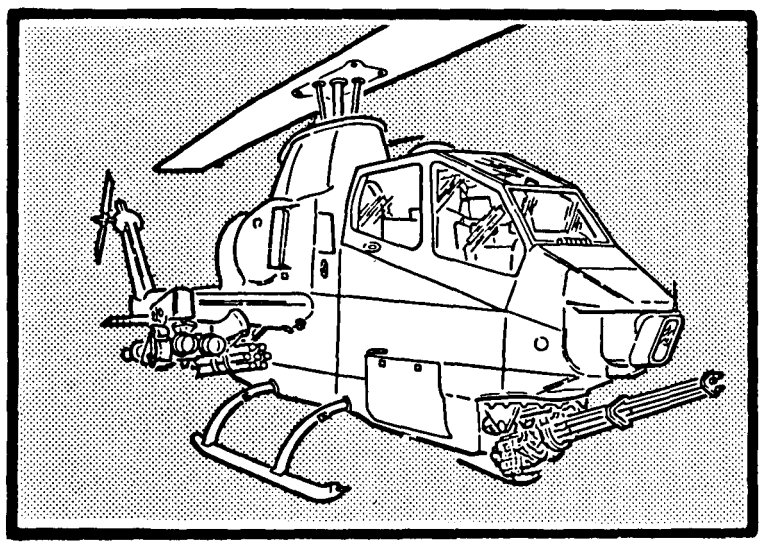
SUPERSEDES COPY DATED APRIL 1981

AVIATION INTERMEDIATE MAINTENANCE MANUAL

FOR

20-MM AUTOMATIC GUN HELICOPTER ARMAMENT SUBSYSTEMS:

M97A4 - PN 9324960 (1005-01-100-4469)
M97A3 – PN 9324699 (1005-01-063-4762)



HEADQUARTERS, DEPARTMENT OF THE ARMY

03 MARCH 1986

TM 9-1090-206-30
C5

CHANGE

NO. 5

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D. C., 12 December 1994

AVIATION INTERMEDIATE MAINTENANCE MANUAL

FOR

20MM AUTOMATIC GUN HELICOPTER

ARMAMENT SUBSYSTEMS

M97A4 - PN 9324960 (1005-01-100-4469)
M97A3 - PN 9324699 (1005-01-063-4762)

1. TM 9-1090-206-30, 3 March 1986, has changed.

2. Remove old pagesandinsertnew pages as indicated below.

3. New or changed material is indicated by a vertical bar in the margin of the page.

Remove Pages	Insert Pages
4-3 and 4-4	4-3 and 4-4
4-117 thru 4-130	4-117 and 4-130
5-1 thru 5-22	5-1 and 5-22
A-1 and A-2	A-1 and A-2
Index 1 and Index 2	Index 1 and Index 2
Index 5 and Index 6	Index 5 and Index 6

4. File this change sheet in front of the publication for reference purposes.

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, ***United States Army***
Chief of Staff

Official:

MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
07673

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TM 9–1090–206–30
C 4

CHANGE

NO. 4

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC 31 December 1992

AVIATION INTERMEDIATE MAINTENANCE MANUAL

FOR

20MM AUTOMATIC GUN HELICOPTER

ARMAMENT SUBSYSTEMS

M97A4 – PN 9324960 (1005–01–100–4469)
M97A3 – PN 9324699 (1005–01–063–4762)

1. TM 9–1090–206–30, 3 March 1986, is changed to include pertinent information pertaining to blue/green modification of pilot and gunner armament control panels for night vision goggle compatibility.

2. Remove old pages and insert new pages as indicated below.

3. New or changed material is indicated by a vertical bar in the margin of the page.

4. New or changed illustrations are indicated by a miniature pointing hand highlighting the change.

Remove Pages	Insert Pages
1–43 and 1–44	1–43 and 1–44
2–79 thru 2–142	2–79 thru 2–142
2–513 thru 2–586	2–513 thru 2–586
2–589 thru 2–632	2–589 thru 2–632
Index 1 thru Index 6	Index 1 thru Index 6

5. File this and any prior change sheet in front of the publication for reference purposes.

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CHANGE

NO. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D.C., 9 August 1991

AVIATION INTERMEDIATE MAINTENANCE MANUAL
FOR
20MM AUTOMATIC GUN HELICOPTER ARMAMENT SUBSYSTEM:
M97A4–PN 9324960 (1005–01–100–4469)(EIC: 4UG)
M97A3–PN 9324699 (1005–01–063–4762)(EIC: 4UF)

NOTE
Change 2 to this manual was special distribution for units equipped with failure isolation shop sets.

1. TM 9–1090–206–30, March 1986, is changed.

2. Remove old pages and insert new pages as indicated below.

3. New or changed material is indicated by a vertical bar in the margin of the page.

4. New or changed illustrations are indicated by a miniature pointing hand highlighting the change.

Remove Pages	Insert Pages
2–237 thru 2–244	2–237 thru 2–244
None	2–244.1 thru 2–244.2
2–245 and 2–246	2–245 and 2–246
2–249 and 2–250	2–249 and 2–250
None	2–334.1 thru 2–334.39/(2–334.40 blank)
None	2–352.1 thru 2–352.8
5–1 thru 5–8	5–1 thru 5–8
5–11 thru 5–16	5–11 thru 5–16
5–19 thru 5–22	5–19 thru 5–22
B–1 and B–2	B–1 and B–2
Index 1 thru Index 6	Index 1 thru Index 6

5. File this change sheet in front of the publication for reference purposes.

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:

PATRICIA P. HICKERSON
Brigadier General, United States Army
The Adjutant General

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TM 9-1090-206-30
C2

CHANGE

NO. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D.C., 28 August 1990

AVIATION INTERMEDIATE MAINTENANCE MANUAL
FOR
20MM AUTOMATIC GUN HELICOPTER ARMAMENT SUBSYSTEM:
M97A4 - PN 9324960 (1005-01-100-4469)
M97A3 - PN 9324699 (1005-01-063-4762)

1. TM 9-1090-206-30, March 1986 is changed to incorporate Electronic Circuit Boards, Failure Isolation Shop Set (FISS).

2. Remove old pages and insert new pages indicated below.

3. New or changed material is indicated by vertical bar in the margin of the page.

4. New or changed illustrations are indicated by a miniature pointing hand highlighting the change.

5. Upon receipt of this change, all references to MOS 68M will be changed to 68J, due to MOS consolidation. Title for 68J is as follows: Aircraft Armament/Missile Systems Repairer.

Remove pages	Insert pages
i thru vi	i thru vi
2-1 and 2-2	2-1 and 2-2
2-17 thru 2-22	2-17 thru 2-22
2-25 thru 2-28	2-25 thru 2-28
2-33 thru 2-36	2-33 thru 2-36
2-45 thru 2-48	2-45 thru 2-48
2-61 thru 2-64	2-61 thru 2-64
2-143 thru 2-146	2-143 thru 2-146
Glossary 1 and Glossary 2	Glossary 1 and Glossary 2
Index 3 and Index 4	Index 3 and Index 4
Cover	Cover

6. File this change sheet in back of the publication for reference purposes.

By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
Chief of Staff

Official:

THOMAS F. SIKORA
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION: To be distributed in accordance with DA Form 12-31E, (Block 485), AVIM Maintenance requirements for TM 9-1090-206-30.

CHANGE

No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 27 JUNE 1988

AVIATION UNIT MAINTENANCE MANUAL

FOR

20-MM AUTOMATIC GUN HELICOPTER ARMAMENT SUBSYSTEM:
M97A2 - PN 9324960 (1005-01-100-4469)
M97A1 - PN 9324699 (1005-01-063-4762)

TM 9-1090-206-30, 3 March 1986, is changed as follows:

1. Remove old pages and insert new pages as indicated below.

2. New or changed material is indicated by a vertical bar in the margin of the page.

3. New or changed illustrations are indicated by a miniture pointing hand highlighting the change and new or changed material on wiring and schematic diagrams is indicated by screening the changed area.

4. Upon receipt of the change, ADVANCE COPY C1 and C2 will be destroyed.

5. Throughout this book obsolete model designators are used. Upon receipt of this change, update all the model designators in the book as follows:

MODEL DESIGNATORS

OBSOLETE	CURRENT	OBSOLETE	CURRENT
M97A1	M97A3	M141	M161
M97A2	M97A4	M138	M147
M22	M26		

REMOVE PAGES	INSERT PAGES	REMOVE PAGES	INSERT PAGES
i thru iv	i thru iv	2-15 thru 2-18	2-15 thru 2-18
1-1 thru 1-8	1-1 thru 1-8	2-33 and 2-34	2-33 and 2-34
1-11 thru 1-14	1-11 thru 1-14	2-39 thru 2-46	2-39 thru 2-46
1-41 thru 1-44	1-41 thru 1-44	2-83 thru 2-86	2-83 thru 2-86
1-53 and 1-54	1-53 and 1-54	2-179 thru 2-182	2-179 thru 2-182
1-59 and 1-60	1-59 and 1-60	2-196.1 thru 2-196.4	2-196.1 thru 2-196.10
1-65 and 1-66	1-65 and 1-66	(2-197 blank)/2-198	2-197 and 2-198
1-69 thru 1-71/ (1-72 blank)	1-69 thru 1-71/ (1-72 blank)	2-199 thru 2-202	2-199 thru 2-202
		None	2-202.1 thru 2-202.32
2-1 thru 2-6	2-1 thru 2-6	2-203 and 2-204	2-203 and 2-204
2-9 and 2-10	2-9 and 2-10	2-241 and 2-242	2-241 and 2-242

TM 9-1090-206-30
C1

REMOVE PAGES	INSERT PAGES
2-255 and 2-256	2-256 and 2-256
2-307 thru 2-310	2-307 thru 2-310
None	2-310.1 and 2-310.2
2-317 and 2-318	2-317 and 2-318
None	2-334.1 thru 2-334.39/ 2-334.40 blank)
2-351 and 2-352	2-351 and 2-352
2-379 and 2-380	2-379 and 2-380
2-743 and 2-744	2-743 and 2-744
2-805 thru 2-808	2-805 thru 2-808
2-845 and 2-846	2-845 and 2-846
3-1 and 3-2	3-1 and 3-2
None	3-2.1 and 3-2.2
3-3 and 3-4	3-3 and 3-4
4-23 thru 4-26	4-23 thru 4-26
None	4-50.1/(4-50.2 blank)
4-51 and 4-52	4-51 and 4-52
None	4-4-80.1/(4-80.2 blank)
4-81 and 4-82	4-81 and 4-82
4-111 and 4-112	4-111 and 4-112
4-129 and 4-130	4-129 and 4-130
4-133 and 4-134	4-133 and 4-134
4-141 thru 4-144	4-141 thru 4-144
A-1 and A-2	A-1 ant A-2
B-1 and B-2	B-1 and B-2
C-11 thru C-14	C-11 thru C-14
None	E-1 thru E-6
Index 3 thru Index 6	Index 3 thru Index 6
None	FO-32.1/(FO-32.2 blank) thru FO-32.15/ (FO-32.16 blank)

6. File this change sheet in back of the publication for reference purposes.

By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
Chief of Staff

Official:

R. L. DILWORTH
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:

To be distributed in accordance with DA Form 12-31A, AVUM Maintenance requirements for Armament Subsystem: Gun Automatic, 20-MM, M97E1

SUMMARY OF WARNINGS AND FIRST AID

This list summarizes critical WARNINGS in this manual. They are repeated here to let you know how important they are. Study these WARNINGS carefully; they can save your life and the lives of soldiers you work with.

WARNING

Personnel performing instructions involving 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 or DEATH.

Read How to Use This Manual, Chapter 1, Chapter 2, Chapter 4, Chapter 5, and perform HELICOPTER ARMAMENT SUBSYSTEM MAINTENANCE SETUP before starting any on helicopter inspection, check, service, alinement or maintenance procedures.

HIGH VOLTAGE

WARNING

Personnel performing maintenance, adjustments, and/or troubleshooting in or around the turret subsystem shall be aware that the system uses and generates HIGH voltages which can cause injury or DEATH. Good practices, considering local conditions, shall be observed.

Care shall be exercised, when using metal tools, that circuits are not shorted. Some circuits have high current capability which when shorted will flash and may cause burns and/or eye injury.

Remove all jewelry and exposed metal objects from body and clothing before performing maintenance, adjustments, and/or troubleshooting to prevent personal injury.

CLEANING

WARNING

Do not use flammable materials near fire or an open flame. Most cleaning materials are harmful or fatal if swallowed. Use adequate ventilation. Avoid contact with skin and prolonged breathing of vapors.

Cleaning solvents evaporate quickly and have a drying effect on the skin. Gloves will be worn to avoid cracks in the skin, and in some cases mild irritation or inflammation of the skin.

Use and disposal of flammable and toxic materials will be in accordance with applicable regulations.

OPERATION, CHECKOUT, AND MAINTENANCE

WARNING

Operation and maintenance of the turret subsystem shall be performed only by authorized personnel. Verify that the HELICOPTER ARMAMENT SUBSYSTEM MAINTENANCE SETUP has been performed prior to performing any on helicopter operation, checkout, or maintenance procedures. All safety precautions and regulations shall be observed. Personnel shall remain clear of hazardous area bounded by safety barricade.

When retaining ring is removed, pin may fly out and cause injury.

If retaining ring is not properly installed, track lock pin may fly out and cause injury.

Wear suitable eye protection when installing bolt head locks.

Observe all safety precautions and regulations. Open turret drive motor and turret stow circuit breakers whenever marks or measurements are being made on turret.

Verify all power is off before performing any corrective action.

Make sure that the turret system, the rockets, and the TOW missile launchers are downloaded and that no live rounds remain in gun or feeder before performing any checks or procedures.

All repair work on polycarbonate (Lexan) material will be performed in a hood-vent area or outside.

When performing any operational check or procedure, all safety precautions and regulations shall be observed. Open turret drive motor and turret stow circuit breakers whenever adjustments are being performed on emergency stow switches.

BORESIGHTING

WARNING

Make sure all personnel are clear of TMLs and turret before MODE SELECT switch on the TOW control panel is positioned to STBY TOW. Outboard wing pylon and turret may activate and cause injury.

Before setting LCHR BORESIGHT switch to left or right, keep hands clear of articulating outboard ejector rack assembly. Racks may move rapidly up or down.

Before setting LCHR BORESIGHT switch to OFF, keep hands clear of articulating outboard ejector rack. Racks may move rapidly up or down.

FIRST AID

See FM 21-11 for artifical respiration and first aid procedures. .

TECHNICAL MANUAL
TM 9-1090-206-30

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C. 3 March 1986

Aviation Unit Maintenance Manual
For
20-MM AUTOMATIC GUN HELICOPTER ARMAMENT SUBSYSTEM
M97A4–PN 9324960 (1005-01-100-4469)
M97A3–PN 9324699 (1005-01-063-4762)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a 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 Armament, Munitions and Chemical Command, Attn: AMSMC-MAS, Rock Island, IL 61299-6000. A reply will be furnished to you.

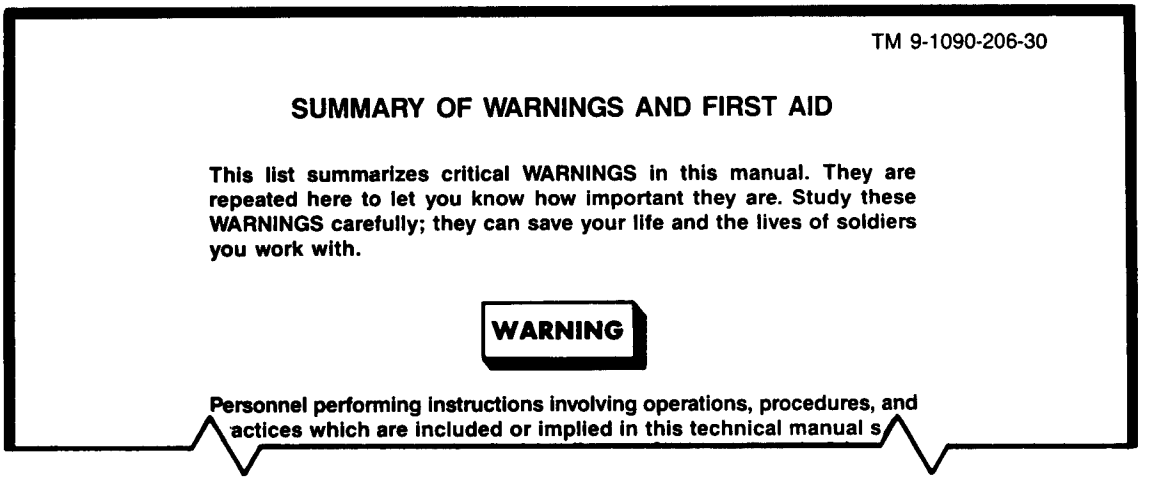
* This manual supersedes TM 9-1090-206-30 dated 26 January 1981.

HOW TO USE THIS MANUAL

This manual covers Aviation Intermediate Maintenance (AVIM) level maintenance support tasks for the 20-mm Automatic Gun Helicopter Armament Subsystems: M97A4 and M97A3.

Use the front cover locators and edge marked pages to quickly find parts of the manual identified on the cover.

Before starting any inspection or maintenance procedures, read HOW TO USE THIS MANUAL, CHAPTER 1 —GENERAL INFORMATION, CHAPTER 2—AVIATION INTERMEDIATE MAINTENANCE INSTRUCTIONS, CHAPTER 4—ALINEMENT AND BORESIGHTING PROCEDURES USING BORESIGHT ASSEMBLY GROUND SUPPORT EQUIPMENT (BAGSE), and CHAPTER 5—COMPOSITE ALIGNMENT AND BORESIGHTING PROCEDURES; and for any on helicopter inspection or maintenance perform HELICOPTER ARMAMENT SUBSYSTEM MAINTENANCE SETUP, TM 9-1090-206-20-1 or TM 9-1090-206-20-2.



TM 9-1090-206-30

SUMMARY OF WARNINGS AND FIRST AID

This list summarizes critical WARNINGS in this manual. They are repeated here to let you know how important they are. Study these WARNINGS carefully; they can save your life and the lives of soldiers you work with.

WARNING

Personnel performing instructions involving operations, procedures, and actices which are included or implied in this technical manual s

SUMMARY OF WARNINGS AND FIRST AID lists the warnings and first aid information in this manual. These warnings contain additional information about things that could hurt or kill personnel. The maintenance task may have a slightly different version of these warnings.

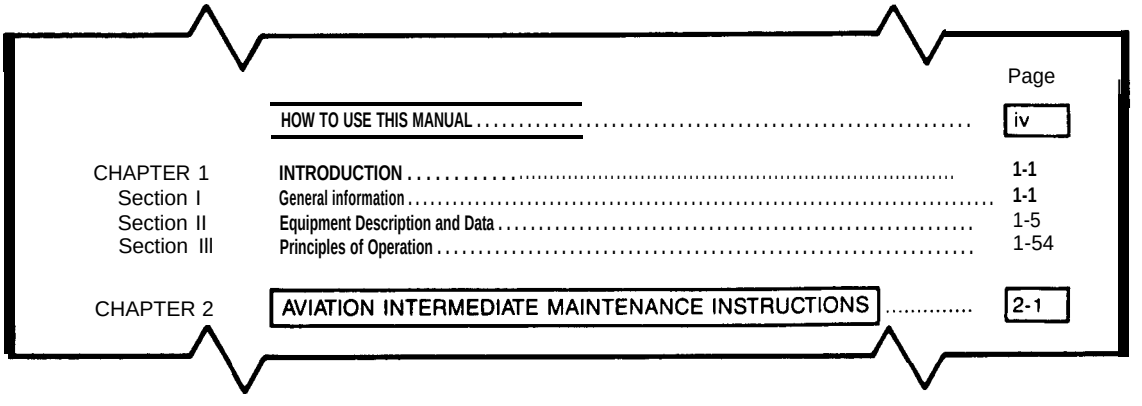


TABLE OF CONTENTS lists the chapters, sections, and appendixes in this manual. It also lists the pages where chapters, sections, and appendixes can be found.

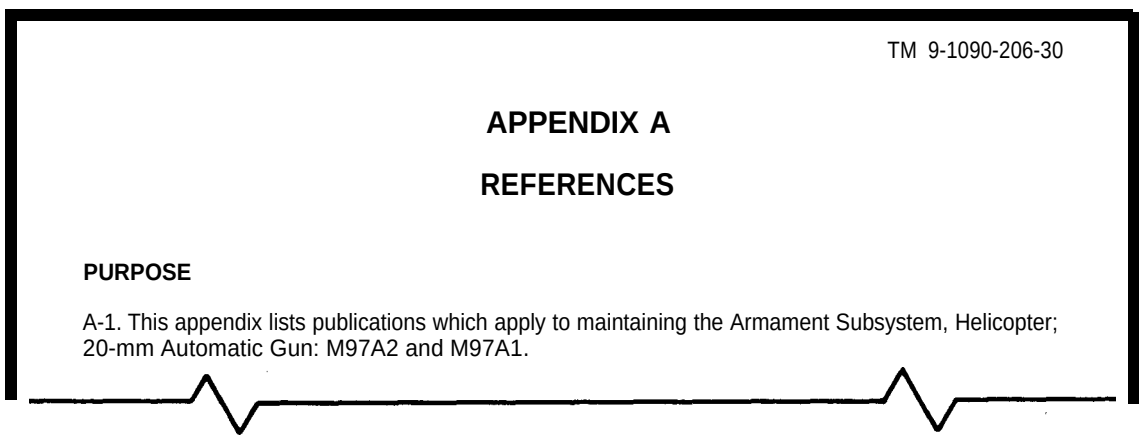
CHAPTER 1 covers General information, Equipment Description and Data, and Principles of Operation of the 20-mm Automatic Gun Helicopter Armament Subsystems:M97A4 and M97A3.

CHAPTER 2 contains information for Service Upon Receipt, Preventive Maintenance Checks and Services, General Maintenance Instructions, Turret Subsystem Troubleshooting, Line Replaceable Unit Testing and Troubleshooting, and maintenance tasks authorized to be performed at the Aviation Intermediate Maintenance (AVIM) level.

CHAPTER 3 contains auxiliary equipment maintenance tasks authorized to be performed at the AVIM level.

CHAPTER 4 contains boresighting procedures using Boresight Assembly Ground Support Equipment (BAGSE) for use in boresighting and alinement of the 20-mm Automatic Gun Helicopter Armament Subsystem: M97A2.

CHAPTER 5 contains composite boresighting procedures for use in boresighting and alinement of the 20-mm Automatic Gun Helicopter Armament Subsystem: M97A1.



TM 9-1090-206-30

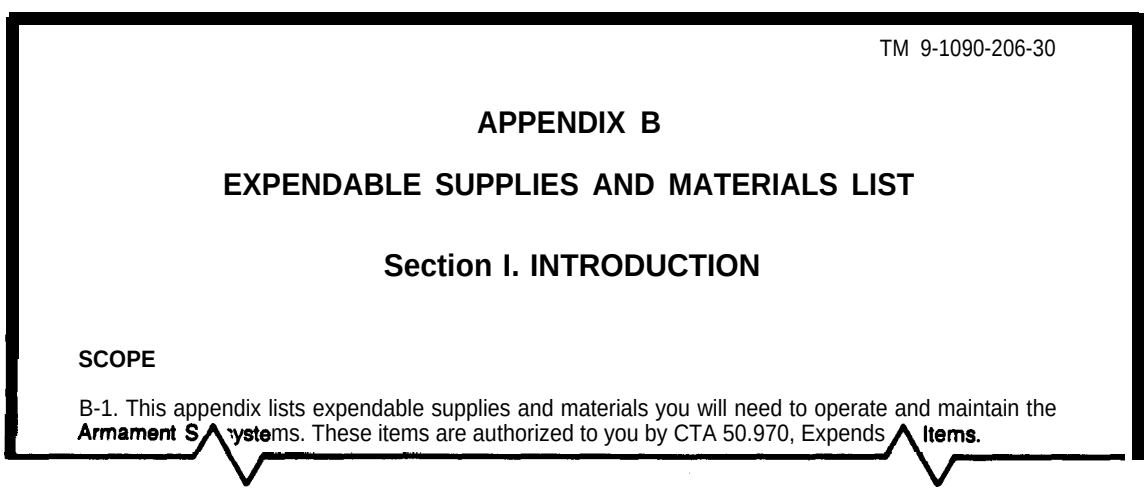
APPENDIX A

REFERENCES

PURPOSE

A-1. This appendix lists publications which apply to maintaining the Armament Subsystem, Helicopter; 20-mm Automatic Gun: M97A2 and M97A1.

APPENDIX A lists references such as technical manuals and other publications available to and required by maintenance personnel.



TM 9-1090-206-30

APPENDIX B

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

SCOPE

B-1. This appendix lists expendable supplies and materials you will need to operate and maintain the Armament Subsystems. These items are authorized to you by CTA 50.970, Expendable Items.

APPENDIX B lists expendable supplies and materials used to maintain or repair the 20-mm Automatic Gun Helicopter Armament Subsystems: M97A2 and M79A1.

TM 9-1090-206-30

APPENDIX C

ILLUSTRATED LIST OF MANUFACTURED ITEMS

INTRODUCTION

C-1. This appendix includes complete instructions for making items authorized to be manufactured or fabricated by aviation intermediate maintenance personnel. A part number index in alphanumeric order is provided for cross-referencing the part number of the item to the figure which cover fabrication criteria. All bulk materials needed for manufacture of an item are listed by part number or specification number on the illustration.

APPENDIX C lists and provides instructions to make items authorized to be manufactured or fabricated by aviation intermediate maintenance personnel.

TM 9-1090-206-30

APPENDIX D

TORQUE LIMITS

GENERAL

D-1. This appendix contains selected general information and methods for applying torque. Special torque values and sequences are indicated in the task relating to a specific part. For complete general information and instructions for applying torque, refer to TM 55-1500-204-25/1.

APPENDIX D contains selected general information and methods for applying torque.

TM 9-1090-206-30

GLOSSARY

AADS	Airspeed and Direction Sensor
ACQ	Acquisition
ADS	Air Data Subsystem
ALT	Airborne Laser Tracker
AP	Articulated Pylon
ATS	Acquisition/Track/Stow (Switch on, SHC)
ATTK	Attack (Flag in PSI, Light in TSU)
AZ	Azimuth

GLOSSARY gives the meanings of abbreviations and unusual terms found in the manual.

TM 9-1090-208-30

INDEX

INDEX contains an alphabetical list of important information. Usually each subject is presented in more than one way to make information easir to find.

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATION

SOMETHING WRONG WITH THIS PUBLICATION?

THEN JOT DOWN THE DOPE ABOUT IT ON THIS FORM, CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE

BE EXACT: PIN–POINT WHERE IT IS

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

DA FORM 2028-2 is used to recommend improvements or to report errors found in the manual.

TM 9-1090-206-30

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 Lb.
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches
1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

TEMPERATURE

5/9 (°F - 32) = °C
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius

METRIC SYSTEM AND EQUIVALENTS provides information to convert between English and Metric equivalents.

USING YOUR MANUAL ON THE JOB

Like any tool, the best way to use this manual is to practice using it. Knowing how to use this manual will save both time and money.

To help you find the information you need, each chapter and section of this manual begins with an index which lists the contents of the chapter and/or section by title and page/paragraph number.

Where do you start?

A fault is discovered in one of two ways: during normal operation; or during normal maintenance such as inspection, alinement, PMCS, or other scheduled testing. The symptoms of the fault may be common or unusual, but identification of fault symptoms is the first step in the troubleshooting process.

Entry into the troubleshooting process is based on observed fault symptoms. It is important that fault symptoms be identified as accurately as possible. System and component level faults will usually be identified at the AVUM level. Isolation to a specific component may continue at the AVIM level. Selected fault symptom indexes are provided which relate to AVIM corrective actions. A section called Line Replaceable Unit Testing and Troubleshooting is provided to isolate faults within a specific line replaceable unit (LRU).

How do you fix a problem-A Quick Overview

1. Find the correct maintenance task in this manual. To do this, pick a key word from the item to be replaced or repaired. Lookup the word in the INDEX, which will give you the page number of the task.

2. Turn to the task and read the entire task carefully before starting. Pay attention to warnings and cautions. Get the equipment, supplies and any other personnel needed. If the task requires part replacement refer to the Repair Parts and Special Tools List (RPSTL), TM 9-109O-2O6-23P

3. Start with step 1 in the task and do each step in order in some referenced tasks, one or more steps may have been completed. If so, proceed to the next step.

Finding a Task

Using another manual could result in reference to a task in this manual. For example, you were referenced to this manual to find the task REMOVAL/INSTALLATION OF AZIMUTH RESOLVER. To find where this task is located refer to the INDEX at the back of this manual.

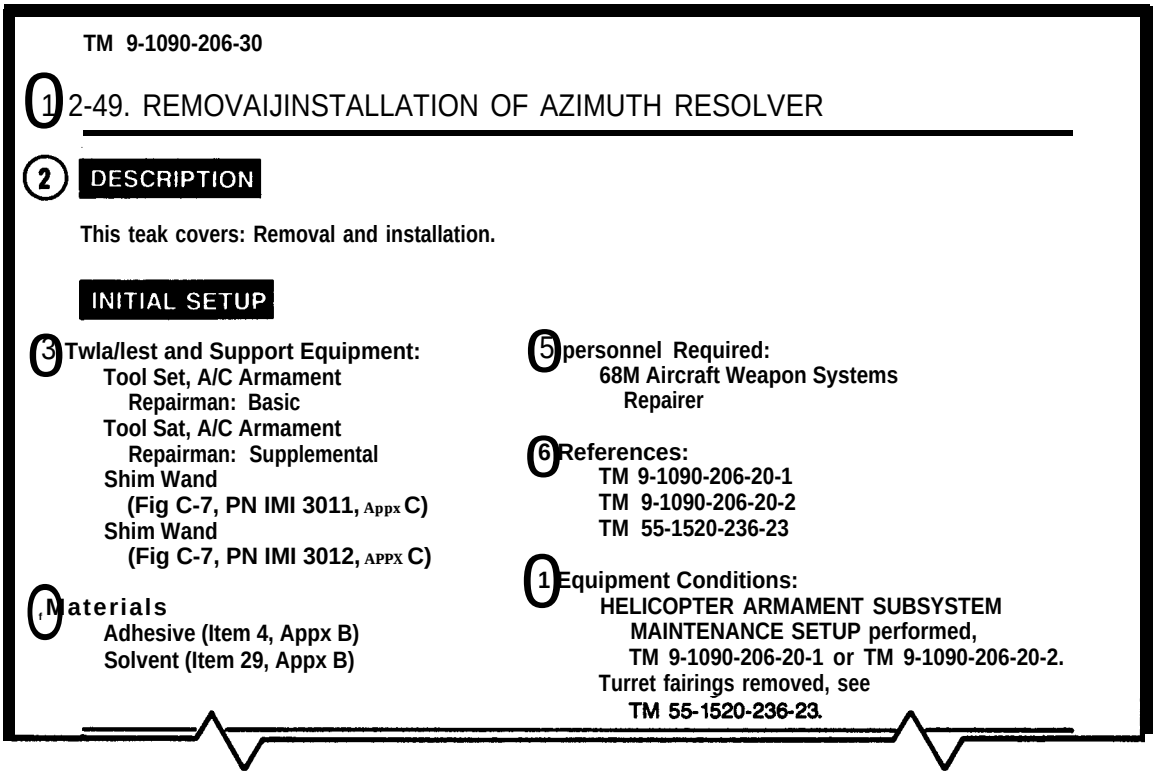
Using the INDEX

The INDEX lists each item under one or more headings. The task, REMOVAL/INSTALLATION OF AZIMUTH RESOLVER could be found:

Under “A”
Azimuth Resolver—Removal/Installation, 2-49
Under “R”
Removal/installation of Azimuth Resolver, 2-49
Turn to paragraph 2-49.

Beginning the Task

When you find paragraph 2-49, read the top half of the page. See the example below with its legend.



TM 9-1090-206-30

1 2-49. REMOVAIJINSTALLATION OF AZIMUTH RESOLVER

2 DESCRIPTION

This teak covers: Removal and installation.

INITIAL SETUP

3 Twla/lest and Support Equipment:
Tool Set, A/C Armament
Repairman: Basic
Tool Sat, A/C Armament
Repairman: Supplemental
Shim Wand
(Fig C-7, PN IMI 3011, Appx C)
Shim Wand
(Fig C-7, PN IMI 3012, APPX C)

4 Materials
Adhesive (Item 4, Appx B)
Solvent (Item 29, Appx B)

5 personnel Required:
68M Aircraft Weapon Systems
Repairer

6 References:
TM 9-1090-206-20-1
TM 9-1090-206-20-2
TM 55-1520-236-23

7 Equipment Conditions:
HELICOPTER ARMAMENT SUBSYSTEM
MAINTENANCE SETUP performed,
TM 9-1090-206-20-1 or TM 9-1090-206-20-2.
Turret fairings removed, see
TM 55-1520-236-23.

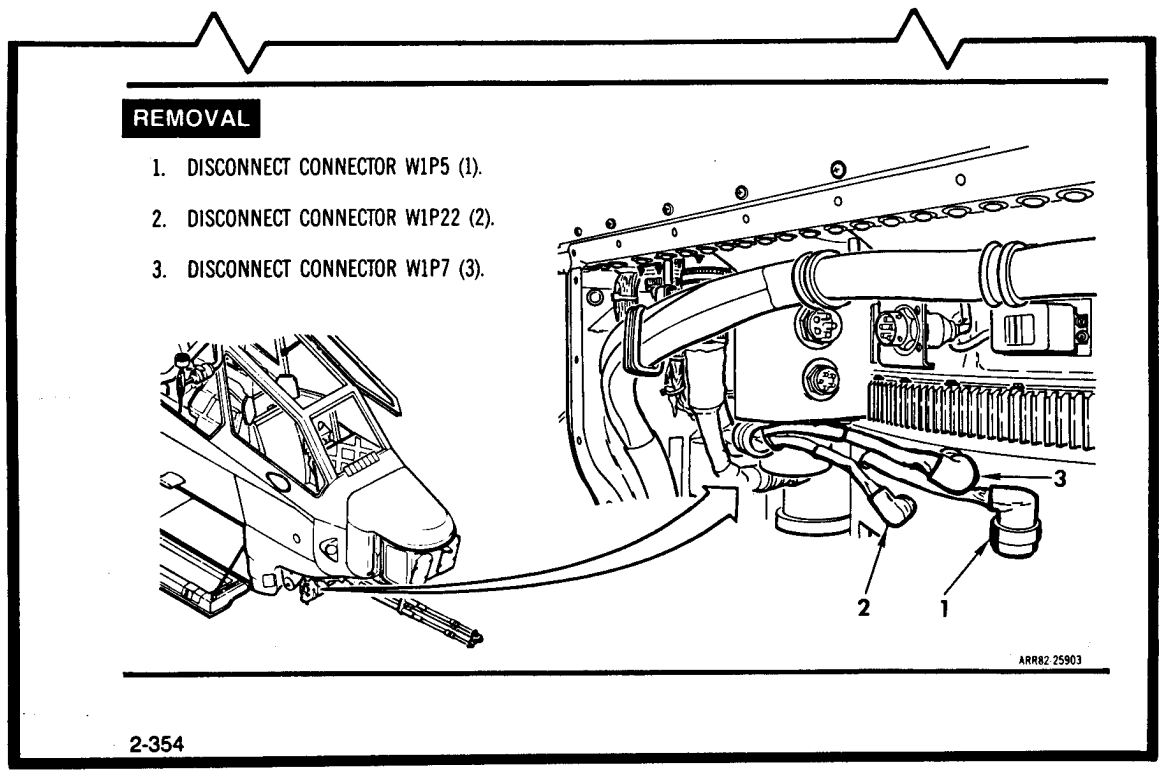
Legend to Example

1.	Title	This is the paragraph number and name of the task.
2.	Description	This describes the overall actions you will perform.
3.	Tools	These are the tools and equipment you will need to complete the task. Tools found in the basic and supplemental A/C armament repairman tool sets will not be listed separately.
4.	Materials	These are the consumable materials you will need to do the task. Consumable materials are listed in the Expendable Supplies and Materials List (Appendix B). Use the Repair Parts and Special Tools List (RPSTL) to order the parts you need for the task.
5.	Personnel Required	This tells you the personnel needed to perform the task.
6.	References	These are other manuals that are required in the task.
7.	Equipment Conditions	This describes the condition the equipment must be in before you start the task.

Using the Task Steps

Note the task is presented in step-by-step illustrated instructions. The numbered steps in capital letters tell WHAT to do; the lettered steps tell HOW to do it. If you are experienced, you may need to read only the numbered steps. If you are not experienced, you will want to read all the steps.

Below is the bottom half of the first page of the task REMOVAL/INSTALLATION OF AZIMUTH RESOLVER. As you read step 1, match each numbered part in the instruction with the same number in the illustration. The numbers in the illustrations relate only to the instructions next to it. It is important to do each step in the order given. Note the boxed word REMOVAL in the top left corner. It labels one of the major actions for this task. In this and other tasks, you could see boxed words like INSTALLATION, CLEANING, INSPECTION, and ASSEMBLY.



DEFINITION OF TASK TERMS

Warnings, Cautions, and Notes

Pay attention to all warnings and cautions within the task. Ignoring a warning could cause death or injury to personnel. Ignoring a caution could cause damage to equipment. Notes contain facts to make the task easier. Both warnings and cautions always appear before the steps to which they apply.

WARNINGS: Call attention to conditions, practices, or procedures which could kill or injure personnel. Warnings are also listed in front of manual.

Do not use flammable materials near fire or an open flame. Most cleaning materials are harmful or fatal if swallowed. Use adequate ventilation. Avoid contact with skin and prolonged breathing of vapors.

CAUTIONS: Call attention to conditions, practices, or procedures which could damage equipment.

Do not rotate turret after installing allen wrench in resolver gear.

NOTES: Contain essential information of special importance, interest, or aid in job performance to make the task easier.

NOTE

This group of attaching hardware mounts turret to airframe hard points and is the first to be installed.

Kinds of Tasks

"Removal/Installation _____."
Tasks which remove components and install components. They can be used as tasks which provide access to components or as tasks which replace defective components.

"Repair _____."
Tasks which disassemble, clean, inspect, repair, and assemble components.

"_____ Test"
Tasks which test the functions of the armament subsystem for proper operation.

"Checkout _____."
Tasks which check components for proper operation.

COMMENTS ON TASKS

The following comments apply to all tasks.

1. Consumable materials are listed under materials,

2. Removed components must be cleaned, inspected, and reinstalled if found to be serviceable.

3. Cleaning and inspection must be done according to general maintenance instructions.
4. A new component must be installed if inspection indicates a removed component is defective.
5. Defective components must be discarded or sent to the next higher maintenance level.

CHAPTER 1

INTRODUCTION

CHAPTER CONTENTS

Section I. GENERAL INFORMATION

Section Contents

SCOPE

1-1. This manual is provided for your use in performing aviation intermediate maintenance of the 20-mm Automatic Gun Helicopter Armament Subsystems, M97A4 and M97A3.

MAINTENANCE FORMS, RECORDS, AND REPORTS

1-2. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 736-751, Functional Users Manual for the Army Maintenance Management System - Aviation (TAMMS-A).

DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

1-3. Refer to TM 750-244-1-5 for instructions pertaining to destruction of army materiel to prevent enemy use.

PREPARATION FOR STORAGE OR SHIPMENT

1-4. Preservation, packaging, and preparation for storage will be in accordance with TM 740-90-1 and the local directives of the commands concerned.

QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

1-5. Information not available.

NOMENCLATURE CROSS REFERENCE LIST

1-6. A cross reference of the official and common names of the components of the 20-mm Automatic Gun Helicopter Armament Subsystems M97A4 and M97A3 is shown below. Common names will be used throughout this manual.

Common Name	Official Name
Actuator	Actuator Cam
Adjusting Plate	Adjusting Access Cover
Airspeed Transducer	Motion Transducer
Armament Subsystem	20-mm Automatic Gun Helicopter Armament Subsystem M97A4
Armament Subsystem	20-mm Automatic Gun Helicopter Armament Subsystem M97A3
Azimuth Drive	Rotary Electro-Mechanical Actuator
Azimuth Drive Motor	Direct Current Motor
Azimuth Proximity Switch	Azimuth Switch Assembly
Azimuth Resolver	Electrical Resolver
Azimuth Stow Switch	Rotary Switch
Azimuth Tachometer	Tachometer Generator
Bearing Retainer	Bearing Retainer Assembly
Booster Motor	Direct Current Motor
Cam Link Bracket	Support Bracket Assembly
Elevation Clutch	Positive Clutch

Common Name	Official Name
Elevation Drive Motor	Direct Current Motor
Elevation Proximity Switch	Elevation Switch Assembly
Elevation Stow Switch	Turret Switch
End Plate	End Plate Assembly
Feed Chute	Ammunition Chute
Fire Control Computer	Digital Fire Control Computer M26
Firing Contact	Firing Contact Assembly
Firing Pin Spring	Breech Assembly Spring
Gun Control Unit	Gun Control Assembly
Gun Drive	Rotary Electro-Mechanical Actuator
Gun Drive Motor	Direct Current Motor
Gunner Armament Control Panel	Gunner Armament Control Assembly
Head Up Display Subsystem	Head Up Display Subsystem Helicopter Sight M76
Helmet Sight Subsystem	Helmet-Directed Fire Control Subsystem M136
Interface Control Unit	Interface Control Unit Assembly
Lanyard	Single Leg Wire Rope Assembly
Locking Block	Machine Breech Lock
Mounting Clamp	Rim Clenching Clamp
M197 Gun	20-mm Three Barrel High Rate Automatic Gun M197
M89E1 Feeder	Automatic Gun Feeder Assembly M89E1
Pilot Armament Control Panel	Pilot Armament Control Assembly
Rear Support	Rear Support Assembly
Recoil Adapter	Linear Actuating Recoil Adapter

Common Name	Official Name
Reflex Sight	Pilot Reflex Sight M73
Rocket Management Subsystem	Rocket Management System M138
Rotor	Rotor Assembly
Rotor Housing	Rotor Housing Subassembly
Rounds Totalizer	Electrical Counter
Rubber Stop	Mounting Stop
Saddle	Weapon Saddle
Seal Assembly	Retainer Seal
Shim	Plain Solid Disk
Shim	Ring Spacer
Slider	Linear Actuating Slide Assembly
Tachometer	Tachometer Generator
Thermistor	Fixed Film Resistor
Turret	Turret Assembly
Turret Buffer Amplifier	Turret Buffer Amplifier Assembly
Turret Control Unit	Turret Control Assembly
Upper Support	Matched Support Assembly

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

1-7. If your armament subsystem needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Put it on an SF368 (Quality Deficiency Report). Mail it to us at Commander, U.S. Army Armament, Munitions and Chemical Command, ATTN: AMSMC-QAD, Rock Island, IL 61299-6000. We'll send you a reply. Instructions for preparing EIRs are provided in DA PAM 738-751.

CORROSION PREVENTION AND CONTROL (CPC)

1-8. It is important that any corrosion problems with items contained in this technical manual be reported so that the problem can be corrected and improvements can be made to prevent the problem in the future.

While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials such as rubber and plastic. Unusual cracking, softening, swelling, or breaking of these materials may be a corrosion problem.

If a corrosion problem is identified, it can be reported using SF368, Quality Deficiency Report. The form should be submitted to: Commander, U.S. Army Armament, Munitions and Chemical Command, ATTN: AMSMC-QAD/Customer Feedback Center, Rock Island, IL 61299-6000. Use of key words such as corrosion, rust, deterioration, or cracking will assure that the information is identified as a CPC problem.

Section II. EQUIPMENT DESCRIPTION AND DATA

EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

1-8. The characteristics, capabilities, and features of each subsystem of armament subsystem M97A4 are listed below. Refer to TM 9-1090-206-20-2 for additional information pertaining to armament subsystem M97A3.

ROCKET MANAGEMENT SUBSYSTEM (RMS)

Wing-Mounted
Electrically Powered
Pilot Controlled
Selective Use of Mixed Rocket Inventory
Remote Set of Rocket Fuzes
Choice of Launch Mode, Rate, and Number of Rockets
Continuous Display of Rockets Remaining by Type and Zone Location

HELMET SIGHT SUBSYSTEM (HSS)

Pilot/Gunner Direction of Turret Subsystem Weapon Fire
Pilot/Gunner Direction of Telescopic Sight Unit for Rapid Acquisition of a Missile Target

HEAD UP DISPLAY SUBSYSTEM (HUD)

Pilot Direction of Helicopter for Rocket and Fixed-Forward Weapon Fire
Provides Head Up Display of TOW Prelaunch and Postlaunch Constraints, and Direct and Indirect Rocket Aim Points
Provides Head Up Safety of Flight Display of Engine Torque, Airspeed, Attitude, Magnetic Heading, and Range

FIRE CONTROL COMPUTER (FCC)

Optimizes Characteristics of Each Subsystem for Maximum Effectiveness
Provides Rocket and M197 Gun Fire Control Solutions for Projectile Ballistics, Aircraft Motion, Air Data, Range, and Target Motion

AIR DATA SUBSYSTEM (ADS)

Air Data Input to Fire Control Computer
Provides Pilot Display of Low Airspeed in Forward, Rearward, and Sideways Flight

TURRET SUBSYSTEM

Chin-Mounted
Electrically Powered
Pilot/Gunner Controlled
Provides Suppressive Fire Against Point and Area Targets
Accepts 7.62-mm M134 Gun, 20-mm M197 Gun, or 30-mm XM230E1 Cannon (current application limited to 20-mm configuration)
Automatic Burst Limit or Optional Fire-Out
Interlocks Prevent Projectile Interaction During Combined Firing of Missiles, Rockets, and M197 Gun.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

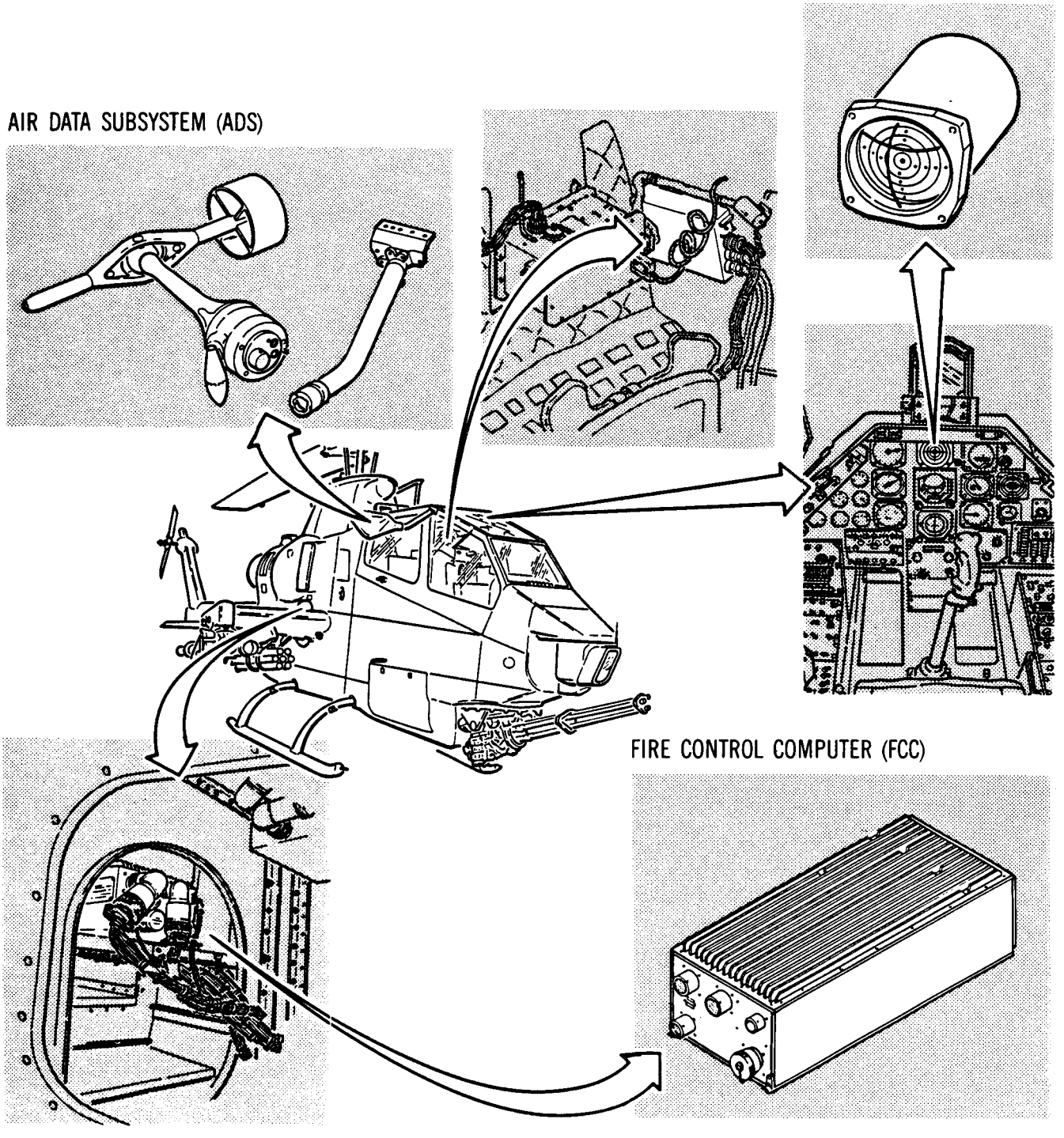
1-9. The armament subsystem provides a mix of point and area target weapons. Each munition is used against the target it is best suited to engage. The integrated fire control makes maximum effective use of each type of ordnance carried. The RMS provides pilot selectivity in use of a mixed rocket inventory. The pilot can choose the best warhead for attack and can choose the number of rockets and launch mode (singles, pairs, multiple pairs). The pilot can remote set fuzes (penetration delay or time of function, i.e., range for sub-munitions) prior to attack. During the mission, the display indicates the number of rounds remaining by type and number. The pilot can manually enter range to target or can use range as provided by the laser rangefinder and updated by the FCC.

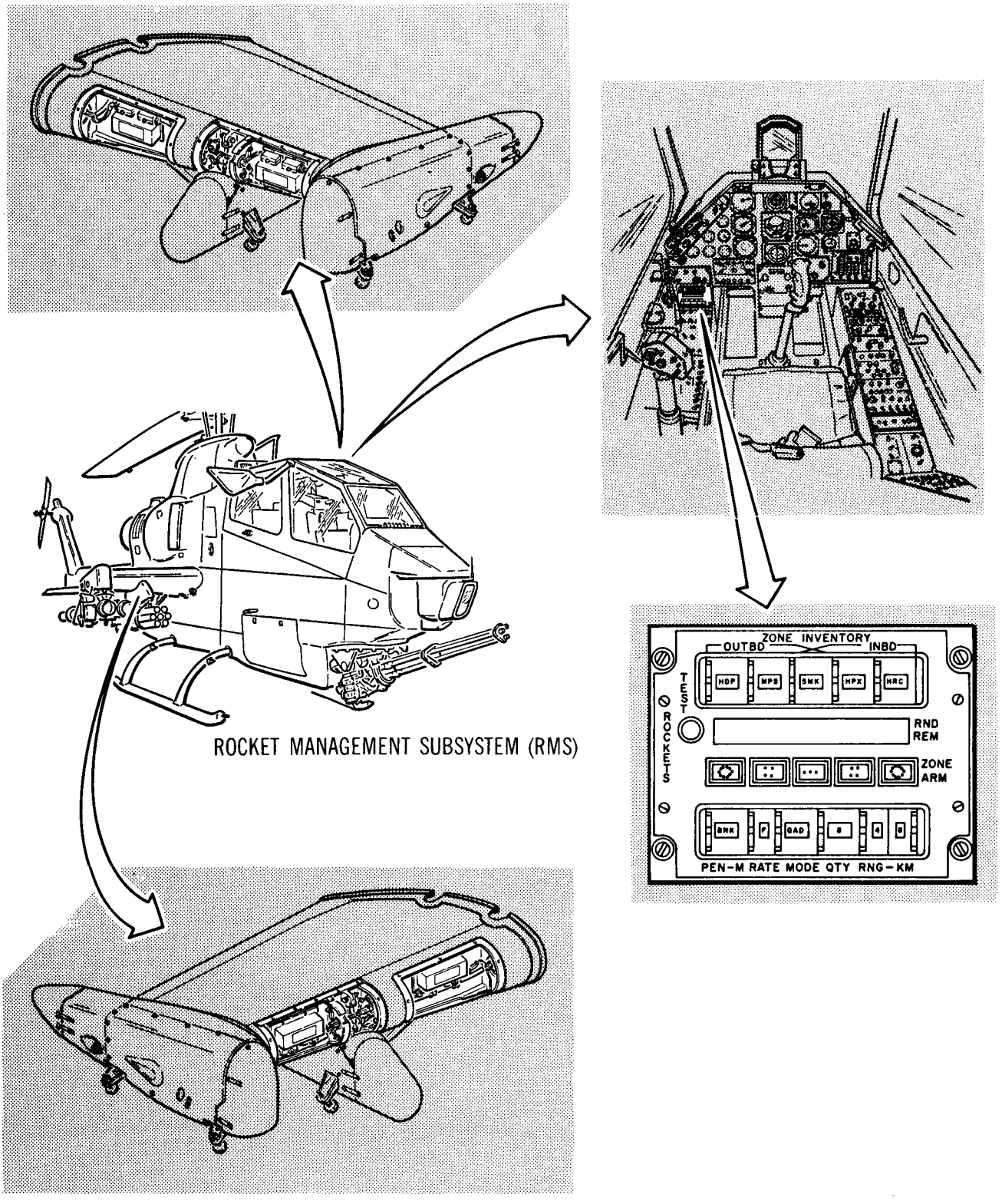
In conjunction with the HUD and computer-driven rocket firing reticles, accurate fire (direct and indirect to 6000 meters) is achievable. Indirect fire is equally achievable day or night as long as the gunner can observe the target with night vision goggles or external illumination.

The turret subsystem provides accurate suppressive fire capability against point and area targets. Provides flexible operation with helmet sight direction by pilot or gunner and precision tracking by gunner using the telescopic sight unit (TSU) of the M65 TOW Guided Missile System. Provides automatic burst limit or optional fire-out capability.

The FCC optimizes the characteristics of each subsystem for maximum effectiveness. Fire control solutions for rockets and M197 gun include: projectile ballistics, aircraft motion, air data, range, and target motion. System control and logic is designed for rapid simple operation in nap-of-the-earth (NOE) environment. The HUD displays TOW envelopes, direct and indirect rocket aim points, airspeed, altitude, heading, and range. The TSU displays weapon status and range. Momentary fire interlocks prevent projectile interaction during combined firing of missiles, rockets, and M197 gun.

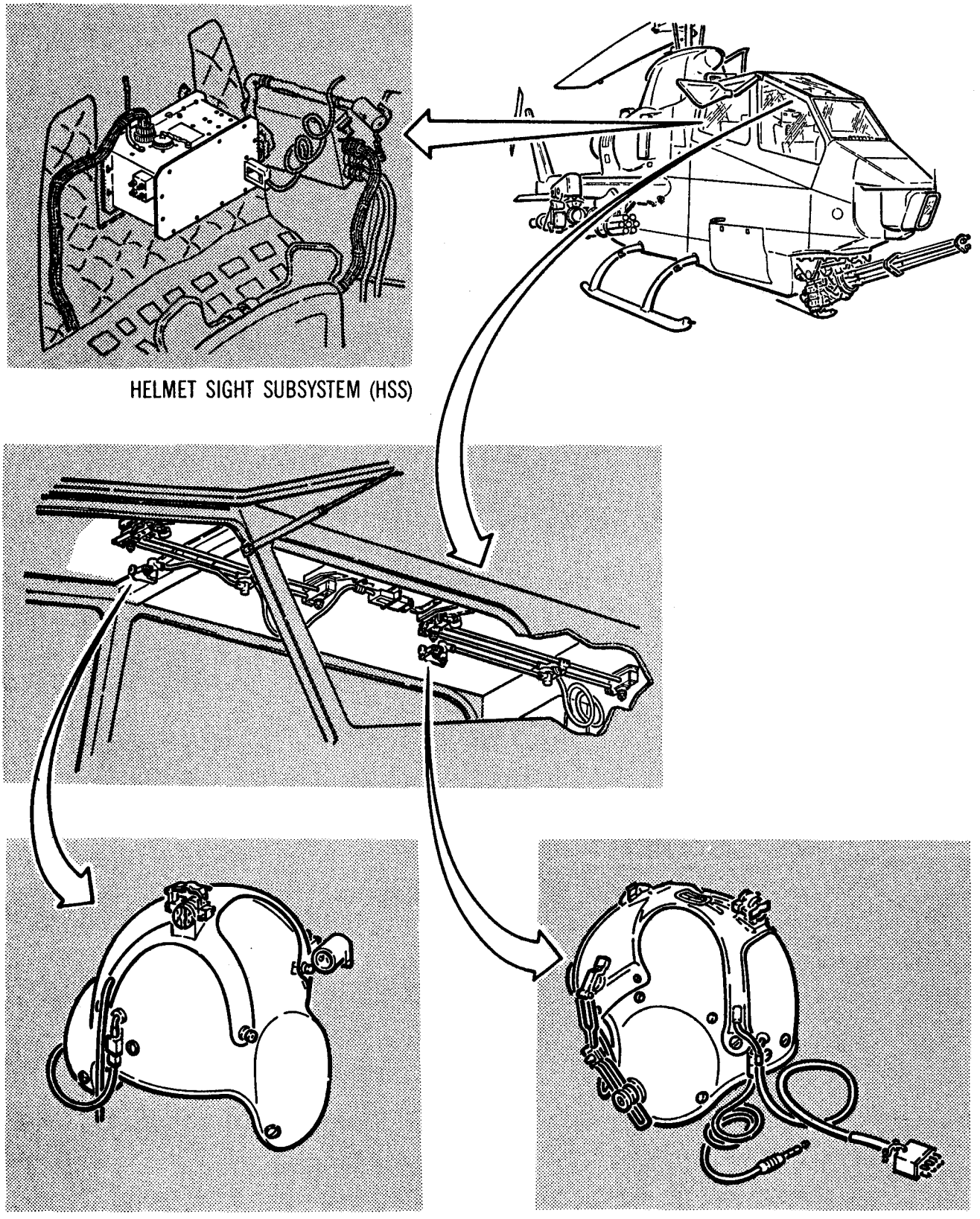
Armament subsystem M97A4 consists of the following major components which are shown mounted in the AH-1E/F helicopter. Refer to TM 9-1090-206-20-2 for additional information pertaining to armament subsystem M97A3.





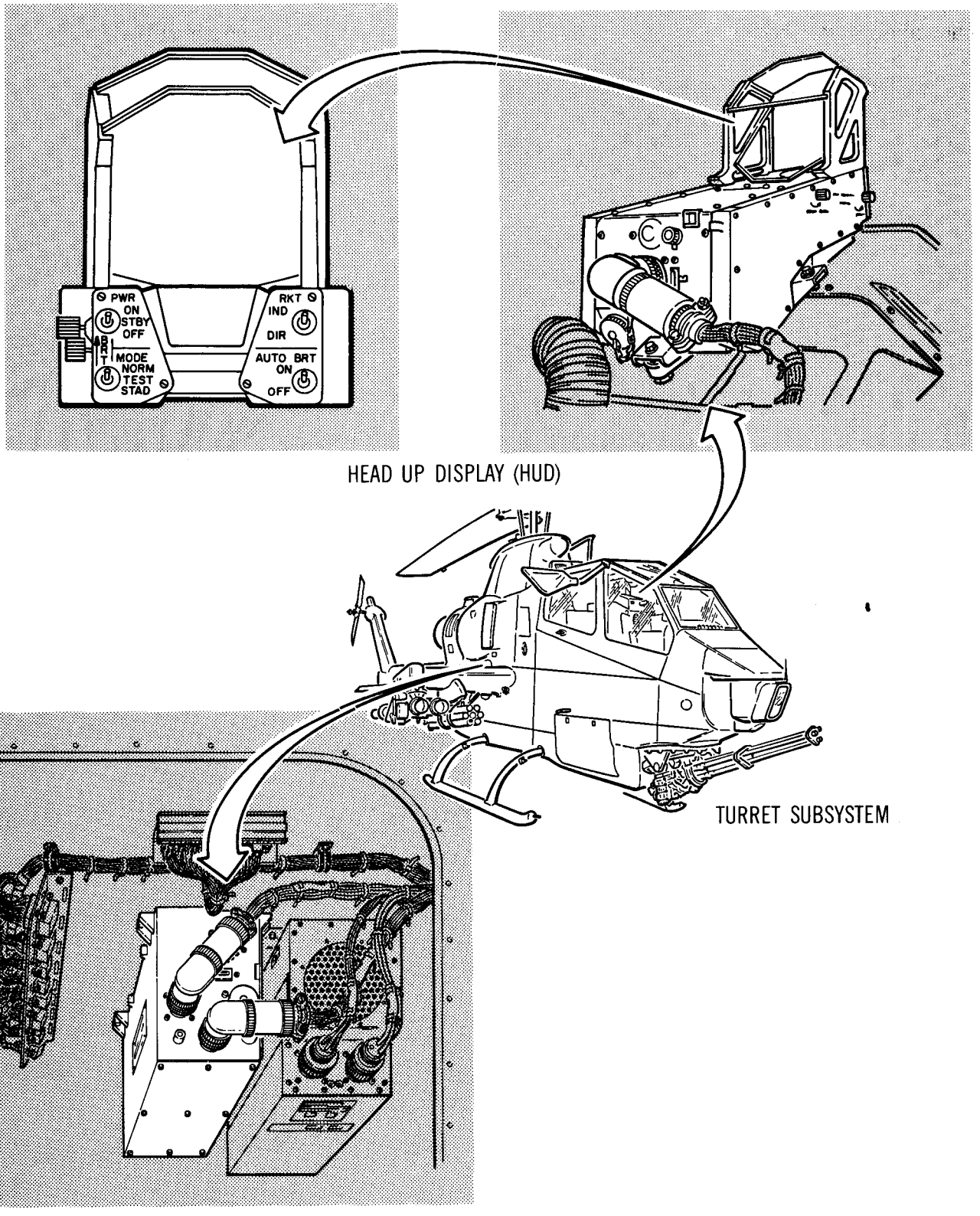
ROCKET MANAGEMENT SUBSYSTEM (RMS)

ARR83-1502



HELMET SIGHT SUBSYSTEM (HSS)

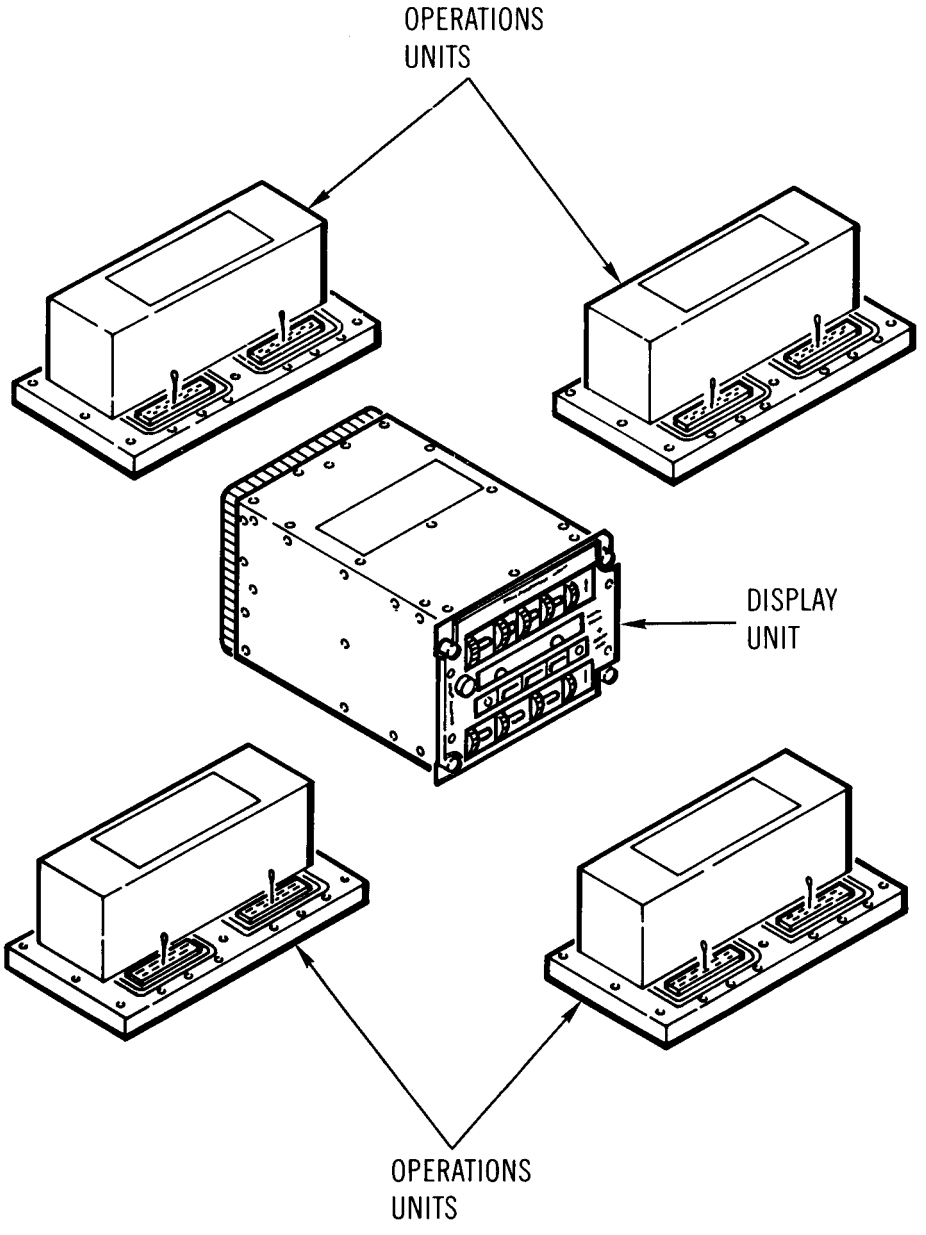
ARR83-1503


PWR
ON
STBY
OFF
BRT
MODE
NORM
TEST
STAD
RKT
IND
DIR
AUTO BRT
ON
OFF
HEAD UP DISPLAY (HUD)
TURRET SUBSYSTEM

ARR83-1504

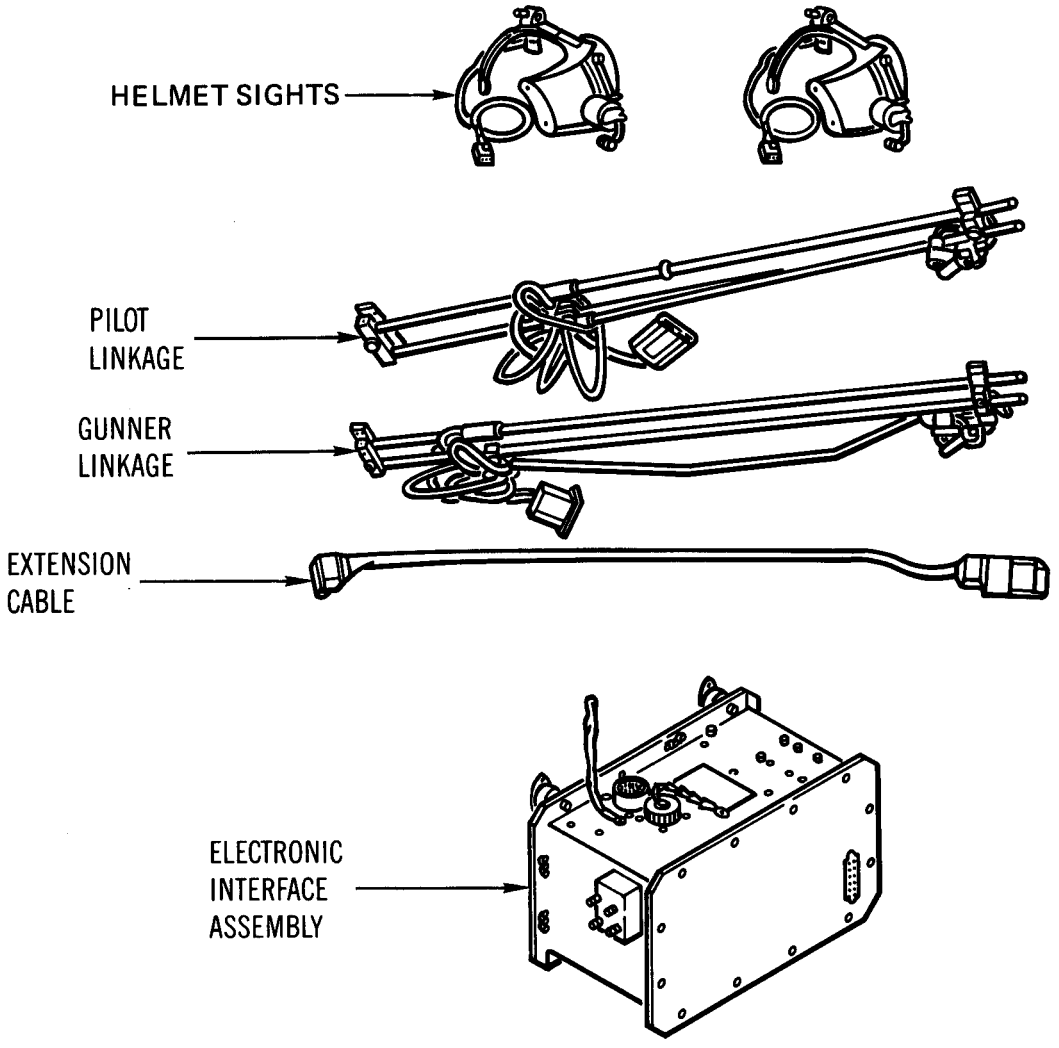
ROCKET MANAGEMENT SUBSYSTEM

Consists of a display unit, four operations units, (one at each wing stores station; current Army configuration utilizes two operations units on inboard stations), interconnecting electrical components, and rocket launchers. The RMS uses 2.75-inch folding fin aerial rockets (FFAR) with MK40 or MK66 rocket motors as a light anti-personnel/assault weapon. The rocket control and display unit permits the pilot to select the launcher zone containing the desired type of rocket and set the warhead fuze. The pilot can program the launcher for rate, mode, and quantity of rockets to be fired. The rocket control and display unit provides a continuous display of rockets remaining by type and zone location. Refer to TM 9-1090-207-13&P for additional information pertaining to RMS components.



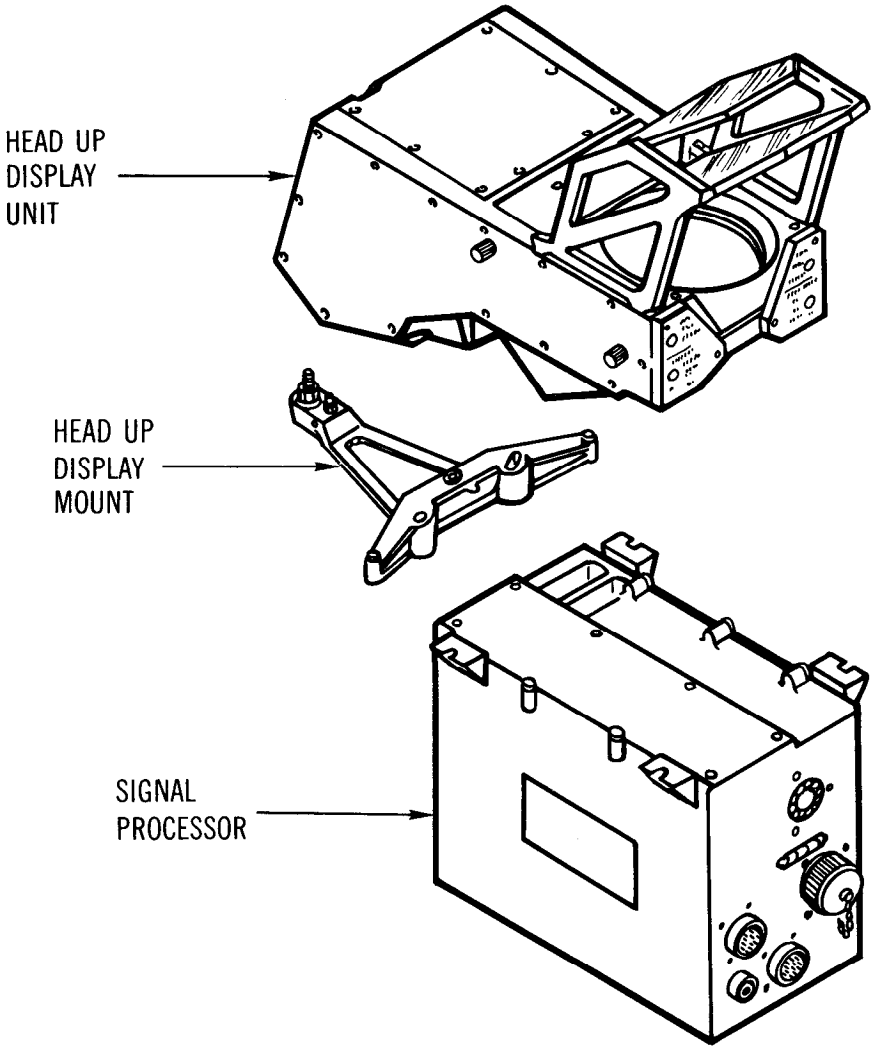
HELMET SIGHT SUBSYSTEM

Consists of the pilot and gunner helmet sights, pilot and gunner linkage, extension cable, and the electronic interface assembly. The HSS provides the pilot and gunner with the capability to rapidly acquire visible targets and to direct either the TSU or the turret to those targets. Refer to TM 9-1270-212-14&P for additional information pertaining to HSS components.



HEAD UP DISPLAY SUBSYSTEM

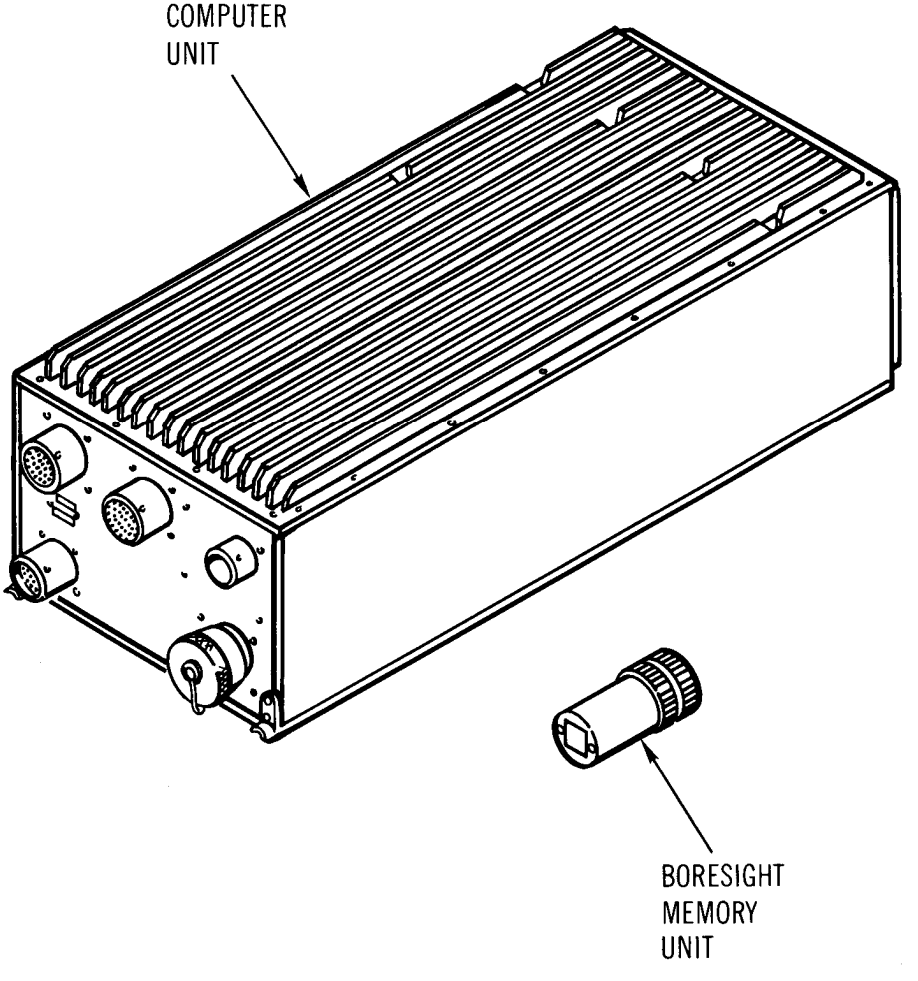
Consists of a head up display unit, signal processor, and the head up display mount. The HUD permits the pilot to aim the helicopter for rocket and fixed forward gun firing. The HUD provides the pilot with a head up display of TOW missile prelaunch and postlaunch flight constraints, direct and indirect rocket aim points, engine torque, airspeed, altitude, magnetic heading, and range. The fire control and flight data is displayed as numbers and symbols on the head up display unit optical image combiner. The head up display unit is mounted on and above the pilot instrument panel so that the dual combiner is in the pilot's forward field of view. The transparent dual combiner permits the pilot to view the target and the displayed symbology simultaneously. Refer to TM 9-1270-220-13&P for additional information pertaining to HUD components.



ARR83-1507

FIRE CONTROL COMPUTER

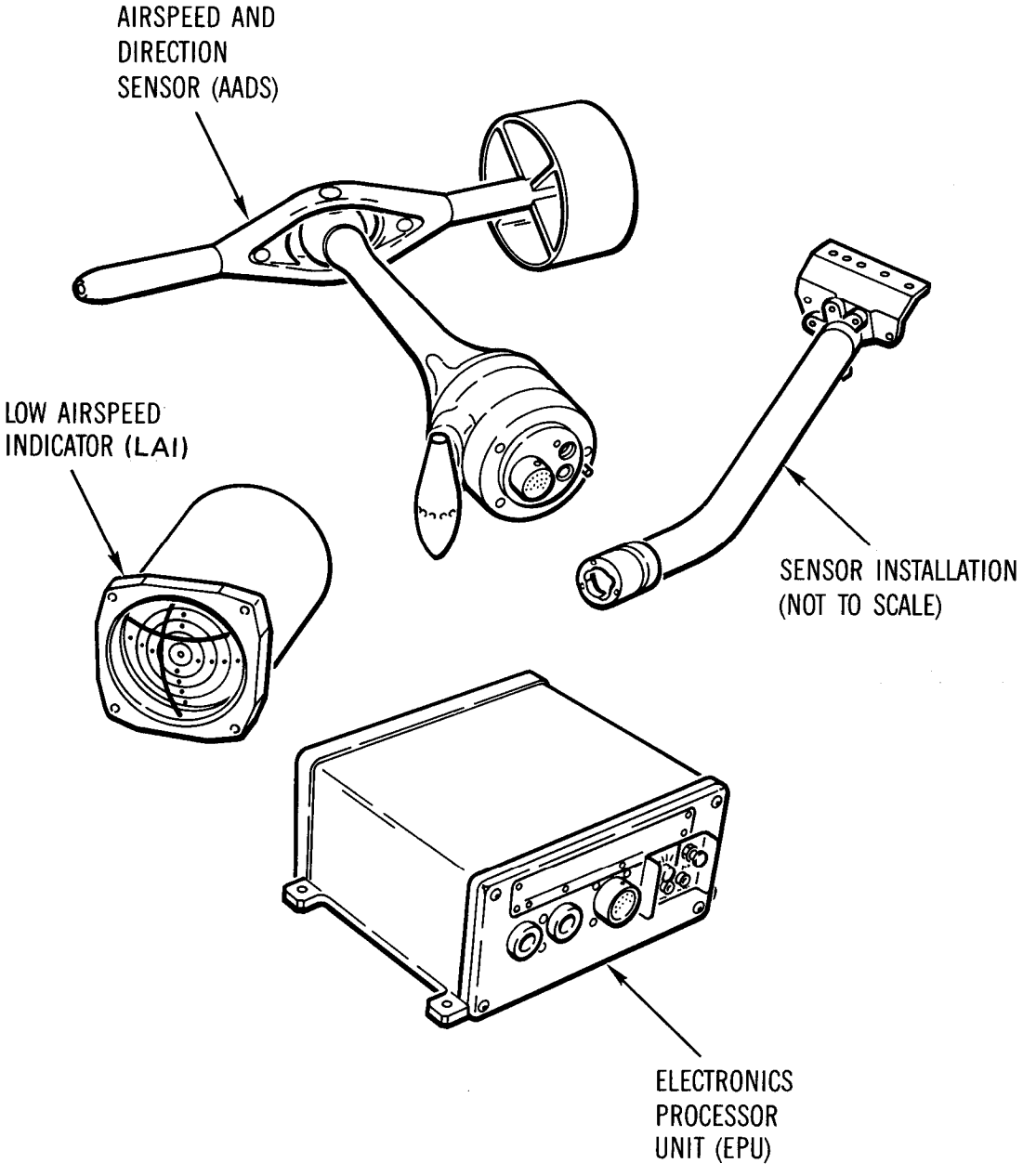
Consists of the computer unit and the boresight memory unit. The FCC provides ballistic computations and directional correction commands for rocket, powered by MK40/MK66 rocket motors, or gun firing to compensate for aircraft motion, air data, range, projectile ballistics, and target motion. The FCC also provides boresight compensation, data for HUD symbology, and outputs to enhance the functions of the doppler navigation set. Refer to TM 9-1270-218-13&P for additional information pertaining to FCC components.



ARR83-1508

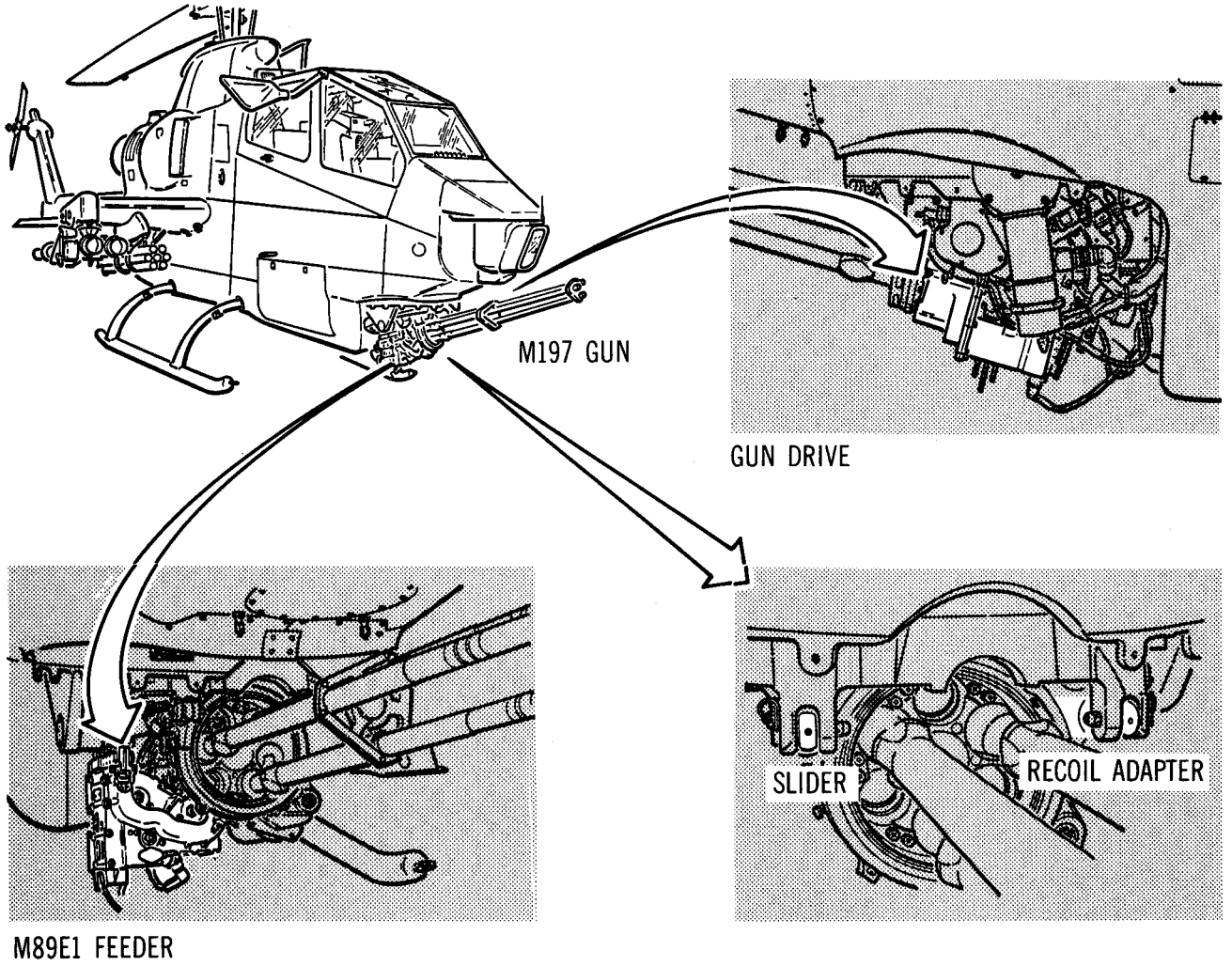
AIR DATA SUBSYSTEM

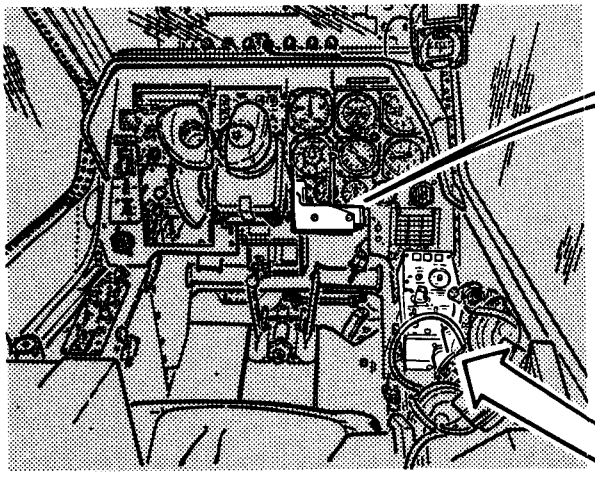
Consists of the airspeed and direction sensor, electronics processor unit, and the low airspeed indicator. However, the sensor installation is usually considered part of the air data subsystem. The ADS supplies true airspeed, absolute (static) pressure, and free-stream air temperature signals to the FCC. An altitude signal is fed to the ADS from the radar altimeter to provide ground effect error correction. The low airspeed indicator provides the pilot with a display of horizontal airspeed, up to 50 knots, in forward, rearward, and sideways flight. Refer to TM 9-1270-219-13&P for additional information pertaining to ADS components.



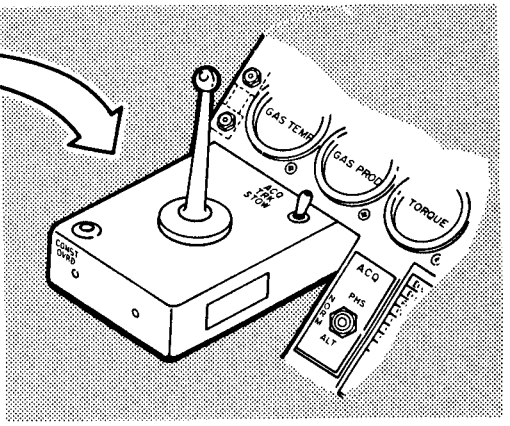
TURRET SUBSYSTEM

Chin-mounted on the AH-1E/F helicopter. Provides suppressive fire armament with either the 7.62-mm M134 Machine Gun, 20-mm M197 Automatic Gun, or the 30-mm XM230E1 Cannon; however, current application is limited to 20-mm configuration. The electrically powered turret is flexible in azimuth and elevation and is aimed at selected targets by pilot and gunner using HSS; by pilot using HUD; or by gunner using TSU. Ammunition is supplied from a single container located directly behind the turret and below the crew compartment. Two doors, one on each side, provide access to the ammunition bay. The turret subsystem consists of the following major components which are shown mounted in the AH-1E/F helicopter.

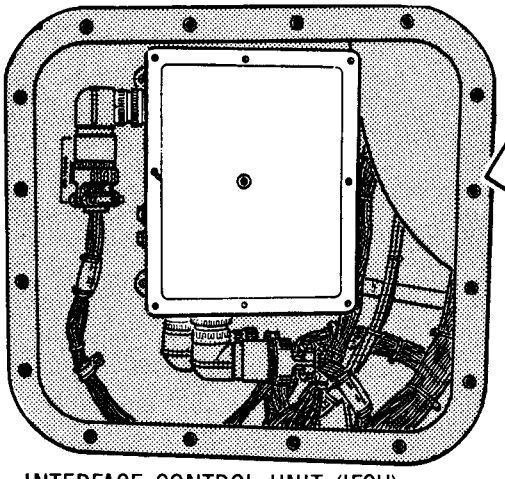




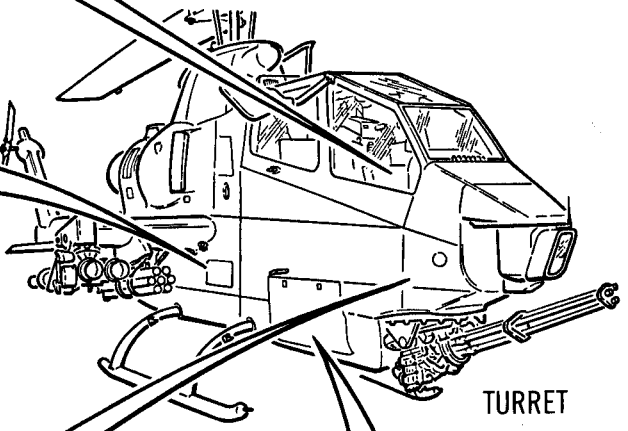
GUNNER ARMAMENT CONTROL PANEL (GACP)



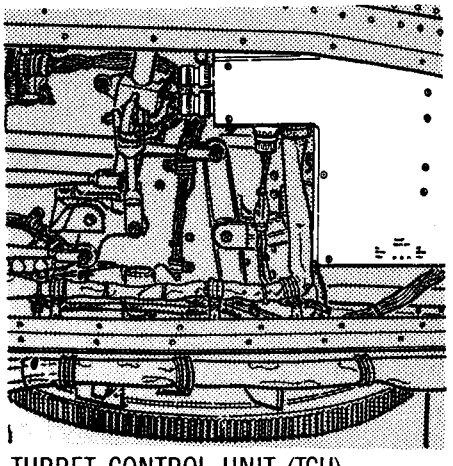
ACQUISITION SWITCH PANEL



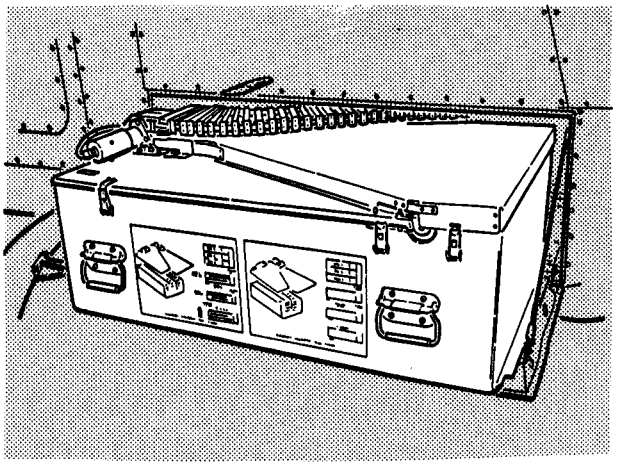
INTERFACE CONTROL UNIT (IFCU)



TURRET

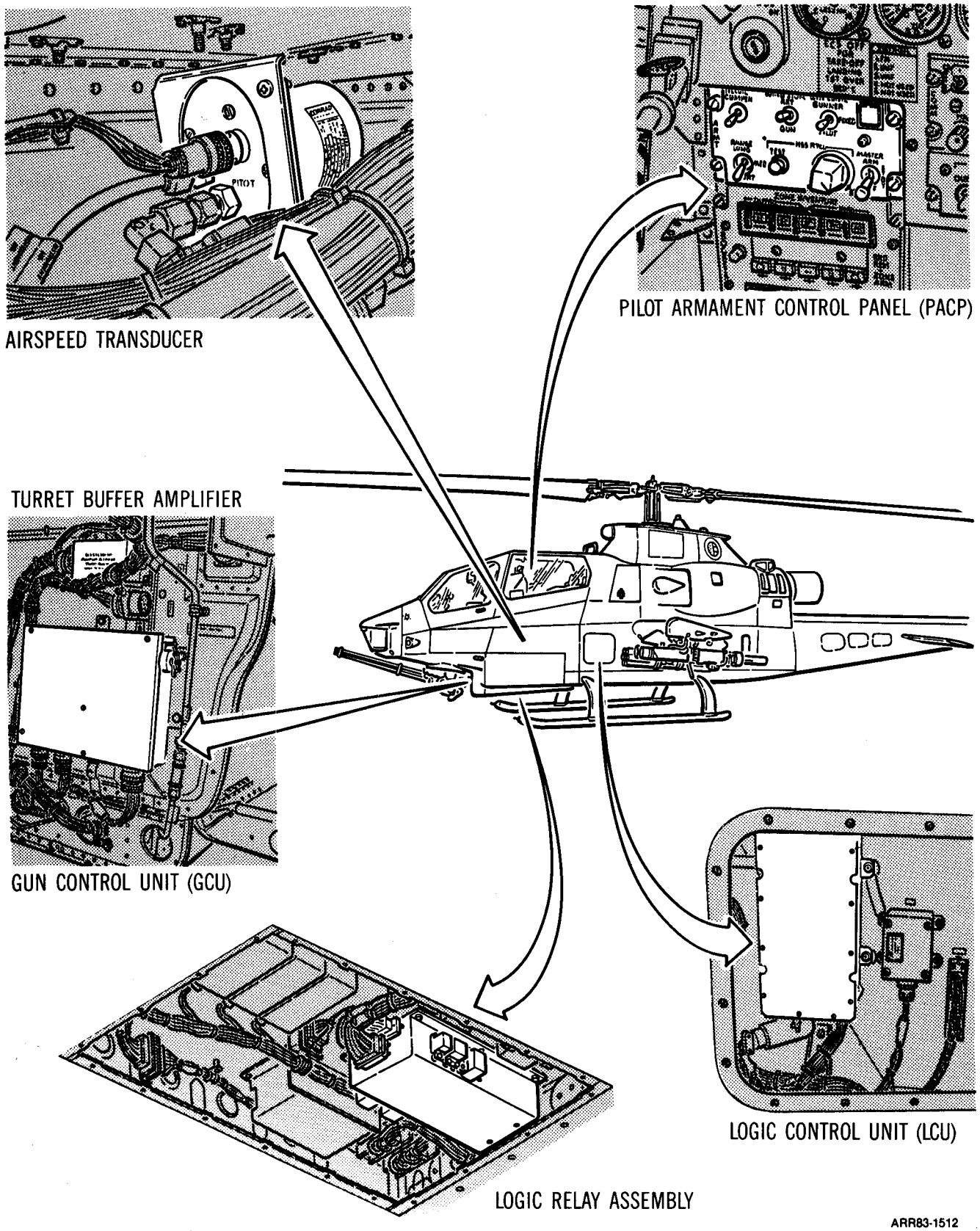


TURRET CONTROL UNIT (TCU)



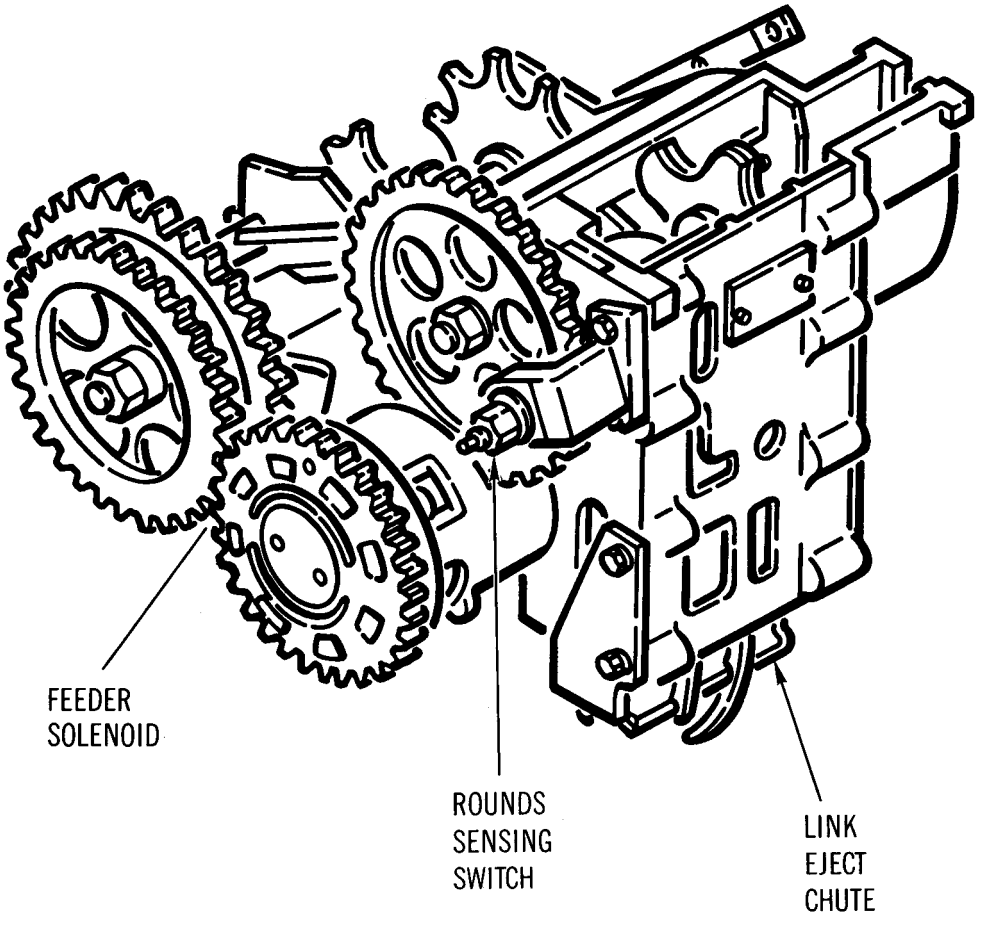
AMMUNITION FEED SYSTEM

ARR83-1511


AIRSPEED TRANSDUCER
PILOT ARMAMENT CONTROL PANEL (PACP)
TURRET BUFFER AMPLIFIER
GUN CONTROL UNIT (GCU)
LOGIC CONTROL UNIT (LCU)
LOGIC RELAY ASSEMBLY
ARR83-1512

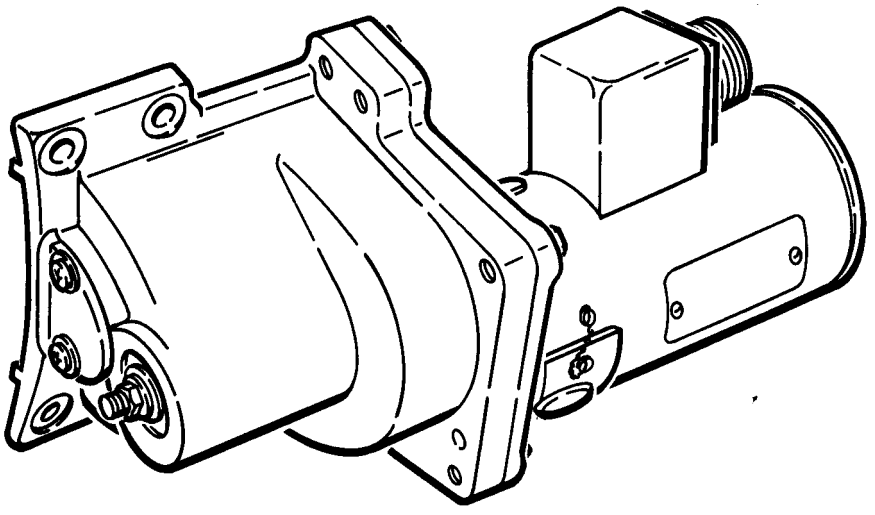
M89E1 FEEDER

Mounted on and geared to the M197 gun. A solenoid-operated declutching mechanism controls the operation of the M89E1 feeder. The forward and aft housings contain round and link handling sprockets and guides. The stripper sprocket and link stripper strip rounds from the stripper sprocket to the feeder sprocket. The feeder sprocket feeds rounds into the M197 gun. The link eject chute directs empty links clear of the helicopter. The rounds sensing switch provides electrical counting pulses to the RND REM indicator on the gunner armament control panel and to the rounds totalizer on the turret.



GUN DRIVE

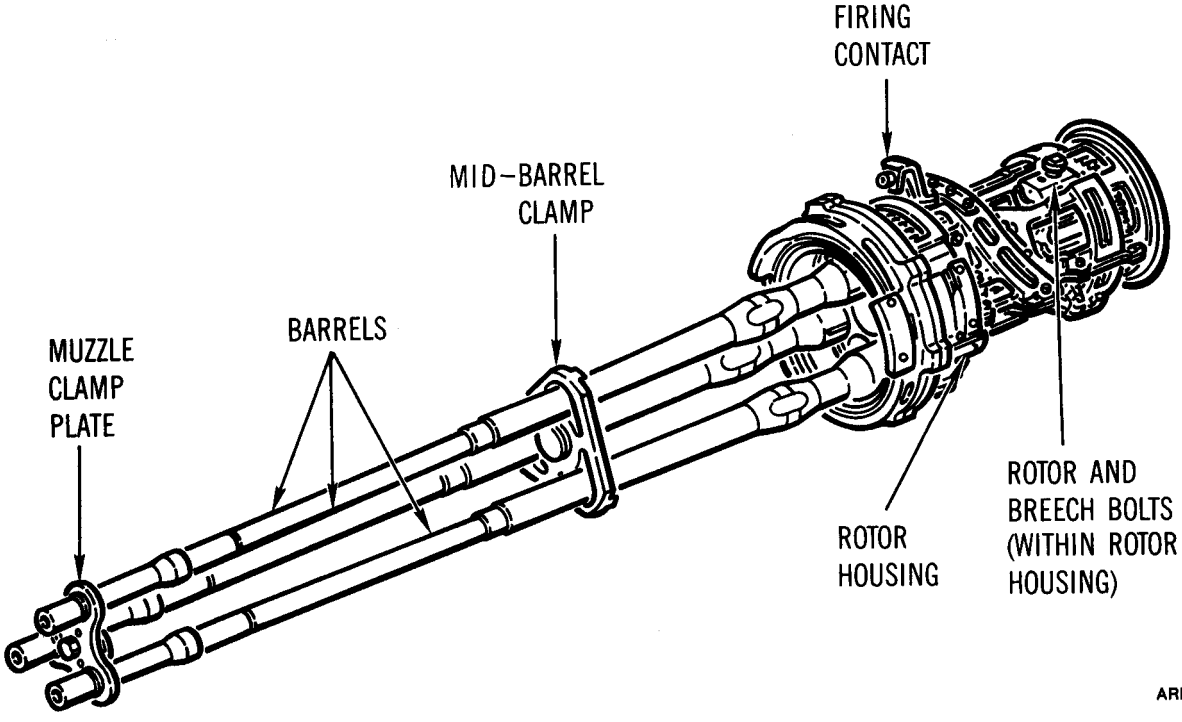
Mounted on and geared to the M197 gun. Consists of a gearbox and a gun drive motor. The gearbox encloses a gear train which transmits power from the dc motor to the M197 gun. The output cluster gear is pinned together with two shear pins to protect drive train components from excessive damage.



ARR83-1514

M197 GUN

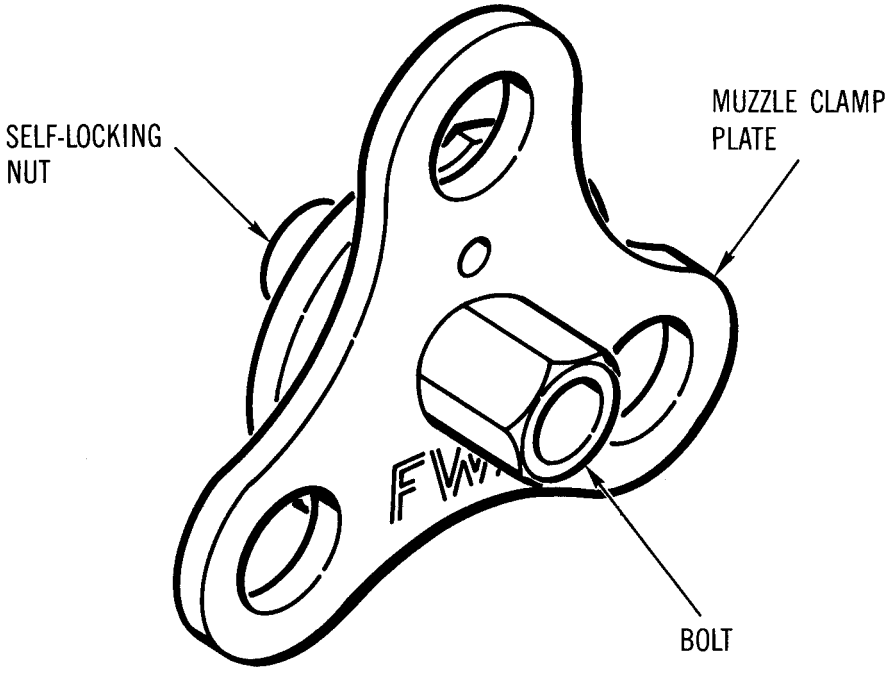
Turret-mounted, air-cooled, three-barrel, 20-mm automatic gun. Utilizes a rotary action mechanism, contained within a fixed rotor housing, and a rotating barrel cluster. Operates at a firing rate of 730 ±50 shots-per-minute. Drive power is provided by the gun drive. The M197 gun consists of the following major components.



ARR83-1515

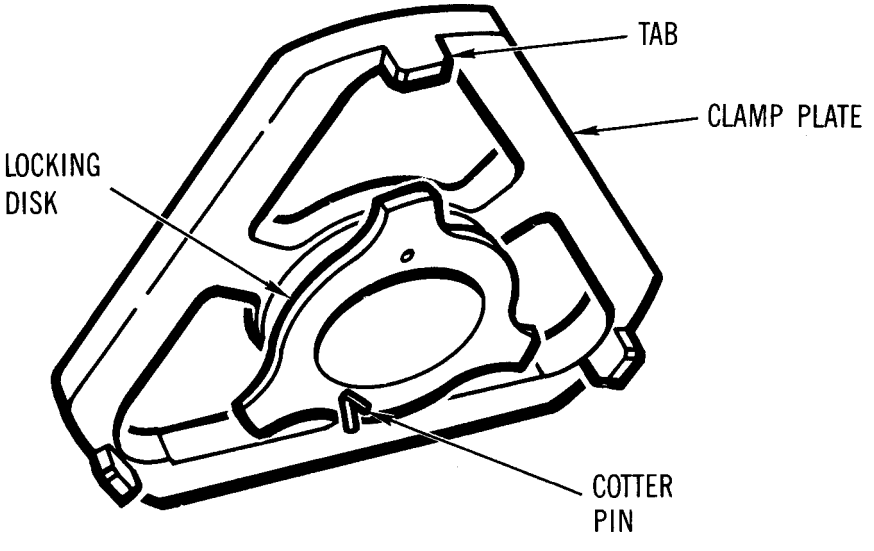
MUZZLE CLAMP PLATE

Located at outer end of barrel cluster. Restrains individual barrel movement during firing. Secured in position against shoulders on the barrels by a bolt and self-locking nut.



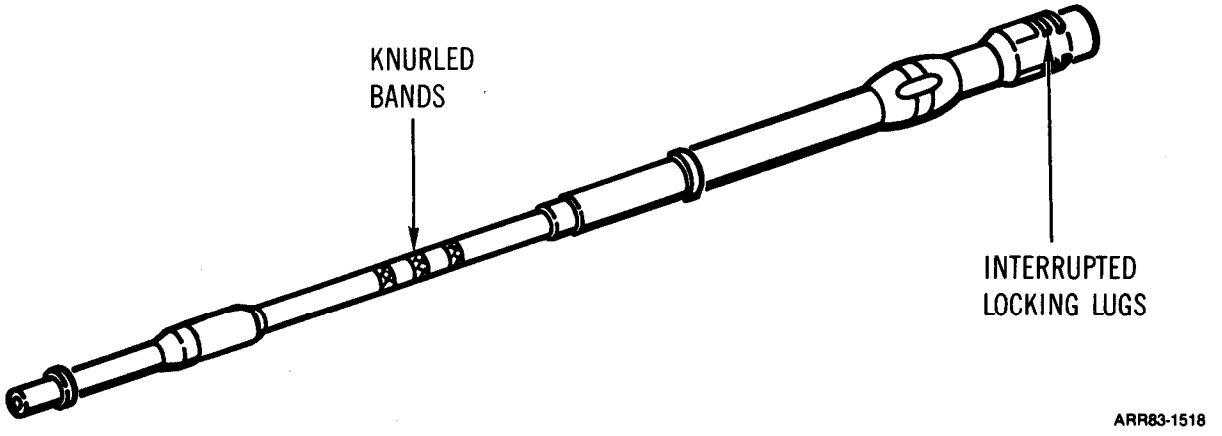
MID-BARREL CLAMP

Located near center of the barrel cluster. Three tabs on the clamp plate prevent rotational movement of individual barrels. Secured in position by rotating the locking disk to LOCK position. Gun rotation, barrel detents, and a cotter pin prevent the mid-barrel clamp from unlocking.



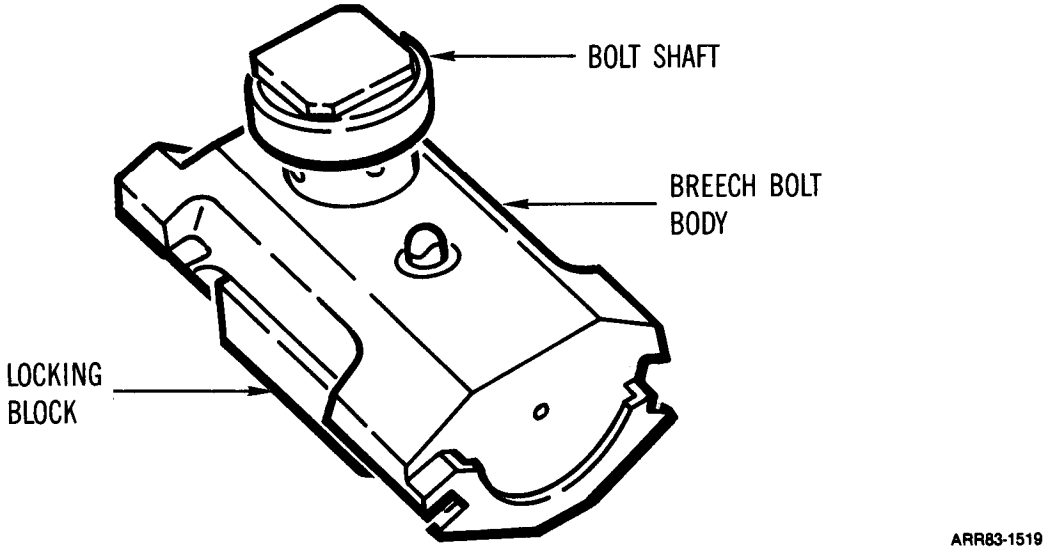
BARRELS

Cluster-mounted in forward end of rotor. Three rows of interrupted locking lugs engage similar locking lugs in the rotor. Knurled bands provide a gripping surface for installation and removal of the barrels.



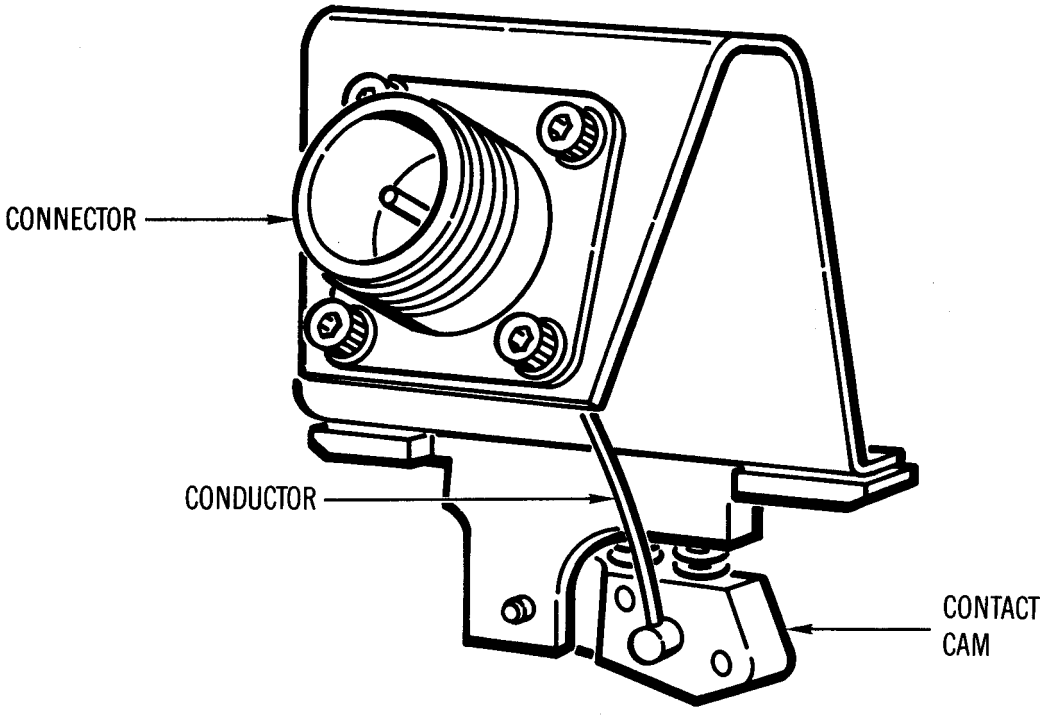
BREECH BOLTS

Three breech bolts are used in the M197 gun. Each breech bolt consists of a bolt shaft, locking block, firing circuit components, and a breech bolt body. Two types of breech bolts are available for use. Intermixing the two types of breech bolts is not recommended. The improved breech bolt differs from the standard breech bolt in internal construction and parts life. Slots or grooves in the side of the breech bolt permit the breech bolt to slide along the rotor tracks. The bolt shaft determines the position of the breech bolt as it follows the main cam path in the rotor housing. The extractor lip on the front of the breech bolt body engages the rim of a round and controls the forward and aft position of the round as it cycles through the M197 gun. The radial position of the round is controlled by the inner wall of the rotor housing. Each breech bolt picks up a round as it enters the M197 gun, transports it to the firing chamber, locks it into firing position, transmits firing voltage to the primer of the round, extracts the empty case from the chamber, and transports the empty case to the guide bar where it is cammed out of the M197 gun.



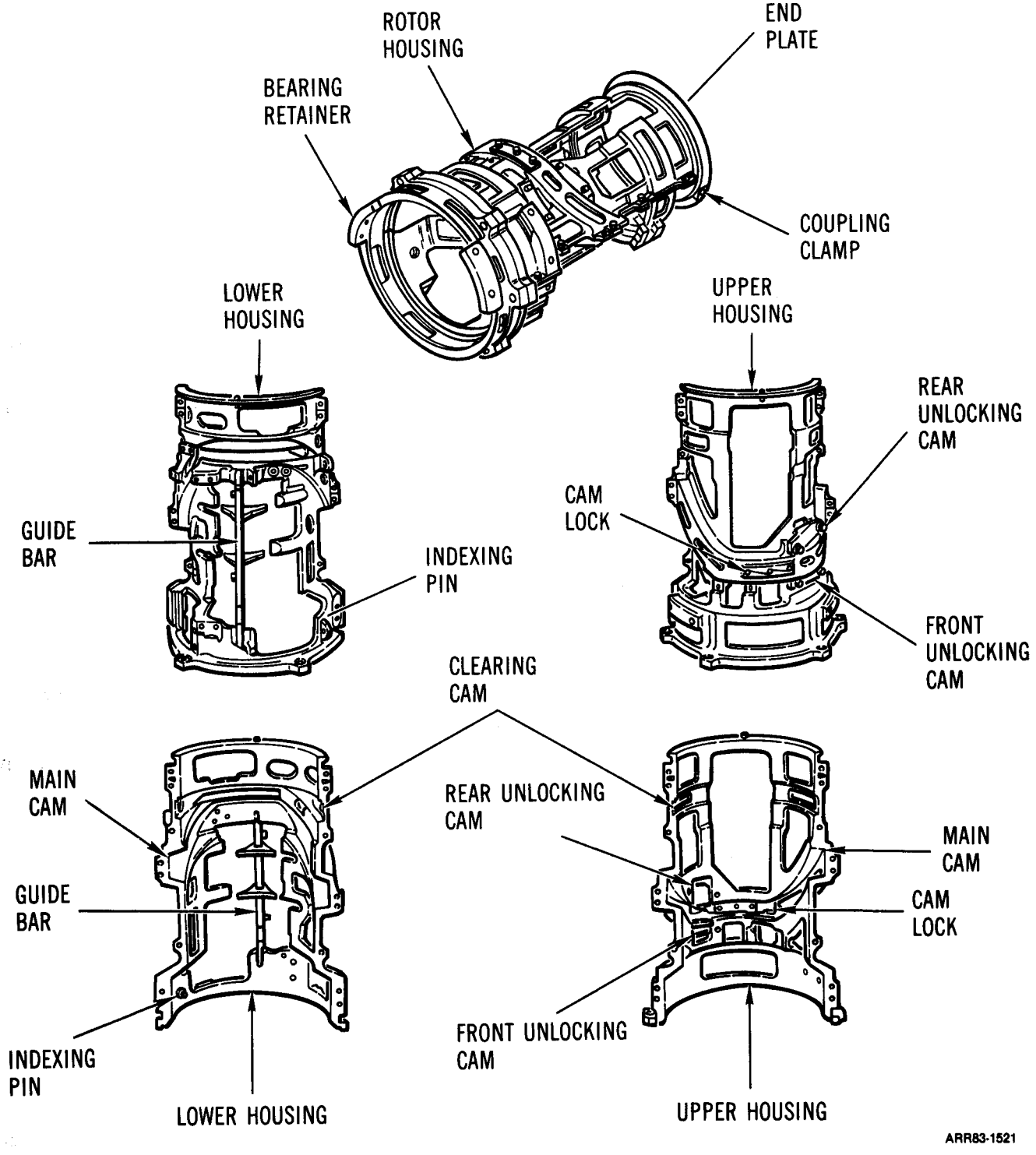
FIRING CONTACT

Mounted on rotor housing. Provides interface between an external source of fire volts and the M197 gun. Provides an electrical path through the rotor housing to the breech bolts. Circuit is through the connector and conductor to the insulated insert in the contact cam. When a breech bolt passes under the contact cam, the fire volts circuit is completed through the breech bolt cam and firing pinto the electrically-primed ammunition.

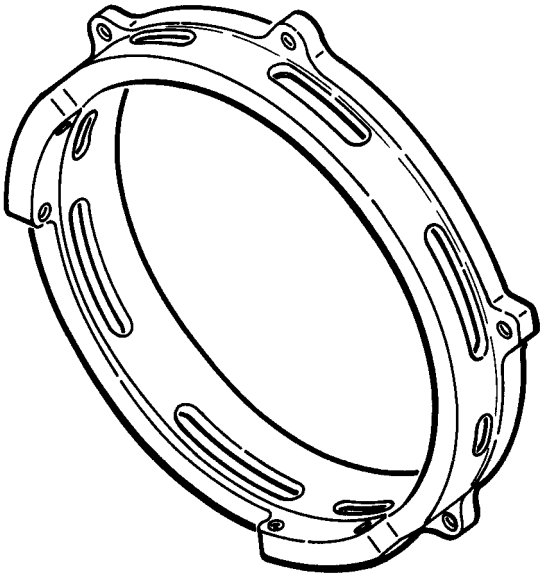


ROTOR HOUSING AND ASSOCIATED PARTS

The rear housing consists of an upper and a lower housing half assembled as a set. The cam paths in the rotor housing control the movement of the breech bolts. The main cam causes the breech bolts to move forward and backward along the rotor tracks as the rotor turns. The clearing cam provides for removal of the breech bolts. The following parts are mounted on the rotor housing.

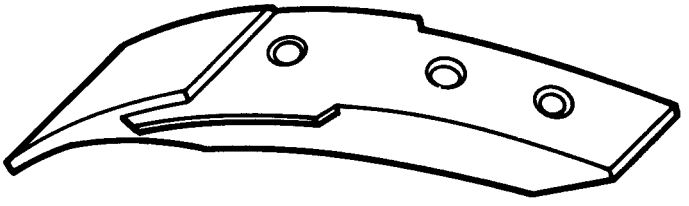


Bearing Retainer. Serves as a seat for the ball bearing at the forward end of the rotor.



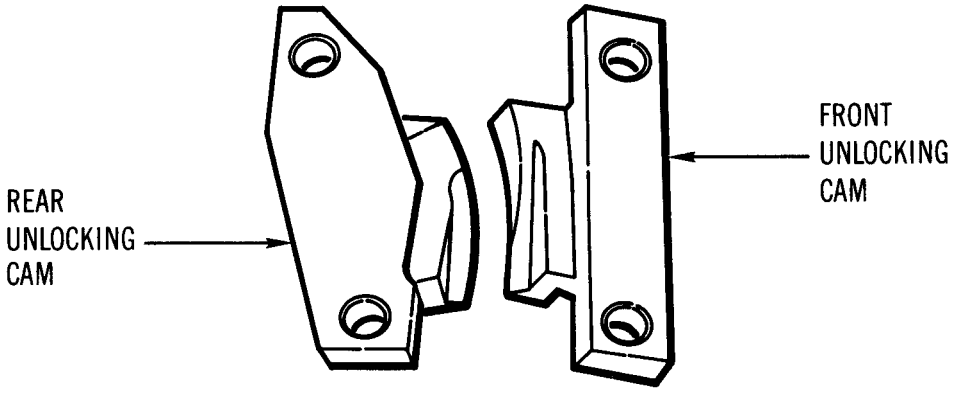
ARR83-1522

Cam Lock. Locks breech bolt in battery by forcing the bolt shaft downward to engage the locking block in the locking well of the rotor.



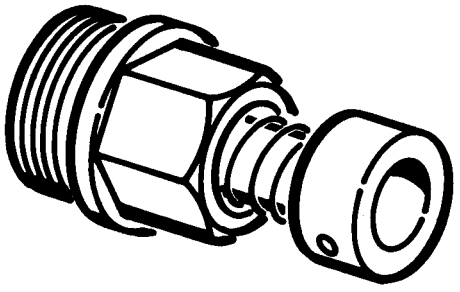
ARR83-1523

Front and Rear Unlocking Cams. Unlock breech bolt after firing by lifting the bolt shaft to disengage the locking well in the rotor.



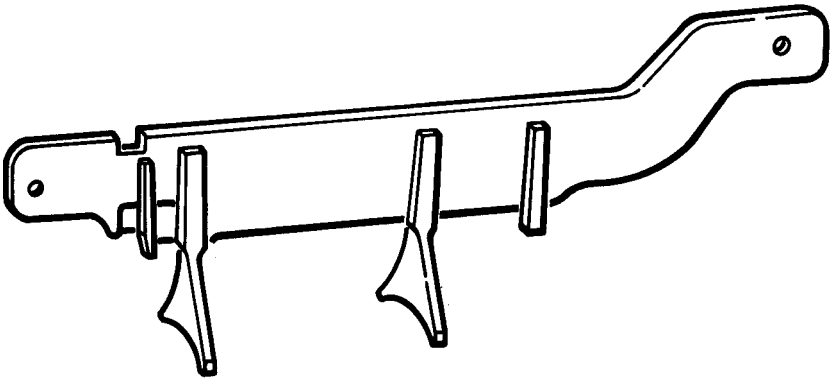
ARR83-1524

Indexing Pin. Times M197 gun for installation of timed M89E1 feeder.



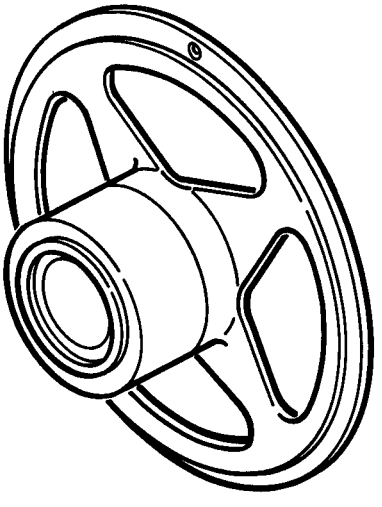
ARR83-1525

Guide Bar. Guides rounds into and out of the M197 gun.



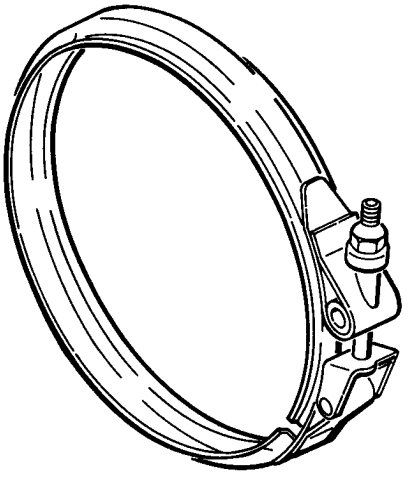
ARR83-1526

End Plate. Serves as the inner race for the needle bearing at the aft end of rotor. Provides the aft mounting point for the M197 gun.



ARR83-1527

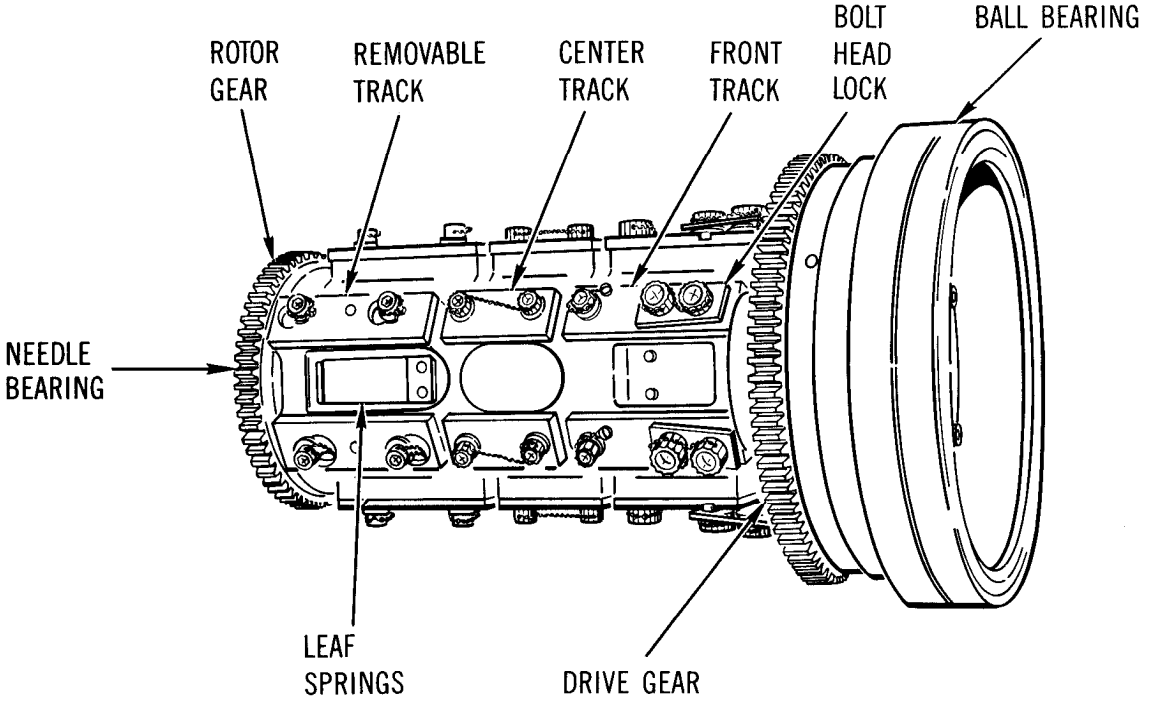
Coupling Clamp. Secures the end plate to the rotor housing.



ARR83-1528

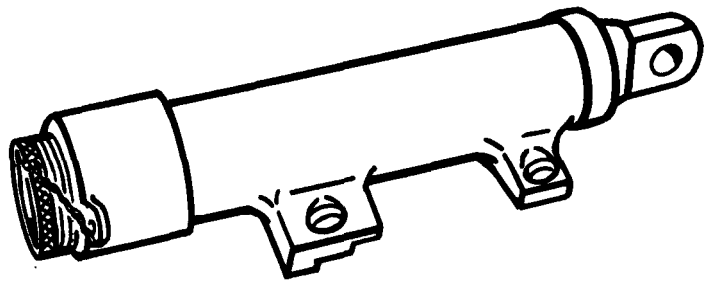
ROTOR

Major component of the M197 gun. Provides a mounting for the rotor tracks, rotor gear, ball bearing, needle bearing, and the leaf springs. Interrupted locking lugs in the forward end of the rotor engage similar locking lugs on the barrels. Six sets of rotor tracks retain and guide the breech bolts as they move along the rotor. Each set consists of a front track, center track, and a removable track. The removable tracks permit installation and removal of the breech bolts. The forward end of the rotor is supported by an external double-row ball bearing. The aft end of the rotor is supported by an internal needle bearing.



RECOIL ADAPTER

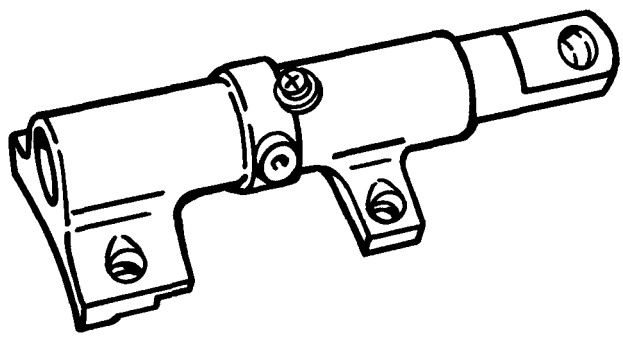
Mounted on the M197 gun. Provides the forward, left side, mounting point for the M197 gun. Dampens the recoil loads transmitted to the turret structure when the M197 gun is firing.



ARR83-1530

SLIDER

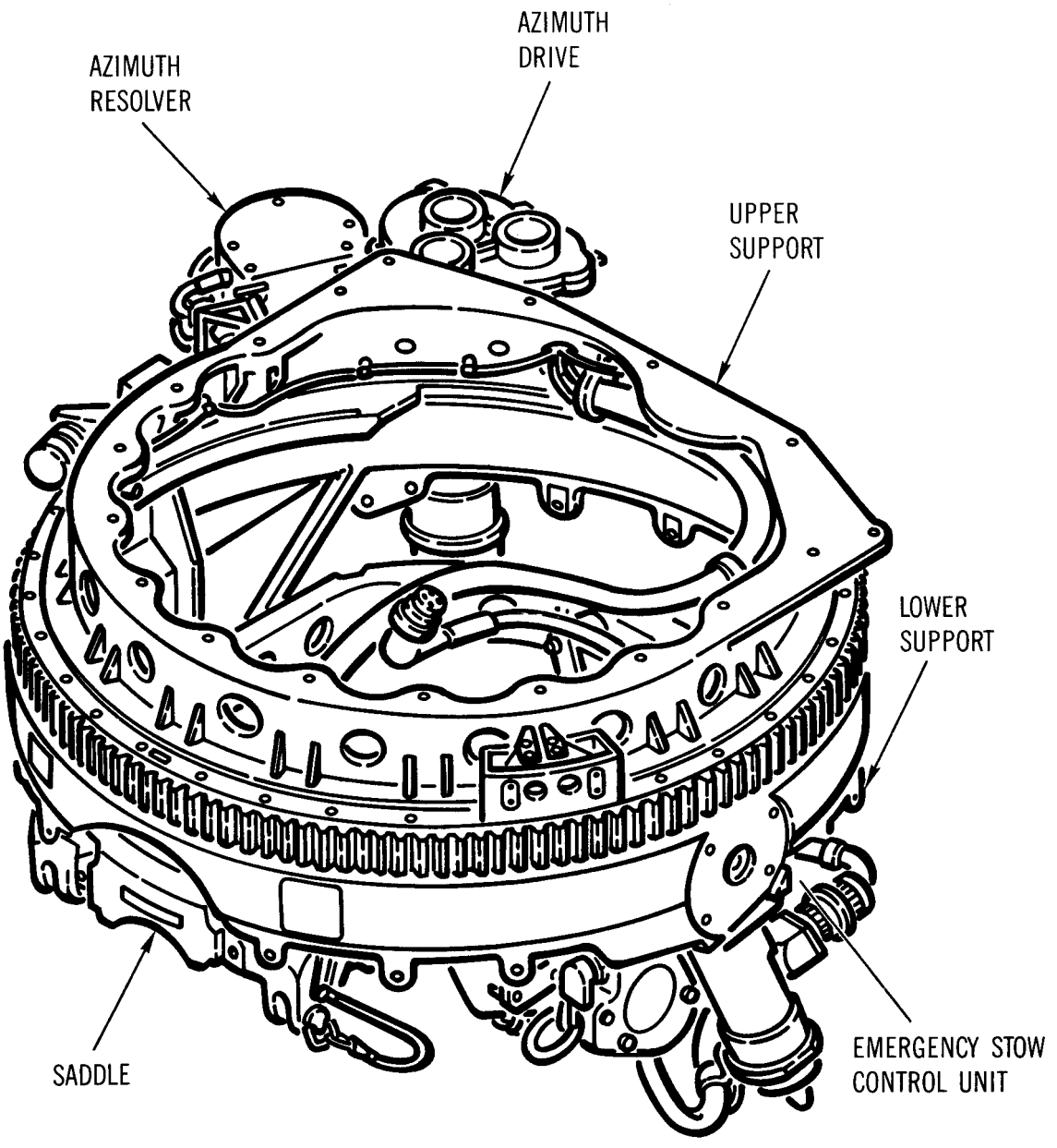
Mounted on the M197 gun. Serves as a guide and as the forward, right side, mounting point for the M197 gun.



ARR83-1531

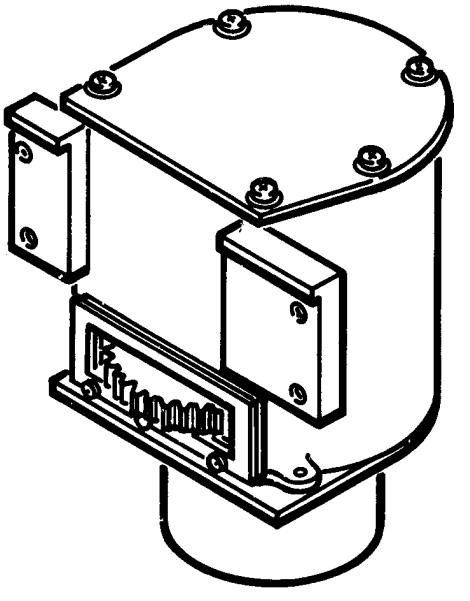
TURRET

The turret consists of the following major components.



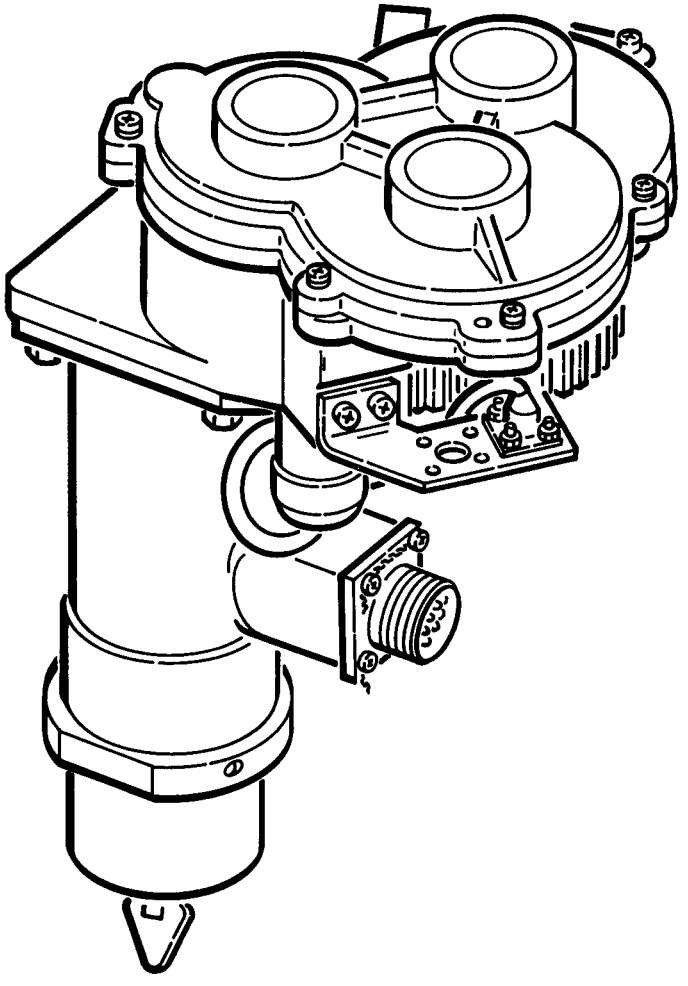
AZIMUTH RESOLVER

Mounts on the upper support and geared to the ring gear on the lower support. Contains the azimuth stow switch and a resolver. The azimuth stow switch is a mechanically actuated, three-deck (S1, S2, and S3) cam switch. When switches S1 and S2 are actuated, emergency stow power is routed to the azimuth drive motor brake and the azimuth drive amplifier in the emergency stow control unit to position the turret to 0° azimuth. When the turret is not in 0° azimuth, switch S3 prevents firing of wing stores. The resolver provides azimuth position signals for the azimuth servo loop.



AZIMUTH DRIVE

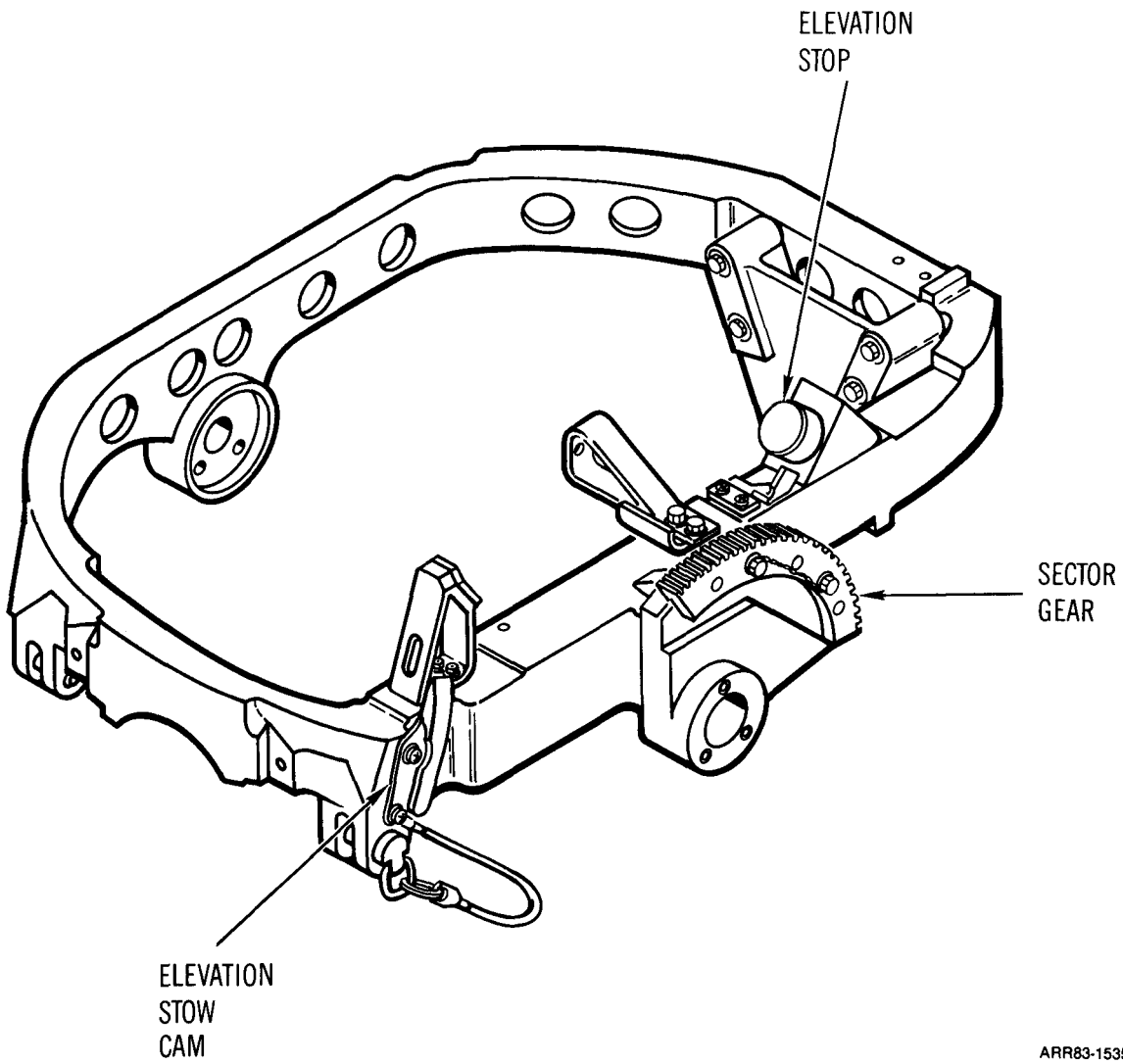
Mounts on the upper support and geared to the ring gear on the lower support. Consists of an azimuth drive motor, gearbox, and a tachometer. The gear train is protected by a slip clutch in the event external obstructions are encountered. The tachometer provides an azimuth rate feedback signal to the servo loop to maintain loop stability. The azimuth drive motor contains a spring-operated brake to lock the lower support in position when power is not applied. The brake is released electrically when power is applied by the azimuth servo loop. A manual brake release on the azimuth drive motor allows the lower support to be moved manually for ground servicing.



ARR83-1534

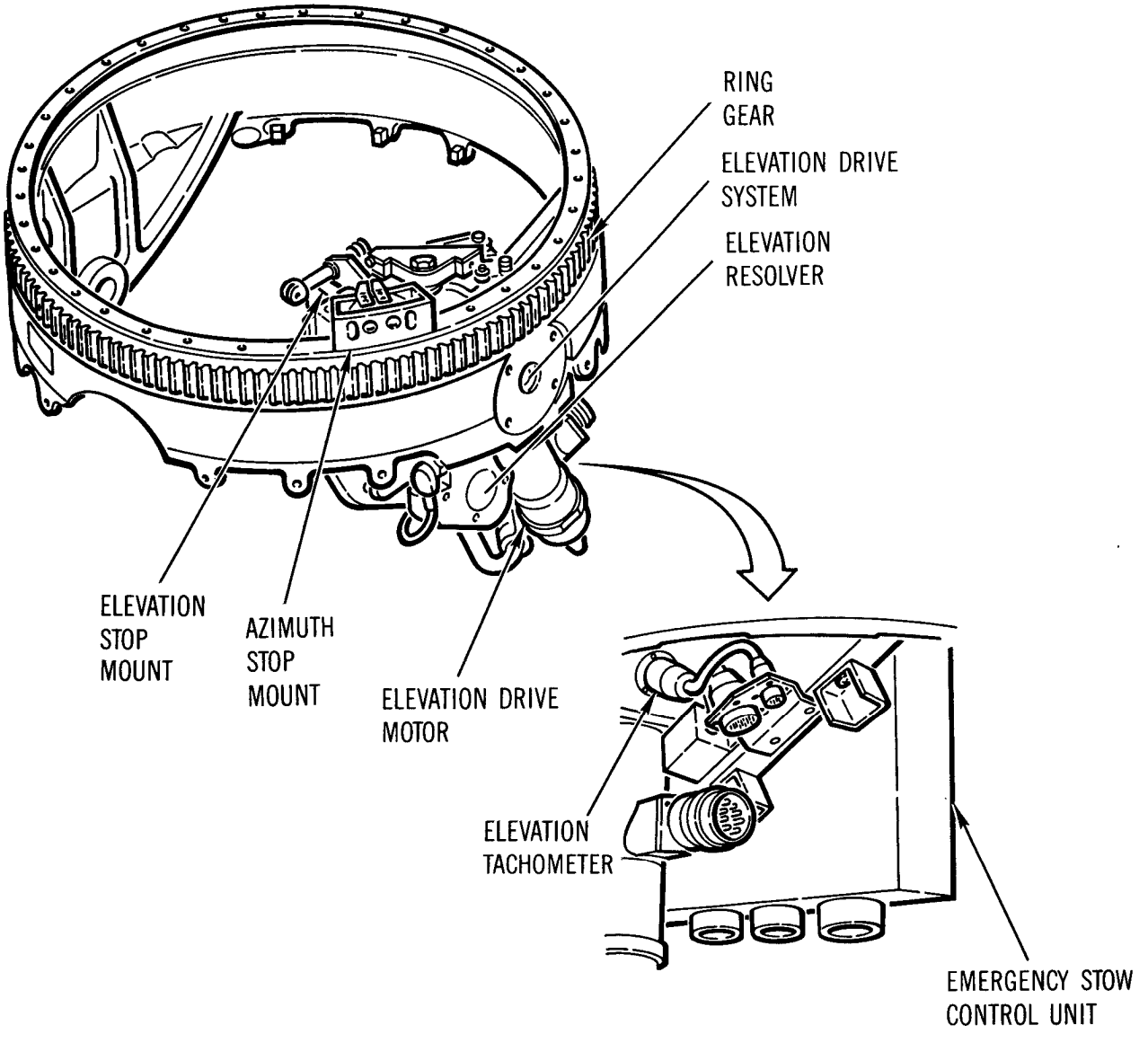
SADDLE

Mounted through bearings to the lower support. Consists of a frame to support the M197 gun. Provides a mount for the elevation stop and the elevation stow cam. The saddle sector gear meshes with the output gear of the elevation drive system.



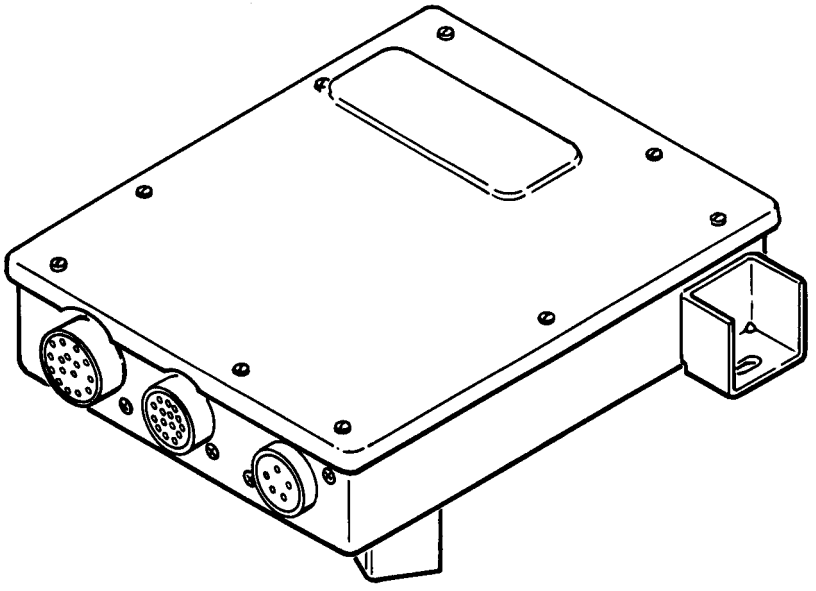
LOWER SUPPORT

Mounted to the upper support through the azimuth bearing. Contains the elevation drive system. Provides a mount for the elevation stops, elevation proximity switches, and the emergency stow control unit. The lower support ring gear meshes with the drive gear of the azimuth resolver and the output gear of the azimuth drive. The elevation drive system consists of an elevation drive motor, gear train, elevation resolver, and a tachometer. The gear train is protected by a slip clutch in the event external obstructions are encountered during turret slew. The resolver provides elevation position signals for the elevation servo loop. The tachometer provides an elevation rate feedback signal to the servo loop to maintain loop stability. The elevation drive motor contains a spring-operated brake to lock the saddle in position when power is not applied. The brake is released electrically when power is applied by the elevation servo system. A manual brake release on the elevation drive motor allows the saddle to be moved manually for ground servicing.



EMERGENCY STOW CONTROL UNIT

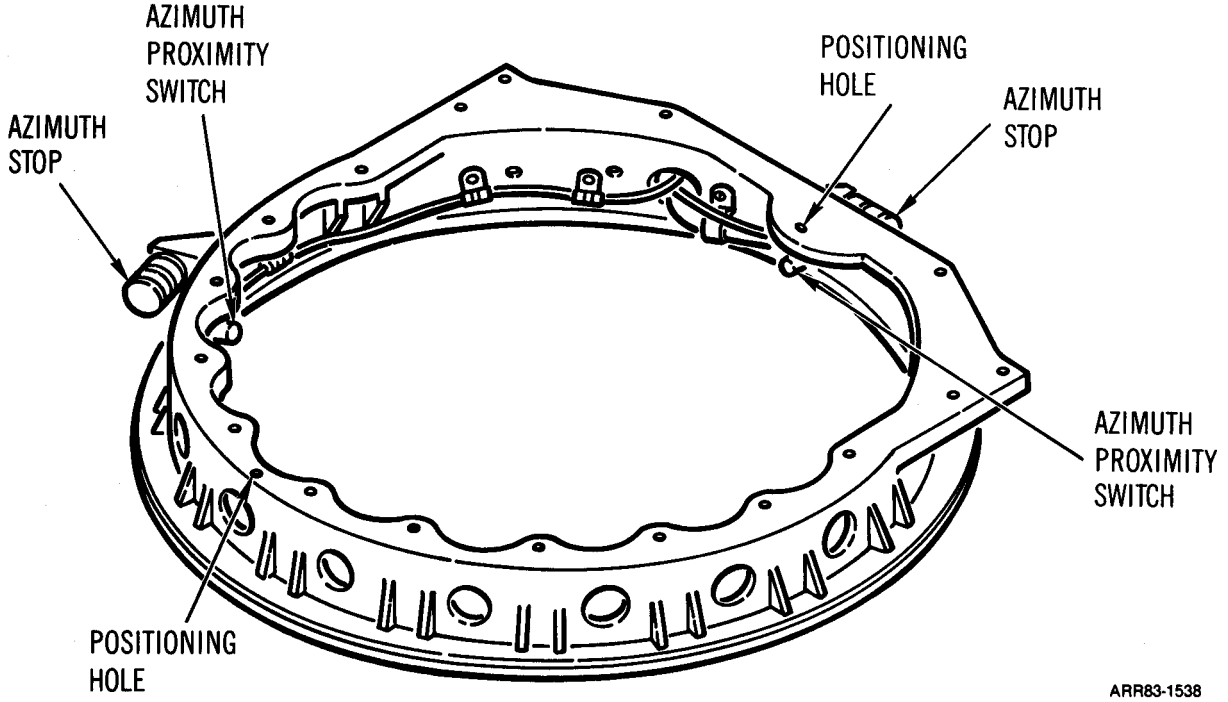
Mounted on the lower support. Contains the circuitry to automatically drive the turret to the emergency stow position whenever normal operating power is removed or lost. The emergency stow position is a minimum of 10° up elevation and 0° ±5° azimuth.



ARR83-1537

UPPER SUPPORT

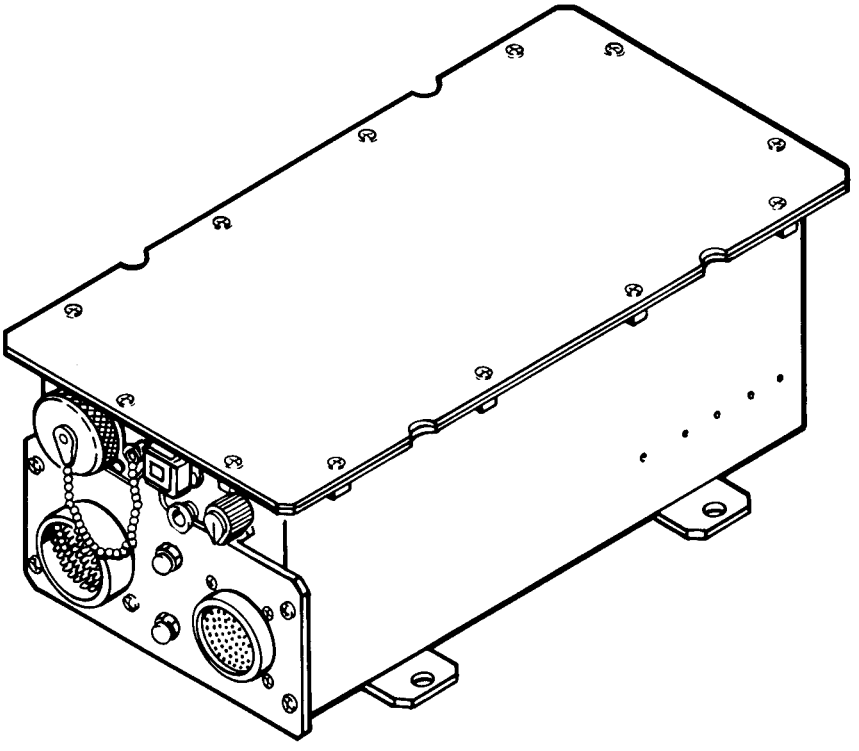
Provides turret to helicopter mounting points. Two positioning holes in the upper support mounting flange engage two positioning pins in the airframe to aline the turret structure to the helicopter. Serves as a mount for the azimuth bearing, azimuth stops, and the azimuth proximity switches.



ARR83-1538

LOGIC CONTROL UNIT

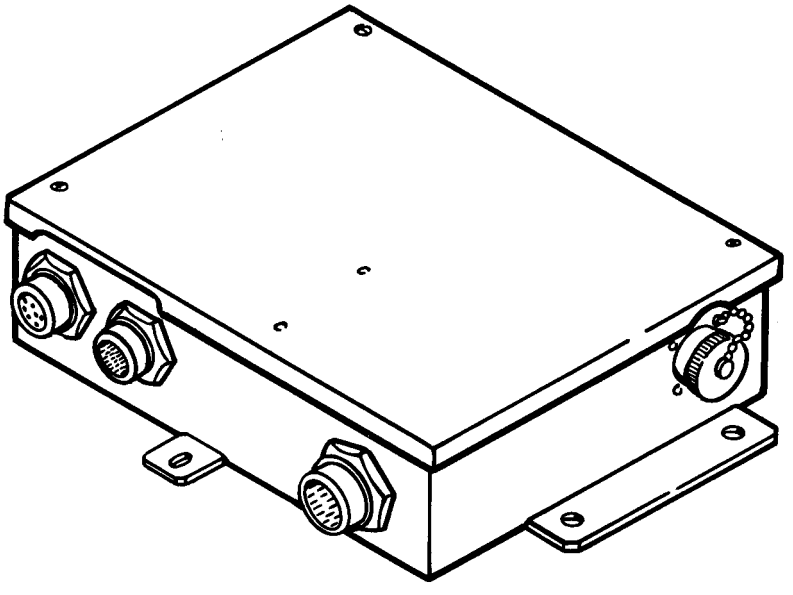
Located in an access compartment on the left side of the helicopter aft of the ammunition bay. Consists of four circuit card assemblies, a transformer, and an elapsed time indicator. Provides stabilization control. coincidence control, error detection, and depression limit.



ARR83-1539

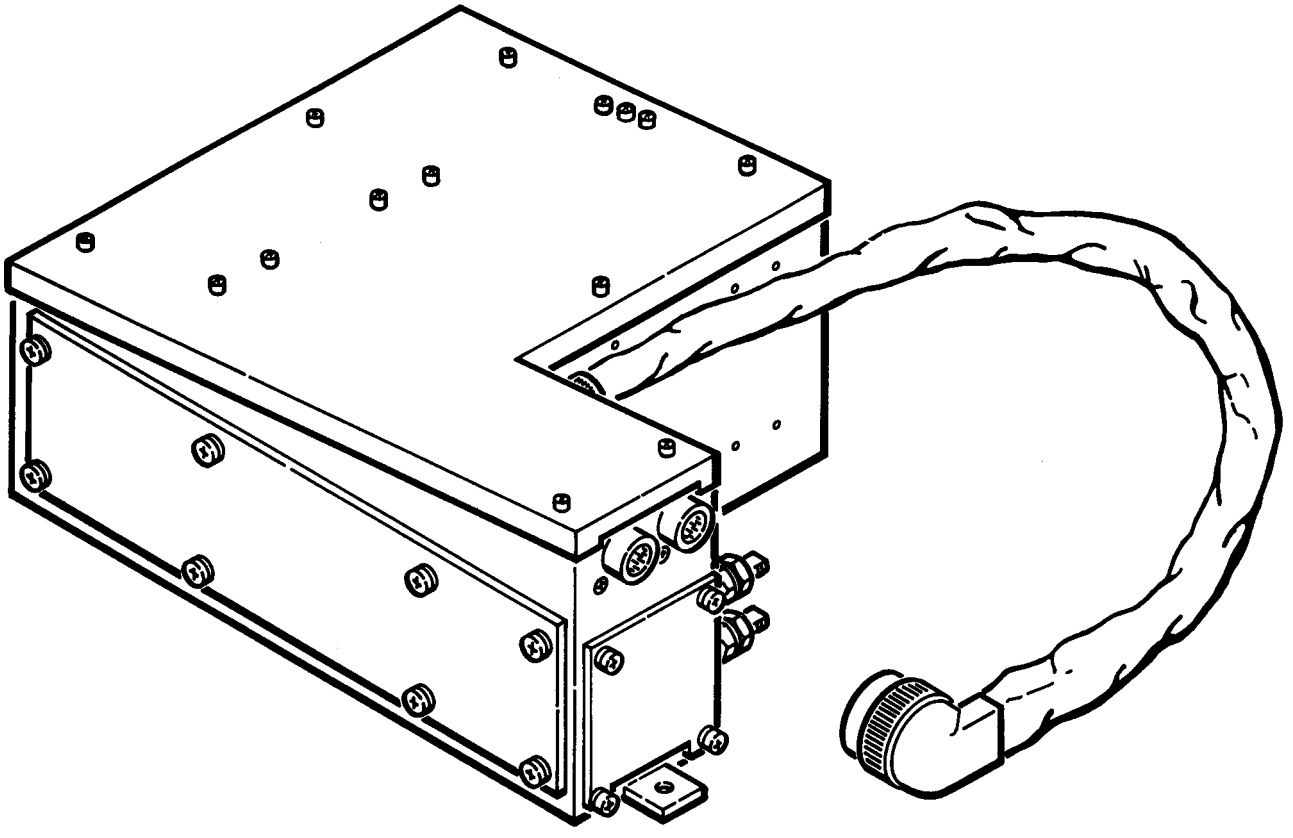
GUN CONTROL UNIT

Mounted on the bulkhead aft of the turret. Consists of five circuit card assemblies, and EMI filter, a transformer, the fire volts power supply, and an elapsed time indicator. Controls voltages for gun drive power, firing, and operation of the feeder solenoid.



TURRET CONTROL UNIT

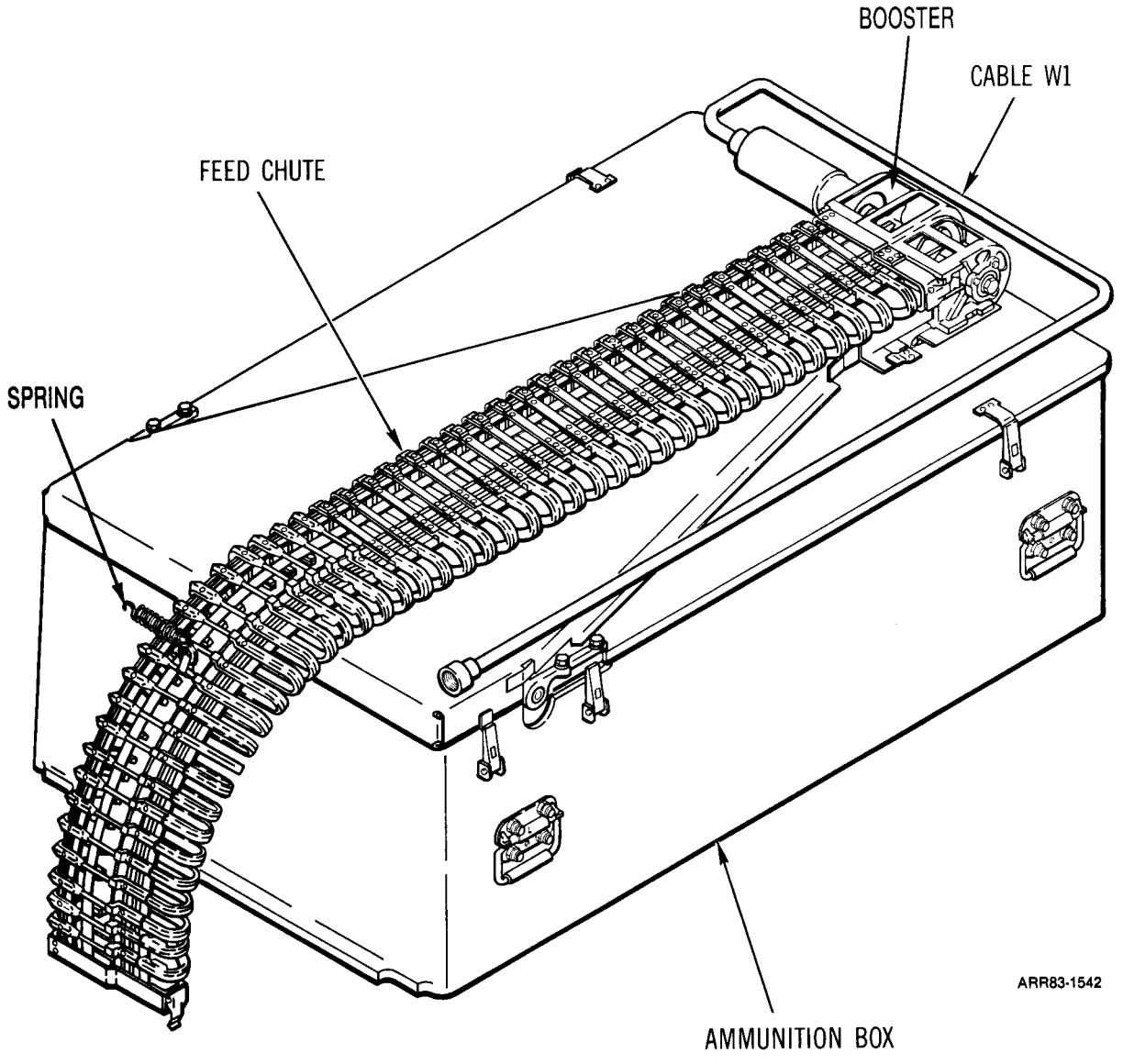
Located in an access compartment on the right side of the helicopter directly below the gunner canopy. Consists of four circuit card assemblies, two power modules, and EMI filter network, a transformer, and an elapsed time indicator. Controls power to azimuth and elevation drive motors for turret positioning.



ARR83-1541

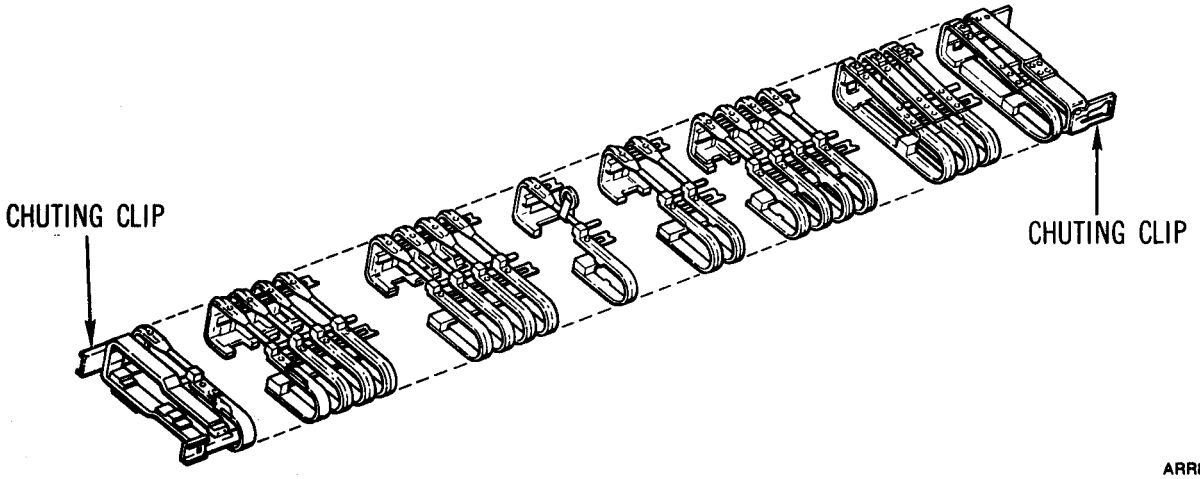
AMMUNITION FEED SYSTEM

Consists of a feed chute, cable W1, and an ammunition box. Stores and supplies linked ammunition to the M89E1 feeder and M197 gun. A spring connected between the feed chute and the airframe holds the feed chute in position to allow a smooth flow of ammunition through the feed chute. Electrical power to operate the booster mounted on the ammunition box cover is supplied through cable W1.



FEED CHUTE

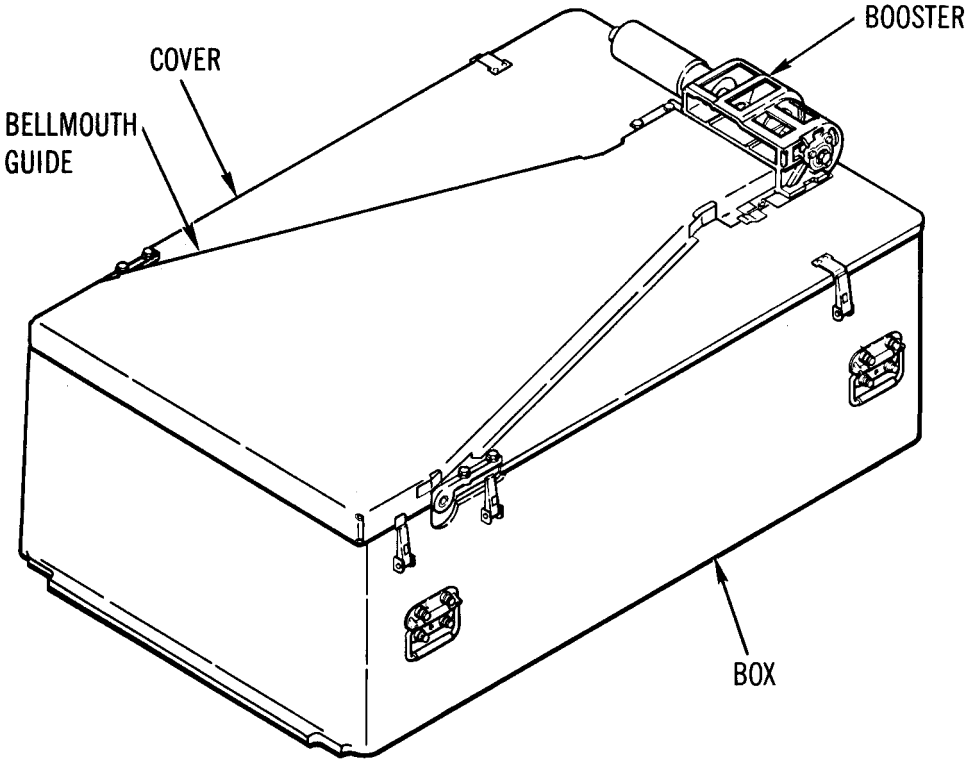
Connects between the booster and the M89E1 feeder. Chuting clips at each end of the feed chute allow remova and installation of the chute.



ARR83-1543

AMMUNITION BOX

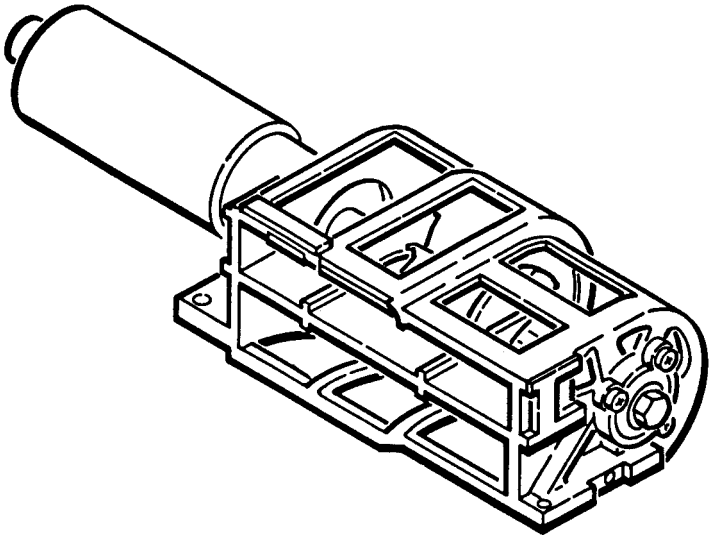
consists of a bellmouth guide, cover, booster, and a 3-bay box. Ammunition stored in the box feeds over a roller at the end of the cover and through the bellmouth guide to the booster.



ARR83-1544

BOOSTER

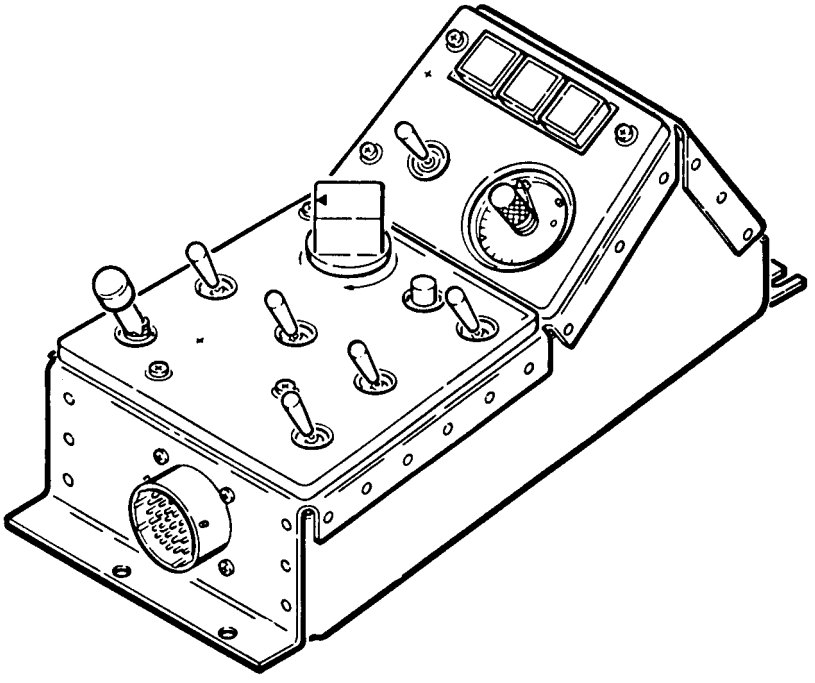
Mounts on the ammunition box cover. Consists of the booster motor, sprocket shaft, and a booster housing with integral link and round guides. The booster provides a smooth, controlled flow of linked ammunition from the ammunition box through the feed chute to the M89F1 feeder.



ARR83-1545

GUNNER ARMAMENT CONTROL PANEL

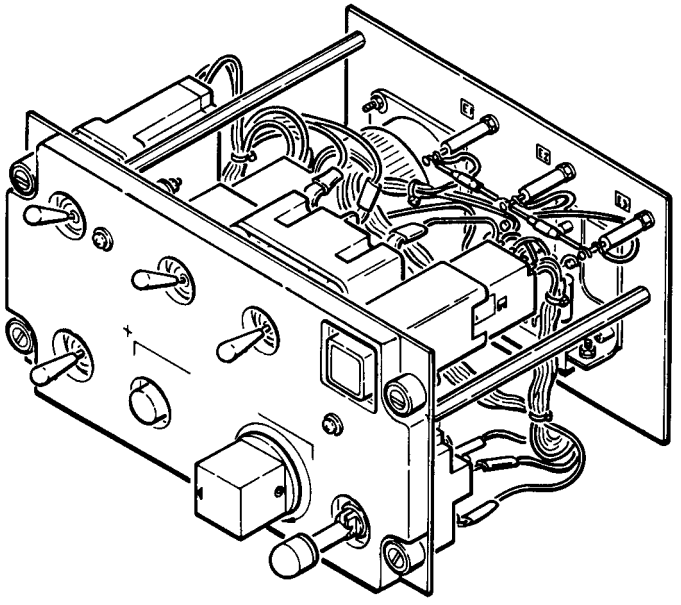
Located in the right console in the gunner cockpit. Contains switches and indicators for gunner control and operation of the RMS and turret subsystem.



ARR83-1546

PILOT ARMAMENT CONTROL PANEL

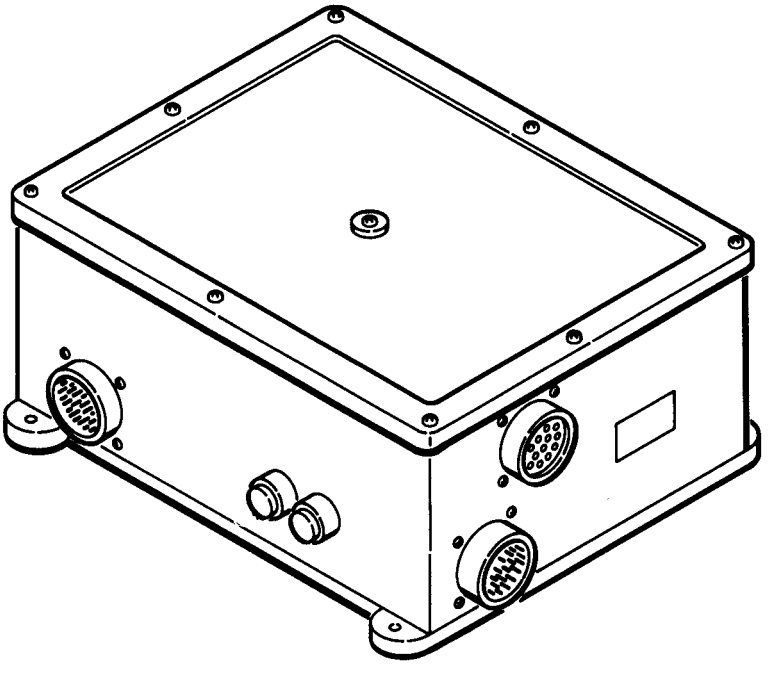
Located in the lower left corner of the console in the pilot cockpit. Contains switches and indicators for pilot control of the RMS and turret subsystem.



ARR83-1547

INTERFACE CONTROL UNIT

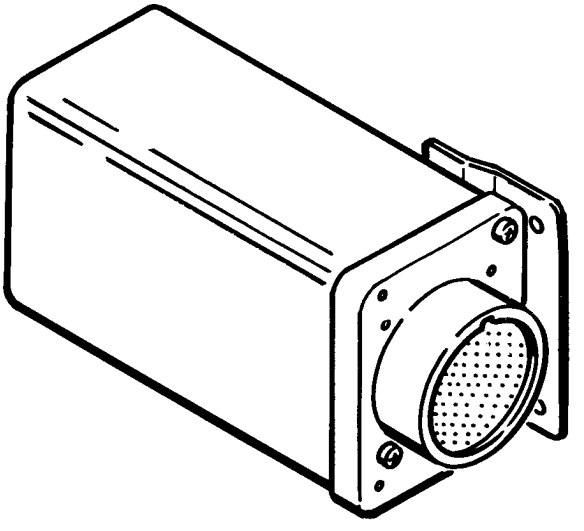
Located in an access compartment below the front of the right wing. Contains the signal switching, signal buffering, reticle lamp and retract circuitry to interface the FCC, HSS, TSU, and the airborne laser tracker (ALT) with the turret subsystem. The FCC adds offset signals through the IFCU buffer amplifiers for range and air data compensation and boresight corrections using the TSU as a baseline.



ARR83-1548

TURRET BUFFER AMPLIFIER

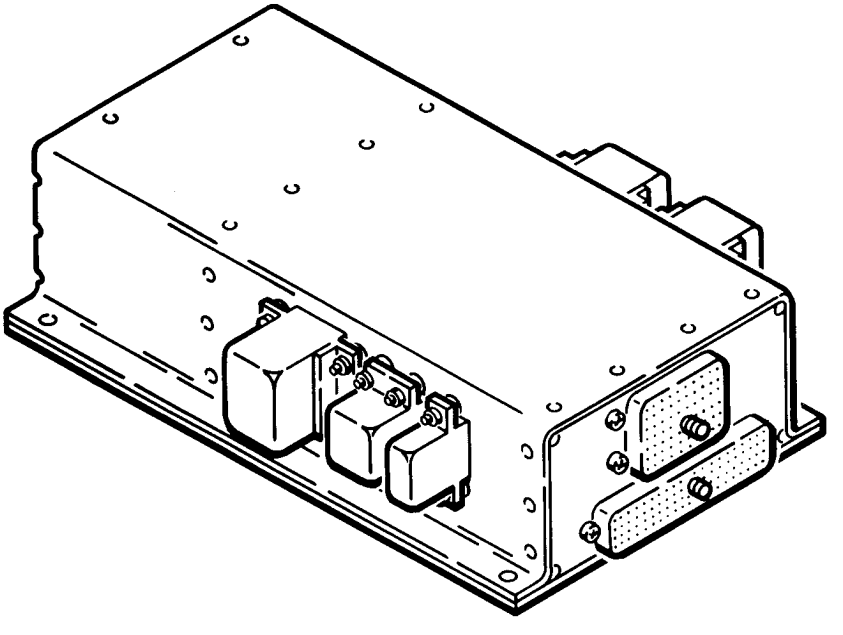
Mounted on the bulkhead aft of the turret. Consists of two electrical connectors and a circuit card assembly. Contains the circuitry to eliminate noise and provide loads for the turret resolvers. Provides relay interlock switching to interrupt the firing voltage if an internal power supply failure occurs.



ARR83-1549

LOGIC RELAY ASSEMBLY

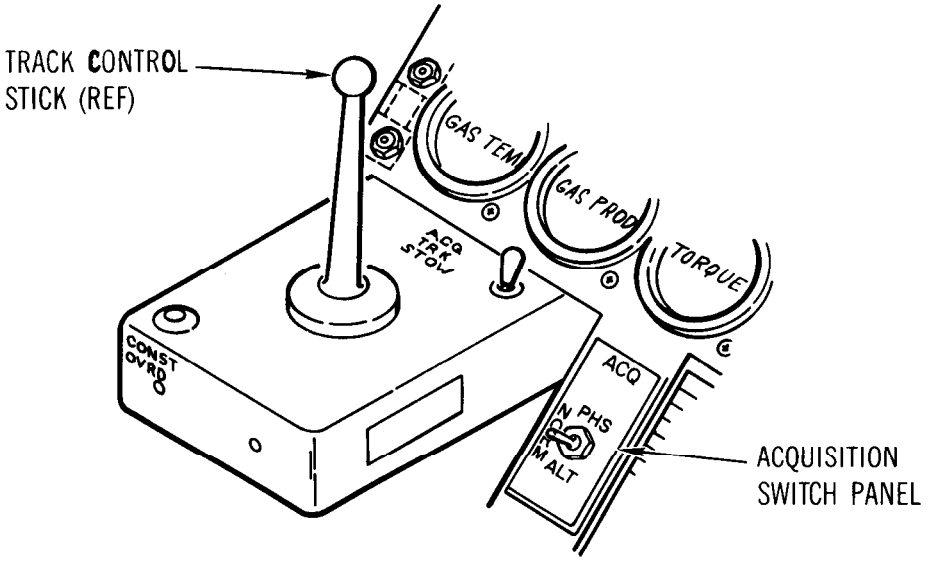
Located in an access compartment on the underside of the helicopter below the ammunition bay. Consists of three circuit card assemblies, five relays, and two wiring harnesses. Provides switching for the turret subsystem, TOW, wing stores, night vision goggles, and control of the armament subsystem indicators.



ARR83-1550

ACQUISITION SWITCH PANEL

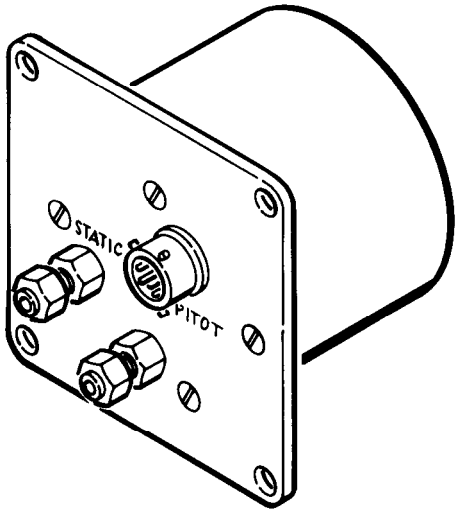
Located in the lower right corner of the console in the gunner's cockpit. Provides a mounting for the PHS/NORM/ALT switch. Positioning the switch to PHS allows the TSU to be alined with the pilot helmet sight (PHS). Positioning the switch to ALT allows the TSU to be alined with the ALT when a designated target is being tracked. Positioning the switch to NORM allows the TSU to be controlled by the sight hand control track control stick.



ARR83-1551

AIRSPEED TRANSDUCER

Located in an access compartment on the left side of the helicopter above the ammunition bay. Provides an unscaled velocity signal to the stabilization control amplifier of the M65 TOW Guided Missile System. Static and pitot air pressure are supplied to the airspeed transducer. A reference voltage is applied to a potentiometer with the airspeed transducer. Forward motion of the helicopter produces a differential pressure from the pitot system to the airspeed transducer. The differential pressure controls the relative position of the potentiometer wiper. The airspeed proportional voltage on the wiper is proportional to the airspeed of the helicopter.



ARR83-1552

DIFFERENCES BETWEEN MODELS

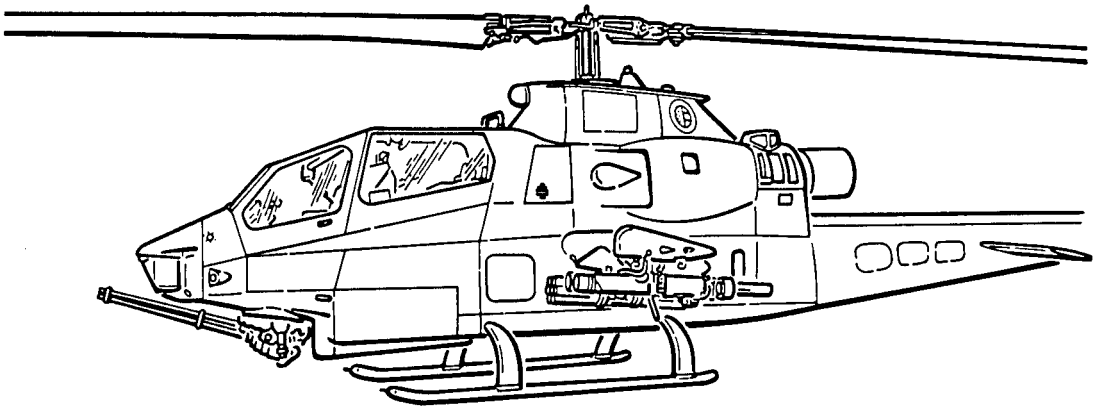
1-10. The major differences between the two models of the armament subsystem are identified in the following tabulated data. Refer to TM 9-1090 -206-20-2 for additional information pertaining to armament subsystem M97A3.

	M97A4	M97A3
M147 Rocket Management Subsystem	X	X
M136 Helmet Sight Subsystem	X	X
M76 Head Up Display Subsystem	X	
M73 Pilot Reflex Sight		X
M26 Fire Control Computer	X	
XM43 Air Data Subsystem	X	
M89E1 Feeder	X	X
Gun Drive	X	X
M197 Gun	X	X
Recoil Adapter and Slider	X	X
Turret	X	X
Logic Control Unit	X	X
Gun Control Unit	X	X
Turret Control Unit	X	X
Ammunition Feed System	X	X
Gunner Armament Control Panel (12910143)	X	
Gunner Armament Control Panel (12011954)		X
Pilot Armament Control Panel (12011971)	X	
Pilot Armament Control Panel (12011952)		X
Interface Control Unit (209-074-110-1)	X	
Interface Control Unit (209-074-051-3)		X
Turret Buffer Amplifier	X	
Logic Relay Assembly	X	
Acquisition Switch Panel (209-175-341-2)	X	
Acquisition Switch Panel (209-075-674-1)		X
Airspeed Transducer	X	X

EQUIPMENT DATA

1-11. Performance data for the armament subsystem M97A4 turret subsystem and its major components are provided in the following tabulated data. Refer to TM 9-1090-206-20-2 for additional information pertaining to the armament subsystem M97A3 turret subsystem and its major components.

TURRET SUBSYSTEM



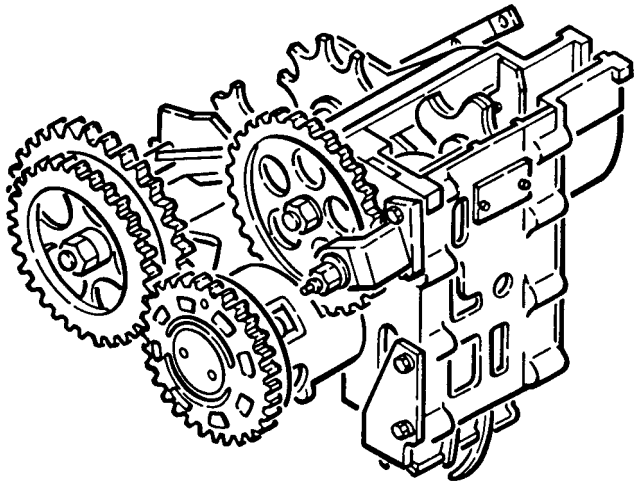
ARR83-1553

Mounting	Chin
Ammunition	
Type	20-mm (M50 series) linked (M14A2 links)
Capacity	750 rounds
Firing Rate	730 ±50 shots-per-minute
Burst Limit	16 ±4 rounds. Optional fireout
Clearing	Automatic after each burst
Case Ejection	Bottom of turret
Azimuth Limits	±130° mechanical, ±110° electrical
Elevation Limit	+13.6 to 21° (depending on azimuth position) mechanical, one degree less electrical
Depression Limit	
Normal Operation	-530° 15' mechanical, -500 15’ electrical
Ground Operation	5°
Slewing Rate	
Azimuth	Above 80°/sec (220 °in 3.3 to 4.2 seconds)
Elevation	Above 60°/see (65° in 1.6 to 1.8 seconds)
Slow slew (ground maintenance)	6° ±2° per second
Position Accuracy	3 mils maximum
Modes of Operation	
Gunner Control	With TSU or HSS
Pilot Control	HSS or HUD (fixed forward 0° azimuth, 0° elevation)
Pilot Override	HSS
Automatic Stow	
Gunner in Control	+11° elevation, 0° azimuth
Pilot in Control (WPN CONTR) switch set to PILOT)	+11° elevation, 0° azimuth
Pilot in Control (WPN CONTR) switch set to FIXED)	0° elevation, 0° azimuth

TURRET SUBSYSTEM (cont)

Emergency Stow	+10° elevation (minimum), 0 ±5° azimuth
Power Requirements	28 Vdc 200 amps, high level (HL) 10 amps, low level (LL) 115 V, 400 Hz
Weight	
Loaded	1000 pounds (approximate)
Without M197 gun, M89E1 feeder and ammunition	416 pounds
Reload Turnaround Time	15 minutes

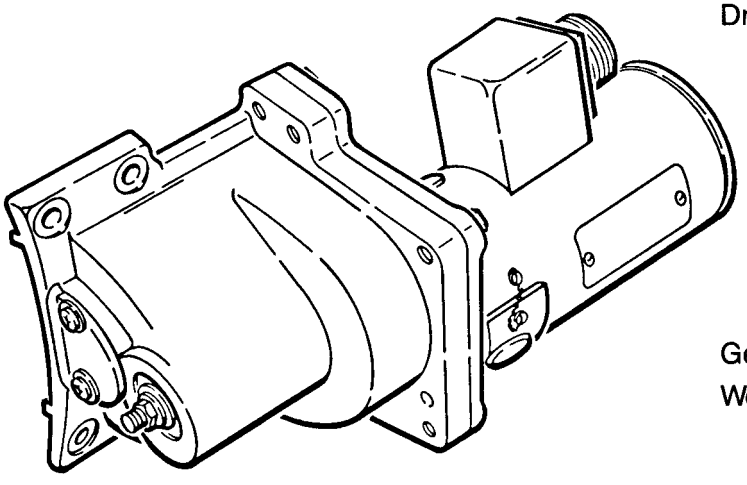
M89E1 FEEDER



Length	13 inches
Height	8 inches
Width	9.5 inches
Weight	22.5 pounds
Type of Link	M14 series
Type of Ammunition	M50 series
Drive	Gear
Power Requirements (Solenoid)	28 Vdc

ARR83-1554

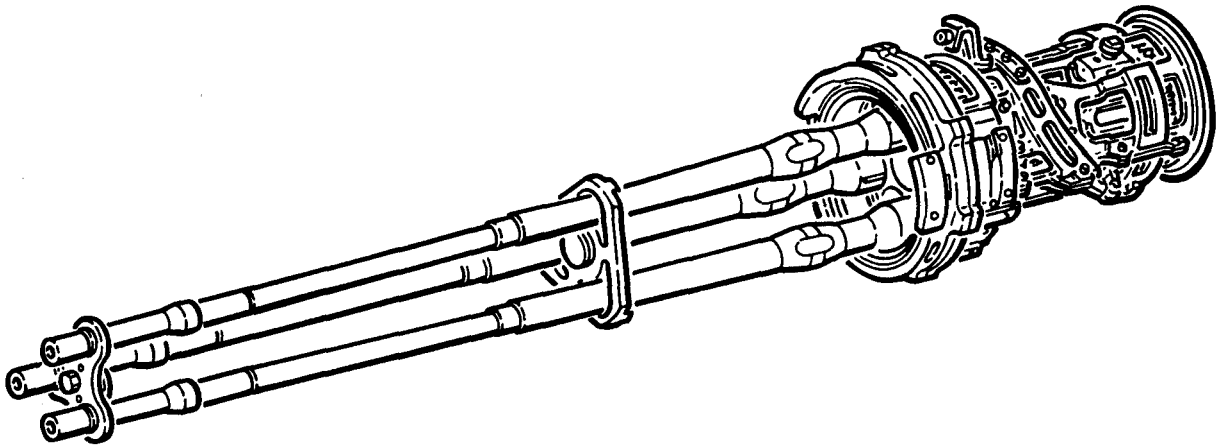
GUN DRIVE



Drive Motor	
Voltage	28 Vdc
Speed	6500 rpm
Starting Current	600 amps (maximum)
Direction of Rotation	Clockwise when viewed from spline end
Horsepower	3
Gear Ratio	28:1
Weight	11.4 pounds

ARR83-1555

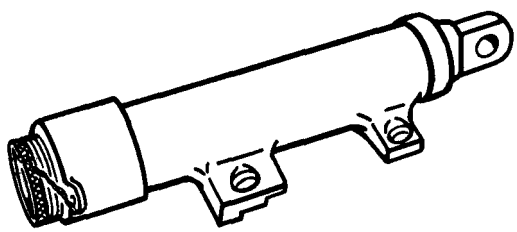
M197 GUN



ARR83-1556

Caliber	20-mm
Rate-of-Fire	730 ±50 shots-per-minute
Effective Range	3000 meters
Muzzle Velocity	3380 ±50 feet per second
Drive	Gear (external electric gun drive)
Rotation	Counterclockwise viewed from breech
Length Overall	72 inches
Weight	139 pounds
Number of Barrels	3
Length of Barrels	60 inches

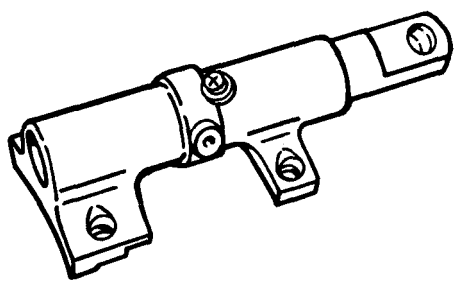
RECOIL ADAPTER



Weight	7.9 pounds
Preload	200 ±50 pounds
Recoil Movement	1.5 inches (maximum)

ARR83-1557

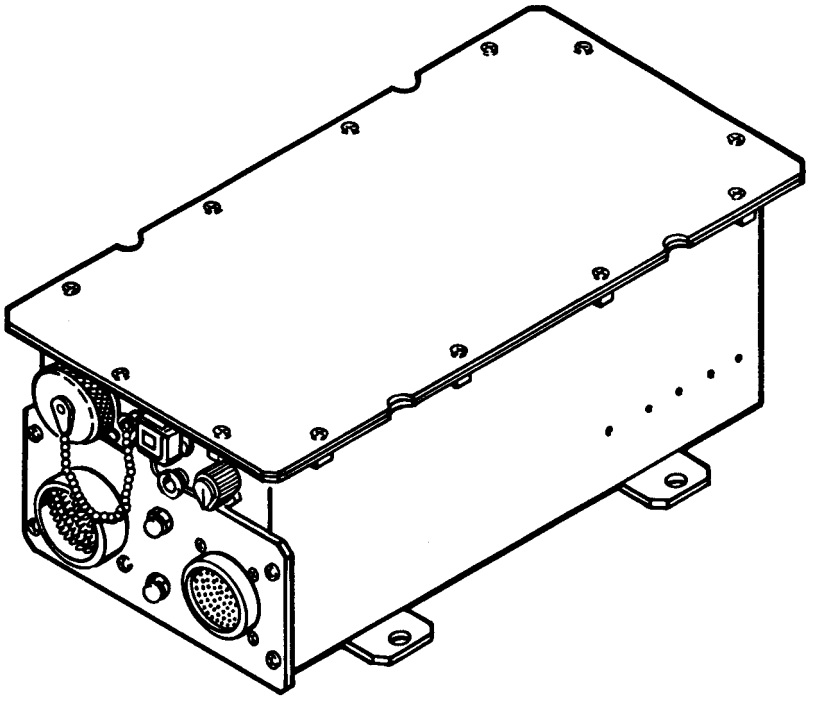
SLIDER



Weight	4.2 pounds
Preload	Not Applicable
Recoil Movement	Not Applicable

ARR83-1558

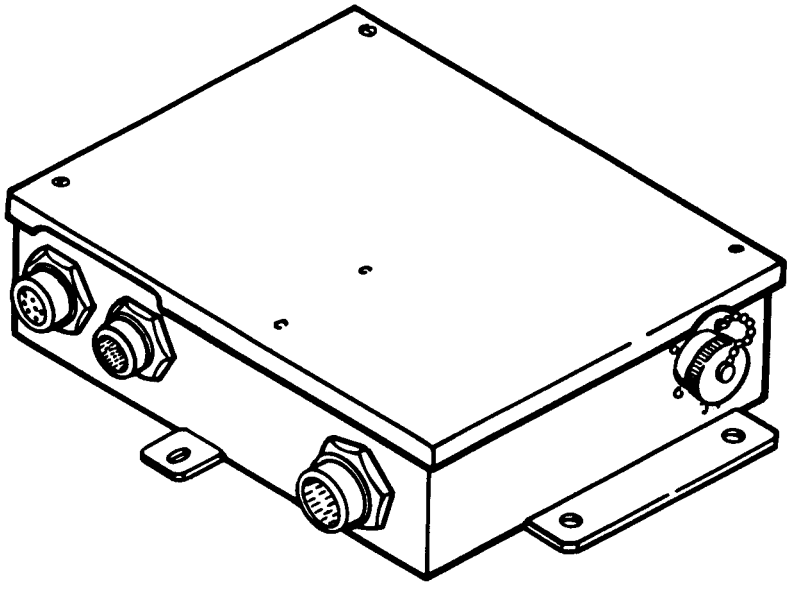
LOGIC CONTROL UNIT



Power Requirements	28 Vdc
	+18 Vdc
	-18 Vdc
	115 Vac
	26 Vac
Weight	4.8 pounds
Height	4.3 inches
Width	5.4 inches
Length	11.3 inches

ARR83-1559

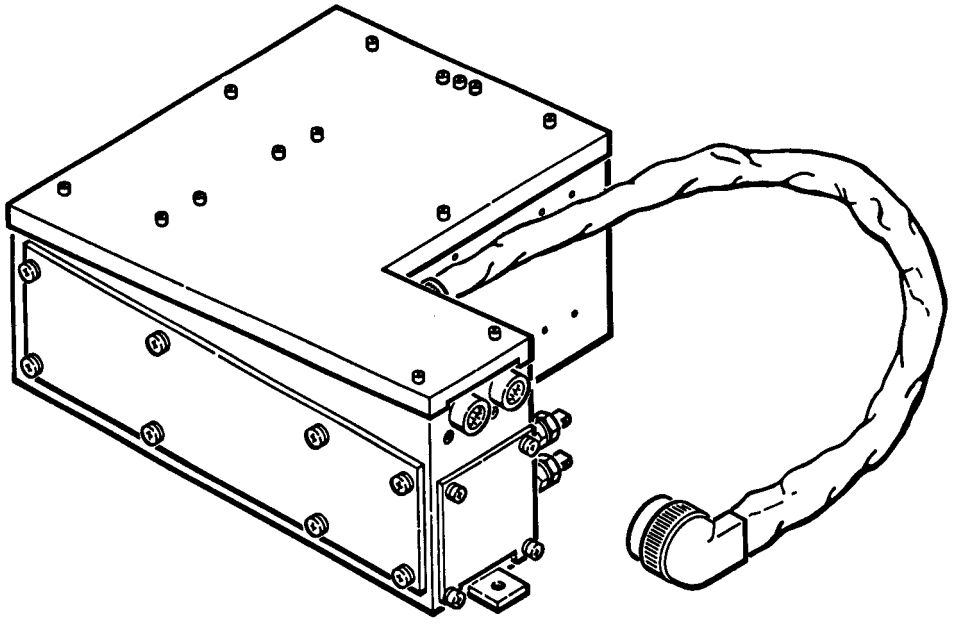
GUN CONTROL UNIT



Power Requirements	28 (22 to 30) Vdc, 15 amps (maximum)
	115 ±5 V, 400 ±20 Hz, 95 VA (maximum)
Firing Voltage	250 to 400 Vdc, 0.5 amp
Weight	8.4 pounds
Height	2.78 inches
Width	8.95 inches
Length	12.09 inches

ARR83-1560

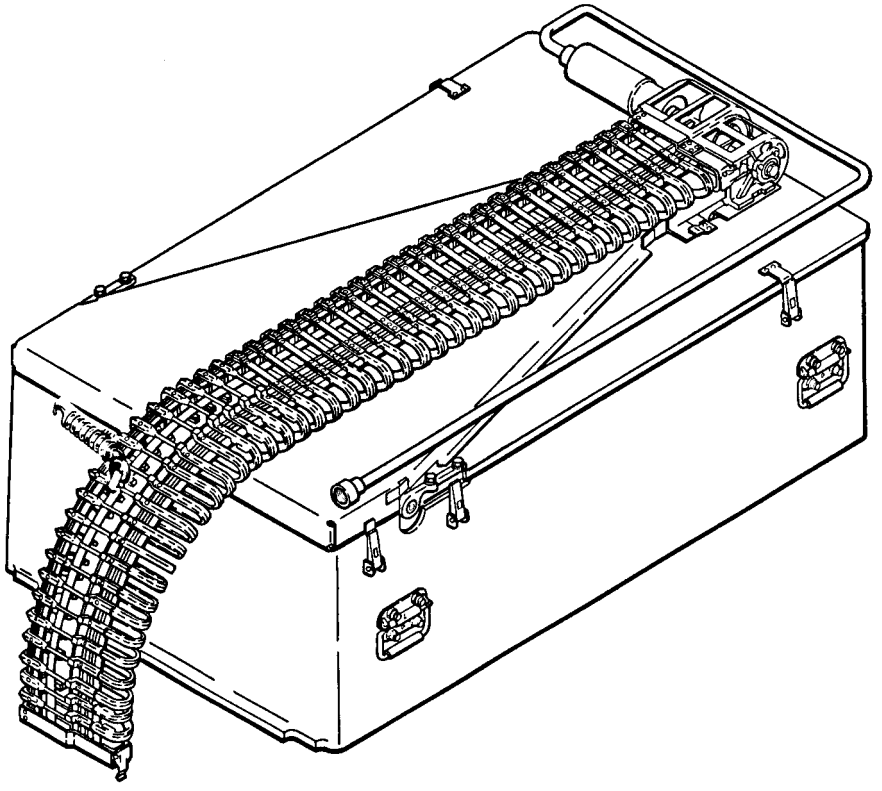
TURRET CONTROL UNIT



Power Requirements	28 (22 to 30) Vdc
	200 amps, high level (HL)
	2 amps, low level (LL)
	115 ±5 V, 400 ±20 Hz, 95 VA (maximum)
	26 ±5 V, 400 ±20 Hz
Weight	15.6 pounds
Height	5.16 inches
Width	10.16 inches
Length	12.72 inches

ARR83-1561

AMMUNITION FEED SYSTEM

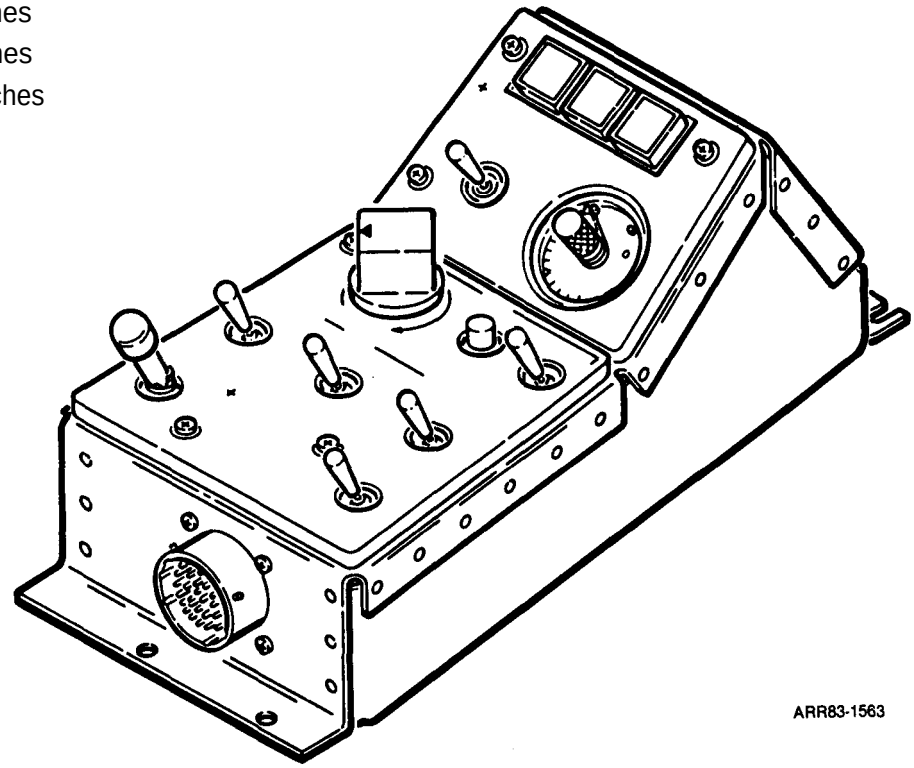


Capacity	750 rounds of linked 20-mm ammunition
Ammunition Box	
Weight	
Empty	93 pounds
Loaded	545 pounds
Height	18 inches
Width	26.5 inches
Length	44 inches
Booster	
Weight	8.5 pounds
Drive Motor	
Voltage	22.5 to 30 Vdc
Current	30 amps (maximum) at rated load
Feed Chute	
Weight	16 pounds
Height	3.5 inches
Width	7.5 inches
Length (extended)	90 inches

ARR83-1562

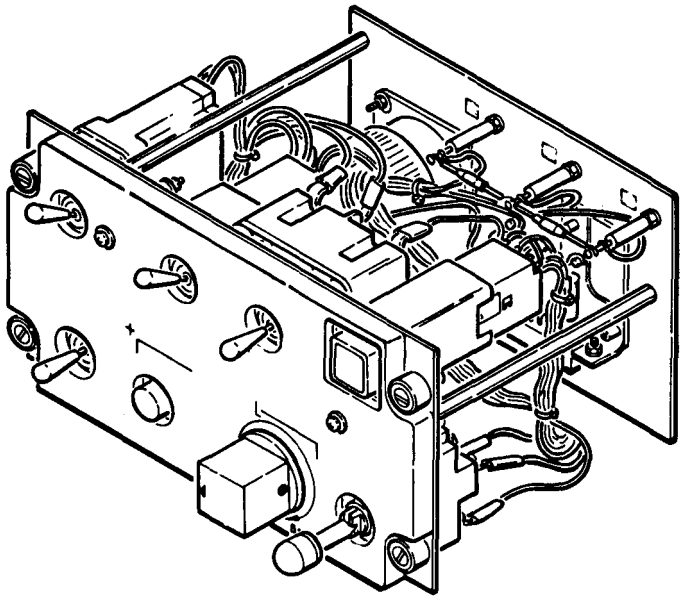
GUNNER ARMAMENT CONTROL PANEL

Weight	2.5 pounds
Height	3.8 inches
Width	4.8 inches
Length	10.9 inches



ARR83-1563

PILOT ARMAMENT CONTROL PANEL

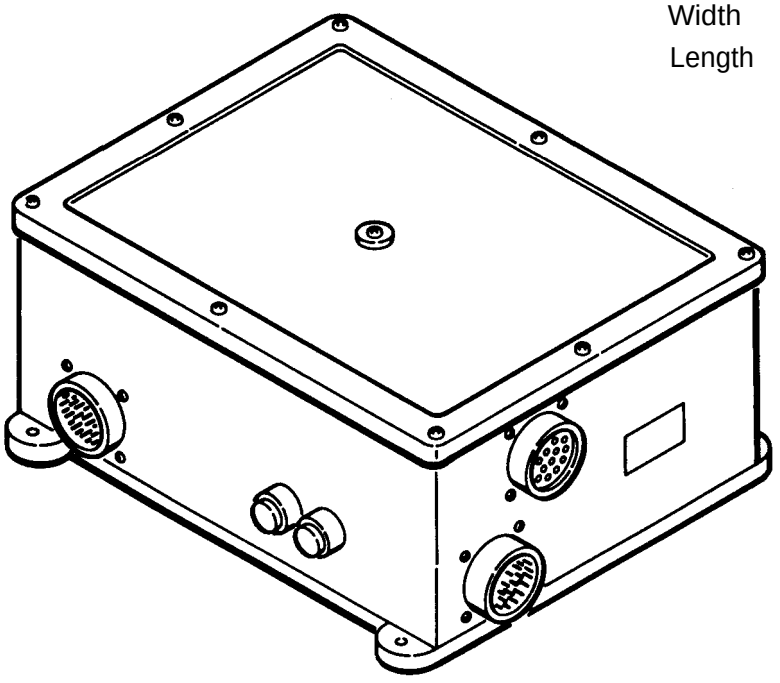


Weight	1.5 pounds
Height	3.0 inches
Width	4.4 inches
Length	5.8 inches

ARR83-1564

INTERFACE CONTROL UNIT

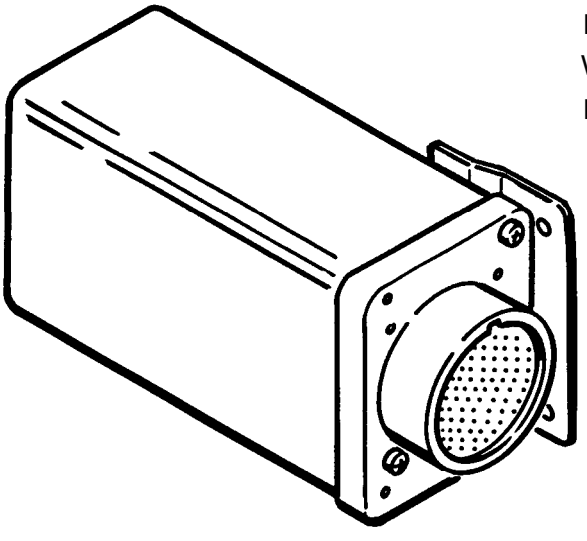
Power Requirements	28 Vdc
	115 Vac
Weight	7 pounds
Height	4.6 inches
Width	9.4 inches
Length	10.4 inches



ARR83-1565

TURRET BUFFER AMPLIFIER

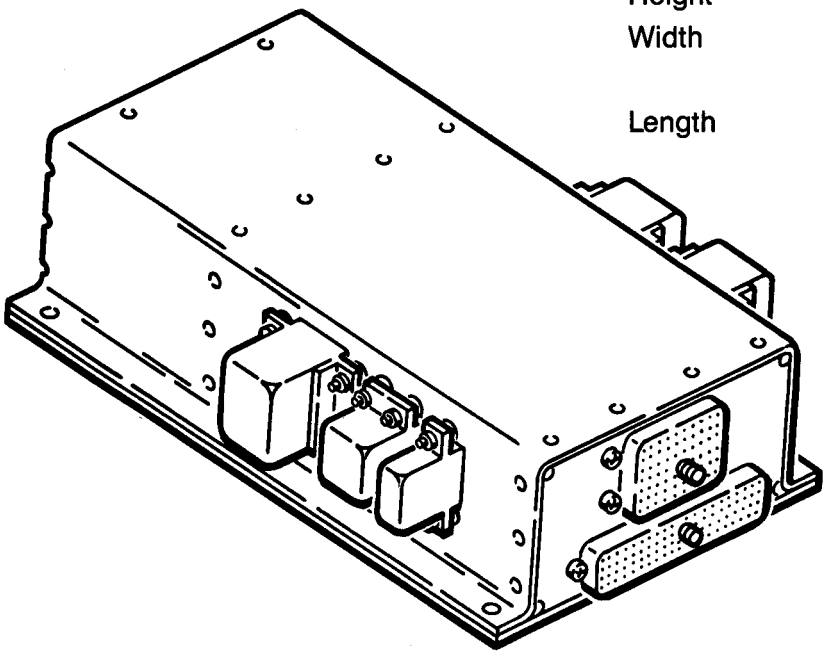
Power Requirements	115 Vac
Weight	0.9 pounds
Height	2.0 inches
Width	2.4 inches
Length	4.9 inches



ARR83-1

LOGIC RELAY ASSEMBLY

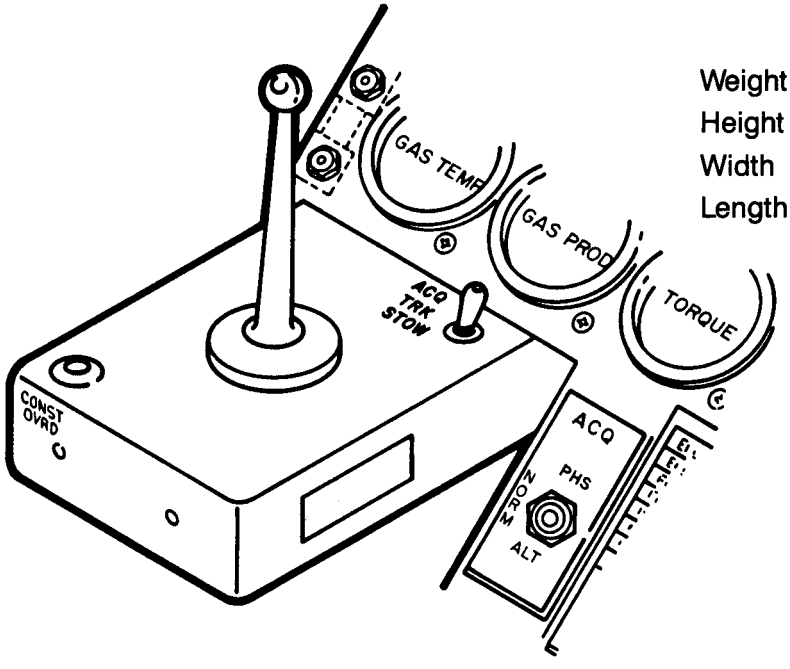
Power Requirements	28 Vdc (input)
Weight	5.6 pounds
Height	2.75 inches
Width	7.25 inches (total with relays installed)
Length	12.0 inches (total with connector bolt included)



ARR83-1567

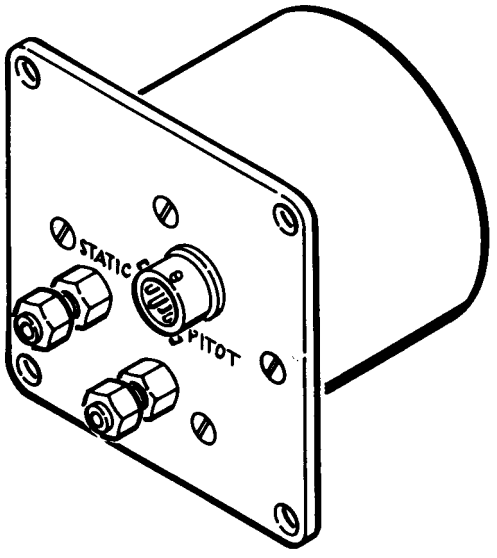
ACQUISITION SWITCH PANEL

Weight	0.5 ounce
Height	1.2 inches
Width	0.25 inch
Length	2.6 inches



ARR83-1568

AIRSPEED TRANSDUCER



Resistance	5K ±025 ohms
Load	200 K ohms
Accuracy	
Air Speed	Tolerance
15 to 29 knots	+10 knots, -15 knots
30 to 39 knots	±10 knots
40 to 99 knots	±5 knots
100 to 200 knots	±3 knots
Temperature Range	-67°F (-55°C) to + 185°F (+85°C)
Weight	0.7 pound
Power Rating	0.20 watt

ARR83-1569

SAFETY, CARE, AND HANDLING

1-12. The armament/turret subsystem incorporates a number of safety features. The electrically-primed rounds are isolated from the firing circuit except when the turret subsystem is being fired. The armament/turret subsystem is quite resistant to radiation hazard (RADHAZ) disturbance. If the M14 links are equipped with RADHAZ tabs, the ammunition in the turret subsystem can be considered RADHAZ safe. The M197 gun is loaded and cleared in flight so that the helicopter may take off and land without live rounds in firing position. Observation of all safety precautions is MANDATORY at all times. The following general safety precautions are not related to any specific equipment or procedure and do not appear elsewhere in the manual. All concerned personnel must understand and apply these precautions during operation and maintenance of the equipment.

1. All personnel who supervise or perform work in connection with the handling of munitions will be familiar with the instructions and directives of the commands concerned.

2. All concerned personnel will become familiar with the armament/turret subsystem and support equipment before undertaking any operation or procedure. All concerned personnel will read the complete operation or procedure thoroughly before starting, to assure complete understanding by all involved.

3. All personnel must understand that observance of all safety precautions which apply to any specific equipment will be ineffective unless all safety precautions which apply to its related equipment are also observed at the same time.

4. Safety devices will always be used to minimize the possibility of accidents. Safety devices will be kept in good operating order.

Section III. PRINCIPLES OF OPERATION

GENERAL

1-13. The turret subsystem is electrically operated and requires 28 Vdc and 115 V, 400 Hz power from the helicopter electrical system. Power to the turret subsystem is normally controlled by switches on the pilot AC armament circuit breaker panel.

The turret subsystem has three modes of operation: gunner in control, pilot in control, and pilot override. During gunner operation, the gunner directs the M197 gun using the TSU or HSS. During pilot operation, the pilot can either direct the M197 gun using the HSS or fire the M197 gun as a fixed position weapon using the HUD/Reflex Sight. During pilot override operation, a switch on the gunner armament control panel bypasses pilot control of turret subsystem power and operation, and the gunner directs the M197 gun using the HSS.

If normal turret subsystem operating power is lost or removed, for any reason, the emergency stow control unit will automatically position the M197 gun at the emergency stow position to permit the helicopter to be landed safely.

Electrical circuits in the TSU, HSS, turret control unit, and the turret permit remote control of the turret azimuth and elevation drive systems. The azimuth drive system positions the M197 gun over an azimuth range of 110° either side of 0° azimuth. The M197 gun can be depressed a maximum of 50° below 0° elevation. Elevation of the M197 gun above the horizontal varies with the azimuth position of the M197 gun. The variable upper elevation limit assures maximum gun elevation consistent with safe clearance of the helicopter rotor blades and structure. Mechanical stops prevent positioning the M197 gun beyond the azimuth and elevation limits. Azimuth and elevation proximity switches remove power from the azimuth and elevation drive systems just before the turret reaches the mechanical stops. The proximity switches also disable circuits in the gun control unit to prevent the M197 gun from firing if the turret is at a positional limit.

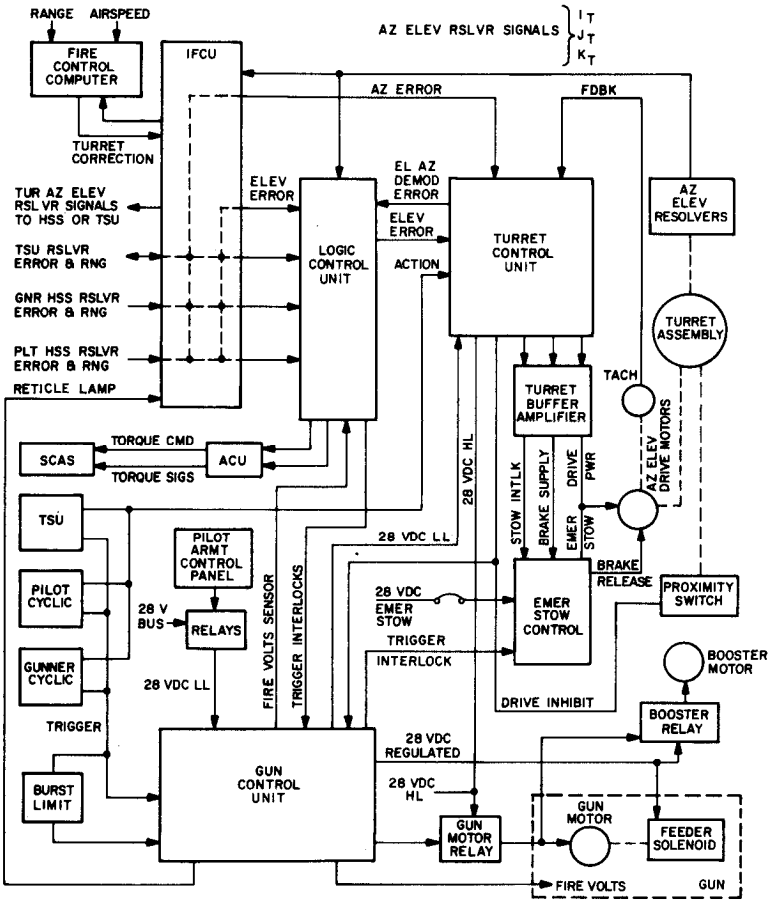
The gun control unit electrically controls the operation of the M197 gun, M89E1 feeder, and the ammunition feed system. If the turret is positioned within operational limits and is within 45° of the azimuth and elevation command signals, the gun control unit will apply power to the gun drive, M89E1 feeder, and booster when the trigger is depressed. The gun control unit also applies firing voltage to the M197 gun at the same time as gun drive power is applied.

The gun drive provides mechanical power to operate the M197 gun. Drive power is transmitted through the M197 gun to operate the M89E1 feeder. The feeder solenoid and booster motor are energized simultaneously to provide a smooth, controlled flow of ammunition from the ammunition box to the M89E1 feeder. The feeder solenoid engages the feeder declutching mechanism and linked ammunition is pulled into the M89E1 feeder, stripped from the links, and fed into the M197 gun. The empty links are ejected from the M89E1 feeder and directed out the bottom of the turret.

The M197 gun will fire a burst of 16 ±4 rounds when the trigger switch is pressed to the first detent. When the trigger switch is pressed to the second detent, the M197 gun will fire a continuous burst at 730 ±50 shots-per-minute. The flow of ammunition into the M197 gun is stopped immediately whenever the trigger is released. Time delay circuits in the gun control unit continue gun drive power and firing voltage to allow all rounds remaining in the M197 gun to be fired. If the turret activates any proximity switch, the trigger signal is interrupted, and the M197 gun will go into a clearing cycle. When the turret slews out of that limit, the M197 gun will resume firing. If the azimuth and elevation command signal lead the actual position of the turret, the trigger signal is interrupted, firing voltage is removed, and the M197 gun will go into a non-firing clearing cycle. When the turret position catches up with the commanded position the M197 gun will resume firing. Electrical interlocks prevent firing rockets or TOW missiles when the turret is slewed more than 50 in azimuth. When the wing stores lockout circuitry is enabled, the turret will stow at zero degrees azimuth and elevation to preclude the possibility of gun fire detonating rockets or missiles in close proximity to the helicopter.

FUNCTIONAL DESCRIPTION

1-14. The turret subsystem consists of four major functional groups: pilot/gunner fire control; sight control; weapon control; and turret positioning. The function and relationship of these major groups are shown in a block diagram. Refer to figure FO-1 for a schematic diagram of the turret. For a more detailed functional bbck diagram, see figure FO-2 (M97A1) or FO-2.1 (M97A2).



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The pilot/gunner fire control provides the means to select the operator, either pilot or gunner, who will control the turret and who will fire the M197 gun. The sight control subsystem consists of the TSU, HSS, and the interface control unit. The sight control function permits the operator to acquire a target and to position the turret in azimuth and elevation relative to that target. Either the TSU or the HSS may be used to position the turret depending upon control switch selections available to the operator. The trigger signal from the mode dependent trigger switch is applied to the gun control unit.

The gun control unit provides the circuits necessry to fire the M197 gun. The gun control unit also provides time delays, trigger interlocks, gun clearing, and some system-related power supplies. Some of the gun firing interlock circuits are provided by the logic control unit. The logic control unit contains the following fire interrupt logics: azimuth and elevation synchronization detectors; gunner stow interrupt; depression limit interrupt; out of coincidence; and interface control unit power supply failure interrupt. Burst limiting and simultaneous firing of the M197 gun and rockets is also provided by the gun control unit. Gun recoil induced helicopter attitude changes are minimized by circuits which interface with the helicopter stabilized control augmentation system (SCAS). The pitch, yaw, and roll torque signals are dependent upon turret position, and are utilized by the helicopter when a torque command signal is present.

The turret control unit circuits position the turret in fixed forward (0° azimuth, 11° elevation) positions, and also in a track or flexible mode to the selected sight line-of-sight. The turret control unit also provides signals to the gun control unit to indicate and out-of-coincidence (weapon to sight) condition, weapon in depression limit, weapon in gunner stow, weapon in an azimuth or elevation limit, and a defect in the interface control unit. Whenever any of these indications are present, the M197 gun cannot be fired. The turret positioning circuits also include a backup provision to stow the turret in an upper forward position in the event of primary position control failure.

OPERATING MODES

The turret subsystem is functionally enabled in the following operating modes:

Gunner TSU. The gunner positions the turret and TSU with the sight hand control track control stick when WPN CONTR switch is placed to GUNNER.

Gunner HSS. The gunner positions the turret with his helmet sight when WPN CONTR switch is placed to GUNNER.

Pilot Override. The gunner places the PLT ORIDE switch on the gunner armament control panel to PLT ORIDE position to override the pilot in either PILOT or FIXED mode of the WPN CONTR switch. The gunner then takes control of the turret with his helmet sight.

Pilot HSS. The pilot positions the turret with his helmet sight when the WPN CONTR switch is placed to PILOT position.

Fixed. When the WPN CONTR switch is placed to FIXED position the M197 gun is fixed at 0° azimuth, 0° elevation and the pilot fires the M197 gun with his cyclic stick trigger.

NOTE

A description of the various armament configurations and firing modes are contained in TM 55-1520-236-10. A complete wiring diagram, showing interface between the turret subsystem and the helicopter power and control wiring is contained in TM 55-1520-236-23.

STANDBY MODE

Placing the MASTER ARM switch on the pilot armament control panel to STBY energized standby relay K38. With standby relay K38 energized, 28 Vdc LL is applied from helicopter circuit breaker CB1 to the 28-volt regulated supply in the gun control unit. After a 2.2 to 5.5-second time delay, relay A4K2 in the gun control unit will energize if 115 Vac and 28 Vdc LL are present in the gun control unit. This time delay and voltage interlock is necessary to assure proper operation of the turret when turret power is applied. With helicopter TURRET PWR relay K7 energized, 28 Vdc HL is enabled to the turret control unit, gun drive motor, and booster motor. The turret may now be positioned, but not fired because the trigger circuits are disabled at this time. When the action switch is pressed, the turret is slaved to the TSU or HSS. When the action switch is released, the turret is automatically positioned to 0° azimuth, 11° elevation.

The FIXED mode on the WPN CONTR switch is used to command the turret to the 0° azimuth, 0° elevation position. This position is used by the pilot when he does not want to use his helmet sight to position the turret. This fixed mode can be used to position the M197 gun for use in a strafing attack when the MASTER ARM switch is placed in the ARM position. When the fixed mode is selected, relay A3A1K1 in the turret control unit is energized and the action (track) relays cannot be activated.

When the WPN CONTR switch is in GUNNER position, the gunner can use the TSU or his helmet sight for turret positioning. When the TOW control panel model select switch is set to TSU/GUNS, the turret can be slaved to the TSU line-of-sight (LOS). All other TOW system modes would cause the pilot's HSS to direct the turret position. The GUNNER mode action switch is located on the TSU left-hand grip and is used to slave the turret to either the TSU or the HSS.

The PILOT mode allows the pilot to position the turret with his helmet sight. The turret is slaved to the helmet sight line-of-sight when the pilot cyclic stick action switch is pressed.

ARMED MODE

The turret subsystem has the same modes of operation as in the standby mode except that the trigger and firing circuits have been energized by the MASTER ARM switch. The trigger circuits are interlocked to the status conditions of the mode switches to prevent inadvertent firing of the M197 gun. The wing stores triggers cannot be utilized unless turret azimuth stow switch S3 is closed. This prevents firing rockets or TOW missiles if the M197 gun is at any position other than 0° azimuth. Burst limiting is controlled by the burst limit relay in the helicopter. The burst limit relay is energized when the selected trigger is pressed to the first detent. Contacts on the burst limit relay open and disconnect the burst limit signal from the input to the gun control unit. When the PLT ORIDE switch on the gunner armament control panel is placed in the PLT ORIDE position, the gunner positions the turret with his helmet sight. In this mode, the gunner uses the action and trigger switches on his cyclic stick and the TOW missile subsystem is interlocked to off.

TURRET POSITIONING

The turret is positioned by a directional cosine servo system. In other than gunner stow and fixed, positioning of the turret is initiated by the TSU or HSS. The positioning block consists of the following functional groups: sight resolvers, interface control unit, turret, servo amplifiers and motors, and emergency stow. The turret position resolvers are mechanically coupled to the saddle (elevation) and lower support (azimuth). The servo amplifier consists of azimuth and elevation servo amplifier circuits and servo motors, power amplifiers, and dc tachometer feedback loops. The emergency stow group consists of an elevation and azimuth drive in the emergency stow control unit and a turret power amplifier cutoff signal. The azimuth and elevation stow switches are mounted on the turret and are mechanically actuated.

The turret commanded position is dependent upon the position of the WPN CONTR switch. With the WPN CONTR switch set to FIXED, the turret will slew to the fixed forward position (0 °azimuth, 0° elevation). Inthe FIXEDposition, fixed relay A3A1K1 isenergized and inhibits action relays A3A1K3, K4, and K5. With the action relays deenergized, the sine of the turret azimuth resolver signal and the sine of the turret elevation resolver signal are applied to the respective azimuth and elevation servo amplifiers. The servo amplifiers then drive the turret to approximately 0° azimuth and 0° elevation to null the resolver signals. Thus, whenever fixed relay A3A1K1 is energized, the turret will position to 0° azimuth, 0° elevation.

When the WPN CONTR switch is set to GUNNER position, fixed relay A3A1K1 is deenergized. With relay A3A1K1 deenergized, the upper stow signal is applied to the elevation servo amplifier to drive the turret to 11° elevation (gunner stow). With the WPN CONTR switch set to GUNNER, the action relays are enabled and the turret can be commanded by the selected sighting mechanism.

Positioning the turret to a point of conversion consists of three steps: activating the turret subsystem; acquiring the target with the selected sighting mechanism; and tracking the turret to a point of conversion. The turret is activated by pressing the action switch. With the action switch pressed, 28 Vdc is applied to action relays A3A1K3, K4, and K5. When energized, relay A3A1K4 applies the azimuth error signal from the interface control unit to the variable main amplifier in the turret control unit, and relay A3A1K5 provides a path for the elevation error signal from the logic control unit to the elevation servo amplifier. With the action relays energized, the servo drive circuits are enabled and the positioning resolver applies the proper signals to position the turret to a point of conversion.

Acquisition of a target with the selected sight can also be accomplished prior to closing the action relays. As a sight is moved in azimuth and elevation, the sight resolver rotors are rotationally displaced from their respective stators and generate error signals which are applied to the appropriate servo amplifier. The servo amplifier then moves the turret in the direction to null the error. The turret signals, which excite the sight resolvers, null the error by changing phase and amplitude according to turret position. Thus, the position to which sight was moved is duplicated by the turret. The elevation error signal is applied to the turret control unit through depression limit circuitry in the logic control unit. When the depression limit switch on the gunner armament control panel is in the TURRET DEPR LIMIT position, 28 Vdc is applied through deenergized fixed relay A3A1K1 to the logic control unit. Turret depression is then limited to -5° to prevent driving the gun barrels into the ground.

When the turret is in the FIXED mode, the prime error signal is from the sine winding of the respective turret resolver. Therefore if the turret is not at zero, an error signal will be developed to move the turret to zero. The stow offset signal is a secondary input available to the servo amplifiers. This signal provides a maximum position control of ±2° to allow boresighting in the fixed mode without adjustment of the turret resolvers. Adjustment of the stow offset potentiometers in the turret control unit will aline the turret. In the gunner stow mode, the fixed elevation stow voltage is equivalent to +11° and the azimuth stow input is shorted to ground.

The azimuth and elevation servo amplifiers are functionally similar. The azimuth servo amplifier determines, by error signal phase, the direction in which the turret will be driven. As the turret moves, a tachometer feedback signal is developed and applied to the azimuth servo amplifier. Both tachometer feedback signals, azimuth and elevation, perform two functions. One function is slew velocity limiting to keep the turret from driving too fast. The second function is a reverse drive signal which is provided to the servo amplifier when the turret position is within 4.5° of the point of conversion. This last function provides a damping effect to stop the turret from over-driving the point of conversion and also to prevent oscillation of the turret. When the turret reaches the point of conversion, both error signals are at a zero voltage level and the turret stops driving. When the turret stops driving, the tachometer feedback signal drops to a zero voltage level. As long as the sights are not moved, the turret will remain in that position.

When the action switches are released, the action relays are deenergized and gunner stow positioning signals are applied to the azimuth and elevation servo amplifiers. The servo amplifiers then drive the turret to the gunner stow position. The azimuth and elevation proximity switches, which are mounted on the turret, provide safe positioning of the turret. When the turret is slewed into a limit (left, right, up, or down), a limit signal from the applicable proximity switch is applied to the gun control unit to prohibit the M197 gun from firing. The limit signal is also applied to the applicable servo amplifier to prohibit the drive circuit from continuing to drive in that direction. Whenever the turret lags the sight command by more than 4.5°, the logic control unit provides a coincidence signal to the gun control unit to prohibit the M197 gun from firing.

The emergency stow control unit provides the capability to stow the turret in an emergency stow position (approximate gunner stow). The emergency stow control unit also provides the capability to stow the turret safely when power to, or within, the turret subsystem is low or faulty. When emergency stow is initiated, the turret will drive to at least 10° elevation and to approximately 0° azimuth. When all the electrical power required for turret subsystem operation is applied to the turret subsystem, 28 Vdc emergency stow power is inhibited. When one or more of the monitored power supplies are faulty, the following events occur: power to the elevation and azimuth brakes is routed via the respective stow switches; the turret control unit circuits are inhibited; and the elevation stow circuit supplies power to the elevation drive motor. This drives the turret to the upper stow position.

When the turret reaches the upper stow position, the elevation stow switch inhibits power to the elevation drive and brake. This locks the turret in the elevation stow position. When the elevation stow switch is activated, 28 Vdc emergency stow power is routed through the azimuth stow switch to the azimuth brake. This enables the azimuth drive in the emergency stow control unit to position the turret to 0° azimuth. The azimuth stow switch is a three-deck cam switch. One switch is open when the turret is out of the 0° azimuth position. The other two switches are open or closed depending on whether the turret is positioned to the left or right of 0° azimuth. If the turret is positioned left of 0° the emergency stow control unit will cause the turret to slew right to 0° and stop. At this time azimuth brake power is inhibited to lock the turret in azimuth. When the turret is not in 0° azimuth, azimuth stow switch S3 is open to inhibit wing stores from firing.

The logic control unit coincidence circuits monitor either the TSU or HSS resolver signals. This action provides indications to the gun control unit that the turret is alined to the sight and that the total resolver system is functional. If coincidence between the sight and turret resolvers exceed 4.5° or if a resolver failure occurs, gun firing will be interrupted. In addition, the interface control unit provides positive and negative 18 Vdc interlock voltages. Failure of either voltage will open the Q inputs to the coincidence circuits.

The fire control computer provides continuous gun directing command signals proportional to the ballistic prediction angle, including compensation for effects of range, air density, helicopter pitch and roll, total velocity, rotor downwash, weather vaning, and time-of-flight. The fire control computer provides inputs for compensation or alinement to the servo loop through the interface control unit buffers. The computer inputs are parallel to the loop. If the fire control computer fails, the interface control unit bypasses the fire control computer and ties the sights directly to the weapon.

WEAPON CONTROL

The M197 gun is controlled by four functional groups: trigger logic, fire volts, gun drive motor circuits, and feeder and booster drive circuits. The trigger logic consists of a burst limit circuit, a rocket lockout circuit, a reticle flasher circuit, and the trigger enable gates circuitry. The trigger logic circuitry provides the safe-to-fire logic and will prohibit the M197 gun from firing when specified conditions are not met.

The fire volts circuitry consists of a fire volts time delay, the fire volts lockout gates, a fire volts power supply, and the fire volts sensor. The fire volts circuitry provides 320 Vdc to electrically fire the primer of the rounds, interrupts the fire volts when certain conditions are not met, and provides the logic control unit torque command circuitry with a signal which interlocks the torque command to the helicopter SCAS system. The gun drive delay relay (gun drive motor) circuit provides a time delay for gun clearing. The feeder and booster drive circuit consists of a relay driver which energizes the feeder solenoid and booster motor.

The trigger logic circuits consist of six AND gates, a rocket lockout time delay, a burst limiter circuit, and a reticle flasher circuit. The six AND gates receive their inputs from the four turret limit switches and the turret positioning azimuth and elevation coincidence signals. When the turret system activates any turret proximity switch, the trigger signal is interrupted and the M197 gun goes into clearing. When the turret slews out of that limit, the trigger signal is enabled and the M197 gun starts firing. The azimuth and/or elevation error signals occur when a sight position command leads the actual turret position by 4.5° or a resolver failure occurs. When this occurs, the trigger signal is inhibited and the M197 gun goes into a non-firing clearing cycle. When the turret position catches up with the sight commanded position (less than 4.5°), the M197 gun will resume firing.

When the turret subsystem is in a firing condition, the sight reticle lamp is constantly illuminated. When the trigger signal is interrupted, a trigger lockout signal is applied to the reticle flasher circuit. When enabled, the reticle flasher circuit causes the sight reticle lamp to blink on and off. The flashing reticle lamp indicates the gun firing circuits are inhibited. When the trigger signal is again enabled, the reticle lamp stops flashing.

With trigger applied and interlock conditions good, the trigger signal is applied to the fire volts time delay, feeder/booster relay driver, and the gun motor time delay circuits. The fire volts and gun motor tone delays are activated when the trigger is released or when the trigger signal is interrupted. The fire volts time delay and the fire volts lockout route the trigger signal to the fire volts relay. With this signal applied, the fire volts relay is energized and 320 Vdc is applied to the M197 gun. Each time a round is fired, the drop in voltage level provides a pulse to the sensor circuit. The sensor circuit detects the pulse and applies a signal to the logic control unit to indicate that the M197 gun is firing. The gun motor time delay energizes gun motor relay K5. With K5 energized, 28 Vdc is applied to the gun drive motor, feeder solenoid, and the booster motor. As the M197 gun fires, a rounds count pulse from the rounds sensing switch on the M89E1 feeder is applied to the rounds remaining indicator on the gunner armament control panel and to the rounds totalizer on the turret.

When the trigger is released, the gun control circuitry initiates the clearing cycle. The feeder and booster motor relays are deenergized when the trigger is released to prevent rounds from being fed into the M197 gun. Approximately 650 milliseconds after the trigger is released, the gun motor time delay will inhibit the gun drive. Approximately 1.5 seconds after the trigger is released, the fire volts time delay will inhibit fire volts. Since the gun drive will continue to operate for approximately 650 milliseconds after the feeder solenoid is deenergized, all rounds in the M197 gun at the start of the clearing cycle (approximately two to four) will be fired out.

When the trigger switch is depressed to the first detent, these same events will occur after 16 ±4 rounds have been fired. The burst limit circuit causes the trigger logic circuit to inhibit the trigger signal approximately 1.5 seconds after the trigger is pressed. This causes the M197 gun to fire about 16 ±4 rounds. The rocket lockout signal can only be applied with the turret in the azimuth stow position. With the rocket lockout signal applied, the lockout time delay inhibits the trigger signal. When rocket lockout signal is removed, the lockout time delay will continue to inhibit the trigger signal for approximately 1 ±0.5 seconds to assure safe firing of wing stores.

EMERGENCY STOW CONTROL UNIT (205F457)

The emergency stow control unit consists of component assembly A1 and three power amplifier modules Q1, Q2 and Q3. (Refer to figure FO-3.) Module Q1 is the left drive power amplifier, module Q2 is the right drive power amplifier, and module Q3 is the up elevation drive power amplifier. Component assembly A1 consists of relay K1 and the necessary logic components to stow the turret when normal power is lost. Circuit breaker CB1 is provided on the input power line to protect circuitry from damage caused by overloads. The elevation and azimuth turret stow switches provide switching logic to position the turret in the emergency stow position (at least 10° elevation, and 0 ±5° azimuth). The emergency stow control unit receives power through turret elevation stow circuit breaker 19CB6. The 28 Vdc HL is applied through filters FL1 and FL2, diode CR1 and circuit breaker CB1, to terminal 2 on component assembly A1, and to the collectors of the power amplifier modules Q1, Q2, and Q3 of component assemblies A1 and A2 through CR1 and parallel resistors R1 and R2.

Emergency stow relay A1K1 automatically initiates the emergency stow sequence by deenergizing if any of the following power sources become inoperative: the 28 Vdc regulated supply in the gun control unit; the + 15 V supply in the turret control unit; 115 V, 400 Hz system power; 28 Vdc LL system power; or 28 Vdc HL system power. With the system voltages normal, relay A1K1 receives power at J3-J from the 28 Vdc regulated supply and a ground at J3-H through a power sensing switch transistor in the turret control unit. Relay A1K1 remains energized during normal operations. The 28 Vdc elevation and azimuth brake supply voltage is applied to J2-G and routed through normally-open contacts of relay A1K1, and diodes A1CR4 and A1CR5, With relay A1K1 energized, contacts B2 and B3 open and contacts A1 and A2 close. With contacts B2 and B3 open, power to the elevation stow switch is inhibited. With contacts A1 and A2 closed, power is routed to the elevation and azimuth brakes to release the brakes. With no power applied to the elevation stow switch, the power amplifiers have no driving voltage and are in the off condition.

When one or more of the voltages monitored by relay A1K1 are faulty, relay A1K1 deenergizes. When A1K1 deenergizes, contacts A1 and A2 open and contacts B2 and B3 close. With contacts B2 and B3 closed, 28 Vdc is routed to the turret elevation stow switch, pin B. With contacts A1 and A2 opened, 28 Vdc to the elevation and azimuth brakes is inhibited. This applies the brakes and holds the circuit where it was at the time power was lost. The 28 Vdc applied to the turret elevation stow switch common is routed to J3-M through its normally closed contacts to pin A. The 28 Vdc is then routed to diode A1CR6 and to resistor A1R3 in the base circuit of the up drive power amplifier. Diode A1CR6 is forward biased and conducts. This routes 28 Vdc to the elevation brake to release the brake. With the elevation brake released, the turret can be driven in elevation. With 28 Vdc applied to the base circuit of the up drive power amplifier, the power amplifier is turned on and drives the turret upward.

When the turret reaches approximately 11° elevation, the elevation stow switch will actuate. This removes 28 Vdc from J3-M through pin A and connects 28 Vdc through pin C to the turret azimuth stow switch. When 28 Vdc is removed from J3-M, up drive is inhibited and the elevation brake is applied to lock the turret in elevation. With 28 Vdc applied to the azimuth stow switch common, azimuth drive can be applied, as determined by the status of the azimuth stow switch, to drive the turret toward zero degree azimuth. The direction of drive, left or right, depends on the position of the turret (azimuth stow switch status). If the turret is left of zero degree azimuth, the turret will drive right to zero degree azimuth.

For the purpose of this discussion, we will assume that the turret is positioned left of zero degree azimuth. The azimuth stow switch is a three-deck (S1, S2, and S3), rotary, cam-actuated device contained in the azimuth resolver. When the turret is in the stow position, S1 and S2 are open and S3 is closed. If the turret is left of zero degree azimuth, S1 is closed and S2 and S3 are open. With S1 closed, 28 Vdc from the elevation stow switch is routed through J3-K to the base circuit of the right drive power amplifier and to diode

A1CR1. With 28 Vdc applied to the anode, diode A1CR1 is forward biased and applies 28 Vdc to the azimuth brake. This releases the azimuth brake and enables the turret to be moved in azimuth. With 28 Vdc applied to the base circuit of the right drive power amplifier, the power amplifier is turned on and drives the turret to the right. When the turret is at zero degree azimuth, S1 opens and removes 28 Vdc from the right drive power amplifier. This inhibits drive to the turret and causes the azimuth brake to be applied. With the power amplifier biased off and the azimuth brake applied, the turret is locked at zero degree azimuth. Under normal conditions, the turret cannot be moved electrically unless power is restored and relay A1K1 is energized.

If the turret had been positioned to the right of zero degree azimuth, the left drive power amplifier would have been biased on through S2 and J3-S, and diode A1CR2 would have been forward biased to apply power to the azimuth brake. Since S3 is closed only when the turret is at zero degree azimuth, it acts as an interlock to prevent firing wing stores unless the turret is at zero degree azimuth.

EMERGENCY STOW CONTROL UNIT (189F729)

The emergency stow control unit consists of three component assemblies; A1, A2, and A3. (Refer to figure FO-4.) Component assembly A1 is the up elevation drive power amplifier. Component assembly A2 consists of the left drive and right drive power amplifiers. Component assembly A3 consists of relay K1 and the necessary logic components to stow the turret when normal power is lost. The elevation and azimuth turret stow switches provide switching logic to position the turret in the emergency stow position (at least 10° eievation, and 0 ±5° azimuth). The emergency stow control unit receives power through turret elevation stow circuit breaker 19CB6. The 28 Vdc HL is applied through filters FL1 and FL2, to terminal 20 on component assembly A3, and to the collectors of the power amplifiers of component assemblies Al and A2 through diode CR1 and parallel resistors R1 and R2.

Emergency stow relay A3K1 automatically initiates the emergency stow sequence by deenergizing if any of the following power sources become inoperative: the 28 Vdc regulated suppiy in the gun control unit; the + 15 V supply in the turret controi unit; 115 V, 400 Hz system power; 28 Vdc LL system power; or 28 Vdc HL system power. With the system voltages normal, relay A3K1 receives power at J3-J from the 28 Vdc regulated supply and a ground at J3-H through a power sensing switch transistor in the turret controi unit. Relay A3K1 remains energized during normai operations. The 28 Vdc elevation and azimuth brake supply voltage is applied to J2-G and routed through normally-open contacts of relay A3K1, and diodes A3CR4 and A3CR5. With relay A3K1 energized, contacts B2 and B3 open and contacts A1 and A2 close. With contacts B2 and B3 open, power to the elevation stow switch is inhibited. With contacts A1 and A2 closed, power is routed to the elevation and azimuth brakes to release the brakes. With no power applied to the elevation stow switch, the power amplifiers have no driving voltage and are in the off condition.

When one or more of the voltages monitored by relay A3K1 are faulty, relay A3K1 deenergizes. When A3K1 deenergizes, contacts A1 and A2 open and contacts B2 and B3 close. With contacts B2 and B3 closed, 28 Vdc is routed to the turret eievation stow switch, pin B. With contacts A1 and A2 open, 28 Vdc to the eievation and azimuth brakes is inhibited. This applies the brakes and hoids the circuit where it was at the time power was lost. The 28 Vdc applied to the turret eievation stow switch common is routed to J3-M through its normally closed contacts to pin A. The 28 Vdc is then routed to diode A3CR6 and to resistor A1R1 in the base circuit of the up drive power amplifier. Diode A3CR6 is forward biased and conducts. This routes 28 Vdc to the eievation brake to release the brake. With the elevation brake released, the turret can be driven in elevation. With 28 Vdc applied to the base circuit of the up drive power amplifier, the power amplifier is turned on and drives the turret upward.

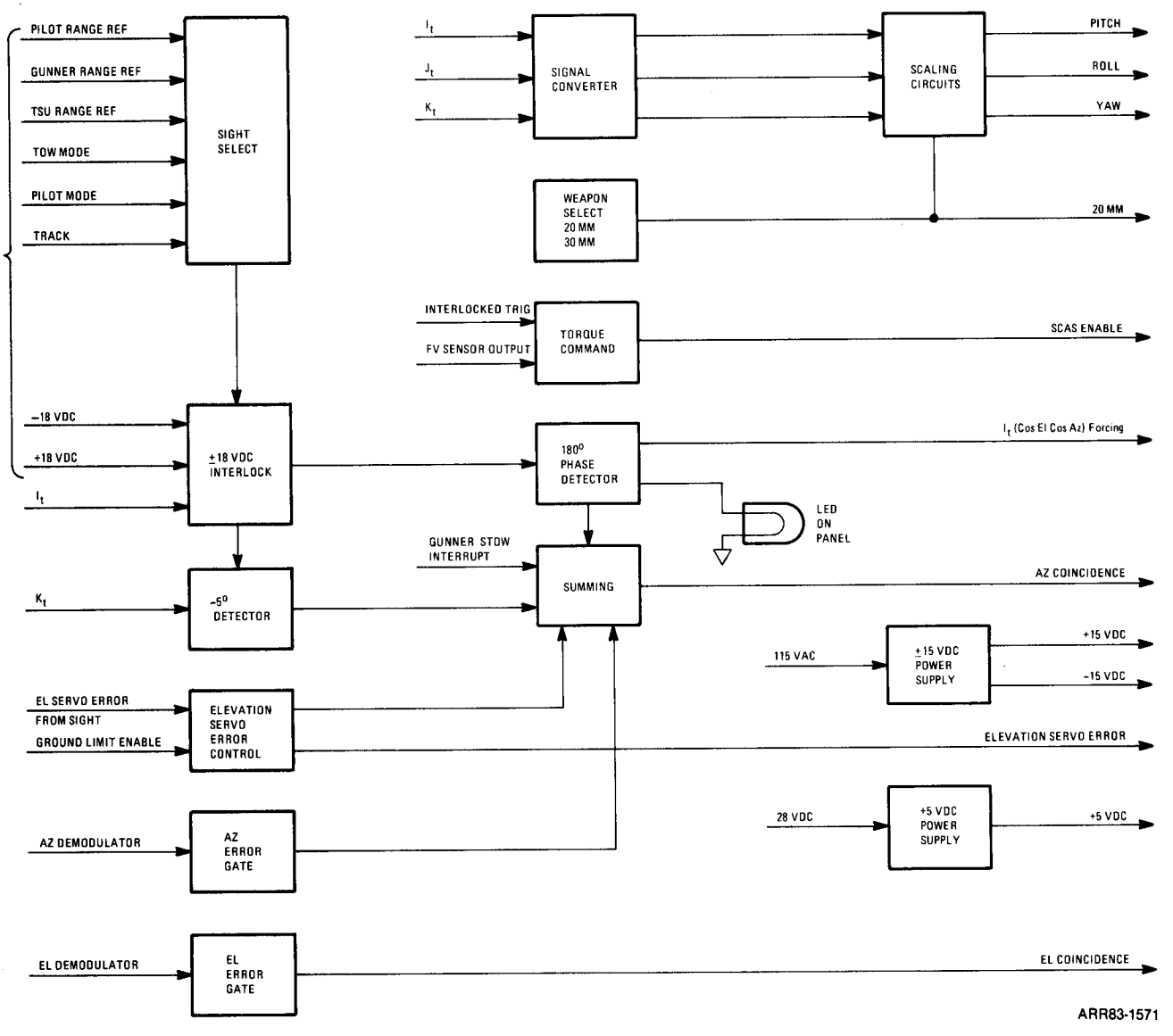
When the turret reaches approximately 11° elevation, the elevation stow switch will actuate. This removes 28 Vdc from J3-M through pin A and connects 28 Vdc through pin C to the azimuth stow switch. When 28 Vdc is removed from J3-M, up drive is inhibited and the elevation brake is applied to lock the turret in elevation. With 28 Vdc now applied to the azimuth stow switch common, azimuth drive can be applied, as determined by the status of the azimuth stow switch, to drive the turret toward zero degree azimuth. The direction of drive, left or right, depends on the position of the turret (azimuth stow switch status). If the turret is left of zero degree azimuth, the turret will drive right to zero degree azimuth.

For the purpose of this discussion, we will assume that the turret is positioned left of zero degree azimuth. The azimuth stow switch is a three-deck (S1, S2, and S3), rotary, cam-actuated device contained in the azimuth resolver. When the turret is in the stow position, S1 and S2 are open and S3 is closed. If the turret is left of zero degree azimuth, S1 is closed and S2 and S3 are open. With S1 closed, 28 Vdc from the elevation stow switch is routed through J3-K to the base circuit of the right drive power amplifier and to diode A3CR14. With 28 Vdc applied to the anode, diode A3CR14 is forward biased and applies 28 Vdc to the azimuth brake. This releases the azimuth brake and enables the turret to be moved in azimuth. With 28 Vdc applied to the base circuit of the right drive power amplifier, the power amplifier is turned on and drives the turret to the right. When the turret is at zero degree azimuth, S1 opens and removes 28 Vdc from the right drive power amplifier. This inhibits drive to the turret and causes the azimuth brake to be applied. With the power amplifier biased off and the azimuth brake applied, the turret is locked at zero degree azimuth. Under normal conditions, the turret cannot now be moved electrically unless power is restored and relay A3K1 is energized.

If the turret had been positioned to the right of zero degree azimuth, the left drive power amplifier would have been biased on through S2 and J3-S, and diode CR15 would have been forward biased to apply power to the azimuth brake. Since S3 is closed only when the turret is at zero degree azimuth, it acts as an interlock to prevent firing wing stores unless the turret is at zero degree azimuth. Fusible resistors R1 and R2 are designed to protect the drive transistors and the drive motors by opening before any drive circuit is overloaded.

LOGIC CONTROL UNIT

The logic control consists of five functional groups: SCAS compensation signals, torque command signal, 180 degree detection, turret depression limit control, and error interlocks. (Refer to block diagram and figure FO-5.) Supporting sections for these five functional groups are: power supplies, scaling switch, and coincidence control input signal switching.



The SCAS compensation signal circuitry is located on circuit card assembly A1. This circuitry consists of integrated circuits which convert turret resolver signals into appropriately scaled voltages (400 Hz) for pitch, roll, and yaw attitude corrections. These signals are used by the SCAS to counteract recoil force induced helicopter attitude changes. These three signals are available to the SCAS electronics any time the turret subsystem is energized. This section of the logic control is affected by the scaling switch because of differences in recoil forces generated by the different caliber weapons which may be installed in the turret subsystem.

The torque command circuitry is located on circuit card assembly A2. This circuitry consists of digital integrated circuits which interpret gun control generated signals to determine whether or not the M197 gun is actually firing. If the M197 gun is firing, the circuitry provides a torque command signal to the SCAS control unit. The SCAS control unit uses this command signal to enable the effect of the pitch, roll, and yaw signals into the aircraft control surfaces.

The 180-degree detection circuitry is located on circuit card assembly A5. The phase and amplitude of the resolver chain final output is detected by this circuitry. The 180-degree detection circuitry provides a safety interlock which prevents the M197 gun from firing in the event of resolver chain failure or an excessive (180 degrees out of alinement) error. This circuitry also switches the turret forward signal in and out to provide a forcing function which causes the turret to aline with the sight even when an out of coincidence condition exists. Circuit card assembly A5 receives its input signal from the switching relays located on circuit card assembly A7. These relays are energized by system mode logic depending on which sight is being selected to control the turret position. In addition, this circuitry provides a fail-safe on weapon firing if the ±18 V power supplies in the interface control unit should fail.

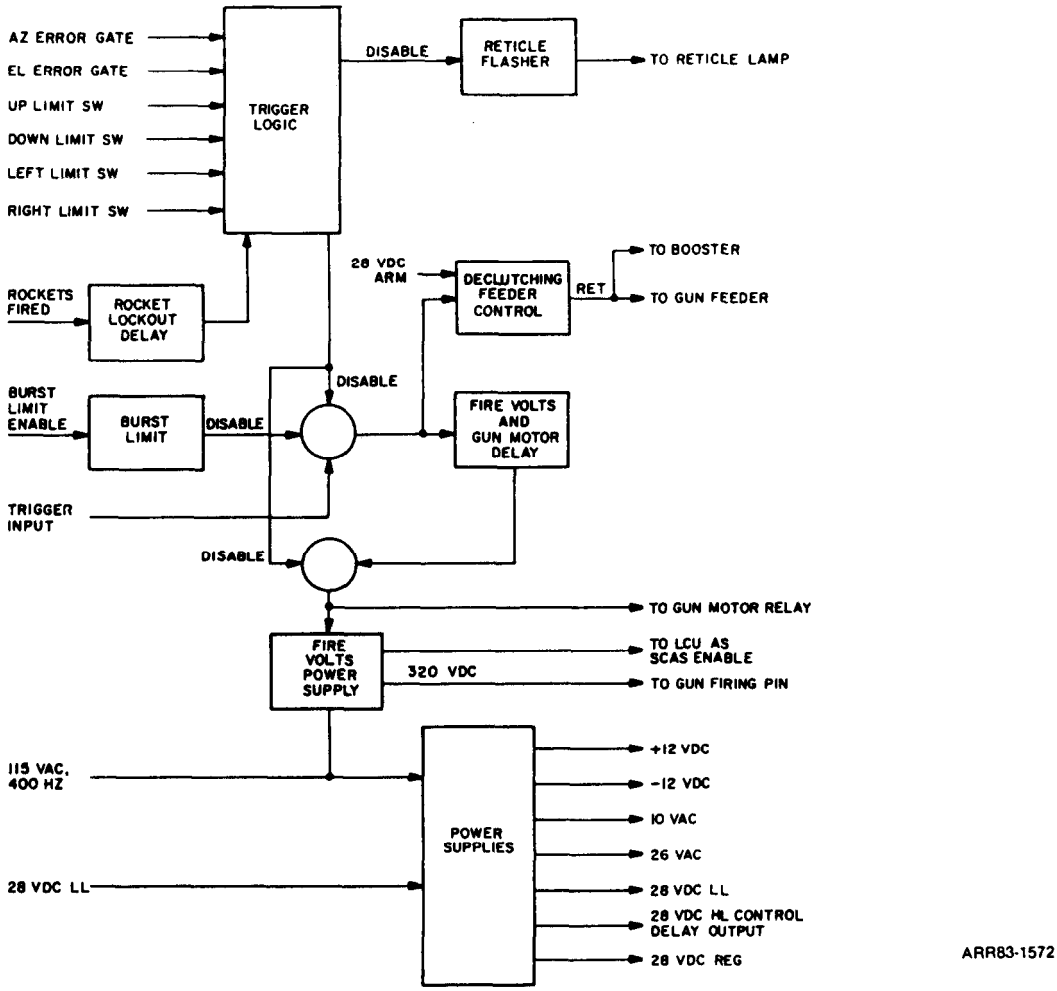
The turret depression limit circuitry is located on circuit card assembly A4. This circuitry detects and monitors the turret elevation position when a depression limit enable signal is provided by the gunner armament control panel. The turret depression limit circuitry also monitors the sight elevation position command signal to determine if the signal is an up or down command. When the turret is lower than -5 degrees and the sight command is down, the turret control elevation error generated by the circuitry prevents further depression of the turret. However if either of the two above conditions are not satisfied, the sight will control the turret position. When the turret depression limit circuity controls the turret control elevation error command, one additonal signal is generated in the logic control unit to prevent the M197 gun from firing.

The azimuth and elevation error interlock circuitry is located on circuit card assembly A4. This circuitry consists of amplitude detection circuits which interrupt gun firing if the turret is not within 4.5° of its commanded position. These circuits monitor turret control azimuth and elevation demodulator outputs. If either output exceeds a preset dc amplitude of either polarity, gun firing will be interrupted.

Visual inspection of the logic control unit will reveal that the slot for circuit card assembly A3 is empty. This position has been reserved for future growth and expansion of system logic functions.

GUN CONTROL UNIT

General. The gun control unit consists of five circuit card assemblies, an EMI filter, transformer T1, an elapsed time meter, and the fire volts power supply PS1. (Refer to block diagram and figure FO-6.) The EMI filter provides line filtering for power inputs and signals. Step-down transformer T1 is used to drop 115 V, 400 Hz for the ± 12 Vdc and 28 Vdc regulated power supplies. Transformer T1 also provides the 26 V and 10 V, 400 Hz reference voltages. The fire volts power supply is enabled by 115 Vac power. The power supply output of approximately 320 Vdc is controlled by the fire volts time delay circuit and relay. The circuit card assemblies provide the necessary circuitry to control the firing of the M197 gun. The five circuit card assemblies contain the following circuits: ± 12 Vdc and 28 Vdc regulated power supplies; high level turret power delay; reticle flasher; trigger logic; fire volts time delay; gun motor time delay; feeder solenoid circuit; fire volts and fire volts sensor; and burst limit.



Power Supplies. The 28 Vdc regulator and the ± 12 Vdc regulator are located on circuit card assemblies A4 and A5. Transformer T1 steps down the 115 V, 400 Hz input at J1-G and J1-H to approximately 56 Vac (26 Vac to center tap). Full wave rectifiers provide negative and positive dc voltages for the -12 Vdc regulator, + 12 Vdc regulator, 28 Vdc regulator and the 28 Vdc HL control circuits. The ± 12 Vdc regulators are identical except for polarity and provide power for the operational amplifiers and other components in the gun control unit. The 28 Vdc regulator provides power for the 28 Vdc HL control circuits, the buffer amplifier modules in the turret, the interface control unit, and the emergency stow relay in the emergency stow control unit. In addition to providing power for the power supplies on circuit card assemblies A4 and A5, the secondary of transformer T1 provides 26 Vac to the turret control unit and, through a voltage divider and filter network, a 10 Vac reference voltage for the turret resolvers.

High Level Turret Power Delay. Turret drive power is delayed for 2.2 to 5.5 seconds by the high level turret power delay circuit to allow the various turret positioning circuits to stabilize before the turret drive circuits are enabled. The high level turret power delay circuit consists of a relay driver transistor, a power-sensing delay switch, and associated components.

Trigger Logic. The trigger logic circuits are located on circuit card assembly A1. The trigger logic circuits interrupt the trigger signal and fire volts when the M197 gun is more than 4.5° out of coincidence with the sight, and interrupt the trigger signal when the turret is driven to any of the four limits. The trigger

logic circuits also enable the reticle flasher when a gun interrruption is detected and disable the reticle flasher when conditions are normal. The functional inputs to the trigger logic circuits are azimuth and elevation error gate signals; up, down, left, and right limit signals from the azimuth and elevation proximity switches; and the rocket lockout signal.

The functional output of the trigger logic circuit is switched + 12 V signals from two logic gate transistors. One 12-volt signal is an enabling signal to the fire volts relay gate circuit. The other 12-volt signal is both an enabling signal to the trigger signal gate and a 12-volt inhibiting signal to the reticle flasher circuit.

The input voltages for the trigger logic circuits are all present at J3 of the gun control unit. The azimuth and elevation error gate signals, from the logic control unit, are +6.7 V with no position error and 0 Vdc in error condition. The four limit signals, from the azimuth and elevation proximity switches, are +22 V normally and 0 Vdc in limit. Absence of any one of the six signals to the trigger logic circuits will interrupt the trigger logic circuits and fire volts, and enable the reticle flasher circuit.

Burst Limit and Trigger Gate Circuit. The burst limit and trigger gate circuit is located on circuit card assembly A2. After a preset time, the burst limit and trigger gate circuit inhibits the trigger signal to the fire volts delay and gun motor delay circuits. The preset time corresponds to a burst length of approximately 16 rounds. Variable resistor A2R14 is used to adjust the preset time.

Reticle Flasher. The reticle flasher circuit is located on circuit card assembly A2. The reticle flasher circuit consists of one half of an operational amplifier and two transistors. The operational amplifier is connected to act as a free running oscillator. The oscillator output alternately applies and removes a ground to the sight reticle lamp through the two transistors. This causes the reticle to flash to indicate the M197 gun cannot be fired. If all trigger logic inputs are present, a signal from the trigger logic disables the reticle flasher oscillator output and applies a steady ground to the reticle flasher lamp. This causes the reticle lamp to come on steady to indicate that the M197 gun may be fired.

Feeder Solenoid. The solenoid control circuitry consists primarily of switching transistors A3Q2 and A5Q4. The feeder solenoid is energized whenever the trigger signal is applied. The control circuitry energizes the feeder solenoid by applying a ground through transistor A5Q3 to the solenoid coil. There is no significant time delay in turn-on or turn-off of the feeder solenoid. When the trigger signal is inhibited by the trigger logic or burst limit, transistor A5Q3 is no longer biased on and the ground is removed from the solenoid coil to deenergize the feeder solenoid.

Gun Motor Relay and Fire Volts Delay Circuit. The gun motor and fire volts delay circuit consists primarily of dual operational amplifier AR1 located on circuit card assembly A3. One half of the amplifier controls the fire volts enabling circuit; the other half of the amplifier controls the gun motor relay. With no trigger signal applied, dual operational amplifier AR1 inhibits both the fire volts and the gun motor relay circuits. Upon application of a trigger signal, capacitor A3C3 on the dual amplifier inverting input begins to charge very rapidly. As the voltage across capacitor A3C3 increases, the amplifier outputs provide ground paths for the fire volts power supply relay and the gun motor relay. When the trigger signal is removed, capacitor A3C3 discharges slowly. This holds the operational amplifier in a gun firing condition for approximately 650 milliseconds to allow the M197 gun to fire out.

Fire Vots and Fire Volts Sensor Circuits. Fire volts power supply PS1 is a transformer-rectifier which produces the 320 Vdc used to fire the 20-mm rounds. The output of the fire volts power supply is supplied to the M197 gun through relay contacts controlled by the fire volts signal. The firing volts sensor generates a signal when the M197 gun is actually firing to enable the aircraft stabilization circuits (SCAS) which compensate for gun recoil. The fire volts signal applied to the fire volts power supply can be disabled by an error gate signal from the trigger logic circuit.

TURRET CONTROL UNIT

The turret control unit consists of four plug-in circuit card assemblies, two power modules, an EMI filter section, an elapsed time meter, and transformer A8T1. (Refer to figures FO-7 and FO-8.) The circuit card assemblies contain the low level servo control electronics, mode control circuits, error interlock circuits, power supplies, emergency stow lockout circuits, over/under voltage protection circuits, and other electronics necessary to control the speed, direction, and torque of the turret drive motors. Power modules A6 and A7 contain the power output stages for the elevation and azimuth drive motors. The power modules are mounted as an integral unit designated as a drive component assembly. Each power module consists of two high current Darlington transistor pairs, motor coasting diodes, and motor current shunts for current feedback sensing. The EMI filter section provides line filtering for power inputs and signals. Transformer A8T1 is a 115 V, 400 Hz step-down transformer used to provide 26 Vac for the + 15 V and -15 V supplies on component board A1. The elapsed time meter indicates the total number of hours that 115 V, 400 Hz power has been applied to the turret control unit.

There are three positioning signals considered by the first stage amplifier; the azimuth error signal, elevation error signal, and the cosine elevation signal. These signals are ac voltages generated by the turret or sight positioning resolvers, or by the stow command positioning signal and the turret resolvers. When the error signals are at zero, the output to the servo drive motors is also at zero. When an error signal is at something other than zero, the applicable output to the servo drive motor applies a dc pulse to cause the motor to drive in that direction. When that position is obtained, the error signal is again at zero and the outputs to the servo drive motors are zero.

Because the elevation and azimuth channels are similar, only the elevation channel will be discussed; however, the differences in the azimuth channel will also be discussed. With an elevation error signal applied to the elevation preamplifier, the error signal is amplified and applied to the demodulator phase-sensitive circuit. The output of the demodulator is a variable dc level that is proportional to the amplitude of the error signal; the polarity of the output is dependent on the phase of the input. The 26 Vac reference voltage provides the reference for phase comparison. The output of the demodulator phase-sensitive circuit is applied to two circuits; a level detector and a dc amplifier. If the amplitude of the demodulator is not more than ± 1.5 Vdc, the level detector provides an output of 28 Vdc to indicate the lag of the turret. When the output of the demodulator is more than ± 1.5 Vdc, the output of the level detector drops to zero volt to indicate a lag of more than 4.5°. The output of the level detector is also applied to the tachometer feedback circuit to cause it to cut out and allow the dc amplifier to turn full on.

The output of the dc amplifier is applied to a second dc amplifier for further amplification. The output of the second dc amplifier is applied to the pulse width modulator. The pulse width modulator is polarity sensitive, so if the output of the amplifier is positive, one modulator will conduct; if negative, the other modulator will conduct. This determines the drive direction output to the servo drive motors. The triangle wave generator output is also applied to the pulse width modulators. The variable dc pulse output width modulator is dependent on the amplitude of the dc amplifier output. Only one pulse width modulator will be conducting for a given direction. The output of the pulse width modulator is applied to the applicable power amplifer through a drive inhibit circuit.

The output of the power amplifier is applied to the elevation servo drive motor through a current shunt. The shunt provides current feedback to the dc amplifier for current limiting. As the turret moves to the commanded position, the elevation tachometer starts to apply a negative feedback to the dc amplifier. The tachometer feedback circuits provide dynamic braking, limit switch braking, and velocity limiting. Dynamic braking occurs when the turret is coincident with its commanded position. When the turret is

more than 4.5° out of coincidence, the tachometer signals are inhibited; however, as the turret approaches the commanded position and the difference becomes less than 4.5°, the tachometer signals are enabled. Without the feedback signal, the turret will be moving at near velocity limit so that, at the time the tachometer signals are enabled, the feedback signal is high. This high negative feedback signal is applied to the turret control unit to cause the servo drive train to reverse direction and decelerate the turret very rapidly. As the turret decelerates to zero degrees-per-second, the feedback signal decreases to zero and the position loop brings the turret to the final commanded position.

The turret proximity switch limit braking circuits are time dependent. After a proximity switch is activated, limit braking occurs for 800 milliseconds to allow high gain tachometer feedback into the drive circuit and stop the turret. After 800 milliseconds, the tachometer feedback signal is inhibited to allow the drive circuit to control the turret. The limit braking circuit also inhibits the drive circuit to keep the turret from continuing to drive into the mechanical stop. The voltage cutout and stow initiate circuits provide a safing circuit to detect the absence of operating voltages and initiate emergency stow to position the M197 gun in a safe position for landing the helicopter. The safing circuit inhibits the turret control drive amplifiers and causes the emergency stow control unit to be enabled.

The differences between the elevation channel and azimuth channel are the elevation up limit switch circuit and the azimuth gain circuit. The elevation up limit switch circuit provides the necessary drive to hold the turret in the up limit. With no power applied and the elevation brakes released, the M197 gun will move downward due to its weight. This would cause an elevation error and the elevation drive motor would drive the turret up. The turret would then begin to oscillate. To prevent this, the elevation limit switch applies a signal to the low current and limit switch circuit. This causes a fixed signal to be applied to the up drive circuit to hold the turret in the up limit. The other difference is the azimuth demodulator circuitry that modifies the gain of the azimuth error demodulation. Gain is required due to the interconnection between the azimuth and elevation resolver loop. A cosine elevation signal is used as the excitation signal for the azimuth turret resolver; when the turret is depressed to 30°, the cosine elevation is 8.66 volts. To maintain the same azimuth error voltage for a 4.5° error signal, it is necessary to increase the gain, The azimuth demodulator circuitry provides the required gain.

GUNNER ARMAMENT CONTROL PANEL

The gunner armament control panel contains switches and indicators to enable gunner control and operation of the turret subsystem.

PILOT ARMAMENT CONTROL PANEL

The pilot armament control panel contains switches and indicators to enable pilot control and operation of the turret subsystem.

INTERFACE CONTROL UNIT M97A4 (209-074-110-1)

The interface control unit contains the signal switching, buffering and alinement, reticle control circuitry, and reticle retract control circuitry necessary to interface the HSS and the TSU with the turret subsystem. (Refer to figure FO-9.) When the gunner selects the gun mode in the TOW system, the computing resolver chain in the turret subsystem is connected to similar resolvers in the TSU. Elevation and azimuth commands developed in the TSU are returned to the turret subsystem through the interface control unit as positioning signals for the turret subsystem. Thus, as the TSU tracks the target, the turret is commanded to follow the TSU line-of-sight. Operation with either the pilot or gunner helmet sight is accomplished in a similar manner. The function of the interface control unit is to receive signals from the TSU, HSS, control panels, airborne laser tracker, and the fire control computer.

The interface control unit also provides the appropriate circuit response for the mode selected by the system operator. This interchange of signals is accomplished in the the interface control unit by relay logic. Once the sight unit is selected, turret positioning signals from the sight are routed back through the interface control unit to differentially connected buffer amplifiers. The buffer amplifiers isolate the sight resolver outputs from the turret system to assure computing accuracy. The buffer amplifiers also provide a means of changing output phase for different applications of the interface control unit. In addition to the gun mode, an acquisition mode is provided so that either helmet sight can position the TSU. Thus, the acquisition mode allows either the pilot or gunner to acquire a target for the TOW missile by utilizing the helmet sight. The relay logic in the interface control unit also provides a dual mode capability. if the gunner has selected the TOW mode, the pilot still has the capability of directing the turret with the helmet sight. In addition, either helmet sight may be directing the turret while the other helmet sight is used to acquire a target for the TOW missile. In addition, the interface control unit provides reticle testing circuits and interface.

INTERFACE CONTROL UNIT M97A3 (209-074-051 -3)

The interface control unit contains the signal switching, buffering and alinement, range compensation, airspeed compensation, reticle control circuitry, and reticle retract control circuitry necessary to interface the HSS and the TSU with the turret subsystem. (Refer to figures FO-10 thru FO-14.) When the gunner selects the gun mode in the TOW system, the computing resolver chain in the turret subsystem is connected to similar resolvers in the TSU. Elevation and azimuth commands and a range compensation function developed in the TSU are returned to the turret subsystem through the interface control unit as positioning signals for the turret subsystem. Thus, as the TSU tracks the target, the turret is commanded to follow the TSU line-of-sight. Operation with either the pilot or gunner helmet sight is accomplished in a similar manner. The function of the interface control unit is to receive signals from the TSU, HSS, control panels, and the airspeed transducer.

The interface control unit also provides the appropriate circuit response for the mode selected by the system operator. This interchange of signals is accomplished in the the interface control unit by relay logic. Once the sight unit is selected, turret positioning signals from the sight are routed back through the interface control unit to differentially connected buffer amplifiers. The buffer amplifiers isolate the sight resolver outputs from the turret system to assure computing accuracy. The buffer amplifiers also provide a means of changing output phase for different applications of the interface control unit. In addition to the gun mode, an acquisition mode is provided so that either helmet sight can position the TSU. Thus, the acquisition mode allows either the pilot or gunner to acquire a target for the TOW missile by utilizing the helmet sight. The relay logic in the interface control unit also provides a dual mode capability. If the gunner has selected the TOW mode, the pilot still has the capability of directing the turret with the helmet sight. In addition, either helmet sight may be directing the turret while the other helmet sight is used to acquire a target for the TOW missile. The interface control unit pitch and roll alinement resolvers are used to adjust the misalinement which may occur between the TSU and the turret. In addition, the interface control unit provides reticle testing circuits and interface along with range drop and airspeed correction scaling circuits.

TURRET BUFFER AMPLIFIER M97A4

The turret buffer amplifier consists of two electrical connectors, a flexible printed wiring board assembly, and a case. The printed wiring board assembly contains printed circuitry and components required to eliminate noise, provide turret resolvers loads, and relay interlock switching to interrupt firing voltage if an internal power supply failure occurs.

Line-of-sight signals buffered by the turret buffer amplifier isolate resolvers from incompatible capacitance loading effects within the logic control unit and the turret control unit to maintain required signal accuracy.

GUN CONTROL UNIT FAULT CODE TROUBLESHOOTING DATA

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
tiate retest after any module placement.

WARNING

Verify all power is off before performing any corrective action.

1. FAULT CODE 4100 (SNORT ON DC INPUT CIRCUITS)

Step 1. Remove A4 module and initiate retest.

If fault code 4100 recurs, go to step 2. If fault code 4100 did not recur, replace A4 module.

Step 2. Disconnect P2 from A5 module and initiate retest.

If fault code 4100 does not recur, replace A5 module, If fault code 4100 does recur, replace UUT.

2. FAULT CODE 4101 (NO 115 VAC OUTPUT AT J3-Y)

Replace UUT.

3. FAULT CODE 4102 (NO 115 VAC OUTPUT AT J3-L)

Replace UUT.

4. FAULT CODE 4103 (26 VAC IMPROPERLY APPEARS AS OUTPUT AT J3-F)

Replace A4 module and initiate retest.

If fault code 4103 recurs, replace UUT. If fault code 4103 did not recur, replace A4 module.

5. FAULT CODE 4104 (10 VAC IMPROPERLY APPEARS AS OUTPUT AT J3-C)

Replace A4 module and initiate retest.

If fault code 4104 recurs, replace UUT. If fault code 4104 did not recur, replace A4 module.

6. FAULT CODE 4105 (NO +28 VDC OUTPUT AT J3-M)

Replace UUT.

7. FAULT CODE 4106 (NO +7.5 VDC OUTPUT AT J3-R)

Replace UUT.

8. FAULT CODE 4107 (NO +115 VAC OUTPUT AT J4-M)

Step 1. Replace A4 module and initiate retest.

If fault code 4107 does not recur, A4 module is defective; replace. If fault code 4107 recurs, proceed to step 2.

Step 2. Replace A5 interconnection module and initiate retest.

If fault code 4107 does not recur, A5 interconnection module is defective; replace. If fault code 4107 recurs, replace UUT.

2-21. GUN CONTROL UNIT TEST (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

9. FAULT CODE 4108 (26 VAC IMPROPERLY APPEARS AS OUTPUT AT J4-K)

Replace A4 module and initiate retest.

If fault code 4108 recurs, replace UUT. If fault code 4108 did not recur, replace A4 module.

10. FAULT CODE 4109 (10 VAC IMPROPERLY APPEARS AS OUTPUT AT J4-B)

Replace A4 module and initiate retest.

If fault code 4109 recurs, replace UUT. If fault code 4109 did not recur, replace A4 module.

11. FAULT CODE 4110 (SHORT ON DC INPUT CIRCUITS)

Step 1. Remove A4 module and initiate retest.

If fault code 4110 recurs, go to step 2. If fault code 4110 does recur, replace A4 module.

Step 2. Disconnect P2 from A5 interconnection module and initiate retest.

If fault code 4110 does not recur, replace A5 interconnection module. If fault code 4110 does recur, replace UUT.

12. FAULT CODE 4111 (NO 28 VDC OUTPUT AT J2-F)

Set test set to C0 mode and enter 41 on keyboard. Test set should read +26 ±4 (Vdc).

If reading out of tolerance, replace UUT.

13. FAULT CODE 4112 (NO 26 VAC OUTPUT AT J3-F)

Step 1. Replace A4 module and initiate retest.

If fault code 4112 does not recur, A4 module is defective; replace. If fault code 4112 recurs, proceed to step 2.

Step 2. Set test set to CO mode. Check for 26 Vac across terminals 3 and 4 of T1.

If 26 Vac present at terminals 3 and 4 of T1, replace UUT. If absent, proceed to step 3.

Step 3. Set test set to CO mode. Check for 115 Vac across terminals 1 and 2 of T1.

If 115 Vac present at terminals 1 and 2, replace T1.

Step 4. Replace A5 interconnection module and initiate retest. Observe if fault code 4112 recurs

If fault code 4112 did not recur, A5 interconnection module is defective; replace. If fault code 4112 did recur, replace UUT.

14. FAULT CODE 4113 (NO 26 VAC OUTPUT AT J4-K)

Step 1. Replace A4 module and initiate retest. Observe if fault code 4113 recurs

If fault code 4113 did not recur, A4 module is defective; replace. If fault code 4113 did recur, proceed to step 2.

Step 2. Replace A5 interconnection module and initiate retest. Observe if fault code 4113 recurs.

If fault code 4113 did not recur, A5 interconnection module is defective; replace. If fault code 4113 did recur, replace UUT.

GUN CONTROL UNIT FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

15. FAULT CODE 4114 (NO 10 VAC OUTPUT AT J3-C)

Step 1. Replace A4 module and initiate retest. Observe if fault code 4114 recurs.
If fault code 4114 did not recur, A4 module is defective; replace. If fault code 4114 did recur, proceed to step 2.

Step 2. Replace A5 interconnection module and initiate retest. Observe if fault code 4114 recurs.
If fault code 4114 did not recur, A5 interconnection module is defective; replace. If fault code 4114 did recur, replace UUT.

16. FAULT CODE 4115 (NO 10 VAC OUTPUT AT J4-A)

Replace A5 interconnection module and initiate retest. Observe if fault code 4115 recurs.
If fault code 4115 did not recur, A5 interconnection module is defective; replace. If fault code 4115 did recur, replace UUT

17. FAULT CODE 4116 (NO 10 VDC OUTPUT AT J4-C)

Step 1. Replace A2 module and initiate retest. Observe if fault code 4116 recurs.
If fault code 4116 did not recur, A2 module is defective; replace. If fault code 4116 did recur, proceed to step 2.

Step 2. Replace A4 module and initiate retest. Observe if fault code 4116 recurs.
If fault code 4116 did not recur, A4 module is defective; replace. If fault code 4116 did recur, proceed to step 3.

Step 3. Replace A5 interconnection module and initiate retest. Observe if fault code 4116 recurs.
If fault code 4116 did not recur, A5 interconnection module is defective; replace. If fault code 4116 did recur, replace UUT.

18. FAULT CODE 4121 (NO DELAY ON J1-J OUTPUT)

Replace A4 module and initiate retest. Observe if fault code 4121 recurs.
If fault code 4121 did not recur, A4 module is defective; replace. If fault code 4121 did recur, replace UUT.

19. FAULT CODE 4122 (NO DELAY ON J4-S OUTPUT)

Replace A4 module and initiate retest. Observe if fault code 4122 recurs.
If fault code 4122 did not recur, A4 module is defective; replace. If fault code 4122 did recur, replace UUT.

20. FAULT CODE 4123 (NO 28 VDC OUTPUT AT J3-J)

Replace UUT.

21. FAULT CODE 4124 (NO 28 VDC OUTPUT AT J3-S)

Replace A5 interconnection module and initiate retest.
If fault code 4124 did not recur, A5 interconnection module is defective; replace. If fault code 4124 did recur, replace UUT.

2-21. GUN CONTROL UNIT TEST (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

22. FAULT CODE 4125 (NO 28 VDC OUTPUT AT J4-H)

Step 1. Replace A4 module and initiate retest.

If fault code 4125 did not recur, A4 module is defective; replace. If fault code 4125 did recur, proceed to step 2.

Step 2. Replace A5 interconnection module and initiate retest. Observe if fault code 4125 recurs

If fault code 4125 did not recur, A5 interconnection module is defective; replace. If fault code 4125 did recur, replace UUT.

23. FAULT CODE 4126 (NO 28 VDC OUTPUT AT J3-A)

Replace A5 interconnection module and initiate retest. Observe if fault code 4126 recurs.

if fault code 4126 did not recur, A5 interconnection module is defective; replace. If fault code 4126 did recur, replace UUT.

24. FAULT CODE 4131 (NO 28 VDC DELAYED OUTPUT AT J1-J)

Replace A4 module and initiate retest.

If fault code 4131 did not recur, A4 module is defective; replace. If fault code 4131 did recur, proceed to step 2.

Step 2. Replace A5 interconnection module and initiate retest. Observe if fault code 4131 recurs.

If fault code 4131 did not recur, A5 interconnection module is defective; replace. If fault code 4131 did recur, replace UUT.

25. FAULT CODE 4132 (NO 28 VDC DELAYED OUTPUT AT J4-S)

Step 1. Replace A4 module and initiate retest.

If fault code 4132 did not recur, A4 module is defective; replace. If fault code 4132 did recur, proceed to step 2.

Step 2. Replace A5 interconnection module and inititate retest. Observe if fault code 4132 recurs.

If fault code 4132 did not recur, A5 interconnection module is defective; replace. If fault code 4132 did recur, replace UUT.

26. FAULT CODE 4140 (SHORT ON DC INPUT CIRCUITS)

Replace UUT.

27. FAULT CODE 4141 (NO 0 VDC OUTPUT AT J4-W)

Replace Al module and initiate retest, Observe if fault code 4141 recurs.

If fault code 4141 did not recur, A1 module is defective; replace. If fault code 4141 did recur, replace UUT.

28. FAULT CODE 4142 (NO 0 VDC OUTPUT AT J4-X)

Replace Al module and initiate retest. Observe if fault code 4142 recurs.

If fault code 4142 did not recur, Al module is defective; replace. If fault code 4142 did recur, replace UUT.

GUN CONTROL UNIT FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

29. FAULT CODE 4143 (NO 0 VDC OUTPUT AT J4-U)

Replace A1 module and initiate retest. Observe if fault code 4143 recurs.

If fault code 4143 did not recur, A1 module is defective; replace. If fault code 4143 did recur, replace UUT.

30. FAULT CODE 4144 (NO 0 VDC OUTPUT AT J4-V)

Replace A1 module and initiate retest. Observe if fault code 4144 recurs.

If fault code 4144 did not recur, A1 module is defective; replace. If fault code 4144 did recur, replace UUT.

31. FAULT CODE 4145 (NO 0 VDC OUTPUT AT J4-Y)

Replace A1 module and initiate retest. Observe if fault code 4145 recurs.

If fault code 4145 did not recur, A1 module is defective; replace, If fault code 4145 did recur, replace UUT.

32. FAULT CODE 4146 (NO 0 VDC OUTPUT AT J4-Z)

Replace A1 module and initiate retest. Observe if fault code 4146 recurs.

If fault code 4146 did not recur, A1 module is defective; replace. If fault code 4146 did recur, replace UUT.

33. FAULT CODE 4147 (NO 10 VDC OUTPUT AT J4-C)

Step 1. Replace A4 module and initiate retest. Observe if fault code 4147 recurs.

If fault code 4147 did not recur, A4 module is defective; replace. If fault code 4147 did recur, proceed to step 2.

Step 2. Replace A2 module and initiate retest. Observe if fault code 4147 recurs.

If fault code 4147 did not recur, A2 module is defective; replace. If fault code 4147 did recur, replace UUT.

34. FAULT CODE 4160 (SHORT ON DC INPUT CIRCUITS J3-N, -X, -V, -P, -W, -U, OR J1-A)

Step 1. Disconnect A1 module from chassis and initiate retest. Observe if fault code 4160 recurs. (Disregard all other fault codes that will be generated.)

If fault code 4160 did not recur, then A1 module is cause of short; replace A1 module. If fault code 4160 did recur with A1 module removed, proceed to step 2.

Step 2. Reinstall A1 module Remove A3 module and initiate retest. Observe if fault code 4160 recurs. (Disregard all other fault codes that will be generated.)

If fault code 4160 did not recur, then A3 module is cause of short; replace A3 module. If fault code 4160 did recur with A3 module removed, proceed to step 3.

Step 3. Replace A5 interconnection module and initiate retest. Observe if fault code 4160 recurs.

If fault code 4160 did not recur, A5 interconnection module is the cause of short; replace. If fault code 4160 did recur, short is in chassis wiring; replace UUT.

35. FAULT CODE 4161 (NO DC OUTPUT AT J4-Y)

Replace A1 module and initiate retest.

If fault code 4161 recurs, replace A5 interconnection module and initiate retest. If fault code 4161 did not recur, A5 interconnection module is defective; replace. If fault code 4161 did recur, replace UUT.

2-21. GUN CONTROL UNIT TEST (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE

Initiate retest after any module replacement.

36. FAULT CODE 4162 (NO DC OUTPUT AT J4-Z)

Replace A1 module and initiate retest.

If fault code 4162 recurs, replace A5 interconnection module and initiate retest. If fault code 4162 did not recur, A5 interconnection module is defective; replace. If fault code 4162 did recur, replace UUT.

37. FAULT CODE 4163 (NO 28 VDC OUTPUT AT J4-W)

Replace A1 module and initiate retest.

If fault code 4163 recurs, replace A5 interconnection module and initiate retest. If fault code 4163 did not recur, A5 interconnection module is defective; replace. If fault code 4163 did recur, replace UUT.

38. FAULT CODE 4164 (NO 28 VDC OUTPUT AT J4-U)

Replace A1 module and initiate retest.

If fault code 4164 recurs, replace A5 interconnection module and initiate retest. If fault code 4164 did not recur, A5 interconnection module is defective; replace. If fault code 4164 did recur, replace UUT.

39. FAULT CODE 4165 (NO 28 VDC OUTPUT AT J4-V)

Replace A1 module and initiate retest.

If fault code 4165 recurs, replace A5 interconnection module and initiate retest. If fault code 4165 did not recur, A5 interconnection module is defective; replace. If fault code 4165 did recur, replace UUT.

40. FAULT CODE 4166 (NO 28 VDC OUTPUT AT J4-X)

Replace A1 module and initiate retest.

If fault code 4166 recurs, replace A5 interconnection module and initiate retest. If fault code 4166 did not recur, A5 interconnection module is defective; replace. If fault code 4166 did recur, replace UUT.

41. FAULT CODE 4167 (NO 28 VDC OUTPUT AT J3-C)

Replace A3 module and initiate retest. Observe if fault code 4167 recurs.

if fault code 4167 did not recur, A3 module is defective; replace. If fault code 4167 did recur, replace A5 interconnection module.

42. FAULT CODE 4168 (NO 28 VDC OUTPUT AT J4-D)

Observe if fault code 4167 occurred. If so, perform corrective action for fault code 4167. This should correct malfunction for fault code 4168.

if there was no fault code 4167, an open exists in chassis wiring; replace UUT.

GUN CONTROL UNIT FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

43. FAULT CODE 4169 (NO O VDC OUTPUT AT J3-T)

Step 1. Replace A1 module and initiate retest. Observe if fault code 4169 recurs.
If fault code 4169 did not recur, A1 module is defective; replace. If fault code 4169 did recur, proceed to step 2.

Step 2. Replace A2 module and initiate retest. Observe if fault code 4169 recurs.
If fault code 4169 did not recur, A2 module is defective; replace. If fault code 4169 did recur, proceed to step 3.

Step 3. Replace A5 interconnection module and initiate retest. Observe if fault code 4169 recurs.
If fault code 4169 did not recur, A5 interconnection module is defective; replace. If fault code 4169 did recur, replace UUT.

44. FAULT CODE 4170 (SHORT ON DC INPUT CIRCUITS J2-D AND J1-K)

Step 1. Disconnect A3 module from chassis and initiate retest. Observe if fault code 4170 recurs. (Disregard all other fault codes that will be generated.)
If fault code 4170 did not recur, then A3 module is cause of short; replace A3 module. If fault code 4170 did recur, proceed to step 2.

Step 2. Replace A5 interconnection module and initiate retest. Observe if fault code 4170 recurs.
If fault code 4170 did not recur, A5 interconnection module is the cause of short; replace. If fault code 4170 did recur, short is in chassis wiring; replace UUT.

45. FAULT CODE 4171 (NO 28 VDC INPUT TO J2-D)

Replace A3 module and initiate retest. Observe if fault code 4171 recurs.
If fault code 4171 did not recur, A3 module is defective; replace If fault code 4171 did recur, replace A5 interconnection module

46. FAULT CODE 4172 (NO 28 VDC OUTPUT AT J4-F)

Step 1. Replace A3 module and initiate retest. Observe if fault code 4172 recurs.
If fault code 4172 did not recur, A3 module is defective; replace. If fault code 4172 did recur, proceed to step 2.

Step 2. Replace A5 interconnection module and initiate retest. Observe if fault code 4172 recurs
If fault code 4172 did not recur, A5 interconnection module is defective; replace. If fault code 4172 did recur, replace UUT.

47. FAULT CODE 4173 (NO 28 VDC OUTPUT AT J4-E)

Step 1. Replace A3 module and initiate retest. Observe if fault code 4173 recurs.
If fault code 4173 did not recur, A3 module is defective; replace. If fault code 4173 did recure, proceed to step 2.

Step 2. Replace A5 interconnection module and initiate retest. Observe if fault code 4173 recurs.
If fault code 4173 did not recur, A5 interconnection module is defective; replace. If fault code 4173 did recur, replace UUT.

2-21. GUN CONTROL UNIT TEST (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE

Initiate retest after any module replacement.

48. FAULT CODE 4174 (NO 0 VDC OUTPUT AT J2-A)

Fire volts power supply PS1 is defective; replace UUT.

49. FAULT CODE 4175 (NO 0 VDC OUTPUT AT J4-P)

Fire volts power supply PS1 is defective; replace UUT.

50. FAULT CODE 4176 (NO 28 VDC OUTPUT AT J2-H)

Step 1. Replace A2 module and initiate retest. Observe if fault code 4176 recurs.

If fault code 4176 did not recur, A2 module is defective; replace. If fault code 4176 did recur, proceed to step 2.

Step 2. Replace A5 interconnection module and initiate retest. Observe if fault code 4176 recurs.

If fault code 4176 did not recur, A5 interconnection module is defective; replace. If fault code 4176 did recur, replace UUT.

51. FAULT CODE 4177 (NO 28 VDC INPUT AT J1-K)

Replace A3 module and initiate retest.

If fault code 4177 recurs, replace UUT.

52. FAULT CODE 4178 (NO 28 VDC OUTPUT AT J4-G)

Step 1. Replace A3 module and initiate retest.

If fault code 4178 did not recur, A3 module is defective; replace. If fault code 4178 did recur, proceed to step 2.

Step 2. Replace A5 interconnection module and initiate retest. Observe if fault code 4178 recurs.

If fault code 4178 did not recur, A5 interconnection module is defective; replace. If fault code 4178 did recur, replace UUT.

53. FAULT CODE 4179 (NO 28 VDC OUTPUT AT J2-C)

Open in chassis wiring. Replace UUT.

54. FAULT CODE 4180 (SHORT ON DC INPUT CIRCUIT J1-P)

Replace A5 interconnection module and initiate retest. Observe if fault code 4180 recurs.

If fault code 4180 did not recur, A5 interconnection module is cause of short; replace. If fault code 4180 did recur, short is in chassis wiring; replace UUT.

55. FAULT CODE 4181 (NO 28 VDC OUTPUT AT J4-T)

Replace A5 interconnection module and initiate retest. Observe if fault code 4181 recurs.

If fault code 4181 did not recur, A5 interconnection module is defective; replace. If fault code 4181 did recur, replace UUT.

GUN CONTROL UNIT FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE) TEST OR INSPECTION CORRECTIVE ACTION	NOTE Initiate retest after any module replacement.

56. FAULT CODE 4182 (NO 0 VDC OUTPUT AT J3-C)

Step 1. Replace A3 module and initiate retest, Observe if fault code 4182 recurs.

If fault code 4182 did not recur, A3 module is defective; replace. If fault code 4182 did recur, proceed to step 2.

Step 2. Replace A1 module and initiate retest. Observe if fault code 4182 recurs.

If fault code 4182 did not recur, A1 module is defective; replace. If fault code 4182 did recur, replace A5 interconnection module.

57. FAULT CODE 4183 (NO 0 VDC OUTPUT AT J2-D)

Step 1. Replace A3 module and initiate retest.

If fault code 4183 did not recur, A3 module is defective; replace. If fault code 4183 did recur, proceed to step 2.

Step 2. Replace A5 interconnection module and initiate retest. Observe if fault code 4183 recurs

If fault code 4183 did not recur, A5 interconnection module is defective; replace. If fault code 4183 did recur, defect is in chassis wiring replace UUT.

58. FAULT CODE 4184 (NO 0 VDC OUTPUT AT J4-F)

Replace A3 module and initiate retest. Observe if fault code 4184 recurs.

If fault code 4184 did not recur, A3 module is defective; replace. If fault code 4184 did recur, replace A5 interconnection module.

59. FAULT CODE 4185 (NO 0 VDC OUTPUT AT J4-E)

Step 1. Replace A3 module and initiate retest. Observe if fault code 4185 recurs.

If fault code 4185 did not recur, A3 module is defective; replace. If fault code 4185 did recur, proceed to step 2.

Step 2. Replace A1 module and initiate retest. Observe if fault code 4185 recurs.

If fault code 4185 did not recur, A1 module is defective; replace. If fault code 4185 did recur, replace A5 interconnection module.

60. FAULT CODE 4186 (NO FIRE VOLTS OUTPUT AT J2-A)

Step 1. Replace A3 module and initiate retest, Observe if fault code 4186 recurs.

If fault code 4186 did not recur, A3 module is defective; replace. If fault code 4186 did recur, proceed to step 2.

Step 2. Replace A5 interconnection module and initiate retest. Observe if fault code 4186 recurs.

If fault code 4186 did not recur, A5 interconnection module is defective; replace. If fault code 4186 did recur, fire volts power supply PS1 is defective; replace UUT.

2-21. GUN CONTROL UNIT TEST (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

61. FAULT CODE 4187 (NO FIRE VOLTS OUTPUT AT J4-P)

Step 1. Replace A2 module and initiate retest. Observe if fault code 4187 recurs.
If fault code 4187 did not recur, A2 module is defective; replace If fault code 4187 did recur, proceed to step 2.

Step 2. Replace A5 interconnection module and initiate retest. Observe if fault code 4187 recurs.
If fault code 4187 did not recur, A5 interconnection module is defective; replace. If fault code 4187 did recur, an open exists in chassis wiring; replace UUT.

62. FAULT CODE 4188 (NO 0 VDC OUTPUT AT J1-K)

Step 1. Replace A3 module and initiate retest. Observe if fault code 4188 recurs.
If fault code 4188 did not recur, A3 module is defective; replace. If fault code 4188 did recur, proceed to step 2.

Step 2. Replace A5 interconnection module and intitiate retest. Observe if fault code 4188 recurs.
If fault code 4188 did not recur, A5 interconnection module is defective; replace. If fault code 4188 did recur, replace UUT.

63. FAULT CODE 4189 (NO 0 VDC OUTPUT AT J4-G)

Replace A3 module and initiate retest.
If fault code 4189 recurs, replace A5 interconnection module.

64. FAULT CODE 4191 (NO 0 VDC OUTPUT AT J4-T)

Replace UUT.

65. FAULT CODE 4192 (NO 28 VDC OUTPUT AT J3-C)

Replace A3 module.

66. FAULT CODE 4193 (NO 28 VDC OUTPUT AT J2-D)

Replace A3 module and initiate retest. Observe if fault code 4193 recurs.
If fault code 4193 did not recur, A3 module is defective; replace, if fault code 4193 did recur, replace A5 interconnection module.

67. FAULT CODE 4194 (NO TIME DELAY FOR REMOVAL OF 0 VDC AT J1-K)

Replace A3 module.

68. FAULT CODE 4195 (NO TIME DELAY FOR REMOVAL OF FIRE VOLTS AT J2-A)

Replace A3 module.

69. FAULT CODE 4201 (INSUFFICIENT TIME DELAY FOR REMOVAL OF 0 VDC AT J1-K)

Replace A3 module.

GUN CONTROL UNIT FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

70. FAULT CODE 4211 (TIME DELAY TOO LONG FOR APPLYING 28 VDC TO J1-K)
Replace A3 module.

71. FAULT CODE 4212 (INSUFFICIENT TIME DELAY FOR REMOVAL OF FIRE VOLTS AT J2-A)
Replace A3 module.

72. FAULT CODE 4221 (TIME DELAY TOO LONG FOR REMOVAL OF FIRE VOLTS AT J2-A)
Replace A3 module.

73. FAULT CODE 4231 (NO 0 VDC OUTPUT AT J4-E)
Replace A3 module.

74. FAULT CODE 4241 (NO 28 VDC OUTPUT AT J4-E WITH A2 ERROR INPUT AT J3-N)
Replace A1 module and initiate retest. Observe if fault code 4241 recurs.
If fault code 4241 did not recur, A1 module is defective; replace. If fault code 4241 did recur, replace A5 interconnection module.

75. FAULT CODE 4251 (NO 0 VDC OUTPUT AT J4-E WITH A2 ERROR INPUT REMOVED FROM J3-N)
Replace A1 module.

76. FAULT CODE 4261 (NO 28 VDC OUTPUT AT J4-E WITH EL ERROR INPUT AT J3-X)
Replace A1 module and initiate retest. Observe if fault code 4261 recurs.
If fault code 4261 did not recur, A1 module is defective; replace. If fault code 4261 did recur, replace A5 interconnection module.

77. FAULT CODE 4271 (NO 28 VDC OUTPUT AT J3-C WITH RT AZ LIMIT INPUT AT J3-P)
Replace A1 module and initiate retest. Observe if fault code 4271 recurs.
If fault code 4271 did not recur, A1 module is defective; replace. If fault code 4271 did recur, replace A5 interconnection module.

78. FAULT CODE 4281 (NO 28 VDC OUTPUT AT J3-C WITH LT A2 LIMIT INPUT AT J3-W)
Replace A1 module and initiate retest. Observe if fault code 4281 recurs.
If fault code 4281 did not recur, A1 module is defective; replace. If fault code 4281 did recur, replace A5 interconnection module.

79. FAULT CODE 4291 (NO 28 VDC OUTPUT AT J3-C WITH UP EL LIMIT INPUT AT J3-V)
Replace A1 module and initiate retest. Observe if fault code 4291 recurs.
If fault code 4291 did not recur, A1 module is defective; replace. If fault 4291 did recur, replace A5 interconnection module.

2-21. GUN CONTROL UNIT TEST (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

80. FAULT CODE 4301 (NO 28 VDC OUTPUT AT J3-C WITH DN EL LIMIT INPUT AT J3-U)

Replace A1 module and initiate retest. Observe if fault code 4301 recurs.

If fault code 4301 did not recur, A1 module is defective; replace. If fault code 4301 did recur, replace A5 interconnection module.

81. FAULT CODE 4310 (SHORT ON DC INPUT AT J1-E)

Step 1. Disconnect A2 module from chassis and initiate retest. Observe if fault code 4310 recurs. (Disregard all other fault codes that will be generated.)

If fault code 4310 did not recur, then A2 module is cause of short replace A2 module. If fault code 4310 did recur, proceed to step 2.

Step 2. Replace A5 interconnection module and initiate retest. Observe if fault code 4310 recurs.

If fault code 4310 did not recur, A5 interconnection module is cause of short; replace. If fault code 4310 did recur, short is in chassis wiring; replace UUT.

82. FAULT CODE 4311 (NO 28 VDC OUTPUT AT J3-C WITH ROCKET LOCKOUT SIGNAL APPLIED AT J1-E)

Step 1. Replace A2 module and initiate retest. Observe if fault code 4311 occurs.

If fault code 4311 did not recur, A2 module is defective; replace. If fault code 4311 did recur, proceed to step 2.

Step 2. Replace A1 module and initiate retest. Observe if fault code 4311 recurs.

If fault code 4311 did not recur, A1 module is defective; replace. If fault code 4311 did recur, proceed to step 3.

Step 3. Replace A5 interconnection module and initiate retest. Observe if fault code 4311 recurs.

If fault code 4311 did not recur, A5 interconnection module is defective; replace. If fault code 4311 did recur, an open exists in chassis wiring; replace UUT.

83. FAULT CODE 4312 (NO 28 VDC OUTPUT AT J4-J)

Replace A5 interconnection module and initiate retest. Observe if fault code 4312 recurs.

If fault code 4312 did not recur, A5 interconnection module is defective; replace. If fault code 4312 did recur, an open exists in chassis wiring; replace UUT.

84. FUAULT CODE 4331 (NO 28 VDC AT J3-C, TIME DELAY CHECK AFTER REMOVAL OF ROCKET LOCKOUT SIGNAL AT J1-E)

Replace A2 module.

85. FAULT CODE 3441 (VO 0 VDC AT J3-C, TIME DELAY CHECK AFTER REMOVAL OF ROCKET LOCKOUT SIGNAL AT J1-E)

Replace A2 module.

GUN CONTROL UNIT FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

86. FAULT CODE 4350 (SHORT ON DC INPUT AT J1-S)

Step 1. Disconnect A2 module from chassis and initiate retest. Observe if fault code 4350 recurs. (Disregard all other fault codes that will be generated.)

If fault code 4350 did not recur, A2 module is cause of short; replace A2 module. If fault code 4350 did recur, proceed to step 2.

Step 2. Replace A5 interconnection module and initiate retest. Observe if fault code 4350 recurs.

If fault code 4350 did not recur, A5 interconnection module is cause of short; replace. If fault code 4350 did recur, short is in chassis wiring; replace UUT.

87. FAULT CODE 4351 (NO +12 VDC OUTPUT AT J4-C WITH BURST LIMIT INPUT AT J1-S, TIME DELAY CHECK)

Step 1. Replace A2 module and initiate retest. Observe if fault code 4351 recurs.

If fault code 4351 did not recur, A2 module is defective; replace. If fault code 4351 did recur, proceed to step 2.

Step 2. Replace A5 interconnection module and initiate retest, Observe if fault code 4351 recurs.

If fault code 4351 did not recur, A5 interconnection module is defective; replace. If fault code 4351 did recur, an open exists in chassis wiring; replace UUT.

88. FAULT CODE 4352 (NO 0 VDC AT J3-C, TIME DELAY CHECK, AND APPLICATION OF BURST LIMIT INPUT AT J1-S).

Replace A2 module.

89. FAULT CODE 4371 (NO -12 VDC OUTPUT AT J4-C WITH BURST LIMIT INPUT AT J1-S, TIME DELAY CHECK)

Replace A2 module.

90. FAULT CODE 4372 (NO 28 VDC OUTPUT AT J3-C, TIME DELAY CHECK AFTER REMOVAL OF ROCKET LOCKOUT SIGNAL AT J1-E AND APPLICATION OF BURST LIMIT INPUT AT J1-S)

Replace A2 module.

91. FAULT CODE 4381 (NO +12 VDC OUTPUT AT J4-C AFTER REMOVAL OF BURST LIMIT INPUT AT J1-S)

Replace A2 module.

END OF TROUBLESHOOTING

2-22. TURRET CONTROL UNIT TEST

DESCRIPTION

This task covers: On bench testing including fault code troubleshooting data.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Electronics Systems Test Set: M137
- DC Power Supply PP1104C
- Distribution Panel 12007200
- Power Supply 11834203
- Cable Assembly 7540635
- Failure Isolation Shop Set 11838720

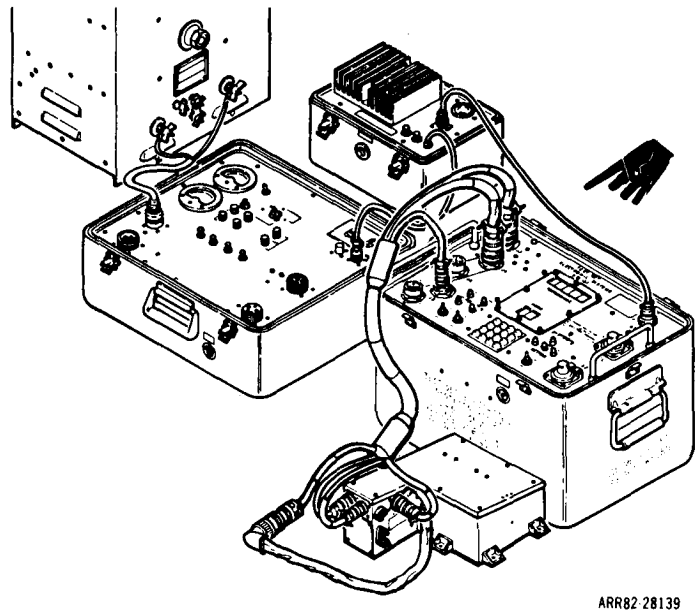
Personnel Required:
- 68J Aircraft Armament/Missile Systems Repairer

Equipment Conditions:
- On bench in shop.
- Bench power ready and test set power cable W1 connected.

General Safety Instructions:
- Never work on electronic equipment unless there is another person nearby who is familiar with operation and hazards of this equipment and who is competent in administering first aid. When aided by operator, technician must warn operator about dangerous areas.
- Power must not be applied to unit under test while test leads are being connected to or removed from unit assemblies/circuits under test.

TURRET CONTROL UNIT TEST

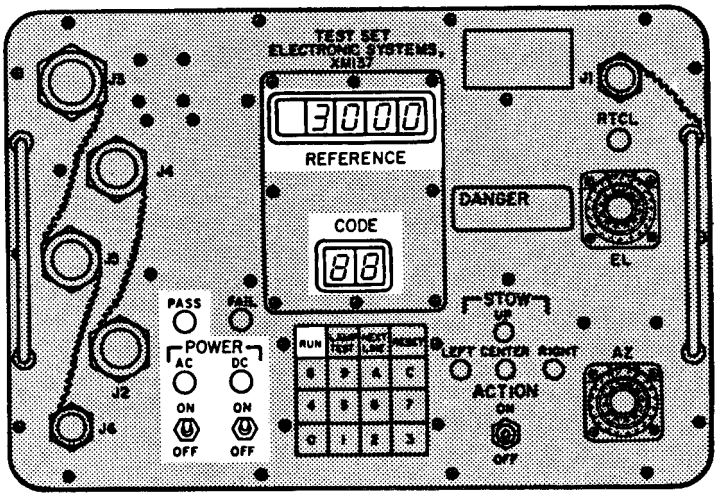
1. CONNECT TEST SET CABLE W8 AS FOLLOWS:
   - W8P1 to test set J4
   - W8P2 to TCU J3
   - W8P3 to test set J3
   - W8P4 to TCU J1
   - W8P5 to TCU J2
   - W8E1 to TCU E1
   - W8E2 to TCU E2
   - W8J1 to TCU P1



ARR82-28139

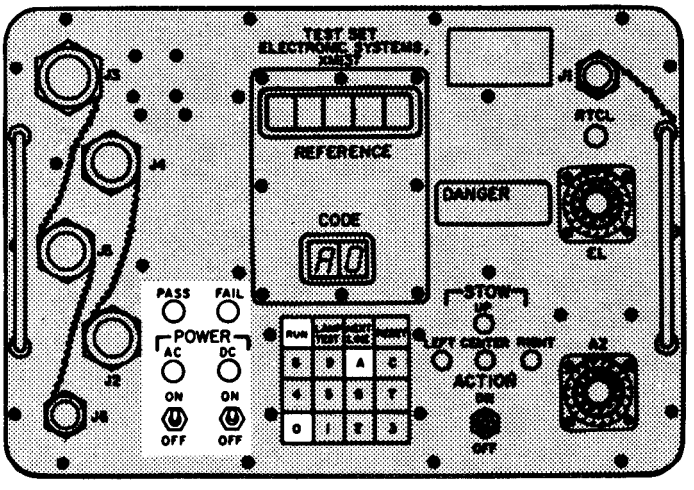
TURRET CONTROL UNIT TEST (cont)

2. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.
   a. AC and DC Power indicators light.
   b. 8's appear in REFERENCE and CODE displays.
   c. PASS indicator lights.
3. ON TEST SET, PRESS RUN KEY.
   3000 appears in REFERENCE display.



ARR82-28140

4. ON TEST SET, PRESS A, O, AND RUN KEYS.
   a. Automatic test sequence runs.
   b. PASS or FAIL indicator lights.
   c. If PASS indicator lights, unit under test is good. Remove power, disconnect test set cables, and return unit under test to service.
   d. If FAIL indicator lights, go to next step.



ARR82-28141

2-22. TURRET CONTROL UNIT TEST (cont)

5. WHEN THE FAIL INDICATOR LIGHTS, A FOUR-DIGIT FAULT CODE WILL APPEAR IN THE REFERENCE DISPLAY.

6. USING NEXT LINE KEY, DISPLAY ALL FAULT CODES AND RECORD THEM FOR REFERENCE.

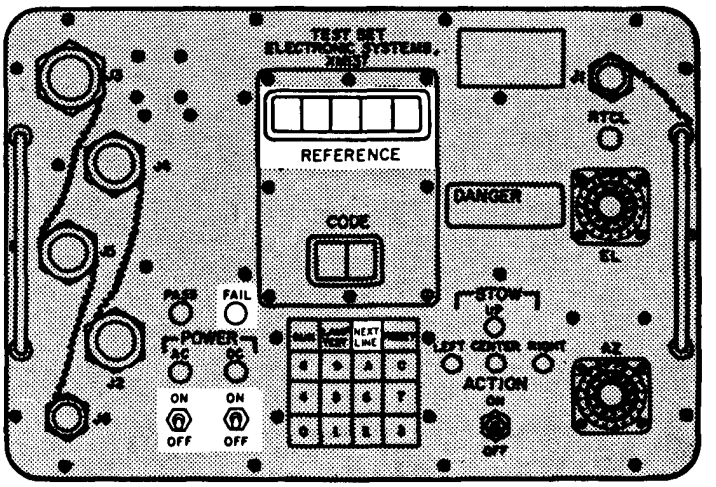
7. SET TEST SET CIRCUIT BREAKERS TO OFF

NOTE

- **Refer to FO-8 for interface diagram between test set and unit under test.**
- Failure isolation shop set will help identify failed circuit card assemblies.

8. PERFORM TROUBLESHOOTING PROCEDURES IN FAULT CODE TROUBLESHOOTING TABLE PROVIDED AT END OF THIS TEST.

9. UPON COMPLETION OF TROUBLESHOOTING PROCEDURES, REPEAT THIS TEST.



ARR82-28142

END OF TEST

TURRET CONTROL UNIT FAULT CODE TROUBLESHOOTING DATA

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE

Initiate retest after any module replacement.

WARNING

Verify all power is off before performing any corrective action.

1. FAULT CODE 3100 (SHORT ON 28 VDC INPUT AT E1 AND E2 STUDS)

Check C19 and C20, for shorts with multimeter.

If capacitors are defective, replace. If capacitors are good, replace UUT.

2. FAULT CODE 3101 (J4-F OUTPUT NOT 0 VDC)

Interchange A3 and A4 modules. Initiate retest and observe if fault code 3101 recurs.

If fault code 3101 did not recur, original A4 module is defective; replace. If fault code 3101 recurs, replace drive component assembly.

3. FAULT CODE 3102 {J4-D OUTPUT NOT 0 VDC)

Interchange A3 and A4 modules. Initiate retest and observe if fault code 3102 recurs.

If fault code 3102 did not recur, original A4 module is defective; replace. If fault code 3102 did recur, replace drive component assembly.

4. FAULT CODE 3103 (J4-C OUTPUT NOT 0 VDC)

Interchange A3 and A4 modules. Initiate retest and observe if fault code 3103 recurs.

If fault code 3103 did not recur, original A3 module is defective; replace. If fault code 3103 did recur, replace drive component assembly.

5. FAULT CODE 3104 (J4-A OUTPUT IS NOT 0 VDC)

Interchange A3 and A4 modules. Initiate retest and observe if fault code 3104 recurs.

If fault code 3104 did not recur, original A3 module is defective; replace. If fault code 3104 did recur, replace drive component assembly.

6. FAULT CODE 3105 (J4-G OUTPUT NOT 28 VDC)

Check J4 cable for continuity between J4-G and C20.

Replace cable J4 if defective.

7. FAULT CODE 3106 (TEST SET MONITOR FOR 28 VDC INPUT AT E1 INDICATES 0 VDC)

Check C19 and C20 for shorts with multimeter.

If capacitors are defective, replace. If capacitors are good, replace UUT.

2-22. TURRET CONTROL UNIT TEST (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

8. FAULT CODE 3110 (SHORT ON 28 VDC INPUT AT J4-B AND -E)

Step 1. Disconnect following wires from drive module and initiate retest disregarding all other fault codes:

J4-A to A7-R1-2
J4-C to A7-R2-2
J4-D to A7-R2-2
14-F to A7-R1-2

If fault code 3110 does not recur, replace J4 cable. If fault code 3110 does recur, proceed to step 2.

Step 2. Disconnect following wires from capacitors C19 and C20. Intitiate retest disregarding all other fault codes.

J4-B to C20
J4-E to C19

If fault code 3110 does not recur, replace drive component assembly. If fault code 3110 does recur, replace J4 cable.

9. FAULT CODE 3111 (J4-F OUTPUT NOT 2 TO 5 VDC)

Check continuity between J4-F and A6-R1-2 and between J4-E and C19.

If either is open, replace J4 cable. If both check good, diode A6CR2 is open; replace drive component assembly.

10. FAULT CODE 3112 (J4-D OUTPUT NOT 2 TO 5 VDC)

Check continuity between J4-D and A6-R2-2.

If open, replace J4 cable. If check is good, diode A6CR2 is open; replace drive component assembly.

11. FAULT CODE 3113 (J4-C OUTPUT IS NOT 2 TO 5 VDC)

Check continuity between J4-C and A7-R2-2 and between J4-B and C20.

If either is open, replace J4 cable, If both check good, diode A7CR2 is open; replace drive component assembly.

12. FAULT CODE 3114 (J4-A OUTPUT IS NOT 2 TO 5 VDC)

Check continuity between J4-A and A7-R1-2.

If open, replace J4 cable. If check is good, diode A7CR1 is open; replace drive component assembly.

13. FAULT CODE 3115 (TEST SET MONITOR FOR INPUT AT J4-B IS NOT 2 TO 5 VDC)

Check cable W8 for continuity between P3-DD, P1-BB, J1-B, and J1-E.

Replace cable W8 if defective.

14. FAULT CODE 3120 (SHORT ON DC INPUT AT J2-F -G, -U)

Remove A1 and A2 modules, Initiate retest and observe if fault code 3120 recurs. (Disregard all other fault codes that will be generated.)

If fault code 3120 did not recur, reinstall A1 and A2 modules one at a time and initiate retest. Redate module that causes fault code 3120 to reappear. If fault code 3120 recurs, disconnect wire from A8-E3 and initiate retest. If fault code 3120 recurs, replace wiring harness. If fault code 3120 does not recur, replace A8 module.

TURRET CONTROL UNIT FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

15. FAULT CODE 3121 (J1-U OUTPUT IS NOT 0 VDC)

Replace A1 module and initiate retest. Observe if fault code 3121 recurs.

If fault code 3121 did not recur, original A1 module is defective; replace. If fault code 3121 did recur, replace UUT.

16. FAULT CODE 3122 (OUTPUT AT J3-B IS NOT 28 VDC)

Replace A2 module and initiate retest.

If fault code 3122 did not recur, original A2 module is defective; replace. If fault code 3122 did recur, check continuity between J2-U and P2-17 and between J2-B and P2-9. If either is open, replace wiring harness. If check is good, replace UUT.

17. FAULT CODE 3123 (OUTPUT AT J3-A IS NOT 28 VDC)

Replace A2 module and initiate retest.

If fault code 3123 did not recur, original A2 module is defective; replace. If fault code 3123 did recur, check continuity between J3-A and P2-23. If open, replace wiring harness. If check is good, replace UUT.

18. FAULT CODE 3124 (OUTPUT AT J3-K IS NOT 28 VDC)

Replace A2 module and initiate retest.

If fault code 3124 does not recur, original A2 module is defective; replace. If fault code 3124 did recur, check continuity between J3-K and P2-11. If open, replace wiring harness. If check is good, replace UUT.

19. FAULT CODE 3125 (OUTPUT AT J3-C IS NOT 28 VDC)

Replace A2 module and initiate retest.

If fault code 3125 does not recur, original A2 module is defective; replace. If fault code 3125 did recur, check continuity between J3-C and P2-25. If open, replace wiring harness. If check is good, replace UUT.

20. FAULT CODE 3126 (OUTPUT AT J3-U IS NOT 28 VDC)

Replace A1 module and initiate retest.

If fault code 3126 does not recur, original A1 module is defective; replace. If fault code 3126 does recur, check continuity between J3-U and A8-E10 and between A8-E11 and P2-22. If either is open, replace wiring harness. If check is good, replace A8 module and initiate retest. If fault code 3126 recurs, replace UUT.

21. FAULT CODE 3127 (OUTPUT AT J2-N IS NOT 0 VDC)

Replace A1 module and initiate retest.

If fault code 3127 does not recur, original Al module is defective; replace. If fault 3127 does recur, replace A2 module and initiate retest. If fault code 3127 does not recur, original A2 module is defective; replace. If fault code 3127 did recur, check continuity between J3-D and P3-14. If open, replace wiring harness. If check is good, replace UUT.

22. FAULT CODE 3128 (OUTPUT AT J1-R IS NOT 2.5 VAC)

Check continuity between J3-D and J1-R.

If open, replace wiring harness. If check is good, replace UUT.

2-22. TURRET CONTROL UNIT TEST (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE

Initiate retest after any module replacement.

23. FAULT CODE 3129 (OUTPUT AT J1-N IS NOT 2.5 VAC)

Check continuity between J3-G and J1-N.

If open, replace wiring harness. If check is good, replace UUT.

24. FAULT CODE 3130 (SNORT ON DC INPUT AT J3-N)

Check C19 and C20 for shorts with multimeter.

If capacitors are defective; replace. If capacitors check good, replace UUT.

25. FAULT CODE 3131 (INPUT AT J3-N IS NOT 0 VDC)

Replace A1 module and initiate retest.

If fault code 3131 does not recur, original A1 module is defective; replace. If fault code 3131 recurs, check continuity between following points:

J3-N and A8-E12
P2-12 and A8-E13
A8T1-4 and P2-1
A8T1-3 and P2-14
J2-J and A8T1-2
J2-H and A8T1-1

If any are open, replace wiring harness. If check is good, replace UUT.

26. FAULT CODE 3132 (J2-P OUTPUT IS NOT 2.1 TO 3.5 VDC)

Replace A1 module and initiate retest.

If fault code 3132 does not recur, original A1 module is defective; replace. If fault code 3132 does recur, check continuity between following points:

J2-P and P3-2
J3-D and P3-14
J2-L and P3-20

If any are open, replace wiring harness, If check is good, replace UUT.

27. FAULT CODE 3133 (J4-C OUTPUT NOT 28 VDC)

Step 1. Set test set to C1 mode, and using multimeter, measure voltage at A3TP2.

If voltage is approximately 28 Vdc, replace drive component assembly. If voltage is near 0 Vdc, proceed to step 2.

Step 2. Replace A2 module and initiate retest, Observe if fault code 3133 recurs.

If fault code 3133 did not recur, original A2 module is defective; replace. If fault code 3133 did recur, proceed to step 3.

Step 3. Replace A3 module and initiate retest. Observe if fault code 3133 recurs.

If fault code 3133 did not recur, original A3 module is defective; replace. If fault code 3133 did recur, replace UUT.

TURRET CONTROL UNIT FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

28. FAULT CODE 3134 (J4-A OUTPUT NOT 0 VDC)

Step 1. Set test set to C1 mode and enter 43 on keyboard. Test set should indicate 0 ± 4 (Vdc). If indication is out of tolerance, leave test set in C1 mode and use a voltmeter to measure voltage at A3TP1.

If voltage is approximately 0 Vdc, replace drive component assembly. If A1 voltage is approximately 28 Vdc, proceed to step 2.

Step 2. Replace A3 module and initiate retest. Observe if fault code 3134 recurs.

If fault code did not recur, original A3 module is defective; replace. If fault code 3134 did recur, replace UUT.

29. FAULT CODE 3135 J2-D OUTPUT NOT 2.1 TO 3.5 VDC)

Replace A1 module and initiate retest.

If fault code 3135 did not recur, original A1 module is defective; replace. If fault code 3135 did recur, check continuity between following points:

J2-D and P3-1

J3-G and P3-22

If any are open, replace wiring harness. If check is good, replace UUT.

30. FAULT CODE 3136 (J4-F OUTPUT IS NOT 0 VDC)

Step 1. Set test set to C1 mode and enter 46 on keyboard. Test set should indicate 0 ± 4 (Vdc). If indication is out of tolerance, leave test set in C1 mode and use a voltmeter to measure voltage at A4TP1.

If voltage is approximately 0 Vdc, replace drive component assembly. If voltage is near 28 Vdc, proceed to step 2.

Step 2. Replace A4 module and initiate retest. Observe if fault code 3136 recurs.

If fault code 3136 did not recur, original A4 module is defective; replace. If fault code 3136 did recur, proceed to step 3.

Step 3. Replace A2 module and initiate retest. Observe if fault code 3136 recurs.

If fault code 3136 did not recur, original A2 module is defective; replace. If fault code 3136 did recur, replace UUT.

31. FAULT CODE 3137 (J4-D OUTPUT NOT 28 VDC)

Step 1. Set test set to C1 mode and enter 45 on keyboard. Test set should indicate +26 ± 4 (Vdc). If indication is out of tolerance, leave test set in C0 mode and use a voltmeter to measure voltage at A4TP2.

If voltage is approximately 28 Vdc, replace drive component assembly. If voltage is approximately 0 Vdc, proceed to step 2.

Step 2. Replace A4 module and initiate retest. Observe if fault code 3135 recurs.

If fault code 3135 did not recur, original A4 module is defective; replace. If fault code 3135 did recur, replace UUT.

32. FAULT CODE 3138 (J2-N OUTPUT NOT 28 VDC)

Replace A2 module.

33. FAULT CODE 3141 (J2-P OUTPUT IS NOT -2.1 TO -3.5 VDC)

Replace A1 module.

2-22. TURRET CONTROL UNIT TEST (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE

Initiate retest after any module replacement.

34. FAULT CODE 3142 (J4-C OUTPUT IS NOT 0 VDC)

Step 1. Replace A3 module and initiate retest. Observe if fault code 3142 recurs.

If fault code 3142 did not recur, original A3 module is defective; replace. If fault code 3142 did recur, proceed to step 2.

Step 2. Replace A2 module and initiate retest. Observe if fault code 3142 recurs.

If fault code 3142 did not recur, original A2 module is defective; replace. If fault code 3142 did recur; replace drive component assembly.

35. FAULT CODE 3143 (J4-A OUTPUT IS NOT 28 VDC)

Replace A3 module and initiate retest. Observe if fault code 3143 recurs.

If fault code 3143 did not recur, original A3 module is defective; replace. If fault code 3143 did recur, replace drive component assembly.

36. FAULT CODE 3144 (J2-D OUTPUT IS NOT -2.1 TO -3.5 VDC)

Replace A1 module.

37. FAULT CODE 3145 (J4-F OUTPUT IS NOT 28 VDC)

Step 1. Set test set to C2 mode and enter 46 on keyboard. Test set should indicate +26 ± 4 (Vdc). If indication is out of tolerance, leave test set in C2 mode and use a voltmeter to measure voltage at A4TP1.

If voltage is approximately 28 Vdc, replace drive component assembly. If voltage is near 0 Vdc, proceed to step 2.

Step 2. Replace A4 module and initiate retest. Observe if fault code 3145 recurs.

If fault code 3145 did not recur, original A4 module is defective; replace. If fault code 3145 did recur, proceed to step 3.

Step 3. Replace A2 module and initiate retest. Observe if fault code 3145 recurs.

If fault code 3145 did not recur, original A2 module is defective; replace. If fault code 3145 did recur, replace UUT.

38. FAULT CODE 3146 (J4-D OUTPUT NOT 0 VDC)

Step 1. Set test set to C2 mode and enter 45 on keyboard. Test set should indicate approximately 0 (Vdc). If indication is out of tolerance, leave test set in C2 mode and use a voltmeter to measure voltage at A4TP2.

If voltage is approximately 0 Vdc, replace drive component assembly. If voltage is approximately 28 Vdc, proceed to step 2.

Step 2. Replace A4 module and initiate retest. Observe if fault code 3146 recurs.

If fault code 3146 did not recur, original A4 module is defective; replace. If fault code 3146 did recur, replace UUT.

39. FAULT CODE 3151 (J4-F OUTPUT IS NOT 28 VDC)

Replace A2 module and initiate retest.

If fault code 3151 did not recur, original A2 module is defective; replace. If fault code 3151 did recur, replace UUT.

TURRET CONTROL UNIT FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

40. FAULT CODE 3152 J4-D OUTPUT IS NOT 0 VDC)

Replace A2 module.

41. FAULT CODE 3161 (J4-C OUTPUT IS NOT 0 VDC)

Replace A2 module and initiate retest.

If fault code 3161 did not recur, original A2 module is defective; replace. If fault code 3161 recurs, replace UUT.

42. FAULT CODE 3162 (J4-A OUTPUT IS NOT 28 VDC)

Replace A2 module.

43. FAULT CODE 3171 (J4-F OUTPUT IS NOT 28 VDC)

Replace A2 module and initiate retest.

If fault code 3171 did not recur, original A2 module is defective; replace. If fault code 3171 did recur, replace UUT.

44. FAULT CODE 3181 (J4-C OUTPUT IS NOT 0 VDC)

Replace A2 module.

45. FAULT CODE 3182 (J4-A OUTPUT IS NOT 28 VDC)

Replace A2 module.

46. FAULT CODE 3191 (J4-F OUTPUT IS NOT 0 VDC)

Replace A2 module and initiate retest.

If fault code 3191 did not recur, original A2 module is defective; replace. If fault code 3191 recurs, check continuity between following points:

J3-R and A8-E8
P2-15 and A8-E8
J2-S and P2-10

If any are open, replace wiring harness. If check is good, replace A8 module.

47. FAULT CODE 3192 (J4-D OUTPUT IS NOT 28 VDC)

Replace A2 module.

48. FAULT CODE 3201 (J4-C OUTPUT IS NOT 28 VDC)

Replace A2 module and initiate retest.

If fault code 3201 did not recur, original A2 module is defective; replace. If fault code 3201 recurs, check continuity between following points:

J3-T and A8-E6
P2-24 and A8-E6

If any are open, replace wiring harness. If check is good, replace A8 module.

2-22. TURRET CONTROL UNIT TEST (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE

Initiate retest after any module replacement.

49. FAULT CODE 3202 (J4-A OUTPUT IS NOT 0 VDC)

Replace A2 module.

50. FAULT CODE 3211 (J4-F OUTPUT IS NOT 0 VDC)

Replace A2 module and initiate retest.

If fault code 3211 did not recur, original A2 module is defective; replace. If fault code 3211 recurs, replace A8 module.

51. FAULT CODE 3212 (J4-D OUTPUT IS NOT 28 VDC)

Replace A2 module.

52. FAULT CODE 3221 (J4-C OUTPUT IS NOT 28 VDC)

Replace A2 module and initiate retest.

If fault code 3221 does not recur, original A2 module is defective; replace. If fault code 3221 recurs; replace A8 module.

53. FAULT CODE 3222 (J4-A OUTPUT IS NOT 0 VDC)

Replace A2 module.

54. FAULT CODE 3231 (J4-F OUTPUT IS NOT 0 VDC)

Replace A2 module.

55. FAULT CODE 3232 (J4-D OUTPUT IS NOT 28 VDC)

Replace A2 module.

56. FAULT CODE 3241 (J4-C OUTPUT IS NOT 28 VDC)

Replace A2 module.

57. FAULT CODE 3242 (J4-A OUTPUT IS NOT 0 VDC)

Replace A2 module.

58. FAULT CODE 3251 (J4-F OUTPUT IS NOT 28 VDC)

Replace A2 module.

59. FAULT CODE 3252 (J4-D OUTPUT IS NOT 0 VDC)

Replace A2 module.

60. FAULT CODE 3261 (J4-C OUTPUT IS NOT 0 VDC)

Replace A2 module.

TURRET CONTROL UNIT FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE) TEST OR INSPECTION CORRECTIVE ACTION	NOTE Initiate retest after any module replacement.

61. FAULT CODE 3262 (J4-A OUTPUT IS NOT 28 VDC)
Replace A2 module,

62. FAULT CODE 3271 (J4-F OUTPUT IS NOT 0 VDC)
Replace A2 module,

63. FAULT CODE 3272 (J4-D OUTPUT IS NOT 28 VDC)
Replace A2 module.

64. FAULT CODE 3281 (J4-C OUTPUT IS NOT 28 VDC)
Replace A2 module.

65. FAULT CODE 3282 (J4-A OUTPUT IS NOT 0 VDC)
Replace A2 module,

66. FAULT CODE 3291 (J4-F OUTPUT IS NOT 28 VDC)
Replace A2 module.

67. FAULT CODE 3292 (J4-D OUTPUT IS NOT 0 VDC)
Replace A2 module.

68. FAULT CODE 3301 (J4-C OUTPUT IS NOT 0 VDC)
Replace A2 module.

69. FAULT CODE 3302 (J4-A OUTPUT IS NOT 28 VDC)
Replace A2 module.

70. FAULT CODE 3310 (SHORT ON 28 VDC INPUTS AT J3-A, -B, -C, -K, OR J1-K)

Step 1. Disconnect A2 module and initiate retest. Observe if fault code 3310 recurs. (Disregard all other fault codes that will be generated.)
If fault code 3310 did not recur with A2 module disconnected, A2 module is cause of short; replace.
If fault code 3310 did recur, reconnect A2 module and proceed to step 2.

Step 2. Disconnect Al module and initiate retest. Observe if fault code 3310 recurs. (Disregard all other fault codes that will be generated.)
If fault code 3310 did not recur with Al module disconnected, Al module is cause of short; replace.
If fault code 3310 did recur, reconnect Al module and proceed to step 3.

Step 3. Replace wiring harness.

2922. TURRET CONTROL UNIT TEST (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

71. FAULT CODE 3311 (J1-U OUTPUT IS NOT 28 VDC)

Step 1. Replace Al module and initiate retest. Observe if fault code 3311 recurs.
If fault code 3311 did not recur, original Al module is defective; replace. If fault 3311 did recur, replace UUT.

Step 2. Replace A2 module and initiate retest. Observe if fault code 3311 recurs.
If fault code 3311 did not recur, original A2 module is defective; replace. If fault code 3311 did recur, check continuity between following points:
J2-F and P2-20
J1-U and P2-19
J1-K and A8-E1
P2-21 and A8-E1
If any are open, replace wiring harness. If check is good, replace UUT.

72. FAULT CODE 3312 (J2-D OUTPUT IS NOT -2.1 TO -3.5 VDC)

Step 1. Replace Al module and initiate retest. Observe if fault code 3312 recurs.
If fault code 3312 did not recur, original Al module is defective; replace. If fault code 3312 did recur, proceed to step 2.

Step 2. Replace A4 module and initiate retest. Observe if fault code 3312 recurs.
If fault code 3312 did not recur, original A4 module is defective; replace. If fault code 3312 did recur, check continuity between following points
J1-T and P3-24
J1-M and P3-23
If any are open, replace wiring harness. check is good, replace UUT.

73. FAULT CODE 3313 (J4-F OUTPUT IS NOT 28 VDC)

Step 1. Replace A2 module and initiate retest. Observe if fault code 3313 recurs.
If fault code 3313 did not recur, original A2 module is defective; replace. If fault code 3313 did recur, proceed to step 2.

Step 2. Replace A4 module and initiate retest. Observe if fault code 3313 recurs.
If fault code 3313 did not recur, original A4 module is defective; replace. If fault code 3313 did recur, replace UUT.

74. FAULT CODE 3314 (J4-D OUTPUT IS NOT 0 VDC)

Step 1. Replace A2 module and initiate retest. Observe if fault code 3314 recurs.
If fault code 3314 did not recur, original A2 module is defective; replace. If fault code 3314 did recur, proceed to step 2.

Step 2. Replace A4 module and initiate retest. Observe if fault code 3314 recurs.
If fault code 3314 did not recur, original A4 module is defective; replace. If fault code 3314 did recur, replace UUT.

TURRET CONTROL UNIT FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

75. FAULT CODE 3315 (J2-P OUTPUT IS NOT -2.1 TO -3.5 VDC)

Step 1. Replace Al module and initiate retest. Observe if fault code 3315 recurs.
If fault code 3315 did not recur, original Al module is defective; replace. If fault code 3315 did recur, proceed to step 2.

Step 2. Replace A3 module and initiate retest. Observe if fault code 3315 recurs.
If fault code 3315 did not recur, original A3 module is defective; replace. If fault code 3315 did recur, check continuity between following points:
J1-C to P3-5
J1-B to P3-15
If any are open, replace wiring harness. If check is good, replace UUT.

76. FAULT CODE 3316 (J4-C OUTPUT IS NOT 0 VDC)

Step 1. Replace A2 module and initiate retest. Observe if fault code 3316 recurs.
If fault code 3316 did not recur, original A2 module is defective; replace. If fault code 3316 did recur, proceed to step 2.

Step 2. Replace A3 module and initiate retest. Observe if fault code 3316 recurs.
If fault code 3316 did not recur, original A3 module is defective; replace. If fault code 3316 did recur, replace UUT.

77. FAULT CODE 3317 (J4-A OUTPUT IS NOT 28 VDC)

Step 1. Replace A2 module and initiate retest. Observe if fault code 3317 recurs.
If fault code 3317 did not recur, original A2 module is defective; replace. If fault code 3317 did recur, proceed to step 2.

Step 2. Replace A3 module and initiate retest. Observe if fault code 3317 recurs.
If fault code 3317 did not recur, original A3 module is defective; replace. If fault code 3317 did recur, replace UUT.

78. FAULT CODE 3321 (J4-F OUTPUT IS NOT 0 VDC, DYNAMIC BRAKING CHECK)

Replace A2 module

79. FAULT CODE 3322 (J4-D OUTPUT IS NOT 28 VDC, DYNAMIC BRAKING CHECK)

Replace A2 module.

80. FAULT CODE 3323 (J4-D DELAYED OUTPUT IS NOT 0 VDC, DYNAMIC BRAKING CHECK)

Replace A2 module.

81. FAULT CODE 3331 (J4-C OUTPUT IS NOT 28 VDC, DYNAMIC BRAKING CHECK)

Replace A2 module.

82. FAULT CODE 3332 (J4-C DELAYED OUTPUT IS NOT 0 VDC, DYNAMIC BRAKING CHECK)

Replace A2 module.

2-22. TURRET CONTROL UNIT TEST (cont)

MALFUNCTION (FAULT CODE)	NOTE
TEST OR INSPECTION	Initiate retest after any module replacement.
CORRECTIVE ACTION	

83. FAULT CODE 3333 (J4.A OUTPUT IS NOT 0 VDC, DYNAMIC BRAKING CHECK)
Replace A2 module.

84. FAULT CODE 3341 (14-F OUTPUT IS NOT 28 VDC, DYNAMIC BRAKING CHECK)
Replace A2 module.

85. FAULT CODE 3342 (J4-F DELAYED OUTPUT IS NOT 0 VDC, DYNAMIC BRAKING CHECK)
Replace A2 module.

86. FAULT CODE 3343 (J4-D OUTPUT IS NOT 0 VDC, DYNAMIC BRAKING CHECK)
Replace A2 module.

87. FAULT CODE 3351 (J4-C OUTPUT IS NOT 0 VDC, DYNAMIC BRAKING CHECK)
Replace A2 module.

88. FAULT CODE 3352 (J4-A OUTPUT IS NOT 28 VOC, DYNAMIC BRAKING CHECK)
Replace A2 module.

89. FAULT CODE 3353 (J4-C OUTPUT IS NOT 28 VOC, DYNAMIC BRAKING CHECK)
Replace A2 module.

90. FAULT CODE 3354 (J4-A DELAYED OUTPUT IS NOT 0 VDC, DYNAMIC BRAKING CHECK)
Replace A2 module.

91. FAULT CODE 3361 (J2-D OUTPUT IS NOT 0 VDC)
Replace Al module,

92. FAULT CODE 3362 (J2-P OUTPUT IS NOT 0 VDC)
Replace Al module.

93. FAULT CODE 3363 (J2-N OUTPUT IS NOT 28 VDC)
Replace A2 module and initiate retest. Observe if fault code 3363 recurs.
If fault code 3363 did not recur, original A2 module is defective; replace. If fault code 3363 did recur, check continuity between following points:
J2-N and A8-E4
P2-8 and A8-E2
If any are open, replace wiring harness. If check is good, replace UUT.

TURRET CONTROL UNIT FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

94. FAULT CODE 3371 (J3-N OUTPUT IS NOT 28 VDC, LOW VOLTAGE CUTOUT CHECK)

Replace Al module and initiate retest, Observe if fault code 3371 recurs.

If fault code 3371 did not recur, original Al module is defective; replace. If fault code 3371 did recur, replace UUT.

95. FAULT CODE 3372 (J4-F OUTPUT IS NOT 0 VDC, LOW VOLTAGE CUTOUT CHECK)

Replace A4 module and initiate retest. Observe if fault code 3372 recurs,

If fault code 3372 did not recur, original A4 module is defective; replace. If fault code 3372 did recur, replace UUT.

96. FAULT CODE 3373 (J4-D OUTPUT IS NOT 0 VDC, LOW VOLTAGE CUTOUT CHECK)

Replace A4 module.

97. FAULT CODE 3374 (J4-C OUTPUT IS NOT 0 VDC, LOW VOLTAGE CUTOUT CHECK)

Replace A3 module and initiate retest. Observe if fault code 3374 recurs.

If fault code 3374 did not recur, original A3 module is defective; replace. If fault code 3374 did recur, replace UUT.

98. FAULT CODE 3375 (J4-A OUTPUT IS NOT 0 VDC, LOW VOLTAGE CUTOUT CHECK)

Replace A3 module.

99. FAULT CODE 3381 (14-F OUTPUT IS NOT 0 VDC, LOW VOLTAGE CUTOUT CHECK)

Replace A4 module.

100. FAULT CODE 3382 (J4-D OUTPUT IS NOT O VDC, LOW VOLTAGE CUTOUT CHECK)

Replace A4 module.

101. FAULT CODE 3383 (J4-C OUTPUT IS NOT 0 VDC, LOW VOLTAGE CUTOUT CHECK)

Replace A3 module.

102. FAULT CODE 3384 (J4-A OUTPUT IS NOT 0 VDC, LOW VOLTAGE CUTOUT CHECK)

Replace A3 module

103. FAULT CODE 3391 (J2-D OUTPUT IS NOT -1.5 TO -3.0 VDC, AZ DEMOD GAIN CHECK)

Replace Al module.

104. FAULT CODE 3401 (J2-D OUTPUT IS NOT -1.5 TO -2.0 VDC, AZ DEMOD GAIN CHECK)

Replace Al module.

105. FAULT CODE 3411 (J1-U OUTPUT IS NOT 28 VDC)

See fault code 3311 for corrective action.

2-22. TURRET CONTROL UNIT TEST (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE

Initiate retest after any module replacement.

106. FAULT CODE 3412 (J2-D OUTPUT IS NOT +0.4 TO +1.5 VDC, AZ DEMOD GAIN CHECK)

Step 1. Set test set to CO mode and enter 05 on keyboard. Adjust A1R14 for 0 ±0.1 (Vdc) on REFERENCE display.

If adjustment does not bring reading within tolerance, replace Al module.

Step 2. Initiate retest and observe if fault code 3412 recurs.

If fault code 3412 recurs; replace A1 module.

107. FAULT CODE 3413 (J2-P OUTPUT IS NOT -0.4 TO -1.5 VOC, EL DEMOD GAIN CHECK)

Step 1. Set test set to CO mode and enter 04 on keyboard. Adjust A1R11 for 0 ±0.1 (Vdc) on REFERENCE display.

If adjustment does not bring reading within tolerance, replace A1 module.

Step 2. Initiate retest and observe if fault code 3413 recurs,

If fault code 3413 recurs, replace A1 module.

108. FAULT CODE 3414 (J2-N OUTPUT IS NOT 28 VDC)

Replace A2 module.

109. FAULT CODE 3421 (J2-P OUTPUT IS NOT -0.4 TO -3.5 VDC)

Replace A1 module.

110. FAULT CODE 3431 (J2-P OUTPUT IS NOT -0.4 TO -3.5 VDC)

Replace A1 module.

111. FAULT CODE 3432 (J2-N OUTPUT IS NOT O VDC)

Replace A2 module.

112. FAULT CODE 3440 (SHORT ON DC INPUT AT J1-K)

Disconnect Al module and initiate retest. Observe if fault code 3440 recurs. (Disregard all other fault codes that will be generated.)

If fault code 3440 did not recur with Al module disconnected, then Al module is cause of short; replace.

If fault code 3440 did recur, replace wiring harness.

113. FAULT CODE 3441 (J2-D OUTPUT IS NOT -0.4 TO -1.2 VDC, AZ DEMOD GAIN CHECK)

Replace A1 module.

114. FAULT CODE 3442 (J2-P OUTPUT IS NOT -0.4 TO -1.2 VDC, EL DEMOD GAIN CHECK)

Replace A1 module,

END OF TROUBLESHOOTING

2-23. GUNNER ARMAMENT CONTROL PANEL (12910143) TEST

DESCRIPTION

This task covers: On bench testing including interface diagram and fault code troubleshooting data.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Electronics Systems Test Set: M137
- DC Power Supply PP1104C
- Distribution Panel 12007200
- Power Supply 11834203
- Cable Assembly 7540635

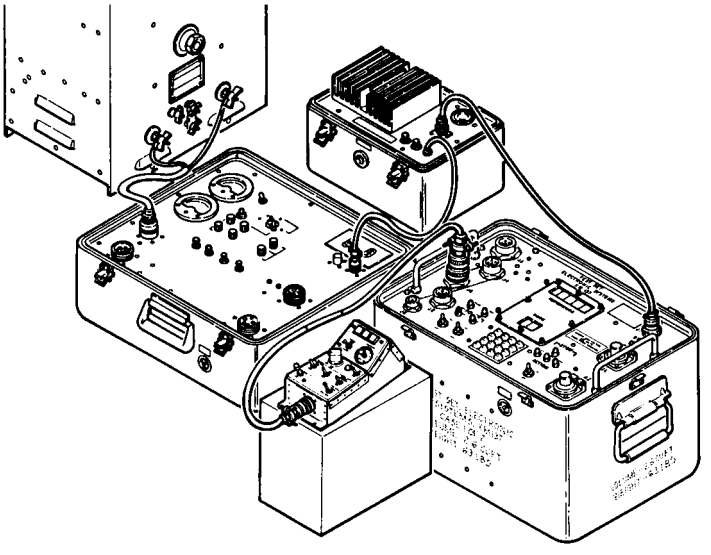
Personnel Required:
- 68J Aircraft Armament/Missile Systems Repairer

Equipment Conditions:
- On bench in shop.
- Bench power ready and test set power cable W1 connected.

General Safety Instructions:
- Never work on electronic equipment unless there is another person nearby who is familiar with operation and hazards of this equipment and who is competent in administering first aid. When aided by operator, technician must warn operator about dangerous areas.
- Power must not be applied to unit under test while test leads are being connected to or removed from unit assemblies/circuits under test.

GUNNER ARMAMENT CONTROL PANEL (12910143) TEST

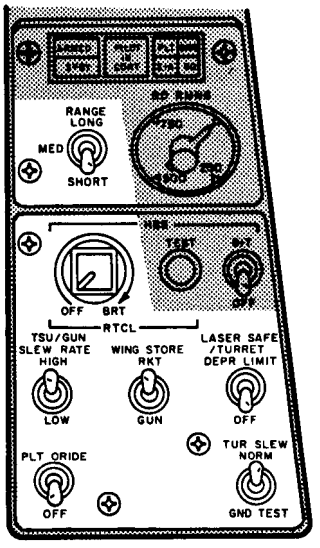
1. CONNECT TEST SET CABLE W22 AS FOLLOWS:
   - W22P1 to test set J5
   - W22P2 to GACP



ARR82-25975

2-23. GUNNER ARMAMENT CONTROL PANEL (12910143) TEST (cont)

2. SET SWITCHES ON GUNNER ARMAMENT CONTROL PANEL AS FOLLOWS:
   PLT ORIDE to OFF
   RANGE to SHORT
   WING STORE to RKT
   HSS RTCL to OFF
   TUR SLEW to NORM
   LASER SAFE/TURRET
   DEPR LIMIT to OFF
   TSU/GUN SLEW RATE to HIGH

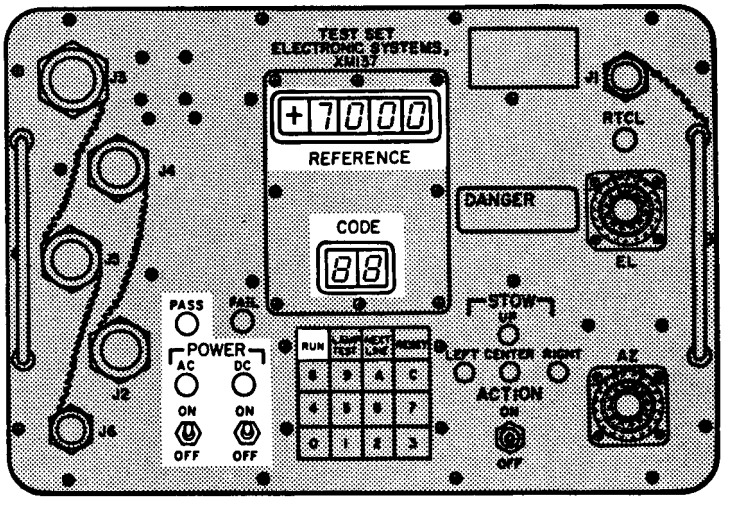


GUNNER ARMAMENT CONTROL PANEL

ARR82-25976

3. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.
   a. AC and DC power indicators light.
   b. 8's appear in REFERENCE and CODE displays.
   c. PASS indicator lights.

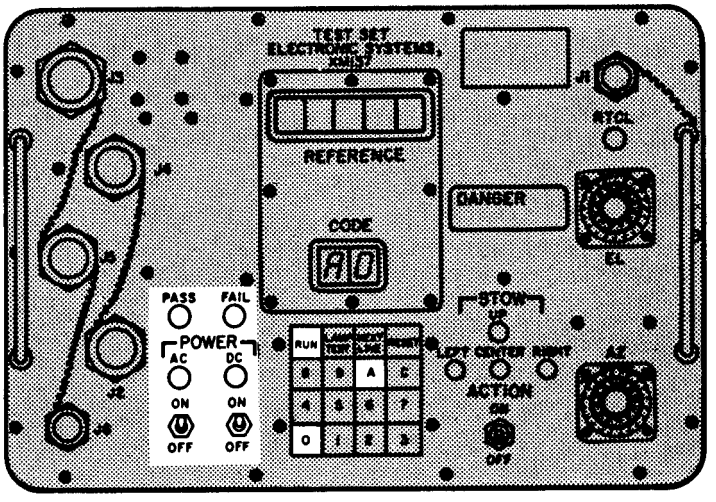
4. ON TEST SET, PRESS RUN KEY.
   +7000 appears in REFERENCE display.



ARR82-25977

GUNNER ARMAMENT CONTROL PANEL (12910143) TEST (cont)

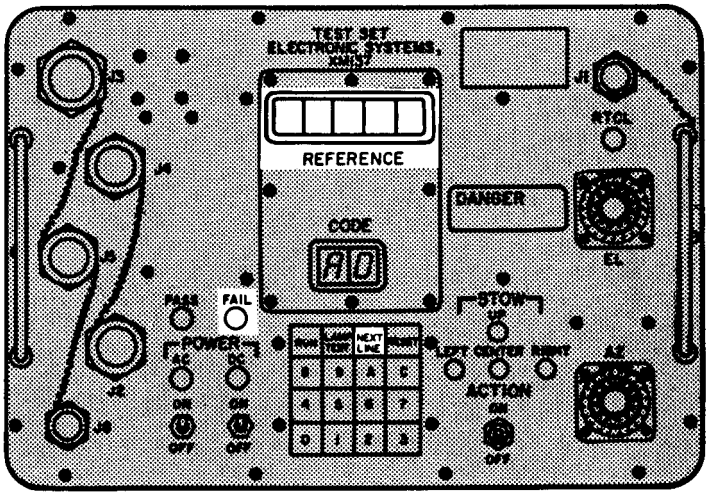
5. ON TEST, SET, PRESS A, O, AND RUN KEYS.
   a. Automatic test sequence runs.
   b. PASS or FAIL indicator lights.
   c. If PASS indicator lights, gunner armament control panel passes this part of test, go to step 12 and continue test.
   d. If FAIL indicator lights, go to next step.



ARR82-25978

6. WHEN THE FAIL INDICATOR LIGHTS, A FOUR-DIGIT CODE WILL APPEAR IN THE REFERENCE DISPLAY.

7. USING NEXT LINE KEY, DISPLAY ALL FAULT CODES AND RECORD THEM FOR REFERENCE.



ARR82-25979

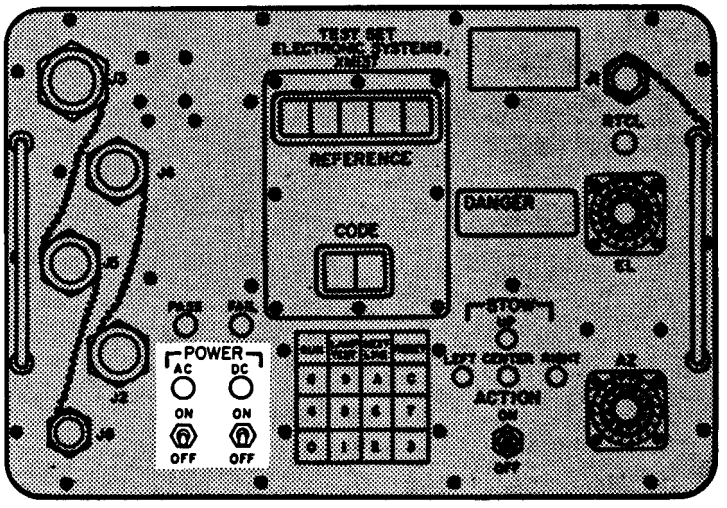
2-23. GUNNER ARMAMENT CONTROL PANEL (12910143) TEST (cont)

8. SET TEST CIRCUIT BREAKERS TO OFF

9. REFER TO GUNNER ARMAMENT CONTROL PANEL (209-175-338-1) INTERFACE DIAGRAM FOR INTERFACE BETWEEN TEST SET AND UNIT UNDER TEST.

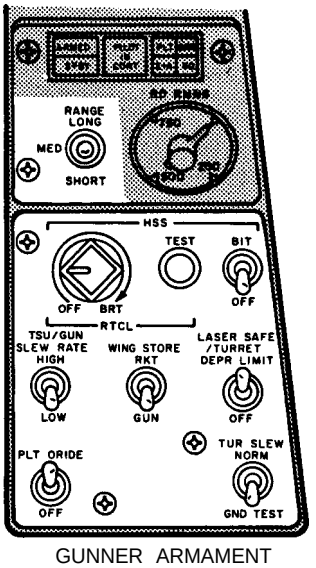
10. PERFORM TROUBLESHOOTING PROCEDURES IN FAULT CODE TROUBLESHOOTING DATA PROVIDED AT END OF THIS TEST.

11. UPON COMPLETION OF TROUBLESHOOTING PROCEDURES, REPEAT THIS TEST.



ARR82-25980

12. SET SWITCHES ON GUNNER ARMAMENT CONTROL PANEL AS FOLLOWS:
    - PLT ORIDE to ORIDE
    - RANGE to MED
    - WING STORE to GUN
    - HSS RTCL intensity (on, but not rotated to BRT)
    - HSS RTCL/TEST to OFF (not pressed)
    - HSS BIT (hold on during test)
    - TUR SLEW to GND TEST
    - LASER SAFE/TURRET DEPR LIMIT to on
    - TSU/GUN SLEW RATE to LOW

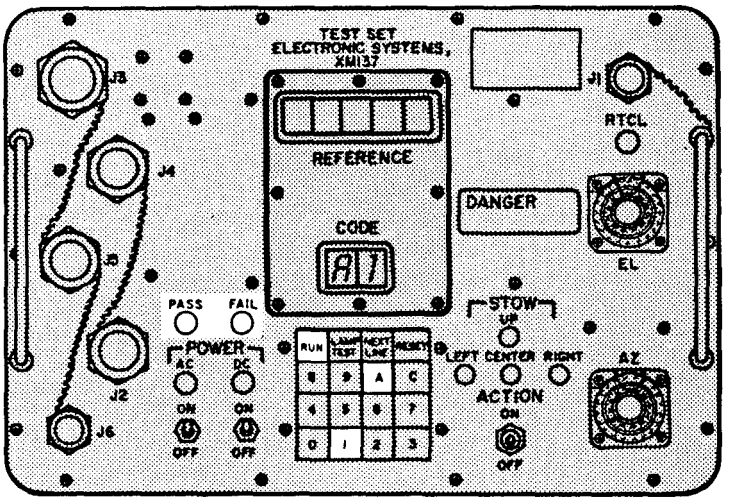


GUNNER ARMAMENT CONTROL PANEL

ARR82-25981

GUNNER ARMAMENT CONTROL PANEL (12910143) TEST (cont)

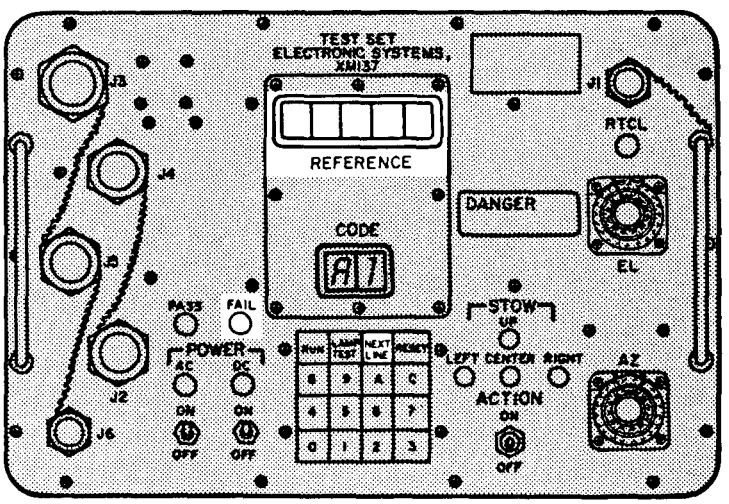
13. WITH HSS BIT SWITCH ON GUNNER ARMAMENT CONTROL PANEL HELD ON, PRESS A, 1, AND RUN KEYS ON TEST SET.
    a. Automatic test sequence runs.
    b. PASS or FAIL indicator lights.
    c. If PASS indicator lights, gunner armament control panel passes this part of test, go to step 20 and continue test.
    d. If FAIL indicator lights, go to next step.



ARR82-25982

14. WHEN THE FAIL INDICATOR LIGHTS, A FOUR-DIGIT FAULT CODE WILL APPEAR IN THE REFERENCE DISPLAY.

15. USING NEXT LINE KEY; DISPLAY ALL FAULT CODES AND RECORD THEM FOR REFERENCE.



ARR82-25983

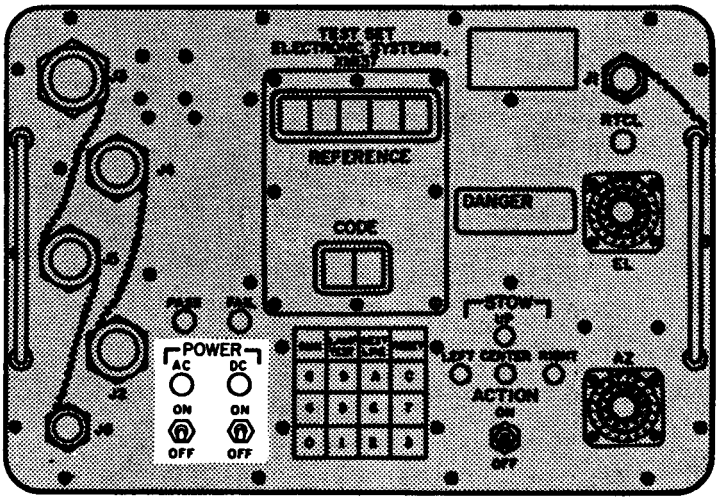
2-23. GUNNER ARMAMENT CONTROL PANEL (12910143) TEST (cont)

16. SET TEST SET CIRCUIT BREAKERS TO OFF.

17. REFER TO GUNNER ARMAMENT CONTROL PANEL (12910143) INTERFACE DIAGRAM FOR INTERFACE BETWEEN TEST SET AND UNIT UNDER TEST.

18. PERFORM TROUBLESHOOTING PROCEDURES IN FAULT CODE TROUBLESHOOTING DATA PROVIDED AT END OF THIS TEST.

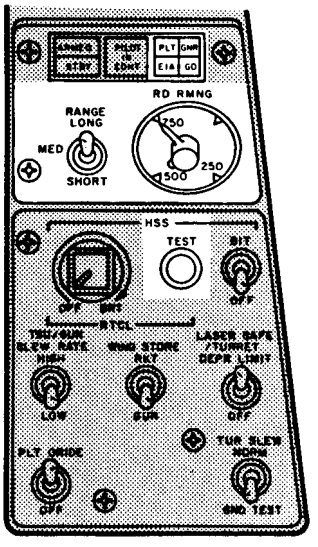
19. UPON COMPLETION OF TROUBLESHOOTING PROCEDURES, REPEAT THIS TEST.



ARR82-25984

20. SET SWITCHES ON GUNNER ARMAMENT CONTROL PANEL AS FOLLOWS:

RANGE to LONG
RD RMNG to 750
HSS RTCL TEST (held pressed during test)
HSS BIT indicator (held pressed during test)

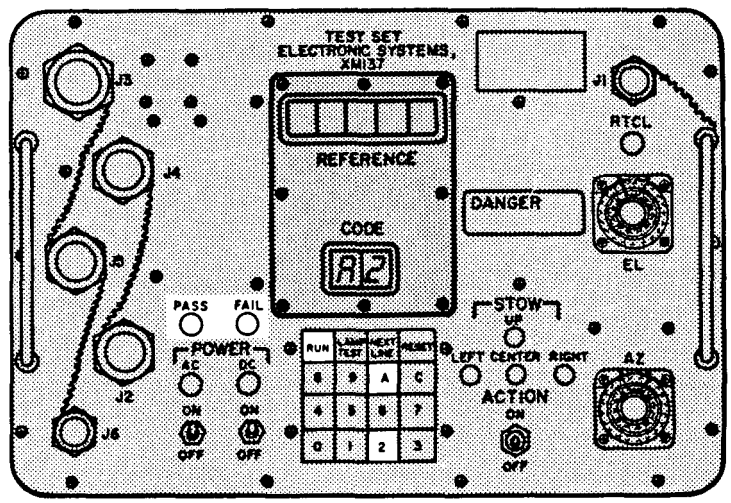


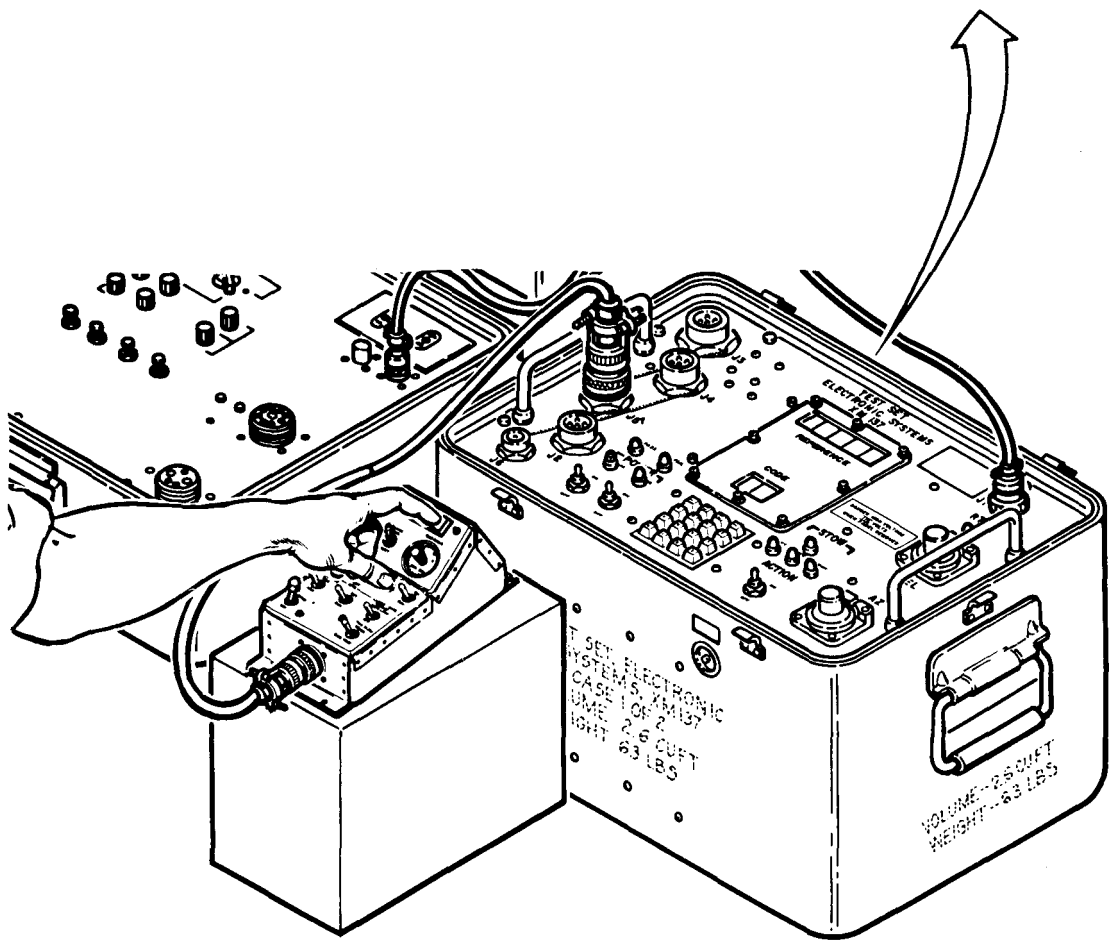
GUNNER ARMAMENT CONTROL PANEL

ARR82-25985

GUNNER ARMAMENT CONTROL PANEL (12910143) TEST (cont)

21. WITH HSS RTCL TEST Pushbutton AND HSS BIT INDICATOR ON GUNNER ARMAMENT CONTROL PANEL PRESSED, PRESS A, 2, AND RUN KEYS ON TEST SET.
    a. Automatic test sequence runs.
    b. RD RMNG counter counts down approximately 50 rounds.
    c. PASS or FAIL indicator lights.
    d. If PASS indicator lights, gunner armament control panel passes this part of test, go to step 28 and continue test.
    e. If FAIL indicator lights, go to next step.



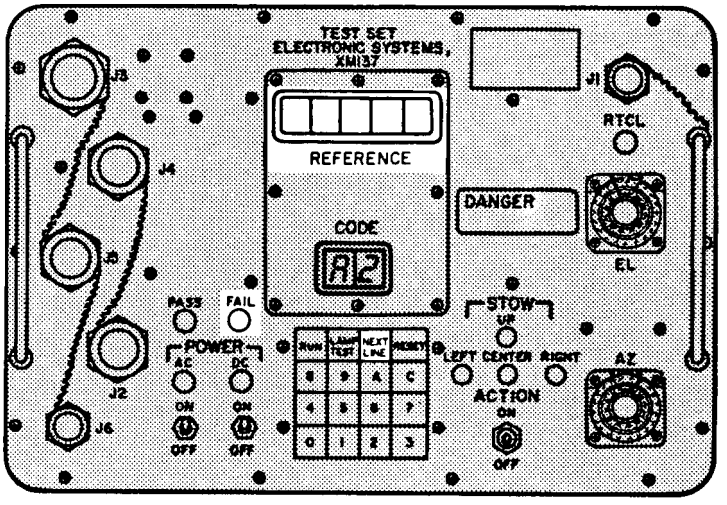


ARR82-25986

2-23. GUNNER ARMAMENT CONTROL PANEL (12910143) TEST (cont)

22 WHEN THE FAIL INDICATOR LIGHTS, A FOUR-DIGIT FAULT CODE WILL APPEAR IN THE REFERENCE DISPLAY.

23. USING NEXT LINE KEY, DISPLAY ALL FAULT CODES AND RECORD THEM FOR REFERENCE.



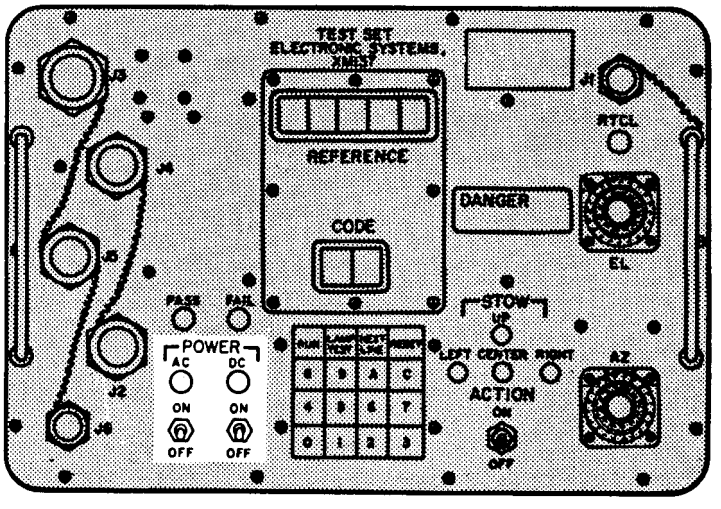
ARR82-25987

24. SET TEST SET CIRCUIT BREAKERS TO OFF.

25. REFER TO GUNNER ARMAMENT CONTROL PANEL (12910143) INTERFACE DIAGRAM FOR INTERFACE BETWEEN TEST SET AND UNIT UNDER TEST.

26. PERFORM TROUBLESHOOTING PROCEDURES IN FAULT CODE TROUBLESHOOTING DATA PROVIDED AT END OF THIS TEST.

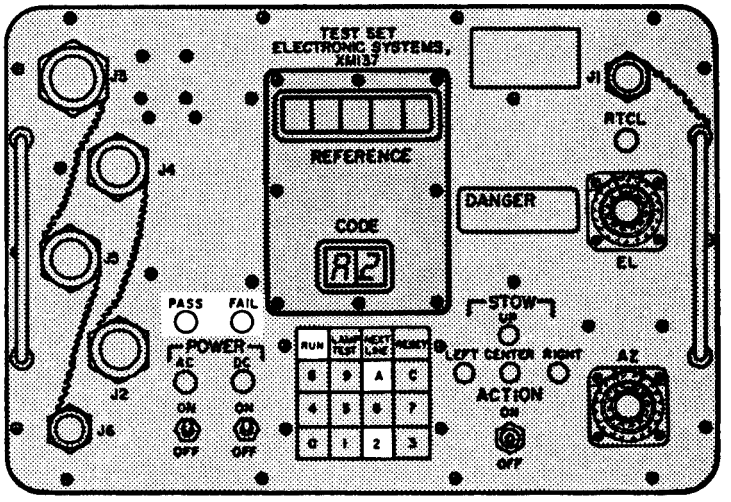
27. UPON COMPLETION OF TROUBLESHOOTING PROCEDURES, REPEAT THIS TEST.

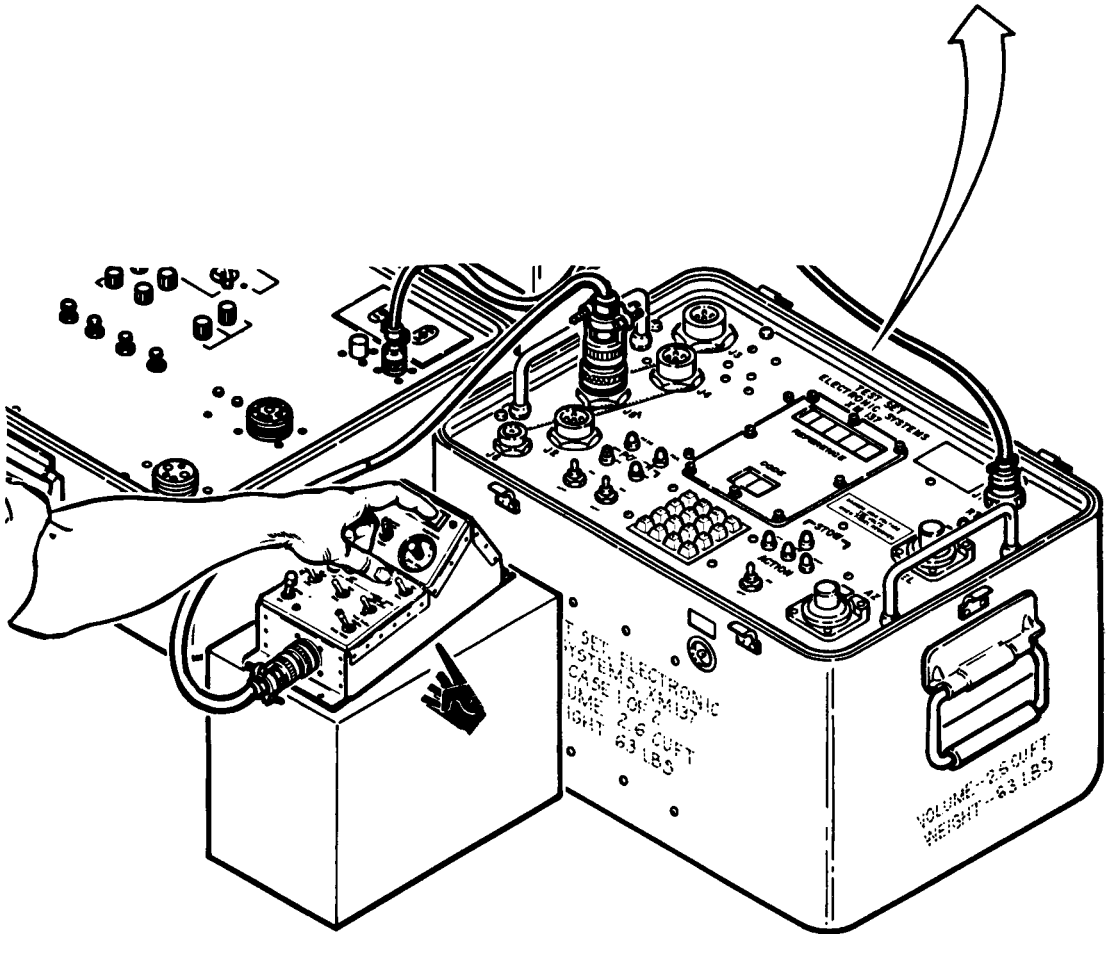


ARR82-25988

GUNNER ARMAMENT CONTROL PANEL (209-175-338-1) TEST (cont)

21. WITH HSS RTCL TEST PUSHBUTTON AND HSS BIT INDICATOR ON GUNNER ARMAMENT CONTROL PANEL PRESSED, PRESS A, 2, AND RUN KEYS ON TEST SET,
    a. Automatic test sequence runs.
    b. RD RMNG counter counts down approximately 50 rounds.
    c. PASS or FAIL indicator lights.
    d. If PASS indicator lights, gunner armament control panel passes this part of test, go to step 28 and continue test.
    e. If FAIL indicator lights, go to next step.



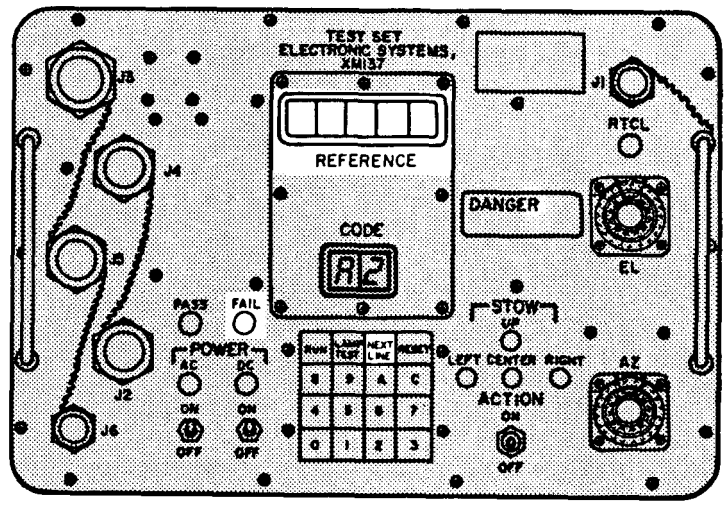


ARR82-25986

2-23. GUNNER ARMAMENT CONTROL PANEL (209-175-338-1) TEST (cont)

22. WHEN THE FAIL INDICATOR LIGHTS, A FOUR-DIGIT FAULT CODE WILL APPEAR IN THE REFERENCE DISPLAY.

23. USING NEXT LINE KEY, DISPLAY ALL FAULT CODES AND RECORD THEM FOR REFERENCE.



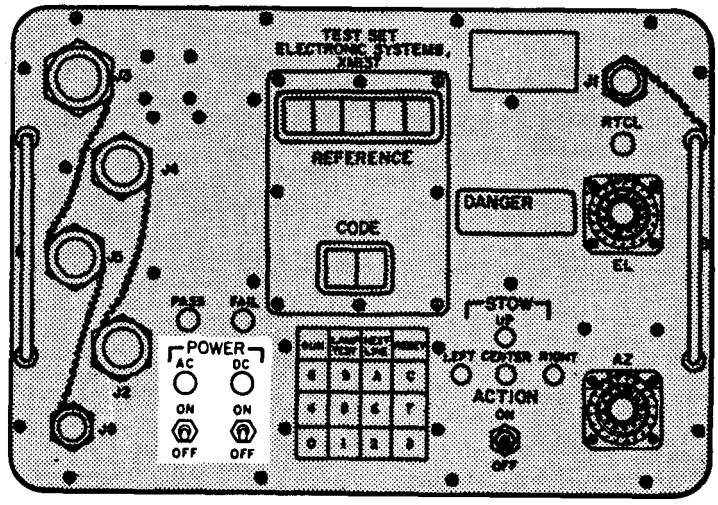
ARR82-25987

24. SET TEST SET CIRCUIT BREAKERS TO OFF.

25. REFER TO GUNNER ARMAMENT CONTROL PANEL (209-175-338-1) INTERFACE DIAGRAM FOR INTERFACE BETWEEN TEST SET AND UNIT UNDER TEST.

26. PERFORM TROUBLESHOOTING PROCEDURES IN FAULT CODE TROUBLESHOOTING DATA PROVIDED AT END OF THIS TEST.

27. UPON COMPLETION OF TROUBLESHOOTING PROCEDURES, REPEAT THIS TEST.



ARR82-25988

GUNNER ARMAMENT CONTROL PANEL (12910143) TEST (cont)

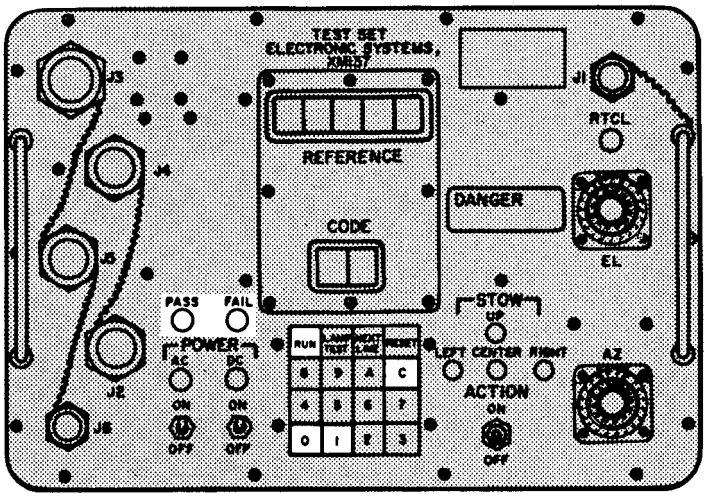
28. ON TEST SET, PRESS C, O, AND RUN KEYS.

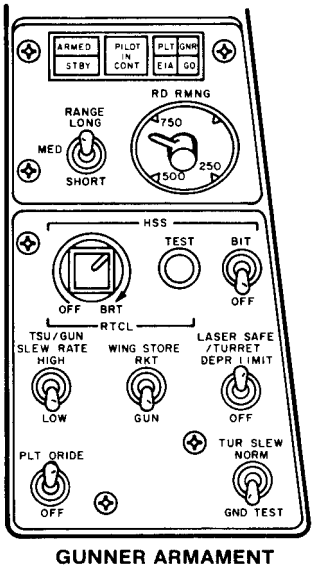
    Indicators and panel lamps on gunner armament control panel will light; however, rounds remaining counter will not light.

29. ON TEST SET, PRESS C, 1, AND RUN KEYS.

    a. ARMED, STBY, and PILOT IN CONT indicators dim.

    b. If indicators do not dim or lamps and/or indicators do not come on at all, replace relay assembly (8Z3). See REPAIR OF GUNNER ARMAMENT CONTROL PANEL (1291 0143), para 2-59, After repair, repeat test.



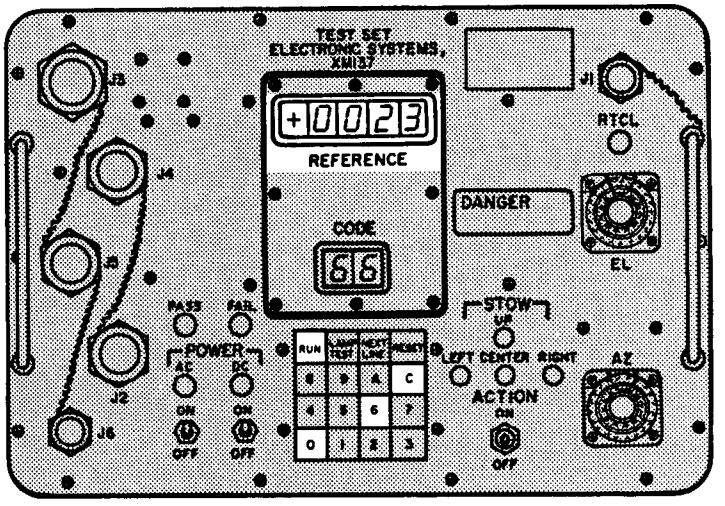


GUNNER ARMAMENT CONTROL PANEL

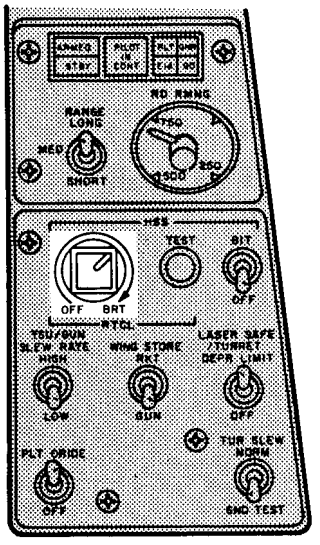
ARR82-25989

2-23. GUNNER ARMAMENT CONTROL PANEL (12910143) TEST (cont)

30. ON TEST SET, PRESS C, O, AND RUN KEYS, THEN, PRESS 6, 6, AND RUN KEYS. ON GUNNER ARMAMENT CONTROL PANEL, ROTATE HSS RTCL INTENSITY KNOB BETWEEN OFF AND BRT WHILE OBSERVING REFERENCE DISPLAY ON TEST SET.
    a. Voltage readings in REFERENCE display vary with movement of knob.
    b. If voltage readings do not vary, replace resistor 17R2. See REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12910143), para 2-59. After repair, repeat test.



31. IF ALL INDICATIONS ARE NORMAL, REMOVE POWER, DISCONNECT TEST SET CABLES, AND RETURN UNIT TO SERVICE.

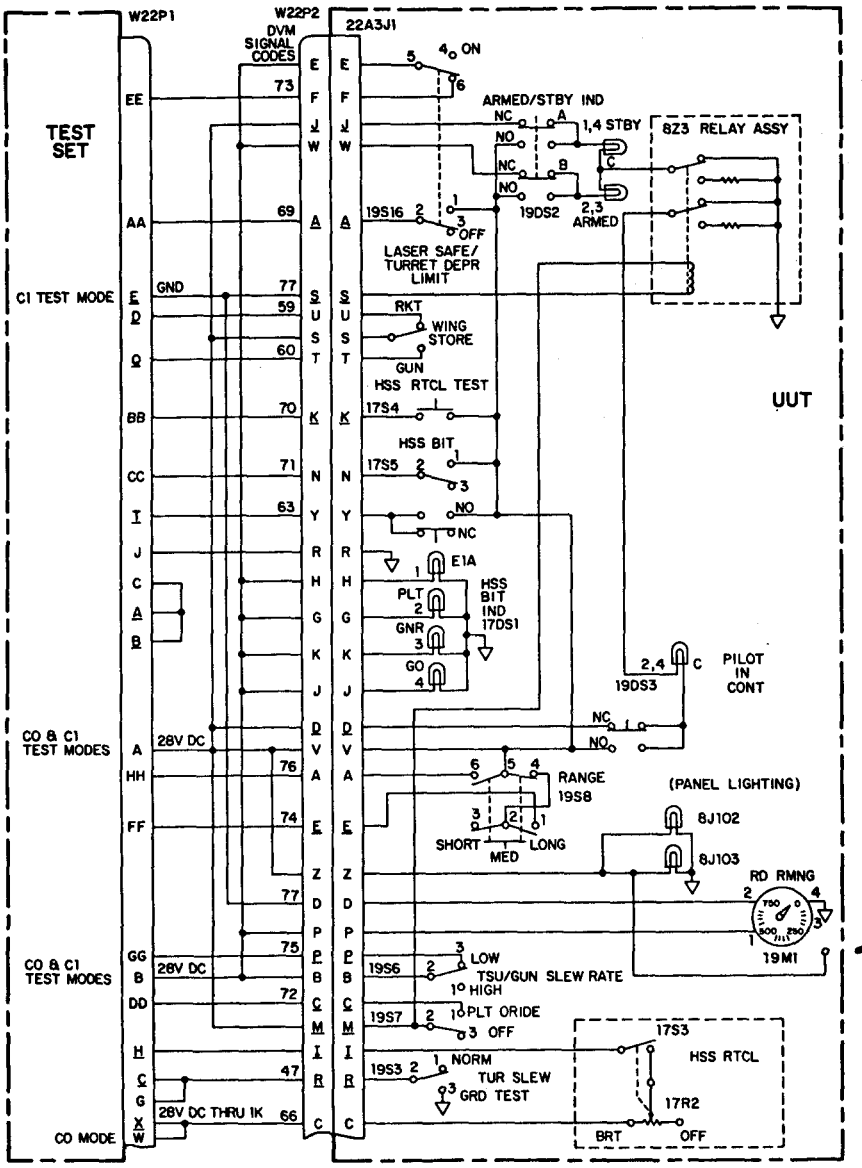


GUNNER ARMAMENT CONTROL PANEL

ARR82-25990

END OF TEST

GUNNER ARMAMENT CONTROL PANEL (12910143) INTERFACE DIAGRAM



ARR82-25991

NOTE

Wire A212D22 from terminal 3 at rounds remaining counter has been capped and stowed.

2-23. GUNNER ARMAMENT CONTROL PANEL (12910143) TEST (cent)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

GUNNER ARMAMENT CONTROL PANEL (12910143) FAULT CODE TROUBLESHOOTING DATA

WARNING

Verify all power is off before performing any corrective action.

NOTE

Fault codes +7100 through +7107 and +7111 through +7116 assume that UUT switches are positioned as specified in step 2.

1. FAULT CODE +7100 (SHORT ON 28 VDC INPUT FROM W22P1-A, -B OR - W)

Use GUNNER ARMAMENT CONTROL PANEL (12910143) INTERFACE DIAGRAM to locate cause of short in UUT, Replace defective component. Repair or replace harness assembly if defective.

2. FAULT CODE +7101 (OUTPUT AT J1-C IS NOT 0 VDC)

Set test set to CO mode and enter 72 on keyboard.

If output is not 0 (Vdc), S7 is defective; replace.

3. FAULT CODE +7102 (OUTPUT AT J1-P IS NOT 0 VDC)

Set test set to CO mode and enter 75 on keyboard.

If output is not 0 (Vdc), S6 is defective; replace.

4. FAULT CODE +7103 (OUTPUT AT J1-E IS NOT 0 VDC)

Set test set to CO mode and enter 74 on keyboard.

If output is not 0 (Vdc), S8 is defective; replace.

5. FAULT CODE +7104 (OUTPUT AT J1-A IS NOT 28 VDC)

Set test set to CO mode and enter 76 on keyboard.

If output is not +26 ±4 (Vdc), S8 is defective; replace.

6. FAULT CODE +7105 (OUTPUT AT J1-R IS NOT 5 VDC)

Set test set to CO mode and enter 47 on keyboard.

If output is not + 5 ±1 (Vdc), S3 is defective; replace.

GUNNER ARMAMENT CONTROL PANEL (12910143) FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

7. FAULT CODE + 7106 (OUTPUT AT J1-Y IS NOT O VDC)

Set test set to CO mode and enter 63 on keyboard.

If output is not 0 (Vdc), DS1 is defective; replace.

8. FAULT CODE +7107 (OUTPUT AT J1-N IS NOT 0 VDC)

Set test set to CO mode and enter 71 on keyboard.

If output is not 0 (Vdc), S5 is defective; replace.

9. FAULT CODE +7111 (OUTPUT AT J1-C IS NOT 28 VDC)

Set test set to CO mode and enter 66 on keyboard.

If output is not +26 ±4 (Vdc), either HSS RTCL potentiometer 17R2 or on-off switch 17S3 is defective, and is causing a voltage drop to appear at J1-C. Replace 17S3 or 17R2.

10. FAULT CODE +7112 (OUTPUT AT J1-K IS NOT 0 VDC)

Set test set to CO mode and enter 70 on keyboard.

If output is not 0 (Vdc), S4 is defective; replace.

11. FAULT CODE +7113 (OUTPUT AT J1-A IS NOT 0 VDC)

Set test set to CO mode and enter 69 on keyboard.

If output is not 0 (Vdc), S16 is defective; replace.

12. FAULT CODE +7114 (OUTPUT AT J1-T IS NOT 0 VDC)

Set test to CO mode and enter 60 on keyboard.

If output is not 0 (Vdc), WING STORE switch is defective; replace.

13. FAULT CODE +7115 (OUTPUT AT J1-U IS NOT 28 VDC)

Set test set to CO mode and enter 59 on keyboard.

If output is not +26 ±4 (Vdc), WING STORE switch is defective; replace.

14. FAULT CODE +7116 (OUTPUT AT J1-F IS NOT 28 VDC)

Set test set to CO mode and enter 73 on keyboard.

If output is not +26 ±4 (Vdc), S16 is defective replace.

NOTE

Fault codes +7130 through +7137 and +7141 through +7145 assume that UUT switches are positioned as specified instep 12.

15. FAULT CODE +7130 (SHORT ON 28 VDC INPUT)

See fault code + 7100 for corrective action.

2-23. GUNNER ARMAMENT CONTROL PANEL (12910143) TEST (cont)
TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

16. FAULT CODE +7131 (OUTPUT AT J1-C IS NOT 28 VDC)
Set test set to CO mode and enter 72 on keyboard.
If output is not +26 ±4 (Vdc), S7 is defective; replace.

17. FAULT CODE +7132 (OUTPUT AT J1-P IS NOT 28 VDC)
Set test set to CO mode and enter 75 on keyboard.
If output is not +26 ±4 (Vdc), S6 is defective; replace.

18. FAULT CODE +7133 (OUTPUT AT J1-E IS NOT O VDC)
Set test set to CO mode and enter 74 on keyboard.
If output is not 0 (Vdc), S8 is defective; replace.

19. FAULT CODE +7134 (OUTPUT AT J1-A IS NOT 0 VDC)
Set test set to CO mode and enter 76 on keyboard.
If output is not 0 (Vdc), S8 is defective; replace.

20. FAULT CODE +7135 (OUTPUT AT J1-R IS NOT 0 VDC)
Set test set to CO mode and enter 47 on keyboard.
If output is not 0 (Vdc), S3 is defective; replace.

21. FAULT CODE +7136 (OUTPUT AT J1-Y IS NOT O VDC)
Set test set to CO mode and enter 63 on keyboard.
If output is not 0 (Vdc), DS1 is defective; replace.

22. FAULT CODE +7137 (OUTPUT AT J1-N IS NOT 28 VDC)
Set test set to CO mode and enter 71 on keyboard.
If output is not +26 ±4 (Vdc), S5 is defective; replace.

23. FAULT CODE +7141 (OUTPUT AT J1-C IS NOT 2 TO 3 VDC)
Set test set to CO mode and enter 66 on keyboard.
If output is not + 2 to + 3 (Vdc), make sure that HSS RTCL potentiometer 17R2 is turned on but is not rotated CW toward BRT position. If potentiometer is positioned as specified, and test set voltage is still out of tolerance, then HSS RTCL potentiometer 17R2 or on-off switch 17S3 is defective. Replace 17R2 or 17S3.

24. FAULT CODE +7142 (OUTPUT AT J1-A IS NOT 28 VDC)
Set test set to CO mode and enter 69 on keyboard.
If output is not +26 to ±4 (Vdc), S16 is defective; replace,

GUNNER ARMAMENT CONTROL PANEL (12910143) FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

25. FAULT CODE +7143 (OUTPUT AT J1-T IS NOT 28 VDC)

Set test to CO mode and enter 60 on keyboard.

If output is not +26 ±4 (Vdc), WING STORE switch is defective; replace.

26. FAULT CODE +7144 (OUTPUT AT J1-U IS NOT 0 VDC)

Set test set to CO mode and enter 59 on keyboard.

If output is not 0 (Vdc), WING STORE switch is defective; replace,

27, FAULT CODE +7145 (OUTPUT AT J1-F IS NOT 0 VDC)

Set test set to CO mode and enter 73 on keyboard,

If output is not 0 (Vdc), S16 is defective; replace.

NOTE

Fault codes +7160 through +7164 assume that UUT switches are positioned as specified in step 21.

28. FAULT CODE +7160 (SHORT ON 28 VDC INPUT)

See fault code + 7100 for corrective action.

29. FAULT CODE +7161 (OUTPUT AT J1-E IS NOT 28 VDC)

Set test set to CO mode and enter 74 on keyboard.

If output is not +26 ±4 (Vdc), S8 is defective; replace.

30. FAULT CODE +7162 (OUTPUT AT J1-A IS NOT 0 VDC)

Set test set to CO mode and enter 76 on keyboard.

If output is not 0 (Vdc), S8 is defective; replace.

31. FAULT CODE +7163 (OUTPUT AT J1-Y IS NOT 28 VDC)

Set test set to CO mode and enter 63 on keyboard while holding HSS BIT press-to-test indicator (PLT/GNR/EIA/GO) pressed,

If output is not +26 ±4 (Vdc), DS1 is defective; replace.

32. FAULT CODE +7164 (OUTPUT AT J1-K IS NOT 28 VDC)

Set test set to CO mode and enter 70 on keyboard while holding HSS RTCL TEST switch pressed.

If output is not +26 ±4 (Vdc), S4 is defective; replace.

END OF TROUBLESHOOTING

2-24. GUNNER ARMAMENT CONTROL PANEL (12011954) TEST

DESCRIPTION

This task covers: On bench testing including interface diagram and fault code troubleshooting data.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Electronics Systems Test Set: M137
- DC Power Supply PP1104C
- Distribution Panel 12007200
- Power Supply 11834203
- Cable Assembly 7540635

Personnel Required:
- 68J Aircraft Armament/ Missile Systems Repairer

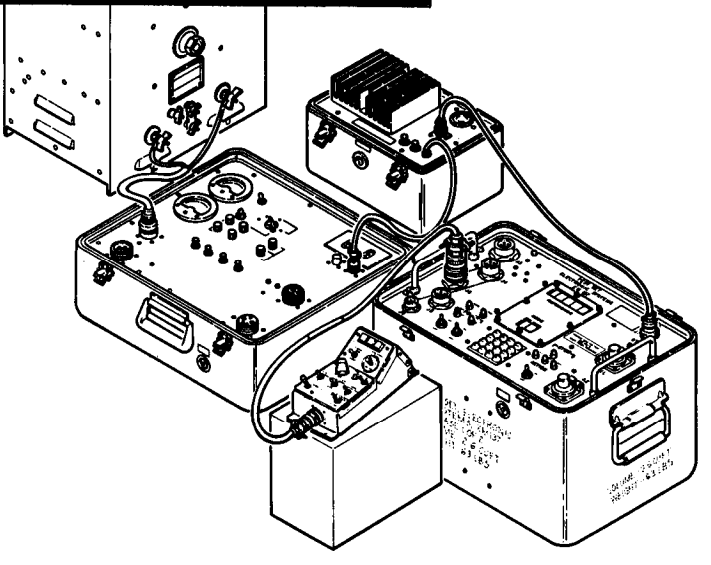
Equipment Conditions:
- On bench in shop.
- Bench power ready and test set power cable W1 connected.

General Safety Instructions:
- Never work on electronic equipment unless there is another person nearby who is familiar with operation and hazards of this equipment and who is competent in administering first aid. When aided by operator, technician must warn operator about dangerous areas.
- Power must not be applied to unit under test while test leads are being connected to or removed from unit assemblies/circuits under test.

GUNNER ARMAMENT CONTROL PANEL (12011954) TEST

1. CONNECT TEST SET CABLE W11 AS FOLLOWS:

   W11P1 to test set J5
   W11P2 to GACP

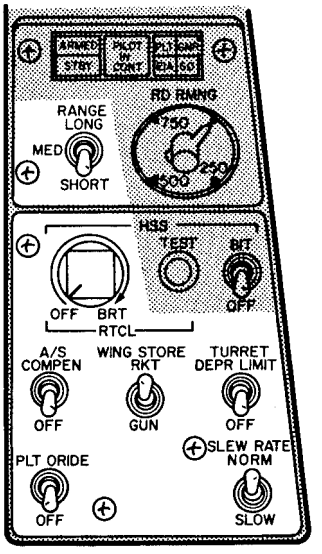


ARR82-25992

GUNNER ARMAMENT CONTROL PANEL (12011 954) TEST (cont)

2. SET SWITCHES ON GUNNER ARMAMENT CONTROL PANEL AS FOLLOWS:

   PLT ORIDE to OFF
   RANGE to SHORT
   WING STORE to RKT
   HSS RTCL to OFF
   SLEW RATE to NORM
   TURRET DEPR LIMIT to OFF
   A/S COMPEN to OFF



GUNNER ARMAMENT CONTROL PANEL

ARR82-25993

3. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.

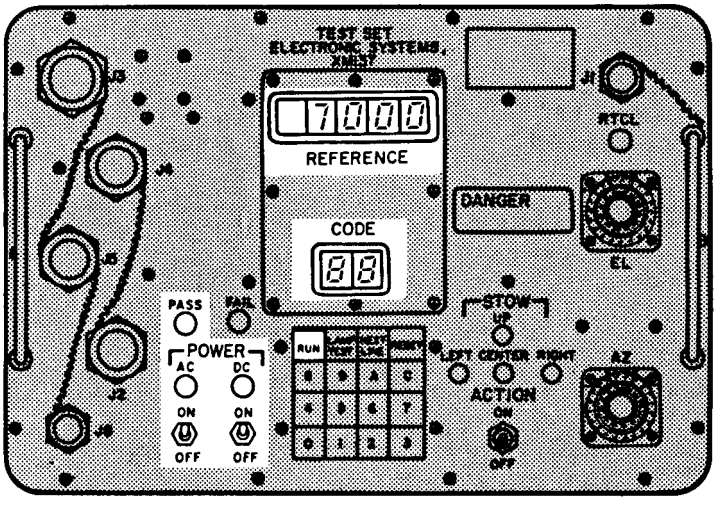
   a. AC and DC power indicators light.

   b. 8's appear in REFERENCE and CODE displays.

   c. PASS indicator lights.

4. ON TEST SET, PRESSRUN KEY.

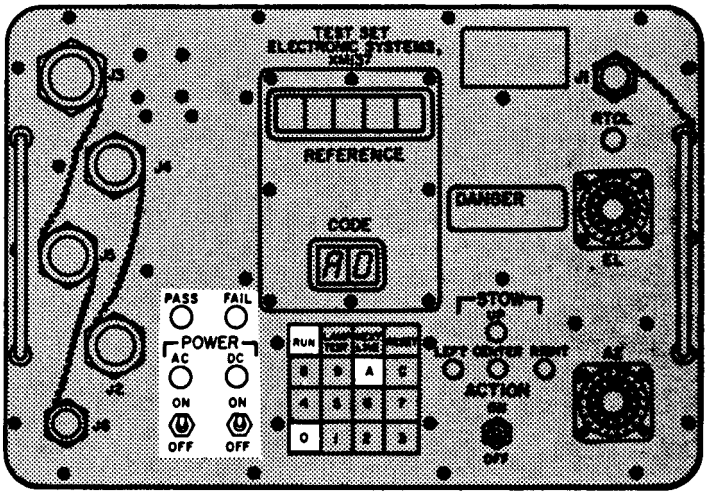
   7000 appears in REFERENCE display.



ARR82-25994

2-24. GUNNER ARMAMENT CONTROL PANEL (12011954) TEST (cont)

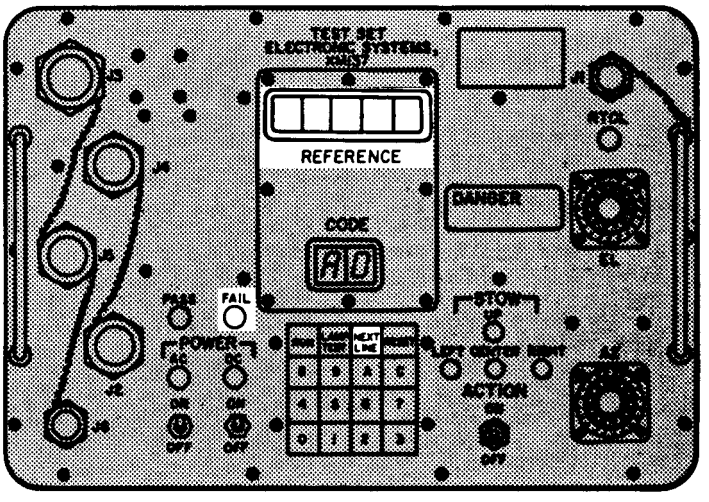
5. ON TEST SET, PRESS A, O, AND RUN KEYS.
   a. Automatic test sequence runs.
   b. PASS or FAIL indicator lights.
   c. If PASS indicator lights, gunner armament control panel passes this part of test, go to step 12 and continue test.
   d. If FAIL indicator lights, go to next step.



ARR82-25995

6. WHEN THE FAIL INDICATOR LIGHTS, A FOUR-DIGIT FAULT CODE WILL APPEAR IN THE REFERENCE DISPLAY.

7. USING NEXT LINE KEY, DISPLAY ALL FAULT CODES AND RECORD THEM FOR REFERENCE.



ARR82-25996

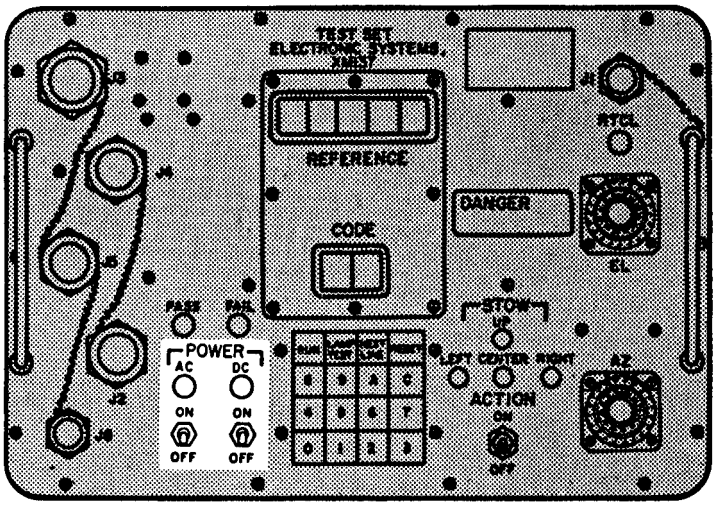
GUNNER ARMAMENT CONTROL PANEL (12011 954) TEST (cont)

8. SET TEST SET CIRCUIT BREAKERS TO OFF

9. REFER TO GUNNER ARMAMENT CONTROL PANEL (12011954) INTERFACE DIAGRAM FOR INTERFACE BETWEEN TEST SET AND UNIT UNDER TEST.

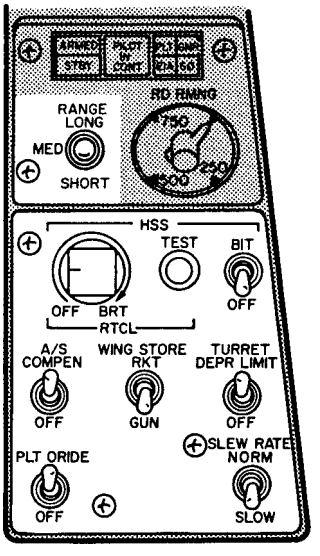
10. PERFORM TROUBLESHOOTING PROCEDURES IN FAULT CODE TROUBLESHOOTING DATA PROVIDED AT THE END OF THIS TEST.

11. UPON COMPLETION OF TROUBLESHOOTING PROCEDURES, REPEAT THIS TEST.



ARR82-25997

12. SET SWITCHES ON GUNNER ARMAMENT CONTROL PANEL AS FOLLOWS:
    - PLT ORIDE to ORIDE
    - RANGE to MED
    - WING STORE to GUN
    - HSS RTCL intensity (on, but not rotated to BRT)
    - HSS RTCL/TEST to OFF (not pressed)
    - HSS BIT (hold on during test)
    - SLEW RATE to SLOW
    - TURRET DEPR LIMIT to on
    - A/S COMPEN to COMPEN

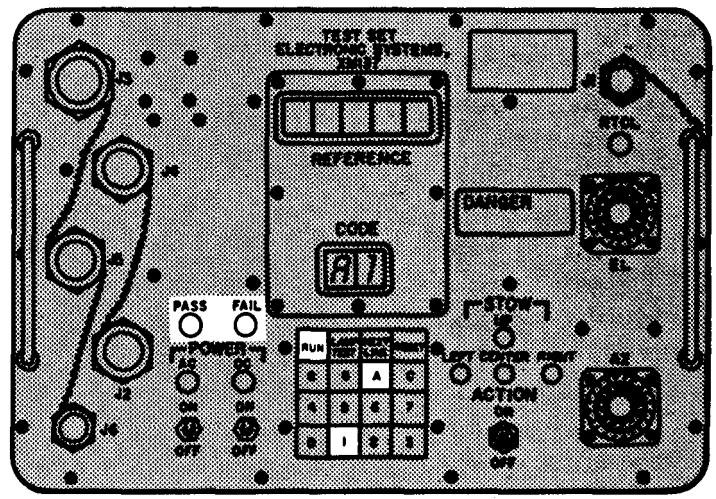


GUNNER ARMAMENT CONTROL PANEL

ARR82-25998

2-24. GUNNER ARMAMENT CONTROL PANEL (12011954) TEST (cont)

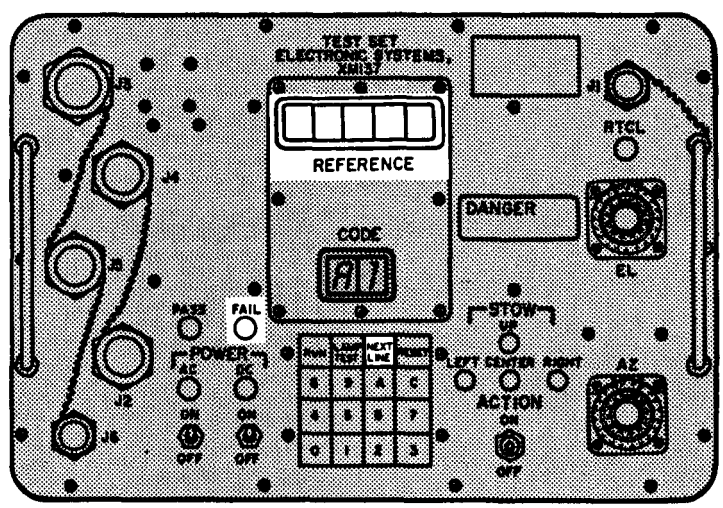
13. WITH HSS BIT SWITCH ON GUNNER ARMAMENT CONTROL PANEL HELD ON, PRESS A, 1, AND RUN KEYS ON TEST SET.
    a. Automatic test sequence runs.
    b. PASS or FAIL indicator lights.
    c. If PASS indicator lights, gunner armament control panel passes this part of test, go to step 20 and continue test.
    d. If FAIL indicator lights, go to next step.



ARR82-25999

14. WHEN THE FAIL INDICATOR LIGHTS, A FOUR-DIGIT FAULT CODE WILL APPEAR IN THE REFERENCE DISPLAY.

15. USING NEXT LINE KEY, DISPLAY ALL FAULT CODES AND RECORD THEM FOR REFERENCE.



ARR82-26000

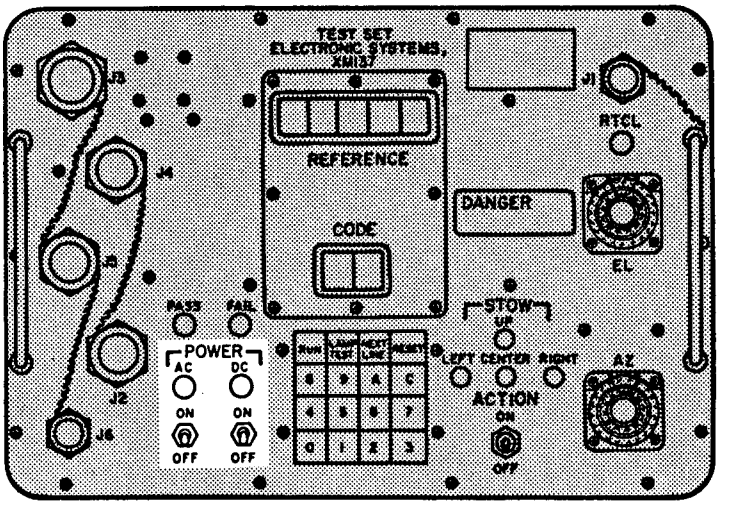
GUNNER ARMAMENT CONTROL PANEL (12011 954) TEST (cont)

16. SET TEST SET CIRCUIT BREAKERS TO OFF.

17. REFER TO GUNNER ARMAMENT CONTROL PANEL (12011954) INTERFACE DIAGRAM FOR INTERFACE BETWEEN TEST SET AND UNIT UNDER TEST.

18. PERFORM TROUBLESHOOTING PROCEDURES IN FAULT CODE TROUBLESHOOTING DATA PROVIDED AT THE END OF THIS TEST.

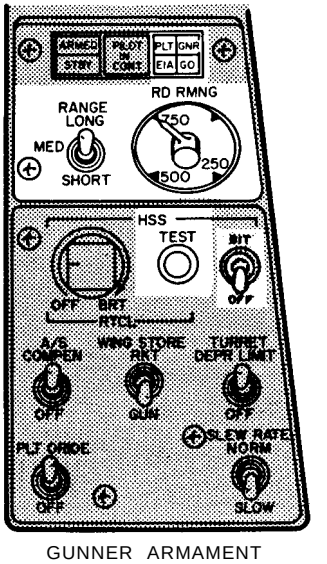
19. UPON COMPLETION OF TROUBLESHOOTING PROCEDURES, REPEAT THIS TEST,



ARR82-26001

20. SET SWITCHES ON GUNNER ARMAMENT CONTROL PANEL AS FOLLOWS:

    RANGE to LONG
    RD RMNG to 750
    HSS RTCL TEST (held pressed during test)
    HSS BIT indicator (held pressed during test)

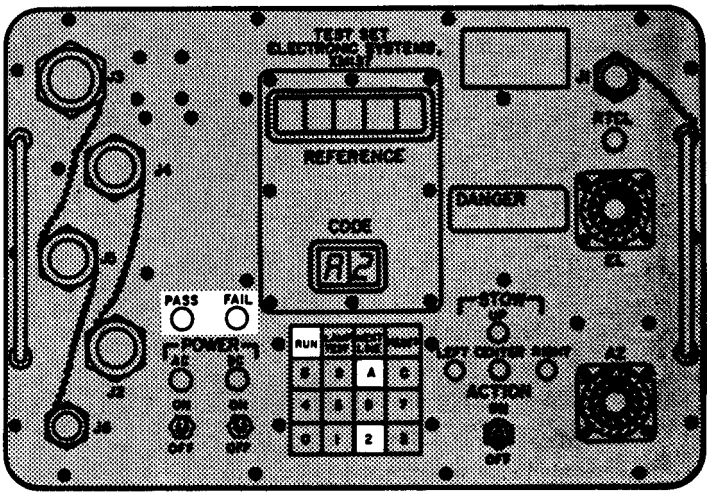


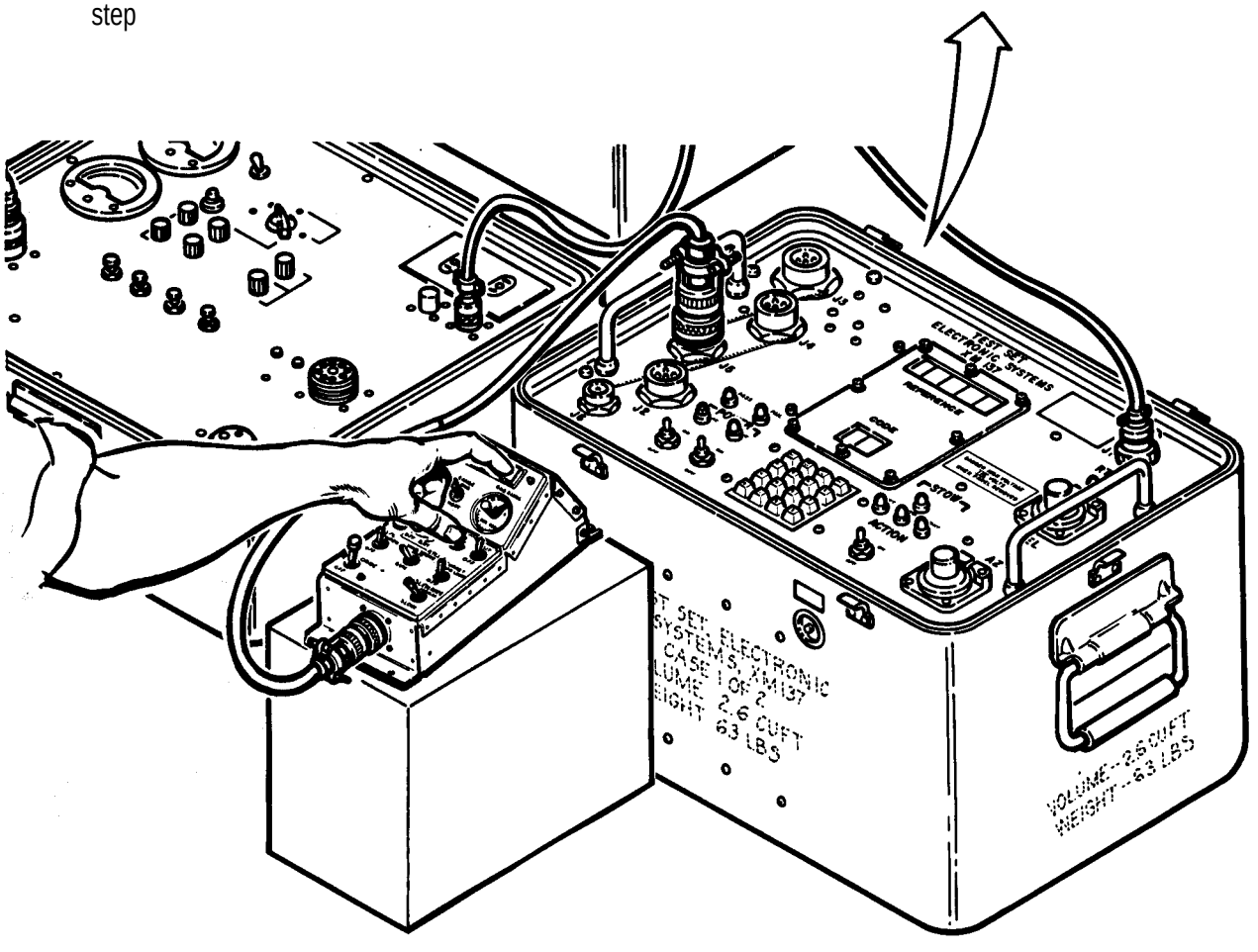
GUNNER ARMAMENT CONTROL PANEL

ARR82-26002

2-24. GUNNER ARMAMENT CONTROL PANEL (12011954) TEST (cont)

21. WITH HSS RTCL TEST PUSHBUTTON AND HSS BIT INDICATOR ON GUNNER ARMAMENT CONTROL PANEL PRESSED, PRESS A, 2, AND RUN KEYS ON TEST SET.
    a. Automatic test sequence runs.
    b. RD RMNG counter counts down approximately 50 rounds.
    c. PASS or FAIL indicator lights.
    d. If PASS indicator lights, gunner armament control panel passes this part of test, go to step 28 and continue test.
    e. If FAIL indicator lights, go to next step



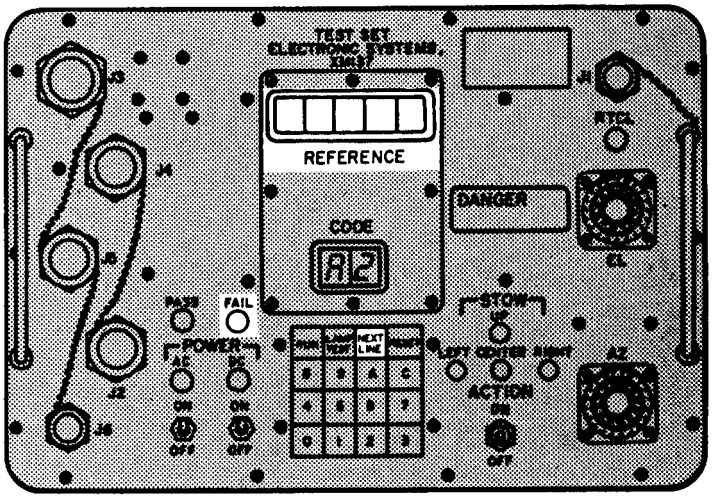


ARR82-26003

GUNNER ARMAMENT CONTROL PANEL (12011 954) TEST (cont)

22. WHEN THE FAIL INDICATOR LIGHTS, A FOUR-DIGIT FAULT CODE WILL APPEAR IN THE REFERENCE DISPLAY.

23. USING NEXT LINE KEY, DISPLAY ALL FAULT CODES AND RECORD THEM FOR REFERENCE.



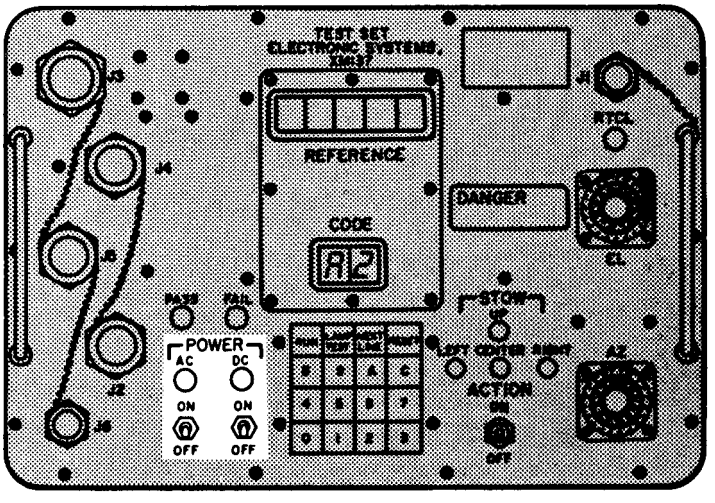
ARR82-26004

24. SET TEST SET CIRCUIT BREAKERS TO OFF.

25. REFER TO GUNNER ARMAMENT CONTROL PANEL (12011954) INTERFACE DIAGRAM FOR INTERFACE BETWEEN TEST SET AND UNIT UNDER TEST.

26, PERFORM TROUBLESHOOTING PROCEDURES IN FAULT CODE TROUBLESHOOTING DATA PROVIDED AT THE END OF THIS TEST.

27 UPON COMPLETION OF TROUBLESHOOTING PROCEDURES, REPEAT THIS TEST.



ARR82-26005

2-24. GUNNER ARMAMENT CONTROL PANEL (12011954) TEST (cont)

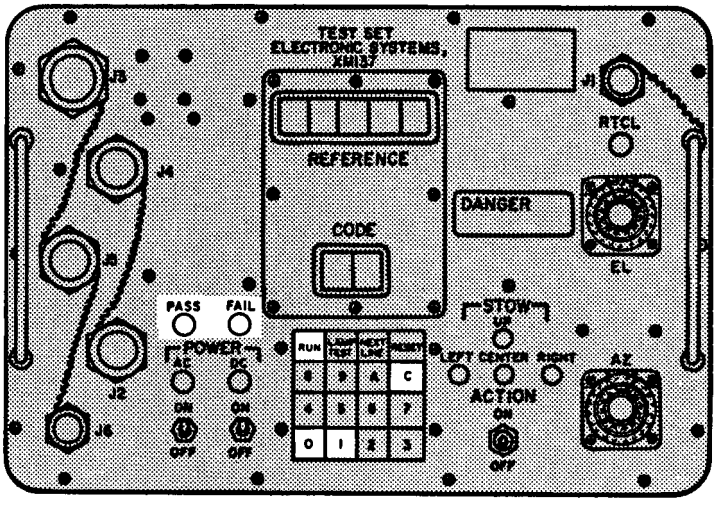
28. ON TEST SET, PRESS C, O, AND RUN KEYS.

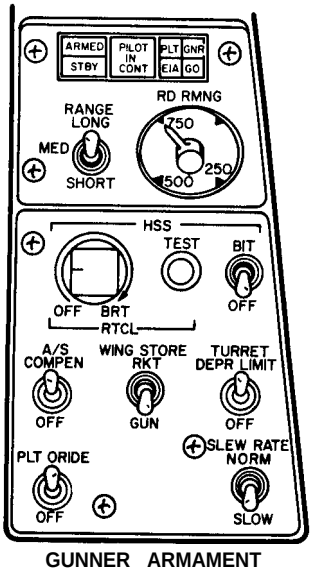
Indicators and panel lamps on gunner armament control panel will light; however, rounds remaining counter will not light.

29. ON TEST SET, PRESS C, 1, AND RUN KEYS.

a. ARMED, STBY, and PILOT IN CONT indicators dim.

b. If indicators do not dim or lamps and/or indicators do not come on at all, replace relay assembly (8Z3), See REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12011 954), para 2-60. After repair, repeat test.





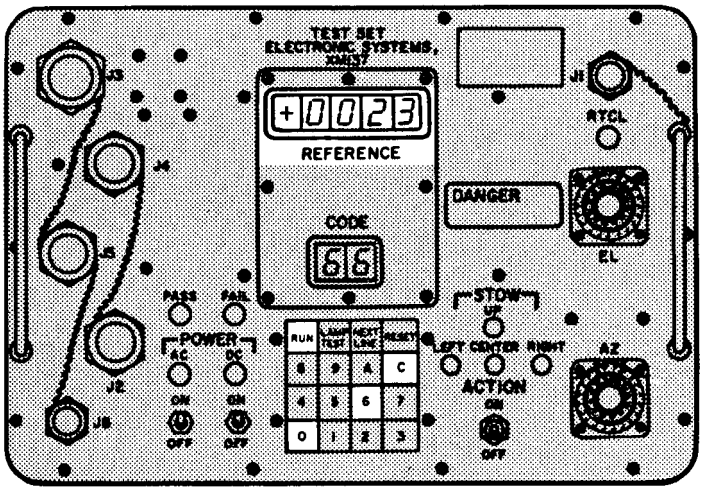
GUNNER ARMAMENT CONTROL PANEL

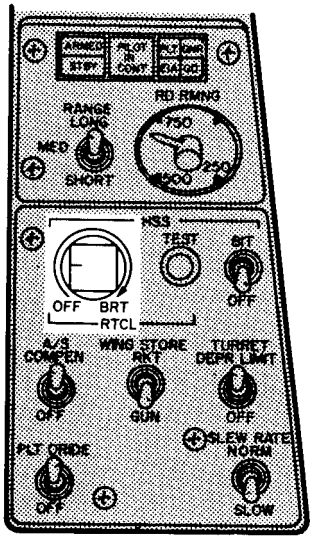
ARR82-26006

GUNNER ARMAMENT CONTROL PANEL (12011954) TEST (cont)

30. ON TEST SET, PRESS C, O, AND RUN KEYS, THEN, PRESS 6, 6, AND RUN KEYS. ON GUNNER ARMAMENT CONTROL PANEL, ROTATE HSS RTCL INTENSITY KNOB BETWEEN OFF AND BRT WHILE OBSERVING REFERENCE DISPLAY ON TEST SET.
    a. Voltage readings in REFERENCE display vary with movement of knob.
    b. If voltage readings do not vary, replace resistor 17R2. See REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12011954), para 2-60. After repair, repeat test.

31. IF ALL INDICATIONS ARE NORMAL, REMOVE POWER, DISCONNECT TEST SET CABLES, AND RETURN UNIT TO SERVICE.





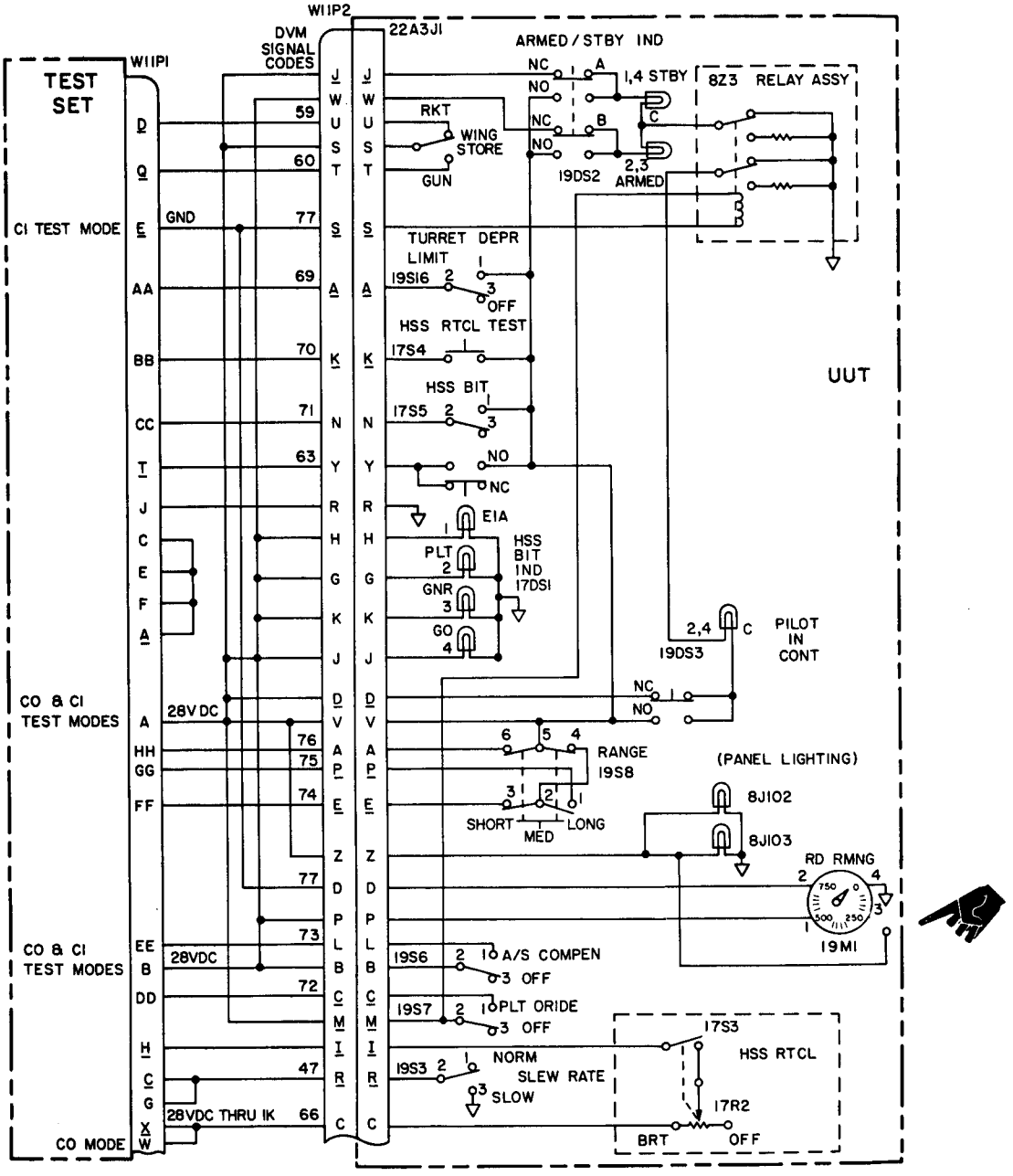
GUNNER ARMAMENT CONTROL PANEL

ARR82-26007

END OF TEST

2-24. GUNNER ARMAMENT CONTROL PANEL (12011954) TEST (cont)

GUNNER ARMAMENT CONTROL PANEL (12011954) INTERFACE DIAGRAM



NOTE

Wire A212D22 from terminal 3 at rounds remaining counter has been capped and stowed.

ARR82-26008

GUNNER ARMAMENT CONTROL PANEL (12011954) FAULT CODE TROUBLESHOOTING DATA

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

WARNING

Verify all power is off before performing any corrective action.

NOTE

Fault codes 7100 through 7115 assume that UUT switches are positioned as specified in step 2.

1. FAULT CODE 7100 (SNORT ON 28 VDC INPUTS FROM W11P1-A, -B OR -W)
Use GUNNER ARMAMENT CONTROL PANEL (12011954) INTERFACE DIAGRAM to locate cause of short in UUT.
Replace defective component. Repair or replace harness assembly if defective.

2. FAULT CODE 7101 (OUTPUT AT J1-C IS NOT 0 VDC)
Set test set to CO mode and enter 72 on keyboard.
If output is not 0 (Vdc), S7 is defective; replace.

3. FAULT CODE 7102 (OUTPUT AT J1-L IS NOT 0 VDC)
Set test set to CO mode and enter 73 on keyboard.
If output is not 0 (Vdc), S6 is defective; replace.

4. FAULT CODE 7103 (OUTPUT AT J1-P IS NOT O VDC)
Set test set to CO mode and enter 75 on keyboard.
If output is not 0 (Vdc), S8 is defective; replace,

5. FAULT CODE 7104 (OUTPUT AT J1-E IS NOT O VDC)
Set test set to CO mode and enter 74 on keyboard.
If output is not 0 (Vdc), S8 is defective; replace.

6. FAULT CODE 7105 (OUTPUT AT J1-A IS NOT 28 VDC)
Set test set to CO mode and enter 76 on keyboard.
If output is not +26 ±4 (Vdc), S8 is defective; replace,

7. FAULT CODE 7106 (OUTPUT AT J1-R IS NOT 5 VDC)
Set test set to CO mode and enter 47 on keyboard,
If output is not + 5 ±1 (Vdc), S3 is defective; replace.

2-24. GUNNER ARMAMENT CONTROL PANEL (12011954) TEST (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

8. FAULT CODE 7107 (OUTPUT J1-Y IS NOT O VDC)
Set test set to CO mode and enter 63 on keyboard.
If output is not 0 (Vdc), DS1 k defective; replace.

9. FAULT CODE 7108 (OUTPUT AT J1-N IS NOT O VDC)
Set test set to CO mode and enter 71 on keyboard.
If output is not 0 (Vdc), S5 is defective; replace.

10. FAULT CODE 7111 (OUTPUT AT J1-C IS NOT 28 VDC)
Set test set to CO mode and enter 66 on keyboard.
If output is not +26 ±4 (Vdc), either HSS RTCL potentiometer 17R2 or on-off switch 17S3 is defective and is causing a voltage drop to appear at J1-C. Replace 17S3 or 17R2.

11. FAULT CODE 7112 (OUTPUT AT J1-K IS NOT O VDC)
Set test set to CO mode and enter 70 on keyboard.
If output is not 0 (Vdc), S4 is defective; replace.

12. FAULT CODE 7113 (OUTPUT AT J1-A IS NOT 0 VDC)
Set test set to CO mode and enter 69 on keyboard.
If output is not 0 (Vdc), S16 is defective; replace.

13. FAULT CODE 7114 (OUTPUT AT J1-T IS NOT O VDC)
Set test set to CO mode and enter 60 on keyboard.
If output is not 0 (Vdc), WING STORE switch is defective; replace.

14. FAULT CODE 7115 (OUTPUT AT J1-U IS NOT 28 VDC)
Set test set to CO mode and enter 59 on keyboard.
If output is not +26 ±4 (Vdc), WING STORE switch is defective; replace.

NOTE

Fault codes 7130 through 7144 assume that UUT switches are positioned as specified in step 12.

15. FAULT CODE 7130 (SNORT ON 28 VDC INPUT)
See fault code 7100 for corrective action.

16. FAULT CODE 7131 (OUTPUT AT J1-C IS NOT 28 VDC)
Set test set to CO mode and enter 72 on keyboard.
If output is not +26 ±4 (Vdc), S7 is defective; replace.

GUNNER ARMAMENT CONTROL PANEL (12011 954) FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

17. FAULT CODE 7132 (OUTPUT AT J1-L IS NOT 28 VDC)
Set test set to CO mode and enter 73 on keyboard.
If output is not +26 ±4 (Vdc), S6 is defective; replace.

18. FAULT CODE 7133 (OUTPUT AT J1-P IS NOT 0 VDC)
Set test set to CO mode and enter 75 on keyboard.
If output is not 0 (Vdc), S8 is defective; replace.

19. FAULT CODE 7134 (OUTPUT AT J1-E IS NOT 28 VDC)
Set test set to CO mode and enter 74 on keyboard.
If output is not +26 ±4 (Vdc), S8 is defective; replace.

20. FAULT CODE 7135 (OUTPUT AT J1-A IS NOT 0 VDC)
Set test set to CO mode and enter 76 on keyboard.
If output is not 0 (Vdc), S8 is defective; replace.

21. FAULT CODE 7136 (OUTPUT AT J1-R IS NOT 0 VDC)
Set test set to CO mode aid enter 47 on keyboard.
If output is not 0 (Vdc), S3 is defective; replace.

22. FAULT CODE 7137 (OUTPUT AT J1-Y IS NOT 0 VDC)
Set test set to CO mode and enter 63 on keyboard.
If output is not 0 (Vdc), DS1 is defective; replace.

23. FAULT CODE 7138 (OUTPUT AT J1-N IS NOT 28 VDC)
Set test set to CO mode and enter 71 on keyboard.
If output is not +26 ±4 (Vdc), S5 is defective; replace.

24. FAULT CODE 7141 (OUTPUT AT J1-C IS NOT 2 TO 3 VDC)
Set test set to CO mode and enter 66 on keyboard.
If output is not + 2 to + 3 (Vdc), make sure that HSS RTCL potentiometer 17R2 is turned on but is not rotated CW toward BRT position. If potentiometer is positioned as specified, and test set voltage is still out of tolerance, then HSS RTCL potentiometer 17R2 or on-off switch 17S3 is defective. Replace 17R2 or 17S3.

25. FAULT CODE 7142 (OUTPUT AT J1-A IS NOT 28 VDC)
Set test set to CO mode and enter 69 on keyboard.
If output is not +26 ±4 (Vdc), S16 is defective; replace.

2-24. GUNNER ARMAMENT CONTROL PANEL (12011 954) TEST (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

26. FAULT CODE 7143 (OUTPUT AT J1-T IS NOT 28 VDC)

Set test set to CO mode and enter 60 on keyboard.

If output is not +26 ±4 (Vdc), WING STORE switch is defective; replace.

27. FAULT CODE 7144 (OUTPUT AT J1-U IS NOT 0 VDC)

Set test set to CO mode and enter 59 on keyboard.

If output is not 0 (Vdc), WING STORE switch is defective; replace.

NOTE

Fault codes 7160 through 7165 assume that UUT switches are positioned as specified in step 20.

28. FAULT CODE 7160 (SHORT ON 28 VDC INPUT)

See fault code 7100 for corrective action.

29. FAULT CODE 7161 (OUTPUT AT J1-P IS NOT 28 VDC)

Set test set to CO mode and enter 75 on keyboard.

If output is not +26 ±4 (Vdc), S8 is defective; replace.

30. FAULT CODE 7162 (OUTPUT AT J1-E IS NOT 0 VDC)

Set test set to CO mode and enter 74 on keyboard.

If output is not 0 (Vdc), S8 is defective; replace.

31. FAULT CODE 7163 (OUTPUT AT J1-A IS NOT 0 VDC)

Set test set to CO mode and enter 76 on keyboard.

If output is not 0 (Vdc), S8 is defective; replace

32. FAULT CODE 7164 (OUTPUT AT J1-Y IS NOT 28 VDC)

Set test set to CO mode and enter 63 on keyboard while holding HSS BIT press-tc-test indicator (PLT/GNR/EIA/GO) pressed.

If output is not +26 ±4 (Vdc), DS1 k defective; replace.

33. FAULT CODE 7165 (OUTPUT AT J1-K IS NOT 28 VDC)

Set test set to CO mode and enter 70 on keyboard while holding HSS RTCL TEST switch pressed.

If output is not +26 ±4 (Vdc), S4 is defective; replace.

END OF TROUBLESHOOTING

2-25. PILOT ARMAMENT CONTROL PANEL (209-175-339-1) TEST

DESCRIPTION

This task covers: On bench testing including interface diagram and fault code troubleshooting.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Electronics Systems Test Set: M137
- DC Power Supply PP1104C
- Distribution Panel 12007200
- Power Supply 11834203
- Cable Assembly 7540635

Personnel Required:
- 68J Aircraft Fire Control Repairer

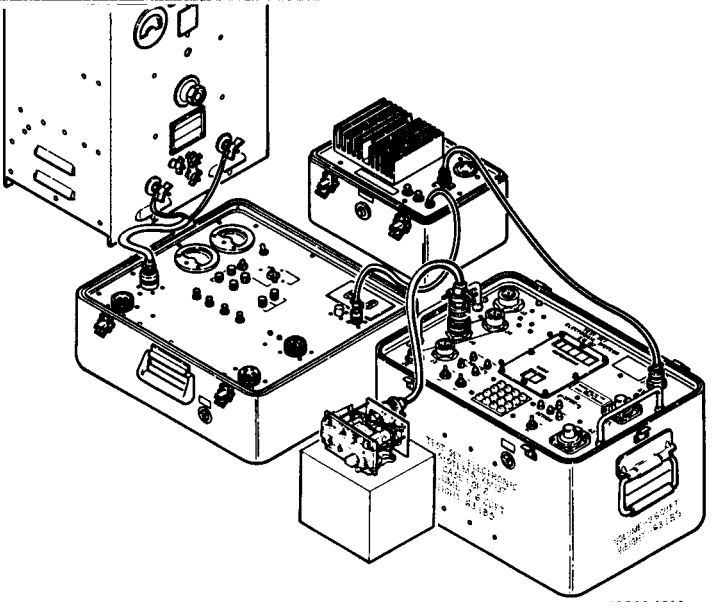
Equipment Conditions:
- On bench in shop.
- Bench power ready and test set power cable W1 connected.

General Safety Instructions:
- Never work on electronic equipment unless there is another person nearby who is familiar with operation and hazards of this equipment and who is competent in administering first aid. When aided by operator, technician must warn operator about dangerous areas.
- Power must not be applied to unit under test while test leads are being connected to or removed from unit assemblies/circuits under test.

PILOT ARMAMENT CONTROL PANEL (209-175-339-1) TEST

1. CONNECT TEST SET CABLE W23 AS FOLLOWS:

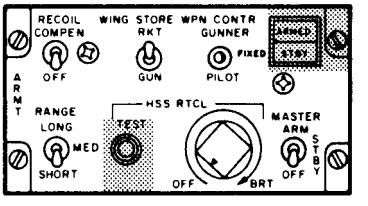
   W23P1 to test set J5
   W23P2 to PACP



2-25. PILOT ARMAMENT CONTROL PANEL (209-175-339-1) TEST (cont)

2. SET SWITCHES ON PILOT ARMAMENT CONTROL PANEL AS FOLLOWS:

   WPN CONTR to FIXED
   MASTER ARM to OFF
   RECOIL COMPEN to OFF
   RANGE to SHORT
   WING STORE to RKT
   HSS RTCL to OFF



PILOT ARMAMENT CONTROL PANEL

ARR83-1213

3. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.

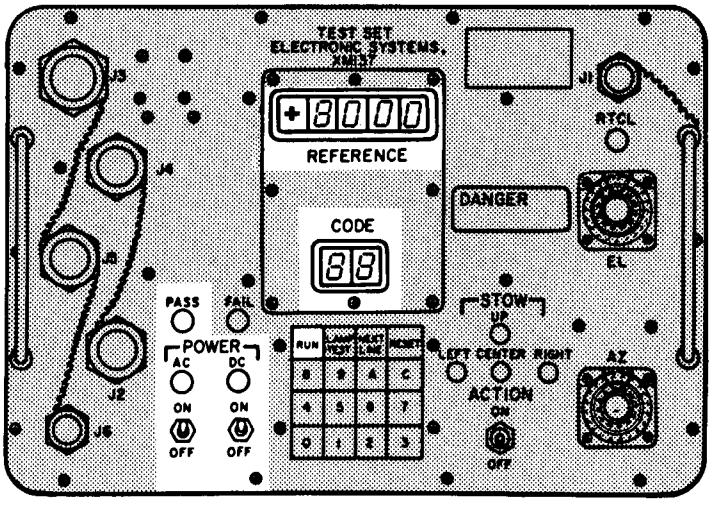
   a. AC and DC power indicators light.

   b. 8's appear in REFERENCE and CODE displays.

   c. PASS indicator lights.

4. ON TEST SET, PRESS RUN KEY.

   +8000 appears in REFERENCE display.



ARR83-1214A

2-25. PILOT ARMAMENT CONTROL PANEL (12011971) TEST

DESCRIPTION

This task covers: On bench testing including interface diagram and fault code troubleshooting.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Electronics Systems Test Set: M137
- DC Power Supply PP1104C
- Distribution Panel 12007200
- Power Supply 11834203
- Cable Assembly 7540635

Personnel Required:
- 68J Aircraft Armament/ Missile Systems Repairer

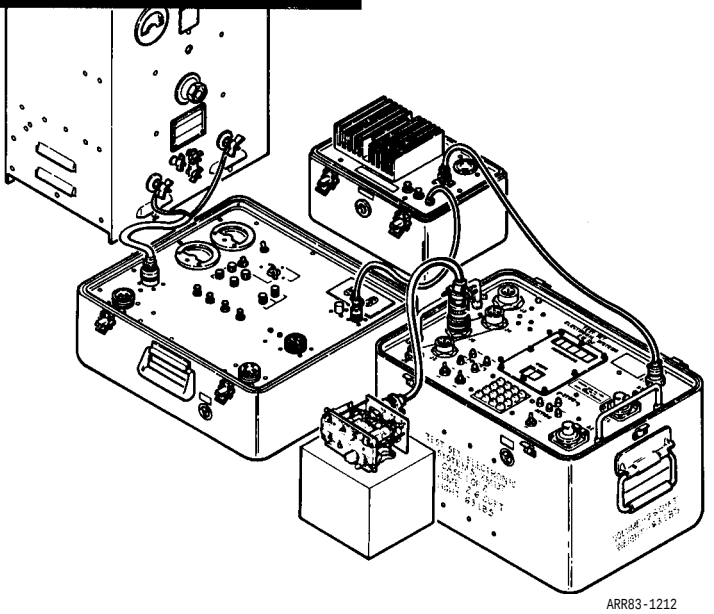
Equipment Conditions:
- On bench in shop.
- Bench power ready and test set power cable WI connected.

General Safety Instructions:
- Never work on electronic equipment unless there is another person nearby who is familiar with operation and hazards of this equipment and who is competent in administering first aid, When aided by operator, technician must warn operator about dangerous areas,
- Power must not be applied to unit under test while test leads are being connected to or removed from unit assemblies/circuits under test.

PILOT ARMAMENT CONTROL PANEL (12011971) TEST

1. CONNECT TEST SET CABLE W23 AS FOLLOWS:

   W23P1 to test set J5
   W23P2 to PACP

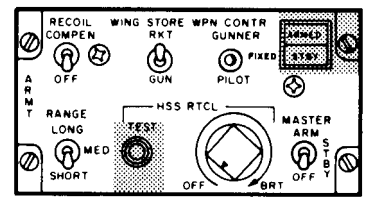


ARR83-1212

2-25. PILOT ARMAMENT CONTROL PANEL (12011971) TEST (cont)

2. SET SWITCHES ON PILOT ARMAMENT CONTROL PANEL AS FOLLOWS:

   WPN CONTR to FIXED
   MASTER ARM to OFF
   RECOIL COMPEN to OFF
   RANGE to SHORT
   WING STORE to RKT
   HSS RTCL to OFF



PILOT ARMAMENT CONTROL PANEL

ARR83-1213

3. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.

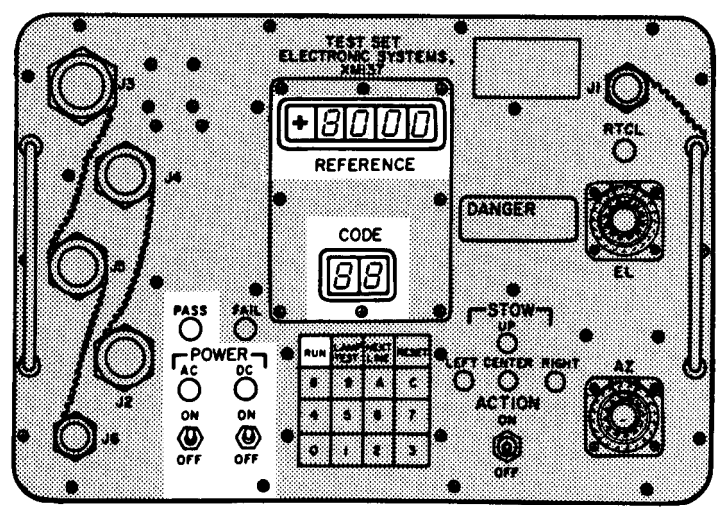
   a. AC and DC power indicators light.

   b. 8's appear in REFERENCE and CODE displays.

   c. PASS indicator lights.

4. ON TEST SET, PRESS RUN KEY.

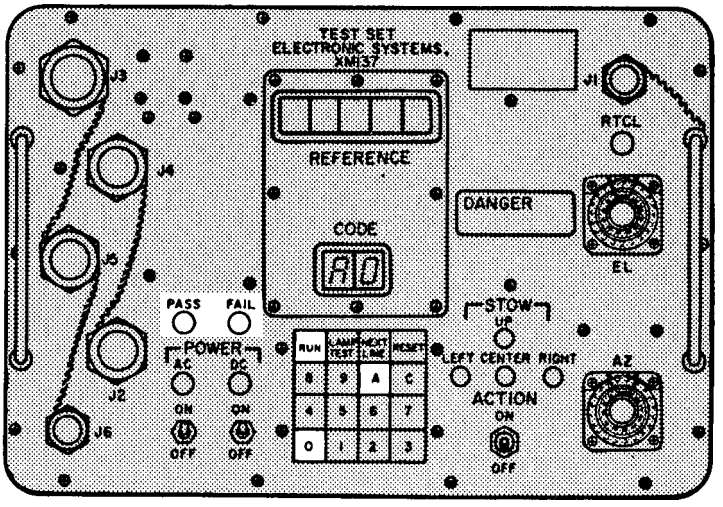
   + 8000 appears in REFERENCE display.



ARR83-1214A

PILOT ARMAMENT CONTROL PANEL (12011971) TEST (cont)

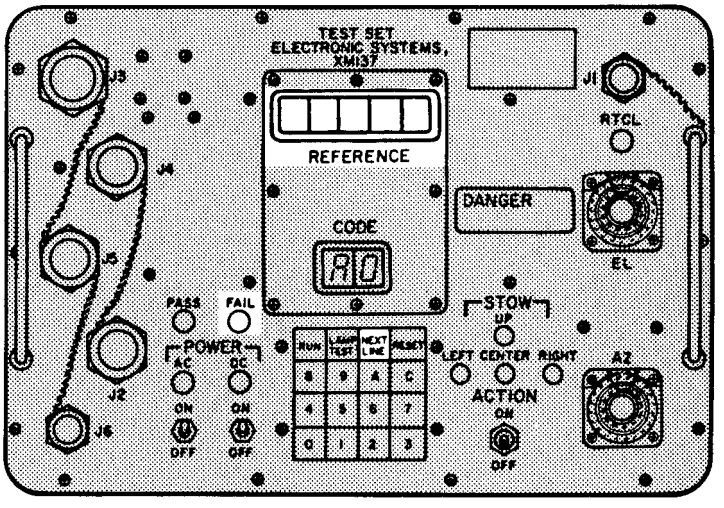
5. ON TEST, SET, PRESS A, O, AND RUN KEYS.
   a. Automatic test sequence runs.
   b. PASS or FAIL indicator lights.
   c. If PASS indicator lights, pilot armament control panel passes this part of test, go to step 12 and continue test.
   d. If FAIL indicator lights, go to next step.



ARR83-1215A

6. WHEN THE FAIL INDICATOR LIGHTS, A FOUR-DIGIT FAULT CODE WILL APPEAR IN THE REFERENCE DISPLAY.

7. USING NEXT LINE KEY, DISPLAY ALL FAULT CODES AND RECORD THEM FOR REFERENCE.



ARR83-1216A

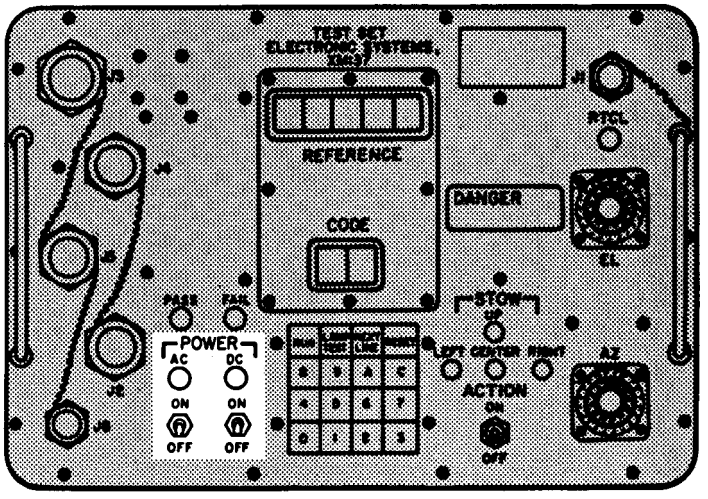
2-25. PILOT ARMAMENT CONTROL PANEL (12011971) TEST (cont)

8. SET TEST SET CIRCUIT BREAKERS TO OFF.

9. REFER TO PILOT ARMAMENT CONTROL PANEL (12011971) INTERFACE DIAGRAM FOR INTERFACE BETWEEN TEST SET AND UNIT UNDER TEST.

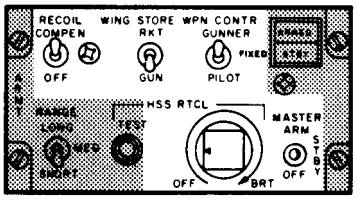
10. PERFORM TROUBLESHOOTING PROCEDURES IN FAULT CODE TROUBLESHOOTING DATA PROVIDED AT END OF THIS TEST.

11. UPON COMPLETION OF TROUBLESHOOTING PROCEDURES, REPEAT THIS TEST.



ARR83-1217

12. SET SWITCHES ON PILOT ARMAMENT CONTROL PANEL AS FOLLOWS:
    - WPN CONTR to GUNNER
    - MASTER ARM to STBY
    - RECOIL COMPEN to COMPEN
    - WING STORE to GUN
    - HSS RTCL intensity (on, but not rotated to BRT)



PILOT ARMAMENT CONTROL PANEL

ARR83-1218

PILOT ARMAMENT CONTROL PANEL (12011971) TEST (cont)

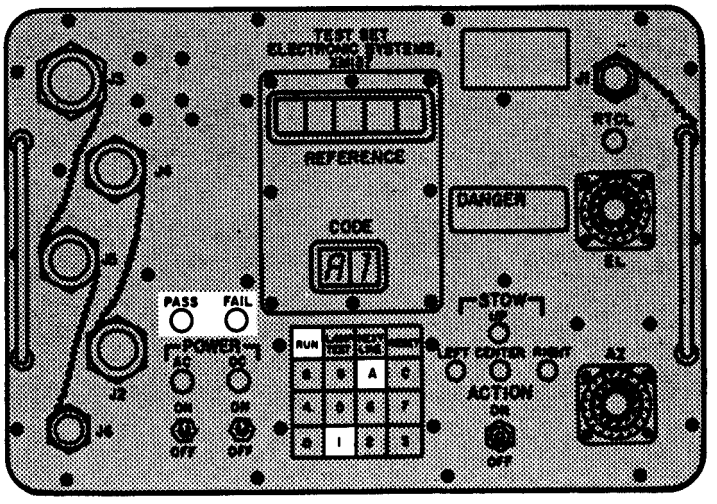
13. ON TEST SET, PRESS A, 1, AND RUN KEYS,

a. Automatic test sequence runs

b. PASS or FAIL indicator lights.

c. If PASS indicator lights, pilot armament control panel passes this part of test, go to step 20 and continue test.

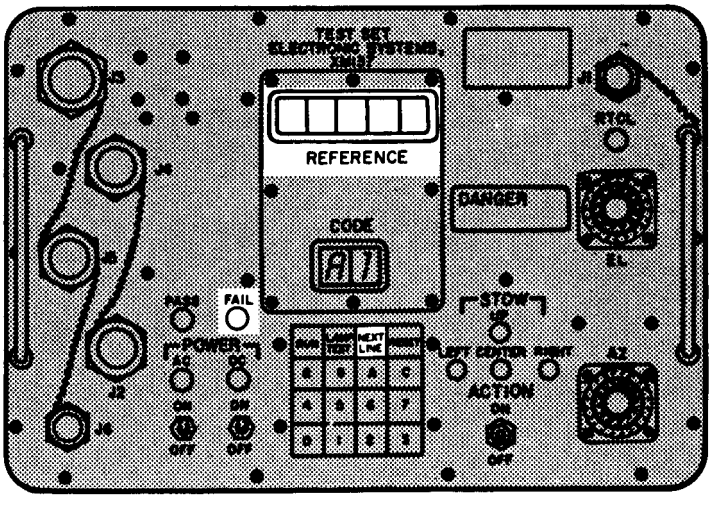
d. If FAIL indicator lights, go to next step



ARR83-1219

14. WHEN THE FAIL INDICATOR LIGHTS, A FOUR-DIGIT FAULT CODE WILL APPEAR IN THE REFERENCE DISPLAY.

15. USING NEXT LINE KEY, DISPLAY ALL FAULT CODES AND RECORD THEM FOR REFERENCE.



ARR83-1220

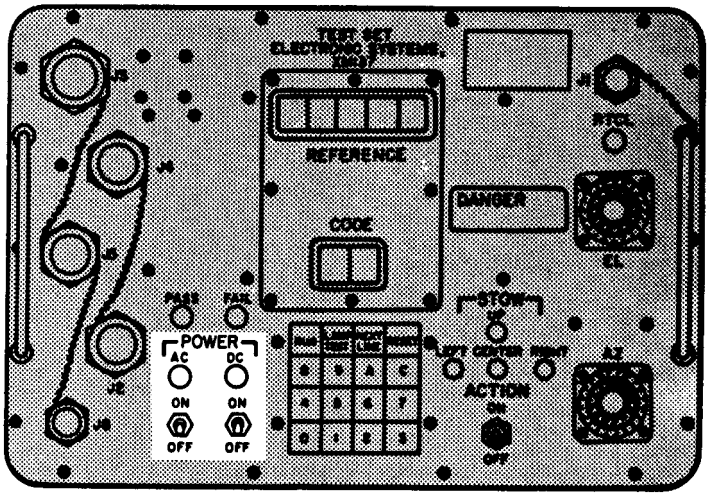
2-25. PILOT ARMAMENT CONTROL PANEL (12011971) TEST (cont)

16. SET TEST SET CIRCUIT BREAKERS TO OFF.

17. REFER TO PILOT ARMAMENT CONTROL PANEL (12011971) INTERFACE DIAGRAM FOR INTERFACE BETWEEN TEST SET AND UNIT UNDER TEST.

18. PERFORM TROUBLESHOOTING PROCEDURES IN FAULT CODE TROUBLESHOOTING DATA PROVIDED AT END OF THIS TEST.

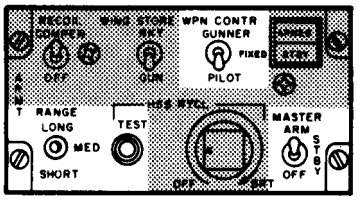
19. UPON COMPLETION OF TROUBLESHOOTING PROCEDURES, REPEAT THIS TEST.



ARR83-1221

20. SET SWITCHES ON PILOT ARMAMENT CONTROL PANEL AS FOLLOWS:

    WPN CONTR to PILOT
    MASTER ARM to ARM
    RANGE TO MED
    HSS RTCL TEST (held pressed during test).

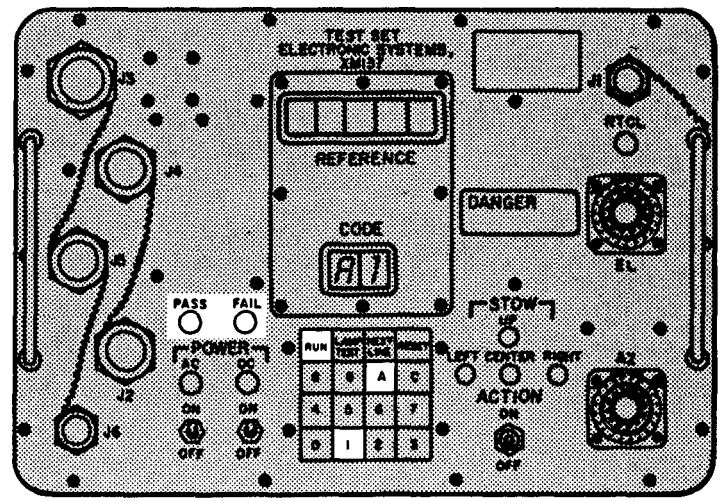


PILOT ARMAMENT CONTROL PANEL

ARR83-1222

PILOT ARMAMENT CONTROL PANEL (209-175-339-1) TEST (cont)

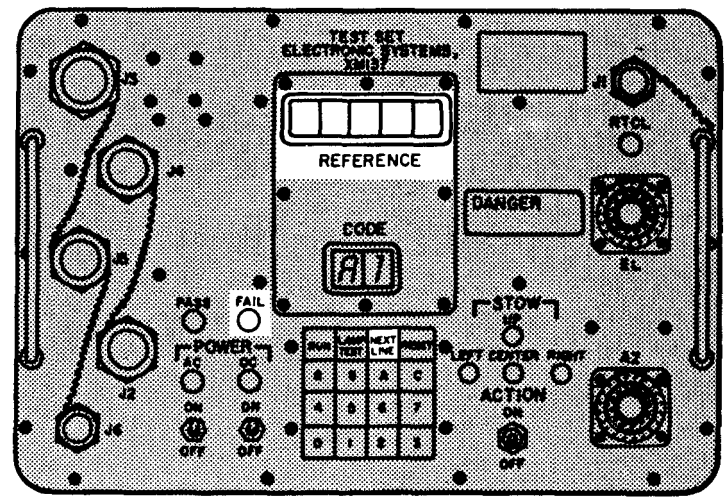
13. ON TEST SET, PRESS A, 1, AND RUN KEYS.
    a. Automatic test sequence runs.
    b. PASS or FAIL indicator lights.
    c. If PASS indicator lights, pilot armament control panel passes this part of test, go to step 20 and continue test.
    d. If FAIL indicator lights, go to next step.



ARR83-1219

14. WHEN THE FAIL INDICATOR LIGHTS, A FOUR-DIGIT FAULT CODE WILL APPEAR IN THE REFERENCE DISPLAY.

15 USING NEXT LINE KEY, DISPLAY ALL FAULT CODES AND RECORD THEM FOR REFERENCE.



ARR83-1220

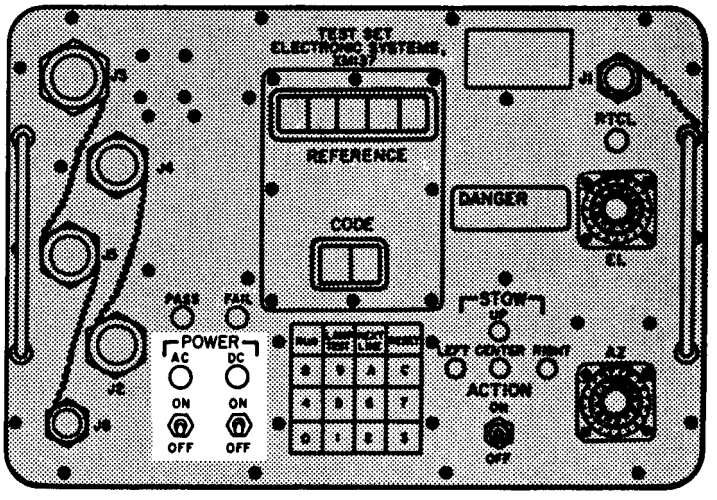
2-25. PILOT ARMAMENT CONTROL PANEL (209-175-339-1) TEST (cont)

16. SET TEST SET CIRCUIT BREAKERS TO OFF.

17. REFER TO PILOT ARMAMENT CONTROL PANEL (209-175-339-1) INTERFACE DIAGRAM FOR INTERFACE BETWEEN TEST SET AND UNIT UNDER TEST.

18. PERFORM TROUBLESHOOTING PROCEDURES IN FAULT CODE TROUBLESHOOTING DATA PROVIDED AT END OF THIS TEST.

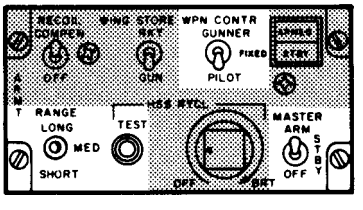
19. UPON COMPLETION OF TROUBLESHOOTING PROCEDURES, REPEAT THIS TEST.



ARR83-1221

20. SET SWITCHES ON PILOT ARMAMENT CONTROL PANEL AS FOLLOWS:

    WPN CONTR to PILOT
    MASTER ARM to ARM
    RANGE TO MED
    HSS RTCL TEST (held pressed during test).

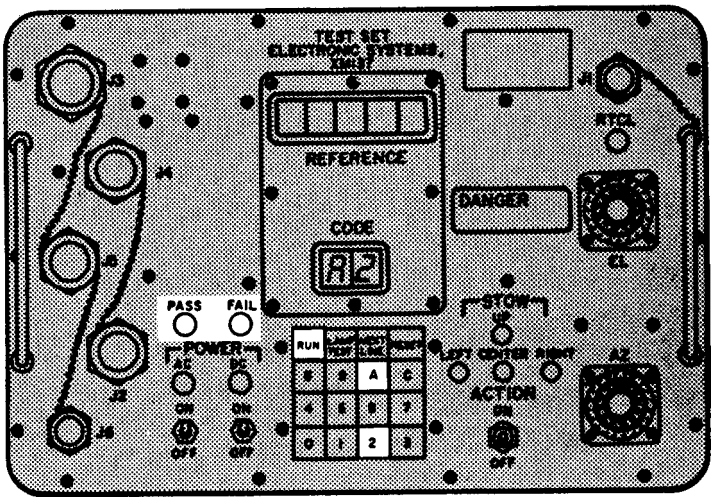


PILOT ARMAMENT CONTROL PANEL

ARR83-1222

PILOT ARMAMENT CONTROL PANEL (12011971) TEST (cont)

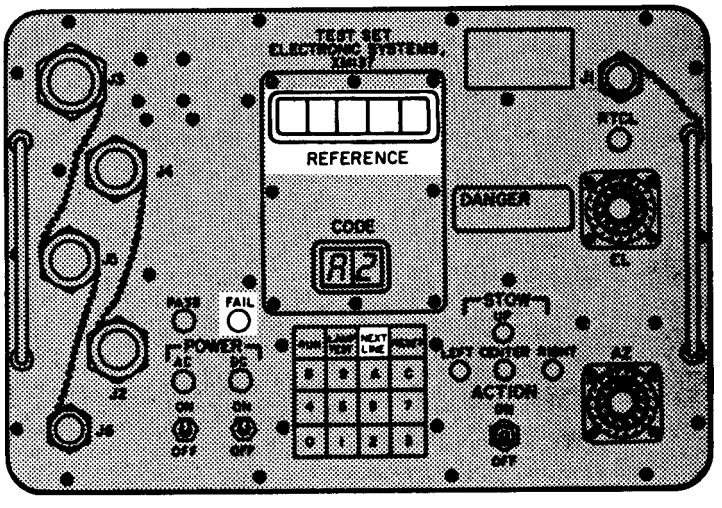
21. WITH HSS RTCL TEST PUSHBUTTON ON PILOT ARMAMENT CONTROL PANEL PRESSED, PRESS A, 2, AND RUN KEYS ON TEST SET.
    a. Automatic test sequence runs.
    b. PASS or FAIL indicator lights.
    c. If PASS indicator lights, pilot armament control panel passes this part of test, go to step 28 and continue test.
    d. If FAIL indicator lights, go to next step



ARR83-1223

22. WHEN THE FAIL INDICATOR LIGHTS, A FOUR-DIGIT FAULT CODE WILL APPEAR IN THE REFERENCE DISPLAY.

23. USING NEXT LINE KEY, DISPLAY ALL FAULT CODES AND RECORD THEM FOR REFERENCE.



ARR83-1224

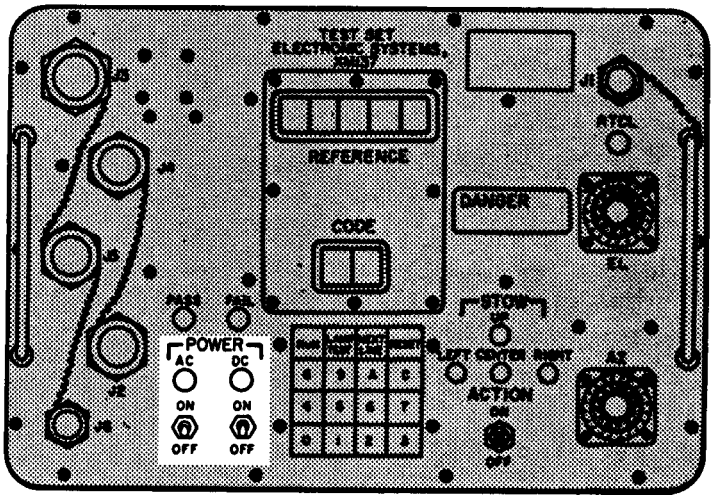
2-25. PILOT ARMAMENT CONTROL PANEL (12011971) TEST (cont)

24. SET TEST SET CIRCUIT BREAKERS TO OFF.

25. REFER TO PILOT ARMAMENT CONTROL PANEL (12011971) INTERFACE DIAGRAM FOR INTERFACE BETWEEN TEST SET AND UNIT UNDER TEST.

26. PERFORM TROUBLESHOOTING PROCEDURES IN FAULT CODE TROUBLESHOOTING DATA PROVIDED AT END OF THIS TEST.

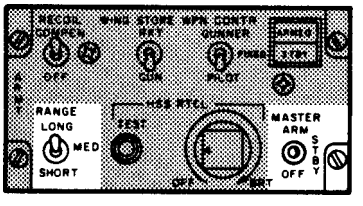
27. UPON COMPLETION OF TROUBLESHOOTING PROCEDURES, REPEAT THIS TEST.



ARR83-1225

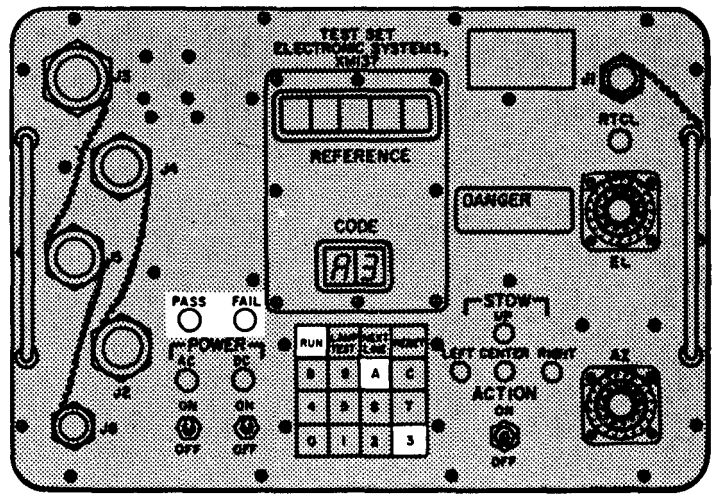
28. SET SWITCHES ON PILOT ARMAMENT CONTROL PANEL AS FOLLOWS:

MASTER ARM to STBY
RANGE to LONG



PILOT ARMAMENT CONTROL PANEL (12011971) TEST (cont)

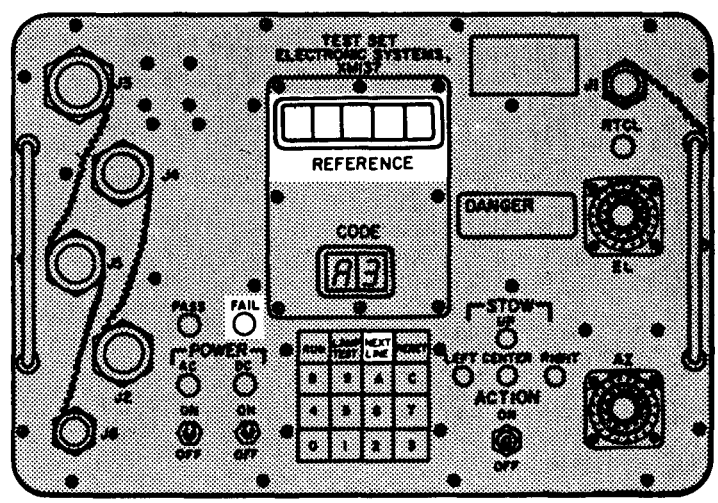
29. ON TEST SET, PRESS A, 3, AND RUN KEYS.
    a. Automatic test sequence runs.
    b. PASS or FAIL indicator lights.
    c. If PASS indicator lights, pilot armament control panel passes this part of test, go to step 36 and continue test.
    d. If FAIL indicator lights, go to next step.



ARR83-1227

30. WHEN THE FAIL INDICATOR LIGHTS A FOUR-DIGIT FAULT CODE WILL APPEAR IN THE REFERENCE DISPLAY.

31. USING NEXT LINE KEY, DISPLAY ALL FAULT CODES AND RECORD THEM FOR REFERENCE.



ARR83-1228

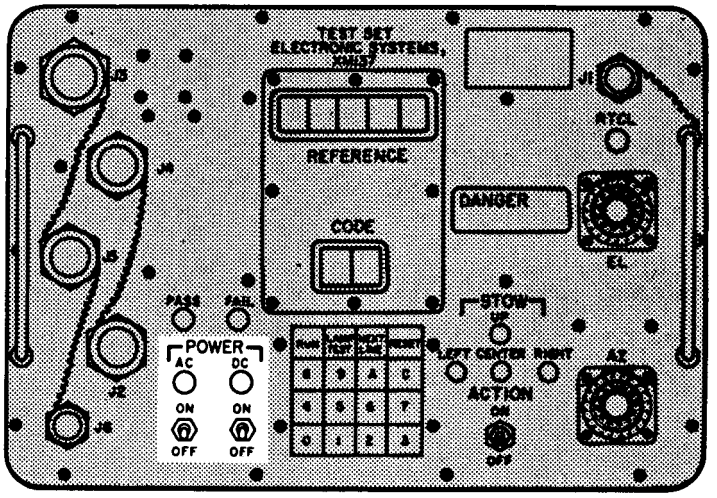
2-25. PILOT ARMAMENT CONTROL PANEL (12011971) TEST (cont)

32. SET TEST SET CIRCUIT BREAKERS TO OFF

33. REFER TO PILOT ARMAMENT CONTROL PANEL (12011971) INTERFACE DIAGRAM FOR INTERFACE BETWEEN TEST SET AND UNIT UNDER TEST.

34. PERFORM TROUBLESHOOTING PROCEDURES IN FAULT CODE TROUBLESHOOTING DATA PROVIDED AT END OF THIS TEST.

35. UPON COMPLETION OF TROUBLESHOOTING PROCEDURES, REPEAT THIS TEST.



ARR83-1229

36. ON PILOT ARMAMENT CONTROL PANEL, SET MASTER ARM SWITCH TO ARM.

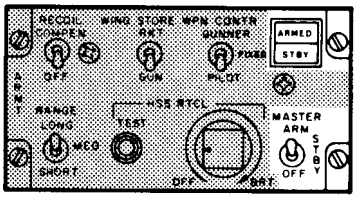
37. ON TEST SET, PRESS C, O, AND RUN KEYS,

    Indicators and panel lamps on pilot armament control panel light.

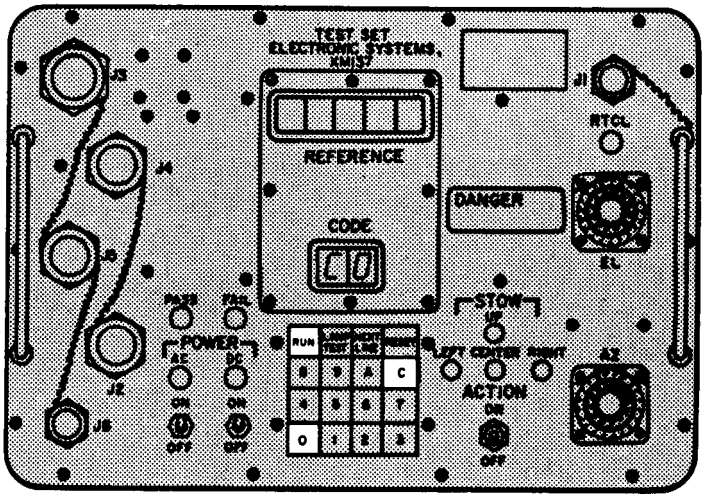
38. ON PILOT ARMAMENT CONTROL PANEL, SET MASTER ARM SWITCH TO OFF, THEN BACK TO ARM.

    a. ARMED and STBY indicators go out then come on.

    b. If lamps and/or indicators do not come on at all, lamps and/or relay (8Z4) are defective. Replace defective component(s), see REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011971), para 2-61. After repair, repeat test.



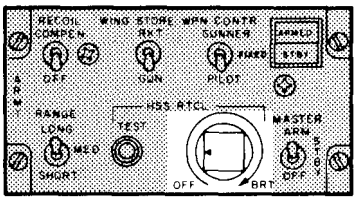
PILOT ARMAMENT CONTROL PANEL



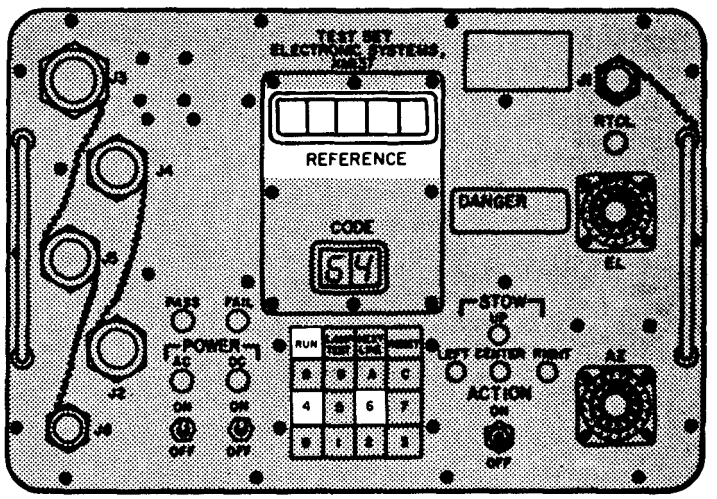
ARR83-1252A

PILOT ARMAMENT CONTROL PANEL (12011971) TEST (cont)

39. ON TEST SET, PRESS 6, 4, AND RUN KEYS. ON PILOT ARMAMENT CONTROL PANEL, ROTATE HSS RTCL INTENSITY KNOB BETWEEN OFF AND BRT WHILE OBSERVING REFERENCE DISPLAY ON TEST SET.
    a. Voltage reading in REFERENCE display vary smoothly with movement of knob.
    b. If voltage readings do not vary or are erratic, replace resistor 17R1. See REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011971), para 2-61. After repair, repeat test.



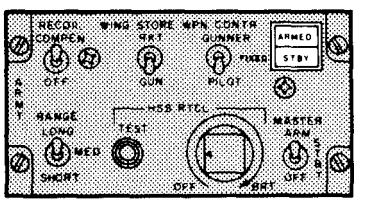
PILOT ARMAMENT CONTROL PANEL



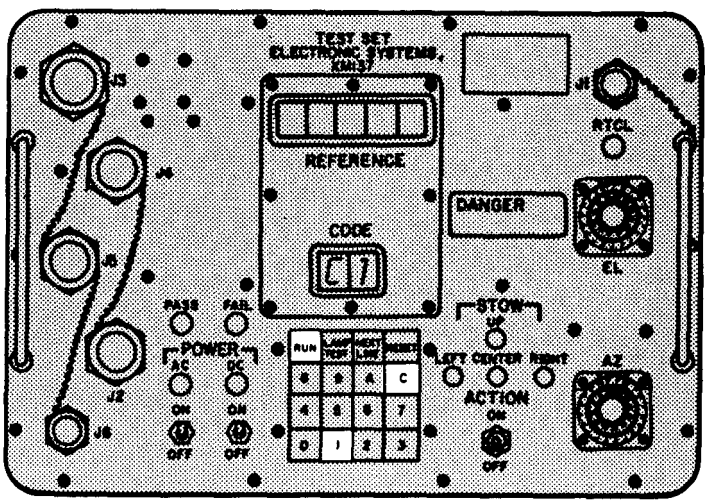
ARR83-1230

40. ON TEST SET, PRESS C, 1, AND RUN KEYS.
    a. ARMED and STBY indicators dim.
    b. If indicators do not dim, replace relay assembly (8Z4). See REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011971), para 2-61.

41. IF ALL INDICATIONS ARE NORMAL, REMOVE POWER, DISCONNECT TEST SET CABLES, AND RETURN UNIT TO SERVICE.



PILOT ARMAMENT CONTROL PANEL

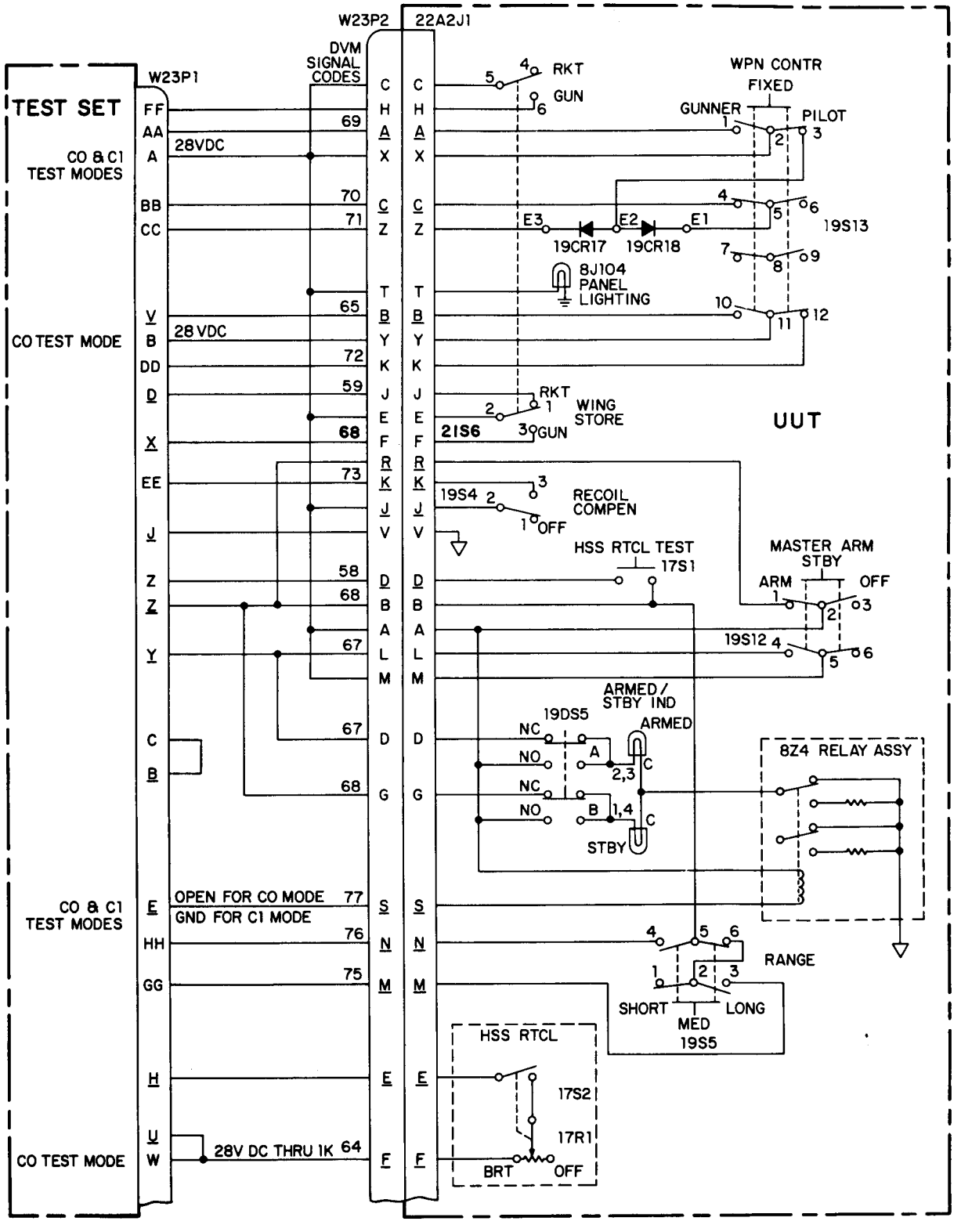


ARR83-1231

END OF TEST

2–25. PILOT ARMAMENT CONTROL PANEL (12011971) TEST (cont)

PILOT ARMAMENT CONTROL PANEL (12011971) INTERFACE DIAGRAM



PILOT ARMAMENT CONTROL PANEL (12011971) FAULT CODE TROUBLESHOOTING DATA

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

WARNING

Verify all power is off before performing any corrective action.

NOTE

Fault code +8100 through +8108 and +8111 through +8114 assume that UUT switches are positioned as specified in step 2.

1. FAULT CODE +8100 (SHORT ON 28 VDC INPUTS FROM W23P1-A, -B, OR - W)

Use PILOT ARMAMENT CONTROL PANEL (1201 1971) INTERFACE DIAGRAM to locate cause of short in UUT. Replace defective component. Repair or replace cable assembly if defective.

2. FAULT CODE +8101 (OUTPUT AT J1-A IS NOT 0 VDC)

Set test set to CO mode and enter 69 on keyboard,
If output is not 0 (Vdc), S13 is defective; replace.

3. FAULT CODE +8102 (OUTPUT AT J1-C IS NOT 28 VDC)

Set test set to CO mode and enter 70 on keyboard.
If output is not +26 ±4 (Vdc), S13 or CR18 is defective; replace.

4. FAULT CODE +8103 (OUTPUT AT J1-Z IS NOT 28 VDC)

Set test set to CO mode and enter 71 on keyboard.
If output is not +26 ±4 (Vdc), CR17 is defective; replace.

5. FAULT CODE +8104 (OUTPUT AT J1-B IS NOT 0 VDC)

Set test set to CO mode and enter 65 on keyboard.
If output is not 0 (Vdc), S13 is defective; replace.

6. FAULT CODE +8105 (OUTPUT AT J1-K IS NOT 28 VDC)

Set test set to CO mode and enter 72 on keyboard.
If output is not +26 ±4 (Vdc), S13 is defective; replace.

7. FAULT CODE + 8106 (OUTPUT AT J1-R IS NOT 0 VDC)

Set test set to CO mode and enter 68 on keyboard.
If output is not 0 (Vdc), S12 is defective; replace.

2-25. PILOT ARMAMENT CONTROL PANEL (12011971) (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

8. FAULT CODE +8107 (OUTPUT AT J1-L IS NOT 0 VDC)
Set test set to CO mode and enter 67 on keyboard.
If output is not 0 (Vdc), S12 is defective; replace.

9. FAULT CODE +8108 (OUTPUT AT J1-K IS NOT 0 VDC)
Set test set to CO mode and enter 73 on keyboard.
If output is not 0 (Vdc), S4 is defective; replace.

10. FAULT CODE +8111 (OUTPUT AT J1-F IS NOT 28 VDC)
Set test set to CO mode and enter 64 on keyboard.
If output is not +26 ±4 (Vdc), either HSS RTCL potentiometer 17R1 or on-off switch 17S2 is defective and is causing a voltage drop to appear at J1-F. Replace 17R1 or 17S2.

11. FAULT CODE +8112 (OUTPUT AT J1-J IS NOT 28 VDC)
Set test set to CO mode and enter 59 on keyboard.
If output is not +26 ±4 (Vdc), WING STORE switch is defective; replace,

12. FAULT CODE +8113 (OUTPUT AT J1-F IS NOT 0 VDC)
Set test to CO mode and enter 66 on keyboard.
If output is not 0 (Vdc), WING STORE switch is defective; replace.

13. FAULT CODE +8114 (OUTPUT AT J1-H IS NOT 0 VDC)
Set test set to CO mode and enter 74 on keyboard.
If output is not 0 (Vdc), S6 is defective; replace.

NOTE

Fault codes +8130 through +8138 and +8141 through +8147 assume that UUT switches are positioned as specified instep 12.

14. FAULT CODE +8130 (SHORT ON 28 VDC INPUT)
See fault code +8100 for corrective action.

15. FAULT CODE +8131 (OUTPUT AT J1-A IS NOT 28 VDC)
Set test set to C1mode and enter 69 on keyboard,
If output is not +26 ±4 (Vdc), S13 is defective replace.

16. FAULT CODE +8132 (OUTPUT AT J1-C IS NOT 0 VDC)
Set test set to C1 mode and enter 70 on keyboard.
If output is not 0 (Vdc), S13 is defective; replace

PILOT ARMAMENT CONTROL PANEL (1 2011 971)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

17. FAULT CODE +8133 (OUTPUT AT J1-Z IS NOT 0 VDC)
Set test set to C1 mode and enter 71 on keyboard.
If output is not 0 (Vdc), S13 is defective; replace.

18. FAULT CODE +8134 (OUTPUT AT J1-B IS NOT 28 VDC)
Set test set to CO mode and enter 65 on keyboard.
If output is not +26 ±4 (Vdc), S13 is defective; replace

19. FAULT CODE +8135 (OUTPUT AT J1-K IS NOT 0 VDC)
Set test set to CO mode and enter 72 on keyboard.
If output is not 0 (Vdc), S13 is defective; replace.

20. FAULT CODE +8136 (OUTPUT AT J1-R IS NOT 28 VDC)
Set test set to CO mode and enter 68 on keyboard.
If output is not +26 ±4 (Vdc), S12 is defective; replace.

21. FAULT CODE +8137 (OUTPUT AT J1-L IS NOT 0 VDC)
Set test set to CO mode and enter 67 on keyboard.
If output is not 0 (Vdc), S12 is defective; replace.

22. FAULT CODE +8138 (OUTPUT AT J1-K IS NOT 28 VDC)
Set test set to CO mode and enter 73 on keyboard.
If output is not +26 ±4 (Vdc), S4 is defective; replace.

23. FAULT CODE +8141 (OUTPUT AT J1-F IS NOT +2 TO +5 VDC)
Set test set to CO mode and enter 64 on keyboard.
If output is not + 2 to + 5 (Vdc), make sure that HSS RTCL potentiometer 17R1 is turned on but is not rotated CW toward the BRT position. If potentiometer is positioned as specified, and test set voltage is still out of tolerance, then HSS RTCL potentiometer 17R1 or on-off switch 17S2 is defective. Replace 17R1 or 17S2.

24. FAULT CODE +8142 (OUTPUT AT J1-J IS NOT 0 VDC)
Set test set to CO mode and enter 59 on keyboard.
If output is not 0 (Vdc), S6 is defective; replace.

25. FAULT CODE +8143 (OUTPUT AT J1-F IS NOT 28 VDC)
Set test to CO mode and enter 66 on keyboard.
If output is not +26 ±4 (Vdc), S6 is defective; replace.

2-25. PILOT ARMAMENT CONTROL PANEL (12011971) FAULT CODE TROUBLESHOOTING DATA

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

26. FAULT CODE +8144 (OUTPUT AT J1-D IS NOT 0 VDC)
Set test set to CO mode and enter 58 on keyboard.
If output is not 0 (Vdc), S1 is defective; replace.

27. FAULT CODE +8145 (OUTPUT AT Jl-M IS NOT 0 VDC)
Set test set to CO mode and enter 75 on keyboard.
If output is not 0 (Vdc), S5 is defective; replace,

28. FAULT CODE +8146 (OUTPUT AT J1-N IS NOT 28 VDC)
See test code to CO mode and enter 76 on keyboard.
If output is not +26 ±4 (Vdc), S5 is defective; replace.

29. FAULT CODE +8147 (OUTPUT AT J1-H IS NOT 28 VDC)
Set test set to CO mode and enter 74 on keyboard.
If output is not +26 ±4 (Vdc), S6 is defective; replace.

NOTE

Fault codes +8160 through +8168, + 8171 and +8172 assume that UUT switches are positioned as specified in step 20.

30. FAULT CODE +8160 (SHORT ON 28 VDC IN PUT)
See fault code +8100 for corrective action.

31. FAULT CODE +8161 (OUTPUT AT J1-A IS NOT 0 VDC)
Set test set to CO mode and enter 69 on keyboard.
If output is not 0 (Vdc), S13 is defective; replace.

32. FAULT CODE +8162 (OUTPUT AT J1-C IS NOT 0 VDC)
Set test set to CO mode and enter 70 on keyboard.
If output is not 0 (Vdc), S13 is defective; replace.

33. FAULT CODE +8163 (OUTPUT AT J1-Z IS NOT 28 VDC)
Set test set to CO mode and enter 71 on keyboard.
If ouptut is not +26 ±4 (Vdc), S13 or CR17 is defective; replace,

34. FAULT CODE +8164 (OUTPUT AT J1-B IS NOT 0 VDC)
Set test set to CO mode and enter 65 on keyboard.
If output is not 0 (Vdc), S13 is defective; replace.

PILOT ARMAMENT CONTROL PANEL (12011971)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

35. FAULT CODE +8165 (OUTPUT AT J1-K IS NOT 28 VDC)

Set test set to CO mode and enter 72 on keyboard.
if output is not +26 ±4 (Vdc), S13 is defective; replace.

36. FAULT CODE +8166 (OUTPUT AT J1-& IS NOT 28 VDC)

Set test set to CO mode and enter 68 on keyboard.
If output is not +26 ±4 (Vdc), S12 is defective; replace.

37. FAULT CODE +8167 (OUTPUT AT 11-1 IS NOT 28 VDC)

Set test set to CO mode and enter 67 on keyboard.
If output is not +26 ±4 (Vdc), S12 is defective; replace.

38. FAULT CODE +8168 (OUTPUT AT J1-D IS NOT 28 VDC)

Set test set to CO mode and enter 58 on keyboard while holding HSS RTCL TEST switch S1 pressed.
If output is not +26 ±4 (Vdc), S1 is defective; replace.

39. FAULT CODE +8171 (OUTPUT AT J1-M IS NOT 0 VDC)

Set test set to CO mode and enter 75 on keyboard.
If output is not 0 (Vdc), S5 is defective; replace.

40. FAULT CODE +8172 (OUTPUT ATM IS NOT O VDC)

Set test set to CO mode and enter 76 on keyboard.
If output is not 0 (Vdc), S5 is defective; replace.

NOTE

Fault codes +8200 through +8202 assume that UUT switches are positioned as specified in step 28.

41. FAULT CODE +8200 (SHORT ON 28 VDC INPUT)

See fault code + 8100 for corrective action.

42. FAULT CODE +8201 (OUTPUT AT J1-M IS NOT 28 VDC)

Set test set to CO mode and enter 75 on keyboard.
If output is not 28 (Vdc), S5 is defective; replace.

43. FAULT CODE +8202 (OUTPUT AT J1-N IS NOT +26 ±4 VDC)

Set test set to CO mode and enter 76 on keyboard.
If output is not +26 ±4 (Vdc), S5 is defective; replace.

END OF TROUBLESHOOTING

2-26. PILOT ARMAMENT CONTROL PANEL (12011952) TEST

DESCRIPTION

This task covers: On bench testing including interface diagram and fault code troubleshooting.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Electronics Systems Test Set: M137
- DC Power Supply PP1104C
- Distribution Panel 12007200
- Power Supply 11834203
- Cable Assembly 7540635

Personnel Required:
- 68J Aircraft Armament/Missile Systems Repairer

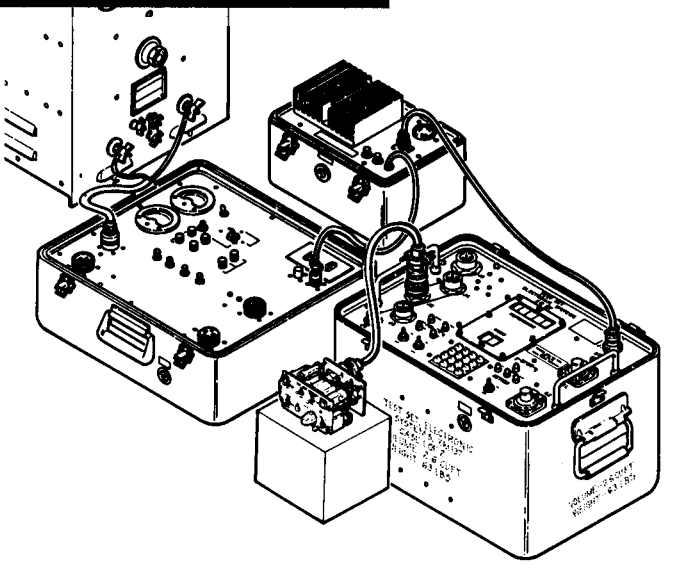
Equipment Conditions:
- On bench in shop.
- Bench power ready and test set power cable W1 connected.

General Safety Instructions:
- Never work on electronic equipment unless there is another person nearby who is familiar with operation and hazards of this equipment and who is competent in administering first aid. When aided by operator, technician must warn operator about dangerous areas.
- Power must not be applied to unit under test while test leads are being connected to or removed from unit assemblies/circuits under test.

PILOT ARMAMENT CONTROL PANEL (12011952) TEST

1. CONNECT TEST SET CABLE W12 AS FOLLOWS:

   W12P1 to test set J5
   W12P2 to PACP

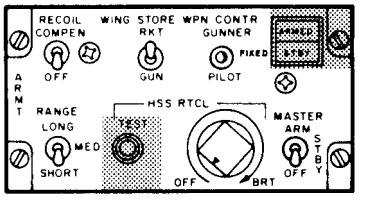


ARR82-26033

PILOT ARMAMENT CONTROL PANEL (12011 952) TEST (cont)

2. SET SWITCHES ON PILOT ARMAMENT CONTROL PANEL AS FOLLOWS:

   WPN CONTR to FIXED
   MASTER ARM to OFF
   RECOIL COMPEN to OFF
   RANGE to SHORT
   WING STORE to RKT
   HSS RTCL to OFF



PILOT ARMAMENT CONTROL PANEL

ARR82-26034

3. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.

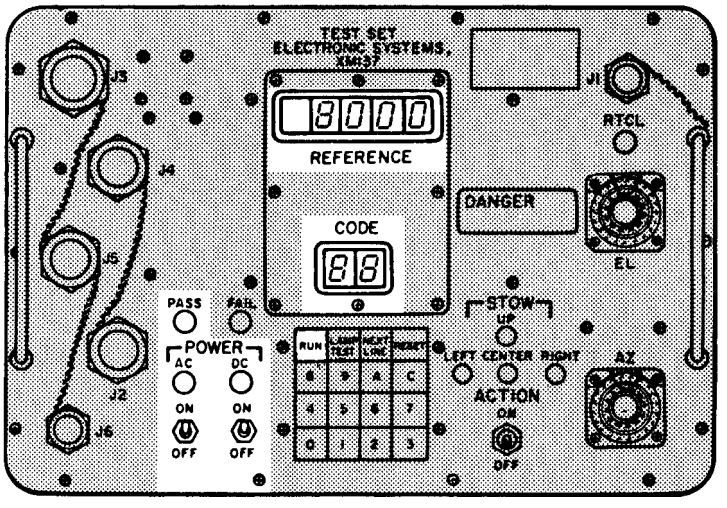
   a. AC and DC power indicators light.

   b. 8's appear in REFERENCE and CODE displays.

   c. PASS indicator lights.

4. ON TEST SET, PRESS RUN KEY.

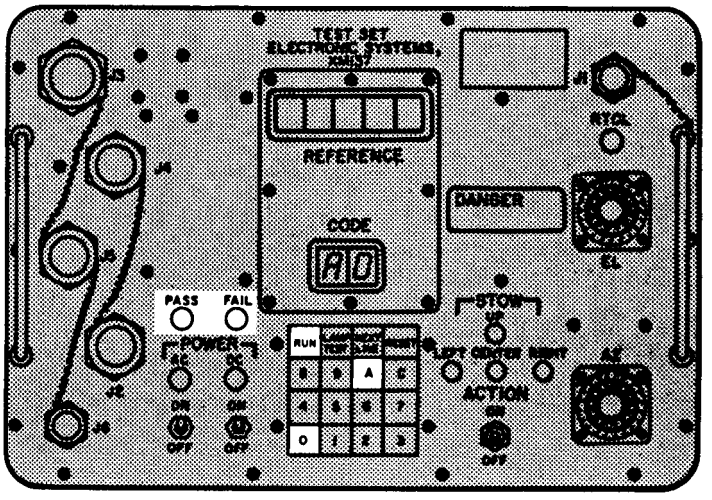
   8000 appears in REFERENCE display.



ARR82-26035A

12-26. PILOT ARMAMENT CONTROL PANEL (12011952) TEST (cont)

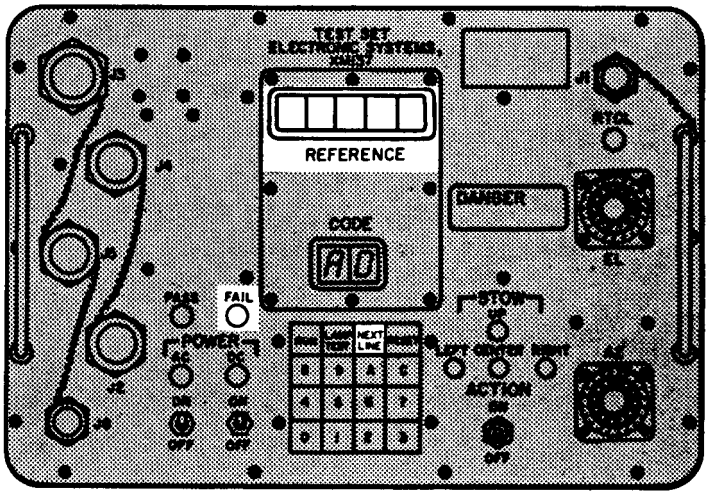
5. ON TEST, SET, PRESS A, O, AND RUN KEYS.
   a. Automatic test sequence runs.
   b. PASS or FAIL indicator lights
   c. If PASS indicator lights, pilot armament control panel passes this part of test, go to step 12 and continue test.
   d. If FAIL indicator lights, go to next step.



ARR82-26036

6. WHEN THE FAIL INDICATOR LIGHTS, A FOUR-DIGIT FAULT CODE WILL APPEAR IN THE REFERENCE DISPLAY.

7. USING NEXT LINE KEY, DISPLAY ALL FAULT CODES AND RECORD THEM FOR REFERENCE.



ARR82-26037

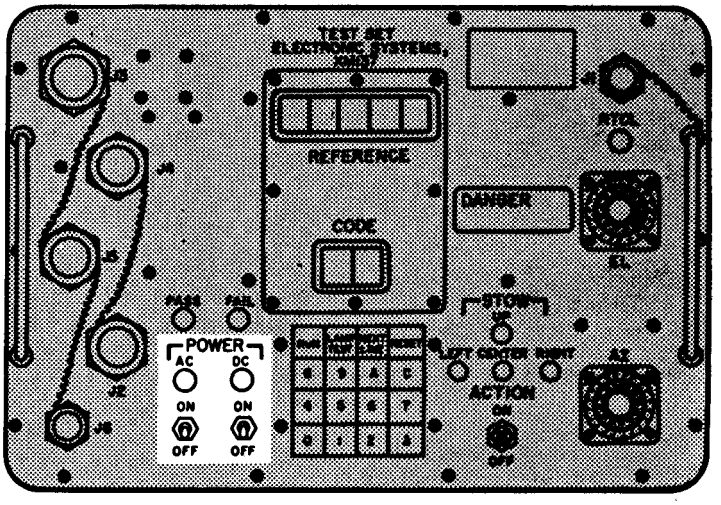
PILOT ARMAMENT CONTROL PANEL (12011952) TEST (cont)

8. SET TEST SET CIRCUIT BREAKERS TO OFF.

9. REFER TO PILOT ARMAMENT CONTROL PANEL (12011952) INTERFACE DIAGRAM FOR INTERFACE BETWEEN TEST SET AND UNIT UNDER TEST.

10. PERFORM TROUBLESHOOTING PROCEDURES IN FAULT CODE TROUBLESHOOTING DATA PROVIDED AT END OF THIS TEST.

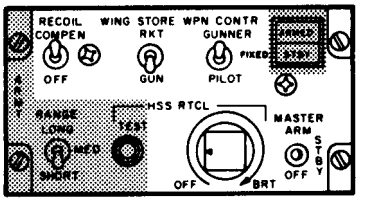
11. UPON COMPLETION OF TROUBLESHOOTING PROCEDURES, REPEAT THIS TEST.



ARR82-23038

12. SET SWITCHES ON PILOT ARMAMENT CONTROL PANEL AS FOLLOWS:

    WPN CONTR to GUNNER
    MASTER ARM to STBY
    RECOIL COMPEN to COMPEN
    WING STORE to GUN
    HSS RTCL intensity (on, but not rotated to BRT)

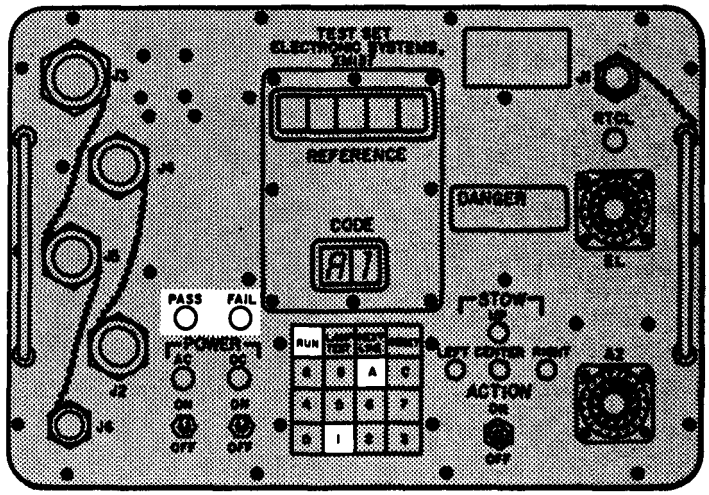


PILOT ARMAMENT CONTROL PANEL

ARR8232-23039

2-26. PILOT ARMAMENT CONTROL PANEL (12011952) TEST (cont)

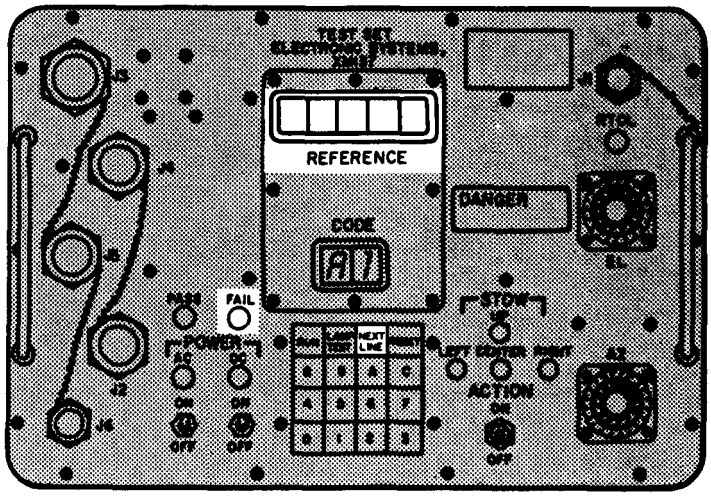
13. ON TEST SET PRESS A, 1, AND RUN KEYS.
    a. Automatic test sequence runs.
    b. PASS or FAIL indicator lights.
    c. If PASS indicator lights, pilot armament control panel passes this part of test, go to step 20 and continue test.
    d. If FAIL indicator lights, go to next step.



ARR82-26040

14. WHEN THE FAIL INDICATOR LIGHTS, A FOUR-DIGIT FAULT CODE WILL APPEAR IN THE REFERENCE DISPLAY.

15. USING NEXT LINE KEY, DISPLAY ALL FAULT CODES AND RECORD THEM FOR REFERENCE.



ARR82-26041

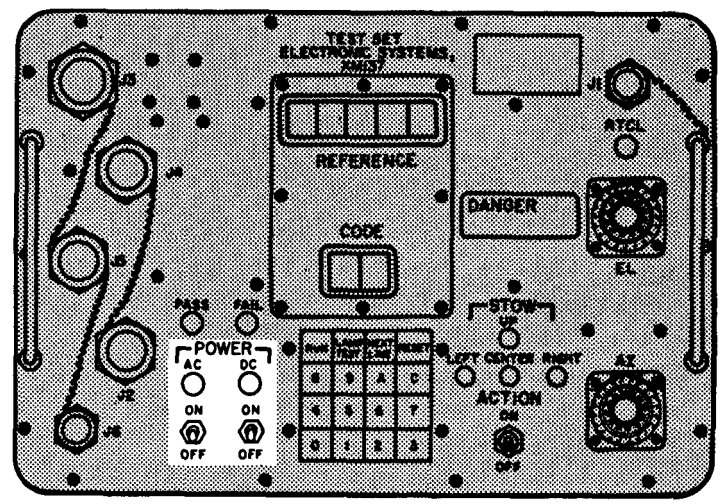
PILOT ARMAMENT CONTROL PANEL (12011952) TEST (cont)

16. SET TEST SET CIRCUIT BREAKERS TO OFF.

17. REFER TO PILOT ARMAMENT CONTROL PANEL (12011952) INTERFACE DIAGRAM FOR INTERFACE BETWEEN TEST SET AND UNIT UNDER TEST.

18. PERFORM TROUBLESHOOTING PROCEDURES IN FAULT CODE TROUBLESHOOTING DATA PROVIDED AT END OF THIS TEST.

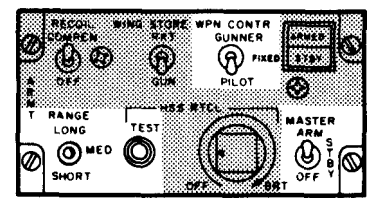
19. UPON COMPLETION OF TROUBLESHOOTING PROCEDURES, REPEAT THIS TEST.



ARR82-26042

20. SET SWITCHES ON PILOT ARMAMENT CONTROL PANEL AS FOLLOWS:

    WPN CONTR to PILOT
    MASTER ARM to ARM
    RANGE to MED
    HSS RTCL TEST (held pressed during test).

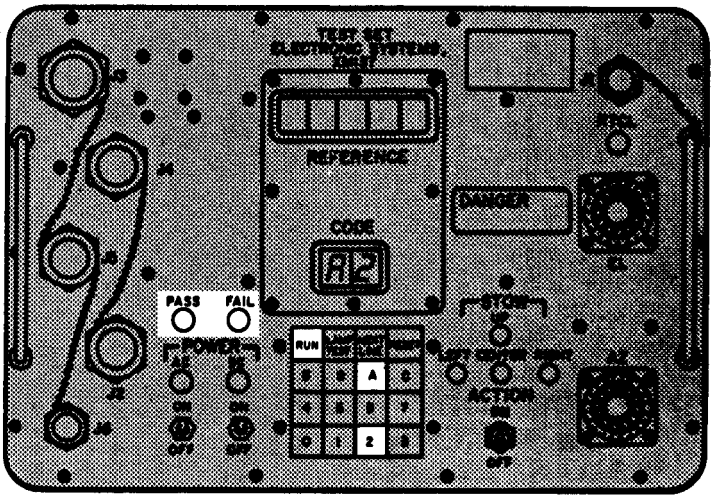


PILOT ARMAMENT CONTROL PANEL

ARR82-26043

2-26. PILOT ARMAMENT CONTROL PANEL (12011952) TEST (cont)

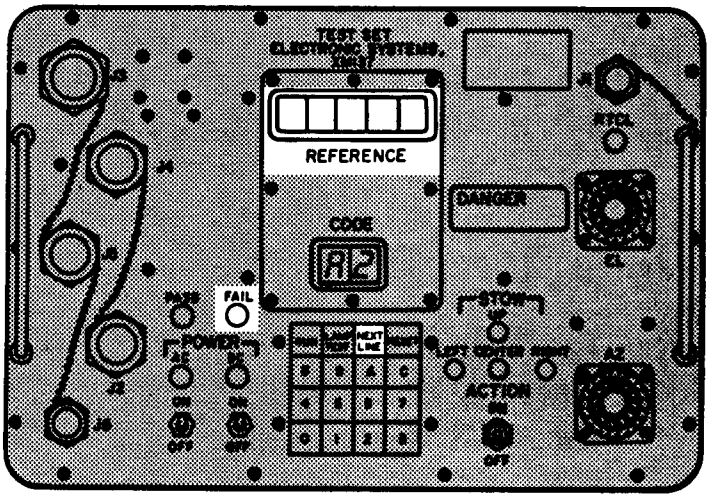
21. WITH HSS RTCL PUSHBUTTON ON PILOT ARMAMENT CONTROL PANEL PRESSED, PRESS A, 2, AND RUN KEYS ON TEST SET,
    a. Automatic test sequence runs,
    b. PASS or FAIL indicator lights.
    c. If PASS indicator lights, pilot armament control panel passes this part of test, go to step 28 and continue test.
    d. If FAIL indicator lights, go to next step.



ARR83-1201

22. WHEN THE FAIL INDICATOR LIGHTS, A FOUR-DIGIT FAULT CODE WILL APPEAR IN THE REFERENCE DISPLAY.

23. USING NEXT LINE KEY, DISPLAY ALL FAULT CODES AND RECORD THEM FOR REFERENCE.



ARR83-1202

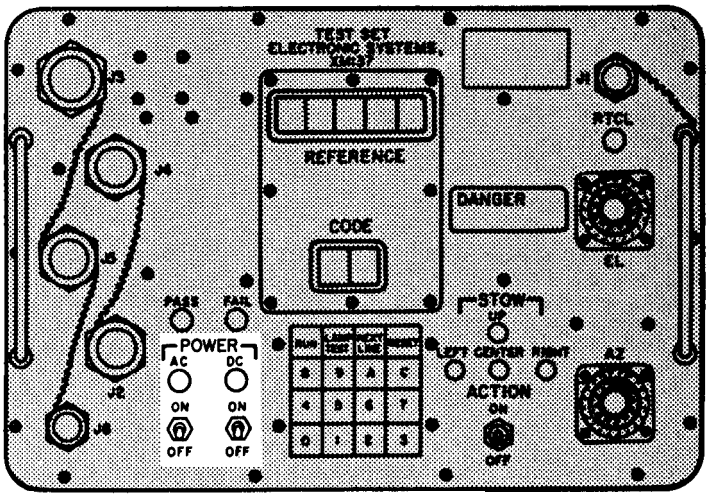
PILOT ARMAMENT CONTROL PANEL (12011952) TEST (cont)

24. SET TEST SET CIRCUIT BREAKERS TO OFF.

25. REFER TO PILOT ARMAMENT CONTROL PANEL (12011952) INTERFACE DIAGRAM FOR INTERFACE BETWEEN TEST SET AND UNIT UNDER TEST.

26. PERFORM TROUBLESHOOTING PROCEDURES IN FAULT CODE TROUBLESHOOTING DATA PROVIDED AT END OF THIS TEST.

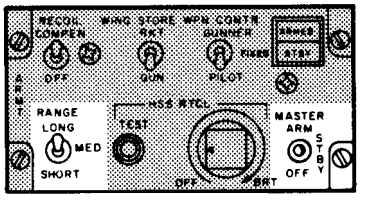
27. UPON COMPLETION OF TROUBLESHOOTING PROCEDURES, REPEAT THIS TEST.



ARR83-1203

28. SET SWITCHES ON PILOT ARMAMENT CONTROL PANEL AS FOLLOWS:

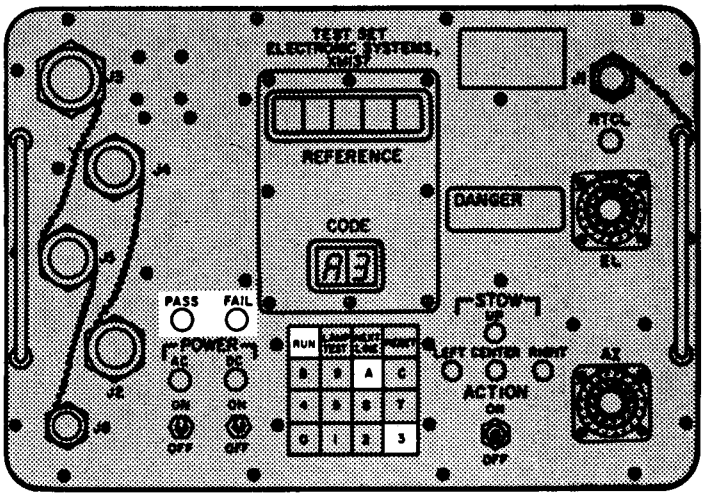
    MASTER ARM to STBY
    RANGE to LONG



ARR83-1204

2-26. PILOT ARMAMENT CONTROL PANEL (12011952) TEST (cont)

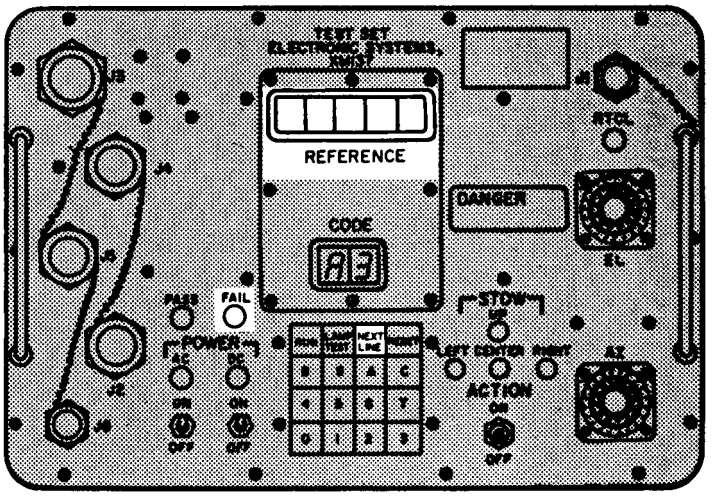
29. ON TEST SET, PRESS A, 3, AND RUN KEYS.
    a. Automatic test sequence runs.
    b. PASS or FAIL indicator lights.
    c. If PASS indicator lights, pilot armament control panel passes this part of test, go to step 36 and continue test.
    d. If FAIL indicator lights, go to next step.



ARR83-12045

30. WHEN THE FAIL INDICATOR LIGHTS A FOUR-DIGIT FAULT CODE WILL APPEAR IN THE REFERENCE DISPLAY.

31. USING NEXT LINE KEY DISPLAY ALL FAULT CODES AND RECORD THEM FOR REFERENCE.



ARR83-1206

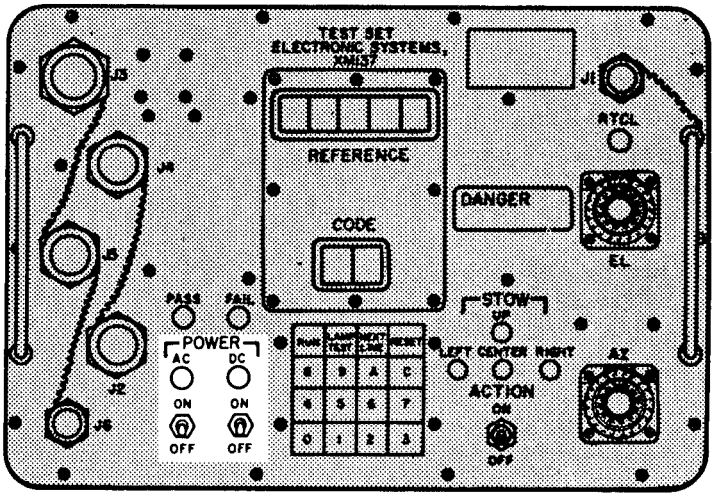
PILOT ARMAMENT CONTROL PANEL (12011 952) TEST (cont)

32. SET TEST SET CIRCUIT BREAKERS TO OFF.

33. REFER TO PILOT ARMAMENT CONTROL PANEL (12011952) INTERFACE DIAGRAM FOR INTERFACE BETWEEN TEST SET AND UNIT UNDER TEST.

34. PERFORM TROUBLESHOOTING PROCEDURES IN FAULT CODE TROUBLESHOOTING DATA PROVIDED AT END OF THIS TEST.

35. UPON COMPLETION OF TROUBLESHOOTING PROCEDURES, REPEAT THIS TEST.



ARR83-1207

36. ON PILOT ARMAMENT CONTROL PANEL, SET MASTER ARM SWITCH TO ARM.

37. ON TEST SET, PRESS C, O, RUN KEYS, AND ARMED/STDBY.

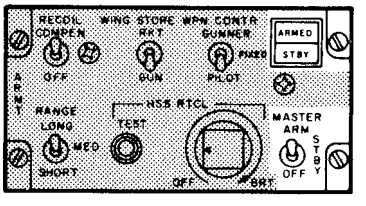
NOTE

Indicators on pilot armament control panel light.

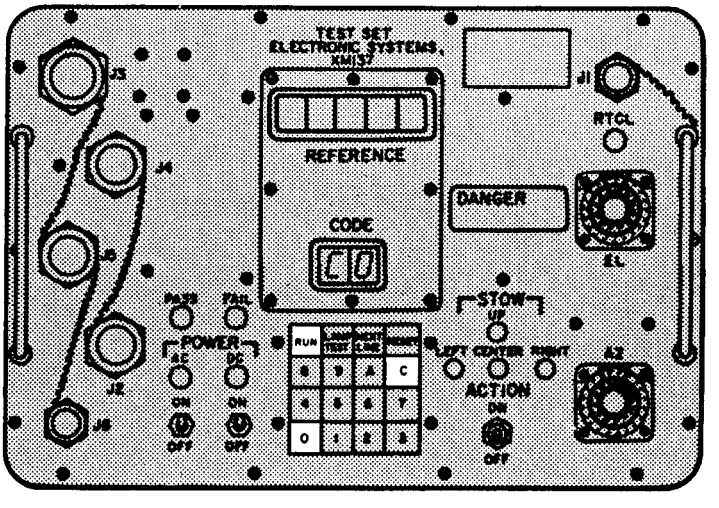
38. ON PILOT ARMAMENT CONTROL PANEL, SET MASTER ARM SWITCH TO OFF THEN BACK TO ARM.

a. ARMED and STBY indicators go out then come on.

b. If indicators do not come on at all, indicator lamps and/or relay (8Z4) are defective. Replace defective components, see REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011952), para 2-62. After repair, repeat test.



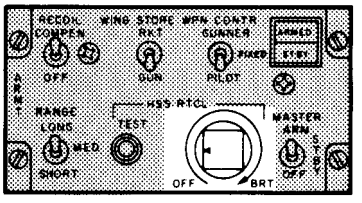
PILOT ARMAMENT CONTROL PANEL



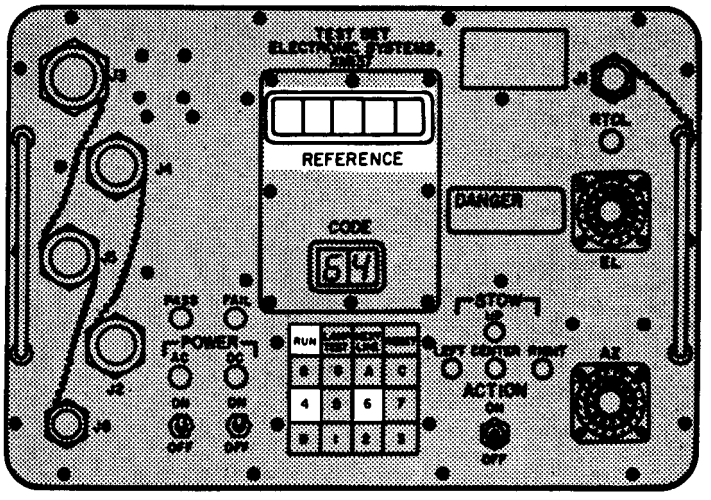
ARR83-1208A

2-26. PILOT ARMAMENT CONTROL PANEL (12011952) TEST (cont)

39. ON TEST SET, PRESS 6, 4, AND RUN KEYS. ON PILOT ARMAMENT CONTROL PANEL, ROTATE HSS RTCL INTENSITY KNOB BETWEEN OFF AND BRT WHILE OBSERVING REFERENCE DISPLAY ON TEST SET.
    a. Voltage readings in REFERENCE display vary smoothly with movement of knob.
    b. If voltage readings do not vary or are erratic, replace resistor 17R1. See REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011952), para 2-82. After repair, repeat test.



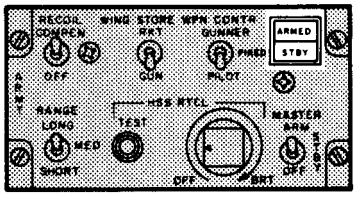
PILOT ARMAMENT CONTROL PANEL



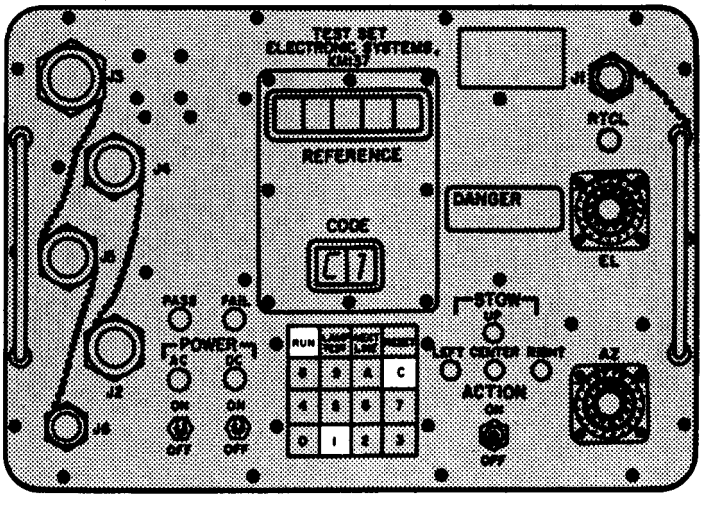
ARR83-1209

40. ON TEST SET, PRESS C, 1, AND RUN KEYS.
    a. ARMED and STBY indicators dim.
    b. If indicators do not dim, replace relay assembly (824). See REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011952), para 2-82, After repair, repeat test.

41. IF ALL INDICATIONS ARE NORMAL, REMOVE POWER, DISCONNECT TEST SET CABLES, AND RETURN UNIT TO SERVICE.



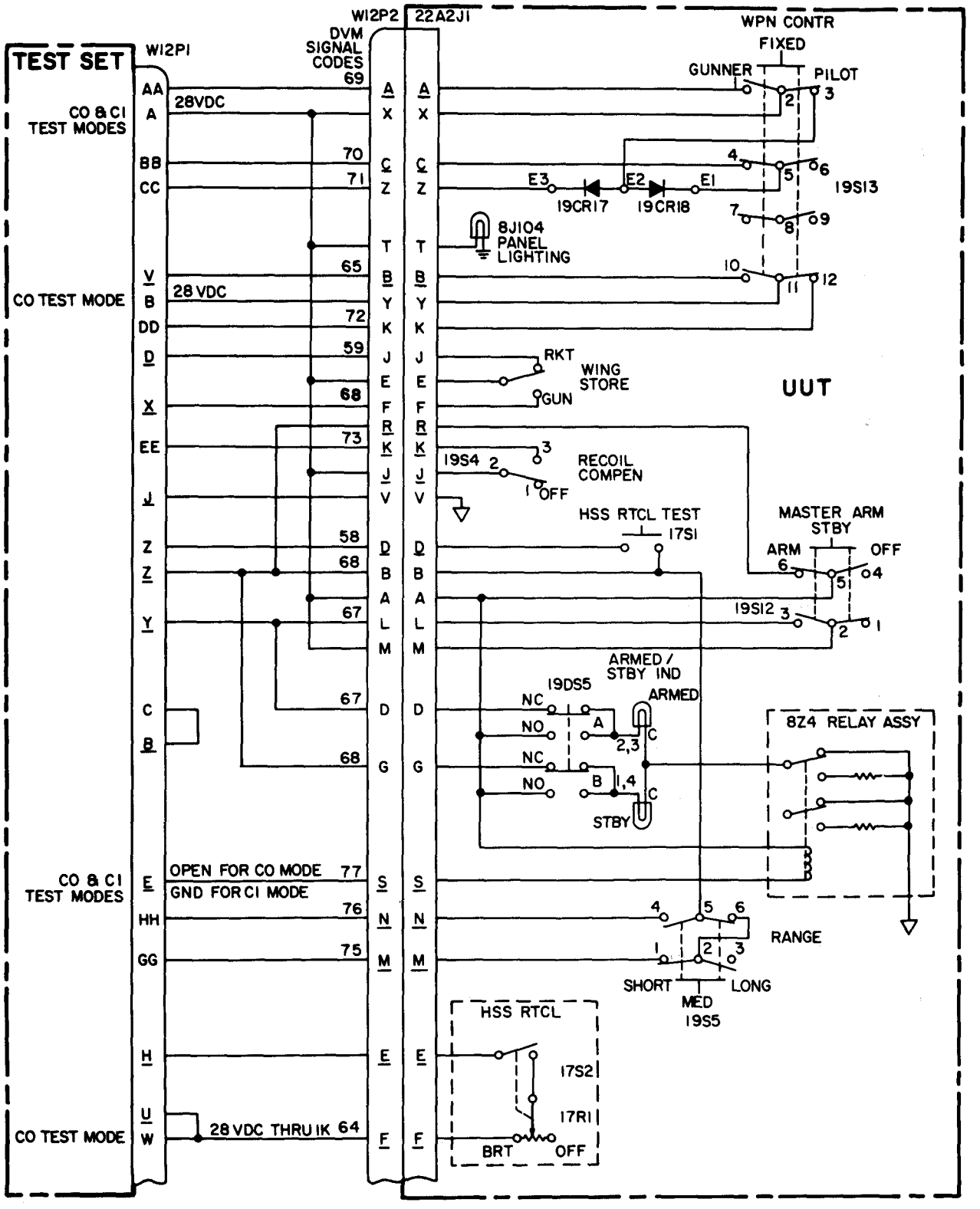
PILOT ARMAMENT CONTROL PANEL



ARR83-1210

END OF TEST

PILOT ARMAMENT CONTROL PANEL (12011952) INTERFACE DIAGRAM



ARR83-1211

2-26. PILOT ARMAMENT CONTROL PANEL (12011952) TEST (cont)

PILOT ARMAMENT CONTROL PANEL (12011952) FAULT CODE TROUBLESHOOTING DATA

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

WARNING

Verify all power is off before performing any corrective action.

NOTE

Fault codes 8100 through 8113 assume that UUT switches are positioned as specified in step 2.

1. FAULT CODE 8100 (SHORT ON 28 VDC INPUT FROM W12P1-A, -B OR - W)

Use PILOT ARMAMENT CONTROL PANEL (12011952) INTERFACE DIAGRAM to locate cause of short in UUT. Replace defective component. Repair or replace cable assembly if defective.

2. FAULT CODE 8101 (OUTPUT AT J1-A IS NOT 0 VDC)

Set test set to CO mode and enter 69 on keyboard.
If output is not 0 (Vdc), S13 is defective; replace.

3. FAULT CODE 8102 (OUTPUT AT J1-C IS NOT 28 VDC)

Set test set to CO mode and enter 70 on keyboard.
If output is not +28 (Vdc), S13 or CR18 is defective; replace.

4. FAULT CODE 8103 (OUTPUT AT J1-Z IS NOT 28 VDC)

Set test set to CO mode and enter 71 on keyboard.
If output is not +26 ±4 (Vdc), CR17 is defective; replace.

5. FAULT CODE 8104 (OUTPUT AT J1-B IS NOT 0 VDC)

Set test set to CO mode and enter 65 on keyboard.
If output is not 0 (Vdc), S13 is defective; replace.

6. FAULT CODE 8105 (OUTPUT AT J1-K IS NOT 28 VDC)

Set test set to CO mode and enter 72 on keyboard.
If output is not +26 ± 4 (Vdc), S13 is defective; replace.

7. FAULT CODE 8106 (OUTPUT AT J1-R IS NOT 0 VDC)

Set test set to CO mode and enter 68 on keyboard.
If output is not 0 (Vdc), S12 is defective; replace.

PILOT ARMAMENT CONTROL PANEL (12011952)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

8. FAULT CODE 8107 (OUTPUT AT J1-L IS NOT 0 VDC)

Set test set to CO mode and enter 67 on keyboard.

If output is not 0 (Vdc), S12 is defective; replace.

9. FAULT CODE 8108 (OUTPUT AT J1-K IS NOT O VDC)

Set test set to CO mode and enter 73 on keyboard.

If output is not 0 (Vdc), S4 is defective; replace.

10. FAULT CODE 8111 (OUTPUT AT J1-F IS NOT 28 VDC)

Set test set to CO mode and enter 64 on keyboard.

If output is not +26 ± 4 (Vdc), either HSS RTCL potentiometer 17R1 or on-off switch 17S2 is defective and is causing a voltage drop to appear at J1-F Replace 17R1 or 17S2.

11. FAULT CODE 8112 (OUTPUT AT J1-J IS NOT 28 VDC)

Set test set to CO mode and enter 59 on keyboard.

If output is not +26 ±4 (Vdc), WING STORE switch is defective; replace.

12. FAULT CODE 8113 (OUTPUT AT J1-F IS NOT O VDC)

Set test to CO mode and enter 66 on keyboard.

If output is not 0 (Vdc), WING STORE switch is defective; replace.

NOTE

Fault codes 8130 through 8146 assume that UUT switches are positioned as specified in step 12.

13. FAULT CODE 8130 (SHORT ON 28 VDC INPUT)

See fault code 8100 for corrective action.

14. FAULT CODE 8131 (OUTPUT AT J1-A IS NOT 28 VDC)

Set test set to C1 mode and enter 69 on keyboard.

If output is not +26 ±4 (Vdc), S13 is defective; replace.

15. FAULT CODE 8132 (OUTPUT AT J1-C IS NOT O VDC)

Set test set to C1 mode and enter 70 on keyboard.

If output is not 0 (Vdc), S13 is defective; replace.

2-26. PILOT ARMAMENT CONTROL PANEL (12011952) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

16. FAULT CODE 8133 (OUTPUT AT J1-Z IS NOT 0 VDC)

Settestsetto C1 mode and enter 71 on keyboard.

If output is not 0 (Vdc), S13 is defective; replace.

17. FAULT CODE 8134 (OUTPUT AT J1-B IS NOT 28 VDC)

Set test set to CO mode and enter 65 on keyboard.

If output is not +26 ±4 (Vdc), S13 is defective; replace.

18. FAULT CODE 8135 (OUTPUT AT J1-K IS NOT 0 VDC)

Set test set to CO mode and enter 72 on keyboard.

If output is not 0 (Vdc), S13 is defective; replace.

19. FAULT CODE 8136 (OUTPUT AT J1-R IS NOT 28 VDC)

Set test set to CO mode and enter 68 on keyboard.

If output is not +26 ±4 (Vdc), S12 is defective; replace.

20. FAULT CODE 8137 (OUTPUT AT J1-L IS NOT 0 VDC)

Settest setto CO mode and enter 67 on keyboard.

If output is not 0 (Vdc), S12 is defective; replace.

21. FAULT CODE 8138 (OUTPUT AT J1-K IS NOT 28 VDC)

Set test set to CO mode and enter 73 on keyboard.

If output is not +26 ±4 (Vdc), S4 is defective; replace.

22. FAULT CODE 8141 (OUTPUT AT J1-F IS NOT 2 T0 3 VDC)

Set test set to CO mode and enter 64 on keyboard.

If output is not +2 to +3 (Vdc), make sure that HSSRTCL potentiometer 17R1 isturnedon but is not rotated CW toward the BRT position. If potentiometer is positioned as specified, and test set voltage is still out of tolerance, then HSS RTCL potentiometer 17R1 or on-off switch 17S2 is defective. Replace 17R1 or 17S2.

23. FAULT CODE 8142 (OUTPUT AT J1-J IS NOT 0 VDC)

Settest setto CO mode and enter 59 on keyboard.

If output is not 0 (Vdc), WING STORE switch is defective; replace.

24. FAULT CODE 8143 (OUTPUT AT J1-F IS NOT 28 VDC)

Settestsetto CO mode and enter 66 on keyboard.

If output is not +26 ±4 (Vdc), WING STORE switch is defective; replace.

PILOT ARMAMENT CONTROL PANEL (12011952)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

25. FAULT CODE 8144 (OUTPUT AT J1-D IS NOT O VDC)

Set test to CO mode and enter 58 on keyboard.

If output is not 0 (Vdc), S1 is defective; replace.

26. FAULT CODE 8145 (OUTPUT AT J1-M IS NOT O VDC)

Set test set to CO mode and enter 75 on keyboard.

If output is not 0 (Vdc), S5 is defective; replace,

27. FAULT CODE 8146 (OUTPUT AT J1-N IS NOT 28 VDC)

Set test set to CO mode and enter 76 on keyboard.

If output is not +26 ± 4 (Vdc), S5 is defective; replace.

NOTE

Fault codes 8160 through 8172 assume that UUT switches are positioned as specified in step 20.

28. FAULT CODE 8160 (SHORT ON 28 VDC INPUT)

See fault code 8100 for corrective action.

29. FAULT CODE 8161 (OUTPUT AT J1-A IS NOT 0 VDC)

Set test set to CO mode and enter 69 on keyboard.

If output is not 0 (Vdc), S13 is defective; replace,

30. FAULT CODE 8162 (OUTPUT AT J1-C IS NOT 0 VDC)

Set test set to CO mode and enter 70 on keyboard.

If output is not 0 (Vdc), S13 is defective; replace,

31. FAULT CODE 8163 (OUTPUT AT J1-Z IS NOT 28 VDC)

Set test set to CO mode and enter 71 on keyboard.

If. output is not +26 ± 4 (Vdc), S13 or CR17 is defective; replace.

32. FAULT CODE 8164 (OUTPUT AT J1-B IS NOT 0 VDC)

Set test set to CO mode and enter 65 on keyboard.

If output is not 0 (Vdc), S13 is defective; replace.

33. FAULT CODE 8165 (OUTPUT AT J1-K IS NOT 28 VDC)

Set test set to CO mode and enter 72 on keyboard.

If ouptut is not +26 ± 4 (Vdc), S13 is defective; replace.

2-26. PILOT ARMAMENT CONTROL PANEL (12011952) TEST (cont) FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

34. FAULT CODE 8166 (OUTPUT AT J1-R IS NOT 28 VDC)
Set test set to CO mode and enter 68 on keyboard.
If output is not +26 ± 4 (Vdc), S12 is defective; replace.

35. FAULT CODE 8167 (OUTPUT AT J1-L IS NOT 28 VDC)
Set test set to CO mode and enter 67 on keyboard.
If output is not +26 ±4 (Vdc), S12 is defective; replace.

36. FAULT CODE 8168 (OUTPUT AT J1-D IS NOT 28 VDC)
Set test set to CO mode and enter 58 on keyboard while holding HSS RTCL TEST switch S1 pressed.
If output is not +26 ±4 (Vdc), S1 is defective; replace.

37. FAULT CODE 8171 (OUTPUT AT J1-M IS NOT 28 VDC)
Set test set to CO mode and enter 75 on keyboard.
If output is not +26 ±4 (Vdc), S5 is defective; replace.

38. FAULT CODE 8172 (OUTPUT AT J1-N IS NOT O VDC)
Set test set to CO mode and enter 76 on keyboard.
If output is not 0 (Vdc), S5 is defective; replace.

NOTE

Fault codes 8200 through 8202 assume that UUT switches are positioned as specified in step 28.

39. FAULT CODE 8200 (SHORT ON 28 VDC INPUT)
See fault code 8100 for corrective action.

40. FAULT CODE 8201 (OUTPUT AT J1-M IS NOT 0 VDC)
Set test set to CO mode and enter 75 on keyboard.
If output is not 0 (Vdc), S5 is defective; replace,

41. FAULT CODE 8202 (OUTPUT AT J1-N IS NOT 0 VDC)
Set test set to CO mode and enter 76 on keyboard.
If output is not 0 (Vdc), S5 is defective; replace.

END OF TROUBLESHOOTING

Signal noise from the turret control unit is eliminated by the turret buffer amplifier to prevent erratic fire control computer and/or turret response. Buffering action between turret buffer amplifier and the interface control unit provides low impedance line drivers to isolate the turret resolvers from external loads. Configuring the ground circuits within the turret buffer amplifier provides a means to eliminate possible ground loops which can affect resolver signal accuracy. The 10 volt reference voltage from the helicopter electrical system is also processed by the turret buffer amplifier and applied to the turret to assure that the resulting resolver reference voltages are compatible with remainder of the armament subsystem components.

The turret buffer amplifier provides its own separate symmetrical power supply for the buffer amplifiers and interlock relays contained within the unit. Signals not requiring buffering are connected straight through the turret buffer amplifier.

M97A4 LOGIC RELAY ASSEMBLY

The logic relay assembly consists of three identical circuit card assemblies and five chassis mounted relays. Each printed wiring assembly contains three 4-pole relays and four 2-pole relays for control of low current level functions. Higher current level switching functions are controlled by one 2-pole, one 4-poie, and three 6-pole chassis mounted relays. The primary function of the logic relay assembly is to provide switching for the turret, TOW, and wing stores subsystems. Additional functions include night vision goggle switching and armament subsystem indicator light control.

CHAPTER 2

AVIATION INTERMEDIATE MAINTENANCE INSTRUCTIONS

CHAPTER CONTENTS

Section I. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT

COMMON TOOLS AND EQUIPMENT

2-1. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit, SC 5180-95-CL-B09 and SC 5180-95-CL-B10.

SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

2-2. The special tools, TMDE, and support equipment required to perform the aviation intermediate maintenance tasks authorized by the maintenance allocation chart (MAC) are listed and illustrated in TM 9-1090-206-23P, the repair parts and special tools list for this equipment. The toots which must be fabricated by aviation intermediate maintenance are listed and illustrated in Appendix C. Failure isolation shop sets (FISS) are described and illustrated in TM 9-4933-270-30.

REPAIR PARTS

2-3. Repair parts are listed and illustrated in the repair parts and special tools list, TM 9-1090-206-23P, covering aviation intermediate maintenance for this equipment.

Section II. SERVICE UPON RECEIPT

GENERAL

2-4. When a new or reconditioned turret subsystem is received, the using organization must determine that the subsystem is complete and has been properly prepared for service by the preparing activity. All components of the subsystem should be identified, inspected, serviced, and installed on the helicopter.

INSPECTING, SERVICING, AND SETTING-UP

2-5. Inspecting, servicing, and setting-up instructions are as follows:

Parts of the turret subsystem which may be coated with rust-preventive compound will be thoroughly cleaned with wiping cloths or with a non-metallic bristle brush saturated with solvent cleaning compound in accordance with paragraph 2-12. After the rust-preventive compound has been completely removed, the turret subsystem will be lubricated in accordance with TM 9-1090-206-20-1 or TM 9-1090-206-20-2.

The turret subsvstem will be functionally checked out completely with the aid of the Electronics Systems Test Set: M137 in accordance with TM 9-1090-206-20-1 or TM 9-1090-206-20-2.

The turret subsystem will be boresighted in accordance with Chapter 4 or Chapter 5.

Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

Section Contents

GENERAL

2-6. Preventive maintenance is systematic care, inspection, and service of equipment to maintain it in serviceable condition and to detect faults and failures before extensive and time consuming repairs or replacements become necessary.

EXPENDABLE SUPPLIES AND MATERIALS

2-7. Consumable supplies and materials are listed in Appendix B in alphabetical order. Each consumable has an item number assigned for ease of location and reference. When an item number is unknown you may locate any consumable used in this manual through its alphabetical arrangement. Consumables are referenced in the narrative by name and item number e.g., abrasive cloth.

RESPONSIBILITY

2-8. Preventive maintenance is a responsibility of aviation intermediate maintenance and is further defined by unit policies. To make certain that maintenance is accomplished when due, a record of rounds cycled through the turret subsystem must be maintained on DA Form 2408-4.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES

2-9. Preventive maintenance checks and services performed by aviation intermediate maintenance on the turret subsystem are either time-dependent or rounds-dependent. The schedule prescribed for each check or service will be considered the minimum requirement for operation of the turret subsystem under usual conditions. Unusual operating conditions, such as extreme temperatures, dust or sand, moist or salty atmosphere, and rain or snow, require more frequent checks and services. Perform HELICOPTER ARMAMENT SUBSYSTEM MAINTENANCE SETUP, TM 9-1090-206-20-1 or TM 9-1090-206-20-2, before performing any on helicopter preventive maintenance check or service. If a preventive maintenance check has not been performed within a 90-day period preceding operation, it will be performed prior to operation.

TIME-DEPENDENT CHECKS AND SERVICES

Time-dependent checks and services consist primarily of inspection checks to make certain that the turret subsystem is in an operational condition. These checks and services will normally be performed before operation or quarterly.

ROUND-DEPENDENT CHECKS AND SERVICES

Round-dependent checks and services are performed to make certain that parts subject to adjustment variations, wear, or sudden failure are inspected, adjusted, or replaced before overall turret subsystem performance is affected. These checks and services will be performed strictly as scheduled, after the turret subsystem has fired or cycled (as applicable) the number of rounds specified for each item. Rounds cycled through the turret subsystem include those fired, as well as those that are cycled through the M197 gun and ejected unfired.

ROUTINE PROCEDURES

Inspection checks will be made to determine if items are in good condition, correctly assembled or stored, secured, not excessively worn, and adequately lubricated. Any or all of these checks that are pertinent to any item (including supporting, attaching, or connecting members) will be performed automatically as routine procedures in addition to any specific procedures given.

Corrosion. Inspect metal, rubber and plastic for corrosion or deterioration (cracking, softening, swelling, or breaking). Replace authorized parts or forward to next higher level of maintenance for repair, if required.

Good Condition. Inspection for good condition is usually a visual inspection to determine that the unit is not damaged beyond a safe or serviceable condition. Good condition means that a component or part is not bent or twisted, chafed or burred, bare or frayed, dented or collapsed, torn or cut, or deteriorated.

Correct Assembly. Inspection of an item to see if it is correctly assembled or stowed is usually a visual inspection to determine that the item is in its normal position and that all of its parts are present and in their correct relative positions.

Secure Mounting. Inspection of an item to determine if it is secure is usually a visual examination or a check by hand or wrench, for looseness. Such an inspection must include any brackets, locknuts, lockwire, and cotter pins as well as any connecting cables and wires.

Excessively Worn. This means worn beyond serviceable limits or to the point likely to result in failure if the item is not replaced before the next scheduled inspection. Refer to the pertinent sections in this chapter for parts inspection data. It also includes illegible markings, data, identification plates, and printed matter.

Tighten. When the instruction "tighten" appears in a procedure, it means tighten with the appropriate tool (wrench, screwdriver, etc.), even though the item appears to be secure.

SPECIFIC PROCEDURES

Specific time-dependent and rounds-dependent preventive maintenance checks and services to be performed are listed in the following tabulated data.

AVIM PREVENTIVE MAINTENANCE CHECKS AND SERVICES

The Item No. column specifies the logical order of performance. This column will be used as a source of item numbers for the TM Number column on DA Form 2404, Equipment Inspection and Maintenance Worksheet, in recording preventive maintenance checks and services.

The interval column designates the intervals at which the procedures are to be performed. B means before, M means monthly, Q means quarterly, H means hours, and RD means rounds fired or cycled (as applicable) . The dots indicate the item to be inspected and the proced-ure to be performed.

The Item To Be Inspected column lists the items that require periodic checks and services.

The Procedure column describes the maintenance checks and services to be performed.

B — Before **Q — Quarterly** **RD — Rounds**
M — Monthly **H - Hours**

Item No.	Interval					Item To Be Inspected	Procedures
	B	M	Q	H	RD		
1			•		5000	Recoil Adapter	Lubricate recoil adapter, see REPAIR OF RECOIL ADAPTER, para 2-34.
2	•				30000	Recoil Adapter	Recoil adapter preload must be checked before operation unless a check has been performed during previous three months. Check recoil adapter preload, see REPAIR OF RECOIL ADAPTER, para 2-34.
3				150		Armament Subsystem	Perform ALINEMENT AND BORESIGHTING PROCEDURES USING BORESIGHT ASSEMBLY GROUND SUPPORT EQUIPMENT (BAGSE), Chapter 4 or COMPOSITE ALINEMENT AND BORESIGHTING PROCEDURES, Chapter 5.
				150		Azimuth Drive Clutch	Manually exercise gun in a side to side direction two or three times to insure that clutch is free to slip. With the barrels in the full forward position, attach a spring scale to the end of one barrel. Exert a steady pressure on the spring scale in either a left or right direction. The barrels should not move with a pressure of 116 pounds or less. Above 116 pounds, the barrels should move with a continuous pressure not exceeding 220 pounds. Repeat the procedure in the opposite direction. Adjust per paragraph 2-38.

M197 GUN PREVENTIVE MAINTENANCE—ROUNDS DEPENDENT

Item No.	Rounds Interval	Item to be Inspected/Procedure
1	Every 15,000	Ball Bearing Lubricate.
2	Every 15,000	Needle Bearing Lubricate.
3	Every 30,000	Rotor Visually inspect rotor for defects. Replace bolt head locks, RH front tracks, LH front tracks, front track mounting bolts, and front track screws; clean, inspect, and repair or replace double plate, doubler plate mounting screws, leaf springs, and rotor stops as necessary; and clean and inspect needle bearing.
4	Every 45,000	Center Tracks Replace center tracks and mounting bolts.
5	Every 45,000	Removable Tracks Replace removable tracks and inspect removable track spacers, track lock pins, and retaining rings.

Section IV. GENERAL MAINTENANCE INSTRUCTIONS

Section Contents — Para

SCOPE

2-10. This section contains selected general preparation, cleaning, inspection, and repair information , and instructions for aviation intermediate maintenance personnel. For complete general maintenance instructions, refer to TM 55-1500-204-25/1.

PREPARATION.

2-11. The steps and precautions that must be followed to prepare the turret subsystem for maintenance are provided in the following paragraphs.

PERSONNEL SAFETY

Proper care will be exercised when handling the turret subsystem, and its components and parts. Many components are heavy and personnel should not try to handle them by hand. The assistance of another person, a lifting device, or other support equipment is needed. Make certain that all lifting devices are in good working order. Personnel should remove wrist watches, rings, identification bracelets, etc. Safety glasses (goggles) will be worn to protect the eyes. Hearing protection devices will be worn in high noise level areas.

EQUIPMENT

Obtain the proper equipment before beginning maintenance. This equipment includes hand tools and special tools, support equipment, test equipment, receptacles for small parts, work tables, wood blocks, consumable materials, and wiping clothes. Refer to Section I for common and special tools, TMDE, support equipment, and repair parts.

HANDLING TECHNIQUES

Avoid damage to parts and components when performing any maintenance task. Damage caused by careless handling can cause improper functioning. Repair or replace all defective parts.

TORQUING

When torquing is required, the torque requirements are indicated in the task relating to the specific part. General information for torquing and standard torque values are contained in Appendix D.

CLEANING

2-12. General cleaning procedures are provided in the following paragraphs. Special cleaning procedures are covered in the task relating to the specific part.

GENERAL CLEANING WARNING AND CAUTIONS

WARNING

Do not use cleaning solvents near an open flame. Fire extinguishers will be available when these materials are used. Use only in well-ventilated areas.

WARNING

Use and disposal of flammable and toxic materials will be in accordance with applicable regulations.

WARNING

Cleaning solvents evaporate quickly and have a drying effect on the skin. Gloves will be worn to avoid cracks in the skin, and in some cases mild irritation or inflammation of the skin.

CAUTION

Petroleum based solvents or vapor degreasers will not be used to clean any parts other than those specified herein. These solvents may cause damage to paint, plastics, and rubber.

CAUTION

Solvents such as acetone, toluene, or trimethylene oxide will not be used to clean polycarbonate (Lexan) ammunition feed system components.

CAUTION

Electrical and electronic components will not be cleaned by immersion.

CAUTION

Recoil adapters will not be cleaned by immersion.

CAUTION

Components that contain bearings will not be cleaned by immersion.

CAUTION

Special attention will be given to components and parts subject to powder residue.

GENERAL CLEANING INSTRUCTIONS

Be careful when performing any cleaning procedure. Dirt can damage parts and cause malfunctions. Observe the following instructions when performing cleaning.

1. Clean all parts before inspection, after repair, and before assembly.

2. Keep hands free of grease; grease collects dirt.

3. Never use abrasives, files, scrapers, wire brushes, or sharp tools on surfaces where the finish is important to the operation or sealing of parts.

4. Gloves will be worn when handling clean polished parts.

NOTE

Cleaning materials are not lubricants. Parts requiring lubrication will be dried and lubricated or preserved in accordance with TM 9-1090-206-20-1 or TM 9-1090-206-20-2.

5. Clean polished parts will be lubricated immediately after cleaning to prevent rusting

6. Cover and wrap parts after cleaning to protect them from dirt.

7. Clean and lubricate new bearings. Bearings that have been in service should be relubricated. Bearings require special cleaning techniques. Refer to TM 9-214 for cleaning, lubrication, and maintenance procedures for roller bearings, needle bearings, and ball bearings.

8. Use solvent (item 29, Appx B) to clean or remove grease and oil from all metal parts, except those exposed to powder residue. This solvent does not readily dissolve corrosive salts from powder and primer compositions. Use soap and water or solvent (item 29, Appx B) to clean polycarbonate (Lexan) ammunition feed system components.

9. Scrub surfaces subjected to powder residue with a non-metallic, bristle brush saturated with solvent cleaning compound (item 11, Appx B) prior to cleaning with solvent (item 29, Appx B).

10. When authorized to install new parts, remove any preservative materials such as rust-preventive compound or grease. Lubricate parts requiring lubrication in accordance with TM 9-1090-206-20-1 or TM 9-1090-206-20-2.

11. Wipe electrical and electronic components with a clean lint-free cloth or wiping paper. Use a soft bristle brush to clean electronic components. Use alcohol (item 9, Appx B) for removal of soluble materials and wipe dry. Make certain that no metal filings, residue, or other foreign material remain on components.

INSPECTION

2-13. General inspection procedures are provided in the following paragraphs. Special inspection procedures are covered in the task relating to the specific part.

BEARINGS

Inspect bearings, Refer to TM 9-214 for inspection procedures for roller bearings, needle bearings, and ball bearings.

BEARING RETAINERS

Inspect bearing retainers for wear, deformation, cracks, and breaks.

BRACKETS

Inspect brackets for bends, cracks, and breaks.

COVERS

Inspect covers for bends, cracks, and breaks.

ELECTRICAL WIRING

Inspect wiring for frayed insulation, loose terminals, cuts, abrasions, broken wires, and discoloration.

ELECTRICAL AND ELECTRONIC COMPONENT

1. Inspect capacitors for broken leads; burned, cracked, or bulging body; leaking electrolyte; and stripped threads.

2. Inspect resistors for cracked or broken body, broken leads, and burns.

3. Inspect wiring harnesses for defective wiring, damaged terminals or connectors, and loose or damaged inserts.

4. Inspect circuit card assemblies for damaged connectors, missing components, and burned, discolored, or broken components.

CABLE ASSEMBLIES

Inspect cable covering for cuts, tears, or abrasion. Inspect connectors for damage.

CABLE CLAMPS

Inspect cable clamps for deformation, cracks, or breaks.

ELECTRICAL CONNECTORS

1. Inspect pins and receptacles for bends, deformation, breaks, corrosion, and looseness.
2. Inspect connector body, coupling ring, and backshell for deformation, cracks, and breaks.
3. Inspect insert for cracks and breaks.

GEARS AND GEARSHAFTS

Inspect gears, and gearshafts for burrs, wear, cracked, broken or missing teeth, and pitting at tooth contact areas.

GUIDES

Inspect guides for bends, deformation, cracks, and breaks.

HOUSINGS

1. Inspect housings for cracks, deformation, breaks, and warped mating surfaces.
2. Use a magnifying glass and a strong light to check for cracks. Check area next to threaded inserts, sharp corners, and fillets.
3. Inspect machined surfaces for nicks, burrs, and raised material. Mark damaged areas for repair.
4. Use a straight edge to check all mounting flanges on housings for straightness.

INSERTS

1. Inspect inserts for cracks and stripped or damaged threads.
2. Check inserts for a loose fit.

QUICK-RELEASE PINS

Inspect quick-release pins for wear and broken or missing parts.

SHAFTS

Inspect shafts for burrs, wear, binding, scoring, galling, twisting, cracks, and breaks.

SNAP RINGS

Inspect snap rings for nicks, burrs, deformation, wear, and loss of tension.

SPLINED PARTS

Inspect splined parts for burrs, wear, and twisted, cracked, or broken splines.

SPRINGS

Inspect springs for deformation, cracks, breaks, and loss of tension.

SPROCKETS

Inspect sprockets for wear, bends, deformation, cracks, or breaks.

STENCILS

Check stencils for illegible or missing data.

SWITCHES

Inspect switches for broken or missing parts and loss of mechanical action.

THREADED PARTS

1. Inspect threaded parts for bends, cracks, breaks, corrosion, and worn, stripped, or damaged threads.
2. Inspect heads on screws and bolts for deformation.
3. Inspect wrench flats on nuts for deformation.

TIMING PINS

Inspect timing pins for bends, cracks, and breaks.

REPAIR

2-14. General repair instructions and procedures are provided in the following paragraphs. Special repair instructions and procedures are provided in the task related to the specific part. Clean all parts after repair is completed.

GENERAL REPAIR INSTRUCTIONS

Repair consists of replacing damaged or malfunctioning components found during inspection and/or troubleshooting. Removal of subassemblies and/or components is to be performed only to the extent necessary to accomplish the required repair. Good judgement should be exercised to keep disassembly and assembly operations to a minimum.

Care must be exercised to use tools that are suitable for the task in order to avoid mutilation of parts or damage to tools.

Use the double-twist method of lockwiring. Use wire twisters to twist lockwire. Lockwire will always be installed and twisted so that the loop around the head stays down. It should not come up over the bolt head, causing a slack loop, Extreme care must be used when twisting wires together to insure that they are tight but not overstressed to the point where breakage will occur under slight load or vibration. New lockwire will be used on each application.

Self-locking nuts, bolts, screws, and other retaining devices, such as spring pins and cotter pins, that are removed during maintenance will be discarded and new parts will be used.

Screw thread inserts will not be removed unless replacement is required.

BEARINGS

1. Refer to TM 9-214 for maintenance procedures for roller bearings, needle bearings, and ball bearings.
2. Replace bearings if defects are found.

BEARING RETAINERS

Replace bearing retainers that are deformed, cracked, or broken.

BRACKETS

1. Straighten bent brackets. Replace if function has been impaired.
2. Replace brackets that are cracked or broken.
3. Straighten bent covers. Replace if function has been impaired.
4. Replace covers that are cracked or broken.

CABLE ASSEMBLIES

1. Repair minor cable covering cuts, tears, or abrasions with electrical tape.
2. Repair or replace connectors if damaged. If repair or replacement of connectors is not authorized, replace cable assemblies.

CABLE CLAMPS

Replace cable clamps that are deformed, cracked, or broken.

ELECTRICAL CONNECTORS

1. Straighten bent pins.
2. Replace connector if connector body, coupling ring, insert, or backshell is cracked or broken.

GEARS AND GEARSHAFTS

1. Replace gears that have pitted, worn, cracked, broken, or missing teeth.
2. Remove sharp burrs from gear teeth with a soft honing stone.

GUIDES

Replace guides that are bent, deformed, cracked, or broken.

HOUSINGS

1. Replace housings that are cracked, warped, deformed, or broken.
2. Repair minor damage to machined surfaces with crocus cloth or a soft honing stone.

INSERTS

Replace inserts when threads are stripped or damaged, or when inserts are cracked or loose. Do not chase inserts.

QUICK-RELEASE PINS

Replace quick-release pins that are worn, or that have broken or missing parts.

SHAFTS

1. Replace shafts that are scored, galled, twisted, cracked, or broken.
2. Remove burrs and minor surface irregularities with crocus cloth or a soft honing stone.

SNAP RINGS

Replace snap rings that are defective.

SPLINER PARTS

1. Replace splined parts that are twisted, cracked, or broken.
2. Remove burrs with a soft honing stone.

SPRINGS

Replace springs that are defective.

SPROCKETS

Replace sprockets that are bent, deformed, cracked, or broken.

STENCILS

Remark items that have illegible or incomplete stenciling.

SWITCHES

Replace switches that have broken or missing parts or that have defective mechanical action.

THREADED PARTS

1. Replace parts that have stripped threads. Replace parts that cannot be repaired by chasing threads with a used tap or die. Replace parts that cannot be repaired by installing inserts.

2. Chase damaged threads with a used tap or die of correct size. If possible, a worn tap or die should be used because a new tap may cut oversize and a new die may cut undersize.

TIMING PINS

Replace timing pins that are bent, cracked or broken.

Section V. TURRET SUBSYSTEM TROUBLESHOOTING

Section Contents

GENERAL

2-15. This section provides a fault symptom index which lists the more common fault symptoms which require AVIM maintenance action. The index contains those fault symptoms identified at the AVUM level which required AVIM maintenance for corrective action. The index lists the fault symptom, then lists the recommended action or actions to be taken for that symptom, and finally references the task where that action may be found.

2-15.1. Refer to Appendix E for isolation of faulty electronic circuit cards.

2-16. TURRET SUBSYSTEM FAULT SYMPTOM INDEX

Fault Symptom		Action		Reference
M197 GUN				
1.	M197 gun has high rotating torque [in excess of 100 lb.-in. (11.3 N.m)].		Check for defective ball bearing or needle bearing, see REPAIR OF ROTOR.	Para 2-33
2.	Erratic dispersion pattern.	1.	Check preload of recoil adapter, see REPAIR OF RECOIL ADAPTER.	Para 2-34
		2.	Check for worn or damaged slider, see REPAIR OF SLIDER.	Para 2-35
3.	Apparent excessive gun vibration.		Check for worn or damaged rear mount on saddle, see REPAIR OF TURRET MECHANICAL COMPONENTS.	Para 2-42
TURRET				
4.	Turret chatters in elevation.		Check for sticking/dragging elevation drive motor brake by replacing elevation drive motor, see REMOVAL/ INSTALLATION OF ELEVATION DRIVE MOTOR.	Para 2-44
5.	Turret chatters/binds in azimuth.	1.	Check for sticking/dragging azimuth drive motor brake by replacing azimuth drive motor, see REPAIR OF AZIMUTH DRIVE.	Para 2-52
		2.	Notify next higher maintenance level to check for dirty or defective main bearing.	
6.	Turret fails to drive in up elevation.	1.	Check for defective elevation drive motor by replacing elevation drive motor, see REMOVAIJINSTALLATION OF ELEVATION DRIVE MOTOR.	Para 2-44
		2.	Check for defective elevation drive clutch, see REPAIR OF ELEVATION GEAR TRAIN.	Para 2-37

TURRET SUBSYSTEM FAULT SYMPTOM INDEX (cont)

Fault Symptom	Action	Reference
7. Erratic dispersion.	1. Check for loose, worn, or defective ball mount, see REPAIR OF TURRET MECHANICAL COMPONENTS.	Para 2-42
	2. Check for loose, worn, or damaged rear support, see REPAIR OF TURRET MECHANICAL COMPONENTS.	Para 2-42
	3. Check for loose mounting of saddle in turret, see REPAIR OF SADDLE SHAFT BEARING AND LUBRICATION FITTING.	Para 2-43
8. Turret can be moved with elevation and azimuth brakes applied.	1. Check elevation and azimuth drive motor brakes by replacing elevation and azimuth drive motors, see REMOVAL/INSTALLATION OF ELEVATION DRIVE MOTOR and REPAIR OF AZIMUTH DRIVE.	Para 2-44 and 2-52
	2. Check azimuth and elevation drive clutches, see ADJUSTMENT OF AZIMUTH AND ELEVATION DRIVE CLUTCHES.	Para 2-38
9. Unable to retain boresight.	Check azimuth and elevation resolvers, see REPAIR OF ELEVATION RESOLVER and REPAIR OF AZIMUTH RESOLVER.	Para 2-36 and 2-50

Section VI. LINE REPLACEABLE UNIT TESTING AND TROUBLESHOOTING

GENERAL

2-17. This section provides a series of tests in task format for testing and troubleshooting the LRUS which are part of the 20-MM Automatic Gun Helicopter Armament Subsystems: M97A4 and M97A3. These tests are for AVIM testing and troubleshooting of LRUS in the maintenance facility. Each test uses the Electronics Systems Test Set: Ml 37 to run pre-programmed automatic tests on the selected LRU. When the unit fails a test, a four digit fault code will appear on the test set's display. Fault code troubleshooting data is provided within each test. The fault code troubleshooting data provides a list of fault codes, test or inspection criteria, and corrective actions. It is permissible for AVIM to run these tests while the unit is still installed on the helicopter. However, extender cables may be required, certain safety precautions must be observed, and helicopter circuit breakers must be positioned. Refer to the applicable LRU check in TM 9-1090-206-20-1 or TM 9-1090 -206-20-2 for this information.

2-17.1. The failure isolation shop set (FISS), electronic circuit board: 20MM turret and rocket management subsystems provides slave boards for use during troubleshooting to aid in the identification of faulty circuit board assemblies within the line replaceable unit (LRU), once the faulty circuit board has been identified the slave board is returned to the shop set for future use and a replacement board is requisitioned for the LRU.

2-18. EMERGENCY STOW CONTROL UNIT (205F457) TEST

DESCRIPTION

This task covers: On bench testing including fault code troubleshooting data.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Electronics Systems Test Set: XM137
- DC Power Supply PP1104C
- Distribution Panel 12007200
- Power Supply 11834203
- Cable Assembly 7540635
- Failure Isolation Shop Set 11838720

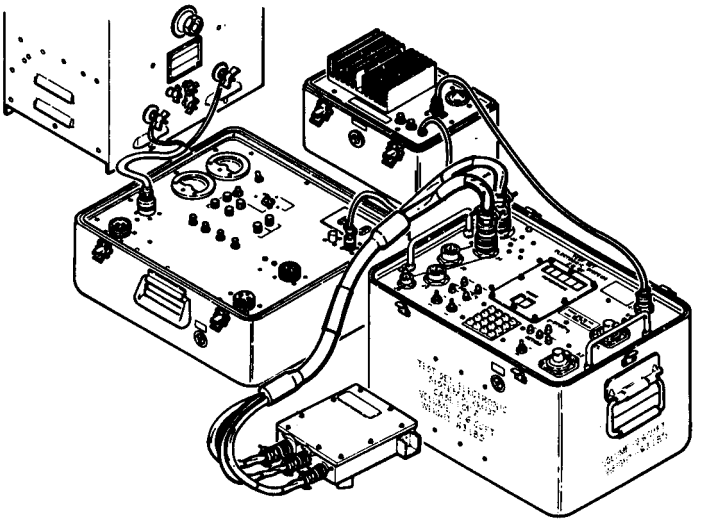
Personnel Required:
- 68J Aircraft Armament/Missile Systems Repairer

Equipment Conditions:
- On bench in shop.
- Bench power ready and test set power cable W1 connected.

General Safety Instructions:
- Never work on electronic equipment unless there is another person nearby who is familiar with operation and hazards of this equipment and who is competent in administering first aid. When aided by operator, technician must warn operator about dangerous areas.
- Power must not be applied to unit under test while test leads are being connected to or removed from unit assemblies/circuits under test.

EMERGENCY STOW CONTROL UNIT (205F457) TEST

1. CONNECT TEST SET CABLE W1O AS FOLLOWS:
   - W10P1 to test set J4
   - W10P2 to test set J3
   - W1OP3 to ESCU J1
   - W1OP4 to ESCU J2
   - W1OP5 to ESCU J3



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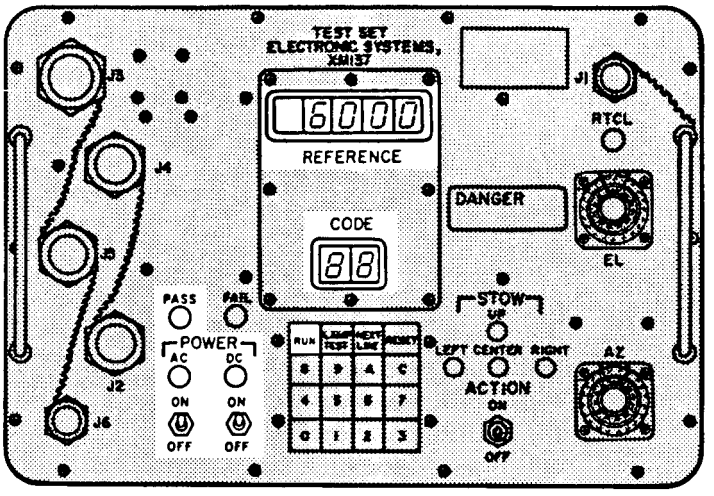
2-18. EMERGENCY STOW CONTROL UNIT (205F457) TEST (cont)

2. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.
   a. AC and DC POWER indicators light.
   b. 8's appear in REFERENCE and CODE displays.
   c. PASS indicator lights,

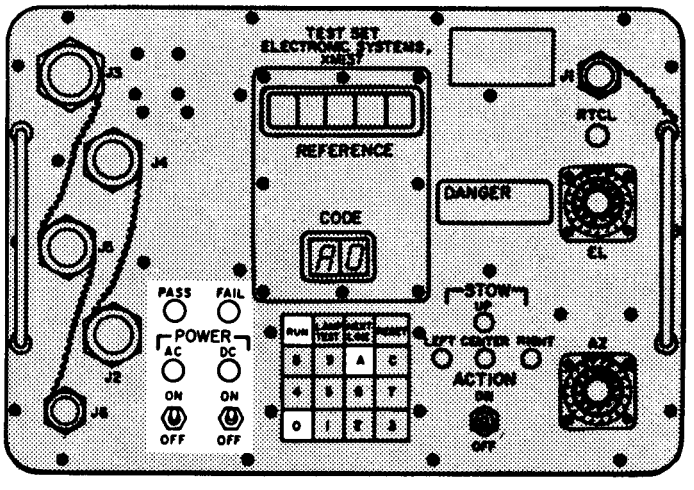
3. ON TEST SET, PRESS RUN KEY.

   6000 appears in REFERENCE display.



ARR82-28131

4. ON TEST SET, PRESS A, O, AND RUN KEYS.
   a. Automatic test sequence runs.
   b. PASS or FAIL indicator lights.
   c. If PASS indicator lights, unit under test is good. Remove power, disconnect test set cables, and return unit under test to service.
   d. If FAIL indicator lights, go to next step.



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EMERGENCY STOW CONTROL UNIT (205F457) TEST (cont)

5. WHEN THE FAIL INDICATOR LIGHTS, A FOUR-DIGIT FAULT CODE WILL APPEAR IN THE REFERENCE DISPLAY.

6. USING NEXT LINE KEY, DISPLAY ALL FAULT CODES AND RECORD THEM FOR REFERENCE.

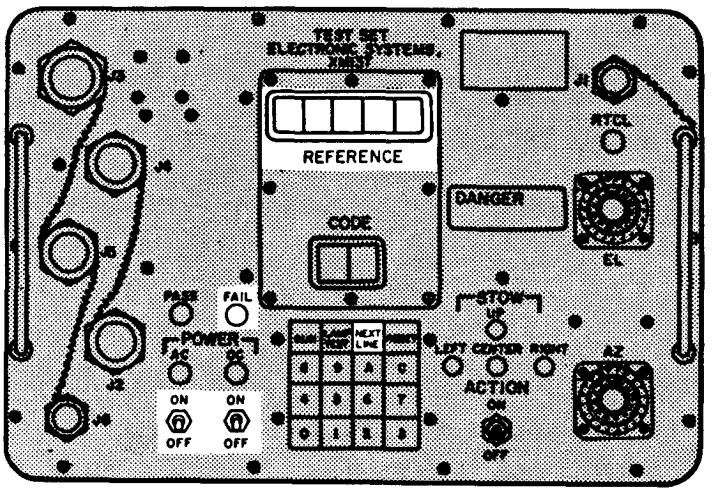
7. SET TEST SET CIRCUIT BREAKERS TO OFF.

NOTE

- Refer to FO-3 for interface diagram between test set and unit under test.
- Failure isolation shop set will help identify failed circuit card assemblies.

8. PERFORM TROUBLESHOOTING PROCEDURES IN FAULT CODE TROUBLESHOOTING DATA PROVIDED AT END OF THIS TEST.

9. UPON COMPLETION OF TROUBLESHOOTING PROCEDURES, REPEAT THIS TEST.



ARR82-28133

END OF TEST

2-8. EMERGENCY STOW CONTROL UNIT (205F457) TEST (cont)

FAULT CODE TROUBLESHOOTING DATA

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

WARNING

Verify all power is off before performing any corrective action.

1. FAULT CODE 6100 (SHORT ON 28 VDC INPUT AT J1-A)

Step 1. Check resistors R1 and R2 for visible damage.

If R1 or R2 are defective, replace.

Step 2. Disconnect internal connector from Al module. Initiate retest and observe if fault code 6100 recurs. (Disregard all other fault codes that will be generated.)

If fault code 6100 did not recur, Al module is cause of short; replace. If fault code 6100 did recur with Al module removed, short is caused by other chassis components or wiring; replace UUT.

2. FAULT CODE 6101 (NO 28 VDC OUTPUT ATJ1-B)

Filter FL1 defective; replace UUT.

3. FAULT CODE 6102 (NO 28 VDC OUTPUT AT J3-N)

Step 1. Reset circuit breaker CB1 and initiate retest. Observe if fault code 6102 recurs.

If fault code 6102 did recur, proceed to step 2.

Step 2. Replace A1 module and initiate retest, Observe if fault code 6102 recurs.

If fault code 6102 did not recur, original A1 module is defective; replace. If fault code 6102 did recur, replace UUT.

4. FAULT CODE 6103 (NO O VDC OUTPUT AT J2-J)

Replace A1 module and initiate retest. Observe if fault code 6103 recurs.

If fault code 6103 did not recur, original A1 module is defective; replace. If fault code 6103 did recur, Q3 is defective; replace UUT.

5. FAULT CODE 6104 (NO 0 VDC OUTPUT AT J2-N)

Replace A1 module and initiate retest. Observe if fault code 6104 recurs.

If fault code 6104 did not recur, original A1 module is defective; replace.

If fault code 6104 did recur, Q2 is defective; replace UUT.

6. FAULT CODE 6105 (NO 0 VDC OUTPUT AT J2-R)

Replace Al module and initiate retest. Observe if fault code 6105 recurs.

If fault code 6105 did not recur, original A1 module is defective; replace. If fault code 6105 did recur, Q1 is defective; replace UUT.

EMERGENCY STOW CONTROL UNIT (205F457)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

7. FAULT CODE 6110 (SHORT ON 28 VDC INPUT AT J3-H, -J, -K, -L, -S, OR -M)

Disconnect internal connector from Al module. Initiate retest and observe if fault code 6110 recurs. (Disregard all other fault codes that will be generated.)

If fault code 6110 did not recur, Al module is cause of short; replace. If fault code 6110 did recur with Al module removed, short is elsewhere in chassis; replace UUT.

8. FAULT CODE 6111 (NO O VDC OUTPUT AT J3-N)

Replace Al module.

9. FAULT CODE 6112 (NO 28 VDC INPUT AT J3-L)

Replace Al module and initiate retest. Observe if fault code 6112 recurs.

If fault code 6112 did not recur, original Al module is defective; replace. If fault code 6112 did recur, replace UUT.

10. FAULT CODE 6113 (NO 28 VDC OUTPUT AT J3-P)

Replace A1 module.

11. FAULT CODE 6114 (NO 28 VDC OUTPUT AT J3-R)

Replace A1 module.

12. FAULT CODE 6115 (NO 28 VDC OUTPUT AT J2-H)

Replace A1 module.

13. FAULT CODE 6116 (NO 28 VDC OUTPUT AT J2-J)

Replace A1 module and initiate retest. Observe if fault code 6116 recurs.

If fault code 6116 did not recur, original A1 module is defective; replace. If fault code 6116 did recur, Q3 or CR2 is defective; replace UUT.

14. FAULT CODE 6117 (NO 28 VDC OUTPUT AT J2-F)

Replace A1 module.

15. FAULT CODE 6118 (NO 28 VDC OUTPUT AT J2-N)

Replace A1 module and initiate retest. Observe if fault code 6118 recurs.

If fault code 6118 did not recur, original A1 module is defective; replace. If fault code 6118 did recur, Q2 or CR3 is defective; replace UUT.

16. FAULT CODE 6119 (NO 28 VDC OUTPUT AT J2-R)

Replace A1 module and initiate retest. Observe if fault code 6119 recurs.

If fault code 6119 did not recur, original A1 module is defective; replace. If fault code 6119 did recur, Q1 or CR4 is defective; replace UUT.

2-18.EMERGENCY STOW CONTROL UNIT (205F457) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)	TEST OR INSPECTION	CORRECTIVE ACTION
	NOTE Initiate retest after any module replacement.	

17. FAULT CODE 6121 (NO 28 VDC OUTPUT AT J2-F)
Replace A1 module.

18. FAULT CODE 6122 (NO 0 VDC OUTPUT AT J2-H)
Replace A1 module.

19. FAULT CODE 6123 (NO 0 VDC OUTPUT AT J3-K)
Replace A1 module.

20. FAULT CODE 6130 (SHORT ON 28 VDC INPUT AT J3-K)
Refer to fault code 6110 for corrective action.

21. FAULT CODE 6131 (NO 0 VDC OUTPUT AT J3-S)
Replace A1 module.

22. FAULT CODE 6132 (NO 0 VDC OUTPUT AT J2-H)
Replace A1 module.

23. FAULT CODE 6133 (NO 28 VDC OUTPUT AT J2-F)
Replace A1 module.

24, FAULT CODE 6140 (SHORT ON 28 VDC INPUT AT J3-M)
Refer to fault code 6110 for corrective action.

25. FAULT CODE 6141 (NO 0 VDC OUTPUT AT J2-F)
Replace A1 module.

26. FAULT CODE 6142 (NO O VDC OUTPUT AT J3-K)
Replace A1 module.

27. FAULT CODE 6143 (NO 28 VDC OUTPUT AT J2-H)
Replace A1 module.

28. FAULT CODE 6150 (SHORT ON DC INPUT AT J2-F, -H)
Disconnect internal connector from Al module. Initiate retest and observe if fault code 6150 recurs. (Disregard all other fault codes that will be generated.)
If fault code 6150 did not recur with Al module disconnected, then Al module is cause of short, replace.
If fault code 6150 did recur with Al module disconnected, then cause of short is elsewhere in chassis; replace UUT.

EMERGENCY STOW CONTROL UNIT (205F457)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

29. FAULT CODE 6151 (NO 0 VDC OUTPUT AT J2-G)
Replace A1 module.

30. FAULT CODE 6152 (NO 0 VDC OUTPUT AT J3-K)
Replace A1 module.

31. FAULT CODE 6153 (NO 0 WC OUTPUT AT J3-S)
Replace A1 module,

32. FAULT CODE 6160 (SHORT ON DC INPUT AT J2-H)
Refer to fault code 6150 for corrective action except observe for recurrence of fault code 6160 on retest.

33. FAULT CODE 6161 (NO 0 VDC OUTPUT AT J2-G)
Replace A1 module.

34. FAULT CODE 6162 (NO 0 VDC OUTPUT AT J3-M)
Replace A1 module.

35. FAULT CODE 6170 (SHORT ON DC INPUT SIGNALS AT J2-N, -R, and -J)
Replace UUT.

36. FAULT CODE 6171 (NO 0 VDC OUTPUT AT J3-M)
CR2 is defective; replace UUT.

37. FAULT CODE 6172 (NO 0 VDC OUTPUT AT J3-K)
CR3 is defective; replace UUT

38. FAULT CODE 6173 (NO 0 VDC OUTPUT AT J3-S)
CR4 is defective, replace UUT.

END OF TROUBLESHOOTING

2-19. EMERGENCY STOW CONTROL UNIT (189F729) TEST

DESCRIPTION

This task covers: On bench testing including fault code troubleshooting data.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Electronics Systems Test Set: M137
- DC Power Supply PP1104C
- Distribution Panel 12007200
- Power Supply 11834203
- Cable Assembly 7540635
- Failure Isolation Shop Set 11838720

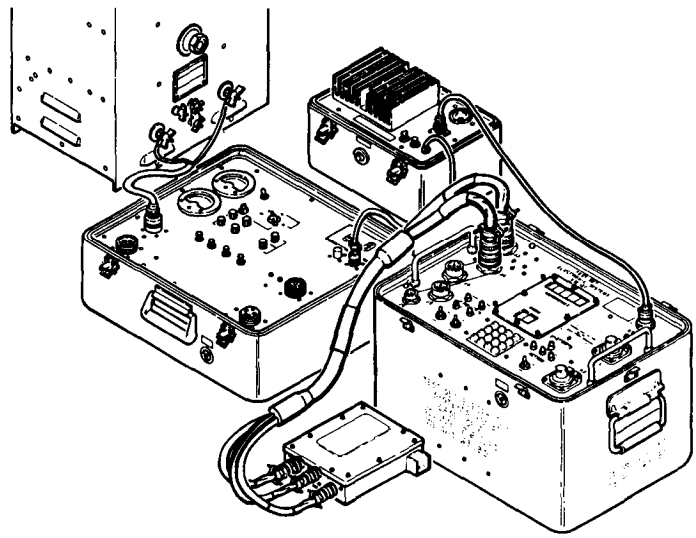
Personnel Required:
- 68J Aircraft Armament/Missile Systems Repairer

Equipment Conditions:
- On bench in shop.
- Bench power ready and test set power cable W1 connected.

General Safety Instructions:
- Never work on electronic equipment unless there is another person nearby who is familiar with operation and hazards of this equipment and who is competent in administering first aid. When aided by operator, technician must warn operator about dangerous areas.
- Power must not be applied to unit under test while test leads are being connected to or removed from unit assemblies/circuits under test.

EMERGENCY STOW CONTROL UNIT (189F729) TEST

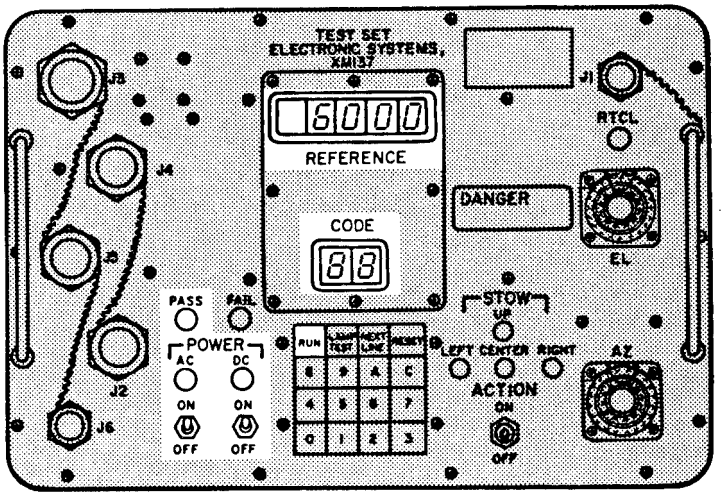
1. CONNECT TEST SET CABLE W10 AS FOLLOWS:
   - W10P1 to test set J4
   - W10P2 to test set J3
   - W10P3 to ESCU J1
   - W10P4 to ESCU J2
   - W1OP5 to ESCU J3



ARR82-28126

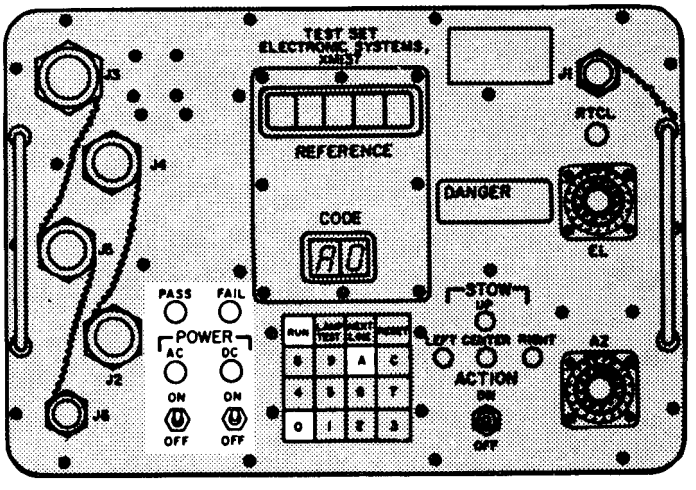
EMERGENCY STOW CONTROL UNIT (189F729) TEST (cont)

2. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.
   a. AC and DC POWER indicators light.
   b. 8's appear in REFERENCE and CODE displays.
   c. PASS indicator lights.
3. ON TEST SET, PRESS RUN KEY.
   6000 appears in REFERENCE display.



ARR82-28127

4. ON TEST SET, PRESS A, O, AND RUN KEYS.
   a. Automatic test sequence runs.
   b. PASS or FAIL indicator lights.
   c. If PASS indicator lights, unit under test is good. Remove power, disconnect test set cables, and return unit under test to service.
   d. If FAIL indicator lights, go to next step.



ARR82-28128

2-19. EMERGENCY STOW CONTROL UNIT (189F729) TEST (cont)

5. WHEN THE FAIL INDICATOR LIGHTS, A FOUR-DIGIT FAULT CODE WILL APPEAR IN THE REFERENCE DISPLAY.

6. USING NEXT LINE KEY, DISPLAY ALL FAULT CODES AND RECORD THEM FOR REFERENCE.

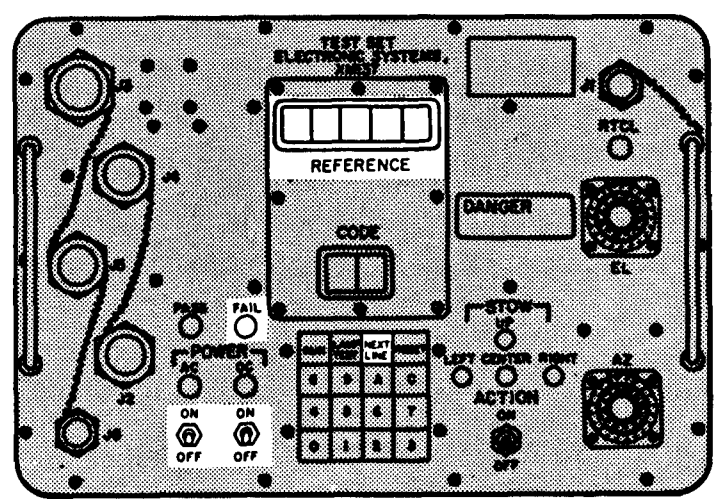
7. SET TEST SET CIRCUIT BREAKERS TO OFF.

NOTE

- **Refer to FO-4 for interface diagram between test set and unit under test.**
- **Failure isolation shop set will help identify failed circuit card assemblies.**

8. PERFORM TROUBLESHOOTING PROCEDURES IN FAULT CODE TROUBLESHOOTING DATA PROVIDED AT END OF THIS TEST.

9. UPON COMPLETION OF TROUBLESHOOTIING PROCEDURES, REPE:AT THIS TEST.



ARR82-28129

END OF TEST

EMERGENCY STOW CONTROL UNIT (189F729) FAULT CODE TROUBLESHOOTING DATA

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

WARNING

Verify all power is off before performing any corrective action.

1. FAULT CODE 6100 (SHORT ON 28 VDC INPUT AT J1-A)

Step 1. Check resistors R1 and R2 for visible damage.

Replace resistors if defective.

Step 2. Disconnect internal connector from A3 module. Initiate retest and observe if fault code 6100 recurs. (Disregard all other fault codes that will be generated.)

If fault code 6100 did not recur, A3 module is cause of short; replace. If fault code 6100 did recur with A3 module removed, short is caused by other chassis components or wiring; replace UUT.

2. FAULT CODE 6101 (NO 28 VDC OUTPUT AT J1-B)

Replace UUT.

3. FAULT CODE 6102 (NO 28 VDC OUTPUT AT J3-N)

Replace A3 module and initiate retest, Observe if fault code 6102 recurs.

If fault code 6102 did not recur, original A3 module is defective; replace. If fault code 6102 did recur, replace UUT.

4. FAULT CODE 6103 (NO O VDC OUTPUT AT J2-J)

Problem in Al module; replace UUT.

5. FAULT CODE 6104 (NO O VDC OUTPUT AT J2-N)

Problem in A2 module; replace UUT.

6. FAULT CODE 6105 (NO O VDC OUTPUT AT J2-R)

Problem in A2 module; replace UUT.

7. FAULT CODE 6110 (SHORT ON 28 VDC INPUT AT J3-H, -J, -K, -L, -S, OR -M)

Disconnect internal connector from A3 module. Initiate retest and observe if fault code 6110 recurs. (Disregard all other fault codes that will be generated.)

If fault code 6110 did not recur, A3 module is cause of short; replace. If fault code 6110 did recur with A3 module removed, short is elsewhere in chassis; replace UUT.

2-19. EMERGENCY STOW CONTROL UNIT (189F729) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

8. FAULT CODE 6111 (NO 0 VDC OUTPUT AT J3-N)

Replace A3 module and initiate retest. Observe if fault code 6111 recurs.

If fault code 6111 did not recur, original A3 module is defective; replace. If fault code 6111 did recur, replace UUT.

9. FAULT CODE 6112 (NO 28 VDC INPUT AT J3-L)

Replace A3 module and initiate retest. Observe if fault code 6112 recurs.

If fault code 6112 did not recur, original A3 module is defective; replace. if fault code 6112 did recur, replace UUT.

10. FAULT CODE 6113 (NO 28 VDC OUTPUT AT J3-P)

Replace A3 module and initiate retest. Observe if fault code 6113 recurs.

If fault code 6113 did not recur, original A3 module is defective; replace. If fault code 6113 did recur, replace UUT.

11. FAULT CODE 6114 (NO 28 VDC OUTPUT AT J3-R)

Step 1. Check cable W10 P5-P to -T for continuity.

Replace cable W10 if open.

Step 2. Replace A3 module and initiate retest. Observe if fault code 6114 recurs.

If fault code 6114 did not recur, original A3 module is defective; replace. If fault code 6114 did recur, replace UUT.

12. FAULT CODE 6115 (NO 28 VDC OUTPUT AT J2.H)

Replace A3 module and initiate retest. Observe if fault code 6115 recurs.

If fault code 6115 did not recur, original A3 module is defective; replace. If fault code 6115 did recur, replace UUT.

13. FAULT CODE 6116 (NO 28 VDC OUTPUT AT J2-J)

Check resistors R1 and R2 for visible damage.

If R1 or R2 are defective, replace. If R1 or R2 are not defective; replace UUT.

14. FAULT CODE 6117 (NO 28 VDC OUTPUT AT J2-F)

Replace A3 module and initiate retest. Observe if fault code 6117 recurs.

If fault code 6117 did not recur, original A3 module is defective; replace. If fault code 6117 did recur, replace UUT.

15. FAULT CODE 6118 (NO 28 VDC OUTPUT AT J2-N)

Replace A3 module and initiate retest. Observe if fault code 6118 recurs.

If fault code 6118 did not recur, original A3 module is defective; replace. If fault code 6118 did recur, replace UUT.

EMERGENCY STOW CONTROL UNIT (189F729)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

16. FAULT CODE 6119 (NO 28 VDC OUTPUT AT J2-R)
Replace A3 module and initiate retest. Observe if fault code 6119 recurs.
If fault code 6119 did not recur, original A3 module is defective; replace. If fault code 6119 did recur, replace UUT.

17. FAULT CODE 6121 (NO 28 VDC OUTPUT AT J2-F)
Replace A3 module.

18. FAULT CODE 6122 (NO 0 VDC OUTPUT AT J2-H)
Replace A3 module.

19. FAULT CODE 6123 (NO 0 VDC OUTPUT AT J3-K)
Replace A3 module.

20. FAULT CODE 6130 (SHORT ON 28 VDC INPUT AT J3-K)
Redate A3 module and initiate retest. Observe if fault code 6130 recurs.
If fault code 6130 did not recur, original A3 module is defective; replace. If fault code 6130 did recur, replace UUT.

21. FAULT CODE 6131 (NO 0 VDC OUTPUT AT J3-S)
Replace A3 module.

22. FAULT CODE 6132 (NO 0 VDC OUTPUT AT J2-H)
Replace A3 module.

23. FAULT CODE 6133 (NO 28 VDC OUTPUT AT J2-F)
Replace A3 module.

24. FAULT CODE 6140 (SHORT ON 28 VDC INPUT AT J3-M)
Replace A3 module and initiate retest. Observe if fault code 6140 recurs.
If fault code 6140 did not recur, original A3 module is defective; replace. If fault code 6140 did recur, replace UUT.

25. FAULT CODE 6141 (NO 0 VDC OUTPUT AT J2-F)
Replace A3 module.

26. FAULT CODE 6142 (NO 0 VDC OUTPUT AT 13-K)
Replace A3 module.

27. FAULT CODE 6143 (NO 28 VDC OUTPUT AT J2-H)
Replace A3 module.

2-19. EMERGENCY STOW CONTROL UNIT (189F729) TEST (cont)

FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)	NOTE
TEST OR INSPECTION	Initiate retest after any module replacement.
CORRECTIVE ACTION	

28. FAULT CODE 6150 (SHORT ON DC INPUT AT J2-F, -H)

Disconnect internal connector from A3 module. Initiate retest and observe if fault code 6150 recurs. (Disregard all other fault codes that will be generated.)

If fault code 6150 did not recur with A3 module disconnected, then A3 module is cause of short replace. If fault code 6150 did recur with A3 module disconnected, then cause of short is elsewhere in chassis; replace UUT.

29. FAULT CODE 6151 (NO 0 VDC OUTPUT AT J2-G)

Replace A3 module.

30. FAULT CODE 6152 (NO 0 VDC OUTPUT AT J3-K)

Replace A3 module.

31. FAULT CODE 6153 (NO 0 VDC OUTPUT AT J3-S)

Replace A3 module.

32. FAULT CODE 6160 (SHORT ON DC INPUT AT J2-H)

Replace A3 module and initiate retest. Observe if fault code 6160 recurs.

If fault code 6160 did not recur, original A3 module is defective; replace. If fault code 6160 did recur, replace UUT.

33. FAULT CODE 6161 (NO 0 VDC OUTPUT AT J2-G)

Replace A3 module.

34. FAULT CODE 6162 (NO 0 VDC OUTPUT AT J3-M)

Replace A3 module.

35. FAULT CODE 6170 (SHORT ON DC INPUT SIGNALS AT 12-N, -R, and -J)

Replace UUT.

36. FAULT CODE 6171 (NO 0 VDC OUTPUT AT J3-M)

Replace UUT.

37. FAULT CODE 6172 (NO 0 VDC OUTPUT AT J3-K)

Replace UUT.

38. FAULT CODE 6173 (NO 0 VDC OUTPUT AT J3-S)

Replace UUT.

END OF TROUBLESHOOTING

2-20. LOGIC CONTROL UNIT TEST

DESCRIPTION

This task covers: On bench testing including fault code troubleshooting data

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Electronics Systems Test Set: M137
- DC Power Supply PP1104C
- Distribution Panel 12007200
- Power Supply 11834203
- Cable Assembly 7540635
- Failure Isolation Shop Set 11838720

Personnel Required:
- 68J Aircraft Armament/Missile Systems Repairer

Equipment Conditions:
- On bench in shop.
- Bench power ready and test set power cable W1 connected.

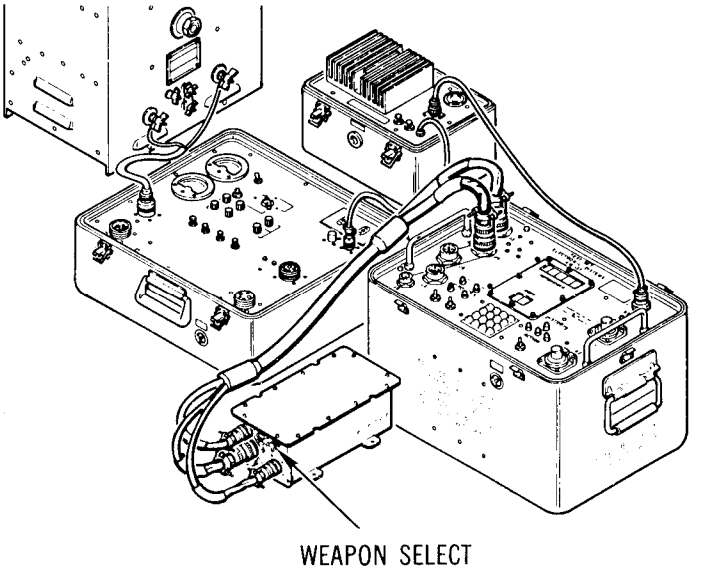
Generai Safety Instructions:
- Never work on electronic equipment unless there is another person nearby who is familiar with operation and hazards of this equipment and who is competent in administering first aid. When aided by operator, technician must warn operator about dangerous areas.
- Power must not be applied to unit under test while test leads are being connected to or removed from unit assemblies/circuits under test.

LOGIC CONTROL UNIT TEST

1. REMOVE COVER FROM J3.

2. CONNECT TEST SET CABLE W14 AS FOLLOWS:
   - W14P1 to test set J4
   - W14P2 to test set J3
   - W14P3 to LCU J1
   - W14P4 to LCU J2
   - W14P5 to LCU J3

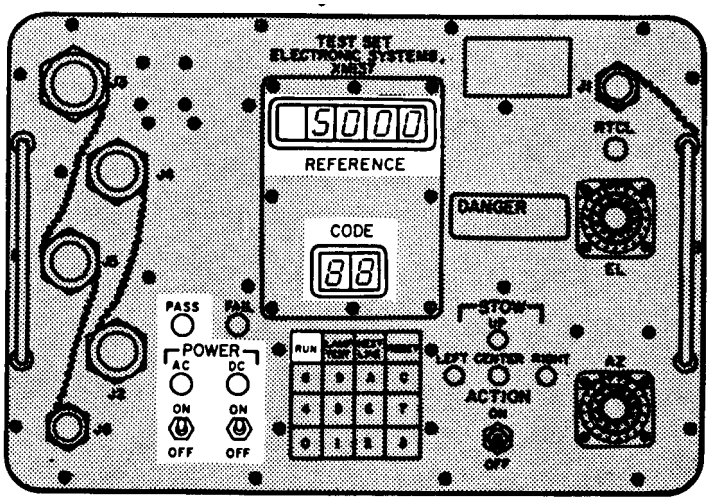
3. VERIFY THAT WEAPON SELECT SWITCH IS LOCKED IN 20-MM POSITION.



2-20. LOGIC CONTROL UNIT TEST (cont)

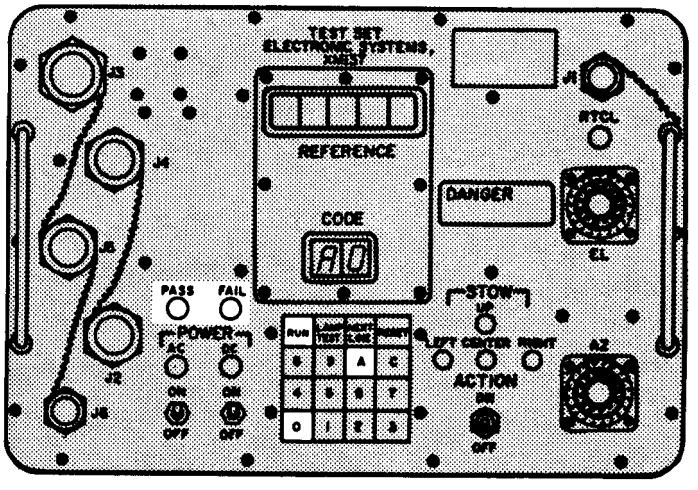
4. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.
   a. AC and DC POWER indicators light.
   b. 8's appear in REFERENCE and CODE displays.
   c. PASS indicator lights.
5. ON TEST SET, PRESS RUN KEY.

   5000 appears in REFERENCE display.



ARR82-28119

6. ON TEST SET, PRESS A, O, AND RUN KEYS.
   a. Automatic test sequence runs.
   b. PASS or FAIL indicator lights.
   c. If PASS indicator lights, logic control unit passes this part of test, go to step 12 and continue test.
   d. If FAIL indicator lights, go to next step.



ARR82-28120

LOGIC CONTROL UNIT TEST (cont)

7. WHEN THE FAIL INDICATOR LIGHTS, A FOUR-DIGIT FAULT CODE WILL APPEAR IN THE REFERENCE DISPLAY.

8. USING NEXT LINE KEY, DISPLAY ALL FAULT CODES AND RECORD THEM FOR REFERENCE.

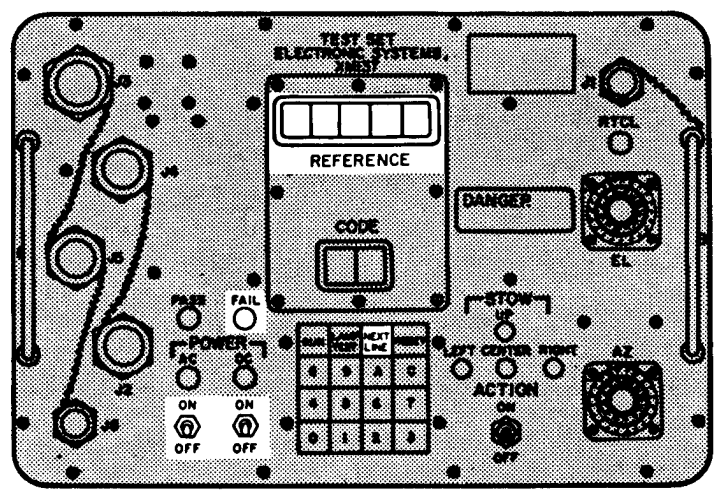
9. SET TEST SET CIRCUIT BREAKERS TO OFF.

NOTE

- **Refer to F0-5 for interface diagram between test set and unit under test.**
- **Failure isolation shop set will help identify failed circuit card assemblies.**

10. PERFORM TROUBLESHOOTING PROCEDURES IN FAULT CODE TROUBLESHOOTING TABLE PROVIDED AT END OF THIS TEST.

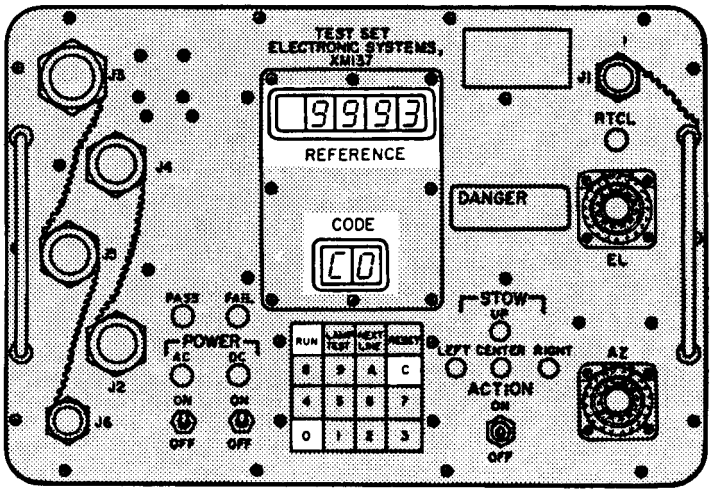
11. UPON COMPLETION OF TROUBLESHOOTING PROCEDURES, REPEAT THIS TEST.



ARR82-28121

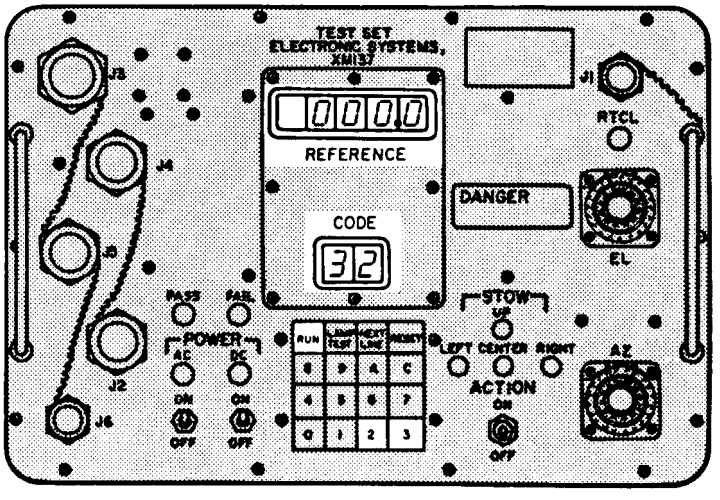
2-20. LOGIC CONTROL UNIT TEST (cont)

12. ON TEST SET, PRESS C, O, AND RUN KEYS.
    a. CO appears in CODE display.
    b. 9993 appears in REFERENCE display.



ARR82-28122

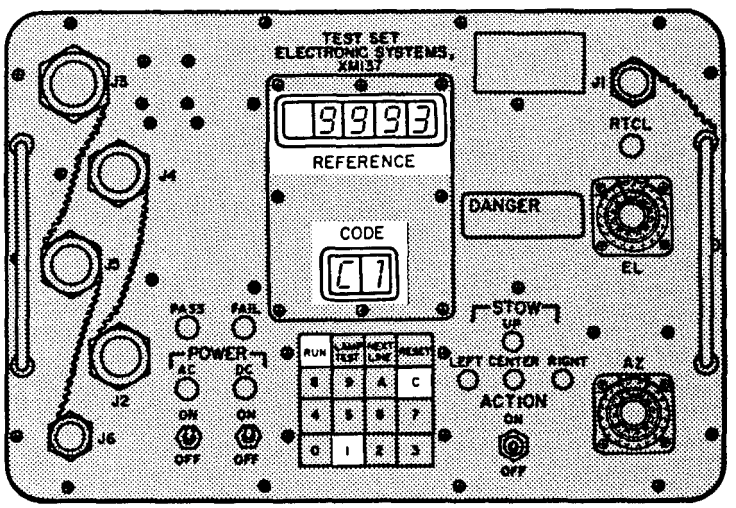
13. ON TEST SET, PRESS 3,2, AND RUN KEYS.
    a. 32 appears in CODE display.
    b. REFERENCE display indicates approximately 0 (Vdc).
    c. If indication is abnormal, replace A2 module and retest.



ARR82-28123

LOGIC CONTROL UNIT TEST (cont)

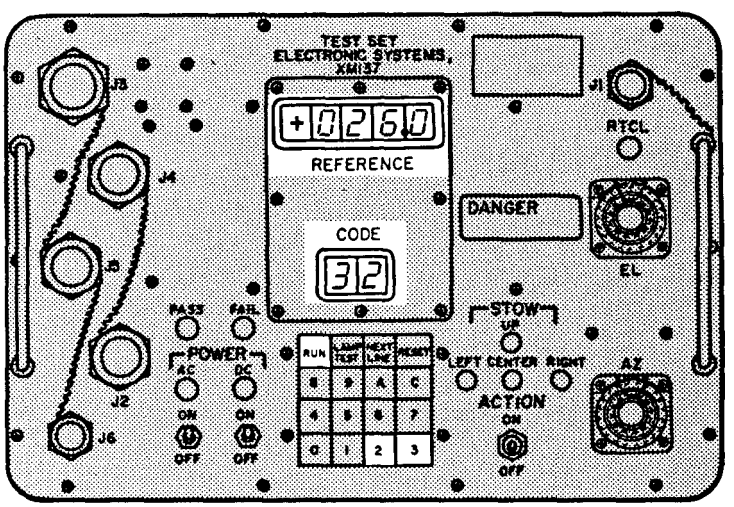
14. ON TEST SET, PRESS, C, 1, AND RUN KEYS.
    a. Cl appears in CODE display,
    b. 9993 appears in REFERENCE display.



ARR82-28124

15. ON TEST SET, PRESS 3,2, AND RUN KEYS.
    a. 32 appears in CODE display.
    b. REFERENCE display indicates approximately 26 ±4 (Vdc).
    c. If indication is abnormal, replace A2 module and retest.

16. IF All INDICATIONS ARE NORMAL, REMOVE POWER, DISCONNECT TEST SET CABLES, AND RETURN UNIT TO SERVICE.



ARR82-28125

END OF TEST

2-20. LOGIC CONTROL UNIT TEST (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

LOGIC CONTROL UNIT FAULT CODE TROUBLESHOOTING DATA

WARNING

Verify all power is off before performing any corrective action.

1. FAULT CODE 5100 (SHORT ON 28 VDC INPUT AT J2-H)

Step 1. Disconnect chassis connectors P1 and P2 from J6 and J7 of A6 interconnection module. Initiate retest and observe if fault code 5100 recurs. (Many fault codes will be generated. Look only for fault code 5100.)
If fault code 5100 recurs on the retest, then cause of short is in chassis wiring; replace UUT. If fault code 5100 did not recur, proceed to step 2.

Step 2. Reconnect connectors P1 and P2 to J6 and J7 of A6 interconnection module,

Step 3. Remove modules Al, A2, A4 and A5 one at a time and initiate retest after each is removed. Check for fault code 5100 on each retest, (Disregard the other fault codes.)
If fault code 5100 does not recur upon removal of a module, then that module is cause of short; replace defective module. If fault code 5100 recurs after all four modules have been checked, then short is caused by A6 interconnection module replace A6 interconnection module.

2. FAULT CODE 5101 (J3-A OUTPUT IS NOT +15 VDC)

Step 1. Replace A1 module and initiate retest. Observe if fault code 5101 recurs.
If fault code 5101 did not recur, original A1 module is defective; replace. If fault code 5101 did recur, proceed to step 2.

Step 2. Set test set to CO mode,

. . . .Step 3. Check transformer T1 by measuring for 115 Vac input across terminals 1 and 2, and 26 Vac output across terminals 3 and 4.
Replace transformer T1 if 115 Vac is present and 26 Vac is not.

Step 4. Using figure F0-5 check continuity of A6 wiring from J7-14 to J1-D, J7-13 to J1-R and J1-Q, and J1-N to J8-7.
Replace A6 interconnection module if continuity check indicates open wiring. If A6 wiring is good, chassis wiring is defective; replace UUT.

3. FAULT CODE 5102 (J3-B OUTPUT IS NOT -15 VDC)

Step 1. Replace A1 module and initiate retest. Observe if fault code 5102 recurs.
If fault code 5102 did not recur, original A1 module is defective; replace. If fault code 5102 did recur, proceed to step 2.

Step 2. Check continuity of A6 wiring from A1P1-P to J8-8.
Replace A6 interconnection module if continuity check indicates open wiring. If A6 wiring is good, chassis wiring is defective; replace UUT.

LOGIC CONTROL UNIT FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

4. FAULT CODE 5103 (J3-P OUTPUT IS NOT +5 VDC)

Step 1. Replace A2 module and initiate retest. Observe if fault code 5103 recurs.
If fault code 5103 did not recur, original A2 module is defective; replace. If fault code 5103 did recur, proceed to step 2.

Step 2. Disconnect chassis connector P1 from A6J6 and check across R1 for 87 ± 4.5 ohms.
Replace R1 if defective.

Step 3. Use figure FO-5 and check continuity of A6 wiring from J6-39 to J2-B, and from J2-C and D to J8-11.
Replace A6 interconnection module if continuity check indicates open wiring. If A6 wiring is good, chassis wiring is defective; replace UUT.

5. FAULT CODE 5104 (J2-R OUTPUT IS NOT 28 VDC)

Step 1. Check that weapon select switch S1 on UUT is set to 20-mm.
Position switch to 20-mm and initiate retest.

Step 2. Check S1 deck B for continuity between Cl and pin 2 (switch positioned at 20-mm).
Replace S1 if continuity absent. If S1 is good, problem is in chassis wiring; replace UUT.

6. FAULT CODE 5111 (J1-A OUTPUT IS NOT 2.2 TO 3.3 VAC)

Step 1. Replace Al module and retest. Observe if fault code 5111 recurs.
If fault code 5111 did not recur, original Al module is defective; replace.

Step 2. Check S1 deck A for continuity between C1 and pin 2 (switch positioned at 20-mm).
Replace S1 if continuity absent.

Step 3. Replace A6 interconnection module and initiate retest. Observe if fault code 5111 recurs.
If fault code 5111 did not recur, original A6 interconnection module is defective; replace. If fault code 5111 did recur, replace UUT.

7. FAULT CODE 5112 (J3-X OUTPUT IS NOT 2.2 TO 3.3 VAC)

Replace UUT.

8. FAULT CODE 5113 (J1-Y OUTPUT IS NOT 0.8 TO 1.5 VAC)

Step 1. Replace A1 module and initiate retest. Observe if fault code 5113 recurs.
If fault code 5113 did not recur, original A1 module is defective; replace.

Step 2. Check S1 deck A for continuity between C2 and pin 5 (switch positioned at 20-mm).
Replace S1 if continuity absent.

Step 3. Replace A6 interconnection module and initiate retest. Observe if fault code 5113 recurs.
If fault code 5113 did not recur, original A6 interconnection module is defective; replace. If fault code 5113 did recur, replace UUT.

9. FAULT CODE 5114 (J3-Y OUTPUT IS NOT 0.8 to 1.5 VAC)

Replace UUT.

2-20. LOGIC CONTROL UNIT TEST (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

10. FAULT CODE 5115 (J1-X OUTPUT IS NOT 0.8 TO 1.5 VAC)

Step 1. Replace A1 module and initiate retest. Observe if fault code 5115 recurs
If fault code 5115 did not recur, original A1 module is defective, replace
Step 2. Replace A6 interconnection module and initiate retest. Observe if fault code 5115 recurs
If fault code 5115 did not recur, original A6 interconnection module is defectiive; replace. If fault code 5115 did recur, replace UUT.

11. FAULT CODE 5116 (J3-W OUTPUT IS NOT 0.8 TO 1.5 VAC)

Replace UUT.

12. FAULT CODE 5117 (J2-X OUTPUT IS NOT 0 VDC)

Replace A2 module and initiate retest.
If fault code 5117 did not recur, original A2 module is defective; replace. If fault code 5117 did recur, replace UUT.

13. FAULT CODE 5121 (J3-U OUTPUT IS NOT 28 VDC)

Step 1. Replace A4 module and initiate retest. Observe if fault code 5121 recurs.
If fault code 5121 did not recur, original A4 module is defective; replace.
Step 2. Replace A6 interconnection module. Observe if fault code 5121 recurs.
If fault code 5121 did not recur, original A6 interconnection module is defective; replace If fault code 5121 did recur, replace UUT.

14. FAULT CODE 5122 (J1-M OUTPUT IS NOT 0 VDC)

Step 1. Replace A4 module and initiate retest. Observe if fault code 5122 recurs,
If fault code 5122 did not recur, original A4 module is defective; replace
Step 2. Replace A6 interconnection module and initiate retest. Observe if fault code 5122 recurs
If fault code 5122 did not recur, original A6 interconnection module is defective replace. If fault code 5122 did recur, replace UUT.

15. DELETED

16. DELETED

17. FAULT CODE 5131 (J1-M OUTPUT IS NOT 0 VDC)

Replace A4 module.

LOGIC CONTROL UNIT FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

18. FAULT CODE 5141 (J3-U OUTPUT IS NOT O VDC)

Step 1. Replace A4 module and initiate retest. Observe if fault code 5141 recurs.
If fault code 5141 did not recur, original A4 module is defective; replace.

Step 2. Replace A6 interconnection module and initiate retest. Observe if fault code 5141 recurs.
If fault code 5141 did not recur, original A6 interconnection module is defective; replace. If fault code 5141 did recur, replace UUT.

19. FAULT CODE 5142 (J1-M OUTPUT IS NOT 28 VDC)

Replace A4 module.

20. DELETED

21. FAULT CODE 5151 (J1-M OUTPUT IS NOT 0 VDC)

Replace A4 module.

22. FAULT CODE 5160 (SHORT ON DC INPUTS AT J2-B, -C, -D, -E, OR -1)

Disconnect in turn A5, A7, and A6 modules and initiate retest after each module is disconnected. Observe if fault code 5160 recurs after each retest. (Disregard all other fault codes. Look only for fault code 5160.)
Replace module causing short. If fault code 5160 recurs after all three modules have been disconnected, then short is caused by chassis wiring replace UUT.

23. FAULT CODE 5171 (J3-K OUTPUT IS NOT O VDC)

Step 1. Replace A5 module and initiate retest. Observe if fault code 5171 recurs.
If fault code 5171 did not recur, original A5 module is defective; replace.

Step 2. Replace A7 module and initiate retest. Observe if fault code 5171 recurs.
If fault code 5171 did not recur, original A7 module is defective; replace.

Step 3. Replace A6 interconnection module and initate retest. Observe if fault code 5171 recurs.
If fault code 5171 did not recur, original A6 interconnection module is defective; replace. If fault code 5171 did recur, replace UUT.

24. FAULT CODE 5172 (J3-E OUTPUT IS NOT 5 VAC)

Replace A7 module and initiate retest.
If fault code 5172 did not recur, original A7 module is defective; replace. If fault code 5172 did recur, replace UUT.

25. FAULT CODE 5181 (J3-K OUTPUT IS NOT 1.3 TO 1.9 VDC)

Step 1. Replace A5 module and initiate retest. Observe if fault code 5181 recurs.
If fault code 5181 did not recur, original A5 module is defective; replace.

Step 2. Replace A6 interconnection module and inititate retest. Observe if fault code 5181 recurs.
If fault code 5181 did not recur, original A6 module is defective; replace. If fault code 5181 did recur, replace UUT.

Step 3. Replace DS1 LED.

2-20. LOGIC CONTROL UNIT TEST (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

26. FAULT CODE 5182 (J1-J OUTPUT IS NOT 7 VAC)

Step 1. Replace A5 module and initiate retest. Observe if fault code 5182 recurs.

If fault code 5182 did not recur, original A5 module is defective; replace.

Step 2. Replace A6 interconnection module and initiate retest. Observe if fault code 5182 recurs.

If fault code 5182 did not recur, original A6 module is defective; replace If fault code 5182 did recur, replace UUT.

27. FAULT CODE 5191 (J2-B OUTPUT IS NOT 0 VDC)

Replace A7 module.

28. FAULT CODE 5192 (J3.E OUTPUT IS NOT 5 VAC)

Replace A7 module and initiate retest. Observe if fault code 5192 recurs.

If fault code 5192 did not recur, original A7 module is defective; replace. If fault code 5192 did recur, replace UUT.

29. FAULT CODE 5193 (J3.K OUTPUT IS NOT 1.3 TO 1.9 VDC)

Replace A7 module.

30. FAULT CODE 5201 (J2-C OUTPUT IS NOT 0 VDC)

Replace A7 module.

31. FAULT CODE 5202 (J3-E OUTPUT IS NOT 5 VAC)

Replace A7 module.

32. FAULT CODE 5210 (SHORT ON DC INPUT AT J2-B)

Disconnect A4 and A6 modules in turn and initiate retest after each module is disconnected. Observe if fault code 5210 recurs. (Many fault codes will be generated. Look only for fault code 5210.)

Replace A4 or A6 module if cause of short. If fault code 5210 recurs with both A4 and A6 disconnected, short is caused by chassis wiring; replace UUT.

33. FAULT CODE 5211 (J3-E OUTPUT IS NOT 2 VAC)

Replace A7 module and initate retest. Observe if fault code 5211 recurs.

If fault code 5211 did not recur, original A7 module is defective; replace. If fault code 5211 did recur, replace UUT.

34. FAULT CODE 5212 (J3-K OUTPUT IS NOT 0 VDC)

Replace A5 module.

35. FAULT CODE 5213 (J1-J OUTPUT IS NOT 0 VAC)

Replace A5 module.

LOGIC CONTROL UNIT FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
initiate retest after any module replacement.

36. FAULT CODE 5221 (J3-K OUTPUT IS NOT 1.3 TO 1.9 VDC)

Replace A5 module.

37. FAULT CODE 5231 (J3-L OUTPUT IS NOT O VDC)

Step 1. Replace A4 module and initate retest. Observe if fault code 5231 recurs.

If fault code 5231 did not recur, original A4 module is defective; replace.

Step 2. Replace A6 interconnection module and initiate retest. Observe if fault code 5231 recurs.

If fault code 5231 did not recur, original A6 interconnection module is defective; replace. If fault code 5231 did recur, replace UUT.

38. FAULT CODE 5232 (J3-U OUTPUT IS NOT APPROX 17 VDC)

Replace A4 module.

39. FAULT CODE 5233 (J1-J OUTPUT IS NOT 7 VAC)

Replace A5 module.

40. FAULT CODE 5241 (J3-D OUTPUT IS NOT .1. TO -15 VDC)

Step 1. Replace A4 module and initiate retest. Observe if fault code 5241 recurs.

If fault code 5241 did not recur, original A4 module is defective; replace.

Step 2. Replace A6 interconnection module and initiate retest. Observe if fault code 5241 recurs.

If fault code 5241 did not recur, original A6 interconnection module is defective; replace. If fault code 5241 did recur, replace UUT.

41. FAULT CODE 5242 (J1-D OUTPUT IS NOT 0.5 VAC)

Step 1. Replace A4 module and initiate retest. Observe if fault code 5242 recurs.

If fault code 5242 did not recur, original A4 module is defective; replace.

Step 2. Replace A6 interconnection module and initiate retest. Observe if fault code 5242 recurs.

If fault code 5242 did not recur, original A6 interconnection module is defective; replace. If fault code 5242 did recur, replace UUT.

42. FAULT CODE 5243 (J3.R OUTPUT IS NOT 0.5 VAC)

Replace UUT.

43. FAULT CODE 5244 (J3-L OUTPUT IS NOT 2 TO 4 VDC)

Replace A4 module.

44. FAULT CODE 5251 (J3-L OUTPUT IS NOT 2 TO 4 VDC)

Step 1. Replace A4 module and initiate retest. Observe if fault code 5251 recurs.

If fault code 5251 did not recur, original A4 module is defective; replace.

Step 2. Replace A6 interconnection module and initiate retest. Observe if fault code 5251 recurs.

If fault code 5251 did not recur, original A6 interconnection module is defective; replace. If fault code 5251 did recur, replace UUT.

2-20. LOGIC CONTROL UNIT TEST (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

45. FAULT CODE 5260 (SHORT ON 28 VDC INPUT AT J2-J)

Disconnect A4 and A6 modules in turn and initiate retest after each module is disconnected. Observe if fault code 5260 recurs. (Many fault codes will be generated. Look only for fault code 5260.)

Replace A4 or A6 module if cause of short. If fault code 5260 recurs with both A4 and A6 disconnected, short is caused by chassis wiring; replace UUT.

46. FAULT CODE 5261 (J3-L OUTPUT IS NOT 0 to -5 VDC)

Step 1. Replace A4 module and initiate retest. Observe if fault code 5261 recurs.

If fault code 5261 did not recur, original A4 module is defective; replace.

Step 2. Replace A6 interconnection module and initiate retest. Observe if fault code 5261 recurs

If fault code 5261 did not recur, original A6 interconnection module is defective; replace. If fault code 5261 did recur, replace UUT.

47. FAULT CODE 5262 (J3.D OUTPUT IS NOT -1.1 to -15 VDC)

Replace A4 module.

48. FAULT CODE 5271 (J3-D OUTPUT IS NOT +5 TO +15 VDC)

Replace A4 module.

49. FAULT CODE 5272 (J1-D OUTPUT IS NOT 0 VAC)

Replace A4 module.

50. FAULT CODE 5281 (J3-D OUTPUT IS NOT .1.5 TO -15 VDC)

Replace A4 module.

51. FAULT CODE 5282 (JI-D OUTPUT IS NOT 0 TO -1 VAC)

Replace A4 module.

52. FAULT CODE 5291 (J3-D OUTPUT IS NOT -1.1 TO -15 VDC)

Replace A4 module.

53. FAULT CODE 5292 (J1-D OUTPUT IS NOT +0.8 TO +2.5 VAC)

Replace A4 module.

54. FAULT CODE 5301 (J3-L OUTPUT IS NOT -2 TO .5 VDC)

Replace A4 module.

LOGIC CONTROL UNIT FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE) TEST OR INSPECTION CORRECTIVE ACTION	NOTE Initiate retest after any module replacement.

55. FAULT CODE 5302 (J1-L OUTPUT IS NOT 0 VDC)

Step 1. Replace A4 module and initiate retest. Observe if fault code 5302 recurs.
If fault code 5302 did not recur, original A4 module is defective; replace.

Step 2. Replace A5 module and initiate retest. Observe if fault code 5302 recurs.
If fault code 5302 did not recur, original A5 module is defective; replace If fault code 5302 did recur, replace UUT.

END OF TROUBLESHOOTING

2-21. GUN CONTROL UNIT TEST

DESCRIPTION

This task covers: Or bench testing including fault code troubleshooting data,

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Electronics Systems Test Set: M137
- DC Power Supply PP1104C
- Distribution Panel 12007200
- Power Supply 11834203
- Cable Assembly 7540635
- Failure Isolation Shop Set 11838720

Personnel Required:
- 68J Aircraft Armament\ Missile Systems Repairer

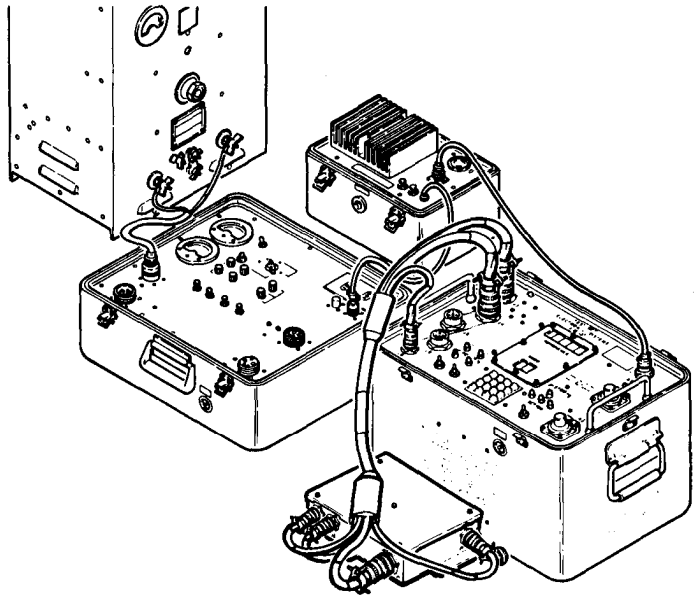
Equipment Conditions:
- On bench in shop.
- Bench power ready and test set power cable W1 connected.

General Safety Instructions:
- Never work on electronic equipment unless there is another person nearby who is familiar with operation and hazards of this equipment and who is competent in administering first aid. When aided by operator, technician must warn operator about dangerous areas.
- Power must not be applied to unit under test while test leads are being connected to or removed from unit assemblies/circuits under test.

GUN CONTROL UNIT TEST

1. REMOVE COVER FROM J4.

2. CONNECT TEST SET CABLE W9 AS FOLLOWS:
   - W9P1 to test set J4
   - W9P2 to test set J3
   - W9P3 to GCU J1
   - W9P4 to GCU J2
   - W9P5 to GCU J3
   - W9P6 to GCU J4
   - W9P7 to test set J6

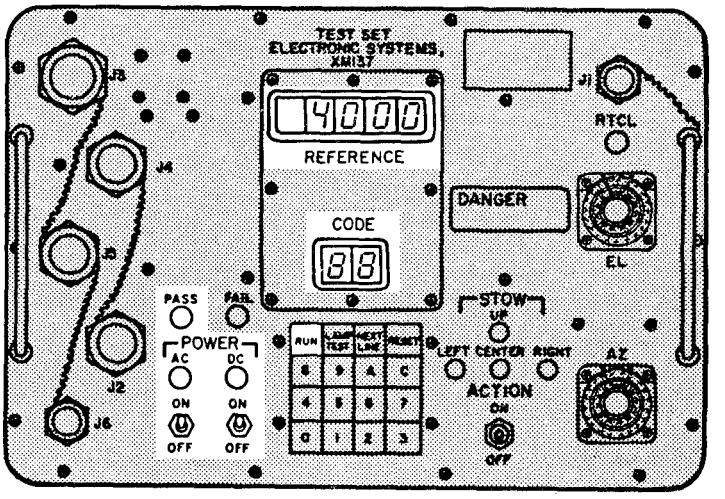


ARR82-28134

GUN CONTROL UNIT TEST (cont)

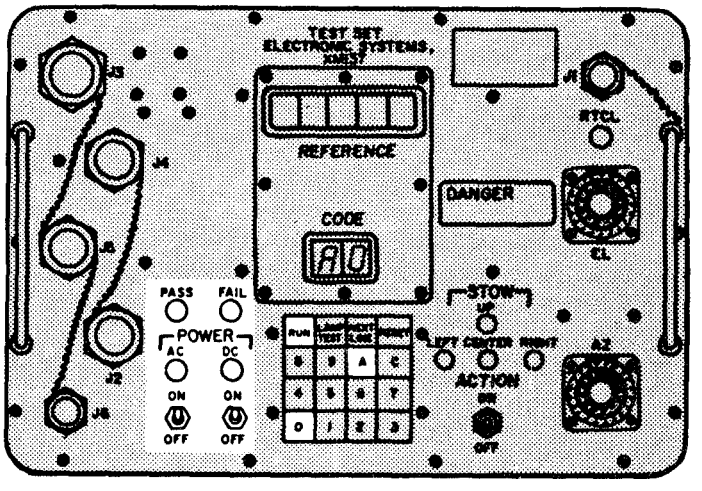
3. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.
   a. AC and DC POWER indicators light.
   b. 8's appear in REFERENCE and CODE displays.
   c. PASS indicator lights.
4. ON TEST SET, PRESS RUN KEY.

   4000 appears in REFERENCE display.



ARR82-28135

5. ON TEST SET, PRESS A, O, AND RUN KEYS.
   a. Automatic test sequence runs.
   b. PASS or FAIL indicator lights.
   c. if PASS indicator lights, gun control unit passes this part of test, go to step 11 and continue test.
   d. If FAIL indicator lights, go to next step.



ARR82-28136

2-21. GUN CONTROL UNIT TEST (cont)

6. WHEN THE FAIL INDICATOR LIGHTS, A FOUR-DIGIT FAULT CODE WILL APPEAR IN THE REFERENCE DISPLAY.

7. USING NEXT LINE KEY, DISPLAY ALL FAULT CODES AND RECORD THEM FOR REFERENCE.

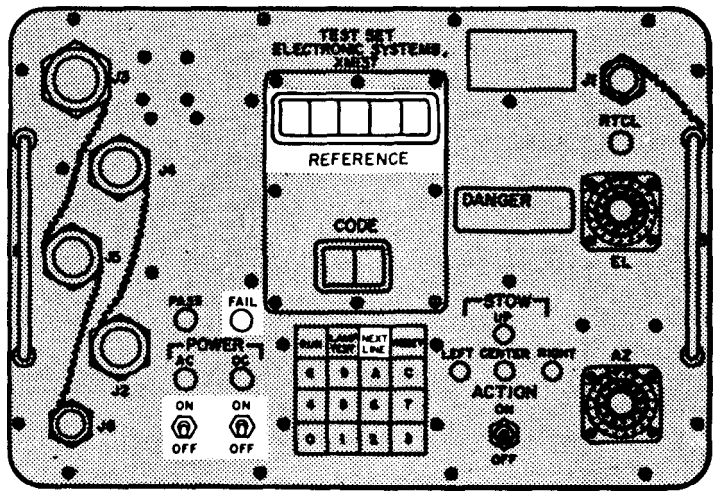
8. SET TEST SET CIRCUIT BREAKERS TO OFF.

NOTE

- **Refer to FO-6 for interface diagram between test set and unit under test.**
- **Failure isolation shop set will help identify failed circuit card assemblies.**

9. PERFORM TROUBLESHOOTING PROCEDURES IN FAULT CODE TROUBLESHOOTING TABLE PROVIDED AT END OF THIS TEST.

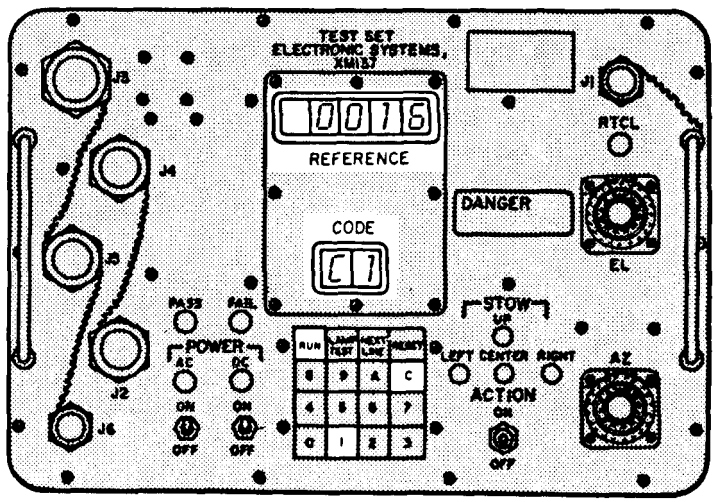
10. UPON COMPLETION OF TROUBLESHOOTING PROCEDURES, REPEAT THIS TEST.



ARR82-28137

11. ON TEST SET, PRESS C, 1, AND RUN KEYS.
    a. C1 appears in CODE display,
    b. REFERENCE display indicates 0000 and after approximately 5 seconds the display indicates 0016 ±4.
    c. If indication is not 0016 ±4, see GUN CONTROL UNIT BURST LIMIT POTENTIOMETER ADJUSTMENT, para 2-71 for M97A4 or para 2-79 for M97A3. After adjustment, repeat test.

12. IF ALL INDICATIONS ARE NORMAL, REMOVE POWER, DISCONNECT TEST SET CABLES, AND RETURN UNIT TO SERVICE.



ARR82-28138

END OF TEST

2-27. INTERFACE CONTROL UNIT (209-074-110-1) TEST

DESCRIPTION

This task covers: On bench testing including fault code troubleshooting data.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Electronics Systems Test Set: M137
- DC Power Supply PP1104C
- Distribution Panel 12007200
- Power Supply 11834203
- Cable Assembly 7540635
- **Failure isolation Shop Set 11838720**

Personnel Required:
- **68J Aircraft Armament/Missile Systems Repairer**

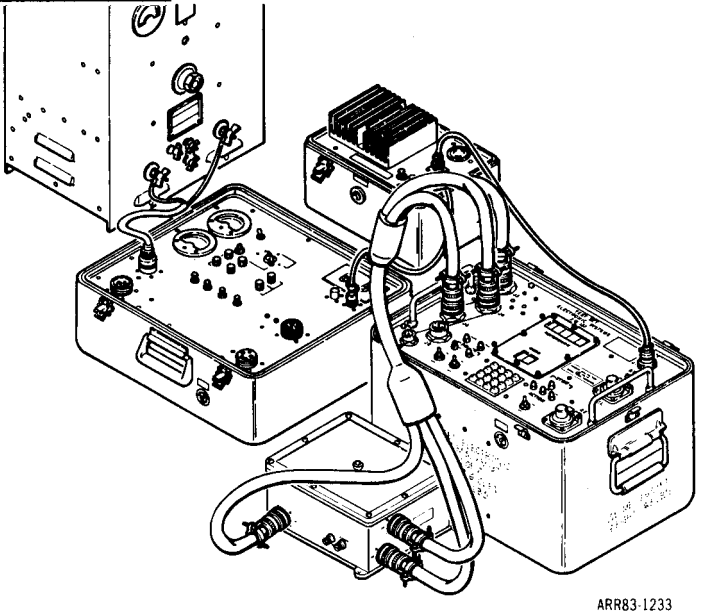
Equipment Conditions:
- On bench in shop.
- Bench power ready and test set power cable W1 connected.

General Safety Instructions:
- Never work on electronic equipment unless there is another person nearby who is familiar with operation and hazards of this equipment and who is competent in administering first aid. When aided by operator, technician must warn operator about dangerous areas.
- Power must not be applied to unit under test while test leads are being connected to or removed from unit assemblies/circuits under test.

INTERFACE CONTROL UNIT (209-074-110-1) TEST

1. CONNECT TEST SET CABLE W20 AS FOLLOWS:

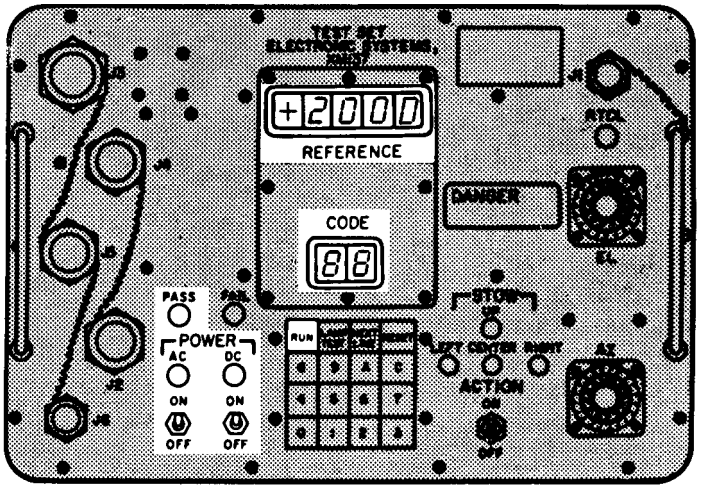
   W20P1 to test set J4
   W20P2 to test set J5
   W20P3 to test set J3
   W20P4 to IFCU J13
   W20P5 to IFCU J14
   W20P6 to IFCU J15



ARR83-1233

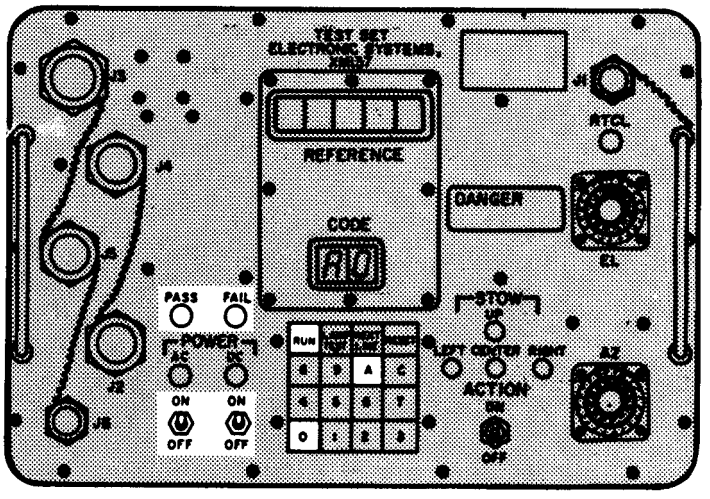
2-27. INTERFACE CONTROL UNIT (209-074-110-1) TEST (cont)

2. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.
   a. AC and DC power indicators light.
   b. 8's appear in REFERENCE and CODE displays.
   c. PASS indicator lights.
3. ON TEST SET, PRESS RUN KEY.
   +2000 appears in REFERENCE display.



ARR83-1234

4. ON TEST, SET, PRESS A, O, AND RUN KEYS.
   a. Automatic test sequence runs.
   b. PASS or FAIL indicator lights.
   c. If PASS indicator lights, remove power. Disconnect test set cables, and return unit to service.
   d. If FAIL indicator lights, go to next step.



ARR83-1235

INTERFACE CONTROL UNIT (209-074-110-1) TEST (cont)

5. WHEN FAIL INDICATOR LIGHTS, A FOUR-DIGIT FAULT CODE WILL APPEAR IN THE REFERENCE DISPLAY.

6. USING NEXT LINE KEY, DISPLAY ALL FAULT CODES AND RECORD THEM FOR REFERENCE.

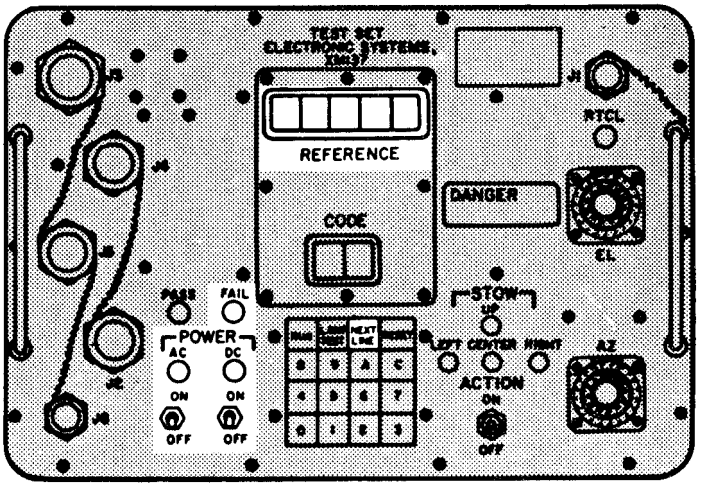
7. SET TEST SET AC AND DC CIRCUIT BREAKERS TO OFF.

NOTE

- **Refer to figure FO-9 for interface diagram between test set and unit under test.**
- **Failure isolation shop set will help identify failed circuit card assemblies.**

8. PERFORM TROUBLESHOOTING PROCEDURES IN FAULT CODE TROUBLESHOOTING DATA PROVIDED AT END OF THIS TEST.

9. UPON COMPLETION OF TROUBLESHOOTING PROCEDURES, REPEAT THIS TEST.



ARR83-1236

END OF TEST

2-27. INTERFACE CONTROL UNIT (209-074-110-1) TEST (cont)

FAULT CODE TROUBLESHOOTING DATA

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

WARNING

Verify all power is off before performing any corrective action.

1. FAULT CODE +2100 (SHORT ON 28 VDC INPUT AT J15-G)

Replace UUT.

2. FAULT CODE +2101 (NO +18 VDC OUTPUT AT J15-X)

Step 1. Check that test set AC POWER switch is set to ON.

Step 2. Rerun test and watch F2 fuse lamp.

Replace F2 fuse if fuse lamp lights at any time.

Step 3. Replace A8 module and initiate retest. Observe if fault code +2101 recurs.

If fault code + 2101 did not recur, original A8 module is defective; replace. If fault code + 2101 did recur, replace UUT.

3. FAULT CODE +2102 (NO -18 VDC OUTPUT AT J15-W)

Replace A8 module and initiate retest. Observe if fault code + 2102 recurs.

If fault code + 2102 did not recur, original A8 module is defective; replace. If fault code + 2102 did recur, replace UUT.

4. FAULT CODE +2103 (NO +10 VDC OUTPUT AT J15-B)

Step 1. Rerun test and watch F1 fuse lamp.

Replace F1 fuse if fuse lamp lights at anytime.

Step 2. Replace A8 module and initiate retest. Observe if fault code + 2103 recurs.

If fault code + 2103 did not recur, original A8 module is defective; replace. If fault code + 2103 did recur, replace UUT.

5. FAULT CODE +2104 (NO +28 VDC OUTPUT AT J15-S)

Step 1. Rerun test and watch F1 fuse lamp.

Replace F1 fuse if fuse lamp lights at any time.

Step 2. Replace A4 module and initiate retest. Observe if fault code + 2104 recurs.

If fault code + 2104 did not recur, original A4 module is defective; replace. If fault code + 2104 did recur, proceed to step 3.

Step 3. Replace A8 module and initiate retest. Observe if fault code + 2104 recurs.

If fault code + 2104 did not recur, original A8 module is defective; replace. If fault code + 2104 did recur, replace UUT.

INTERFACE CONTROL UNIT (209-074-110-1)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

6. FAULT CODE +2110 (SHORT ON +28 VDC INPUT AT J15-P).

Remove in turn A8, A2, A3, and A4 modules and initiate retest after each module is removed. Observe if fault code + 2110 recurs. (Disregard all other fault codes that will be generated.)

If fault code + 2110 did not recur, last module removed is defective; replace. If fault code + 2110 did recur after last module was removed, replace UUT.

7. FAULT CODE +2111 (NO +28 VDC OUTPUT AT J15-T)

Step 1.Replace A3 module and initiate retest. Observe if fault code + 2111 recurs.

If fault code + 2111 did not recur, original A3 module is defective; replace. If fault code + 2111 did recur, proceed to step 2.

Step 2. Replace A8 module and initiate retest. Observe if fault code + 2111 recurs.

If fault code + 2111 did not recur, original A8 module is defective; replace. If fault code + 2111 did recur, replace UUT.

8. FAULT CODE +2112 (NO 0 VDC OUTPUT AT J15-S)

Step 1. Replace A4 module and initiate retest. Observe if fault code + 2112 recurs.

If fault code + 2112 did not recur, original A4 module is defective; replace. If fault code + 2112 did recur, proceed to step 2.

Step 2. Replace A8 module and initiate retest. Observe if fault code + 2112 recurs.

If fault code +2112 did not recur, original A8 module is defective; replace. If fault code + 2112 did recur, replace UUT.

9. FAULT CODE +2120 (SHORT ON DC INPUT CIRCUIT J15-R4)

Remove in turn A8, A1, A2, and A4 modules and initiate retest after each module is removed. Observe if fault code + 2120 recurs (Disregard all other fault codes that will be generated.)

If fault code + 2120 did not recur, last module removed is defective; replace. If fault code + 2120 did recur after last module was removed, replace UUT.

10. FAULT CODE +2112 (NO +28 VDC OUTPUT AT J15-U)

Step 1. Replace A2 module and initiate retest. Observe if fault code + 2121 recurs.

If fault code + 2121 did not recur, original A2 module is defective; replace. If fault code + 2121 did recur, proceed to step 2.

Step 2. Replace A8 module and initiate retest. Observe if fault code + 2121 recurs.

If fault code + 2121 did not recur, original A8 module is defective; replace. If fault code + 2121 did recur, replace UUT.

2-27. INTERFACE CONTROL UNIT (209-074-110-1) TEST (Cont) FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

11. FAULT CODE +2131 (NO O VDC OUTPUT AT J15-U)

Step 1. Replace A2 module and initiate retest. Observe if fault code + 2131 recurs.
If fault code + 2131 did not recur, original A2 module is defective; replace. If fault code + 2131 did recur, proceed to step 2.

Step 2. Replace A8 module and initiate retest. Observe if fault code + 2131 recurs.
If fault code + 2131 did not recur, original A8 module is defective; replace. If fault code + 2131 did recur, replace UUT.

12. FAULT CODE +2141 (NO O VDC OUTPUT AT J15-R)

Replace A8 module and initiate retest. Observe if fault code +2141 recurs.
If fault code + 2141 did not recur, original A8 module is defective; replace. If fault code + 2141 did recur, replace UUT.

13. FAULT CODE +2150 (SHORT ON DC INPUT CIRCUIT J15-R)

Replace A8 module and initiate retest. Observe if fault code + 2150 recurs.
If fault code + 2150 did not recur, original A8 module is defective; replace. If fault code + 2150 did recur, replace UUT.

14. FAULT CODE +2151 (NO +28 VOC OUTPUT AT J15-T)

Step 1. Replace A8 module and initiate retest. Observe if fault code + 2151 recurs.
If fault code + 2151 did not recur, original A8 module is defective; replace. If fault code + 2151 did recur, proceed to step 2.

Step 2. Replace A3 module and initiate retest. Observe if fault code + 2151 recurs.
If fault code + 2151 did not recur, original A3 module is defective; replace. If fault code + 2151 did recur, replace UUT.

15. FAULT CODE +2152 (NO 0 VDC OUTPUT AT J15-S)

Step 1. Replace A8 module and initiate retest. Observe if fault code + 2152 recurs.
If fault code + 2152 did not recur, original A8 module is defective; replace. If fault code + 2152 did recur, proceed to step 2.

Step 2. Replace A4 module and inititate retest. Observe if fault code +2152 recurs.
If fault code + 2152 did not recur, original A4 module is defective; replace. If fault code + 2152 did recur, replace UUT.

16. FAULT CODE +2161 (NO 0 VDC OUTPUT AT J15-U)

Step 1. Replace A8 module and initiate retest. Observe if fault code + 2161 recurs.
If fault code + 2161 did not recur, original A8 module is defective; replace. If fault code + 2161 did recur, proceed to step 2.

Step 2. Replace A2 module and initiate retest. Observe if fault code + 2161 recurs.
If fault code + 2161 did not recur, original A2 module is defective; replace. If fault code + 2161 did recur, replace UU[T]

INTERFACE CONTROL UNIT (209-074-110-1)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

17. FAULT CODE +2171 (NO 0 VDC OUTPUT AT J15-P)

Replace A8 module and initiate retest. Observe if fault code + 2171 recurs.

If fault code + 2171 did not recur, original A8 module is defective; replace. If fault code + 2171 did recur, replace UUT.

18. FAULT CODE +2180 (SHORT ON DC INPUT CIRCUITS J15-K or M)

Remove in turn A8, A5, A4, A2, and Al modules and inititate retest after each module is removed. Observe if fault code + 2180 recurs. (Disregard all other fault codes that will be generated.)

If fault code + 2180 did not recur, last module removed is defective; replace. If fault code + 2180 did recur after last module was removed, replace UUT.

19. FAULT CODE +2181 (NO 0 VDC OUTPUT AT J15-U)

Step 1. Replace A4 module and initiate retest. Observe if fault code + 2181 recurs.

If fault code + 2181 did not recur, original A4 module is defective; replace. If fault code + 2181 did recur, proceed to step 2.

Step 2. Replace A8 module and initiate retest. Observe if fault code + 2181 recurs.

If fault code + 2181 did not recur, original A8 module is defective; replace. If fault code + 2181 did recur, replace UUT.

20. FAULT CODE +2191 (NO 0 VDC OUTPUT AT J15-M)

Replace A8 module and initiate retest. Observe if fault code + 2191 recurs.

If fault code + 2191 did not recur, original A8 module is defective; replace. If fault code + 2191 did recur, replace UUT.

21. FAULT CODE +2192 (NO 0 VDC OUTPUT AT J15-M)

Replace A8 module and initiate retest. Observe if fault code + 2192 recurs.

If fault code + 2192 did not recur, original A8 module is defective; replace. If fault code + 2192 did recur, replace UUT.

22. FAULT CODE +2193 (NO 0 VDC OUTPUT AT J15-Q)

Replace A8 module and initiate retest. Observe if fault code + 2193 recurs.

If fault code + 2193 did not recur, original A8 module is defective; replace. If fault code + 2193 did recur, replace UUT.

23. FAULT CODE +2194 (NO 0 VDC OUTPUT AT J15-K)

Replace A8 module and initiate retest. Observe if fault code + 2194 recurs.

If fault code + 2194 did not recur, original A8 module is defective; replace. If fault code + 2194 did recur, replace UUT.

2-27. INTERFACE CONTROL UNIT (209-074-110-1) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

24. FAULT CODE +2201 (NO 0 VDC OUTPUT AT J15-S)

Replace A8 module and initiate retest. Observe if fault code + 2201 recurs.

If fault code + 2201 did not recur, original A8 module is defective; replace. If fault code + 2201 did recur, replace UUT.

25. FAULT CODE +2210 (SHORT ON DC INPUT CIRCUITS J15-N)

Remove in turn A8 an A4 modules and initiate retest after each module is removed. Observe if fault code + 2210 recurs. (Disregard all other fault codes that will be generated.)

If fault code + 2210 did not recur, last module removed is defective; replace. If fault code + 2210 did recur after last module was removed, replace UUT.

26. FAULT CODE +2211 (NO 0 VDC OUTPUT AT J15-S)

Replace A8 module and inititate retest. Observe if fault code + 2211 recurs.

If fault code + 2211 did not recur, original A8 module is defective; replace. If fault code + 2211 did recur, replace UUT.

27. FAULT CODE +2212 (NO +28 VDC OUTPUT AT J15-G)

Step 1. Replace A8 module and initiate retest. Observe if fault code + 2212 recurs.

If fault code + 2212 did not recur, original A8 module is defective; replace. If fault code + 2212 did recur, proceed to step 2.

Step 2. Replace A4 module and initiate retest. Observe if fault code + 2212 recurs.

If fault code + 2212 did not recur, original A4 module is defective; replace. If fault code + 2212 did recur, replace UUT.

28. FAULT CODE +2220 (SHORT ON DC INPUT CIRCUITS J15-P or Q)

Remove in turn A8 and A3 modules and initiate retest after each module is removed. Observe if fault code + 2220 recurs. (Disregard all other fault codes that will be generated.)

If fault code + 2220 did not recur, last removed module is defective; replace. If fault code + 2220 did recur after last module was removed, replace UUT.

29. FAULT CODE +2221 (NO 0 VDC OUTPUT AT J15-T)

Step 1. Replace A3 module and initiate retest. Observe if fault code + 2221 recurs.

If fault code + 2221 did not recur, original A3 module is defective; replace. If fault code + 2221 did recur, proceed to step 2.

Step 2. Replace A8 module and initiate retest. Observe if fault code + 2221 recurs.

If fault code +2221 did not recur, original A8 module is defective; replace. If fault code + 2221 did recur, replace UUT.

INTERFACE CONTROL UNIT (209-074-110-1)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

30. FAULT CODE +2231 (NO 0 VDC OUTPUT AT J15-U)

Replace A8 module and initiate retest. Observe if fault code + 2231 recurs.

If fault code + 2231 did not recur, original A8 module is defective; replace. If fault code + 2231 did recur, replace UUT.

31. FAULT CODE +2232 (NO +28 VDC OUTPUT AT J15-F)

Step 1. Replace A3 module and initiate retest. Observe if fault code + 2232 recurs.

If fault code + 2232 did not recur, original A3 module is defective; replace. If fault code + 2232 did recur, proceed to step 2.

Step 2. Replace A8 module and initiate retest. Observe if fault code + 2232 recurs.

If fault code + 2232 did not recur, original A8 module is defective; replace. If fault code + 2232 did recur, replace UUT.

32. FAULT CODE +2241 (NO 0 VAC OUTPUT AT J14-L)

Step 1. Replace A5 module and initiate retest. Observe if fault code + 2241 recurs.

If fault code + 2241 did not recur, original A5 module is defective; replace. If fault code + 2241 did recur, proceed to step 2.

Step 2. Replace All module and initiate retest. Observe if fault code + 2241 recurs.

If fault code + 2241 did not recur, original All module is defective; replace. If fault code + 2241 did recur, replace UUT.

33. FAULT CODE +2251 (NO 0 VAC OUTPUT AT J14-L)

Replace A5 module and initiate retest. Observe if fault code + 2251 recurs.

If fault code + 2251 did not recur, original A5 module is defective; replace. If fault code + 2251 did recur, replace UUT.

34. FAULT CODE +2260 (SHORT ON DC INPUT CIRCUIT J15-J)

Replace A5 module and initiate retest. Observe if fault code + 2260 recurs.

If fault code + 2260 did not recur, original A5 module is defective; replace. If fault code + 2260 did recur, replace UUT.

35. FAULT CODE +2261 (NO +2.6 VAC OUTPUT AT J14-L)

Step 1. Replace A5 module and initiate retest. Observe if fault code + 2261 recurs.

If fault code + 2261 did not recur, original A5 module is defective; replace. If fault code + 2261 did recur, proceed to step 2.

Step 2. Replace A8 module and initiate retest. Observe if fault code + 2261 recurs.

If fault code + 2261 did not recur, original A8 module is defective; replace. If fault code + 2261 did recur, replace UUT.

2-27. INTERFACE CONTROL UNIT (209-074-110-1) TEST (cont) FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)	TEST OR INSPECTION	CORRECTIVE ACTION
	NOTE **Initiate retest after any module replacement.**	

36. FAULT CODE +2271 (NO +2.6 VAC OUTPUT AT J14-L)

Replace A8 module and initiate retest. Observe if fault code + 2271 recurs.

If fault code + 2271 did not recur, original A8 module is defective; replace. If fault code + 2271 did recur, replace UUT.

37. FAULT CODE +2281 (NO +2.6 VAC OUTPUT AT J14-L)

Replace A8 module and initiate retest, Observe if fault code + 2281 recurs.

If fault code + 2281 did not recur, original A8 module is defective; replace. If fault code + 2281 did recur, replace UUT.

38. FAULT CODE +2282 (NO +28 VDC OUTPUT AT J15-E)

Step 1. Replace A2 module and initiate retest. Observe if fault code + 2282 recurs.

If fault code + 2282 did not recur, original A2 module is defective; replace. If fault code + 2282 did recur, proceed to step 2.

Step 2. Replace A8 module and initiate retest. Observe if fault code + 2282 recurs.

If fault code + 2282 did not recur, original A8 module is defective; replace. If fault code + 2282 did recur, replace UUT.

39. FAULT CODE +2283 (NO 0 VDC OUTPUT AT J15-Q)

Replace A8 module and initiate retest, Observe if fault code + 2283 recurs.

If fault code + 2283 did not recur, original A8 module is defective; replace. If fault code + 2283 did recur, replace UUT.

40. FAULT CODE +2284 (NO 0 VDC OUTPUT AT J15-N)

Replace A8 module and initiate retest. Observe if fault code + 2284 recurs.

If fault code + 2284 did not recur, original A8 module is defective; replace. If fault code + 2284 did recur, replace UUT.

41. FAULT CODE +2291 (NO 0 VDC OUTPUT AT J15-K)

Replace A8 module and initiate retest. Observe if fault code + 2291 recurs.

If fault code +2291 did not recur, original A8 module is defective; replace. If fault code + 2291 did recur, replace UUT.

42. FAULT CODE +2292 (NO 0 VDC OUTPUT AT J15-P)

Replace A8 module and initiate retest. Observe if fault code + 2292 recurs.

If fault code + 2292 did not recur, original A8 module is defective; replace. If fault code + 2292 did recur, replace UUT.

INTERFACE CONTROL UNIT (209-074-110-1)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

43. FAULT CODE +2293 (NO 0 VDC OUTPUT AT J15-R)

Replace A8 module and initiate retest. Observe if fault code + 2293 recurs.

If fault code + 2293 did not recur, original A8 module is defective; replace. If fault code + 2293 did recur, replace UUT.

44. FAULT CODE +2301 (NO 0 VDC OUTPUT AT J15-R)

Replace A8 module and initiate retest. Observe if fault code + 2301 recurs.

If fault code + 2301 did not recur, original A8 module is defective; replace. If fault code + 2301 did recur, replace UUT.

45. FAULT CODE +2302 (NO 0 VDC OUTPUT AT J15-Q)

Replace A8 module and initiate retest. Observe if fault code +2302 recurs.

If fault code + 2302 did not recur, original A8 module is defective; replace. If fault code + 2302 did recur, replace UUT.

46. FAULT CODE +2311 (NO 0 VDC OUTPUT AT J15-P)

Replace A8 module and initiate retest. Observe if fault code + 2311 recurs.

If fault code + 2311 did not recur, A8 module is defective; replace. If fault code + 2311 did recur, replace UUT.

47. FAULT CODE +2321 (NO 0 VAC OUTPUT AT J14-T)

Step 1. Replace A11 module and initiate retest. Observe if fault code + 2321 recurs.

If fault code + 2321 did not recur, original All module is defective; replace. If fault code + 2321 did recur, proceed to step 2.

Step 2. Replace A9 module and initiate retest. Observe if fault code + 2321 recurs.

If fault code + 2321 did not recur, original A9 module is defective; replace. If fault code + 2321 did recur, replace UUT.

48. FAULT CODE +2322 (NO 0 VAC OUTPUT AT J14-V)

Step 1. Replace A11 module and initiate retest. Observe if fault code + 2322 recurs.

If fault code + 2322 did not recur, original All module is defective; replace. If fault code + 2322 did recur, proceed to step 2.

Step 2. Replace A9 module and initiate retest. Observe if fault code + 2322 recurs.

If fault code + 2322 did not recur, original A9 module is defective; replace, If fault code + 2322 did recur, replace UUT.

2-27. INTERFACE CONTROL UNIT (209-074-110-1) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

49. FAULT CODE +2323 (NO O VAC OUTPUT AT J14-W)

Step 1. Replace A11 module and initiate retest. Observe if fault code +2323 recurs.
If fault code + 2323 did not recur, original Al 1 module is defective; replace. If fault code + 2323 did recur, proceed to step 2.

Step 2. Replace A9 module and initiate retest. Observe if fault code + 2323 recurs.
If fault code + 2323 did not recur, original A9 module is defective; replace. If fault code + 2323 did recur, replace UUT.

50. FAULT CODE +2331 (NO +5 VAC OUTPUT AT J14-T)

Step 1. Replace A11 module and initiate retest. Observe if fault code + 2331 recurs.
If fault code + 2331 did not recur, original A11 module is defective; replace. If fault code + 2331 did recur, proceed to step 2.

Step 2. Replace A9 module and initiate retest. Observe if fault code +2331 recurs.
If fault code + 2331 did not recur, original A9 module is defective; replace. If fault code + 2331 did recur, replace UUT.

51. FAULT CODE +2332 (NO +5 VAC OUTPUT AT J14-V)

Step 1. Replace A11 module and initiate retest. Observe if fault code + 2332 recurs.
If fault code + 2332 did not recur, original A11 module is defective; replace. If fault code + 2332 did recur, proceed to step 2.

Step 2. Replace A9 module and initiate retest. Observe if fault code + 2332 recurs.
If fault code + 2332 did not recur, original A9 module is defective; replace. If fault code + 2332 did recur, replace UUT.

52. FAULT CODE +2333 (NO +5 VAC OUTPUT AT J14W)

Step 1. Replace A11 module and initiate retest. Observe if fault code + 2333 recurs.
If fault code +2333 did not recur, A11 module is defective; replace. If fault code + 2333 did recur, proceed to step 2.

Step 2. Replace A9 module and initiate retest. Observe if fault code + 2333 recurs.
If fault code +2333 did not recur, original A9 module is defective; replace. If fault code + 2333 did recur, replace UUT.

53. FAULT CODE +2341 (NO +7.6 VAC OUTPUT AT J14-T)

Step 1. Replace A5 module and initiate retest. Observe if fault code + 2341 recurs.
If fault code + 2341 did not recur, original A5 module is defective; replace. If fault code + 2341 did recur, proceed to step 2.

Step 2. Replace A11 module and initiate retest. Observe if fault code +2341 recurs.
If fault code + 2341 did not recur, original All module is defective; replace. If fault code + 2341 did recur, replace UUT.

INTERFACE CONTROL UNIT (209-074-110-1)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

54. FAULT CODE +2342 (NO +7.6 VAC OUTPUT AT J14-V)

Step 1. Replace A5 module and initiate retest. Observe if fault code + 2342 recurs.

If fault code + 2342 did not recur, original A5 module is defective; replace. If fault code + 2342 did recur, proceed to step 2.

Step 2. Replace A11 module and initiate retest. Observe if fault code + 2342 recurs.

If fault code + 2342 did not recur, original All module is defective; replace. If fault code + 2342 did recur, replace UUT.

55. FAULT CODE +2343 (NO +7.6 VAC OUTPUT AT J14-W)

Step 1. Replace A5 module and initiate retest. Observe if fault code + 2343 recurs.

If fault code + 2343 did not recur, original A5 module is defective; replace. If fault code + 2343 did recur, proceed to step 2.

Step 2. Replace A11 module and initiate retest. Observe if fault code + 2343 recurs.

If fault code + 2343 did not recur, original Al 1 module is defective; replace. If fault code + 2343 did recur, replace UUT.

56. FAULT CODE +2351 (NO +5 VAC OUTPUT AT J14-T)

Replace A5 module and initiate retest. Observe if fault code +2351 recurs.

If fault code + 2351 did not recur, original A5 module is defective; replace. If fault code + 2351 did recur, replace UUT.

57. FAULT CODE +2352 (NO +5 VAC OUTPUT AT J14-V)

Replace A5 module and initiate retest. Observe if fault code + 2352 recurs.

If fault code + 2352 did not recur, original A5 module is defective; replace. If fault code + 2352 did recur, replace UUT.

58. FAULT CODE +2353 (NO +5 VAC OUTPUT AT J14-W)

Replace A5 module and initiate retest. Observe if fault code + 2353 recurs,

If fault code + 2353 did not recur, original A5 module is defective; replace. If fault code + 2353 did recur, replace UUT.

59. FAULT CODE +2354 (NO +5 VAC OUTPUT AT J14-R)

Step 1. Replace A4 module and initiate retest. Observe if fault code + 2354 recurs.

If fault code + 2354 did not recur, original A4 module is defective; replace. If fault code + 2354 did recur, proceed to step 2.

Step 2. Replace A11 module and initiate retest. Observe if fault code + 2354 recurs.

If fault code + 2354 did not recur, original All module is defective; replace. If fault code + 2354 did recur, replace UUT.

2-27. INTERFACE CONTROL UNIT (209-074-110-1) TEST (cont) FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)	TEST OR INSPECTION	CORRECTIVE ACTION
	NOTE Initiate retest after any module replacement.	

60. FAULT CODE +2355 (NO +5 VAC OUTPUT AT J14-T)

Step 1. Replace A4 module and initiate retest. Observe if fault code + 2355 recurs.

If fault code +2355 did not recur, original A4 module is defective; replace. If fault code + 2355 did recur, proceed to step 2.

Step 2. Replace A11 module and initiate retest. Observe if fault code + 2355 recurs.

If fault code + 2355 did not recur, Al 1 module is defective; replace. If fault code + 2355 did recur, replace UUT.

61. FAULT CODE +2356 (NO +5 VAC OUTPUT AT J14-V

Step 1. Replace A4 module and initiate retest. Observe if fault code + 2356 recurs.

If fault code + 2356 did not recur, original A4 module is defective; replace. If fault code + 2356 did recur, proceed to step 2.

Step 2. Replace A11 module and initiate retest. Observe if fault code + 2356 recurs.

If fault code + 2356 did not recur, original All module is defective; replace. If fault code + 2356 did recur, replace UUT.

62. FAULT CODE +2357 (NO 0 VDC OUTPUT AT J15-T)

Replace A8 module and initiate retest. Observe if fault code +2357 recurs.

If fault code + 2357 did not recur, original A8 module is defective; replace. If fault code + 2357 did recur, replace UUT.

63. FAULT CODE +2361 (NO 0 VDC OUTPUT AT J15-S)

Step 1. Replace A4 module and initiate retest. Observe if fault code + 2361 recurs.

If fault code + 2361 did not recur, original A4 module is defective; replace. If fault code + 2361 did recur, proceed to step 2.

Step 2. Replace A8 module and initiate retest, Observe if fault code + 2361 recurs.

If fault code + 2361 did not recur, original A8 module is defective; replace. If fault code + 2361 did recur, replace UUT.

64. FAULT CODE +2362 (NO +5 VAC OUTPUT AT J14-X

Replace A3 module and initiate retest. Observe if fault code +2362 recurs.

If fault code + 2362 did not recur, original A3 module is defective; replace. If fault code + 2362 did recur, replace UUT.

65. FAULT CODE +2363 (NO +5 VAC OUTPUT AT J14.Z

Replace A3 module and initiate retest. Observe if fault code + 2363 recurs.

If fault code + 2363 did not recur, original A3 module is defective; replace. If fault code + 2363 did recur, replace UUT.

INTERFACE CONTROL UNIT (209-074-110-1)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

66. FAULT CODE +2364 (NO +5 VAC OUTPUT AT J14-BB)

Replace A3 module and initiate retest. Observe if fault code + 2364 recurs.

If fault code + 2364 did not recur, original A3 module is defective; replace. If fault code + 2364 did recur, replace UUT.

67. FAULT CODE +2371 (NO 0 VAC OUTPUT AT J14-T)

Replace A4 module and initiate retest. Observe if fault code + 2371 recurs.

If fault code + 2371 did not recur, original A4 module is defective; replace. If fault code + 2371 did recur, replace UUT.

68. FAULT CODE +2372 (NO 0 VAC OUTPUT AT J14-R)

Replace A4 module and initiate retest. Observe if fault code + 2372 recurs.

If fault code + 2372 did not recur, original A4 module is defective; replace. If fault code + 2372 did recur, replace UUT.

69. FAULT CODE +2373 (NO 0 VAC OUTPUT AT J14-V)

Replace A4 module and initiate retest. Observe if fault code + 2373 recurs.

If fault code + 2373 did not recur, original A4 module is defective; replace. If fault code + 2373 did recur, replace UUT.

70. FAULT CODE +2381 (NO +5 VAC OUTPUT AT J14-J)

Replace A2 module and initiate retest. Observe if fault code + 2381 recurs.

If fault code + 2381 did not recur, original A2 module is defective; replace. If fault code + 2381 did recur, replace UUT.

71. FAULT CODE +2382 (NO +5 VAC OUTPUT AT J14-M)

Replace A2 module and initiate retest. Observe if fault code + 2382 recurs.

If fault code +2382 did not recur, original A2 module is defective; replace. If fault code + 2382 did recur, replace UUT.

72. FAULT CODE +2383 (NO +5 VAC OUTPUT AT J14-P)

Replace A2 module and initiate retest. Observe if fault code + 2383 recurs.

If fault code + 2383 did not recur, original A2 module is defective; replace. If fault code + 2383 did recur, replace UUT.

2-27. INTERFACE CONTROL UNIT (209-074-110-1) TEST (cont) FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

73. FAULT CODE +2391 (NO 0 VAC OUTPUT AT J14-L)

Step 1. Replace A11 module and initiate retest. Observe if fault code + 2391 recurs.
If fault code + 2391 did not recur, original A11 module is defective; replace, If fault code + 2391 did recur, proceed to step 2.

Step 2. Replace A9 module and initiate retest, Observe if fault code +2391 recurs.
If fault code + 2391 did not recur, original A9 module is defective; replace. If fault code + 2391 did recur, replace UUT.

74. **FAULT CODE +2392 (NO O VAC OUTPUT AT J14-N)**

Step 1. Replace A11 module and initiate retest. Observe if fault code + 2392 recurs.
If fault code + 2392 did not recur, original A11 module is defective; replace. If fault code + 2392 did recur, proceed to step 2.

Step 2. Replace A9 module and initiate retest. Observe if fault code + 2392 recurs.
If fault code + 2392 did not recur, original A9 module is defective; replace. If fault code + 2392 did recur, replace UUT.

75. FAULT CODE +2393 (NO O VAC OUTPUT AT J14-R)

Step 1. Replace A11 module and initiate retest. Observe if fault code +2393 recurs.
If fault code + 2393 did not recur, original A11 module is defective; replace. If fault code + 2393 did recur, proceed to step 2.

Step 2. Replace A9 module and initiate retest. Observe if fault code + 2393 recurs.
If fault code + 2393 did not recur, original A9 module is defective; replace. If fault code + 2393 did recur, replace UUT.

76. FAULT CODE +2401 (NO +5 VAC OUTPUT AT J14-L)

Step 1. Replace A9 module and initiate retest. Observe if fault code + 2401 recurs.
If fault code + 2401 did not recur, original A9 module is defective; replace, If fault code + 2401 did recur, proceed to step 2.

Step 2. Replace A11 module and initiate retest. Observe if fault code +2401 recurs.
If fault code + 2401 did not recur, original A11 module is defective; replace. If fault code + 2401 did recur, replace UUT.

77. FAULT CODE +2402 (NO +5 VAC OUTPUT AT J14-N)

Step 1. Replace A9 module and initiate retest. Observe if fault code + 2402 recurs.
If fault code + 2402 did not recur, original A9 module is defective; replace. If fault code + 2402 did recur, proceed to step 2.

Step 2. Replace A11 module and initiate retest. Observe if fault code +2402 recurs.
If fault code + 2402 did not recur, original All module is defective; replace. If fault code + 2402 did recur, replace UUT.

INTERFACE CONTROL UNIT (209-074-110-1)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

78. FAULT CODE +2403 (NO +5 VAC OUTPUT AT J14-R)

Step 1. Replace A9 module and initiate retest. Observe if fault code + 2403 recurs.

If fault code + 2403 did not recur, original A9 module is defective; replace. If fault code +2403 did recur, proceed to step 2.

Step 2. Replace A11 module and initiate retest. Observe if fault code + 2403 recurs.

If fault code + 2403 did not recur, original A11 module is defective; replace. If fault code + 2403 did recur, replace UUT.

79. FAULT CODE +2404 (NO O VDC OUTPUT AT J14-Z)

Replace A2 module and initiate retest. Observe if fault code + 2402 recurs.

If fault code + 2404 did not recur, original A2 module is defective; replace, If fault code + 2404 did recur, replace **UUT.**

80. FAULT CODE +2405 (NO O VDC OUTPUT AT J14-B)

Replace A2 module and initiate retest, Observe if fault code + 2405 recurs.

If fault code + 2405 did not recur, original A2 module is defective; replace. If fault code + 2405 did recur, replace UUT.

81. FAULT CODE +2405 (NO O VDC OUTPUT AT J14-D)

Replace A2 module and initiate retest. Observe if fault code + 2405 recurs.

If fault code + 2405 did not recur, original A2 module is defective; replace, If fault code + 2405 did recur, replace UUT.

82. FAULT CODE +2411 (NO +7.6 VAC OUTPUT AT J14-L)

Step 1. Replace A5 module and initiate retest. Observe if fault code + 2411 recurs.

If fault code + 2411 did not recur, original A5 module is defective; replace. If fault code + 2411 did recur, proceed to step 2.

Step 2. Replace All module and initiate retest. Observe if fault code + 2411 recurs.

If fault code + 2411 did not recur, original All module is defective; replace. If fault code + 2411 did recur, replace UUT.

83. FAULT CODE +2412 (NO +7.6 VAC OUTPUT AT J14-N)

Step 1. Replace A5 module and initiate retest. Observe if fault code + 2412 recurs.

If fault code + 2412 did not recur, original A5 module is defective; replace. If fault code + 2412 did recur, proceed to step 2.

Step 2. Replace All module and initiate retest. Observe if fault code + 2412 recurs.

If fault code + 2412 did not recur, original A11 module is defective; replace. If fault code + 2412 did recur, replace UUT.

2-27. INTERFACE CONTROL UNIT (209-074-110-1) TEST (Cont) FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

84. FAULT CODE +2413 (NO +7.6 VAC OUTPUT AT J14-R)

Step 1. Replace A5 module and initiate retest, Observe if fault code + 2413 recurs.

If fault code + 2413 did not recur, original A5 module is defective; replace. If fault code + 2413 did recur, proceed to step 2.

Step 2. Replace All module and initiate retest. Observe if fault code + 2413 recurs.

If fault code + 2413 did not recur, original A11 module is defective; replace, If fault code + 2413 did recur; replace UUT.

85. FAULT CODE +2421 (NO -5 VAC OUTPUT AT J14-Z)

Set test set to C3 mode and enter 09 on keyboard.

If test set REFERENCE display indicates -11.0 to -14.0, A5 module is defective; replace. If test set REFERENCE display indicates -1.0 to + 1.0, A2 module is defective; replace.

86. FAULT CODE +2422 (NO -5 VAC OUTPUT AT J14-B)

Set test set to C3 mode and enter 10 on keyboard.

If test set REFERENCE display indicates -11.0 to -14.0, A5 module is defective; replace. If test set REFERENCE display indicates -1.0 to + 1.0, A2 module is defective; replace.

87. FAULT CODE +2423 (NO +5 VAC OUTPUT AT J14-D)

Set test set to C3 mode and enter 21 on keyboard.

If test set REFERENCE display indicates -11.O to -14.0, A5 module is defective; replace. If test set REFERENCE display indicates -1.0 to + 1.0, A2 module is defective; replace.

88. FAULT CODE +2424 (NO O VAC OUTPUT AT J14-R)

Replace A4 module and initiate retest. Observe if fault code + 2424 recurs.

If fault code + 2424 did not recur, original A4 module is defective; replace. If fault code + 2424 did recur, replace UUT.

89. FAULT CODE +2425 (NO 0 VAC OUTPUT AT J14-T)

Replace A4 module and initiate retest. Observe if fault code +2425 recurs.

If fault code + 2425 did not recur, original A4 module is defective; replace. If fault code + 2425 did recur, replace UUT.

90. FAULT CODE +2426 (NO 0 VAC OUTPUT AT J14-V)

Replace A4 module and initiate retest, Observe if fault code +2426 recurs.

If fault code + 2426 did not recur, original A4 module is defective; replace. If fault code + 2426 did recur, replace UUT.

INTERFACE CONTROL UNIT (209-074-110-1)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)	NOTE
TEST OR INSPECTION	Initiate retest after any module replacement.
CORRECTIVE ACTION	

91. FAULT CODE +2427 (NO +28 VDC OUTPUT AT J15-E)

Step 1. Replace A2 module and initiate retest. Observe if fault code + 2427 recurs.

If fault code + 2427 did not recur, original A2 module is defective; replace. If fault code + 2427 did recur, proceed to step 2.

Step 2. Replace A8 module and initiate retest. Observe if fault code + 2427 recurs.

If fault code + 2427 did not recur, original A8 module is defective; replace. If fault code + 2427 did recur, replace UUT.

92. FAULT CODE +2428 (NO 0 VDC AT OUTPUT AT J15-G)

Replace A8 module and initiate retest. Observe if fault code + 2428 recurs.

If fault code + 2428 did not recur, original A8 module is defective; replace. If fault code + 2428 did recur, replace UUT.

93. FAULT CODE +2431 (NO +5 VAC OUTPUT AT J14-R)

Replace A4 module and initiate retest. Observe if fault code + 2431 recurs,

If fault code + 2431 did not recur, original A4 module is defective; replace. If fault code + 2431 did recur, replace UUT.

94. FAULT CODE +2432 (NO +5 VAC OUTPUT AT J14-T)

Replace A4 module and initiate retest. Observe if fault code + 2432 recurs.

If fault code + 2432 did not recur, original A4 module is defective; replace. If fault code + 2432 did recur, replace UUT.

95. FAULT CODE +2433 (NO +5 VAC OUTPUT AT J14-V)

Replace A4 module and initiate retest. Observe if fault code + 2433 recurs.

If fault code + 2433 did not recur, original A4 module is defective; replace. If fault code + 2433 did recur, replace UUT.

96. FAULT CODE +2434 (NO 0 VAC OUTPUT AT J14-X)

Replace A3 module and initiate retest. Observe if fault code +2434 recurs,

If fault code +2434 did not recur, original A3 module is defective; replace. if fault code + 2434 did recur, replace UUT.

97. FAULT CODE +2435 (NO 0 VAC OUTPUT AT J14-Z)

Replace A3 module and initiate retest. Observe if fault code + 2435 recurs.

If fault code + 2435 did not recur, original A3 module is defective; replace. If fault code +2435 did recur, replace UUT.

2-27. INTERFACE CONTROL UNIT (209-074-110-1) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

98. FAULT CODE +2436 (NO 0 VAC OUTPUT AT J14-BB)

Replace A3 module and initiate retest. Observe if fault code +2436 recurs.

If fault code + 2436 did not recur, original A3 module is defective; replace. If fault code + 2436 did recur, replace UUT.

99. FAULT CODE +2437 (NO +28 VOC OUTPUT AT J15-G)

Step 1. Replace A4 module and initiate retest. Observe if fault code + 2437 recurs.

If fault code + 2437 did not recur, original A4 module is defective; replace. If fault code + 2437 did recur, proceed to step 2.

Step 2. Replace A8 module and initiate retest. Observe if fault code + 2437 recurs.

if fault code + 2437 did not recur, original A8 module is defective; replace. If fault code + 2437 did recur, replace UUT.

100. FAULT CODE +2438 (NO 0 VDC OUTPUT AT J15-F)

Replace A8 module and initiate retest. Observe if fault code + 2438 recurs.

If fault code + 2438 did not recur, original A8 module is defective; replace. If fault code + 2438 did recur, replace UUT.

101. FAULT CODE +2441 (NO +5 VAC OUTPUT AT J14-X)

Replace A3 module and initiate retest. Observe if fault code +2441 recurs.

If fault code + 2441 did not recur, original A3 module is defective; replace. If fault code + 2441 did recur, replace UUT.

102. FAULT CODE +2442 (NO +5 VAC OUTPUT AT J14-Z)

Replace A3 module and initiate retest. Observe if fault code +2442 recurs.

If fault code + 2442 did not recur, original A3 module is defective; replace. If fault code + 2442 did recur, replace UUT.

103. FAULT CODE +2443 (NO +5 VAC OUTPUT AT J14-BB)

Replace A3 module and initiate retest. Observe if fault code +2443 recurs.

If fault code +2443 did not recur, original A3 module is defective; replace. If fault code +2443 did recur, replace UUT.

104. FAULT CODE +2444 (NO +28 VDC OUTPUT AT J15-F)

Step 1. Replace A3 module and initiate retest. Observe if fault code + 2444 recurs.

If fault code + 2444 did not recur, original A3 module is defective; replace. If fault code +2444 did recur, proceed to step 2.

Step 2. Replace A8 module and initiate retest. Observe if fault code + 2444 recurs.

If fault code +2444 did not recur, original A8 module is defective; replace. If fault code +2444 did recur, replace UUT.

INTERFACE CONTROL UNIT (209-074-110-1)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

105. FAULT CODE +2451 (NO 0 VDC OUTPUT AT J15-K)

Replace A9 module and initiate retest. Observe if fault code +2451 recurs.

If fault code +2451 did not recur, original A9 module is defective; replace. If fault code +2451 did recur, replace UUT.

106. FAULT CODE +2452 (NO 0 VDC AT OUTPUT AT J15-L)

Replace A9 module and initiate retest. Observe if fault code +2452 recurs.

If fault code +2452 did not recur, original A9 module is defective; replace. If fault code +2452 did recur, replace UUT.

107. FAULT CODE +2453 (NO 0 VDC OUTPUT AT J14-G)

Replace A9 module and initiate retest. Observe if fault code +2453 recurs.

If fault code +2453 did not recur, original A9 module is defective; replace. If fault code +2453 did recur, replace UUT.

108. FAULT CODE +2454 (NO 0 VDC OUTPUT AT J14-H)

Replace A9 module and initiate retest. Observe if fault code +2454 recurs.

If fault code +2454 did not recur, original A9 module is defective; replace. If fault code +2454 did recur, replace UUT.

109. FAULT CODE +2455 (NO 0 VDC OUTPUT AT J15-J)

Replace A9 module and initiate retest. Observe if fault code +2455 recurs.

If fault code +2455 did not recur, original A9 module is defective; replace. If fault code +2455 did recur, replace UUT.

110. FAULT CODE +2456 (NO 0 VDC OUTPUT AT J15-H)

Replace A9 module and initiate retest. Observe if fault code +2456 recurs.

If fault code +2456 did not recur, original A9 module is defective; replace. If fault code +2456 did recur, replace UUT.

111. FAULT CODE +2457 (NO 0 VDC OUTPUT AT J14-E)

Replace A9 module and initiate retest. Observe if fault code +2457 recurs.

If fault code +2457 did not recur, original A9 module is defective; replace. If fault code + 2457 did recur, replace UUT.

112. FAULT CODE +2458 (NO 0 VDC OUTPUT AT J14-F)

Replace A9 module and initiate retest. Observe if fault code +2458 recurs.

If fault code +2458 did not recur, original A9 module is defective; replace. If fault code + 2458 did recur, replace UUT.

2-27. INTERFACE CONTROL UNIT (209-074-110-1) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)	TEST OR INSPECTION	CORRECTIVE ACTION
	NOTE **Initiate retest after any module replacement.**	

113. FAULT CODE +2461 (NO +2.5 VAC OUTPUT AT J15-K)

Step 1. Check for fault code +2471.

If fault code +2471 appears, A3 module is defective; replace. If fault code +2471 did not appear, proceed to step 2.

Step 2. Replace A2 module and initiate retest. Observe if fault code +2461 recurs.

If fault code +2461 did not recur, original A2 module is defective; replace. If fault code + 2461 did recur, proceed to step 3.

Step 3. Replace A9 module and initiate retest. Observe if fault code +2461 recurs.

If fault code +2461 did not recur, original A9 module is defective; replace. If fault code +2461 did recur, replace UUT.

114. FAULT CODE +2462 (NO +2.5 VAC OUTPUT AT J15-L)

Step 1. Check for fault code +2472.

If fault code +2472 appears, A3 module is defective; replace. If fault code +2472 did not appear, proceed to step 2.

Step 2. Replace A2 module and initiate retest. Observe if fault code +2462 recurs.

If fault code +2462 did not recur, original A2 module is defective; replace. If fault code +2462 did recur, proceed to step 3.

Step 3. Replace A9 module and initiate retest. Observe if fault code +2462 recurs.

If fault code +2462 did not recur, original A9 module is defective; replace. If fault code +2462 did recur, replace UUT.

115. FAULT CODE +2463 (NO +2.5 VAC OUTPUT AT J15-J)

Step 1. Check for fault code +2473.

If fault code +2473 appears, A3 module is defective; replace. If fault code +2473 did not appear, proceed to step 2.

Step 2. Replace A2 module and initiate retest. Observe if fault code +2463 recurs.

If fault code +2463 did not recur, original A2 module is defective; replace. If fault code +2463 did recur, proceed to step 3.

Step 3. Replace A9 module and initiate retest. Observe if fault code +2463 recurs.

If fault code +2463 did not recur, original A9 module is defective; replace. If fault code +2463 did recur, replace UUT.

116. FAULT CODE +2464 (NO +2.5 VAC OUTPUT AT J15-H)

Step 1. Check for fault code +2474.

If fault code +2474 appears, A3 module is defective; replace. If fault code +2474 did not appear, proceed to step 2.

Step 2. Replace A2 module and initiate retest. Observe if fault code +2464 recurs.

If fault code +2464 did not recur, original A2 module is defective; replace. If fault code +2464 did recur, replace UUT.

INTERFACE CONTROL UNIT (209-074-110-1)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

117. FAULT CODE +2465 (NO +28 VDC OUTPUT AT J15-U)

Step 1. Replace A2 module and initiate retest. Observe if fault code +2465 recurs.
If fault code +2465 did not recur, original A2 module is defective; replace. If fault code +2465 did recur, proceed to step 2.

Step 2. Replace A8 module and initiate retest. Observe if fault code +2465 recurs.
If fault code +2465 did not recur, original A8 module is defective; replace. If fault code +2465 did recur, replace UUT.

118. FAULT CODE +2466 (NO 0 VAC OUTPUT AT J4-G)

Set test set to C0 mode and enter 53 on keyboard.
If test set REFERENCE display indicates -2.1 to -3.2, A2 module is defective; replace. If test set REFERENCE display indicates +2.1 to +3.2, A3 module is defective; replace. If test set REFERENCE display indicates -0,6 to -2.0, A4 module is defective; replace.

119. FAULT CODE +2467 (NO 0 VAC OUTPUT AT J14-H)

Set test set to C0 mode and enter 54 on keyboard.
If test set REFERENCE display indicates +2.1 to +3.2, A2 module is defective; replace. If test set REFERENCE display indicates -2.1 to -3.2, A3 module is defective; replace. If test set REFERENCE display indicates +0.6 to +2.0, A4 module is defective; replace.

120. FAULT CODE +2468 (NO 0 VAC OUTPUT AT J14-E)

Set test set to C0 mode and enter 47 on keyboard.
If test set REFERENCE display indicates -2.1 to -3.2, A2 module is defective; replace. If test set REFERENCE display indicates +2.1 to +3.2, A3 module is defective; replace. If test set REFERENCE display indicates -0.6 to -2.0, A4 module is defective; replace.

121. FAULT CODE +2469 (NO 0 VAC OUTPUT AT J14-F)

Set test set to C0 mode and enter 48 on keyboard.
If test set REFERENCE display indicates +2.1 to +3.2, A2 module is defective; replace. If test set REFERENCE display indicates -2.1 to -3.2, A3 module is defective; replace. If test set REFERENCE display indicates +0.6 to +2.0, A4 module is defective; replace.

122. FAULT CODE +2471 (NO 0 VAC OUTPUT AT J15-K)

Set test set to C0 mode and enter 57 on keyboard.
If test set REFERENCE display indicates +2.1 to +3.2, A2 module is defective; replace. If test set REFERENCE display indicates -2.1 to -3.2, A3 module is defective; replace. If test set REFERENCE display indicates +0.6 to +2.0, A4 module is defective; replace.

2-27. INTERFACE CONTROL UNIT (209-074-110-1) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

123. FAULT CODE +2472 (NO 0 VAC OUTPUT AT J15-L)

Set test set to C0 mode and enter 51 on keyboard.

If test set REFERENCE display indicates -2.1 to -3.2, A2 module is defective; replace. If test set REFERENCE display indicates +2.1 to +3.2, A3 module is defective; replace. If test set REFERENCE display indicates -0.6 to -2.0, A4 module is defective; replace.

124. FAULT CODE +2473 (NO 0 VAC OUTPUT AT J15-J)

Set test set to C0 mode and enter 56 on keyboard.

If test set REFERENCE display indicates +2.1 to +3.2, A2 module is defective; replace. If test set REFERENCE display indicates -2.1 to -3.2, A3 module is defective; replace. If test set REFERENCE display indicates +0.6 to +2.0, A4 module is defective replace.

125. FAULT CODE +2474 (NO 0 VAC OUTPUT AT J15-H)

Set test set to C0 mode and enter 55 on keyboard.

If test set REFERENCE display indicates -2.1 to -3.2, A2 module is defective; replace. If test set REFERENCE display indicates +2.1 to +3.2, A3 module is defective; replace. If test set REFERENCE display indicates -0.6 to -2.0, A4 module is defective; replace.

126. FAULT CODE +2475 (NO +28 VDC OUTPUT AT J15-E)

Step 1. Replace A2 module and initiate retest. Observe if fault code +2475 recurs.

If fault code +2475 did not recur, original A2 module is defective; replace. If fault code +2475 did recur, proceed to step 2.

Step 2. Replace A8 module and initiate retest. Observe if fault code +2475 recurs.

If fault code +2475 did not recur, original A8 module is defective; replace. If fault code +2475 did recur, replace UUT.

127. FAULT CODE +2476 (NO +2.5 VAC OUTPUT AT J14-G)

Step 1. Replace A2 module and initiate retest. Observe if fault code +2476 recurs.

If fault code +2476 did not recur, original A2 module is defective; replace. If fault code +2476 did recur, proceed to step 2.

Step 2. Replace A9 module and initiate retest. Observe if fault code +2476 recurs.

If fault code +2476 did not recur, original A9 module is defective; replace. If fault code +2476 did recur, replace UUT.

128. FAULT CODE +2477 (NO +2.5 VAC OUTPUT AT J14-H)

Step 1. Replace A2 module and initiate retest. Observe if fault code +2477 recurs.

If fault code +2477 did not recur, original A2 module is defective; replace. If fault code +2477 did recur, proceed to step 2.

Step 2. Replace A9 module and initiate retest. Observe if fault code +2477 recurs.

If fault code +2477 did not recur, original A9 module is defective; replace. If fault code +2477 did recur, replace UUT.

INTERFACE CONTROL UNIT (209-074-110-1)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

129. FAULT CODE +2478 (NO +2.5 VAC OUTPUT AT J14-E)

Step 1. Replace A2 module and initiate retest. Observe if fault code +2478 recurs.
If fault code +2478 did not recur, original A2 module is defective; replace. If fault code +2478 did recur, proceed to step 2.

Step 2. Replace A9 module and initiate retest. Observe if fault code +2478 recurs.
If fault code +2478 did not recur, original A9 module is defective; replace. If fault code +2478 did recur, replace UUT.

130. FAULT CODE +2479 (NO +2.5 VAC OUTPUT AT J14-F)

Step 1. Replace A2 module and initiate retest. Observe if fault code +2479 recurs,
If fault code + 2479 did not recur, original A2 module is defective; replace. If fault code +2479 did recur, proceed to step 2.

Step 2. Replace A9 module and initiate retest. Observe if fault code +2479 recurs.
If fault code +2479 did not recur, original A9 module is defective; replace. If fault code +2479 did recur, replace UUT.

131. FAULT CODE +2481 (NO +2.5 VAC OUTPUT AT J15-K)

Replace A3 module and initiate retest. Observe if fault code +2481 recurs.
If fault code +2481 did not recur, original A3 module is defective; replace. If fault code +2481 did recur, replace UUT.

132. FAULT CODE +2482 (NO +2.5 VAC OUTPUT AT J15-L)

Replace A3 module and initiate retest. Observe if fault code +2482 recurs.
If fault code +2482 did not recur, original A3 module is defective; replace. If fault code +2482 did recur, replace UUT.

133. FAULT CODE +2483 (NO +2.5 VAC OUTPUT AT J15-J)

Replace A3 module and initiate retest. Observe if fault code +2483 recurs,
If fault code +2483 did not recur, original A3 module is defective; replace. If fault code +2483 did recur, replace UUT.

134. FAULT CODE +2484 (NO +2.5 VAC OUTPUT AT J15-H)

Replace A3 module and initiate retest. Observe if fault code +2484 recurs.
If fault code +2484 did not recur, original A3 module is defective; replace. If fault code +2484 did recur, replace UUT.

135. FAULT CODE +2485 (NO 0 VAC OUTPUT AT J14-G)

Replace A3 module and initiate retest. Observe if fault code +2485 recurs.
If fault code +2485 did not recur, original A3 module is defective; replace. If fault code + 2485 did recur, replace UUT.

2-27. INTERFACE CONTROL UNIT (209-074-110-1) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)	TEST OR INSPECTION / CORRECTIVE ACTION
	NOTE **Initiate retest after any module replacement.**

136. FAULT CODE +2486 (NO 0 VAC OUTPUT AT J14-H)

Replace A3 module and initiate retest. Observe if fault code +2486 recurs.

If fault code +2486 did not recur, original A3 module is defective; replace. If fault code +2486 did recur, replace UUT.

137. FAULT CODE +2487 (NO 0 VAC OUTPUT AT J14-E)

Replace A3 module and initiate retest. Observe if fault code +2487 recurs.

If fault code +2487 did not recur, original A3 module is defective; replace. If fault code +2487 did recur, replace UUT.

138. FAULT CODE +2488 (NO 0 VAC OUTPUT AT J14-F)

Replace A3 module and initiate retest. Observe if fault code +2488 recurs.

If fault code +2488 did not recur, original A3 module is defective; replace. If fault code +2488 did recur, replace UUT.

139. FAULT CODE +2489 (NO +28 VDC OUTPUT AT J15-T)

Step 1. Replace A3 module and initiate retest. Observe if fault code +2489 recurs.

If fault code +2489 did not recur, original A3 module is defective; replace. If fault code +2489 did recur, proceed to step 2.

Step 2. Replace A8 module and initiate retest. Observe if fault code +2489 recurs.

If fault code +2489 did not recur, original A8 module is defective; replace. If fault code +2489 did recur, replace UUT.

140. FAULT CODE +2491 (NO 0 VDC OUTPUT AT J15-K)

Replace A3 module and initiate retest. Observe if fault code +2491 recurs.

If fault code +2491 did not recur, original A3 module is defective; replace. If fault code +2491 did recur, replace UUT.

141. FAULT CODE +2492 (NO 0 VDC OUTPUT AT J15-L)

Replace A3 module and initiate retest. Observe if fault code +2492 recurs.

If fault code +2492 did not recur, original A3 module is defective; replace. If fault code +2492 did recur, replace UUT.

142. FAULT CODE +2493 (NO 0 VDC OUTPUT AT J15-J)

Replace A3 module and initiate retest. Observe if fault code +2493 recurs.

If fault code +2493 did not recur, original A3 module is defective; replace. If fault code +2493 did recur, replace UUT.

INTERFACE CONTROL UNIT (209-074-110-1)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

143. FAULT CODE +2494 (NO 0 VDC OUTPUT AT J15-H)

Replace A3 module and initiate retest. Observe if fault code +2494 recurs.

If fault code +2494 did not recur, original A3 module is defective; replace. If fault code +2494 did recur, replace UUT.

144. FAULT CODE +2495 (NO +2.5 VAC OUTPUT AT J14-G)

Step 1. Rerun test and watch F1 fuse lamp.

Replace F1 fuse if fuse lamp lights at any time.

Step 2. Replace A3 module and initiate retest. Observe if fault code +2495 recurs.

If fault code +2495 did not recur, original A3 module is defective; replace. If fault code +2495 did recur, replace UUT.

145. FAULT CODE +2496 (NO +2.5 VAC OUTPUT AT J14-H)

Replace A3 module and initiate retest. Observe if fault code +2496 recurs.

If fault code +2496 did not recur, original A3 module is defective; replace, If fault code +2496 did recur, replace UUT.

146. FAULT CODE +2497 (NO +2.5 VAC OUTPUT AT J14-E)

Replace A3 module and initiate retest. Observe if fault code +2497 recurs.

If fault code +2497 did not recur, original A3 module is defective; replace. If fault code +2497 did recur, replace UUT.

147. FAULT CODE +2498 (NO +2.5 VAC OUTPUT AT J14-F)

Replace A3 module and initiate retest. Observe if fault code +2498 recurs.

If fault code +2498 did not recur, original A3 module is defective; replace. If fault code +2498 did recur, replace UUT.

148. FAULT CODE +2499 (NO +28 VDC OUTPUT AT J15-F)

Step 1. Replace A3 module and initiate retest. Observe if fault code +2499 recurs.

If fault code +2499 did not recur, original A3 module is defective; replace. If fault code +2499 did recur, proceed to step 2.

Step 2. Replace A8 module and initiate retest. Observe if fault code +2499 recurs.

If fault code +2499 did not recur, original A8 module is defective; replace. If fault code +2499 did recur, replace UUT.

149. FAULT CODE +2501 (NO +1.3 VAC OUTPUT AT J15-K)

Replace A4 module and initiate retest. Observe if fault code +2501 recurs.

If fault code +2501 did not recur, original A4 module is defective; replace. If fault code +2501 did recur, replace UUT.

2-27. INTERFACE CONTROL UNIT (209-074-110-1) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE) TEST OR INSPECTION CORRECTIVE ACTION	NOTE Initiate retest after any module replacement.

150. FAULT CODE +2502 (NO +1.3 VAC OUTPUT J15-L)

Replace A4 module and initiate retest. Observe if fault code +2502 recurs.

If fault code +2502 did not recur, original A4 module is defective; replace. If fault code +2502 did recur, replace UUT.

151. FAULT CODE +2503 (NO +1.3 VAC OUTPUT AT J15-J)

Replace A4 module and initiate retest. Observe if fault code +2503 recurs.

if fault code +2503 did not recur, original A4 module is defective; replace. If fault code +2503 did recur, replace UUT.

152. FAULT CODE +2504 (NO 1.3 VAC OUTPUT AT J15-H)

Replace A4 module and initiate retest. Observe if fault code +2504 recurs.

if fault code +2504 did not recur, original A4 module is defective; replace. If fault code +2504 did recur, replace UUT.

153. FAULT CODE +2505 (NO 0 VAC OUTPUT AT J14-G)

Replace A4 module and initiate retest. Observe if fault code +2505 recurs.

if fault code +2505 did not recur, original A4 module is defective; replace. If fault code +2505 did recur, replace UUT.

154. FAULT CODE +2506 (NO 0 VAC OUTPUT AT J14-H)

Replace A4 module and initiate retest. Observe if fault code +2506 recurs.

If fault code +2506 did not recur, original A4 module is defective; replace. If fault code +2506 did recur, replace UUT.

155. FAULT CODE +2507 (NO 0 VAC OUTPUT AT J14-E)

Replace A4 module and initiate retest. Observe if fault code +2507 recurs.

If fault code +2507 did not recur, original A4 module is defective; replace. If fault code +2507 did recur, replace UUT.

156. FAULT CODE +2508 (NO 0 VAC OUTPUT AT J15-F)

Replace A4 module and initiate retest. Observe if fault code +2508 recurs.

If fault code +2508 did not recur, original A4 module is defective; replace. If fault code +2508 did recur, replace UUT.

157. FAULT CODE +2509 (NO 0 VDC OUTPUT AT J15-G)

Replace A8 module and initiate retest. Observe if fault code +2509 recurs.

If fault code +2509 did not recur, original A8 module is defective; replace. If fault code +2509 did recur, replace UUT.

INTERFACE CONTROL UNIT (209-074-110-1)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)	TEST OR INSPECTION	CORRECTIVE ACTION
	NOTE Initiate retest after any module replacement.	

158. FAULT CODE +2511 (NO 0 VAC OUTPUT AT J15-K)

Replace A4 module and initiate retest. Observe if fault code +2511 recurs.

If fault code +2511 did not recur, original A4 module is defective; replace. If fault code +2511 did recur, replace UUT.

159. FAULT CODE +2512 (NO 0 VAC OUTPUT AT J15-L)

Replace A4 module and initiate retest. Observe if fault code +2512 recurs.

If fault code +2512 did not recur, original A4 module is defective; replace. If fault code +2512 did recur, replace UUT.

160. FAULT CODE +2513 (NO 0 VAC OUTPUT AT J15-J)

Replace A4 module and initiate retest. Observe if fault code +2513 recurs.

If fault code +2513 did not recur, original A4 module is defective; replace. If fault code +2513 did recur, replace UUT.

161. FAULT CODE +2514 (NO 0 VAC OUTPUT AT J15-H)

Replace A4 module and initiate retest. Observe if fault code +2514 recurs.

If fault code +2514 did not recur, original A4 module is defective; replace. If fault code +2514 did recur, replace UUT.

162. FAULT CODE +2515 (NO +1.3 VAC OUTPUT AT J14-G)

Replace A4 module and initiate retest. Observe if fault code +2515 recurs.

If fault code +2515 did not recur, original A4 module is defective; replace. If fault code +2515 did recur, replace UUT.

163. FAULT CODE +2516 (NO +1.3 VAC OUTPUT AT J14-H)

Replace A4 module and initiate retest. Observe if fault code +2516 recurs.

If fault code +2516 did not recur, original A4 module is defective; replace. If fault code +2516 did recur, replace UUT.

164. FAULT CODE +2517 (NO +1.3 VAC OUTPUT AT J14-E)

Replace A4 module and initiate retest. Observe if fault code +2517 recurs.

If fault code +2517 did not recur, original A4 module is defective; replace. If fault code +2517 did recur, replace UUT.

165. FAULT CODE +2518 (NO +1.3 VAC OUTPUT J14-F)

Replace A4 module and initiate retest. Observe if fault code +2518 recurs.

If fault code +2518 did not recur, original A4 module is defective; replace. If fault code +2518 did recur, replace UUT.

2-27. INTERFACE CONTROL UNIT (209-074-110-1) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE) TEST OR INSPECTION CORRECTIVE ACTION	NOTE Initiate retest after any module replacement.

166. FAULT CODE +2519 (NO +28 VDC OUTPUT AT J15-G)

Step 1. Replace A4 module and initiate retest. Observe if fault code +2519 recurs.
If fault code +2519 did not recur, original A4 module is defective; replace. If fault code +2519 did recur, proceed to step 2.

Step 2. Replace A8 module and initiate retest. Observe if fault code +2519 recurs.
If fault code +2519 did not recur, original A8 module is defective; replace. If fault code +2519 did recur, replace UUT.

167. FAULT CODE +2521 (NO +28 VDC OUTPUT AT J15-I)

Replace A1 module and initiate retest. Observe if fault code +2521 recurs.
If fault code +2521 did not recur, original A1 module is defective; replace. If fault code +2521 did recur, replace UUT.

168. FAULT CODE +2522 (NO 0 VDC OUTPUT AT J15-Y)

Replace A1 module and initiate retest. Observe if fault code +2522 recurs.
If fault code +2522 did not recur, original A1 module is defective; replace. If fault code +2522 did recur, replace UUT.

169. FAULT CODE +2523 (NO 0 VDC OUTPUT AT J15-X)

Replace A1 module and initiate retest. Observe if fault code +2523 recurs.
If fault code +2523 did not recur, original A1 module is defective; replace. If fault code +2523 did recur, replace UUT.

170. FAULT CODE +2524 (NO 0 VDC OUTPUT AT J15-Z)

Replace A1 module and initiate retest. Observe if fault code + 2524 recurs.
If fault code +2524 did not recur, original A1 module is defective; replace. If fault code +2524 did recur, replace UUT.

171. FAULT CODE +2525 (NO 0 VDC OUTPUT AT J15-EE)

Replace A1 module and initiate retest. Observe if fault code +2525 recurs.
If fault code +2525 did not recur, original A1 module is defective; replace. If fault code +2525 did recur, replace UUT.

172. FAULT CODE +2526 (NO 0 VDC OUTPUT AT J15-CC)

Replace A1 module and initiate retest. Observe if fault code +2526 recurs.
If fault code +2526 did not recur, original A1 module is defective; replace. If fault code +2526 did recur, replace UUT.

INTERFACE CONTROL UNIT (209-074-110-1)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

173. FAULT CODE +2531 (NO 0 VDC OUTPUT AT J15-I)

Replace A1 module and initiate retest. Observe if fault code +2531 recurs.

If fault code +2531 did not recur, original A1 module is defective; replace. If fault code +2531 did recur, replace UUT.

174. FAULT CODE +2532 (NO +28 VDC OUTPUT AT J15-Y)

Step 1. Replace A1 module and initiate retest. Observe if fault code +2532 recurs.

If fault code +2532 did not recur, original A1 module is defective; replace. If fault code +2532 did recur, proceed to step 2.

Step 2. Replace A8 module and initiate retest. Observe if fault code +2532 recurs.

If fault code +2532 did not recur, original A8 module is defective; replace. If fault code +2532 did recur, replace UUT.

175. FAULT CODE +2533 (NO +28 VDC OUTPUT AT J15-X)

Replace A1 module and initiate retest. Observe if fault code +2533 recurs.

If fault code +2533 did not recur, original A1 module is defective; replace. If fault code +2533 did recur, replace UUT.

176. FAULT CODE +2534 (NO +28 VDC OUTPUT AT J15-Z)

Replace A1 module and initiate retest. Observe if fault code +2534 recurs.

If fault code +2534 did not recur, original A1 module is defective; replace. If fault code +2534 did recur, replace UUT.

177. FAULT CODE +2535 (NO +28 VDC OUTPUT AT J15-EE)

Step 1. Replace A1 module and initiate retest. Observe if fault code +2535 recurs.

If fault code +2535 did not recur, original A1 module is defective; replace. If fault code +2535 did recur, proceed to step 2.

Step 2. Replace A2 module and initiate retest. Observe if fault code +2535 recurs.

If fault code +2535 did not recur, original A2 module is defective; replace. If fault code +2535 did recur, replace UUT.

178. FAULT CODE +2536 (NO +28 VDC OUTPUT AT J15-CC)

Step 1. Replace A1 module and initiate retest. Observe if fault code +2536 recurs.

If fault code +2536 did not recur, original A1 module is defective; replace. If fault code +2536 did recur, proceed to step 2.

Step 2. Replace A2 module and initiate retest. Observe if fault code +2536 recurs.

If fault code +2536 did not recur, original A2 module is defective; replace. If fault code +2536 did recur, replace UUT.

2-27. INTERFACE CONTROL UNIT (209-074-110-1) TEST (cont)

FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

179. FAULT CODE +2541 (NO +28 VDC OUTPUT AT J15W)

Replace A1 module and initiate retest. Observe if fault code +2541 recurs.

If fault code +2541 did not recur, original A1 module is defective; replace. If fault code +2541 did recur, replace UUT.

180. FAULT CODE +2542 (NO +28 VDC OUTPUT J15-BB)

Replace A1 module and initiate retest. Observe if fault code +2542 recurs.

If fault code +2542 did not recur, original A1 module is defective; replace. If fault code +2542 did recur, replace UUT.

181. FAULT CODE +2542 (NO +28 VDC OUTPUT J15-BB)

Replace A1 module and initiate retest. Observe if fault code +2551 recurs.

If fault code +2551 did not recur, original A1 module is defective; replace. If fault code +2551 did recur, replace UUT.

182. FAULT CODE +2552 (NO 0 VDC OUTPUT AT J15-X)

Replace A1 module and initiate retest. Observe if fault code +2552 recurs.

If fault code +2552 did not recur, original A1 module is defective; replace. If fault code +2552 did recur, replace UUT.

183. FAULT CODE +2553 (NO +7.5 VDC OUTPUT AT J15-Z)

Replace A1 module and initiate retest. Observe if fault code +2553 recurs.

If fault code +2553 did not recur, original A1 module is defective; replace. If fault code +2553 did recur, replace UUT.

184. FAULT CODE +2554 (NO 0 VDC OUTPUT AT J15-EE)

Replace A1 module and initiate retest. Observe if fault code +2554 recurs.

If fault code +2554 did not recur, original A1 module is defective; replace. If fault code +2554 did recur, replace UUT.

185. FAULT CODE +2555 (NO 0 VDC OUTPUT AT J15-BB)

Replace A1 module and initiate retest. Observe if fault code +2555 recurs.

If fault code +2555 did not recur, original A1 module is defective; replace. If fault code +2555 did recur, replace UUT.

186. FAULT CODE +2556 (NO +7.5 VDC OUTPUT AT J15-CC)

Replace A1 module and initiate retest. Observe if fault code +2556 recurs.

If fault code +2556 did not recur, original A1 module is defective; replace. If fault code +2556 did recur, replace UUT.

INTERFACE CONTROL UNIT (209-074-110-1)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

187. FAULT CODE +2571 (NO RETICLE RETRACT PULSE AT J15-Z)

Replace A8 module and initiate retest. Observe if fault code +2571 recurs.

If fault code +2571 did not recur, original A8 module is defective; replace. If fault code +2571 did recur, replace UUT.

188. FAULT CODE +2581 (NO 0 VDC OUTPUT AT J15-K)

Replace A8 module and initiate retest. Observe if fault code +2581 recurs.

If fault code +2581 did not recur, original A8 module is defective; replace. If fault code +2581 did recur, replace UUT.

189. FAULT CODE +2591 (NO RETICLE RETRACT PULSE AT J15-Z)

Replace A8 module and initiate retest. Observe if fault code +2591 recurs.

If fault code +2591 did not recur, original A8 module is defective; replace. If fault code +2591 did recur, replace UUT.

190. FAULT CODE +2601 (NO 0 VDC OUTPUT AT J15-Q)

Replace A8 module and initiate retest. Observe if fault code +2601 recurs.

If fault code +2601 did not recur, original A8 module is defective; replace. If fault code +2601 did recur, replace UUT.

191. FAULT CODE +2611 (NO 0 VDC OUTPUT AT J15-N)

Replace A8 module and initiate retest. Observe if fault code +2611 recurs.

If fault code +2611 did not recur, original A8 module is defective; replace. If fault code +2611 did recur, replace UUT.

192. FAULT CODE +2621 (NO RETICLE RETRACT PULSE AT J15-Z)

Step 3. Replace A1 module and initiate retest. Observe if fault code +2621 recurs.

If fault code +2621 did not recur, original A1 module is defective; replace. If fault code +2621 did recur, proceed to step 2.

Step 2. Replace A4 module and initiate retest. Observe if fault code +2621 recurs.

If fault code +2621 did not recur, original A4 module is defective; replace. If fault code +2621 did recur, proceed to step 3.

Step 3. Replace A8 module and initiate retest. Observe if fault code +2621 recurs.

If fault code +2621 did not recur, original A8 module is defective; replace. If fault code +2621 did recur, replace UUT.

193. FAULT CODE +2631 (NO +28 VDC OUTPUT AT J15-T)

Replace A1 module and initiate retest. Observe if fault code +2631 recurs.

If fault code +2631 did not recur, original A1 module is defective; replace. If fault code +2631 did recur, replace UUT.

2-27. INTERFACE CONTROL UNIT (209-074-110-1) TEST (cont)

FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)	NOTE
TEST OR INSPECTION	Initiate retest after any module replacement.
CORRECTIVE ACTION	

194. FAULT CODE +2641 (NO 0 VDC OUTPUT AT J15-T)

Replace A1 module and initiate retest. Observe if fault code +2641 recurs.

If fault code +2641 did not recur, original A1 module is defective; replace. If fault code +2641 did recur, replace UUT.

195. FAULT CODE +2651 (RETICLE RETRACT PULSE IS PRESENT AT J15-Z)

Replace A4 module and initiate retest. Observe if fault code +2651 recurs.

If fault code +2651 did not recur, original A4 module is defective; replace. If fault code +2651 did recur, replace UUT.

END OF TROUBLESHOOTING

2-28. INTERFACE CONTROL UNIT (209-074-051-3) TEST

DESCRIPTION

This task covers: On bench testing including fault code troubleshooting data.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental
- Electronics Systems Test Set: M137
- DC Power Supply PP1104C
- Distribution Panel 12007200
- Power Supply 11834203
- Cable Assembly 7540635

Personnel Required:
- 68J Aircraft Fire Control Repairer

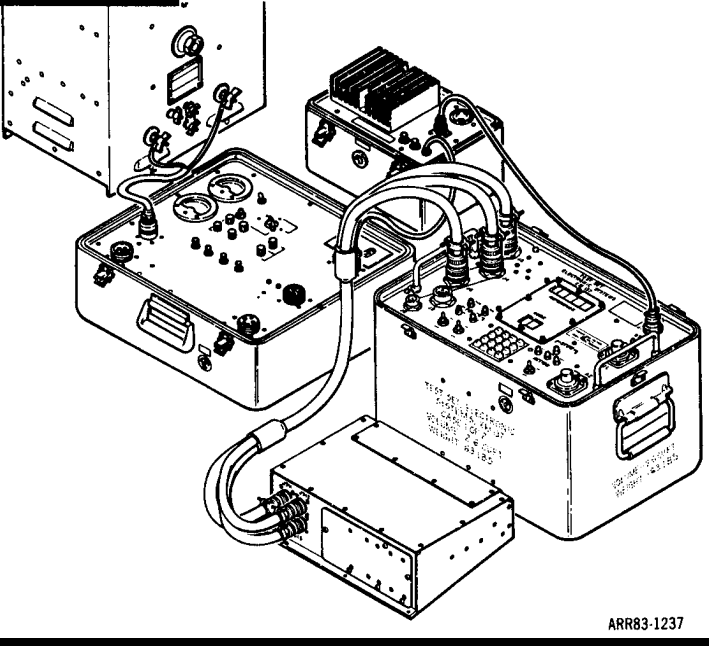
Equipment Conditions:
- On bench in shop.
- Bench power ready and test set power cable W1 connected.

General Safety Instructions:
- Never work on electronic equipment unless there is another person nearby who is familiar with operation and hazards of this equipment and who is competent in administering first aid. When aided by operator, technician must warn operator about dangerous areas.
- Power must not be applied to unit under test while test leads are being connected to or removed from unit assemblies/circuits under test.

INTERFACE CONTROL UNIT (209-074-051-3) TEST

1. CONNECT TEST SET CABLE W7 AS FOLLOWS:

   W7P1 to test set J4
   W7P2 to test set J5
   W7P3 to test set J3
   W7P4 to IFCU J311
   W7P5 to IFCU J312
   W7P6 to IFCU J313

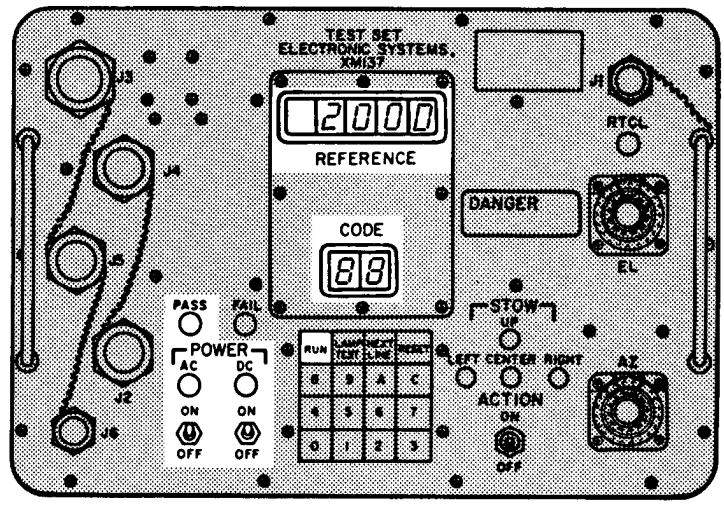


ARR83-1237

2-28. INTERFACE CONTROL UNIT (209-074-051-3) TEST (cont)

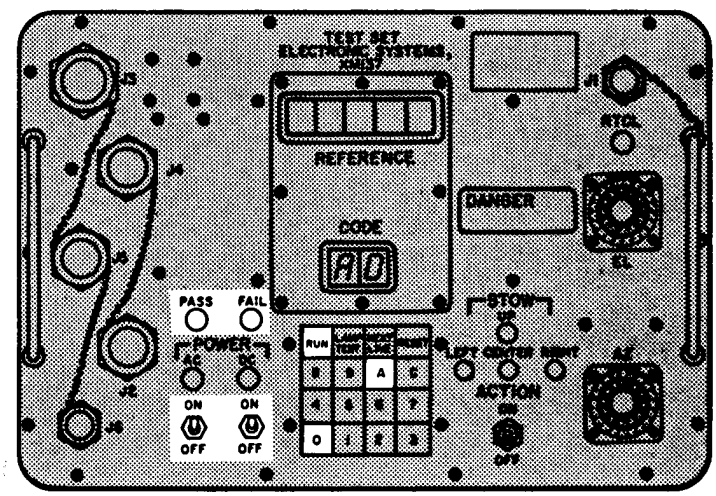
2. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.
   a. AC and DC power indicators light.
   b. 8's appear in REFERENCE and CODE displays
   c. PASS indicator lights.
3. ON TEST SET, PRESS RUN KEY.

   2000 appears in REFERENCE display.



ARR83-1238

4. ON TEST, SET, PRESS A, O, AND RUN KEYS.
   a. Automatic test sequence runs.
   b. PASS or FAIL indicator lights.
   c. If PASS indicator lights, remove power, disconnect test set cables, and return unit to service.
   d. If FAIL indicator lights, go to next step.



ARR83-1239

INTERFACE CONTROL UNIT (209-074-051-3) TEST (cont)

5. WHEN FAIL INDICATOR LIGHTS, A FOUR-DIGIT FAULT CODE WILL APPEAR IN THE REFERENCE DISPLAY.

6. USING NEXT LINE KEY, DISPLAY ALL FAULT CODES AND RECORD THEM FOR REFERENCE.

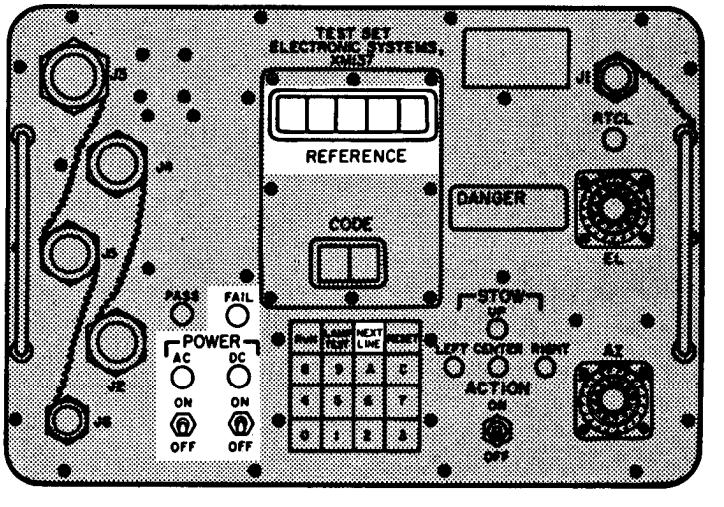
7. SET TEST SET AC AND DC CIRCUIT BREAKERS TO OFF.

NOTE

Refer to figures FO-10 thru 14 for interface diagram between test set and unit under test.

8. PERFORM TROUBLESHOOTING PROCEDURES IN FAULT CODE TROUBLESHOOTING DATA PROVIDED AT END OF THIS TEST.

9. UPON COMPLETION OF TROUBLESHOOTING PROCEDURES, REPEAT THIS TEST.



ARR83-1240

END OF TEST

2-28. INTERFACE CONTROL UNIT (209-074-051-3) TEST (cont)

INTERFACE CONTROL UNIT (209-074-051-3) FAULT CODE TROUBLESHOOTING DATA

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

WARNING

Verify all power is off before performing any corrective action.

1. FAULT CODE 2100 (SHORT ON 28 VDC INPUT AT J311-CC)

Step 1. Check cable W7 connector P4-CC for short.

Replace cable W7 if shorted.

Step 2. Check for shorted conductor between J311-CC and J1-J in UUT.

If conductor is shorted, replace UUT. If conductor is not shorted, then short exists in resolver mount assembly. Replace resolver mount assembly.

2. FAULT CODE 2101 (SHORT IN RELAY K23-A2/A1 CONTACTS)

Replace K23.

3. FAULT CODE 2102 (SHORT IN RELAY K23-A2/A1 CONTACTS)

Replace K23.

4. FAULT CODE 2110 (SHORT ON 28 VDC INPUT AT J311-C)

Step 1. Check cable W7 connector P4-C for short.

Replace cable W7 if shorted.

Step 2. Check TB1, VR3, K23 coil, and CR23 diode.

If TB1, VR3, K23, or CR23 are defective, replace. If all are good, replace UUT.

5. FAULT CODE 2111 (NO +18 VDC OUTPUT AT J312-A)

Set test set to CO mode and enter 50 on keyboard. Test set should indicate approximately +18 (Vdc). If indication is not approximately +18 (Vdc) refer to test diagram and troubleshoot circuit.

If K23, CR23, A1 or A2 modules are defective, replace. If problem is elsewhere, replace UUT.

6. FAULT CODE 2112 (NO -18 VDC OUTPUT AT J312-T)

Set test set to CO mode and enter 49 on keyboard. Test set should indicate approximately -18 (Vdc). If indication is not approximately -18 (Vdc) refer to test diagram and troubleshoot circuit.

If A1 or A2 module are defective, replace. If problem is elsewhere, replace UUT.

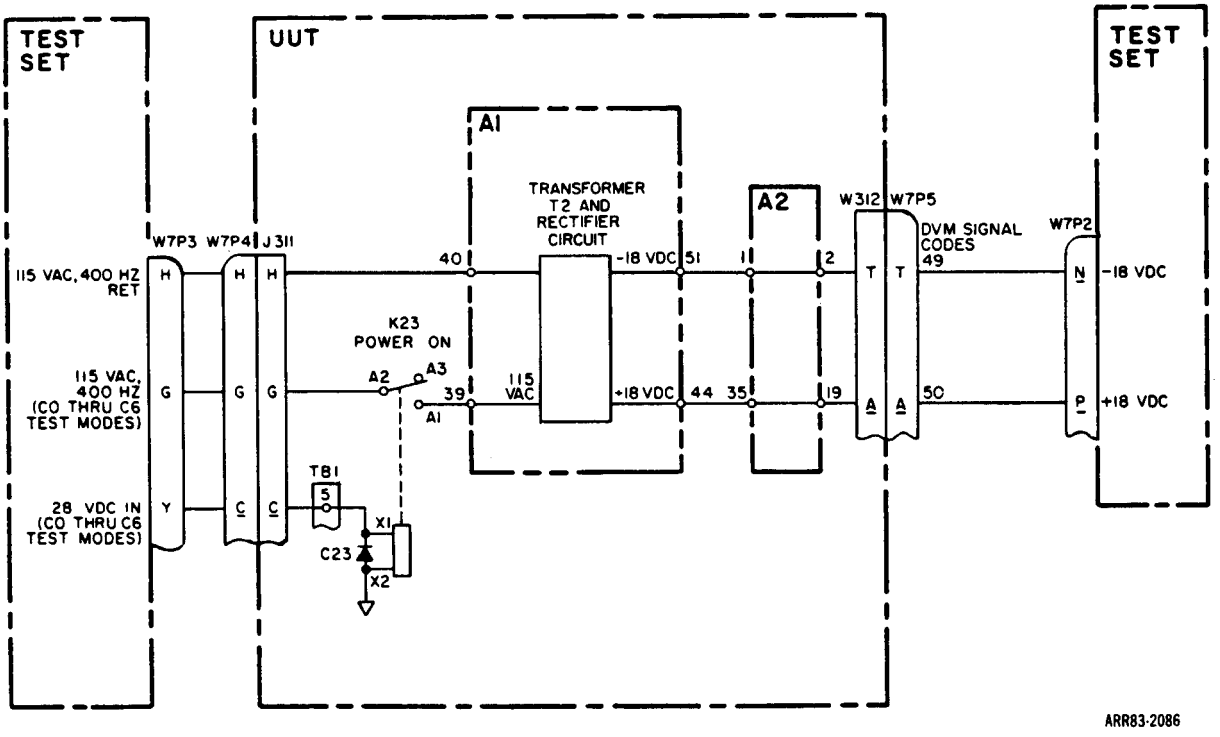
INTERFACE CONTROL UNIT (209-074-051-3)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.



7. FAULT CODE 2120 (SHORT ON 28 VDC INPUT AT J313-N)

Step 1. Check cable W7 connector P6-N for short.
Replace cable W7 if shorted.

Step 2. Refer to figure FO-10 and check circuit from J313-N through K16 to K4 and K8 coils, and from K16-A2 to K19 coil (K19 not shown).
If relay or associated diode is defective, replace. If relays and diodes are good, replace UUT.

8. FAULT CODE 2121 (NO +5 VAC SIGNAL OUTPUT AT J313-C)

Set test set to C5 mode and enter 06 on keyboard. Test set should indicate +5 ±1.3 (Vac). If indication is out of tolerance, troubleshoot Jt signal from J311-B through resolver network and K4 to J313-C. Refer to figure FO-10. If resolver mount assembly buffer amplifier, K4, or K16 is defective, replace. If problem is in chassis wiring, replace UUT.

9. FAULT CODE 2131 (NO +5 VAC SIGNAL OUTPUT AT J313-A)

Set test set to C5 mode and enter 12 on keyboard. Test set should indicate +5 ±1.3 (Vac). If indication is out of tolerance, troubleshoot It signal from J311-C through resolver network and K4 to J313-A. Refer to figure FO-10. If resolver mount assembly buffer amplifier, or K4 is defective, replace. If problem is in chassis wiring, replace UUT.

2-28. INTERFACE CONTROL UNIT (209-074-051-3) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

10. FAULT CODE 2141 (NO +1.6 VAC SIGNAL OUTPUT AT J313-D)

Set test set to C5 mode and enter 53 on keyboard. Test set should indicate +1.6 ±0.6 (Vac). If indicator is out of tolerance, troubleshoot Kt signal from J311-A through resolver network and K4 to J313-D. Refer to figure FO-10.

If resolver mount assembly buffer amplifier, or K4 is defective, replace. If problem is in chassis wiring, replace UUT.

11. FAULT CODE 2151 (NO -4 VAC INPUT AT J313-D WITH -4 VAC INPUT AT J311-BB)

Replace resolver mount assembly and initiate retest.

If fault code 2151 recurs on retest, replace UUT.

12. FAULT CODE 2161 (NO +5 VAC OUTPUT AT J311.T WITH +7 VAC INPUT AT J311-C AND ALL RELAYS DEENERGIZED)

Step 1. Set test set to C0 mode. Refer to figure FO-10 and assume all relays are deenergized.

Step 2. Measure signal on K4-B2. Signal should be approximately + 5 Vat.

Adjust IFCU roll resolver B2 for correct output. If signal cannot be adjusted to +5 ±1.3 Vac, replace resolver mount assembly.

Step 3. Enter 09 on keyboard. Signal should be the same as that observed in 12 step 2. Use figure FO-10 and signal trace from K4-B2 to J312-C.

Replace defective relay.

Step 4. With test set still in C0 mode, measure signal at A2 pin 14. Signal should be same as that observed in 12 step 2. Use figure FO-10 and signal trace from J312-C through cable W7 to J312-F and from J312-F and from J312-F to A2 pin 14.

If cable W7 is defective, replace. If K9, K7, or K8 is defective, replace.

Step 5. Measure signal at A2-TP2. Signal should be +5 ±1.3 Vac.

If signal is not correct, replace A2 module.

Step 6. Enter 15 on keyboard. Signal should be same as that measured in 12 step 5.

If UUT wiring is defective; replace UUT.

13. FAULT CODE 2162 (NO +1.5 VAC OUTPUT AT J311-S WITH +2.5 VAC INPUT AT J311-A AND ALL RELAYS DEENERGIZED)

Step 1. Set test set to C0 mode. Refer to figure FO-10 and assume all relays are deenergized.

Step 2. Measure signal on K4-F2. Signal should be approximately +1.5 Vac.

Adjust IFCU pitch resolver (B1) for correct output. If signal cannot be adjusted to approximately +1.5 Vat, replace resolver mount assembly.

Step 3. Enter 07 on keyboard. Signal should be same as that observed in 13 step 2. Use figure FO-10 and signal trace from K4-F2 to J312-A.

Replace defective relay.

Step 4. With test set still in C0 mode, measure signal at A2 pin 17. Signal should be same as that observed in 13 step 2. Use figure FO-10 and signal trace from J312-A through cable W7 to J312-H and from J312-H to A2 pin 17.

If cable W7 is defective, replace. If K9, K7, or K8 is defective, replace.

INTERFACE CONTROL UNIT (209-074-051-3)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

Step 5. Measure signal at A2-TP3. Signal should be approximately -1.5 Vac.
If signal is not correct, replace A2 module.
Step 6. Measure signal at A3-TP1. Signal should be +1.5 ±0.5 Vac.
If signal is not correct, replace A3 module.
Step 7. Enter 16 on keyboard. Signal should be same as that measured in 13 step 6.
If UUT wiring is defective, replace UUT.

14. FAULT CODE 2163 (NO +5 VAC OUTPUT AT J312-D WITH +7 VAC INPUT AT J311-B AND ALL RELAYS DEENERGIZED)

Step 1. Set test set to C0 mode. Refer to figure FO-10 and assume all relays are deenergized.
Step 2. Measure signal on K4-D2. Signal should be +5 ±1.3 Vac.
If signal is not correct, replace resolver mount assembly.
Step 3. Enter 54 on keyboard. Signal should be same as that measured in 14 step 2. Use figure FO-10 and trace signal from K4-D2 to J312-D.
If relay is defective, replace. If UUT wiring is defective, replace UUT.

15. FAULT CODE 2164 (OUTPUT AT J313-R WAS OTHER THAN 0 VAC)

Step 1. Set test set to C0 mode. Refer to figure FO-10 and assume all relays are deenergized.
Step 2. Ac signal at K4-B2 should be present at K9-B2 but not be present at K9-B1. If signal is present at K9-B1, check that 28 Vdc is not present at K9 coil.
If 28 Vdc is not present on K9 coil, replace K9. If 28 Vdc is present on K9 coil, replace UUT.

16. FAULT CODE 2165 (OUTPUT AT J313-S WAS OTHER THAN 0 VAC)

Step 1. Set test set to C0 mode. Refer to figure FO-10 and assume all relays are reenergize.
Step 2. AC signal at K4-F2 should be present at K9-D2 but not be present at K9-D1.
If signal is present at K9-D1, replace K9.

17. FAULT CODE 2166 (OUTPUT AT J313-D WAS OTHER THAN 0 VAC)

Step 1. Set test set to C0 mode. Refer to figure FO-10 and assume all relays are deenergized.
Step 2. Ac signal at K4-F2 should not be present at K4-F1.
If signal is present at K4-F1, replace K4.

18. FAULT CODE 2170 (SHORT ON 28 VDC INPUT AT J313-M)

Step 1. Check cable W7 connector P6-M for short.
Replace cable W7 if defective.
Step 2. Refer to figure FO-10 and check circuit from J313-M through K1, K9, and K20 coils (K20 not shown) and associated diodes.
If relays or diodes are defective, replace. If relays and diodes are good, replace UUT.

2-28. INTERFACE CONTROL UNIT (209-074-051-3) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

19. FAULT CODE 2171 (NO -7 VAC OUTPUT AT J313-R)

Set test set to C1 mode, Refer to figure FO-10 and assume only relays K1 and K9 are energized. Input signal of -7 Vac at J313-W should be present at J313-R via K1, K2, W7, K9, and K10. Use figure FO-10 to isolate defective relay or cable and replace.

If relays or cable W7 are not cause of signal loss, replace UUT.

20. FAULT CODE 2172 (NO -2.5 VAC OUTPUT AT J313-S)

Set test set to C1 mode. Conditions of signal flow are same as for fault code 2171 except that -2.5 Vac input is at J313-U and should be present at J313-S. Use figure FO-10 to isolate defective relay or cable and replace.

If relays on cable W7 are not cause of signal loss, replace UUT.

21. FAULT CODE 2173 (NO -7 VAC OUTPUT AT J312-D)

Set test set to C1 mode. Input signal of -7 Vac at J313-V should be present at J312-D via energized contacts of K1 and deenergized contacts of K2. Use figure FO-10 to isolate cause of signal loss.

If K1 and K2 are defective, replace. If K1 and K2 are good, replace UUT.

22. FAULT CODE 2174 (NO 0 VAC OUTPUT AT J311-T)

Step 1. Set test set to C1 mode. Only relays K1 and K9 should be energized. Ac signals are applied at J313-W, -V, and U, and J311-C, -B, and -A,

Step 2. Check for 0 Vac at A2-14. If ac voltage is present, use figure FO-10 to locate source and routing of unwanted signal.

If a relay is defective, replace. If 0 Vac is present at A2-14, replace A2 module.

23. FAULT CODE 2175 NO O VAC OUTPUT AT J311-S)

Step 1. Set test set to C1 mode. Only relays K1 and K9 should be energized. Ac signals are applied at J313-W, -V, and -U, and J311-C, -B, and -A.

Step 2. Check for 0 Vac at A2-17. if ac voltage is present, use figure FO-10 to locate source of unwanted signal.

Replace relay if defective.

Step 3. If 0 Vac is present at A2-17, check for 0 Vac at A2-TP3.

If 0 Vac is not present at A2-TP3, replace A2 module. If 0 Vac is present at A2-TP3, replace A3 module.

24. FAULT CODE 2176 (NO 0 VAC OUTPUT AT J313-D)

Set test set to C1 mode. Only relays K1 and K9 should be energized. Ac signals are applied at 1311-A, -B, and -C, and J313-U, -V, and -W. Use figure FO-10 to locate source and routing of unwanted signal at J313-D.

Replace relay if defective.

25. FAULT CODE 2180 (SHORT ON 28 VDC INPUT AT J313-K OR J313-N)

Step 1. Check cable W7 connector P6-K and -N for short.

Replace cable W7 if shorted.

Step 2. Check K16, K6, K5, K10, K19, and K18 coils and associated diodes for shorts.

If relay or diode is defective, replace. If relay or diode is good, replace UUT.

INTERFACE CONTROL UNIT (209-074-051-3)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

26. FAULT CODE 2181 (NO -7 VAC OUTPUT AT J313-R)

Set test set to C2 mode. Relays K16, K6, K5, and K10 are energized by 28 Vdc at J313-K. Input signal of -7 Vac at J313-V should be present at J313-R via K6, K5, W7, and K10. Use figure FO-10 to isolate cause of signal loss.

If relay is defective, replace. If relays are not cause of signal loss, replace UUT.

27. FAULT CODE 2182 (NO -2.5 VAC OUTPUT AT J313-S)

Set test set to C2 mode. Relays K16, K6, K5, and K10 are energized by 28 Vdc at J313-K. Input signal of -2.5 Vac at J313-U should be present at J313-S via K6, K5, W7, and K10. Use figure FO-10 to isolate cause of signal loss.

If relay is defective, replace. If relays are not cause of signal loss, replace UUT.

28. FAULT CODE 2183 (NO -7 VAC OUTPUT AT J312-V)

Set test set to C2 mode. Relays K16, K6, K5, and K10 are energized by 28 Vdc at J313-K. Input signal of -7 Vac at J313-W should be present at J312-V via K6 and K5. Use figure FO-10 to isolate cause of signal loss.

If relay is defective, replace. If relays are not cause of signal loss, replace UUT.

29. FAULT CODE 2184 (NO +5 VAC OUTPUT AT J311-T)

Set test set to C2 mode. Relays K16, K6, K5, and K10 are energized by 28 Vdc at J313-K. Ac signal at J311-C should pass through resolver network and be present at K4-B2. Signal on K4-B2 should be present at K8-D2 via K3, K28, K1, K2, W7, K9, and K7. Use figure FO-10 to isolate cause of signal loss.

If relay is defective, replace. If relays are not cause of signal loss, replace UUT.

30. FAULT CODE 2185 (NO +1.5 VAC OUTPUT AT J311-S)

Set test set to C2 mode. Conditions are same as for fault code 2184 except that ac signal at K4-F2 should be present at K8-F2. Use figure FO-10 to isolate cause of signal loss.

If relay is defective, replace. If relays are not cause of signal loss, replace UUT.

31. FAULT CODE 2186 (NO +5 VAC OUTPUT AT 1312-D)

Set test set to C2 mode. Conditions are same as fault code 2184 except that ac signal at K4-D2 should be present at K8-D2. Use figure FO-10 to isolate cause of signal loss.

If relay is defective, replace. If relays are not cause of signal loss, replace UUT.

32. FAULT CODE 2187 (OUTPUT AT J313-D WAS OTHER THAN 0 VAC)

Set test set to C2 mode. Ac signal at K4-F2 should not be present at K4-F1. Relay K4 should be deenergized. Use figure FO-10 to determine source of unwanted signal at J313-D.

If K4 is shorted, replace. If signal at J313-D is a result of shorts in chassis wiring, replace UUT.

33. FAULT CODE 2188 (OUTPUT AT J311-E WAS OTHER THAN 0 VAC)

Set test set to C2 mode. With 28 Vdc applied at J313-K in C2 mode, no dc should be present at J311-E.

If dc is present, CR41 in A1 module is shorted; replace A1 module.

2-28. INTERFACE CONTROL UNIT (209-074-051-3) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)	TEST OR INSPECTION	CORRECTIVE ACTION
		NOTE **Initiate retest after any module replacement.**

34. FAULT CODE 2189 (OUTPUT AT J313-L WAS OTHER THAN 0 VDC)

Set test set to C2 mode. With 28 Vdc applied at J313-K in C2 mode, no dc should be present at J313-L

If dc is present, CR42 and A1 module is shorted; replace A1 module.

35. FAULT CODE 2190 (SHORT ON 28 VDC INPUT AT J311-E)

Step 1. Check cable W7 connector P4-E for short.

Replace cable W7 if shorted.

Step 2. Refer to figure FO-10. Check K3, K28, K5, K7, and K26 (not shown) coils and associated diodes for shorts.

If relays or diodes are defective, replace. If relays or diodes are good, replace UUT.

36. FAULT CODE 2191 (NO +5 VDC OUTPUT AT J311-T)

Step 1. Set test set to C3 mode. Refer to figure FO-10. Ac input signals are present at J313-W, -V, and -U, and J311-C, -B, and -A. Relays K3, K28, K5, K7, and K16 are energized by 28 Vdc applied at J311-E.

Step 2. Ac signal at K4-D2 should be present at A2-14 via K4, K3, K6, K5, W7, K1O, K7, and K8. Use figure FO-10 to isolate defective relay or determine reason for loss of signal.

If relay is defective, replace. If problem is in chassis wiring, replace UUT.

37. FAULT CODE 2192 (NO +1.5 VAC OUTPUT AT J311-S)

Set test set to C3 mode. Signal conditions are same as for fault code 2191 except that ac signal at K4-F2 should be present at A2-17. Use figure FO-10 to isolate defective relay or determine reason for loss of signal.

If relay is defective, replace. If problem is in chassis wiring, replace UUT.

38. FAULT CODE 2193 (NO +5 VAC OUTPUT AT J312-V)

Set test set to C3 mode. Signal conditions are same as for fault code 2191 except that ac signal at K4-B2 should be present at J312-V via K4, K3, K6, and K5. Use figure FO-10 to isolate defective relay or determine reason for loss of signal.

If relay is defective, replace. If problem is in chassis wiring, replace UUT.

39. FAULT CODE 2194 (OUTPUT AT J312-D WAS OTHER THAN 0 VAC)

Set test set to C3 mode. Signal conditions are same as for fault code 2191. There should be no signal present at K2-D2 due to K2 being deenergized and K28 being energized. Use figure FO-10 to isolate faulty component. K1 may be shorted D2 to D1 and permit signal at J313-V to be present at J312-D.

If relay is defective, replace. If problem is in chassis wiring, replace UUT.

40. FAULT CODE 2195 (OUTPUT AT J313-D WAS OTHER THAN 0 VDC)

Set test set to C3 mode. Signal conditions are same as for fault code 2191, Ac signal at K4-F2 should not be present at K4-F1 because K4 should be deenergized in C3 mode. Check K4 for short F2 to F1. See figure FO-10.

If K4 is defective, replace. If unwanted signal at J313-D is due to chassis wiring problems, replace UUT.

INTERFACE CONTROL UNIT (209-074-051-3)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

41. FAULT CODE 2196 (OUTPUT AT J313-R WAS OTHER THAN 0 VAC)

Set test set to C3 mode. Signal conditions are same as fault code 2191. Ac signal at K10-B2 should not be present at K10-B1 because K10 should be deenergized in C3 mode. Check K10 for short B2 to B1. See figure FO-10.

If K10 is defective, replace. If unwanted signal at J313-R is due to chassis wiring problems, replace UUT.

42. FAULT CODE 2197 (OUTPUT AT J313-S WAS OTHER THAN 0 VAC)

Set test set to C3 mode. Signal conditions ae same as fault code 2191. Ac signal at K10-D2 should not be present at K10-D1 because K10 should be deenergized in C3 mode. Check K10 for short D2 to D1. See figure FO-10.

If K10 is defective, replace. If unwanted signal at J313-S is due to chassis wiring, replace UUT.

43. FAULT CODE 2198 (OUTPUT AT J313-L WAS OTHER THAN 0 VDC)

Set test set to C3 mode. This applies 28 Vdc to J311-E, dc should not be present at J313-L DVM code 60). See figure FO-10.

If dc is present at J313-L, CR40 in A1 module is shorted; replace A1 module.

44. FAULT CODE 2199 (OUTPUT AT J313-K WAS OTHER THAN 0 VDC)

Set test set to C3 mode. This applies 28 Vdc at J311-E, dc should not be present at J313-K (DVM code 62). See figure FO-10.

If dc is present at J313-K, CR43 in A1 module is shorted; replace A1 module.

45. FAULT CODE 2200 (SHORT ON 28 VDC INPUT AT J313-L)

Step 1. Check cable W7 connector P4-L for short.

Replace cable W7 if shorted.

Step 2. Refer to figure FO-10. Check K3, K28, K5, K7, and K26 (not shown) coils and associated diodes for shorts.

If relays or diodes are defective, replace. If relays or diodes are good, replace UUT.

46. FAULT CODE 2201 (OUTPUT AT J311-E WAS OTHER THAN 0 VDC)

Set test set to C4 mode. This applies 28 Vdc at J313-L, dc should not be present at J311-E (DVM code 61). See figure FO-10.

If dc is present at J311-E, CR39 in A1 module is shorted; replace A1 module.

47. FAULT CODE 2202 (NO +5 VDC OUTPUT AT 1311-T)

Set test set to C4 mode. This applies 28 Vdc at J313-L and + 2.5 Vac at J311-A. Enter 08 on test set and check for +2.5 Vac indication on test set. If +2.5 Vac is not indicated, a wiring problem probably exists in A1 module that prevents 28 Vdc input at terminal 46 from being present as an output on terminals 49 and 50 of A1 module. See figure FO-10.

Replace A1 module.

48. FAULT CODE 2210 (SHORT ON 28 VDC INPUT AT J313-N)

Step 1. Check cable W7 connector P6-N for short.

Replace cable W7 if shorted.

Step 2. Refer to figure FO-10. Check K4, K8, K, and K19 coils and associated diodes for shorts.

If relays or diodes are defective, replace. If relays or diodes are good, replace UUT.

2-28. INTERFACE CONTROL UNIT (209-074-051-3) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

49. FAULT CODE 2211 (NO +5 VAC OUTPUT AT J311-T)

Step 1. Set test set to C5 mode. Refer to figure FO-10. Ac input signals are present at J313-W, -V, and -U, and J311-C, -B, and -A. Relays K4, K8, and K2 are energized by 28 Vdc at 1313-N via normally closed contacts of K16.

Step 2. Ac signal at K4-B2 should be present at A2-14 via K4, W7, and K8. Use figure FO-10 to isolate defective relay or determine reason for loss of signal at J311-T. K4 or K8 are most likely cause for signal loss.

If relay is defective; replace. If problem is in chassis wiring, replace UUT.

50. FAULT CODE 2212 (NO +5 VAC OUTPUT AT J311-S)

Set test set to C5 mode. Signal conditions are same as for fault code 2211 except that ac signal at K4-D2 should be present at A2-17. Use figure FO-10 to isolate defective relay or determine reason for loss of signal at J311-S. K4 or K8 are most likely cause for signal loss,

If relay is defective; replace, If problem is in chassis wiring, replace UUT.

51. FAULT CODE 2213 (NO +1.5 VAC OUTPUT AT J313-D)

Set test set to C5 mode. Signal conditions are same as for fault code 2211 except that ac signal at K4-F2 should be present at J313-D via K4. K4 is most likely cause for signal loss at J313-D. See figure FO-10.

If relay is defective, replace, If problem is in chassis wiring, replace UUT.

52. FAULT CODE 2214 (OUTPUT AT J313-R WAS OTHER THAN 0 VAC)

Set test set to C5 mode. Signal conditions are same as for fault code 2211. Use figure FO-10 to isolate source of unwanted signal at J313-R.

If relay is defective, replace. If unwanted signal at J313-R is due to chassis wiring problems, replace UUT.

53. FAULT CODE 2215 (OUTPUT AT J313-S WAS OTHER THAN 0 VAC)

Set test set to C5 mode. Signal conditions are same as for fault code 2211. Use figure FO-10 to isolate source of unwanted signal at J313-S.

If relay is defective replace. If unwanted signal at J313-S is due to chassis wiring problems, replace UUT.

54. FAULT CODE 2216 (OUTPUT AT J312-V WAS OTHER THAN 0 VAC)

Set test set to C5 mode. Signal conditions are same as for fault code 2211. Use figure FO-10 to isolate source of unwanted signal at J312-V.

If relay is defective, replace. If unwanted signal at J312-V is due to chassis wiring problems, replace UUT.

55. FAULT CODE 2217 (OUTPUT AT J312-D WAS OTHER THAN 0 VDC)

Set test set to C5 mode. Signal conditions are same as for fault code 2211. Use figure FO-10 to isolate source of unwanted signal at J312-D.

If relay is defective, replace. If unwanted signal at J312-D is due to chassis wiring problems, replace UUT.

INTERFACE CONTROL UNIT (209-074-051-3)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
initiate retest after any module replacement.

56. FAULT CODE 2230 (SHORT ON 28 VDC INPUT)

Step 1. Refer to figure FO-11 and assume all relays are deenergized. For this fault code 28 Vdc was applied at J311-HH, -X, -P, -N, and -H during automatic sequence. Ground was not applied to K11-X2 via J311-E and K11 remained deenergized.

Step 2. Use figure FO-11 and determine which cable W7 conductor or UUT circuit is grounded.
If cable W7 is defective, replace. If problem in UUT is a defective relay or diode, replace. If problem is in chassis wiring, replace UUT.

57. FAULT CODE 2231 (OUTPUT AT J311-M WAS OTHER THAN 0 VDC)

Input signal conditions were same as for fault code 2230. 28 Vdc applied at J311-HH should not have been present at K13-C2 since K11 was not energized. Use figure FO-11 to check for defective component. Probable cause is short on K11 contacts A2 to A1.
Replace relay if defective.

58. FAULT CODE 2232 (OUTPUT AT J311W WAS OTHER THAN 0 VDC)

Input signal conditions were same as for fault code 2230. 28 Vdc applied at J311-HH should not have been present at K13-A2 since K11 was not energized. Use figure FO-11 to check for defective component. Probable cause is short on K11 contacts A2 and A1.
Replace relay if defective.

59. FAULT CODE 2233 (NO 28 VDC APPLIED AT J311-H)

Input signal conditions were same as for fault code 2230. 28 Vdc applied at J311-H was monitored at P3-K of test set. Fault code indicates that 28 Vdc was not applied. Check cable W7 for open between P4-H, P2-Z, and P3-K. See figure FO-11.
Replace cable W7 if defective.

60. FAULT CODE 2234 (NO 28 VDC OUTPUT AT J311-G)

Input signal conditions were same as for fault code 2230. 28 Vdc at J311-H should have been present at J311-G during automatic sequence. Check for open circuit between J311-H and J311-G through K13 contracts B2 and B3. See figure FO-11.
If relay is defective, replace. If open is in chassis wiring, replace UUT.

61. FAULT CODE 2235 (OUTPUT AT J311-I WAS OTHER THAN 0 VDC)

Input signal conditions were same as for fault code 2230. 28 Vdc applied at J311-X should not have been present K12-C2. since K11 was not energized. Check for closed circuit betweent J311-I and J311-X. Probable cause of fault is short on K11 contacts B2 to B1. See figure FO-11.
Replay relay if defective.

2-28. INTERFACE CONTROL UNIT (209-074-051-3) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

62. FAULT CODE 2236 (OUTPUT AT J311-GG WAS OTHER THAN 0 VDC)

Input signal conditions were same as for fault code 2230. 28 Vdc applied at J311-X during automatic sequence should not have been present at K12-A2 since K11 was not energized. Probable cause of fault is short on K11 contacts B2 to B1. See figure FO-11.

Replace relay if defective.

63. FAULT CODE 2237 (NO 28 VDC APPLIED AT J311-N)

Input signal conditions were same as for fault code 2230. 28 Vdc applied at J311-N was monitored at P3-BB of test set. Fault code indicates that 28 Vdc was not applied. Check cable W7 for open between P4-N, P1-K, and P3-BB. See figure FO-11.

Replace cable W7 if defective.

64. FAULT CODE 2238 (NO 28 VDC OUTPUT AT J311-Y)

Input signal conditions are same as for fault code 2230. 28 Vdc applied at J311-N should have been present at J311-Y via K12-B2/B3 during automatic sequence. See figure FO-11. Check for open on K3 between contacts B2 and B3

Replace K13 if contacts are open.

65. FAULT CODE 2240 (SHORT ON LOW INPUT AT J311-E)

With 28 Vdc present at K11-X1, a short occurred when ground was applied at K11-X2 via J311-E. Most likely cause is CR11 shorted. See figure FO-11.

If CR11 is shorted, replace. If problem is in chassis wiring, replace UUT.

66. FAULT CODE 2241 (NO 28 VDC OUTPUT AT J311-M)

During automatic sequence, K11 was energized and 28 Vdc at J311-HH was applied to J311-M through energized contacts of K11 and deenergized contacts C2 and C3 of K13. Set test set to C0 mode. This energizes both K11 and K13. Check for 28 Vdc at K13-C3. If 28 Vdc is absent, K11 is probably defective. If 28 Vdc is present, K13 probably failed to make contact C2 to C3 in its deenergized state. See figure FO-11.

Replace K11 or K13.

67. FAULT CODE 2242 (NO 28 VDC OUTPUT AT J311-W)

During automatic sequence, K11 was energized and 28 Vdc at J311-HH was applied to J311-W through energized contacts of K11 and deenergized contacts A2 and A3 of K13. Set test set to C0 mode. This energizes both K11 and K13. Check for 28 Vdc at K13-A3. If 28 Vdc is absent, K11 is probably defective. If 28 Vdc is present, K13 probably failed to make contact A2 to A3 in its deenergized state. See figure FO-11.

Replace K11 or K13.

68. FAULT CODE 2243 (NO 28 VDC OUTPUT AT J311-I)

During automatic sequence, K11 was energized and 28 Vdc at J311-X was applied to J311-I through energized contacts of K11 and deenergized contacts C2 and C3 of K12. Set test set to C0 mode. This energizes both K11 and K12. Check for 28 Vdc at K12-C3. If 28 Vdc is absent, K11 is probably defective. If 28 Vdc is present, K12 probably failed to make contact C2 to C3 in its deenergized state. See figure FO-11.

Replace K11 or K12.

INTERFACE CONTROL UNIT (209-074-051-3)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

69. FAULT CODE 2244 (NO 28 VDC OUTPUT AT J311-GG)

Input signals were same as for fault code 2243 except that K12 contacts A2 and A3 probably failed to make contact in deenergized state. This resulted in 28 Vdc input at J311-X failing to be present at J3-11-GG. See figure FO-11.

Replace K12 if defective.

70. FAULT CODE 2250 (SHORT ON 28 VDC INPUT AT J311-EE or J311-FF)

Step 1. Check cable W7, connector P4-EE and -FF for short.

Replace cable W7 if defective.

Step 2. Check K12 and K13 coils and associated diodes for shorts. See figure FO-11.

If relays or diodes are shorted, replace. If problem is in chassis wiring, replace UUT.

71. FAULT CODE 2251 (OUTPUT AT J311-W WAS OTHER THAN 0 VDC)

Step 1. During automatic sequence, relays K11, K12, and K13 were energized and 28 Vdc signals were present at J311-X, -HH, -N, and -H. See figure FO-11.

Step 2. With K13 energized, 28 Vdc from K11-A1 should not be present at J311 -W through K13. Set test set to C0 mode. In this mode, 28 Vdc is not on K13-A1 from J312-R and should be present at J311-W (DVM code 45). IF not, then K13 probably failed to break contact A2 to A3 during automatic sequence.

Replace K13 if defective.

72. FAULT CODE 2252 (OUTPUT AT J311-H WAS OTHER THAN 0 VDC)

During automatic sequence, K13 was energized and applied chassis ground from TB-1 to J311-H. Set test set to C0 mode. This energizes K13, and DVM code 58 should indicate 0 (Vdc) on J311-H. Use figure FO-11 to isolate defective component. Most likely cause of fault is K13 contacts B2 to B1 failed to make contact.

Replace K13 if defective.

73. FAULT CODE 2253 (OUTPUT AT J311-G WAS OTHER THAN 0 VDC)

Set test set to C0 mode and enter 29 on keyboard. Test set should display 0 (Vdc). If not, K13 contacts B2 to B3 probably failed to open. See figure FO-11.

Replace K13 if defective.

74. FAULT CODE 2254 (OUTPUT AT J311-N WAS OTHER THAN 0 VDC)

During automatic sequence, K12 was energized and applied chassis ground from TB1-1 to J311-N. Set test set to C0 mode. This energizes K12 and DVM code 27 should indicate 0 (Vdc) on J311-N. Use figure FO-11 to isolate defective component. Most likely cause of fault is K12 contacts B2 to B1 failed to make contact.

Replace K12 if defective.

75. FAULT CODE 2255 (OUTPUT AT J311-Y WAS OTHER THAN 0 VDC)

Set test set to C0 mode and enter 26 on keyboard. Test set should display 0 (Vdc). If not, K12 contacts B2 to B3 probably failed to open. See figure FO-11.

Replace K12 if defective.

2-28. INTERFACE CONTROL UNIT (209-074-051-3) TEST (cont)

FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

76. FAULT CODE 2256 (OUTPUT AT J311-GG WAS OTHER THAN 0 VDC)

Step 1. During automatic sequence, K11, K12 and K13 were energized. 28 Vdc at K11-B1 should not have been present at J311-GG because K12 contacts A2 to A3 were opened.

Step 2. Set test set to C0 mode and enter 46 on keyboard. In this mode, 28 Vdc is now on K12-A1 from J312-N and should be present at J311-GG (DVM code 46). If not, then K12 probably failed to break contact A2 to A3 during automatic sequence. See figure FO-11.

Replace K12 if defective.

77. FAULT CODE 2260 (SHORT ON 28 VDC INPUT AT J312-N OR J312-R)

Step 1. Check cable W7 connector P5-N and -R for short.

Replace cable W7 if shorted.

Step 2. Check chassis wiring from J312-N and -R for shorts. See figure FO-11.

Replace UUT if chassis wiring shorted.

78. FAULT CODE 2261 (NO 28 VDC OUTPUT AT J311-W)

Set test set to C0 mode and enter 45 on keyboard. Test set should indicate +28 ±4 (Vdc). Failure to indicate +28 (Vdc) means that K13 contacts A2 to A1 probably did not make and apply voltage from J312-R to J311-W. See figrue FO-11.

Replace K13 if defective.

79. FAULT CODE 2262 (NO 28 VDC OUTPUT AT J311-GG)

Set test set to C0 mode and enter 46 on keyboard. Test set should indicate +28 ±4 (Vdc). Failure to indicate 28 Vdc means that K12 contacts A2 to A1 probably did not make and apply voltage from J312-N to J311-GG. See figure FO-11.

Replace K12 if defective.

80. FAULT CODE 2300 (SHORT ON 28 VDC INPUT AT J311-D)

Step 1. Check cable W7 connector P4-D for short.

Replace cable W7 if defective.

Step 2. Check K17 coil and CR17 for short. See figure FO-12.

If relay or diode is shorted, replace. If short is in chassis wiring, replace UUT.

81. FAULT CODE 2310 (SHORT ON 28 VDC INPUT AT J311-D)

Step 1. Check cable W7 connector P4-D for short.

Replace W7 cable if defective.

Step 2. Check K15 coil and CR15 for short. See figure FO-12.

If relay or diode is shorted, replace, If short is in chassis wiring, replace UUT.

INTERFACE CONTROL UNIT (209-074-051-3)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

82. FAULT CODE 2311 (IMPROPER AC OUTPUT AT J311-AA)

Step 1. Refer to figure FO-12. For this fault code, K15 and K17 were energized with ac signal from J312-J and -C passing through K26, K8, and K15 to Z4. Ac signal of approximately 5 Vac at pin 9 of Z4 then passed through R33, K24-A3/A2, K25-A3/A2, across divider R54/R55, through K17-B3/B2 and K30-A3/A2 to J311-AA.

Step 2. Set test set to C6 mode. This energizes all relays except K26. Check that ac signals from test set output pins P3-X and -Y appear at A2-8 and -36, and are approximately 5 Vac at pin 9 of Z4. From Z4 pin 9, use DVM for continuity check through remainder of signal path to J311-AA.

If relays or associated diodes are defective, replace. If resistors in A2 divider network or Z4 is defective, replace A2 module. If chassis wiring is defective, replace UUT.

83. FAULT CODE 2320 (SHORT ON 28 VDC INPUT AT J311-E)

Step 1. Check cable W7 connector P4-E for short.

Replace cable W7 if defective.

Step 2. Check K26 coil and CR 26 for short. See figure FO-12. Also check K3, K28, and K7 coils and associated diodes for shorts. See figure FO-10.

If relays or diodes are defective, replace. If short is in chassis wiring, replace UUT.

84. FAULT CODE 2321 (IMPROPER AC OUTPUT AT J311-AA)

Step 1. Input signals were same as for fault code 2311 except that K26 was energized in additon to K15 and K17. This would have caused ac signal output at J311-AA to change from phase 1 (+) to phase 2 (-) due to switching of inputs by K26. See figure FO-12.

Step 2. Check operation of K26 by setting test set to C4 mode and checking that contacts A1/A2 and B1/B3 show continuity.

Replace K26 if defective.

85. FAULT CODE 2330 (SHORT 0N 28 VDC INPUT AT J313-N)

Step 1. Checkable W7 connector P6-N for short.

Replace cable W7 if shorted.

Step 2. Check K8 coil and CR8 for short. See figure FO-10. Also check K4, K2, and K19 (not shown) coils andassociated diodes for shorts. See figure FO-10.

If relays or diodes are defective, replace. If short is in chassis wiring, replace UUT.

86. FAULT CODE 2331 (IMPROPER AC OUTPUT AT J311-AA)

Step 1. Refer to figure FO-12. For this fault code, only K15, K17, and K8 were energized with ac signal from J313-P and -Q passing through K8 and K15 to Z4. Ac signal of approximately 5 Vac at pin 9 of Z4 then passed through R33, K24-A3/A2, K25-A3/A2, across divider R54/R55, through K17-B3/B2 and K30-A3/A2 to J311-AA. Ac signal at J311-AA reverts to a phase 1 (+) signal. (See fault codes 2311 and 2321).

Step 2. Check K8 operation by placing test set in C2 mode and verifying contacts A1/A2 and B1/B2 close.

Replace K8 if defective.

2-28. INTERFACE CONTROL UNIT (209-074-051-3) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

87. FAULT CODE -241O (SHORT ON 28 VDC INPUT AT J313-N)

Step 1. Check cable W7 connector P6-N for short.
Replace cable W7 if shorted.

Step 2. Check K4, K8, K2, and K19 coils and associated diodes for shorts. See figures FO-13 and FO-10.
If relays or diodes are defective, replace, If short is in chassis wiring, replace UUT.

88. FAULT CODE 2411 (NO +7 VAC OUTPUT AT J313-C)

Set test set to C6 mode. Use figure FO-13 to isolate cause of signal loss between J311-U input and J313-G output (DVM code 14).
If problem is in A2 module, replace. If problem is in chassis wiring replace UUT.

89. FAULT CODE 2412 (OUTPUT AT J313-A WAS OTHER THAN 0 VAC)

Refer to figure FO-13. For this fault code, only K4 was energized and 7 Vac phase 1 (+) was applied at J311-U. With both K29 and K15 deenergized, a ground should have been applied to resolver network through K15-B3/B2 and P1-V. Remove power to UUT and check for this ground. If ground is present, then problem is in resolver network. If ground is missing, then K29 or K15 is likely cause for fault.
If resolver network, relay, or A2 module are defective, replace, If problem is in chassis wiring, replace UUT.

90. FAULT CODE 2420 (SHORT ON 28 VDC INPUT AT J311-D)

Step 1. Check cable W7 connector P4-D for short.
Replace cable W7 if defective.

Step 2. Check K15 coil and CR15 for short. See figure FO-13.
If K15 or CR15 is defective, replace. If short is in chassis wiring, replace UUT.

91. FAULT CODE 2421 (IMPROPER AC OUTPUT AT J313-A)

Step 1. Refer to figure FO-13. For this fault code, K4 and K15 were energized and 7 Vac phase 1 (+) was applied at J311-U. Ac signal at A2-31 should have passed through K29-A2/A3, A2-R26, A2-R27/R28 divider, K17-A3/A2, K29-B3/B2, and K15-B1/B2 to resolver network. With power removed from UUT, perform continuity check from A2-33 to K15-B1.
Replace A2 module, K29, or K17 if defective.

Step 2. Set test set to C6 mode. This energizes all four relays. Check K15-B2/B1 for continuity. If open, K15 is defective. If closed, problem is in resolver network or K4.
Replace resolver network K15, or K4 if defective.

92. FAULT CODE 2430 (SHORT ON 28 VDC INPUT AT J311-D)

Step 1. Check cable W7 connector P4-D for short.
Replace cable W7 if shorted.

Step 2. Check K17 coil and CR17 for short. See figure FO-13.
If K17 or CR17 is defective, replace. If short is in chassis wiring, replace UUT.

INTERFACE CONTROL UNIT (209-074-051-3)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

93. FAULT CODE 2431 (IMPROPER AC OUTPUT AT J313-A)

Step 1. Refer to figure FO-13. For this fault code, K4, K15, and K17 were energized. Ac signal at A2-31 should have passed through K29-A2/A3, A2-R26/R27/R28 divider, K17-A1/A2, K29-B3/B2, and K15-B1/B2 to resolver network. With power removed from UUT, perform continuity check from A2-33 to K17-A1.

If A2 wiring or components are defective, replace A2 module.

Step 2. Set test set to C6 mode. This energizes all four relays. Check K17-A1/A2 for continuity. If open, K17 is defective. If closed, problem is in resolver network.

Replace resolver network or K17.

94. FAULT CODE 2440 (SHORT ON 28 VDC INPUT AT J311-K)

Step 1. Check cable W7 connector P4-K for short.

Replace cable W7 if shorted.

Step 2. Check K29 coil and K30 (not shown) coils and associated diodes for shorts. Refer to figure FO-13.

If relay or diode is defective, replace. If short is in chassis wiring, replace UUT.

95. FAULT CODE 2441 (IMPROPER AC OUTPUT AT J313-A)

Step 1. For this fault code, all four relays shown in figure FO-13 were energized. Ac signal at A2-33 should have passed through K29-A2/A1, A2-R46/R47 divider, K29-B1/B2, and K15-B1/B2 to resolver network. Set test set to C6 mode and enter 12 on keyboard. This energizes all four relays, and applies 7 Vac phase 1 (+) to J311-U. Test set should display approximately +1 (Vac).

Step 2. Check K29-A2/A1 and B2/B1 for continuity.

Replace K29 if defective.

Step 3. Check A2-R46/R47 divider.

If A2 module is defective, replace. If A2 module and relays are good, then problem is in resolver network; replace.

96. FAULT CODE 2450 (SHORT ON 28 VDC INPUT AT J313-M)

Step 1. Check cable W7 connector P6-M for short.

Replace cable W7 if shorted.

Step 2. Check for short on conductor between J313-M and K19-B2. See figure FO-14.

If K19 is defective, replace. If short is in chassis wiring, replace UUT.

97. FAULT CODE 2451 (OUTPUT AT J313-H WAS OTHER THAN 0 VDC)

For this fault code, K19 was not energized and 28 Vdc was present on its B2 contact. Check for short on K19-B1/B2 with power off. See figure FO-14.

Replace K19 if defective.

2-28. INTERFACE CONTROL UNIT (209-074-051-3) TEST (cont)

FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE

Initiate retest after any module replacement.

98. FAULT CODE 2452 (OUTPUT AT J311-L WAS OTHER THAN 0 VDC)

Step 1. Refer to figure FO-14. For this fault code, no relays were energized and Z3 should not have fired and permitted application of 28 Vdc from TB1-6 to K22-X1. Set test set to C5 mode. This applies and holds 28 Vdc at J311-C. Check for 28 Vdc on K22-X1. If 28 Vdc is present, A2-Q1 or Q2 is probably defective.
Replace A2 module,

Step 2. If 28 Vdc is not on K22-X1, check K22-A1/A2 for short.
Replace K22 if defective.

99. FAULT CODE 2460 (SHORT ON 28 VDC INPUT AT J313-K)

Step 1. Check cable W7 connector P6-K for short.
Replace cable W7 if shorted.

Step 2. Check K18 coil and CR18 for shorts. See figure FO-14. Check K6, K10, K16, and K5 coils and associated diodes for shorts. See figure FO-10.
If relay or diode is defective, replace. If short is in chassis wiring, replace UUT.

100. FAULT CODE 2461 (NO 28 VDC OUTPUT AT J311-L)

Step 1. For this fault code, K18 was energized. This permitted application of +5.1 Vdc from A2-34 through K18-A1/A2 and A2-CR34 to pin 5 of A2-Z3. This caused Z3 to fire and turn on Q2 and A1. This applied 28 Vdc through Q1 to K22-X1 for 50-250 milliseconds. For this period of time, 28 Vdc from TB1-6 is passed through K22-A1/A2 to J311-L See figure FO-14.

Step 2. Set test set to C2 mode, This energizes K18 and K19. Check that K18-A1/A2 closes and that approximately +5 Vdc from A2-34 is present at A2-4. If both of these conditions are met, then A2 module (CR34 and Z4) is probably defective.
Replace A2 module if defective.

Step 3. If K18-A1/A2 is not closed, K18 is defective.
Replace K18.

Step 4. If approximately +5 Vdc is not present at A2-34, A2 module is defective.
Replace A2 module.

Step 5. If problem persists after A2 module is replaced, K22 may not be making contact A1/A2 during 50-250 millisecond period Z4 is firing.
Replace K22

101. FAULT CODE 2470 (SHORT ON 28 VDC INPUT AT J313-M OR J313-N)

Step 1. Check cable W7 connector P6-M and -N for short.
Replace cable W7.

Step 2. Check K19 and K20 (fig. FO-12) for shorts. Check K8, K4, K2, K1, and K9 (fig. FO-8) coils and associated diodes for shorts.
If relay or diode is defective, replace. If short is in chassis wiring, replace UUT.

INTERFACE CONTROL UNIT (209-074-051-3)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

102. FAULT CODE 2471 (NO 28 VDC OUTPUT AT J311-L)

Step 1. Refer to figure FO-14. For this fault code, relays K19 and K20 were energized. This permitted application of +5.1 Vdc from A2-14 through K20-B1/B2, K19-A1/A2, and A2-CR33 to pin 5 of A2-Z3. This caused Z3 to fire and turn on Q2 and Q1. This applied 28 Vdc to K22-X1 for 50-250 milliseconds. For this period of time, 28 Vdc from TB1-6 is passed through K22-A1/A2 to J311-L

Step 2. Set test set to C1 mode. This energizes K20. Check that approximately +5 Vdc is supplied through K20-B1/B2 to K19-A1. If not, K20 is defective.
Replace K20.

Step 3. Set test set to C5 mode. This energizes K19 and deenergizes K20. Check that K19-A1/A2 contacts close. If not, K19 is defective.
Replace K19.

Step 4. If K19 and K20 are good, A2 module is probably defective.
Replace A2 module.

103. FAULT CODE 2481 (NO 28 VDC OUTPUT AT J313-H)

For this fault code, K19 was energized and 28 Vdc was applied at J313-M. Set test set to C5 mode. This energizes K19. Check if K19-B2/B1 makes contact or if open is elsewhere in circuit between J313-M and J313-H. See figure FO-14.
If K19 is defective, replace. If open is in chassis wiring, replace UUT.

END OF TROUBLESHOOTING

2-28.1 TURRET BUFFER AMPLIFIER ASSEMBLY (209-074-140-101) TEST

DESCRIPTION

This task covers: On bench testing including fault code troubleshooting data.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Electronics Systems Test Set: XM137
- DC Power Supply PP1104C
- Distribution Panel 12007200
- Power Supply 11834203
- Cable Assembly 7540635

Personnel Required:
- 68J Aircraft Fire Control Repairer

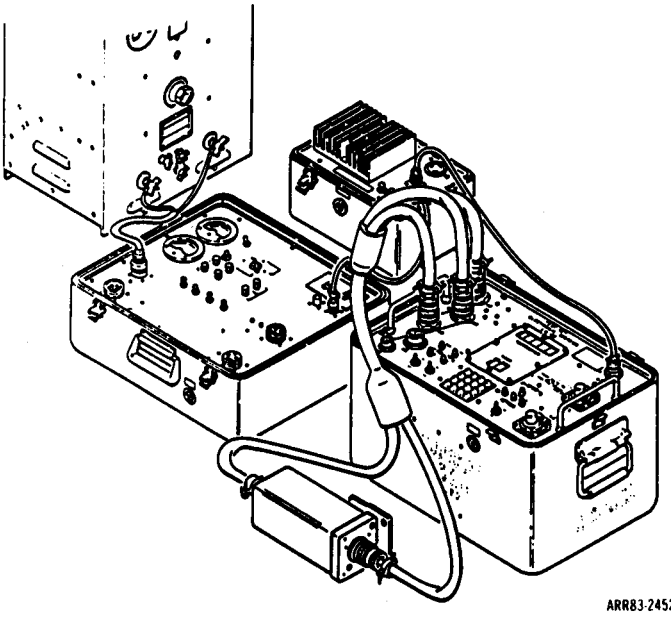
Equipment Conditions:
- On bench in shop.
- Bench power ready and test set power cable W1 connected.

General Safety Instructions:
- Never work on electronic equipment unless there is another person nearby who is familiar with operation and hazards of this equipment and who is competent in administering first aid. When aided by operator, technician must warn operator about dangerous areas.
- Power must not be applied to unit under test while test leads are being connected to or removed from unit assemblies/circuits under test.

TURRET BUFFER AMPLIFIER ASSEMBLY (209-074-140-101) TEST

1. CONNECT TEST SET CABLE W25 AS FOLLOWS:

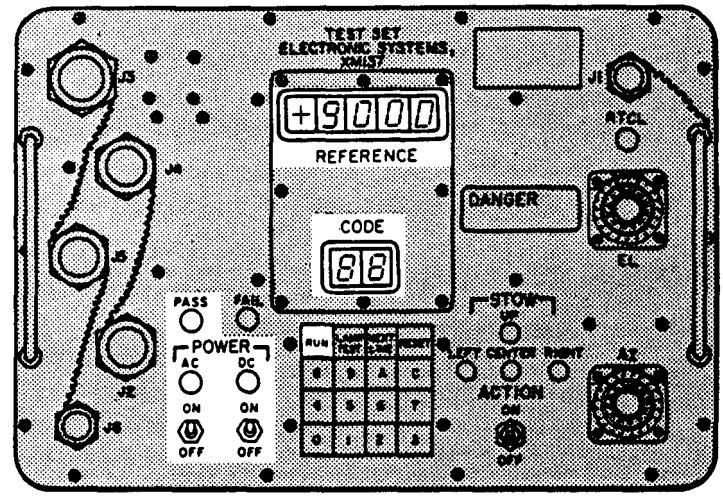
   W25P1 to test set J3
   W25P2 to test set J4
   W25P3 to test set J5
   W25P4 to buffer amplifier J1
   W25P5 to buffer amplifier J2



ARR83-2452

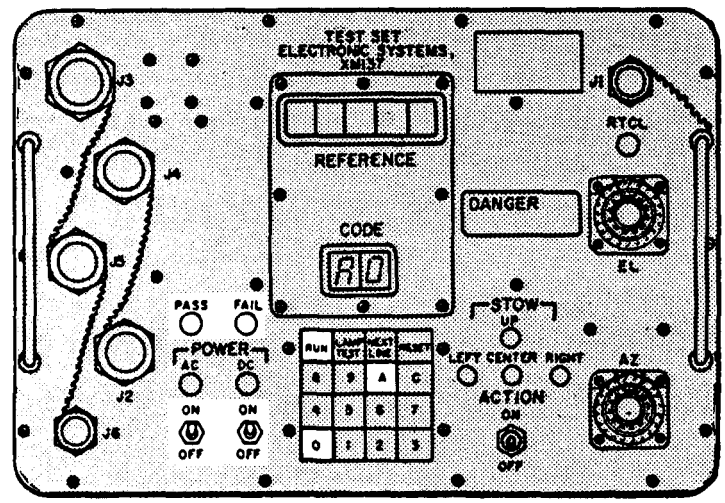
TURRET BUFFER AMPLIFIER ASSEMBLY (209-074-140-101) TEST (cont)

2. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.
   a. AC and DC power indicators light.
   b. 8's appear in REFERENCE and CODE displays.
   c. PASS indicator lights.
3. ON TEST SET, PRESS RUN KEY.
   +9000 appears in REFERENCE display.



ARR87-30021

4. ON TEST, SET, PRESS A, O, AND RUN KEYS.
   a. Automatic test sequence runs.
   b. PASS or FAIL indicator lights.
   c. If PASS indicator lights, remove power. Disconnect test set cables, and return unit to service.
   d. If FAIL indicator lights, go to next step.



ARR87-30022

2-28.1. TURRET BUFFER AMPLIFIER ASSEMBLY (209-074-140-101) TEST (cont)

5. WHEN FAIL INDICATOR LIGHTS, A FOUR-DIGIT FAULT CODE WILL APPEAR IN THE REFERENCE DISPLAY.

6. USING NEXT LINE KEY, DISPIAY ALL FAULT CODES AND RECORD THEM FOR REFERENCE.

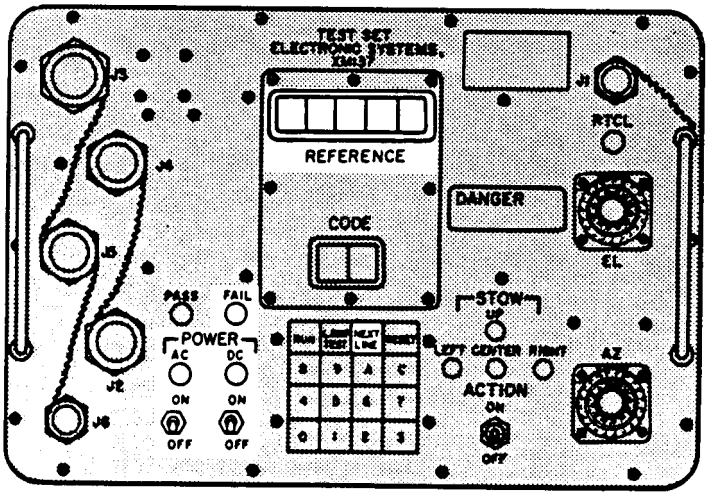
7. SET TEST SET AC AND DC CIRCUIT BREAKERS TO OFF.

NOTE

Refer to figure FO-14.1 for schematic diagram of unit under test and FO-14.2 for interface diagram.

8. PERFORM TROUBLESHOOTING PROCEDURES IN FAULT CODE TROUBLESHOOTING DATA PROVIDED AT END OF THIS TEST.

9. UPON COMPLETION OF TROUBLESHOOTING PROCEDURES, REPEAT THIS TEST.



ARR87 0026

END OF TEST

TURRET BUFFER AMPLIFIER ASSEMBLY (209-074-140-101) FAULT CODE TROUBLESHOOTING DATA

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE

Initiate retest after any module replacement.

WARNING

Verify all power is off before performing any corrective action.

1. **FAULT CODE +9100 (SHORT ON 28 VDC INPUT AT J2-Z)**
   Replace UUT.

2. **FAULT CODE +9101 (OUTPUT AT J1-Z NOT 28 VDC)**
   Replace UUT.

3. **FAULT CODE +9102 (OUTPUT AT J1-F NOT 28 VDC)**
   Replace UUT.

4. **FAULT CODE +9103 (OUTPUT AT J1-J NOT 28 VDC)**
   Replace UUT.

5. **FAULT CODE +9110 (SHORT ON 28 VDC INPUT AT J2-K)**
   Replace UUT.

6. **FAULT CODE +9111 (OUTPUT AT J1-K NOT 28 VDC)**
   Replace UUT.

7. **FAULT CODE +9112 (OUTPUT AT J1-C NOT 28 VDC)**
   Replace UUT.

8. **FAULT CODE +9113 (OUTPUT AT J1-G NOT 28 VDC)**
   Replace UUT.

9. **FAULT CODE +9120 (SHORT ON 28 VDC INPUT AT J2-H)**
   Replace UUT.

10. **FAULT CODE +9121 (OUTPUT AT J1-H NOT 28 VDC)**
    Replace UUT.

2-28.1. TURRET BUFFER AMPLIFIER ASSEMBLY (209-074-140-101) TEST (cont) FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE) TEST OR INSPECTION CORRECTIVE ACTION	NOTE Initiate retest after any module replacement.

11. FAULT CODE +9122 (OUTPUT AT J1-1 NOT 28 VDC)
Replace UUT.

12. FAULT CODE +9123 (OUTPUT AT J1-J NDT 28 VDC)
Replace UUT.

13. FAULT CODE +9130 (SHORT ON 28 VDC INPUT AT J2-Z)
Replace UUT.

14. REPLACE CODE +9131 (OUTPUT AT J1-Z NOT 28 VDC)
Replace UUT.

15. FAULT CODE +9132 (OUTPUT AT J1-E NOT 28 VDC)
Replace UUT.

16. FAULT CODE +9133 (OUTPUT AT J1-BB NOT 28 VDC)
Replace UUT.

17. FAULT CODE +9140 (SHORT ON 28 VDC INPUT AT J2-AA)
Replace UUT.

18. FAULT CODE +9141 (OUTPUT AT J1-AA NOT 28 VDC)

19. FAULT CODE +9142 (OUTPUT AT J1-V NOT 28 VDC)
Replace UUT.

20. FAULT CODE +9143 (OUTPUT AT J1-W NOT 28 VDC)
Replace UUT.

21. FAULT CODE +9150 (SHORT ON 28 VDC INPUT AT J2-X)
Replace UUT.

22. FAULT CDDE +9151 (OUTPUT AT J1-X NOT 28 VDC)
Replace UUT.

23. FAULT CODE +9152 (OUTPUT AT J1-Y NOT 28 VDC)
Replace UUT.

24. FAULT CODE +9153 (OUTPUT AT J1-EE NDT 28 VDC)
Replace UUT.

TURRET BUFFER AMPLIFIER ASSEMBLY (209-074-140-101) FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE) TEST OR INSPECTION CORRECTIVE ACTION	NOTE Initiate retest after any module replacement.

25. FAULT CODE +9160 (SHORT ON 28 VDC INPUT AT J2-FF)
Replace UUT.

26. FAULT CODE +9161 (OUTPUT AT J1-FF NOT 28 VDC)
Replace UUT.

27. FAULT CODE +9162 (OUTPUT AT J1-GG NOT 28 VDC)
Replace UUT.

28. FAULT CODE +9163 (OUTPUT AT J1-HH NOT 28 VDC)
Replace UUT.

29. FAULT CODE +9170 (SHORT ON 28 VDC INPUT AT J2-X)
Replace UUT.

30. FAULT CODE +9171 (OUTPUT AT J1-X NOT 28 VDC)
Replace UUT.

31. FAULT CODE +9172 (OUTPUT AT J1-W NOT 28 VDC)
Replace UUT.

32. FAULT CODE +9173 (OUTPUT AT J1-F NOT 28 VDC)
Replace UUT.

33. FAULT CODE +9180 (SHORT ON 28 VDC INPUT AT J2-P)
Replace UUT.

34. FAULT CODE +9181 (OUTPUT AT J1-P NOT 28 VDC)
Replace UUT.

35. FAULT CODE +9182 (OUTPUT AT J1-Q NOT 28 VDC)
Replace UUT.

36. FAULT CODE +9191 (J2-G IS NOT CONNECTED TO GROUND.)
Replace UUT.

37. FAULT CODE +9201 (J2-M IS NOT CONNECTED TO GROUND.)
Redate UUT.

2-28.1. TURRET BUFFER AMPLIFIER ASSEMBLY (209-074-140-101) TEST (cont) FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE) TEST OR INSPECTION CORRECTIVE ACTION	NOTE Initiate retest after any module replacement.

38. FAULT CODE +9211 (J2-N IS NOT CONNECTED TO GROUND)
Replace UUT.

39. FAULT CODE +9221 (J2-S IS NOT CONNECTED TO GROUND)
Replace UUT.

40. FAULT CODE +9231 (J2-Y IS NOT CONNECTED TO GROUND)
Replace UUT.

41. FAULT CODE +9241 (J2-T IS NOT CONNECTED TO GROUND)
Replace UUT.

42. FAULT CODE +9250 (SHORT ON 28 VOC INPUT AT J1-V, OR S)
Replace UUT.

43. FAULT CODE +9251 (OUTPUT AT J1-U IS NOT 0 VDC)
Replace UUT.

44. FAULT CODE +9252 (OUTPUT AT J1-T IS NOT 0 VDC)
Replace UUT.

45. FAULT CODE +9261 (OUTPUT AT J141 IS NOT 28 VDC)
Replace UUT.

46. FAULT CODE +9262 (OUTPUT AT J1-T IS NOT 28 VDC)
Replace UUT.

47. FAULT CODE +9271 (OUTPUT AT J1-R IS NOT 0 VAC)
Replace UUT.

48. FAULT CODE +9272 (OUTPUT AT J1-P IS NOT 0 VAC)
Replace UUT.

49. FAULT CODE +9273 (OUTPUT AT J1-M IS NOT 0 VAC)
Replace UUT.

50. FAULT CODE +9274 (OUTPUT AT J1-B IS NOT 0 VAC)
Replace UUT.

TURRET BUFFER AMPLIFIER ASSEMBLY (209-074-140-101) FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE) TEST OR INSPECTION CORRECTIVE ACTION	NOTE Initiate retest after any module replacement.

51. FAULT CODE +9275 {OUTPUT AT J1-A IS NOT 0 VAC)
Replace UUT.

52. FAULT CODE +9281 (OUTPUT AT J1-U IS NOT 0 VAC)
Replace UUT.

53. FAULT CODE +9282 (OUTPUT AT J1-A IS NOT 0 VAC)
Replace UUT.

54. FAULT CODE +9283 (OUTPUT AT 11-B IS NOT 0 VAC)
Replace UUT.

55. FAULT CODE +9284 (OUTPUT AT J1-E IS NOT 0 VAC)
Replace UUT.

56. FAULT CODE +9285 (OUTPUT AT J1-H IS NOT 0 VAC)
Replace UUT.

57. FAULT CODE +9291 (OUTPUT AT J1-R IS NOT +7 VAC)
Replace UUT.

58. FAULT CODE +9301 (OUTPUT AT J1-P IS NOT +7 VAC)
Replace UUT.

59. FALT CODE +9311 (OUTPUT AT J1-M IS NOT -9.5 VAC)
Replace UUT.

60. FAULT CODE +9312 (OUTPUT AT J1-B IS NOT +7 VAC)
Replace UUT.

61. FAULT CODE +9313 (OUTPUT AT J1-A IS NOT -2.5 VAC)
Replace UUT.

62. FAULT CODE +9321 (OUTPUT AT J1-U IS NOT -7 VAC)
Replace UUT.

63. FAULT CODE +9331 (OUTPUT AT J1-A IS NOT +7 VAC)
Replace UUT.

2-28.1. TURRET BUFFER AMPLIFIER ASSEMBLY (209-074-140-101) TEST (cont) FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE) TEST OR INSPECTION CORRECTIVE ACTION	NOTE Initiate retest after any module replacement.
64. FAULT CODE +9332 (OUTPUT AT J1-B IS NOT -2.5 VAC) Replace UUT.	
65. FAULT CODE +9333 (OUTPUT AT J1-E IS NOT +9.5 VAC) Replace UUT.	
66. FAULT CODE +9341 (OUTPUT AT J1-H IS NOT -9.5 VAC) Replace UUT.	

END OF TROUBLESHOOTING

2-29. LOGIC RELAY ASSEMBLY (209-175-352-101) TEST

DESCRIPTION

This task covers: On bench testing including fault code troubleshooting data.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Electronics Systems Test Set: XM137
- DC Power Supply PP1104C
- Distribution Panel 12007200
- Power Supply 11834203
- Cable Assembly 7540635

Personnel Required:
- 68J Aircraft Fire Control Repairer

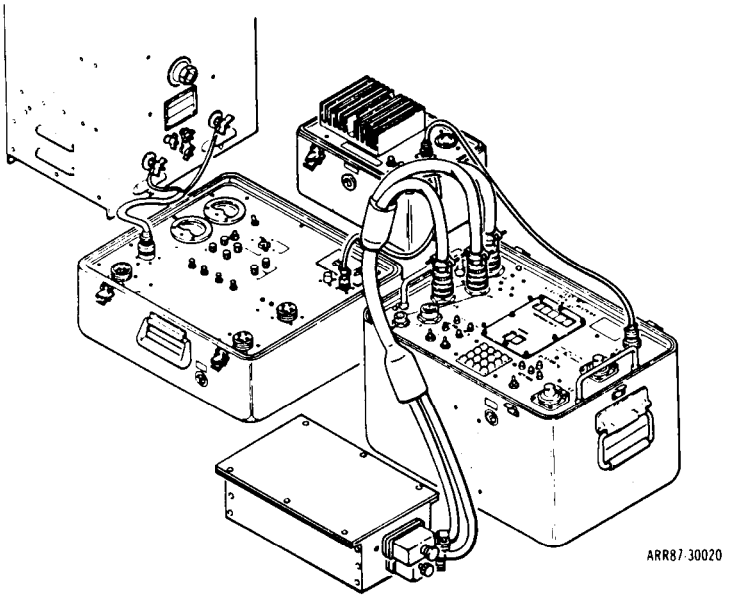
Equipment Conditions:
- On bench in shop.
- Bench power ready and test set power cable W1 connected.

General Safety Instructions:
- Never work on electronic equipment unless there is another person nearby who is familiar with operation and hazards of this equipment and who is competent in administering first aid. When aided by operator, technician must warn operator about dangerous areas.
- Power must not be applied to unit under test while test leads are being connected to or removed from unit assemblies/circuits under test.

LOGIC RELAY ASSEMBLY (209-175-352-101) TEST

1. CONNECT TEST SET CABLE W24 AS FOLLOWS:

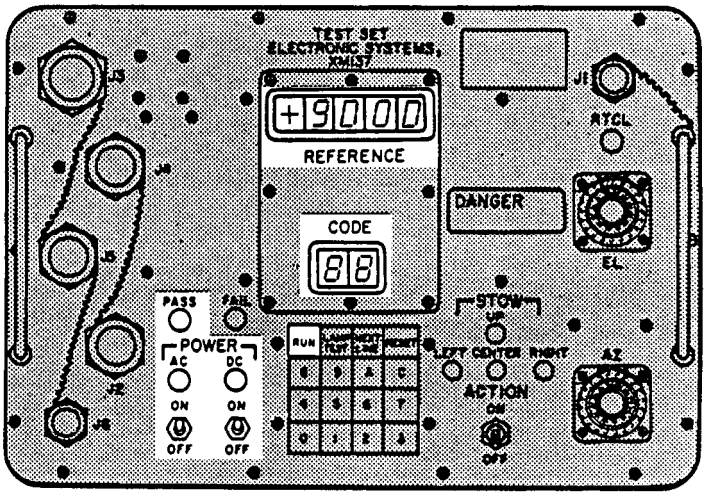
   W24P1 to test set J3
   W24P2 to test set J4
   W24P3 to test set J5
   W24P4 to logic relay assembly J1
   W24P5 to logic relay assembly J2



2-29. LOGIC RELAY ASSEMBLY (209-175-352-101) TEST (cont)

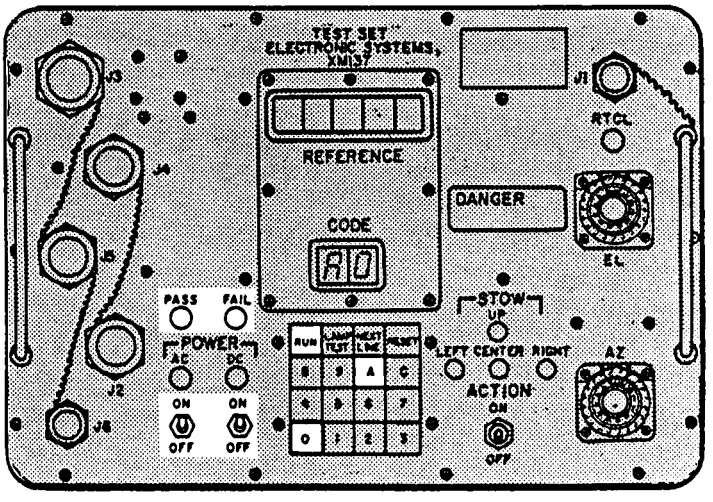
2. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.
   a. AC and DC power indicators light.
   b. 8's appear in REFERENCE and CODE displays.
   c. PASS indicator lights.
3. ON TEST SET, PRESS RUN KEY.

   +9000 appears in REFERENCE display.



ARR87-30024

4. ON TEST, SET, PRESS A, O, AND RUN KEYS.
   a. Automatic test sequence runs.
   b. PASS or FAIL indicator lights.
   c. If PASS indicator lights, remove power. Disconnect test set cables, and return unit to service.
   d. If FAIL indicator lights, go to next step.



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LOGIC RELAY ASSEMBLY (209-175-352-101) TEST (cont)

5. WHEN FAIL INDICATOR LIGHTS, A FOUR-DIGIT FAULT CODE WILL APPEAR IN THE REFERENCE DISPLAY.

6. USING NEXT LINE KEY, DISPLAY ALL FAULT CODES AND RECORD THEM FOR REFERENCE.

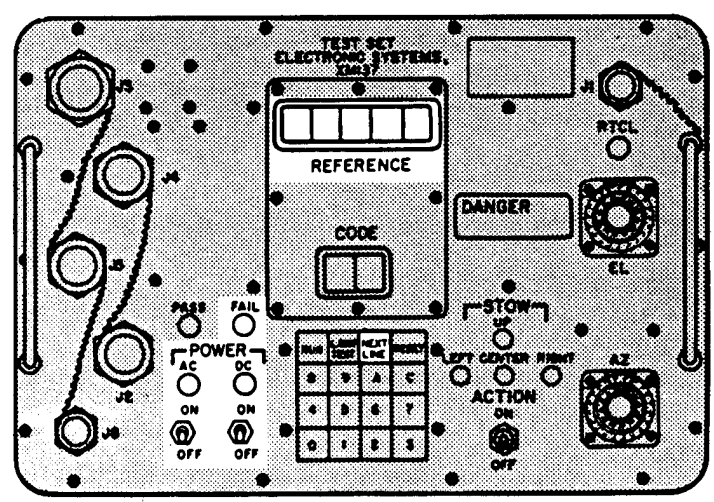
7. SET TEST SET AC AND DC CIRCUIT BREAKERS TO OFF.

NOTE

Refer to figure FO-14.3 for schematic diagram of unit under test and FO-14.4 for interface diagram.

8. PERFORM TROUBLESHOOTING PROCEDURES IN FAULT CODE TROUBLESHOOTING DATA PROVIDED AT END OF THIS TEST.

9. UPON COMPLETION OF TROUBLESHOOTING PROCEDURES, REPEAT THIS TEST.



ARRX/ 30023

END OF TEST

2-29. LOGIC RELAY ASSEMBLY (209-175-352-101) TEST (cont)

LOGIC RELAY ASSEMBLY (209-175-352-101) FAULT CODE TROUBLESHOOTING DATA

MALFUNCTION (FAULT CODE)	NOTE
TEST OR INSPECTION	Initiate retest after any module replacement.
CORRECTIVE ACTION	

WARNING

Verify all power is off before performing any corrective action.

1. FAULT CODE 9100 (SHORT ON 28 VDC INPUT AT J1-4, 7, 36, 39, 42, 45, 50, 53, 56, or 59)

Remove A1 and retest. Disregard all other fault codes.

If fault code 9100 does not recur replace A1. If fault code 9100 does recur replace UUT.

2. FAULT CODE 9101 (OUTPUT AT J1-8 IS NOT 28 VDC)

Replace A1 and retest.

If fault code 9101 recurs replace UUT.

3. FAULT CODE 9102 (OUTPUT AT J1-5 IS NOT 28 VDC)

Replace A1 and retest.

If fault code 9102 recurs replace UUT.

4. FAULT CODE 9103 (OUTPUT AT J1-46 IS NOT 28 VDC)

Replace A1 and retest.

If fault code 9103 recurs replace UUT.

5. FAULT CODE 9104 (OUTPUT AT J1-43 IS NOT 28 VDC)

Replace A1 and retest.

If fault code 9104 recurs replace UUT.

6. FAULT CODE 9105 (OUTPUT AT J140 IS NOT 28 VDC)

Replace A1 and retest.

If fault code 9105 recurs replace UUT.

7. FAULT CODE 9106 (OUTPUT AT J1-37 IS NOT 28 VDC)

Replace A1 and retest.

If fault code 9106 recurs replace UUT.

8. FAULT CODE 9107 (OUTPUT AT J1-60 IS NOT 28 VDC)

Replace A1 and retest.

If fault code 9107 recurs replace UUT.

LOGIC RELAY ASSEMBLY (209-175-352-101)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE) TEST OR INSPECTION CORRECTIVE ACTION	NOTE Initiate retest after any module replacement.

9. FAULT CODE 9111 (OUTPUT AT J1-57 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9111 recurs replace UUT.

10. FAULT CODE 9112 (OUTPUT AT J1-54 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9112 recurs replace UUT.

11. FAULT CODE 9113 (OUTPUT AT J1-51 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9113 recurs replace UUT.

12. FAULT CODE 9114 (OUTPUT AT J1-16 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9114 recurs replace UUT.

13. FAULT CODE 9115 (OUTPUT AT J1-13 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9115 recurs replace UUT.

14. FAULT CODE 9116 (OUTPUT AT J1-44 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9116 recurs replace UUT.

15. FAULT CODE 9117 (OUTPUT AT J1-41 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9117 recurs replace UUT.

16. FAULT CODE 9121 (OUTPUT AT J1-38 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9121 recurs replace UUT.

17. FAULT CODE 9122 (OUTPUT AT J1-35 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9122 recurs replace UUT.

18. FAULT CODE 9123 (OUTPUT AT J1-58 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9123 recurs replace UUT.

2-29. LOGIC RELAY ASSEMBLY (209-175-352-101) TEST (cont) FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE

Initiate retest after any module replacement.

19. FAULT CODE 9124 (OUTPUT AT J1-55 IS NOT 0 VDC)

Replace A1 and retest.

If fault code 9124 recurs replace UUT.

20. FAULT CODE 9125 (OUTPUT AT J1-52 IS NOT 0 VDC)

Replace A1 and retest.

If fault code 9125 recurs replace UUT.

21. FAULT CODE 9126 (OUTPUT AT J1-49 IS NOT 0 VDC)

Replace A1 and retest.

If fault code 9101 recurs replace UUT.

22. FAULT CODE 9130 (SHORT ON 28 VDC INPUT AT J1-2, 34, 48)

Remove A1 and retest. Disregard all other fault codes.

If fault code 9130 does not recur replace A1. If fault code 9130 does recur replace UUT.

23. FAULT CODE 9131 (OUTPUT AT J1-8 IS NOT 0 VDC)

Replace A1 and retest.

If fault code 9131 recurs replace UUT.

24. FAULT CODE 9132 (OUTPUT AT J1-5 IS NOT 0 VDC)

Replace A1 and retest.

If fault code 9132 recurs replace UUT.

25. FAULT CODE 9133 (OUTPUT AT J1-46 IS NOT 0 VDC)

Replace A1 and retest.

If fault code 9133 recurs replace UUT.

26. FAULT CODE 9134 (OUTPUT AT J1-43 IS NOT 0 VDC)

Replace A1 and retest.

If fault code 9134 recurs replace UUT.

27. FAULT CODE 9135 (OUTPUT AT J1-40 IS NOT 0 VDC)

Replace A1 and retest.

If fault code 9135 recurs replace UUT.

28. FAULT CODE 9136 (OUTPUT AT J1-37 IS NOT 0 VDC)

Replace A1 and retest.

If fault code 9136 recurs replace UUT.

LOGIC RELAY ASSEMBLY (209-175-352-101)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE) TEST OR INSPECTION CORRECTIVE ACTION	NOTE Initiate retest after any module replacement.

29. FAULT CODE 9137 (OUTPUT AT J1-60 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9137 recurs replace UUT.

30. FAULT CODE 9141 (OUTPUT AT J1-57 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9141 recurs replace UUT.

31. FAULT CODE 9142 (OUTPUT AT J1-54 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9142 recurs replace UUT.

32. FAULT CODE 9143 (OUTPUT AT J1-51 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9143 recurs replace UUT.

33. FAULT CODE 9144 (OUTPUT AT J1-16 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9144 recurs replace UUT.

34. FAULT CODE 9145 (OUTPUT AT J1-13 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9145 recurs replace UUT.

35. FAULT CODE 9146 (OUTPUT AT J1-44 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9146 recurs replace UUT.

36. FAULT CODE 9147 (OUTPUT AT J1-41 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9147 recurs replace UUT.

37. FAULT CODE 9151 (OUTPUT AT J1-38 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9151 recurs replace UUT.

38. FAULT CODE 9152 (OUTPUT AT J1-35 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9152 recurs replace UUT.

2-29. LOGIC RELAY ASSEMBLY (209-175-352-101) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE) TEST OR INSPECTION CORRECTIVE ACTION	NOTE Initiate retest after any module replacement.

39. FAULT CODE 9153 (OUTPUT AT J1-58 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9153 recurs replace UUT.

40. FAULT CODE 9154 (OUTPUT AT J1-55 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9154 recurs replace UUT.

41. FAULT CODE 9155 (OUTPUT AT J1-52 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9155 recurs replace UUT.

42. FAULT CODE 9156 (OUTPUT AT J1-49 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9156 recurs replace UUT.

43. FAULT CODE 9160 (SHORT ON 28 VDC INPUT AT J1-12, 15, 20, 23, 28, 31, 64, 67, 70, OR 73)
Remove A1 and retest. Disregard all other fault codes.
If fault code 9160 does not recur replace A1. If fault code 9160 does recur replace UUT.

44. FAULT CODE 9161 (OUTPUT AT J1-16 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9161 recurs replace UUT.

45. FAULT CODE 9162 (OUTPUT AT J1-13 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9162 recurs replace UUT.

46. FAULT CODE 9163 (OUTPUT AT J1-24 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9163 recurs replace UUT.

47. FAULT CODE 9164 (OUTPUT AT J1-21 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9164 recurs replace UUT.

48. FAULT CODE 9165 (OUTPUT AT J1-74 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9165 recurs replace UUT.

LOGIC RELAY ASSEMBLY (209-175-352-101)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

49. FAULT CODE 9166 (OUTPUT AT J1-71 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9166 recurs replace UUT.

50. FAULT CODE 9167 (OUTPUT AT J1-68 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9167 recurs replace UUT.

51. FAULT CODE 9171 (OUTPUT AT J1-65 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9171 recurs replace UUT.

52. FAULT CODE 9172 (OUTPUT AT J1-32 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9172 recurs replace UUT.

53. FAULT CODE 9173 (OUTPUT AT J1-29 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9173 recurs replace UUT.

54. FAULT CODE 9174 (OUTPUT AT J1-14 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9174 recurs replace UUT.

55. FAULT CODE 9175 {OUTPUT AT J1-11 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9175 recurs replace UUT.

56. FAULT CODE 9176 (OUTPUT AT J1-22 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9176 recurs replace UUT.

57. FAULT CODE 9177 (OUTPUT AT J1-19 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9177 recurs replace UUT.

58. FAULT CODE 9181 (OUTPUT AT J1-72 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9181 recurs replace UUT.

2-29. LOGIC RELAY ASSEMBLY (209-175-352-101) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)	NOTE
TEST OR INSPECTION	Initiate retest after any module replacement.
CORRECTIVE ACTION	

59. FAULT CODE 9182 (OUTPUT AT J1-69 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9182 recurs replace UUT.

60. FAULT CODE 9183 (OUTPUT AT J1-66 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9183 recurs replace UUT.

61. FAULT CODE 9184 (OUTPUT AT J1-63 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9184 recurs replace UUT.

62. FAULT CODE 9185 (OUTPUT AT J1-30 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9185 recurs replace UUT.

63. FAULT CODE 9186 (OUTPUT AT J1-27 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9181 recurs replace UUT.

64. FAULT CODE 9190 (SNORT ON 28 VDC INPUT AT J1-10, 18, 26, OR 62)
Remove A1 and retest. Disregard all other fault codes.
If fault code 9130 does not recur replace A1. If Fault Code 9130 does recur replace UUT.

65. FAULT CODE 9191 (OUTPUT AT J1-16 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9191 recurs replace UUT.

66. FAULT CODE 9192 (OUTPUT AT J1-13 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9192 recurs replace UUT.

67. FAULT CODE 9193 (OUTPUT AT J1-24 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9193 recurs replace UUT.

68. FAULT CODE 9194 (OUTPUT AT J1-21 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9194 recurs replace UUT.

LOGIC RELAY ASSEMBLY (209-175-352-101)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE) TEST OR INSPECTION CORRECTIVE ACTION	NOTE Initiate retest after any module replacement.

69. FAULT CODE 9195 (OUTPUT AT J1-74 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9195 recurs replace UUT.

70. FAULT CODE 9196 (OUTPUT AT J1-71 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9196 recurs replace UUT.

71. FAULT CODE 9197 (OUTPUT AT J1-68 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9197 recurs replace UUT.

72. FAULT CODE 9201 (OUTPUT AT J1-65 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9201 recurs replace UUT.

73. FAULT CODE 9202 (OUTPUT AT J1-32 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9202 recurs replace UUT.

74. FAULT CODE 9203 (OUTPUT AT J1-29 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9203 recurs replace UUT.

75. FAULT CODE 9204 (OUTPUT AT J1-14 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9204 recurs replace UUT.

76. FAULT CODE 9205 (OUTPUT AT J1-11 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9205 recurs replace UUT.

77. FAULT CODE 9206 (OUTPUT AT J1-22 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9206 recurs replace UUT.

78. FAULT CODE 9207 (OUTPUT AT J1-19 IS NOT 0 VDC)
Replace A1 and retest.
If fault code 9207 recurs replace UUT.

2-29. LOGIC RELAY ASSEMBLY (209-175-352-101) TEST (cont) FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE) TEST OR INSPECTION CORRECTIVE ACTION	NOTE Initiate retest after any module replacement.

79. FAULT CODE 9211 (OUTPUT AT J1-72 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9211 recurs replace UUT.

80. FAULT CODE 9212 (OUTPUT AT J1-69 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9212 recurs replace UUT.

81. FAULT CODE 9213 (OUTPUT AT J1-66 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9213 recurs replace UUT.

82. FAULT CODE 9214 (OUTPUT AT J1-63 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9214 recurs replace UUT.

83. FAULT CODE 9215 (OUTPUT AT J1-30 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9215 recurs replace UUT.

84. FAULT CODE 9216 (OUTPUT AT J1-27 IS NOT 28 VDC)
Replace A1 and retest.
If fault code 9211 recurs replace UUT.

85. FAULT CODE 9220 (SNORT ON 28 VDC INPUT AT J1-78, 81, 110, 113, 116, 119, 124, 127, 130 OR 133)
Remove A2 and retest. Disregard all other fault codes.
If fault code 9220 does not recur replace A2. If fault code 9220 does recur replace UUT.

86. FAULT CODE 9221 (OUTPUT AT J1-82 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9221 recurs replace UUT.

87. FAULT CODE 9222 (OUTPUT AT J1-79 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9222 recurs replace UUT.

88. FAULT CODE 9223 (OUTPUT AT J1-120 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9223 recurs replace UUT.

LOGIC RELAY ASSEMBLY (209-175-352-101)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

89. FAULT CODE 9224 (OUTPUT AT J1-117 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9224 recurs replace UUT.

90. FAULT CODE 9225 (OUTPUT AT J1-114 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9225 recurs replace UUT.

91. FAULT CODE 9226 (OUTPUT AT J1-111 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9226 recurs replace UUT.

92. FAULT CODE 9227 (OUTPUT AT J1-134 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9227 recurs replace UUT.

93. FAULT CODE 9231 (OUTPUT AT J1-131 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9231 recurs replace UUT.

94. FAULT CODE 9232 (OUTPUT AT J1-128 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9232 recurs replace UUT.

95. FAULT CODE 9233 (OUTPUT AT J1-125 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9233 recurs replace INIT.

96. FAULT CODE 9234 (OUTPUT AT J1-80 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9234 recurs replace UUT.

97. FAULT CODE 9235 (OUTPUT AT J1-77 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9235 recurs replace UUT.

98. FAULT CODE 9236 (OUTPUT AT J1-118 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9236 recurs replace UUT.

2-29. LOGIC RELAY ASSEMBLY (209-175-352-101) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

99. FAULT CODE 9237 (OUTPUT AT J1-115 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9237 recurs replace UUT.

100. FAULT CODE 9241 (OUTPUT AT J1-112 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9241 recurs replace UUT.

101. FAULT CODE 9242 (OUTPUT AT J1-109 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9242 recurs replace UUT.

102. FAULT CODE 9243 (OUTPUT AT J1-132 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9243 recurs replace UUT.

103. FAULT CODE 9244 (OUTPUT AT J1-129 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9244 recurs replace UUT.

104. FAULT CODE 9245 (OUTPUT AT J1-126 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9245 recurs replace UUT.

105. FAULT CODE 9246 (OUTPUT AT J1-123 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9241 recurs replace UUT.

106. FAULT CODE 9250 (SHORT ON 28 VDC INPUT AT J1-76, 108, OR 122)
Remove A2 and retest. Disregard all other fault codes.
If fault code 9250 does not recur replace A2. If fault code 9250 does recur replace UUT.

107. FAULT CODE 9251 (OUTPUT AT J1-82 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9251 recurs replace UUT.

108. FAULT CODE 9252 (OUTPUT AT J1-79 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9252 recurs replace UUT.

LOGIC RELAY ASSEMBLY (209-175-352-101)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE) TEST OR INSPECTION CORRECTIVE ACTION	NOTE Initiate retest after any module replacement.

109. FAULT CODE 9253 (OUTPUT AT J1-120 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9253 recurs replace UUT.

110. FAULT CODE 9254 (OUTPUT AT J1-117 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9254 recurs replace UUT.

111. FAULT CODE 9255 (OUTPUT AT J1-114 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9255 recurs replace UUT.

112. FAULT CODE 9256 (OUTPUT AT J1-111 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9256 recurs replace UUT.

113. FAULT CODE 9257 (OUTPUT AT J1-134 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9257 recurs replace UUT.

114. FAULT CODE 9261 (OUTPUT AT J1-131 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9261 recurs replace UUT.

115. FAULT CODE 9262 (OUTPUT AT J1-128 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9262 recurs replace UUT.

116. FAULT CODE 9263 (OUTPUT AT J1-125 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9263 recurs replace UUT.

117. FAULT CODE 9264 (OUTPUT AT J1-80 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9264 recurs replace UUT.

118. FAULT CODE 9265 (OUTPUT AT J1-77 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9265 recurs replace UUT.

2-29. LOGIC RELAY ASSEMBLY (209-175-352-101) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

119. FAULT CODE 9266 (OUTPUT AT J1-118 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9266 recurs replace UUT.

120. FAULT CODE 9267 (OUTPUT AT J1-115 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9267 recurs replace UUT.

121. FAULT CODE 9271 (OUTPUT AT J1-112 IS NOT 28 VDC)
Replace A2 and retest,
If fault code 9271 recurs replace UUT.

122. FAULT CODE 9272 (OUTPUT AT J1-109 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9272 recurs replace UUT.

123. FAULT CODE 9273 (OUTPUT AT J1-132 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9273 recurs replace UUT.

124. FAULT CODE 9274 (OUTPUT AT J1-129 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9274 recurs replace UUT.

125. FAULT CODE 9275 (OUTPUT AT J1-126 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9275 recurs replace UUT.

126. FAULT CODE 9276 (OUTPUT AT J1-123 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9271 recurs replace UUT.

127. FAULT CODE 9280 (SHORT ON 28 VDC INPUT AT J1-86, 89, 94, 97, 102, 105, 138, 141, 144, OR 147)
Remove A2 and retest. Disregard all other fault codes.
If fault code 9280 does not recur replace A2. If fault code 9280 does recur replace UUT.

128. FAULT CODE 9281 (OUTPUT AT J1-90 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9281 recurs replace UUT.

LOGIC RELAY ASSEMBLY (209-175-352-101)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE) TEST OR INSPECTION CORRECTIVE ACTION	NOTE Initiate retest after any module replacement.

129. AULT CODE 9282 (OUTPUT AT J1-87 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9282 recurs replace UUT.

130. FAULT CODE 9283 (OUTPUT AT J1-98 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9283 recurs replace UUT.

131. FAULT CODE 9284 (OUTPUT AT J1-95 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9284 recurs replace UUT.

132. FAULT CODE 9285 (OUTPUT AT J1-148 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9285 recurs replace UUT.

133. FAULT CODE 9286 (OUTPUT AT J1-145 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9286 recurs replace UUT.

134. FAULT CODE 9287 (OUTPUT AT J1-142 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9287 recurs replace UUT.

135. FAULT CODE 9291 (OUTPUT AT J1-139 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9291 recurs replace UUT.

136. FAULT CODE 9292 (OUTPUT AT J1-106 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9292 recurs replace UUT.

137. FAULT CODE 9293 (OUTPUT AT J1-103 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9293 recurs replace UUT.

138. FAULT CODE 9294 (OUTPUT AT J1-88 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9294 recurs replace UUT.

2-29. LOGIC RELAY ASSEMBLY (209-175-352-101) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

139. FAULT CODE 9295 (OUTPUT AT J1-85 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9295 recurs replace UUT.

140. FAULT CODE 9296 (OUTPUT AT J1-96 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9296 recurs replace UUT.

141. FAULT CODE 9297 (OUTPUT AT J1-93 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9297 recurs replace UUT.

142. FAULT CODE 9301 (OUTPUT AT J1-146 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9301 recurs replace UUT.

143. FAULT CODE 9302 (OUTPUT AT J1-143 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9302 recurs replace UUT.

144. FAULT CODE 9303 (OUTPUT AT J1-140 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9303 recurs replace UUT.

145. FAULT CODE 9304 (OUTPUT AT J1-137 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9304 recurs replace UUT.

146. FAULT CODE 9305 (OUTPUT AT J1-104 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9305 recurs replace UUT.

147. FAULT CODE 9306 (OUTPUT AT J1-101 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9306 recurs replace UUT.

148. FAULT CODE 9310 (SNORT ON 28 VDC INPUT AT J1-84, 92, 100, OR 136)
Remove A2 and retest. Disregard all other fault codes.
If fault code 9310 does not recur replace A2. If fault code 9310 does recur replace UUT.

LOGIC RELAY ASSEMBLY (209-175-352-101)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

149. FAULT CODE 9311 (OUTPUT AT J1-90 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9311 recurs replace UUT.

150. FAULT CODE 9312 (OUTPUT AT J1-87 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9312 recurs replace UUT.

151. FAULT CODE 9313 (OUTPUT AT J1-98 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9313 recurs replace UUT.

152. FAULT CODE 9314 (OUTPUT AT J1-95 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9314 recurs replace UUT.

153. FAULT CODE 9315 (OUTPUT AT J1-148 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9315 recurs replace UUT.

154. FAULT CODE 9316 (OUTPUT AT J1-145 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9316 recurs replace UUT.

155. FAULT CODE 9317 (OUTPUT AT J1-142 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9317 recurs replace UUT.

156. FAULT CODE 9321 (OUTPUT AT J1-139 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9321 recurs replace UUT.

157. FAULT CODE 9322 (OUTPUT AT J1-106 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9322 recurs replace UUT

158. FAULT CODE 9323 (OUTPUT AT J1-103 IS NOT 0 VDC)
Replace A2 and retest.
If fault code 9323 recurs replace UUT.

2-29. LOGIC RELAY ASSEMBLY (209-175-352-101) TEST (cont) FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)	NOTE
TEST OR INSPECTION	Initiate retest after any module replacement.
CORRECTIVE ACTION	

159. FAULT CODE 9324 (OUTPUT AT J1-88 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9324 recurs replace UUT.

160. FAULT CODE 9325 (OUTPUT AT J1-85 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9325 recurs replace UUT.

161. FAULT CODE 9326 (OUTPUT AT J1-96 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9326 recurs replace UUT.

162. FAULT CODE 9327 (OUTPUT AT J1-93 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9327 recurs replace UUT.

163. FAULT CODE 9331 (OUTPUT AT J1-146 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9331 recurs replace UUT.

164. FAULT CODE 9332 (OUTPUT AT J1-143 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9332 recurs replace UUT.

165. FAULT CODE 9333 (OUTPUT AT J1-140 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9333 recurs replace UUT.

166. FAULT CODE 9334 (OUTPUT AT J1-137 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9334 recurs replace UUT.

167. FAULT CODE 9335 (OUTPUT AT J1-104 IS NOT 28 VDC)
Replace A2 and retest.
if fault code 9335 recurs replace UUT.

168. FAULT CODE 9336 (OUTPUT AT J1-101 IS NOT 28 VDC)
Replace A2 and retest.
If fault code 9336 recurs replace UUT.

LOGIC RELAY ASSEMBLY (209-175-352-101)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

169. FAULT CODE 9340 (SHORT ON 28 VDC INPUT AT 152, 155, 184, 187, 190, 193, 198, 201, 204 OR 207)
Remove A3 and retest. Disregard all other fault codes.
If fault code 9340 does not recur replace A2. If fault code 9340 does recur replace UUT.

170. FAULT CODE 9341 (OUTPUT AT J1-156 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9341 recurs replace UUT.

171. FAULT CODE 9342 (OUTPUT AT J1-153 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9342 recurs replace UUT.

172. FAULT CODE 9343 (OUTPUT AT J1-194 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9343 recurs replace UUT.

173. FAULT CODE 9344 (OUTPUT AT J1-191 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9344 recurs replace UUT.

174. FAULT CODE 9345 (OUTPUT AT J1-188 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9345 recurs replace UUT.

175. FAULT CODE 9346 (OUTPUT AT J1-185 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9346 recurs replace UUT.

176. FAULT CODE 9347 (OUTPUT AT J1-208 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9347 recurs replace UUT.

177. FAULT CODE 9351 (OUTPUT AT J1-205 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9351 recurs replace UUT.

178. FAULT CODE 9352 (OUTPUT AT J1-202 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9352 recurs replace UUT.

2-29. LOGIC RELAY ASSEMBLY (209-175-352-101) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

179. FAULT CODE 9353 (OUTPUT AT J1-199 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9353 recurs replace UUT.

180. FAULT CODE 9354 (OUTPUT AT J1-154 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9354 recurs replace UUT.

181. FAULT CODE 9355 (OUTPUT AT J1-151 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9355 recurs replace UUT.

182. FAULT CODE 9356 (OUTPUT AT J1-192 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9356 recurs replace UUT.

183. FAULT CODE 9357 (OUTPUT AT J1-189 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9357 recurs replace UUT.

184. FAULT CODE 9361 (OUTPUT AT J1-186 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9361 recurs replace UUT.

185. FAULT CODE 9362 (OUTPUT AT J1-183 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9362 recurs replace UUT.

186. FAULT CODE 9363 (OUTPUT AT J1-206 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9363 recurs replace UUT.

187. FAULT CODE 9364 (OUTPUT AT J1-203 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9364 recurs replace UUT.

188. FAULT CODE 9365 (OUTPUT AT J1-200 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9365 recurs replace UUT.

LOGIC RELAY ASSEMBLY (209-175-352-101)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

189. FAULT CODE 9366 (OUTPUT AT J1-197 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9366 recurs replace UUT.

190. FAULT CODE 9370 (SHORT ON 28 VDC INPUT AT J1-150, 182, OR 196)
Remove A3 and retest. Disregard all other fault codes.
If fault code 9370 does not recur replace A3. If fault code 9370 does recur replace UUT.

191. FAULT CODE 9371 (OUTPUT AT J1-156 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9371 recurs replace UUT.

192. FAULT CODE 9372 (OUTPUT AT J1-153 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9372 recurs replace UUT.

193. FAULT CODE 9373 (OUTPUT AT J1-194 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9373 recurs replace UUT.

194. FAULT CODE 9374 (OUTPUT AT J1-191 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9374 recurs replace UUT.

195. FAULT CODE 9375 (OUTPUT AT J1-188 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9375 recurs replace UUT.

196. FAULT CODE 9376 (OUTPUT AT J1-185 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9376 recurs replace UUT.

197. FAULT CODE 9377 (OUTPUT AT J1-208 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9377 recurs replace UUT.

198. FAULT CODE 9381 (OUTPUT AT J1-205 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9381 recurs replace UUT.

2-29. LOGIC RELAY ASSEMBLY (209-175-352-101) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

199. FAULT CODE 9382 (OUTPUT AT J1-202 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9382 recurs replace UUT.

200. FAULT CODE 9383 (OUTPUT AT J1-199 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9383 recurs replace UUT.

201. FAULT CODE 9384 (OUTPUT AT J1-154 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9384 recurs replace UUT.

202. FAULT CODE 9385 (OUTPUT AT J1-151 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9385 recurs replace UUT.

203. FAULT CODE 9386 (OUTPUT AT J1-192 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9356 recurs replace UUT.

204. FAULT CODE 9387 (OUTPUT AT J1-189 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9387 recurs replace UUT.

205. FAULT CODE 9391 (OUTPUT AT J1-186 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9391 recurs replace UUT.

206. FAULT CODE 9392 (OUTPUT AT J1-183 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9392 recurs replace UUT.

207. FAULT CODE 9393 (OUTPUT AT J1-206 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9393 recurs replace UUT.

208. FAULT CODE 9394 (OUTPUT AT J1-203 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9394 recurs replace UUT.

LOGIC RELAY ASSEMBLY (209-175-352-101)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

209. FAULT CODE 9395 (OUTPUT AT J1-200 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9395 recurs replace UUT.

210. FAULT CODE 9396 (OUTPUT AT J1-197 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9396 recurs replace UUT.

211. FAULT CODE 9400 (SHORT ON 28 VDC INPUT AT J1-160, 163, 168, 171, 176, 179, 212, 215, 218, OR 221)
Remove A3 and retest. Disregard all other fault codes
If fault code 9400 does not recur replace A3. If fault code 9400 does recur replace UUT.

212. FAULT CODE 9401 (OUTPUT AT J1-164 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9401 recurs replace UUT.

213. FAULT CODE 9402 (OUTPUT AT J1-161 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9402 recurs replace UUT.

214. FAULT CODE 9403 (OUTPUT AT J1-172 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9403 recurs replace UUT.

215. FAULT CODE 9404 (OUTPUT AT J1-169 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9404 recurs replace UUT.

216. FAULT CODE 9405 (OUTPUT AT J1-222 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9405 recurs replace UUT.

217. FAULT CODE 9406 (OUTPUT AT J1-219 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9406 recurs replace UUT.

218. FAULT CODE 9407 (OUTPUT AT J1-216 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9407 recurs replace UUT.

2-29. LOGIC RELAY ASSEMBLY (209-175-352-101) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE) TEST OR INSPECTION CORRECTIVE ACTION	NOTE Initiate retest after any module replacement.

219. FAULT CODE 9411 (OUTPUT AT J1-213 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9411 recurs replace UUT.

220. FAULT CODE 9412 (OUTPUT AT J1-180 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9412 recurs replace UUT.

221. FAULT CODE 9413 (OUTPUT AT J1-177 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9413 recurs replace UUT.

222. FAULT CODE 9414 (OUTPUT AT J1-162 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9414 recurs replace UUT.

223. FAULT CODE 9415 (OUTPUT AT J1-159 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9415 recurs replace UUT.

224. FAULT CODE 9416 (OUTPUT AT J1-170 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9416 recurs replace UUT.

225. FAULT CODE 9417 (OUTPUT AT J1-1167 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9417 recurs replace UUT.

226. FAULT CODE 9421 (OUTPUT AT J1-220 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9421 recurs replace UUT.

227. FAULT CODE 9422 (OUTPUT AT J1-217 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9422 recurs replace UUT.

228. FAULT CODE 9423 (OUTPUT AT J1-214 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9423 recurs replace UUT.

LOGIC RELAY ASSEMBLY (209-175-352-101)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

229. FAULT CODE 9424 (OUTPUT AT J1-211 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9424 recurs replace UUT.

230. FAULT CODE 9425 (OUTPUT AT J1-178 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9425 recurs replace UUT.

231. FAULT CODE 9426 (OUTPUT AT J1-175 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9426 recurs replace UUT.

232. FAULT CODE 9430 (SHORT ON 28 VDC INPUT AT J1-158, 166, 174 OR 210)
Remove A3 and retest. Disregard all other fault codes.
If fault code 9430 does not recur replace A3. If fault code 9430 does recur replace UUT.

233. FAULT CODE 9431 (OUTPUT AT J1-164 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9431 recurs replace UUT.

234. FAULT CODE 9432 (OUTPUT AT J1-161 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9432 recurs replace UUT.

235. FAULT CODE 9433 (OUTPUT AT J1-172 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9433 recurs replace UUT.

236. FAULT CODE 9434 (OUTPUT AT J1-169 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9434 recurs replace UUT.

237. FAULT CODE 9435 (OUTPUT AT J1-222 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9435 recurs replace UUT.

238. FAULT CODE 9436 (OUTPUT AT J1-219 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9436 recurs replace UUT.

2-29. LOGIC RELAY ASSEMBLY (209-175-352-101) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE) TEST OR INSPECTION CORRECTIVE ACTION	NOTE Initiate retest after any module replacement.

239. FAULT CODE 9437 (OUTPUT AT J1-216 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9437 recurs replace UUT.

240. FAULT CODE 9441 (OUTPUT AT J1-213 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9441 recurs replace UUT.

241. FAULT CODE 9442 (OUTPUT AT J1-180 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9442 recurs replace UUT.

242. FAULT CODE 9443 (OUTPUT AT J1-177 IS NOT 0 VDC)
Replace A3 and retest.
If fault code 9443 recurs replace UUT.

243. FAULT CODE 9444 (OUTPUT AT J1-162 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9444 recurs replace UUT.

244. FAULT CODE 9445 (OUTPUT AT J1-159 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9445 recurs replace UUT.

245. FAULT CODE 9446 (OUTPUT AT J1-170 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9446 recurs replace UUT.

246. FAULT CODE 9447 (OUTPUT AT J1-1167 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9447 recurs replace UUT.

247. FAULT CODE 9451 (OUTPUT AT J1-220 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9451 recurs replace UUT.

248. FAULT CODE 9452 (OUTPUT AT J1-217 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9452 recurs replace UUT.

LOGIC RELAY ASSEMBLY (209-175-352-101)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

249. FAULT CODE 9453 (OUTPUT AT J1-214 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9423 recurs replace UUT.

250. FAULT CODE 9454 (OUTPUT AT J1-211 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9454 recurs replace UUT.

251. FAULT CODE 9455 (OUTPUT AT J1-178 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9455 recurs replace UUT.

252. FAULT CODE 9456 (OUTPUT AT J1-175 IS NOT 28 VDC)
Replace A3 and retest.
If fault code 9456 recurs replace UUT.

253. FAULT CODE 9460 (SNORT ON 28 VDC INPUT AT J2-2, 5, 8, 11, 14 OR 17)
Remove K1 and retest. Disregard all other fault codes.
If fault code 9460 does not recur replace K1. If fault code 9460 does recur replace UUT.

254. FAULT CODE 9461 (OUTPUT AT J2-18 IS NOT 28 VDC)
Replace K1 and retest.
If fault code 9461 recurs replace UUT.

255. FAULT CODE 9462 (OUTPUT AT J2-15 IS NOT 28 VDC)
Replace K1 and retest.
If fault code 9462 recurs replace UUT.

256. FAULT CODE 9463 (OUTPUT AT J2-12 IS NOT 28 VDC)
Replace K1 and retest.
If fault code 9463 recurs replace UUT.

257. FAULT CODE 9464 (OUTPUT AT J2-9 IS NOT 28 VDC)
Replace K1 and retest.
If fault code 9464 recurs replace UUT.

258. FAULT CODE 9465 (OUTPUT AT J2-6 IS NOT 28 VDC)
Replace K1 and retest.
If fault code 9465 recurs replace UUT.

2-29. LOGIC RELAY ASSEMBLY (209-175-352-101) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

259. FAULT CODE 9466 (OUTPUT AT J2-3 IS NOT 28 VDC)
Replace K1 and retest.
If fault code 9466 recurs replace UUT.

260. FAULT CODE 9471 (OUTPUT AT 12-16 IS NOT 0 VDC)
Replace K1 and retest.
If fault code 9471 recurs replace UUT.

261. FAULT CODE 9472 (OUTPUT AT 12-13 IS NOT 0 VDC)
Replace K1 and retest.
If fault code 9472 recurs replace UUT.

262. FAULT CODE 9473 (OUTPUT AT J2-10 IS NOT 0 VDC)
Replace K1 and retest.
If fault code 9473 recurs replace UUT.

263. FAULT CODE 9474 (OUTPUT AT 12-7 IS NOT 0 VDC)
Replace K1 and retest.
If fault code 9474 recurs replace UUT.

264. FAULT CODE 9475 (OUTPUT AT J2-4 IS NOT 0 VDC)
Replace K1 and retest.
If fault code 9475 recurs replace UUT.

265. FAULT CODE 9476 (OUTPUT AT J2-1 IS NOT 0 VDC)
Replace K1 and retest.
If fault code 9476 recurs replace UUT.

266. FAULT CODE 9480 (SHORT ON 28 VDC INPUT AT J1-224.)
Remove K1 and retest. Disregard all other fault codes.
If fault code 9430 does not recur replace K1. If fault code 9430 does recur replace UUT.

267. FAULT CODE 9481 (OUTPUT AT J2-18 IS NOT 0 VDC)
Replace K1 and retest.
If fault code 9481 recurs replace UUT.

268. FAULT CODE 9482 (OUTPUT AT 12-15 IS NOT 0 VDC)
Replace K1 and retest.
If fault code 9482 recurs replace UUT.

LOGIC RELAY ASSEMBLY (209-175-352-101)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE) TEST OR INSPECTION CORRECTIVE ACTION	NOTE Initiate retest after any module replacement.

269. FAULT CODE 9483 (OUTPUT AT J2-12 IS NOT 0 VDC)
Replace K1 and retest.
If fault code 9483 recurs replace UUT.

270. FAULT CODE 9484 (OUTPUT AT J2-9 IS NOT 0 VDC)
Replace K1 and retest.
If fault code 9484 recurs replace UUT.

271. FAULT CODE 9485 (OUTPUT AT J2-6 IS NOT 0 VDC)
Replace K1 and retest.
If fault code 9485 recurs replace UUT.

272. FAULT CODE 9486 (OUTPUT AT J2-3 IS NOT 0 VDC)
Replace K1 and retest.
If fault code 9486 recurs replace UUT.

273. FAULT CODE 9491 (OUTPUT AT J2-16 IS NOT 28 VDC)
Replace K1 and retest.
If fault code 9491 recurs replace UUT.

274. FAULT CODE 9492 (OUTPUT AT J2-13 IS NOT 28 VDC)
Replace K1 and retest.
If fault code 9492 recurs replace UUT.

275. FAULT CODE 9493 (OUTPUT AT J2-10 IS NOT 28 VDC)
Replace K1 and retest.
If fault code 9493 recurs replace UUT.

276. FAULT CODE 9494 (OUTPUT AT J2-7 IS NOT 28 VDC)
Replace K1 and retest.
If fault code 9494 recurs replace UUT.

277. FAULT CODE 9495 (OUTPUT AT J2-4 IS NOT 28 VDC)
Replace K1 and retest.
If fault code 9495 recurs replace UUT.

278. FAULT CODE 9496 (OUTPUT AT J2-1 IS NOT 28 VDC)
Replace K1 and retest.
If fault code 9496 recurs replace UUT.

2-29. LOGIC RELAY ASSEMBLY (209-175-352-101) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

279. FAULT CODE 9500 (SHORT ON 28 VDC INPUT AT J1-20, 23, 26, 29, 32, OR 35)
Remove K2 and retest. Disregard all other fault codes.
If fault code 9500 does not recur replace K2. If fault code 9500 does recur replace UUT.

280. FAULT CODE 9501 (OUTPUT AT J2-36 IS NOT 28 VDC)
Replace K2 and retest
If fault code 9501 recurs replace UUT.

281. FAULT CODE 9502 (OUTPUT AT J2-33 IS NOT 28 VDC)
Replace K2 and retest
If fault code 9502 recurs replace UUT.

282. FAULT CODE 9503 (OUTPUT AT J2-30 IS NOT 28 VDC)
Replace K2 and retest.
If fault code 9503 recurs replace UUT.

283. FAULT CODE 9504 (OUTPUT AT J2-27 IS NOT 28 VDC)
Replace K2 and retest
If fault code 9504 recurs replace UUT.

284. FAULT CODE 9505 (OUTPUT AT J2-24 IS NOT 28 VDC)
Replace K2 and retest.
If fault code 9505 recurs replace UUT.

285. FAULT CODE 9506 (OUTPUT AT J2-21 IS NOT 28 VDC)
Replace K2 and retest.
If fault code 9506 recurs replace UUT.

286. FAULT CODE 9511 (OUTPUT AT J2-34 IS NOT 0 VDC)
Replace K2 and retest.
If fault code 9511 recurs replace UUT.

287. FAULT CODE 9512 (OUTPUT AT J2-31 IS NOT 0 VDC)
Replace K2 and retest.
If fault code 9512 recurs replace UUT.

288. FAULT CODE 9513 OUTPUT AT J2-28 IS NOT 0 VDC)
Replace K2 and retest.
If fault code 9513 recurs replace UUT.

LOGIC RELAY ASSEMBLY (209-175-352-101)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE) TEST OR INSPECTION CORRECTIVE ACTION	NOTE Initiate retest after any module replacement.

289. FAULT CODE 9514 (OUTPUT AT J2-25 IS NOT 0 VDC)
Replace K2 and retest.
If fault code 9514 recurs replace UUT.

290. FAULT CODE 9515 (OUTPUT AT J2-22 IS NOT 0 VDC)
Replace K2 and retest.
If fault code 9515 recurs replace UUT.

291. FAULT CODE 9516 (OUTPUT AT J2-19 IS NOT 0 VDC)
Replace K2 and retest.
If fault code 9516 recurs replace UUT.

292. FAULT CODE 9520 (SHORT ON 28 VDC INPUT AT J1-226)
Remove K2 and retest. Disregard all other fault codes.
If fault code 9520 does not recur replace K2. If fault code 9520 does recur replace UUT.

293. FAULT CODE 9521 (OUTPUT AT J2-36 IS NOT 0 VDC)
Replace K2 and retest.
If fault code 9521 recurs replace UUT.

294. FAULT CODE 9522 (OUTPUT AT J2-33 IS NOT 0 VDC)
Replace K2 and retest.
If fault code 9522 recurs replace UUT.

295. FAULT CODE 9523 (OUTPUT AT J2-30 IS NOT 0 VDC)
Replace K2 and retest.
If fault code 9523 recurs replace UUT.

296. FAULT CODE 9524 (OUTPUT AT J2-27 IS NOT 0 VDC)
Replace K2 and retest.
If fault code 9524 recurs replace UUT.

297. FAULT CODE 9525 (OUTPUT AT J2-24 IS NOT 0 VDC)
Replace K2 and retest.
If fault code 9525 recurs replace UUT.

298. FAULT CODE 9526 (OUTPUT AT J2-21 IS NOT 0 VDC)
Replace K2 and retest.
If fault code 9526 recurs replace UUT.

2-29. LOGIC RELAY ASSEMBLY (209-175-352-101) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE) TEST OR INSPECTION CORRECTIVE ACTION	NOTE Initiate retest after any module replacement.

299. FAULT CODE 9531 (OUTPUT AT J2-34 IS NOT 28 VDC)
Replace K2 and retest.
If fault code 9531 recurs replace UUT.

300. FAULT CODE 9532 (OUTPUT AT J2-31 IS NOT 28 VDC)
Replace K2 and retest.
If fault code 9532 recurs replace UUT.

301. FAULT CODE 9533 (OUTPUT AT J2-28 IS NOT 28 VDC)
Replace K2 and retest.
If fault code 9533 recurs replace UUT.

302. FAULT CODE 9534 (OUTPUT AT J2-25 IS NOT 28 VDC)
Replace K2 and retest.
If fault code 9534 recurs replace UUT.

303. FAULT CODE 9535 (OUTPUT AT J2-22 IS NOT 28 VDC)
Replace K2 and retest.
If fault code 9535 recurs replace UUT.

304. FAULT CODE 9536 (OUTPUT AT J2-19 IS NOT 28 VDC)
Replace K2 and retest.
If fault code 9536 recurs replace UUT.

305. FAULT CODE 9540 (SHORT ON 28 VDC INPUT AT J2-38, 41, 44, 47, 50, OR 53)
Remove K3 and retest. Disregard all other fault codes.
If fault code 9540 does not recur replace K3. If fault code 9540 does recur replace UUT.

306. FAULT CODE 9541 (OUTPUT AT J2-54 IS NOT 28 VDC)
Replace K3 and retest.
If fault code 9541 recurs replace UUT.

307. FAULT CODE 9542 (OUTPUT AT J2-51 IS NOT 28 VDC)
Replace K3 and retest.
If fault code 9542 recurs replace UUT.

308. FAULT CODE 9543 (OUTPUT AT J2-48 IS NOT 28 VDC)
Replace K3 and retest.
If fault code 9543 recurs replace UUT.

LOGIC RELAY ASSEMBLY (209-175-352-101)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE) TEST OR INSPECTION CORRECTIVE ACTION	NOTE Initiate retest after any module replacement.

309. FAULT CODE 9544 (OUTPUT AT J2-45 IS NOT 28 VDC)
Replace K3 and retest.
If fault code 9544 recurs replace UUT.

310. FAULT CODE 9545 (OUTPUT AT J2-42 IS NOT 28 VDC)
Replace K3 and retest.
If fault code 9545 recurs replace UUT.

311. FAULT CODE 9546 (OUTPUT AT J2-39 IS NOT 28 VDC)
Replace K3 and retest.
If fault code 9546 recurs replace UUT.

312. FAULT CODE 9551 (OUTPUT AT J2-52 IS NOT 0 VDC)
Replace K3 and retest.
If fault code 9551 recurs replace UUT.

313. FAULT CODE 9552 (OUTPUT AT J2-49 IS NOT 0 VDC)
Replace K3 and retest.
If fault code 9552 recurs replace UUT.

314. FAULT CODE 9553 (OUTPUT AT J2-46 IS NOT 0 VDC)
Replace K3 and retest.
If fault code 9553 recurs replace UUT.

315. FAULT CODE 9554 (OUTPUT AT J2-43 IS NOT 0 VDC)
Replace K3 and retest.
If fault code 9554 recurs replace UUT.

316. FAULT CODE 9555 (OUTPUT AT J2-40 IS NOT 0 VDC)
Replace K3 and retest.
If fault code 9555 recurs replace UUT.

317. FAULT CODE 9556 (OUTPUT AT J2-37 IS NOT 0 VDC)
Replace K3 and retest.
If fault code 9556 recurs replace UUT.

318. FAULT CODE 9560 (SHORT ON 28 VDC INPUT AT J1-228)
Remove K3 and retest. Disregard all other fault codes.
If fault code 9560 does not recur replace K3 If fault code 9560 does recur replace UUT.

2-29. LOGIC RELAY ASSEMBLY (209-175-352-101) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

319. FAULT CODE 9561 (OUTPUT AT J2-54 IS NOT 0 VDC)
Replace K3 and retest.
If fault code 9561 recurs replace UUT.

320. FAULT CODE 9562 (OUTPUT AT J2-51 IS NOT 0 VDC)
Replace K3 and retest.
If fault code 9562 recurs replace UUT.

321. FAULT CODE 9563 (OUTPUT AT J2-48 IS NOT 0 VDC)
Replace K3 and retest.
If fault code 9563 recurs replace UUT.

322. FAULT CODE 9564 (OUTPUT AT J2-45 IS NOT 0 VDC)
Replace K3 and retest.
If fault code 9564 recurs replace UUT.

323. FAULT CODE 9565 (OUTPUT AT J2-42 IS NOT 0 VDC)
Replace K3 and retest.
If fault code 9565 recurs replace UUT.

324. FAULT CODE 9566 (OUTPUT AT J2-39 IS NOT 0 VDC)
Replace K3 and retest.
If fault code 9566 recurs replace UUT.

325. FAULT CODE 9571 (OUTPUT AT J2-52 IS NOT 28 VDC)
Replace K3 and retest.
If fault code 9571 recurs replace UUT.

326. FAULT CODE 9572 (OUTPUT AT J2-49 IS NOT 28 VDC)
Replace K3 and retest.
If fault code 9572 recurs replace UUT.

327. FAULT CODE 9573 (OUTPUT AT J2-46 IS NOT 28 VDC)
Replace K3 and retest.
If fault code 9573 recurs replace UUT.

328. FAULT CODE 9574 (OUTPUT AT J2-43 IS NOT 28 VDC)
Replace K3 and retest.
If fault code 9574 recurs replace UUT.

LOGIC RELAY ASSEMBLY (209-175-352-101)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

329. FAULT CODE 9575 (OUTPUT AT J2-40 IS NOT 28 VDC)
Replace K3 and retest.
If fault code 9575 recurs replace UUT.

330. FAULT CODE 9576 (OUTPUT AT J2-37 IS NOT 28 VDC)
Replace K3 and retest.
If fault code 9576 recurs replace UUT.

331. FAULT CODE 9580 (SHORT ON 28 VDC INPUT AT J2-56, 59, 62, OR 65)
Remove K4 and retest. Disregard all other fault codes.
If fault code 9580 does not recur replace K4. If fault code 9580 does recur replace UUT.

332. FAULT CODE 9581 (OUTPUT AT J2-66 IS NOT 28 VDC)
Replace K4 and retest.
If fault code 9581 recurs replace UUT.

333. FAULT CODE 9582 (OUTPUT AT J2-63 IS NOT 28 VDC)
Replace K4 and retest.
If fault code 9582 recurs replace UUT.

334. FAULT CODE 9583 (OUTPUT AT J2-60 IS NOT 28 VDC)
Replace K4 and retest.
If fault code 9583 recurs replace UUT.

335. FAULT CODE 9584 (OUTPUT AT J2-57 IS NOT 28 VDC)
Replace K4 and retest.
If fault code 9584 recurs replace UUT.

336. FAULT CODE 9585 (OUTPUT AT 12-64 IS NOT 0 VDC)
Replace K4 and retest.
If fault code 9585 recurs replace UUT.

337. FAULT CODE 9586 (OUTPUT AT J2-61 IS NOT 0 VDC)
Replace K4 and retest.
If fault code 9586 recurs replace UUT.

338. FAULT CODE 9587 (OUTPUT AT J2-58 IS NOT 0 VDC)
Replace K4 and retest.
If fault code 9587 recurs replace UUT.

2-29. LOGIC RELAY ASSEMBLY (209-175-352-101) TEST (cont)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE) TEST OR INSPECTION CORRECTIVE ACTION	NOTE Initiate retest after any module replacement.

339. FAULT CODE 9588 (OUTPUT AT J2-55 IS NOT 0 VDC)
Replace K4 and retest.
If fault code 9588 recurs replace UUT.

340. FAULT CODE 9590 (SNORT ON 28 VDC INPUT AT J1-230)
Remove K4 and retest. Disregard all other fault codes.
If fault code 9590 does not recur replace K4. If fault code 9590 does recur replace UUT.

341. FAULT CODE 9591 (OUTPUT AT J2-66 IS NOT 0 VDC)
Replace K4 and retest
If fault code 9591 recurs replace UUT.

342. FAULT CODE 9592 (OUTPUT AT J2-63 IS NOT 0 VDC)
Replace K4 and retest.
If fault code 9592 recurs replace UUT.

343. FAULT CODE 9593 (OUTPUT AT J2-60 IS NOT 0 VDC)
Replace K4 and retest.
If fault code 9593 recurs replace UUT.

344. FAULT CODE 9594 (OUTPUT AT J2-57 IS NOT 0 VDC)
Replace K4 and retest.
If fault code 9594 recurs replace UUT.

345. FAULT CODE 9595 (OUTPUT AT J2-64 IS NOT 28 VDC)
Replace K4 and retest.
If fault code 9595 recurs replace UUT.

346. FAULT CODE 9596 (OUTPUT AT J2-61 IS NOT 28 VDC)
Replace K4 and retest.
If fault code 9596 recurs replace UUT.

347. FAULT CODE 9597 (OUTPUT AT J2-58 IS NOT 28 VDC)
Replace K4 and retest.
If fault code 9597 recurs replace UUT.

348. FAULT CODE 9598 (OUTPUT AT J2-55 IS NOT 28 VDC)
Replace K4 and retest.
If fault code 9598 recurs replace UUT.

LOGIC RELAY ASSEMBLY (209-175-352-101)
FAULT CODE TROUBLESHOOTING DATA (cont)

MALFUNCTION (FAULT CODE)

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE
Initiate retest after any module replacement.

349. FAULT CODE 9600 (SNORT ON 28 VDC INPUT AT J1-68, OR 71.)
Remove K5 and retest. Disregard all other fault codes.
if fault code 9600 does not recur replace K5. If fault code 9600 does recur replace UUT.

350. FAULT CODE 9601 (OUTPUT AT 12-72 IS NOT 28 VDC)
Replace K5 and retest.
If fault code 9601 recurs replace UUT.

351. FAULT CODE 9602 (OUTPUT AT J2-69 IS NOT 28 VDC)
Replace K5 and retest.
If fault code 9602 recurs replace UUT.

352. FAULT CODE 9603 (OUTPUT AT J2-70 IS NOT 0 VDC)
Replace K5 and retest.
If fault code 9603 recurs replace UUT.

353. FAULT CODE 9604 (OUTPUT A1 J2-67 IS NOT 0 VDC)
Replace K5 and retest.
If fault code 9604 recurs replace UUT.

354. FAULT CODE 9610 (SNORT ON 28 VDC INPUT AT J1-232.)
Remove K5 and retest. Disregard all other fault codes.
If fault code 9610 does not recur replace K5 If fault code 9610 does recur replace UUT.

355. FAULT CODE 9611 (OUTPUT AT J2-72 IS NOT 0 VDC)
Replace K5 and retest.
If fault code 9611 recurs replace UUT.

356. FAULT CODE 9612 (OUTPUT AT J2-69 IS NOT 0 VDC)
Replace K5 and retest.
If fault code 9602 recurs replace UUT.

357. FAULT CODE 9613 (OUTPUT AT J2-70 IS NOT 28 VDC)
Replace KS and retest.
If fault code 9613 recurs replace UUT.

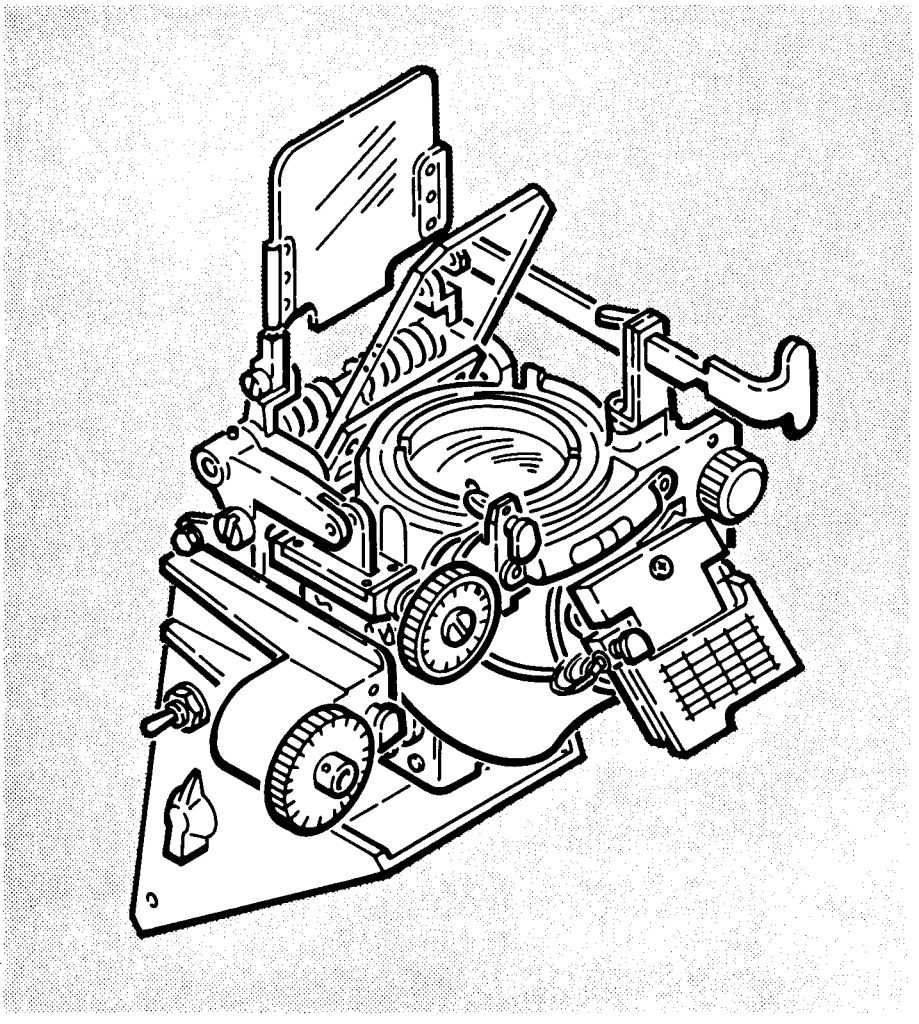
358. FAULT CODE 9614 (OUTPUT AT J2-67 IS NOT 28 VDC)
Replace K5 and retest.
If fault code 9614 recurs replace UUT.

END OF TROUBLESHOOTING

Section VII. REFLEX SIGHT TROUBLESHOOTING

GENERAL

2-30. This section provides a fault symptom index which lists the more common fault symptoms which require AVIM maintenance action. The index lists the fault symptom, then lists the recommended action or actions to be taken for that symptom, and finally references the task where that action may be found.



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2-31. REFLEX SIGHT FAULT SYMPTOM INDEX

Fault Symptom		Action	Reference
RANGE POTENTIOMETER			
1.	Range knob of range potentiometer binds or has too rough motion.	Swollen frayed or distorted preformed packing, see REPAIR OF RANGE POTENTIOMETER.	Para 2-68
2.	Breakaway torque of range potentiometer is less than 1.5 lb-in. (0.17 N.m) or more than 3.0 lb-in. (0.34 N.m)	Worn or damaged preformed packing. Replace packing, see REPAIR OF RANGE POTENTIOMETER.	Para 2-68
3.	Range scale does not indicate 0 when knob is in maximum ccw position.	Check for bent or distorted range scale bracket, see REPAIR OF RANGE POTENTIOMETER.	Para 2-68
4.	When range control knob of range potentiometer is in maximum ccw position, resistance does not measure 5 to 20 ohms across pins A and B.	Replace resistor, see REPAIR OF RANGE POTENTIOMETER.	Para 2-68
5.	Resistance across pins A and B does not decrease as range control knob of range potentiometer is turned cw.	Replace resistor, see REPAIR OF RANGE POTENTIOMETER.	Para 2-68
6.	Resistance across pins A and B does not increase as range contol knob of range potentiometer is turned ccw.	Replace resistor, see REPAIR OF RANGE POTENTIOMETER.	Para 2-68
7.	When range control knob of range potentiometer is in any ccw position, resistance does not measure 9.5 to 1055k ohms across pins A and C.	Replace resistor, see REPAIR OF RANGE POTENTIOMETER.	Para 2-68
REFLEX SIGHT			
8.	Ball not centered in inclinometer when sight is mounted on level surface.	1. Inclinometer not located properly in relation to mounting surface. Relocated inclinometer, see REPAIR OF REFLEX SIGHT.	Para 2-67
		2. Defective vial. Replace vial, see REPAIR OF REFLEX SIGHT.	Para 2-67

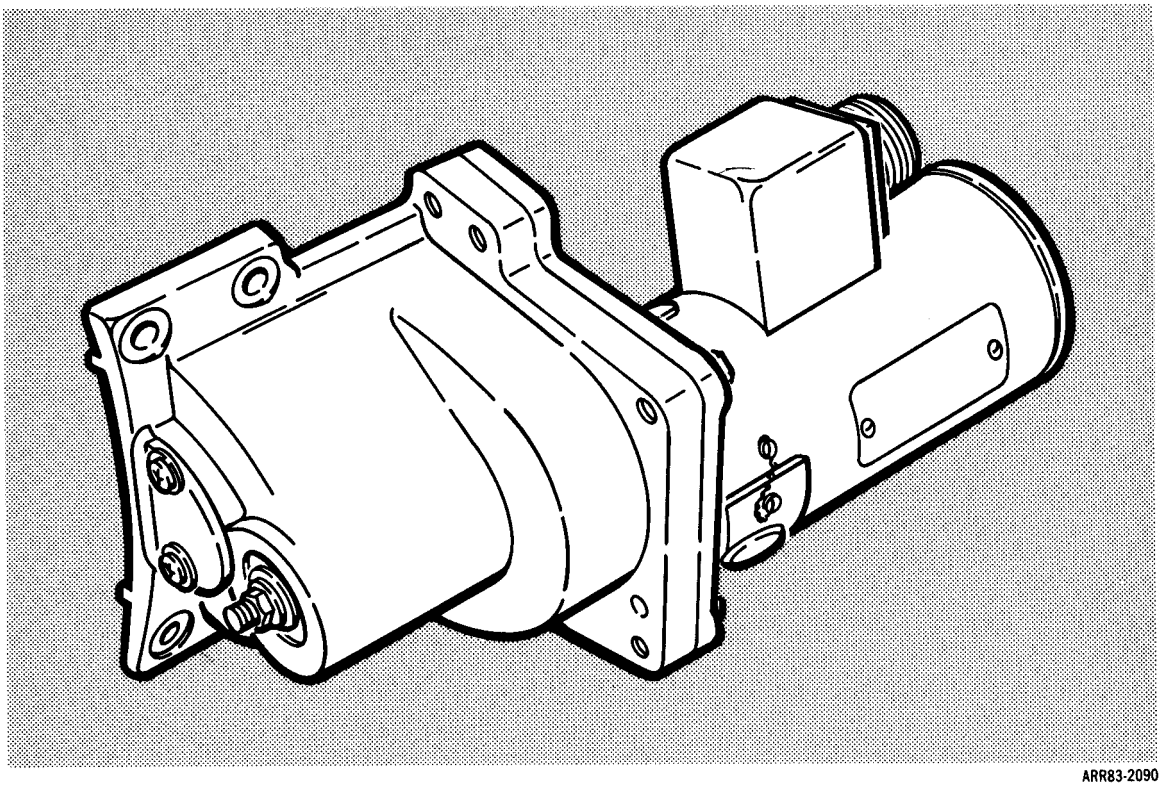
2-31. REFLEX SIGHT FAULT SYSTEM INDEX (cont)

Fault	Symptom		Action	Reference
REFLEX SIGHT (cont)				
9.	Running torque (elevation/depression knob) less than 4.0 lb-in. (0.45 N.m)	1.	Collar too loose on worm shaft. Tighten collar, see REPAIR OF REFLEX SIGHT.	Para 2-67
		2.	Shim between slider and worm shaft too thick. Reduce shim thickness, see REPAIR OF REFLEX SIGHT.	Para 2-67
		3.	Worn spring washer between collar and worm shaft housing. Replace washer, see REPAIR OF REFLEX SIGHT.	
10.	Running torque (elevation/depression knob) exceeds 7.0 lb-in. (0.79 N.m)	1.	Collar too tight on worm shaft. Loosen collar, see REPAIR OF REFLEX SIGHT.	Para 2-67
		2.	Not enough shims between worm shaft and slider. Add shims, see REPAIR OF REFLEX SIGHT.	Para 2-67
		3.	Worn spring washer between collar and worm shaft housing. Replace washer, see REPAIR OF REFLEX SIGHT.	Para 2-67
11.	Elevation/depression error in sight exceeds 2.0 mils in 100 mils travel.		Damaged or defective slider. Replace slider, see REPAIR OF REFLEX SIGHT.	Para 2-67
12.	Plumb travel of sight exceeds 1.0 mil in 100 mils travel.		Worn, elongated, or out-of-line bores for torsion spring shaft. Replace head assembly housing, see REPAIR OF REFLEX SIGHT.	Para 2-67
13.	One (or two) panel lamp(s) does not light while one does light and responds properly to turning of lamp intensity knob.	1.	Defective lamp(s). Replace lamp(s), see REPAIR OF REFLEX SIGHT.	Para 2-67
		2.	Defective ground. Check ground connections and clean terminals, see REPAIR OF REFLEX SIGHT.	Para 2-67

REFLEX SIGHT FAULT SYSTEM INDEX (cont)

Fault Symptom		Action	Reference
REFLEX SIGHT (cont)			
13. One (or two) panel lamps(s) does not light while one does light and responds properly to turning of lamp intensity knob. (cont)	3.	Defective light assembly. Replace light assembly, see REPAIR OF REFLEX SIGHT.	Para 2-67
	4.	Frayed, broken or damaged wiring. Replace or repair wiring harness, see REPAIR OF REFLEX SIGHT	Para 2-67
14. Panel lamps do not respond properly to turning of lamp intensity control knob.		Open resistor. Replace resistor, see REPAIR OF REFLEX SIGHT.	Para 2-67

Section VIII. MAINTENANCE OF GUN DRIVE



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2-32. REPAIR OF GUN DRIVE

DESCRIPTION

This task covers: Disassembly, cleaning, inspection, replacement of brush assemblies, and assembly.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental

Materials:
- Grease (Item 12, Appx B),
- Lockwire (Item 17 Appx B)
- Lumber (Item 21, Appx B)
- Solvent (Item 29, Appx B)

Personnel Required:
- 68M Aircraft Weapon Systems
  - Repairer

References:
- TM 9-1090-206-20-1
- TM 9-1090-206-20-2

Equipment Conditions:
- Gun drive removed, see REMOVAL/INSTALLATION OF GUN DRIVE, TM 9-1090-206-20-1 or TM 9-1090-206-20-2

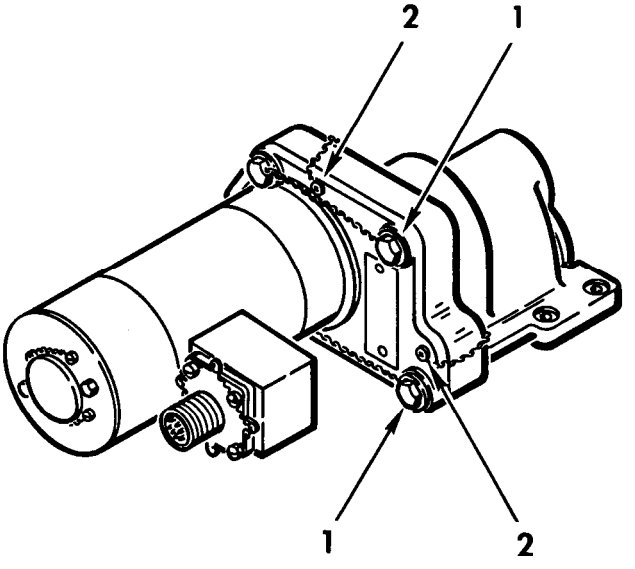
DISASSEMBLY

WARNING

Do not use flammable materials near fire or an open flame. Most cleaning materials are harmful or fatal if swallowed. Use adequate ventilation. Avoid contact with skin and protonged breathing of vapors.

1. PRIOR TO DISASSEMBLY, THOROUGHLY CLEAN GUN DRIVE MOTOR EXTERIOR BY WIPING WITH A CLEAN CLOTH MOISTENED WITH SOLVENT AND WIPE DRY WITH A LINT FREE CLOTH.

2. REMOVE LOCKWIRE FROM TWO PAIRS OF BOLTS (1) AND TWO SPRING PINS (2).



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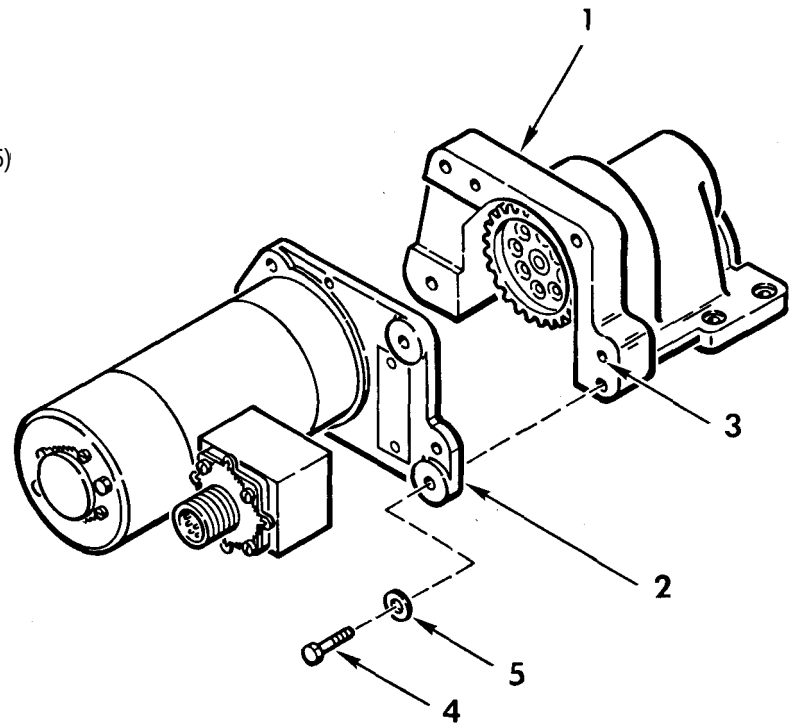
DISASSEMBLY (cont)

3. SEPARATE DRIVE HOUSING (1) FROM MOUNTING PIATE (2).
   a. Drive two spring pins (3) into drive housing (1) until they clear mounting plate (2).
   b. Remove four bolts (4), four washers (5) and separate mounting plate (2) from drive housing (1).



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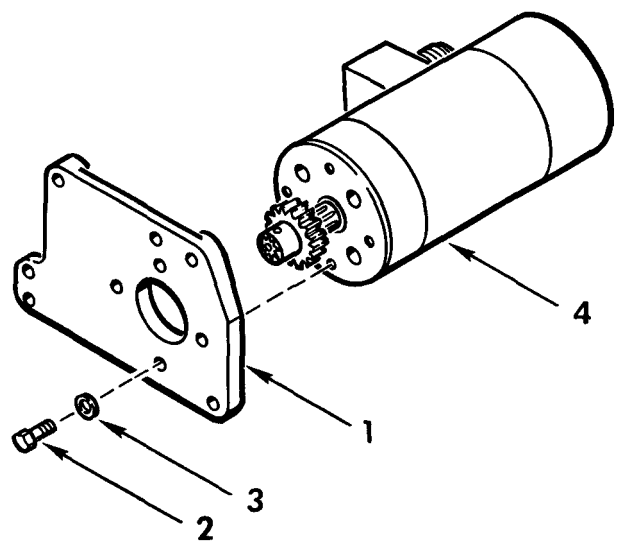
4. REMOVE MOUNTING PLATE (1).
   a. Remove lockwire from four bolts (2).
   b. Remove four bolts (2), four washers (3), and mounting plate (1) from gun drive motor (4).



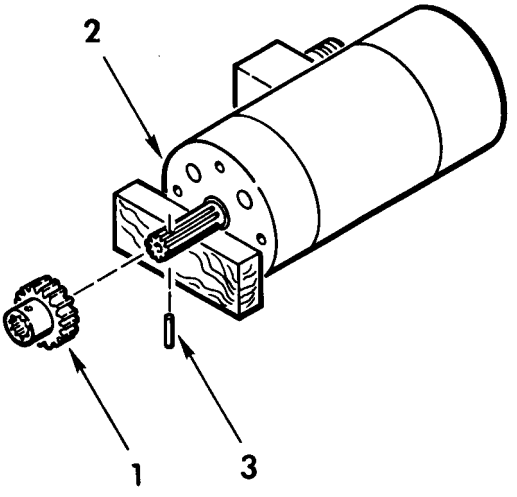
ARR82-25853

2-32. REPAIR OF GUN DRIVE (cont)

5. REMOVE SPUR GEAR (1).

   a. Place a block of wood under motor shaft (2). Make sure spur gear (1) is free of wood block.

   b. Remove spring pin (3) and spur gear (1).



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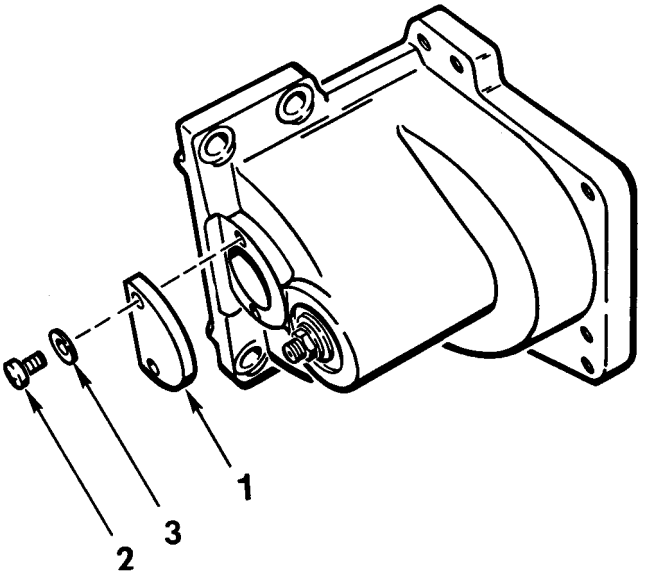
6. REMOVE GUN RETAINER PLATE (1).

   Remove two bolts (2), two flat washers (3), and gun retainer plate (1).



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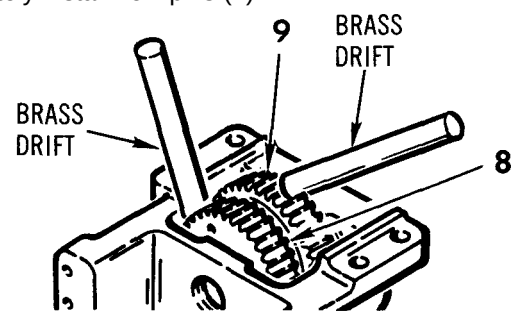
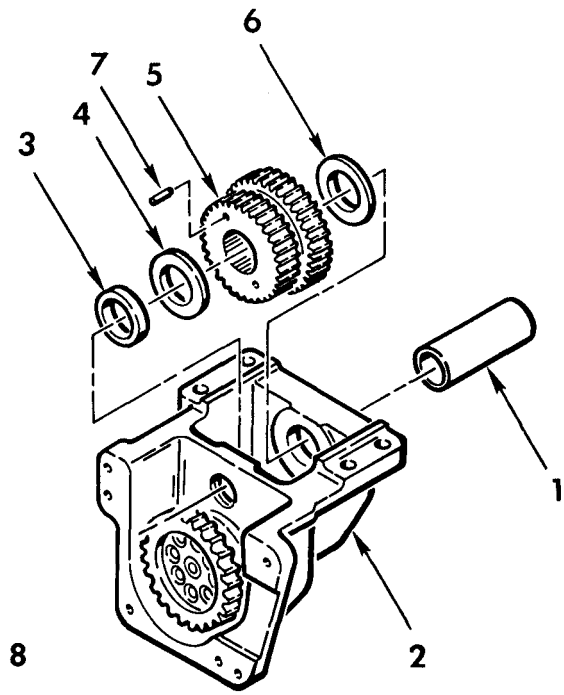
DISASSEMBLY (cont)

7. REMOVE BEARING (1).

a. Slide bearing (1) from drive housing (2); removing spacer (3), washer (4), cluster gear (5), and washer (6).

b. If bearing (1) cannot be easily removed, two pins (7) must be sheared. Wedge one brass drift between tooth of gear (8) and drive housing (2). Using another brass drift, drive gear (9) until two pins (7) shear. Note orientation of one gear to the other. Remove pieces of pins from each gear and immediately install new pins (7).





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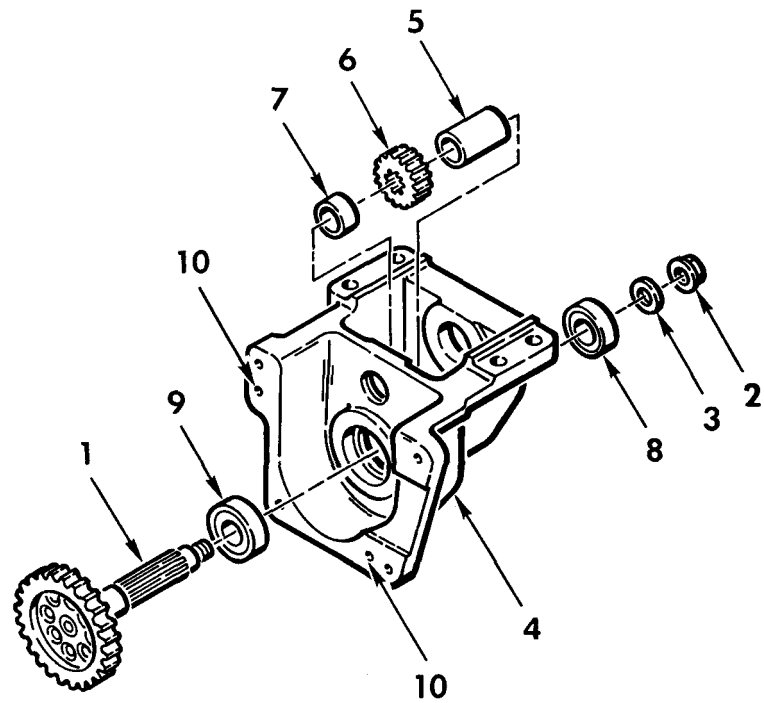
8. REMOVE SPUR GEARSHAFT (1).

a. Remove nut (2) and washer (3) from spur gearshaft (1).

b. Slide spur gearshaft (1) from drive housing (4), removing spacer (5), gear (6), and spacer (7).

c. Remove bearing (8) and bearing (9) from drive housing (4).

d. If pins (10) are bent or broken, replace.



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2-32. REPAIR OF GUN DRIVE (cont)

CLEANING

PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV.

INSPECTION

10. ALL GUN DRIVE PARTS SHALL BE VISUALLY INSPECTED AND REPAIRED OR REPLACED IF FOUND TO BE DEFECTIVE.

11. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV AND TABULATED DATA:

Component	Possible Defect	Remedy
Gun Drive Motor	Noisy bearings	Replace gun drive motor.
	Will not rotate	Replace gun drive motor,
	Bent connector pins	Straighten.
Cluster Gear	Check for sheared pins	Replace pins
	Chipped or broken gear teeth	Replace cluster gear.
	Visually check bearing for corrosion or wear	Replace cluster gear.
Spur Gearshaft	Chipped or broken teeth	Replace.
	Stripped spline	Replace.
Bearings	Noisy, corroded	Replace.
Drive Housing	Cracks or breaks	Replace gun drive.

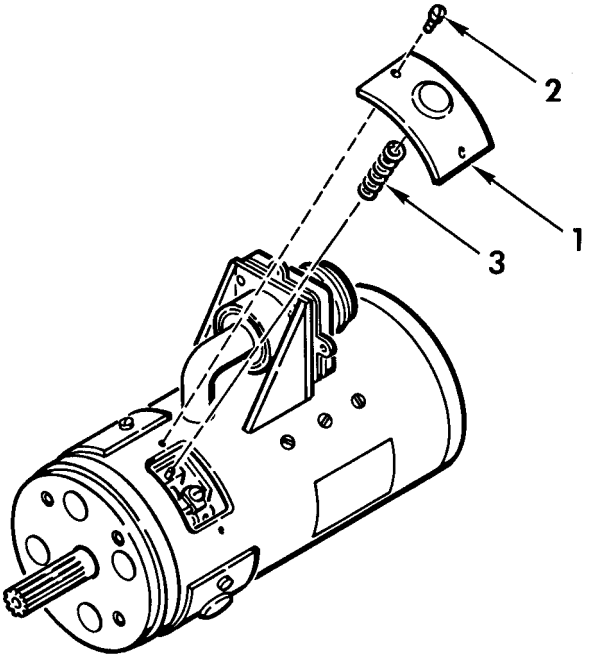
REPLACEMENT OF BRUSH ASSEMBLY

NOTE

If you have gun drive motor, part number 309GE6, proceed to step 12.

If you have gun drive motor, part number G297CN711, proceed to step 17.

12. REMOVE BRUSH COVER (1).
    a. Remove lockwire.
    b. Remove two screws (2), brush cover (1), and spring (3).
    c. Repeat steps a and b for remaining brush covers.



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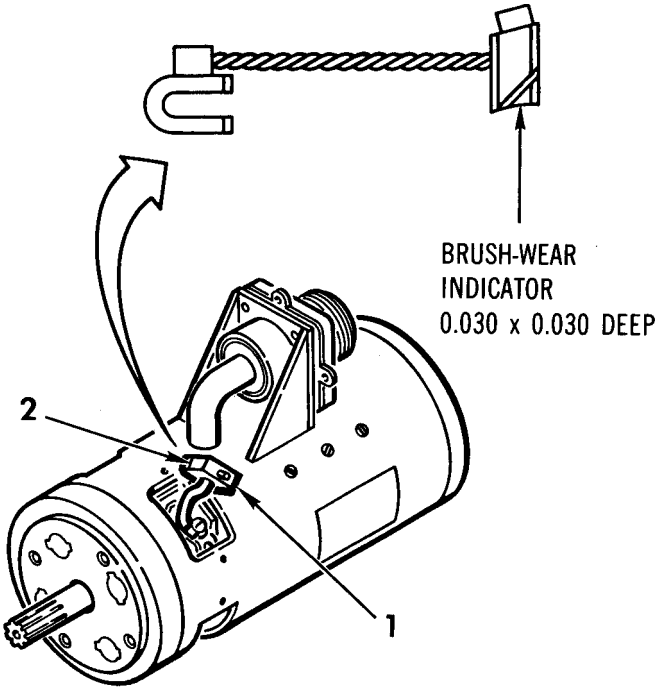
NOTE

If any brush assembly is worn beyond brush wear indicator mark, replace all brush assemblies and attaching hardware.

13. CHECK BRUSH ASSEMBLIES (1) FOR WEAR.
    a. Lift brush assembly (1) and check for presence of wear indicator (2).
    b. Repeat step a for remaining brush assemblies (1).
    c. If wear indicator (2) is visible on each brush assembly, go to step 16. If wear indicator (2) is not visible on each brush assembly, go to next step.



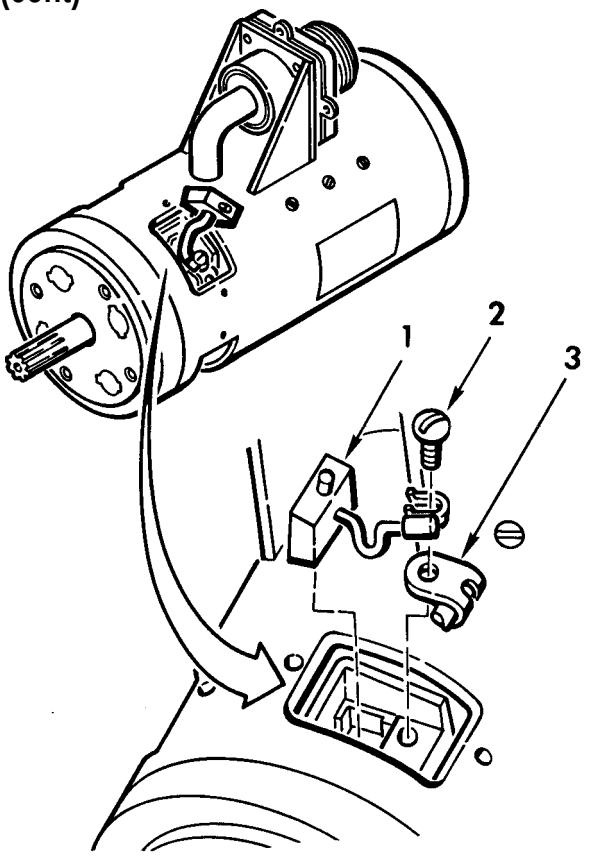
ARR82-25859A

2-32. REPAIR OF GUN DRIVE (cont)

REPLACEMENT OF BRUSH ASSEMBLY (cont)

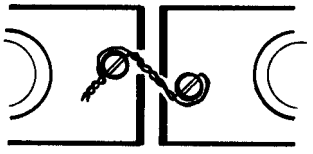
14. REMOVE BRUSH ASSEMBLY (1).
    a. Remove screw (2) and brush assembly (1). This releases lug and lead assembly (3) from brush holder.
    b. Repeat step a for remaining brush assemblies (1).

15. INSTALL BRUSH ASSEMBLY (1).
    a. Install new brush assembly (1). Secure brush assembly and tug and lead assembly (3) to brush holder using screw (2).
    b. Repeat step a for remaining brush assemblies (1).



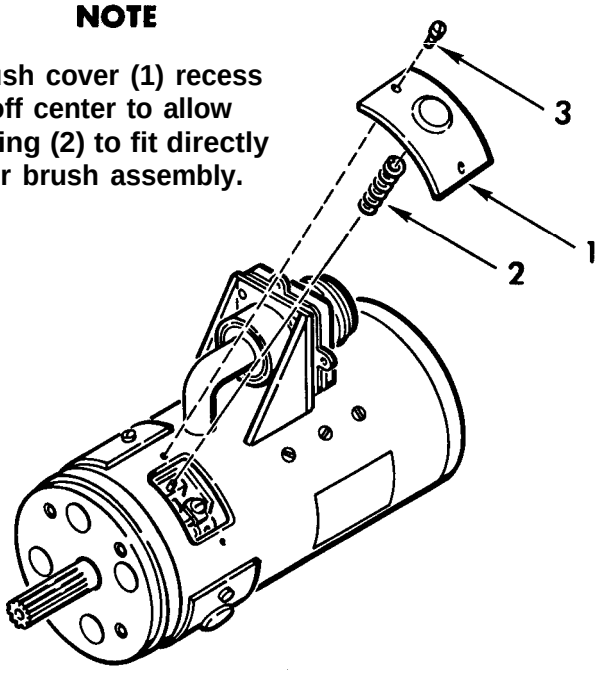
ARR82-25860

16. INSTALL BRUSH COVER (1).
    a. Place spring (2) on stud of brush assembly, position spring in recess of brush cover (1), then press brush cover down and secure with two screws (3).
    b. Repeat step a for remaining brush covers (1).
    c. Lockwire brush covers (1).



NOTE

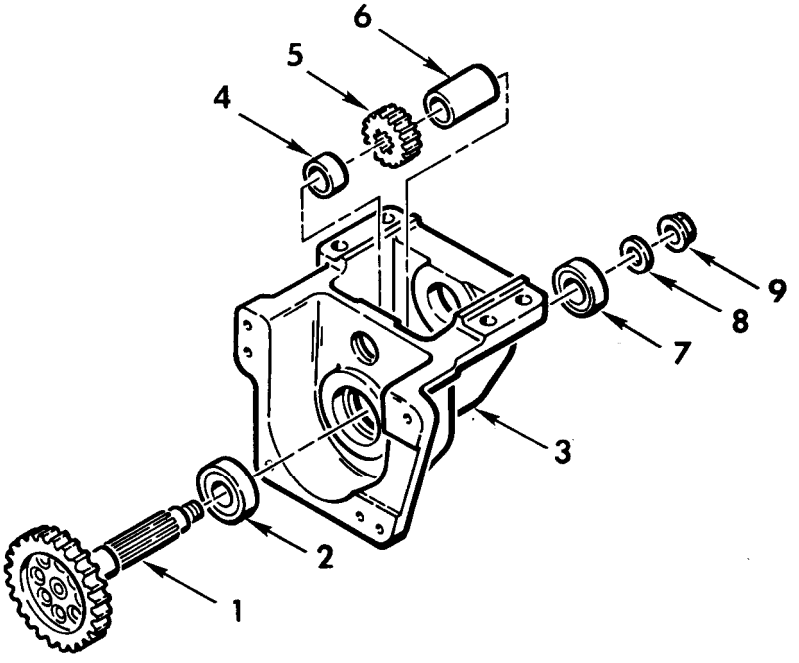
Brush cover (1) recess is off center to allow spring (2) to fit directly over brush assembly.



ARR82-25861

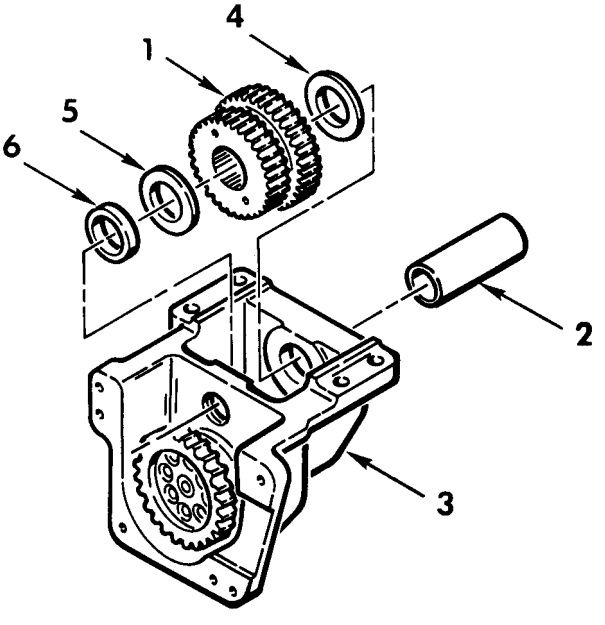
ASSEMBLY

17. INSTALL SPUR GEARSHAFT (1).
    a. Install bearing (2) in drive housing (3).
    b. Insert threaded end of spur gearshaft (1) through hole in bearing (2).
    c. Install spacer (4), gear (5), and spacer (6) on threaded end of spur gearshaft (1) while sliding gearshaft into drive housing (3).
    d. Insert spur gearshaft (1) through rear hole in drive housing (3).
    e. Install bearing (7)on threaded end of spur gearshaft (1), and insert bearing into rear hole in drive housing (3).
    f. Install washer (8), and nut (9) on threaded end of spur gearshaft (1). Tighten finger-tight.



ARR82-25862

18. INSTALL CLUSTER GEAR (1).
    a. Insert bearing (2) through rear hole in drive housing (3).
    b. Install washer (4), cluster gear (1), washer (5), and spacer (6) while sliding bearing (2) into drive housing (3).



AEE82-25863

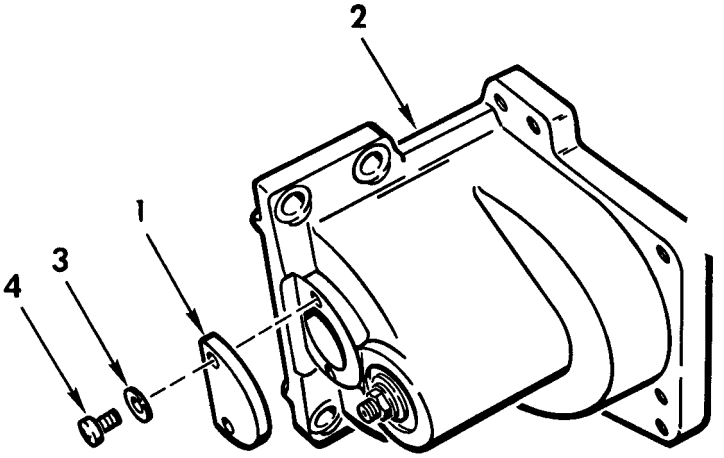
2-32. REPAIR OF GUN DRIVE (cont)

ASSEMBLY (cont)

19. INSTALL GUN RETAINER PLATE (1).

a. Install gun retainer plate (1) on drive housing (2) and secure using two washers (3) and two screws (4).

b. Coat gear teeth on installed parts with grease.



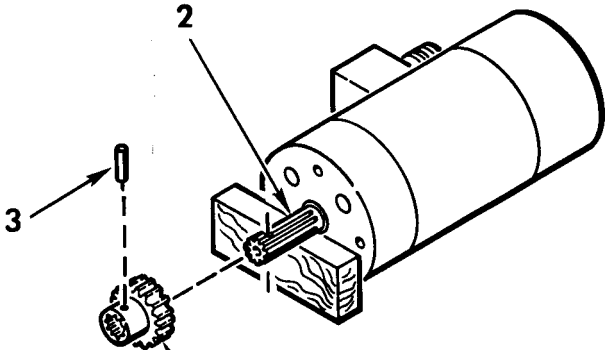
ARR82-25864

20. INSTALL SPUR GEAR (1).

a. Place a block of wood under motor shaft (2).

b. Place spur gear (1) on motor shaft (2), and secure spur gear to motor shaft using spring pin (3).

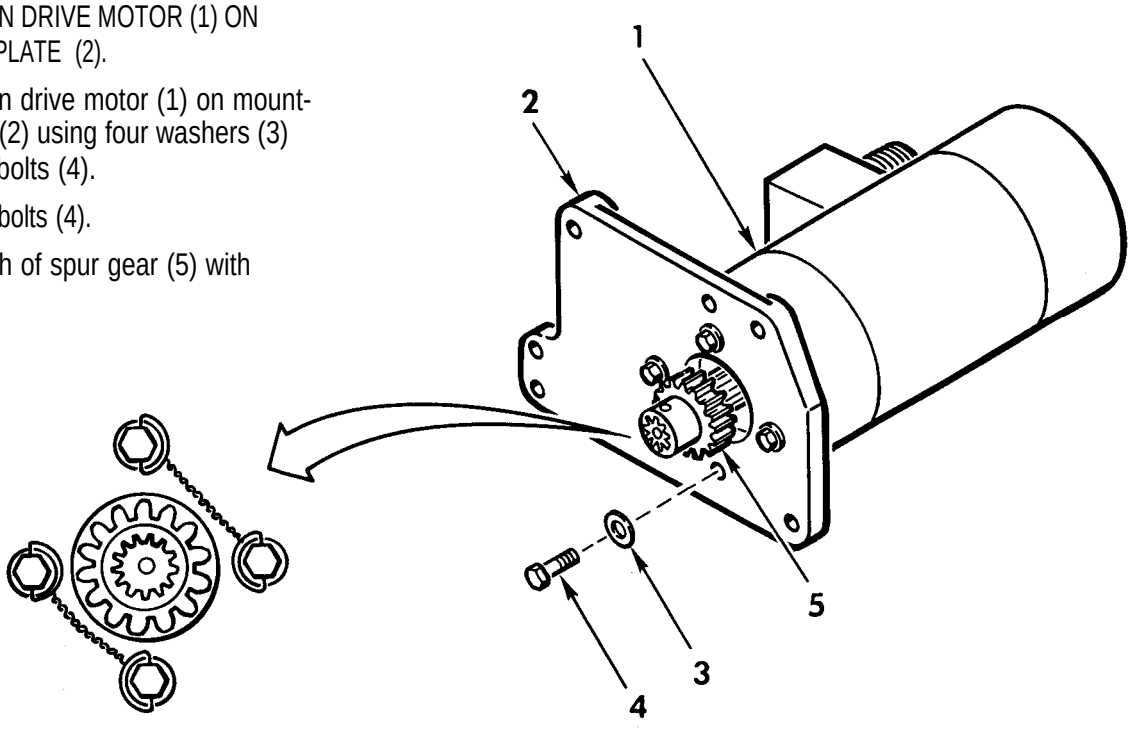
c. Drive spring pin (3) into spur gear (1) so that either end of spring pin does not protrude from spur gear.



ARR82-25865

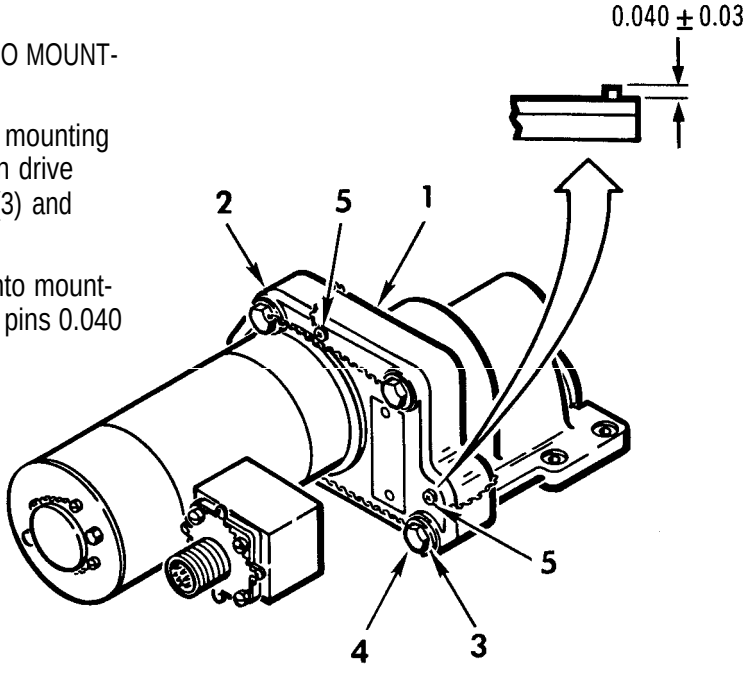
ASSEMBLY (cont)

21. INSTALL GUN DRIVE MOTOR (1) ON MOUNTING PLATE (2).
    a. Install gun drive motor (1) on mounting plate (2) using four washers (3) and four bolts (4).
    b. Lockwire bolts (4).
    c. Coat teeth of spur gear (5) with grease.



ARR82-25867

22. INSTALL DRIVE HOUSING (1) TO MOUNTING PLATE (2).
    a. Install drive housing (1) on mounting plate (2), with attached gun drive motor, using four washers (3) and four bolts (4).
    b. Drive two spring pins (5) into mounting plate (2). Leave end of pins 0.040 ±0.03 inch above surface.



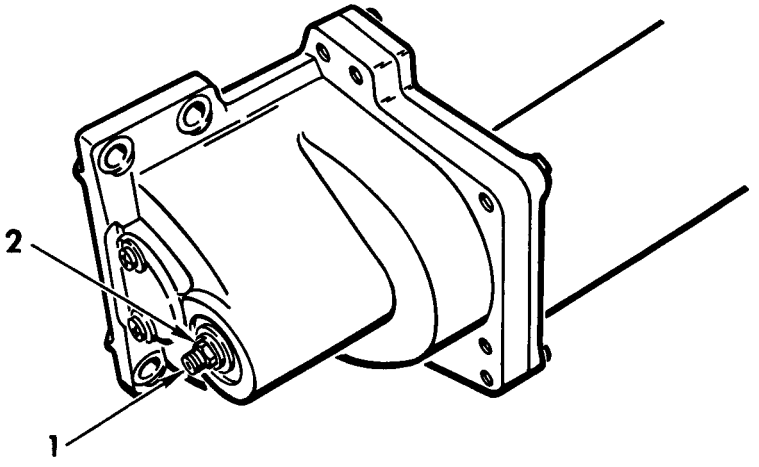
ARR82-25866

2-32. REPAIR OF GUN DRIVE (cont)

ASSEMBLY (cont)

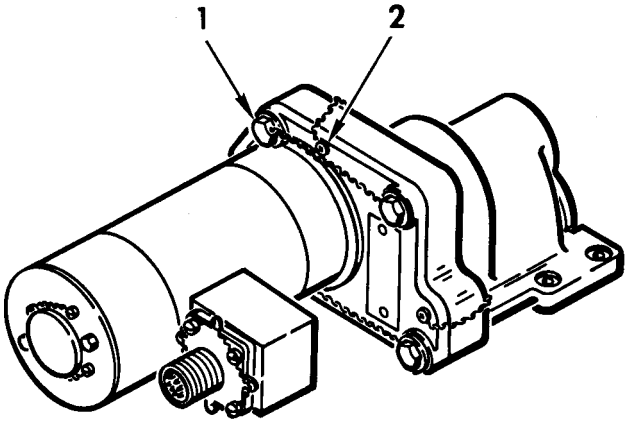
23. ADJUST END PLAY OF SPUR GEARSHAFT (1).

Tighten nut (2) until end play of gearshaft (1) is between 0.001 to 0.004 inch.



ARR82-25868

24. LOCKWIRE BOLTS (1) AND SPRING PINS (2).

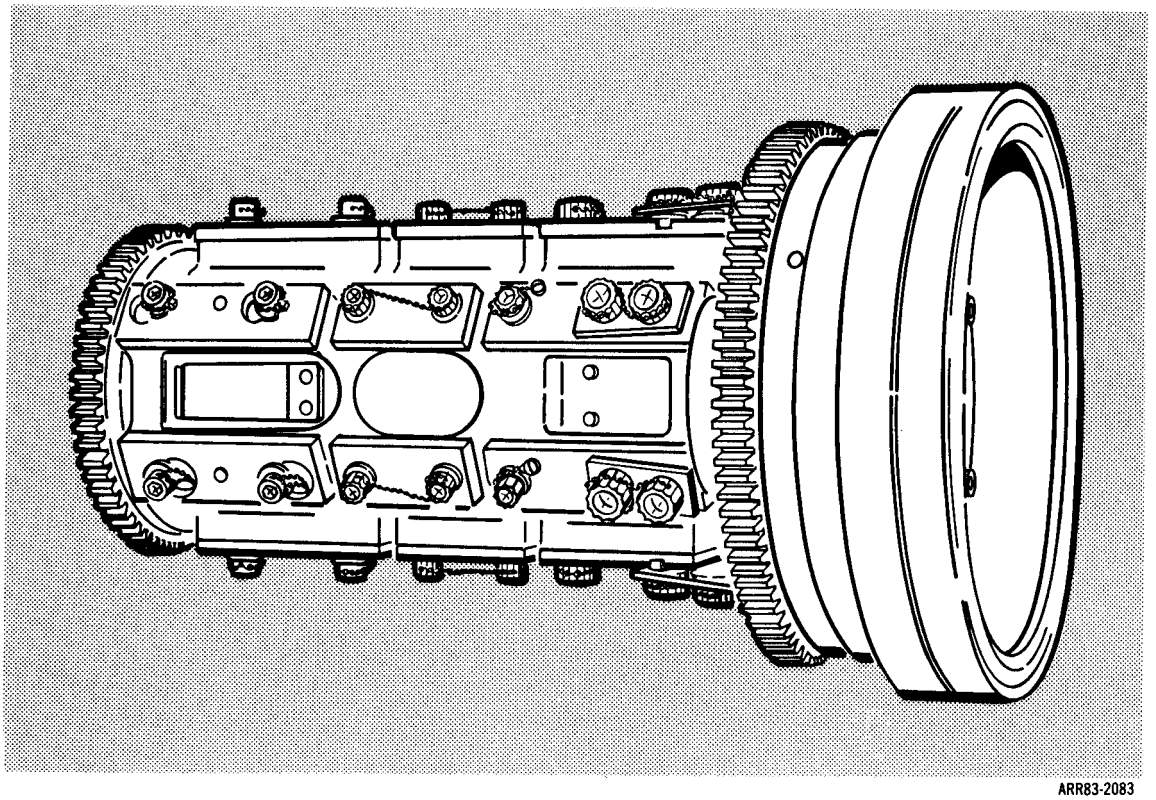


ARR82-25869

END OF TASK

Section IX. MAINTENANCE OF M197 GUN

Section Contents	Para
Repair of Rotor	2-33



ARR83-2083

2-33. REPAIR OF ROTOR

DESCRIPTION

This task covers: Disassembly, cleaning, inspection, replacement of rotor stop, lubrication, and assembly.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental
- Bolt Head Lock
- Installation Tool (Fig C-3, Appx C)

Materials:
- Grease (Item 12, Appx B)
- Lockwire (Item 18, Appx B)
- Lubricant (Item 20, Appx B)

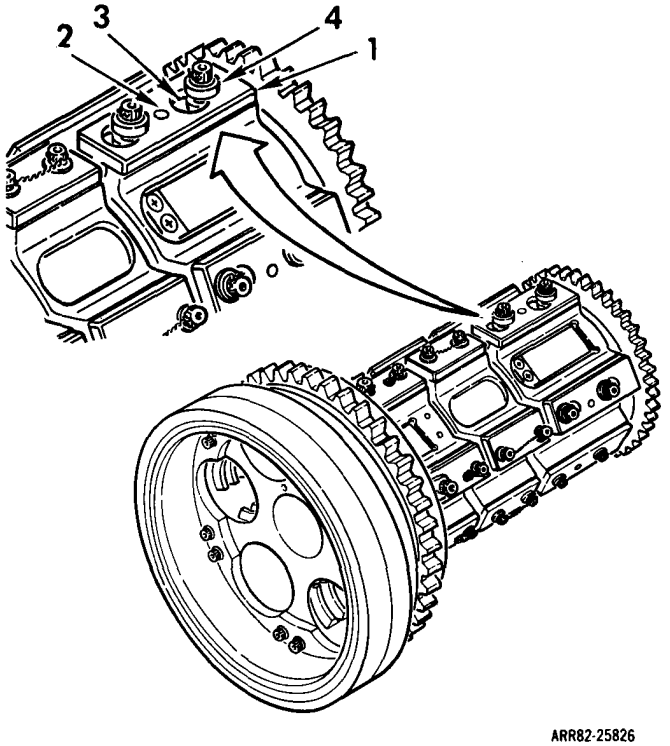
Personnel Required:
- 68M Aircraft Weapon Systems Repairer

References:
- TM 9-1090-206-20-1
- TM 9-1090-206-20-2

Equipment Conditions:
- Rotor removed from M197 gun, see REPAIR OF M197 GUN, TM 9-1090-206-20-1 or TM 9-1090-206-20-2

DISASSEMBLY

1. REMOVE REMOVABLE ROTOR TRACK (1).
   a. While pressing lock pin (2), slide removable rotor track (1) so keyhole (3) is under track spacer (4) and remove removable rotor track.
   b. Repeat step a for remaining removable rotor tracks (1).



ARR82-25826

DISASSEMBLY (cont)

WARNING

When retaining ring is removed, pin may fly out and cause injury.

2. REMOVE TRACK LOCK PIN (1).

a. Remove retaining ring (2).

b. Remove track lock pin (1) and track lock spring (3).

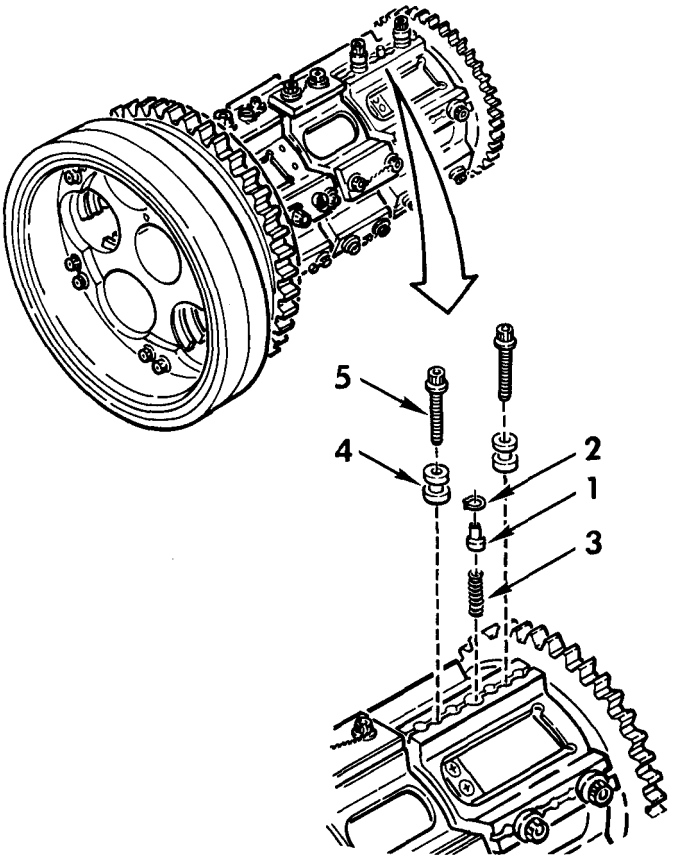
c. Repeat steps a and b for remaining track lock pins (1).

3. REMOVE SPACER (4).

a. Remove lockwire from two bolts (5).

b. Remove two bolts (5) and spacers (4).

c Repeat steps a and b for remaining spacers (4).



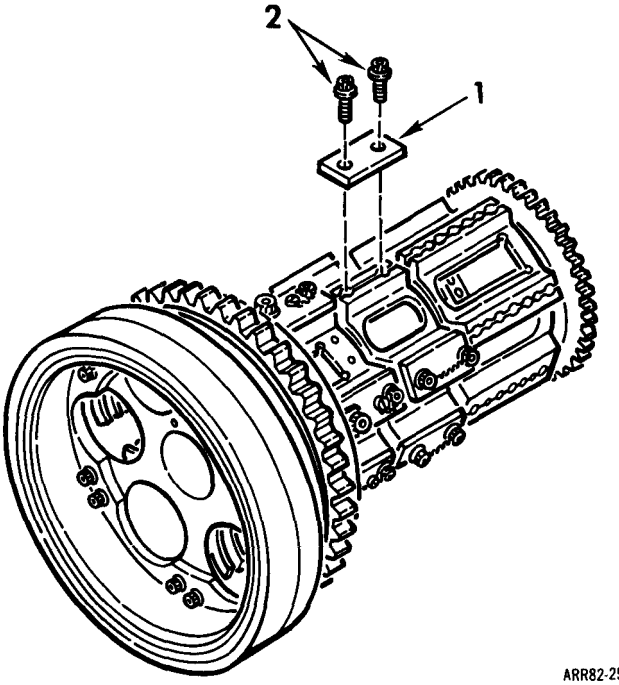
ARR82-25827

4. REMOVE CENTER ROTOR TRACKS (1).

a. Remove lockwire from two bolts (2).

b. Remove two bolts (2) and center rotor track (1).

c Repeat steps a and b to remove remaining center rotor tracks (1).

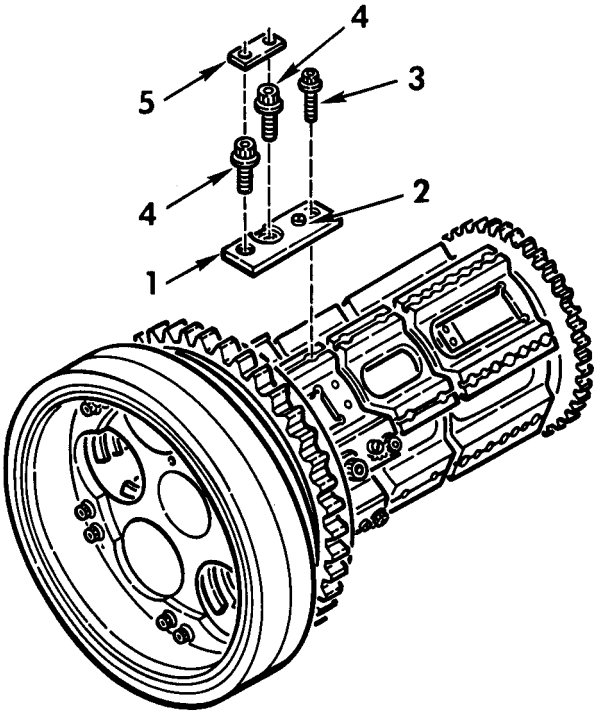


ARR82-25828

2-33. REPAIR OF ROTOR (cont)

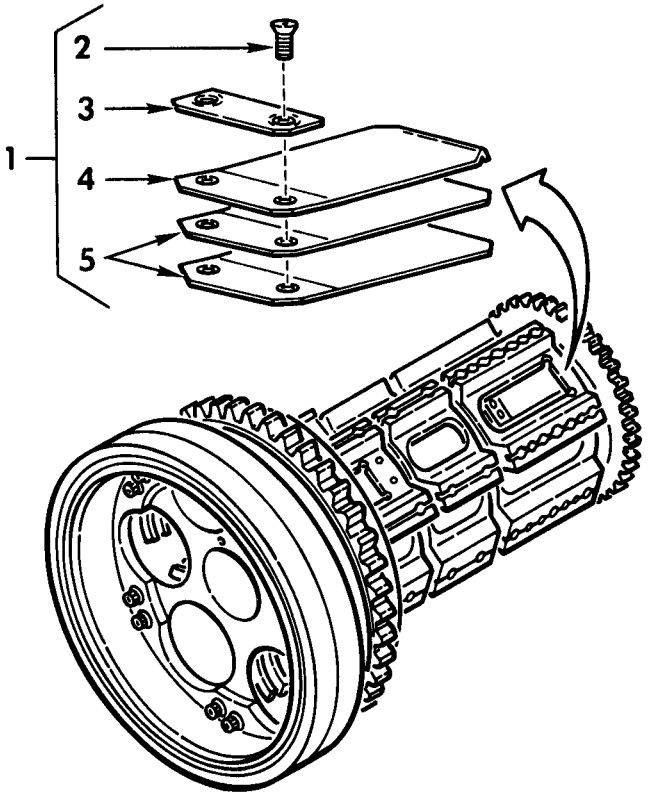
DISASSEMBLY (cont)

5. REMOVE FRONT ROTOR TRACK (1).
   a. Remove lockwire from screw (2) and rear bolt (3).
   b. Remove lockwire from two bolts (4).
   c. Remove bolt head lock (5).
   d. If required for maintenance, remove screw (2).
   e. Remove bolt (3) and two bolts (4).
   f. Remove right hand front rotor track (1).
   g. Repeat steps a through f to remove remaining front rotor tracks (1).



ARR82-25829

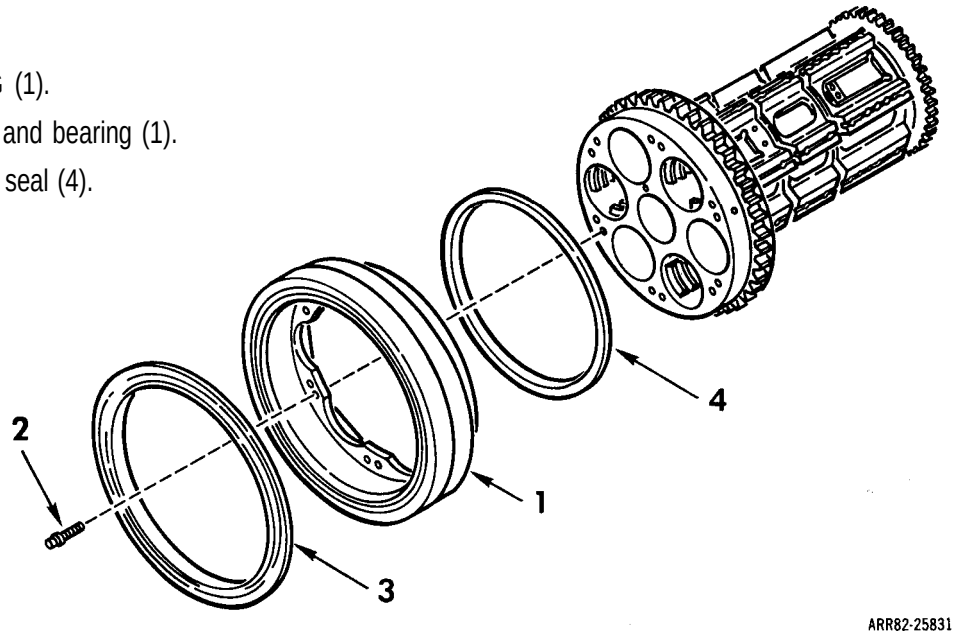
6. REMOVE LEAF SPRING SET (1)
   a. Remove two screws (2).
   b. Remove plate (3), spring (4), and two springs (5).
   c. Repeat steps a and b to remove remaining leaf spring sets (1).



ARR82-25830

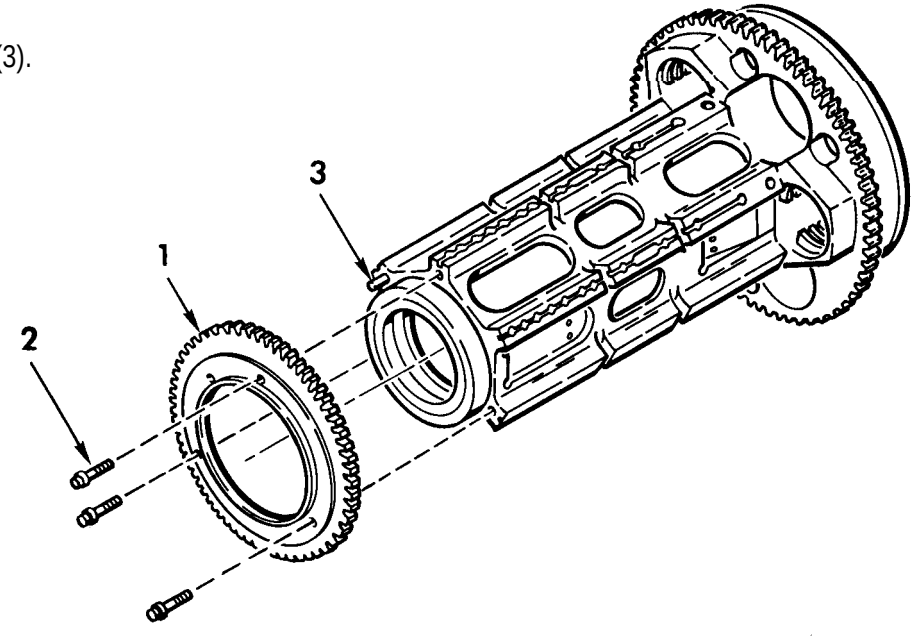
DISASSEMBLY (cont)

7. REMOVE BALL BEARING (1).
   a. Remove 12 bolts (2) and bearing (1).
   b. Remove seal (3) and seal (4).



ARR82-25831

8. REMOVE ROTOR GEAR (1).
   a. Remove lockwire from three bolts (2).
   b. Remove three bolts (2). Remove rotor gear (1) by tapping evenly around forward face of rotor gear with soft-faced hammer.
   c. If defective, remove pin (3).



ARR82-25832

2-33. REPAIR OF ROTOR (cont)

CLEANING

CAUTION

Every precaution shall be taken to avoid contaminating the needle bearing when cleaning the rotor.

9. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV.

INSPECTION

10. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV.

11. INSPECT PARTS IN ACCORDANCE WITH TABULATED DATA:

Component	Possible Defect	Remedy
Rotor Body	Chipped or cracked barrel locking lugs	Return M197 gun to next higher maintenance level for disposition.
	Cracked or missing rotor stops	Replace.
	Damaged or elongated rotor stop holes	Return M197 gun to next higher maintenance level for disposition.
Rotor Stops	Worn rotor stops. Acceptable head thickness is 0.005 in. minimum.	Replace.
Needle Bearing	Binding or damaged	Return M197 gun to next higher maintenance level for repair.
Ball Bearing	Cracked or binding	Replace.
Ball Bearing Seals	Broken or dented seals	Repair if possible. If repair not possible, replace seals.
Rotor Gear	Worn or chipped rotor gear teeth Polished teeth, finish removal, and small chips from teeth (0.030 in.) are permissible.	Replace rotor gear.

INSPECTION (cont)

Component	Possible Defect	Remedy
Rotor Tracks	Bent, galled, cracked, or twisted	Replace.
	Cracked, flaked, or missing plating	Replace.
	Broken keys on underside of rotor track	Replace.
	Bent, cracked, or distorted	Replace.
Track Lock Pins	Bent, cracked, or distorted	Replace.
Retaining Ring	Bent or damaged	Replace.
Track Lock Spring	Broken	Replace.
Leaf Spring Set	Broken or nonfunctional leaf springs, top leaf spring, doubler plate or screws.	Replace all parts. Use new parts from spring set. NOTE **Spring set contains sufficient parts for two guns. Retain unused parts for future use.**

2-33. REPAIR OF ROTOR (cont)

REPLACEMENT OF ROTOR STOP

CAUTION

To avoid possibility of damage to rotor body, exercise care when cutting off head of rotor stop with chisel. If rotor body is damaged, gun will be returned to next higher maintenance level for disposition.

12. POSITION CENTER PUNCH IN CENTER OF HEAD OF ROTOR STOP (1).

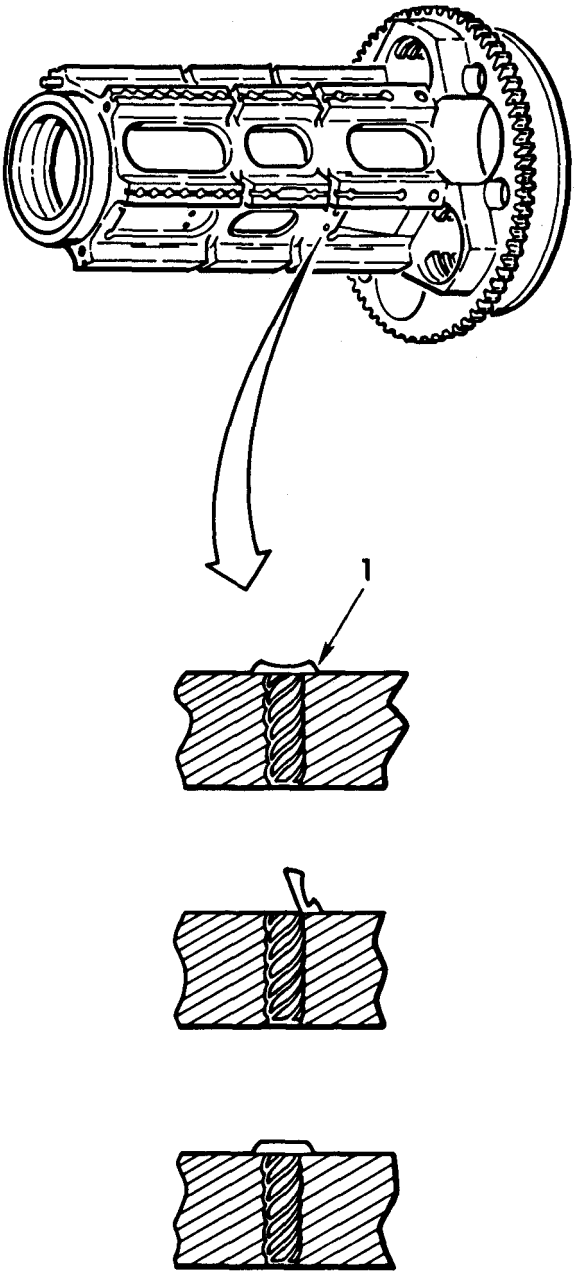
13. STRIKE CENTER PUNCH WITH HAMMER TO DISH HEAD OF ROTOR STOP **(1).**

14. USING A CHISEL, CUT OFF HEAD OF STOP (1).

15. USING A 3/32-INCH DRIFT, CAREFULLY DRIVE REMAINDER OF ROTOR STOP (1) FROM ROTOR BODY.

16. POSITION ROTOR STOP (1) IN MOUNTING HOLE IN ROTOR BODY.

17. USING A DRIFT LARGER IN DIAMETER THAN HEAD OF ROTOR STOP (1), SEAT ROTOR STOP IN ROTOR BODY.



ARR82-25833

LUBRICATION

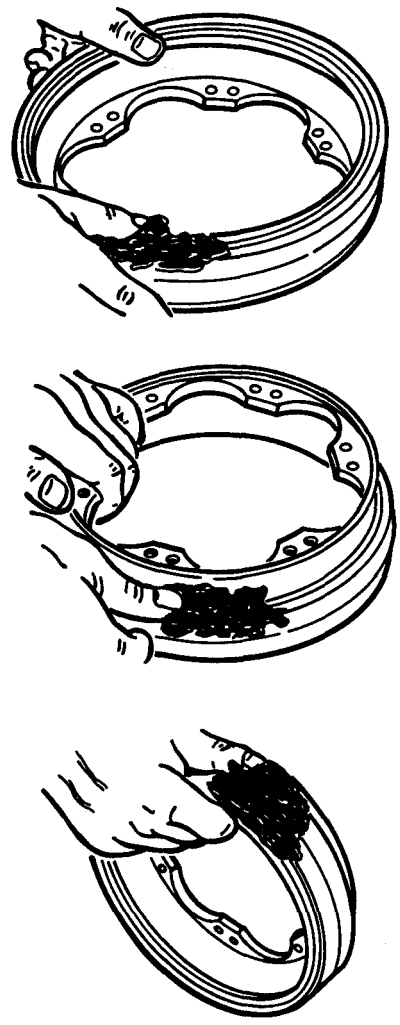
CAUTION

Do not use a grease gun to fill ball bearing. The pressure developed by the grease gun will overfill the ball bearing.

18. PACK CAVITIES ON BOTH SIDES OF BALL BEARING WITH GREASE, BY HAND.

19. SPREAD OUTER RACES OF BALL BEARING APART WITH THUMBS AND FILL CAVITY HALF FULL WITH GREASE, BY HAND.

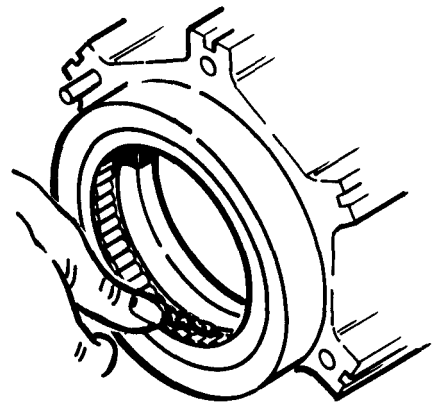
20. ROTATE BALL BEARING, AS NECESSARY, TO DISTRIBUTE GREASE EVENLY.



ARR82-25834

21. FILL CAVITY OF NEEDLE BEARING APPROXIMATELY ONE-HALF FULL OF GREASE, BY HAND.

22. MAKE SURE THAT TIPS OF NEEDLES ARE COATED WITH GREASE.

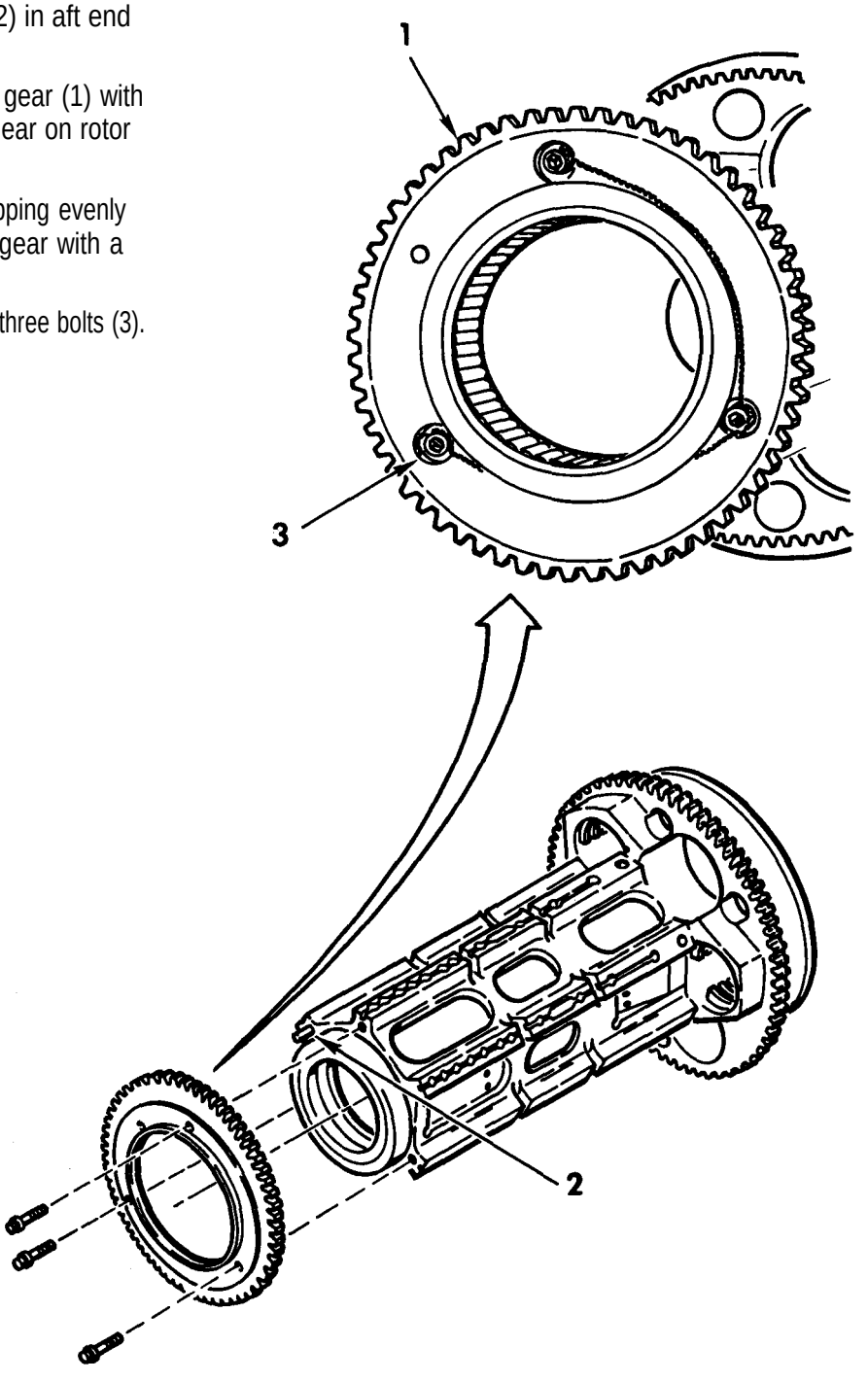


ARR82-25925

2-33. REPAIR OF ROTOR (cont)

ASSEMBLY

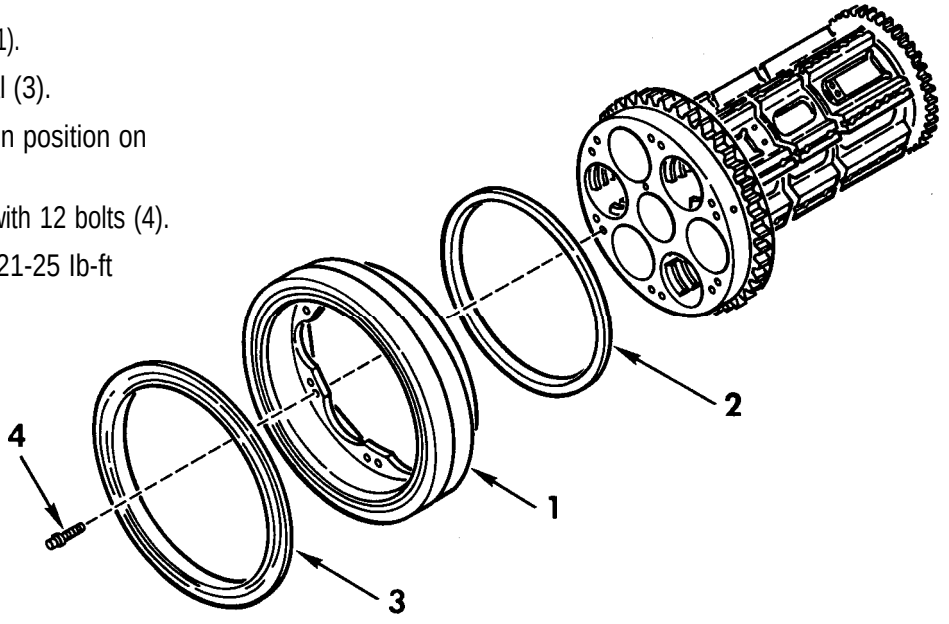
23. INSTALL ROTOR GEAR (1).
    a. If removed, install pin (2) in aft end of rotor body.
    b. Aline index hole in rotor gear (1) with pin (2) and place rotor gear on rotor body.
    c. Seat rotor gear (1) by tapping evenly around aft face of rotor gear with a soft-faced hammer.
    d. Secure rotor gear (1) with three bolts (3).
    e. Lockwire three bolts (3).



ARR82-25835

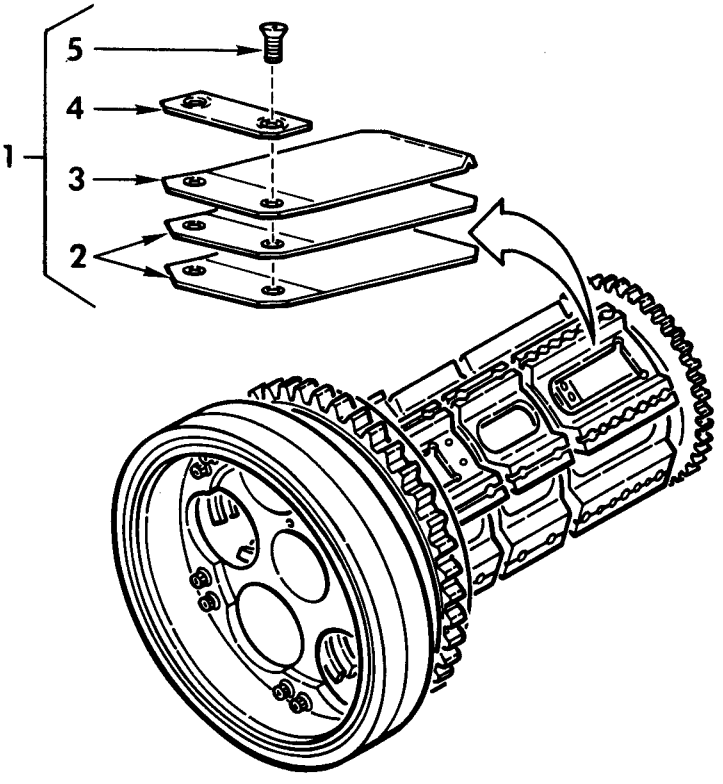
ASSEMBLY (cont)

24. INSTALL BALL BEARING (1).
    a. Install seal (2) and seal (3).
    b. Place ball bearing (1) in position on forward end of rotor.
    c Secure ball bearing (1) with 12 bolts (4).
    d. Torque 12 bolts (4) to 21-25 lb-ft (28-34 N.m).



ARR82-25836

25. INSTALL LEAF SPRING SET (1).
    a. Install two springs (2), spring (3), and plate (4).
    b. Secure with two screws (5).
    c. Repeat steps a and b to install remaining leaf spring sets (1).

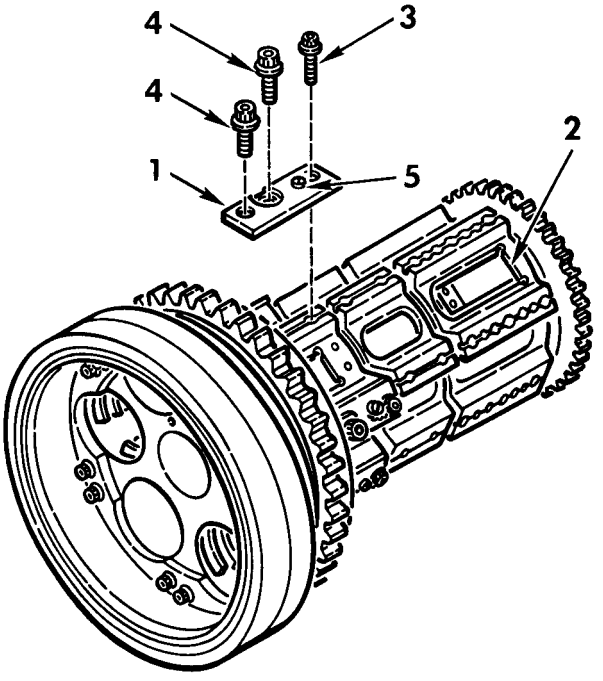


ARR82-25837

2-33. REPAIR OF ROTOR(cont)

ASSEMBLY (cont)

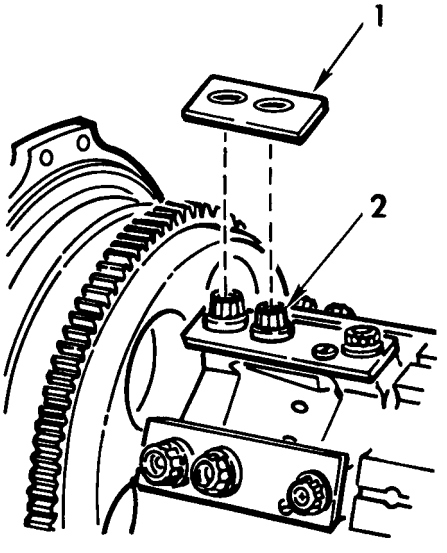
26. INSTALL FRONT ROTOR TRACK (1).
    a. Orient front rotor track (1), so the extended edge will overhang the bolt path with the leaf spring set (2).
    b. Install right hand front rotor track (1). Lubricate bolt threads and secure front rotor track using bolt (3) and two bolts (4).
    c. If removed, install screw (5).
    d. Torque bolt (3) to 46-50 lb-ft (62-68 N.m).
    e. Torque two bolts (4) to 129-138 lb-ft (175-187 N.m).
    f. Repeat steps a through e for remaining front rotor tracks (1).



ARR82-25838

27. LUBRICATE BOLT HEAD LOCK (1) AND BOLT HEADS (2).

28. PLACE BOLT HEAD LOCK (1) IN MOUNTING POSITION ON BOLT HEADS (2).



ARR82-25839

ASSEMBLY (cont)

WARNING

Wear a suitable eye protective device to prevent injury.

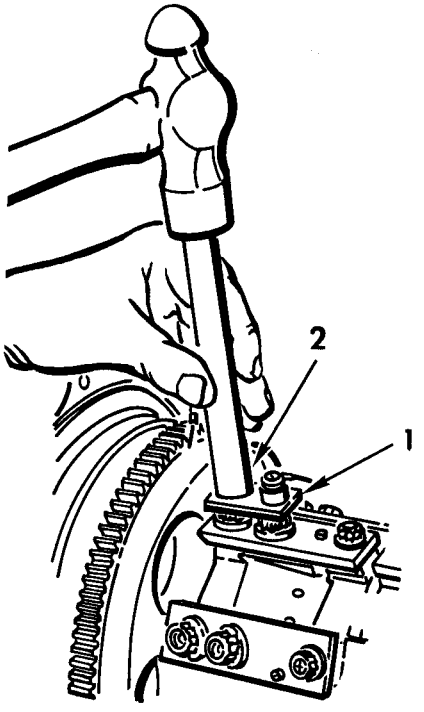
CAUTION

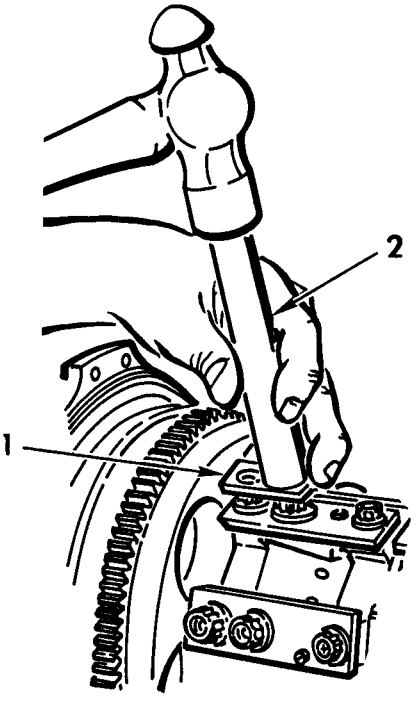
Bolts securing front rotor tracks must be torqued prior to performing following steps.

NOTE

Newly installed bolt head locks may appear distorted or loose. This condition is normal.

29. INSTALL BOLT HEAD LOCK (1).
    a. Place bolt head lock installation tool (2) in position on bolt head lock (1) over forward bolt and strike tool sharply with a hammer to start bolt head lock over bolt.
    b. Place bolt head lock installation tool (2) in position bolt head lock (1) over aft bolt and strike tool sharply with a hammer to start bolt head lock over bolt.
    c. Repeat steps a and b above, as necessary, to fully seat bolt head lock (1) over bolt heads and allow access to lockwire holes in bolt heads.
    d. After installation of bolt head lock (1), remove chips from area around bolt heads and from rotor using low-pressure compressed air or a fiber bristle brush.



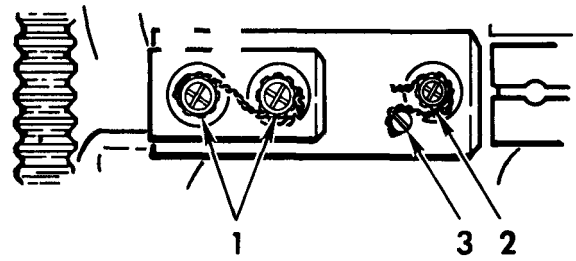


ARR82-25840

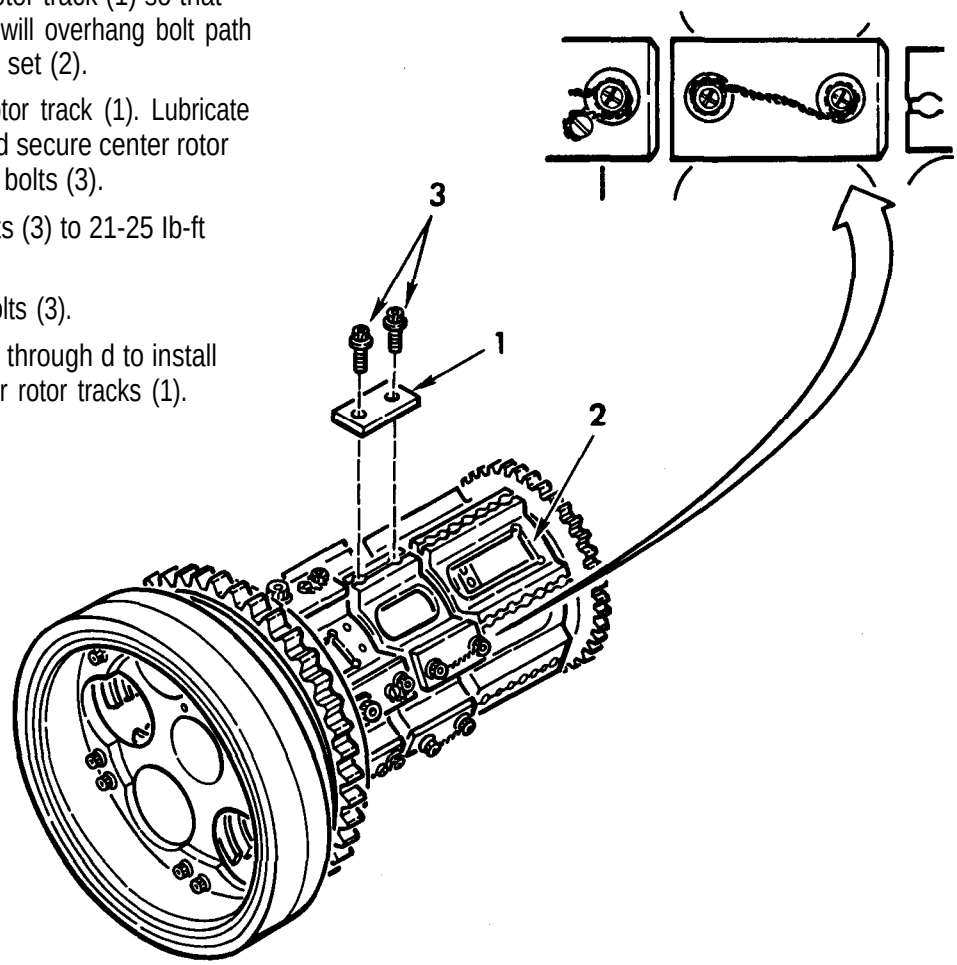
2-33. REPAIR OF ROTOR (cont)

ASSEMBLY (cont)

30. LOCKWIRE BOLTS (1) AND (2).
    a. Lockwire two forward bolts (1).
    b. Lockwire rear bolt (2) and screw (3).
    c. Repeat steps 27 through 30 to install remaining bolt head locks.



31. INSTALL CENTER ROTOR TRACKS (1).
    a. Orient center rotor track (1) so that extended edge will overhang bolt path with leaf spring set (2).
    b. Install center rotor track (1). Lubricate bolt threads and secure center rotor track using two bolts (3).
    c. Torque two bolts (3) to 21-25 lb-ft (28-34 N.m).
    d. Lockwire two bolts (3).
    e. Repeat steps a through d to install remaining center rotor tracks (1).



ARR82-25842

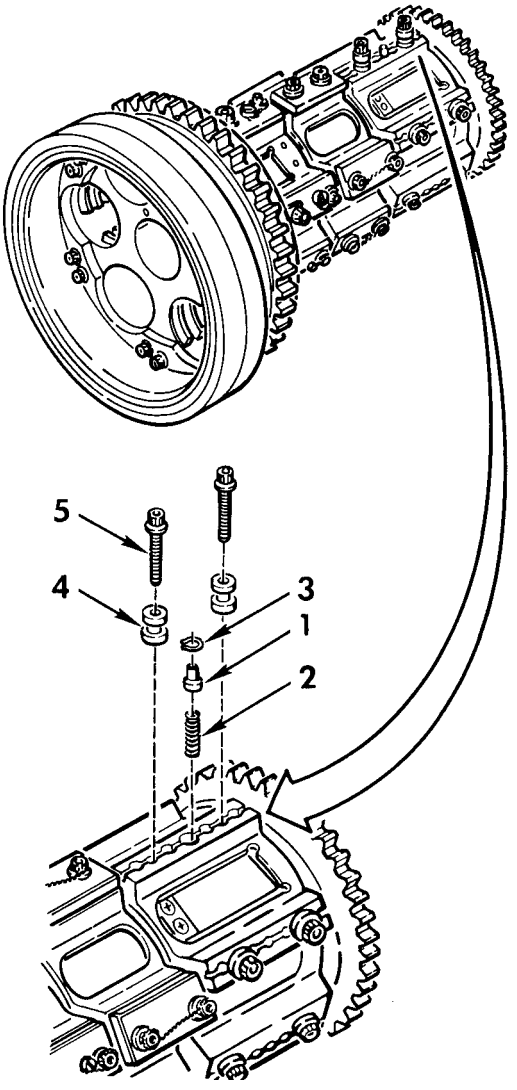
ASSEMBLY (cont)

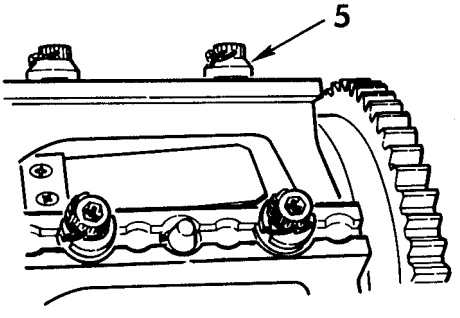
WARNING

If retaining ring is not properly installed, track lock pin may fly out and cause injury.

32. INSTALL TRACK LOCK PIN (1).
    a. Install track lock spring (2) and track lock pin (1).
    b. Press track lock pin (1) and install retaining ring (3).
    c. Repeat steps a and b for remaining track lock pins (1).

33. INSTALL TRACK SPACERS (4).
    a. Install two track spacers (4) and two bolts (5).
    b. Lockwire two bolts (5).
    c. Repeat steps a and b for remaining track spacers (4).





ARR82-25843

2-33. REPAIR OF ROTOR (cont)

ASSEMBLY (cont)

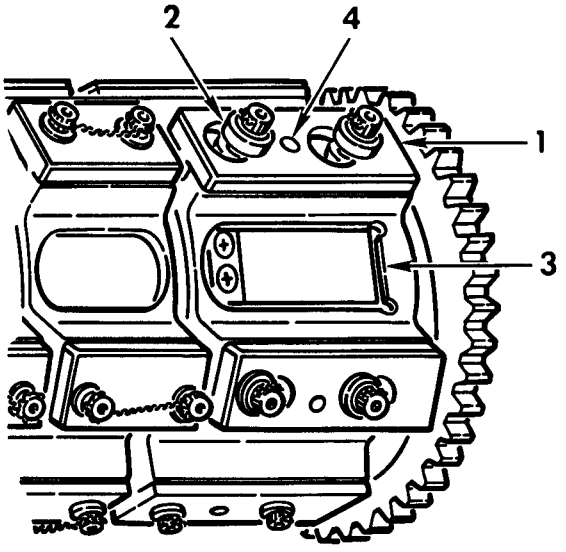
34. INSTALL REMOVABLE ROTOR TRACK (1).

a. Place a removable rotor track (1) over track spacers (2), with track key down and extended edge facing leaf spring set (3).

b. Press removable rotor track (1) down and slide on track spacers (2) until lock pin (4) engages hole in removable rotor track,

c. Make sure lock pin (4) is fully extended in hole in removable rotor track (1).

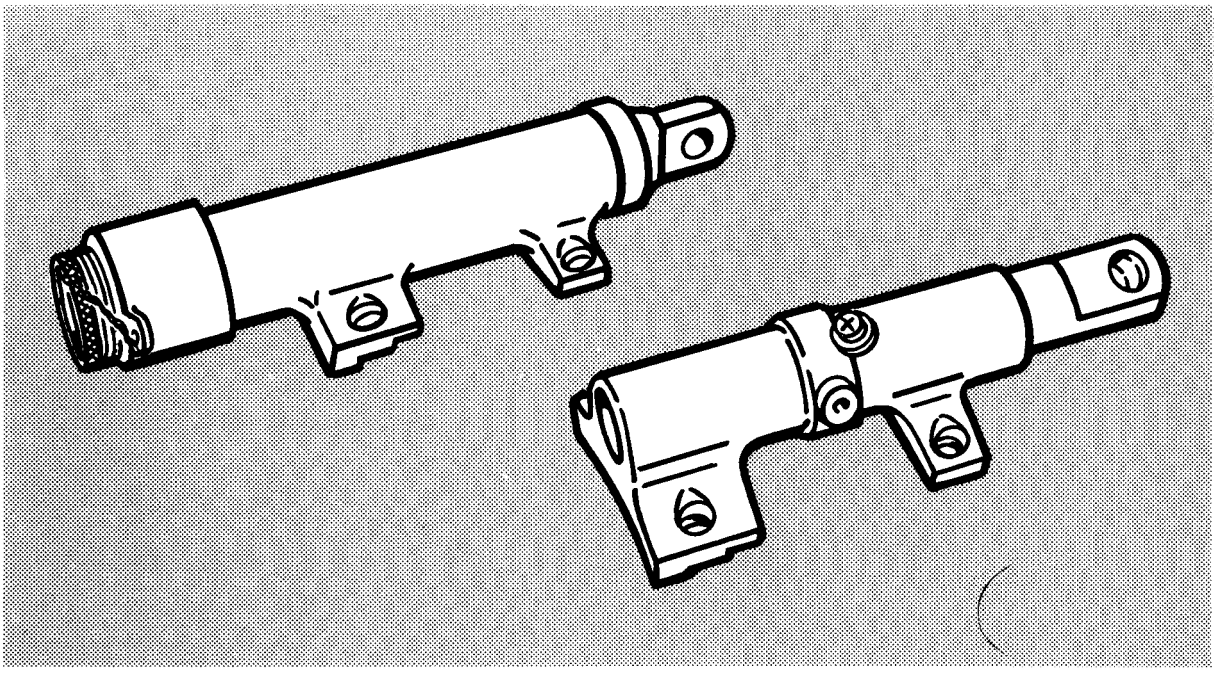
d. Perform steps a through c for remaining removable rotor tracks (1).



ARR82-25844

END OF TASK

Section X. MAINTENANCE OF RECOIL ADAPTER AND SLIDER



ARR83-2082

2-34. REPAIR OF RECOIL ADAPTER

DESCRIPTION

This task covers: Disassembly, cleanlng, Inspection, assembly, and checkout

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental

Materials:
- Grease (item 12, Appx B)
- Grease (item 12.1, Appx B)
- Lockwire (item 17, Appx B)

Personnel Required:
- 68J Aircraft Armament/Missile Systems Repairer

References:
- TM 9-1090-206-20-1
- TM 9-1090-206-20-2

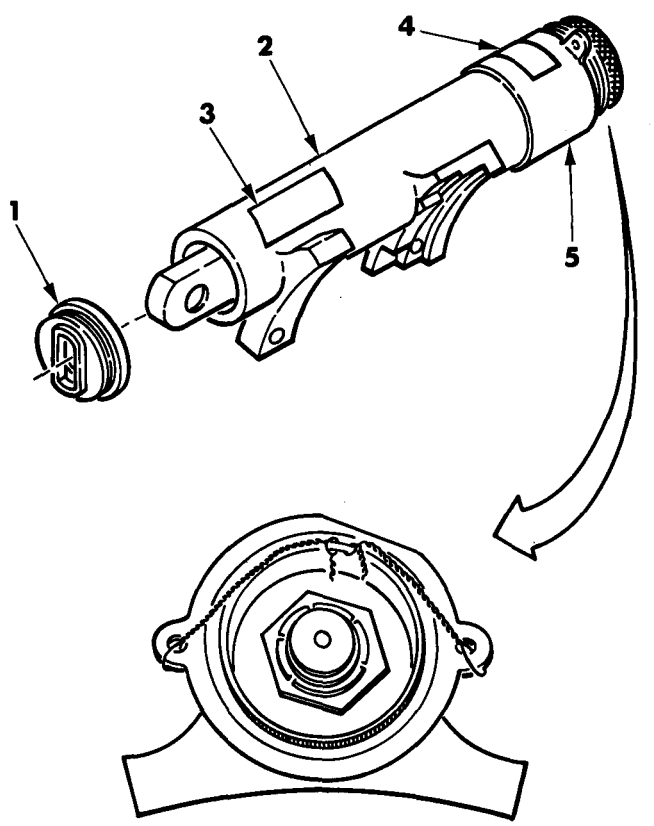
Equipment Conditions:
- Recoil adapter removed, see REMOVAL/INSTALLATION OF RECOIL ADAPTER AND SLIDER, TM 9-1090-206 -20-1 or TM 9-1090-206-20-2.

DISASSEMBLY

1. REMOVE COVER (1) FROM RECOIL ADAPTER (2).

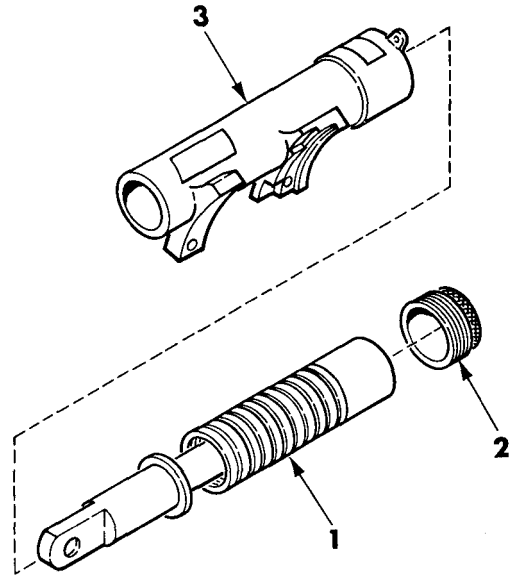
2. REMOVE LOCKWIRE.

2.1 DO NOT REMOVE INSTRUCTION PLATE (3) OR IDENTIFICATION PLATE (4) UNLESS DEFECTIVE OR HOUSING ASSEMBLY (5) REQUIRES REFINISHING, INSPECT IDENTIFICATION PLATE (4) AND INSTRUCTION PLATE (3).

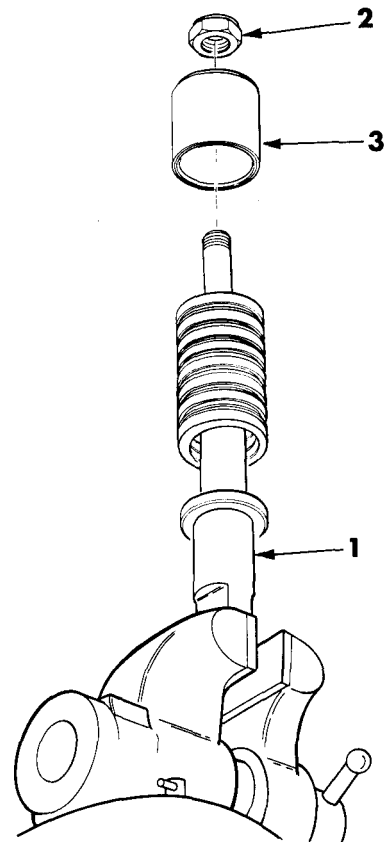


DISASSEMBLY (cont)

3. REMOVE SPINDLE (1).
   a. Remove spindle retainer (2).
   b. Wthdraw spindle (1) from housing (3).



3.1 REMOVE SPINDLE RECOIL ADAPTER REPAIR KIT.
   a. Secure gun recoil spindle (1), threaded end up, in a vise with cushioned jaws
   b. Remove self-locking nut (2), and aft bushing (3). Inspect aft bushing (3). Discard self-locking nut (2).



2-34. REPAIR OF RECOIL ADAPTER (cont)

DISASSEMBLY (cont)

NOTE

Quantity of assembled rings may vary plus or minus two rings to meet the assembled free height dimension.

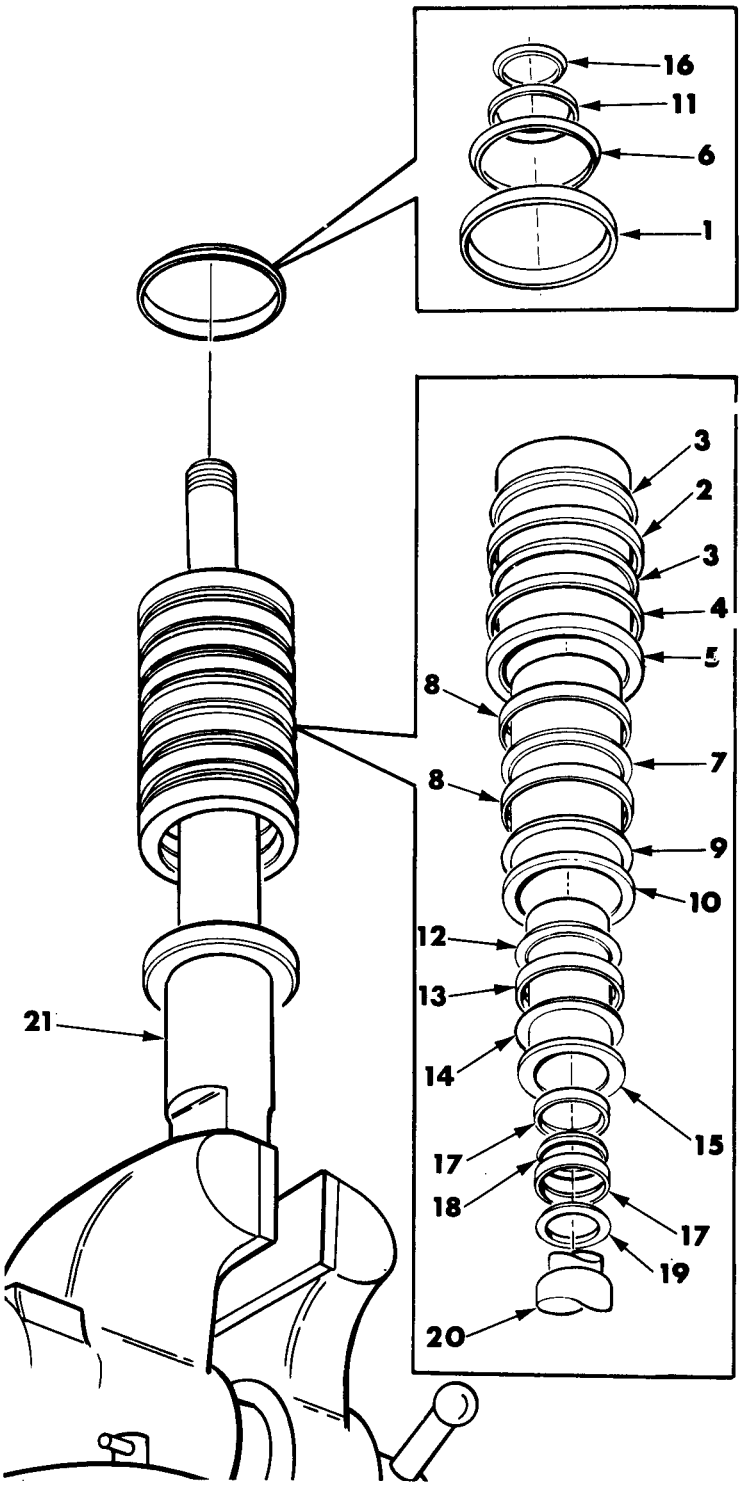
c. Remove outer layer of stacked components (1 thru 5), consisting of outer end ring (1), outer ring (2), inner rings (3), outer end ring (4), and floating bushing (5). Inspect floating bushing (5). Discard components (1 thru 4).

d. Remove next outer layer of stacked components (6 thru 10), consisting of inner end ring (6), outer ring (7), inner rings (8), inner end ring (9), and floating bushing (10). Inspect floating bushing (10). Discard components (6 thru 9).

e. Remove next outer layer of stacked components (11 thru 15), consisting of outer end ring (11), inner ring (12), outer ring (13), inner end ring (14), and floating bushing (15). Inspect floating bushing (15), Discard components (11 thru 14).

f. Remove last layer of stacked components (16 thru 20), consisting of inner end ring (16), outer rings (17), inner ring (18), inner end ring (19), and forward bushing (20), Inspect forward bushing (20). Discard components (16 thru 19),

g. Inspect gun recoil spindle (21) in accordance with para 2-35.



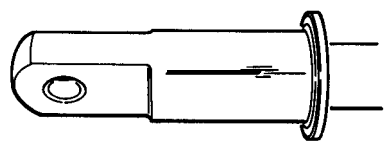
4. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV. REMOVE GRAPHITE GREASE FROM SPINDLE RINGS WITH CLOTH AND RECOAT INCLINED SURFACES OF RINGS WITH GREASE (ITEM 12.1).

INSPECTION

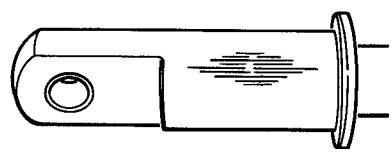
5. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV.

5.1 INSPECT PARTS IN ACCORDANCE WITH TABULATED DATA:

Component	Possible Defect	Remedy
Cover	Cracks, tears, and deterioration	Replace.
Spindle Retainer	Cracks, deformation, and damaged threads	Replace.
Spindle	Cracks, deformation, and damaged threads	Replace.
	Excessively worn	Replace.
	Galling*	Replace.



SPINDLE ACCEPTABLE



SPINDLE NOT Acceptable

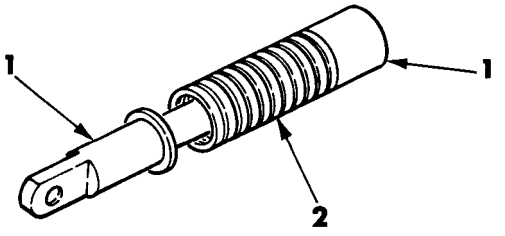
Housing	Elongated mounting holes, cracks and damaged threads	Replace recoil adapter.

*Galling is a rough area containing small or large, deep or shallow gouges and/or abrasions. Galling concentrated in a 13/16-in. (0.81-mm) area or larger (approximately the size of a US nickel) will render the recoil adapter spindle inoperable,

2-34. REPAIR OF RECOIL ADAPTER (cont)

ASSEMBLY

6. LUBRICATE OUTSIDE BEARING SURFACES (1) OF SPINDLE (2) WITH GREASE.



6.1 INSTALL RECOIL SPINDLE REPAIR KIT.

NOTE

Quantity of assembled rings may vary plus or minus two rings to meet the assembled free height dimension.

a. Lubricate inside diameter of forward bushing (1) and install on recoil spindle (2) with flange end down,

CAUTION

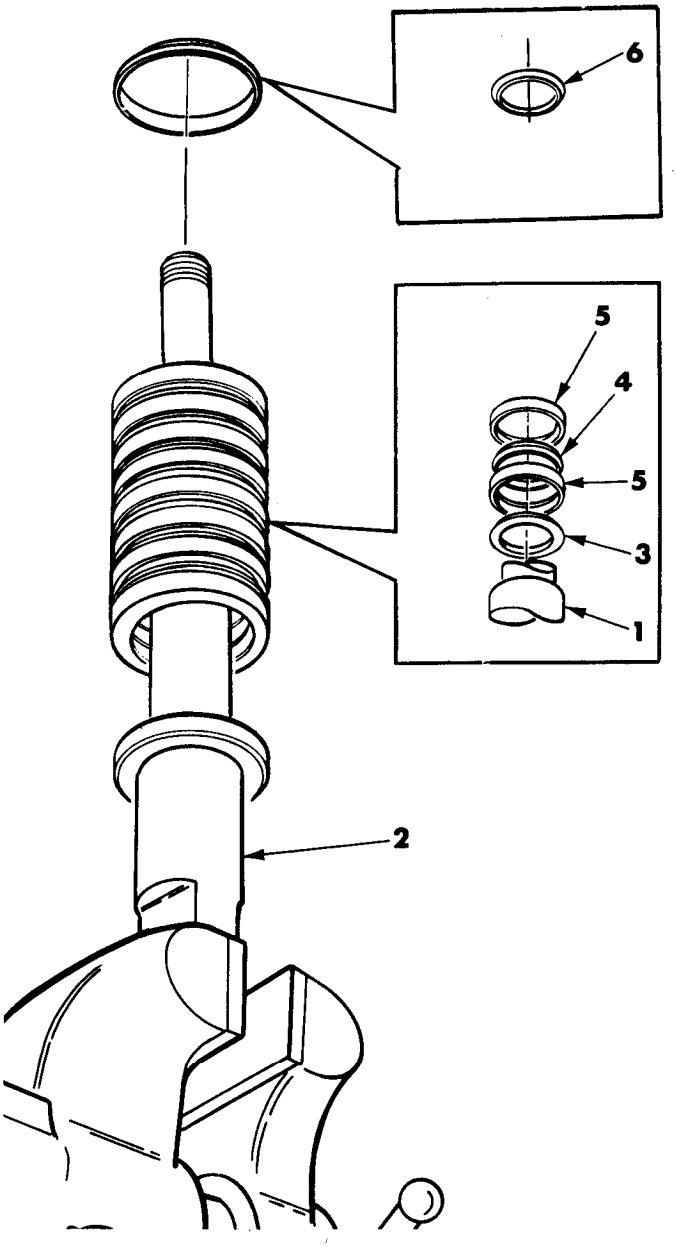
Rings must be stacked evenly. "Cocked" rings can jeopardize the operation of the assembly.

NOTE

All inclined surfaces of rings will be lubricated and excess removed.

b. Install inner end ring (3), and alternately stack inner ring (4) and outer rings (5) until assembled free height of 4.20 ± 0.07 inches is reached. Install inner end ring (6).

c. Measure assembled free height using vernier caliper, If required, add or remove rings to adjust free height and remeasure (refer to illustration, STACK HEIGHT ADJUSTMENT OPTIONS).



ASSEMBLY (cont)

d. Lubricate outside diameter of floating bushing (1) and install on recoil spindle (2) with flange down.

e. Install inner end ring (3), and alternately stack outer ring (4), and inner ring (5) until assembled free height of 3.90± 0.07 inches is reached. Install outer end ring (6).

f. Measure assembled free height using vernier caliper. If required, add or remove rings to adjust free height and remeasure (refer to illustration, STACK HEIGHT ADJUSTMENT OPTIONS).

g. Lubricate outside diameter of the floating bushing (7) and install on recoil spindle (2) with flange down.

h. Install inner end ring (8), and alternately stack inner rings (9), and outer ring (10) until assembled free height of 3.90 ± 0.09 inches is reached. Install inner end ring (11).

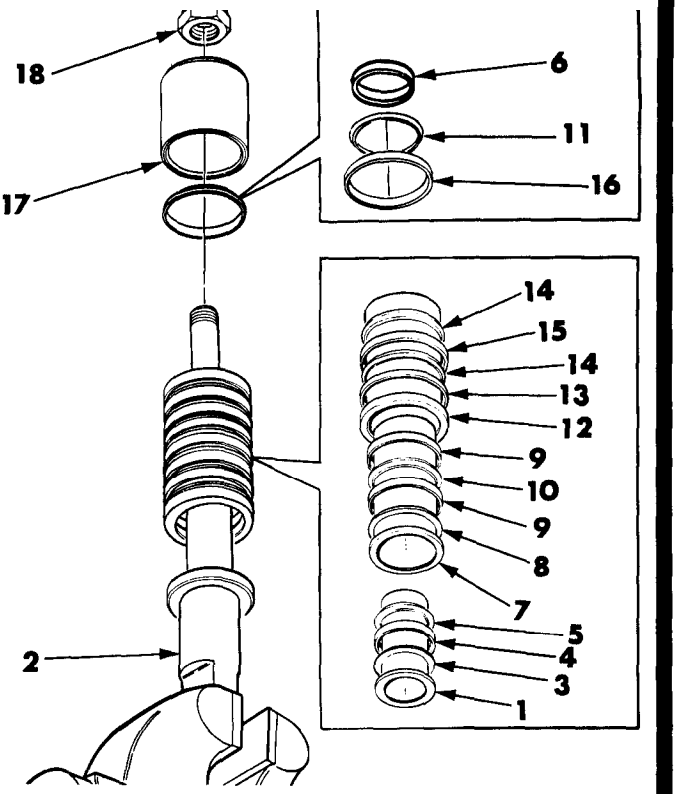
i. Measure assembled free height using vernier caliper. If required, add or remove rings to adjust free height and remeasure (refer to illustration, STACK HEIGHT ADJUSTMENT OPTIONS).

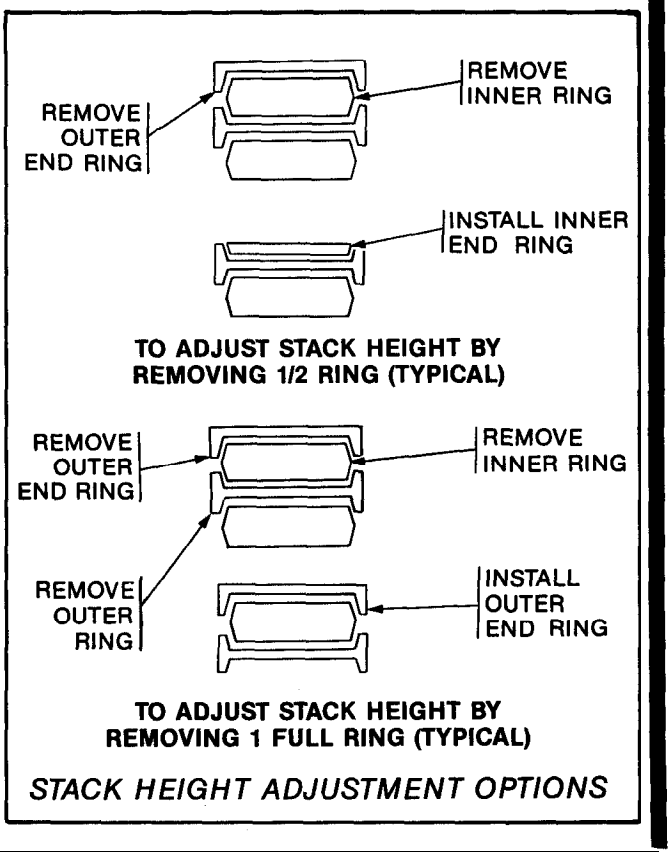
j. Lubricate outside diameter of the floating bushing (12) and install on recoil spindle (2) with flange down.

k. Install outer end ring (13), and alternately stack inner rings (14), and outer ring (15) until assembled free height of 3.80 ± 0.10 inches is reached. Install outer end ring (16).

l. Measure assembled free height using vernier caliper. If required, add or remove rings to adjust free height and remeasure (refer to illustration, STACK HEIGHT ADJUSTMENT OPTIONS).

m. Install aft bushing (17) and self-locking nut (18), Install self-locking nut until approximately 0.50 inch of thread is showing.





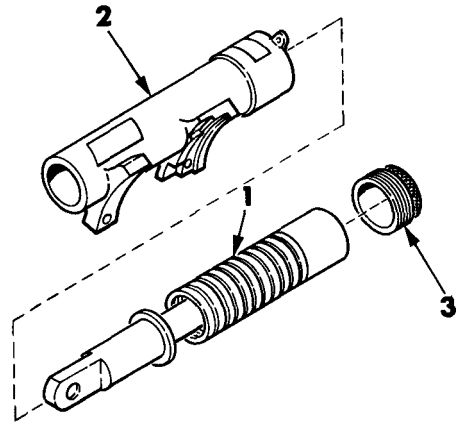
STACK HEIGHT ADJUSTMENT OPTIONS

2-34. REPAIR OF RECOIL ADAPTER (cont)

ASSEMBLY (cont)

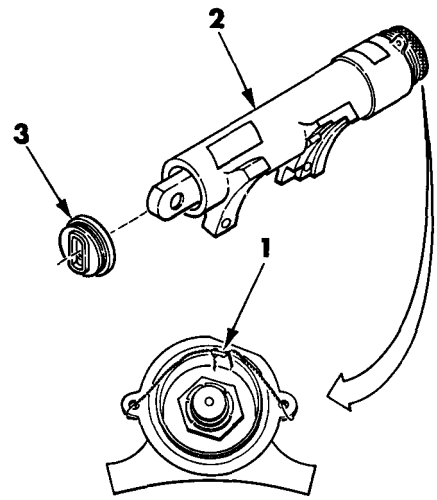
7. INSTALL SPINDLE (1).

   Insert spindle (1) into housing (2) and secure with spindle retainer (3), Turn spindle retainer into housing until spindle end play is removed.



8. LOCKWIRE SPINDLE RETAINER (1) TO HOUSING (2), AS ILLUSTRATED, TO PREVENT MOVEMENT IN EITHER DIRECTION.

9. INSTALL COVER (3).



CHECKOUT

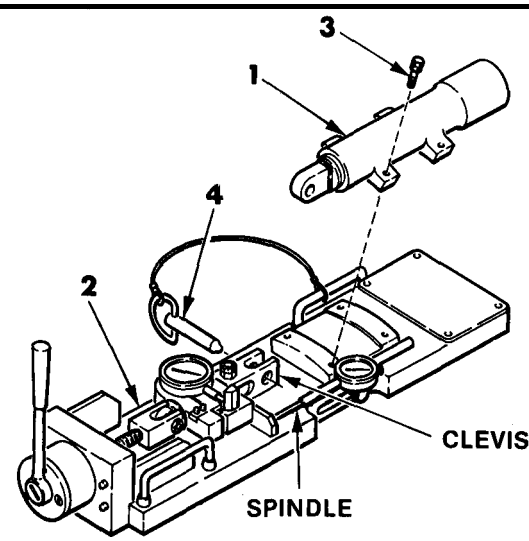
CAUTION

Exercise care to prevent clevis from damaging dial indicator spindle.

10. INSTALL RECOIL ADAPTER (1).

    a. Install recoil adapter (1) on preload gage (2) and secure using four bolts (3).

    b. Install pin (4).



CHECKOUT (cont)

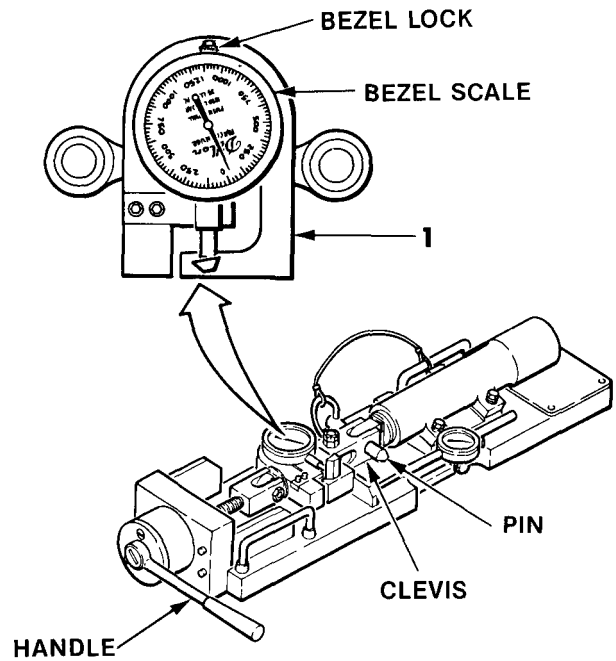
11. ZERO FORCE GAGE(1).

a. Turn handle and adjust clevis until pin will slide easily.

b. Loosen bezel lock,

c. Rotate bezel scale and set 0 under pointer.

d. Tighten bezel lock.



NOTE

At various settings of the dial indicator, the tenths and units register pointers will not always be in exact alinement with a number when the hundredth pointer is at 0. This is a normal characteristic and will not affect the accuracy of any reading.

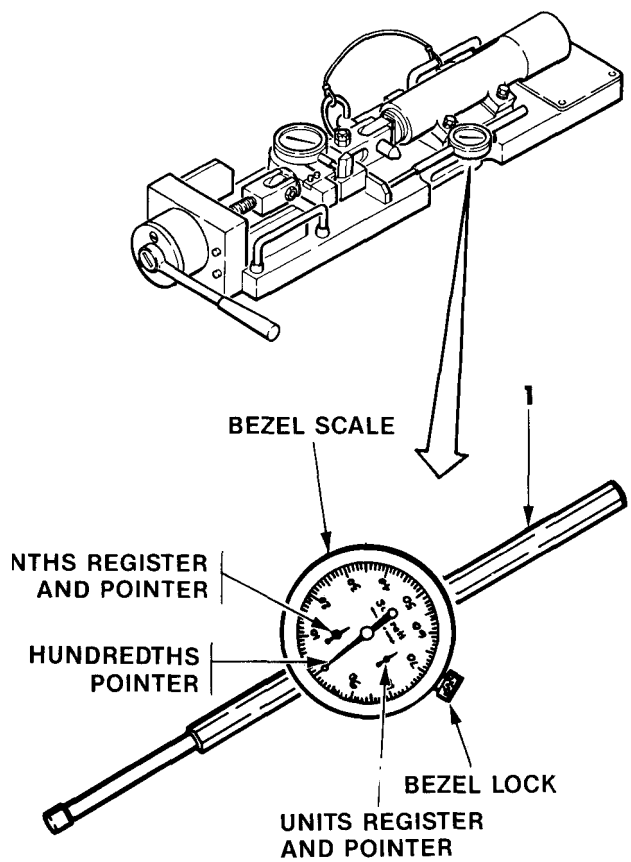
12. SET DIAL INDICATOR (1).

a. Set dial indicator units register to read 2, and tenths register to read 0.

b. Loosen bezel lock.

c. Rotate bezel scale and set 0 under hundredths pointer.

d. Tighten bezel lock,



2-34. REPAIR OF RECOIL ADAPTER (cont)

CHECKOUT (cont)

NOTE

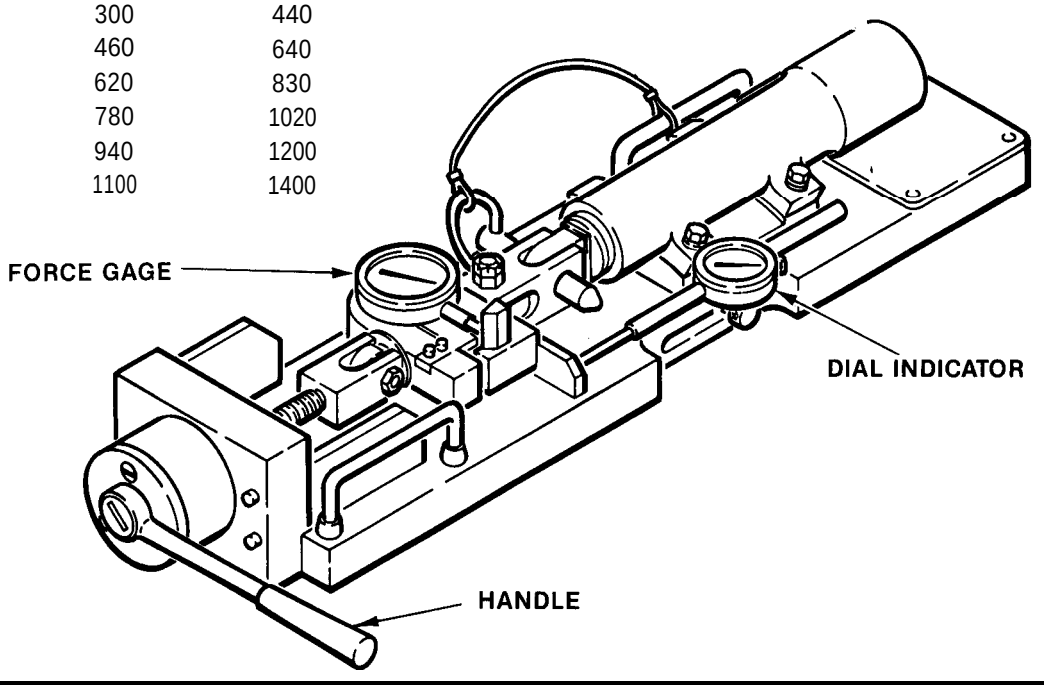
Gage handle must be turned only in a clockwise direction to obtain listed dial indicator readings. Turning gage handle in a counterclockwise direction will result in erroneous readings.

13. PERFORM RECOIL ADAPTER CHECKOUT.

a. Turn handle clockwise and record force gage reading as pointer of dial indicator passes over each listed dial reading. One revolution of dial indicator is equal to 1/10 inch.

b. Replace recoil adapter/recoil adapter spindle if force gage readings do not meet all MIN-MAX criteria.

Dial Indicator Reading	Force Gaae Reading	
	Min	Max
2.00	0	0
1,80	300	440
1.60	460	640
1.40	620	830
1.20	780	1020
1.00	940	1200
.80	1100	1400

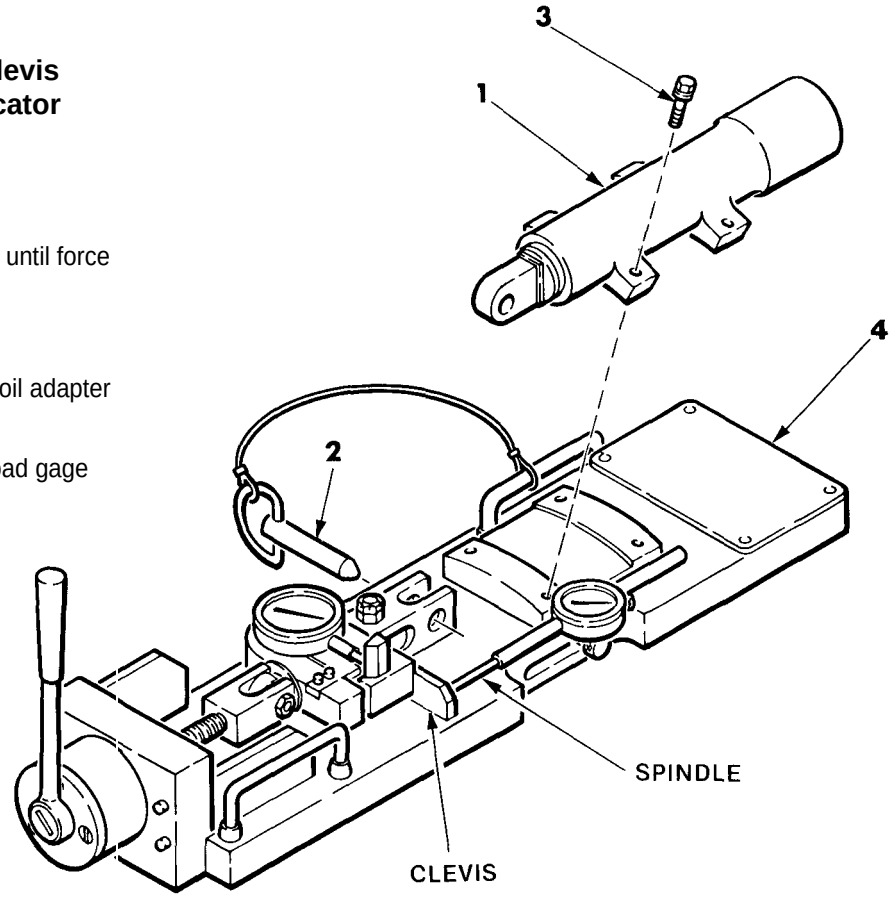


CHECKOUT (cont)

CAUTION

Exercise care to prevent clevis from damaging dial indicator spindle.

14. REMOVE RECOIL ADAPTER (1).
    a. Turn handle counterclockwise until force gage reads 0.
    b. Remove pin (2).
    c. Remove four bolts (3) and recoil adapter (1) from preload gage (4).
    d. Reinstall four bolts (3) in preload gage (4).



END OF TASK

2-35. REPAIR OF SLIDER

DESCRIPTION

This task covers: Disassembly, cleaning, inspection, repair of lubrication fitting, and assembly.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental

Materials:
- Grease (item 32, Appx B)

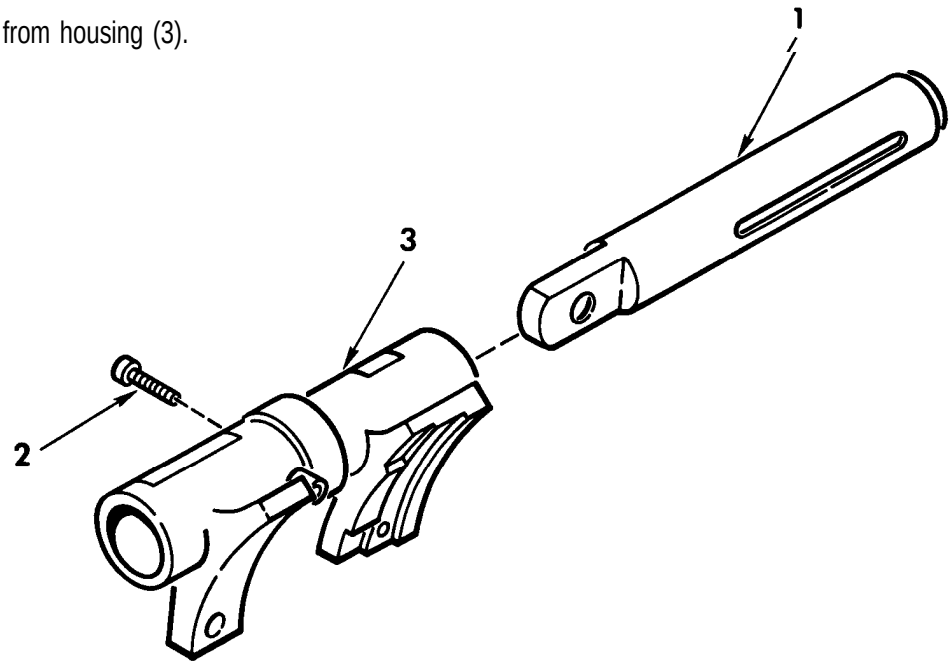
Personnel Required:
- 68M Aircraft Weapon Systems
  - Repairer

References:
- TM 9-1090-206-20-1
- TM 9-1090-206-20-2

Equipment Conditions:
- Slider removed, see
  - REMOVAUINSTALLATION OF RECOIL ADAPTER AND SLIDER, TM 9-1090-206-20-1 or TM 9-1090-206-20-1

DISASSEMBLY

1. REMOVE SPLINDLE (1).
   a. Remove screw (2),
   b. Remove spindle (1) from housing (3).



ARR82 2767 1

CLEANING

2. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV.

INSPECTION

3. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV.

4. INSPECT PARTS IN ACCORDANCE WITH TABULATED DATA

Component	Possible Defect	Remedy
Spindle	Cracks and deformation	Replace.
	Excessively worn	Replace.
	Galling*	Replace.

SPINDLE ACCEPTABLE

SPINDLE NOT ACCEPTABLE

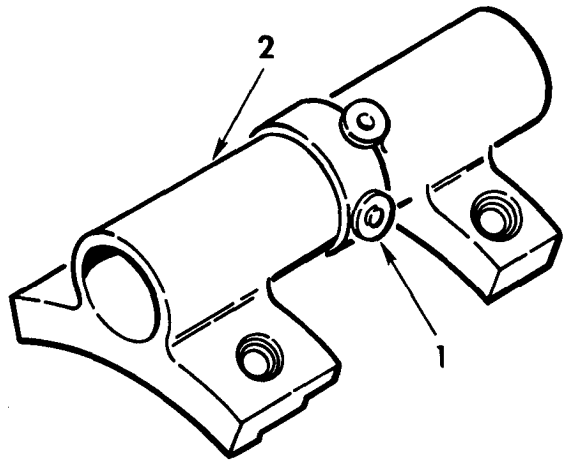
ARR82-27674

Lubrication Fitting	Will not accept lubricant, damaged, missing	Replace.
Housing	Elongated mounting holes, cracks, and damaged threads	Replace slider.

*Galling is a rough area containing small or large, deep or shallow gouges and/or abrasions. Galling concentrated in a 15/16-in. (0.94-mm) area or larger (approximately the size of a US quarter) will render the slider assembly inoperable.

REPAIR OF LUBRICATION FITTING

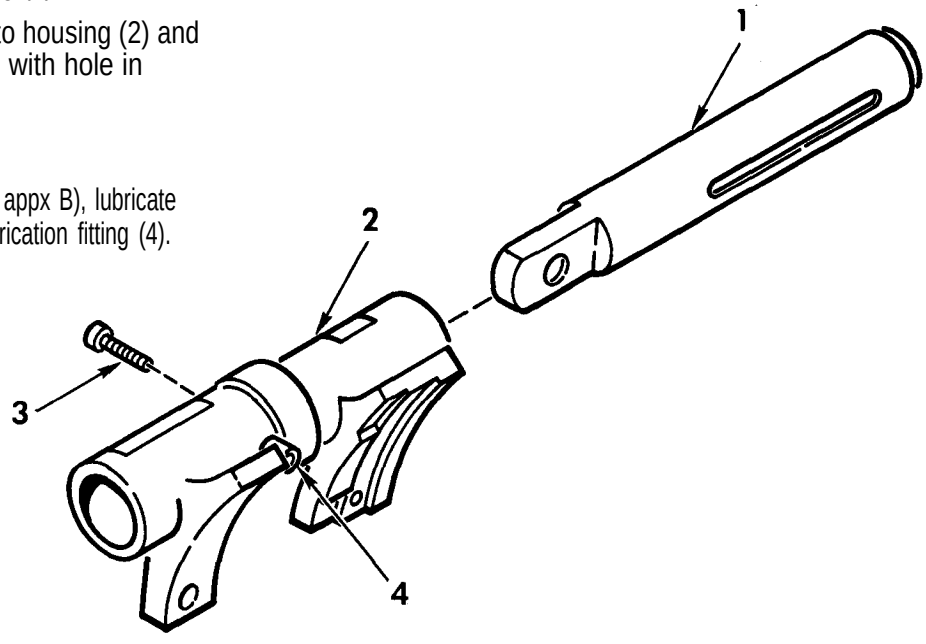
5. REMOVE LUBRICATION FITTING (1).
   a. Secure housing (2) sufficiently for drilling.
   b. Using a 7/64-inch drill bit, drill a hole 0.10 inch deep, on centerline, into lubrication fitting.
   c. Insert a #1 screw extractor and remove lubrication fitting (1).
6. INSTALL NEW LUBRICATION FITTING (1).



ARR82-27675

ASSEMBLY

7. INSTALL SPINDLE (1).
   a. Apply a light coat of grease to outside bearing surface of spindle (1) and inside of housing (2).
   b. Insert spindle (1) into housing (2) and aline slot in spindle with hole in housing.
   c. Install screw (3).
   d. Using grease (item 32, appx B), lubricate spindle (1) through lubrication fitting (4).



END OF TASK

Section XI. MAINTENANCE OF TURRET

Section Contents

2-36. REPAIR OF ELEVATION RESOLVER

DESCRIPTION

This task covers: Removal, cleaning, inspection, and installation.

INITIAL SETUP

Tools/Test and Support Equipment:
Tool Set, A/C Armament
Repairman: Basic
Tool Set, A/C Armament
Repairman: Supplemental

Materials:
Grease (Item 12, Appx B)
Tape (Item 30.1, Appx B)

Personnel Required:
68M Aircraft Weapon Systems
Repairer

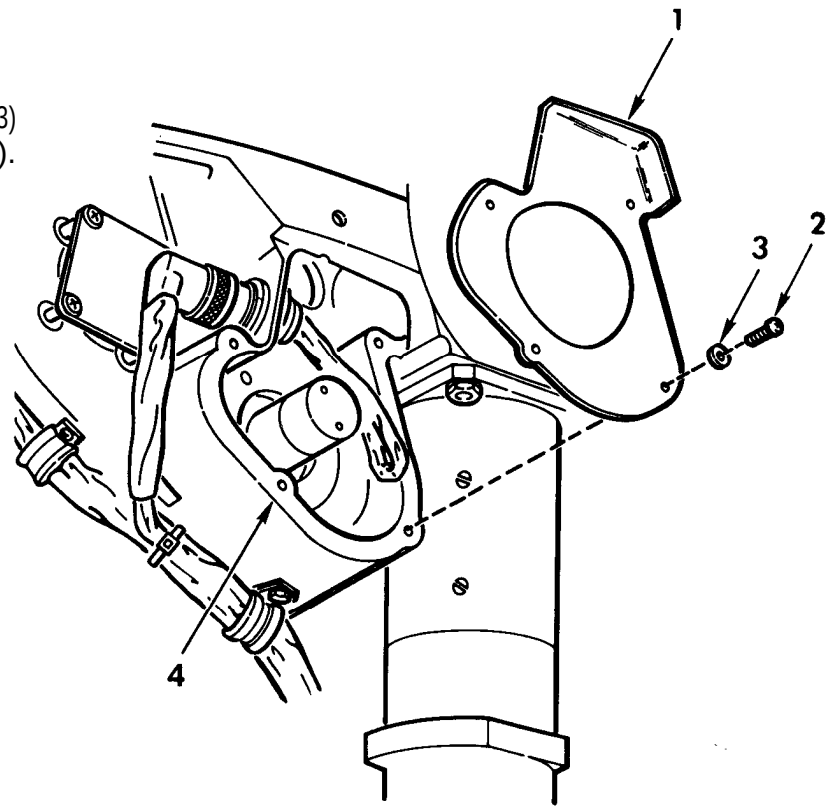
References:
TM 9-1090-206-20-1
TM 9-1090-206-20-2

Equipment Conditions:
HELICOPTER ARMAMENT SUBSYSTEM MAINTENANCE SETUP performed, TM 9-1090-206-20-1 or TM 9-1090-206-20-2.
REMOVAL OF M197 GUN performed, TM 9-1090-206-20-1 or TM 9-1090-206-20-2.

REMOVAL

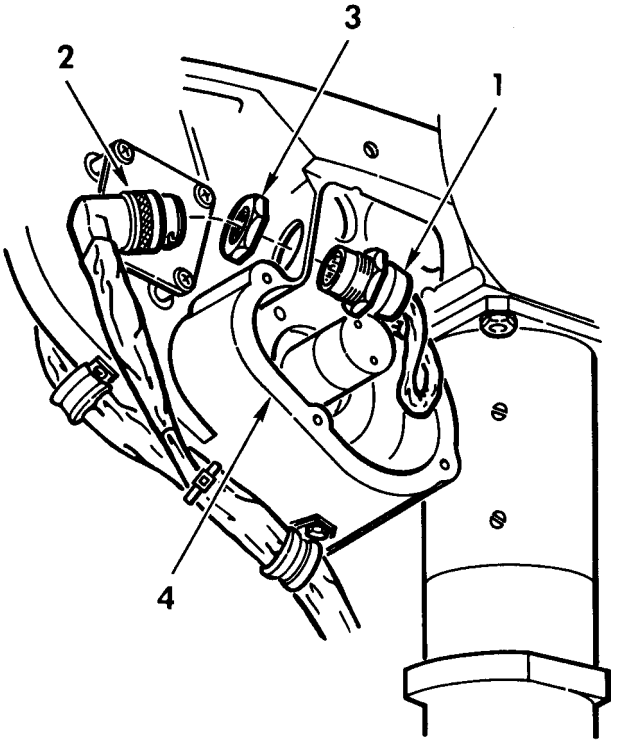
1. REMOVE COVER (1).

Remove foour screws (2), four washers (3) and cover (1) from turret (4).



REMOVAL (cont)

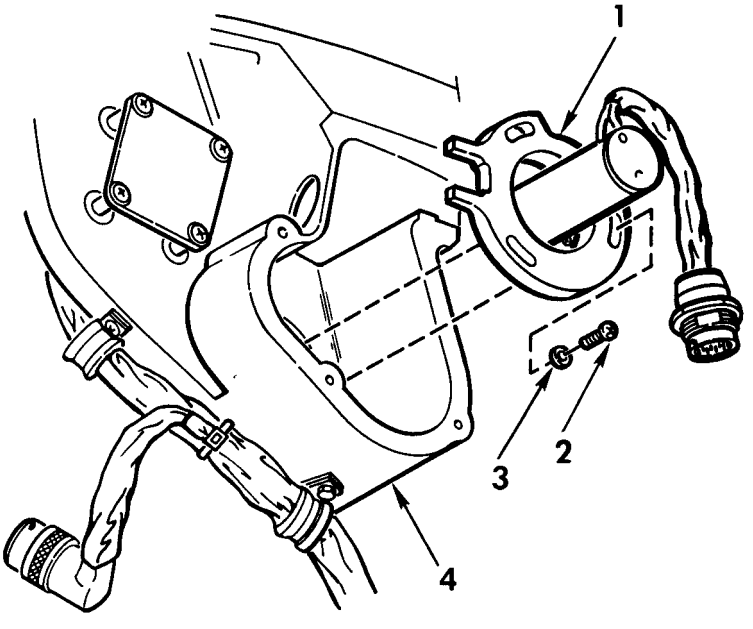
2. REMOVE CONNECTOR A7J31 (1).
   a. Disconnect connector W1P6 (2).
   b. Remove nut (3) from connector A7J31 (1) and remove connector from turret (4).



ARR83-0224

3. REMOVE ELEVATION RESOLVER AND SUPPORT (1).

   Remove three screws (2), three washers (3), and elevation resolver and support (1) from turret (4).



ARR83-0225

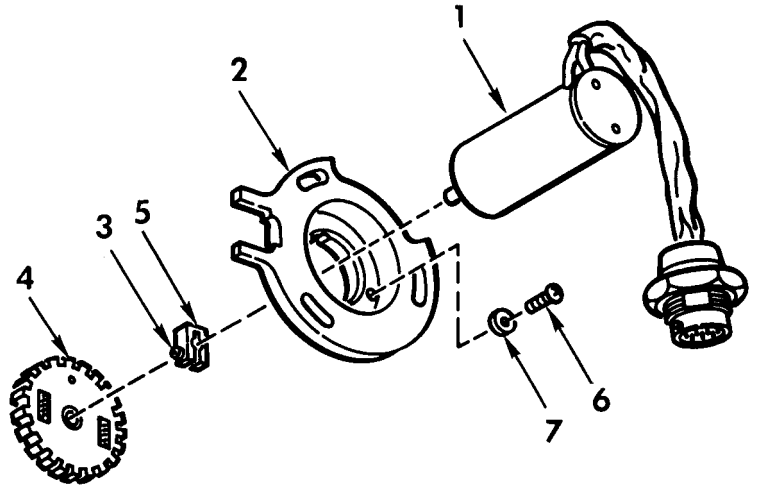
2-36. REPAIR OF ELEVATION RESOLVER (cont)

REMOVAL (cont)

4. SEPARATE ELEVATION RESOLVER (1) FROM SUPPORT (2).
   a. Loosen screw (3). Remove antibacklash gear (4) and clamp (5) from elevation resolver (l).
   b. Remove three screws (6) and three clamps (7) and separate elevation resolver (1) from support (2).

NOTE

After removing antibacklash gear, secure springs in gear with tape to prevent their loss during handling.

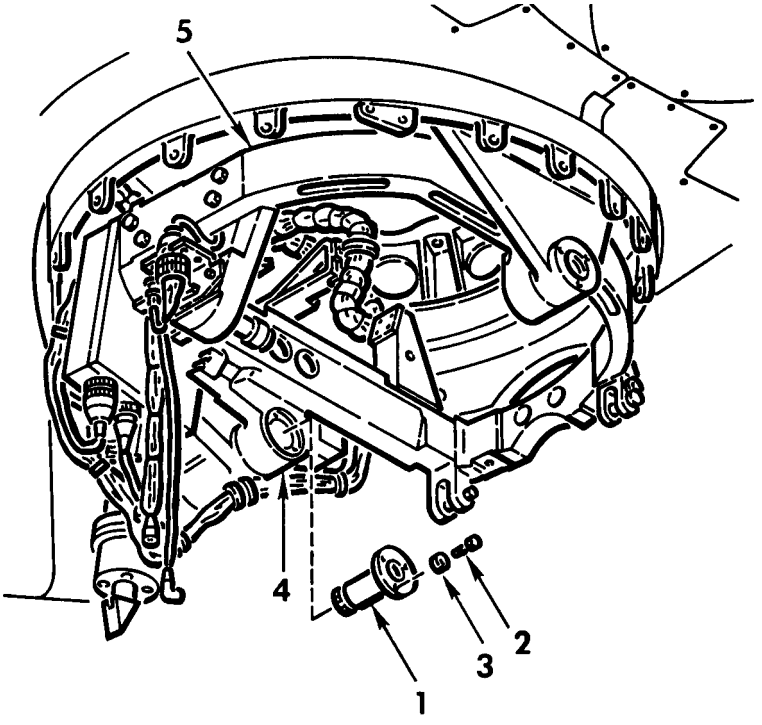


ARR83-0226

NOTE

If gear on saddle shaft shows wear or damage, saddle shaft must be removed and gear replaced. If gear is not defective, proceed to step 7.

5. REMOVE SADDLE SHAFT (1).
   a. Remove three bolts (2) and three washers (3) from saddle shaft (1).
   b. Support saddle (4) and remove saddle shaft (1) from turret (5) and saddle.

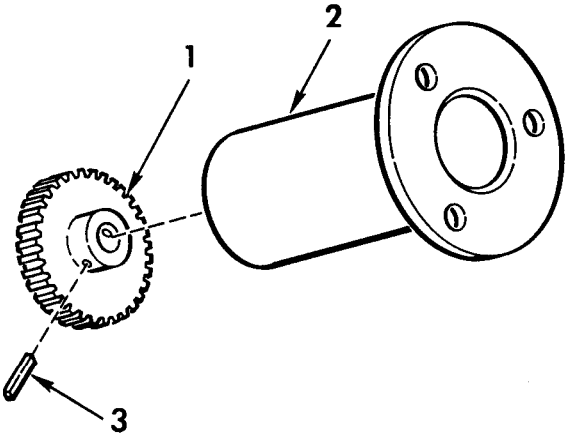


ARR83-0227

REMOVAL (cont)

6. FOR REPLACEMENT ONLY, SEPARATE GEAR (1) FROM SADDLE SHAFT (2).

   Using a 1/16-inch pin punch, drive out spring pin (3) and separate gear (1) from saddle shaft (2).

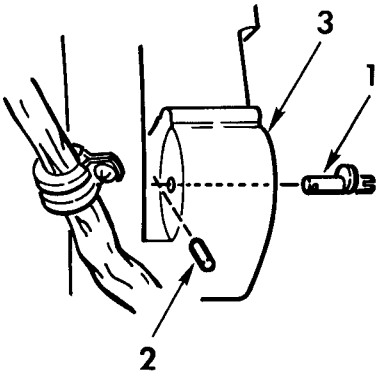


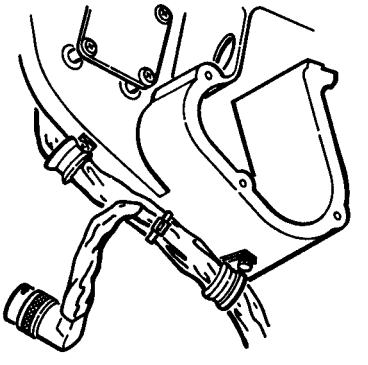
ARR83-0228

7. REMOVE CAM (1).

   a. Using a 1/16-inch pin punch, drive out spring pin (2) securing cam in turret (3).

   b. Remove cam (1) from turret (3).





ARR83-0229

CLEANING

8. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV.

2-36. REPAIR OF ELEVATION RESOLVER (cont)

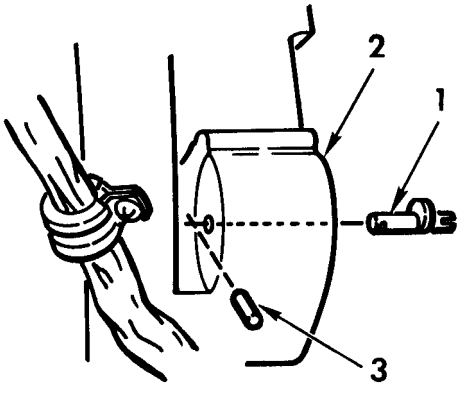
INSPECTION

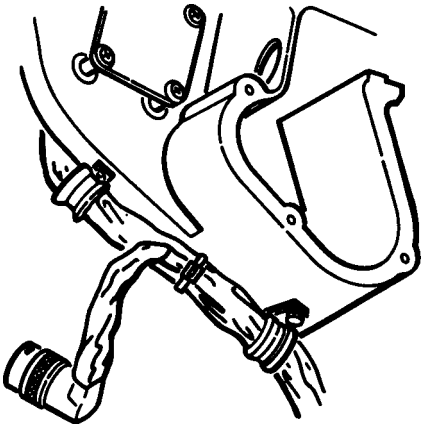
9. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV AND TABULATED DATA:

Component	Possible Defect	Remedy
Cover	Bent or cracked	Straighten or replace.
Gear	Worn, chipped or broken teeth Excessively worn	Replace gear. Replace.
Antibacklash Gear	Worn, chipped or broken teeth Springs broken or missing	Replace gear. Replace springs or gear.
Elevation Resolver	Rough or noisy rotor bearings Split cable covering Bent connector pins	Replace resolver. Repair with electrical tape. Straighten
Support	Cracked or deformed	Replace.

INSTALLATION

10. INSTALL CAM (1).
    a. Install cam (1) in turret (2).
    b. Using a 1/16-inch pin punch, install spring pin (3) to secure cam (1) in turret (2).



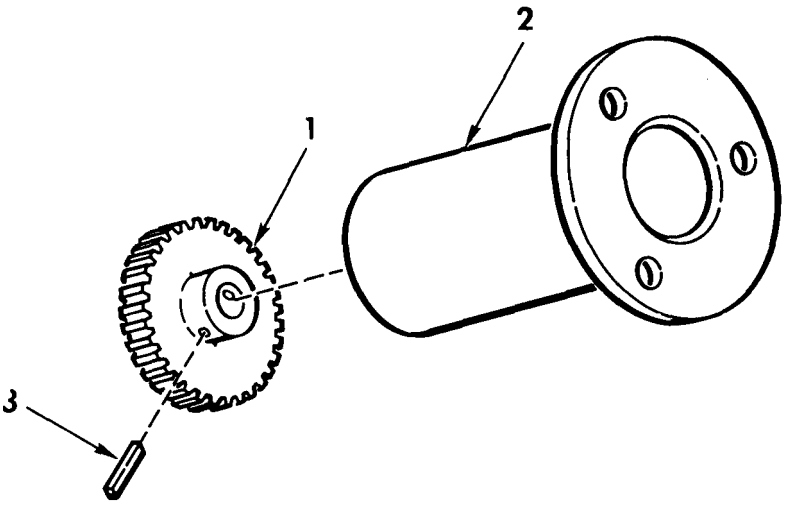


ARR83-0230

INSTALLATION (cont)

11. IF REMOVED, INSTALL GEAR (1).

Position gear (1) on saddle shaft (2). Using a 1/16-inch pin punch, install spring pin (3) to secure gear to saddle shaft.



ARR83-0231

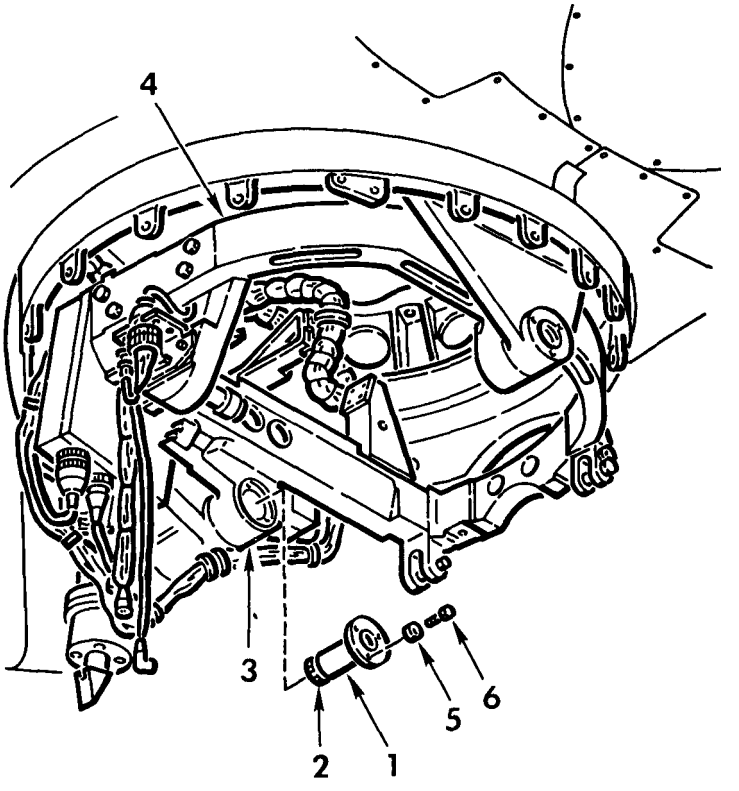
12. IF REMOVED, INSTALL SADDLE SHAFT (1).

a. Apply a light coating of grease to saddle shaft (1) and gear (2).

b. Support saddle (3) and aline saddle with turret (4).

c. Insert saddle shaft (1) into saddle (3) and turret (4).

d. Aline holes in saddle shaft (1) with holes in saddle (3) and install three washers (5) and three bolts (6). Torque bolts to 65-85 lb-in (7.35-9.60 N•m).

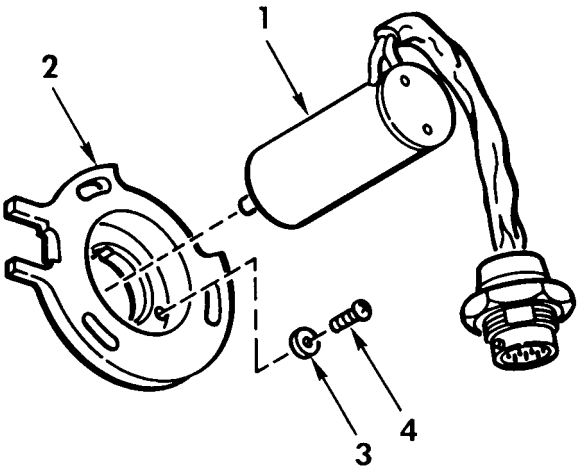


ARR83-0232

2-36. REPAIR OF ELEVATION RESOLVER (cont)

INSTALLATION (cont)

13. INSTALL ELEVATION RESOLVER (1) IN SUPPORT (2).
    a. Position elevation resolver (1) in support (2).
    b. install three clamps (3) and three screws (4) to secure elevation resolver (1) in support (2).

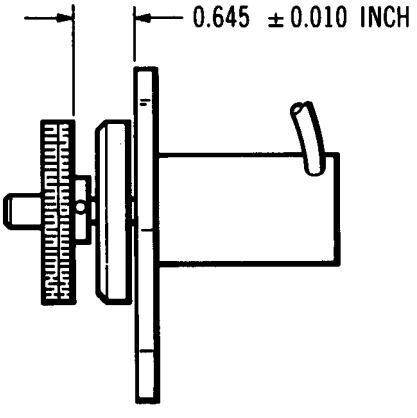


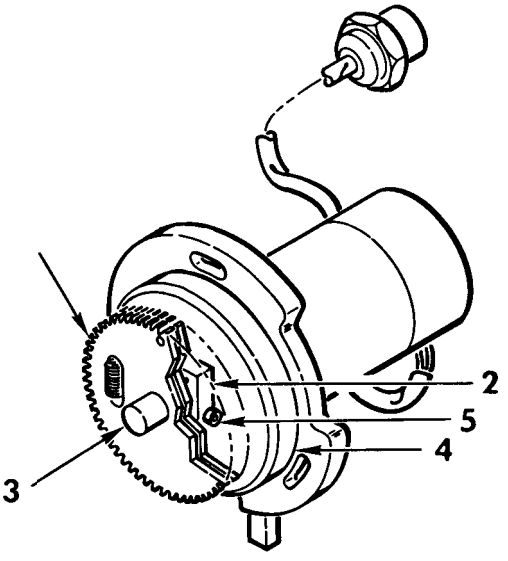
ARR83-0362

NOTE

Tape should now be removed.

14. INSTALL ANTIBACKLASH GEAR (1).
    a. Position clamp (2) on shoulder of antibacklash gear (1). Install gear on resolver shaft (3).
    b. Adjust position of antibacklash gear (1) on resolver shaft (3) to 0.645 ±0.010 inch. Make sure clamp (2) does not contact support (4), then tighten screw (5).



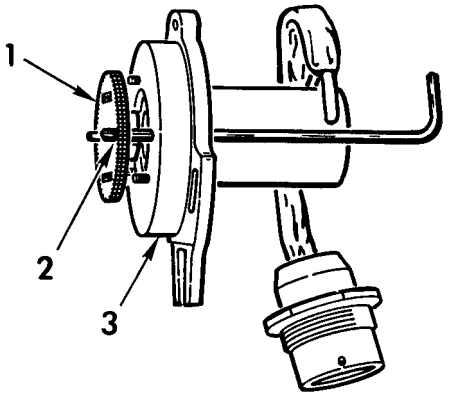


AEE83-0363

INSTALLATION (cont)

15. PRELOAD ANTIBACKLASH GEAR (1).

Preload antibacklash gear (1) by rotating gear halves in direction to compress two springs, until machine holes (2) aline. Inserts 1/16-inch allen wrench through support (3) and into machine holes. Preload of gear is now set.



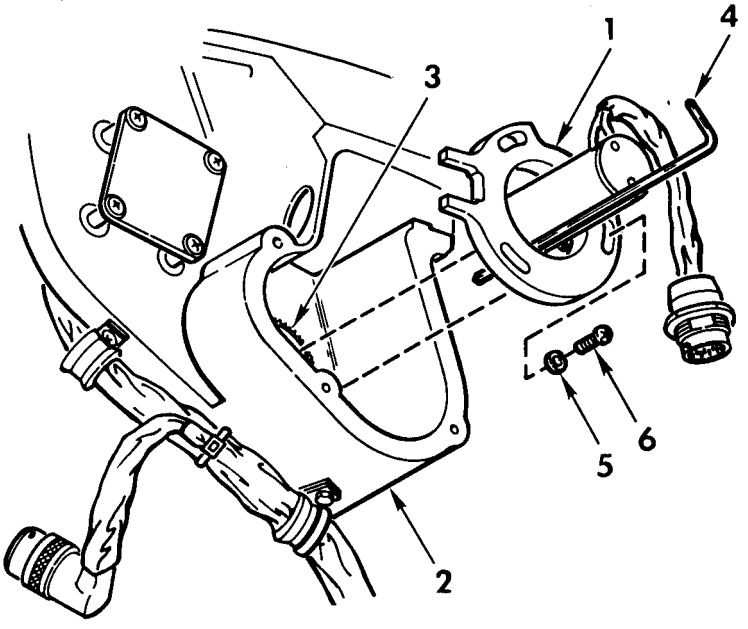
CAUTION

To avoid damage to resolver, do not move saddle while installing resolver.

16. INSTALL ELEVATION RESOLVER AND SUPPORT (1).

a. While maintaining preload on anti-backlash gear, carefully guide elevation resolver and support (1) into place in turret (2). Position it to engage gear (3) and be fully seated in turret, then remove allen wrench (4).

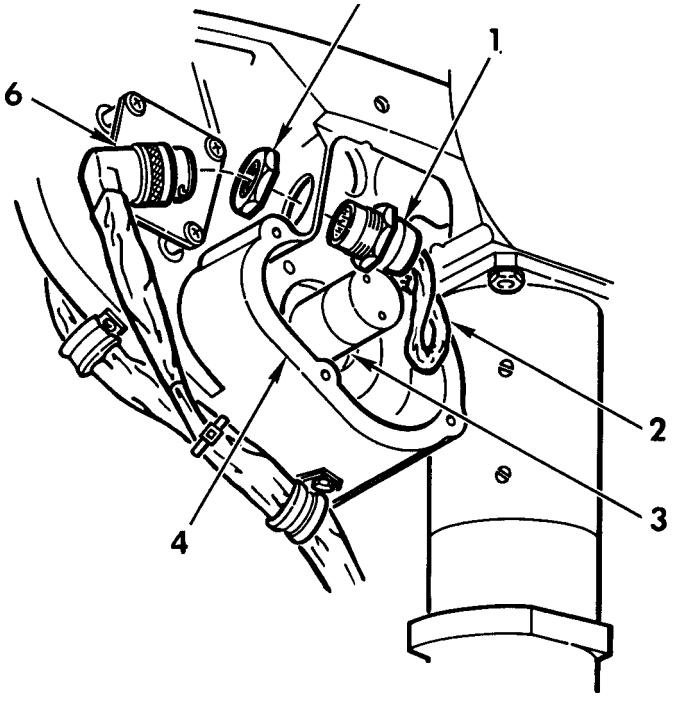
b. Secure support (1) to turret (2) with three washers (5) and three screws (6).



2-36. REPAIR OF ELEVATION RESOLVER (cont)

INSTALLATION (cont)

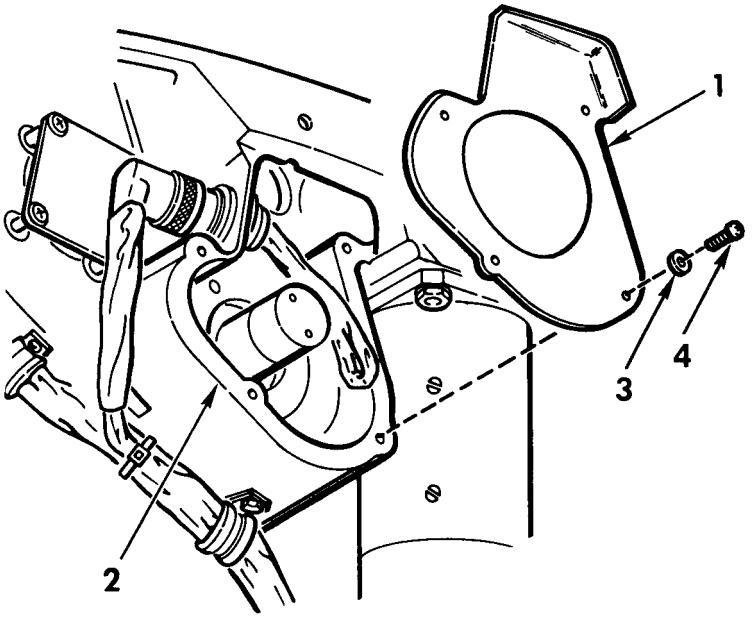
17. INSTALL CONNECTOR A7J31 (1).
    a. Wrap excess cable (2) around elevation resolver (3). Orient connector A7J31 (1) in turret (4). Install nut (5) on connector.
    b. Connect connector W1P6 (6) to connector A7J31 (1).



ARR83-0366

18. INSTALL COVER (1).
    Place cover (1) on turret (2) and install four washers (3) and four screws (4).

19. ALINE ELEVATION RESOLVER, SEE ELEVATION AND AZIMUTH RESOLVER ALINEMENT, PARA 2-69 OR 2-77.



END OF TASK

2-37. REPAIR OF ELEVATION GEAR TRAIN

DESCRIPTION

This task covers: Disassembly, cleaning, inspection, and assembly.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Backlash Gage, 217F938
- Bearing Puller, CJ83B
- Bearing Separator, CJ950

Materials:
- Grease (Item 12, Appx B)

Personnel Required:
- 68M Aircraft Weapon Systems Repairer (2)

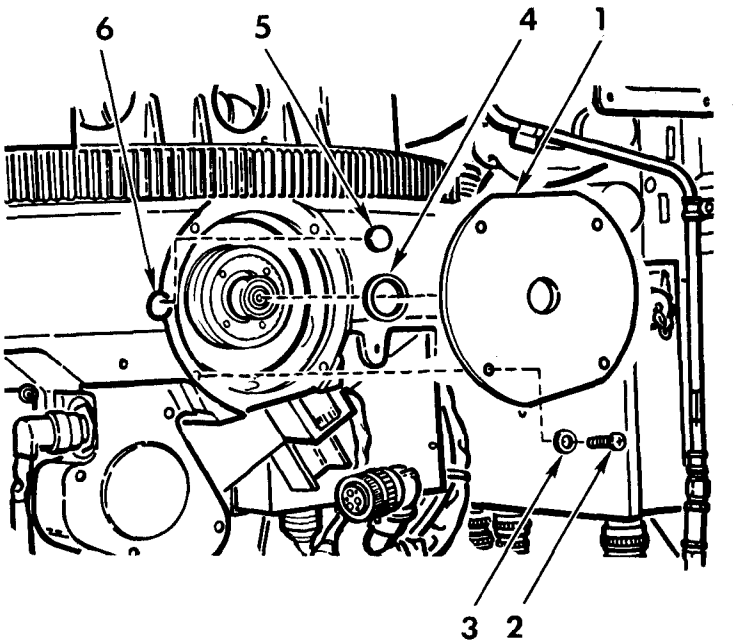
References:
- TM 9-1090-206-20-1
- TM 9-1090-206-20-2
- TM 55-1520-236-23

Equipment Conditions:
- HELICOPTER ARMAMENT SUBSYSTEM MAINTENANCE SETUP performed,
- REMOVAL OF M197 GUN performed,
- Elevation drive tachometer removed,
- Elevation drive tachometer electrical connector bracket removed, see TM 9-1090-206-20-1 or TM 9-1090-206-20-2.
- Turret fairing removed, see TM 55-1520-236-23.

DISASSEMBLY

1. REMOVE ELEVATION DRIVE MOTOR, SEE REMOVAL/INSTALLATION OF ELEVATION DRIVE MOTOR PARA 2-44.

2. REMOVE COVER (1).
   a. Remove four screws (2), four washers (3), and cover (1).
   b. Remove shims (4) from cover (1).
   c. Remove shims (5) from end of shaft (6).
   d. Set shims (4 and 5) aside for use during assembly unless damaged.



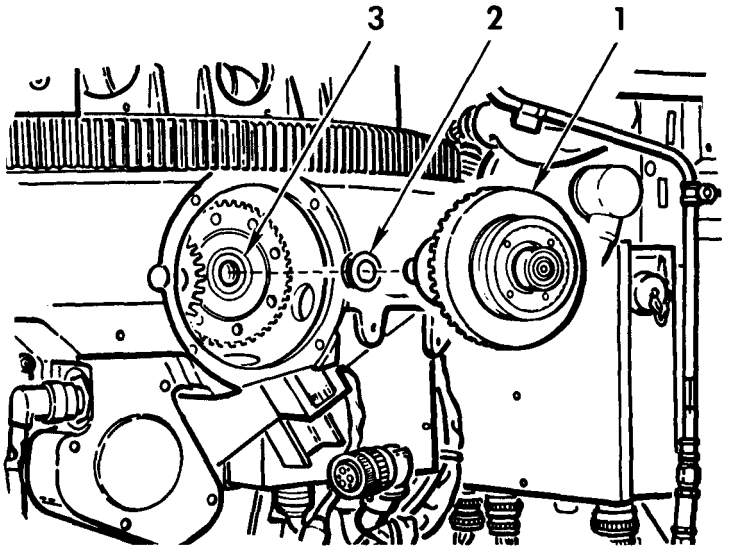
ARR83-0271

2-37. REPAIR OF ELEVATION GEAR TRAIN (cont)

DISASSEMBLY (cont)

3. REMOVE FACE GEAR/CLUTCH ASSEMBLY (1).

   Remove face gear/clutch assembly (1) and shims (2) from cluster gear (3),

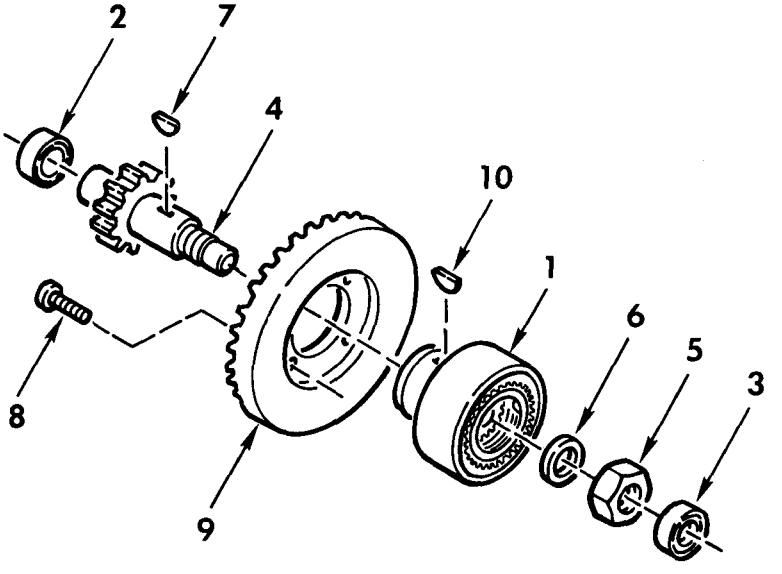


4. REMOVE CLUTCH (1).

   a. Using bearing separator and bearing puller, remove bearings (2 and 3) from gearshaft (4).

   b. Remove nut (5), washer (6), gearshaft (4), and key (7) from clutch (1).

   c. Remove four screws (8), face gear (9), and key (10) from clutch (1).



ARR83-0273

DISASSEMBLY (cont)

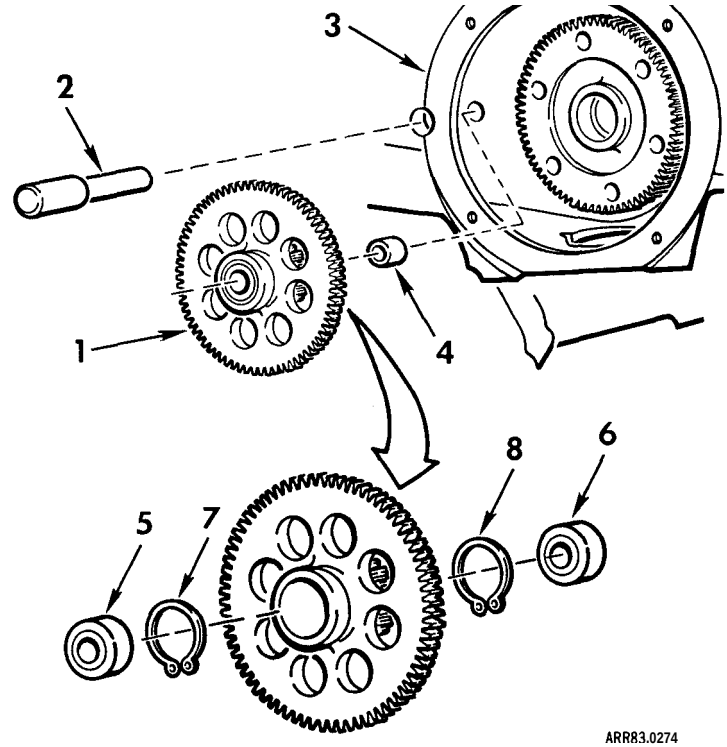
5. REMOVE GEAR (1).

a. Pull gear (1) outward until shaft (2) protrudes approximately l-inch from turret (3).

b. Pull shaft (2) from turret (3). If shaft cannot be pulled from turret, remove down elevation proximity switch, see REPAIR OF TURRET ELECTRICAL COMPONENTS, TM 9-1090-206-20-1 or TM 9-1090-206-20-2. Using a brass drift, inserted in proximity switch hole, lightly tap end of shaft until it is free, then reinstall proximity switch.

c. Remove gear (1) and spacer (4).

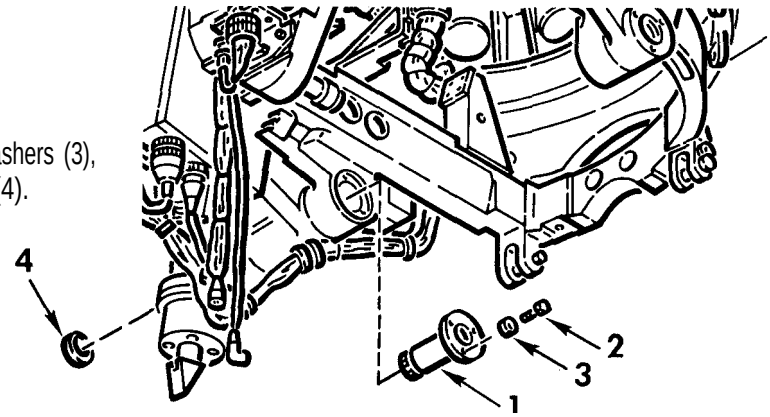
d. Remove bearings (5 and 6) from gear(1). Remove retaining rings (7 and 8) from gear.



ARR83.0274

6. REMOVE SADDLE SHAFT (1).

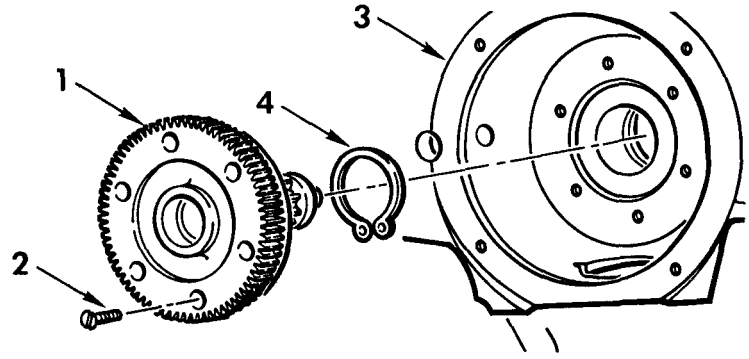
Remove three bolts (2), three washers (3), saddle shaft (1), and washer (4).



7. REMOVE CLUSTER GEAR (1).

a. Remove six screws (2), then remove cluster gear (1) from turret (3).

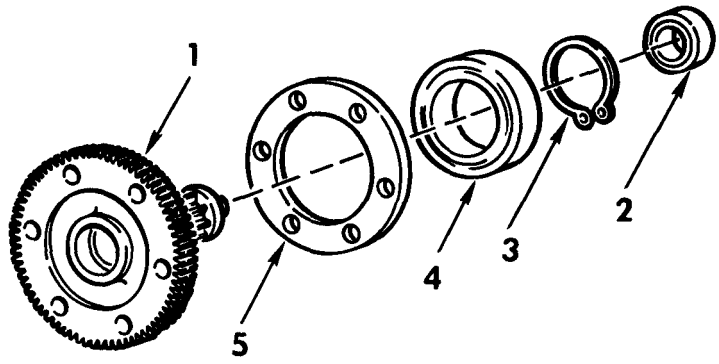
b. Remove retaining ring (4) from turret(3).



ARR83-0275

2-37. REPAIR OF ELEVATION GEAR TRAIN (cont)

8. DISASSEMBLE CLUSTER GEAR (1).
   a. Using bearing separator and bearing puller, remove bearing (2). Remove retaining ring (3) from cluster gear (1).
   b. Using bearing separator and bearing puller, remove bearing (4).
   c. Remove retaining plate (5) from cluster gear (1).



ARR83-0276

CLEANING

9. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV.

INSPECTION

10. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV.

11. INSPECT PARTS IN ACCORDANCE WITH TABULATED DATA:

Component	Possible Defect	Remedy
Clutch	Misadjusted	Readjust to 57-68 lb-in, (6.5-7.7 N.m) see ADJUSTMENT OF AZIMUTH AND ELEVATION DRIVE CLUTCHES, para 2-38. If torque cannot be properly adjusted, replace.
Gears	Broken or cracked teeth	Replace.
Gearshaft	Broken or cracked teeth	Replace.
Shaft	Burred or deformed	Replace.

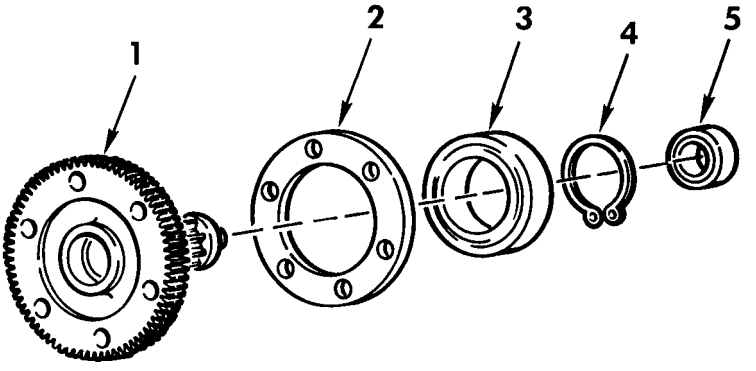
ASSEMBLY

12. ASSEMBLE CLUSTER GEAR (1).

a. Install retaining plate (2) on cluster gear (1), (countersunk holes in plate toward large gear).

b. Apply a light coating of grease to bearing (3). Using an arbor press, install bearing on cluster gear (1) so that it seats against shoulder of large gear. Install retaining ring (4).

c. Apply a light coating of grease to bearing (5). Using an arbor press, install bearing on cluster gear (1) so that it seats against shoulder of gearshaft.



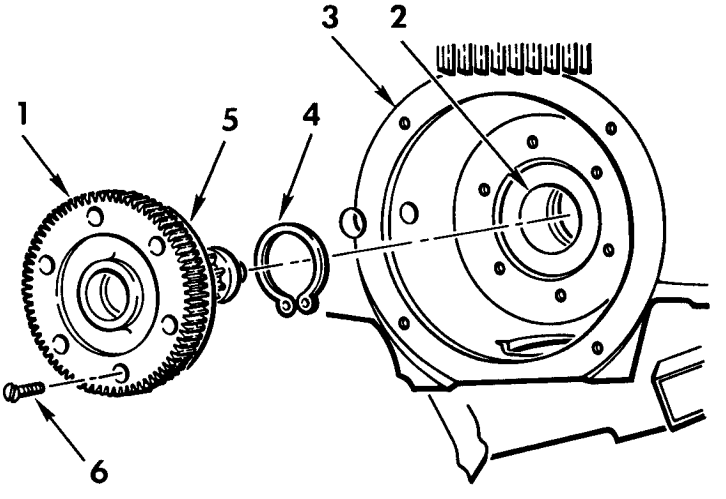
13. INSTALL CLUSTER GEAR (1).

a. Apply a light coating of grease to bearing bore (2) in turret (3).

b. Install retaining ring (4) in bearing bore (2) of turret (3).

c Apply a light coating of grease to teeth of cluster gear (1) and install cluster gear in turret (3).

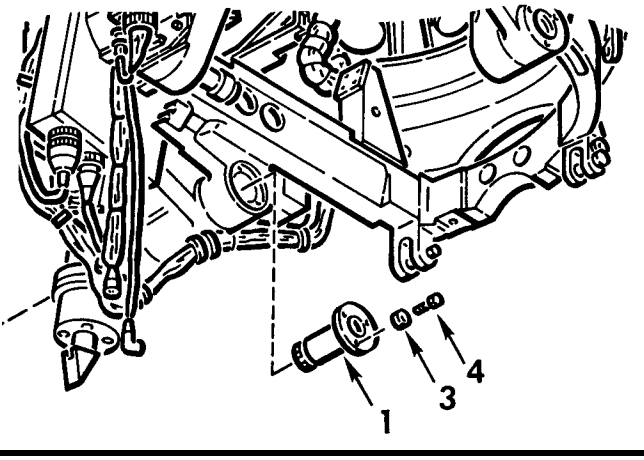
d. Aline holes in cluster gear (1) with holes in retaining plate (5) and holes in turret (3), then install six screws (6).



ARR83-0278

14. INSTALL SADDLE SHAFT (1).

Install saddle shaft (1), washer (2) and secure using three washers (3), and three bolts (4).



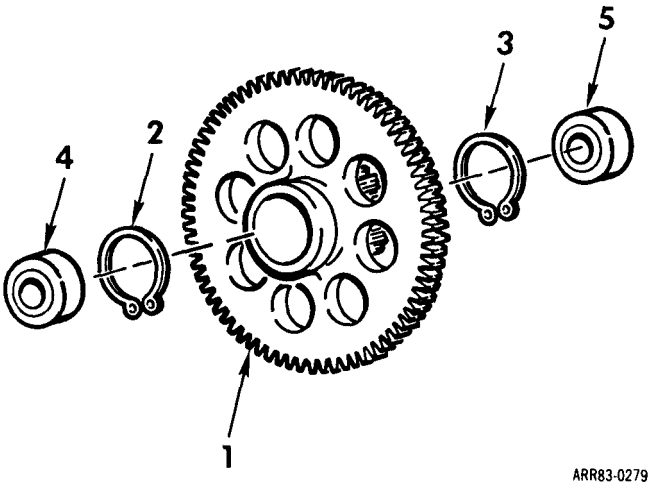
2-37. REPAIR OF ELEVATION GEAR TRAIN (cont)

ASSEMBLY (cont)

15. ASSEMBLE GEAR (1).

    a. Install retaining rings (2 and 3) in gear (1).

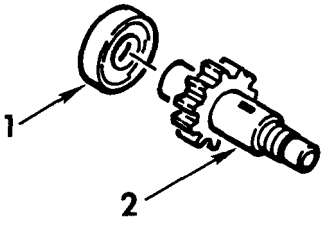
    b. Using an arbor press, install bearings (4 and 5) in gear (1) and seat against retaining rings (2 and 3). Set gear aside for later installation.



ARR83-0279

16. INSTALL BEARING (1).

    Apply a light coating of grease to bearing (1). Using an arbor press, install bearing on gearshaft (2) seating it against shoulder of gearshaft.

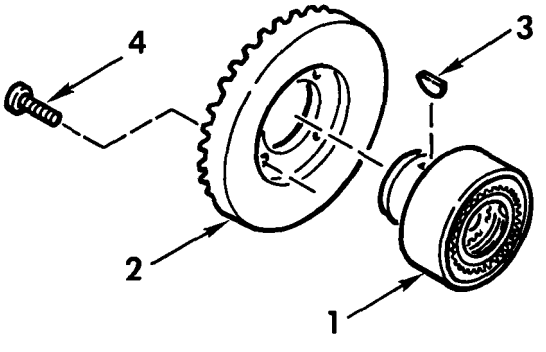


ARR83-0280

17. CHECK CLUTCH (1) FOR BREAKAWAY TORQUE OF 57-68 LB-IN, (6.5-7.7 N.m), SEE ADJUSTMENT OF AZIMUTH AND ELEVATION CLUTCHES, PARA 2-38.

18. INSTALL FACE GEAR (2).

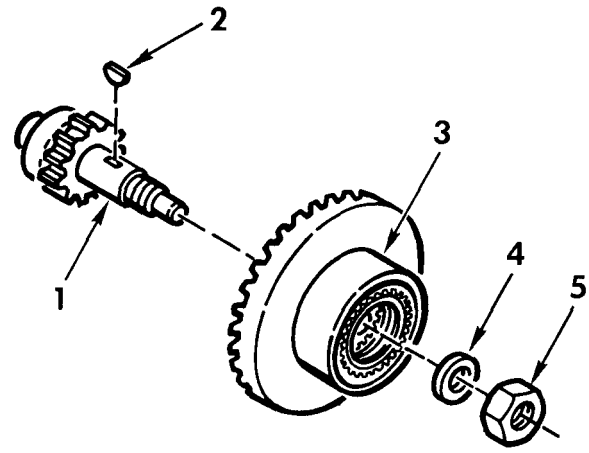
    Position key (3) in clutch (1). Aline keyway in face gear (2) with key in clutch and install face gear on clutch. Secure with four screws (4).



ARR83-0281

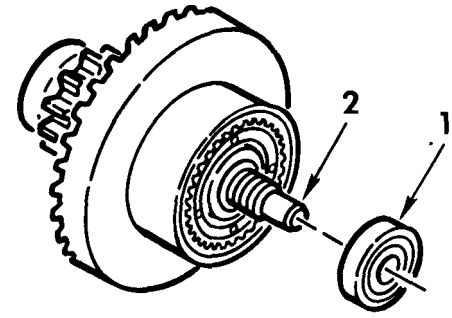
ASSEMBLY (cont)

19. INSTALL GEARSHAFT (1).
    a. Protect teeth of gearshaft (1) and secure gearshaft in vise. Position key (2) in gearshaft.
    b. Aline keyway of clutch (3) with key in gearshaft (1) and install clutch on gearshaft.
    c. Install washer (4) and nut (5).
    d. Torque nut (5) to 25-30 lb-ft (33.90 – 40.68 N.m).



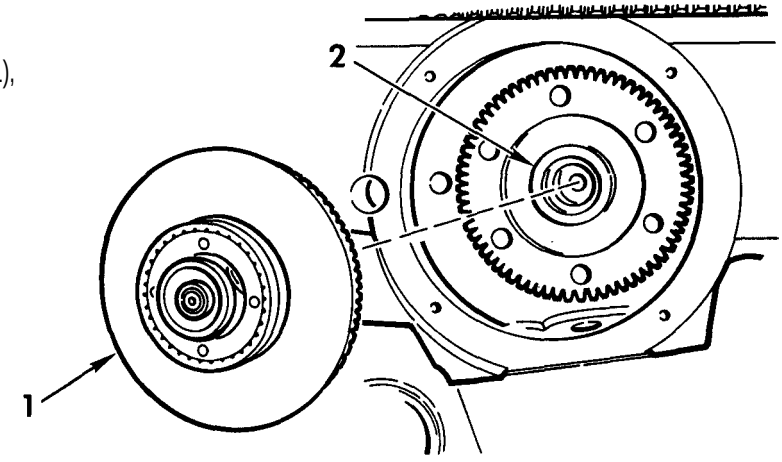
ARR83-0282

20. INSTALL BEARING (1).
    Apply a light coating of grease to bearing (1). Using an arbor press, install bearing on gearshaft (2) seating it against shoulder of gearshaft.



ARR83-0283

21. INSTALL FACE GEAR/CLUTCH ASSEMBLY (1),
    Install face gear/clutch assembly (1) so that it is fully seated in bore of cluster gear (2).

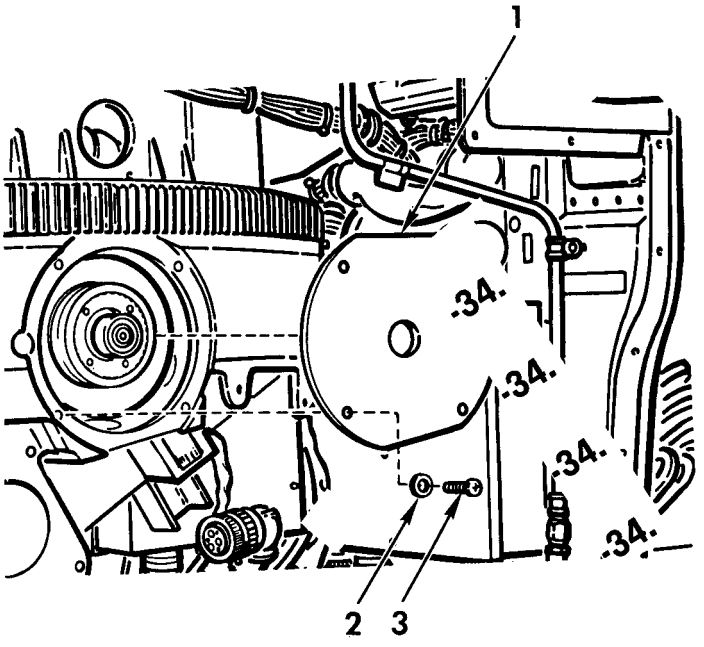


ARR83-0284

2-37. REPAIR OF ELEVATION GEAR TRAIN (cont)

22. INSTALL COVER (1).

Install cover (1), secure with four washers (2), and four screws (3).



ARR83-0285

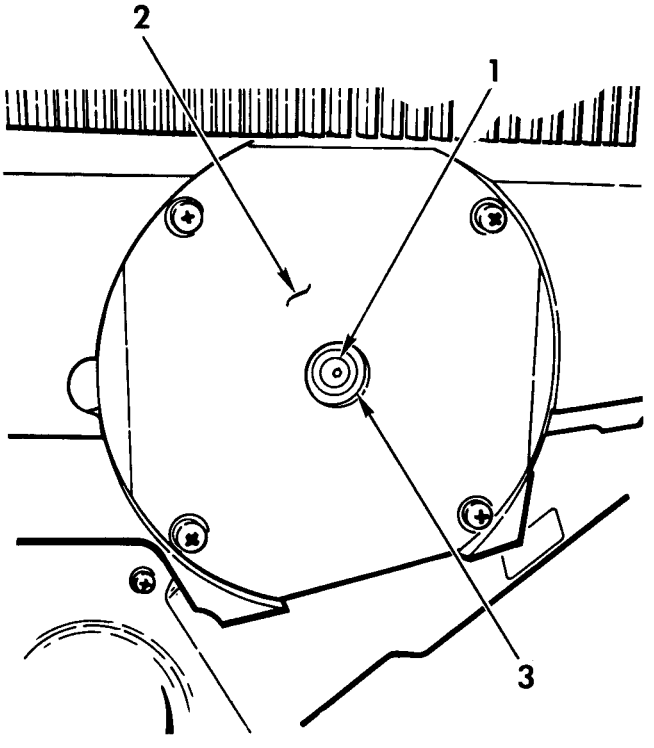
23. DETERMINE TOTAL SHIM PACK FOR

in bore of turret.

b. Using a depth micrometer, measure depth from outer surface of cover (2) to surface of bearing race (3) on end of gearshaft (1) (Dimension A).

c. Using a screwdriver through tachometer hole, move gearshaft (1) out against cover (2) and hold it there. Measure depth to surface of bearing race on end of gearshaft again (Dimension B).

d. Subtract dimension “B” from dimension "A". Difference is thickness of total shim pack required (Dimension C). Using a caliper micrometer, assemble a shim pack to required thickness.

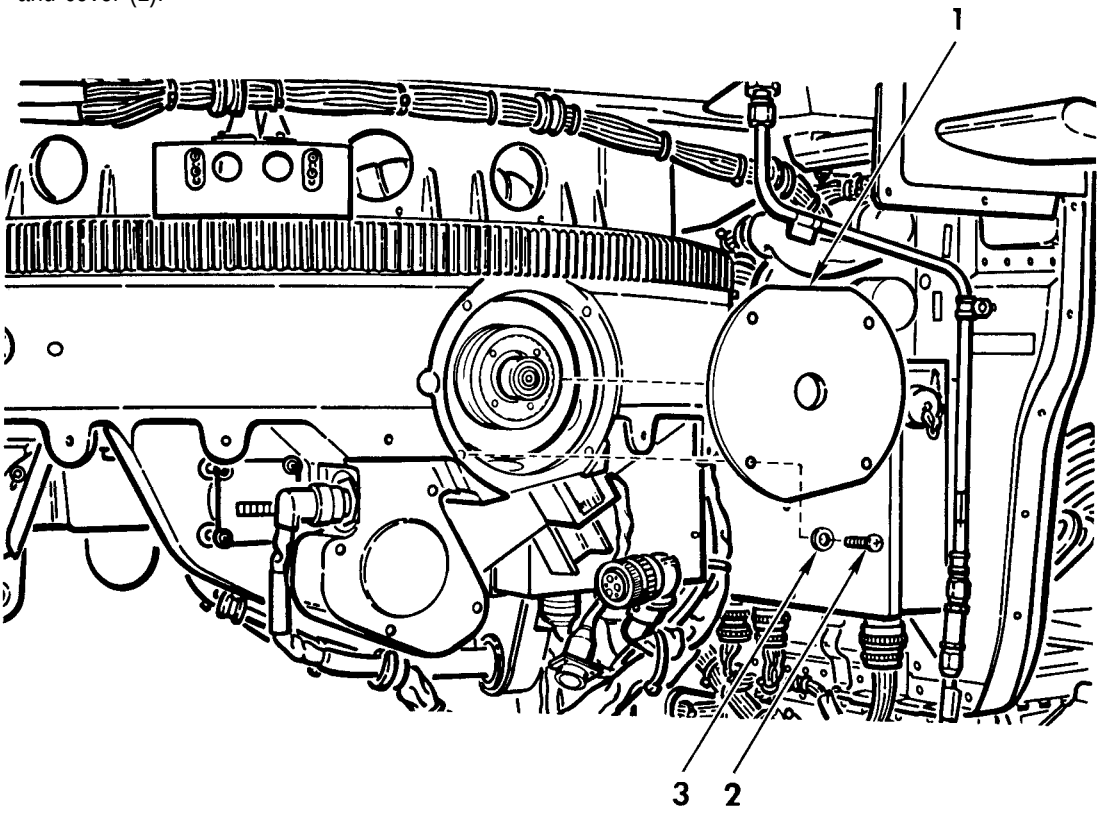


ARR83-0286

ASSEMBLY (cont)

24. REMOVE COVER (1).

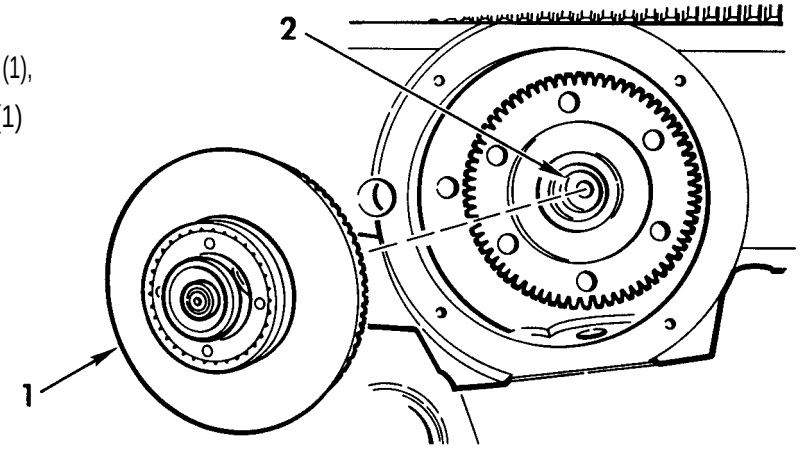
Remove four screws (2), four washers (3), and cover (1).



ARR83-0287

25. REMOVE FACE GEAR/CLUTCH ASSEMBLY (1),

Remove face gear/clutch assembly (1) from bore of cluster gear (2).



ARR83-0288

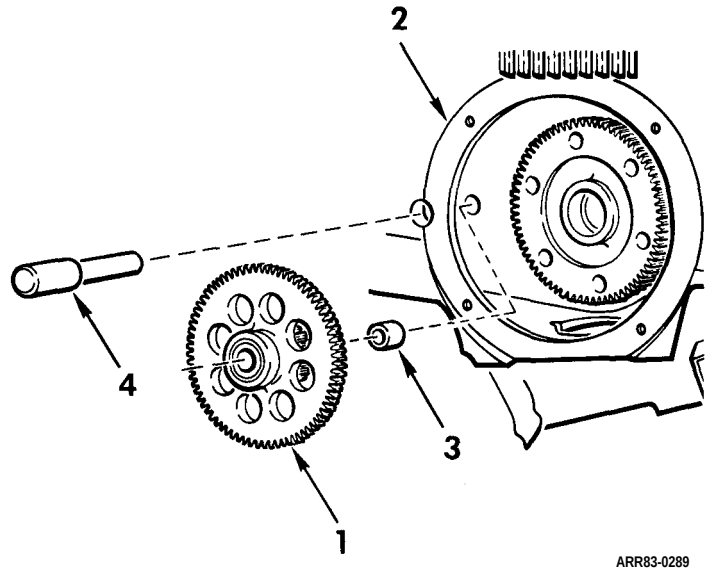
2-37. REPAIR OF ELEVATION GEAR TRAIN (cont)

26. INSTALL GEAR (1).

a. Fill inside shaft hole of turret (2) with grease, then install spacer (3).

b. Apply a light coating of grease to teeth of gear (1) and shaft (4).

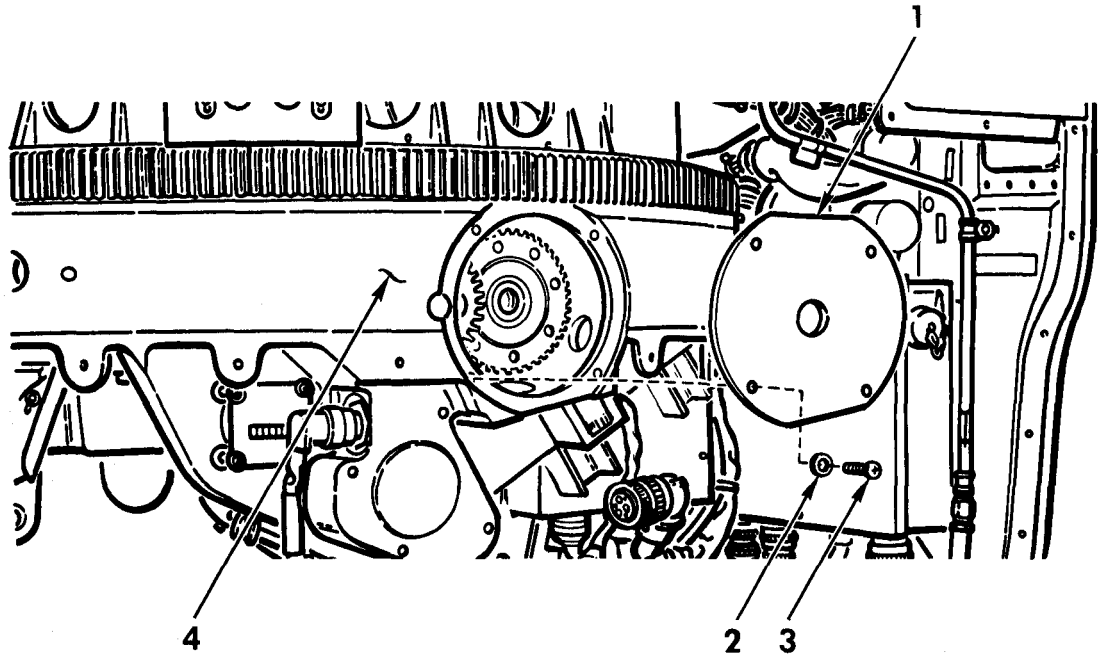
c. Position gear (1) in turret (2) (small gear to inside). Insert shaft (4) (small end first) through outside of turret through gear (1) and spacer (3) so that it is fully seated in turret. Make sure that teeth of gear (1) do not contact turret when gear is rotated.



ARR83-0289

27. INSTALL COVER (1).

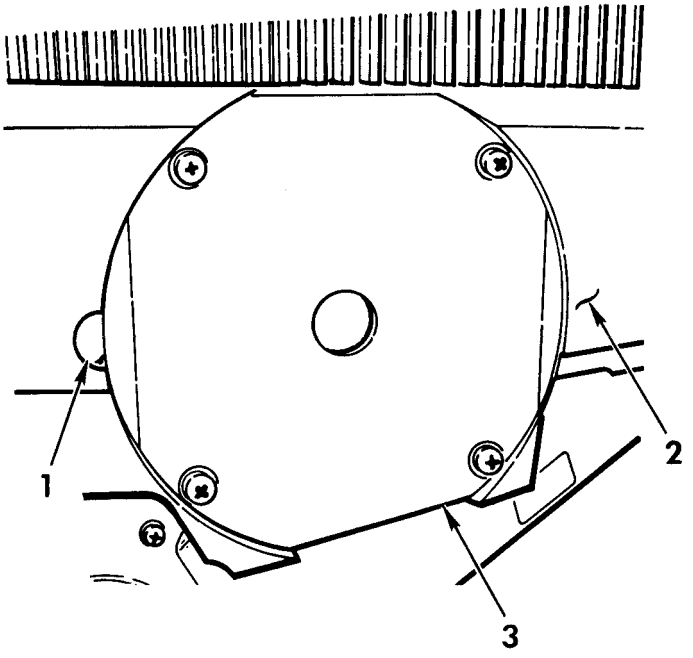
Install cover (1), four washers (2), and four screws (3), on turret (4).



ARR83-0290

ASSEMBLY (cont)

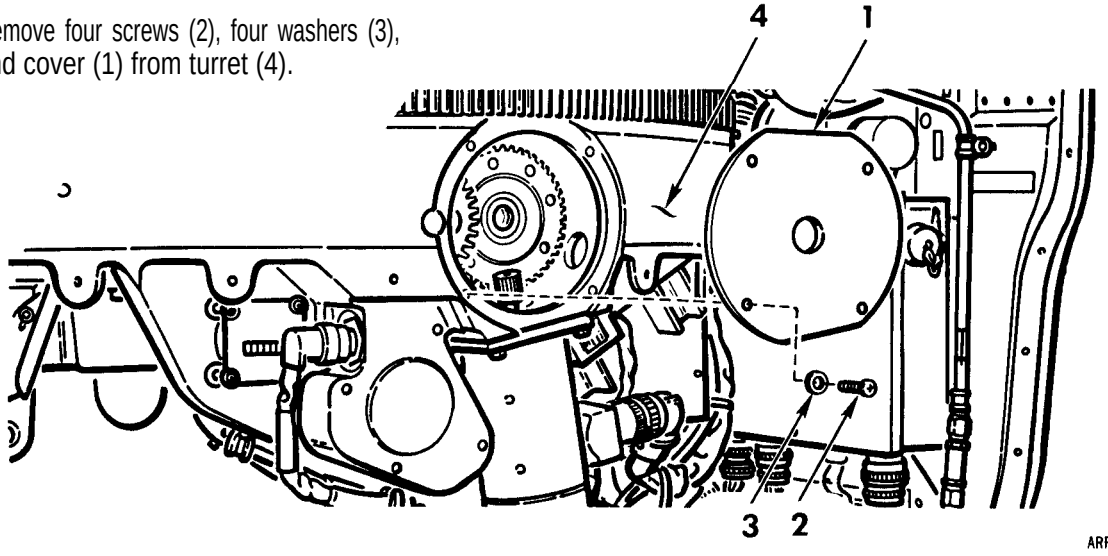
28. MEASURE END PLAY OF SHAFT (1).
    a. Make sure shaft (1) is fully seated in turret (2).
    b. Using a depth micrometer across cover (3) and edge of turret (2), measure distance to end of shaft (1).
    c. Using a screwdriver through tachometer hole and holding it against backside of gear on shaft (1), move shaft against cover (3) and measure distance to end of shaft again. Difference is amount of shaft end play.
    d. Subtract 0.003 inch from the difference. Result is thickness of shims required.
    e. Assemble a shim pack of required thickness and set aside for later assembly.



29. INSTALL ELEVATION DRIVE MOTOR, SEE REMOVAL/INSTALLATION OF ELEVATION DRIVE MOTOR, PARA 2-44.

ARR83-0291

30. REMOVE COVER (1).
    Remove four screws (2), four washers (3), and cover (1) from turret (4).

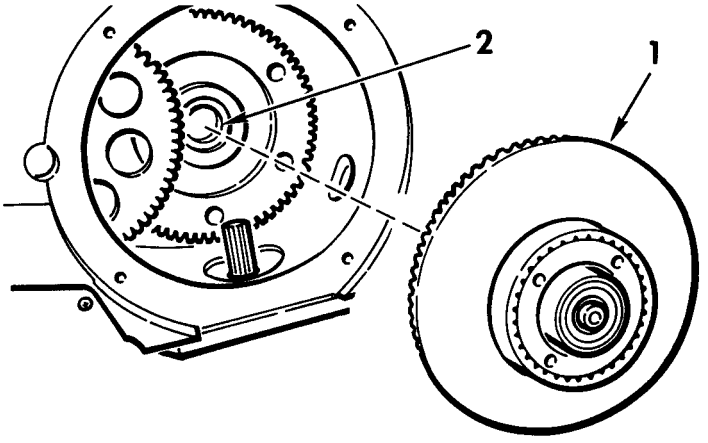


ARR83-0292

2-37. REPAIR OF ELEVATION GEAR TRAIN (cont)

31. INSTALL FACE GEAR/CLUTCH ASSEMBLY (1).

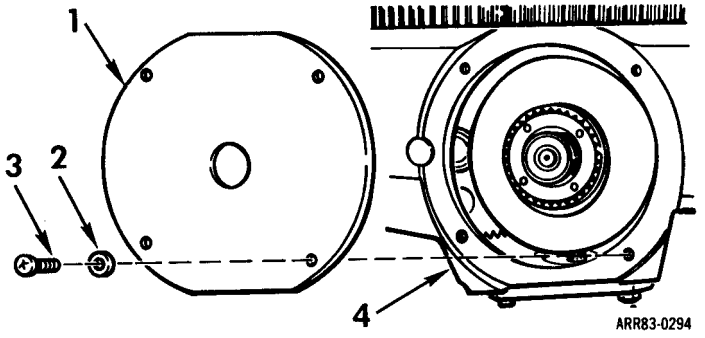
Install face gear/clutch assembly (1) so that it is fully seated in bore of cluster gear (2).



ARR83-0293

32. INSTALL COVER (1).

Install cover (1), four washers (2), and four screws (3) on turret (4).



ARR83-0294

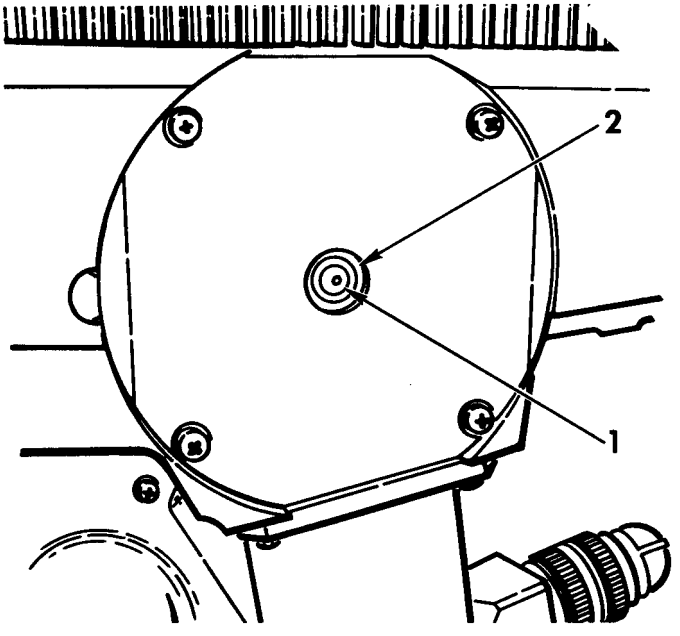
33. DETERMINE OUTER SHIM PACK FOR GEARSHAFT (1).

a. Push gearshaft (1) in against drive motor gear, and measure depth to surface of bearing race (2) on end of gearshaft (Dimension D).

b. Place an index mark on end of gearshaft (1).

c. Subtract dimension “B” from dimension “D”. Then subtract 0,004 inch from this answer. This is the thickness of shims required for the outer shim pack (Dimension E).

d. Prepare an outer shim pack of this thickness (Dimension E) from shims of total shim pack. Remainder of total shim pack will be used as inner shim pack.

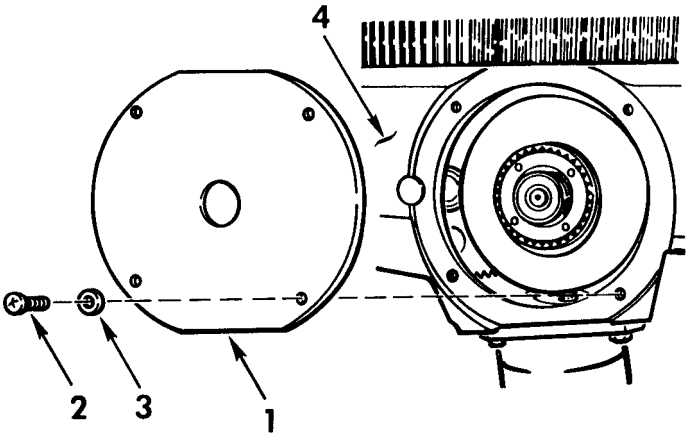


ARR83-0295

ASSEMBLY (cont)

34. REMOVE COVER (1).

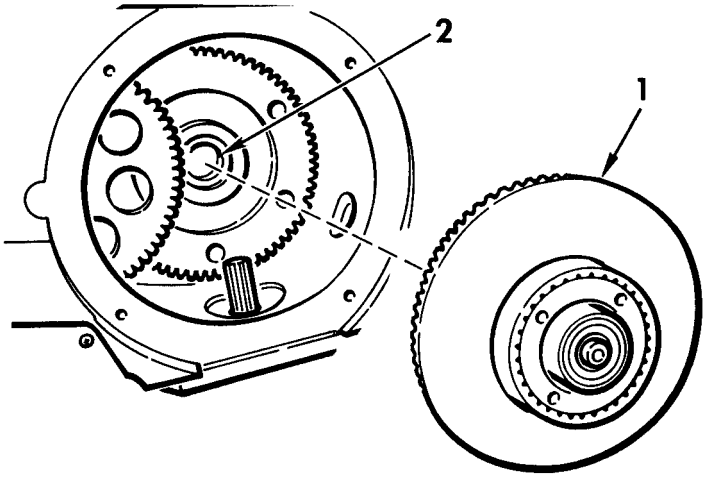
Remove four screws (2), four washers (3), and cover (1) from turret (4).



ARR83-0296

35. REMOVE FACE GEAR/CLUTCH ASSEMBLY (1).

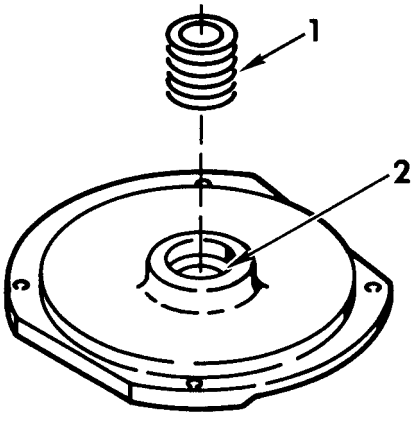
Remove face gear/clutch assembly (1) from cluster gear (2).



ARR83-0297

36. INSTALL OUTER SHIM PACK (1).

Install outer shim pack (1) (Dimension E) in recess of cover (2).

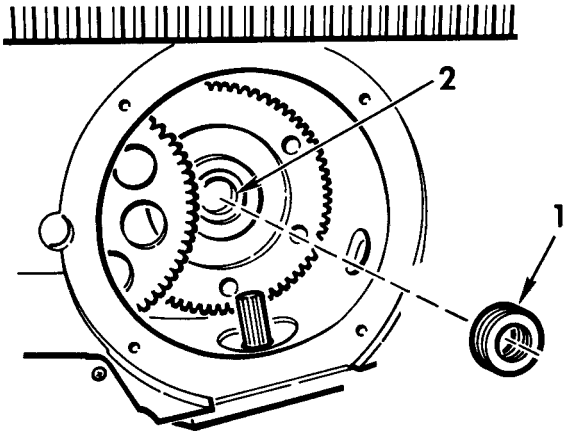


ARR83-0298

2-37. REPAIR OF ELEVATION GEAR TRAIN (cont)

37. INSTALL INNER SHIM PACK (1).

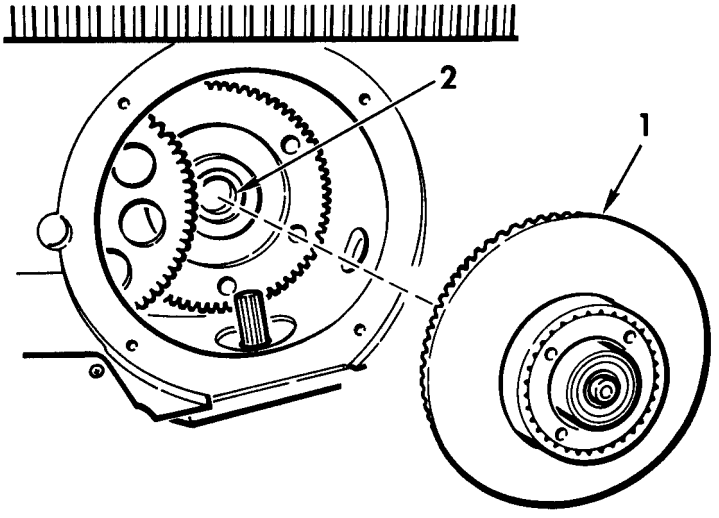
Install inner shim pack (1) (remainder of total shim pack) in bore of cluster gear (2).



ARR83-0299

38. INSTALL FACE GEAR/CLUTCH ASSEMBLY (1).

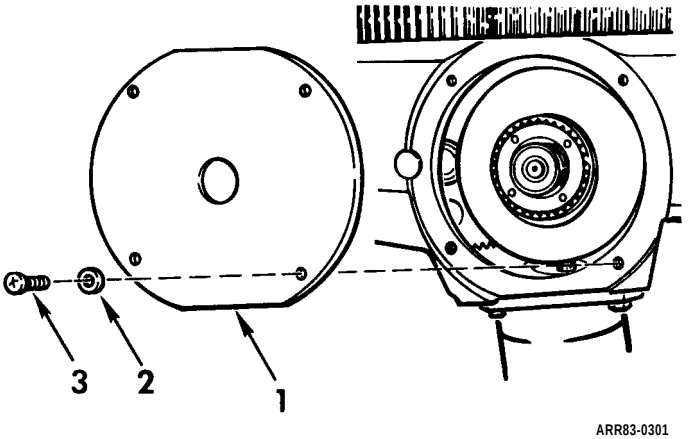
Install face gear/clutch assembly (1) so that it is fully seated in bore of cluster gear (2).



ARR83-0300

39. INSTALL COVER (1).

Install cover (1) (with outer shim pack) and secure with four washers (2) and four screws (3).

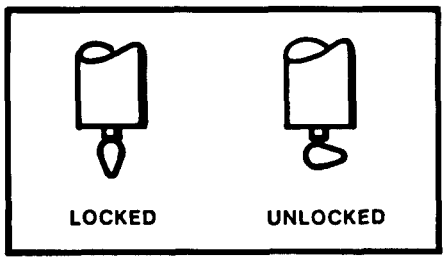


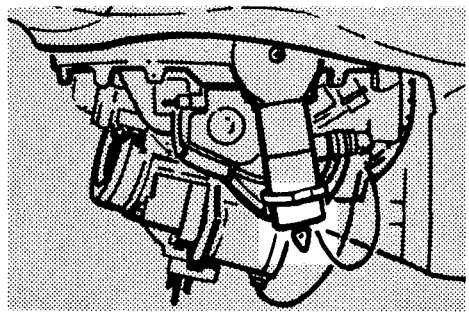
ARR83-0301

ASSEMBLY (cont)

40. UNLOCK ELEVATION DRIVE MOTOR BRAKE.

Position saddle to approximately 0 degrees elevation, then lock elevation drive motor brake.



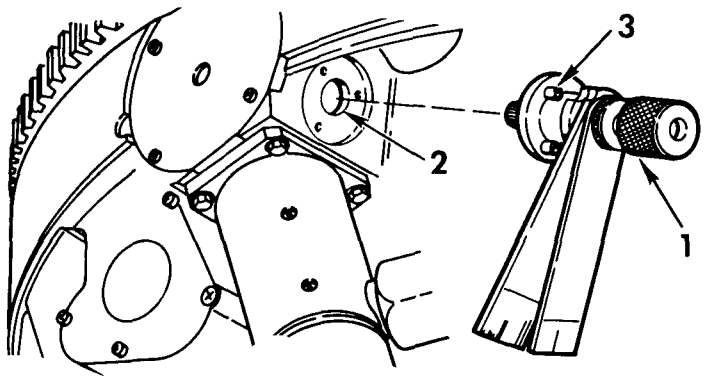


ELEVATION DRIVE MOTOR BRAKE HANDLE

ARR83-0302

41. INSTALL BACKLASH GAGE (1).

Position backlash gage (1) in elevation tachometer hole (2) and secure by tightening three screws (3).



ARR83-0303

42. CHECK FACE GEAR RUNOUT USING BACKLASH GAGE (1).

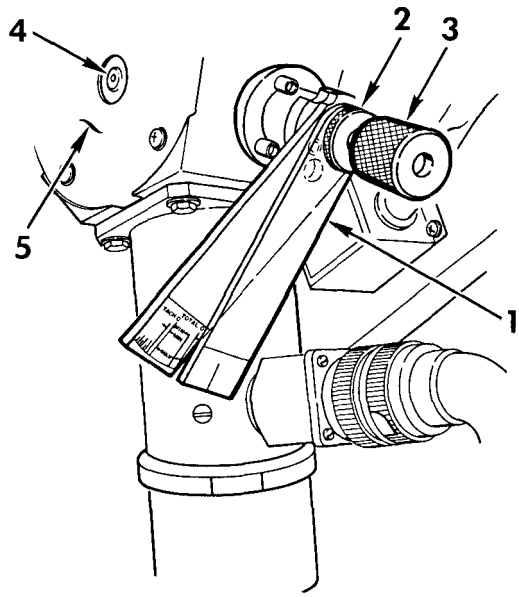
a. Unlock elevation drive motor brake.

b. Loosen locknut (2).

c Rotate knob (3), for at least one full revolution of face gear as shown by index mark on end of gearshaft (4) and stop at the tightest spot.

d. Place a mark on cover (5) which corresponds to index mark on end of gearshaft (4).

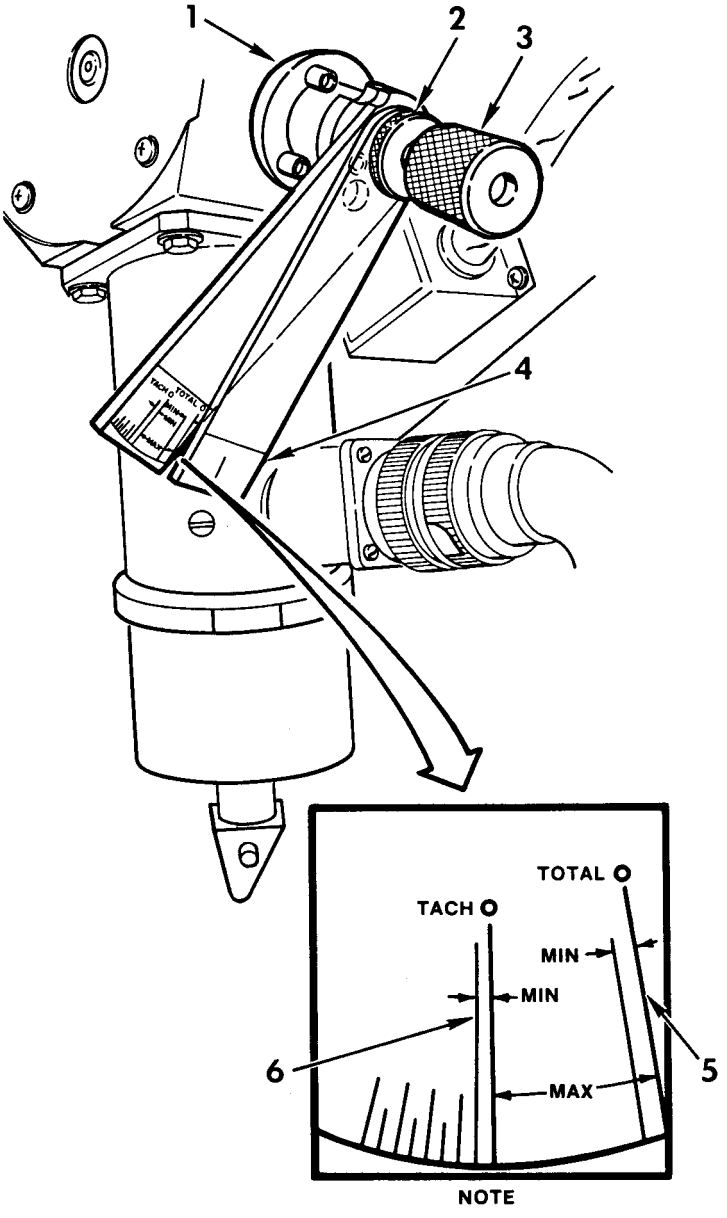
e. If face gear cannot be rotated, go to step 43.



ARR83-0304

2-37. REPAIR OF ELEVATION GEAR TRAIN (cont)

43. CHECK BACKLASH USING BACKLASH GAGE (1).
    a. Lock elevation drive motor brake.
    b. Loosen locknut (2). Rotate knob (3) counterclockwise Position indicator (4) over zero mark of TOTAL scale (5), then tighten locknut.
    c. Gently rotate knob (3) left and right. Note amount of total backlash as shown by amount that indicator (4) moves on TOTAL scale (5).
    d. Loosen locknut (2). Rotate knob (3) counterclockwise. While applying downward pressure on rear of saddle to remove play in gear train, position indicator (4) over zero mark of TACH scale (6), then tighten locknut.
    e. Gently rotate knob (3) left and right. Note amount of tachometer backlash as shown by amount that indicator (4) moves on TACH scale (6).
    f. Unlock elevation drive motor brake.
    g. Loosen locknut (2) and rotate knob (3) until face gear has turned 180 degrees as shown by index mark on end of gearshaft.
    h. Check TOTAL and TACH backlash at this position.
    i. If backlash is not less than minimum, nor more than maximum at both positions of face gear, backlash check is complete. Proceed to step 44. If backlash is not within limits, adjust shims.



ARR83-0305

ASSEMBLY (cont)

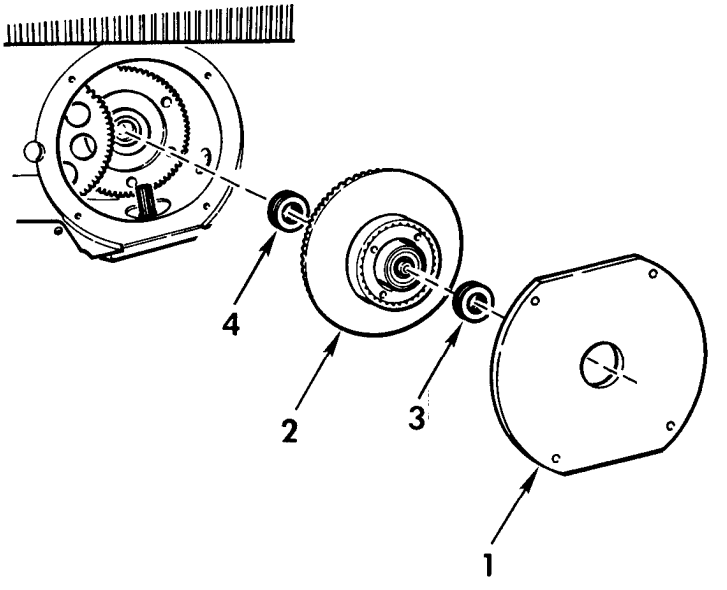
44. ADJUST SHIMS (IF REQUIRED).

a. If backlash is less than minimum, remove cover (1) and face gear/clutch assembly (2). Remove two shims (0.004 inch) from outer shim pack (3) (in cover) and add them to inner shim pack (4) (in cluster gear bore). Do not change total number of shims used.

b. If backlash is more than maximum, move two shims (0.004 inch) from inner shim pack (4) to outer shim pack (3). Do not change total number of shims used.

c. Install face gear/clutch assembly (2) and cover (1), then recheck backlash (see step 42).

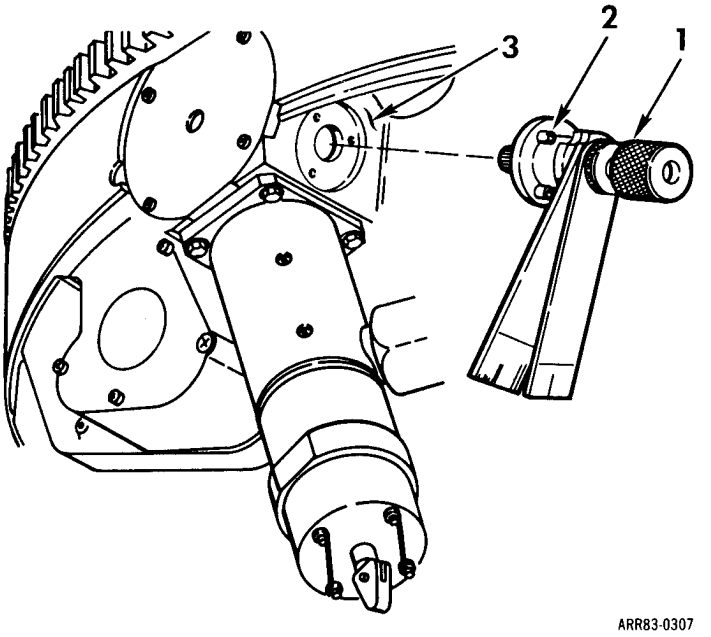
d. If backlash cannot be shimmed into limits, elevation drive motor or face gear is faulty and must be replaced. Repeat backlash checks after replacement.



ARR83-0306

45. REMOVE BACKLASH GAGE (1).

Loosen three screws (2) and remove backlash gage (1) from turret (3).

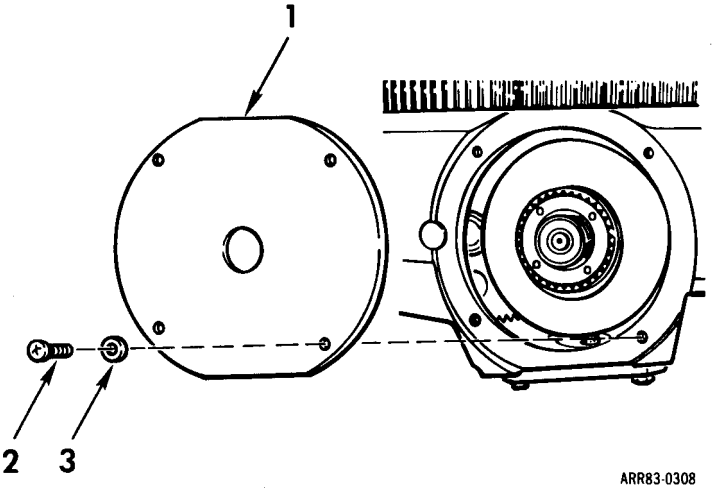


ARR83-0307

2-37. REPAIR OF ELEVATION GEAR TRAIN (Cont)

46. REMOVE COVER (1).

Remove four screws (2), four washers (3), and cover (1). (Do not disturb shims in cover.)

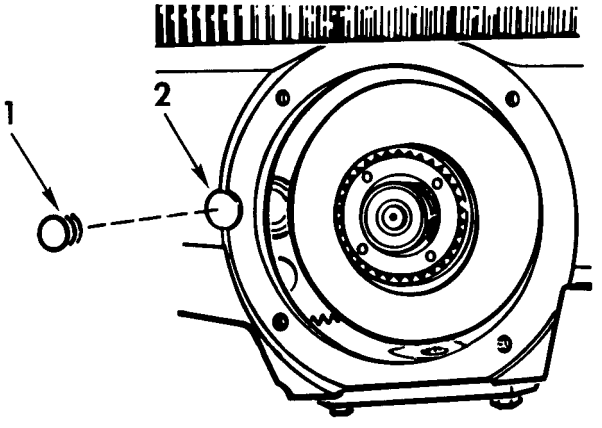


ARR83-0308

47. INSTALL SHIM PACK (1) ON SHAFT (2).

a. Apply a light coating of grease to end of shaft (2).

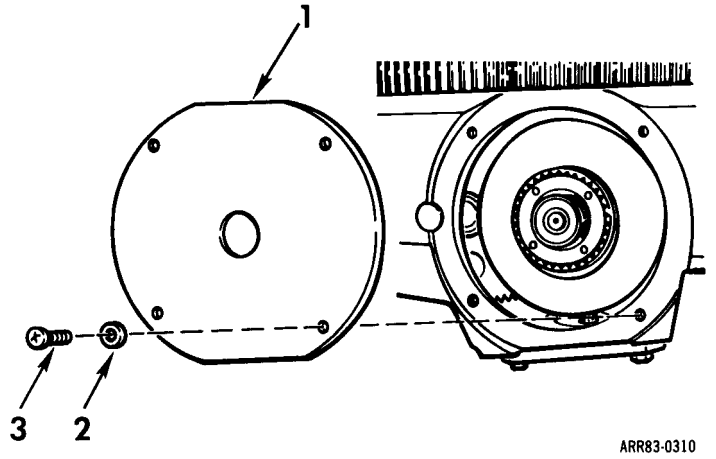
b. Install shim pack (1) (previously assembled in step 27) on end of shaft (2).



ARR83-0309

48. INSTALL COVER (1).

Install cover (1), (including shims) and secure with four washers (2) and four screws (3).



ARR83-0310

END OF TASK

2-38. ADJUSTMENT OF AZIMUTH AND ELEVATION DRIVE CLUTCHES

DESCRIPTION

This task covers: Adjustment.

INITIAL SETUP

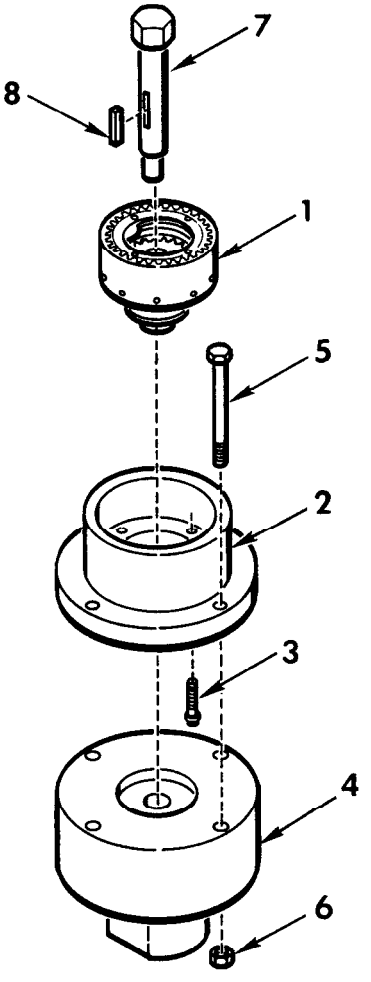
Tools/Test and Support Equipment:
Tool Set, A/C Armament
Repairman: Basic
Tool Set, A/C Armament
Repairman: Supplemental
Clutch Adjuster Holding Fixture

Personnel Required:
68M Aircraft Weapon Systems
Repairer

Equipment Conditions:
In shop on bench.

ADJUSTMENT

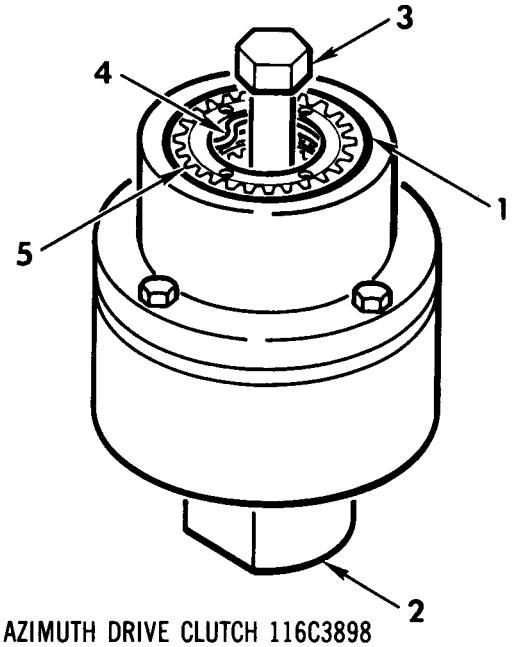
1. INSTALL CLUTCH (1) IN HOLDING FIXTURE UPPER HOUSING (2).
   a. Position clutch (1) in upper housing (2), and install four screws (3).
   b. Position upper housing (2) on lower housing (4) and install four bolts (5) and four nuts (6).
   c. Install torque rod (7) with key (8) into clutch (1).



ARR83-0203

2-38. ADJUSTMENT OF AZIMUTH AND ELEVATION DRIVE CLUTCHES (cont)

2. ADJUST CLUTCH (1).
   a. Secure holding fixture lower housing (2) in a vise.
   b. Using torque wrench, rotate torque rod (3) in each direction to check breakaway torque of clutch (1) against required breakaway torque in tabulated data.
   c. If adjustment is necessary, release locking spring (4) and use a spanner wrench to rotate adjusting nut (5) clockwise to increase torque or counterclockwise to decrease torque.
   d. Return locking spring (4) to locked position and recheck torque. Readjust if necessary.

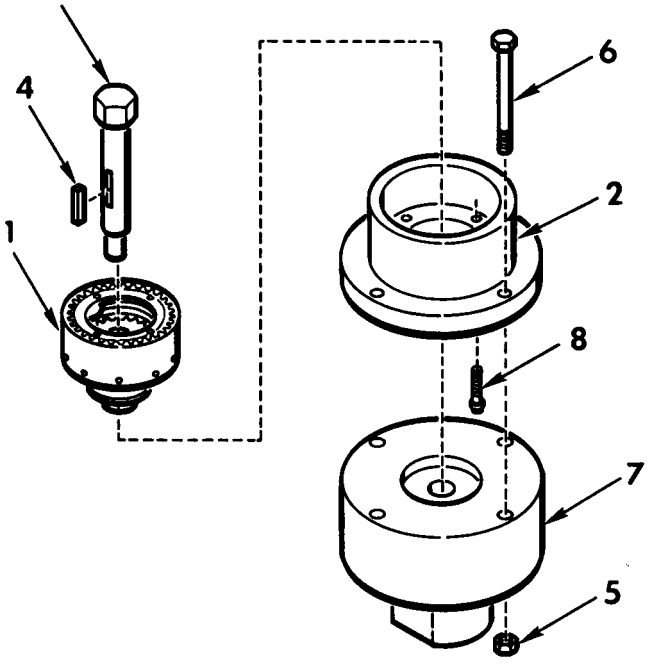


AZIMUTH DRIVE CLUTCH 116C3898
BREAKAWAY TORQUE: 83-101 LB-IN. (9.4-11.4 N.m)

ELEVATION DRIVE CLUTCH 139C7866
BREAKAWAY TORQUE: 57-68 LB-IN. (6.5-7.7 N.m)

ARR83-0204

3. REMOVE CLUTCH (1) FROM HOLDING FIXTURE UPPER HOUSING (2).
   a. Remove torque rod (3) and key (4).
   b. Remove four nuts (5) and four bolts (6). Separate upper housing (2) from lower housing (7).
   c. Remove four screws (8) and remove clutch (1) from upper housing (2).



ARR83-0205

END OF TASK

2-39. REPAIR OF CAM LINK AND ASSOCIATED PARTS

DESCRIPTION

This task covers: Disassembly, cleaning, inspection, and assembly.

INITIAL SETUP

Tools/Test and Support Equipment:
Tool Set, A/C Armament
Repairman: Basic
Tool Set, A/C Armament
Repairman: Supplemental

Materials:
Grease (Item 12, Appx B)
Lockwire (Item 18, Appx B)

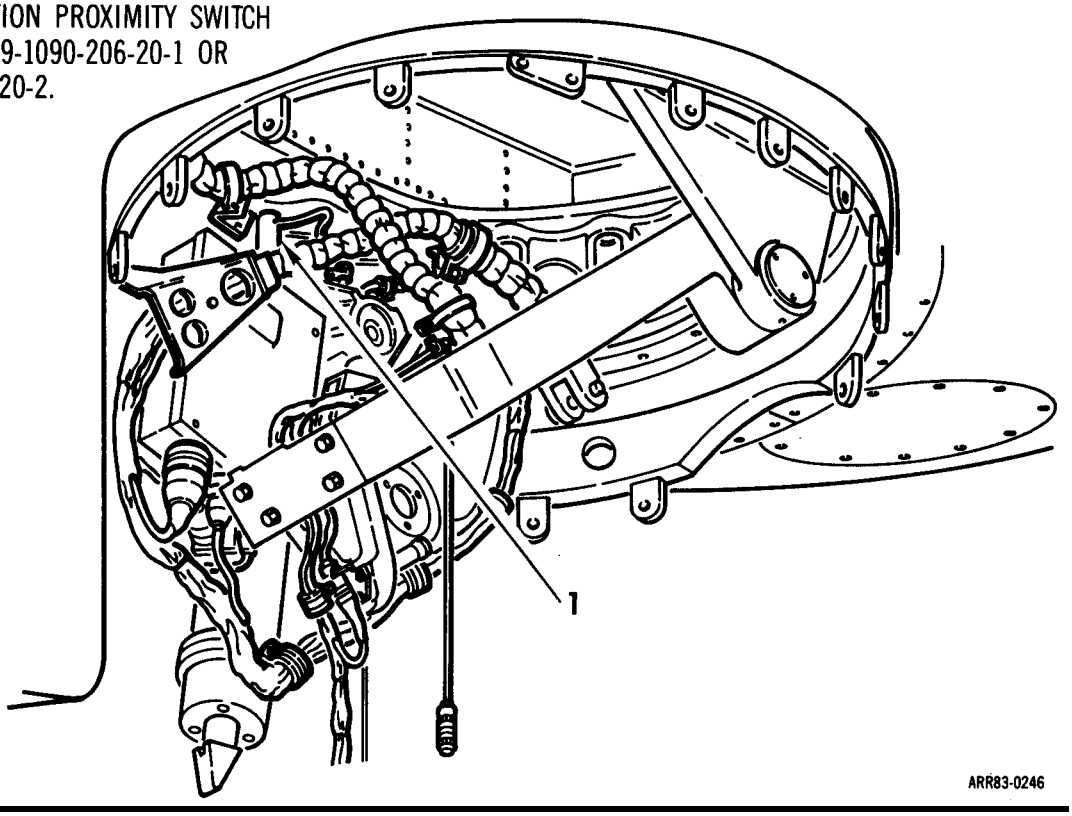
Personnel Required
68M Aircraft Weapon Systems
Repairer

References:
TM 9-1090-206-20-1
TM 9-1090-206-20-2

Equipment Conditions:
HELICOPTER ARMAMENT SUBSYSTEM MAINTENANCE SETUP performed, TM 9-1090-206-20-1 or TM 9-1090-206-20-2.
REMOVAL OF M197 GUN performed, TM 9-1090-206-20-1 or TM 9-1090-206-20-2.

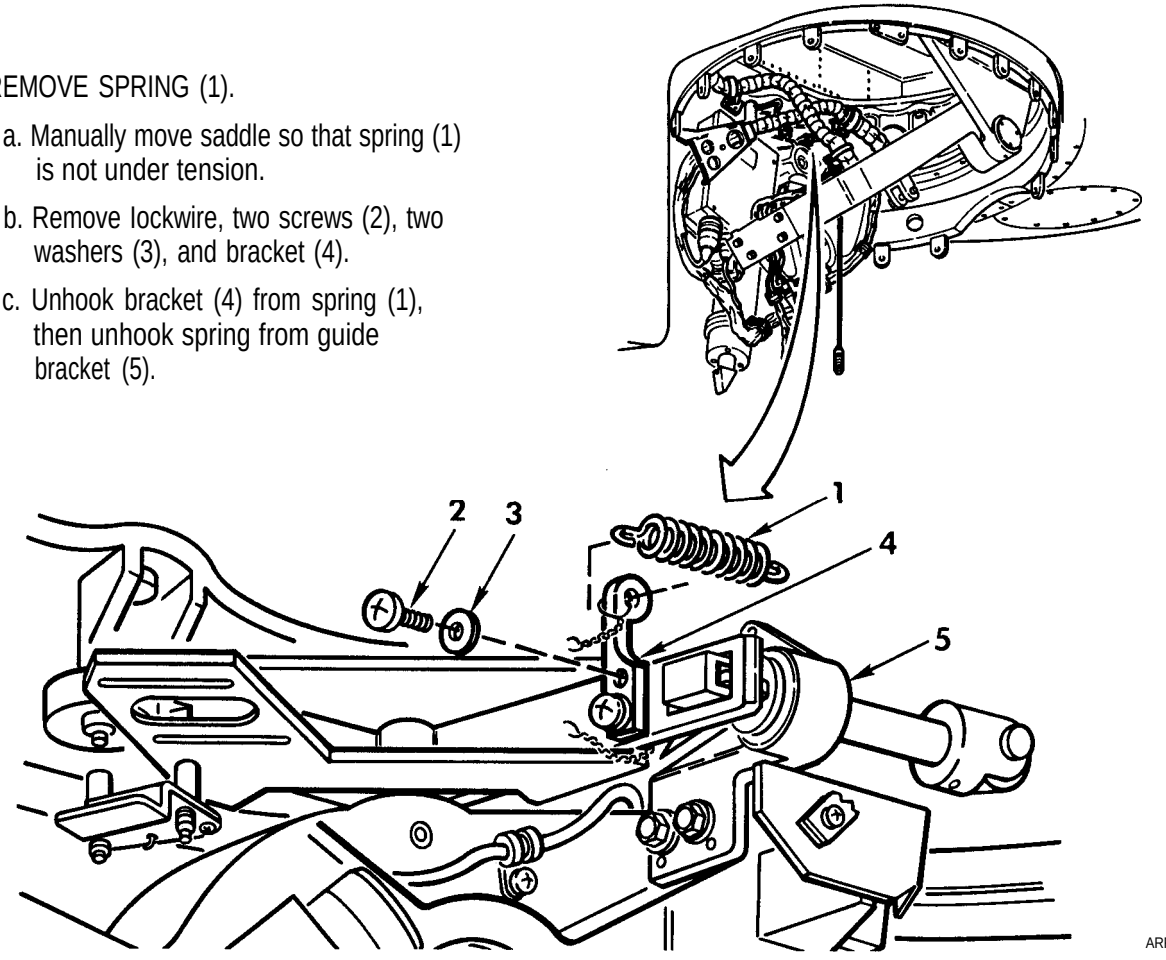
DISASSEMBLY

1. REMOVE ELEVATION PROXIMITY SWITCH S2 (1), SEE TM 9-1090-206-20-1 OR TM 9-1090-206-20-2.



2-39. REPAIR OF CAM LINK AND ASSOCIATED PARTS (cont)

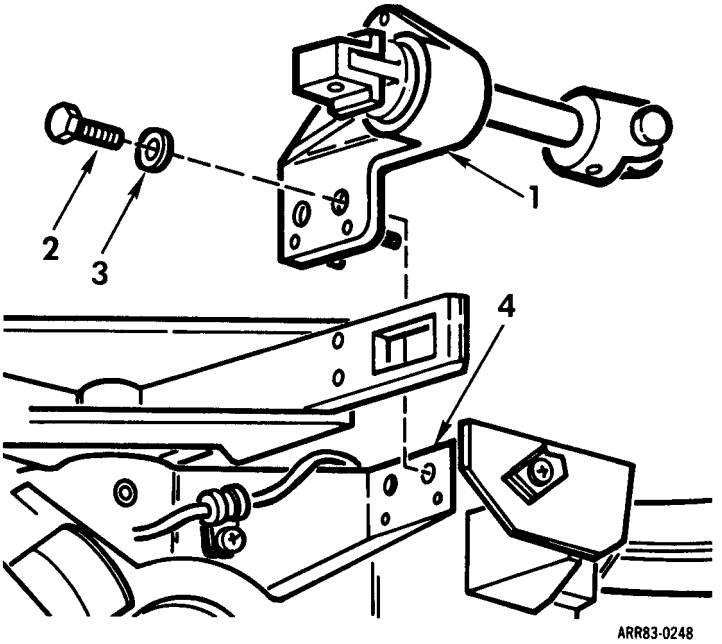
2. REMOVE SPRING (1).
   a. Manually move saddle so that spring (1) is not under tension.
   b. Remove lockwire, two screws (2), two washers (3), and bracket (4).
   c. Unhook bracket (4) from spring (1), then unhook spring from guide bracket (5).



ARR83-0247

3. REMOVE GUIDE BRACKET (1).

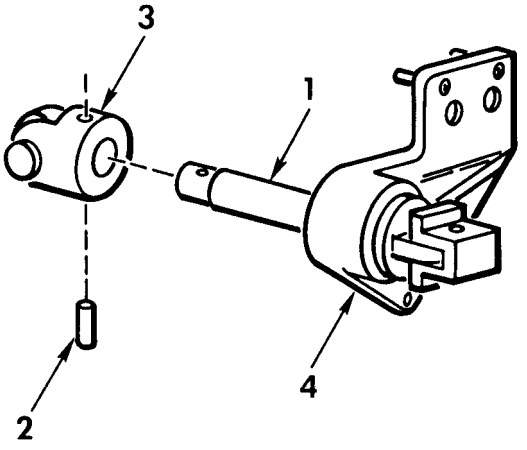
   Remove two bolts (2), two washers (3), and guide bracket (1) from turret (4).



ARR83-0248

DISASSEMBLY (cont)

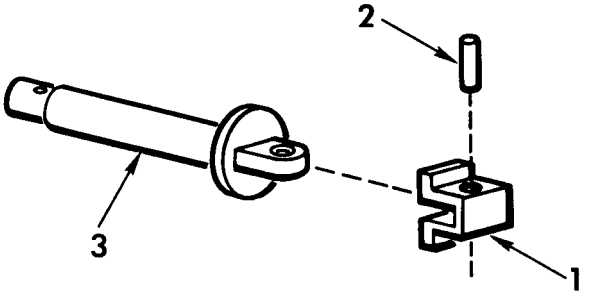
4. REMOVE GUIDE SHAFT (1).
   a. Using a 1/16-inch pin punch, drive out spring pin (2) and remove roller support (3) from guide shaft (1).
   b. Remove guide shaft (1) from guide bracket (4).



ARR83-0249

5. REMOVE YOKE BLOCK (1).

   Using a 7/32-inch pin punch, drive out pin (2) and remove yoke block (1) from guide shaft (3).

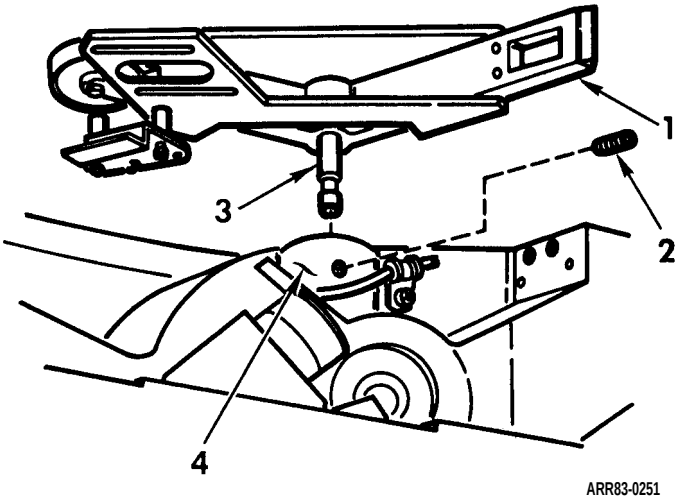


ARR83-0250

NOTE

Pin (3) is not threaded, do not turn with wrench.

6. REMOVE SUPPORT BRACKET (1).
   a. Remove setscrew (2).
   b. Remove support bracket (1) with pin (3) from turret (4).

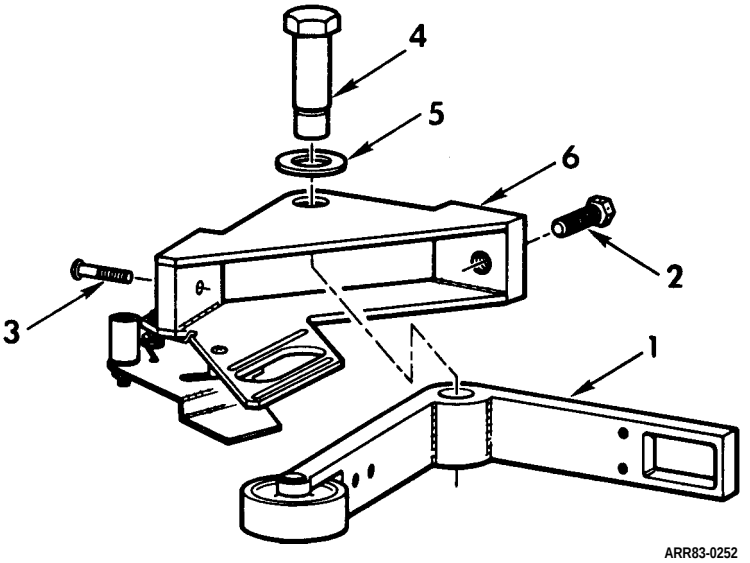


ARR83-0251

2-39. REPAIR OF CAM LINK AND ASSOCIATED PARTS (cont)

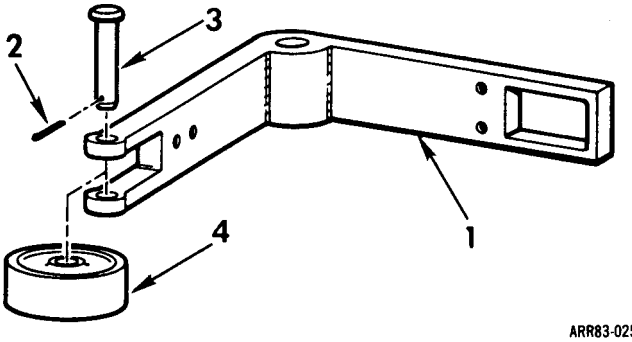
7. REMOVE CAM LINK (1).

Remove bolt (2), screw (3), pin (4), shim (5), and cam link (1) from support bracket (6).



8. DISASSEMBLE CAM LINK (1).

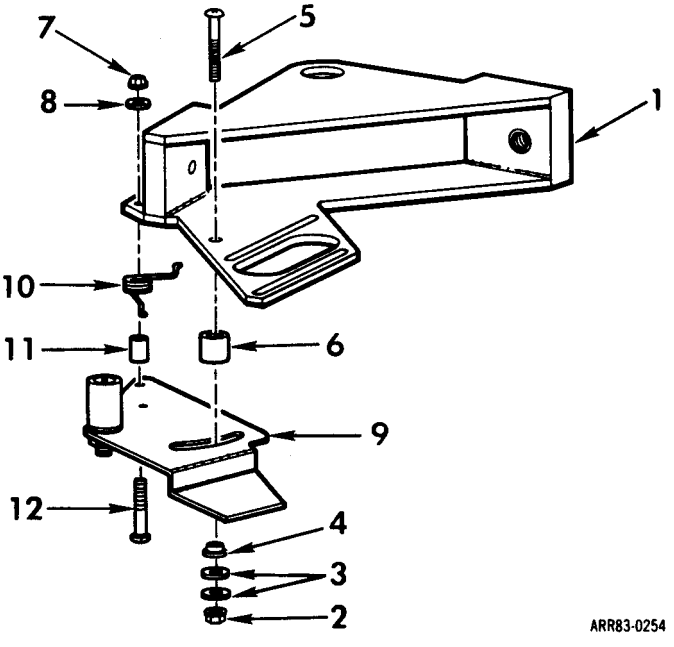
Remove cotter pin (2), pin (3), and cam roller (4) from cam link (1).



9. DISASSEMBLE SUPPORT BRACKET (1).

a. Remove nut (2), two washers (3), sleeve spacer (4), screw (5), and spring spacer (6),

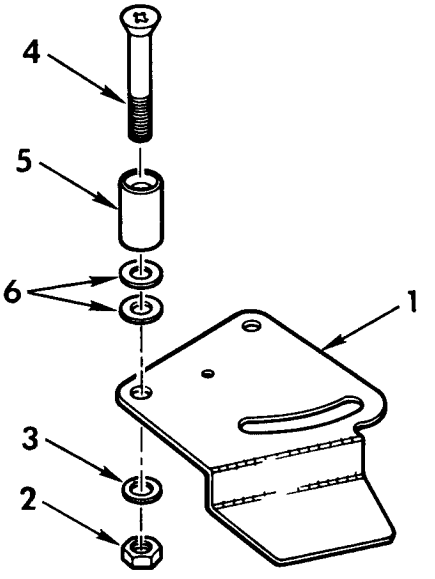
b. Remove nut (7), washer (8), actuator (9), spring (10), sleeve spacer (11), and screw (12) from support bracket (1).



DISASSEMBLY (cont)

10. DISASSEMBLE ACTUATOR (1).

    Remove nut (2), washer (3), screw (4), cam roller (5), and two washers (6) from actuator (1).



ARR83-0255

CLEANING

11. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV.

INSPECTION

12. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV.

13. INSPECT PARTS IN ACCORDANCE WITH TABULATED DATA:

Component	Possible Defect	Remedy
Actuator	Bent or cracked	Replace.
Cam Link	Cracked	Replace.
Cam Roller (Metal)	Worn or cracked	Replace.
Cam Roller (Nylon)	Worn or cracked	Replace.
Guide Bracket	Defective	Return turret to next higher maintenance level for repair.
Guide Shaft	Bent, worn, or cracked	Replace.

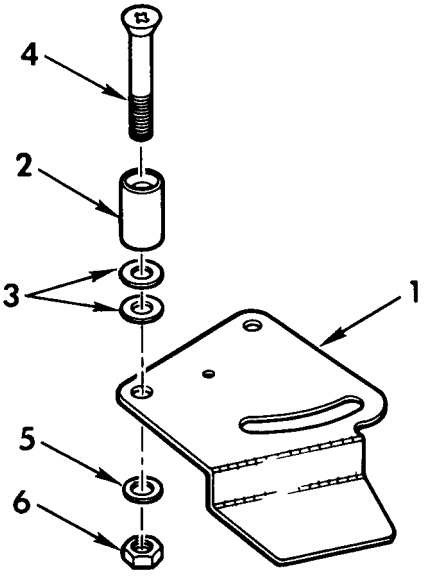
2-39. REPAIR OF CAM LINK AND ASSOCIATED PARTS (Cont)

Component	Possible Defect	Remedy
Pin	Worn or galled	Replace.
Support Bracket	Bent or cracked	Replace.
Torsion Spring	Deformed	Replace.
Yoke Block	Cracked	Replace.

ASSEMBLY

14. ASSEMBLE ACTUATOR (1).

Install cam roller (2) (countersunk end first) and two washers (3) on screw (4). Then install screw in actuator (1) and secure with washer (5) and nut (6).

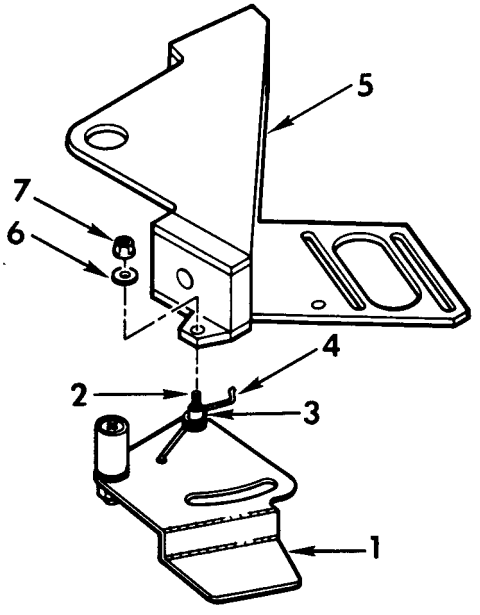


ARR83-0256

15. INSTALL ACTUATOR (1).

a. Install screw (2) in actuator (1) and install spacer (3) on screw. Install end of torsion spring (4) in actuator and position spring over spacer.

b. Position screw (2) with torsion spring (4), spacer (3), and actuator (1) in support bracket (5). Install washer (6) and nut (7). Tighten nut just enough so that actuator can move freely. One additional washer (6) may be added if necessary to permit actuator to move freely.



ARR83-0257

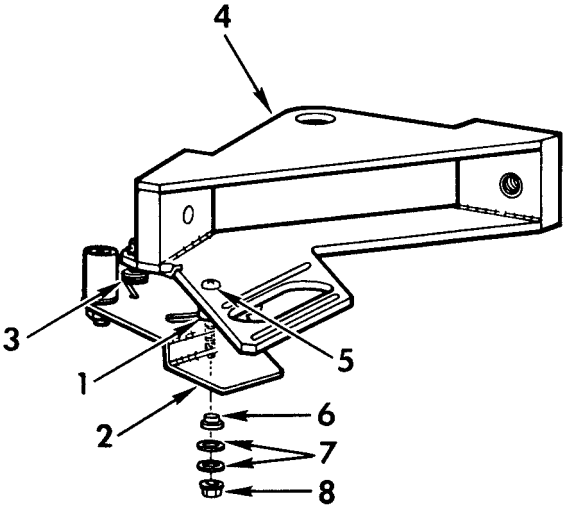
ASSEMBLY (cont)

16. INSTALL SPACER (1).

a. Position actuator (2) so that free end of torsion spring (3) is engaged with support bracket (4) and slot in actuator is alined with hole in support bracket.

b. Position spacer (1) between support bracket (4) and actuator (2). Install screw (5) through support bracket spacer, and slot in actuator.

c. Install sleeve spacer (6), two washers (7), and nut (8) on screw (5). Tighten nut just enough so that actuator (2) can move freely. One additional washer (7) may be added if necessary to permit actuator to move freely.

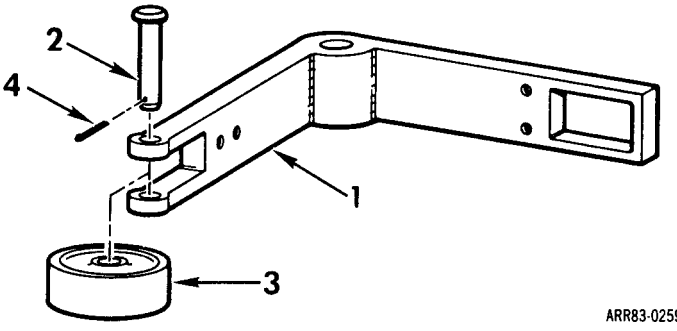


ARR83-0258

17. ASSEMBLE CAM LINK (1).

a. Apply light coating of grease to shaft of pin (2).

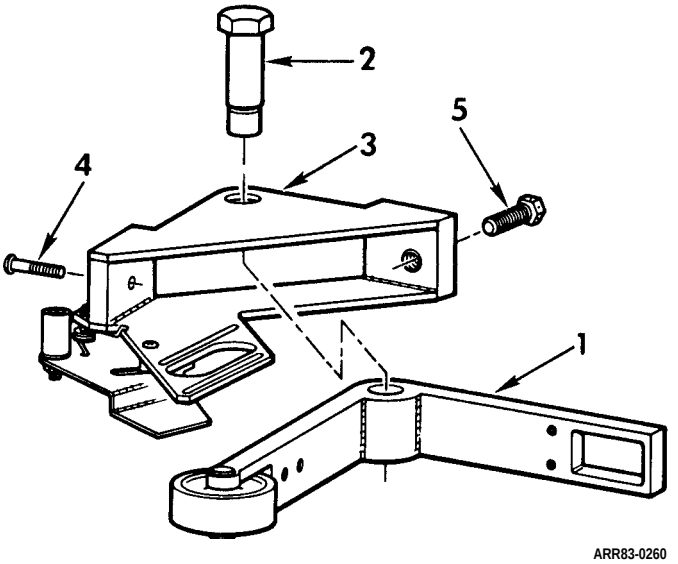
b. Position cam roller (3) in cam link (1), install pin (2) and secure with cotter pin (4).



ARR83-0259

18. INSTALL CAM LINK (1).

Apply a light coating of grease to shaft of pin (2). Place cam link (1) in support bracket (3). Install pin in support bracket. Install screw (4) and bolt (5). Do not tighten bolt.



ARR83-0260

2-39. REPAIR OF CAM LINK AND ASSOCIATED PARTS (cont)

19. INSTALL SUPPORT BRACKET (1).

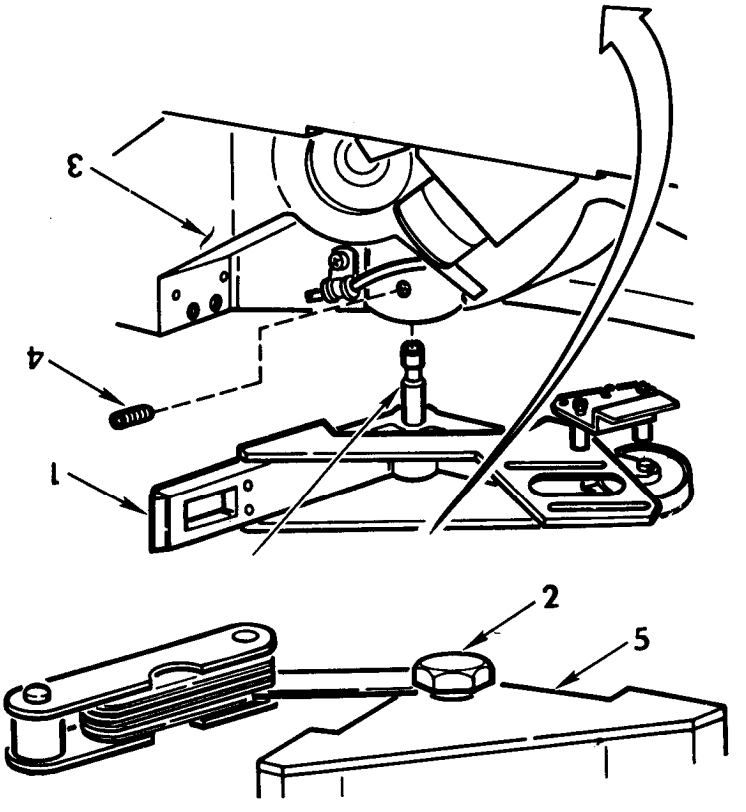
a. Fully seat support bracket (1) with pin (2) in turret (3).

b. Install setscrew (4). Carefully tighten to engage slot in pin (2), then turn 1/8 turn counterclockwise or until pin can rotate freely without being able to be removed.

c. Using a feeler gage, measure clearance between head of pin (2) and support bracket (1). Subtract 0.001 inch from measured clearance and adjust thickness of shim (5) to this dimension.

d. Loosen set screw (4) and remove pin (2), then install shim (5) and pin (2) and repeat steps a and b.

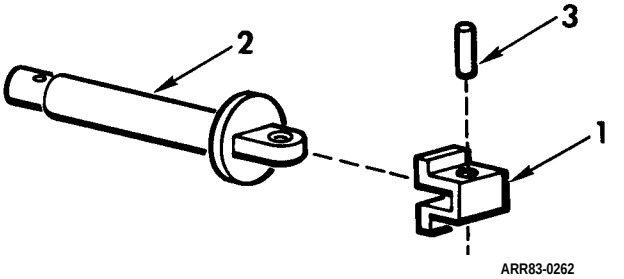
e. Using a feeler gage, check that clearance between head of pin (2) and shim (5) is within 0.0005 to 0.0020 inch. Adjust thickness of shim as necessary for required clearance.



ARR83-0261

20. INSTALL YOKE BLOCK (1).

Position yoke block (1) on guide shaft (2) and install pin (3).

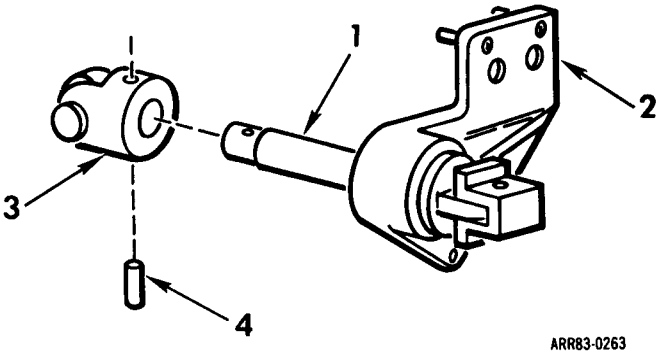


ARR83-0262

21. INSTALL GUIDE SHAFT (1).

a. Apply a light coating of grease on guide shaft (1) and install in guide bracket (2).

b. Position roller support (3) on guide shaft and install spring pin (4).



ARR83-0263

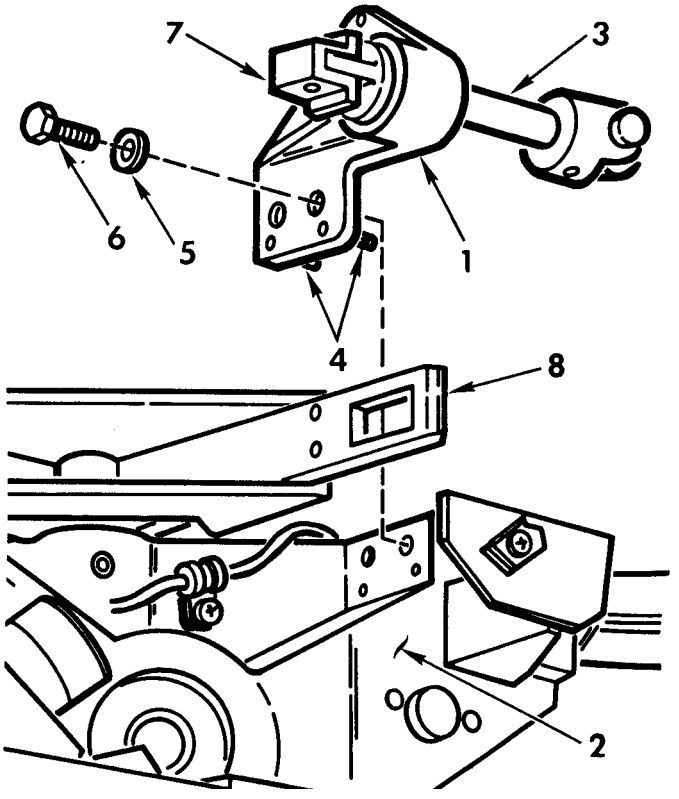
ASSEMBLY (cont)

22. INSTALL GUIDE BRACKET (1).

a. Position guide bracket (1) on turret (2) with roller end of guide shaft (3) fully extended and spring pins (4) alined with holes in turret.

b. Install two washers (5) and two bolts (6).

c. Seat yoke block (7) in cam link (8).



ARR83-0264

23. POSITION TURRET.

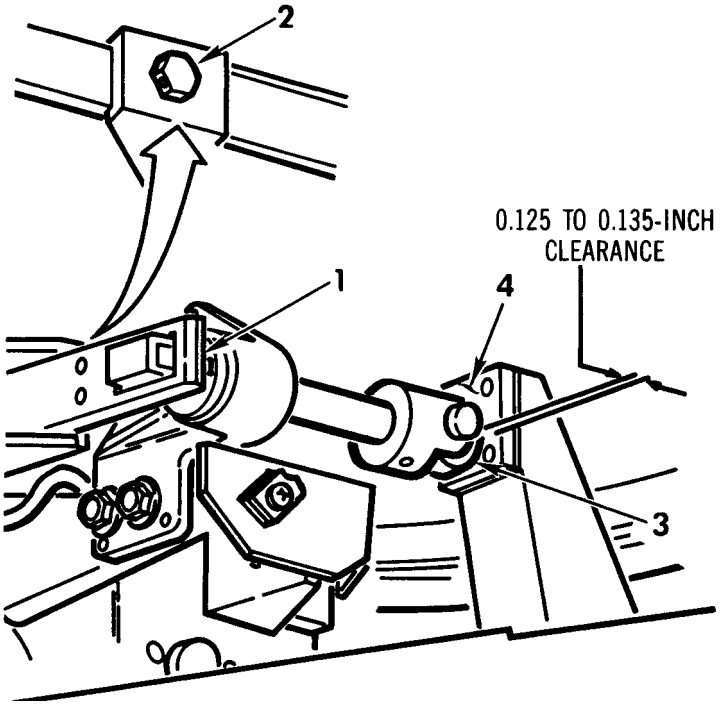
a. Unlock azimuth and elevation drive motor brakes.

b. Manually position turret to approximately 0 degrees azimuth; then, lock azimuth drive motor brake.

c. Manually raise saddle to maximum elevation, then lock elevation drive motor brake.

24. SET PRELOAD ON CAM LINK (1).

Tighten bolt (2), to obtain 0.125 to 0.135 inch clearance between roller (3) and wear plate (4). Roller must be held away from wear plate during measurement.



ARR83-0265

2-39. REPAIR OF CAM LINK AND ASSOCIATED PARTS (cont)

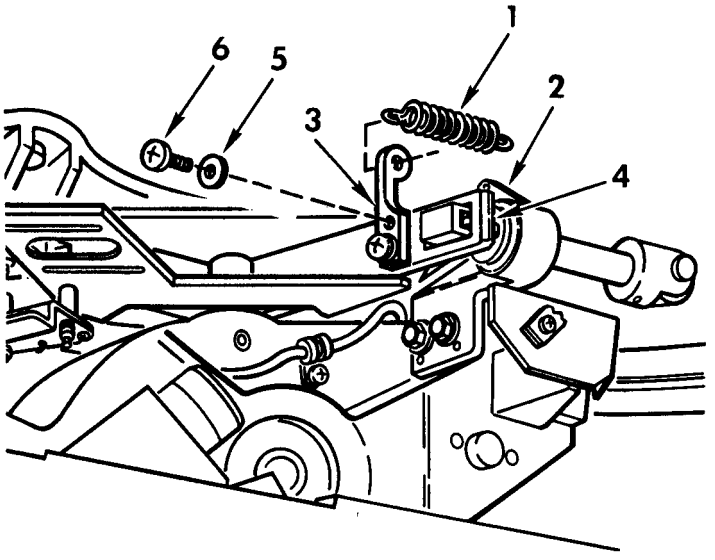
25. POSITION SADDLE.

Unlock elevation drive motor and manually position saddle to approximately 0 degrees elevation.

26. INSTALL SPRING (1),

a. Engage one end of spring (1) in guide bracket (2) then, engage other end of spring in bracket (3).

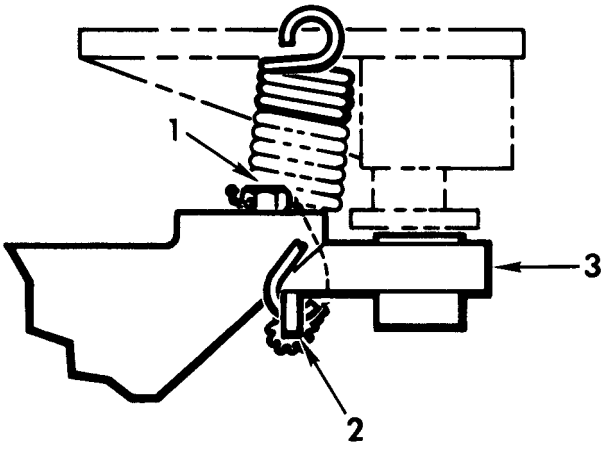
b. Position bracket (3) on cam link (4), Secure with two washers (5) and two screws (6).



ARR83-0266

27. LOCKWIRE BOLT (1) TO BRACKET (2).

Lockwire must be looped under cam link (3) and through bracket (2).



ARR83-0267

ASSEMBLY (cont)

28. INSTALL ELEVATION PROXIMITY SWITCH S2, SEE TM 9-1090-206-20-1 OR TM 9-1090-206-20-2.

29. CHECK MOTION OF CAM LINK AND ASSOCIATED PARTS.

    a. Unlock elevation and azimuth drive motors. Manually rotate turret and move saddle through all positions.

    b. Visually check that all parts have been properly installed and positioned, so that small cam roller contacts cam and adequate clearance exists between all moving parts.

    c. Check routing of all cables, orientation of all cable clamps, and position of all switches and actuators.

30. INSTALL M197 GUN, SEE TM 9-1090 -206-20-1 OR TM 9-1090-206-20-2.

If clearance between gun barrels and TSU is not as specified, damage to TSU may result.

31. CHECK CLEARANCE TO TSU, SEE ELEVATION MECHANICAL STOP ADJUSTMENT, PARA 2-76 OR 2-85.

END OF TASK

2-40. REPAIR OF GUIDE BRACKET BEARINGS

DESCRIPTION

This task covers: Removal and installation.

INITIAL SETUP

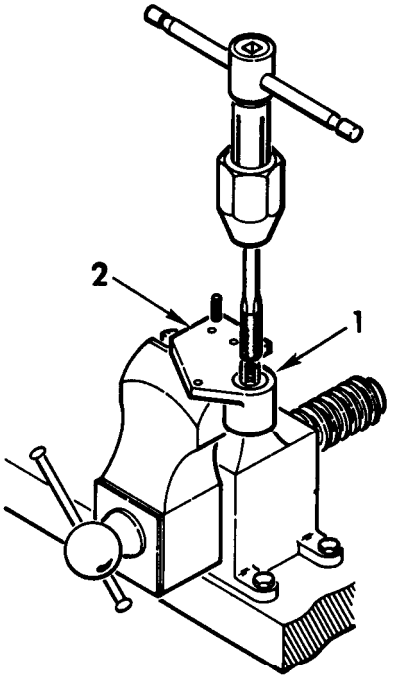
Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental
- Starting Thread Tap 9/16-18NF
- Bottoming Thread Tap 9/16-18NF
- Bearing Removal Tool
  - (Fig C-2, Appx C)
- Bearing Installation Tool
  - (Fig C-1, PN IMI 3005, Appx C)
- Materials:
  - Grease (Item 12, Appx B)
  - Tape (Item 30.1, Appx B)

Personnel Required:
- 68M Aircraft Weapon Systems
  - Repairer

Equipment Conditions:
- Guide bracket removed, see
  - REPAIR OF CAM LINK AND ASSOCIATED PARTS, para 2-39.

REMOVAL

1. CUT THREADS IN BEARING (1).
   a. Secure guide bracket (2) in a soft-jawed vise.
   b. Place a piece of tape 1/2-inch from beginning of threads on thread taps to mark depth.
   c. Using starting thread tap, carefully cut threads to 1/2-inch deep in bearing (1).
   d. Using bottoming thread tap, finish threads to 1/2-inch deep in bearing (1).



ARR83-0233

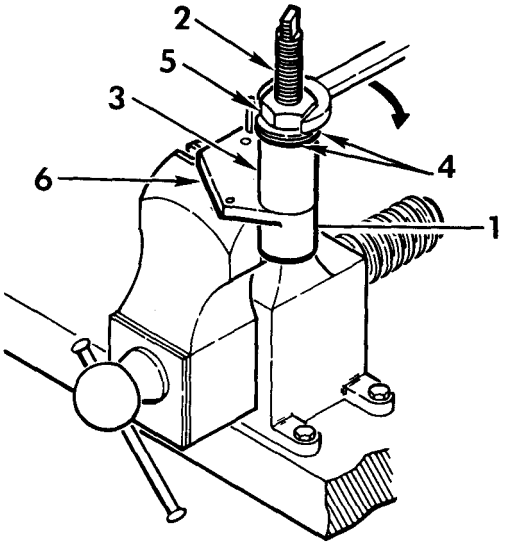
REMOVAL (cont)

2. REMOVE FORWARD BEARING (1).

a. Screw shaft (2) of bearing removal tool into forward bearing (1).

b. Install collar (3) (counterbored end first), two washers (4), and nut (5) of bearing removal tool onto shaft (2).

c. Using wrench, turn nut (5) clockwise until bearing (1) is extracted from guide bracket (6). Remove bearing from shaft (2) of bearing removal tool.



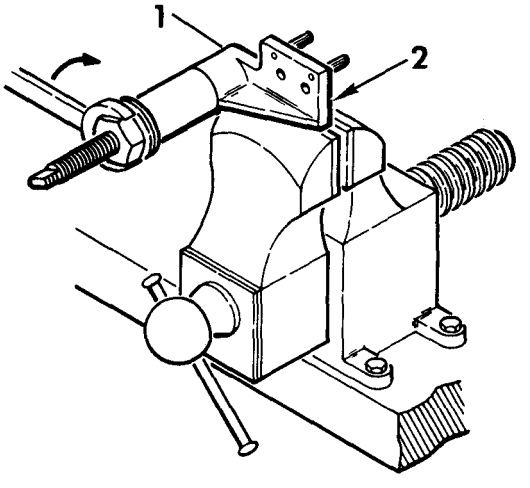
ARR83-0234

3. REMOVE AFT BEARING (1).

Repeat procedures in steps 1 and 2 for removal of aft bearing (1) from guide bracket (2).

WARNING

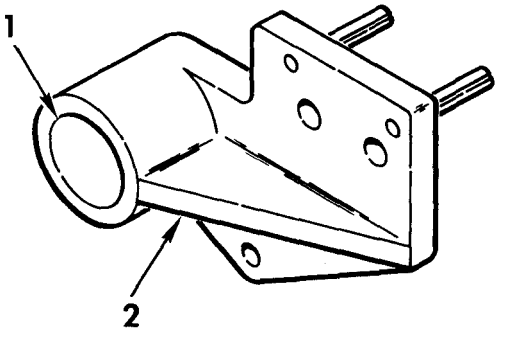
Safety glasses must be worn when usinq low-pressure compressed air or brush to remove metal chips or dirt to prevent possible eye damage.



ARR83-0235

4. REMOVE METAL CHIPS FROM BEARING BORE (1).

Using low-pressure compressed air, remove all metal chips, dirt, etc. from bearing bore (1) in guide bracket (2).



ARR83-0236

2-40. REPAIR OF GUIDE BRACKET BEARINGS (cont)

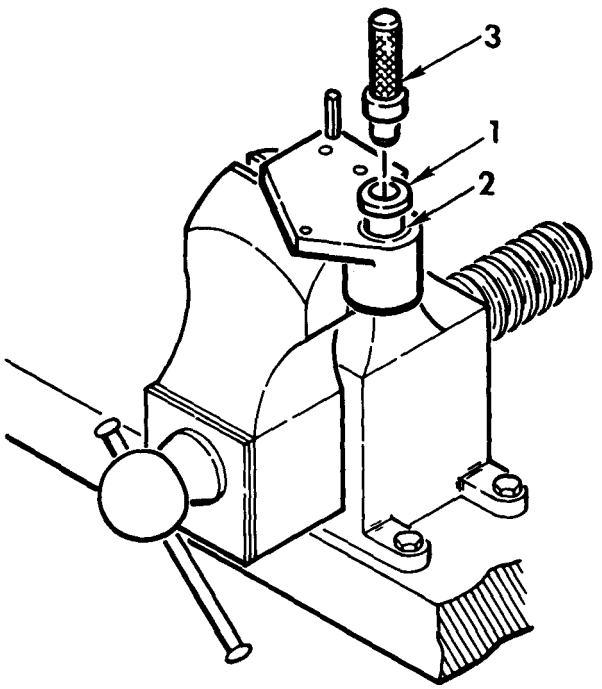
INSTALLATION

5. INSTALL FORWARD BEARING (1).

   a. Apply a light coating of grease to bore of guide bracket (2).

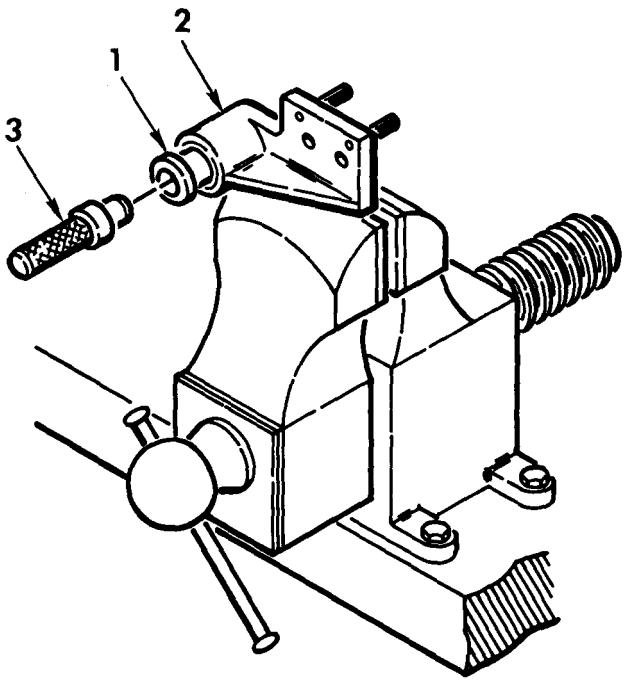
   b. Place bearing (1) (shoulder end first) onto bearing installation tool (3).

   c. Position bearing installation tool (3) and bearing (1) squarely in guide bracket (2), then seat bearing in guide bracket by gently tapping top of bearing installation tool with a softfaced hammer.



6. INSTALL AFT BEARING (1).

   Repeat procedures in step 5 for installation of aft bearing (1) in guide bracket (2) using bearing installation tool (3).



ARR83-0238

END OF TASK

2-41. REPAIR OF AZIMUTH RUBBER BUMPERS AND CABLE CLAMP BRACKET

DESCRIPTION

This task covers: Repair setup, removal, cleaning, inspection, and installation.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  Repairman: Basic
- Tool Set, A/C Armament
  Repairman: Supplemental
- Electronics Systems Test
  Set: M137

Personnel Required:
- 68M Aircraft Weapon Systems
  Repairer

References:
- TM 9-1090-206-20-1
- TM 9-1090-206-20-2
- TM 55-1520-236-23.

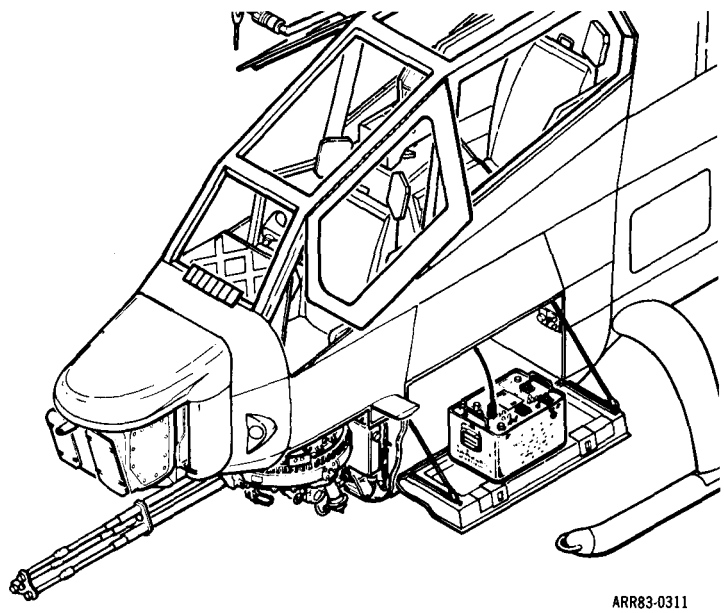
Equipment Conditions:
- HELICOPTER ARMAMENT SUBSYSTEM MAINTENANCE SETUP performed, TM 9-1090-206-20-1 or TM 9-1090-206-20-2.
- Turret fairing removed, see TM 55-1520-236-23
- Turret subsystem boresighted, see Chapter 4 or Chapter 5.

REPAIR SETUP

WARNING

Observe all safety precautions and regulations. Open turret drive motor and turret stow circuit breakers whenever marks or measurements are being made on turret.

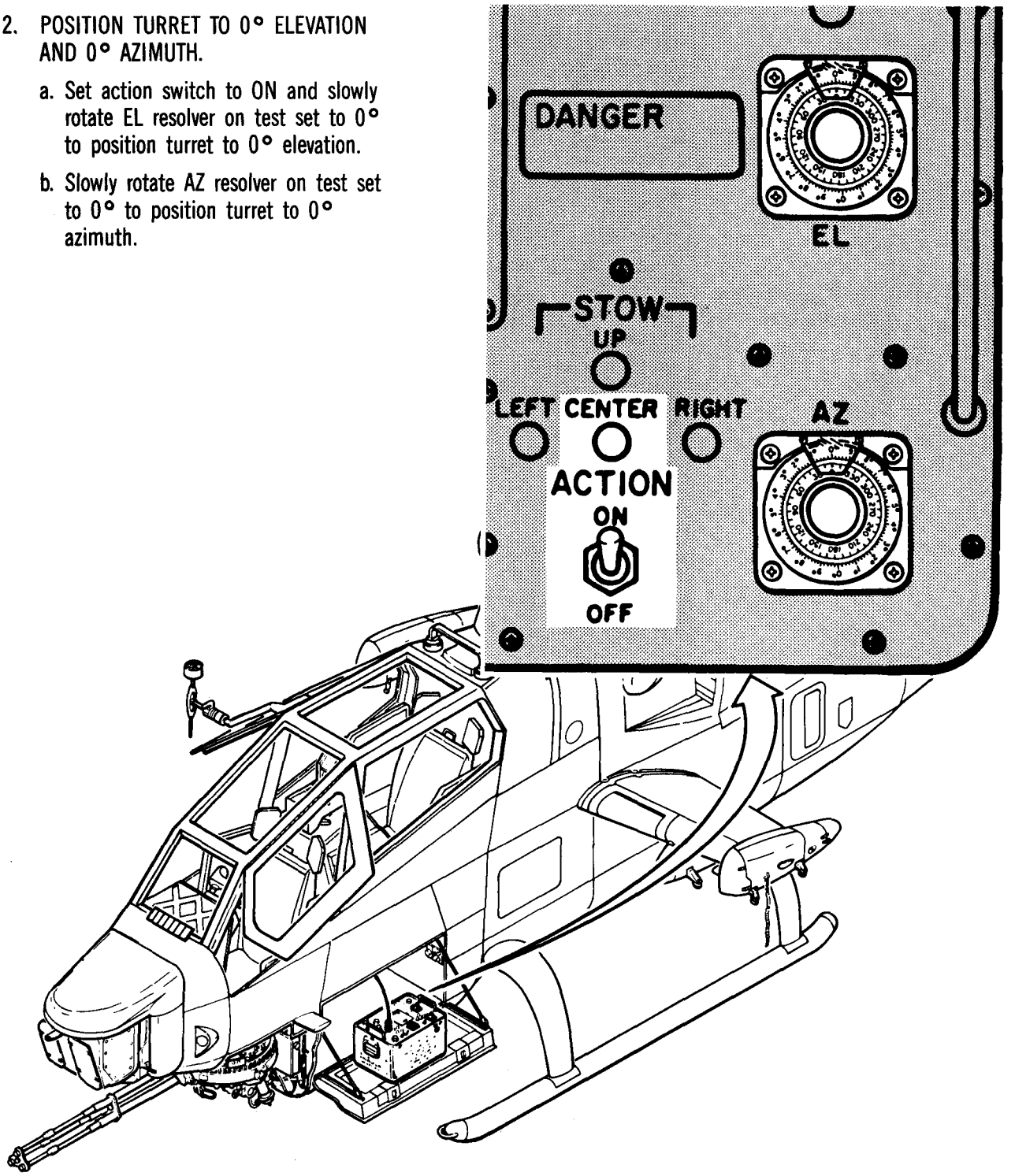
1. CONNECT TEST SET AND SETUP FOR SIGHT BYPASS PROCEDURE, SEE TM 9-1090 -206-20-1 OR TM 9-1090-206-20-2.



ARR83-0311

2-41. REPAIR OF AZIMUTH RUBBER BUMPERS AND CABLE CLAMP BRACKET (cont)

2. POSITION TURRET TO 0° ELEVATION AND 0° AZIMUTH.
   a. Set action switch to ON and slowly rotate EL resolver on test set to 0° to position turret to 0° elevation.
   b. Slowly rotate AZ resolver on test set to 0° to position turret to 0° azimuth.

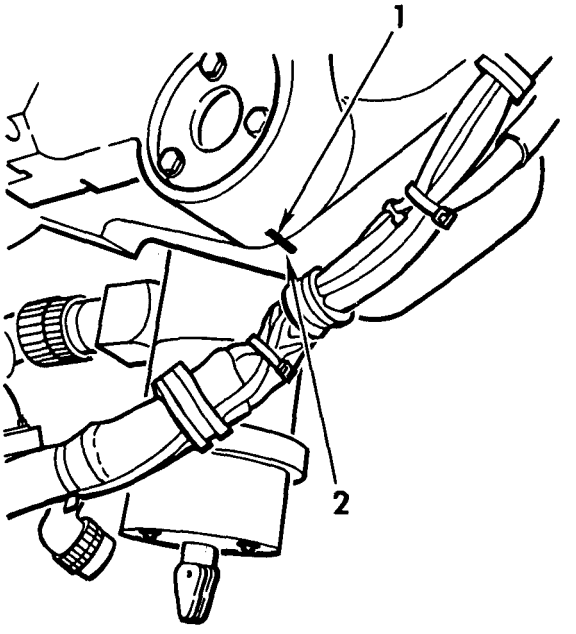


ARR83-0312

REPAIR SETUP (cont)

3. MARK SADDLE BEARING SUPPORT (1) AT 0° ELEVATION.

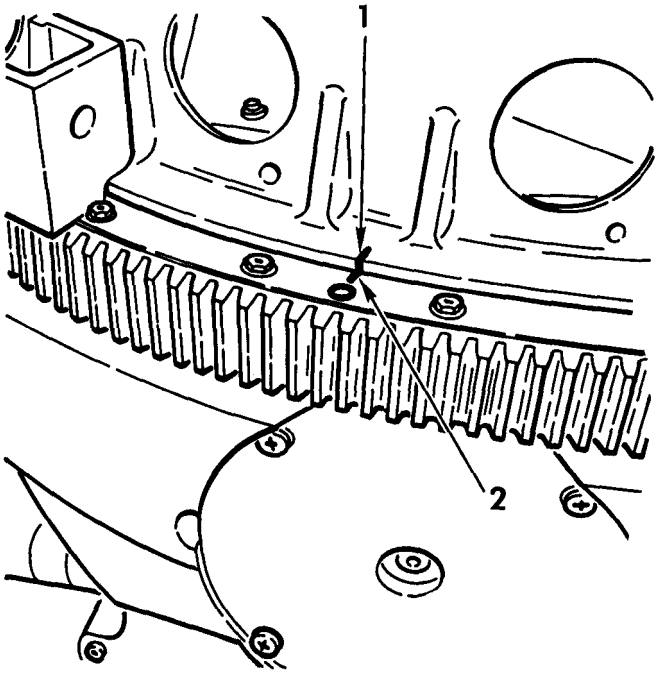
   Make a witness mark on saddle bearing support (1) and a corresponding mark on lower support (2) to show when turret is positioned to 0° elevation.



ARR83-0313

4. MARK LEFT SIDE OF UPPER SUPPORT (1) AND LOWER SUPPORT (2) AT 0° AZIMUTH POSITION.

   Make a reference mark on left side of upper support (1) and a corresponding mark on lower support (2) to show when turret is positioned to 0° azimuth.

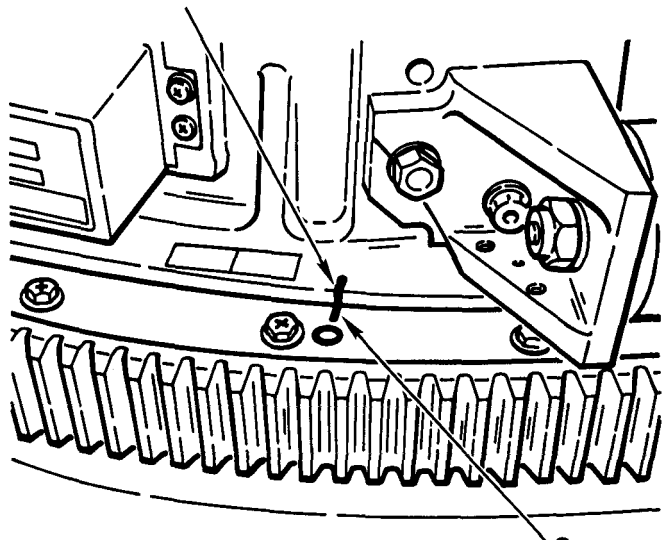


ARR83-0314

2-41. REPAIR OF AZIMUTH RUBBER BUMPERS AND CABLE CLAMP BRACKET (cont)

5. MARK RIGHT SIDE OF UPPER SUPPORT(1) AND LOWER SUPPORT (2) at 0° AZIMUTH POSITION.

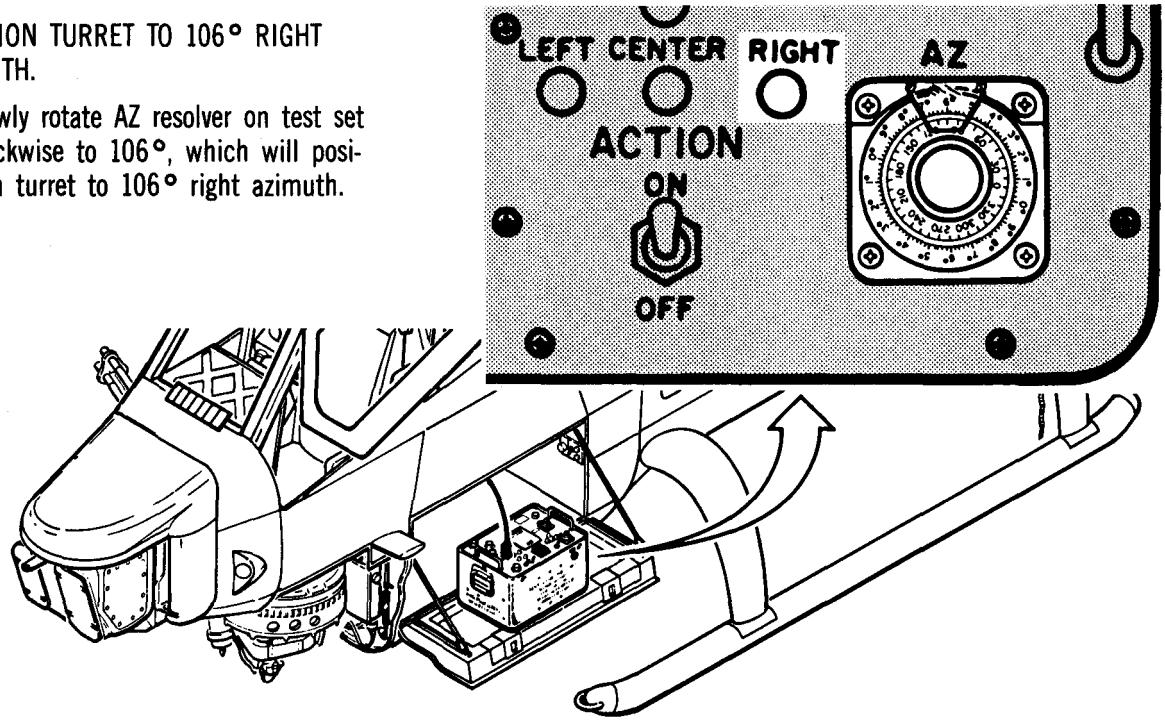
Make a reference mark on right side of upper support (1) and a corresponding mark on lower support (2) to show when turret is positioned to 0° azimuth.



ARR83-0315

6. POSITION TURRET TO 106° RIGHT AZIMUTH.

Slowly rotate AZ resolver on test set clockwise to 106°, which will position turret to 106° right azimuth.

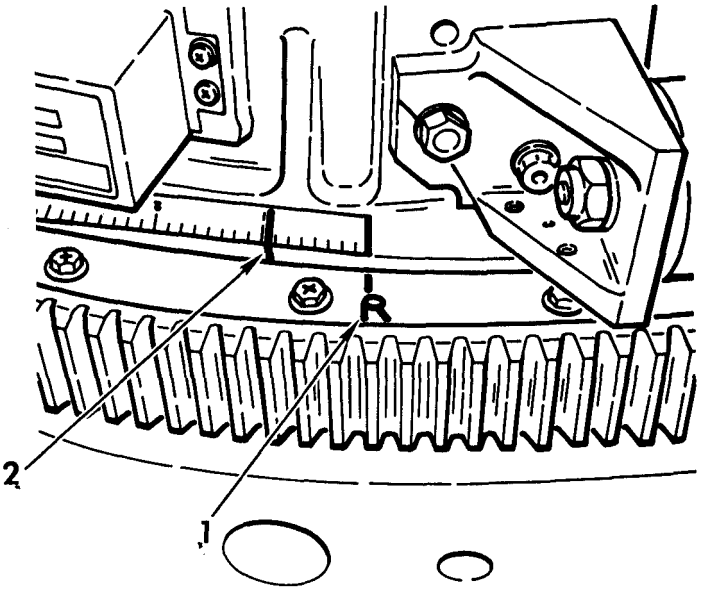


ARR83-0316

REPAIR SETUP (cont)

7. MARK RIGHT AZIMUTH SHIM POSITION (1).

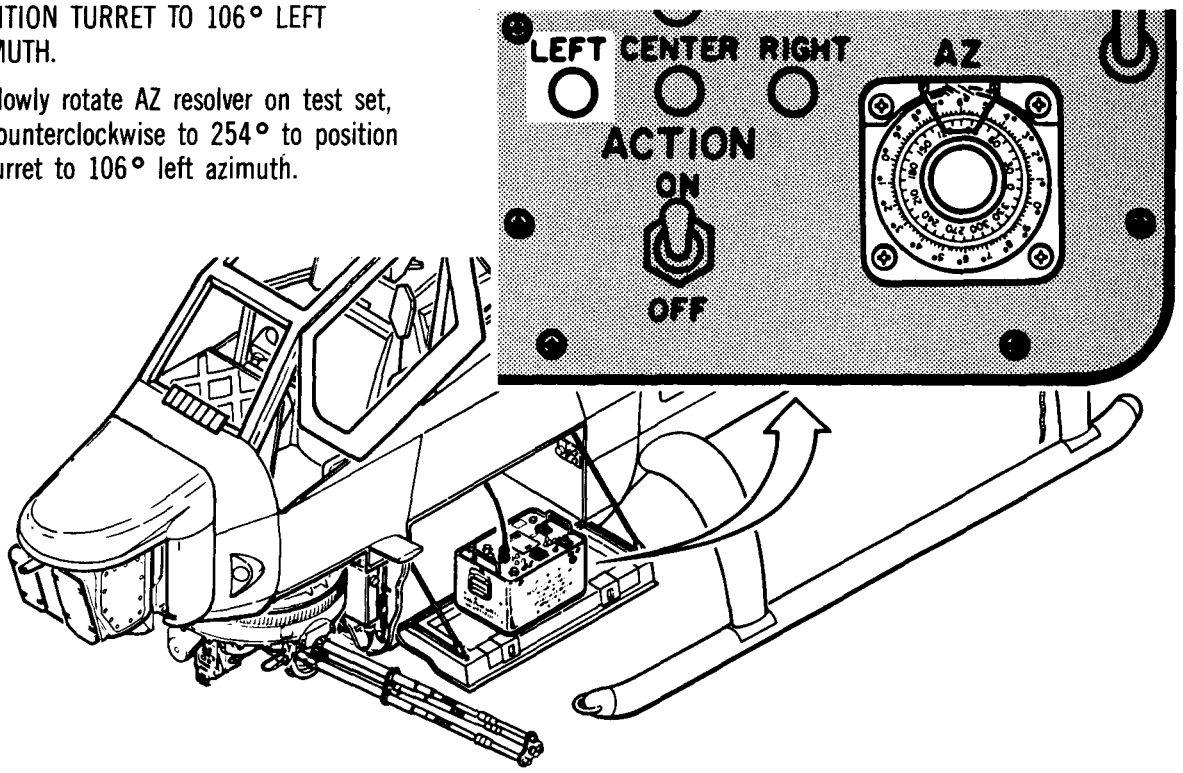
Make a mark for right azimuth shim position (1), 15/16-inch to right of reference mark (2) on right side of upper support.



ARR83-0317

8. POSITION TURRET TO 106° LEFT AZIMUTH.

Slowly rotate AZ resolver on test set, counterclockwise to 254° to position turret to 106° left azimuth.

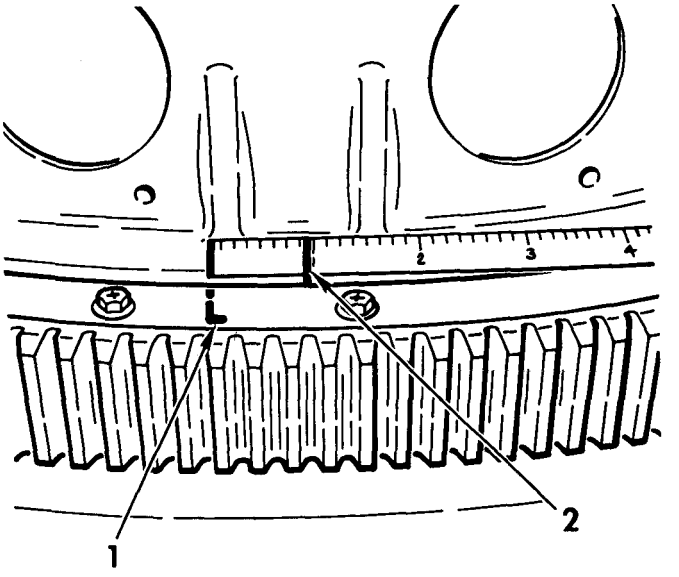


ARR83-0318

2-41. REPAIR OF AZIMUTH RUBBER BUMPERS AND CABLE CLAMP BRACKET (cont)

9. MARK LEFT AZIMUTH SHIM POSITION (1).

Make a mark for left azimuth shim position (1), 15/16-inch to left of reference mark (2) on left side of upper support.

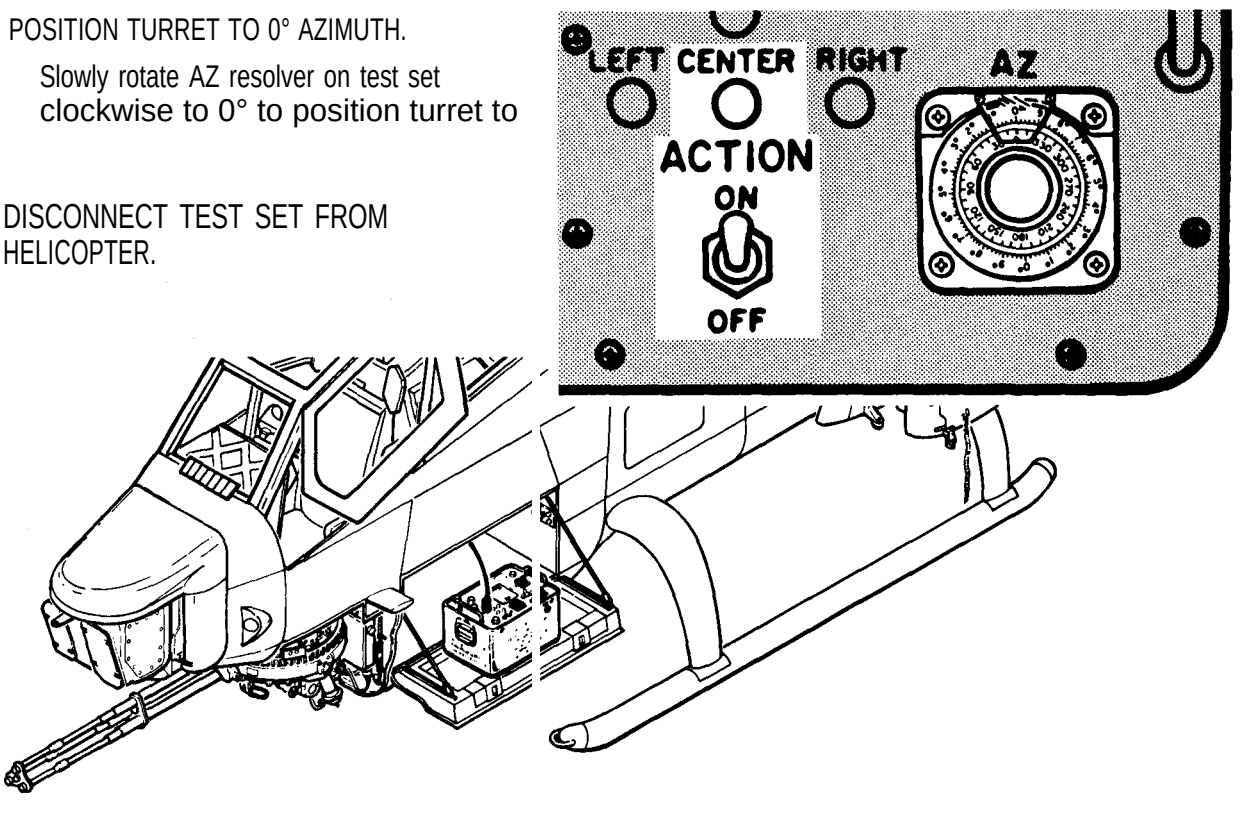


ARR83-0319

10. POSITION TURRET TO 0° AZIMUTH.

Slowly rotate AZ resolver on test set clockwise to 0° to position turret to

11. DISCONNECT TEST SET FROM HELICOPTER.



ARR83-0320

REMOVAL

NOTE

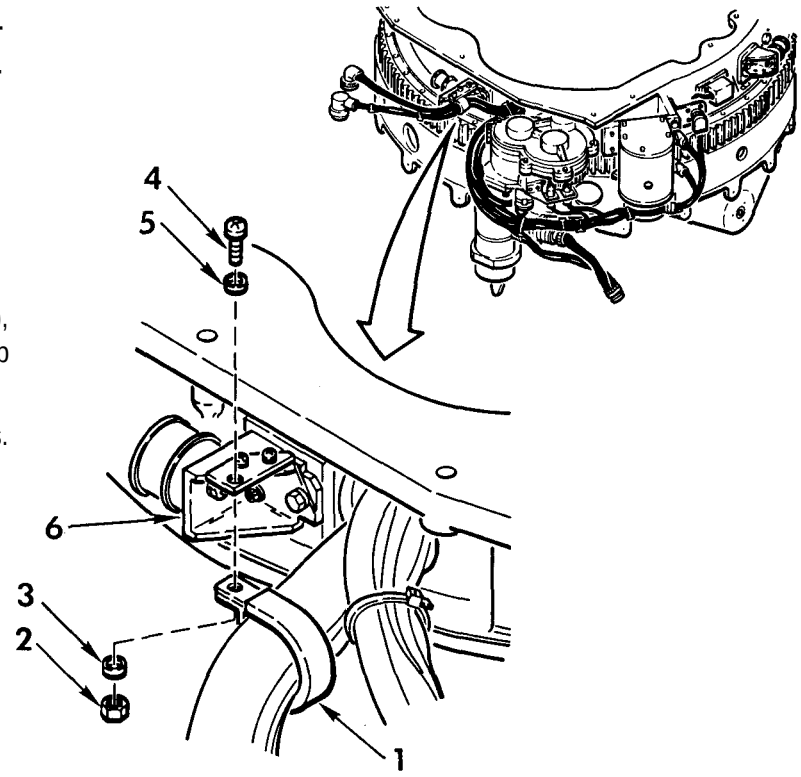
If only right azimuth rubber bumper is to be replaced, proceed to step 16.

12. REMOVE TURRET FROM HELICOPTER, SEE REMOVAl. OF TURRET, PARA 2-45.

13. REMOVE CLAMP (1).

a. Remove nut (2), washer (3), screw (4), washer (5), and clamp (1) from clamp bracket (6).

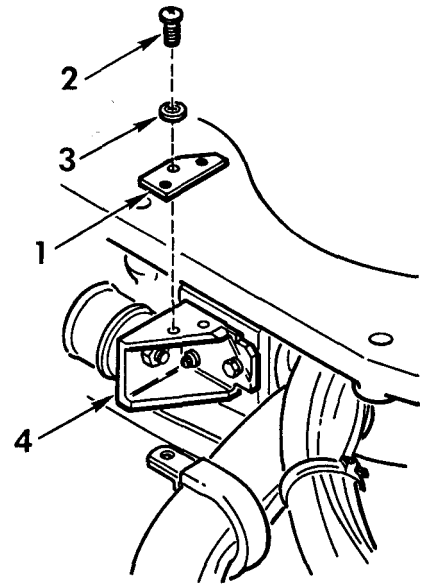
b. Separate clamp (1) from turret cables.



ARR83-0321

14. REMOVE CLAMP BRACKET (1).

Remove two screws (2), two washers (3), and clamp bracket (1) from stop bracket (4).

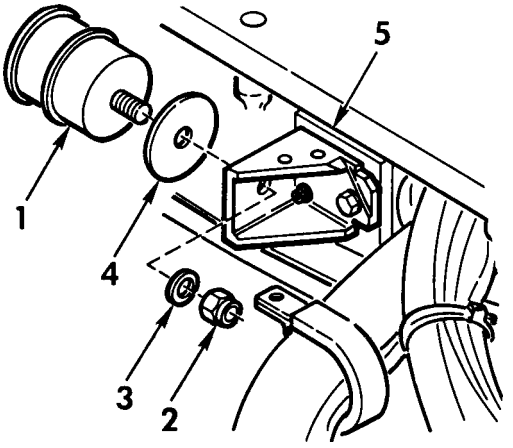


ARR83-0322

2-41. REPAIR OF AZIMUTH RUBBER BUMPERS AND CABLE CLAMP BRACKET (cont)

15. REMOVE LEFT AZIMUTH RUBBER BUMPER (1).

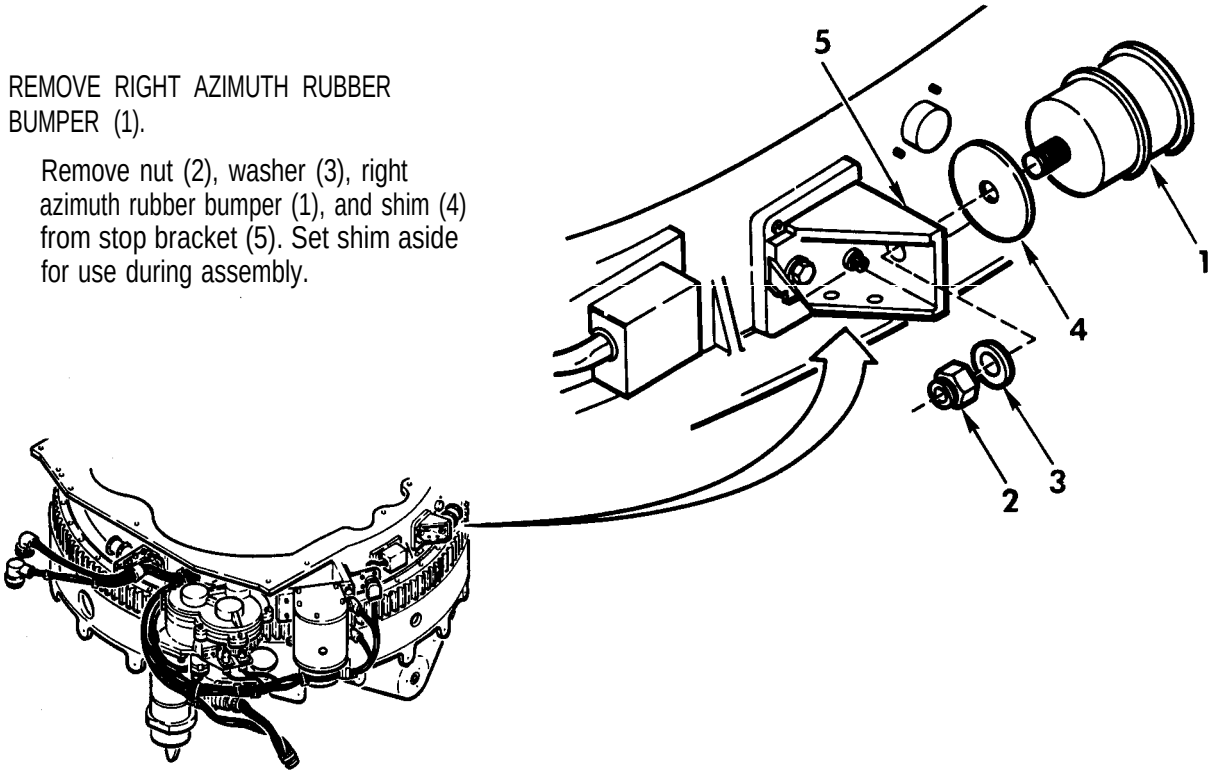
    Remove nut (2), washer (3), left azimuth rubber bumper (l), and shim (4) from stop bracket (5). Set shim aside for use during assembly.



ARR83-0323

16. REMOVE RIGHT AZIMUTH RUBBER BUMPER (1).

    Remove nut (2), washer (3), right azimuth rubber bumper (1), and shim (4) from stop bracket (5). Set shim aside for use during assembly.



ARR83-0324

CLEANING

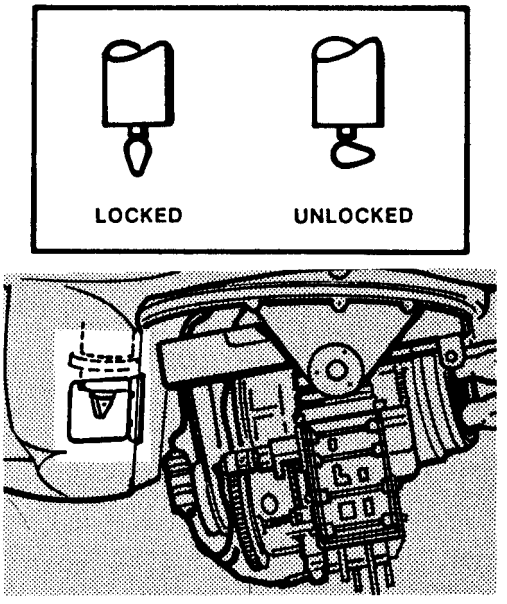
17. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV.

INSPECTION

18. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV.

INSTALLATION

19. UNLOCK AZIMUTH DRIVE MOTOR BRAKE.



AZIMUTH DRIVE MOTOR BRAKE HANDLE

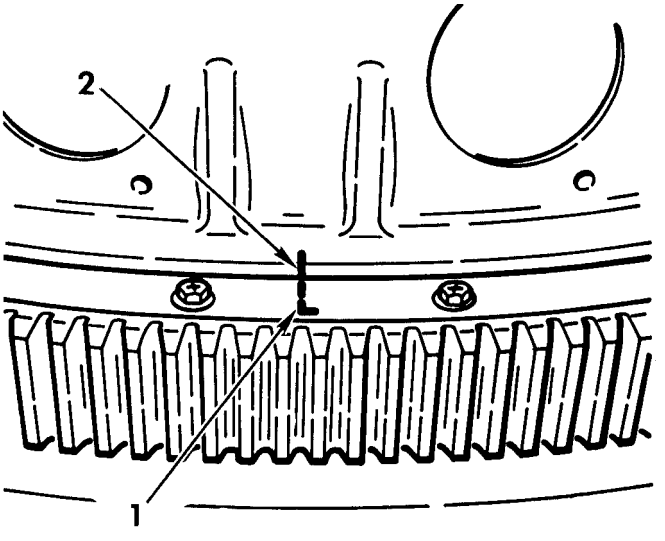
ARR83-0325

NOTE

If only right azimuth rubber bumper was removed, proceed to step 26.

20. MOVE TURRET TO LEFT AZIMUTH SHIM POSITION MARK (1).

Manually move turret counterclockwise so that left azimuth shim position mark (1) is alined with reference mark (2) on left side of upper support.



ARR83-0326

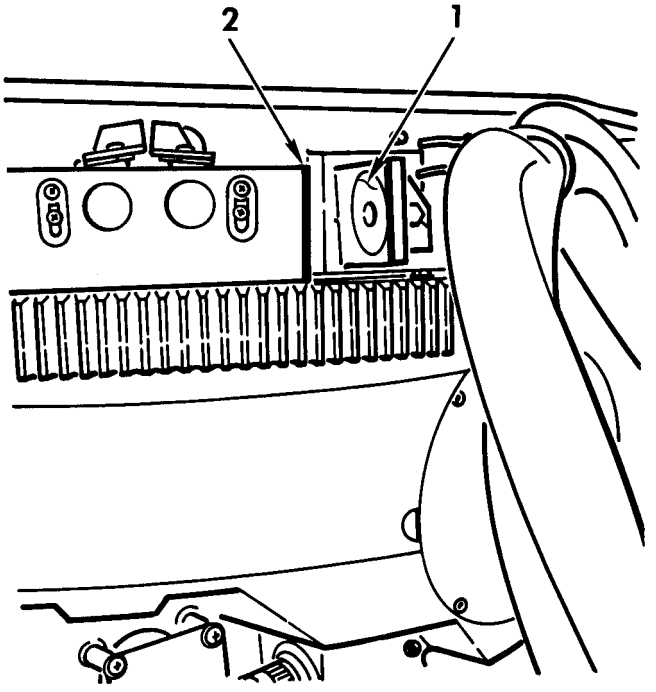
2-41. REPAIR OF AZIMUTH RUBBER BUMPERS AND CABLE CLAMP BRACKET (cont)

21. MEASURE CLEARANCE TO LEFT AZIMU STOP BRACKET (1).

    Using a vernier caliper, measure clearance between face of left azimuth stop bracket (1) and face of stop mount (2).

22. DETERMINE SHIM THICKNESS.

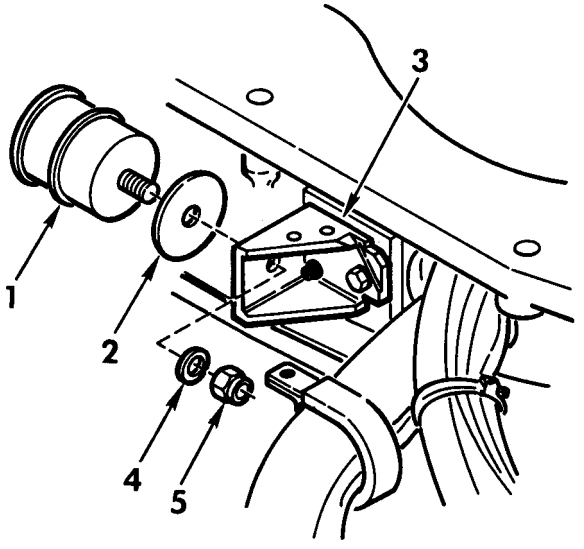
    Measure length of left azimuth rubber bumper, and subtract this dimension from clearance dimension obtained in step 21, Remainder is thickness of shim required. Assemble a shim to this thickness.



ARR83-0327

23. INSTALL LEFT AZIMUTH RUBBER BUMPER (1).

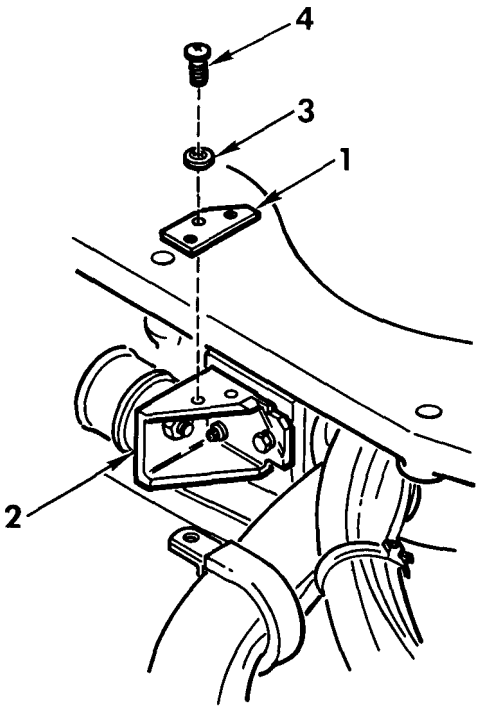
    Install shim (2) and left azimuth rubber bumper (1) onto stop bracket (3) and secure with washer (4) and nut (5).



INSTALLATION (cont)

24. INSTALL CLAMP BRACKET (1).

Position clamp bracket (1) on stop bracket (2) and secure with two washers (3) and two screws (4).

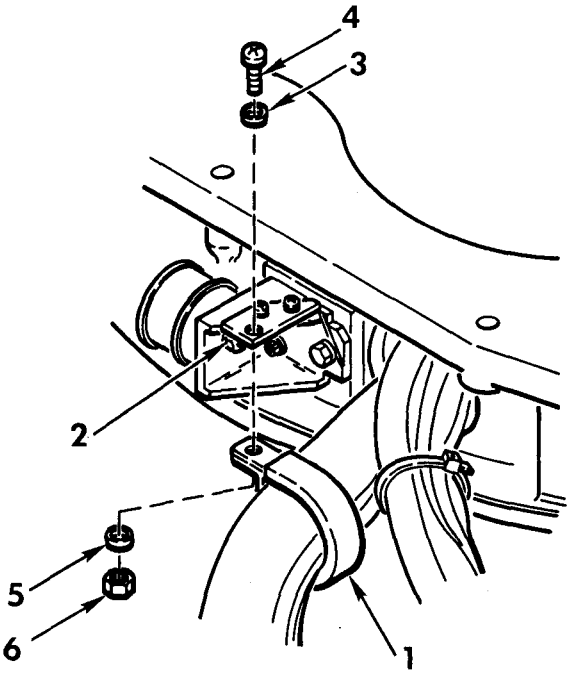


ARR83-0329

25. INSTALL Cl-AMP (1).

a. Install clamp (1) on turret cables.

b. Position cables with clamp (1) on clamp bracket (2) and secure with washer (3), screw (4), washer (5), and nut (6).

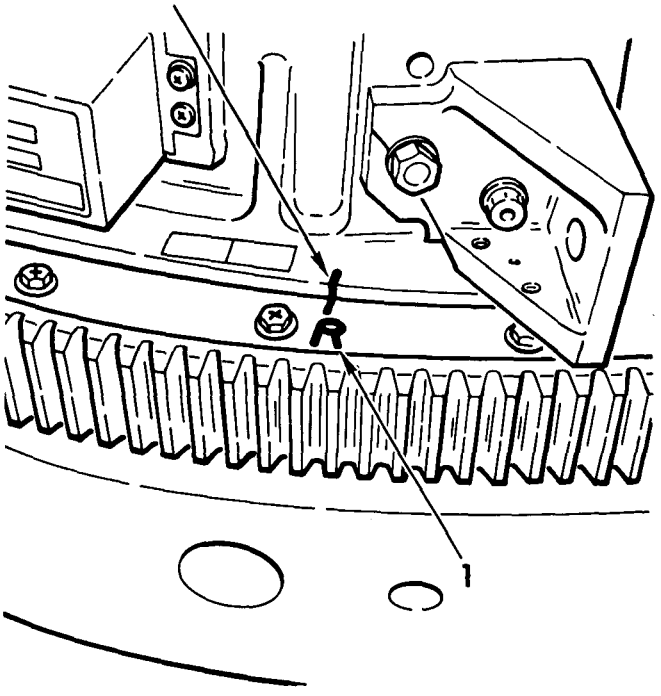


ARR83-0330

2-41. REPAIR OF AZIMUTH RUBBER BUMPERS AND CABLE CLAMP BRACKET (cont)

26. MOVE TURRET TO RIGHT AZIMUTH SHIM POSITION MARK (1).

    Manually move turret clockwise so that right azimuth shim position mark (1) is alined with reference mark (2) on right side of upper support.



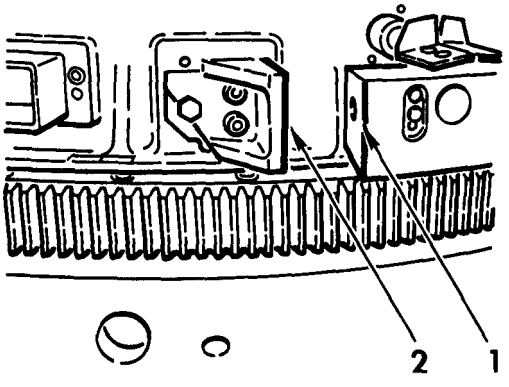
ARR83-0331

27. MEASURE CLEARANCE TO RIGHT AZIMUTH STOP BRACKET (1).

    Using a vernier caliper, measure clearance between face of right azimuth stop bracket (1) and face of stop mount (2).

28. DETERMINE SHIM THICKNESS.

    Measure length of right azimuth rubber bumper and subtract this dimension from clearance dimension obtained in step 27. Remainder is thickness of shim required. Assemble a shim to this thickness.

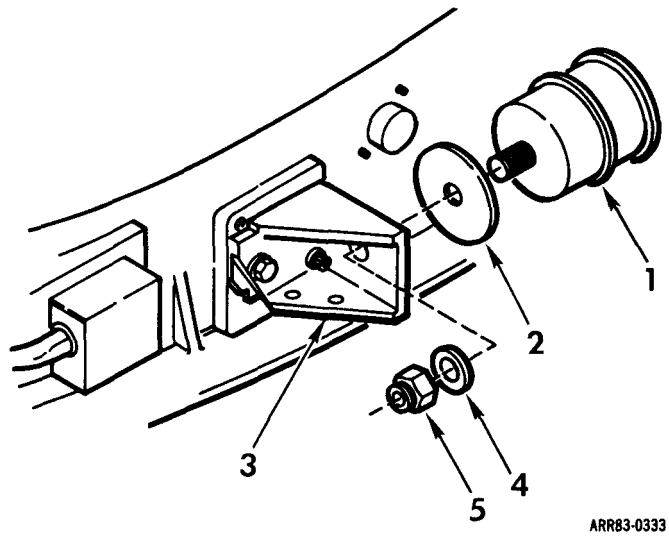


ARR83-0332

INSTALLATION (cont)

29. INSTALL RIGHT AZIMUTH RUBBER BUMPER (1).

Install shim (2) and right azimuth rubber bumper (1) onto stop bracket (3) and secure with washer (4) and nut (5).

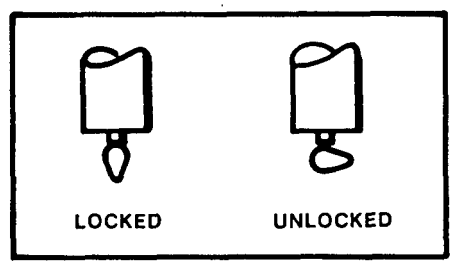


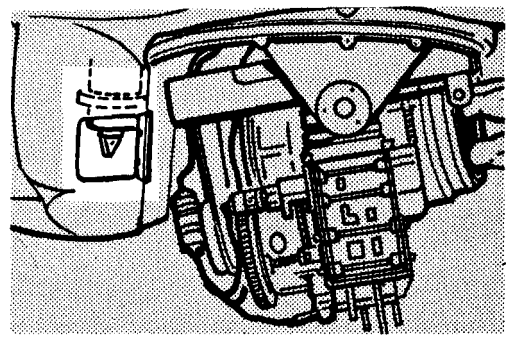
30. LOCK AZIMUTH DRIVE MOTOR BRAKE.

NOTE

If only right azimuth rubber bumper was removed, omit step 31.

31. INSTALL TURRET ON HELICOPTER, SEE INSTALLATION OF TURRET, PARA 2-48.





AZIMUTH DRIVE MOTOR BRAKE HANDLE

ARR83-0334

END OF TASK

2-42. REPAIR OF TURRET MECHANICAL COMPONENTS

DESCRIPTION

This task covers: Removal, cleaning, inspection, and installation.

INITIAL SETUP

Tools/Test and Support Equipment:
Tool Set, A/C Armament
Repairman: Basic
Tool Set, A/C Armament
Repairman: Supplemental

Materials:
Lockwire (Item 18, Appx B)

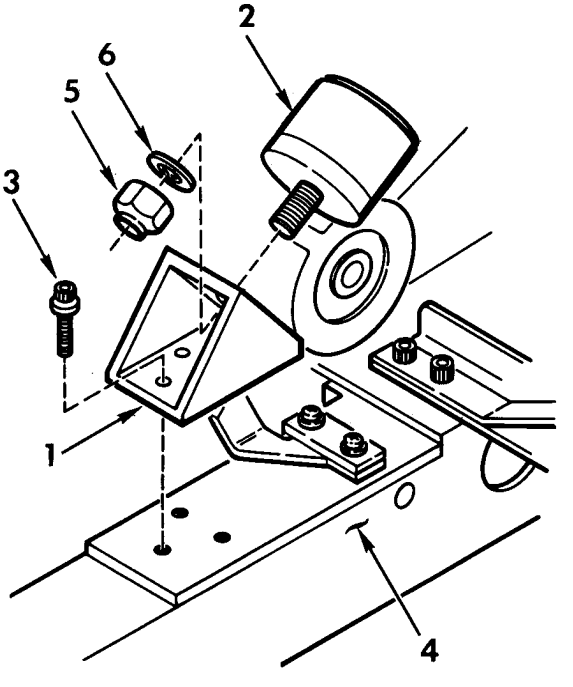
Personnel Required:
68M Aircraft Weapon Systems
Repairer

References:
TM 9-1090-206-20-1
TM 9-1090-206-20-2

Equipment Conditions:
HELICOPTER ARMAMENT SUBSYSTEM MAINTENANCE SETUP performed,
TM 9-1090-206-20-1 or
TM 9-1090-206-20-2.
REMOVAL OF M197 GUN performed,
TM 9-1090-206-20-1 or
TM 9-1090-206-20-2.

REMOVAL

1. REMOVE ELEVATION STOP MOUNT (1) AND ELEVATION STOP (2).
   a. Remove three screws (3) and elevation stop mount (1) from saddle (4).
   b. Remove nut (5), washer (6), and elevation stop (2) from elevation stop mount (1).

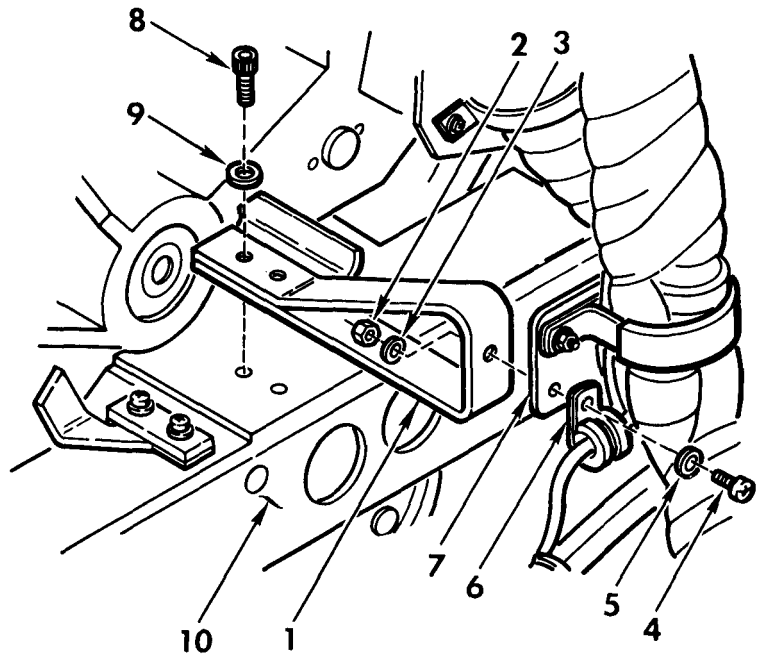


REMOVAL (cont)

2. REMOVE BRACKET (1),

   a. Remove nut (2), washer (3), screw (4), washer (5), loop clamp (6), and clamp assembly (7) from bracket (1).

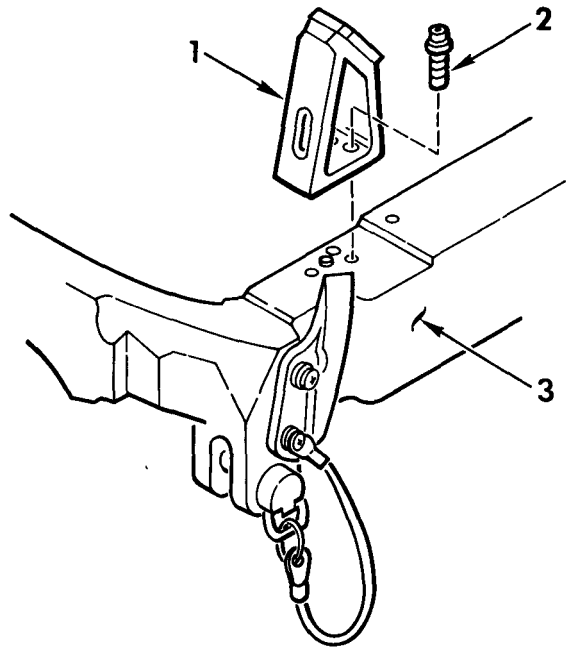
   b. Remove two screws(8), two washers (9), and bracket (1) from saddle (10).



ARR83-0345

3. REMOVE ACTUATOR CAM (1).

   Remove three screws (2) and actuator cam (1) from saddle (3).



ARR83-0346

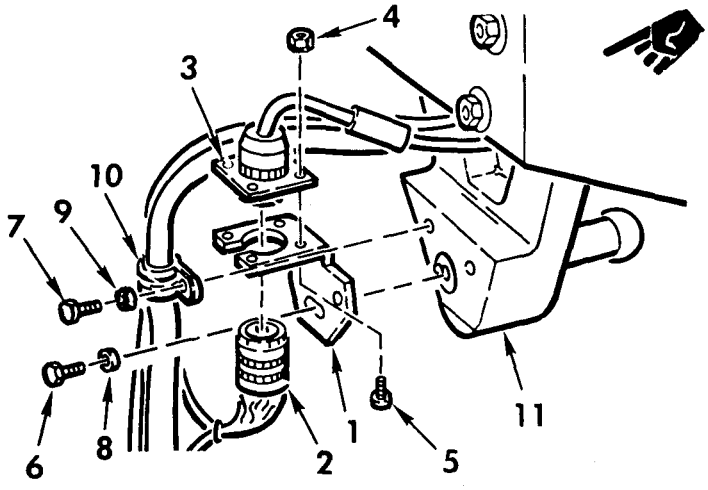
2-42. REPAIR OF TURRET MECHANICAL COMPONENTS (cont)

4. REMOVE BRACKET (1).

a. Disconnect connector W2P1 (2) from connector W3J1 (3).

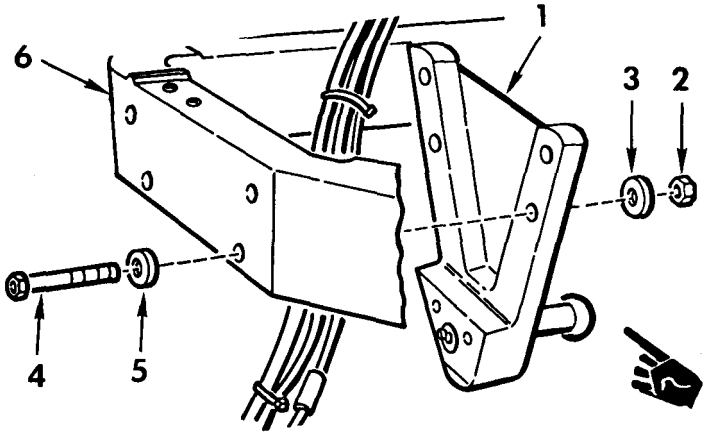
b. Remove four nuts (4), four screws (5), and connector W3J1 (3) from bracket (1).

c. Remove lockwire from bolt (6) and two bolts (7). Remove bolt (6), washer (8), two bolts (7), two washers (9), loop clamp (10), and bracket (1) from rear support (11).



5. REMOVE REAR SUPPORT (1).

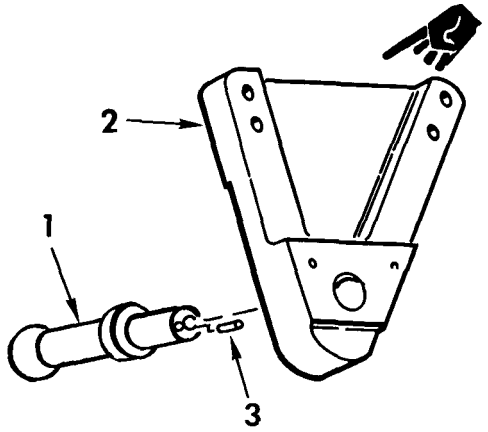
Remove four nuts (2), four washers (3), four washers (4), four bolts (5), and rear support (1) from saddle (6).



6. REMOVE BALL MOUNT (1).

a. Remove ball mount (1) from rear support (2).

b. Remove spring pin (3) from ball mount (1).



CLEANING

7. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV.

INSPECTION

8. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV.

9. INSPECT PARTS IN ACCORDANCE WITH TABULATED DATA.

Component	Possible Defect	Remedy
Actuator Cam	Cracked or broken	Return turret to next higher maintenance for repair.
Ball Mount	Worn, cracked, or broken	Replace.
Brackets	Bent, cracked, or broken	Straighten or replace.
Elevation Stop	Cracked or deteriorated	Replace.
Elevation Stop Mount	Cracked or broken	Replace.
Rear Support	Cracked or broken	Replace.

INSTALLATION

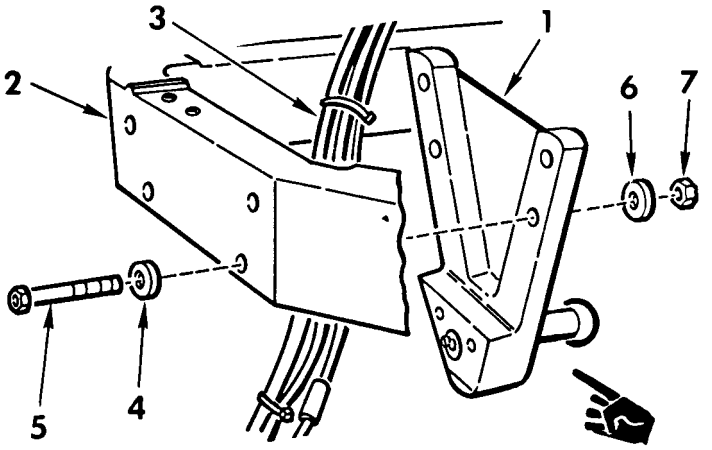
10. DELETED.

2-42. REPAIR OF TURRET MECHANICAL COMPONENTS (cont)

11. INSTALL SUPPORT (1).

a. Position rear support (1) on turret (2). Make sure cables (3) are routed between rear support and turret.

b. Secure rear support (1) with four washers (4), four bolts (5), four washers (6), and four nuts (7). Torque nuts to 135-145 lb-in. (15.3 – 16.4 N.m).

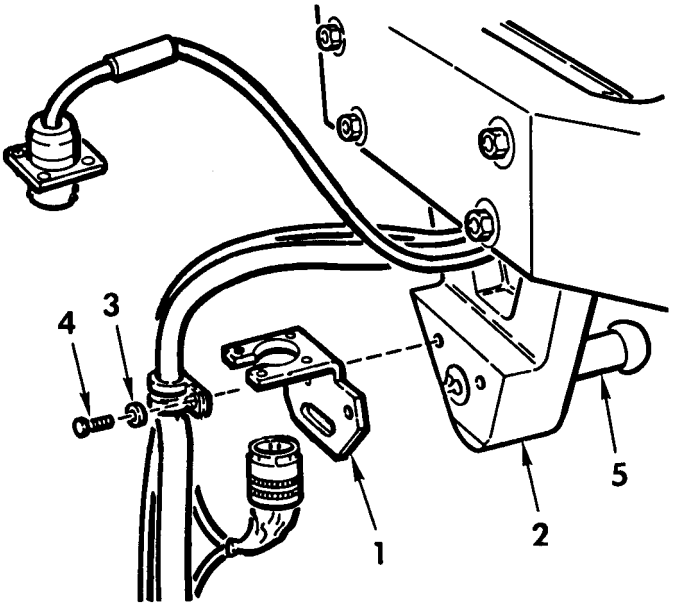


12. INSTALL BRACKET (1).

WARNING

Failure to perform the following procedure exactly as specified could result in ball mount coming loose which would cause the gun to become unstable about its horizontal axis.

a. Install bracket (1) to rear support (2) and secure with two washers (3) and two bolts (4). Do not tighten bolt which will hold loop clamp.



NOTE

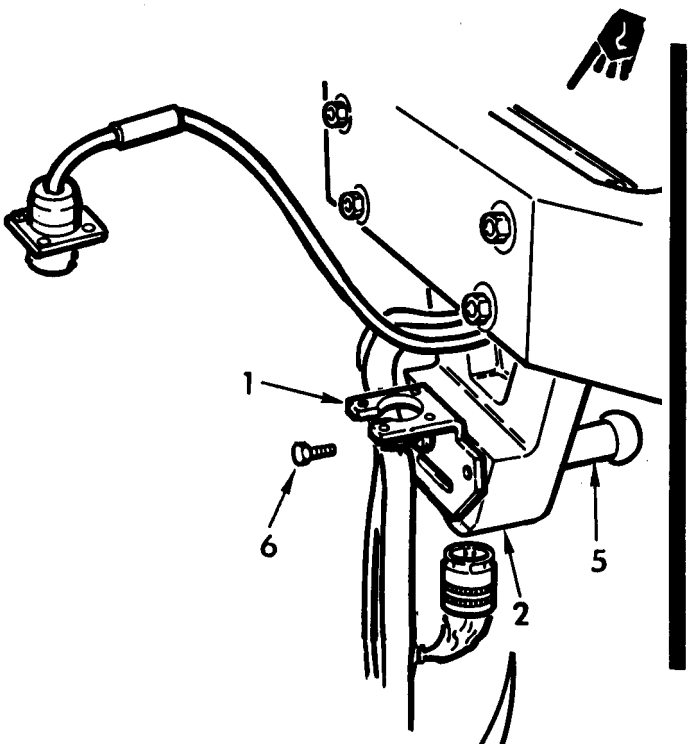
Pin must be removed from ball mount (5) before performing the following procedure.

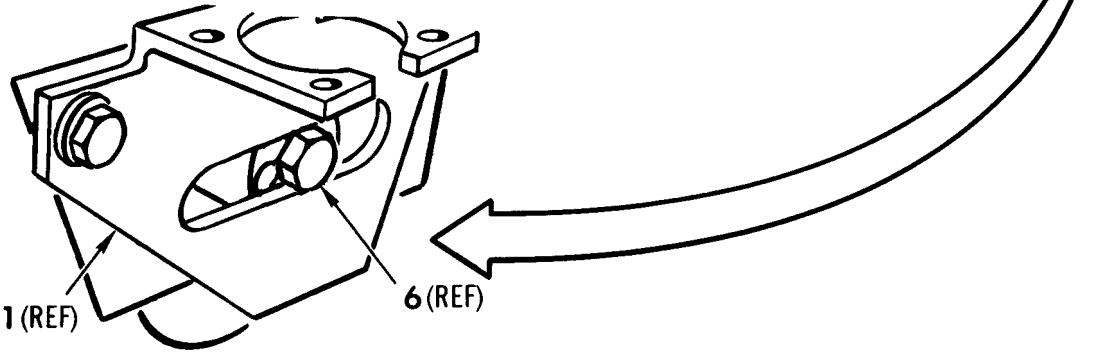
INSTALLATION (cont)

b. Install ball mount (5) into rear support (2) so the center hole and the pin hole are alined with the slot in bracket (1). Temporarily retain ball mount (5) with bolt (6) without a washer, Tighten bolt only fingertight.

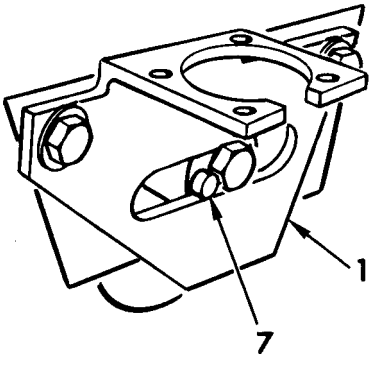
NOTE

Bolt (6) should be installed so that a flat on the head of the bolt is adjacent to the pin hole in the ball mount and not obstructing access to the pin hole.





c. Install pin (7) so it projects through bracket (1) and it is just flush with the outer surface of the bracket.



2-42. REPAIR OF TURRET MECHANICAL COMPONENTS (cont)

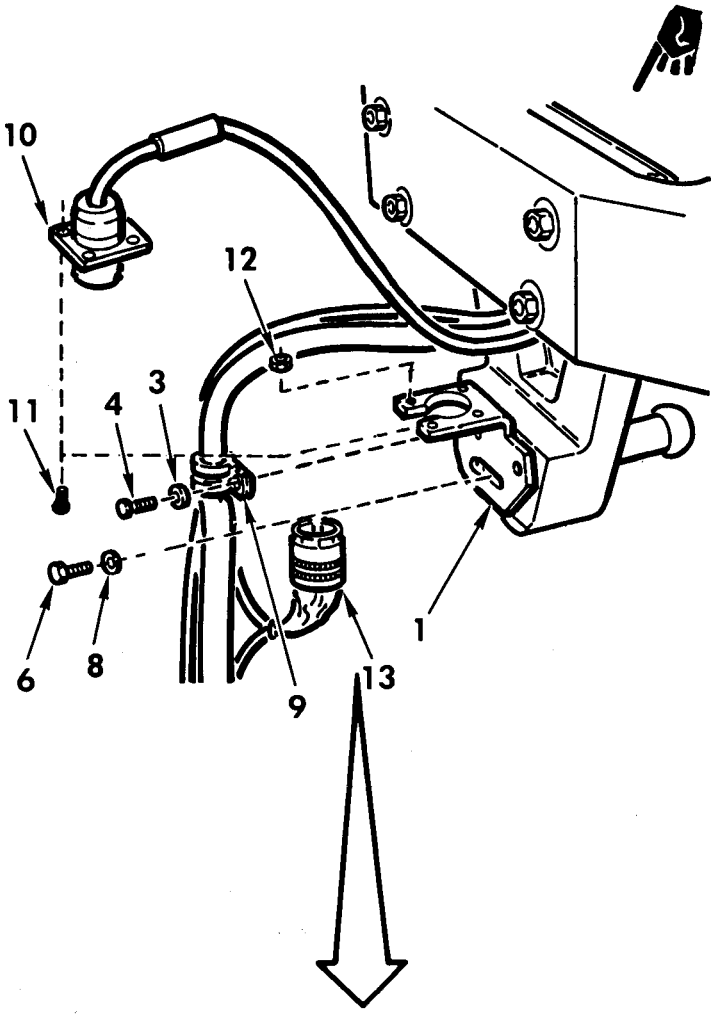
d. Remove bolt (6) and reinstall with washer (8). Torque bolt (6) to 130-140 lb-in. (14,6-15.7 N.m).

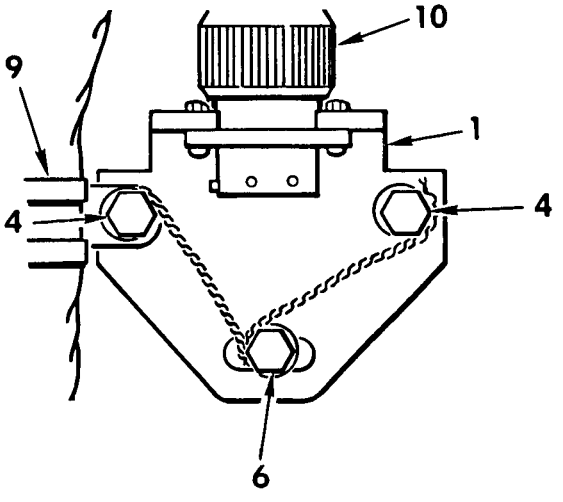
e. Remove bolt (4) and washer (3) from left-hand mounting hole of bracket (l). Position loop clamp (9) on left-hand mounting hole of bracket (l). Secure with washer (3) and bolt (4).

f. Safety wire two bolts (4) and bolt (6), as shown, to prevent movement.

g. Place connector W3J1 (10) on bracket (1), and install four screws (11) and four nuts (12).

h. Connect connector W2P1 (13) to connector W3J 1 (10).

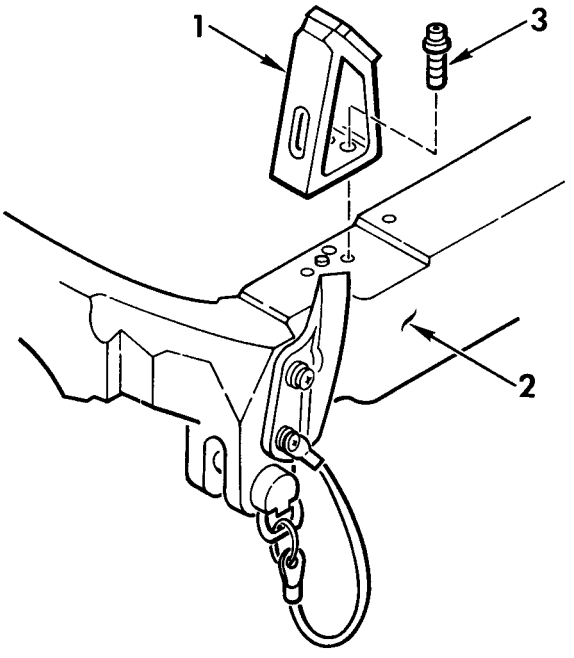




INSTALLATION (cont)

13. INSTALL ACTUATOR CAM (1).

Position actuator cam (1) on saddle (2), and install three screws (3).

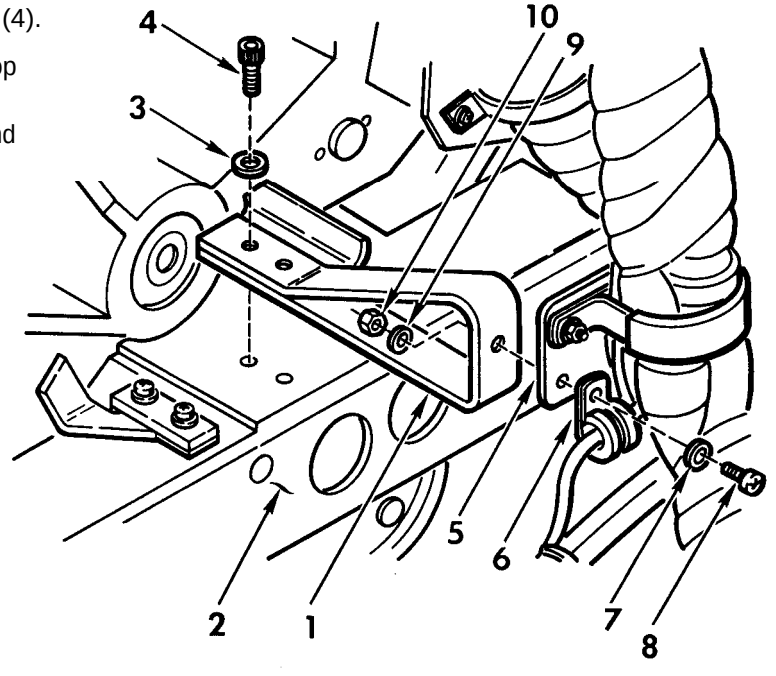


ARR83-0357

14. INSTALL BRACKET (1).

a. Place bracket (1) on saddle (2) and install two washers (3) and two screws (4).

b. Position clamp assembly (5) and loop clamp (6) on bracket (1) and install washer (7), screw (8), washer (9), and nut (10).



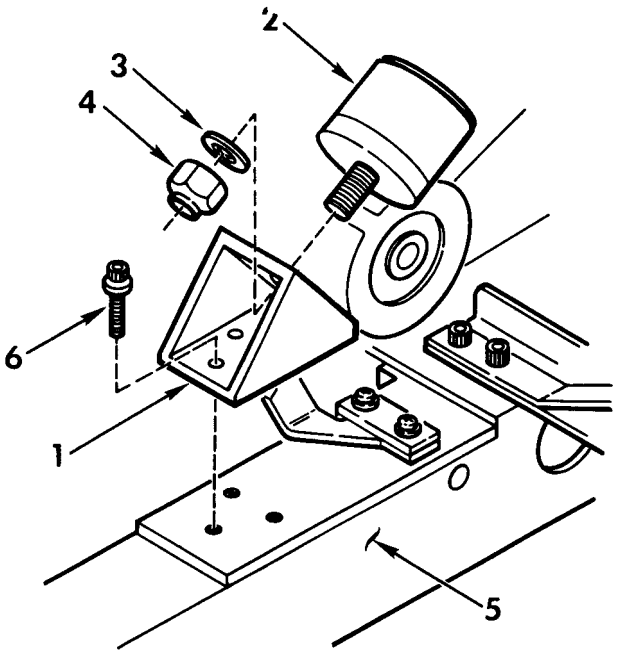
ARR83-0358

2-42. REPAIR OF TURRET MECHANICAL COMPONENTS (cont)

15. INSTALL ELEVATION STOP MOUNT (1) AND ELEVATION STOP (2).

a. Install elevation stop (2), washer (3), and nut (4) in elevation stop mount (1).

b. Position elevation stop mount (1) on saddle (5) and secure with three screws (6):



END OF TASK

2-43. REPAIR OF SADDLE SHAFT BEARING AND LUBRICATION FITTING

DESCRIPTION

This task covers: Removal, cleaning, inspection, and installation.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental
- Bearing Installation Tool
  - (Fig C-1, PN IMI 3001, Appx C)
- Bearing Removal Tool
  - (Fig C-1, PN IMI 3002, Appx C)
- Bearing Installation Tool
  - (Fig C-1, PN IMI 3003, Appx C)
- Bearing Removal Tool
  - (Fig C-1, PN IMI 3004, Appx C)

Materials:
- Grease (Item 12, Appx B)
- Lockwire (Item 18, Appx B)

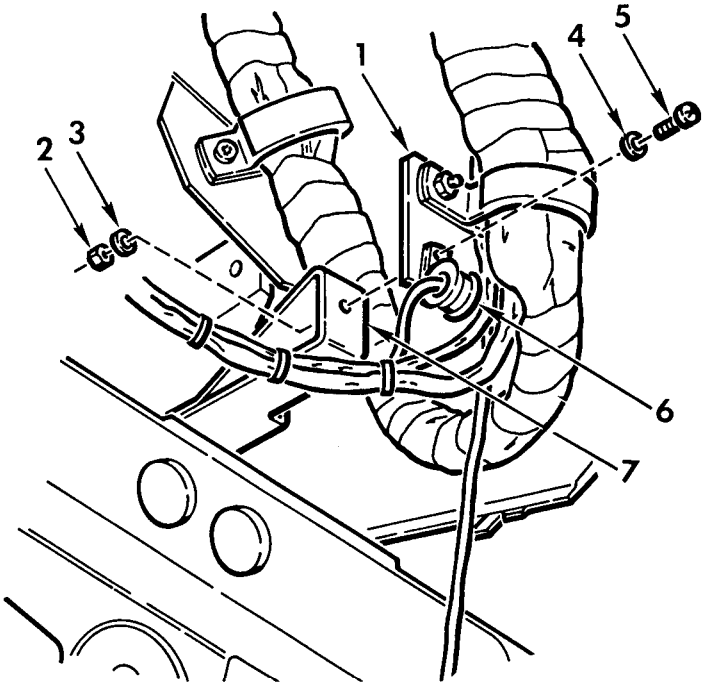
Personnel Required:
- 68M Aircraft Weapon Systems
  - Repairer

Equipment Conditions:
- Elevation resolver and support removed, see REPAIR OF ELEVATION RESOLVER, para 2-36.

REMOVAL

1. DISCONNECT CLAMP ASSEMBLY (1).

   Remove nut (2), washer (3), washer (4), screw (5), loop clamp (6), and clamp assembly (1) from bracket (7).



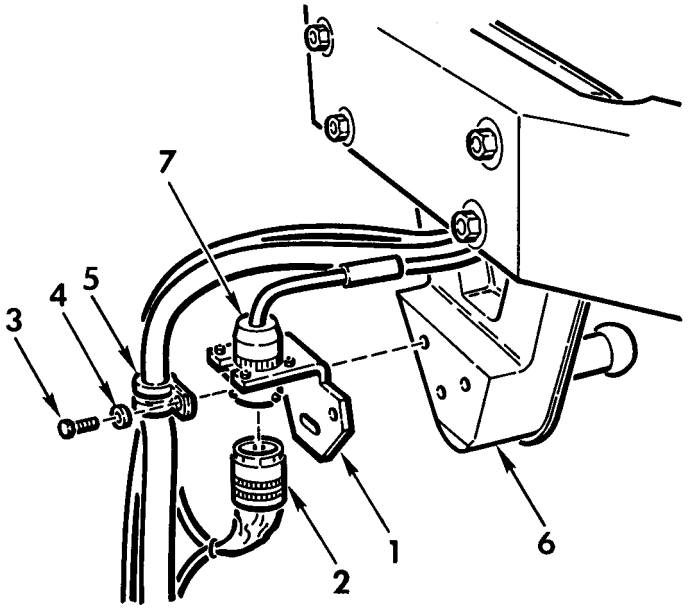
ARR83-0211

2-43. REPAIR OF SADDLE SHAFT BEARING AND LUBRICATION FITTING (cont)

NOTE

Do not remove connector W3J1 (7) from bracket (1).

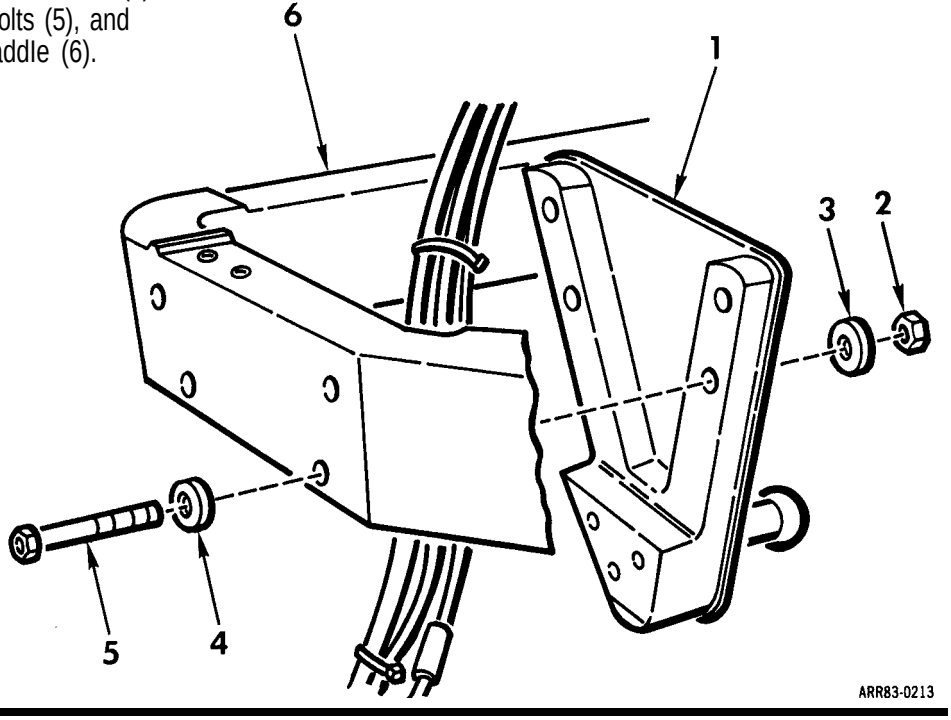
Disconnect connector W2P1 (2). Remove lockwire, three bolts (3), three washers (4), cable clamp (5), and bracket (1) from rear support (6).



ARR83-0212

3. REMOVE REAR SUPPORT (1).

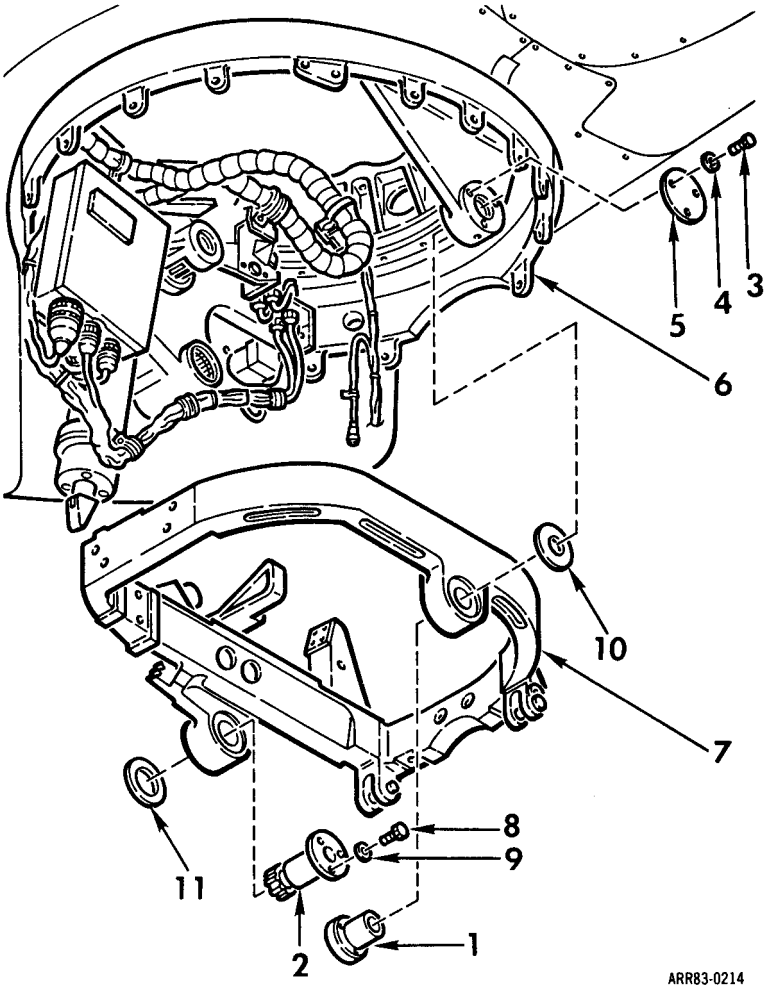
Remove four nuts (2), four washers (3), four washers (4), four bolts (5), and rear support (1) from saddle (6).



ARR83-0213

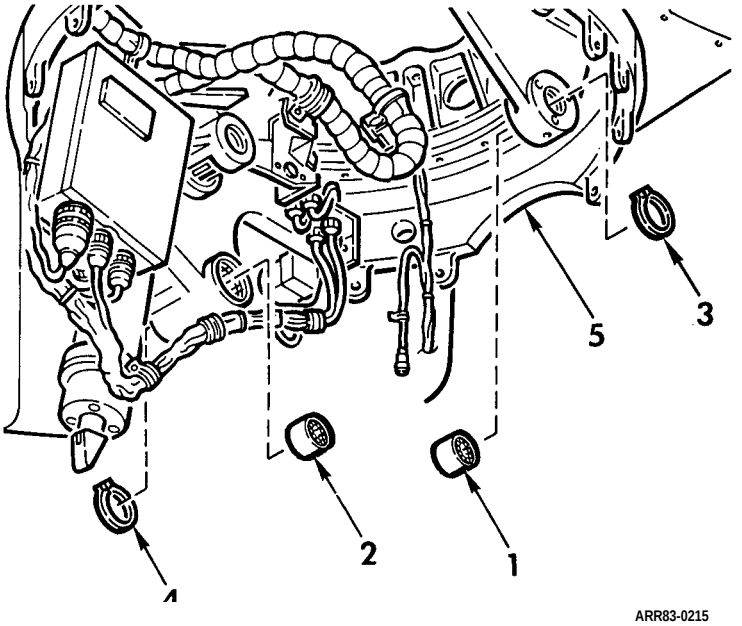
REMOVAL (cont)

4. REMOVE SADDLE SHAFTS (1 AND 2).
   a. Remove three screws (3), three washers (4), and plate (5) from turret (6).
   b. Support saddle (7). Remove six screws(8), six washers (9), saddle shafts (1 and 2) and washers (10 and 11).
   c. Remove saddle (7) from turret (6).



ARR83-0214

5. REMOVE SADDLE SHAFT BEARINGS (1 AND 2).
   a. Remove retaining rings (3 and 4).
   b. Using bearing removal tool (fig C-1, PN IMI 3002, Appx C), remove bearing (1) from turret (5).
   c. Using bearing removal tool (fig C-1, PN IMI 3004, Appx C) remove bearing (2) from turret (5).



ARR83-0215

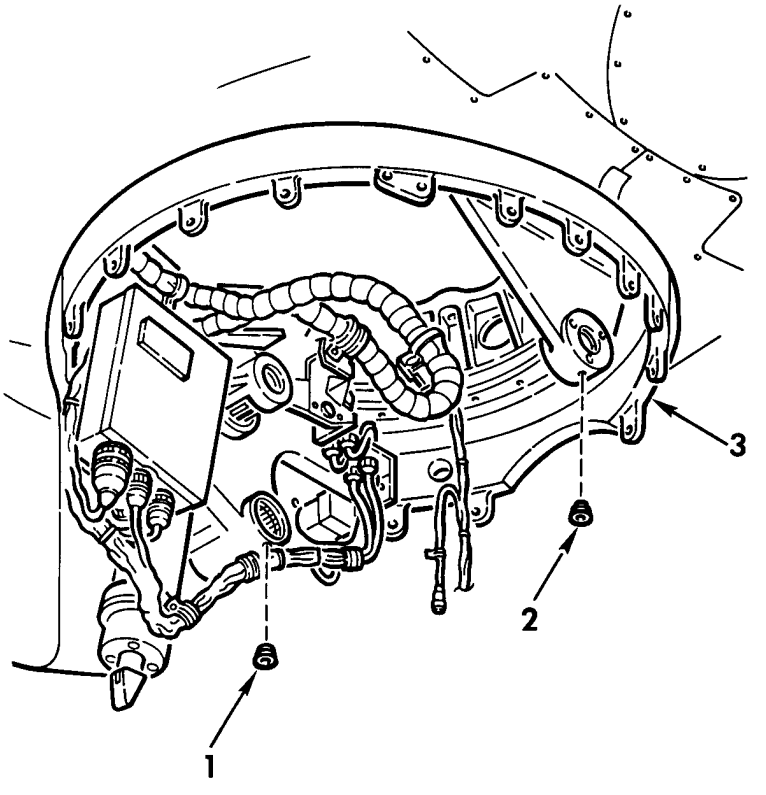
2-43. REPAIR OF SADDLE SHAFT BEARING AND LUBRICATION FITTING (cont)

6. REMOVE LUBRICATION FITTINGS (1 AND 2).
   a. Using a 7/64-inch drill bit, drill a hole 0.10-inch deep, on centerline, into lubrication fittings (1 and 2).
   b. Using a number 1 screw extractor, remove lubrication fittings (1 and 2) from turret (3). Discard fittings.

WARNING

Safety glasses must be worn when using low-pressure compressed air or brush to remove metal chips or dirt to prevent possible eye damage.

   c. Remove metal chips from bearing bores and lubrication fitting holes.



ARR83-0216

CLEANING

7. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV.

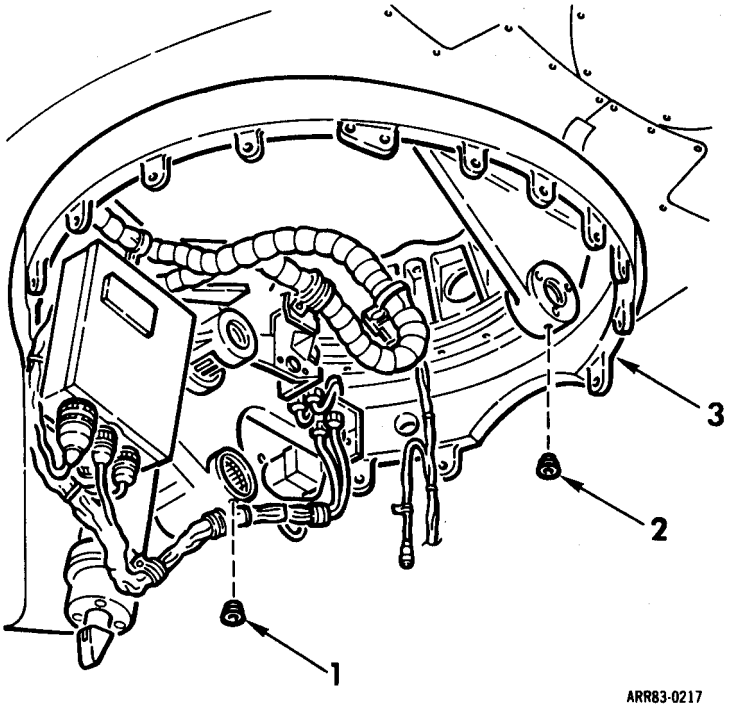
INSPECTION

8. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV.

INSTALLATION

9. INSTALL LUBRICATION FITTINGS (1 AND 2).

Press lubrication fittings (1 and 2) into place in turret (3).



ARR83-0217

NOTE

When installing bearings (1 and 2), offset grease holes in bearing races approximately 90 degrees from grease holes in lower support.

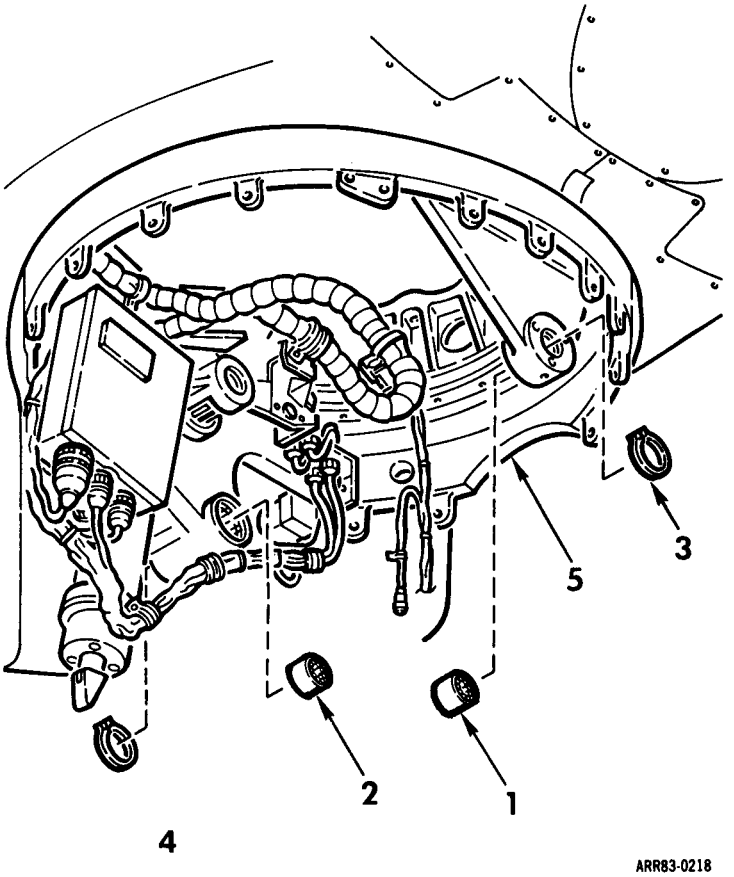
10. INSTALL SADDLE SHAFT BEARINGS (1 AND 2).

a. Install retaining rings (3 and 4).

b. Grease bearings (1 and 2). Apply a light coat of grease to bearing bores in turret (5).

c. Using bearing installation tool (fig C-1, PN IMI 3001, Appx C), install bearing (1) in turret (5) so that bearing is seated against retaining ring (3).

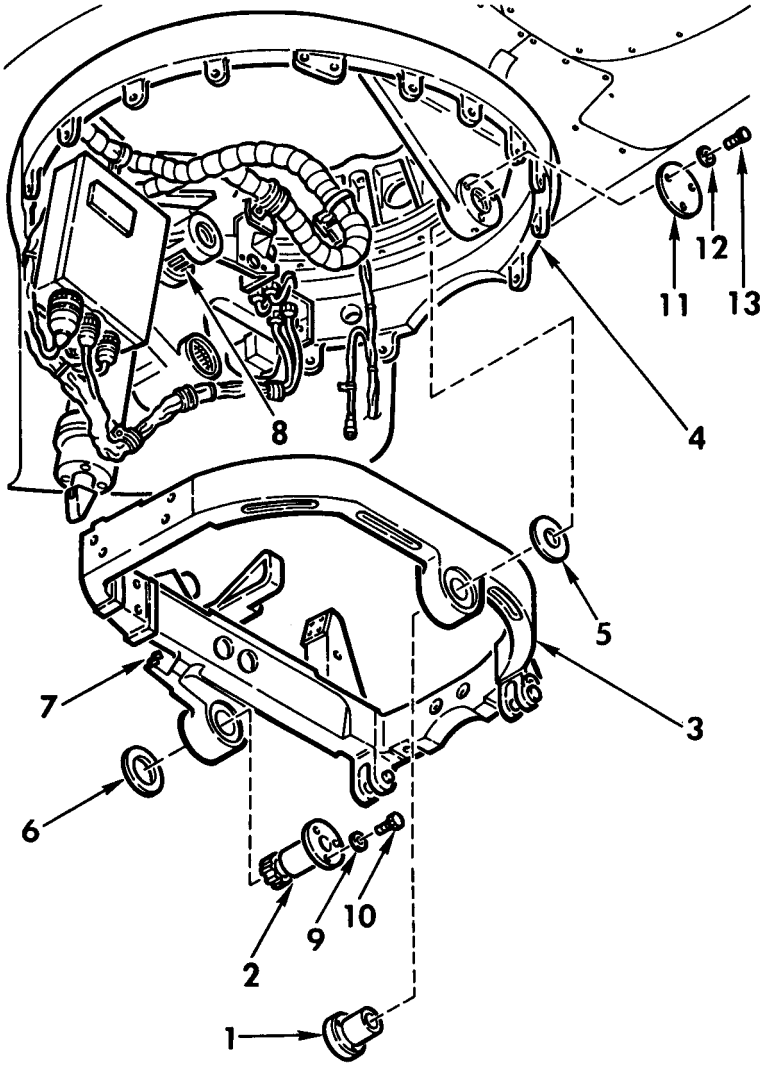
d. Using bearing installation tool (fig C-1, PN IMI 3003, Appx C), install bearing (2) in turret (5) so that bearing is seated against retaining ring (4).



ARR83-0218

2-43. REPAIR OF SADDLE SHAFT BEARING AND LUBRICATION FITTING (cont)

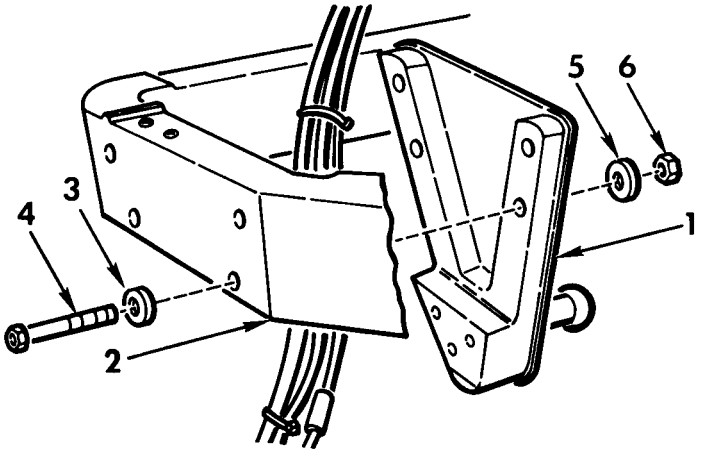
11. INSTALL SADDLE SHAFTS (1 AND 2).
    a. Position saddle (3) in turret (4).
    b. Coat saddle shafts (1 and 2) with grease, and install through saddle (3), washers (5 and 6) and into turret (4). Make sure that sector gear teeth (7) are properly meshed with pinion gear teeth (8) on elevation drive.
    c. Install six washers (9) and six bolts (10). Torque bolts to 50-60 lb-in. (5.7-6.8 N.m) to secure saddle shafts (1 and 2) to saddle (3).
    d. Position plate (11) on turret (4) and install three washers (12) and three screws (13).



ARR83-0219

a. Position cables between rear support (1) on saddle (2).

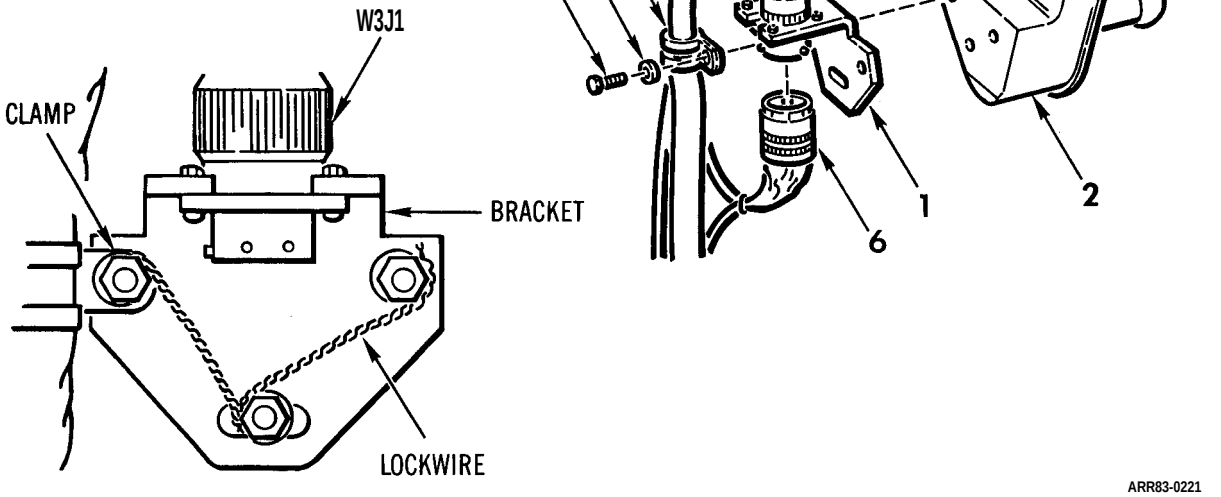
b. Secure rear support (1) to saddle (2) with four washers (3), four bolts (4), four washers (5) and four nuts (6). Torque nuts to 135–145 lb-in. (15.3 -16.4 N.m).



ARR83-0220

INSTALLATION (cont)

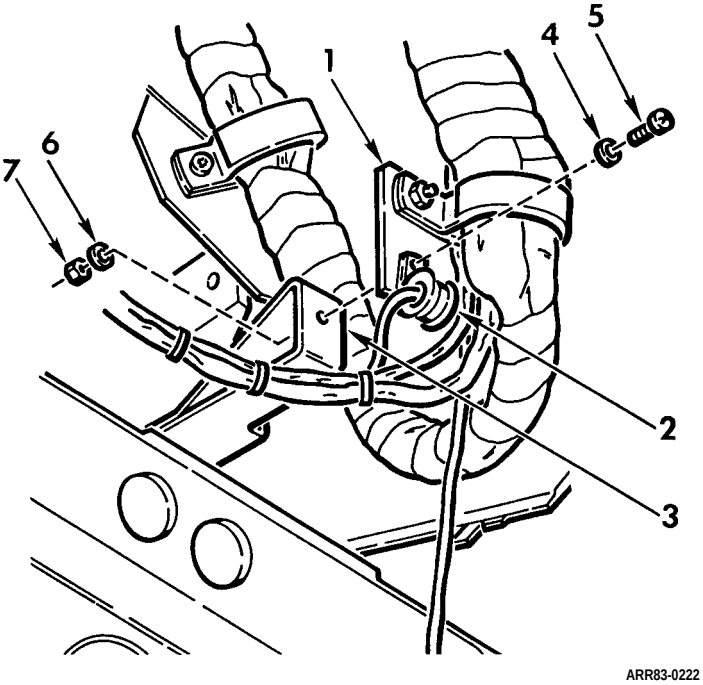
13. INSTALL BRACKET (1).
    a. Position bracket (1) on rear support (2) and loop clamp (3) on bracket. Secure with three washers (4) and three bolts (5). Lockwire bolts.
    b. Connect connector W2P1 (6) to connector W3J1 (7).



ARR83-0221

14. INSTALL CLAMP ASSEMBLY (1).

    Position clamp assembly (1) and loop clamp (2) on bracket (3) and install washer (4), screw (5), washer (6), and nut (7).



ARR83-0222

END OF TASK

2-44. REMOVAL/INSTALLATION OF ELEVATION DRIVE MOTOR

DESCRIPTION

This task covers: Removal and installation.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental

Materials:
- Lockwire (Item 17, Appx B)

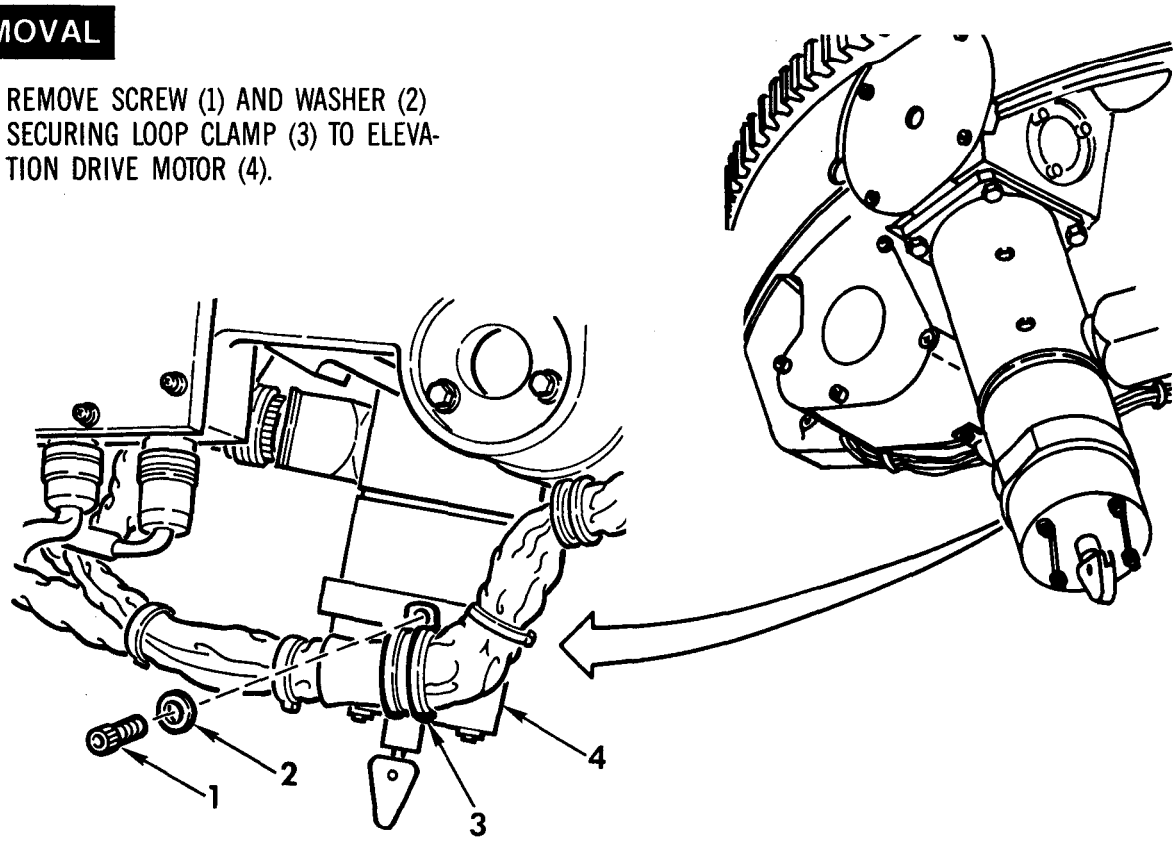
Personnel Required:
- 68M Aircraft Weapon Systems Repairer

References:
- TM 9-1090-206-20-1
- TM 9-1090-206-20-2

Equipment Conditions:
- HELICOPTER ARMAMENT SUBSYSTEM MAINTENANCE SETUP performed, TM 9-1090-206-20-1 or TM 9-1090-206-20-2.
- REMOVAL OF M197 GUN performed, TM 9-1090-206-20-1 or TM 9-1090-206-20-2.
- Elevation tachometer removed, see para 3-56, REPAIR OF TURRET ELECTRICAL COMPONENTS, TM 9-1090-206-20-1 or TM 9-1090-206-20-2.

REMOVAL

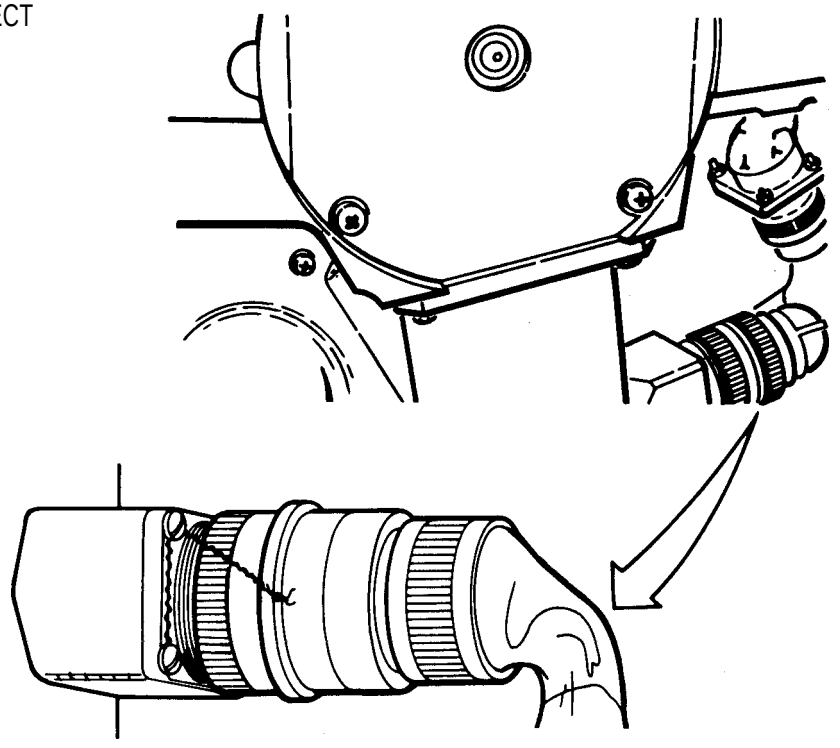
1. REMOVE SCREW (1) AND WASHER (2) SECURING LOOP CLAMP (3) TO ELEVATION DRIVE MOTOR (4).



ARR83-1245

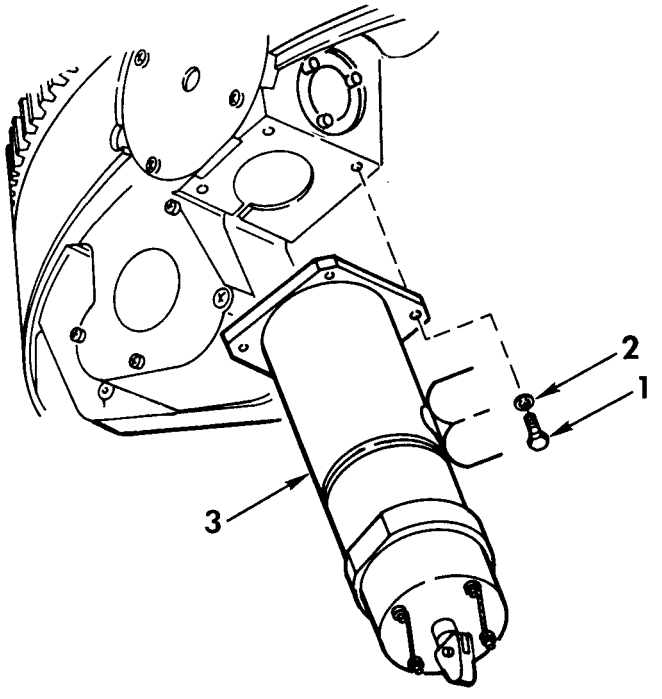
REMOVAL (cont)

2. REMOVE LOCKWIRE AND DISCONNECT CONNECTOR W4P11.



ARR83-1246

3. REMOVE FOUR BOLTS (1), FOUR WASHERS (2) AND ELEVATION DRIVE MOTOR (3).

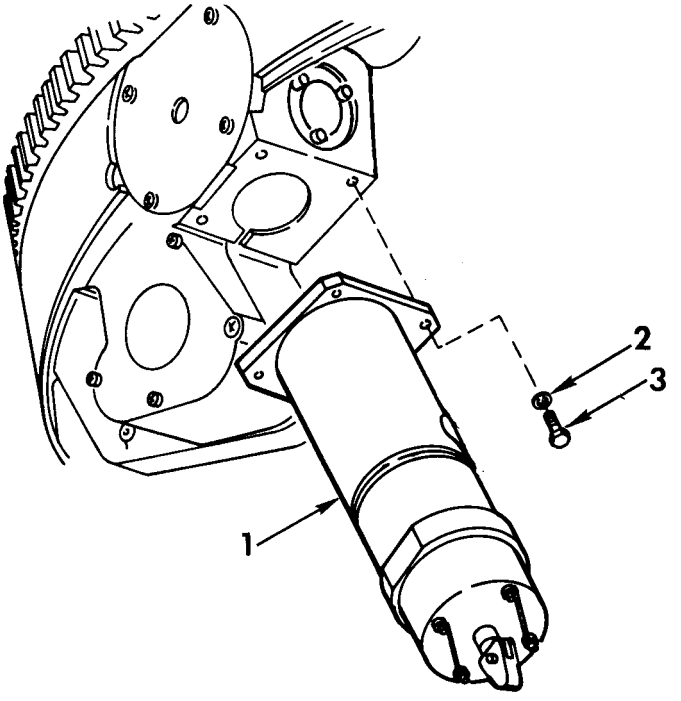


ARR83-1247

2-44. REMOVAL/INSTALLATION OF ELEVATION DRIVE MOTOR (cont)

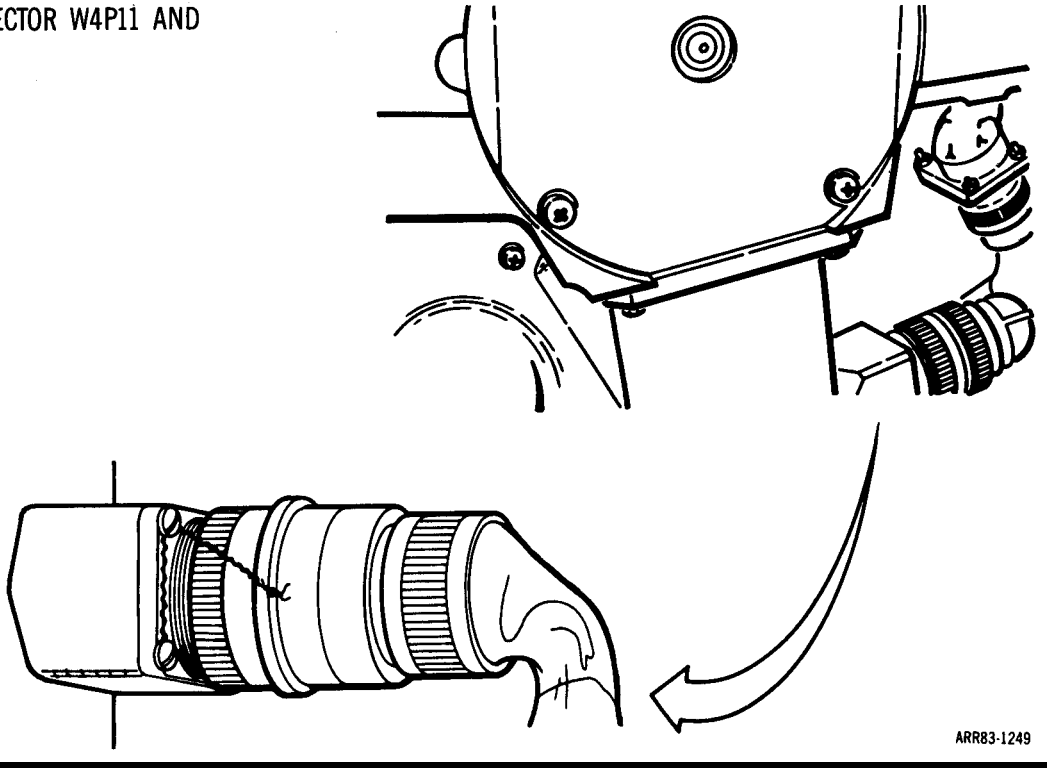
INSTALLATION

4. INSTALL ELEVATION DRIVE MOTOR (1) AND SECURE USING FOUR WASHERS (2) AND FOUR BOLTS (3).



ARR83-1248

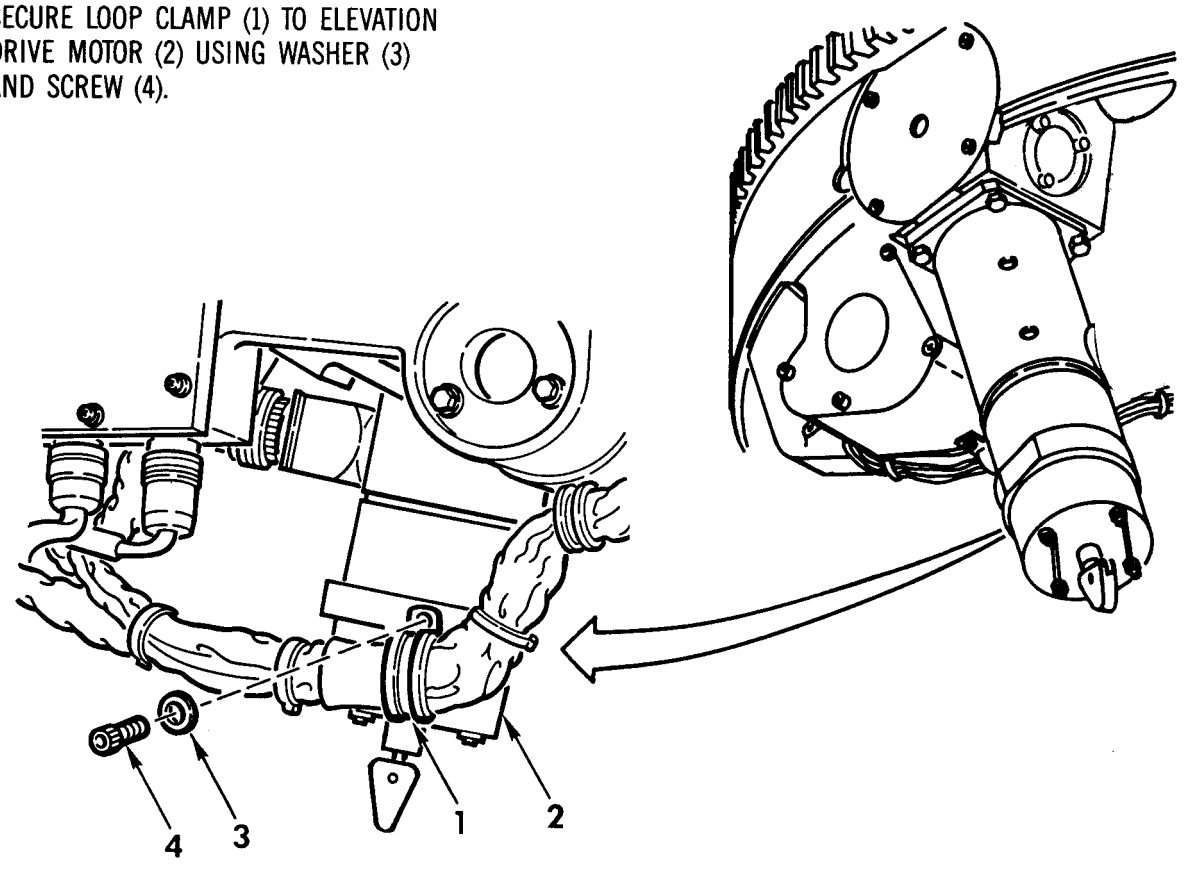
5. CONNECT CONNECTOR W4P11 AND LOCKWIRE.



ARR83-1249

INSTALLATION (cont)

6. SECURE LOOP CLAMP (1) TO ELEVATION DRIVE MOTOR (2) USING WASHER (3) AND SCREW (4).



ARR83-1250

END OF TASK

2-45. REMOVAL OF TURRET

DESCRIPTION

This task covers: Removal.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  Repairman: Basic
- Tool Set, A/C Armament
  Repairman: Supplemental
- Aircraft Jack
- Turret Installation/Removal Fixture PN IMI 3015 (Fig C-8, Appx C)
- Tape (Item 30.1, Appx B)

Personnel Required:
- 68M Aircraft Weapon Systems Repairer (3)

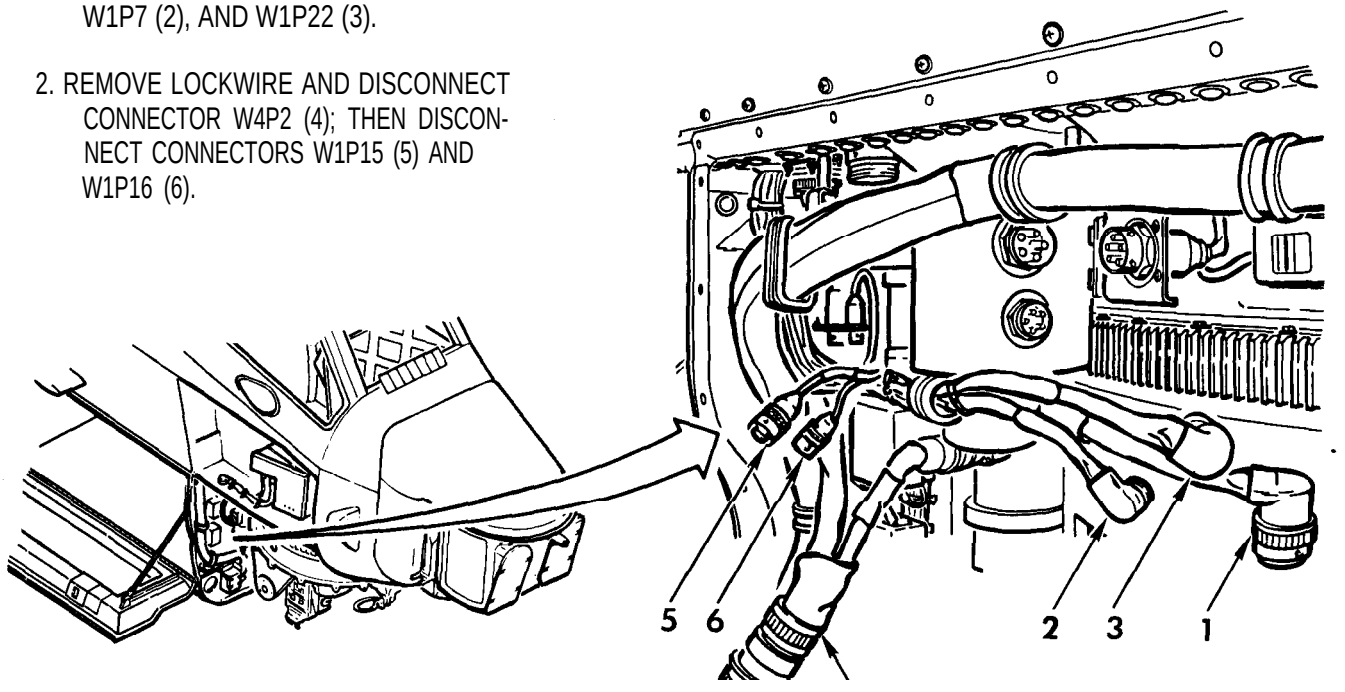
References:
- TM 9-1090-206-20-1
- TM 9-1090-206-20-2
- TM 55-1520-236-23

Equipment Conditions:
- HELICOPTER ARMAMENT SUBSYSTEM MAINTENANCE SETUP performed, TM 9-1090-206-20-1 or TM 9-1090-206-20-2.
- Turret fairing, left and right aircraft panels above turret removed, see TM 55-1520-236-23.
- REMOVAL OF M197 GUN performed, TM 9-1090-206-20-1 or TM 9-1090-206-20-2.

REMOVAL

1. DISCONNECT CONNECTORS W1P5 (1), W1P7 (2), AND W1P22 (3).

2. REMOVE LOCKWIRE AND DISCONNECT CONNECTOR W4P2 (4); THEN DISCONNECT CONNECTORS W1P15 (5) AND W1P16 (6).



ARR82-25931

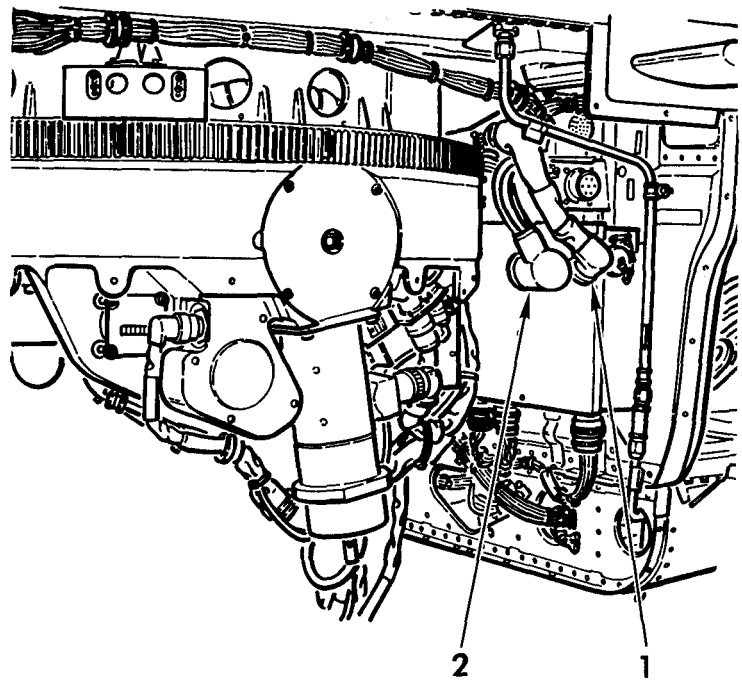
REMOVAL (cont)

3. REMOVE LOCKWIRE AND DISCONNECT CONNECTOR W3P1 (1).

4. DISCONNECT CONNECTOR W1P3 (2).

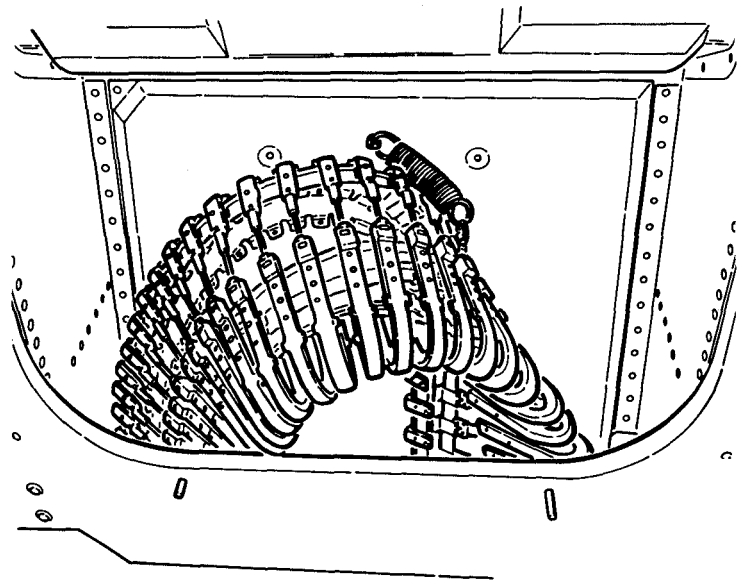
5. REMOVE CABLE TIEDOWN STRAPS, AS NECESSARY, SECURING CABLES W1 AND W3 TO AIRCRAFT HARNESS.

6. FREE CABLES W1 AND W3 FROM HELICOPTER HARNESS AND POSITION AS REQUIRED TO PREVENT DAMAGE WHEN TURRET IS LOWERED.



ARR82-25932

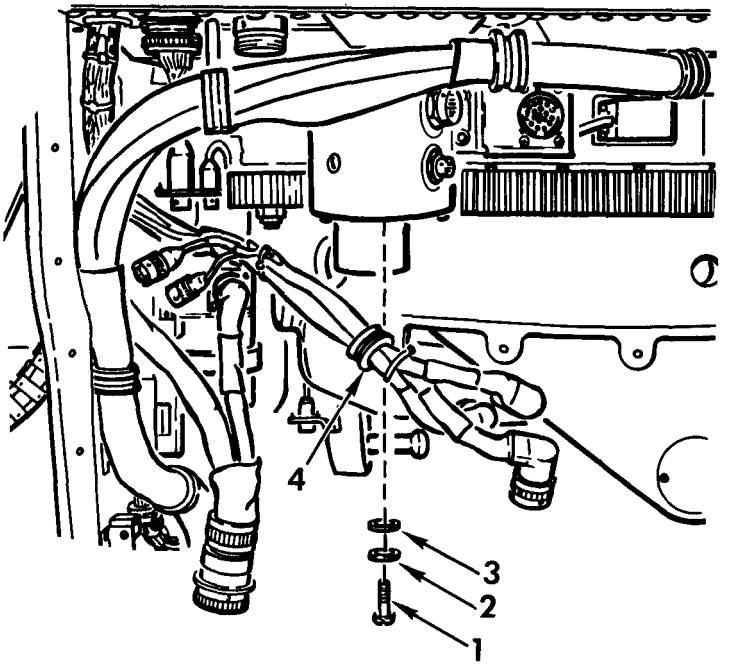
7. FOLD FEEDER END OF FEED CHUTE UP INSIDE HELICOPTER.



ARR82-25933

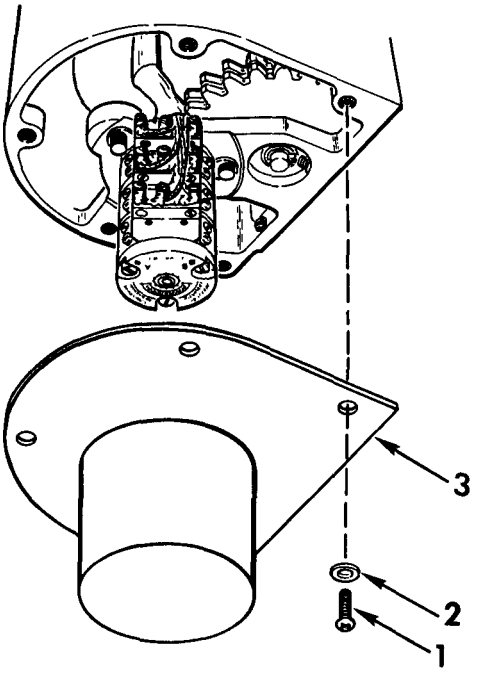
2-45. REMOVAL OF TURRET (cont)

8. REMOVE SCREW (1), WASHER (2), AND WASHER (3) SECURING CLAMP (4) TO AZIMUTH RESOLVER.



ARR82-25934

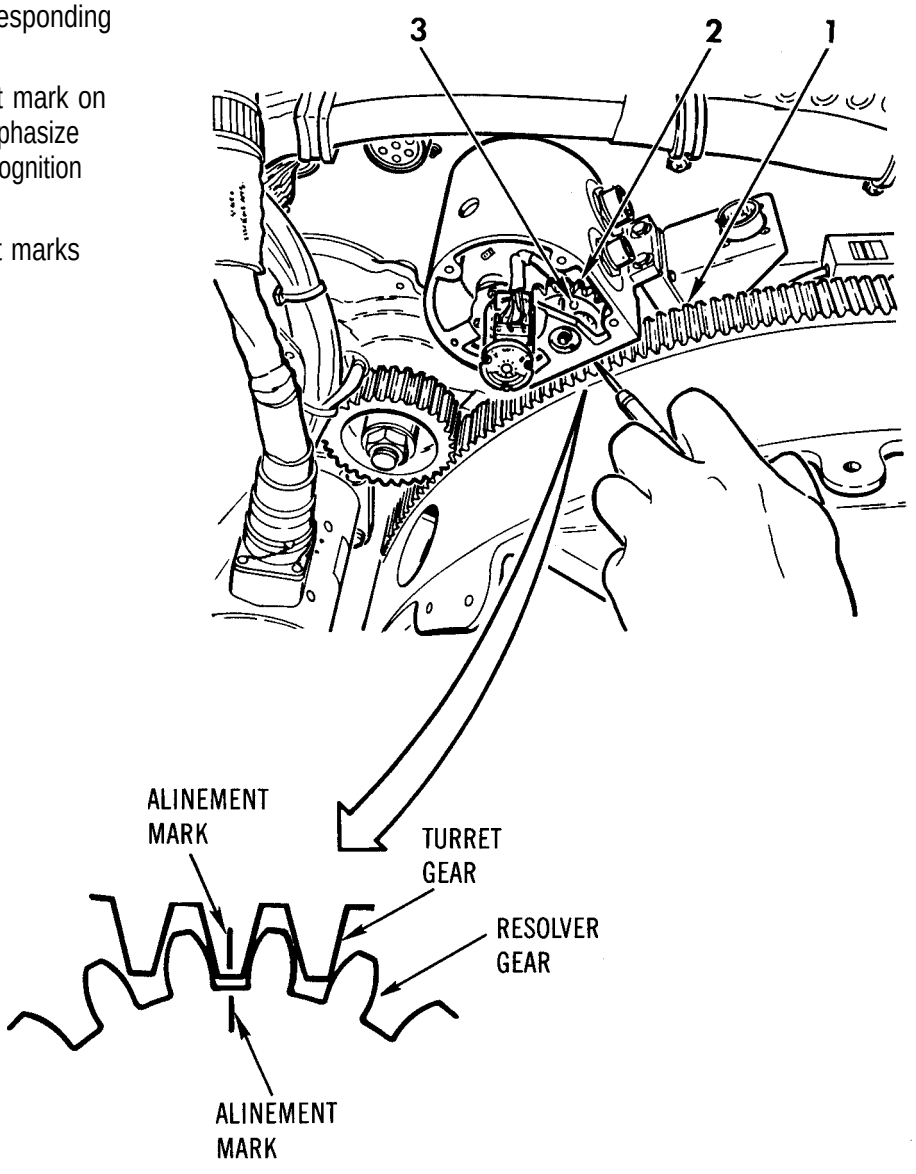
9. REMOVE FOUR SCREWS (1), FOUR WASHERS (2), AND COVER (3), REINSTALL HARDWARE AND HARDWARE REMOVED IN STEP 8.



ARR82-25935

REMOVAL (cont)

10. MARK TURRET GEAR (1) AND RESOLVER GEAR (2).
    a. Rotate turret until alinement hole (3) is in an accessible position.
    b. With a scribe or equivalent, make an alinement mark on fully engaged tooth of turret gear and corresponding resolver gear.
    c Rotate turret until alinement mark on turret gear is accessible. Emphasize alinement mark for easy recognition during installation.
    d. Rotate turret until alinement marks are alined.



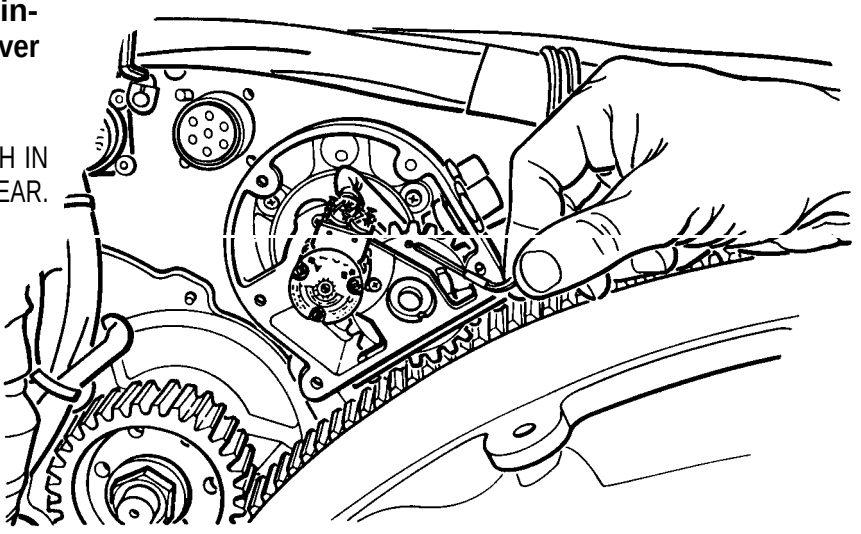
ARR82-25936

2-45. REMOVAL OF TURRET (cont)

CAUTION

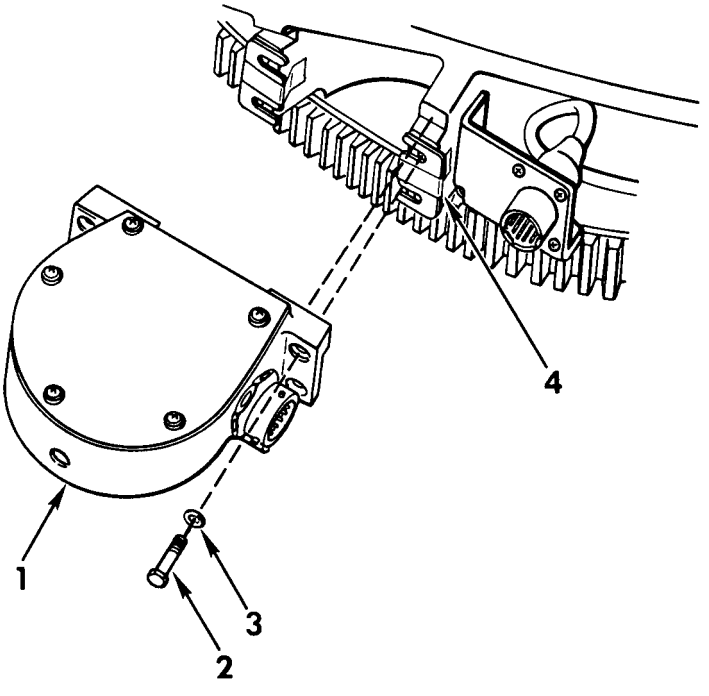
Do not rotate turret after installing allen wrench in resolver gear.

11. INSTALL 3/32-INCH ALLEN WRENCH IN ALINEMENT HOLE OF RESOLVER GEAR. TAPE ALLEN WRENCH IN PLACE.



ARR82-25937

12. REMOVE AZIMUTH RESOLVER (1).
    a. Remove four bolts (2), four washers (3), and azimuth resolver (1).
    b. Tape shims (4) in place. Do not remove unless defective.
    c. Reinstall hardware.

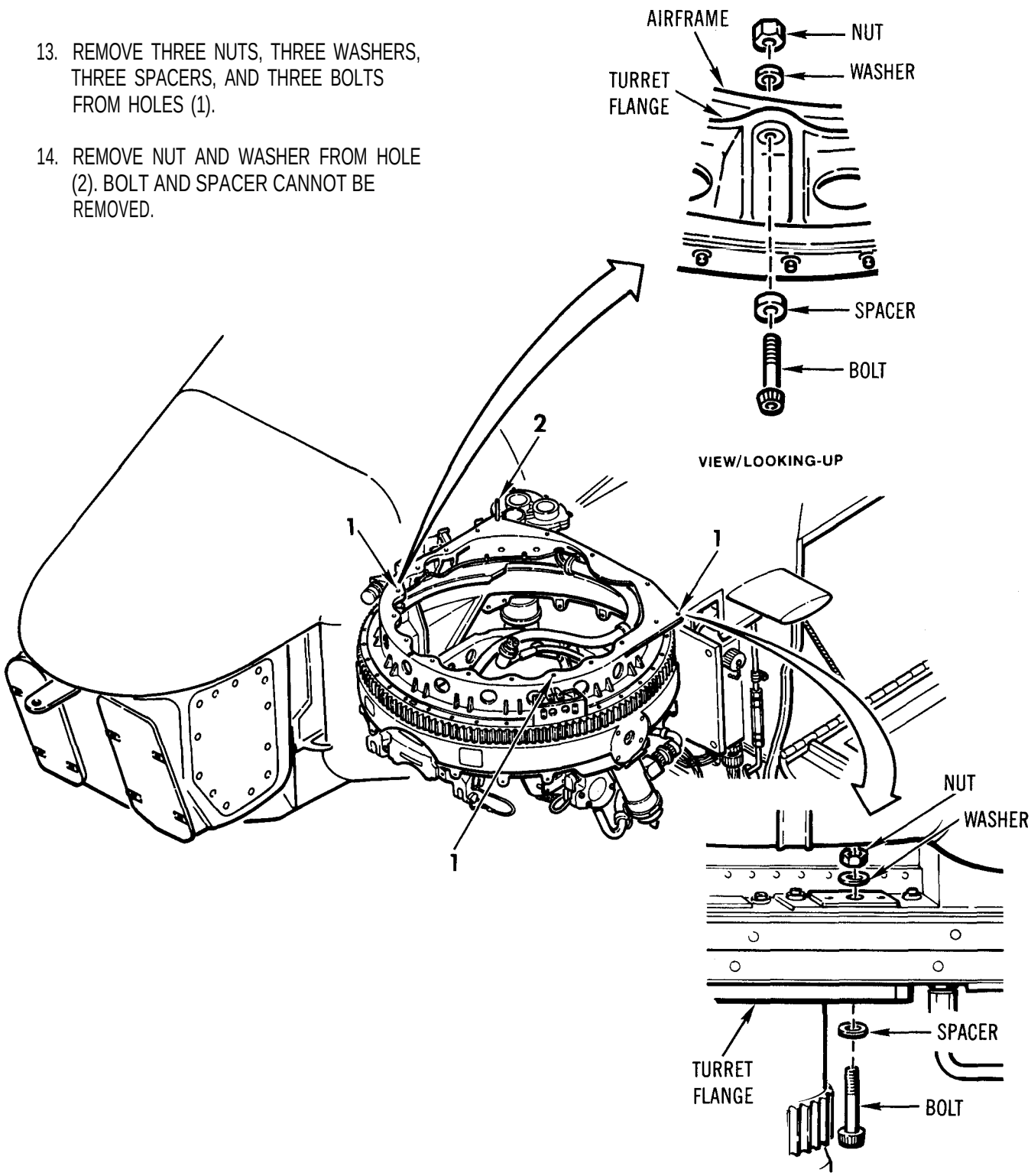


ARR82-25938

REMOVAL (cont)

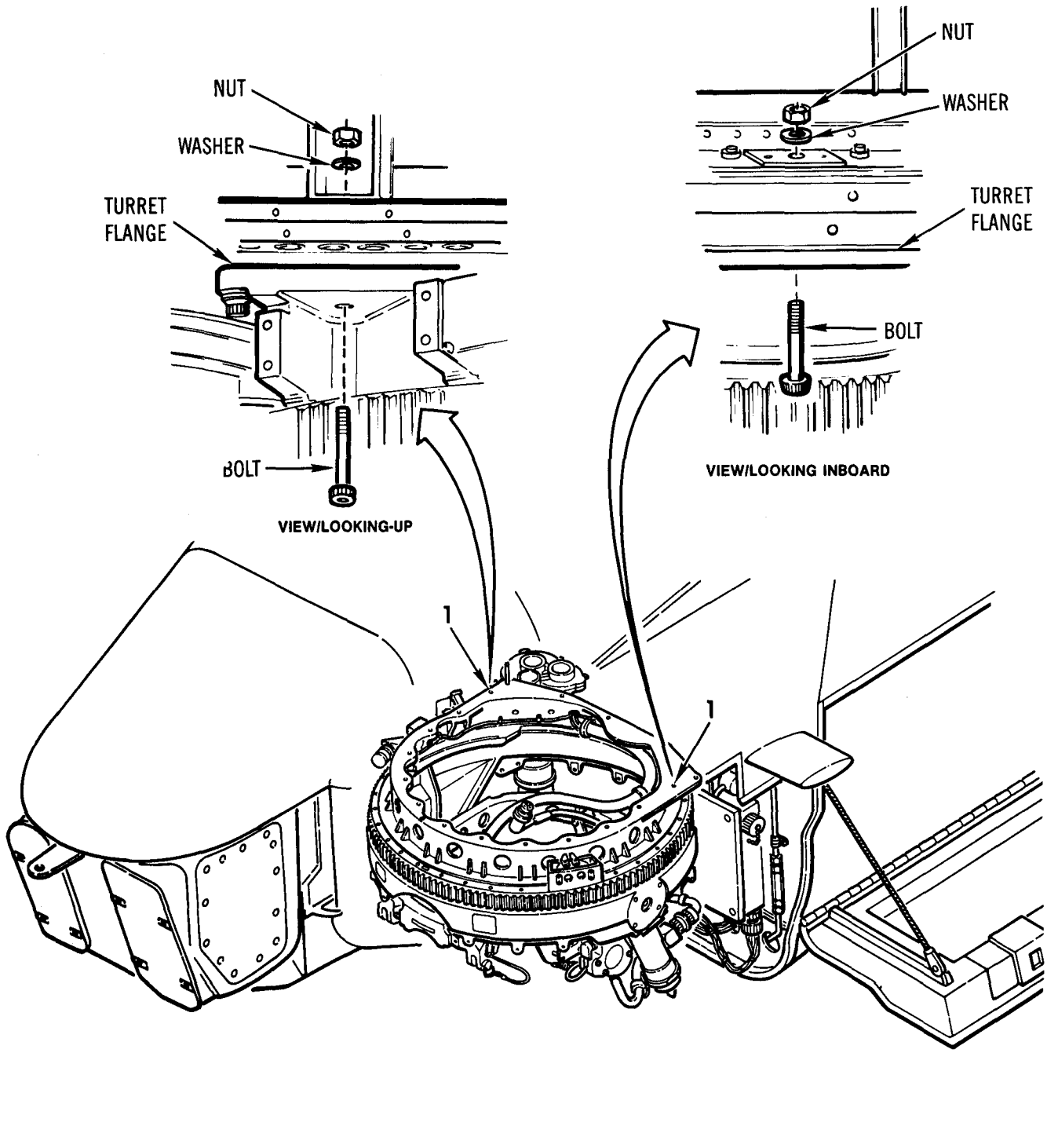
13. REMOVE THREE NUTS, THREE WASHERS, THREE SPACERS, AND THREE BOLTS FROM HOLES (1).

14. REMOVE NUT AND WASHER FROM HOLE (2). BOLT AND SPACER CANNOT BE REMOVED.



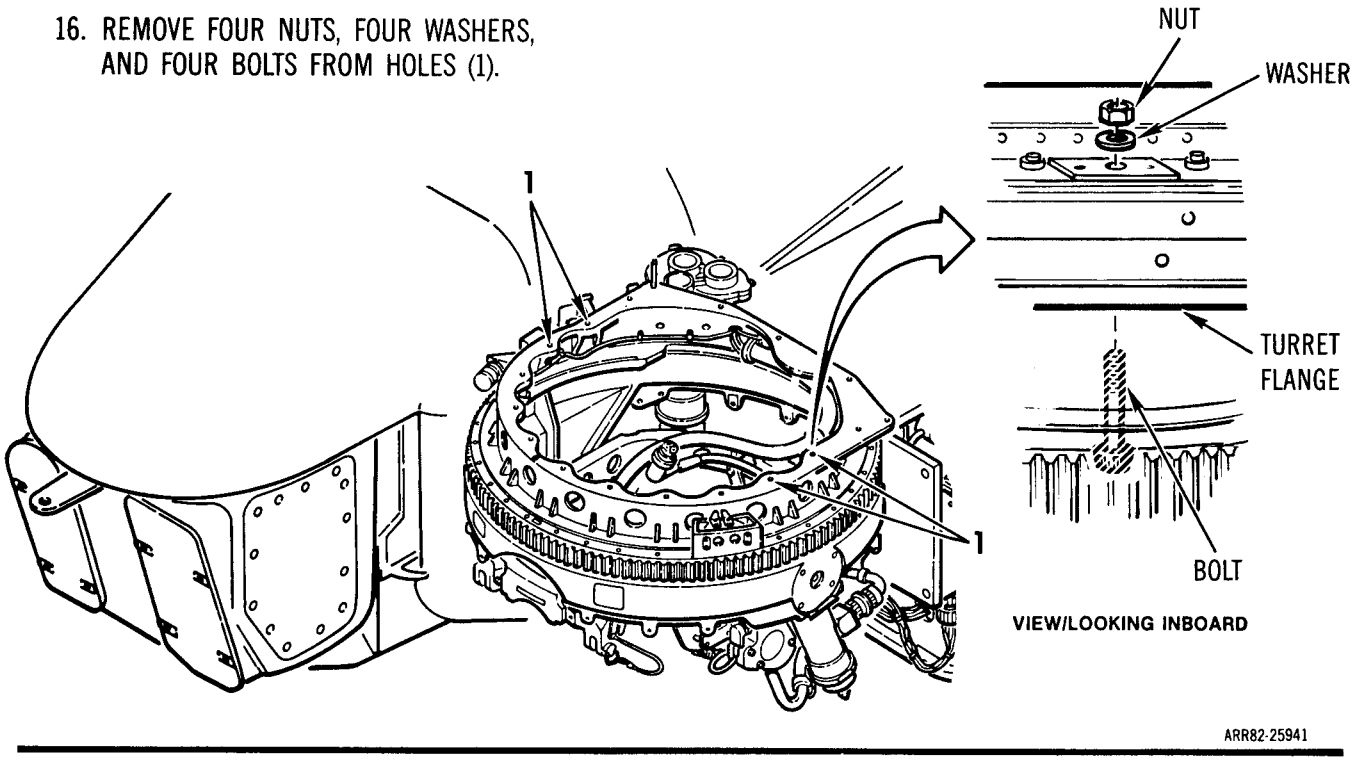
2-415. REMOVAL OF TURRET (Cont)

15. REMOVE TWO NUTS, TWO WASHERS, AND TWO BOLTS FROM HOLES (1).

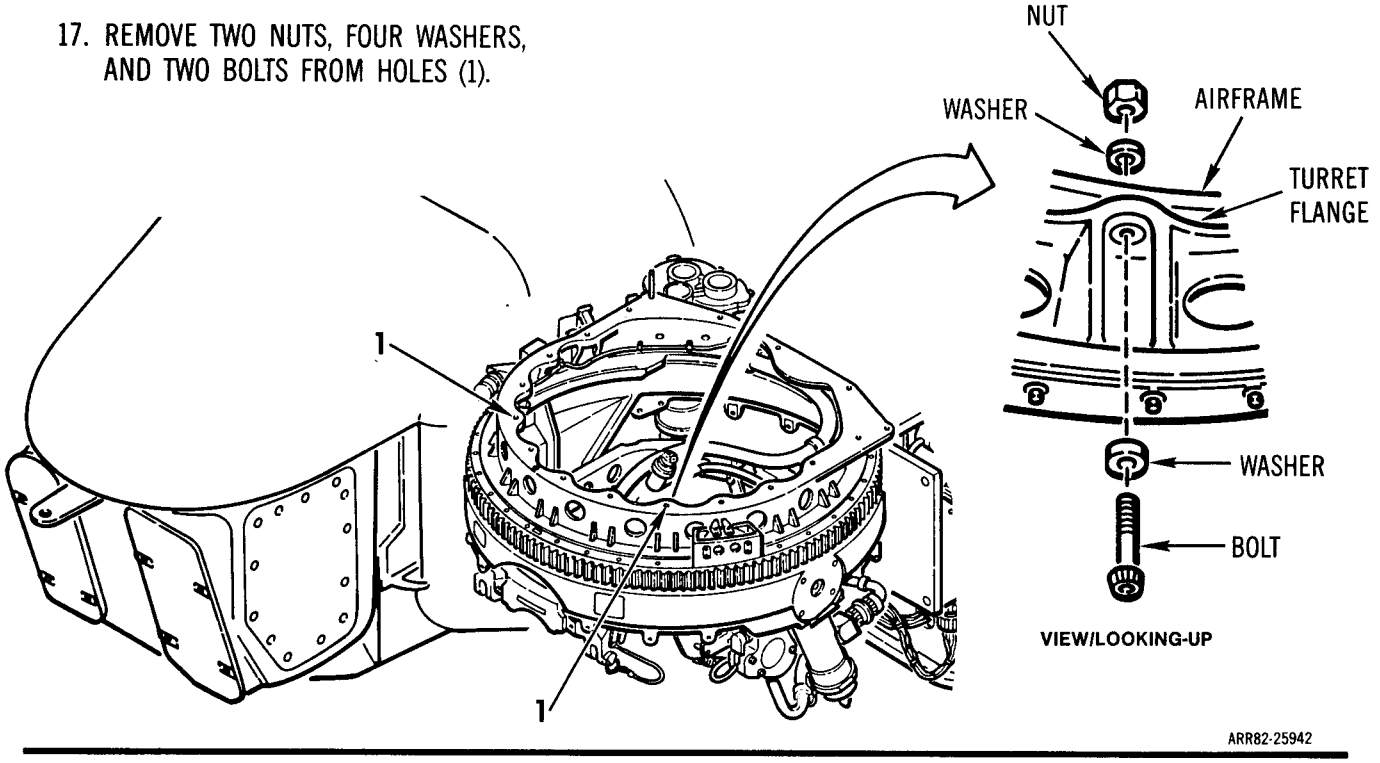


REMOVAL (cont)

16. REMOVE FOUR NUTS, FOUR WASHERS, AND FOUR BOLTS FROM HOLES (1).

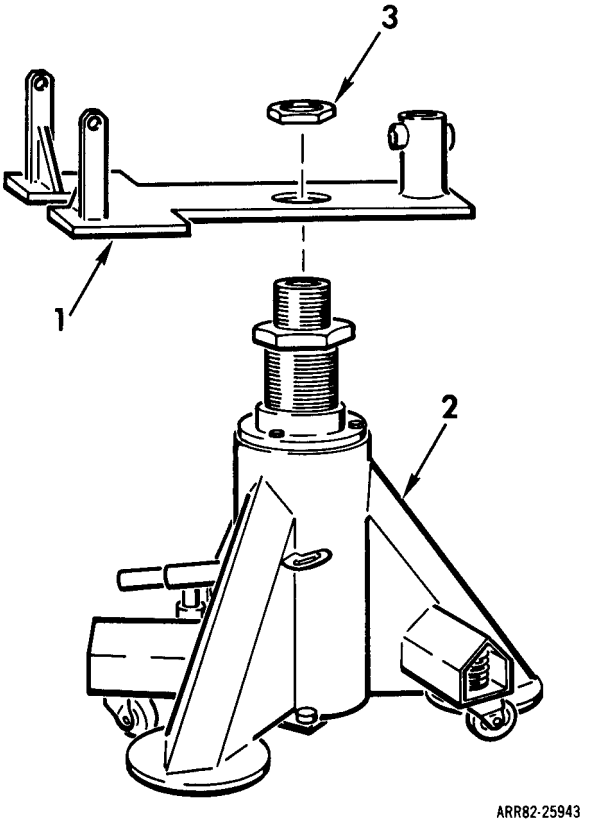


17. REMOVE TWO NUTS, FOUR WASHERS, AND TWO BOLTS FROM HOLES (1).



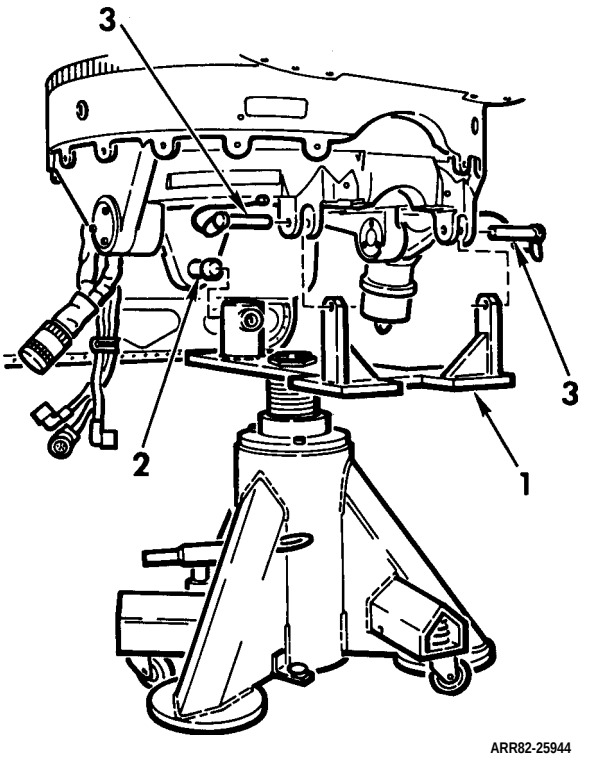
2-45. REMOVAL OF TURRET (cont)

18. INSTALL TURRET INSTALLATION/REMOVAL FIXTURE (1) ON AIRCRAFT JACK (2).
    a. Remove nut (3) from aircraft jack.
    b. Install turret installation/removal fixture (1) on shaft of aircraft jack (2).
    c. Install nut (3).



ARR82-25943

19. INSTALL TURRET INSTALLATION/REMOVAL FIXTURE (1) BY SLIDING REAR OF TURRET INSTALLATION/REMOVAL FIXTURE ONTO BALL MOUNT (2) AND POSITIONING FRONT TABS OF TURRET INSTALLATION/REMOVAL FIXTURE INTO SADDLE LUGS. SECURE USING TWO QUICK-RELEASE PINS (3).



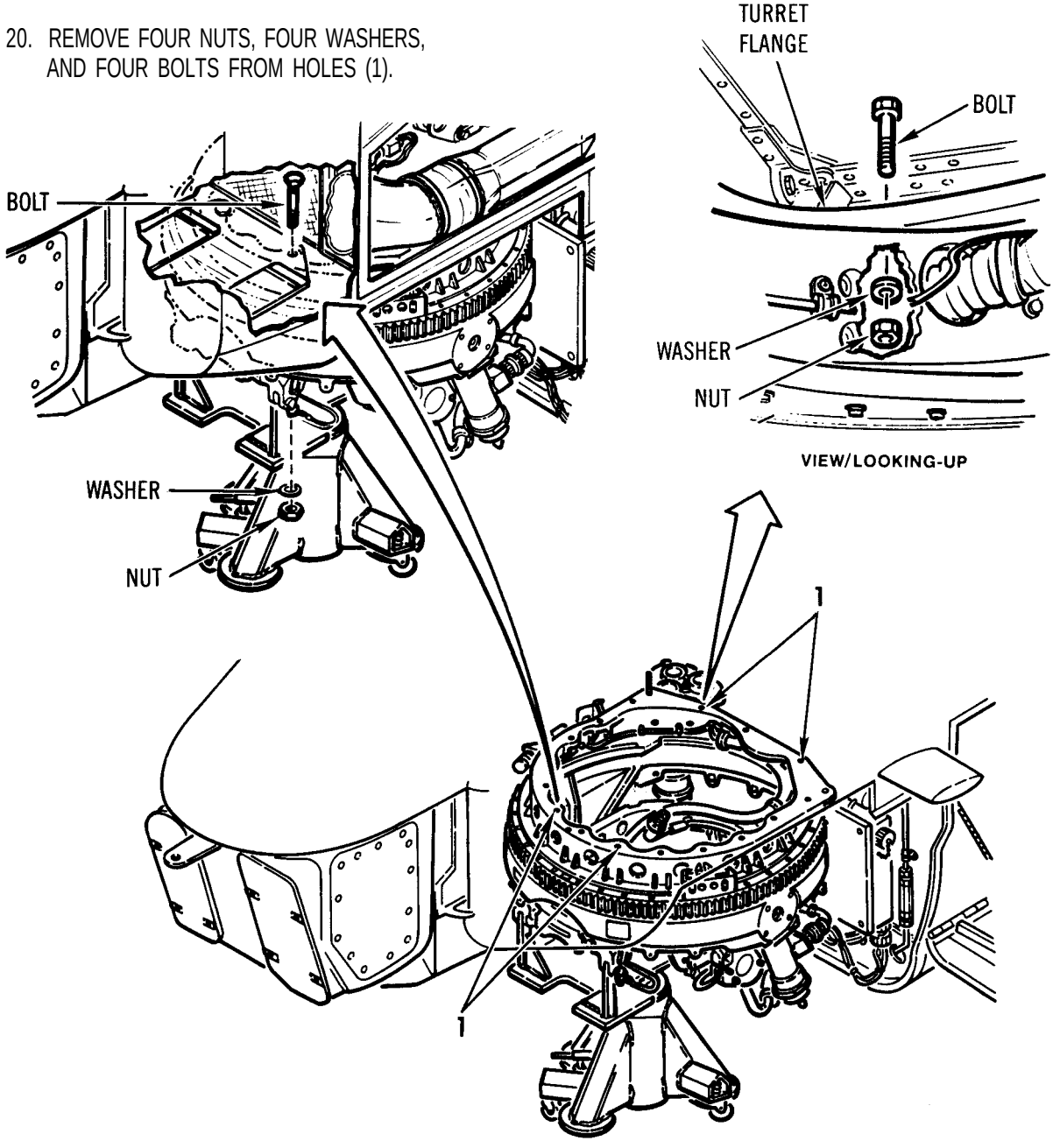
ARR82-25944

REMOVAL (cont)

NOTE

This group of attaching hardware mounts turret to airframe hard points and is the last to be removed.

20. REMOVE FOUR NUTS, FOUR WASHERS, AND FOUR BOLTS FROM HOLES (1).



ARR82-25945

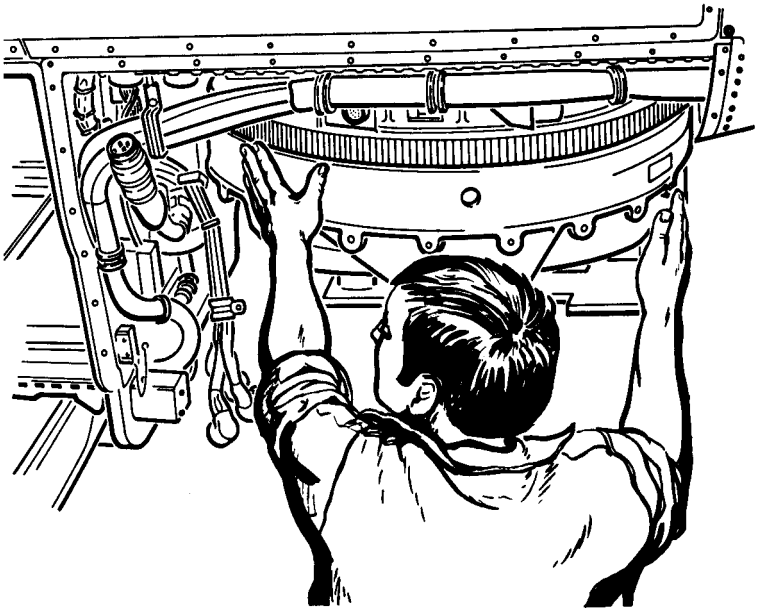
2-45. REMOVAL OF TURRET (cont)

21. POSITION PERSONS ON ALL SIDES OF TURRET TO VERIFY TURRET MOUNTING HARDWARE HAS BEEN REMOVED, NECESSARY CABLING IS DISCONNECTED AND FREE OF HELICOPTER, AND TO WATCH FOR AND PREVENT ANY POSSIBLE INTERFERENCE OR DAMAGE AS TURRET IS BEING LOWERED.

CAUTION

Turret must be lowered straight down after it is clear of alinement pins. Turret upper support mounting flange may be damaged if turret is allowed to tilt and cause captive mounting boit above azimuth drive to bind in floor of helicopter.

22. CAREFULLY LOWER TURRET UNTIL IT IS CLEAR OF ALINEMENT PINS. CHECK FOR ANY INTERFERENCE. CONTINUE TO LOWER TURRET, REPOSITIONING AS NECESSARY TO CLEAR OBSTRUCTIONS, UNTIL CAPTIVE MOUNTING BOLT IS FREE. CONTINUE TO LOWER TURRET UNTIL IT IS CLEAR, THEN REMOVE TURRET.



ARR82-25946

END OF TASK

2-45.1. REMOVAL OF TURRET CABLES

DESCRIPTION

This task covers: Removal.

INITIAL SETUP

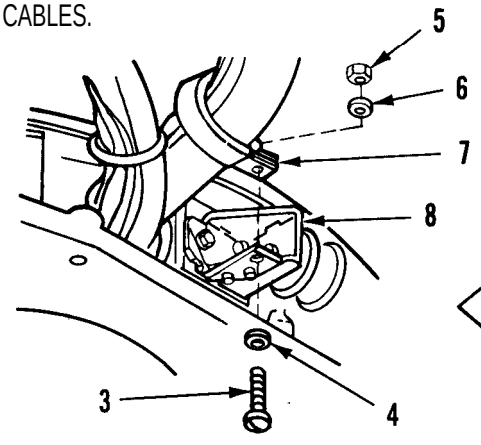
Tools/Test and Support Equipment:
Tool Set, A/C Armament Repairman: Basic
Tool Set, A/C Armament Repairman: Supplemental

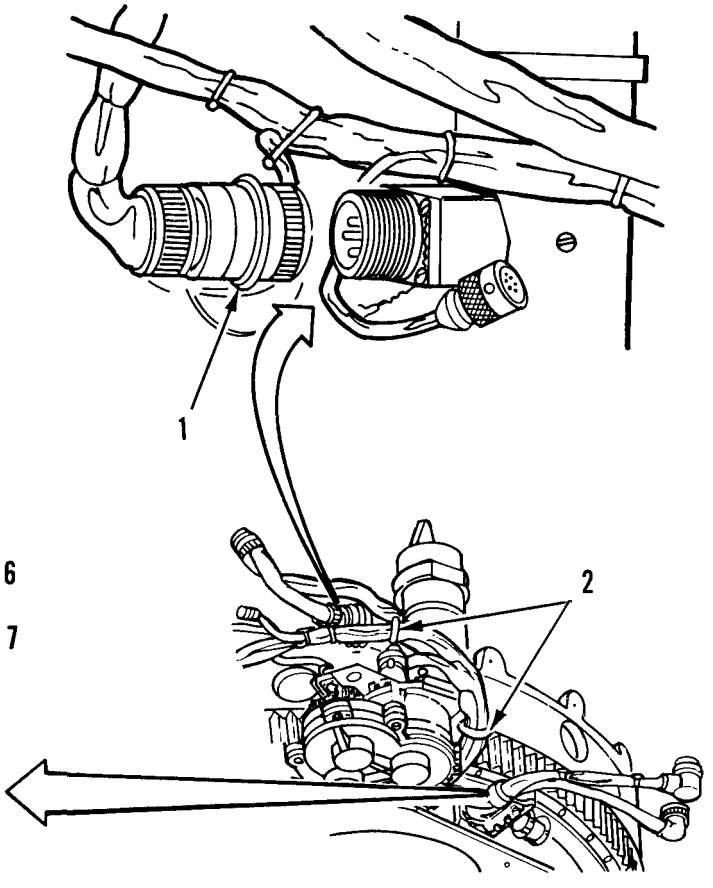
Personnel Required:
68J Aircraft Armament/Missile Systems Repairer (2)

Equipment Conditions:
REMOVAL OF TURRET performed, para 2-45.
Turret upside down on bench in shop .

REMOVAL

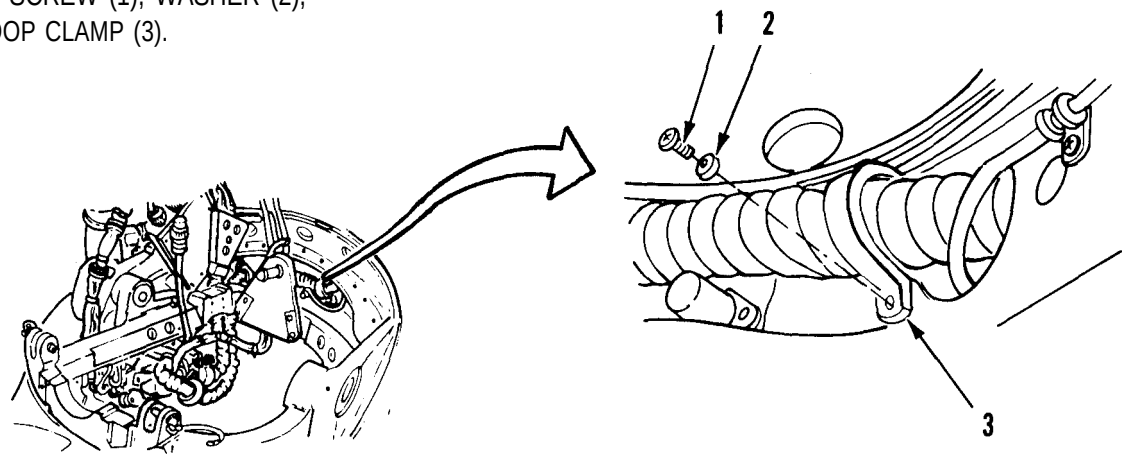
1. REMOVE LOCKWIRE AND DISCONNECT CONNECTOR W4P14 (1) FROM CONNECTOR A7J11.
2. REMOVE CABLE STRAPS (2) AS NECESSARY TO FREE CONNECTOR A7J13 FROM TURRET HARNESS,
3. REMOVE SCREW (3), WASHER (4), NUT (5), WASHER (6), AND CLAMP (7) FROM CLAMP BRACKET (8).
4. SEPARATE CLAMP (7) FROM TURRET CABLES.





2-45.1. REMOVAL OF TURRET CABLES (cont)

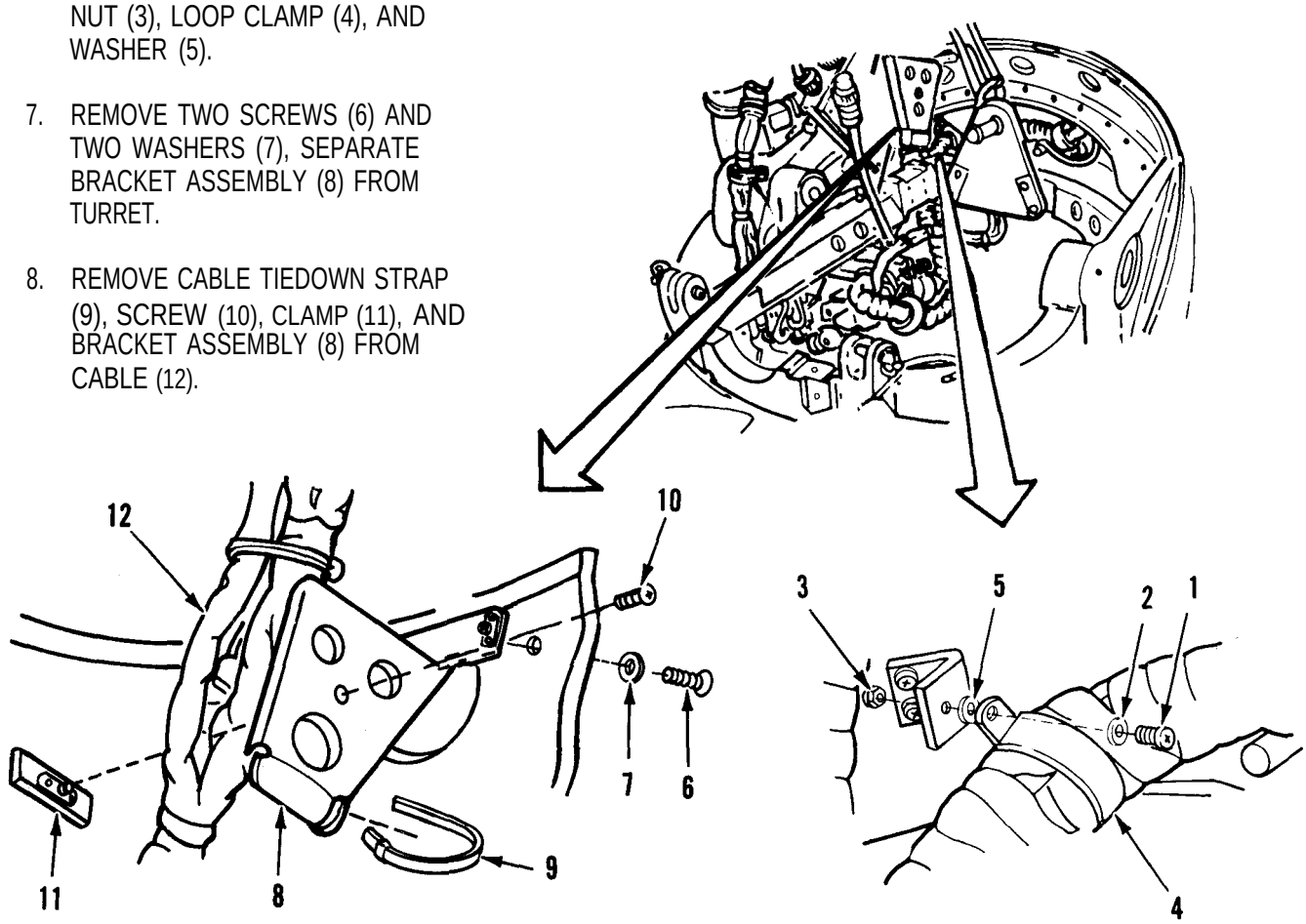
5. REMOVE SCREW (1), WASHER (2), AND LOOP CLAMP (3).



6. REMOVE SCREW (1), WASHER (2), NUT (3), LOOP CLAMP (4), AND WASHER (5).

7. REMOVE TWO SCREWS (6) AND TWO WASHERS (7), SEPARATE BRACKET ASSEMBLY (8) FROM TURRET.

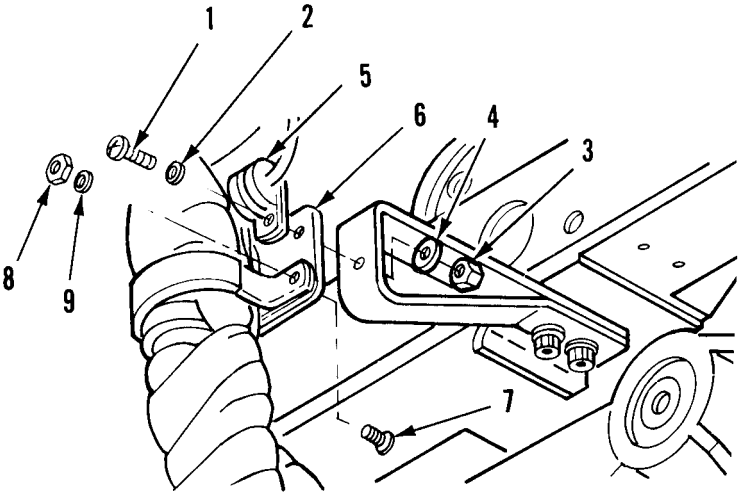
8. REMOVE CABLE TIEDOWN STRAP (9), SCREW (10), CLAMP (11), AND BRACKET ASSEMBLY (8) FROM CABLE (12).

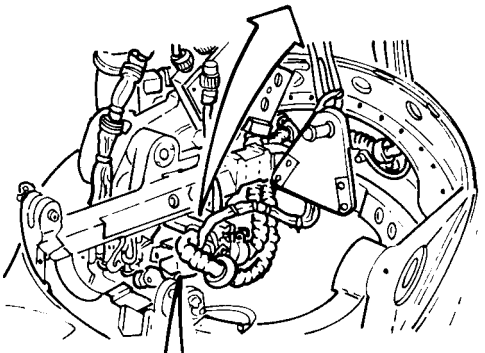


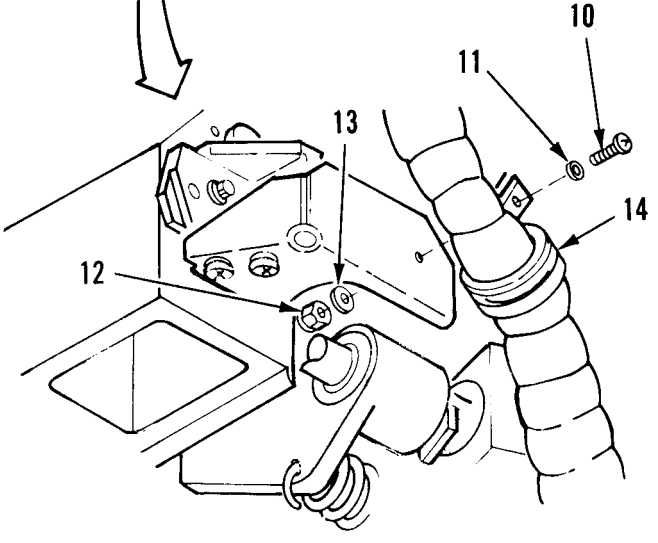
REMOVAL (cont)

9. REMOVE SCREW (1), WASHER (2), NUT (3), WASHER (4), LOOP CLAMP (5), AND CLAMP ASSEMBLY (6) FROM BRACKET, REMOVE SCREW (7), NUT (8), AND WASHER (9). SEPARATE CLAMPS FROM CABLES.

10. REMOVE SCREW (10), WASHER (11), NUT (12), WASHER (13), AND LOOP CLAMP (14).



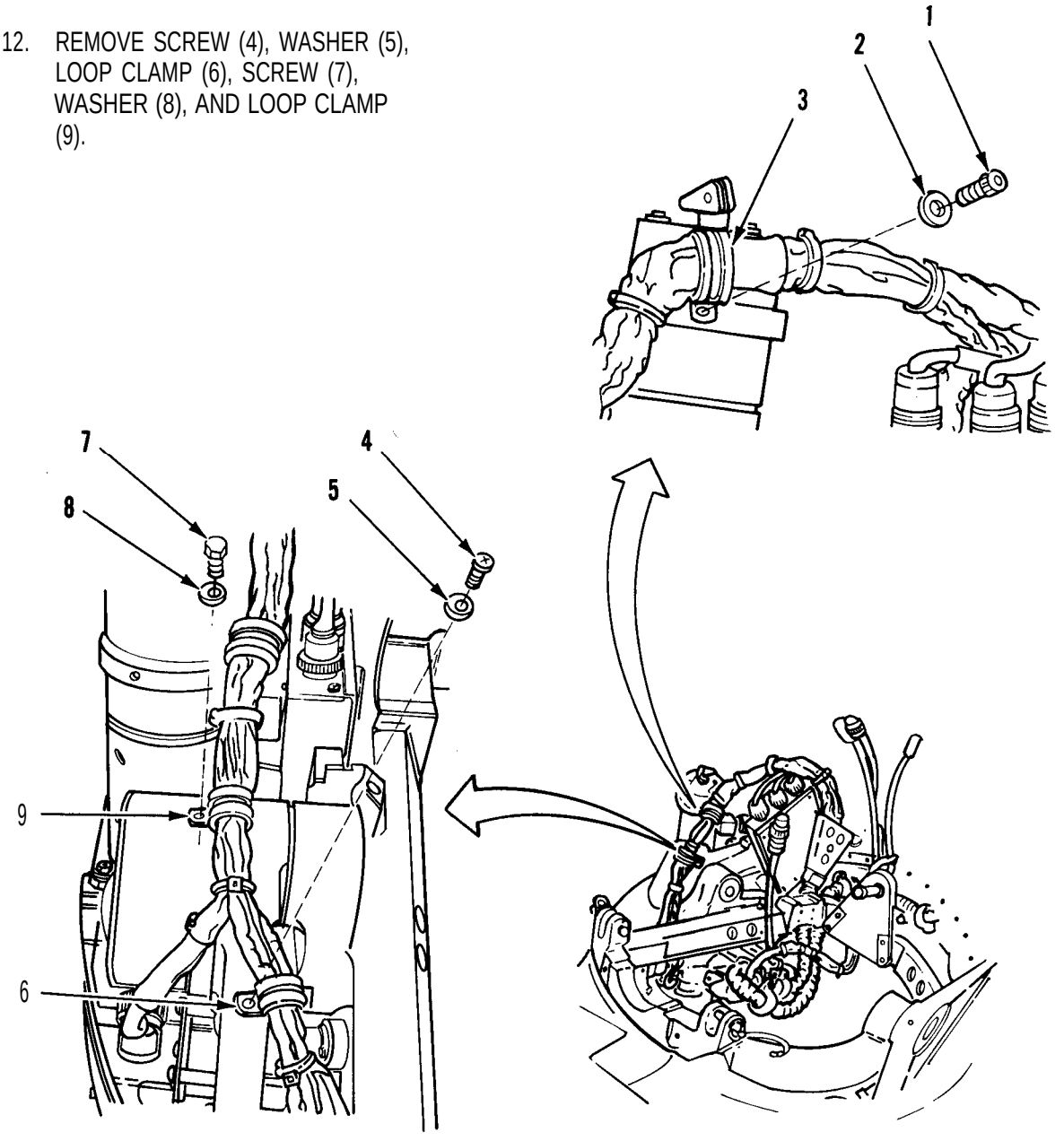




2-45.1. REMOVAL OF TURRET CABLES (cont)

11. REMOVE SCREW (1), WASHER (2), AND LOOP CLAMP (3).

12. REMOVE SCREW (4), WASHER (5), LOOP CLAMP (6), SCREW (7), WASHER (8), AND LOOP CLAMP (9).

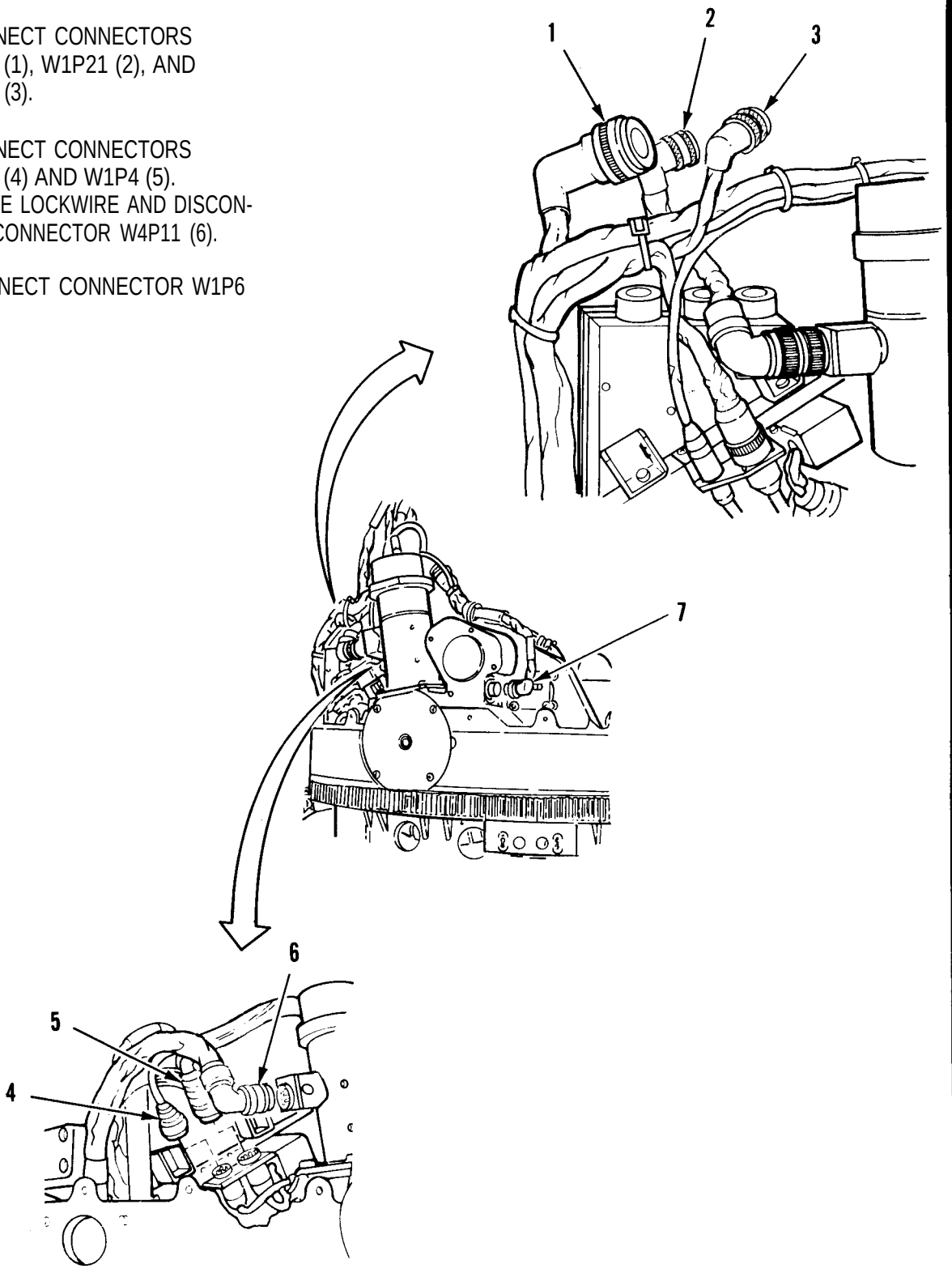


REMOVAL (cont)

13. DISCONNECT CONNECTORS W4P20 (1), W1P21 (2), AND W3P19 (3).

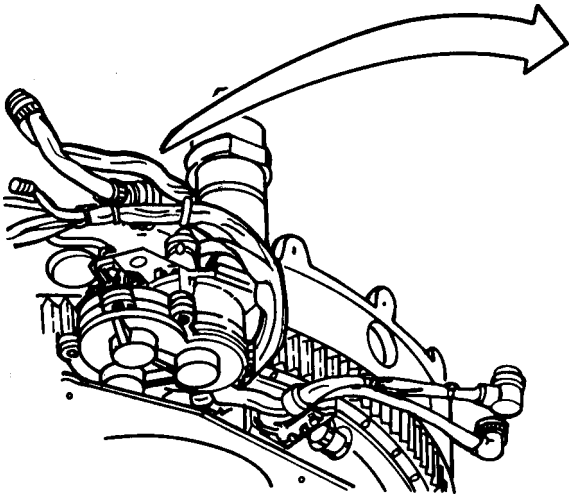
14. DISCONNECT CONNECTORS W1P12 (4) AND W1P4 (5). REMOVE LOCKWIRE AND DISCONNECT CONNECTOR W4P11 (6).

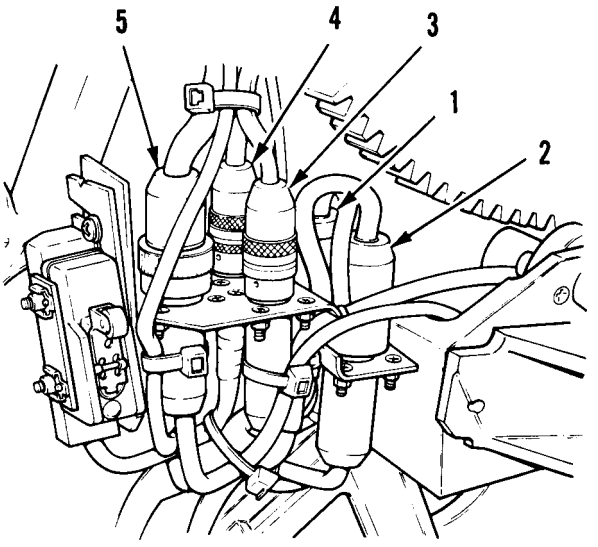
15. DISCONNECT CONNECTOR W1P6 (7).



2-45.1. REMOVAL OF TURRET CABLES (cont)

16. DISCONNECT CONNECTOR W5P1 (1) FROM A7J17; W5P2 (2) FROM A7J10; W1P17 (3) FROM W5J1; WIP18 (4) FROM A7J22; AND W1P13 (5) FROM W5J2.





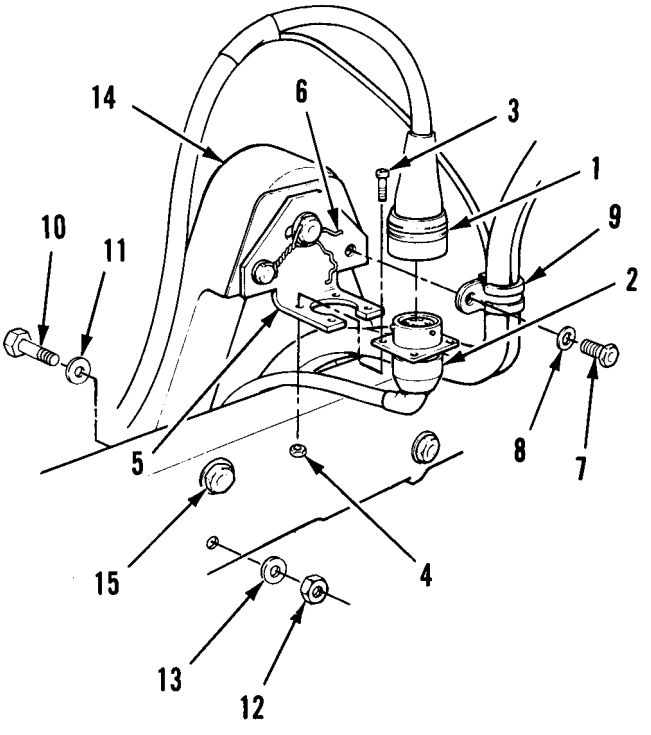
17. REMOVE CONNECTOR W2P1 (1) FROM CONNECTOR W3J1 (2).

18. REMOVE FOUR SCREWS (3), FOUR NUTS (4), AND CONNECTOR W3J1 (2) FROM BRACKET (5).

19. REMOVE LOCKWIRE (6), BOLT (7), WASHER (8), AND LOOP CLAMP (9).

20. REMOVE THREE BOLTS (10), THREE WASHERS (11), THREE NUTS (12), AND THREE WASHERS (13) FROM REAR SUPPORT (14), LOOSEN FOURTH BOLT (15) ENOUGH TO ROTATE REAR SUPPORT TO ONE SIDE.

21. REMOVE CABLE ASSEMBLY FROM TURRET.



END OF TASK

2-45.2. REPAIR OF CRIMPED-CONTACT CONNECTOR

DESCRIPTION

This task covers: Removal, repair, and installation of crimped-contact connector.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental

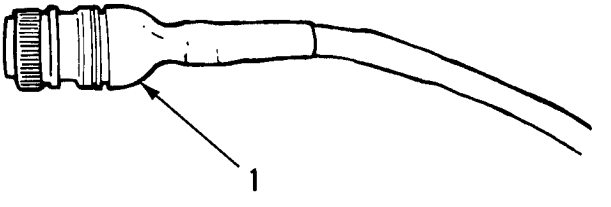
Materials:
- Adhesive (Item 8.1, APPX B)

Personnel Required:
- 68J Aircraft Armament\ Missile Systems Repairer

Equipment Conditions:
- REMOVAL OF TURRET CABLES performed, para 2-45.1.
- On bench in shop.

REMOVAL

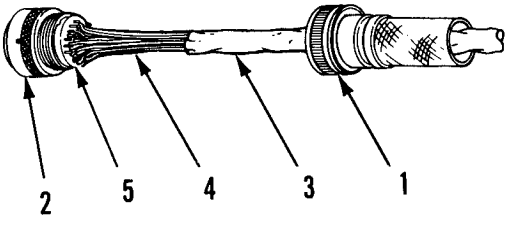
1. CUT BOOT (1) LENGTHWISE AND REMOVE FROM CABLE ASSEMBLY.



2. UNSCREW ADAPTER (1).

   a. Unscrew adapter (1) from connector (2),

   b. Slide adapter (1) and cable tubing (3) back along cable wires (4) to allow access to connector grommet (5).



2-45.2. REPAIR OF CRIMPED-CONTACT CONNECTOR (cont)

3. REMOVE CONNECTOR (1),

NOTE
Label each wire as it is removed.

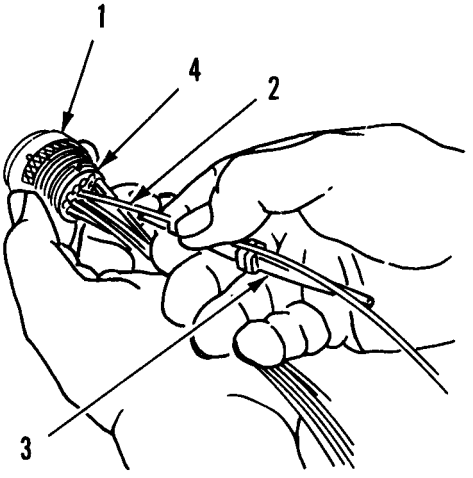
a. Place contact wire (2) into extraction tool (3).

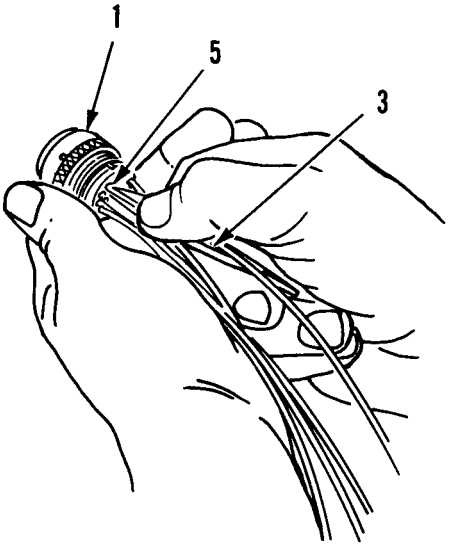
b. Push extraction tool (3) into cavity in connector grommet (4) until tool bottoms.

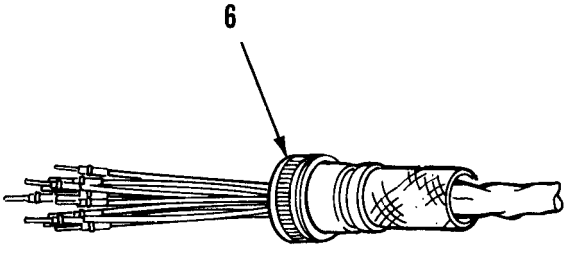
c. Carefully pull both wired contact (5) and extraction tool (3) from connector (1).

d. Repeat steps a, b, and c until all wired contacts are extracted and remove connector (1).

e. Remove adapter (6).







REPAIR

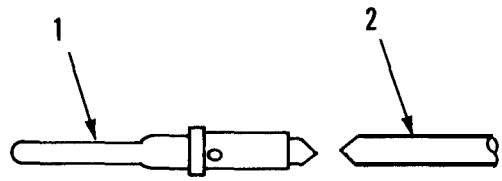
4. REPLACE ANY DAMAGED CONTACT (1).

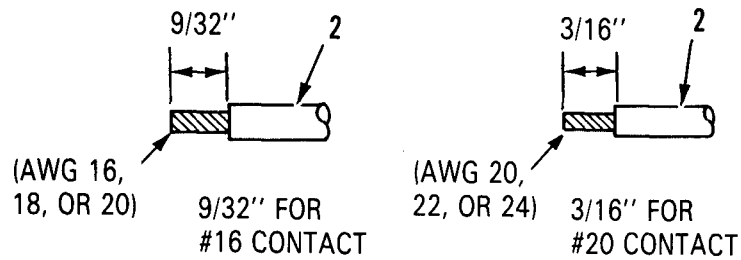
   a. Remove damaged contact (1) by cutting cable wire (2) at rear of contact.

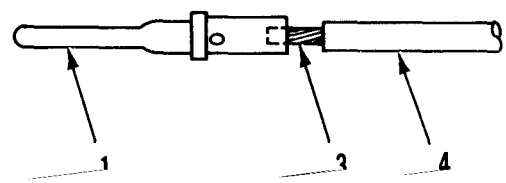
   b.
   contact size.

   c. Twist wire strands (3) and insert twisted wire into contact (1). Wire insulation (4) must touch rear of contact.

   d. Crimp contact (1) onto wire,

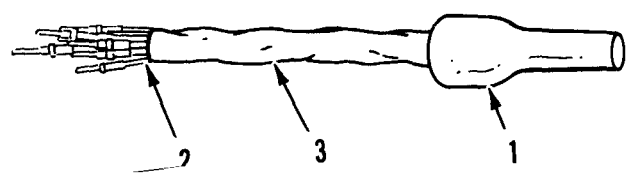






INSTALLATION

5. PLACE BOOT (1) OVER CABLE WIRES (2) AND CABLE TUBING (3).

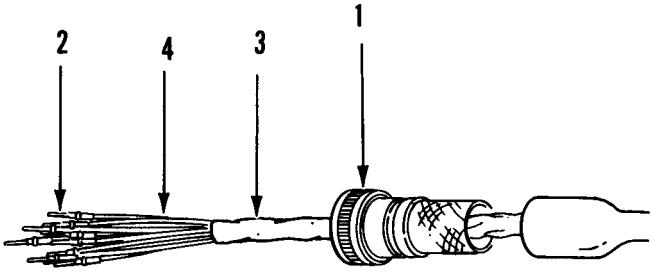


2-45.2. REPAIR OF CRIMPED-CONTACT CONNECTOR (cont)

6. INSTALL ADAPTER (1).

a. Insert wired contacts (2) through adapter (1)

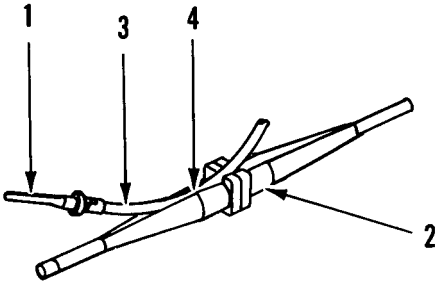
b. Slide adapter (1) and cable tubing (3) along cable wires (4) for a minimum distance of 6 in. (15.24 cm).

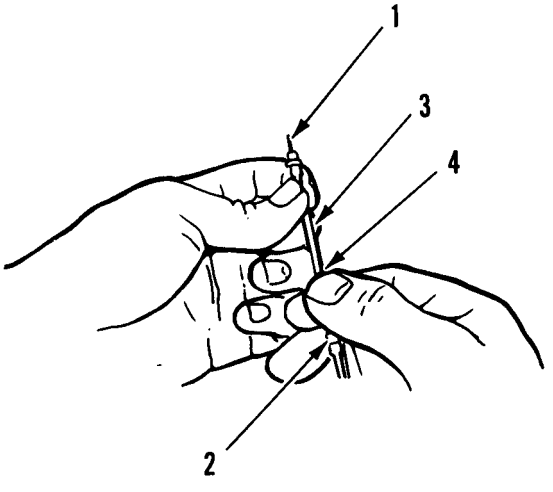


7. PLACE WIRED CONTACT (1) INTO INSERTION TOOL (2).

a. Place cable wire (3) into insertion tool (2) at large opening (4).

b. Slide insertion tool (2) back on cable wire (3) while holding thumb against cable wire at opening (4) until wired contact (1) slips into insertion tool.





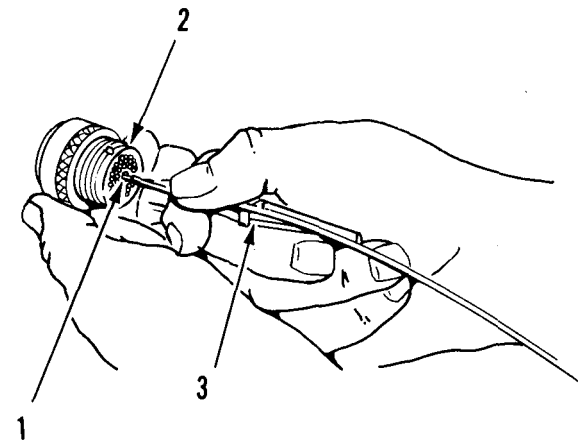
INSTALLATION (cont)

NOTE

Begin contact insertion at center of connector grommet.

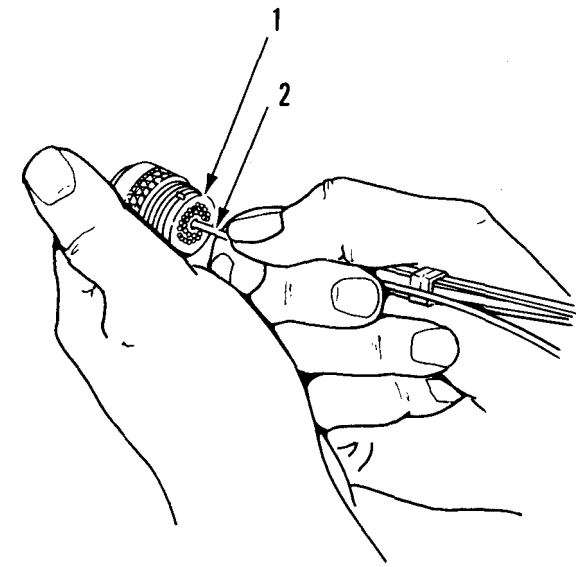
8. INSERT WIRED CONTACT (1) INTO CAVITY IN CONNECTOR GROMMET (2).

   Hold insertion tool (3) against shoulder of wired contact (1) and insert wired contact and tool into cavity in connector grommet (2) using firm, even pressure. When wired contact is completely inserted, a slight click will be heard.



9. CHECK THAT WIRED CONTACT IS LOCKED IN POSITION IN CONNECTOR GROMMET (1).

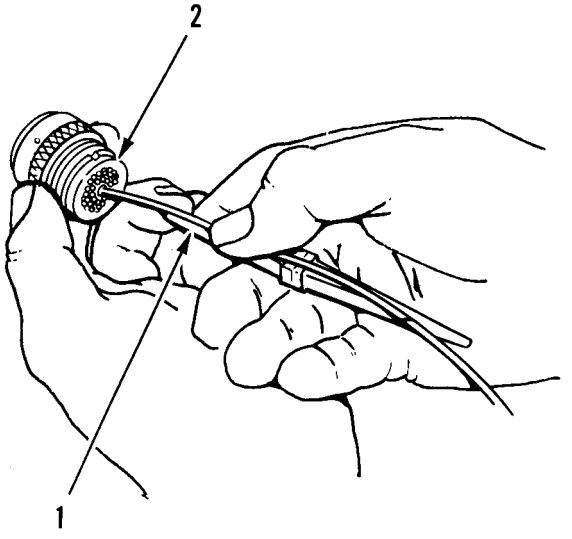
   Make certain that contact is locked in place by gently pulling back on contact wire (2).



2-45.2. REPAIR OF CRIMPED-CONTACT CONNECTOR (cont)

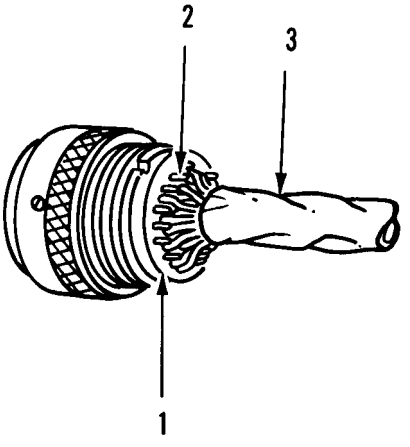
10. REMOVE INSERTION TOOL (1) FROM CONNECTOR GROMMET (2).

11. REPEAT STEPS 7 THRU 10 UNTIL ALL WIRED CONTACTS ARE INSERTED IN CONNECTOR GROMMET (2).



12. FILL UNWIRED CAVITIES IN CONNECTOR GROMMET (1) WITH SEALING PLUGS (2).

13. POSITION END OF CABLE TUBING (3) 7/16 IN (1.11 CM) FROM CONNECTOR GROMMET (1).



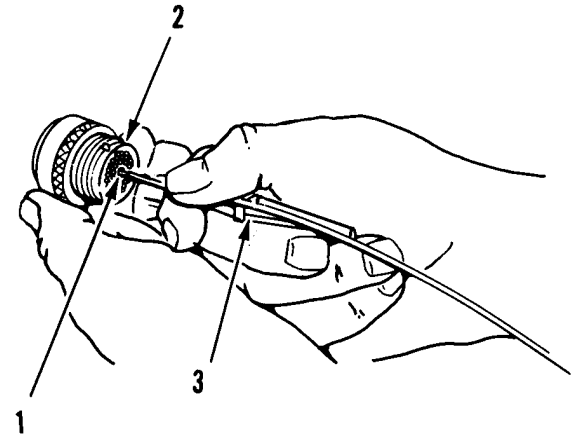
INSTALLATION (cont)

NOTE

Begin contact insertion at center of connector grommet.

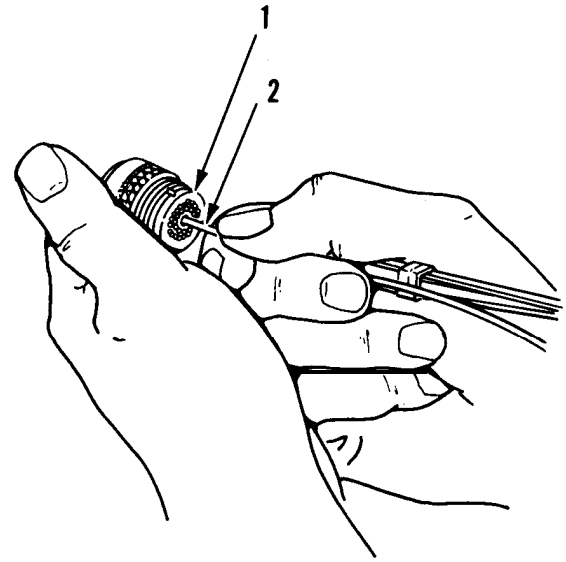
8. INSERT WIRED CONTACT (1) INTO CAVITY IN CONNECTOR GROMMET (2).

   Hold insertion tool (3) against shoulder of wired contact (1) and insert wired contact and tool into cavity in connector grommet (2) using firm, even pressure, When wired contact is completely inserted, a slight click will be heard.



9. CHECK THAT WIRED CONTACT IS LOCKED IN POSITION IN CONNECTOR GROMMET (1).

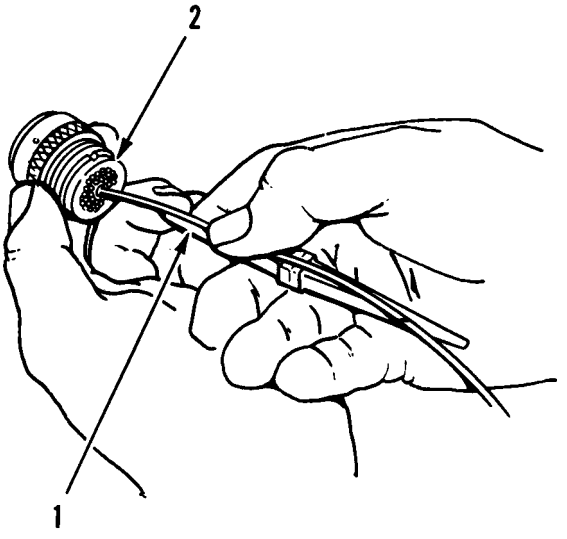
   Make certain that contact is locked in place by gently pulling back on contact wire (2).



2-45.2. REPAIR OF CRIMPED-CONTACT CONNECTOR (cont)

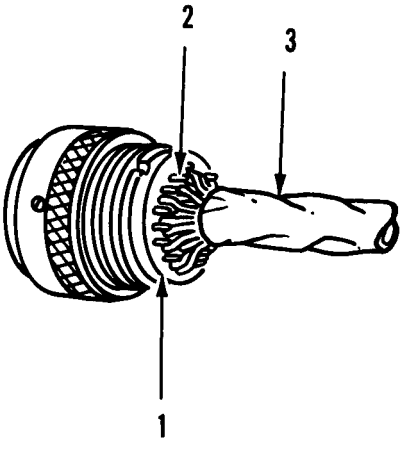
10. REMOVE INSERTION TOOL (1) FROM CONNECTOR GROMMET (2).

11. REPEAT STEPS 7 THRU 10 UNTIL ALL WIRED CONTACTS ARE INSERTED IN CONNECTOR GROMMET (2).



12. FILL UNWIRED CAVITIES IN CONNECTOR GROMMET (1) WITH SEALING PLUGS (2).

13. POSITION END OF CABLE TUBING (3) 7/16 IN. (1.11 CM) FROM coNNECTOR GROMMET (1).

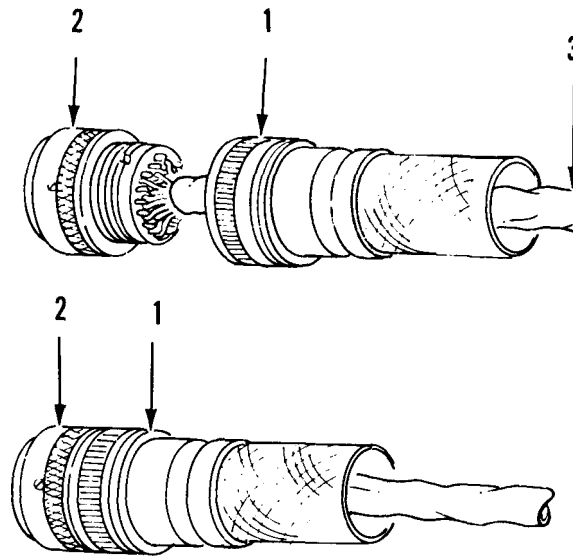


INSTALLATION (cont)

14. INSTALL ADAPTER (1) ON CONNECTOR (2).

    a. Slide adapter (1) along cable (3) toward connector (2).

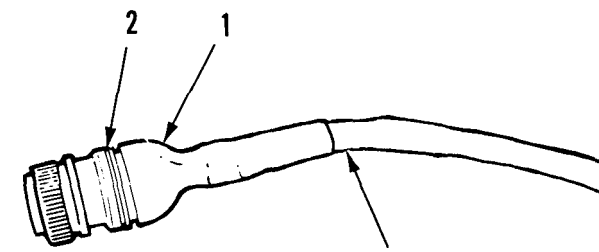
    b. Screw adapter (1) onto connector (2).



NOTE

Adhesive must cure for 24 hours.

15. BOND BOOT (1) TO ADAPTER (2) AND TUBING (3) BY APPLYING ADHESIVE (ITEM 8.1, APPX B) TO ADJOINING SURFACES.



END OF TASK

2-45.3. REPAIR OF CABLE W1

DESCRIPTION

This task covers: Inspection, repair, and test of cable W1.

INITIAL SETUP

Tools/Test and Support Equipment:
Tool Set, A/C Armament Repairman: Basic
Tool Set, A/C Armament Repairman: Supplemental

Personnel Required:
68J Aircraft Armament/Missile Systems Repairer

Equipment Conditions:
REMOVAL OF TURRET CABLES performed, para 2-45.1.
On bench in shop.

INSPECTION

1. INSPECT POWER INPUT CABLE, WI (1).

   Inspect cable WI (1) for loose hardware, bent connector pins, and fraying, Repair as required.

2. VERIFY ELECTRICAL CONTINUITY OF CABLE WI (1).

   Verify suspected defects in cable W1 (1) through point-to-point continuity checks using cable wiring diagram. If repair is required, continue with procedure.

REPAIR

3. REPAIR CABLE W1 CONNECTORS (2).

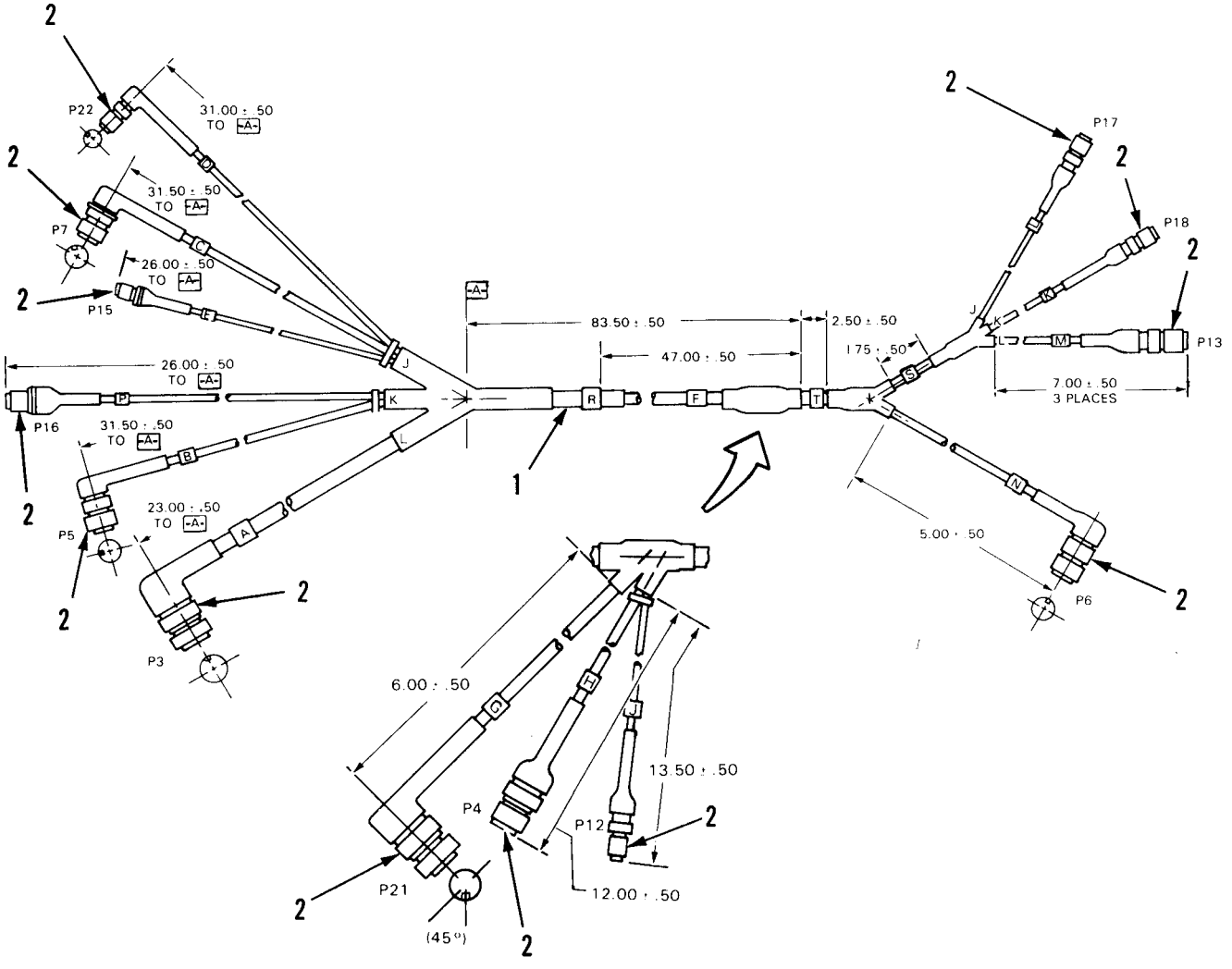
   See REPAIR OF CRIMPED-CONTACT CONNECTOR, para 2-45.2, and cable wiring diagram.

TEST

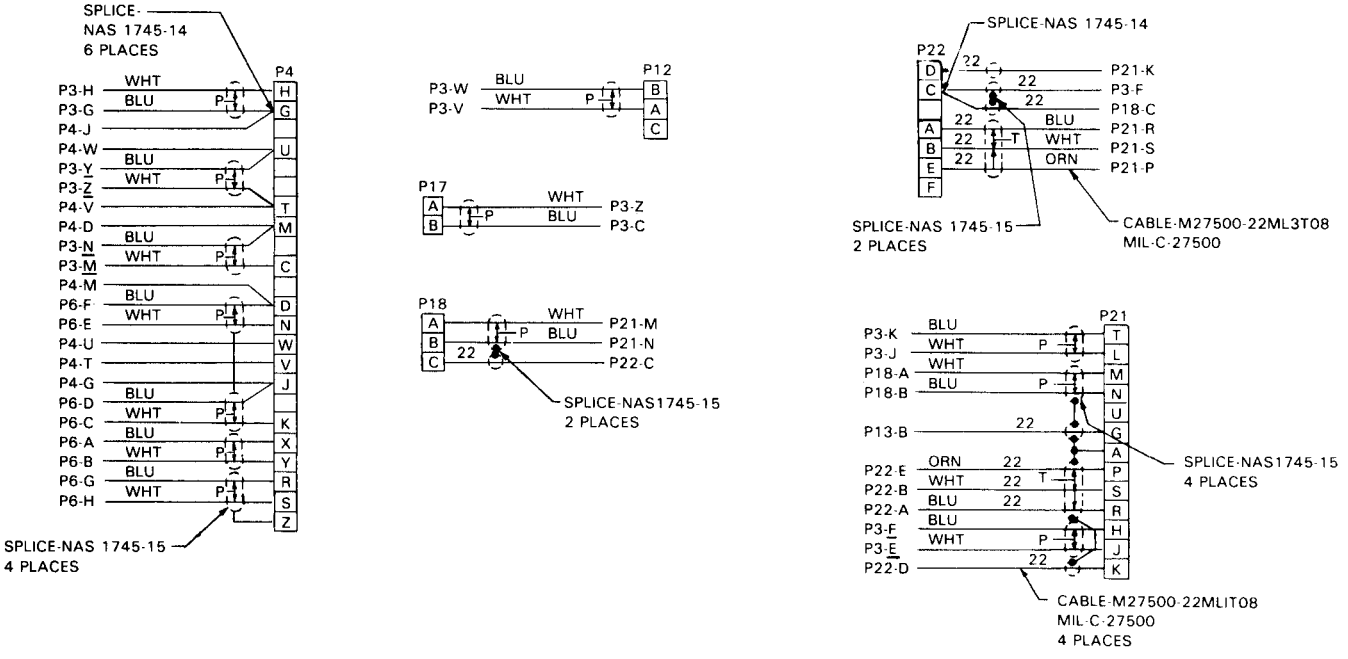
4. TEST CABLE W1 (1).

   Perform point-to-point continuity check of cable W1 (1). See cable wiring diagram, If cable is still defective, document defects and forward cable to next higher maintenance level.

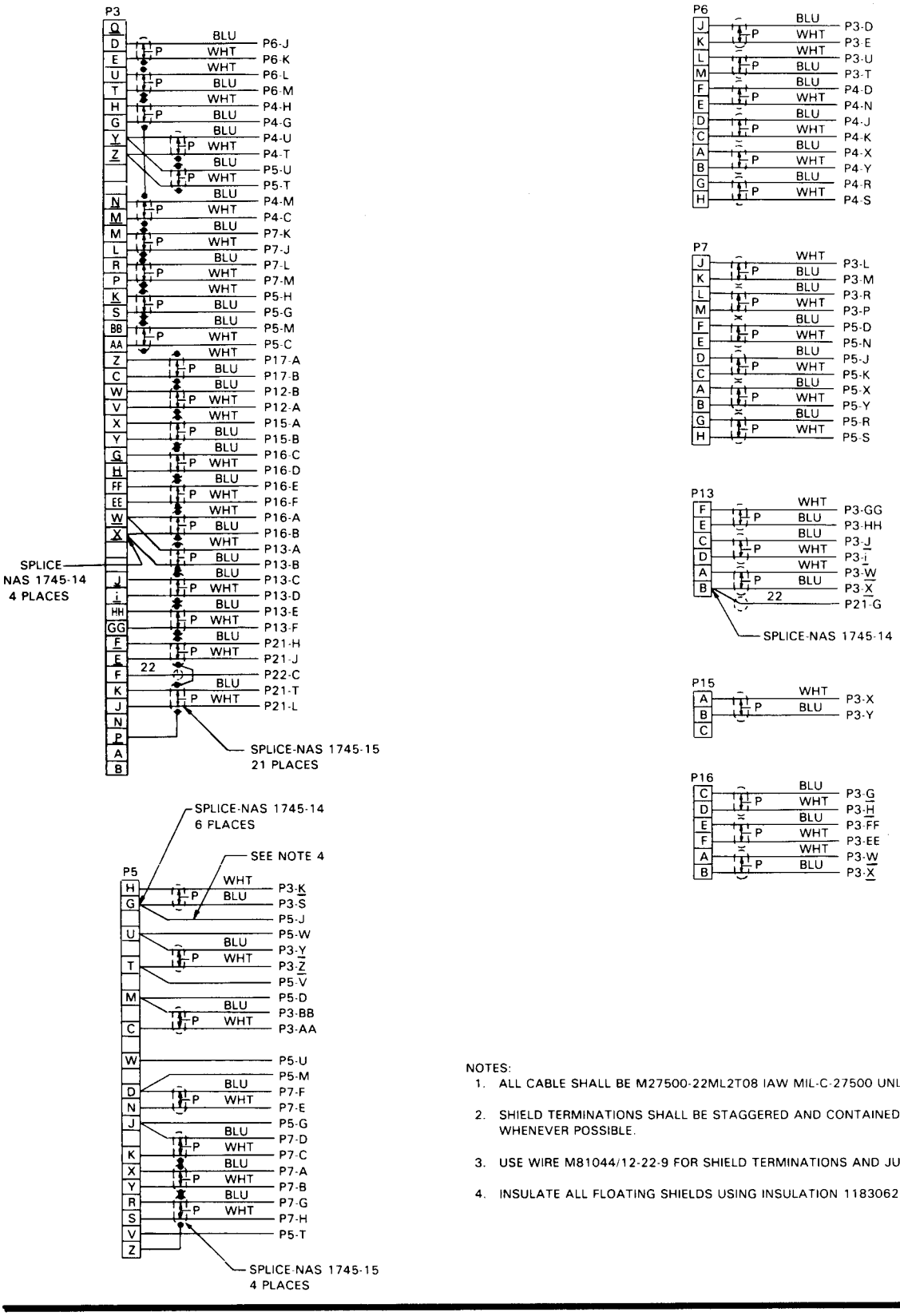
REPAIR OF CABLE W1 (cont)



2-45.3. REPAIR OF CABLE W1 (cont)



REPAIR OF CABLE W1 (cont)



NOTES:

1. ALL CABLE SHALL BE M27500-22ML2T08 IAW MIL-C-27500 UNLESS OTHERWISE SPECIFIED.
2. SHIELD TERMINATIONS SHALL BE STAGGERED AND CONTAINED WITHIN CONNECTOR BOOT WHENEVER POSSIBLE.
3. USE WIRE M81044/12-22-9 FOR SHIELD TERMINATIONS AND JUMPERS.
4. INSULATE ALL FLOATING SHIELDS USING INSULATION 11830621-150.

END OF TASK

2-45.4. REPAIR OF CABLE W2

DESCRIPTION

This task covers: Inspection, repair, and test of cable W2.

INITIAL SETUP

Tools/Test and Support Equipment:
Tool Set, A/C Armament Repairman: Basic
Tool Set, A/C Armament Repairman: Supplemental

Personnel Required:
68J Aircraft Armament/Missile Systems Repairer

Equipment Conditions:
REMOVAL OF TURRET CABLES performed, para 2-45.1.
On bench in shop.

INSPECTION

1, INSPECT EXTENSION CABLE, W2 (1).

Inspect cable W2 (1) for loose hardware, bent connector pins, and fraying, Repair as required.

2. VERIFY ELECTRICAL CONTINUITY OF CABLE W2 (1).

Verify suspected defects in cable W2 (1) through point-to-point continuity checks using cable wiring diagram. If repair is required, continue with procedure.

REPAIR

3. REPAIR CABLE W2 CONNECTORS (2).

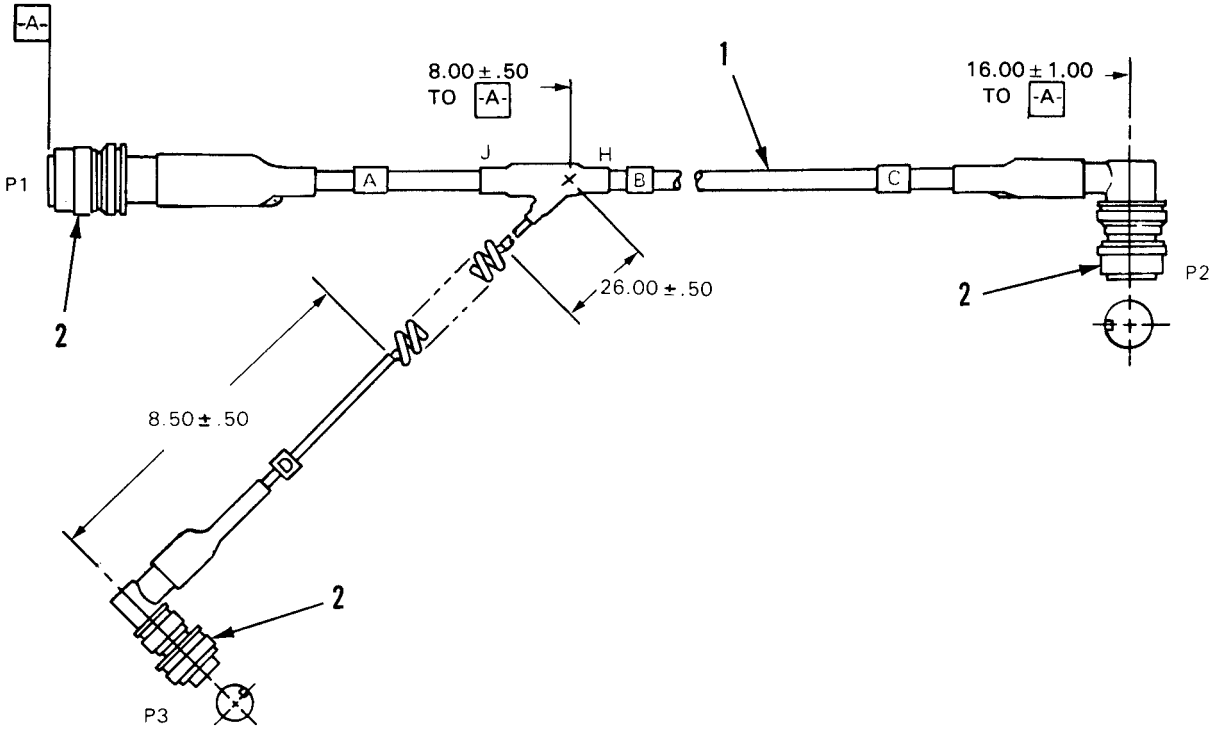
See REPAIR OF CRIMPED-CONTACT CONNECTOR, para 2-45.2, and cable wiring diagram.

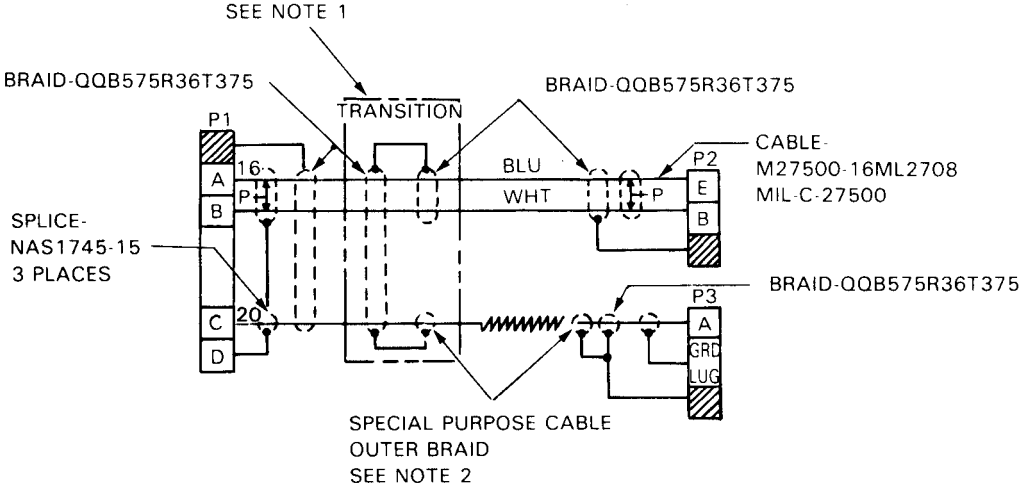
TEST

4, TEST CABLE W2 (1).

Perform point-to-point continuity check of W2 (1), See cable wiring diagram. If cable is still defective, document defects and forward cable to next higher maintenance level.

REPAIR OF CABLE W2 (cont)





NOTES:

1. WRAP SHIELDS UNDER TRANSITION WITH EMI TAPE 11831193 AND TACK SOLDER AS REQUIRED TO ADEQUATELY JOIN SHIELDS.

2. CONNECT SPECIAL PURPOSE CABLE OUTER BRAID TO P3 OUTER BRAID BY WRAPPING WITH EMI TAPE, AND TACK SOLDERING As REQUIRED. JOIN BRAIDS 6.00 MAX FROM COIL SECTION PRIOR TO SHRINKING OF TUBING.

3. ALL SHIELD TERMINATION JUMPER WIRES TO BE M81044/12-20-9 IAW MIL-W-81044/12.

END OF TASK

2-45.5. REPAIR OF CABLE W3

DESCRIPTION

This task covers: Inspection, repair, and test of cable W4.

INITIAL SETUP

Tools/Test and Support Equipment:
Tool Set, A/C Armament Repairman: Basic
Tool Set, A/C Armament Repairman: Supplemental

Personnel Required:
68J Aircraft Armament/Missile Systems Repairer

Equipment Conditions:
REMOVAL OF TURRET CABLES performed, para 2-45.1.
On bench in shop.

INSPECTION

1, INSPECT EXTENSION CABLE, W3 (1).

Inspect cable W3 (1) for loose hardware, bent connector pins, and fraying. Repair as required.

2. VERIFY ELECTRICAL CONTINUITY OF CABLE W3 (1).

Verify suspected defects in cable W3 (1) through point-to-point continuity checks using cable wiring diagram. If repair is required, continue with procedure.

REPAIR

3. REPAIR CABLE W3 CONNECTORS (2).

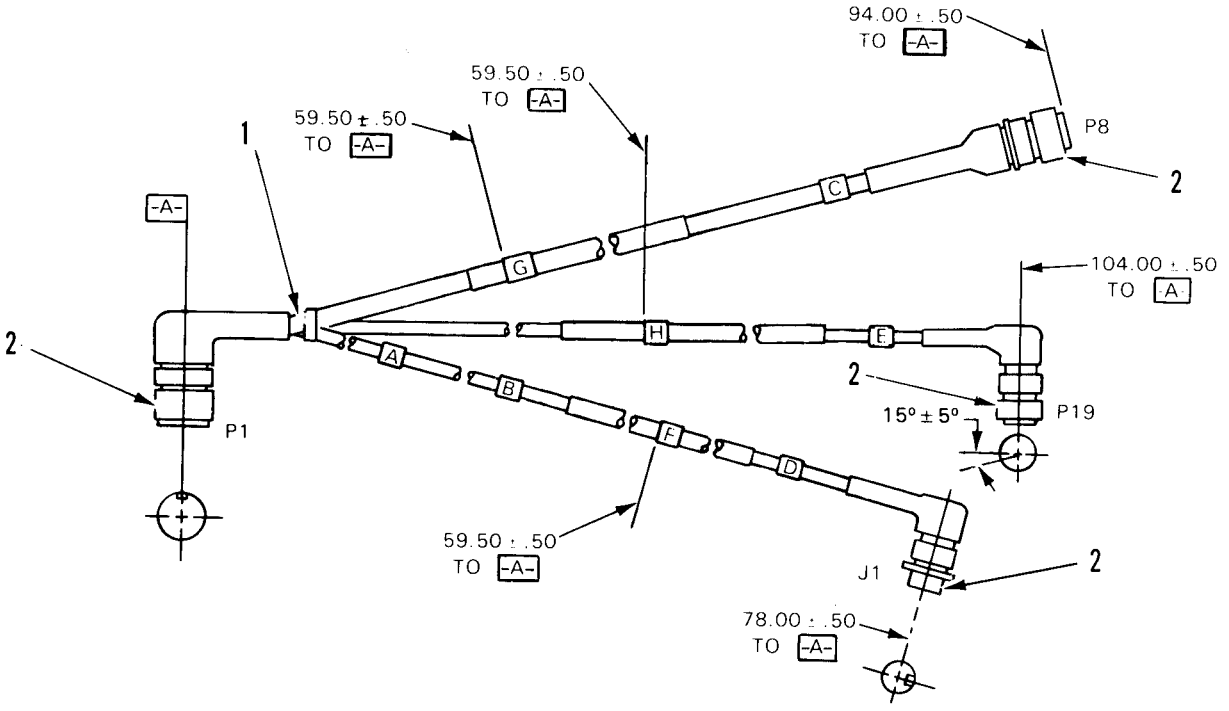
See REPAIR OF CRIMPED-CONTACT CONNECTOR, para 2-45.2, and cable wiring diagram.

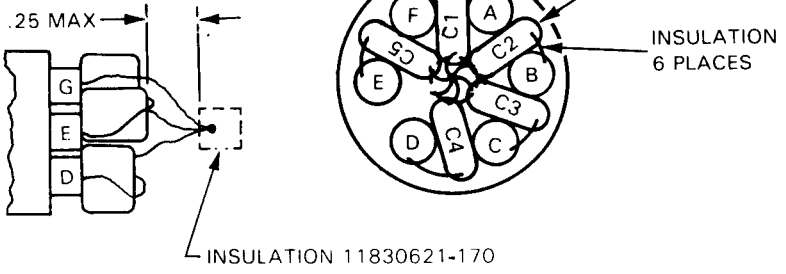
TEST

4, TEST CABLE W3 (1).

Perform point-to-point continuity check of cable W3 (1). See cable wiring diagram, If cable is still defective, document defects and forward cable to next higher maintenance level.

REPAIR OF CABLE W3 (cont)



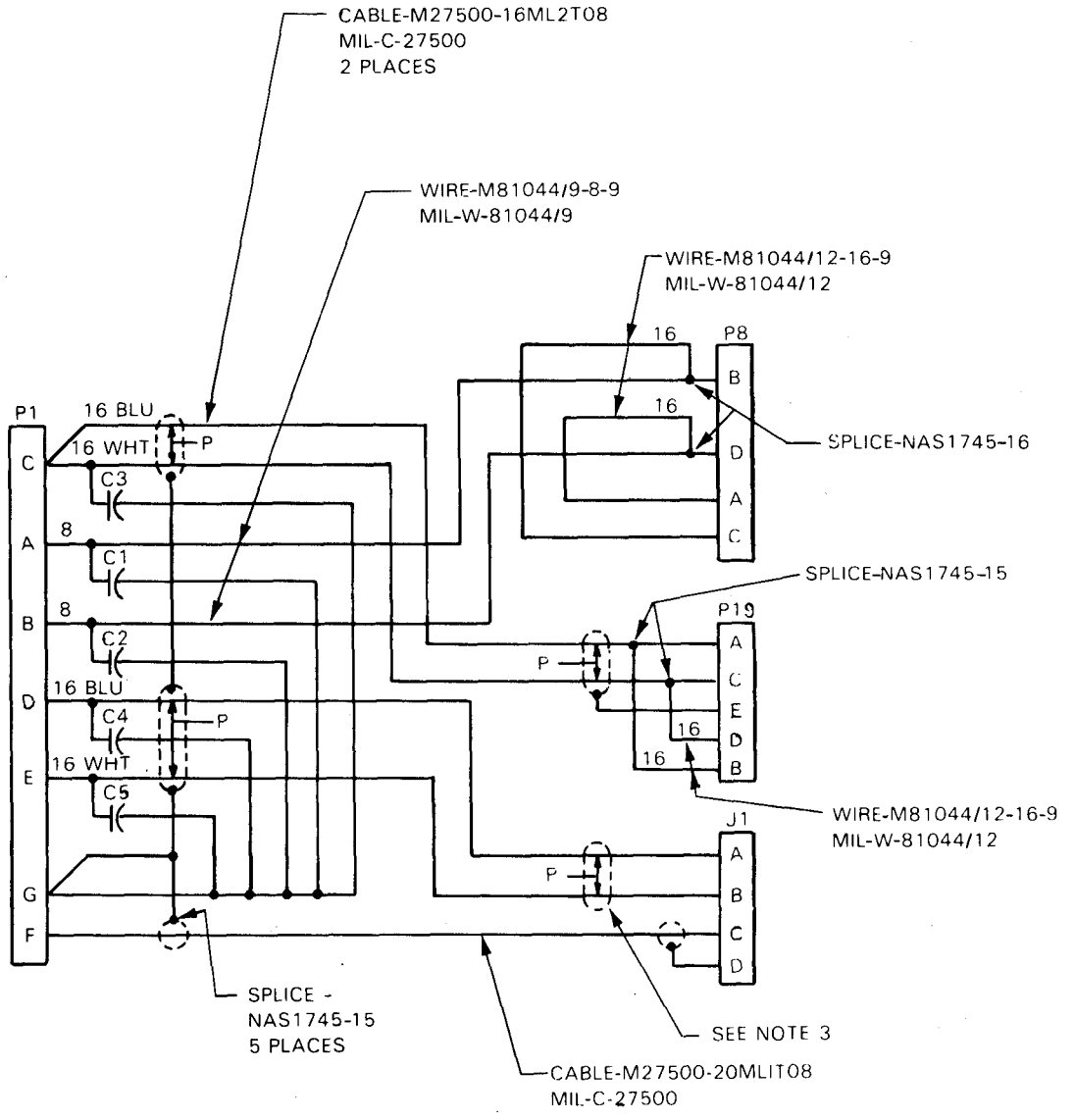


ARRANGEMENT OF C1 THRU C5
ASSEMBLED TO PINS OF P1

NOTES:

1. SHIELD TERMINATION SHALL BE STAGGERED AND CONTAINED WITHIN CONNECTOR BOOT WHEREVER POSSIBLE.
2. AWG NUMBER 8 WIRES SHALL BE TWISTED 3 ± 1 TURNS EACH FOOT BETWEEN P1 AND P8.
3. INSULATE FLOATING SHIELD ON J1 USING INSULATION 11830521-152.
4. IT IS PERMISSIBLE TO SOLDER WIRE TERMINATIONS INTO NUMBER 8 CONTACTS.
5. ALL SHIELD TERMINATION JUMPER WIRES TO BE M81044/12-20-9 IAW MIL-W-81044/12.

2-45.5. REPAIR OF CABLE W3 (cont)



END OF TASK

2-45.6 REPAIR OF CABLE W4

DESCRIPTION

This task covers: Inspection, repair, and test of cable W4.

INITIAL SETUP

Tools/Test and Support Equipment:
Tool Set, A/C Armament Repairman: Basic
Tool Set, A/C Armament Repairman: Supplemental

Personnel Required:
68J Aircraft Armament/Missile Systems Repairer

Equipment Conditions:
REMOVAL OF TURRET CABLES performed, para 2-45.1.
On bench in shop.

INSPECTION

1, INSPECT EXTENSION CABLE, W4 (1).

Inspect cable W4 (1) for loose hardware, bent connector pins, and fraying. Repair as required.

2. VERIFY ELECTRICAL CONTINUITY OF CABLE W4 (1).

Verify suspected defects in cable W4 (1) through point-to-point continuity checks using cable wiring diagram. If repair is required, continue with procedure.

REPAIR

3. REPAIR CABLE W4 CONNECTORS (2).

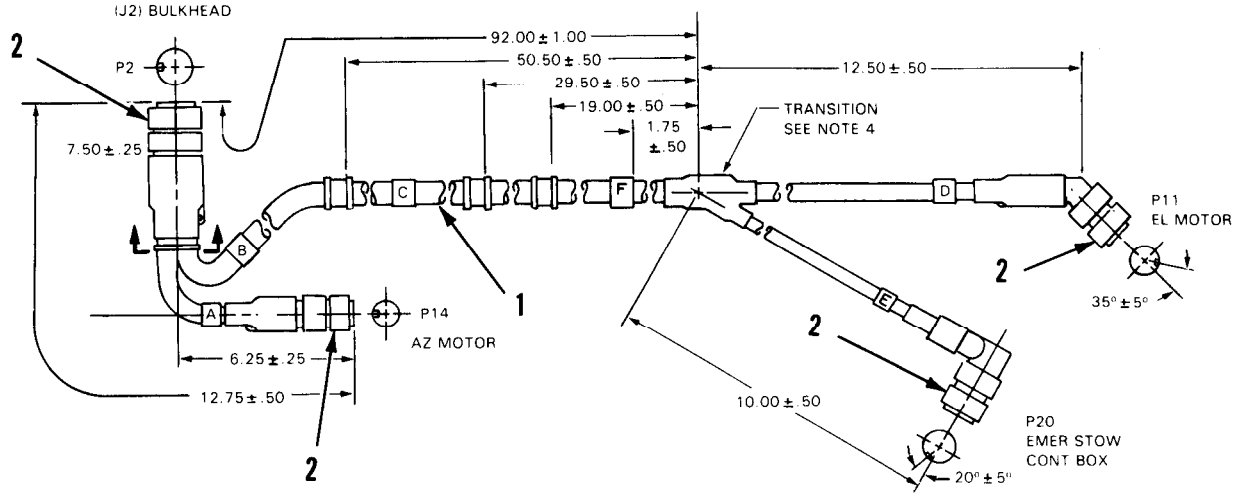
See REPAIR OF CRIMPED-CONTACT CONNECTOR, para 2-45.2, and cable wiring diagram,

TEST

4. TEST CABLE W4 (1).

Perform point-to-point continuity check of cable W4 (1). See cable wiring diagram. If cable is still defective, document defects and forward cable to next higher maintenance level.

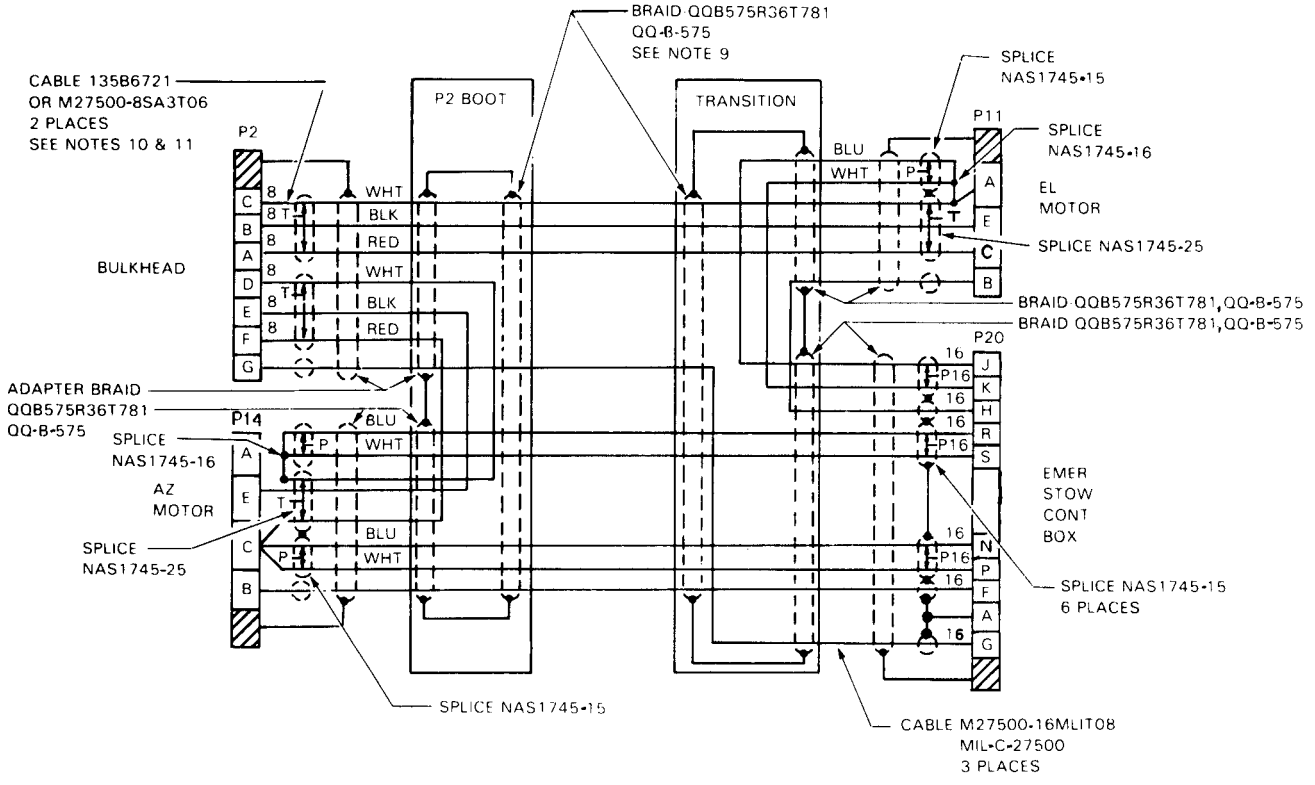
2-45.6. REPAIR OF CABLE W4 (cont)



NOTES:

1. ALL CABLE SHALL BE M27500-16ML 2 T0 8 IAW MIL-C-27500 UNLESS OTHERWISE
2. SHIELD TERMINATIONS SHALL BE STAGGERED AND CONTAINED WITHIN CONNECTOR BOOT WHEREVER POSSIBLE.
3. IT IS PERMISSIBLE FOR THE OUTER BRAID TO BE IN CONTACT WITH BUT NOT DIRECTLY SOLDERED TO THE INNER SHIELDS ON THE COMPLETED CABLE.
4. BOND BOOTS AND TRANSITION TO INSULATION SLEEVING USING ADHESIVE.
5. WRAP SHIELDS UNDER TRANSITION WITH EMI TAPE, 11831193, AND TACK SOLDER AS REQUIRED TO ADEQUATELY JOIN SHIELDS.
6. IT IS PERMISSIBLE TO SOLDER WIRE TERMINATIONS INTO NUMBER 8 CONTACTS.
7. WHEN ALTERNATIVE CABLE M27500-85AT06 IS USED, THE WIRES ARE COLOR CODED WHITE, BLUE, AND ORANGE IN PLACE OF WHITE, BLACK, AND RED RESPECTIVELY.
8. BOND APPROXIMATELY 1 IN. (2.54 CM) LENGTH OF FILLER 11831207 TO CABLES PRIOR TO SHRINKING OF BOOT.
9. AT INTERFACE OF BOOTS TO ADAPTERS, APPLY ADHESIVE 11831147 TO ENTIRE PERIMETER.
10. BETALLOY RING IS SUPPLIED WITH P11, P14 AND P20 ADAPTERS.
11. ALL SHIELD TERMINATION JUMPER WIRES TO BE M81044/1 2-20-9 IAW MIL-W-B1044112.

REPAIR OF CABLE W4 (cont)



END OF TASK

2-45.7. REPAIR OF CABLE W5

DESCRIPTION

This task covers: Inspection, repair, and test of cable W5.

INITIAL SETUP

Tools/Test and Support Equipment:
Tool Set, A/C Armament Repairman: Basic
Tool Set, A/C Armament Repairman: Supplemental

Personnel Required:
68J Aircraft Armament/Missile Systems Repairer

Equipment Conditions:
REMOVAL OF TURRET CABLES performed, para 2-45.1.
On bench in shop.

INSPECTION

1. INSPECT SYSTEM TEST CABLE, W5 (1).

   Inspect cable W5 (1) for loose hardware, bent connector pins, and fraying, Repair as required,

2. VERIFY ELECTRICAL CONTINUITY OF CABLE W5 (1).

   Verify suspected defects in cable W5 (1) through point-to-point continuity checks using wiring diagram. If repair is required, continue with procedure.

REPAIR

3. REPAIR CABLE W5 CONNECTORS (2).

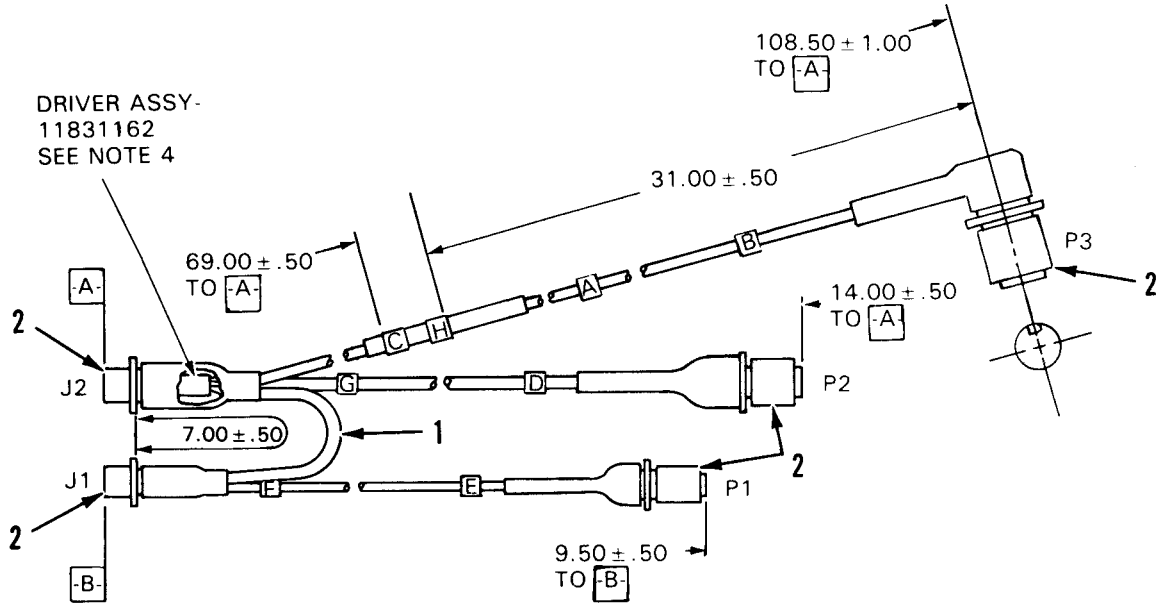
   See REPAIR OF CRIMPED-CONTACT CONNECTOR, para 2-45.2, and cable wiring diagram.

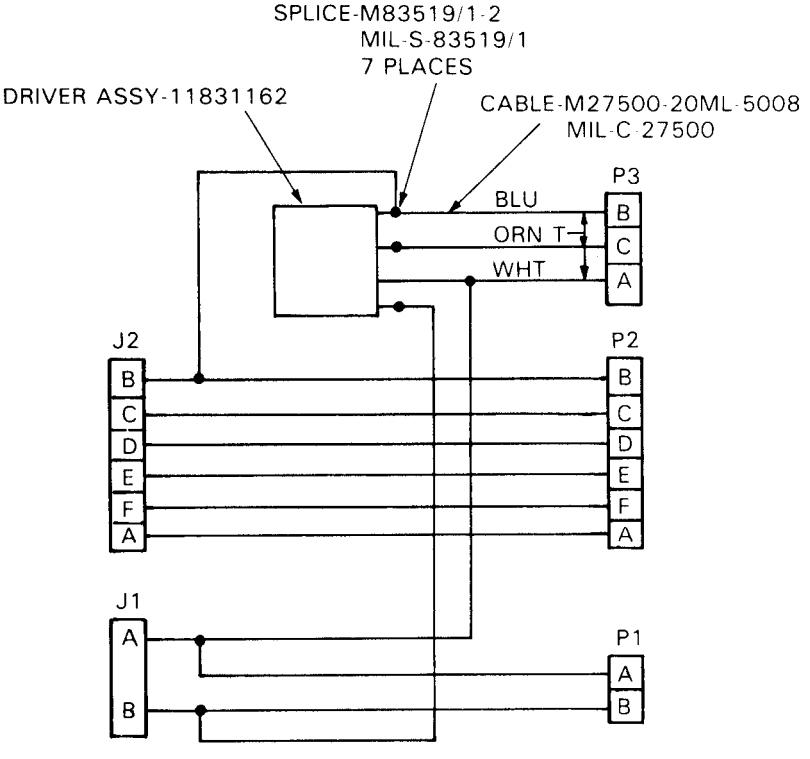
TEST

4, TEST CABLE W5 (1).

Perform point-to-point continuity check of cable W5 (1). See cable wiring diagram, If cable is still defective, document defects and forward cable to next higher maintenance level.

REPAIR OF CABLE W5 (cont)





NOTES

1. ALL WIRE SHALL BE M81044/12-22-9 IAW MIL-W-81044/12 UNLESS OTHERWISE SPECIFIED.

2. AT INTERFACE OF BOOTS TO ADAPTERS OR CONNECTORS, APPLY ADHESIVE TO ENTIRE PERIMETER.

3. B0ND BOOT TO TUBING USING ADHESIVE.

4. DRIVER ASSY 11831162 SHALL BE CONTAINED WITHIN BOOT AND HELD SECURELY IN WIRE BUNDLE USING TEFLON TAPE.

END OF TASK

2-45.8. INSTALLATION OF TURRET CABLES

DESCRIPTION

This task covers: Installation.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental

Materials:
- Insulation Sleeving (Item 13.1. Appx B)
- Lockwire (Item 17, Appx B)

Personnel Required:
- 68J Aircraft Armament/Missile Systems Repairer (2)

Equipment Conditions:
- REMOVAL OF TURRET CABLES performed, para 2-45.1.

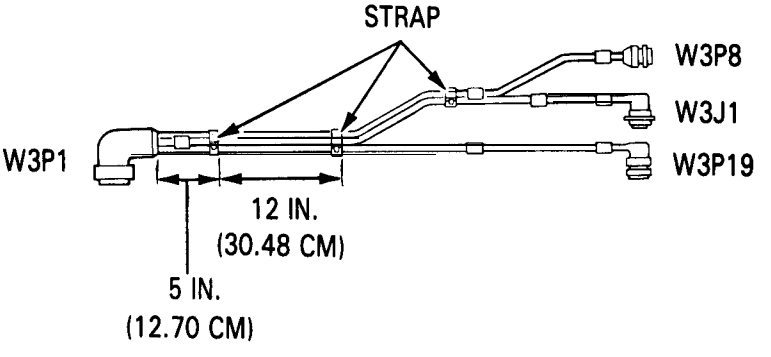
INSTALLATION

CAUTION

MAKE SURE KEYS AND KEYWAYS ARE ALINED WHEN MATING CONNECTORS. DO NOT FORCE. USE ONLY CONNECTOR PLIERS TO TIGHTEN OR LOOSEN CONNECTORS.

USE CABLE STRAPS TO KEEP CABLING RUNS AS COMPACT AS POSSIBLE. MAKE SURE CABLING IS SECURE AND WILL NOT INTERFERE WITH TURRET OPERATIONS.

1. LAY CABLE W3 ON BENCH AND INSTALL THREE CABLE STRAPS AS SHOWN.

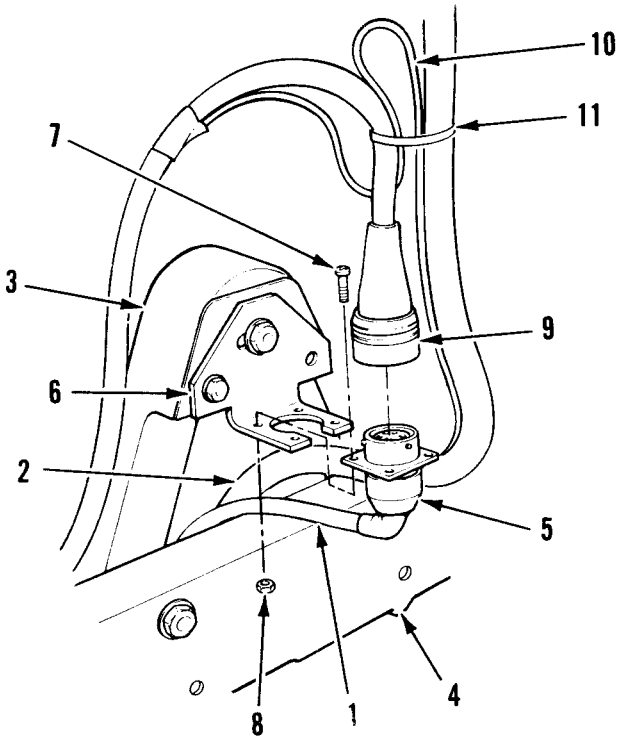


INSTALLATION (cont)

2. PLACE W3 CABLE IN TURRET. ALINE CLAMP AREA OF W3J1 AND W3P8 WITH SADDLE CLAMP BRACKET. ROUTE W3J1 (1) AND W3P8 (2) BRANCHES BETWEEN REAR SUPPORT (3) AND SADDLE (4).

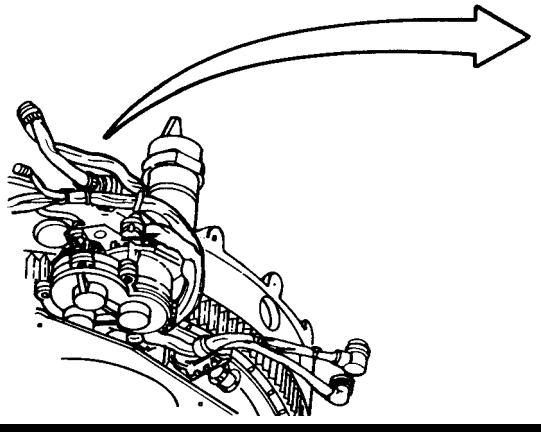
3. POSITION W3J1 CONNECTOR (5) (KEYWAY TO FRONT) ON BRACKET (6). INSTALL FOUR SCREWS (7) AND FOUR NUTS (8).

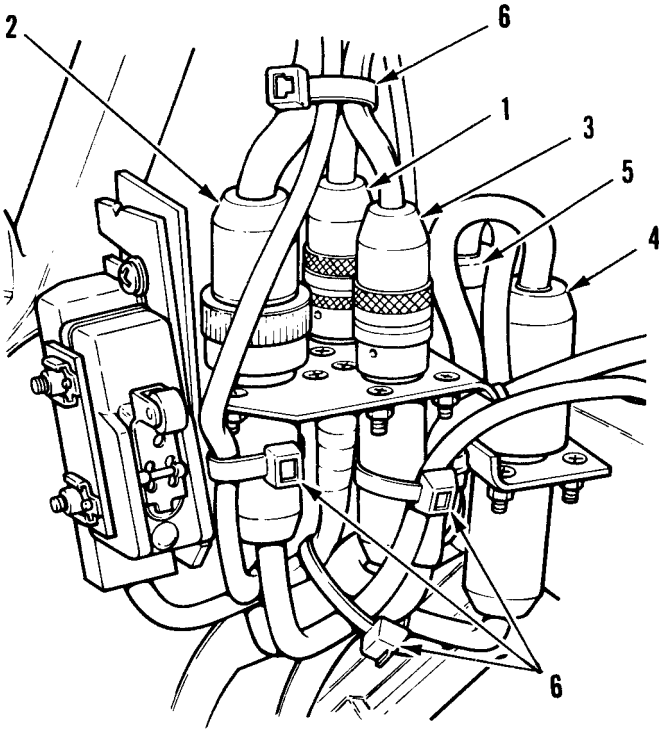
4. PLACE W2 CABLE IN TURRET. CONNECT W2P1 CONNECTOR (9) TO W3J1 CONNECTOR (5). ROUTE W2P3 (10) DOWNWARD BETWEEN WEAPON SADDLE AND REAR SUPPORT. SECURE W3P8 (21, W2P1 (9), AND LOOP OF W2P3 (10) WITH CABLE STRAP (11).



5. PLACE W1 CABLE ASSEMBLY IN TURRET AND MAKE CONNECTION TO ELEVATION STOW BRACKET ASSEMBLY AS FOLLOWS: W1P18 (1) TO A7J22; W1P13 (2) TO W5J2; W1P17 (3) TO W5J1; W5P2 (4) TO A7J10; AND W5P1 (5) TO A7J17.

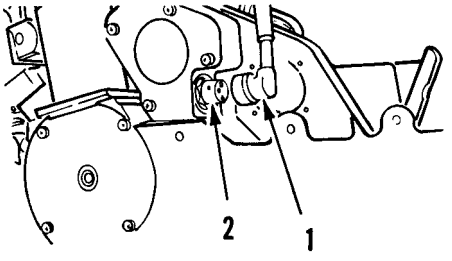
6. INSTALL FOUR CABLE STRAPS (6) AS SHOWN.





2-45.8. INSTALLATION OF TURRET CABLES (cont)

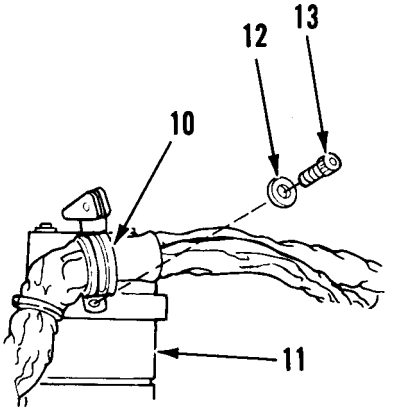
7. CONNECT W1P6 (1) TO ELEVATION RESOLVER A7J3 (2).

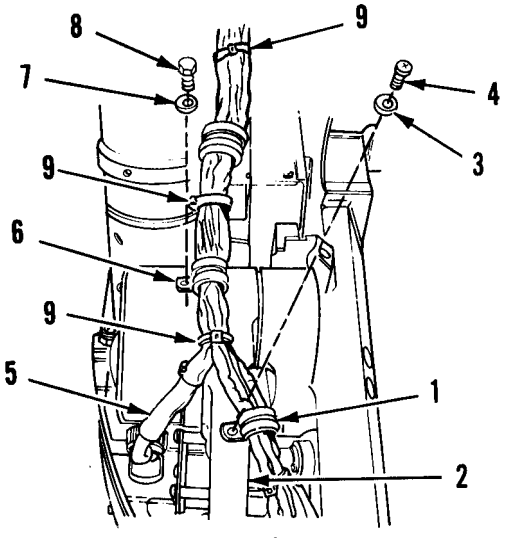


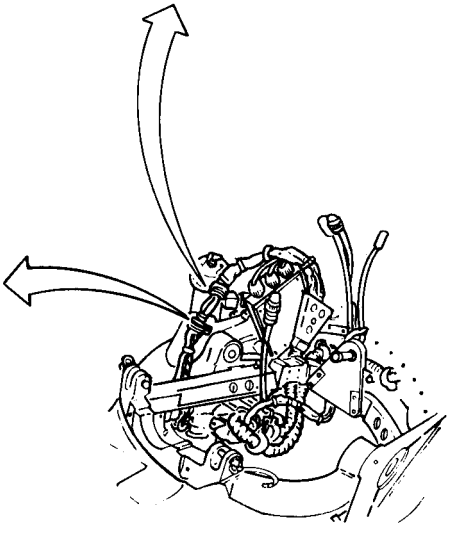
8. GATHER CABLES W1P18, W1P13, W1P17, AND W5P3 FROM ELEVATION STOW BRACKET ASSEMBLY AND SECURE THEM IN PLACE WITH LOOP CLAMP (1), ATTACH LOOP CLAMP TO BRACE (2) WITH WASHER (3) AND BOLT (4).

9. ADD W16 BRANCH (5) TO CABLE BUNDLE AND SECURE BUNDLE TO TURRET WITH LOOP CLAMP (6), WASHER (7), AND BOLT (8), INSTALL THREE CABLE STRAPS (9).

10. PLACE LOOP CLAMP (10) AROUND BUNDLE AT ELEVATION DRIVE MOTOR (11), SECURE LOOP CLAMP TO ELEVATION DRIVE MOTOR WITH WASHER (12) AND SCREW (13).







INSTALLATION (cont)

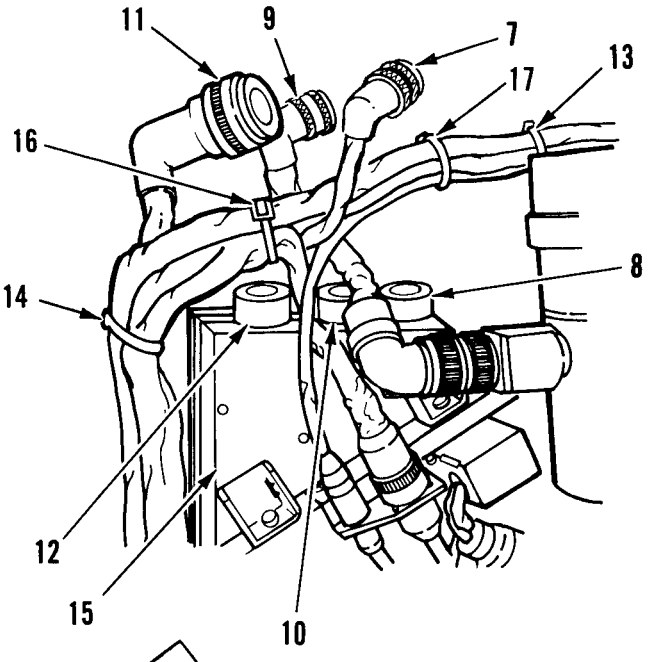
11. CONNECT W1P4 (1) TO ELECTRONIC AMPLIFIER A7J1 (2) AND W1P12 (3) TO ELEVATION TACHOMETER A7J9 (4).

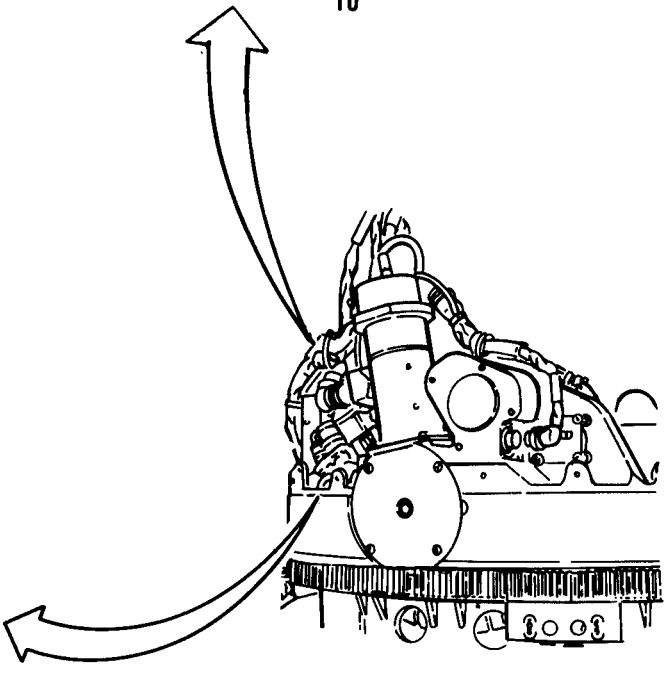
12. PLACE W4 CABLE IN TURRET, CONNECT W4P11 (5) TO ELEVATION DRIVE MOTOR A7J8 (6), SECURE CONNECTORS WITH LOCKWIRE (ITEM 17, APPX B).

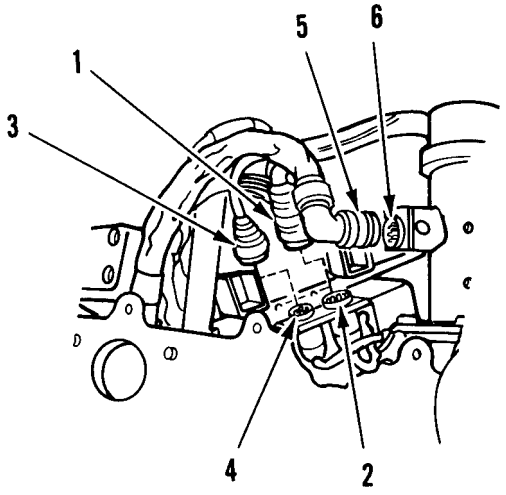
13. CONNECT W3P19 (7) TO A7A1J1 (8); W1P21 (9) TO A7A1J3 (10); AND W4P20 (11) TO A7A1J2 (12).

14. INSTALL A STRAP (13) AROUND BUNDLE APPROXIMATELY 3 IN. (7.62 CM) FROM CENTER OF ELEVATION DRIVE MOTOR.

15. INSTALL STRAP (14) AROUND BUNDLE NEAR END OF EMERGENCY STOW BOX (15). INSTALL THIRD STRAP (16) BETWEEN THE FIRST TWO. INSTALL FOURTH STRAP (17) APPROXIMATELY 4 IN. (10.16 CM) BEYOND CONNECTOR W4P20 (11).







2-45.8 INSTALLATION OF TURRET CABLES (cont)

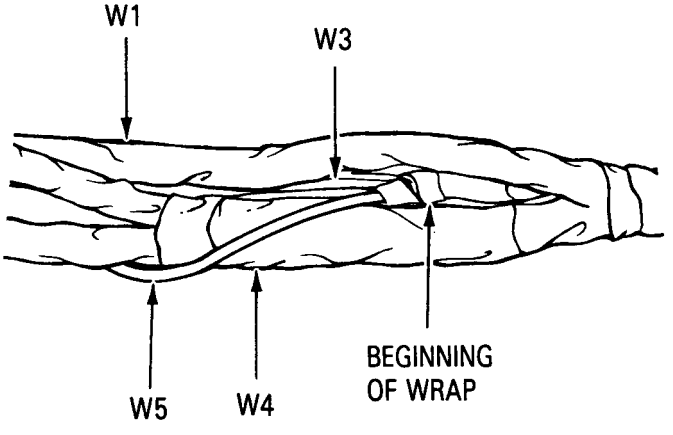
16. CUT 16 FT (4.88 M) OF INSULATION SLEEVING (ITEM 13.1, APPX B). COIL UP AND TAPE ALL BUT 5 FT (1 .52 M) OF INSULATION SLEEVING TO FACILITATE HANDLING.

NOTE

BEFORE STARTING MAIN WRAPPING, THE WRAP SHOULD BE LOCKED IN POSITION BY MAKING TWO OR THREE TURNS AROUND A SMALLER CABLE. WHEN FINISHING THE WRAPPING, TAKE TWO OR THREE TURNS AROUND A SMALLER CABLE TO LOCK THE WRAP IN POSITION.

KEEP CABLE BUNDLE TAUT AND WRAP CLOCKWISE. WRAPPING DOES NOT OVERLAP; SEGMENTS BUTT TOGETHER.

17. HOLD CABLE BUNDLE TAUT. START WRAPPING TWO SMALLER CABLES, W3 AND W5, APPROXIMATELY 2 IN. (5.08 CM) AHEAD OF CLAMP AREA ON W4 CABLE, TOWARD EMERGENCY STOW CONTROL, FOR APPROXIMATELY 5 IN. (12.70 CM).



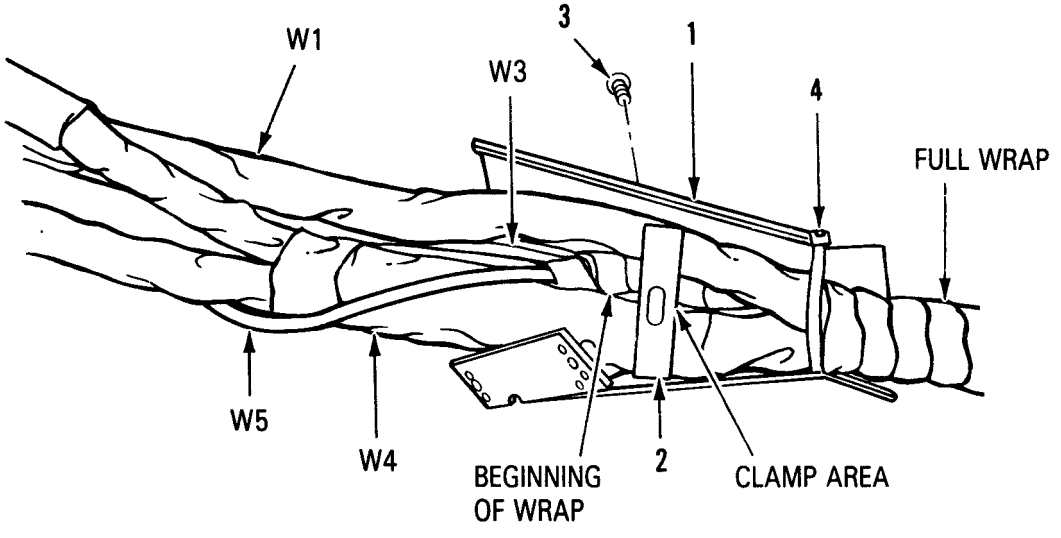
INSTALLATION (cont)

18. PLACE CABLE BRACKET (1) ON CABLE ASSEMBLY. CABLES SHOULD BE ARRANGED AS SHOWN.

19. LOOSELY INSTALL BRACKET PLATE (2) AND SCREW (3). WRAP COMPLETE BUNDLE TWO TURNS BEYOND END OF BRACKET BEFORE TIGHTENING SCREW.

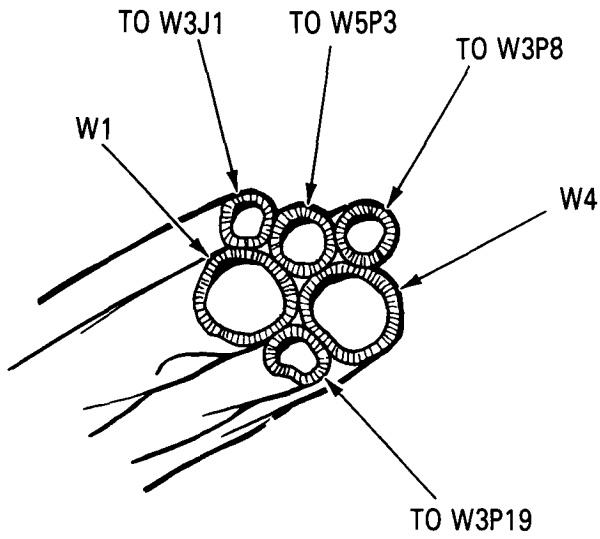
20. MAKE SURE ALL CABLES ARE IN PLACE UNDER BRACKET PLATE AND SCREW IS IN CLAMP AREA ON W4 CABLE. TIGHTEN SCREW (3) UNTIL CABLES ARE FIRMLY SECURED.

21. INSTALL CABLE STRAP (4) AROUND BRACKET PLATE AND CABLE BUNDLE.



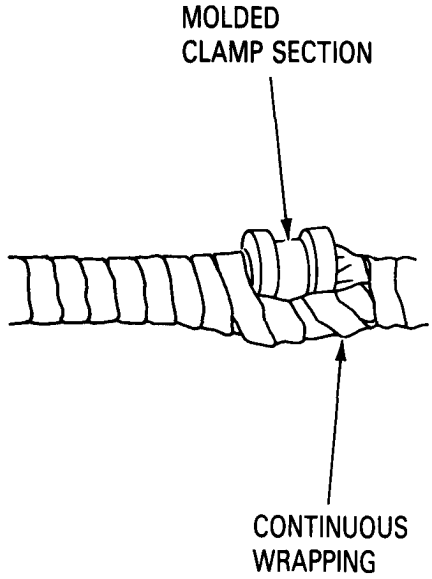
2-45.8. INSTALLATION OF TURRET CABLES (cont)

22. ARRANGE CABLING SO WHEN THE CLAMP AREA, INCLUDING MOLDED SECTION OF W4, IS REACHED THE CABLES WILL BE POSITIONED AS SHOWN.



23. INSTALL A CABLE STRAP TEMPORARILY AROUND SECOND MOLDED SECTION TO HOLD CABLES IN PLACE.

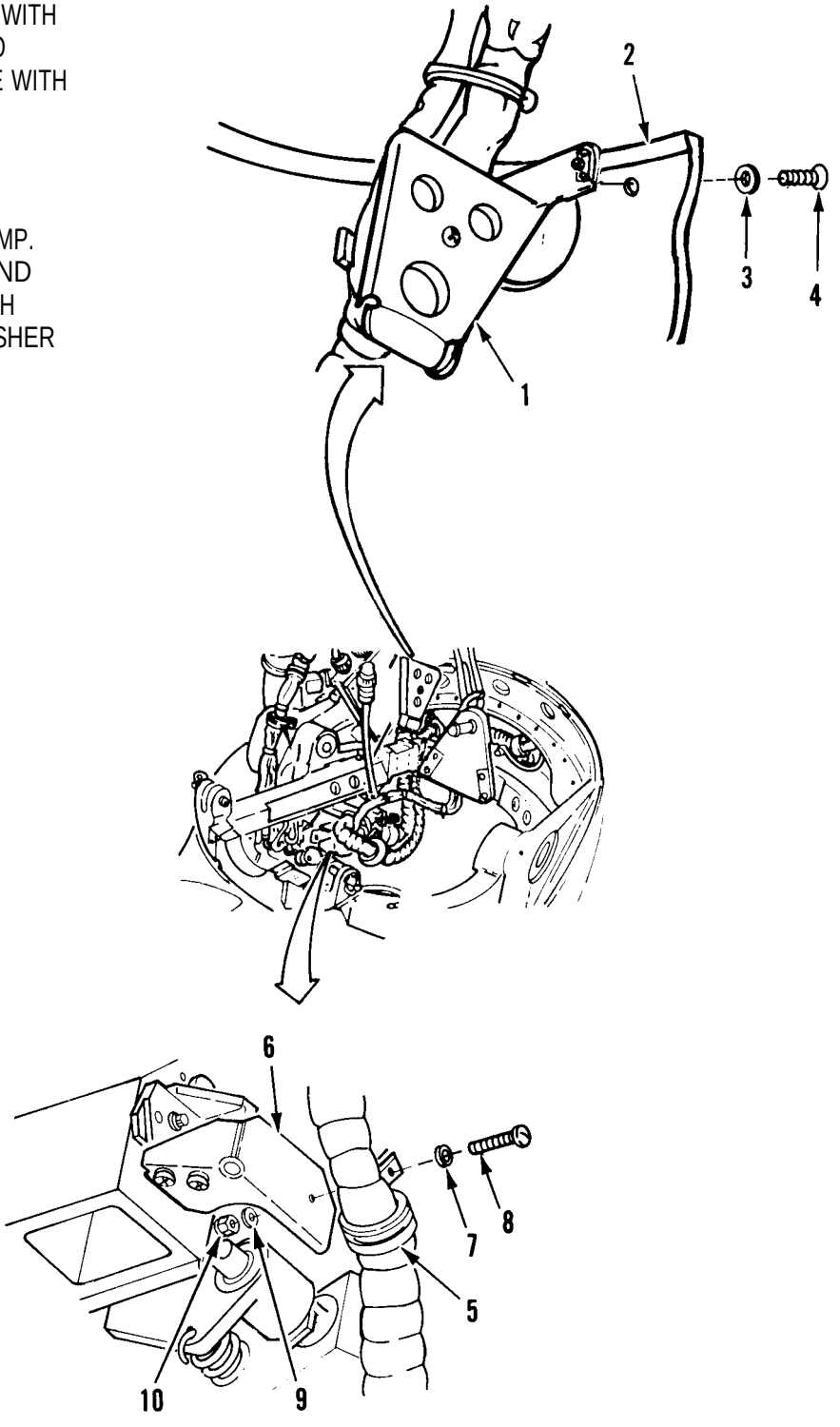
24. PROCEED WRAPPING BY PASSING MOLDED CLAMP SECTIONS AS SHOWN, UNTIL JUST BEYOND SECOND MOLDED CLAMP SECTION, TAKE THREE TURNS AROUND SMALLEST CABLE TO LOCK AND TERMINATE WRAPPING AT THIS POINT.



INSTALLATION (cont)

25. INSTALL CABLE BRACKET (1) WITH ATTACHED CABLE BUNDLE TO LOWER SUPPORT (2); SECURE WITH TWO WASHERS (3) AND TWO SCREWS (4).

26. INSTALL LOOP BRACKET (5) AROUND FIRST MOLDED CLAMP. SECTION OF W4 CABLE AND SECURE TO BRACKET (6) WITH WASHER (7), SCREW (8), WASHER (9), AND NUT (10).



2-45.8. INSTALLATION OF TURRET CABLES (cont)

27. SHAPE CABLE BUNDLE SO THAT SECOND MOLDED CLAMP SECTION OF W4 CABLE LINES UP WITH SADDLE CLAMP BRACKET (1) AND CLAMP AREAS OF W1 , W3, AND W5. INSTALL CLAMP ASSEMBLY (2) AROUND MOLDED CLAMP sEc-TION OF W4 AND CLAMP AREAS OF WI, W3, AND W5, SECURE CLAMP WITH SCREW (3), WASHER (4), AND SELF-LOCKING NUT (5).

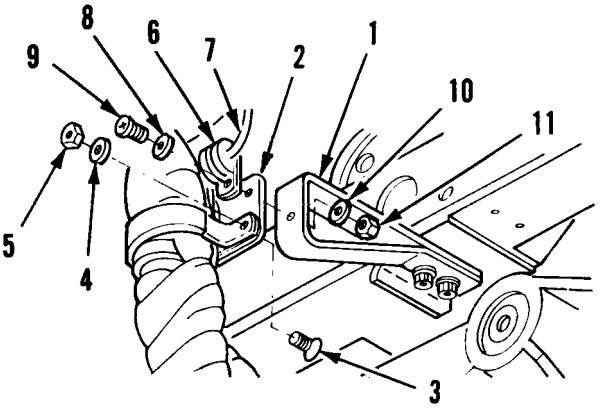
28. INSTALL CLAMP (6) AROUND FIRE VOLTS CABLE W2P3 (7). SECURE CLAMP (6) AND CLAMP ASSEMBLY (2) TO SADDLE CLAMP (1) WITH WASHER (8), SCREW (9), WASHER (10), AND SELF-LOCKING NUT (11).

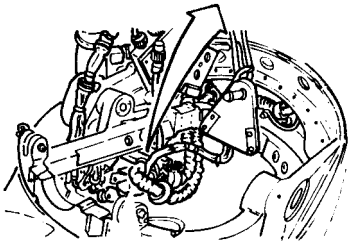
NOTE

DO NOT WRAP W5P3 CABLE BRANCH IN CABLE BUNDLE. IT MUST BE BROKEN OUT OF CABLE BUNDLE AT SECOND MOLDED CLAMP SECTION.

29. REMOVE STRAP THAT TIES W3P8 AND W3J1 TOGETHER AND BRING THOSE BRANCHES TO SECOND W4 MOLDED CLAMP SECTION TO BE WRAPPED WITH CABLE BUNDLE. CONTINUE WRAPPING CABLE BUN-DLE, EXCEPT W5P3 BRANCH, LAY-ING CABLES IN WITHOUT TWISTS AND TURNS, KEEP BUNDLES AS SMALL AS POSSIBLE.

30. CONTINUE WRAPPING PAST THIRD MOLDED CLAMP SECTION, TER-MINATING WRAP AT CABLE EXIT HOLE IN UPPER SUPPORT.

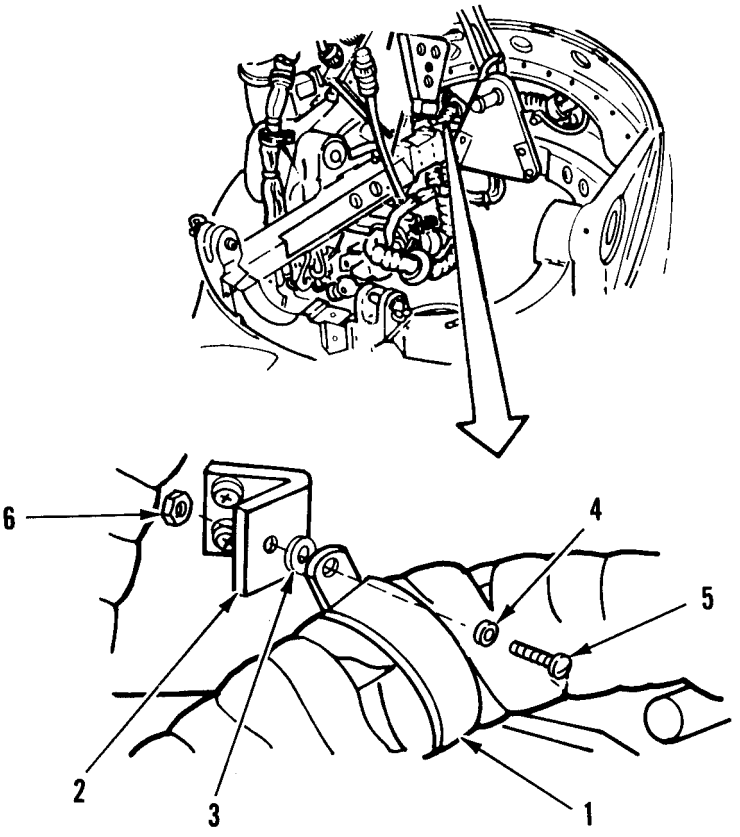




INSTALLATION (cont)

31. INSTALL LOOP CLAMP AROUND BUNDLE AT THIRD MOLD.

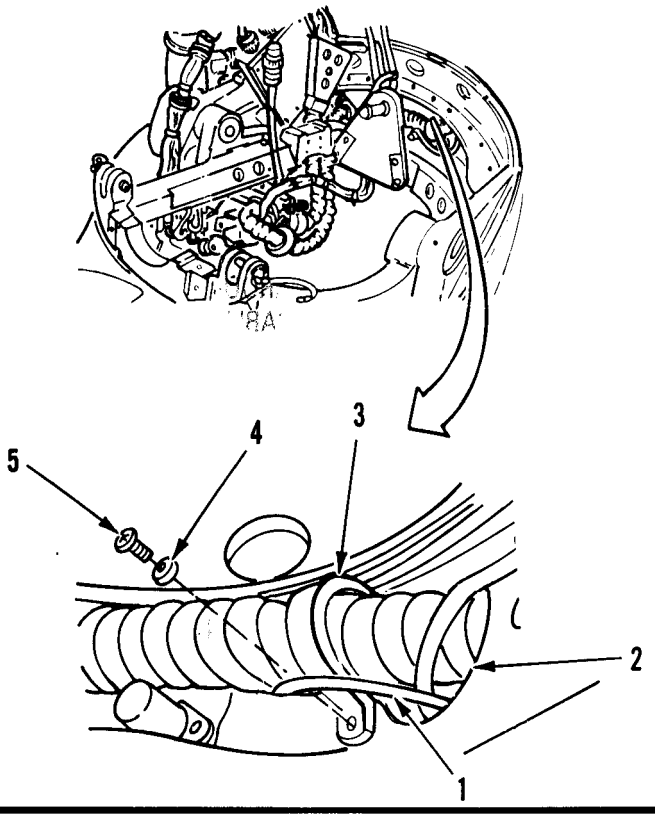
ED CLAMP SECTION. SECURE TO CLAMP SECTION. SECURE TO CLAMP BRACKET (2) WITH WASHER (3), WASHER (4), SCREW (5), AND SELF-LOCKING NUT(6).



2-45.8 INSTALLATION OF TURRET CABLES (cont)

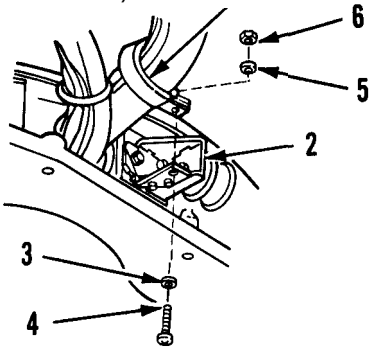
32. FEED CABLES, INCLUDING AZIMUTH LIMIT (PROXIMITY) SWITCH ASSEMBLY CABLE (1), THROUGH EXIT HOLE (2).

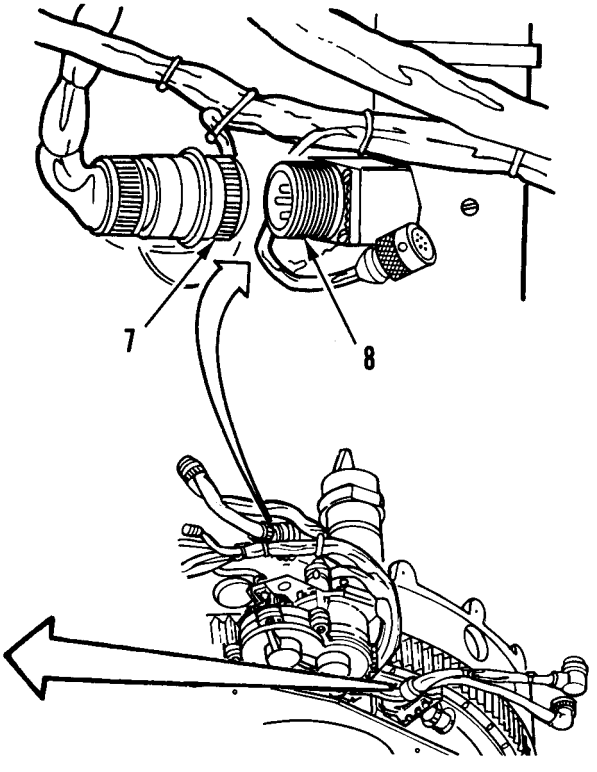
33. INSTALL LOOP CLAMP (3) AROUND WRAPPED CABLE BUNDLE AT EXIT HOLE, TAKING CARE NOT TO CLAMP AZIMUTH LIMIT SWITCH ASSEMBLY CABLE (1). SECURE LOOP CLAMP TO UPPER SUPPORT WITH WASHER (4) AND SCREW (5).



34. INSTALL LOOP CLAMP (1) AROUND W1P3 AND W3P1 BRANCHES. SECURE LOOP CLAMP TO BRACKET (2) ON AZIMUTH STOP MOUNT WITH WASHER (3), SCREW (4), WASHER (5), AND SELF-LOCKING NUT (6).

35. CONNECT W4P14 (7) TO AZIMUTH DRIVE MOTOR CONNECTOR A7J11 (8). SECURE CONNECTORS WITH LOCKWIRE (ITEM 17, APPX B).



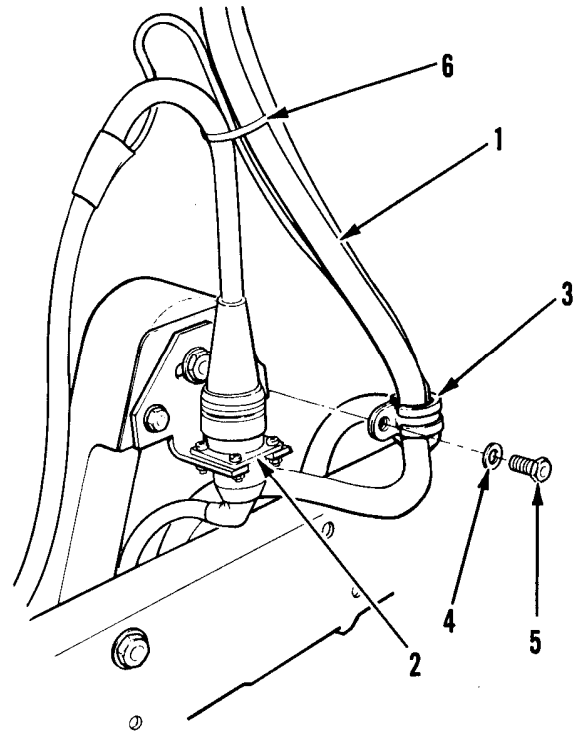


INSTALLATION (cont)

36. ROUTE W5P3 CABLE (1) BETWEEN REAR SUPPORT AND SADDLE. BE SURE CABLE BRANCH IS APPROXIMATELY 16 IN, (40.64 CM) LONG FROM END OF W5P3 CONNECTOR TO FLANGE ON W3J1 (2).

37. INSTALL LOOP CLAMP (3) AROUND W5P3, W3P8, AND W2P3 CABLES, MAINTAINING THE REQUIRED 16 IN. (40.64 CM) LENGTH FOR W5P3. WITHOUT PUTTING TENSION ON CABLES, REMOVE SLACK FROM W2 AND W3 CABLES ABOVE THE LOOP CLAMP.

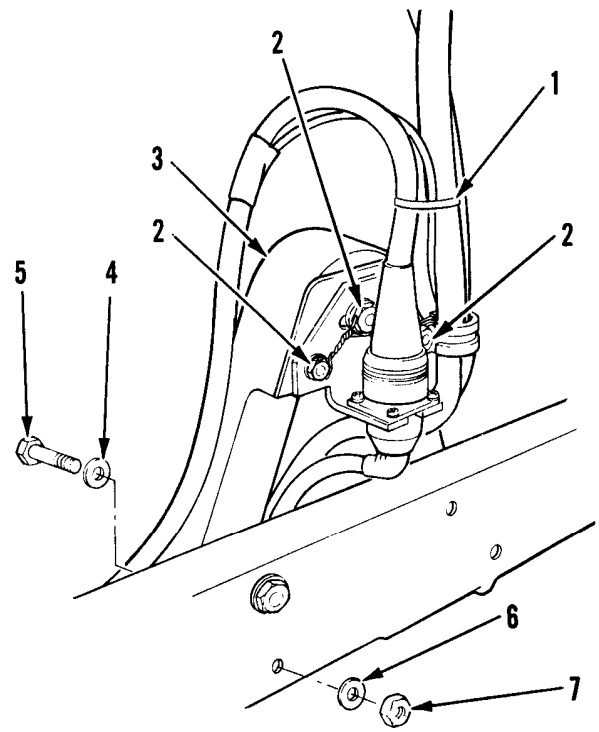
38. ATTACH LOOP CLAMP (3) TO REAR SUPPORT WITH WASHER (4) AND BOLT (5). REMOVE TEMPORARY CABLE STRAP (6).



39. INSTALL A CABLE STRAP (1) THROUGH LOOP AND AROUND W5P3 AND W2P2 BRANCHES, SECURE THREE CONNECTOR BRACKET BOLTS (2) WITH LOCKWIRE (ITEM 17, APPX B).

40. ROTATE REAR SUPPORT (3) INTO POSITION. INSTALL THREE WASHERS (4), REMAINING THREE REAR SUPPORT MOUNTING BOLTS (5), THREE WASHERS (6), AND THREE NUTS (7), TORQUE ALL FOUR BOLTS TO 135-145 LB-IN. (15.25-16.38 N.M).

41. GATHER EXCESS COILING INSIDE MOUNT AND TUCK INTO BUNDLE. SECURE WITH CABLE STRAPS AS REQUIRED.



END OF TASK

2-46. REPAIR OF CAM LINK BEARING

DESCRIPTION

This task covers: Removal and installation.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental
- Starting Thread Tap 9/16-18NF
- Bottoming Thread Tap 9/16-18NF
- Bearing Installation Tool
  - (Fig C-1, PN IMI 3005, Appx C)

Materials:
- Grease (Item 12, Appx B)
- Tape (Item 30.1, Appx B)

Personnel Required:
- 68M Aircraft Weapon Systems
  - Repairer

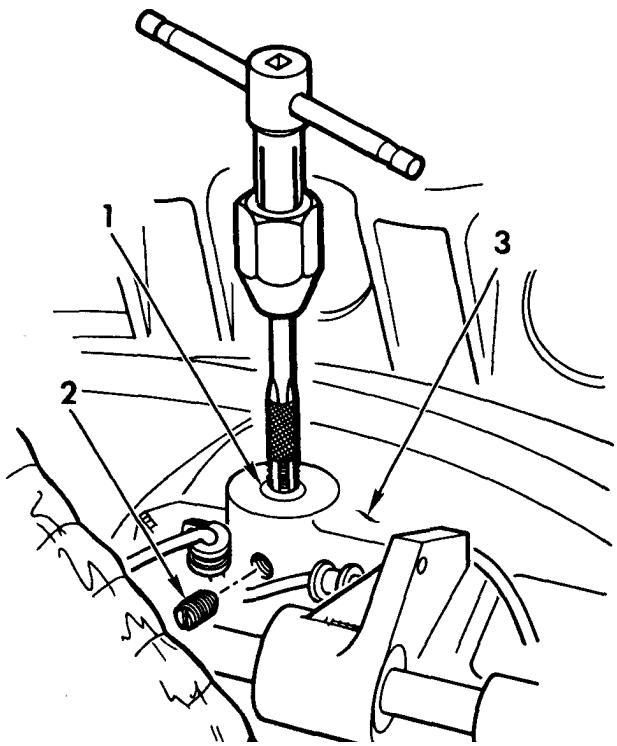
Equipment Conditions:
- REMOVAL OF TURRET performed, para 2-45.
- Cam link removed, see REPAIR OF CAM LINK AND ASSOCIATED PARTS, para 2-39.

REMOVAL

CAUTION

Do not cut threads deeper than ½-inch or turret may be damaged.

1. CUT THREADS IN CAM LINK BEARING (1):
   a. Remove setscrew (2) from turret (3).
   b. Place a piece of tape ½-inch from beginning of threads on thread taps to mark depth.
   c. Using starting thread tap, carefully cut threads ½-inch deep in cam link bearing (1).
   d. Using bottoming thread tap, finish threads to ½-inch deep in cam link bearing (1).

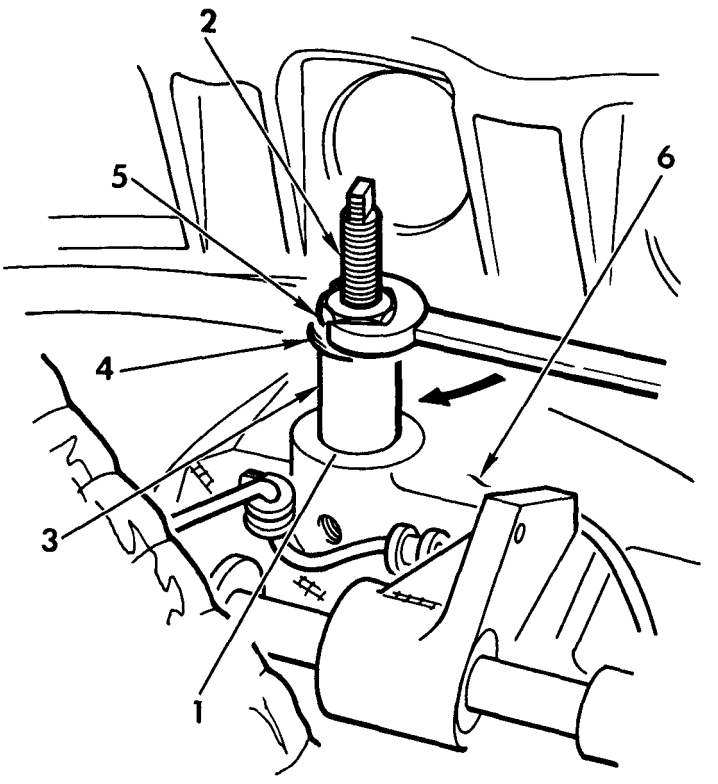


2-46. REPAIR OF CAM LINK BEARING (cont)

2. REMOVE CAM LINK BEARING (1).
   a. Screw shaft (2) of bearing removal tool into cam link bearing (1).
   b. Install collar (3) (counterbored end first), two washers (4), and nut (5) of bearing removal tool onto shaft (2).
   c. Using wrench, turn nut (5) clockwise, until cam link bearing (1) is extracted from turret (6). Remove cam link bearing from shaft (2) of bearing removal tool.

WARNING

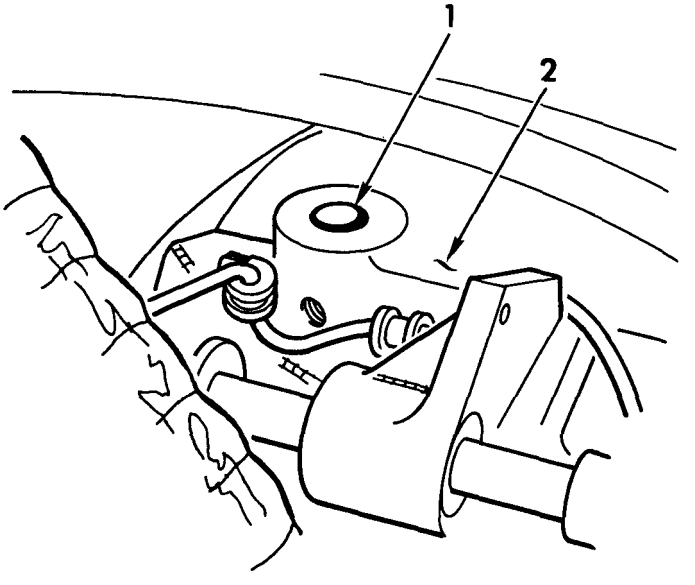
Safety glasses must be worn when using low-pressure compressed air or brush to remove metal chips or dirt to prevent possible eye damage.



ARR83-0240

3. REMOVE METAL CHIPS FROM BEARING BORE (1).

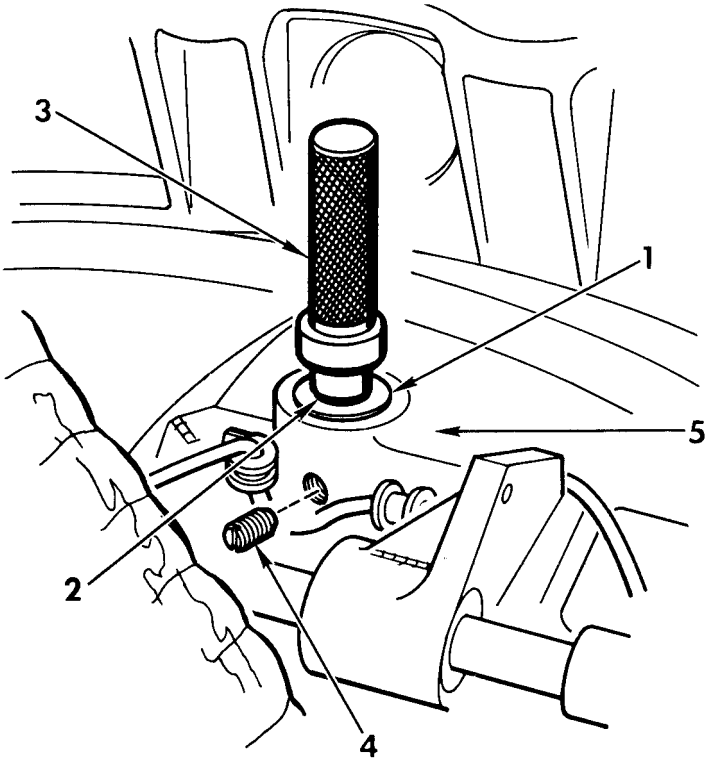
   Remove all metal chips, dirt, etc. from bearing bore (1) and surrounding area of turret (2).



ARR83-0241

INSTALLATION

4. INSTALL CAM LINK BEARING (1).
   a. Apply a light coating of grease to bearing bore (2).
   b. Place cam link bearing (1) onto bearing installation tool (3).
   c. Position bearing installation tool (3) and cam link bearing (1) squarely in bearing bore (2), then seat cam link bearing (1) by gently tapping top of bearing installation tool with a soft-faced hammer.
   d. Install setscrew (4) in turret (5).



ARR83-0242

END OF TASK

2-47. REPAIR OF AZIMUTH PROXIMITY SWITCHES

DESCRIPTION

This task covers: Removal, cleaning, inspection, and installation.

INITIAL SETUP

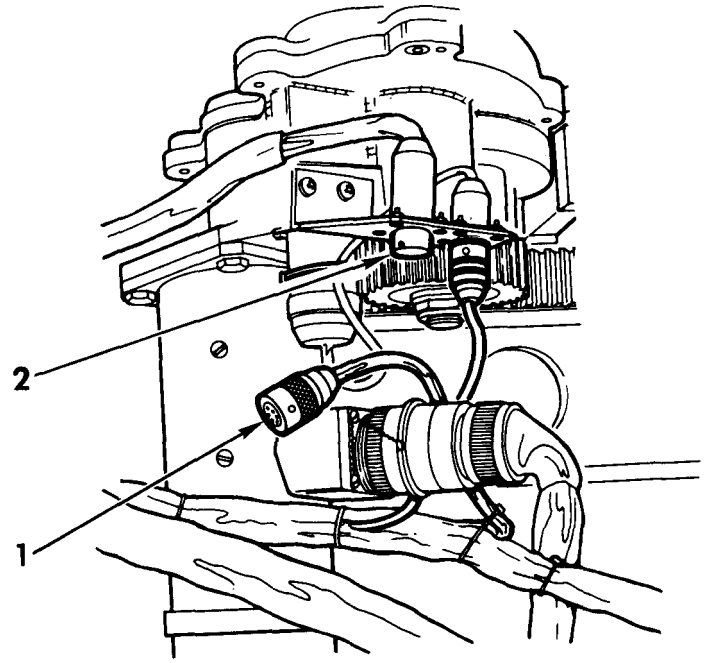
Tools/Test and Support Equipment:
Tool Set, A/C Armament
Repairman: Basic
Tool Set, A/C Armament
Repairman: Supplemental

Personnel Required:
68M Aircraft Weapon Systems
Repairer

Equipment Conditions:
REMOVAL OF TURRET performed, para 2-45.

REMOVAL

1. DISCONNECT CABLE W1P16 (1) FROM CONNECTOR A7J13 (2).



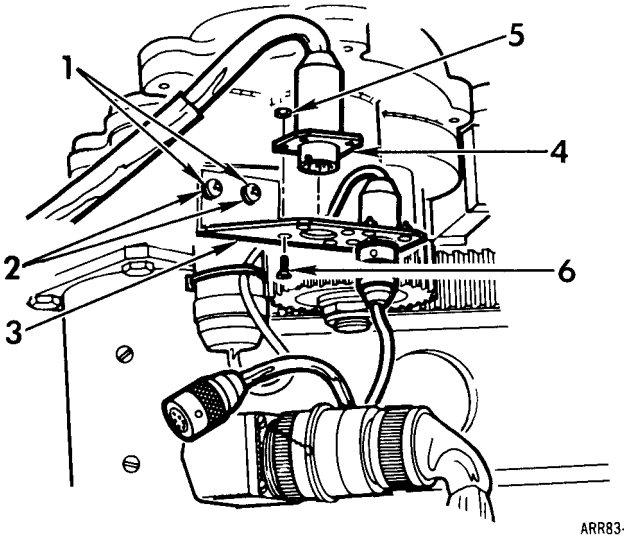
ARR83-0335

REMOVAL (cont)

2. REMOVE TWO SCREWS (1), TWO WASHERS (2), AND BRACKET (3).

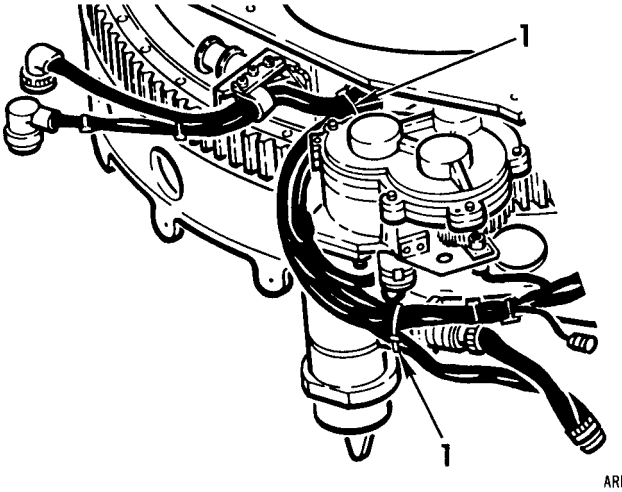
3. REMOVE CONNECTOR A7J13 (4).

   Remove four nuts (5), four screws (6), and connector A7J13 (4) from bracket (3).



ARR83-0336

4. REMOVE CABLE STRAPS (1), AS NECESSARY, TO FREE CONNECTOR A7J13 FROM TURRET HARNESS.

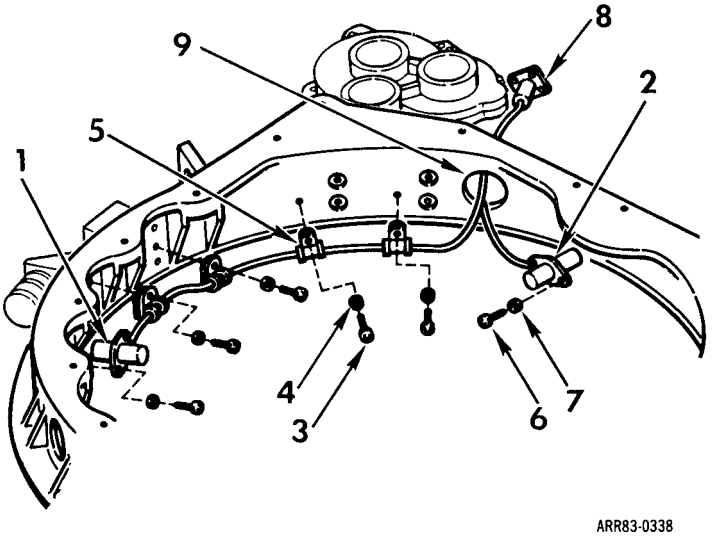


ARR83-0337

5. REMOVE AZIMUTH PROXIMITY SWITCHES (1 AND 2).

   a. Remove four screws (3), four washers (4), and four cable clamps (5).

   b. Remove four screws (6), four washers (7), and withdraw connector A7J13 (8) from cable hole in turret (9).



ARR83-0338

2-479 REPAIR OF AZIMUTH PROXIMITY SWITCHES (cont)

CLEANING

6. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV.

INSPECTION

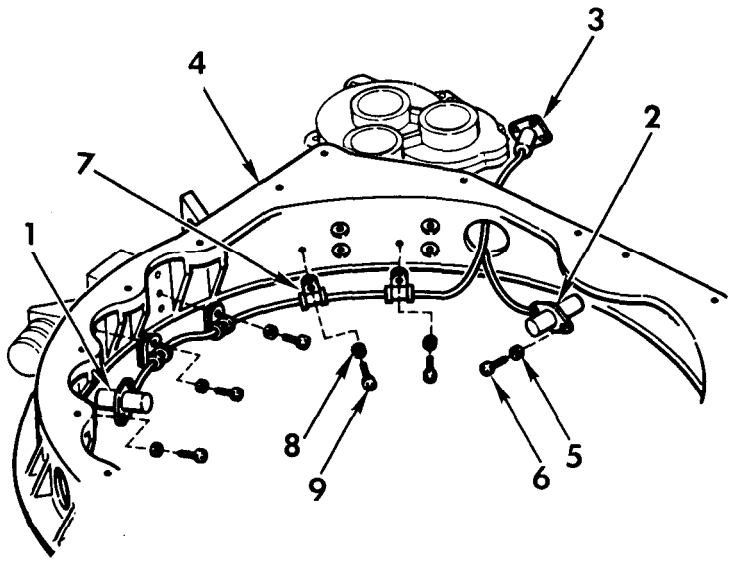
7. PERFORM GENERAL INSPECTION PROCEDURE IN ACCORDANCE WITH SECTION IV.

8. INSPECT PARTS IN ACCORDANCE WITH TABULATED DATA:

Component	Possible Defect	Remedy
Azimuth Proximity Switches	Dented	Replace.
Switch Cable	Damaged covering	Repair with electrical tape.
Connector	Bent pins	Straighten.

INSTALLATION

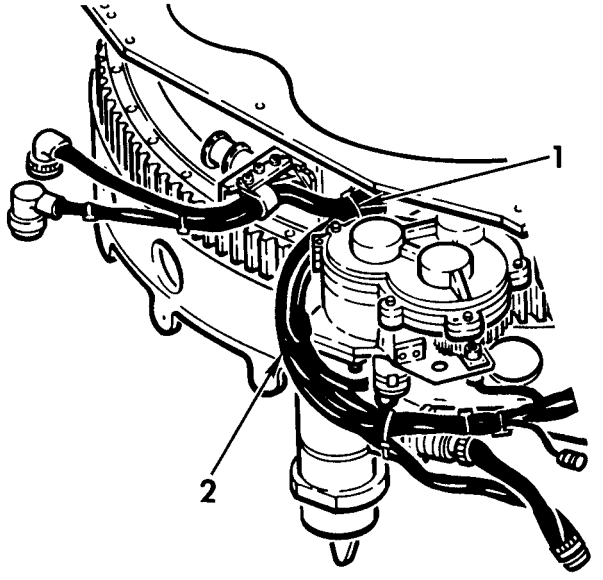
9. INSTALL AZIMUTH PROXIMITY SWITCHES (1 AND 2).
   a. Insert connector A7J13 (3) through cable hole and position azimuth proximity switches (1 and 2) on turret (4).
   b. Install four washers (5) and four screws (6) to secure azimuth proximity switches (1 and 2).
   c. Install four cable clamps (7), four washers (8), and four screws (9) to secure switch cable to turret (4).



ARR83-0339

INSTALLATION (cont)

10. INSTALL CABLE STRAPS (1 AND 2) TO SECURE SWITCH CABLE (3).

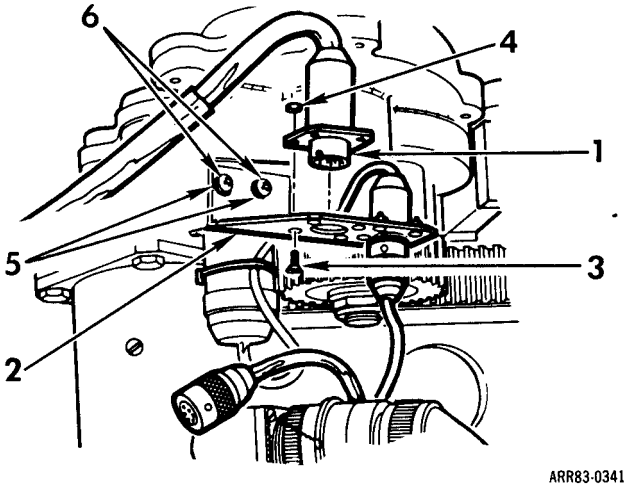


ARR83-0340

11. INSTALL CONNECTOR A7J13 (1).

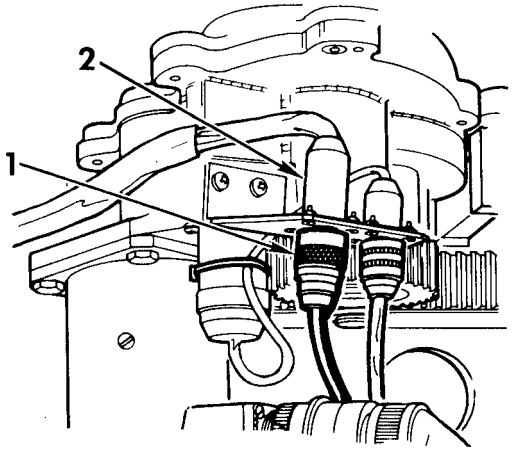
    Position connector A7J13 (1) on bracket (2) and secure with four screws (3) and four nuts (4).

12. INSTALL BRACKET (2) AND SECURE WITH TWO WASHERS (5) AND TWO SCREWS (6).



ARR83-0341

13. CONNECT CABLE W1P16 (1) TO CONNECTOR A7J13 (2).



ARR83-0342

END OF TASK

2-48. INSTALLATION OF TURRET

DESCRIPTION

This task covers: Installation.

INITIAL SETUP

Tools/Test and Support Equipment:
Tool Set, A/C Armament
Repairman: Basic
Tool Set, A/C Armament
Repairman: Supplemental

Materials:
LockWire (Item 17, APPX B)
Cable Tiedown Straps (Item 30, Appx B)

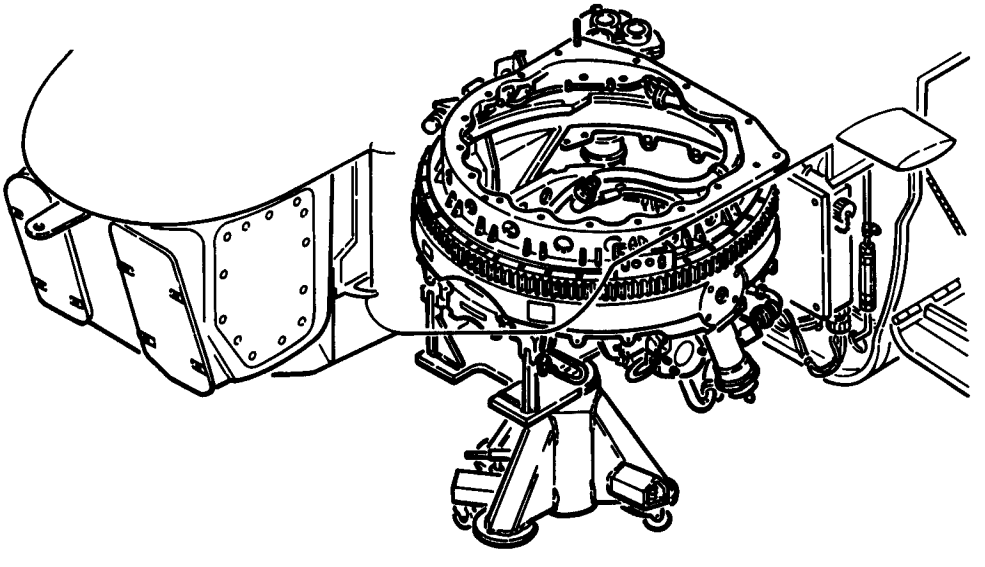
Personnel Required:
68M Aircraft Weapon Systems
Repairer (3)

References:
TM 9-1090-206-20-1
TM 9-1090-206-20-2
TM 55-1520-236-23

Equipment Conditions:
HELICOPTER ARMAMENT SUBSYSTEM
MAINTENANCE SETUP performed,
TM 9-1090-206-20-1 or
TM 9-1090-206-20-2.
Turret Fairing left and right
aircraft panels above turret removed, see
TM 55-1520-236-23.
Turret installation/removal fixture mounted
on aircraft jack and turret installed in fixture.

INSTALLATION

1. POSITION TURRET UNDER HELICOPTER.



ARR82-25947

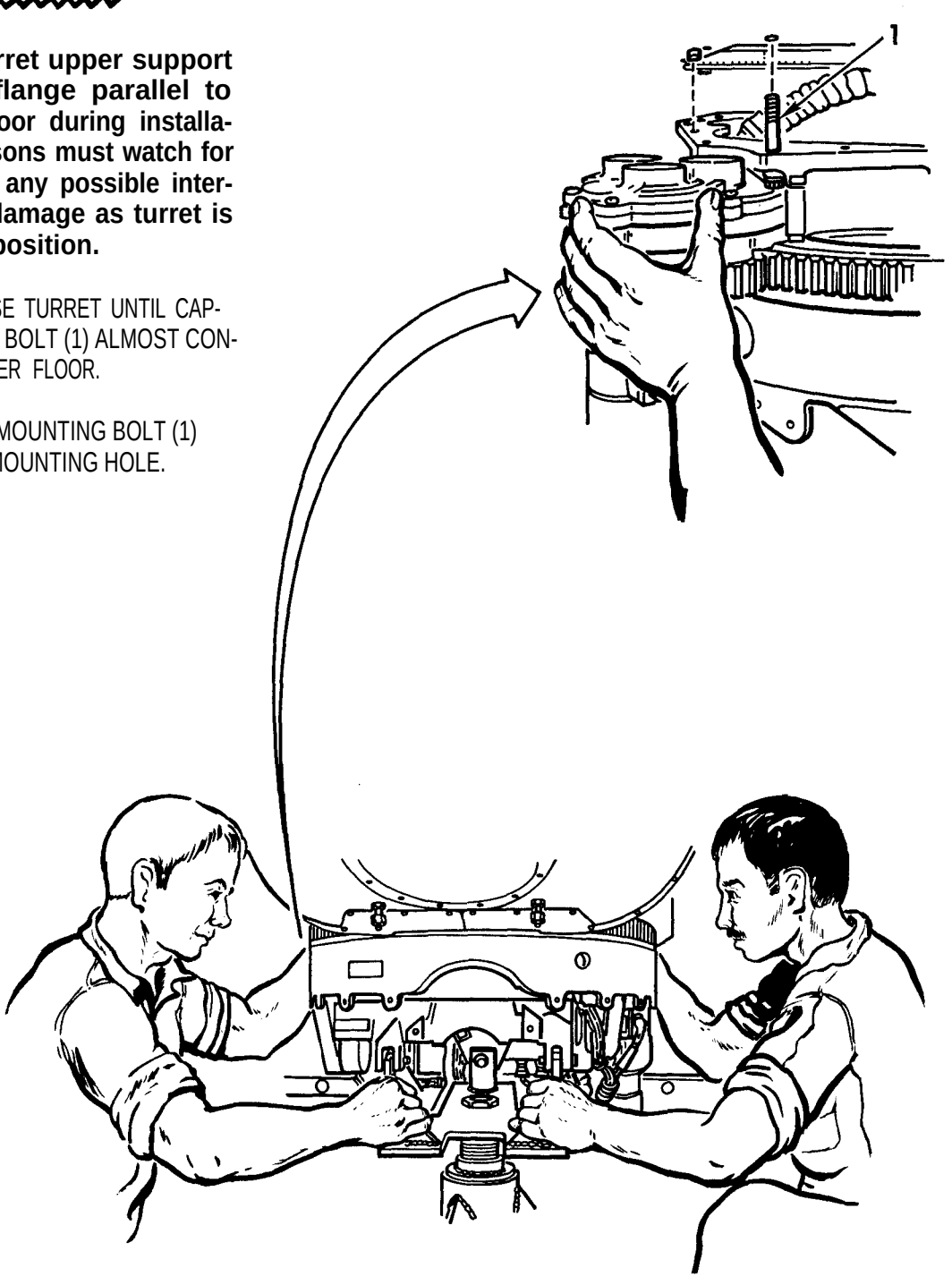
INSTALLATION (cont)

CAUTION

Maintain turret upper support mounting flange parallel to helicopter floor during installation. All persons must watch for and prevent any possible interference or damage as turret is raised into position.

2. CAREFULLY RAISE TURRET UNTIL CAPTIVE MOUNTING BOLT (1) ALMOST CONTACTS HELICOPTER FLOOR.

3. ALINE CAPTIVE MOUNTING BOLT (1) WITH PROPER MOUNTING HOLE.

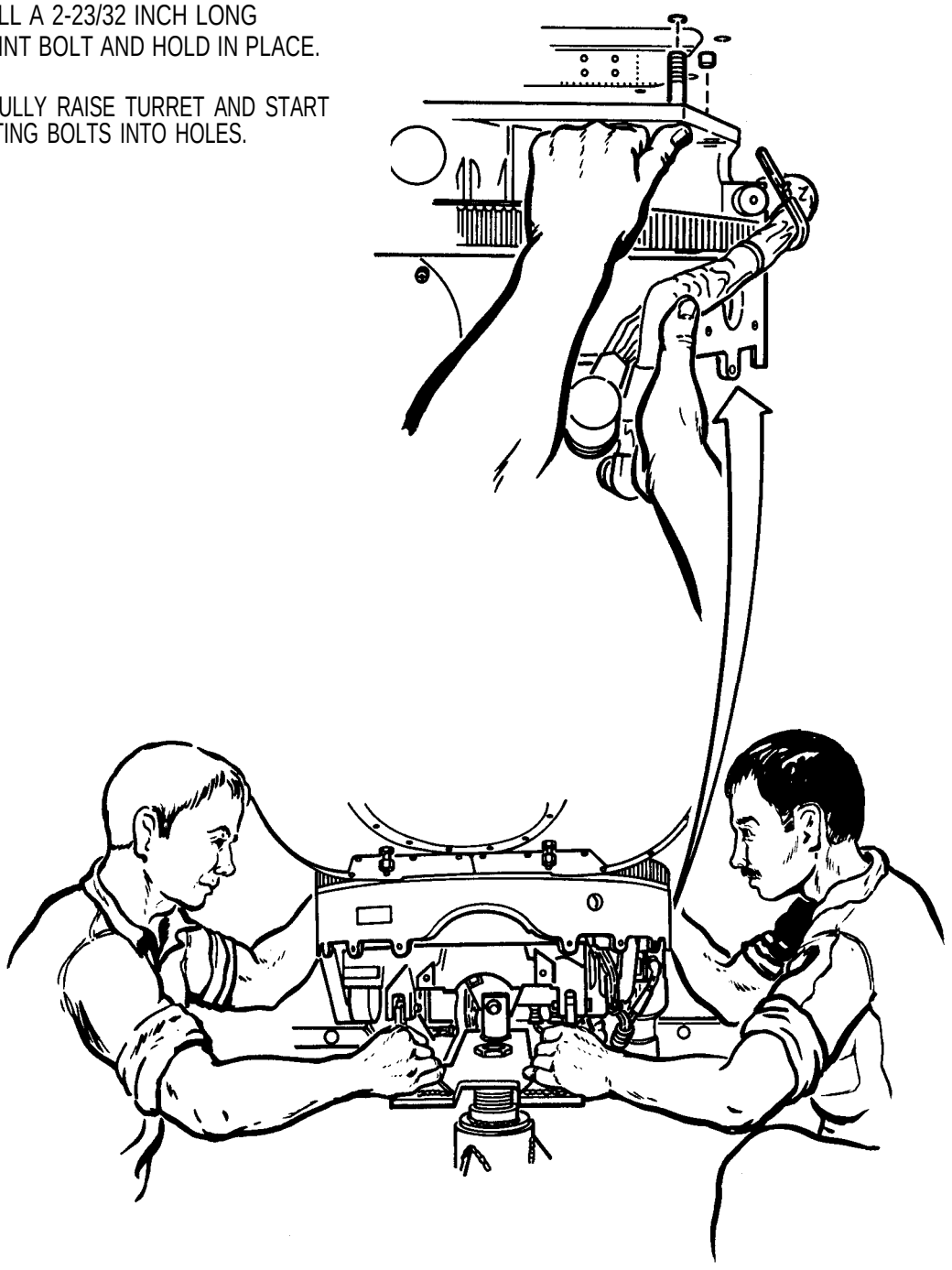


ARR82-25948

2-48. INSTALLATION OF TURRET (cont)

4. INSTALL A 2-23/32 INCH LONG 12-POINT BOLT AND HOLD IN PLACE.

5. CAREFULLY RAISE TURRET AND START MOUNTING BOLTS INTO HOLES.

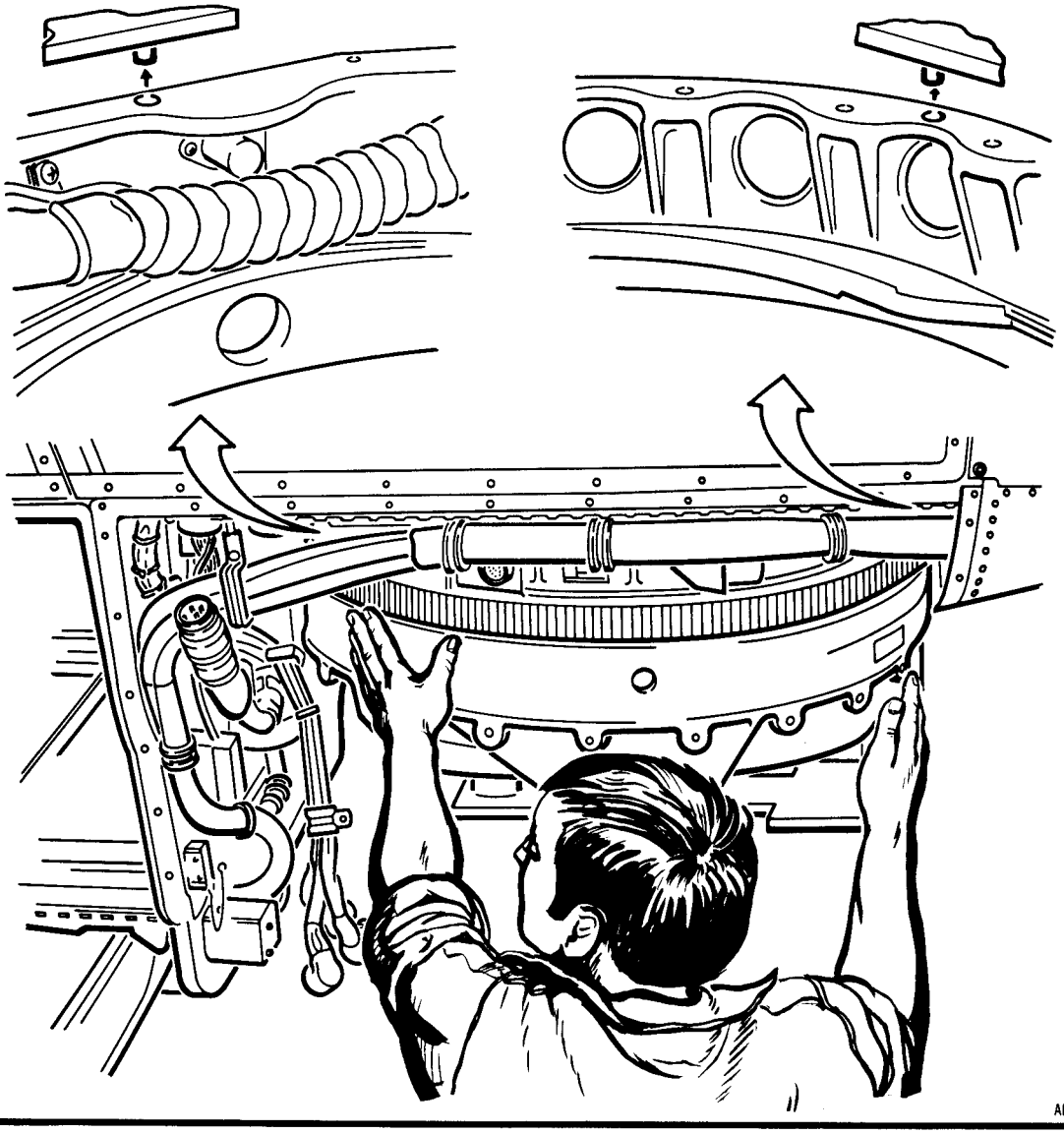


ARR82-25949

INSTALLATION (cont)

6. CAREFULLY RAISE TURRET UNTIL TURRET UPPER SUPPORT MOUNTING FLANGE JUST CONTACTS FORE AND AFT ALINEMENT PINS.

7. POSITION TURRET AS NECESSARY, TO START ALINEMENT PINS INTO ALINEMENT HOLES AND CONTINUE TO CAREFULLY RAISE TURRET UNTIL MOUNTING FLANGE IS IN FULL CONTACT WITH HELICOPTER FLOOR.



ARR82-25950

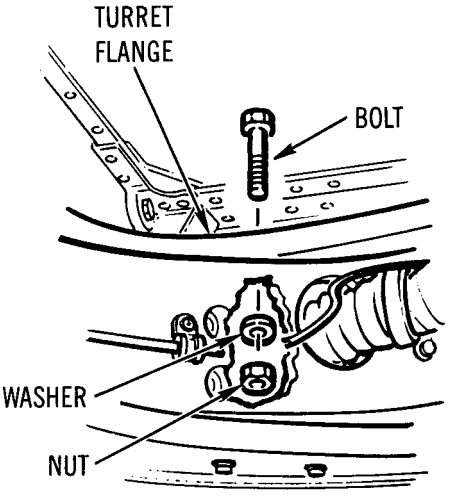
2-48. INSTALLATION OF TURRET (cont)

NOTE

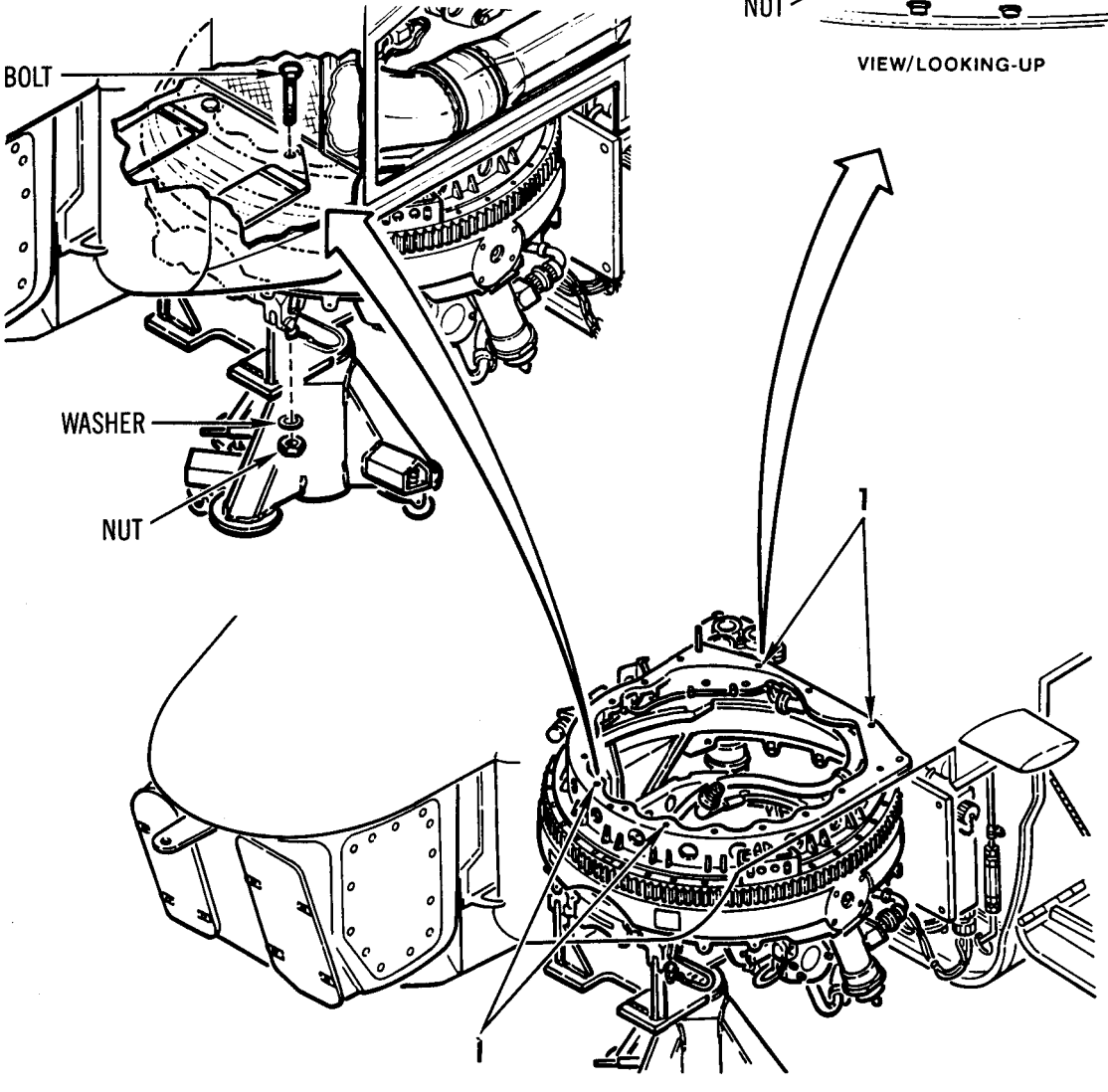
This group of attaching hardware mounts turret to airframe hard points and is the first to be installed.

8. INSTALL FOUR BOLTS, FOUR WASHERS, AND FOUR NUTS IN HOLES (1).

9. TORQUE FOUR BOLTS TO 12.5–15.8 LB-FT (17.0–21.5 N.m).



VIEW/LOOKING-UP

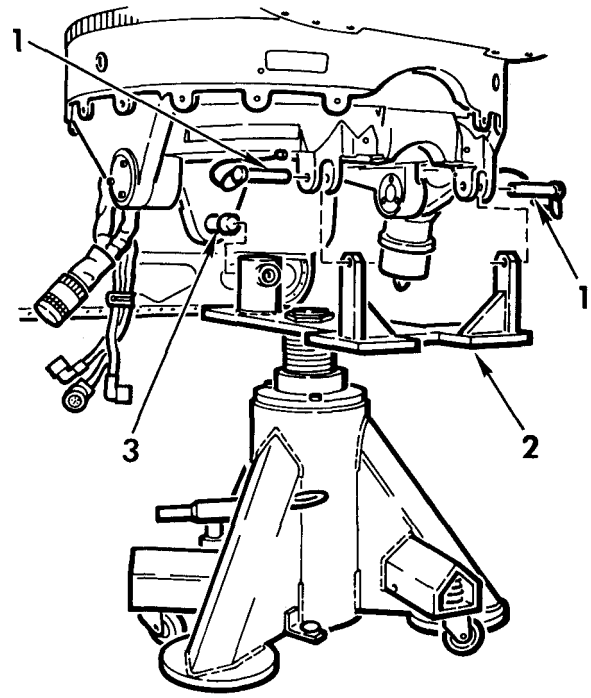


ARR82-25951

INSTALLATION (cont)

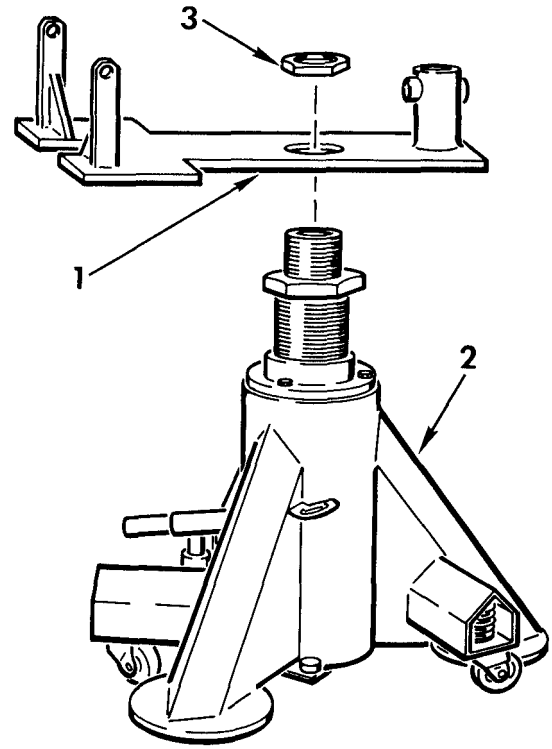
10. REMOVE TWO QUICK-RELEASE PINS (1).

11. DISENGAGE TURRET FIXTURE (2) FROM BALL MOUNT (3).



ARR82-25952

12. REMOVE TURRET INSTALLATION/ REMOVAL FIXTURE (1) FROM AIRCRAFT JACK (2).
    a. Remove nut (3).
    b. Remove turret installation/removal fixture (1).
    c. Install nut(3).



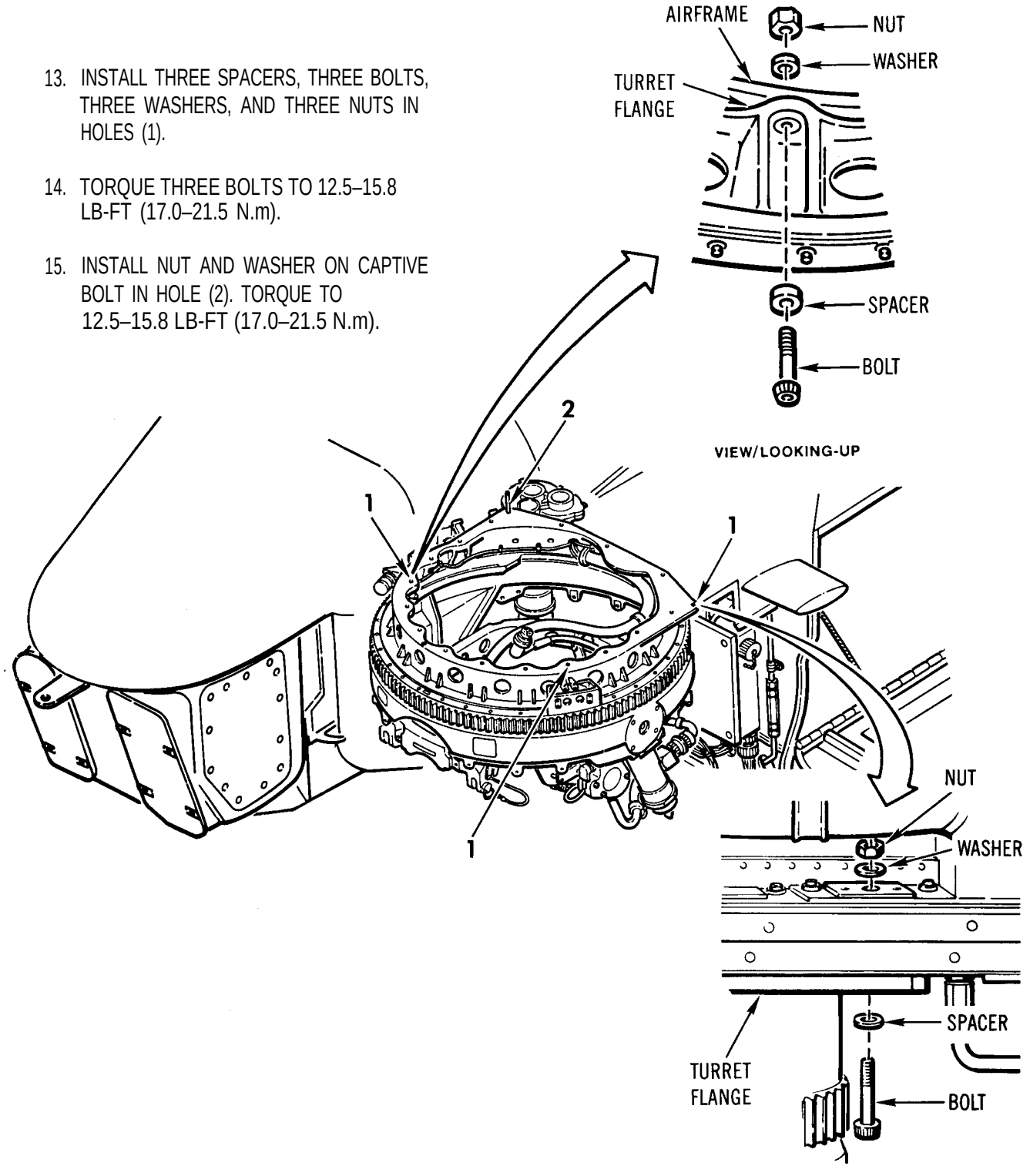
ARR82-25953

2-48. INSTALLATION OF TURRET (cont)

13. INSTALL THREE SPACERS, THREE BOLTS, THREE WASHERS, AND THREE NUTS IN HOLES (1).

14. TORQUE THREE BOLTS TO 12.5–15.8 LB-FT (17.0–21.5 N.m).

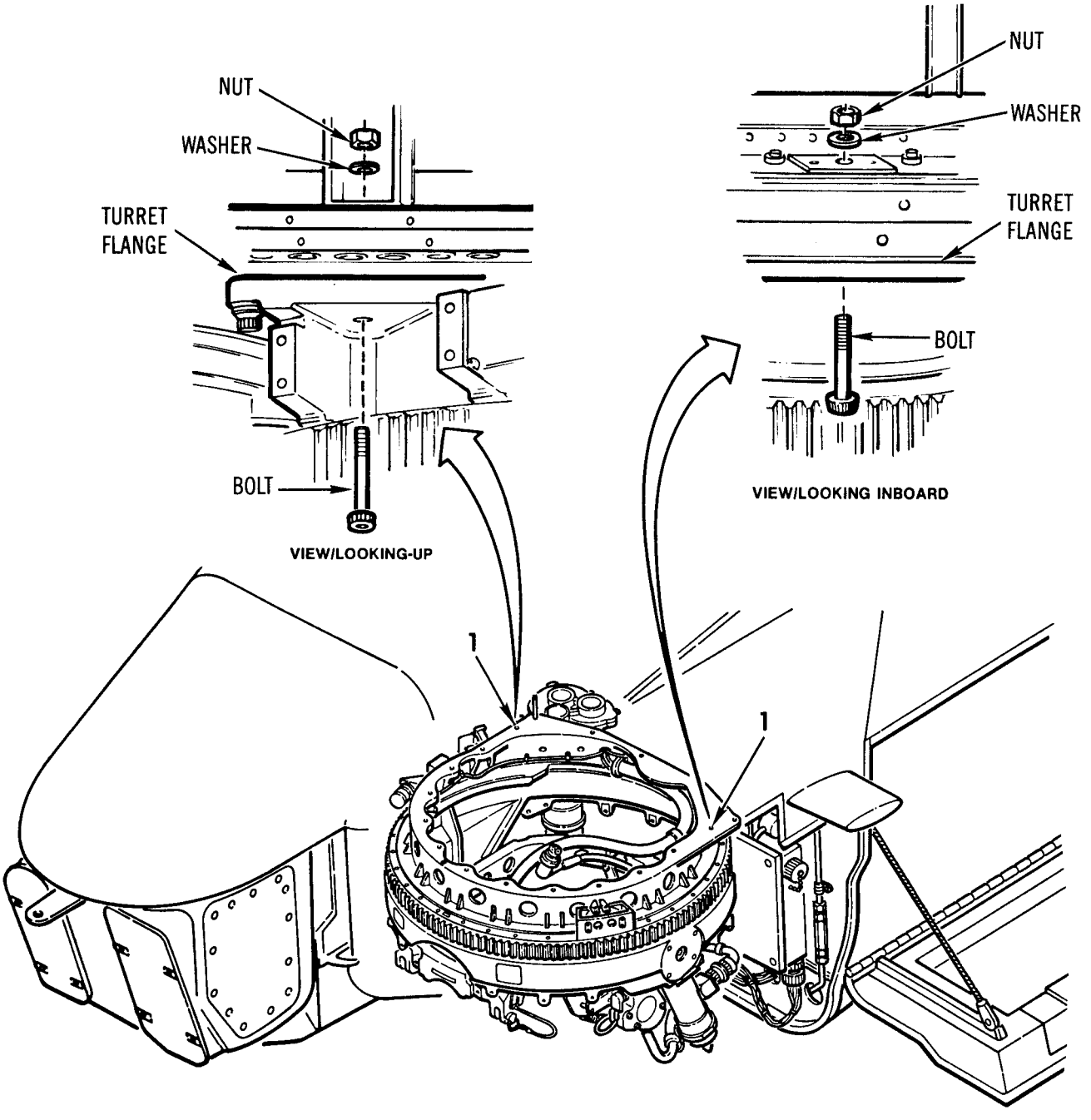
15. INSTALL NUT AND WASHER ON CAPTIVE BOLT IN HOLE (2). TORQUE TO 12.5–15.8 LB-FT (17.0–21.5 N.m).



INSTALLATION (cont)

16. INSTALL TWO BOLTS, TWO WASHERS, AND TWO NUTS IN HOLES (1).

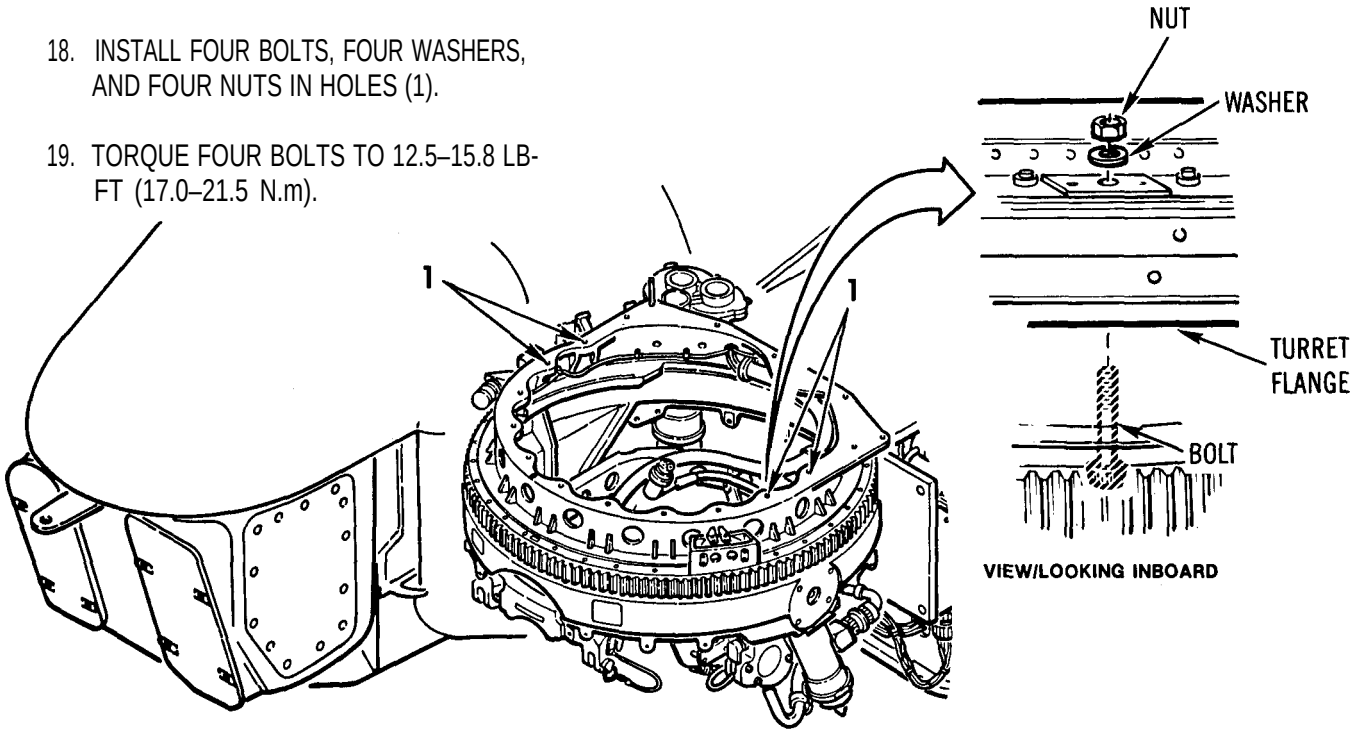
17. TORQUE TWO BOLTS TO 12.5–15.8 LB-FT (17.0–21.5 N.m).



2-48. INSTALLATION OF TURRET (cont)

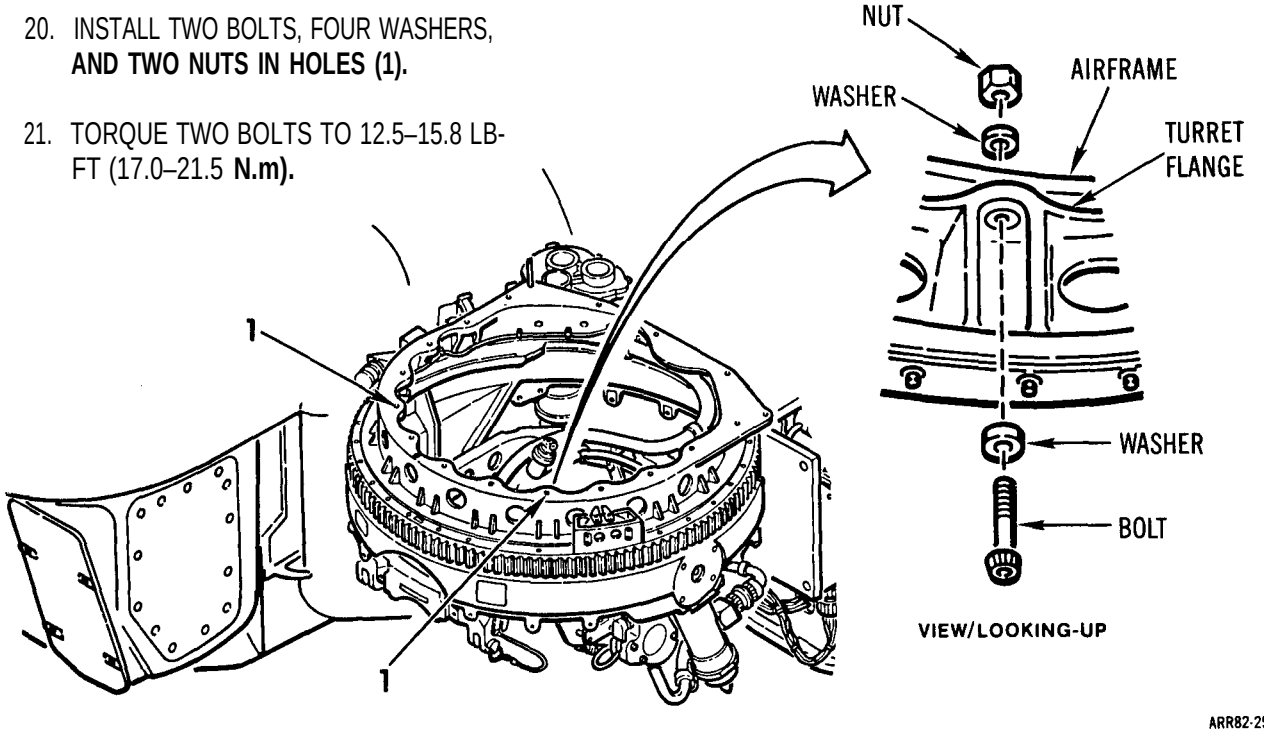
18. INSTALL FOUR BOLTS, FOUR WASHERS, AND FOUR NUTS IN HOLES (1).

19. TORQUE FOUR BOLTS TO 12.5–15.8 LB-FT (17.0–21.5 N.m).



20. INSTALL TWO BOLTS, FOUR WASHERS, **AND TWO NUTS IN HOLES (1).**

21. TORQUE TWO BOLTS TO 12.5–15.8 LB-FT (17.0–21.5 **N.m).**



2-48.1. REPAIR OF UPPER AND LOWER SUPPORT

DESCRIPTION

This task covers: Disassembly, cleaning, inspection, repair, and assembly.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental

Personnel Required:
- 68J Aircraft Armament/Missile Systems Repairer (3)

Materials:
- Grease (item 12, Appx B)

References:
- TM 9-1090-206-20-1
- TM 9-1090-206-20-2

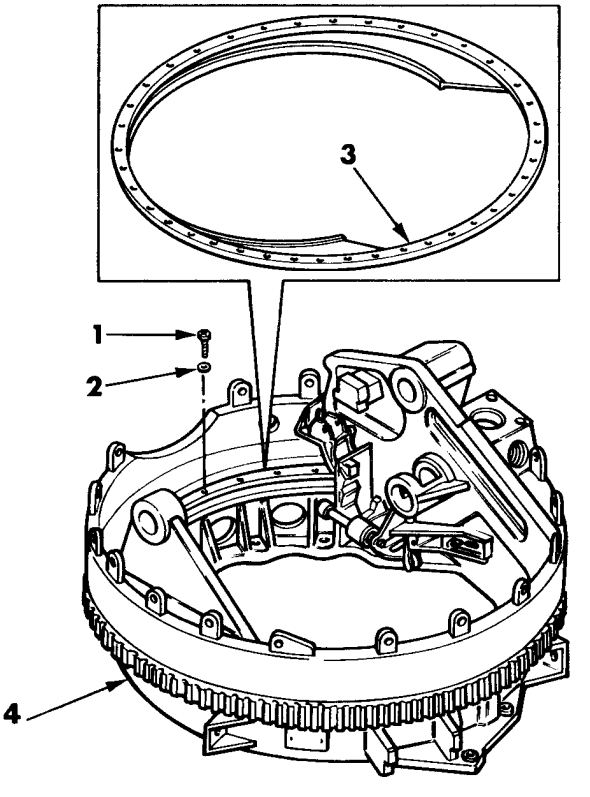
Equipment Conditions:
- HELICOPTER ARMAMENT SUBSYSTEM MAINTENANCE SETUP performed, TM 9-1090-206-20-1 or TM 9-1090-206-20-2.
- REMOVAL OF TURRET performed. para 2-45.
- Turret upside down on bench in shop.

DISASSEMBLY

NOTE

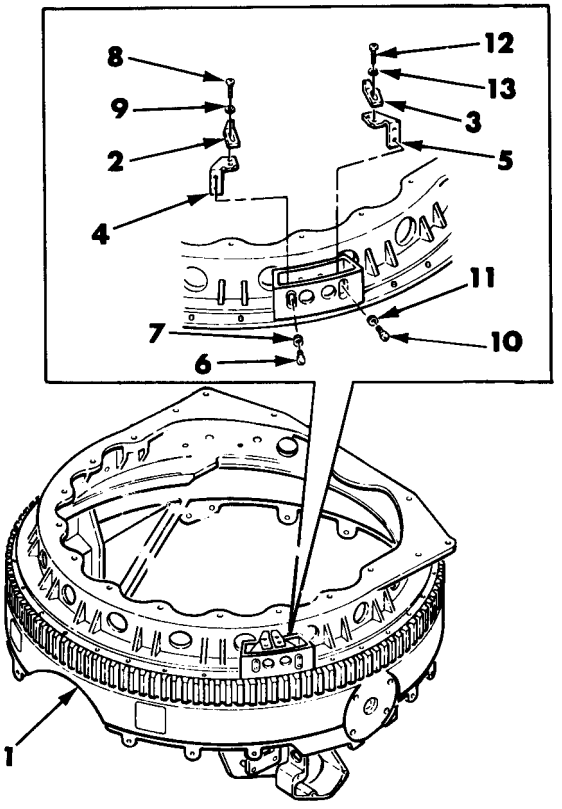
It will be necessary to rotate the turret in azimuth to gain access to some of the mounting hardware.

1 REMOVE 36 SCREWS (1) AND 36 WASHERS (2) SECURING CAM RETAINER (3) TO UPPER SUPPORT (4).



2-48.1. REPAIR OF UPPER AND LOWER SUPPORT (cont)

DISASSEMBLY (cont)



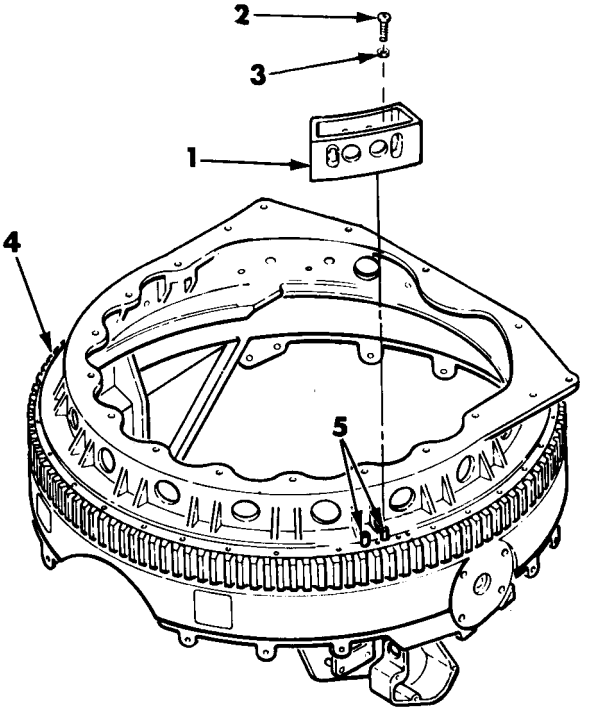
2. TURN TURRET OVER, WITH LOWER SUPPORT (1) DOWN.

3. REMOVE TWO ACTUATORS (2 AND 3) AND BRACKET ASSEMBLIES (4 AND 5).
   a. Remove two screws (6), two washers (7), and remove actuator (2) and bracket assembly (4).
   b. Remove two screws (8), two washers (9), and remove actuator (2) from bracket assembly (4).
   c. Remove two screws (10), two washers (11), and remove actuator (3) and bracket assembly (5).
   d. Remove two screws (12), two washers (13), and remove actuator (3) from bracket assembly (5).

4. REMOVE AZIMUTH STOP MOUNT (1).

NOTE

Azimuth stop mount (1) is matched with the lower support (4) and is not interchangeable. It must remain with its matching part to which it will be reassembled. Do not remove unless damaged, loose on dowel pins, or necessary to refinish lower support.



Remove four screws (2) and four washers (3) from lower support (4). Check azimuth stop mount (1) for looseness on dowel pins (5) before removing. If loose, tag azimuth stop mount to that effect and separate azimuth stop mount (1) from two dowel pins (5). Do not remove dowel pins unless necessary to make repairs.

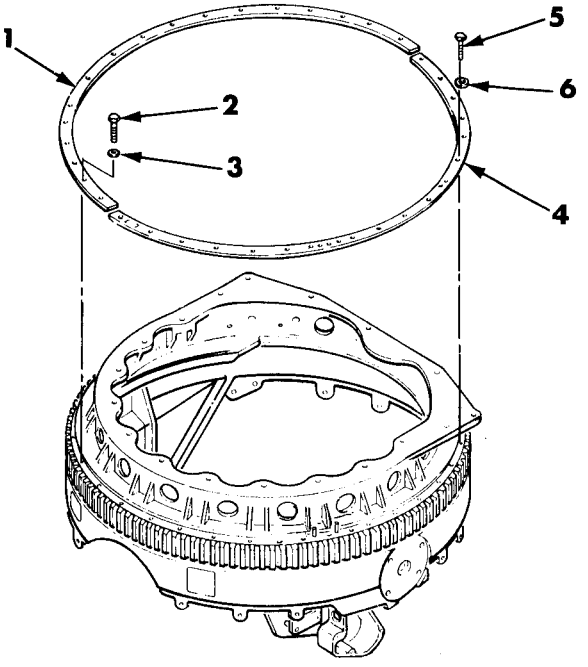
DISASSEMBLY (cont)

5. REMOVE RIGHT-HALF COVER (1).

   Remove 18 screws (2) and 18 washers (3) securing right-half cover (1).

6. REMOVE LEFT-HALF COVER (4).

   Remove 16 screws (5) and 16 washers (6) securing left-half cover (4).



7. REMOVE UPPER SUPPORT (1).

   Using soft-faced hammer, separate upper support (1) from lower support (2).

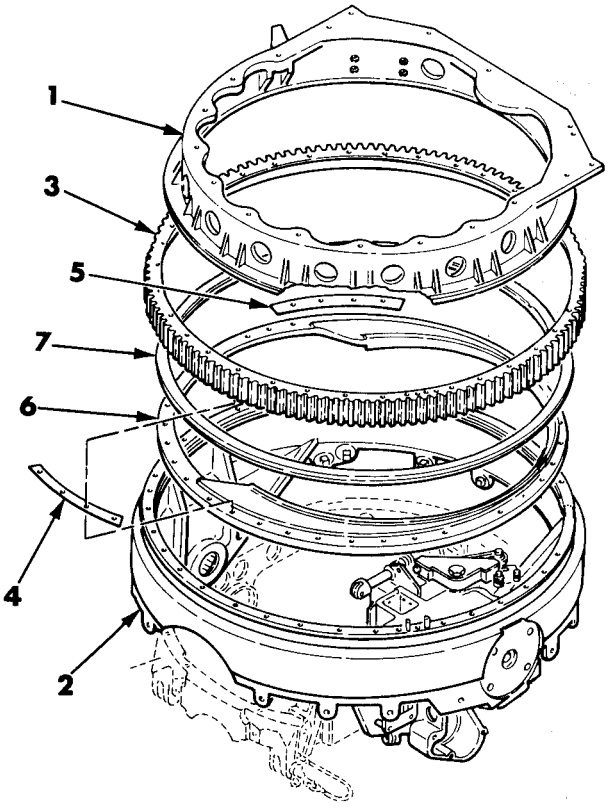
8. REMOVE RING (SPUR) GEAR (3), SHIMS (4 AND 5), CAM RETAINER (6), AND MAIN BEARING (7).

NOTE

Shims (4 and 5) may or may not be present.

Using soft-faced hammer, remove ring (spur) gear (3), shims (4 and 5), cam retainer (6) and main bearing (7) from lower support (2).

9. REMOVE LOWER SUPPORT (2).



2-48.1. REPAIR OF UPPER AND LOWER SUPPORT (cont)

CLEANING

10. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV.

INSPECTION

11. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV.

REPAIR

12. PERFORM GENERAL REPAIR PROCEDURES IN ACCORDANCE WITH SECTION IV.

ASSEMBLY

13. INSTALL LOWER SUPPORT (1).

14. INSTALL CAM RETAINER (2), MAIN BEARING (3), SHIMS (4 AND 5), AND RING (SPUR) GEAR (6).

a. Lay cam retainer (2) in lower support (1) so that non-caroming surface is toward front of support and spring pin hole is toward the rear.

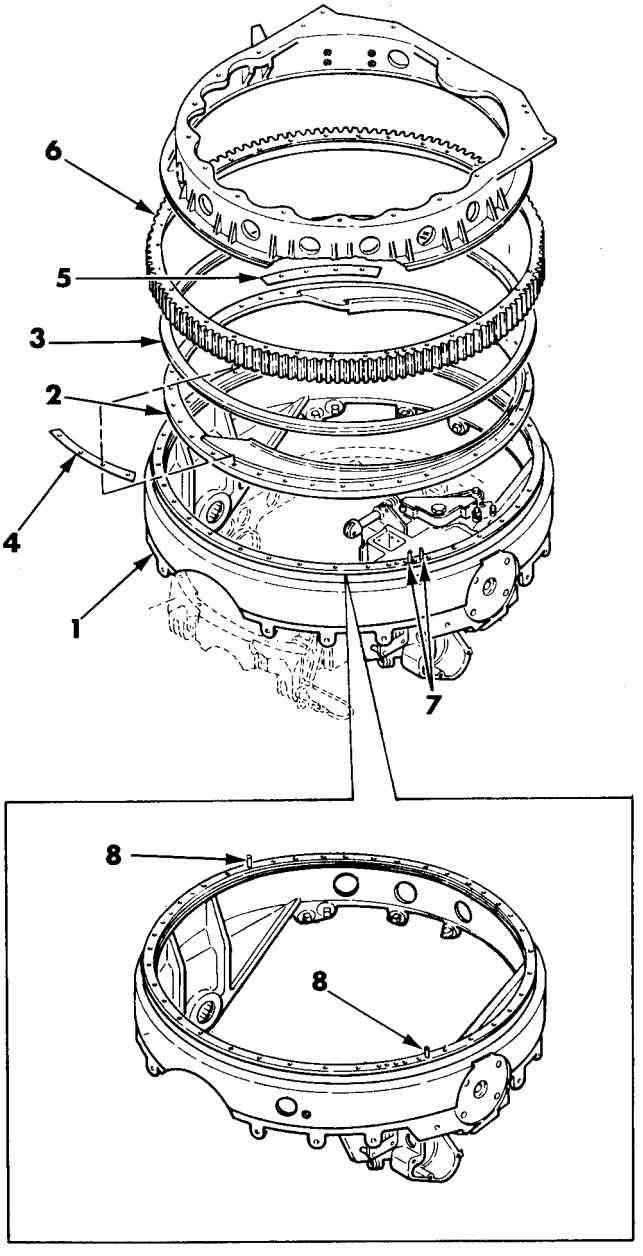
b. Lubricate the main bearing bore in the lower support. Position main bearing (3), open side down, in lower support (1). Evenly tap bearing at spaced intervals with soft-faced hammer until firmly seated.

c. Install shims (4 and 5) if present during disassembly.

NOTES

- **Pilot pin can be made by grinding or sawing the head off of a 10-32 screw to an overall length of 1 inch even.**
- **It may be necessary to drill a guide pin hole, due to the differences in turret assemblies.**

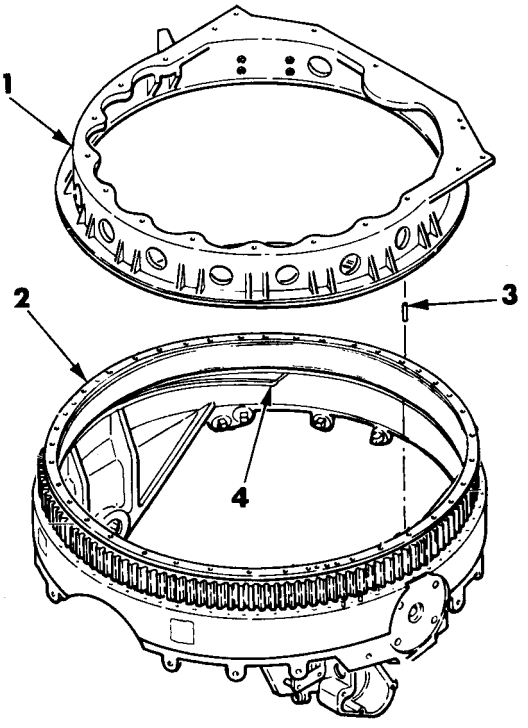
d. Lubricate inside of ring (spur) gear (6), Align pin holes in ring (spur) gear with two pins (7) in lower support (1). Tap the ring (spur) gear (6) at spaced intervals, carefully maintaining alignment, with a soft-faced hammer until firmly seated in place. If pins (7) are not installed, alignment can be simplified by temporarily installing threaded pilot pins (8) as shown and removing them after the ring (spur) gear has been seated.



2-48.1. REPAIR OF UPPER AND LOWER SUPPORT (cont)

ASSEMBLY (cont)

15. INSTALL UPPER SUPPORT (1).
    a. Lubricate main bearing seat of upper support (1).
    b. Position upper support (1) over lower support (2) so that spring pin (3) in upper support is aligned with mating hole in cam retainer (4). Rest upper support (1) on lower support (2).
    c. Using soft-faced hammer, install upper support (1) into lower support (2).



16. INSTALL LEFT-HALF COVER (5).

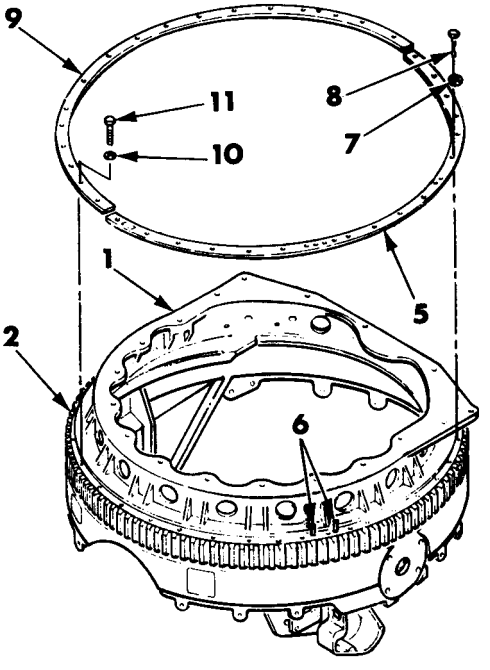
NOTE

If pins (6) are not installed, both left-half and right-half covers (5 and 9) can be installed after lower support has been fully seated.

Insert left-half cover (5) in slot around edge of upper support (1). Align holes in cover with dowel pins (6) and holes in lower support (2). Install 16 washers (7) and 16 screws (8).

17. INSTALL RIGHT-HALF COVER (9).

Insert right-half cover (9) in upper support slot and secure with 18 washers (10) and 18 screws (11).



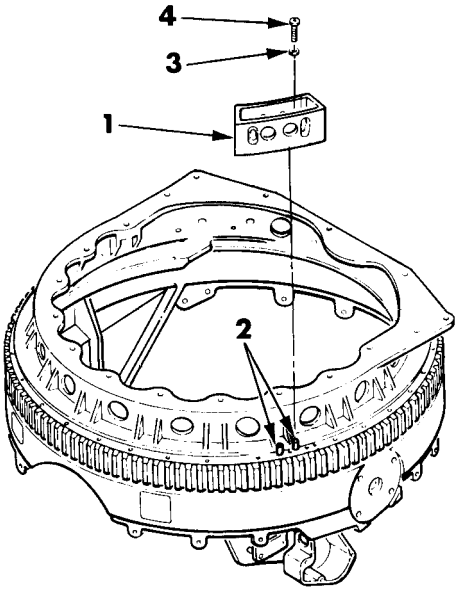
ASSEMBLY (cont)

18. INSTALL AZIMUTH STOP MOUNT (1).

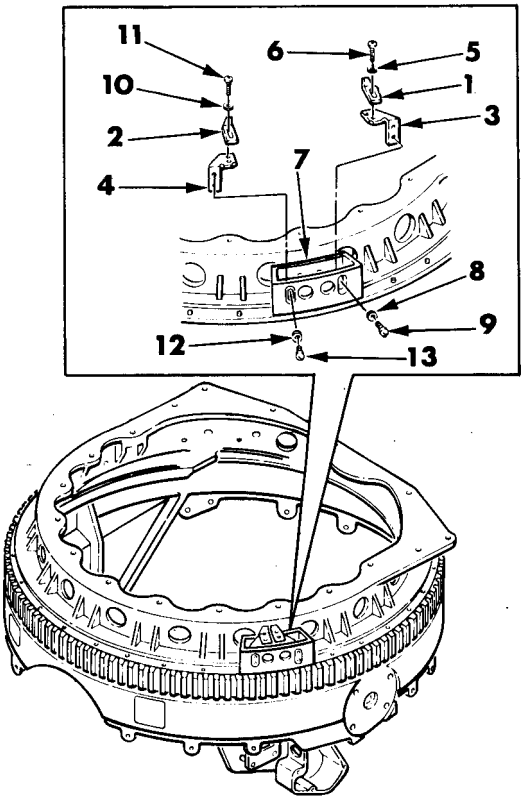
NOTE

Each azimuth stop mount will remain with the lower support from which it was removed. The azimuth stop mounts are NOT interchangeable.

Seat azimuth stop mount (1) on dowel pins (2) using soft-faced hammer to make sure it is firmly installed. Install four washers (3) and four screws (4).



19. INSTALL TWO ACTUATORS (1 AND 2) AND BRACKET ASSEMBLIES (3 AND 4).
    a. Install actuator (1) on bracket assembly (3) with two washers (5) and two screws (6).
    b. Position actuator and bracket assembly on azimuth stop mount (7) and secure with two washers (8) and two screws (9).
    c. Install actuator (2) on bracket assembly (4) with two washers (10) and two screws (11).
    d. Position actuator and bracket assembly on azimuth stop mount (7) and secure with two washers (12) and two screws (13).
    e. Rotate azimuth stop mount (7) until left actuator is in line with left azimuth proximity switch.
    f. Perform final adjustment of actuator brackets in accordance with para 2-81.



2-48.1. REPAIR OF UPPER AND LOWER SUPPORT (cont)

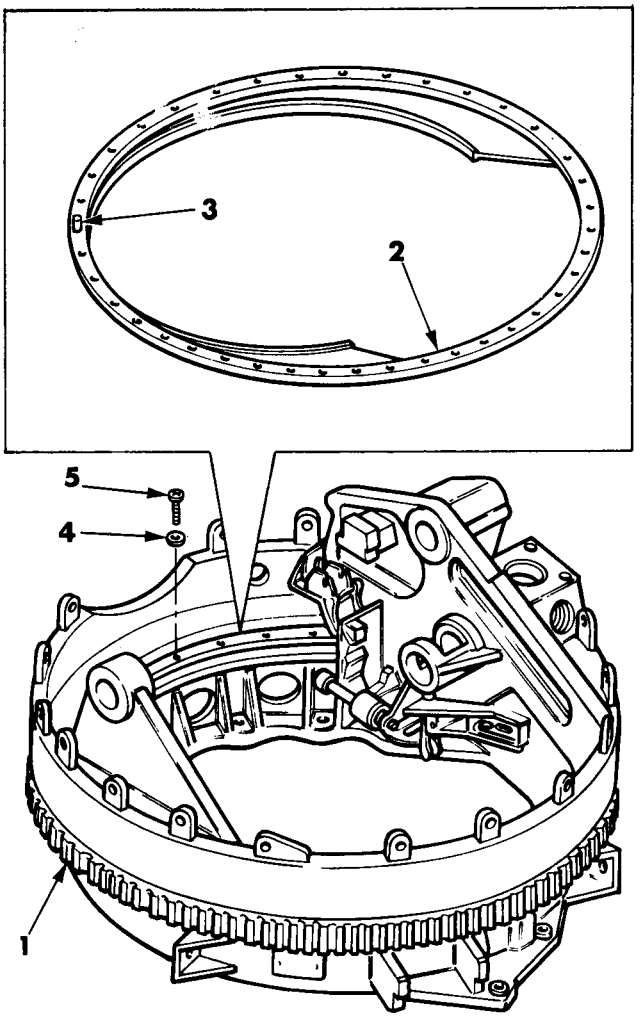
ASSEMBLY (cont)

CAUTION

Actuators must clear upper support in all azimuth positions.

20. POSITION TURRET ASSEMBLY WITH UPPER SUPPORT (1) DOWN.

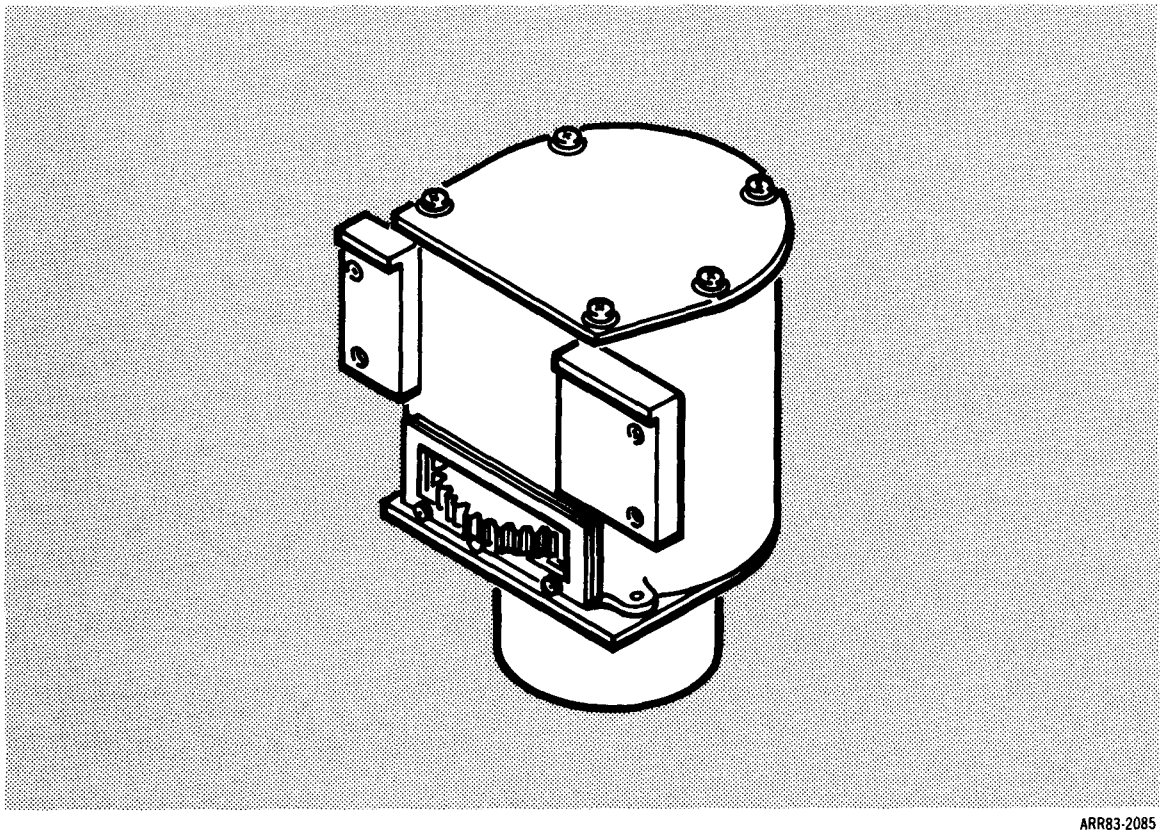
21. SECURE CAM RETAINER (2) TO UPPER SUPPORT (1).
    a. Ensure alignment spring pin (3) is centered in alignment hole of cam retainer (2).
    b. Secure cam retainer (2) to upper support (1) with 36 washers (4) and 36 screws (5).



END OF TASK

Section XII. MAINTENANCE OF AZIMUTH RESOLVER

Section Contents



ARR83-2085

2-49. REMOVAM/INSTALLATION OF AZIMUTH RESOLVER

DESCRIPTION

This task covers: Removal and installation.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental
- Shim Wand
  - (Fig C-7, PN IMI 3011, APPX C)
- Shim Wand
  - (Fig C-7, PN IMI 3012, APPX C)

Materials:
- Adhesive (Item 4, Appx B)
- Solvent (Item 29, Appx B)
- Tape (Item 30.1, Appx B)

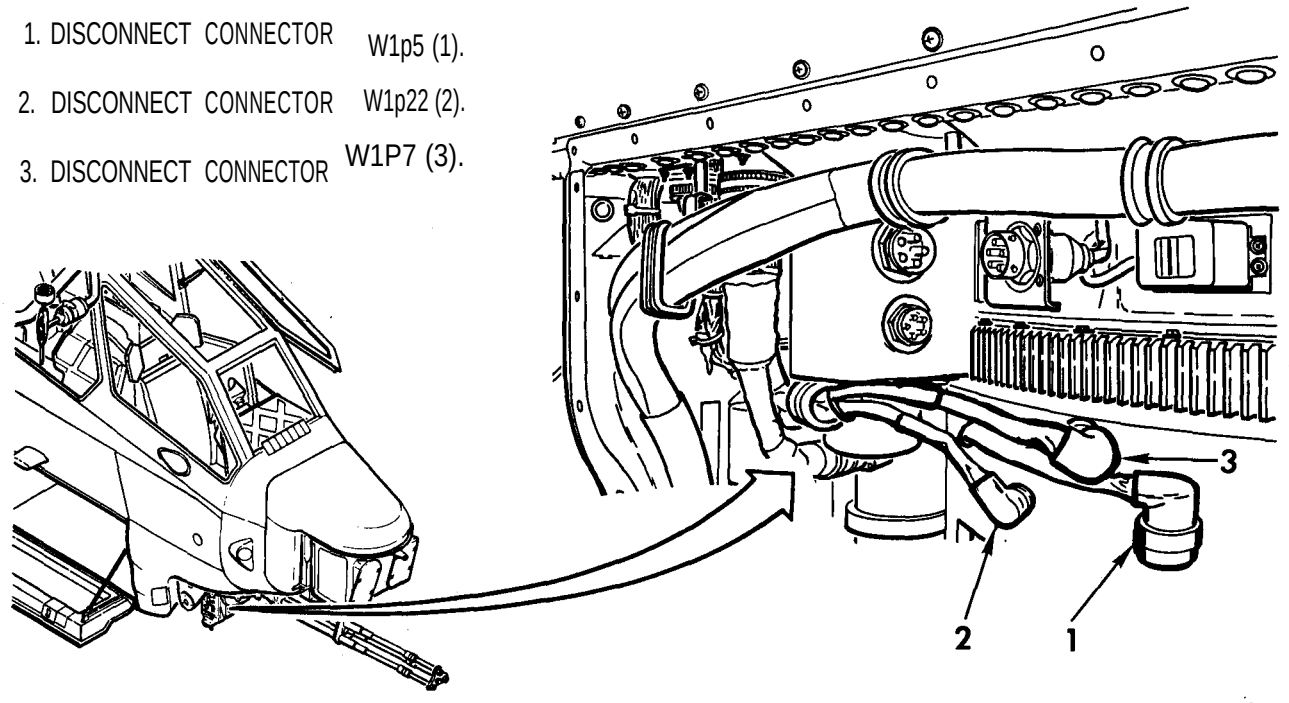
Personnel Required:
- 68M Aircraft Weapon Systems
  - Repairer

References:
- TM 9-1090-206-20-1
- TM 9-1090-206-20-2
- TM 55-1520-236-23

Equipment Conditions:
- HELICOPTER ARMAMENT SUBSYSTEM
  - MAINTENANCE SETUP performed,
  - TM 9-1090-206-20-1 or TM 9-1090-206-20-2.
- Turret fairings removed, see
  - TM 55-1520-236-23.

REMOVAL

1. DISCONNECT CONNECTOR W1p5 (1).
2. DISCONNECT CONNECTOR W1p22 (2).
3. DISCONNECT CONNECTOR W1P7 (3).

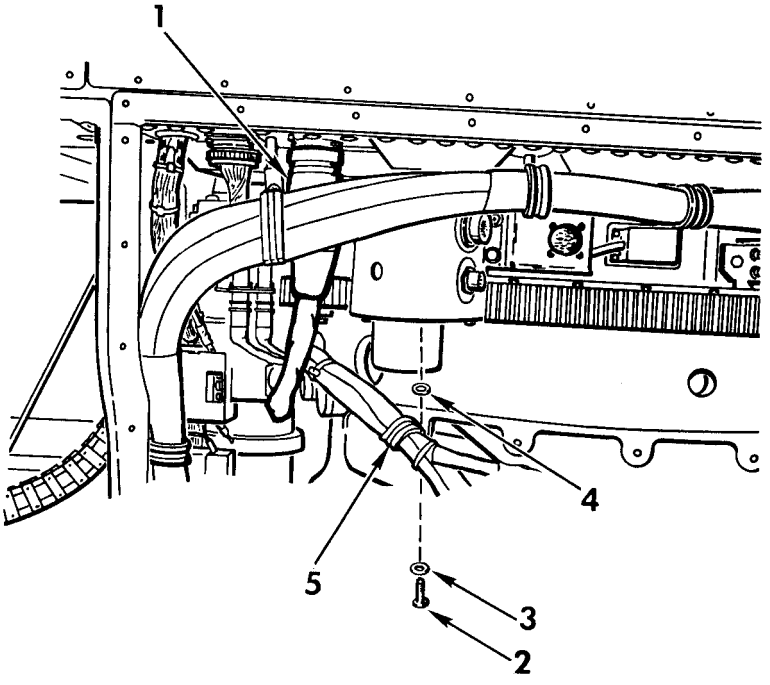


ARR82-25903

REMOVAL (cont)

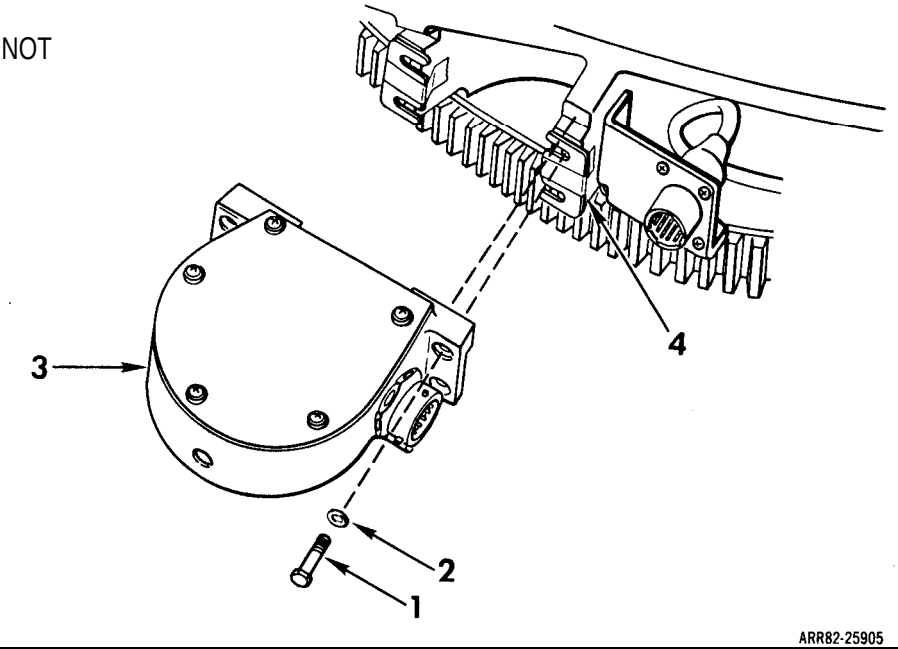
4. DISCONNECT CONNECTOR W4P2 (1).

5. REMOVE SCREW (2), WASHER (3), AND WASHER (4) SECURING LOOP CLAMP (5) TO ACCESS COVER. REINSTALL HARDWARE.



6. REMOVE FOUR BOLTS (1), FOUR WASHERS (2), AND AZIMUTH RESOLVER (3).

7. TAPE SHIMS (4) IN PLACE. DO NOT REMOVE UNLESS DEFECTIVE.

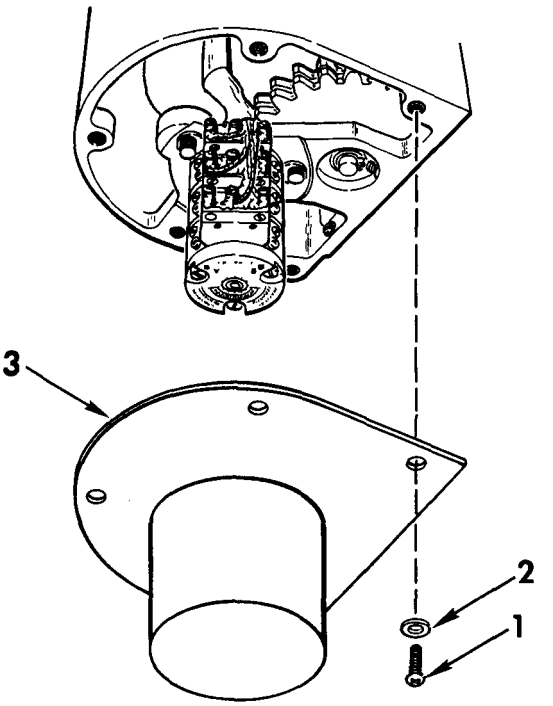


ARR82-25905

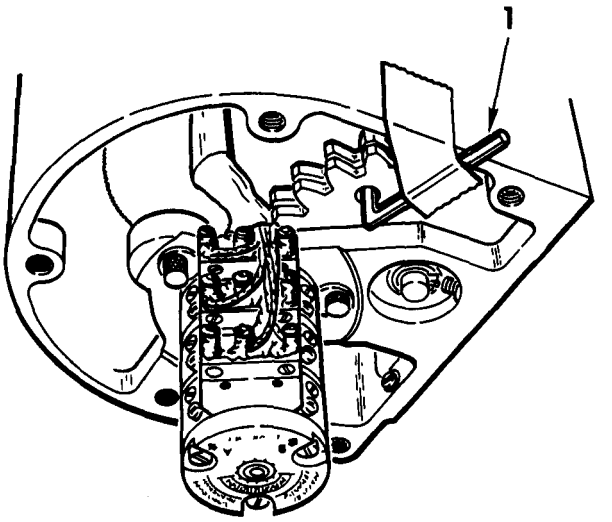
2-49. REMOVAL/INSTALLATION OF AZIMUTH RESOLVER (cont)

INSTALLATION

8. REMOVE FIVE SCREWS (1), FIVE WASHERS (2), AND ACCESS COVER (3).



9. PRELOAD RESOLVER GEAR BY INSTALLING A 3/32-INCH ALLEN WRENCH (1) IN ALINEMENT HOLE. SECURE ALLEN WRENCH WITH TAPE.



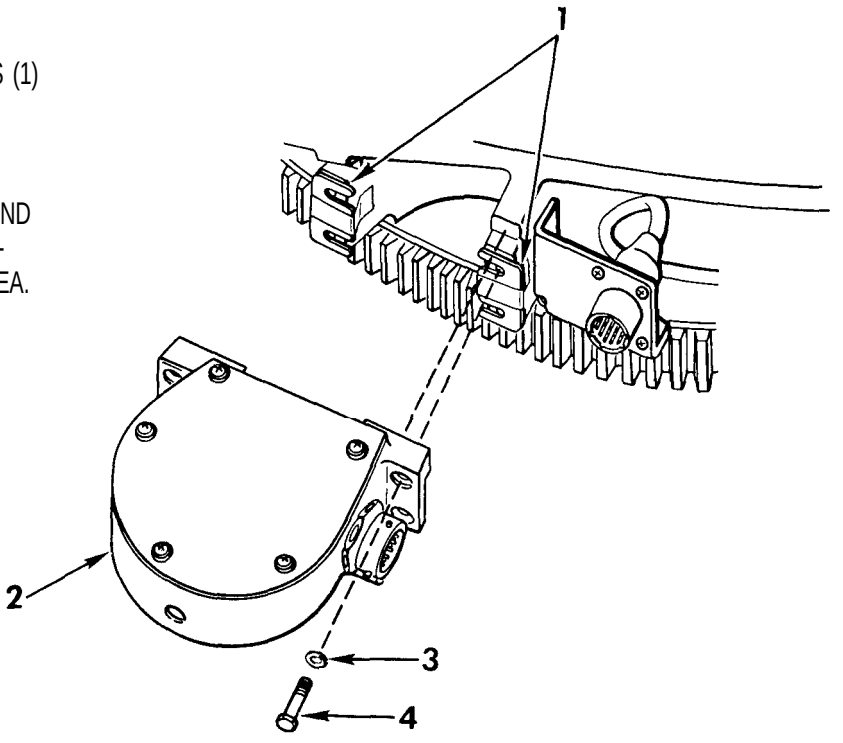
ARR82-25907

INSTALLATION (cont)

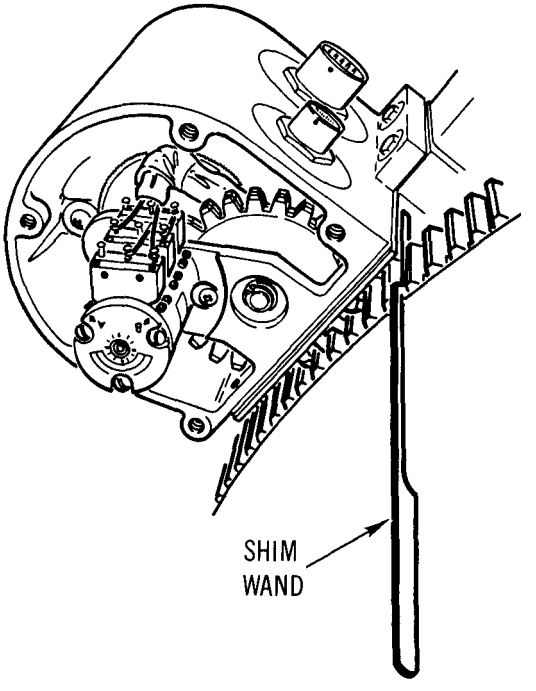
10. REMOVE TAPE AND MAKE SURE SHIMS (1) ARE IN POSITION.

11. INSTALL AZIMUTH RESOLVER (2) AND SECURE USING FOUR WASHERS (3) AND FOUR BOLTS (4). MAKE SURE MOUNTING TABS REST ON SHOULDERED AREA.

12. REMOVE TAPE AND ALLEN WRENCH.



13. PLACE SHIM WAND (FIG. C-7, PN IMI 3012, APPX C) AGAINST RIGHT HAND WALL OF TURRET GEAR TOOTH.



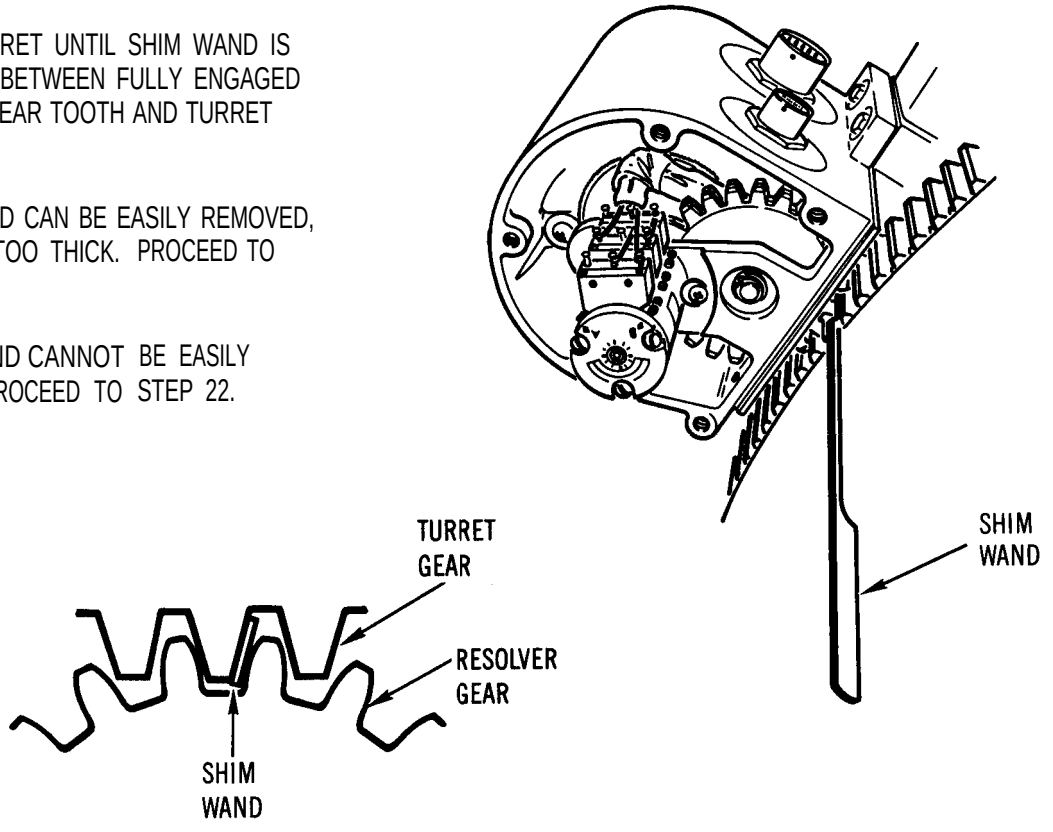
ARR82-25909

2-49.REMOVAL/INSTALLATION OF AZIMUTH RESOLVER (cont)

14. ROTATE TURRET UNTIL SHIM WAND IS POSITIONED BETWEEN FULLY ENGAGED RESOLVER GEAR TOOTH AND TURRET GEAR TOOTH.

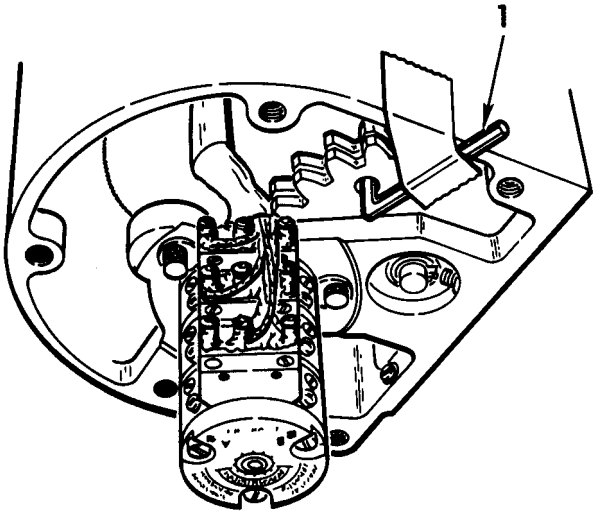
15. IF SHIM WAND CAN BE EASILY REMOVED, SHIMS ARE TOO THICK. PROCEED TO STEP 17.

16. IF SHIM WAND CANNOT BE EASILY REMOVED, PROCEED TO STEP 22.



ARR82-25910

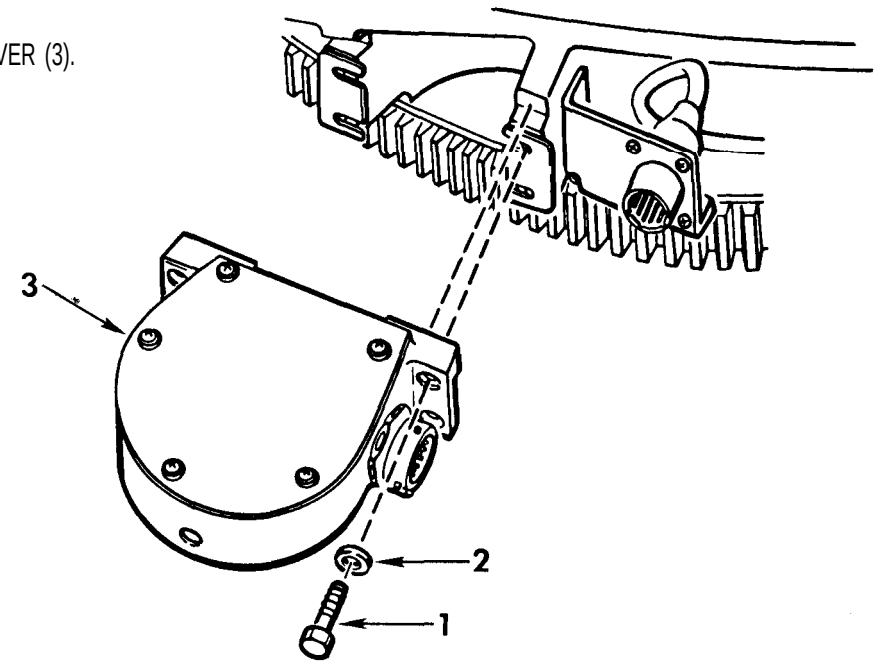
17. PRELOAD RESOLVER GEAR BY INSTALLING A 3/32-INCH ALLEN WRENCH (1) IN ALINEMENT HOLE. SECURE ALLEN WRENCH WITH TAPE.



ARR82-25911

INSTALLATION (cont)

18. REMOVE FOUR BOLTS (1) , FOUR WASHERS (2). AND AZUMUTH RESOLVER (3).

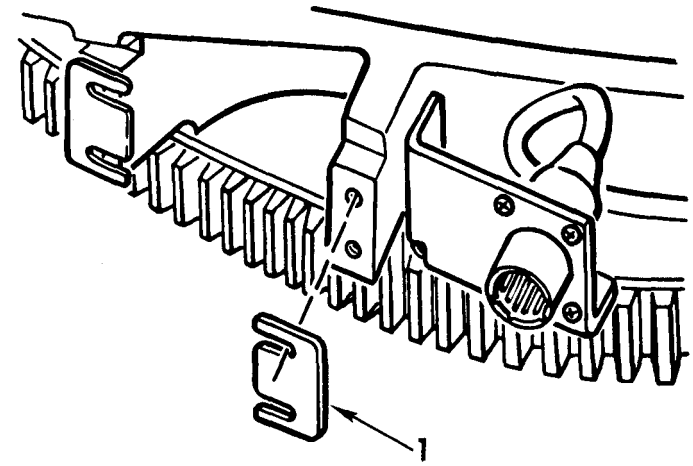


ARR82-25912

19. REMOVE SHIMS (1).

20. IF SHIMS (1) ARE TOO THICK, REDUCE THICKNESS OF EACH SHIM IN 0.002 OR 0.004 INCH INCREMENTS. IF SHIMS (1) ARE TOO THIN, DISCARD THEM AND OBTAIN NEW SHIMS. REDUCE THICKNESS OF EACH NEW SHIM TO 0.050 INCH.

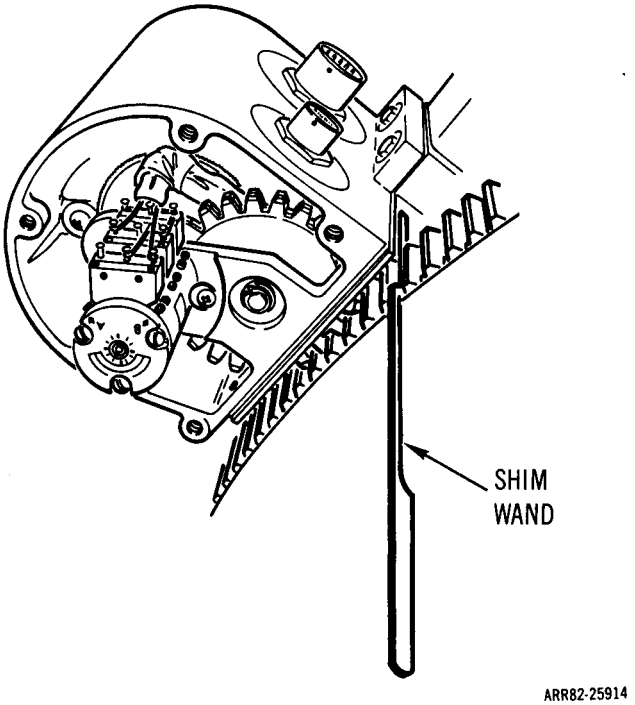
21. REPEAT STEPS (11) THROUGH (16).



ARR82-25913

2-49. REMOVAL/INSTALLATION OF AZIMUTH RESOLVER (cont)

22. PLACE SHIM WAND (FIG. C-7, PN IMI 3011, APPX C) AGAINST RIGHT HAND WALL OF TURRET GEAR TOOTH.

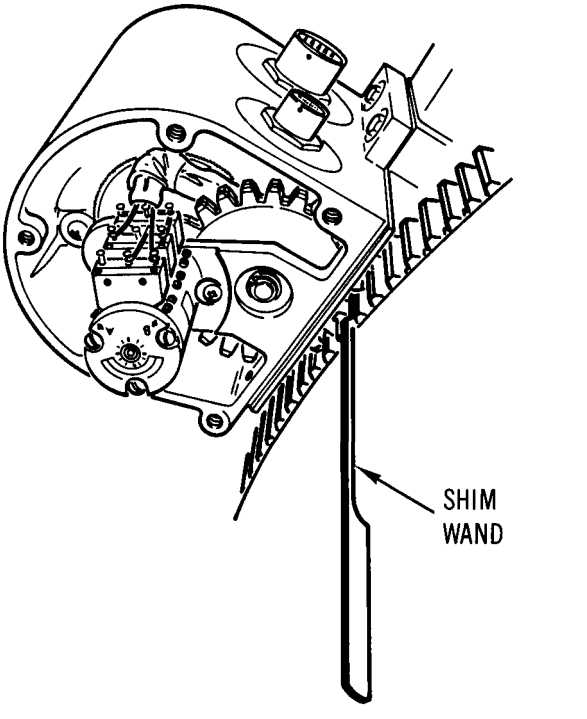


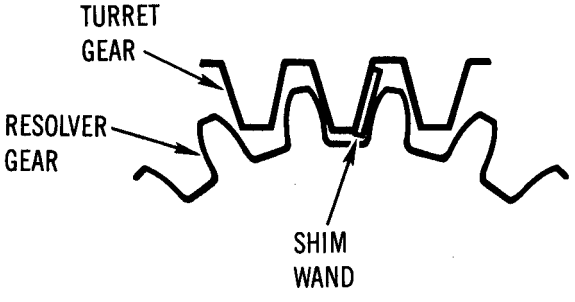
ARR82-25914

23. ROTATE TURRET UNTIL SHIM WAND IS POSITIONED BETWEEN FULLY ENGAGED AZIMUTH RESOLVER TOOTH AND TURRET GEAR.

24. IF SHIM WAND CANNOT BE EASILY REMOVED, SHIMS ARE TOO THIN. REPEAT STEPS (17) THROUGH (25).

25. IF SHIM WAND CAN BE EASILY REMOVED, PROCEED TO STEP 26.





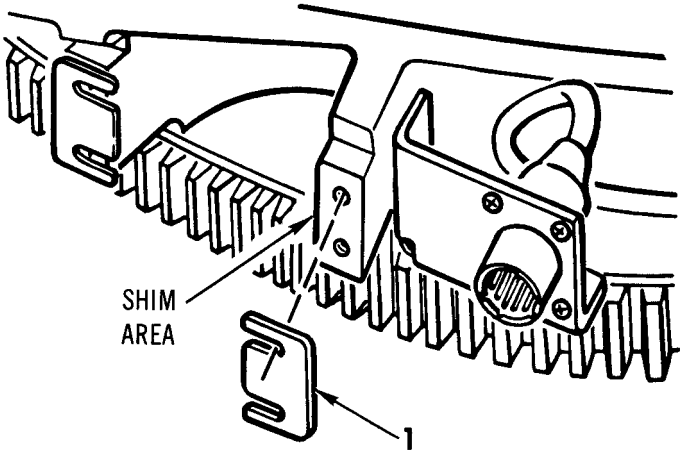
ARR82-25926

INSTALLATION (cont)

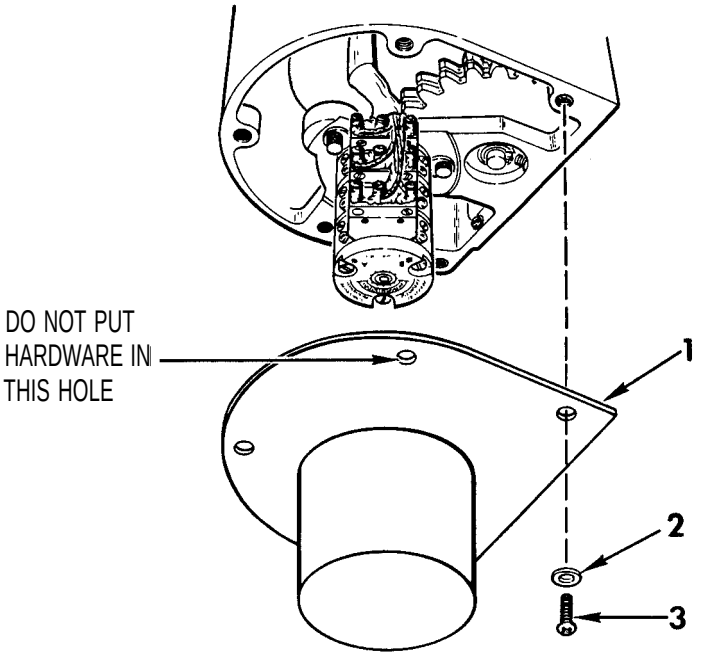
WARNING

Do not use flammable materials near fire or an open flame. Most cleaning materials are harmful or fatal if swalled. Use adequate ventilation. Avoid contact with skin and prolonged breathing of vapors.

26. REMOVE AZIMUTH RESOLVER.
27. CLEAN SHIM AREA OF TURRET WITH SOLVENT. ALLOW TO DRY.
28. BOND SHIMS (1) TO TURRET USING ADHESIVE.
29. INSTALL AZIMUTH RESOLVER.



30. INSTALL ACCESS COVER (1) AND SECURE USING FOUR WASHERS (2) AND FOUR SCREWS (3).

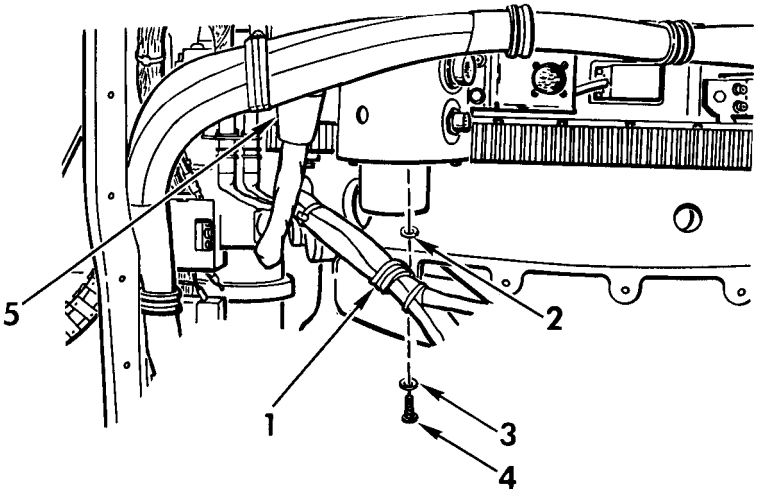


ARR82-25928

2-49.REMOVAL/INSTALLATION OF AZIMUTH RESOLVER (cont)

31. POSITION LOOP CLAMP (1) ON ACCESS COVER AND SECURE USING WASHER (2), WASHER (3), AND SCREW (4).

32. CONNECT CONNECTOR W4P2 (5).



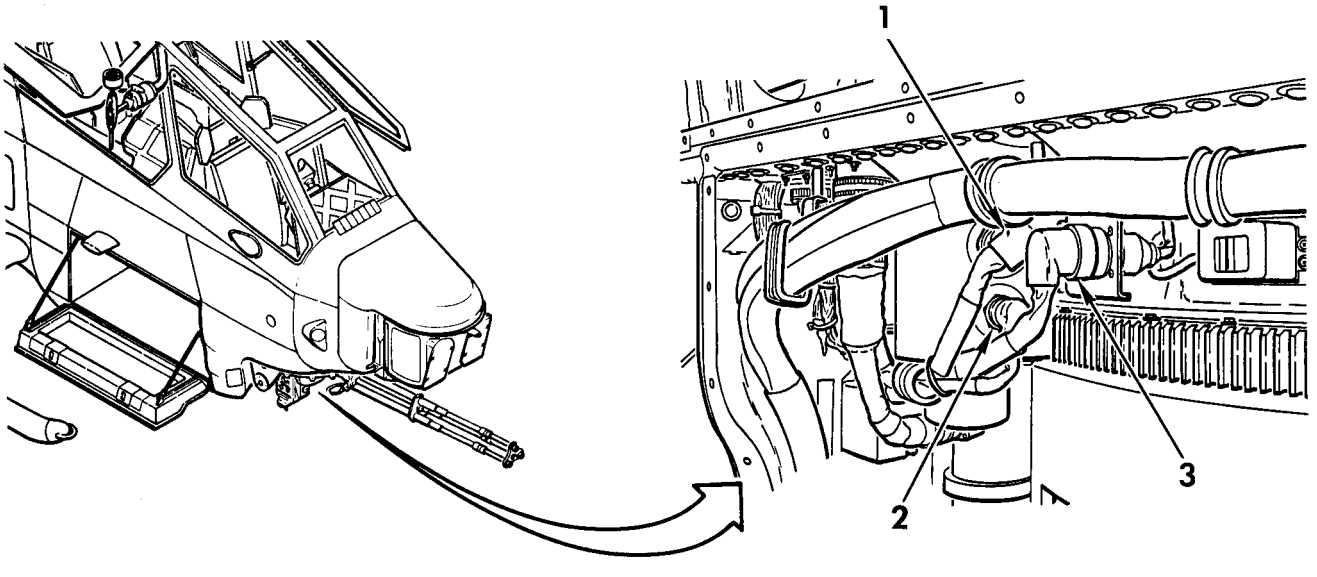
ARR82-25929

33. CONNECT CONNECTOR W1P7 (1).

34. CONNECT CONNECTOR W1P22 (2).

35. CONNECT CONNECTOR W1P5 (3).

36. ALINE AZIMUTH RESOLVER, SEE ELEVATION AND AZIMUTH RESOLVER ALINEMENT, PARA 2-69 OR 2-77.



ARR82-25930

END OF TASK

2-50. REPAIR OF AZIMUTH RESOLVER

DESCRIPTION

This task covers: Disassembly, cleaning, inspection, and assembly.

INITIAL SETUP

Tools/Test and Support Equipment:
Tool Set, A/C Armament
Repairman: Basic
Tool Set, A/C Armament
Repairman: Supplemental

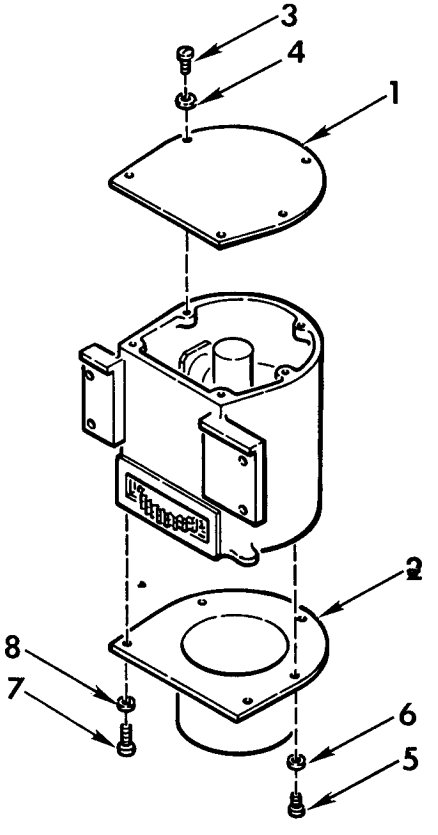
Materials:
Grease (Item 12, Appx B)

Personnel Required:
68M Aircraft Weapon Systems
Repairer

Equipment Conditions:
Azimuth resolver removed see REMOVAL/INSTALLATION OF AZIMUTH RESOLVER, para 2-49.

DISASSEMBLY

1. REMOVE ACCESS COVERS (1) AND (2).
   a. Remove five screws (3), five washers (4) and access cover (1).
   b. Remove three screws (5), three washers (6), two screws (7), two washers (8), and access cover (2).

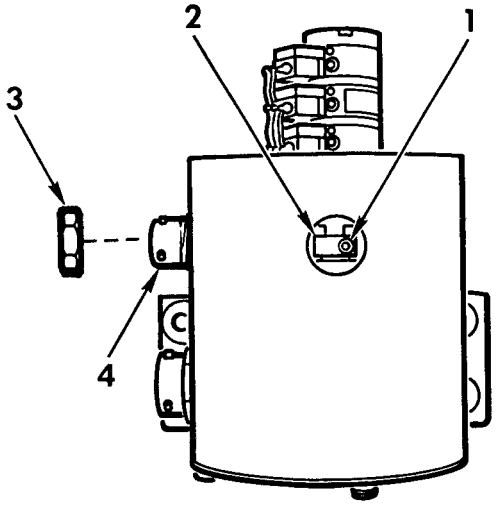


ARR82-27697

2-50. REPAIR OF AZIMUTH RESOLVER (cont)

2. LOOSEN SETSCREW (1) ON HUB CLAMP (2).

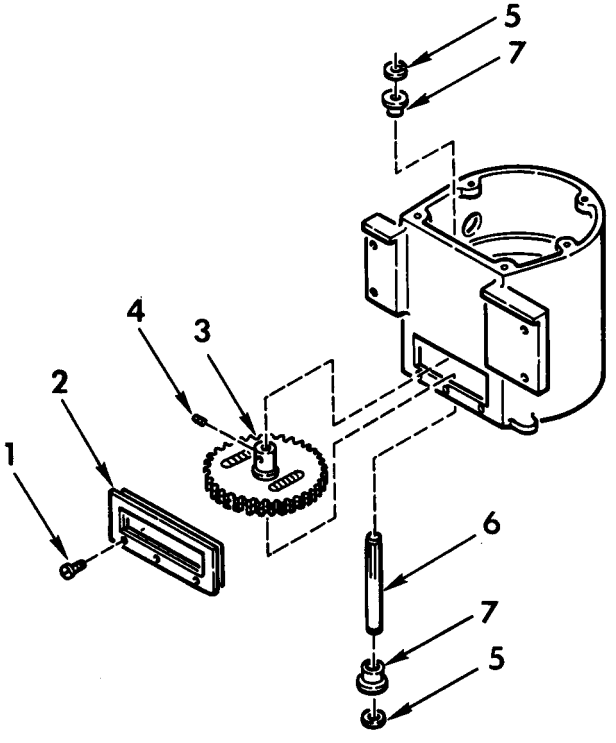
3. REMOVE CONNECTOR NUT (3) AND WITHDRAW CONNECTOR (4) FROM HOUSING.



ARR82-27698

4. REMOVE THREE SCREWS (1) AND SEAL ASSEMBLY (2).

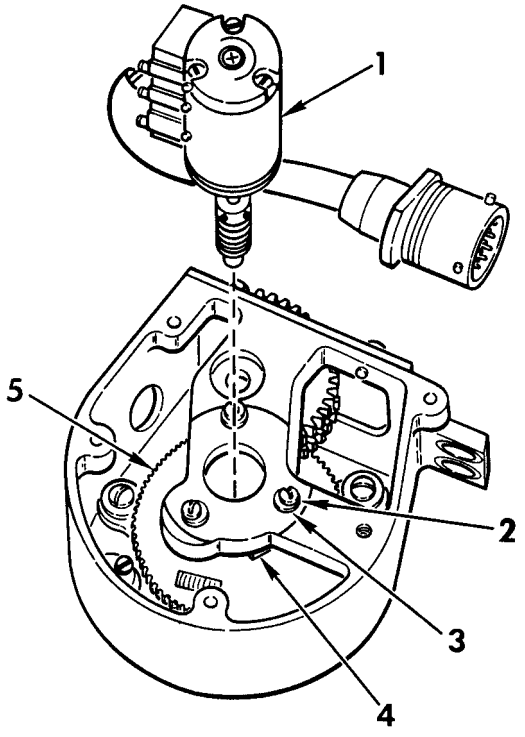
5. REMOVE ANTIBACKLASH GEAR (3).
   a. Loosen two setscrews (4).
   b. Remove two retaining rings (5), shaft (6), and antibacklash gear (3).
   c. Remove two bearings (7).



ARR82-27699

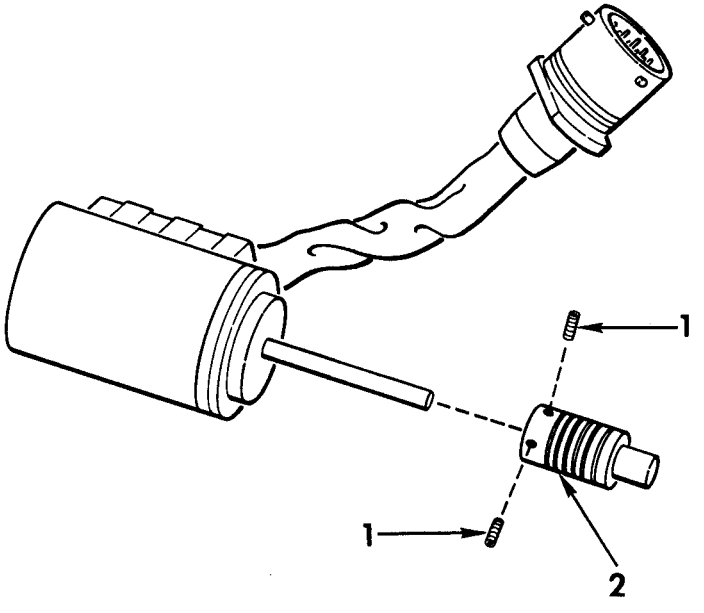
DISASSEMBLY (cont)

6. REMOVE AZIMUTH STOW SWITCH (1).
   a. Loosen three screws (2), pivot three clamps (3) out of slot in switch body, and remove azimuth stow switch (1). Do not remove screws and clamps unless defective.
   b. Remove hub clamp (4) and antibacklash gear (5).



ARR82-27700

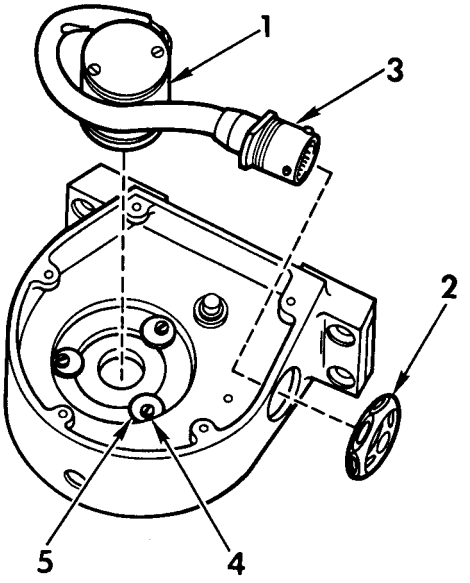
7. LOOSEN TWO SETSCREWS (1) AND REMOVE FLEXIBLE COUPLING (2).



ARR82-27701

2-50. REPAIR OF AZIMUTH RESOLVER (cont)

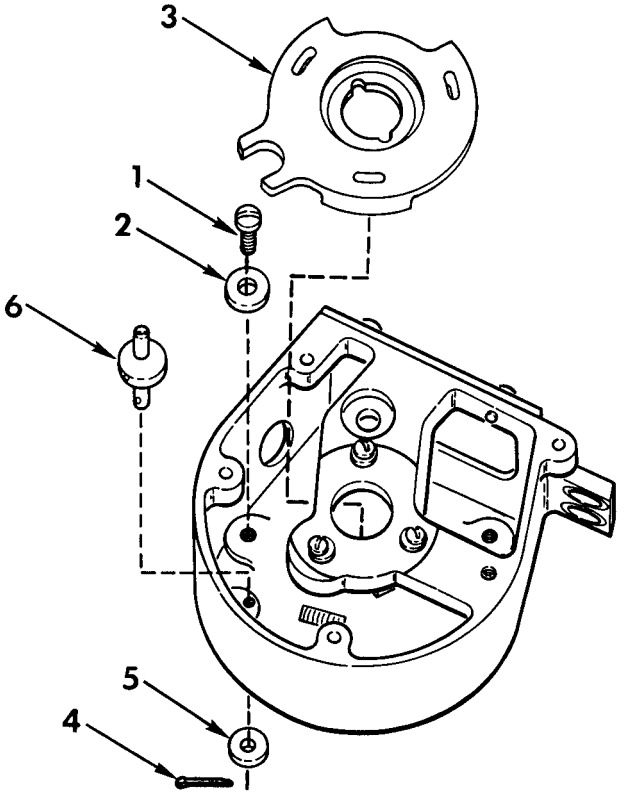
8. REMOVE AZIMUTH RESOLVER (1).
   a. Remove connector nut (2).
   b. Withdraw connector (3) from housing.
   c. Loosen three screws (4), pivot three clamps (5) out of slot in resolver body, and remove azimuth resolver (1). Do not remove screws and clamps unless defective.



ARR82-27702

9. REMOVE THREE SCREWS (1), THREE WASHERS (2), AND SUPPORT (3).

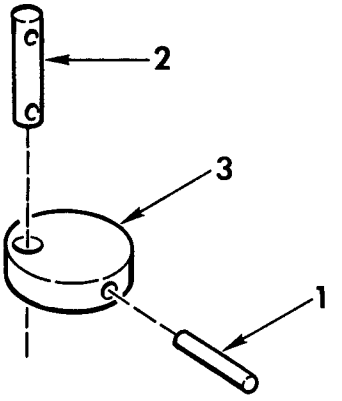
10. REMOVE PIN (4), WASHER (5), AND ADJUSTMENT CAM (6),



ARR82-27703

DISASSEMBLY (cont)

11. REMOVE PIN (1) AND SHAFT (2) FROM CAM (3).



ARR82-27704

CLEANING

12. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV.

INSPECTION

13. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV.

14. INSPECT PARTS IN ACCORDANCE WITH TABULATED DATA:

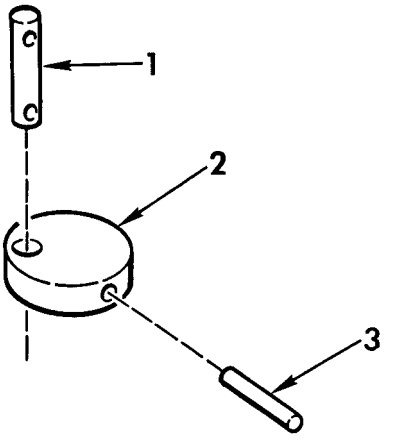
Component	Possible Defect	Remedy
Azimuth Resolver	Noisy rotor bearings	Replace.
Hub Clamp	Cracks, broken, corroded	Replace.
Housing and Covers	Cracked, broken	Replace.
Antibacklash Gears	Worn or pitted teeth, missing teeth	Replace.
Azimuth Stow Switch	Improper electrical operation	Replace
Support	Cracked, worn, broken	Replace.
Bearings	Worn, cracked, corroded	Replace.
Seal Assembly	Bent, broken	Straighten or replace.
Connectors	Bent connector pins	Straighten.

2-50. REPAIR OF AZIMUTH RESOLVER (cont)

ASSEMBLY

15. ASSEMBLE SHAFT (1) TO CAM (2) AND SECURE USING PIN (3).

16. APPLY A LIGHT COAT OF GREASE TO ADJUSTMENT CAM.

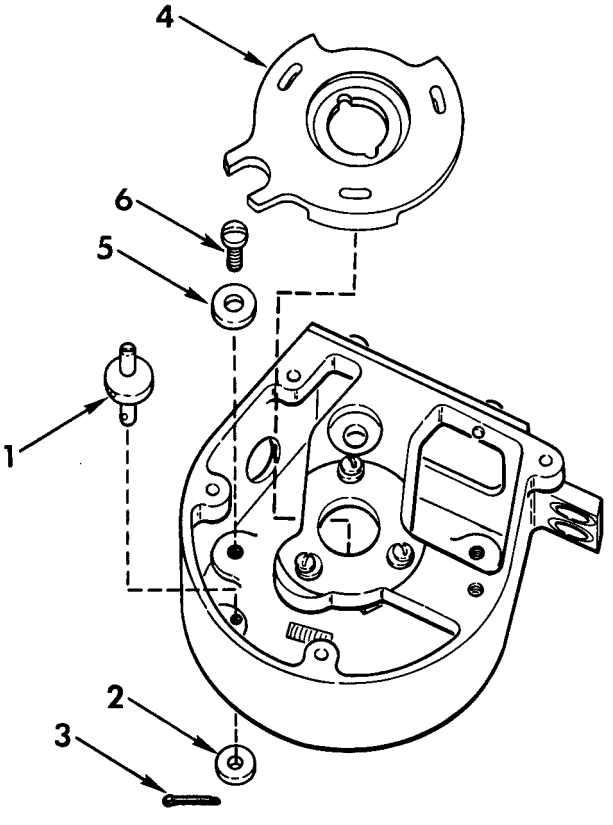


ARR82-27705

17. INSTALL ADJUSTMENT CAM (1) AND SECURE USING WASHER (2) AND PIN (3).

18. APPLY A LIGHT COAT OF GREASE TO INSIDE SURFACE OF CAM FINGERS OF SUPPORT (4).

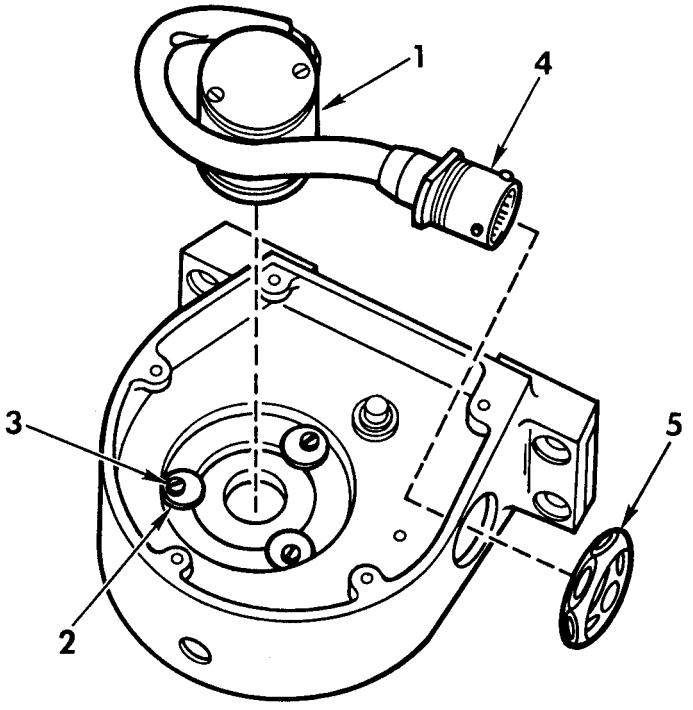
19. INSTALL SUPPORT (4) AND SECURE USING THREE WASHERS (5) AND THREE SCREWS (6). TORQUE SCREWS TO 12–20 LB-IN (1.4–2.3 N.m).



ARR82-27706

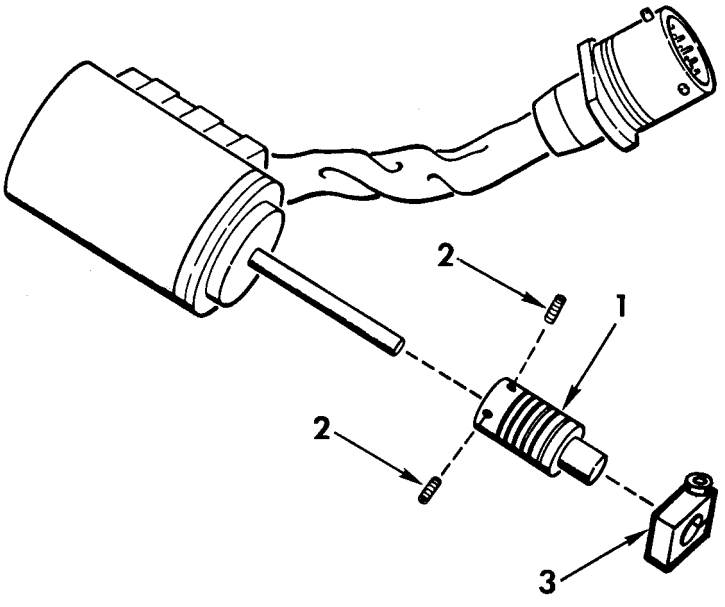
ASSEMBLY (cont)

20. INSTALL AZIMUTH RESOLVER (1).
    a. Install azimuth resolver (1). Secure by pivoting three mounting clamps (2) into slot in resolver body and tightening three screws (3).
    b. Install connector (4) and secure using nut (5).



ARR82-27707

21. INSTALL FLEX COUPLING (1) AND TIGHTEN TWO SETSCREWS (2).
22. INSTALL HUB CLAMP (3) ON END OF FLEXIBLE COUPLING (1).

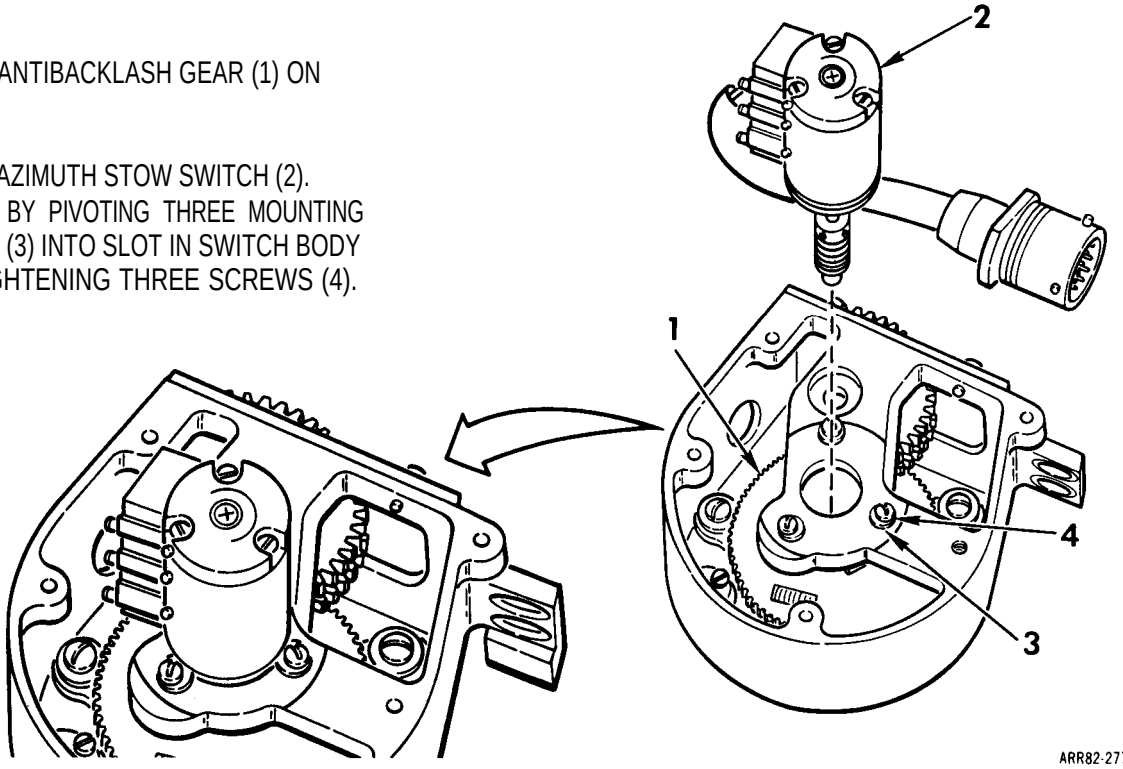


ARR82-27708

2-50. REPAIR OF AZIMUTH RESOLVER (cont)

23. INSTALL ANTIBACKLASH GEAR (1) ON SHAFT.

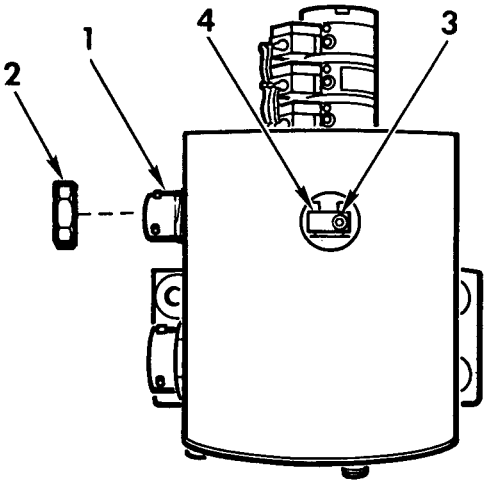
24. INSTALL AZIMUTH STOW SWITCH (2). SECURE BY PIVOTING THREE MOUNTING CLAMPS (3) INTO SLOT IN SWITCH BODY AND TIGHTENING THREE SCREWS (4).



ARR82-27709

25. INSTALL CONNECTOR (1) AND SECURE WITH CONNECTOR NUT (2).

26. TIGHTEN SETSCREW (3) ON HUB CLAMP (4).



ARR82-27710

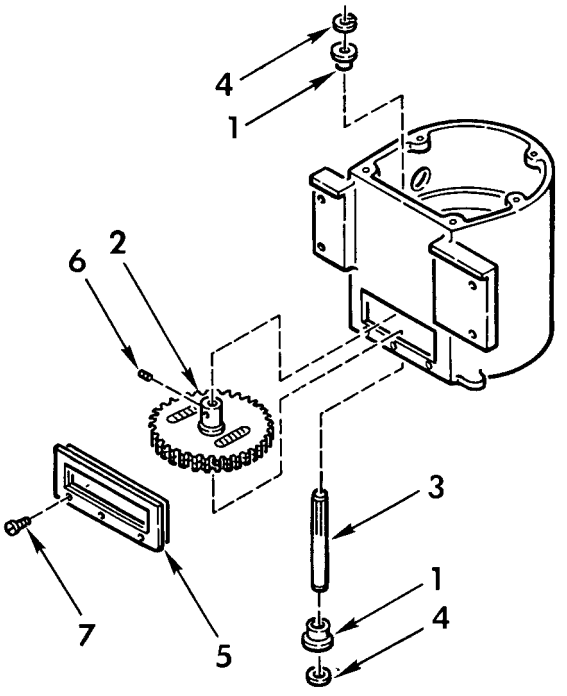
ASSEMBLY (cont)

27. INSTALL TWO BEARINGS (1) IN HOUSING.

28. HOLD ANTIBACKLASH GEAR (2) IN POSITION IN HOUSING AND INSTALL SHAFT (3). SECURE SHAFT USING TWO RETAINING RINGS (4).

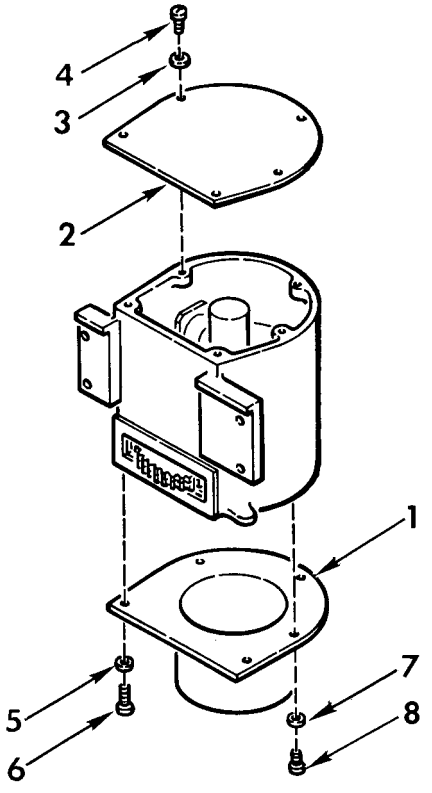
29. PLACE SEAL ASSEMBLY (5) IN POSITION. LOCATE ANTIBACKLASH GEAR (2) ON SHAFT (3) SO THAT IT IS CENTERED IN SLOT OF SEAL ASSEMBLY. REMOVE SEAL ASSEMBLY AND TIGHTEN TWO SET-SCREWS (6).

30. INSTALL SEAL ASSEMBLY (5) AND SECURE USING THREE SCREWS (7).



ARR82-27711

31. INSTALL ACCESS COVERS (1) AND (2).
    a. Install access cover (2) and secure using five washers (3) and five screws (4).
    b. Install access cover (1) and secure using two washers (5), two screws (6), three washers (7), and three screws (8).

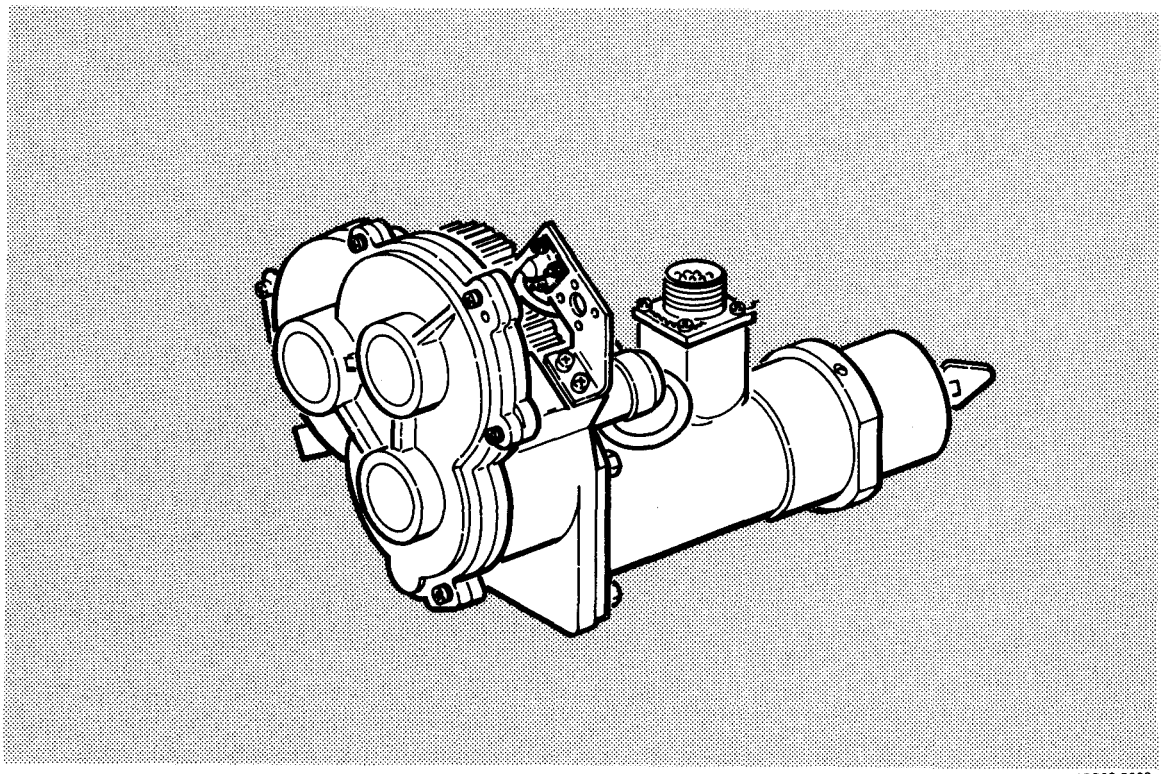


ARR82-27712

END OF TASK

Section XIII. MAINTENANCE OF AZIMUTH DRIVE

Section Contents



ARR83-2089

2-51. REMOVAL/INSTALLATION OF AZIMUTH DRIVE

DESCRIPTION

This task covers: Removal and installation.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental
- Shim Wand
  - (Fig C-7, PN IMI 3013, Appx C)
- Shim Wand
  - (Fig C-7, PN IMI 3014, Appx C)

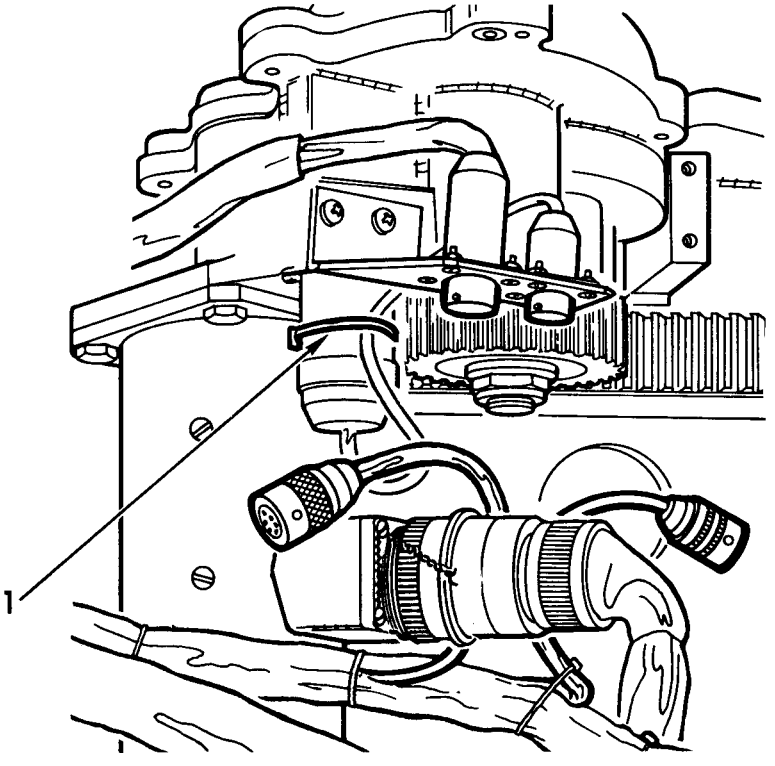
Materials:
- Adhesive (Item 4, Appx B)
- Lockwire (Item 17, Appx B)
- Solvent (Item 29, Appx B)

Personnel Required:
- 68M Aircraft Weapon Systems Repairer

Equipment Conditions:
- REMOVAL OF TURRET performed, para 2-45.

REMOVAL

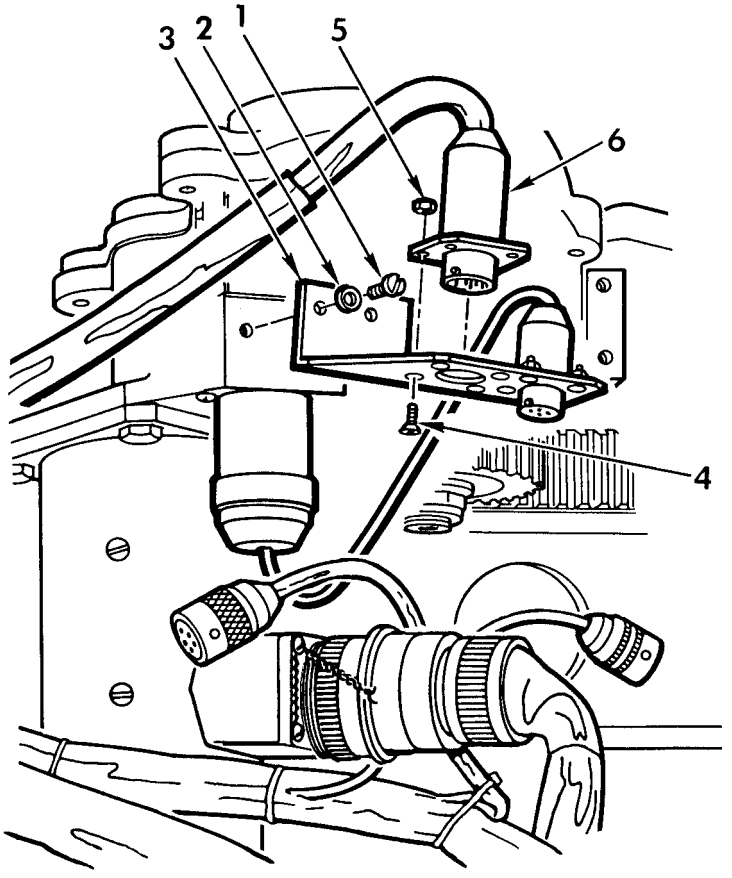
1. REMOVE CABLE TIEDOWN STRAP (1).



ARR82-25960

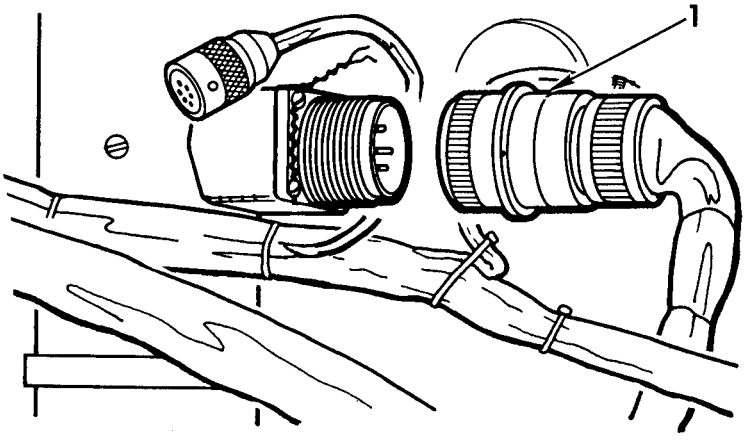
REMOVAL (cont)

2. REMOVE TWO SCREWS (1), TWO WASHERS (2), AND CONNECTOR BRACKET (3).
3. REMOVE FOUR SCREWS (4), FOUR NUTS (5), AND CONNECTOR A7J13 (6).
4. REINSTALL CONNECTOR BRACKET (3) AND SECURE USING TWO WASHERS (2) AND TWO SCREWS (1).



ARR82-25961

5. REMOVE LOCKWIRE AND DISCONNECT CONNECTOR W4P14 (1).

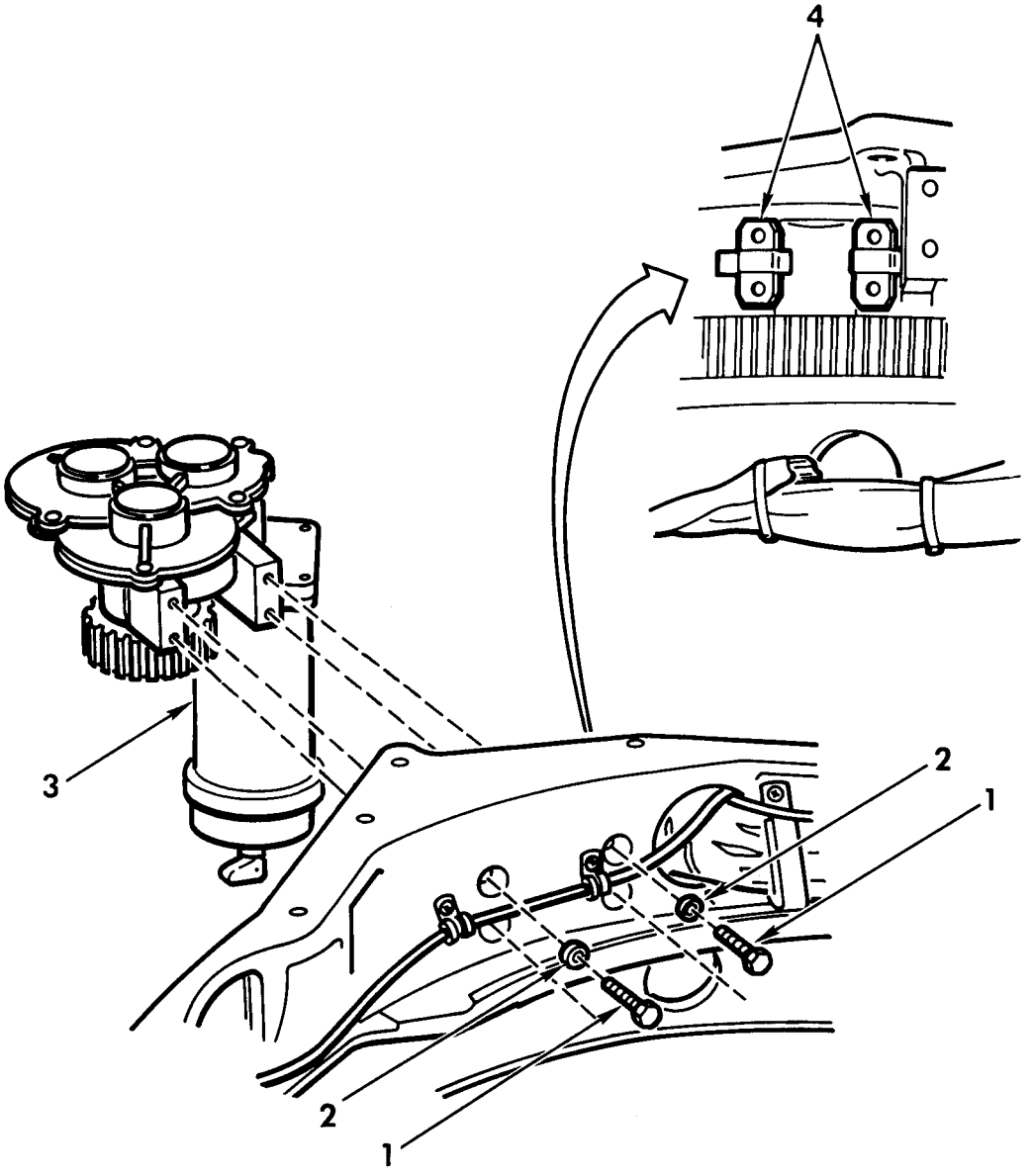


ARR82-25962

2-51. REMOVAL/INSTALLATION OF AZIMUTH DRIVE (cont)

6. REMOVE FOUR BOLTS (1), FOUR WASHERS (2), AND AZIMUTH DRIVE (3).

7. TAPE SHIMS (4) IN PLACE.

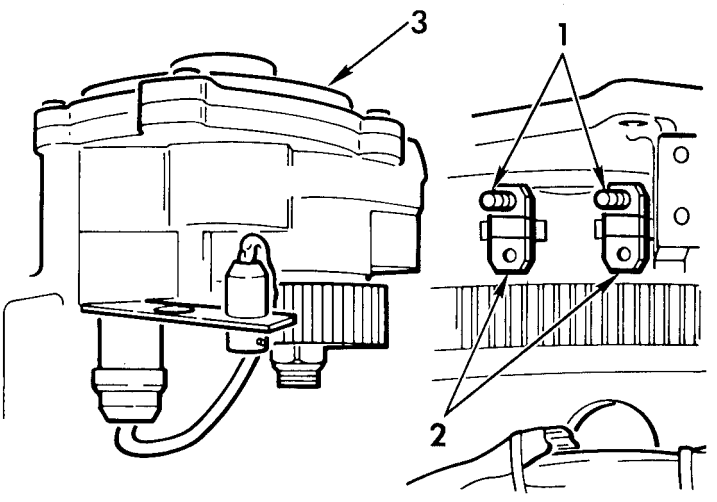


ARR82-25963

INSTALLATION

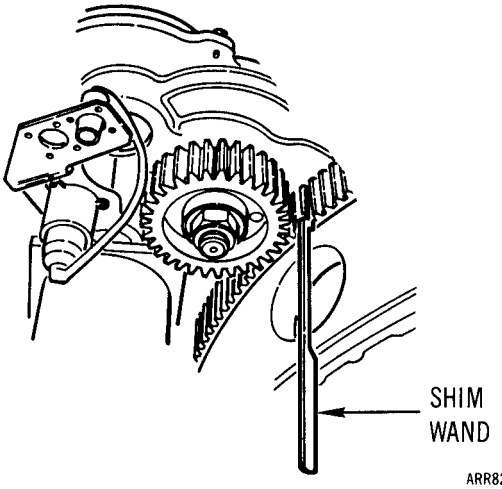
8. INSTALL TWO WASHERS AND TWO BOLTS (1) TO HOLD SHIMS (2) IN POSITION AND REMOVE TAPE.

9. INSTALL AZIMUTH DRIVE (3) AND REMAINING TWO WASHERS AND TWO BOLTS (1). SECURE BY TIGHTENING FOUR BOLTS (1).



ARR82-25964

10. PLACE SHIM WAND (FIG, C-7, PN IMI 3014, APPX C) AGAINST RIGHT HAND WALLL OF TURRET GEAR TOOTH.

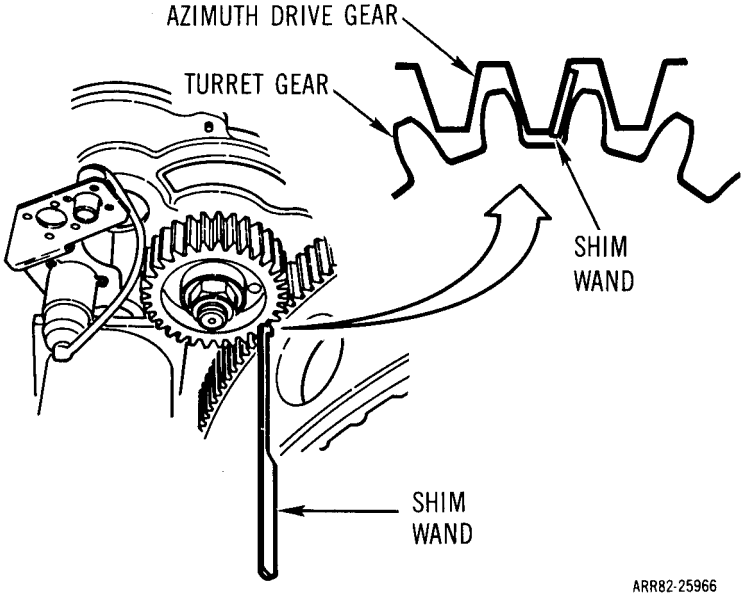


ARR82-25965

11. ROTATE TURRET UNTIL SHIM WAND IS POSITIONED BETWEEN FULLY ENGAGED AZIMUTH DRIVE GEAR TOOTH AND TURRET GEAR TOOTH.

12. IF SHIM WAND CAN BE EASILY REMOVED, SHIMS ARE TOO THICK. PROCEED TO STEP 14.

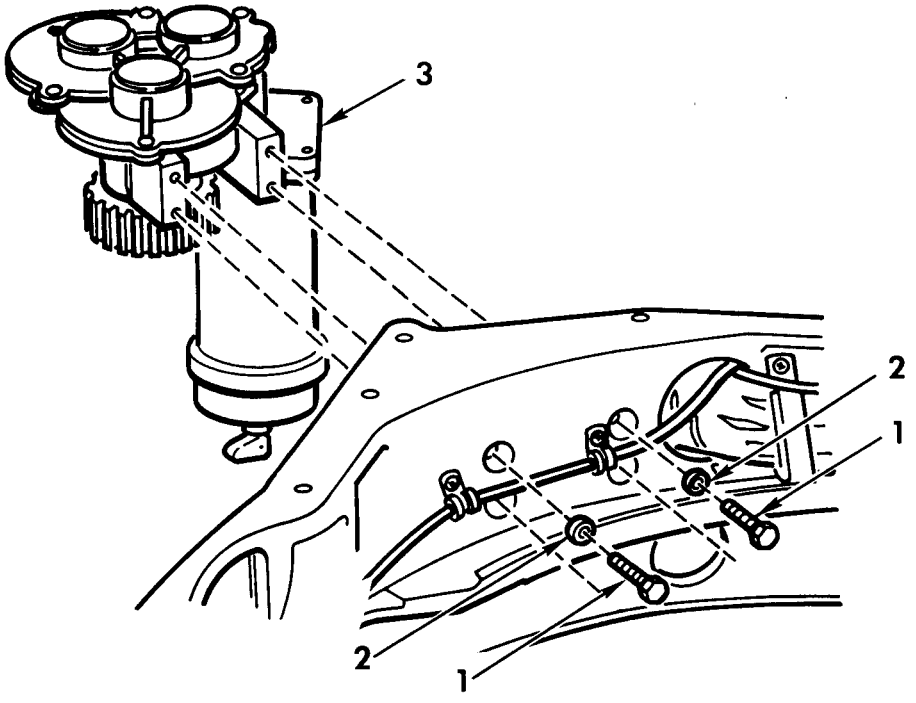
13. IF SHIM WAND CANNOT BE EASILY REMOVED, PROCEED TO STEP 18.



ARR82-25966

2-51. REMOVAL/INSTALLATION OF AZIMUTH DRIVE (cont)

14. REMOVE FOUR BOLTS (1), FOUR WASHERS (2), AND AZIMUTH DRIVE (3).

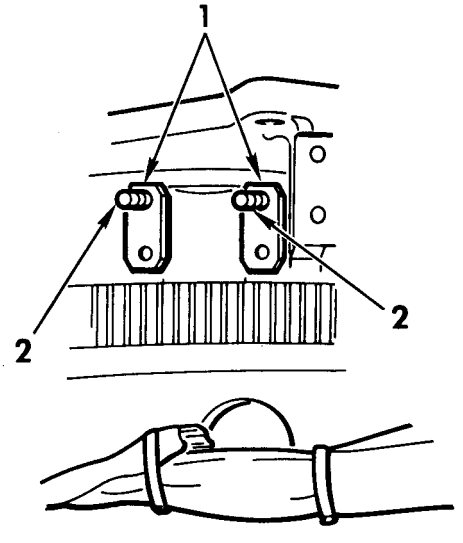


ARR82-25967

15. REMOVE SHIMS (1).

16. IF SHIMS (1) ARE TOO THICK, REDUCE THICKNESS IN 0.002 OR 0.004 INCH INCREMENTS. IF SHIMS (1) ARE TOO THIN, DISCARD THEM AND OBTAIN NEW SHIMS. REDUCE THICKNESS OF EACH NEW SHIM TO 0.050 INCH.

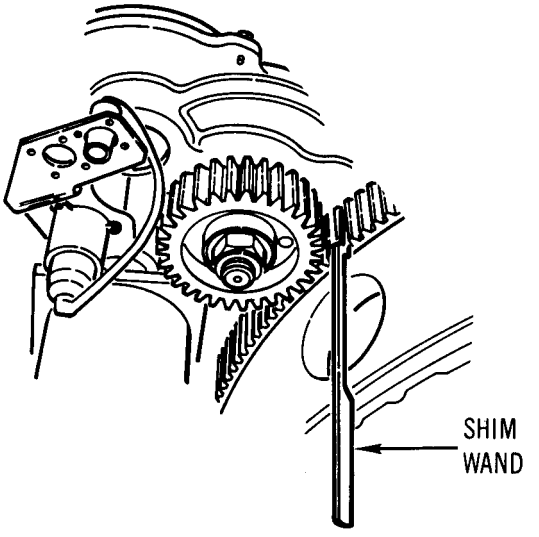
17. PLACE SHIMS (1) IN POSITION AND INSTALL TWO WASHERS AND TWO BOLTS (2) THEN, REPEAT STEPS (9) THROUGH (13).



ARR82-25968

INSTALLATION (cont)

18. PLACE SHIM WAND (FIG. C-7, PN IMI 3013, APPX C) AGAINST RIGHT HAND WALL OF TURRET GEAR TOOTH.

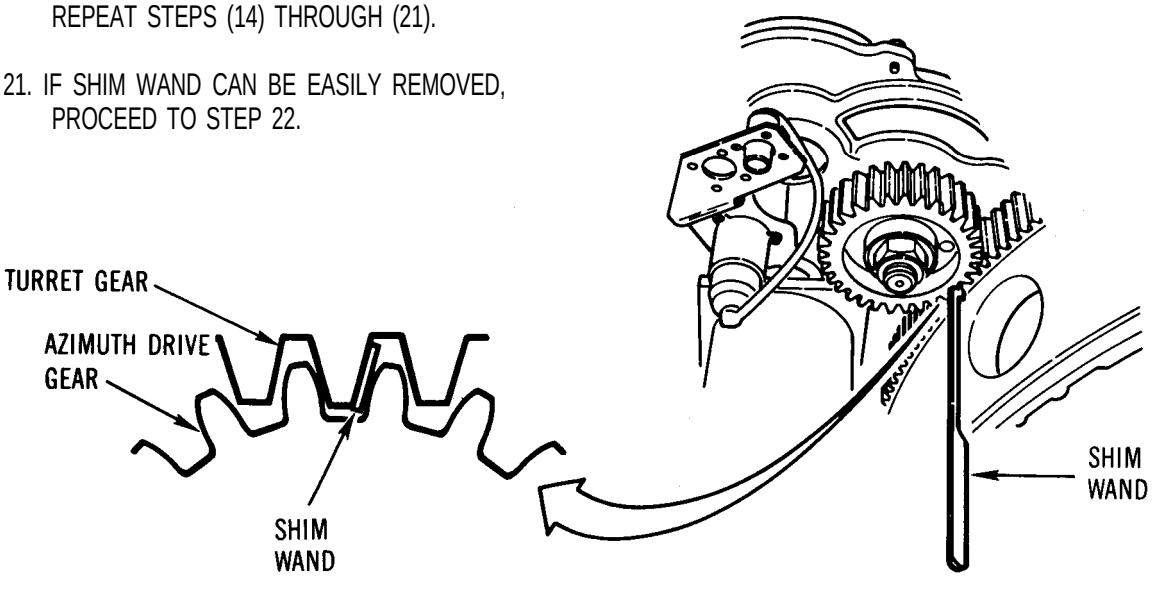


ARR82-25969

19. ROTATE TURRET UNTIL SHIM WAND IS POSITIONED BETWEEN FULLY ENGAGED AZIMUTH DRIVE GEAR TOOTH AND TURRET GEAR TOOTH.

20. IF SHIM WAND CANNOT BE EASILY REMOVED, SHIMS ARE TOO THIN. REPEAT STEPS (14) THROUGH (21).

21. IF SHIM WAND CAN BE EASILY REMOVED, PROCEED TO STEP 22.



ARR82-25970

2-51. REMOVAL/INSTALLATION OF AZIMUTH DRIVE (cont)

WARNING

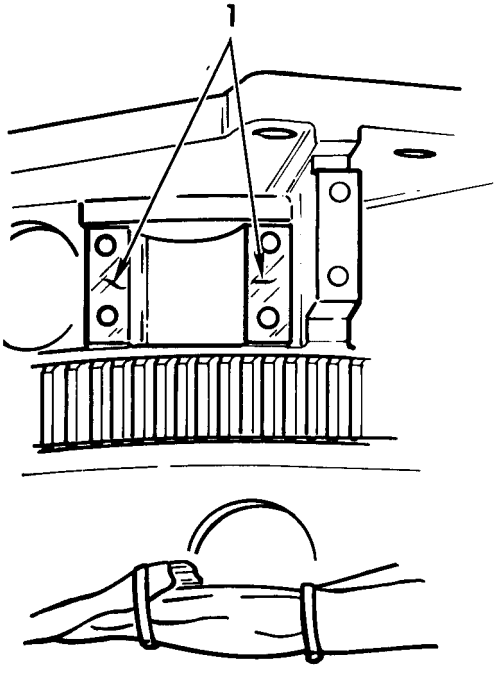
Do not use flammable materials near fire or an open flame. Most cleaning materials are harmful or fatal if swallowed. Use adequate ventilation. Avoid contact with skin and prolonged breathing of vapors.

22. REMOVE AZIMUTH DRIVE.

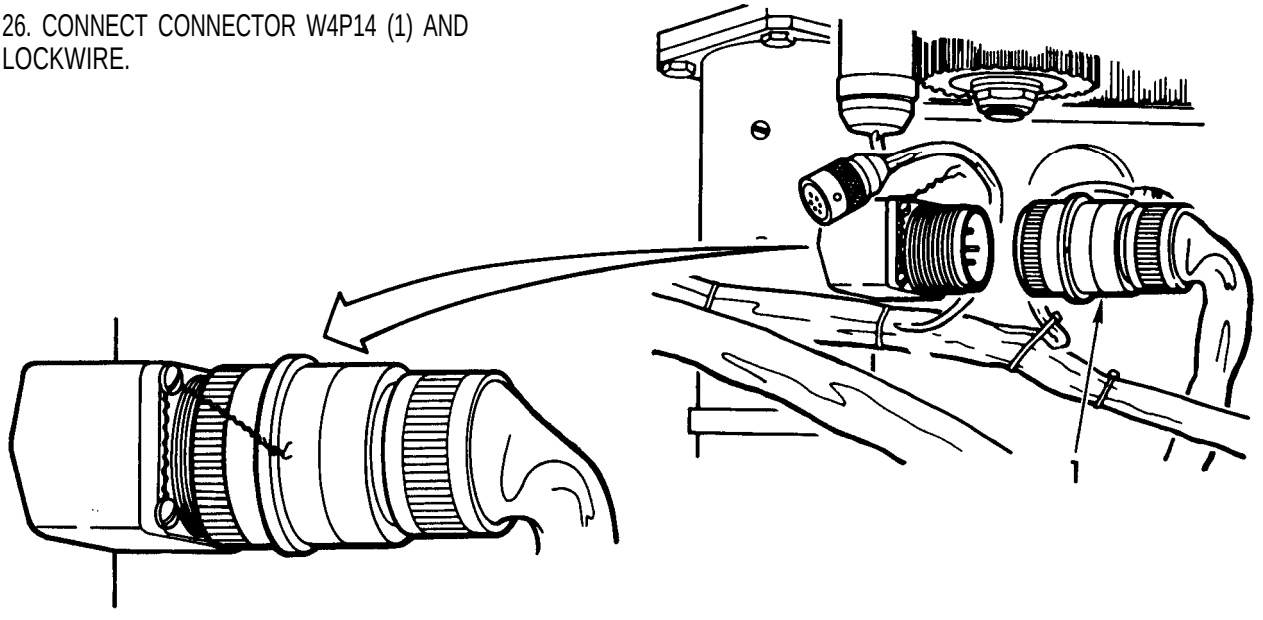
23. CLEAN SHIM AREA OF TURRET WITH SOLVENT, ALLOW TO DRY.

24. BOND SHIMS (1) TO TURRET USING ADHESIVE.

25. INSTALL AZIMUTH DRIVE, FOUR WASHERS, AND FOUR BOLTS. TORQUE BOLTS TO 120-130 LB-IN. (13.5 -14.6 N.m).



26. CONNECT CONNECTOR W4P14 (1) AND LOCKWIRE.



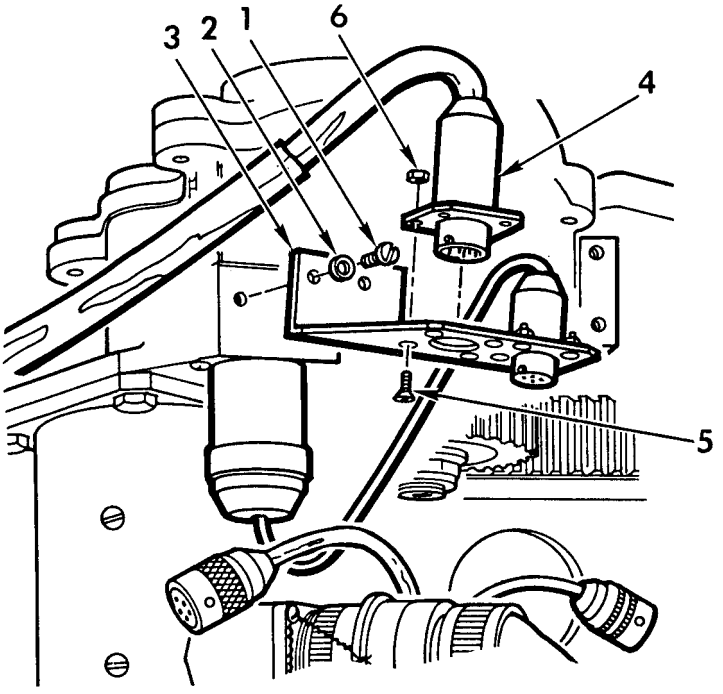
ARR82-25972

INSTALLATION (cont)

27. REMOVE TWO SCREWS (1), TWO WASHERS (2), AND CONNECTOR BRACKET (3).

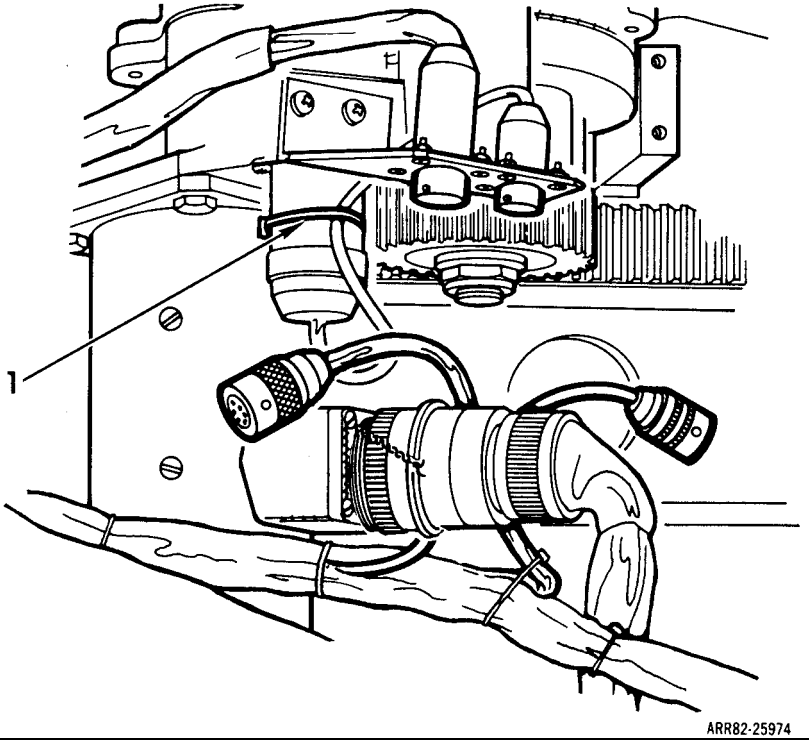
28. INSTALL CONNECTOR A7J13 (4) ON CONNECTOR BRACKET (3) AND SECURE USING FOUR SCREWS (5) AND FOUR NUTS (6).

29. REINSTALL CONNECTOR BRACKET (3) AND SECURE USING TWO WASHERS (2) AND TWO SCREWS (1).



ARR82-25973

30. ROUTE TACHOMETER CABLE BEHIND TACHOMETER AND SECURE USING CABLE TIEDOWN STRAP (1).



ARR82-25974

END OF TASK

2-52. REPAIR OF AZIMUTH DRIVE

DESCRIPTION

This task covers: Disassembly, cleaning, inspection, and assembly.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental
- Bearing Separator CJ950 (55719)
- Bearing Puller CJ83B (55719)

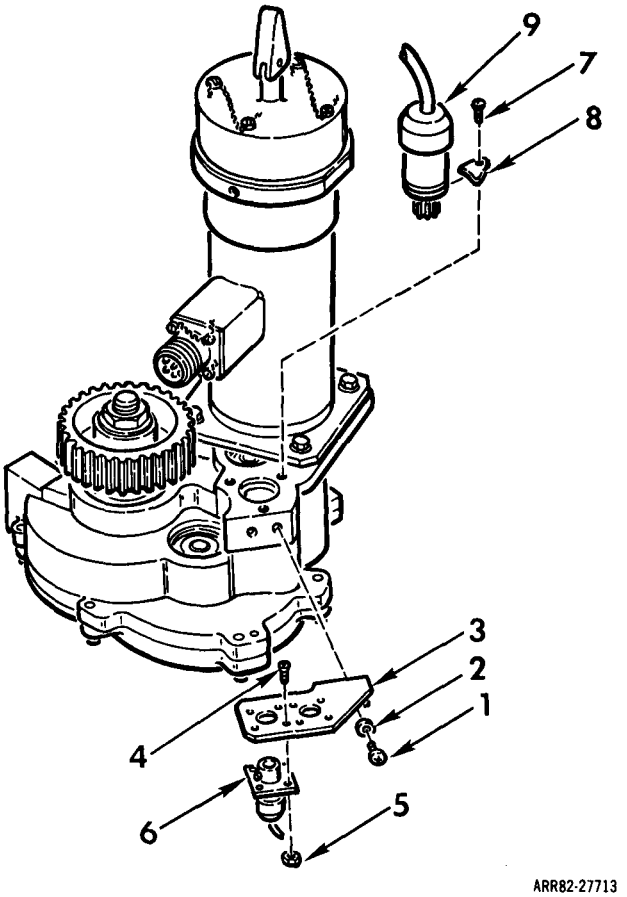
Materials:
- Adhesive (Item 4, Appx B)
- Grease (Item 12, Appx B)
- Solvent (Item 29, Appx B)

Personnel Required:
- 68M Aircraft Weapon Systems
  - Repairer

Equipment Conditions:
- Azimuth drive removed, see REMOVAL/INSTALIATION OF AZIMUTH DRIVE, para 2-51

DISASSEMBLY

1. REMOVE TWO SCREWS (1), TWO WASHERS (2), AND CONNECTOR BRACKET (3).
2. REMOVE FOUR SCREWS (4), FOUR NUTS (5), AND CONNECTOR (6).
3. REMOVE THREE SCREWS (7), THREE MOUNTING CLAMPS (8) AND TACHOMETER (9).

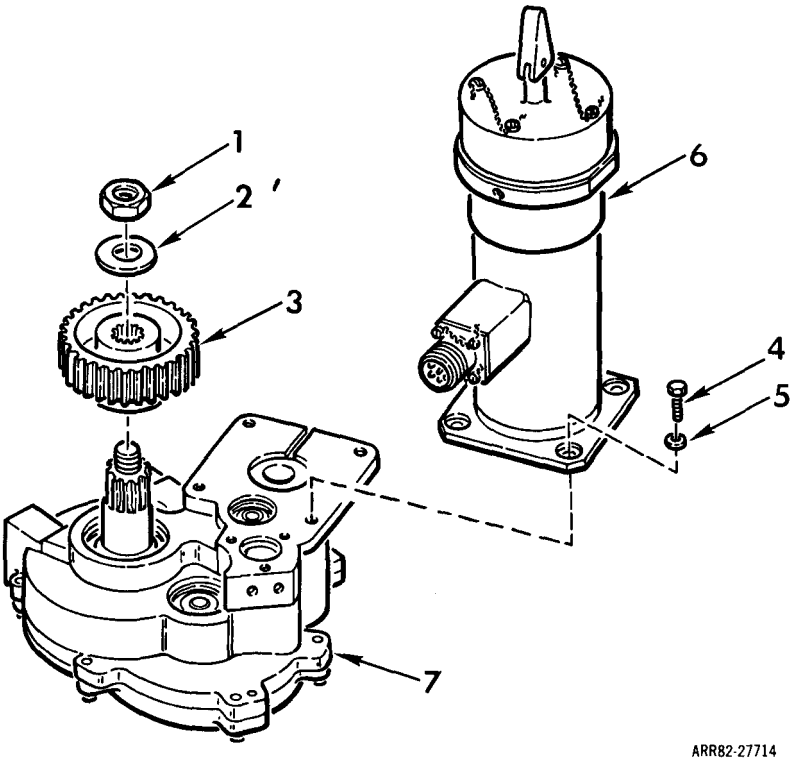


ARR82-27713

DISASSEMBLY (cont)

4. REMOVE NUT (1), WASHER (2), AND GEAR (3).

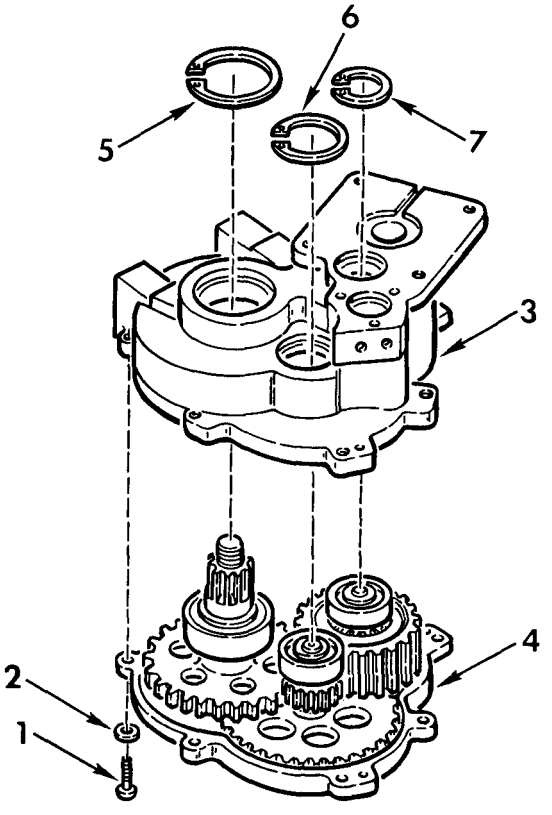
5. REMOVE FOUR BOLTS (4), FOUR WASHERS (5), AND AZIMUTH DRIVE MOTOR (6) FROM HOUSING (7).



ARR82-27714

6. REMOVE SIX SCREWS (1), SIX WASHERS (2), AND HOUSING (3) FROM COVER (4).

7. REMOVE RETAINING RING (5), RETAINING RING (6), AND RETAINING RING (7).



ARR82-27715

2-52. REPAIR OF AZIMUTH DRIVE (cent)

8. REMOVE CLUTCH GEAR GROUP (1).

a. Remove clutch gear group (1) from cover (2). It may be necessary to lift adjoining gearshafts to remove group.

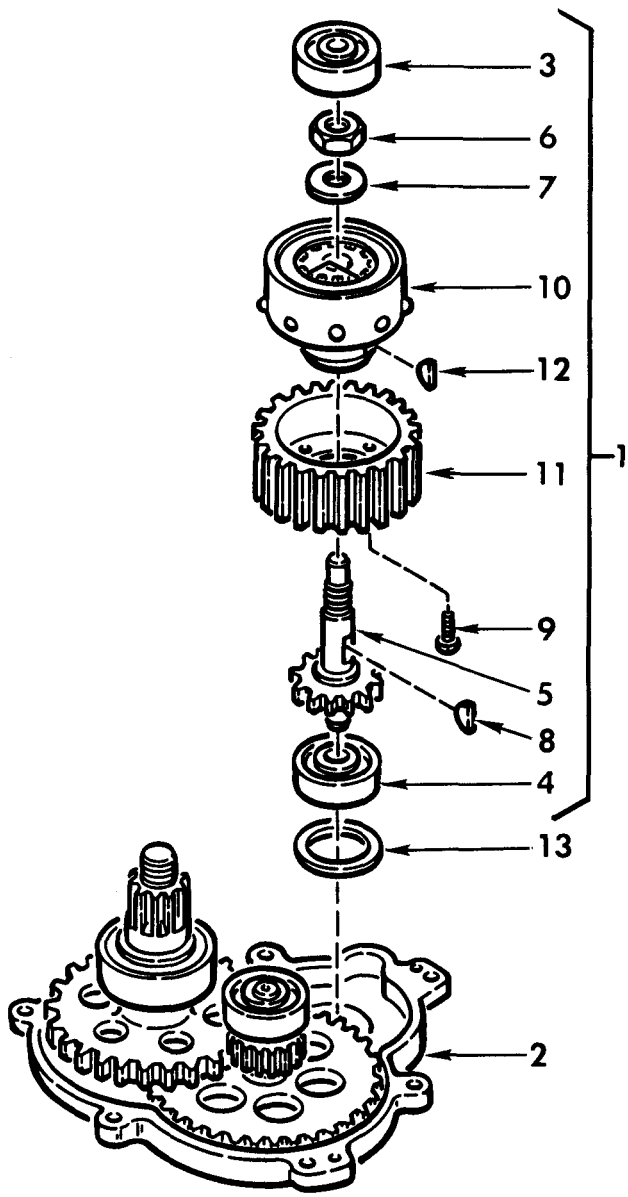
b. Using bearing separator and puller, remove bearing (3) and bearing (4).

c. Protect teeth of gearshaft (5) and remove nut (6) and washer (7).

d. Withdraw gearshaft (5) and remove key (8).

e. Remove four screws (9) and withdraw azimuth clutch (10) from clutch gear (11). Remove key (12).

f. Remove shim (13), from bearing bore in cover (2).



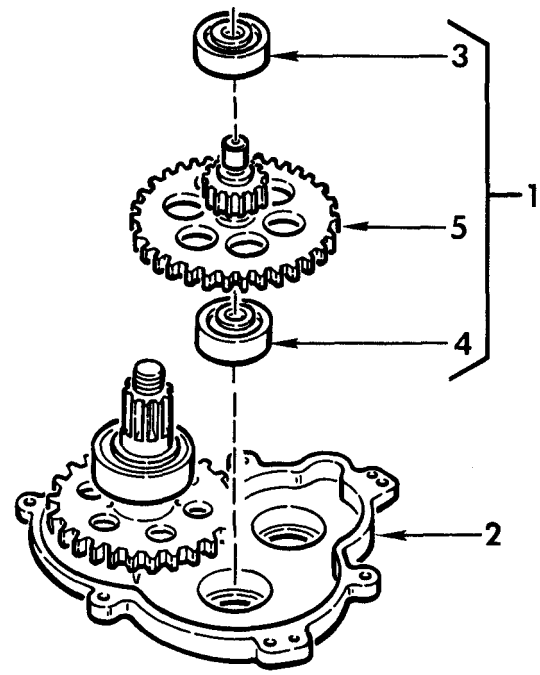
ARR82-27716

DISASSEMBLY (cont)

9. REMOVE GEARSHAFT GROUP (1).

a. Remove gearshaft group (1) from cover (2). It may be necessary to lift adjoining gearshaft to remove group.

b. Using bearing separator and puller, remove bearing (3) and bearing (4) from gearshaft (5).



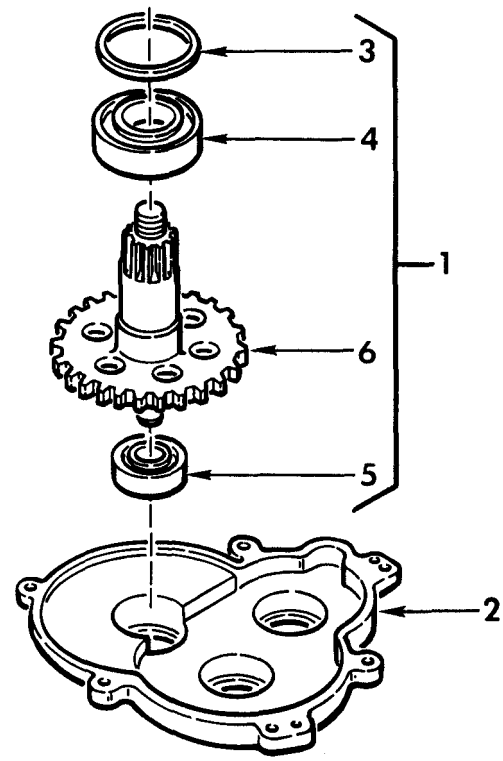
ARR82-27717

10. REMOVE GEARSHAFT GROUP (1).

a. Remove gearshaft group (1) from cover (2).

b. Remove shim (3).

c. Using bearing separator and puller, remove bearing (4) and bearing (5) from gearshaft (6).

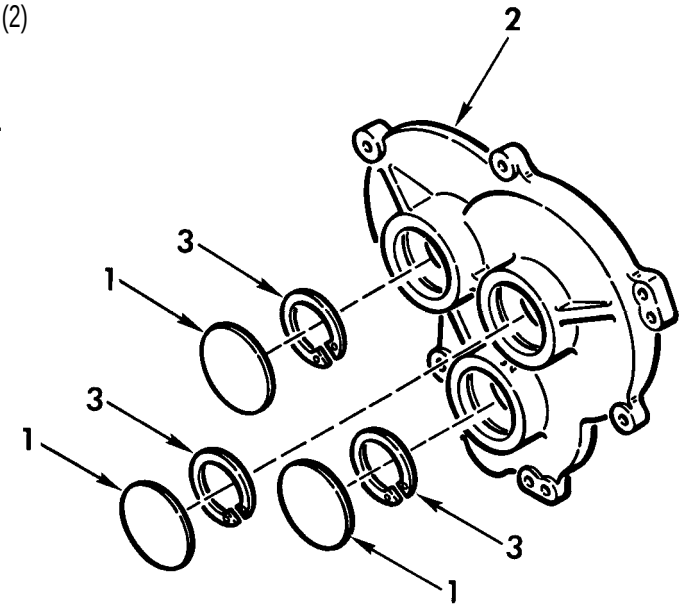


ARR82-277

2-52. REPAIR OF AZIMUTH DRIVE (cont)

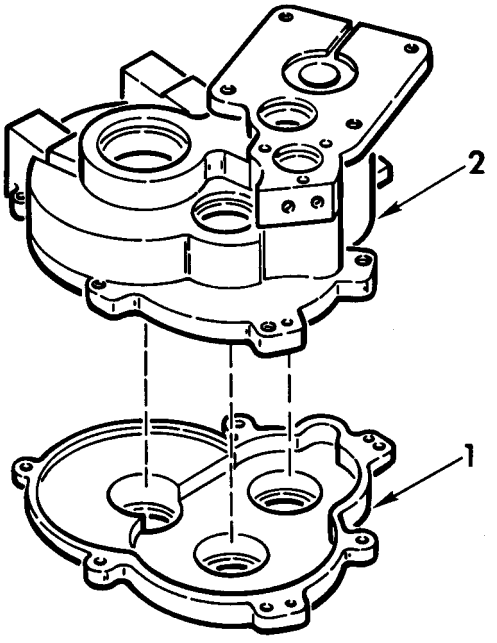
11. REMOVE THREE DISKS (1) FROM COVER (2) BY CUTTING OR BREAKING ADHESIVE.

12. REMOVE THREE RETAINING RINGS (3).



ARR82-27719

13. STORE COVER (1) AND HOUSING (2) AS A MATCHED PAIR UNTIL REQUIRED FOR ASSEMBLY.



ARR82-27720

CLEANING

14. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV.

INSPECTION

15. ALL AZIMUTH DRIVE PARTS SHALL BE VISUALLY INSPECTED AND REPAIRED OR REPLACED IF FOUND TO BE DEFECTIVE.

16. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV AND TABULATED DATA:

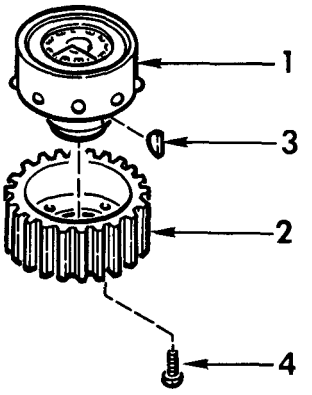
Component	Possible Defect	Remedy
Clutch Gears	Worn or pitted teeth	Replace.
	Broken or chipped.	Replace.
Connector Bracket	Bent or cracked	Straighten. Replace if cracked.
Bearings	Worn, rough, or noisy	Replace.
Gearshaft	Worn or pitted teeth	Replace.
	Broken or chipped	Replace.
Housing and Cover (Matched Parts)	Cracked	Replace both housing and cover.
	Gouged	Blend gouged area.
Azimuth Drive Motor	Connector pins bent	Straighten.
	Noisy or rough bearings	Replace motor.
	Brake does not operate	Replace motor.
	Brake lever missing or broken	Replace motor.
	Mounting flange cracked	Replace motor.
	Broken safety wire	Replace safety wire.

2-52. REPAIR OF AZIMUTH DRIVE (cont)

ASSEMBLY

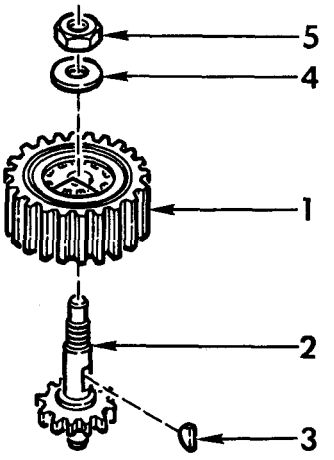
17. ADJUST AZIMUTH CLUTCH, SEE ADJUSTMENT OF AZIMUTH AND ELEVATION DRIVE CLUTCHES, PARA 2-38.

18. ASSEMBLE AZIMUTH CLUTCH (1) TO CLUTCH GEAR (2).
    a. Install key (3) in slot of azimuth clutch (1).
    b. Position clutch gear (2) on azimuth clutch (1) so that keyways and mounting holes are alined and insert azimuth clutch into clutch gear.
    c. Secure clutch gear (2) to azimuth clutch (1) using four screws (4).



ARR82-27721

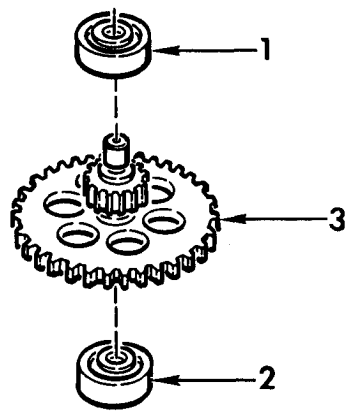
19. INSTALL CLUTCH GEAR (1) ON GEARSHAFT (2).
    a. Install key (3) in keyway of gearshaft (2).
    b. Aline key (3) in gearshaft (2) with keyway slot of azimuth clutch and partially insert gearshaft.
    c. Position washer (4) on azimuth clutch. Insert gearshaft (2) through azimuth clutch (1), washer (4), and secure using nut (5).
    d. Protect teeth of gearshaft (2) and torque nut (5) 25–30 lb-ft (33.9–40.7 N.m).



ARR82-27722

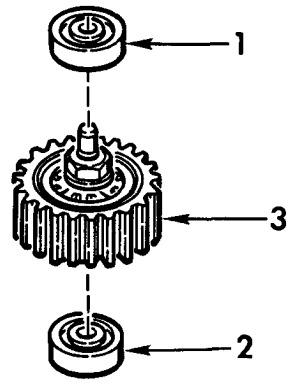
ASSEMBLY (cont)

20. USING AN ARBOR PRESS, INSTALL BEARING (1) AND BEARING (2) ON GEARSHAFT (3).



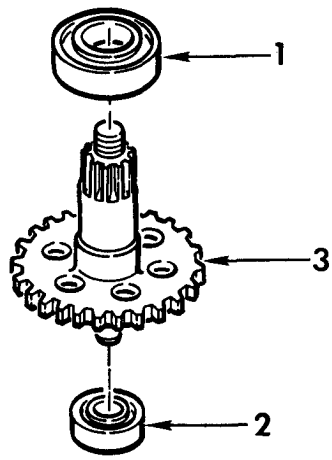
ARR82-27723

21. USING AN ARBOR PRESS, INSTALL BEARING (1) AND BEARING (2) ON CLUTCH GEAR GROUP (3).



ARR82-27724

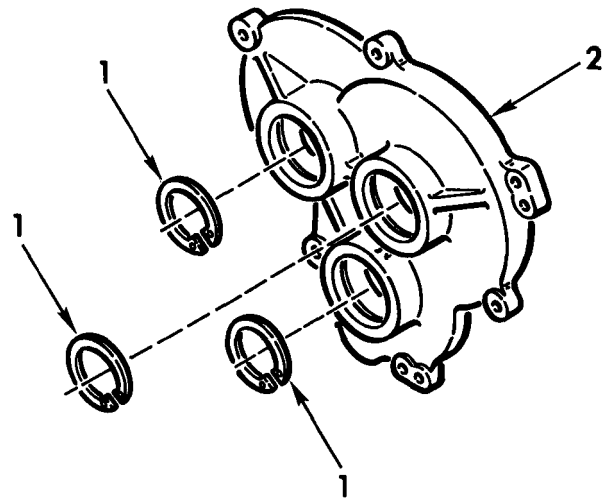
22. USING AN ARBOR PRESS, INSTALL BEARING (1) AND BEARING (2) ON GEARSHAFT (3).



ARR82-27725

2-52. REPAIR OF AZIMUTH DRIVE (cont)

23. INSTALL THREE RETAINING RINGS (1) IN COVER (2).



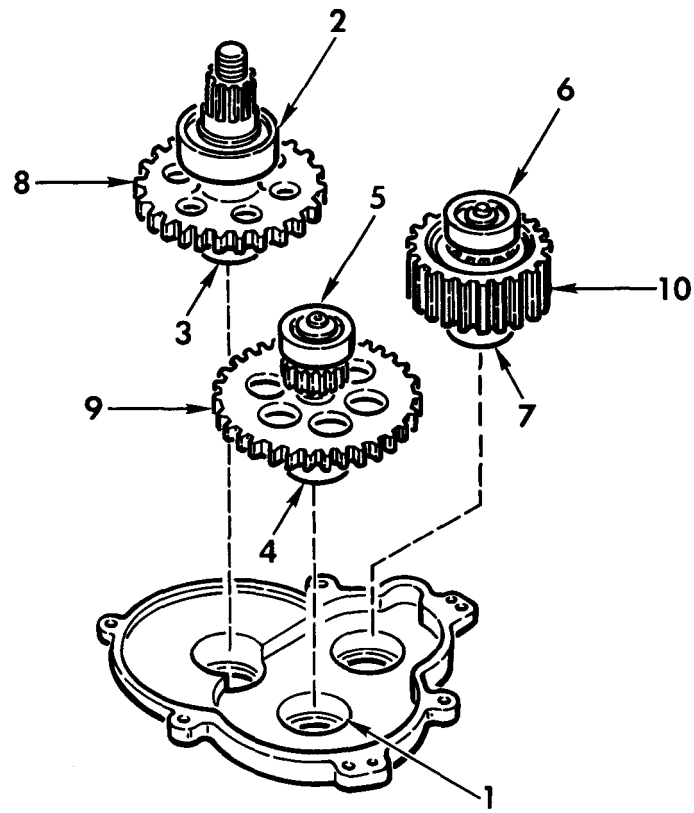
ARR82-27726

24. COAT BEARING BORES IN COVER (1) WITH GREASE.

25. COAT BEARINGS (2 THRU 7) WITH GREASE.

26. PREPOSITION GEARSHAFT GROUP (8), GEARSHAFT GROUP (9), AND CLUTCH GEAR GROUP (10) IN BEARING BORES. CHECK THAT GEAR TEETH OF EACH GROUP ARE ALINED.

27. USING A SOFT-FACED HAMMER, FULLY SEAT GEARSHAFT GROUP (8), GEARSHAFT GROUP (9), AND CLUTCH GEAR GROUP (10).



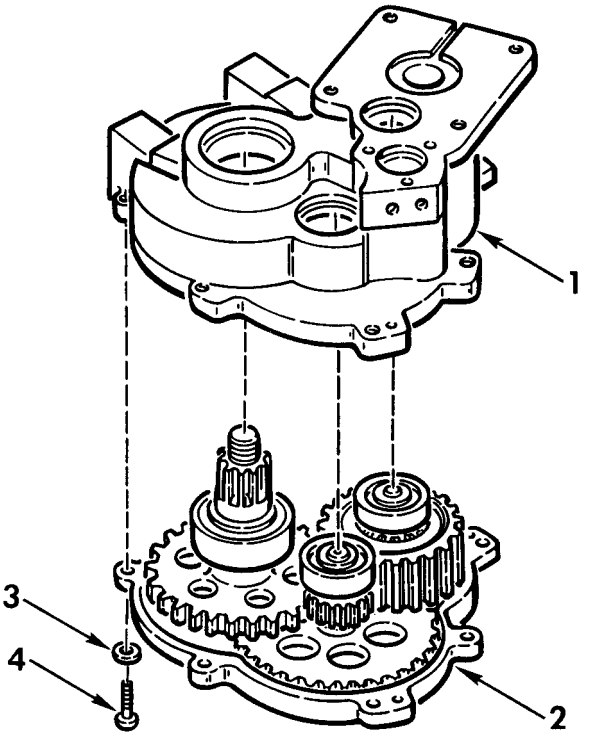
ARR82-27727

ASSEMBLY (cont)

28. CHECK THAT ALL MOVING PARTS ROTATE FREELY WITHOUT BINDING OR GRATING.

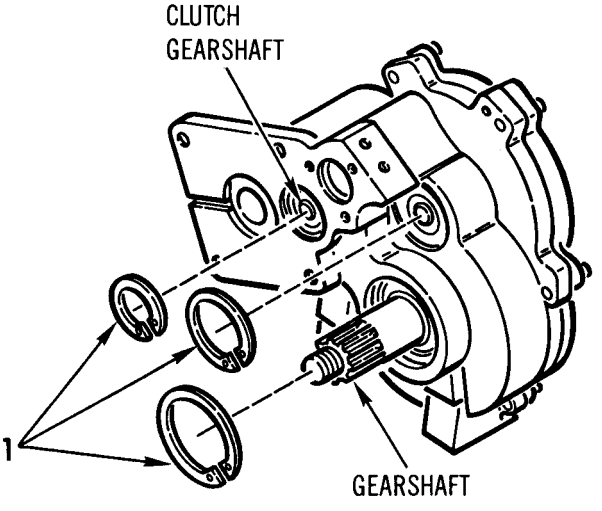
29. INSTALL HOUSING (1) ON COVER (2) AND OBSERVE THAT ALINEMENT PINS MATE CORRECTLY.

30. SECURE HOUSING (1) TO COVER (2) USING SIX WASHERS (3) AND SIX SCREWS (4).



31. INSTALL THREE RETAINING RINGS (1).

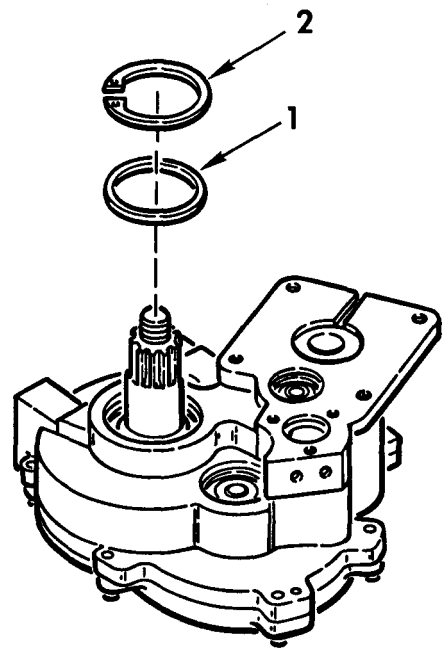
32. USING A DEPTH MICROMETER, CHECK THE END PLAY OF GEARSHAFT AND CLUTCH GEAR. MOVE EACH SHAFT IN BOTH DIRECTIONS AGAINST THE RETAINING RINGS AND MEASURE AND RECORD DISTANCE EACH SHAFT7 MOVED. END PLAY OF EACH SHAFT SHOULD BE LESS THAN 0.005 INCH.



ARR82-27729

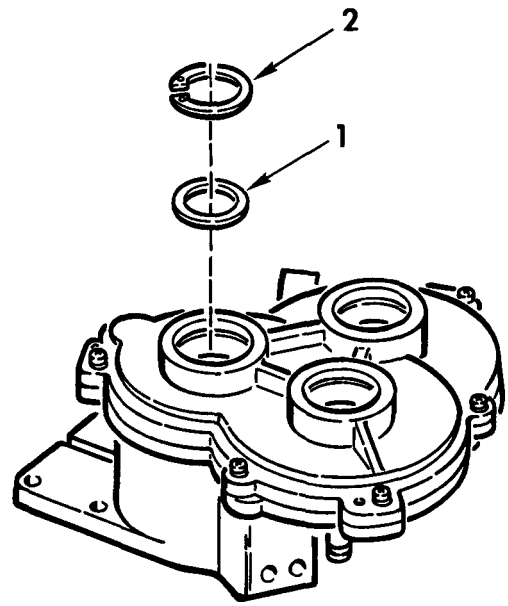
2-52. REPAIR OF AZIMUTH DRIVE (cont)

33. USING SHIMS (1), PREPARE A SHIM PACK TO OBTAIN CORRECT GEARSHAFT END PLAY.
34. REMOVE RETAINING RING (2).
35. INSTALL SHIM PACK (1).
36. INSTALL RETAINING RING (2).
37. CHECK END PLAY.
38. IF END PLAY IS NOT WITHIN TOLERANCE, REPEAT STEPS 33 THROUGH 37.



ARR82-27733

39. USING SHIMS (1), PREPARE A SHIM PACK TO OBTAIN CORRECT CLUTCH GEARSHAFT END PLAY.
40. REMOVE RETAINING RING (2).
41. INSTALL SHIM PACK (1).
42. INSTALL RETAINING RING (2).
43. CHECK END PLAY.
44. IF END PLAY IS NOT WITHIN TOLERANCE, REPEAT STEPS 39 THROUGH 43.



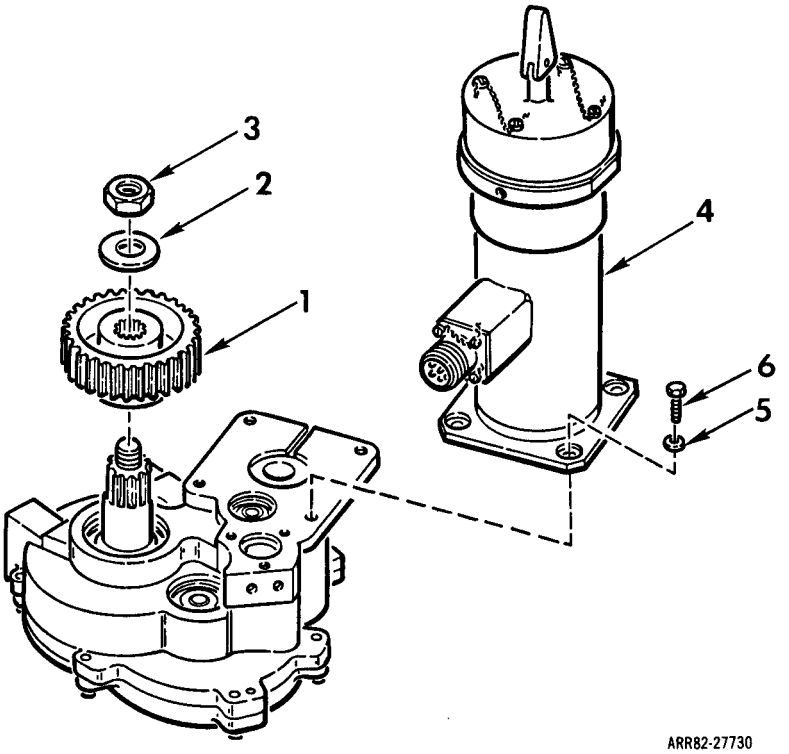
ARR82-27734

ASSEMBLY (cont)

45. INSTALL GEAR (1) AND SECURE USING WASHER (2) AND NUT (3)

46. INSTALL AZIMUTH DRIVE MOTOR (4) AND SECURE USING FOUR WASHERS (5) AND FOUR BOLTS (6).

47. TORQUE NUT (3) TO 25-30 LB-FT (34-41 N.m).



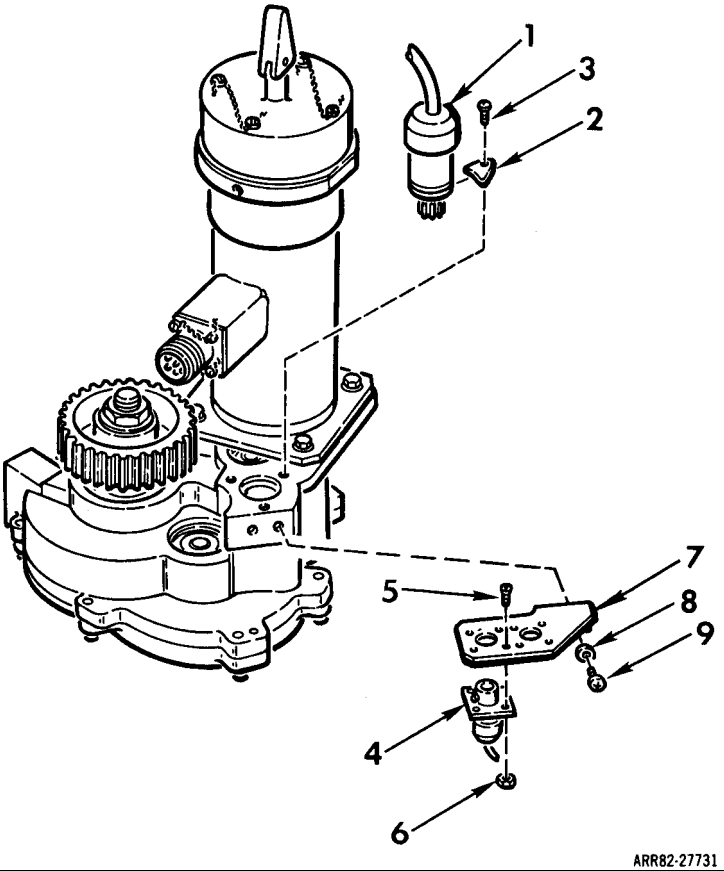
ARR82-27730

48. INSTALL TACHOMETER (1) AND SECURE USING THREE CLAMPS (2) AND THREE SCREWS (3). DO NOT TIGHTEN HARDWARE.

49. INSTALL CONNECTOR (4) AND SECURE USING FOUR SCREWS (5) AND FOUR NUTS (6).

50. INSTALL CONNECTOR BRACKET (7) AND SECURE USING TWO WASHERS (8) AND TWO SCREWS (9).

51. ROTATE TACHOMETER (1) TO TAKE UP CABLE SLACK AND TIGHTEN SCREWS (3).



ARR82-27731

2-52. REPAIR OF AZIMUTH DRIVE (cont)

WARNING

Do not use flammable materials near fire or an open flame. Most cleaning materials are harmful or fatal if swallowed. Use adequate ventilation. Avoid contact with skin and prolonged breathing of vapors.

52. SECURE THREE DISKS (1).

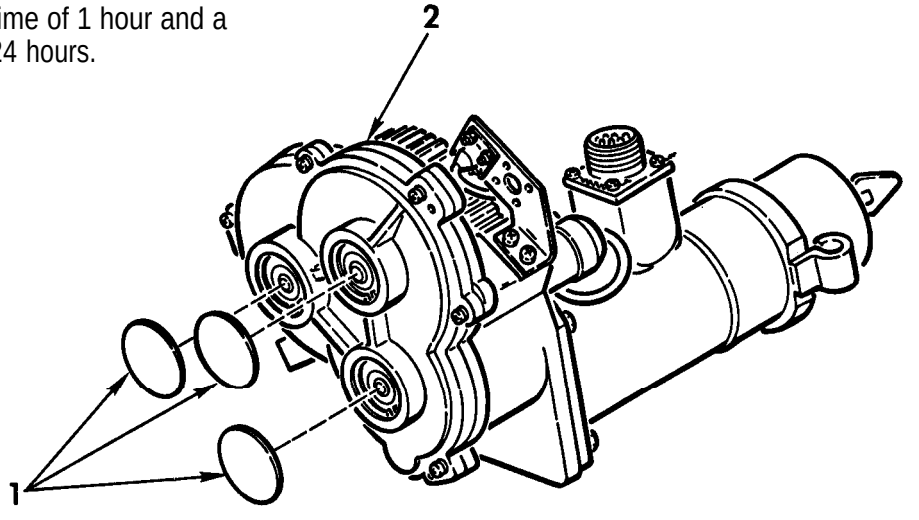
a. Use solvent to clean disks (1) and disk seats on housing (2). Allow to dry.

b. Sparingly apply a very thin bead of adhesive around edge of gearshaft disk holes.

c. Press disks (1) into position.

d. Wipe remaining excess adhesive off with a cloth dampened with solvent. Leave a film of adhesive around edge of each disk (1).

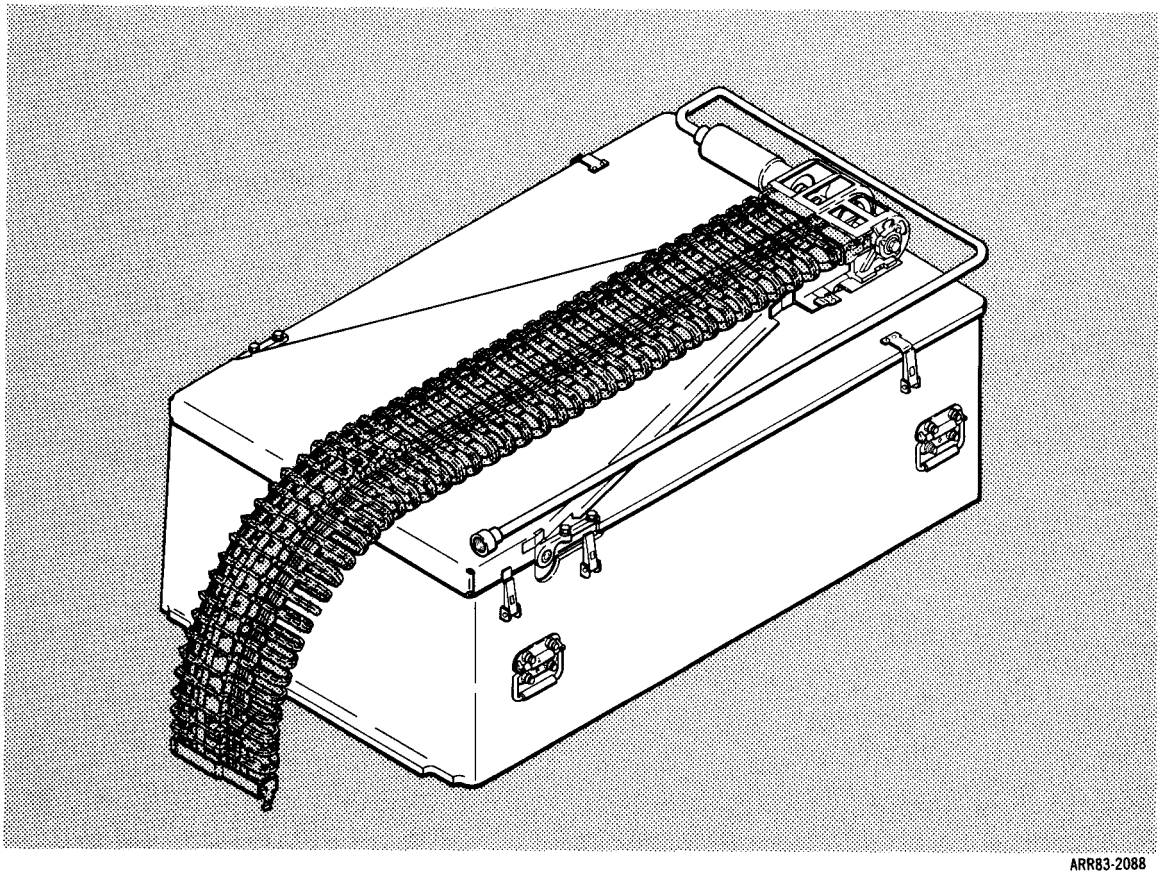
e. Allow a setup time of 1 hour and a curing time of 24 hours.



ARR82-27732

END OF TASK

Section XIV. MAINTENANCE OF AMMUNITION FEED SYSTEM



ARR83-2088

2-53. REPAIR OF AMMUNITION BOX AND COVER ASSEMBLY POLYCARBONATE MATERIAL

DESCRIPTION

This task covers: Repair.

INITIAL SETUP

Tools/Test and Support Equipment:
Tool Set, A/C Armament
Repairman: Basic
Tool Set, A/C Armament
Repairman: Supplemental

Materials:
Abrasive Cloth (Item 1, Appx B)
Polycarbonate Strip
(Item 22, Appx B)

Personnel Required:
68M Aircraft Weapon Systems
Repairer

Equipment Conditions:
In shop on bench.

General Safety Instructions:

WARNING

All repair work will be performed in a hood-ventilated area or outside.

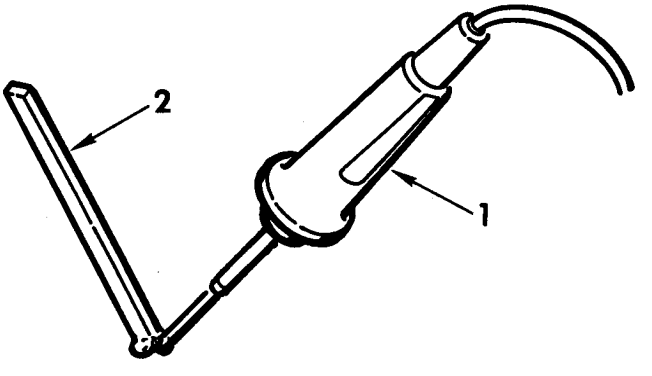
REPAIR

NOTE

Overheating will degrade repair material.

1. PREHEAT SOLDERING IRON (1).

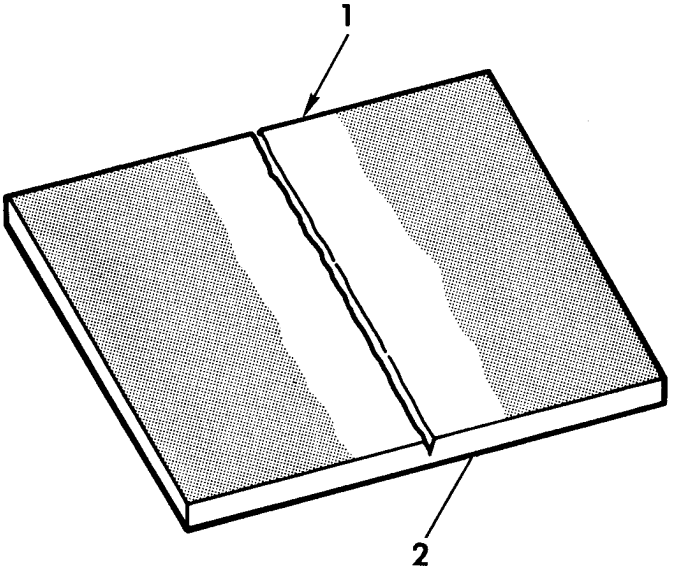
Preheat soldering iron (1) until tip will just melt a 0.25 X 0.25 inch section of scrap polycarbonate material (2).



ARR83-0361

REPAIR (cont)

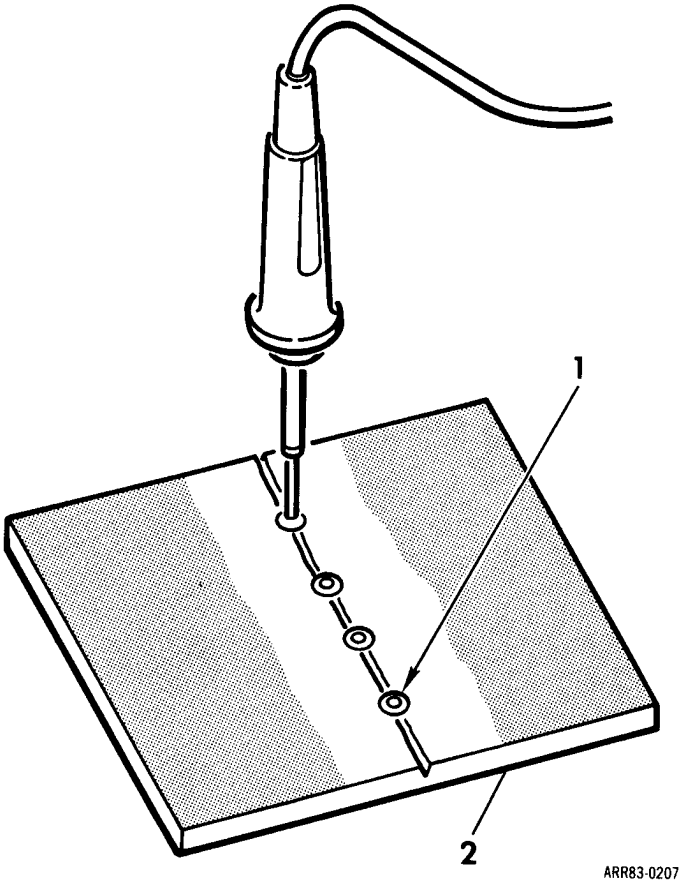
2. REMOVE FINISH FROM DAMAGED AREA (1).
   a. Using abrasive cloth, remove finish in a strip approximately 1-inch wide along cracked or damaged area (1).
   b. Remove finish on opposite side (2) of material in damaged area, even if crack or damage is not completely through material.



ARR83-0206

3. TACK-WELD CRACK (1).

   Tack-weld crack (1) at half-inch intervals, by inserting tip of soldering iron into crack to a depth of one half material thickness. Repeat tacking on opposite side (2) of material.



ARR83-0207

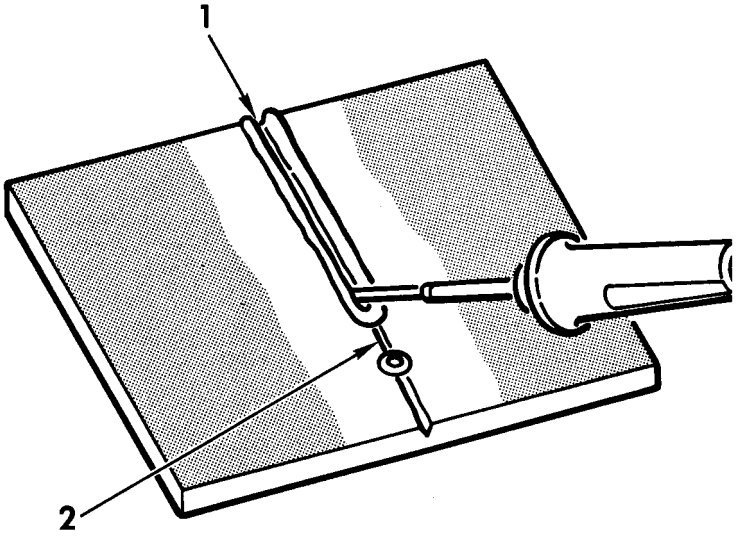
2-53. REPAIR OF AMMUNITION BOX AND COVER ASSEMBLY POLYCARBONATE MATERIAL (cont)

4. PREHEAT AREA TO BE REPAIRED.

Preheat surface to be repaired by holding a heat gun close to surce. If surface blisters or rises, material is too hot. Move heat gun away.

5. WELD CRACK OR DAMAGED AREA (1).

Weld crack or damaged area (1) by inserting tip of soldering iron in crack to half the depth of material. Slowly draw soldering iron along crack (3 inches at a time maximum). Use heat gun to preheat area (2) in front of soldering iron while welding.



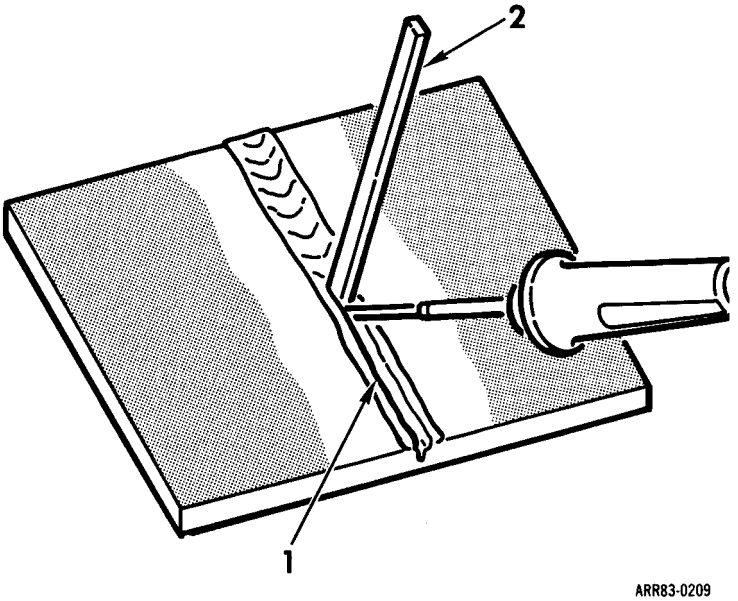
ARR83-0208

6. FILL IN WELD (1).

a. While maintaining heat on repair area with heat gun, use soldering iron to fill in and smooth crack with material displaced during welding (1).

b. If additional material is needed, place material (2) in void area, melt and blend in with tip of soldering iron. The use of molded polycarbonate material in accordance with 11831031 is recommended.

c. If damage is in area of fastener hole, completely fill in hole, smooth, then re-drill hole.



ARR83-0209

REPAIR (cont)

7. WELD OPPOSITE SIDE OF MATERIAL.

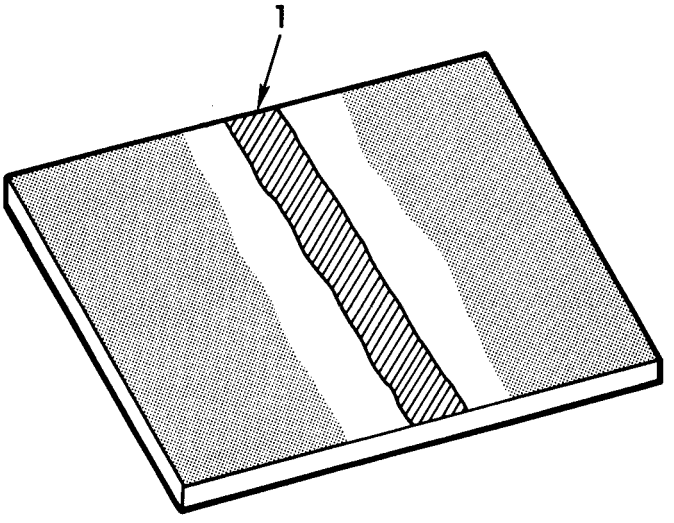
Repeat steps 5 and 6 on opposite side of material. (Example: If crack on outside of box is welded, now weld crack on inside of box.)

CAUTION

Repainting or retouching is not authorized. Use of common finish materials will degrade functional integrity of polycarbonate. Restoration of original finish is specifically restricted to depot level maintenance.

8. SMOOTH REPAIRED AREA (1).

Using abrasive cloth, smooth, and blend in repaired area (1). Do not paint.

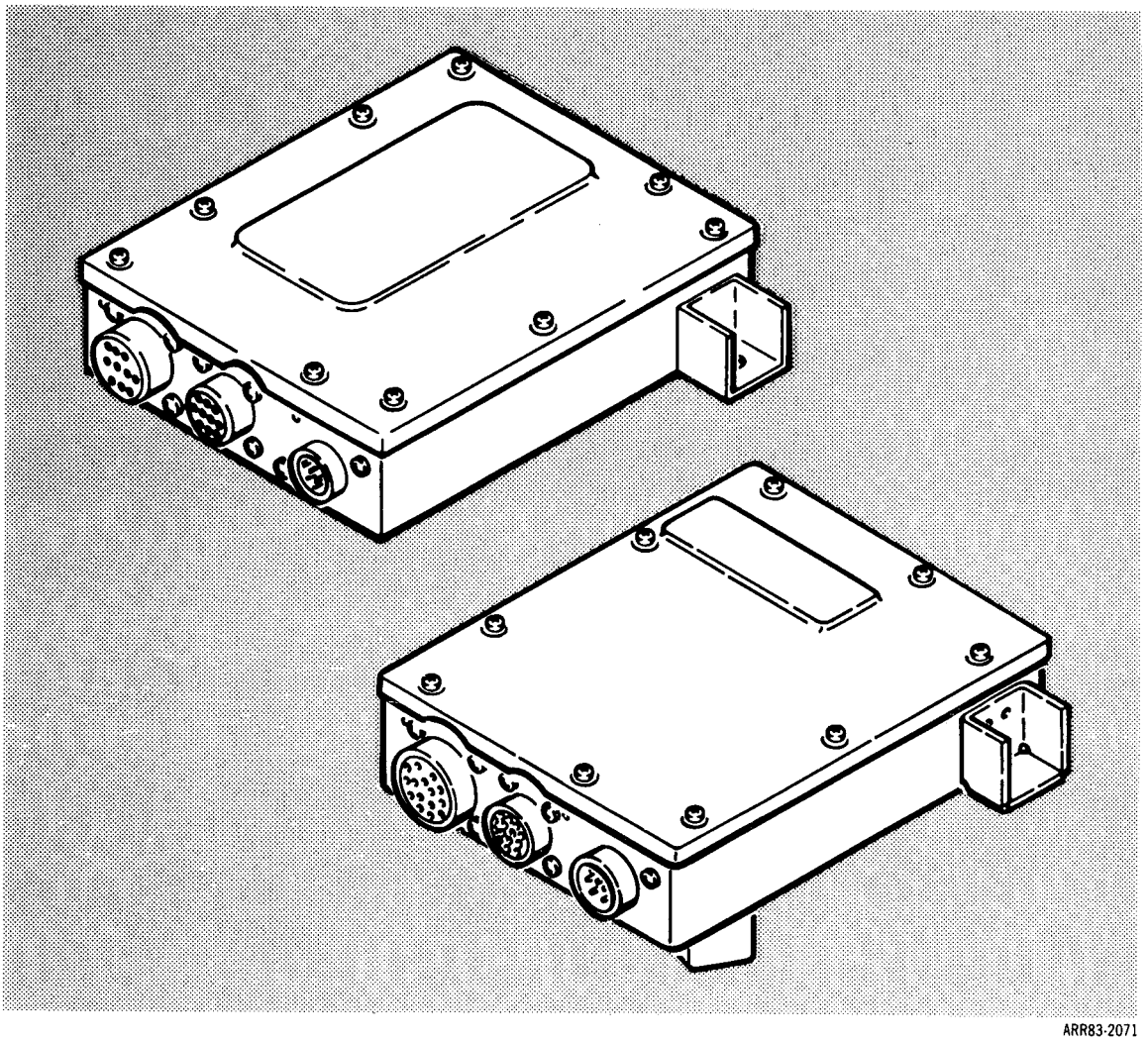


ARR83-0210

END OF TASK

Section XV. MAINTENANCE OF EMERGENCY STOW CONTROL UNIT

Section Contents



ARR83-2071

2-54. REPAIR OF EMERGENCY STOW CONTROL UNIT (205F457)

DESCRIPTION

This task covers: Disassembly, cleaning, inspection, and assembly.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental

Materials:
- Solder (Item 27, Appx B)
- Strap (Item 30, Appx B)
- Insulation Sleeving (Item 14.1, Appx B)

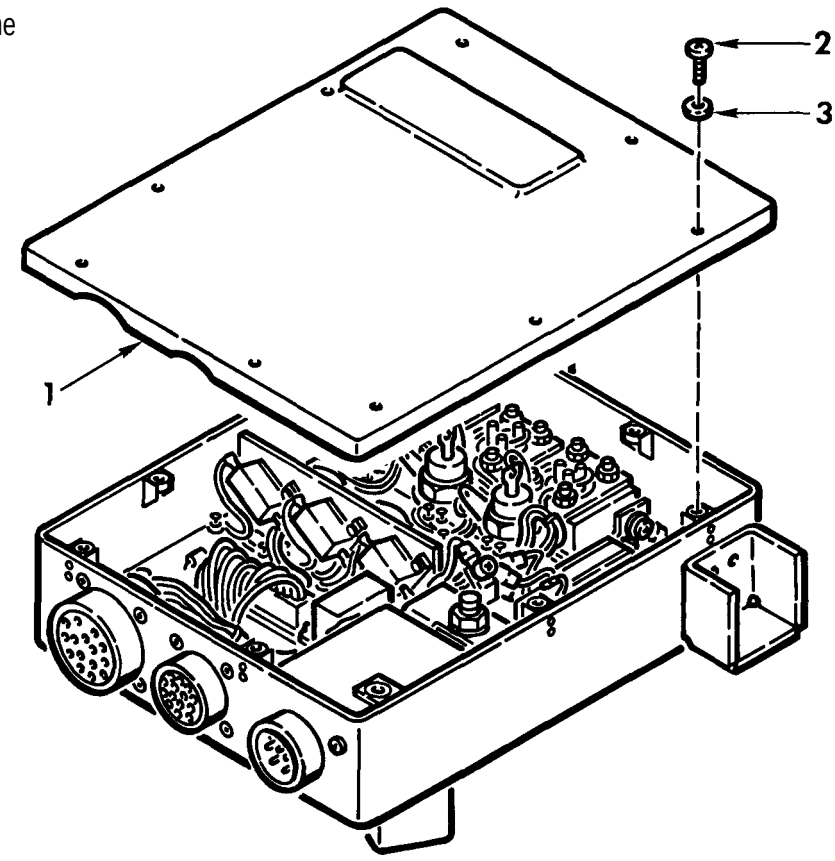
Personnel Required:
- 68J Aircraft Fire Control Repairer

Equipment Conditions:
- In shop on bench.
- No power applied.

DISASSEMBLY

1. REMOVE COVER (1).

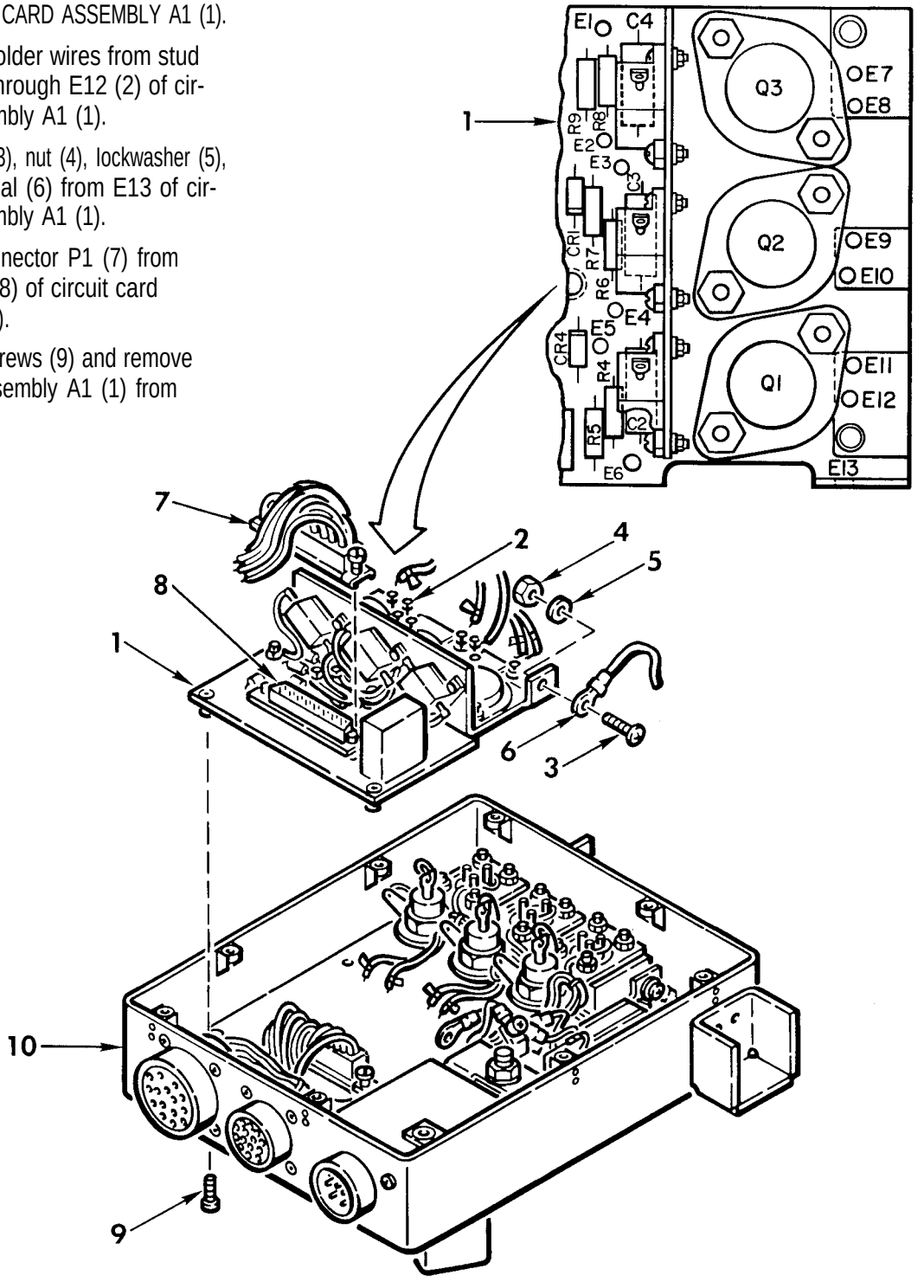
   Remove nine screws (2), nine washers (3), and cover (1).



ARR82-27351

DISASSEMBLY (cont)

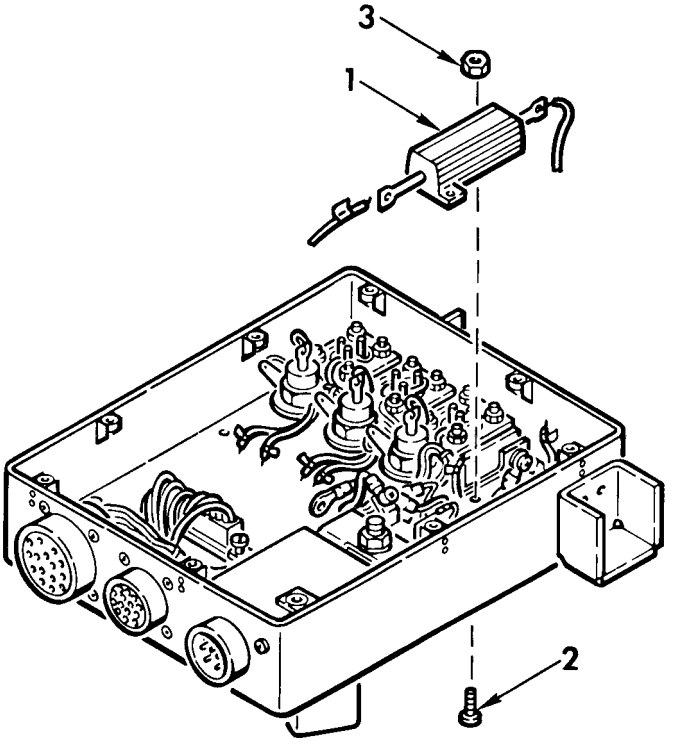
2. REMOVE CIRCUIT CARD ASSEMBLY A1 (1).
   a. Label and unsolder wires from stud terminals E7 through E12 (2) of circuit card assembly A1 (1).
   b. Remove screw (3), nut (4), lockwasher (5), and lug terminal (6) from E13 of circuit card assembly A1 (1).
   c. Disconnect connector P1 (7) from connector J1 (8) of circuit card assembly A1 (1).
   d. Remove five screws (9) and remove circuit card assembly A1 (1) from case (10).



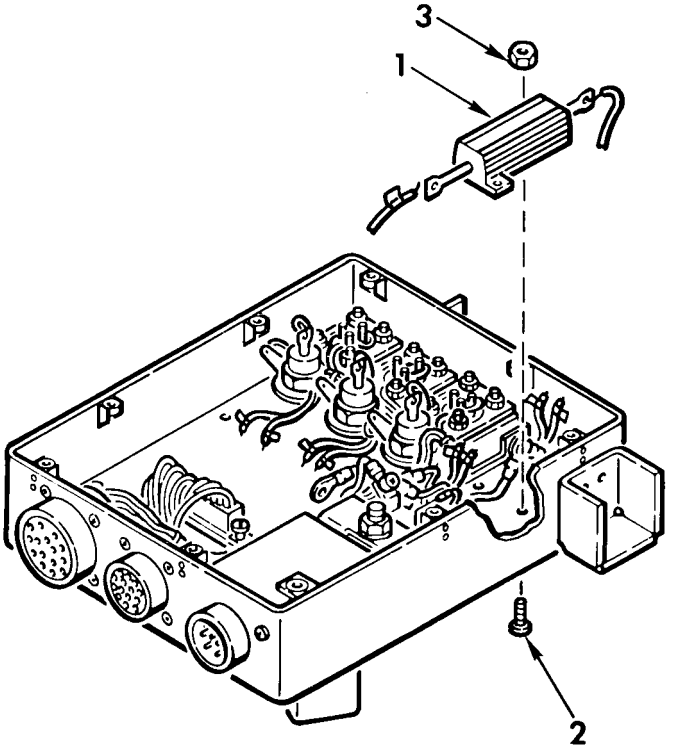
ARR82-27352

2-54. REPAIR OF EMERGENCY STOW CONTROL UNIT (205F457) (cont)

3. REMOVE RESISTOR R1 (1).
   a. Label and unsolder wire from each end of resistor R1 (1).
   b. Remove two screws (2), two nuts (3), and resistor R1 (1).

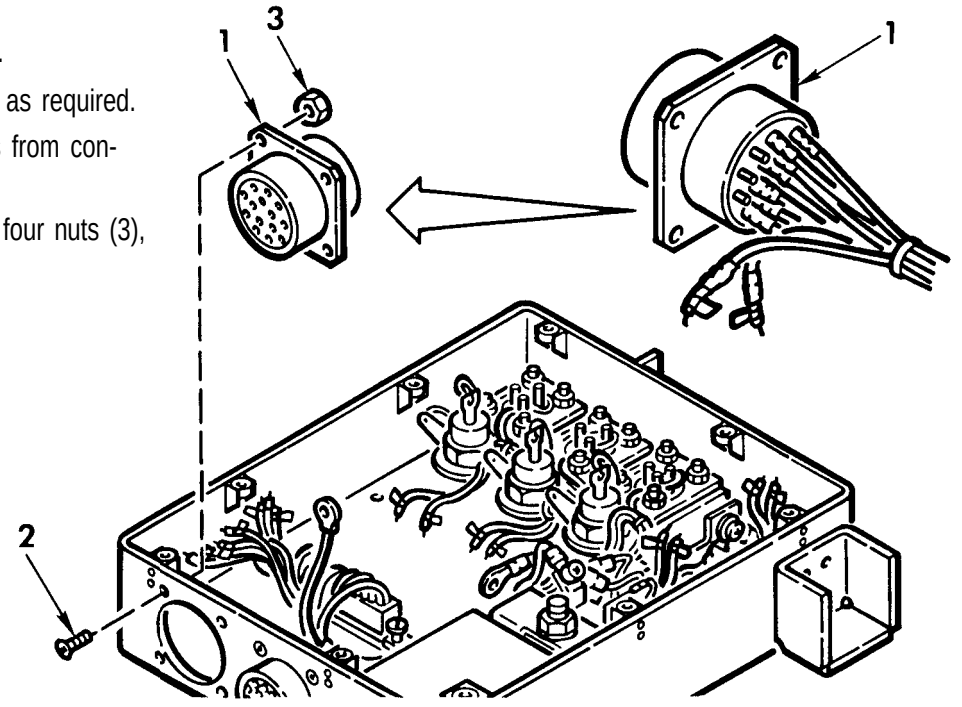


4. REMOVE RESISTOR R2 (1).
   a. Label and unsolder wire from each end of resistor R2 (1).
   b. Remove two screws (2), two nuts (3), and resistor R2 (1).



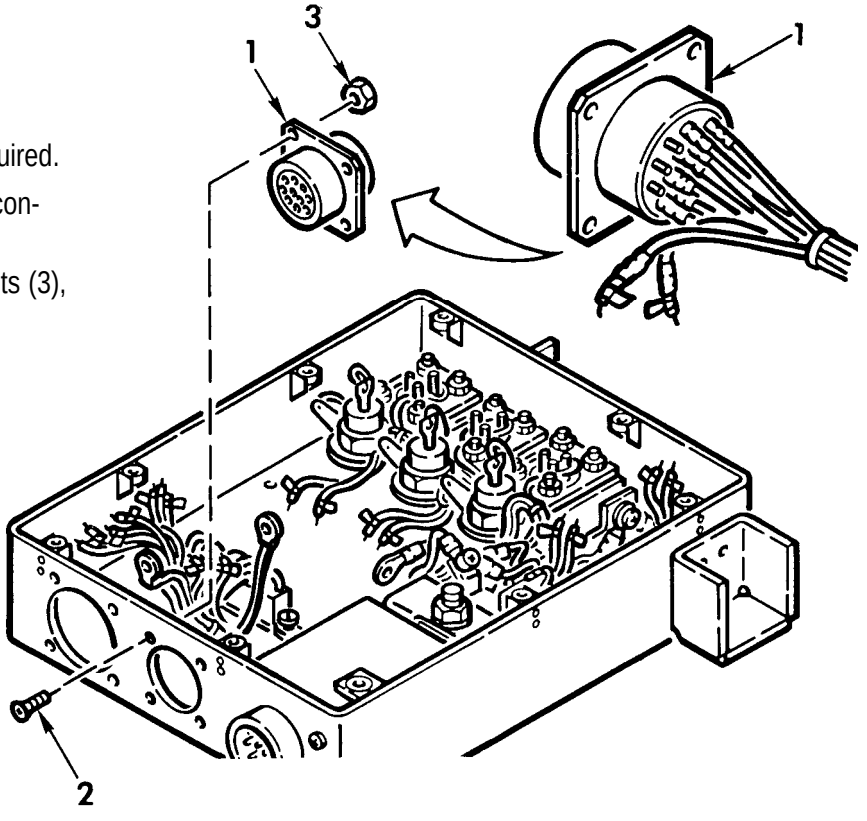
DISASSEMBLY (cont)

5. REMOVE CONNECTOR J2 (1).
   a. Cut cable tiedown straps as required.
   b. Label and unsolder wires from connector J2 (1) terminals.
   c. Remove four screws (2), four nuts (3), and connector J2 (1).



ARR82-27355

6. REMOVE CONNECTOR 13 (1).
   a. Cut cable tiedown straps as required.
   b. Label and unsolder wires from connector J3 (1) terminals.
   c. Remove four screws (2), four nuts (3), and connector J3 (1).



ARR82-273

2.54. REPAIR OF EMERGENCY STOW CONTROL UNIT (205F457) (cont)

7. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV.

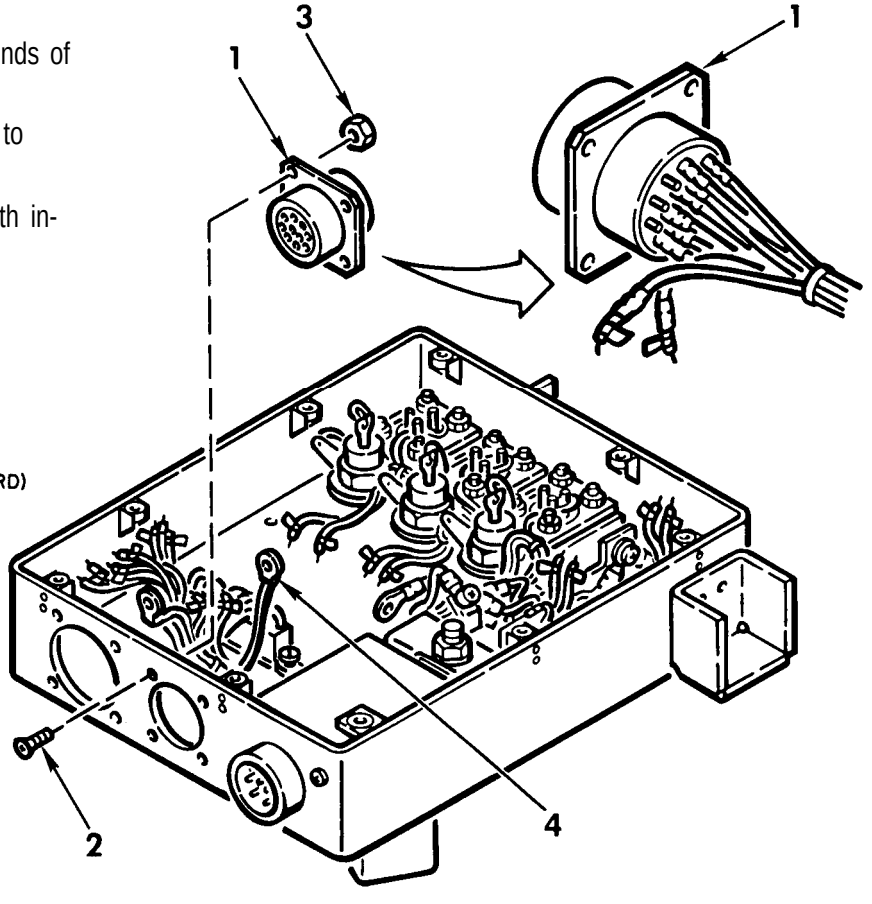
INSPECTION

8. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV.

ASSEMBLY

9. INSTALL CONNECTOR J3 (1).
   a. Install four screws (2), four nuts (3) with one lug terminal (4) under one nut (3), and connector J3 (1).
   b. Install insulation sleeving over ends of wires prior to soldering.
   c. Remove labels and solder wires to connector J3 (1) terminals.
   d. Protect soldered connections with insulation sleeving.
   e. Install cable tiedown straps as required.

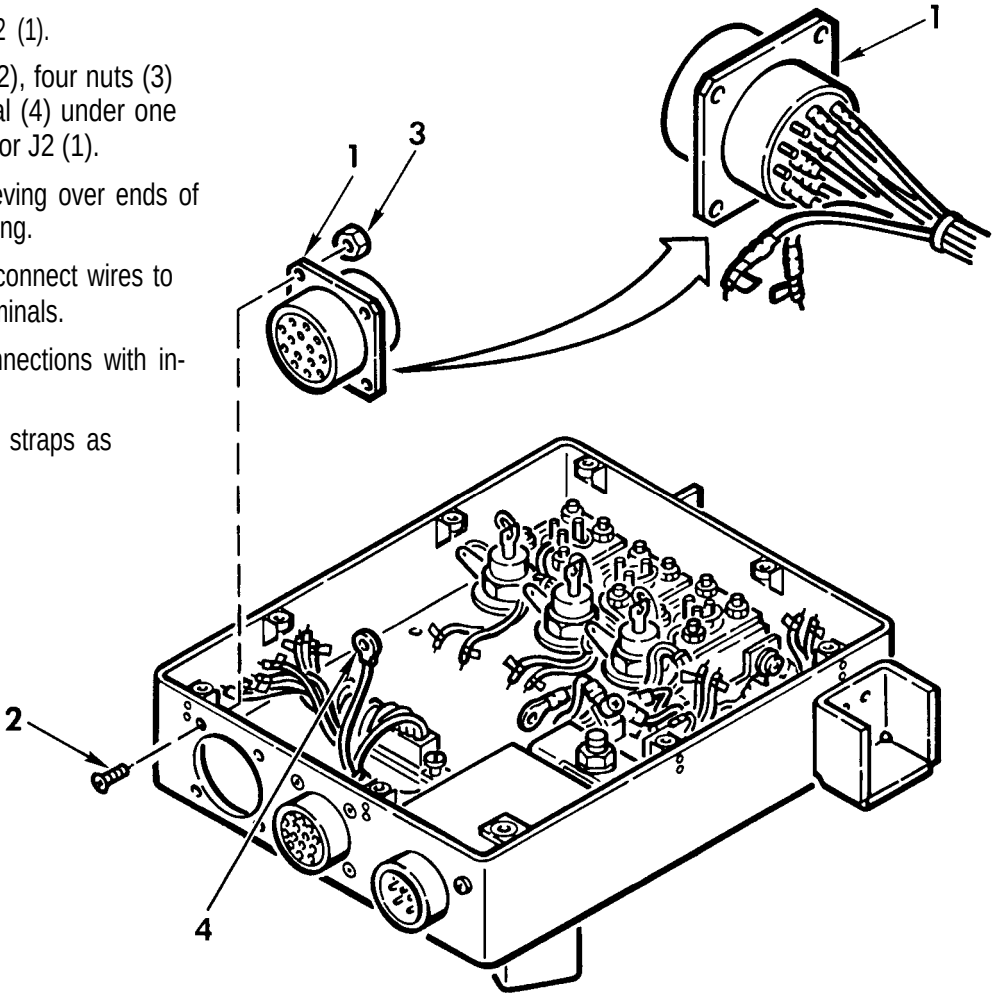
J3 TERM.		CONNECTS TO:
A	26	SCREW AT J3(GRD)
G	8	P1-6
H	9	P1-14
J	11	P1-16
K	15	P1-21
M	12	P1-17
N	4	P1-1
P	17	P1-24
R	7	P1-4
S	16	P1-23
T	6	P1-3
L	18	P1-25



ARR82-27357

ASSEMBLY (cont)

10. INSTALL CONNECTOR J2 (1).
    a. Install four screws (2), four nuts (3) with one lug terminal (4) under one nut (3), and connector J2 (1).
    b. Install insulation sleeving over ends of wires prior to soldering.
    c. Remove labels and connect wires to connector J2 (1) terminals.
    d. Protect soldered connections with insulation sleeving.
    e. Install cable tiedown straps as required.

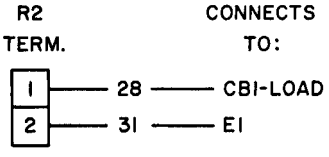


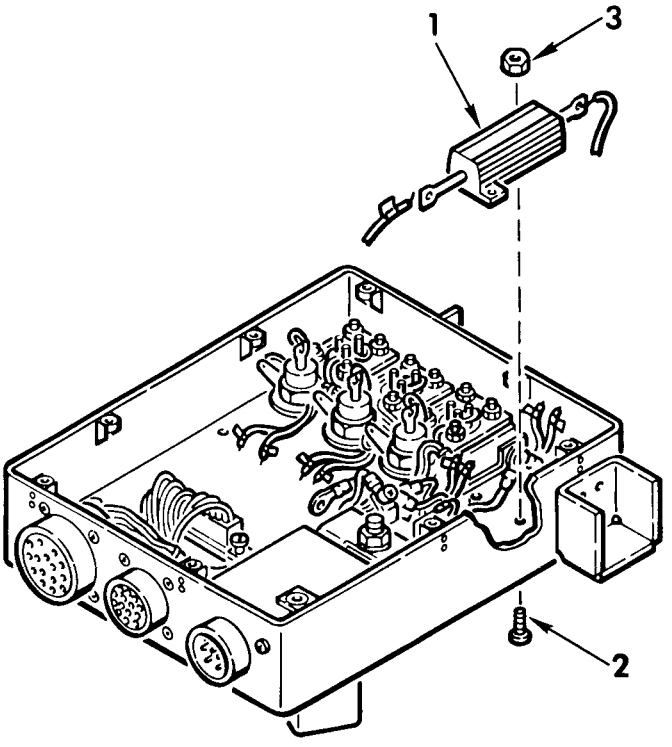
J2 TERM.		CONNECTS TO:
A	19	SCREW AT J2 (GRD)
F	14	PI-20
G	10	PI-15
H	13	PI-18
J	20	CR2-C
K	21	CR2-C
N	22	CR3-C
P	23	CR3-C
R	24	CR4-C
S	25	CR4-C

ARR82-27358

2-54. REPAIR OF EMERGENCY STOW CONTROL UNIT (205F457) (cont)

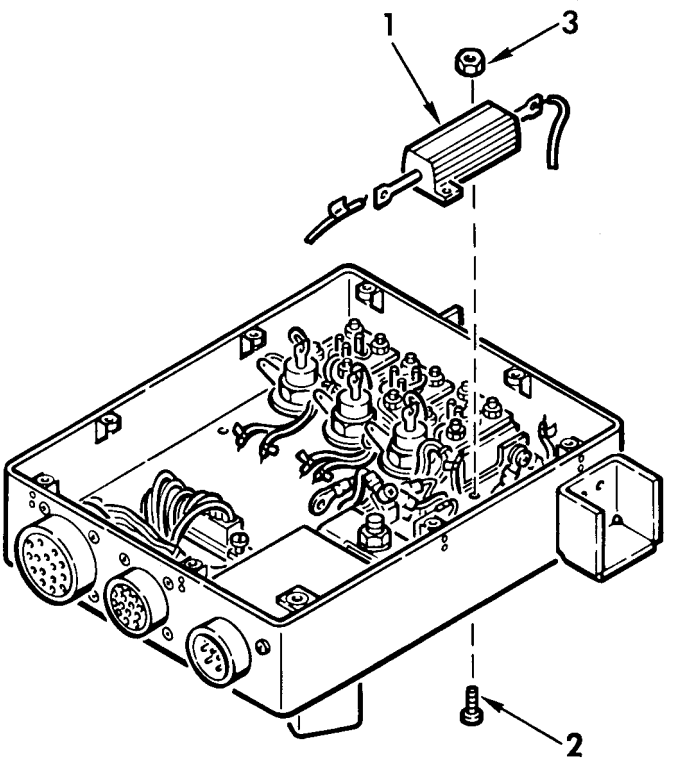
11. INSTALL RESISTOR R2 (1).
    a. Install two screws (2), two nuts (3), and resistor R2 (1).
    b. Remove labels and solder wires to resistor R2 (1) terminals.





ARR82-27359

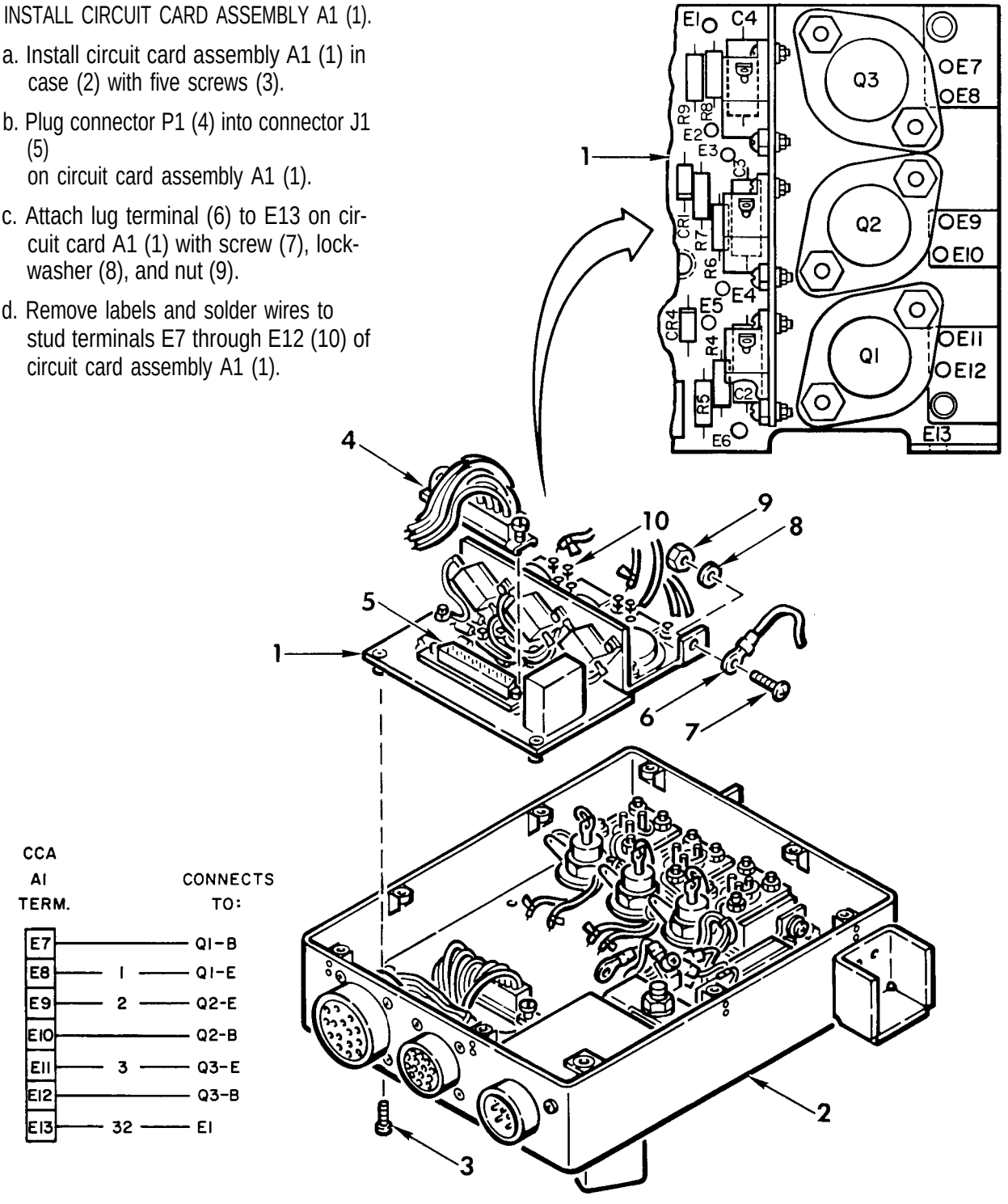
12. INSTALL RESISTOR R1 (1).
    a. Install two screws (2), two nuts (3), and resistor R1 (1).
    b. Remove labels and solder wires to resistor R1 (1) terminals.



ARR82-27360

ASSEMBLY (cont)

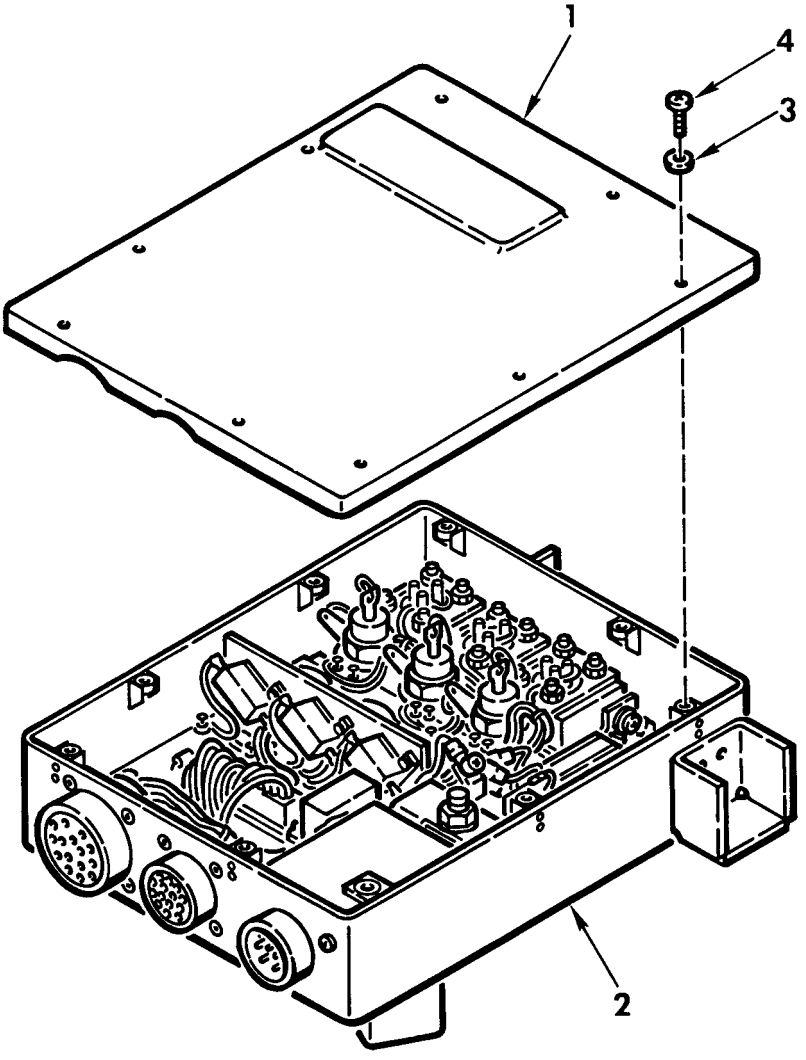
13. INSTALL CIRCUIT CARD ASSEMBLY A1 (1).
    a. Install circuit card assembly A1 (1) in case (2) with five screws (3).
    b. Plug connector P1 (4) into connector J1 (5) on circuit card assembly A1 (1).
    c. Attach lug terminal (6) to E13 on circuit card A1 (1) with screw (7), lockwasher (8), and nut (9).
    d. Remove labels and solder wires to stud terminals E7 through E12 (10) of circuit card assembly A1 (1).



ARR82-27361

2-54. REPAIR OF EMERGENCY STOW CONTROL UNIT (205F457) (cont)

14. INSTALL COVER (1).
    a. Remove all loose debris from inside case (2).
    b. Install cover (1) on case (2) with nine washers (3) and nine screws (4).



ARR82-27362

END OF TASK

2-55. REPAIR OF EMERGENCY STOW CONTROL UNIT (189F729)

This task covers: Disassembly, cleaning, inspection, and assembly.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental
- Multimeter AN/USM-223

Materials:
- Solder (Item 27, Appx B)
- Strap(Item 30, Appx B)
- Insulation Sleeving (Item 14.1, Appx B)

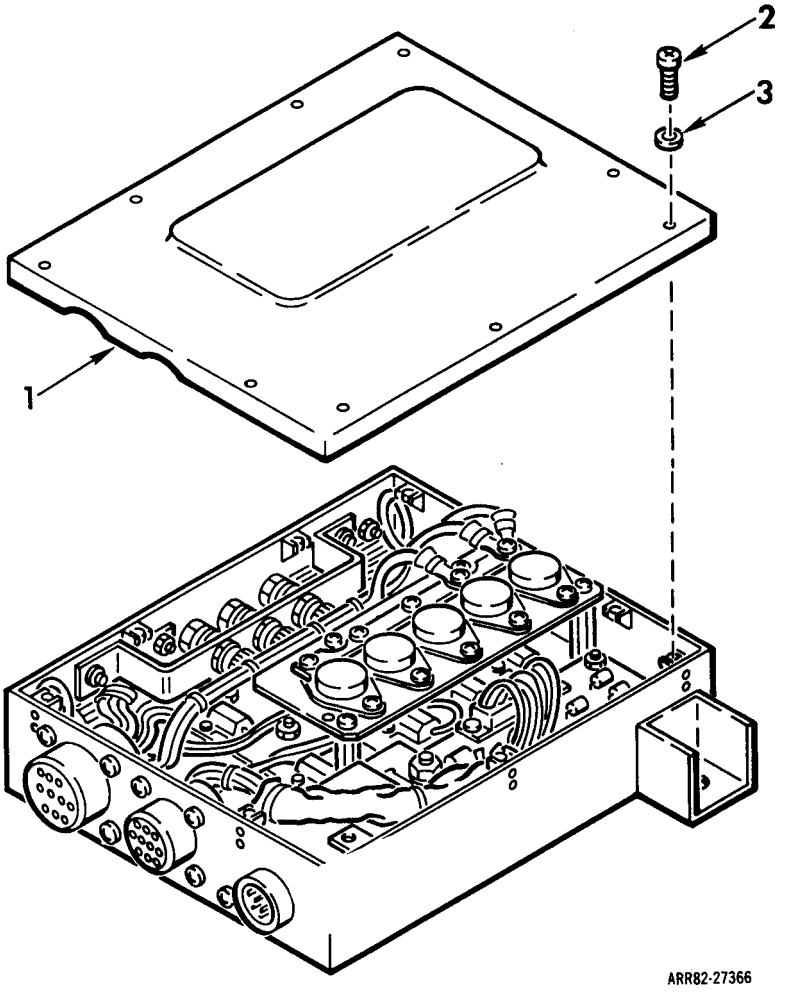
Personnel Required:
- 68J Aircraft Fire Control Repairer

Equipment Conditions:
- In shop on bench.
- No power applied.

DISASSEMBLY

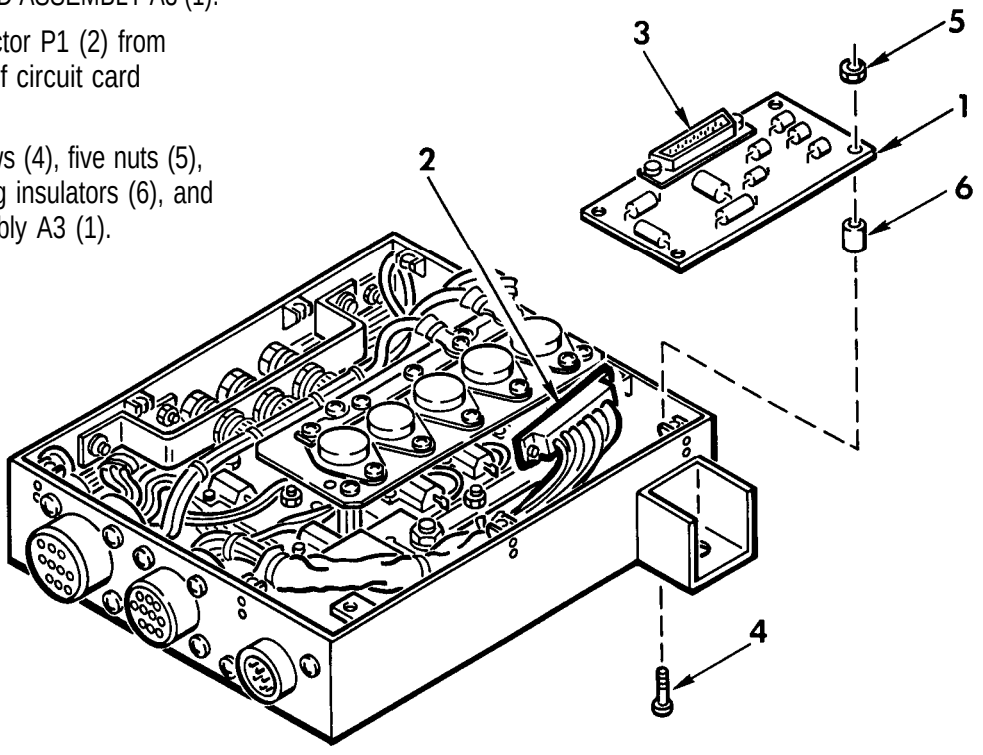
1. REMOVE COVER (1).

   Remove nine screws (2), nine washers (3), and cover (1).



2-55. REPAIR OF EMERGENCY STOW CONTROL UNIT (189F729) (cont)

2. REMOVE CIRCUIT CARD ASSEMBLY A3 (1).
   a. Disconnect connector P1 (2) from connector J1 (3) of circuit card assembly A3 (1).
   b. Remove five screws (4), five nuts (5), five sleeve bushing insulators (6), and circuit card assembly A3 (1).

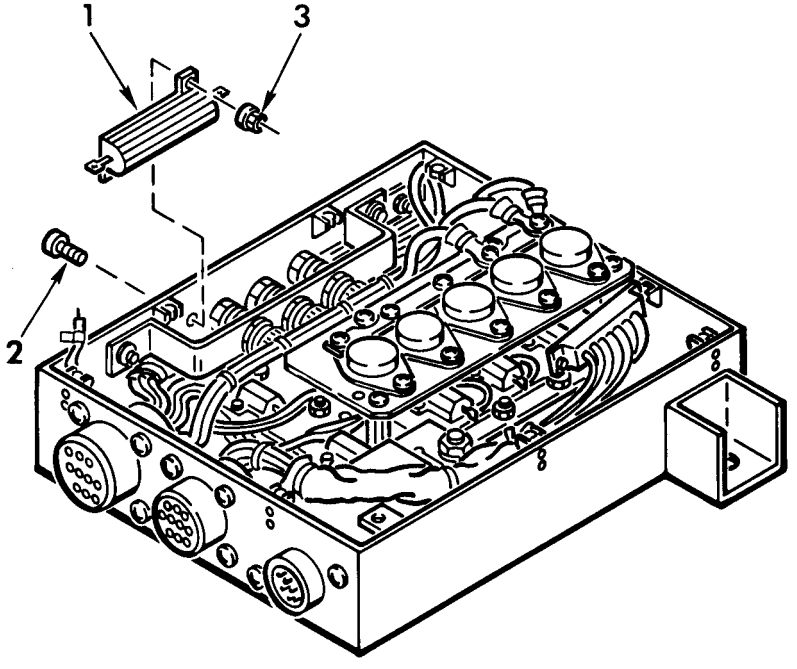


ARR82-27367

3. REMOVE RESISTOR R1 (1).
   a. Label and unsolder wire from each end of resistor R1 (1).
   b. Remove two screws (2), two nuts (3), and resistor R1 (1).

NOTE

Label wires after removal for proper identification.

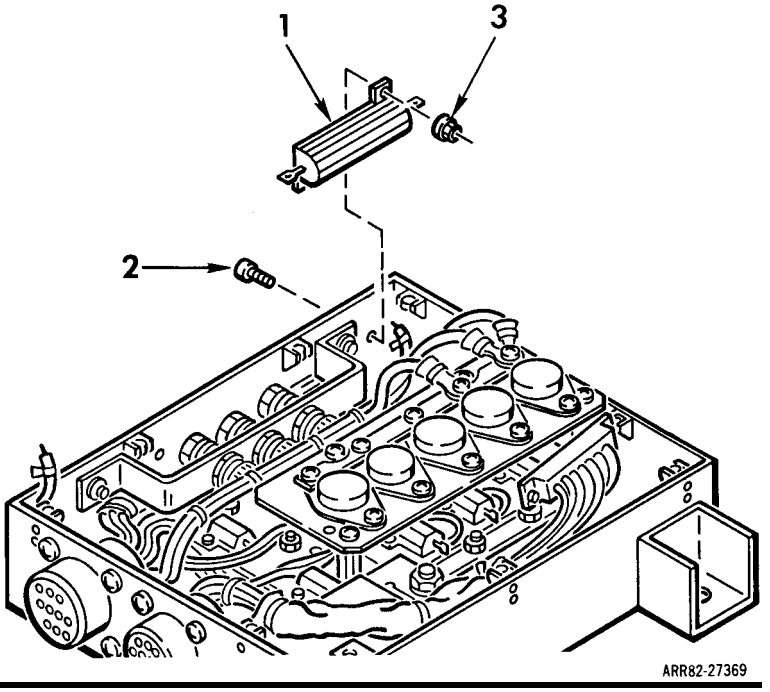


ARR82-27368

DISASSEMBLY (cont)

4. REMOVE RESISTOR R2 (1).
   a. Label and unsolder wire from each end of resistor R2 (1).
   b. Remove two screws (2), two nuts (3), and resistor R2 (1).

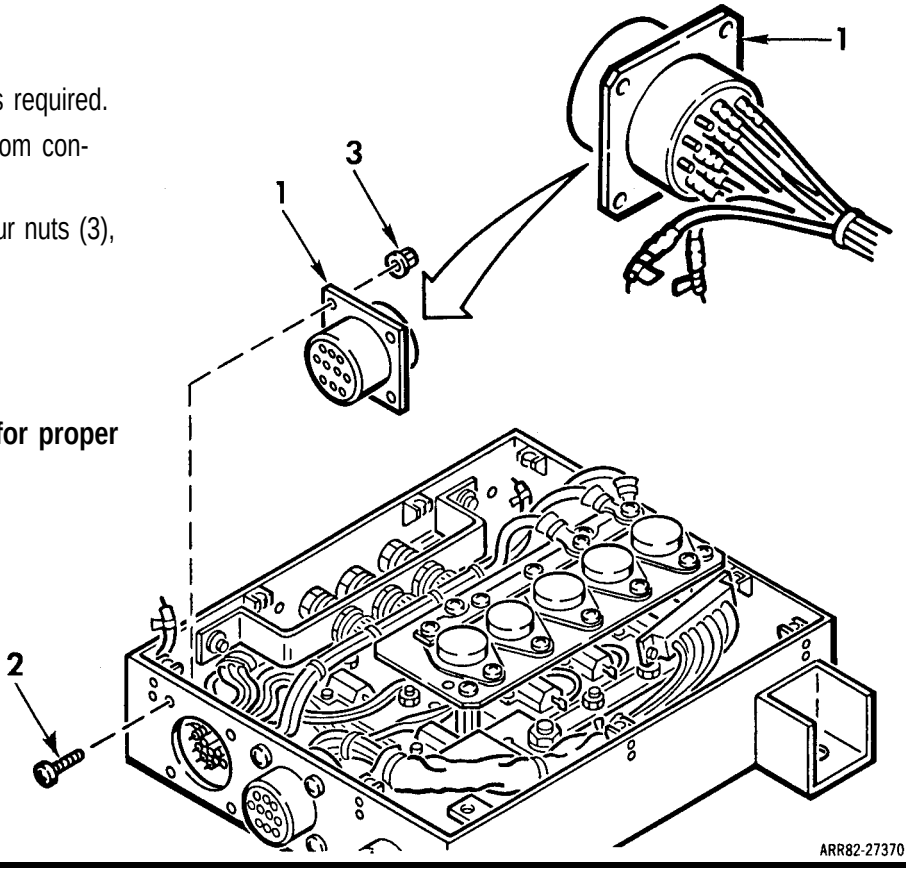
Label wires after removal for proper identification.



5. REMOVE CONNECTOR J2 (1).
   a. Cut cable tiedown straps as required.
   b. Label and unsolder wires from connector J2 (1) terminals.
   c. Remove four screws (2), four nuts (3), and connector J2 (1).

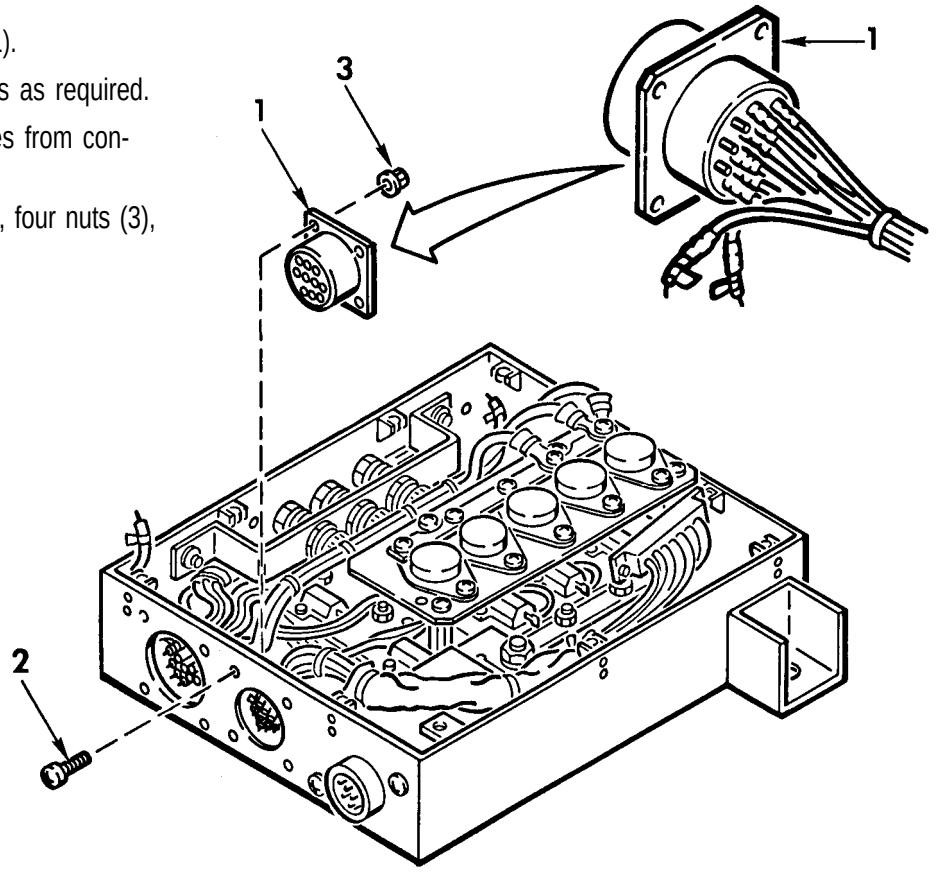
NOTE

Label wires after removal for proper identification.



2-55. REPAIR OF EMERGENCY STOW CONTROL UNIT (189F729) (cont)

6. REMOVE CONNECTOR J3 (1).
   a. Cut cable tiedown straps as required.
   b. Label and unsolder wires from connector J3 (1) terminals.
   c. Remove four screws (2), four nuts (3), and connector J3 (1).



ARR82-27371

CLEANING

7. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV.

INSPECTION

8. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV.

ASSEMBLY

9. INSTALL CONNECTOR J3 (1).

a. Install four screws (2), four nuts (3) with one lug terminal (4) under one nut (3), and connector J3 (1).

b. Install insulation sleeving over ends of wires prior to soldering.

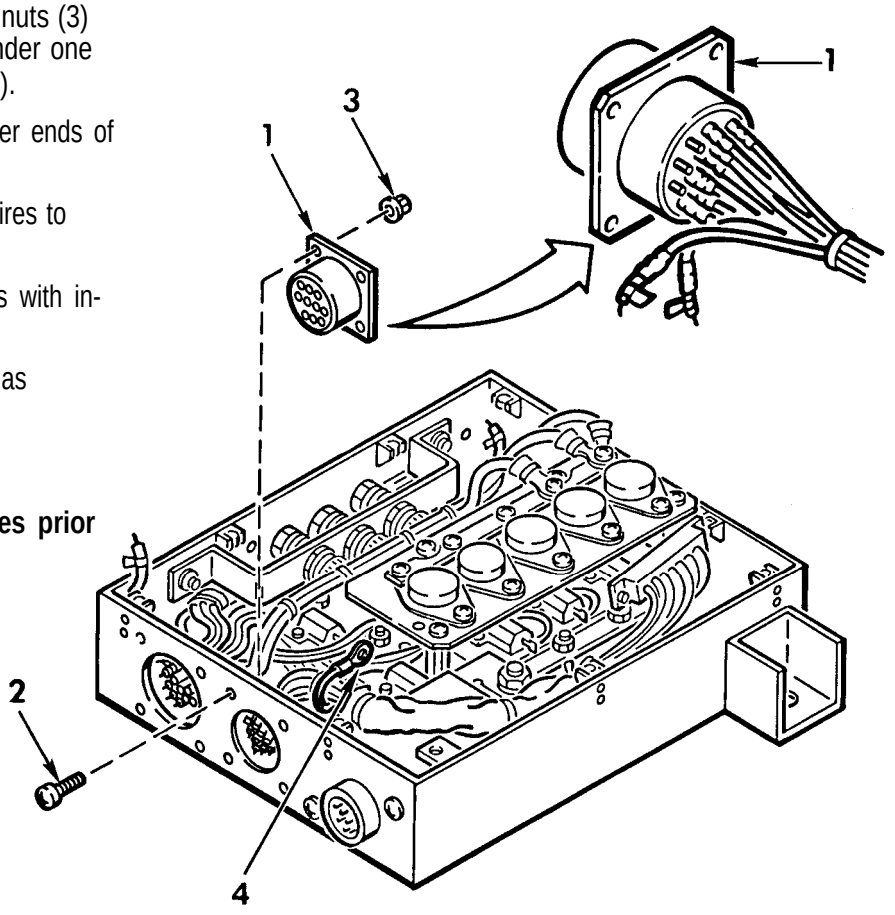
c. Remove labels and solder wires to connector J3 (1) terminals.

d. Protect soldered connections with insulation sleeving.

e. Install cable tiedown straps as required.

NOTE

Use multimeter to identify wires prior to connecting them.



J3 TERM		CONNECTS TO:
A	38	SCREW AT J3 (GRD)
G	15	P1-5
H	23	P1-22
J	25	P1-24
K	17	P1-7
M	18	P1-9
N	22	P1-21
P	13	P1-2
R	12	P1-1
S	19	P1-12
T	20	P1-14
U	21	P1-19
L	14	P1-4

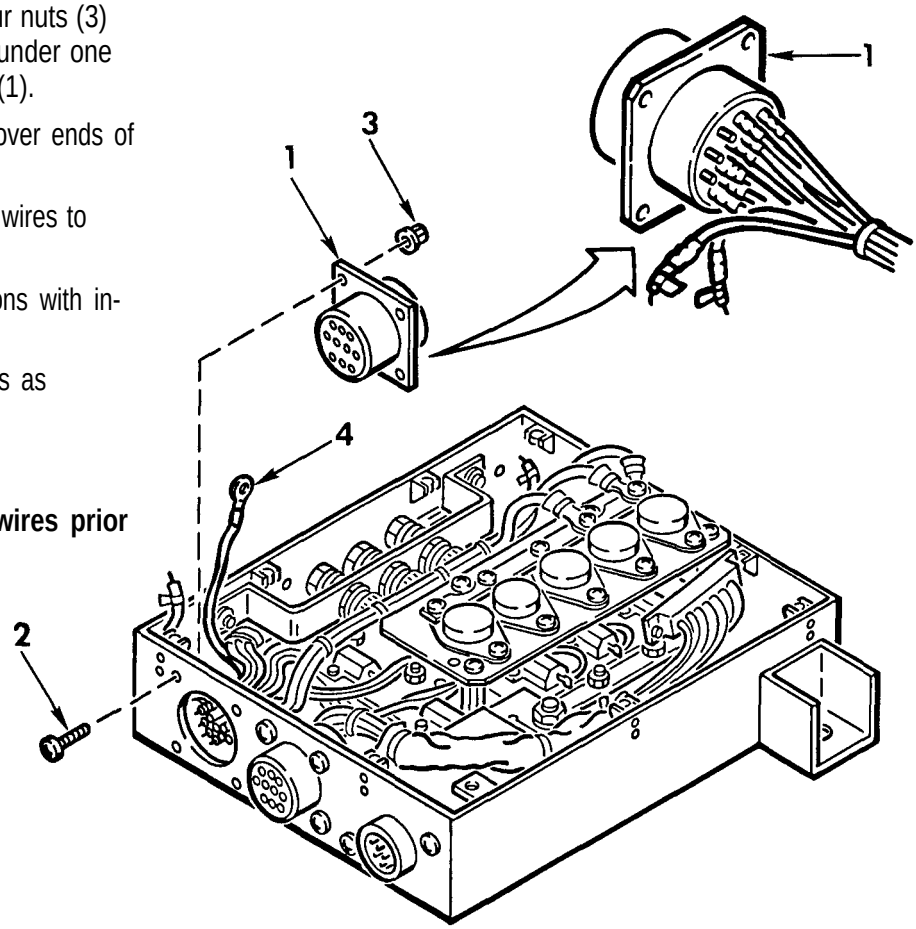
ARR82-27372

2-55. REPAIR OF EMERGENCY STOW CONTROL UNIT (189F729) (cont)

10. INSTALL CONNECTOR J2 (1).
    a. Install four screws (2), four nuts (3) with one lug terminal (4) under one nut (3), and connector J2 (1).
    b. Install insulation sleeving over ends of wires prior to soldering.
    c. Remove labels and solder wires to connector J2 (1) terminals
    d. Protect soldered connections with insulation sleeving.
    e. Install cable tiedown straps as required.

NOTE

Use multimeter to identify wires prior to connecting them.



J2 TERM		CONNECTS TO:
A	28	SCREW AT J2 (GRD)
F	16	P1-6
G	24	P1-23
H	26	P1-25
J	29	CR2-C
K	30	CR2-C
N	31	CR3-C
P	32	CR3-C
R	33	CR4-C
S	34	CR4-C

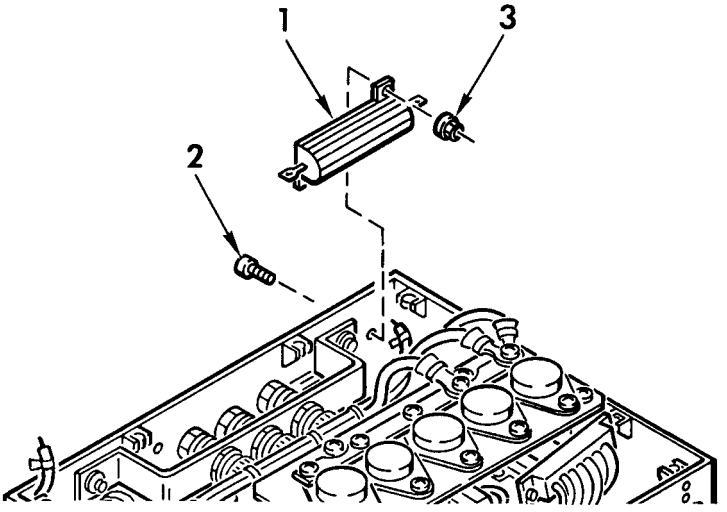
ARR82-27373

ASSEMBLY (cont)

11. INSTALL RESISTOR R2 (1).
    a. Install two screws (2), two nuts (3), and resistor R2 (1).
    b. Remove labels and solder wires to resistor R2 (1) terminals.

NOTE

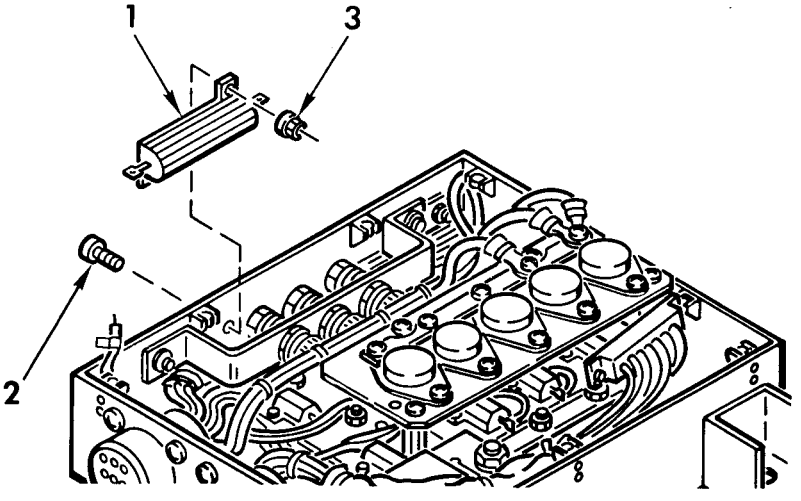
Use multimeter to identify wires prior to connecting them.



R2 TERM		CONNECTS TO:
1	36	CR1-C
2	37	A1-E8

ARR82-27374

12. INSTALL RESISTOR R1 (1).
    a. Install two screws (2), two nuts (3), and resistor R1 (1).
    b. Remove labels and solder wires to resistor R1 (1) terminals.

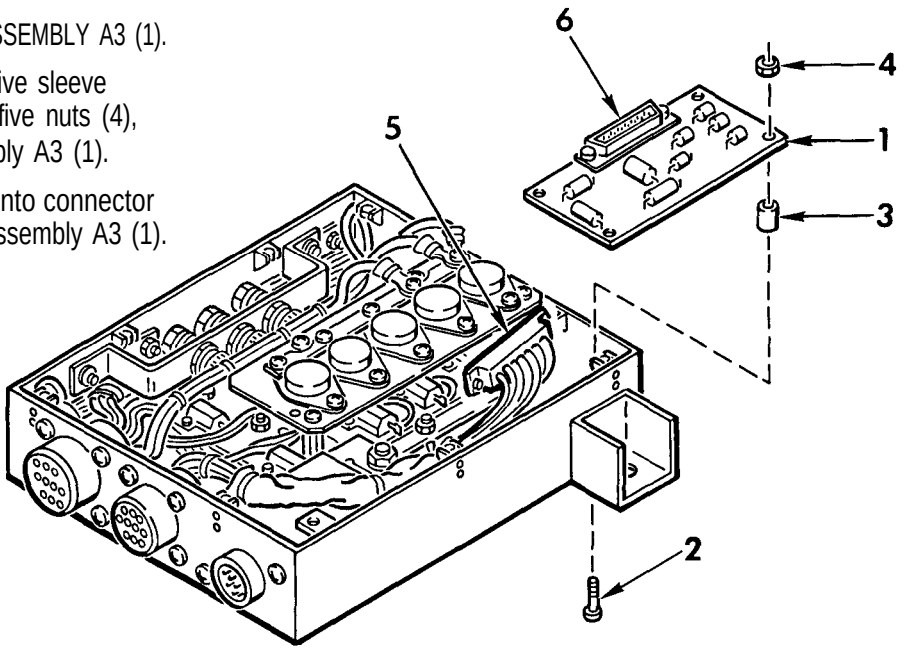


R1 TERM		CONNECTS TO:
1	35	CR1-C
2	5	A1-E8

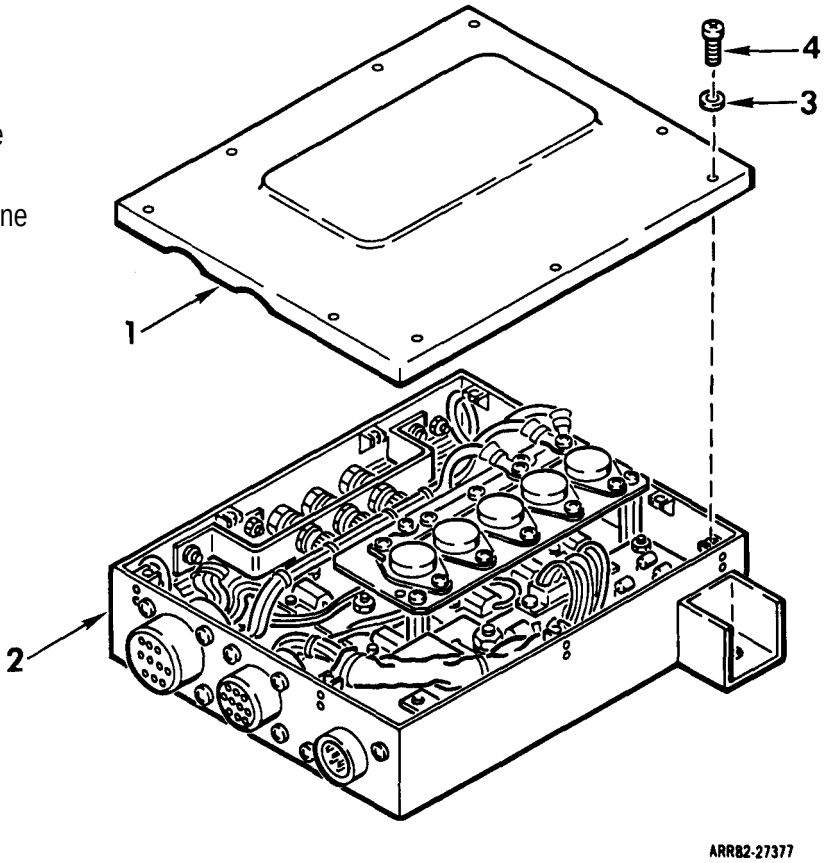
ARR82-27375

2-55. REPAIR OF EMERGENCY STOW cONTROL UNIT (189F729) (cont)

13. INSTALL CIRCUIT CARD ASSEMBLY A3 (1).
    a. Install five screws (2), five sleeve bushing insulators (3), five nuts (4), and circuit card assembly A3 (1).
    b. Plug connector P1 (5) into connector J1 (6) on circuit card assembly A3 (1).



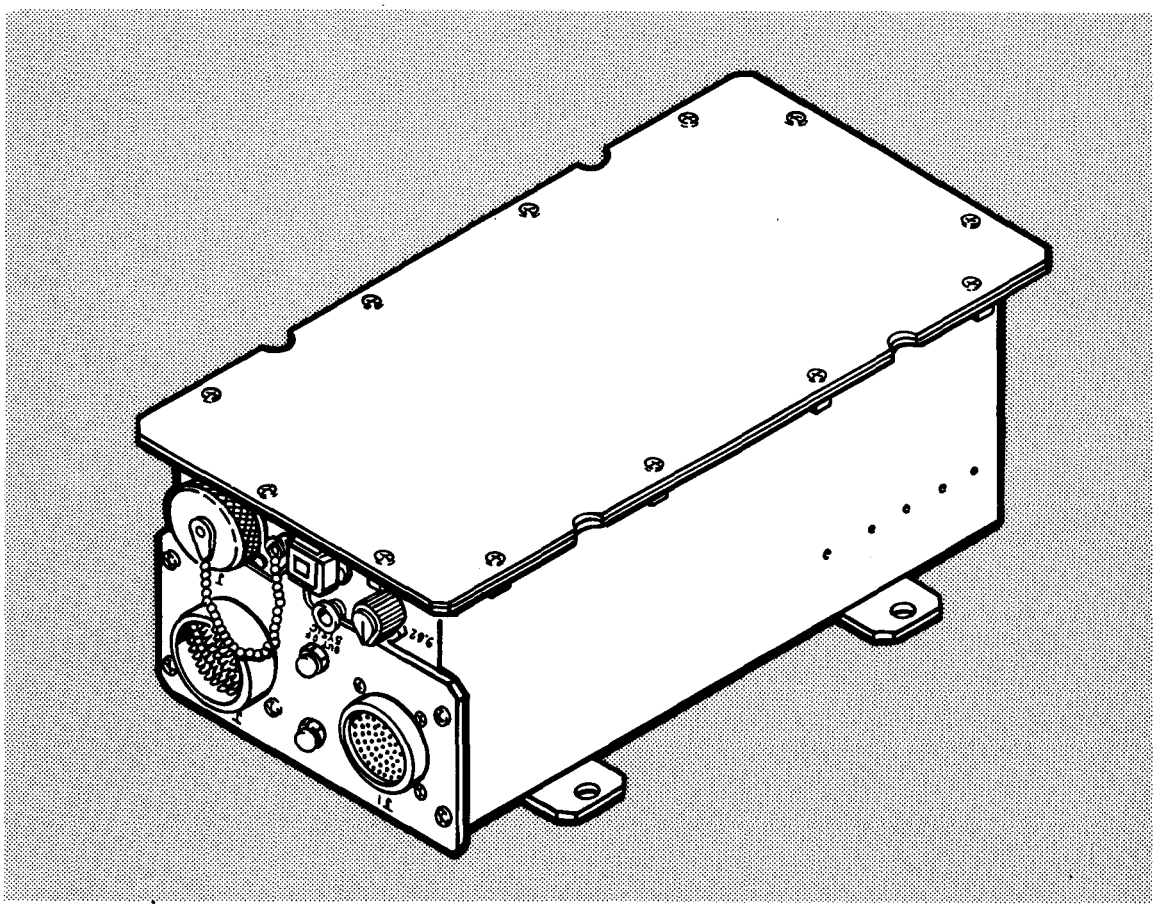
14. INSTALL COVER (1)
    a. Remove all loose debris from inside case (2).
    b. Install cover (1) on case (2) with nine washers (3) and nine screws (4).



END OF TASK

Section XVI. MAINTENANCE OF LOGIC CONTROL UNIT

Section Contents	Para
Repair of Logic Control Unit	2-56



ARR83-2087

2-56. REPAIR OF LOGIC CONTROL UNIT

DESCRIPTION

This task covers: Disassembly, cleaning, inspection, repair, and assembly.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- CCA Protective Bags
- Circuit Card Puller PN IM 13008 (Fig C-4, Appx C)
- Multimeter AN/USM-223

Materials:
- Adhesive (Item 5, Appx B)
- Adhesive (Item 6, Appx B)
- Adhesive (Item 8, Appx B)
- Locking Compound (Item 19, Appx B)
- Silicone Compound (Item 26, Appx B)
- Solder (Item 27, Appx B)

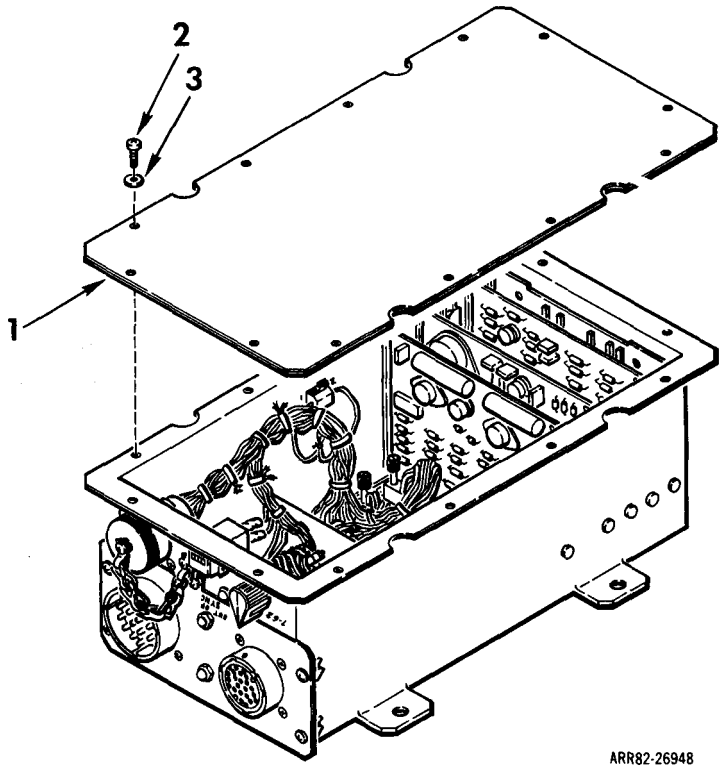
Personnel Required:
- 68J Aircraft Fire Control Repairer

Equipment Conditions:
- In shop on bench.
- No power applied.

DISASSEMBLY

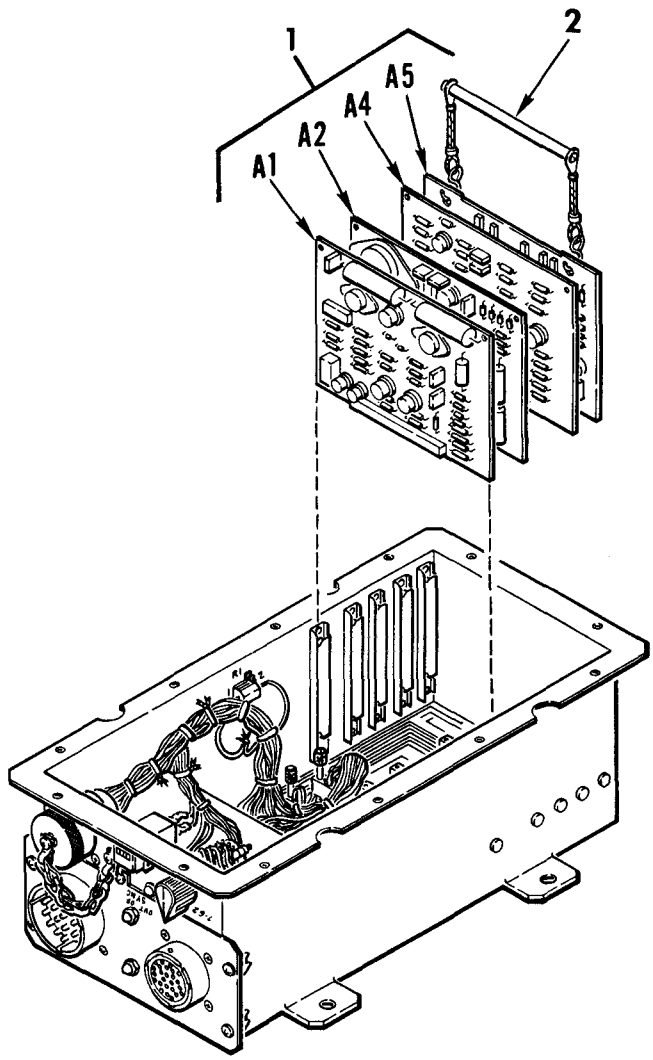
1. REMOVE COVER (1).

   Remove 12 screws (2), 12 washers (3), and cover (1).



DISASSEMBLY (cont)

2. REMOVE CIRCUIT CARD ASSEMBLIES A1, A2, A4, AND A5 (1).
   a. Using circuit card puller (2), remove circuit card assemblies A1, A2, A4, and A5 (1).
   b. Place circuit card assemblies (1) in protective bags.



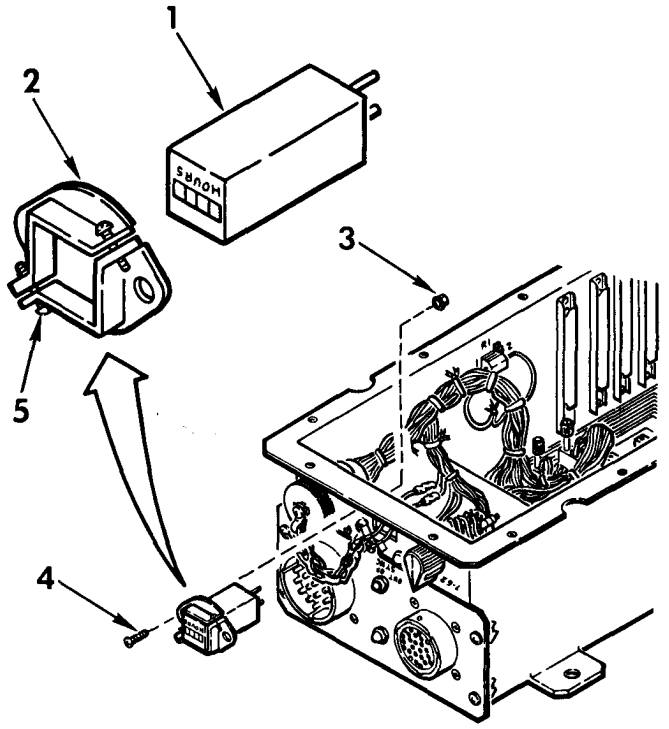
ARR82-26949

2-56. REPAIR OF LOGIC CONTROL UNIT (cont)

3. REMOVE TIME TOTALIZING METER M1 (1) AND MOUNTING FLANGE (2).
   a. Label and unsolder two wires from time totalizing meter M1 (1) terminals.
   b. Remove two nuts (3) and two screws (4).
   c. Push time totalizing meter (1) and mounting flange (2) through front of panel.
   d. Loosen two screws (5) to separate time totalizing meter M1 (1) from mounting flange (2).

NOTE

Label wires after removal for proper identification.

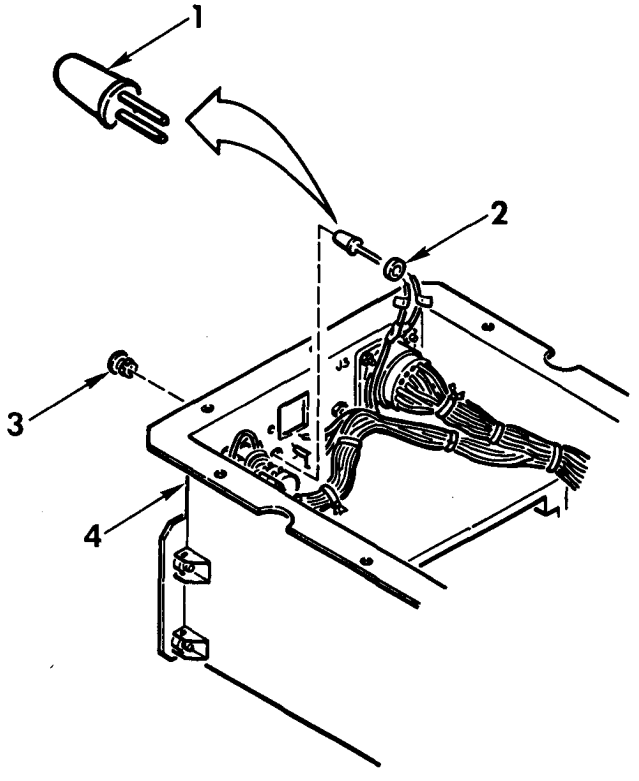


ARR82-26950

NOTE

Wire number W135 connects to anode of diode and wire number W136 connects to cathode of light emitting diode DS1 (1). Cathode terminal is adjacent to flat surface on diode body or may also be identified by a small dot adjacent to terminal.

4. REMOVE LIGHT EMITTING DIODE DS1 (1).
   a. Slide locking collar (2) over wiring.
   b. Withdraw light emitting diode DS1 (1) through rear of panel.
   c. Label and unsolder wires from light emitting diode DS1 (1) terminals.
   d. Remove spring tension clip (3) from case (4).



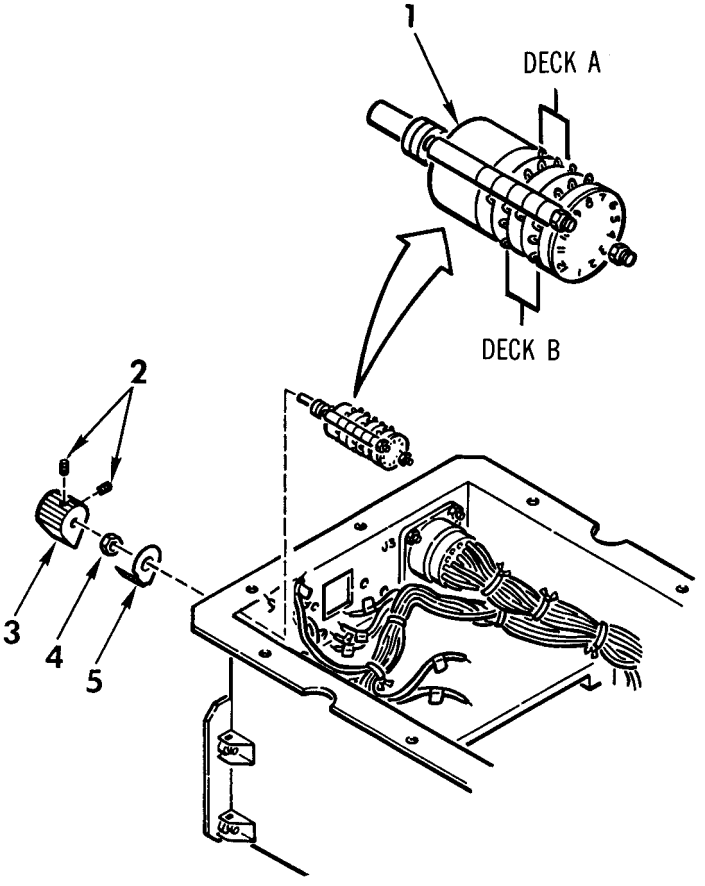
ARR82-26951

DISASSEMBLY (cent)

5. REMOVE ROTARY SWITCH S1 (1).
   a. Loosen two setscrews (2) and remove knob (3).
   b. Remove nut (4) and switch lock (5).
   c. Pull rotary switch S1 (1) free of case.
   d. Label and unsolder wires from rotary switch S1 (1).

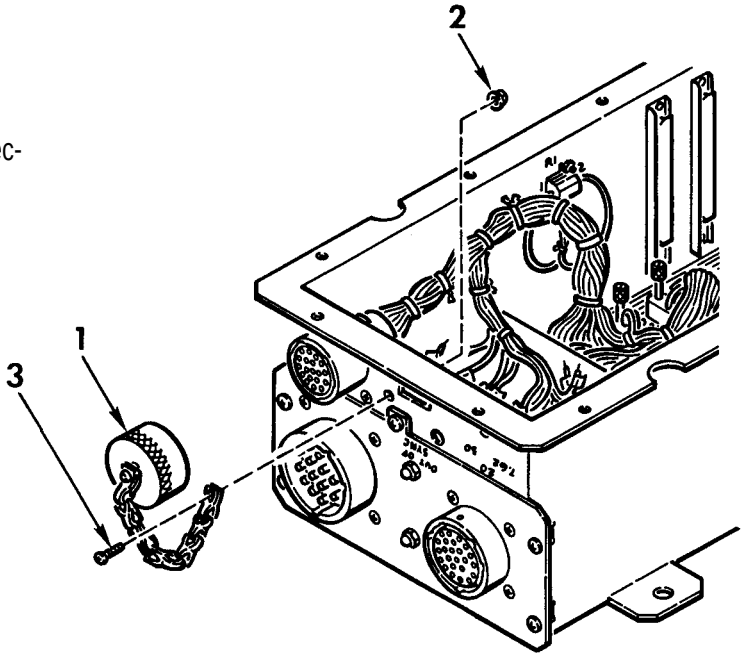
NOTE

Label wires after removal for proper identification.



6. REMOVE ELECTRICAL COVER (1).

   Remove nut (2), screw (3), and electrical cover (1).

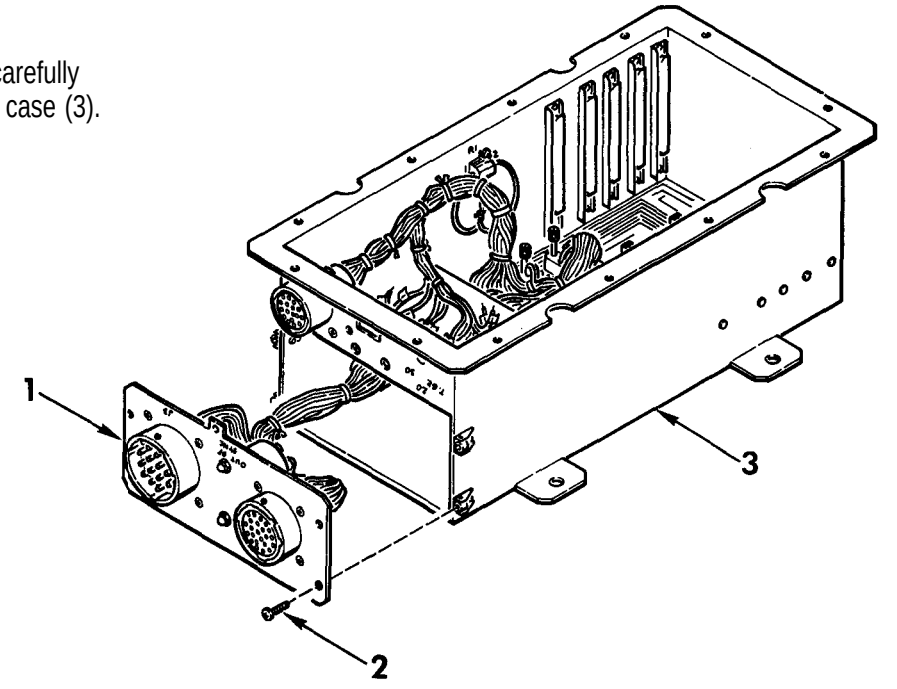


ARR82-26953

2-56. REPAIR OF LOGIC CONTROL UNIT (cont)

7. REMOVE FRONT PANEL (1).

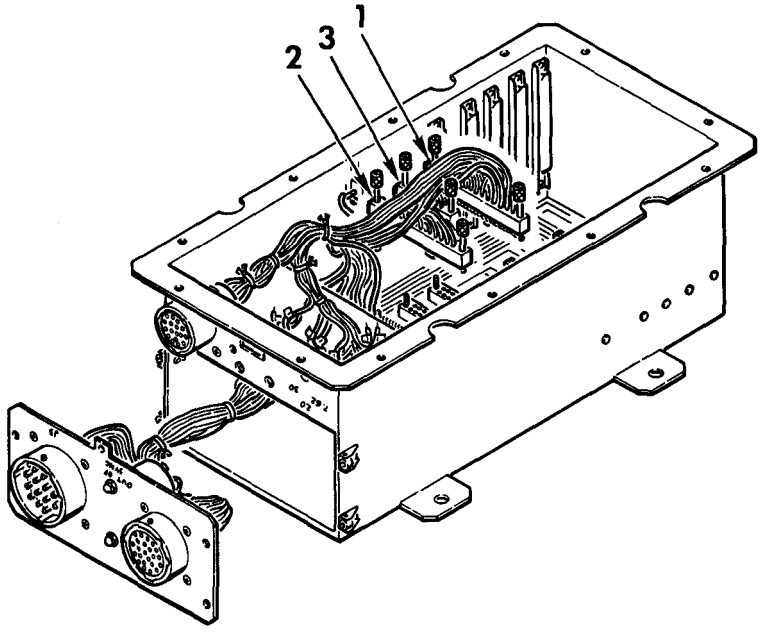
Remove five screws (2) and carefully pull front panel (1) away from case (3).



ARR82-26954

8. DISCONNECT CONNECTORS P1 (1), P2 (2), AND P3 (3).

Disconnect connectors P1 (1), P2 (2), and P3 (3) from their mating connectors.



ARR82-26955

DISASSEMBLY (cont)

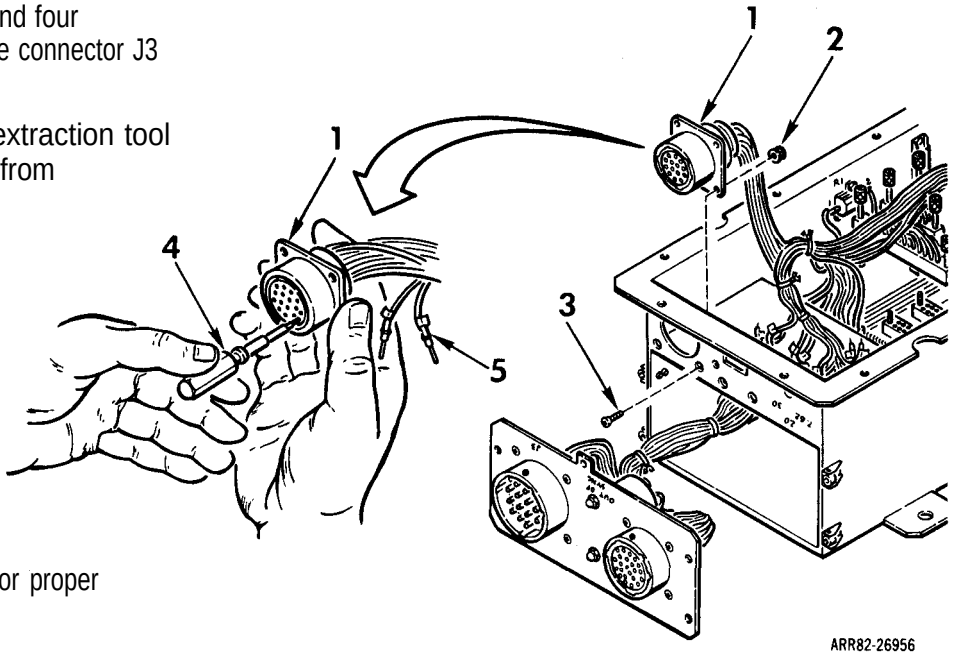
9. REMOVE CONNECTOR J3 (1).

a. Remove four nuts (2) and four screws (3), and separate connector J3 (1) from case.

b. Using pin insertion/extraction tool (4), remove pins (5) from connector J3 (1).

NOTE

Label wires after removal for proper identification.



ARR82-26956

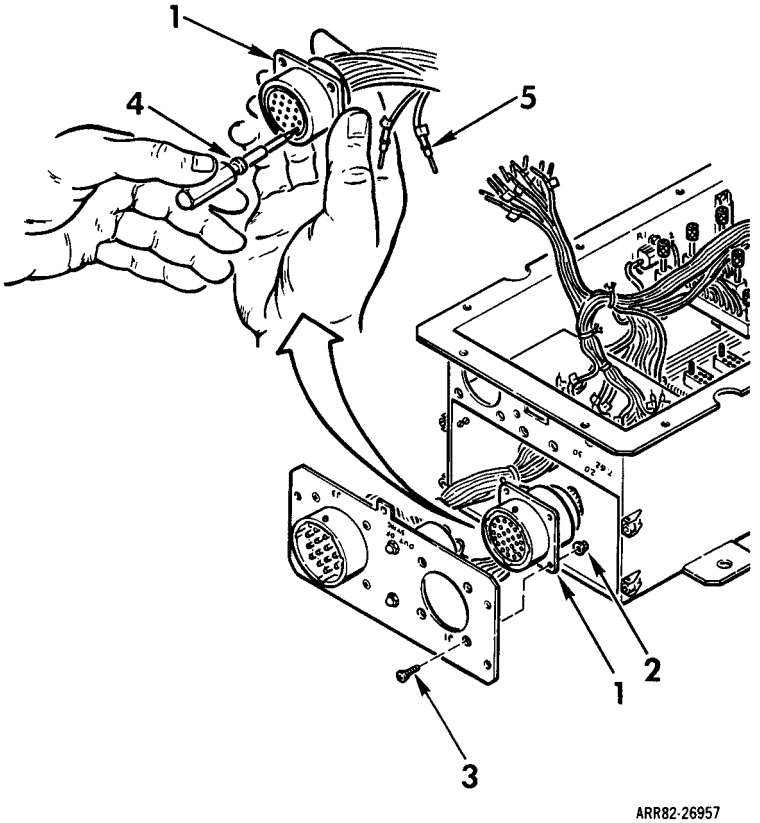
10. REMOVE CONNECTOR J1 (1).

a. Remove four nuts (2) and four screws (3), and separate connector J1 (1) from front panel.

b. Using pin insertion/extraction tool (4), remove pins (5) from connector J1 (1).

NOTE

Label wires after removal for proper identification.



ARR82-26957

2-56. REPAIR OF LOGIC CONTROL UNIT (cont)

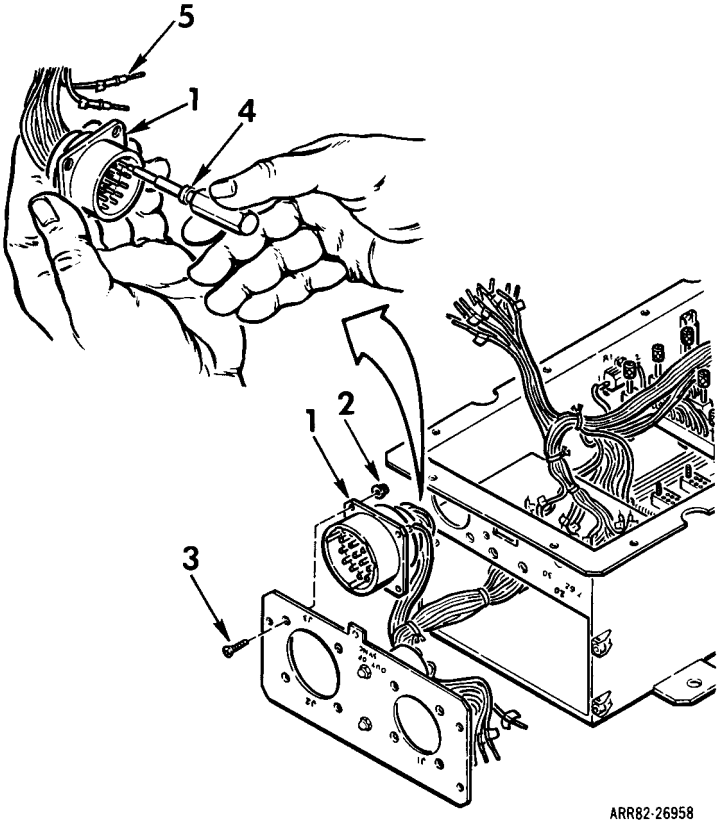
11. REMOVE CONNECTOR J2 (1).

a. Remove four nuts (2) and four screws (3), and separate connector J2 (1) from front panel.

b. Using pin insertion/extraction tool (4), remove pins (5) from connector J2 (1).

NOTE

Label wires after removal for proper identification.

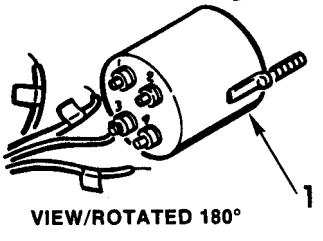


12. REMOVE TRANSFORMER T1 (1).

a. Remove two cap nuts (2) and separate transformer T1 (1) from front panel (3).

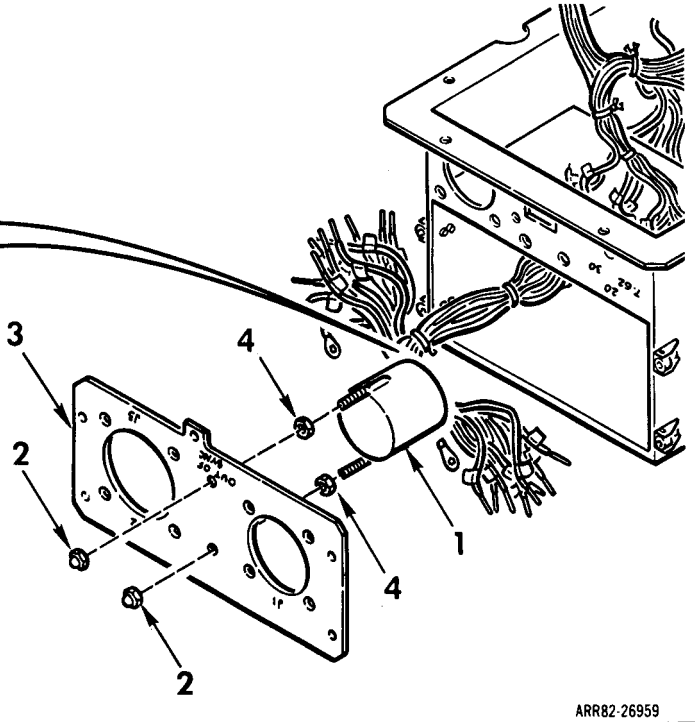
b. Remove two nuts (4).

c. Label and unsolder wires from transformer T1 (1) terminals



NOTE

Label wires after removal for proper identification.

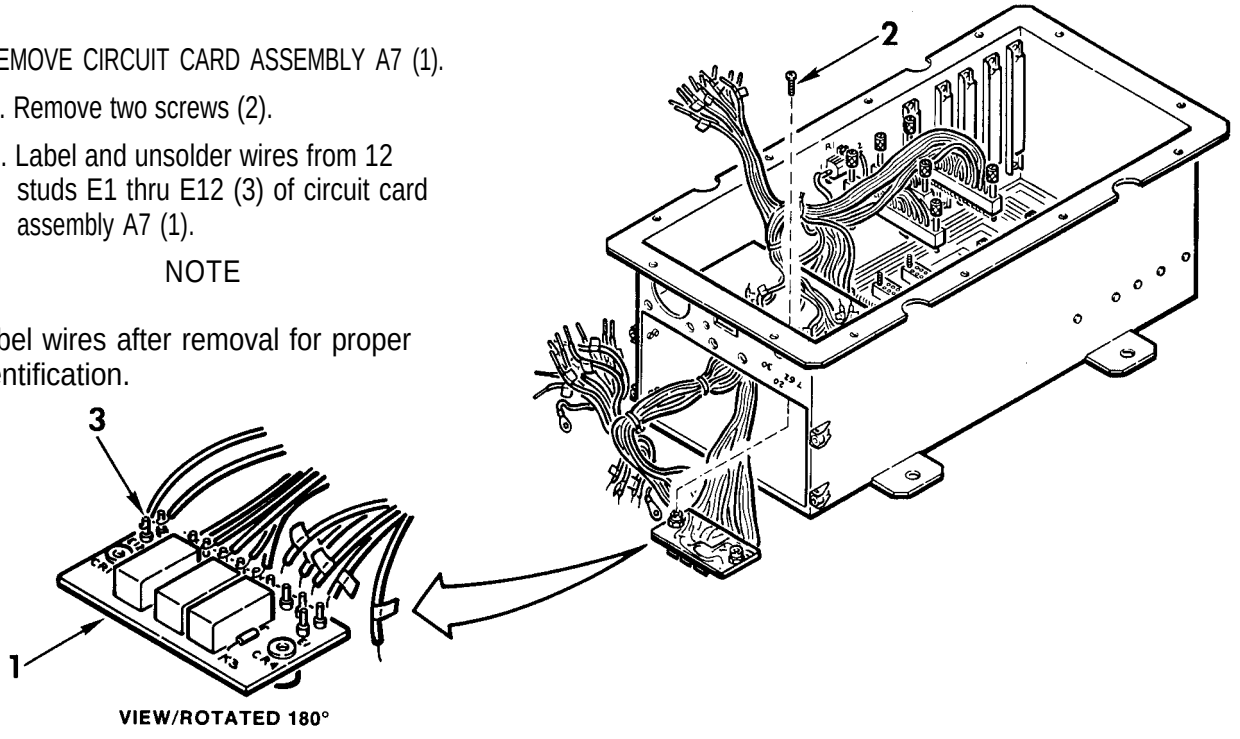


DISASSEMBLY (cont)

13. REMOVE CIRCUIT CARD ASSEMBLY A7 (1).
    a. Remove two screws (2).
    b. Label and unsolder wires from 12 studs E1 thru E12 (3) of circuit card assembly A7 (1).

NOTE

Label wires after removal for proper identification.

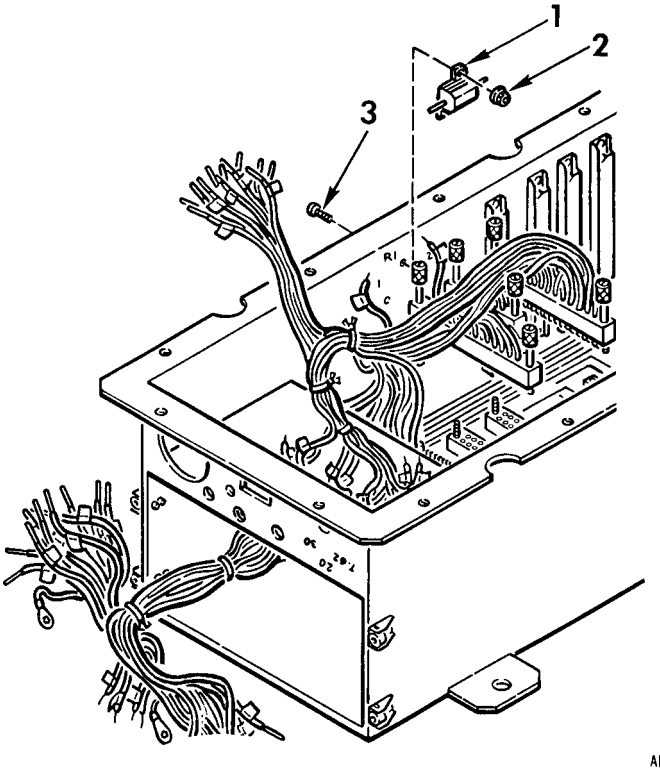


ARR82-26960

14. REMOVE RESISTOR R1 (1).
    a. Remove two nuts (2) and two screws (3).
    b. Label and unsolder two wires from resistor R1 (1) terminals.

NOTE

Label wires after removal for proper identification.

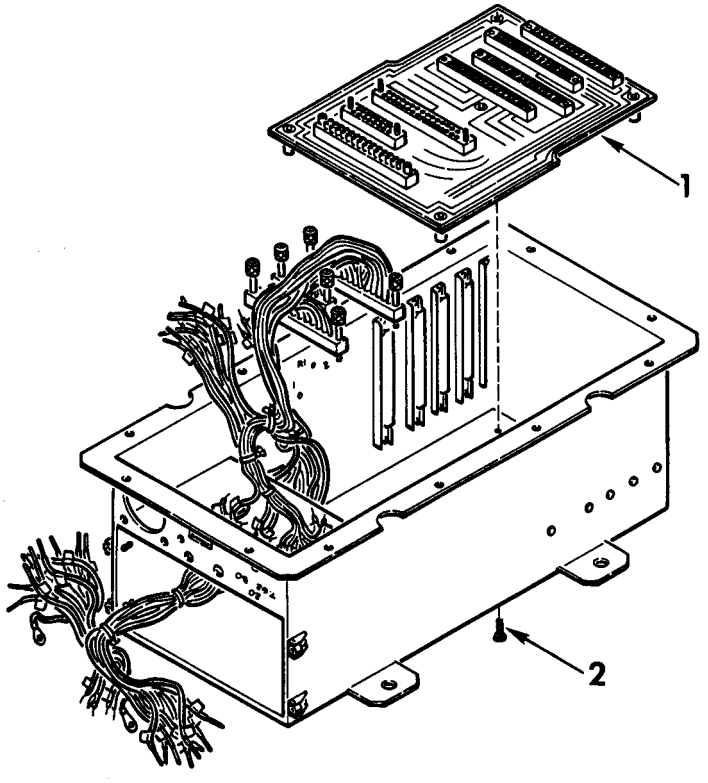


ARR82-26961

2-56. REPAIR OF LOGIC CONTROL UNIT (cont)

15. REMOVE CIRCUIT CARD ASSEMBLY A6 (1).

    Remove five screws (2) and circuit card assembly A6 (1).



ARR82-26962

CLEANING

16. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV.

INSPECTION

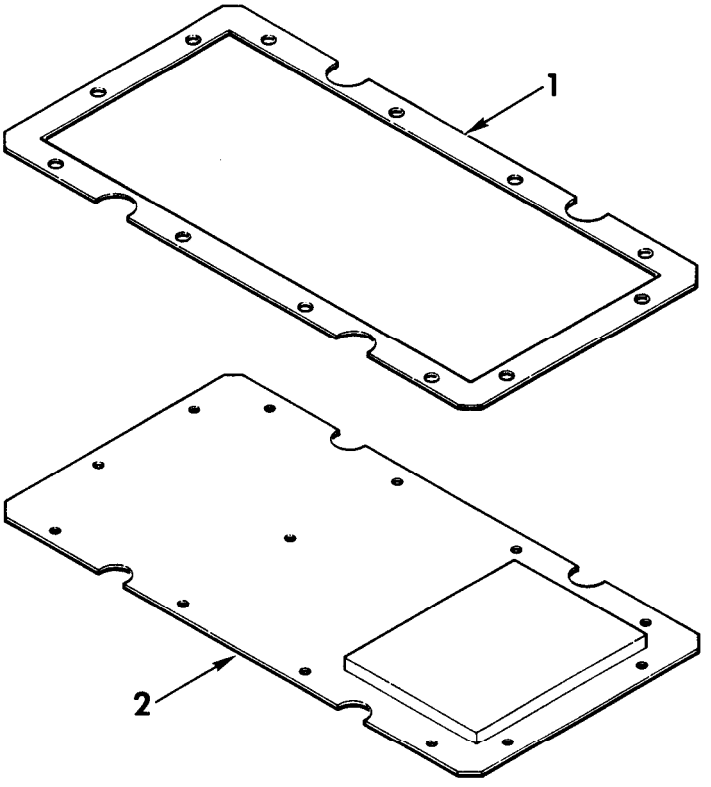
17. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV.

REPAIR

NOTE

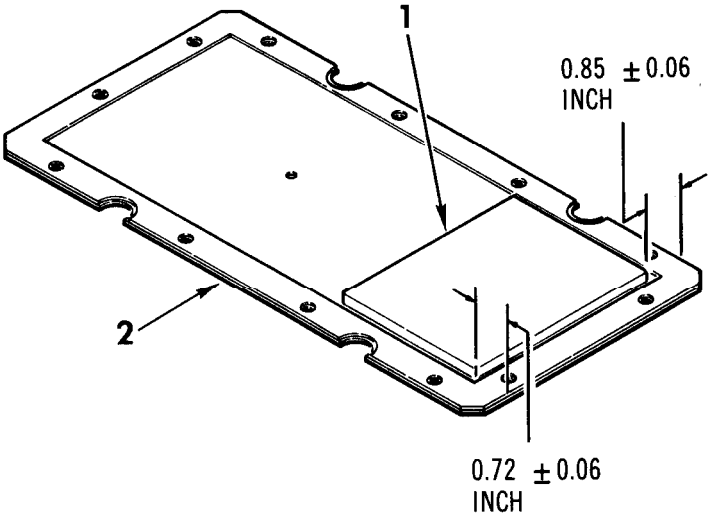
Replacement gasket may be made by cutting strips from stock. Maximum joining gap of 0.02 inch allowable between strips.

18. REPLACE DAMAGED GASKET (1) ON COVER (2).
    a. Remove damaged electronic shielding gasket (1).
    b. Clean gasket residue from cover (2) by scraping with hardwood or plastic tool.
    c. Carefully coat cover mounting surface with adhesive (item 5, Appx B).
    d. Place new gasket (1) on mounting surface so that when installed it presents a smooth and even surface with no gaps at joints exceeding 0.02 inch.



ARR82-26963

19. REPLACE DAMAGED CUSHIONING PAD (1) ON COVER (2).
    a. Remove damaged cushioning pad (1).
    b. Clean pad residue from cover (1) by scraping with hardwood or plastic tool.
    c. Carefully coat cover mounting surface with adhesive (item 6, Appx B).
    d. Install new cushioning pad (1) on mounting surface. Locate pad within dimensions shown.



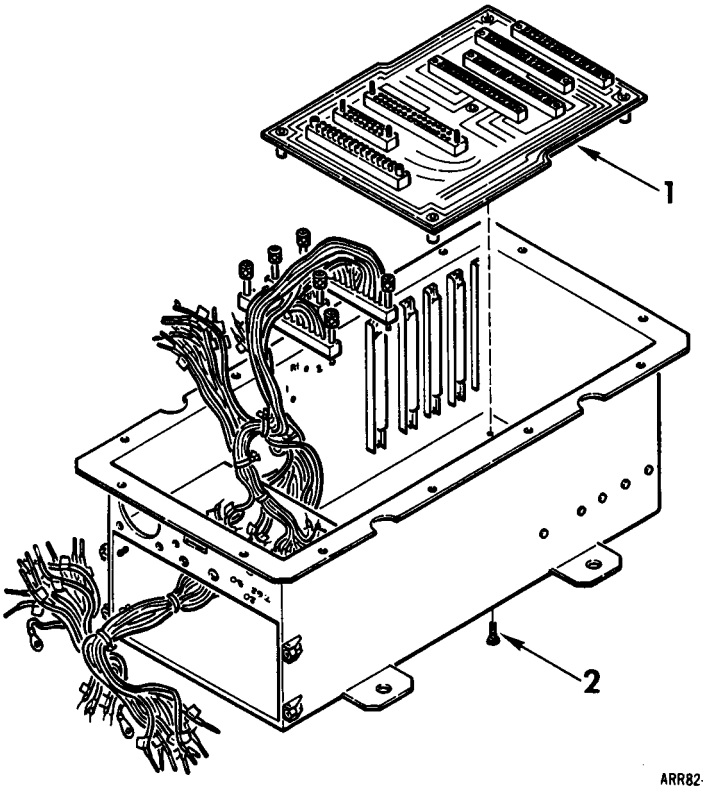
ARR82-26964

2-56. REPAIR OF LOGIC CONTROL UNIT (cont)

ASSEMBLY

20. INSTALL CIRCUIT CARD ASSEMBLY A6 (1).

    Secure circuit card assembly A6 (1) to case with five screws (2).



ARR82-26965

21. INSTALL RESISTOR R1 (1).

    a. Secure resistor R1 (1) to case with two nuts (2) and two screws (3).

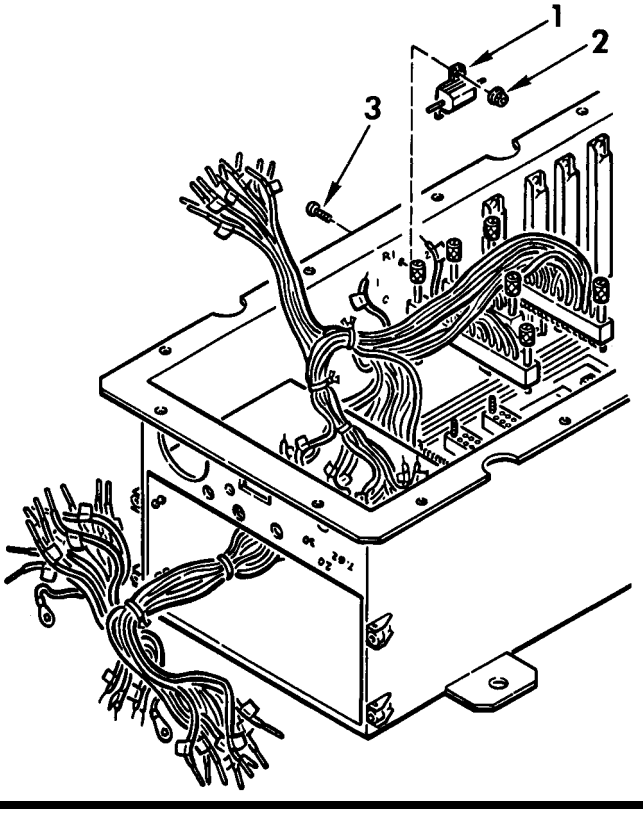
    b. Remove labels from soldered wires.

    c Solder two wires to resistor R1 (1) terminals

NOTE

Use multimeter to identify wires prior to connecting them.

RESISTOR R1 TERM		CONNECTS TO:
2	92	FL47
1	162	P1-39



ARR82-26966

ASSEMBLY (cont)

22. INSTALL TRANSFORMER T1 (1).

a. Install one nut (2) on each stud of transformer T1 (1).

b. Secure transformer T1 (1) to front panel (3) with two cap nuts (4) and two nuts (2).

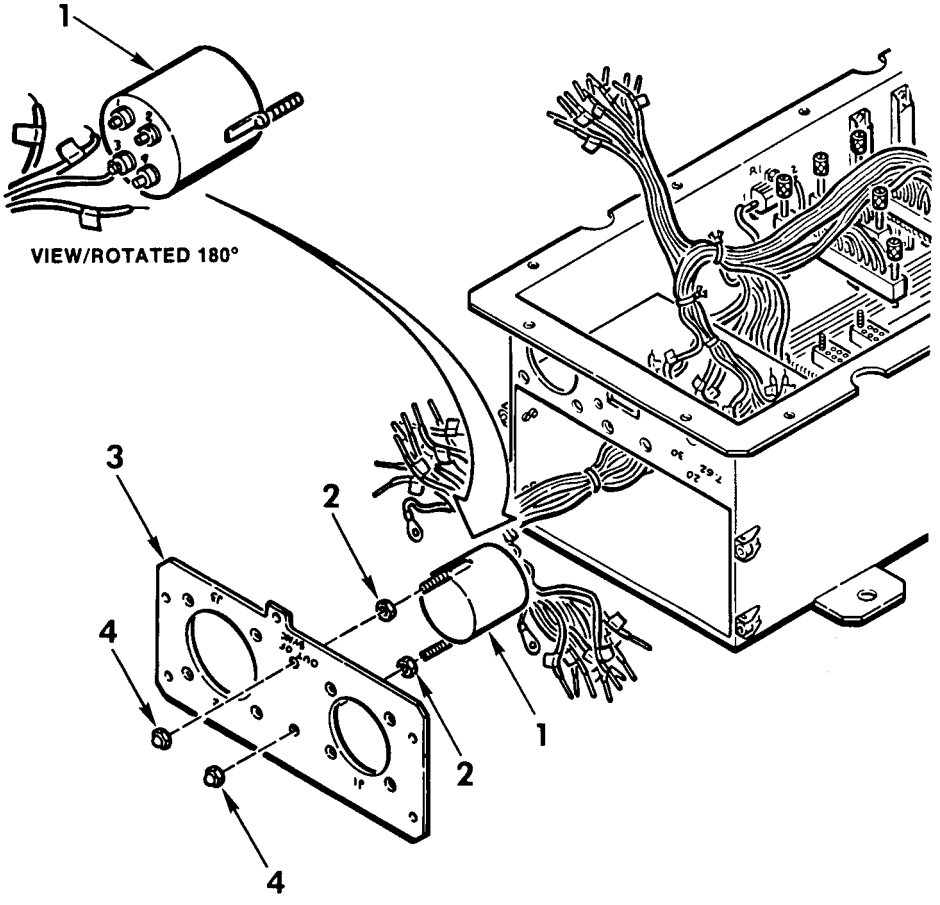
c. Remove labels from soldered wires.

d. Solder wires to transformer T1 (1) terminals

TRANSFORMER TERM		CONNECTS TO:
1	127	J2-E
	137	FL30
2	28	J2-F
	138	FL31
3	139	FL41
4	140	FL42

NOTE

Use multimeter to identify wires prior to connecting them.



ARR82-26967

2-56. REPAIR OF LOGIC CONTROL UNIT (cont)

23. INSTALL CIRCUIT CARD ASSEMBLY A7 (1).

a. Remove labels from soldered wires.

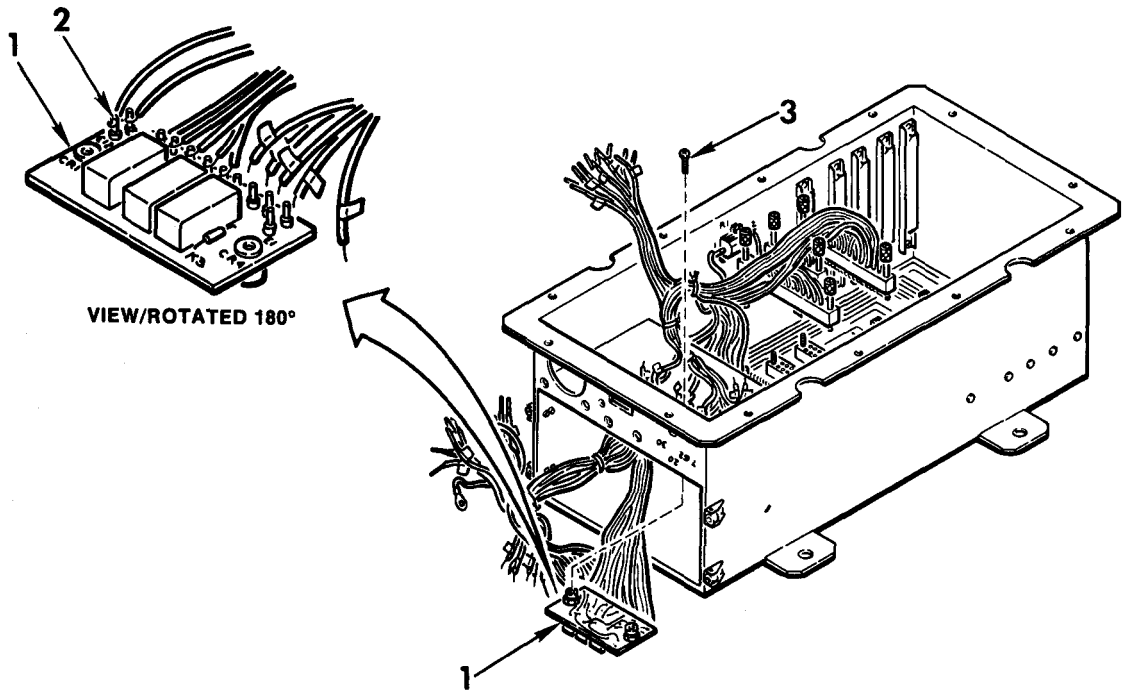
b. Solder wires to studs E1 thru E12 (2) of circuit card assembly A7 (1).

c. Secure circuit card assembly A7 (1) to case with two screws (3).

NOTE

Use multimeter to identify wires prior to connecting them.

CIRCUIT CARD A7 TERM		CONNECTS TO:
E1	7	J1-C
E2	182	FL12
E3	29	J2-G
E4	8	J1-D
E5	181	FL11
E6	167	J1-A
E7	165	J1-T
E8	168	J1-S
E9	166	J1-B
E10	171	J2-A
E11	172	J2-B
E12	170	J2-C



ARR82-26968

ASSEMBLY (cont)

24. INSTALL CONNECTOR J2 (1).

a. Insert wires into connector J2 (1). Pins will snap into place when inserted into connector J2 by hand.

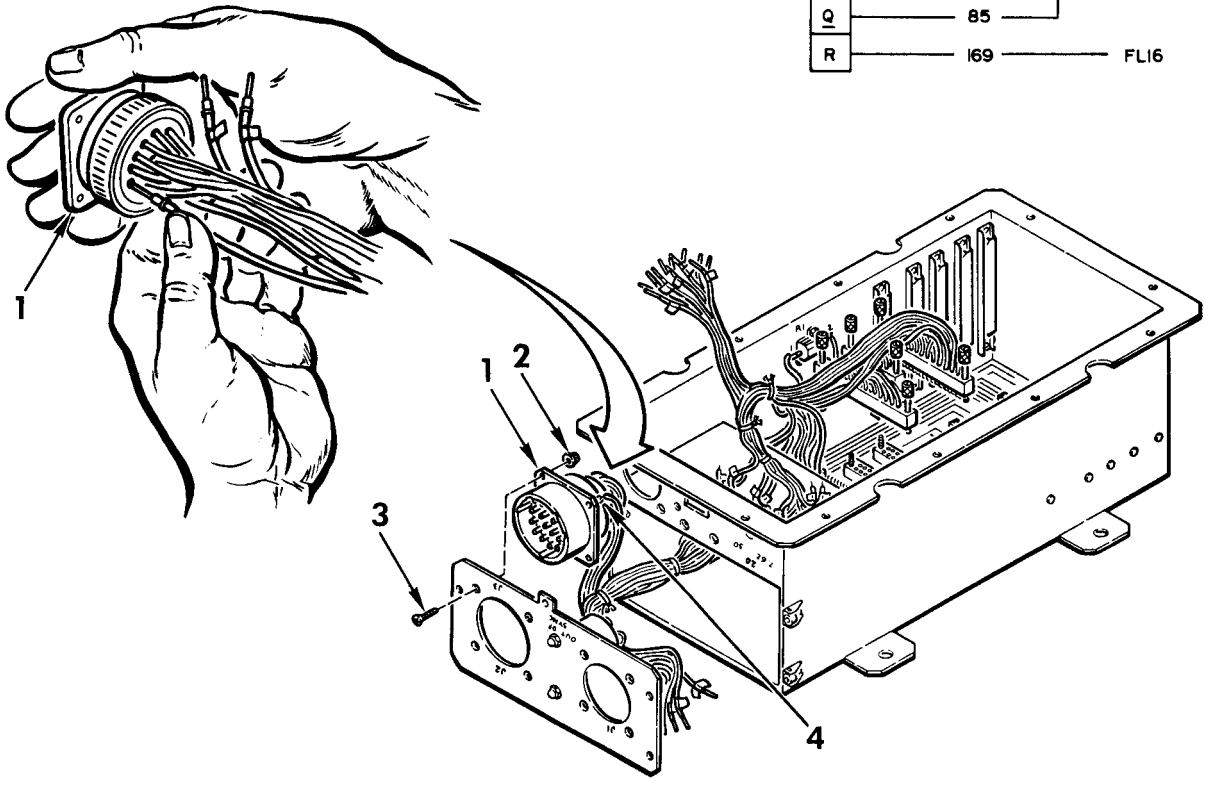
b. Remove labels from wires

c. Orient connector J2 (1) large keyway at 12 o'clock position and secure connector J2 to front panel using four nuts (2) and four screws (3) with E1 lug terminal (4) secured under one nut (2).

NOTE

Use multimeter to identify wires prior to connecting them.

CONNECTOR J2 TERM		CONNECTS TO:
E	27	T1-1
F	28	T1-2
G	29	A7-E3
	30	FL49
Z	31	FL7
B	172	A7-E11
C	170	A7-E12
A	171	A7-E10
H	36	FL47
R	37	FL38
N	38	FL19
	23	J1-R
I	39	FL37
U	40	FL6
D	41	FL15
E	180	FL34
X	58	FL25
B	59	FL26
J	60	FL36
P	61	E1
Q	85	
R	169	FL16



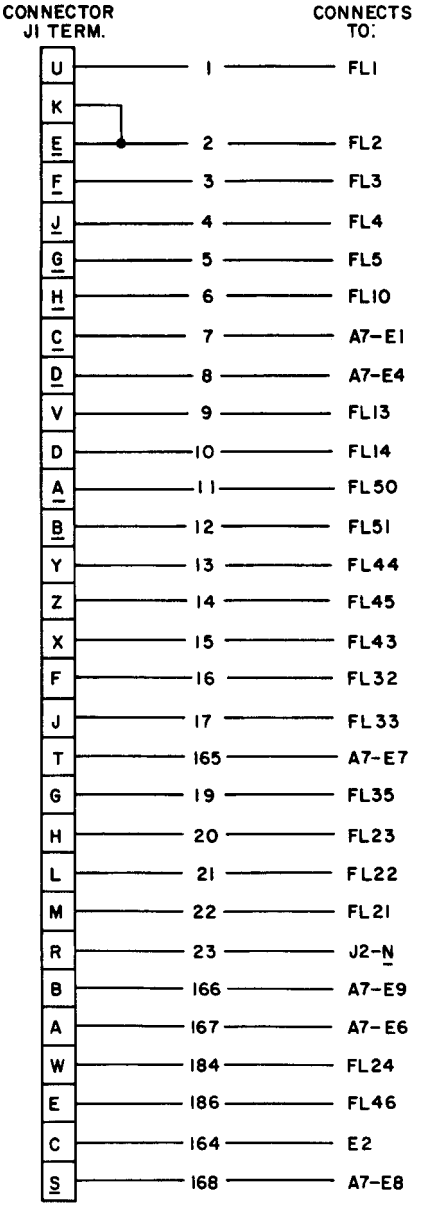
ARR82-26969

2-56. REPAIR OF LOGIC CONTROL UNIT (cont)

25. INSTALL CONNECTOR J1 (1).
    a. Insert wires into connector J1 (1). Pins will snap into place when inserted into connector J1 by hand.
    b. Remove labels from wires.
    c. Orient connector J1 (1) large keyway at 12 o'clock position and secure connector J 1 to front panel using four nuts (2) and four screws (3) with E2 lug terminal (4) secured under one nut (2).

NOTE

Use multimeter to identify wires prior to connecting them.



ASSEMBLY (cont)

26. INSTALL CONNECTOR J3 (1).

a. Insert wires into connector J3 (1). Pins will snap into place when inserted into connector 13 by hand.

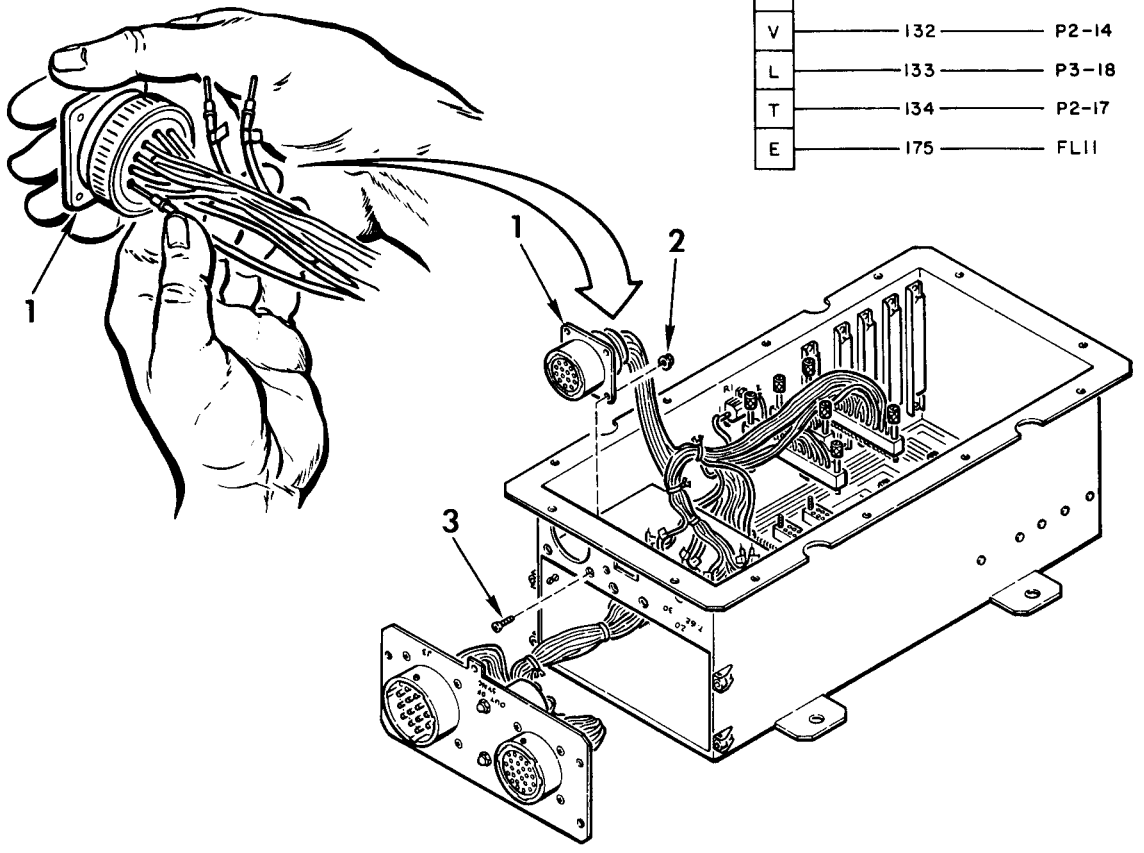
b. Remove labels from wires.

c. Orient connector J3 (1) large keyway at 12 o'clock position and secure connector J3 to case with four nuts (2) and four screws (3).

NOTE

Use multimeter to identify wires prior to connecting them.

CONNECTOR J3 TERM		CONNECTS TO:
X	33	SIA-COMI
J	94	FLI9
A	117	P3-7
B	118	P3-8
C	19	P3-2
P	120	P3-11
R	121	PI-36
K	122	PI-32
A	123	PI-34
S	124	P2-19
Z	125	P3-10
B	126	PI-37
U	127	P3-17
D	128	P3-15
C	129	SIA-9
Y	130	PI-14
W	131	PI-10
V	132	P2-14
L	133	P3-18
T	134	P2-17
E	175	FLII

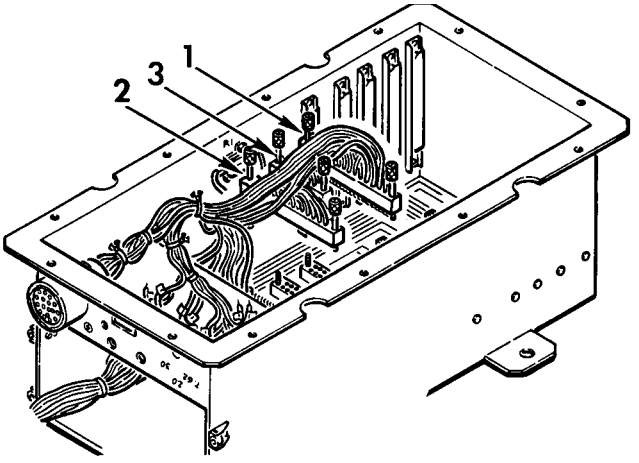


ARR82-26971

2-56. REPAIR OF LOGIC CONTROL UNIT (cont)

27. CONNECT CONNECTORS P1 (1), P2 (2), AND P3 (3).

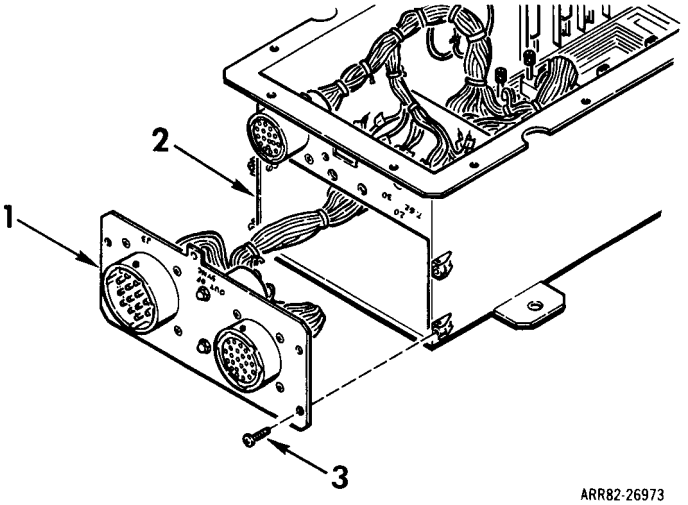
Connect connectors P1 (1), P2 (2), and P3 (3) to mating connectors J6, J7, and J8, respectively.



ARR82-26972

28. INSTALL FRONT PANEL (1).

Install front panel (1) on case (2) with five screws (3).

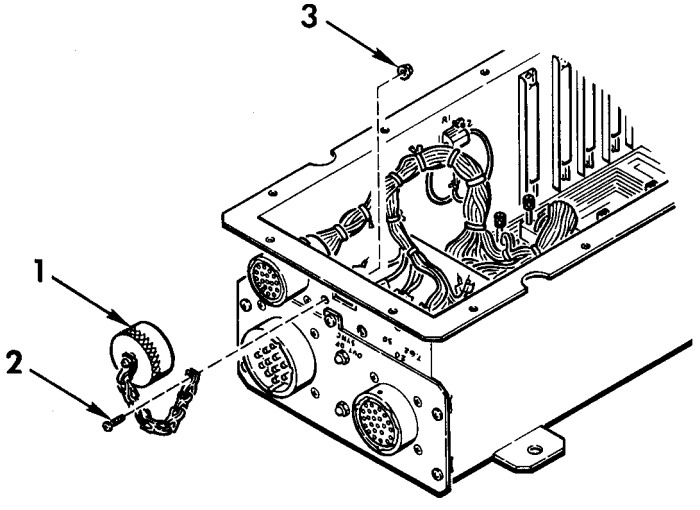


ARR82-26973

29. INSTALL ELECTRICAL COVER (1).

a. Apply a thin coat of silicone compound to mating surface of gasket inside electrical cover (1).

b. Install electrical cover (1) on case with screw (2) and nut (3).



ARR82-26974

ASSEMBLY (cont)

30. INSTALL ROTARY SWITCH S1 (1).

a. Remove labels from soldered wires.

b. Solder wires to rotary switch S1 (1) deck A and deck B terminals.

c. Insert rotary switch S1 (1) shaft through cutout in case.

d. Set and install switch (1) in 20-mm position.

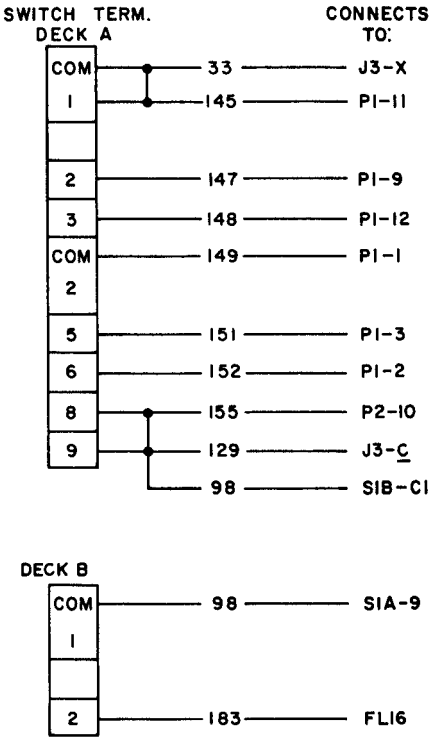
e. Place switch lock (2) over shaft and secure switch S1 (1) and switch lock (2) with nut (3).

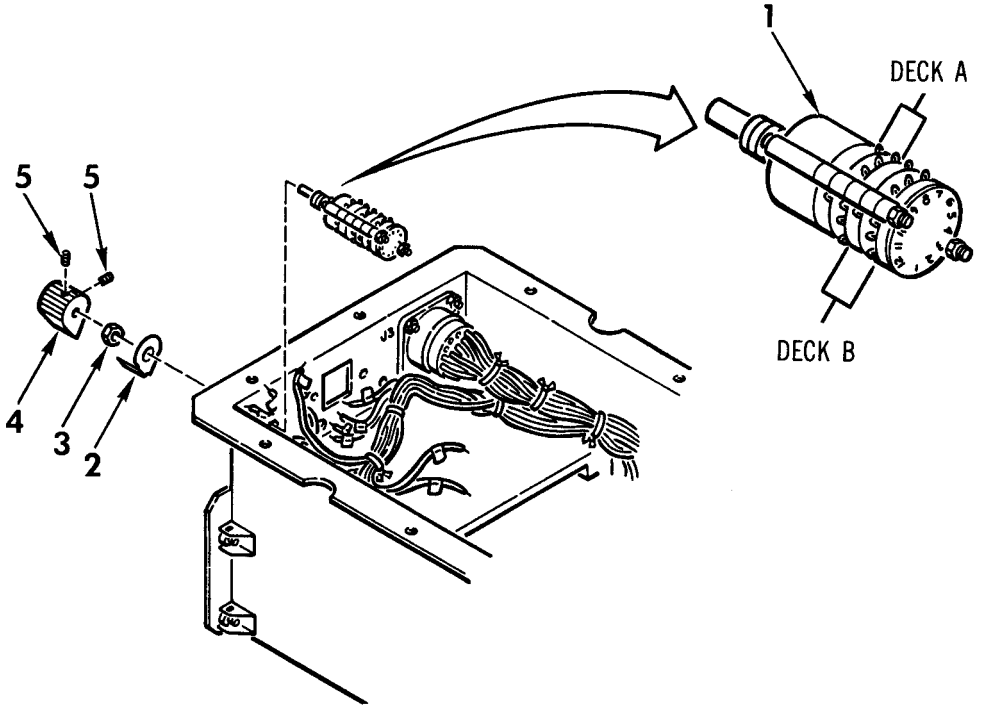
f. Torque nut (3) to 10 lb-in. (1.1 N.m).

g. Secure knob (4) to switch shaft with two setscrews (5).

NOTE

Use multimeter to identify wires prior to connecting them.



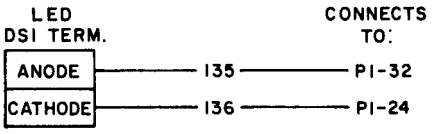


ARR82-26975

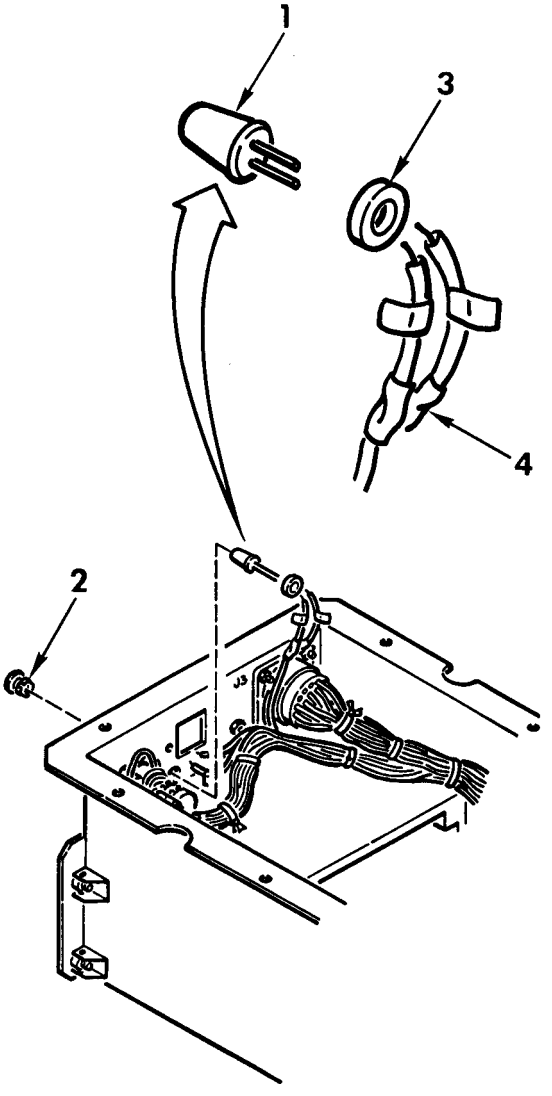
2-56. REPAIR OF LOGIC CONTROL UNIT (cont)

NOTE

Wire number W135 connects to anode and wire number W136 connects to cathode of light emitting diode DS1 (1). Cathode terminal is next to flat surface on diode body or may also be identified by a small dot next to terminal.



31. INSTALL LIGHT EMITTING DIODE DS1 (1).
    a. Install spring tension clip (2) in cutout in case.
    b. Slide locking collar (3) onto two wires.
    c. Remove labels from soldered wires.
    d. Solder two wires to diode terminals.
    e. Insert light emitting diode DS1 (1) through spring tension clip (2).
    f. Slide locking collar (3) onto light emitting diode (1) to secure light emitting diode in place.
    g. Apply adhesive (item 8, Appx B) between front panel and locking collar (3).
    h. Place insulation sleeving (4) over soldered connections.



NOTE

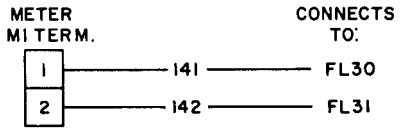
Use multimeter to identify wires prior to connecting them.

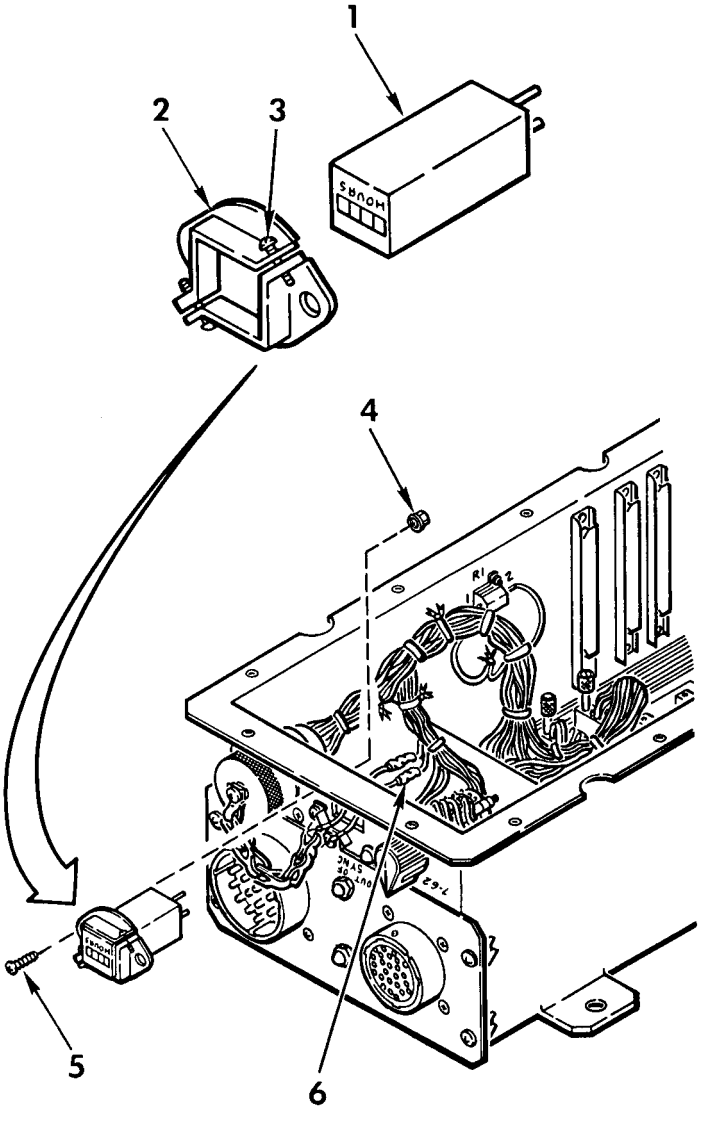
ASSEMBLY (cont)

32. INSTALL TIME TOTALIZING METER M1 (1) AND MOUNTING FLANGE (2).
    a. Assemble time totalizing meter M1 (1) to mounting flange (2) by tightening two screws (3).
    b. Apply locking compound to threads of screws (3).
    c. Install time totalizing meter M1 (1) and mounting flange (2) on front panel with two nuts (4) and two screws (5).
    d. Apply locking compound to screws (5).
    e. Remove labels from soldered wires.
    f. Solder wire from filter FL30 to terminal 1 (top) of time totalizing meter M1 (1).
    g. Solder wire from filter FL31 to terminal 2 (bottom) of time totaiizing meter M1 (1).
    h. Place insulation sleeving (6) over soldered connections.

NOTE

Use multimeter to identify wires prior to connecting them.



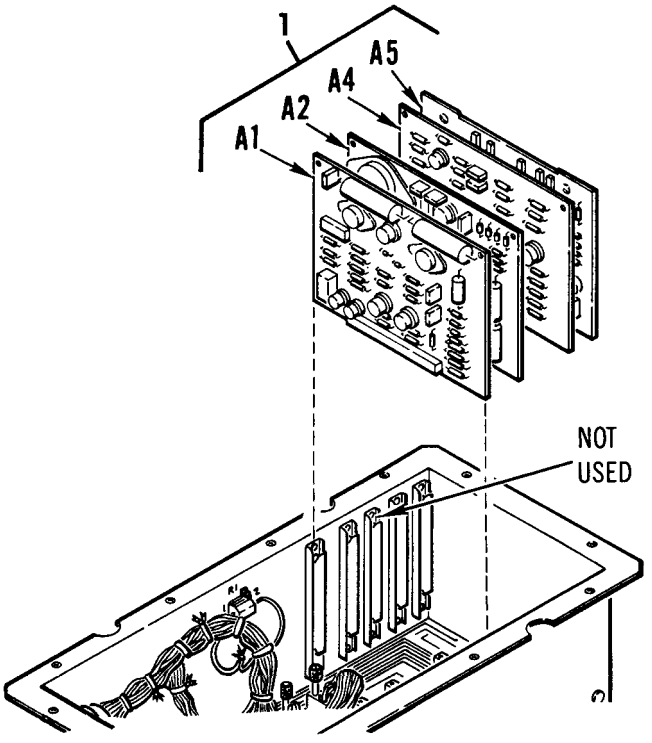


ARR82-26977

2-56. REPAIR OF LOGIC CONTROL UNIT (cont)

33. INSTALL CIRCUIT CARD ASSEMBLIES A1, A2, A4, AND A5 (1).

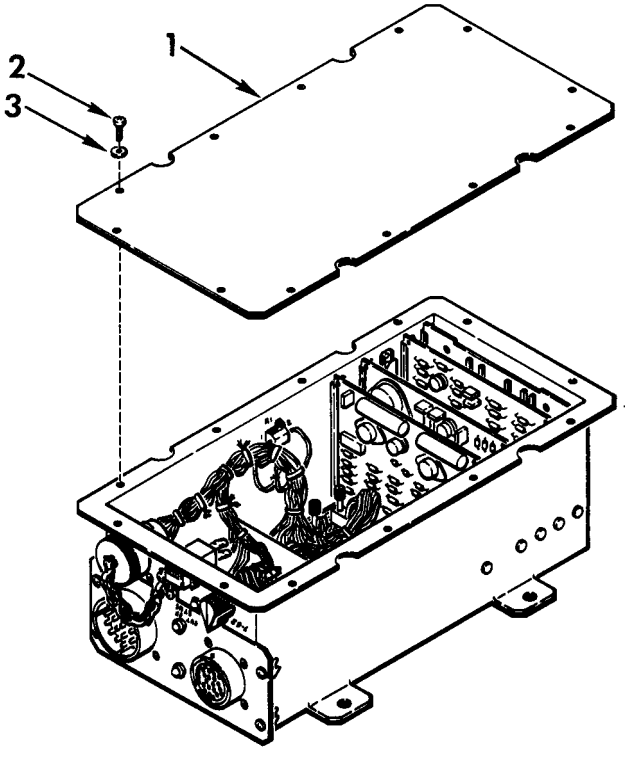
Install circuit card assemblies A1, A2, A4, and A5 (1) in connectors. Push down carefully on edge of card to seat firmly in connector.



ARR82-26978

34. INSTALL COVER (1).

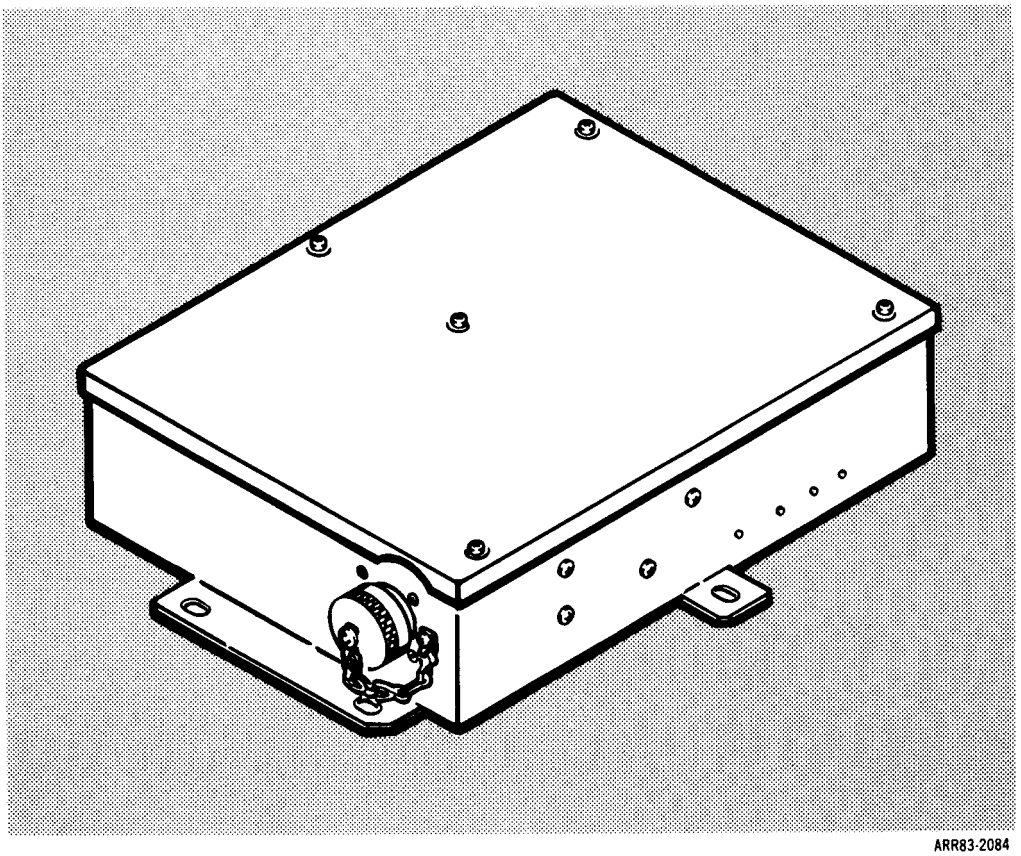
Install cover (1), using 12 screws (2) and 12 washers (3).



ARR82-26979

END OF TASK

Section XVII. MAINTENANCE OF GUN CONTROL UNIT



ARR83-2084

2-57. REPAIR OF GUN CONTROL UNIT

DESCRIPTION

This task covers: Disassembly, cleaning, inspection, repair, and assembly.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- CCA Protective Bags
- Circuit Card Puller (Fig C-4, Appx C)
- Multimeter AN/USM-223

Materials:
- Adhesive (Item 7, Appx B)
- Insulation Sleeving (Item 15, Appx B)
- Lockwire (item 18, Appx B)
- Locking Compound (Item 19, Appx B)
- Silicone Compound (Item 26, Appx B)
- Solder (Item 27, Appx B)
- Strap (Item 30, Appx B)
- Tape, (Item 31, Appx B)

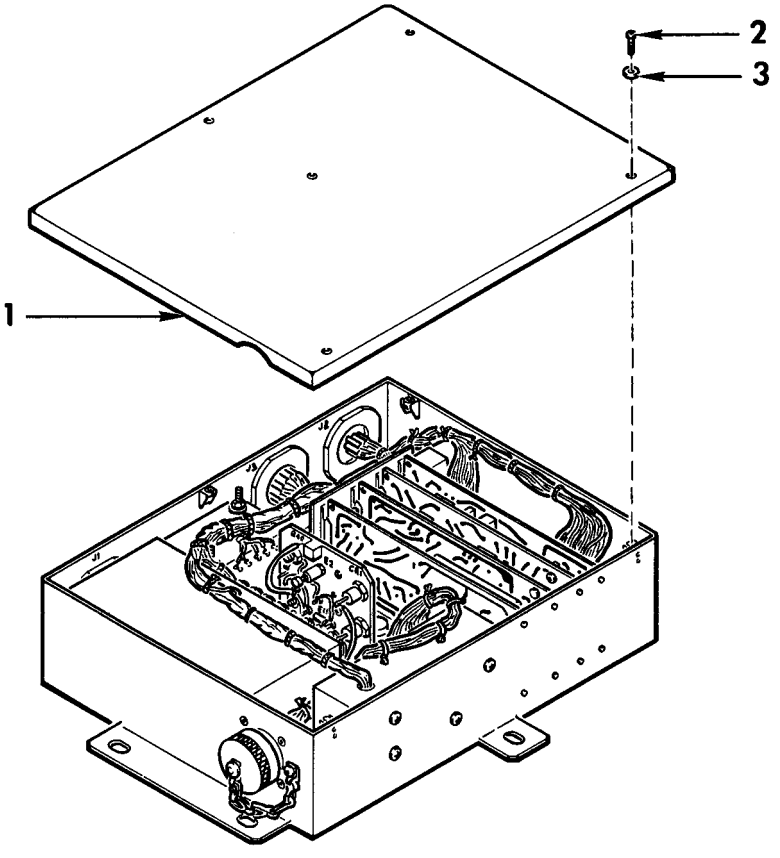
Personnel Required:
- 68J Aircraft Fire-Control Repairer

Equipment Conditions:
- In shop on bench,
- No power applied.

DISASSEMBLY

1. REMOVE COVER (1).

   Remove five screws (2), five washers (3), and cover (1).



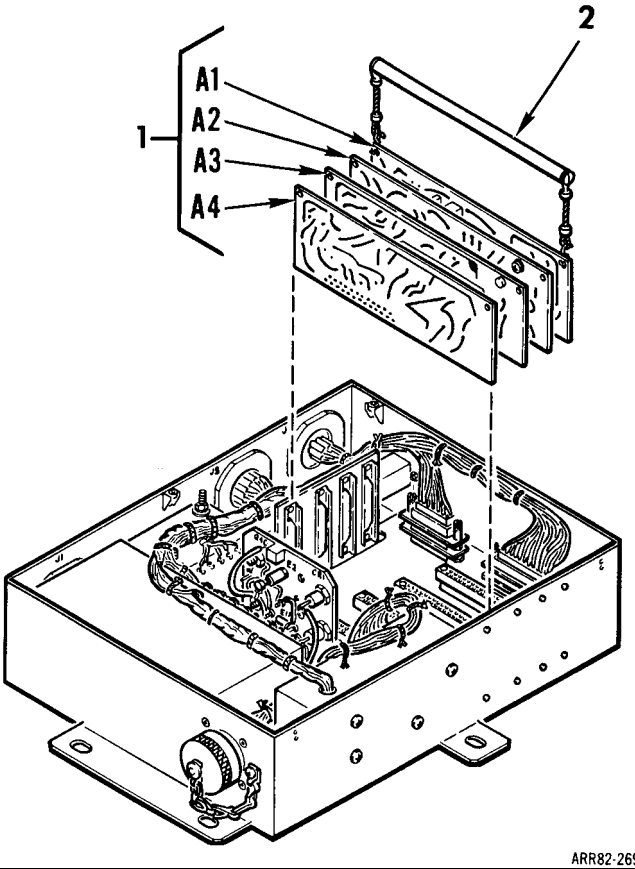
ARR82-26991

DISASSEMBLY (cont)

2. REMOVE CIRCUIT CARD ASSEMBLIES A1 THRU A4 (1).

   a. Using circuit card puller (2), remove circuit cards A1 thru A4 (1).

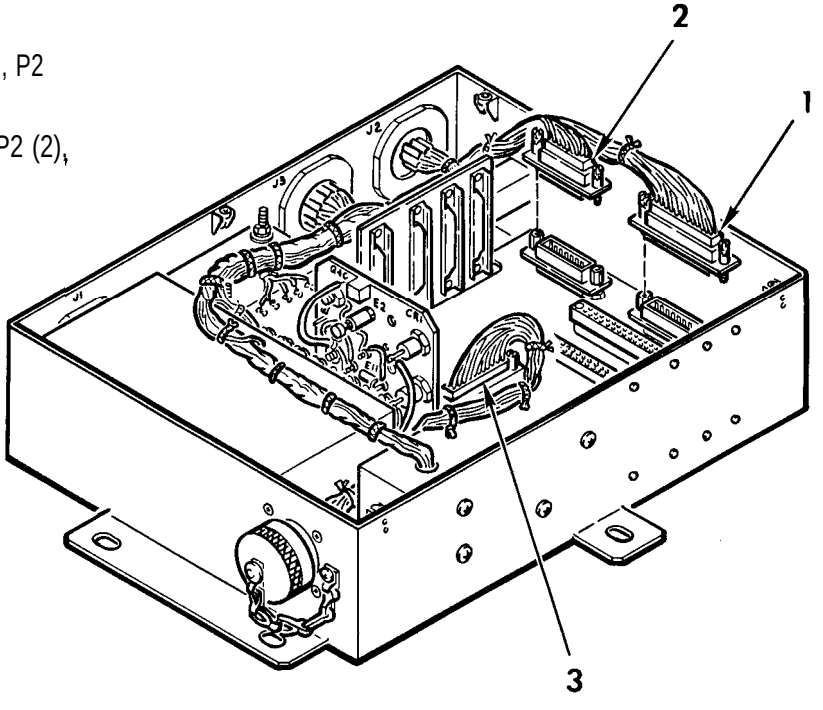
   b. Place circuit card assembles (1) in protective bags.



ARR82-26992

3. DISCONNECT CONNECTORS P1 (1), P2 (2), AND P3 (3).

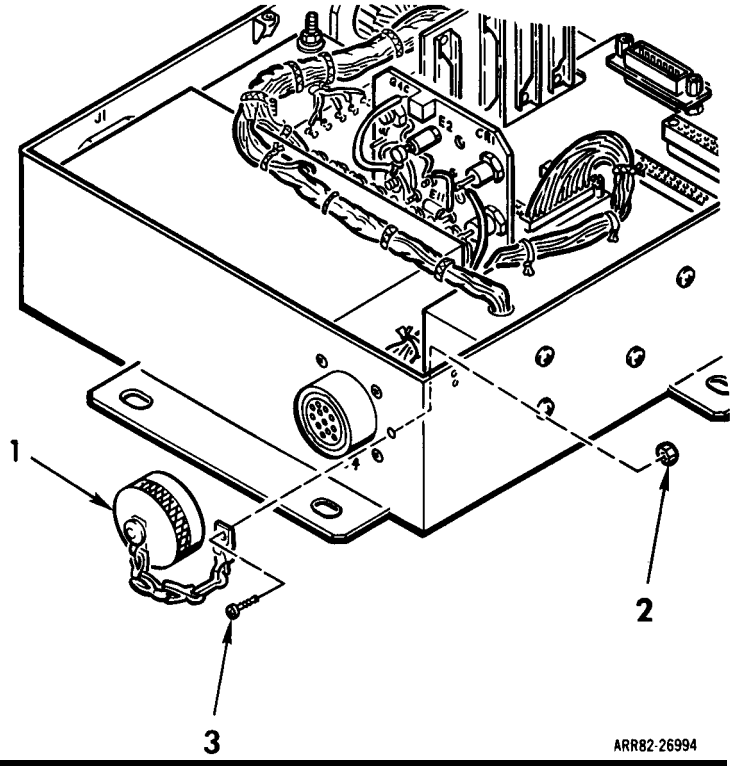
   Disconnect connectors P1 (1), P2 (2), and P3 (3) from their mating connectors.



2-57. REPAIR OF GUN CONTROL UNIT (cont)

4. REMOVE ELECTRICAL COVER (1).

Remove nut (2), screw (3), and electrical cover (1).

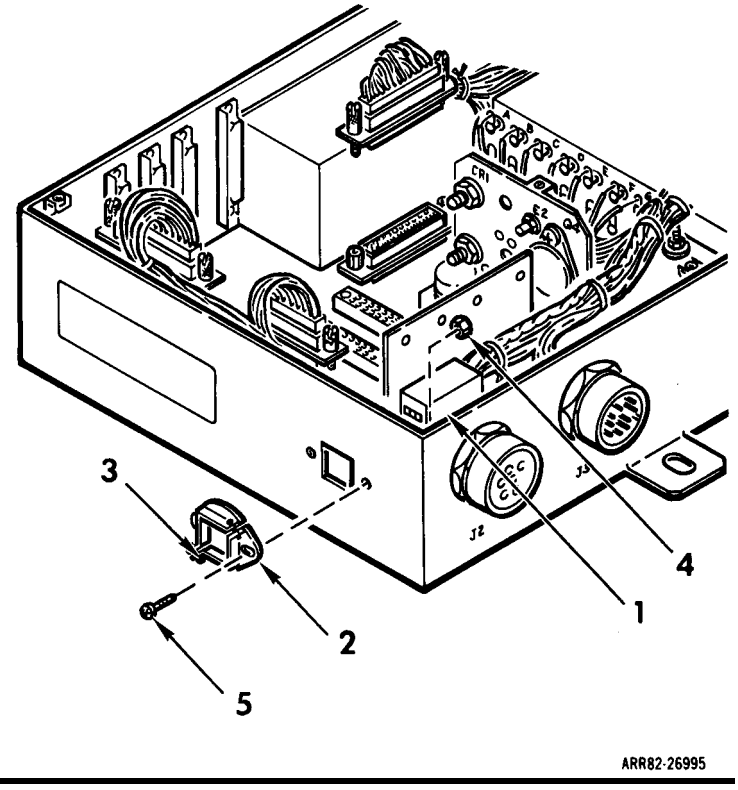


5. REMOVE TIME TOTALIZING METER M1 (1) AND MOUNTING FLANGE (2).

a. Loosen two clamping screws (3) on mounting flange (2).

b. Push time totalizing meter M1 (1) through flange (2) to inside of case.

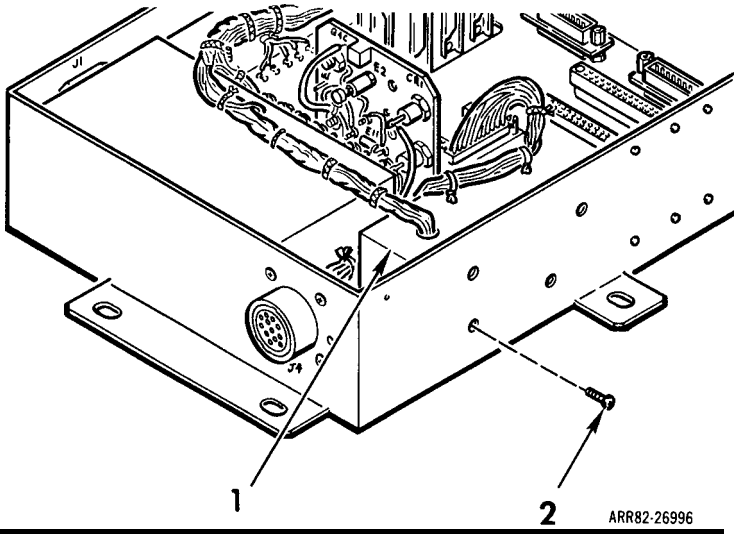
c. Remove two nuts (4), two screws (5), and mounting flange (2).



DISASSEMBLY (cont)

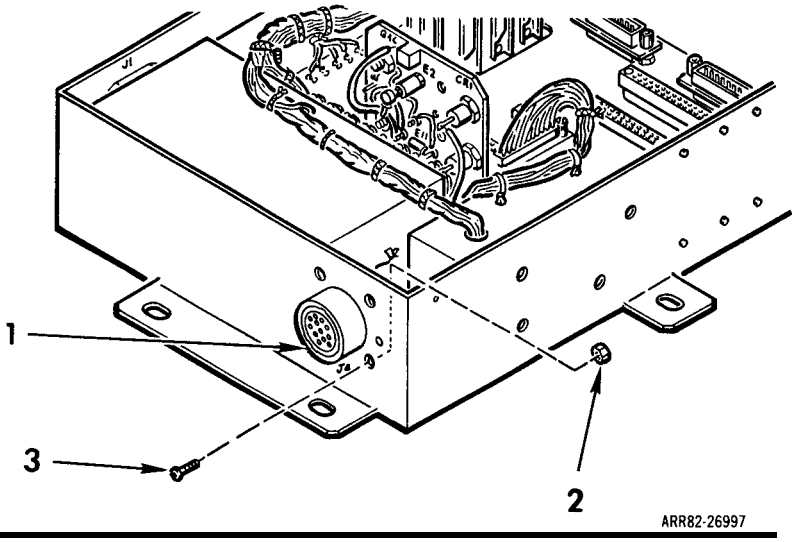
6. REMOVE RECTIFIER TRANSFORMER (1) MOUNTING SCREWS (2).

   Remove four screws (2) securing rectifier transformer (1) to case.



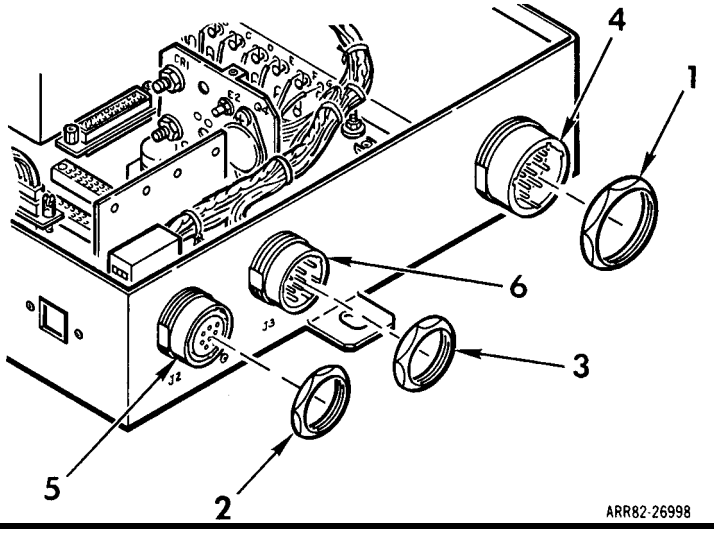
7. REMOVE CONNECTOR J4 (1) MOUNTING HARDWARE.

   Remove four nuts (2) and four screws (3) securing connector J4 (1) to case.



8. REMOVE THREE CONNECTOR NUTS (1,2, AND 3).

   Remove three connector nuts (1, 2, and 3) that secure connectors J1 (4), J2 (5), and J3 (6) to case.

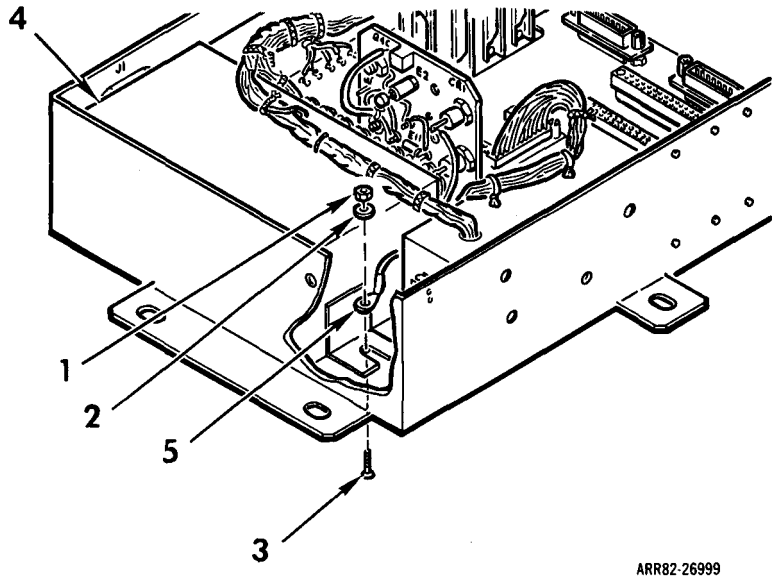


2-7. REPAIR OF GUN CONTROL UNIT (cont)

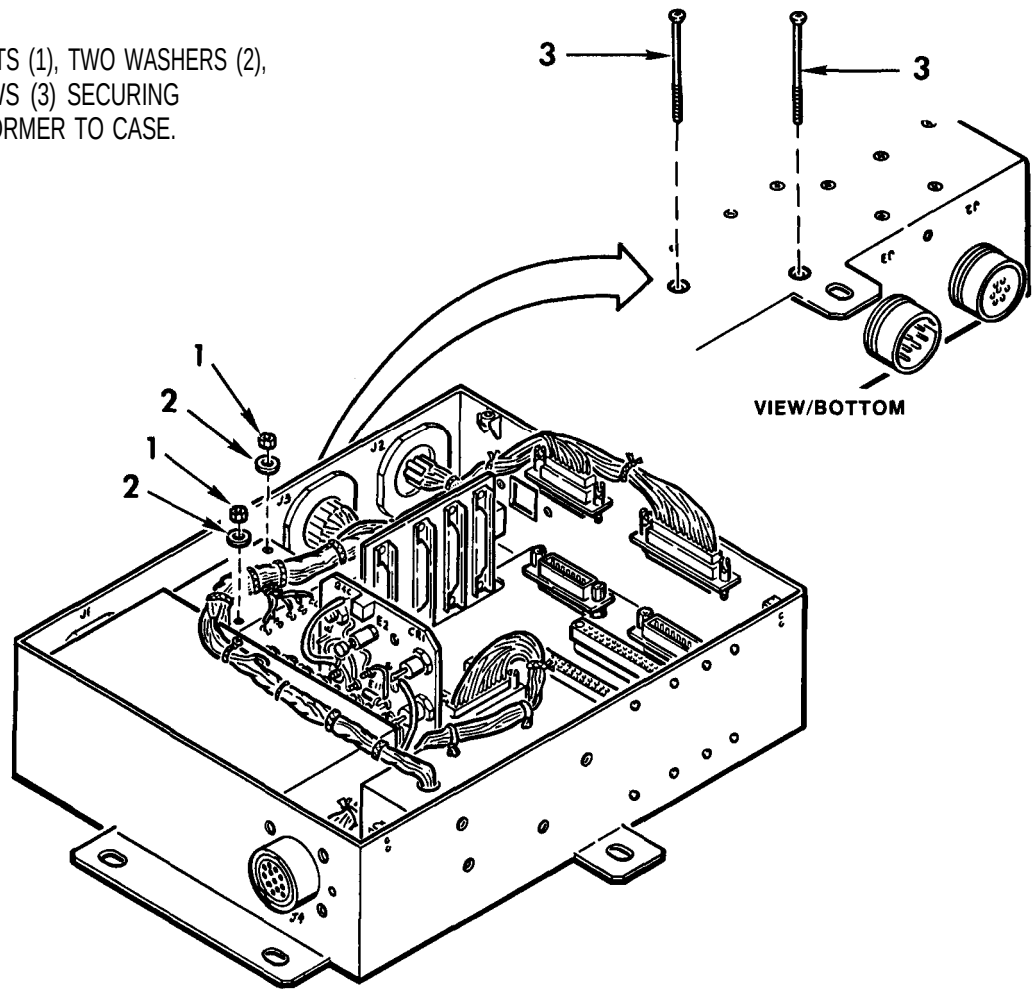
9. REMOVE NUT (1, WASHER (2), AND SCREW (3) SECURING RADIO FREQUENCY FILTER (4) AND LUG TERMINAL (5) TO CASE.

NOTE

Label lug terminal (5) with letters LG.



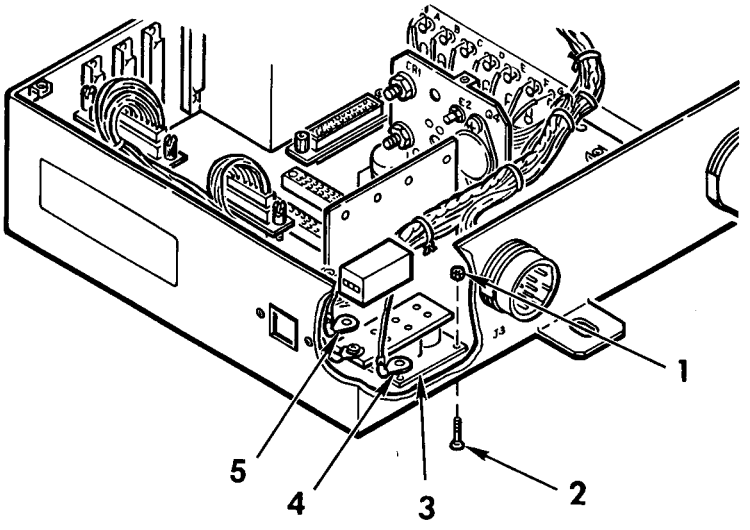
10. REMOVE TWO NUTS (1), TWO WASHERS (2), AND TWO SCREWS (3) SECURING POWER TRANSFORMER TO CASE.



DISASSEMBLY (cont)

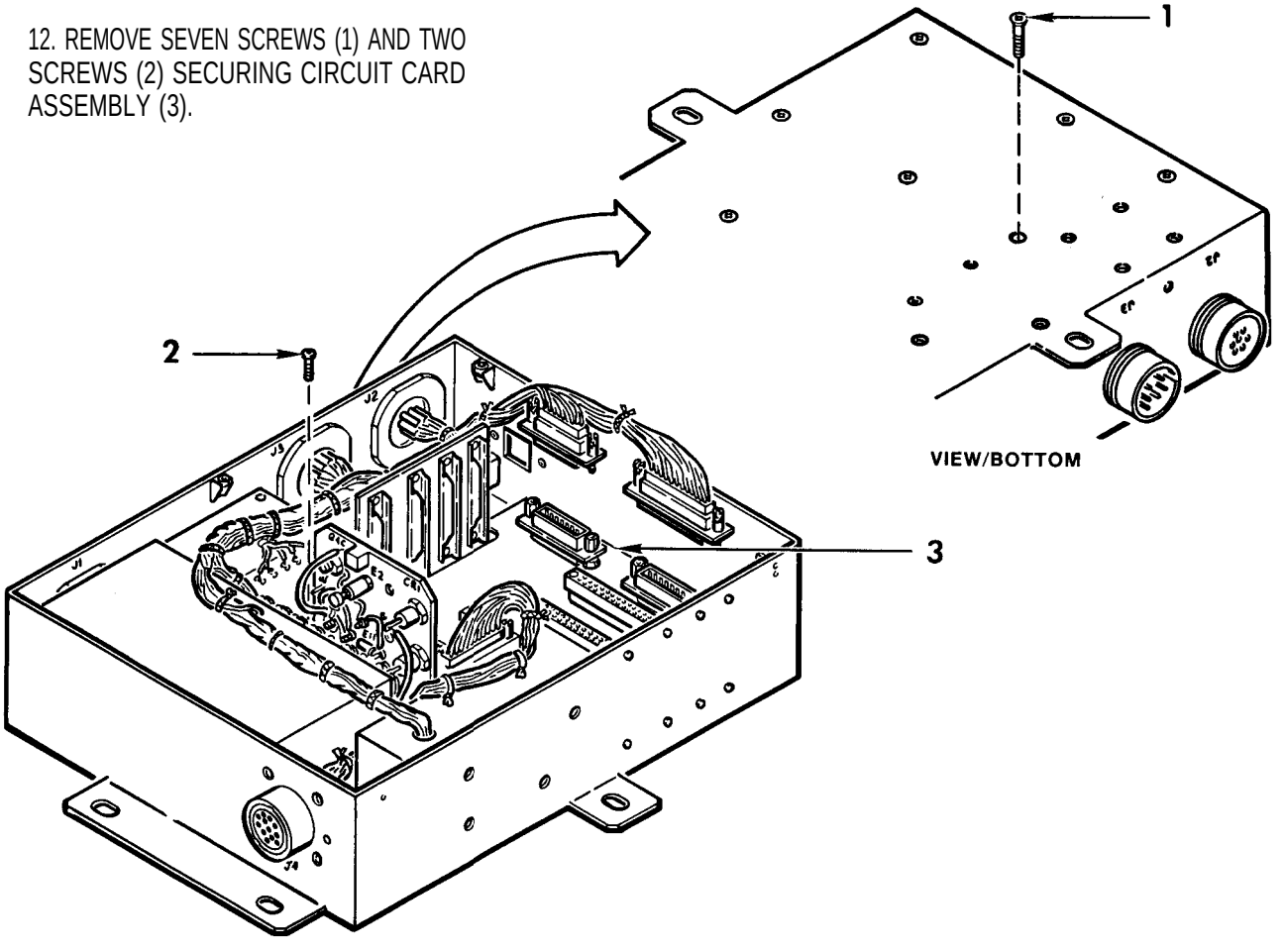
REMOVE FOUR NUTS (1) AND FOUR SCREWS (2) SECURING OVERVOLTAGE ABSORBER (3) AND TWO LUG TERMINALS (4) TO CASE.

Label lug terminal (4) with letter A and lug terminal (5) with letter B.



ARR82-27001

12. REMOVE SEVEN SCREWS (1) AND TWO SCREWS (2) SECURING CIRCUIT CARD ASSEMBLY (3).



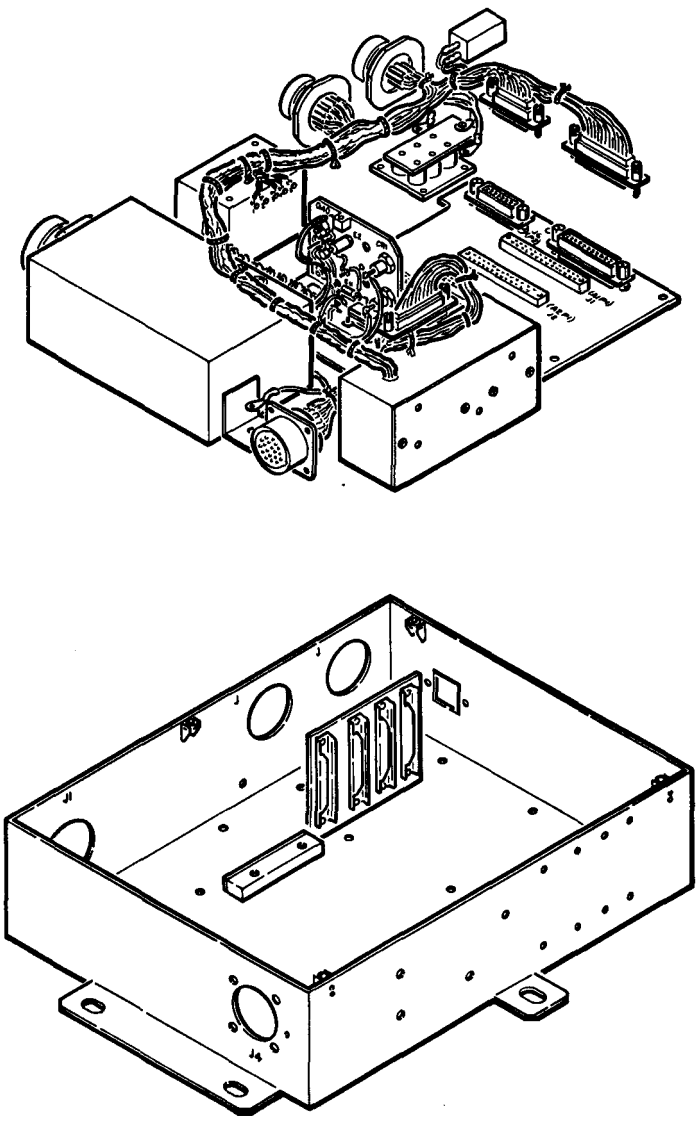
ARR82-27002

2-57. REPAIR OF GUN CONTROL UNIT (cont)

CAUTION

Be careful when removing components to avoid stress on wiring.

13. REMOVE ALL LOOSE COMPONENTS FROM CASE AS AN INTERCONNECTED ASSEMBLY.



ARR82-27003

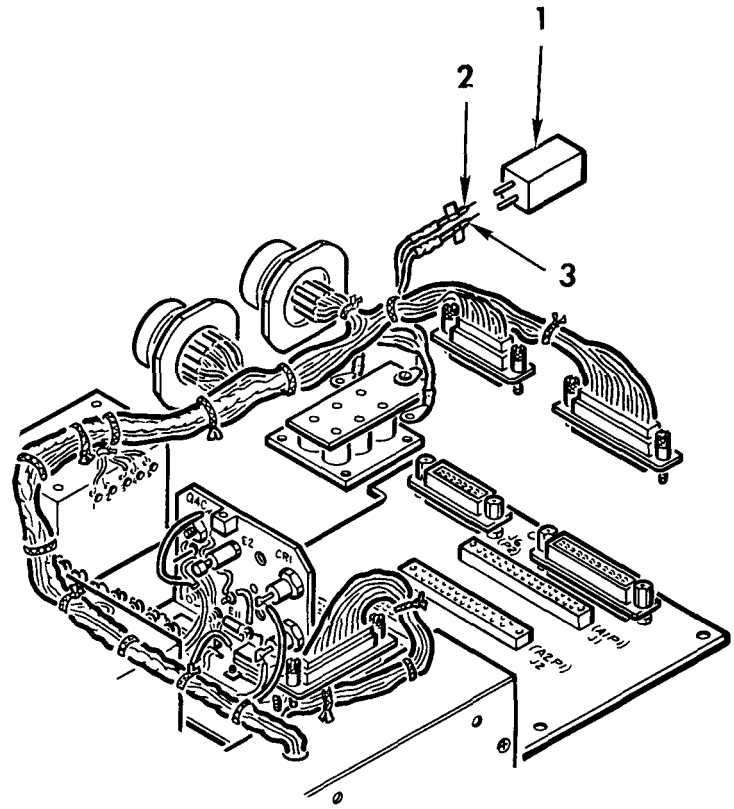
DISASSEMBLY (cont)

NOTE

At this point in disassembly, individual components should be separated from interconnected assembly only as required. Each following step contains procedures for disconnecting one component.

14. DISCONNECT TIME TOTALIZING METER M1 (1).

    Label and unsolder wires (2 and 3) from time totalizing meter M1 (1) terminals.

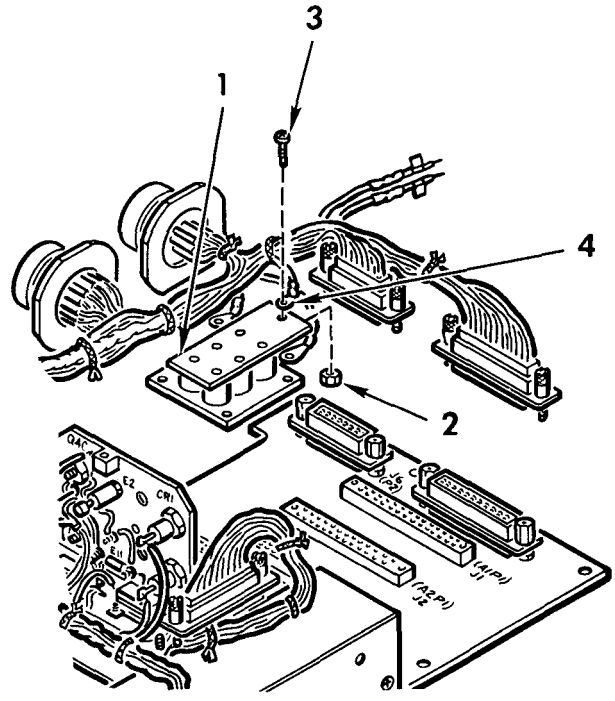


ARR82-27004

15. DISCONNECT OVERVOLTAGE ABSORBER CR1 (1).

    a. Remove nut (2) and screw (3) to separate overvoltage absorber CR1 (1) from lug terminal (4).

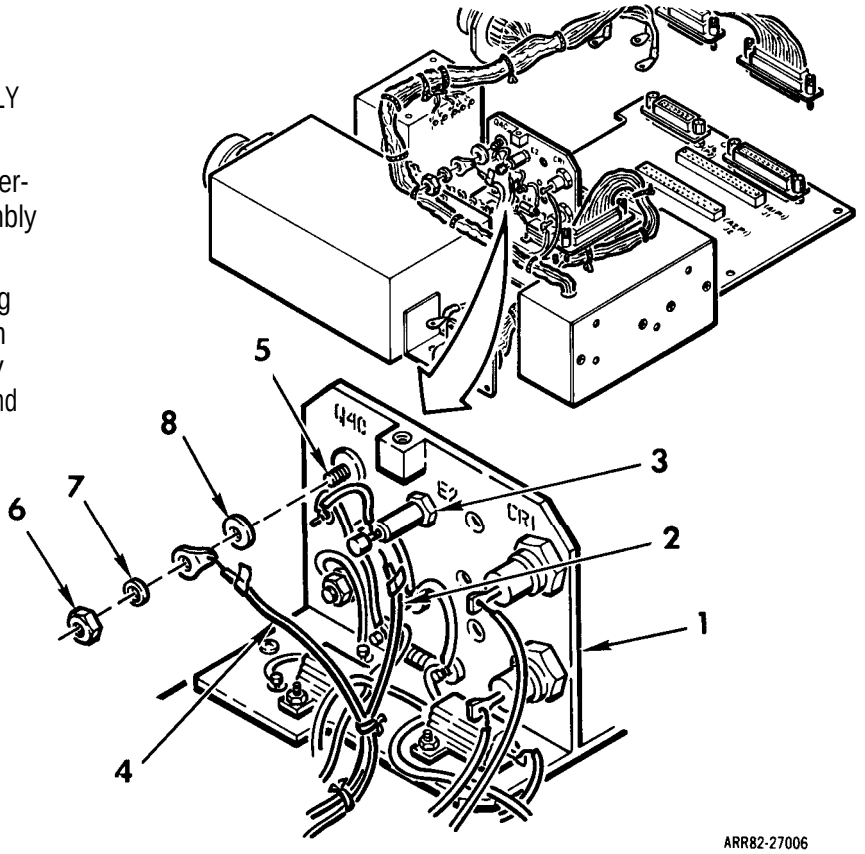
    b. Label lug terminal (4) with letter C.



ARR82-27005

2-57. REPAIR OF GUN CONTROL UNIT (cont)

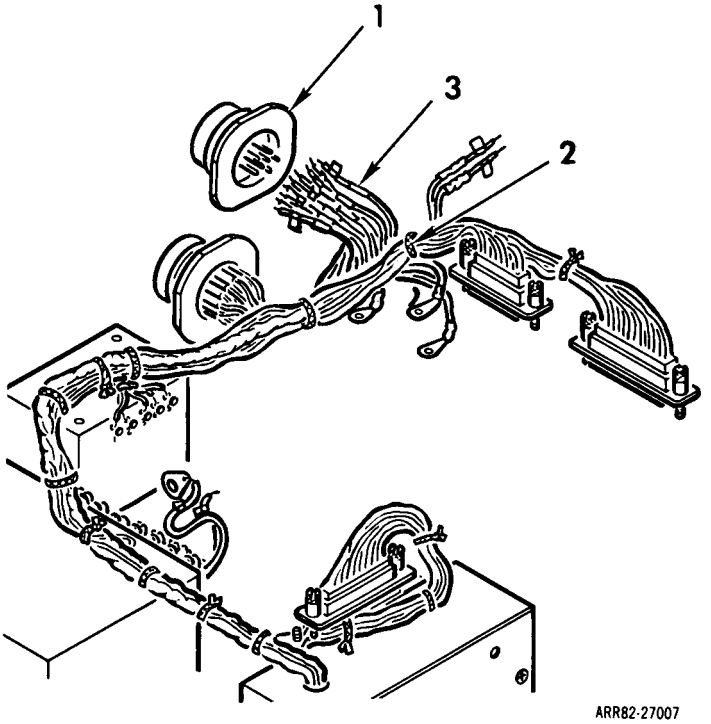
16. DISCONNECT CIRCUIT CARD ASSEMBLY A5, (1).
    a. Label and unsolder wire (2) from terminal E2 (3) on circuit card assembly A5 (1).
    b. Label wire (4) then, disconnect lug terminal from terminal Q4-C (5) on circuit card assembly A5 (1) by removing nut (6), lockwasher (7), and washer (8).



17. DISCONNECT CONNECTOR J2 (1).
    a. Cut cable lacing tape (2) from wire bundle as required.
    b. Remove insulation sleeving (3) from soldered terminals.
    c. Label and unsolder wires from connector terminals.

NOTE

Label wires after removal for proper identification.

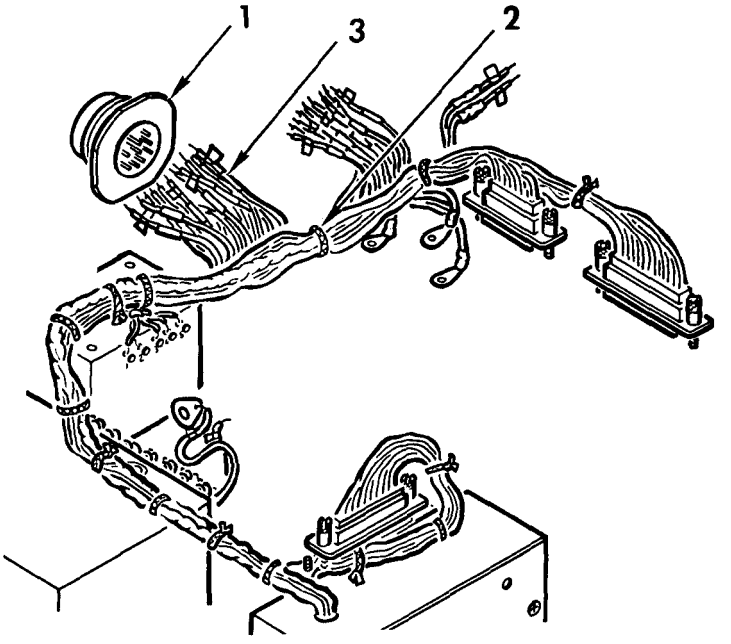


DISASSEMBLY (cont)

18. DISCONNECT CONNECTOR J3 (1).
    a. Cut cable lacing tape (2) from wire bundle as required.
    b. Remove insulation sleeving (3) from soldered terminals.
    c. Label and unsolder wires from connector terminals.

NOTE

Label wires after removal for proper identification.

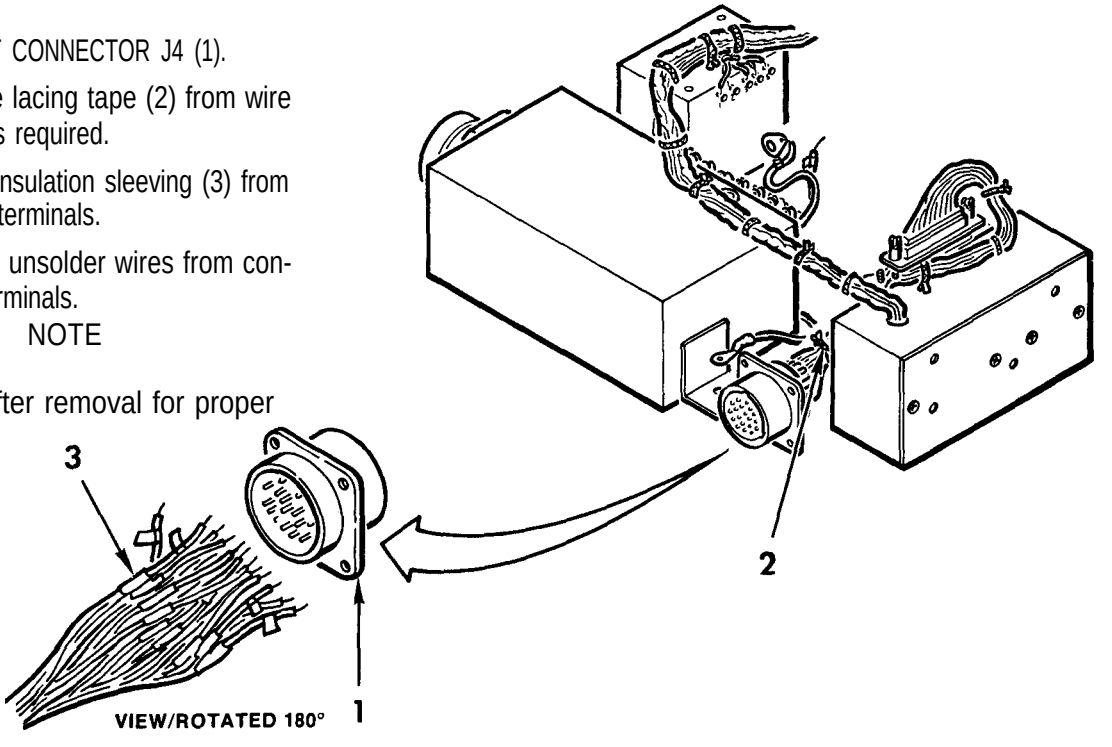


ARR82-27008

19. DISCONNECT CONNECTOR J4 (1).
    a. Cut cable lacing tape (2) from wire bundle as required.
    b. Remove insulation sleeving (3) from soldered terminals.
    c Label and unsolder wires from connector terminals.

NOTE

Label wires after removal for proper identification.



ARR82-27009

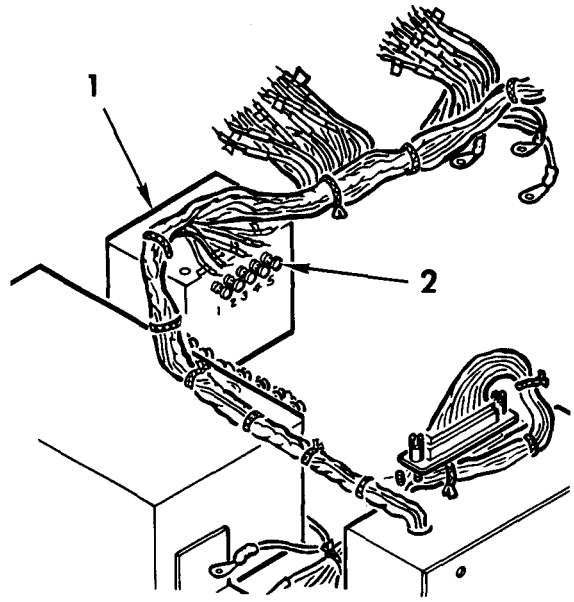
2-57. REPAIR OF GUN CONTROL UNIT (cont)

20. DISCONNECT POWER TRANSFORMER T1 (1).

Label and unsolder five wires from power transformer T1 (1) terminals (2).

NOTE

Label wires after removal for proper identification.



ARR82-27010

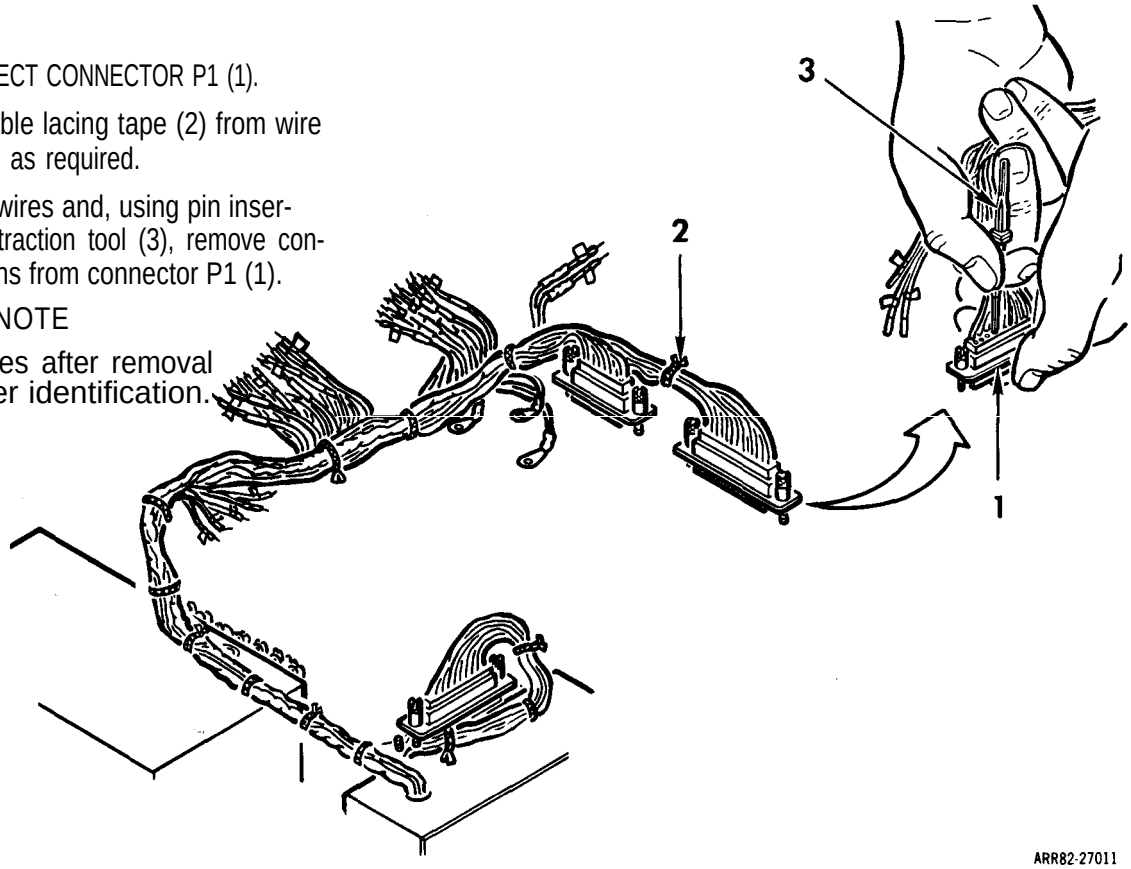
21. DISCONNECT CONNECTOR P1 (1).

a. Cut cable lacing tape (2) from wire bundle as required.

b. Label wires and, using pin insertion/extraction tool (3), remove contact pins from connector P1 (1).

NOTE

Label wires after removal for proper identification.

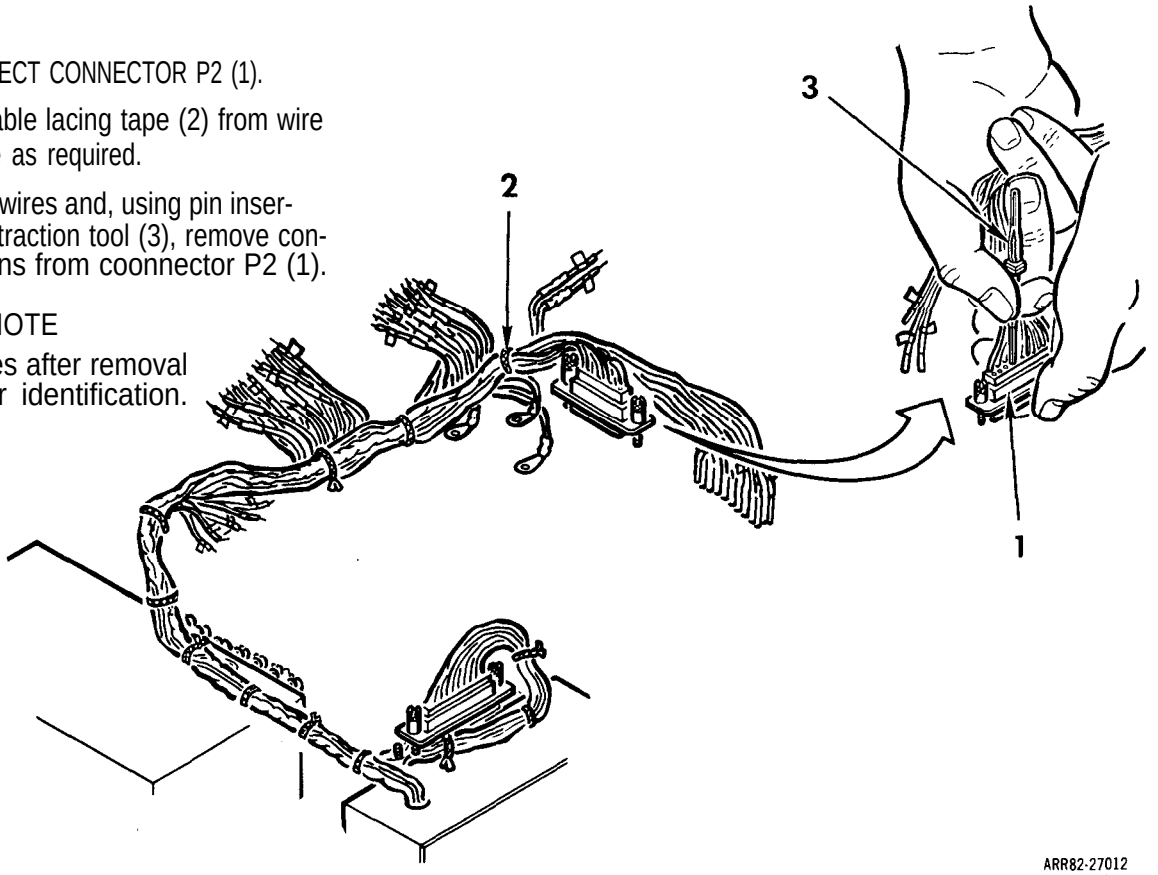


ARR82-27011

DISASSEMBLY (cont)

22. DISCONNECT CONNECTOR P2 (1).
    a. Cut cable lacing tape (2) from wire bundle as required.
    b. Label wires and, using pin insertion/extraction tool (3), remove contact pins from coonnector P2 (1).

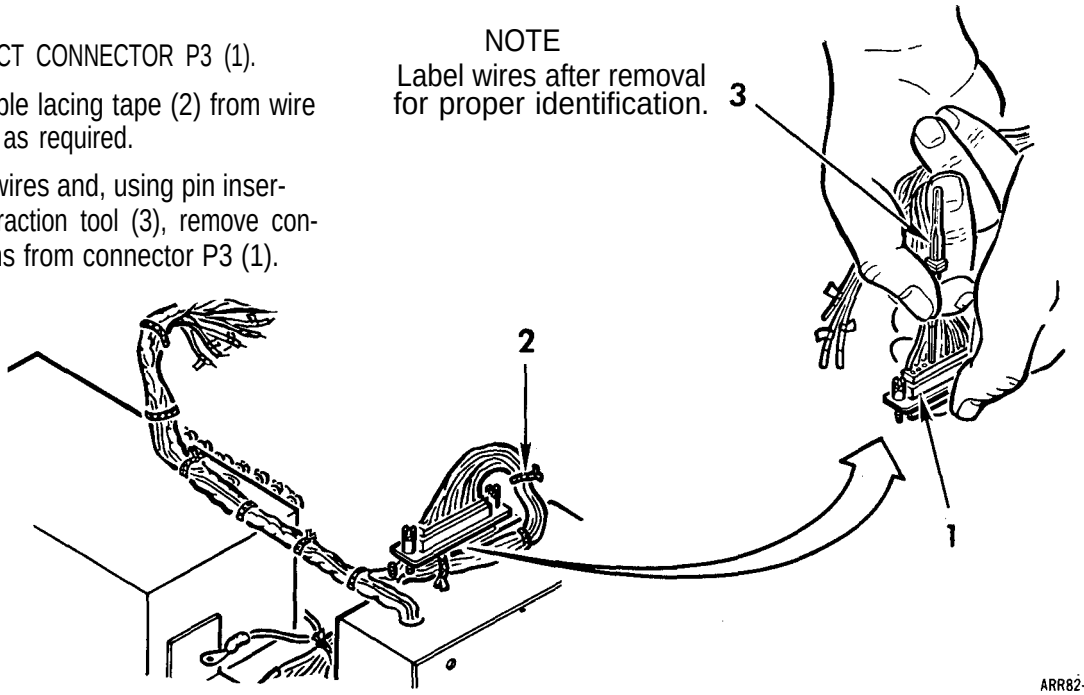
NOTE
Label wires after removal for proper identification.



ARR82-27012

23. DISCONNECT CONNECTOR P3 (1).
    a. Cut cable lacing tape (2) from wire bundle as required.
    b. Label wires and, using pin insertion/extraction tool (3), remove contact pins from connector P3 (1).

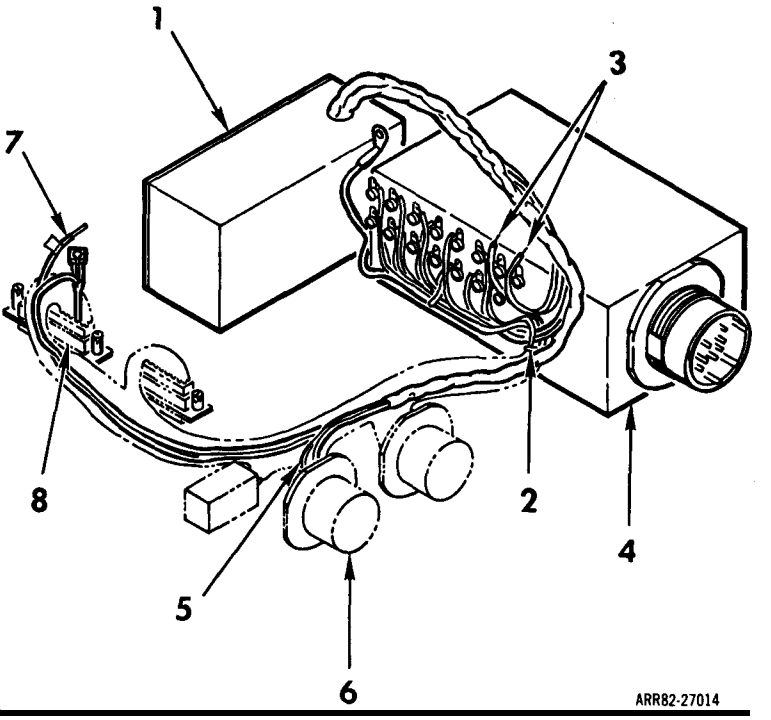
NOTE
Label wires after removal for proper identification.



ARR82-27013

2-57. REPAIR OF GUN CONTROL UNIT (cont)

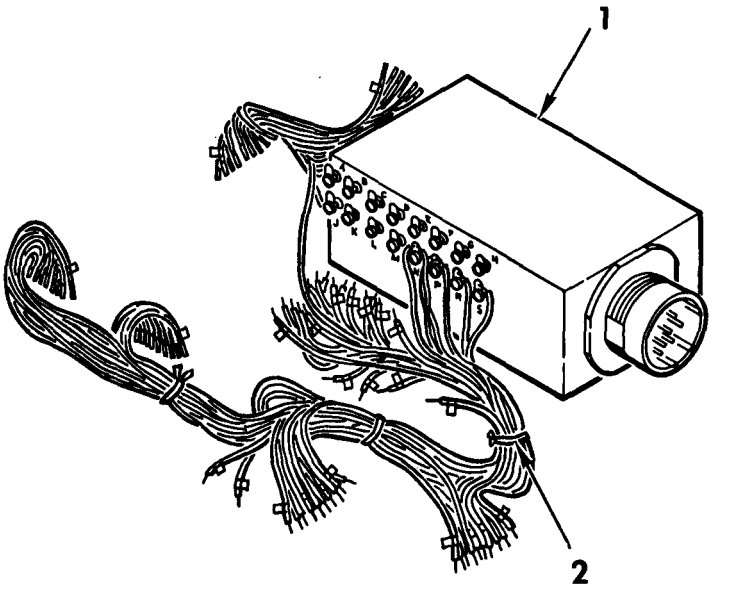
24. DISCONNECT RECTIFIER TRANSFORMER (1).
    a. Cut cable lacing tape (2) from wire bundle as required.
    b. Label and unsolder two wires (3) from radio frequency filter (4) terminals G and H.
    c. If not previously disconnected, label and unsolder wires (5) from terminals A and B of connector J2 (6).
    d. If not previously disconnected, use pin insertion/extraction tool and disconnect wires (7) from pins 3 and 24 of connector P1 (8) and label.



25. DISCONNECT RADIO FREQUENCY FILTER (1) FROM WIRE HARNESS.
    a. Cut cable lacing tape (2) from wire harness as required.
    b. Label and unsolder wires from terminals A thru S of radio frequency filter (1).

NOTE

Label wires after removal for proper identification.



CLEANING

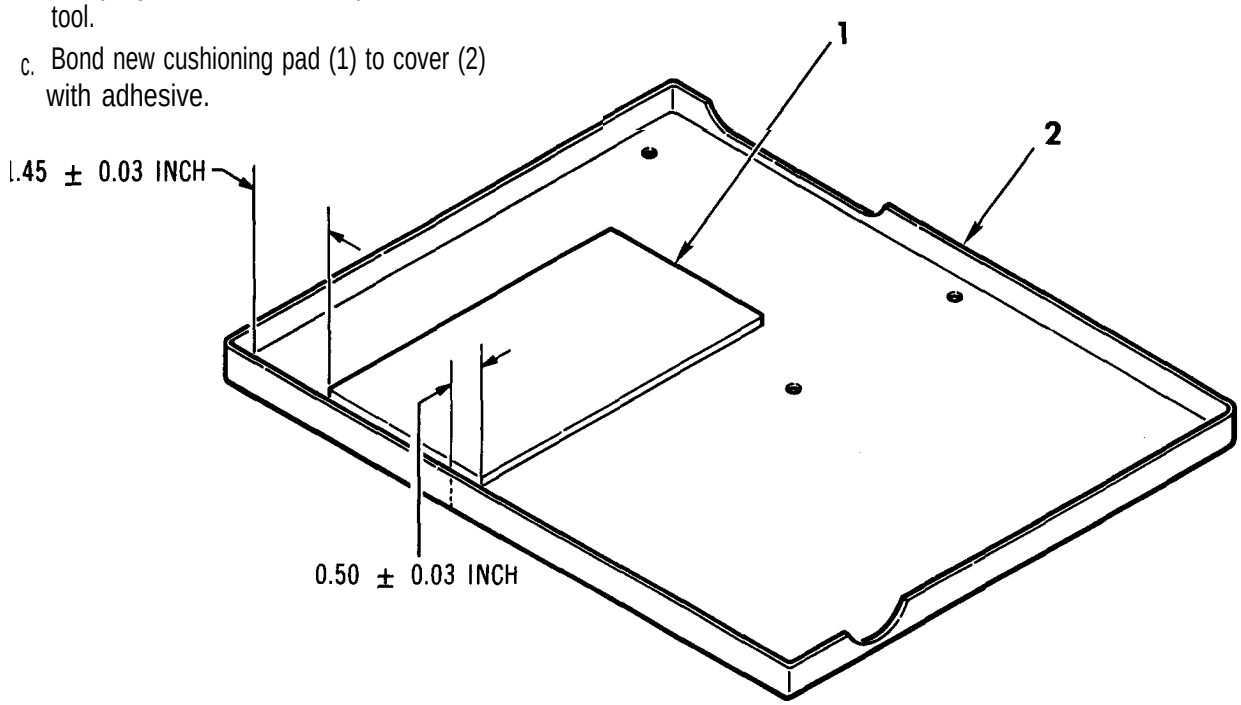
26. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV.

INSPECTION

27. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV.

REPAIR

28. REPLACE DAMAGED CUSHIONING PAD (1) ON COVER (2).
    a. Remove damaged cushioning pad (1) from cover (2).
    b. Clean pad residue from cover (2) by scraping with hardwood or plastic tool.
    c. Bond new cushioning pad (1) to cover (2) with adhesive.



ARR82-27016

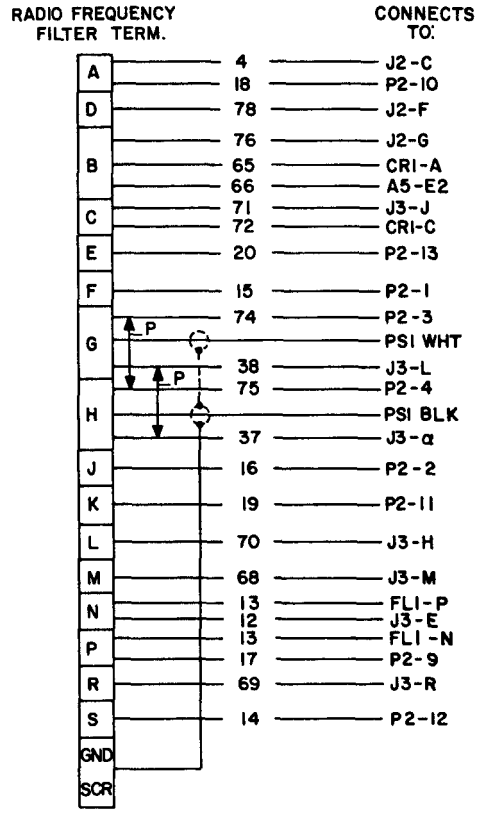
2-57. REPAIR OF GUN CONTROL UNIT (cont)

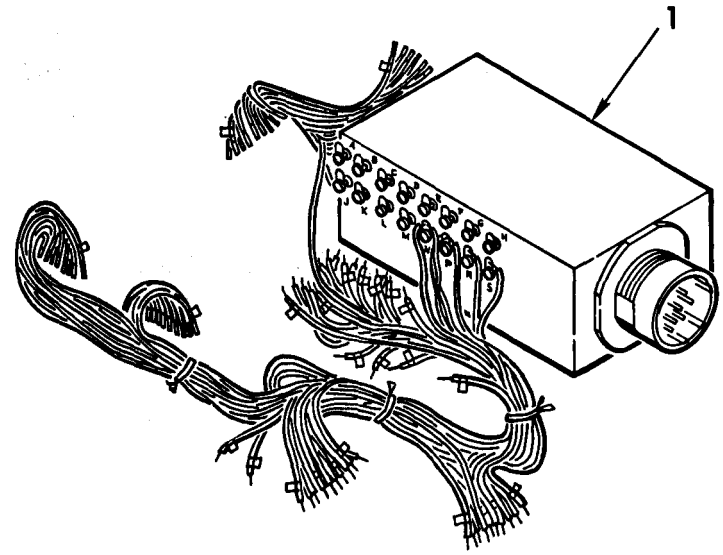
ASSEMBLY

29. CONNECT RADIO FREQUENCY FILTER (1) TO WIRE HARNESS.
    a. Solder wires to radio frequency filter (1) terminals A thru S.
    b. Remove labels from soldered wires.

NOTE

Use multimeter to identify wires prior to connecting them.

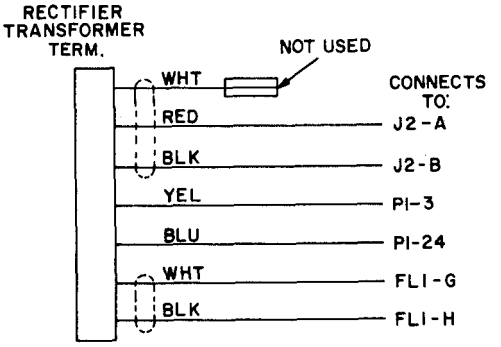




ARR82-27017

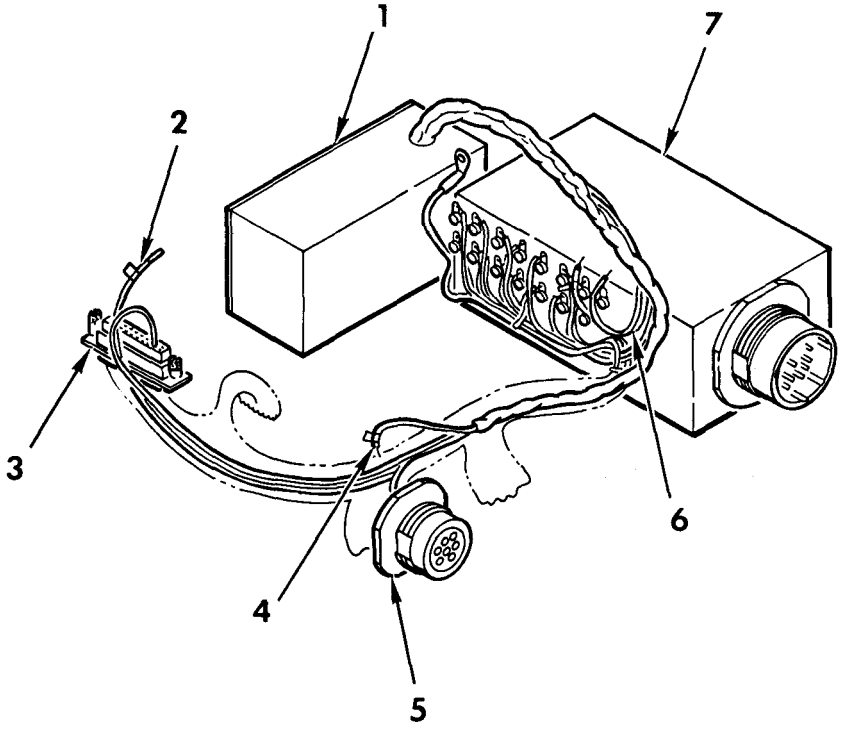
ASSEMBLY (cont)

30. CONNECT RECTIFIER TRANSFORMER (1) TO WIRE HARNESS.
    a. Connect wires (2) to pins 3 and 24 of connector P1 (3).
    b. Place a piece of insulation sleeving over two wires (4) that will connect to pins A and B of connector J2 (5).
    c. Solder wires (4) to pins A and B of connector J2 (5).
    d. Cover soldered connections on connector J2 (5) with insulation sleeving.
    e. Solder wires (6) to terminals G and H of radio frequency filter (7).
    f. Remove labels from connected wires.



NOTE

Use multimeter to identify wires prior to connecting them.

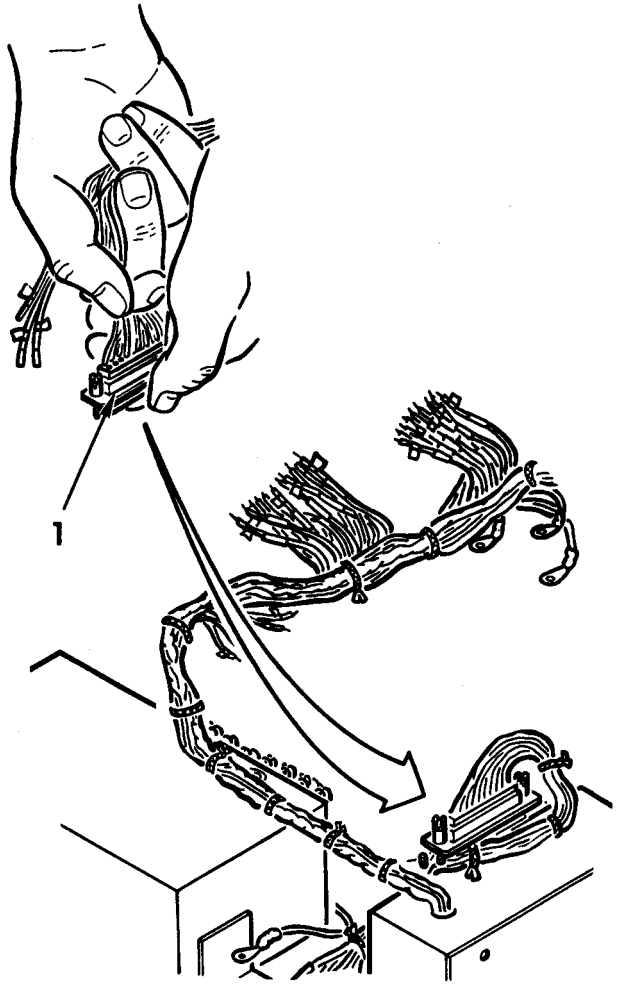


2-57. REPAIR OF GUN CONTROL UNIT (cont)

31. CONNECT CONNECTOR P3 (1) TO WIRE HARNESS.
    a. Install contact pins into connector P3 (1) and snap into place.
    b. Remove labels from installed contact pins.

NOTE

Use multimeter to identify wires prior to connecting them.



CONNECTOR P3 TERM.		CONNECTS TO:
1	51	J4-S
2	48	J4-M
3	49	J4-N
4	50	J4-P
5	39	J4-A
6	40	J4-C
7	62	J4-h
8	56	J4-x
9	54	J4-V
10	53	J4-U
11	55	J4-W
12	58	J4-Z
13	57	J4-Y
14	60	J4-f
15	46	J4-J
16	61	J4-q
17	52	J4-T
18	44	J4-G
19	41	J4-D
20	43	J4-F
21	42	J4-E
22	63	J4-j
23	59	J4-a
24	47	J4-K
25	45	J4-H

ARR82-27019

ASSEMBLY (cont)

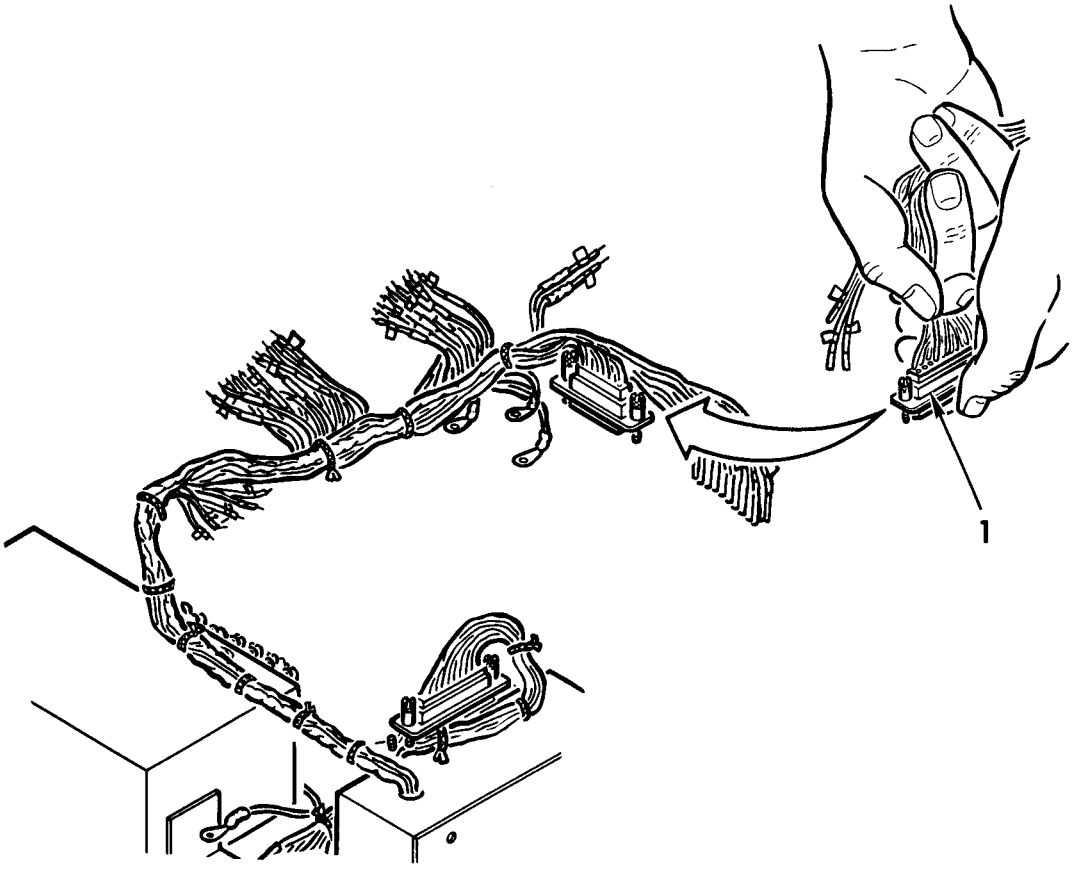
32. CONNECT CONNECTOR P2 (1) TO WIRE HARNESS.
    a. Insert contact pins into connector P2 (1) and snap into place.
    b. Remove labels from installed contact pins.

NOTE

Use multimeter to identify wires prior to connecting them.

CONNECTOR P2 TERM.		CONNECTS TO:
1	15	FLI-F
2	16	FLI-J
3	74	FLI-G
4	75	FLI-H
7	67	CRI-A
8	64	J3-K
9	17	FLI-P
10	18	FLI-A
11	19	FLI-K
12	14	FLI-S
13	20	FLI-E
14	73	CRI-C

P



ARR82-27020

2-57. REPAIR OF GUN CONTROL UNIT (cont)

33. CONNECT CONNECTOR P1 (1) TO WIRE HARNESS.

a. Insert contact pins into connector P1 (1) and snap into place.

b. Remove labels from installed contact pins

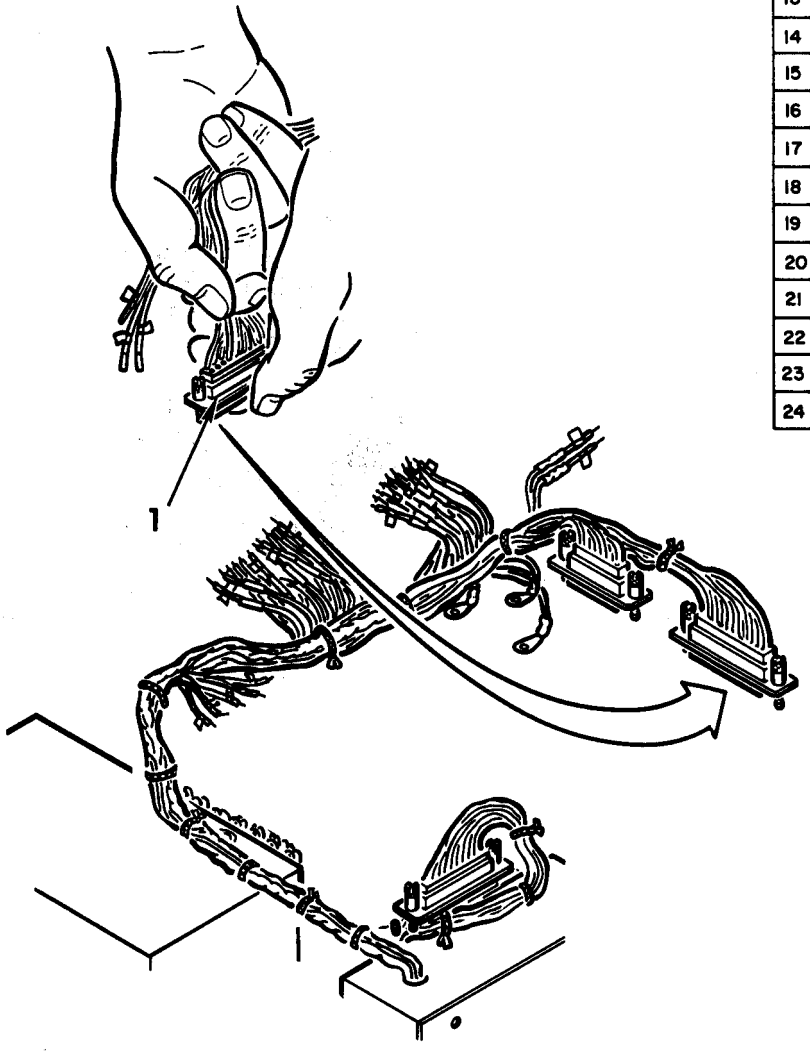
NOTE

Use multimeter to identify wires prior to connecting them.

CONNECTOR P1 TERM.		CONNECTS TO:
1	22	J3-G
2	11	J3-D
3		PSI YEL
4	35	TI-2
5	36	TI-1
6	8	J3-A
8	23	J3-N
9	30	J3-X
10	28	J3-V
11	24	J3-P
12	29	J3-W
13	27	J3-U
14	9	J3-B
15	25	J3-S
16	32	TI-4
17	33	TI-3
18	34	TI-5
19	26	J3-T
20	21	J3-F
21	10	J3-C
22	7	J2-H
23	2	J2-A
24		PSI BLU

P

T



ARR82-27021

ASSEMBLY (cont)

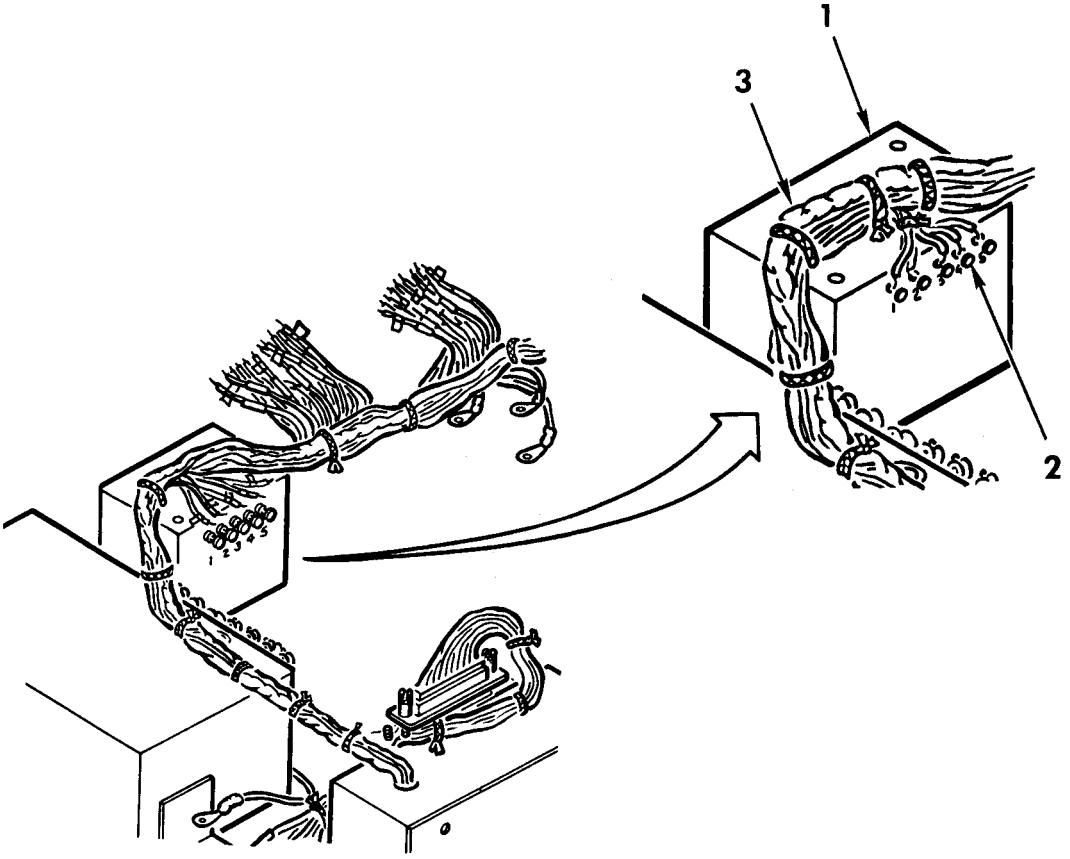
34. CONNECT POWER TRANSFORMER T1 (1) TO WIRE HARNESS (3).
    a. Solder five wires to transformer T1 (1) terminals (2).
    b. Remove labels from soldered wires.

NOTE

Use multimeter to identify wires prior to connecting them.

POWER TRANSFORMER T1 TERM.		CONNECTS TO:
1	36	P1-5
2	35	P1-4
3	33	P1-17
4	32	P1-16
5	34	P1-18

P
T



2-57. REPAIR OF GUN CONTROL UNIT (cont)

35. CONNECT CONNECTOR J4 (1) TO WIRE HARNESS.

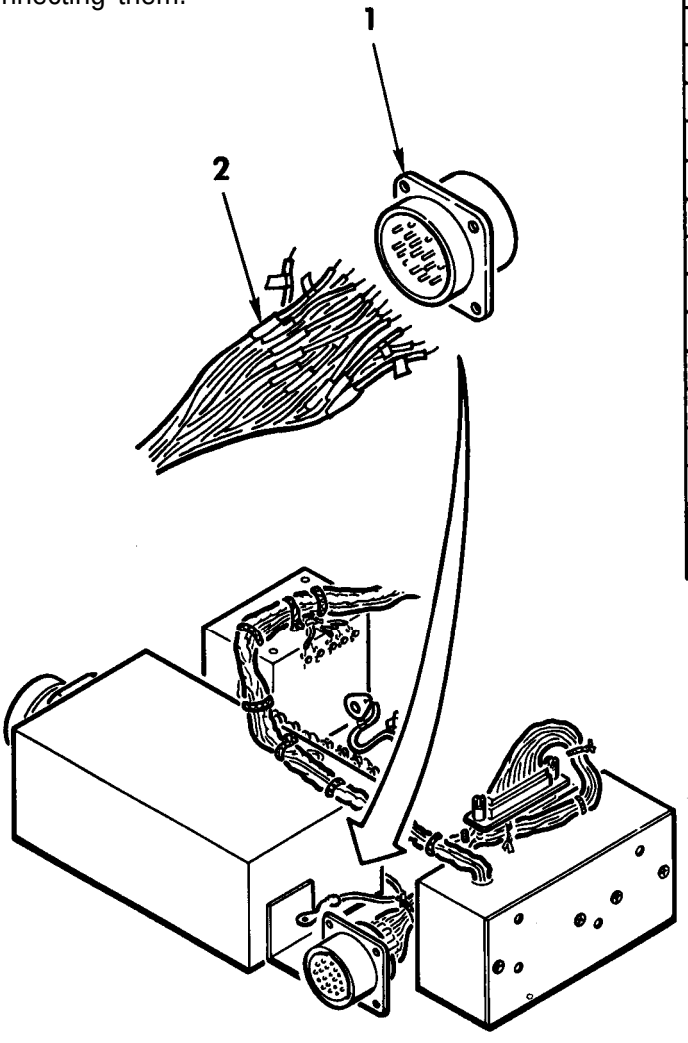
a. Place a piece of insulation sleeving (2) over each wire connecting to connector J4 (1).

b. Solder wires to connector J4 (1) terminals.

c. Remove labels from soldered wires

NOTE

Use multimeter to identify wires prior to connecting them.



NECTOR TERM.	SPLICE - NASI745-3	CONNECTS TO:
A	39	P3-5
C	40	P3-6
D	77	J3-c
D	41	P3-19
E	42	P3-21
F	43	P3-20
G	44	P3-18
H	45	P3-25
J	46	P3-15
K	47	P3-24
M	48	P3-2
N	49	P3-3
P	50	P3-4
S	51	P3-1
T	52	P3-17
U	53	P3-10
V	54	P3-9
W	55	P3-11
X	56	P3-8
Y	57	P3-13
Z	58	P3-12
a	59	P3-23
f	60	P3-14
q	61	P3-16
h	62	P3-7
j	63	P3-22

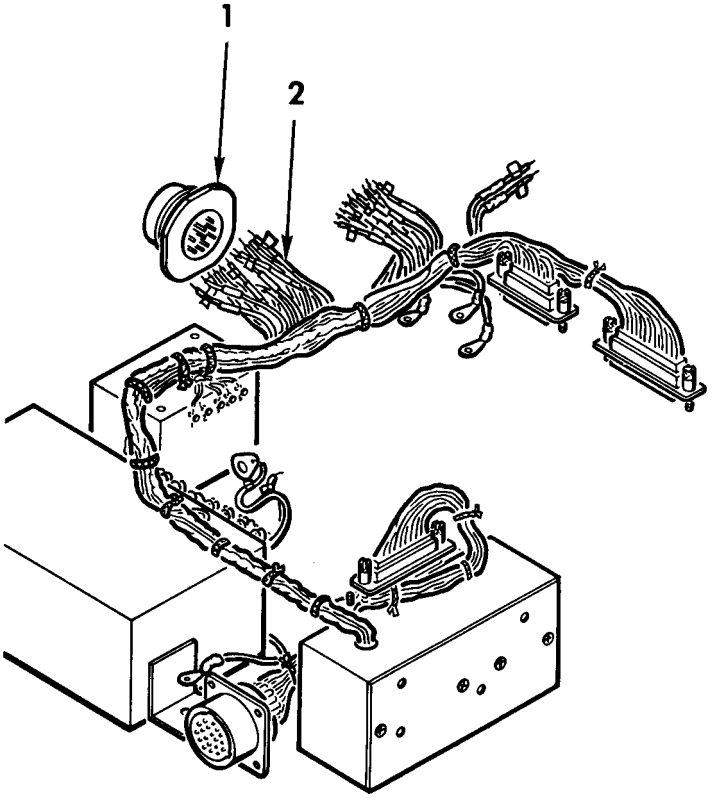
ARR82-27023

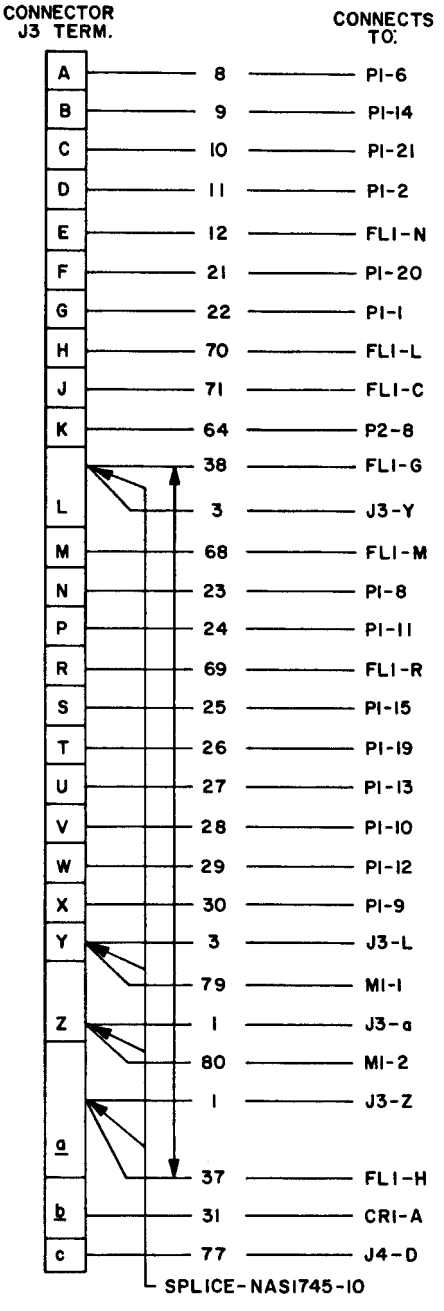
ASSEMBLY (cont)

36. CONNECT CONNECTOR J3 (1) TO WIRE HARNESS.
    a. Place a piece of insulation sleeving (2) over each wire connecting to connector J3 (1).
    b. Solder wires to connector J3 (1) terminals.
    c. Remove labels from soldered wires.

NOTE

Use multimeter to identify wires prior to connecting them.





ARR82-27024

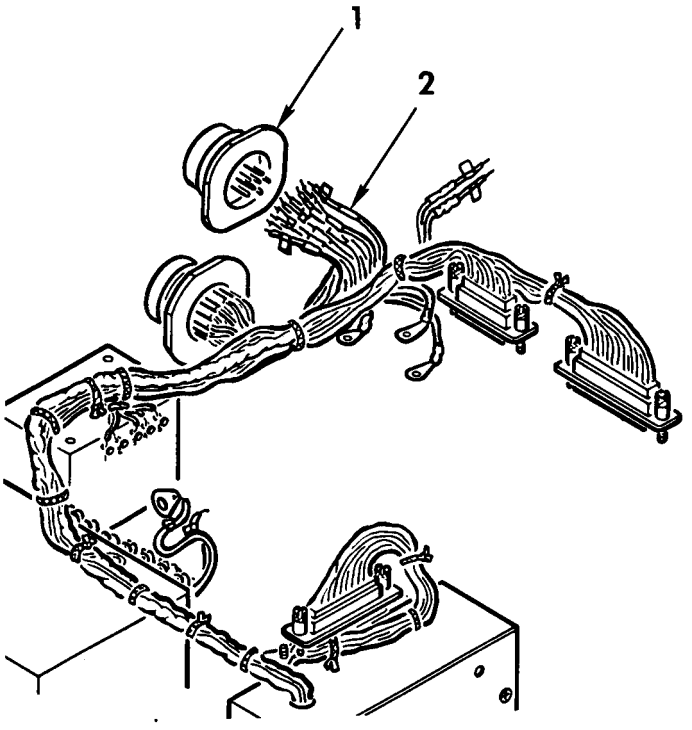
2-57. REPAIR OF GUN CONTROL UNIT (cont)

37. CONNECT CONNECTOR J2 (1) TO WIRE HARNESS.

a. Place a piece of insulation sleeving (2) over each wire connecting to connector J2 (1). Use meter to ID wires.

b. Solder wires to connector J2 (1).

c. Remove labels from soldered wires.



CONNECTOR J2 TERM.		CONNECTS TO:
	2-SPLICE-NASI745-I2	
A	2	P1-23
		PSI RED
B		PSI BLK
C	4	FL1-A
D	5	A5Q4-C
E	6	CR1-A
H	7	P1-22
F	78	FL1-D
G	76	FL1-B

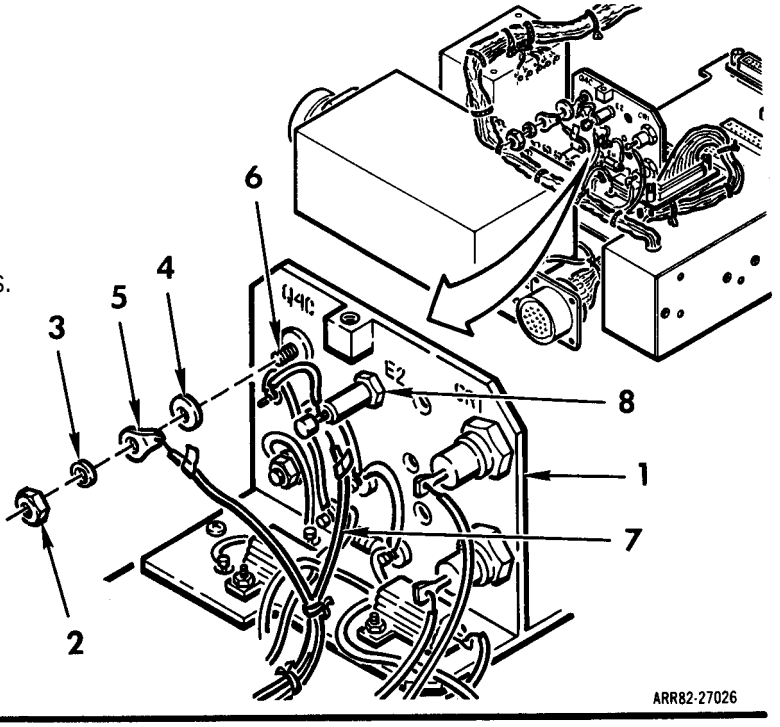
ARR82-27025

38. CONNECT CIRCUIT CARD ASSEMBLY A5 (1) TO WIRE HARNESS.

a. Use nut (2), lockwasher (3), and washer (4) to connect lug terminal (5) to terminal Q4-C (6) on circuit card assembly A5 (1). Use meter to ID wires.

b. Solder wire (7) to terminal E2 (8) on circuit card assembly A5 (1).

c. Remove labels from connected wires.



CIRCUIT CARD ASSEMBLY A5 TERM.		CONNECTS TO:
Q4-C	5	J2-D
E2	66	FL1-B

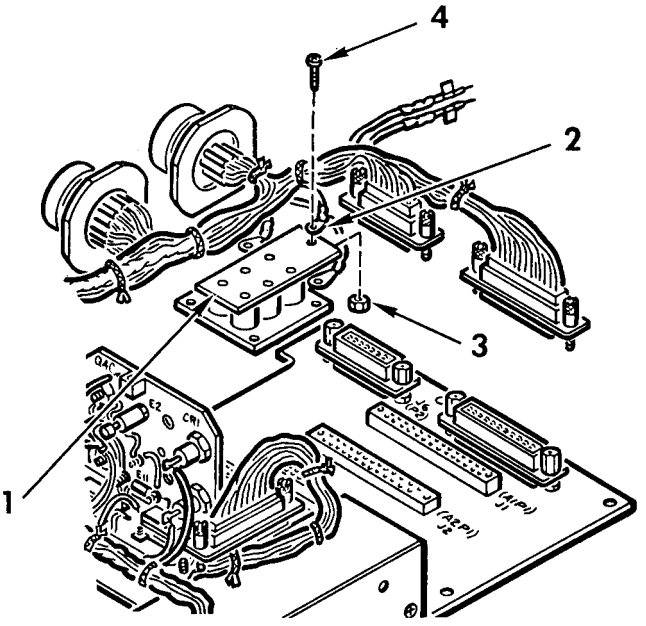
ARR82-27026

ASSEMBLY (cont)

39. CONNECT OVERVOLTAGE ABSORBER CR1 (1) TO WIRE HARNESS.
    a. Use nut (3) and screw (4) to connect lug terminal (2), labeled with letter C, to center terminal of overvoltage absorber CR1 (1).
    b. Remove label from connected lug terminal.

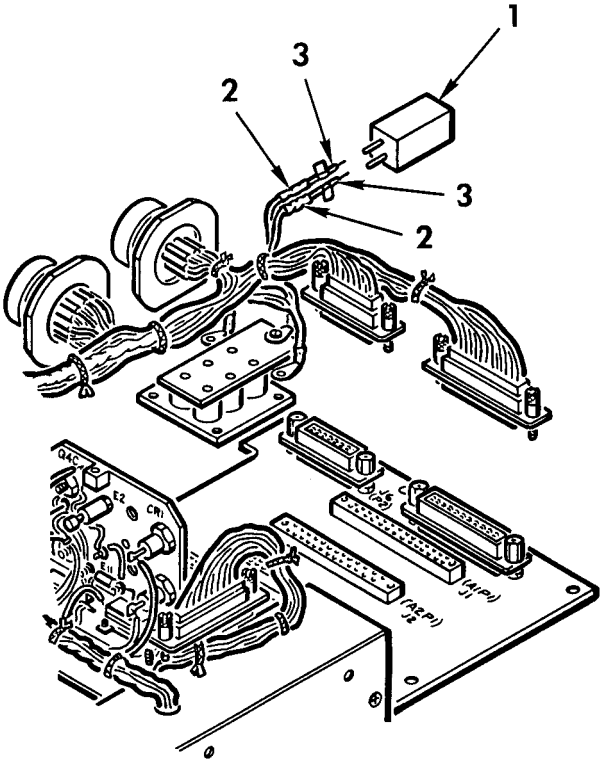
NOTE

Use multimeter to identify wires prior to connecting them.



ARR82-27027

40. CONNECT TIME TOTALIZING METER M1 (1) TO WIRE HARNESS.
    a. Place a piece of insulation sleeving (2) over two wires (3) that will connect to time totalizing meter M1 terminals.
    b. Solder wire from connector J3-Y to terminal 1 (top) of time totalizing meter M1 (1).
    c. Solder wire from connector J3-Z to terminal 2 (bottom) of time totalizing meter M1 (1).
    d. Remove labels from soldered wires.
    e. Cover soldered connections with insulation sleeving (2).

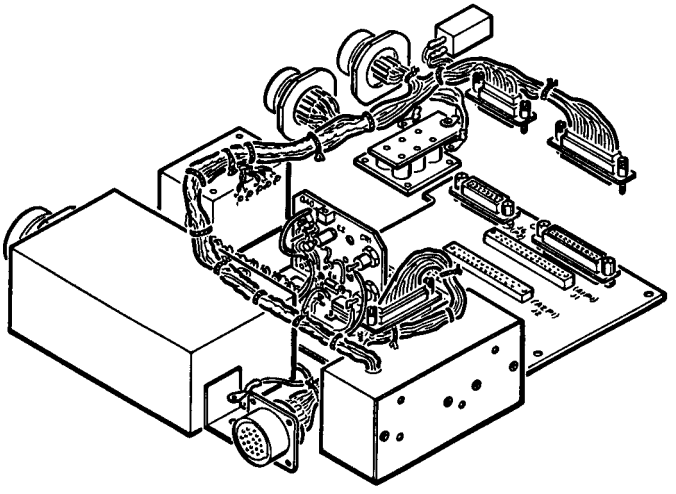


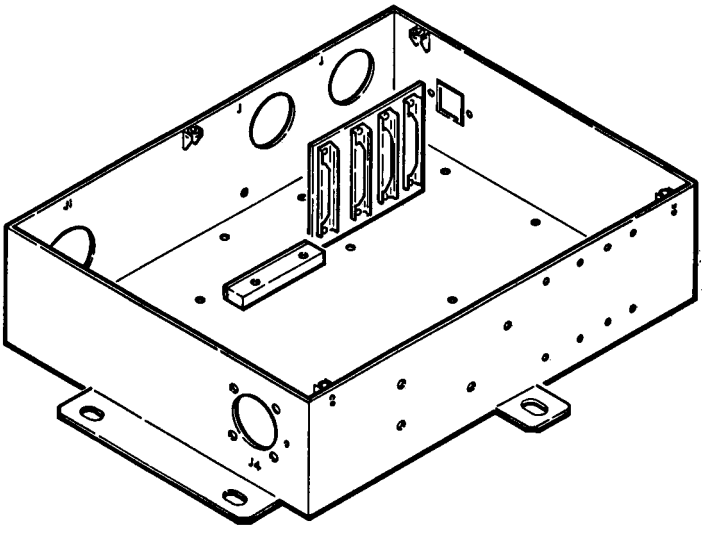
TIME TOTALIZING METER M1 TERM.		CONNECTS TO:
1	79	J3-Y
2	80	J3-Z

ARR82-27028

2-57. REPAIR OF GUN CONTROL UNIT (cont)

41. INSTALL ALL LOOSE COMPONENTS INTO CASE AS AN INTERCONNECTED ASSEMBLY.



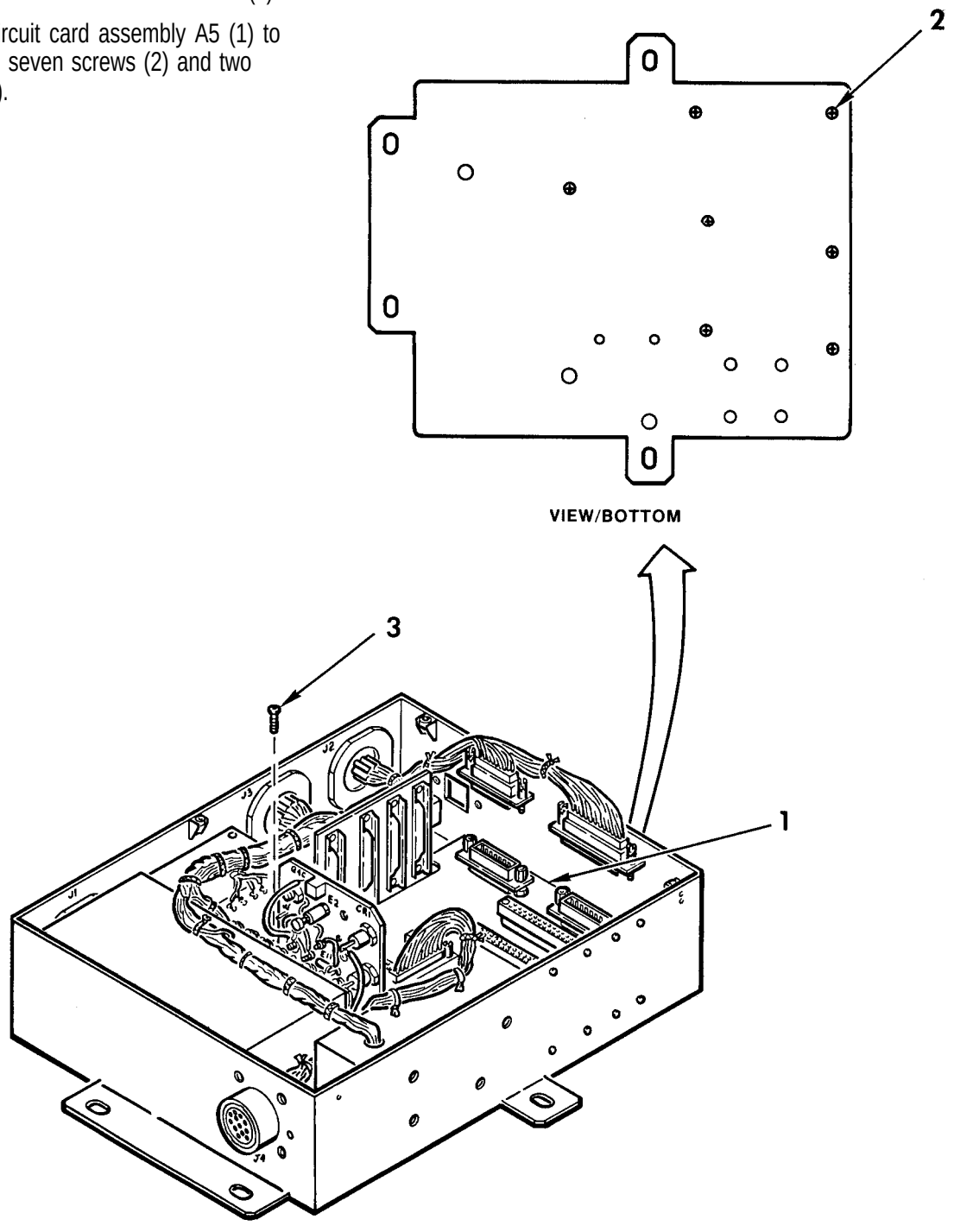


ARR82-27029

ASSEMBLY (cont)

42. INSTAIL CIRCUIT CARD ASSEMBLY A5 (1).

Secure circuit card assembly A5 (1) to case with seven screws (2) and two screws (3).



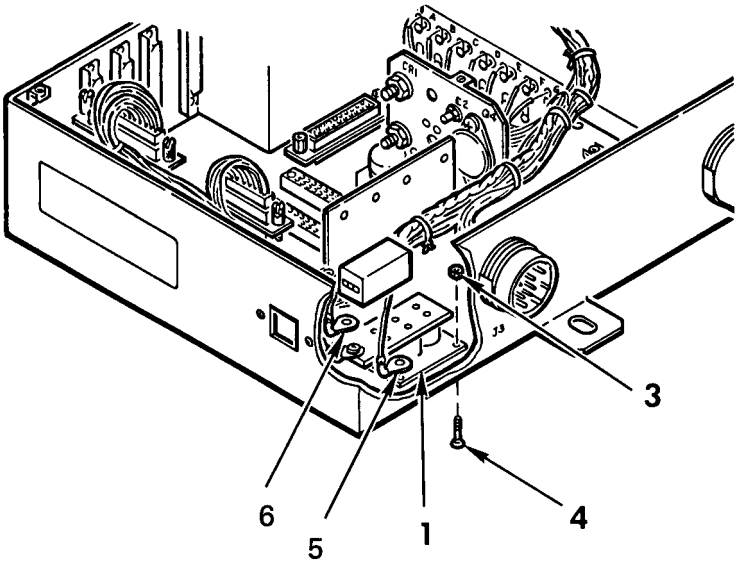
ARR82-27030

2-57. REPAIR OF GUN CONTROL UNIT (cont)

43.- SECURE OVERVOLTAGE ABSORBER CR1 (1) AND LUG TERMINALS LABELLED A (5) AND B (6) WITH FOUR NUTS (3) AND FOUR SCREWS (4).

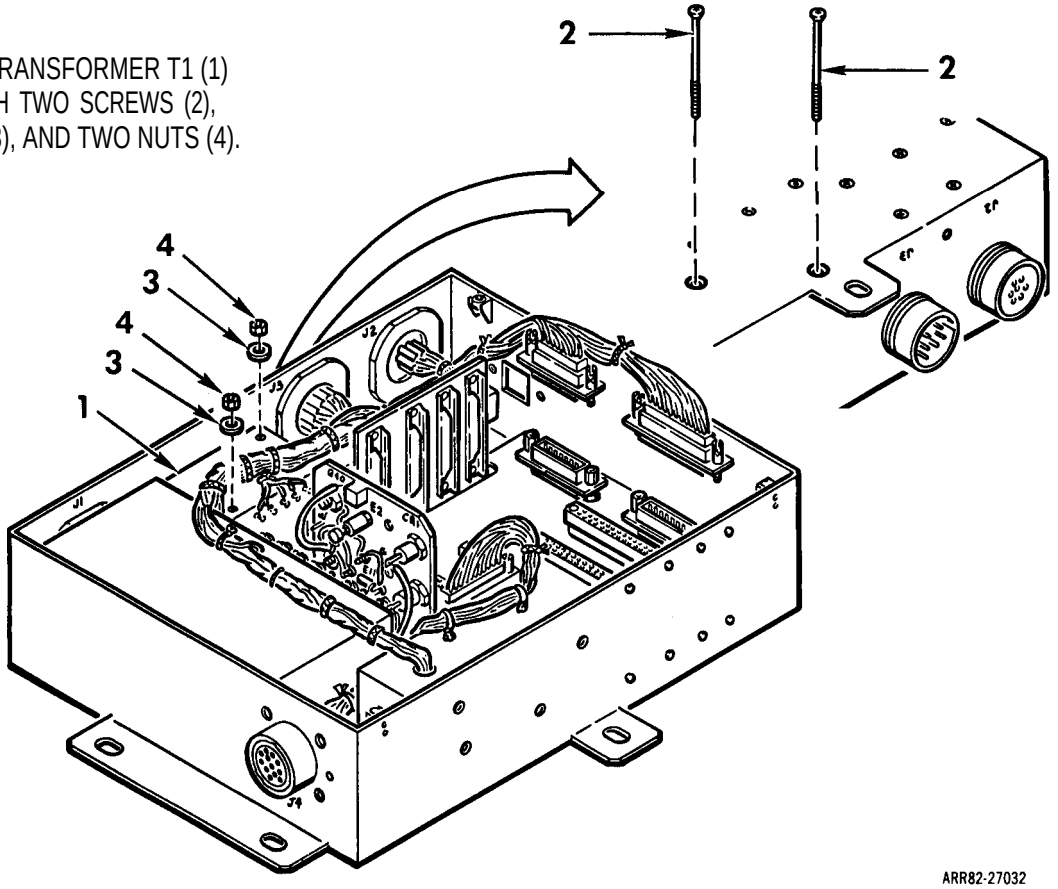
Remove labels from two connected lug terminals.

LUG TERM.		CONNECTS TO:
A	65	FL-8
	67	P2-7
	72	FLI-C
B	73	P2-I4
	31	J3-b
C	6	J2-E



ARR82-27031

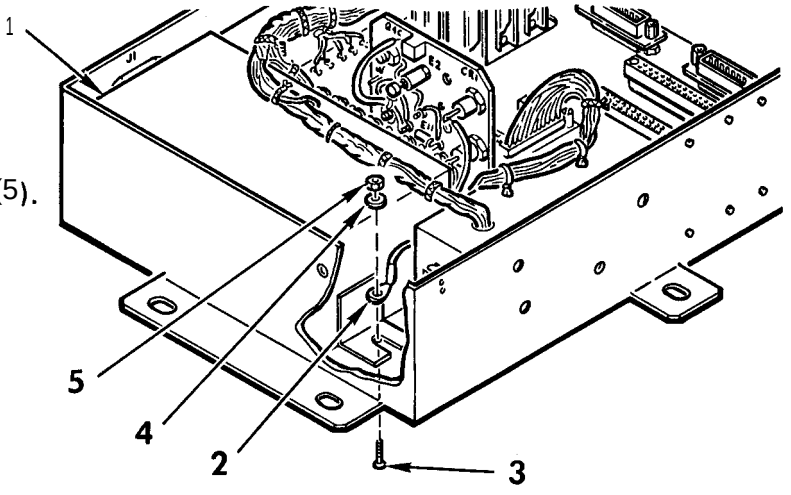
44. INSTALL POWER TRANSFORMER T1 (1) AND SECURE WITH TWO SCREWS (2), TWO WASHERS (3), AND TWO NUTS (4).



ARR82-27032

ASSEMBLY (cont)

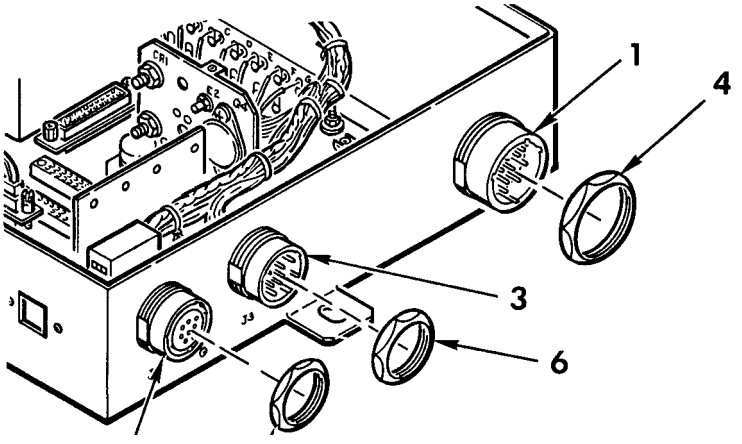
45. INSTALL RADIO FREQUENCY FILTER (1) AND LUG TERMINAL MARKED LG (2) AND SECURE WITH SCREW (3), WASHER (4), AND NUT (5).



46. SECURE CONNECTORS J1 (1), J2 (2), AND J3 (3).

a. Secure connectors J1 (1), J2 (2), and J3 (3) by installing respective connector nuts (4, 5, and 6).

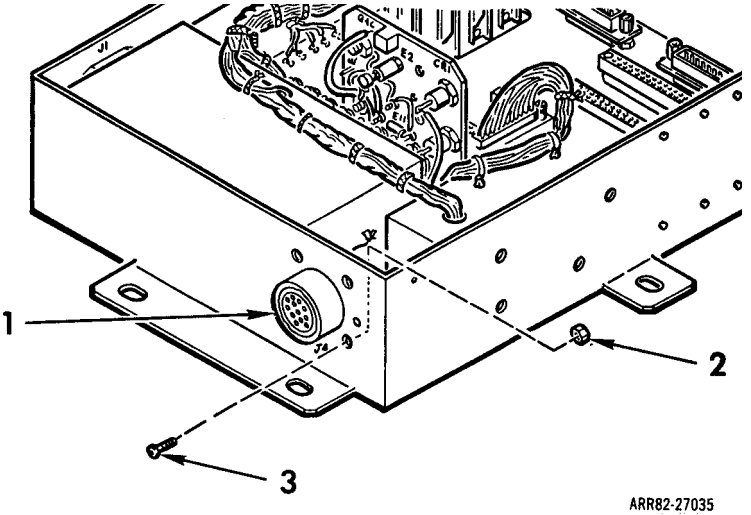
b. Using double-twist method, lockwire connectors J1 (1), J2 (2), and J3 (3) together.



ARR82-27034

47. INSTALL CONNECTOR J4 (1).

Secure connector J4 (1) with four nuts (2) and four screws (3).

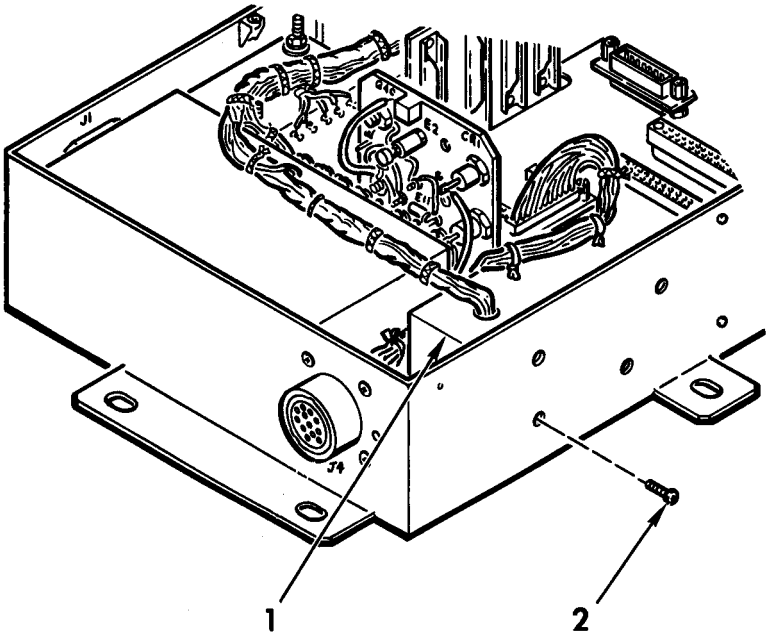


ARR82-27035

2-57. REPAIR OF GUN CONTROL UNIT (cont)

48. INSTALL RECTIFIER TRANSFORMER (1).

Secure rectifier transformer (1) with four screws (2).



ARR82-27036

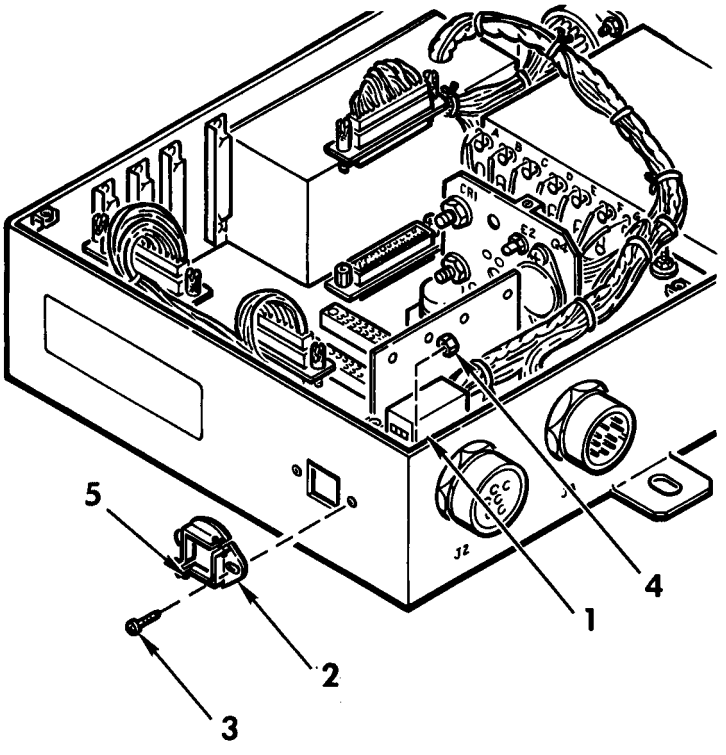
49. INSTALL TIME TOTALIZING METER M1 (1) AND MOUNTING FLANGE (2).

a. Install two screws (3), two nuts (4), and mounting flange (2).

b. Push time totalizing meter M1 (1) from inside case through mounting flange (2) to flush with flange outside edge

c Tighten two clamping screws (5) on flange to secure meter M1 (l).

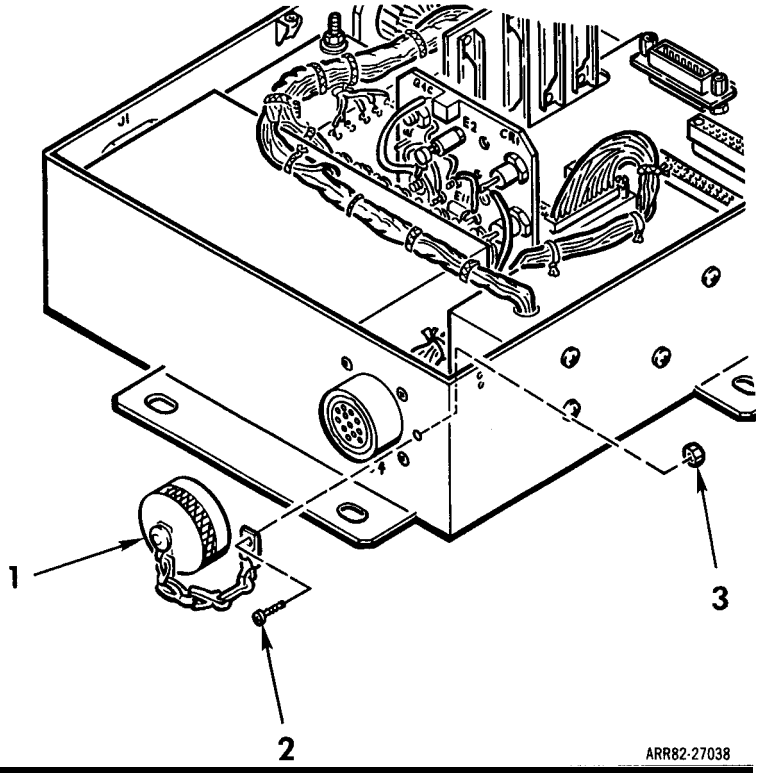
d. Apply locking compound to threads of clamping screws (5).



ARR82-27037

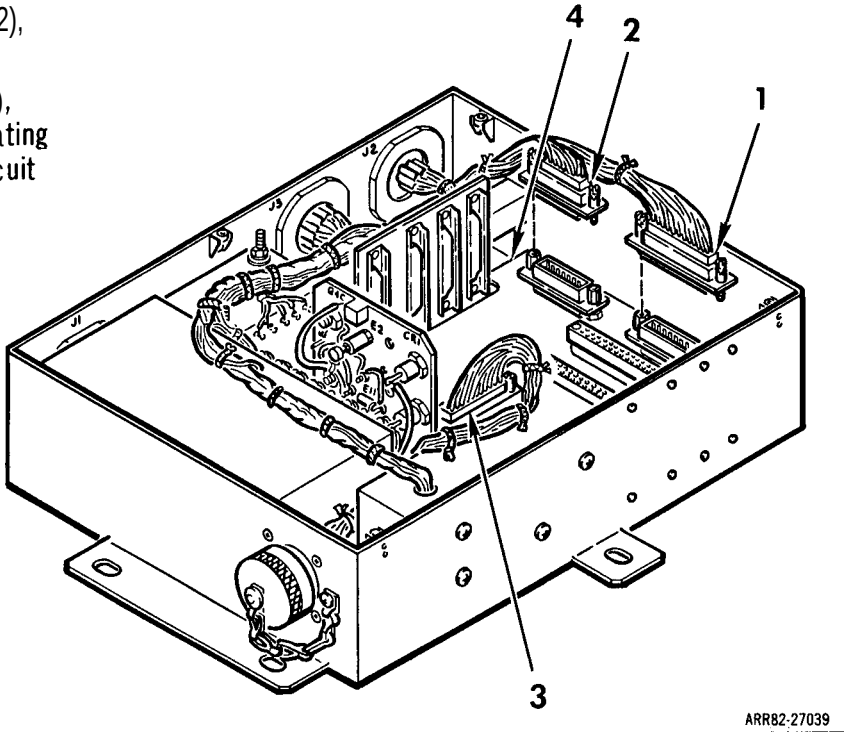
ASSEMBLY (cont)

50. INSTALL ELECTRICAL COVER (1).
    a. Apply thin coat of silicone compound to mating surface of gasket inside electrical cover (1).
    b. Install electrical cover (1) with screw (2) and nut (3).



51. CONNECT CONNECTORS P1 (1), P2 (2), AND P3 (3).

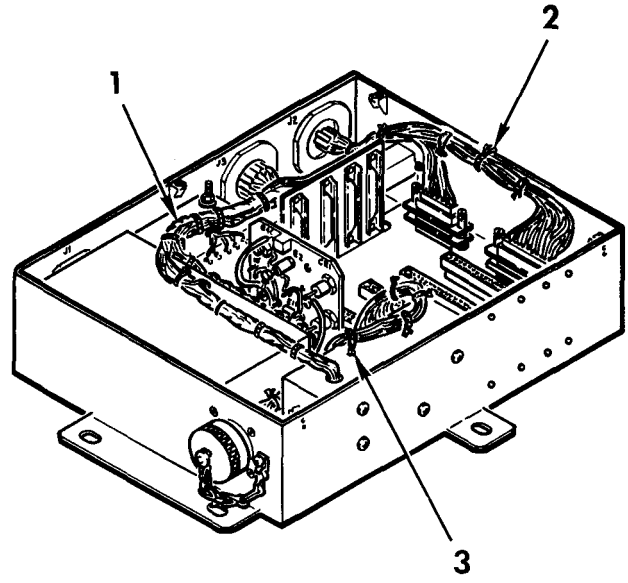
    Connect connectors P1 (1), P2 (2), and P3 (3) to their respective mating connectors J5, J6, and J7 on circuit card assembly A5 (4).



2-57. REPAIR OF GUN CONTROL UNIT (cont)

52. WRAP WIRE BUNDLE (1).

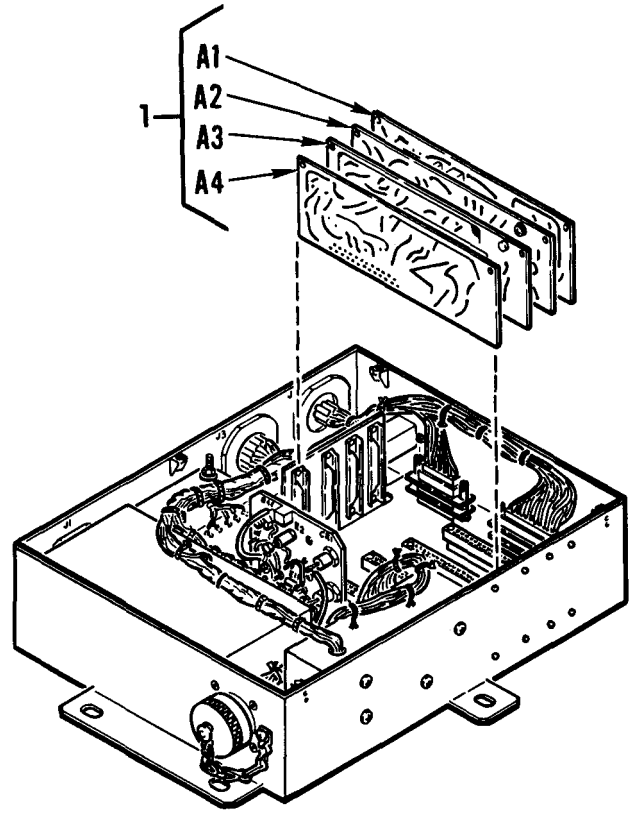
Form wire bundle (1) and tie with cable lacing tape (2) or tie-down straps (3).



ARR82-27040

53. INSTALL CIRCUIT CARD ASSEMBLIES A1 THRU A4 (1),

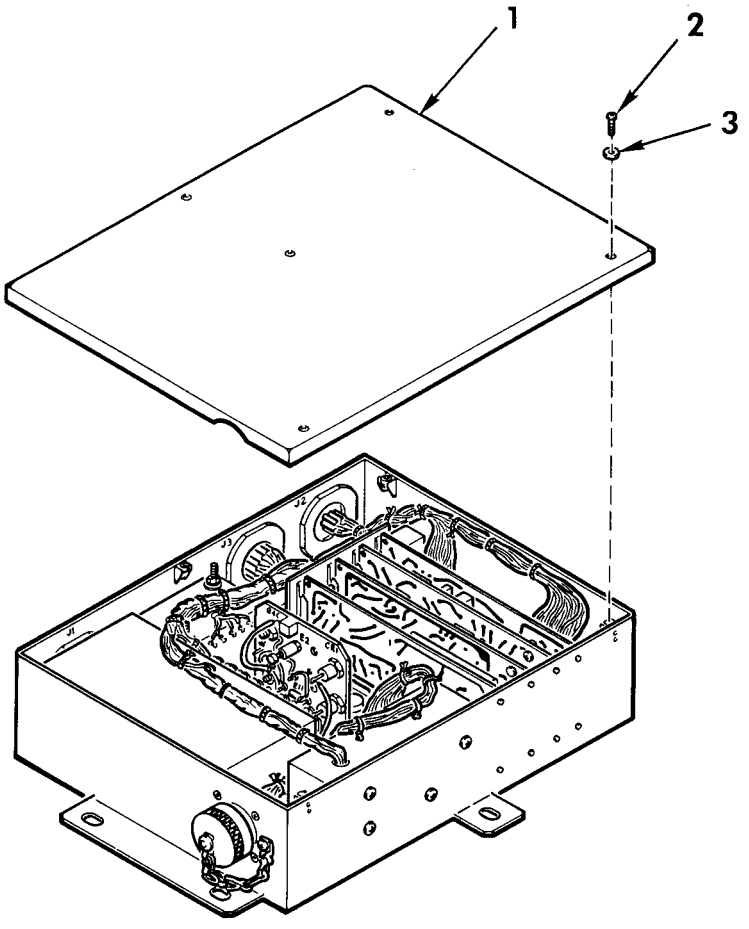
Install circuit card assemblies Al thru A4 (1) in connectors. Push down carefully on edges of card to seat firmly in connector.



ARR82-27041

ASSEMBLY (cont)

54. INSTALL COVER (1).
    a. Check inside case for loose solder, wire, debris, etc.
    b. Install cover (1), five screws (2), and five washers (3).

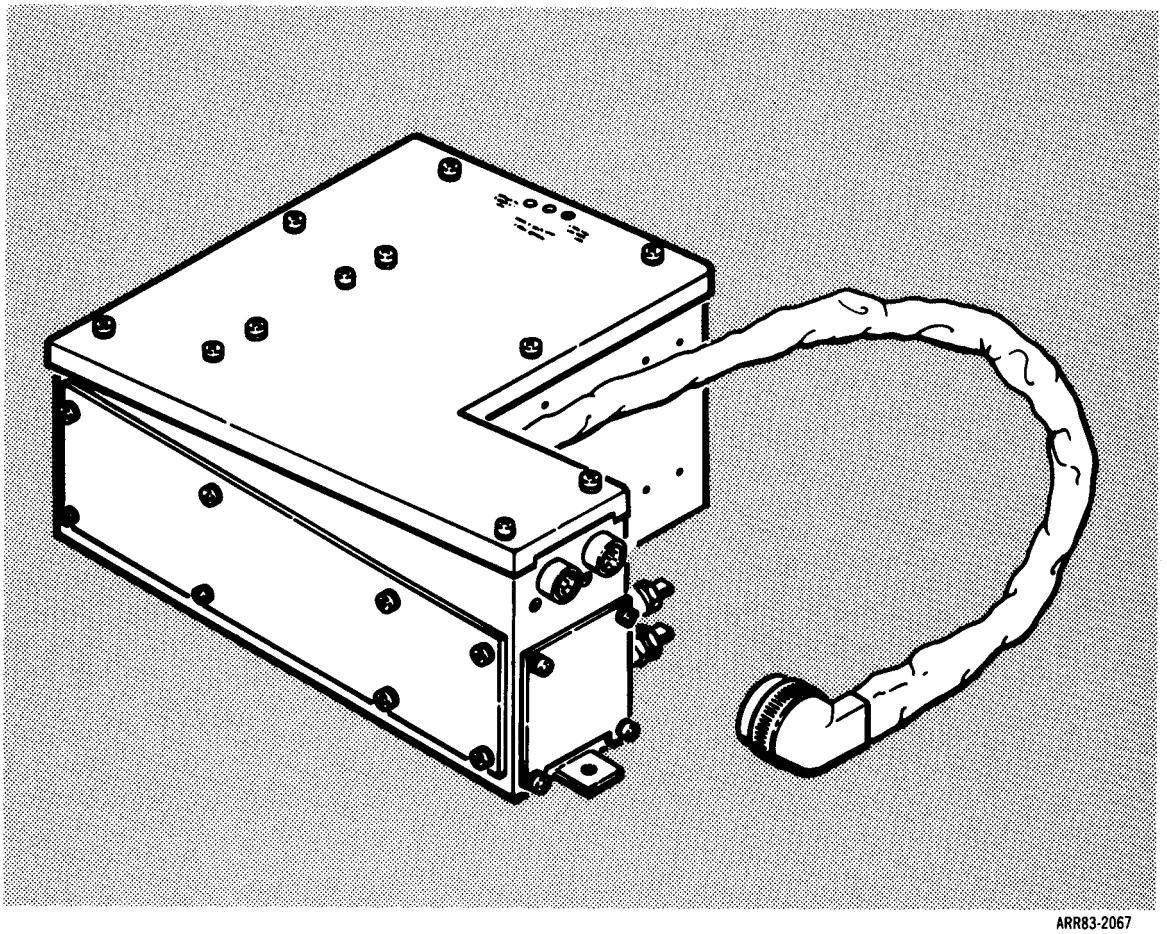


ARR82-27042

END OF TASK

Section XVIII. MAINTENANCE OF TURRET CONTROL UNIT

Section Contents	Para
Repair of Turret Control Unit	2-58



ARR83-2067

2-58. REPAIR OF TURRET CONTROL ASSEMBLY

DESCRIPTION

This task covers: Disassembly, cleaning, inspection, repair, and assembly.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Circuit Card Puller
- Static Grounding Kit at Work Station
- Static Shielding Bag
- CCA Protective Bags
- Circuit Card puller PN 1 Ml 3008 (Fig C-4, Appx B)
- Multimeter: ANWSM-223

Materials:
- Adhesive (Item 2, Appx B)
- Adhesive (Item 5, Appx B)
- Adhesive (Item 6, Appx B)
- Solder (Item 27, Appx B)
- Tape (Item 31, Appx B)
- Insulation Sleeving (14.1, Appx B)
- Cable Tiedown Straps (30), Appx B)

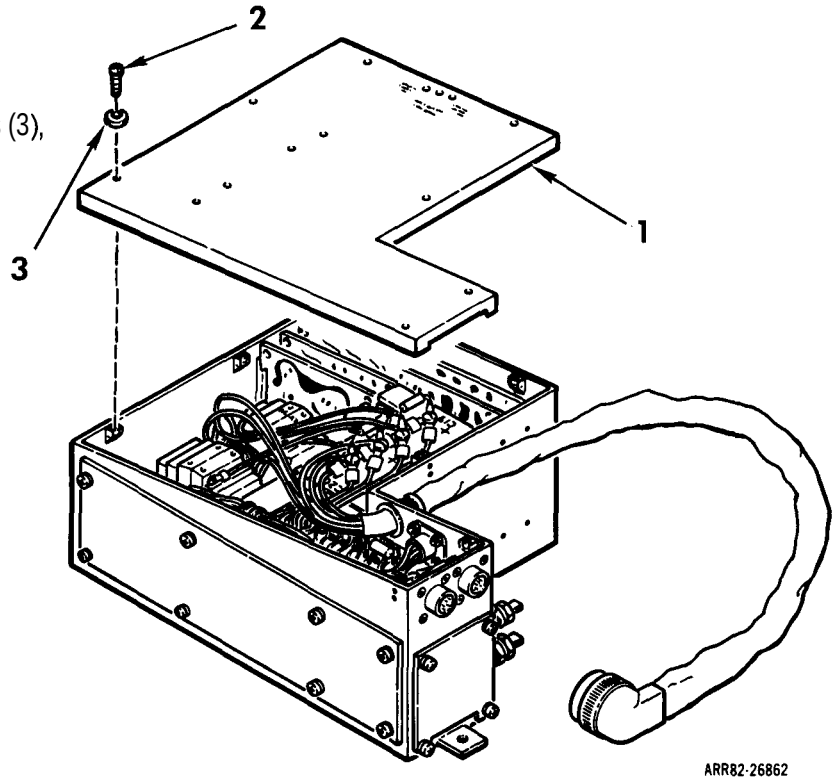
Personnel Required:
- 68J Aircraft Fire Control Repairer

Equipment Conditions:
- In shop on bench
- No power applied.

DISASSEMBLY

1. REMOVE TOP COVER (1).

   Remove 11 screws (2), 11 washers (3), and top cover (1).



DISASSEMBLY (cont)

CAUTION

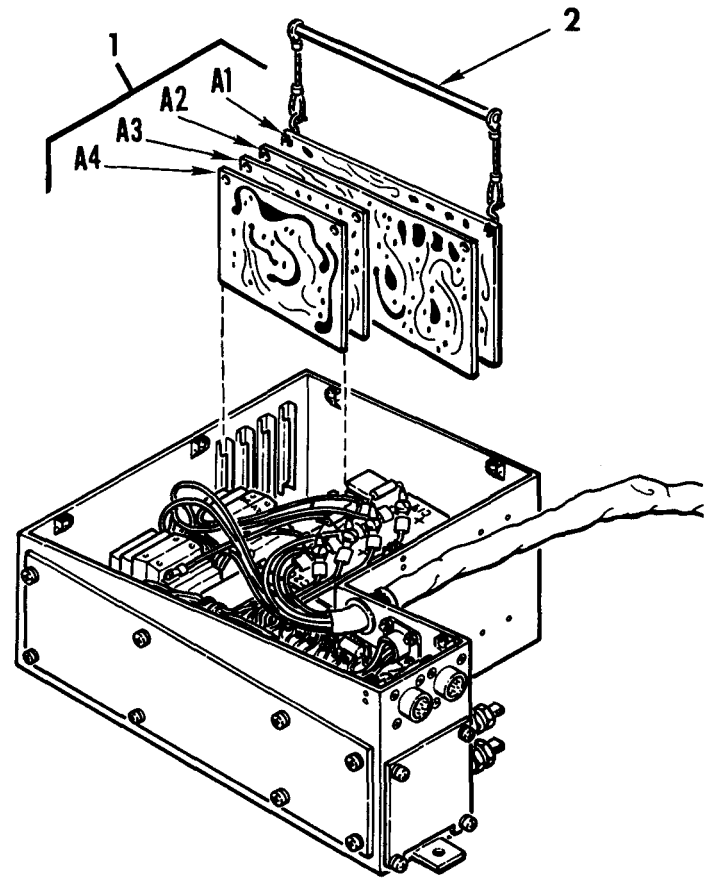
Circuit card assembly A2 is subject to damage by static charges. Handle circuit card assembly A2 at a work station equipped with static grounding kit.

2. REMOVE CIRCUIT CARD ASSEMBLIES A1 THRU A4 (1)

   a. Using circuit card puller (2), remove circuit card assemblies Al thru A4 (1).

   b. Place circuit card assemblies A1, A3, and A4 in protective bags.

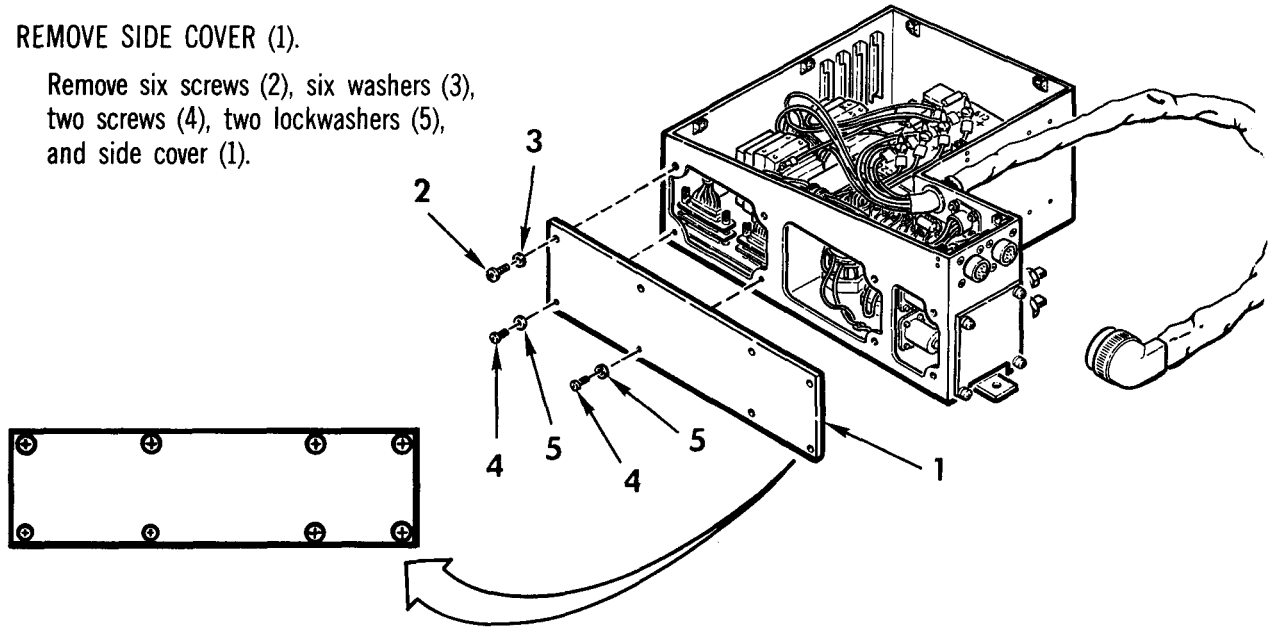
   c. Place circuit card assembly A2 in static shielding bag.



ARR82-26863

3. REMOVE SIDE COVER (1).

   Remove six screws (2), six washers (3), two screws (4), two lockwashers (5), and side cover (1).

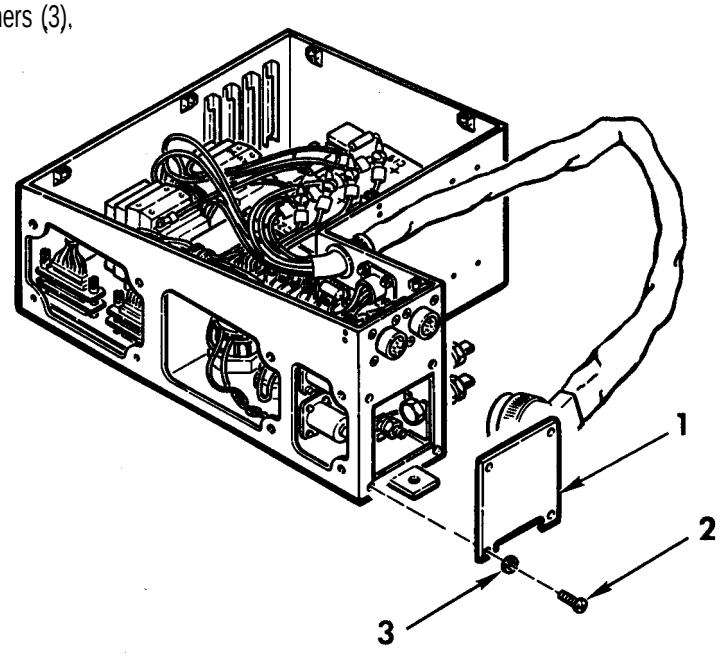


ARR82-26864

2-58. REPAIR OF TURRET CONTROL ASSEMBLY (cont)

4 . REMOVE END COVER (1).

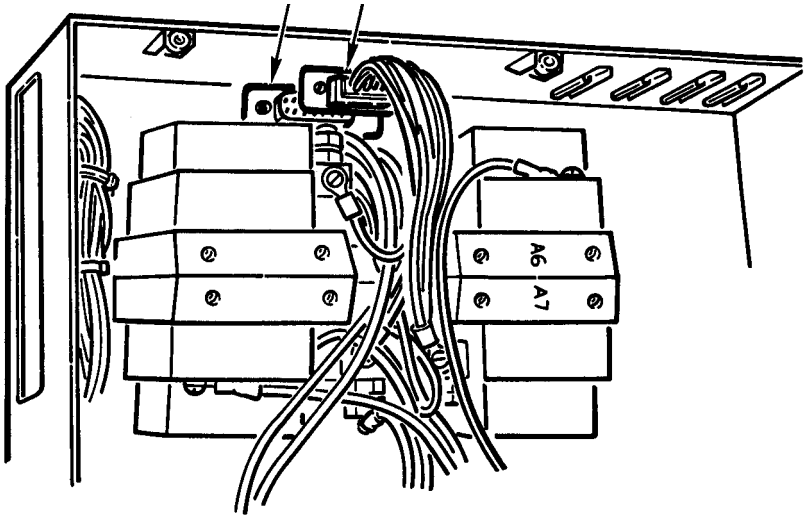
Remove four screws (2), four washers (3), and end cover (1).



ARR82-26865

5. DISCONNECT CONNECTOR P1 (1).

Loosen screwposts on connector P1 (1) and separate connector P1 from connector J5 (2).



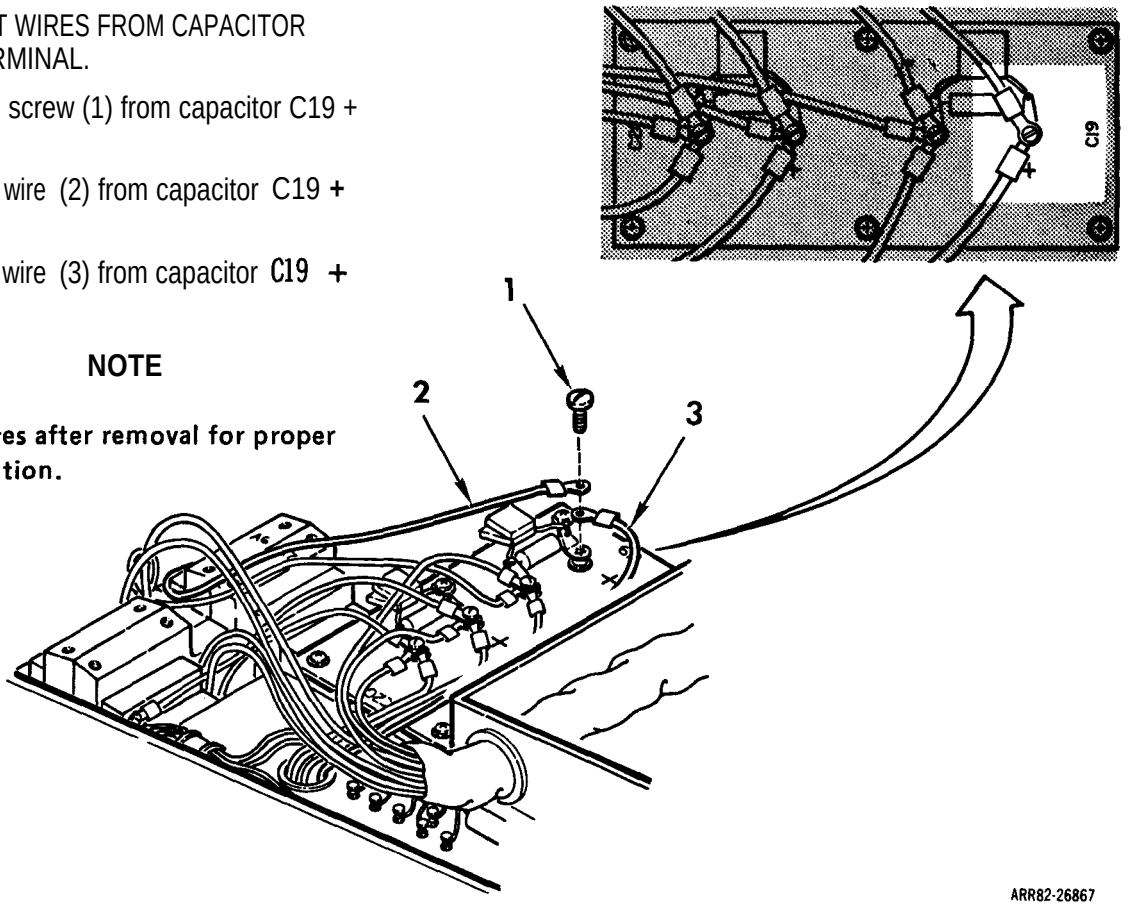
ARR82-26866

DISASSEMBLY (cont)

6. DISCONNECT WIRES FROM CAPACITOR C19 + TERMINAL.
   a. Remove screw (1) from capacitor C19 + terminal.
   b. Remove wire (2) from capacitor C19 + terminal.
   c. Remove wire (3) from capacitor C19 + terminal.

NOTE

Label wires after removal for proper identification.

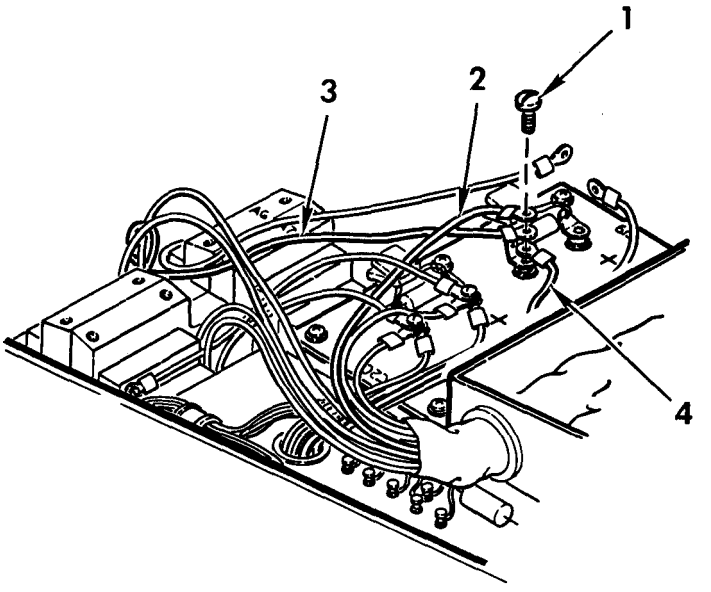


ARR82-26867

7. DISCONNECT WIRES FROM CAPACITOR C19 – TERMINAL.
   a. Remove screw (1) from capacitor C19– terminal.
   b. Remove wire (2) from capacitor C19 – terminal.
   c. Remove wire (3) from capacitor C19 – terminal.
   d. Remove wire (4) from capacitor C19 – terminal.

NOTE

Label wires after removal for proper identification.



ARR82-26868

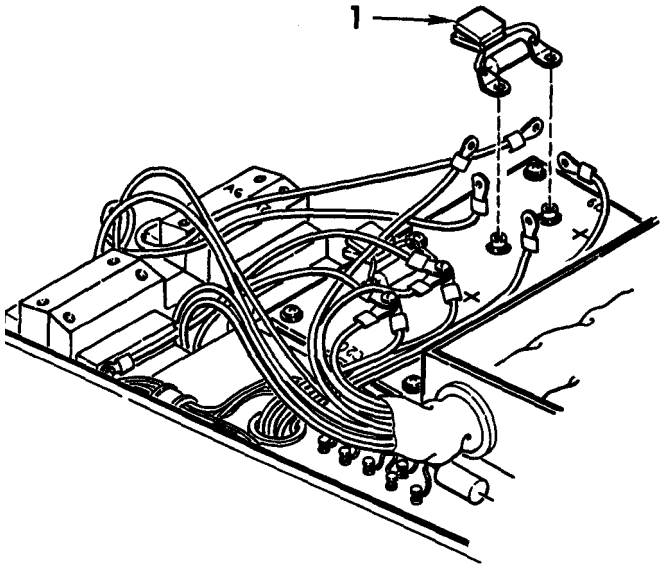
2-58. REPAIR OF TURRET CONTROL ASSEMBLY (cont)

8. REMOVE SOLDERED ASSEMBLY (1) FROM CAPACITOR C19.

   Remove soldered assembly (1) from across + and – terminals of capacitor C19.

NOTE

Label wires after removal for proper identification.

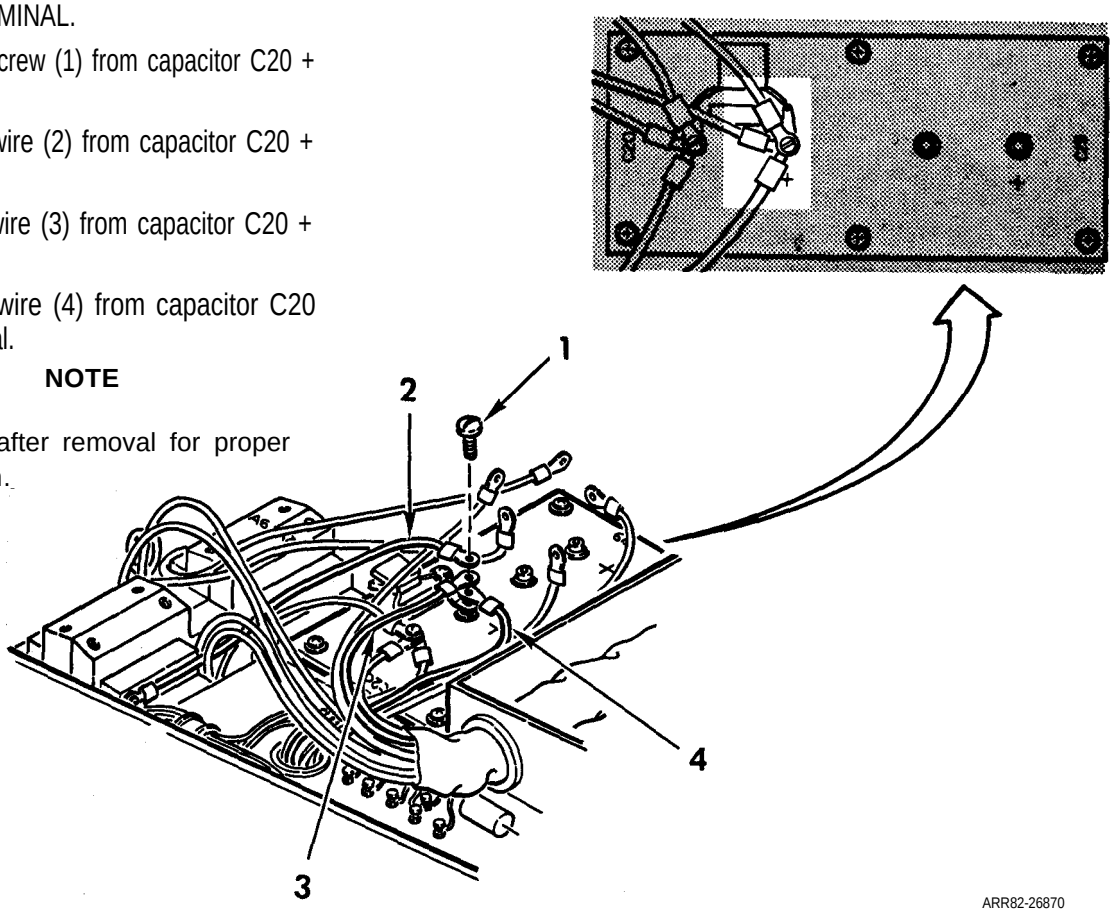


ARR82-26869

9. DISCONNECT WIRES FROM CAPACITOR C20 + TERMINAL.
   a. Remove screw (1) from capacitor C20 + terminal.
   b. Remove wire (2) from capacitor C20 + terminal,
   c. Remove wire (3) from capacitor C20 + terminal.
   d. Remove wire (4) from capacitor C20 + terminal.

NOTE

Label wires after removal for proper identification.



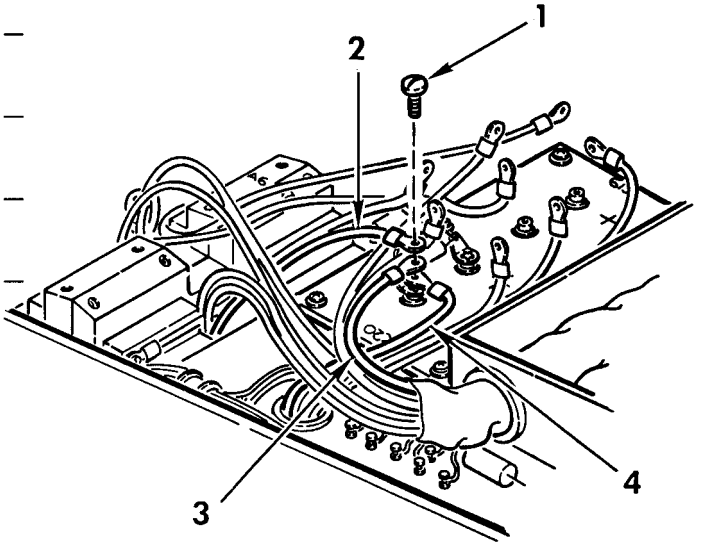
ARR82-26870

DISASSEMBLY (cont)

10. DISCONNECT WIRES FROM CAPACITOR C20 – TERMINAL
    a. Remove screw (1) from capacitor C20 – terminal.
    b. Remove wire (2) from capacitor C20 – terminal.
    c. Remove wire (3) from capacitor C20 – terminal.
    d. Remove wire (4) from capacitor C20 – terminal.

NOTE

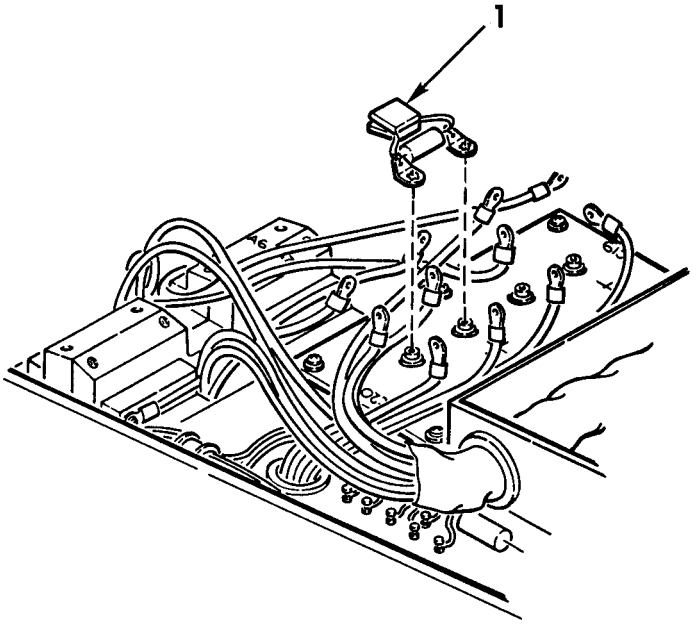
Label wires after removal for proper identification.



ARR82-26871

11. REMOVE SOLDERED ASSEMBLY (1) FROM CAPACITOR C20.

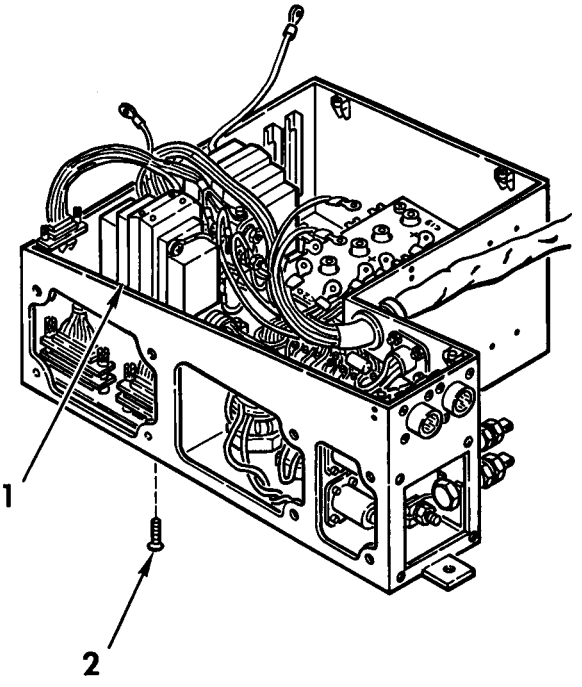
    Remove soldered assembly (1) from across + and – terminals of capacitor C20.



ARR82-26872

2-58. REPAIR OF TURRET CONTROL ASSEMBLY (cont)

12. REMOVE COMPONENT ASSEMBLY (1).
    a. Remove 10 screws (2).
    b. Lift component assembly (1) to gain access to side terminals.

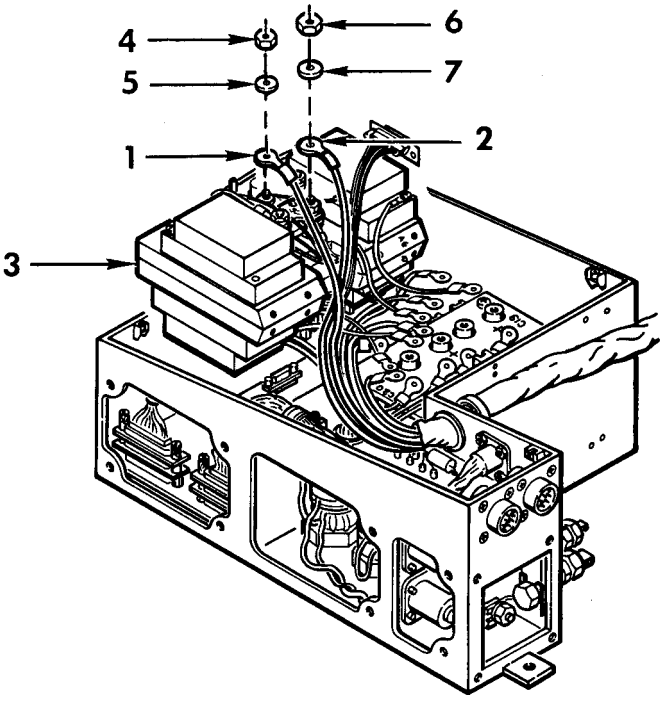


ARR82-26873

13. DISCONNECT WIRES (1) AND (2) FROM A6 SIDE OF COMPONENT ASSEMBLY (3).
    a. Remove nut (4), washer (5), and wire (1) from terminal A6R1-B of component assembly (3).
    b. Remove nut (6), washer (7), and wire (2) from terminal A6R2-B.

NOTE

Label wires after removal for proper identification,



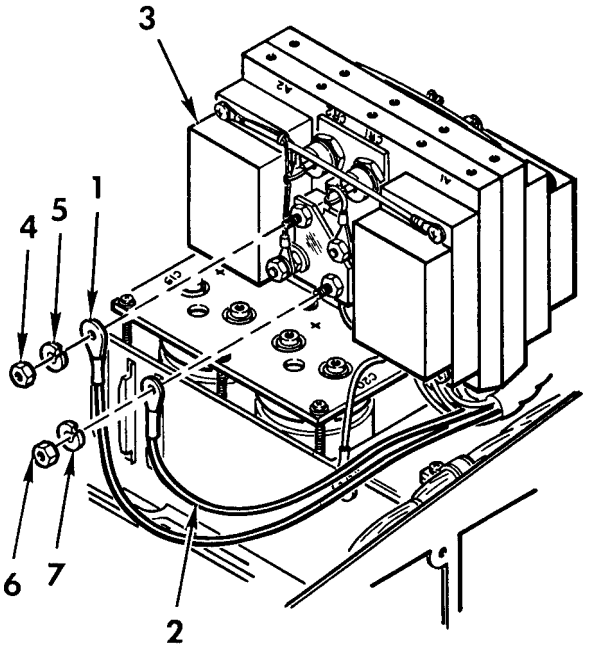
ARR82-26874

DISASSEMBLY (cont)

14. DISCONNECT WIRES (1) AND (2) FROM A7 SIDE OF COMPONENT ASSEMBLY (3).
    a. Remove nut (4), washer (5), and wire (1) from terminal A7R1-B of component assembly (3).
    b. Remove nut (6), washer (7), and wire (2) from terminal A7R2-B.

NOTE

Label wires after removal for proper identification.

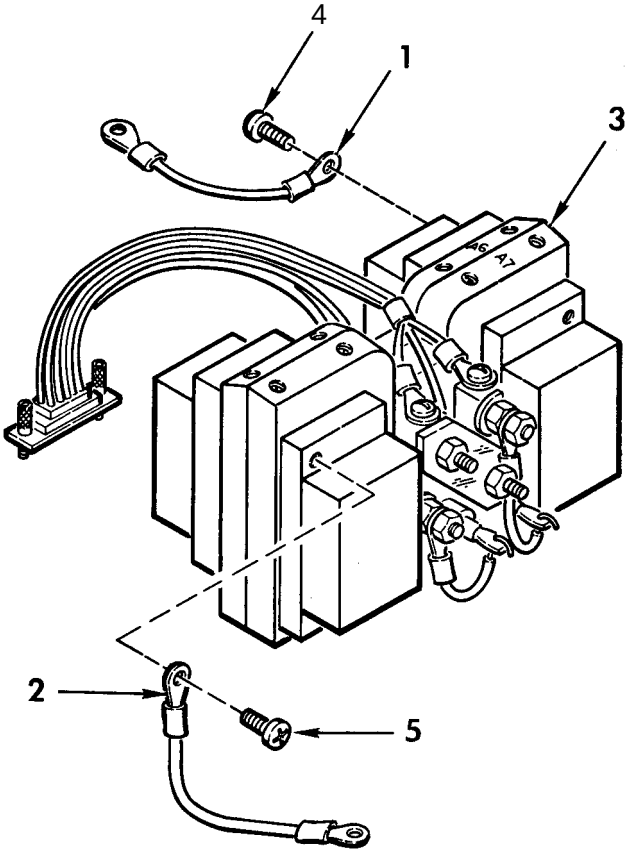


ARR82-26875

15. REMOVE LEADS (1) AND (2) FROM COMPONENT ASSEMBLY (3).
    a. Remove screw (4) and lead (1) from A6 side of component assembly (3).
    b. Remove screw (5) and lead (2) from A7 side of component assembly (3).

NOTE

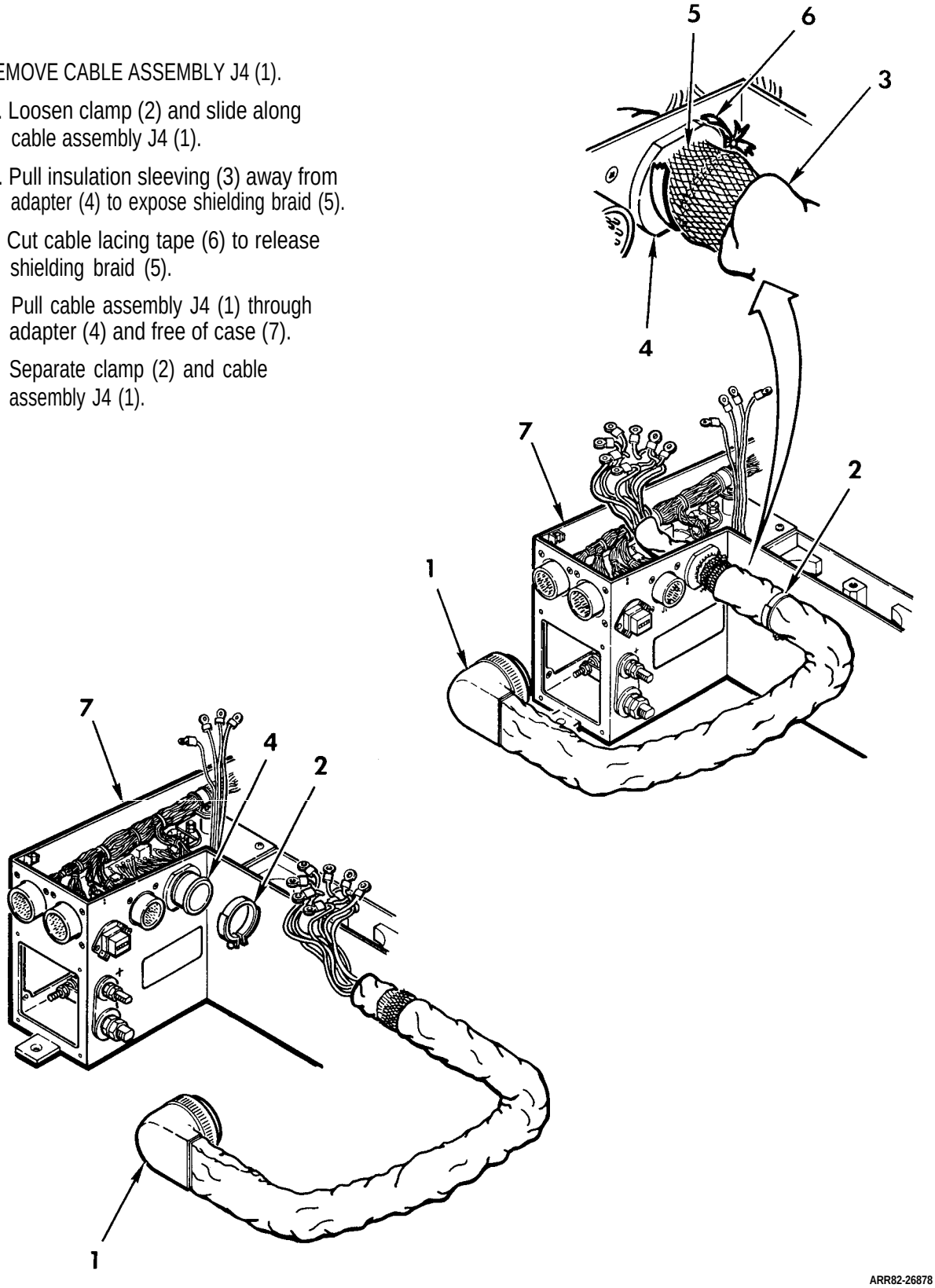
Label wires after removal for proper identification.



ARR82-26876

DISASSEMBLY (cont)

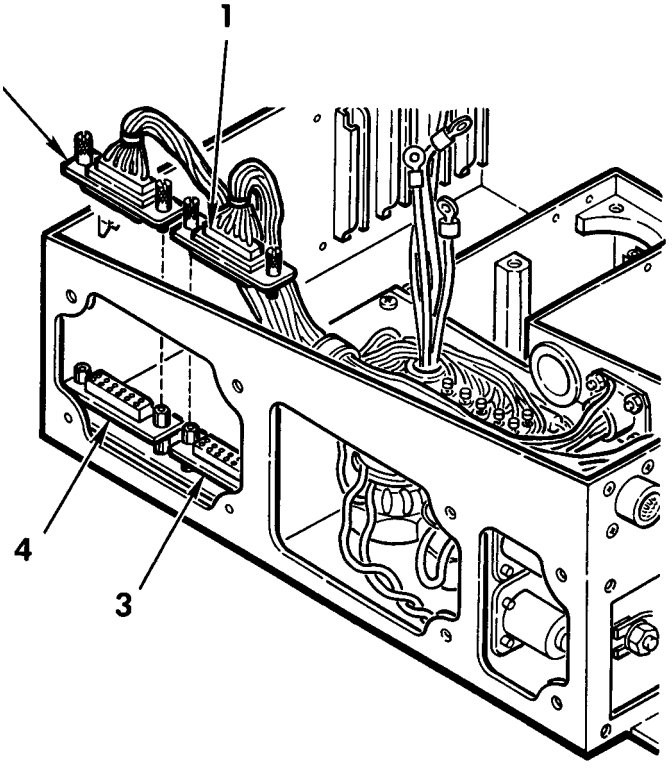
17. REMOVE CABLE ASSEMBLY J4 (1).
    a. Loosen clamp (2) and slide along cable assembly J4 (1).
    b. Pull insulation sleeving (3) away from adapter (4) to expose shielding braid (5).
    c. Cut cable lacing tape (6) to release shielding braid (5).
    d. Pull cable assembly J4 (1) through adapter (4) and free of case (7).
    e. Separate clamp (2) and cable assembly J4 (1).



ARR82-26878

2-58. REPAIR OF TURRET CONTROL ASSEMBLY (Cont)

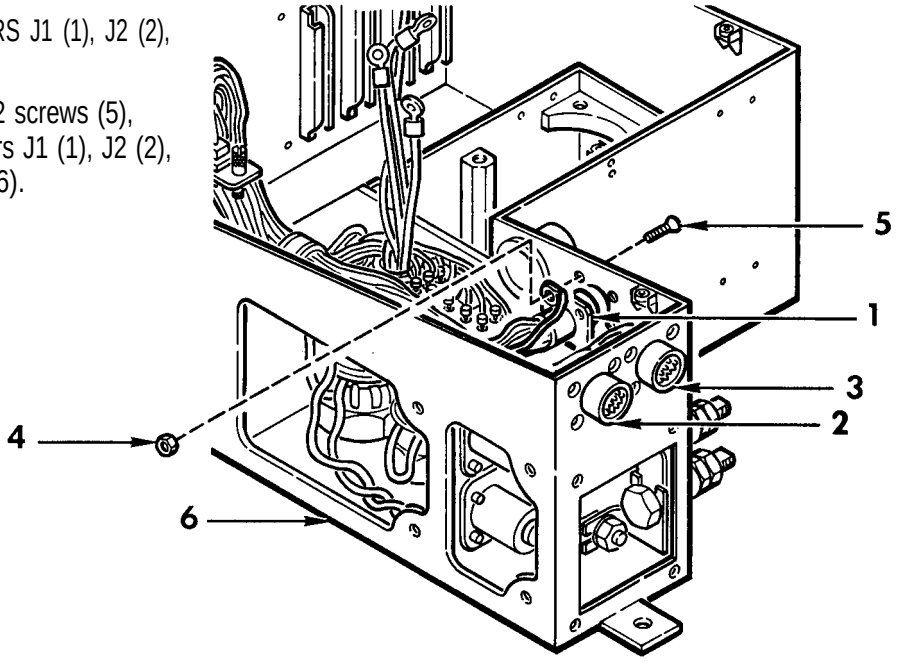
18. DISCONNECT CONNECTORS P2 (1) AND P3 (2).
    a. Loosen screwposts on connector P2 (1) and separate connector P2 from connector J6 (3).
    b. Loosen screwposts on connector P3 (2) and separate connector P3 from connector J7 (4).



ARR82-26880

19. DISCONNECT CONNECTORS J1 (1), J2 (2), AND J3 (3).

    Remove 12 nuts (4), 12 screws (5), and separate connectors J1 (1), J2 (2), and J3 (3) from case (6).

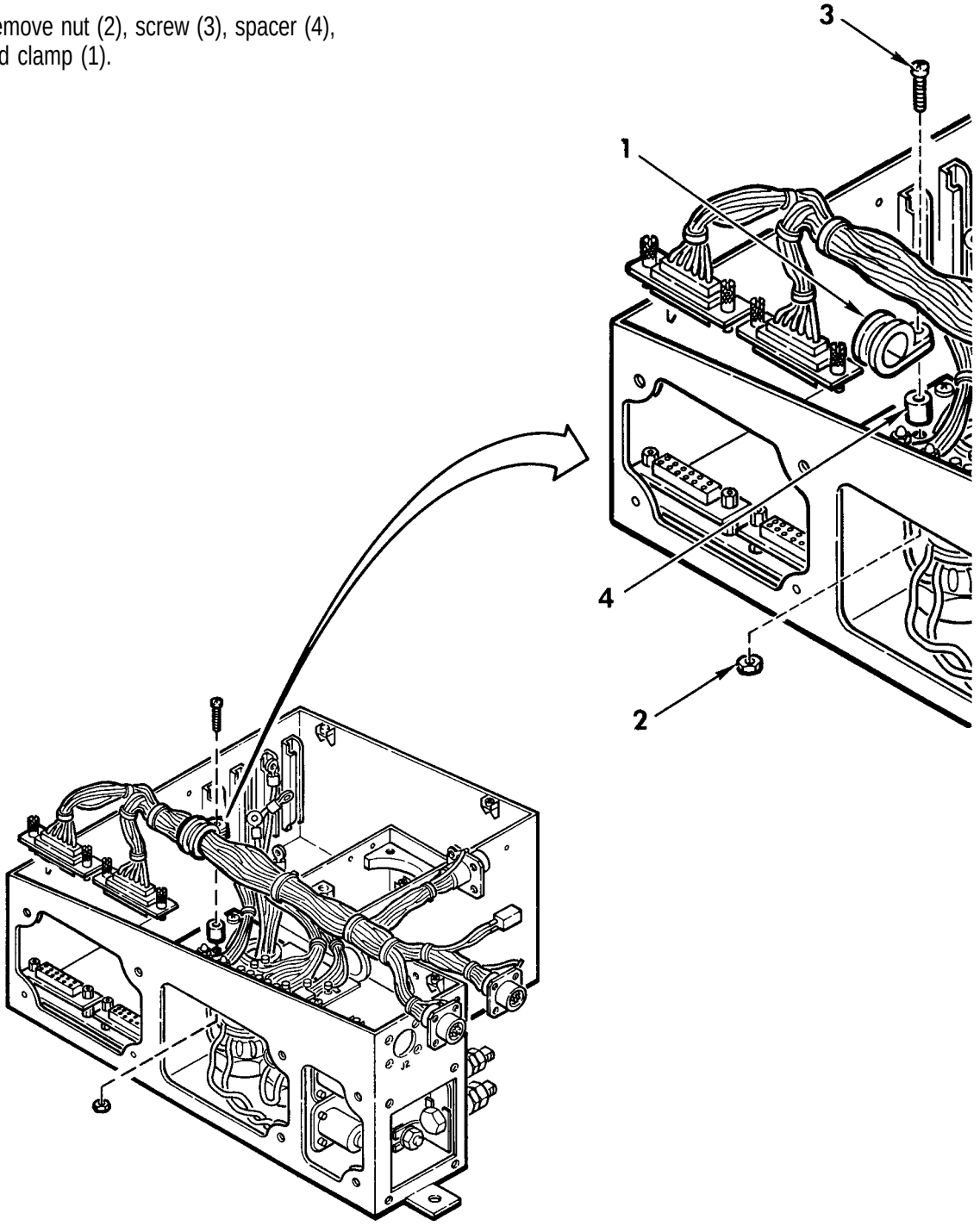


ARR82-26881

DISASSEMBLY (cont)

20. REMOVE CLAMP (1).

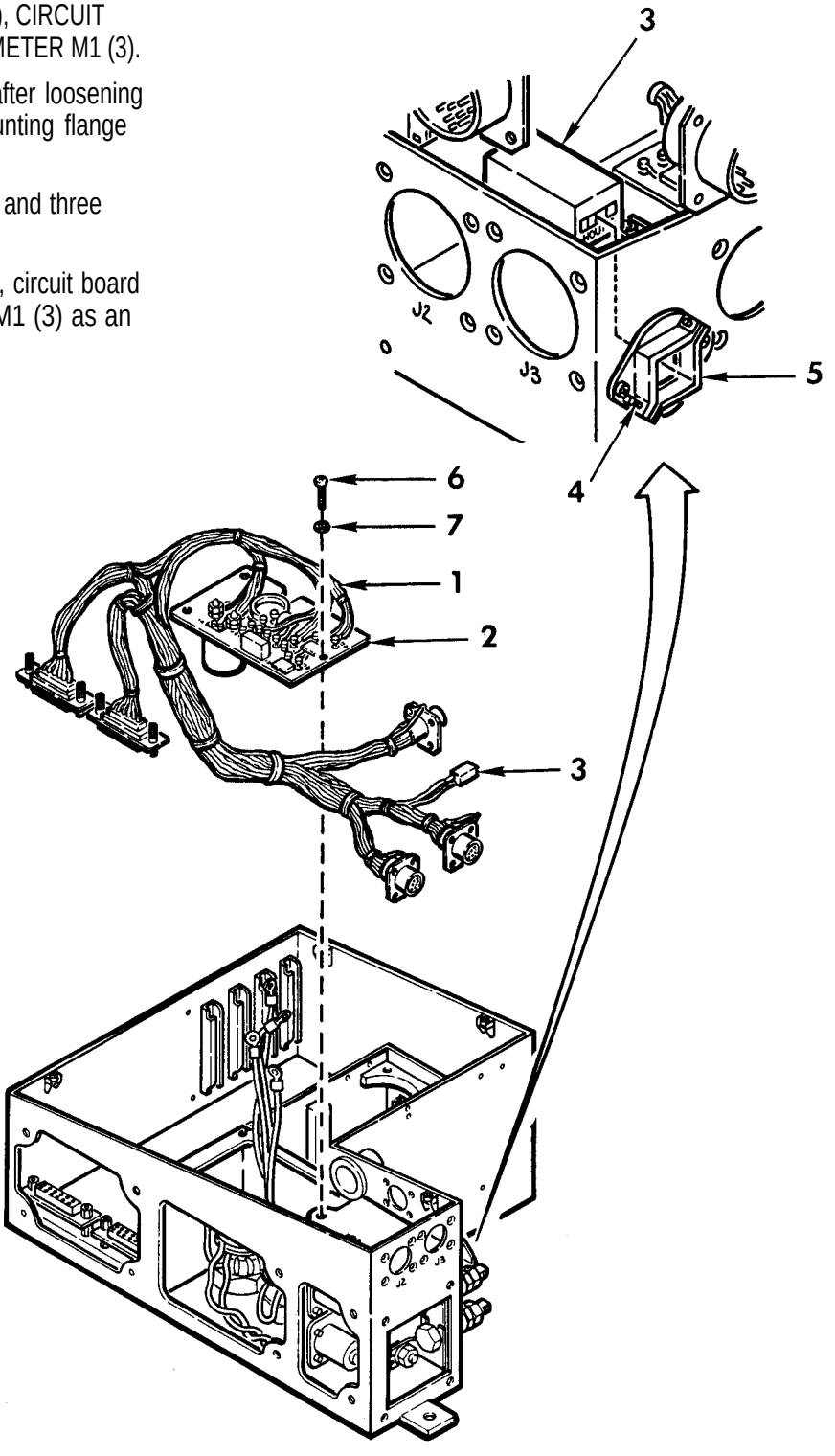
Remove nut (2), screw (3), spacer (4), and clamp (1).



ARR82-26882

2-58. REPAIR OF TURRET CONTROL ASSEMBLY (cont)

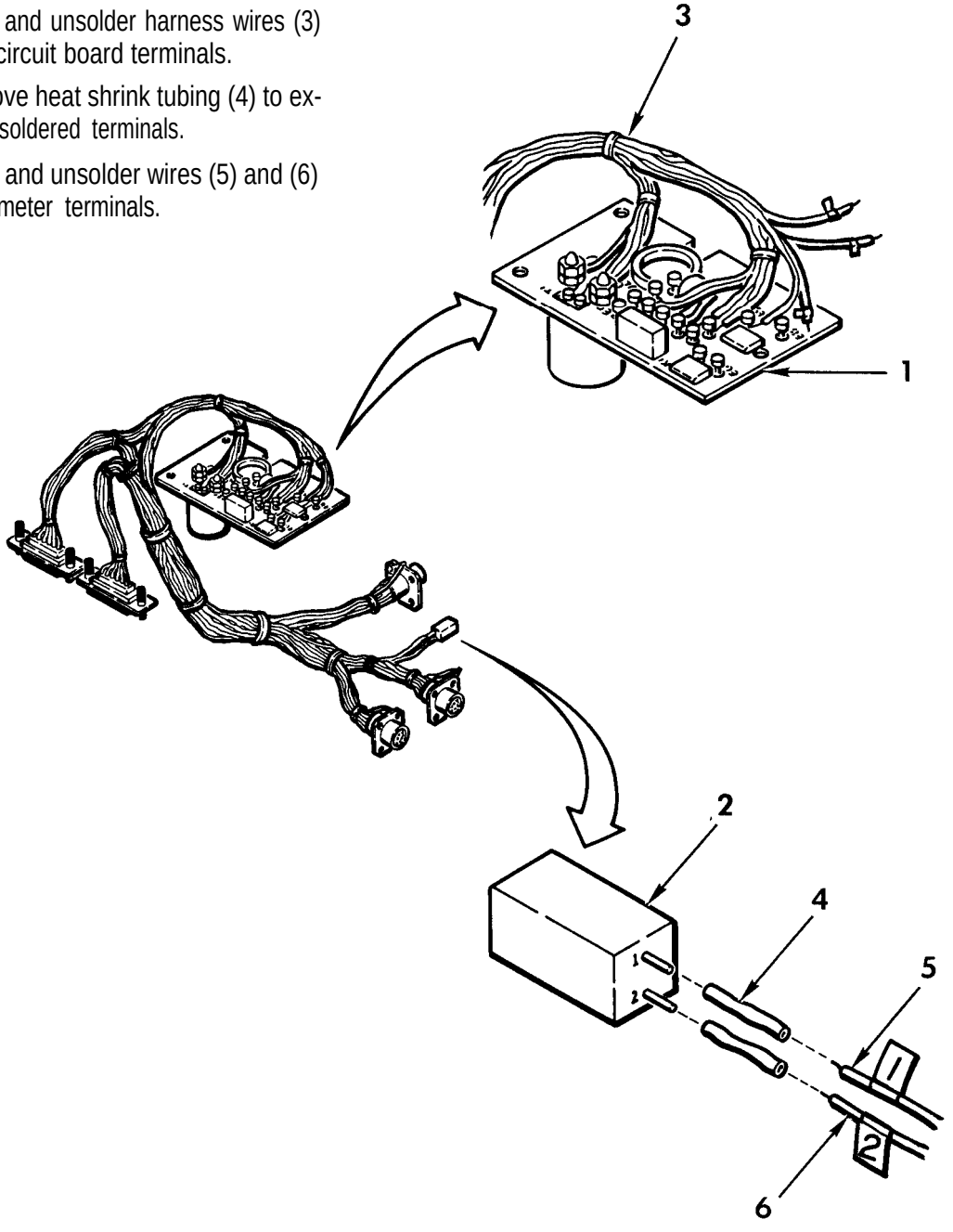
21. REMOVE WIRE HARNESS (1), CIRCUIT BOARD A8 (2), AND HOUR METER M1 (3).
    a. Free hour meter M1 (3) after loosening screws (4) on meter mounting flange (5).
    b. Remove three screws (6) and three washers (7).
    c. Remove wire harness (1), circuit board A8 (2), and hour meter M1 (3) as an assembly.



ARR82-26883

DISASSEMBLY (cont)

22. DISCONNECT CIRCUIT BOARD A8 (1) AND HOUR METER M1 (2).
    a Label and unsolder harness wires (3) from circuit board terminals.
    b. Remove heat shrink tubing (4) to expose soldered terminals.
    c. Label and unsolder wires (5) and (6) from meter terminals.

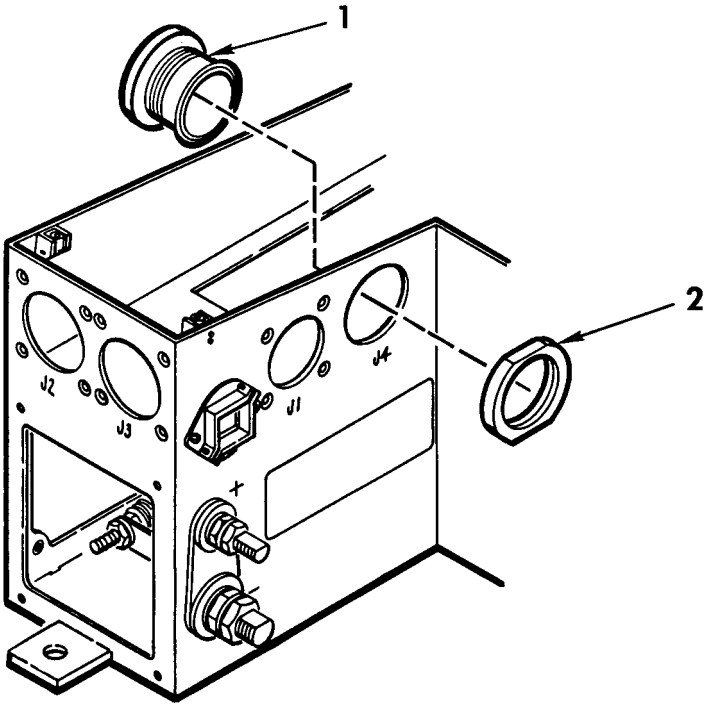


ARR82-26884

2-58. REPAIR OF TURRET CONTROL ASSEMBLY (cont)

23. REMOVE ADAPTER (1).

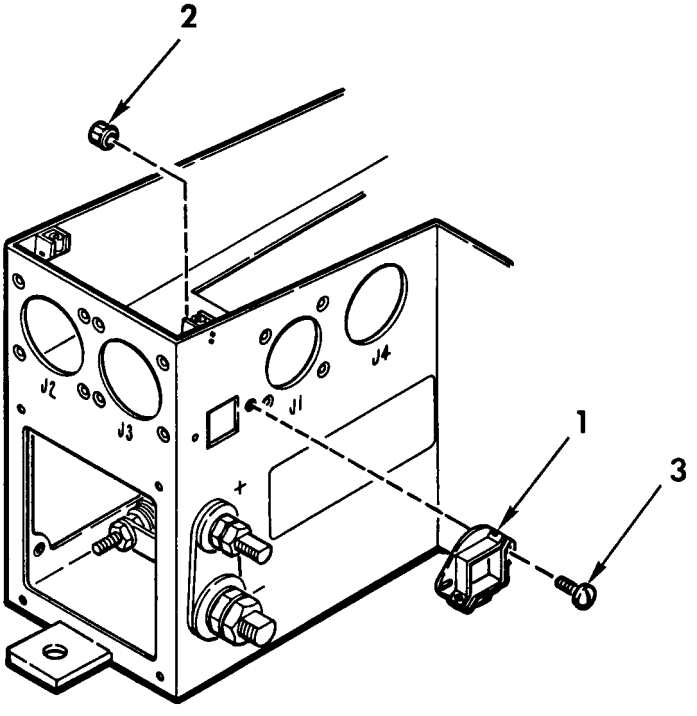
Remove adapter (1) by unscrewing outer nut (2) from threaded flange.



ARR82-26926

24. REMOVE METER MOUNTING FLANGE (1).

Remove two nuts (2), two screws (3), and meter mounting flange (1).

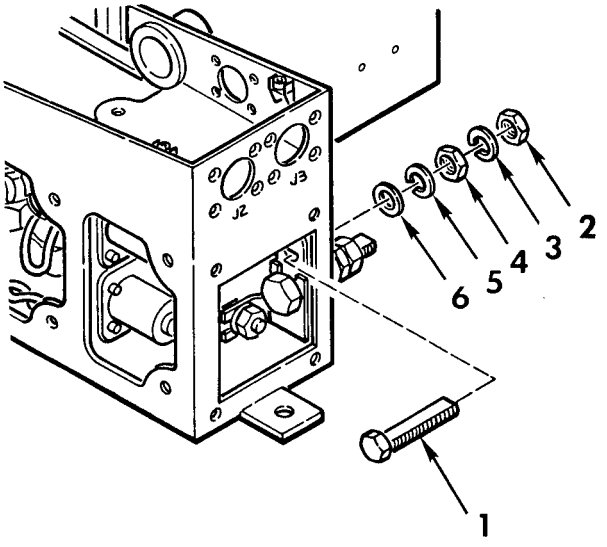


ARR82-26886

DISASSEMBLY (cont)

25. REMOVE (+) ELECTRICAL STUD (1).

Remove nut (2), lockwasher (3), nut (4), lockwasher (5), washer (6), and (+) electrical stud (1).

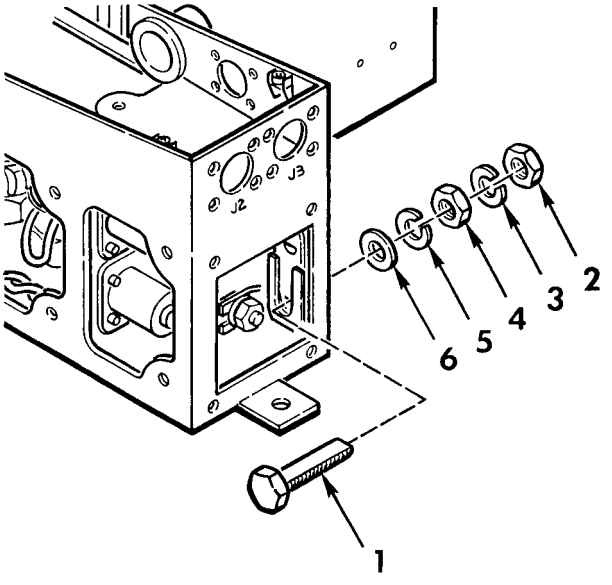


ARR82-26887

26. REMOVE (–) ELECTRICAL STUD (1).

a. Remove nut (2), lockwasher (3), nut (4), lockwasher (5), washer (6), and (–) electrical stud (1).

b. Leave inside and outside plexiglass stud insulators (7) in case.



ARR82-26888

CLEANING

27. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV.

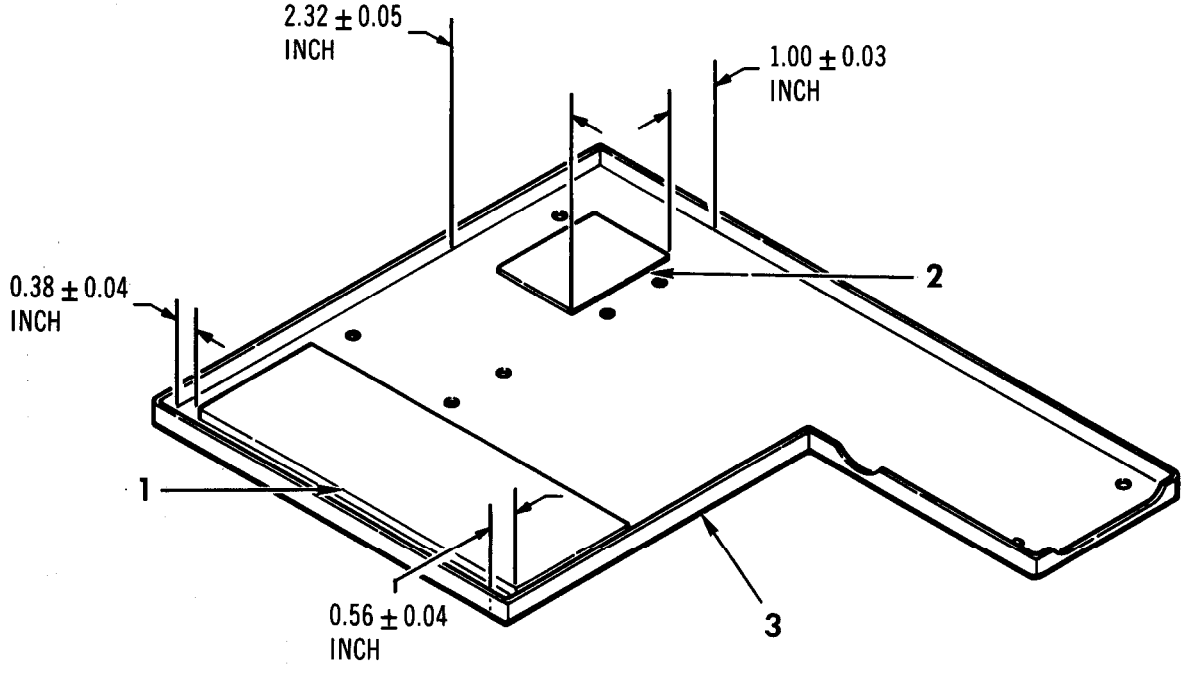
2-58. REPAIR OF TURRET CONTROL ASSEMBLY (cont)

INSPECTION

28. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV.

REPAIR

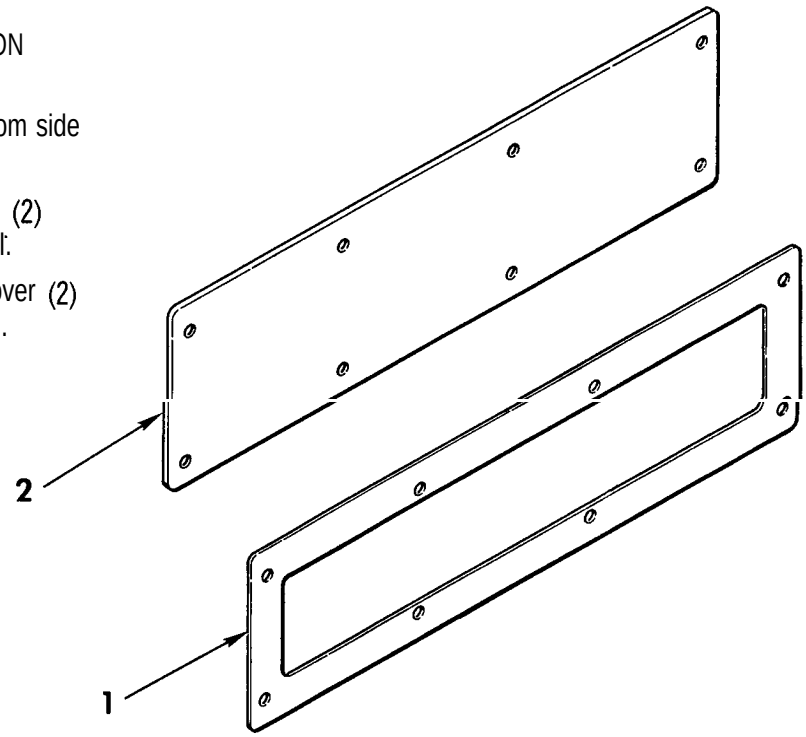
29. REPLACE DAMAGED CUSHIONING PAD (1) OR INSULATOR PLATE (2) ON TOP COVER (3).
    a. Remove damaged cushioning pad (1) or insulator plate (2).
    b. Scrape residue from top cover (3) with a hardwood or plastic tool,
    c Bond new cushioning pad (1) to top cover (3) with adhesive (item 6, Appx B) in location shown.
    d. Bond new insulator plate (2) to top cover (3) with adhesive (item 2, Appx B) in location shown.



ARR82-26923

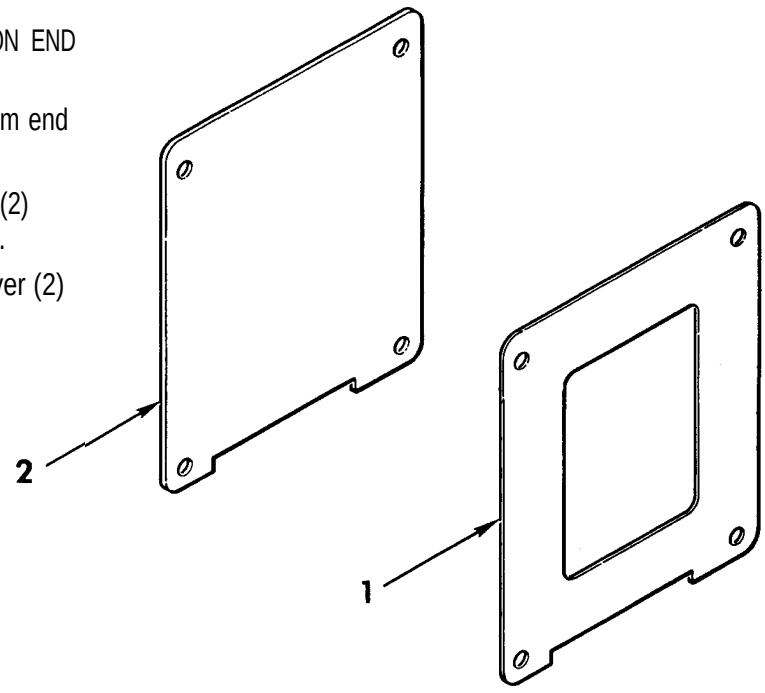
REPAIR (cont)

30. REPLACE DAMAGED GASKET (1) ON SIDE COVER (2).
    a. Remove damaged gasket (1) from side cover (2).
    b. Scrape residue from side cover (2) with a hardwood or plastic tool.
    c. Bond new gasket (1) to side cover (2) with adhesive (item 5, Appx B).



ARR82-26924

31. REPLACE DAMAGED GASKET (1) ON END COVER (2).
    a. Remove damaged gasket (1) from end cover (2).
    b. Scrape residue from end cover (2) with a hardwood or plastic tool.
    c. Bond new gasket (1) to end cover (2) with adhesive (item 5, Appx B).

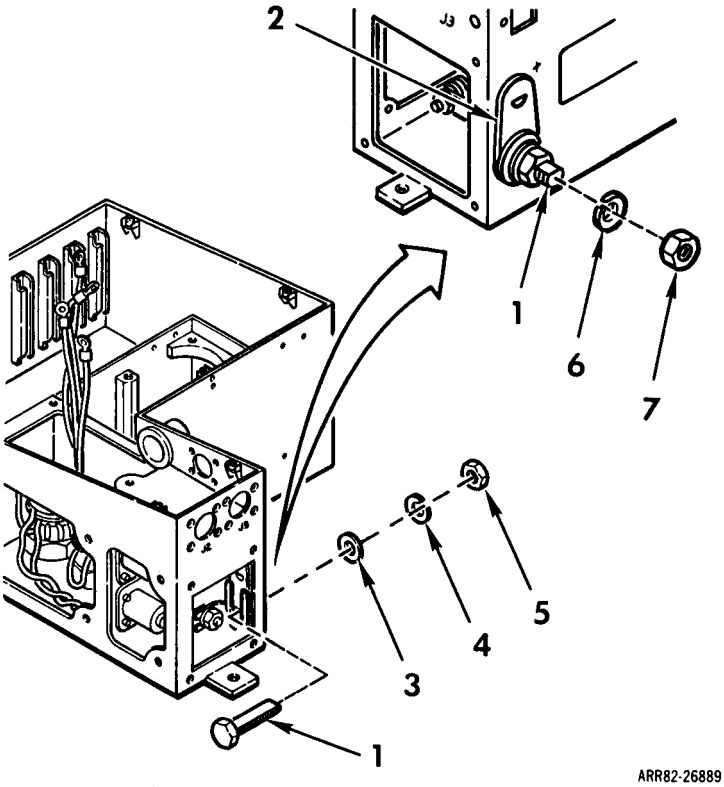


ARR82-26925

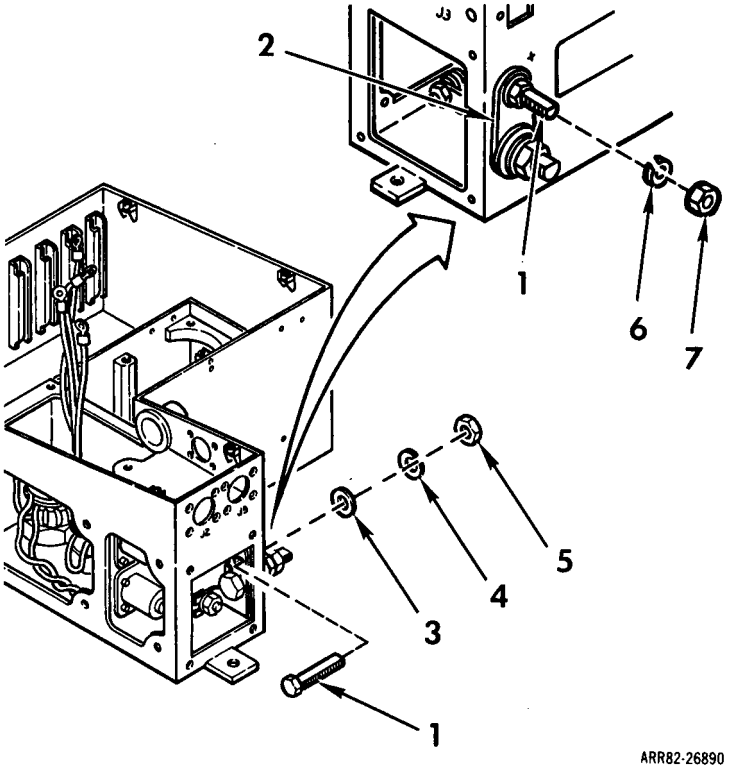
2-58. REPAIR OF TURRET CONTROL ASSEMBLY (cont)

ASSEMBLY

32. INSTALL (–) ELECTRICAL STUD(l).
    a. Check that inside and outside plexiglass stud insulators (2) are installed.
    b. Insert (-) electrical stud (1) thru both plexiglass insulators (2).
    c. Install washer (3), lockwasher (4), and nut (5).
    d. Torque nut (5) to 20-30 lb-in. (2.3-3.4 N.m).
    e. Install lockwasher (6) and nut (7).



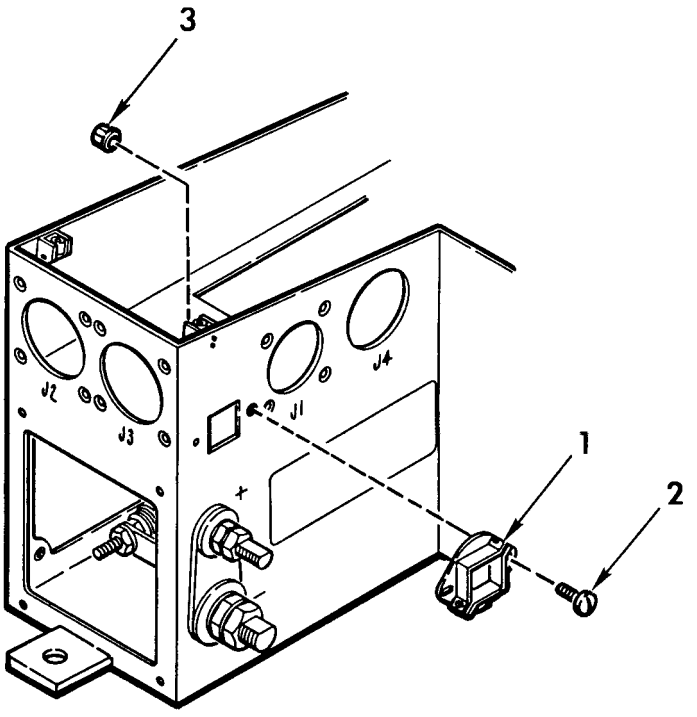
33. INSTALL (+) ELECTRICAL STUD (1).
    a. Insert (+) electrical stud (1) thru both plexiglass insulators (2).
    b. Install washer (3), lockwasher (4), and nut (5).
    c. Torque nut (5) to 20-30 lb-in. (2.3-3.4 N.m).
    d. Install Iockwasher (6) and nut (7).



ASSEMBLY (cont)

34. INSTALL METER MOUNTING FLANGE (1).

Secure meter mounting flange (1) to case with two screws (2) and two nuts (3).

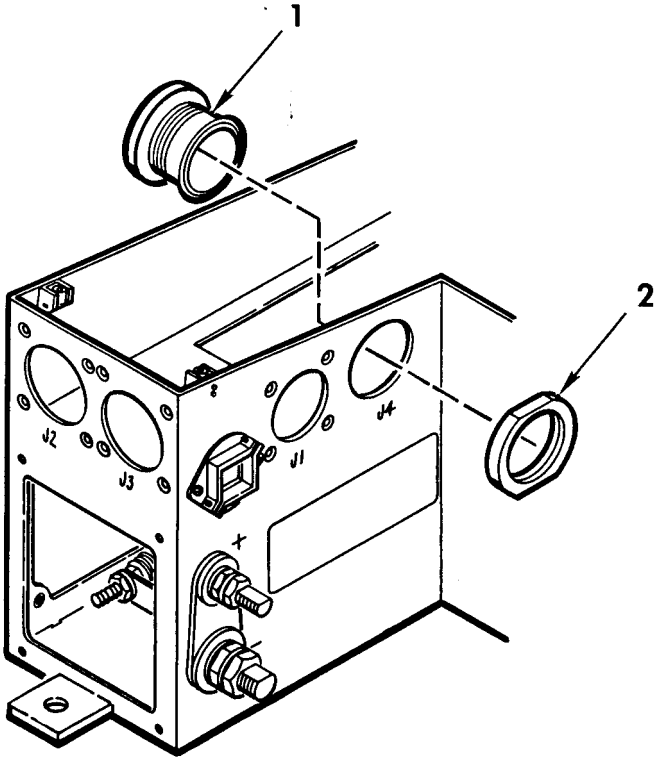


ARR82-26891

35. INSTALL ADAPTER (1).

a. Insert one-half of adapter (1) thru cutout in case with threads outside.

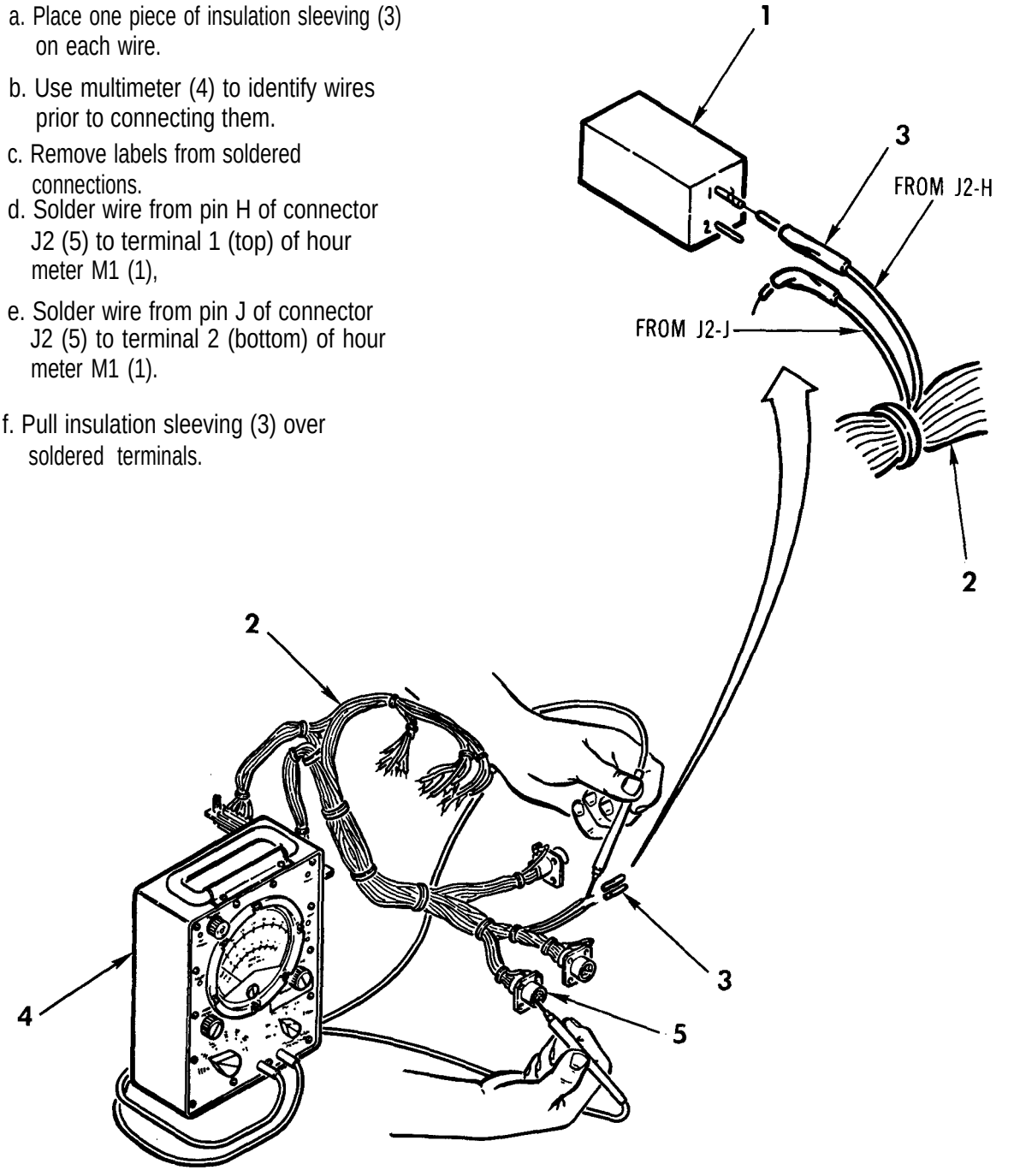
b. Secure adapter (1) to case by tightening nut (2) onto threaded flange.



ARR82-26892

2-58. REPAIR OF TURRET CONTROL ASSEMBLY (cont)

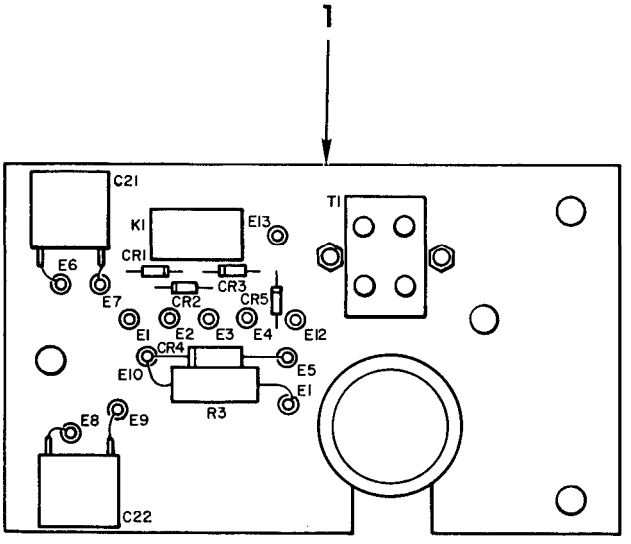
36. CONNECT HOUR METER M1 (1) TO WIRE HARNESS (2).
    a. Place one piece of insulation sleeving (3) on each wire.
    b. Use multimeter (4) to identify wires prior to connecting them.
    c. Remove labels from soldered connections.
    d. Solder wire from pin H of connector J2 (5) to terminal 1 (top) of hour meter M1 (1),
    e. Solder wire from pin J of connector J2 (5) to terminal 2 (bottom) of hour meter M1 (1).
    f. Pull insulation sleeving (3) over soldered terminals.



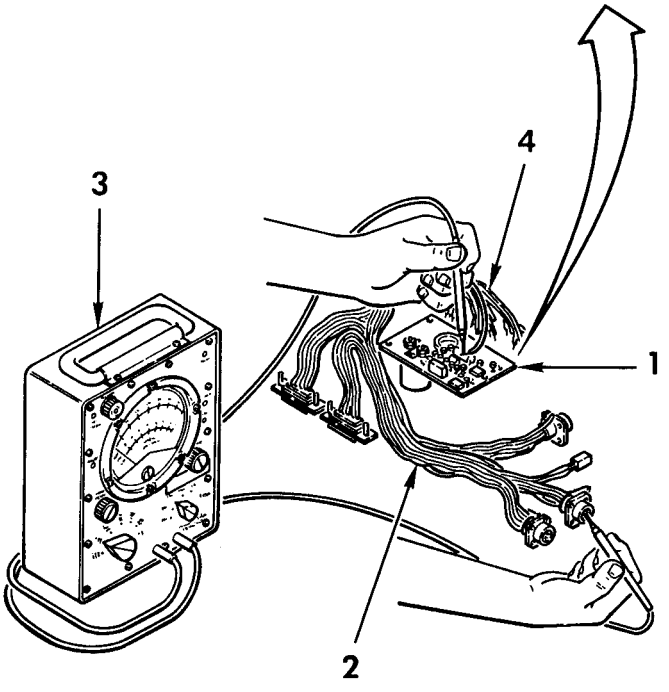
ARR82-26897

ASSEMBLY (cont)

37. INSTALL CIRCUIT BOARD A8 (1) ON WIRE HARNESS (2).
    a. Use multimeter (3) to identify harness wires (4) prior to connecting them.
    b. Remove labels from soldered connections.
    C. Solder wires (4) from wire harness (2) to circuit board A8 (1) as listed.



CIRCUIT BOARD A8 TERM.	HARNESS CONNECTOR TERM.
E1	P2-21
	J1-K
E2	P2-8
E3	P2-17
	J2-U
E4	J2-N
E5	P2-5
	J2-E
E6	J3-T
	P2-24
E7	J3-S
	P2-3
E8	J3-R
	P2-15
E9	J3-P
	P2-2
E10	J3-U
E11	P2-22
E12	J3-N
E13	P2-13
T1-1	J2-H
T1-2	J2-J
T1-3	P2-14
T1-4	P2-1

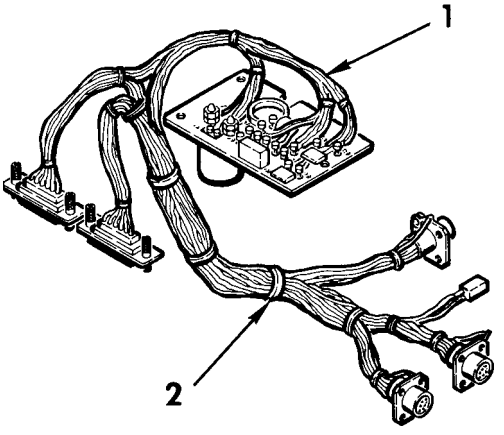


ARR82-26898

2-58. REPAIR OF TURRET CONTROL ASSEMBLY (cont)

38. INSTALL CABLE TIEDOWN STRAPS (1).

After all wires (2) are soldered, wrap wires in bundles with cable tiedown straps (1) as required.

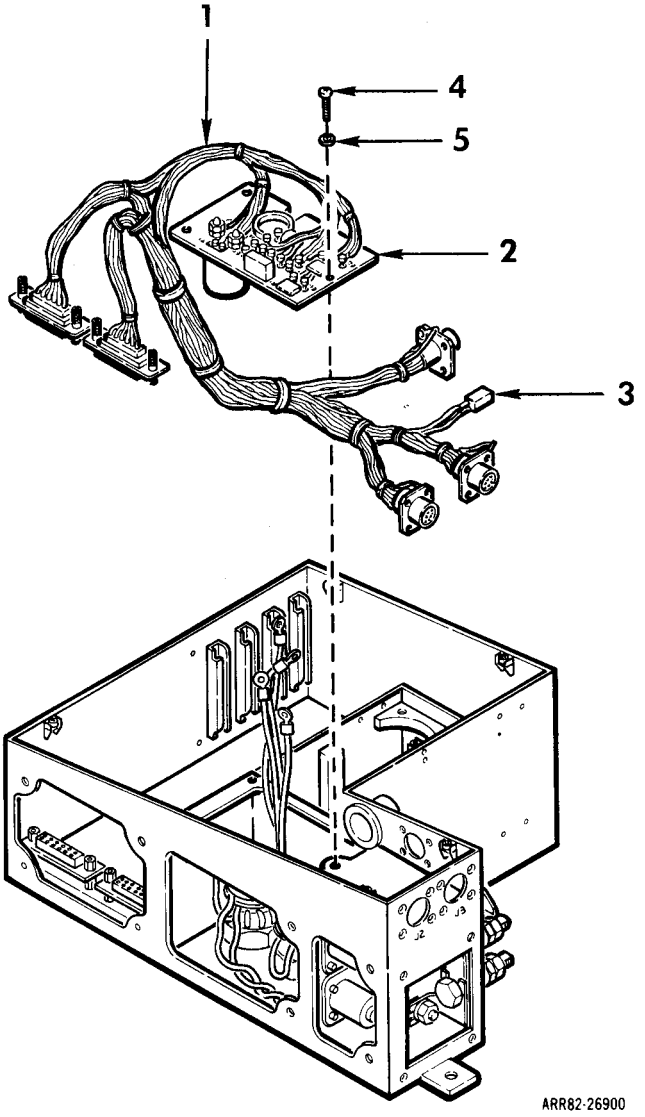


ARR82-26899

39. INSTALL WIRE HARNESS (1), CIRCUIT BOARD A8 (2), AND HOUR METER M1 (3).

a. Place wire harness (1), circuit board A8 (2), and M1 hour meter (3) inside case as an assembly.

b. Secure circuit board A8 (2) to case with three screws (4) and three washers (5).

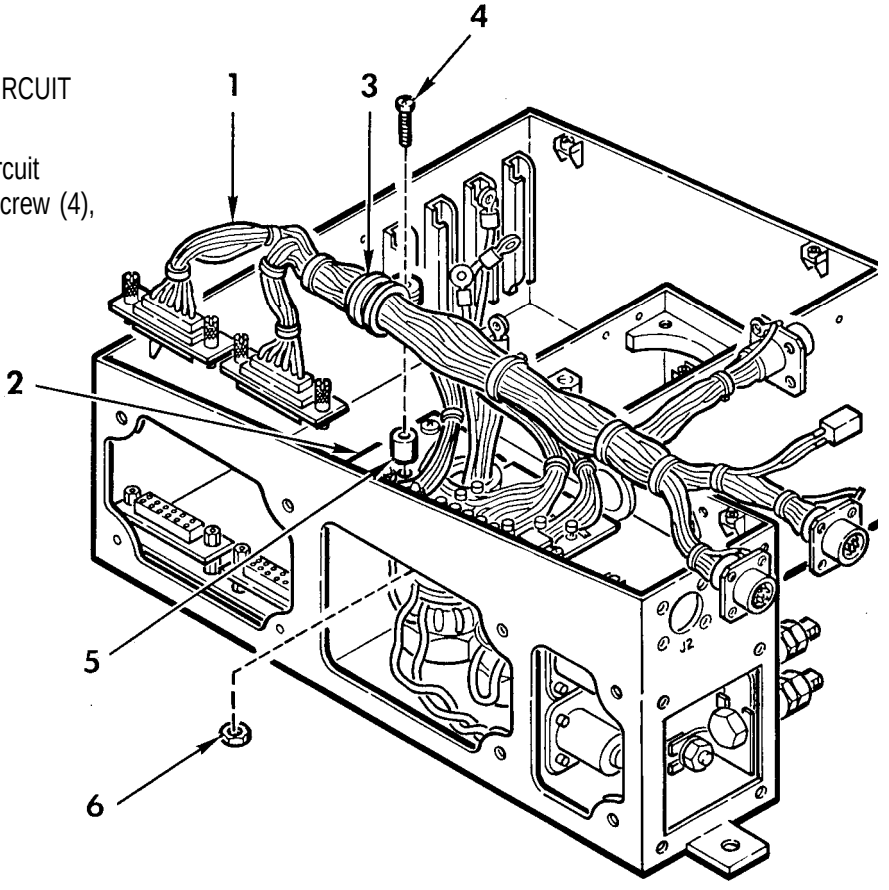


ARR82-26900

ASSEMBLY (cont)

40. CLAMP WIRE HARNESS (1) TO CIRCUIT BOARD A8 (2).

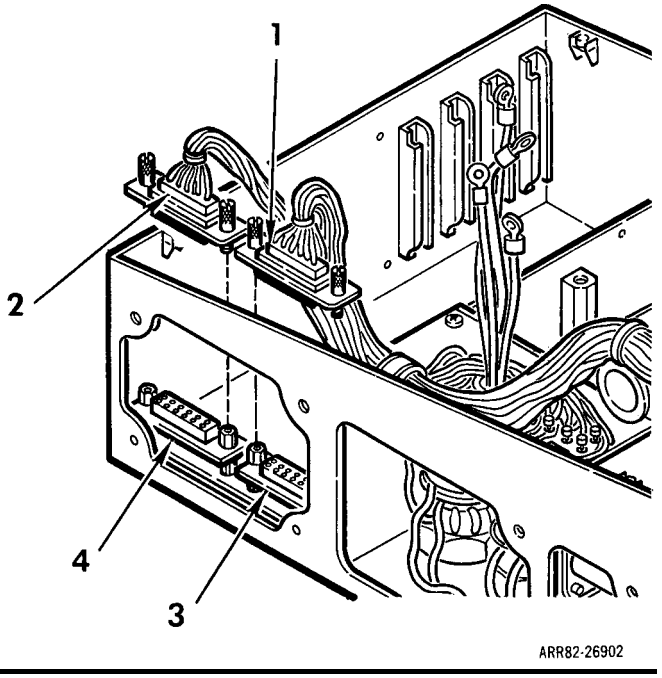
    Secure wire harness (1) to circuit board A8 (2) with clamp (3), screw (4), spacer (5), and nut (6).



41. CONNECT CONNECTORS P2 (1) AND P3 (2).

    a. Connect wire harness connector P2 (1) to connector J6 (3).

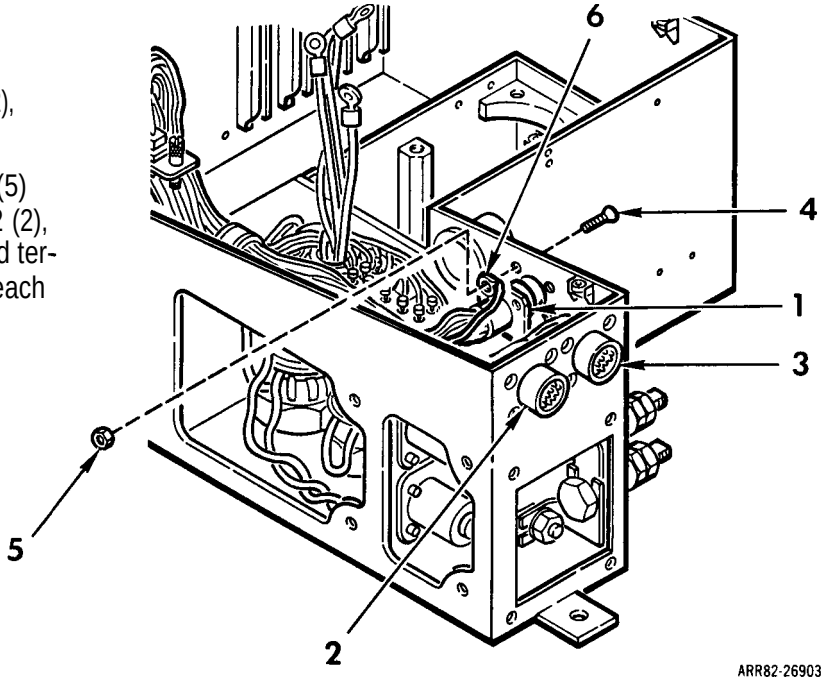
    b. Connect wire harness connector P3 (2) to connector J7 (4).



2-58. REPAIR OF TURRET CONTROL ASSEMBLY (cont)

42. INSTALL CONNECTORS J1 (1), J2 (2), AND J3 (3).

    Use 12 screws (4) and 12 nuts (5) and secure connectors J1 (1), J2 (2), and J3 (3) to case, Place ground terminal (6) under one nut (5) of each connector.

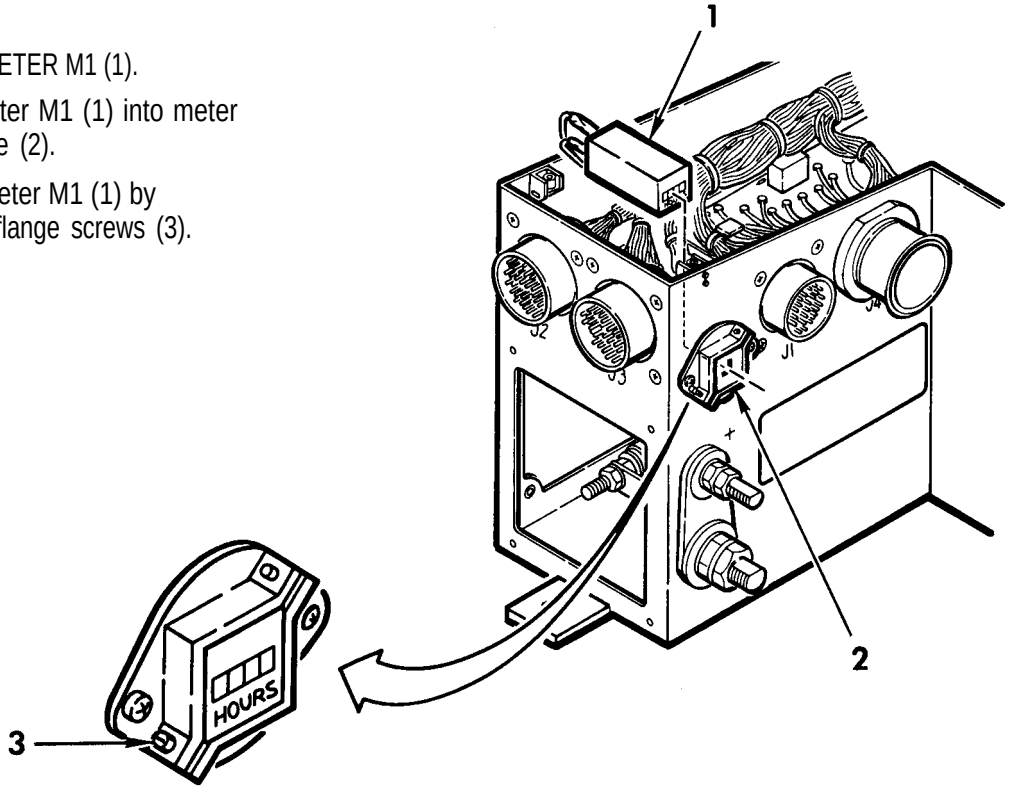


ARR82-26903

43. INSTALL HOUR METER M1 (1).

    a. Insert hour meter M1 (1) into meter mounting flange (2).

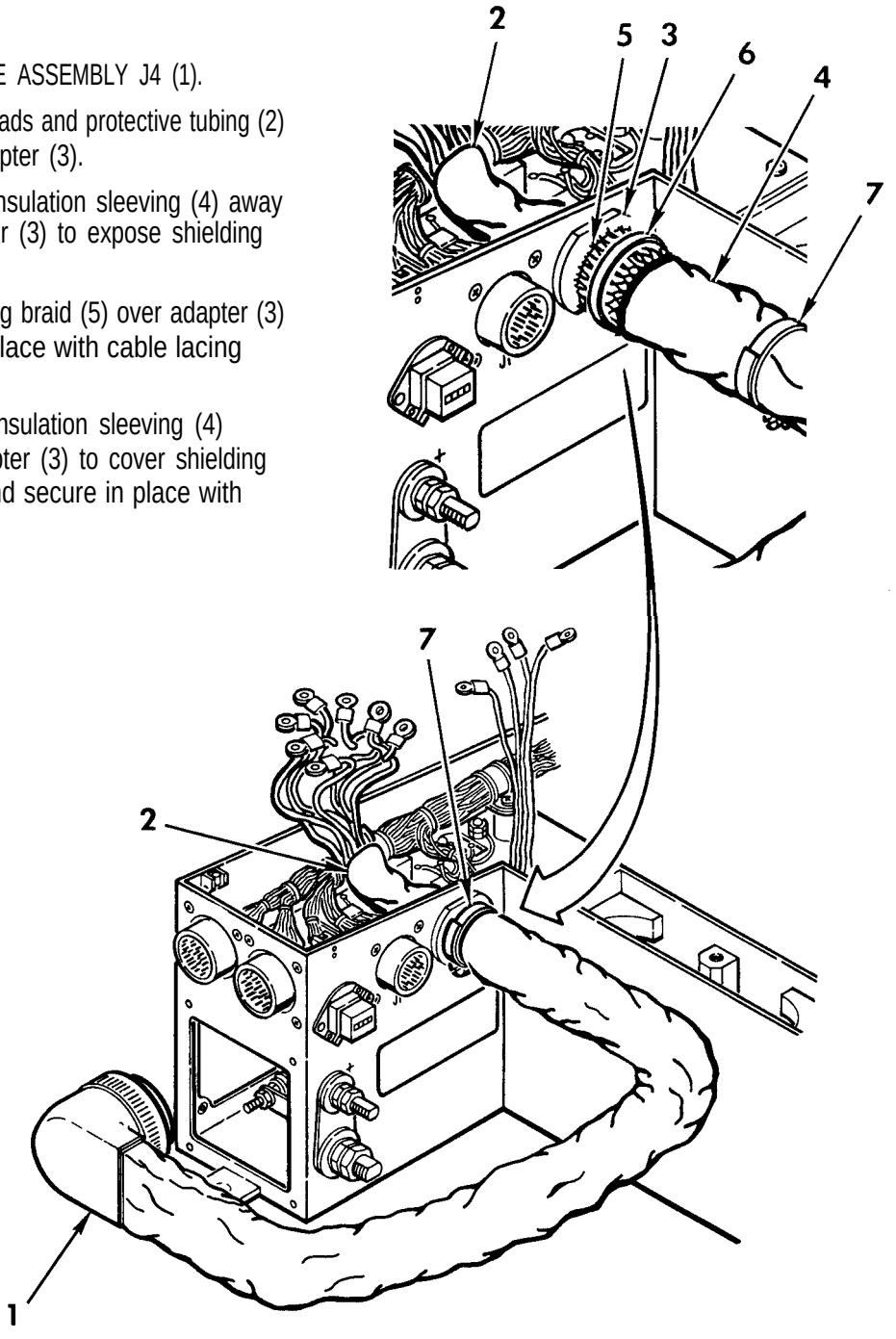
    b. Secure hour meter M1 (1) by tightening two flange screws (3).



ARR82-26904

ASSEMBLY (cont)

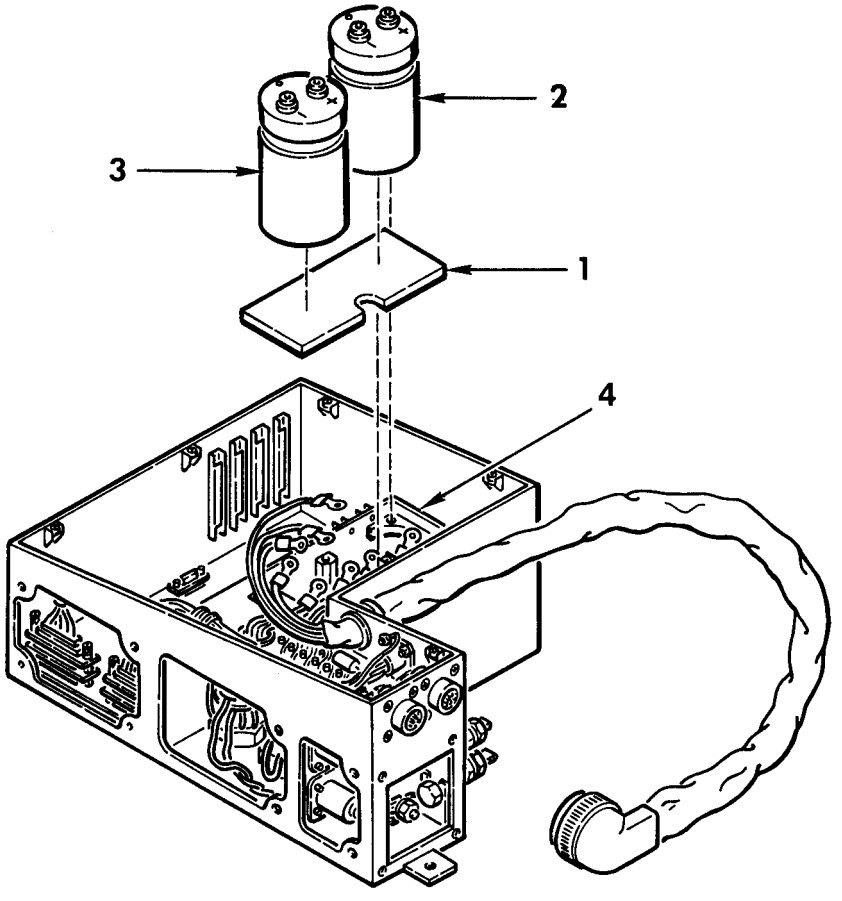
44. INSTALL CABLE ASSEMBLY J4 (1).
    a. Pull cable leads and protective tubing (2) through adapter (3).
    b. Pull cable insulation sleeving (4) away from adapter (3) to expose shielding braid (5).
    c. Pull shielding braid (5) over adapter (3) and tie in place with cable lacing tape (6).
    d. Pull cable insulation sleeving (4) toward adapter (3) to cover shielding braid (5) and secure in place with clamp (7).



ARR82-26905

2-58. REPAIR OF TURRET CONTROL ASSEMBLY (cont)

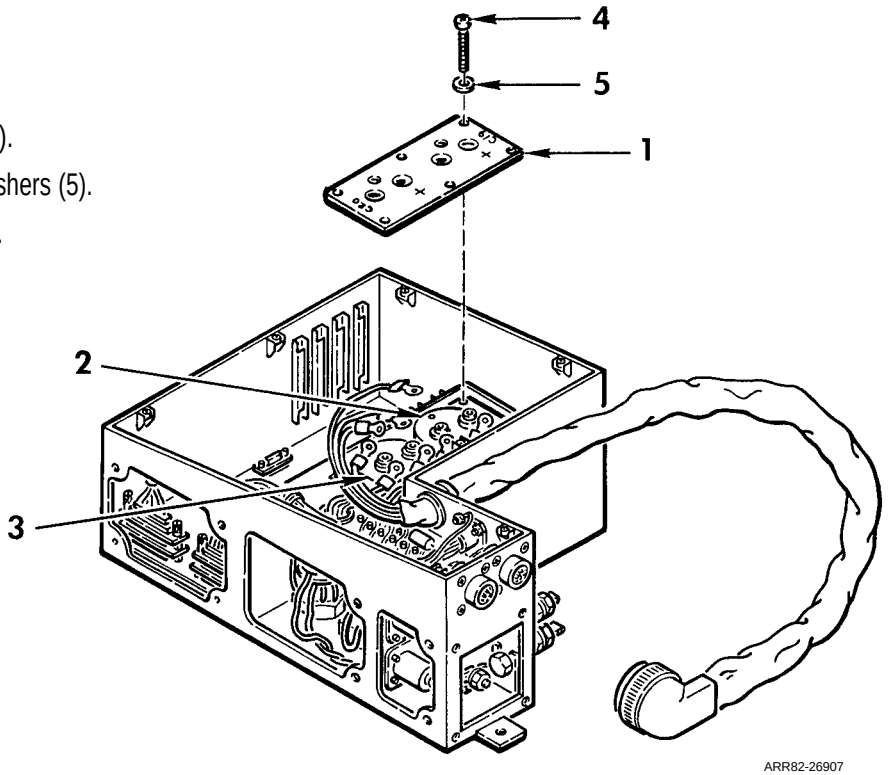
45. INSTALL CUSHIONING PAD (1) AND CAPACITORS C19 (2) AND C20 (3).
    a. Place cushioning pad (1) in bottom of case (4).
    b. Place capacitors C19 (2) and C20 (3) on cushioning pad (1) so that positive (+) terminals are toward circuit card side and negative (–) terminals are toward wire harness side, (The two capacitors are interchangeable.)



ARR82-26906

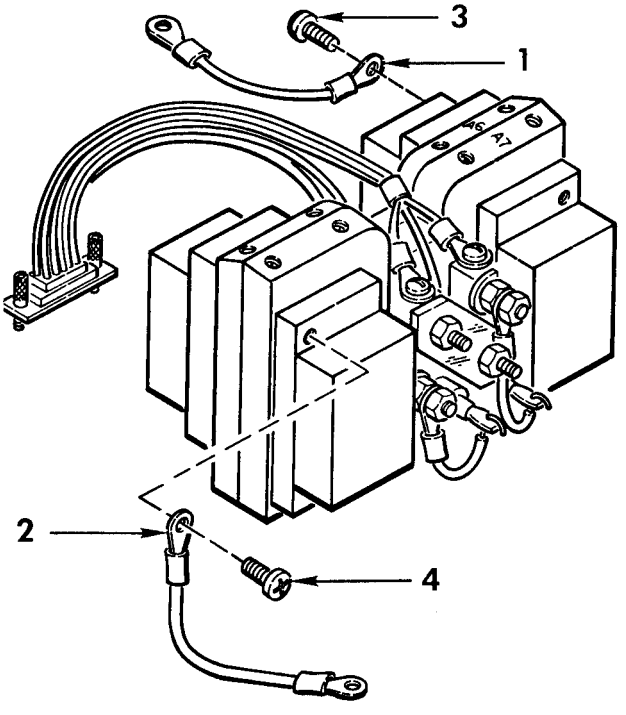
ASSEMBLY (cont)

46. INSTALL CAPACITOR COVER (1).
    a. Place capacitor cover (1) over capacitors C19 (2) and C20 (3).
    b. Install six screws (4) and six washers (5).
    c. Torque screws (4) to 7-9 lb-in. (0.8-1.0 N.m).



ARR82-26907

47. INSTALL LEADS (1) AND (2).
    a. Install leads (1) and (2) and screws (3) and (4) on component assembly.
    b. Torque screws (3) and (4) to 18-22 lb-in. (2.0-2.5 N.m)



ARR82-26908

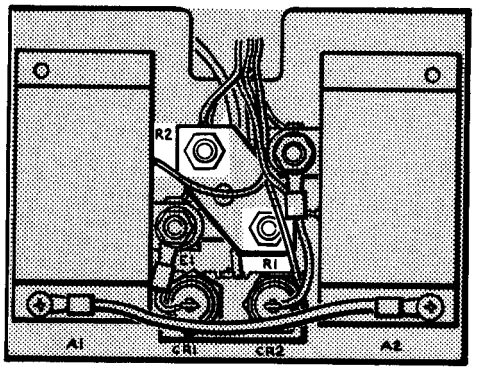
2-58. REPAIR OF TURRET CONTROL ASSEMBLY (cont)

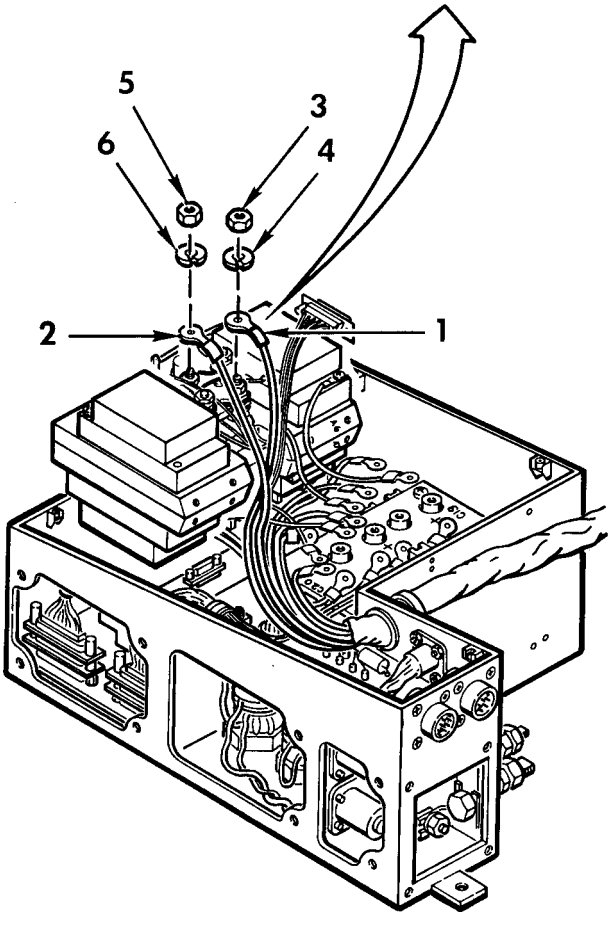
48, CONNECT WIRES (1) AND (2) TO A6 SIDE OF COMPONENT ASSEMBLY.

a. Use multimeter to identify wires (1) and (2) prior to connecting them.

b. Connect wire (1) from pin D of cable assembly J4 to terminal A6R2-B with nut (3) and washer (4).

c. Connect wire (2) from pin F of cable assembly J4 to terminal A6R1-B with nut (5) and washer (6). Remove labels.

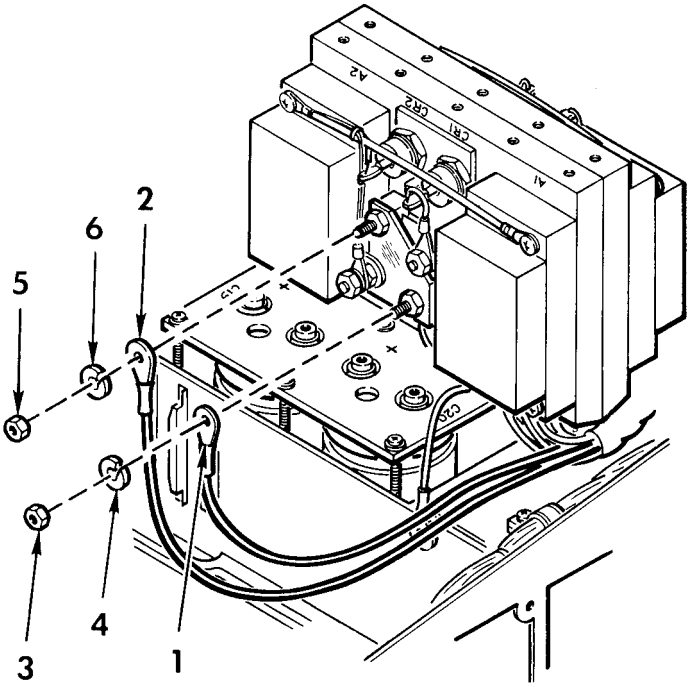




ARR82-26909

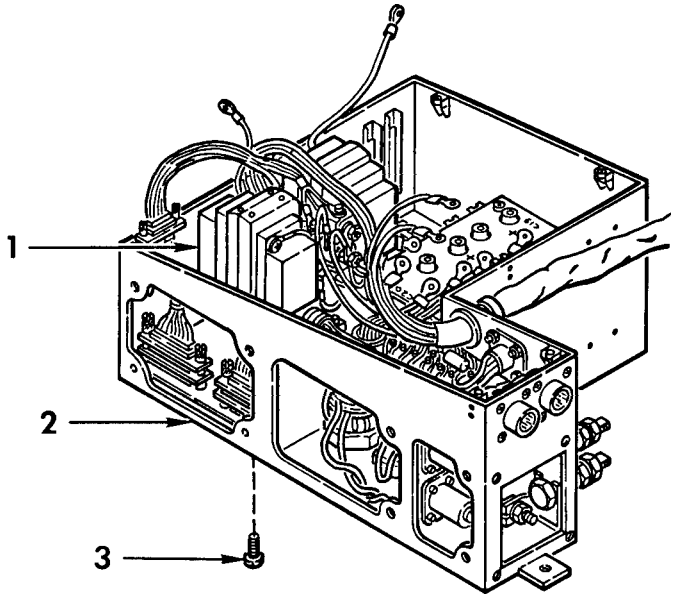
ASSEMBLY (cont)

49. CONNECT WIRES (1) AND (2) TO A7 SIDE OF COMPONENT ASSEMBLY.
    a. Use multimeter to identify wires (1) and (2) prior to connecting them.
    b. Connect wire (1) from pin C of cable assembly J4 to terminal A7R2-B with nut (3) and washer (4).
    c. Connect wire (2) from pin A of cable assembly J4 to terminal A7R1-B with nut (5) and washer (6). Remove labels.



ARR82-26910

50. INSTALL COMPONENT ASSEMBLY (1).
    a. Secure component assembly (1) to case (2) with 10 screws (3).
    b. Torque screws (3) to 8-10 lb-in. (0.9-1.1.N.m).

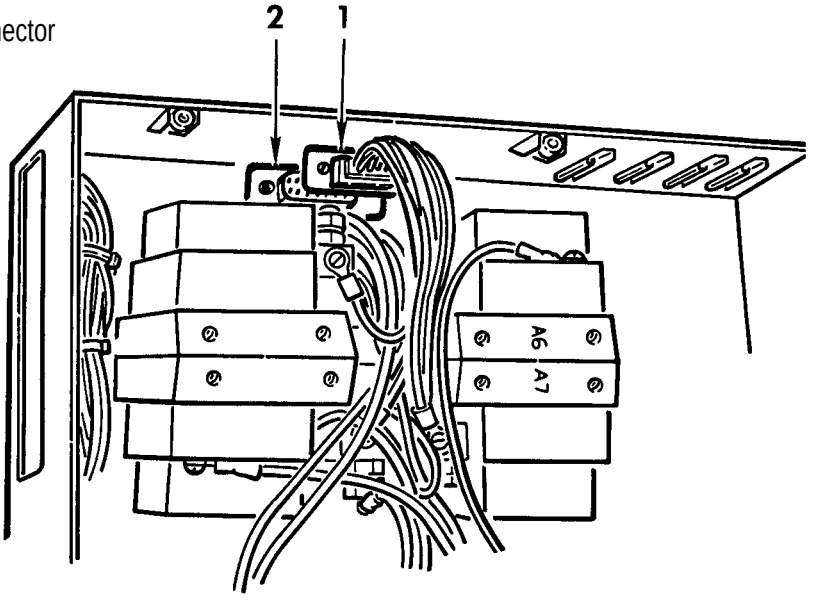


ARR82-26911

2-58. REPAIR OF TURRET CONTROL ASSEMBLY (cont)

51. CONNECT CONNECTOR P1 (1).

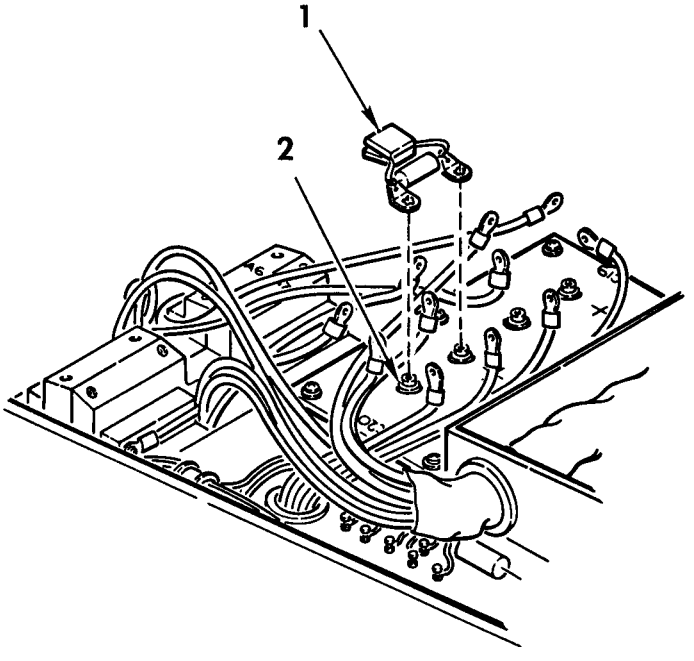
Connect connector P1 (1) to connector J5 (2) and tighten screw posts.



ARR82-26912

52. INSTALL SOLDERED ASSEMBLY (1) ON CAPACITOR C20 (2).

Place soldered assembly (1) so that its terminals lay across positive (+) and negative (–) terminals of capacitor C20 (2). Remove labels.



ARR82-26913

ASSEMBLY (cont)

53 CONNECT WIRES TO CAPACITOR C20 (-) TERMINAL.

a. Use multimeter to identify wires prior to connecting them.

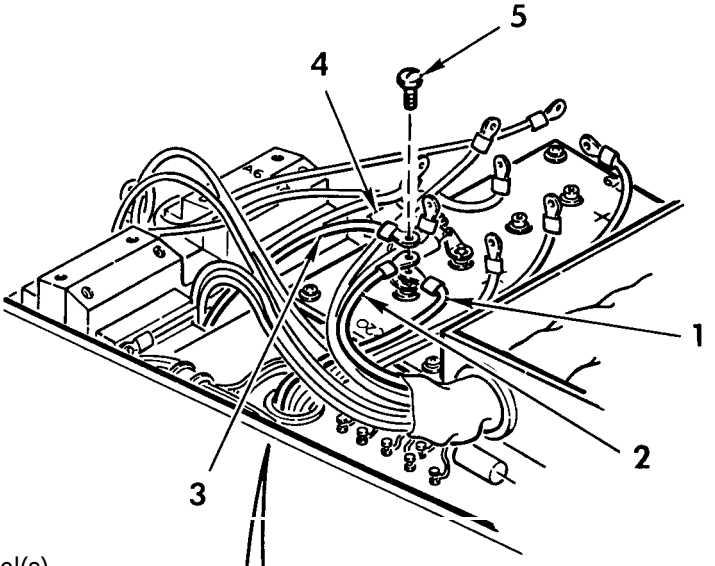
b. Connect wire (1), originating from L4-1, to capacitor C20 (–) terminal.

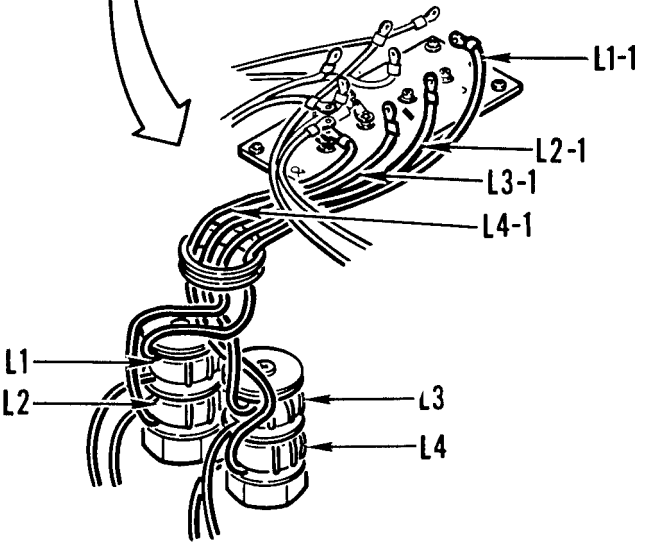
c. Connect wire (2), originating from J4-B, to capacitor C20 (–) terminal.

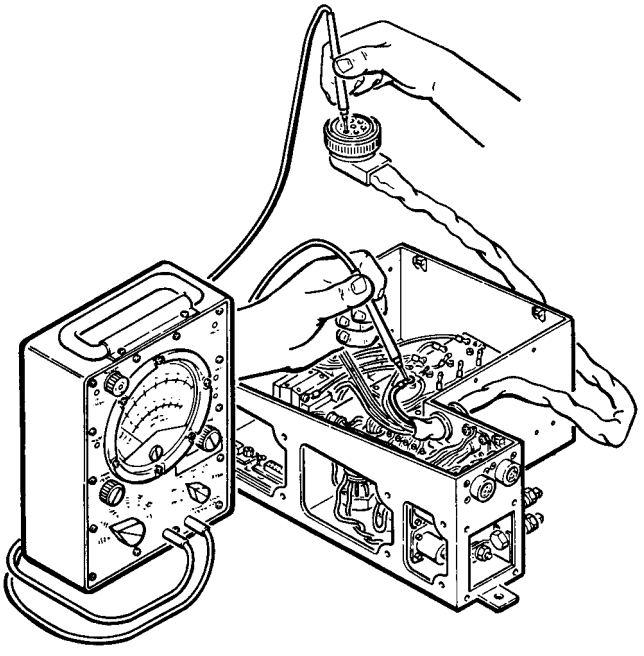
d. Connect wire (3), originating from A7-E1, to capacitor C20 (–) terminal.

e. Secure three wires and soldered assembly (4) to capacitor C20 (–) terminal with screw (5) and remove label(s).

f. Torque screw (5) to 9-11 lb-in. (1.0-1.2 N.m).







ARR82-26914

2-58. REPAIR OF TURRET CONTROL ASSEMBLY (cont)

54. CONNECT WIRES TO CAPACITOR C20 (+) TERMINAL

a. Use multimeter to identify wires prior to connecting them.

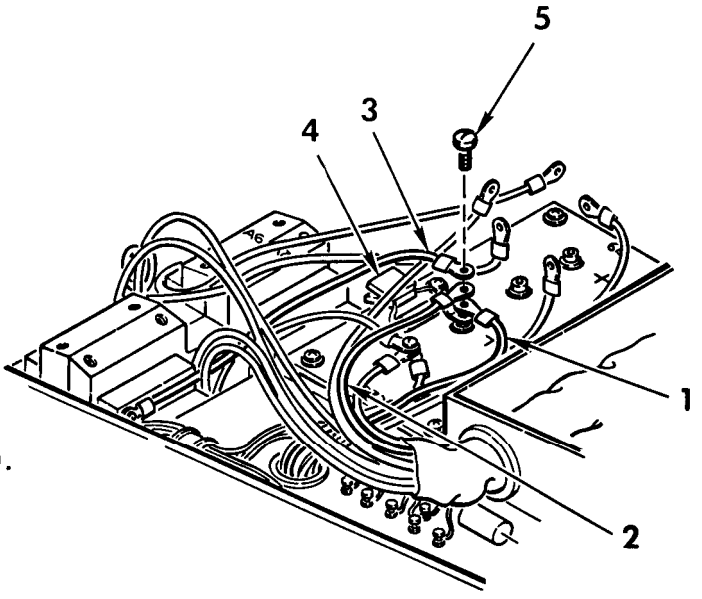
b. Connect wire (1), originating from L3-1, to capacitor C20 (+) terminal.

c. Connect wire (2), originating from J4-G, to capacitor C20 (+) terminal.

d. Connect wire (3), originating from A7-E2, to capacitor C20 (+) terminal.

e. Secure three wires and soldered assembly (4) to capacitor C20 (+) terminal with screw (5) and remove label(s).

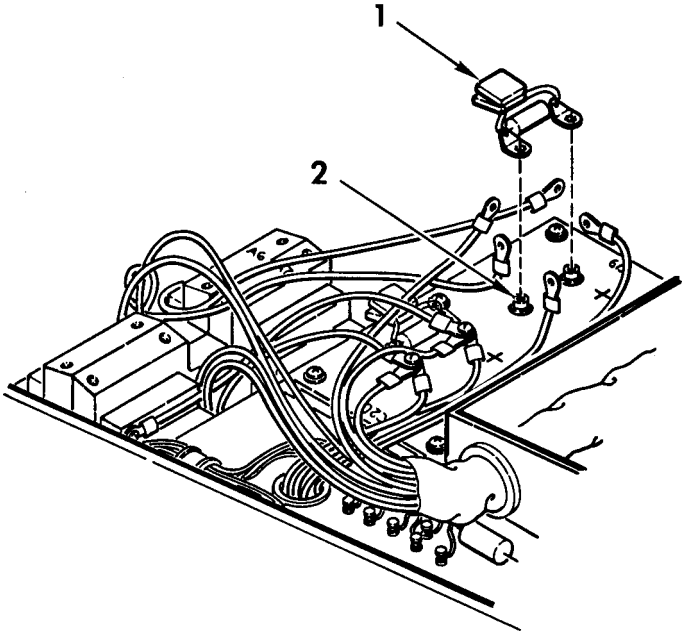
f. Torque screw (5) to 9-11 lb-in. (1.0-1.2 N.m).



ARR82-26915

55. INSTALL SOLDERED ASSEMBLY (1) ON CAPACITOR C19 (2).

Place soldered assembly (1) so that its terminals lay across positive (+) and negative (–) terminals of capacitor C19 (2).



ARR82-26916

ASSEMBLY (cont)

56. CONNECT WIRES TO CAPACITOR C19 (-) TERMINAL.

a. Use multimeter to identify wires prior to connecting them.

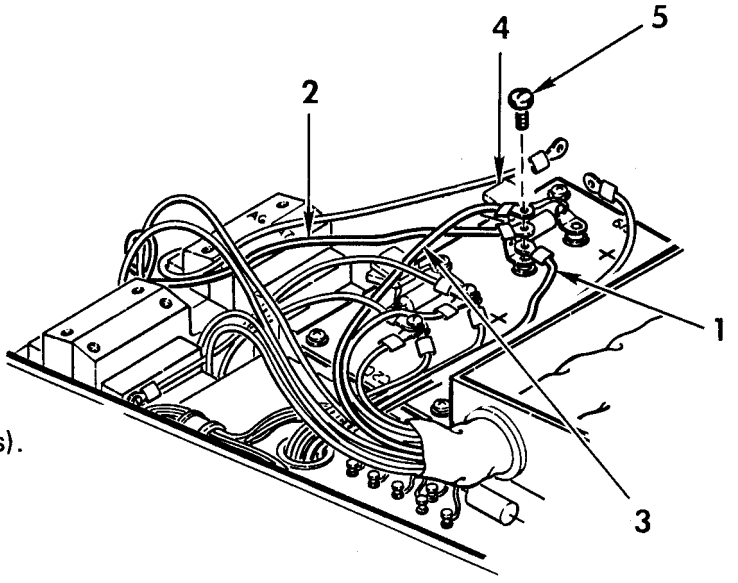
b. Connect wire (1), originating from L2-1, to capacitor C19(-) terminal.

c. Connect wire (2), originating from A6-E1, to capacitor C19 (-) terminal.

d. Connect wire (3), originating from J4-E, to capacitor C19 (-) terminal.

e. Secure three wires and soldered assembly (4) to capacitor C19(-) terminal with screw (5),and remove label(s).

f. Torque screw (5) to 9-11 lb-in. (1.0-1.2 N.m).



ARR82-26917

57. CONNECT WIRES TO CAPACITOR C19 (+) TERMINAL.

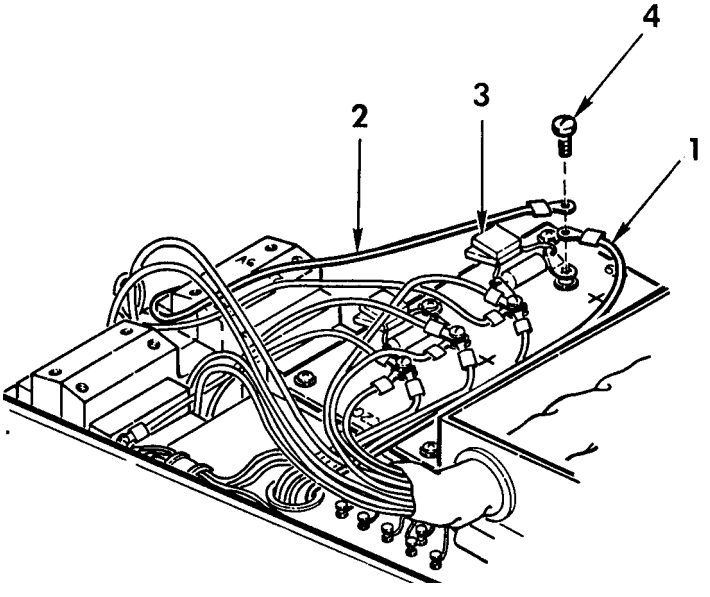
a. Use multimeter to identify wires prior to connecting them.

b. Connect wire (1), originating from L1-1 to capacitor C19 (+) terminal.

c. Connect wire (2), originating from A6-E2, to capacitor C19 (+) terminal.

d. Secure two wires and soldered assembly (3) to capacitor C19 (+) terminal with screw (4) and remove label(s).

e. Torque screw (4) to 9-11 lb-in. (1.0-1.2 N.m).

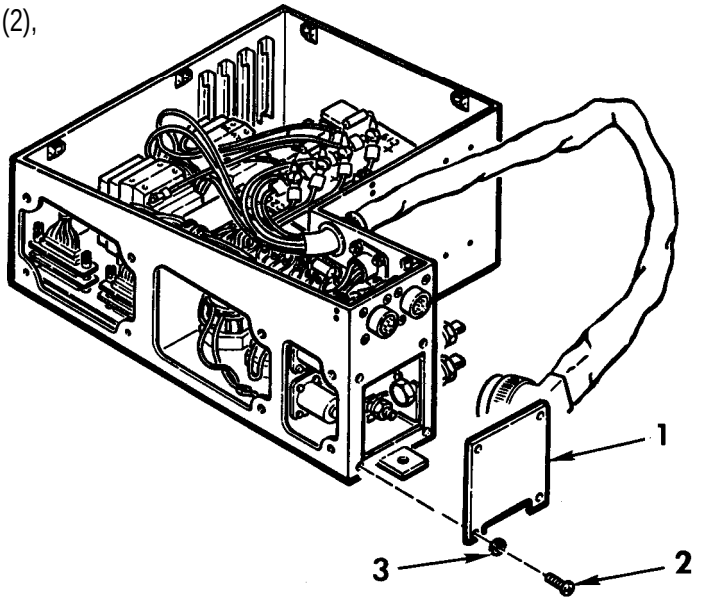


ARR82-26918

2-58. REPAIR OF TURRET CONTROL ASSEMBLY (cont)

58. INSTALL END COVER (1),

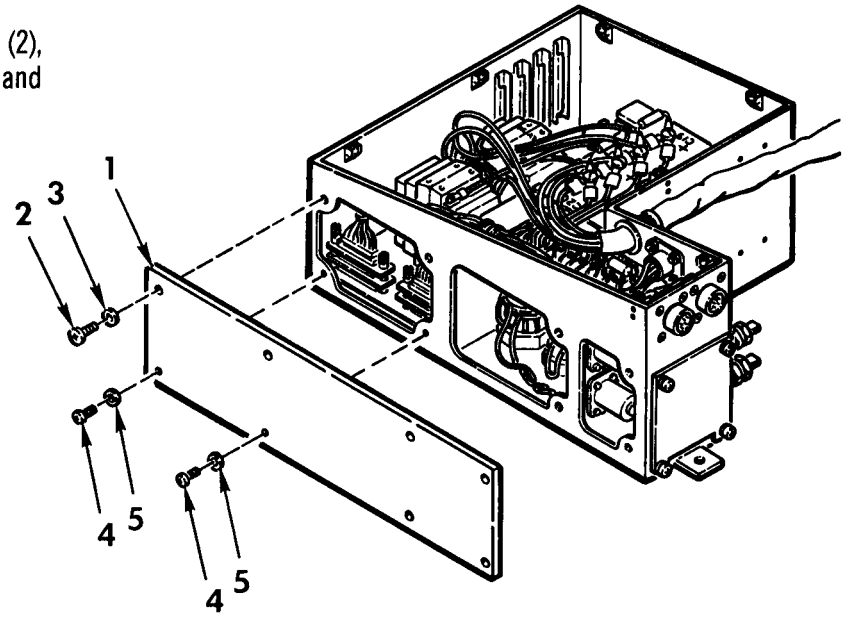
Install end cover (1), four screws (2), and four washers (3).



ARR82-26919

59. INSTALL SIDE COVER (1).

Install side cover (1), six screws (2), six washers (3), two screws (4), and two lockwashers (5).



ARR82-26920

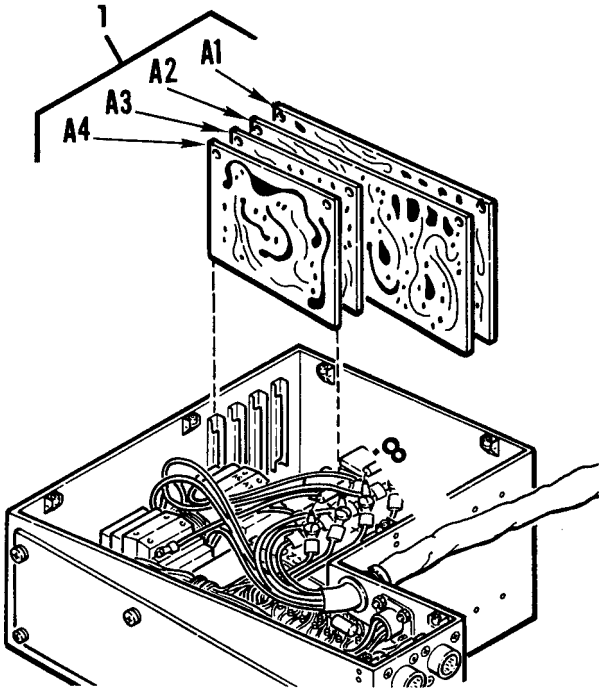
ASSEMBLY (cont)

CAUTION

Circuit card assembly A2 is subject to damage by static charges. Handle circuit card assembly A2 at a work station equipped with static grounding kit.

60. INSTALL CIRCUIT CARD ASSEMBLIES A1 THRU A4 (1).

Install circuit card assemblies A1 thru A4 (1) in connectors. Push down carefully on edges of card to seat firmly in connector.

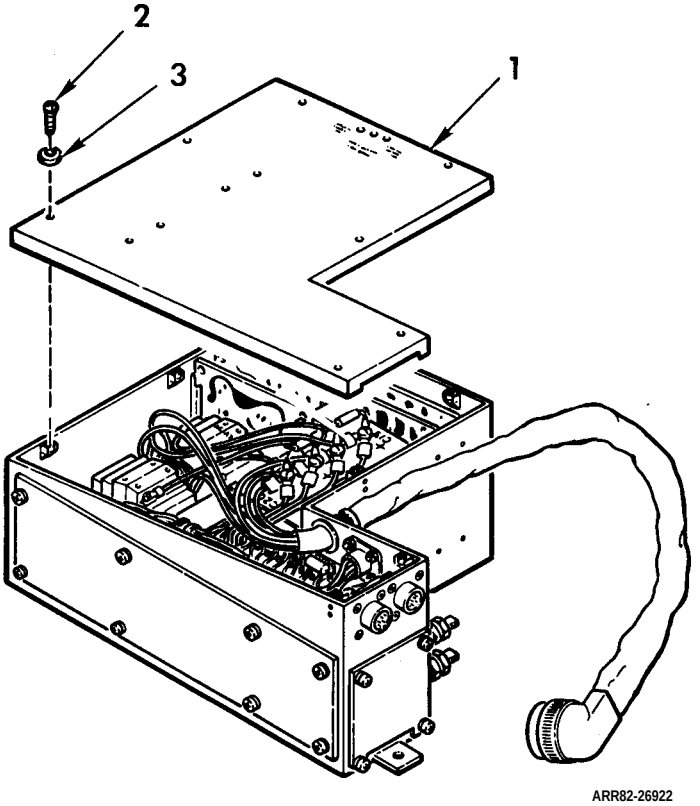


ARR82-26921

61. INSTALL TOP COVER (1).

a. Check inside of case for loose components or wiring, interference, debris, etc.

b. Install top cover (1), 11 screws (2), and 11 washers (3).

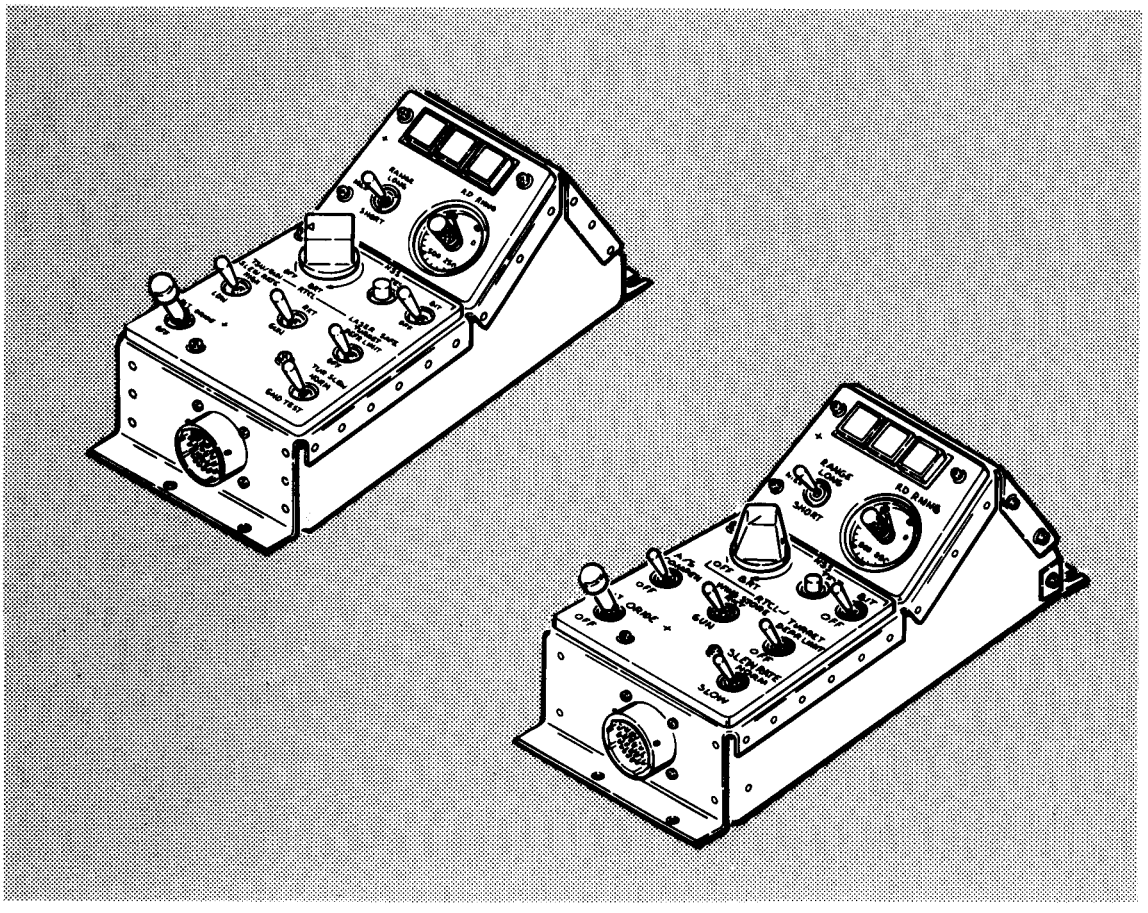


ARR82-26922

END OF TASK

Section XIX. MAINTENANCE OF GUNNER ARMAMENT CONTROL PANEL

Section Contents



ARR83-2068

2-59. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12910143)

DESCRIPTION

This task covers: Disassembly, cleaning, inspection, repair, and assembly.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Multimeter AN/USM-223
- Pin Insertion/Extraction Tool

Materials:
- Solder (Item 28, Appx B)
- Strap (Item 30, Appx B)
- Insulation Sleeving (Item 15.1, APPX B)

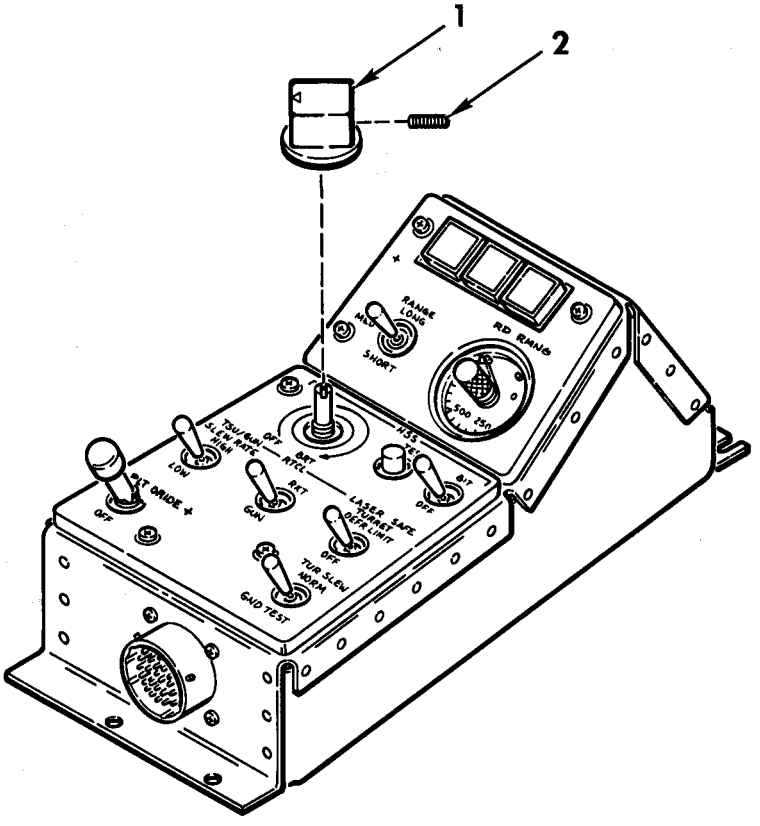
Personnel Required:
- 68J Aircraft Armament/Missile Systems Repairer

Equipment Conditions:
- In shop on bench
- No power applied.

DISASSEMBLY

1. REMOVE KNOB (1).

   Loosen setscrew (2) and remove knob (1).

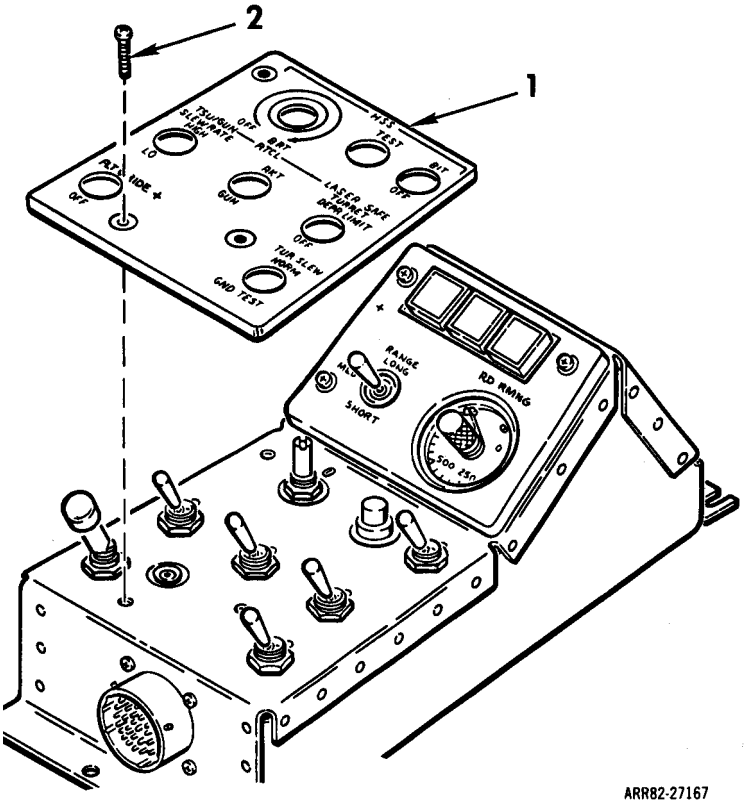


ARR82-27166

DISASSEMBLY (cont)

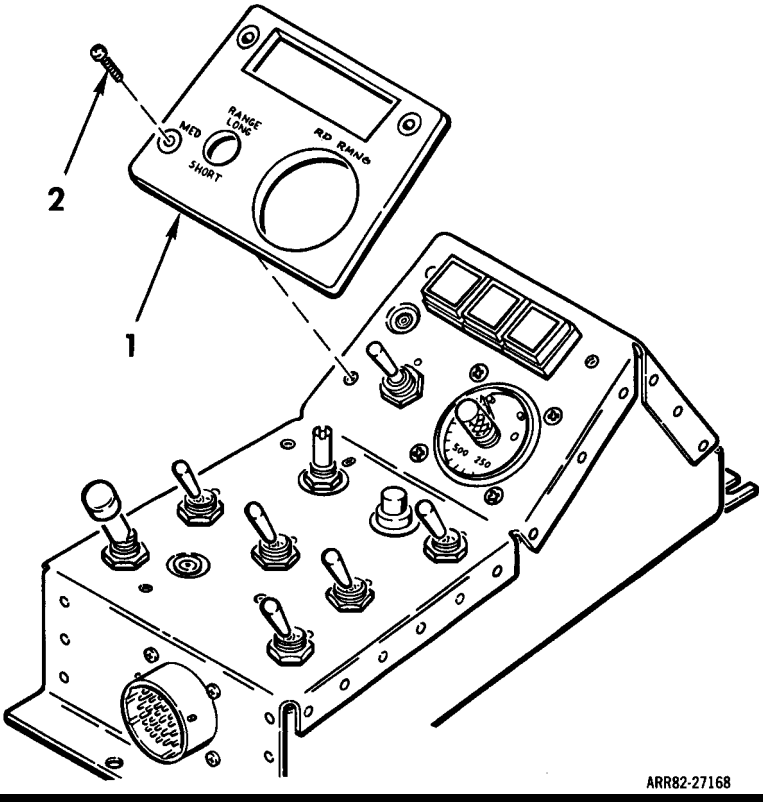
2. REMOVE INDICATOR PANEL (1).

   Remove three screws (2) and indicator panel (1).



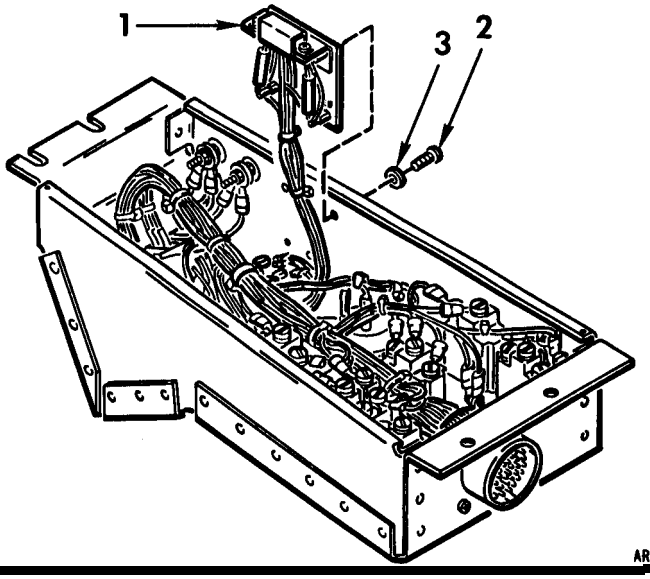
3. REMOVE INDICATOR PANEL (1).

   Remove three screws (2) and indicator panel (1).

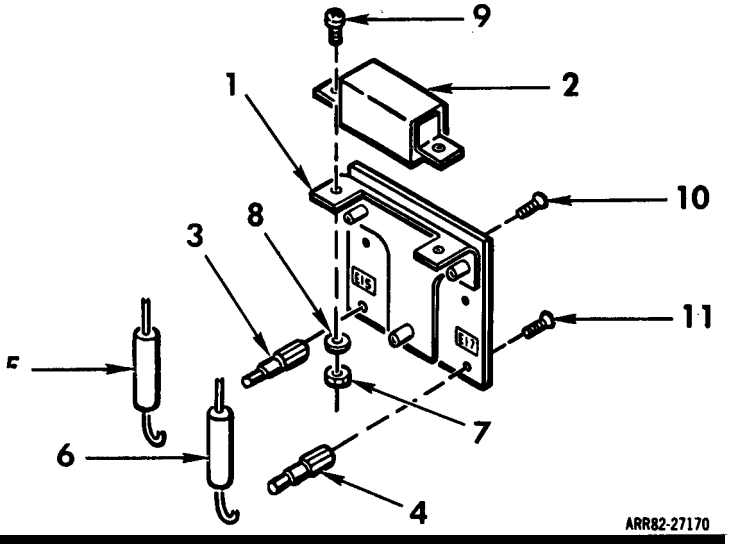


2-59. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12910143) (cont)

4. REMOVE RELAY ASSEMBLY 8Z4 (1).
   a. Remove three screws (2) and three washers (3).
   b. Lift relay assembly 8Z4 (1) from chassis.

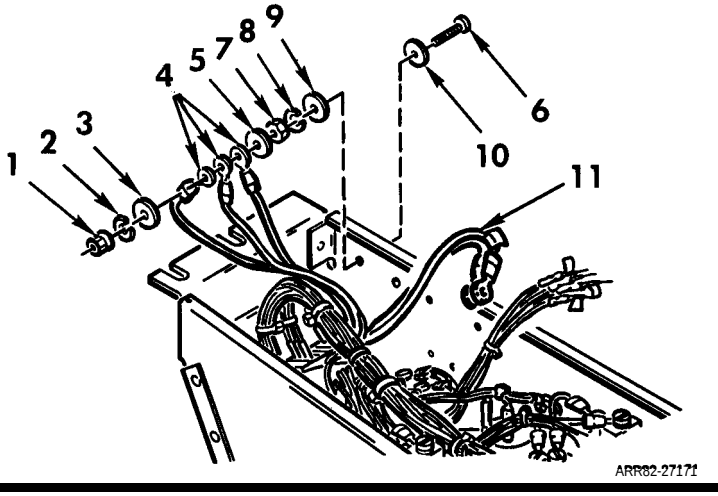


5. DISCONNECT WIRING FROM RELAY ASSEMBLY 8Z4 (1).
   a. Label and unsolder wires from relay assembly 8Z4 (1) including relay (2) and studs E15 (3) and E17 (4).
   b. If required, remove relay (2) by unsoldering two resistors (5) and (6) and removing two nuts (7), two washers (8), and two screws (9).
   c. If required, replace stud E15 (3) or E17 (4) by unsoldering resistor (5) or (6) and removing screw (10) or (11).



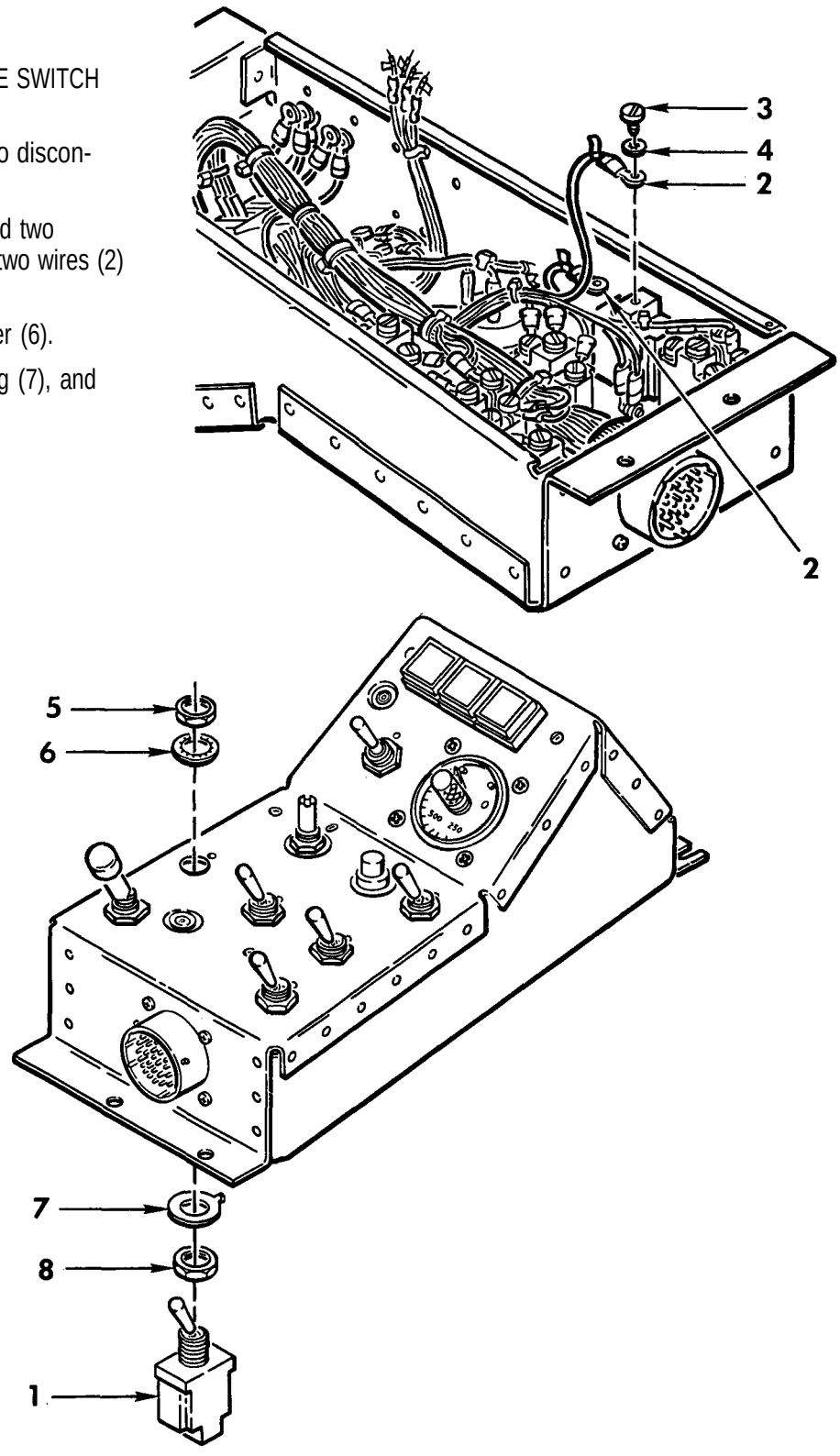
NOTE
Label wires after removal for proper identification.

6. DISCONNECT WIRING FROM GROUND STUDS.
   a. Remove nut (1), lockwasher (2), washer (3), three wires (4), and washer (5) from screw (6).
   b. If required, remove nut (7), lockwasher (8), washer (9), washer (10), and screw (6).
   c Repeat steps a and b to remove two wires (11) and corresponding second set of attaching hardware.



DISASSEMBLY (cont)

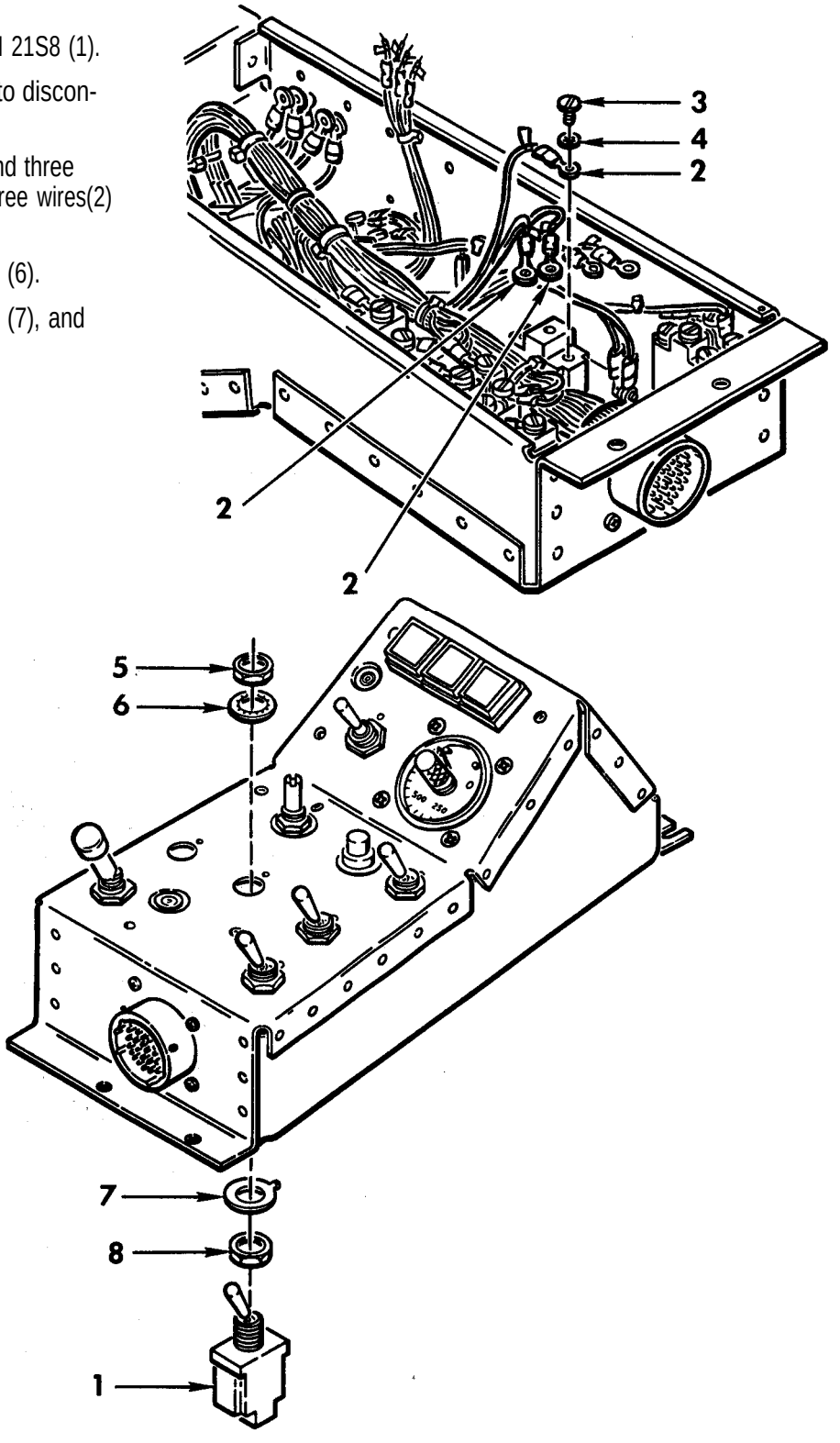
7. REMOVE TSU/GUN SLEW RATE SWITCH 19S6 (1).
   a. Label two wires (2) prior to disconnecting them.
   b. Remove two screws (3) and two washers (4) to disconnect two wires (2) from switch (1) terminals.
   c. Remove nut (5) and washer (6).
   d. Remove switch (1), lockring (7), and nut (8).



ARR82-27172

2-59. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12910143) (cont)

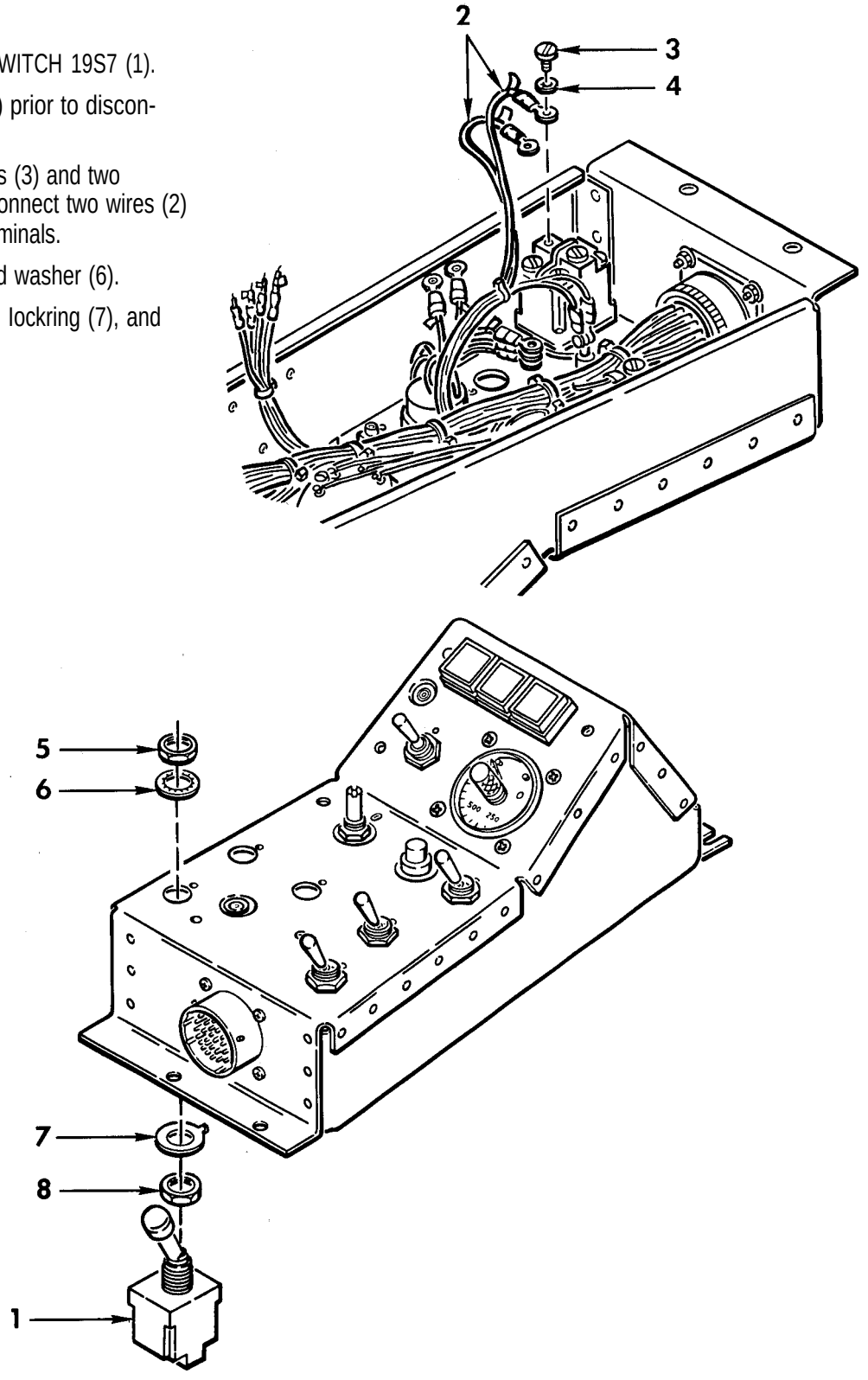
8. REMOVE WING STORE SWITCH 21S8 (1).
   a. Label three wires (2) prior to disconnecting them.
   b. Remove three screws (3) and three washers (4) to disconnect three wires(2) from switch (1) terminals
   c. Remove nut (5) and washer (6).
   d. Remove switch (1), lockring (7), and nut (8).



ARR82-27173

DISASSEMBLY (cont)

9. REMOVE PLT ORIDE SWITCH 19S7 (1).
   a. Label two wires (2) prior to disconnecting them.
   b. Remove two screws (3) and two washers (4) to disconnect two wires (2) from switch (1) terminals.
   c Remove nut (5) and washer (6).
   d. Remove switch (1), lockring (7), and nut (8).



ARR82-27174

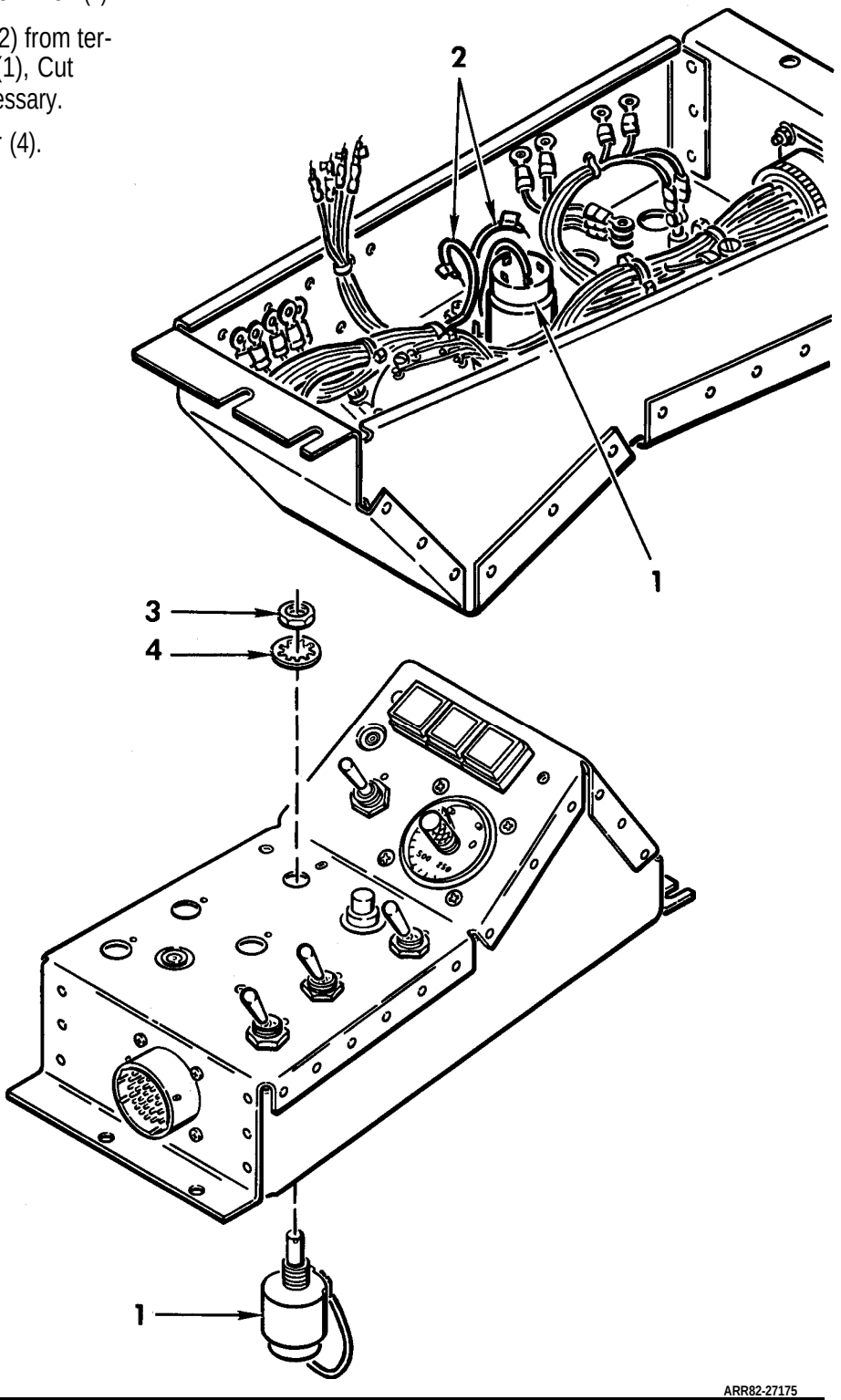
2-59. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12910143) (cont)

10. REMOVE HSS RETICLE LIGHT CONTROL (1).

a. Label and unsolder wires (2) from terminals 2 and 3 of control (1), Cut cable tiedown straps if necessary.

b. Remove nut (3) and washer (4).

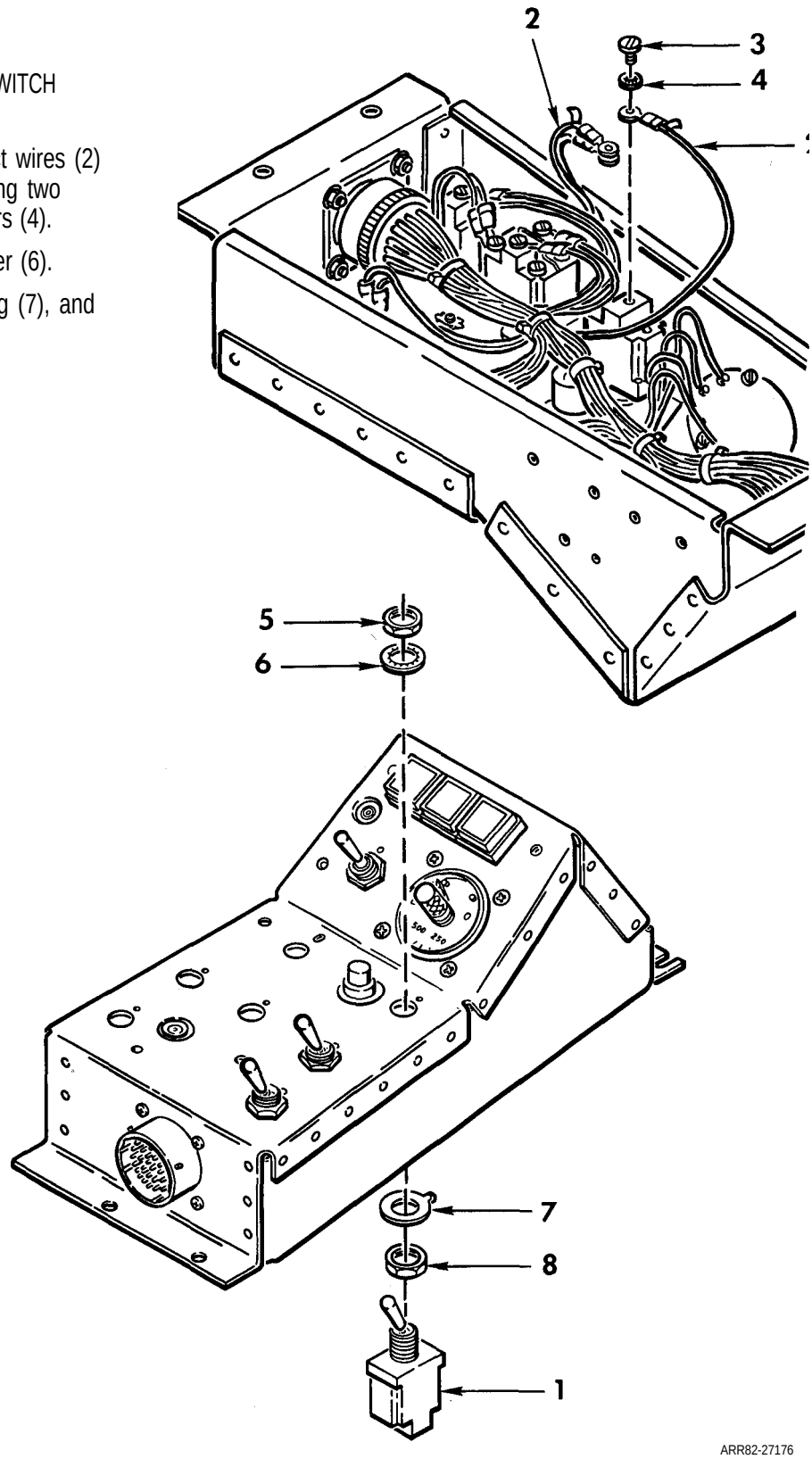
c. Remove control (1).



ARR82-27175

DISASSEMBLY (cont)

11. REMOVE HSS/BIT TOGGLE SWITCH 17S5 (1).
    a. Label wires (2), Disconnect wires (2) from switch (1) by removing two screws (3) and two washers (4).
    b. Remove nut (5) and washer (6).
    c Remove switch (1), Iockrirrg (7), and nut (8).



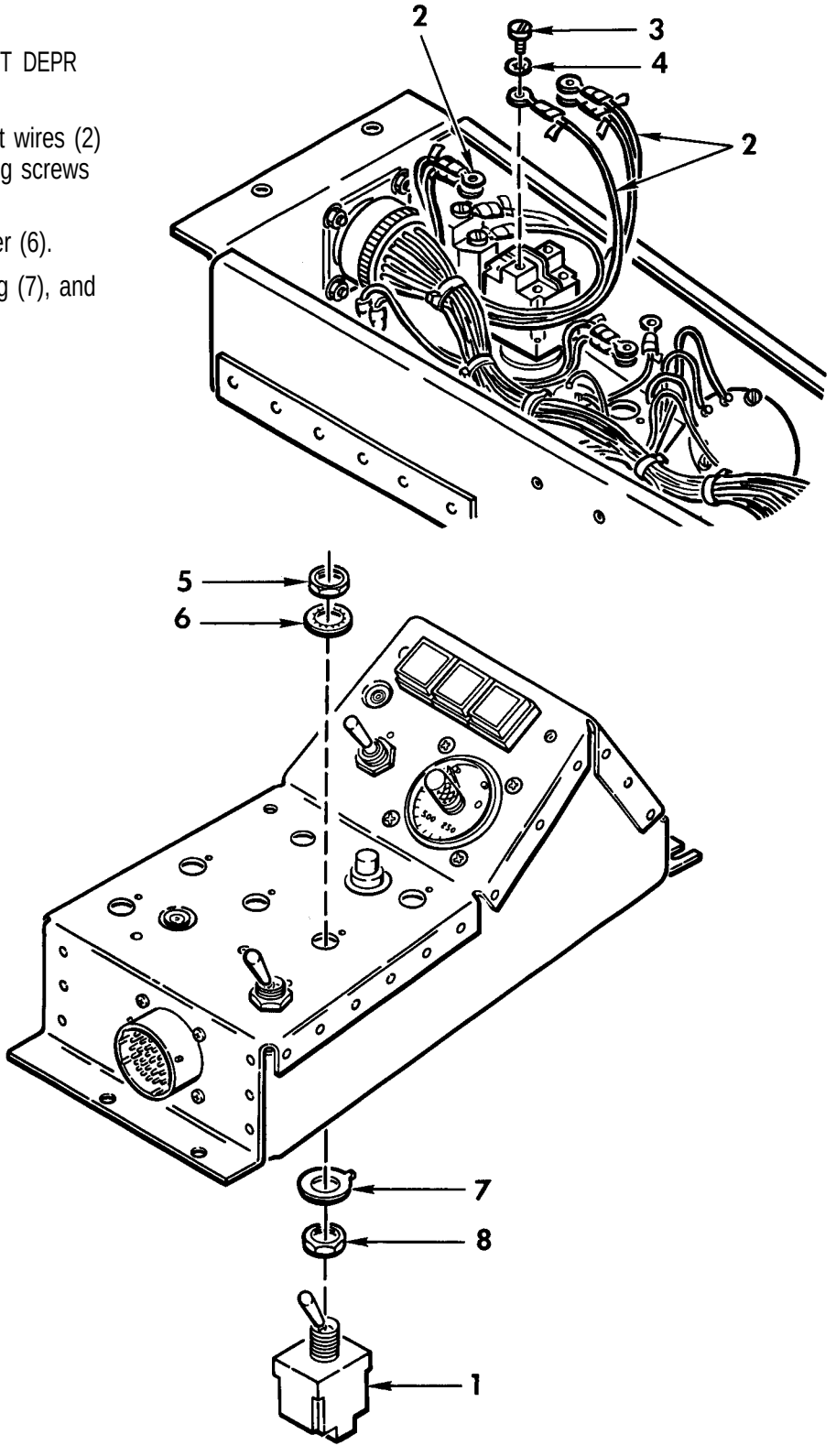
2-59. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12910143) (cont)

12. REMOVE LASER SAFE/TURRET DEPR LIMIT SWITCH 19S16 (1).

a. Label wires (2). Disconnect wires (2) from switch (1) by removing screws (3) and washers (4).

b. Remove nut (5) and washer (6).

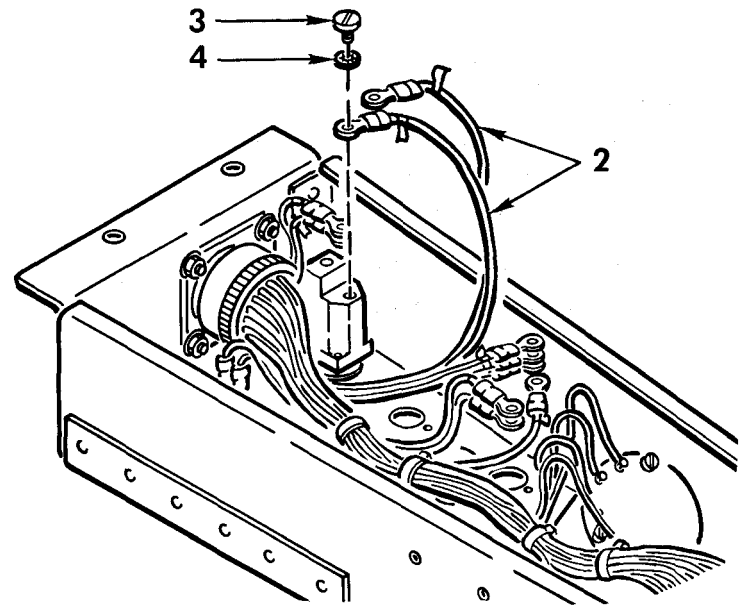
c. Remove switch (1), lockring (7), and nut (8).

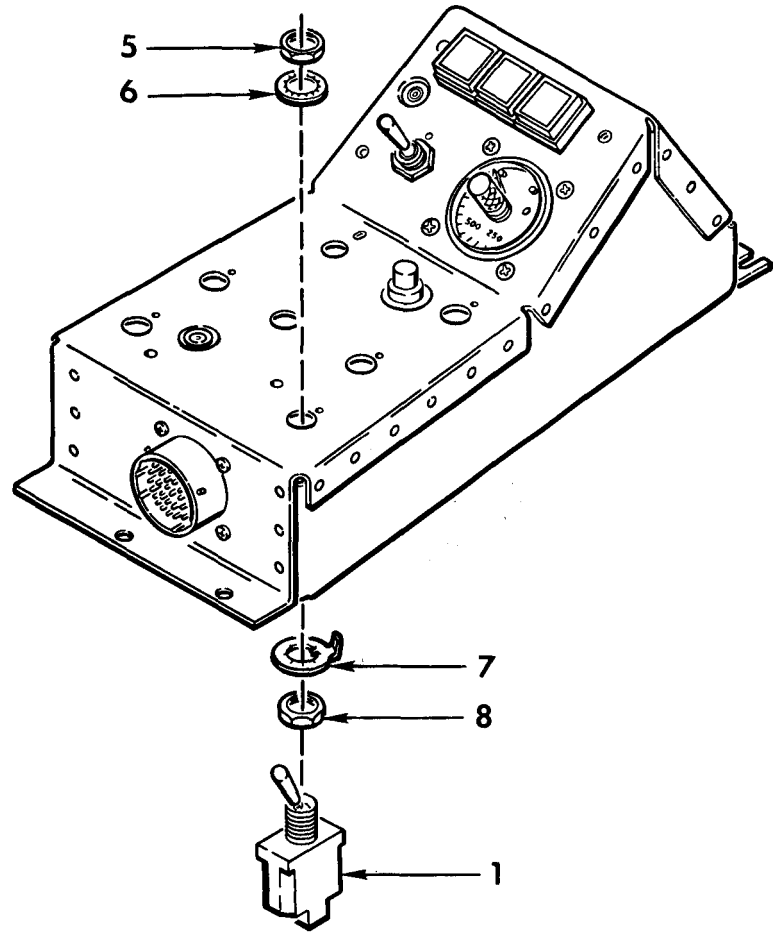


ARR82-27177

DISASSEMBLY (cont)

13. REMOVE TUR SLEW SWITCH 19S3 (1).
    a. Label two wires (2). Disconnect wires (2) from switch (1) by removing screws (3) and washers (4).
    b. Remove nut (5) and washer (6).
    c. Remove switch (1), lockring (7), and nut (8).

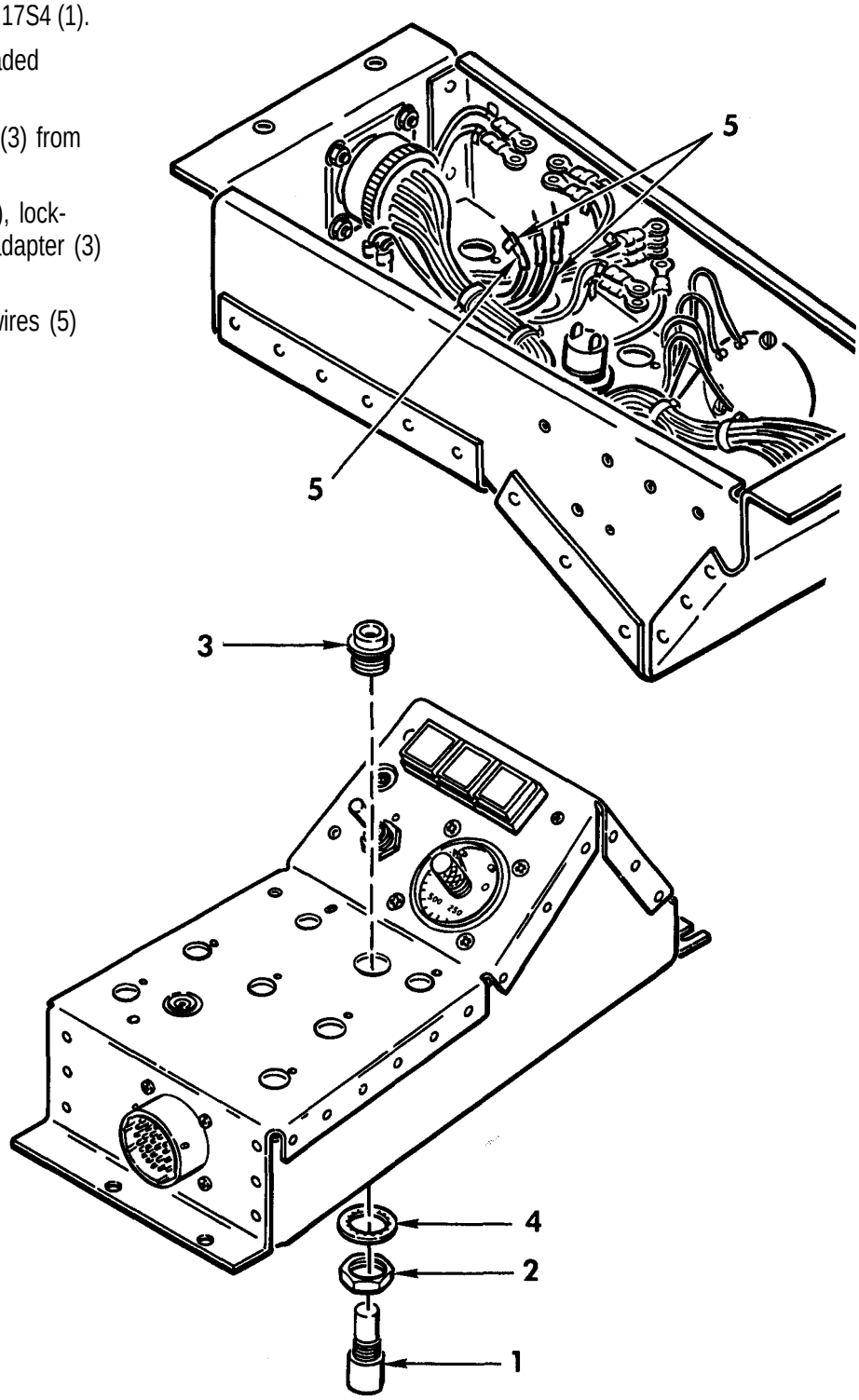




ARR82-27178

2–59. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12910143) (cont)

14. REMOVE TEST PUSH SWITCH 17S4 (1).
    a. Unscrew nut (2) from threaded adapter (3),
    b. Unscrew threaded adapter (3) from body of switch (1).
    c. Separate switch (1), nut (2), lockwasher (4), and threaded adapter (3) from chassis.
    d. Label and unsolder three wires (5) from switch (1) terminals.



ARR82-27179

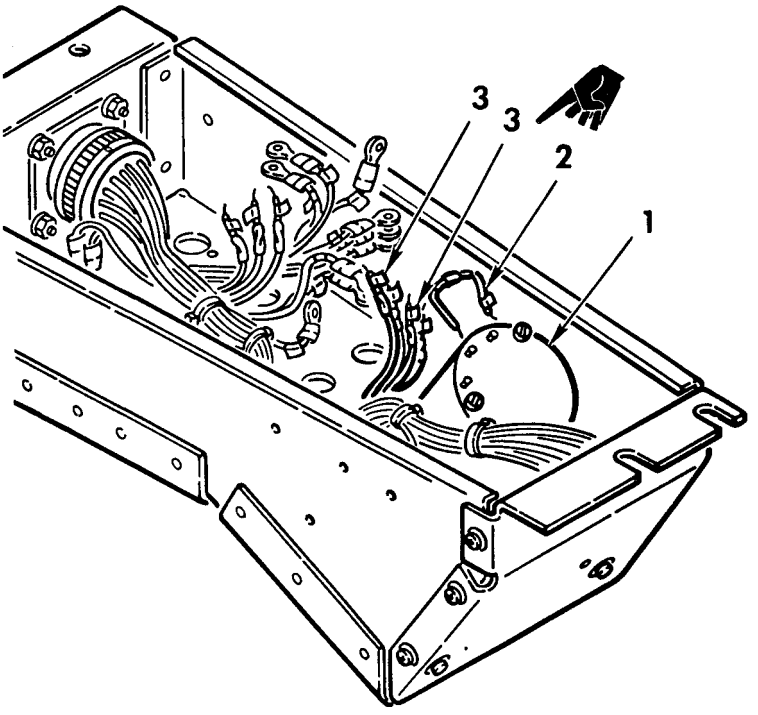
DISASSEMBLY (cont)

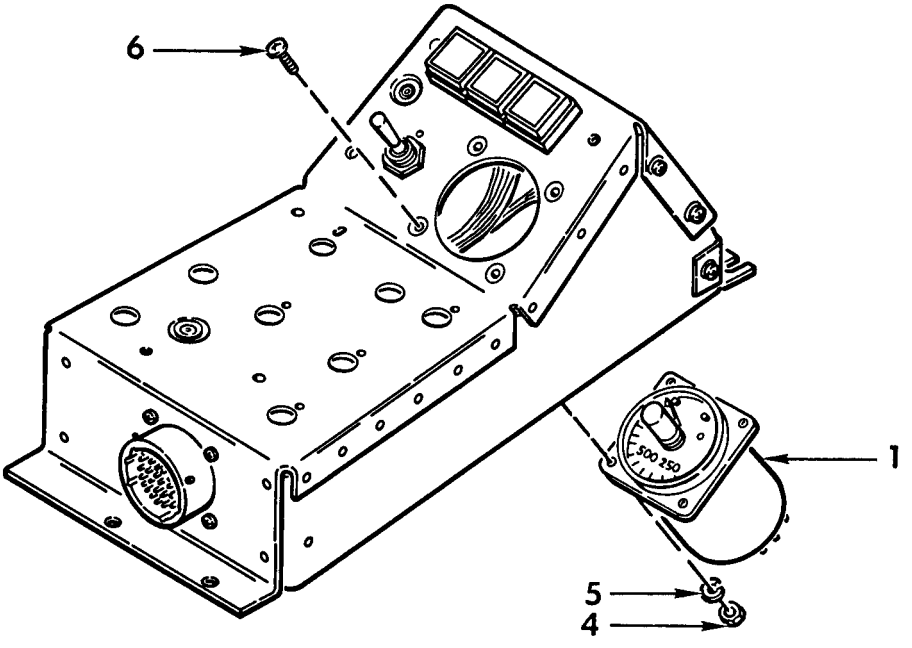
15. REMOVE RD RMNG COUNTER 19M1 (1).

    a. If defective, unsolder and remove diode 19CR14 (2).

    b. Label and unsolder wires (3) from rounds remaining counter (1) terminals.

    c. Remove four nuts (4), four lockwashers (5), four screws (6), and rounds remaining counter (1).

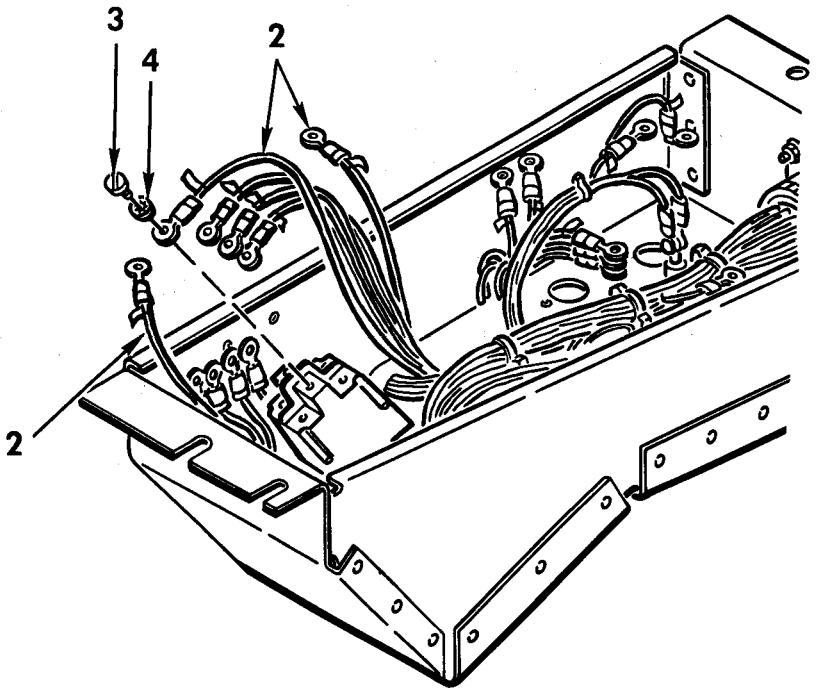


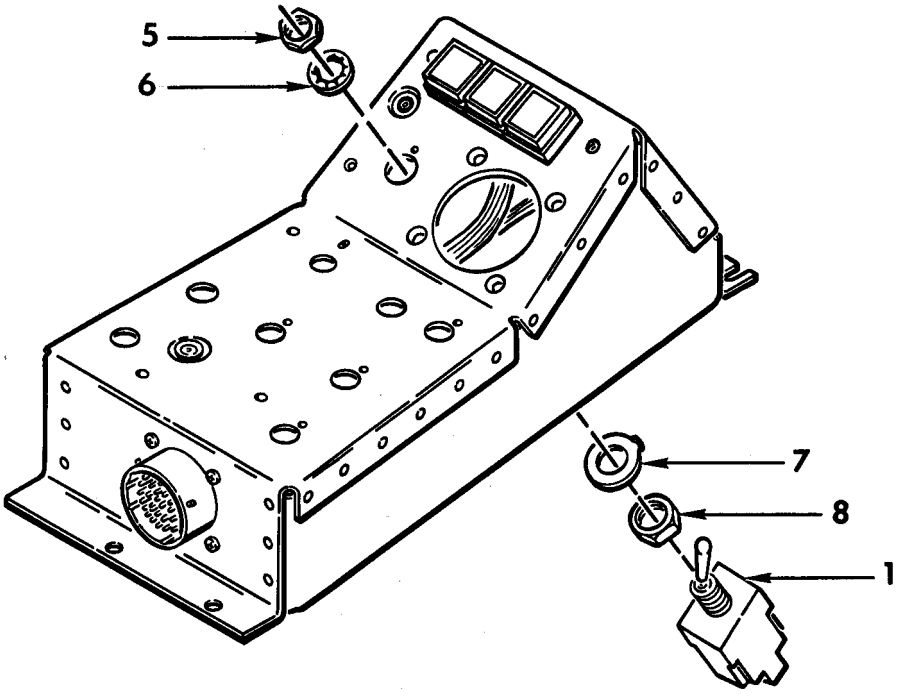


ARR82-27180

2-59. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12910143) (cont)

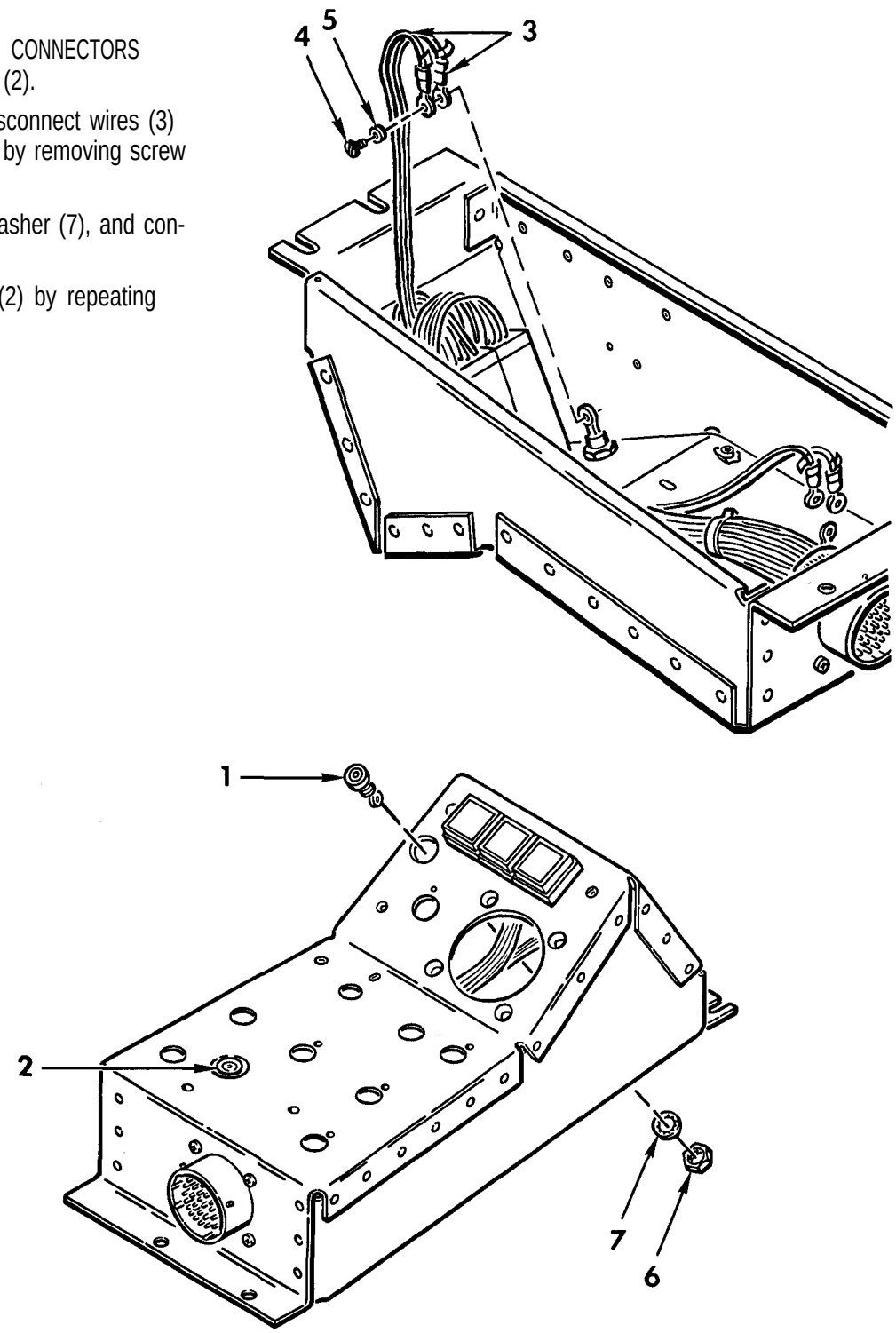
16. REMOVE RANGE SWITCH 19S8 (1).
    a. Label wires (2). Disconnect wires (2) from switch (1) by removing screws (3) and washers (4).
    b. Remove nut (5) and washer (6).
    c Remove switch (1), lockring (7), and nut (8).





DISASSEMBLY (cont)

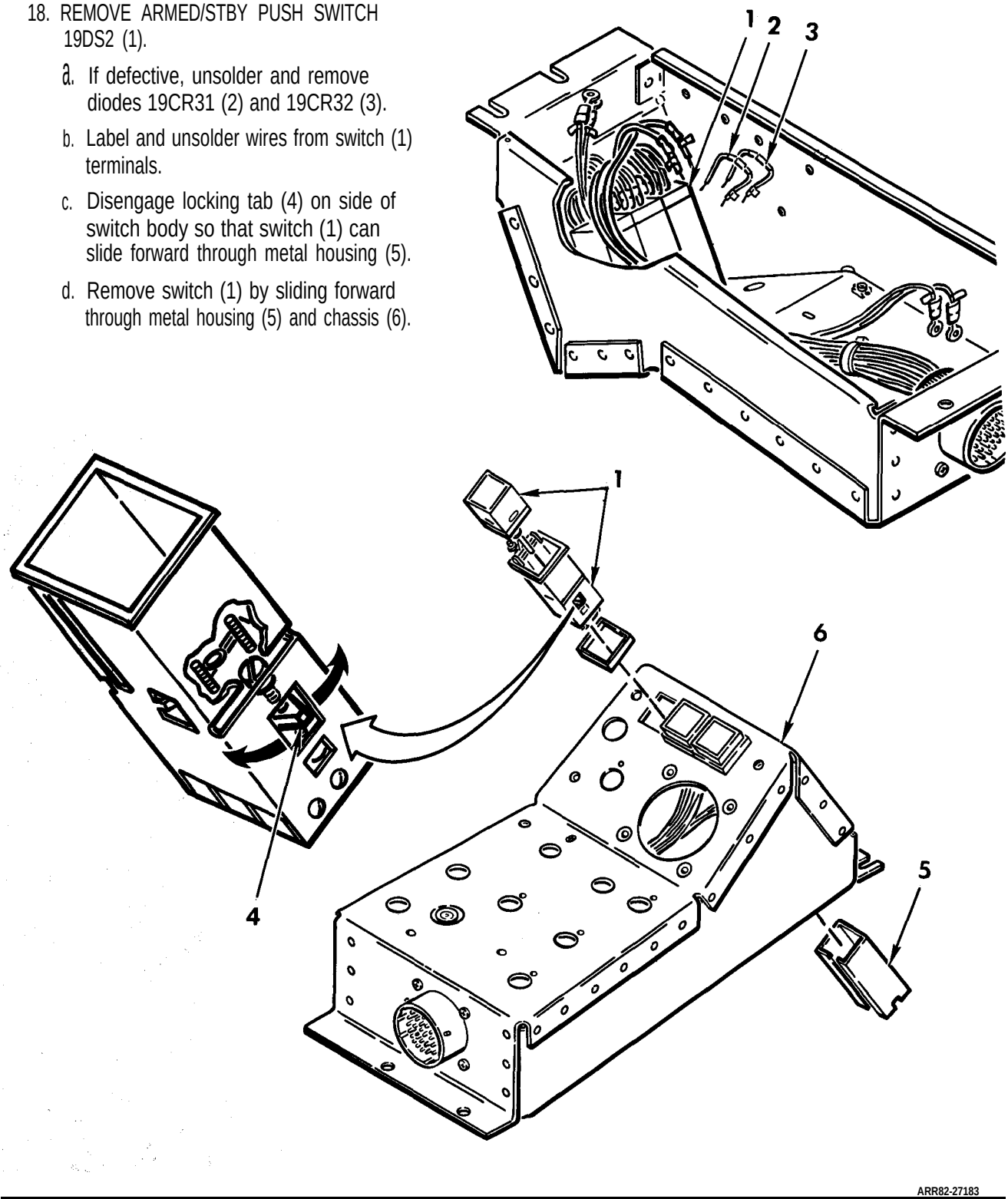
17. REMOVE RECEPTACLE CONNECTORS 8J102 (1) AND 8J103 (2).
    a. Label wires (3). Disconnect wires (3) from connector (1) by removing screw (4) and washer (5).
    b. Remove nut (6), washer (7), and connector (1).
    c. Remove connector (2) by repeating steps a and b.



ARR82-27182

2-59. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12910143) (cont)

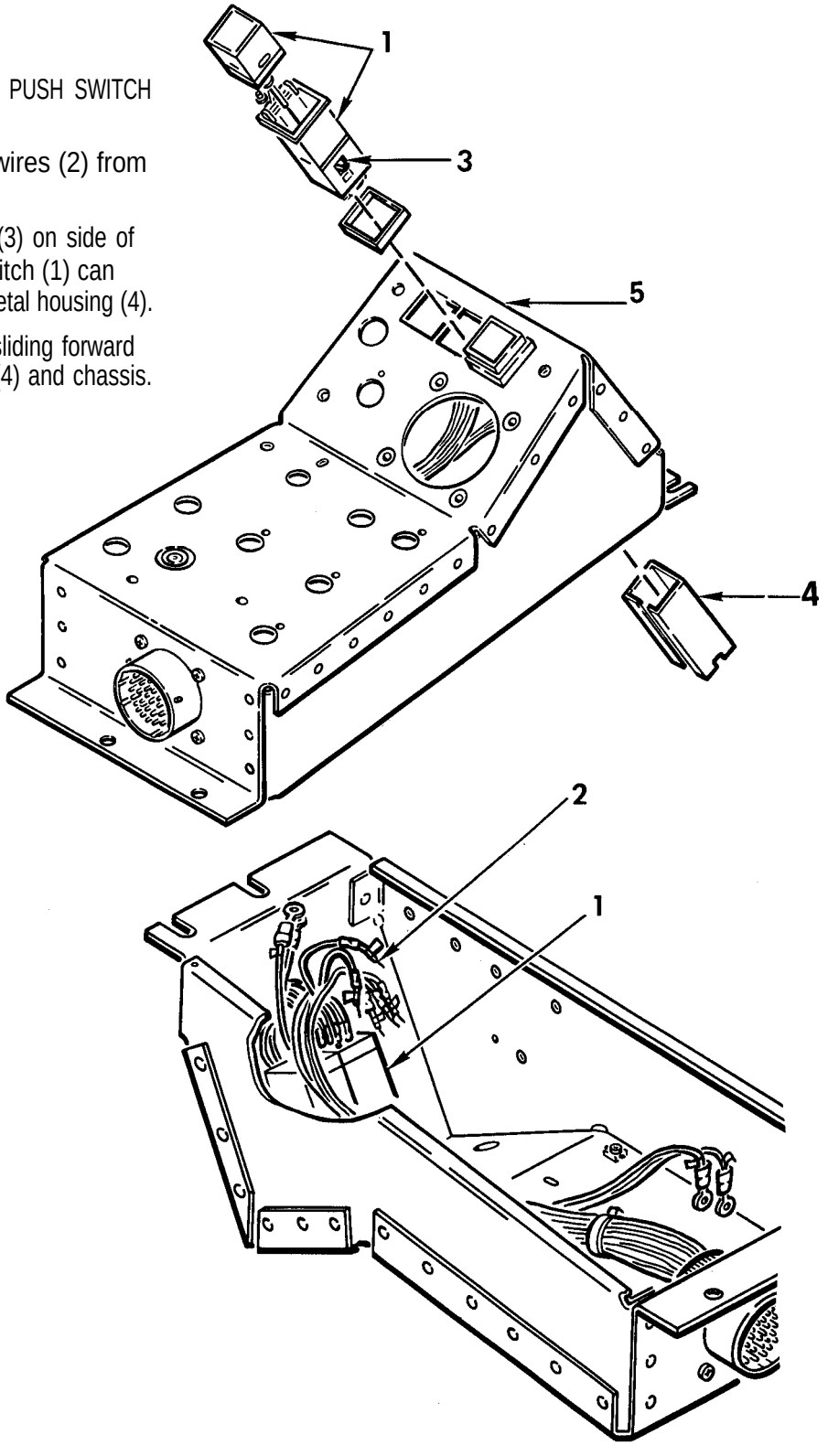
18. REMOVE ARMED/STBY PUSH SWITCH 19DS2 (1).
    a. If defective, unsolder and remove diodes 19CR31 (2) and 19CR32 (3).
    b. Label and unsolder wires from switch (1) terminals.
    c. Disengage locking tab (4) on side of switch body so that switch (1) can slide forward through metal housing (5).
    d. Remove switch (1) by sliding forward through metal housing (5) and chassis (6).



ARR82-27183

DISASSEMBLY (cont)

19. REMOVE ARMT CONT IND PUSH SWITCH 19DS3 (1).
    a. Label and unsolder wires (2) from switch (1) terminals
    b. Disengage locking tab (3) on side of switch body so that switch (1) can slide forward through metal housing (4).
    c Remove switch (1) by sliding forward through metal housing (4) and chassis.



ARR82-27184

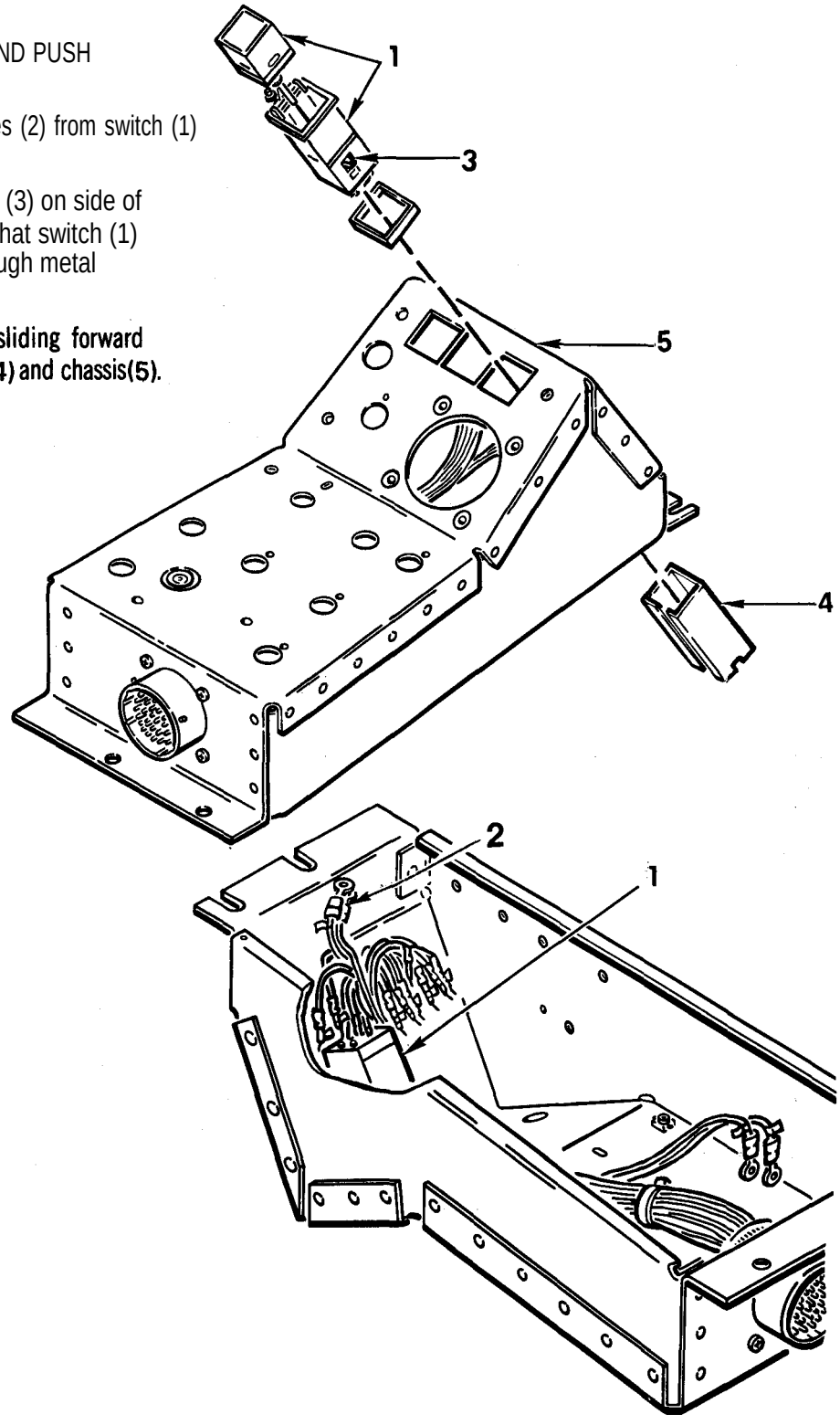
2-59. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12910143) (cont)

20. REMOVE GNR HSS BIT IND PUSH SWITCH 17DS1 (l).

a. Label and unsolder wires (2) from switch (1) terminals

b. Disengage locking tab (3) on side of push switch body so that switch (1) can slide forward through metal housing **(4).**

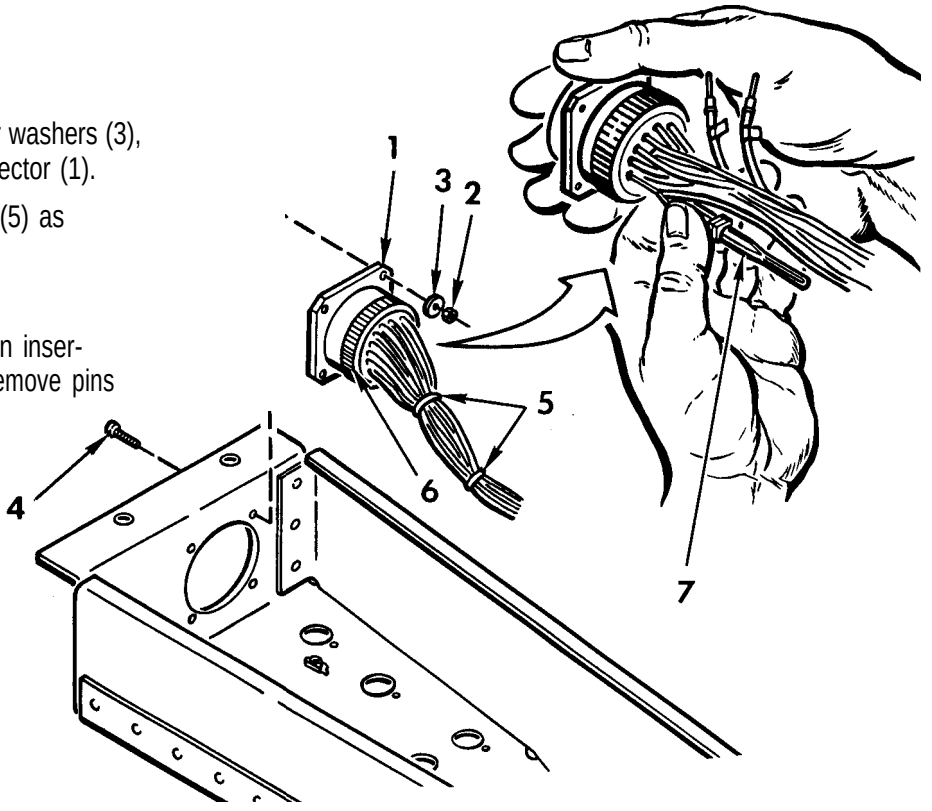
c. Remove **switch (1) by sliding forward** through **metal housing (4) and chassis(5).**



ARR82-27185

DISASSEMBLY (cont)

21. REMOVE CONNECTOR J1 (1).
    a. Remove four nuts (2), four washers (3), four screws (4), and connector (1).
    b. Cut cable tiedown straps (5) as required.
    c Unscrew cable clamp (6).
    d. Label wires and, using pin insertion/extraction tool (7), remove pins from connector (1).



ARR82-27186

CLEANING

22. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV.

INSPECTION

23. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV.

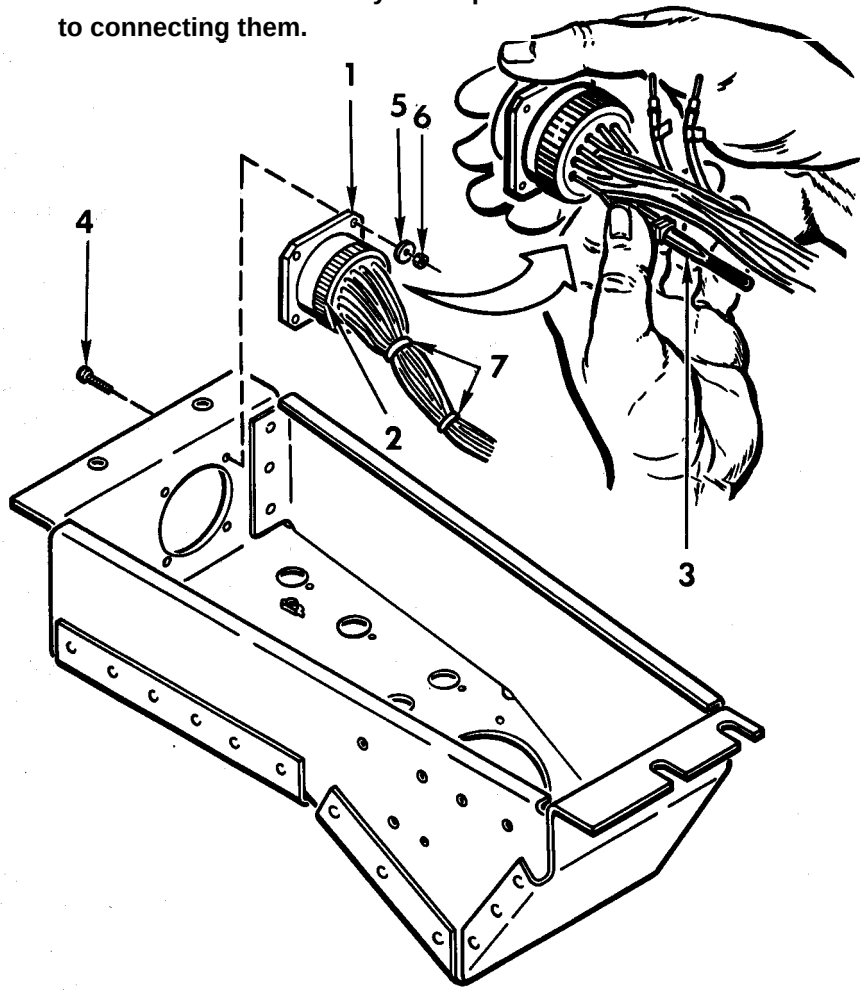
2-59. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12910143) (cont)

ASSEMBLY

24. INSTALL CONNECTOR J1 (1).
    a. Make sure that cable clamp (2) is over ends of unconnected wire bundle.
    b. Remove labels and connect pins to connector (1) with pin insertion/extraction tool (3).
    c. Attach connector (1) to chassis with four screws (4), four washers (5), and four nuts (6).
    d. Screw cable clamp (2) onto connector (1).
    e. Install cable tiedown straps (7) as required to form wire bundle

NOTE

Use multimeter to identify wires prior to connecting them.



CONNECTOR J1 PIN	CONNECTS TO:
A	19S8-6
B	19S6-2
C	17R2 -3 (RTCL)
D	19MI-2
E	19SI6-5
F	19SI6-6
G	17DSI-2
H	17DSI- I
J	17DSI-4
K	17DSI-3
N	17S5-2
P	I9MI-I
R	GND STUD
s	2IS8-2
T	2IS8-3
u	2IS8-1
v	I9S8-5
w	I9DS28-NC
Y	17DSI-C
z	8JI03
a	19SI6-2
c	I9S7-I
d	19DS3-NC
e	I9S8-I
j	I7S3 -2 (RTCL)
j	I9DS2A-NC
k	I7S4 - I
m	I9S7 -2
	8Z4 -X2
p	I9S6-3
r	I9S3-2
s	8Z4 - XI

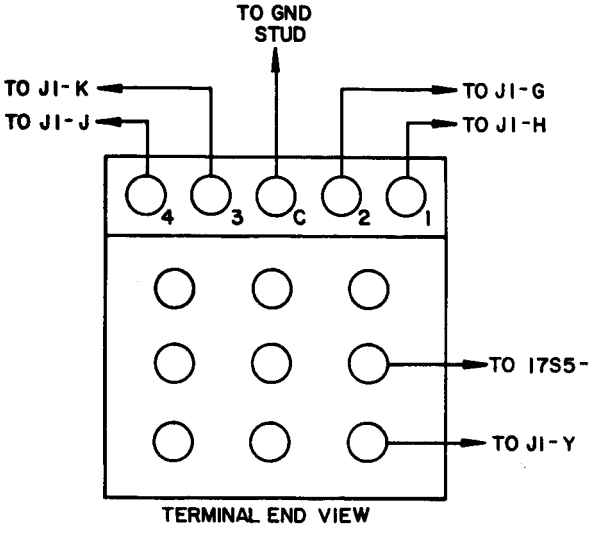
ARR82-27187

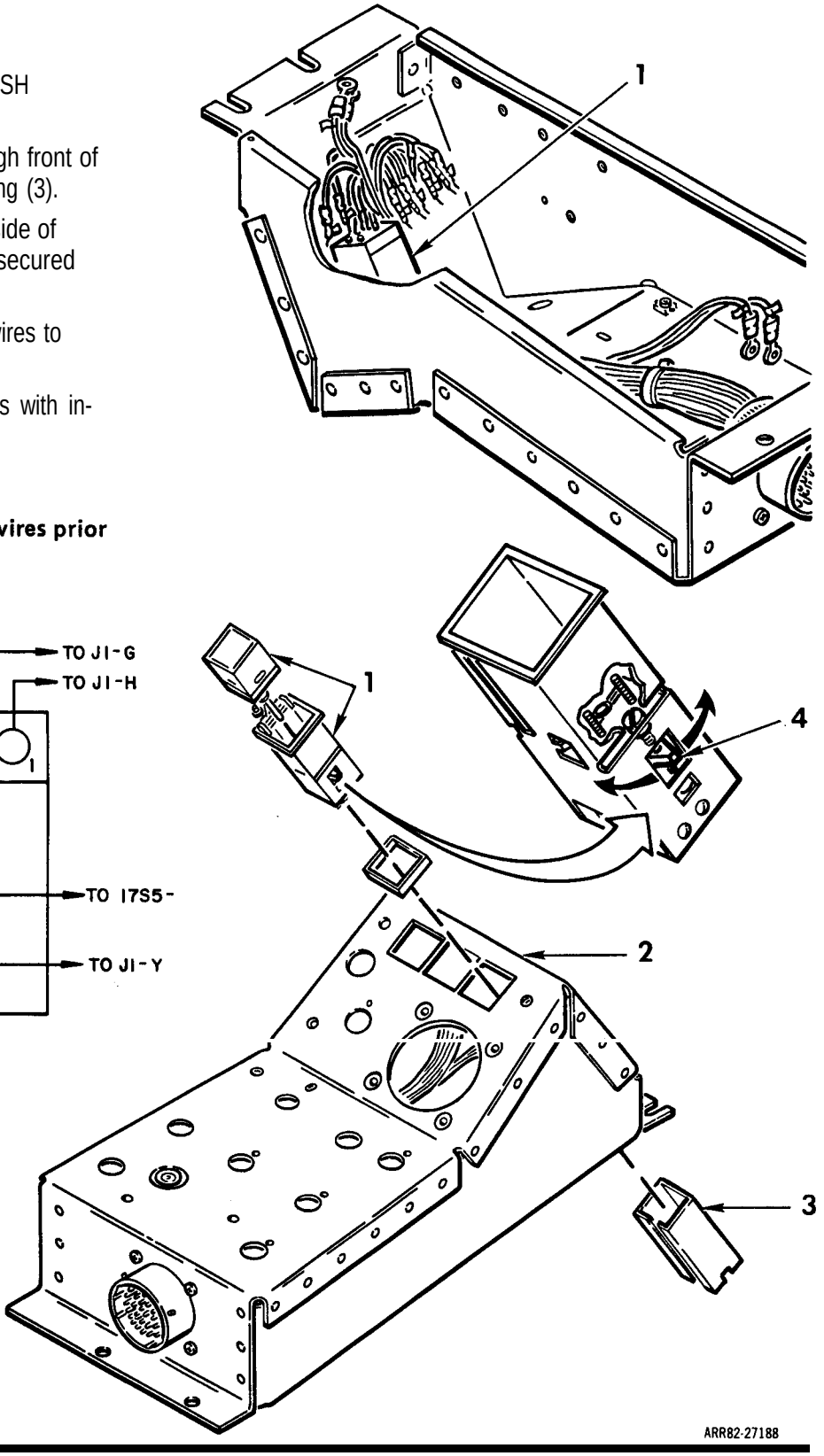
ASSEMBLY (cont)

25. INSTALL GNR HSS BIT IND PUSH SWITCH 17DS1 (1).
    a. Slide switch (1) body through front of chassis (2) and metal housing (3).
    b. Engage locking tab (4) on side of switch (1) so that switch is secured firmly to chassis (2).
    c. Remove labels and solder wires to switch (1) terminals
    d. Protect soldered connections with insulation sleeving.

NOTE

Use multimeter to identify wires prior to connecting them.



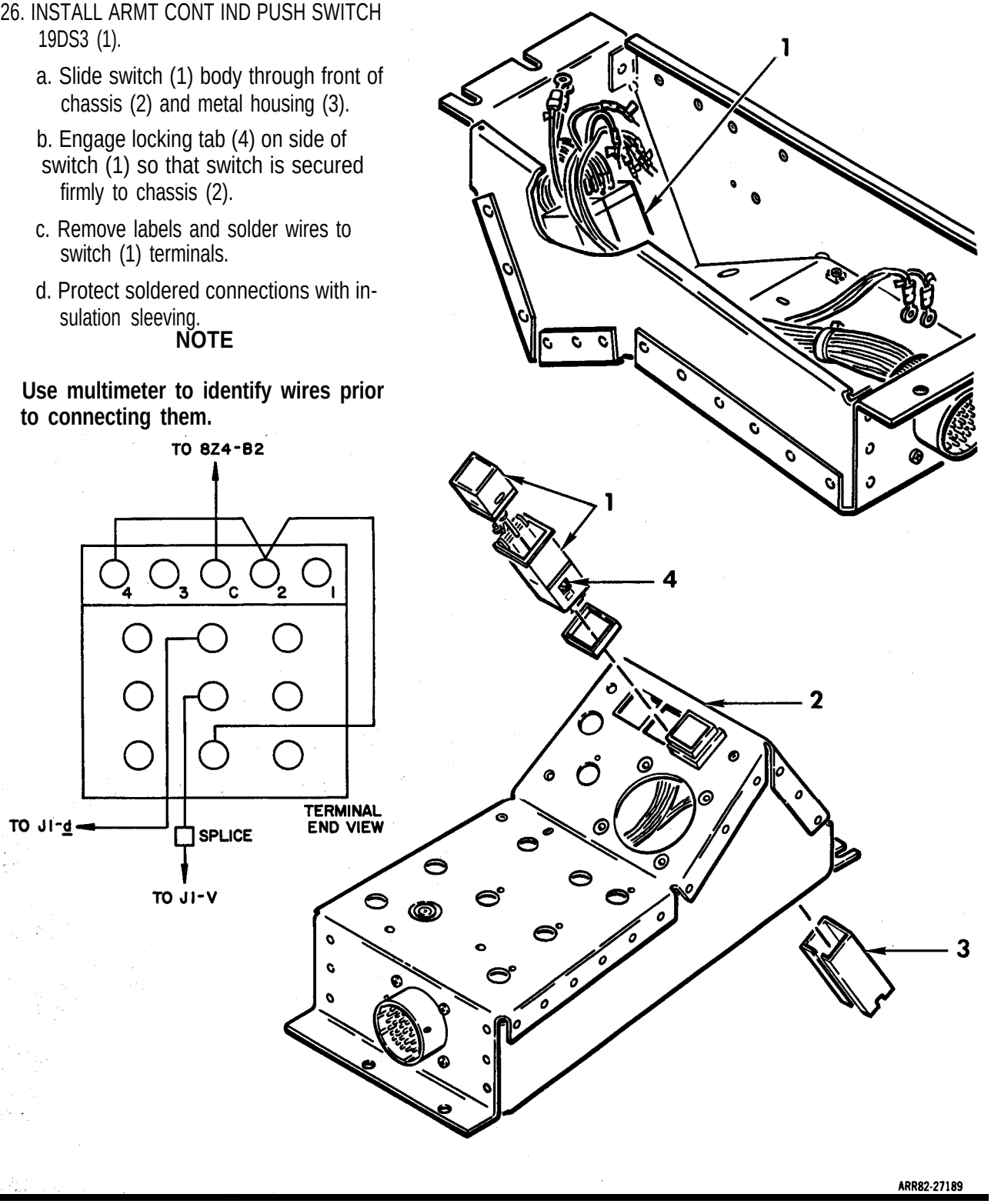


2-59. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12910143) (cont)

26. INSTALL ARMT CONT IND PUSH SWITCH 19DS3 (1).
    a. Slide switch (1) body through front of chassis (2) and metal housing (3).
    b. Engage locking tab (4) on side of switch (1) so that switch is secured firmly to chassis (2).
    c. Remove labels and solder wires to switch (1) terminals.
    d. Protect soldered connections with insulation sleeving.

NOTE

Use multimeter to identify wires prior to connecting them.

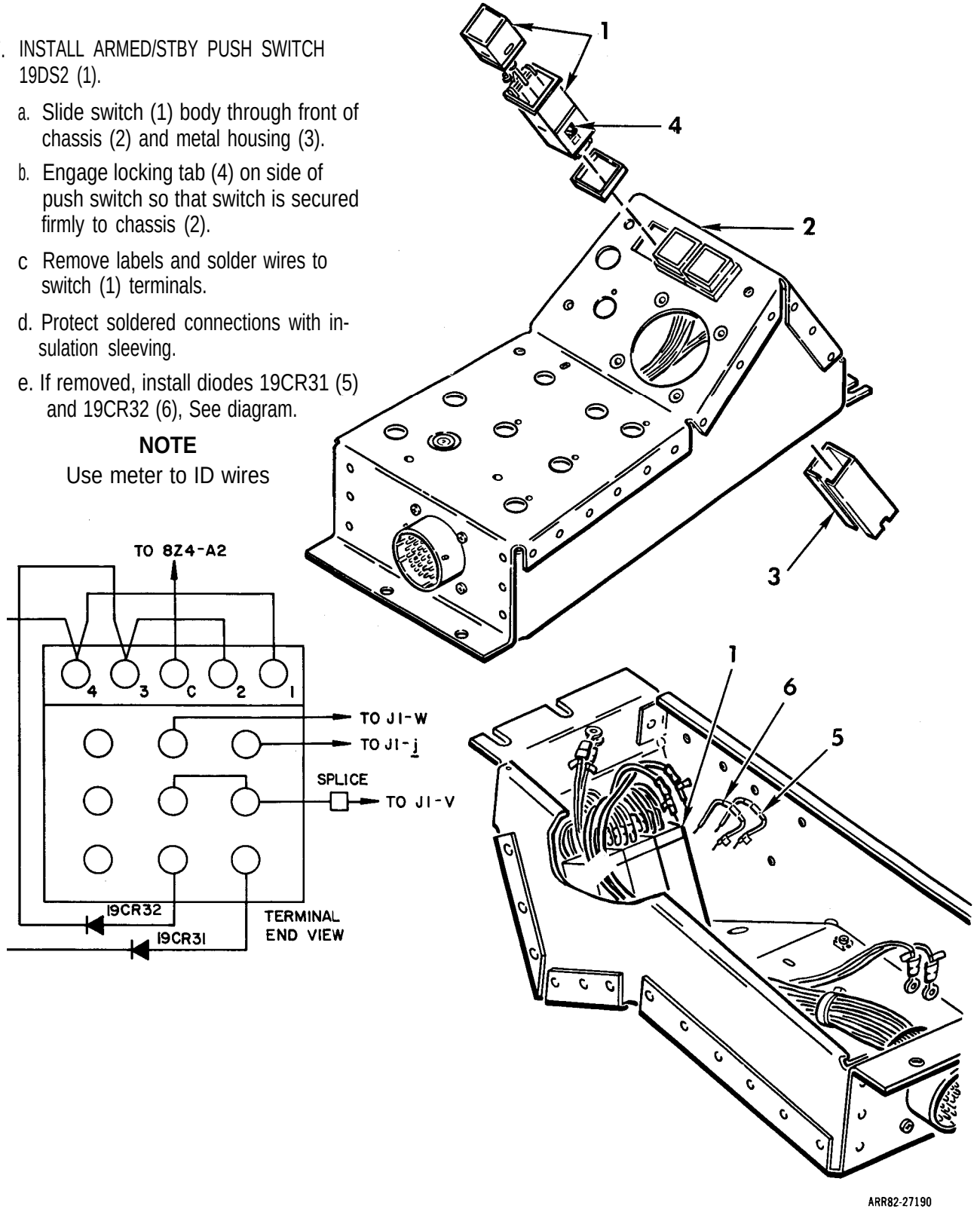


ASSEMBLY (cont)

27. INSTALL ARMED/STBY PUSH SWITCH 19DS2 (1).
    a. Slide switch (1) body through front of chassis (2) and metal housing (3).
    b. Engage locking tab (4) on side of push switch so that switch is secured firmly to chassis (2).
    c Remove labels and solder wires to switch (1) terminals.
    d. Protect soldered connections with insulation sleeving.
    e. If removed, install diodes 19CR31 (5) and 19CR32 (6), See diagram.

NOTE

Use meter to ID wires

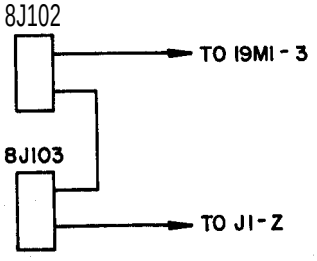


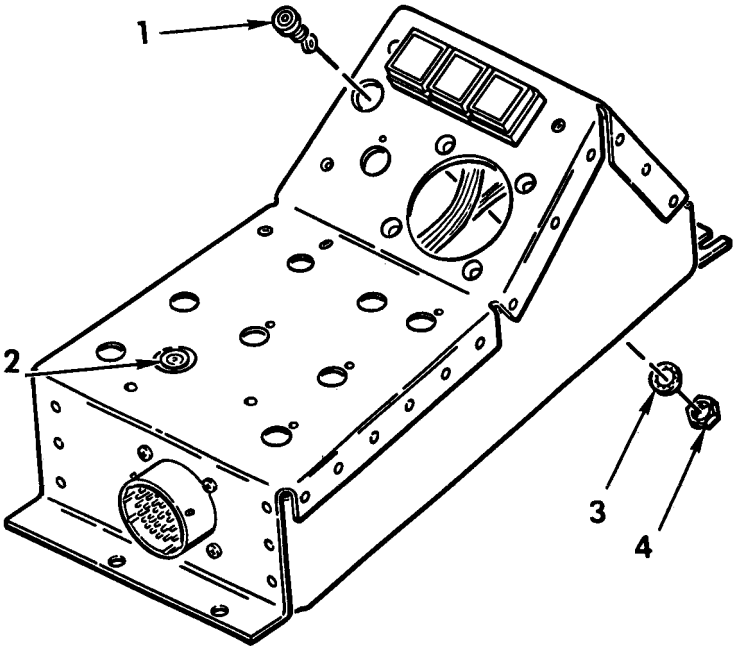
2-59. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12910143) (cont)

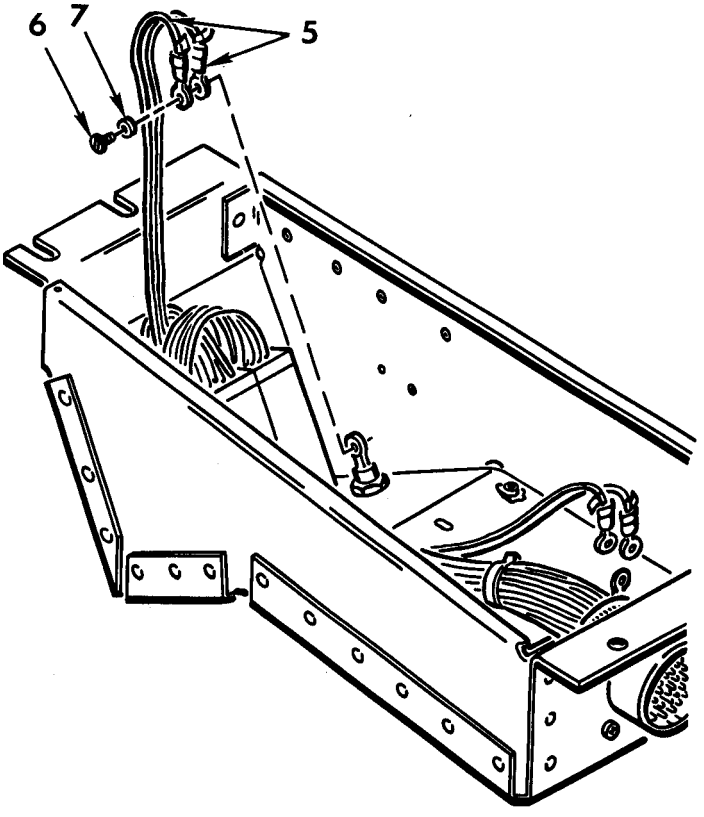
28. INSTALL RECEPTACLE CONNECTORS 8J102 (1) AND 8J103 (2).
    a. Place connector (1) in chassis and secure with washer (3) and nut (4).
    b. Remove labels and connect wires (5) to connector (1) with screw (6) and washer (7).
    c Install connector (2) by repeating steps a and b.

NOTE

Use multimeter to identify wires prior to connecting them.







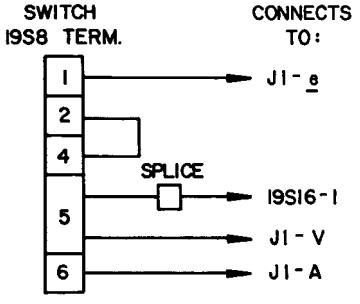
ARR82-27191

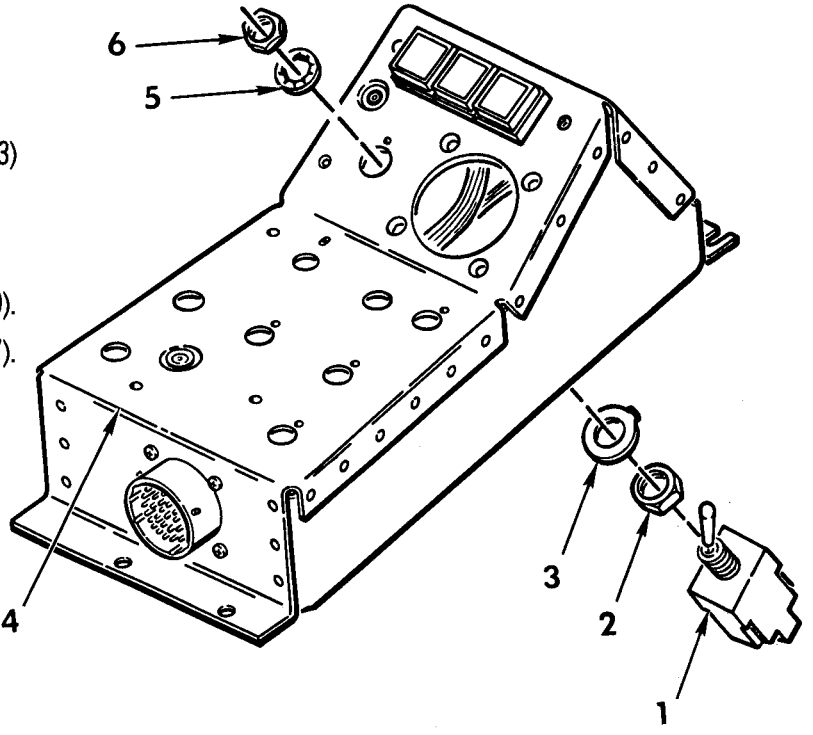
ASSEMBLY (cont)

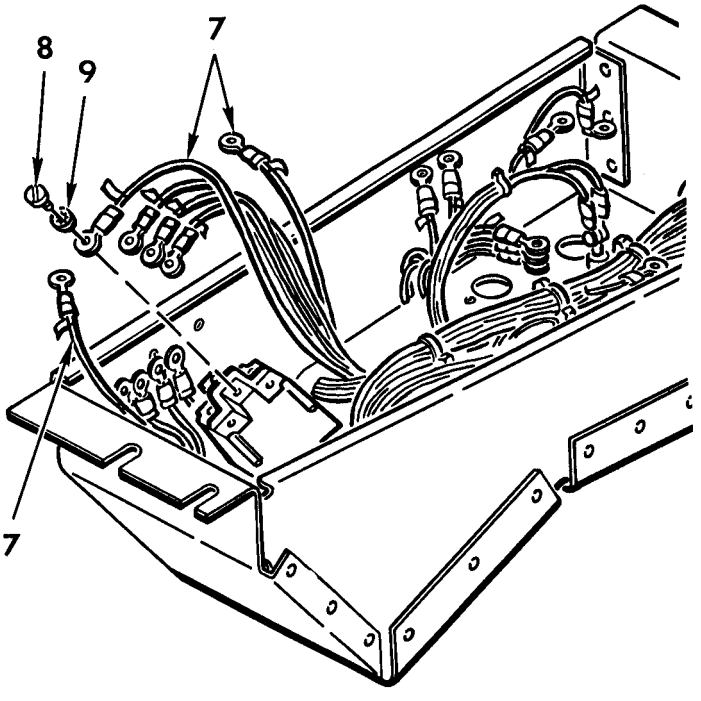
29. INSTALL RANGE SWITCH 19S8 (1).
    a. Thread nut (2) onto switch (1).
    b. Place switch (1), nut (2), and lockring (3) in place and secure to chassis (4) with washer (5) and nut (6).
    c Connect wires (7) to switch (1) terminals with screws (8) and washers (9).
    d. Remove labels from connected wires (7).

NOTE

Use multimeter to identify wires prior to connecting them.







ARR82-27192

2-59. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12910143) (cont)

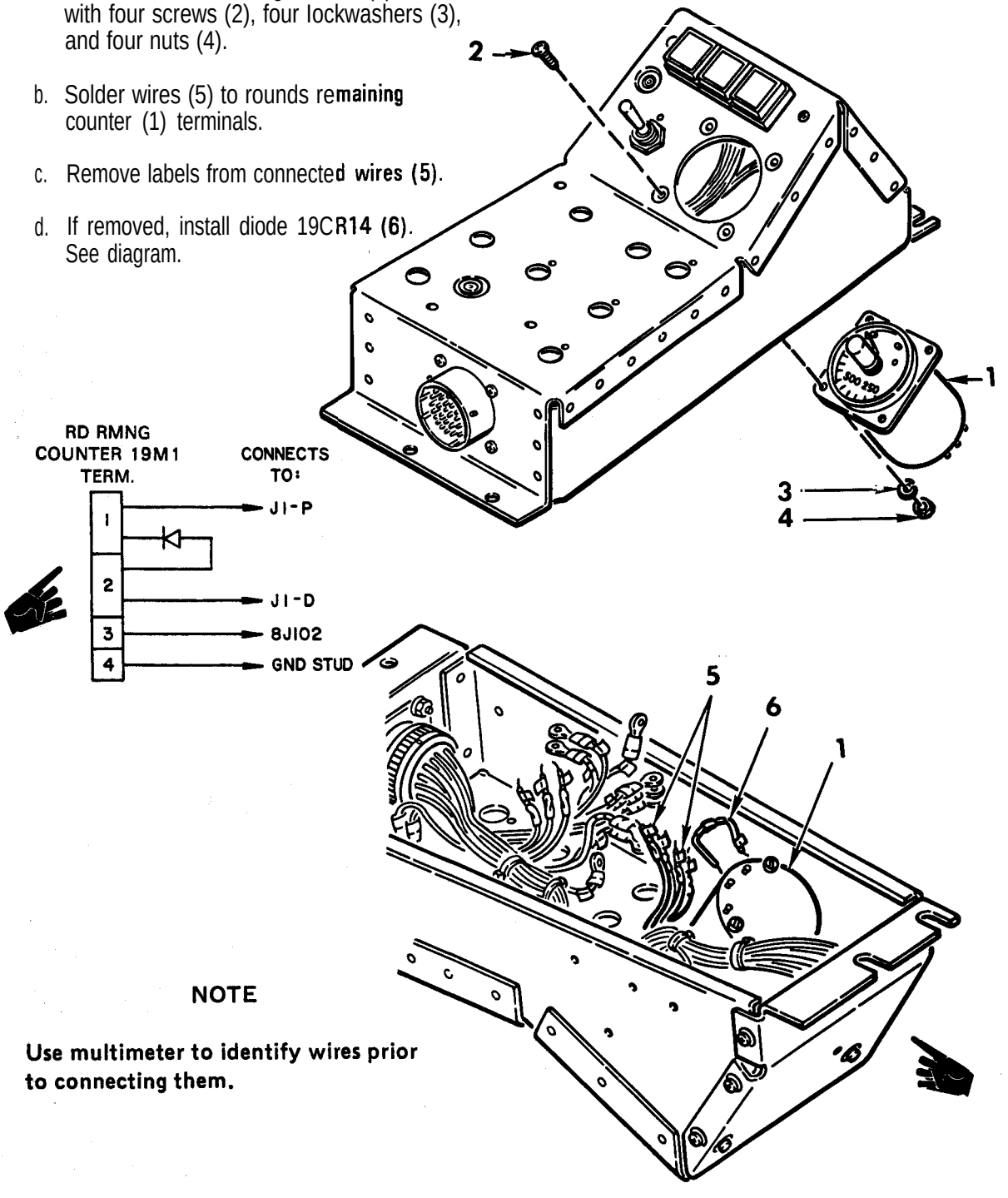
30. INSTALL RD RMNG COUNTER 19M1 (1).

a. Install rounds remaining counter (1) with four screws (2), four lockwashers (3), and four nuts (4).

b. Solder wires (5) to rounds remaining counter (1) terminals.

c. Remove labels from connected wires (5).

d. If removed, install diode 19CR14 (6). See diagram.



NOTE

Use multimeter to identify wires prior to connecting them.

ARR82-27193

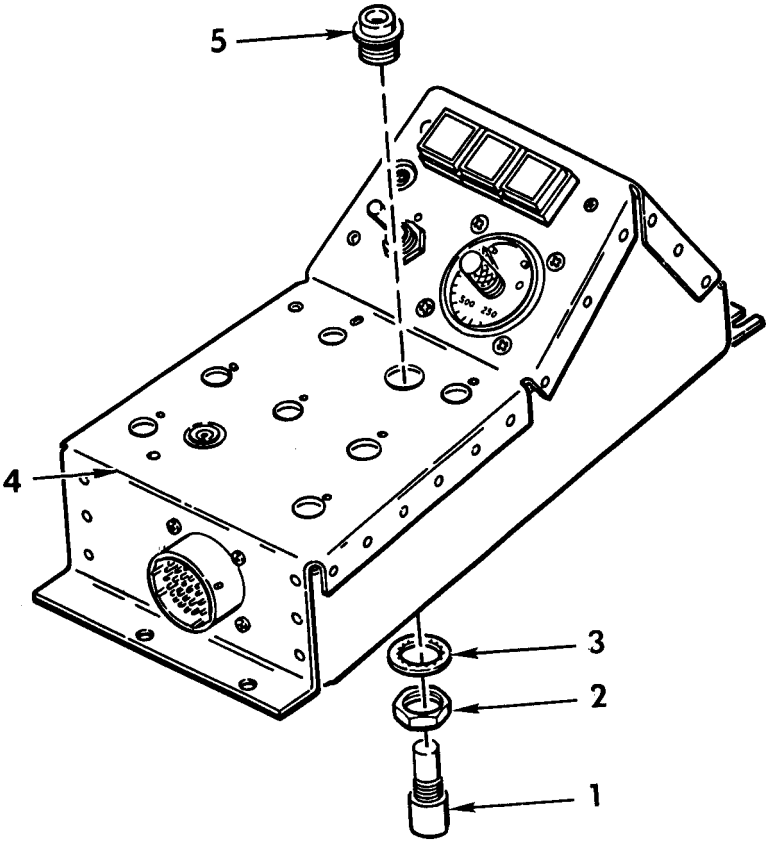
ASSEMBLY (cont)

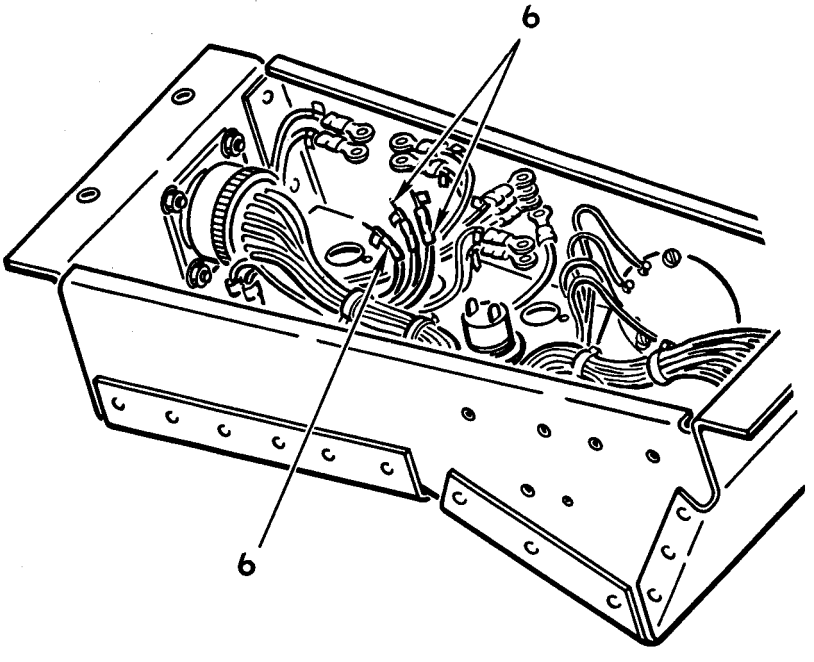
31. INSTALL TEST PUSH SWITCH 17S4 (1).
    a. Position switch (1), nut (2), and lockwasher (3) in place on chassis (4).
    b. Screw threaded adapter (5) onto body of switch (1).
    c. Screw nut (2) onto threaded adapter (5) to secure switch (1) to chassis (4).
    d. Remove labels from wires (6) and solder three wires to switch (1) terminals

NOTE

Use multimeter to identify wires prior to connecting them.

SWITCH 17S4 TERM.	CONNECTS TO:
1	J1-k
2	19S16-1
	17S5-1





ARR82-27194

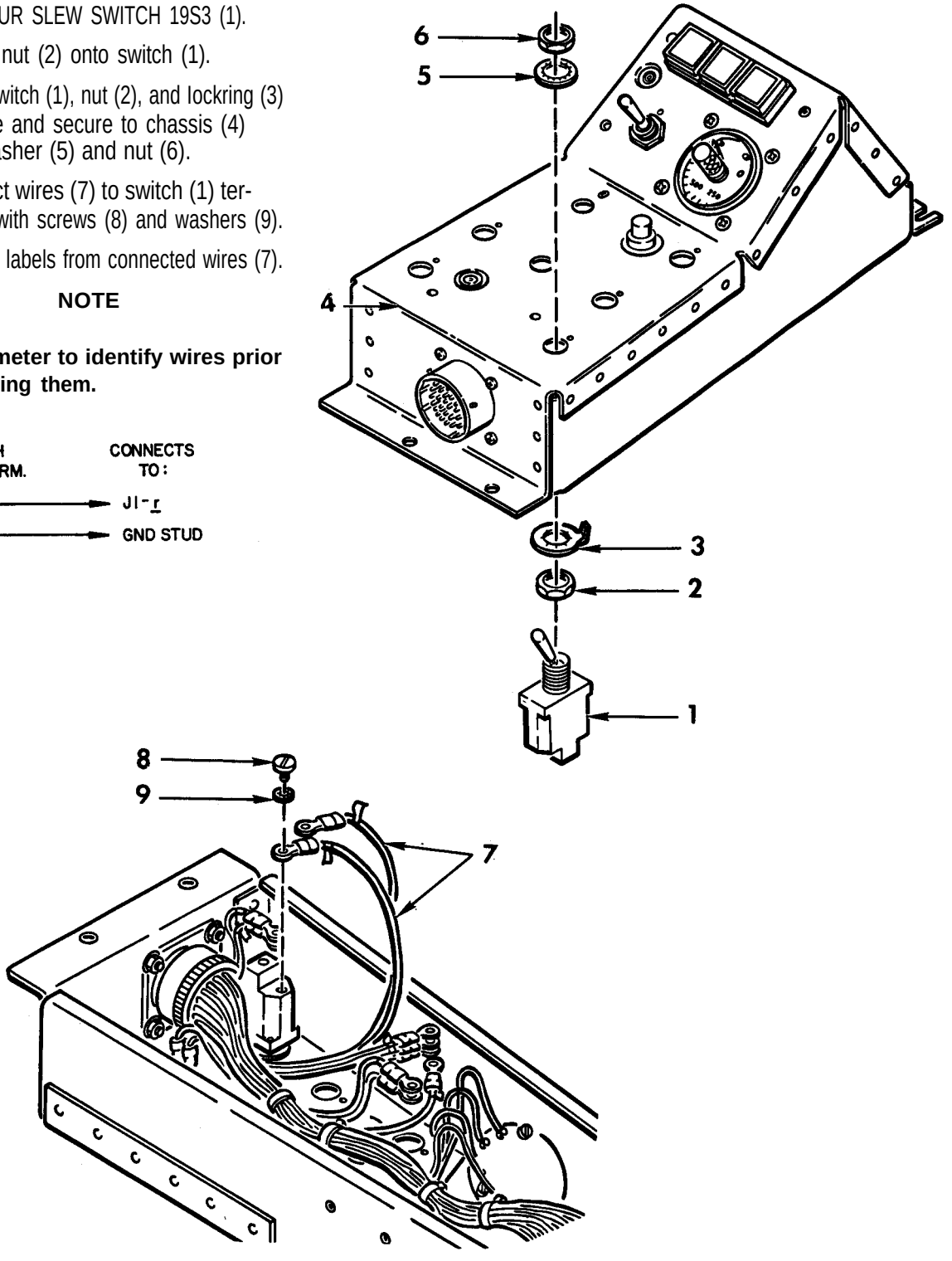
2-59. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12910143) (cont)

32. INSTALL TUR SLEW SWITCH 19S3 (1).
    a. Thread nut (2) onto switch (1).
    b. Place switch (1), nut (2), and lockring (3) in place and secure to chassis (4) with washer (5) and nut (6).
    c. Connect wires (7) to switch (1) terminals with screws (8) and washers (9).
    d. Remove labels from connected wires (7).

NOTE

Use multimeter to identify wires prior to connecting them.

SWITCH 19S3 TERM.	CONNECTS TO:
2	J1-r
3	GND STUD



ARR82-27195

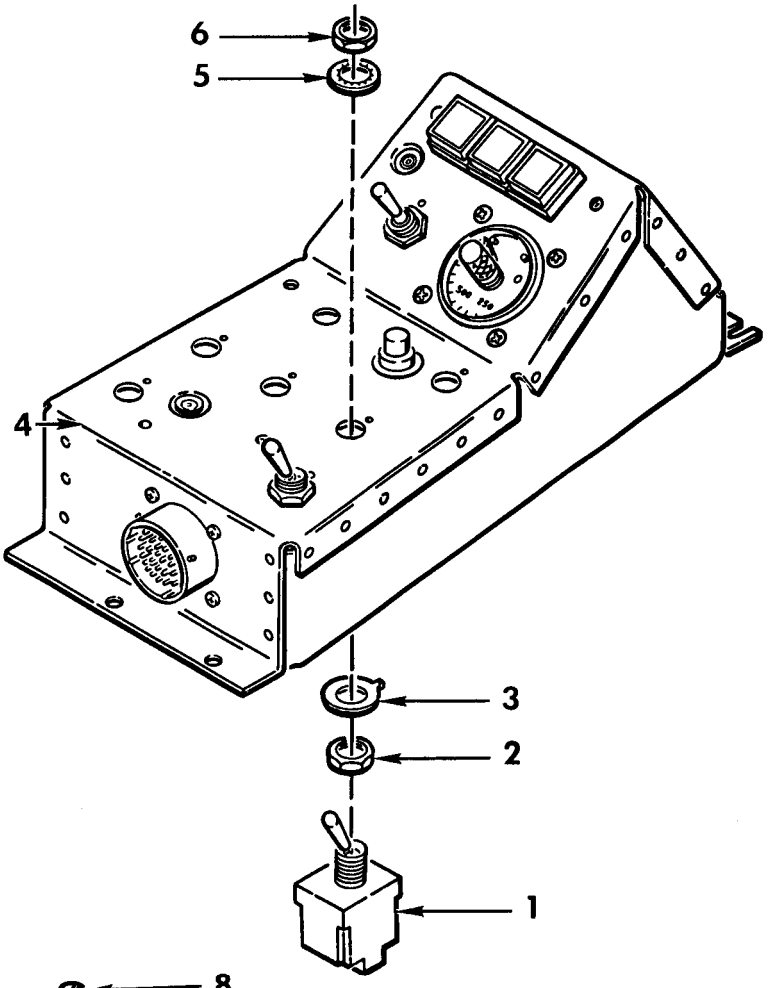
ASSEMBLY (cont)

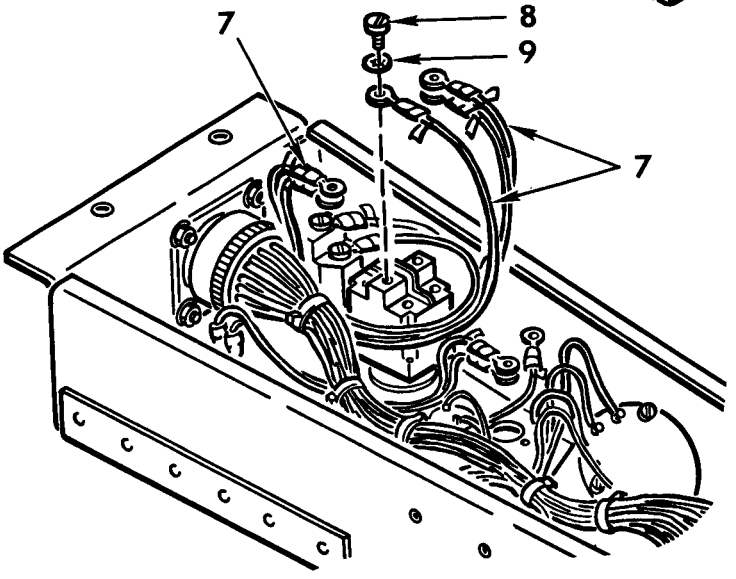
33. INSTALL LASER SAFE/TURRET DEPR LIMIT SWITCH 19S16 (1).
    a. Thread nut (2) onto switch (1).
    b. Place switch (1), nut(2), and lockring (3) in place and secure to chassis (4) with washer (5) and nut (6).
    c. Connect wires (7) to switch (1) terminals with screws (8) and washers (9).
    d. Remove labels from connected wires(7).

NOTE

Use multimeter to identify wires prior to connecting them.

SWITCH 19S16 TERM.	SPLICE	CONNECTS TO:
1		19S8-5
		17S4-2
2		J1-a
5		J1-E
6		J1-F

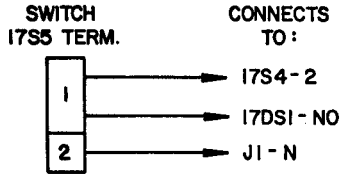


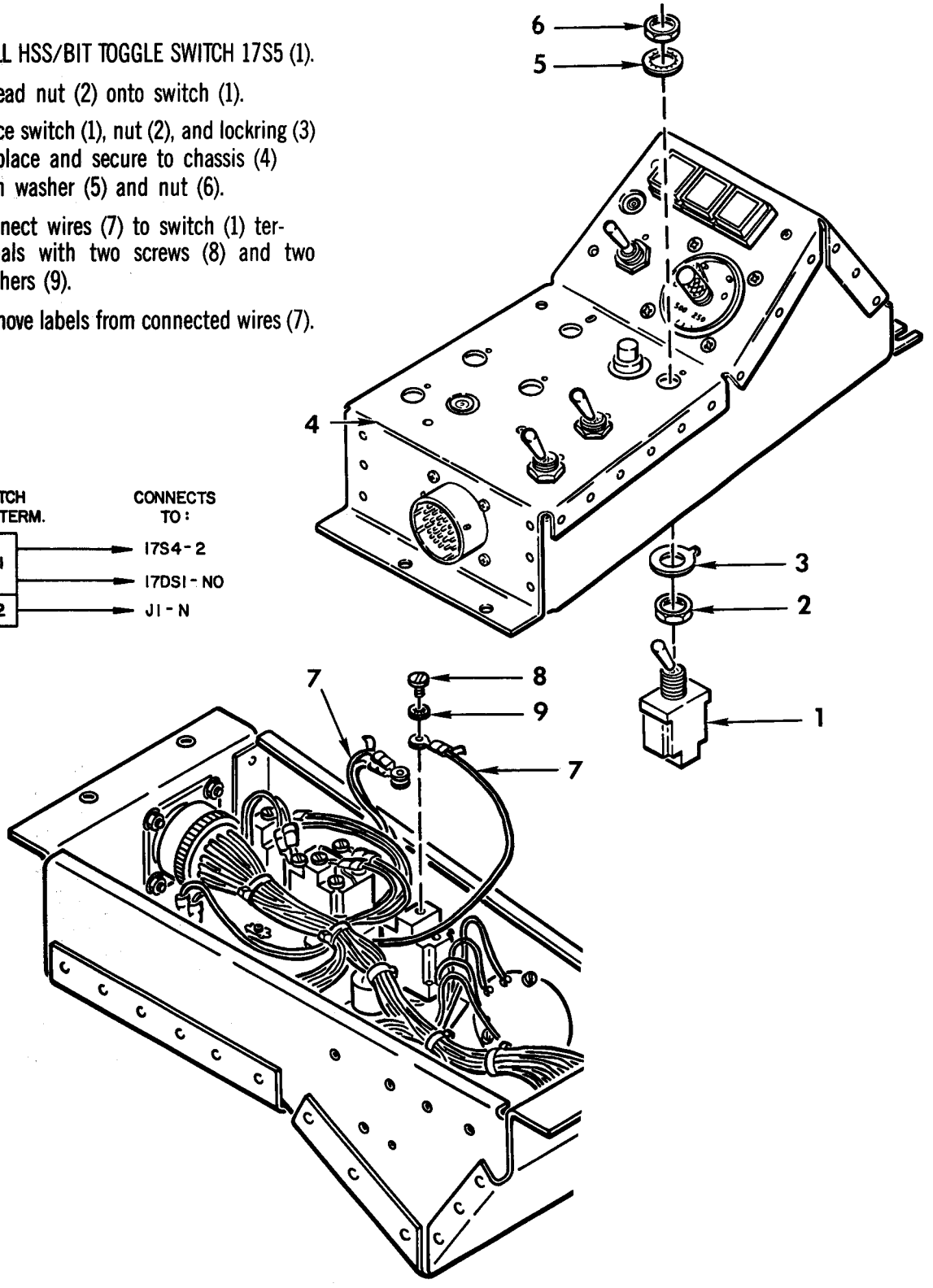


ARR82-27196

2–59. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12910143) (cont)

34. INSTALL HSS/BIT TOGGLE SWITCH 17S5 (1).
    a. Thread nut (2) onto switch (1).
    b. Place switch (1), nut (2), and lockring (3) in place and secure to chassis (4) with washer (5) and nut (6).
    c. Connect wires (7) to switch (1) terminals with two screws (8) and two washers (9).
    d. Remove labels from connected wires (7).





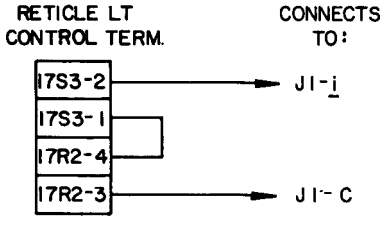
ARR82-27197

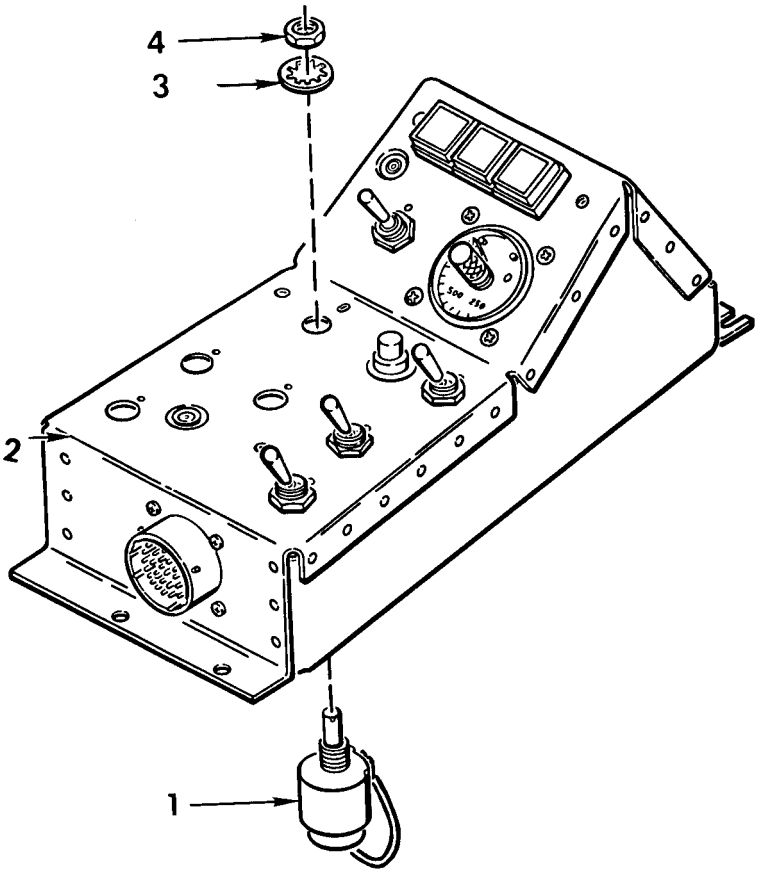
ASSEMBLY (cont)

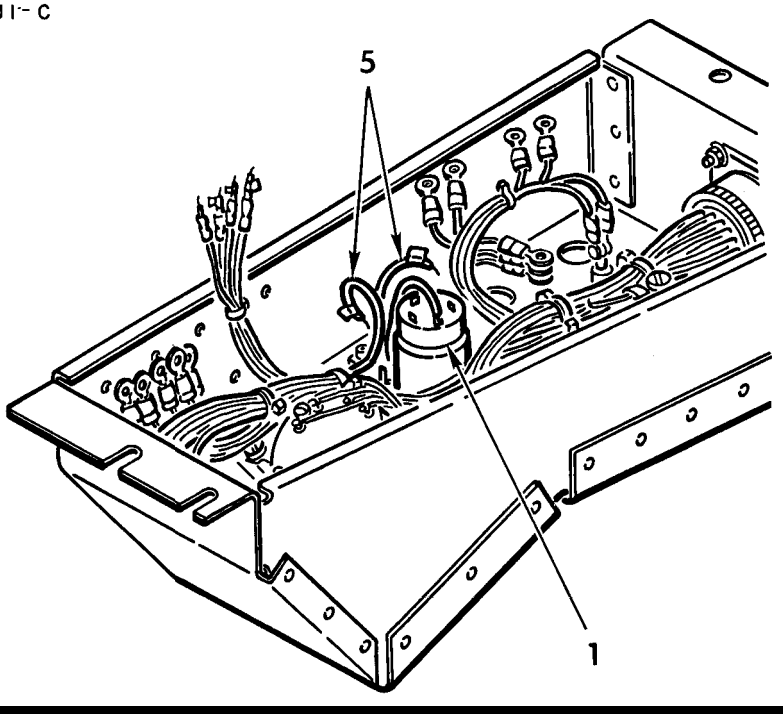
35. INSTALL HSS RETICLE LIGHT CONTROL(1).
    a. Position control (1)in chassis (2) and secure with washer (3) and nut(4).
    b. Install insulation sleeving over ends of wires (5).
    c Solder wires (5) to control (1) terminals.
    d. Remove labels from connected wires (5),
    e. Protect soldered connections with insulation sleeving.

NOTE

Use multimeter to identify wires prior to connecting them.







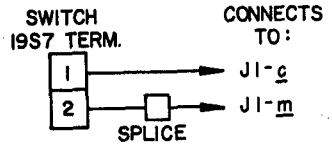
ARR82-27198

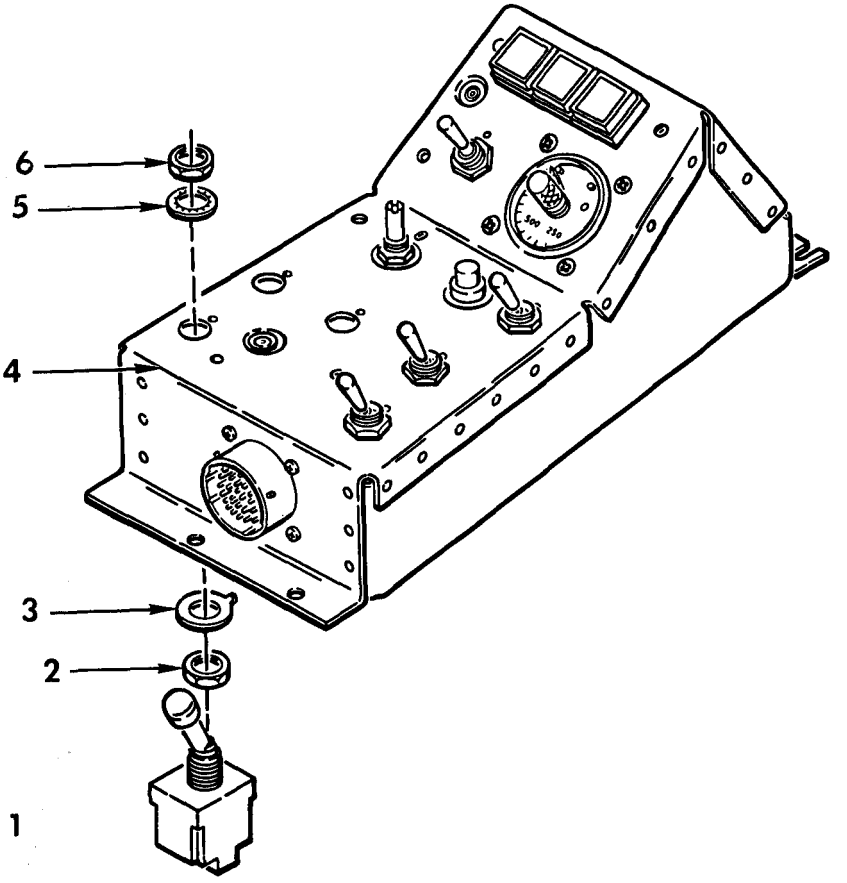
2-59. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12910143) (cont)

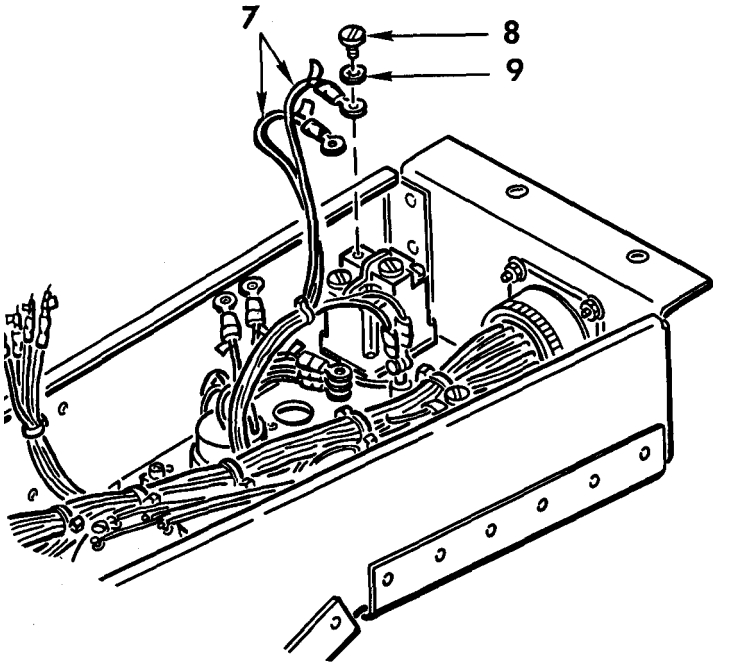
NOTE

Use multimeter to identify wires prior to connecting them.

36. INSTALL PLT ORIDE SWITCH 19S7 (1).
    a. Thread nut (2) onto switch (1).
    b. Place switch (1), nut (2), and lockring (3) in place and secure to chassis (4) with washer (5) and nut (6).
    c. Connect two wires (7) to switch (1) terminals with two screws (8) and two washers (9).
    d. Remove labels from connected wires (7).



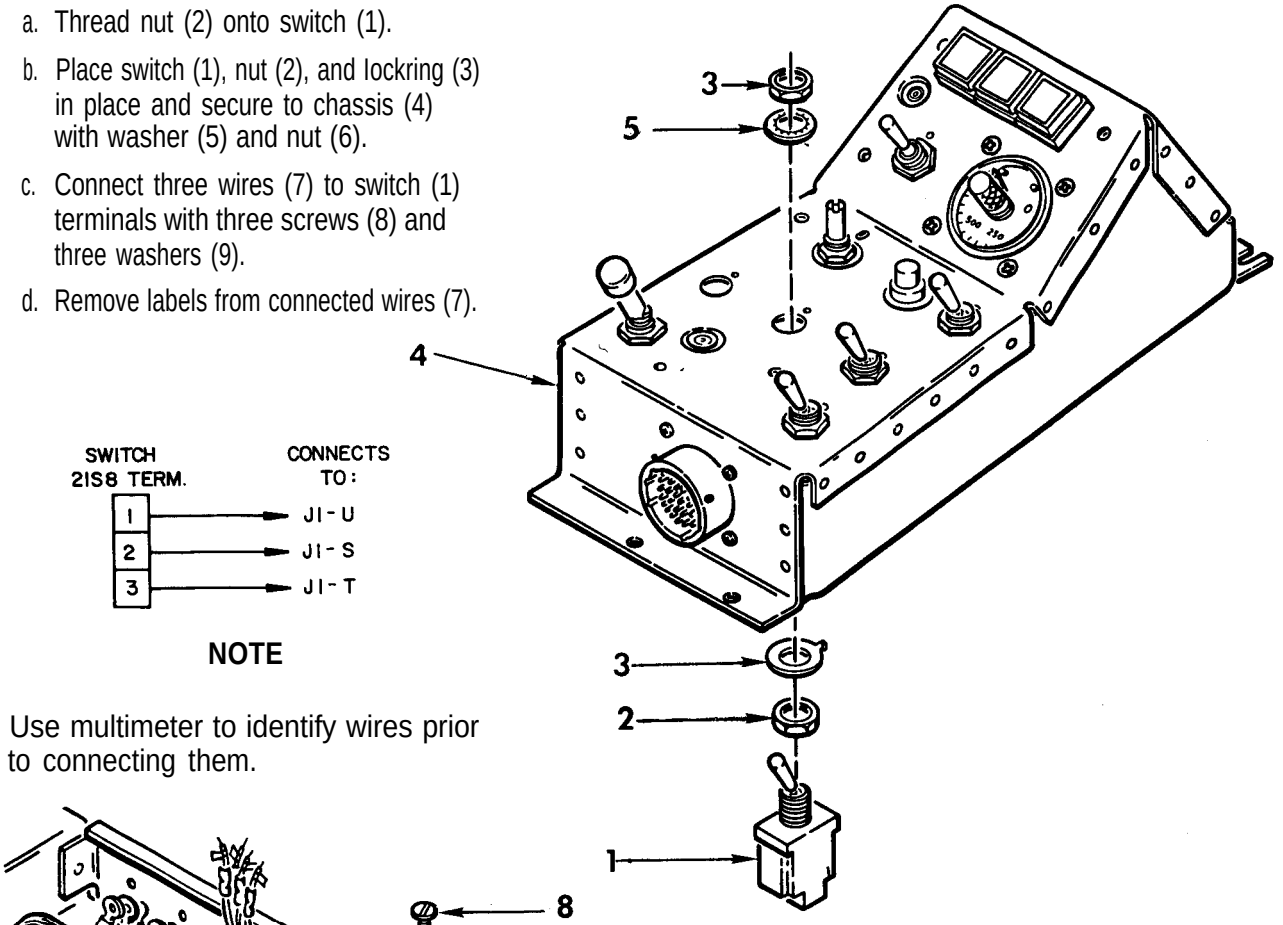




ARR82-27199

ASSEMBLY (cont)

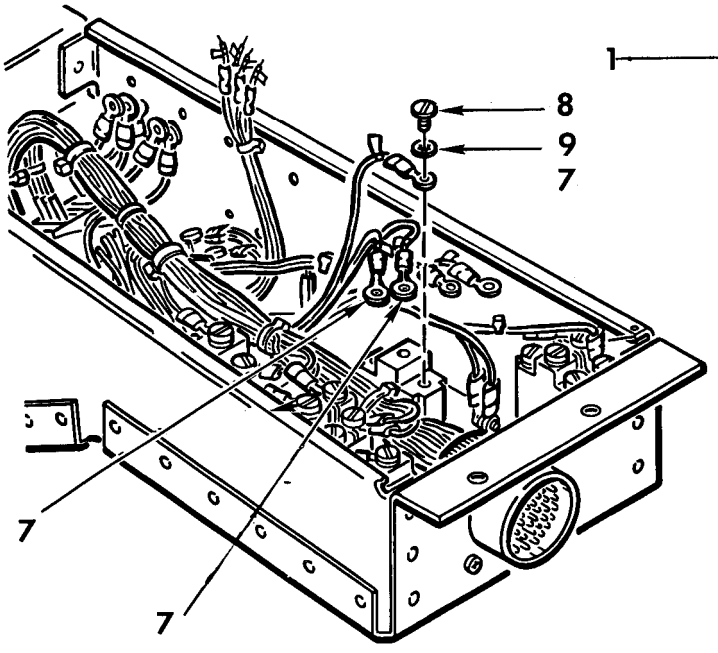
37. INSTALL WING STORE SWITCH 21S8 (1).
    a. Thread nut (2) onto switch (1).
    b. Place switch (1), nut (2), and lockring (3) in place and secure to chassis (4) with washer (5) and nut (6).
    c. Connect three wires (7) to switch (1) terminals with three screws (8) and three washers (9).
    d. Remove labels from connected wires (7).



SWITCH 21S8 TERM.	CONNECTS TO:
1	J1-U
2	J1-S
3	J1-T

NOTE

Use multimeter to identify wires prior to connecting them.



ARR82-27200

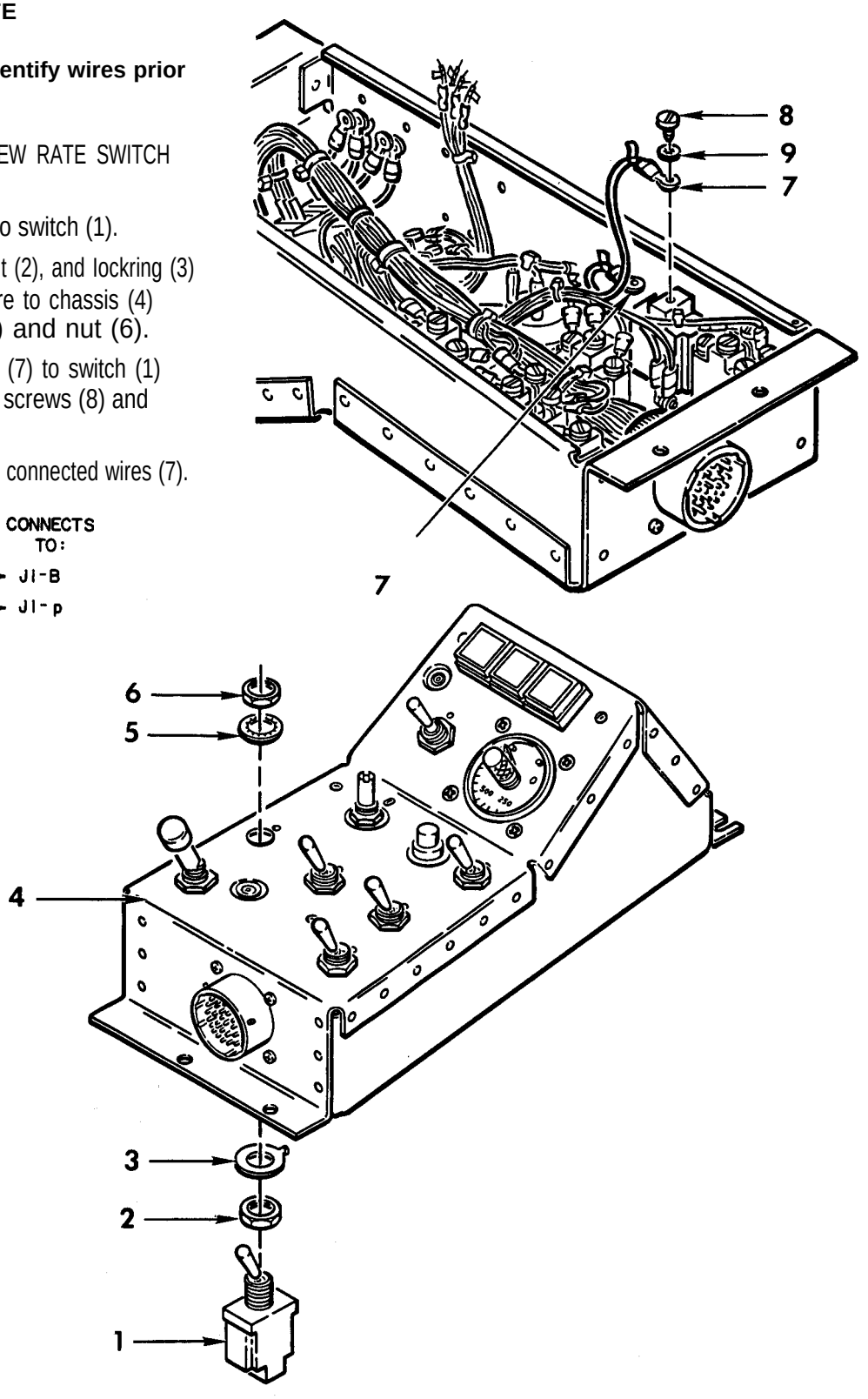
2-59. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12910143) (cont)

NOTE

Use multimeter to identify wires prior to connecting them.

38. INSTALL TSU/GUN SLEW RATE SWITCH 19S6 (1).
    a. Thread nut (2) onto switch (1).
    b. Place switch (1), nut (2), and lockring (3) in place and secure to chassis (4) with washer (5) and nut (6).
    c. Connect two wires (7) to switch (1) terminals with two screws (8) and two washers (9).
    d. Remove labels from connected wires (7).

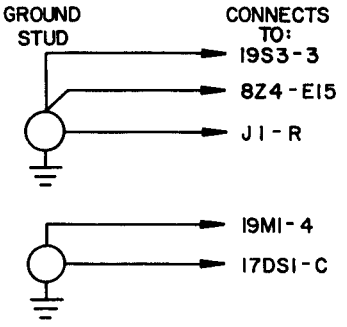
SWITCH 19S6 TERM.	CONNECTS TO:
2	J1-B
3	J1-p



ARR82-27201

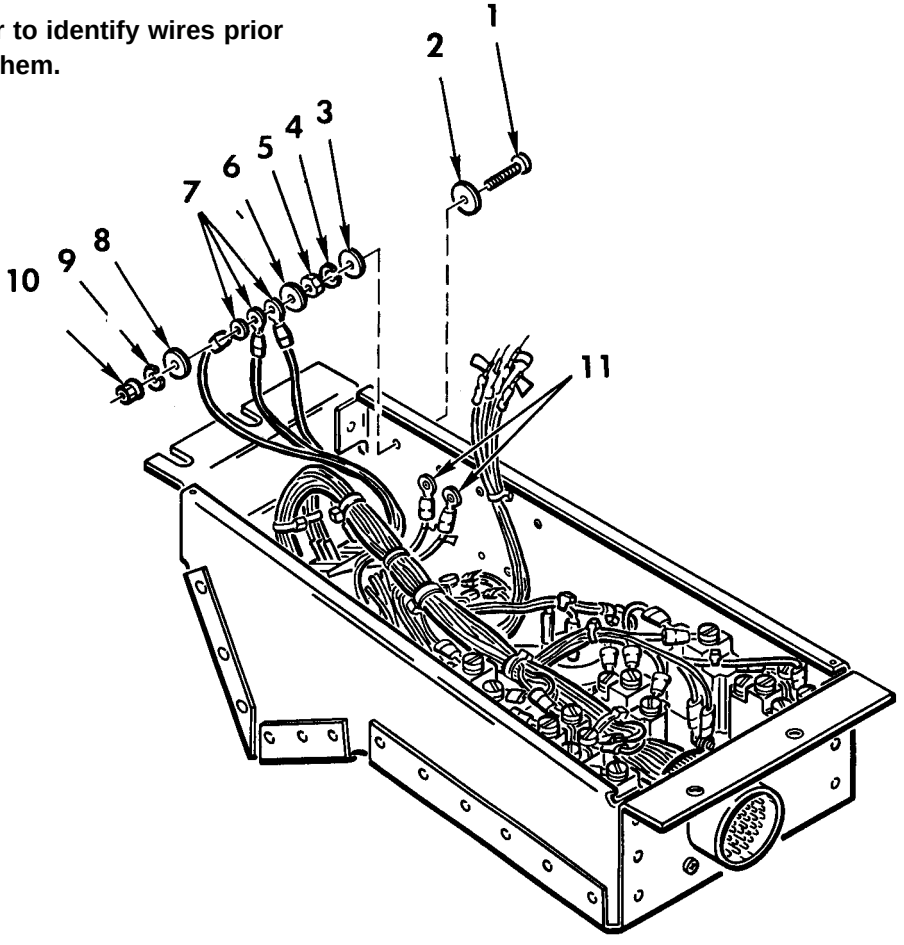
ASSEMBLY (cont)

39. CONNECT WIRING TO GROUND STUDS,
    a. If removed, install screw (1), washer (2), washer (3), lockwasher (4), and nut (5).
    b. Install washer (6), three wires (7), washer (8), lockwasher (9), and nut (10) on screw (1).
    c. Repeat steps a and b to install two wires (11) and corresponding second set of attaching hardware.



NOTE

Use multimeter to identify wires prior to connecting them.



ARR82-27202

2-59. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12910143) (cont)

40. CONNECT WIRING TO RELAY ASSEMBLY 8Z4 (1).

a. Install insulation sleeving over ends of wires and resistors (2) and (3) to be soldered to relay (4) terminals

b. If removed, install stud E15 (5) or E17 (6) on relay assembly (1) with screw (7) or (8).

c. If removed, install relay (4) on relay assembly (1) with two screws (9), two washers (10) and two nuts (11).

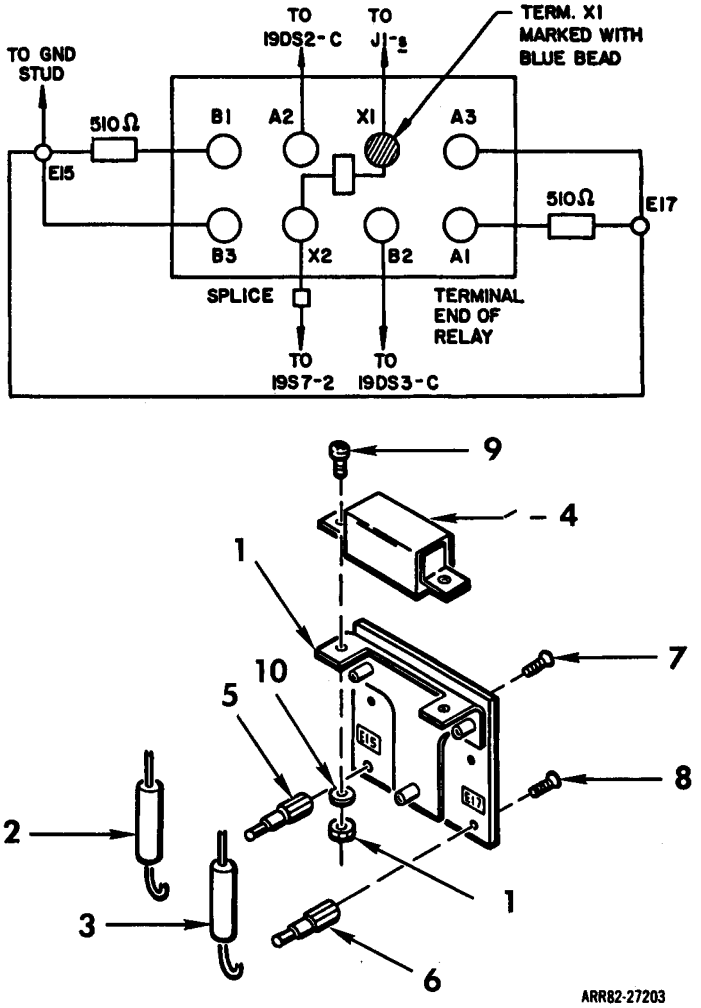
d. If removed, solder one resistor (2) between stud E15 (5) and terminal B1 of relay (4). Solder a second resistor (3) between stud E17 (6) and terminal A1 of relay (4),

e. Solder wires to remaining terminals of relay (4) and remove labels,

f. Protect all soldered terminals of relay (4) with insulation sleeving.

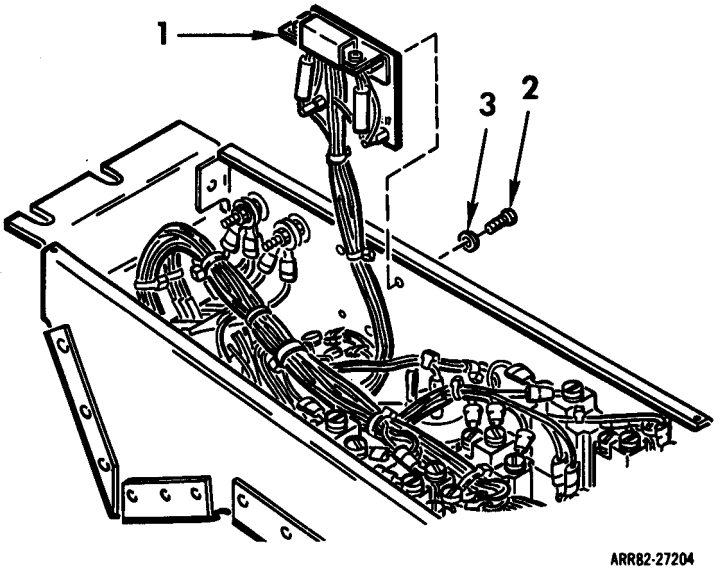
NOTE

Use multimeter to identify wires prior to connecting them.



41. INSTALL RELAY ASSEMBLY 8Z4 (1).

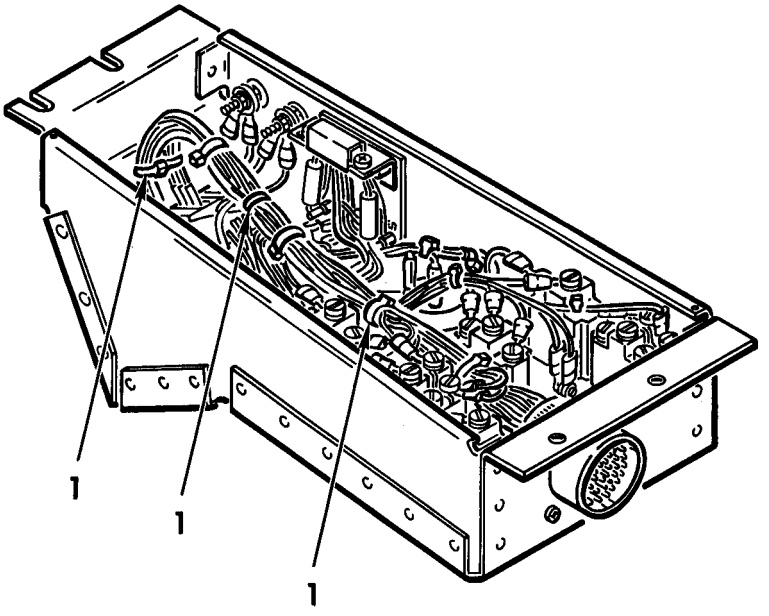
Install three screws (2), three washers (3), and relay assembly (1).



ASSEMBLY (cont)

42. INSTALL CABLE TIEDOWN STRAPS (1).

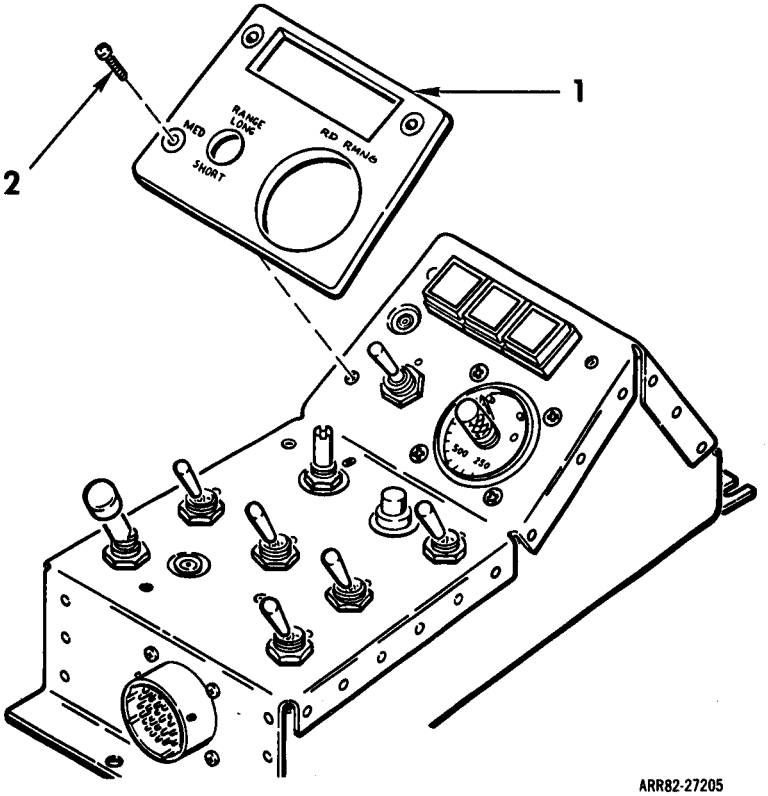
Upon completion of reassembly, form wiring into bundles as required and install cable tiedown straps (1).



ARR82-27208

43. INSTALL INDICATOR PANEL (1).

Install indicator panel (1) and three screws (2).

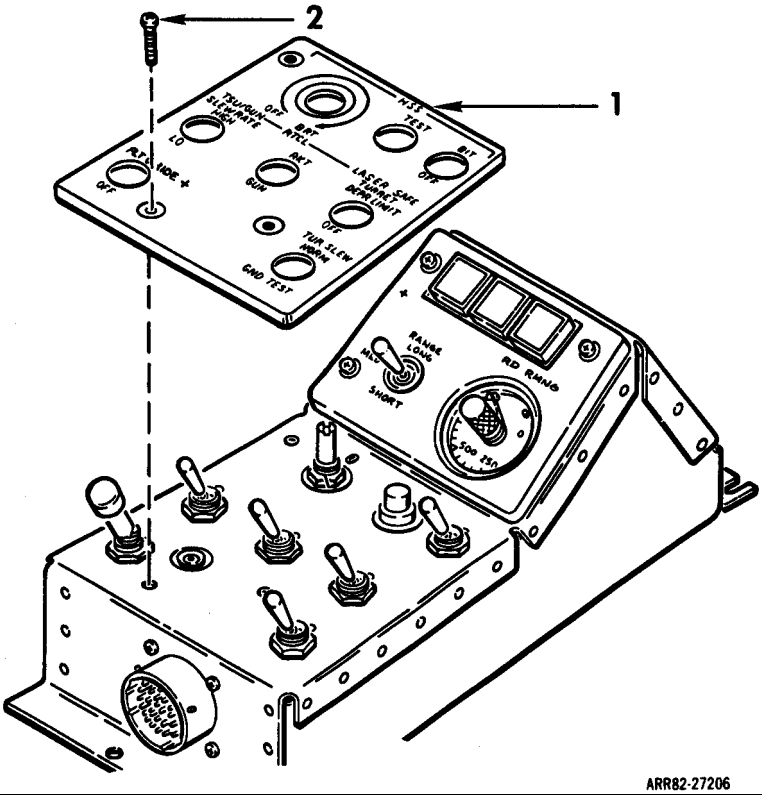


ARR82-27205

2-59. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12910143) (cont)

44. INSTALL INDICATOR PANEL (1).

Install indicator panel (1) and three screws (2).



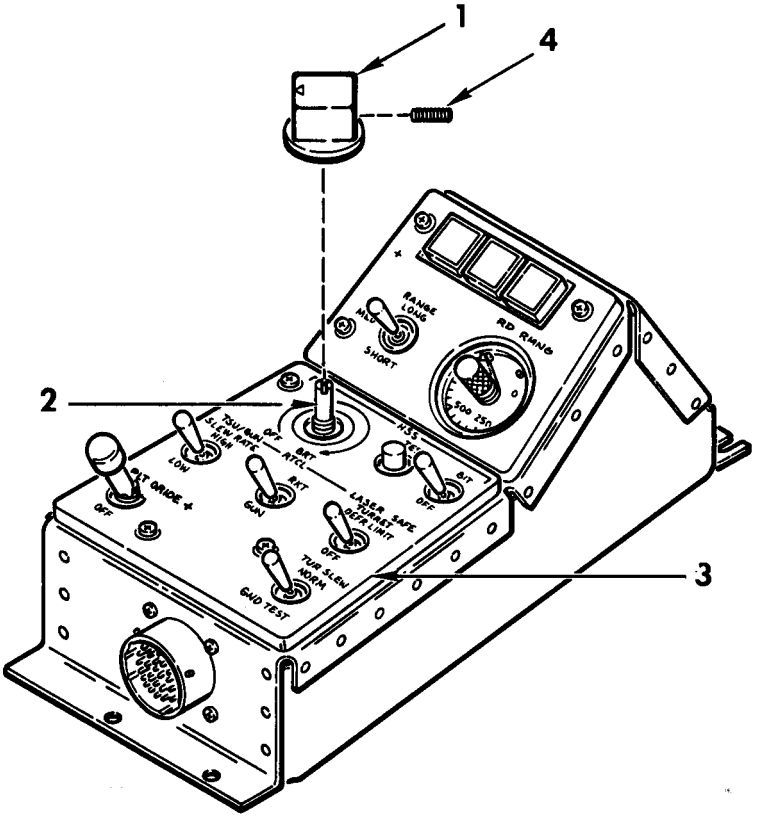
ARR82-27206

45. INSTALL KNOB (1).

a. Rotate shaft (2) to fully OFF position.

b. Place knob (1) on shaft (2) and align index on knob with OFF placard on panel (3).

c. Secure knob (1) to shaft (2) by tightening setscrew (4).



ARR82-27207

END OF TASK

2-60. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12011954)

DESCRIPTION

This task covers: Disassembly, cleaning, inspection, repair, and assembly.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, WC Armament
  - Repairman: Supplemental
- Multimeter AN/USM-223

Materials:
- Solder (Item 28, Appx B)
- Strap (Item 30, Appx B)

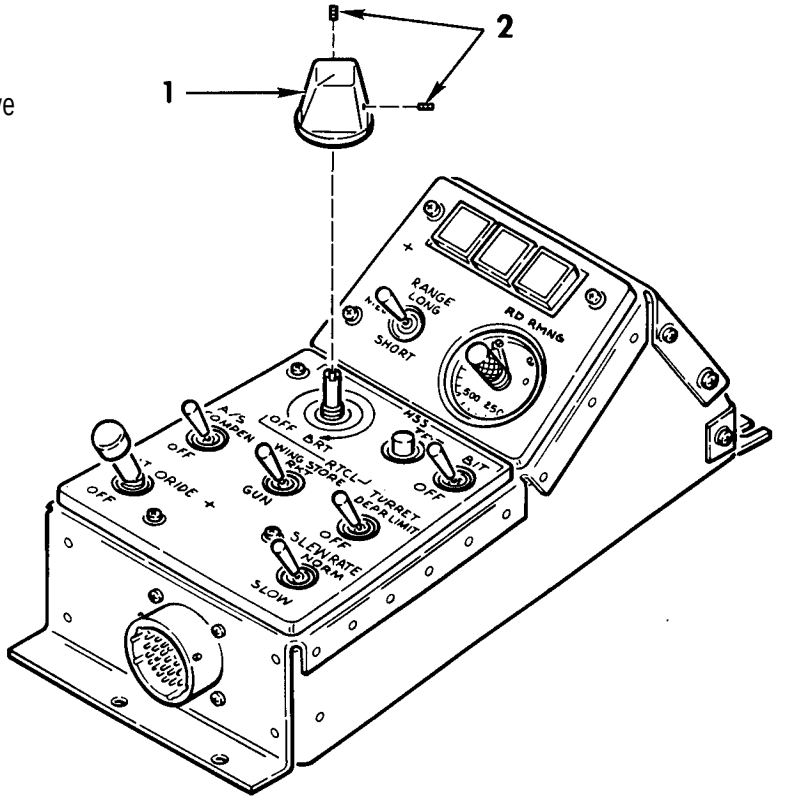
Personnel Required:
- 68J Aircraft Armament/Missile Systems Repairer

Equipment Conditions:
- In shop on bench
- No power applied.

DISASSEMBLY

1. REMOVE KNOB (1).

   Loosen two setscrews (2) and remove knob (1).

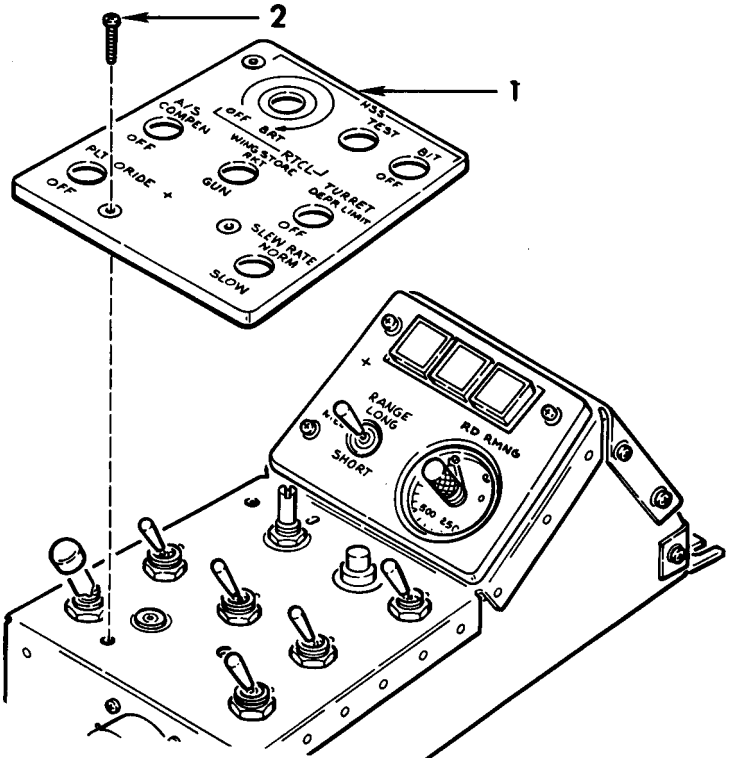


ARR82-27118

2-60. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12011954) (cont)

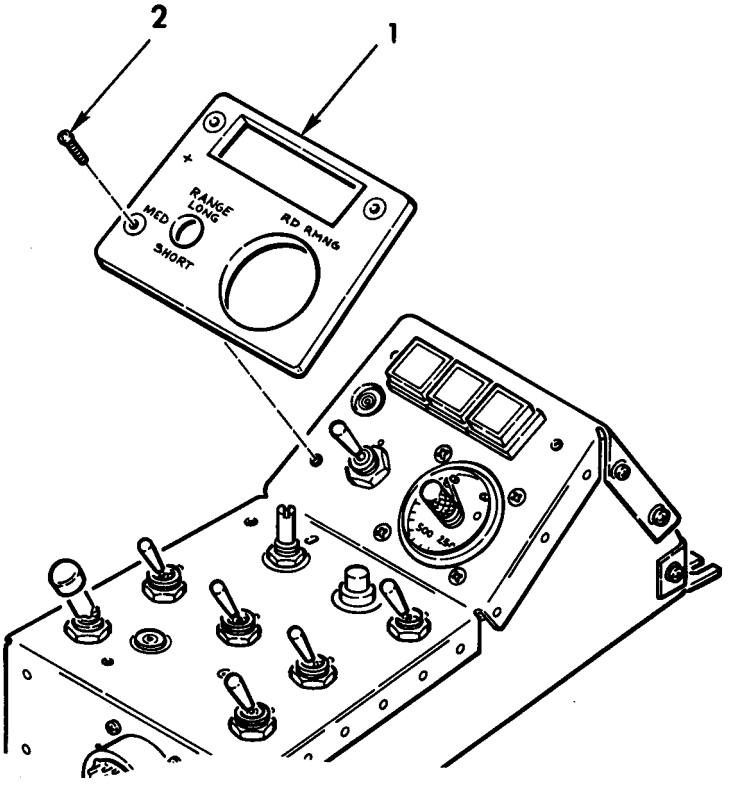
2. REMOVE INDICATOR PANEL (1).

Remove three screws (2) and indicator panel (1).



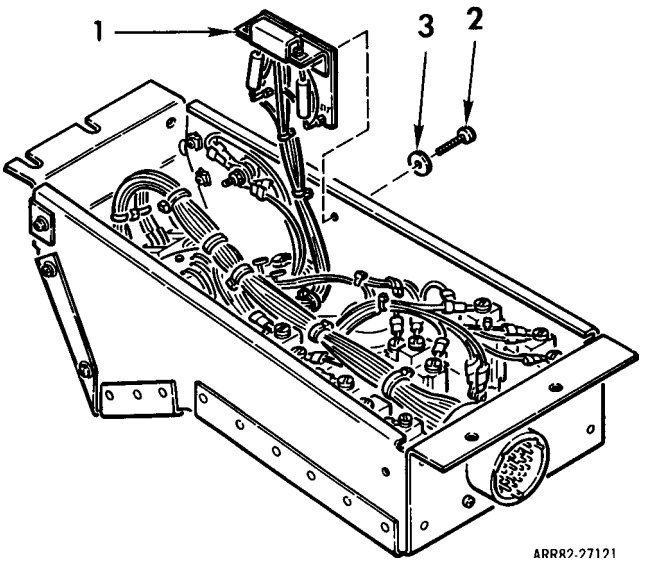
3. REMOVE INDICATOR PANEL (1).

Remove three screws (2) and indicator panel (1).

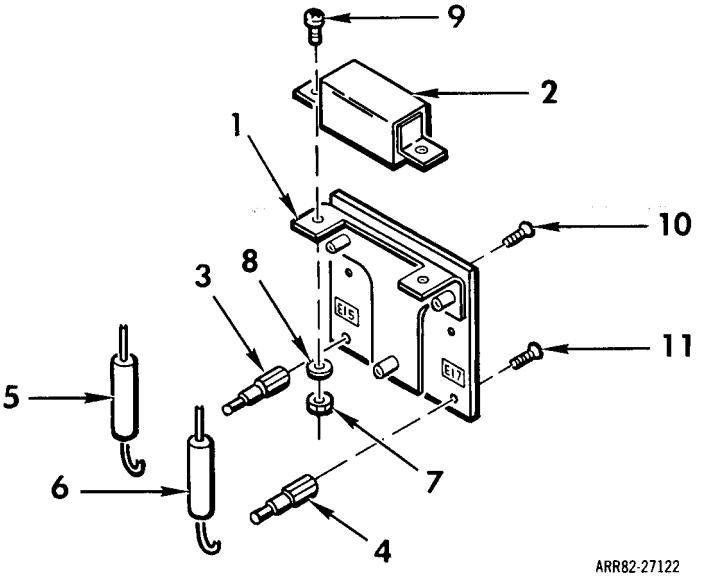


DISASSEMBLY (cont)

4. REMOVE RELAY ASSEMBLY 8Z4 (1).
   a. Remove three screws (2) and three washers (3).
   b. Lift relay assembly 8Z4 (1) from chassis.



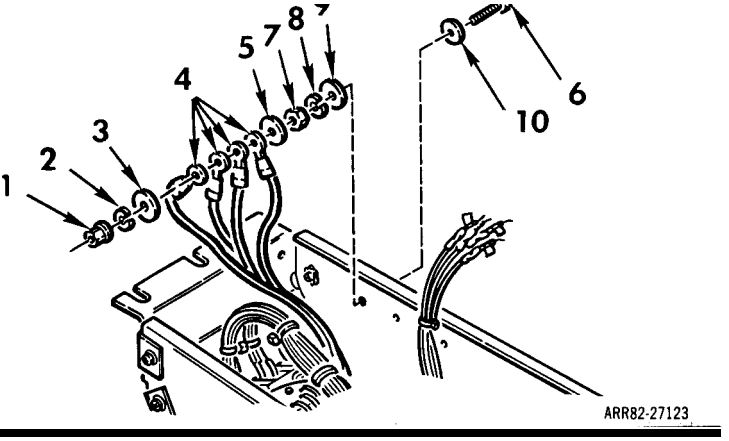
5. DISCONNECT WIRING FROM RELAY ASSEMBLY 8Z4 (1).
   a. Label and unsolder wires from relay assembly 8Z4 (1) including relay (2) and studs E15 (3) and E17 (4).
   b. If required, remove relay (2) by unsoldering two resistors (5) and (6) and removing two nuts (7), two washers (8), and two screws (9).
   c If required, replace stud E15 (3) or E17 (4) by unsoldering resistor (5) or (6) and removing screw (10) or (11).



NOTE

Label wires after removal for proper identification.

6. DISCONNECT WIRES FROM GROUND STUDS.
   a. Remove nut (1), lockwasher (2), washer (3), four wires (4), and washer (5) from screw (6).
   b. If required, remove nut (7), lockwasher (8), washer (9), washer (10), and screw (6).



2-80. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12011954) (cont)

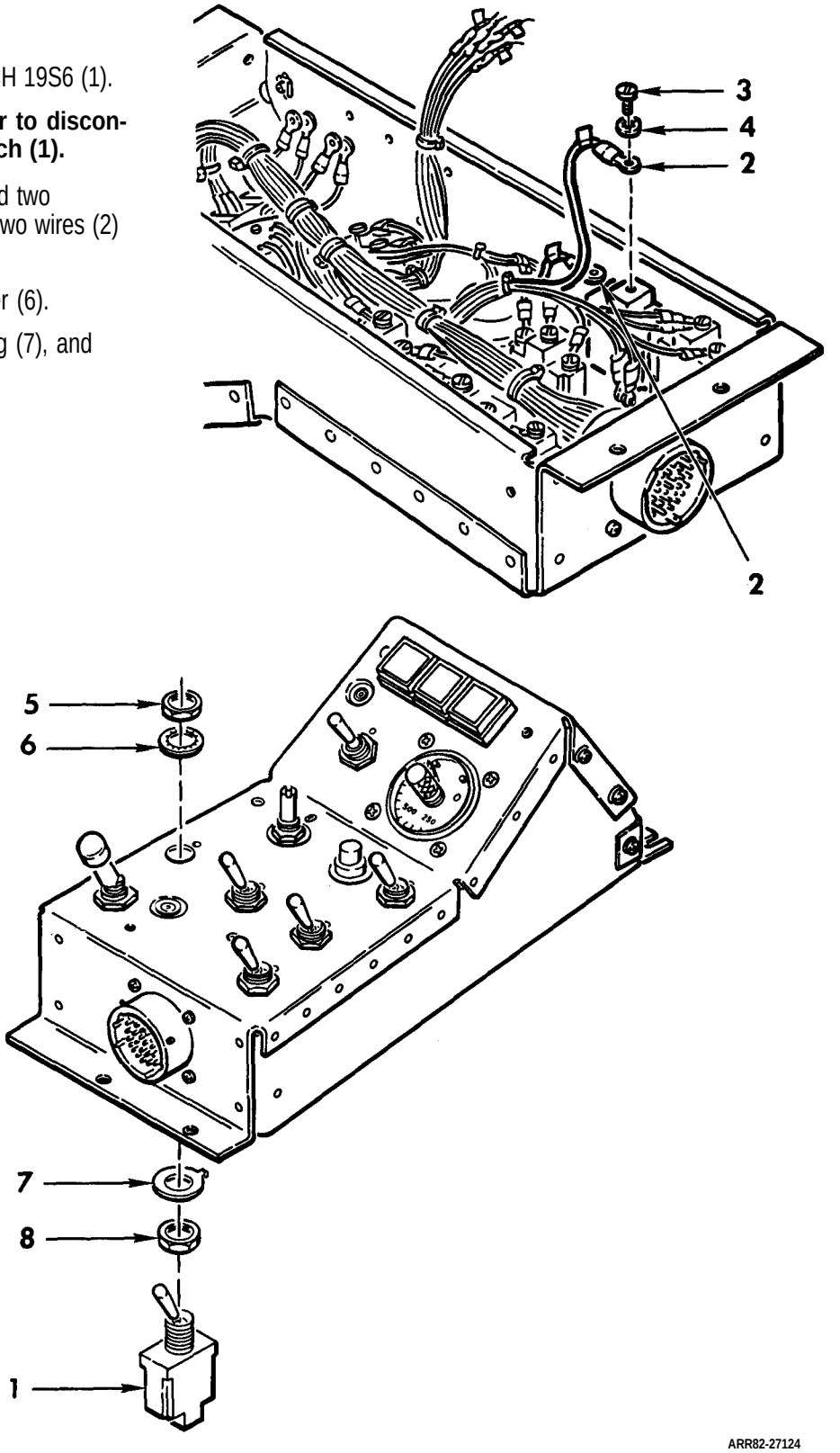
7. REMOVE A/S COMPEN SWITCH 19S6 (1).

a. Label two wires (2) prior to disconnecting them from switch (1).

b. Remove two screws (3) and two washers (4) to disconnect two wires (2) from switch (1) terminals.

c. Remove nut (5) and washer (6).

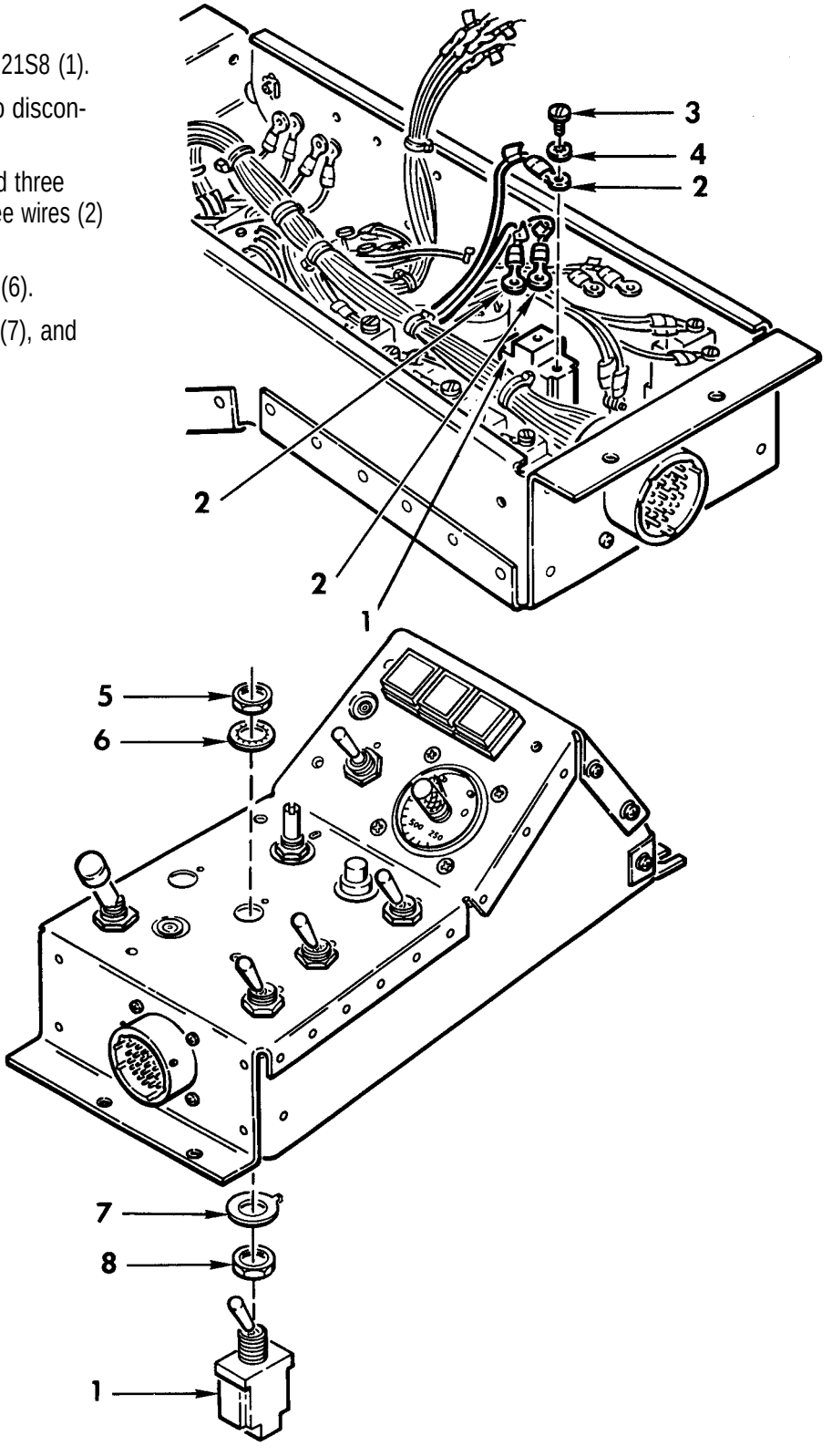
d. Remove switch (1), lockring (7), and nut (8).



ARR82-27124

DISASSEMBLY (cont)

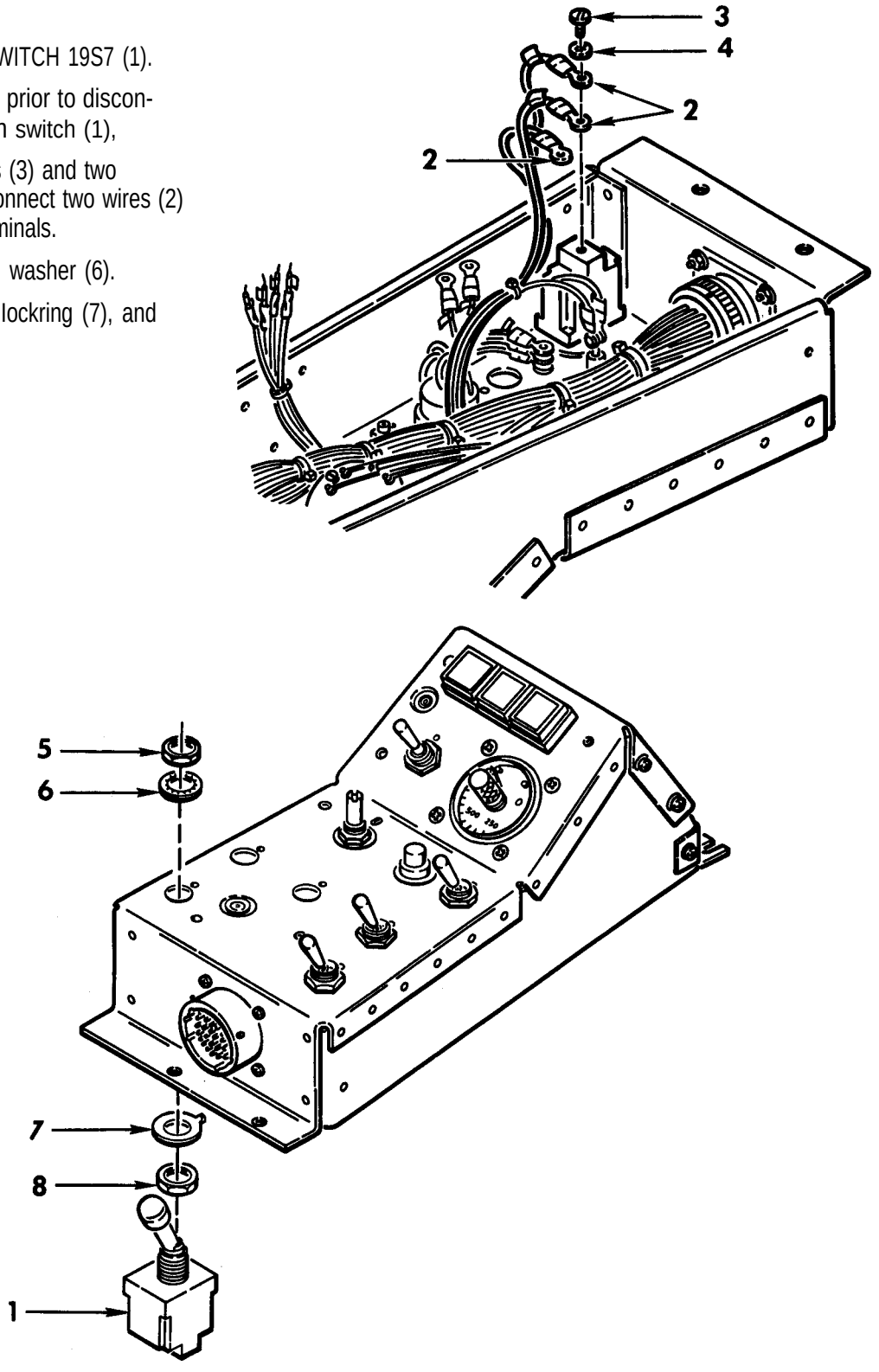
8. REMOVE WING STORE SWITCH 21S8 (1).
   a. Label three wires (2) prior to disconnecting from switch (1).
   b. Remove three screws (3) and three washers (4) to disconnect three wires (2) from switch (1) terminals.
   c. Remove nut (5) and washer (6).
   d. Remove switch (1), lockring (7), and nut (8).



ARR82-27125

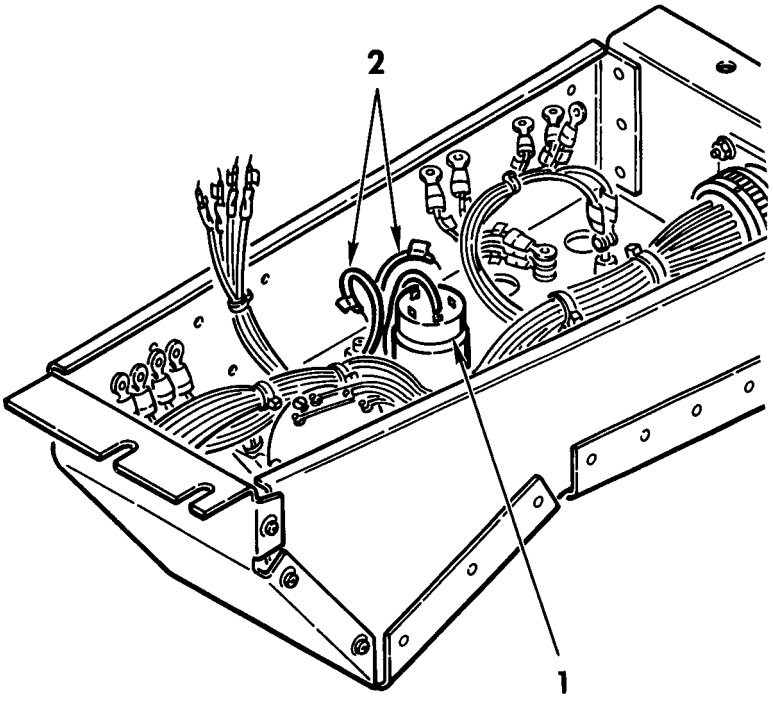
2-80. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12011954) (cont)

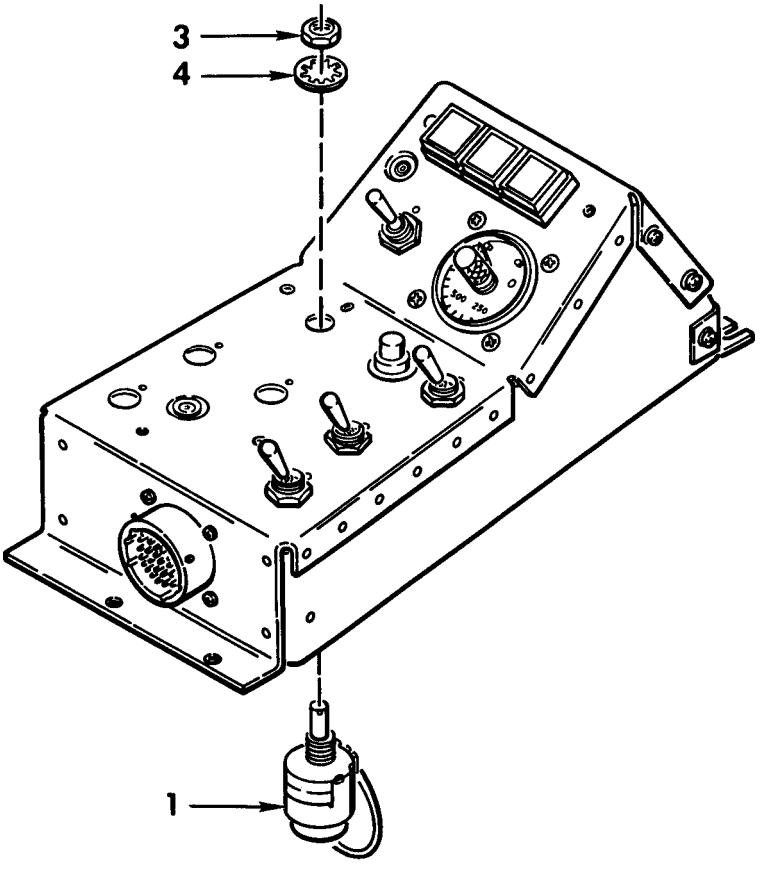
9. REMOVE PLT ORIDE SWITCH 19S7 (1).
   a. Label two wires (2) prior to disconnecting them from switch (1),
   b. Remove two screws (3) and two washers (4) to disconnect two wires (2) from switch (1) terminals.
   c. Remove nut (5) and washer (6).
   d. Remwe switch (1), lockring (7), and nut (8).



DISASSEMBLY (cont)

10. REMOVE HSS RETICLE LIGHT CONTROL (1).
    a. Label and unsolder wires (2) from terminals 3 and 5 of control (1). Cut cable tiedown straps if necessary.
    b. Remove nut (3) and washer (4).
    c. Remove control (1).

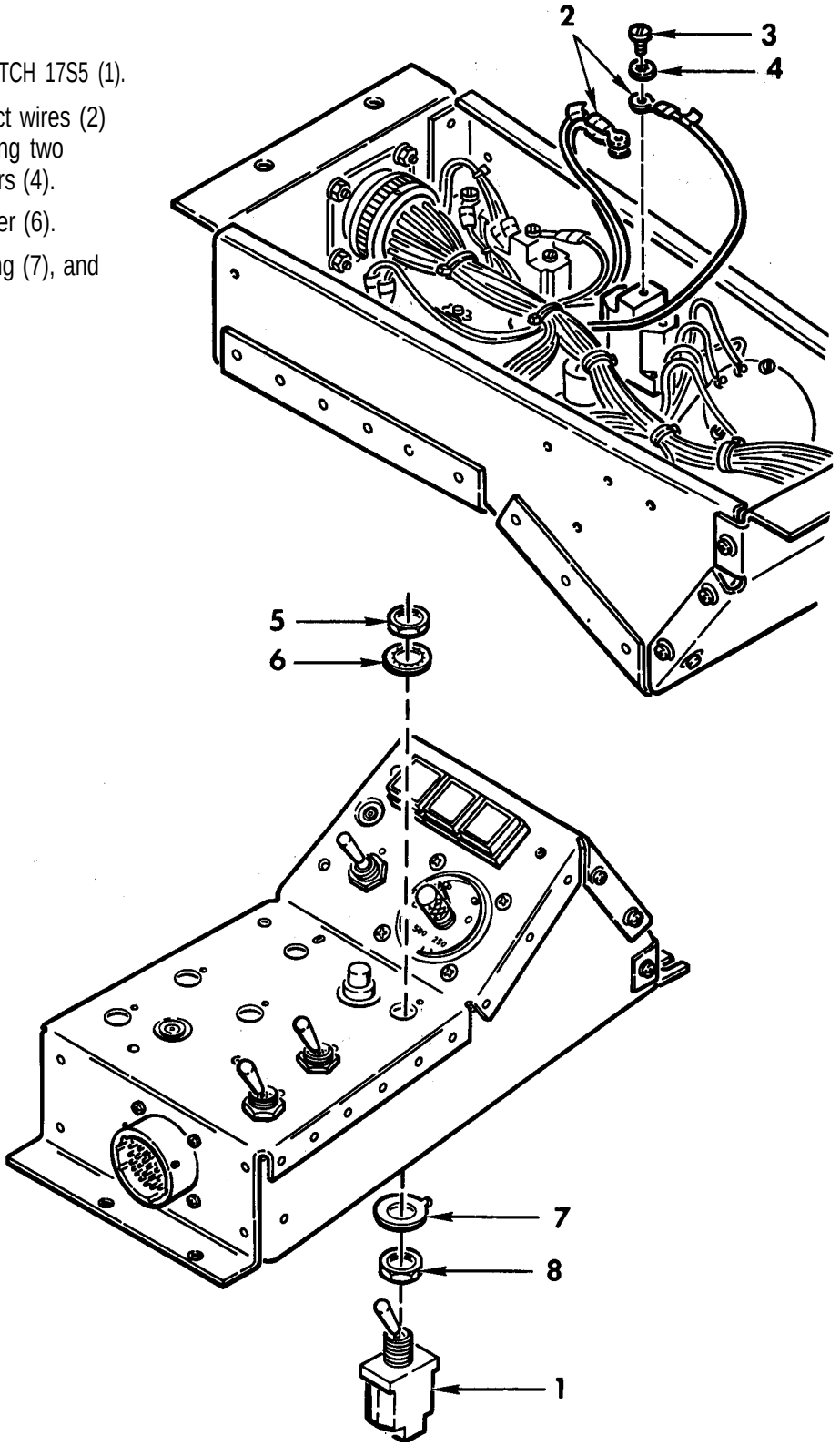




ARR82-27127

2-60. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12011954) (cont)

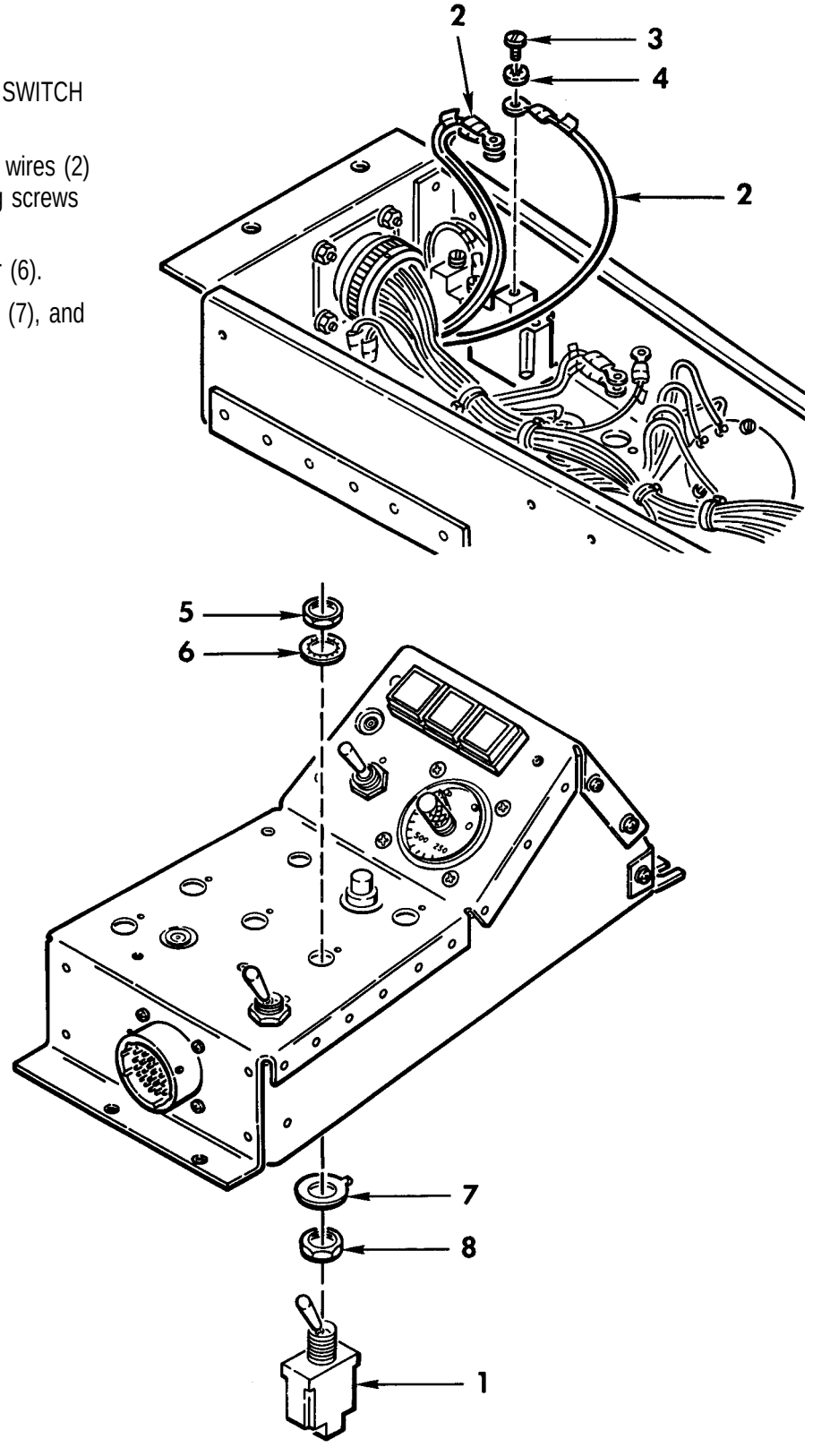
11. REMOVE HSS/BIT TOGGLE SWITCH 17S5 (1).
    a. Label wires (2). Disconnect wires (2) from switch (1) by removing two screws (3) and two washers (4).
    b. Remove nut (5) and washer (6).
    c Remove switch (1), lockring (7), and nut (8).



ARR82-27128

DISASSEMBLY (cont)

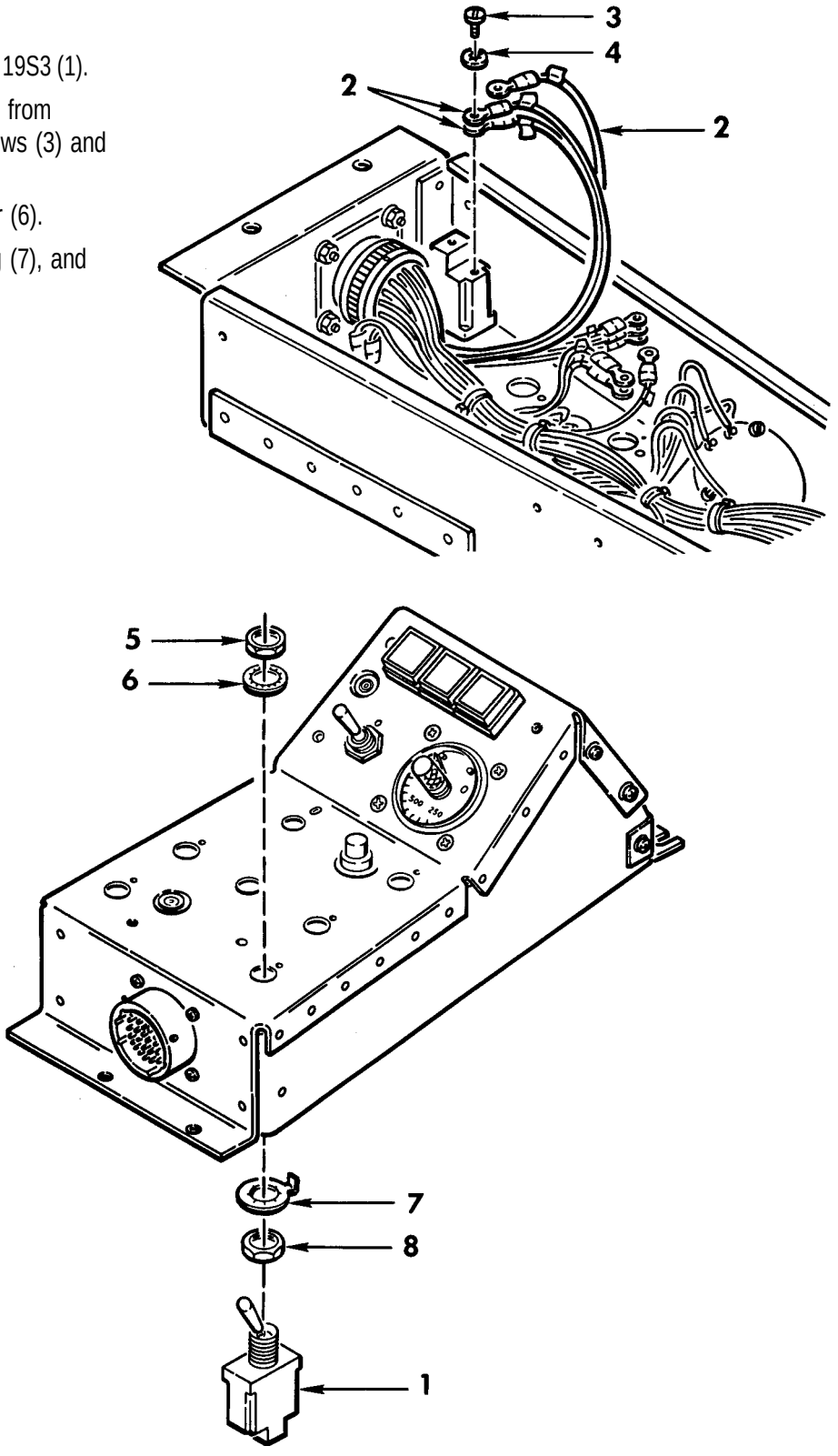
12. REMOVE TURRET DEPR LIMIT SWITCH 19S16 (1).
    a. Label' wires (2). Disconnect wires (2) from switch (1) by removing screws (3) and washer (4).
    b. Remove nut (5) and washer (6).
    c. Remove switch (1), lockring (7), and nut (8).



ARR82-27129

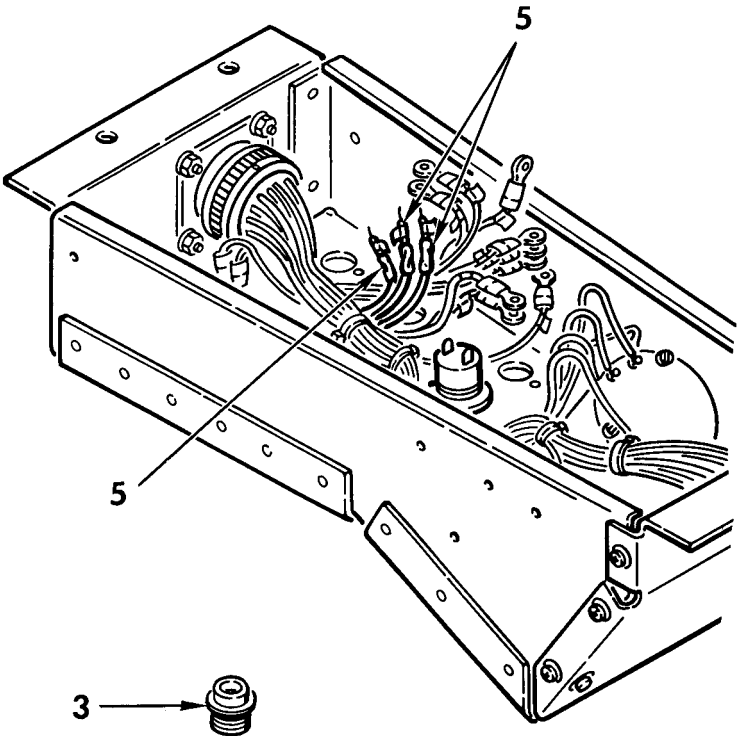
2-60. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12011954) (cont)

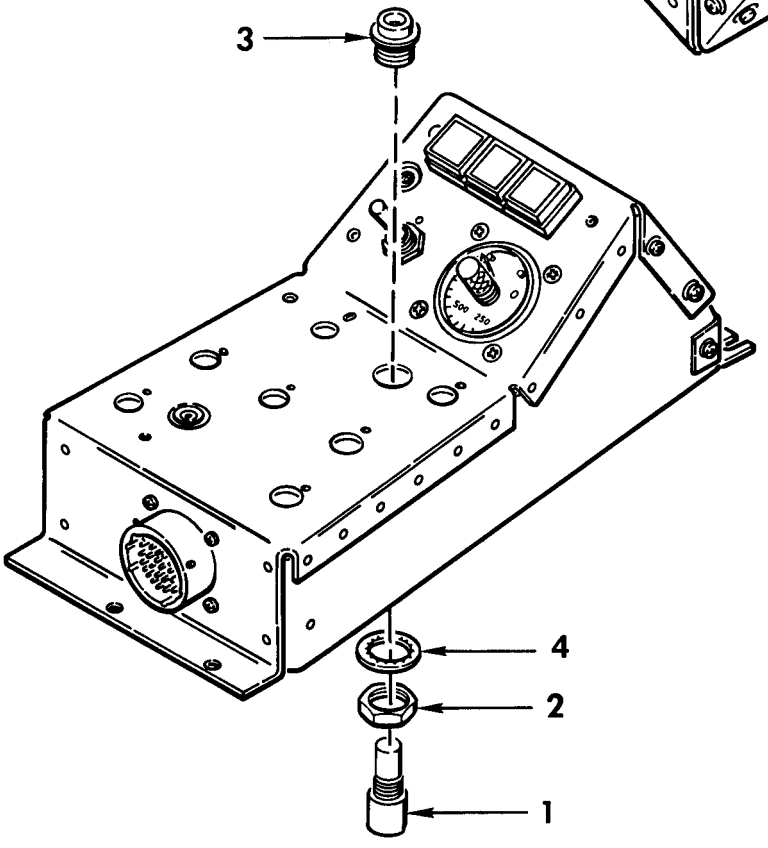
13. REMOVE SLEW RATE SWITCH 19S3 (1).
    a. Label wires (2), Disconnect from switch (1) by removing screws (3) and washers (4).
    b. Remove nut (5) and washer (6).
    c Remove switch (1), lockring (7), and nut (8).



DISASSEMBLY (cont)

14. REMOVE TEST PUSH SWITCH 17S4 (1).
    a. Unscrew nut (2) from threaded adapter (3).
    b. Unscrew threaded adapter (3) from body of switch (1).
    c. Separate switch (1), nut (2), lockwasher (4), and threaded adapter (3) from chassis.
    d. Label and unsolder three wires (5) from switch (1) terminals.





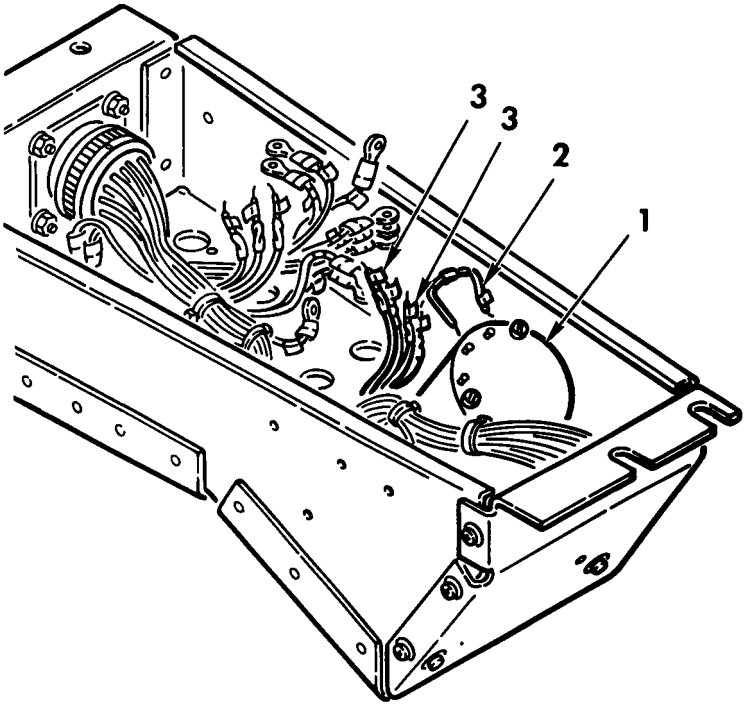
2-60. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (120119S4) (cont)

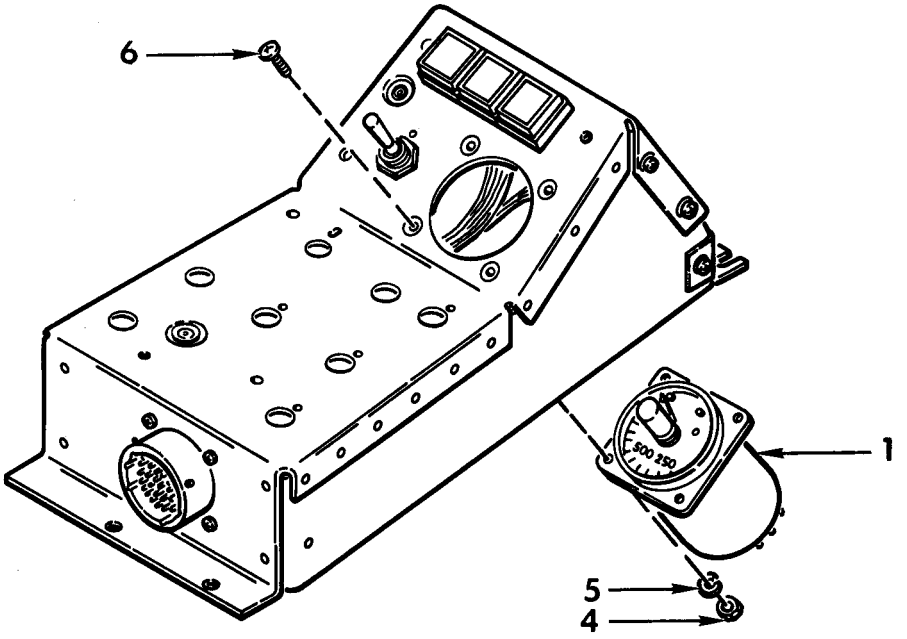
15. REMOVE RD RMNG COUNTER 19M1 (1).

a. If defective, unsolder and remove diode 19CR14 (2).

b. Label and unsolder wires (3) from rounds remaining counter (1) terminals.

c. Remove four nuts (4), four lockwashers (5), four screws (6), and rounds remaining counter (1).





ARR82-27132

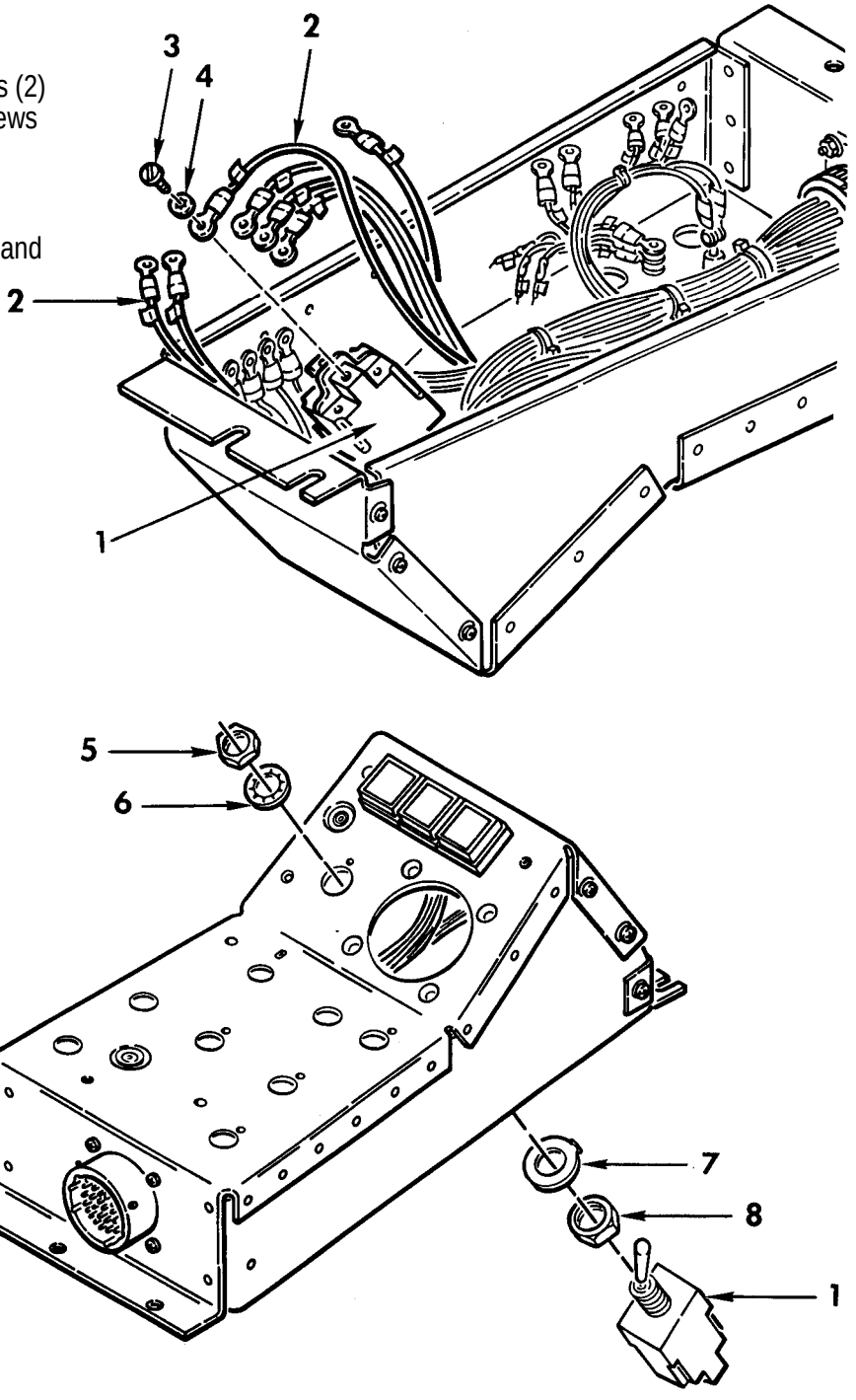
DISASSEMBLY (cont)

REMOVE RANGE SWITCH 19S8 (1).

a. Label wires (2). Disconnect wires (2) from switch (1) by removing screws (3) and washers (4).

b. Remove nut (5) and washer (6).

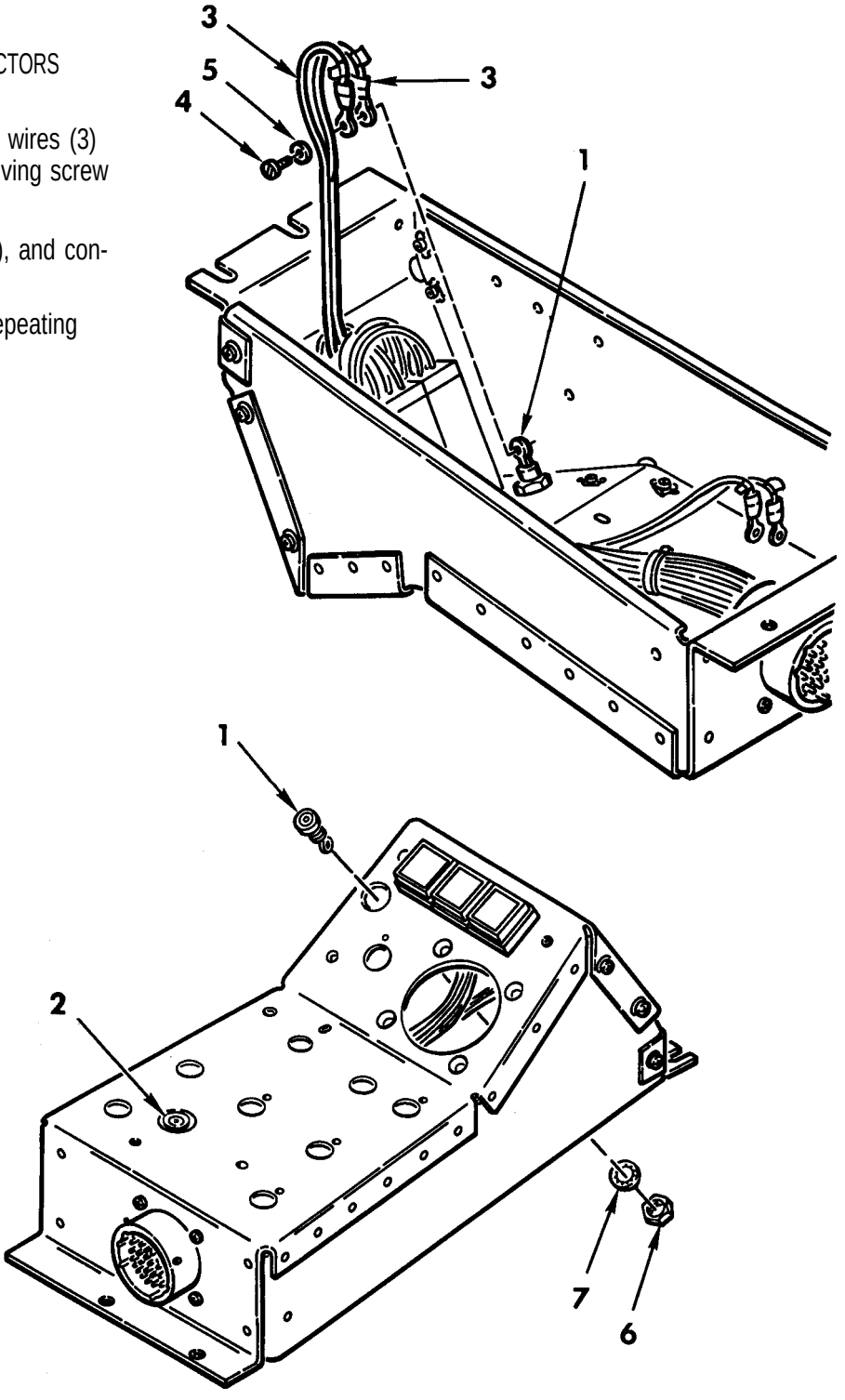
c. Remove switch (1), lockring (7), and nut (8).



ARR82-27133

2-60. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12011954) (cont)

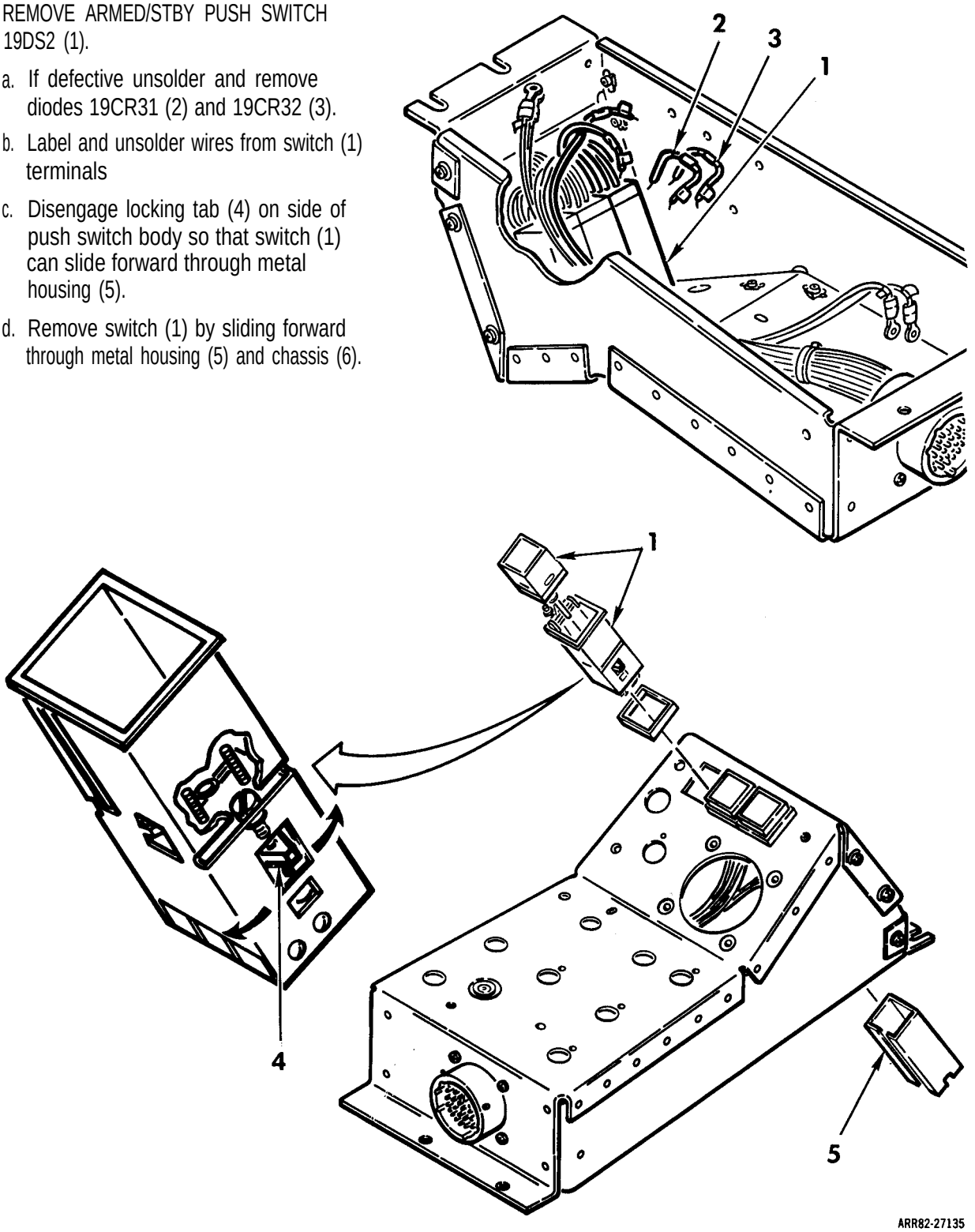
17. REMOVE RECEPTACLE CONNECTORS 8JI02 (1) AND 8J103 (2).
    a. Label wires (3). Disconnect wires (3) from connector (1) by removing screw (4) and washer (5).
    b. Remove nut (6), washer (7), and connector (1).
    c. Remove connector (2) by repeating steps a and b.



ARR82-27134

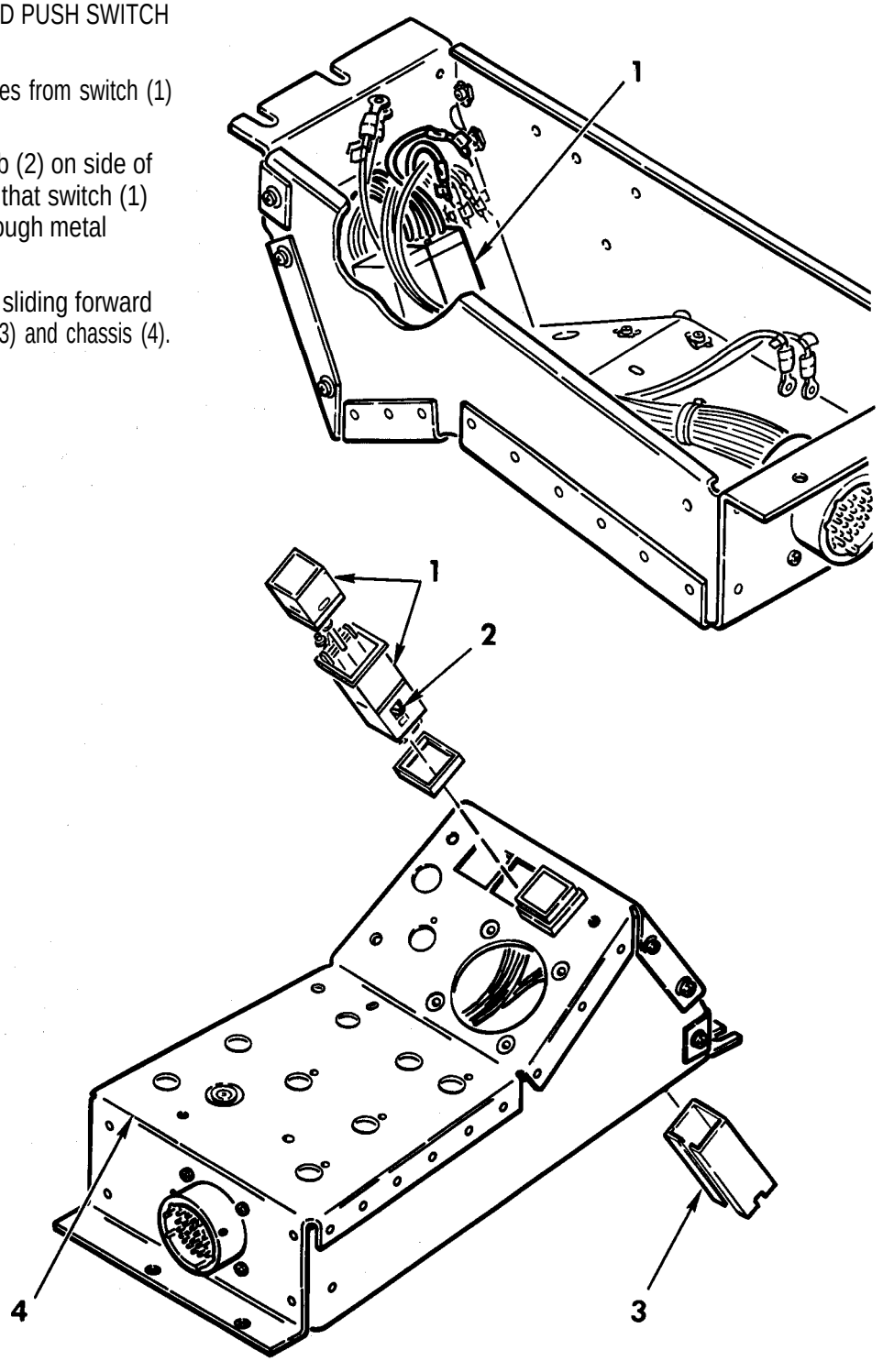
DISASSEMBLY (cont)

18. REMOVE ARMED/STBY PUSH SWITCH 19DS2 (1).
    a. If defective unsolder and remove diodes 19CR31 (2) and 19CR32 (3).
    b. Label and unsolder wires from switch (1) terminals
    c. Disengage locking tab (4) on side of push switch body so that switch (1) can slide forward through metal housing (5).
    d. Remove switch (1) by sliding forward through metal housing (5) and chassis (6).



2-60. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12011954) (cont)

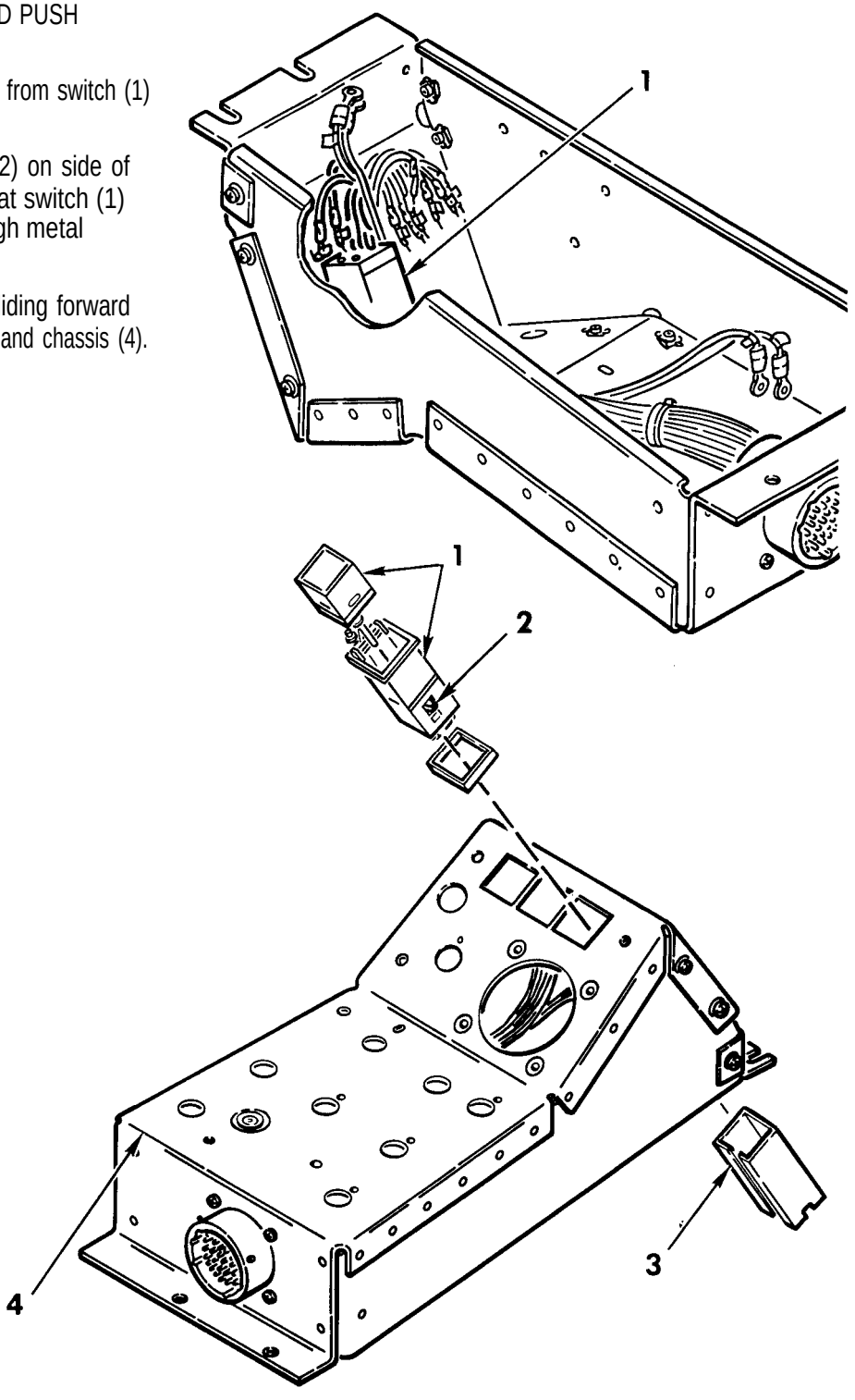
19. REMOVE ARMT CONT IND PUSH SWITCH 19DS3 (1).
    a. Label and unsolder wires from switch (1) terminals.
    b. Disengage locking tab (2) on side of push switch body so that switch (1) can slide forward through metal housing (3).
    c Remove switch (1) by sliding forward through metal housing (3) and chassis (4).



ARRR2-27136

DISASSEMBLY (cont)

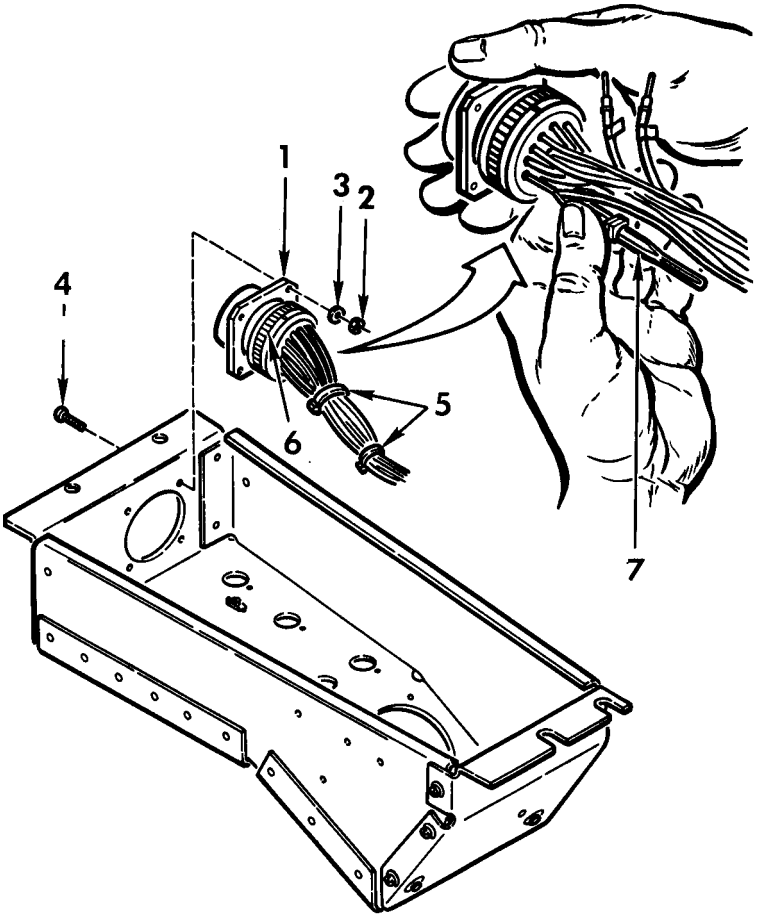
20. REMOVE GNR HSS BIT IND PUSH SWITCH 17DS1 (1).
    a. Label and unsolder wires from switch (1) terminals,
    b. Disengage locking tab (2) on side of push switch body so that switch (1) can slide forward through metal housing (3).
    c. Remove switch (1) by sliding forward through metal housing (3) and chassis (4).



ARR82-27137

2-60. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12011954) (cont)

21. REMOVE CONNECTOR J1 (1).
    a. Remove four nuts (2), four washers (3), and four screws (4), and connector (1).
    b. Cut cable tiedown straps (5) as required.
    c Unscrew cable clamp (6).
    d. Label wires and, using pin insertion/extraction tool (7), remove pins from connector (1).



ARR82-27138

CLEANING

22. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV.

INSPECTION

23. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV.

ASSEMBLY

24. INSTALL CONNECTOR J1 (1).

a. Make sure that cable clamp (2) is over ends of unconnected wire bundle.

b. Remove labels and connect pins to connector (1) with pin insertion/extraction tool (3).

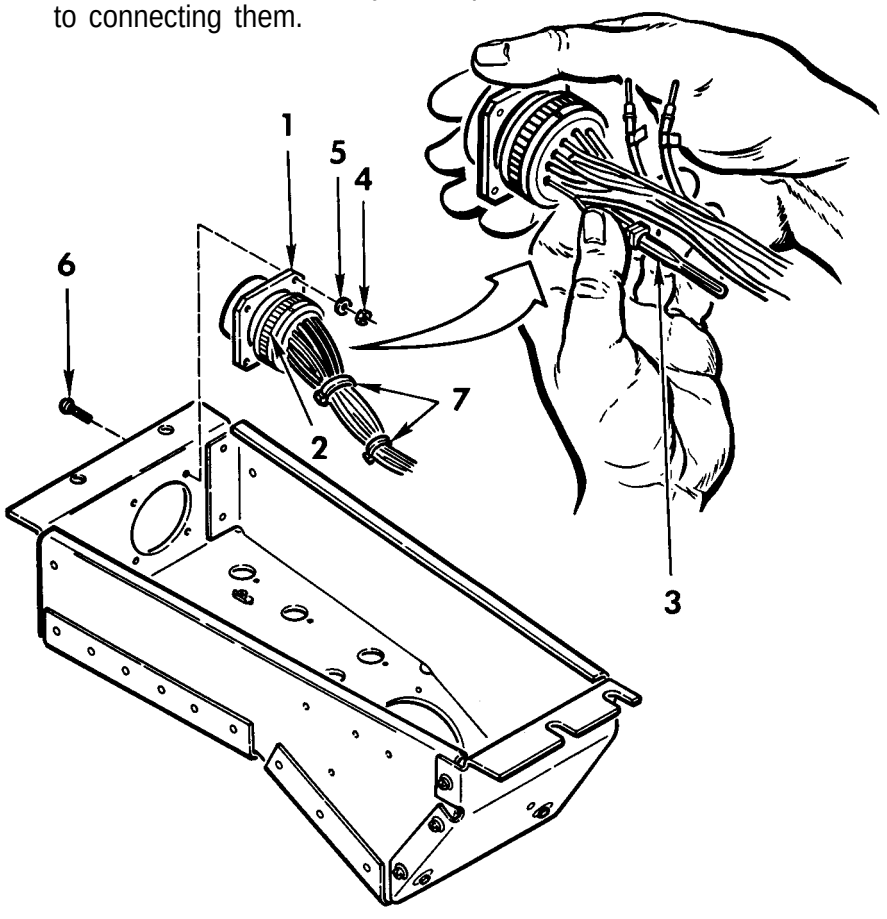
c Attach connector (1) to chassis with four screws (4), four washers (5), and four nuts (6).

d. Screw cable clamp (2) onto connector (1).

e. Install cable tiedown straps (7) as required to form wire bundle.

NOTE

Use multimeter to identify wires prior to connecting them.



CONNECTOR J1 PIN	CONNECTS TO:
A	19S8-6
B	19S6-2
C	17R2-3(RTCL)
D	19M1-2
G	17DS1-2
H	17DS1-1
J	17DS1-4
K	17DS1-3
L	1956-1
N	17S5-2
P	19M1-1
R	GND STUD
S	21S8-2
T	21S8-3
U	21S8-1
V	19S8-5
W	19DS2B-NC
Y	17DS1-C
Z	8J103
a	19S16-2
c	19S7-1
d	19DS3-NC
e	19S8-3
i	17S3-2(RTCL)
j	19DS2A-NC
k	17S4-1
m	19S7-2
p	19S8-1
r	19S3-2
s	8Z4-X1

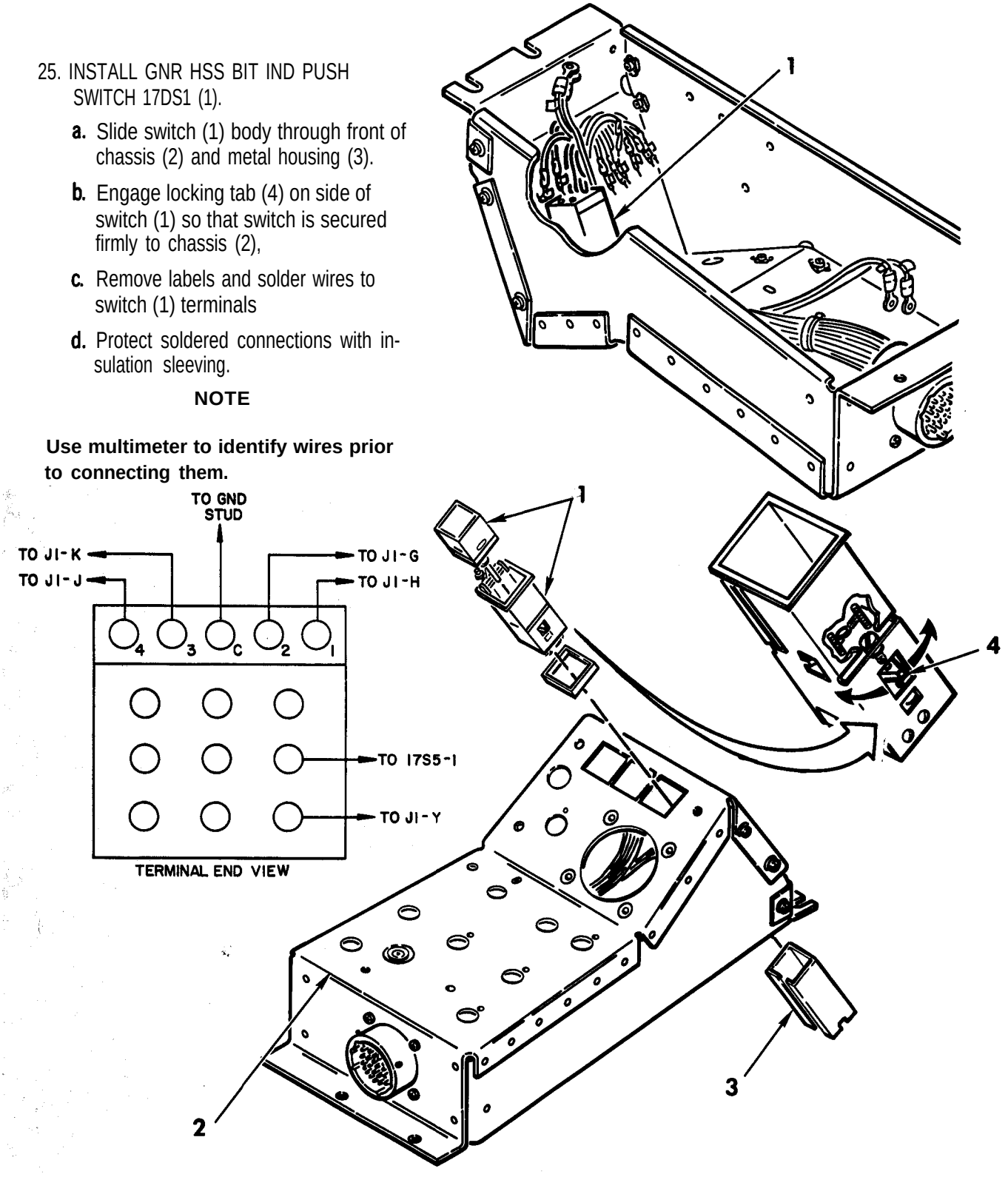
ARR82-27141

2-60. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12011954) (cont)

25. INSTALL GNR HSS BIT IND PUSH SWITCH 17DS1 (1).
    - **a.** Slide switch (1) body through front of chassis (2) and metal housing (3).
    - **b.** Engage locking tab (4) on side of switch (1) so that switch is secured firmly to chassis (2),
    - **c.** Remove labels and solder wires to switch (1) terminals
    - **d.** Protect soldered connections with insulation sleeving.

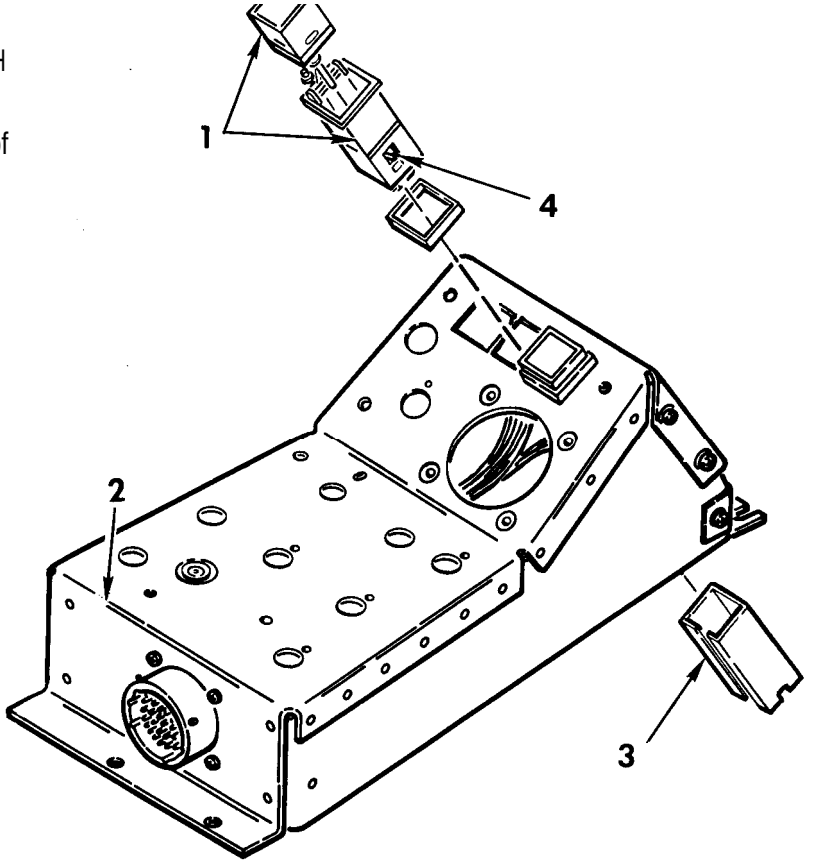
NOTE

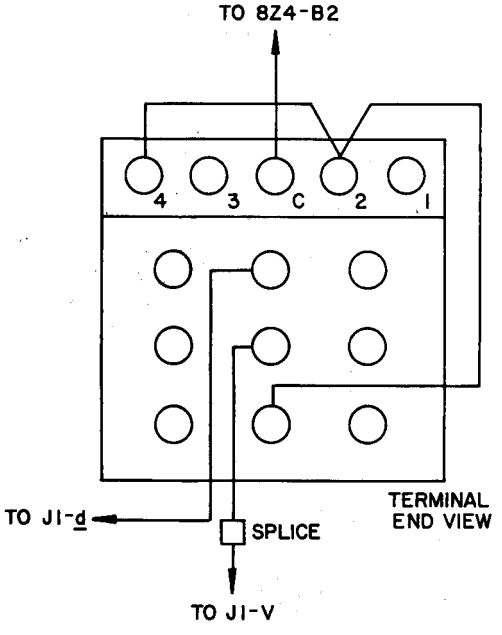
Use multimeter to identify wires prior to connecting them.

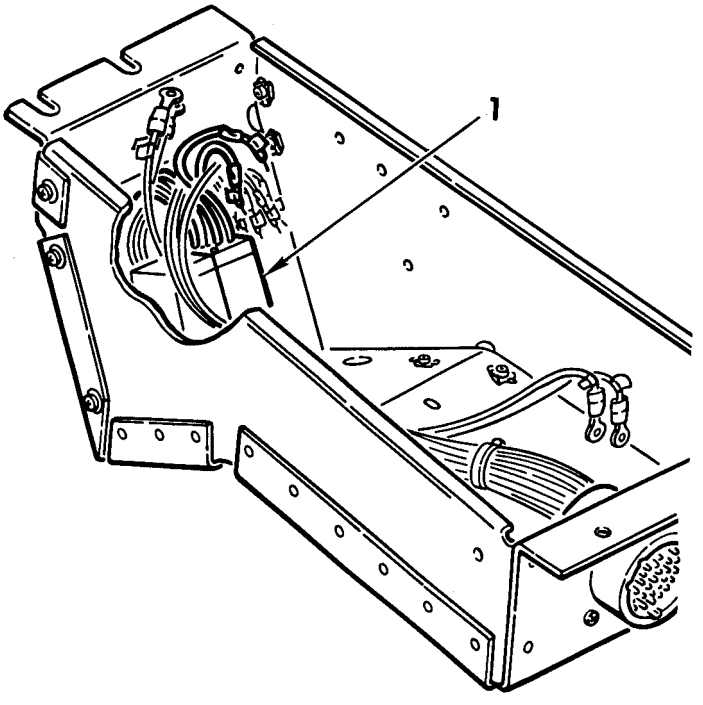


ASSEMBLY (cont)

26. INSTALL ARMT CONT IND PUSH SWITCH 19DS3 (1).
    a. Slide switch (1) body through front of chassis (2) and metal housing (3).
    b. Engage locking tab (4) on side of switch (1) so that switch is secured firmly to chassis (2).
    c. Remove labels and solder wires to switch (1) terminals.
    d. Protect soldered connections with insulation sleeving.







NOTE

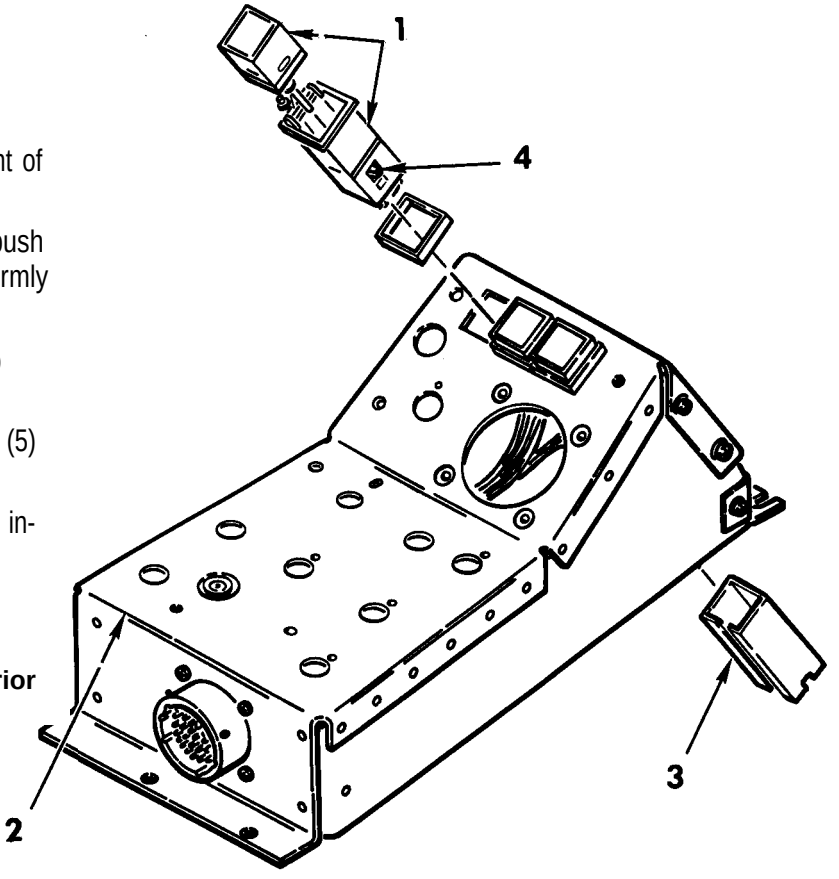
Use multimeter to identify wires prior to connecting them.

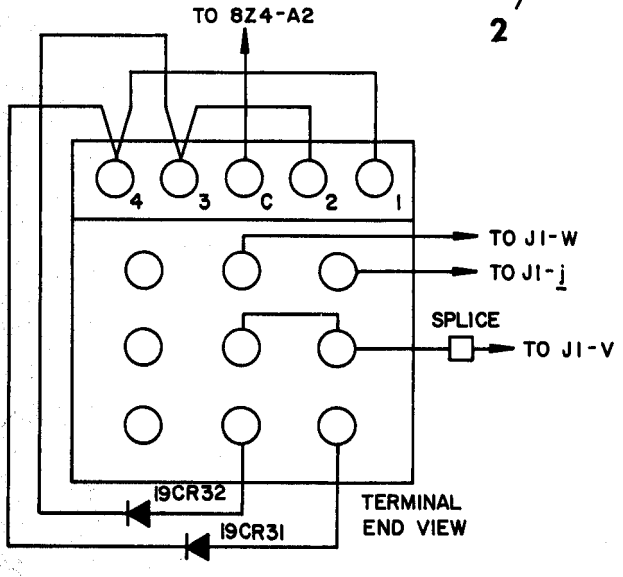
2-60. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12011954) (cont)

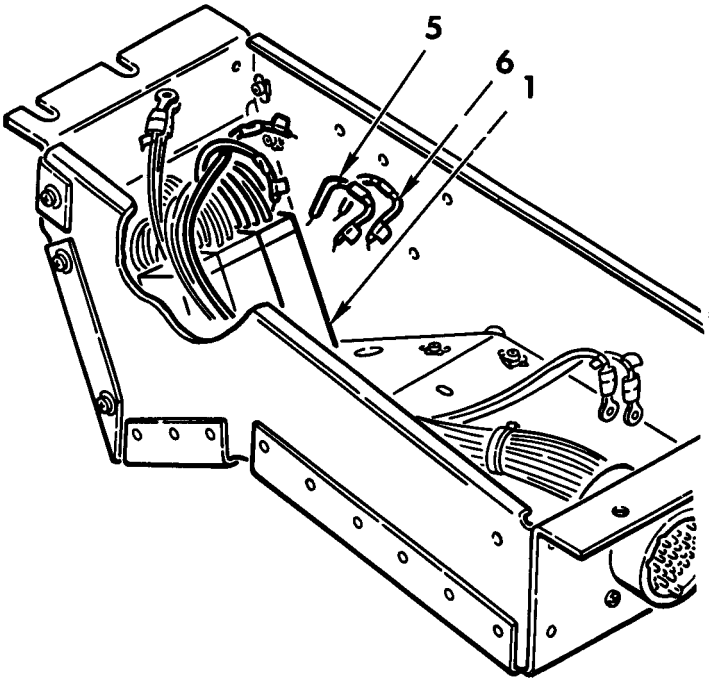
27. INSTALL ARMED/STBY PUSH SWITCH 19DS2 (1).
    a. Slide switch (1) body through front of chassis (2) and metal housing (3).
    b. Engage locking tab 4 on side of push switch so that switch is secured firmly to chassis (2).
    c. Remove labels and solder wires to switch (1) terminals
    d. If removed, install diodes 19CR31 (5) and 19CR32 (6). See diagram.
    e. Protect soldered connections with insulation sleeving.

NOTE

Use multimeter to identify wires prior to connecting them.

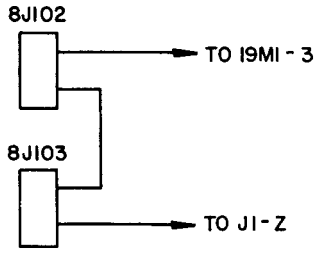


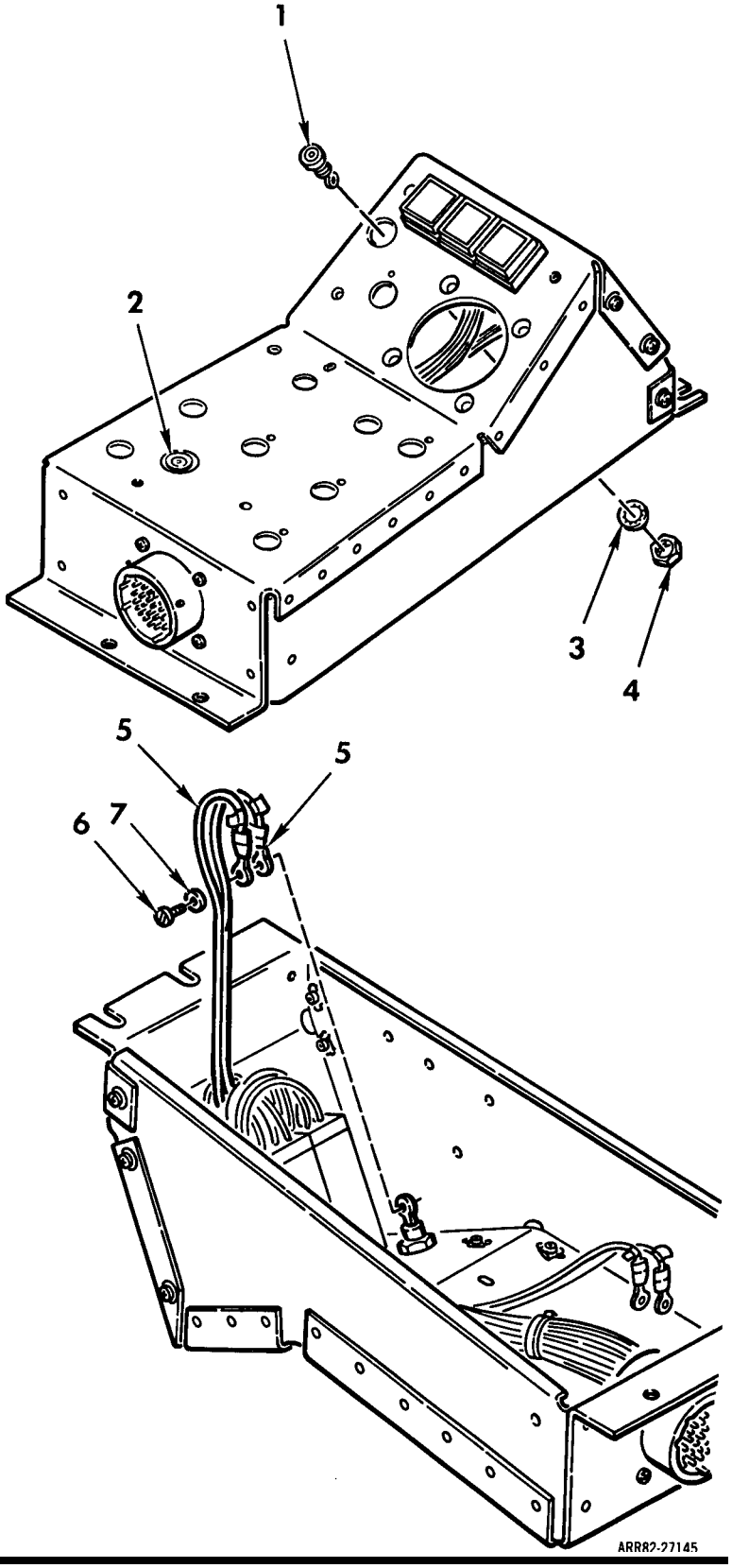




ASSEMBLY (cont)

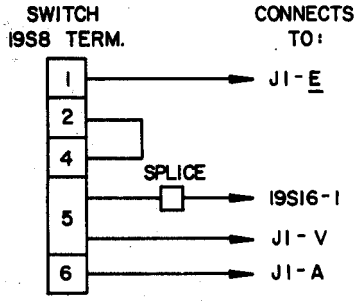
28. INSTALL RECEPTACLE CONNECTORS 8J102 (1) AND 8J103 (2).
    a. Place connector (1) in chassis and secure with washer (3) and nut (4).
    b. Remove labels and connect wires (5) to connector (1) with screw (6) and washer (7).
    c. Install connector (2) by repeating steps a and b.





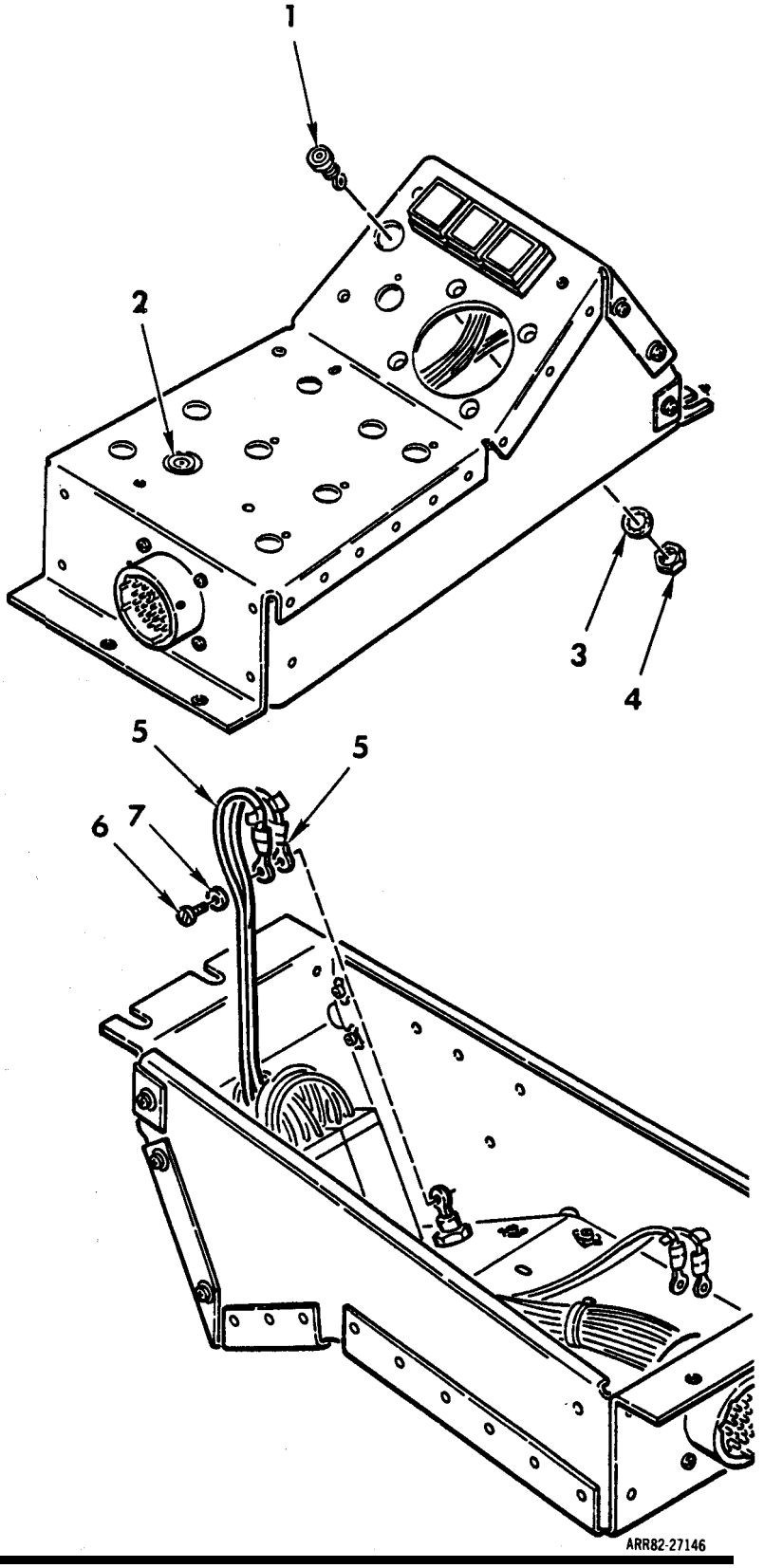
2-60. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12011954) (cont)

29. INSTALL RANGE SWITCH 19S8 (1).
    - **a.** Thread nut (2) onto switch (1).
    - **b.** Place switch (1), nut (2), and lockring (3) in place and secure to chassis (4) with washer (5) and nut (6).
    - **c.** Connect wires (7) to switch (1) terminals with screws (8) and washers (9).
    - **d.** Remove labels from connected wires (7).



NOTE

Use multimeter to identify wires prior to connecting them.



ASSEMBLY (cont)

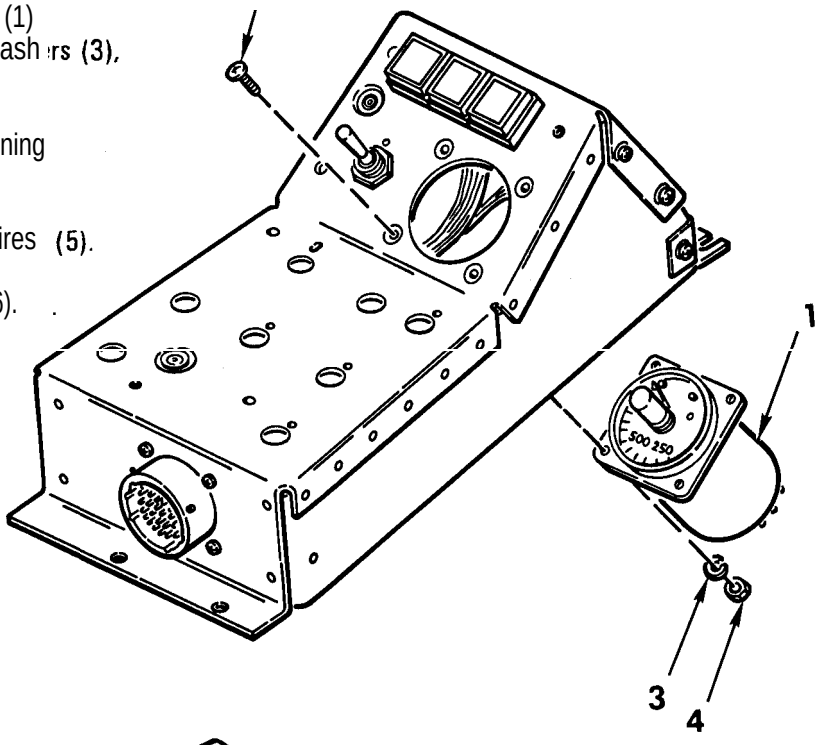
30. INSTALL RD RMNG COUNTER 19M1 (1).

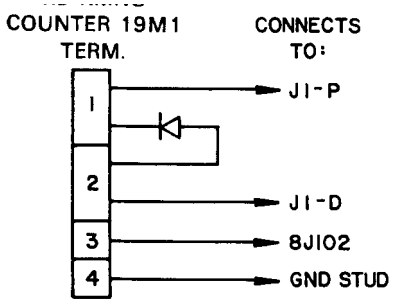
a. Install rounds remaining counter (1) with four screws (2), four lockwashers (3), and four nuts (4).

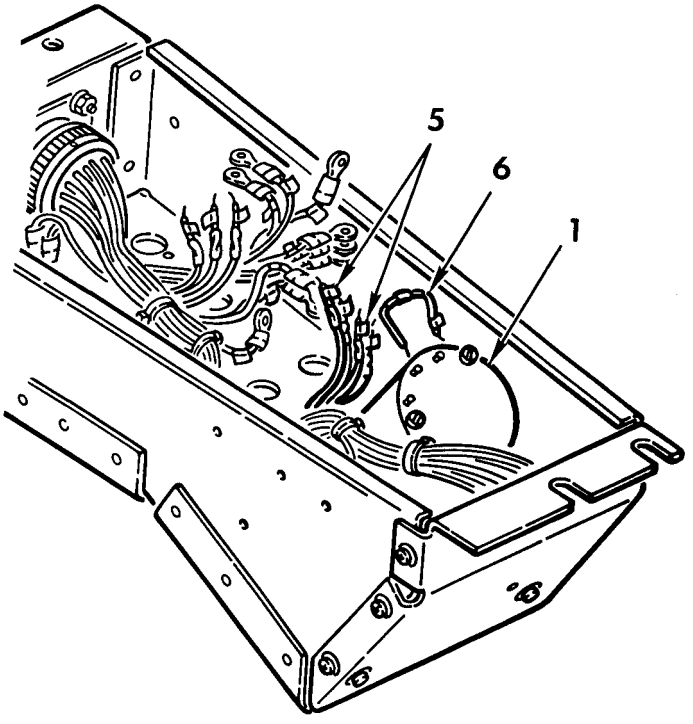
b. Solder wires (5) to rounds remaining counter (1) terminals.

c. Remove labels from connected wires (5).

d. If removed, install diode 19CR14 (6). See diagram.







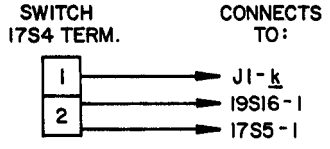
NOTE

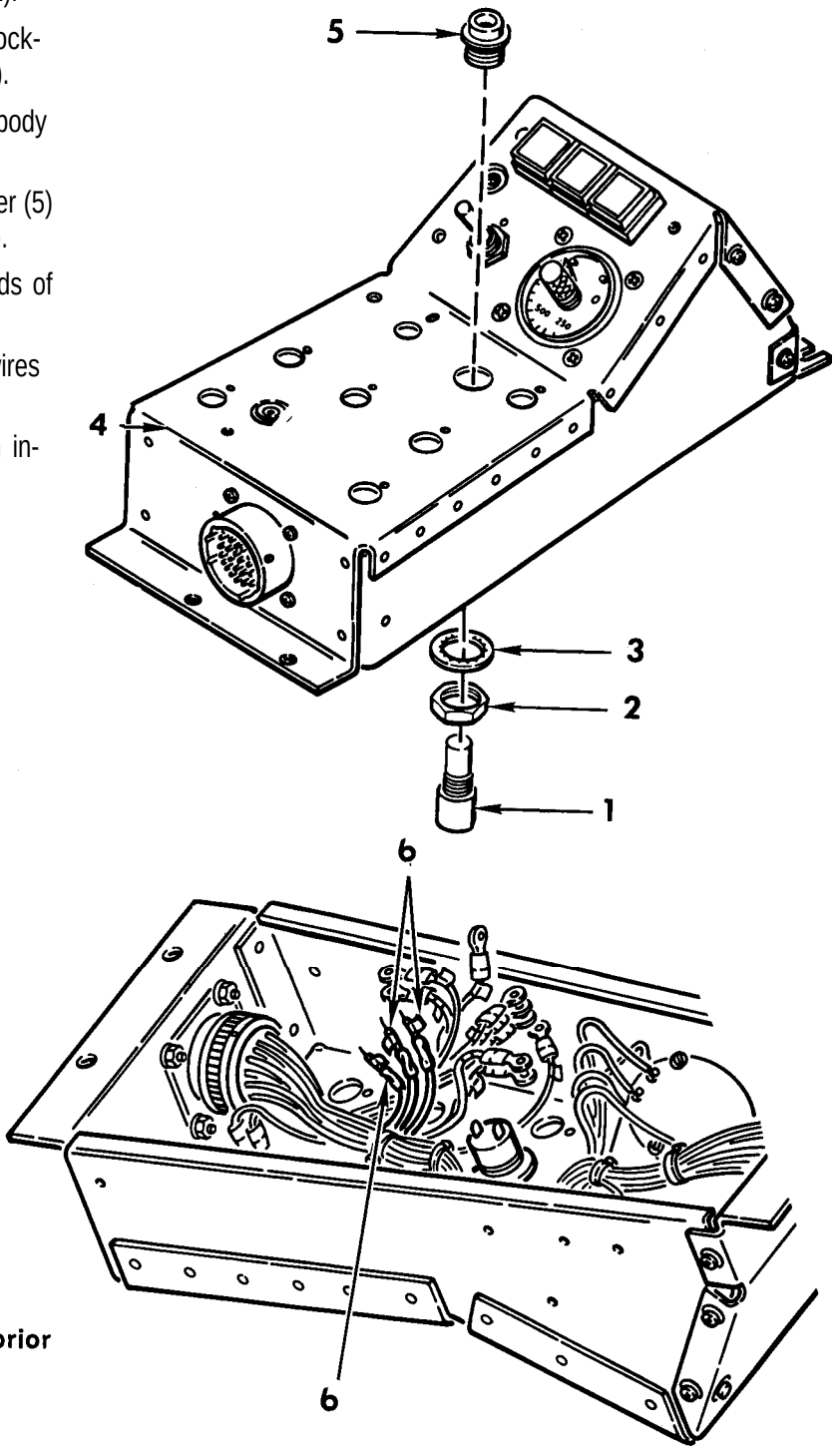
Use multimeter to identify wires prior to connecting them.

ARR82-27147

2-60. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12011954) (cont)

31. INSTALL TEST PUSH SWITCH 17S4 (1).
    a. Position switch (1), nut (2), and lockwasher (3) in place on chassis (4).
    b. Screw threaded adapter (5) onto body of switch (1).
    c. Screw nut (2) onto threaded adapter (5) to secure switch (1) to chassis (4).
    d. Install insulation sleeving over ends of wires (6).
    e. Remove labels and solder three wires to switch (1) terminals.
    f. Protect soldered connections with insulation sleeving.





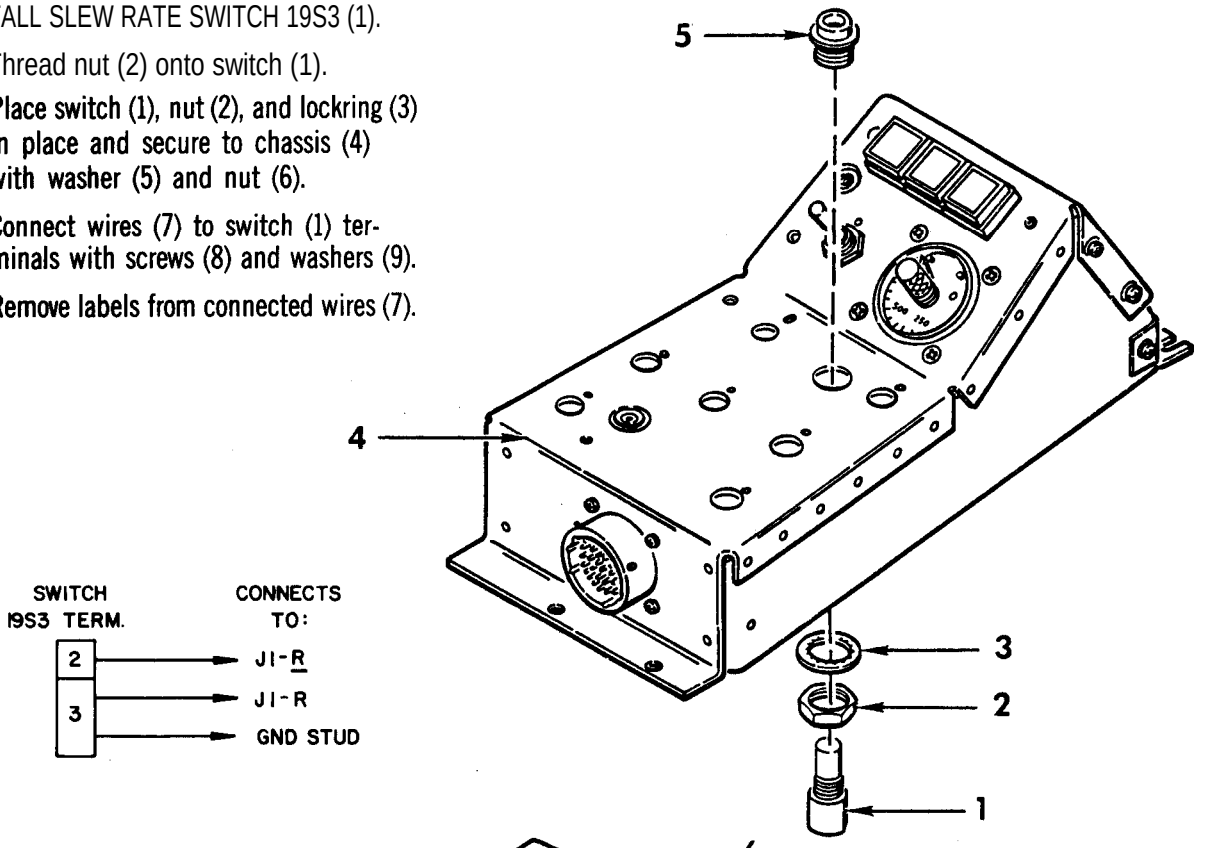
NOTE

Use multimeter to identify wires prior to connecting them.

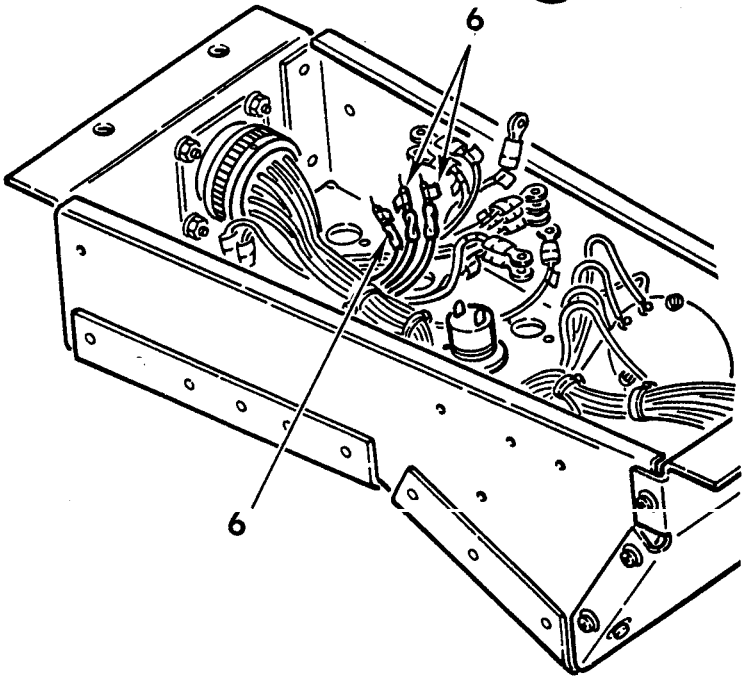
ARR82-27148

ASSEMBLY (cont)

32. INSTALL SLEW RATE SWITCH 19S3 (1).
    a. Thread nut (2) onto switch (1).
    b. Place switch (1), nut (2), and lockring (3) in place and secure to chassis (4) with washer (5) and nut (6).
    c Connect wires (7) to switch (1) terminals with screws (8) and washers (9).
    d. Remove labels from connected wires (7).



SWITCH 19S3 TERM.	CONNECTS TO:
2	J1-R
3	J1-R
	GND STUD



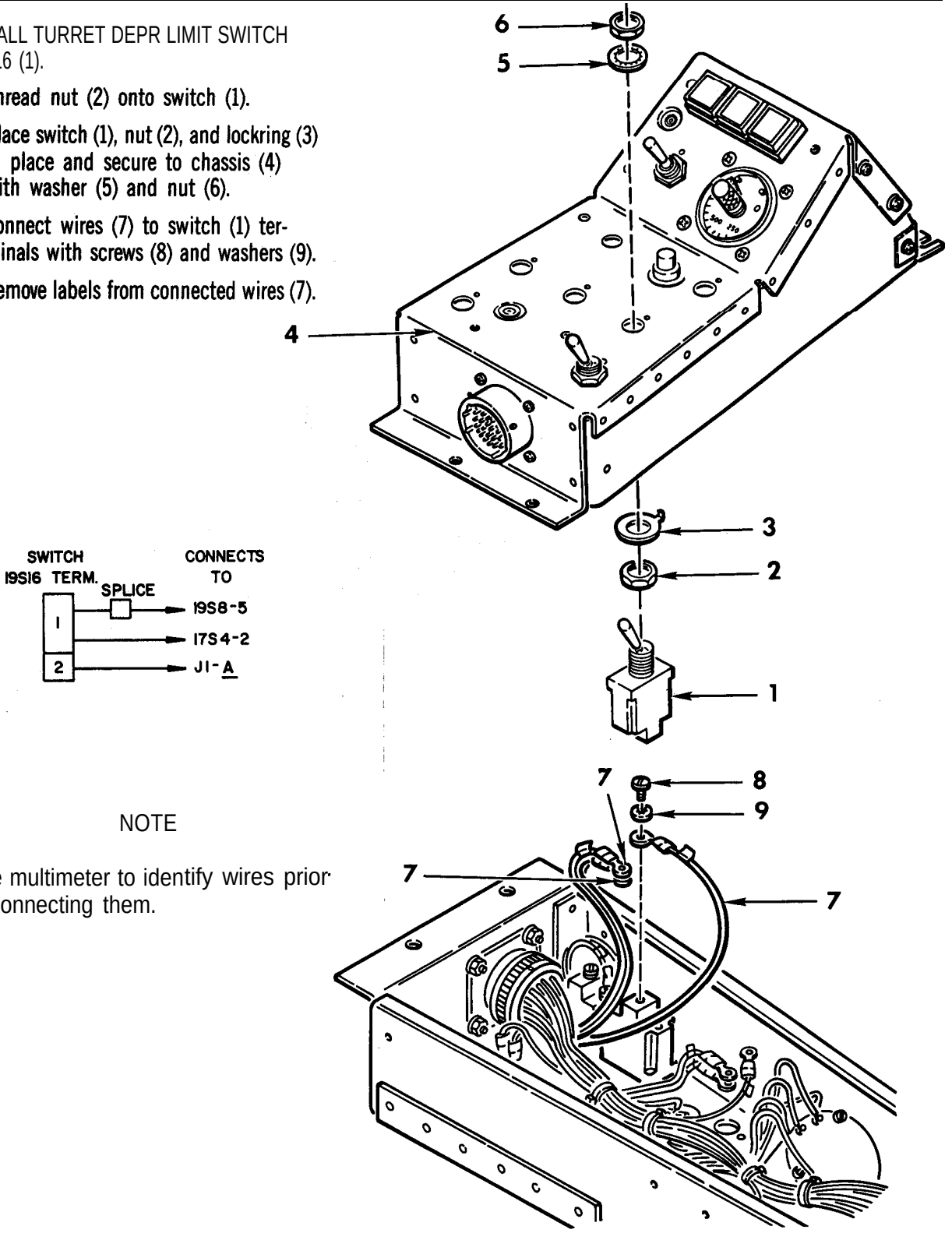
NOTE

Use multimeter to identify to connecting them.

ARR82-27149

2-60. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12011954) (cont)

33. INSTALL TURRET DEPR LIMIT SWITCH 19S16 (1).
    a. **Thread nut (2) onto switch (1).**
    b. **Place switch (1), nut (2), and lockring (3) in place and secure to chassis (4) with washer (5) and nut (6).**
    c. **Connect wires (7) to switch (1) terminals with screws (8) and washers (9).**
    d. **Remove labels from connected wires (7).**



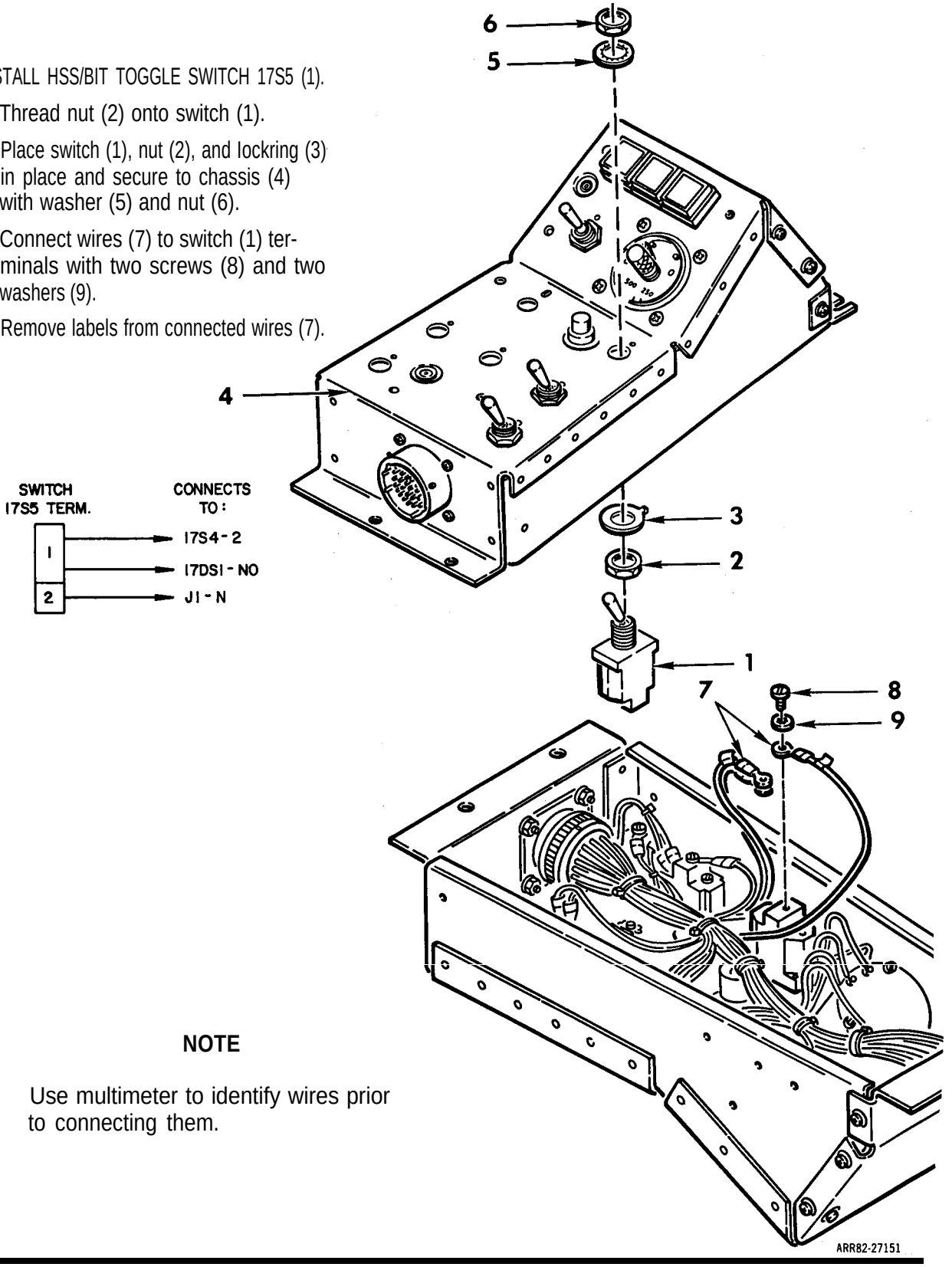
NOTE

Use multimeter to identify wires prior to connecting them.

ARR82-27150

ASSEMBLY (cont)

34. INSTALL HSS/BIT TOGGLE SWITCH 17S5 (1).
    a. Thread nut (2) onto switch (1).
    b. Place switch (1), nut (2), and lockring (3) in place and secure to chassis (4) with washer (5) and nut (6).
    c. Connect wires (7) to switch (1) terminals with two screws (8) and two washers (9).
    d. Remove labels from connected wires (7).



NOTE

Use multimeter to identify wires prior to connecting them.

2-60. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12011954) (cont)

35. INSTALL HSS RETICLE LIGHT CONTROL (1).

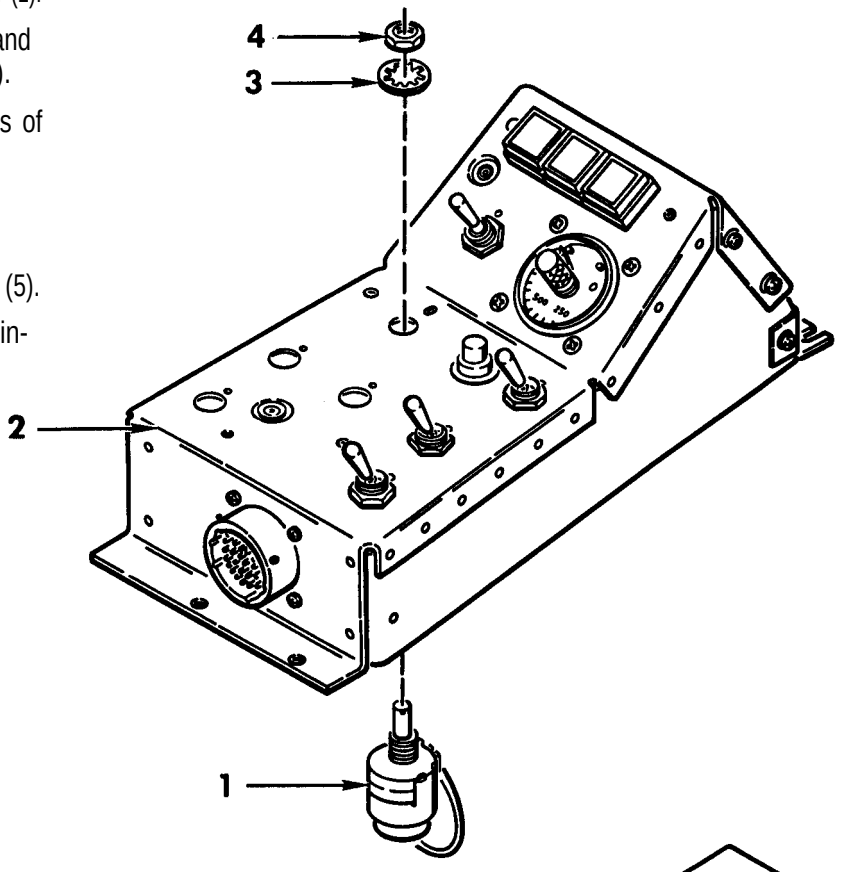
a. Position control (1) in chassis (2) and secure with washer (3) and nut (4).

b. Install insulation sleeving over ends of wires (5).

c. Solder wires (5) to control (1) terminals

d. Remove labels from connected wires (5).

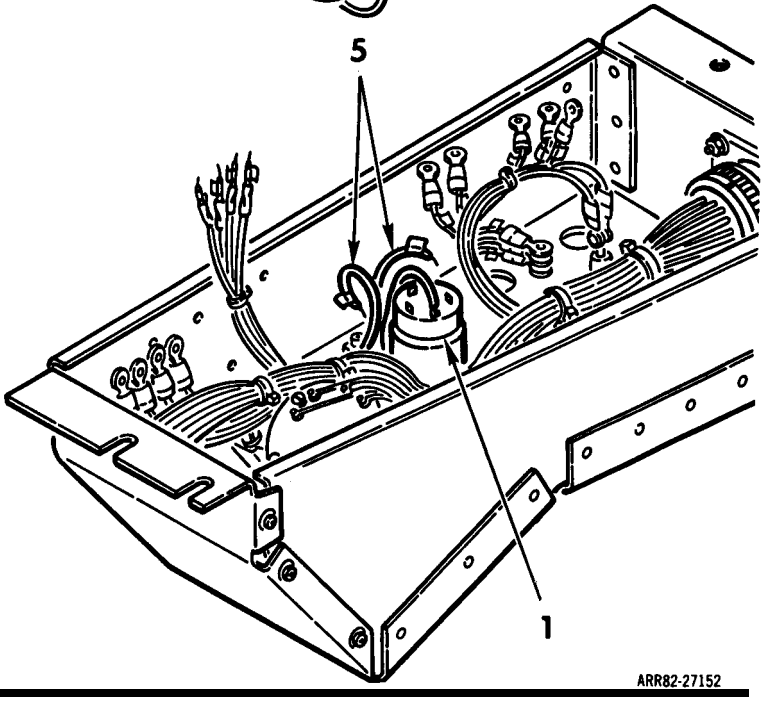
e. Protect soldered connections with insulation sleeving.



RETICLE LT CONTROL TERM.	CONNECTS TO:
17R2-3	J1-C
17R2-2	
17S3-4	
17S3-5	J1-i

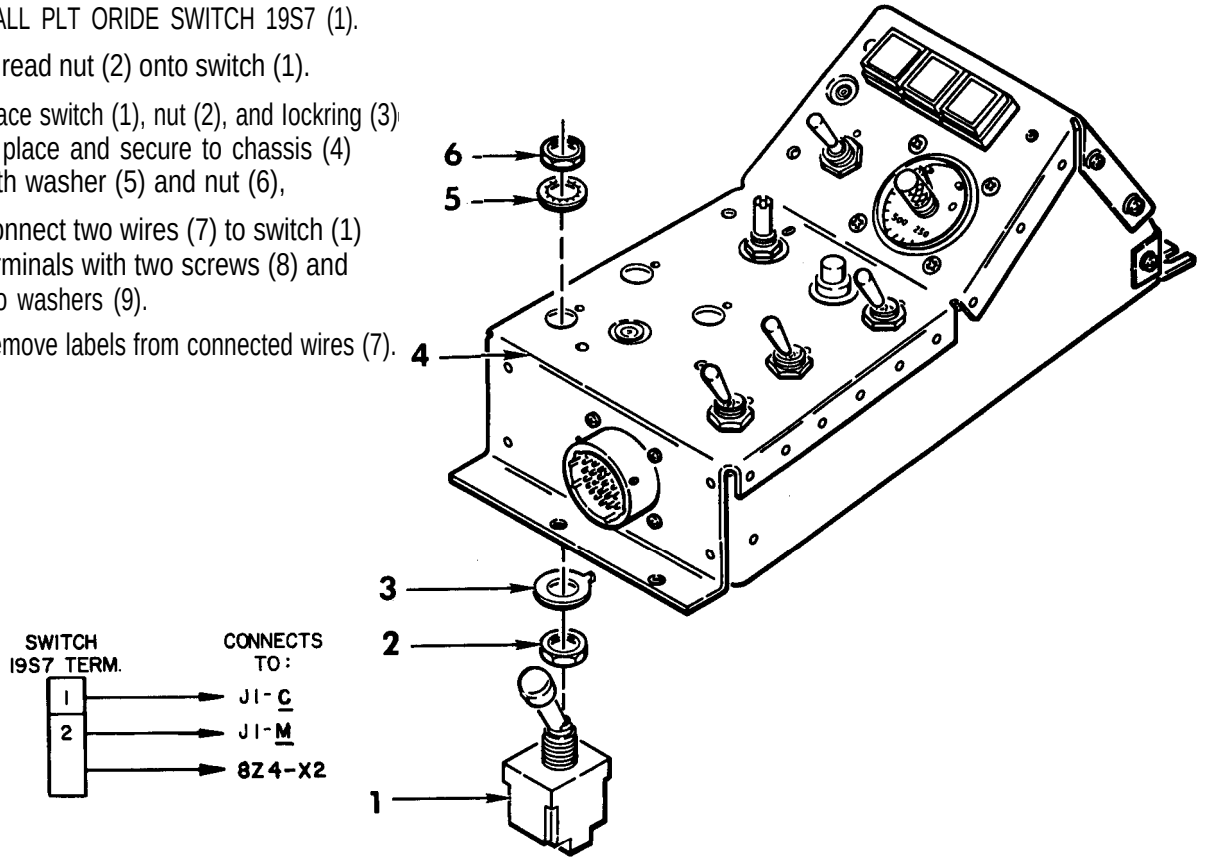
NOTE

Use multimeter to identify wires prior **to connecting them.**



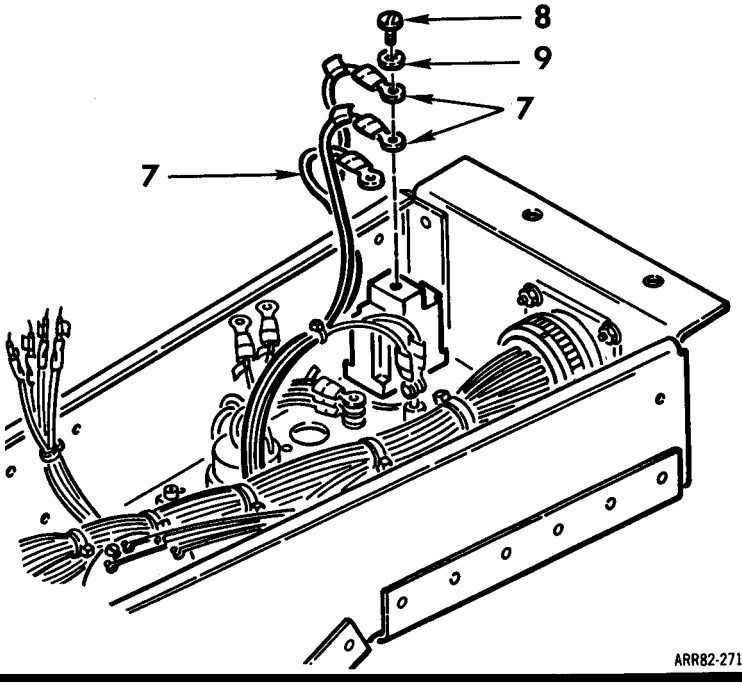
ASSEMBLY (cont)

36. INSTALL PLT ORIDE SWITCH 19S7 (1).
    a. Thread nut (2) onto switch (1).
    b. Place switch (1), nut (2), and lockring (3) in place and secure to chassis (4) with washer (5) and nut (6),
    c. Connect two wires (7) to switch (1) terminals with two screws (8) and two washers (9).
    d. Remove labels from connected wires (7).



NOTE

Use multimeter to identify wires prior to connecting them.



2-60. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12011954) (cont)

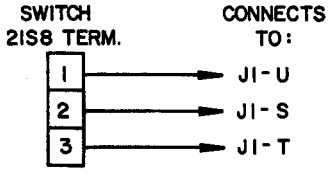
37. INSTALL WING STORES SWITCH 21S8 (1).

a. Thread nut (2) onto switch (1).

b. Place switch (1), nut (2), and lockring (3) in place and secure to chassis (4) with washer (5) and nut (6),

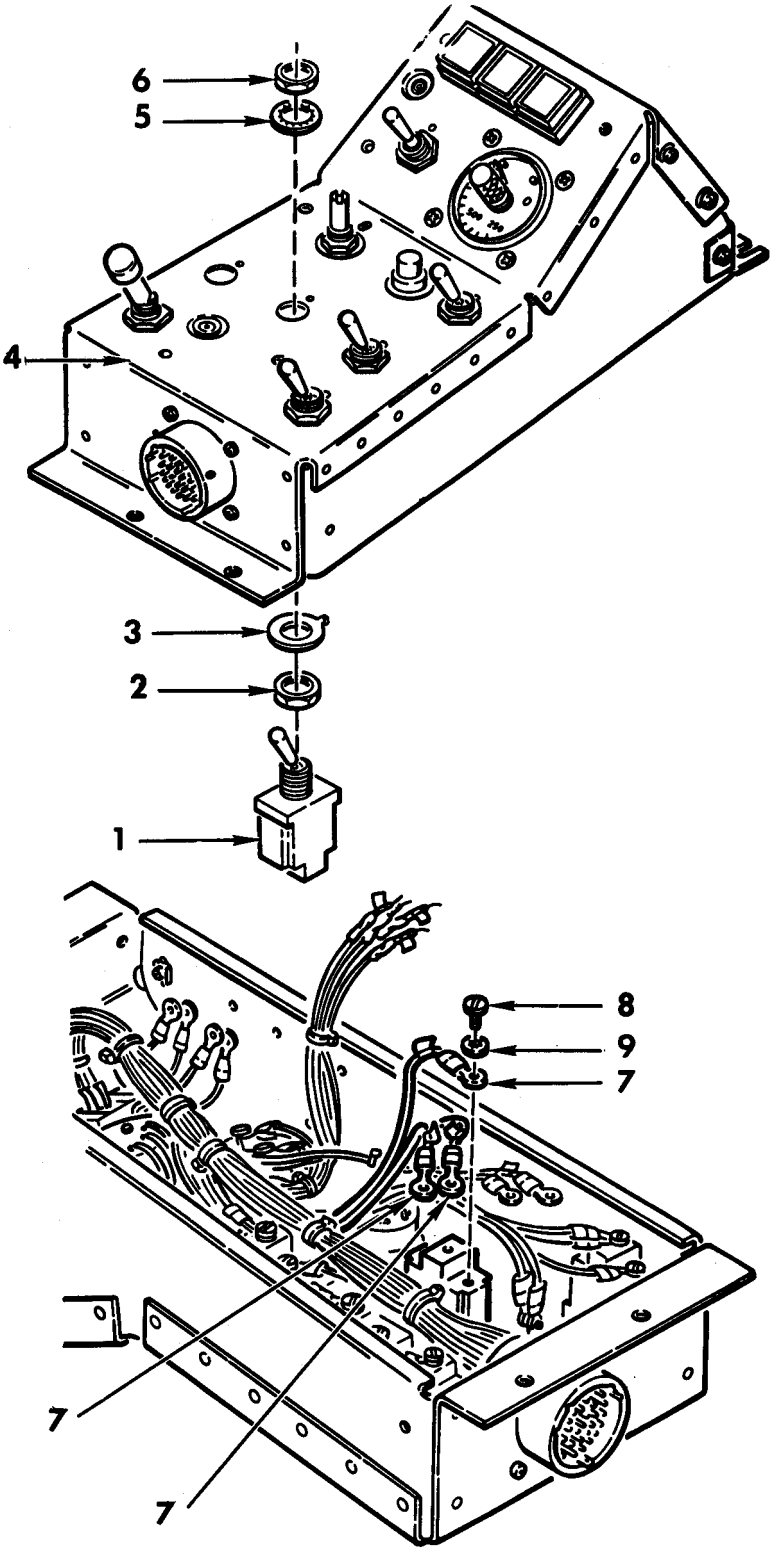
c. Connect three wires (7) to switch (1) terminals with three screws (8) and three washers (9).

d. Remove labels from connected wires (7).



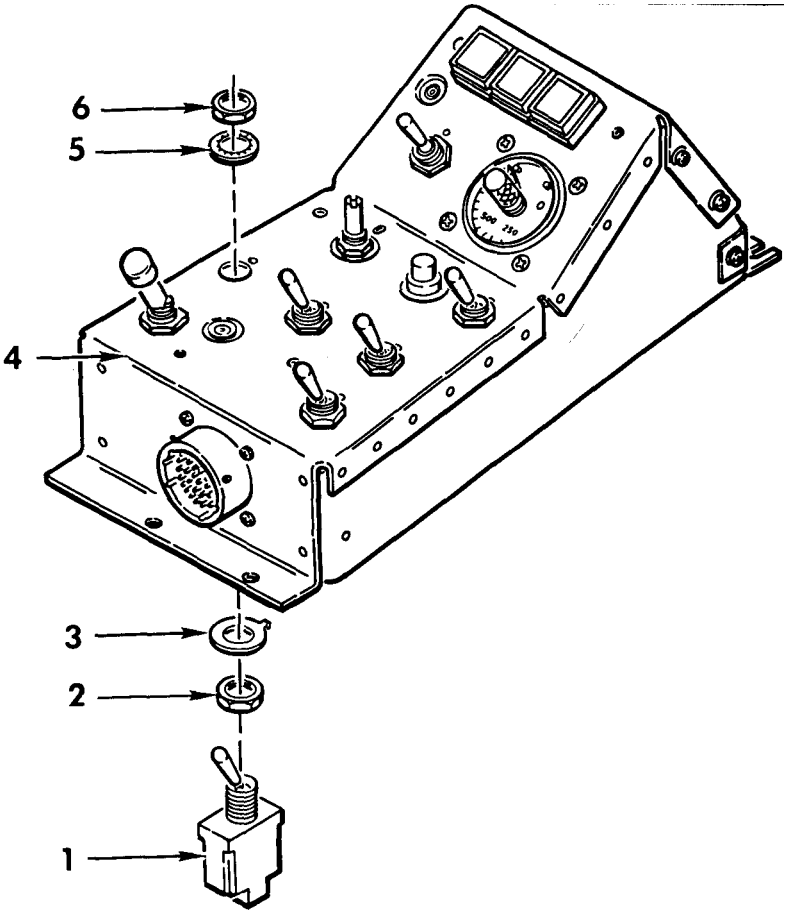
NOTE

Use multimeter to identify wires prior to connecting them.



ASSEMBLY (cont)

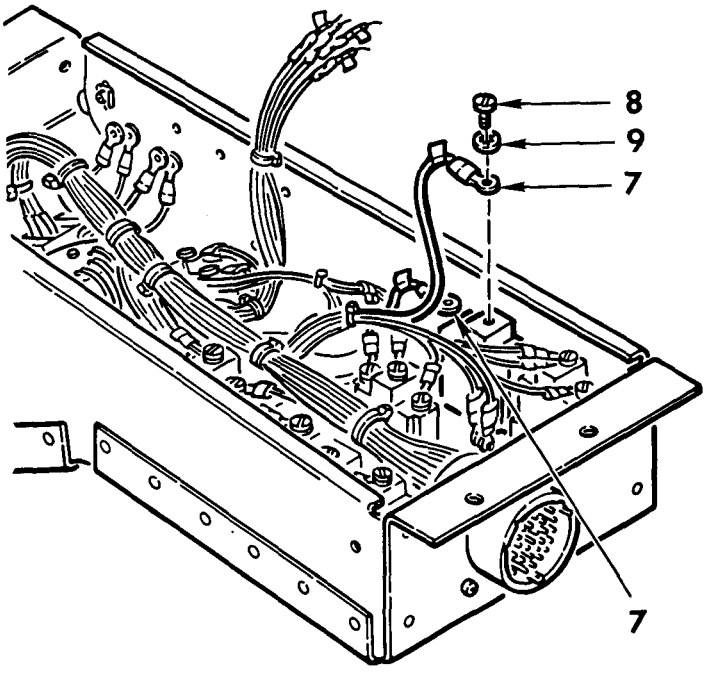
38. INSTALL A/S COMPEN SWITCH 19S6 (1).
    a. Thread nut (2) onto switch (1),
    b. Place switch (1), nut(2), and lockring (3) in place and secure to chassis (4) with washer (5) and nut (6).
    c. Connect two wires (7) to switch (1) terminals with two screws (8) and two washers (9).
    d. Remove labels from connected wires(7).



SWITCH 19S6 TERM.	CONNECTS TO:
1	J1-L
2	J1-B

NOTE

Use multimeter to identify wires prior to connecting them.



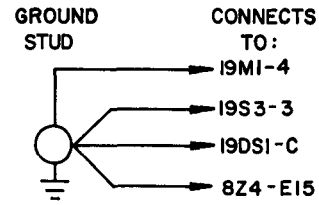
ARR82-27155

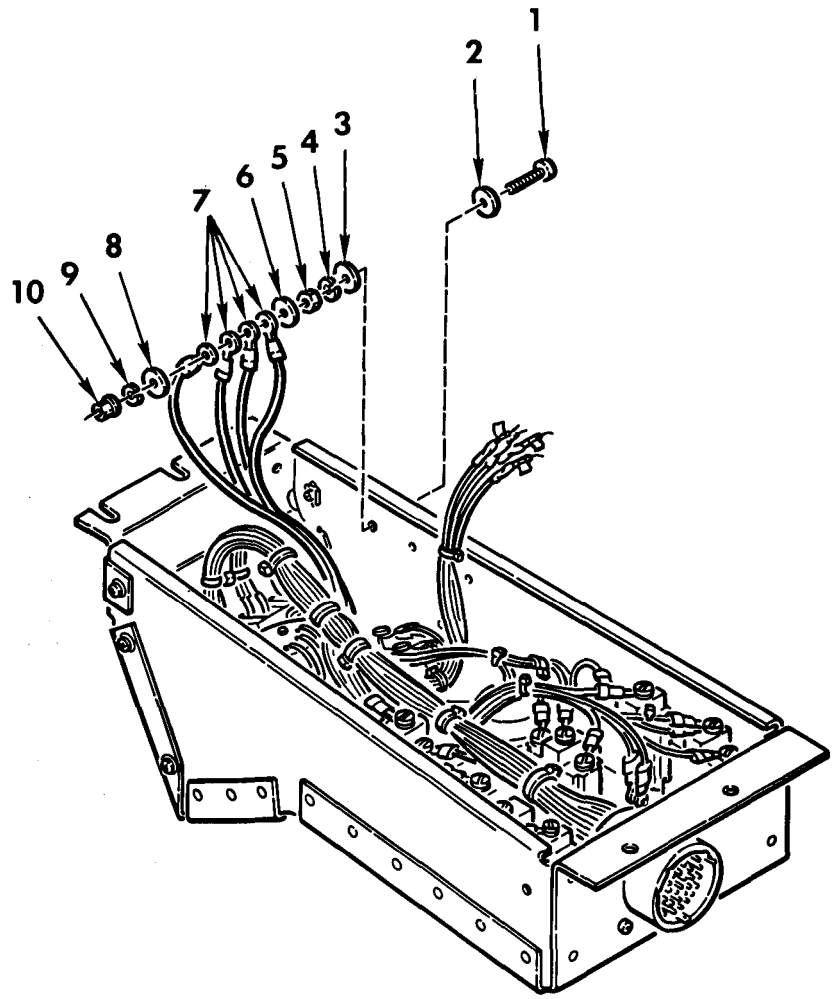
2-60. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12011954) (cont)

39. CONNECT WIRING TO GROUND STUDS.

a. If removed, install screw (1), washer (2), washw (3), lockwasher (4), and nut (5).

b. Install washer (6), four wires (7), washer (8), lockwasher (9), and nut (10) on screw (1).





ARR82-27156

ASSEMBLY (cont)

40. CONNECT WIRING TO RELAY ASSEMBLY 824 (1).

a. Install insulation sleeving over ends of wires and resistors (2) and (3) to be soldered to relay (4) terminals.

b. If removed, install stud E15 (5) or E17 (6) on relay assembly (1) with screw (7) or (8).

c. If removed, install relay (4) on relay assembly (1) with two screws (9), two washers (10) and two nuts (11).

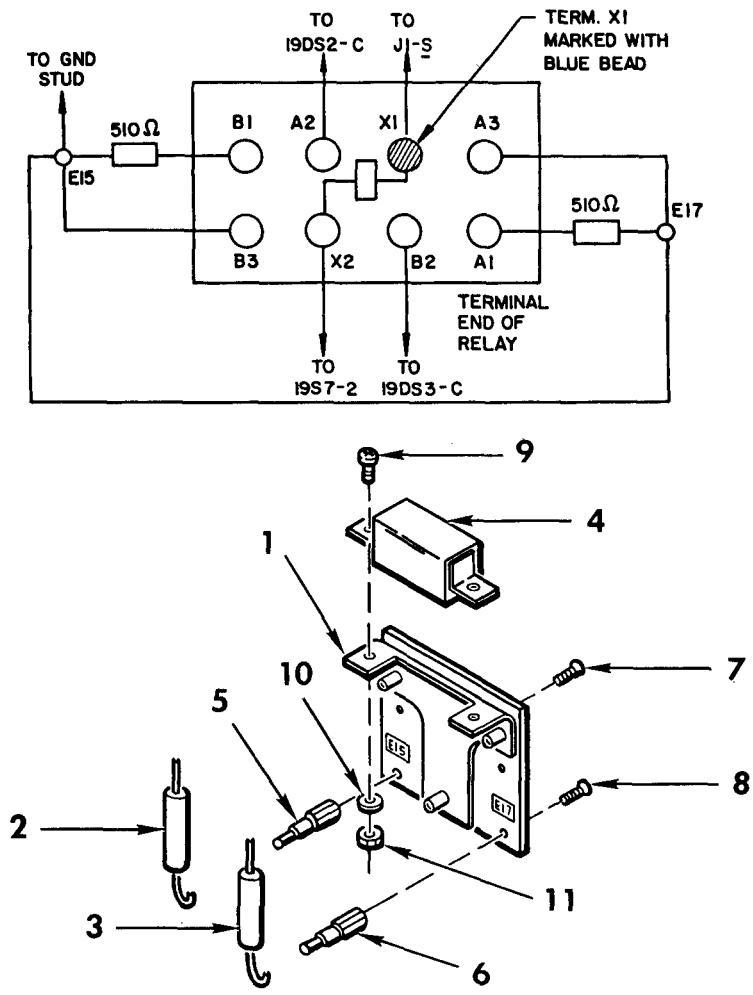
d. If removed, solder one resistor (2) between stud E15 (5) and terminal B1 of relay (4). Solder a second resistor (3) between stud E17 (6) and terminal A1 of relay (4).

e. Solder wires to remaining terminals of relay (4) and remove labels.

f. Protect all soldered terminals of relay(4) with insulation sleeving.

NOTE

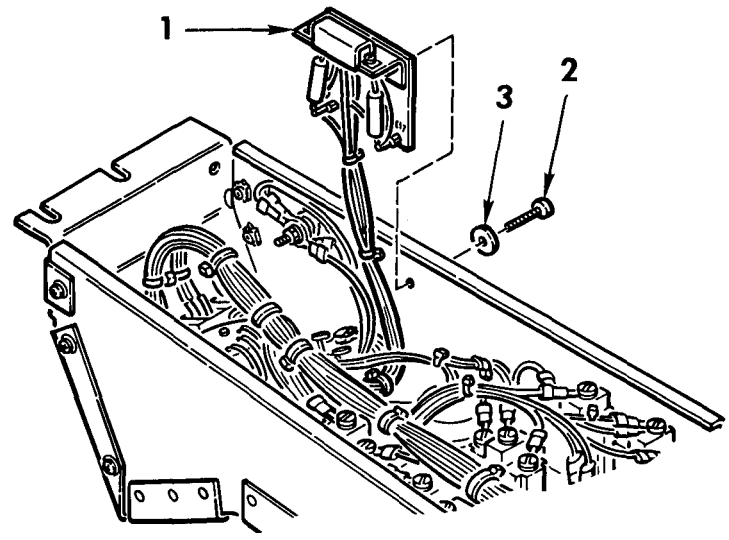
Use multimeter to identify wires prior to connecting them.



ARR82-27157

41. INSTALL RELAY ASSEMBLY 824 (1).

Install three screws (2), three washers (3), and relay assembly (1).

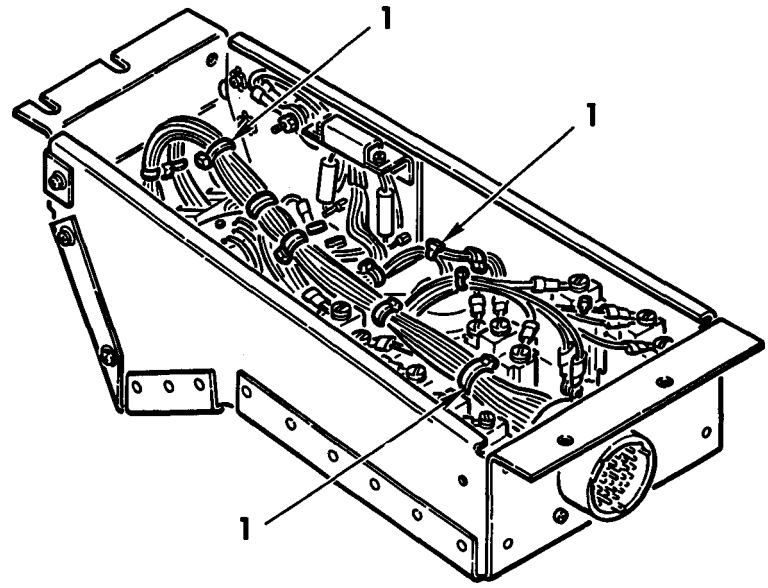


ARR82-27158

2-60. REPAIR OF GUNNER ARMAMENT CONTROL PANEL (12011954) (cont)

42. INSTALL CABLE TIEDOWN STRAPS (1).

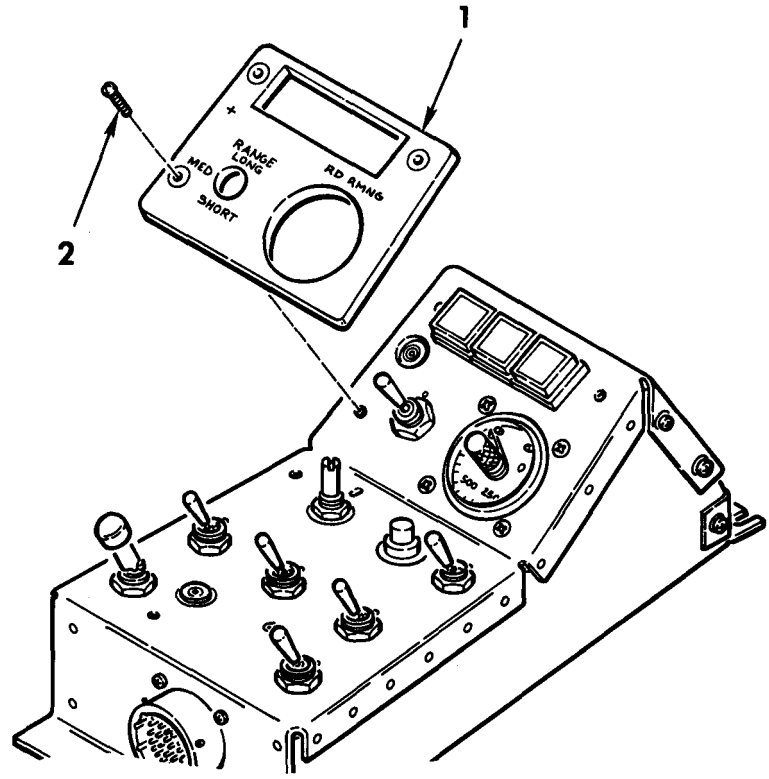
Upon completion of reassembly, form wiring into bundles as required and install cable tiedown straps (1).



ARR82-27162

43. INSTALL INDICATOR PANEL (1).

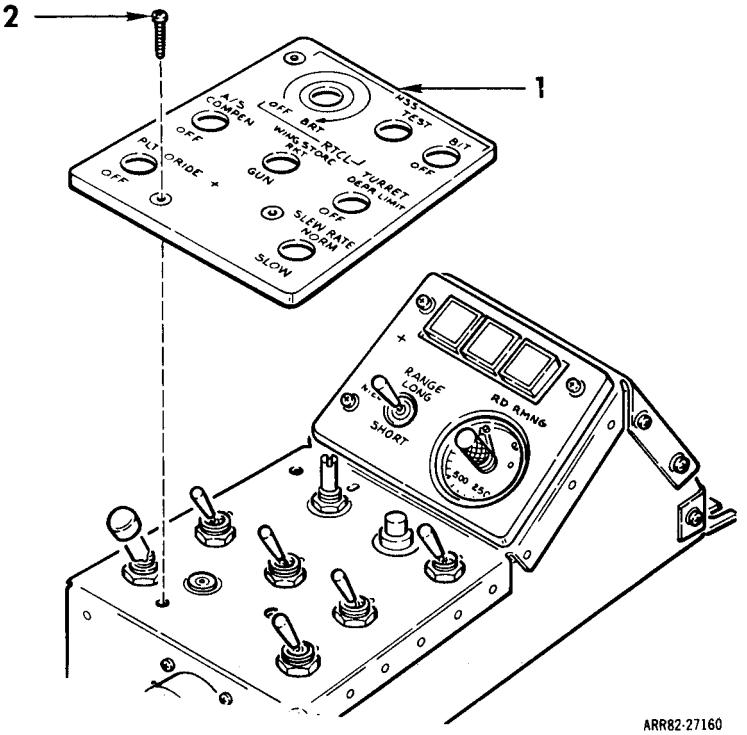
Install indicator panel (1) and three screws (2),



ARR82-27159

44. INSTALL INDICATOR PANEL (1).

Install indicator panel (1) and three screws (2).

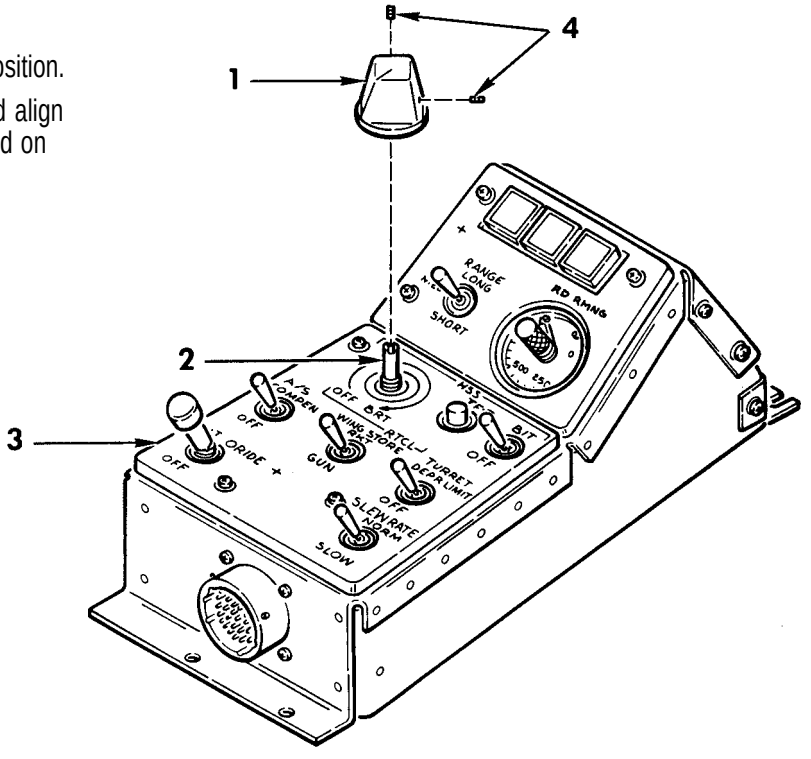


45. INSTALL KNOB (1).

a. Rotate shaft (2) to fully OFF position.

b. Place knob (1) on shaft (2) and align index on knob with OFF placard on panel (3).

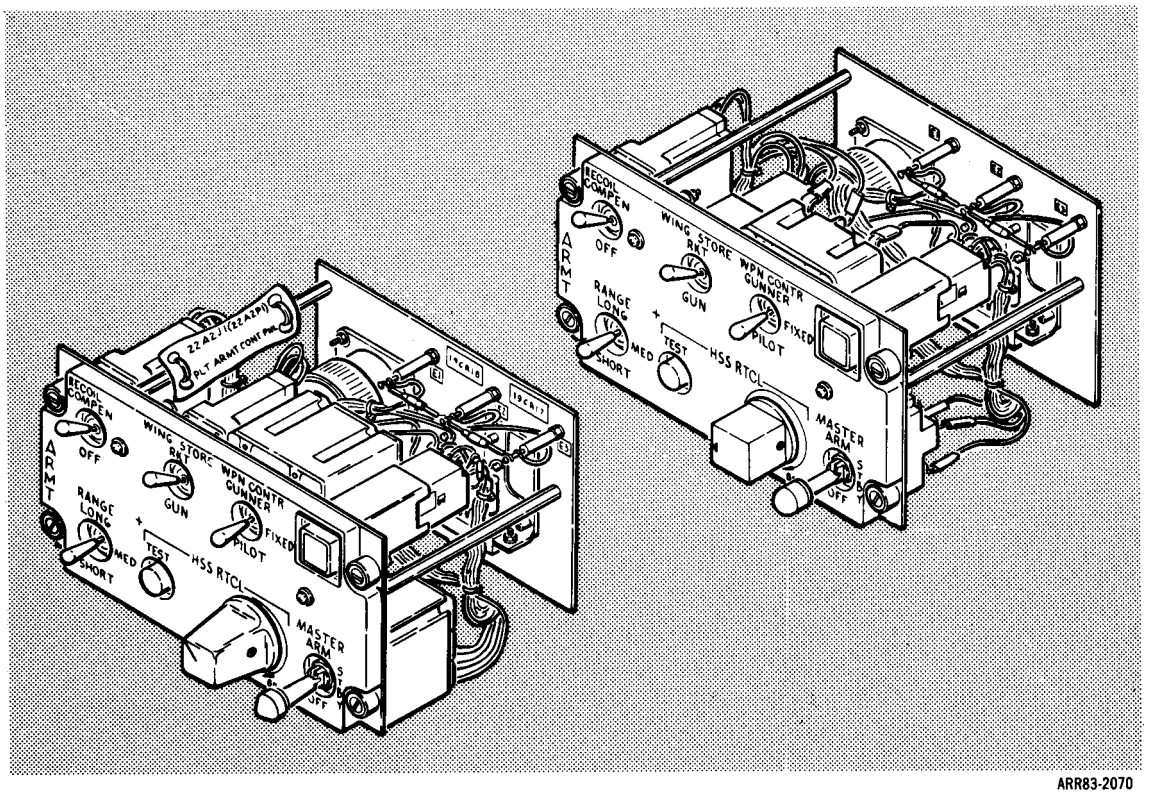
c. Secure knob (1) to shaft (2) by tightening two setscrews (4).



END OF TASK

Section XX. MAINTENANCE OF PILOT ARMAMENT CONTROL PANEL

Section Contents



ARR83-2070

2-61. REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011971)

DESCRIPTION

This task covers: Disassembly, cleaning, inspection, repair, and assembly.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental
- Multimeter AN/USM–223

Materials:
- Solder (Item 28, Appx B)
- Strap (Item 30, Appx B)
- Insulation Sleeving (item 15.1, Appx B)

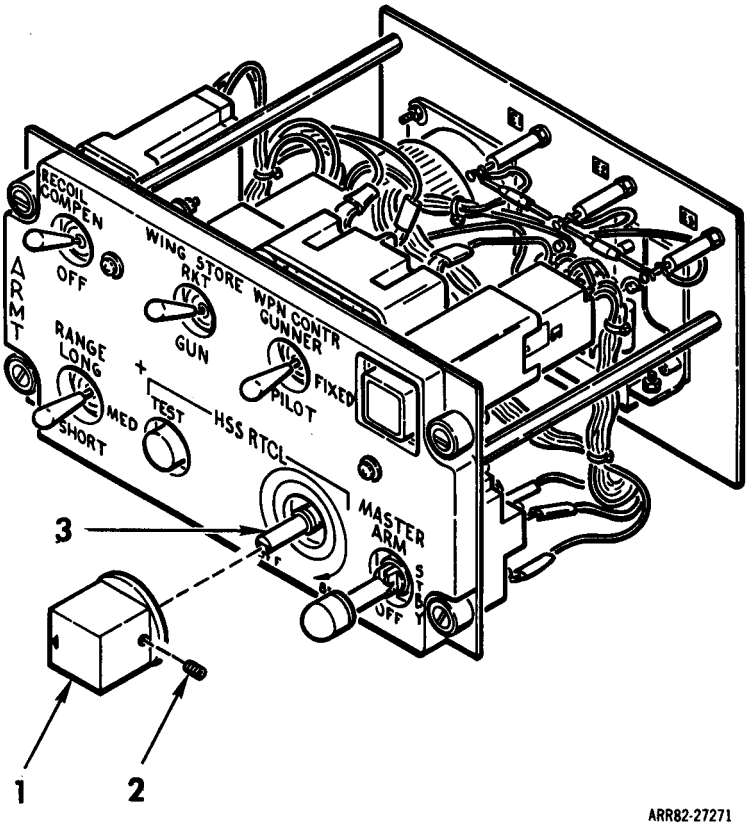
Personnel Required:
- 68J Aircraft Armament/ Missile Systems Repairer

Equipment Conditions:
- In shop on bench.
- No power applied.

DISASSEMBLY

1. REMOVE KNOB (1).

   Loosen setscrew (2) and pull knob (1) from shaft of variable resistor 17R1 (3).

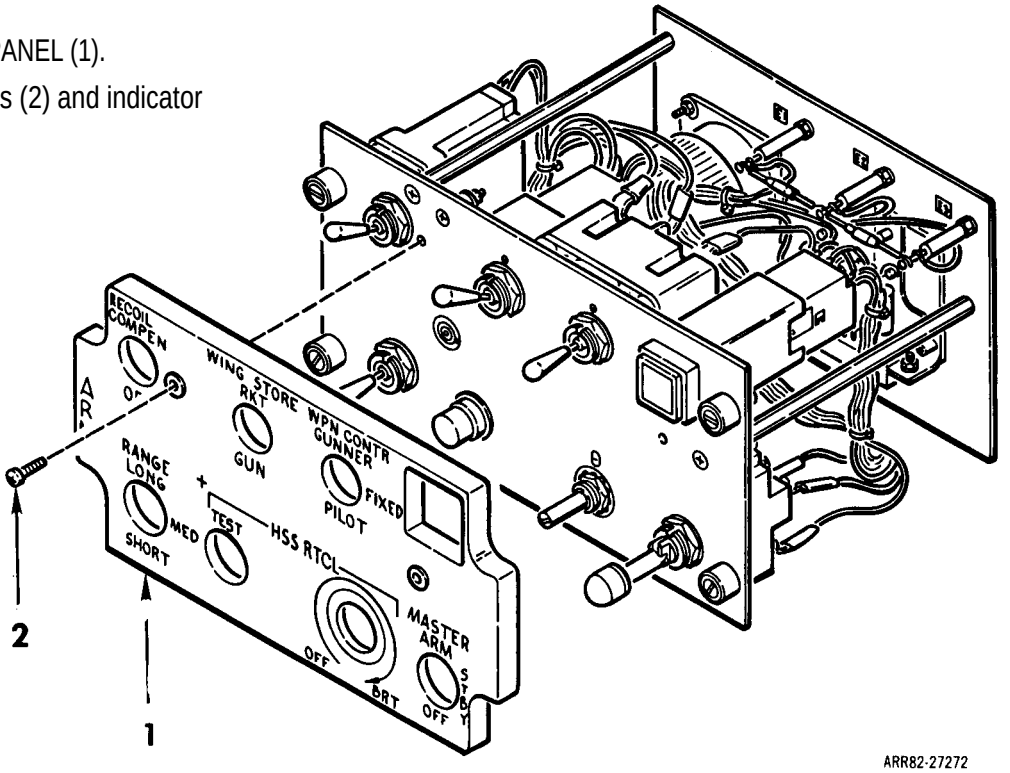


ARR82-27271

DISASSEMBLY (cont)

2. REMOVE INDICATOR PANEL (1).

   Remove two screws (2) and indicator panel (1).

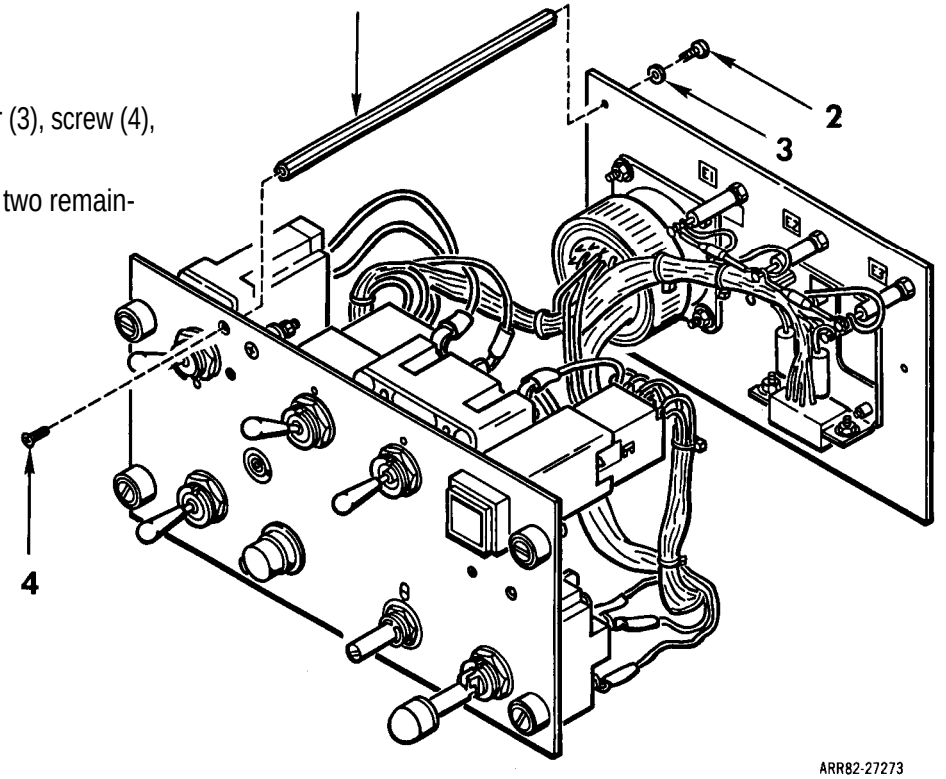


ARR82-27272

3. REMOVE THREE POSTS (1).

   a. Remove screw (2), washer (3), screw (4), and post (1).

   b. Repeat step a to remove two remaining posts.



ARR82-27273

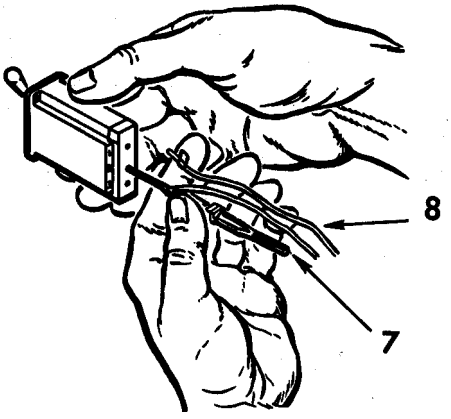
2-61. REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011971) (cont)

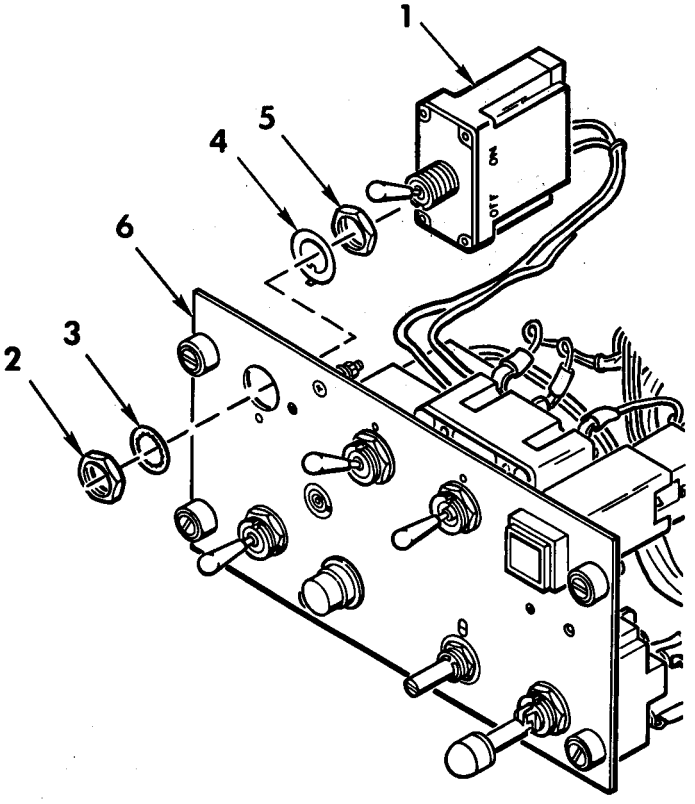
4. REMOVE RECOIL TOGGLE SWITCH 19S4 (1).

a. Remove nut (2) and washer (3).

b. Remove switch (1), lockring (4), and nut (5) from plate (6).

c. Label wires and, using pin insertion/extraction tool (7), remove wires (8) from rear of switch (1).



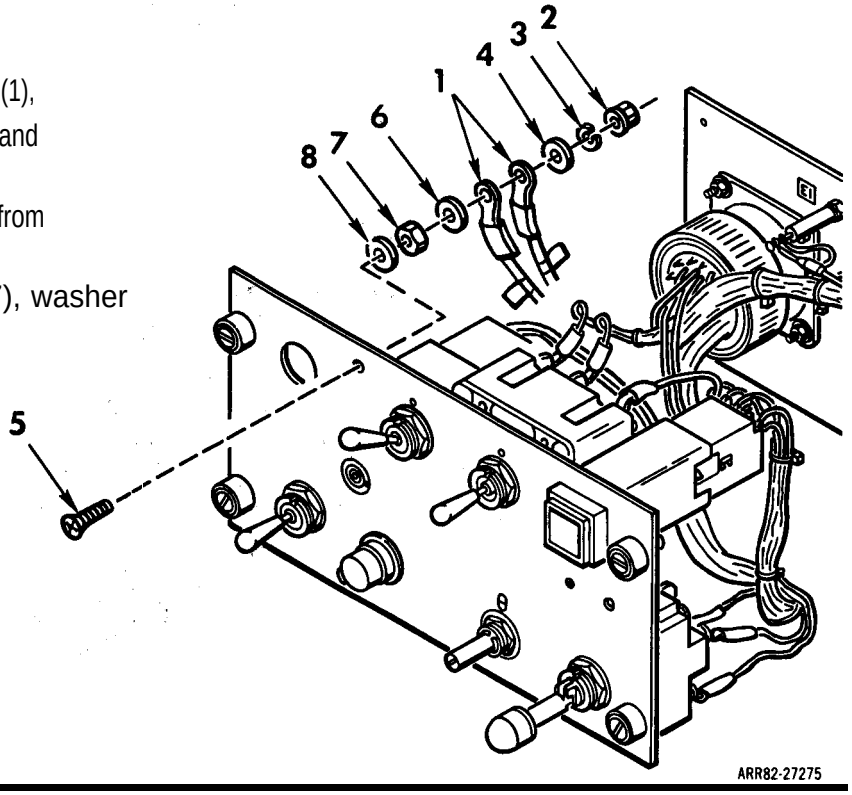


5. DISCONNECT TWO GROUND WIRES (1),

a. Remove nut (2), lockwasher (3), and washer (4).

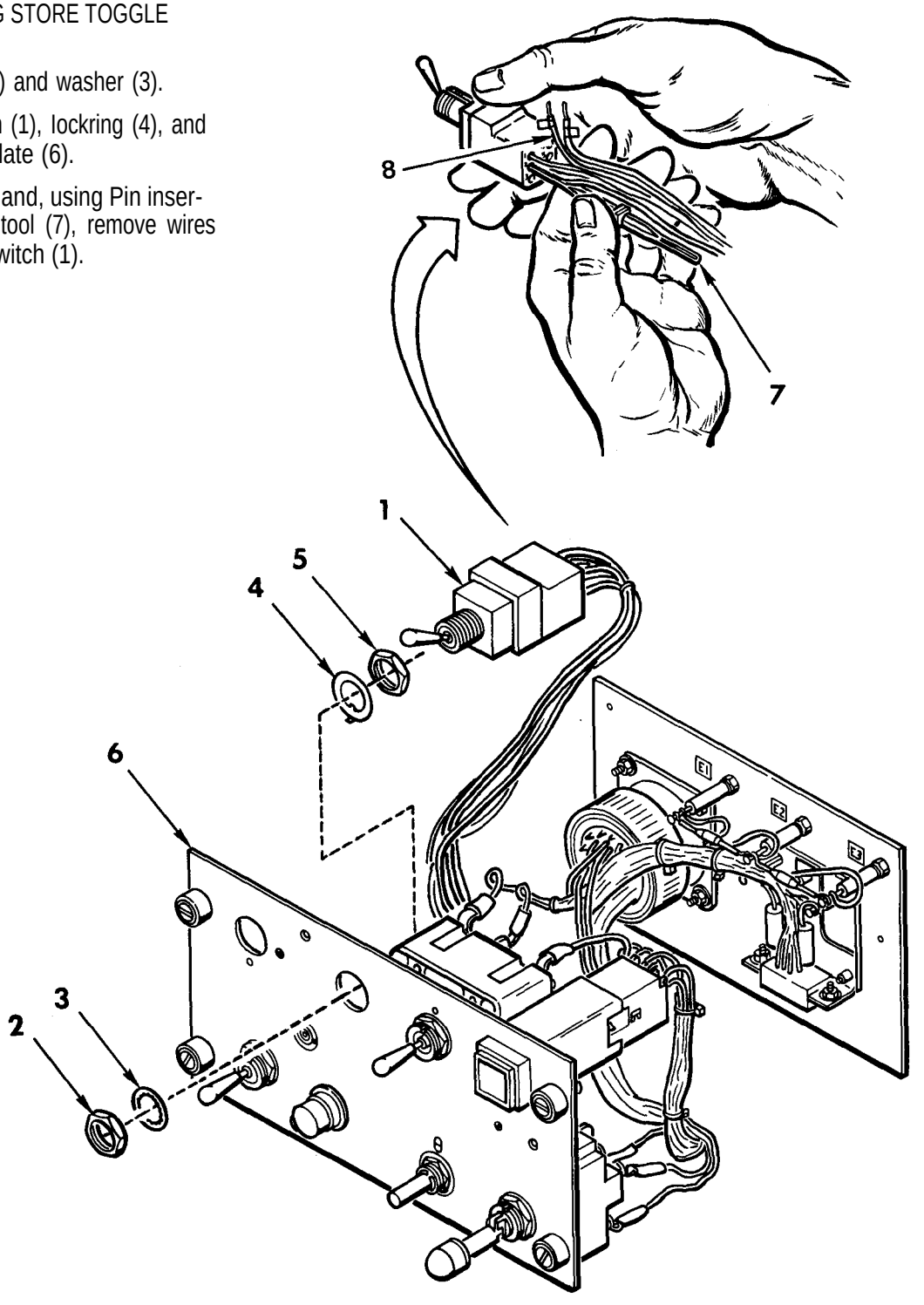
b. Label and remove two wires (1) from screw (5).

c. Remove washer (6), nut (7), washer (8), and screw (5).



DISASSEMBLY (cont)

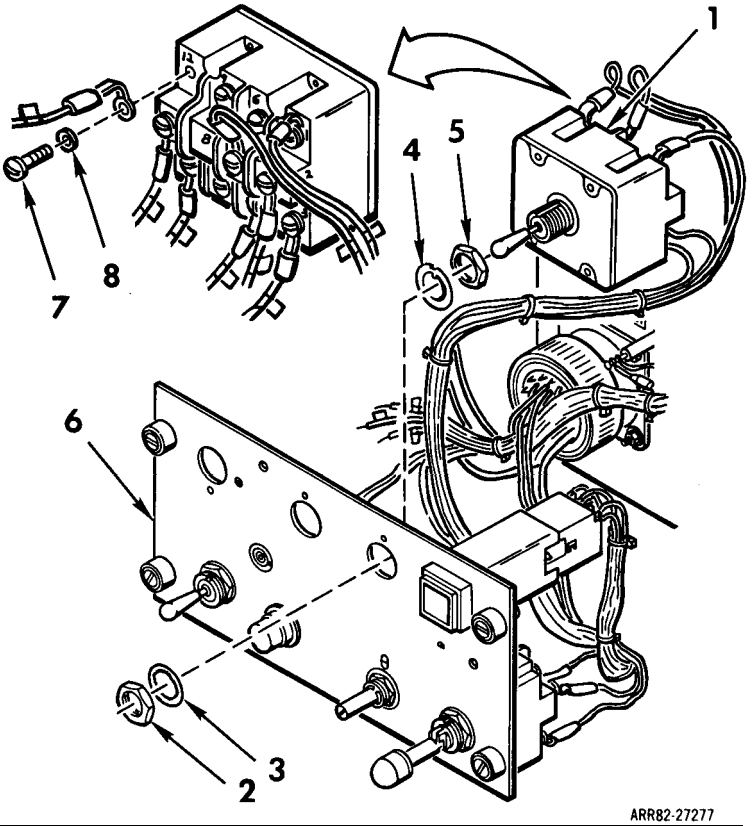
6. DISCONNECT WING STORE TOGGLE SWITCH 21S6 (1).
   a. Remove nut (2) and washer (3).
   b. Remove switch (1), lockring (4), and nut (5) from plate (6).
   c. Label wires(8) and, using Pin insertion/extraction tool (7), remove wires from rear of switch (1).



ARR82-27276

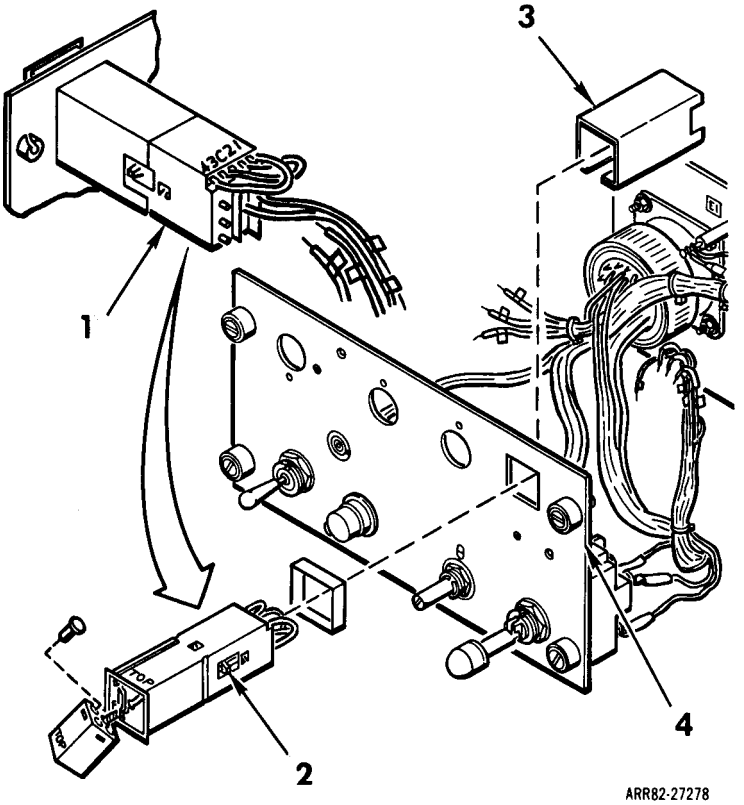
2-61. REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011971) (cont)

7. REMOVE WPN CONT TOGGLE SWITCH 19S13 (1).
   a. Remove nut (2) and washer (3).
   b. Remove switch (1), lockring (4), and nut (5) from plate (6).
   c. Label wires Disconnect wires from switch (1) by, removing screws (7) and lockwashers (8).



ARR82-27277

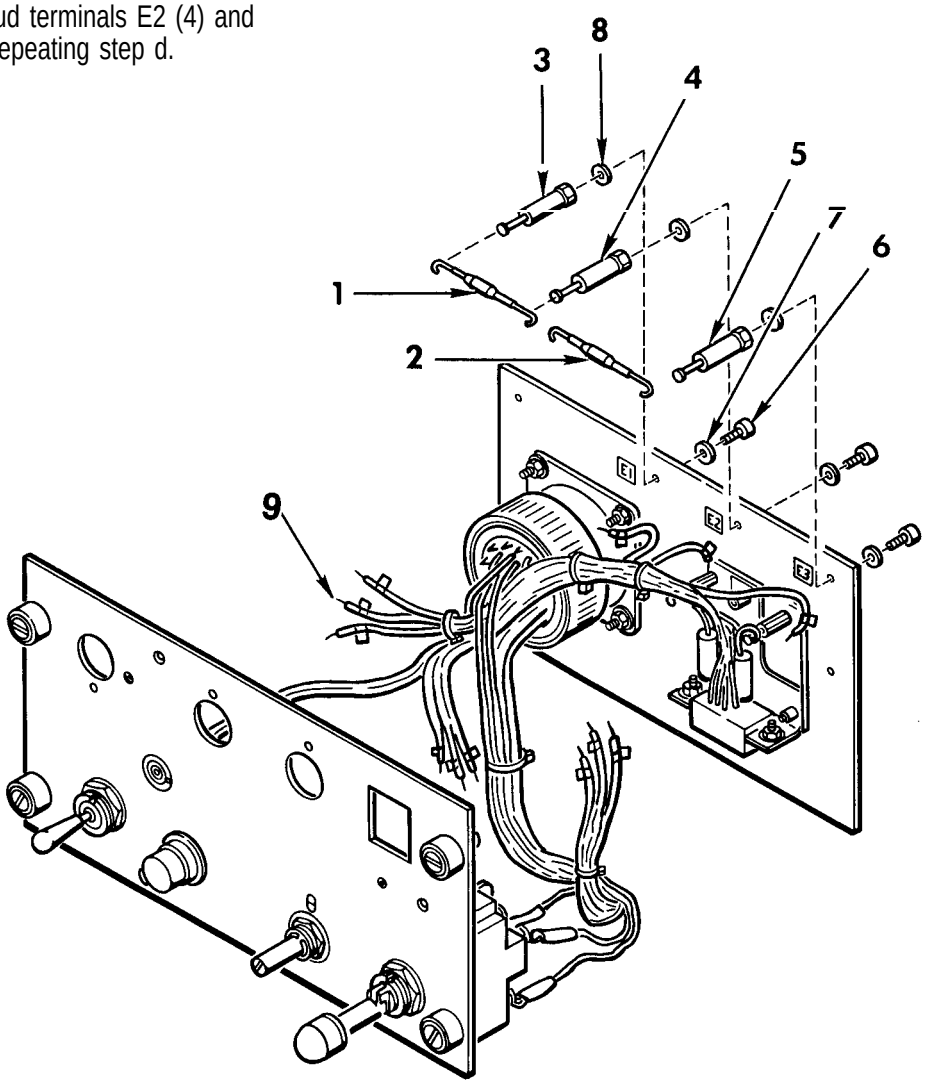
8. REMOVE PUSH SWITCH 19DS5 (1).
   a. Label and unsolder wires from terminals at rear of switch (1).
   b. Disengage locking tabs (2) on side of switch (1) body so that switch can slide forward through metal housing (3).
   c. Remove switch (1) by sliding forward through metal housing (3) and plate (4).



ARR82-27278

DISASSEMBLY (cont)

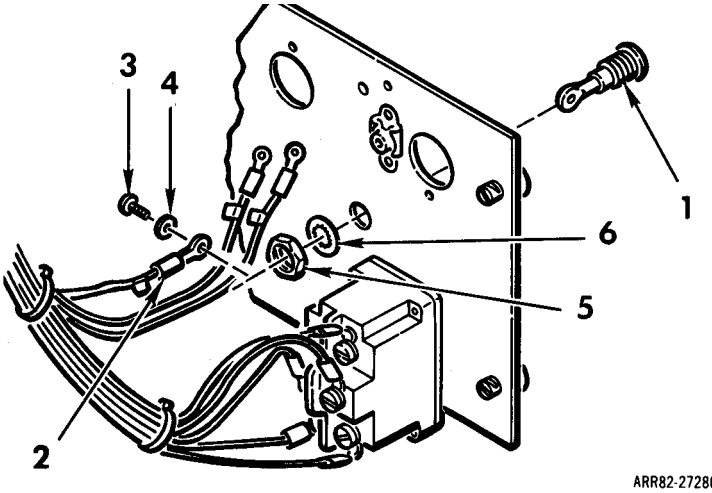
9. REMOVE TWO DIODES (1) AND (2) AND THREE STUD TERMINALS (3, 4, AND 5).
   a. Label and unsolder wires (9) from stud terminals E1 (3), E2 (4), and E3 (5).
   b. Unsolder diode 19CR18 (1) from between stud terminals E1 (3) and E2 (4).
   c. Unsolder diode 19CR17 (2) from between stud terminals E2 (4) and E3 (5).
   d. Remove stud terminal El (3) by removing screw (6), lockwasher (7), and lockwasher (8).
   e. Remove stud terminals E2 (4) and E3 (5) by repeating step d.



ARR82-27279

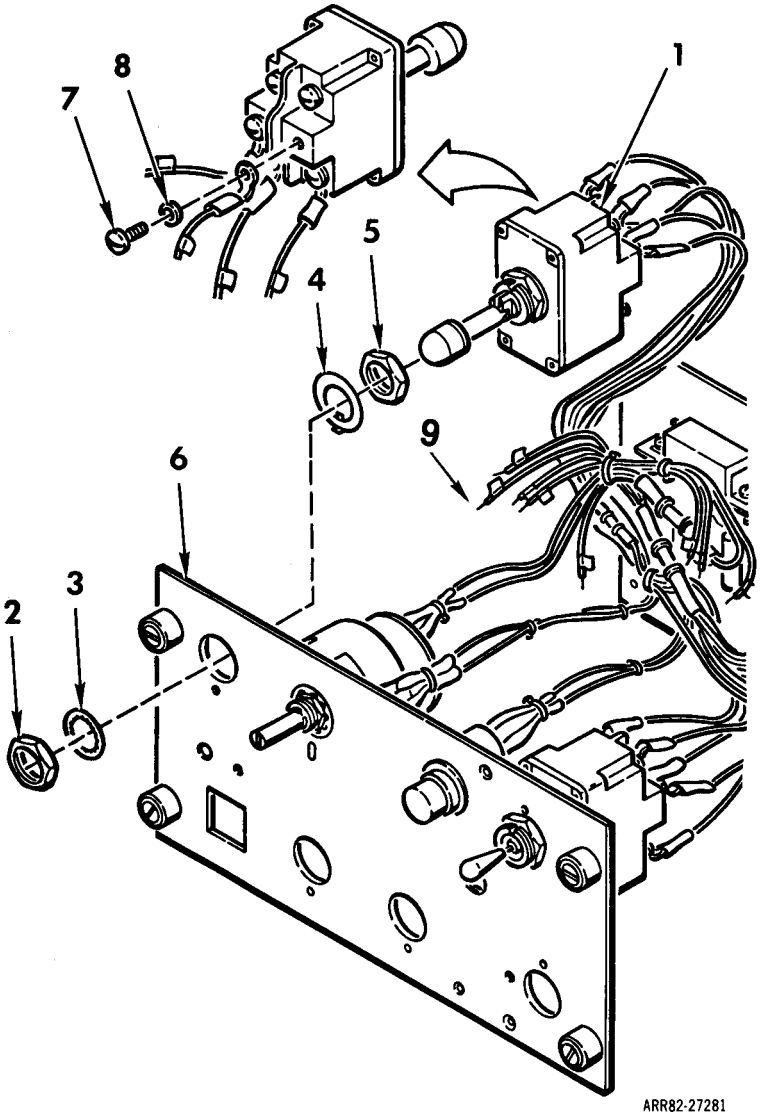
2-61. REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011971) (cont)

10. REMOVE CONNECTOR 8J104 (1).
    a. Label wire (2) and remove screw (3) and washer (4).
    b. Remove nut (5), lockwasher (6), and connector 8J104 (1).



ARR82-27280

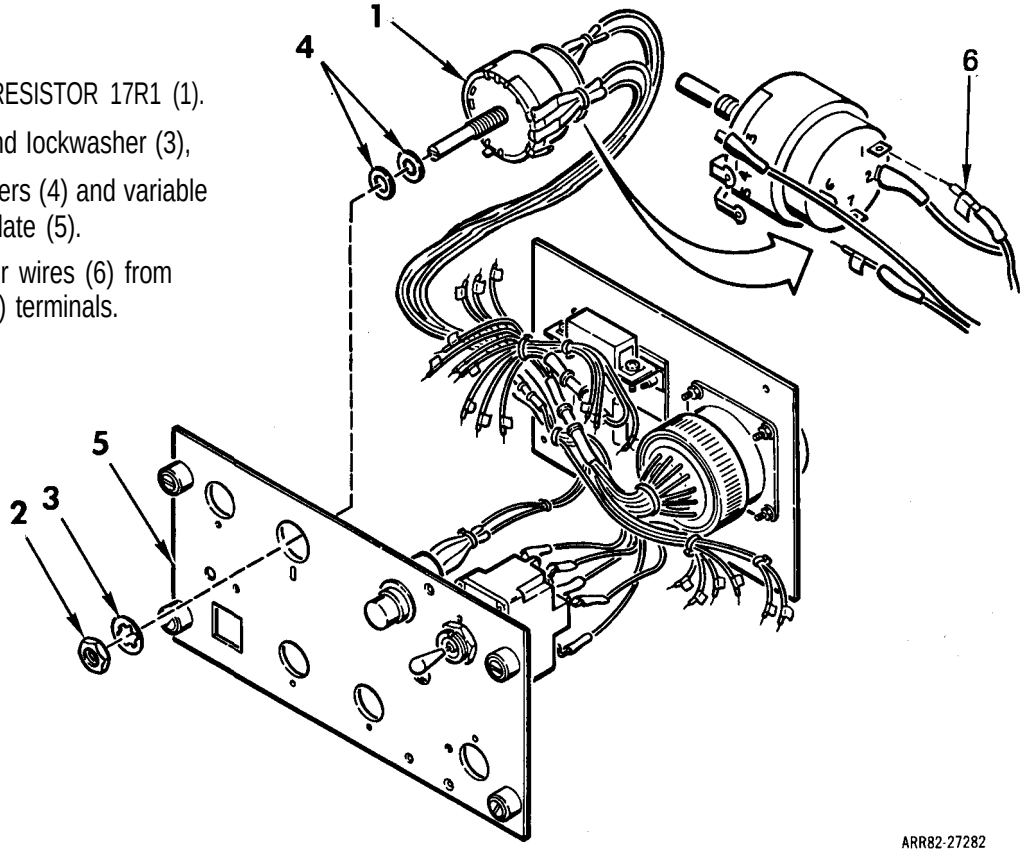
11. REMOVE MASTER ARM TOGGLE SWITCH 19S12 (1).
    a. Remove nut (2) and washer (3).
    b. Remove switch (1), lockring (4), and nut (5) from plate (6).
    c. Label wires. Disconnect wires (9) from switch (1) by removing screws (7) and lockwashers (8).



ARR82-27281

DISASSEMBLY (cont)

12. REMOVE VARIABLE RESISTOR 17R1 (1).
    a. Remove nut (2) and lockwasher (3),
    b. Remove two washers (4) and variable resistor (1) from plate (5).
    c. Label and unsolder wires (6) from variable resistor (1) terminals.

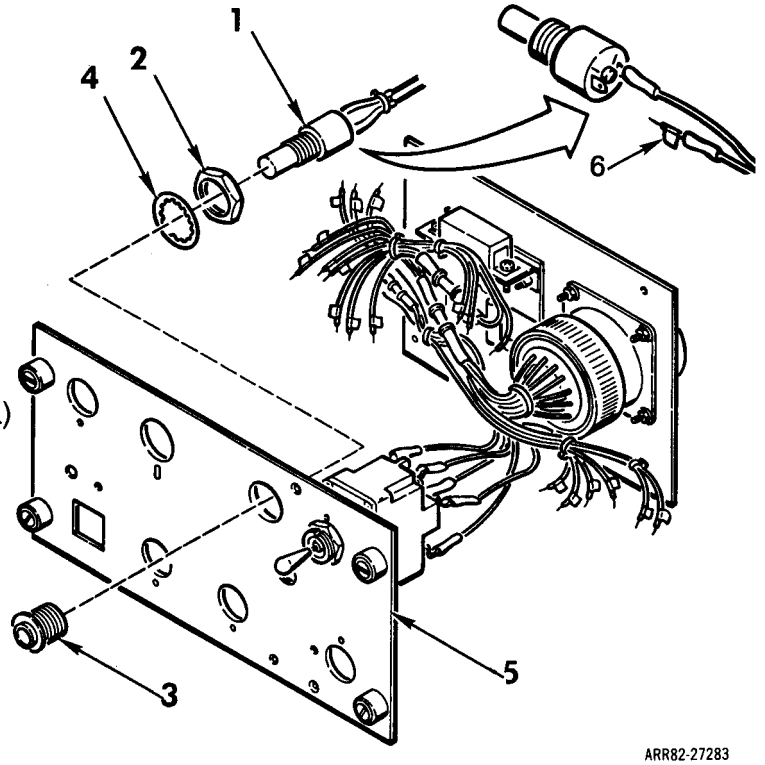


ARR82-27282

13. REMOVE TEST SWITCH 17S1 (1).
    a. Unscrew nut (2) from threaded adapter (3).
    b. Unscrew threaded adapter (3) from body of switch (1).
    c. Separate switch (1), nut (2), lockwasher (4), and threaded adapter (3) from plate (5).
    d. Label and unsolder wires (6) from switch (1) terminals.

NOTE

Use multimeter to identify wires prior to connecting them.



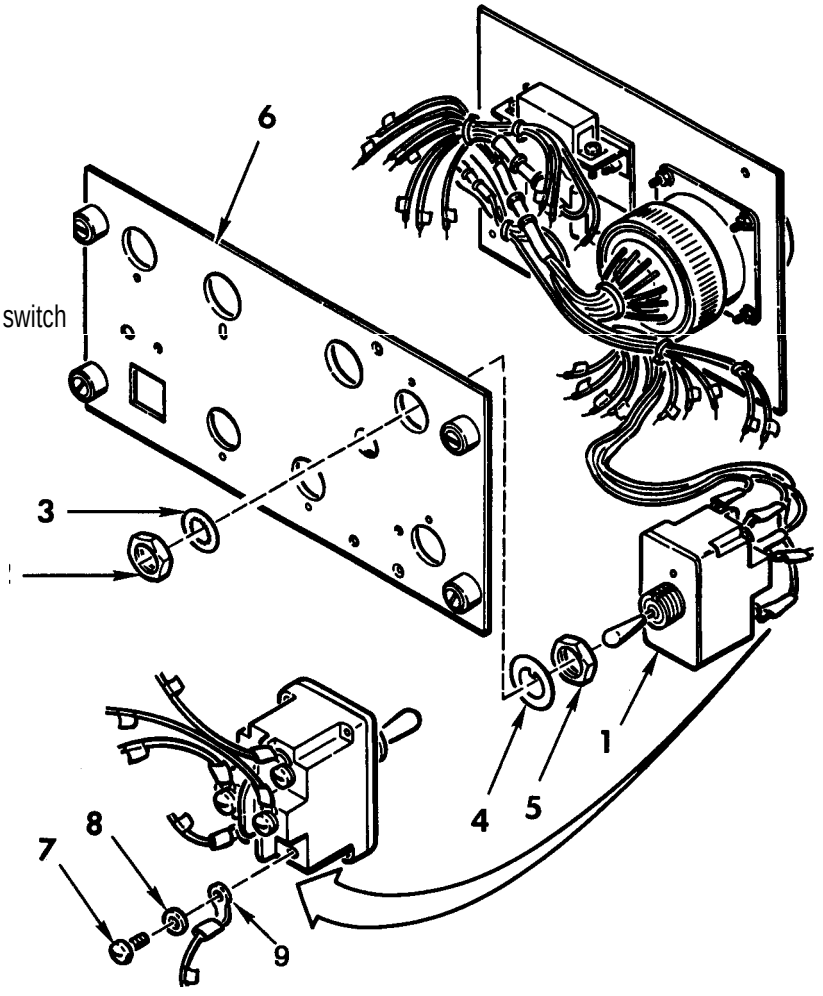
ARR82-27283

2-61. REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011971) (cont)

14. REMOVE RANGE TOGGLE SWITCH 19S5 (1).
    a. Remove nut (2) and washer (3).
    b. Remove switch (1), lockring (4), and nut (5) from plate (6).
    c. Label wires Disconnect wires (9) from switch (1) by removing screws (7) and lockwashers (8).

NOTE

Use multimeter to identify wires prior to connecting them.

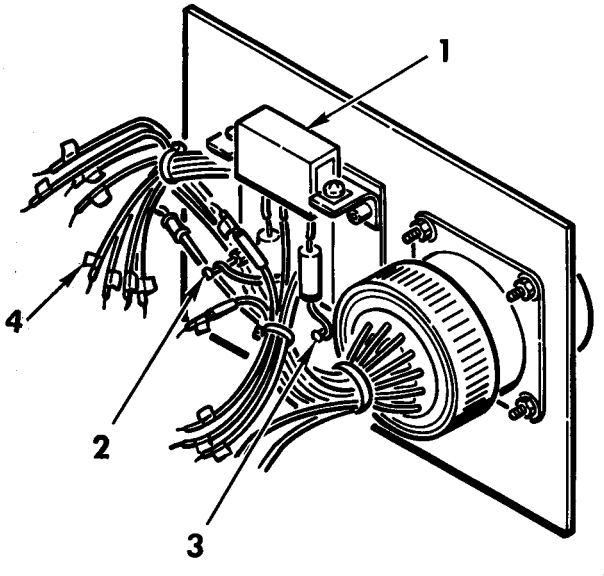


ARR82-27284

15. DISCONNECT WIRING FROM RELAY ASSEMBLY 8Z3 (1).
    a. Label and unsolder wires (4) from relay (1).
    b. Label and unsolder wires from studs E15 (2) and E17 (3).

NOTE

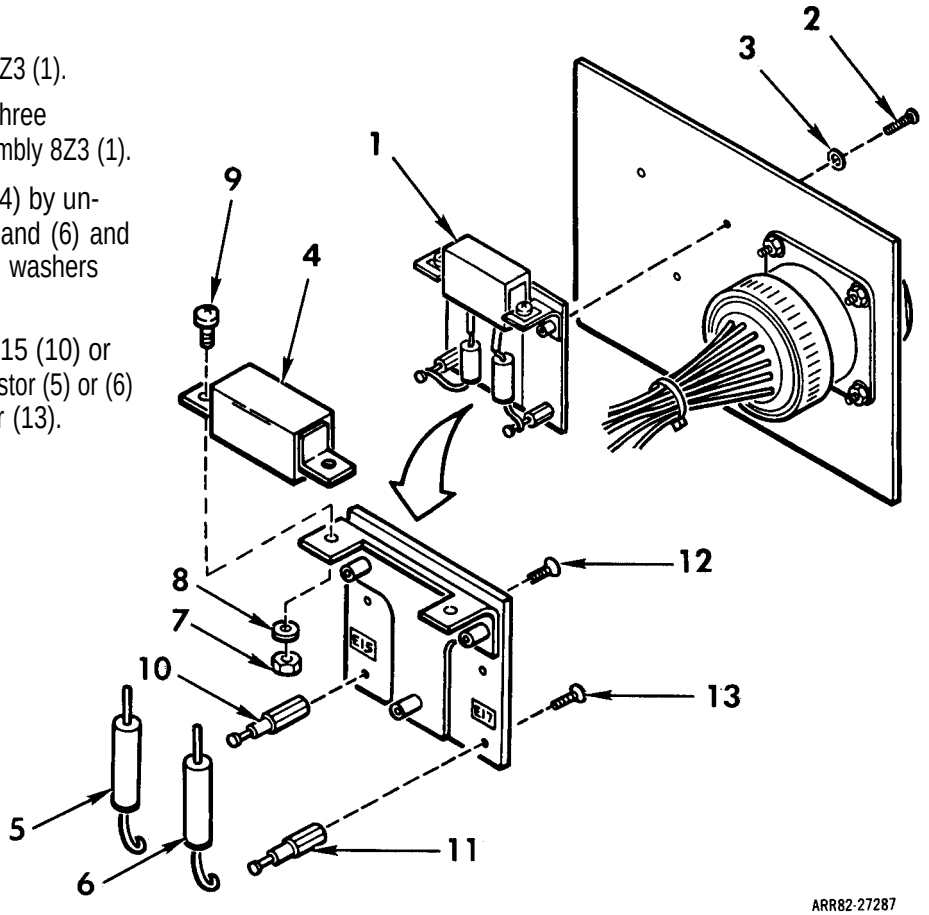
Use multimeter to identify wires prior to connecting them.



ARR82-27285

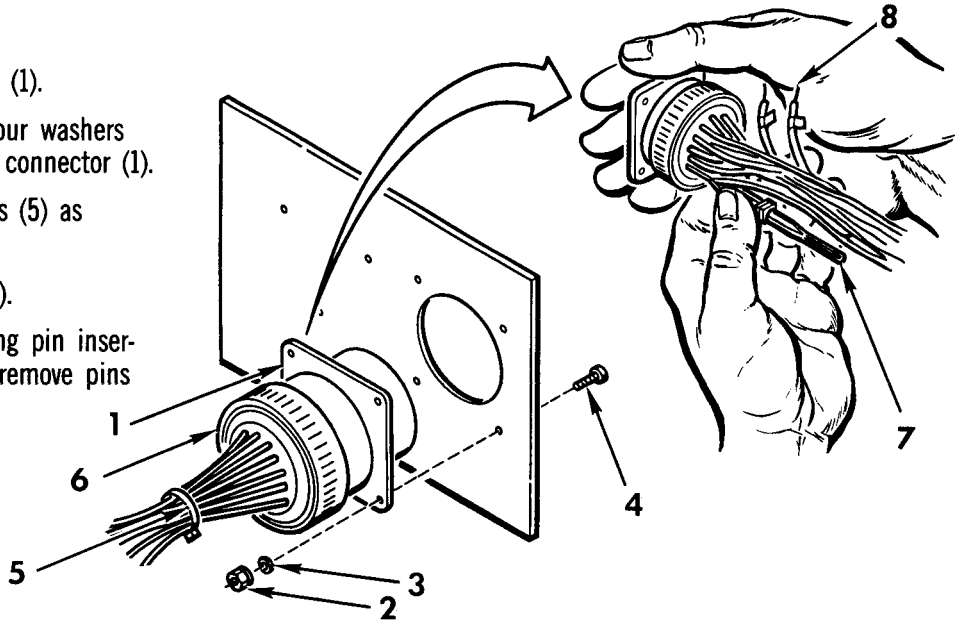
DISASSEMBLY (cont)

16. REMOVE RELAY ASSEMBLY 8Z3 (1).
    a. Remove three screws (2), three washers (3), and relay assembly 8Z3 (1).
    b. If required, replace relay (4) by unsoldering two resistors (5) and (6) and removing two nuts (7), two washers (8) and two screws (9).
    c. If required, replace stud E15 (10) or E17 (11) by unsoldering resistor (5) or (6) and removing screw (12) or (13).



ARR82-27287

17. REMOVE CONNECTOR A2J1 (1).
    a. Remove four nuts (2), four washers (3), four screws (4) and connector (1).
    b. Cut cable tiedown straps (5) as required.
    c. Unscrew cable clamp (6).
    d. Label wires (8) and using pin insertion/extraction tool (7), remove pins from connector (1).



ARR82-27286

2–61. REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011971) (cont)

CLEANING

18. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV.

INSPECTION

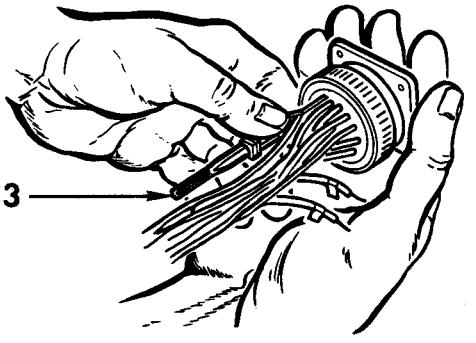
19. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV.

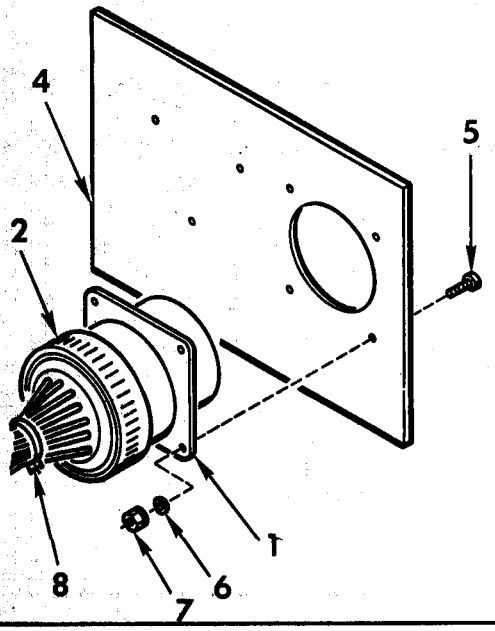
ASSEMBLY

20. INSTALL CONNECTOR A2J1 (1).
    a. Make certain that cable clamp (2) is over ends of unconnected wire bundle.
    b. Remove labels and, using pin insertion/extraction tool (3), connect pins to connector (1).
    c. Install connector (1) on panel (4), with four screws (5), four washers (6), and four nuts (7).
    d. Screw cable clamp (2) onto connector (1).
    e. Install cable tiedown straps (8) as required.

NOTE

Use multimeter to identify wires prior to connecting them.





CONN. A2J1 PIN	CONNECTS TO:
A	19S12-2
	19DS5A-ND
	19DS5B-ND
	8Z3-X2
B	17S1-2
	19S5-5
C	21S6-5
D	19DS5B-NC
E	21S6-2
F	21S6-3
G	19DS5A-NC
H	21S6-6
J	21S6-1
K	19S13-12
L	19S12-4
M	19S12-5
T	8J104

CONN. A2J1 PIN	CONNECTS TO:
V	GND STUD
X	19S13-2
Y	19S13-11
Z	E3
a	19S13-1
b	19S13-10
c	19S13-4
d	17S1-1
e	17S2-2 (RTCL)
f	17R1-3 (RTCL)
j	19S4-2
k	19S4-3
m	19S5-3
n	19S5-4
r	19S12-1
s	8Z3-X1

ARR82-27288

ASSEMBLY (cont)

21. INSTALL RELAY ASSEMBLY 8Z3 (1).

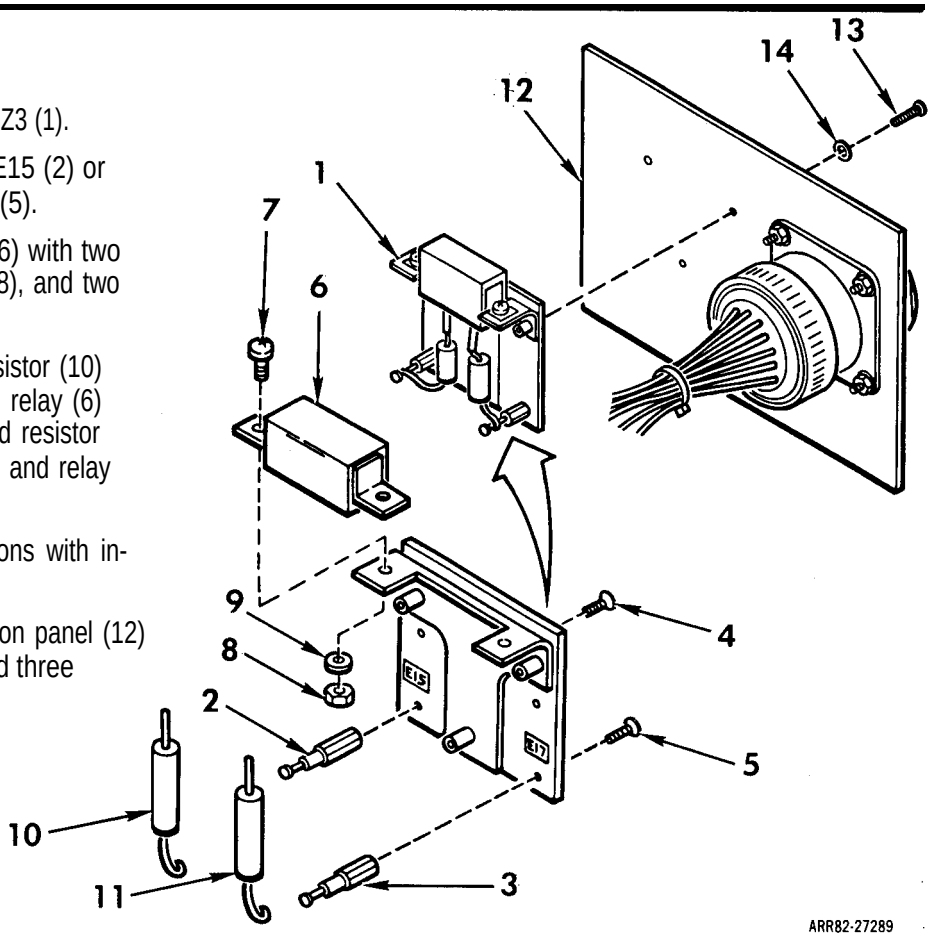
a. If removed, install studs E15 (2) or E17 (3) with screw (4) or (5).

b. If removed, install relay (6) with two screws (7), two washers (8), and two nuts (9).

c. If removed, solder one resistor (10) between stud E15 (2) and relay (6) terminal B1. Solder second resistor (11) between stud E17 (3) and relay (6) terminal AI.

d. Protect soldered connections with insulation sleeving.

e. Install relay assembly (1) on panel (12) with three screws (13) and three washers (14).



ARR82-27289

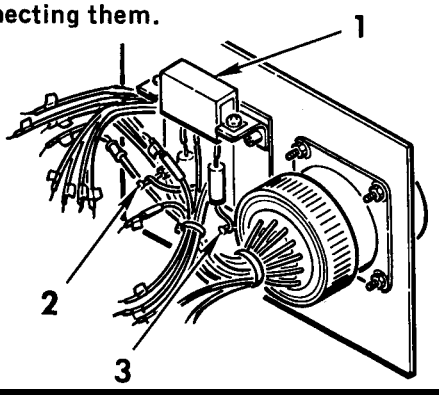
22. CONNECT WIRING TO RELAY 8Z3 (1).

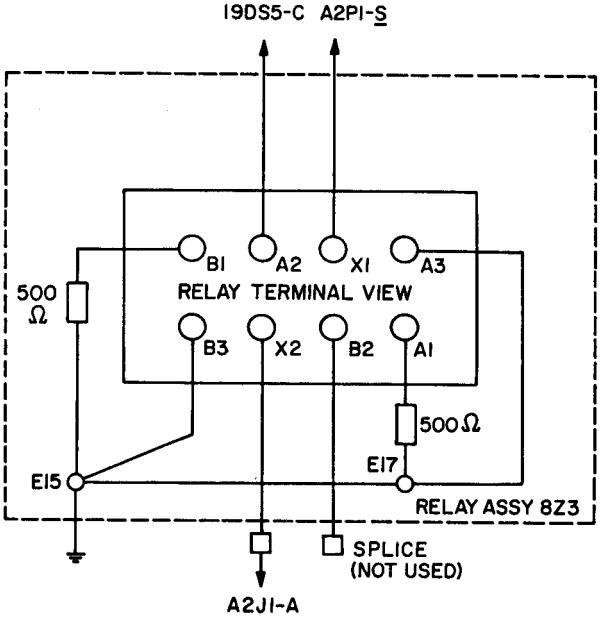
a. Remove labels and solder wires to relay (1) terminals and to studs E15 (2) and E17 (3).

b. Protect soldered connections with insulation sleeving.

NOTE

Use multimeter to identify wires prior to connecting them.





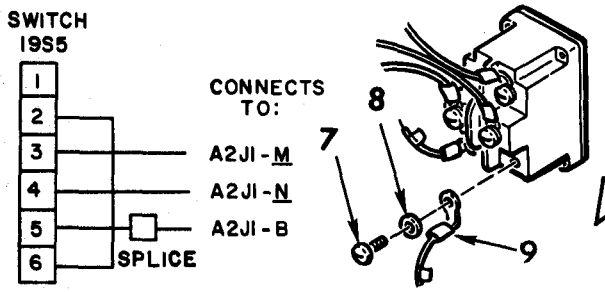
ARR82-27290

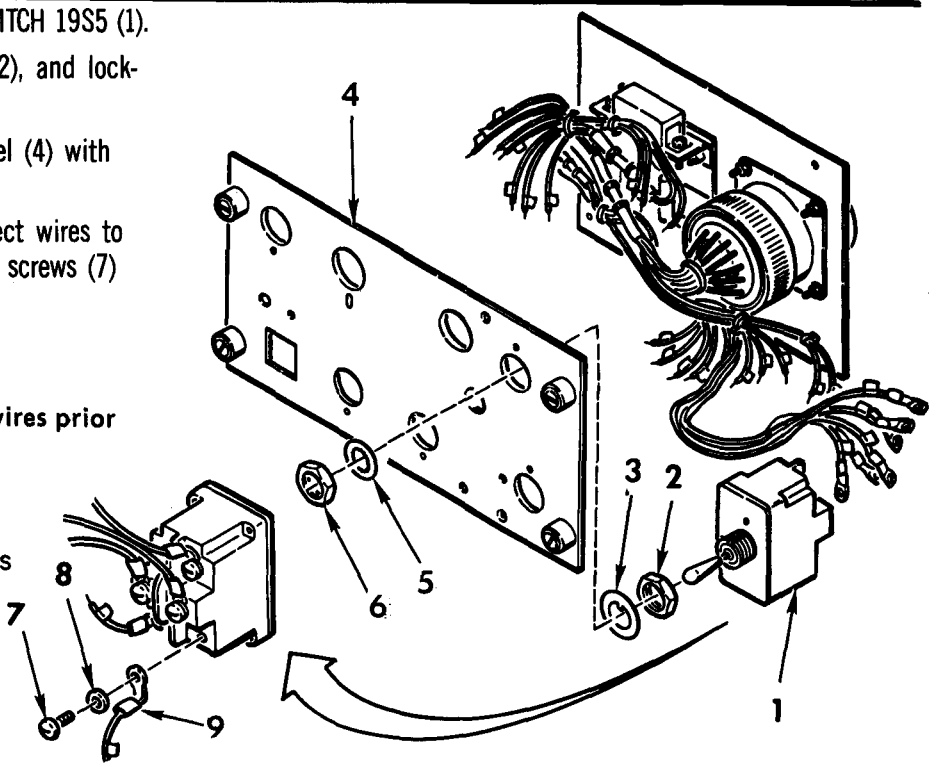
2–61. REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011971) (cont)

23. INSTALL RANGE TOGGLE SWITCH 19S5 (1).
    a. Position switch (1), nut (2), and lockring (3) on plate (4).
    b. Secure switch (1) to panel (4) with washer (5) and nut (6).
    c. Remove labels and connect wires to switch (1) terminals with screws (7) and lockwashers (8).

NOTE

Use multimeter to identify wires prior to connecting them.



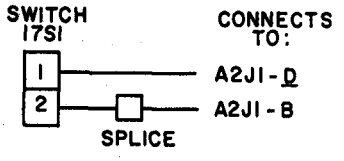


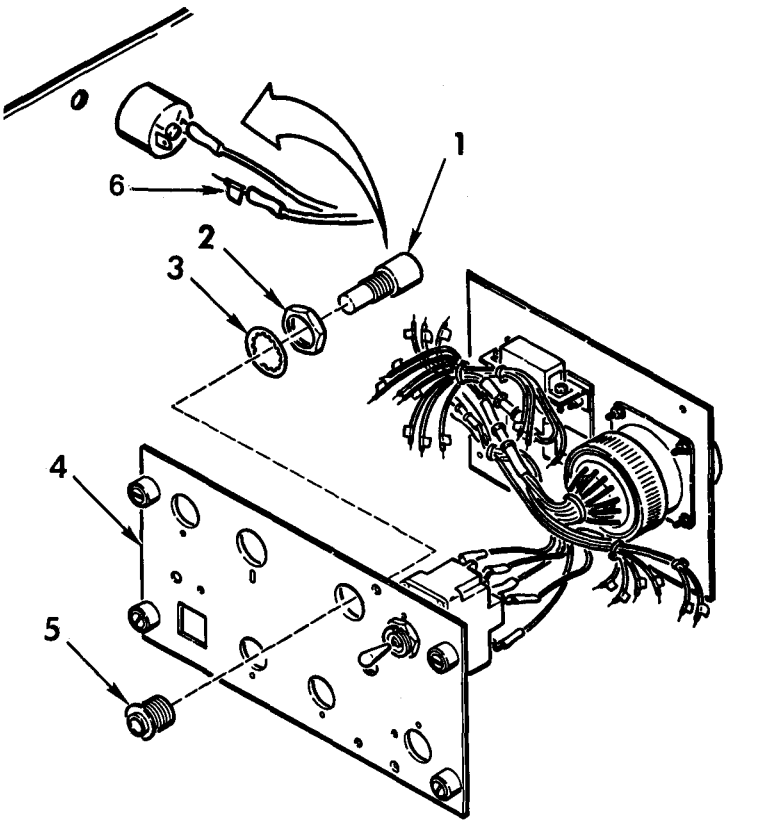
ARR82-27291

24. INSTALL TEST SWITCH 17S1 (1).
    a. Position switch (1), nut (2), and lockwasher (3) in place on plate (4).
    b. Screw threaded adapter (5) onto body of switch (1).
    c. Screw nut (2) onto threaded adapter (5) to secure switch (1) to plate (4).
    d. Remove labels and solder wires (6) to switch (1) terminals.
    e. Protect soldered connections with insulation sleeving.

NOTE

Use multimeter to identify wires prior to connecting them.





ARR82-27292

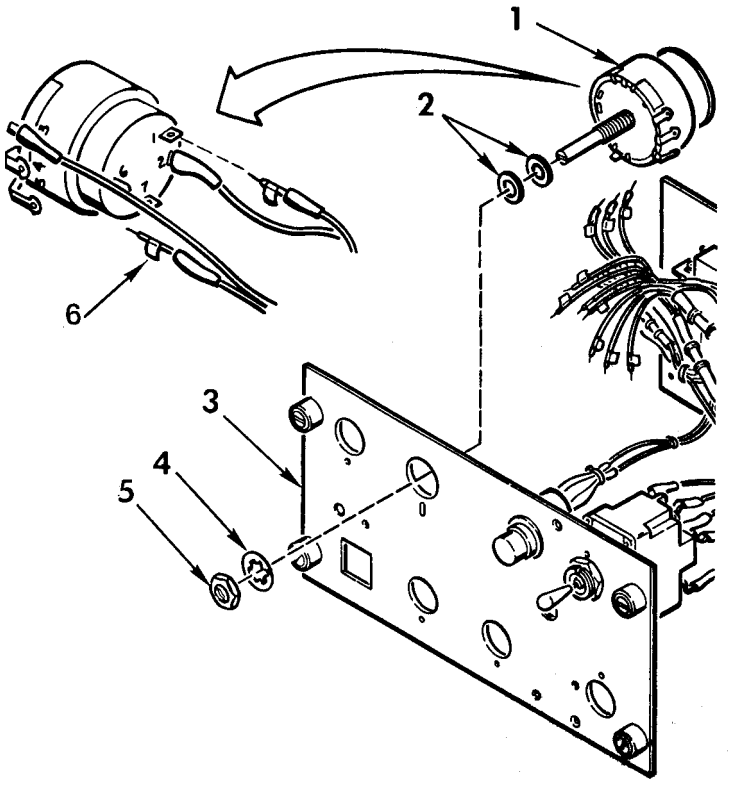
ASSEMBLY (cont)

25. INSTALL VARIABLE RESISTOR 17R1 (1).
    a. Position variable resistor (1) and two washers (2) in place on plate (3).
    b. Secure variable resistor (1) to plate (3) with lockwasher (4) and nut (5).
    c. Remove labels and solder wires (6) to variable resistor (1) terminals.
    d. Protect soldered connections with insulation sleeving.

NOTE

Use multimeter to identify wires prior to connecting them.

VAR. RES. TERM.	CONNECTS TO:
1	
2	A2J1 - E
3	A2J1 - F
4	



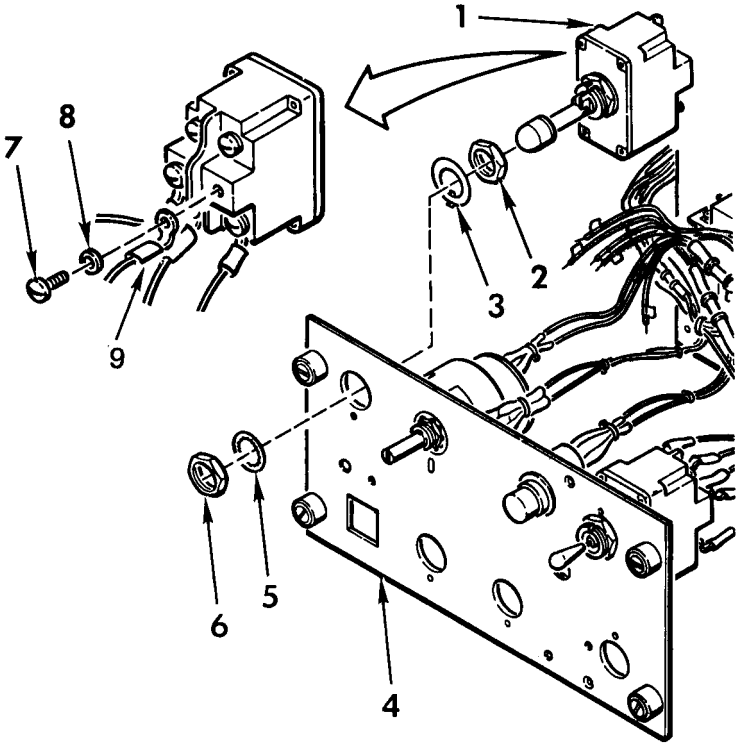
ARR82-27293

26. INSTALL MASTER ARM TOGGLE SWITCH 19S12 (1).
    a. Position switch (1), nut (2), and lockring (3) in place on plate (4).
    b. Secure switch (1) to plate (4) with washer (5) and nut (6).
    c. Remove labels and connect wires (9) to switch (1) terminals with screws (7) and lockwashers (8).

NOTE

Use multimeter to identify wires prior to connecting them.

SWITCH 19S12		CONNECTS TO:
1	SPLICE	A2J1 - R
2		A2J1 - A
4		A2J1 - L
5		A2J1 - M



ARR82-27294

2-61. REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011971) (cont)

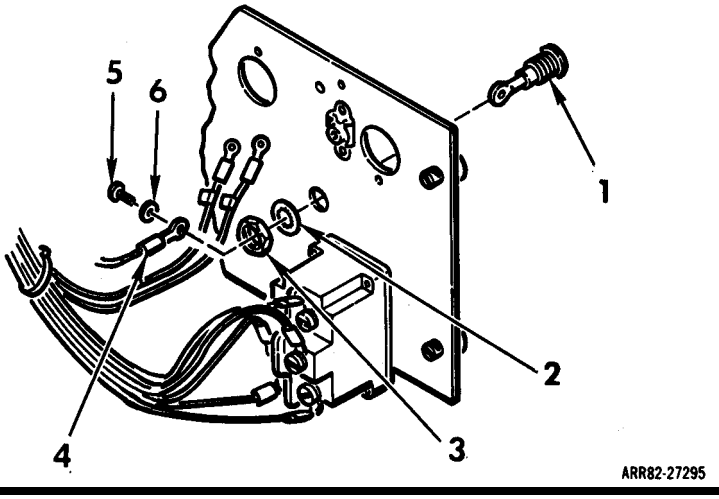
27. INSTALL CONNECTOR 8J104 (1).

a. Install connector 8J104 (1), lockwasher (2), and nut (3).

b. Remove label and connect wire (4) to connector (1) terminal with screw (5) and washer (6).

NOTE

Use multimeter to identify wires prior to connecting them.



28. INSTALL THREE STUD TERMINALS (1, 2, AND 3) AND TWO DIODES (4 AND 5).

a. Install stud terminal E1 (1) with screw (6), lockwasher (7), and lockwasher (8).

b. Install stud terminals E2 (2) and E3 (3) by repeating step a.

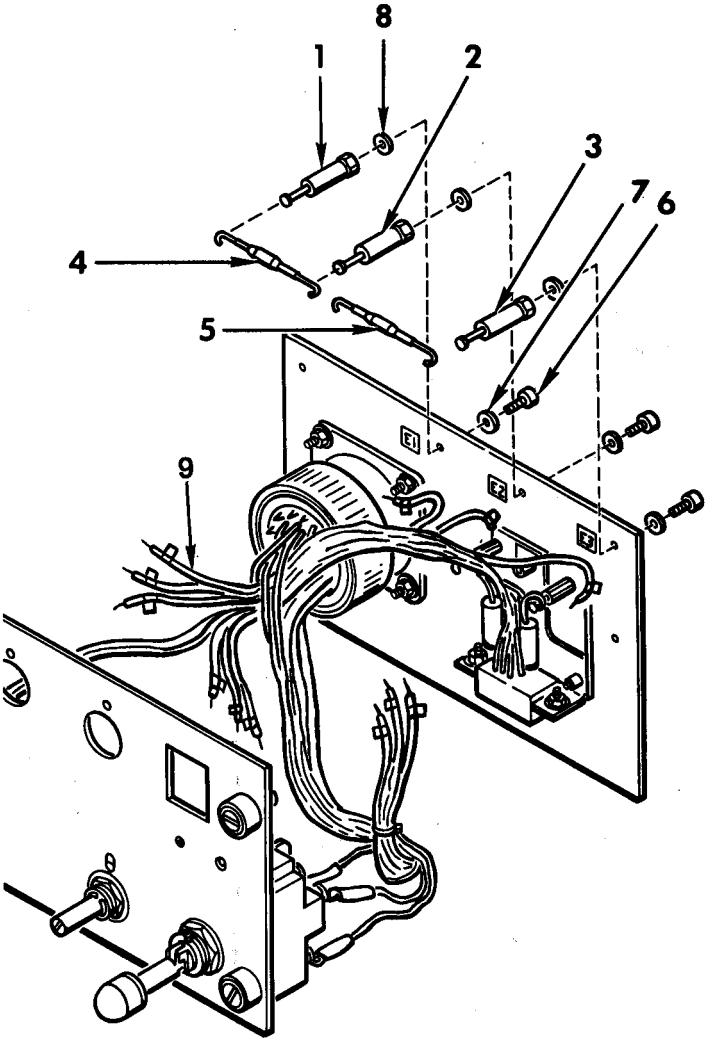
c. Solder diode 19CR18 (4) between stud terminals E1 (1) and E2 (2).

d. Solder diode 19CR17 (5) between stud terminals E2 (2) and E3 (3).

e. Remove labels and solder wires to stud terminals E1 (1), E2 (2), and E3 (3).

NOTE

Use multimeter to identify wires prior to connecting them.

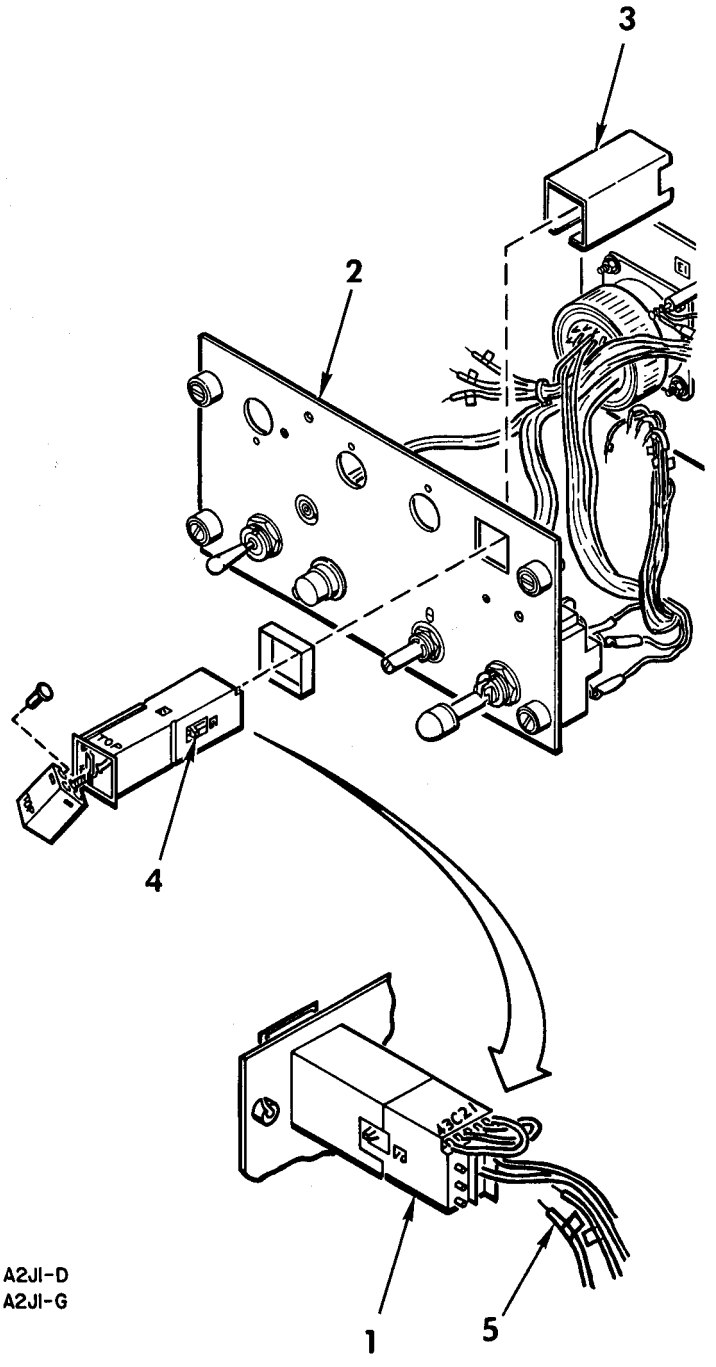


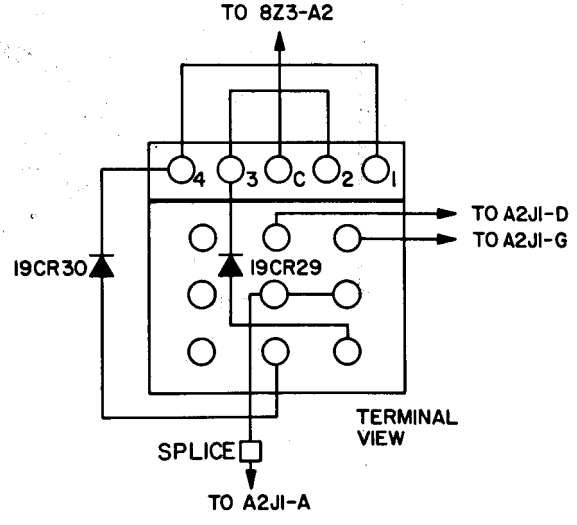
ASSEMBLY (cont)

29. INSTALL PUSH SWITCH 19DS5 (1).
    a. Slide switch (1) body through front of plate (2) and metal housing (3).
    b. Engage locking tabs (4) on side of switch (1) body so that switch is secured firmly to plate (2).
    c. Remove labels and solder wires (5) to switch (1) terminals.
    d. Protect soldered connections with insulation sleeving.

NOTE

Use multimeter to identify wires prior to connecting them.





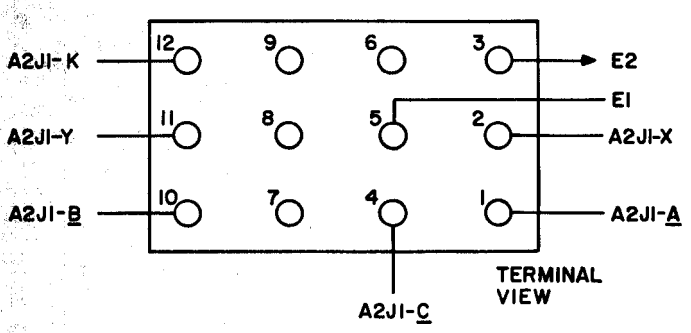
ARR82-27297

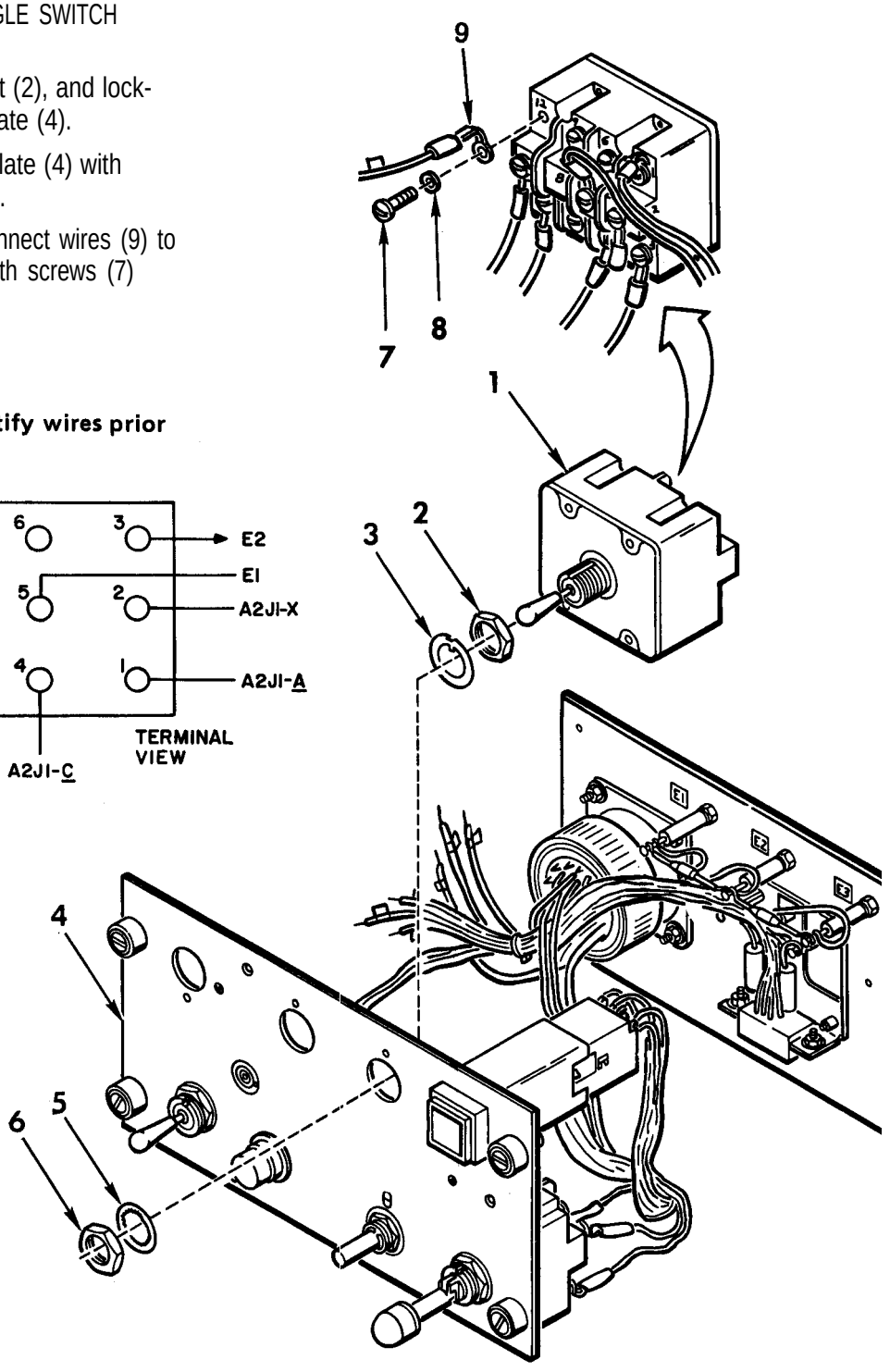
2-61. REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011971) (cont)

30. INSTALL WPN CONT TOGGLE SWITCH 19S13 (1).
    a. Position switch (1), nut (2), and lock-ring (3) in place on plate (4).
    b. Secure switch (1) to plate (4) with washer (5) and nut (6).
    c. Remove labels and connect wires (9) to switch (1) terminals with screws (7) and lockwashers (8).

NOTE

Use multimeter to identify wires prior to connecting them.





ARR82-27298

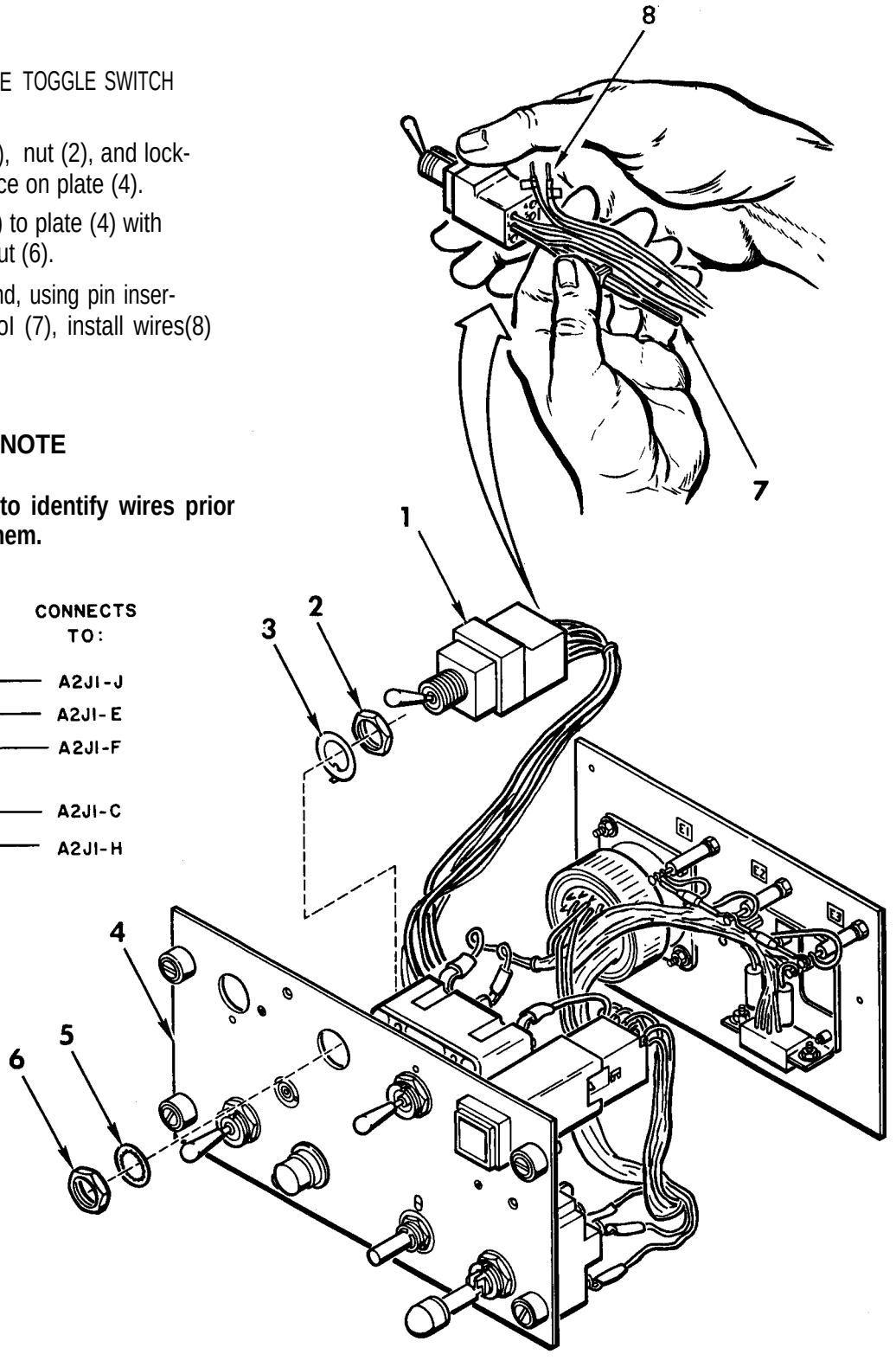
ASSEMBLY (cont)

31. INSTALL WING STORE TOGGLE SWITCH 21S6 (1).
    a. Position switch (1), nut (2), and lockwasher (3) in place on plate (4).
    b. Secure switch (1) to plate (4) with washer (5) and nut (6).
    c. Remove labels and, using pin insertion/extraction tool (7), install wires(8) in switch (1).

NOTE

Use multimeter to identify wires prior to connecting them.

21S6 TERM	CONNECTS TO:
1	A2J1-J
2	A2J1-E
3	A2J1-F
4	
5	A2J1-C
6	A2J1-H



ARR82-27299

2-61. REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011971) (cont)

32. CONNECT TWO GROUND WIRES (1).

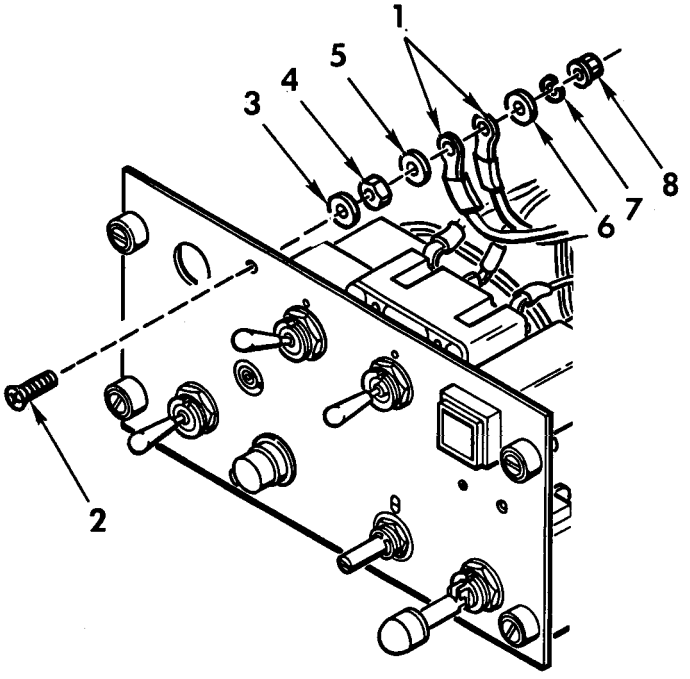
a. Install screw (2), washer (3), nut (4), and washer (5).

b. Remove labels and place two wires (1) on screw (2).

c . Secure wires (1) with washer (6), lockwasher (7), and nut (8).

NOTE

Use multimeter to identify wires prior to connecting them.



ARR82-27300

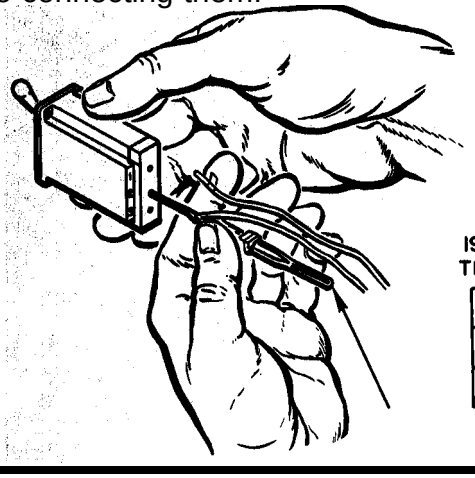
33. INSTALL RECOIL TOGGLE SWITCH 19S4 (1).

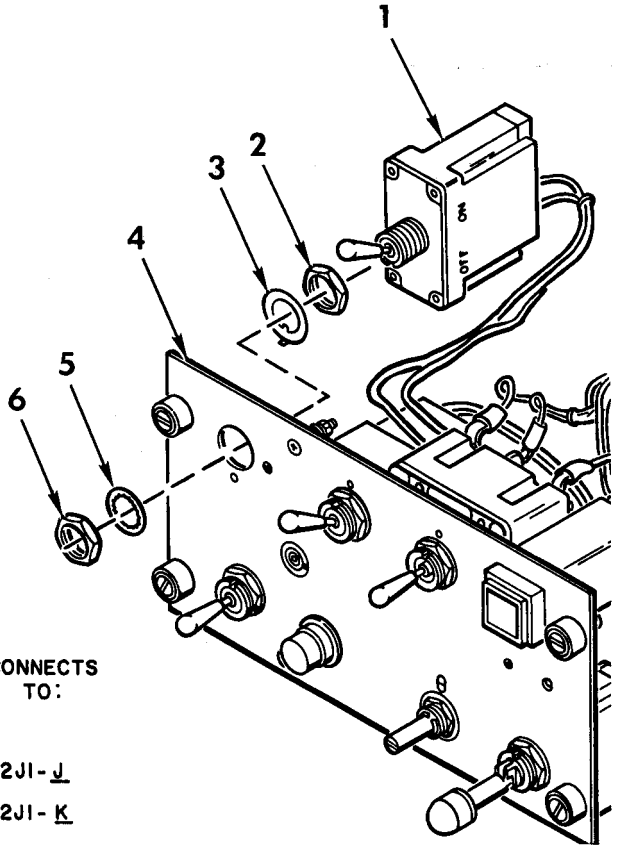
a. Position switch (1), nut (2), and lock-ring (3) in place on plate (4).

b. Secure switch (1) to plate (4) with washer (5) and nut (6).

c .Remove labels and install wires in switch (1) with pin insertion/extraction tool (7).

Use multimeter to identify wires prior to connecting them.





19S4 TERM.	CONNECTS TO:
1	
2	A2J1-J
3	A2J1-K

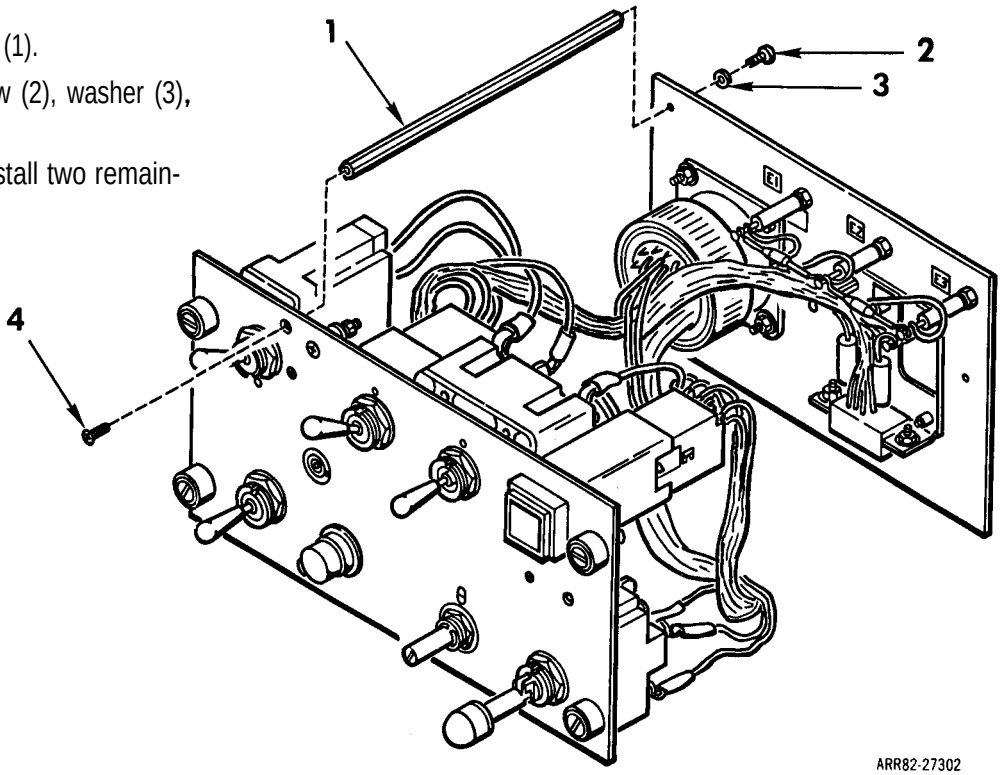
ARR82-27301

ASSEMBLY (cont)

34. INSTALL THREE POSTS (1).

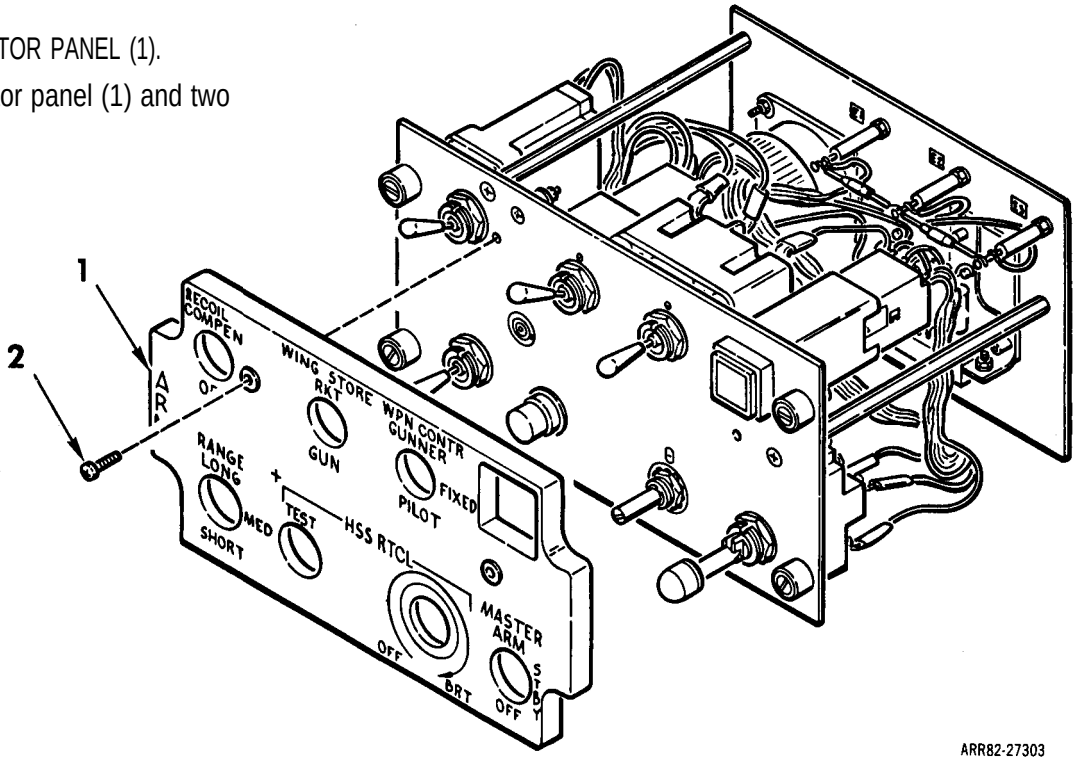
a. Install post (1), screw (2), washer (3), and screw (4).

b. Repeat step a to install two remaining posts (1).



35. INSTALL INDICATOR PANEL (1).

Install indicator panel (1) and two screws (2).



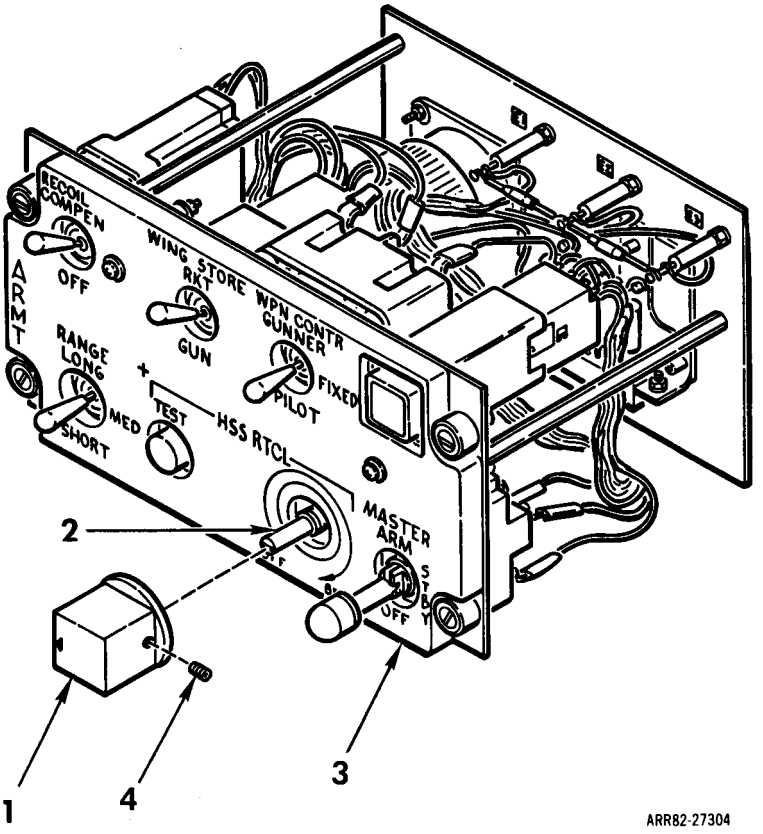
2-61. REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011971) (cont)

36. INSTALL KNOB (1).

a. Rotate shaft (2) to fully OFF position.

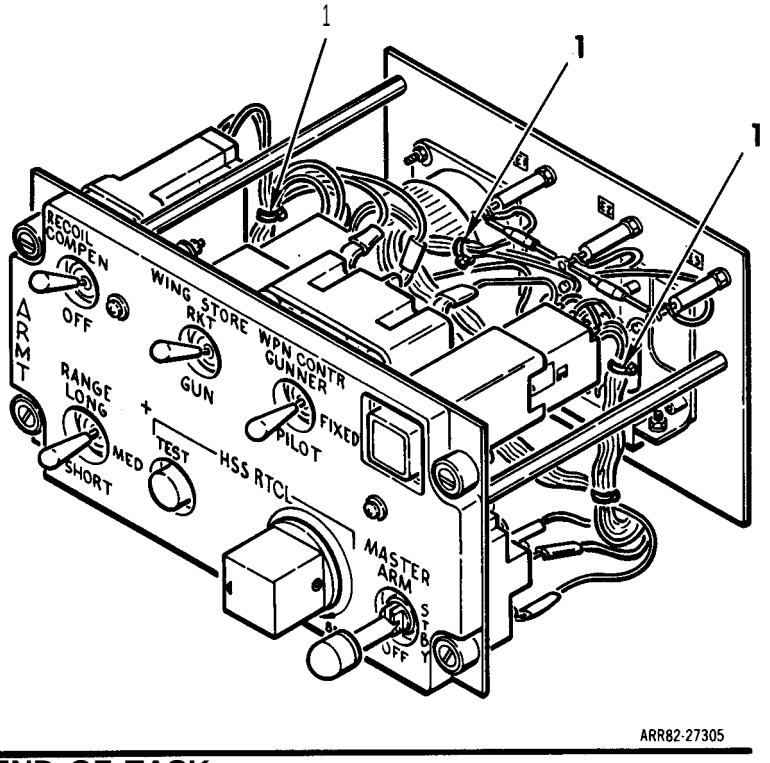
b. Place knob (1) on shaft (2) of variable resistor 17R1 (2) and aline index mark on knob (1) to OFF placard on panel (3).

c. Secure knob (1) to shaft (2) by tightening setscrews (4).



37. INSTALL CABLE TIEDOWN STRAPS (1).

Upon completion of reassembly, form wiring into bundles as required and install cable tiedown straps (1).



END OF TASK

2-62. REPAIR OF PILOT ARMAMENT CONTROL PANEL (209-075-771-3) (cont)

DESCRIPTION

This task covers: Disassembly, cleaning, inspection, and assembly.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental
- Multimeter AN/USM-223

Materials:
- Solder (Item 28, Appx B)
- Strap (Item 30, Appx B)
- Insulation Sleeving (Item 15.1, Appx B)

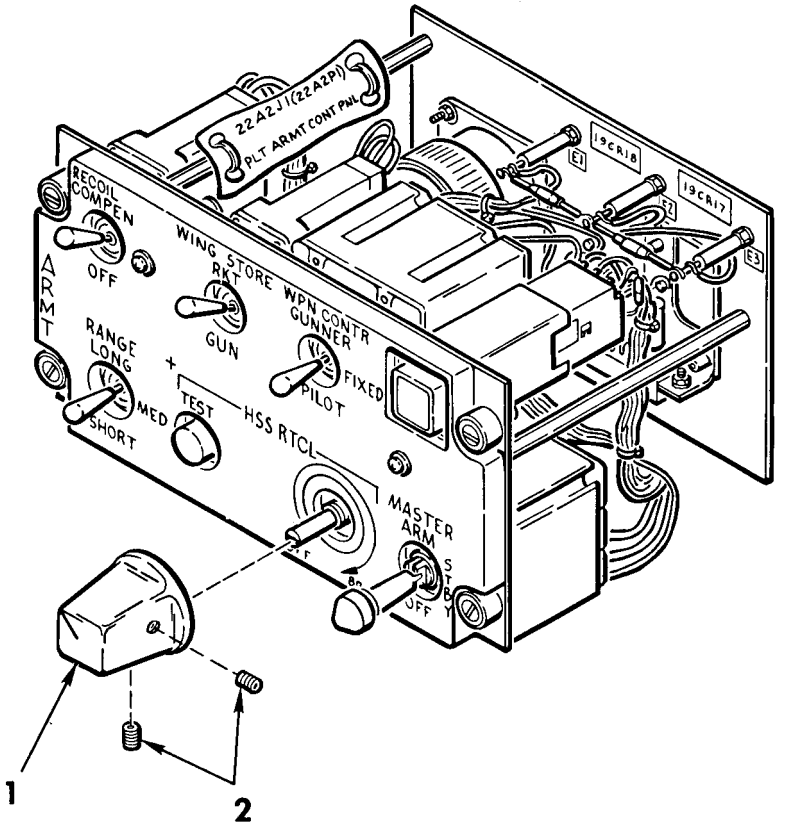
Personnel Required:
- 68J Aircraft Armament/ Missile Systems Repairer

Equipment Conditions:
- In shop on bench.
- No power applied.

DISASSEMBLY

1. REMOVE KNOB (1)

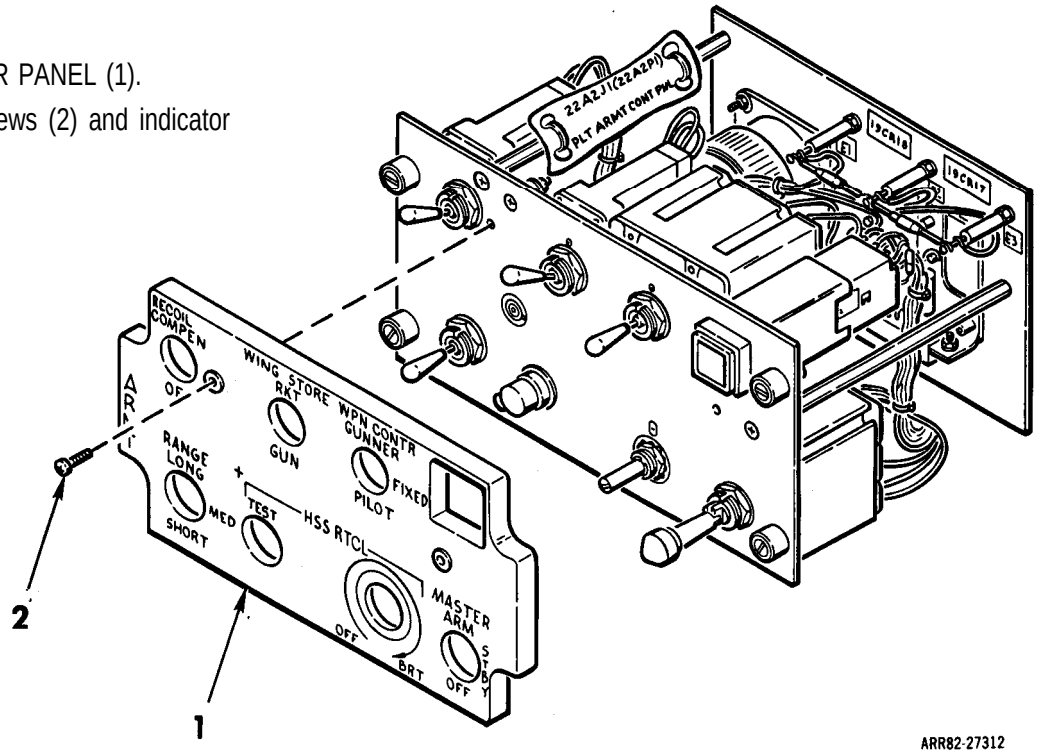
   Loosen two setscrews (2) and remove knob (1).



2-62. REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011952) (cont)

2. REMOVE INDICATOR PANEL (1).

Remove two screws (2) and indicator panel (1).

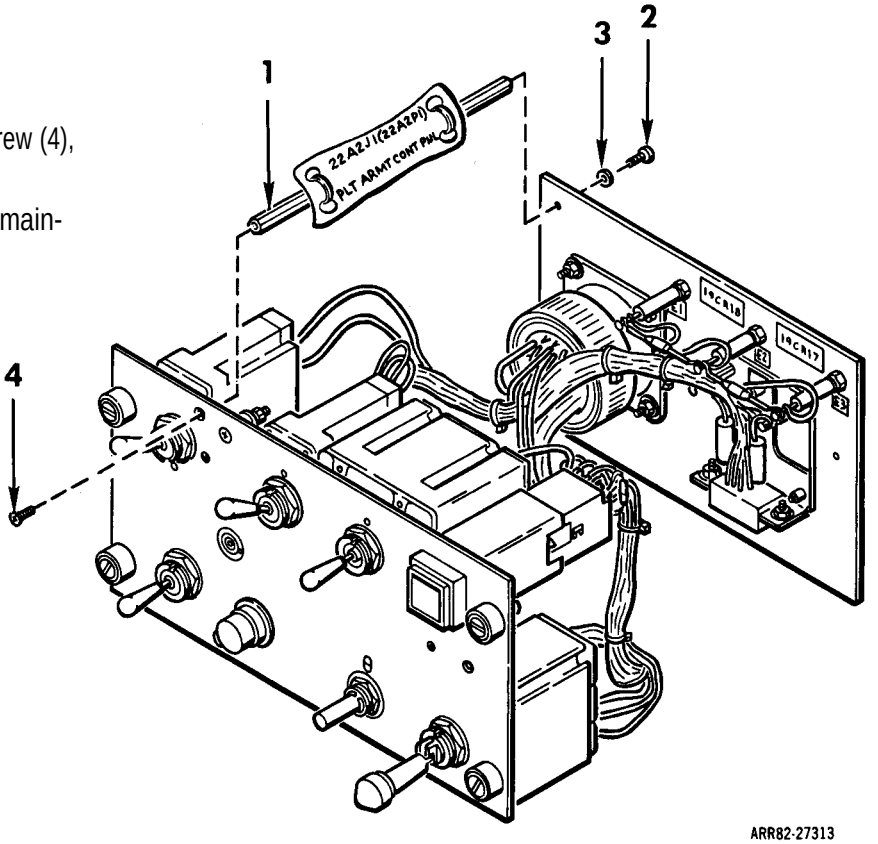


ARR82-27312

3. REMOVE THREE POSTS (1).

a. Remove screw (2), washer (3), screw (4), and post (1).

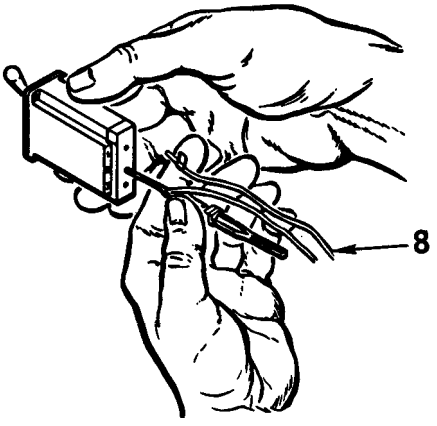
b. Repeat step a to remove two remaining posts.

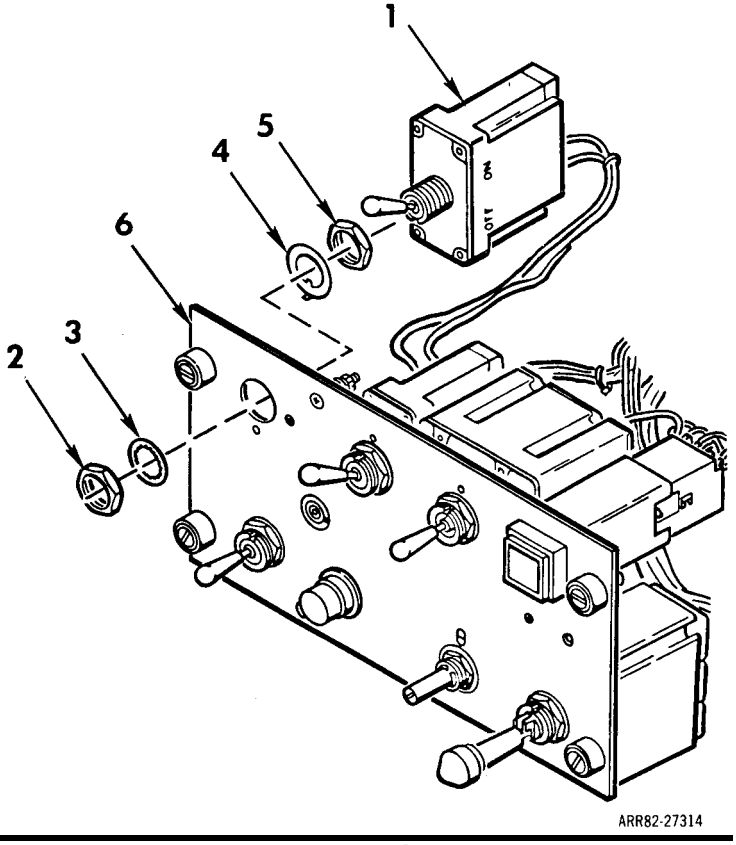


ARR82-27313

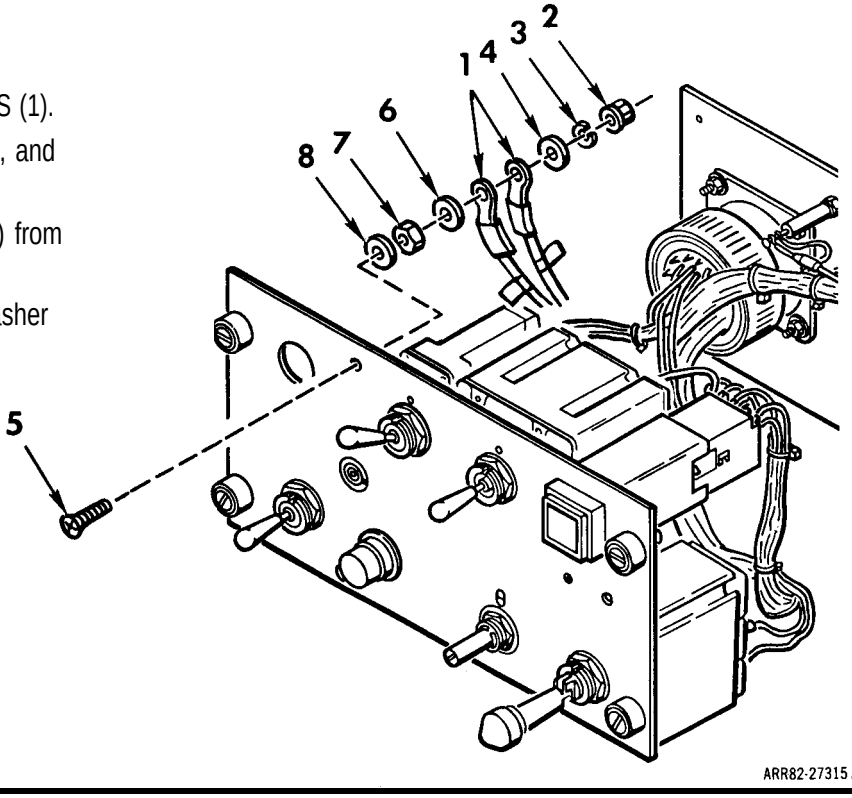
DISASSEMBLY (cont)

4. REMOVE RECOIL TOGGLE SWITCH 19S4 (1).
   a. Remove nut (2) and washer (3).
   b. Remove switch (1), lockring (4), and nut (5) from plate (6).
   c. Label wires and, using pin insertion/extraction tool (7), remove wires (8 from rear of switch (1).





5. DISCONNECT TWO GROUND WIRES (1).
   a. Remove nut (2), lockwasher (3), and washer (4).
   b. Label and remove two wires (1) from screw (5).
   c. Remove washer (6), nut (7), washer (8), and screw (5).



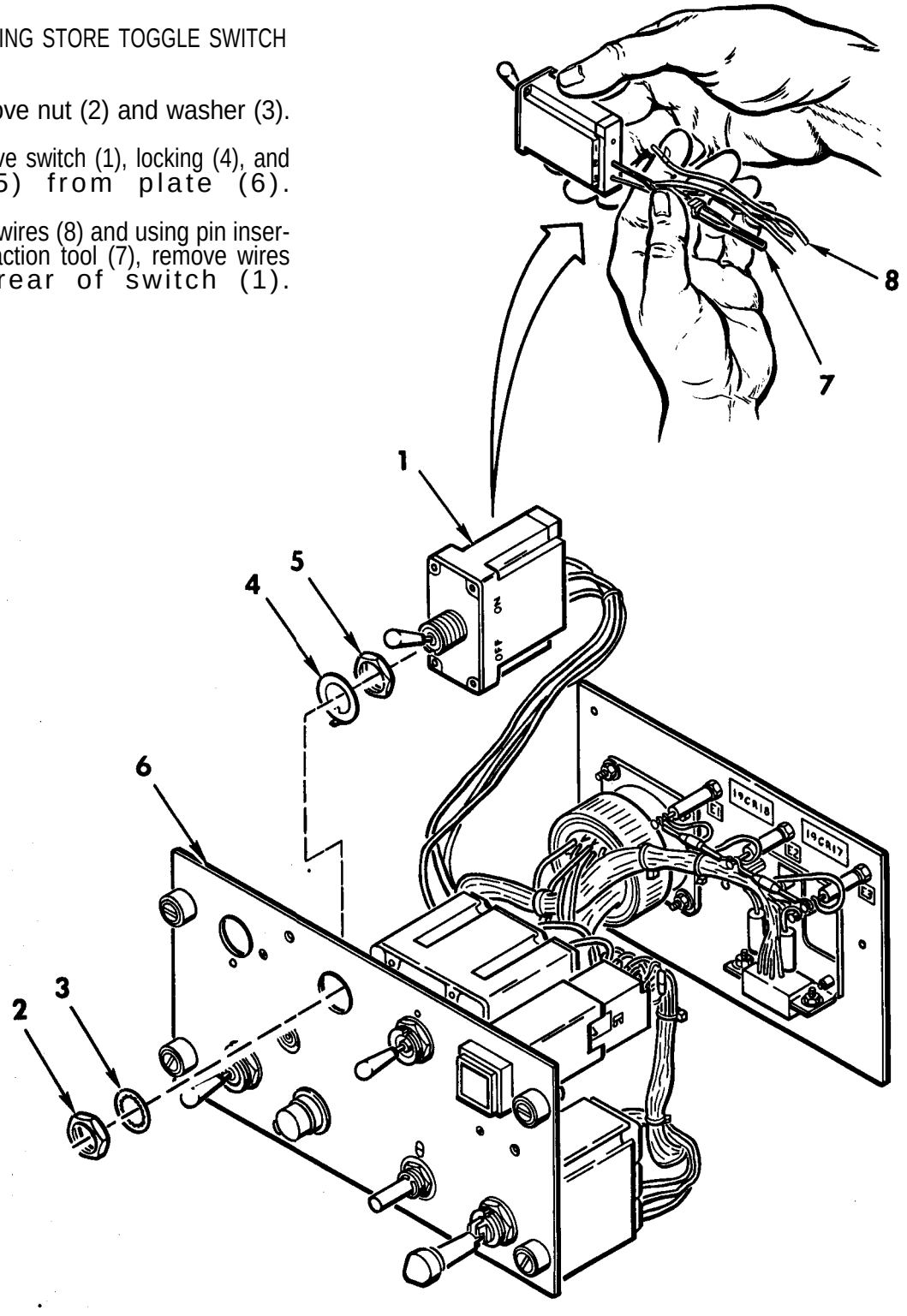
2-62. REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011952) (cont)

6. REMOVE WING STORE TOGGLE SWITCH 21S6 (1).

a. Remove nut (2) and washer (3).

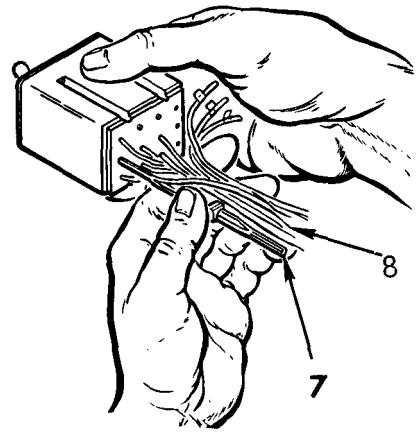
b. Remove switch (1), locking (4), and nut (5) from plate (6).

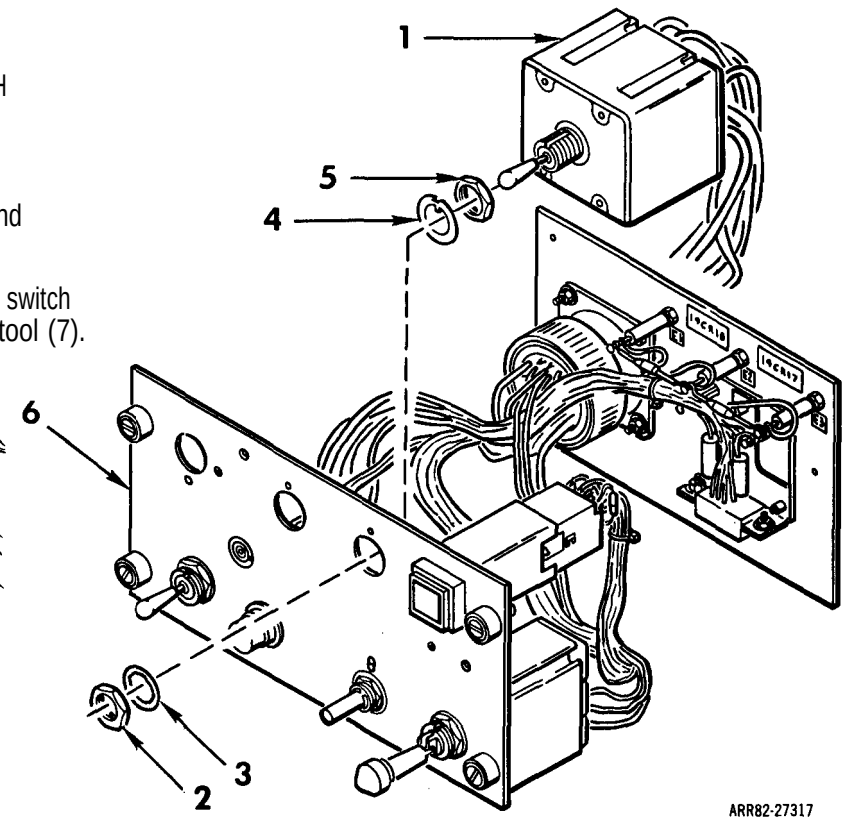
c. Label wires (8) and using pin insertion/extraction tool (7), remove wires from rear of switch (1).



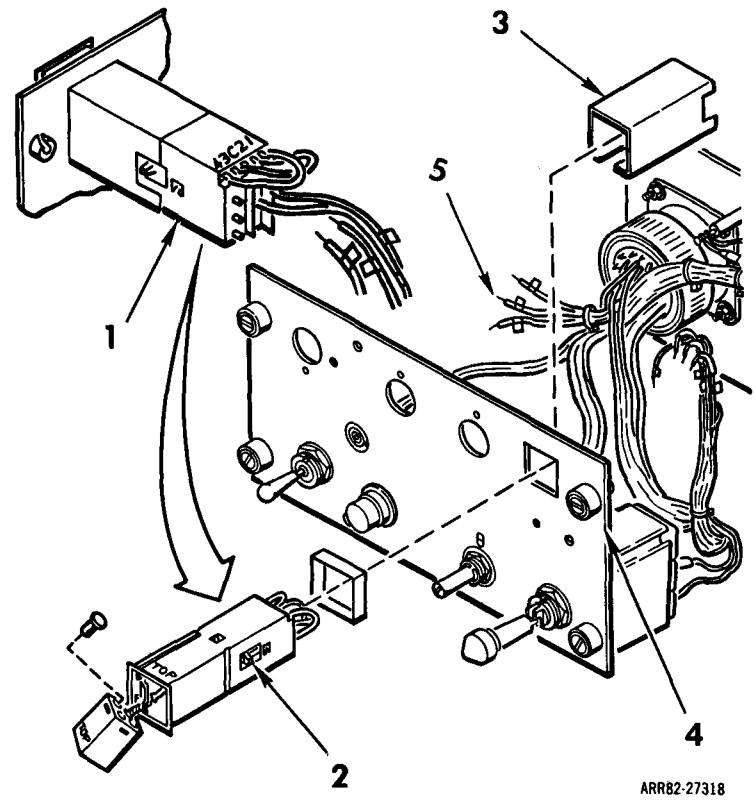
DISASSEMBLY (cont)

7. REMOVE WPN CONT TOGGLE SWITCH 19S13 (1).
   a. Remove nut (2) and washer (3).
   b. Remove switch (1), lockring (4), and nut (5) from plate (6).
   c. Label wires (8) Disconnect wires from switch (1) using pin insertion/extraction tool (7).



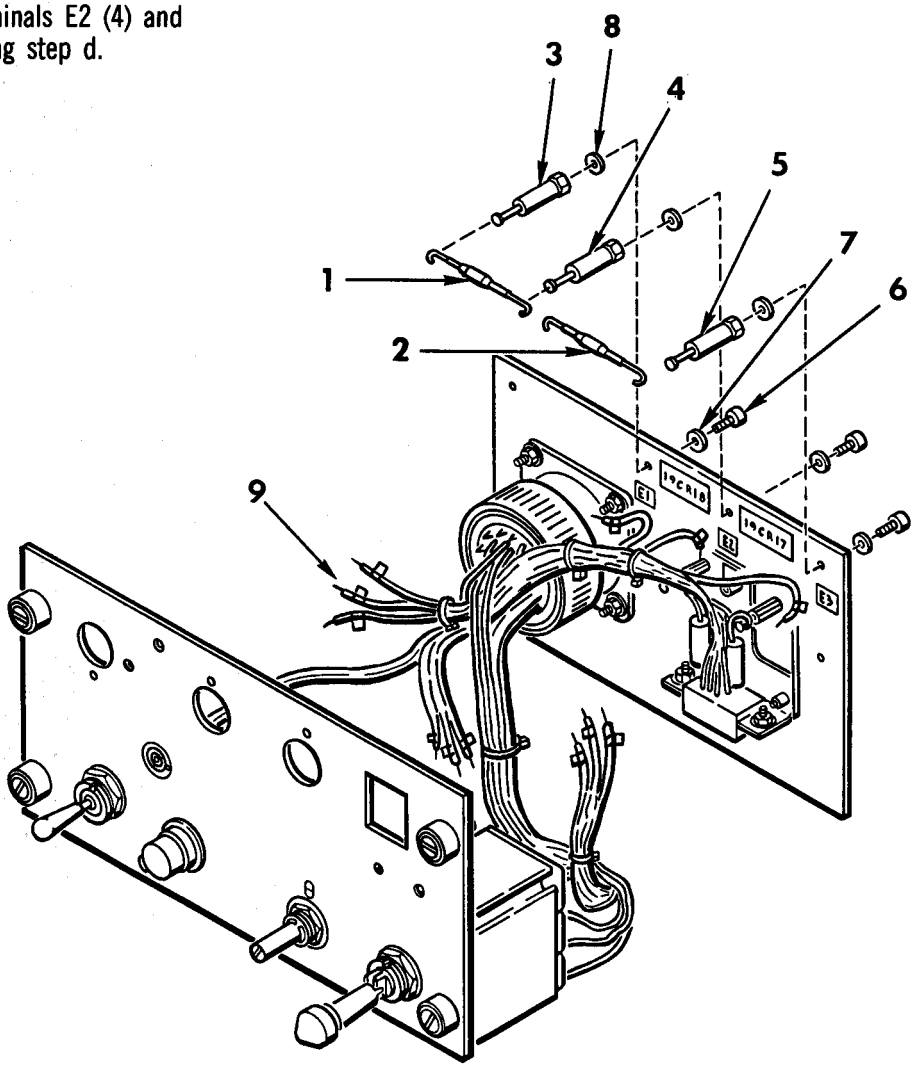


8. REMOVE PUSH SWITCH 19DS5 (1).
   a. Label and unsolder wires (5) from terminals at rear of switch (1).
   b. Disengage locking tabs (2) on side of switch (1) body so that switch can slide forward through metal housing (3).
   c. Remove switch (1) by sliding forward through metal housing (3) and plate (4).



2–62. REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011952) (cont)

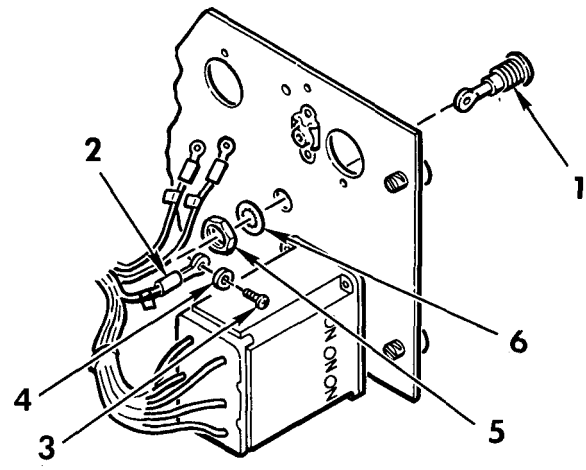
9. REMOVE TWO DIODES (1) AND (2) AND THREE STUD TERMINALS (3, 4, AND 5).
   a. Label and unsolder wires (9) from stud terminals E1 (3), E2 (4), and E3 (5).
   b. Unsolder diode 19CR18 (1) from between stud terminals E1 (3) and E2 (4).
   c. Unsolder diode 19CR17 (2) from between stud terminals E2 (4) and E3 (5).
   d. Remove stud terminal E1 (3) by removing screw (6), lockwasher (7), and lockwasher (8).
   e. Remove stud terminals E2 (4) and E3 (5) by repeating step d.



ARR82-27319

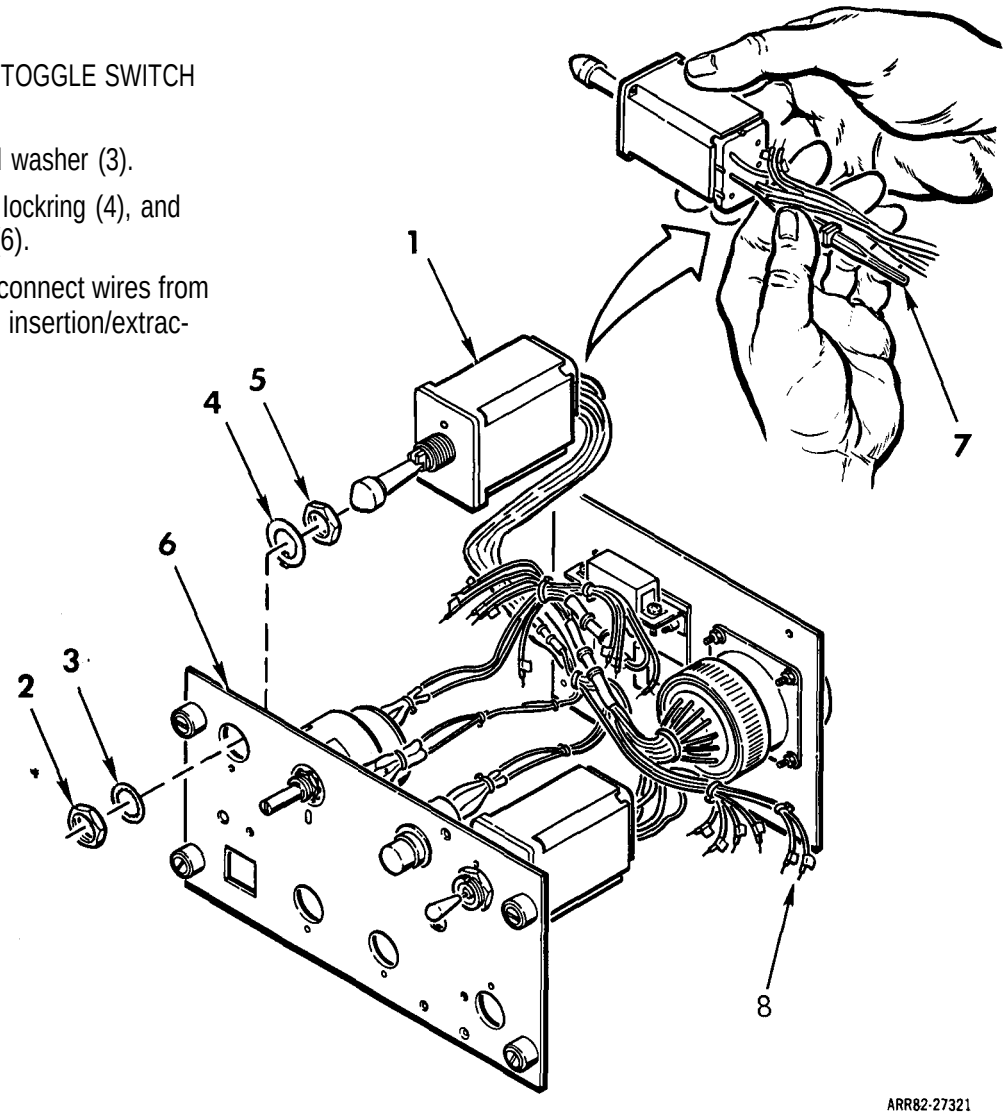
DISASSEMBLY (cont)

10. REMOVE CONNECTOR 8J104 (1)
    a. Label wire (2) and remove screw (3) and washer (4).
    b. Remove nut (5), lockwasher (6), and connector 8J104 (1).



ARR82-27320

11. REMOVE MASTER ARM TOGGLE SWITCH 19S12 (1).
    a. Remove nut (2) and washer (3).
    b. Remove switch (1), lockring (4), and nut (5) from plate (6).
    c. Label wires. (8) Disconnect wires from switch (1) using pin insertion/extraction tool (7).



ARR82-27321

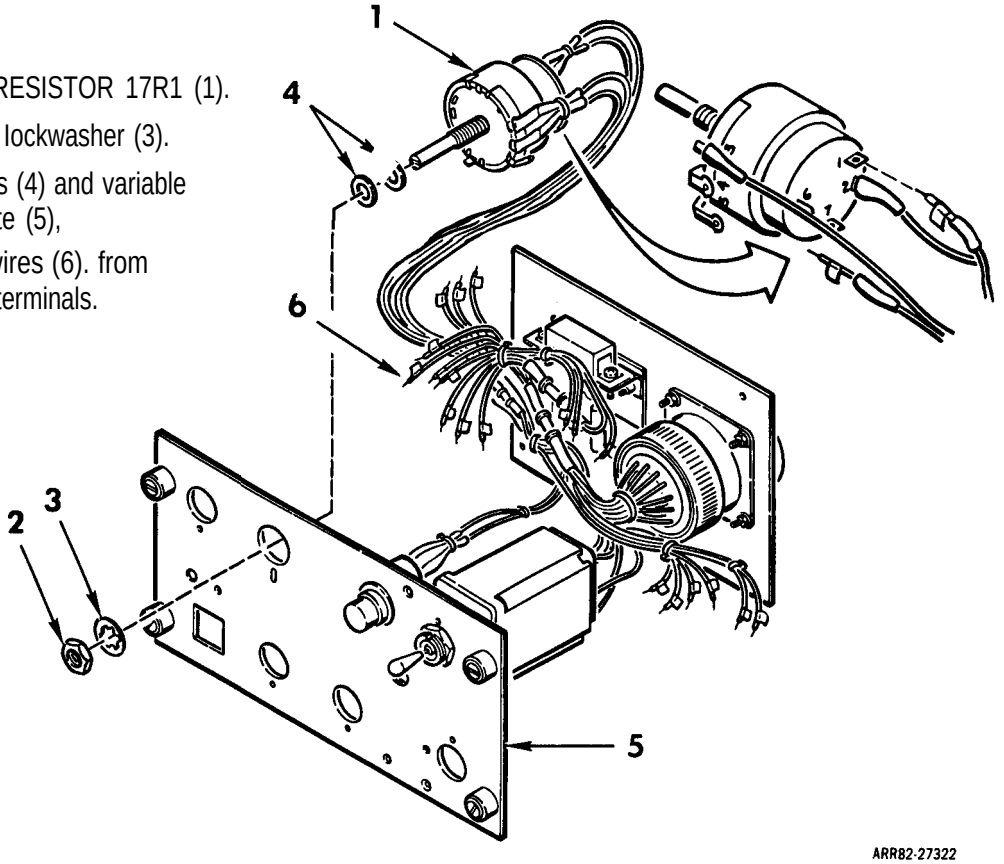
2-62. REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011952) (cont)

REMOVE VARIABLE RESISTOR 17R1 (1).

a. Remove nut (2) and lockwasher (3).

b. Remove two washers (4) and variable resistor (1) from plate (5),

c. label and unsolder wires (6). from variable resistor (1) terminals.



ARR82-27322

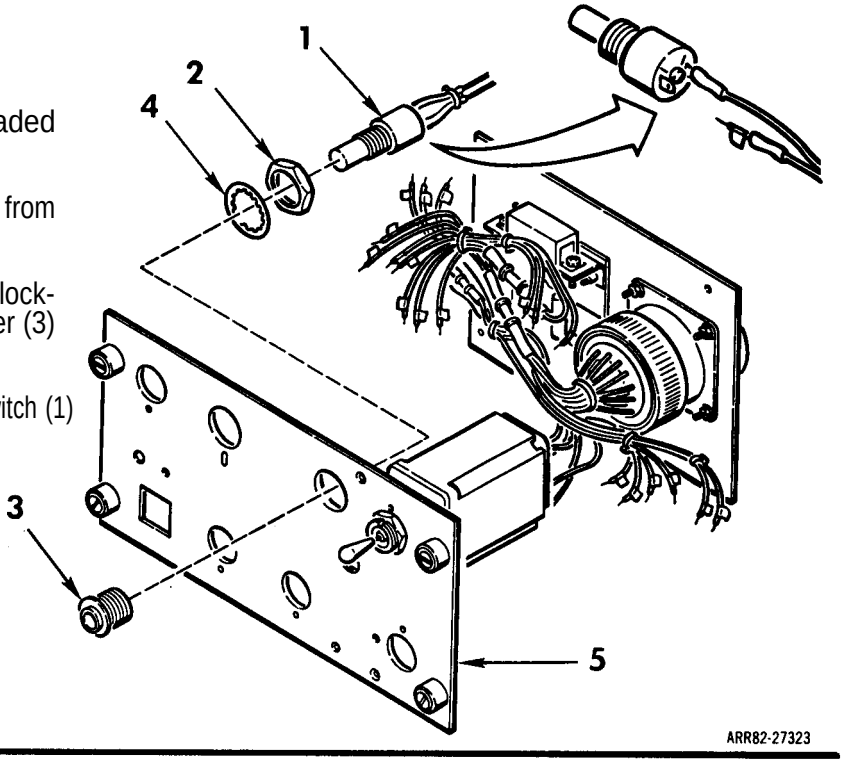
13. REMOVE TEST SWITCH 17S1 (1).

a. Unscrew nut (2) from threaded adapter (3).

b. Unscrew threaded adapter (3) from body of switch (1).

c. Seperate switch (1), nut (2), lock-washer (4), and threaded adapter (3) from plate (5).

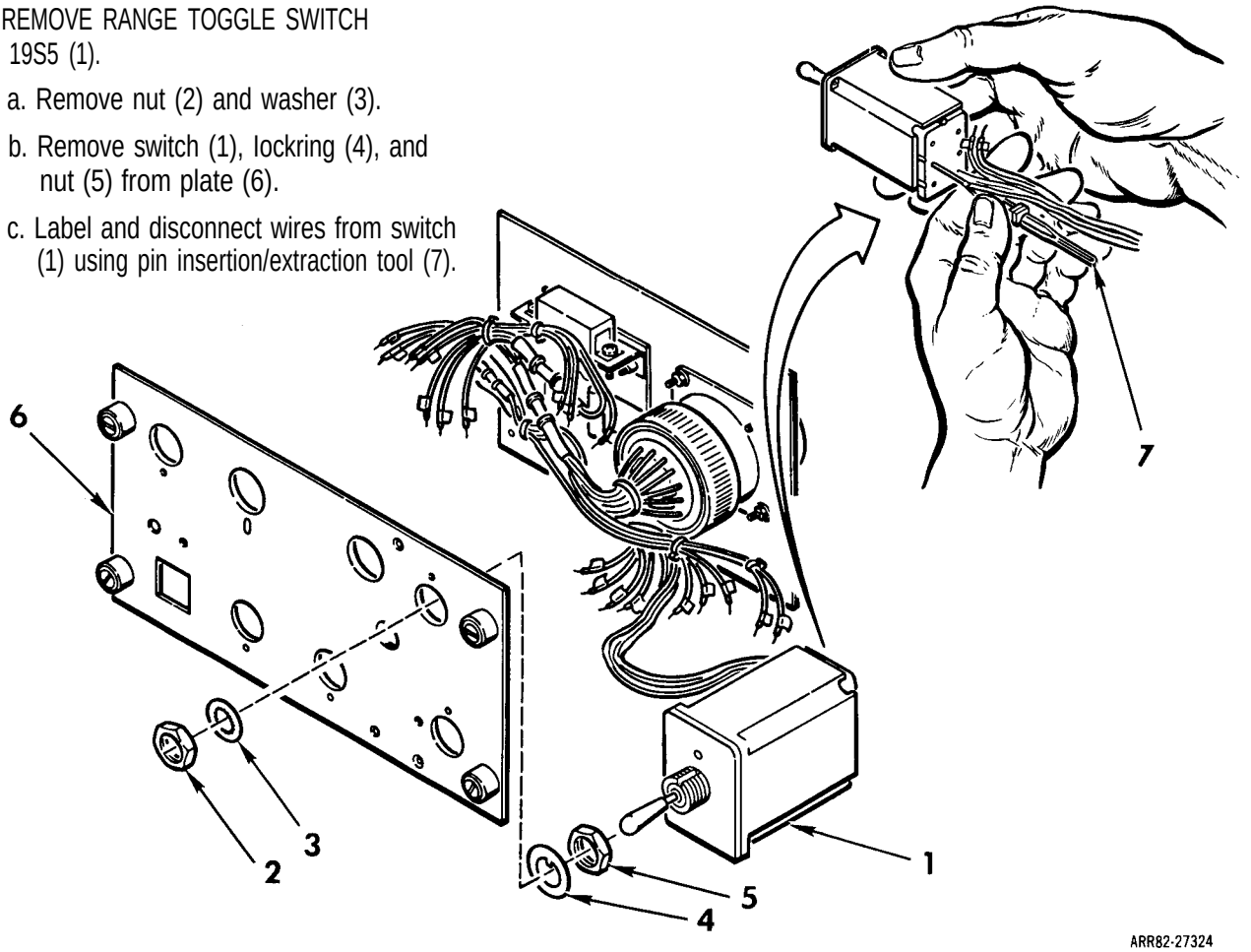
d. Label and unsolder wires from switch (1) terminals.



ARR82-27323

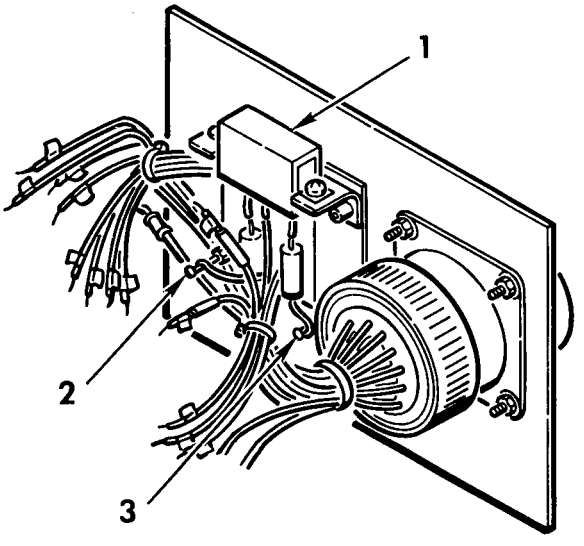
DISASSEMBLY (cont)

14. REMOVE RANGE TOGGLE SWITCH 19S5 (1).
    a. Remove nut (2) and washer (3).
    b. Remove switch (1), lockring (4), and nut (5) from plate (6).
    c. Label and disconnect wires from switch (1) using pin insertion/extraction tool (7).



ARR82-27324

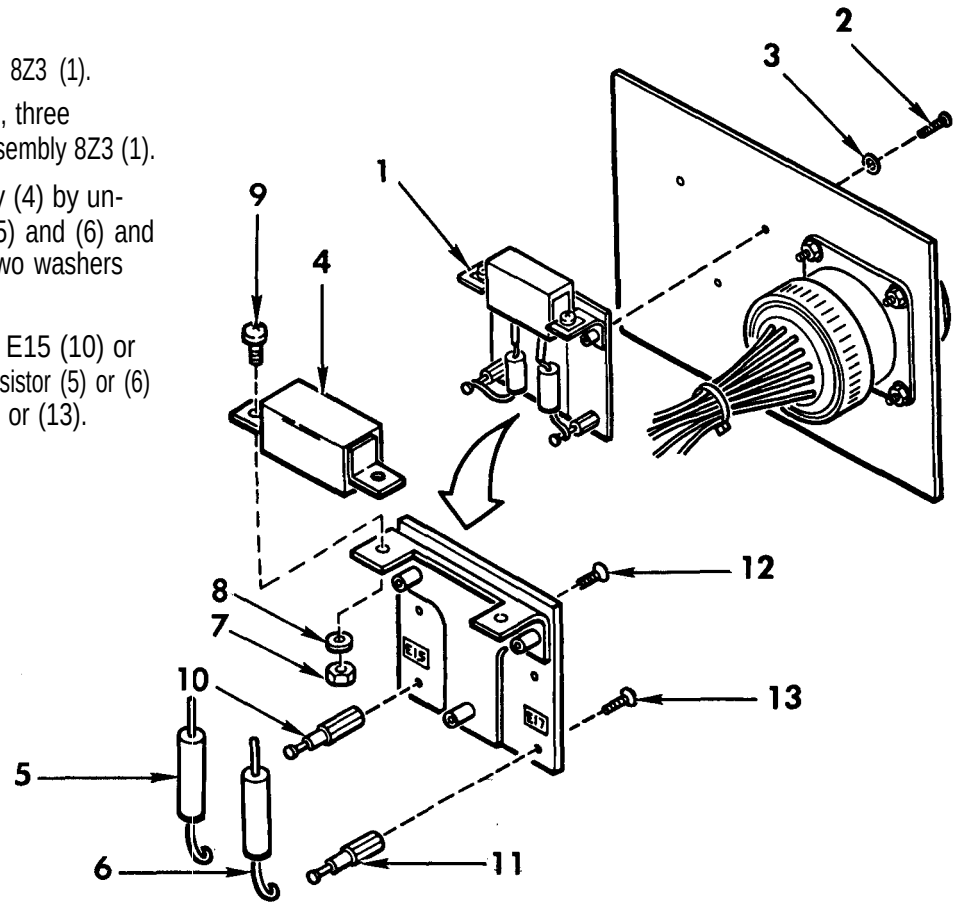
15. DISCONNECT WIRING FROM RELAY ASSEMBLY 8Z3 (1).
    a. Label and unsolder wires from relay (1).
    b. Label and unsolder wires from studs E15 (2) and E17 (3).



ARR82-27325

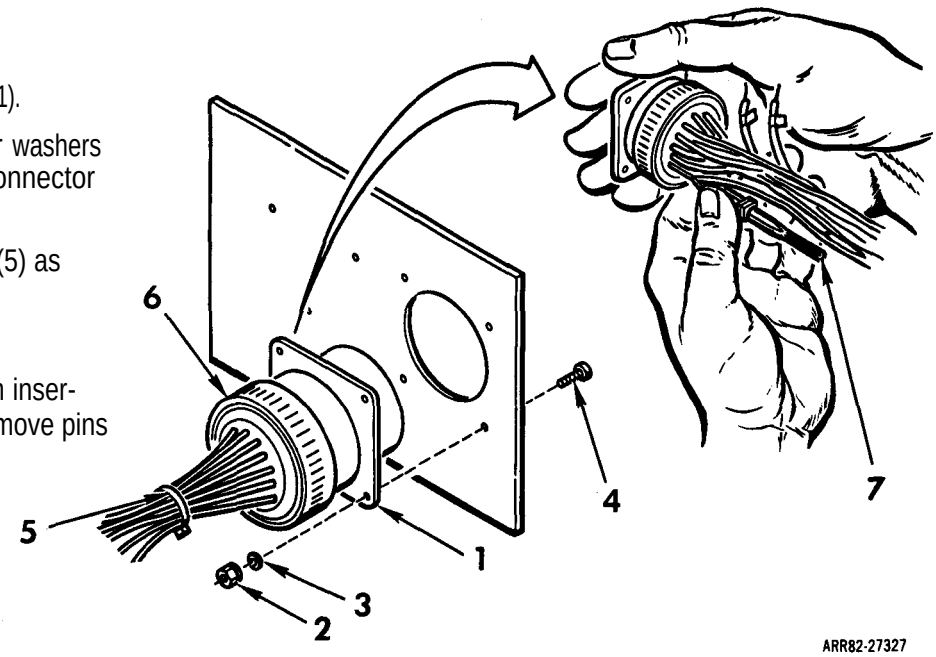
2-62. REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011952) (cont)

16. REMOVE RELAY ASSEMBLY 8Z3 (1).
    a. Remove three screws (2), three washers (3), and relay assembly 8Z3 (1).
    b. If required, replace relay (4) by unsoldering two resistors (5) and (6) and removing two nuts (7), two washers (8), and two screws (9).
    c. If required, replace stud E15 (10) or E17 (11) by unsoldering resistor (5) or (6) and removing screw (12) or (13).



ARR82-27326

17. REMOVE CONNECTOR A2J1 (1).
    a. Remove four nuts (2), four washers (3), four screws (4), and connector (1).
    b. Cut cable tiedown straps (5) as required.
    c. Unscrew cable clamp (6).
    d. Label wires and, using pin insertion/extraction tool (7), remove pins from connector (1).



ARR82-27327

CLEANING

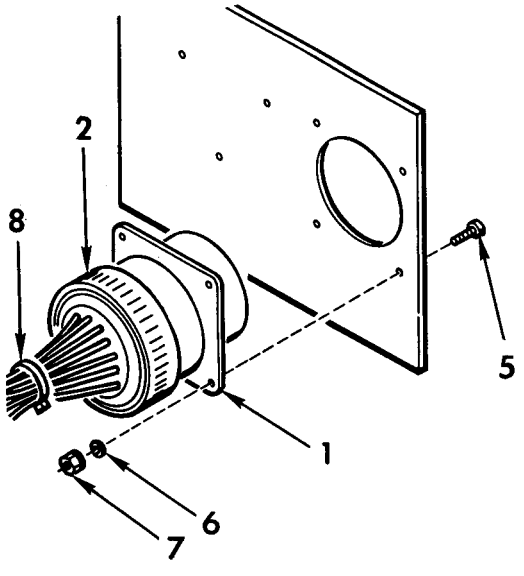
18. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV.

INSPECTION

19. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV.

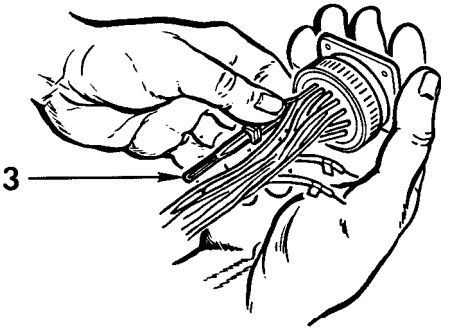
ASSEMBLY

20. INSTALL CONNECTOR A2J1 (1).
    a. Make certain that cable clamp (2) is over ends of unconnected wire bundle.
    b. Remove labels and, using pin insertion/extraction tool (3), connect pins to connector (1).
    c. Install connector (1) on panel (4) with four screws (5), four washers (6), and four screws (7).
    d. Screw cable clamp (2) onto connector (1).
    e. Install cable tiedown straps (8) as required.



NOTE

Use multimeter to identify wires prior to connecting them.



CONNECTOR A2J1 PIN	CONNECTS TO:	CONNECTOR A2J1 PIN	CONNECTS TO:
A	19S12-2	V	GND STUD
	19DS5A-NO	X	19S13-2
	19DS5B-NO	Y	19S13-11
	8Z3-X2	Z	E3
B	17S1-2	a	19S13-1
	19S5-5	b	19S13-10
D	19DS5B-NC	c	19S13-4
E	21S6-2	d	17S1-1
F	21S6-3	e	17S2-2 (RTCL)
G	19DS5A-NC	f	17R1-3 (RTCL)
		j	19S4-2
J	21S6-1	k	19S4-3
K	19S13-12	m	19S5-1
L	19S12-4	n	19S5-4
M	19S12-5	r	19S12-1
T	8J104	s	8Z3-X1

ARP82 27329

2-62. REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011952) (cont)

21. INSTALL RELAY ASSEMBLY 8Z3 (1).

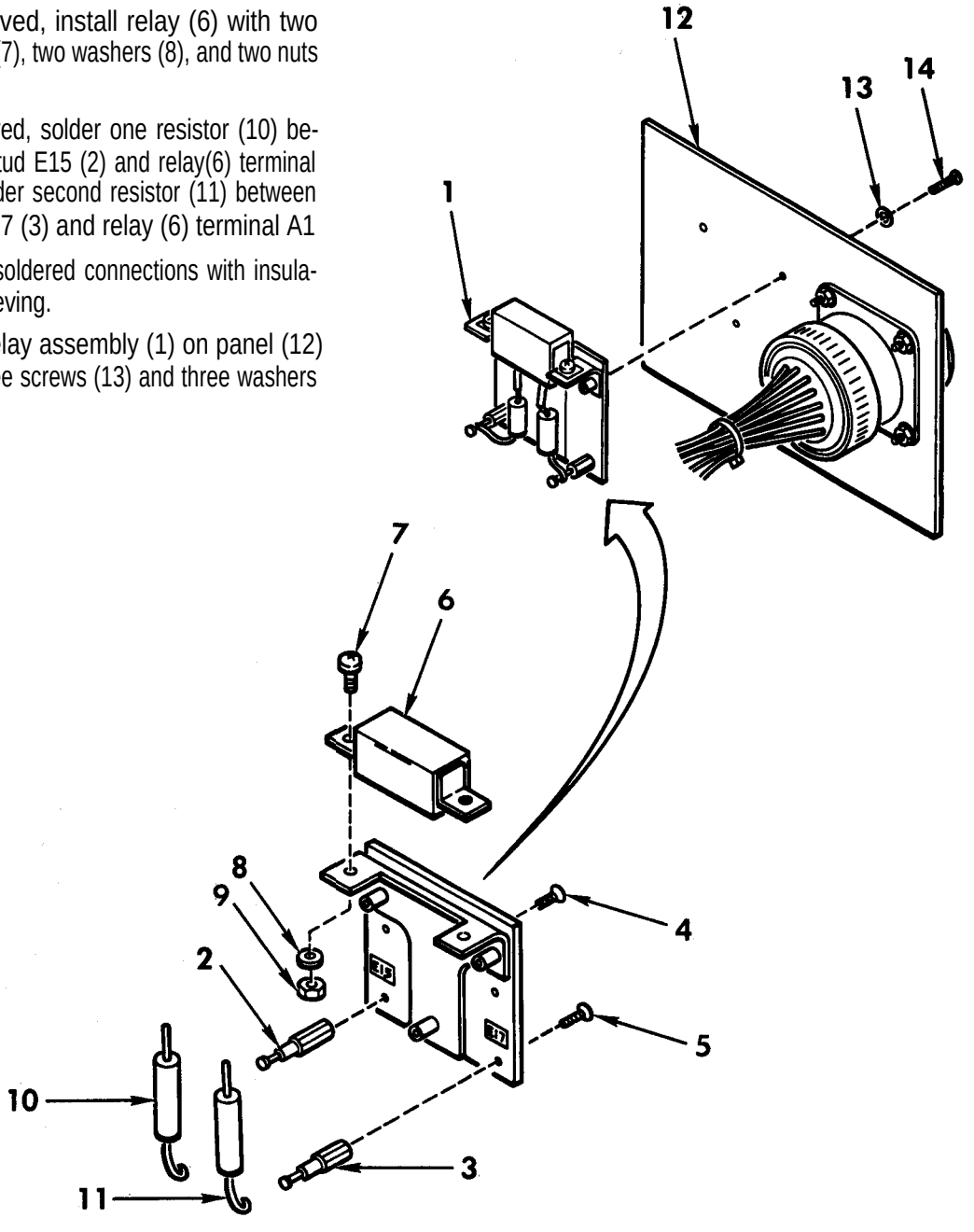
a. If removed, install studs E15 (2) or E17 (3) with screw (4) or (5).

b. If removed, install relay (6) with two screws (7), two washers (8), and two nuts (9).

c. If removed, solder one resistor (10) between stud E15 (2) and relay(6) terminal B1. Solder second resistor (11) between stud E17 (3) and relay (6) terminal A1

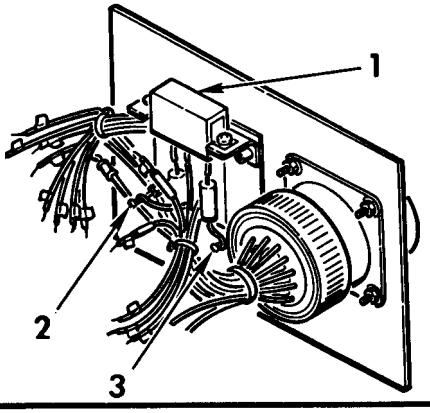
d. Protect soldered connections with insulation sleeving.

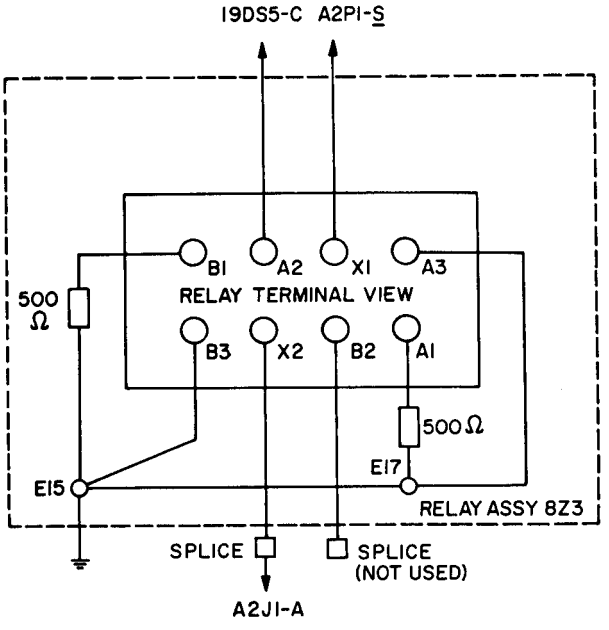
e. Install relay assembly (1) on panel (12) with three screws (13) and three washers (14).



ASSEMBLY (cont)

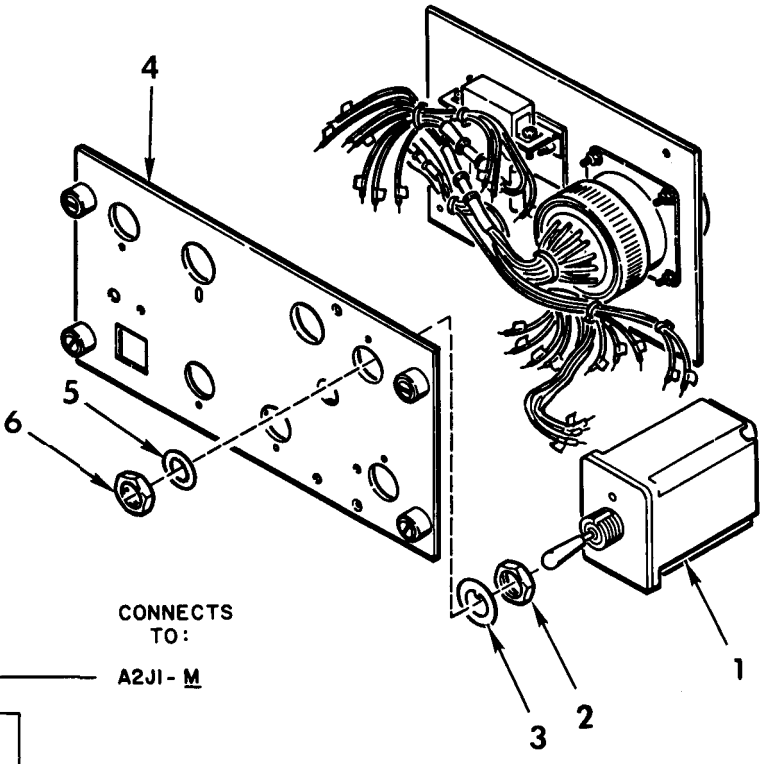
22. CONNECT WIRING TO RELAY 8Z3 (1).
    a. Remove labels and solder wires to relay (1) terminals and to studs E15 (2) and E17 (3).
    b. Protect soldered connections with insulation sleeving.

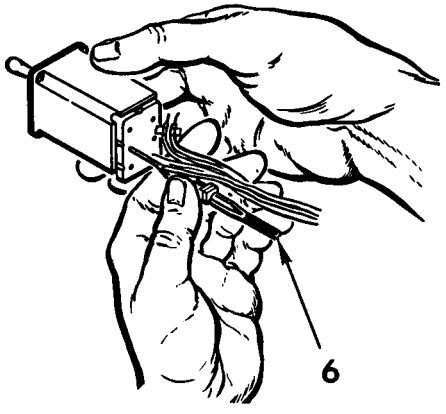


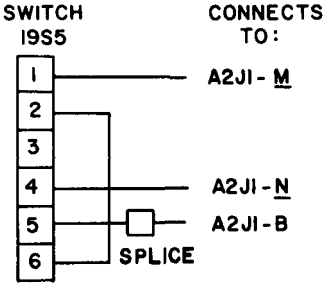


ARR82-27331

23. INSTALL RANGE TOGGLE SWITCH 19S5 (1).
    a. Install switch (l), nut (2), and lockring (3) on plate (4).
    b. Secure switch (1) to plate(4) with washer (5) and nut (6).
    c. Remove labels and, using pin insertion/extraction tool (7), connect wires to switch (1) terminals.







NOTE

Use multimeter to identify wires prior to connecting them.

2-62. REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011952) (cont)

24. INSTALL TEST SWITCH 17S1 (1).

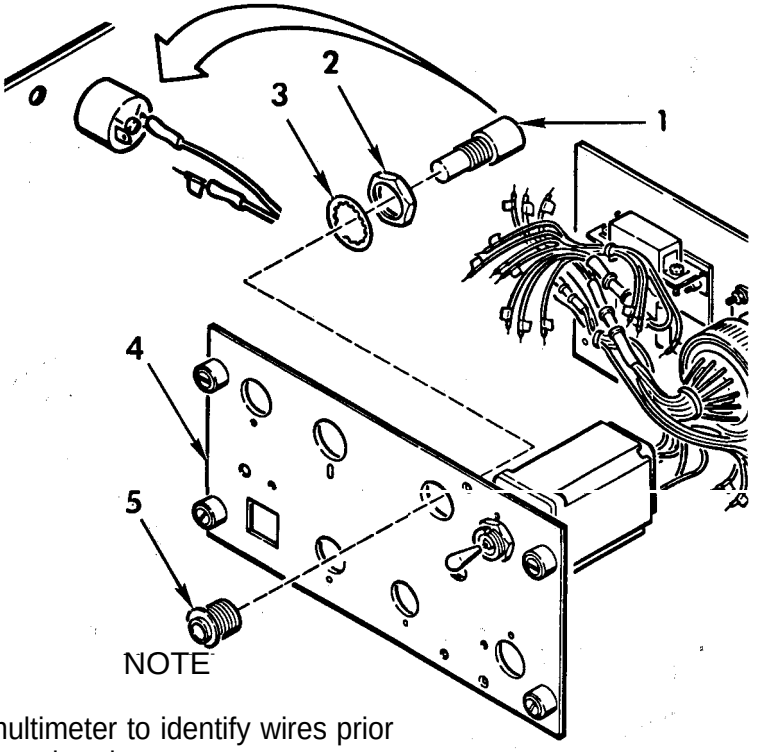
a. Position switch (1), nut (2), and lockwasher (3) in place on plate (4).

b. Screw threaded adapter (5) onto body of switch (1).

c. Screw nut (2) onto threaded adapter (5) to secure switch (1) to plate (4).

d. Remove labels and solder wires to switch terminals

e. Protect soldered connections with insulation sleeving.



NOTE

Use multimeter to identify wires prior to connecting them.

ARR82-27333

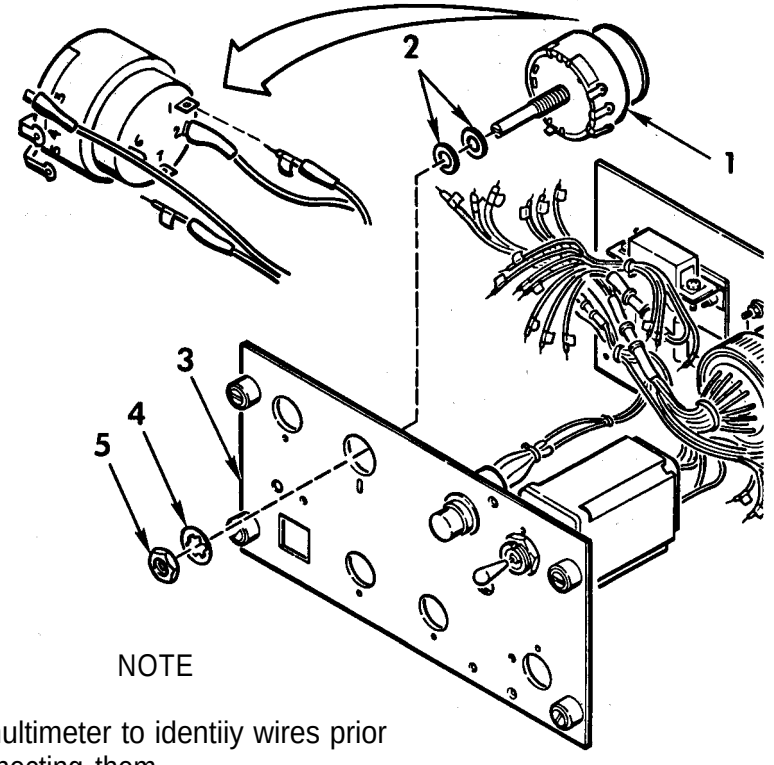
.25. INSTALL VARIABLE RESISTOR 17R1 (1),

a. Position variable resistor (1) and two washers (2) in place on plate (3).

b. Secure variable resistor (1) to plate (3) with lockwasher (4) and nut (5).

c. Remove labels and solder wires to variable resistor (1) terminals.

d. Protect soldered connections with insulation sleeving.



NOTE

Use multimeter to identiiy wires prior to connecting them.

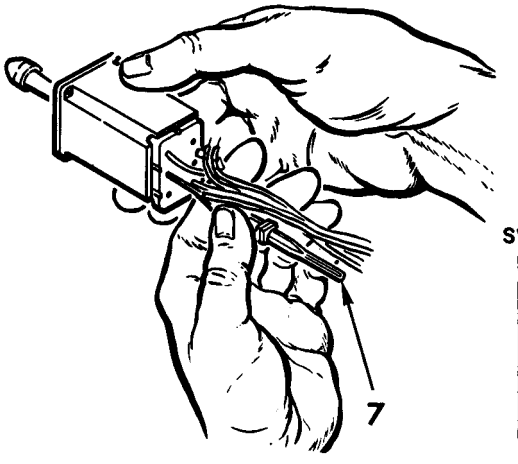
ARR82-27334

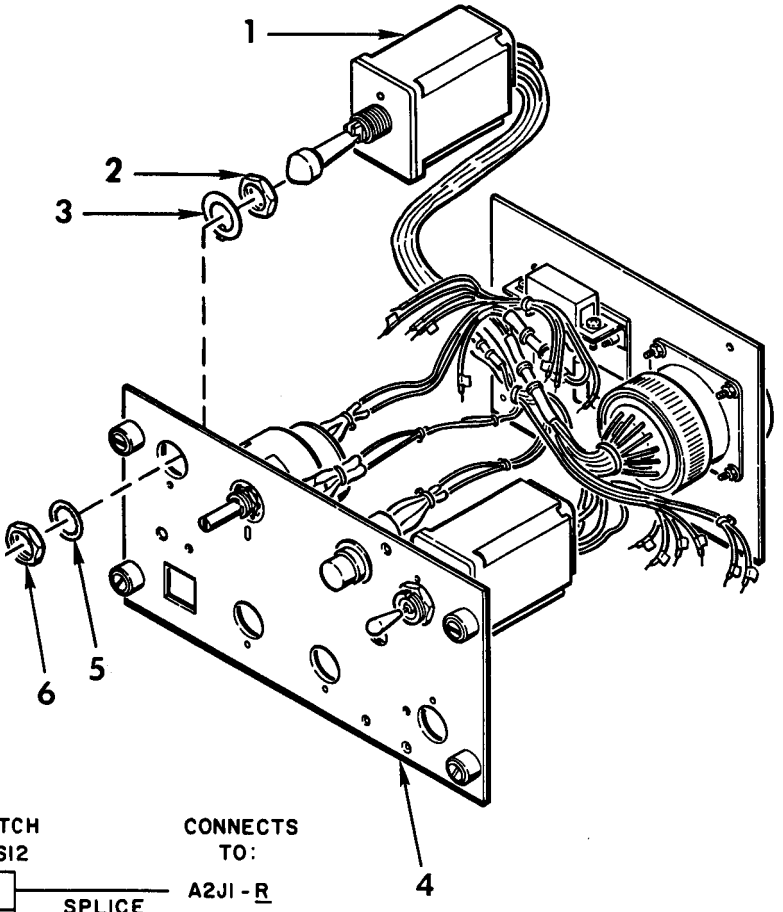
ASSEMBLY (cont)

26. INSTALL MASTER ARM TOGGLE SWITCH 19S12 (1).
    a. Position switch (1), nut (2), and lockring (3) in place on plate (4).
    b. Secure switch (1) to plate (4) with washer (5) and nut (6).
    c. Remove labels and, using pin insertion/extraction tool (7), connect wires to switch (1) terminals.

NOTE

Use multimeter to identify wires prior to connecting them.





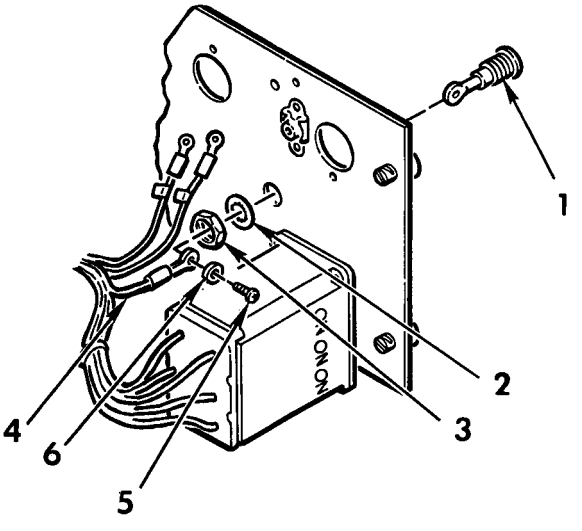
SWITCH 19S12		CONNECTS TO:
1	SPLICE	A2J1 - R
2		A2J1 - A
4		A2J1 - L
5		A2J1 - M

ARR82-27328

27. INSTALL CONNECTOR 8J104 (1).
    a. Install connector 8J104 (1), lockwasher (2), and nut (3).
    b. Remove label and connect wire (4) to connector (1) terminal with screw (5) and washer (6).

NOTE

Use multimeter to identify wires prior to connecting them.



ARR82-27335

2-62. REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011952) (cont)

28. INSTALL THREE STUD TERMINALS (1, 2, AND 3) AND TWO DIODES (4) AND (5).

Install stud terminal El (1) with screws (6), lockwasher (7), and lockwasher (8).

Install stud terminals E2 (2) and E3 (3) by repeating step a.

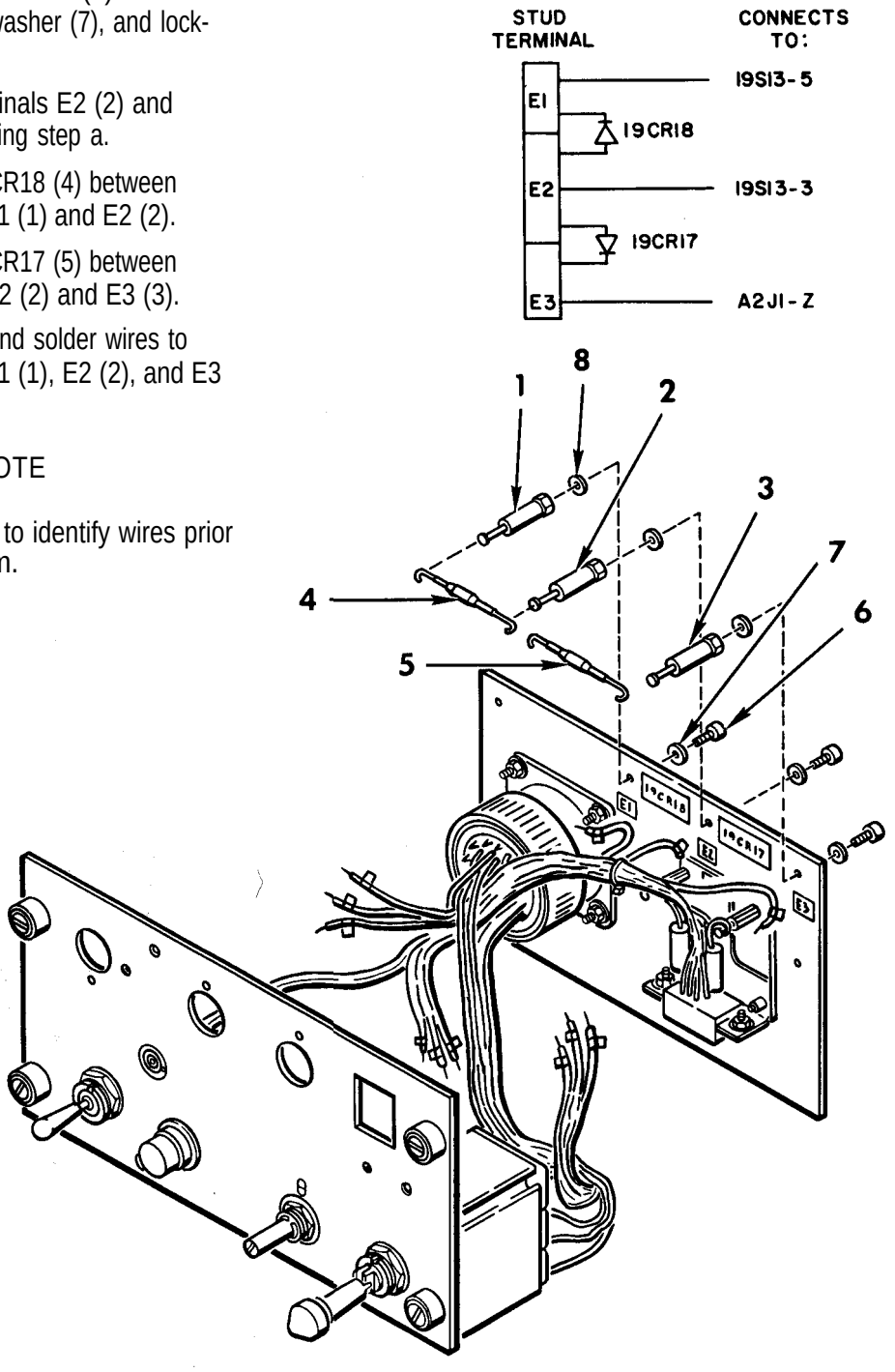
Solder diode 19CR18 (4) between stud terminals E1 (1) and E2 (2).

Solder diode 19CR17 (5) between stud terminals E2 (2) and E3 (3).

Remove labels and solder wires to stud terminals E1 (1), E2 (2), and E3 (3),

NOTE

Use multimeter to identify wires prior to connecting them.



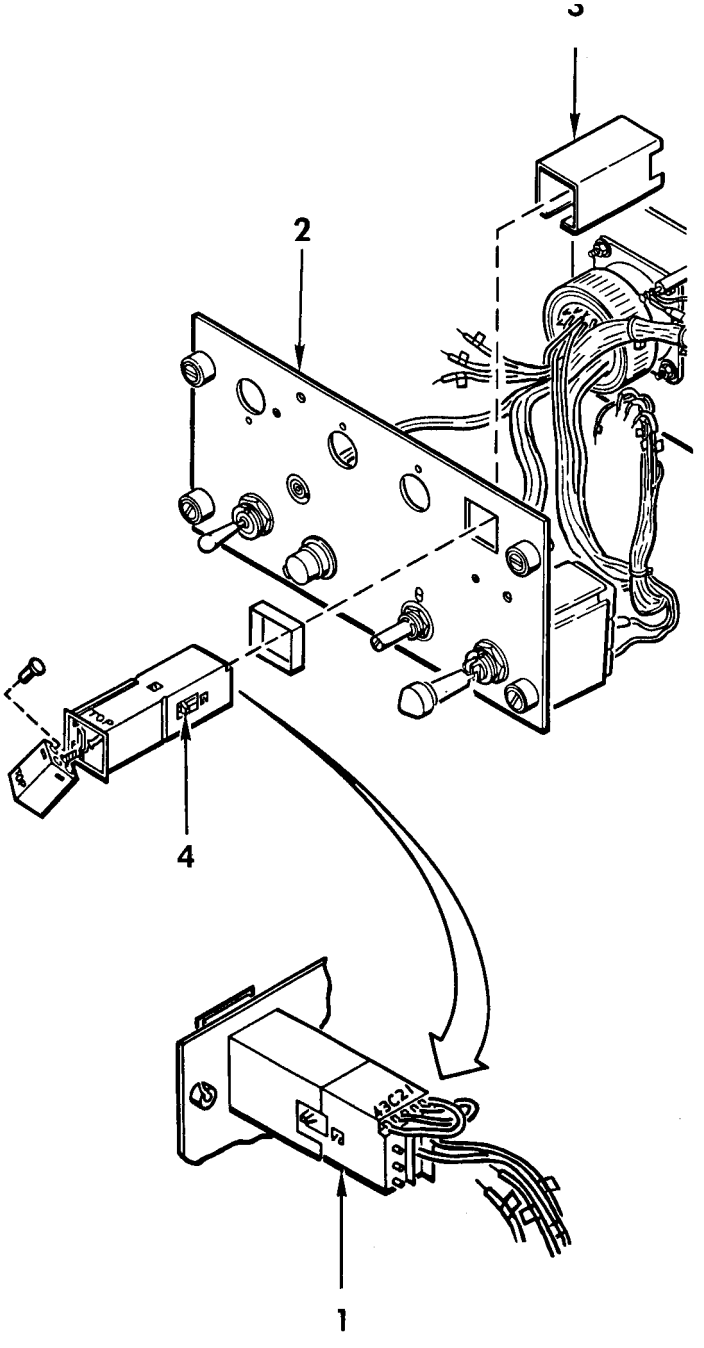
ARR82-27336

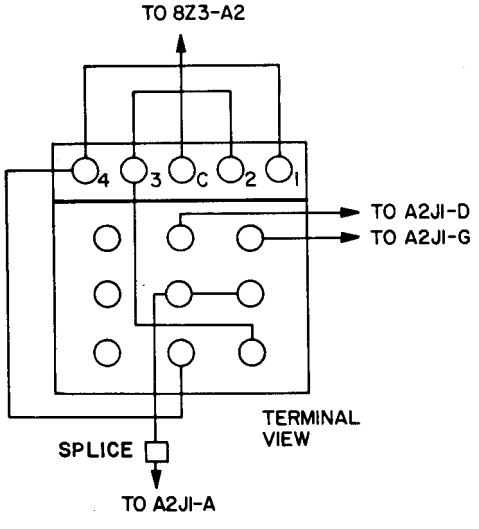
ASSEMBLY (cont)

29. INSTALL PUSH SWITCH 19DS5 (1).
    a. Slide switch (1) body through front of plate (2) and metal housing (3).
    b. Engage locking tabs (4) on side of switch (1) body so that switch is secured firmly to plate (2).
    c. Remove labels and solder wires to switch (1) terminals.
    d. Protect soldered connections with insulation sleeving.

NOTE

Use multimeter to identify wires prior to connecting them.





ARR82-27337

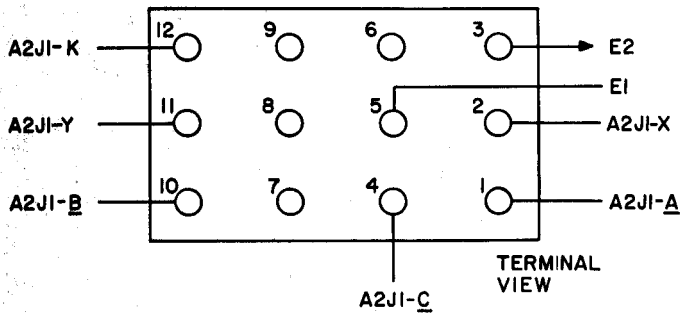
2-62. REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011952) (cont)

30. INSTALL WPN CONT TOGGLE SWITCH 19S13 (1).

a. Position switch (1), nut (2), and lockring (3) in place on plate (4).

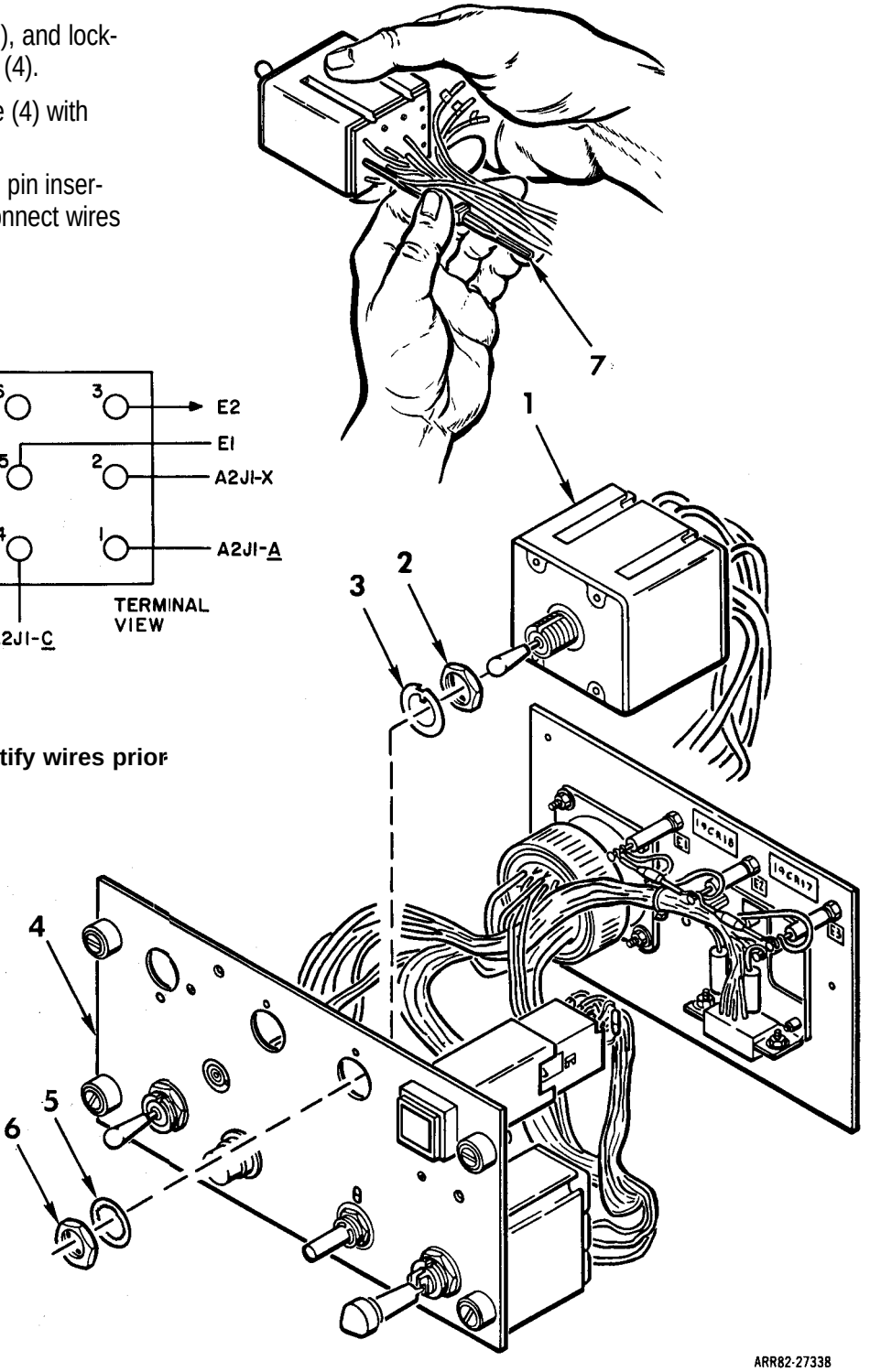
b. Secure switch (1) to plate (4) with washer (5) and nut (6).

c. Remove labels and, using pin insertion/extraction tool (7), connect wires to switch (1) terminals.



NOTE

Use multimeter to identify wires prior to connecting them.



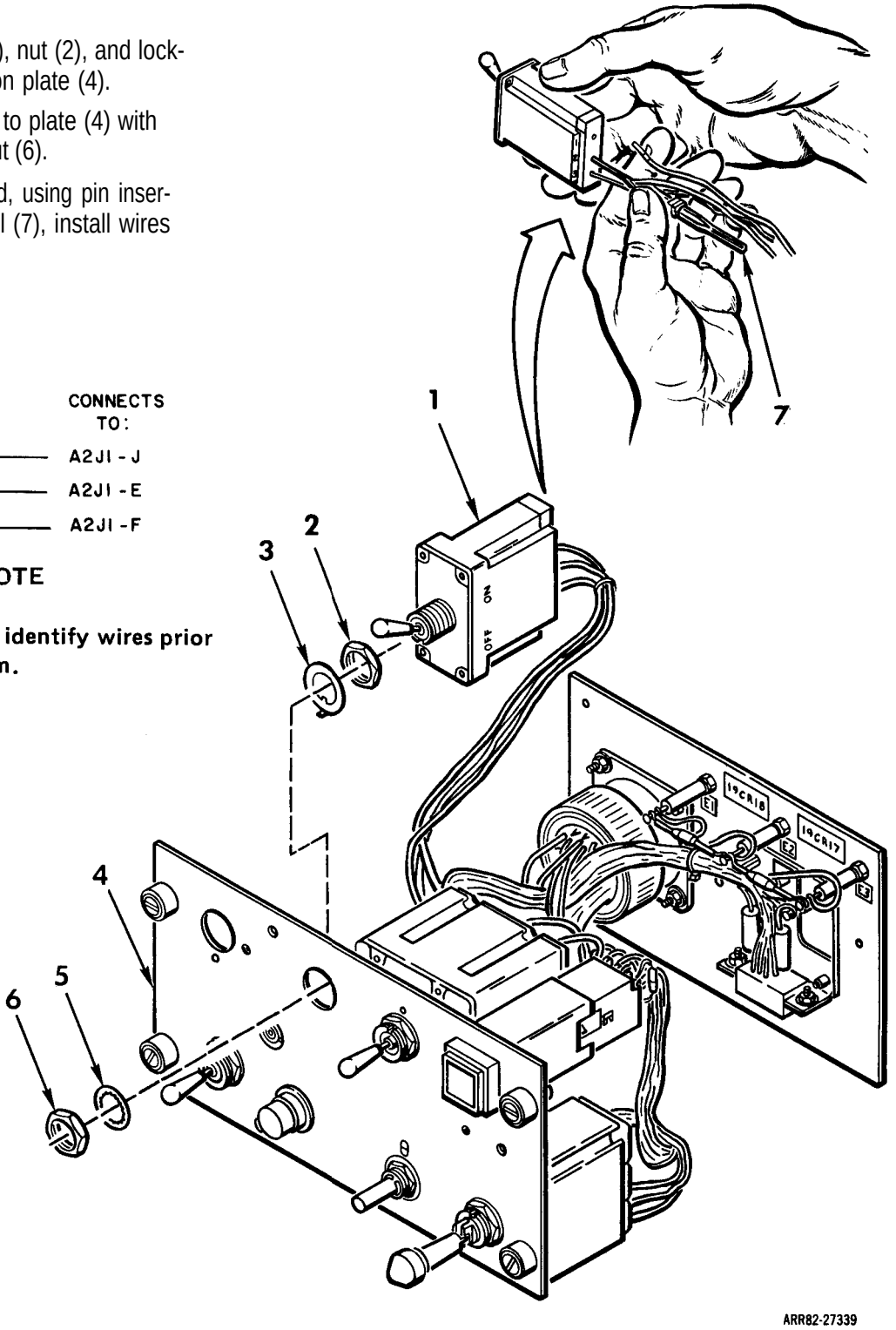
ASSEMBLY (cont)

31. INSTALL WING STORE TOGGLE SWITCH 21S6 (1).
    a. Position switch (1), nut (2), and lockring (3) in place on plate (4).
    b. Secure switch (1) to plate (4) with washer (5) and nut (6).
    c. Remove labels and, using pin insertion/extraction tool (7), install wires in switch (1).

21S6 TERM	CONNECTS TO:
1	A2J1 - J
2	A2J1 - E
3	A2J1 - F

NOTE

Use multimeter to identify wires prior to connecting them.



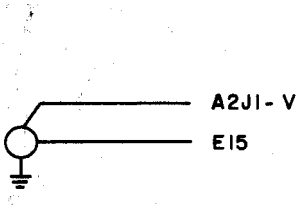
2-62. REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011952) (cont)

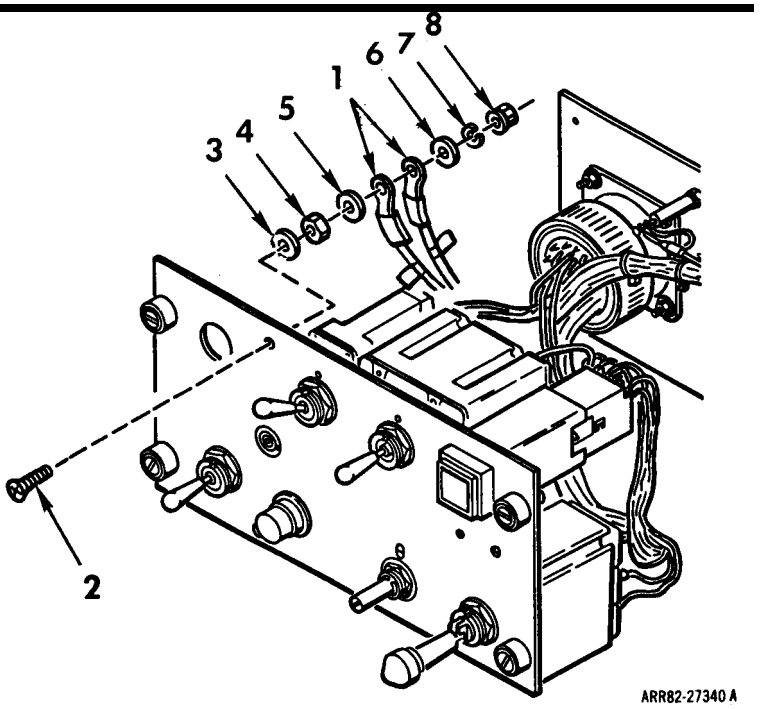
32. CONNECT TWO GROUND WIRES (1).

a. Install screw (2), washer (3), nut (4), and washer (5).

b. Remove labels and place two wires (1) on screw (2).

c. Secure wires (1) with washer (6), lockwasher (7), and nut (8).





33. INSTALL RECOIL TOGGLE SWITCH 19S4 (1).

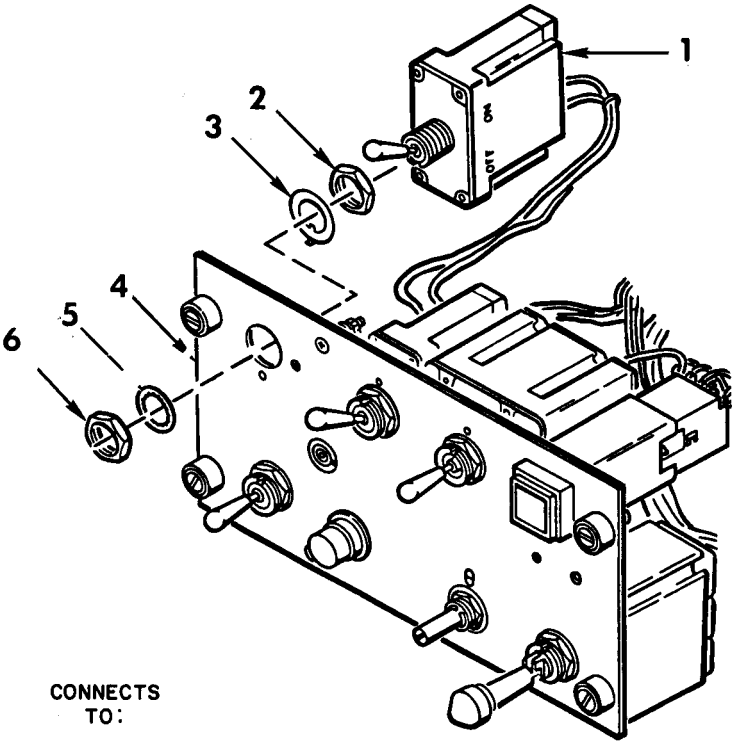
a. Position switch (1), nut (2), and lockring (3) in place on plate (4).

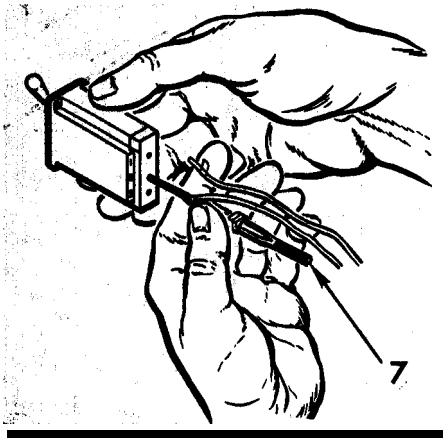
b. Secure switch (1) to plate (4) with washer (5) and nut (6).

c. Remove labels and, using pin insertion/extraction tool (7), install wires in switch (1).

NOTE

Use multimeter to identify wires prior to connecting them.





19S4 TERM.	CONNECTS TO:
1	
2	A2J1-J
3	A2J1-K

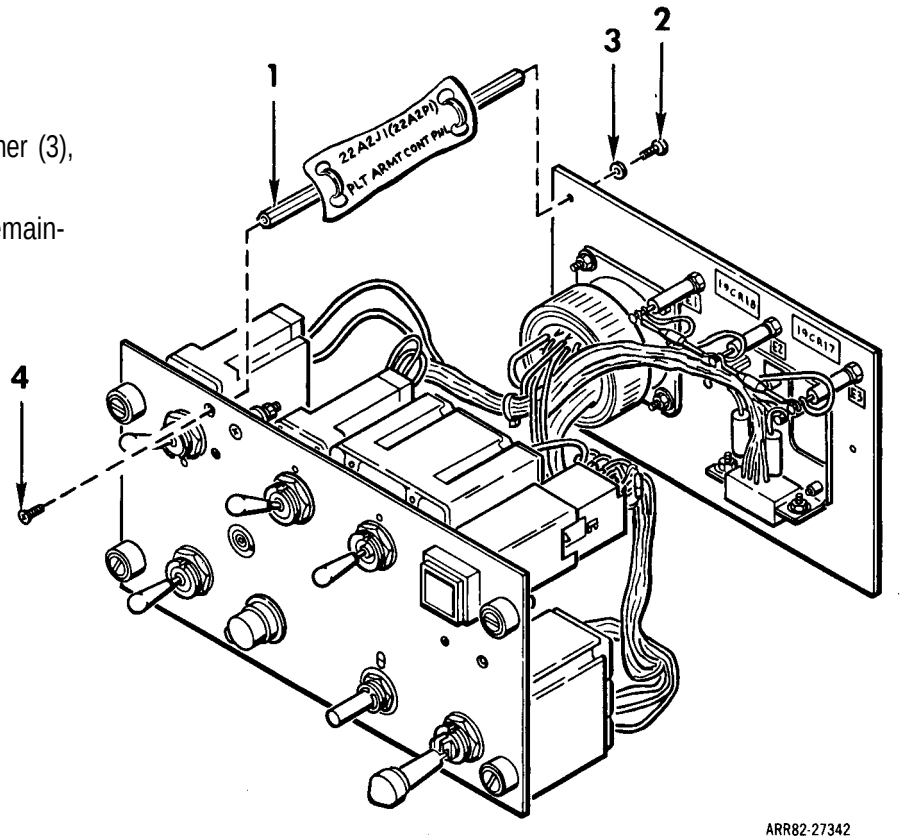
ARR82-27341

ASSEMBLY (cont)

34. INSTALL THREE POSTS (1).

a. Install post (1), screw (2), washer (3), and screw (4).

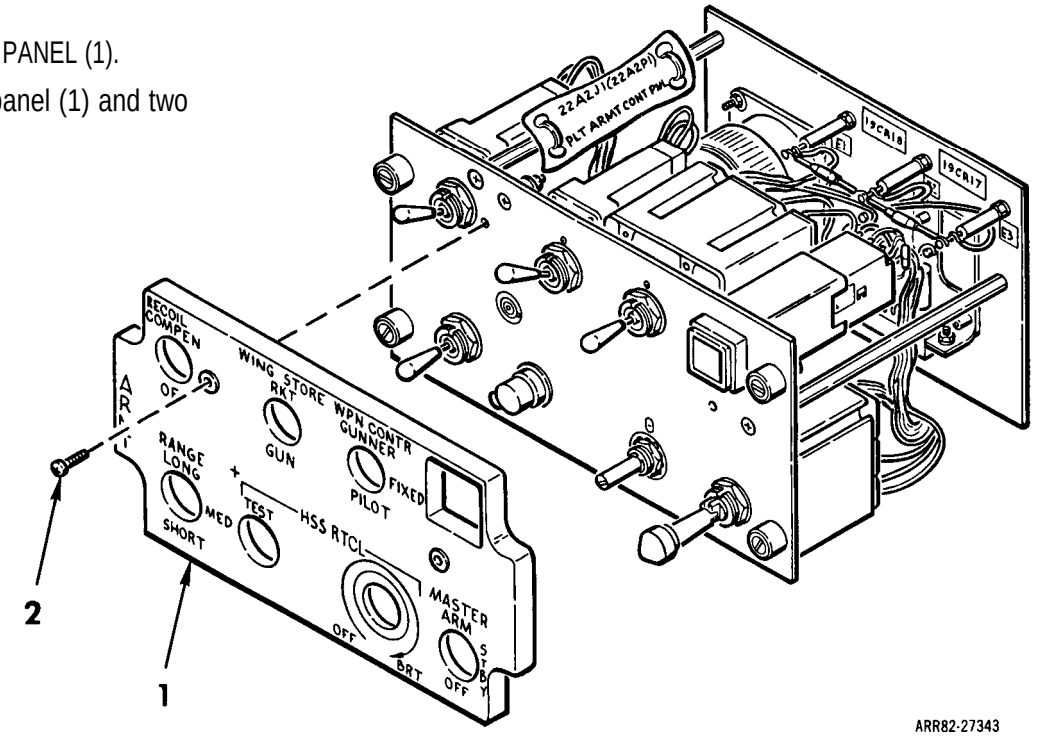
b. Repeat step a to install two remaining posts (1).



ARR82-27342

35. INSTALL INDICATOR PANEL (1).

Install indicator panel (1) and two screws (2).



ARR82-27343

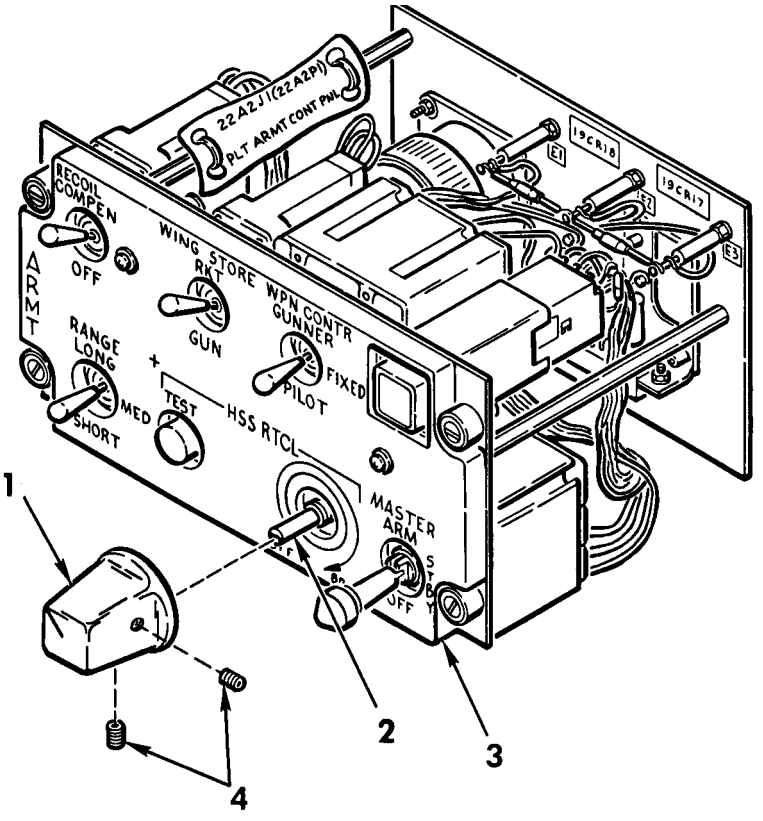
2-62. REPAIR OF PILOT ARMAMENT CONTROL PANEL (12011952) (cont)

36. INSTALL KNOB (1)

a. Rotate shaft (2) to fully OFF position.

b. Place knob (1) on shaft (2) and aline index mark on knob (1) to OFF placard on panel (3).

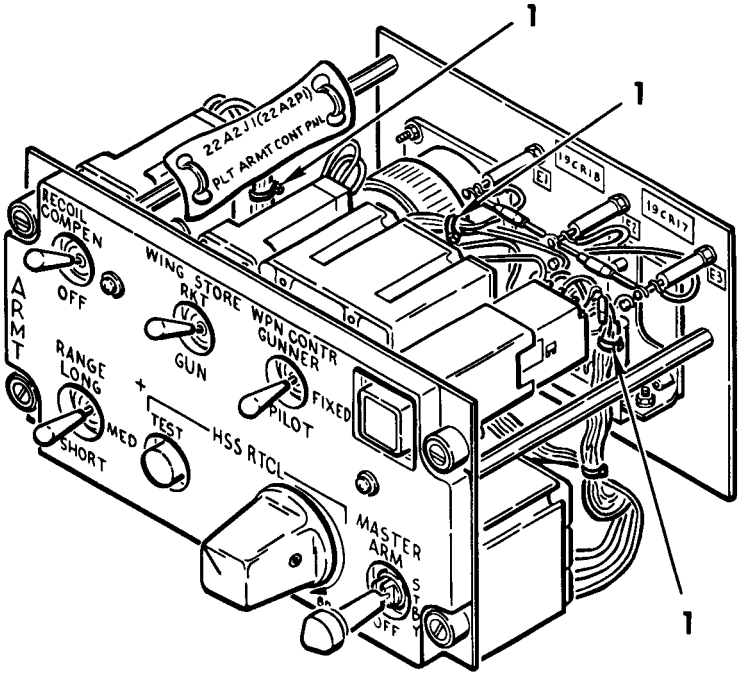
c. Secure knob (1) to shaft (2) by tightiening two setscrews (4).



ARR82-27344

37. INSTALL CABLE TIEDOWN STRAPS (1).

Upon completion of reassembly, form wiring into bundles as required and install cable tiedown straps (1).

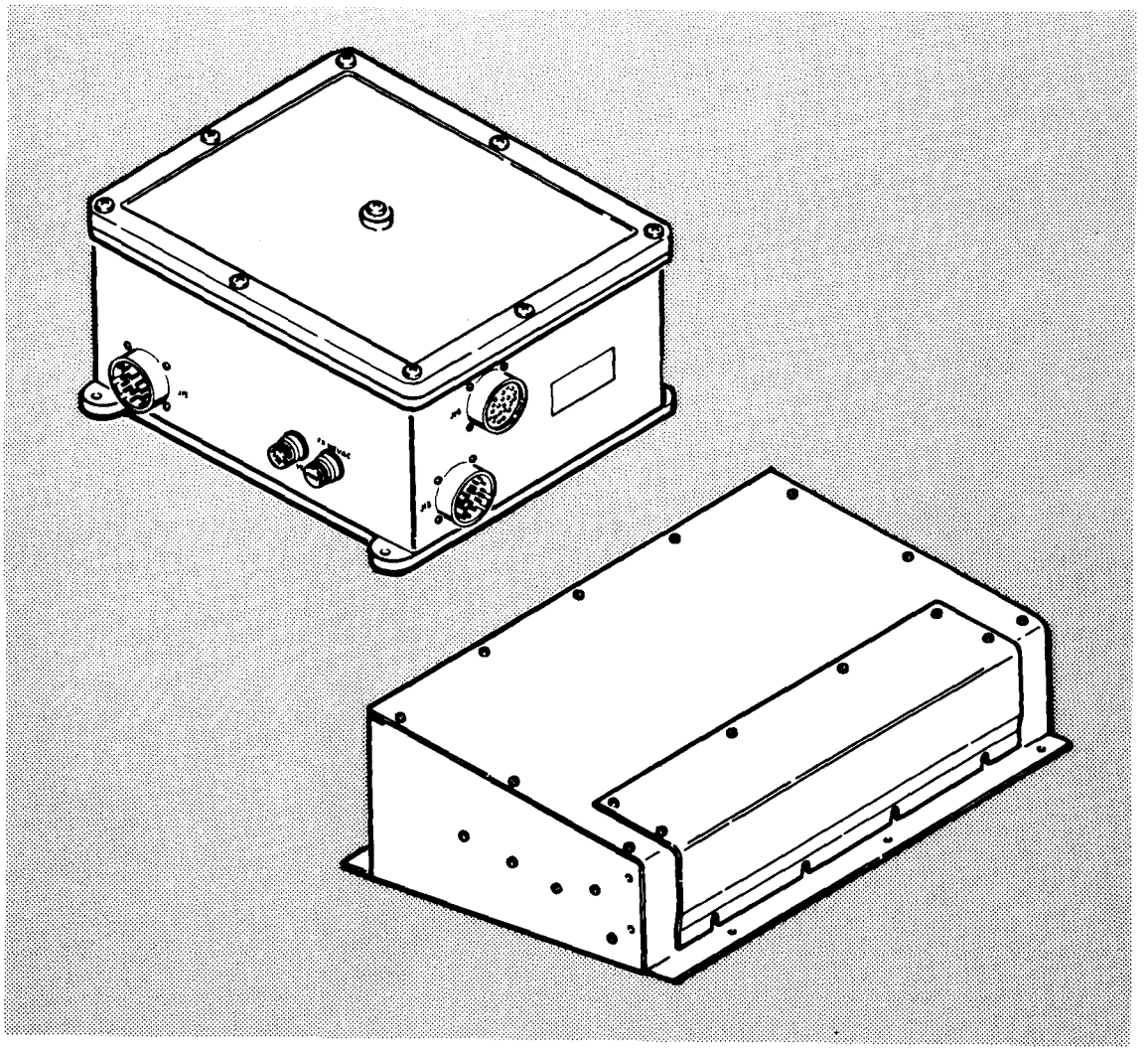


ARR82-27345

END OF TASK

Section XXI. MAINTENANCE OF INTERFACE CONTROL UNIT

Section Contents



ARR83-2070

2-63. REPAIR OF INTERFACE CONTROL UNIT (209-074-110-1)

DESCRIPTION

This task covers: Disassembly, cleaning, inspection, and assembly.

INITIAL SETUP

Tools/Test and Support Equipment:
Tool Set, A/C Armament
Repairman: Basic
Tool Set, A/C Armament
Repairman: Supplemental
CCA Protective Bags
Mul timeter AN/USM-223

Materials/Parts:
Insulating Compound
(Item 13, Appx B)
Sealant (Item 24, Appx B)
Solder (Item 28, Appx B)
Insulation Sleeving (Item 15.1, Appx B)

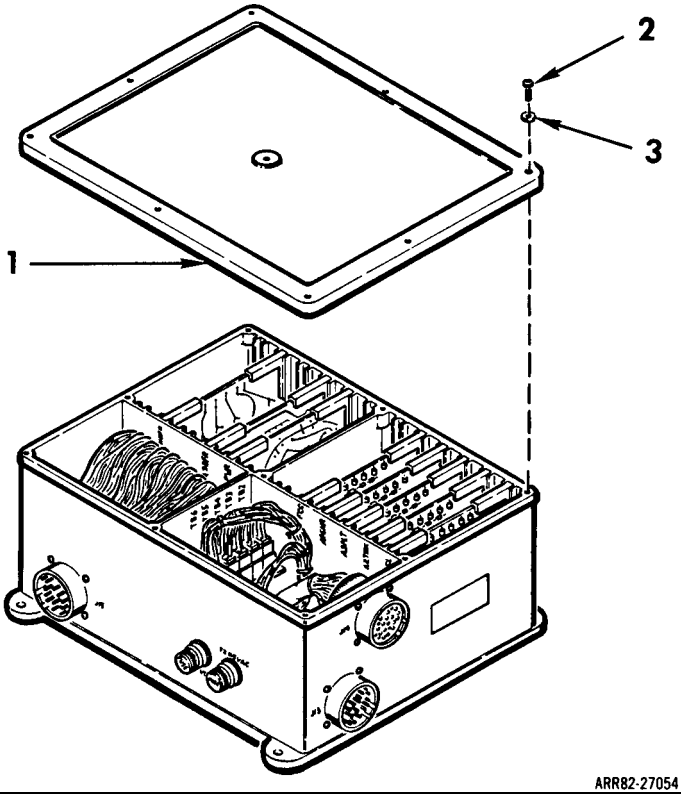
Personnel Required:
68J Aircraft Fire Control
Repairer

Equipment Conditions:
In shop on bench.
No power applied.

DISASSEMBLY

1. REMOVE TOP COVER (1).

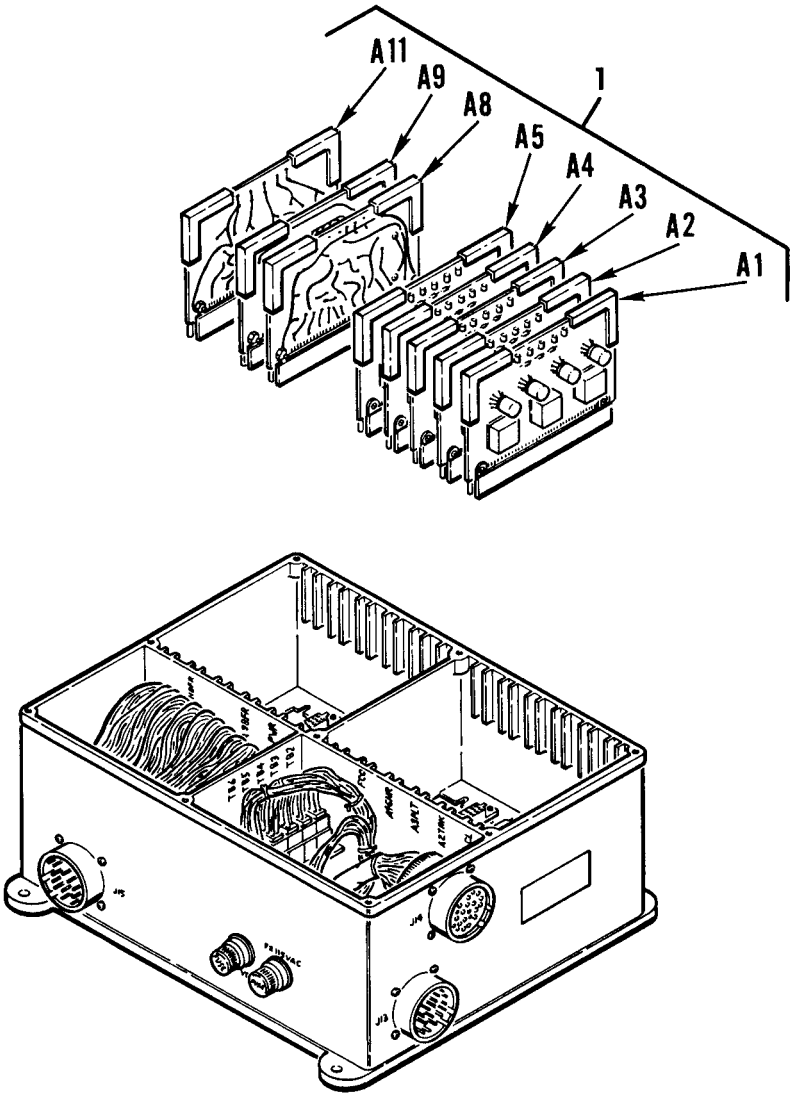
Remove nine screws (2), nine washers (3), and top cover (1).



ARR82-27054

DISASSEMBLY (cont)

2. REMOVE CIRCUIT CARD ASSEMBLIES (1).
   a. Remove eight circuit card assemblies A1 thru A5, A8, A9, and A11 (1).
   b. Place circuit card assemblies in protective bags.

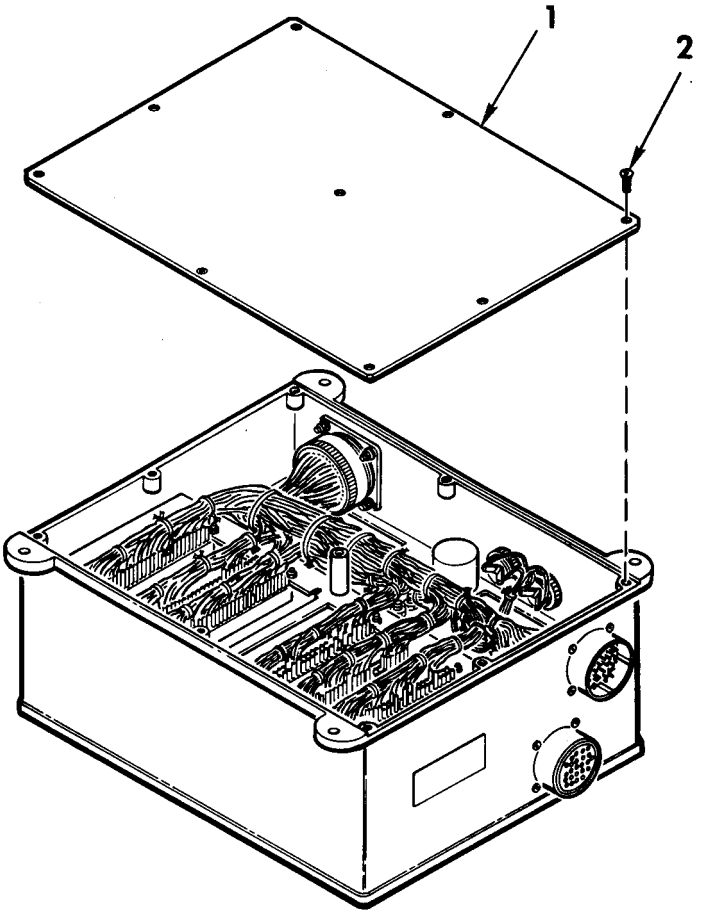


ARR82-27055

2-63. REPAIR OF INTERFACE CONTROL UNIT (209-074-110-1) (cont)

REMOVE BOTTOM COVER (1).

Remove nine screws (2) and bottom cover (1).

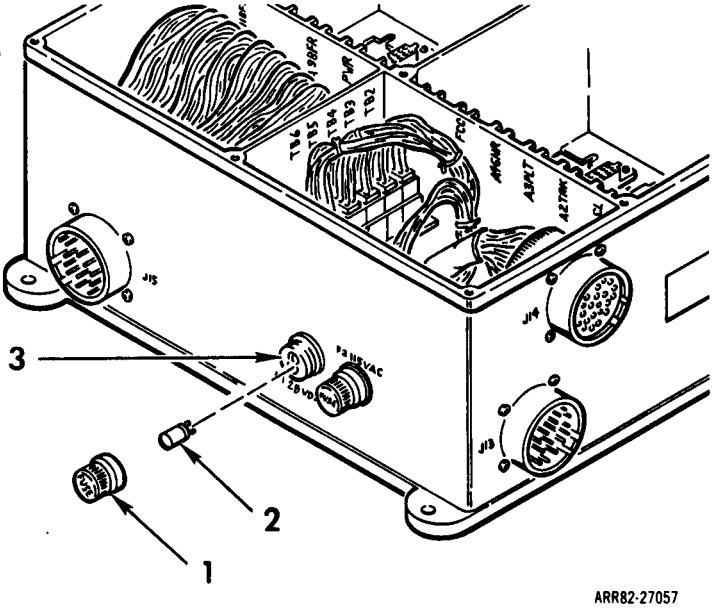


ARR82-27056

4. REMOVE FUSE COVER (1) AND FUSE F1 (2).

a. Remove fuse F1 cover (1) by unscrewing cover from fuseholder (3).

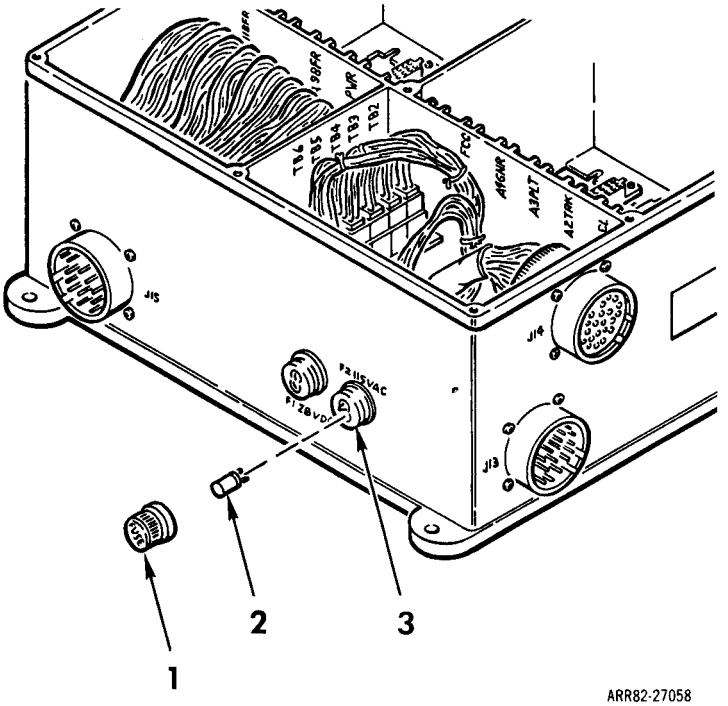
b. Remove fuse F1 (2) by pulling fuse free from fuseholder (3)



ARR82-27057

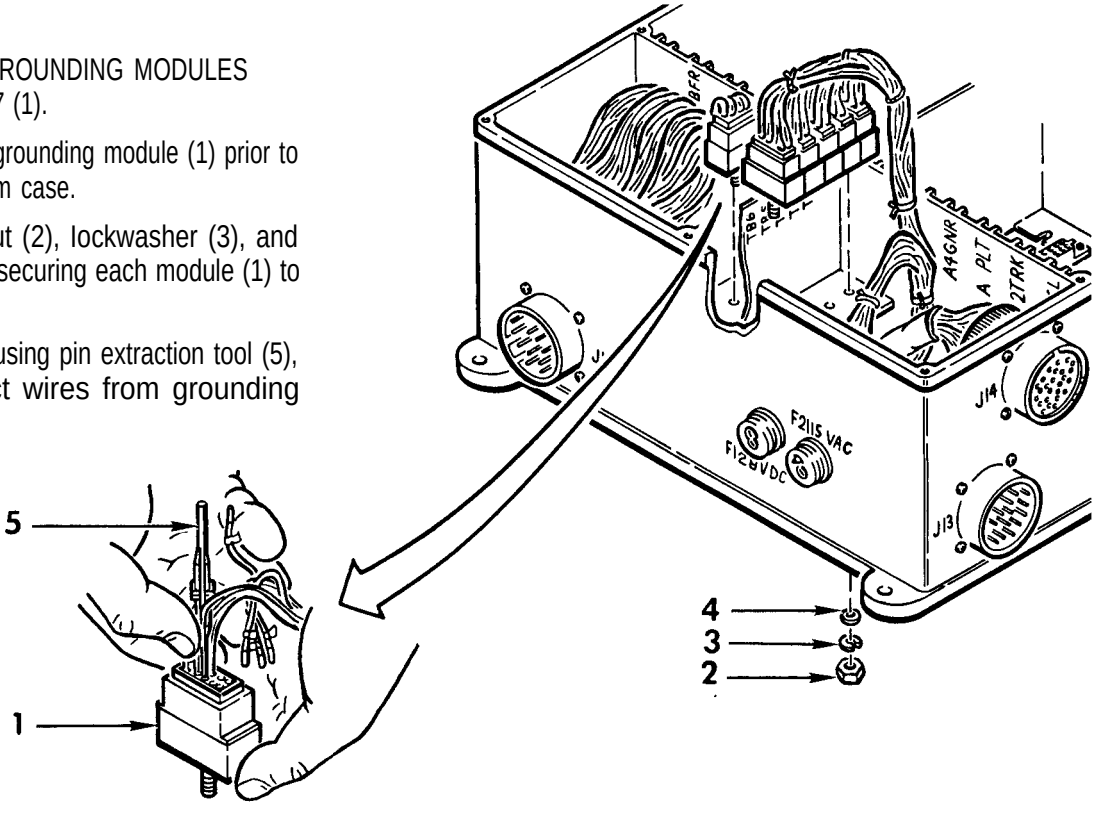
DISASSEMBLY (cont)

5. REMOVE FUSE COVER (1) AND FUSE F2 (2).
   a. Remove fuse F2 cover (1) by unscrewing cover from fuseholder (3).
   b. Remove fuse F2 (2) by pulling fuse free from fuseholder (3).



ARR82-27058

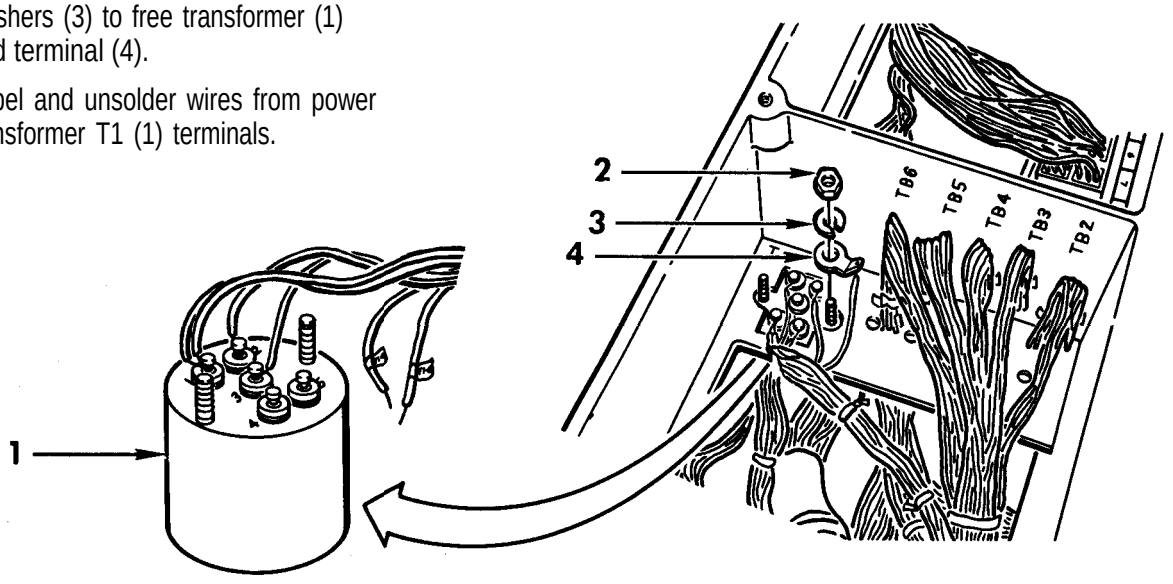
6. REMOVE SIX GROUNDING MODULES TB2 THRU TB7 (1).
   a. Label each grounding module (1) prior to removal from case.
   b. Remove nut (2), lockwasher (3), and washer (4) securing each module (1) to case.
   c. Label and, using pin extraction tool (5), disconnect wires from grounding modules.



ARR82-27059

DISASS REPAIR OF INTERFACE CONTROL UNIT (209-074-110-1) (cont)

7. REMOVE POWER TRANSFORMER T1 (1).
   a. Remove two nuts (2) and two lockwashers (3) to free transformer (1) and terminal (4).
   b. Label and unsolder wires from power transformer T1 (1) terminals.



ARR82-27060

CLEANING

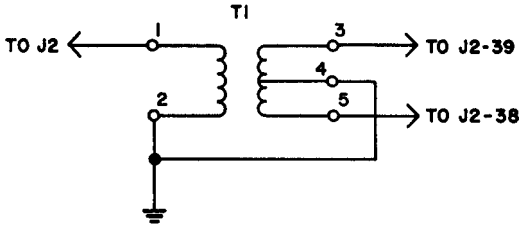
8. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV.

INSPECTION

9. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV.

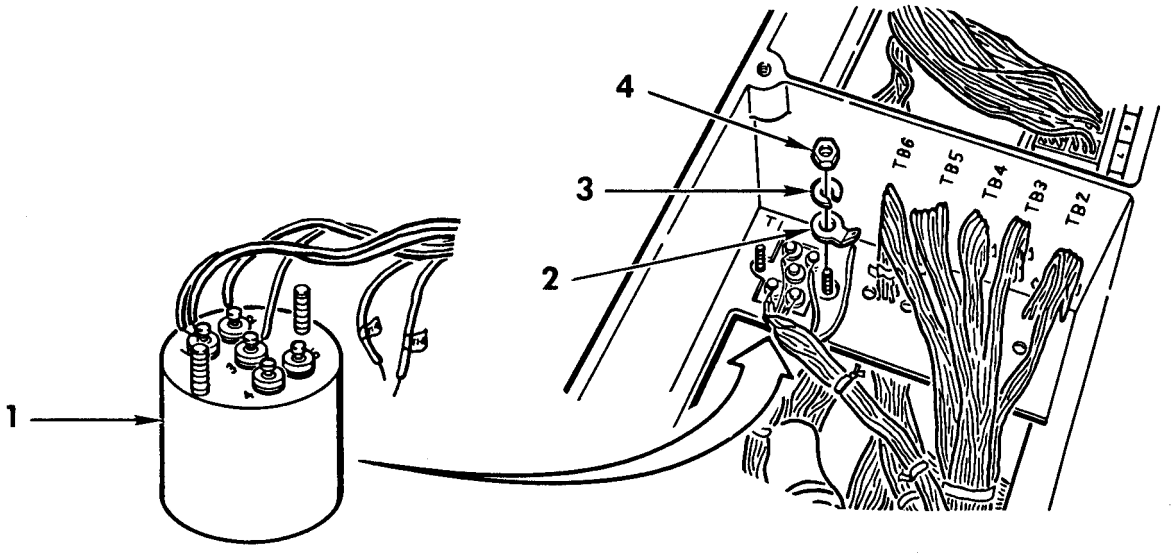
ASSEMBLY

10. INSTALL POWER TRANSFORMER T1 (1).
    a. Solder wires to terminals 1 thru 5 of power transformer T1 (1).
    b. Secure power transformer T1 (1) and terminal (2) to case with two lockwashers (3) and two nuts (4).
    c. Apply insulating compound to soldered connections.
    d. Remove labels from soldered wires.



NOTE

Use multimeter to identify wires prior to connecting them.



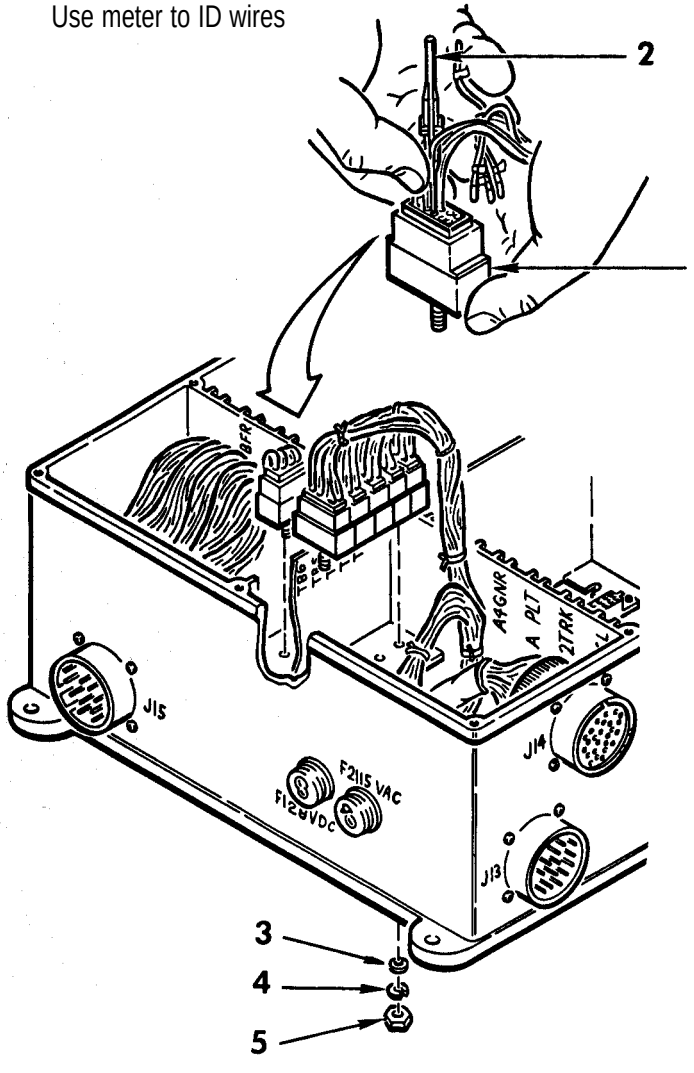
ARR82-27061

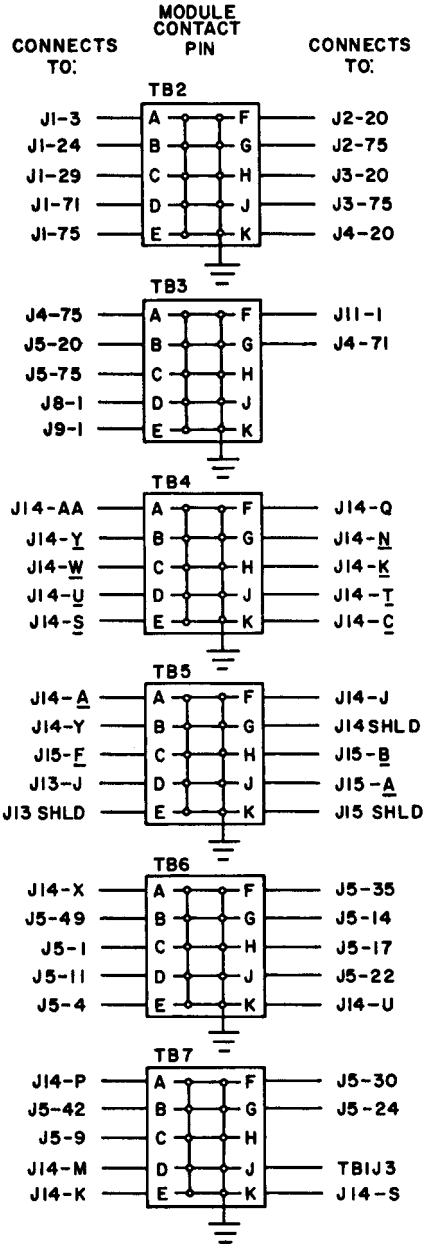
2-63. REPAIR OF INTERFACE CONTROL UNIT (209-074-110-1) (cont)

11. INSTALL SIX GROUNDING MODULES TB2 THRU TB7 (1).
    a. Using pin insertion tool (2), insert contact pins in each grounding module TB 2 thru TB7 (1).
    b. Install each module TB2 thru TB7 (1) in its correct location in case with washer (3), lockwasher (4), and nut (5).
    c. Remove labels from installed modules and connected wires.

NOTE

Use meter to ID wires



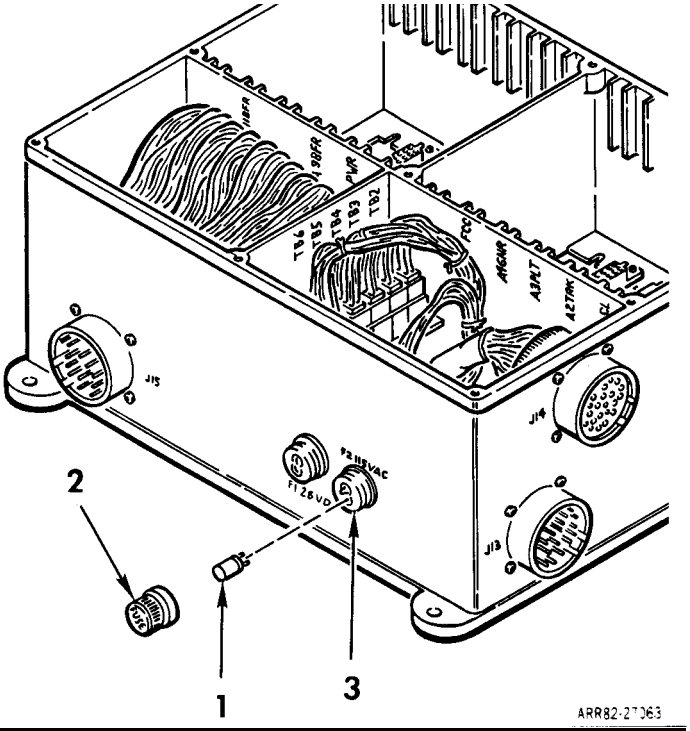


ARR82-27062

ASSEMBLY (cont)

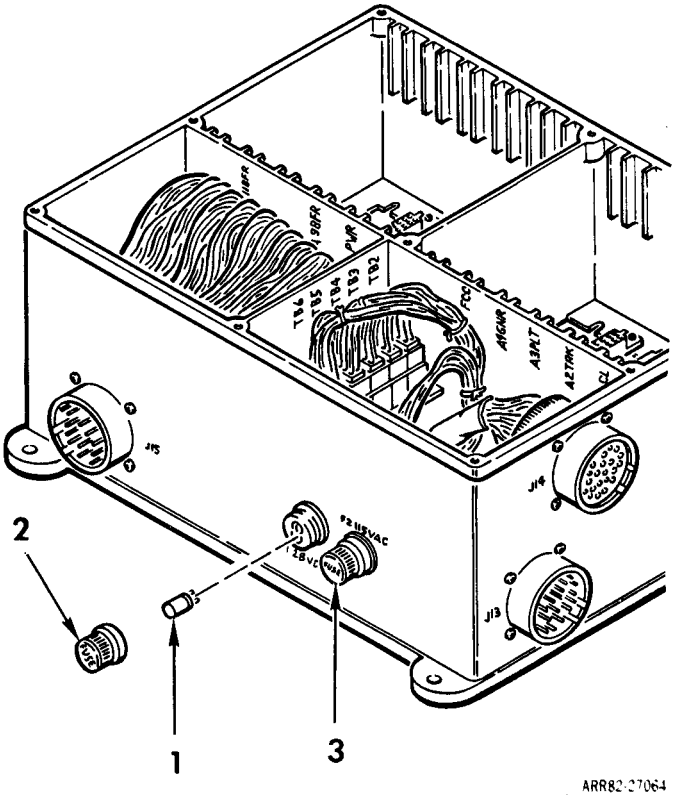
12. INSTALL FUSE F2 (1) AND FUSE COVER (2)

Insert good fuse (1) into fuseholder (3) and screw yellow fuse cover (2) onto fuseholder fingertight.



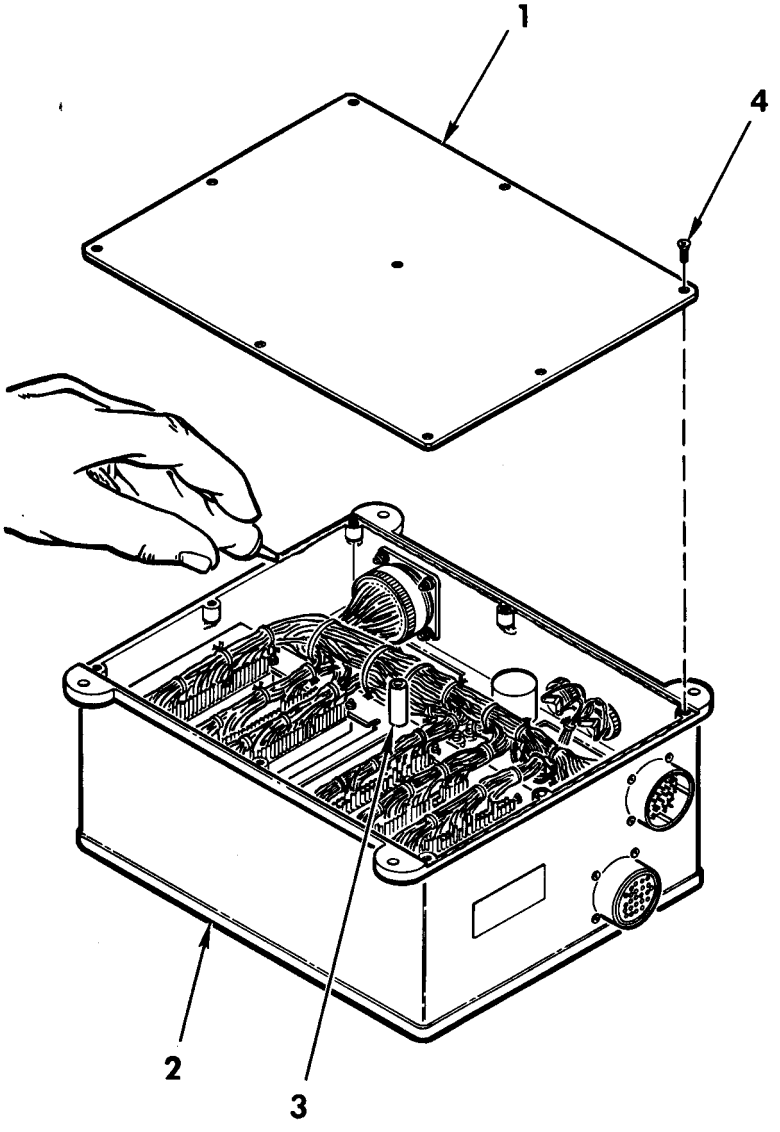
13. INSTALL FUSE F1 (1) AND FUSE COVER (2).

Insert good fuse (1) into fuseholder (3) and screw white fuse cover (2) onto fuseholder fingertight.



2-63. REPAIR OF INTERFACE CONTROL UNIT (209-074-110-1) (cont)

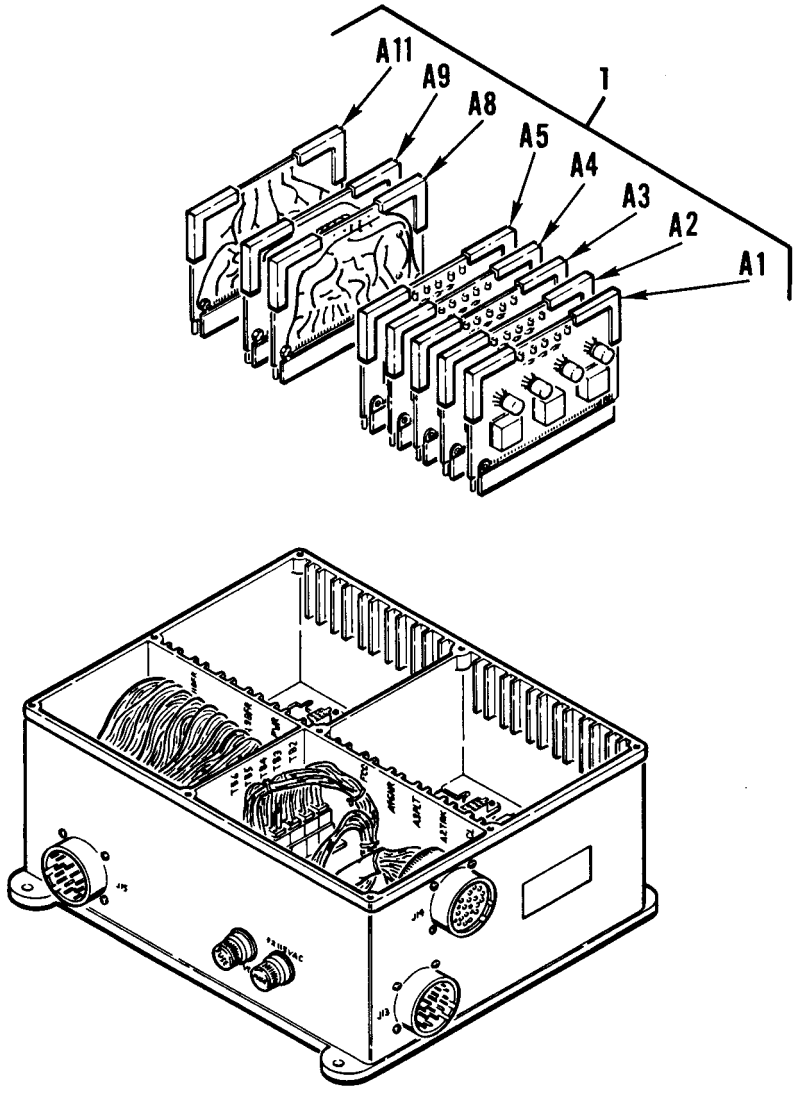
14. INSTALL BOTTOM COVER (1).
    a. Apply sealant to mating surface of case (2) including screw boss (3) located in center of case.
    b. Install bottom cover (1) and nine screws (4) while sealant is tacky.
    c. Remove any excess sealant around outside of case.



ARR82-27065

ASSEMBLY (cont)

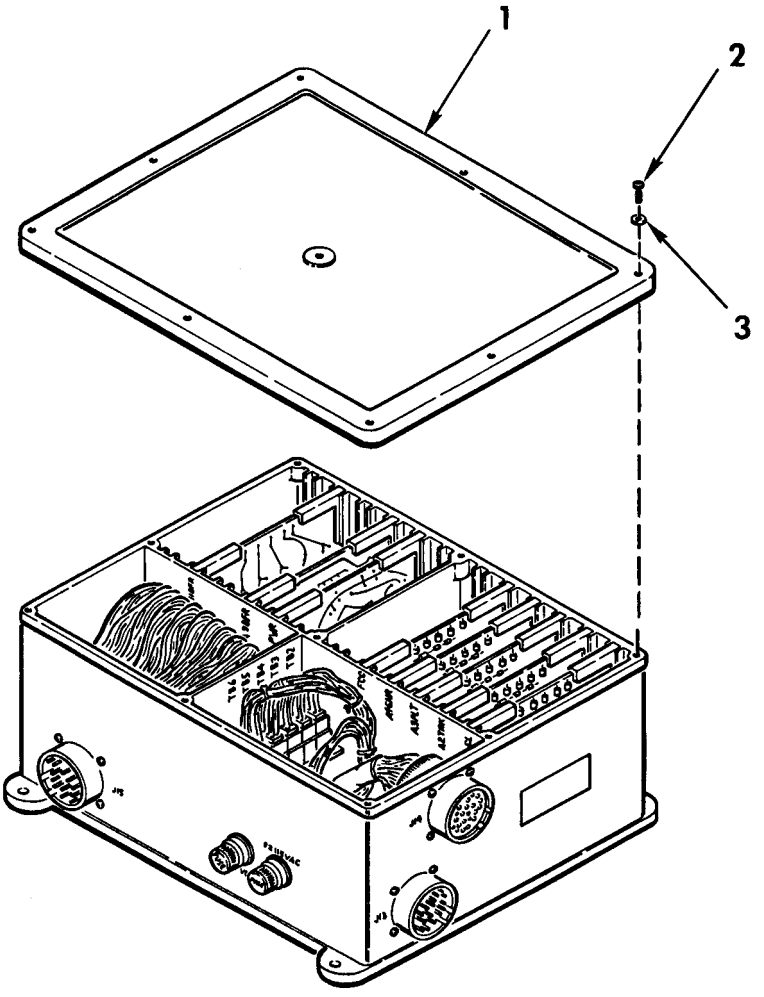
15. INSTALL CIRCUIT CARD ASSEMBLIES (1).
    a. Install eight circuit card assemblies A1 thru A5, A8, A9, and A11 (1) in their respective connectors.
    b. Push down carefully on edges of card to seat firmly in connector.



ARR82-27066

2-63. REPAIR OF INTERFACE CONTROL UNIT (209-074-110-1) (cont)

16. INSTALL TOP COVER (1).
    a. Install top cover (1), nine screws (2), and nine washers (3).



ARR82-27067

END OF TASK

2-64. REPAIR OF INTERFACE CONTROL UNIT (209-074-051-3)

DESCRIPTION

This task covers: Disassembly, cleaning, inspection, and assembly.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental
- Multimeter AN/USM-223

Materials:
- Solder (Item 28, Appx B)
- Strap (Item 30, Appx B)
- Insulation Sleeving (Item 15.1, Appx B)

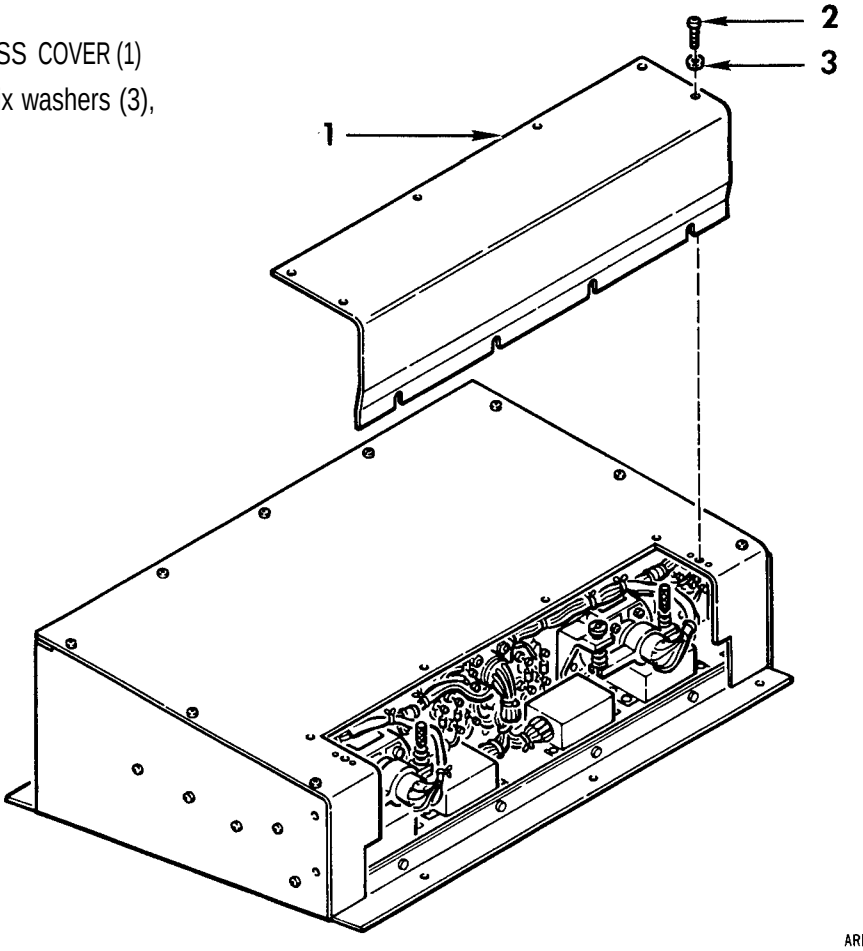
Personnel Required:
- 68J Aircraft Fire Control Repairer

Equipment Conditions:
- In shop on bench.
- No power applied.

DISASSEMBLY

1. REMOVE RESOLVER ACCESS COVER (1)

   Remove six screws (2), six washers (3), and resolver access cover (1).

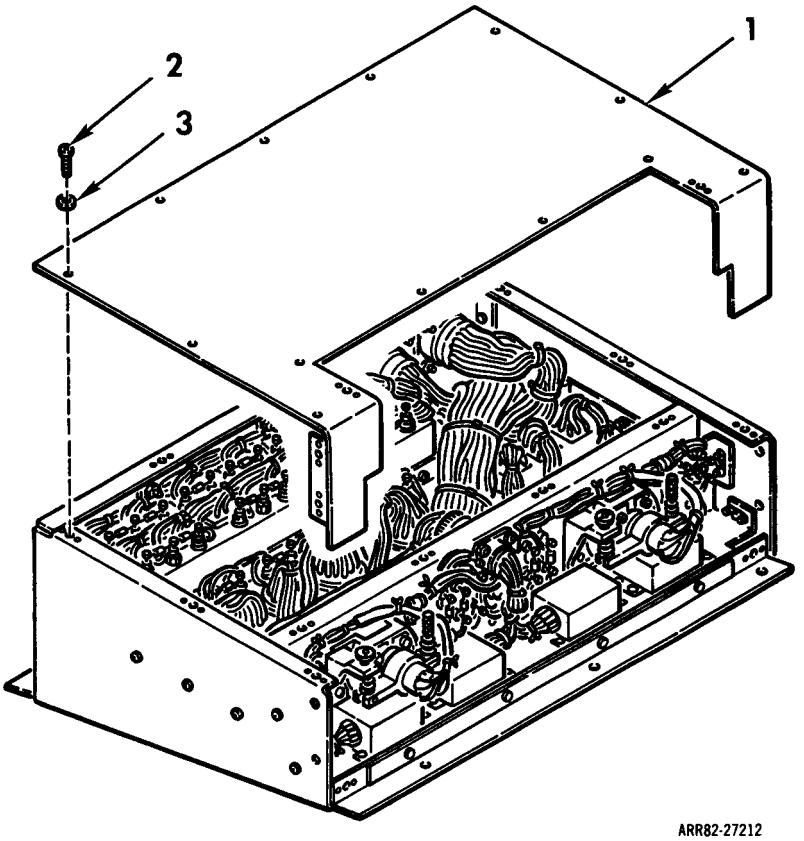


ARR82-27211

2-64. REPAIR OF INTERFACE CONTROL UNIT (209-074-051-3) (cont)

2. REMOVE COVER (1).

Remove 15 screws (2), 15 washers (3), and cover (1).

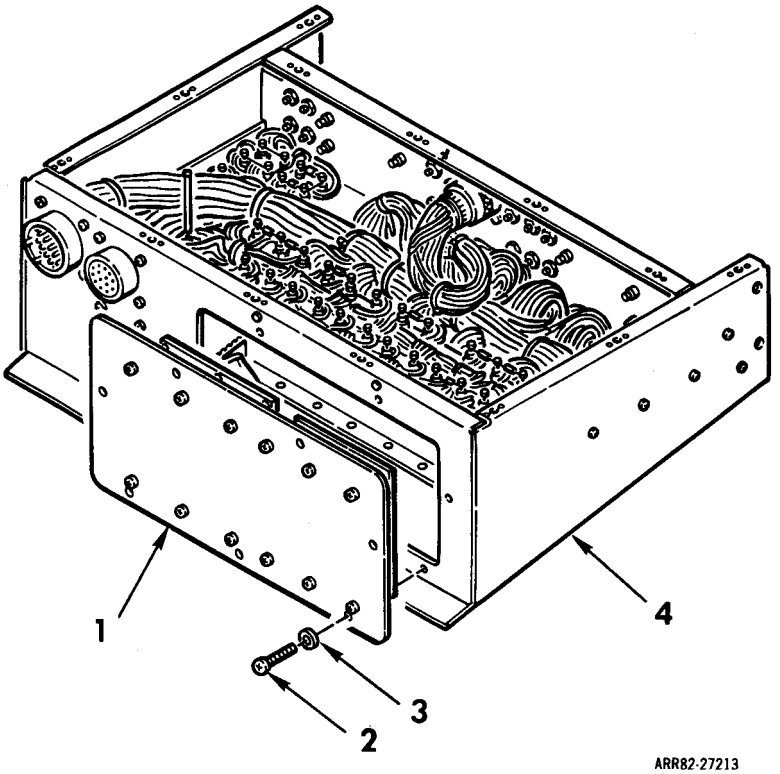


ARR82-27212

3. REMOVE DOOR (1).

a. Remove seven screws (2) and seven washers (3).

b. Pull door (1) free of case (4) to gain access to components inside.

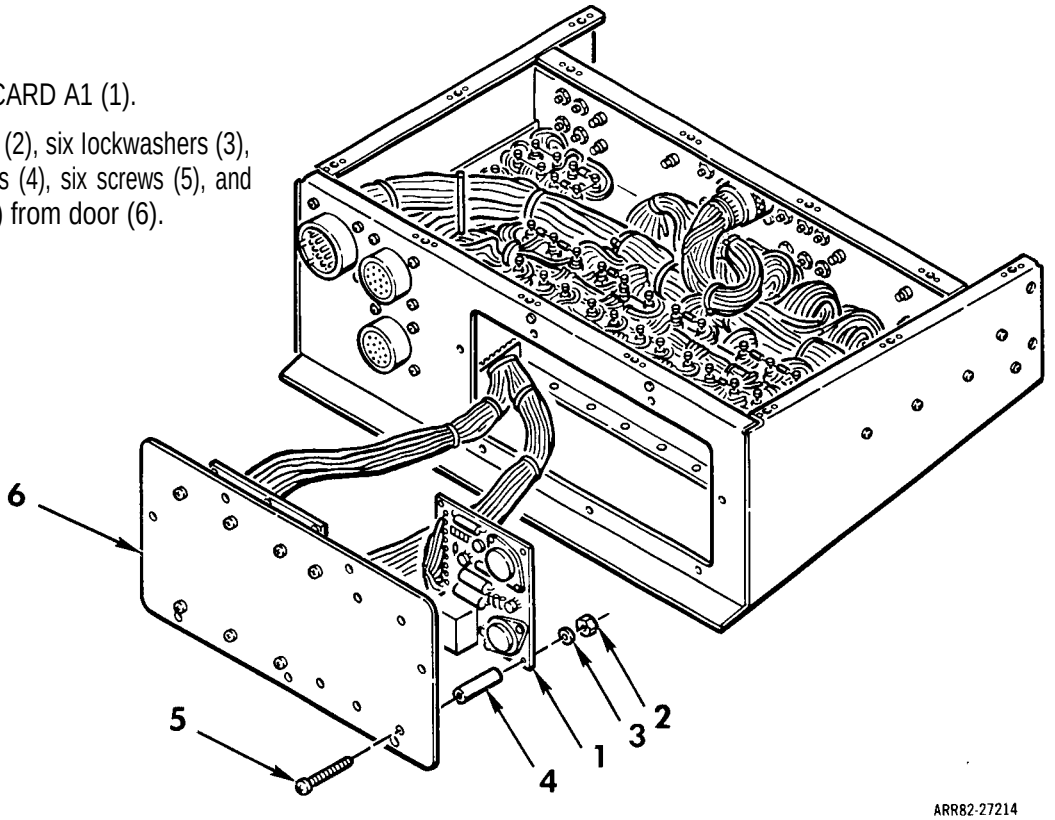


ARR82-27213

DISASSEMBLY (cont)

4. REMOVE CIRCUIT CARD A1 (1).

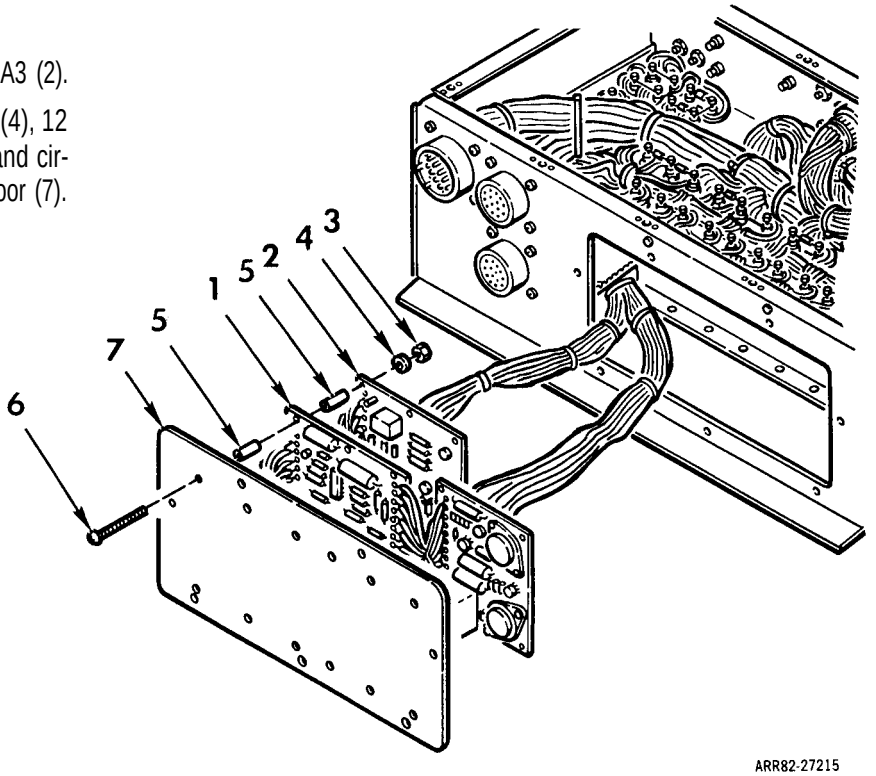
Remove six nuts (2), six lockwashers (3), six sleeve spacers (4), six screws (5), and circuit card (A1) from door (6).



ARR82-27214

5. REMOVE CIRCUIT CARDS A2 (1) AND A3 (2).

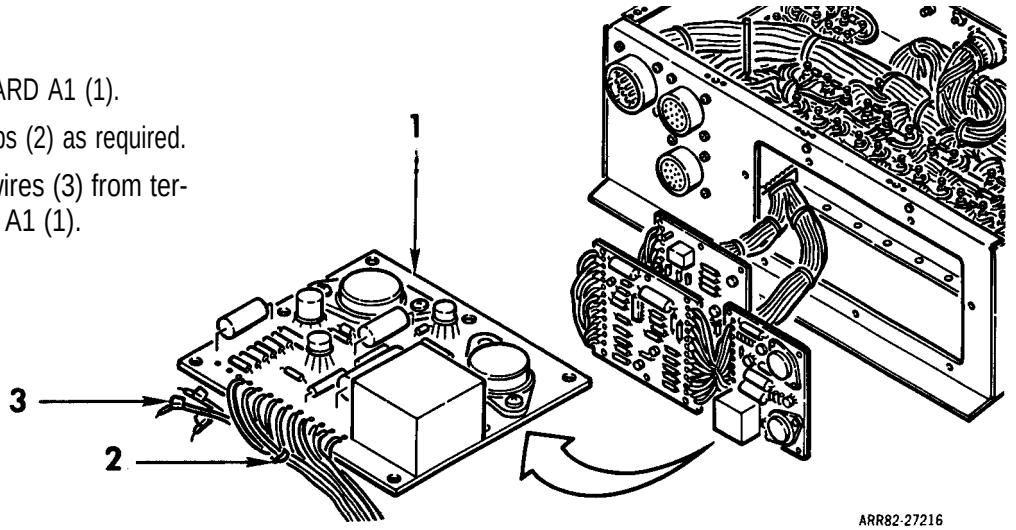
Remove 6 nuts (3), 6 lockwashers (4), 12 sleeve spacers (5), 6 screws (6), and circuit cards A2 (1) and A3 (2) from door (7).



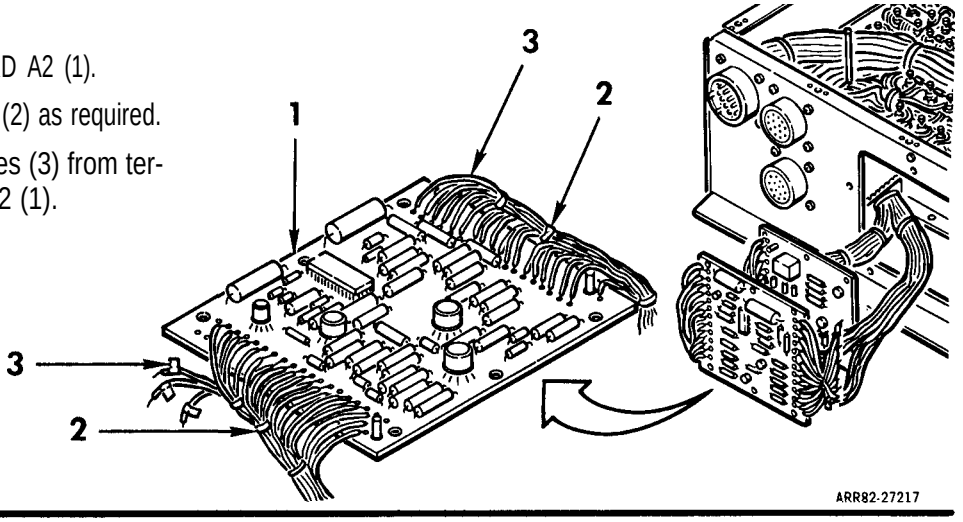
ARR82-27215

2-64. REPAIR OF INTERFACE CONTROL UNIT (209-074-051-3) (cont)

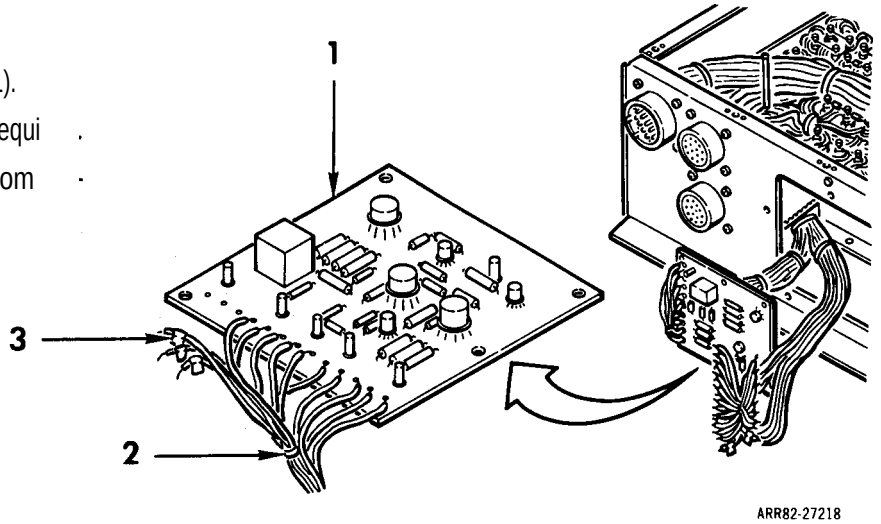
6. DISCONNECT CIRCUIT CARD A1 (1).
   a. Cut cable tiedown straps (2) as required.
   b. Label and unsolder wires (3) from terminals of circuit card A1 (1).



7. DISCONNECT CIRCUIT CARD A2 (1).
   a. Cut cable tiedown straps (2) as required.
   b. Label and unsolder wires (3) from terminals of circuit card A2 (1).

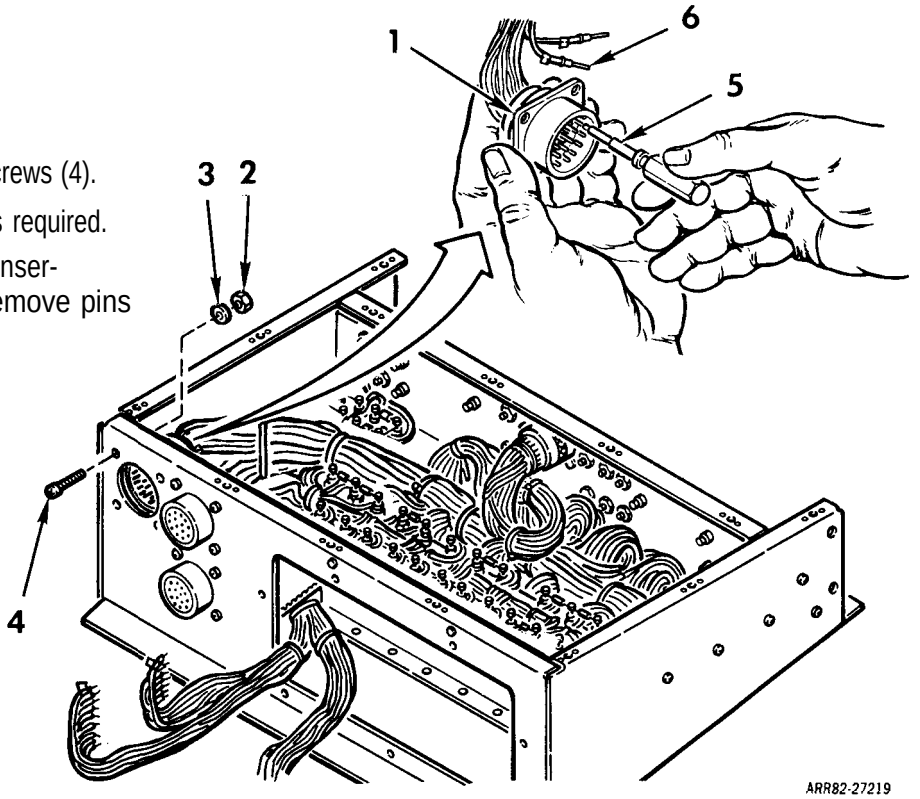


8. DISCONNECT CIRCUIT CARD A3 (1).
   a. Cut cable tiedown straps (2) as requi
   b. Label and unsolder wires (3) from minals of circuit card A3 (1).

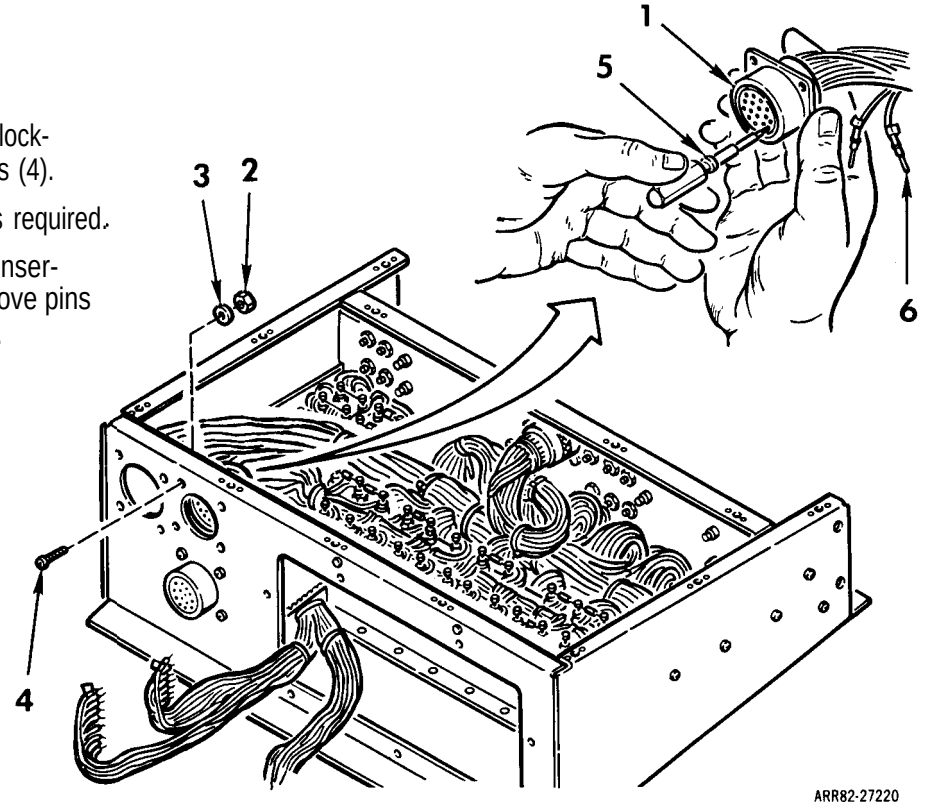


DISASSEMBLY (cont)

9. REMOVE CONNECTOR J311 (1).
   a. Remove four nuts (2), four lockwashers (3), and four screws (4).
   b. Cut cable tiedown straps as required.
   c. Label wires and, using pin insertion/extraction tool (5), remove pins (6) from connector J311 (1).

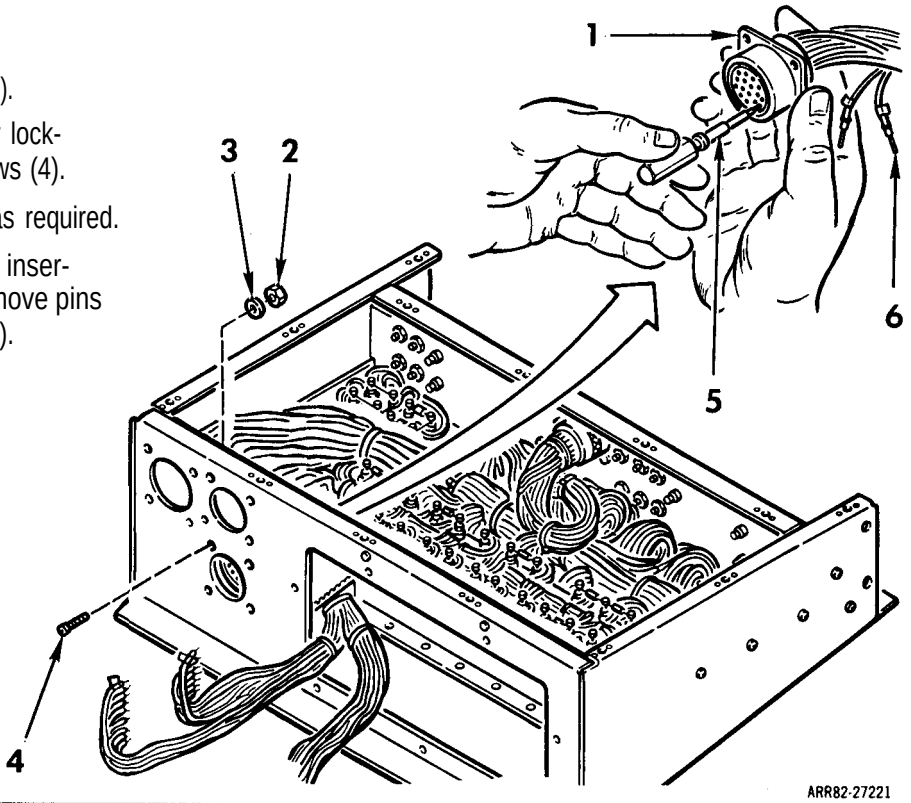


10. REMOVE CONNECTOR J312 (1).
   a. Remove four nuts (2), four lockwashers (3), and four screws (4).
   b. Cut cable tiedown straps as required.
   c. Label wires and, using pin insertion/extraction tool (5), remove pins (6) from connector J312 (1).

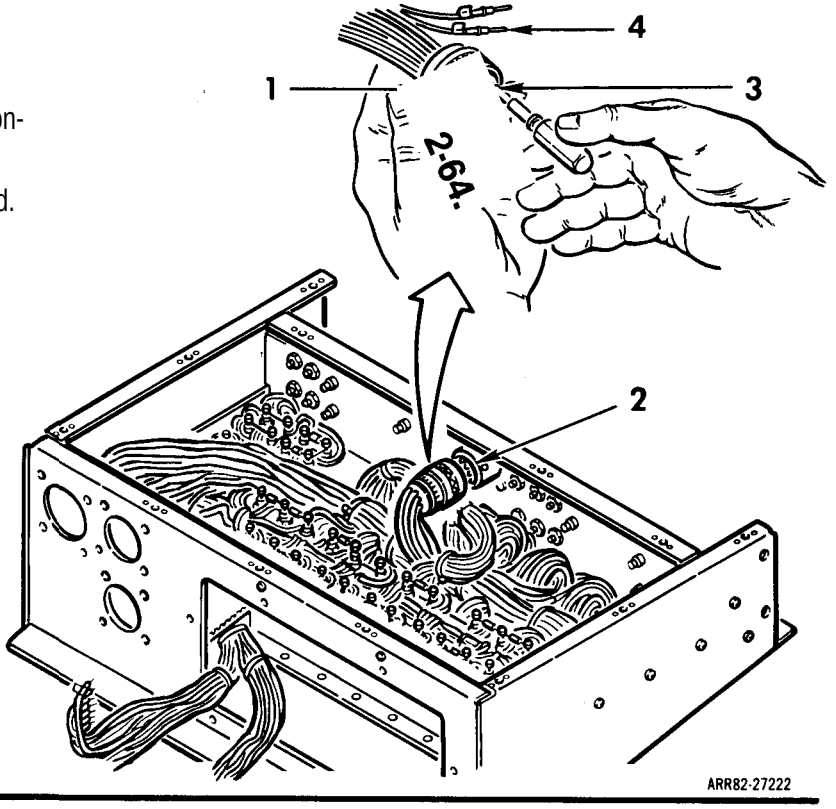


2-64. REPAIR OF INTERFACE CONTROL UNIT (209-074-051-3) (cont)

11. REMOVE CONNECTOR J313 (1).
    a. Remove four nuts (2), four lockwashers (3), and four screws (4).
    b. Cut cable tiedown straps as required.
    c. Label wires and, using pin insertion/extraction tool (5), remove pins (6) from connector J313 (1).

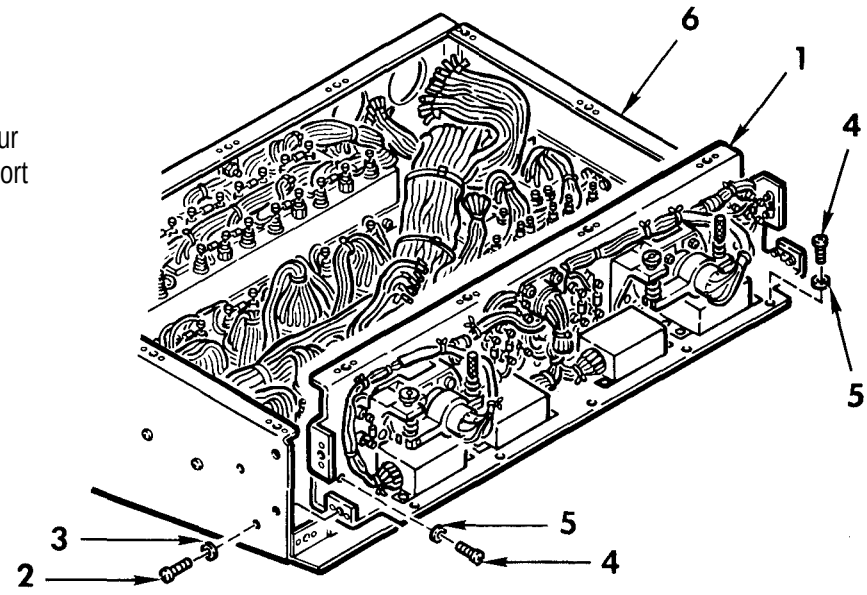


12. REMOVE CONNECTOR J1 (1).
    a. Disconnect connector J1 (1) from connector P1 (2).
    b. Cut cable tiedown straps as required.
    c. Label wires and, using pin insertion/extraction tool (3), remove pins (4) from connector J1 (1).



DISASSEMBLY (cont)

13. REMOVE SUPPORT ASSEMBLY (1).
    a. Remove four screws (2) and four washers (3) from ends of support assembly (1).
    b. Remove 10 screws (4) and 10 washers (5),
    c. Lift support assembly (1) from case (6).



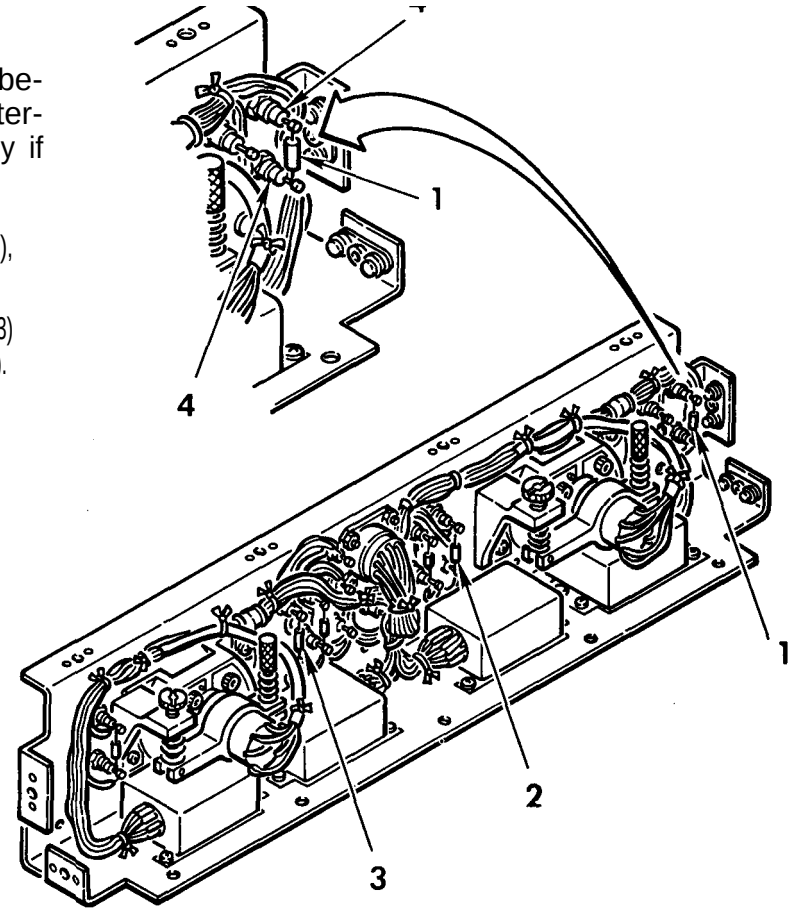
ARR82-27223

NOTE

Each resistor is soldered between two insulated stud terminals. Remove resistors only if damaged.

14. REMOVE DAMAGED RESISTOR R3 (1), R2 (2), OR R4 (3).

    Unsolder damaged resistor (1, 2, or 3) from two insulated stud terminals (4).



ARR82-27224

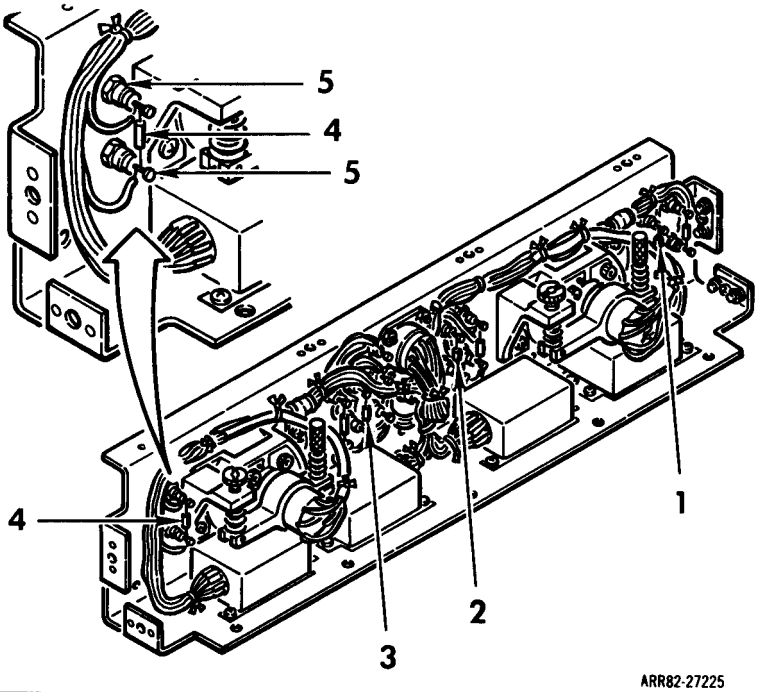
2-64. REPAIR OF INTERFACE CONTROL UNIT (209-074-051-3) (cont)

NOTE

Each thermistor is soldered between two insulated stud terminals. Remove thermistors only if damaged.

15. REMOVE DAMAGED THERMISTOR TR1 (1), TR2 (2), TR3 (3), OR TR4 (4).

Unsolder damaged thermistor (1, 2, 3, or 4) from two insulated stud terminals (5).



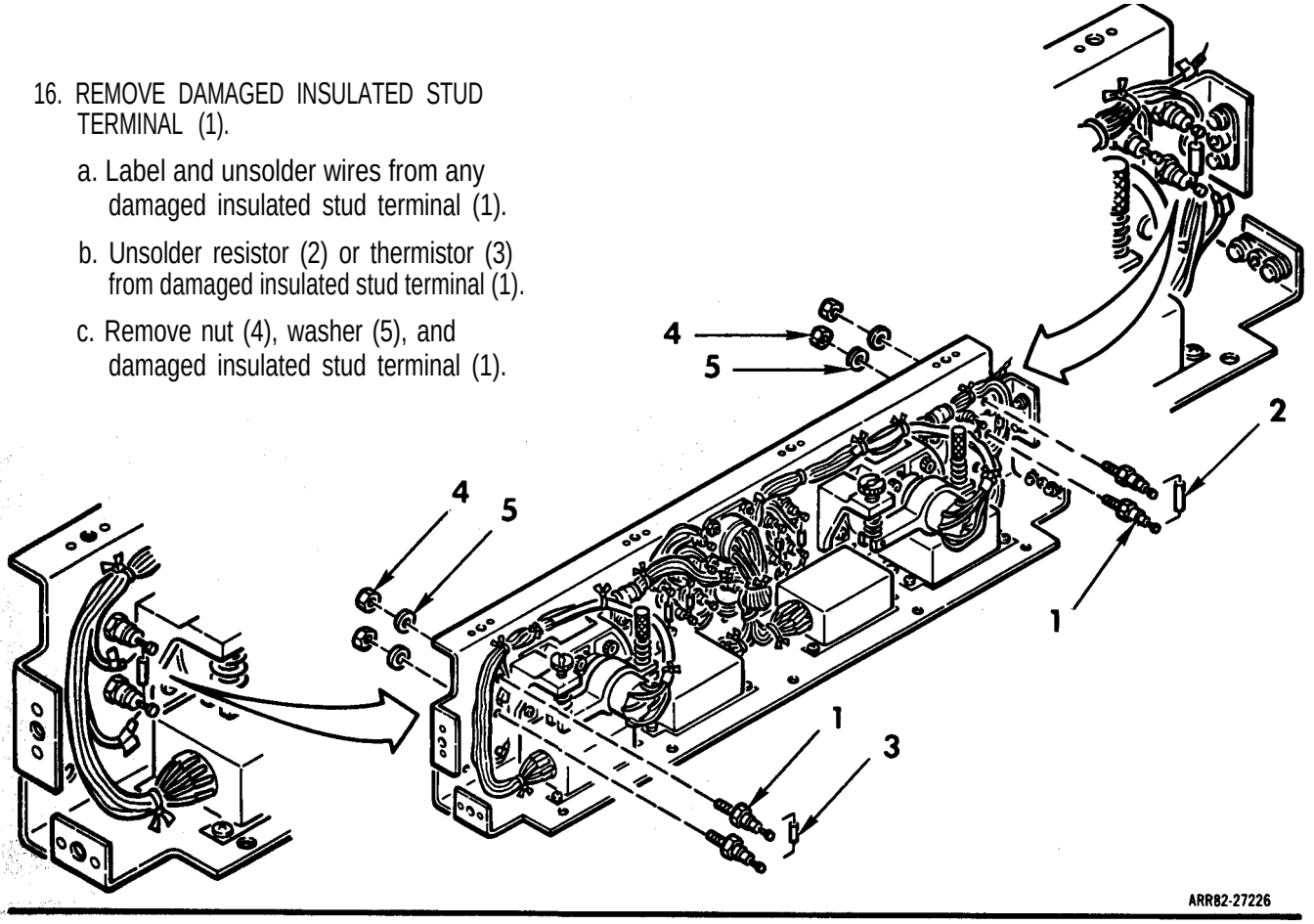
ARR82-27225

16. REMOVE DAMAGED INSULATED STUD TERMINAL (1).

a. Label and unsolder wires from any damaged insulated stud terminal (1).

b. Unsolder resistor (2) or thermistor (3) from damaged insulated stud terminal (1).

c. Remove nut (4), washer (5), and damaged insulated stud terminal (1).



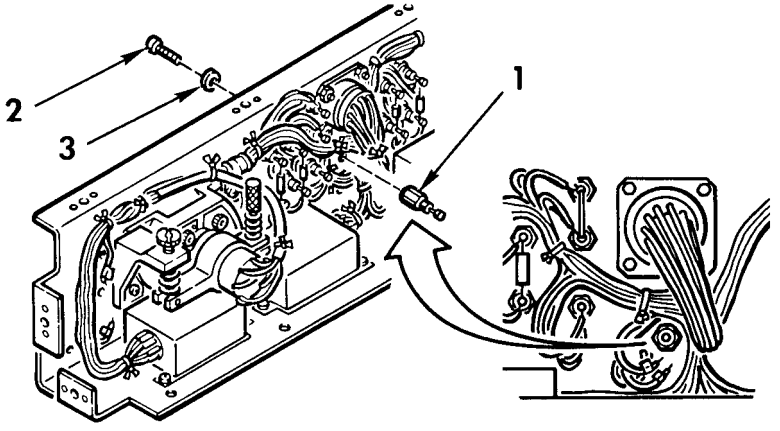
ARR82-27226

DISASSEMBLY (cont)

REMOVE DAMAGED GROUND STUD TERMINAL (1).

a. Label and unsolder wires from damaged ground stud terminal (1).

b. Remove screw (2), washer (3), and ground stud terminal (1).



ARR82-27227

18. REMOVE RESOLVER B1 MOUNT ASSEMBLY (1).

a. Cut cable tiedown straps (2) as necessary.

b. Label and unsolder resolver B1 wires from amplifier AR3 (3) pins 5, 7, and 8.

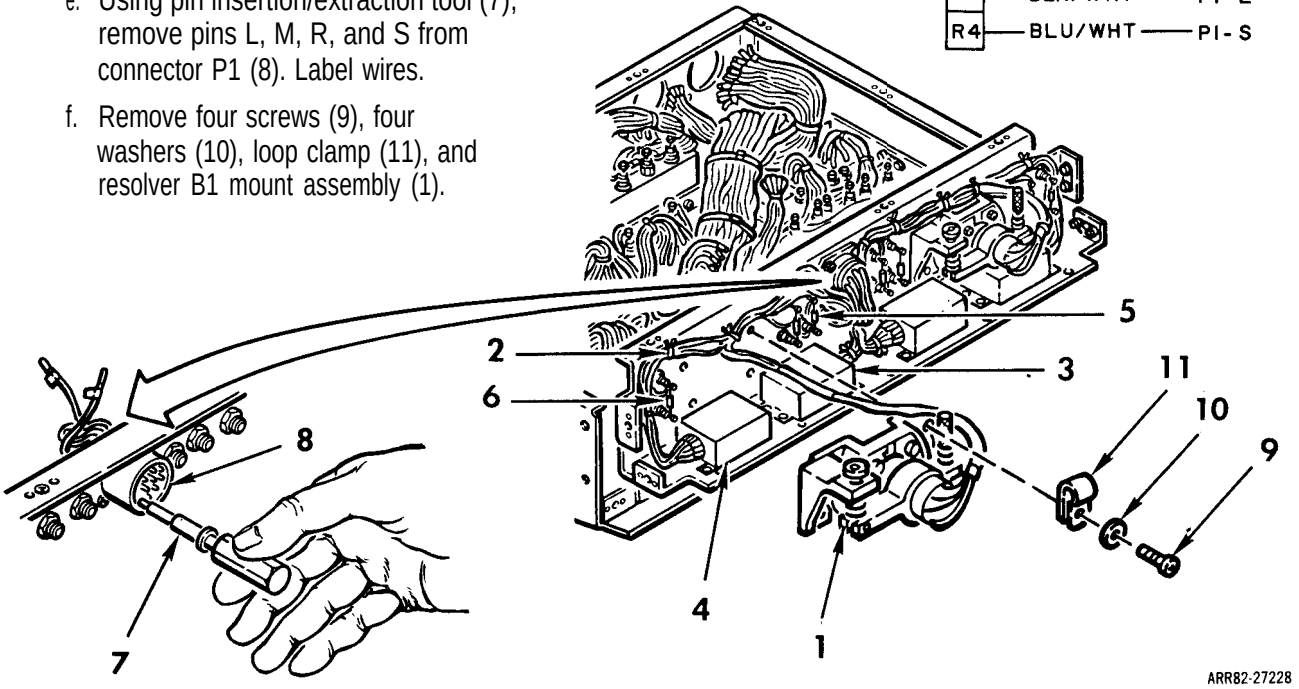
c. Label and unsolder resolver B1 wires from amplifier AR4 (4) pins 5, 7, and 8.

d. Label and unsolder resolver B1 wires from thermistors TR3 (5) and TR4 (6) studs.

e. Using pin insertion/extraction tool (7), remove pins L, M, R, and S from connector P1 (8). Label wires.

f. Remove four screws (9), four washers (10), loop clamp (11), and resolver B1 mount assembly (1).

RESOLVER B1		DISCONNECTS FROM:
S1	RED	AR3-7
S2	YEL	AR4-7
S3	BLK	AR3-8
S4	BLU	AR4-8
S5	BRN	TR3 STUD
S6	ORN	TR4 STUD
S7	GRN	AR3-5
S8	WHT	AR4-5
R1	RED/WHT	P1-M
R2	YEL/WHT	P1-R
R3	BLK/WHT	P1-L
R4	BLU/WHT	P1-S



ARR82-27228

2-64. REPAIR OF INTERFACE CONTROL UNIT (209-074-051-3) (cont)

RESOLVER B2		DISCONNECTS FROM:
S1	RED	AR1-7
S2	YEL	AR2-7
S3	BLK	AR1-8
S4	BLU	AR2-8
S5	BRN	TR1 STUD
S6	ORN	TR2 STUD
S7	GRN	AR1-5
S8	WHT	AR2-5
R1	RED/WHT	P1-P
R2	YEL/WHT	AR4-4
R3	BLK/WHT	P1-N
R4	BLU/WHT	AR4-1

a. Cut cable tiedown straps (2) as necessary.

b. label and molder resolver B2 wires from amplifier AR1 (3) pins 5, 7, and 8.

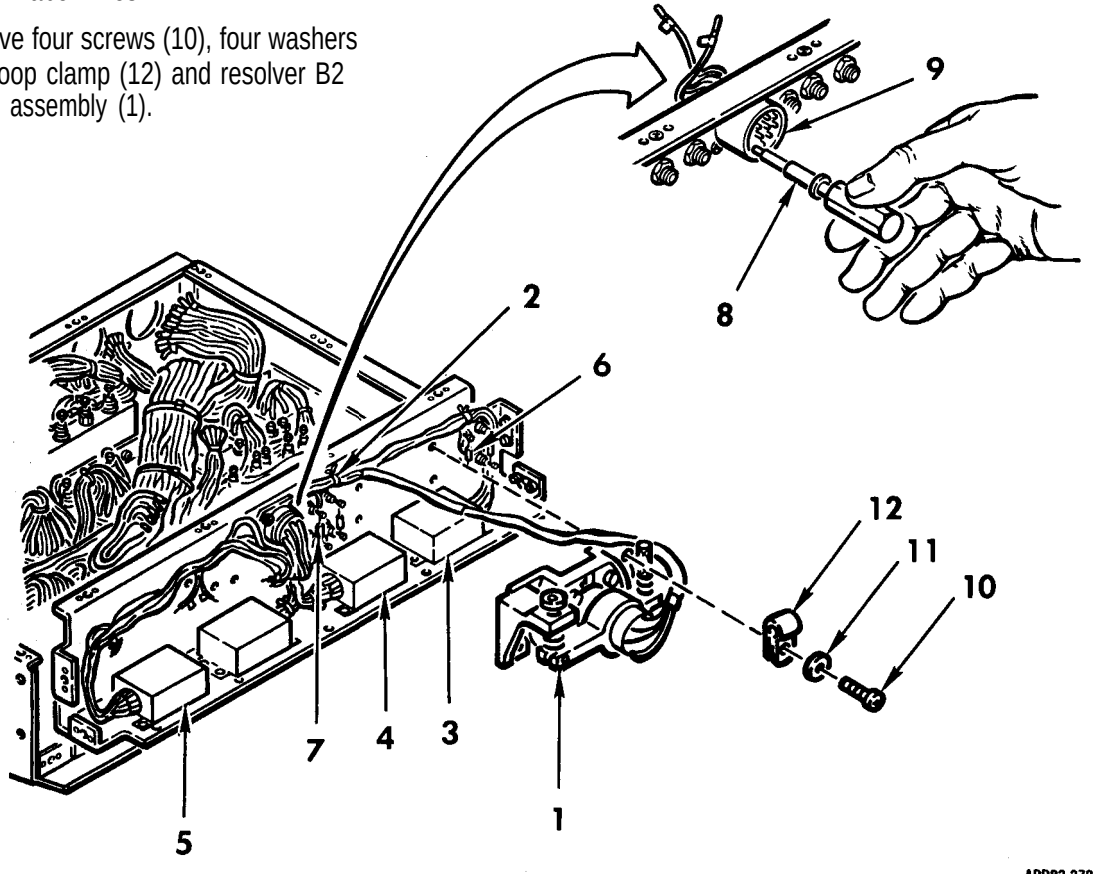
c. Label and unsolder resolver B2 wires from amplifier AR2 (4) pins 5, 7 and 8.

d. Label and unsolder resolver B2 wires from amplifier AR4 (5) pins 1 and 4.

e. Label and unsolder resolver B2 wires from thermistors TR1 (6) and TR2 (7) studs.

f. Using insertion/extraction tool (8), remove pins N and P from connector P1 (9). Label wires.

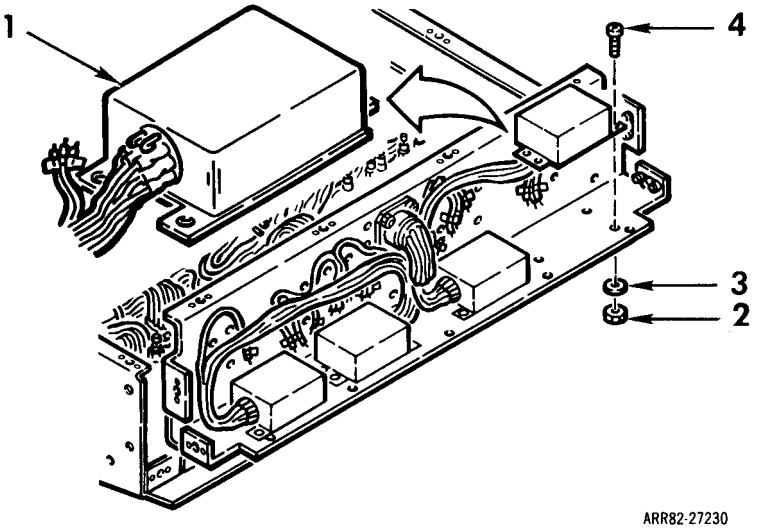
g. Remove four screws (10), four washers (11), loop clamp (12) and resolver B2 mount assembly (1).



ARR82-27229

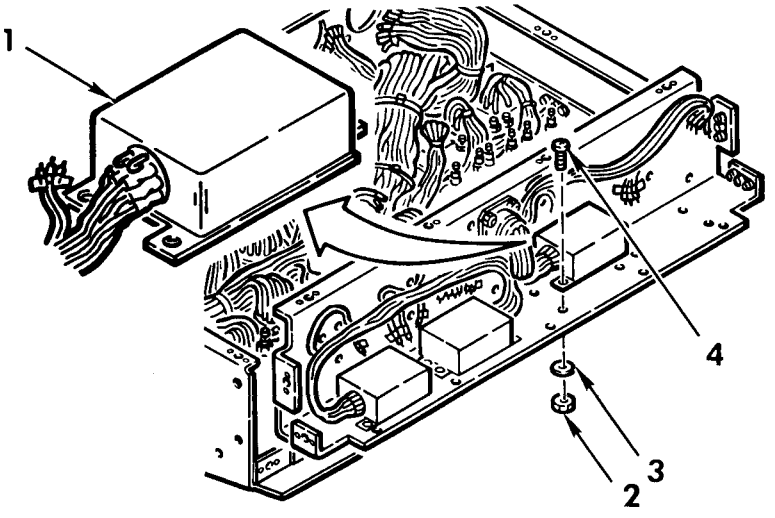
DISASSEMBLY (cont)

20. REMOVE AMPLIFIER AR1 (1).
    a. Cut cable tiedown straps as necessary.
    b. Label and unsolder wires from amplifier AR1 (1) terminals.
    c. Remove four nuts (2), four lockwashers (3), four screws (4), and amplifier AR1 (1).



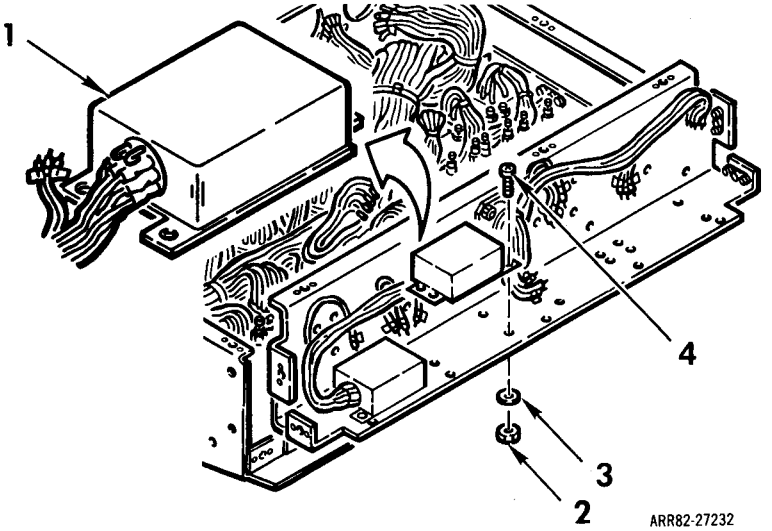
ARR82-27230

21. REMOVE AMPLIFIER AR2 (1).
    a. Cut cable tiedown straps as necessary.
    b. Label and unsolder wires from amplifier AR2 (1) terminals.
    c. Remove four nuts (2), four lockwashers (3), four screws (4), and amplifier AR2 (1).



ARR82-27231

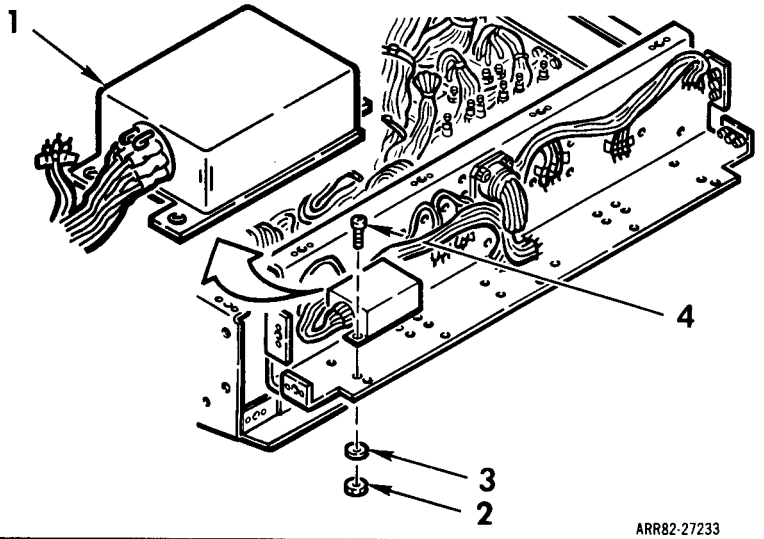
22. REMOVE AMPLIFIER AR3 (1).
    a. Cut cable tiedown straps as necessary.
    b. Label and unsolder wires from amplifier AR3 (1) terminals.
    c. Remove four nuts (2), four lockwashers (3), four screws (4), and amplifier AR3 (1).



ARR82-27232

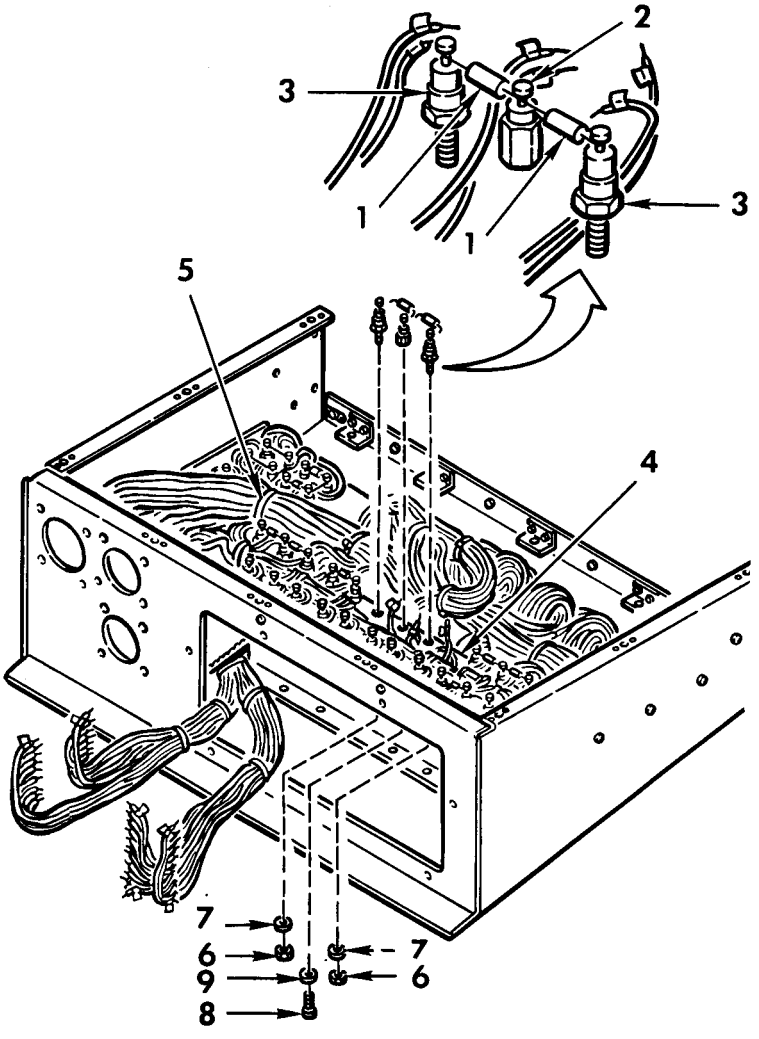
2-64. REPAIR OF INTERFACE CONTROL UNIT (209-074-051-3) (cont)

23. REMOVE AMPLIFIER AR4 (1).
    a. Cut cable tiedown straps as necessary.
    b. Label and unsolder wires from amplifier AR4 (1) terminals.
    c. Remove four nuts (2), four lockwashers (3), four screws (4), and amplifier AR4 (1).



ARR82-27233

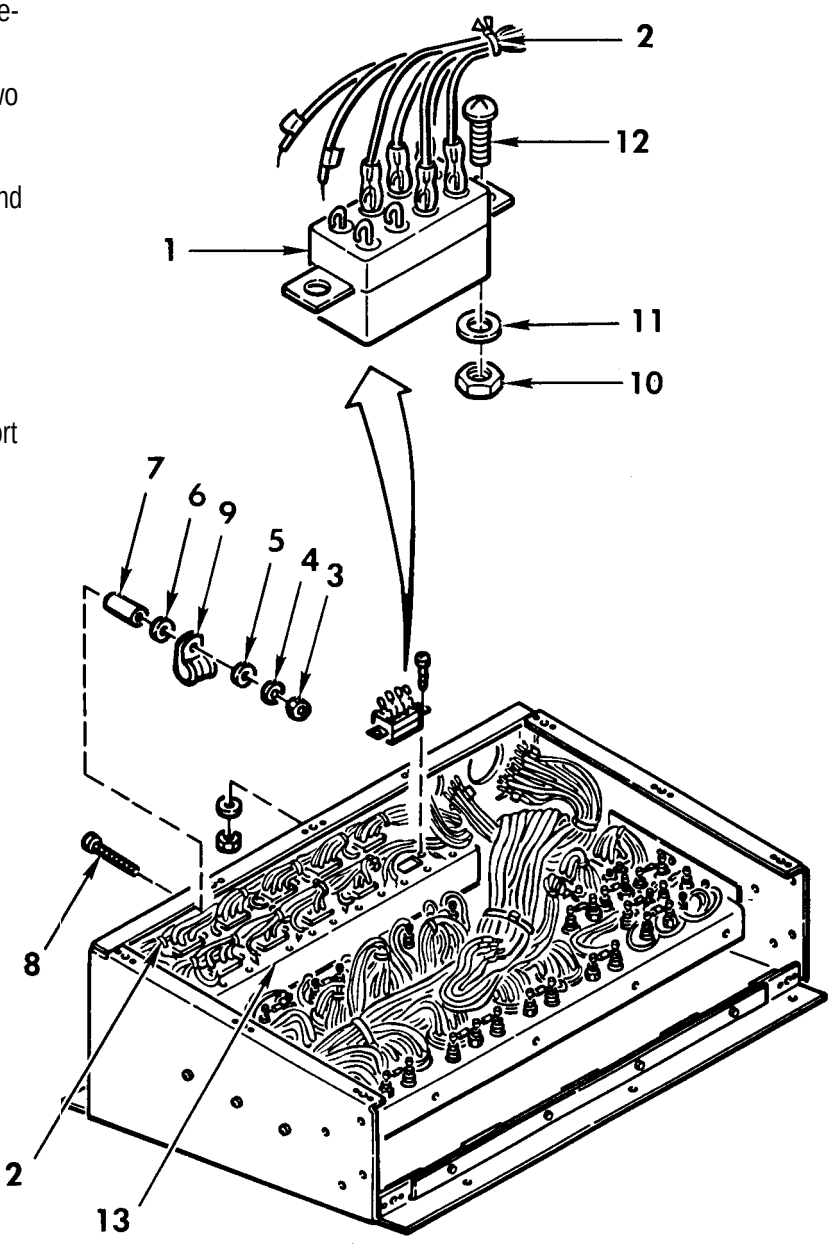
24. REMOVE DAMAGED DIODES (1), GROUND STUD TERMINALS (2), OR INSULATED STUD TERMINALS (3) FROM UPPER SUPPORT (4).
    a. Unsolder any damaged diode (1) from ground stud terminal (2) and insulated stud terminal (3).
    b. Cut cable tiedown straps (5) as necessary.
    c. Label and unsolder wires from damaged ground stud terminal (2) or insulated stud terminal (3).
    d. Unsolder diode (1) from damaged stud terminal (2 or 3).
    e. Remove nut (6), lockwasher (7), and damaged insulated stud terminal (3) from upper support (4).
    f. Remove screw (8), lockwasher (9), and damaged ground stud terminal (2) from upper support (4).



ARR82-27234

DISASSEMBLY (cont)

25. REMOVE DEFECTIVE RELAYS K15 THROUGH K20, K22 THROUGH K26, K29, OR K30 (1).
    a. Cut cable tiedown straps (2), as required, to free wiring to any relay being removed.
    b. If required to free wiring, remove two nuts (3), two lockwashers (4), two washers (5), two washers (6), two sleeve spacers (7), two screws (8), and two loop clamps (9).
    c. Label and unsolder wires from terminals of any defective relay (1).
    d. Remove two nuts (10), two lockwashers (11), two nuts (12), and defective relay (1) from upper support (13).



ARR82-27235

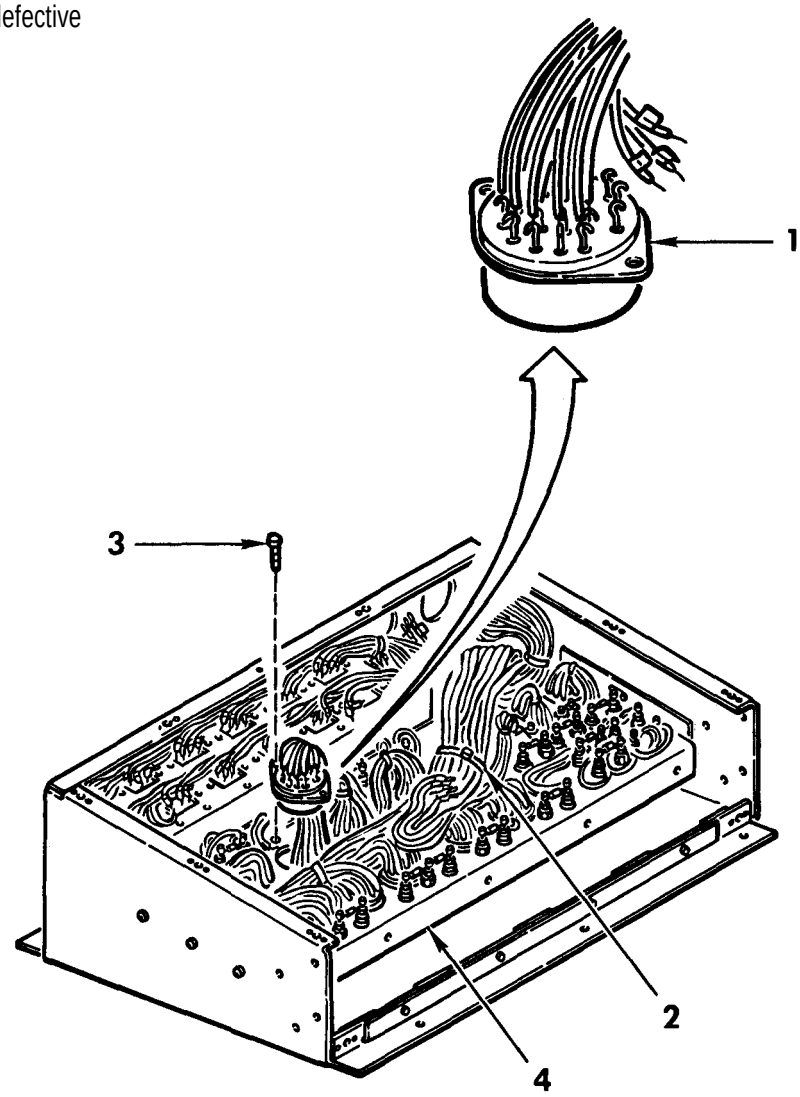
2-64. REPAIR OF INTERFACE CONTROL UNIT (209-074-051-3) (cont)

26. REMOVE DEFECTIVE RELAYS K1 THROUGH K10, K14, OR K28 (1) FROM LOWER SUPPORT (4).

a. Cut cable tiedown straps (2) as required to free wiring to any relay being removed.

b. Label and unsolder wires from terminals of any defective relay (1).

c. Remove two screws (3) and defective relay (1) from lower support (4).



ARR82-27236

DISASSEMBLY (cont)

27. REMOVE DAMAGED DIODES (1), GROUND STUD TERMINALS (2), OR INSULATED STUD TERMINALS (3) FROM LOWER SUPPORT (4).

a. Unsolder any damaged diode (1) from ground stud terminal (2) and insulated stud terminal (3).

b. Remove six screws (5) and six washers (6) from ends of lower support (4).

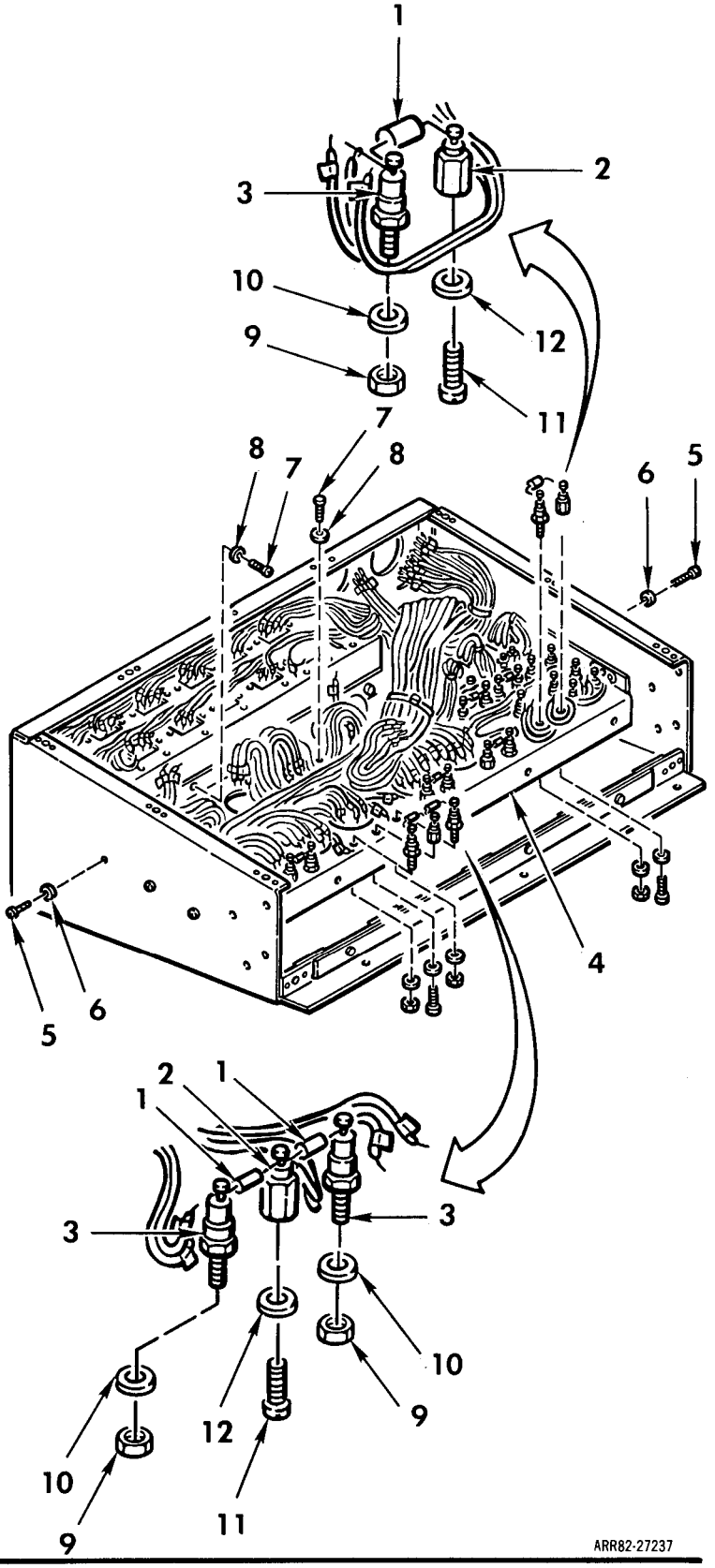
c. Remove 10 screws (7) and 10 washers (8) from lower support (4).

d. Label and unsolder wires from damaged ground stud terminal (2) or insulated stud terminal (3).

e. If damaged stud terminal (2 or 3) has a diode (1) attached, unsolder diode (1).

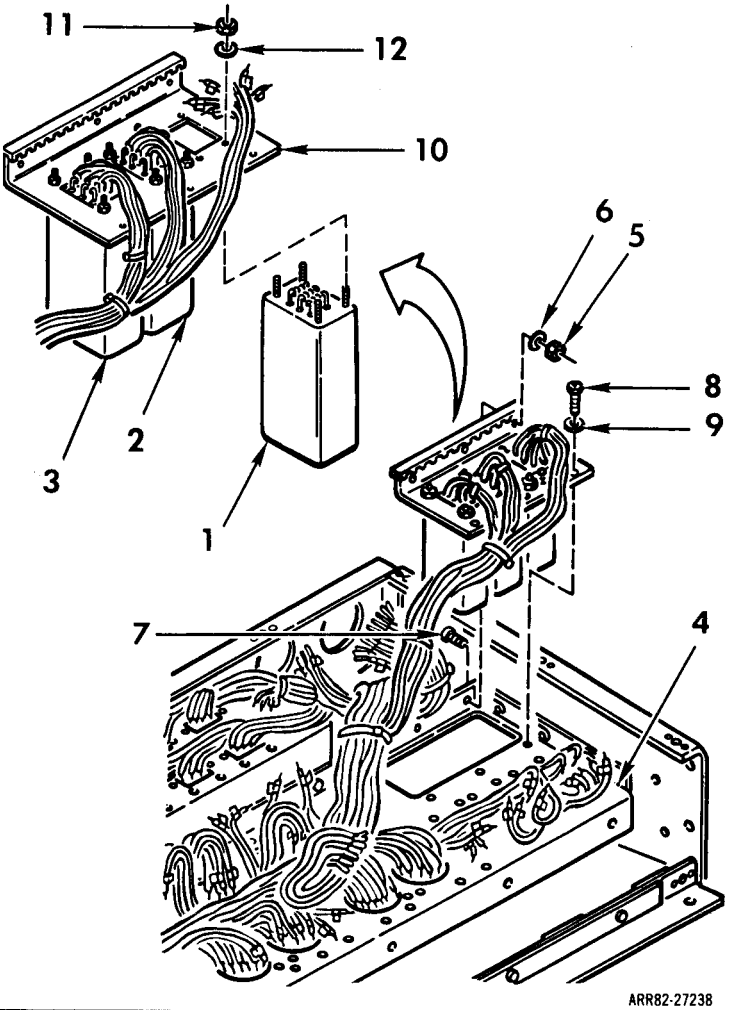
f. Remove nut (9), lockwasher (10) and damaged insulated stud terminal (3) from lower support (4).

g. Remove screw (11), lockwasher (12), and damaged ground stud terminal (2) from lower support (4).



2-64. REPAIR OF INTERFACE CONTROL UNIT (209-074-051-3) (cont)

28. REMOVE DEFECTIVE RELAY K11 (1), K12 (2), OR K13 (3) FROM LOWER SUPPORT (4).
    a. Remove three nuts (5), three lockwashers (6), and three screws (7).
    b. Remove three screws (8) and three washers (9).
    c. Lift cover (10) from lower support (4).
    d. Cut cable tiedown straps, as required, to free wiring to any relay being removed.
    e. Label and unsolder wires from defect ive relay (1) terminals.
    f. Remove four nuts (11), four lockwashers (12), and defective relay (1).



CLEANING

29. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV.

INSPECTION

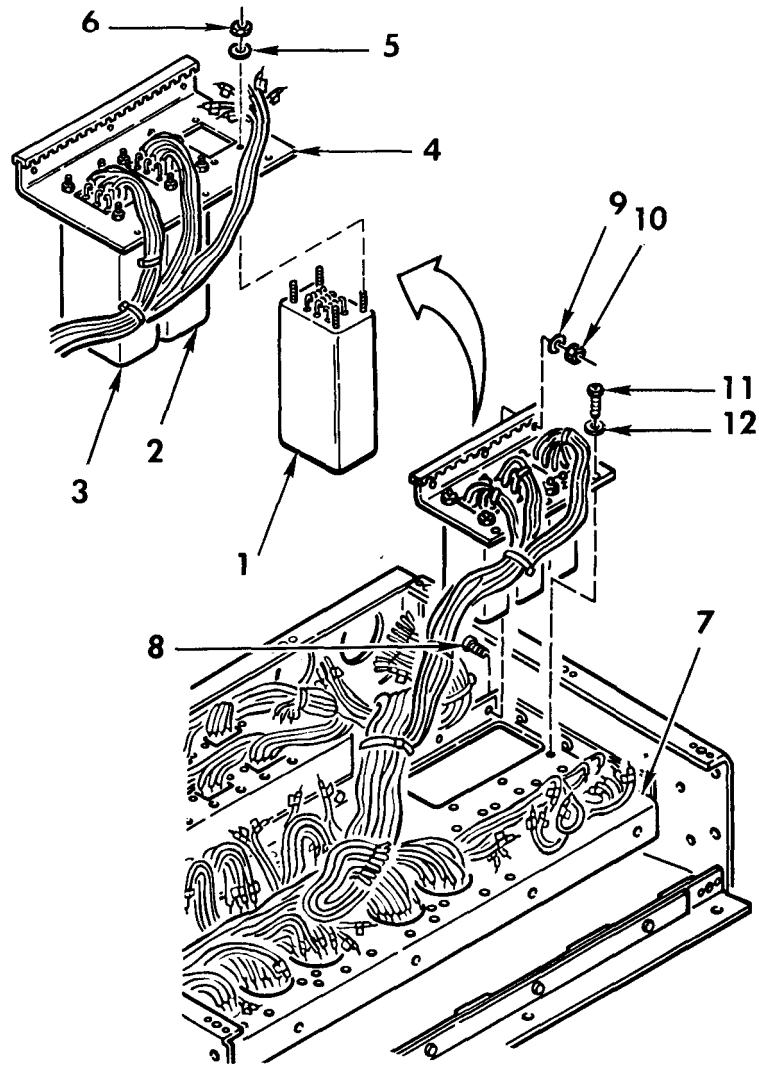
30. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV.

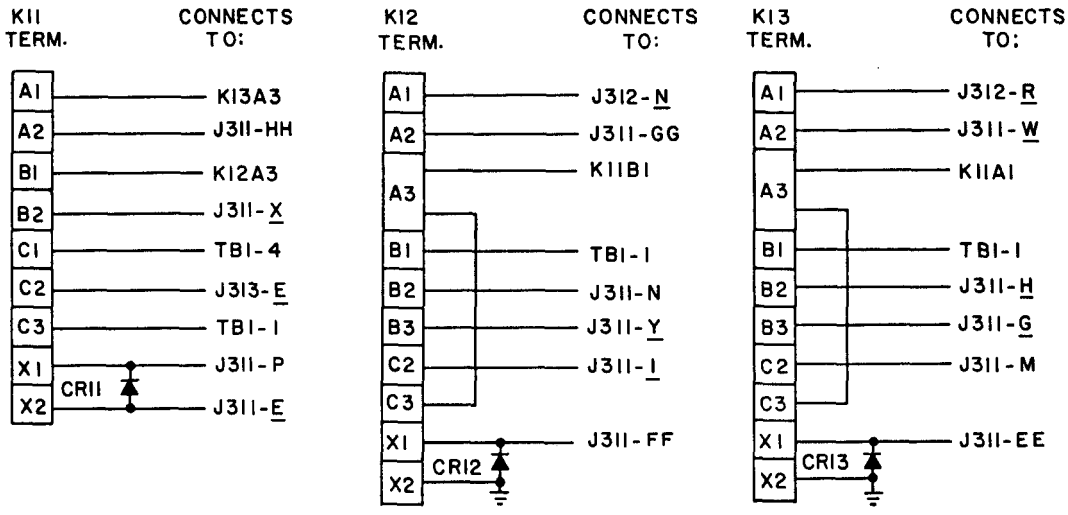
ASSEMBLY

31. INSTAIL RELAY K11 (1), K12 (2), OR K13 (3).
    a. Secure relay (1) to cover (4) with four lockwashers (5) and four nuts (6).
    b. Install insulation sleeving over ends of wires prior to soldering.
    c. Remove labels and solder wires to relay (1) terminals.
    d. Protect soldered connections with insulation sleeving.
    e. Install cover (4) on lower support (7) with three screws (8), three lockwashers (9), three nuts (10), three screws (11), and three washers (12).

NOTE

Use multimeter to identify wires prior to connecting them.





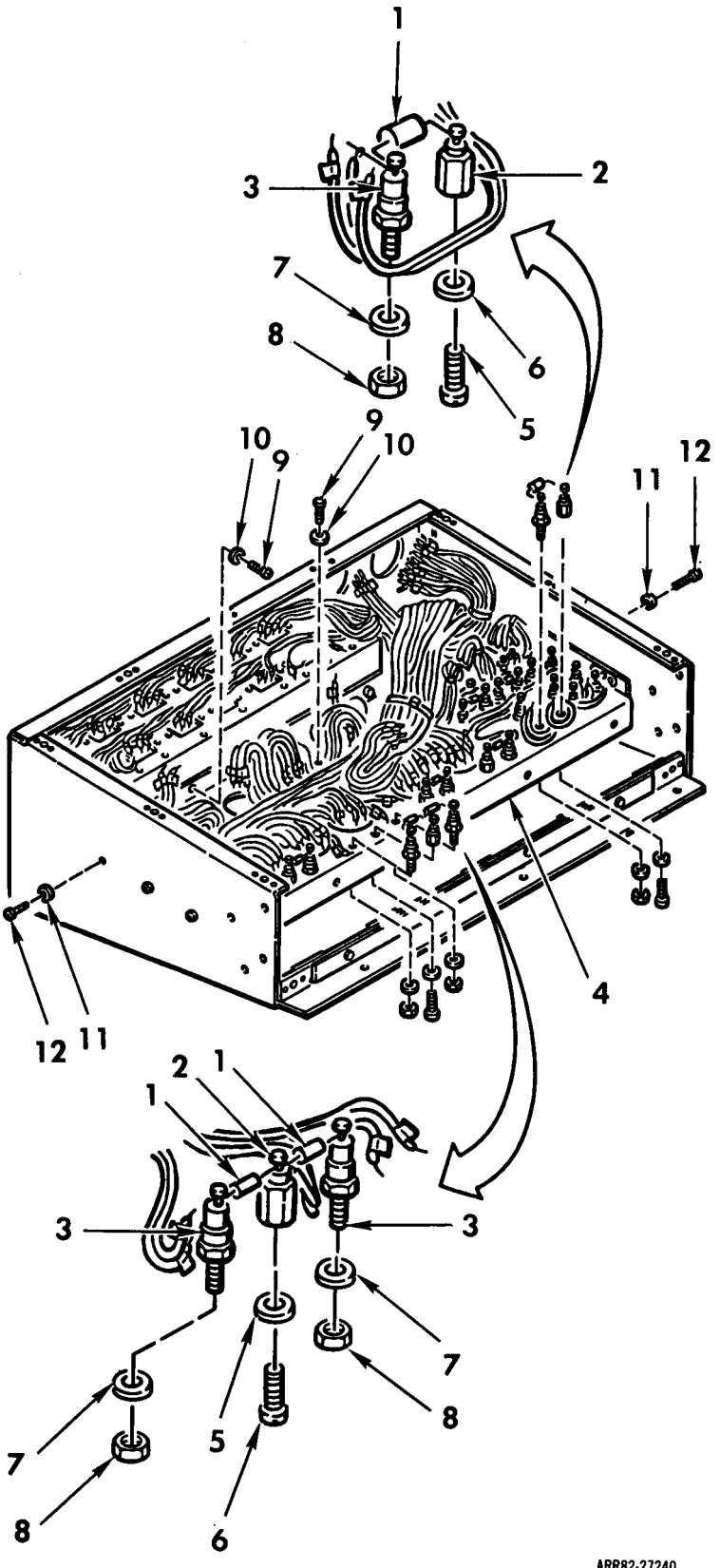
ARR82-27239

2-64. REPAIR OF INTERFACE CONTROL UNIT (209-074-051-3) (cont)

32. INSTALL DIODES (1), GROUND STUD TERMINALS (2), OR INSULATED STUD TERMINALS (3) ON LOWER SUPPORT (4).
    a. Install ground stud terminal (2) on lower support (4) with screw (5) and lockwasher (6).
    b. Install insulated stud terminal (3) on lower support (4) with lockwasher (7) and nut (8)
    c. If damaged stud terminal (2 or 3) had a diode (1) attached, solder diode (1).
    d. Remove labels and connect wires to insulated stud terminal (3) or ground stud terminal (2).
    e. Install 10 screws (9) and 10 washers (10) on lower support (4).
    f. Install six washers (11) and six screws (12) on ends of lower support (4).
    g. Install new diodes (1) where diodes were damaged.

NOTE

Use multimeter to identify wires prior to connecting them.



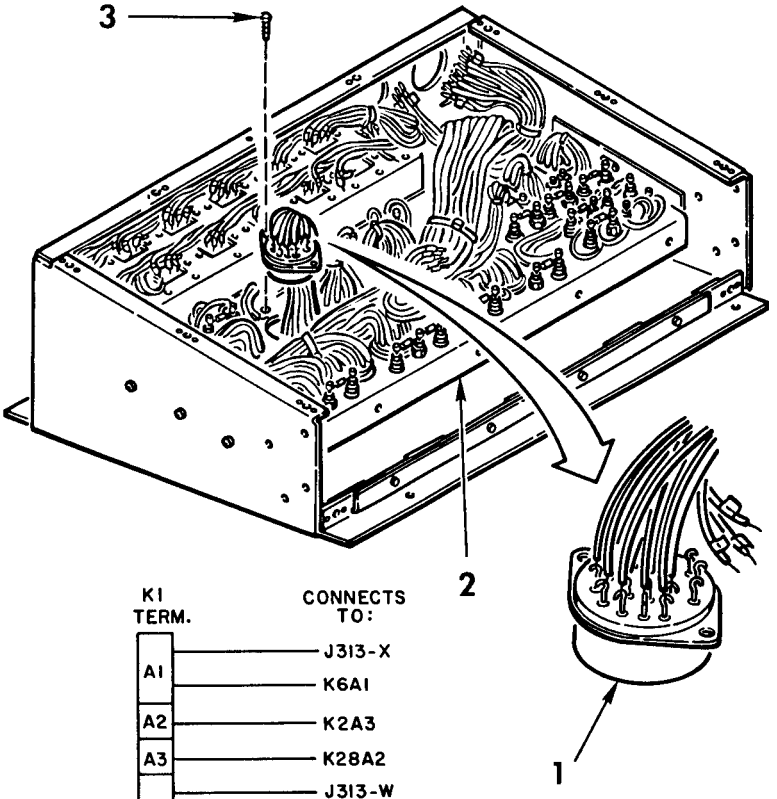
ARR82-27240

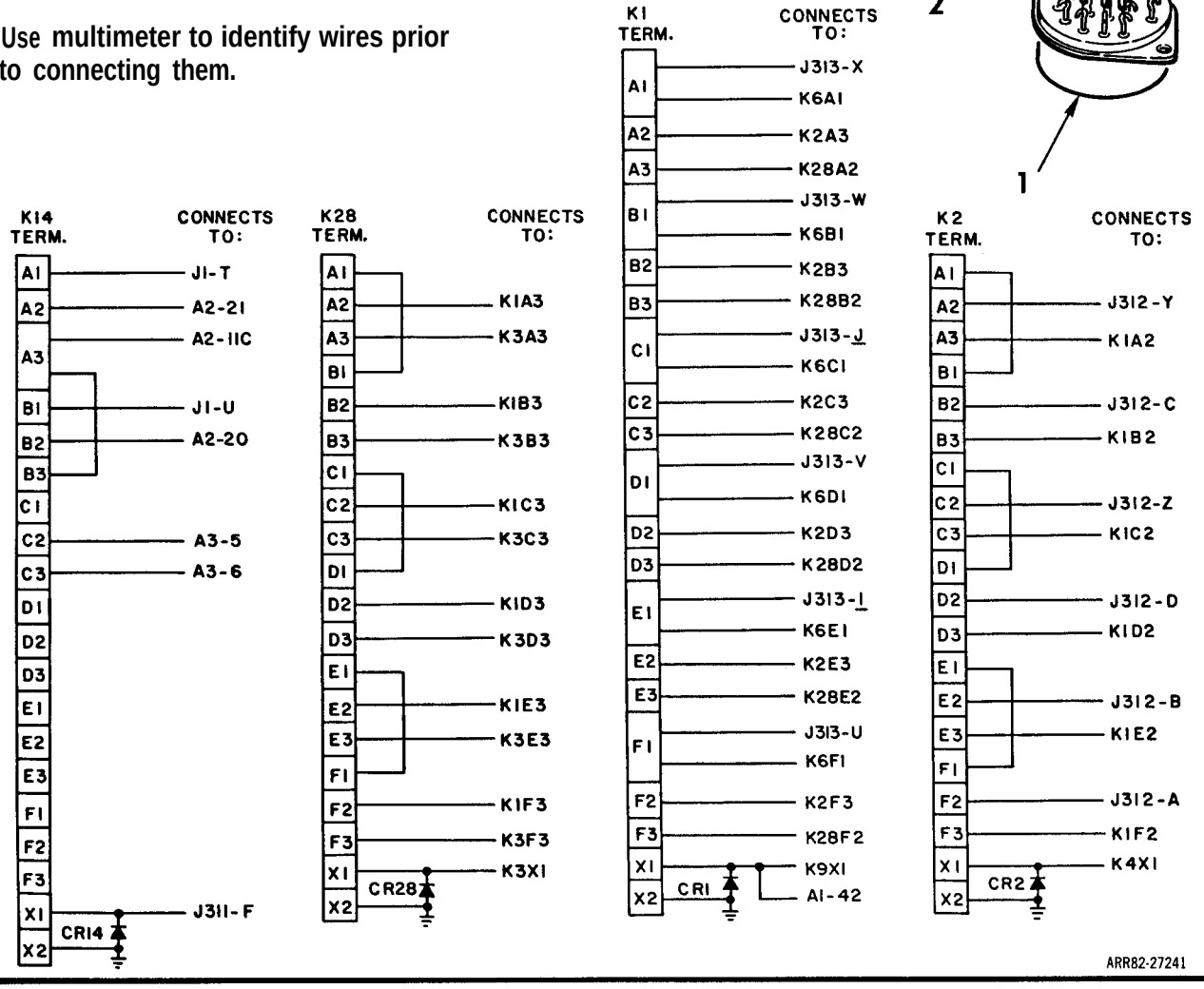
ASSEMBLY (cont)

33. INSTALL RELAYS K1 THROUGH K10, K14, OR K28 (1) ON LOWER SUPPORT (2).
    a. Secure relay (1) to lower support (2) with two screws (3).
    b. Install insulation sleeving over ends of wiring prior to soldering.
    c. Remove labels and solder wires to relay (1) terminals.
    d. Protect soldered connections with insulation sleeving.
    e. Refer to diagrams for wire connections to relays.

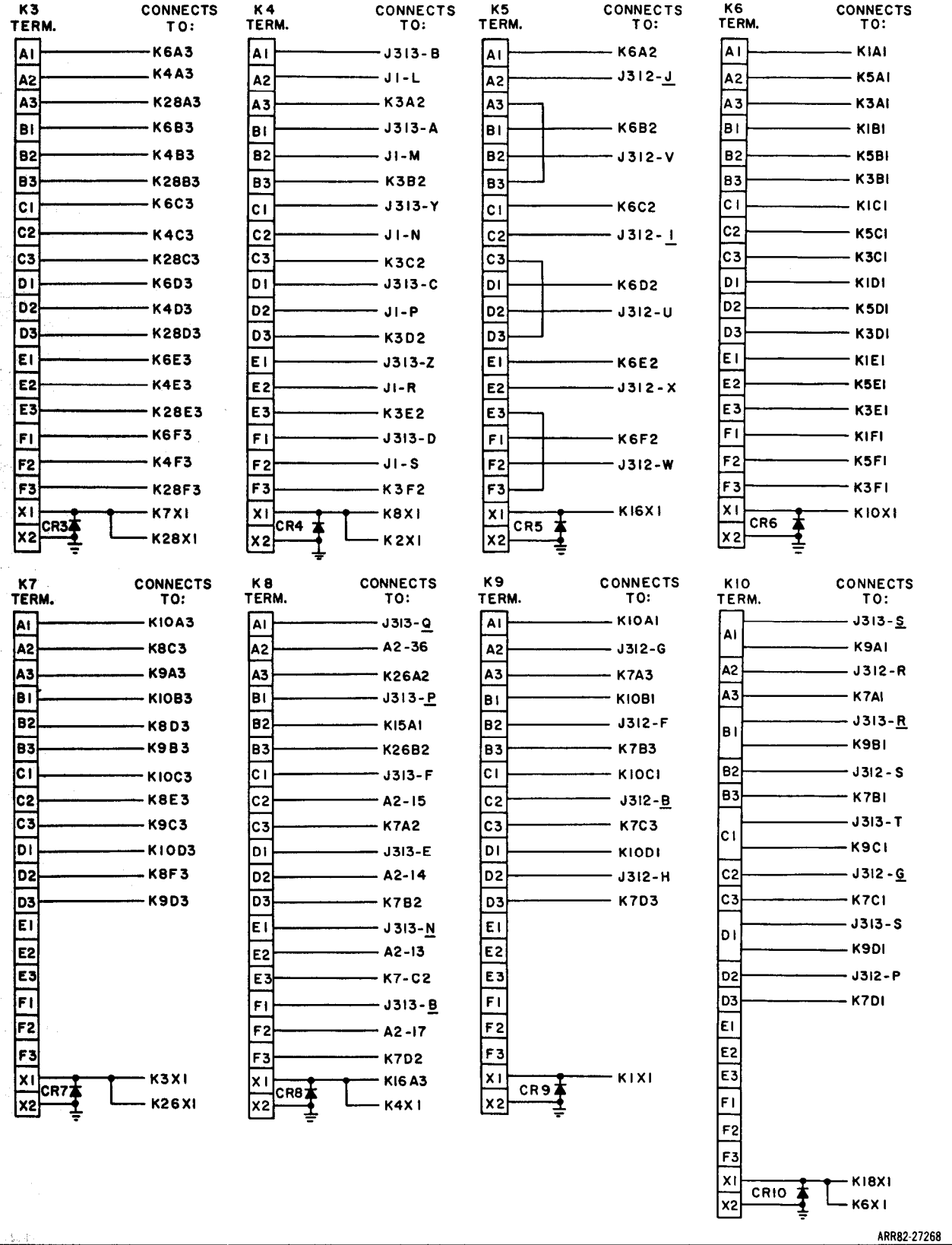
NOTE

Use multimeter to identify wires prior to connecting them.





2-64. REPAIR OF INTERFACE CONTROL UNIT (209-074-051-3) (cont)

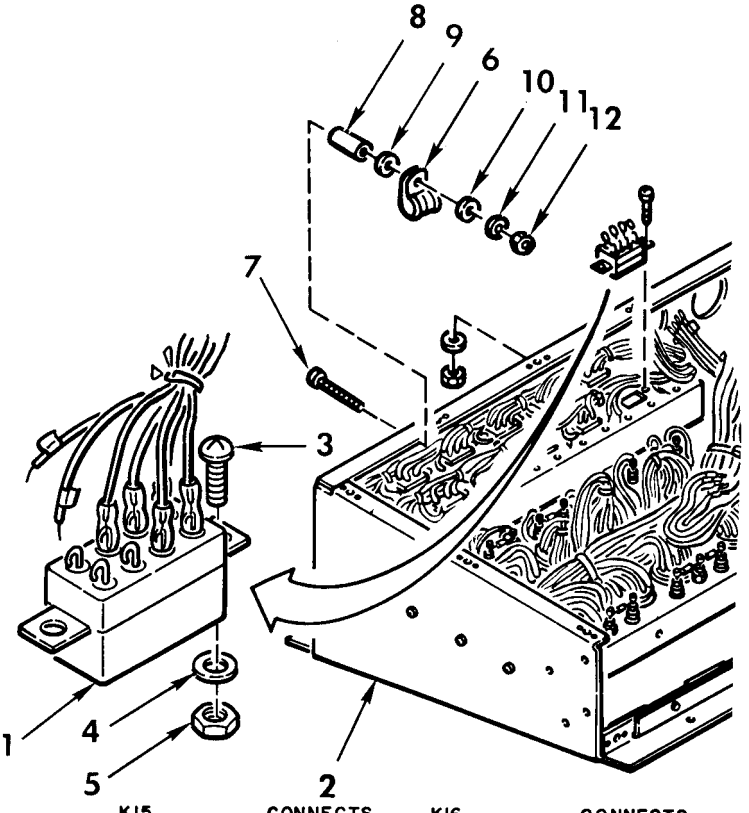


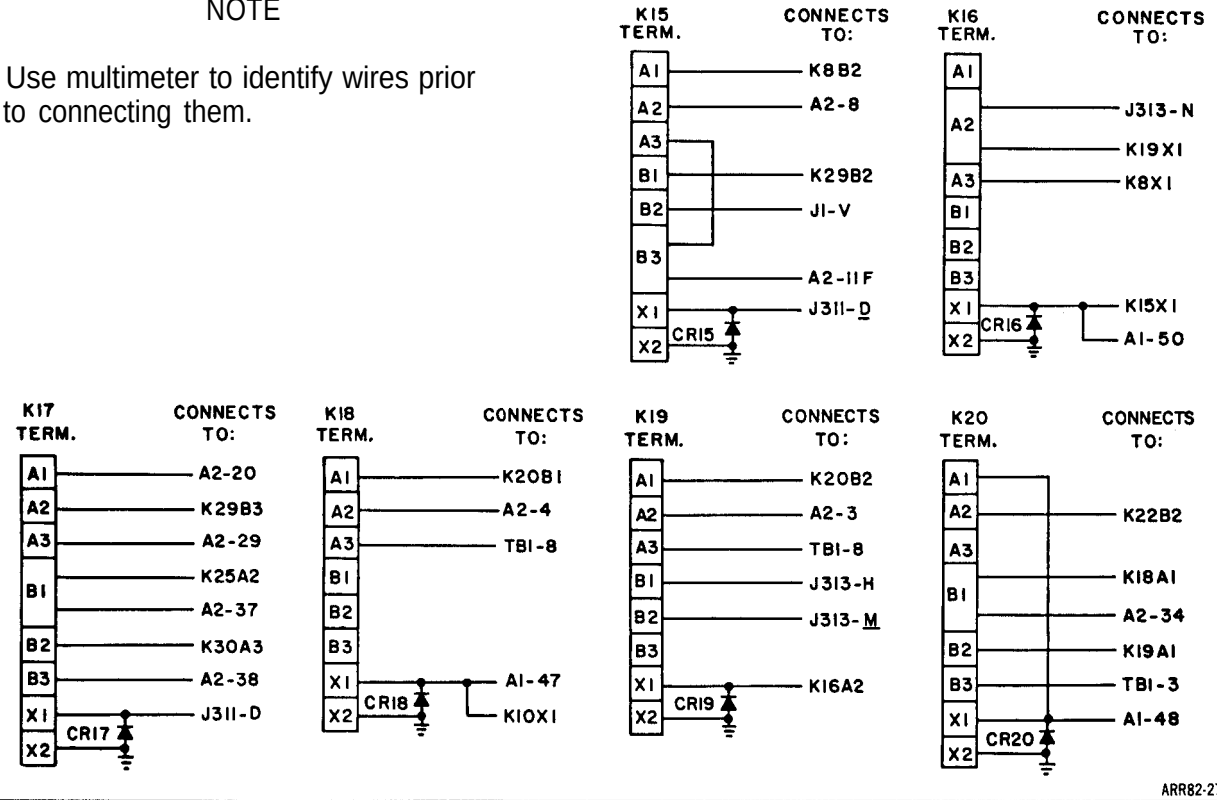
ASSEMBLY (cont)

34. INSTALL RELAYS K15 THROUGH K20, K22 THROUGH K26, K29 OR K30 (1) ON UPPER SUPPORT (2).
    a. Secure relay (1) to upper support (2) with two screws (3), two lockwashers (4), and two nuts (5).
    b. Install insulation sleeving over ends of wiring prior to soldering.
    c. Remove labels and connect wires to relay (1) terminals.
    d. Protect soldered connections with insulation sleeving.
    e. Refer to diagrams for wire connections to relays.
    f. If removed, install two loop clamps (6) with two screws (7), two sleeve spacers (8), two washers (9), two washers (10), two lockwashers (11), and two nuts (12).

NOTE

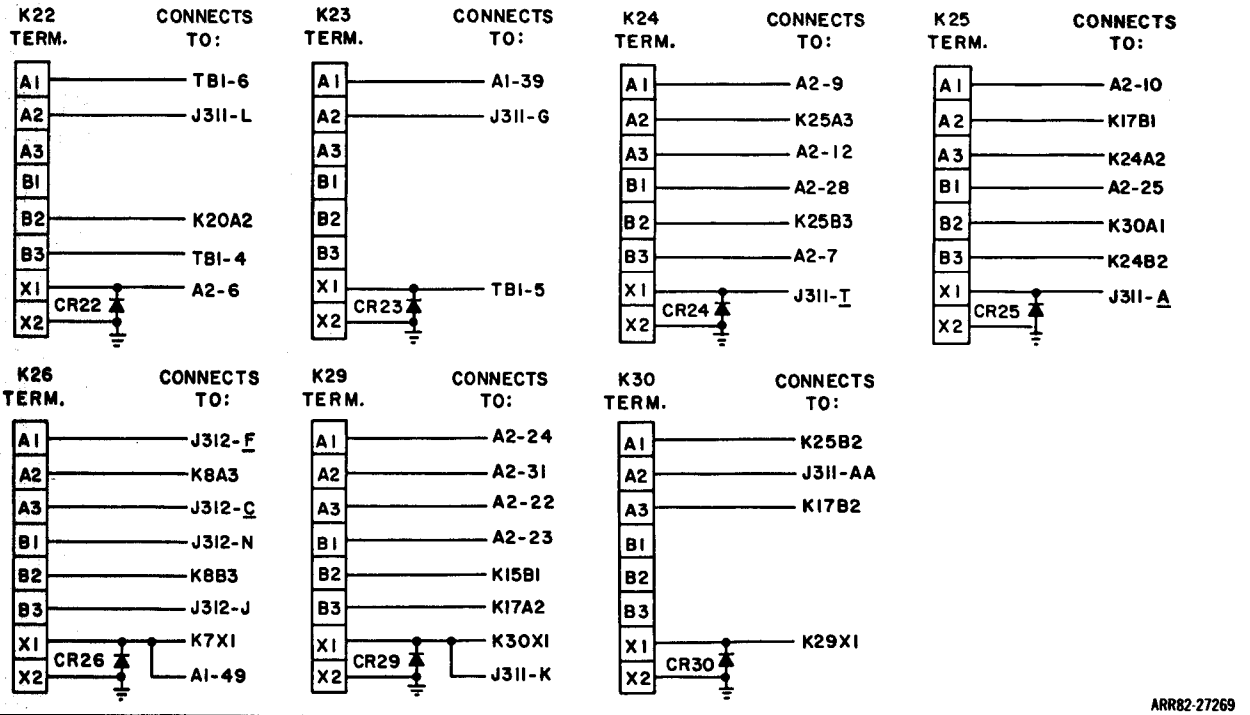
Use multimeter to identify wires prior to connecting them.





ARR82-27242

2-64. REPAIR OF INTERFACE CONTROL UNIT (209-074-051-3) (cont)



35. INSTALL DIODES (1), GROUND STUD TERMINALS (2), 0R INSULATED STUD TERMINALS (3) ON UPPER SUPPORT (4).

Install ground stud terminal (2) on upper support (4) with screw (5) and lockwasher (6).

Install insulated stud terminal (3) on upper support (4) with lockwasher (7) and nut (8).

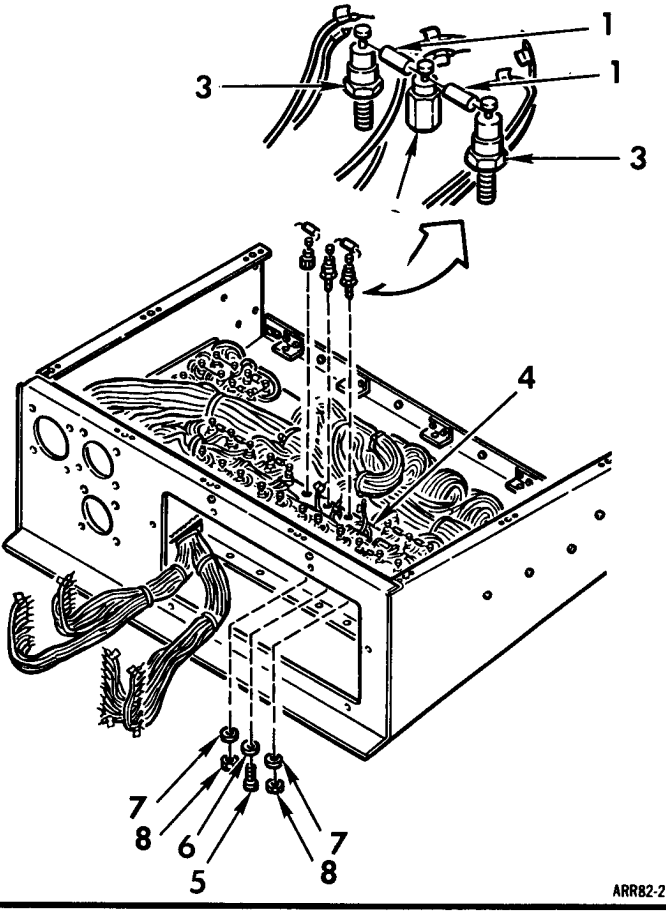
If damaged stud terminal (2 or 3) had a diode (1) attached, solder diode (1).

Remove labels and solder wires to insulated stud terminal (3) or ground stud terminal (2).

Install new diodes (1) where diodes were damaged.

NOTE

Use multimeter to identify wires prior to connecting them.

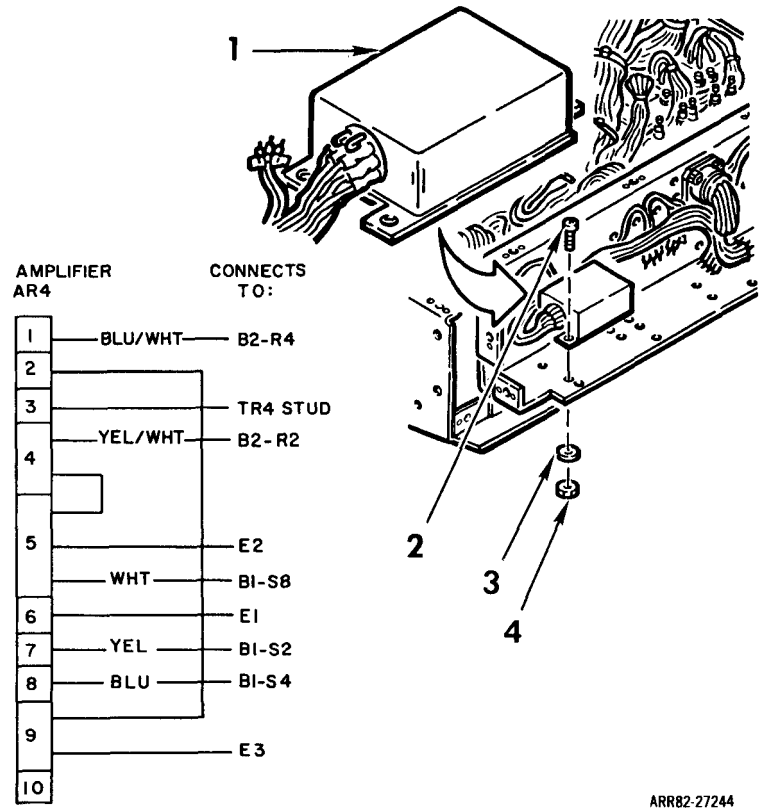


ASSEMBLY (cont)

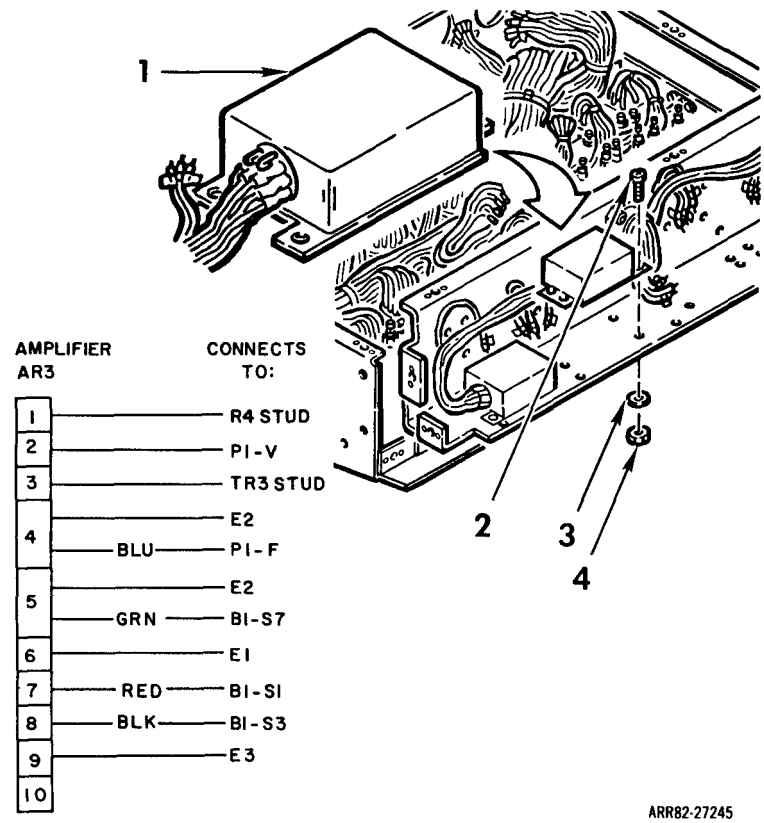
36. INSTALL AMPLIFIER AR4 (1).
    a. Install amplifier AR4 (1) with four screws (2), four lockwashers (3), and four nuts (4).
    b. Install insulation sleeving over ends of wiring prior to soldering.
    c. Remove labels and solder wires to amplifier AR4 (1) terminals.
    d. Protect soldered connections with insulation sleeving.

NOTE

Use multimeter to identify wires prior to connecting them.



37. INSTALL AMPLIFIER AR3 (1).
    a. Install amplifier AR3 (1) with four screws (2), four lockwashers (3), and four nuts (4).
    b. Install insulation sleeving over ends of wires prior to soldering.
    c. Remove labels and solder wires to amplifier AR3 (1) terminals.
    d. Protect soldered connections with insulation sleeving.



2-64. REPAIR OF INTERFACE CONTROL UNIT (209-074-051-3) (cont)

38. INSTALL AMPLIFIER AR2 (1).

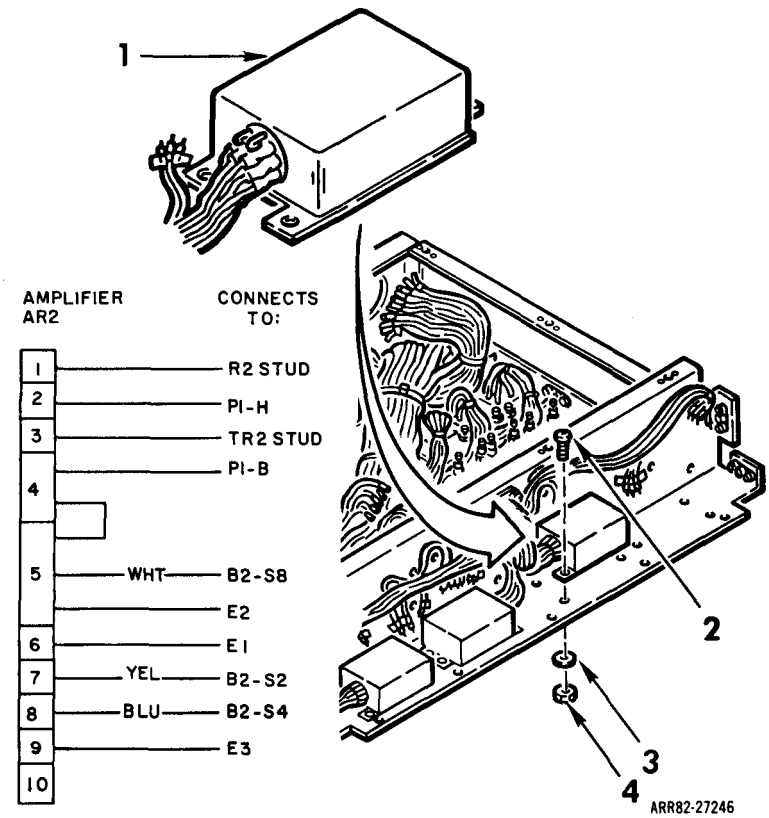
a. Install amplifier AR2 (1) with four screws (2), four lockwashers (3), and four nuts (4).

b. Install insulation sleeving over ends of wires prior to soldering.

c. Remove labels and solder wires to amplifier AR2 (1) terminals.

d. Protect soldered connections with insulation sleeving.

Use meter to ID wires

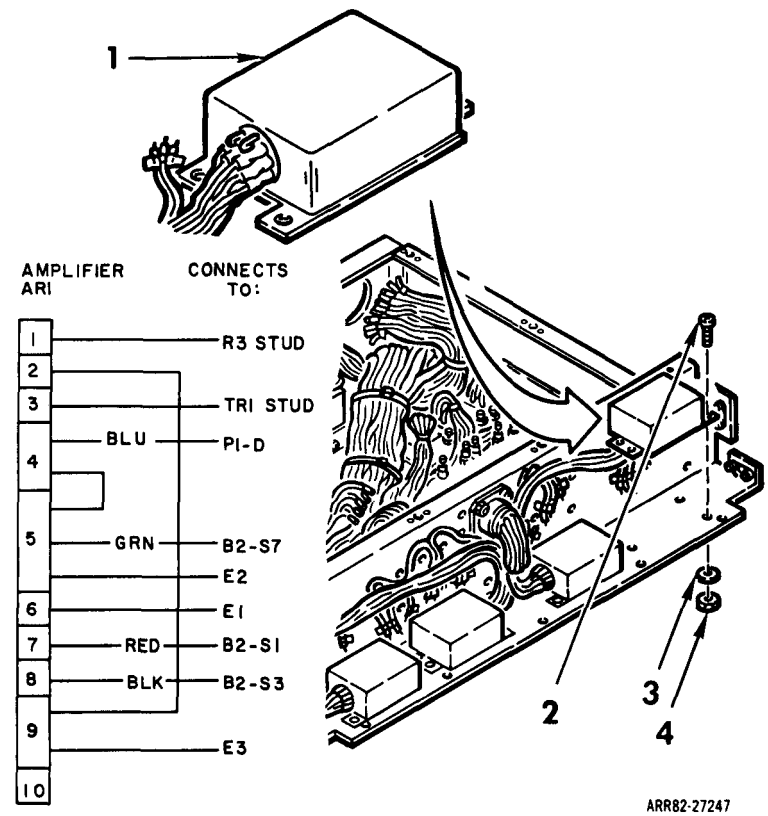


39. INSTALL AMPLIFIER AR1 (1).

a. Install amplifier AR1 (1) with four screws (2), four lockwashers (3), and four nuts (4).

b. Install insulation sleeving over ends of wires prior to soldering.

c. Remove labels and solder wires to amplifier AR1 (1) terminals.



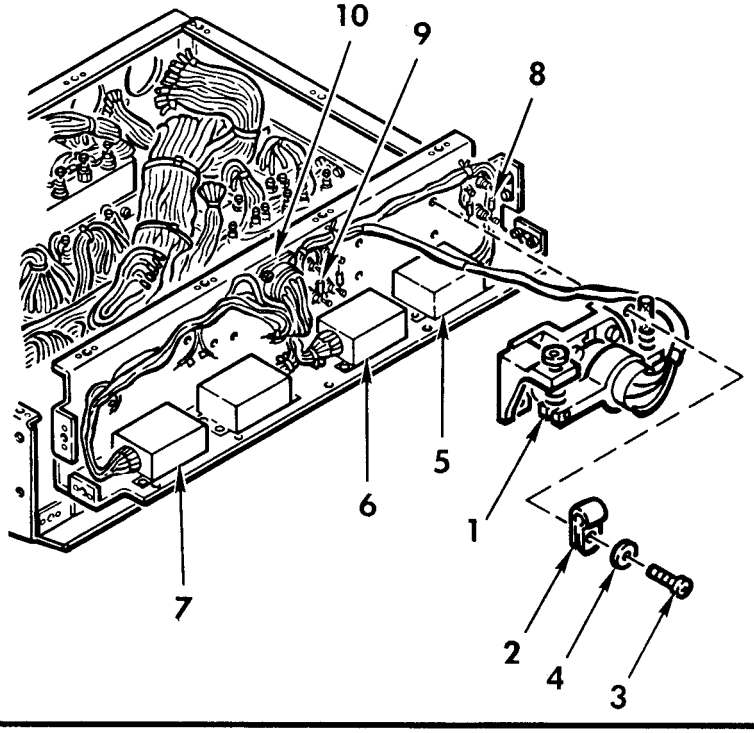
ASSEMBLY (cont)

40. INSTALL RESOLVER B2 MOUNT ASSEMBLY (1).
    a. Install resolver B2 mount assembly (1) and loop clamp (2) with four screws (3), and four washers (4).
    b. Install insulation sleeving over ends of wires prior to soldering to amplifiers AR1 (5), AR2 (6), and AR4 (7).
    c. Remove labels and solder wires to amplifiers AR1 (5), AR2 (6), and AR4 (7).
    d. Remove labels and solder wires to studs of thermistors TR1 (8) and TR2 (9).
    e. Remove labels and connect two wires to connector P1 (10). Pins will snap into place when inserted into connector by hand.

NOTE

Use multimeter to identify wires prior to connecting them.

RESOLVER B2		CONNECTS TO:
S1	RED	AR1-7
S2	YEL	AR2-7
S3	BLK	AR1-8
S4	BLU	AR2-8
S5	BRN	TR1 STUD
S6	ORN	TR2 STUD
S7	GRN	AR1-5
S8	WHT	AR2-5
R1	RED/WHT	P1-P
R2	YEL/WHT	AR4-4
R3	BLK/WHT	P1-N
R4	BLU/WHT	AR4-1



ARR82-27248

2-64. REPAIR OF INTERFACE CONTROL UNIT (209-074-051-3) (cont)

41. INSTALL RESOLVER B1 MOUNT ASSEMBLY (1).

a. Install resolver B1 mount assembly (1) and loop clamp (2) with four screws (3), and four washers (4).

b. Install insulation sleeving over ends of wires prior to soldering to amplifiers AR3 (5) and AR4 (6).

c. Remove labels and solder wires to amplifers AR3 (5) and AR4 (6).

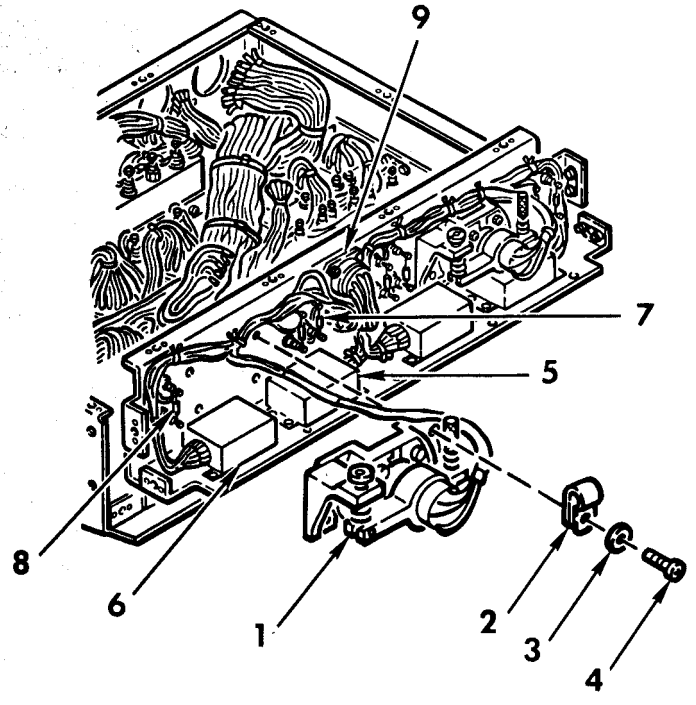
Remove labels and solder wires to studs of thermistors TR3 (7) and TR4 (8).

e. Remove labels and connect four wires to connector P1 (9). Pins will snap into place when inserted into connector by hand.

NOTE

Use multimeter to identify wires prior to connecting them.

RESOLVER B1		CONNECTS TO:
S1	RED	AR3-7
S2	YEL	AR4-7
S3	BLK	AR3-8
S4	BLU	AR4-8
S5	BRN	TR3 STUD
S6	ORN	TR4 STUD
S7	GRN	AR3-5
S8	WHT	AR4-5
R1	RED/WHT	P1-M
R2	YEL/WHT	P1-R
R3	BLK/WHT	P1-L
R4	BLU/WHT	P1-S



ARR82-27249

ASSEMBLY (cont)

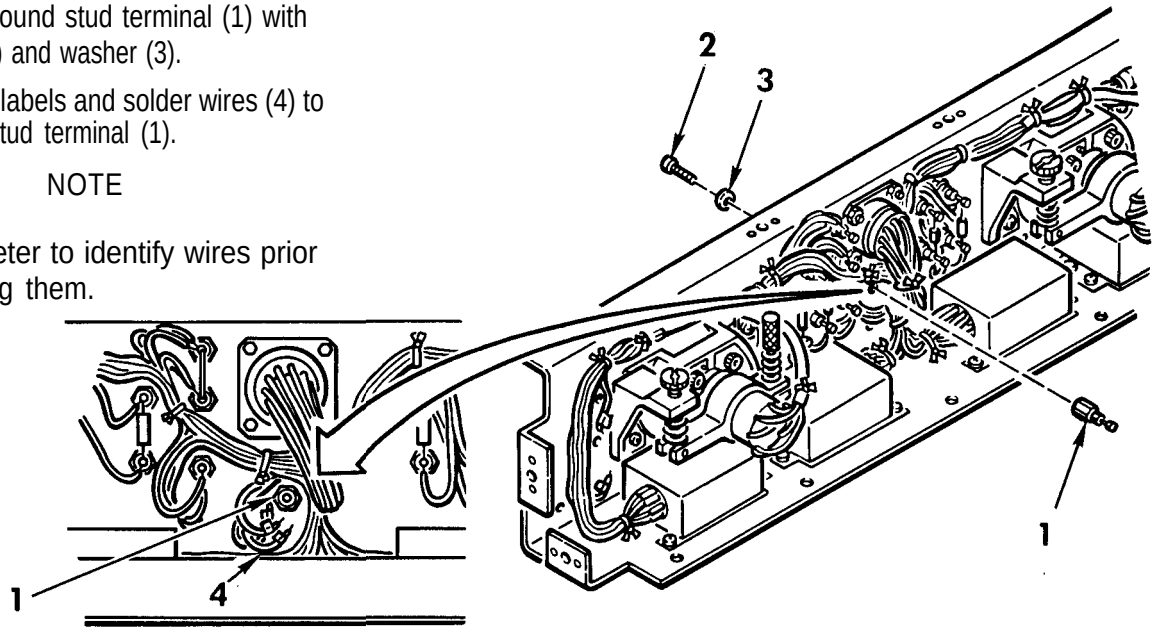
42. INSTALL GROUND STUD TERMINAL (1).

a. Install ground stud terminal (1) with screw (2) and washer (3).

b. Remove labels and solder wires (4) to ground stud terminal (1).

NOTE

Use multimeter to identify wires prior to connecting them.



ARR82-27250

43. INSTALL INSULATED STUD TERMINAL (1).

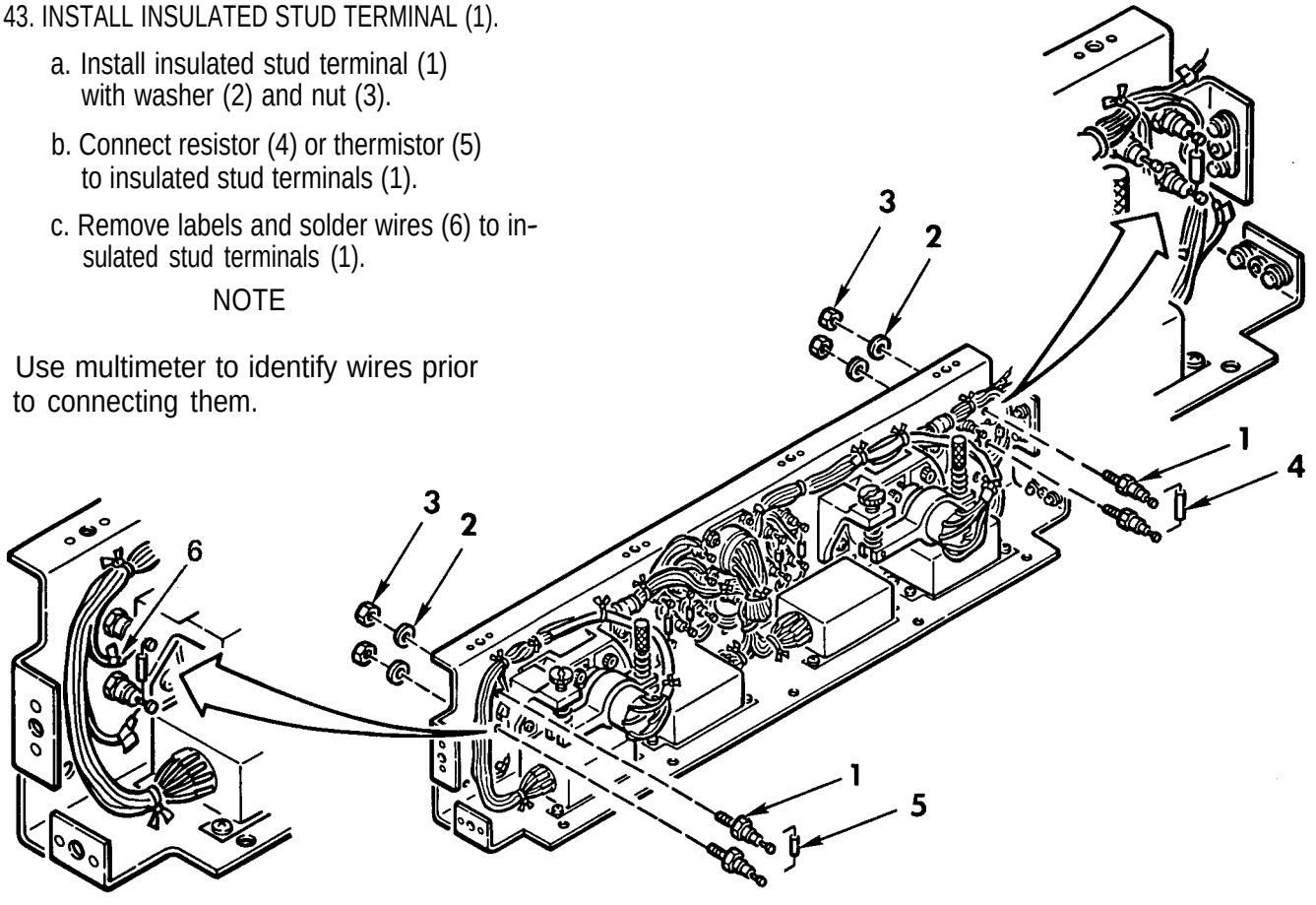
a. Install insulated stud terminal (1) with washer (2) and nut (3).

b. Connect resistor (4) or thermistor (5) to insulated stud terminals (1).

c. Remove labels and solder wires (6) to insulated stud terminals (1).

NOTE

Use multimeter to identify wires prior to connecting them.

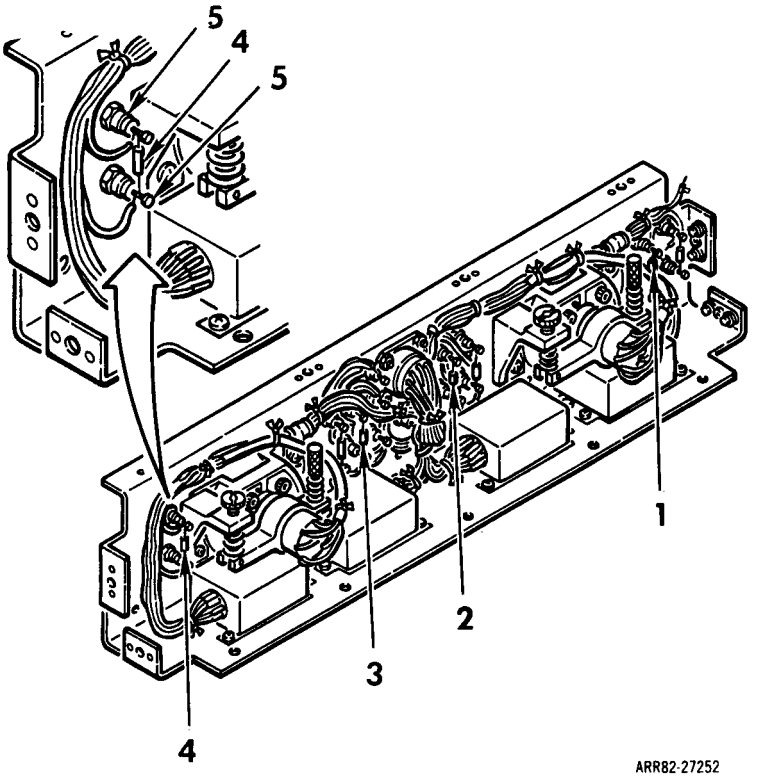


ARR82-27251

2-64. REPAIR OF INTERFACE CONTROL UNIT (209-074-051-3) (cOnt)

44. INSTALL THERMISTORS TR (1), TR2 (2), TR3 (3), OR TR4 (4).

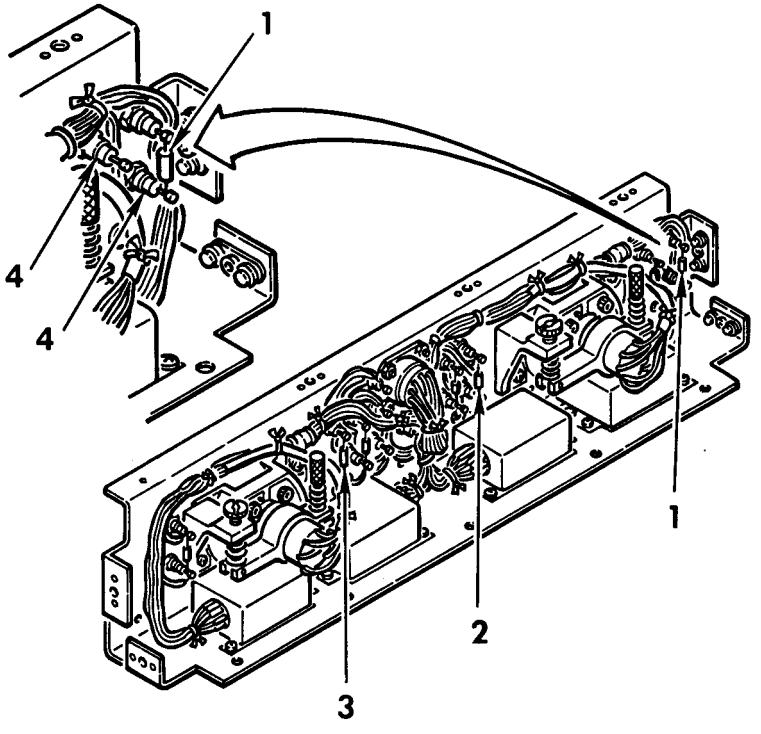
Connect thermistor (1, 2, 3, or 4) between two insulated stud terminals (5) at locations shown.



ARR82-27252

45. INSTAIL RESISTORS R3 (1), R2 (2), OR R4 (3).

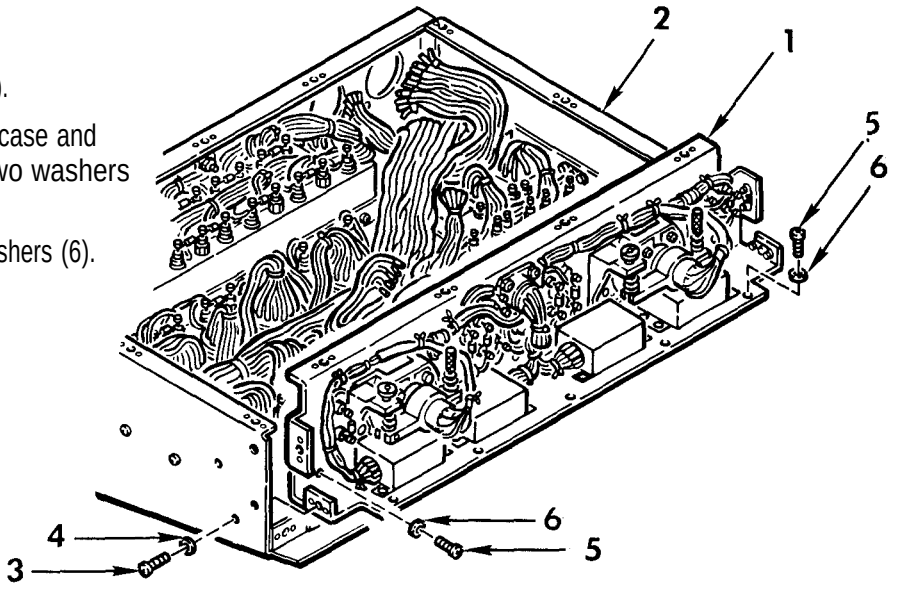
Connect resistor (1, 2 or 3) between two insulated stud terminals (4) at locations shown.



ARR82-27253

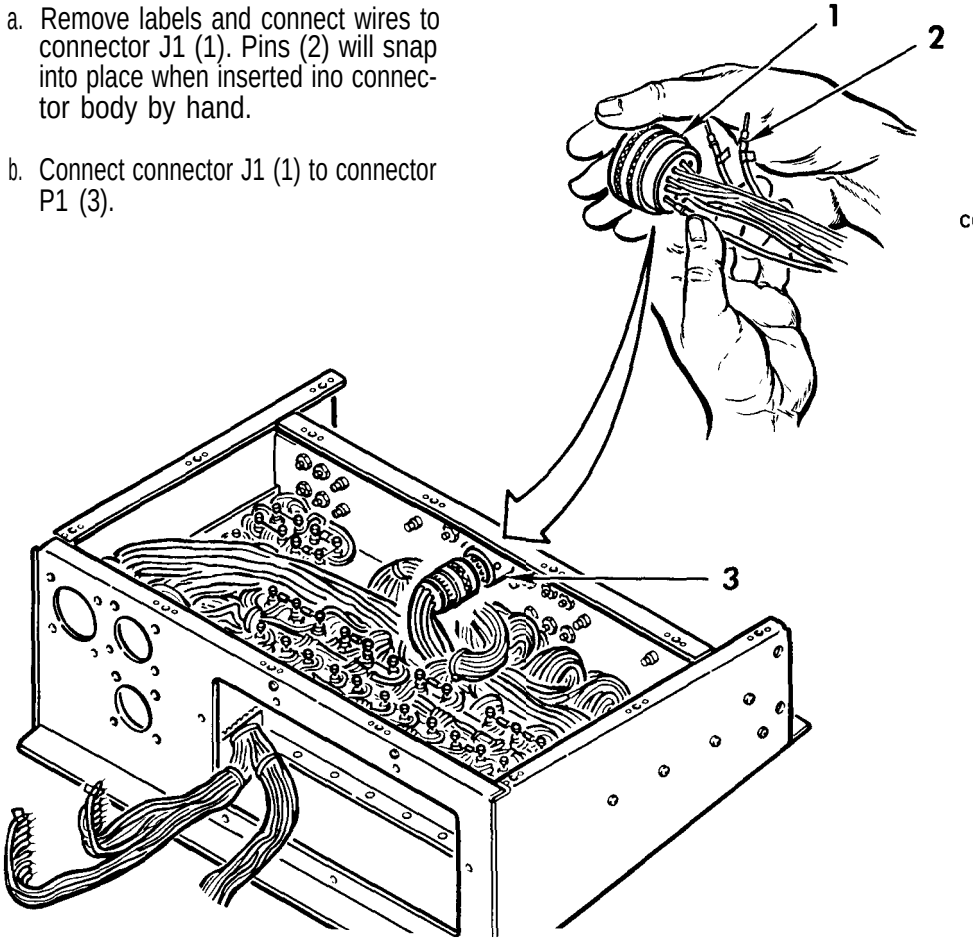
ASSEMBLY (cont)

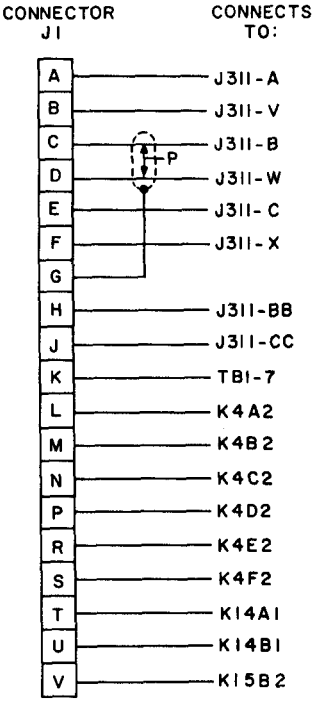
46. INSTALL SUPPORT ASSEMBLY (1).
    a. Place support assembly (1) in case and install two screws (3) and two washers (4) at each end.
    b. Install 10 screws (5) and 10 washers (6).



ARR82-27254

47. INSTALL CONNECTOR J1 (1).
    a. Remove labels and connect wires to connector J1 (1). Pins (2) will snap into place when inserted ino connector body by hand.
    b. Connect connector J1 (1) to connector P1 (3).





ARR82-27255

2-64. REPAIR OF INTERFACE CONTROL UNIT (209-074-051-3) (cont)

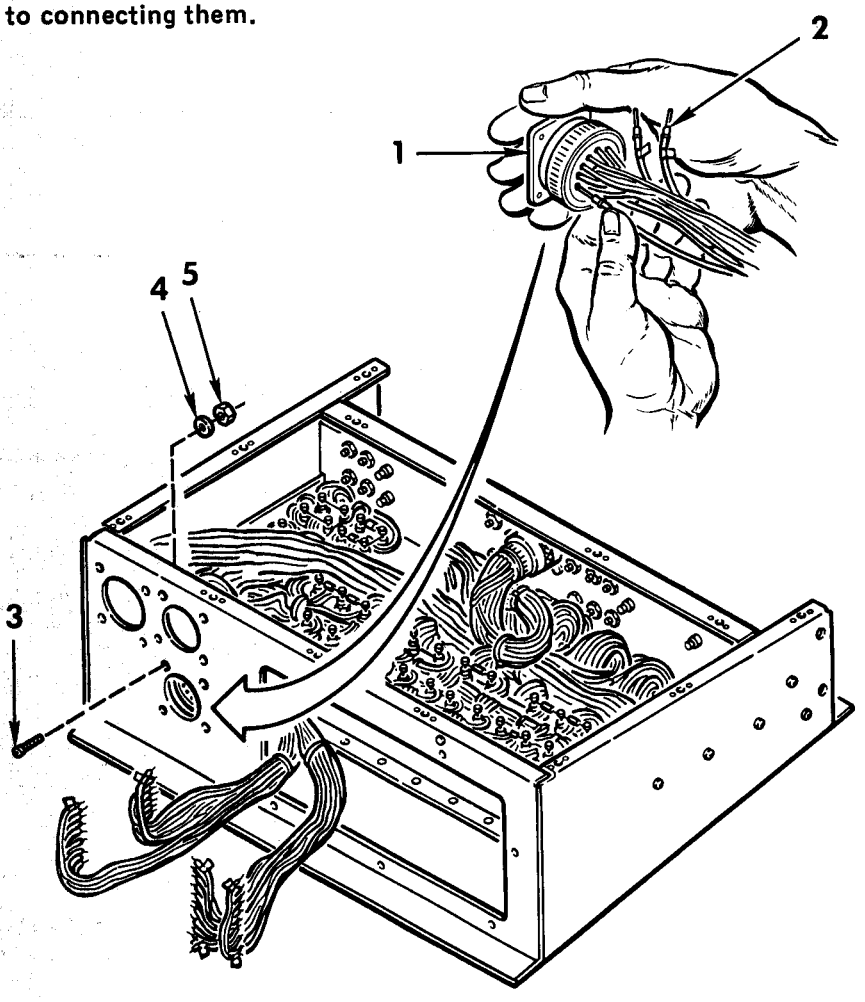
48. INSTALL CONNECTOR J313 (1).

a. Remove labels and connect wires to connector J313 (1). Pins (2) will snap into place when inserted into connector body by hand.

b. Install connector J313 (1) with four screws (3), four lockwashers (4), and four nuts (5).

NOTE

Use multimeter to identify wires prior to connecting them.



J313 PIN	CONNECTS TO:
A	K4BI
B	K4AI
C	K4DI
D	K4FI
E	K8DI
F	K8CI
H	KI9BI
K	KI8XI
L	AI-46
M	AI-43
N	KI6-A2
R	A2-11K
S	KIODI
T	KIOCI
U	KIFI
V	KIDI
W	KIBI
X	KIAI
Y	K4CI
Z	K4EI
A	SHIELD
B	K8FI
E	KIIC2
G	A2-32
H	SHIELD
I	KIEI
J	KICI
K	SHIELD
M	KI9B2
N	K8EI
P	K8BI
Q	K8AI
R	KIOBI
S	KIOAI
T	SHIELD

ARR82-27256

ASSEMBLY (cont)

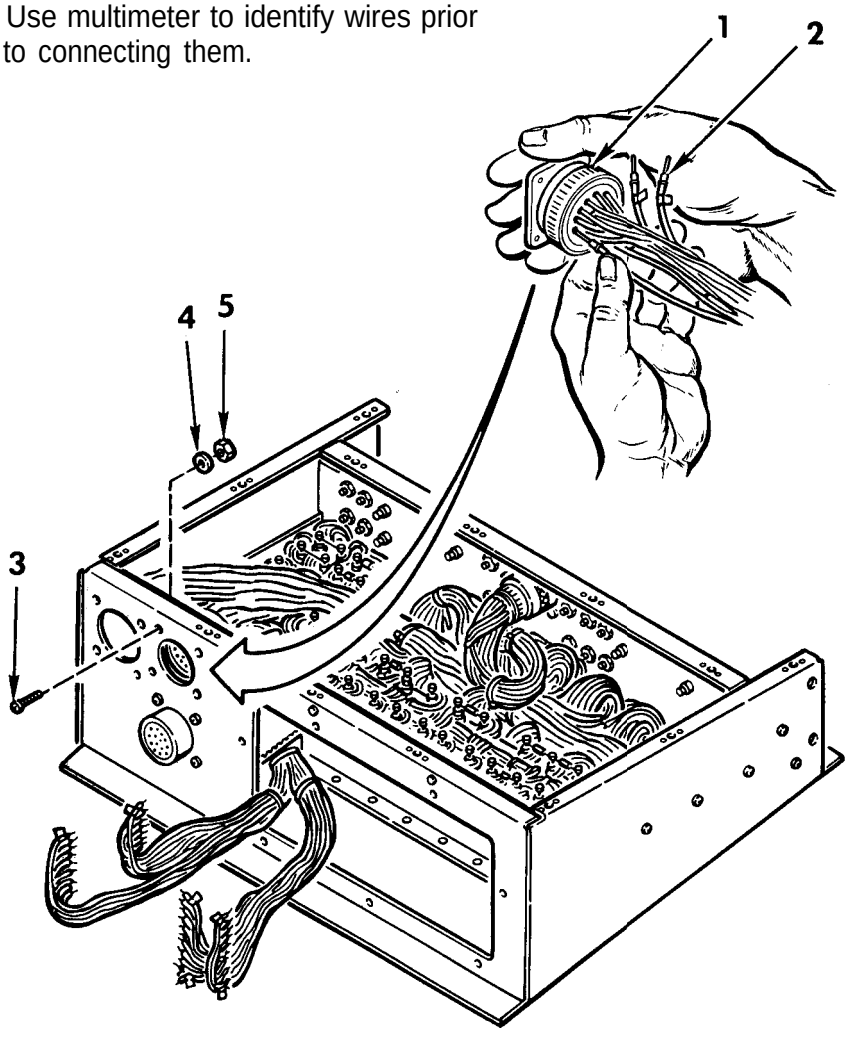
49. INSTALL CONNECTOR J312 (1).

a. Remove labels and connect wires to connector J312 (1). Pins (2) will snap into place when inserted into connector body by hand.

b. Install connector J312 (1) with four screws (3), four lockwashers (4), and four nuts (5).

NOTE

Use multimeter to identify wires prior to connecting them.



J312 PIN	CONNECTS TO:
A	K2F2
B	K2E2
C	K2B2
D	K2D2
F	K9B2
G	K9A2
H	K9D2
J	K26B3
N	K26B1
P	K10D2
R	K10A2
S	K10B2
T	A2-2
U	K5D2
V	K5B2
W	K5F2
X	K5E2
Y	K2A2
Z	K2C2
A	A2-19
B	K9C2
C	K26A3
F	K26A1
G	K10C2
I	K5C2
J	K5A2
K	SHIELD
N	K12A1
P	SHIELD
Q	SHIELD
R	K13A1
S	SHIELD
T	TB1-7

ARR82-27257

2-64. REPAIR OF INTERFACE CONTROL UNIT (209-074-051-3) (cont)

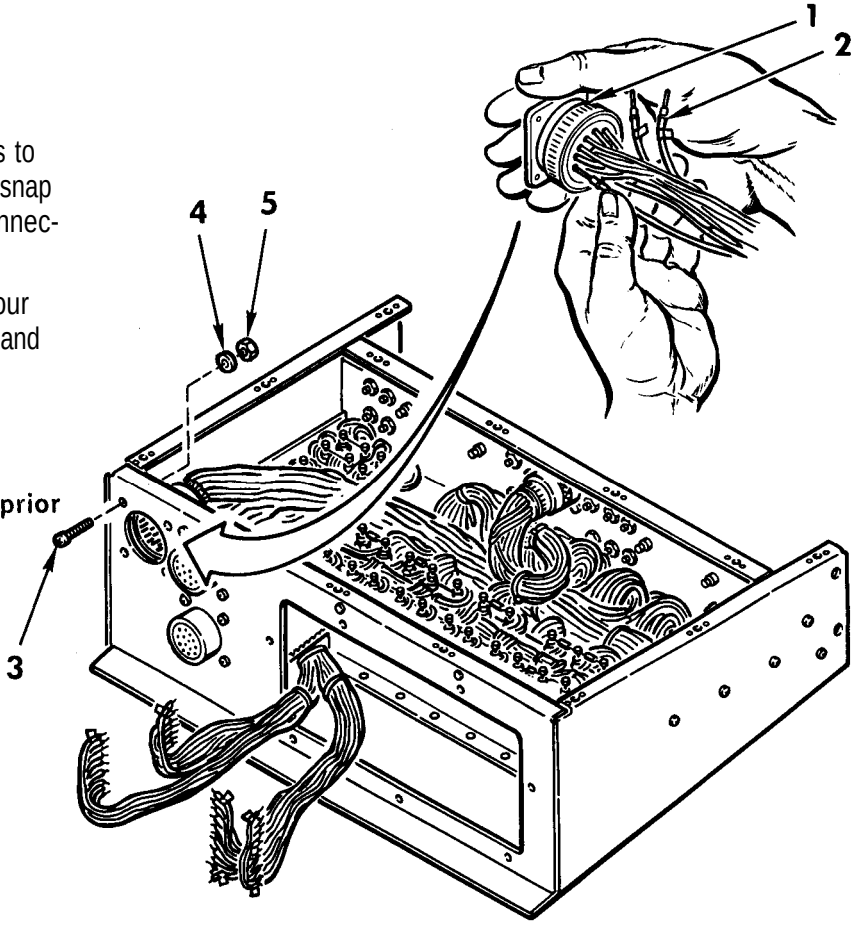
50. INSTALL CONNECTOR J311 (1).

Remove labels and connect wires to connector J311 (1). Pins (2) will snap into place when inserted into connector body by hand.

Install connector J311 (1) with four screws (3), four lockwashers (4), and four nuts (5).

NOTE

Use multimeter to identify wires prior to connecting them.



J311 PIN	CONNECTS TO:	J311 PIN	CONNECTS TO:	J311 PIN	CONNECTS TO:
A	J1-A	U	A2-33	N	TB1-7
B	J1-C	V	J1-B	P	A3-1
C	J1-E	W	J1-D	Q	A3-2
D	K17X1	X	J1-F	R	A2-11E
E	A1-45	Y	SHIELD	T	K24X1
F	K14X1	Z	SHIELD	W	K13A2
G	K23A2	A	K25X1	X	K11B2
H	SPLICE A1-40	B	TB1-3	Y	K12B3
J	TB1-2	C	TB1-4	Z	A2-11A
K	K29X1	D	K15X1	AA	K30A2
L	K22A2	E	K11X2	BB	J1-H
M	K13C2	F	A3-13	CC	J1-J
N	K12B2	G	K13B3	DD	A3-11
P	K11X1	H	K13B2	EE	K13X1
R	SHIELD	I	K12C2	FF	K12X1
S	A3-3	K	A2-11G	GG	K12A2
T	A2-16	M	A2-11B	HH	K11A2

ARR82-27258

ASSEMBLY (cont)

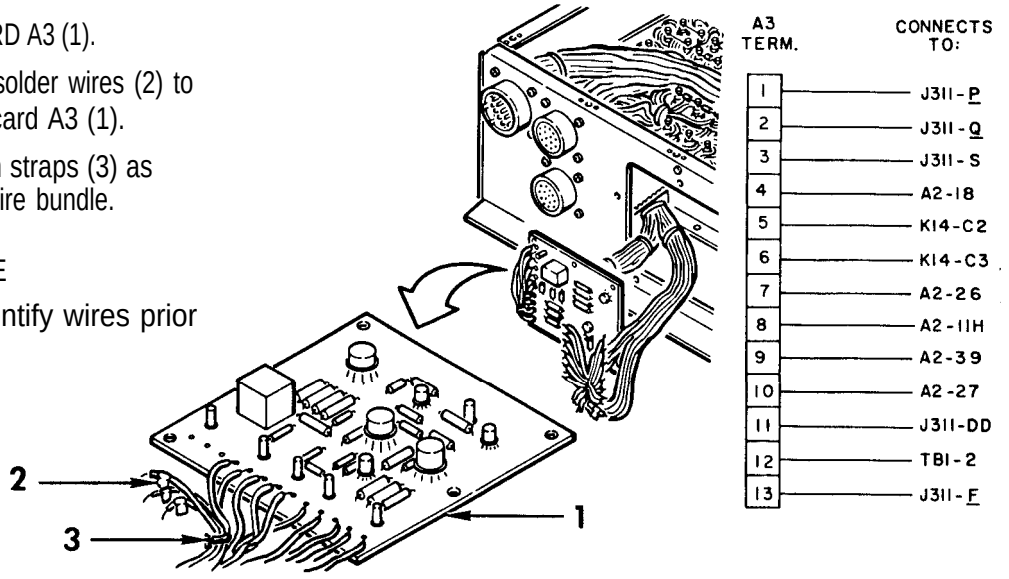
51. CONNECT CIRCUIT CARD A3 (1).

a. Remove labels and solder wires (2) to terminals of circuit card A3 (1).

b. Install cable tiedown straps (3) as necessary to form wire bundle.

NOTE

Use multimeter to identify wires prior to connecting them.



A3 TERM.	CONNECTS TO:
1	J311-P
2	J311-Q
3	J311-S
4	A2-18
5	K14-C2
6	K14-C3
7	A2-26
8	A2-11H
9	A2-39
10	A2-27
11	J311-DD
12	TB1-2
13	J311-F

ARR82-27259

52. CONNECT CIRCUIT CARD A2 (1).

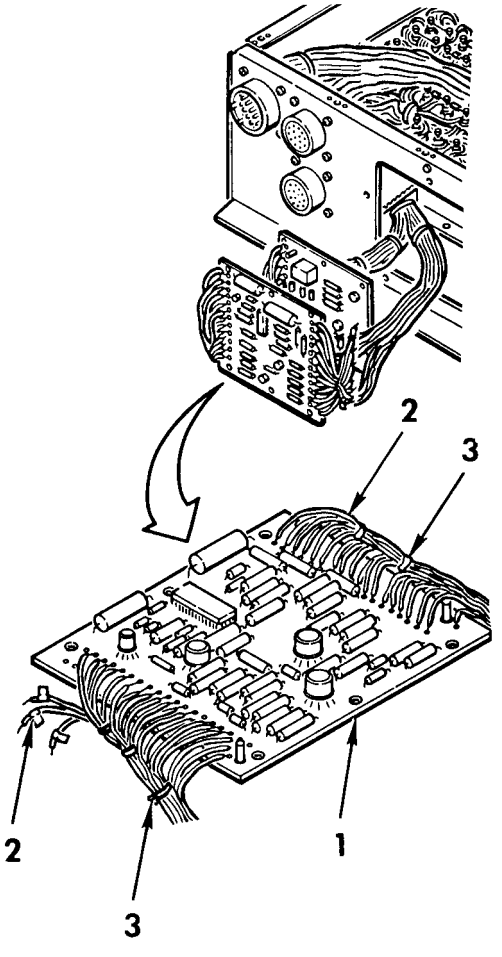
a. Remove labels and solder wires (2) to terminals of circuit card A2 (1).

b. Install cable tiedown straps (3) as necessary to form wire bundle.

NOTE

Use multimeter to identify wires prior to connecting them.

A2 TERM.	CONNECTS TO:
1	A1-51
2	J312-T
3	K19A2
4	K18A2
5	TB1-6
6	K22X1
7	K24B3
8	K15A2
9	K24A1
10	K25A1
11A	J311-Z
11B	J311-M
11C	K14A3
11D	TB1-8
11E	J311-R
11F	K15B3
11G	J311-K
11H	A3-8
11J	SHIELD
11K	J313-R
12	K24A3
13	K8E2
14	K8D2
15	K8C2
16	J311-T
17	K8F2
18	A3-4
19	J312-A
20	K14B2
21	K14A2
22	K29A3
23	K29B1
24	K29A1
25	K25B1
26	A3-7
27	A3-10
28	K24B1
29	K17A3
30	K17A1
31	K29A2
32	J313-G
33	J311-U
34	K20B1
35	A1-44
36	K8A2
37	K17B1
38	K17B3
39	A3-9



ARR82-27260

2-64. REPAIR OF INTERFACE CONTROL UNIT (209-074-051-3) (cont)

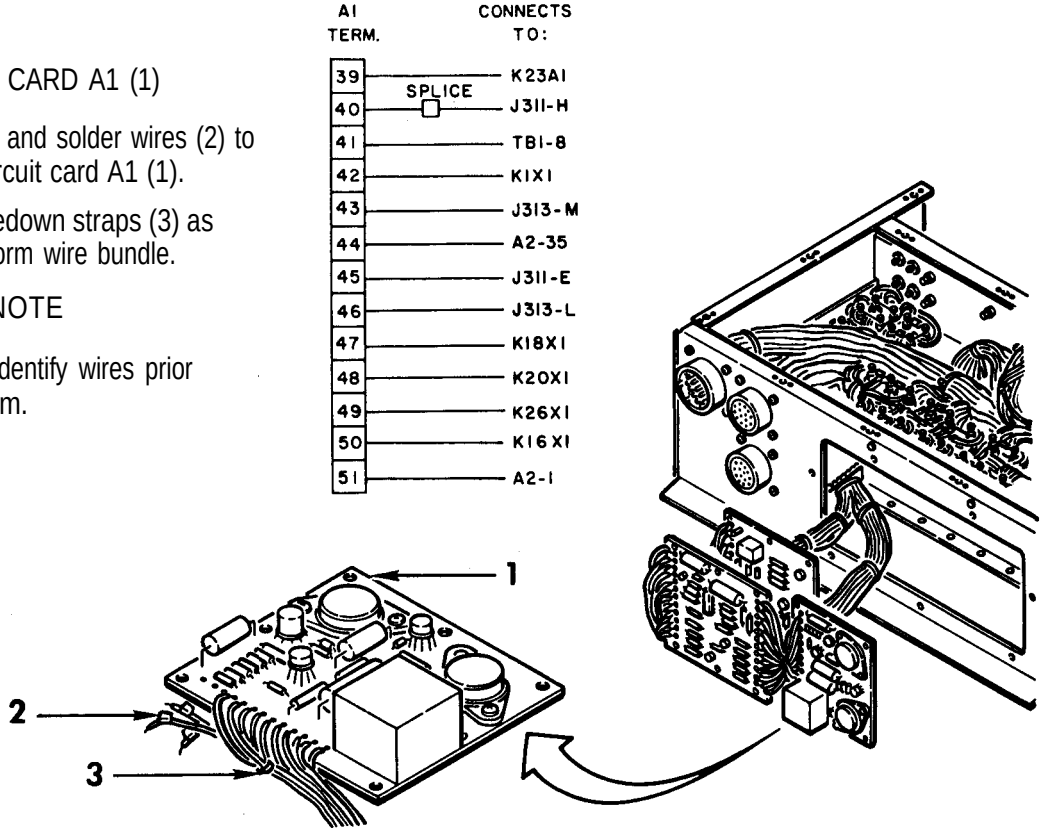
53. CONNECT CIRCUIT CARD A1 (1)

a. Remove labels and solder wires (2) to terminals of circuit card A1 (1).

b. Install cable tiedown straps (3) as necessary to form wire bundle.

NOTE

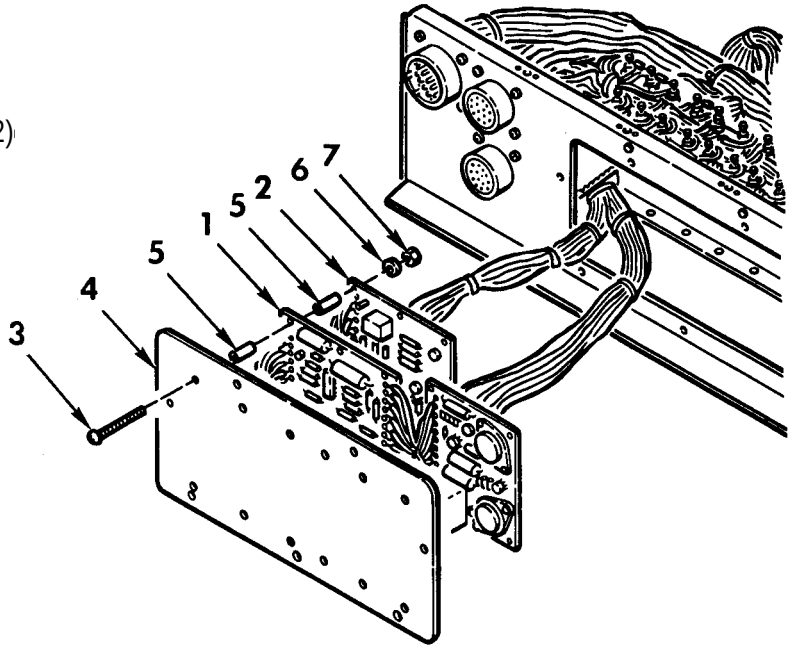
Use multimeter to identify wires prior to connecting them.



ARR82-27261

54. INSTALL CIRCUIT CARDS A2 (1) AND A3 (2).

Secure circuit cards A2 (1) and A3 (2) to door (3) with 6 screws (4), 12 sleeve spacers (5), 6 lockwashers (6), and 6 nuts (7).

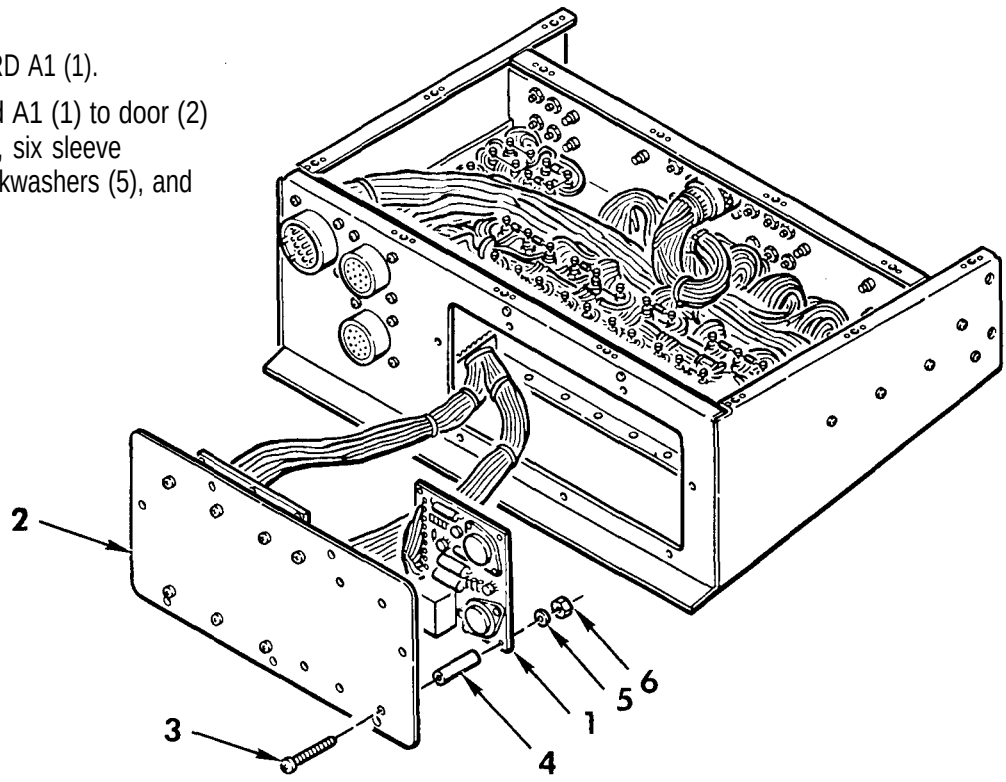


ARR82-27262

ASSEMBLY (cont)

55. INSTALL CIRCUIT CARD A1 (1).

Secure circuit card A1 (1) to door (2) with six screws (3), six sleeve spacers (4), six lockwashers (5), and six nuts (6).

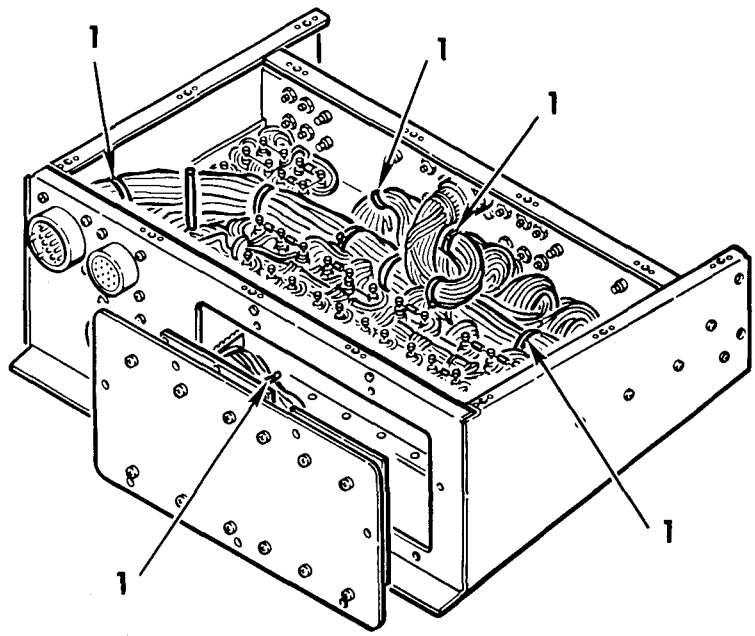


ARR82-27263

56. INSTALL CABLE TIEDOWN STRAPS (1).

Examine all wiring disturbed by component removal and installation.

Form wiring into neat bundles and install cable tiedown straps (1) as required. Do not stress wire connections.

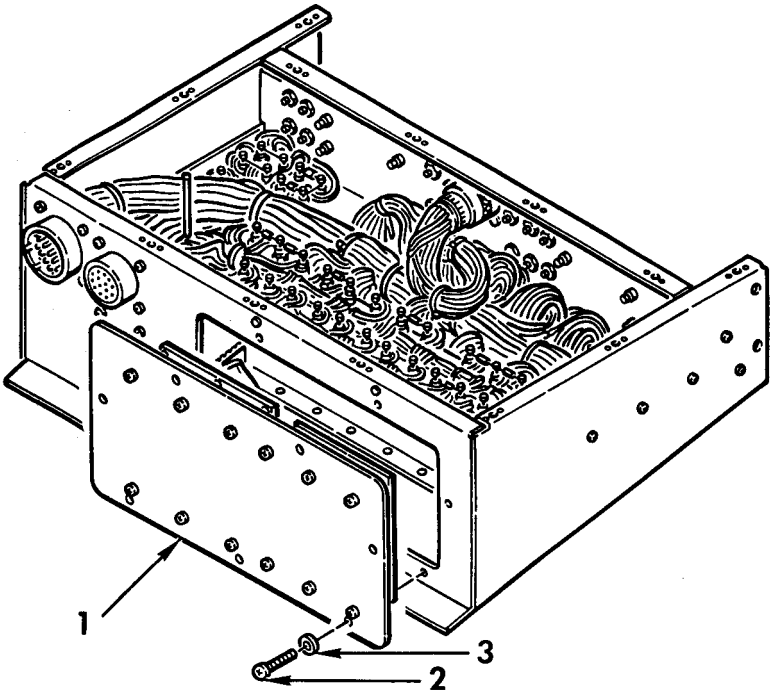


ARR82-27264

2-64. REPAIR OF INTERFACE CONTROL UNIT (209-074-051-3) (cont)

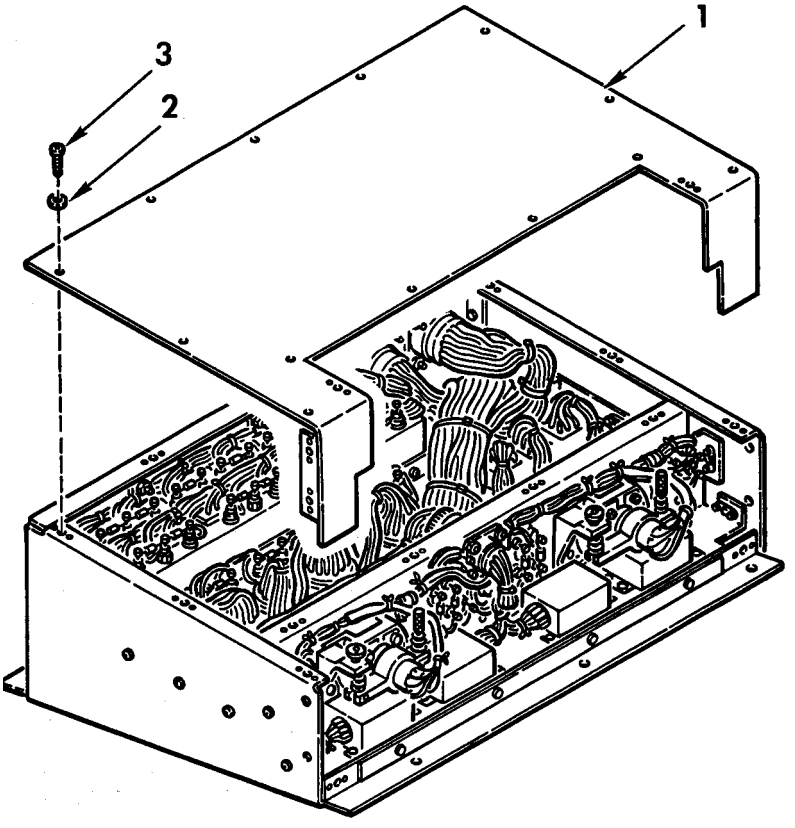
57. INSTALL DOOR (1).

Install door (1), with seven screws (2) and seven washers (3).



ARR82-27265

58. Install cover (1) with 15 screws (2) and 15 washers (3).

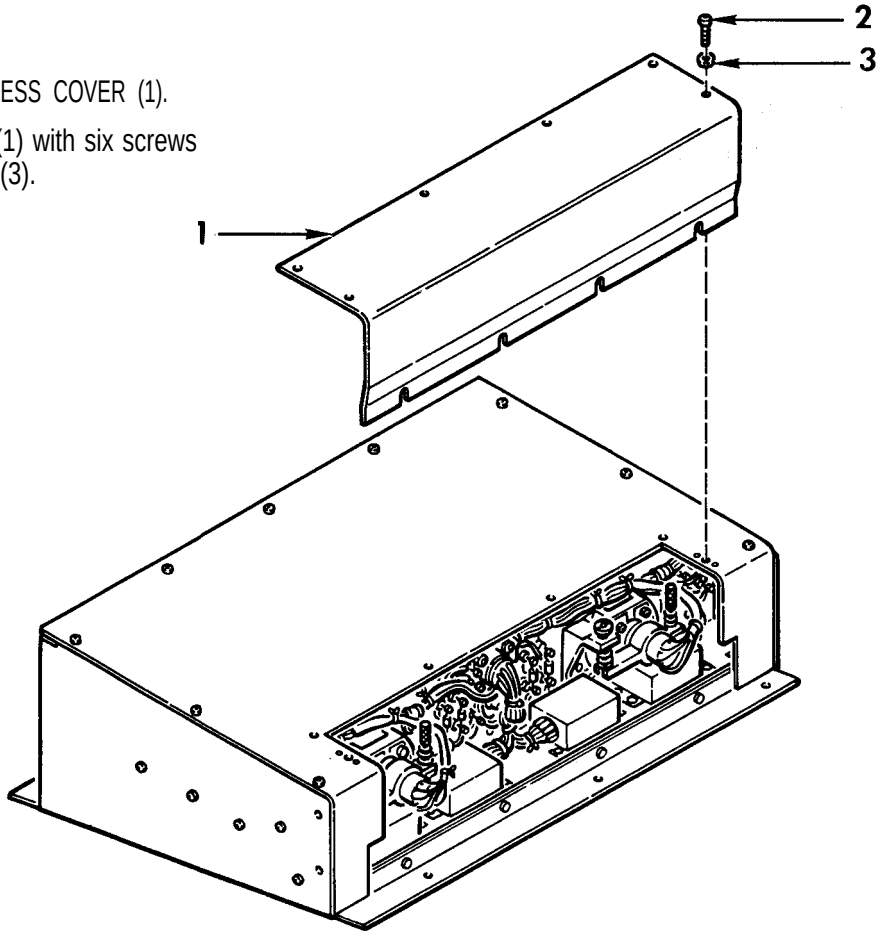


ARR82-27266

ASSEMBLY (cont)

59. INSTALL RESOLVER ACCESS COVER (1).

Install access cover (1) with six screws (2), and six washers (3).

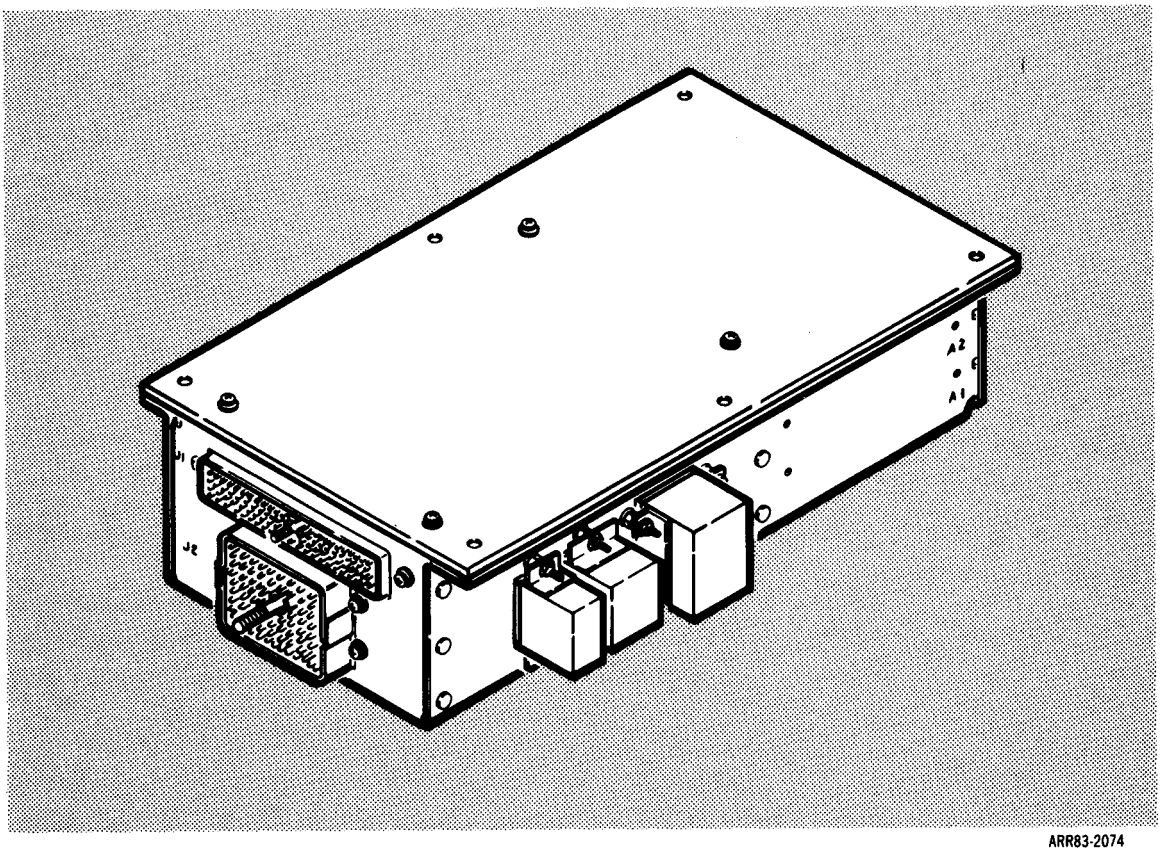


ARR82-27267

END OF TASK

Section XXII. MAINTENANCE OF LOGIC RELAY ASSEMBLY

Section Contents	Para
Repair of Logic Relay Assembly	2-65



ARR83-2074

2-65. REPAIR OF LOGIC RELAY ASSEMBLY

DESCRIPTION

This task covers: Disassembly, cleaning, inspection, and assembly.

INITIAL SETUP

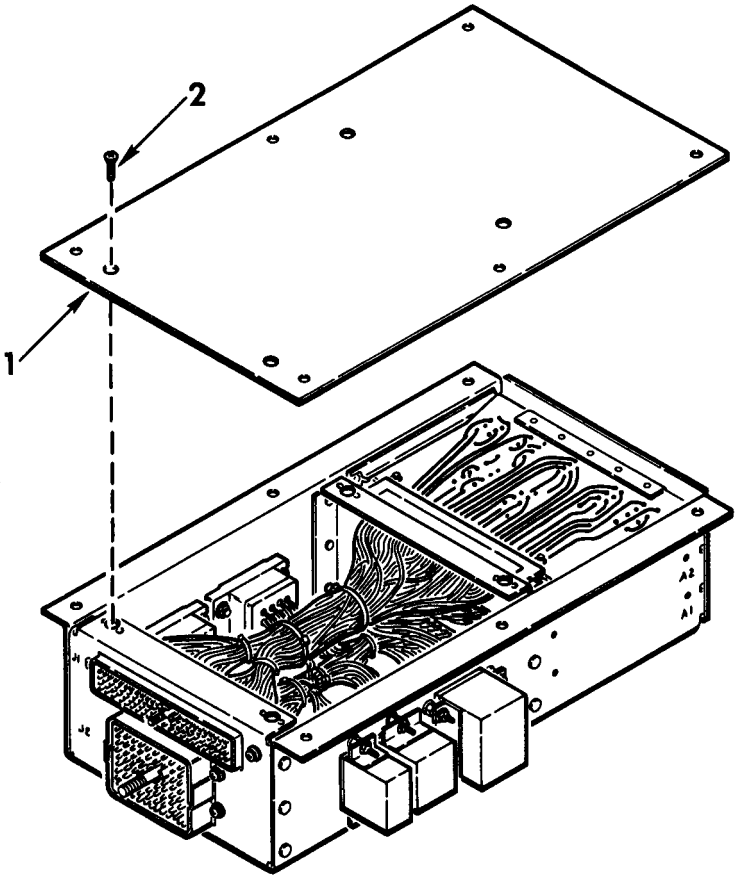
Tool/Test and Support Equipment:
Tool Set, A/C Armament
Repairman: Basic
Tool Set, A/C Armament
Repairman: Supplemental
CCA Protective Bags
Multimeter AN/USM-223
Materials:
Solder (Item 28, Appx B)
Strap (Item 30, Appx B)

Personnel Required:
68J Aircraft Fire Control
Repairer

Equipment Conditions:
In shop on bench.
No power applied.

DISASSEMBLY

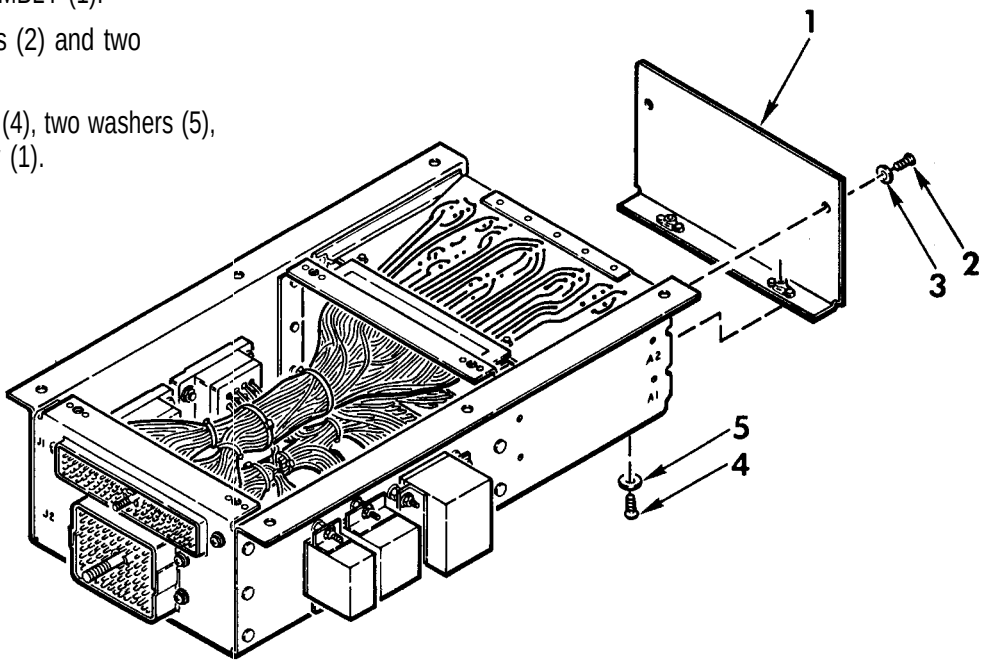
Remove cover (1) and four screws (2).



ARR82-27068

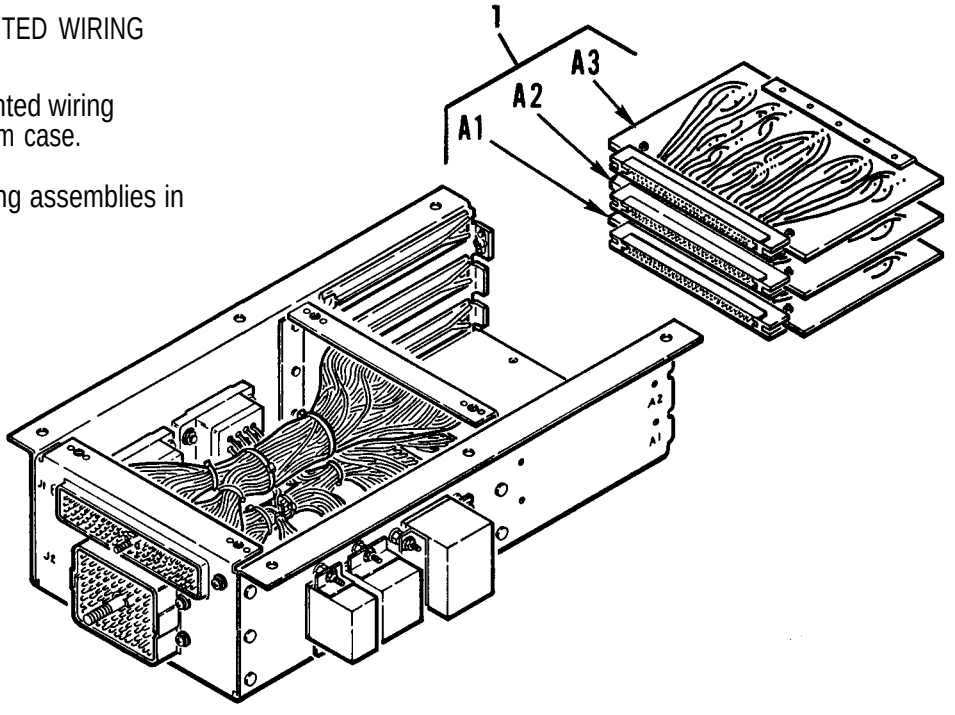
DISASSEMBLY (cont)

2. REMOVE COVER ASSEMBLY (1).
   a. Remove two screws (2) and two washers (3).
   b. Remove two screws (4), two washers (5), and cover assembly (1).



ARR82-27069

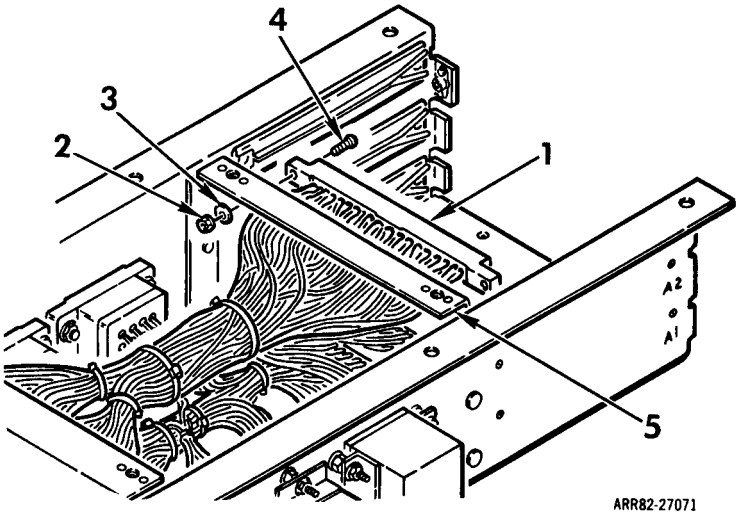
3. REMOVE THREE PRINTED WIRING ASSEMBLIES (1).
   a. Remove three printed wiring assemblies (1) from case.
   b. Place printed wiring assemblies in protective bags.



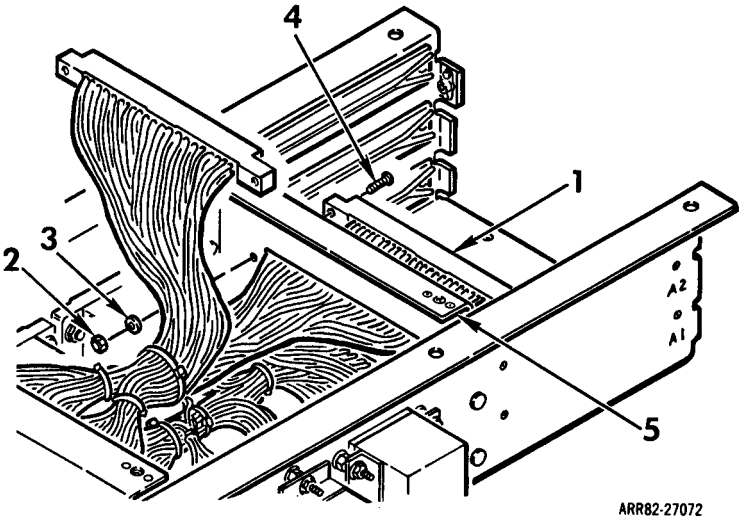
ARR82-27070

2-65. REPAIR OF LOGIC RELAY ASSEMBLY (cont)

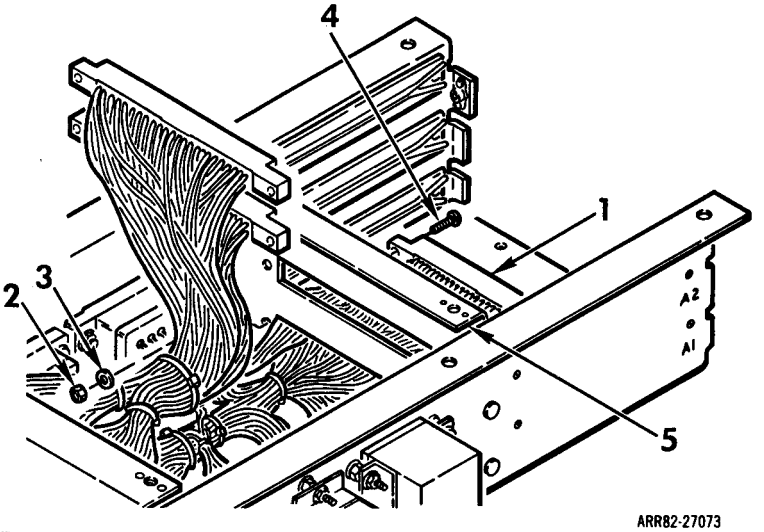
4. REMOVE CONNECTOR A3J1 (1).
   a. Remove two nuts (2), two washers (3), and two screws (4).
   b. Separate connector A3J1 (1) from case (5).



REMOVE CONNECTOR A2J1 (1).
   a. Remove two nuts (2), two washers (3), and two screws (4).
   b. Separate connector A2J1 (1) from case (5).



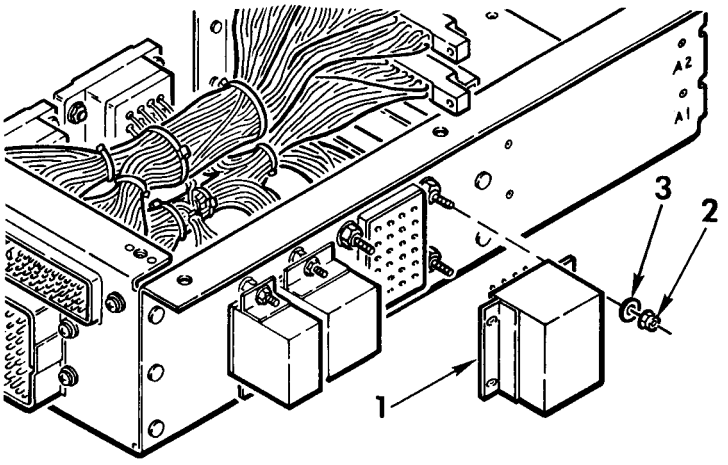
6. REMOVE CONNECTOR A1J1 (1).
   a. Remove two nuts (2), two washers (3), and two screws (4).
   b. Separate connector A1J1 (1) from case (5).



DISASSEMBLY (cont)

7. REMOVE RELAY K3 (1).

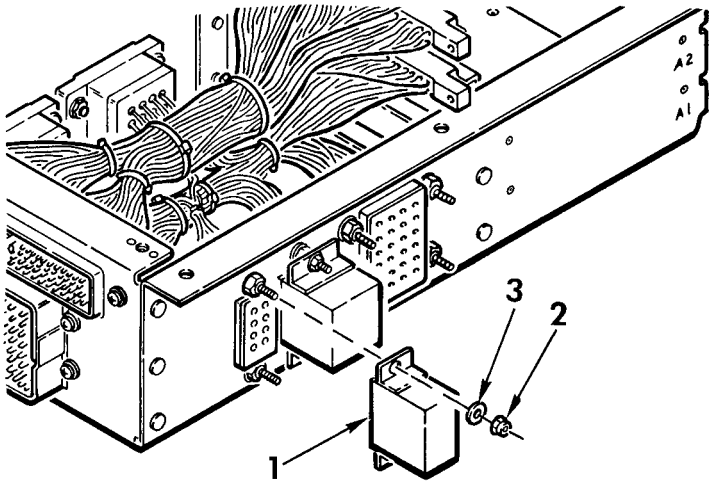
Remove four nuts (2), four washers (3), and relay K3 (1).



ARR82-27074

8. REMOVE RELAY K5 (1).

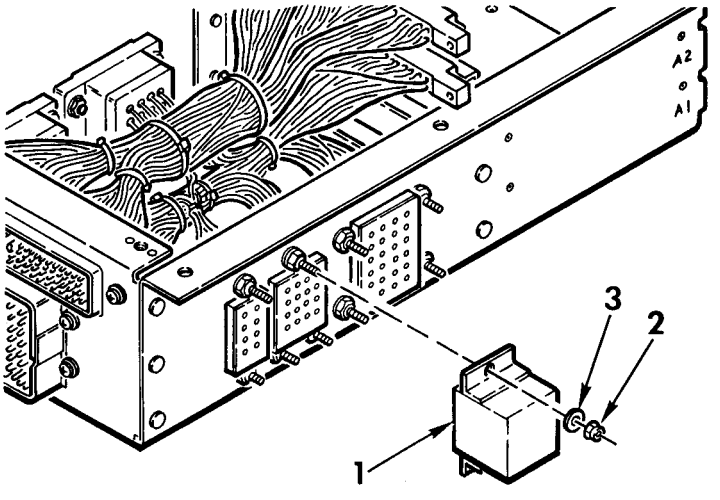
Remove two nuts (2), two washers (3), and relay K5 (1).



ARR82-27075

9. REMOVE RELAY K4 (1).

Remove three nuts (2), three washers (3), and relay K4 (1).

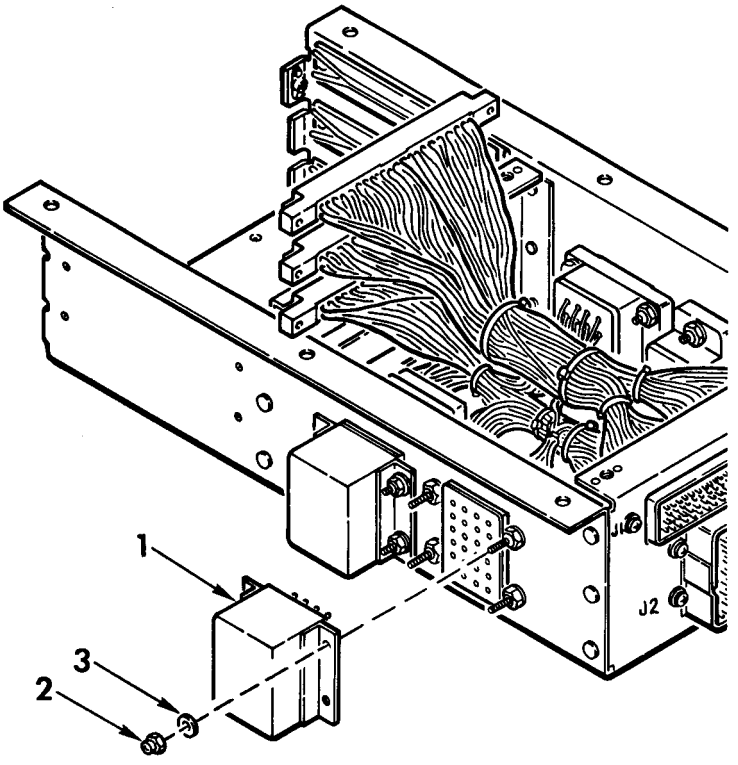


ARR82-27076

2-65. REPAIR OF LOGIC RELAY ASSEMBLY (cont)

10. REMOVE RELAY K1 (1).

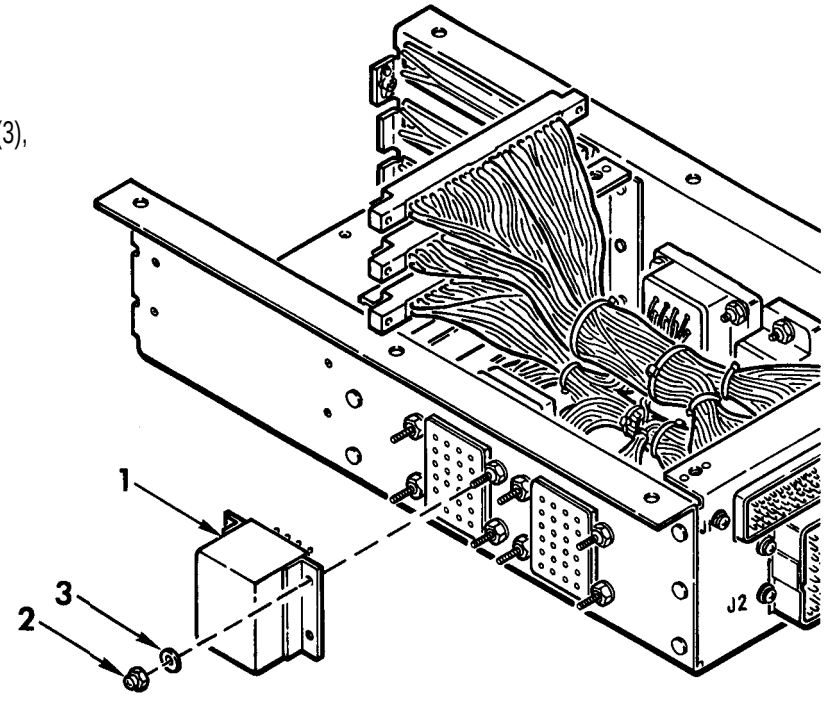
Remove four nuts (2), four washers (3), and relay K1 (1).



ARR82-27077

11. REMOVE RELAY K2 (1).

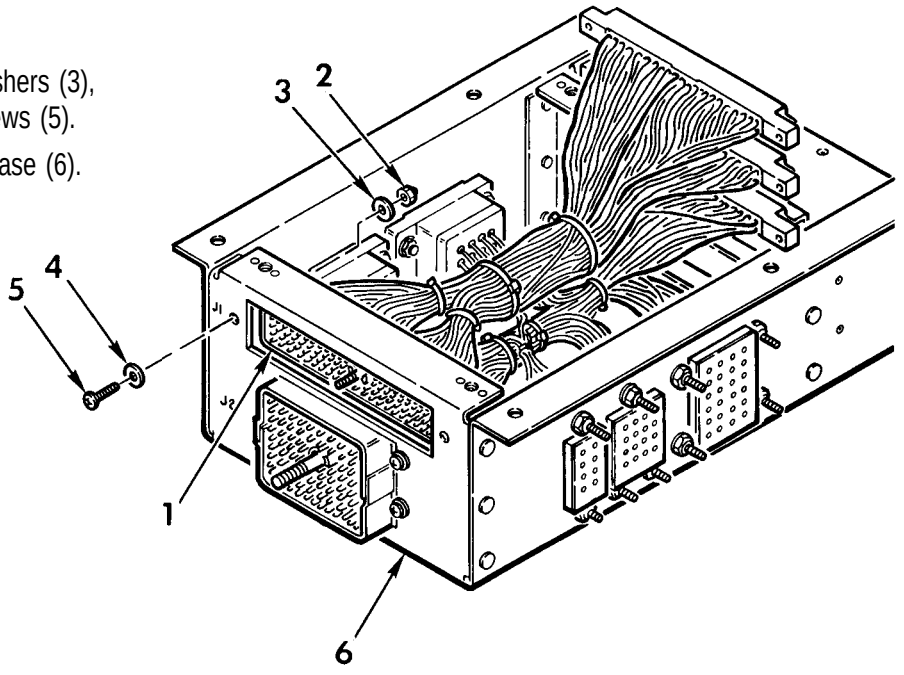
Remove four nuts (2), four washers (3), and relay K2 (1).



ARR82-27078

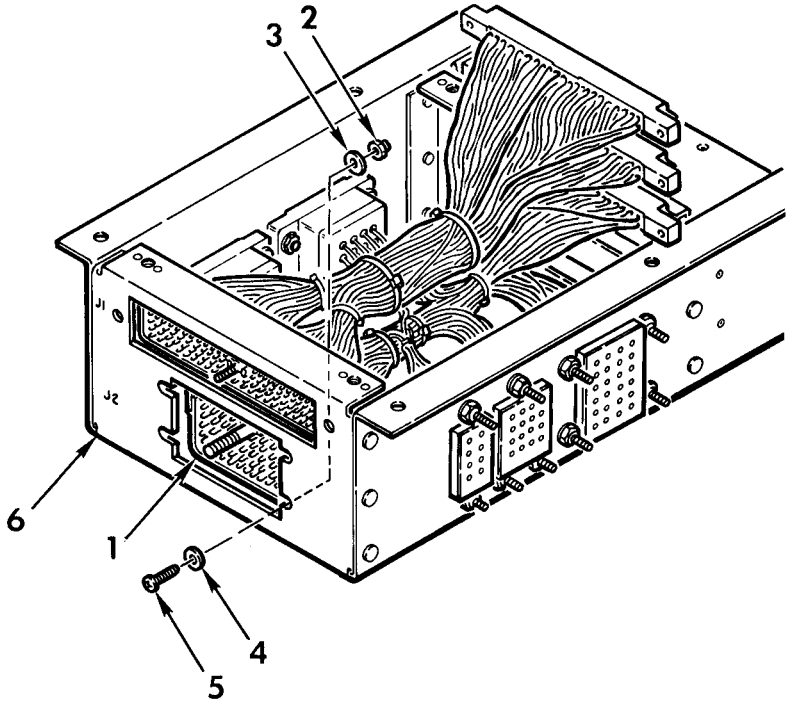
DISASSEMBLY (cont)

12. REMOVE CONNECTOR A5J1 (1).
    a. Remove two nuts (2), two washers (3), two washers (4), and two screws (5).
    b. Separate connector (1) from case (6).



ARR82-27079 A

13. REMOVE CONNECTOR A5J2 (1).
    a. Remove four nuts (2), four washers (3), four washers (4), and four screws (5).
    b. Separate connector (1) from case (6).



ARR82-27080 A

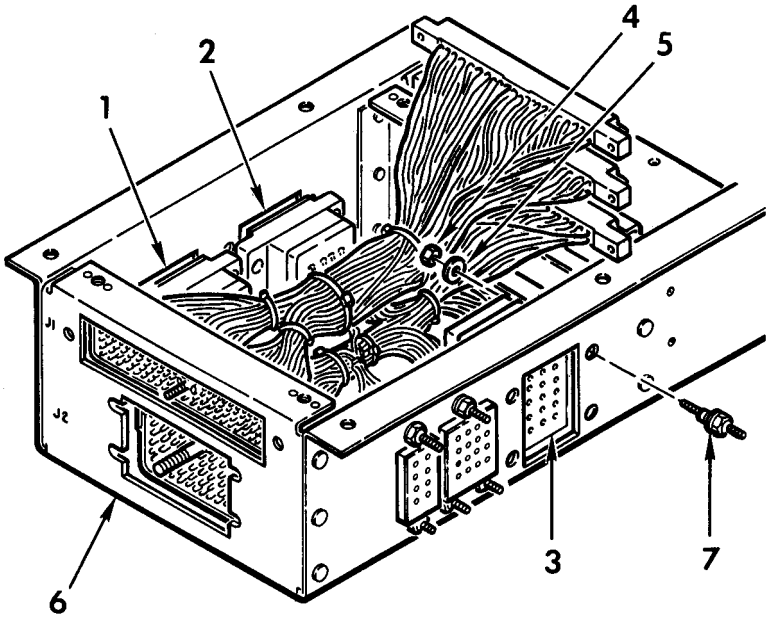
2-65. REPAIR OF LOGIC RELAY ASSEMBLY (cont)

14. REMOVE RELAY CONNECTORS XK1 (1), XK2 (2), AND XK3 (3).

a. Remove four nuts (4), and four washers (5), and separate relay connector XK3 (3) from case (6).

b. Repeat step a to separate relay connectors XK1 (1) and XK2 (2) from case (6).

c. Retain stud/washer.nut assemblies (7) for reinstallation.



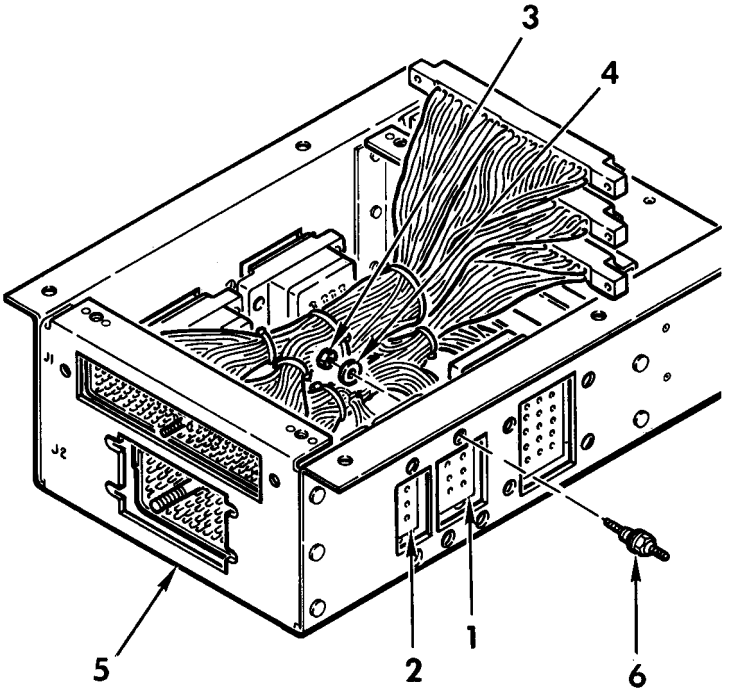
ARR82-27081A

15. REMOVE RELAY CONNECTORS XK4 (1) AND XK5 (2)

a. Remove three nuts (3) and three washers (4), and separate relay connector XK4 (1) from case (5).

b. Repeat step a to separate relay connector XK5 (2) from case (5).

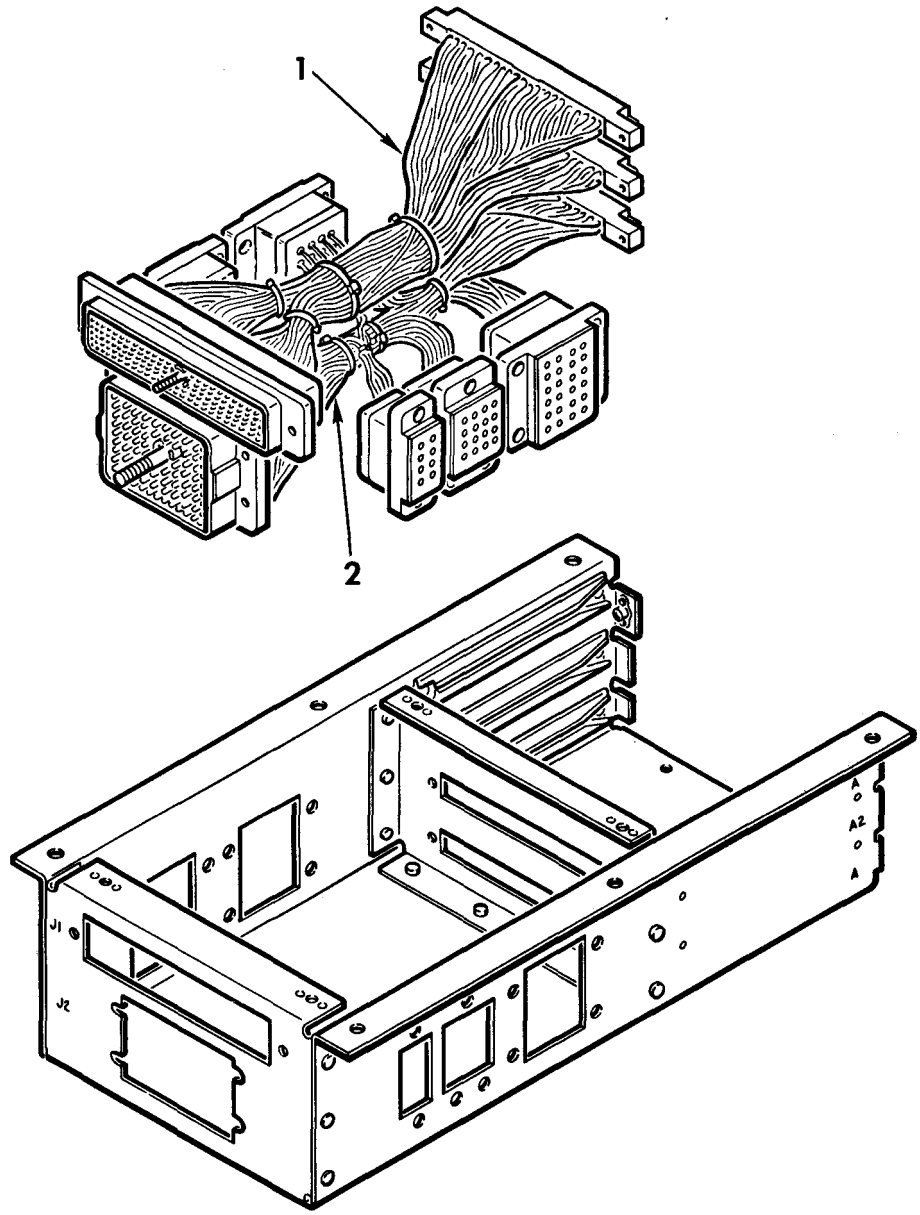
c. Retain stud/washer/nut assemblies (6) for reinstallation.



ARR82-27082A

DISASSEMBLY (cont)

16. REMOVE WIRE HARNESSES (1 AND 2) AS AN ASSEMBLY.



ARR82-27083

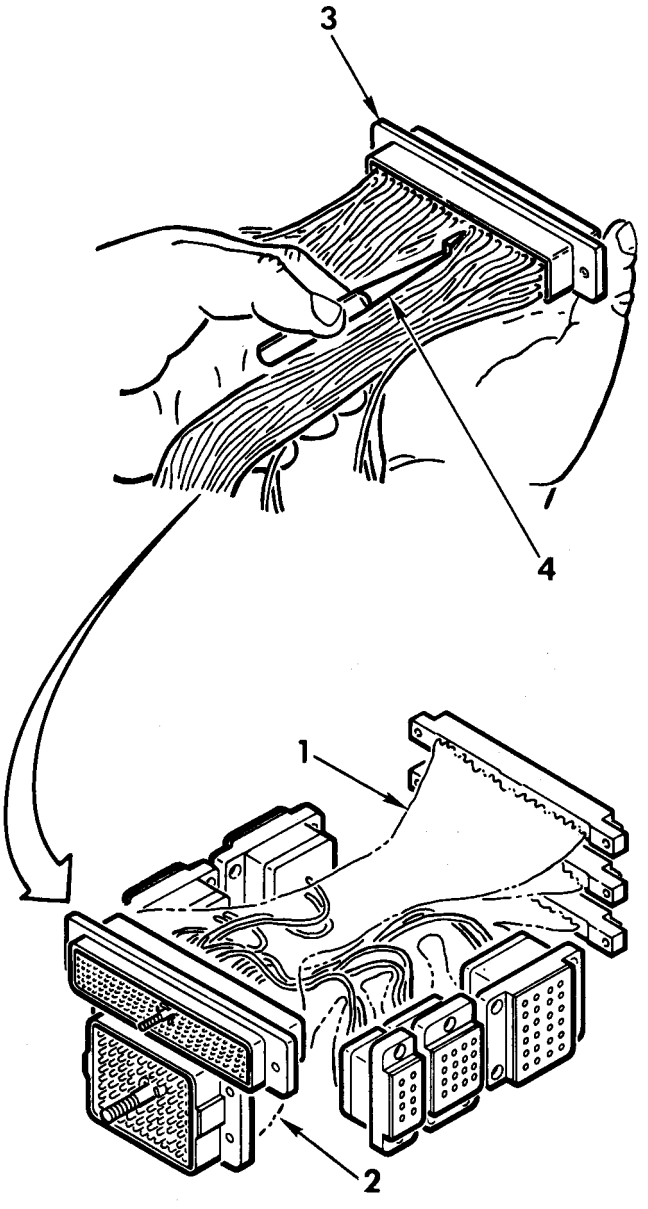
2-65. REPAIR OF LOGIC RELAY ASSEMBLY (cont)

17. SEPARATE UPPER WIRE HARNESS (1) FROM LOWER WIRE HARNESS (2).
    a. Cut cable tiedown straps as required to gain access to back of conector A5J1 (3).
    b. Label each wire as it is disconnected.
    c. Using pin inserrtion/extraction tool (4), disconnect 10 wires from rear of connector A5J1 (3) by extracting connector pins with wires attached. Disconnect following wires:

From:	Disconnect at
XK1 pin X2	A5J1 pin 223
XKE pin X1	A5J1 pin 224
XK2 pin X2	A5J1 pin 225
XK2 pin X1	A5J1 pin 226
XK3 pin X2	A511 pin 227
XK3 pin X1	A5J1 pin 228
XK4 pin X2	A5J1 pin 229
XK4 pin X1	A5J1 pin 230
XK5 pin X2	A5J1 pin 231
XK5 pin X1	A5J1 pin 232

NOTE

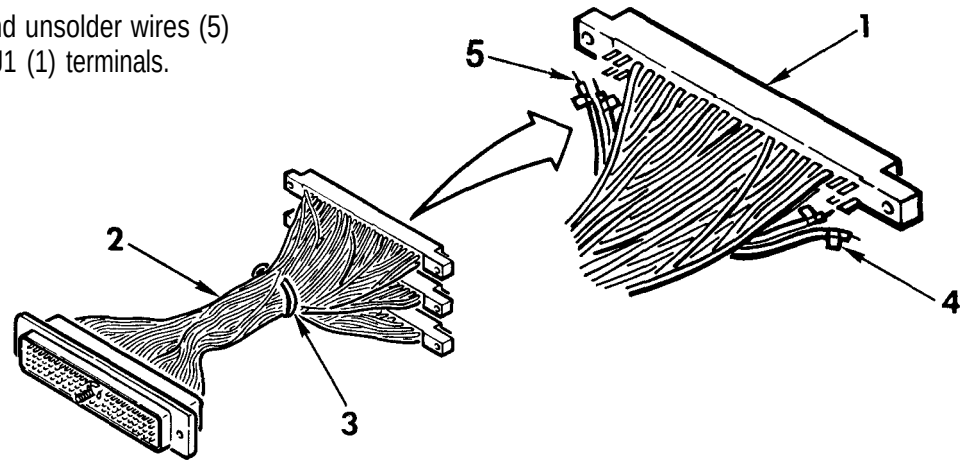
No further disassembly of lower wire harness is permitted. If any part is unserviceable, replace entire lower harness assembly.



ARR82-27084

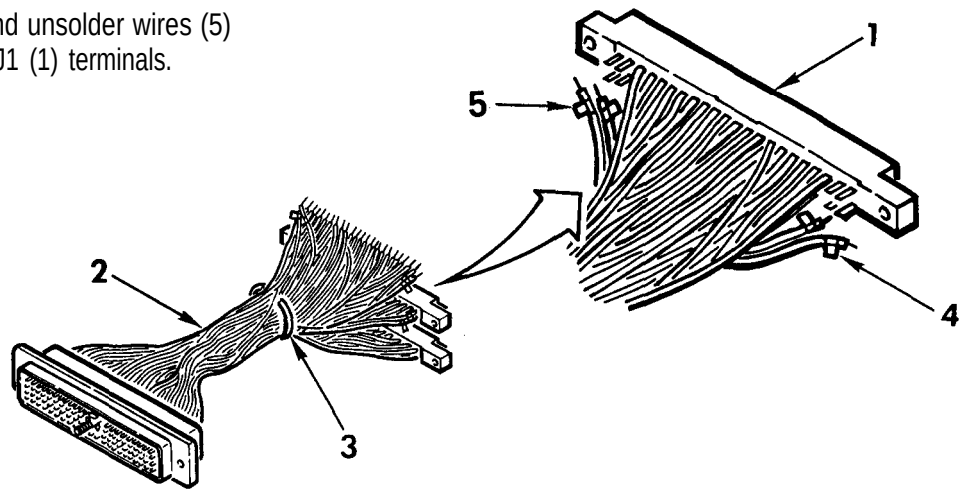
DISASSEMBLY (cont)

18. DISCONNECT CONNECTOR A3J1 (1) FROM UPPER WIRE HARNESS (2).
    a. If required, cut cable tiedown straps (3).
    b. Apply labels (4) and unsolder wires (5) from connector A3J1 (1) terminals.



ARR82-27085

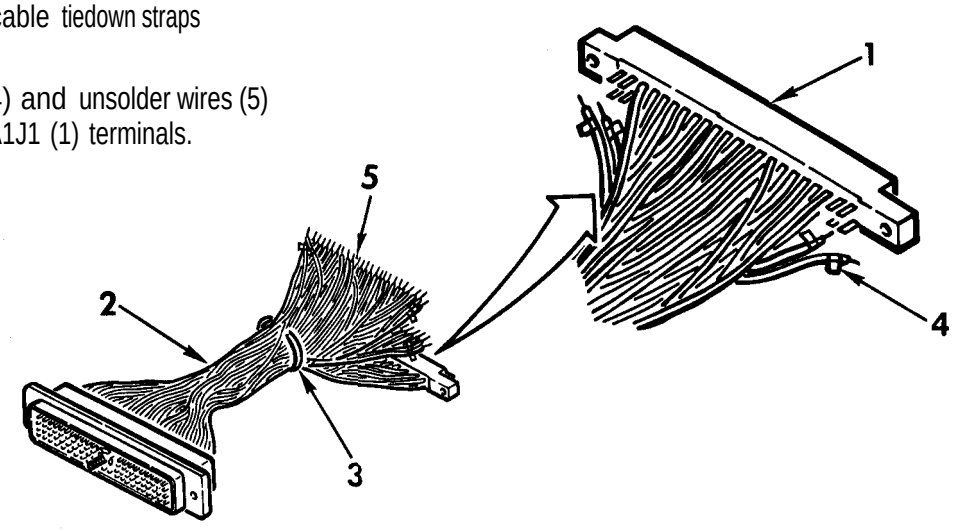
19. DISCONNECT CONNECTOR A2J1 (1) FROM UPPER WIRE HARNESS (2).
    a. If required, cut cable tiedown straps (3).
    b. Apply labels (4) and unsolder wires (5) from connector A2J1 (1) terminals.



ARR82-27086

2-65. REPAIR OF LOGIC RELAY ASSEMBLY (cont)

20. DISCONNECT CONNECTOR A1J1 (1) FROM UPPER WIRE HARNESS (2).
    a. If required, cut cable tiedown straps (3).
    b. Apply labels (4) and unsolder wires (5) from connector A1J1 (1) terminals.



ARR82-27087

CLEANING

21. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV.

INSPECTION

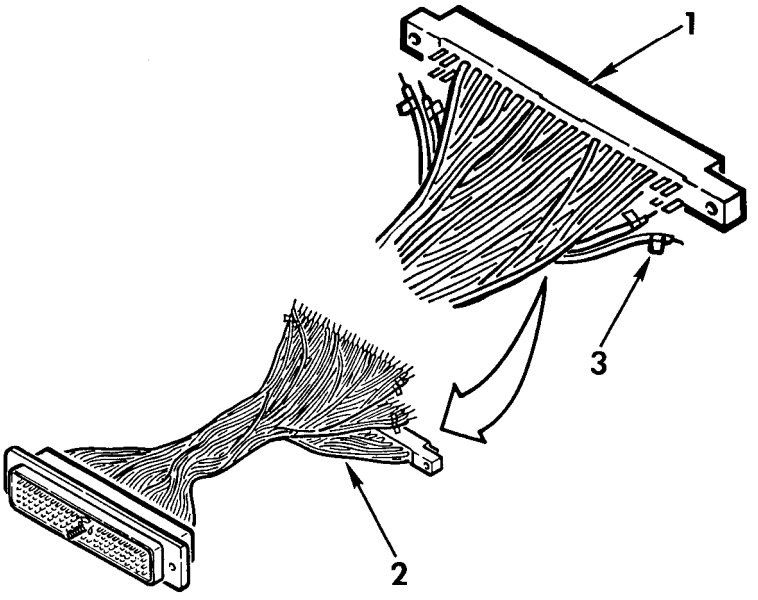
22. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV.

ASSEMBLY

23. CONNECT CONNECTOR A1J1 (1) TO WIRE HARNESS (2).
    a. Prior to soldering wires, orient connector so that pin No. 1 and indexing tab are to left when viewing connector from printed wiring assembly side.
    b. Solder wires (2) to connector A1J1 (1) terminals.
    c. Remove labels (3) after connecting wires.

NOTE

Use multimeter to identify wires prior to connecting them.



A5J1 PIN	CONNECTS TO A1J1 PIN:
1	1
2	4
3	5
4	46
5	47
6	45
7	3
8	2
9	32
10	33
11	28
12	35
13	36
14	34
15	29
16	30
17	78
18	40
19	75
20	38
21	37
22	39
23	76
24	77
25	31

A5J1 PIN	CONNECTS TO A1J1 PIN:
26	73
27	68
28	71
29	74
30	72
31	69
32	70
33	9
34	10
35	12
36	53
37	13
38	52
39	11
40	51
41	49
42	8
43	50
44	7
45	48
46	6
47	20
48	21
49	26
50	24

A5J1 PIN	CONNECTS TO A1J1 PIN:
51	27
52	23
53	25
54	22
55	18
56	16
57	19
58	15
59	17
60	14
61	59
62	62
63	66
64	64
65	67
66	63
67	65
68	61
69	58
70	56
71	60
72	55
73	57
74	54

ARR82-27088

2-65. REPAIR OF LOGIC RELAY ASSEMBLY (cont)

24. CONNECT CONNECTOR A2J1 (1) TO WIRE HARNESS (2).

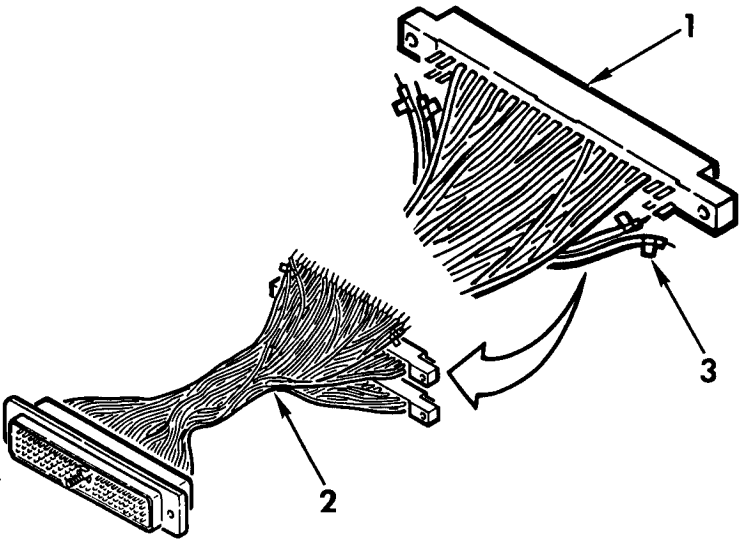
a. Prior to soldering wires, orient connector so that pin No. 1 and index tab are to left when viewing connector from printed wiring assembly side.

b. Solder wires (2) to connector A2J1 (1) terminals.

c. Remove labels (3) after connecting wires.

NOTE

Use multimeter to identify wires prior to connecting them.



A5J1 PIN	CONNECTS TO A2J1 PIN:
75	1
76	4
77	5
78	46
79	47
80	45
81	3
82	2
83	32
84	33
85	28
86	35
87	36
88	34
89	29
90	30
91	78
92	40
93	75
94	38
95	37
96	39
97	76
98	77
99	31

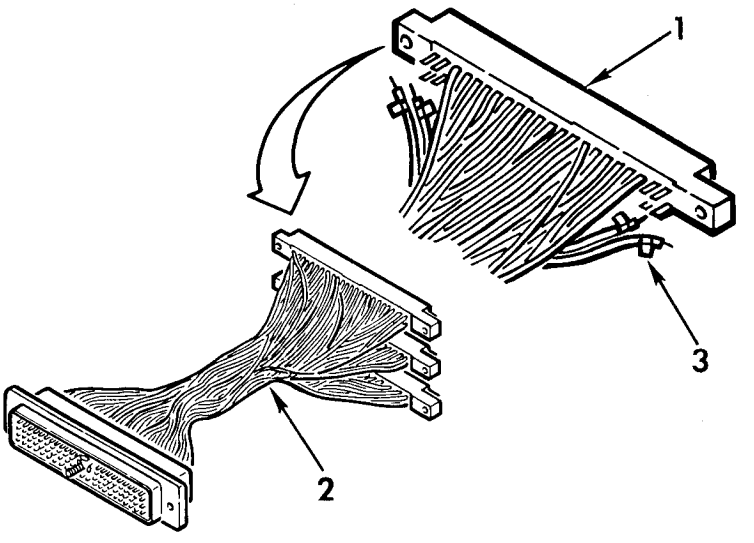
A5J1 PIN	CONNECTS TO A2J1 PIN:
100	73
101	68
102	71
103	74
104	72
105	69
106	70
107	9
108	10
109	12
110	53
111	13
112	52
113	11
114	51
115	49
116	8
117	50
118	7
119	48
120	6
121	20
122	21
123	26
124	24

A5J1 PIN	CONNECTS TO A2J1 PIN:
125	27
126	23
127	25
128	22
129	18
130	16
131	19
132	15
133	17
134	14
135	59
136	62
137	66
138	64
139	67
140	63
141	65
142	61
143	58
144	56
145	60
146	55
147	57
148	54

ARR82-27089

ASSEMBLY (cont)

25. CONNECT CONNECTOR A3J1 (1) TO WIRE HARNESS (2).
    a. Prior to soldering wires, orient connector so that pin No. 1 and index tab are to left when viewing connector from printed wiring assembly side.
    b. Solder wires (2) to connector A3J1 (1) terminals.
    c. Remove labels (3) after connecting wires.



NOTE

Use multimeter to identify wires prior to connecting them.

A5J1 PIN	CONNECTS TO A3J1 PIN:
149	1
150	4
151	5
152	46
153	47
154	45
155	3
156	2
157	32
158	33
159	28
160	35
161	36
162	34
163	29
164	30
165	78
166	40
167	75
168	38
169	37
170	39
171	76
172	77
173	31

A5J1 PIN	CONNECTS TO A3J1 PIN:
174	73
175	68
176	71
177	74
178	72
179	69
180	70
181	9
182	10
183	12
184	53
185	13
186	52
187	11
188	51
189	49
190	8
191	50
192	7
193	48
194	6
195	20
196	21
197	26
198	24

A5J1 PIN	CONNECTS TO A3J1 PIN:
199	27
200	23
201	25
202	22
203	18
204	16
205	19
206	15
207	17
208	14
209	59
210	62
211	66
212	64
213	67
214	63
215	65
216	61
217	58
218	56
219	60
220	55
221	57
222	54

ARR82-27090

2-65. REPAIR OF LOGIC RELAY ASSEMBLY (cont)

26. JOIN UPPER WIRE HARNESS (1) TO LOWER WIRE HARNESS (2).

a. Using pin insertion/extraction tool (3), connect 10 wires and connector pins from lower wire harness (2) to rear of connector A5J1 (4). Connect following 10 wires:

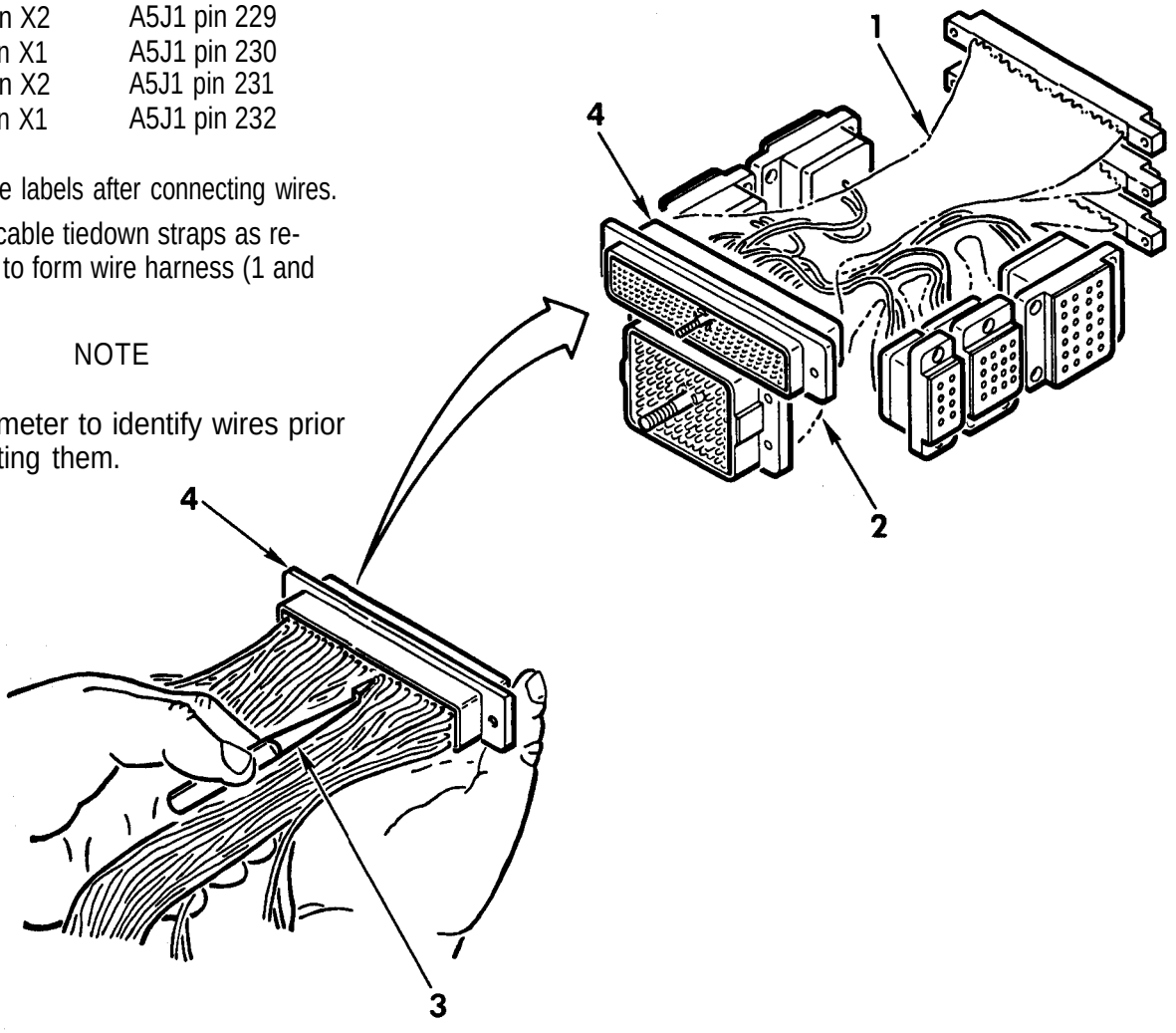
From:	Connect to:
XK1 pin X2	A5J1 pin 223
XK1 pin X1	A5J1 pin 224
XK2 pin X2	A5J1 pin 225
XK2 pin X1	A5J1 pin 226
XK3 pin X2	A5J1 pin 227
XK3 pin X1	A5J1 pin 228
XK4 pin X2	A5J1 pin 229
XK4 pin X1	A5J1 pin 230
XK5 pin X2	A5J1 pin 231
XK5 pin X1	A5J1 pin 232

b. Remove labels after connecting wires.

c. Install cable tiedown straps as required to form wire harness (1 and 2).

NOTE

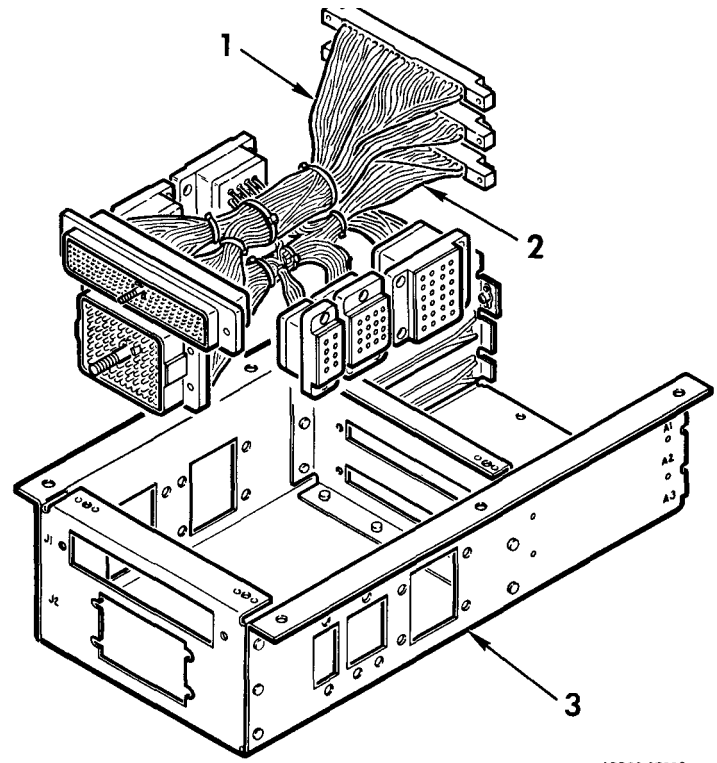
Use multimeter to identify wires prior to connecting them.



ARR82-27091

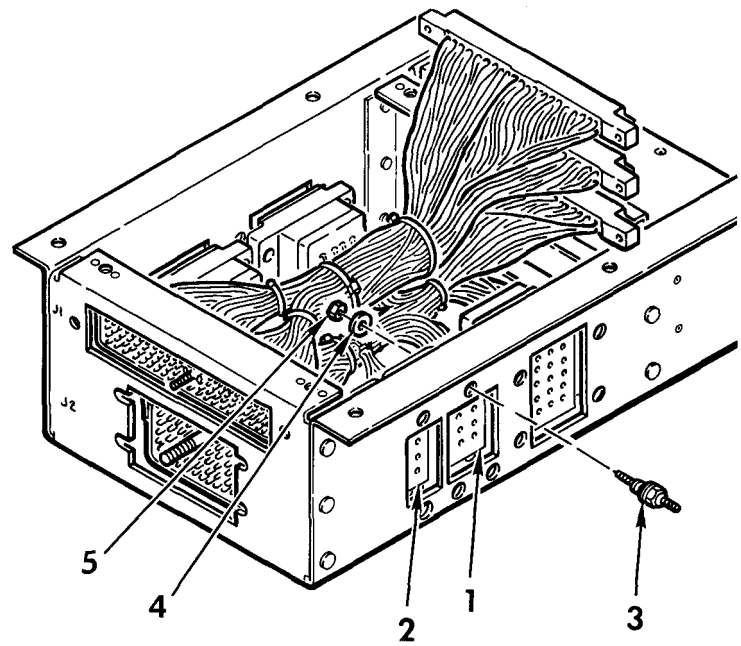
ASSEMBLY (cont)

27. INSTALL WIRE HARNESSES (1 AND 2) IN CASE (3).



ARR82-27092

28. INSTALL RELAY CONNECTORS XK4 (1) AND XK5 (2).
    a. Secure relay connector XK4 (1) to case with three stud/washer/nut assemblies (3), three washers (4), and three nuts (5).
    b. Secure relay connector XK5 (2) to case with two stud/washer/nut assemblies (3), two washers (4), and two nuts (5).



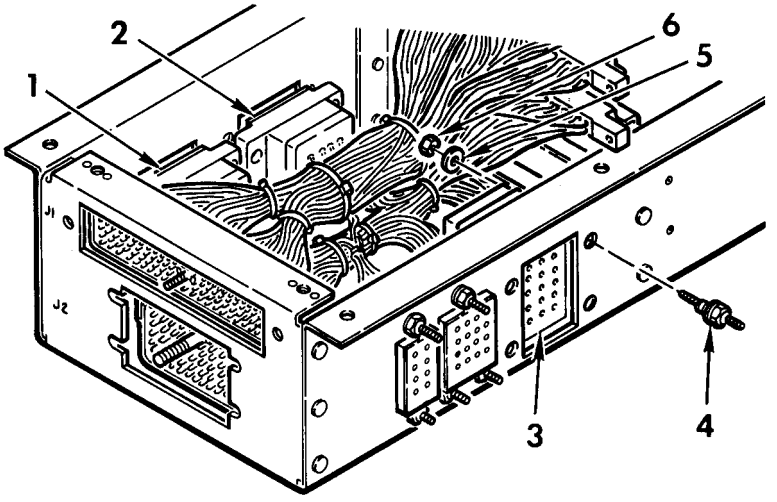
ARR82-27093A

2-65. REPAIR OF LOGIC RELAY ASSEMBLY (cont)

29. INSTALL RELAY CONNECTORS XK1 (1), XK2 (2), AND XK3 (3).

a. Secure relay connector XK3 (3) to case with four stud/washer/nut assemblies (4), four washers (5), and four nuts (6).

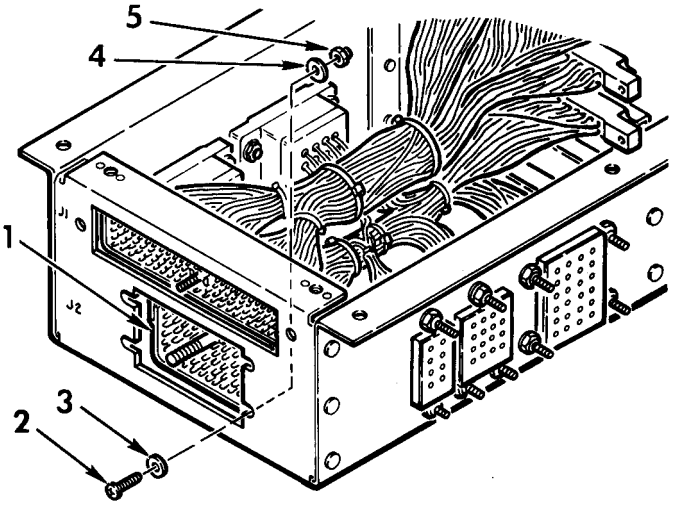
b. Repeat step a to install relay connectors XK1 (1) and XK2 (2).



ARR82-27094A

30. INSTALL CONNECTOR A5J2 (1).

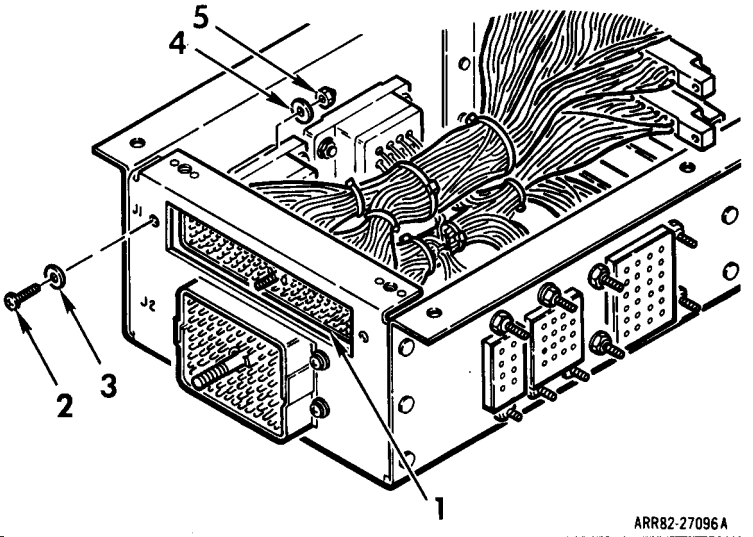
Secure connector A5J2 (1) to case with four screws (2), four washers (3), four washers (4), and four nuts (5).



ARR82-27095A

31. INSTALL CONNECTOR A5J1 (1).

Secure connector A5J1 (1) to case with two screws (2), two washers (3), two washers (4), and two nuts (5).

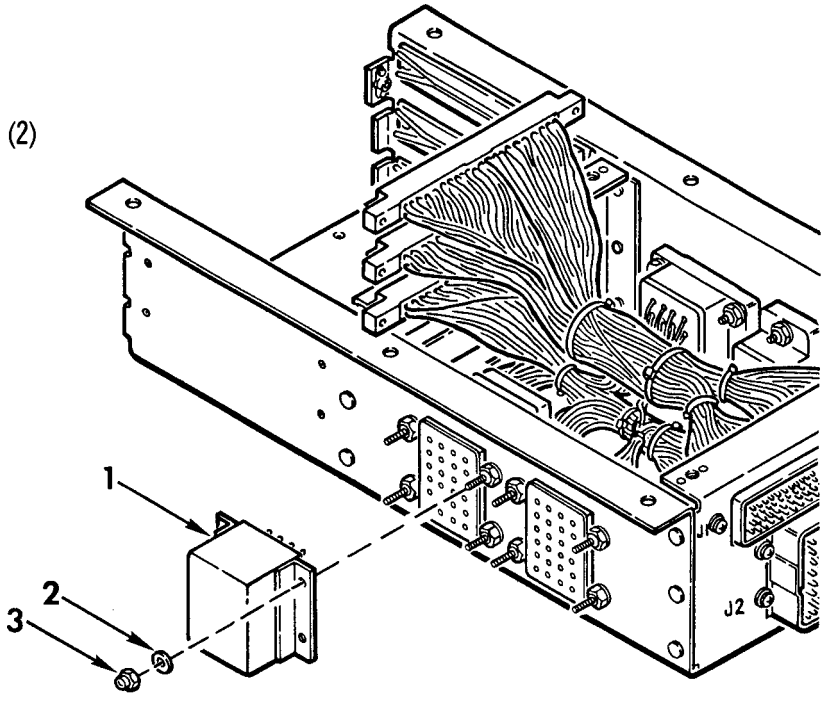


ARR82-27096A

ASSEMBLY (cont)

32. INSTALL RELAY K2 (1).

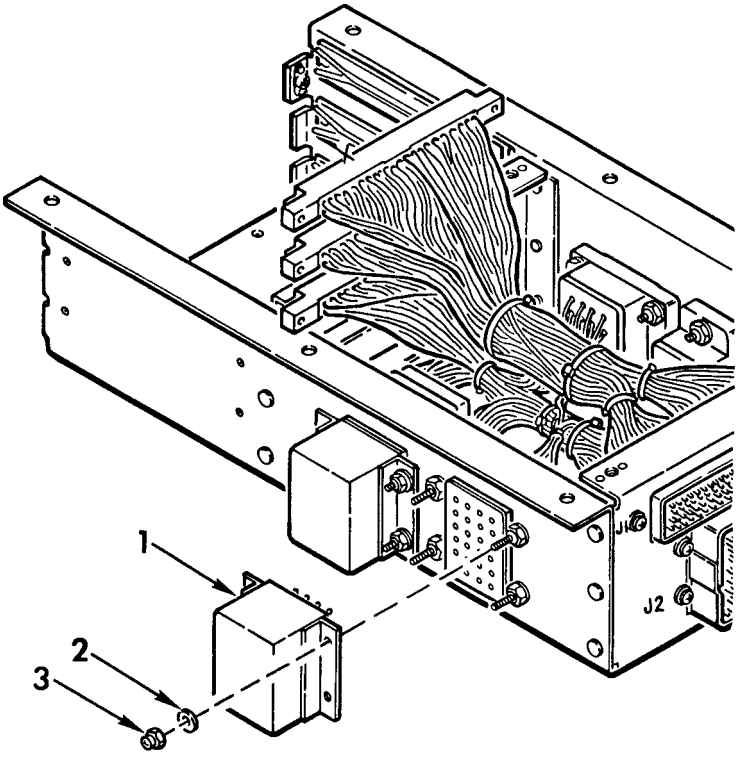
Secure relay K2 (1) with four washers (2) and four nuts (3).



ARR82-27097

33. INSTALL RELAY K1 (1).

Secure relay K1 (1) with four washers (2) and four nuts (3).

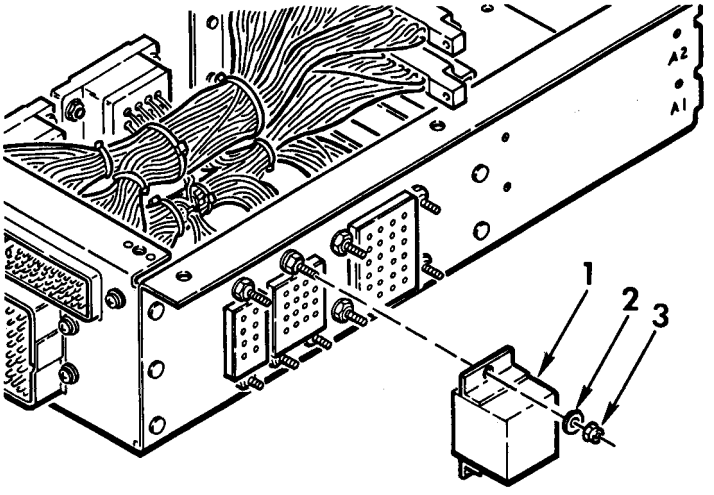


ARR82-27098

2-65. REPAIR OF LOGIC RELAY ASSEMBLY (cont)

34. INSTALL RELAY K4 (1).

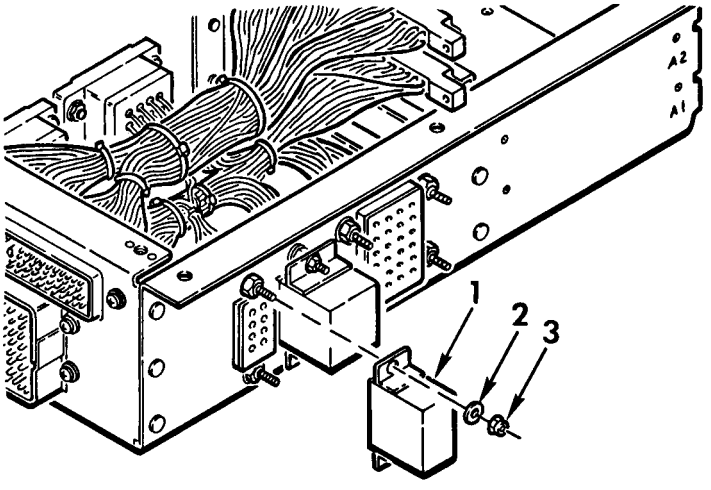
Secure relay K4 (1) with three washers (2) and three nuts (3).



ARR82-27099

35. INSTALL RELAY K5 (1).

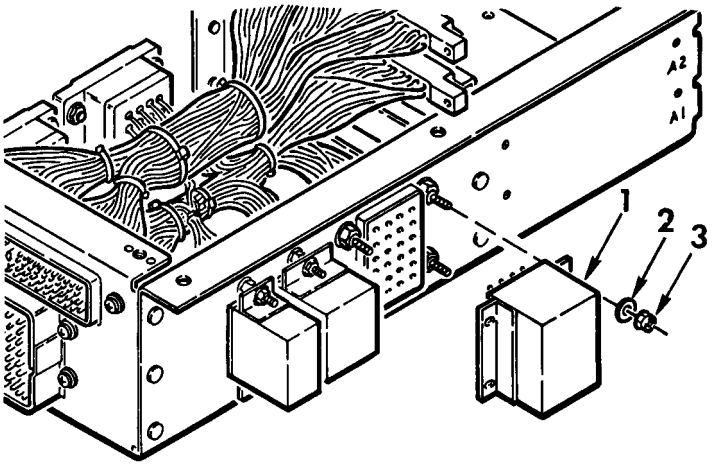
Secure relay K5 (1) with two washers (2) and two nuts (3).



ARR82-27100

36. INSTALL RELAY K3 (1).

Secure relay K3 (1) with four washers (2) and four nuts (3).

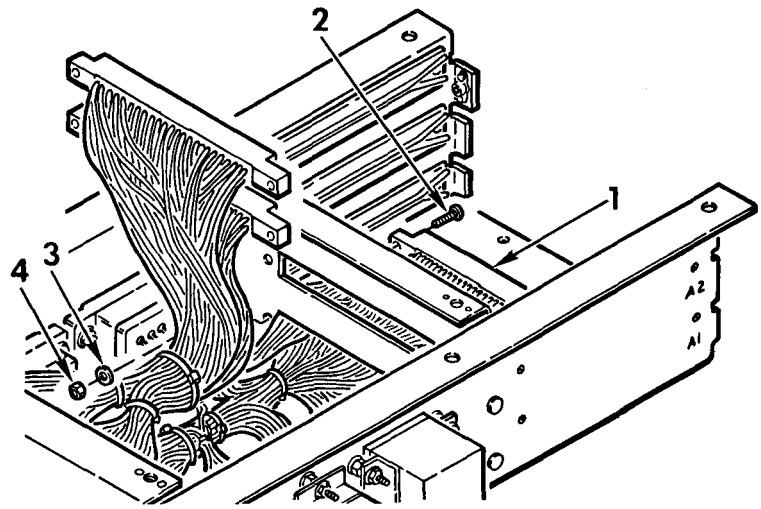


ARRR2-27101

ASSEMBLY (cont)

37. INSTALL CONNECTOR A1J1 (1).

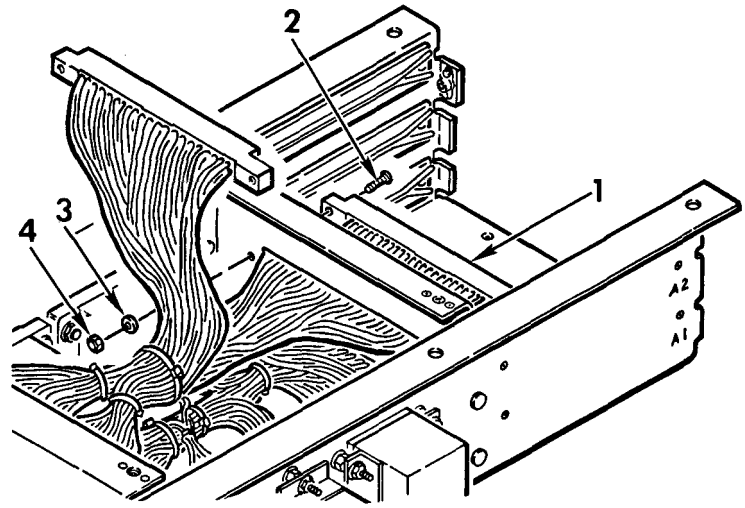
Secure connector A1J1 (1) to case with two screws (2), two washers (3), and two nuts (4).



ARR82-27102

38. INSTALL CONNECTOR A2J1 (1).

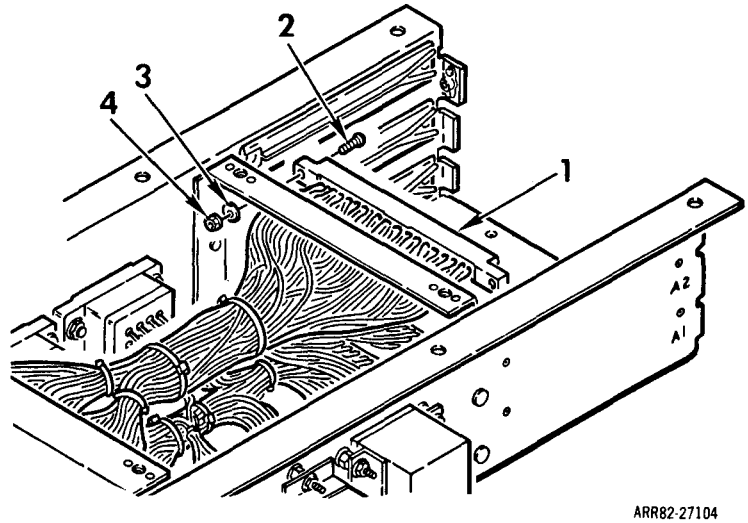
Secure connector A2J1 (1) to case with two screws (2), two washers (3), and two nuts (4).



ARR82-27103

39. INSTALL CONNECTOR A3J1 (1).

Secure connector A3J1 (1) to case with two screws (2), two washers (3), and two nuts (4).

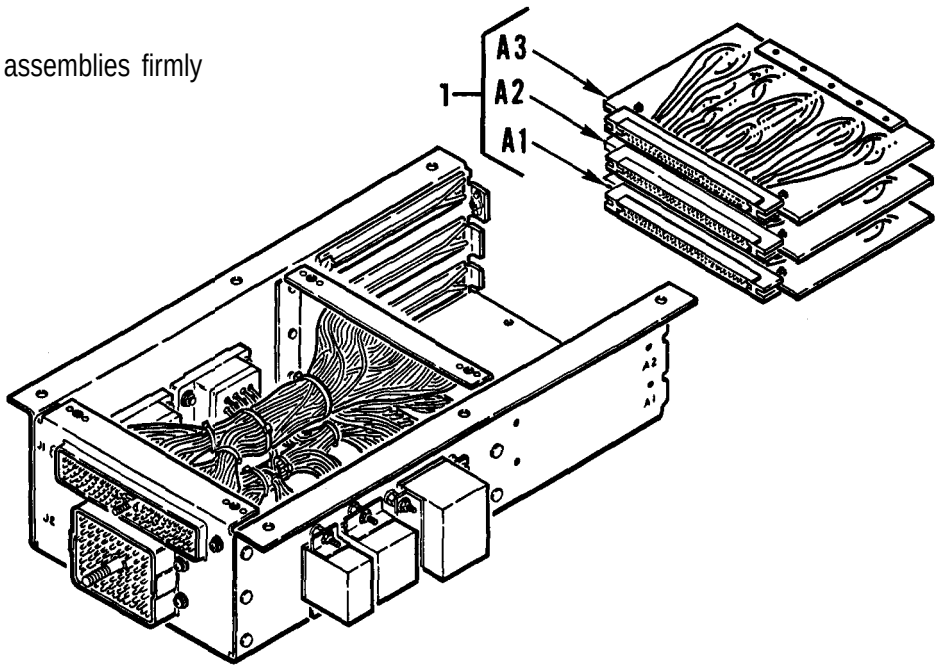


ARR82-27104

2-65. REPAIR OF LOGIC RELAY ASSEMBLY (cont)

40. INSTALL THREE PRINTED WIRING ASSEMBLIES (1).

Seat printed wiring assemblies firmly in connectors

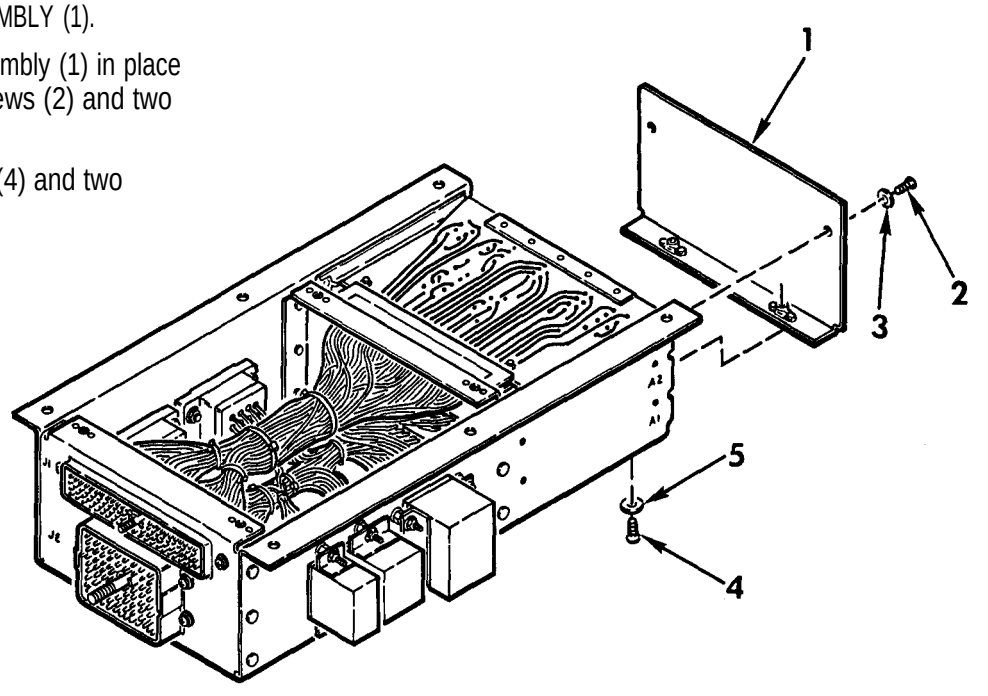


ARR82-27105

INSTALL COVER ASSEMBLY (1).

a. Position cover assembly (1) in place and install two screws (2) and two washers (3).

b. Install two screws (4) and two washers (5).

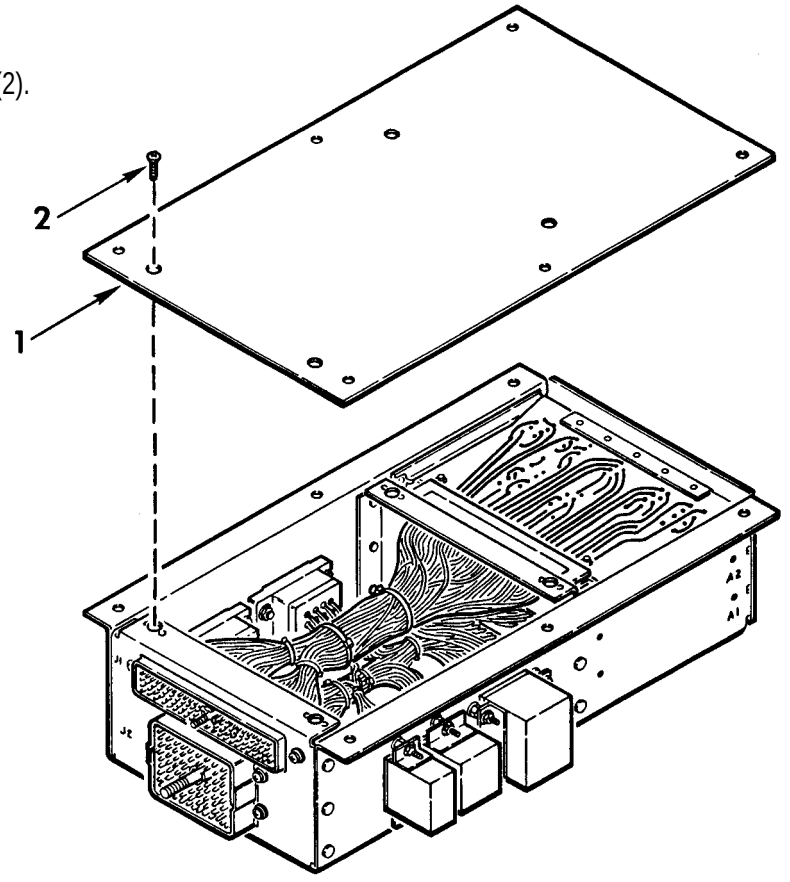


ARR82-27106

ASSEMBLY (cont)

42. INSTALL COVER (1).

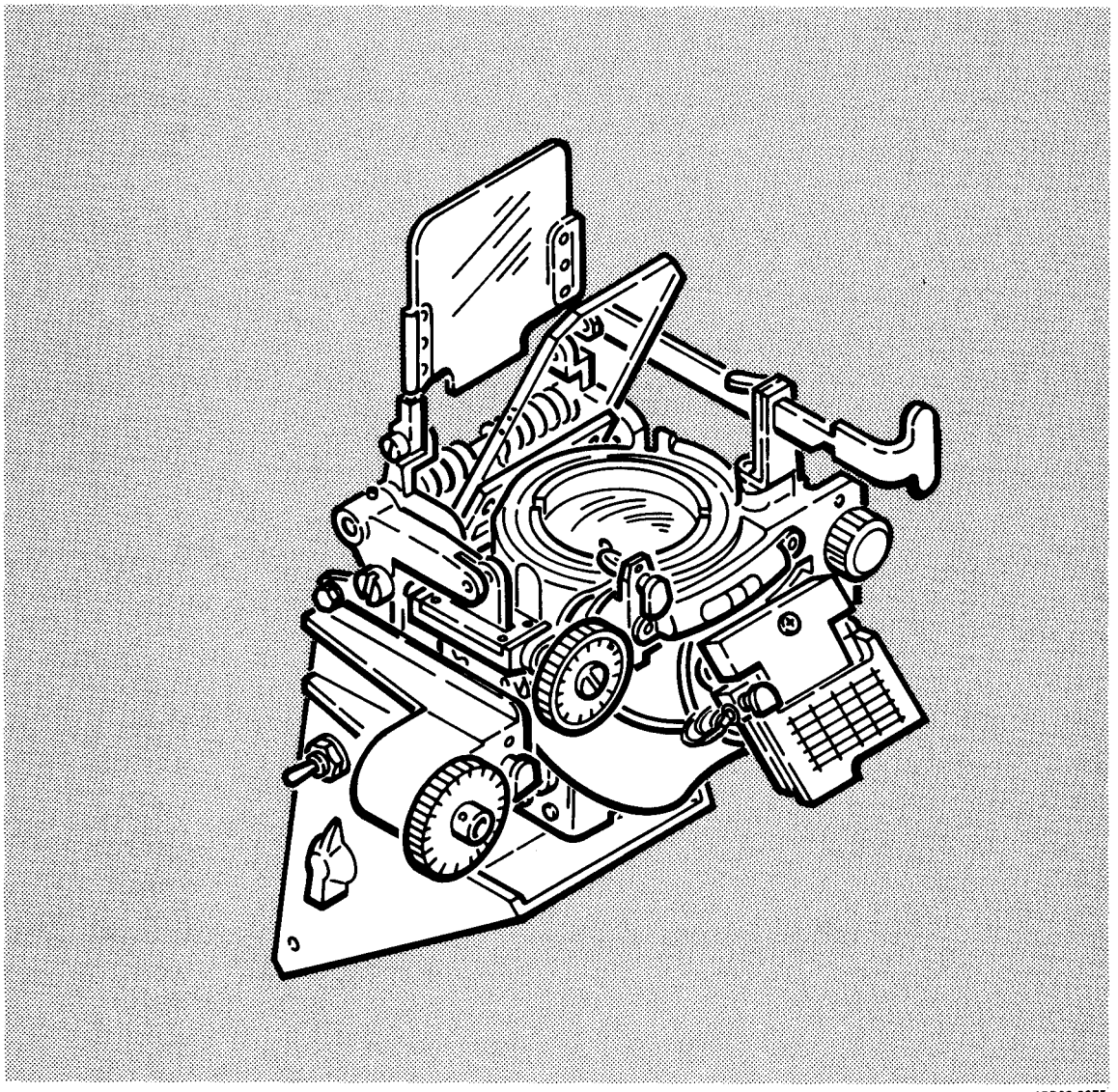
Install cover (1) and four screws (2).



END OF TASK

Section XXIII. MAINTENANCE OF REFLEX SIGHT AND SIGHT SUPPORT

Section Contents



ARR83-2075

2-66. REPAIR OF REFLEX SIGHT SUPPORT

DESCRIPTION

This task covers: Disassembly, cleaning, inspection, and assembly.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  Repairman: Basic
- Tool Set, A/C Armament
  Repairman: Supplemental
- Multimeter AN/USM-223

Personnel Required:
- 68M Aircraft Weapon Systems
  Repairer

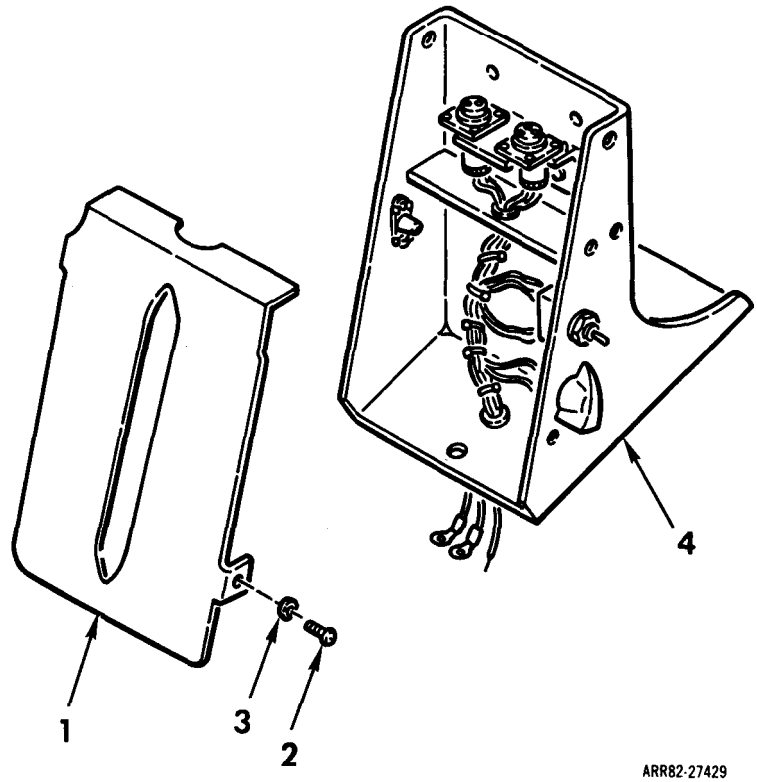
Equipment Conditions:
- In shop on bench.

Materials:
- Sealing Compound
  (Item 23, Appx B)
- Solder (Item 27, Appx B)
- Wire (Item 33, Appx B)

DISASSEMBLY

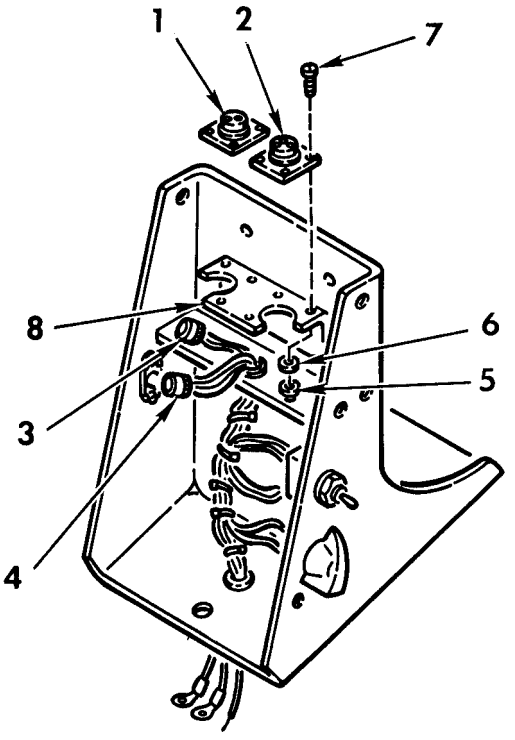
1. REMOVE COVER (1).

   Remove two screws and cover (1) from support (4).



DISASSEMBLY (cont)

2. REMOVE CONNECTORS (1 AND 2).
   a. Separate backshells (3 and 4) from connectors (1 and 2).
   b. Remove six nuts (5), six washers (6), and six screws (7).
   c. Remove connectors (1 and 2) from bracket (8).

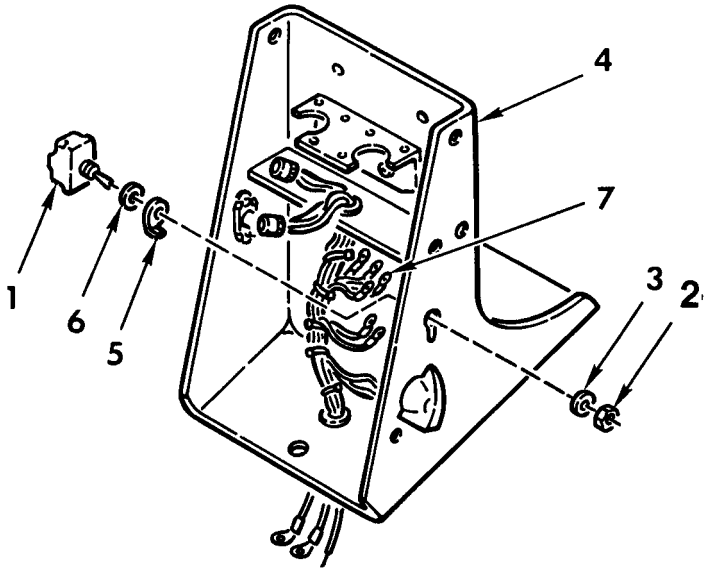


ARR82-27430

3. REMOVE SWITCH (1).
   a. Remove nut (2), washer (3), and switch (1) from support (4).
   b. Remove keywasher (5) and nut (6) from switch (1).
   c. Disconnect six wires (7) from switch (1).

NOTE

Label wires after removal for proper identification.



ARR82-27431

2-66. REPAIR OF REFLEX SIGHT SUPPORT (cont)

4. REMOVE RESISTOR (1).

a. Loosen setscrew (2).

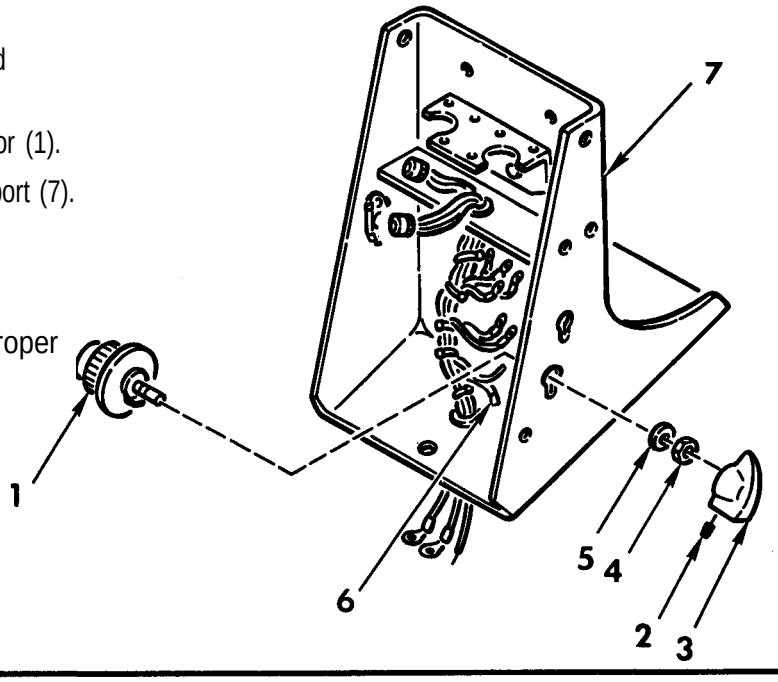
b. Remove knob (3), nut (4), and washer (5) from resistor (1).

c. Unsolder wires (6) from resistor (1).

d. Remove resistor (1) from support (7).

NOTE

Label wires after removal for proper identification.



ARR82-27432

REMOVE WIRES (1)

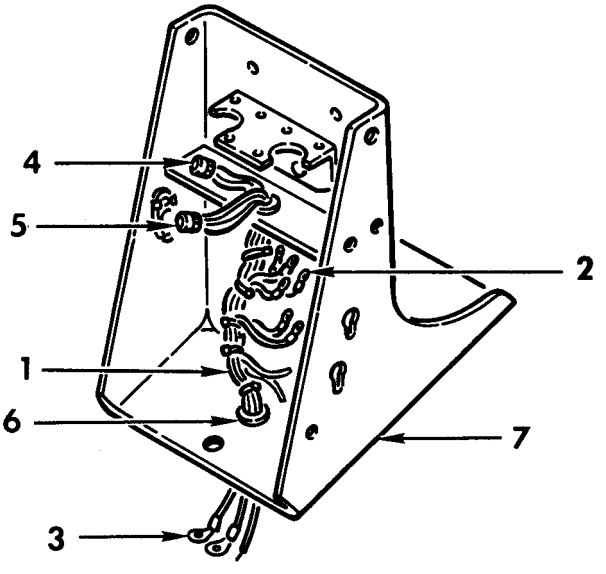
a. Unsolder six terminals (2) from wires (1).

b. Unsolder two terminals (3) from wires (1).

c. Unsolder backshells (4 and 5) from wires (1). Note wire connections for later assembly.

d, Remove wires (1).

e. Remove two grommets (6) from support (7).



ARR82-27433

CLEANING

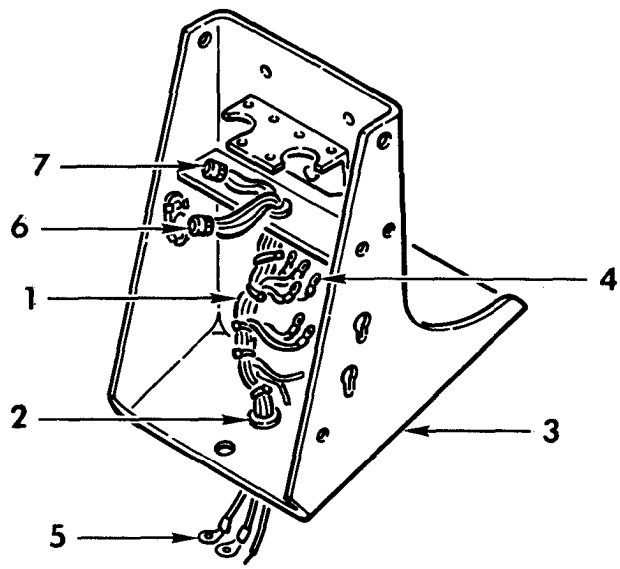
6. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV.

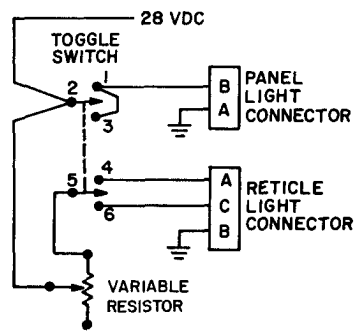
INSPECTION

7. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV.

ASSEMBLY

8. INSTALL WIRES (1).
   a. Install two grommets (2) in support (3).
   b. Install wires (1) in support (3).
   c Solder six terminals (4) and two terminals (5) to wires (1).
   d. Solder backshells (6 and 7) onto wires (1) as noted in disassembly.





REFLEX SIGHT SUPPORT WIRING DIAGRAM

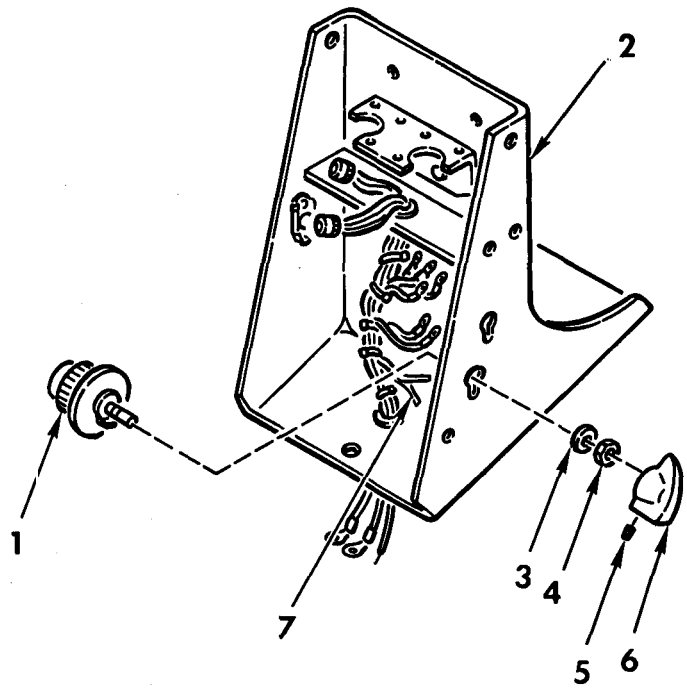
ARR82-27434

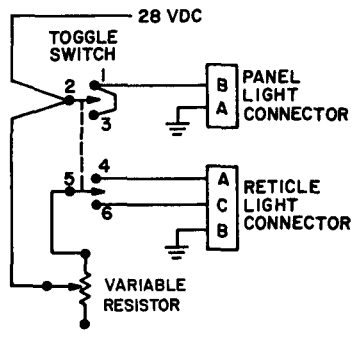
2-66. REPAIR OF REFLEX SIGHT SUPPORT (cont)

9. INSTALL RESISTOR (1).
   a. install resistor (1) in support (2).
   b. Install washer (3), nut (4), and knob (5) on resistor (1).
   c. Tighten setscrew (6).
   d. Solder wires (7) to terminals on resistor (1). Refer to wiring diagram for proper terminal connections on resistor (1).

NOTE

Use meter to ID wires





REFLEX SIGHT SUPPORT WIRING DIAGRAM

ARR82-27435

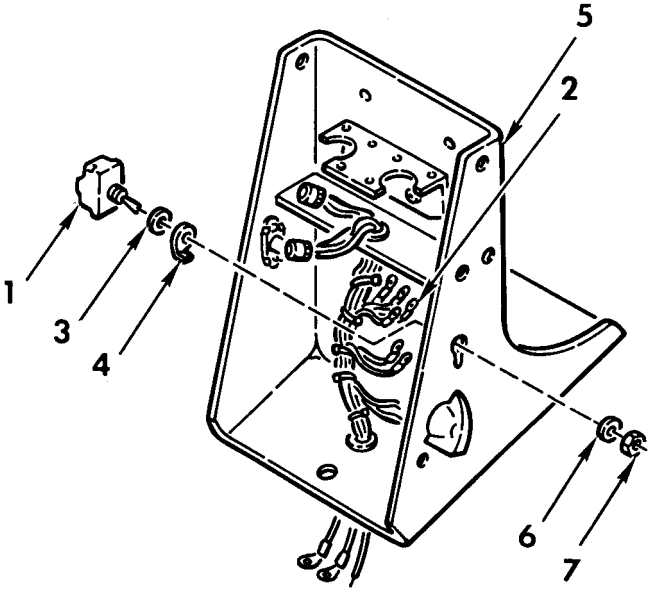
ASSEMBLY (cont)

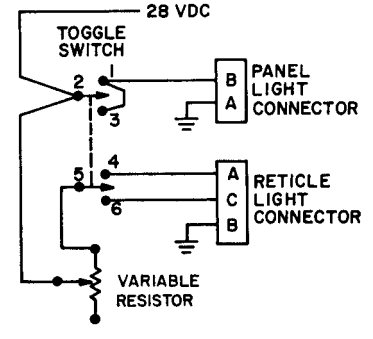
10. INSTALL SWITCH (1).
    a. Connect six wires (2) to switch (1). Refer to wiring diagram for proper terminal connections.
    b. Install nut (3) and keywasher (4) on switch (1).
    c. Install switch (1) in support (5).
    d. Install washer (6) and nut (7) on switch (1).

NOTE

Remove labels.

Use meter to ID wires.



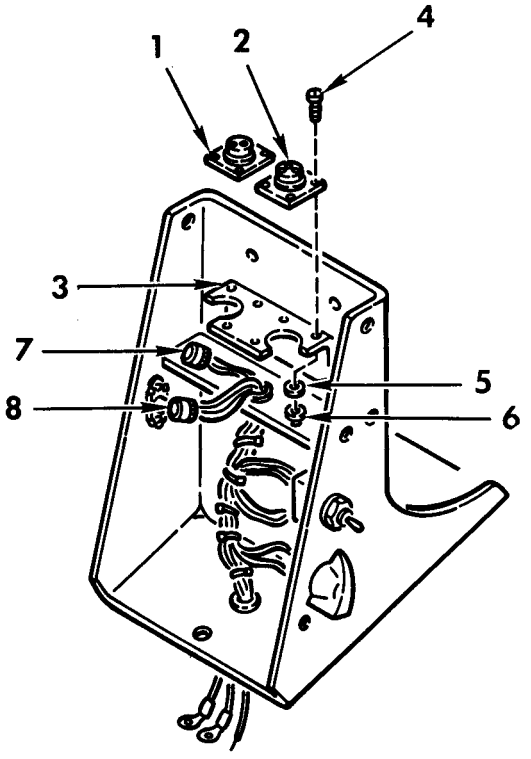


REFLEX SIGHT SUPPORT WIRING DIAGRAM

ARR82-27436

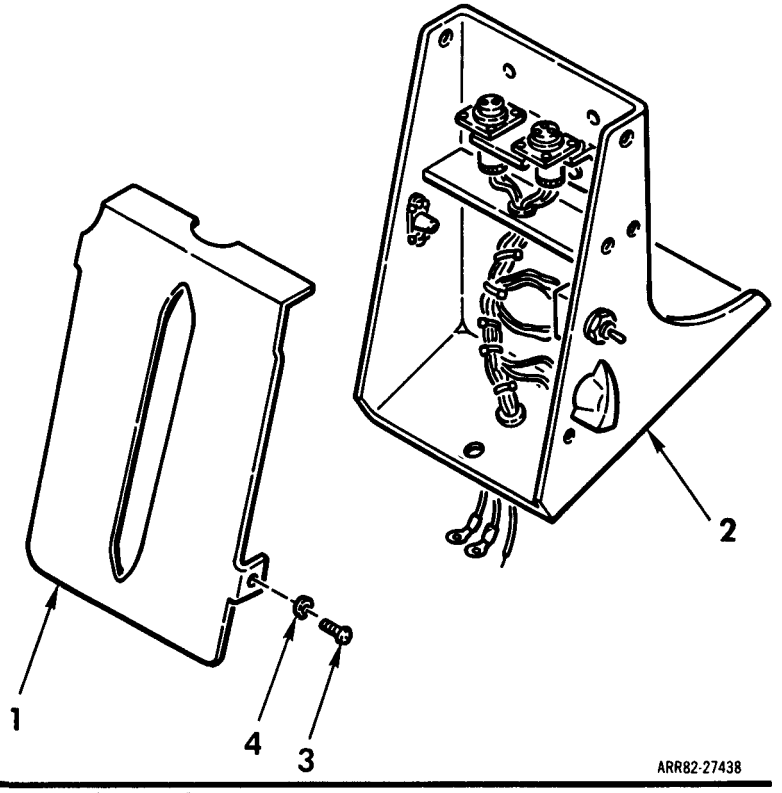
2-66. REPAIR OF REFLEX SIGHT SUPPORT (cont)

11. INSTALL CONNECTORS (1 AND 2).
    a. Position connectors (1 and 2) on bracket (3).
    b. Install six screws (4), six washers (5), and six nuts (6). Use sealing compound on threads of screws.
    c. Connect backshells (7 and 8) to connectors (1 and 2).



ARR82-27437

12. INSTALL COVER (1).
    a. Position cover (1) on support (2).
    b. Install two screws (3) and two washers (4). Use sealing compound on threads of screws.



ARR82-27438

END OF TASK

2-67. REPAIR OF REFLEX SIGHT

DESCRIPTION

This task covers: Disassembly, cleaning, inspection, and assembly.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Adapter, Torque (Fig C-9, Appx C) Depression Knob
- Multimeter AN/USM-223
- Wrench, Machine Plug (Fig C-5, Appx C)
- Wrench, Torque 0-50 lb-in.

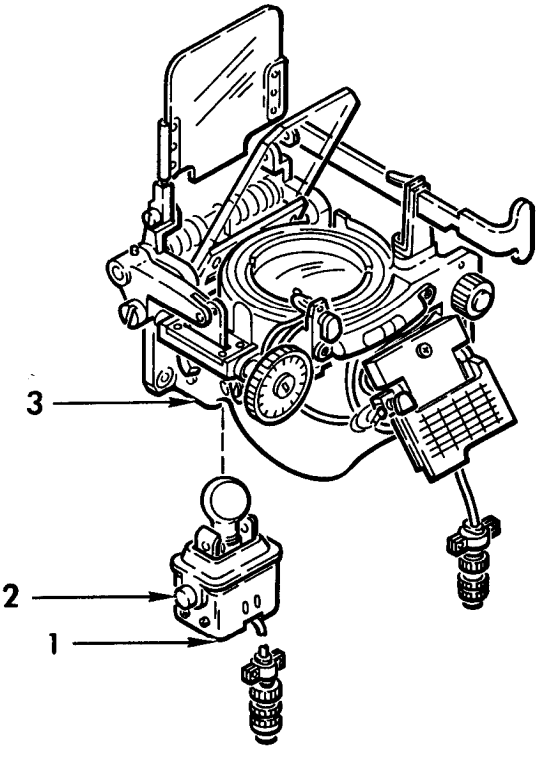
Materials:
- Grease (Item 12, Appx B)
- Alcohol (Item 9, Appx B)
- Insulation Sleeving (Item 15.1, Appx B)
- Lens Paper (Item 16, Appx B)
- Sealing Compound (Item 23, Appx B)
- Solder (Item 27, Appx B)
- Thinner, (Item 32, Appx B)
- Wire (Item 33, Appx B)
- Wire (Item 34, Appx B)

Personnel Required:
- 68M Aircraft Weapon Systems Repairer

Equipment Conditions:
- In shop on bench.

DISASSEMBLY

1. REMOVE LAMP HOUSING (1).
   a. Press two buttons (2) on sides of lamp housing (1).
   b. Pull lamp housing (1) from body (3).

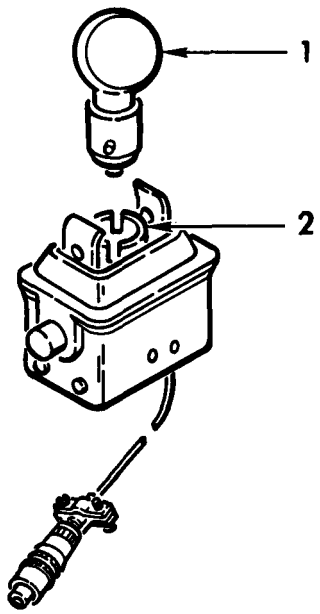


ARR82-27501

2-67. REPAIR OF REFLEX SIGHT (cont)

2. REMOVE LAMP (1).

Remove lamp (1) from socket (2).



ARR82-27502

3. REMOVE SOCKET (1).

a. Remove two screws (2), two washers (3), and plate (4) from housing (5).

b. Remove two screws (6), two washers (7), and plate (8) from housing (5).

c. Separate socket (1) from housing (5).

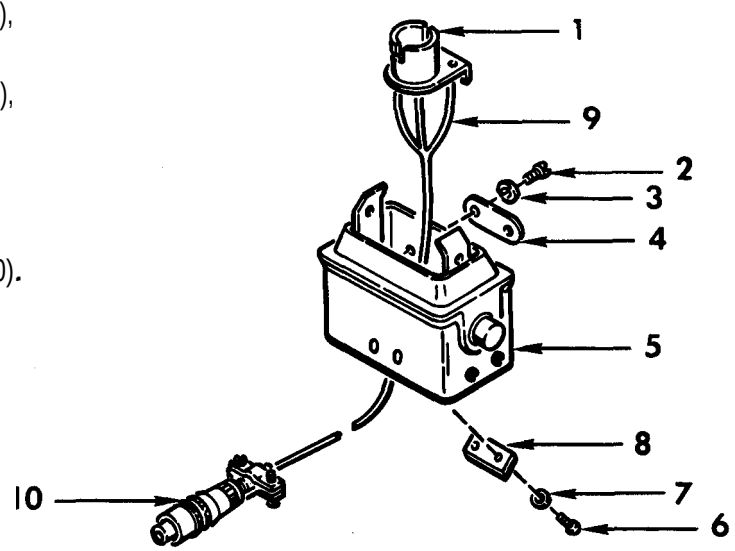
d. Unsolder wires (9) from socket (1).

e. Unsolder wires (9) from connector (10).

f. Remove wires (9) from housing (5).

NOTE

Label wires after removal for proper identification.

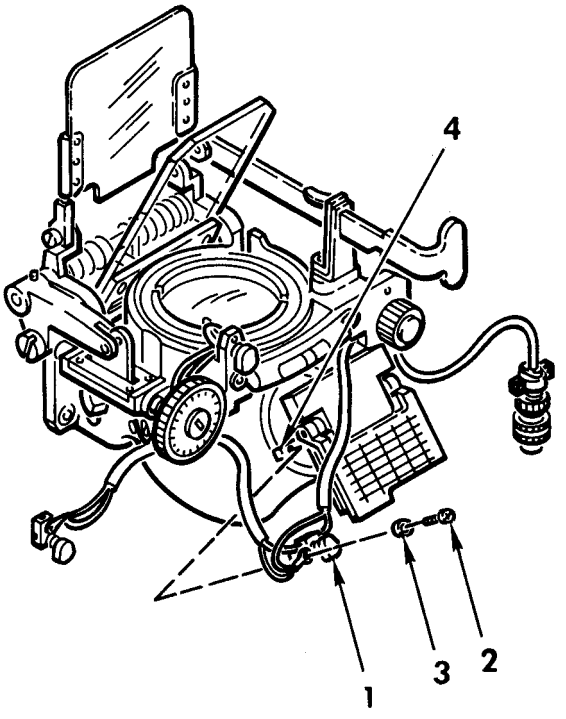


ARR82-27503

DISASSEMBLY (cont)

4. REMOVE LIGHT ASSEMBLY (1).

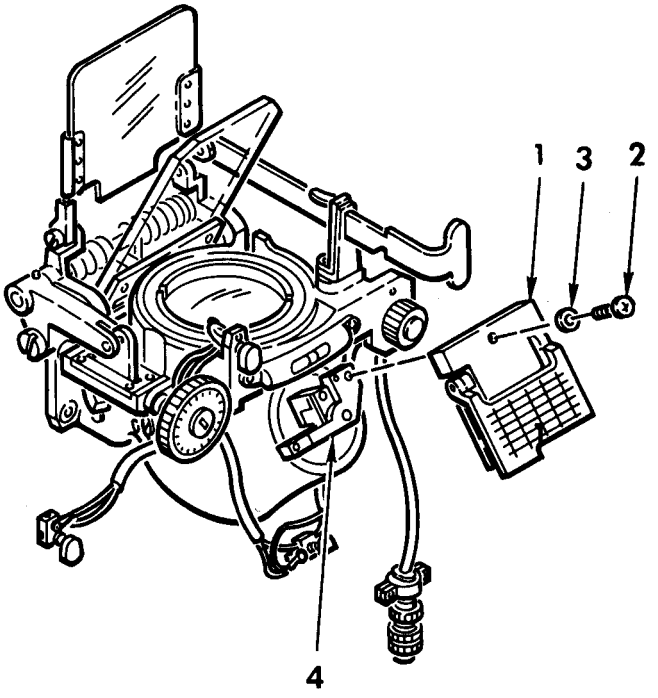
Remove screw (2), washer (3), and light assembly (1) from adapter (4).



ARR82-27504

5. REMOVE ELEVATION CARD (1).

Remove screw (2), washer (3), and elevation card (1) from adapter (4).



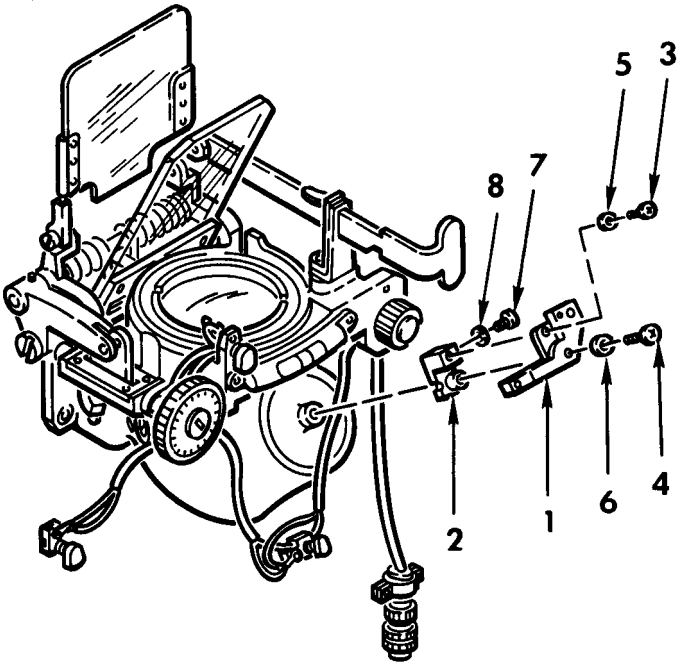
ARR82-27505

2-67. REPAIR OF REFLEX SIGHT (cont)

REMOVE ADAPTER (1) AND SUPPORT (2).

a. Remove two screws (3 and 4), two washers (5 and 6), and adapter (1).

b. Remove screw (7), washer (8), and support (2).

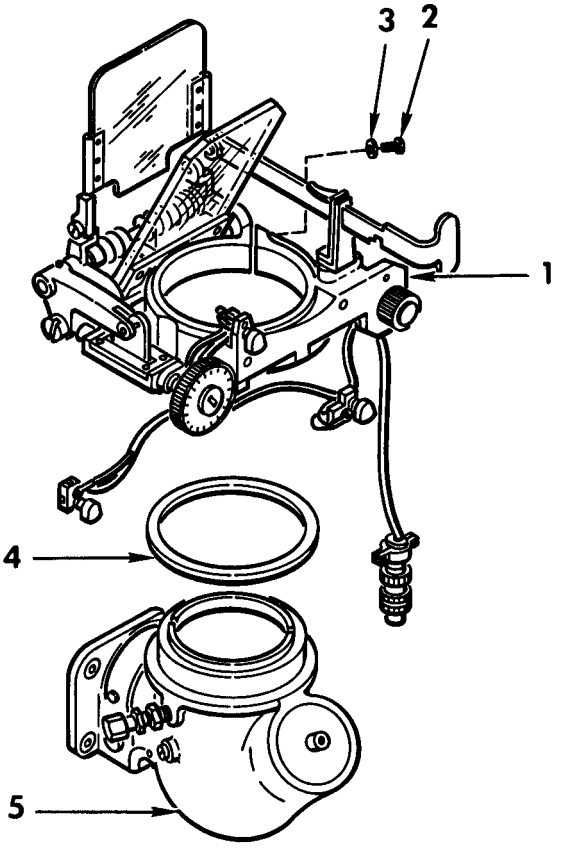


ARR82-27506

7. REMOVE HEAD ASSEMBLY (1).

a. Remove screw (2) and washer (3) from head assembly (1).

b. Remove head assembly (1) and spacer (4) from body (5).

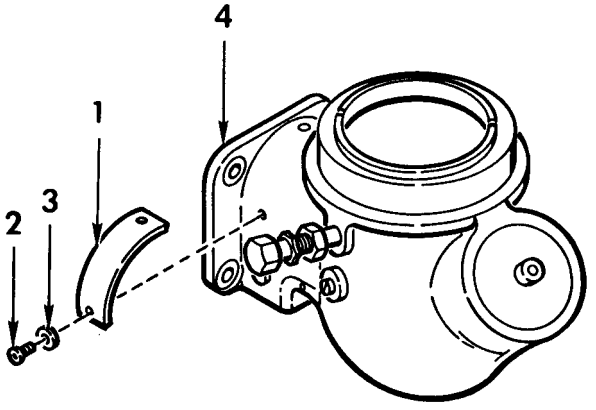


ARR82-27507

DISASSEMBLY (cont)

8. REMOVE IDENTIFICATION PLATE (1).

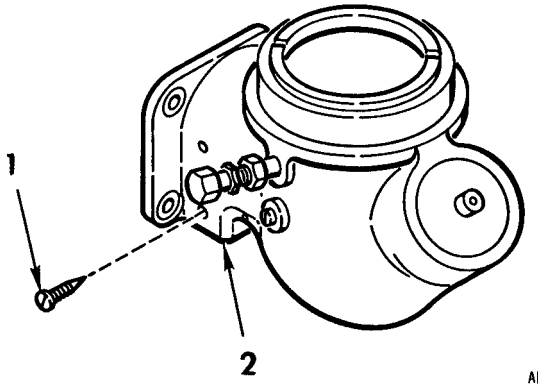
Remove two screws (2), two washers (3), and identification plate (1) from body (4).



ARR82-27508

9. REMOVE STUDS (1).

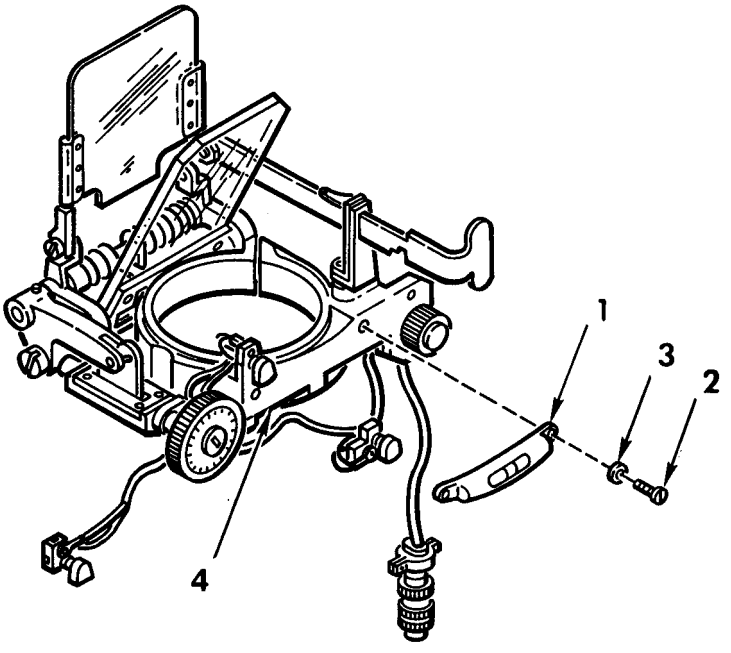
Remove two studs (1) from body (2).



ARR82-27509

10. REMOVE INCLINOMETER (1).

Remove two screws (2), two washers (3), and inclinometer (1) from housing (4).



ARR82-27510

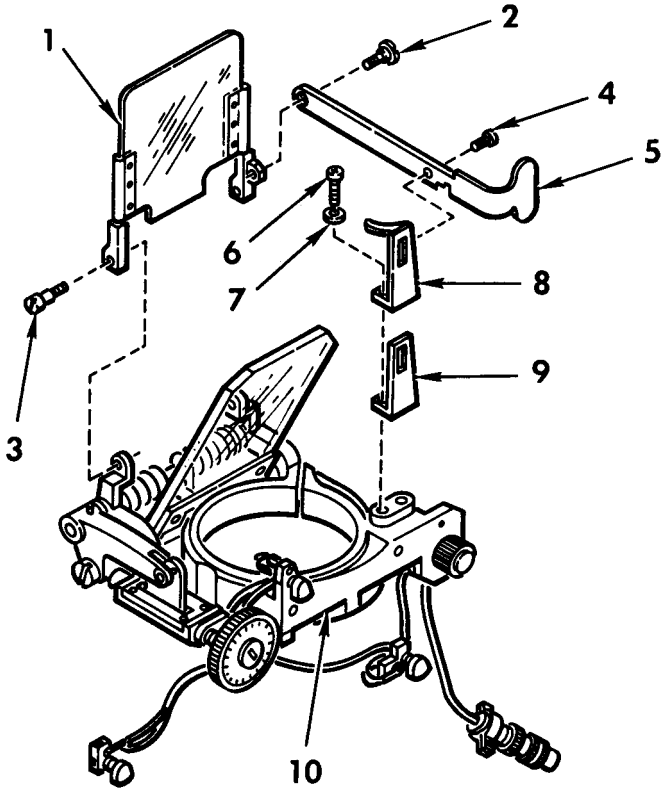
2-67. REPAIR OF REFLEX SIGHT (cont)

11. REMOVE FILTER (1).

a. Remove screw (2), two screws (3), and filter (1).

b. Remove screw (4) and lever (5).

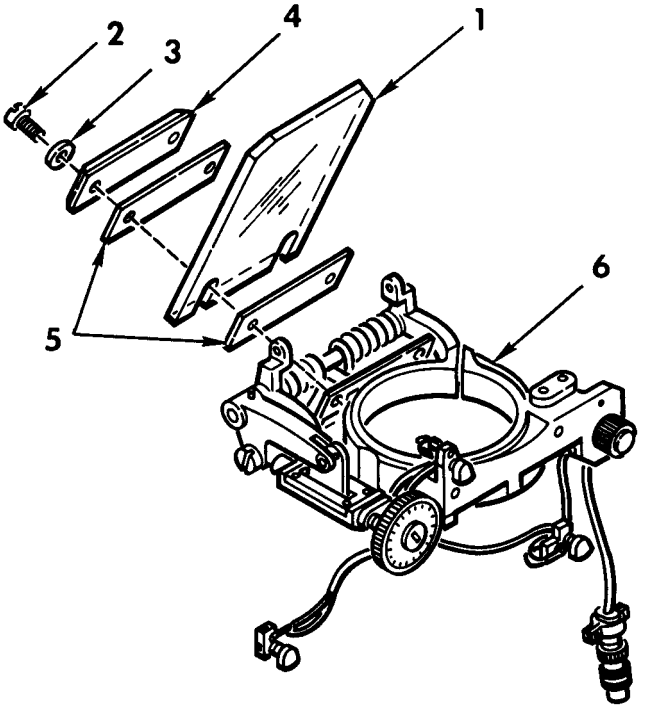
c. Remove two screws (6), two washers (7), spring (8), and bracket (9) from housing (10).



ARR82-27511

12. REMOVE BEAM SPLITTER ASSEMBLY (1).

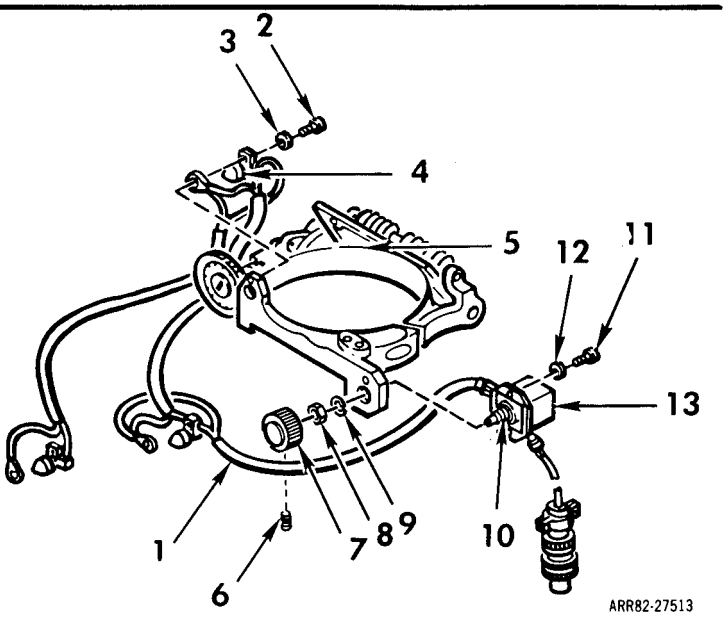
Remove two screws (2), two washers (3), plate (4), two gaskets (5), and beam splitter (1) from mount (6).



ARR82-27512

DISASSEMBLY (cont)

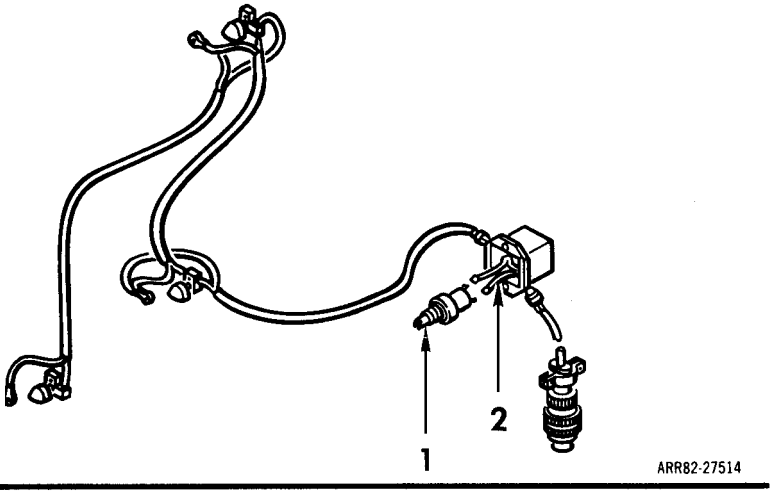
13. REMOVE WIRING HARNESS (1).
    a. Remove screw (2), washer (3), and light (4) from housing (5).
    b. Remove two setscrews (6), knob (7), nut (8), and washer (9) from resistor (10).
    c. Remove two screws (11), two washers (12), resistor (10), and box (13) from housing (5).



14. REMOVE RESISTOR (1).
    Unsolder wires (2) from resistor (1).

NOTE

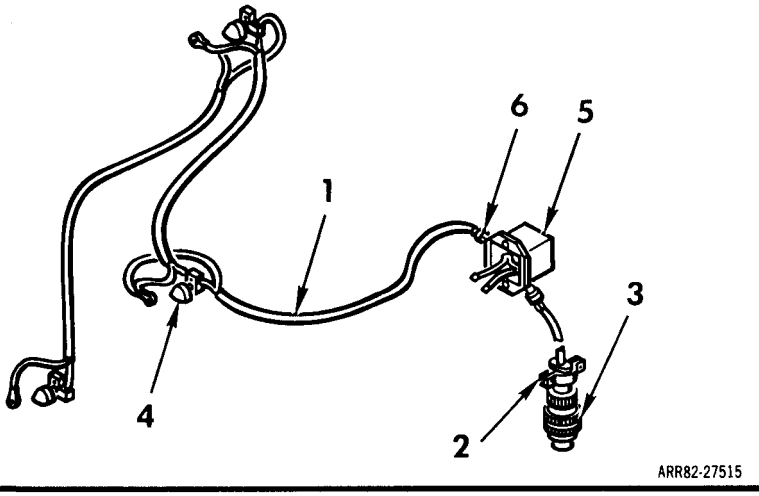
Label wires after removal for proper identification.



15. REMOVE WIRES (1).
    a. Remove backshell (2) and unsolder two wires (1) from connector (3).
    b. Remove wires (1) from three lights (4) and box (5).
    c. Remove two grommets (6) from box (5).

NOTE

Label wires after removal for proper identification.



2-67. REPAIR OF REFLEX SIGHT (cont)

16. REMOVE MOUNT (1).

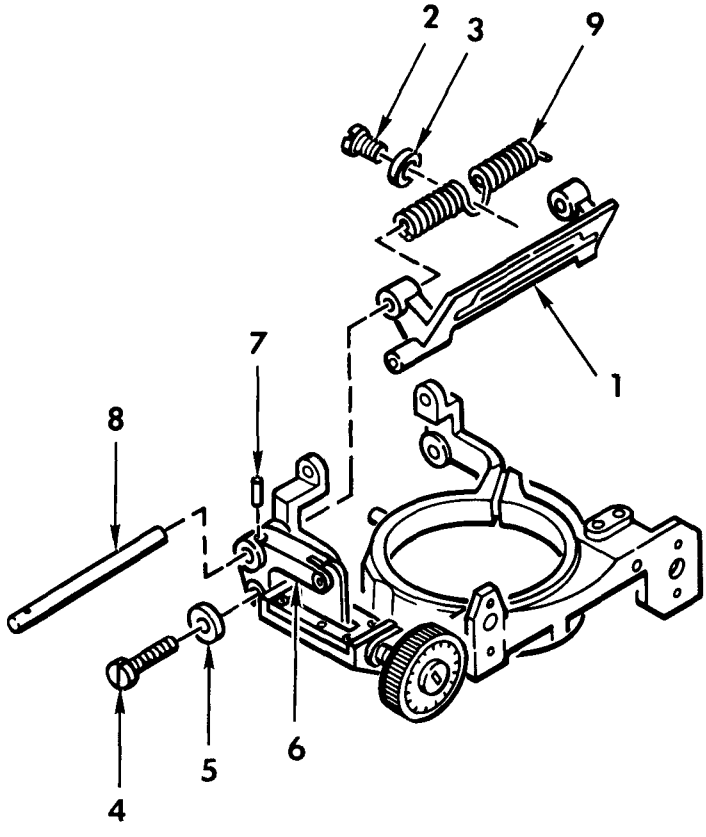
a. Remove screw (2) and washer (3) from spring boss.

b. Remove screw (4) and washer (5) from slider (6).

c. Remove pin (7) and shaft (8) from slider (6).

d. Remove mount (1).

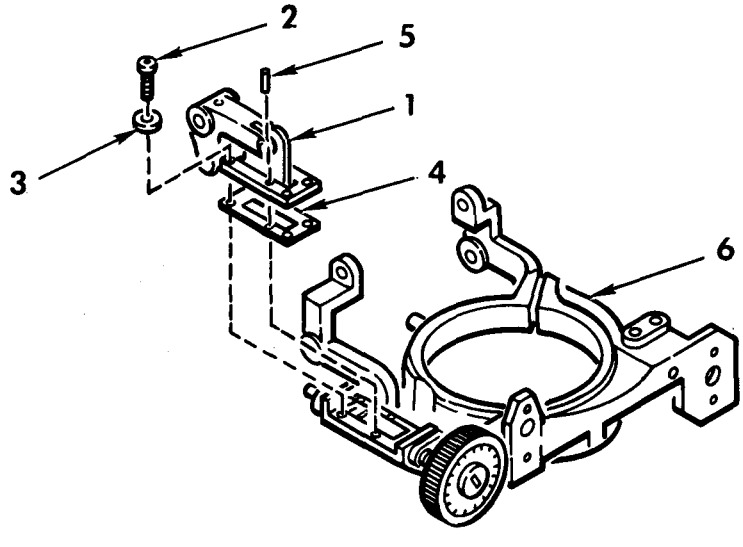
e. Remove spring (9) from mount (1).



ARR82-27516

17. REMOVE SLIDER (1).

Remove four screws (2), four washers (3), slider, (1), shim (4), and two pins (5) from housing (6).



ARR82-27517

DISASSEMBLY (cont)

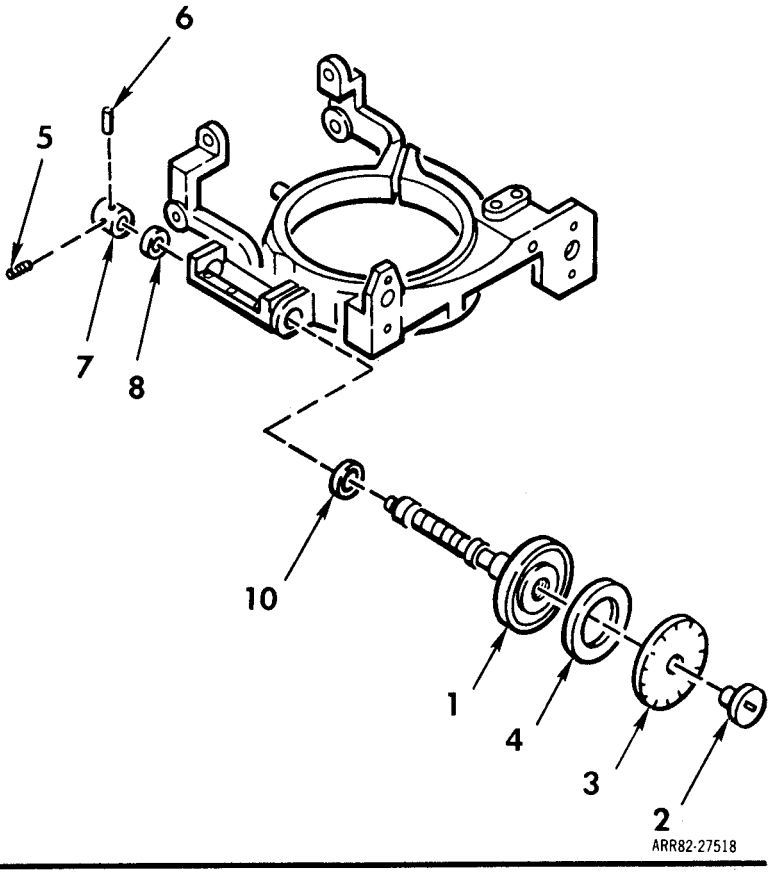
18 REMOVE ELEVATION/DEPRESSION SHAFT (1).

a. Using machine plug wrench, remove plug (2) then, remove dial (3) and spring washer (4) from elevation/depression shaft (1).

b. Remove setscrew (5) and pin (6) from collar (7).

c. Unthread collar (7) from elevation/depression shaft (1).

d. Remove washer (8), elevation/depression shaft (1), and washer (10).



CLEANING

WARNING

Do not use flammable materials near fire or an open flame. Most cleaning materials are harmful or fatal if swallowed. Use adequate ventilation. Avoid contact with skin and prolonged breathing of vapors.

19. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV EXCEPT FOR THE FOLLOWING PARTS:

Lenses-Use lens paper and thinner.
Filter–Use lens paper and alcohol.

2-67. REPAIR OF REFLEX SIGHT (cont)

INSPECTION

20. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV.

ASSEMBLY

21. INSTALL ELEVATION/DEPRESSION SHAFT (1).

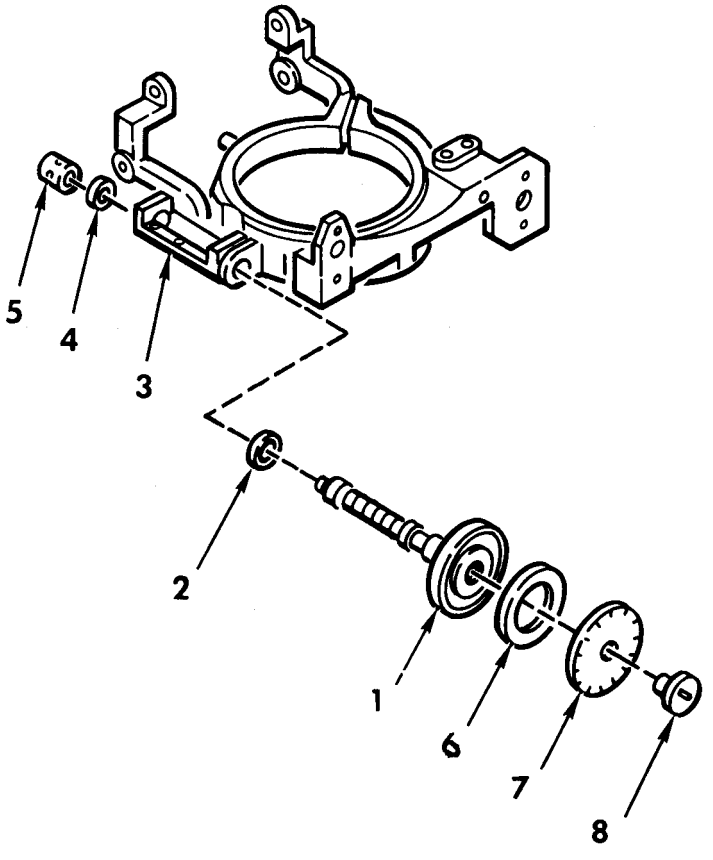
a. Lubricate elevation/depression shaft (1) and washer (2) with grease and install in housing (3).

b. Lubricate washer (4) with grease and install on elevation/depression shaft (1).

c. Thread collar (5) onto elevation/depression shaft (1).

d .Install spring washer (6), dial (7), and machine plug (8) onto elevation/depression shaft.

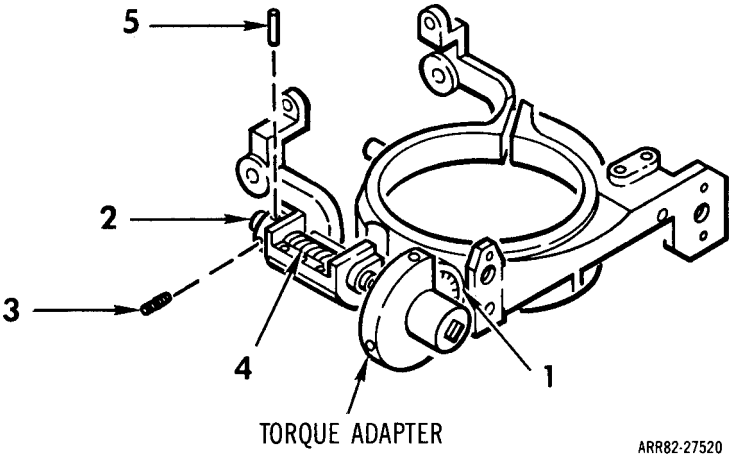
e. Turn elevation/depression (1) fully ccw, set dial so that "MILS" mark is centered on index line on housing (3), then tighten machine plug (8) using machine plug wrench.



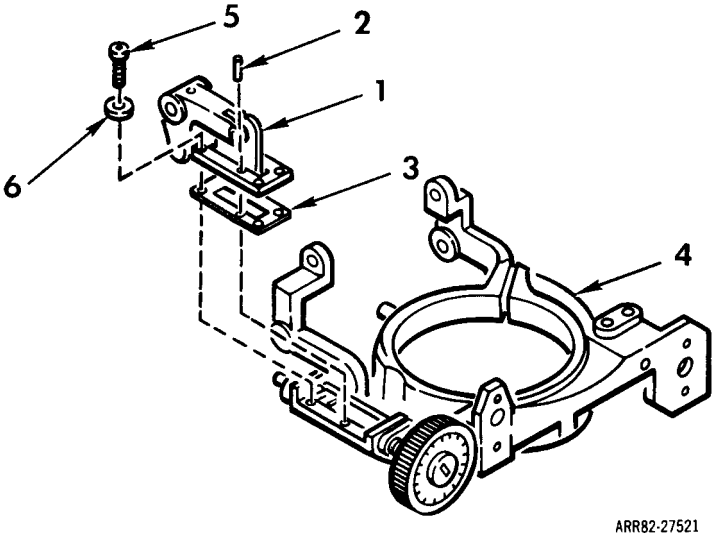
ARR82-27519

ASSEMBLY (cont)

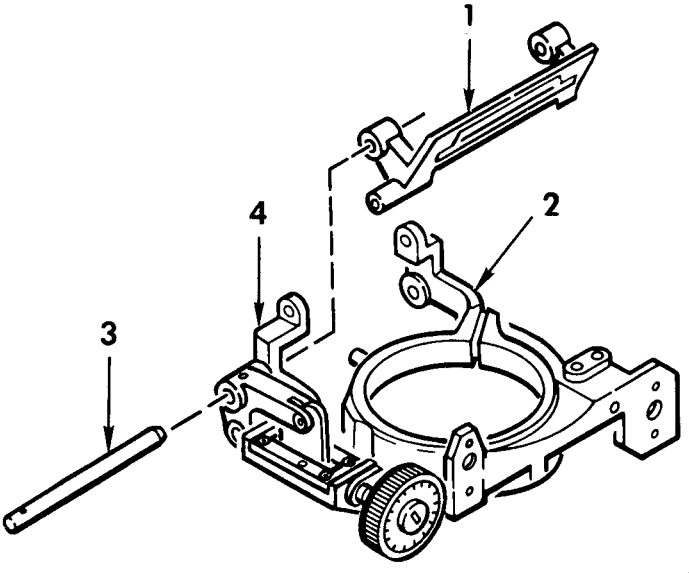
22. SET TORQUE ON ELEVATION/DEPRESSION KNOB (1).
    a. Using a torque wrench and elevation/depression knob torque adapter, tighten collar (2) until a torque of 1.5-4 lb-in. (0.17-0.45 N.m) is obtained on elevation/depression knob (1).
    b. Tighten setscrew (3), drill shaft (4). and install pin (5).



23. INSTALL SLIDER (1).
    a. Install two pins (2).
    b. Position shim (3) on housing (4).
    c. Lubricate slider (1) with grease.
    d. Position slider (1) on shim (3).
    e. Install four screws (5) and four washers (6). Use sealing compound on threads of screws.

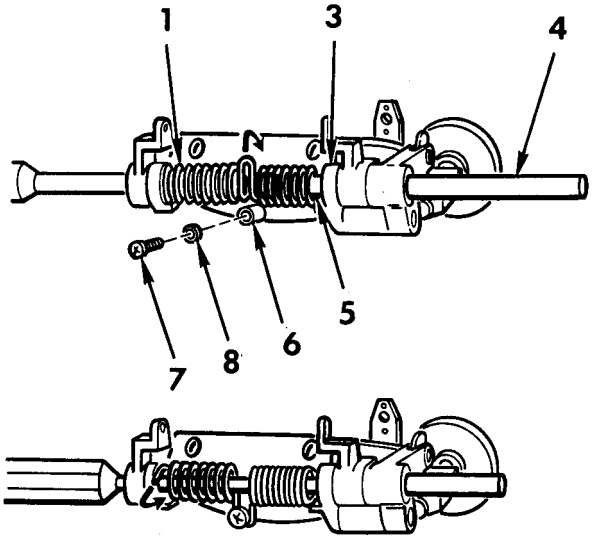


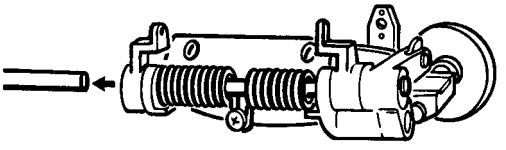
24. INSTALL MOUNT (1).
    a. Position mount (1) in housing (2).
    b. Insert shaft (3) approximately two inches into slider (4), housing (2) and mount (1).

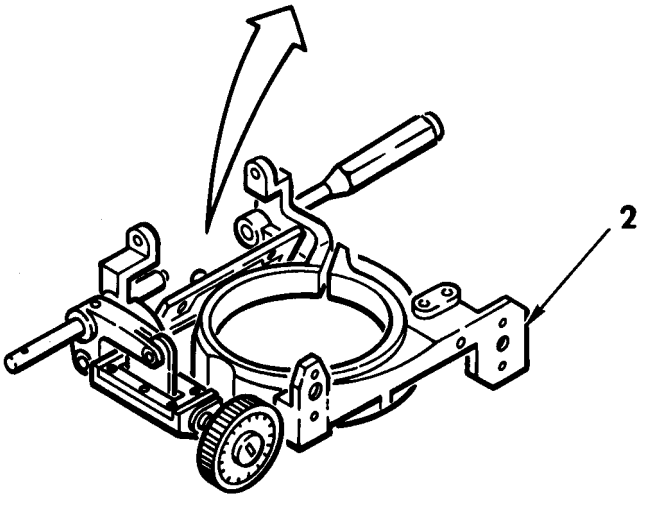


2-67. REPAIR OF REFLEX SIGHT (cont)

25. INSTALL SPRING (1)
    a. Secure housing (2) in vise.
    b. Insert a 5/16-inch pin punch through housing (2) and mount (3) flush with inside face of mount.
    c. Install spring (1) onto shaft (4) with spring end (5) resting on mount (3).
    d. Twist center of spring (1) past mount (3) and onto spring boss (6).
    e. Install screw (7) and washer (8) to secure spring (1) to spring boss (6).
    f. Using locking pliers twist free end of spring (1) into position so that spring end rests on mount (3) and pin punch can be inserted into end of spring to hold it in position.
    g. Carefully push shaft (4) through spring (1), into mount (3) and housing (2) as it displaces pin punch.



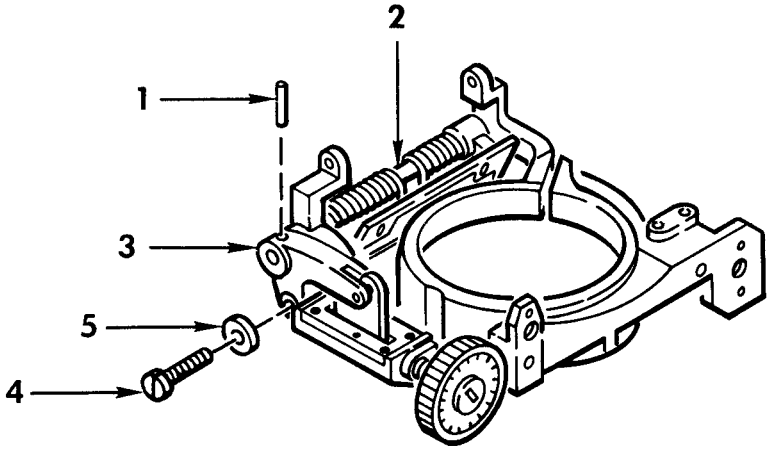




ARR82-27523

ASSEMBLY (cont)

26. INSTALL PIN (1).
    a. Rotate shaft (2) to aline hole in shaft with hole in slider (3).
    b. Install pin (1) into slider (3) and shaft (2).
    c. Install screw (4) and washer (5) in slider (3).



ARR82-27524

2-67. REPAIR OF REFLEX SIGHT (cont)

27. INSTALL WIRES (1 AND 2).

a. Install two grommets (3) in box (4).

b. Install wire (1) (item 33, Appx B). Refer to wiring diagram.

c. Install wire (2) (item 34, Appx B). Refer to wiring diagram.

d. Solder wires at points (5).

e. Cover wires and resistor terminals at point (6) with 0.125-inch diameter insulation sleeving. Do not cover wires at points (7).

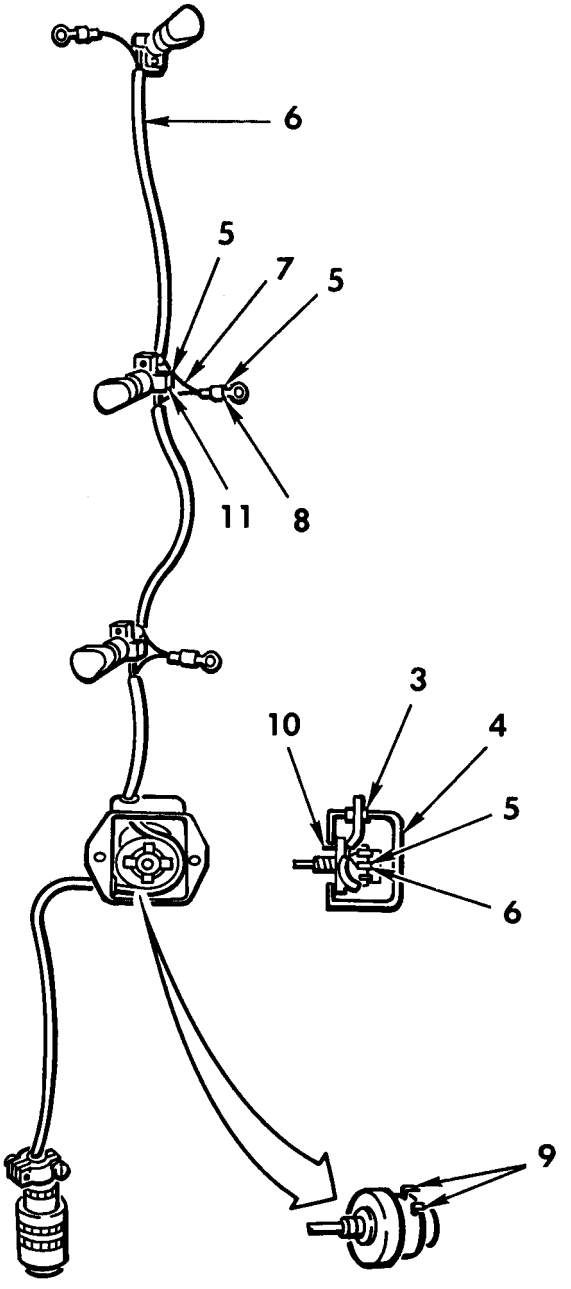
f. Cover terminal lugs at points (8) with 0.187-inch diameter insulation sleeving.

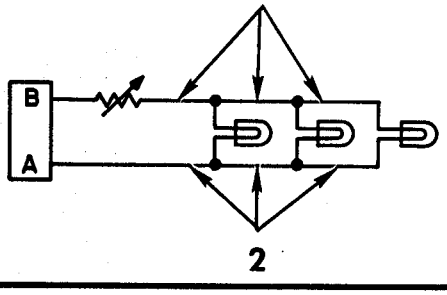
g. Bend resistor terminals (9) 90° for ease in installation.

h. Position tab washer (10) as shown.

Fill slots (11) with sealing compound.

j. Using multimeter, check for continuity between pins A and B of connector while rotating shaft of resistor, Check that pins A and B are not grounded to connector shell.



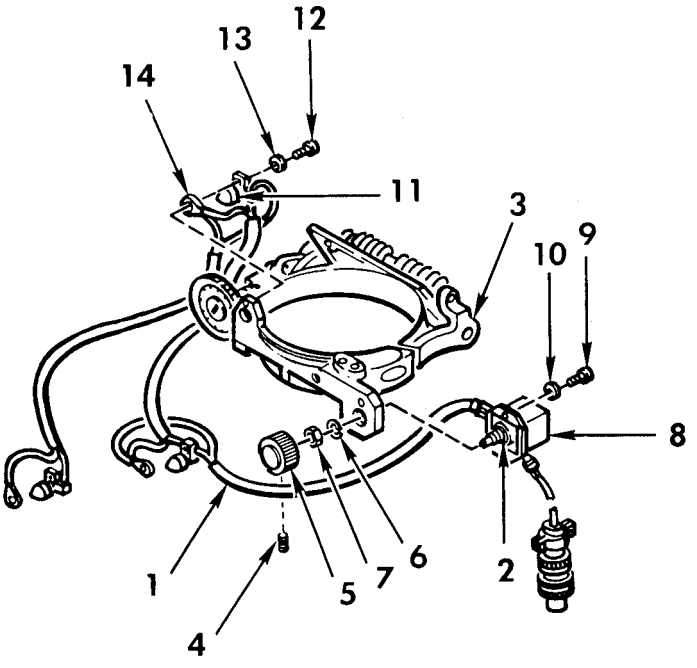


2

ARR82-27525

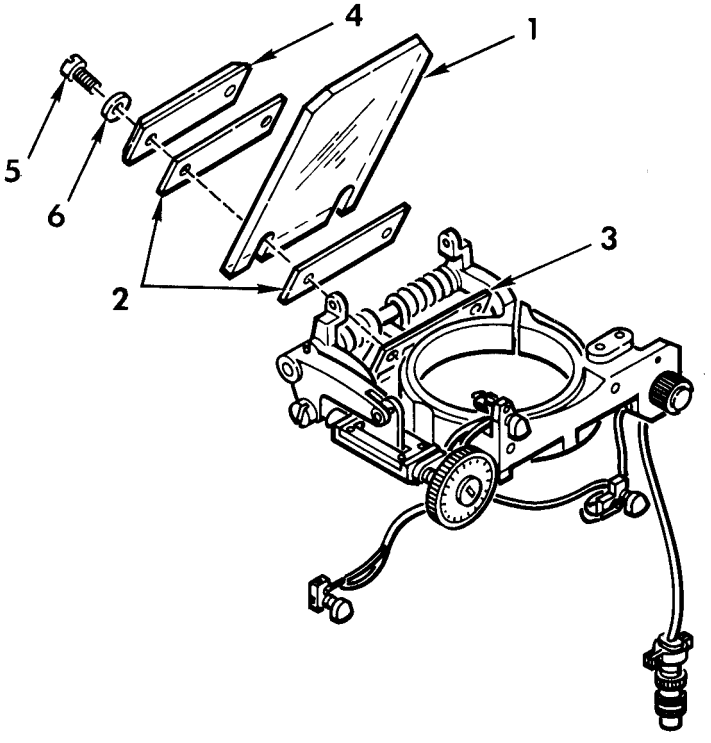
ASSEMBLY (cont)

28. INSTALL WIRING HARNESS (1).
    a. Position resistor (2) on housing (3).
    b. Install two setscrews (4) in knob (5). Install washer (6), nut (7), and knob (5) on resistor (2).
    c. Secure box (8) with two screws (9) and two washers (10). Use sealing compound on threads of screws.
    d. Position light (11) on head assembly (3); then, install screw (12) and washer. Make sure ground lug (14) is under head of screw.



ARR82-27527

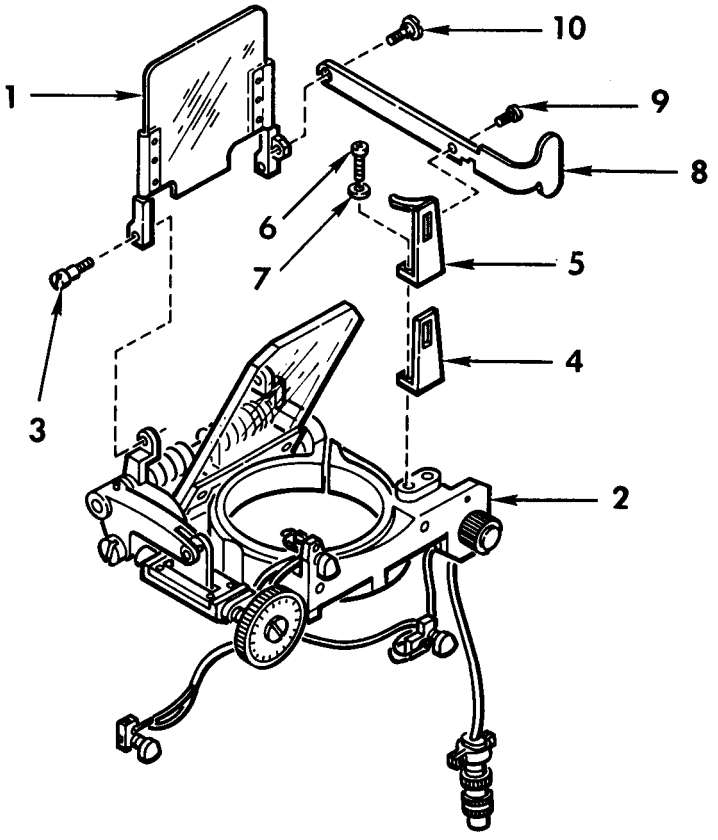
29. INSTALL BEAM SPLITTER ASSEMBLY (1).
    a. Position two gaskets (2) on beam splitter (1).
    b. Position beam splitter (1) on mount (3).
    c. Position platen gasket (2).
    d. Install two screws (5) and two washers (6). Use sealing compound on threads of screws. Torque screws to 30 lb-in. (3.4 N.m).



ARR82-27526

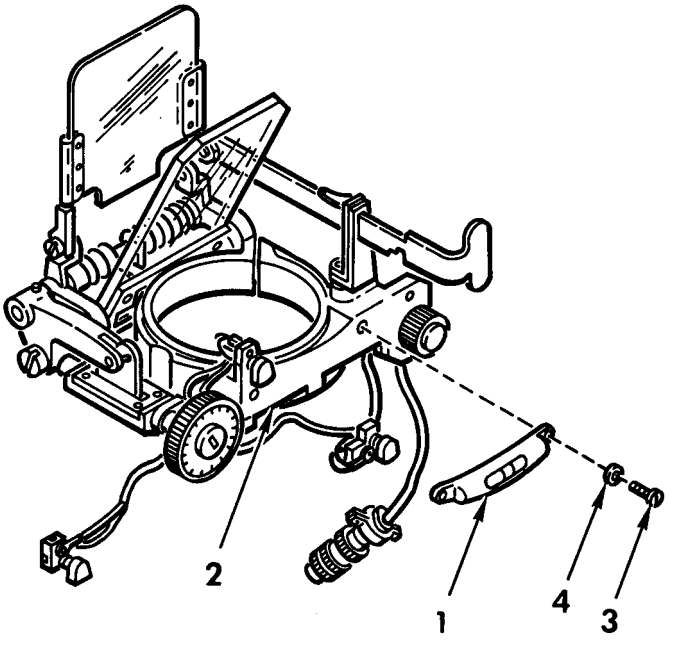
2-67. REPAIR OF REFLEX SIGHT (cont)

30. INSTALL FILTER (1).
    a. Position filter (1) on head assembly (2).
    b. Install two screws (3).
    c. Install bracket (4) and spring (5) on head assembly (2) and secure with two screws (6) and two washers (7). Use sealing compound on threads of screws.
    d. Insert lever (8) into bracket (4) and spring (5). Install screw (9) into lever (8). Use sealing compound on thread of screw.
    e. Secure lever (8) to filter (1) with screw (10).



ARR82-27528

31. INSTALL INCLINOMETER (1).
    a. Place housing (2) on a level surface.
    b. Position inclinometer (1) level on housing (2) and install two screws (3) and two washers (4). Use sealing compound on thread of screws.

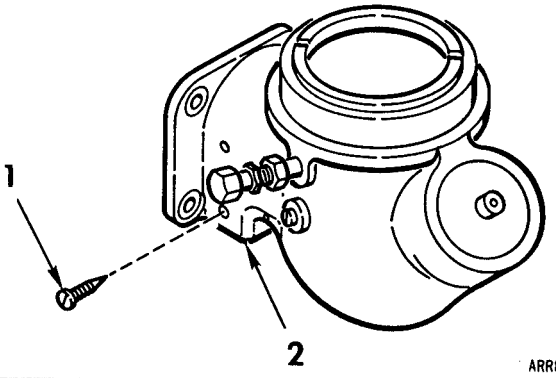


ARR82-27529

ASSEMBLY (cont)

32. INSTALL STUDS (1).

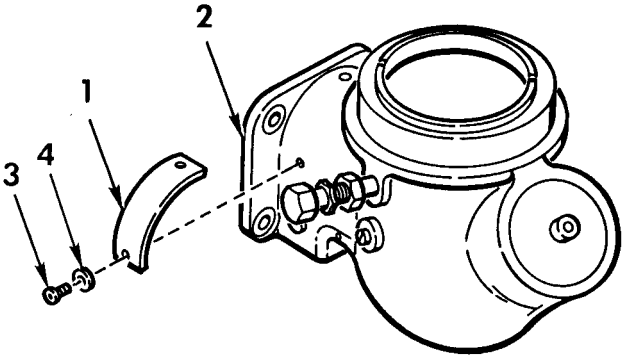
Install two studs (1) in body (2). Use sealing compound on threads of studs.



ARR82-27530

33. INSTALL IDENTIFICATION PLATE (1).

Position identification plate (1) on body (2) and install two screws (3) and two washers (4). Use sealing compound on threads of screws.



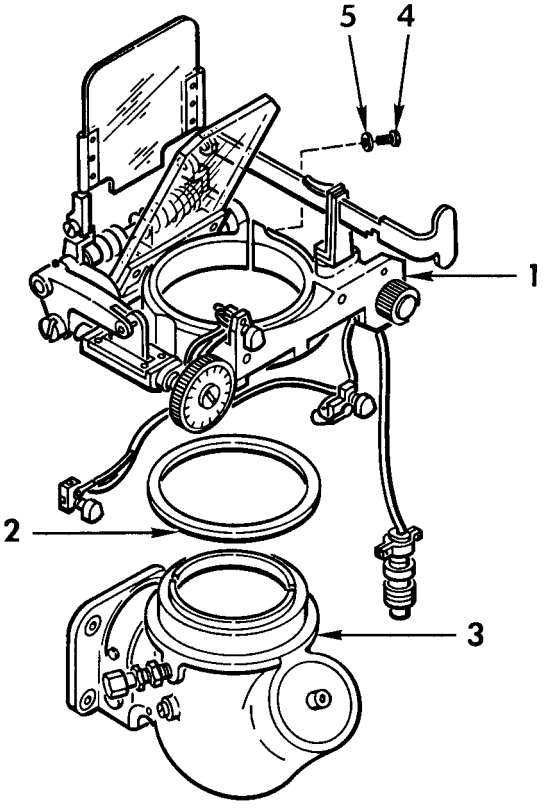
ARR82-27531

34. INSTALL HEAD ASSEMBLY (1).

a. Install spacer (2) on body (3).

b. Position head assembly (1) on body (3).

c. Install screw (4) and washer (5) in head assembly (1). Use sealing compound on threads of screw.



ARR82-27532

2-67. REPAIR OF REFLEX SIGHT (cont)

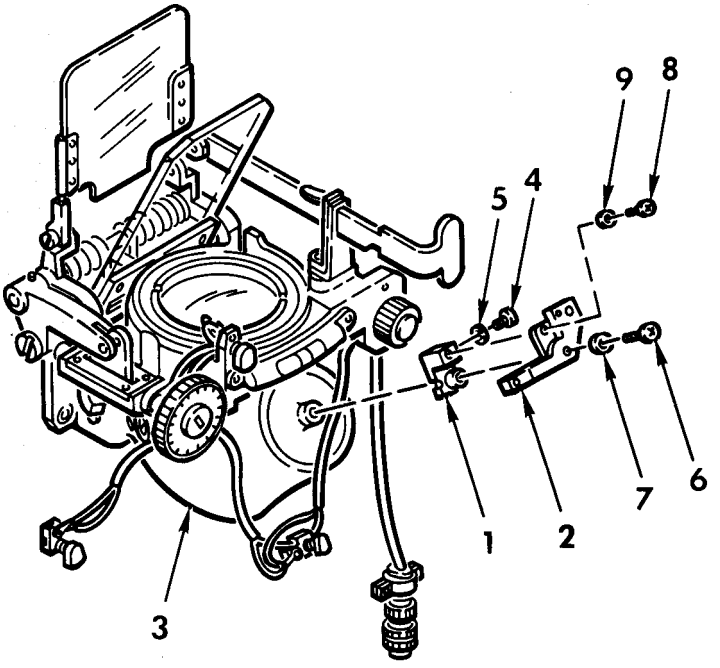
35. INSTALL SUPPORT (1) AND ADAPTER (2).

a. Place support (1) on body (3).

b. Install screw (4) and washer (5). Use sealing compound on thread of screw.

c. Place adapter (2) on support (1) and install screw (6) and washer (7). Use sealing compound on thread of screw.

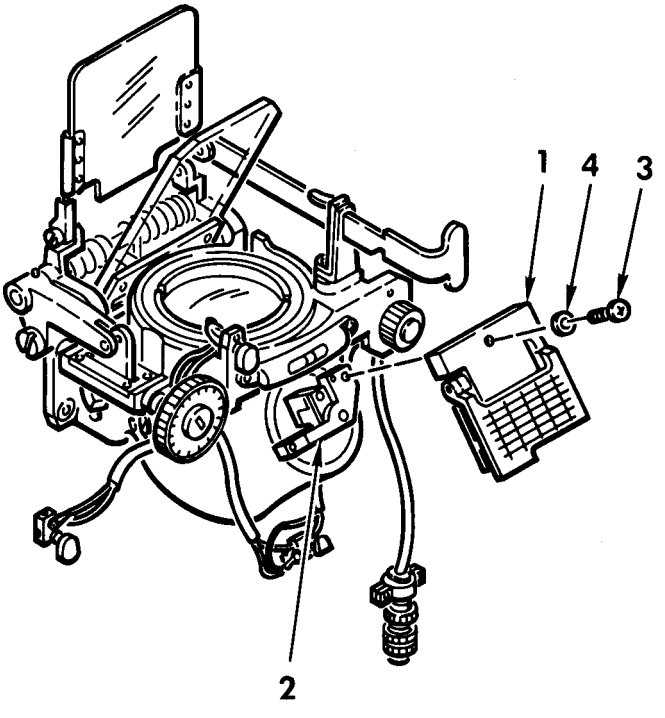
d. Install screw (8) and washer (9) into adapter (2). Use sealing compound on thread of screw.



ARR82-27533

36. INSTALL ELEVATION CARD (1).

Position elevation card (1) on adapter (2) and install screw (3) and washer (4). Use sealing compound on thread of screw.

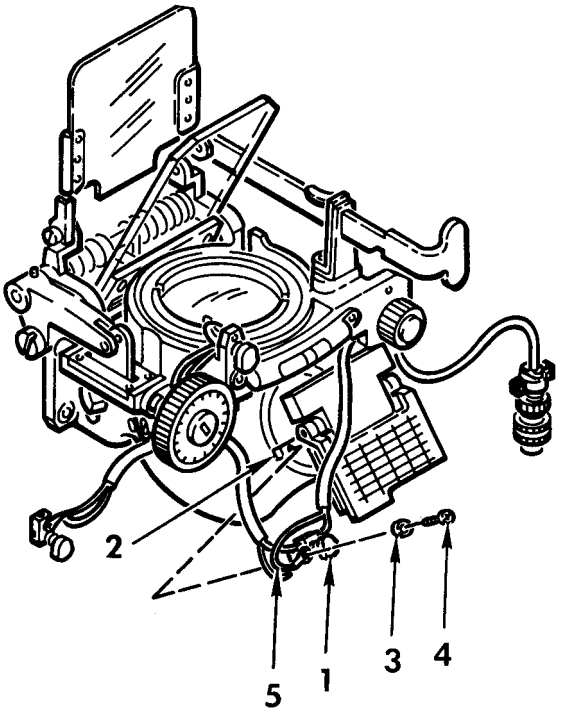


ARR82-27534

ASSEMBLY (cont)

37. INSTALL LIGHT ASSEMBLY (1).

Position light assembly (1) on adapter (2) and install screw (3) and washer (4). Make sure ground terminal (5) is under head of screw. Use sealing compound on thread of screw.

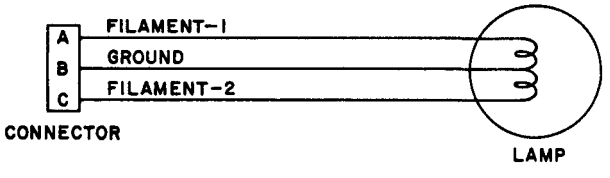


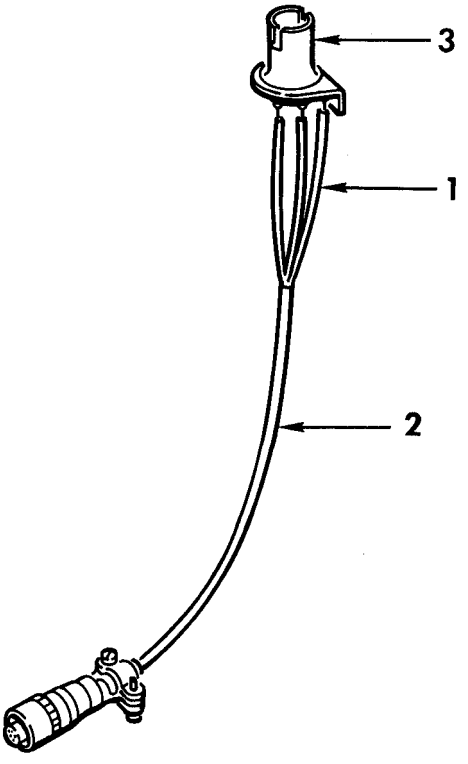
ARR82-27535

38. INSTALL RETICLE LAMP WIRES(1)

a. Solder wires(1) into socket (3) using wire (item 33, Appx B). Refer to wiring diagram.

b. Cover wires (1) with 0.187-inch diameter insulation sleeving.





ARR82-27536

2-67. REPAIR OF REFLEX SIGHT (cont)

39. INSTALL LAMP SOCKET (1).

a. Install wires (2) in housing (3).

b. Install socket (1) in housing (3) and install plate (4), two screws (5), and two washers (6). Use sealing compound on threads of screws.

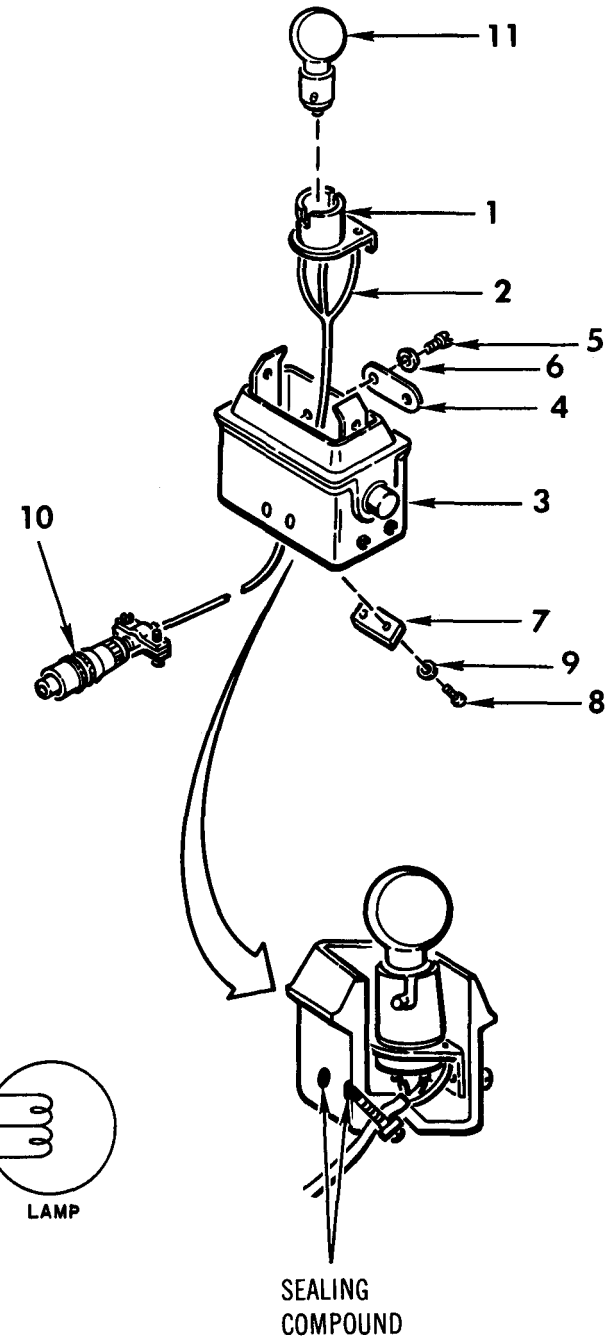
c. Install plate (7), two screws (8), and two washers (9). Use sealing compound on threads of screws.

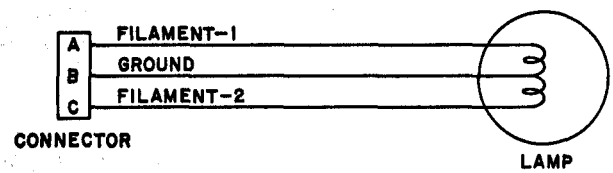
d. Solder wires (2) to connector (10). Refer to wiring diagram.

e. Fill screw holes in housing (3) with sealing compound.

f. Install lamp (11) in socket (1).

g. Using multimeter, check for continuity between pins A and B, and between pins B and C of connector (10).



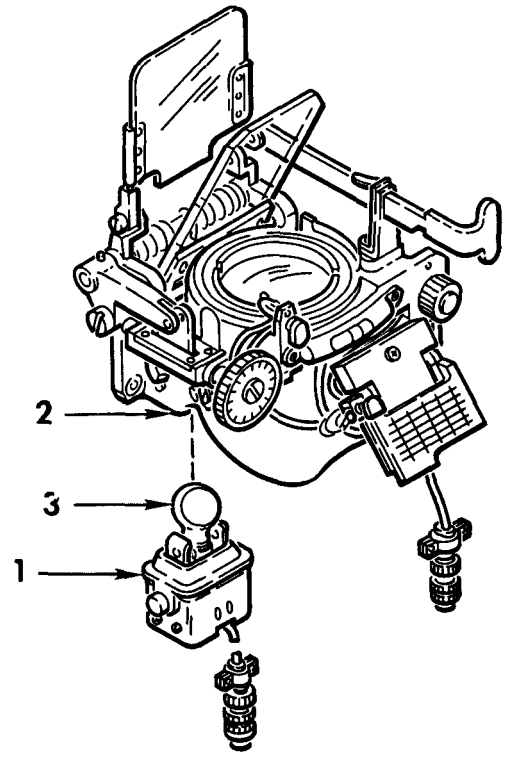


ARR82-27537

ASSEMBLY (cont)

40. INSTALL LAMP HOUSING (1).

Insert lamp housing (1) into body (2). Make sure clear side of lamp (3) is toward lens in body.



ARR82-27538

END OF TASK

2-68. REPAIR OF RANGE POTENTIOMETER

DESCRIPTION

This task covers: Disassembly, cleaning, inspection, assembly, adjustment and test.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental
- Adapter, Torque, Range
  - Potentiometer (Fig C-6, APPX C)
- Multimeter AN/USM-223
- Wrench, Torque, 0-10 lb-in.

Materials:
- Adhesive (Item 3, Appx B)
- Grease (Item 12, Appx B)
- Sealing compound (Item 23 Appx B)
- Solder (Item 27, Appx B)
- Wire (Item 33, Appx B)

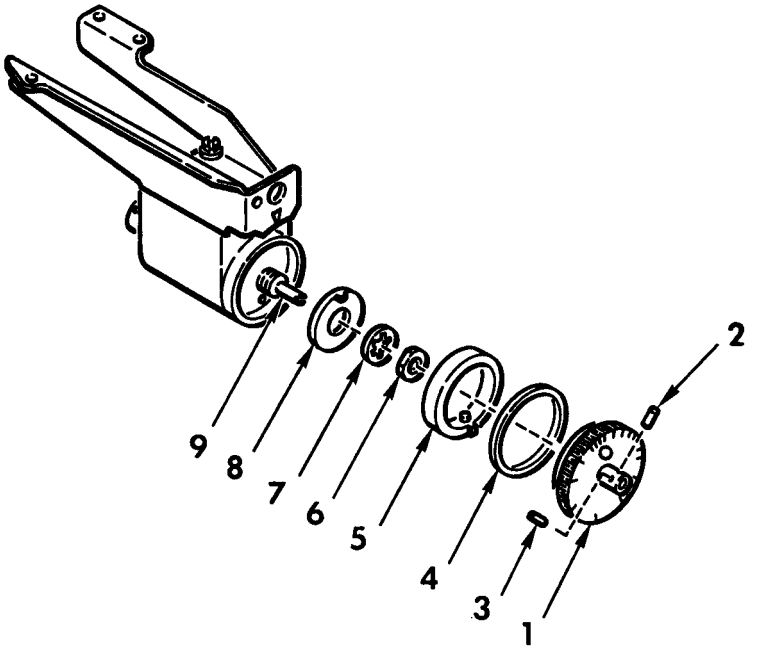
Personnel Required:
- 68M Aircraft Weapon Systems
  - Repairer

Equipment Conditions:
- In shop on bench.

DISASSEMBLY

1. REMOVE KNOB (1).

   Remove setscrew (2), pin (3), knob (1), packing (4), collar (5), nut (6), lockwasher (7), and keywasher (8) from resistor (9).

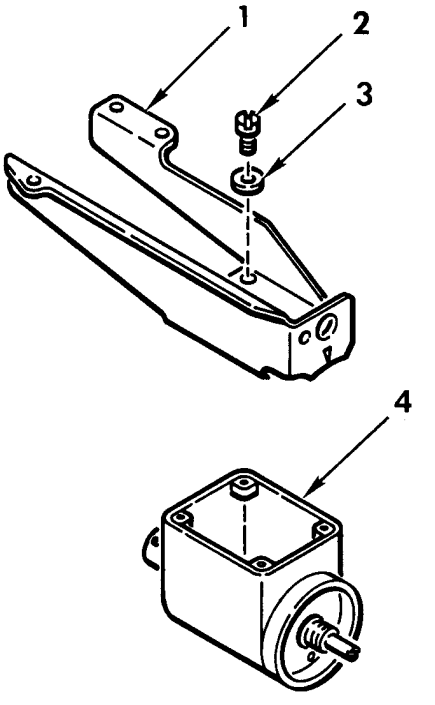


ARR82-27440

DISASSEMBLY (cont)

2. REMOVE BRACKET (1).

Remove four screws (2), four washers (3), and bracket (1) from housing (4).



ARR82-27441

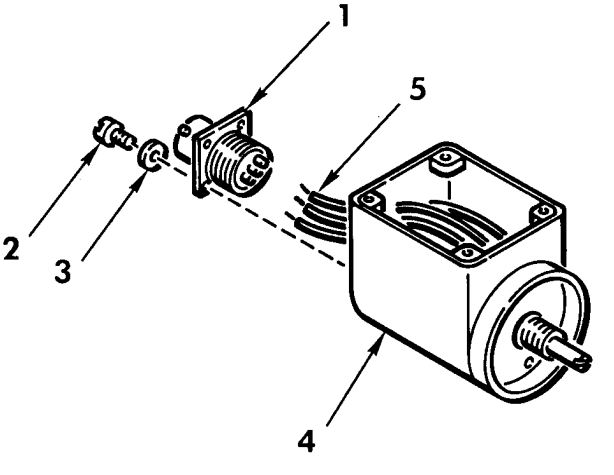
3. REMOVE CONNECTOR (1).

a. Remove four screws (2), four washers (3), and separate connector (1) from housing (4).

b. Unsolder three wires (5) from connector (1). Note terminal connections for later assembly.

NOTE

Label wires after removal for proper identification.



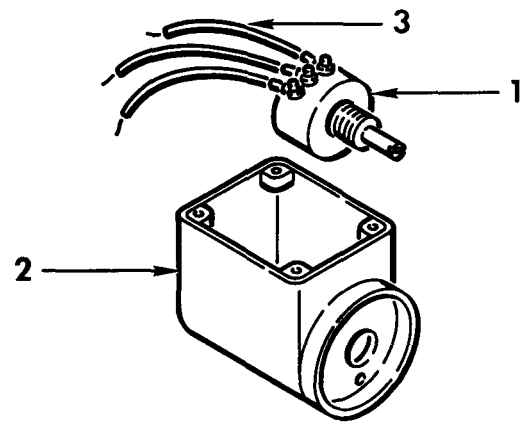
ARR82-27442

2-68. REPAIR OF RANGE POTENTIOMETER (cont)

4. REMOVE RESISSTOR (1)

a. remove resistor (1) from housing (2).

b. Unsolder tre wires (3) from resistor (1).



ARR82-27443

CLEANING

5. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH SECTION IV

INSPECTION

6. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH SECTION IV.

ASSEMBLY

7. INSTALL RESISTOR (1).

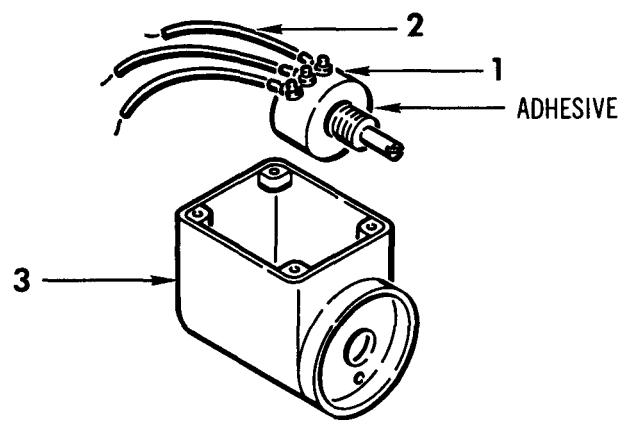
a. Solder three wires (2) to terminals on resistor (1). Use wires 2.0 inches long.

b. Apply adhesive to mounting face of

c. Install resistor (1) in housing (3).

NOTE

Use meter to ID wires



ARR82-27444

ASSEMBLY (cont)

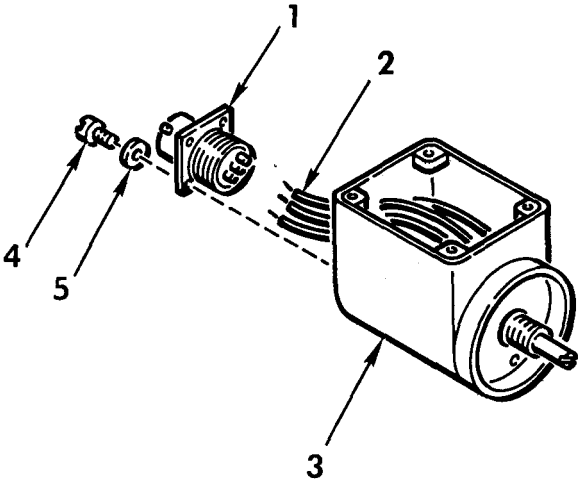
8. INSTALL CONNECTOR (1).

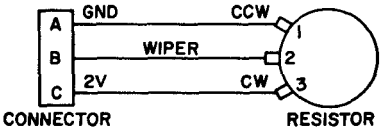
a. Solder three wires (2) to pins on connector (1). Refer to wiring diagram.

b. Position connector (1) on housing (3) and install four screws (4) and four washers (5). Use sealing compound on threads of screws.

NOTE

Use multimeter to identify wires prior to connecting them.



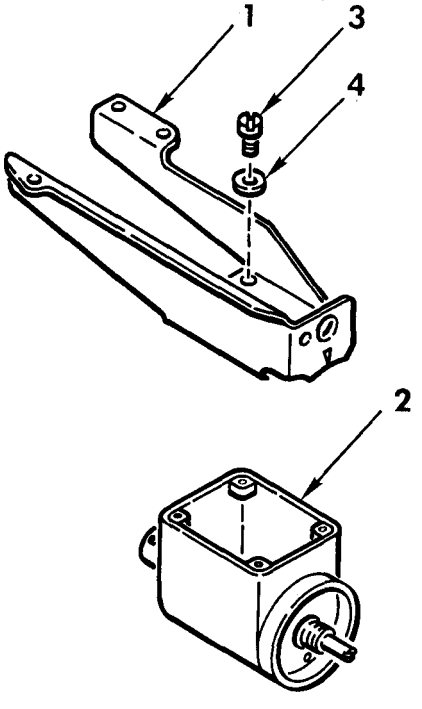


RANGE POTENTIOMETER WIRING DIAGRAM

ARR82-27445

9. INSTALL BRACKET (1).

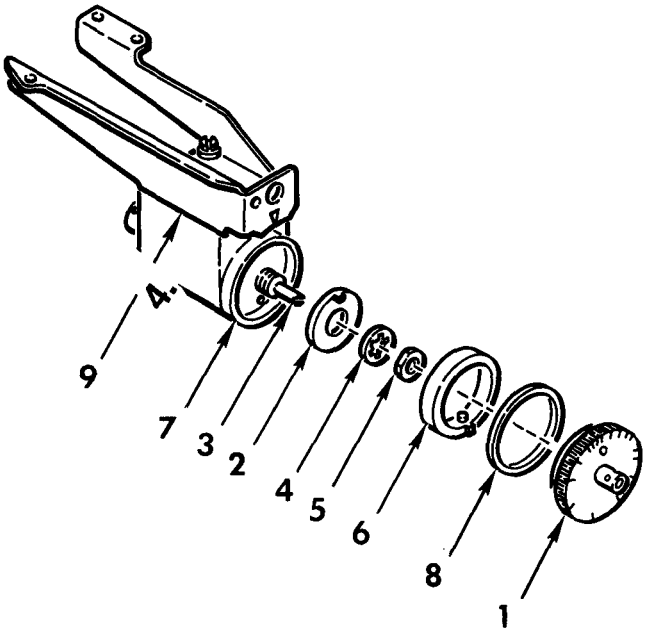
Position bracket (1) on housing (2) and install four screws (3) and four washers (4). Use sealing compound on threads of screws.



ARR82-27446

2-68. REPAIR OF RANGE POTENTIOMETER (cont)

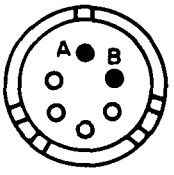
10. INSTALL KNOB (1).
    a. Lubricate keywasher (2) with grease, then install on resistor (3).
    b. Install lockwasher (4) and nut (5).
    c. Lubricate collar (6) with grease, then install in housing (7).
    d. Install packing (8) and knob (1).
    e. Aline "0", mark on knob (1) with index mark on bracket (9). If knob cannot be set on "0", adjust keywasher (2) and collar (6) clockwise or counterclockwise.



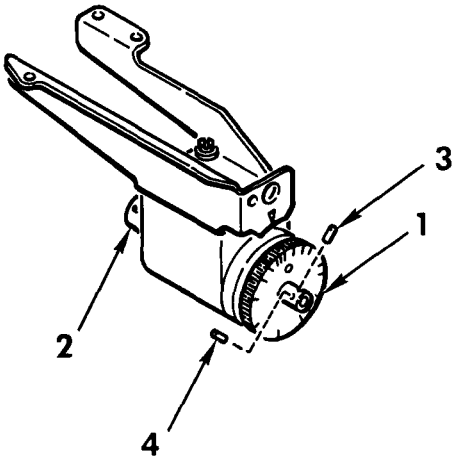
ARR82-27447

ADJUSTMENT AND TEST

11. ADJUST KNOB (1).
    a. Connect multimeter to pins A and B of connector (2).
    b. Hold knob (1) on “0” and rotate shaft of resistor with screwdriver until multimeter reads between 2 and 20 ohms.
    c. Tighten setscrew (3). Recheck meter reading and reset shaft if necessary.
    d. Rotate knob (1) fully clockwise to maximum range, Meter reading must be less than 10,000 ohms.
    e. Drill shaft of resistor and install pin (4).
    f. Slowly rotate knob (1) counterclockwise and clockwise. Meter reading should decrease and increase smoothly with no erratic movement.



CONNECTOR

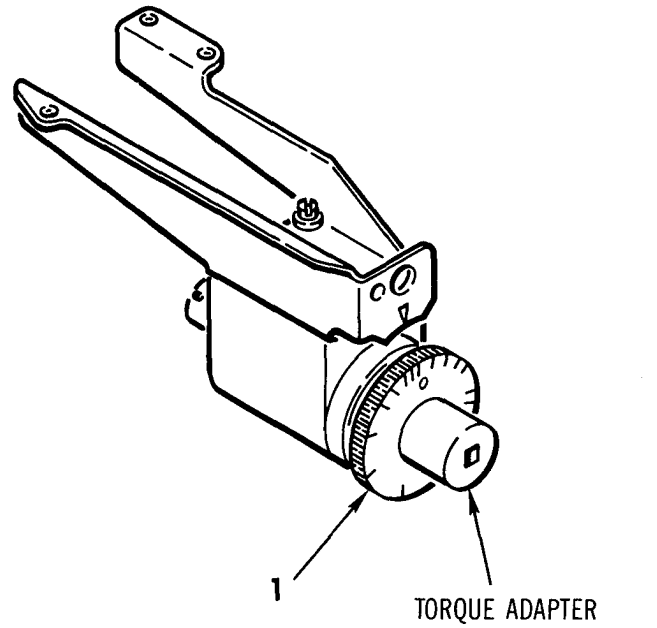


ARR82-27448

ADJUSTMENT AND TEST (cont)

12. TEST KNOB (1).

    Check turning friction of knob (1) using torque wrench and range potentiometer torque adapter. Torque must be 2-5 lb-in. (0.23-0.57 N.m).



END OF TASK

Section XXIV. ARMAMENT SUBSYSTEM M97A4 ADJUSTMENTS AND ALINEMENTS

Section Contents

2-69. ELEVATION AND AZIMUTH RESOLVER ALINEMENT

DESCRIPTION

This task covers: Coarse alinement of elevation and azimuth resolvers.

INITIAL SETUP

Tools/Test and Support Equipment:
Tool Set, A/C Armament Repairman: Basic
Tool Set, A/C Armament Repairman: Supplemental
Electronics Systems Test Set: M137

Materials:
Tape (Item 30.1, Appx B)

Personnel Required:
68J Aircraft Fire Control Repairer (2)

References:
TM 9-1090-206-20-1
TM 55-1520-236-23

Equipment Conditions:
HELICOPTER ARMAMENT SUBSYSTEM MAINTENANCE SETUP performed, TM 9-1090-206-20-1.
Test set cables W1 and W6 connected, see TM 9-1090-206-20-1.
Power applied, see TM 9-1090-206-20-1.

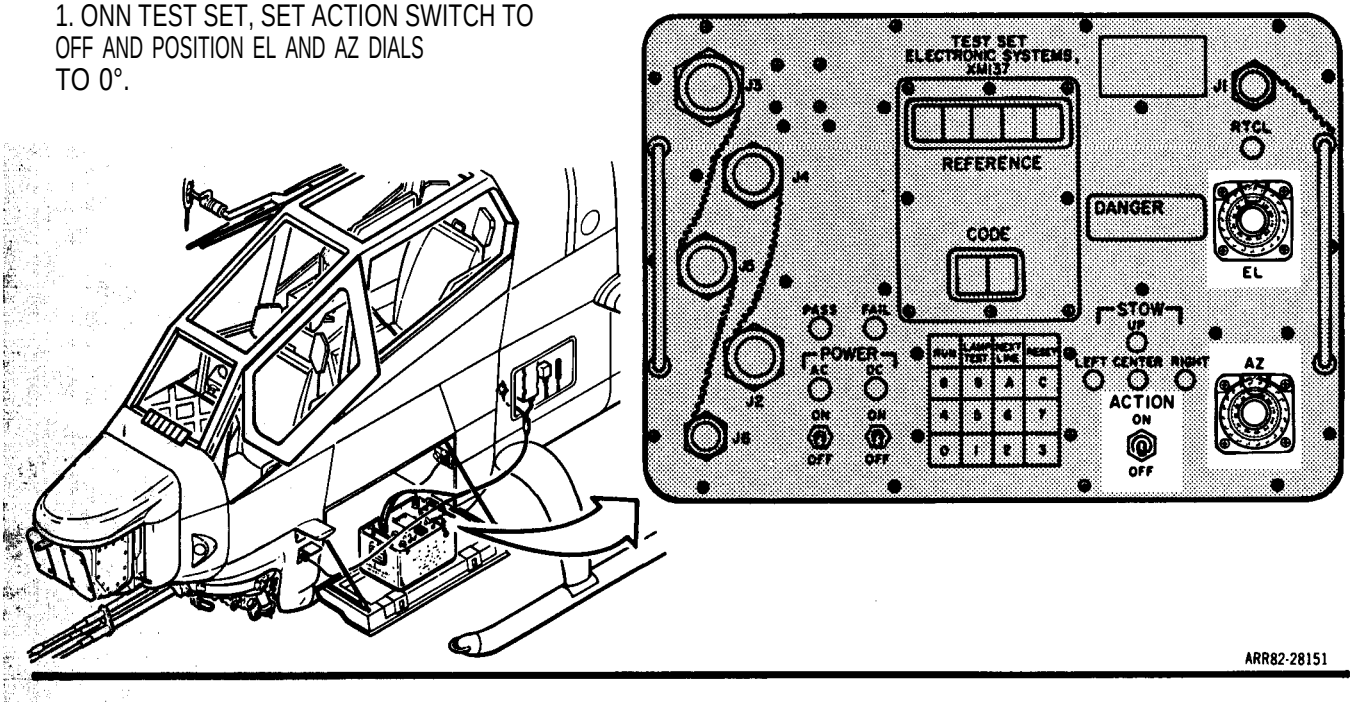
NOTE

Anytime resolvers are alined, boresighting of the turret subsystem must be re-established.

General Safety Instructions:
Remove power when making or breaking cable connections.

RESOLVER ALINEMENT SETUP

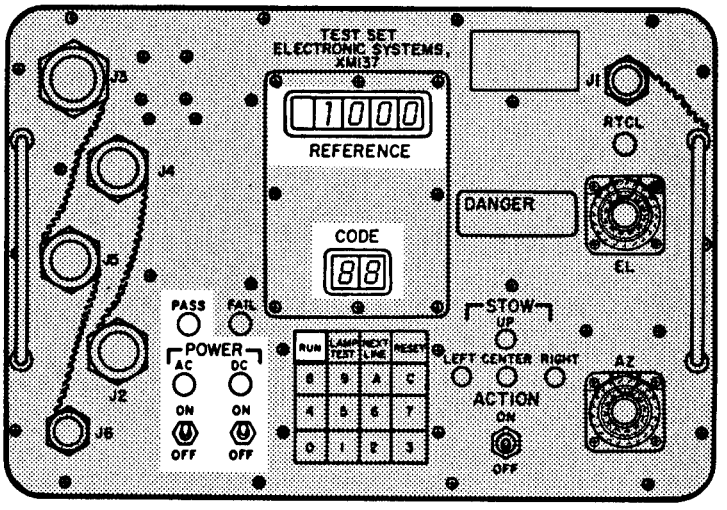
1. ONN TEST SET, SET ACTION SWITCH TO OFF AND POSITION EL AND AZ DIALS TO 0°.



RESOLVER ALINEMENT SETUP (cont)

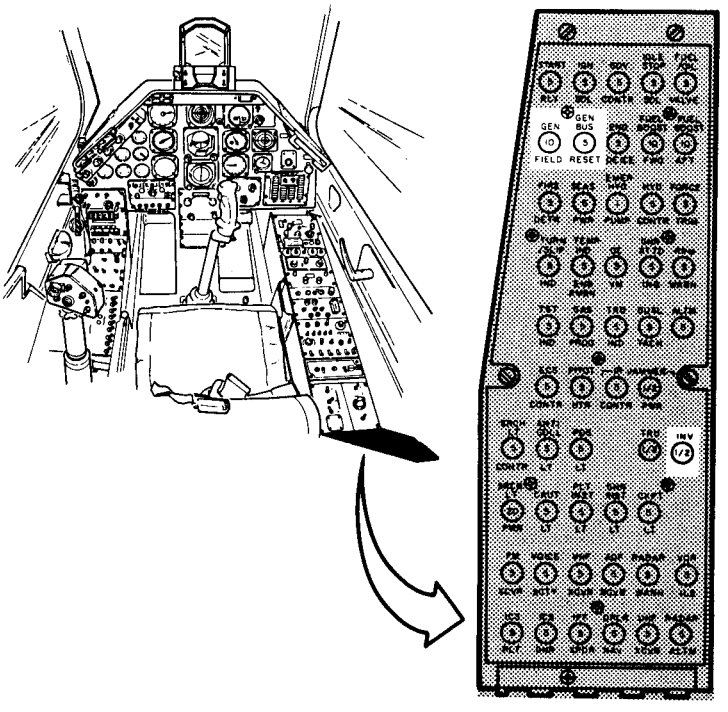
2. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.
   a. AC and DC POWER indicators light.
   b. 8's appear in REFERENCE and CODE displays.
   c. PASS indicator lights.

3. ON TEST SET, PRESS RUN KEY.
   1000 appears in REFERENCE display.



ARR83-1919

4. CLOSE FOLLOWING CIRCUIT BREAKERS ON DC CIRCUIT BREAKER PANEL:
   GEN FIELD
   GEN BUS RESET
   INV

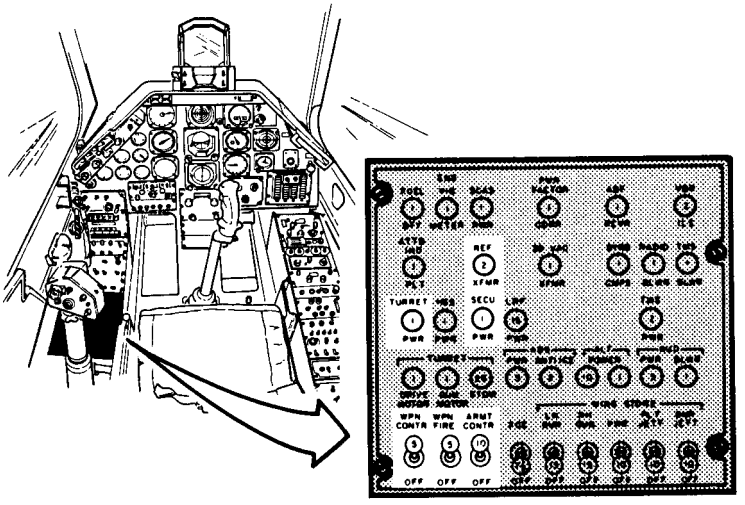


DC CIRCUIT BREAKER PANEL

ARR82-28152

2-69. ELEVATION AND AZIMUTH RESOLVER ALINEMENT (cont)

5. CLOSE FOLLOWING CIRCUIT BREAKERS ON AC/ARMAMENT CIRCUIT BREAKER PANEL:
   - REF XFMR
   - TURRET PWR
   - SECU PWR
   - WPN CONTR
   - WPN FIRE
   - ARMT CONTR

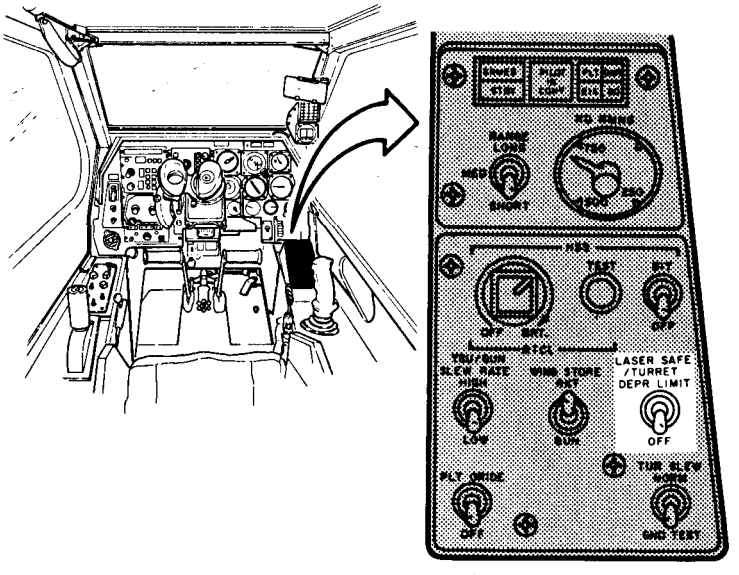


AC / ARMAMENT CIRCUIT BREAKER PANEL

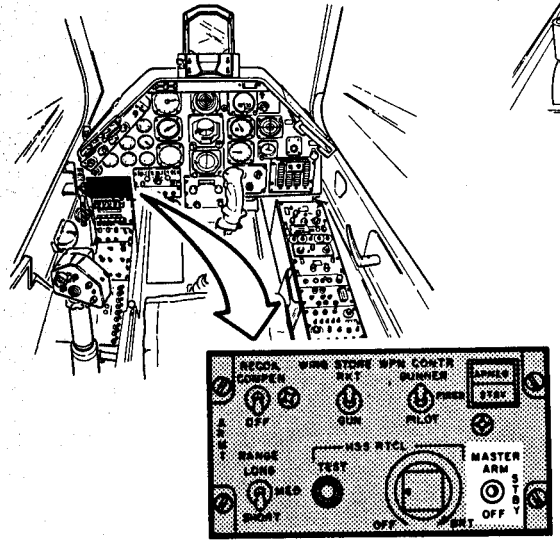
ARR82-28153

6. ON PILOT ARMAMENT CONTROL PANEL, SET MASTER ARM SWITCH TO STBY.

7. ON GUNNER ARMAMENT CONTROL PANEL, SET LASER SAFE/TURRET DEPR LIMIT TO OFF.



GUNNER ARMAMENT CONTROL PANEL

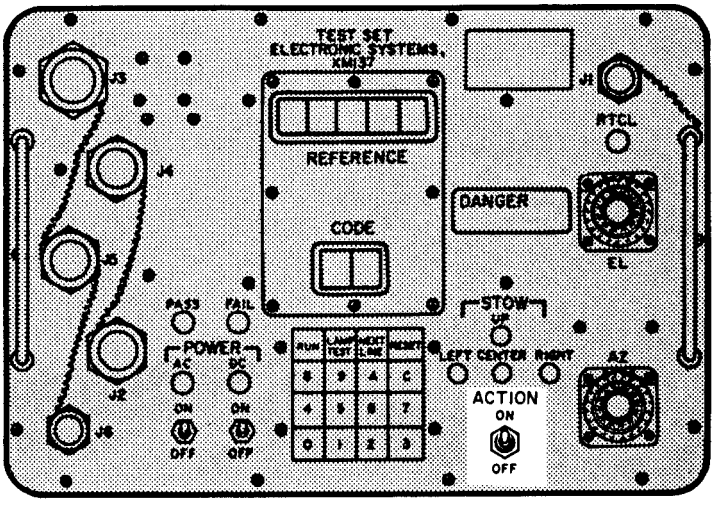


PILOT ARMAMENT CONTROL PANEL

ARR82-28154

RESOLVER ALINEMENT SETUP (cont)

8. ON TEST SET, SET ACTION SWITCH TO ON.



ARR82-28155

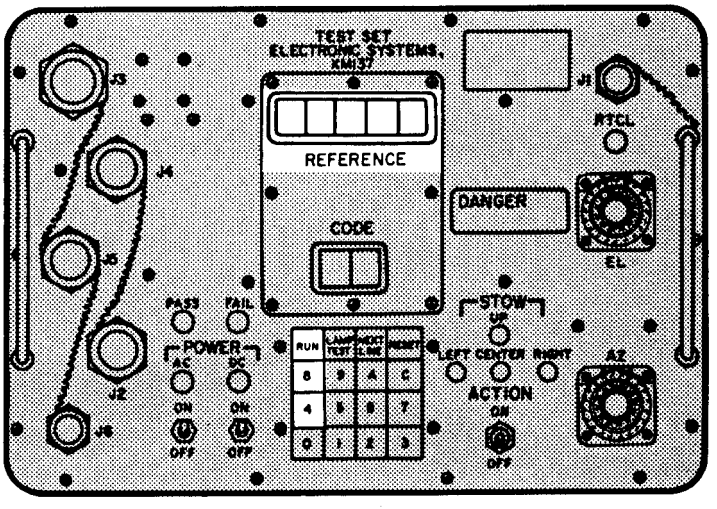
ELEVATION RESOLVER ALINEMENT

9. ON TEST SET, PRESS 4, 8, AND RUN KEYS.

RELEASE ELEVATION DRIVE MOTOR BRAKE AND MANUALLY POSITION TURRET IN ELEVATION UNTIL A MINIMUM VOLTAGE APPEARS IN REFERENCE DISPLAY ON TEST SET. APPLY BRAKE.

a. If minimum voltage appears at approximately 0° EL, elevation resolver is coarse alined; proceed to azimuth resolver alinement.

b. If minimum voltage does not appear at approximately 0° EL, go to next step.



ARR82-28156

2-69. ELEVATION AND AZIMUTH RESOLVER ALINEMENT (cont)

11. RELEASE ELEVATION DRIVE MOTOR BRAKE AND MANUALLY POSITION TURRET TO APPROXIMATELY 0° EL. APPLY BRAKE.

12. REMOVE ELEVATION RESOLVER COVER.

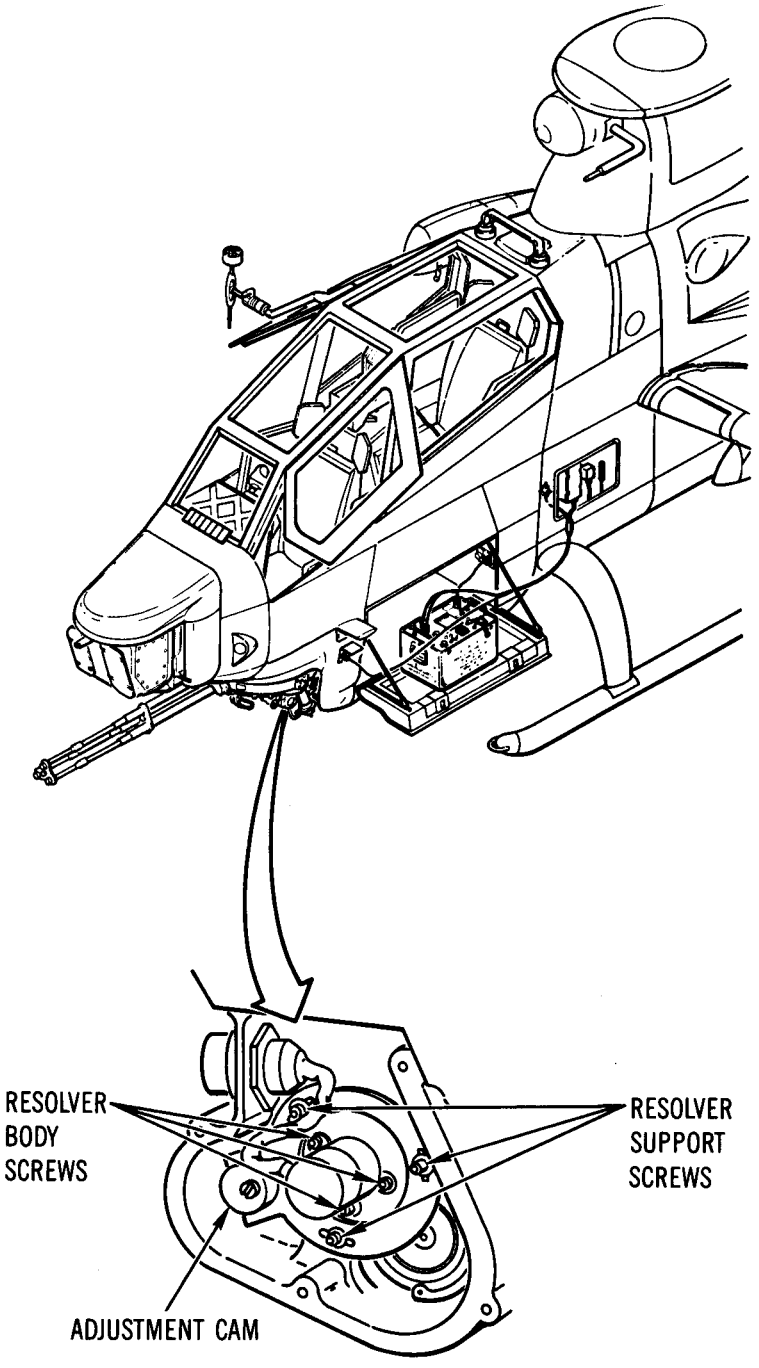
13. LOOSEN THREE RESOLVER SUPPORT SCREWS; THEN, CENTER ADJUSTMENT CAM.

14. LOOSEN THREE RESOLVER BODY SCREWS AND ROTATE RESOLVER BODY UNTIL A MINIMUM VOLTAGE APPEARS IN TEST SET REFERENCE DISPLAY. TIGHTEN THREE RESOLVER BODY SCREWS.

15. TORQUE THREE RESOLVER SUPPORT SCREWS TO 12-20 LB-IN (1.36-2.26 N.m).

16. RELEASE ELEVATION DRIVE MOTOR BRAKE AND MANUALLY DEPRESS TURRET IN EL + SIGN APPEARS IN TEST SET REFERENCE DISPLAY TO VERIFY RESOLVER IS ON PROPER NULL, APPLY BRAKE.

17. INSTALL ELEVATION RESOLVER COVER.



ARR82-28157

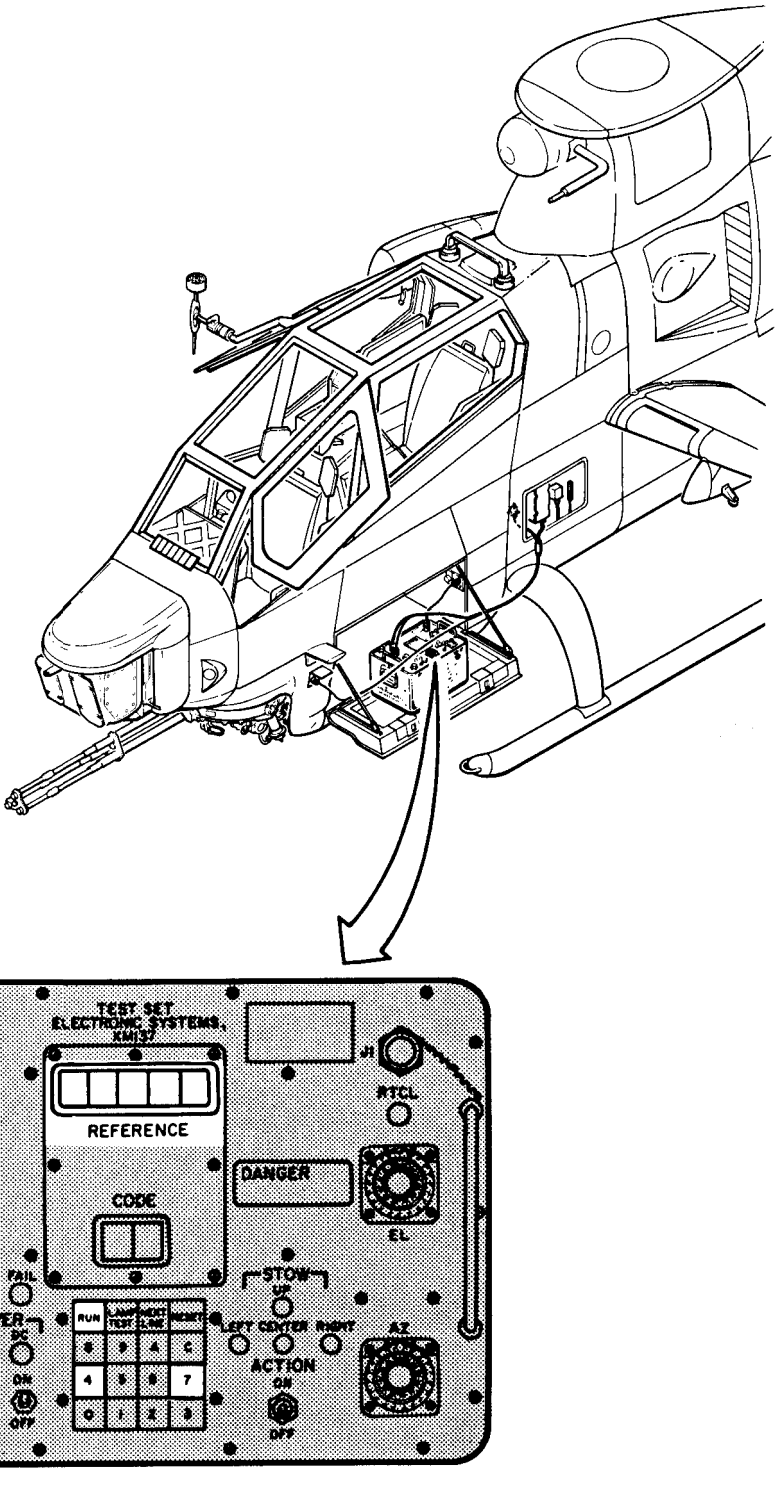
AZIMUTH RESOLVER ALINEMENT

18. ON TEST SET, PRESS 4, 7, AND RUN KEYS.

19. RELEASE AZIMUTH DRIVE MOTOR BRAKE AND MANUALLY POSITION TURRET UNTIL A MINIMUM VOLTAGE APPEARS IN REFERENCE DISPLAY ON TEST SET. APPLY BRAKE.

    a. If minimum voltage appears at approximately 0° AZ, azimuth resolver is coarse alined; go to step 39.

    b. If minimum voltage does not appear at approximately 0° AZ, go to next step.



ARR82-28158

2-69. ELEVATION AND AZIMUTH RESOLVER ALINEMENT (cont)

20. RELEASE AZIMUTH DRIVE MOTOR BRAKE AND MANUALLY POSITION TURRET TO APPROXIMATELY 0° AZ. APPLY BRAKE.
21. REMOVE TURRET FAIRING, SEE TM 55-1520-236-23.

NOTE

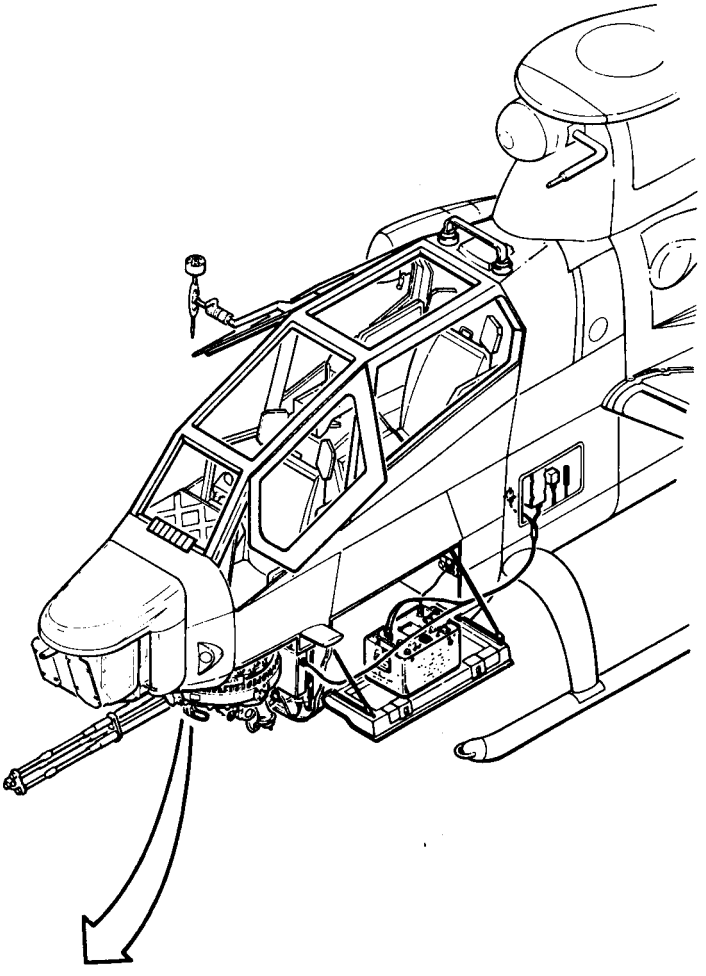
Connectors to azimuth resolver may be temporarily disconnected to access resolver hardware.

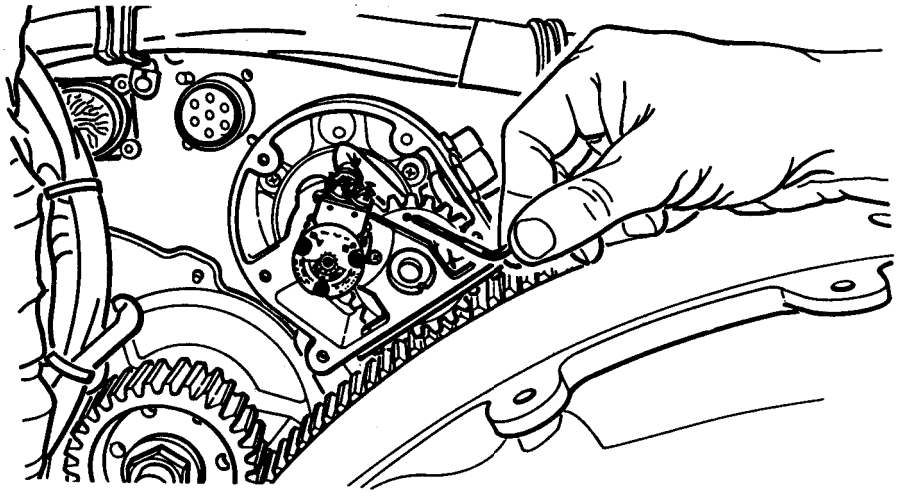
22. REMOVE BOITOM COVER OF AZIMUTH RESOLVER.

NOTE

If hole in resoiver preload gear is not visible, turret may be moved off zero until hoie is visible. After azimuth resolver is removed, return turret to approximately zero azimuth position.

23. INSTALL 3/32-INCH ALLEN WRENCH IN ALINEMENT HOLE OF RESOLVER PRELOAD GEAR AND TAPE IN PLACE.

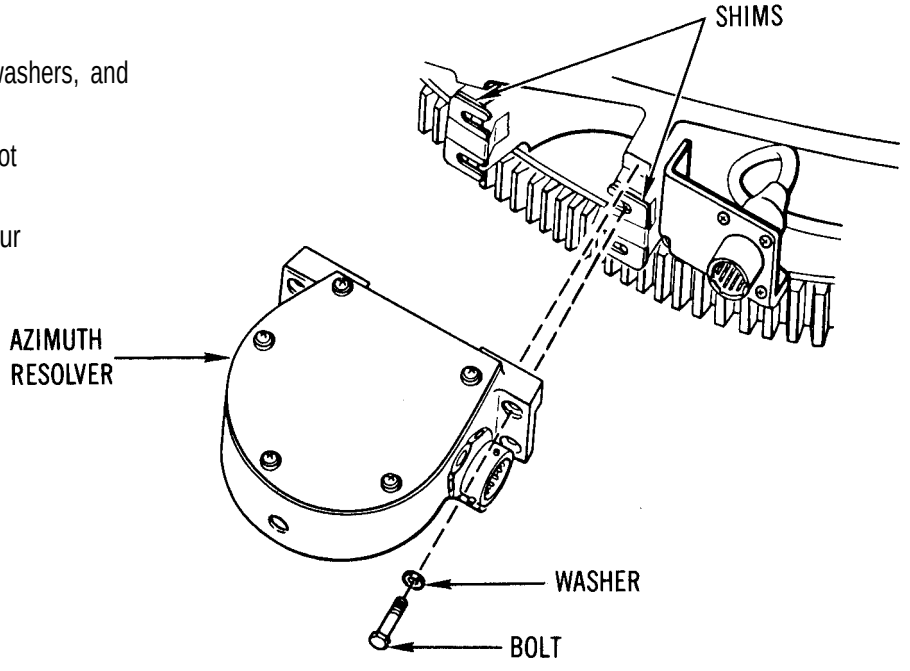




ARR82-28159

AZIMUTH RESOLVER ALINEMENT (cont)

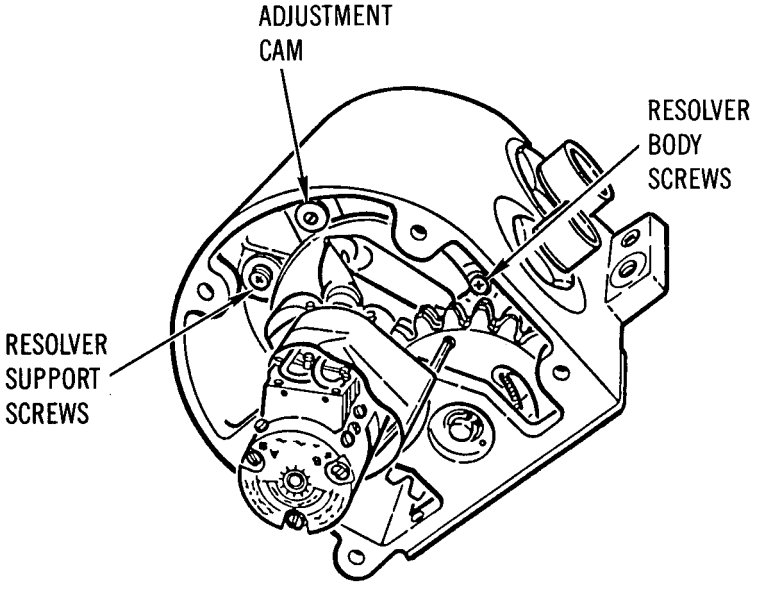
24. REMOVE AZIMUTH RESOLVER.
    a. Remove four bolts, four washers, and azimuth resolver.
    b. Tape shims in place. Do not unless defective.
    c. Reinstall four bolts and four



ARR82-28160

25. LOOSEN THREE RESOLVER SUPPORT SCREWS; THEN, CENTER ADJUSTMENT CAM.

26. TORQUE THREE RESOLVER SUPPORT SCREWS TO 12-20 LB-IN. (1.36-2.26 N.m).



ARR82-28161

2-69. ELEVATION AND AZIMUTH RESOLVER ALINEMENT (cont)

27. REMOVE TOP COVER OF AZIMUTH RESOLVER.

28. CONNECT CONNECTOR IF DISCONNECTED.

29. LOOSEN THREE RESOLVER BODY SCREWS.

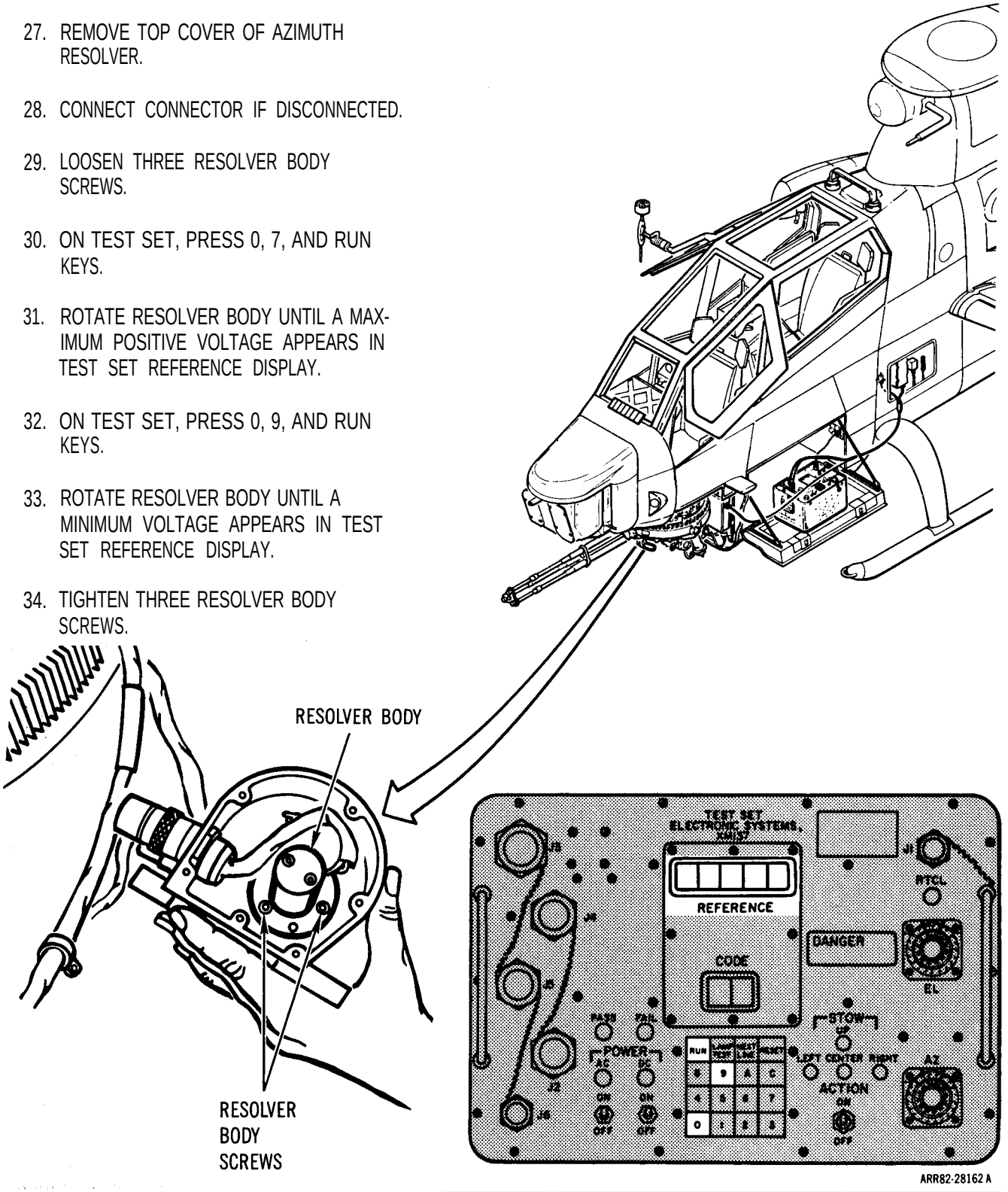
30. ON TEST SET, PRESS 0, 7, AND RUN KEYS.

31. ROTATE RESOLVER BODY UNTIL A MAXIMUM POSITIVE VOLTAGE APPEARS IN TEST SET REFERENCE DISPLAY.

32. ON TEST SET, PRESS 0, 9, AND RUN KEYS.

33. ROTATE RESOLVER BODY UNTIL A MINIMUM VOLTAGE APPEARS IN TEST SET REFERENCE DISPLAY.

34. TIGHTEN THREE RESOLVER BODY SCREWS.



ARR82-28162 A

AZIMUTH RESOLVER ALINEMENT (cont)

35. INSTALL TOP COVER OF AZIMUTH RESOLVER.

NOTE

Connectors to azimuth resolver may be temporarily disconnected to access resolver hardware.

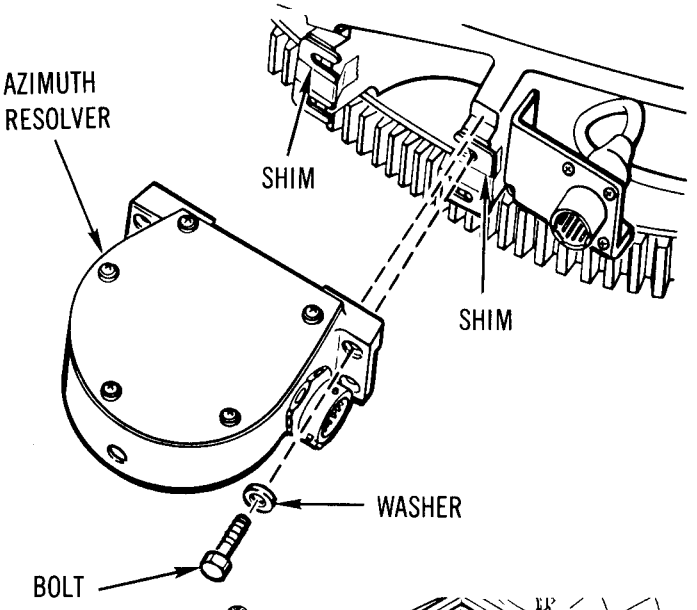
36. REMOVE TAPE FROM SHIMS AND INSTALL AZIMUTH RESOLVER. MAKE SURE RESOLVER GEAR TEETH ARE PRELOADED AND MESH WITH RING GEAR; THEN SECURE WITH FOUR BOLTS AND FOUR WASHERS.

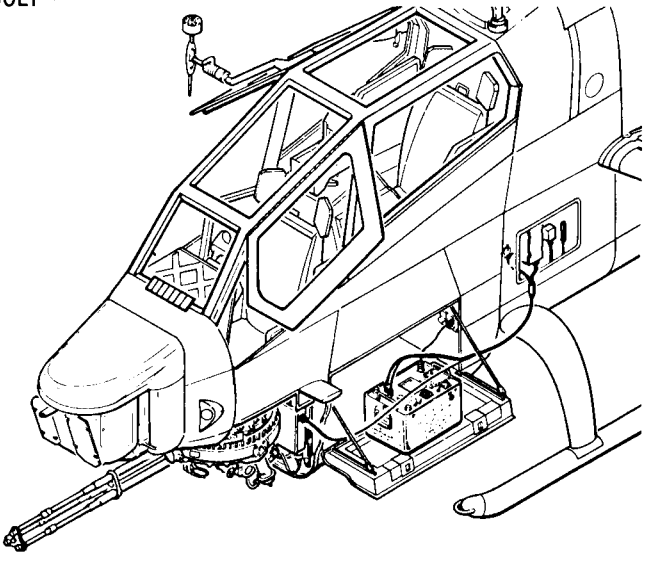
37. REMOVE 3/32-INCH ALLEN WRENCH FROM PRELOAD GEAR.

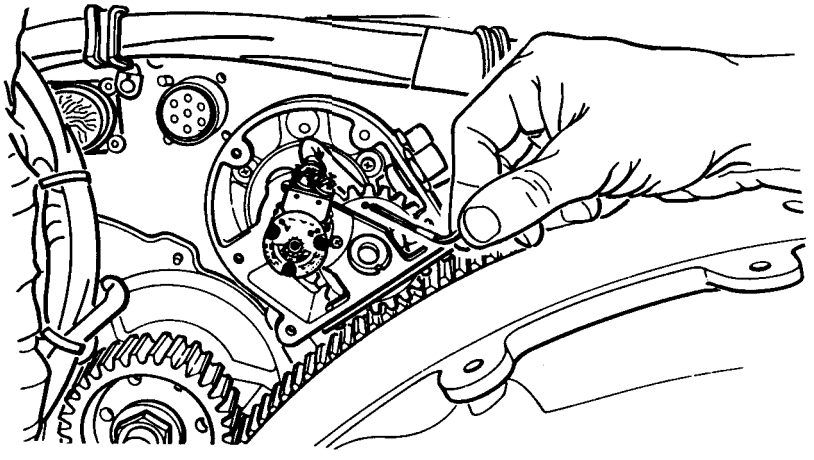
NOTE

The longer bottom cover screw goes through cable bracket.

38. INSTALL BOTTOM COVER OF AZIMUTH RESOLVER.







ARR82-28163 A

2-69. ELEVATION AND AZIMUTH RESOLVER ALINEMENT (cont)

POST ALINEMENT PROCEDURES

39. REMOVE POWER, SEE TM 9-1090-206-20-1; THEN DISCONNECT TEST SET.

40. PERFORM BORESIGHTING PROCEDURE IN ACCORDANCE WITH CHAPTER 4.

41. PERFORM EMERGENCY STOW SWITCH ADJUSTMENT, PARA 2-70.

END OF TASK

2-70. EMERGENCY STOW SWITCH ADJUSTMENT

DESCRIPTION

This task covers: Adjustment of elevation and azimuth stow switches.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Electronics Systems Test Set: M137

Personnel Required:
- 68J Aircraft Fire Control Repairer (2)

References:
- TM 9-1090-206-20-1
- TM 55-1520-236-23

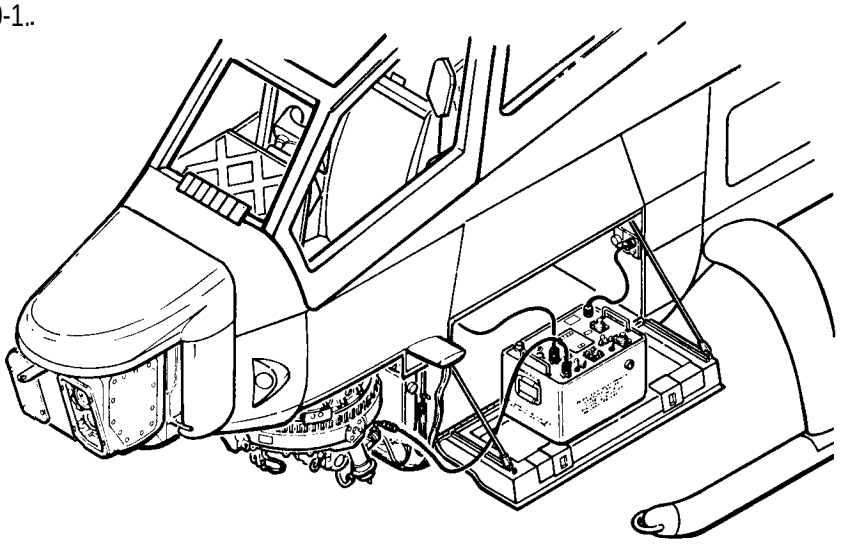
Equipment Conditions:
- M197 gun barrels removed, see TM 9-1090-206-20-1
- Turret subsystem boresighted, see Chapter 4.
- Turret fairing removed, see TM 55-1520-236-23.
- Test set cables W1, W5, W15, W21, and W24 connected, see TM 9-1090-206-20-1

NOTE

Refer to figure FO-15 for emergency stow switch alinement diagram.

ADJUSTMENT SETUP

1. REMOVE BOTTOM COVER OF AZIMUTH RESOLVER , PARA 2-49.
2. APPLY POWER, SEE TM 9-1090-206-20-1..

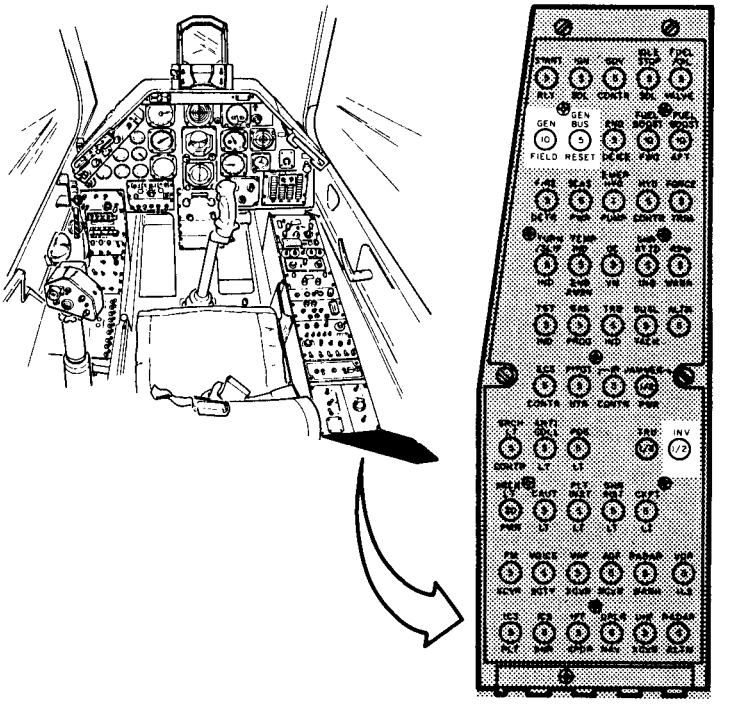


ARR82-28164

2-70. EMERGENCY STOW SWITCH ADJUSTMENT (cont)

3. CLOSE FOLLOWING CIRCUIT BREAKERS ON DC CIRCUIT BREAKER PANEL:

   GEN FIELD
   GEN BUS RESET
   INV

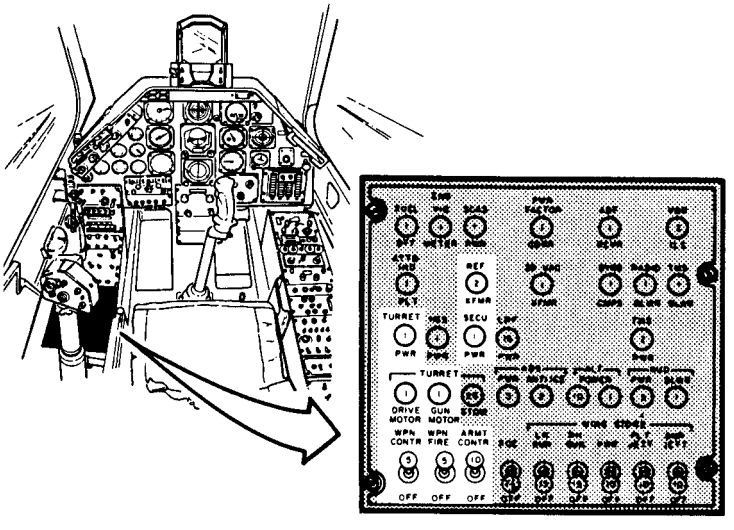


DC CIRCUIT BREAKER PANEL

ARR82-28165

4. CLOSE FOLLOWING CIRCUIT BREAKERS ON AC/ARMAMENT CIRCUIT BREAKER PANEL

   REF XFMR
   TURRET PWR
   SECU PWR
   TURRET DRIVE MOTOR
   TURRET GUN MOTOR
   WPN CONTR
   WPN FIRE
   ARMT CONTR



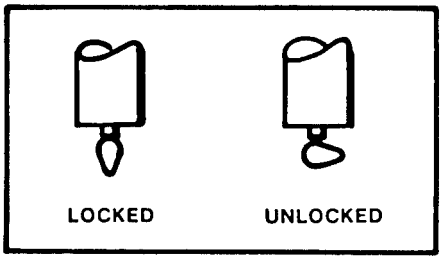
AC / ARMAMENT CIRCUIT BREAKER PANEL

ARR82-28166

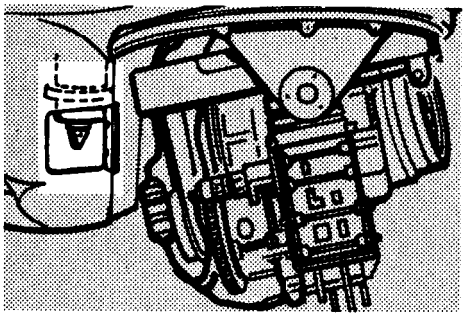
ADJUSTMENT SETUP (cont)

CAUTION

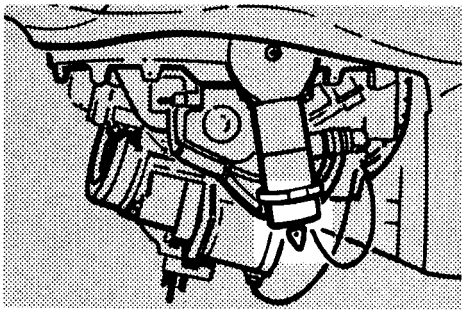
Elevation and azimuth drive motor brakes must be released to prevent motors from overheating.



5. SET ELEVATION AND AZIMUTH DRIVE MOTOR BRAKE HANDLES TO UNLOCKED POSITION.



AZIMUTH DRIVE MOTOR BRAKE HANDLE

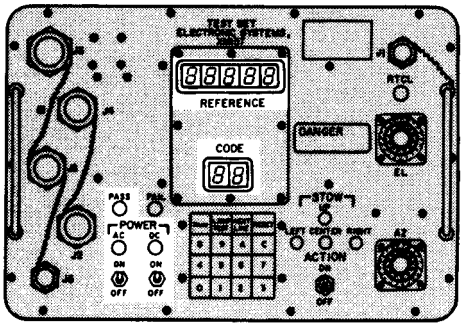


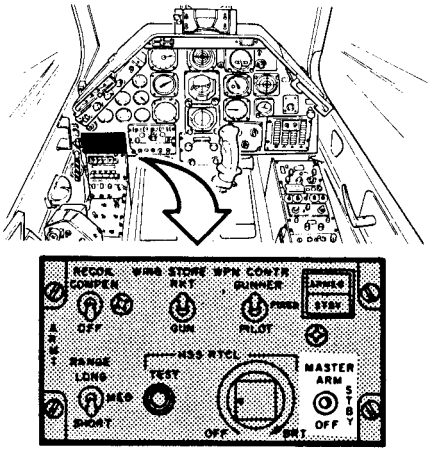
ELEVATION DRIVE MOTOR BRAKE HANDLE

ARR82-28168

6. ON PILOT ARMAMENT CONTROL PANEL, SET MASTER ARM SWITCH TO STBY.

7. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.
   a. AC and DC POWER indicators light.
   b. 8's appear in REFERENCE and CODE displays.
   c. PASS indicator lights.





PILOT ARMAMENT CONTROL PANEL

ARR82-28167A

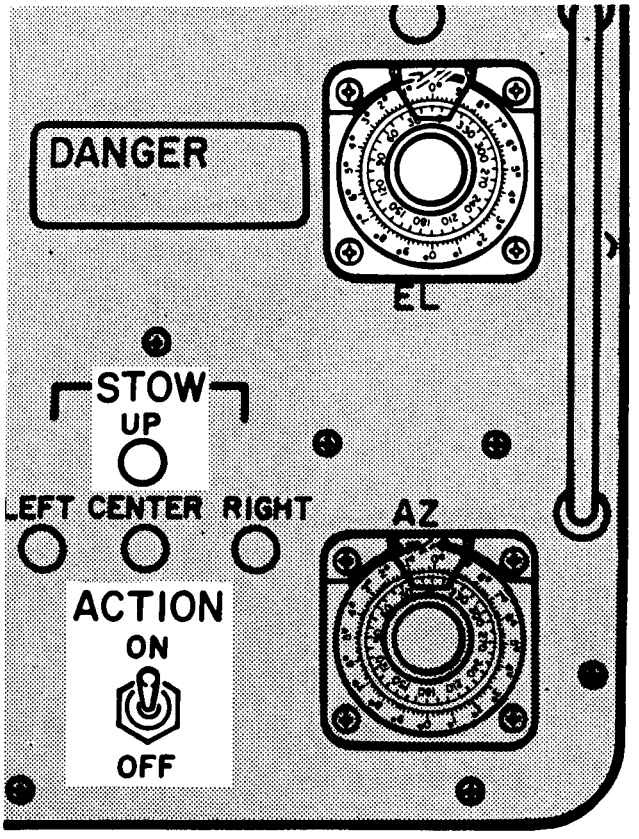
2-70. EMERGENCY STOW SWITCH ADJUSTMENT (cont)

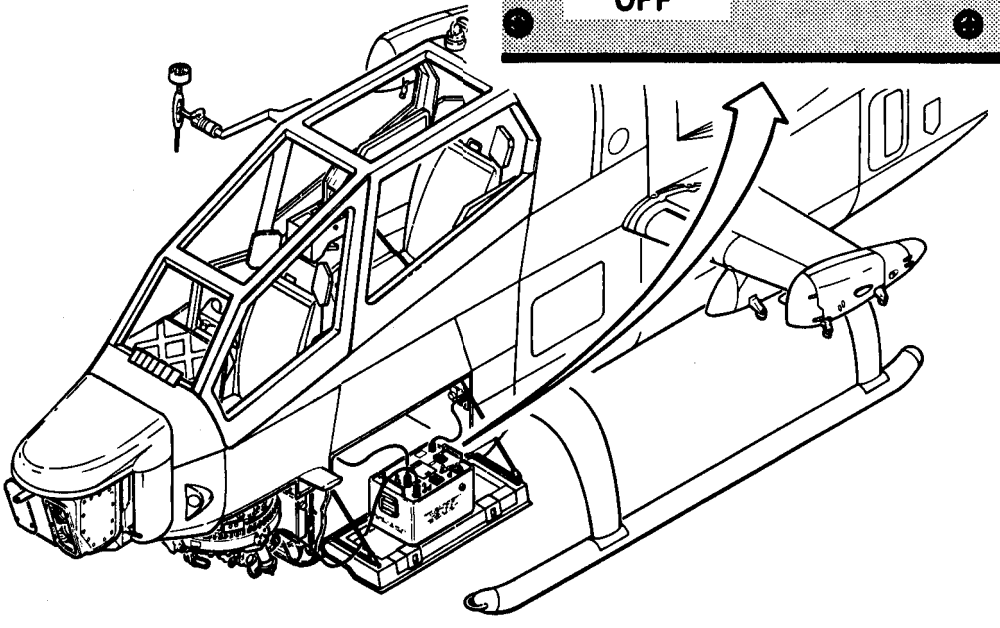
ELEVATION STOW SWITCH ADJUSTMENT

WARNING

When performing any operational check or procedure, all safety precautions and regulations shall be observed. Open turret drive motor and turret stow circuit breakers whenever adjustments are being performed on emergency stow switches.

8. ON TEST SET, SET ACTION SWITCH TO ON AND SLOWLY ROTATE EL RESOLVER CLOCKWISE TO POSITION TURRET UP TO 11°.
   a. UP STOW indicator should go off between + 10° and + 11°.
   b. If UP STOW indicator does not go off, go to next step. If it does, go to step 10.





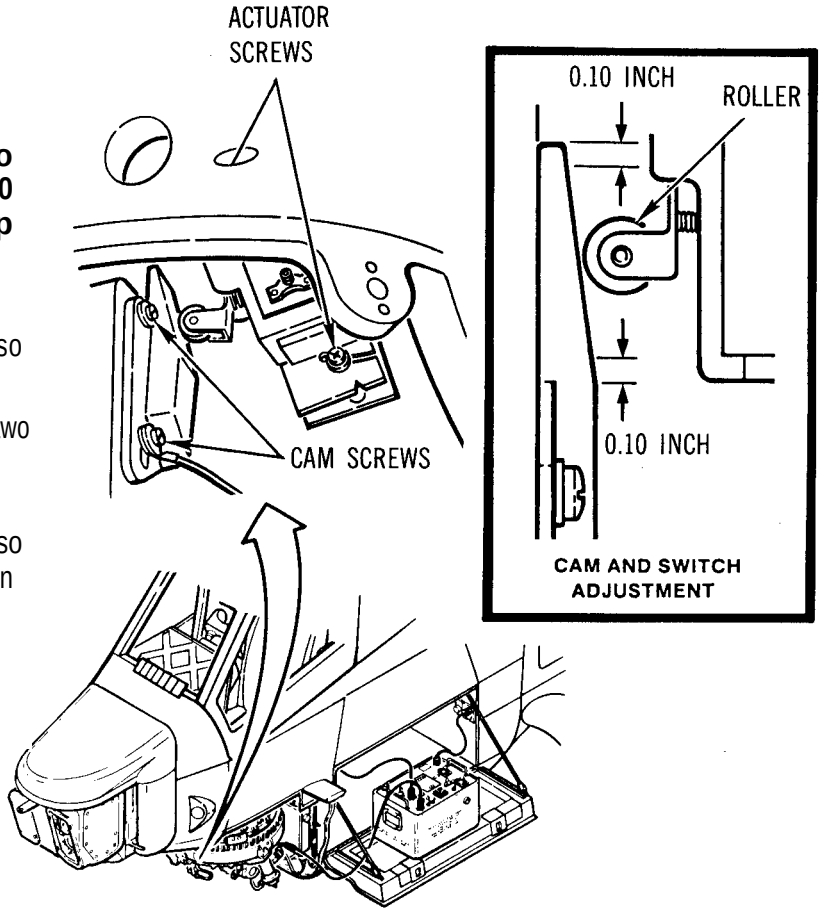
ARR82-28169

ELEVATION STOW SWITCH ADJUSTMENT (cont)

NOTE

Switch should be adjusted so that roller is no closer than 0.10 inch from either end of ramp when switch actuates.

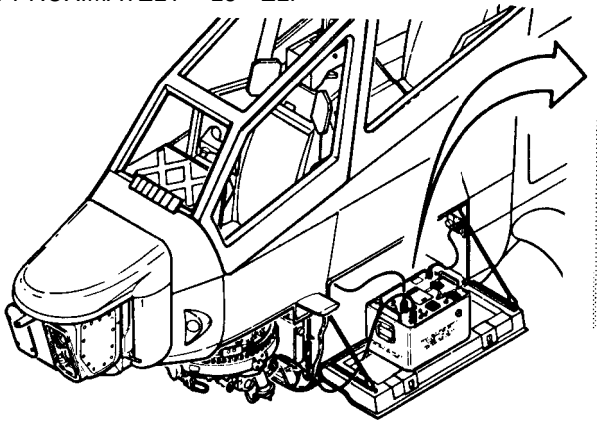
9. ADJUST CAM AND SWITCH ACTUATOR so UP STOW LIGHT JUST GOES OFF.
   a. Loosen two screws on cam and/or two screws on switch actuator adjusting plate.
   b. Adjust cam and/or switch actuator so UP STOW light just goes off between +10° and +11°.
   c. Tighten two screws on cam and/or two screws on actuator adjusting plate.

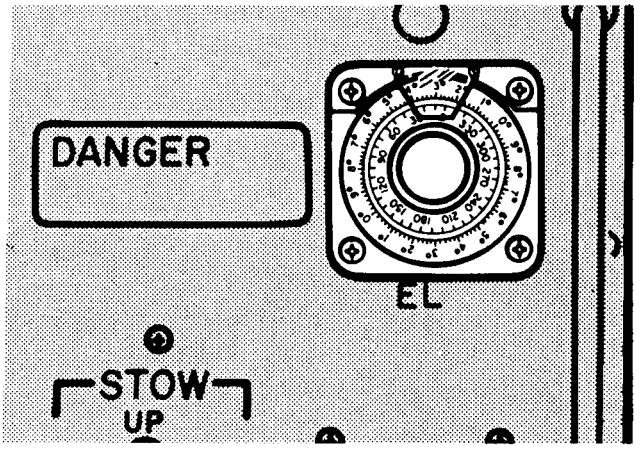


ARR82-28170

AZIMUTH STOW SWITCH ADJUSTMENT

10. ON TEST SET, ROTATE EL RESOLVER CLOCKWISE TO POSITION TURRET TO APPROXIMATELY +13° EL.





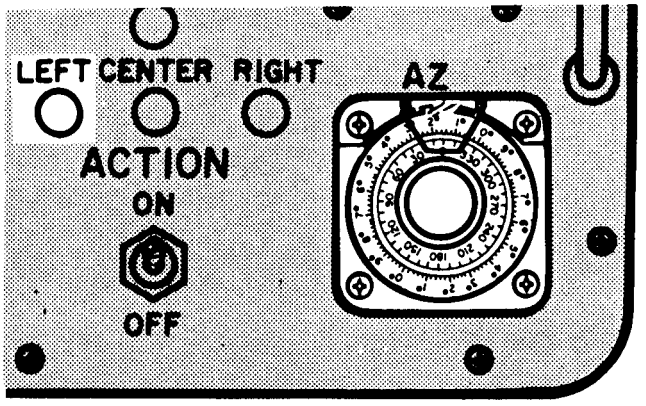
ARR82-28171

2-70. EMERGENCY STOW SWITCH ADJUSTMENT (cont)

NOTE

LEFT STOW light should be on between 1.5° and right limit LEFT STOW light should be off from 1.5° to left limit.

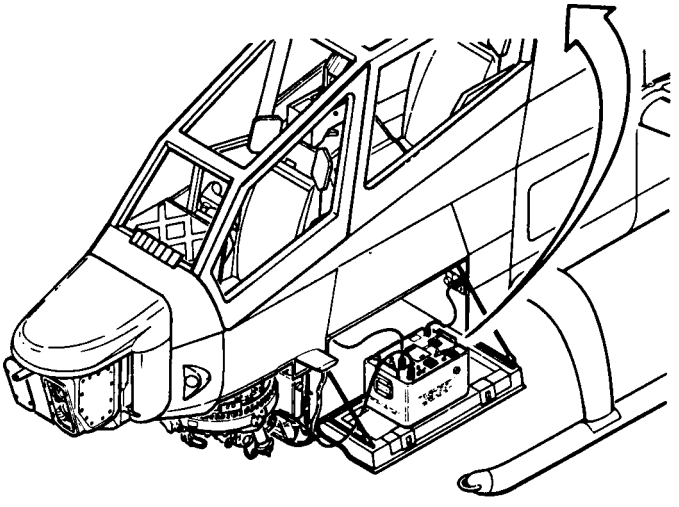
11. ON TEST SET, ROTATE AZ RESOLVER CLOCKWISE TO POSITION TURRET TO 1.5°.

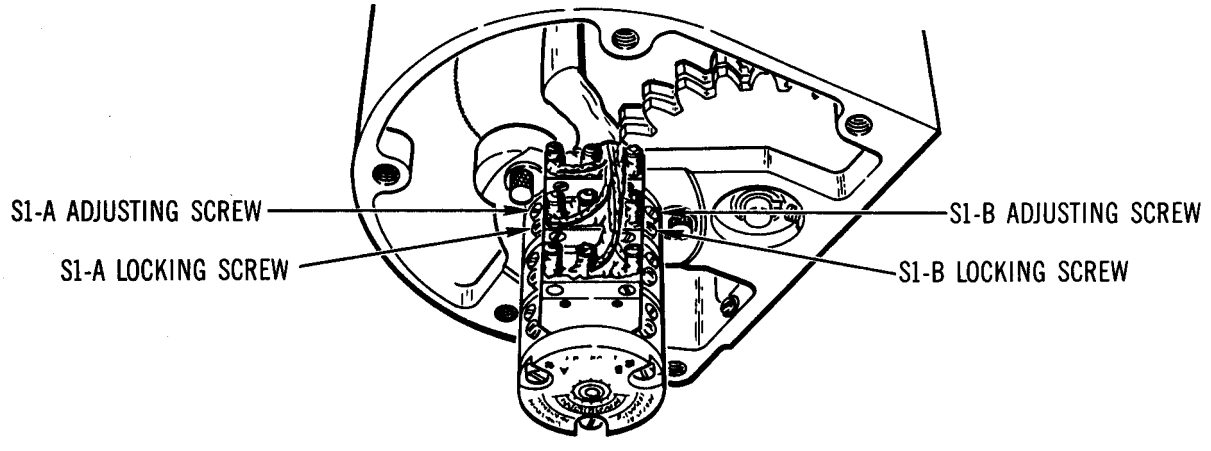


CAUTION

Do not turn adusting screws beyond stops.

12. ADJUST AZIMUTH STOW SWITCH S1 AT 1.50.
    a. Loosen S1-A locking screw.
    b. Turn S1-A adjusting screw ccw until LEFT STOW light just goes off. If S1-A can not be adjusted, lock S1-A, unlock S1-B, turn S1-B ccw approximately 1-½ turns, then lock S1-B, unlock S1-A, and turn S1-A ccw until light just goes off.
    c. Tighten S1-A locking screw.





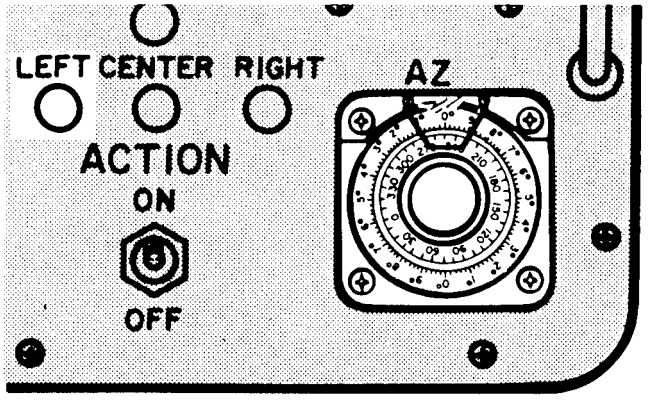
ARR82-28172

AZIMUTH STOW SWITCH ADJUSTMENT (cont)

NOTE

LEFT STOW light should be on between 1.5° and right limit LEFT STOW light should be off from 1.5° to left limit.

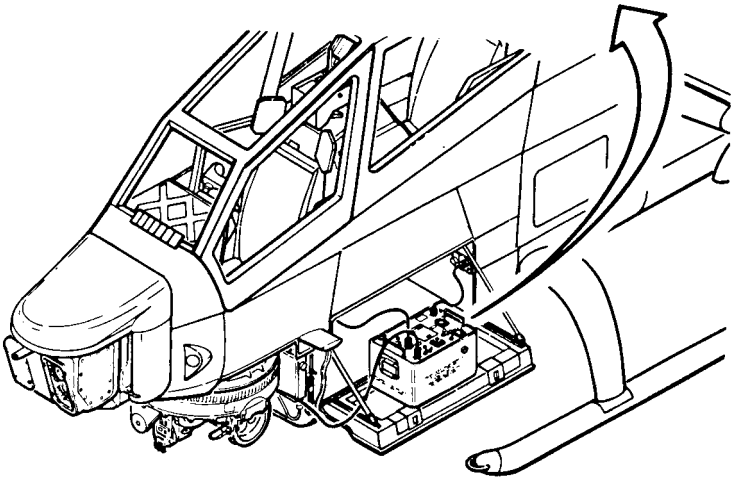
13. **ON** TEST SET, ROTATE AZ RESOLVER COUNTERCLOCKWISE TO POSITION TURRET TO 250.5°.

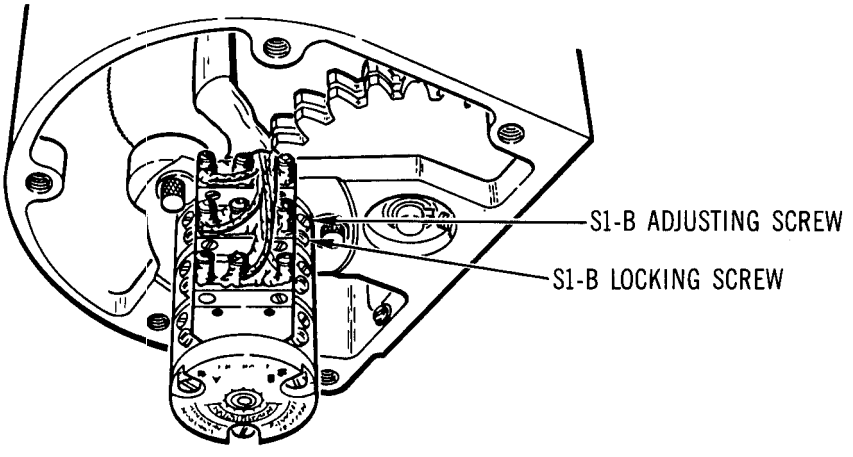


CAUTION

Do not turn adjusting screw beyond stops.

14. ADJUST AZIMUTH STOW SWITCH S1 AT 250.5°.
    a. Loosen S1-B locking screw.
    b. If LEFT STOW tight is out, turn S1-B ccw until light just comes on.
    c. Turn S1-B cw until light goes off, then one full turn more cw.
    d. Tighten S1-B locking screw.



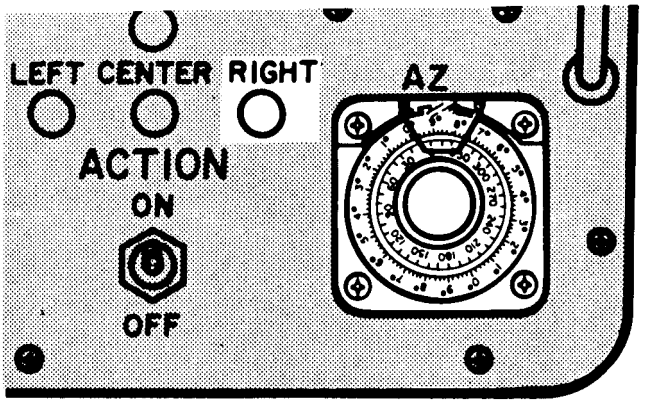


ARR82-28173

2-70. EMERGENCY STOW SWITCH ADJUSTMENT (cont)

NOTE

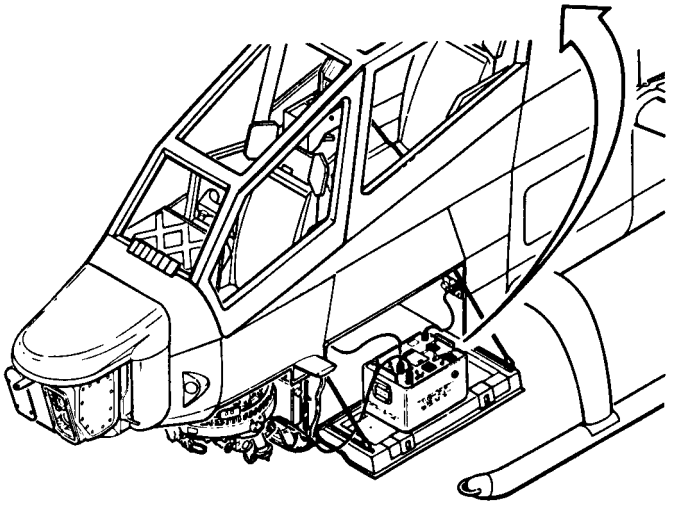
RIGHT STOW light should be on between 358.5° and left limit. RIGHT STOW light should be off from 358.5° to right limit.



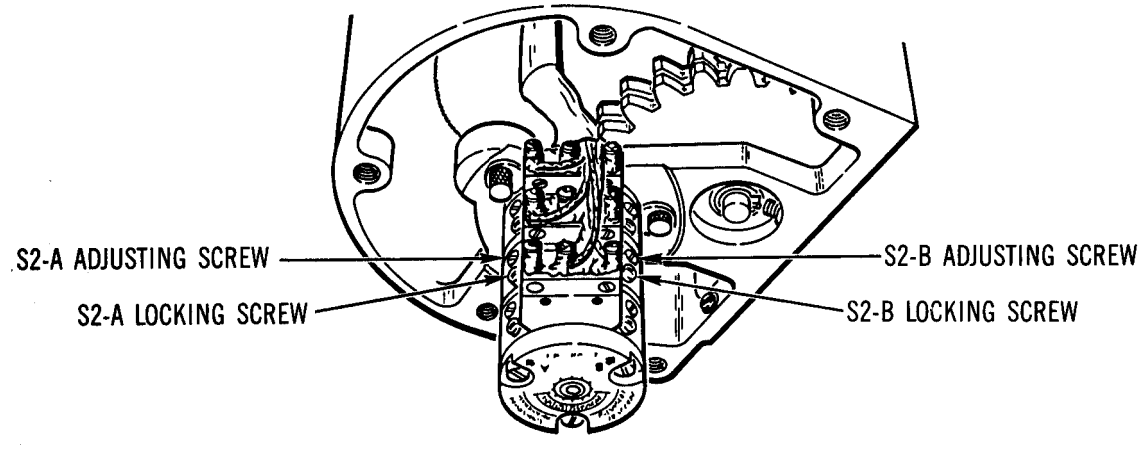
15. ON TEST SET, ROTATE AZ RESOLVER CLOCKWISE TO POSITION TURRET TO 358.5°.

CAUTION

Do not turn adjusting screws beyond stops.



16. ADJUST AZIMUTH STOW SWITCH S2 AT 358.5°.
    a. Loosen S2-B locking screw.
    b. Turn S2-B adjusting screw cw until RIGHT STOW light just goes off. If S2-B can not be adjusted, lock S2-B, unlock S2-A, turn S2-A cw approximately 1-½ turns, then, lock S2-A, unlock S2-B, and turn S2-B cw until light just goes off.
    c. Tighten S2-B locking screw.



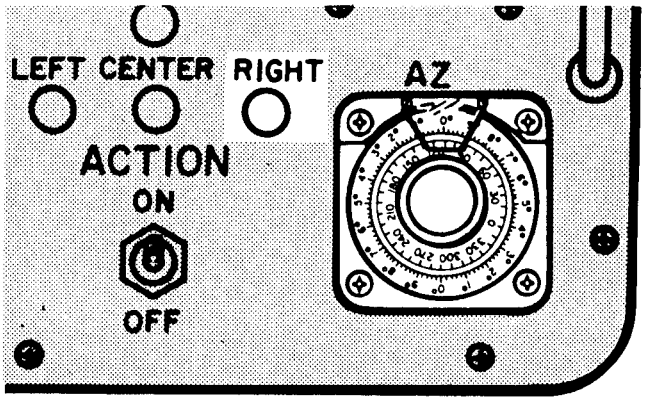
ARR82-28174

AZIMUTH STOW SWITCH ADJUSTMENT (cont)

NOTE

RIGHT STOW light should be on between 358.5° and left limit. RIGHT STOW light should be off from 358.5° to right limit.

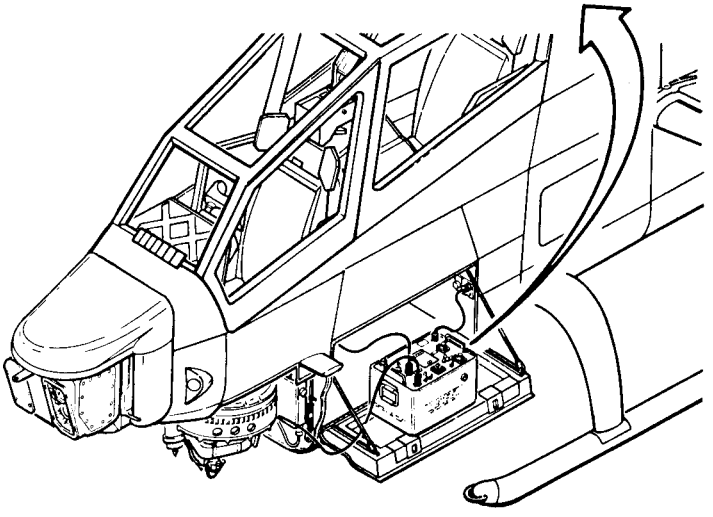
17. ON TEST SET, ROTATE AZ RESOLVER CLOCKWISE TO POSITION TURRET TO 109.5°.

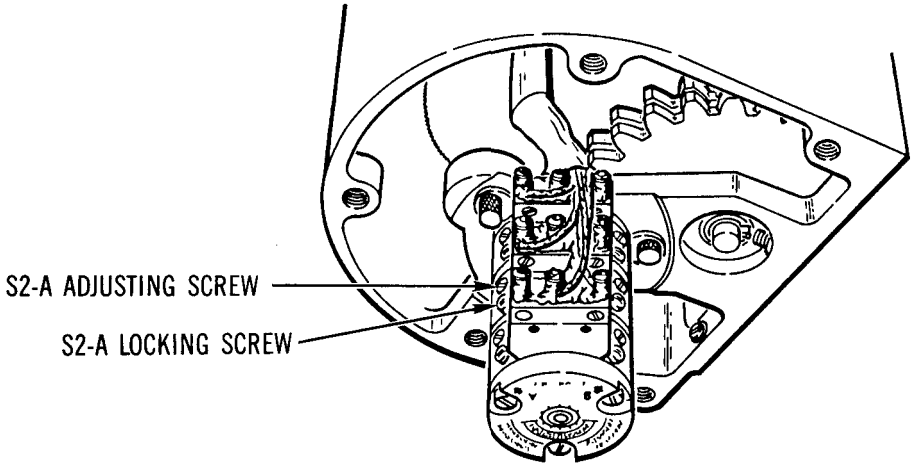


CAUTION

Do not turn adusting screw beyond stops.

18. ADJUST AZIMUTH STOW SWITCH S2 AT 109.5°.
    a. Loosen S2-A locking screw.
    b. If RIGHT STOW light is out, turn S2-A cw until light just comes on.
    c. Turn S2-A ccw until light goes off, then one full turn more ccw.
    d. Tighten S2-A locking screw.





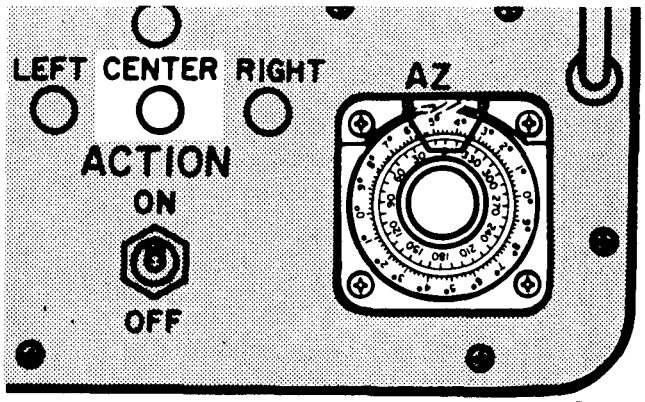
ARR82-28175

2-70. EMERGENCY STOW SWITCH ADJUSTMENT (cont)

NOTE

CENTER STOW light should be on between 355.5° and 4.5°. CENTER STOW light should be off from 355.5° to left limit and from 4.5° to right limit.

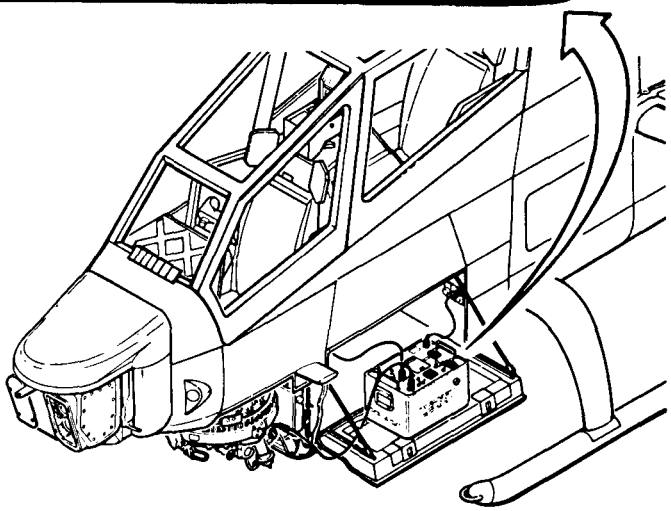
19. ON TEST SET, ROTATE AZ RESOLVER COUNTERCLOCKWISE TO POSITION TURRET TO 4.5°.

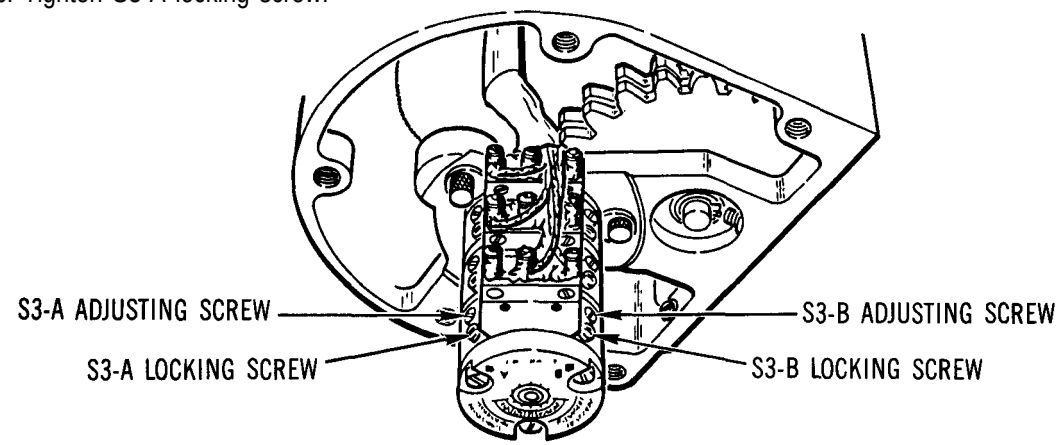


CAUTION

Do not turn adjusting screws beyond stops.

20. ADJUST AZIMUTH STOW SWITCH S3-A AT 4.5°.
    a. Loosen S3-A locking screw.
    b. Turn S3-A adjusting screw cw until CENTER STOW light just goes off. If S3-A cannot be adjusted, lock S3-A, unlock S3-B, turn S3-B cw approximately 1-½ turns, then, lock S3-B, unlock S3-A, and turn S3-A cw until CENTER STOW light just goes off.
    c. Tighten S3-A locking screw.



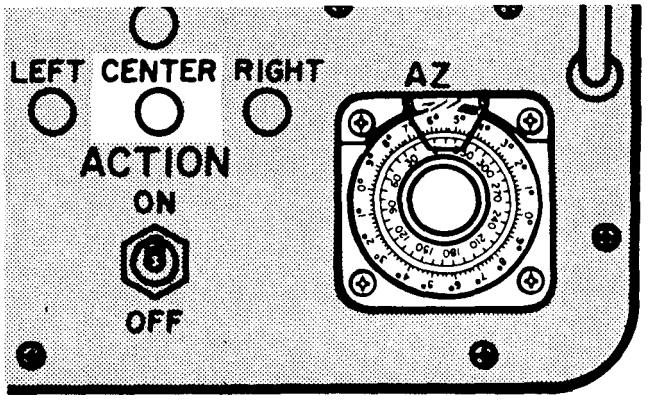


ARR82-28176

AZIMUTH STOW SWITCH ADJUSTMENT (cont)

NOTE

CENTER STOW light should be on between 355.5° and 4.5°. CENTER STOW light should be off from 355.5° to left limit and from 4.5° to right limit.

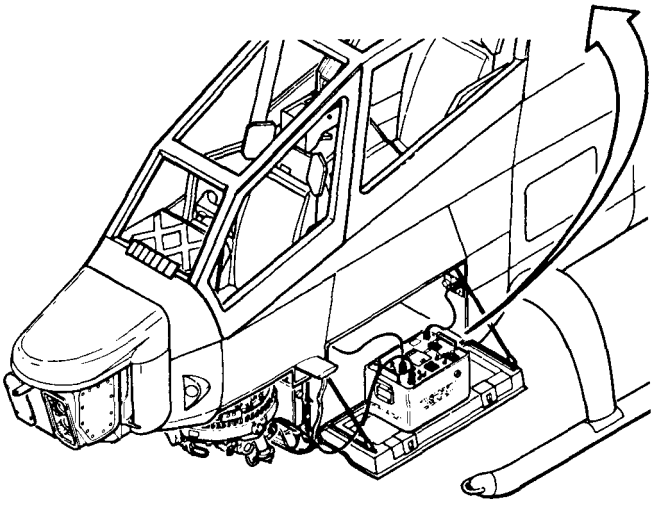


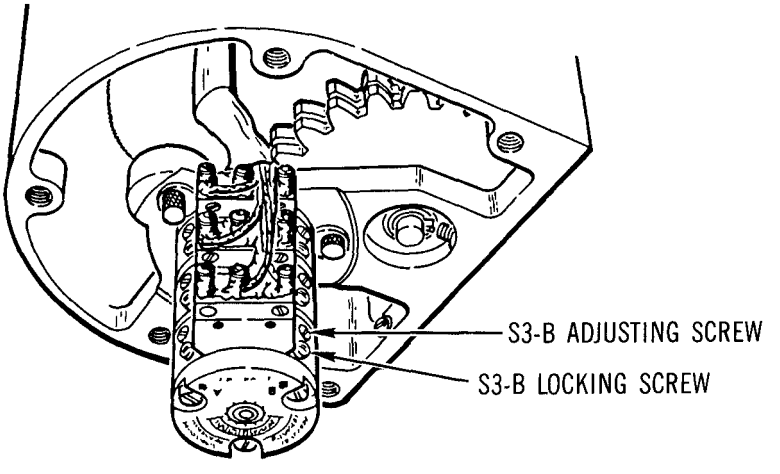
21. ON TEST SET, ROTATE AZ RESOLVER COUNTERCLOCKWISE TO POSITION TURRET TO 355.5°.

CAUTION

Do not turn adjusting screw beyond stops.

22. ADJUST AZIMUTH STOW SWITCH S3-B AT 355.5°.
    a. Loosen S3-B locking screw.
    b. Turn S3-B ccw until CENTER STOW light just goes off.
    c. Tighten S3-B locking screw.





ARR82-28177

2-70. EMERGENCY STOW SWITCH ADJUSTMENT (cont)

23. CHECK AZIMUTH STOW SWITCH ADJUSTMENTS.
    a. Using AZ resolver on test set, move turret to positions indicated in table. Observe STOW light and check against normal indications in table.
    b. Repeat adjustments until normal indications in table are obtained.

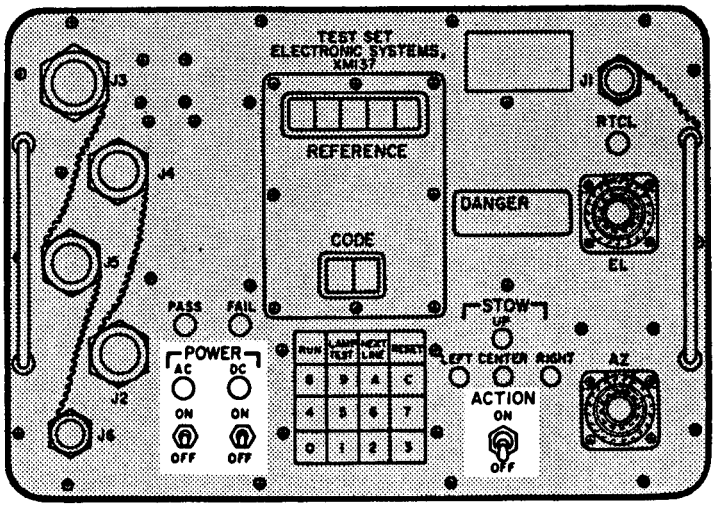
MOVING TURRET LEFT TO RIGHT			
TURRET POSITION	STOW LIGHTS		
	LEFT	CENTER	RIGHT
250.5 TO 355	OFF	OFF	ON
355 TO *	OFF	ON	ON
* TO 358.5	OFF	ON	OFF
* CENTER ON BEFORE RIGHT OFF			
358.5 TO 1.5	OFF	ON	OFF
1.5 TO *	ON	ON	OFF
* TO 5.0	ON	OFF	OFF
* CENTER ON UNTIL LEFT ON			
5.0 TO 109.5	ON	OFF	OFF

MOVING TURRET RIGHT TO LEFT			
TURRET POSITION	STOW LIGHTS		
	LEFT	CENTER	RIGHT
109.5 TO 5.0	ON	OFF	OFF
5.0 TO *	ON	ON	OFF
* TO 1.5	OFF	ON	OFF
* CENTER ON BEFORE LEFT ON			
1.5 TO 358.5	OFF	ON	OFF
358.5 TO *	OFF	ON	ON
* TO 355	OFF	OFF	ON
* CENTER ON UNTIL RIGHT ON			
355 TO 250.5	OFF	OFF	ON

ARR82-28178

POST ADJUSTMENT PROCEDURES

24. ON TEST SET, SET ACTION SWITCH TO OFF AND AC AND DC CIRCUIT BREAKERS TO OFF.



ARR82-28179

POST ADJUSTMENT PROCEDURES (cont)

25. ON PILOT ARMAMENT CONTROL PANEL, SET MASTER ARM SWITCH TO OFF.

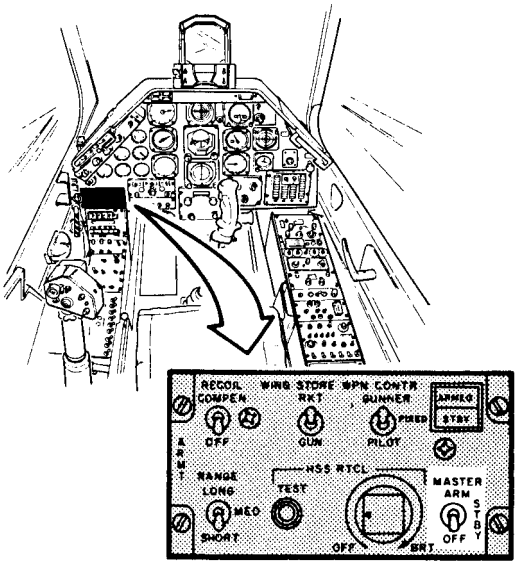
26. APPLY ELEVATION AND AZIMUTH DRIVE MOTOR BRAKES.

27. REMOVE POWER, SEE TM 9-1090-206-20-1; THEN DISCONNECT TEST SET.

NOTE

The longer bottom cover screw goes through cable bracket.

28. INSTALL AZIMUTH RESOLVER BOTTOM COVER.



PILOT ARMAMENT CONTROL PANEL

ARR82-28180

END OF TASK

2-71. GUN CONTROL UNIT BURST LIMIT POTENTIOMETER ADJUSTMENT

DESCRIPTION

This task covers: Burst limit potentiometer adjustment.

INITIAL SETUP

Tools/lest and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental
- Electronics Systems Test Set:
  - M137

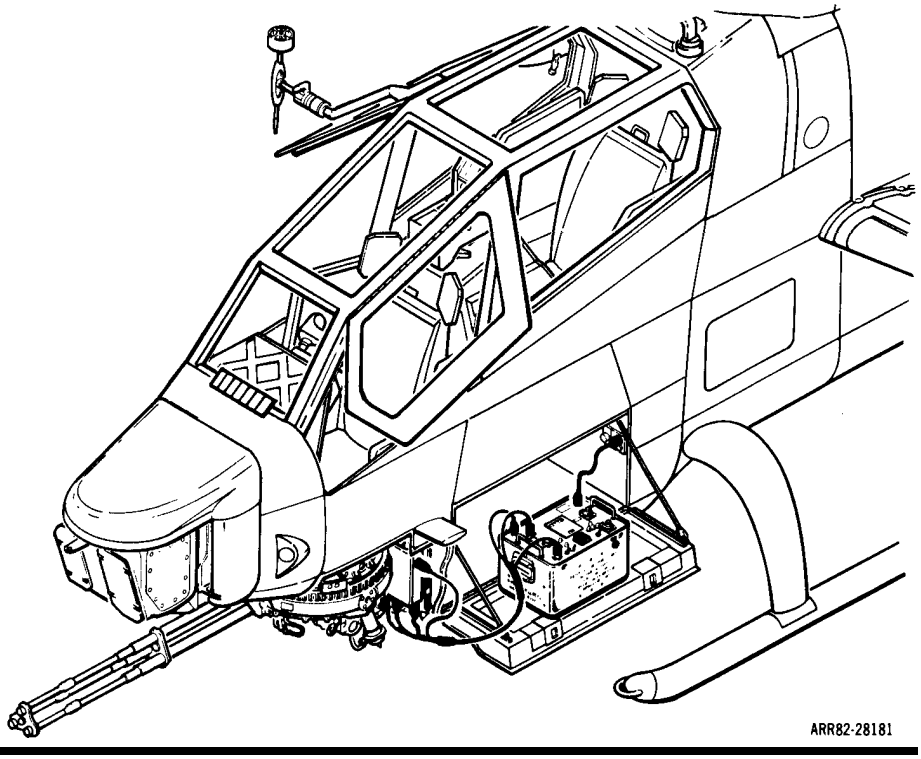
Personnel Required:
- 68J Aircraft Fire Control
  - Repairer (2)

References:
- TM 9-1090-206-20-1
- TM 55-1520-236-23

Equipment Conditions:
- HELICOPTER ARMAMENT SUBSYSTEM
  - MAINTENANCE SETUP performed,
  - TM 9-1090-206-20-1.
- Test set cables W1 and W9
  - connected, see TM 9-1090-206-20-1.
- Turret fairing removed, see TM 55-1520-236-23.

BURST LIMIT POTENTIOMETER ADJUSTMENT

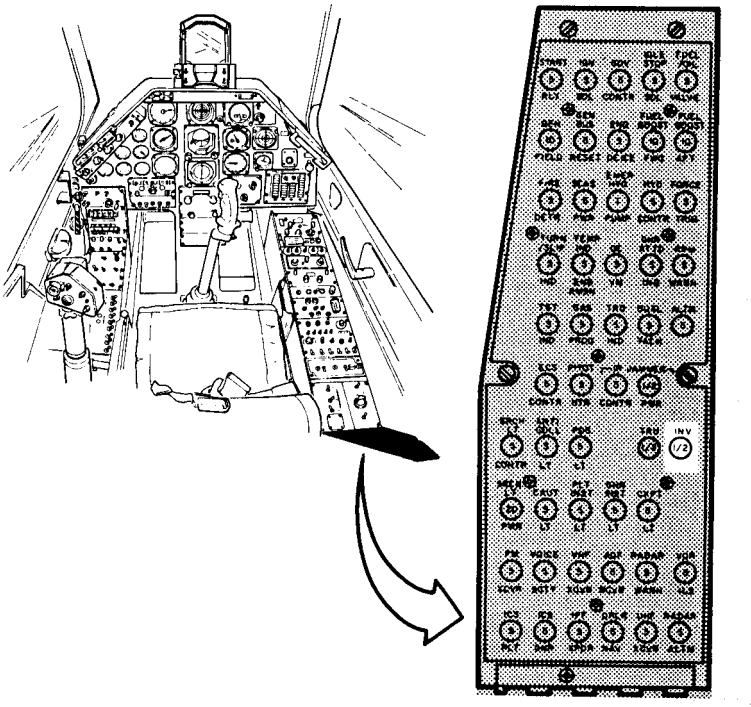
1. APPLY POWER, SEE
   TM 9-1090-206-20-1.



ARR82-28181

BURST LIMIT POTENTIOMETER ADJUSTMENT (cont)

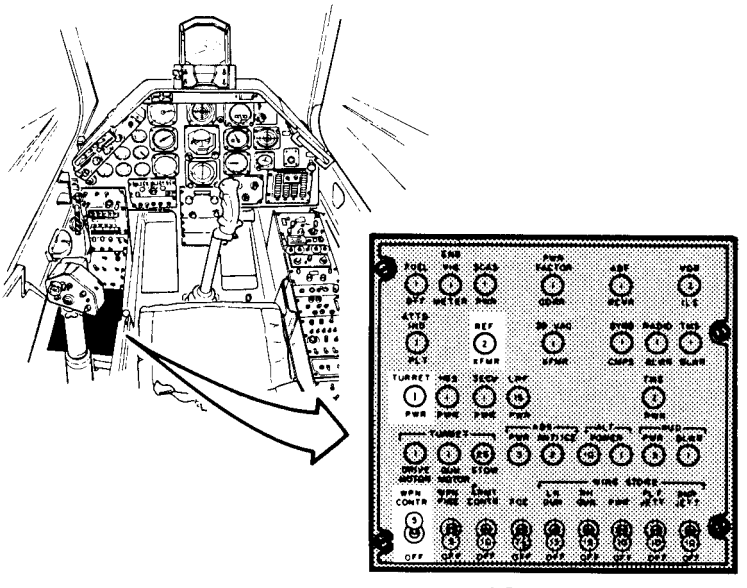
2. CLOSE INV CIRCUIT BREAKER ON DC CIRCUIT BREAKER PANEL.



DC CIRCUIT BREAKER PANEL

ARR82-28183

3. CLOSE REF XFMR, TURRET PWR, AND WPN CONTR CIRCUIT BREAKERS ON A/C ARMAMENT CIRCUIT BREAKER PANEL.

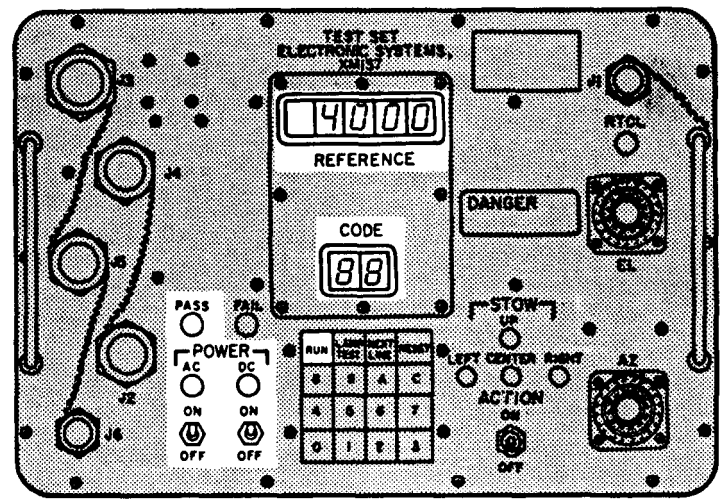


AC / ARMAMENT CIRCUIT BREAKER PANEL

ARR82-28182

2-71. GUN CONTROL UNIT BURST LIMIT POTENTIOMETER ADJUSTMENT (cont)

4. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.
   a. AC and DC POWER indicators light.
   b. 8's appear in REFERENCE and CODE displays.
   c. PASS indicator lights.
5. ON TEST SET, PRESS RUN KEY.
   4000 appears in REFERENCE display.

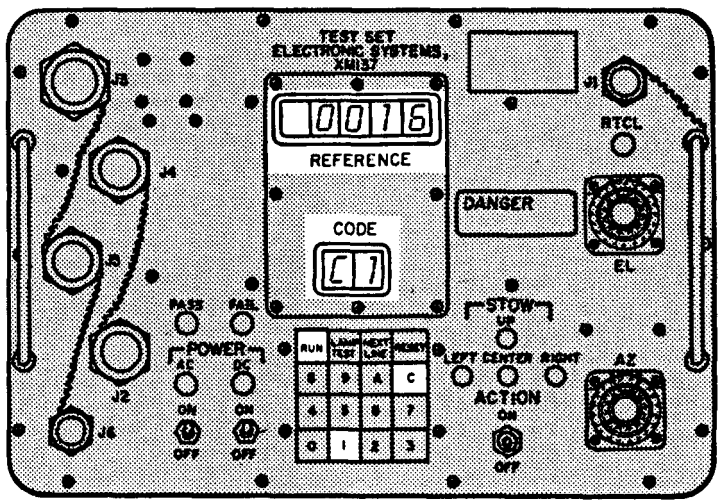


ARR82-28184

NOTE

The burst limit is usually set for 16 ±4 rounds.

6. ON TEST SET, PRESS C, 1, AND RUN KEYS.
   a. Cl appears in CODE display.
   b. REFERENCE display indicates 0000 and after approximately 5 seconds display indicates 0016 ±4. This number indicates the approximate quantity of ammunition expended during a burst limited firing sequence.
   c. Go to next step to adjust burst limit potentiometer.



ARR82-28185

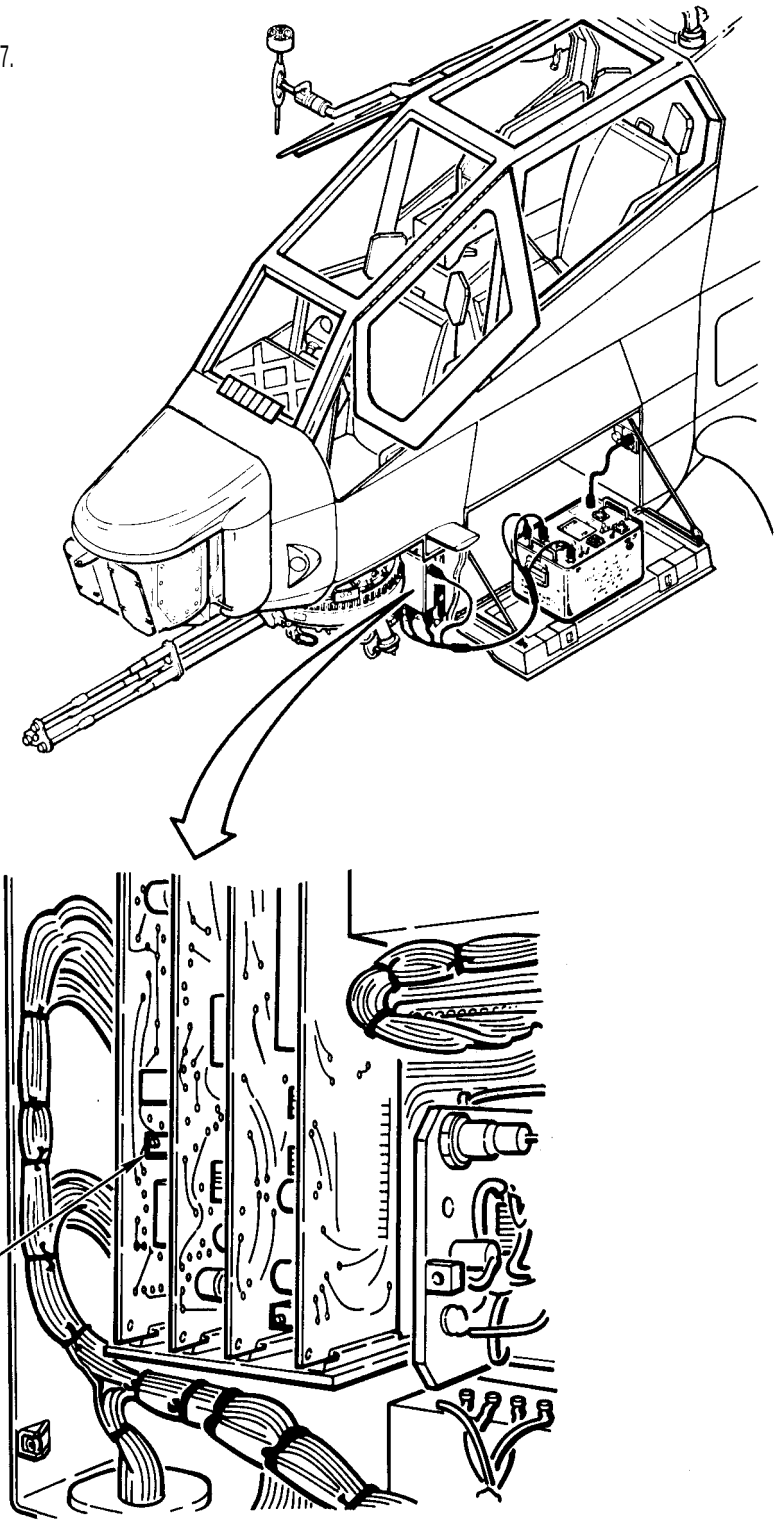
BURST LIMIT POTENTIOMETER ADJUSTMENT (cont)

7. REMOVE GUN CONTROL UNIT COVER, PARA 2-57.

8. WHILE OBSERVING REFERENCE DISPLAY ON TEST SET, ADJUST BURST LIMIT POTENTIOMETER.
   a. Rotate burst limit potentiometer clockwise to decrease number of rounds fired.
   b. Rotate burst limit potentiometer counterclockwise to increase number of rounds fired.

9. INSTALL GUN CONTROL UNIT COVER.

10. REMOVE POWER, SEE TM 9-1090-206-20-1; THEN DISCONNECT TEST SET.



ARR82-28186

END OF TASK

2-72. GUN CONTROL UNIT 28 VDC POWER SUPPLY ADJUSTMENT

DESCRIPTION

This task covers: 28 Vdc power supply adjustment.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental
- Electronics Systems Test Set:
  - M137

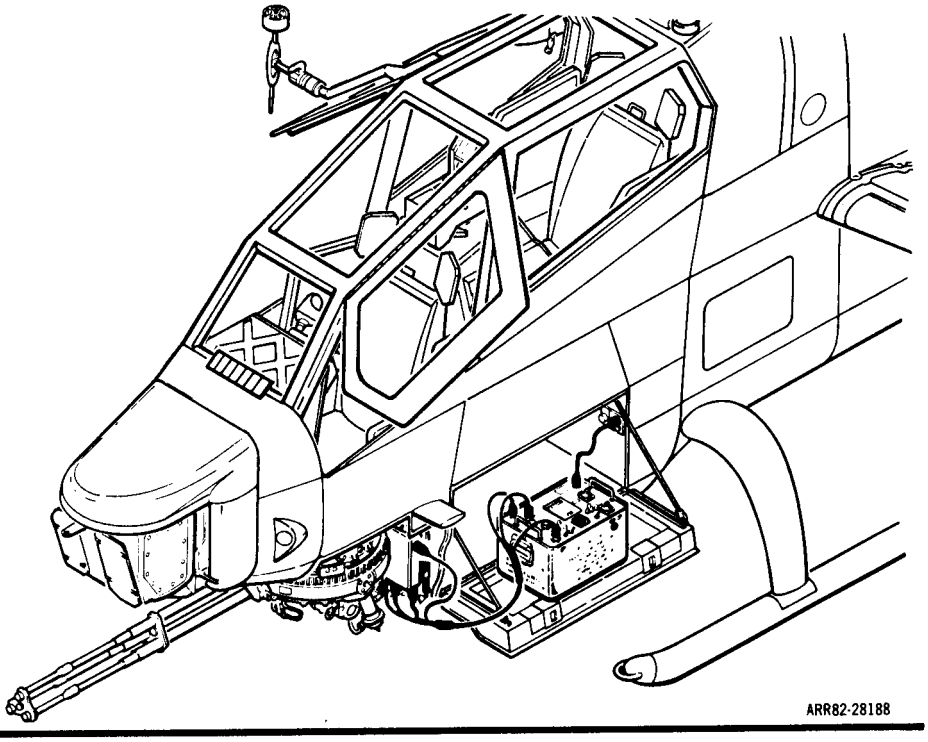
Personnel Required:
- 68J Aircraft Fire Control
  - Repairer (2)

References:
- TM 9-1090 -206-20-1
- TM 55-1520-236-23

Equipment Conditions:
- HELICOPTER ARMAMENT SUBSYSTEM
  - MAINTENANCE SETUP performed,
  - TM 9-1090-206-20-1.
- Test set cables W1 and W9
  - connected, see TM 9-1090-206-20-1.
- Turret fairing removed, see TM 55-1520-236-23.

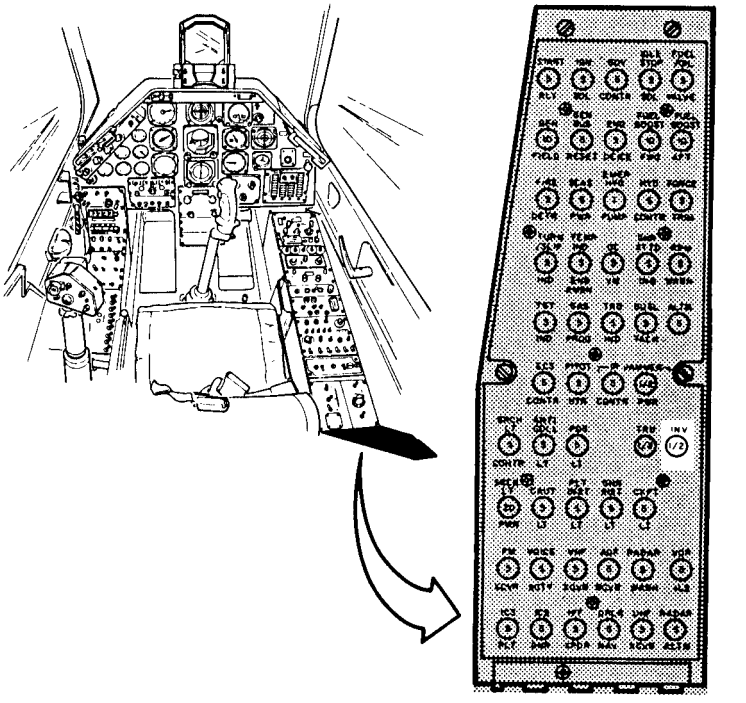
28 VDC POWER SUPPLY ADJUSTMENT

1. APPLY POWER, SEE TM 9-1090-206-20-1.



28 VDC POWER SUPPLY ADJUSTMENT (cont)

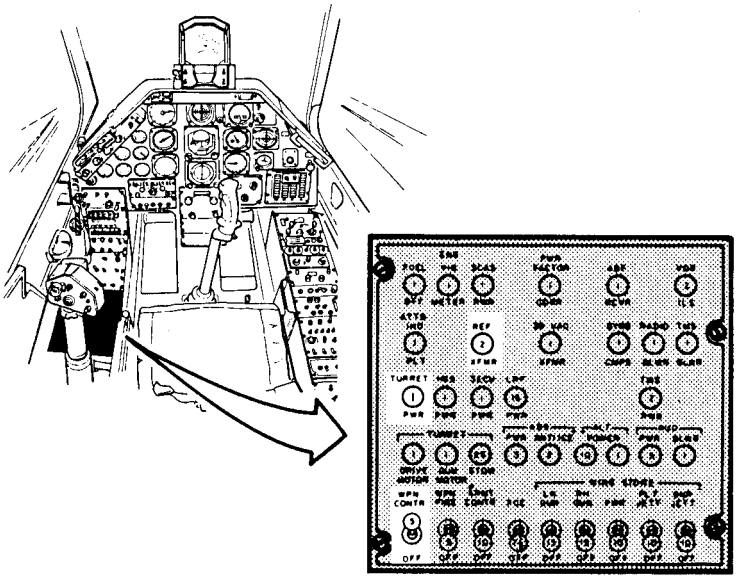
2. CLOSE INV CIRCUIT BREAKER ON DC CIRCUIT BREAKER PANEL.



DC CIRCUIT BREAKER PANEL

ARR82-28189

3. CLOSE REF XFMR, TURRET PWR, AND WPN CONTR CIRCUIT BREAKERS ON AC/ ARMAMENT CIRCUIT BREAKER PANEL.



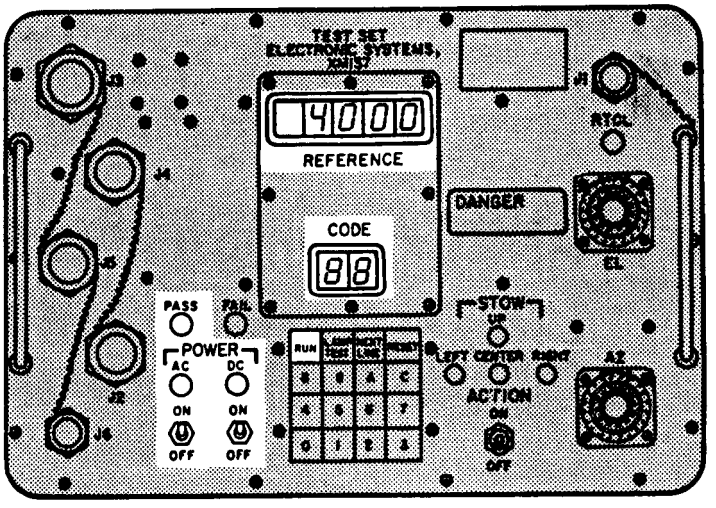
AC / ARMAMENT CIRCUIT BREAKER PANEL

ARR82-28190

2-72. GUN CONTROL UNIT 28 VDC POWER SUPPLY ADJUSTMENT (cont)

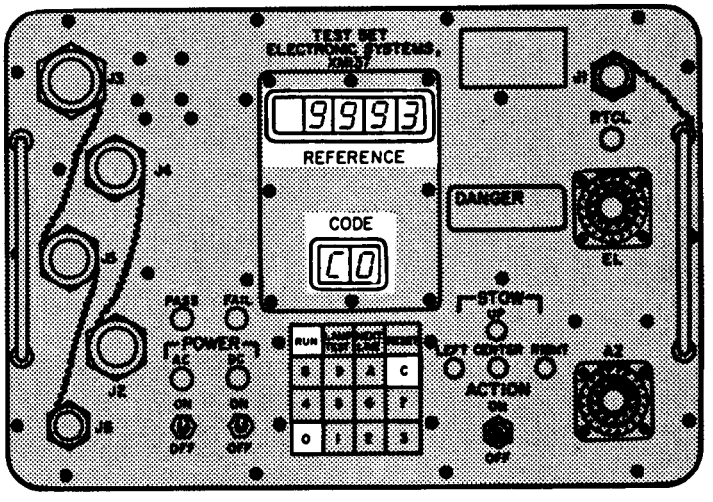
4. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.
   a. AC and DC POWER indicators light.
   b. 8's appear in REFERENCE and CODE displays.
   c. PASS indicator lights.

5. ON TEST SET, PRESS RUN KEY.
   4000 appears in REFERENCE display.



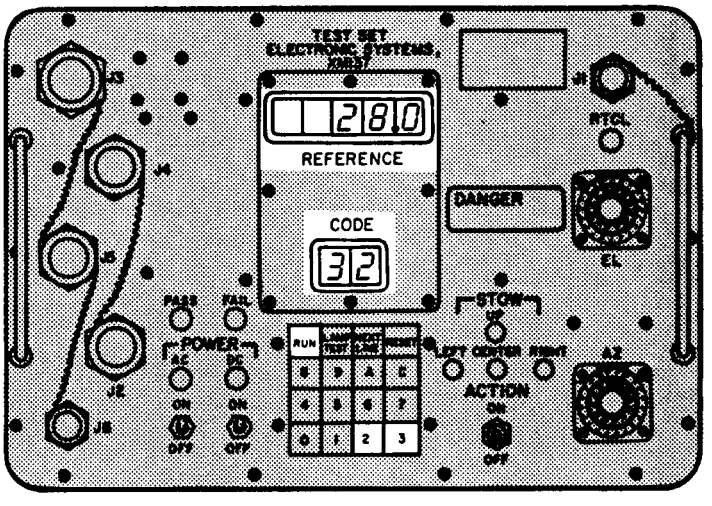
ARR82-28191

6. ON TEST SET, PRESS C, 0, AND RUN KEYS.
   a. CO appears in CODE display.
   b. 9993 appears in REFERENCE display.



ARR82-28192

7. ON TEST SET, PRESS 3, 2, AND RUN KEYS.
   a. 32 appears in CODE display.
   b. 28.0 (Vdc) appears in REFERENCE display. This display is the output of the 28 Vdc regulated power supply.
   c. Go to next step to adjust 28 Vdc power supply.



ARR82-28193

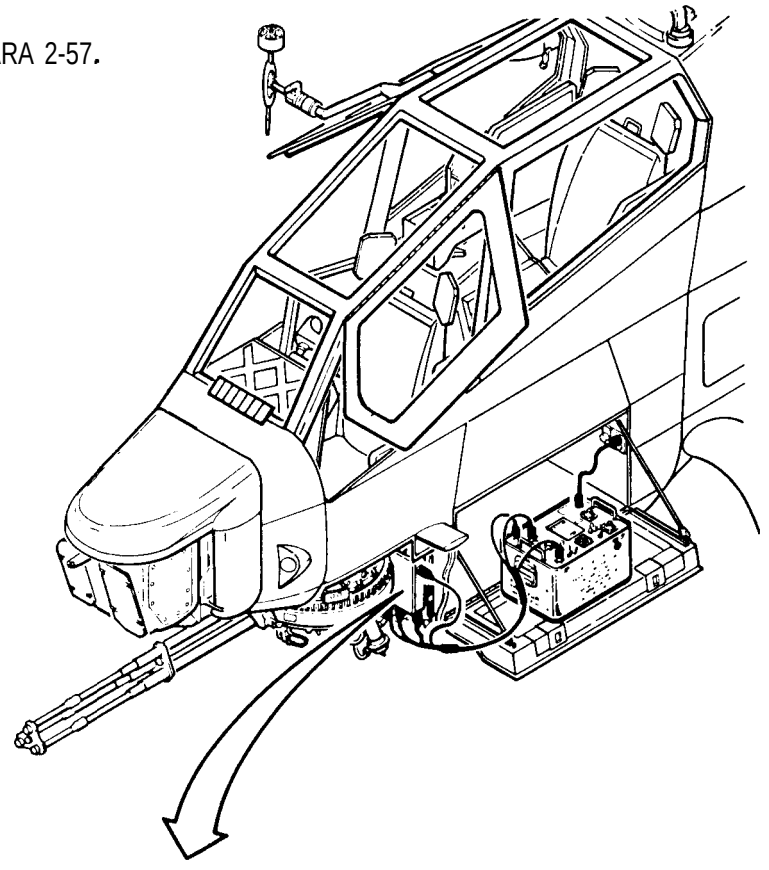
28 VDC POWER SUPPLY ADJUSTMENT (cont)

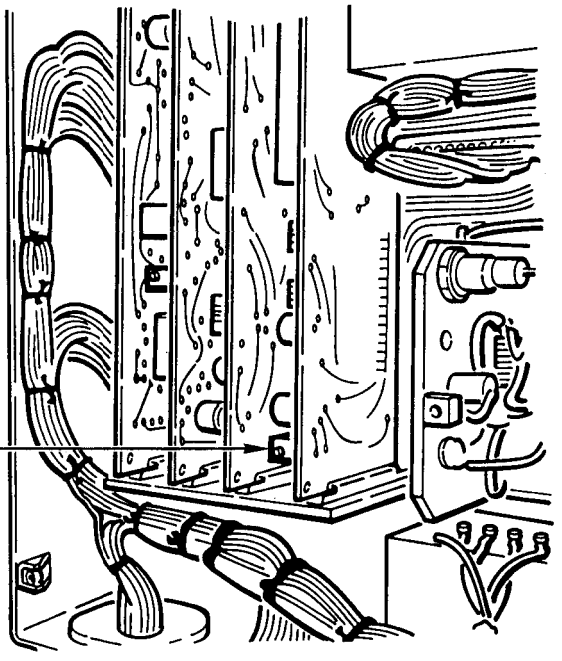
8. REMOVE GUN CONTROL UNIT COVER, PARA 2-57.

9. WHILE OBSERVING REFERENCE DISPLAY ON TEST SET, ADJUST 28 VDC POWER SUPPLY.
   a. Rotate trim potentiometer clockwise to increase voltage.
   b. Rotate trim potentiometer counter-clockwise to decrease voltage.

10. INSTALL GUN CONTROL UNIT COVER.

11. REMOVE POWER, SEE TM 9-1090-206-20-1; THEN DISCONNECT TEST SET.





ARR82-28194

END OF TASK

2-73. AZIMUTH PROXIMITY SWITCH ADJUSTMENT

DESCRIPTION

This task covers: Adjustment of azimuth proximity switches S2 (right) and S1 (left).

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Electronics Systems Test Set: M137

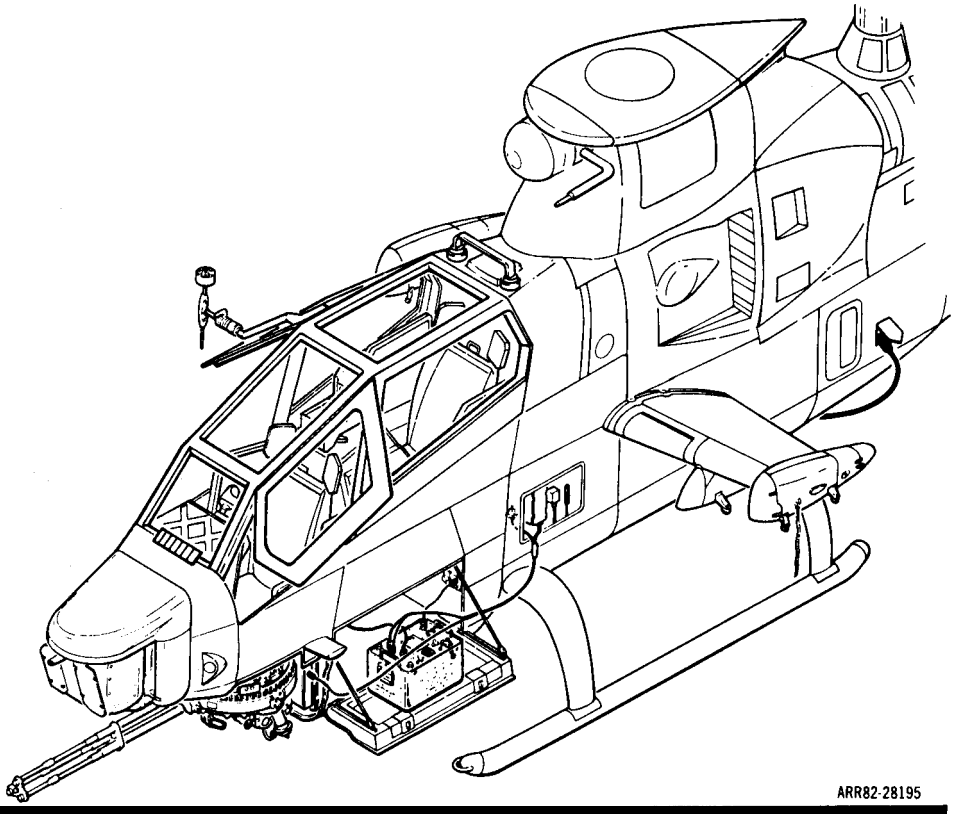
Personnel Required:
- 68J Aircraft Fire Control Repairer (2)

References:
- TM 9-1090-206-20-1
- TM 55-1520-236-23

Equipment Conditions:
- HELICOPTER ARMAMENT SUBSYSTEM MAINTENANCE SETUP performed, TM 9-1090-206-20-1.
- Turret fairing removed, see TM 55-1520-236-23.
- Turret subsystem boresighted, see Chapter 4.
- Test set cables W1, W6, W15, W21, and W24 connected, see TM 9-1090-206-20-1.

ADJUSTMENT SETUP

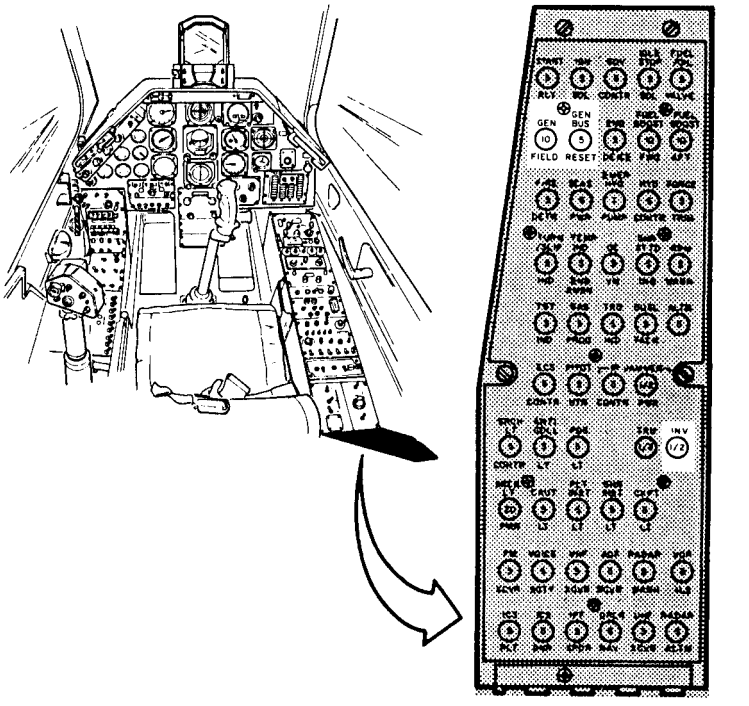
1. APPLY POWER, SEE TM 9-1090-206-20-1.



ARR82-28195

ADJUSTMENT SETUP (cont)

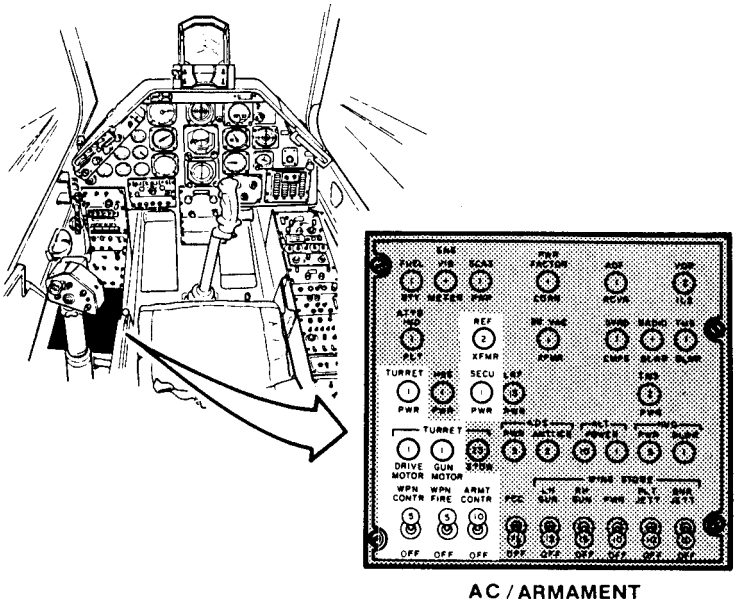
2. CLOSE FOLLOWING CIRCUIT BREAKERS ON DC CIRCUIT BREAKER PANEL:
   - GEN FIELD
   - GEN BUS RESET
   - INV



DC CIRCUIT BREAKER PANEL

ARR82-28196

3. CLOSE FOLLOWING CIRCUIT BREAKERS ON AC/ARMAMENT CIRCUIT BREAKER PANEL:
   - REF XFMR
   - TURRET PWR
   - SECU PWR
   - TURRET DRIVE MOTOR
   - TURRET GUN MOTOR
   - WPN CONTR
   - WPN FIRE
   - ARMT CONTR



AC / ARMAMENT CIRCUIT BREAKER PANEL

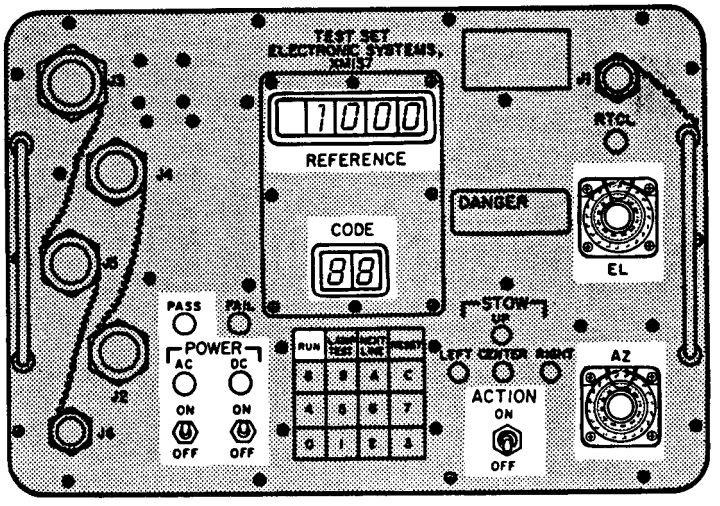
ARR82-28197

2-73. AZIMUTH PROXIMITY SWITCH ADJUSTMENT (cOnt)

4. ON TEST SET, SET AZ AND EL DIALS TO 0° AND CHECK THAT ACTION SWITCH IS OFF.

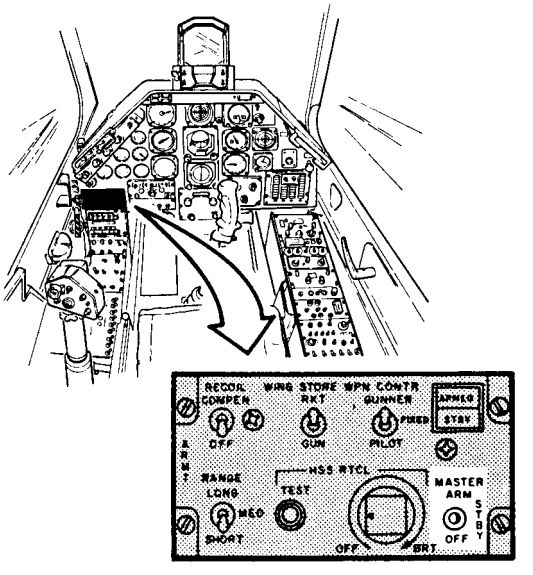
5. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.
   a. AC and DC POWER indicators light.
   b. 8's appear in REFERENCE and CODE displays.
   c. PASS indicator lights.

6. ON TEST SET, PRESS RUN KEY.
   1000 appears in REFERENCE display.



ARR82-28198

7. ON PILOT ARMAMENT CONTROL PANEL, SET MASTER ARM SWITCH TO STBY.



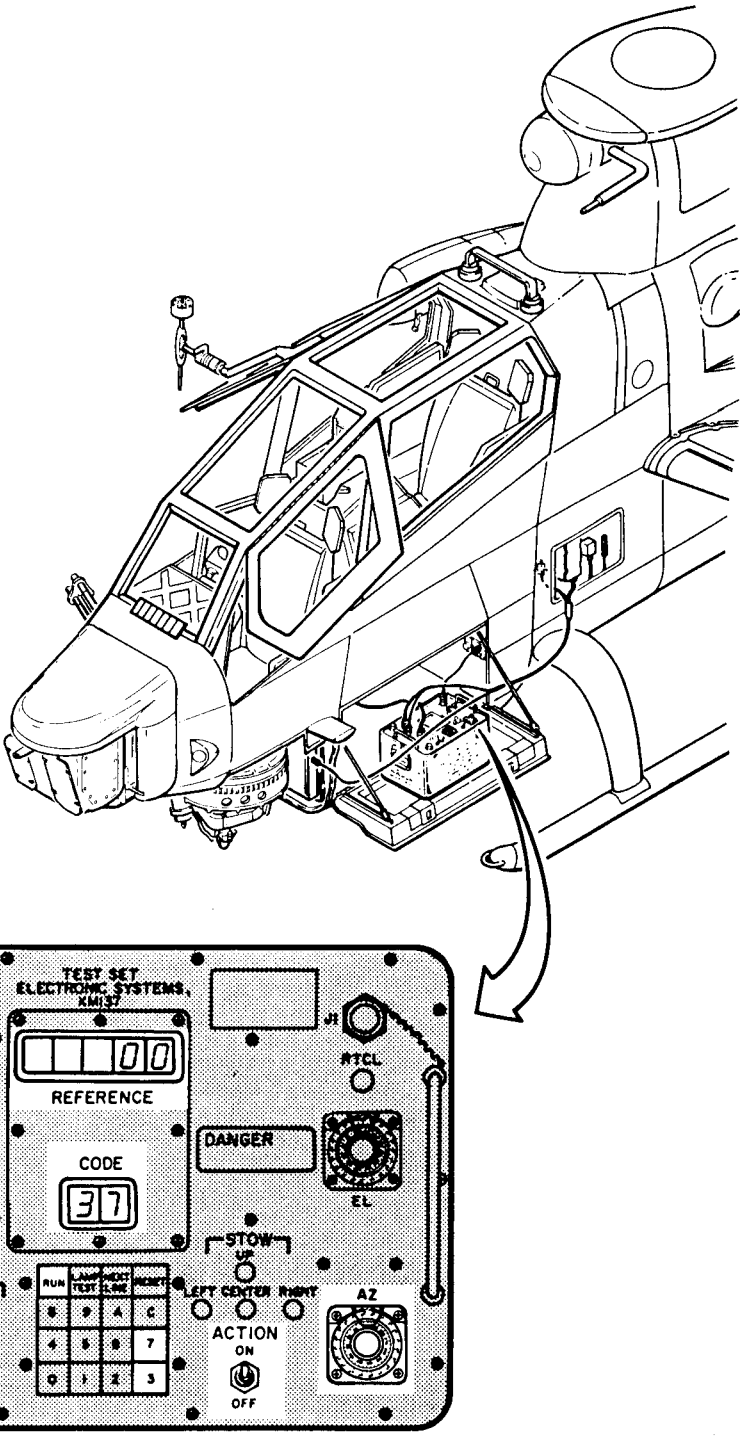
PILOT ARMAMENT CONTROL PANEL

ARR82-28199

RIGHT PROXIMITY SWITCH ADJUSTMENT

8. ON TEST SET, PRESS 3, 7, AND RUN KEYS.
   a. This is the right proximity switch test point.
   b. REFERENCE display should indicate approximately 20 Vdc.

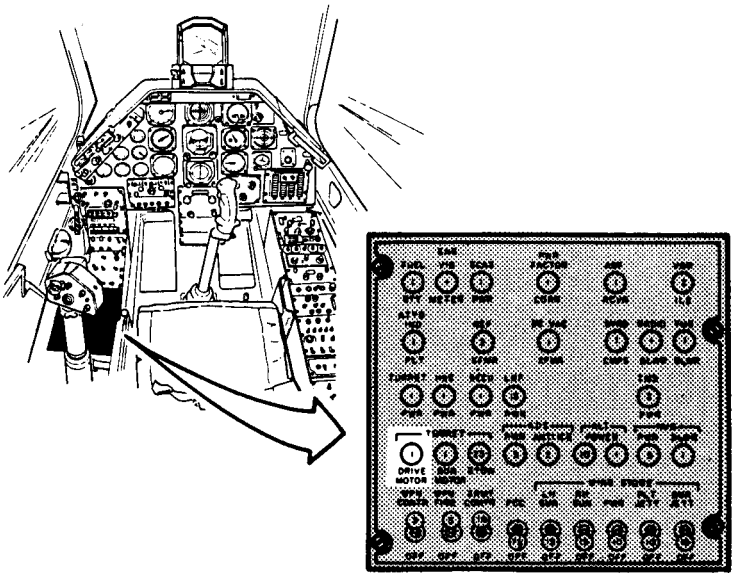
9. ON TEST SET, SET ACTION SWITCH TO ON AND SLOWLY ROTATE AZ DIAL CLOCKWISE UNTIL 110° IS REACHED.
   a. If turret stops at 110° position and REFERENCE display indicates approximately 0 Vdc, go to step 17.
   b. If turret stops moving before AZ resolver reaches 110° position or if REFERENCE display does not indicate approximately 0 Vdc right proximity switch requires adjustment; go to next step.



ARR82-28200

2-73. AZIMUTH PROXIMITY SWITCH ADJUSTMENT (cont)

10. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, OPEN TURRET DRIVE MOTOR CIRCUIT BREAKER.

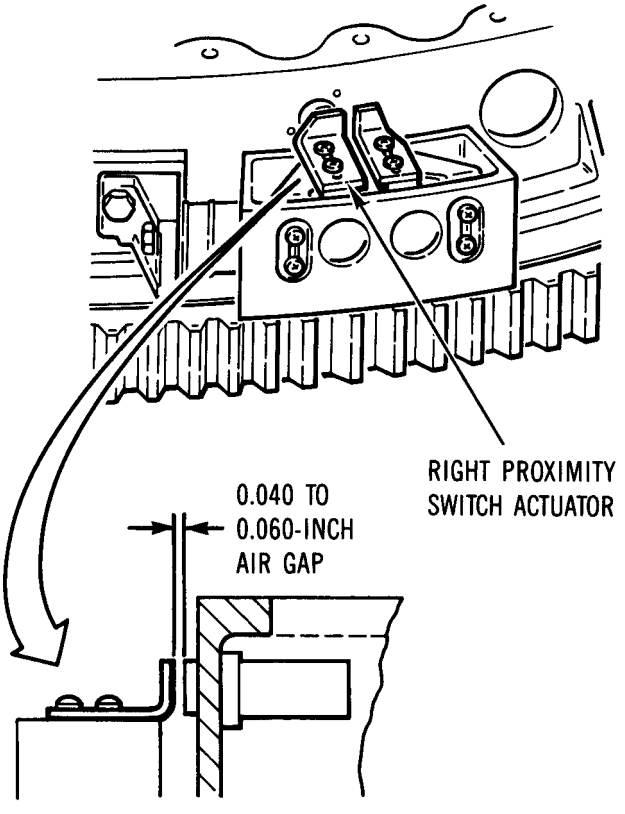


AC / ARMAMENT
CIRCUIT BREAKER PANEL

ARR82-28201

11. RELEASE AZIMUTH DRIVE MOTOR BRAKE AND MANUALLY POSITION TURRET TO RIGHT MECHANICAL LIMIT: THEN APPLY BRAKE.

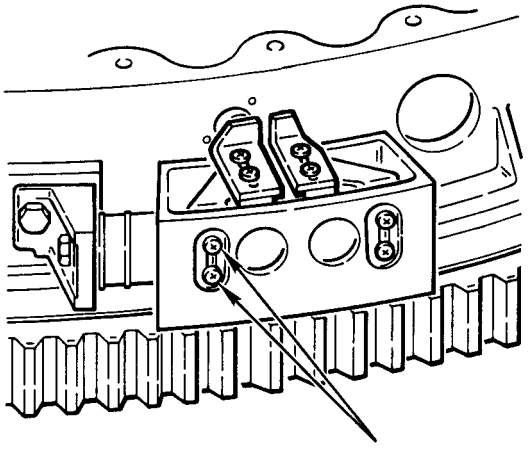
12. LOOSEN TWO SCREWS ON RIGHT PROXIMITY SWITCH ACTUATOR AND ADJUST AIR GAP BETWEEN ACTUATOR AND SWITCH FACE TO 0.040 TO 0.060 INCH, TIGHTEN SCREWS AFTER AIR GAP IS SET.



ARR82-28202

RIGHT PROXIMITY SWITCH ADJUSTMENT (cont)

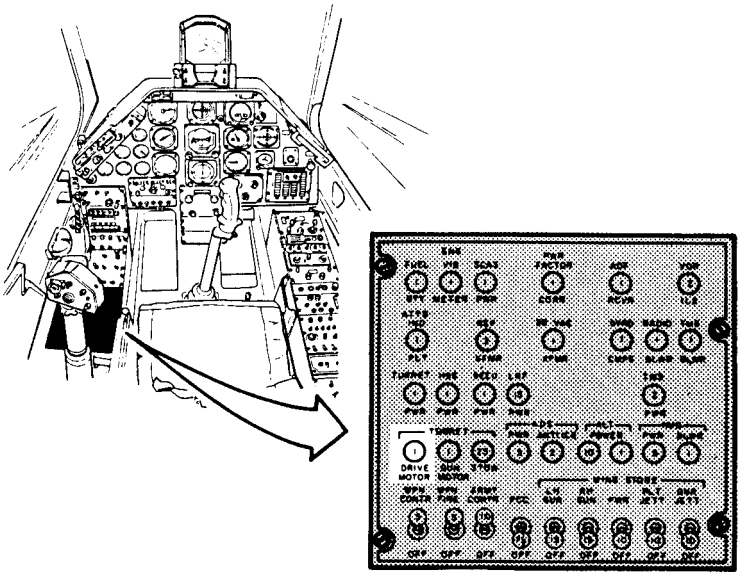
13. LOOSEN RIGHT PROXIMITY SWITCH ACTUATOR VERTICAL ADJUSTMENT SCREWS AND SET ACTUATOR TO ITS LOWEST POSITION.



ARR82-28203

14. CHECK THAT TEST SET AZ DIAL IS STILL SET TO 110°.

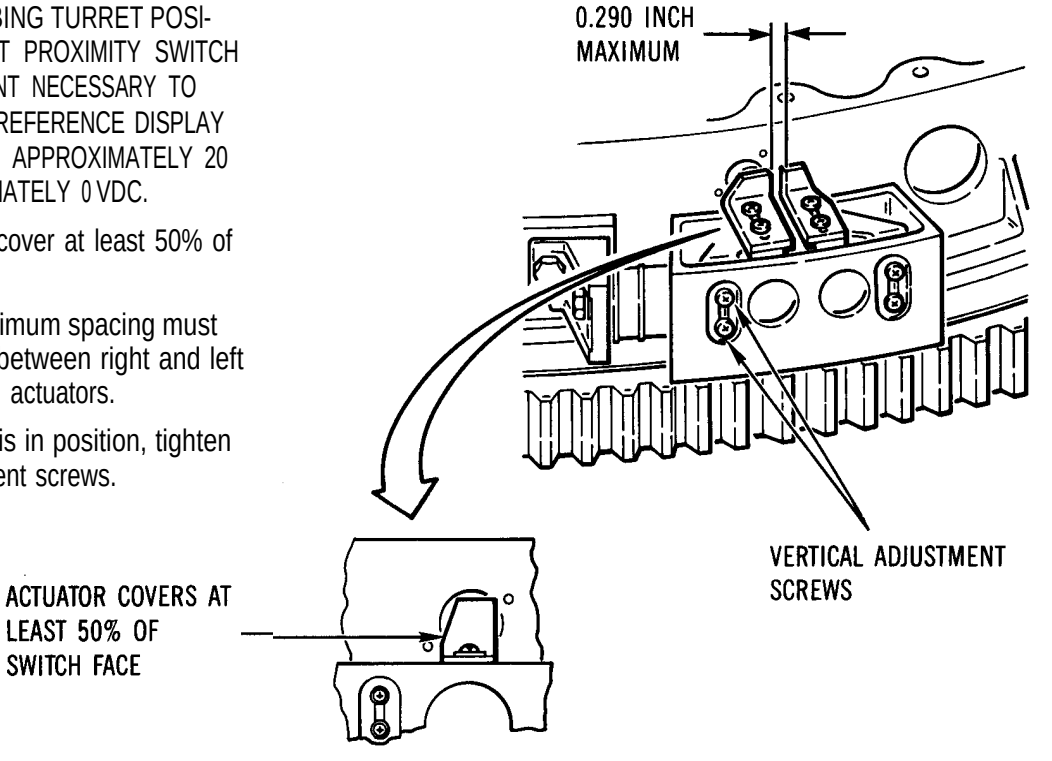
15. ON AC/'ARMAMENT CIRCUIT BREAKER PANEL, CLOSE TURRET DRIVE MOTOR CIRCUIT BREAKER LONG ENOUGH FOR TURRET TO ALINE WITH TEST SET SIGHT SIMULATOR; THEN OPEN TURRET DRIVE MOTOR CIRCUIT BREAKER.



ARR82-28204

2-73. AZIMUTH PROXIMITY SWITCH ADJUSTMENT (cont)

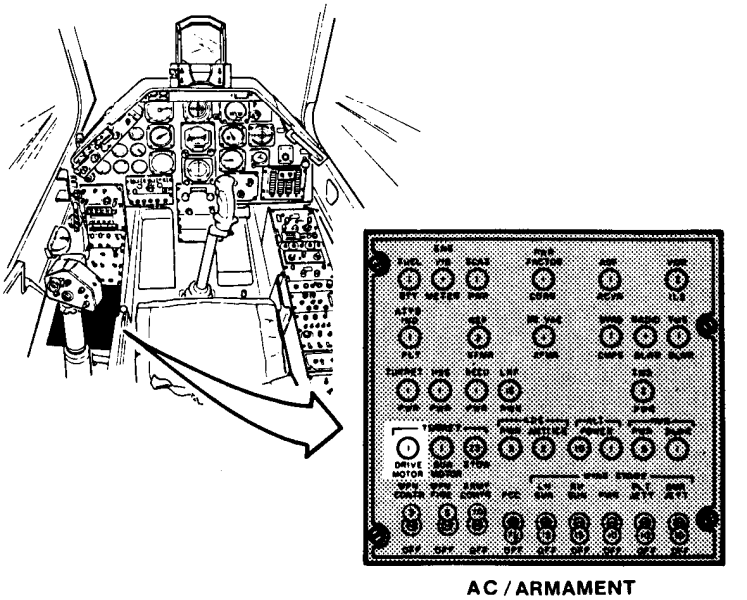
16. WITHOUT DISTURBING TURRET POSITION, RAISE RIGHT PROXIMITY SWITCH ACTUATOR TO POINT NECESSARY TO CAUSE TEST SET REFERENCE DISPLAY TO CHANGE FROM APPROXIMATELY 20 VDC TO APPROXIMATELY 0 VDC.
    a. Actuator must cover at least 50% of switch face.
    b. 0.290-inch maximum spacing must be maintained between right and left proximity switch actuators.
    c. When actuator is in position, tighten vertical adjustment screws.



ARR82-28205

17. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, CLOSE TURRET DRIVE MOTOR CIRCUIT BREAKER.

18. ON TEST SET, SLOWLY ROTATE AZ DIAL TO 0° POSITION.



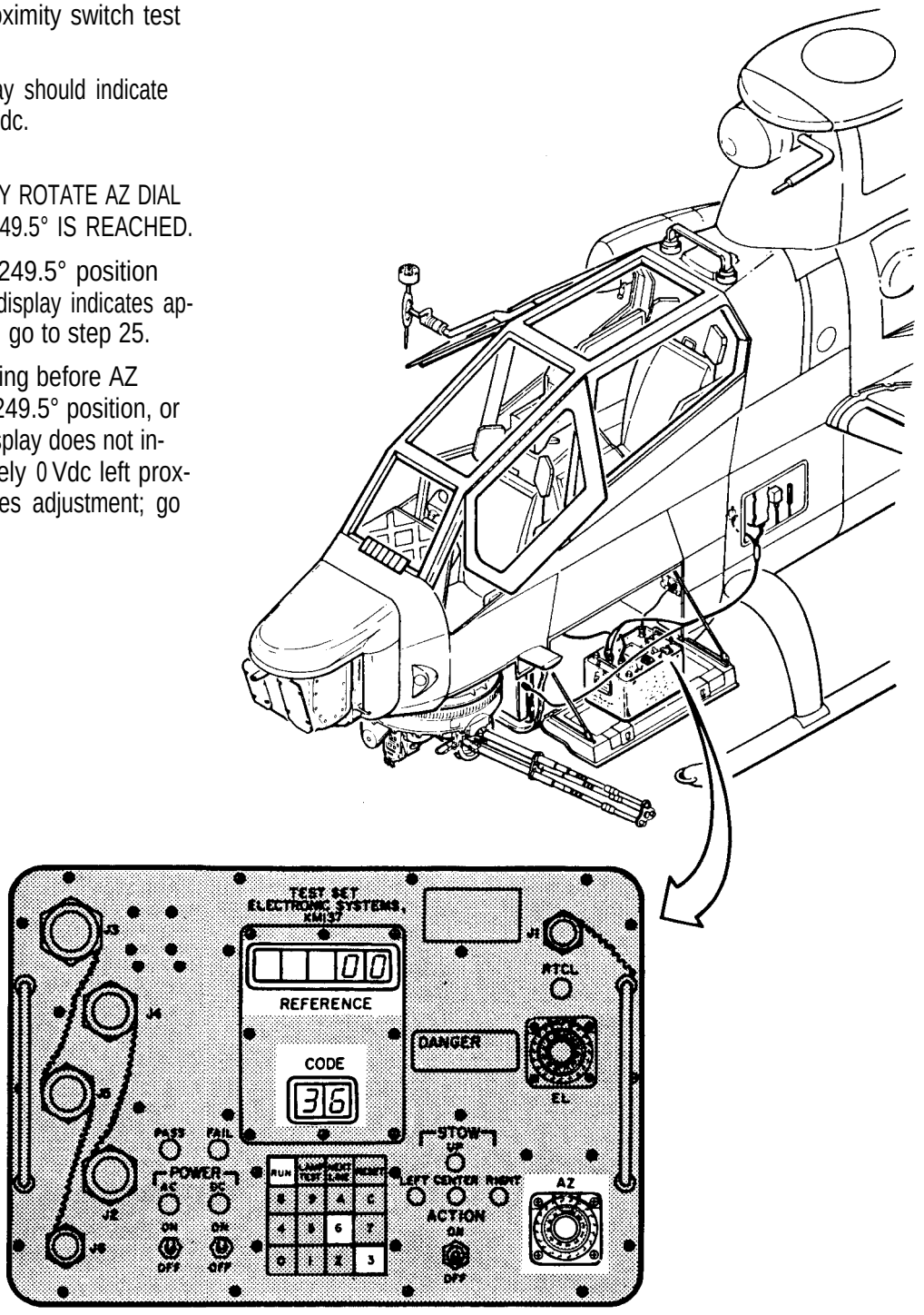
AC / ARMAMENT
CIRCUIT BREAKER PANEL

ARR82-28206

LEFT PROXIMITY SWITCH ADJUSTMENT

19. ON TEST SET, PRESS 3, 6, AND RUN KEYS.
    a. This is the left proximity switch test point.
    b. REFERENCE display should indicate approximately 20 Vdc.

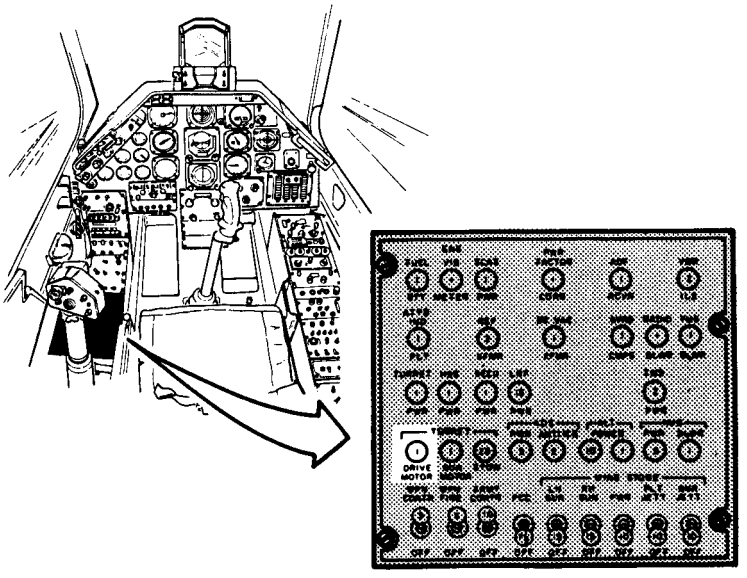
20. ON TEST SET, SLOWLY ROTATE AZ DIAL CLOCKWISE UNTIL 249.5° IS REACHED.
    a. If turret stops at 249.5° position and REFERENCE display indicates approximately 0 Vdc, go to step 25.
    b. If turret stops moving before AZ resolver reaches 249.5° position, or if REFERENCE display does not indicate approximately 0 Vdc left proximity switch requires adjustment; go to next step.



ARR82-28207

2-73. AZIMUTH PROXIMITY SWITCH ADJUSTMENT (cont)

21. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, OPEN TURRET DRIVE MOTOR CIRCUIT BREAKER.



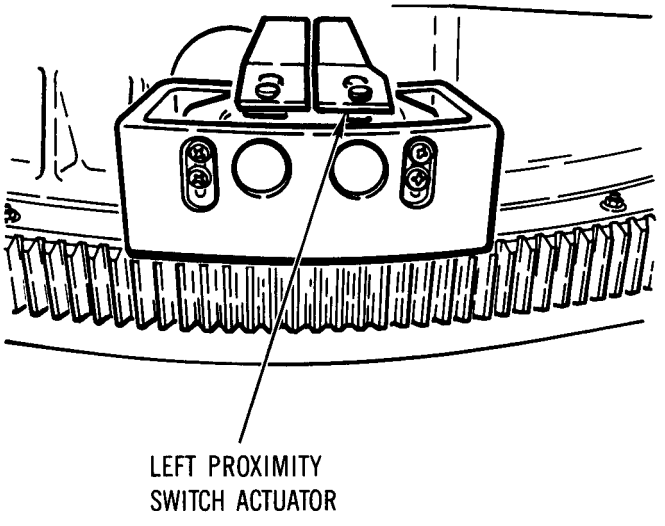
AC / ARMAMENT
CIRCUIT BREAKER PANEL

ARR82-28208

NOTE

Space limitations prevent direct adjustment of left proximity switch actuator. Left proximity switch actuator should be adjusted in same relative position as right proximity switch actuator.

22. RELEASE AZIMUTH DRIVE MOTOR BRAKE AND MANUALLY POSITION TURRET SO THAT ACTUATORS ARE ACCESSIBLE. APPLY BRAKE.



LEFT PROXIMITY
SWITCH ACTUATOR

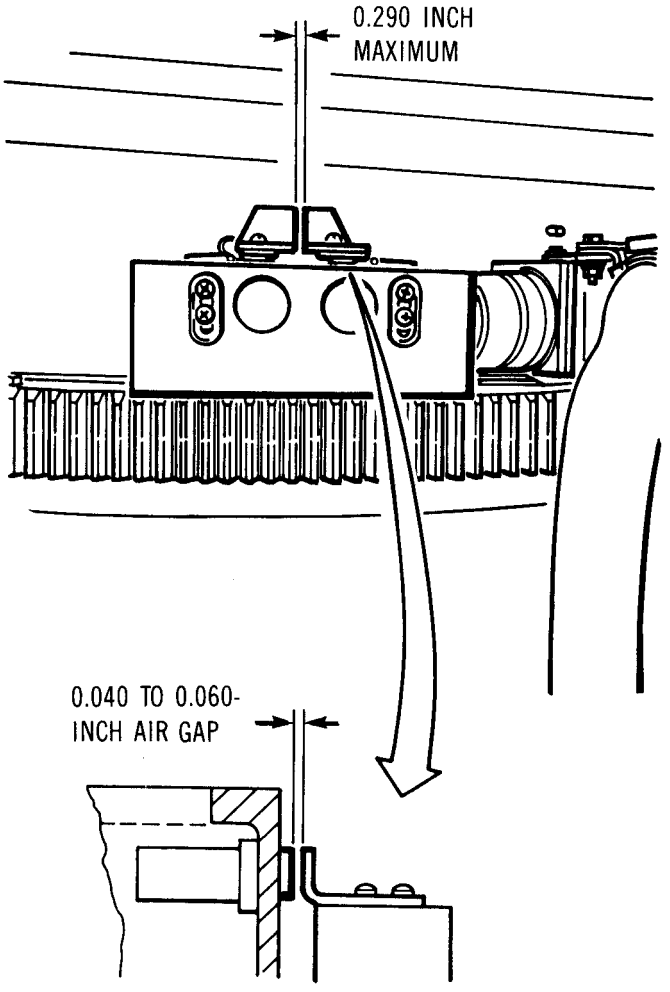
ARR82-28209

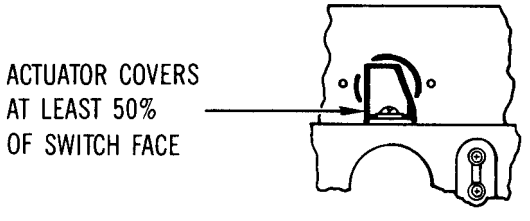
LEFT PROXIMITY SWITCH ADJUSTMENT (cont)

23. ADJUST LEFT PROXIMITY SWITCH ACTUATOR TO SAME RELATIVE POSITION AS RIGHT PROXIMITY SWITCH ACTUATOR.
    a. Air gap and switch face coverage are the same for right and Ieft actuators.
    b. Do not exceed 0.290-inch spacing between actuators.

24. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, CLOSE TURRET DRIVE MOTOR CIRUCIT BREAKER AND REPEAT CHECK IN STEP 20, READJUSTING AS NECESSARY TO MEET POSITIONING REQUIREMENTS AND TEST SET INDICATIONS.

25. REMOVE POWER, SEE TM 9-1090-206-20-1; THEN DISCONNECT TEST SET.





END OF TASK

2-74. ELEVATION PROXIMITY SWITCH ADJUSTMENT

DESCRIPTION

This task covers: Adjustment of elevation proximity switches S1 (down) and S2 (up).

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental
- Electronics Systems Test Set:
  - M137

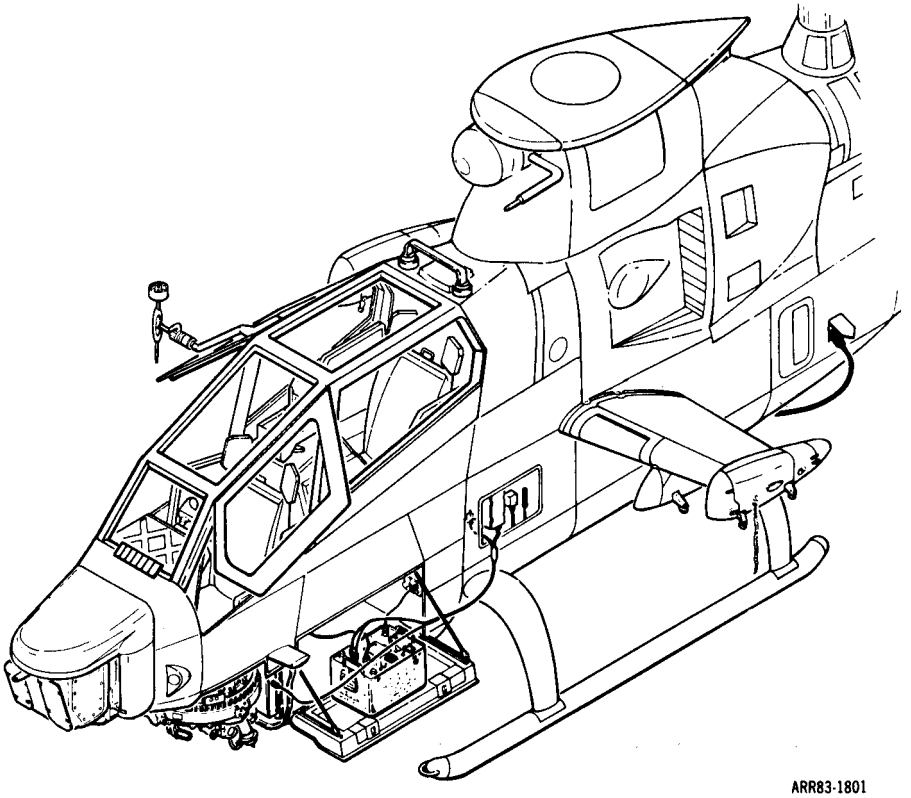
Personnel Required:
- 68J Aircraft Fire Control Repairer (2)

References:
- TM 9-1090-206-20-1
- TM 55-1520-236-23

Equipment Conditions:
- HELICOPTER ARMAMENT SUBSYSTEM MAINTENANCE SETUP performed, TM 9-1090-206-20-1.
- REMOVAL OF M197 GUN performed, TM 9-1090-206-20-1.
- Turret subsystem boresighted, see Chapter 4.
- Turret fairing removed, see TM 55-1520-236-23.
- Test set cables W1, W6, W15, W21, and W24 connected, see TM 9-1090-206-20-1.

ADJUSTMENT SETUP

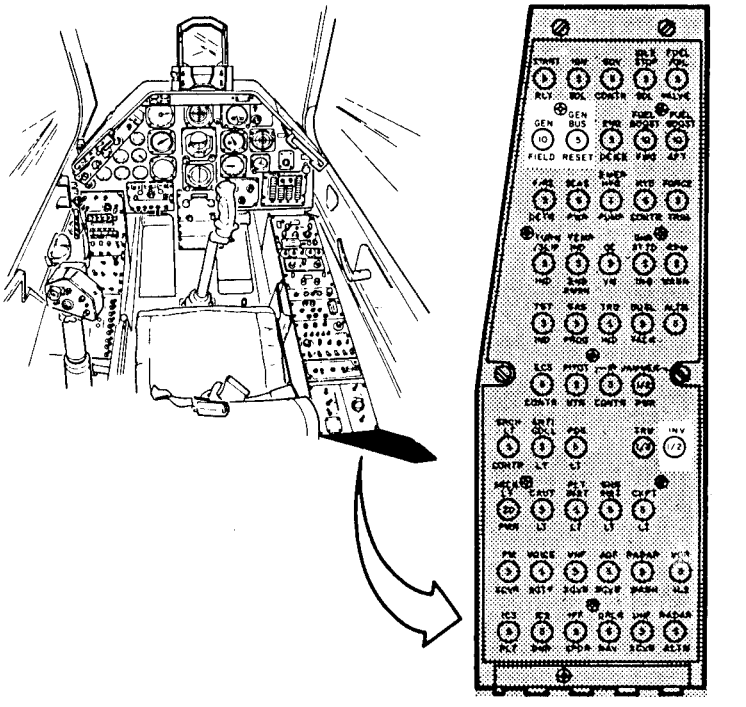
1. APPLY POWER, SEE TM 9-1090-206-20-1.



ARR83-1801

ADJUSTMENT SETUP (cont)

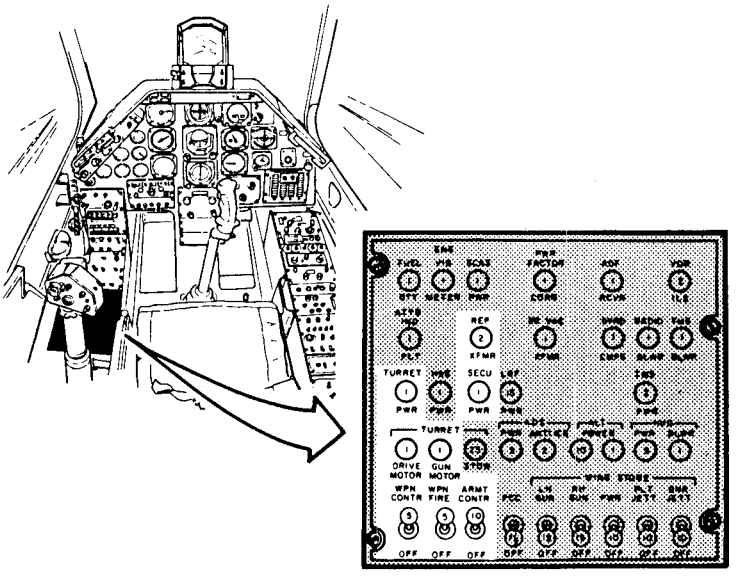
2. CLOSE FOLLOWING CIRCUIT BREAKERS ON DC CIRCUIT BREAKER PANEL:
   - GEN FIELD
   - GEN BUS RESET
   - INV



DC CIRCUIT BREAKER PANEL

ARR83-1802

3. CLOSE FOLLOWING CIRCUIT BREAKERS ON AC/'ARMAMENT CIRCUIT BREAKER PANEL:
   - REF XFMR
   - TURRET PWR
   - SECU PWR
   - TURRET DRIVE MOTOR
   - TURRET GUN MOTOR
   - WPN CONTR
   - WPN FIRE
   - ARMT CONTR



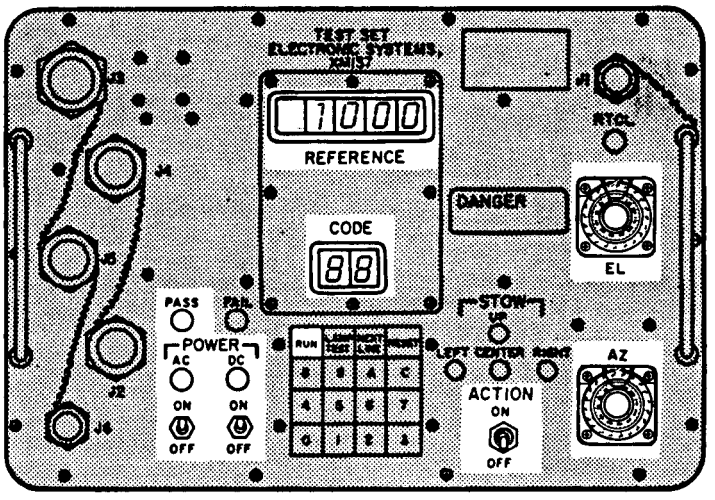
ARR83-1803

2-74. ELEVATION PROXIMITY SWITCH ADJUSTMENT (cont)

4. ON TEST SET, SET AZ AND EL DIALS TO 0° AND CHECK THAT ACTION SWITCH IS OFF.

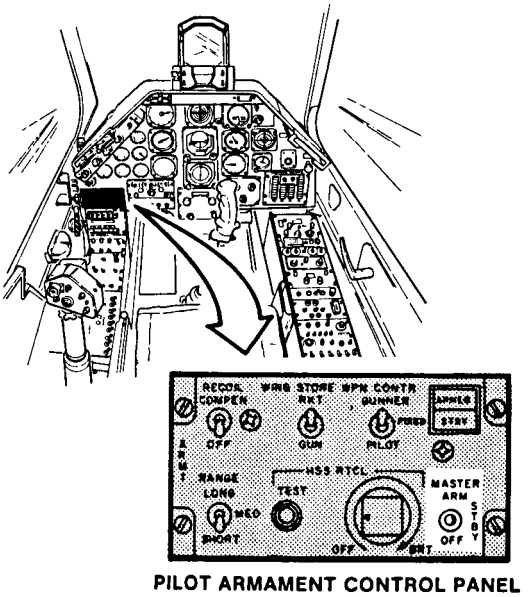
5. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.
   a. AC and DC POWER indicators light.
   b. 8's appear in REFERENCE and CODE displays.
   c. PASS indicator lights.

6. ON TEST SET, PRESS RUN KEY.
   1000 appears in REFERENCE display.



ARR83-1804

7. ON PILOT ARMAMENT CONTROL PANEL, SET MASTER ARM SWITCH TO STBY.

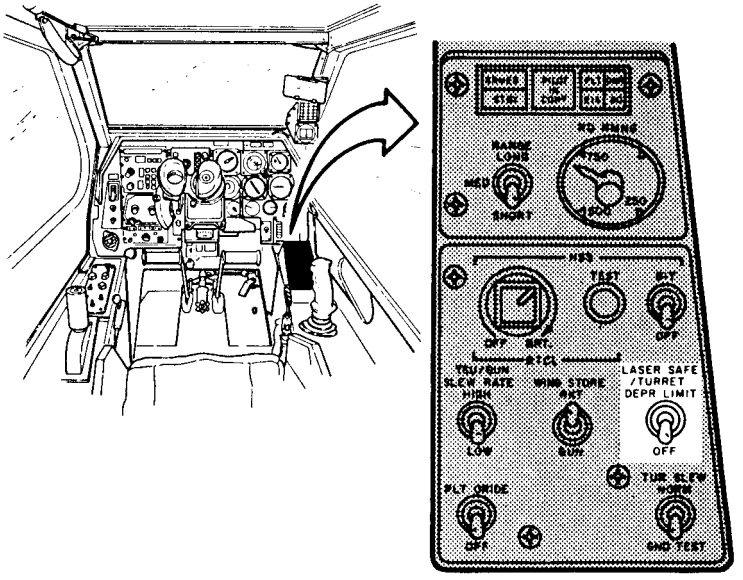


PILOT ARMAMENT CONTROL PANEL

ARR83-1805

ADJUSTMENT SETUP (cont)

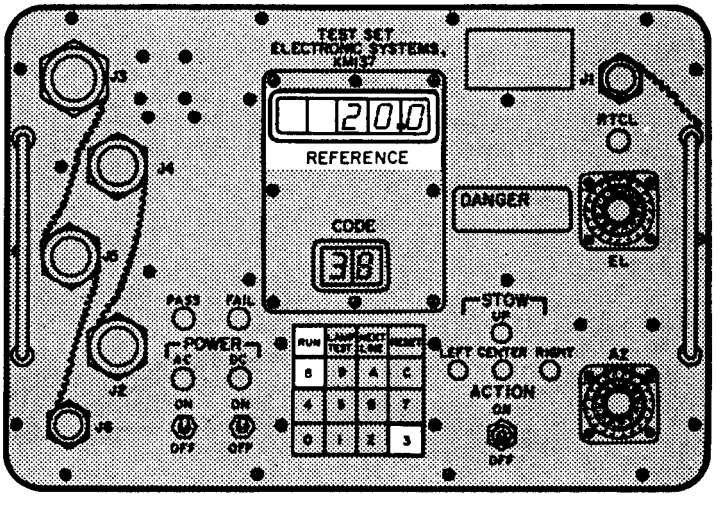
8. ON GUNNER ARMAMENT CONTROL PANEL, SET LASER SAFE/TURRET DEPR LIMIT SWITCH TO OFF.



GUNNER ARMAMENT CONTROL PANEL

ARR83-1806

9. ON TEST SET, PRESS 3, 8, AND RUN KEYS.
   a. This is the down proximity switch test point.
   b. REFERENCE display should indicate approximately 20 Vdc.



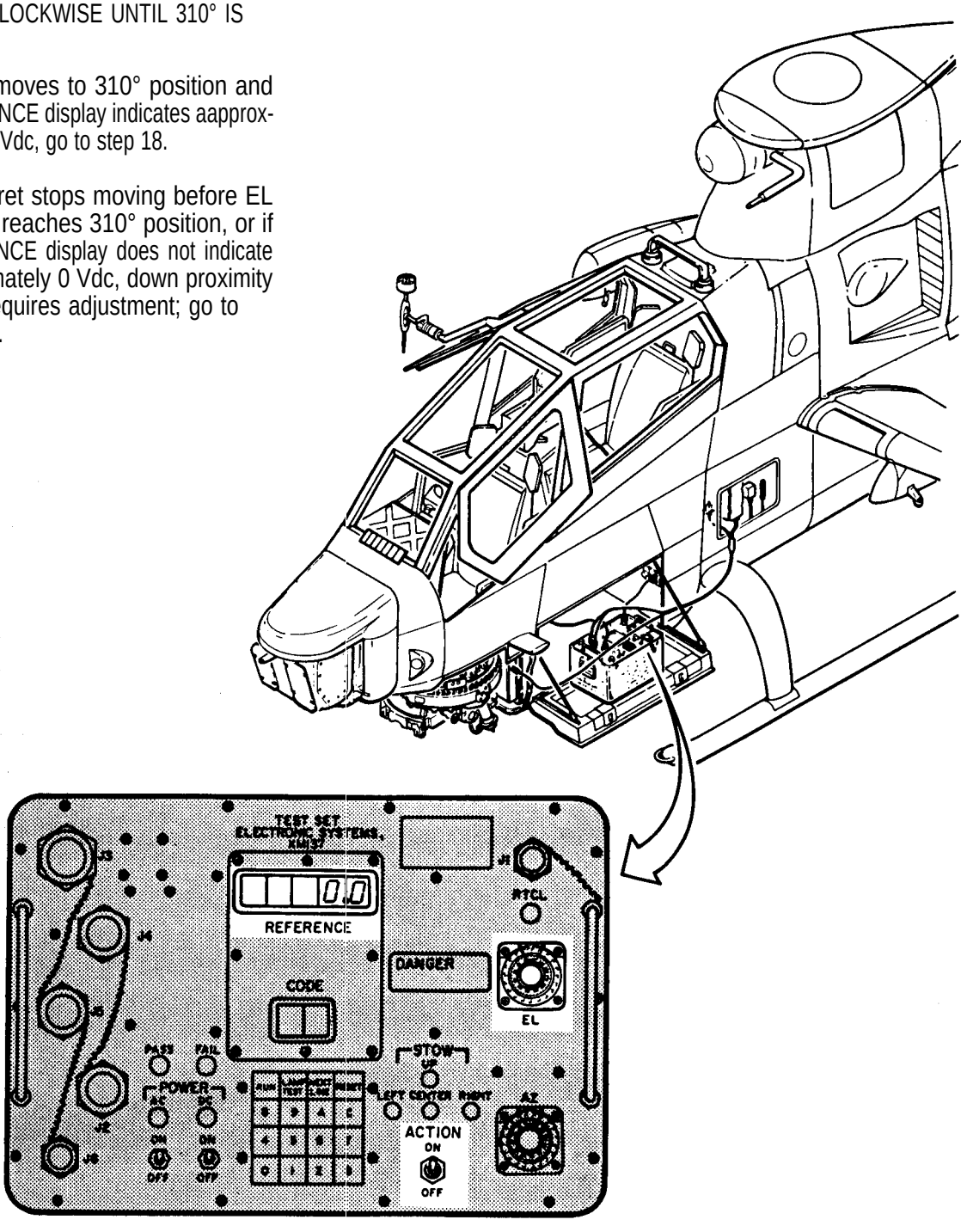
ARR83-1807

2-74. ELEVATION PROXIMITY SWITCH ADJUSTMENT (cont)

10. ON TEST, SET ACTION SWITCH TO ON AND SLOWLY ROTATE EL DIAL COUNTERCLOCKWISE UNTIL 310° IS REACHED.

    a. If turret moves to 310° position and REFERENCE display indicates aapproximately 0 Vdc, go to step 18.

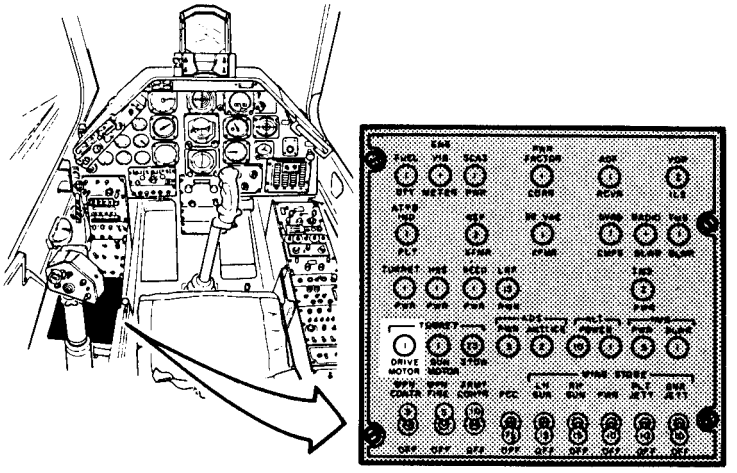
    b. If the turret stops moving before EL resolver reaches 310° position, or if REFERENCE display does not indicate approximately 0 Vdc, down proximity switch requires adjustment; go to next step.



ARR83-1808

DOWN PROXIMITY SWITCH ADJUSTMENT (cont)

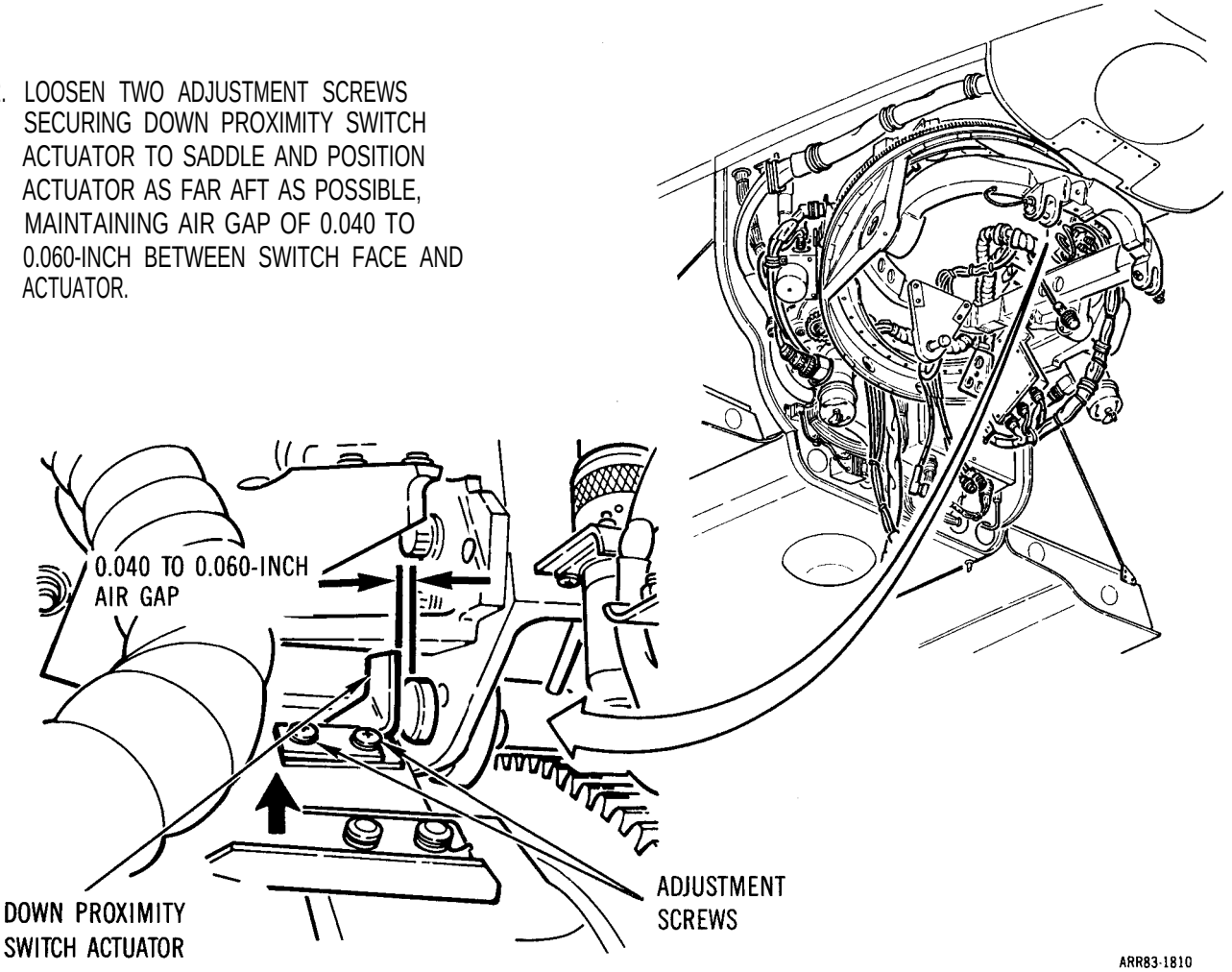
11. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, OPEN TURRET DRIVE MOTOR CIRCUIT BREAKER.



AC / ARMAMENT CIRCUIT BREAKER PANEL

ARR83-1809

12. LOOSEN TWO ADJUSTMENT SCREWS SECURING DOWN PROXIMITY SWITCH ACTUATOR TO SADDLE AND POSITION ACTUATOR AS FAR AFT AS POSSIBLE, MAINTAINING AIR GAP OF 0.040 TO 0.060-INCH BETWEEN SWITCH FACE AND ACTUATOR.

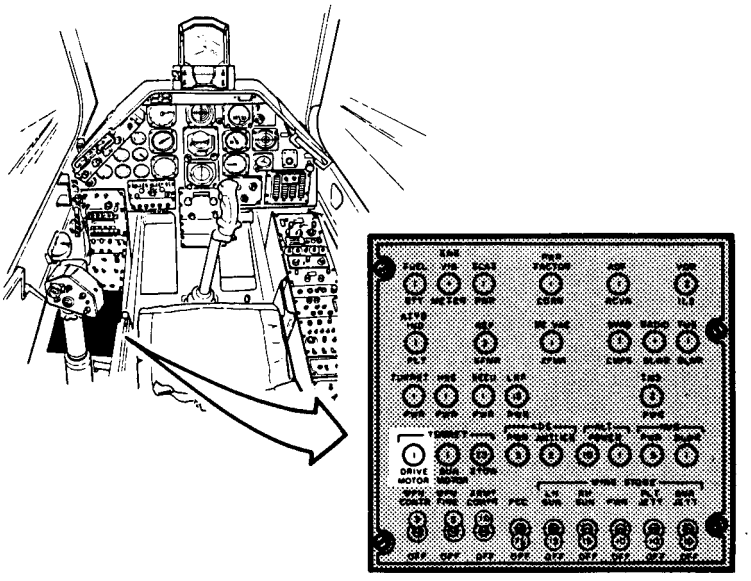


ARR83-1810

2-74. ELEVATION PROXIMITY SWITCH ADJUSTMENT (cont)

13. CHECK THAT TEST SET EL DIAL IS STILL SET TO 310°.

14. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, CLOSE TURRET DRIVE MOTOR CIRCUIT BREAKER LONG ENOUGH FOR TURRET TO ALINE WITH TEST SET SIGHT SIMULATOR; THEN OPEN TURRET DRIVE MOTOR CIRCUIT BREAKER.

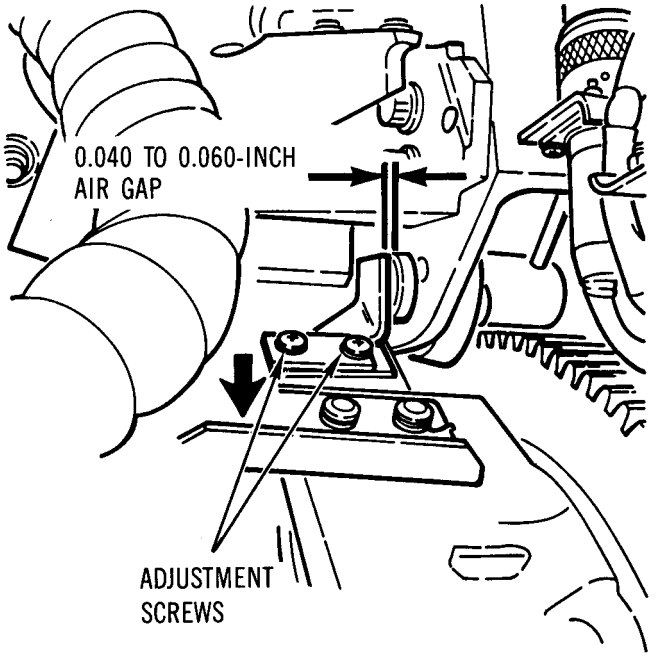


AC / ARMAMENT CIRCUIT BREAKER PANEL

ARR83-1811

15. WITHOUT DISTURBING TURRET POSITION, MOVE DOWN PROXIMITY SWITCH ACTUATOR FORWARD (WHILE MAINTAINING AIR GAP) TO POINT NECESSARY TO CAUSE TEST SET REFERENCE DISPLAY TO CHANGE FROM APPROXIMATELY 20 VDC TO 0 VDC.

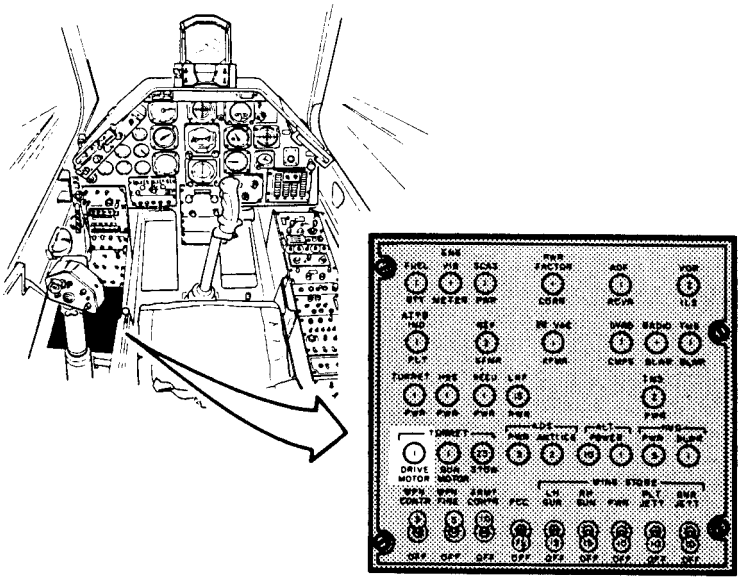
16. TIGHTEN TWO ADJUSTMENT SCREWS SECURING DOWN PROXIMITY SWITCH ACTUATOR TO SADDLE.



ARR83-1812

UP PROXIMITY SWITCH ADJUSTMENT

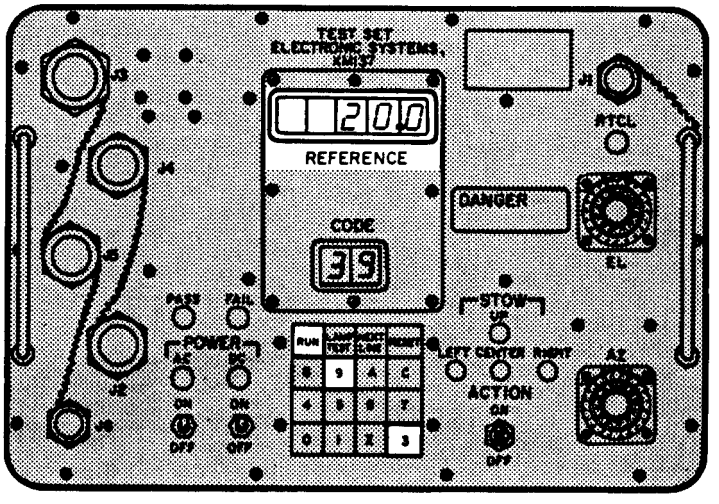
17. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, CLOSE TURRET DRIVE MOTOR CIRCUIT BREAKER.



AC / ARMAMENT
CIRCUIT BREAKER PANEL

ARR83-1813

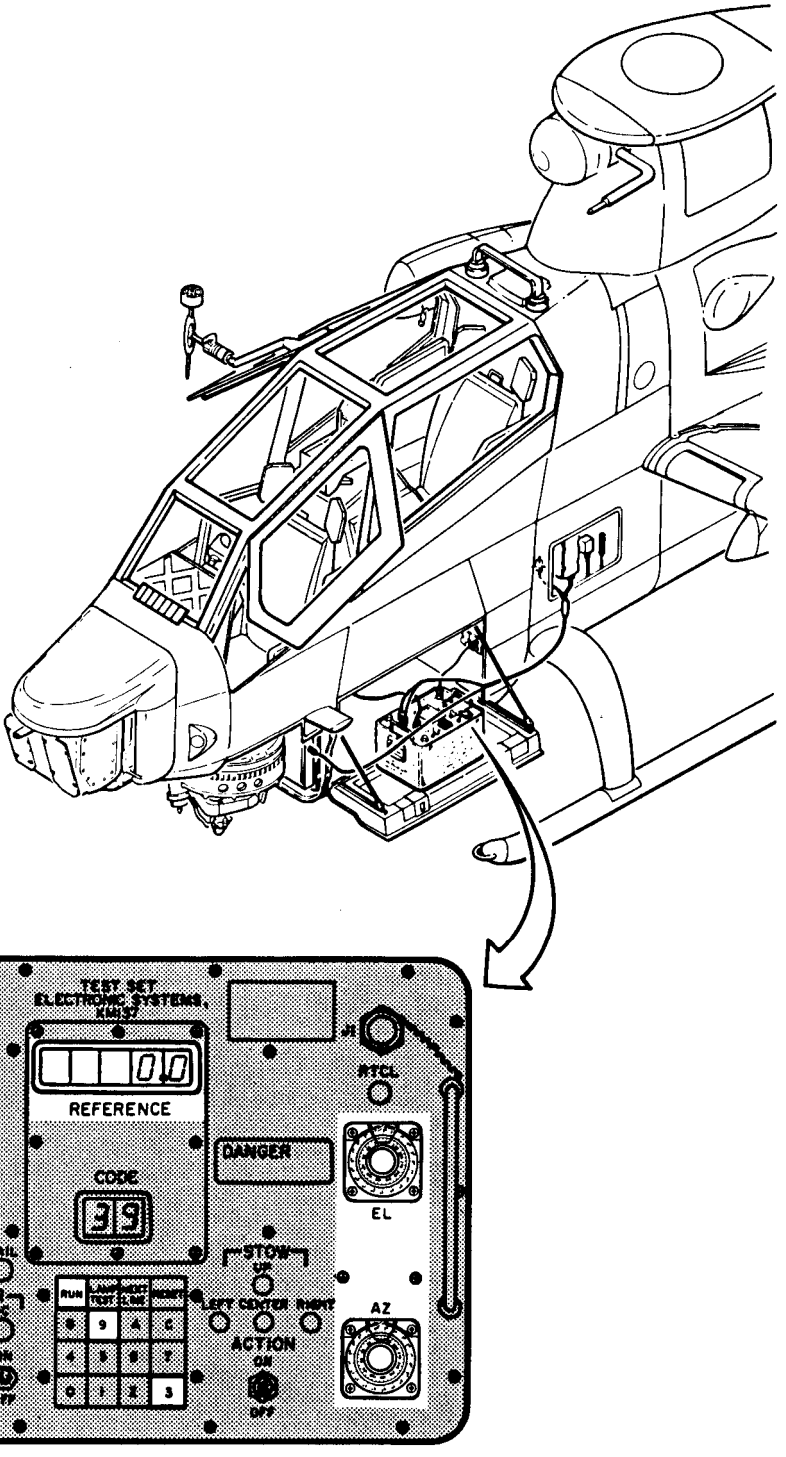
18. ON TEST SET, PRESS 3, 9, AND RUN KEYS.
    a. This is the up proximity switch test point.
    b. REFERENCE display should indicate approximately 20 Vdc.



ARR83-1814

2-74. ELEVATION PROXIMITY SWITCH ADJUSTMENT (cont)

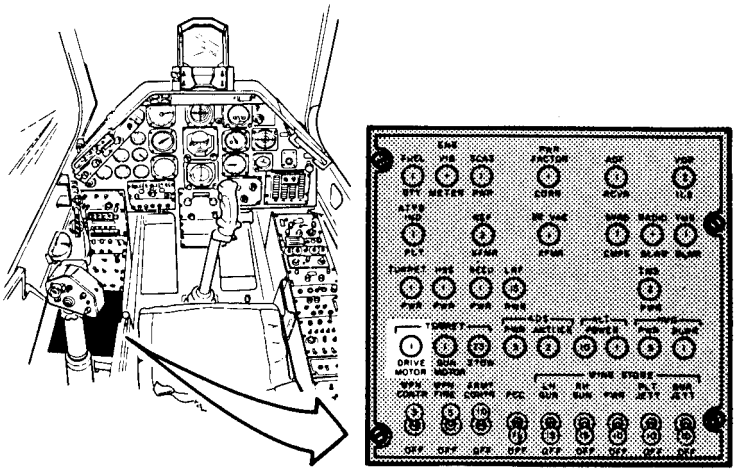
19. ON TEST SET, SLOWLY POSITION AZ DIAL TO 310° AND EL DIAL TO 20.5°.
    a. If REFERENCE display on test set indicates approximately 0 VDC when turret reaches commanded position, go to step 26.
    b. If REFERENCE display does not indicate 0 VDC, up proximity switch requires adjustment; go to next step.



ARR83-1815

UP PROXIMITY SWITCH ADJUSTMENT (cont)

20. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, OPEN TURRET DRIVE MOTOR CIRCUIT BREAKER.



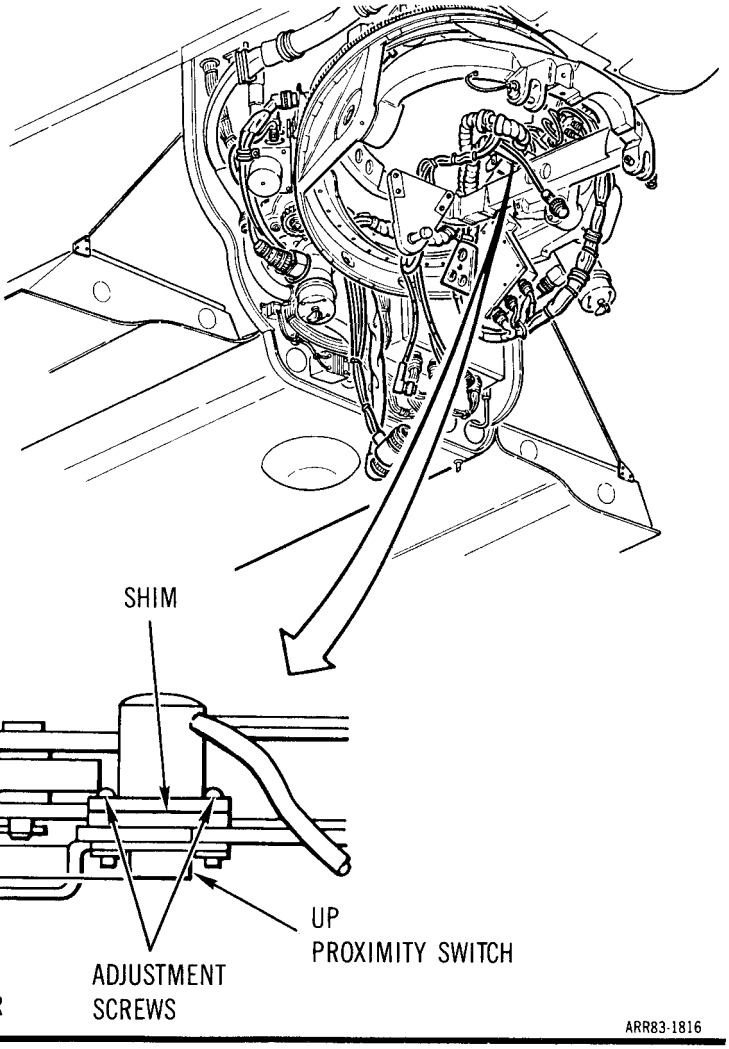
AC / ARMAMENT CIRCUIT BREAKER PANEL

ARR83-2063

21. CHECK AND ADJUST AIR GAP BETWEEN UP PROXIMITY SWITCH FACE AND ACTUATOR.

a. Manually position actuator over up proximity switch face and measure air gap. Air gap should be 0.040 to 0.060-inch.

b. If air gap requires adjustment, remove two adjustment screws and shim to provide 0.040 to 0.060-inch air gap between up proximity switch face and actuator.

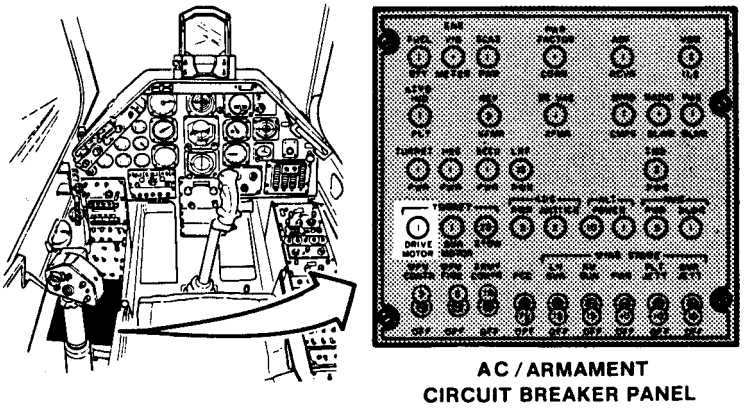


ARR83-1816

2-74. ELEVATION PROXIMITY SWITCH ADJUSTMENT (cont)

22. CHECK THAT TEST SET AZ AND EL DIALS ARE STILL SET TO 310° AND 20.5°.

23. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, CLOSE TURRET DRIVE MOTOR CIRCUIT BREAKER LONG ENOUGH FOR TURRET TO ALINE WITH TEST SET; THEN OPEN TURRET DRIVE MOTOR CIRCUIT BREAKER.



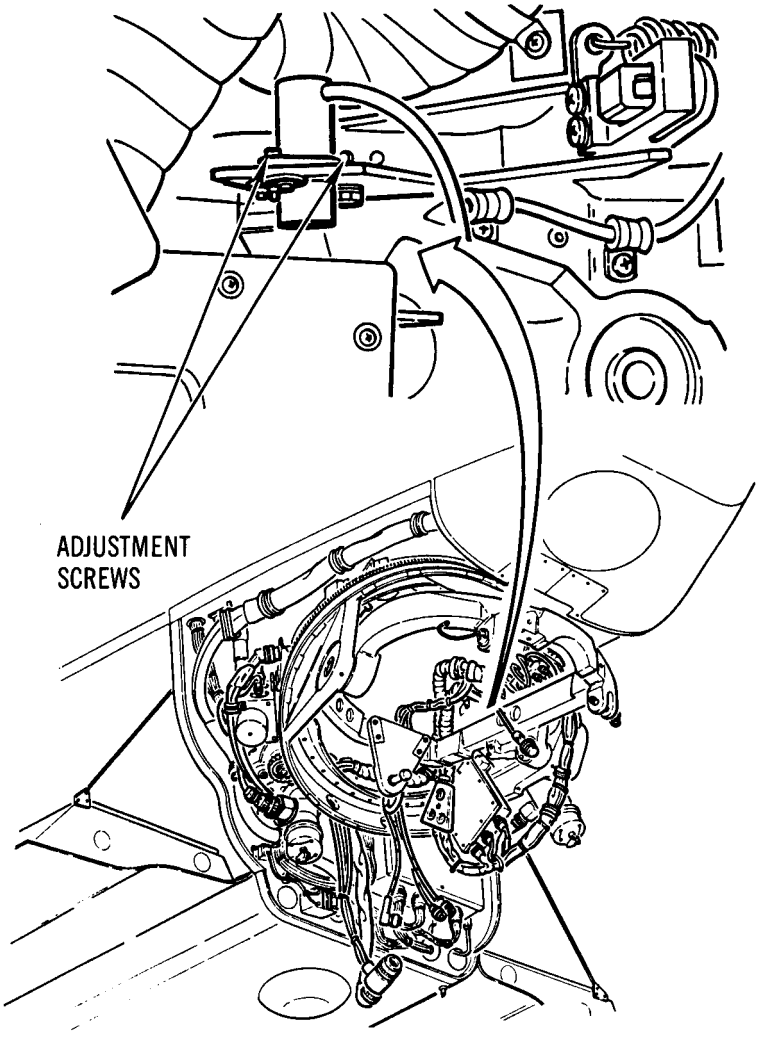
AC / ARMAMENT CIRCUIT BREAKER PANEL

ARR83-2064

24. LOOSEN TWO ADJUSTMENT SCREWS; THEN, WITHOUT DISTURBING TURRET POSITION, SLOWLY ADJUST LATERAL POSITION OF UP PROXIMITY SWITCH UNTIL REFERENCE DISPLAY ON TEST SET INDICATES APPROXIMATELY 0 VDC.

25. TIGHTEN TWO ADJUSTMENT SCREWS.

26. REMOVE POWER, SEE TM 9-1090-206-20-1; THEN DISCONNECT TEST SET.



ARR83-1817

END OF TASK

2-75. TURRET CONTROL UNIT STOW POTENTIOMETER ADJUSTMENT

DESCRIPTION

This task covers: Adjustment of turret control unit stow potentiometers A6A1R11 and A6A1R14 potentiometers.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental
- Electronics Systems Test Set:
  - M137

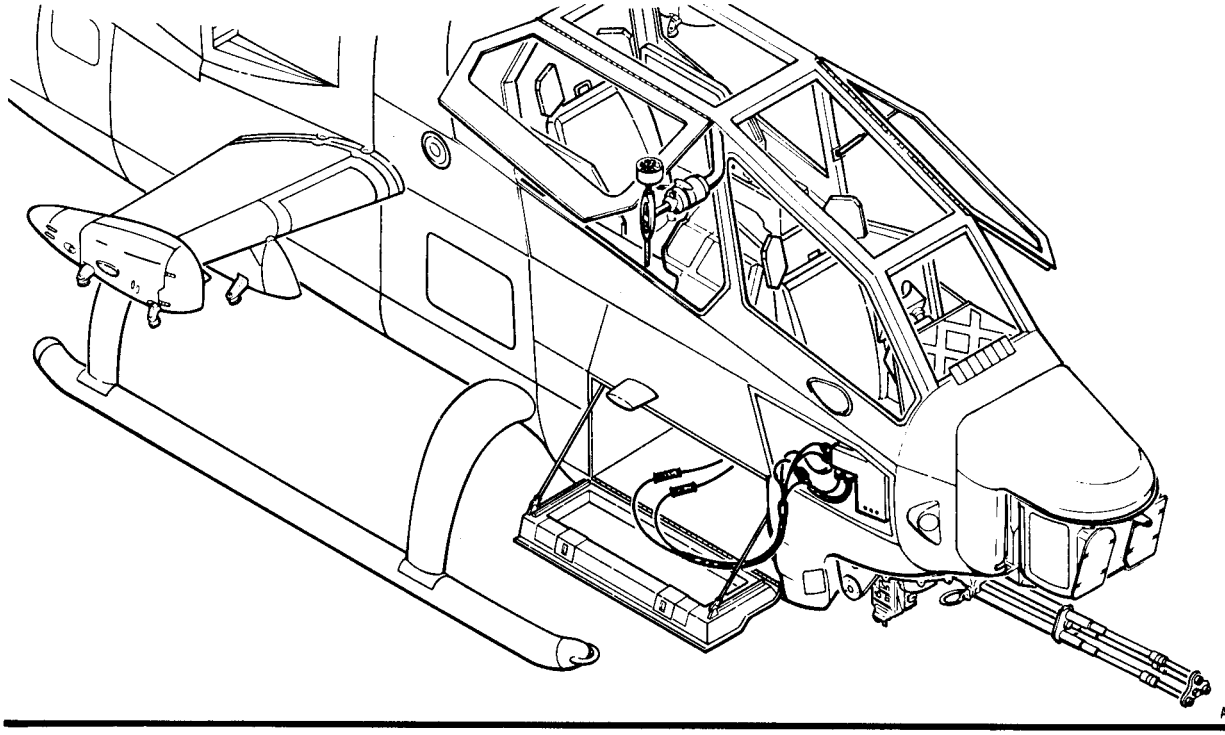
Personnel Required:
- 68J Aircraft Fire Control
  - Repairer

References:
- TM 9-1090-206-20-1

Equipment Conditions:
- HELICOPTER ARMAMENT SUBSYSTEM
  - MAINTENANCE SETUP performed,
  - TM 9-1090-206-20-1.
- Test set cables W1 and W8 connected, see
  - TM 9-1090-206-20-1.

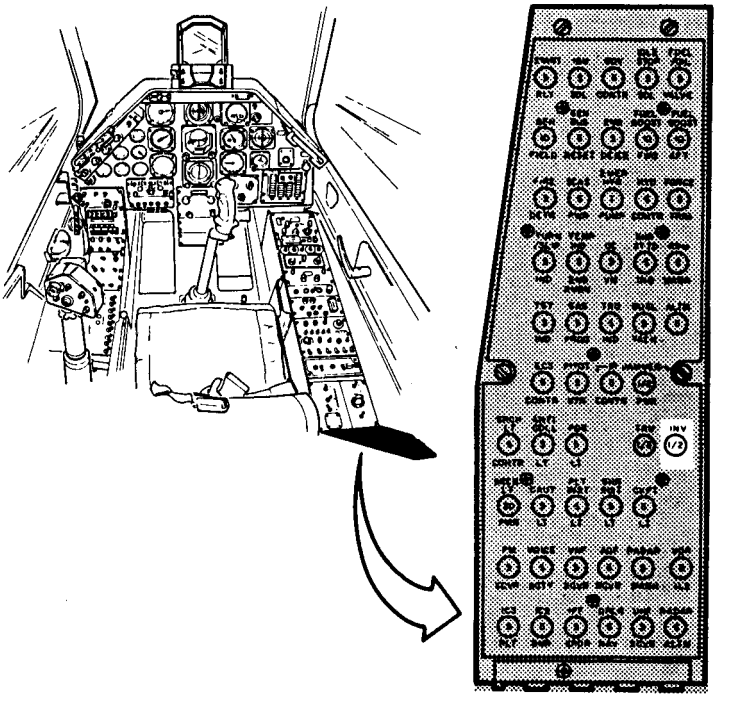
STOW POTENTIOMETER ADJUSTMENT

1. APPLY POWER, SEE
   TM 9-1090-206-20-1.



2-75. TURRET CONTROL UNIT STOW POTENTIOMETER ADJUSTMENT (cont)

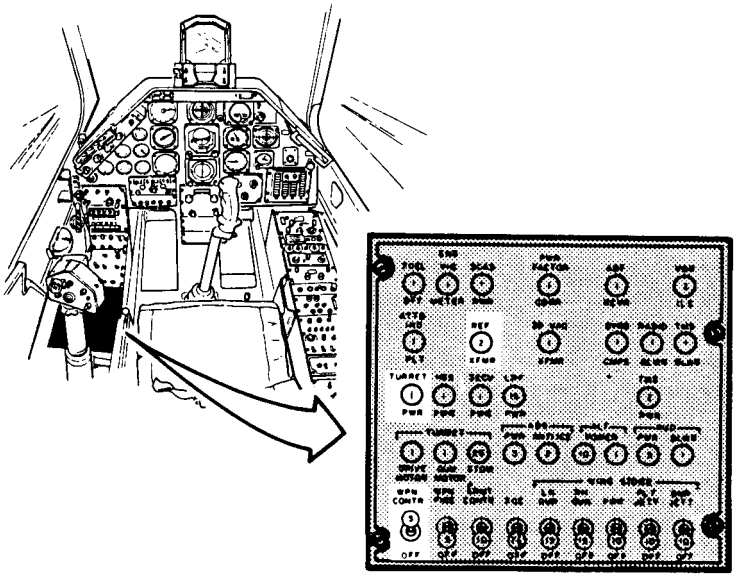
2. CLOSE INV CIRCUIT BREAKER ON DC CIRCUIT BREAKER PANEL.



DC CIRCUIT BREAKER PANEL

ARR83-1819

3. CLOSE REF XFMR, TURRET PWR, AND WPN CONTR CIRCUIT BREAKERS ON AC/ ARMAMENT CIRCUIT BREAKER PANEL.

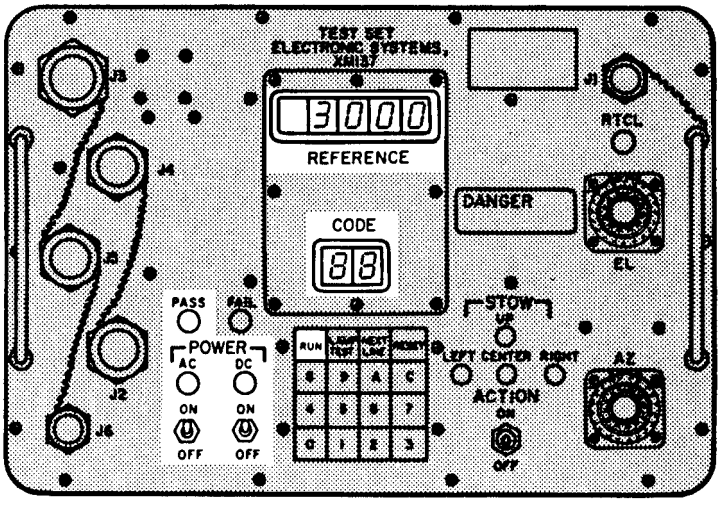


AC / ARMAMENT CIRCUIT BREAKER PANEL

ARR83-1820

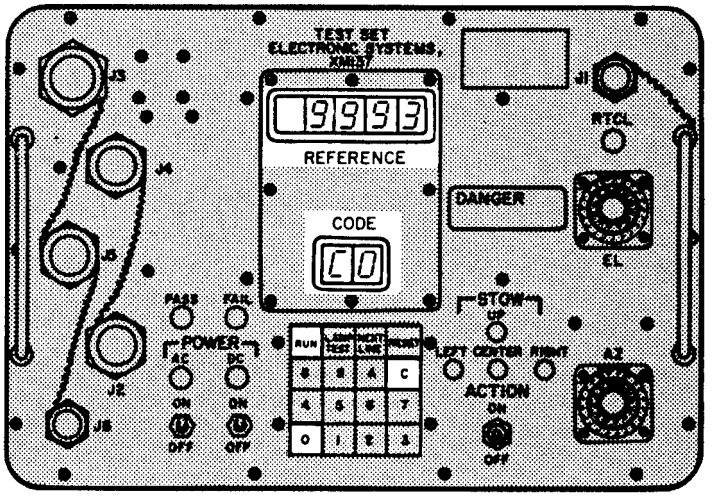
STOW POTENTIOMETER ADJUSTMENT (cont)

4. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.
   a. AC and DC POWER indicators light.
   b. 8's appear in REFERENCE and CODE displays.
   c. PASS indicator lights.
5. ON TEST SET, PRESS RUN KEY.
   3000 appears in REFERENCE display.



ARR83-1821

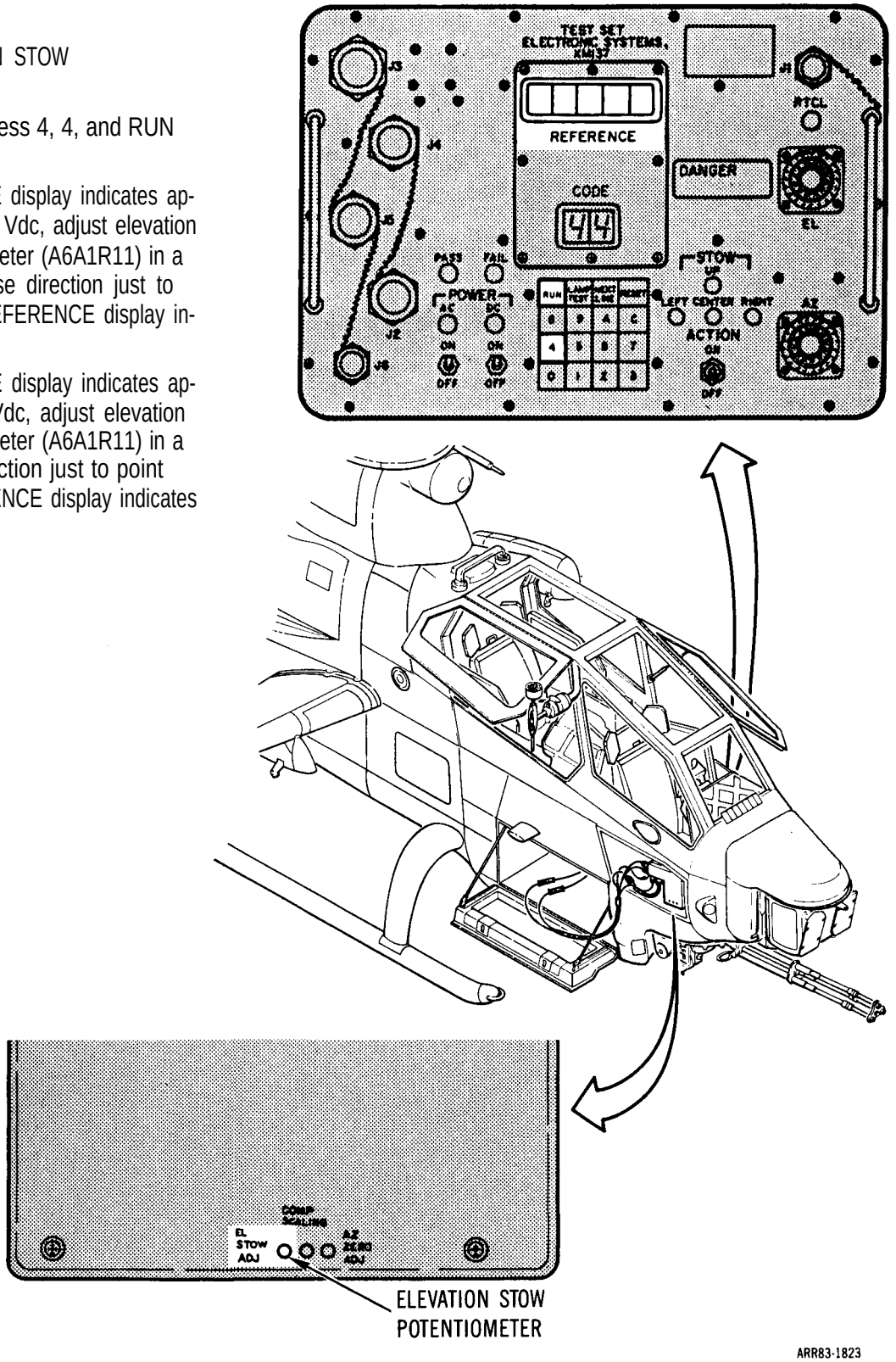
6. ON TEST SET, PRESS C, 0, AND RUN KEY.
   a. C0 appears in CODE display.
   b. 9993 appears in REFERENCE display.



ARR83-1822

2-75. TURRET CONTROL UNIT STOW POTENTIOMETER ADJUSTMENT (cont)

7. ADJUST ELEVATION STOW POTENTIOMETER.
   a. On test set, press 4, 4, and RUN keys.
   b. If REFERENCE display indicates approximately 27 Vdc, adjust elevation stow potentiometer (A6A1R11) in a counterclockwise direction just to point where REFERENCE display indicates 0 Vdc.
   c. If REFERENCE display indicates approximately 0 Vdc, adjust elevation stow potentiometer (A6A1R11) in a clockwise direction just to point where REFERENCE display indicates 27 Vdc.

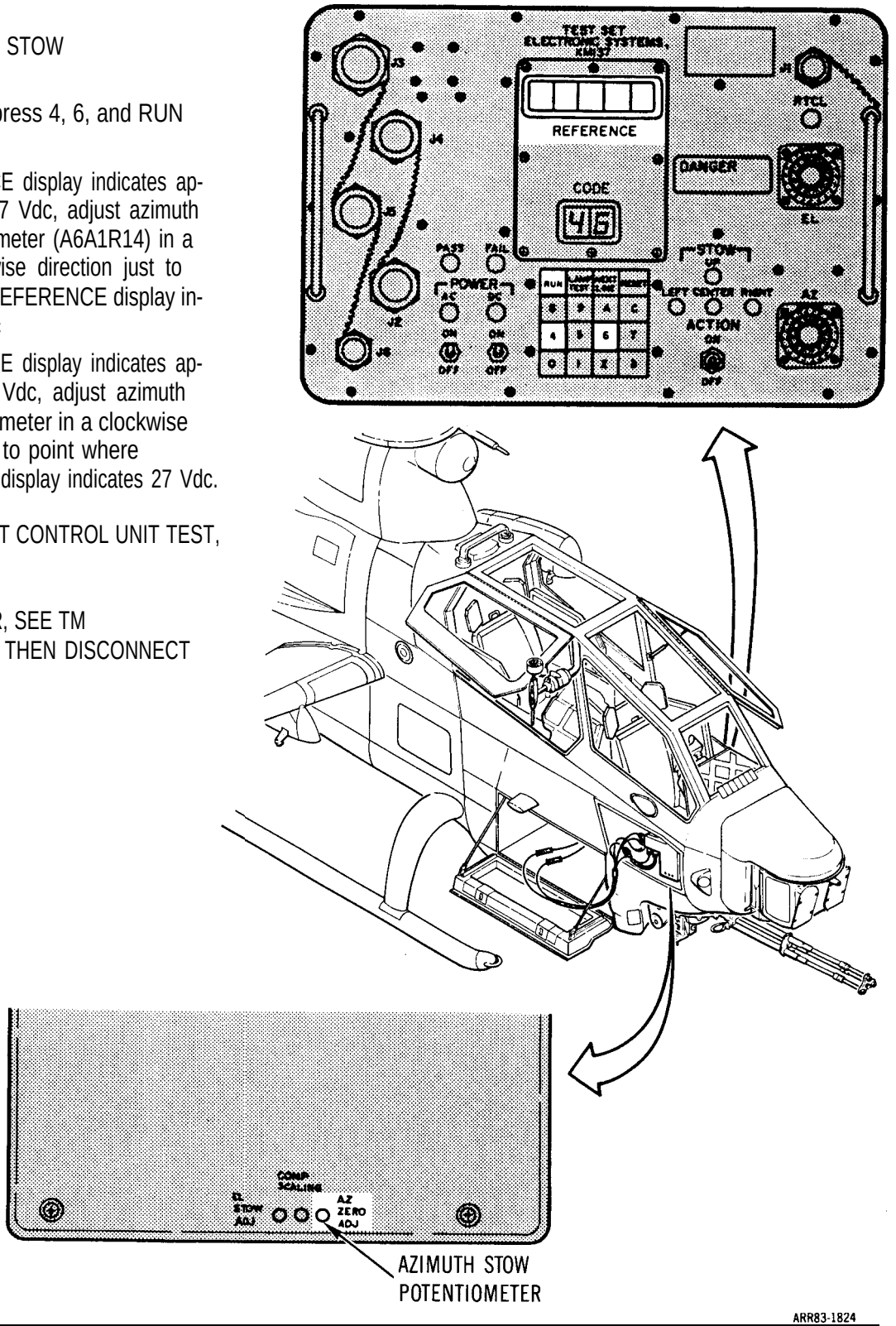


STOW POTENTIOMETER ADJUSTMENT (cont)

8. ADJUST AZIMUTH STOW POTENTIOMETER.
   a. On test set, press 4, 6, and RUN keys.
   b. If REFERENCE display indicates approximately 27 Vdc, adjust azimuth stow potentiometer (A6A1R14) in a counterclockwise direction just to point where REFERENCE display indicates 0 Vdc
   c. If REFERENCE display indicates approximately 0 Vdc, adjust azimuth stow potentiometer in a clockwise direction just to point where REFERENCE display indicates 27 Vdc.

9. PERFORM TURRET CONTROL UNIT TEST, PARA 2-22.

10. REMOVE POWER, SEE TM 9-1090-206-20-1; THEN DISCONNECT TEST SET.



ARR83-1824

END OF TASK

2-76. ELEVATION MECHANICAL STOP ADJUSTMENT

DESCRIPTION

This task covers: Shimming of wearplate to set elevation mechanical stop.

INITIAL SETUP

Tools/Test and Support Equipment:
Tool Set, A/C Armament
Repairman: Basic
Tool Set, A/C Armament
Repairman: Supplemental

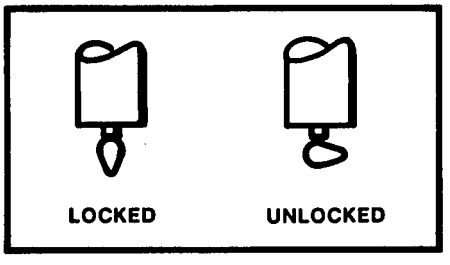
Personnel Required:
68M Aircraft Weapon Systems
Repairer

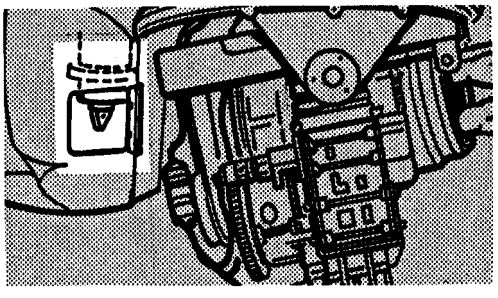
References:
TM 9-1090-206-20-1

Equipment Conditions:
HELICOPTER ARMAMENT SUBSYSTEM MAINTENANCE SETUP performed, TM 9-1090-206-20-1.

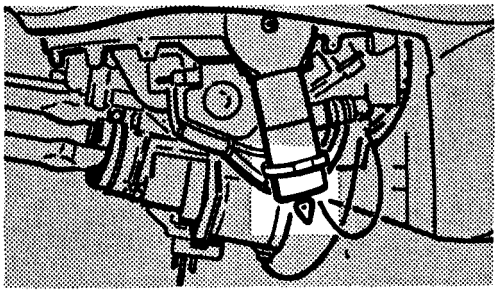
ADJUSTMENT

1. POSITION TURRET.
   a. Unlock azimuth and elevation drive motor brakes.
   b. Manually position turret to approximately 0° azimuth, then lock azimuth drive motor brake.
   c. Manually raise gun barrels to maximum elevation, then lock elevation drive motor brake.





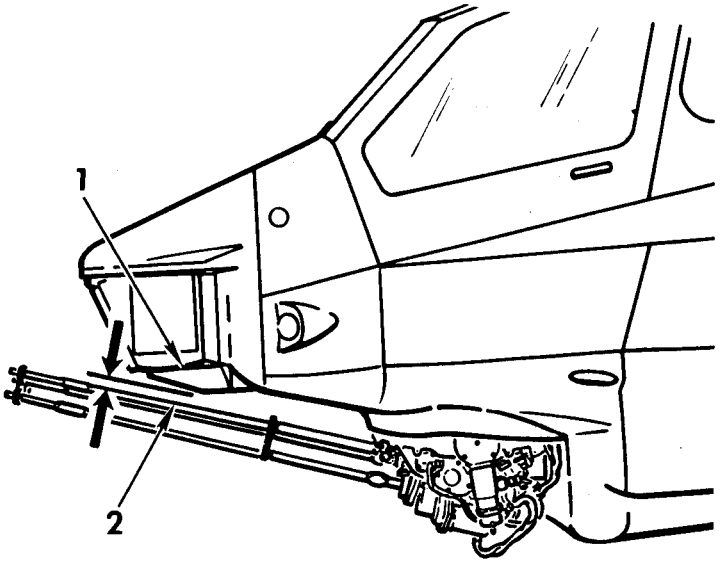
AZIMUTH DRIVE MOTOR BRAKE HANDLE



ELEVATION DRIVE MOTOR BRAKE HANDLE

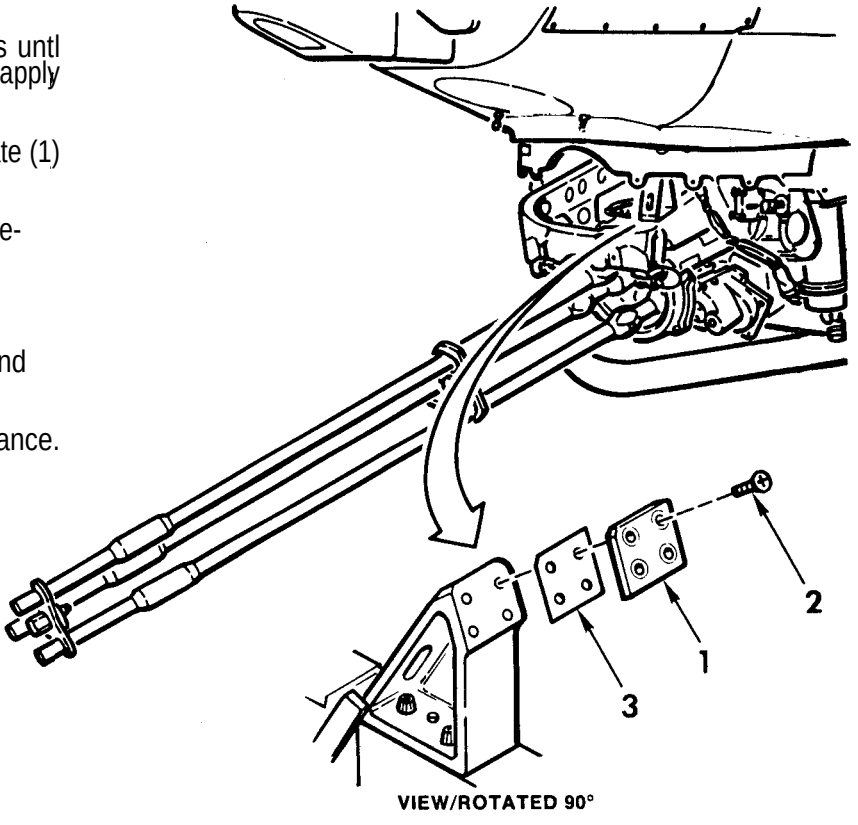
ADJUSTMENT (cont)

2. CHECK CLEARANCE BETWEEN TSU (1) AND BARREL CLUSTER.
   a. Manually rotate barrel cluster until a barrel (2) is at its highest position.
   b. Measure clearance between top of barrel (2) and nearest part of TSU (1). Clearance must not be less than 2-7/8 inches, nor more than 3-1/8 inches. If clearance is not as specified, elevation mechanical stop must be reshimmed; go to next step..



ARR83-0269

3. SHIM WEARPLATE (1).
   a. and manually lower gun barrels untl wearplate (1) is accessible, then apply brake.
   b. Remove four screws (2), wearplate (1) and shim(3).
   c. For each 1/16 inch of clearance re-quuired use 0.015 inch of shim. Prepare a shim pack to this dimension.
   d. Install shim(3), wearplate (1) and four screws (2).
   e. Repeat step 2 to recheck clearance.



ARR83-0270

END OF TASK

Section XXV. ARMAMENT SUBSYSTEM M97A3 ADJUSTMENTS AND ALINEMENTS

Section Contents

2-77. ELEVATION AND AZIMUTH RESOLVER ALINEMENT

DESCRIPTION

This task covers: Coarse alinement of elevation and azimuth resolvers.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Electronics Systems Test Set: M137
- Tape (Item 30.1, Appx B)

Personnel Required:
- 68J Aircraft Fire Control Repairer (2)

References:
- TM 9-1090-206-20-2
- TM 55-152O-236-23

Equipment Conditions:
- HELICOPTER ARMAMENT SUBSYSTEM MAINTENANCE SETUP performed, TM 9-1090-206-20-2.
- Test set cables W1 and W6 connected, see TM 9-1090-206-20-2.
- Power applied, see TM 9-1090-206-20-2.

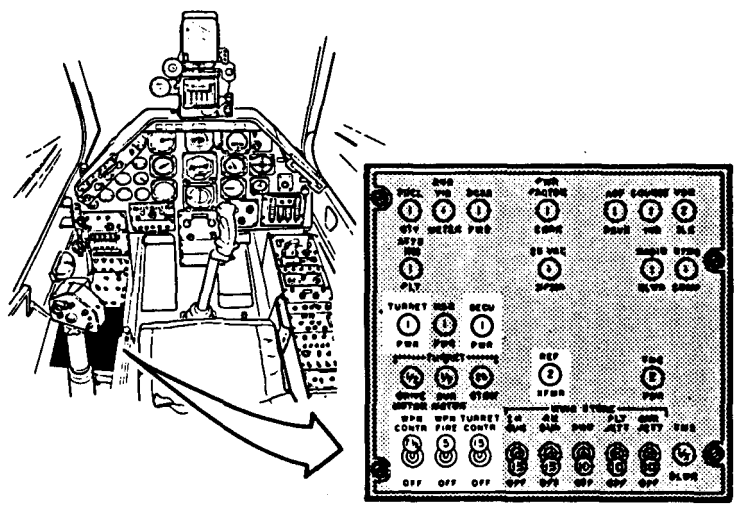
General Safety Instructions:
- Remove power when making or breaking cable connections.

NOTE

Anytime resolvers are alined, boresighting of the turret subsystem must be re-established.

RESOLVER ALINEMENT SETUP

1. CLOSE FOLLOWING CIRCUIT BREAKERS ON AC/ARMAMENT CIRCUIT BREAKER PANEL
   - REF XFMR
   - TURRET PWR
   - SECU PWR
   - WPN CONTR
   - WPN FIRE
   - TURRET CONTR



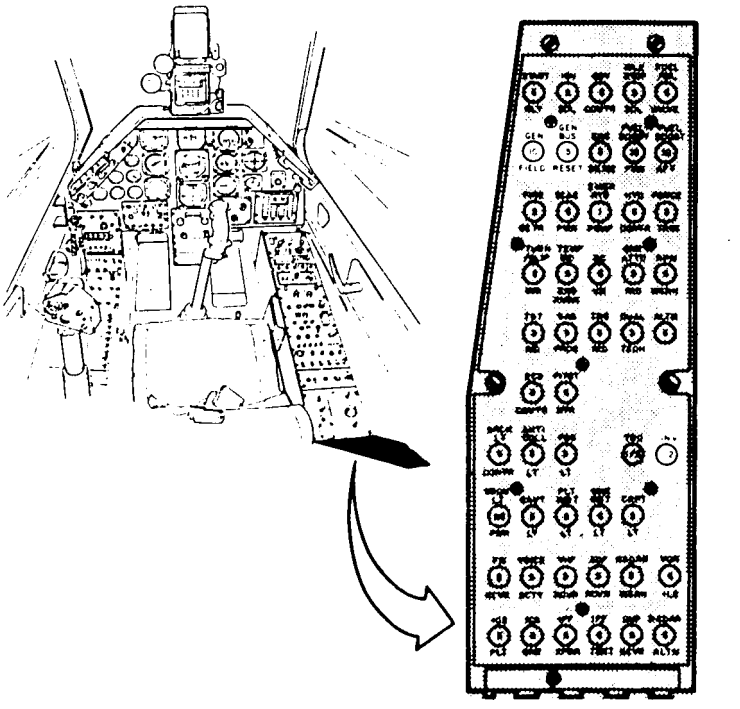
AC / ARMAMENT CIRCUIT BREAKER PANEL

ARR83-1828

RESOLVER ALINEMENT SETUP (cont)

2. CLOSE FOLLOWING CIRCUIT BREAKERS ON DC CIRCUIT BREAKER PANEL:

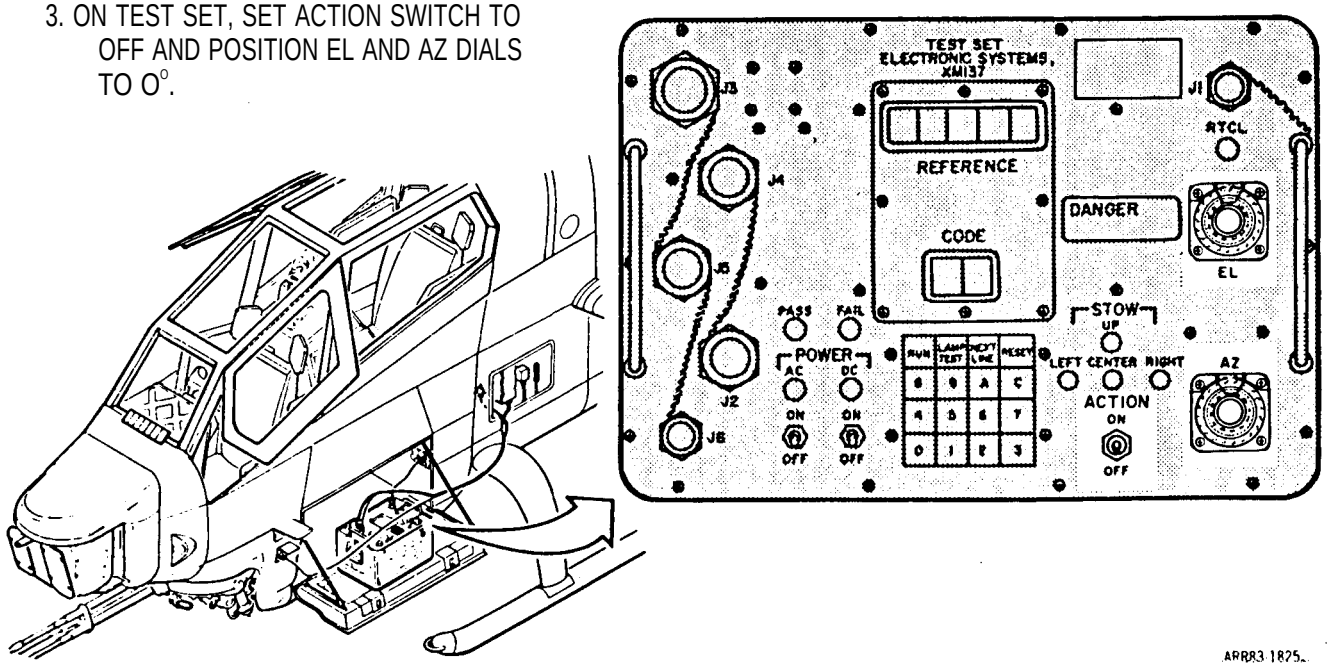
   GEN FIELD
   GEN BUS RESET
   INV



DC CIRCUIT BREAKER PANEL

ARR83 1827

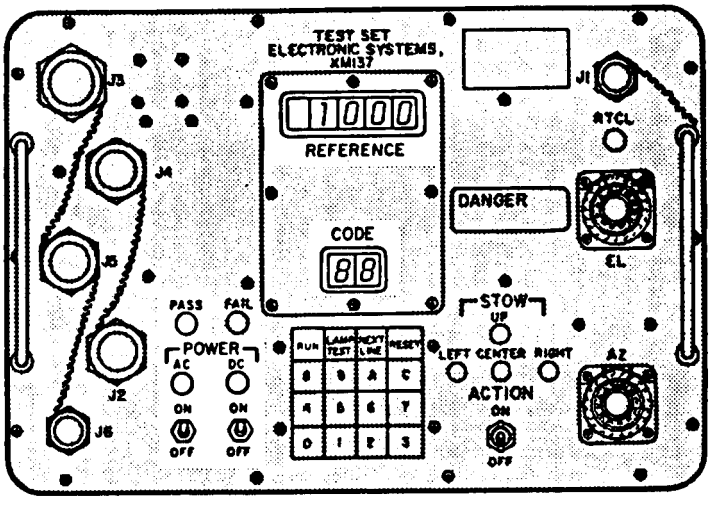
3. ON TEST SET, SET ACTION SWITCH TO OFF AND POSITION EL AND AZ DIALS TO 0^{o}.



ARR83 1825

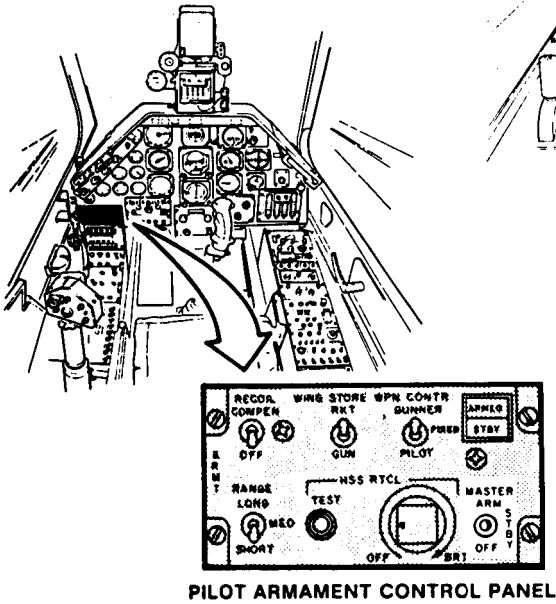
2-77. ELEVATION AND AZIMUTH RESOLVER ALINEMENT (cont)

4. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.
   a. AC and DC POWER indicators light.
   b. 8's appear in REFERENCE and CODE displays.
   c. PASS indicator lights.
5. ON TEST SET, PRESS RUN KEY.
   1000 appears in REFERENCE display.

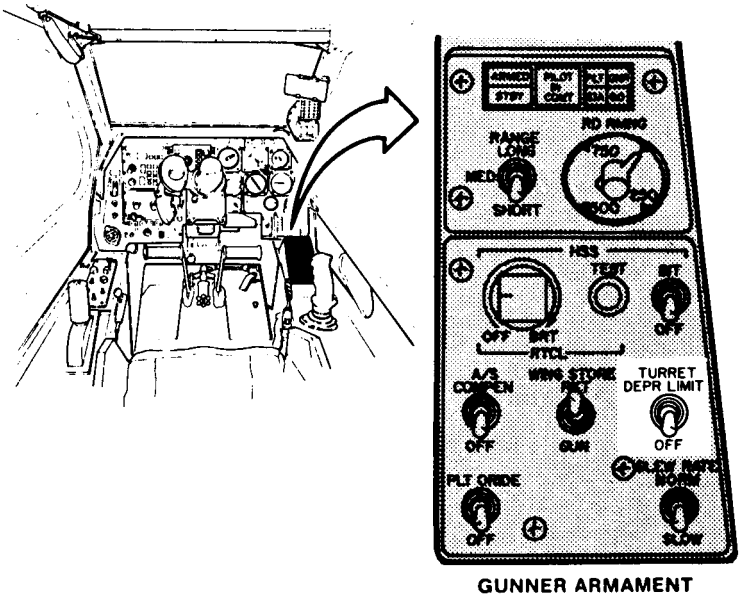


ARR83 1826

6. ON PILOT ARMAMENT CONTROL PANEL, SET MASTER ARM SWITCH TO STBY.
7. ON GUNNER ARMAMENT CONTROL PANEL, SET TURRET DEPR LIMIT TO OFF.



PILOT ARMAMENT CONTROL PANEL

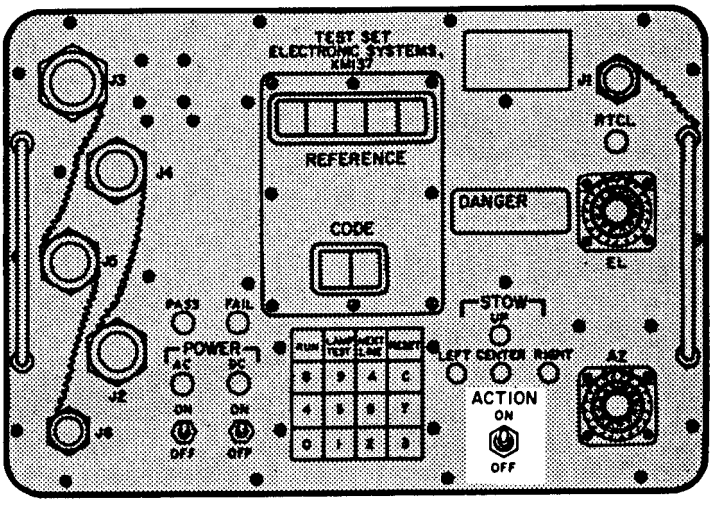


GUNNER ARMAMENT CONTROL PANEL

ARR83-1829

RESOLVER ALINEMENT SETUP (cont)

8. ON TEST SET, SET ACTION SWITCH TO ON.



ARR83-1830

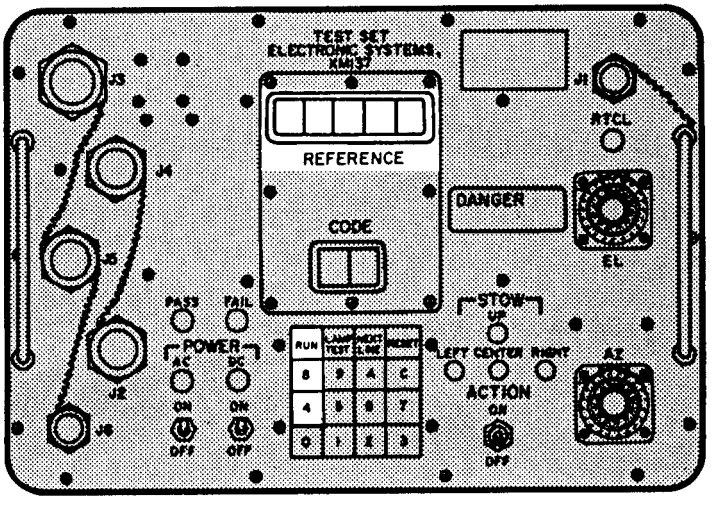
ELEVATION RESOLVER ALINEMENT

9. ON TEST SET, PRESS 4, 8, AND RUN KEYS.

10. RELEASE ELEVATION DRIVE MOTOR BRAKE AND MANUALLY POSITION TURRET IN ELEVATION UNTIL A MINIMUM VOLTAGE APPEARS IN REFERENCE DISPLAY ON TEST SET. APPLY BRAKE.

    a. If minimum voltage appears at approximately 0° EL, elevation resolver is coarse alined; proceed to azimuth resolver alinement.

    b. If minimum voltage does not appear at approximately 0° EL, go to next step.



ARR83-1831

2-77. ELEVATION AND AZIMUTH RESOLVER ALINEMENT (cont)

11. RELEASE ELEVATION DRIVE MOTOR BRAKE AND MANUALLY POSITION TURRET TO APPROXIMATELY 0° EL. APPLY BRAKE.

12. REMOVE ELEVATION RESOLVER COVER.

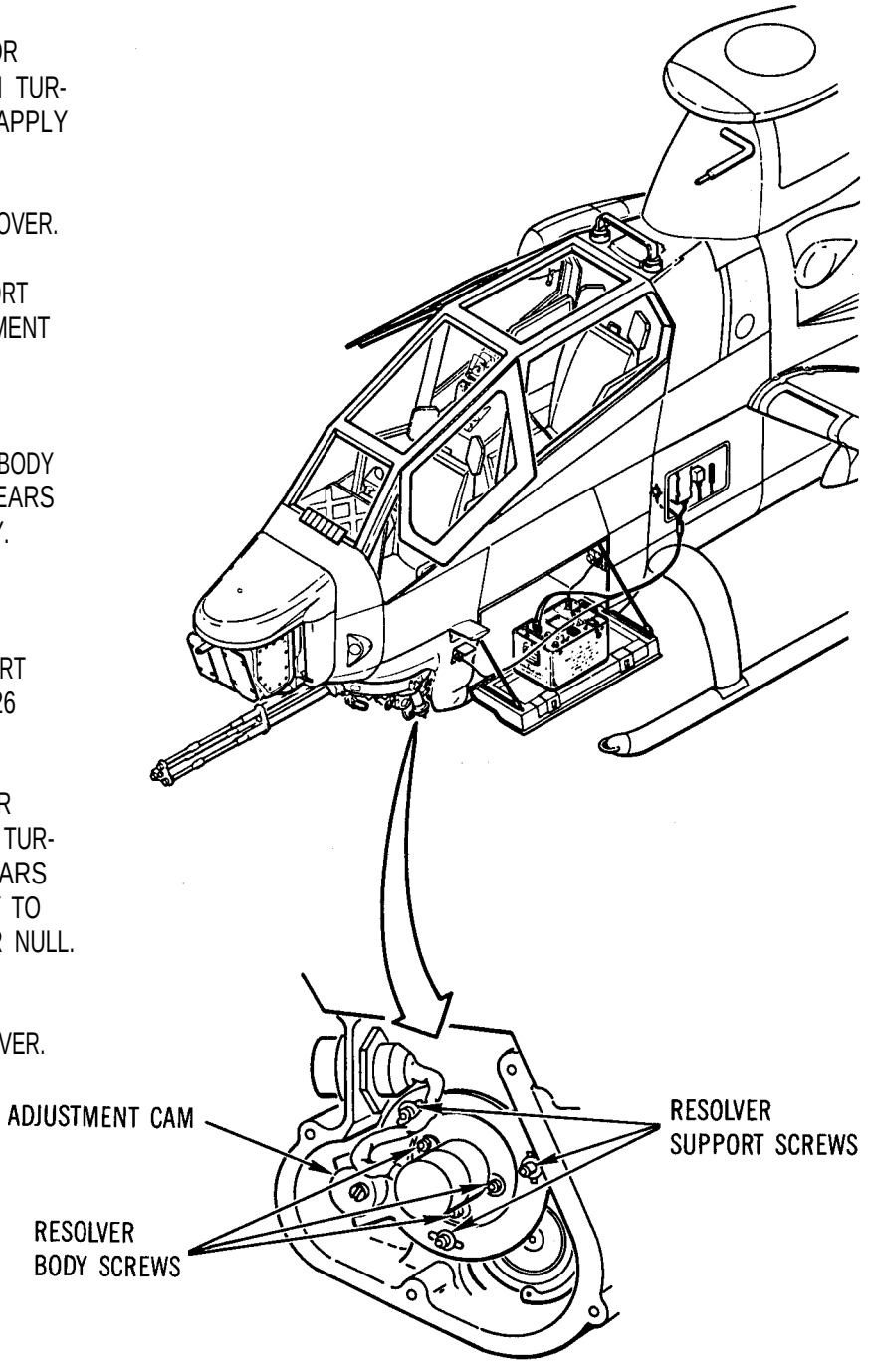
13. LOOSEN THREE RESOLVER SUPPORT SCREWS; THEN, CENTER ADJUSTMENT CAM.

14. LOOSEN THREE RESOLVER BODY SCREWS AND ROTATE RESOLVER BODY UNTIL A MINIMUM VOLTAGE APPEARS IN TEST SET REFERENCE DISPLAY. TIGHTEN THREE RESOLVER BODY SCREWS.

15. TORQUE THREE RESOLVER SUPPORT SCREWS TO 12-20 LB-IN (1.36-2.26 N.m).

16. RELEASE ELEVATION DRIVE MOTOR BRAKE AND MANUALLY DEPRESS TURRET IN EL. PLUS (+) SIGN APPEARS IN TEST SET REFERENCE DISPLAY TO VERIFY RESOLVER IS ON PROPER NULL. APPLY BRAKE.

17. INSTALL ELEVATION RESOLVER COVER.



ARR83-1832

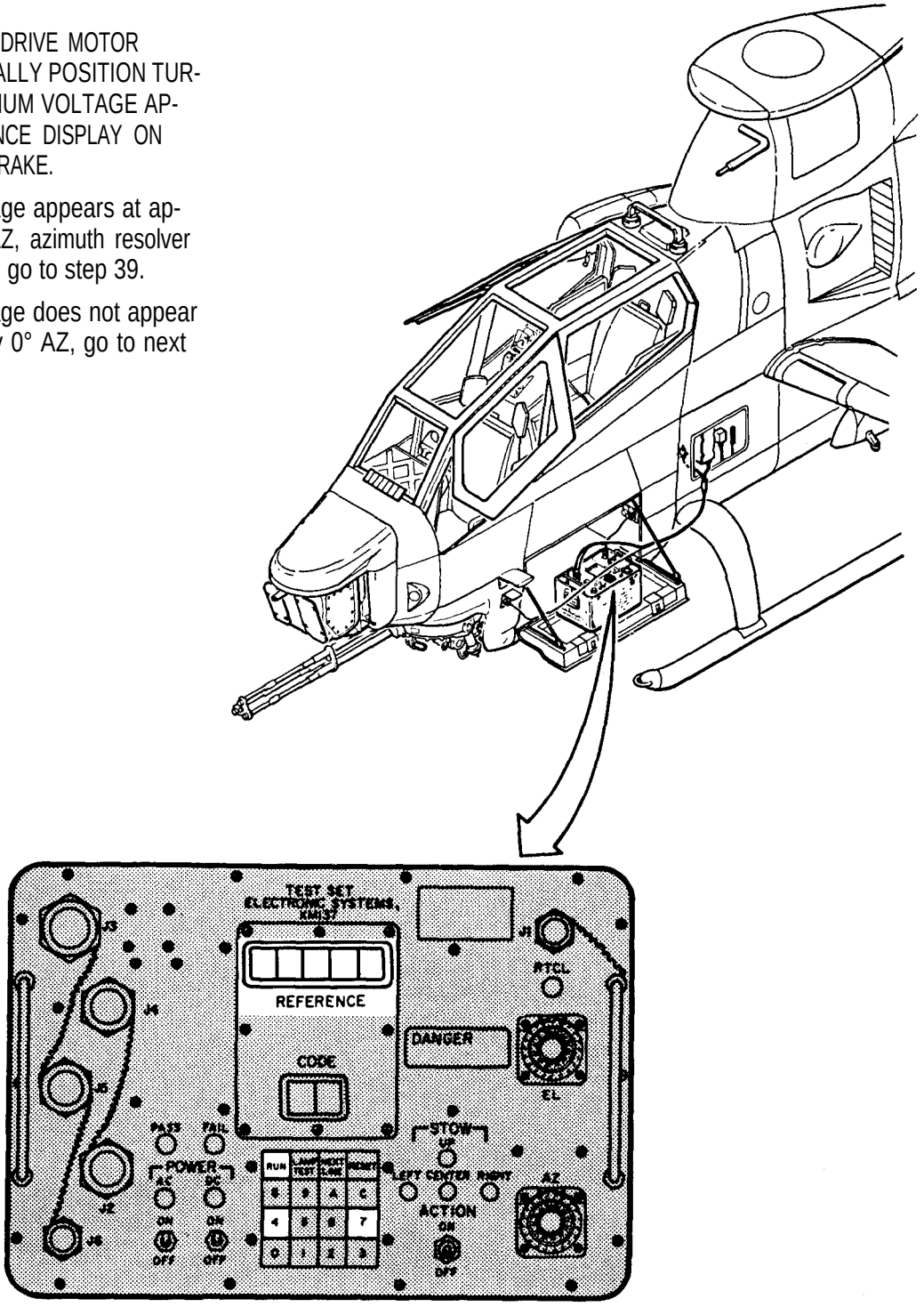
AZIMUTH RESOLVER ALINEMENT

18. ON TEST SET, PRESS 4, 7, AND RUN KEYS.

19. RELEASE AZIMUTH DRIVE MOTOR BRAKE AND MANUALLY POSITION TURRET UNTIL A MINIMUM VOLTAGE APPEARS IN REFERENCE DISPLAY ON TEST SET. APPLY BRAKE.

    a. If minimum voltage appears at approximately 0° AZ, azimuth resolver is coarse alined; go to step 39.

    b. If minimum voltage does not appear at approximately 0° AZ, go to next step.



ARR83-1833

2-77. ELEVATION AND AZIMUTH RESOLVER ALINEMENT (cont)

20. RELEASE AZIMUTH DRIVE MOTOR BRAKE AND MANUALLY POSITION TURRET TO APPROXIMATELY 0° AZ. APPLY BRAKE.

21. REMOVE TURRET FAIRING, SEE TM 55-1520-236-23.

NOTE

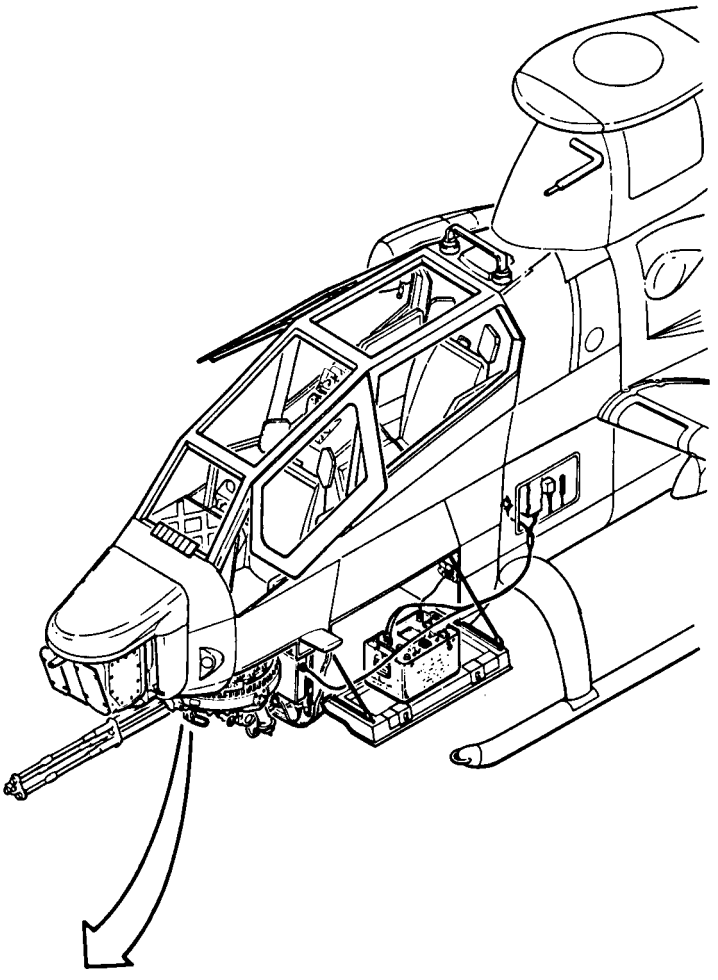
Connectors to azimuth resolver may be temporarily disconnected to access resolver hardware.

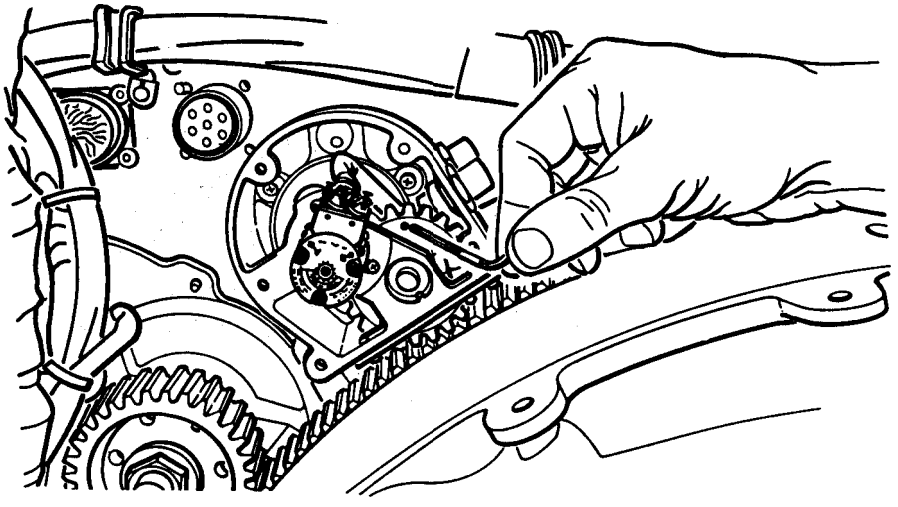
22. REMOVE BOTTOM COVER OF AZIMUTH RESOLVER.

NOTE

If hole in resolver preload gear is not visible, turret may be moved off zero until hole is visible. After azimuth resolver is removed, return turret to approximately zero azimuth position.

23. INSTALL 3/32-INCH ALLEN WRENCH IN ALINEMENT HOLE OF RESOLVER PRELOAD GEAR AND TAPE IN PLACE.

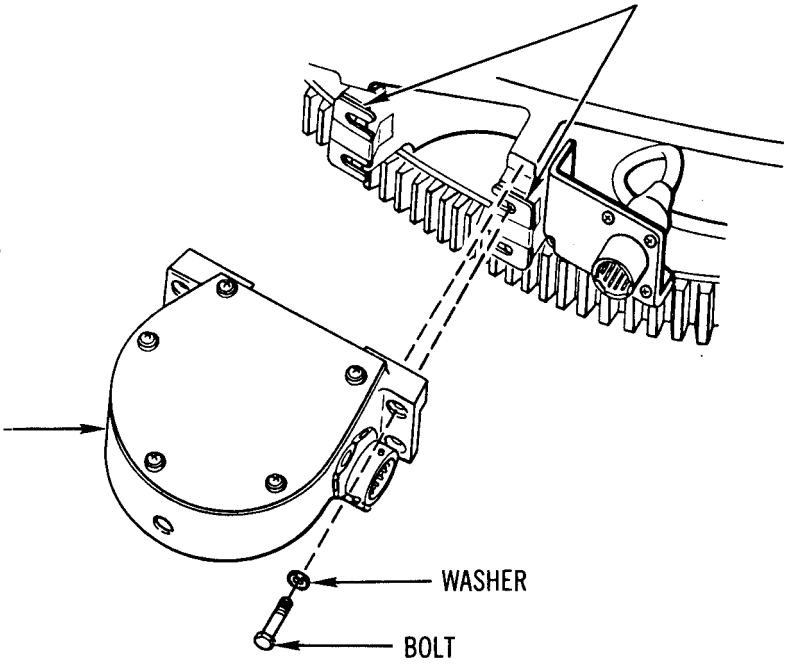




ARR83-1834

AZIMUTH RESOLVER ALINEMENT (cont)

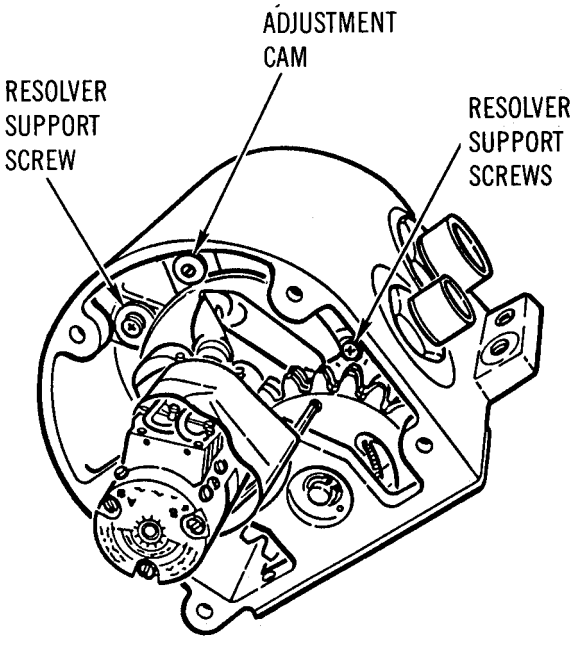
24. REMOVE AZIMUTH RESOLVER.
    a. Remove four bolts, four washers, and azimuth resolver.
    b. Tape shims in place. Do not remove unless defective.
    c. Reinstall four bolts and four washers.



ARR83-1835

25. LOOSEN THREE RESOLVER SUPPORT SCREWS; THEN, CENTER ADJUSTMENT CAM.

26. TORQUE THREE RESOLVER SUPPORT SCREWS TO 12-20 LB-IN. (1.36-2.26 N.m).



ARR83-1836

2-77. ELEVATION AND AZIMUTH RESOLVER ALINEMENT (cont)

27. REMOVE TOP COVER OF AZIMUTH RESOLVER.

28. CONNECT CONNECTORS IF DISCONNECTED.

29. LOOSEN THREE RESOLVER BODY SCREWS.

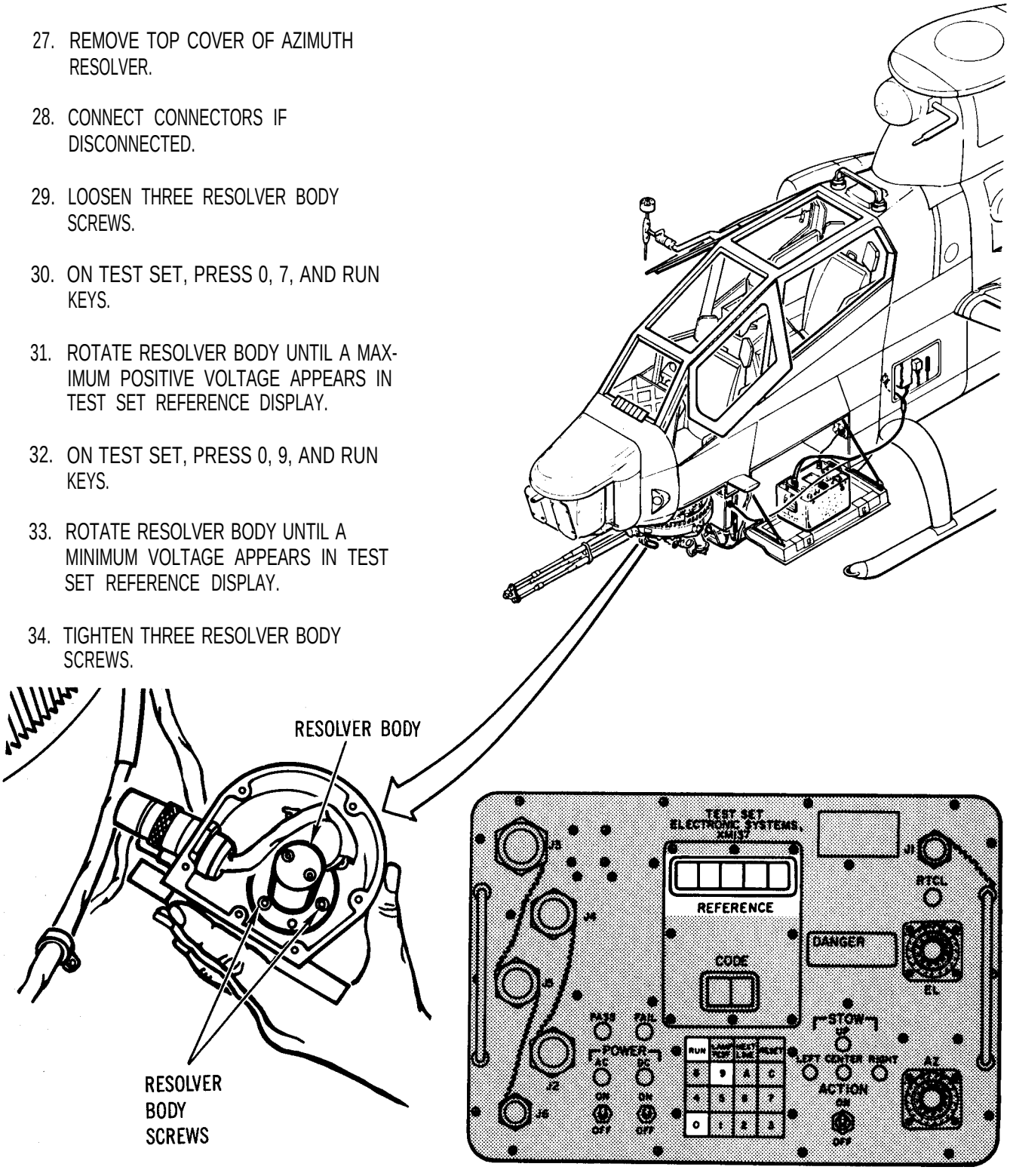
30. ON TEST SET, PRESS 0, 7, AND RUN KEYS.

31. ROTATE RESOLVER BODY UNTIL A MAXIMUM POSITIVE VOLTAGE APPEARS IN TEST SET REFERENCE DISPLAY.

32. ON TEST SET, PRESS 0, 9, AND RUN KEYS.

33. ROTATE RESOLVER BODY UNTIL A MINIMUM VOLTAGE APPEARS IN TEST SET REFERENCE DISPLAY.

34. TIGHTEN THREE RESOLVER BODY SCREWS.



ARR83-1837A

AZIMUTH RESOLVER ALINEMENT (cont)

35. INSTALL TOP COVER OF AZIMUTH RESOLVER.

NOTE

Connectors to azimuth resolver may be temporarily disconnected to access resolver hardware.

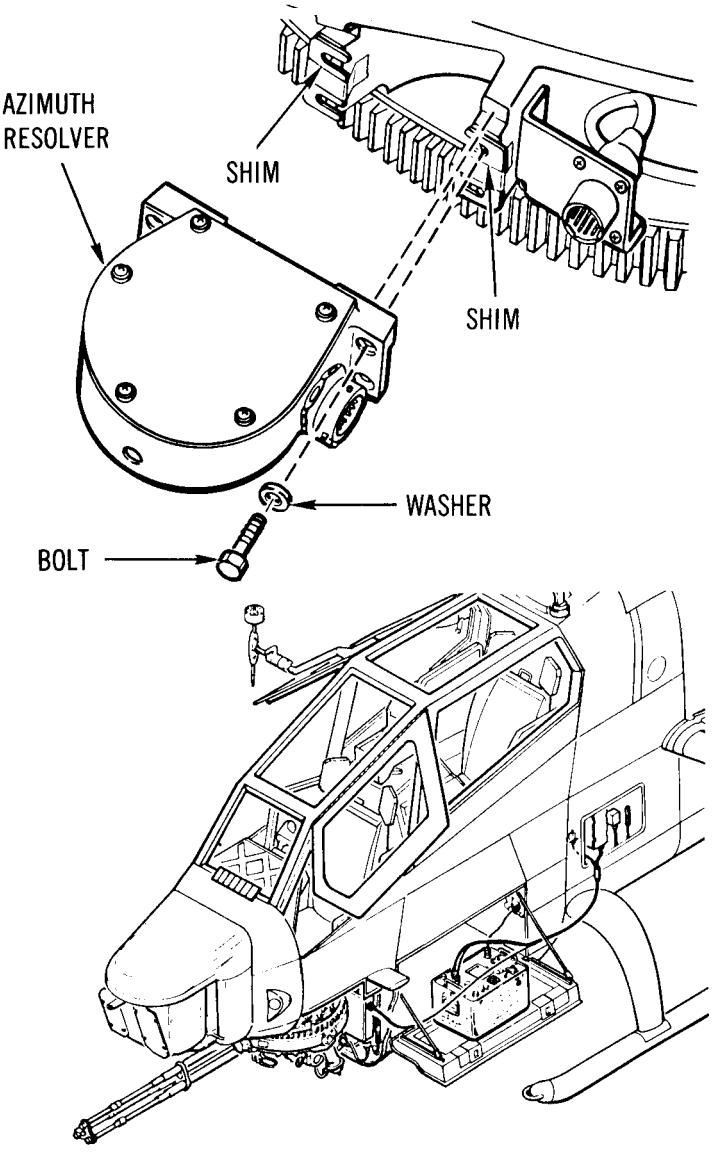
36. REMOVE TAPE FROM SHIMS AND INSTALL AZIMUTH RESOLVER. MAKE SURE RESOLVER GEAR TEETH ARE PRELOADED AND MESH WITH RING GEAR; THEN SECURE WITH FOUR BOLTS AND FOUR WASHERS.

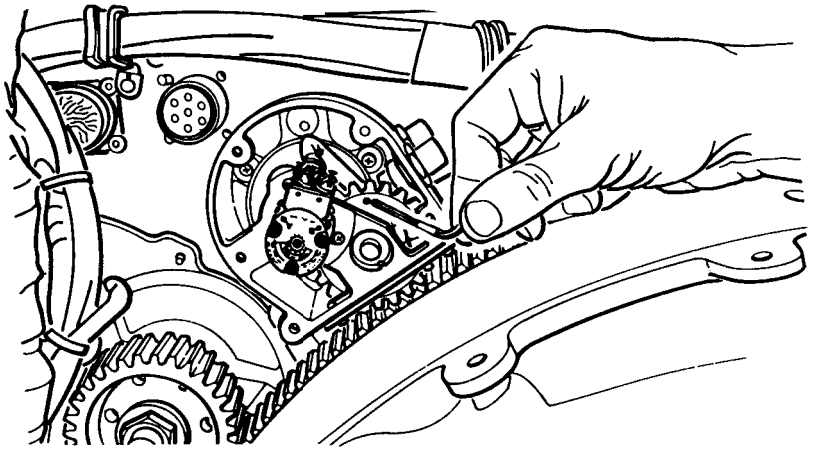
37. REMOVE 3/32-INCH ALLEN WRENCH FROM PRELOAD GEAR.

NOTE

The longer bottom cover screw goes through cable bracket.

38. INSTALL BOTTOM COVER OF AZIMUTH RESOLVER.





ARR83-1838A

2-77. ELEVATION AND AZIMUTH RESOLVER ALINEMENT (cont)

POST ALINEMENT PROCEDURES

39. REMOVE POWER, SEE TM 9-1090-206-20-2; THEN DISCONNECT TEST SET.

40. PERFORM BORESIGHTING PROCEDURE IN ACCORDANCE WITH CHAPTER 5.

41. PERFORM EMERGENCY STOW SWITCH ADJUSTMENT, PARA 2-78.

END OF TASK

2-78. EMERGENCY STOW SWITCH ADJUSTMENT

DESCRIPTION

This task covers: Adjustment of elevation and azimuth stow switches.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental
- Electronics Systems Test Set:
  - M137

Personnel Required:
- 68J Aircraft Fire Control
  - Repairer (2)

References:
- TM 9-1090-206-20-2
- TM 55-1520-236-23

Equipment Conditions:
- M197 gun barrels removed, see
  - TM 9-1090-206-20-2.
- Turret subsystem boresighted, see Chapter 5.
- Turret fairing removed, see
  - TM 55-1520-236-23.
- Test set cables W1, W5, and W15 connected,
  - see TM 9-1090-206-20-2.

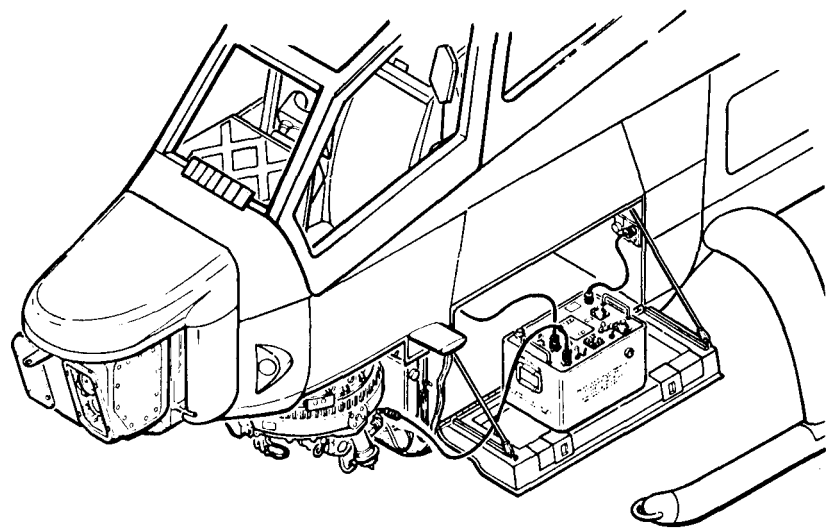
NOTE

Refer to figure FO-15 for emergency stow switch alinement diagram.

ADJUSTMENT SETUP

1. REMOVE BOTTOM COVER OF AZIMUTH RESOLVER, PARA 2-49.

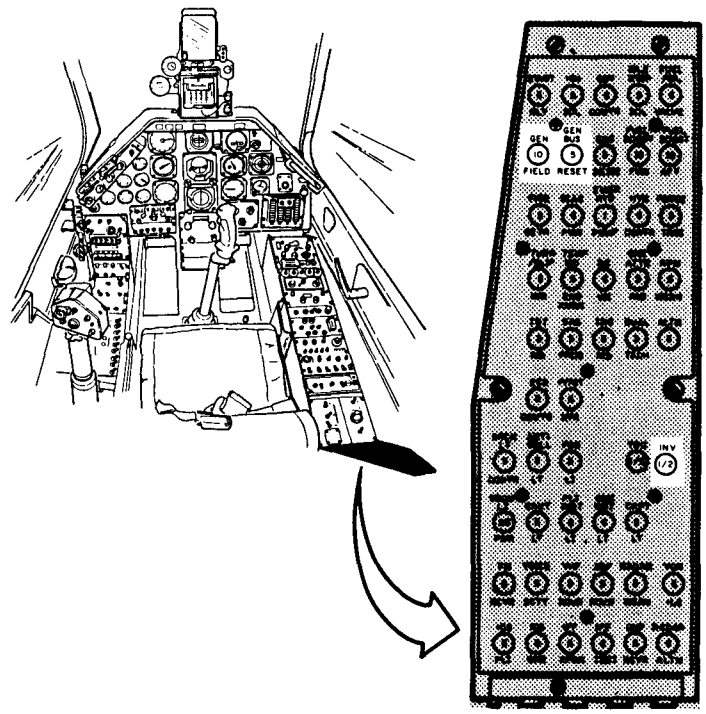
2. APPLY POWER, SEE TM 9-1090-206-20-2.



ARR83-1839

2-78. EMERGENCY STOW SWITCH ADJUSTMENT (cont)

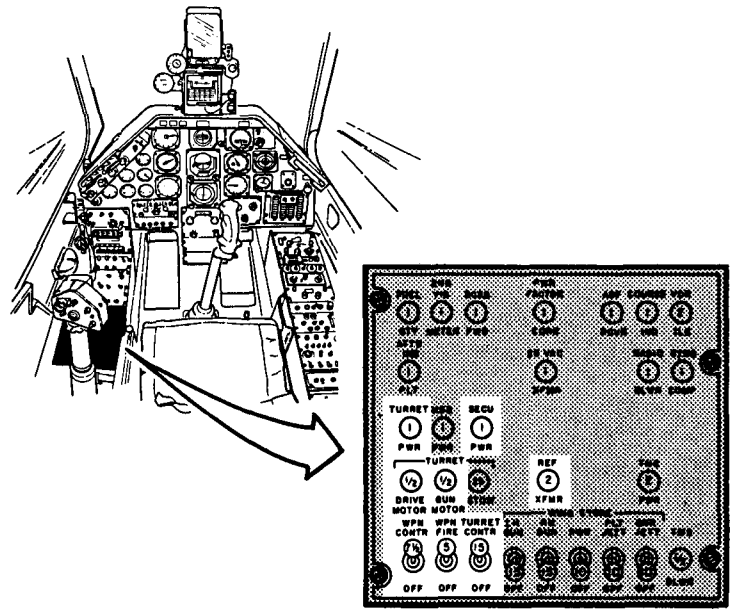
3. CLOSE FOLLOWING CIRCUIT BREAKERS ON DC CIRCUIT BREAKER PANEL:
   - GEN FIELD
   - GEN BUS RESET
   - INV



DC CIRCUIT BREAKER PANEL

ARR83-1840

4. CLOSE FOLLOWING CIRCUIT BREAKERS ON AC/ARMAMENT CIRCUIT BREAKER PANEL:
   - REF XFMR
   - TURRET PWR
   - SECU PWR
   - TURRET DRIVE MOTOR
   - TURRET GUN MOTOR
   - WPN CONTR
   - WPN FIRE
   - TURRET CONTR



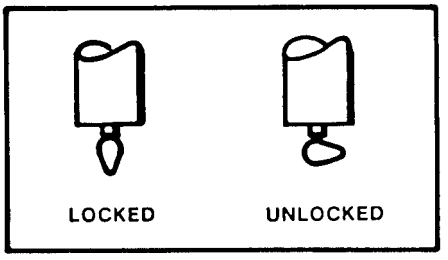
AC / ARMAMENT CIRCUIT BREAKER PANEL

ARR83-1841

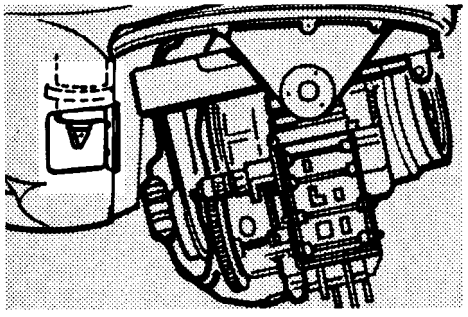
ADJUSTMENT SETUP (cont)

CAUTION

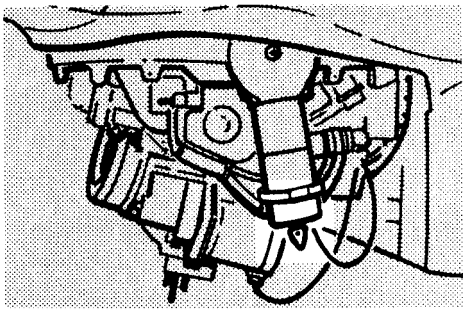
Elevation and azimuth drive motor brakes must be released to prevent motors from overheating.



5. SET ELEVATION AND AZIMUTH DRIVE MOTOR BRAKE HANDLES TO UNLOCKED POSITION.



AZIMUTH DRIVE MOTOR BRAKE HANDLE

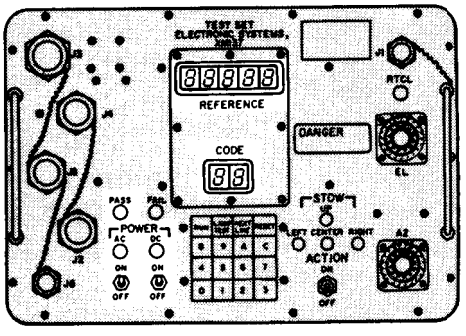


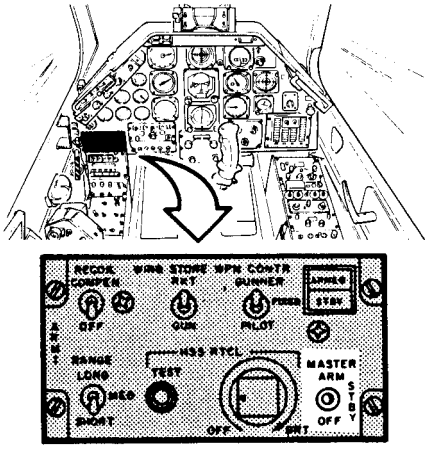
ELEVATION DRIVE MOTOR BRAKE HANDLE

ARR83-1843

6. ON PILOT ARMAMENT CONTROL PANEL, SET MASTER ARM SWITCH TO STBY.

7. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.
   a. AC and DC POWER indicators light.
   b. 8's appear in REFERENCE and CODE displays.
   c. PASS indicator lights.





PILOT ARMAMENT CONTROL PANEL

ARR83-1842A

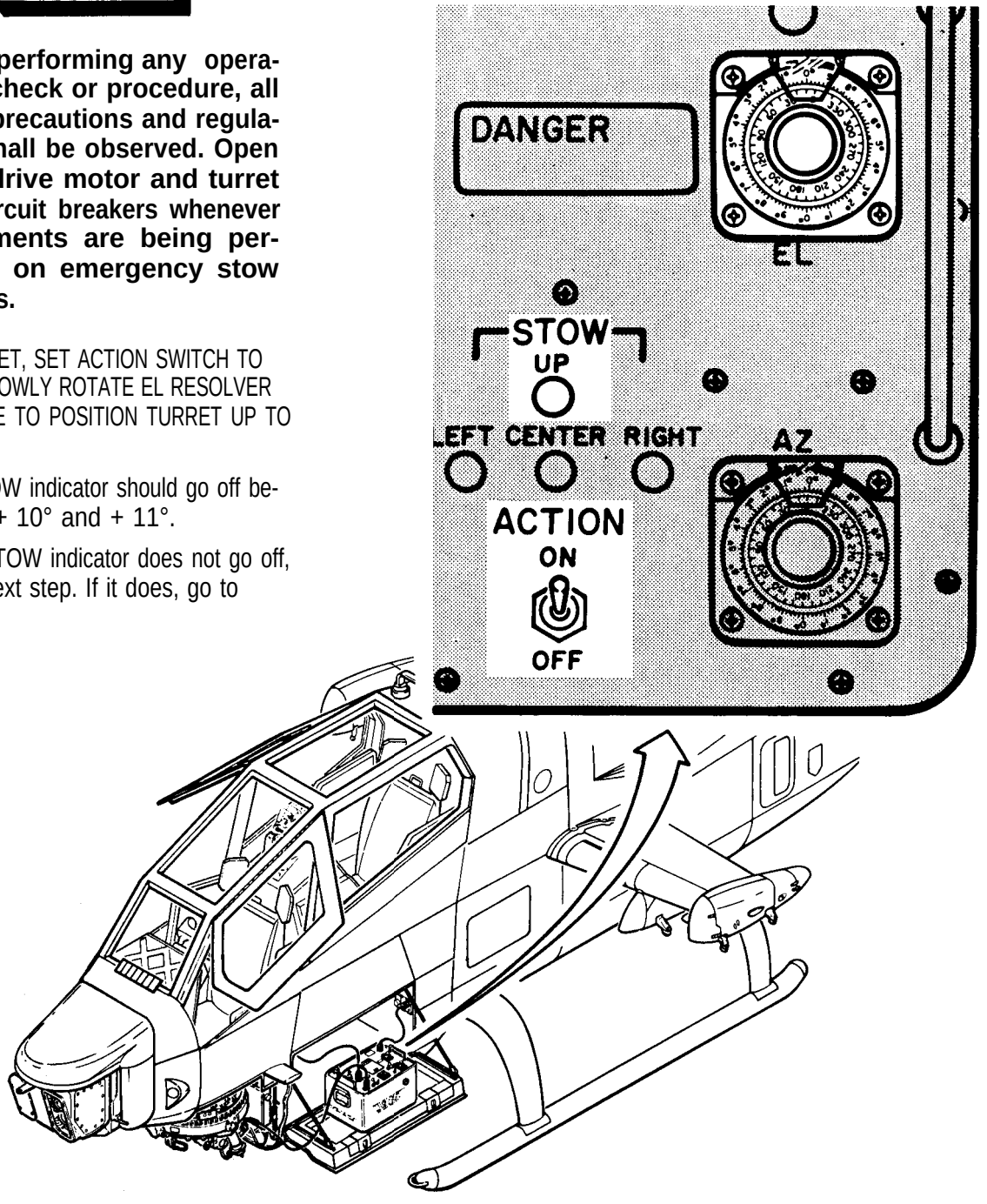
2-78. EMERGENCY STOW SWITCH ADJUSTMENT (cont)

ELEVATION STOW SWITCH ADJUSTMENT

WARNING

When performing any operational check or procedure, all safety precautions and regulations shall be observed. Open turret drive motor and turret stow circuit breakers whenever adjustments are being performed on emergency stow switches.

8. ON TEST SET, SET ACTION SWITCH TO ON AND SLOWLY ROTATE EL RESOLVER CLOCKWISE TO POSITION TURRET UP TO 11°.
   a. UP STOW indicator should go off between + 10° and + 11°.
   b. b. UP STOW indicator does not go off, go to next step. If it does, go to step 10.



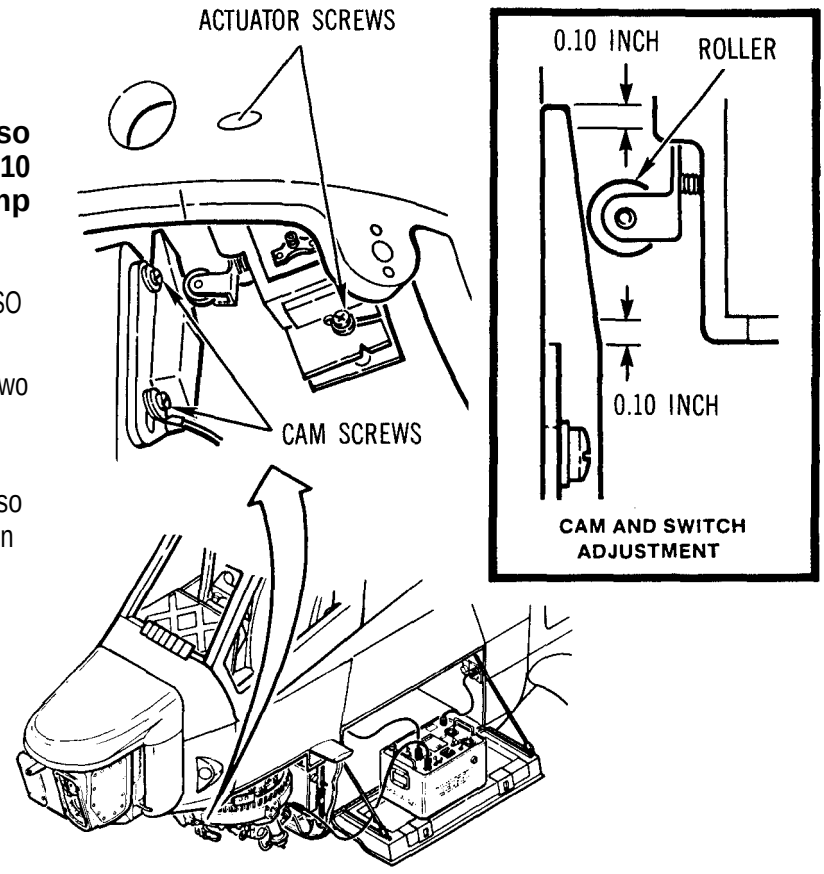
ARR83-1844

ELEVATION STOW SWITCH ADJUSTMENT (cont)

NOTE

Switch should be adjusted so that roller is no closer than 0.10 inch from either end of ramp when switch actuates.

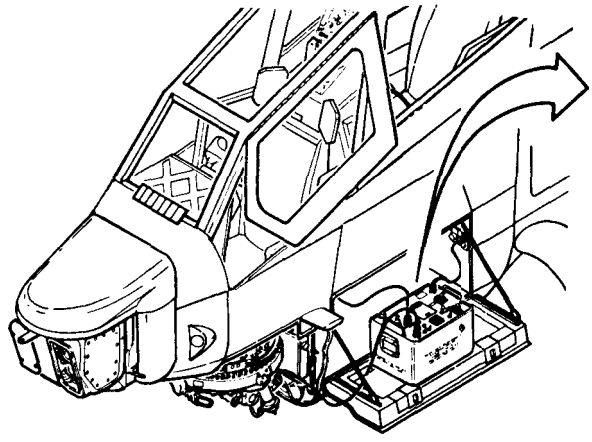
9. ADJUST CAM AND SWITCH ACTUATOR SO UP STOW LIGHT JUST GOES OFF.
   a. Loosen two screws on cam and/or two screws on switch actuator adjusting plate.
   b. Adjust cam and/or switch actuator so UP STOW light just goes off between +10° and +11°.
   c. Tighten two screws on cam and/or two screws on actuator adjusting plate.

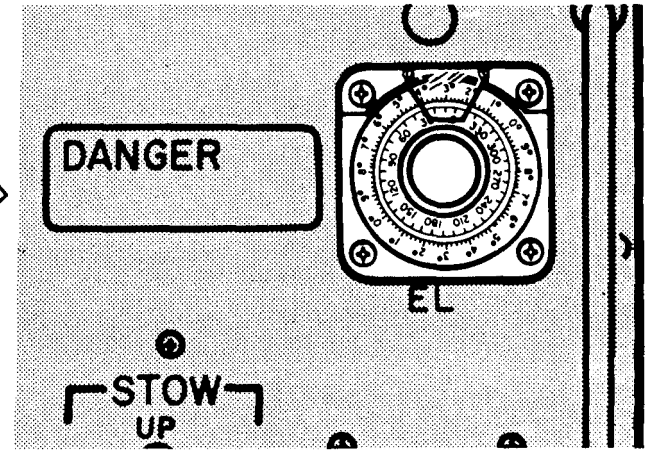


ARR83-1845

AZIMUTH STOW SWITCH ADJUSTMENT

10. ON TEST SET, ROTATE EL RESOLVER CLOCKWISE TO POSITION TURRET TO APPROXIMATELY +13° EL.





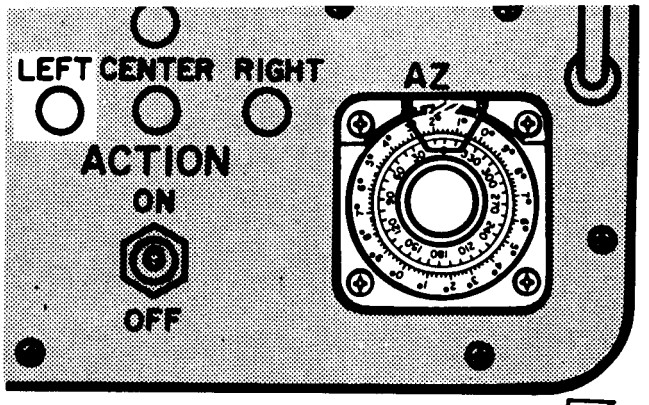
ARR83-1846

2-78. EMERGENCY STOW SWITCH ADJUSTMENT (cont)

NOTE

LEFT STOW light should be on between 1.5° and right limit. LEFT STOW light should be off from 1.5° to left limit.

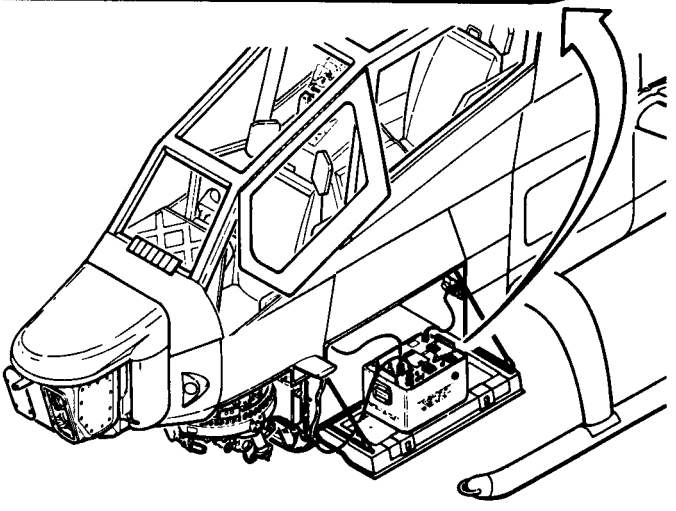
11. ON TEST SET, ROTATE AZ RESOLVER CLOCKWISE TO POSITION TURRET TO 1.5°.

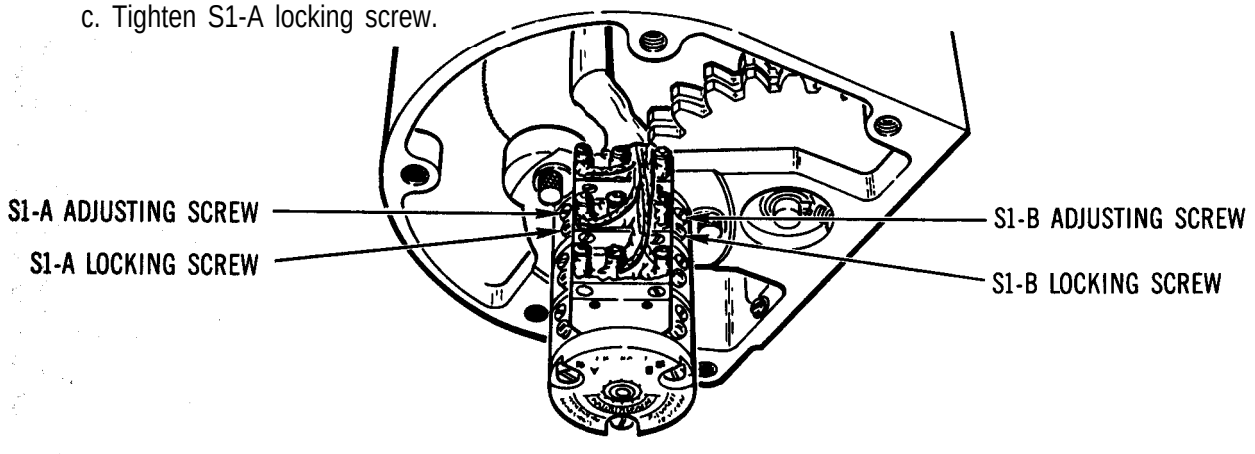


CAUTION

Do not turn adjusting screws beyond stops.

12. ADJUST AZIMUTH STOW SWITCH S1 AT 1.5°.
    a. Loosen S1-A locking screw.
    b. Turn S1-A adjusting screw ccw until LEFT STOW light just goes off. If S1-A can not be adjusted, lock S1-A, unlock S1-B, turn S1-B ccw approximately 1-½ turns, then lock S1-B, unlock S1-A, and turn S1-A ccw until light just goes off.
    c. Tighten S1-A locking screw.





ARR83-1847

AZIMUTH STOW SWITCH ADJUSTMENT (cont)

NOTE

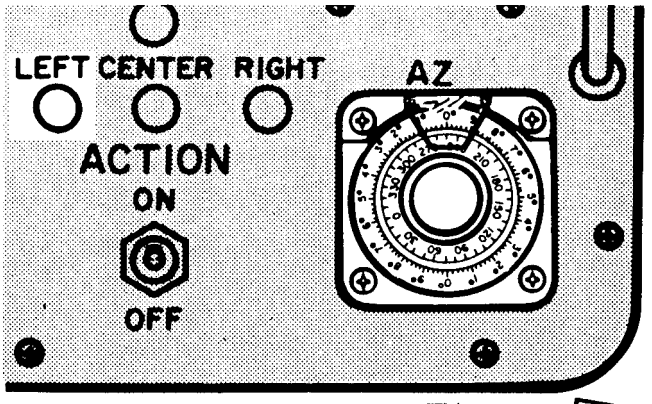
LEFT STOW light should be on between 1.5° and right limit. LEFT STOW light should be off from 1.5° to left limit.

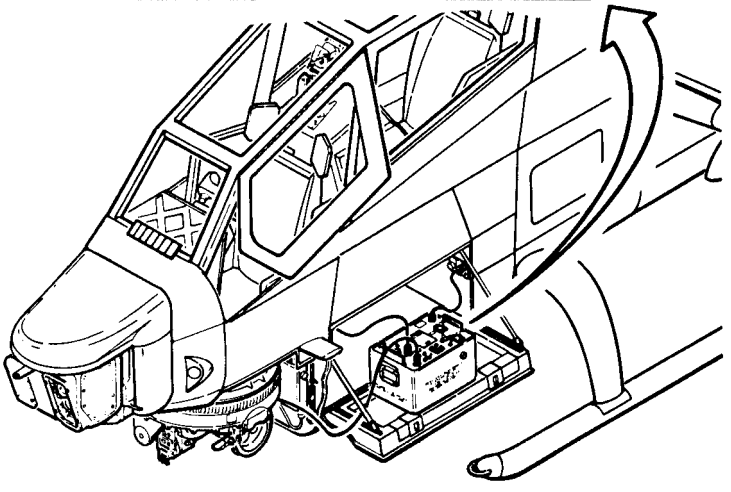
13. ON TEST SET, ROTATE AZ RESOLVER COUNTERCLOCKWISE TO POSITION TURRET TO 250.5°.

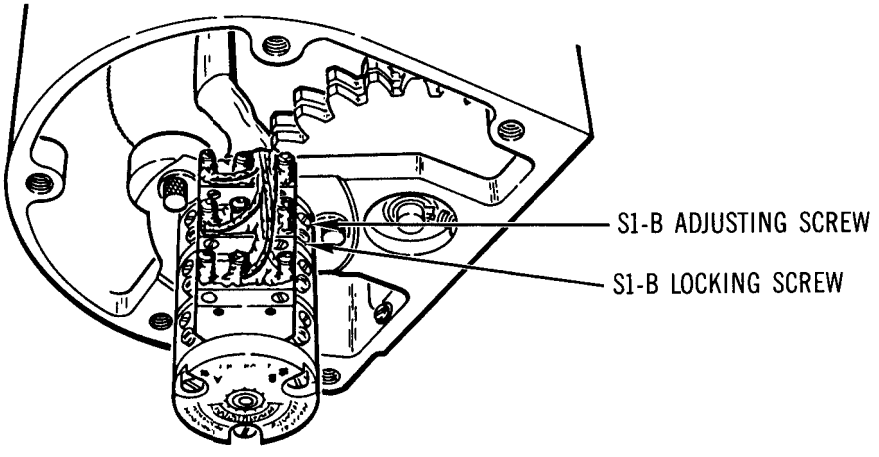
CAUTION

Do not turn adjusting screws beyond stops.

14. ADJUST AZIMUTH STOW SWITCH S1 AT 250.5°.
    a. Loosen S1-B locking screw.
    b. If LEFT STOW light is out, turn S1-B ccw until light just comes on.
    c. Turn S1-B cw until light goes off, then one full turn more cw.
    d. Tighten S1-B locking screw.







ARR83-1848

2-78. EMERGENCY STOW SWITCH ADJUSTMENT (cont)

NOTE

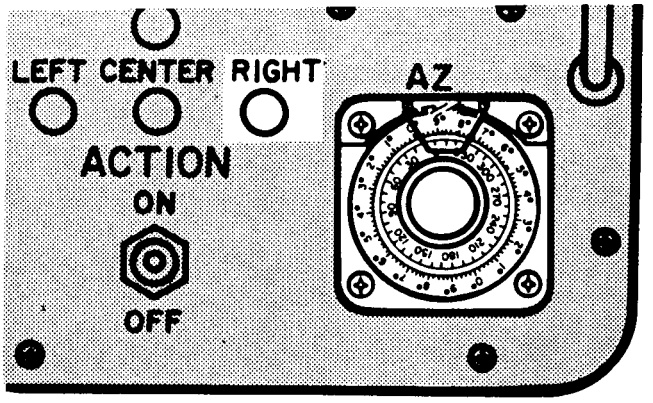
RIGHT STOW light should be on between 358.5° and left limit. RIGHT STOW light should be off from 358.5° to right limit.

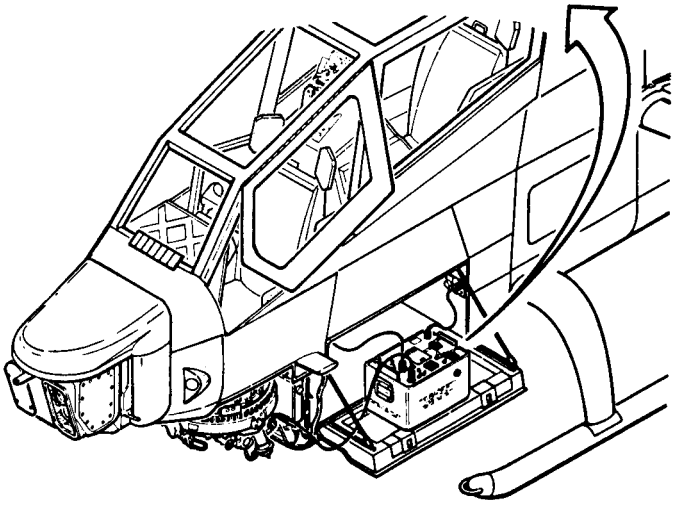
15. ON TEST SET, ROTATE AZ RESOLVER CLOCKWISE TO POSITION TURRET TO 358.5°.

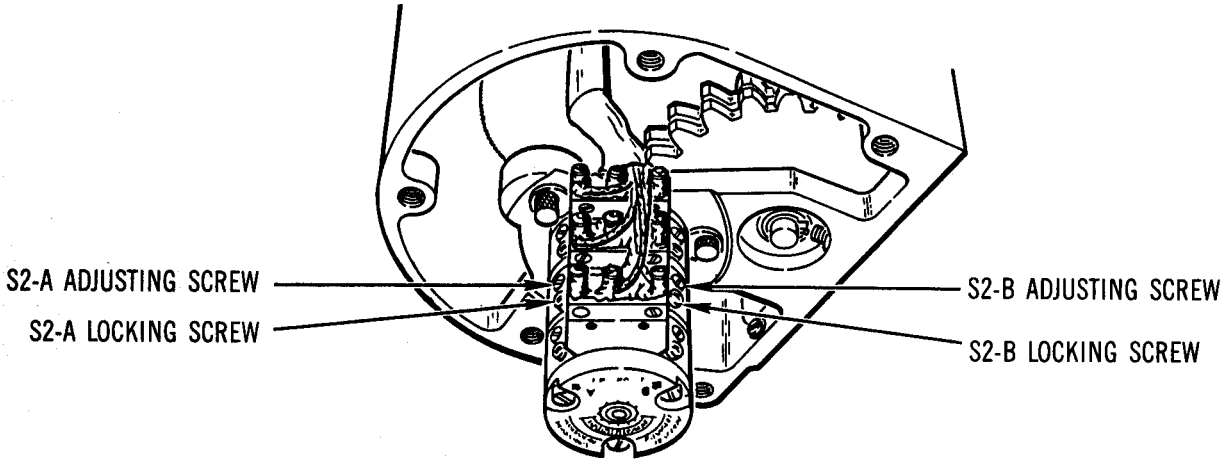
CAUTION

Do not turn adjusting screws beyond stops.

16. ADJUST AZIMUTH STOW SWITCH S2 AT 358.5°.
    a. loosen S2-B locking screw.
    b. Turn S2-B adjusting screw cw until RIGHT STOW light just goes off. If S2-B can not be adjusted, lock S2-B, unlock S2-A, turn S2-A cw approximately 1-½ turns, then, lock S2-A, unlock S2-B, and turn S2-B cw until light just goes off.
    c. Tighten S2-B locking screw.







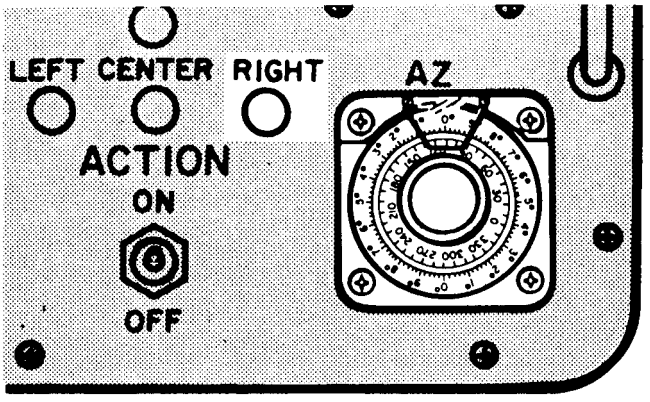
ARR83-1849

AZIMUTH STOW SWITCH ADJUSTMENT (cont)

NOTE

RIGHT STOW light should be on between 358.5° and left limit. RIGHT STOW light should be off from 358.5° to right limit.

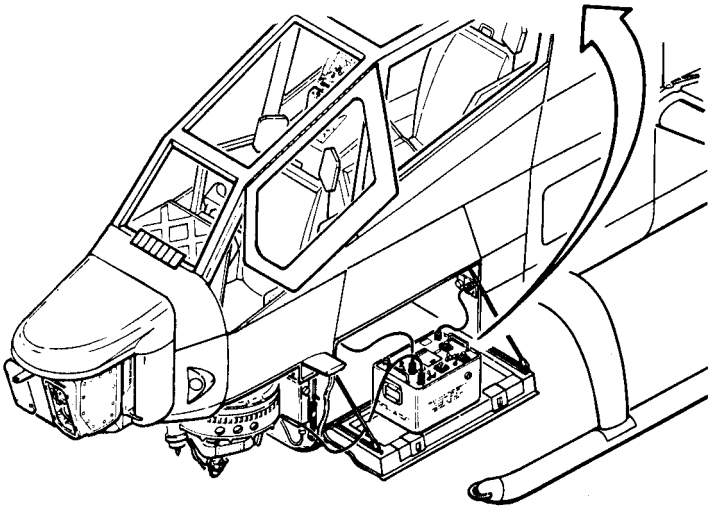
17. ON TEST SET, ROTATE AZ RESOLVER CLOCKWISE TO POSITION TURRET TO 109.5°.

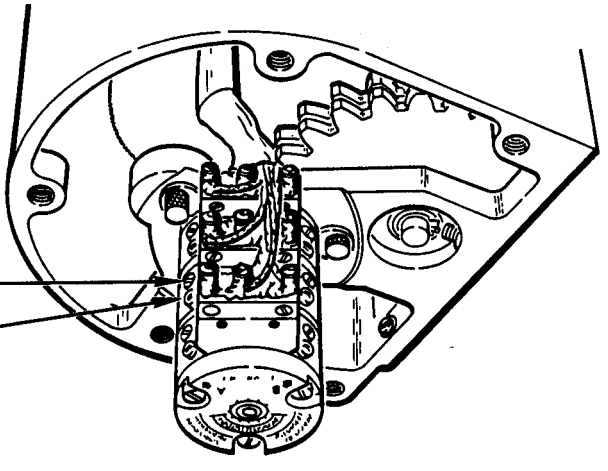


CAUTION

Do not turn adjusting screws beyond stops.

18. ADJUST AZIMUTH STOW SWITCH S2 AT 109.5°.
    a. Loosen S2-A locking screw.
    b. If RIGHT STOW light is out, turn S2-A cw until light just comes on.
    c. Turn S2-A ccw until light goes off, then one full turn more ccw.
    d. Tighten S2-A locking screw.





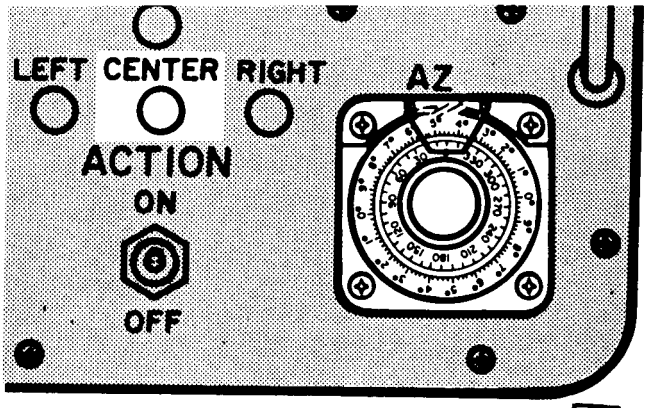
ARR83-1850

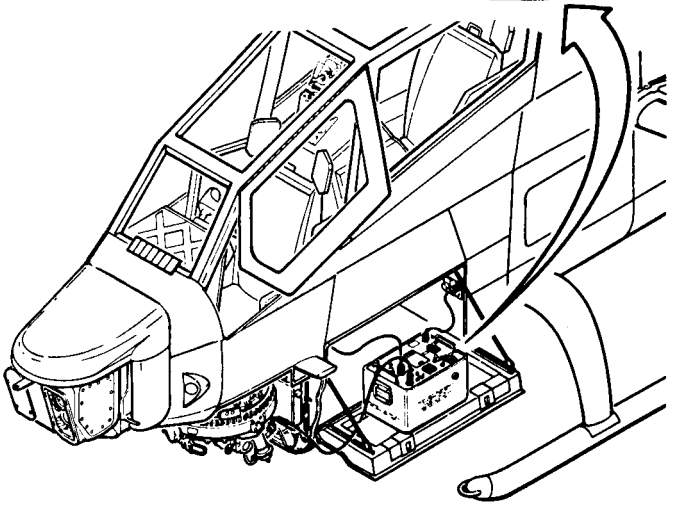
2-78. EMERGENCY STOW SWITCH ADJUSTMENT (cont)

NOTE

CENTER STOW light should be on between 355.5° and 4.5°. CENTER STOW light should be off from 355.5° to left limit and from 4.5° to right limit.

19. ON TEST SET, ROTATE AZ RESOLVER COUNTERCLOCKWISE TO POSITION TURRET TO 4.5°.

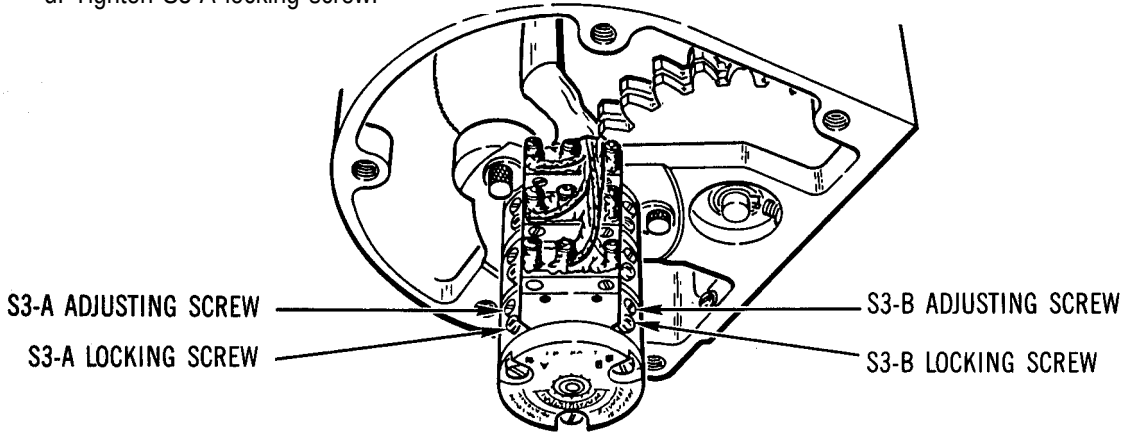




CAUTION

Do not turn adjusting screws beyond stops.

20. ADJUST AZIMUTH STOW SWITCH S3-A AT 4.5°.
    a. Loosen S3-A locking screw.
    b. Turn S3-A adjusting screw cw until CENTER STOW light just goes off. If S3-A cannot be adjusted, lock S3-A, unlock S3-B, turn S3-B cw approximately 1-½ turns, then, lock S3-B, unlock S3-A, and turn S3-A cw until CENTER STOW light just goes off.
    d. Tighten S3-A locking screw.



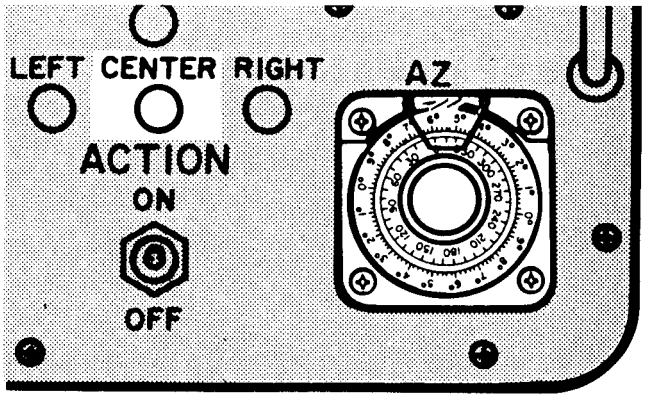
ARR83-1851

AZIMUTH STOW SWITCH ADJUSTMENT (cont)

NOTE

CENTER STOW light should be on between 355.5° and 4.5°. CENTER STOW light should be off from 355.5° to left limit and from 4.5° to right limit.

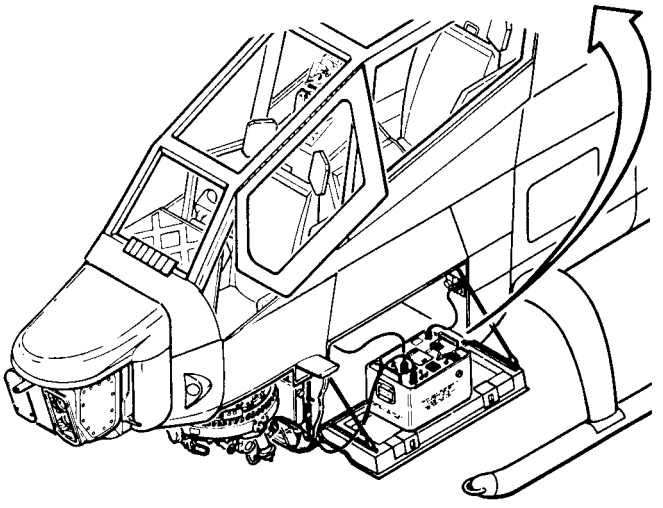
21. ON TEST SET, ROTATE AZ RESOLVER COUNTERCLOCKWISE TO POSITION TURRET TO 355.5°.

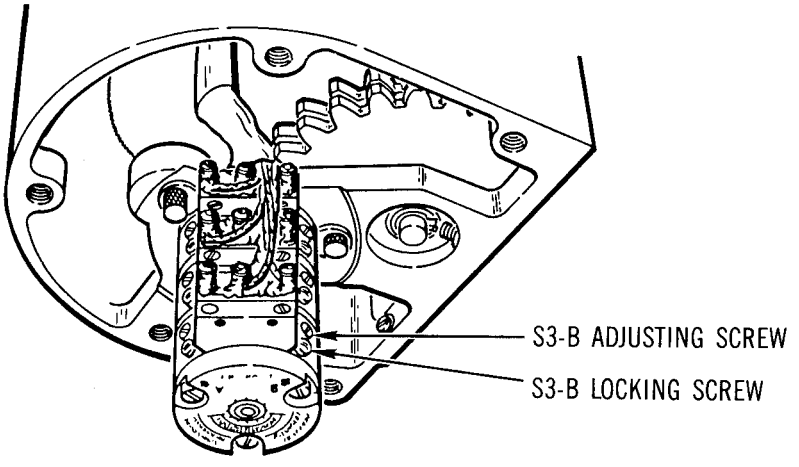


CAUTION

Do not turn adjusting screw beyond stops.

22. ADJUST AZIMUTH STOW SWITCH S3-B AT 355.5°.
    a. Loosen S3-B locking screw.
    b. Turn S3-B ccw until CENTER STOW light just goes off.
    c. Tighten S3-B locking screw.





ARR83-1852

2-78. EMERGENCY STOW SWITCH ADJUSTMENT (cont)

23. CHECK AZIMUTH STOW SWITCH ADJUSTMENTS.
    a. Using AZ resolver on test set, move turret to positions indicated in table. Observe STOW light and check against normal indications in table.
    b. Repeat adjustments until normal indications in table are obtained.

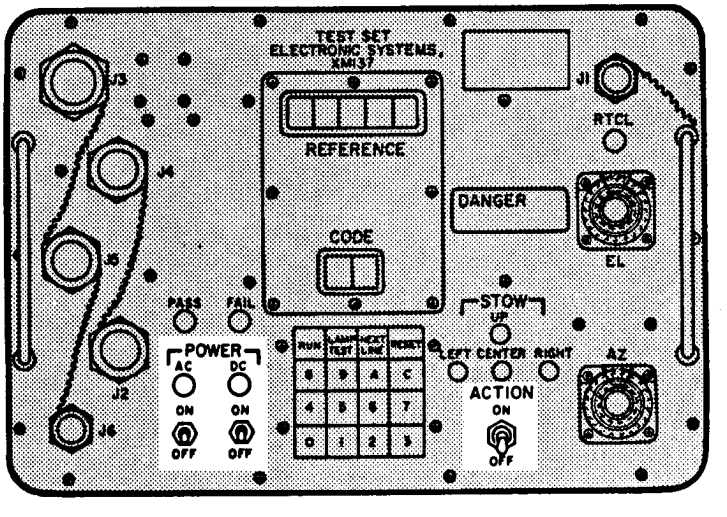
MOVING TURRET LEFT TO RIGHT			
TURRET POSITION	STOW LIGHTS		
	LEFT	CENTER	RIGHT
250.5 TO 355	OFF	OFF	ON
355 TO *	OFF	ON	ON
* TO 358.5	OFF	ON	OFF
* CENTER ON BEFORE RIGHT OFF			
358.5 TO 1.5	OFF	ON	OFF
1.5 TO *	ON	ON	OFF
* TO 5.0	ON	OFF	OFF
* CENTER ON UNTIL LEFT ON			
5.0 TO 109.5	ON	OFF	OFF

MOVING TURRET RIGHT TO LEFT			
TURRET POSITION	STOW LIGHTS		
	LEFT	CENTER	RIGHT
109.5 TO 5.0	ON	OFF	OFF
5.0 TO *	ON	ON	OFF
* TO 1.5	OFF	ON	OFF
* CENTER ON BEFORE LEFT ON			
1.5 TO 358.5	OFF	ON	OFF
358.5 TO *	OFF	ON	ON
* TO 355	OFF	OFF	ON
* CENTER ON UNTIL RIGHT ON			
355 TO 250.5	OFF	OFF	ON

ARR83-1853

POST ADJUSTMENT PROCEDURES

24. ON TEST SET, SET ACTION SWITCH TO OFF AND AC AND DC CIRUCIT BREAKERS TO OFF.



ARR83-1854

POST ADJUSTMENT PROCEDURES (cont)

25. ON PILOT ARMAMENT CONTROL PANEL, SET MASTER ARM SWITCH TO OFF.

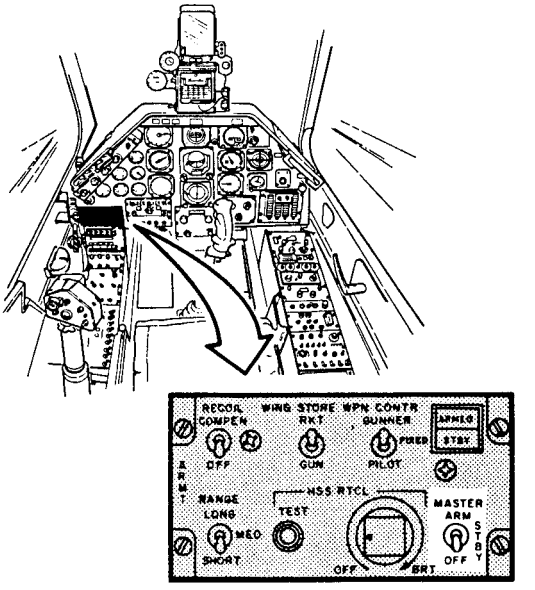
26. APPLY ELEVATION AND AZIMUTH DRIVE MOTOR BRAKES.

27. REMOVE POWER, SEE TM 9-1090-206-20-2; THEN DISCONNECT TEST SET.

NOTE

The longer bottom cover screw goes through cable bracket.

28. INSTALL AZIMUTH RESOLVER BOTTOM COVER , PARA 2-49.



PILOT ARMAMENT CONTROL PANEL

ARR83-1855

END OF TASK

2-79. GUN CONTROL UNIT BURST LIMIT POTENTIOMETER ADJUSTMENT

DESCRIPTION

This task covers: Burst limit potentiometer adjustment.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental
- Electronics Systems Test Set:
  - M137

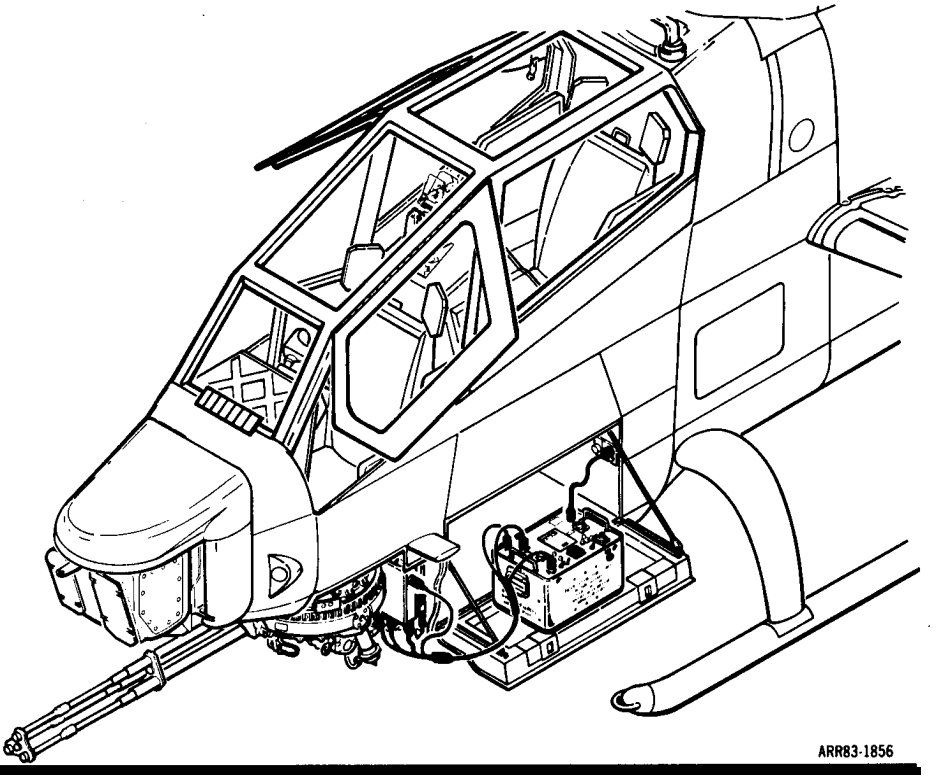
Personnel Required:
- 68J Aircraft Fire Control
  - Repairer

References:
- TM 9-1090-206-20-2
- TM 55-1520-236-23

Equipment Conditions:
- HELICOPTER ARMAMENT SUBSYSTEM
  - MAINTENANCE SETUP performed,
  - TM 9-1090-206-20-2.
- Test set cables W1 and W9 connected, see
  - TM 9-1090-206-20-2.
- Turret fairing removed, see TM 55-1520-236-23.

BURST LIMIT POTENTIOMETER ADJUSTMENT

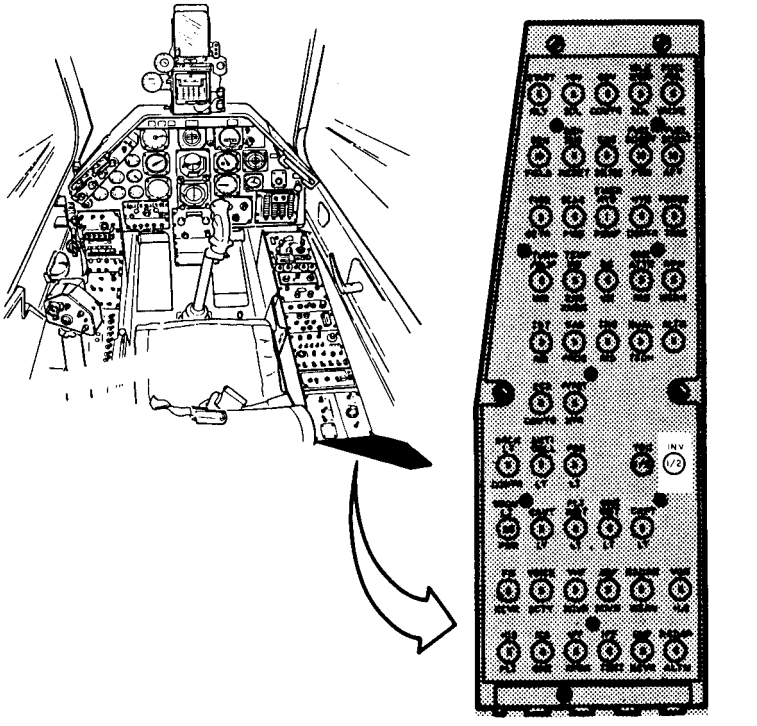
1. APPLY POWER,
   SEE TM 9-1090-206-20-2.



ARR83-1856

BURST LIMIT POTENTIOMETER ADJUSTMENT (cont)

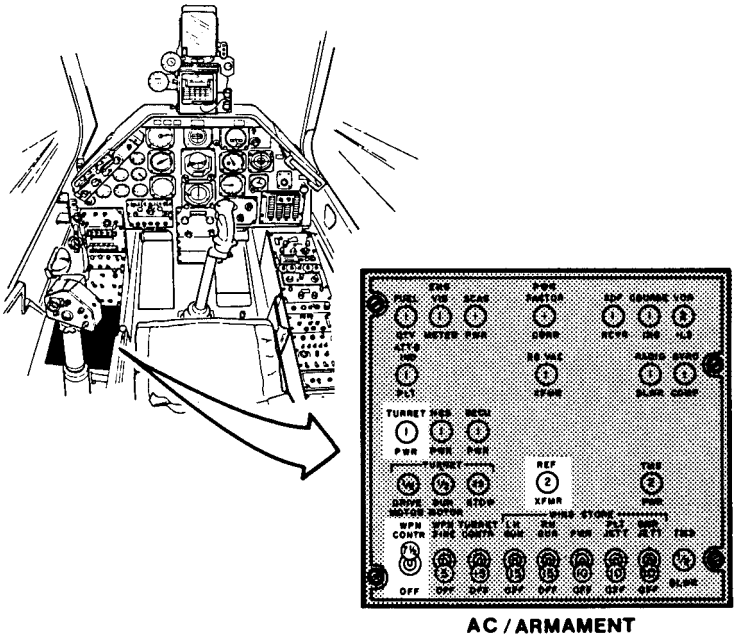
2. CLOSE INV CIRCUIT BREAKER ON DC CIRCUIT BREAKER PANEL.



DC CIRCUIT BREAKER PANEL

ARR83-1857

3. CLOSE REF XFMR, TURRET PWR, AND WPN CONTR CIRCUIT BREAKERS ON A/C ARMAMENT CIRCUIT BREAKER PANEL.

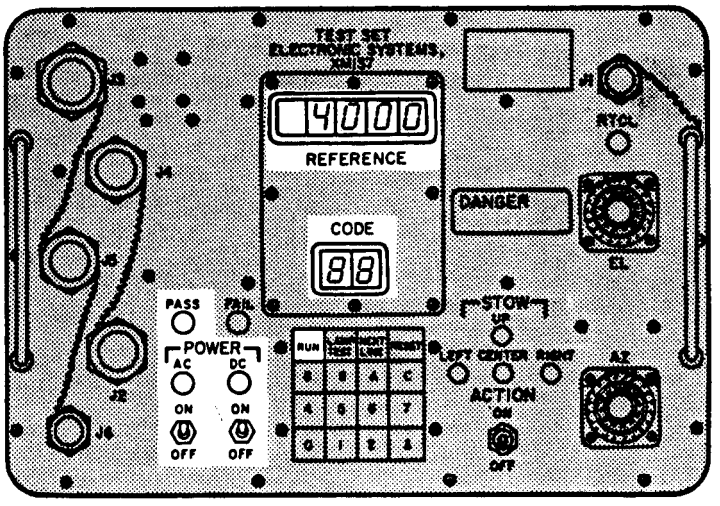


AC / ARMAMENT
CIRCUIT BREAKER PANEL

ARR83-1858

2-79. GUN CONTROL UNIT BURST LIMIT POTENTIOMETER ADJUSTMENT (cont)

4. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.
   a. AC and DC POWER indicators light.
   b. 8's appear in REFERENCE and CODE displays.
   c. PASS indicator lights.
5. ON TEST SET, PRESS RUN KEY.
   4000 appears in REFERENCE display.

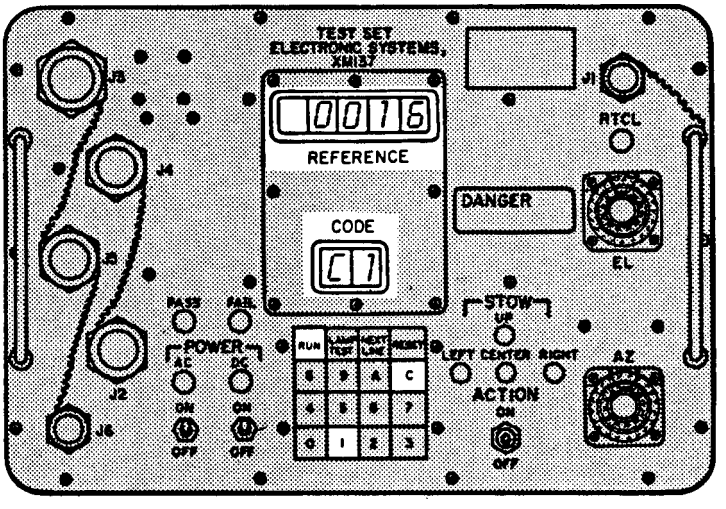


ARR83-1859

NOTE

The burst limit is usually set for 16 ±4 rounds.

6. ON TEST SET, PRESS C, 1, AND RUN KEYS.
   a. C1 appears in CODE display.
   b. REFERENCE display indicates 0000 and after approximately 5 seconds display indicates 0016 ±4. This number indicates the approximate quantity of ammunition expended during a burst limited firing sequence.
   c. Go to next step to adjust burst limit potentiometer.



ARR83-1860

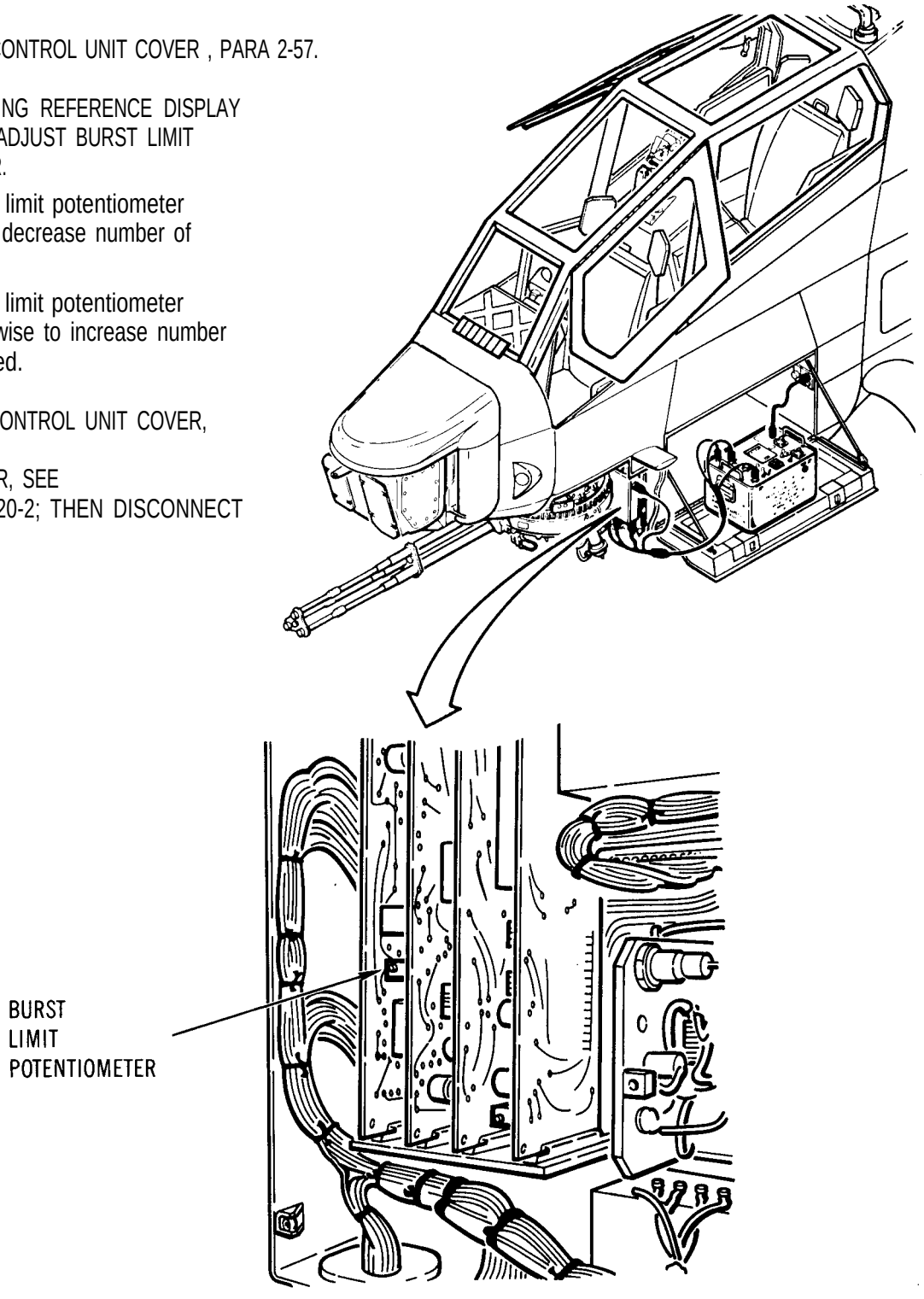
BURST LIMIT POTENTIOMETER ADJUSTMENT (cont)

7. REMOVE GUN CONTROL UNIT COVER , PARA 2-57.

8. WHILE OBSERVING REFERENCE DISPLAY ON TEST SET, ADJUST BURST LIMIT POTENTIOMETER.
   a. Rotate burst limit potentiometer clockwise to decrease number of rounds fired.
   b. Rotate burst limit potentiometer counterclockwise to increase number of rounds fired.

9. INSTALL GUN CONTROL UNIT COVER, PARA 2-57.

10. REMOVE POWER, SEE TM 9-1090-206-20-2; THEN DISCONNECT TEST SET.



END OF TASK

2-80. GUN CONTROL UNIT 28 VDC POWER SUPPLY ADJUSTMENT

DESCRIPTION

This task covers: 28 Vdc power supply adjustment.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental
- Electronics Systems Test Set:
  - M137

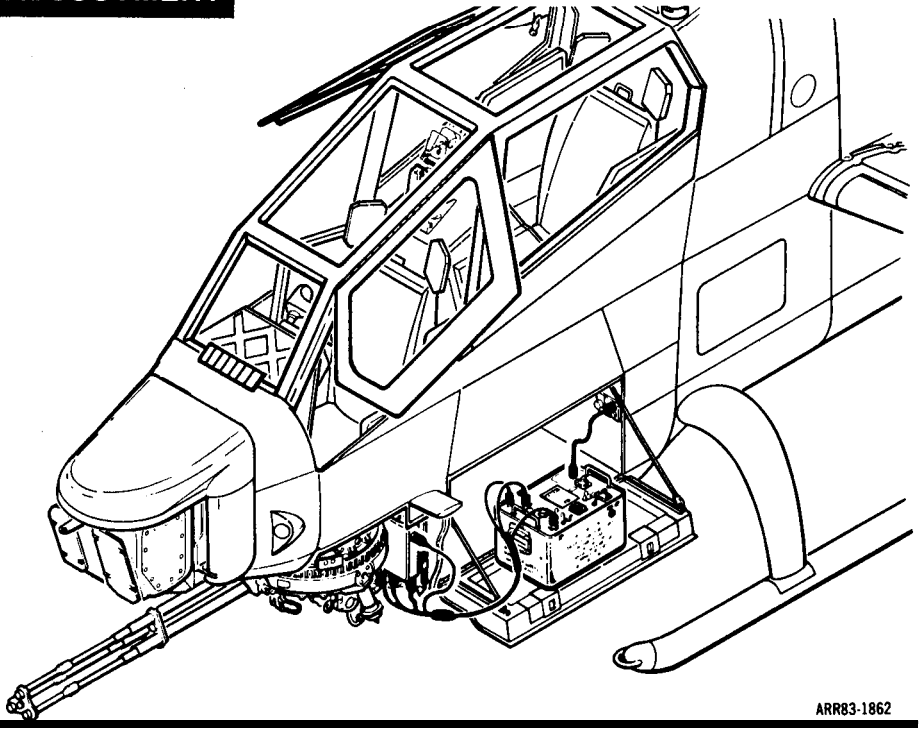
Personnel Required:
- 68J Aircraft Fire Control
  - Repairer (2)

References:
- TM 9-1090-206-20-2
- TM 55-1520-236-23

Equipment Conditions:
- HELICOPTER ARMAMENT SUBSYSTEM
  - MAINTENANCE SETUP performed,
  - TM 9-1090-206-20-2.
- Test set cables W1 and W9 connected. See
  - test set cable connection TM 9-1090-206-20-2.
- Turret fairing removed, see
  - TM 55-1520-236-23.

28 VDC POWER SUPPLY ADJUSTMENT

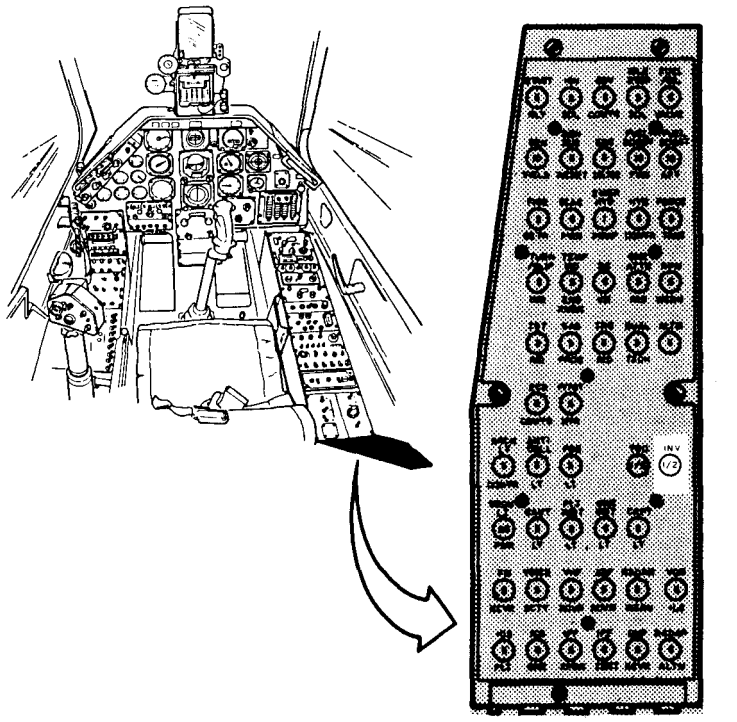
1. APPLY POWER, SEE TM 9-1090-206-20-2.



ARR83-1862

28 VDC POWER SUPPLY ADJUSTMENT (cont)

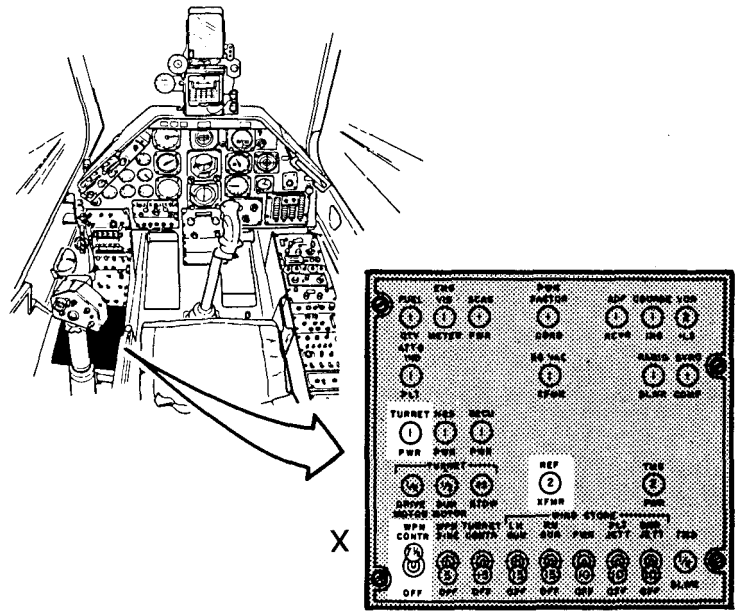
2. CLOSE NV CIRCUIT BREAKER ON DC CIRCUIT BREAKER PANEL.



DC CIRCUIT BREAKER PANEL

ARR83-1866

3. CLOSE REF XFMR, TURRET PWR, AND WPN CONTR CIRCUIT BREAKERS ON AC ARMAMENT CIRCUIT BREAKER PANEL.

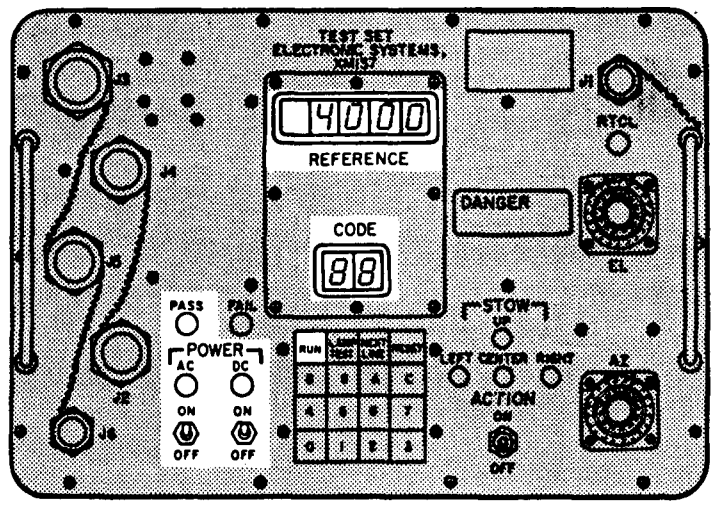


AC / ARMAMENT CIRCUIT BREAKER PANEL

ARR83-1867

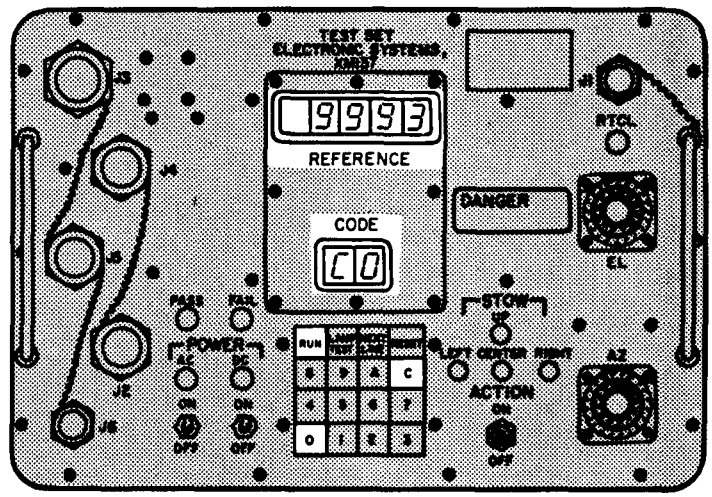
2-80. GUN CONTROL UNIT 28 VDC POWER SUPPLY ADJUSTMENT (cont)

4. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.
   a. AC and DC POWER indicators light.
   b. 8's appear in REFERENCE and CODE displays.
   c. PASS indicator lights.
5. ON TEST SET, DEPRESS RUN KEY.
   4000 appears in REFERENCE display.



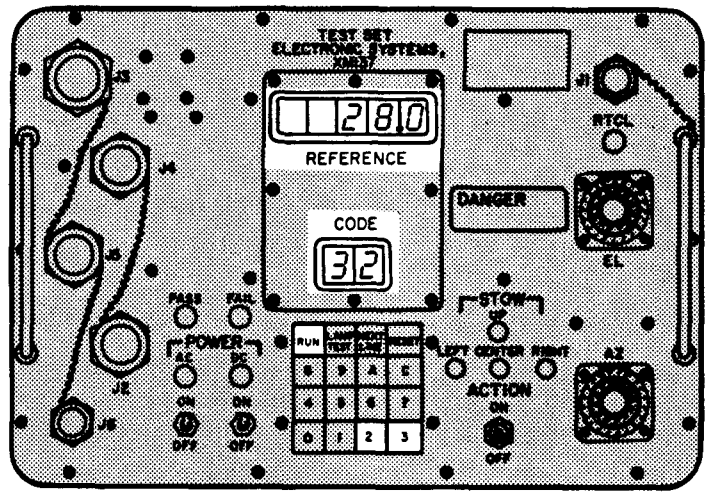
ARR83-1863

6. ON TEST SET, PRESS C, 0, AND RUN KEYS.
   a. C0 appears in CODE display.
   b. 9993 appears in REFERENCE display.



ARR83-1864

7. ON TEST SET, PRESS 3, 2, AND RUN KEYS.
   a. 32 appears in CODE display.
   b. 28.0 Vdc appears in REFERENCE display. This display is the output of the 28 Vdc regulated power supply.
   c. Go to next step to adjust 28 Vdc power supply.



ARR83-1865

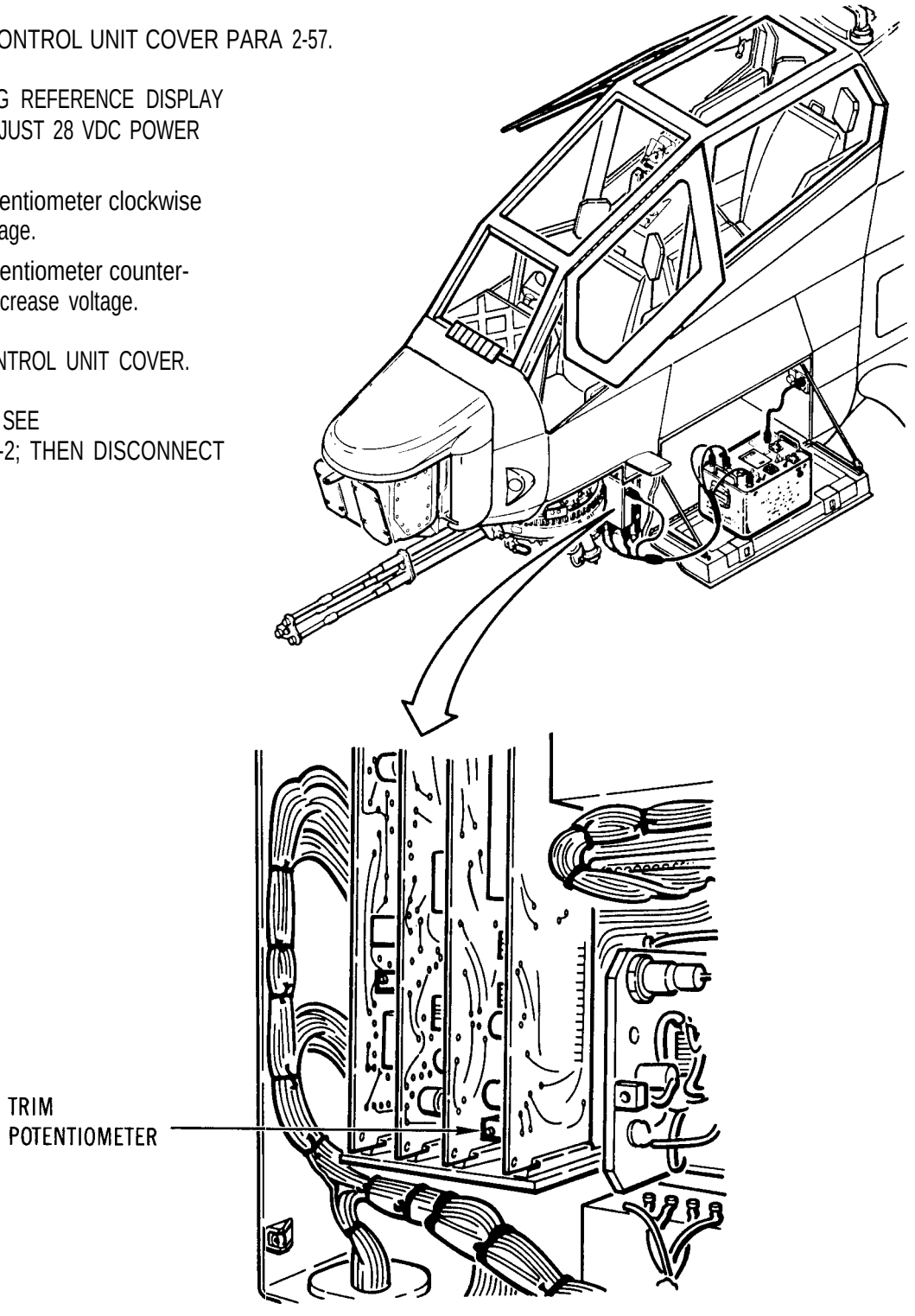
28 VDC POWER SUPPLY ADJUSTMENT (cont)

8. REMOVE GUN CONTROL UNIT COVER PARA 2-57.

9. WHILE OBSERVING REFERENCE DISPLAY ON TEST SET, ADJUST 28 VDC POWER SUPPLY.
   a. Rotate trim potentiometer clockwise to increase voltage.
   b. Rotate trim potentiometer counter-clockwise to decrease voltage.

10. INSTALL GUN CONTROL UNIT COVER.

11. REMOVE POWER, SEE TM 9-1090-206-20-2; THEN DISCONNECT TEST SET.



ARR83-1868

END OF TASK

2-81. AZIMUTH PROXIMITY SWITCH ADJUSTMENT

DESCRIPTION

This task covers: Adjustment of azimuth proximity switches S2 (right) and S1 (left).

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Electronics Systems Test Set: M137

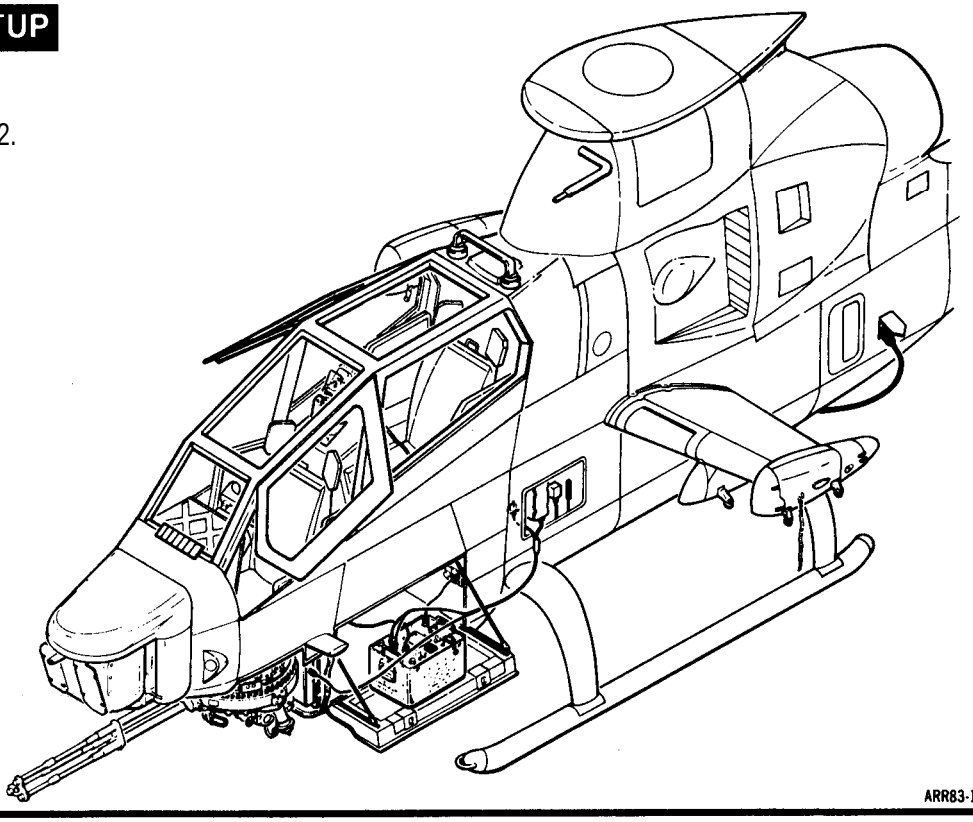
Personnel Required:
- 68J Aircraft Fire Control Repairer (2)

References:
- TM 9-1090-206-20-2
- TM 55-1520-236-23

Equipment Conditions:
- HELICOPTER ARMAMENT SUBSYSTEM MAINTENANCE SETUP performed, see TM 9-1090-206-20-2.
- Turret fairing removed, see TM 55-1520-236-23.
- Turret subsystem boresighted, see Chapter 5.
- Test set cables W1, W6, and W15, connected, see TM 9-1090-206-20-2.

ADJUSTMENT SETUP

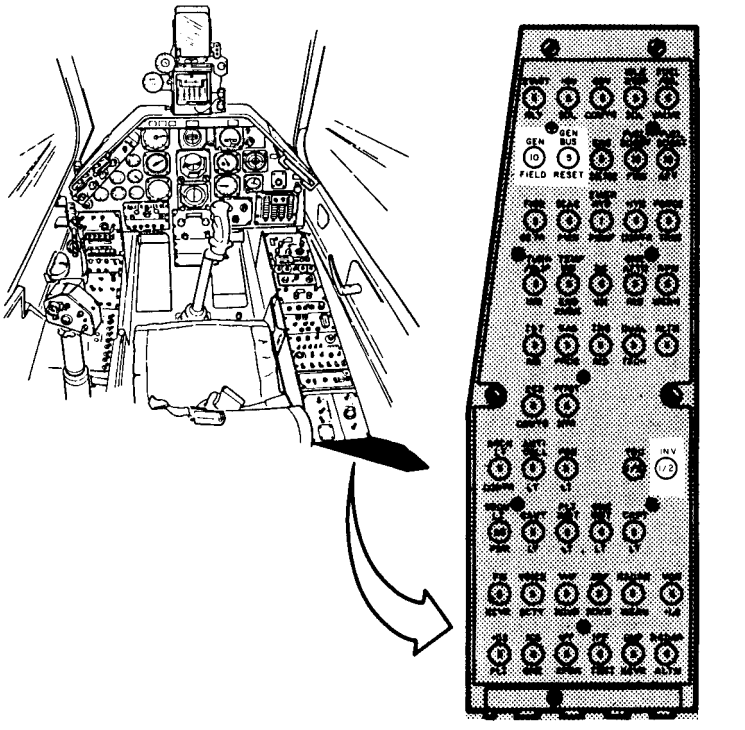
1. APPLY POWER, SEE TM 9-1090-206-20-2.



ARR83-1869

ADJUSTMENT SETUP (cont)

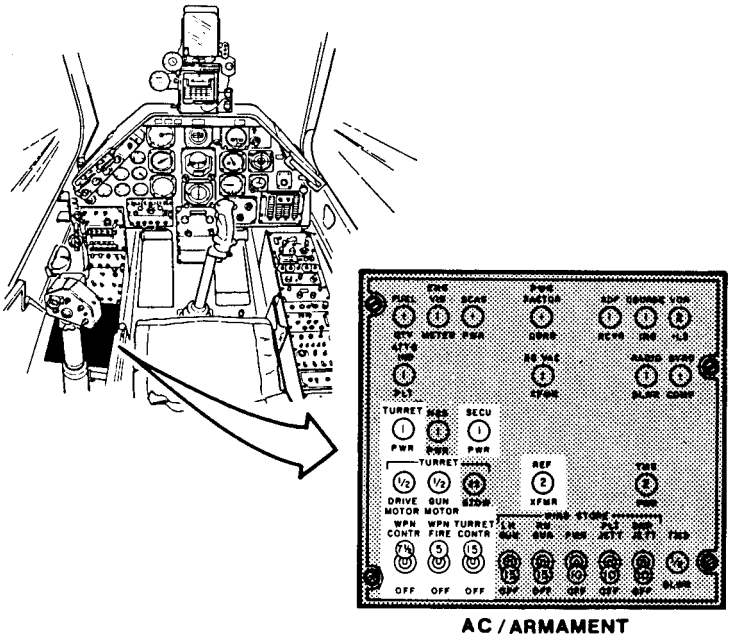
2. CLOSE FOLLOWING CIRCUIT BREAKERS ON DC CIRCUIT BREAKER PANEL:
   - GEN FIELD
   - GEN BUS RESET
   - INV



DC CIRCUIT BREAKER PANEL

ARR83-1870

3. CLOSE FOLLOWING CIRCUIT BREAKERS ON AC/ARMAMENT CIRCUIT BREAKER PANEL
   - REF XFMR
   - TURRET PWR
   - SECU PWR
   - TURRET DRIVE MOTOR
   - TURRET GUN MOTOR
   - WPN CONTR
   - WPN FIRE
   - TURRET CONTR



AC / ARMAMENT CIRCUIT BREAKER PANEL

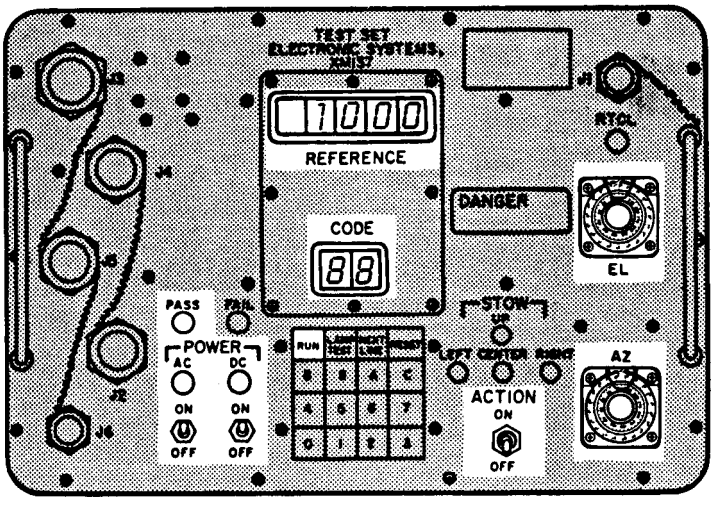
ARR83-1871

2-81. AZIMUTH PROXIMITY SWITCH ADJUSTMENT (cont)

4. ON TEST SET, SET AZ AND EL DIALS TO 0° AND CHECK THAT ACTION SWITCH IS OFF.

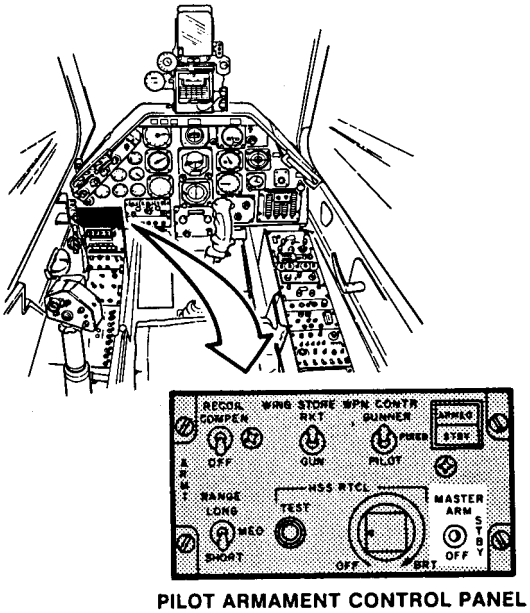
5. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.
   a. AC and DC POWER indicators light.
   b. 8's appear in REFERENCE and CODE displays.
   c. PASS indicator lights.

6. ON TEST SET, DEPRESS RUN KEY.
   1000 appears in REFERENCE display.



ARR83-1872

7. ON PILOT ARMAMENT CONTROL PANEL, SET MASTER ARM SWITCH TO STBY.



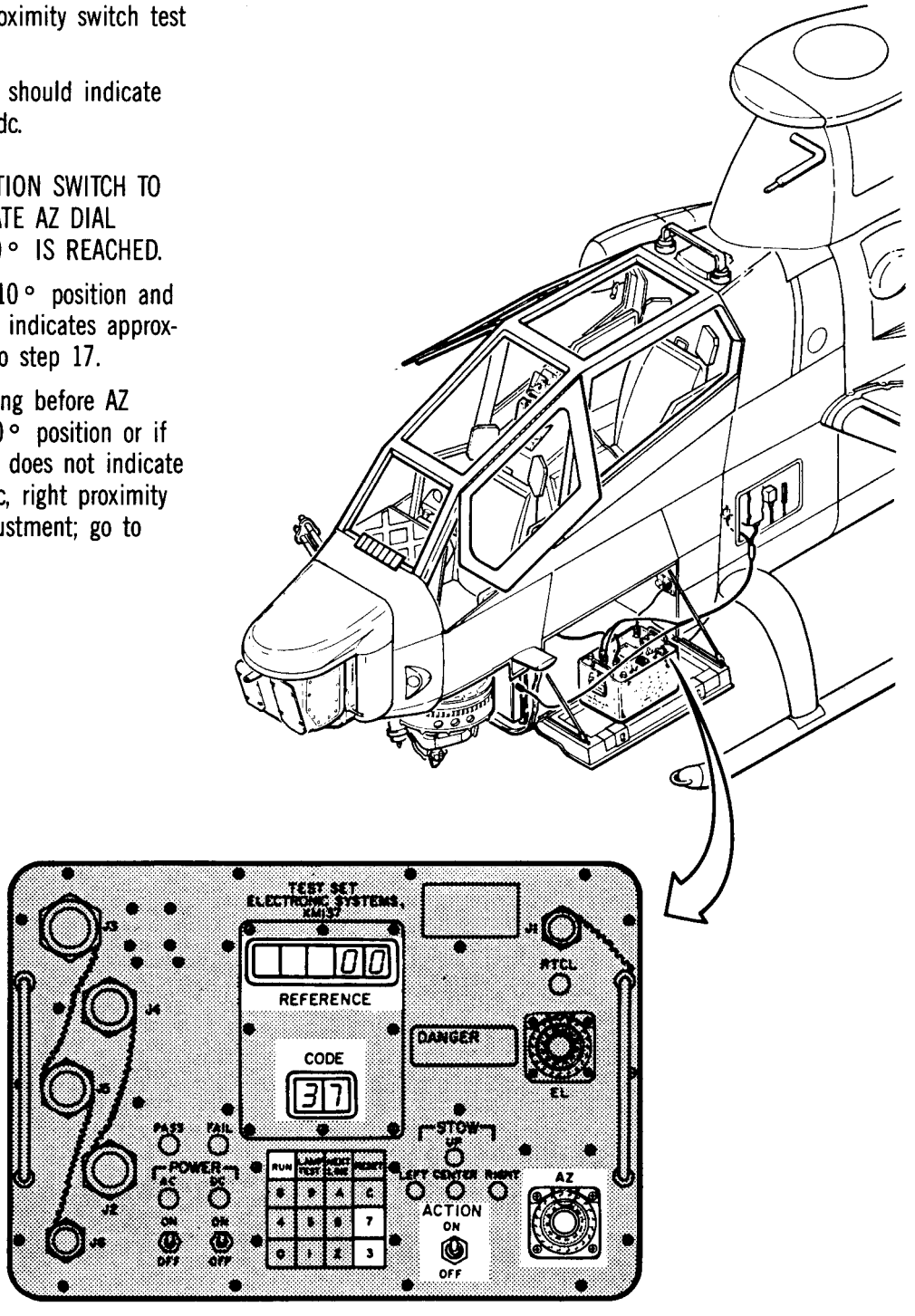
PILOT ARMAMENT CONTROL PANEL

ARR83-1873

RIGHT PROXIMITY SWITCH ADJUSTMENT

8. ON TEST SET, PRESS 3, 7, AND RUN KEYS.
   a. This is the right proximity switch test point.
   b. REFERENCE display should indicate approximately 20 Vdc.

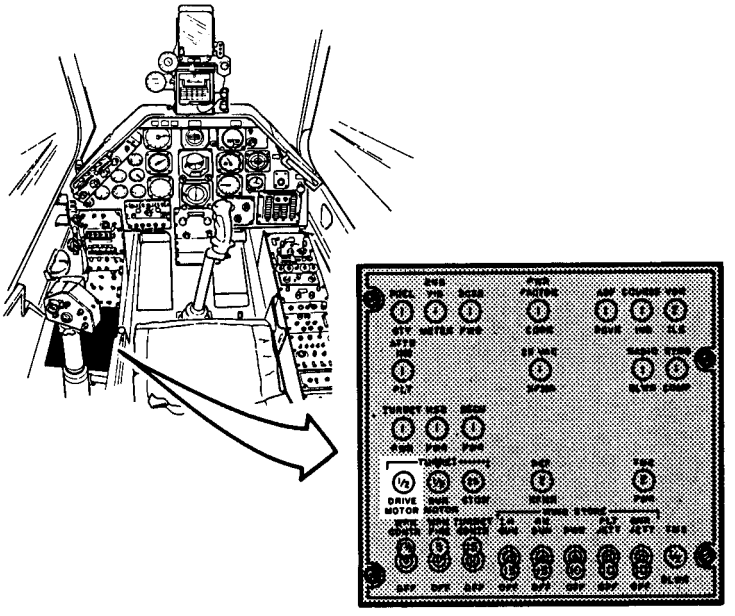
9. ON TEST SET, SET ACTION SWITCH TO ON AND SLOWLY ROTATE AZ DIAL CLOCKWISE UNTIL 110° IS REACHED.
   a. If turret stops at 110° position and REFERENCE display indicates approximately 0 Vdc, go to step 17.
   b. If turret stops moving before AZ resolver reaches 110° position or if REFERENCE display does not indicate approximately 0 Vdc, right proximity switch requires adjustment; go to next step.



ARR83-1874

2-81. AZIMUTH PROXIMITY SWITCH ADJUSTMENT (cont)

10. ON AC\ARMAMENT CIRCUIT BREAKER PANEL, OPEN TURRET DRIVE MOTOR CIRCUIT BREAKER.

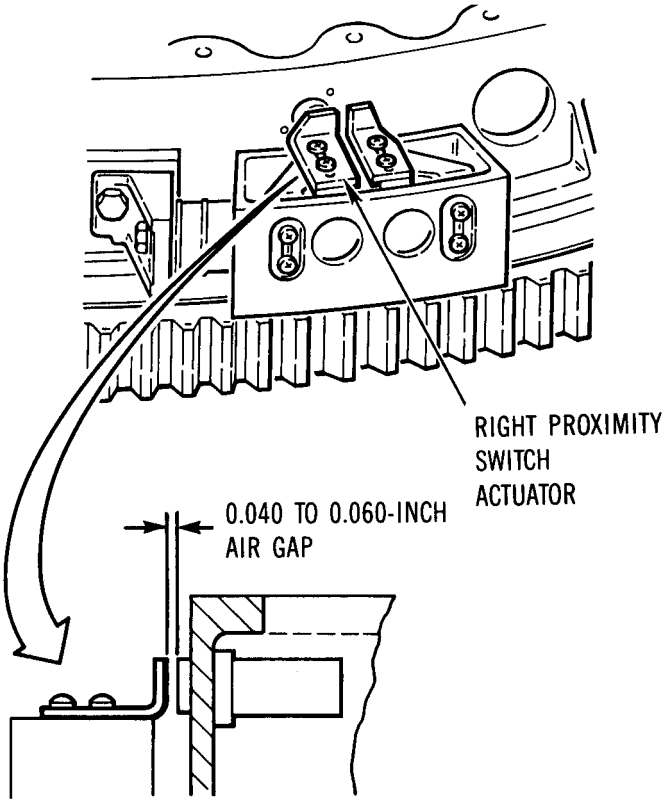


AC / ARMAMENT CIRCUIT BREAKER PANEL

ARR83-1875

11. RELEASE AZIMUTH DRIVE MOTOR BRAKE AND MANUALLY POSITION TURRET TO RIGHT MECHANICAL LIMIT; THEN APPLY BRAKE.

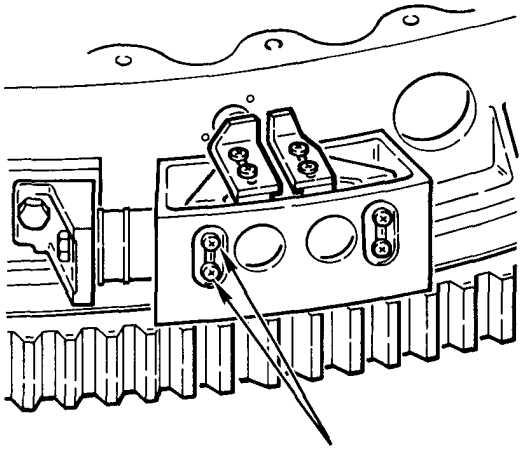
12. LOOSEN TWO SCREWS ON RIGHT PROXIMITY SWITCH ACTUATOR AND ADJUST AIR GAP BETWEEN ACTUATOR AND SWITCH FACE TO 0.040 TO 0.060 INCH. TIGHTEN SCREWS AFTER AIR GAP IS SET.



ARR83-1876

RIGHT PROXIMITY SWITCH ADJUSTMENT (cont)

13. LOOSEN RIGHT PROXIMITY SWITCH ACTUATOR VERTICAL ADJUSTMENT SCREWS AND SET ACTUATOR TO ITS LOWEST POSITION.

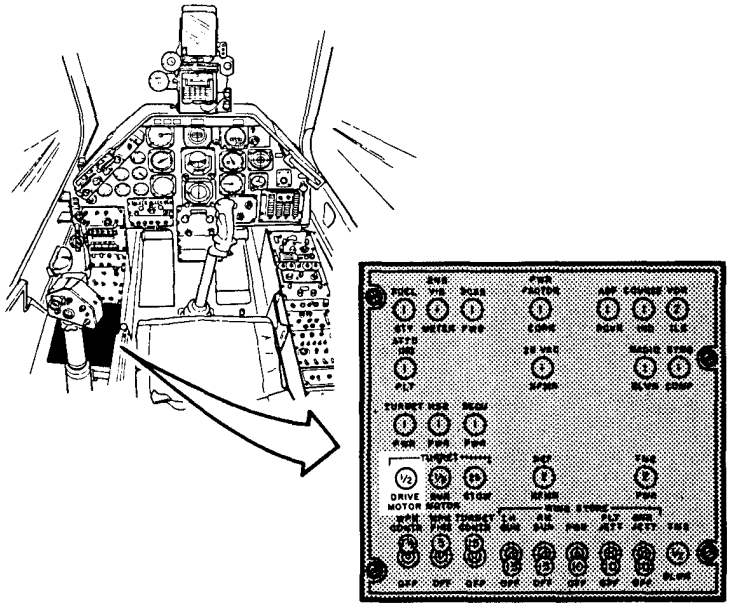


VERTICAL ADJUSTMENT SCREWS

ARR83-1877

14. CHECK THAT TEST SET AZ DIAL IS STILL SET TO 110°.

15. ON AC\ARMAMENT CIRCUIT BREAKER PANEL, CLOSE TURRET DRIVE MOTOR CIRCUIT BREAKER LONG ENOUGH FOR TURRET TO ALINE WITH TEST SET SIMULATOR; THEN OPEN TURRET DRIVE MOTOR CIRCUIT BREAKER.

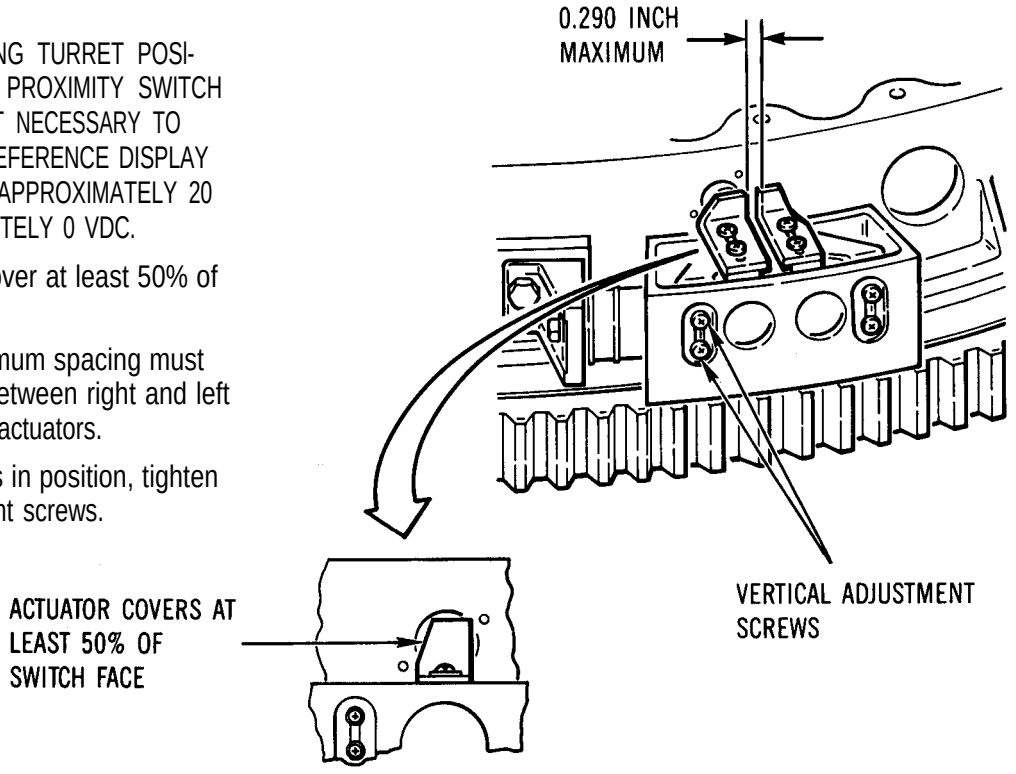


AC / ARMAMENT CIRCUIT BREAKER PANEL

ARR83-1878

2.81. AZIMUTH PROXIMITY SWITCH ADJUSTMENT (cont)

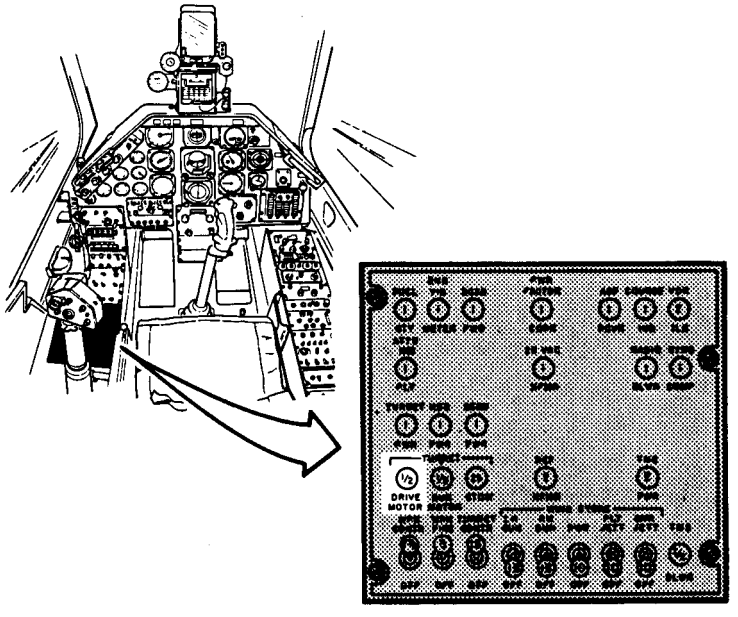
16. WITHOUT DISTURBING TURRET POSITION, RAISE RIGHT PROXIMITY SWITCH ACTUATOR TO POINT NECESSARY TO CAUSE TEST SET REFERENCE DISPLAY TO CHANGE FROM APPROXIMATELY 20 VDC TO APPROXIMATELY 0 VDC.
    a. Actuator must cover at least 50% of switch face.
    b. 0.290-inch maximum spacing must be maintained between right and left proximity switch actuators.
    c. When actuator is in position, tighten vertical adjustment screws.



ARR83-1879

17. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, CLOSE TURRET DRIVE MOTOR CIRCUIT BREAKER.

18. ON TEST SET, SLOWLY ROTATE AZ DIAL TO 0° POSITION.



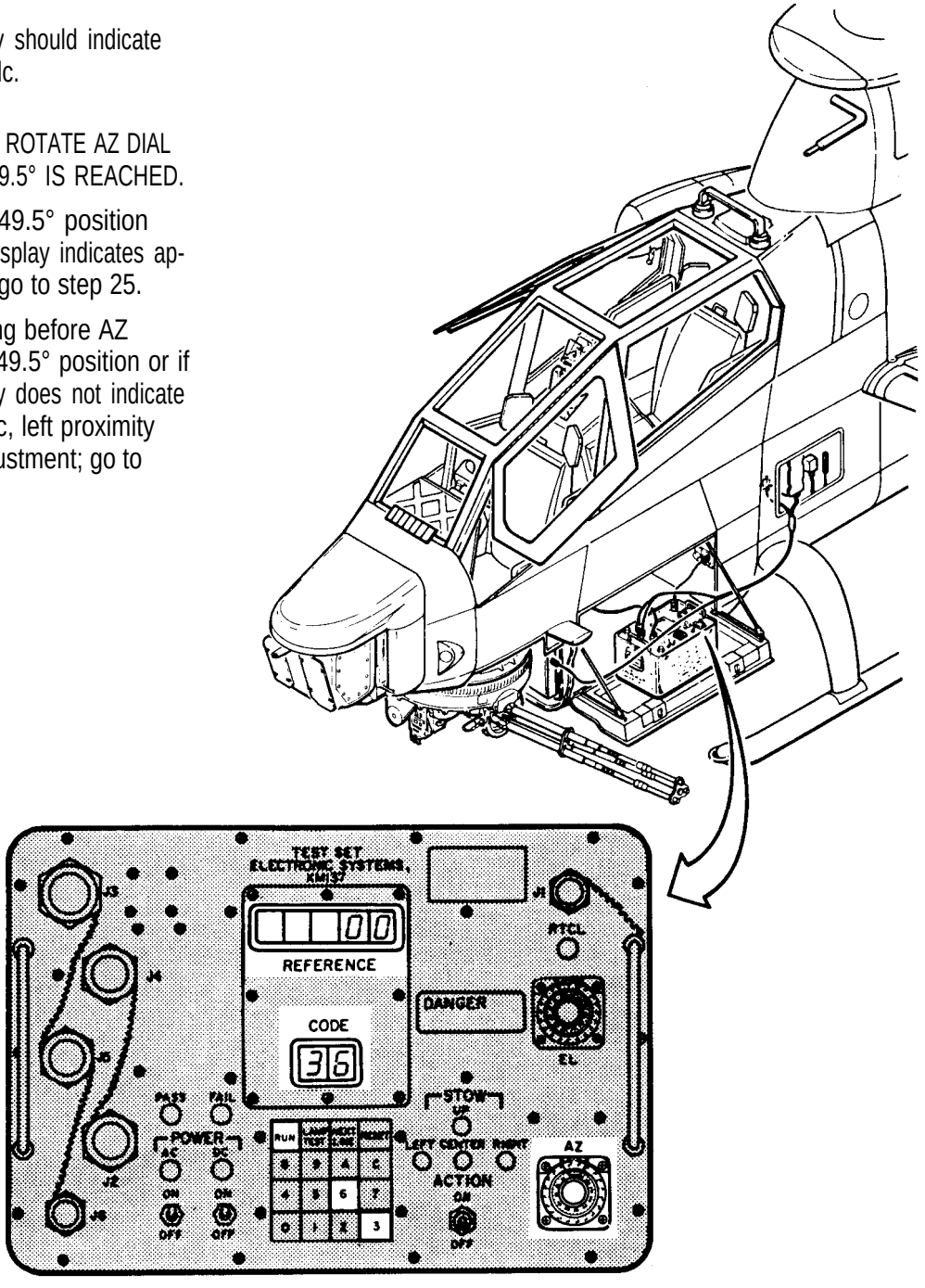
AC / ARMAMENT
CIRCUIT BREAKER PANEL

ARR83-1880

LEFT PROXIMITY SWITCH ADJUSTMENT

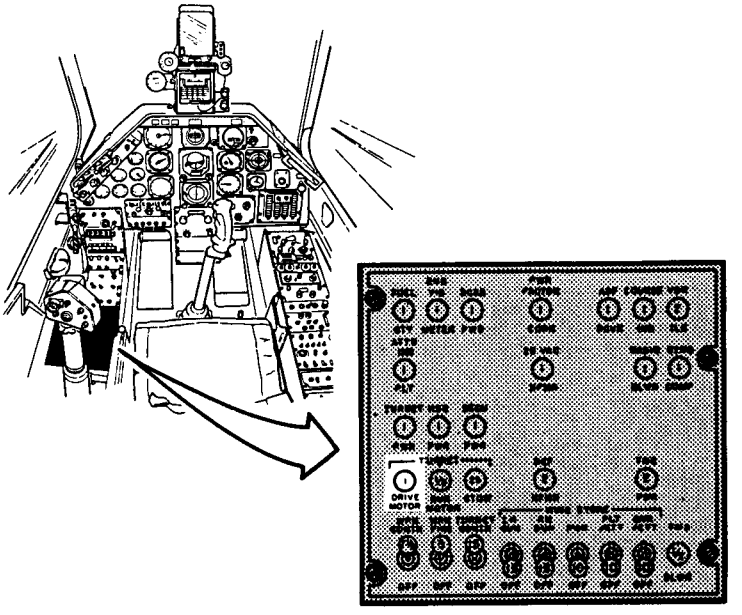
19. ON TEST SET, PRESS 3, 6, AND RUN KEYS.
    a. This is the left proximity switch test point.
    b. REFERENCE display should indicate approximately 20 Vdc.

20. ON TEST SET, SLOWLY ROTATE AZ DIAL CLOCKWISE UNTIL 249.5° IS REACHED.
    a. If turret stops at 249.5° position and REFERENCE display indicates approximately 0 Vdc, go to step 25.
    c. If turret stops moving before AZ resolver reaches 249.5° position or if REFERENCE display does not indicate approximately 0 Vdc, left proximity switch requires adjustment; go to next step.



2-81. AZIMUTH PROXIMITY SWITCH ADJUSTMENT (cont)

21. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, OPEN TURRET DRIVE MOTOR CIRCUIT BREAKER.



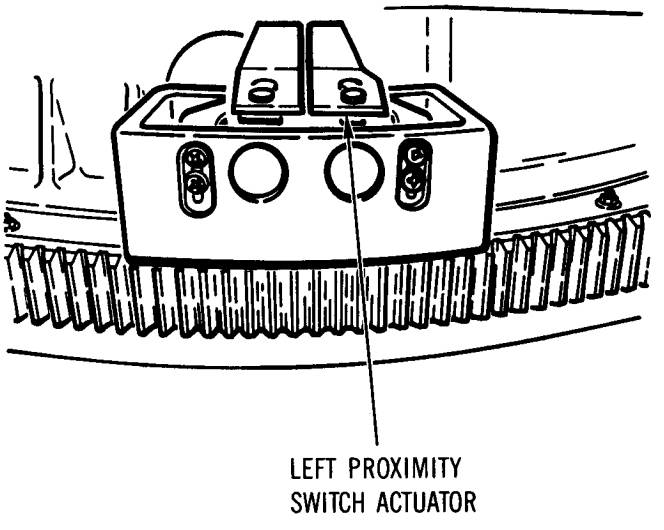
AC / ARMAMENT CIRCUIT BREAKER PANEL

ARR83-1882

NOTE

Space limitations prevent direct adjustment of ieft proximity switch actuator. Left proximity switch actuator should be adjusted in same relative position as right proximity switch actuator.

22. RELEASE AZIMUTH DRIVE MOTOR BRAKE AND MANUALLY POSITION TURRET SO THAT ACTUATORS ARE ACCESSIBLE. APPLY BRAKE.



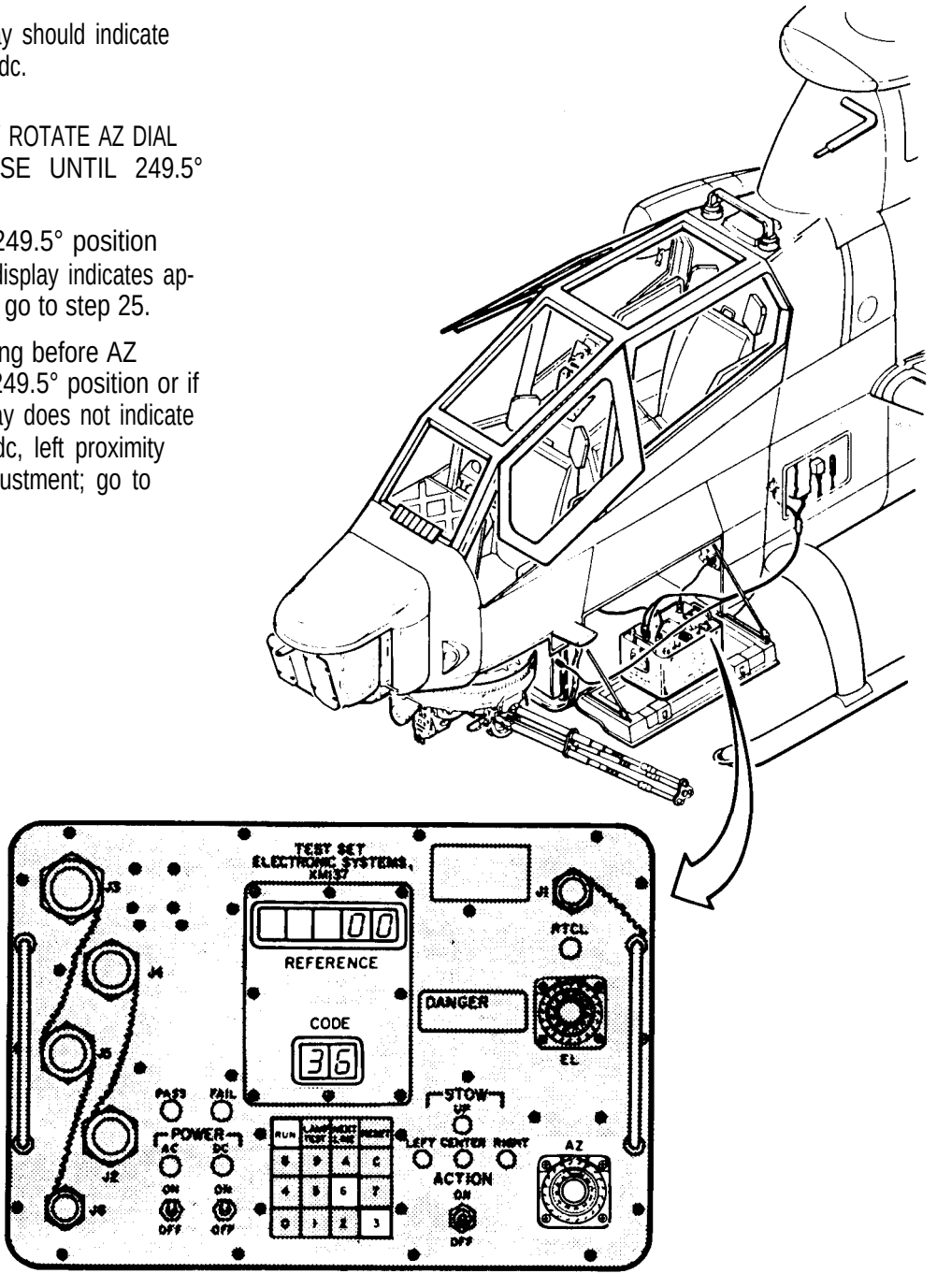
LEFT PROXIMITY SWITCH ACTUATOR

ARR83-1883

LEFT PROXIMITY SWITCH ADJUSTMENT

19. ON TEST SET, PRESS 3, 6, AND RUN KEYS.
    a. This is the left proximity switch test point.
    b. REFERENCE display should indicate approximately 20 Vdc.

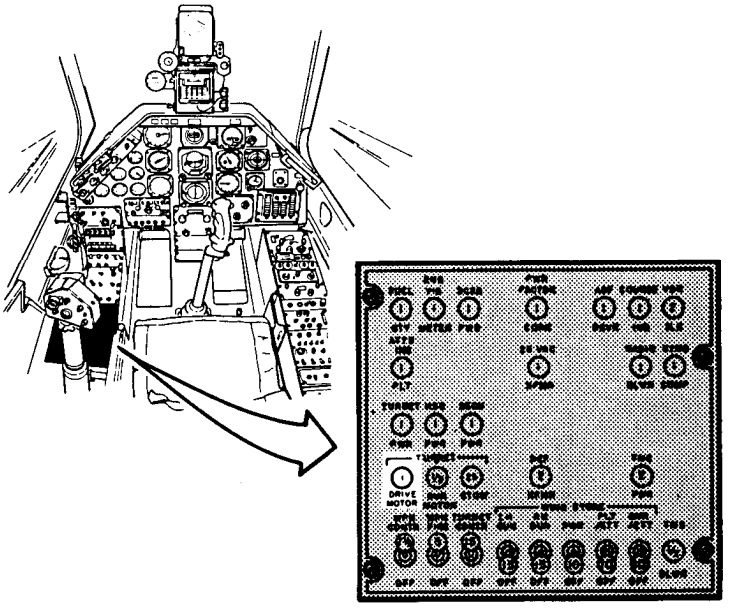
20. ON TEST SET, SLOWLY ROTATE AZ DIAL COUNTERCLOCKWISE UNTIL 249.5° IS REACHED.
    a. If turret stops at 249.5° position and REFERENCE display indicates approximately 0 Vdc, go to step 25.
    b. If turret stops moving before AZ resolver reaches 249.5° position or if REFERENCE display does not indicate approximately 0 Vdc, left proximity switch requires adjustment; go to next step.



ARR83 1881

2-81. AZIMUTH PROXIMITY SWITCH ADJUSTMENT (cont)

21. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, OPEN TURRET DRIVE MOTOR CIRCUIT BREAKER.



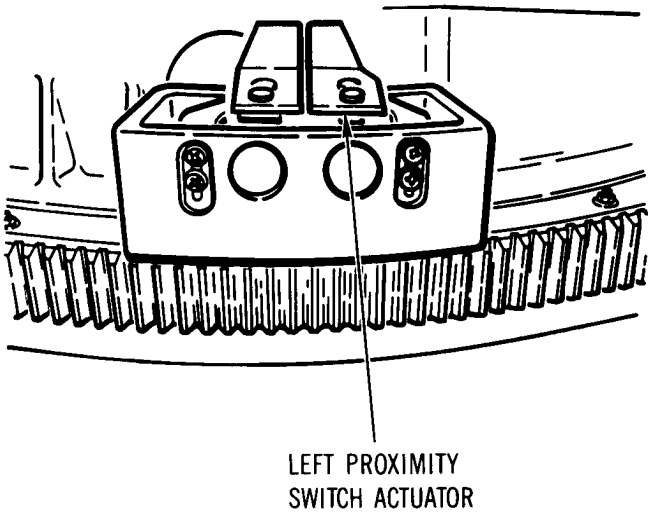
AC / ARMAMENT
CIRCUIT BREAKER PANEL

ARR83-1882

NOTE

Space limitations prevent direct adjustment of left proximity switch actuator. Left proximity switch actuator should be adjusted in same relative position as right proximity switch actuator.

22. RELEASE AZIMUTH DRIVE MOTOR BRAKE AND MANUALLY POSITION TURRET SO THAT ACTUATORS ARE ACCESSIBLE. APPLY BRAKE.

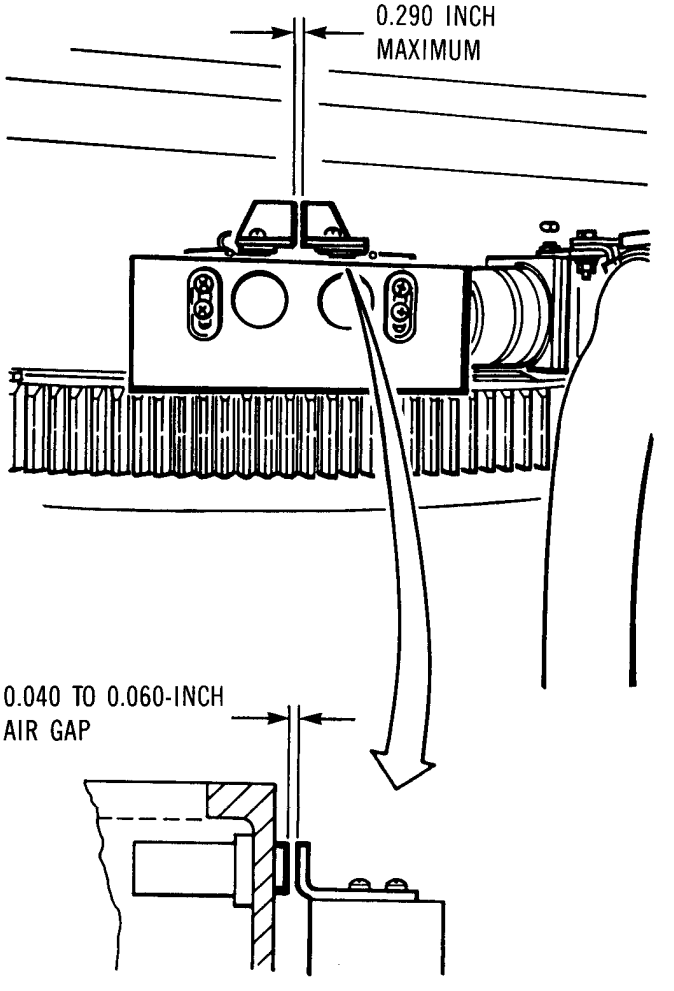


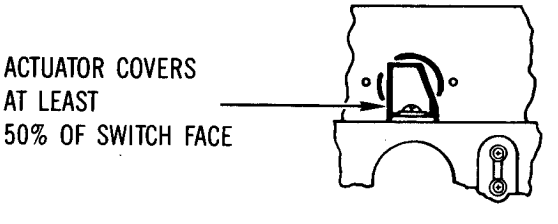
LEFT PROXIMITY
SWITCH ACTUATOR

ARR83-1883

LEFT PROXIMITY SWITCH ADJUSTMENT (cont)

23. ADJUST LEFT PROXIMITY SWITCH ACTUATOR TO SAME RELATIVE POSITION AS RIGHT PROXIMITY SWITCH ACTUATOR.
    a. Air gap and switch face coverage are the same for right and left actuators.
    b. Do not exceed 0.290-inch spacing between actuators.
24. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, CLOSE TURRET DRIVE MOTOR CIRCUIT BREAKER AND REPEAT CHECK IN STEP 20, READJUSTING AS NECESSARY TO MEET POSITIONING REQUIREMENTS AND TEST SET INDICATIONS.
25. REMOVE POWER, SEE TM 9-1090-206-20-2; THEN DISCONNECT TEST SET.





ARR83-1884

END OF TASK

2-82. ELEVATION PROXIMITY SWITCH ADJUSTMENT

DESCRIPTION

This task covers: Adjustment of elevation proximity switches S1 (down) and S2 (up).

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Electronics Systems Test Set: M137

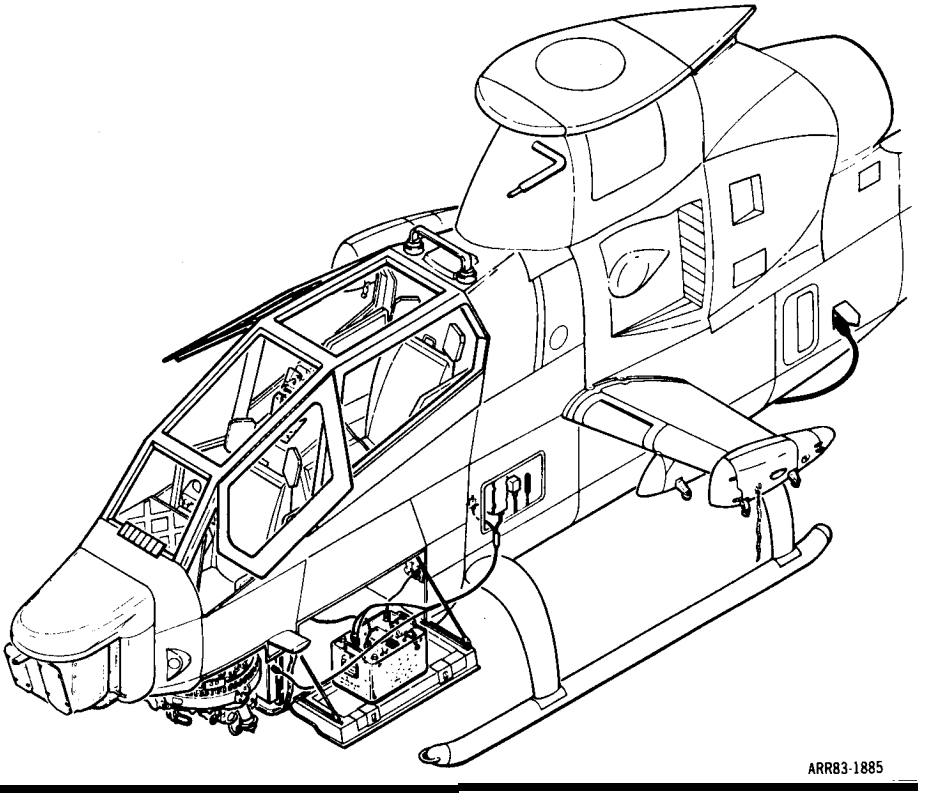
Personnel Required:
- 68J Aircraft Fire Control Repairer (2)

References:
- TM 9-1090-206-20-2
- TM 55-1520-236-23

Equipment Conditions:
- HELICOPTER ARMAMENT SUBSYSTEM MAINTENANCE SETUP performed, TM 9-1090-206-20-2.
- REMOVAL OF M197 GUN performed, TM 9-1090-206-20-2.
- Turret subsystem boresighted, see Chapter 5.
- Turret fairing removed, see TM 55-1520-236-23.
- Test set cables W1, W6, W15, connected, see TM 9-1090-206-20-2.

ADJUSTMENT SETUP

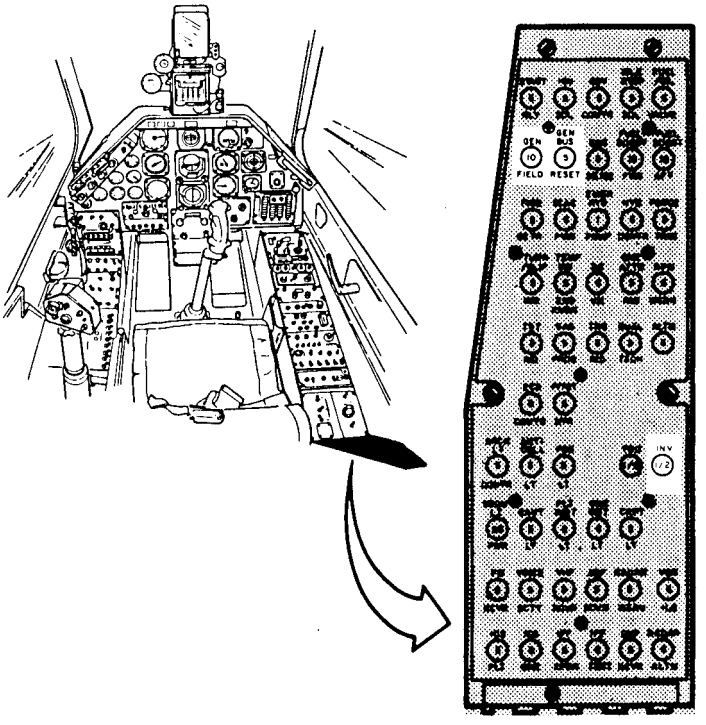
1. APPLY POWER, SEE TM 9-1090-206-20-2.



ARR83-1885

ADJUSTMENT SETUP (cont)

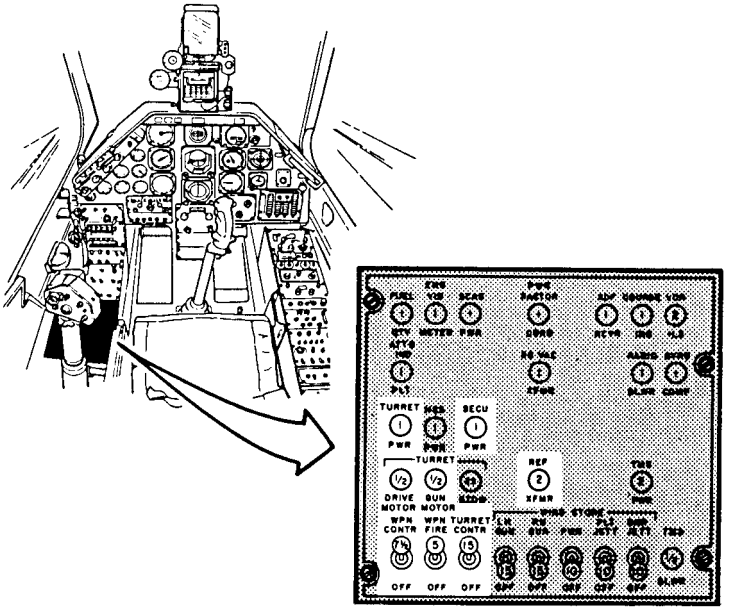
2. CLOSE FOLLOWING CIRCUIT BREAKERS ON DC CIRCUIT BREAKER PANEL:
   - GEN FIELD
   - GEN BUS RESET
   - INV



DC CIRCUIT BREAKER PANEL

ARR83-1886

3. CLOSE FOLLOWING CIRCUIT BREAKERS ON AC/ARMAMENT CIRCUIT BREAKER PANEL:
   - REF XFMR
   - TURRET PWR
   - SECU PWR
   - TURRET DRIVE MOTOR
   - TURRET GUN MOTOR
   - WPN CONTR
   - WPN FIRE
   - TURRET CONTR



AC / ARMAMENT CIRCUIT BREAKER PANEL

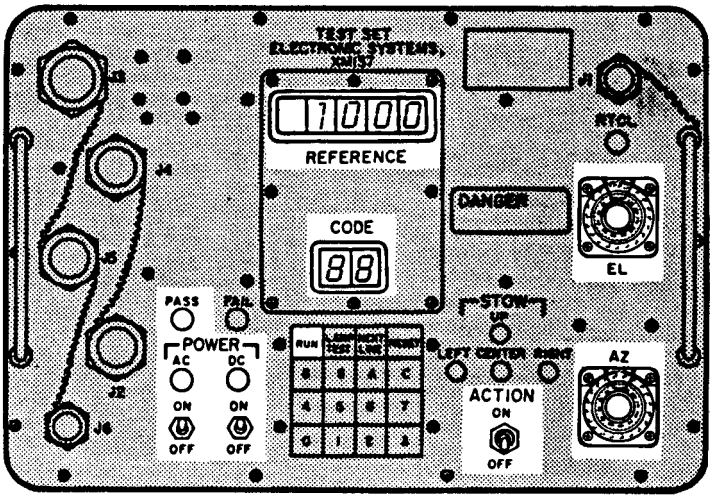
ARR83-1887

2-82. ELEVATION PROXIMITY SWITCH ADJUSTMENT (cont)

4. ON TEST SET, SET AZ AND EL DIALS TO 0° AND CHECK THAT ACTION SWITCH IS OFF.

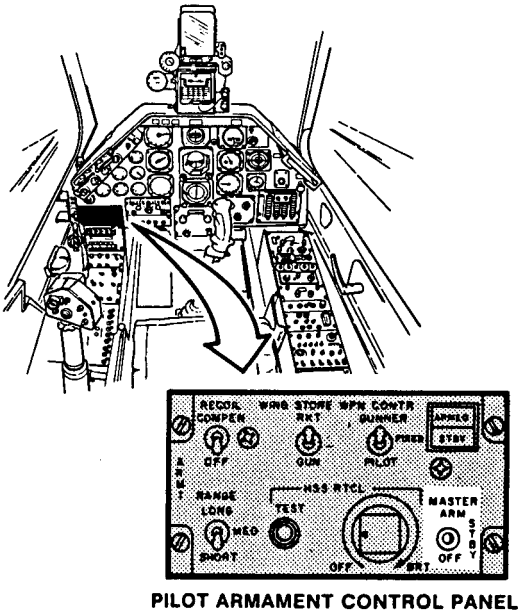
5. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.
   a. AC and DC POWER indicators light.
   b. 8's appear in REFERENCE and CODE displays.
   c. PASS indicator lights.

6. ON TEST SET, PRESS RUN KEY.
   1000 appears in REFERENCE display.



ARR83-1888

7. ON PILOT ARMAMENT CONTROL PANEL, SET MASTER ARM SWITCH TO STBY.

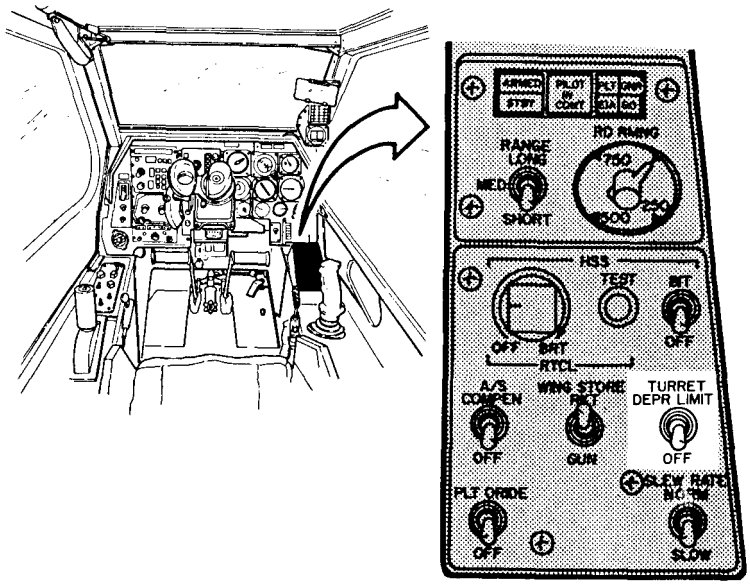


PILOT ARMAMENT CONTROL PANEL

ARR83-1889

ADJUSTMENT SETUP (cont)

8. ON GUNNER ARMAMENT CONTROL PANEL, SET TURRET DEPR LIMIT SWITCH TO OFF.

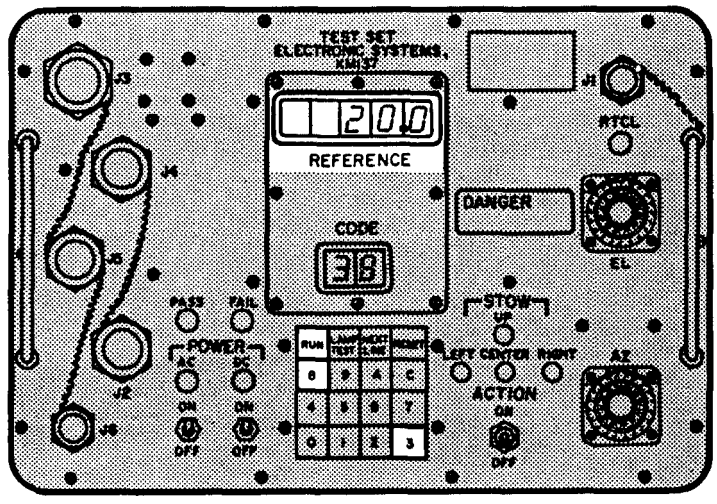


GUNNER ARMAMENT CONTROL PANEL

ARR83-1890

DOWN PROXIMITY SWITCH ADJUSTMENT

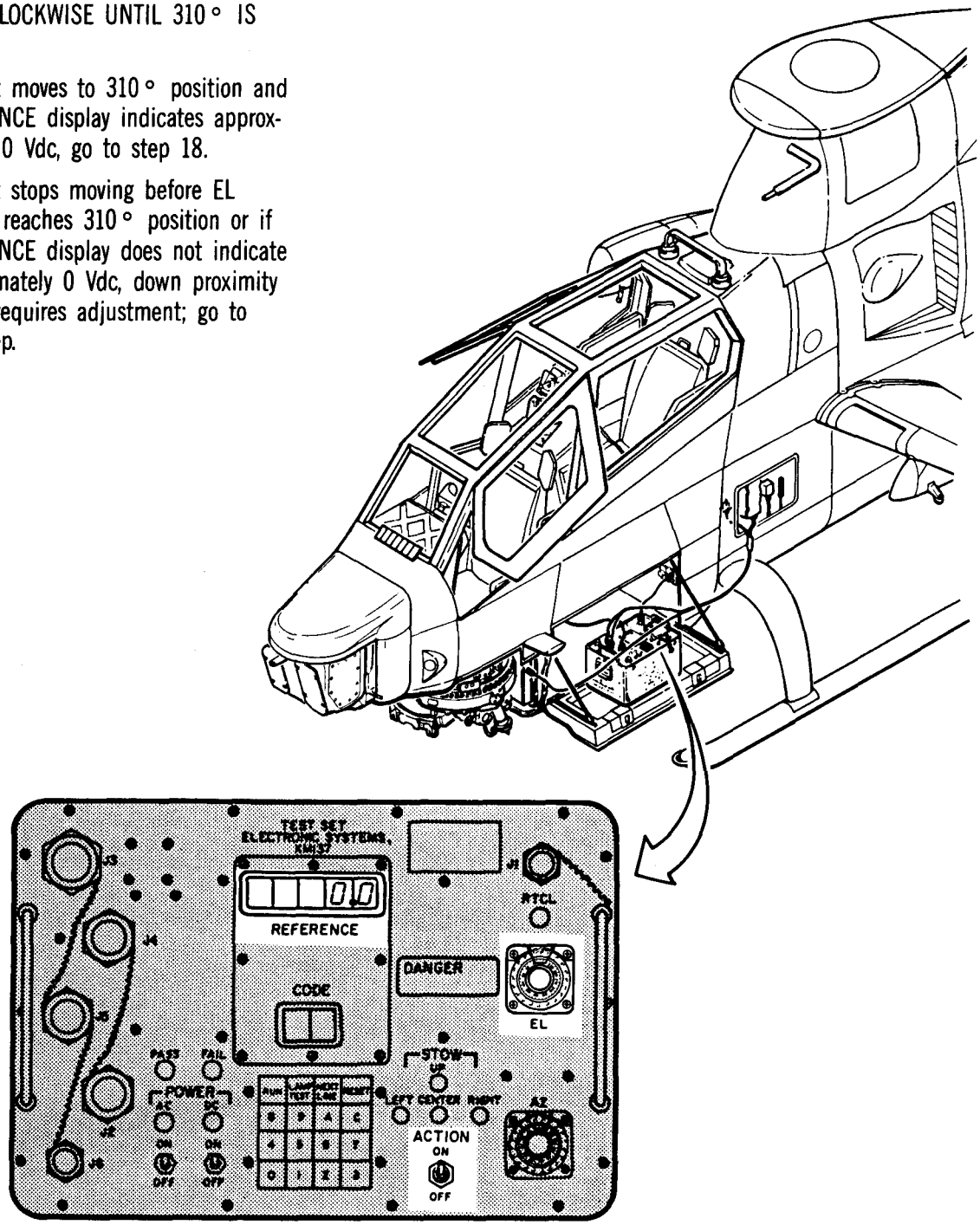
9. ON TEST SET, PRESS 3, 8, AND RUN KEYS.
   a. This is the down proximity switch test point.
   b. REFERENCE display should indicate approximately 20 Vdc.



ARR83-1891

2-82. ELEVATION PROXIMITY SWITCH ADJUSTMENT (cont)

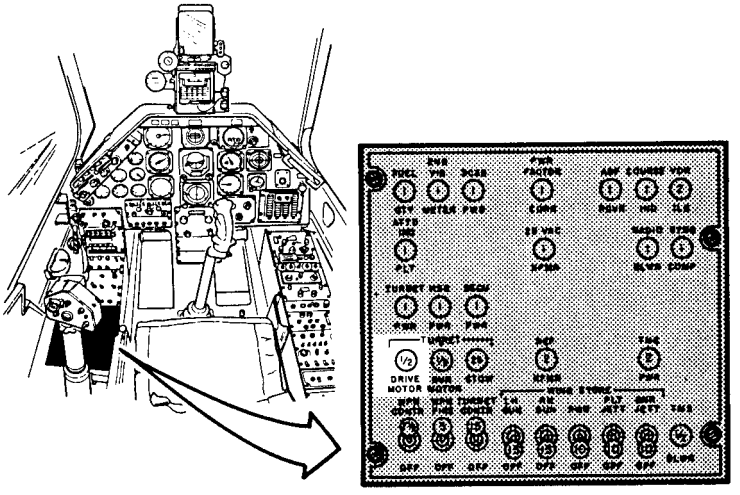
10. ON TEST SET, SET ACTION SWITCH TO ON AND SLOWLY ROTATE EL DIAL COUNTERCLOCKWISE UNTIL 310° IS REACHED.
    a. If turret moves to 310° position and REFERENCE display indicates approximately 0 Vdc, go to step 18.
    b. If turret stops moving before EL resolver reaches 310° position or if REFERENCE display does not indicate approximately 0 Vdc, down proximity switch requires adjustment; go to next step.



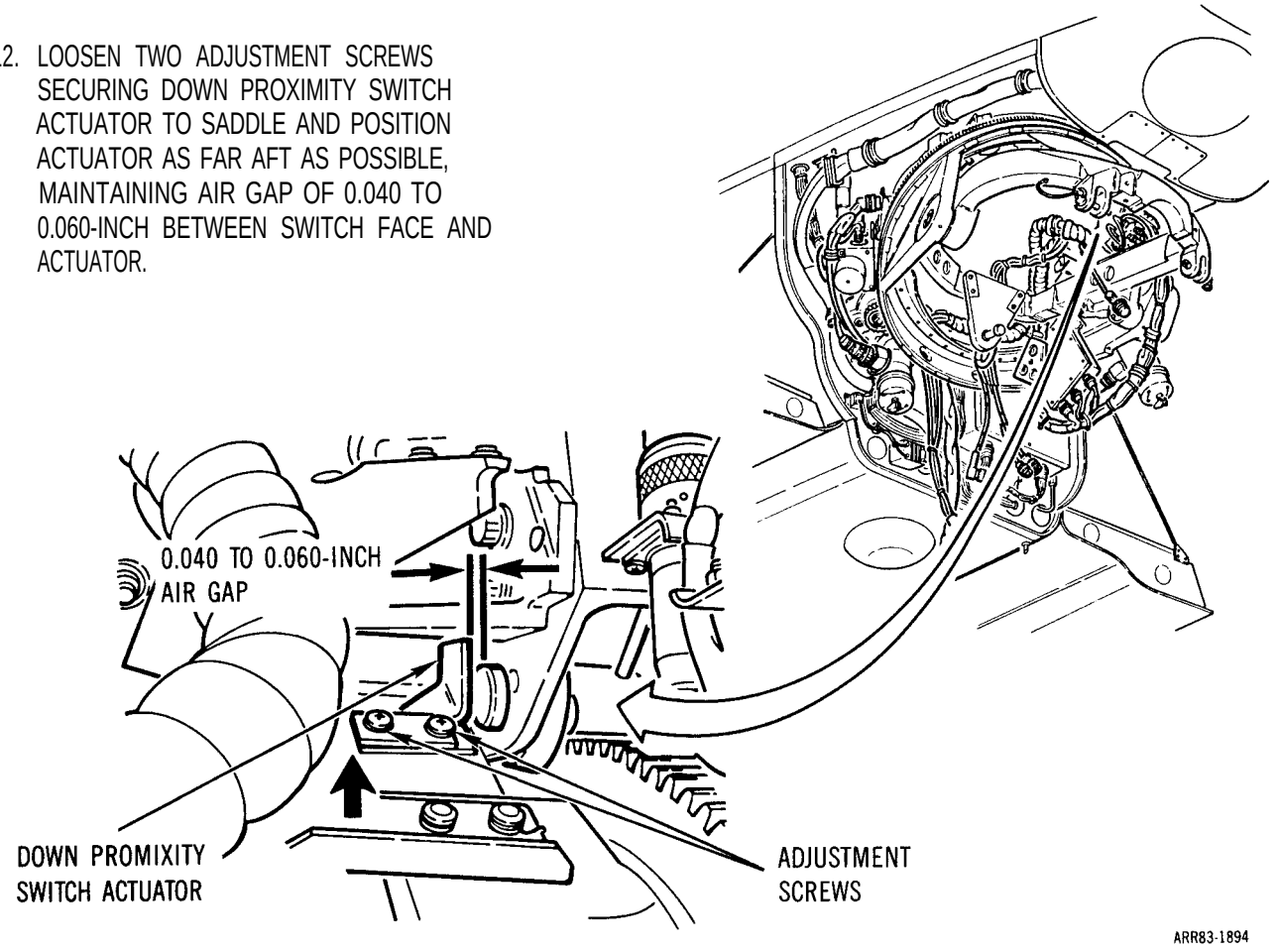
ARR83-1892

DOWN PROXIMITY SWITCH ADJUSTMENT (cont)

11. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, OPEN TURRET DRIVE MOTOR CIRCUIT BREAKER.



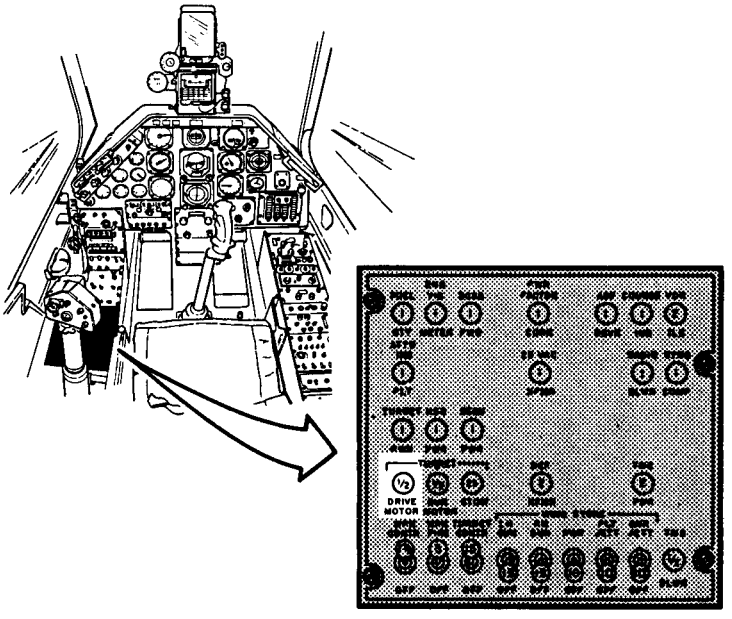
12. LOOSEN TWO ADJUSTMENT SCREWS SECURING DOWN PROXIMITY SWITCH ACTUATOR TO SADDLE AND POSITION ACTUATOR AS FAR AFT AS POSSIBLE, MAINTAINING AIR GAP OF 0.040 TO 0.060-INCH BETWEEN SWITCH FACE AND ACTUATOR.



2-82. ELEVATION PROXIMITY SWITCH ADJUSTMENT (cont)

13. CHECK THAT TEST SET EL DIAL IS STILL SET TO 310°.

14. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, CLOSE TURRET DRIVE MOTOR CIRCUIT BREAKER LONG ENOUGH FOR TURRET TO ALINE WITH TEST SET SIGHT SIMULATOR; THEN OPEN TURRET DRIVE MOTOR CIRCUIT BREAKER.

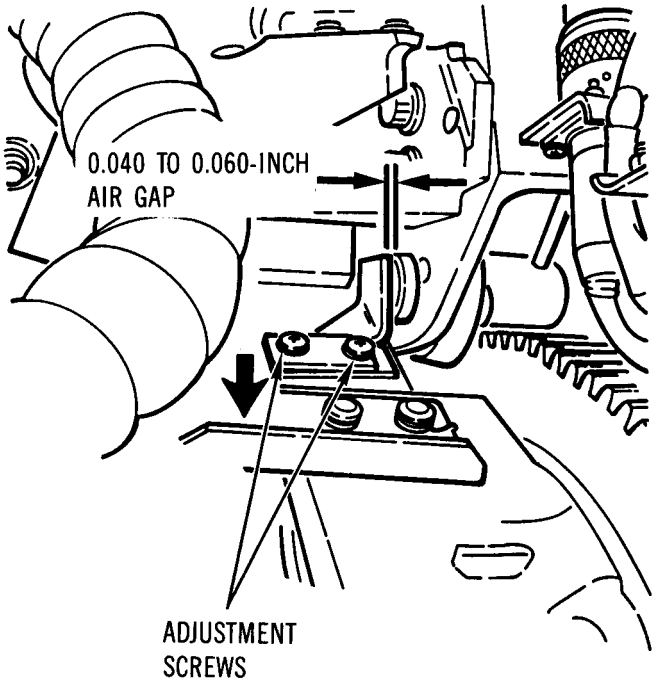


AC / ARMAMENT CIRCUIT BREAKER PANEL

ARR83-1895

15. WITHOUT DISTURBING TURRET POSITION, MOVE DOWN PROXIMITY SWITCH ACTUATOR FORWARD (WHILE MAINTAINING AIR GAP) TO POINT NECESSARY TO CAUSE TEST SET REFERENCE DISPLAY TO CHANGE FROM APPROXIMATELY 20 VDC TO APPROXIMATELY 0 VDC.

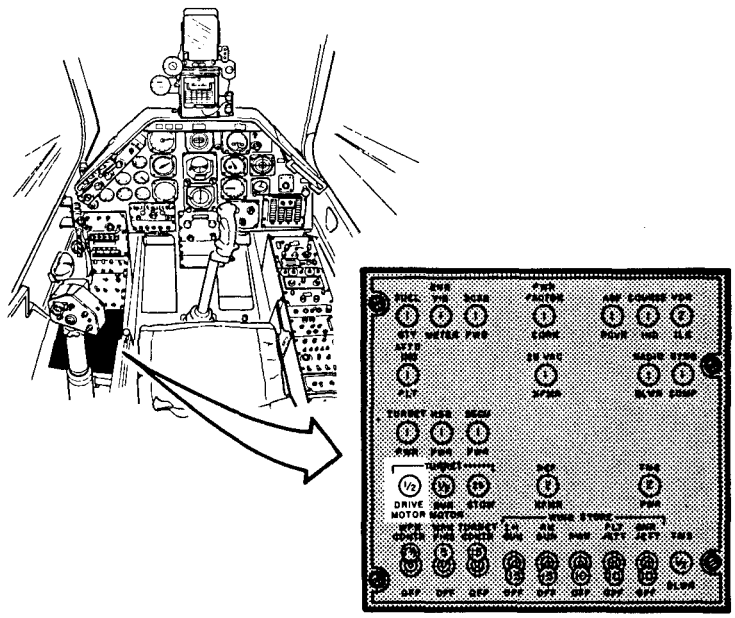
16. TIGHTEN TWO ADJUSTMENT SCREWS SECURING DOWN PROXIMITY SWITCH ACTUATOR TO SADDLE.



ARR83-1896

UP PROXIMITY SWITCH ADJUSTMENT

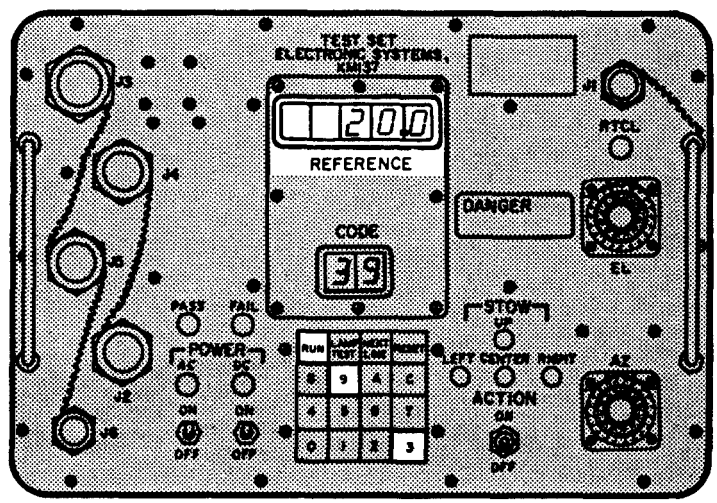
17. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, CLOSE TURRET DRIVE MOTOR CIRCUIT BREAKER.



AC / ARMAMENT
CIRCUIT BREAKER PANEL

ARR83-1897

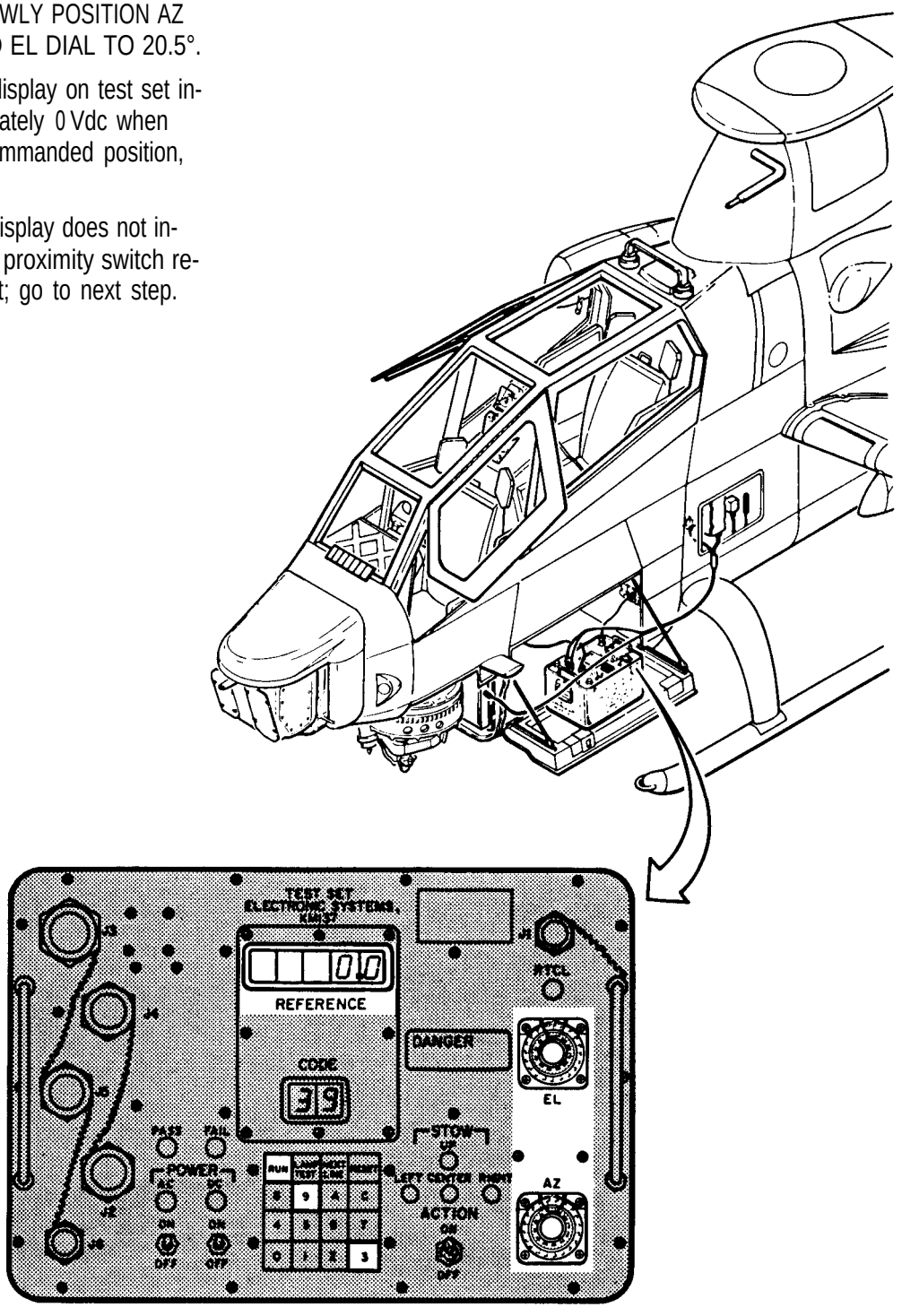
18. ON TEST SET, PRESS 3, 9, AND RUN KEYS.
    a. This is the up proximity switch test point.
    b. REFERENCE display should indicate approximately 20 Vdc.



ARR83-1898

2-82. ELEVATION PROXIMITY SWITCH ADJUSTMENT (cont)

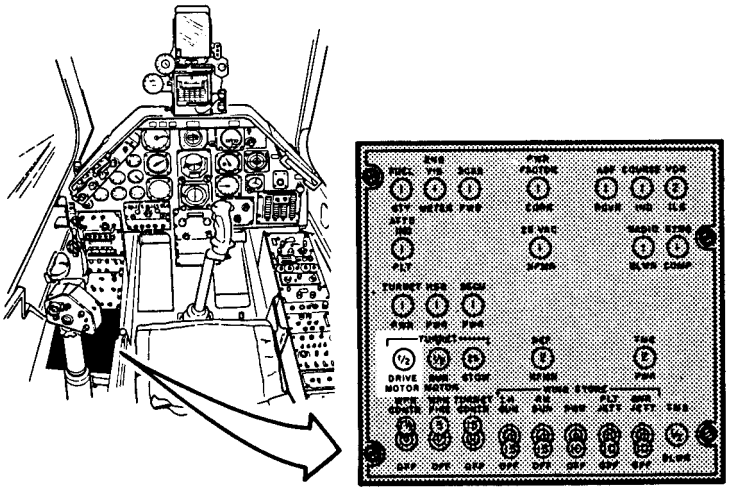
19. ON TEST SET, SLOWLY POSITION AZ DIAL TO 310° AND EL DIAL TO 20.5°.
    a. If REFERENCE display on test set indicates approximately 0 Vdc when turret reaches commanded position, go to step 26.
    b. If REFERENCE display does not indicate 0 Vdc, up proximity switch requires adjustment; go to next step.



ARR83-1899

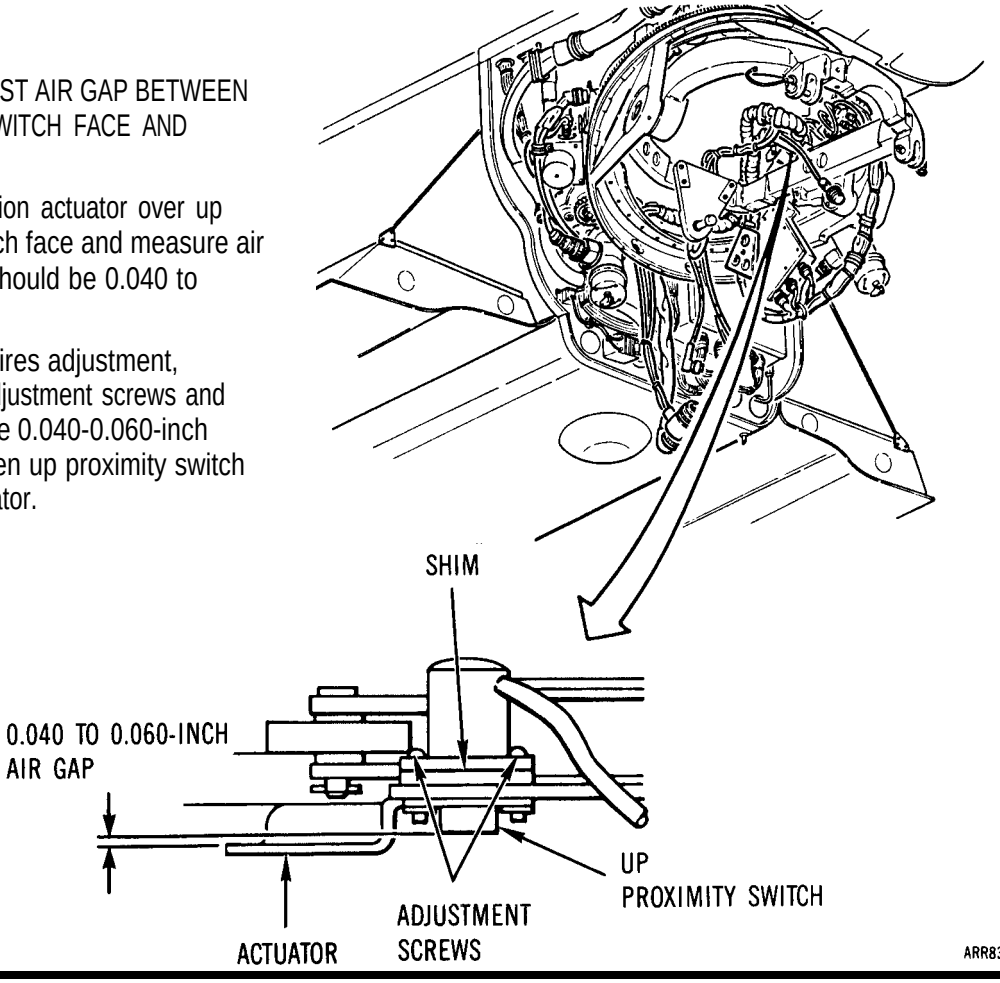
UP PROXIMITY SWITCH ADJUSTMENT (cont)

20. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, OPEN TURRET DRIVE MOTOR CIRCUIT BREAKER.



ARR83-2065

21. CHECK AND ADJUST AIR GAP BETWEEN UP PROXIMITY SWITCH FACE AND ACTUATOR.
    a. Manually position actuator over up proximity switch face and measure air gap. Air gap should be 0.040 to 0.060 inch.
    b. If air gap requires adjustment, remove two adjustment screws and shim to provide 0.040-0.060-inch air gap between up proximity switch face and actuator.

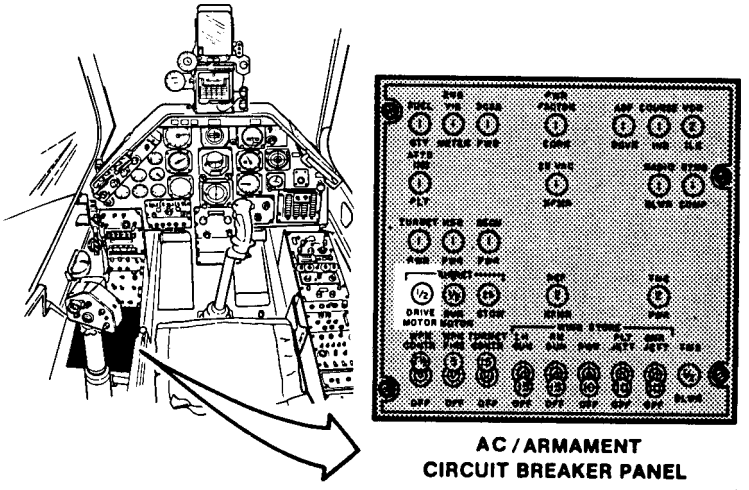


ARR83-1900

2-82. ELEVATION PROXIMITY SWITCH ADJUSTMENT (cont)

22. CHECK THAT TEST SET AZ AND EL DIALS ARE STILL SET TO 310° AND 20.5°.

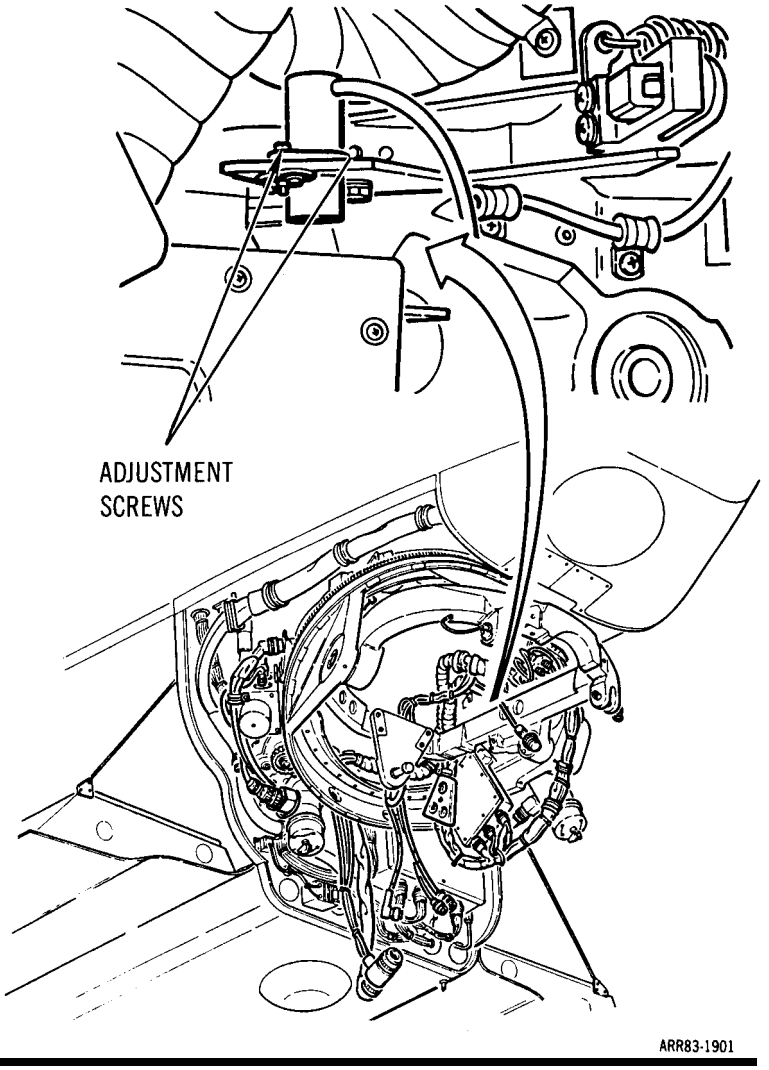
23. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, CLOSE TURRET DRIVE MOTOR CIRCUIT BREAKER LONG ENOUGH FOR TURRET TO ALINE WITH TEST SET, THEN OPEN TURRET DRIVE MOTOR CIRCUIT BREAKER.



24. LOOSEN TWO ADJUSTMENT SCREWS; THEN, WITHOUT DISTURBING TURRET POSITION, SLOWLY ADJUST LATERAL POSITION OF UP PROXIMITY SWITCH UNTIL REFERENCE DISPLAY ON TEST SET INDICATES APPROXIMATELY 0 VDC.

25. TIGHTEN TWO ADJUSTMENT SCREWS.

26. REMOVE POWER, SEE TM 9-1090-206-20-2; THEN DISCONNECT TEST SET.



END OF TASK

2-83. TURRET CONTROL UNIT STOW POTENTIOMETER ADJUSTMENT

DESCRIPTION

This task covers: Adjustment of turret control unit stow potentiometers A6A1R11 and A6A1R14.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental
- Electronics Systems Test Set:
  - M137

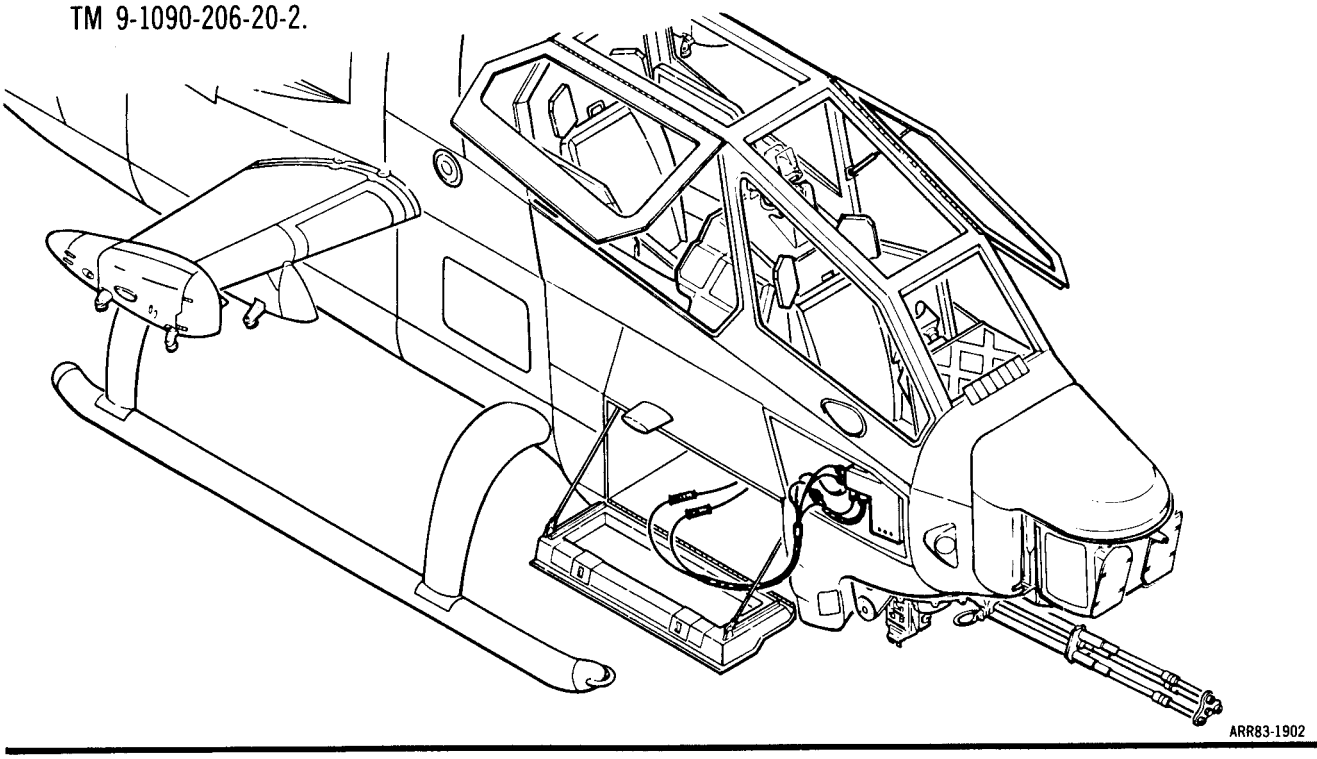
Personnel Required:
- 68J Aircraft Fire Control
  - Repairer

References:
- TM 9-1090-206-20-2

Equipment Conditions:
- HELICOPTER ARMAMENT SUBSYSTEM
  - MAINTENANCE SETUP performed,
  - TM 9-1090-206-20-2.
- Test set cables W1 and W8 connected, see
  - TM 9-1090-20-206-2.

STOW POTENTIOMETER ADJUSTMENT

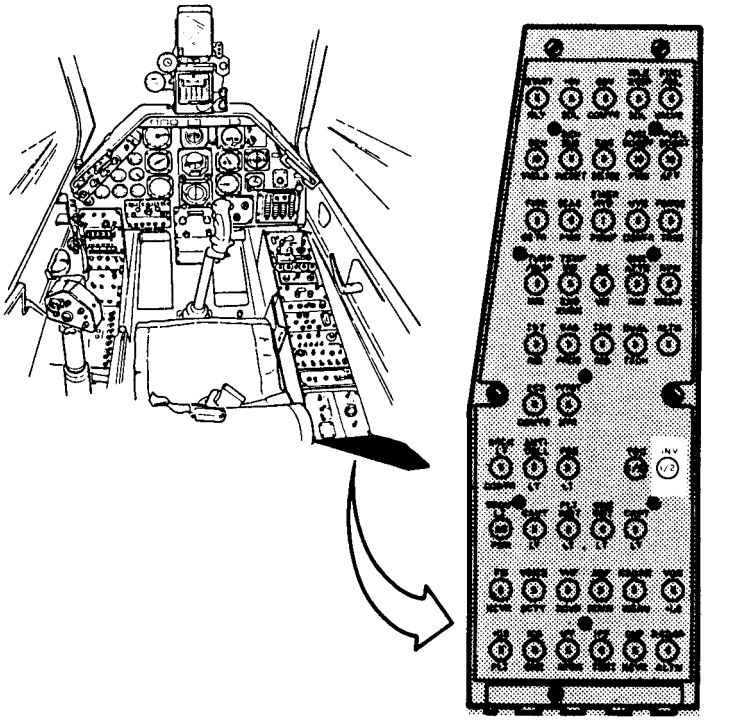
1. APPLY POWER, SEE TM 9-1090-206-20-2.



ARR83-1902

2-83. TURRET CONTROL UNIT STOW POTENTIOMETER ADJUSTMENT (cont)

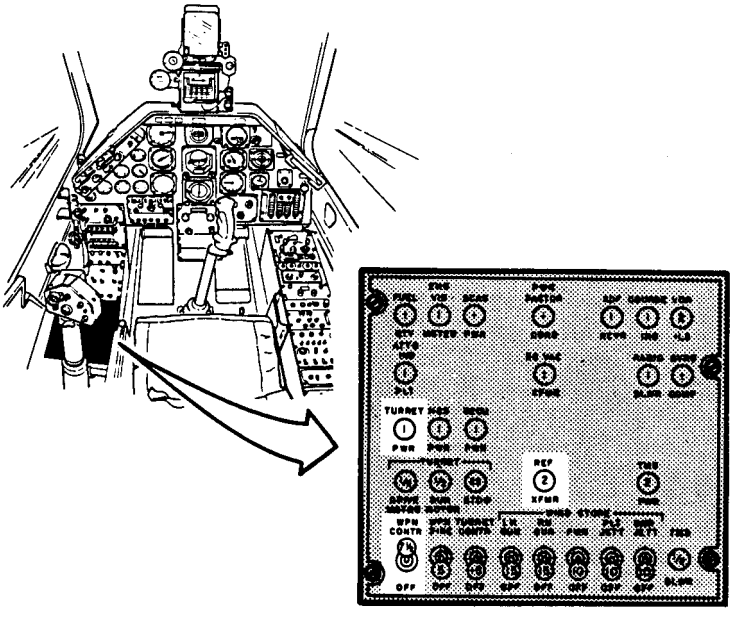
2. CLOSE INV CIRCUIT BREAKER ON DC CIRCUIT BREAKER PANEL.



DC CIRCUIT BREAKER PANEL

ARR83-1903

3. CLOSE REF XFMR, TURRET PWR, AND WPN CONTR CIRCUIT BREAKERS ON AC/ ARMAMENT CIRCUIT BREAKER PANEL.

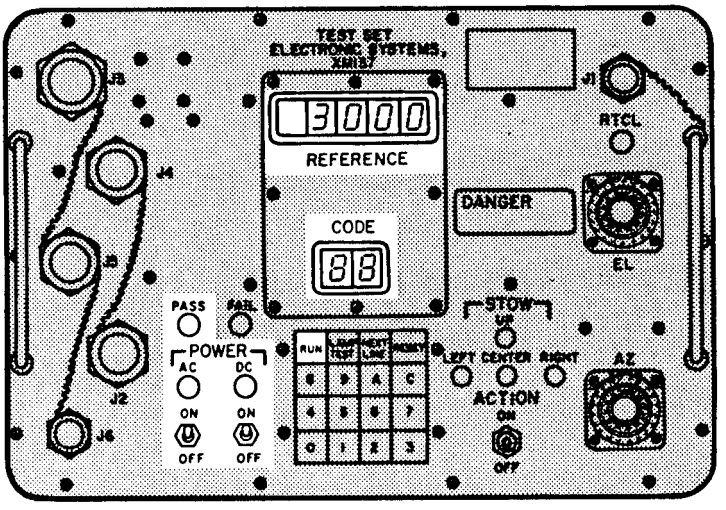


AC / ARMAMENT CIRCUIT BREAKER PANEL

ARR83-1904

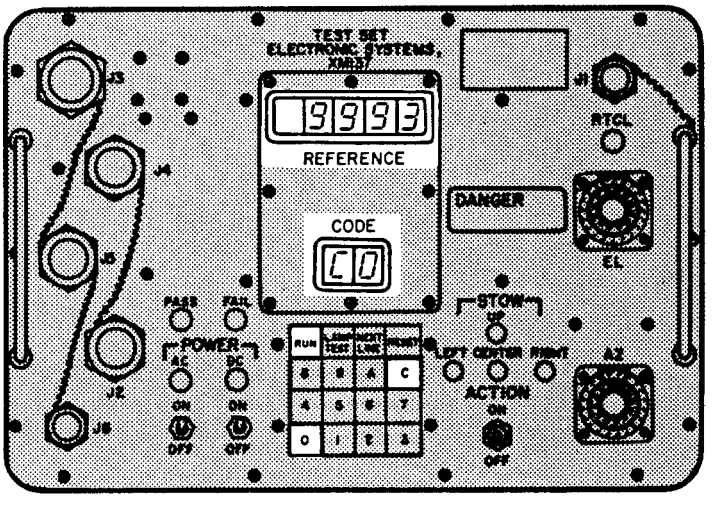
STOW POTENTIOMETER ADJUSTMENT (cont)

4. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.
   a. AC and DC POWER indicators light.
   b. 8's appear in REFERENCE and CODE displays.
   c. PASS indicator lights.
5. ON TEST SET, PRESS RUN KEY.
   3000 appears in REFERENCE display.



ARR83-1905

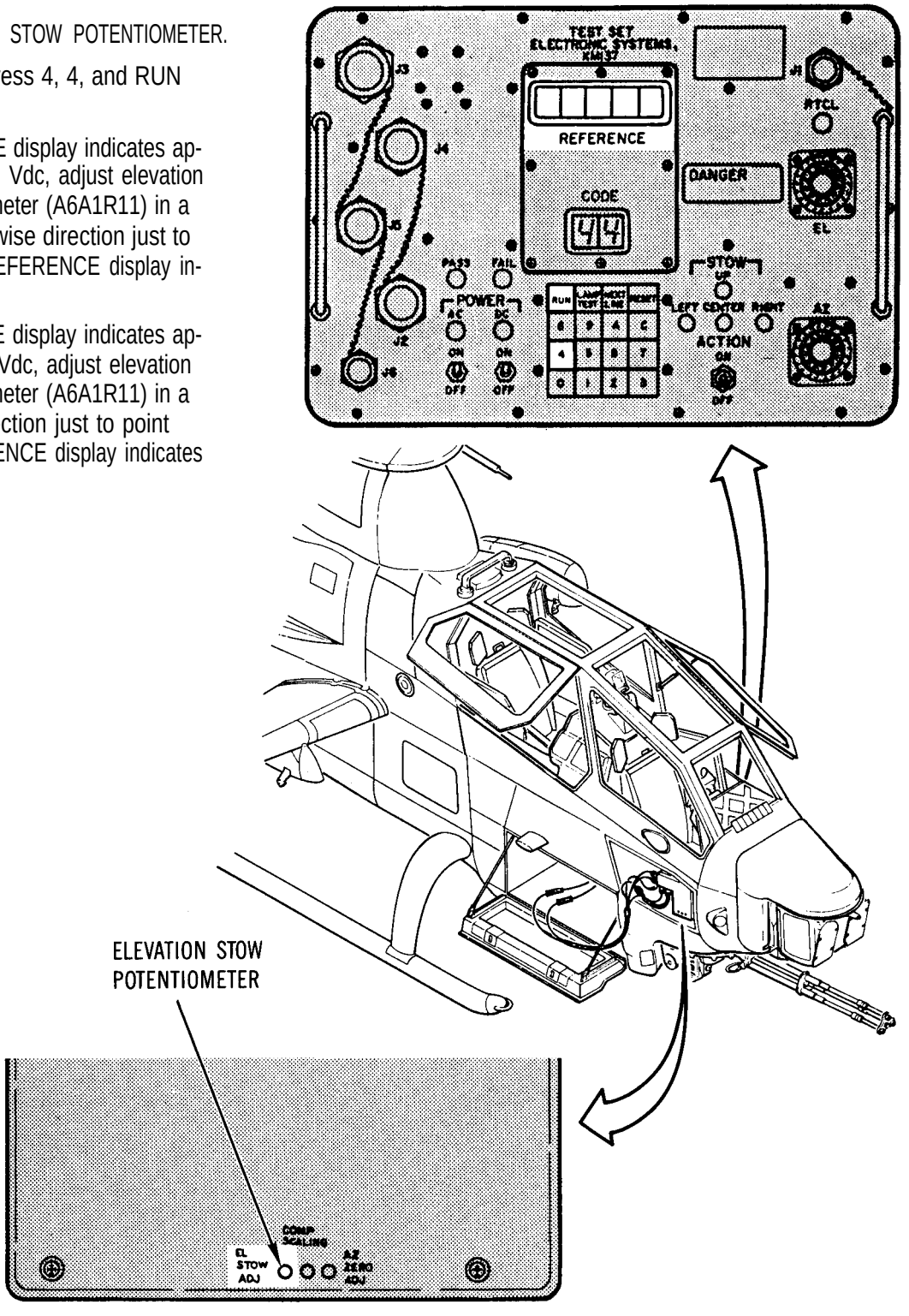
6. ON TEST SET, PRESS C, 0, AND RUN KEYS.
   a. C0 appears in CODE display.
   b. 9993 appears in REFERENCE display.



ARR83-1906

2-83. TURRET CONTROL UNIT STOW POTENTIOMETER ADJUSTMENT (cont)

7. ADJUST ELEVATION STOW POTENTIOMETER.
   a. On test set, press 4, 4, and RUN keys.
   b. If REFERENCE display indicates approximately 27 Vdc, adjust elevation stow potentiometer (A6A1R11) in a counter clockwise direction just to point where REFERENCE display indicates 0 Vdc.
   c. If REFERENCE display indicates approximately 0 Vdc, adjust elevation stow potentiometer (A6A1R11) in a clockwise direction just to point where REFERENCE display indicates 27 Vdc.



ARR83-1907

STOW POTENTIOMETER ADJUSTMENT (cont)

ADJUST AZIMUTH STOW POTENTIOMETER.

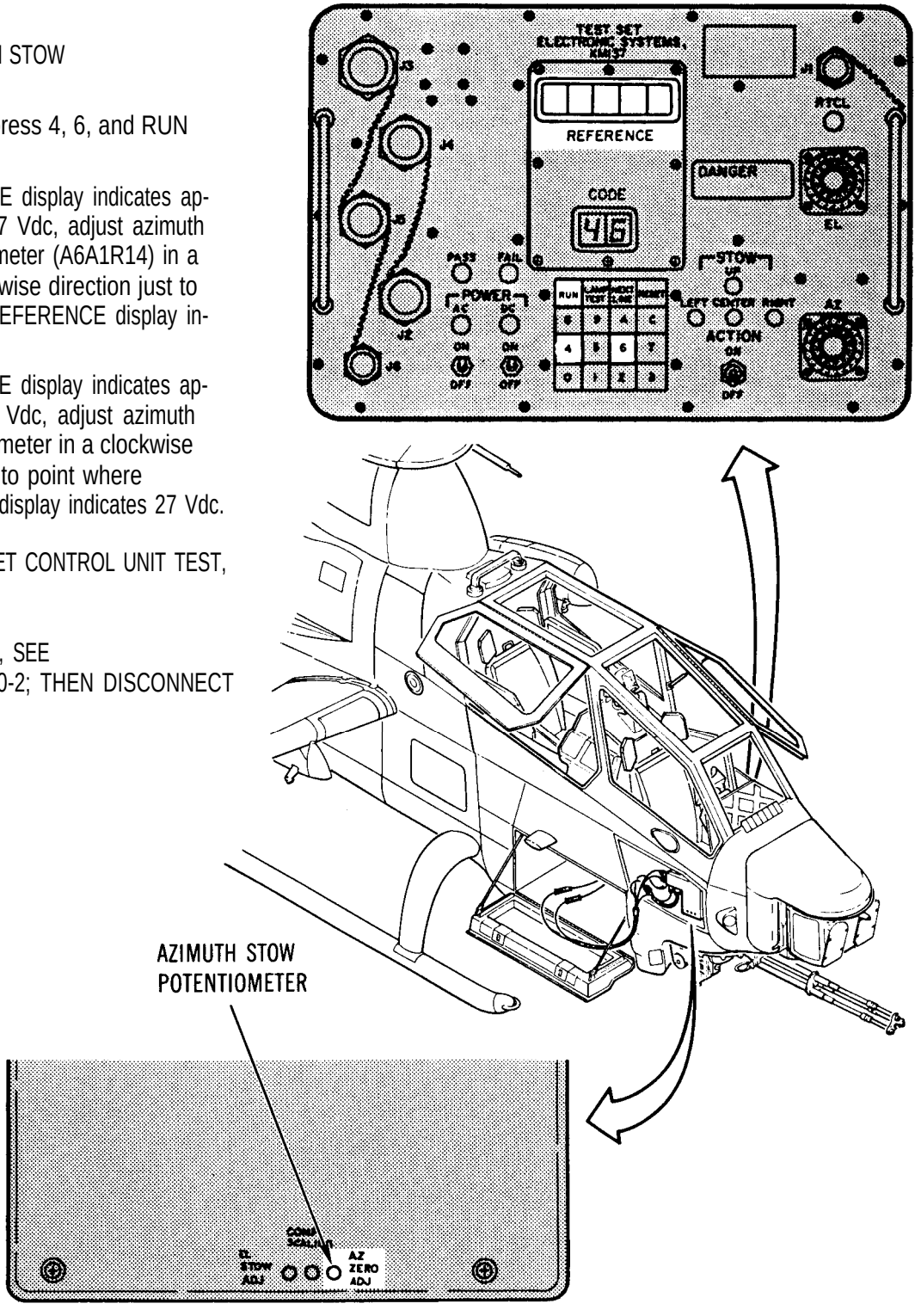
a. On test set, press 4, 6, and RUN keys.

b. If REFERENCE display indicates approximately 27 Vdc, adjust azimuth stow potentiometer (A6A1R14) in a counter clockwise direction just to point where REFERENCE display indicates 0 Vdc

c. If REFERENCE display indicates approximately 0 Vdc, adjust azimuth stow potentiometer in a clockwise direction just to point where REFERENCE display indicates 27 Vdc.

9. PERFORM TURRET CONTROL UNIT TEST, PARA 2-22.

10. REMOVE POWER, SEE TM 9-1090-206-20-2; THEN DISCONNECT TEST SET.



ARR83-1908

END OF TASK

2-84. INTERFACE CONTROL UNIT PITCH AND ROLL RESOLVER ADJUSTMENT

DESCRIPTION

This task covers: Adjustment of pitch and roll resolvers.

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Electronics Systems Test Set: M137

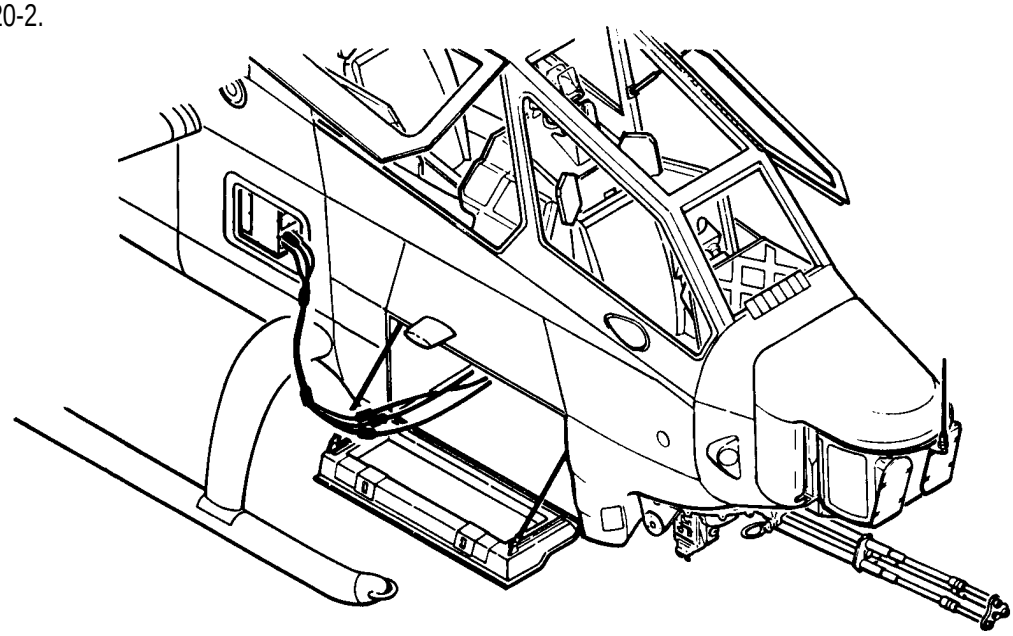
Personnel Required:
- 68J Aircraft Fire Control Repairer (2)

References:
- TM 9-1090-206-20-2

Equipment Conditions:
- HELICOPTER ARMAMENT SUBSYSTEM MAINTENANCE SETUP performed, TM 9-1090-206-20-2.
- Test set cables W1 and W7 connected, see TM 9-1090-206-20-2.

PITCH AND ROLL RESOLVER ADJUSTMENT

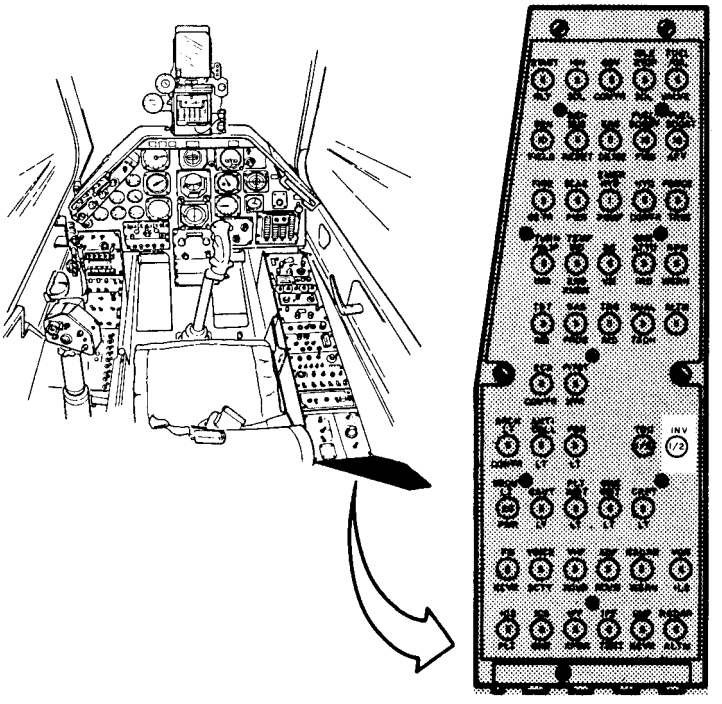
1. APPLY POWER, SEE TM 9-1090-206-20-2.



ARR83-1909

PITCH AND ROLL RESOLVER ADJUSTMENT (cont)

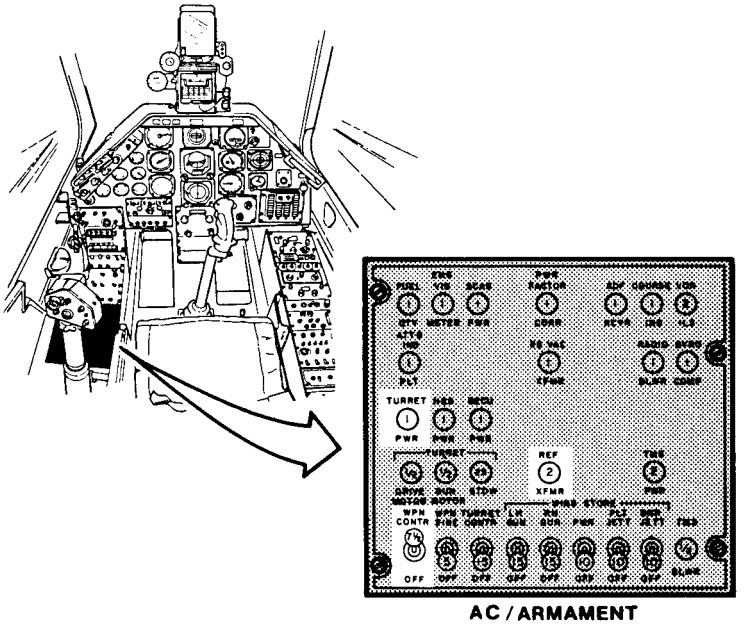
2. CLOSE INV CIRCUIT BREAKER ON DC CIRCUIT BREAKER PANEL.



DC CIRCUIT BREAKER PANEL

ARR83-1910

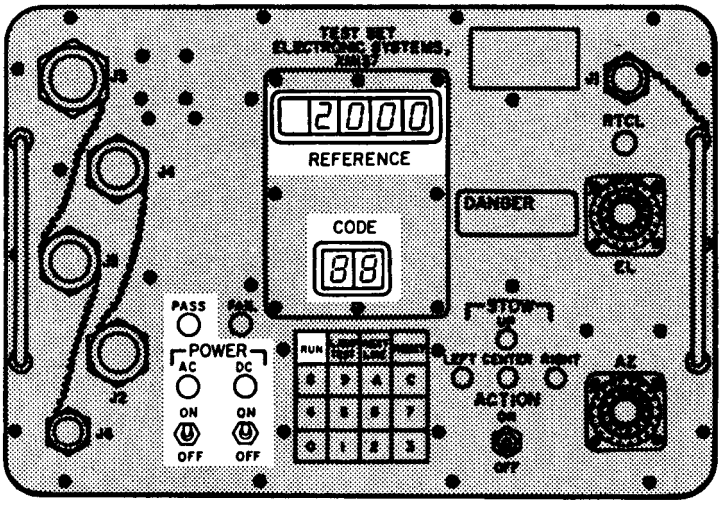
3. CLOSE REF XFMR, TURRET PWR, AND WPN CONTR CIRCUIT BREAKERS ON AC/ ARMAMENT CIRCUIT BREAKER PANEL.



AC / ARMAMENT CIRCUIT BREAKER PANEL

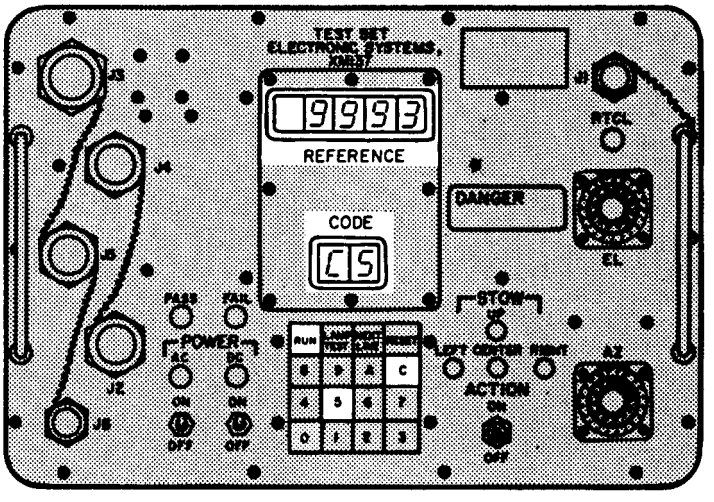
2-84. INTERFACE CONTROL UNIT PITCH AND ROLL RESOLVER ADJUSTMENT (cont)

4. ON TEST SET, SET AC AND DC CIRCUIT BREAKERS TO ON.
   a. AC and DC power indicators light.
   b. 8's appear in REFERENCE and CODE displays.
   c. PASS indicator lights.
5. ON TEST SET, PRESS RUN KEY.
   2000 appears in REFERENCE display.



ARR83-1912

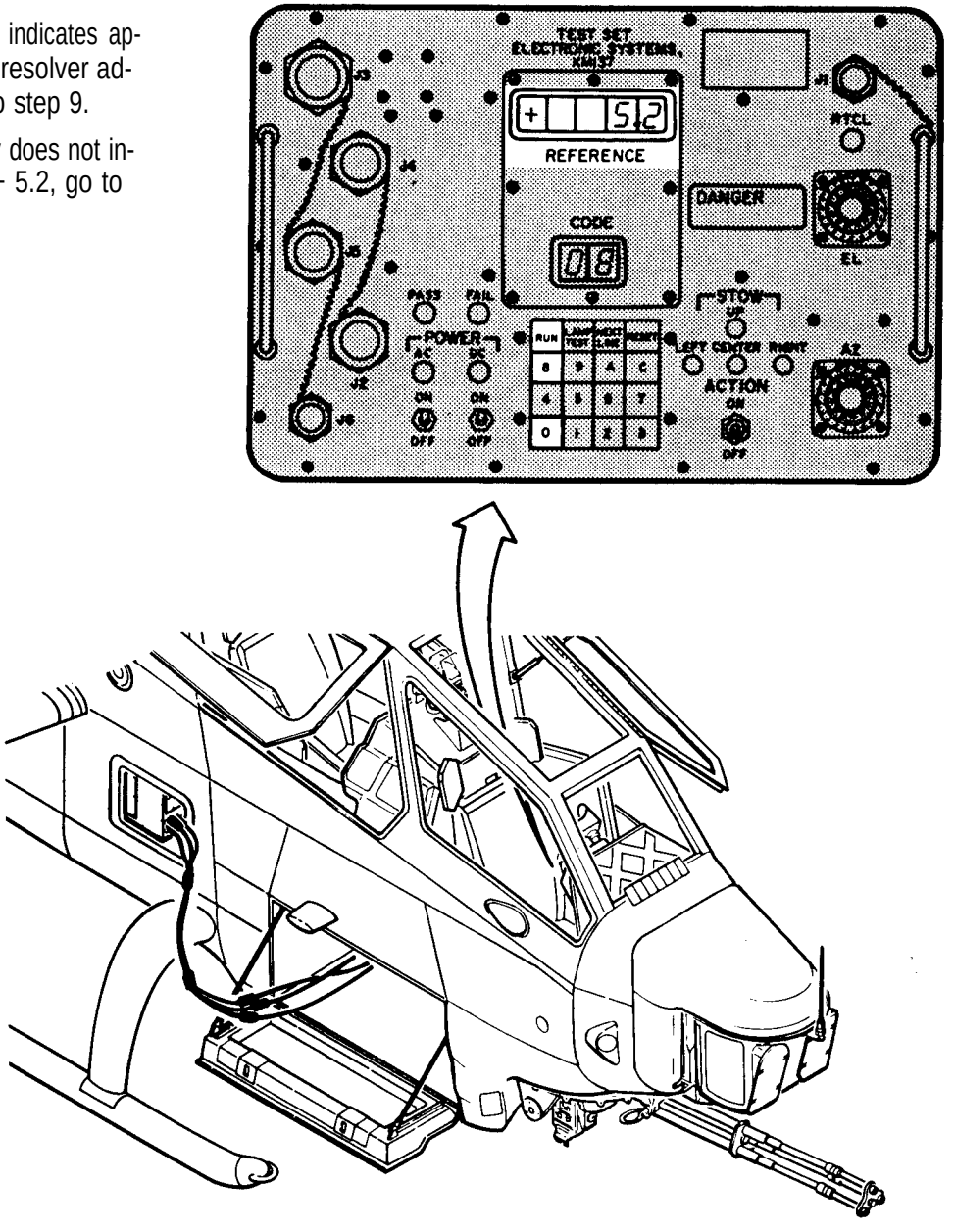
6. ON TEST SET, PRESS C, 5, AND RUN KEYS.
   a. C5 appears in CODE display.
   b. 9993 appears in REFERENCE display.



ARR83-1913

PITCH AND ROLL RESOLVER ADJUSTMENT (cont)

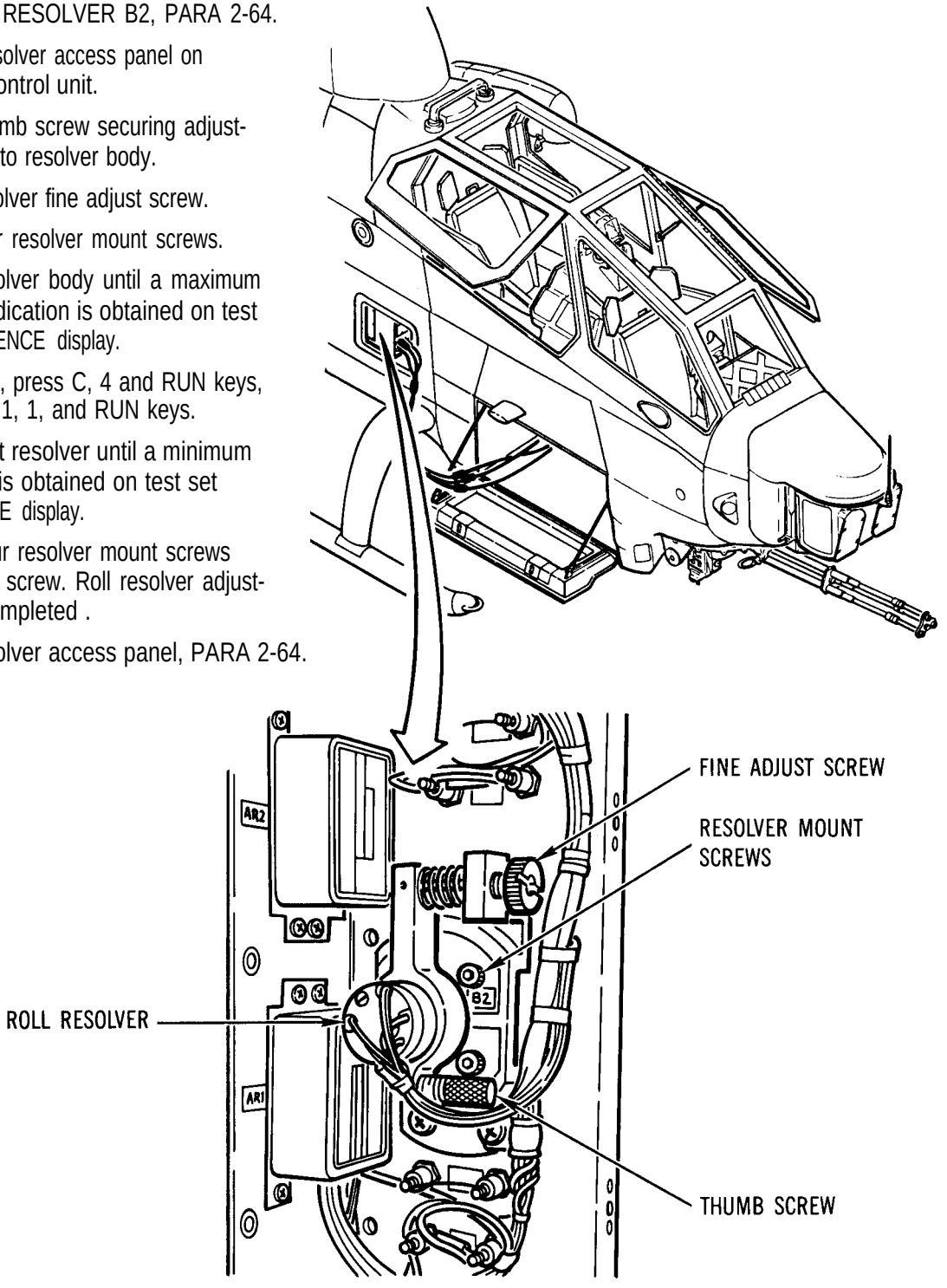
7. CHECK ROLL RESOLVER B2 ADJUSTMENT.
   a. On test set, press 0, 8, and RUN keys.
   b. If REFERENCE display indicates approximately + 5.2, roll resolver adjustment is okay; go to step 9.
   c. If REFERENCE display does not indicate approximately + 5.2, go to next step.



ARR83-1914

2-84. INTERFACE CONTROL UNIT PITCH AND ROLL RESOLVER ADJUSTMENT (cont)

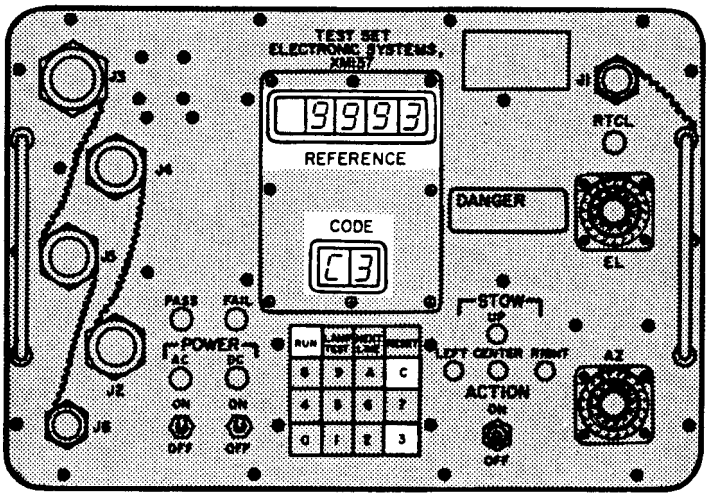
8. ADJUST ROLL RESOLVER B2, PARA 2-64.
   a. Remove resolver access panel on interface control unit.
   b. Loosen thumb screw securing adjustment lever to resolver body.
   c. Center resolver fine adjust screw.
   d. Loosen four resolver mount screws.
   e. Rotate resolver body until a maximum positive indication is obtained on test set REFERENCE display.
   f. On test set, press C, 4 and RUN keys, then press 1, 1, and RUN keys.
   g. Fine adjust resolver until a minimum indication is obtained on test set REFERENCE display.
   h. Tighten four resolver mount screws and thumb screw. Roll resolver adjustment is completed .
   i. Install resolver access panel, PARA 2-64.



ARR83-1915

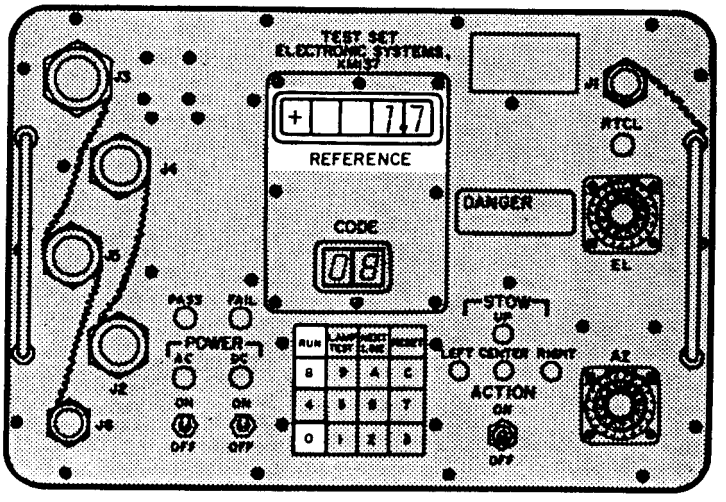
PITCH AND ROLL RESOLVER ADJUSTMENT (cont)

9. ON TEST SET, PRESS C, 3, AND RUN KEYS.
   a. C3 appears in CODE display.
   b. 9993 appears in REFERENCE display.



ARR83-1916

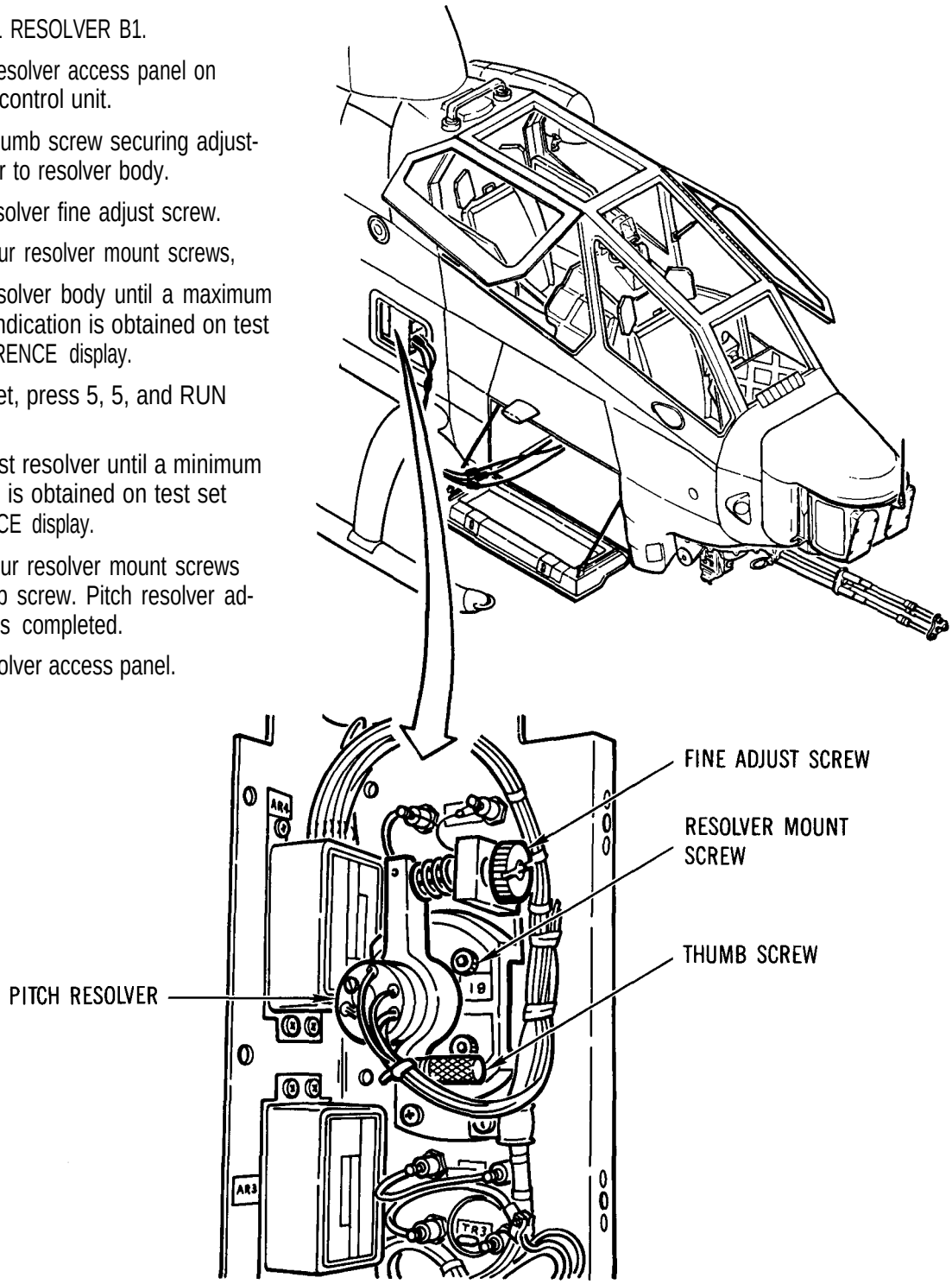
10. CHECK PITCH RESOLVER B1 ADJUSTMENT.
   a. On test set, press 0, 8, and RUN keys.
   b. If REFERENCE display indicates approximately +1.7, pitch resolver adjustment isokay; go to step 12.
   c. If REFERENCE display does not indicate approximately +1.7, go to next step.



ARR83-1917

2-84. INTERFACE CONTROL UNIT PITCH AND ROLL RESOLVER ADJUSTMENT (cont)

11. ADJUST ROLL RESOLVER B1.
    a. Remove resolver access panel on interface control unit.
    b. Loosen thumb screw securing adjustment lever to resolver body.
    c. Center resolver fine adjust screw.
    d. Loosen four resolver mount screws,
    e. Rotate resolver body until a maximum positive indication is obtained on test set REFERENCE display.
    f. On test set, press 5, 5, and RUN keys.
    g. Fine adjust resolver until a minimum indication is obtained on test set REFERENCE display.
    h. Tighten four resolver mount screws and thumb screw. Pitch resolver adjustment is completed.
    i. Install resolver access panel.



ARR83-1918

PITCH AND ROLL RESOLVER ADJUSTMENT (cont)

12. PERFORM INTERFACE CONTROL UNIT (209-074-051-3) TEST, PARA 2-28.

13. REMOVE POWER, SEE TM 9-1090-206-20-2; THEN DISCONNECT TEST SET.

END OF TASK

ADJUSTMENT

2-85. ELEVATION MECHANICAL STOP ADJUSTMENT

DESCRIPTION

This task covers: Shimming of wear plate to set elevation mechanical stop.

INITIAL SETUP

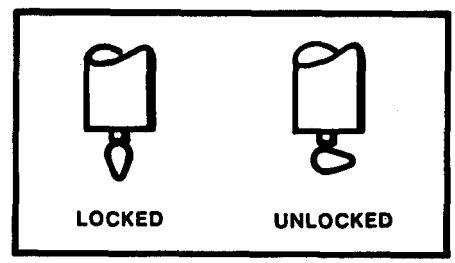
Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental

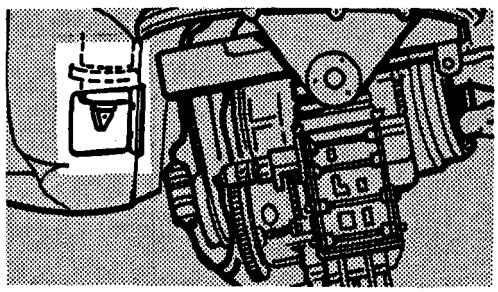
Personnel Required:
- 68M Aircraft Weapon Systems
  - Repairer

References:
- TM 9-1090-206-20-2

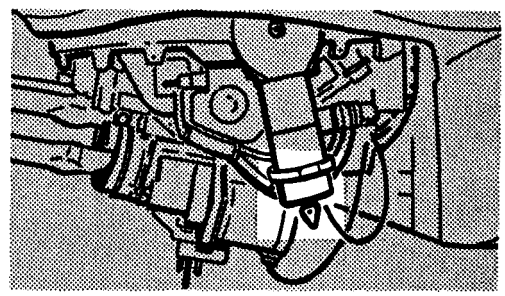
Equipment Conditions:
- HELICOPTER ARMAMENT SUBSYSTEM MAINTENANCE SETUP performed, TM 9-1090-206-20-2.

1. POSITION TURRET.
   a. Unlock azimuth and elevation drive motor brakes.
   b. Manually position turret to approximately 0° azimuth, then lock azimuth drive motor brake.
   c. Manually raise gun barrels to maximum elevation, then lock elevation drive motor brake.





AZIMUTH DRIVE MOTOR BRAKE HANDLE

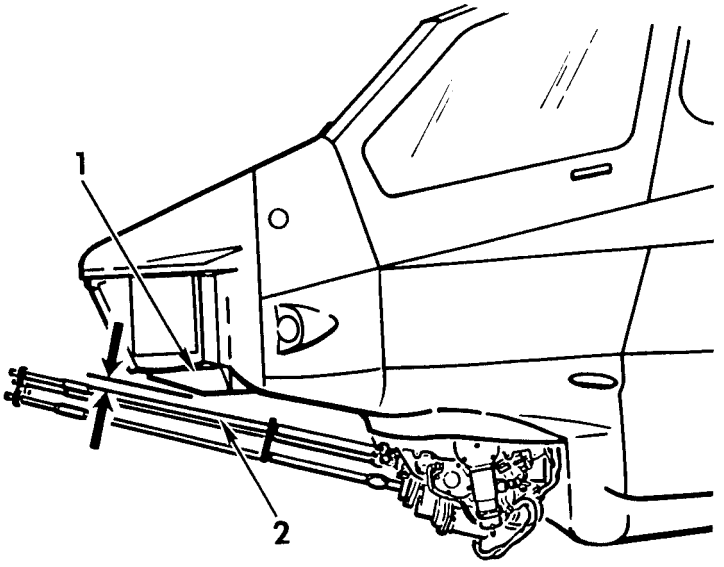


ELEVATION DRIVE MOTOR BRAKE HANDLE

ARR83-0268

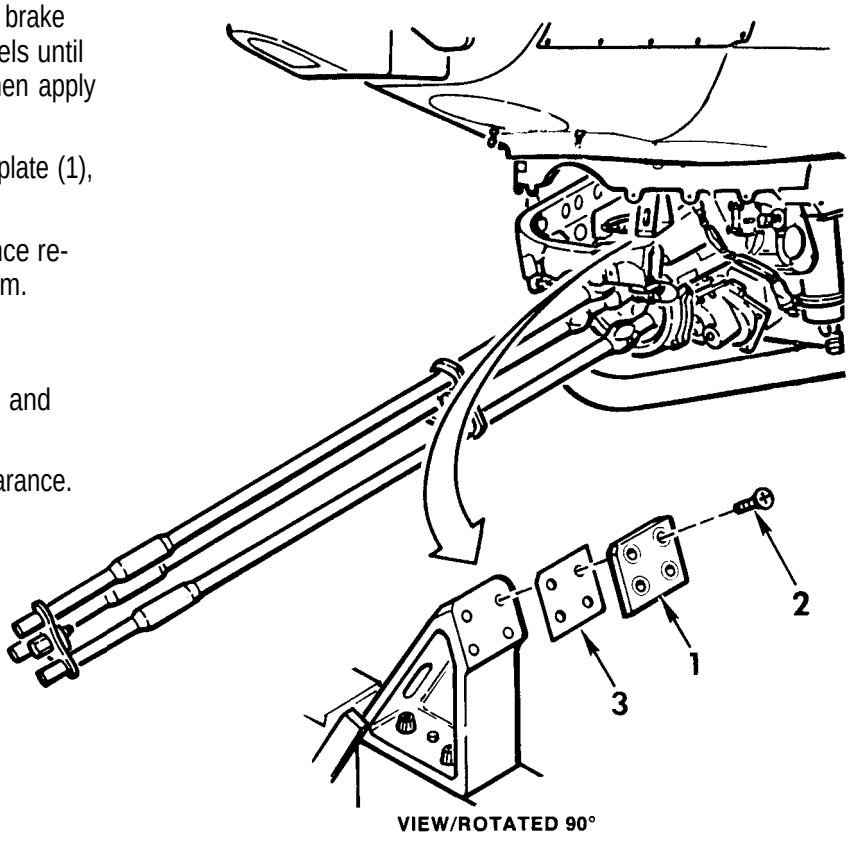
ADJUSTMENT (cont)

2. CHECK CLEARANCE BETWEEN TSU (1) AND BARREL CLUSTER.
   a. Manually rotate barrel cluster until a barrel (2) is at its highest position.
   b. Measure clearance between top of barrel (2) and nearest part of TSU (1). Clearance must not be less than 2-7/8 inches, nor more than 3-1/8 inches. If clearance is not as specified, elevation mechanical stop must be reshimmed; go to next step.



ARR83-0244

3. SHIM WEARPLATE (1).
   a. Release elevation drive motor brake and manually lower gun barrels until wearplate (1) is accessible, then apply brake.
   b. Remove four screws (2), wearplate (1), and shim (3).
   c. For each 1/16-inch of clearance required, use 0.015 inch of shim. Prepare a shim pack to this dimension.
   d. Install shim (3), wearplate (1) and four screws (2).
   e. Repeat step 2 to recheck clearance.



ARR83-0245

END OF TASK

Section XXVI. PREPARATION FOR STORAGE AND SHIPMENT

GENERAL

2-86. This section contains preparation instructions for flyable storage and shipment of the turret subsystem.

PREPARATION FOR FLYABLE STORAGE AND SHIPMENT

2-87. The local maintenance officer is responsible for processing the turret subsystem for flyable storage and shipment. The processing organization is responsible for record keeping requirements. Refer to DA PAM 738-751 for forms used for equipment inventory. Preparation of the turret subsystem for flyable storage and shipment will be in accordance with the following paragraphs, TM 740-90-1, and the local directives of the commands concerned.

CHECKOUT

The turret subsystem will be operationally checked out by performing the turret subsystem pre-operational check in accordance with TM 9-1090-206-20-1 or TM 9-1090-206-20-2 and serviced as required.

PRESERVATION

Preservation of the turret subsystem for flyable storage and shipment will be in accordance with the following paragraphs. The helicopter armament subsystem maintenance setup will be performed in accordance with TM 9-1090-206-20-1 or TM 9-1090-206-20-2 before cleaning and lubricating the turret subsystem.

Cleaning. The turret subsystem will be cleaned in accordance with Section IV.

Lubrication. The turret subsystem will be lubricated in accordance with LO 9-1090-206-20.

Section XXVII. PRE-EMBARKATION INSPECTION OF MATERIEL IN UNITS ALERTED FOR OVERSEAS MOVEMENT

GENERAL

2-88. This inspection is conducted on materiel in alerted units scheduled for overseas duty to make certain that such materiel will not become unserviceable in a relatively short time. The inspection prescribes a higher percentage of remaining usable life in serviceable materiel to meet a specific need beyond minimum serviceability.

PRE-EMBARKATION

2-89. The turret system must be thoroughly cleaned of all grease, dirt, or other material that might interfere with its proper function or obscure the true condition of parts.

1. Screw heads must be in serviceable condition. Threads must not be stripped. Internal threads must not be stripped.
2. Cable assemblies must not have loose or damaged connections, cut or worn insulation, broken wires, kinks, or sharp bends.
3. Material must be free of burrs, particularly those on functional surfaces.
4. Parts must not be cracked, bent, distorted, or damaged. They must be free of detrimental wear.
5. Rivets must be tight.
6. Painted surfaces must be free of bare spots.
7. Rollers and slides must function smoothly.
8. Welded or brazed joints must not show signs of separation or failure.
9. Ammunition box and chuting must not have cracks, dents, or bends that would interfere with smooth flow of ammunition.
10. Springs must not be deformed, weak, or broken.

11. All locking devices shall be positive in action and must not become disengaged due to normal operation and firing.

12. Instruction, warning, and nameplates must be present, legible, and secure.

13. Quick-release pins and similar devices must function properly and must not be subject to loss during use or transportation.

14. Inspect links for bent or broken tabs and bent segments.

15. Inspect electrical components for improper functioning, physical damage, and missing parts.

16. Inspect for worn out lamps and damaged lamp covers and switches.

17. Inspect electrical connections for damage or corrosion.

18. Check that elevation knob on support assembly raises and lowers reflex sight, Check switch and rheostat on support assembly. Inspect reflex sight for broken components or damaged optical elements. Check that filter assembly operating lever operates freely. Check that elevation/depression knob performs its function.

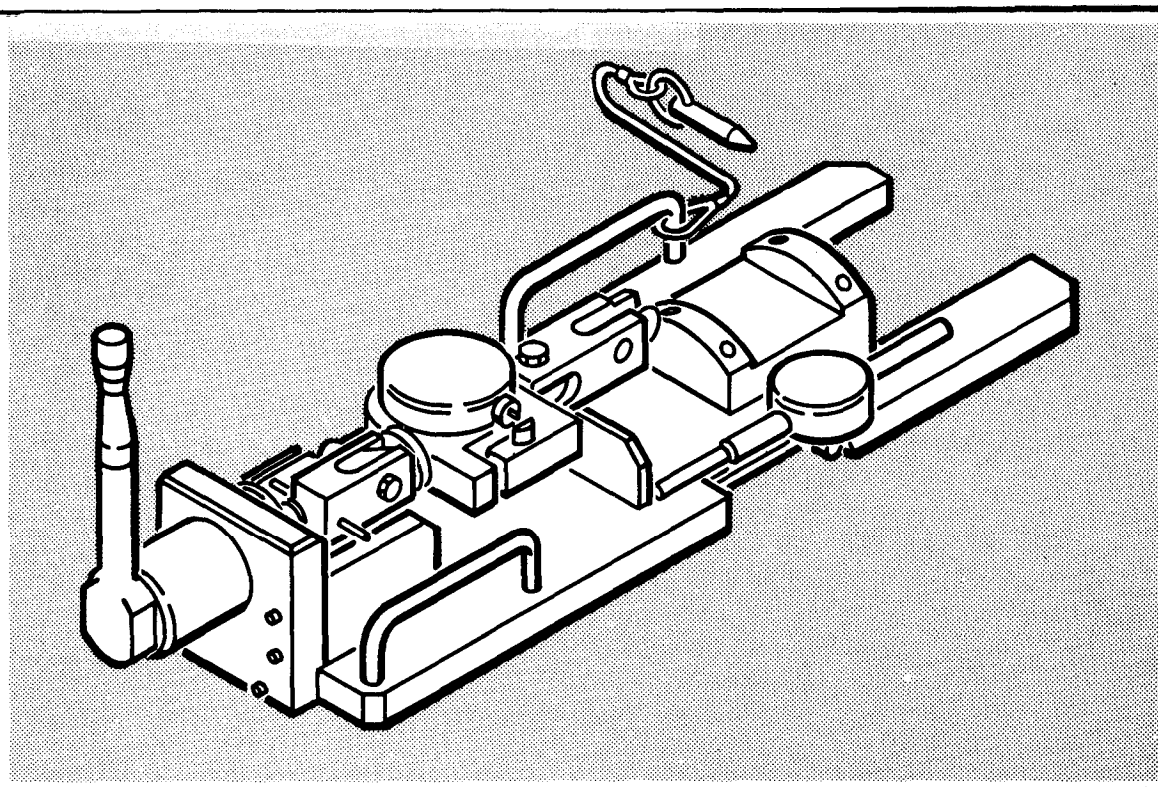
CHAPTER 3

MAINTENANCE OF AUXILIARY EQUIPMENT

CHAPTER CONTENTS

Section I. MAINTENANCE OF RECOIL ADAPTER PRELOAD GAGE

Section Contents



ARR83-2076

3-1. REPAIR OF RECOIL ADAPTER PRELOAD GAGE

DESCRIPTION

This task covers: Disassembly, cleaning, inspection, and assembly.

INITIAL SETUP

Tools/Test and Support Equipment:
Tool Set, A/C Armament
Repairman: Basic
Tool Set, A/C Armament
Repairman: Supplemental

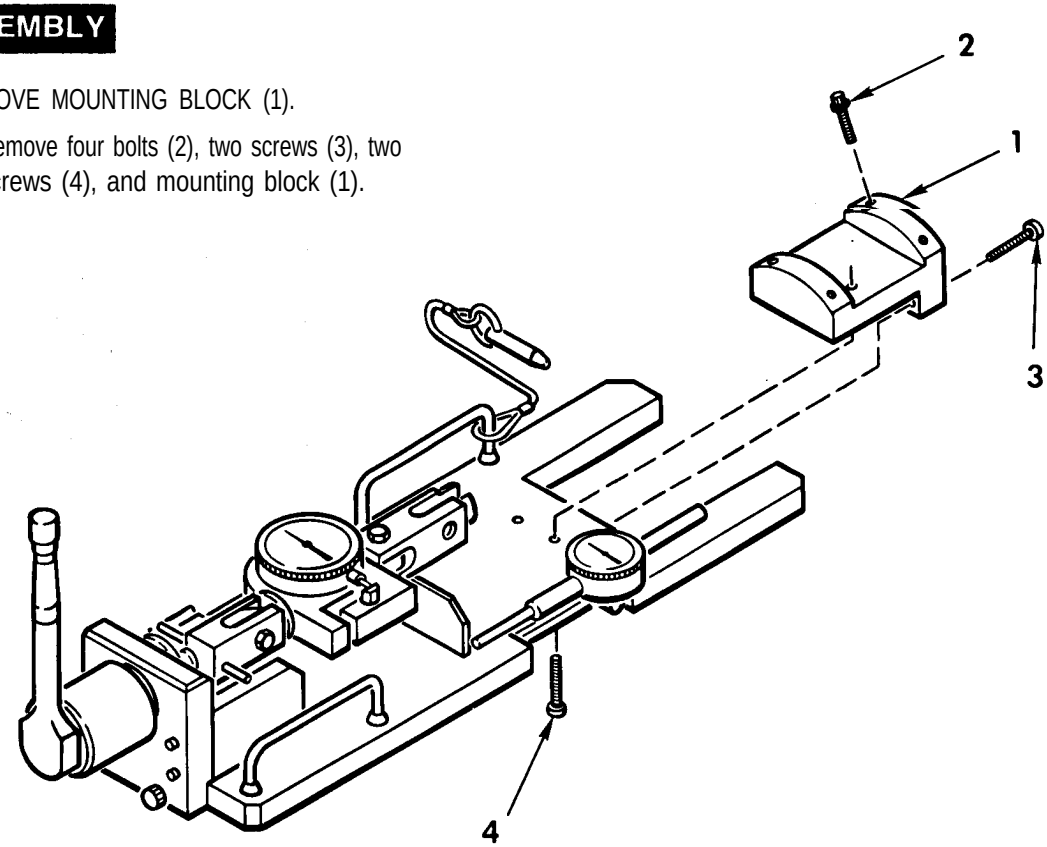
Personnel Required:
68M Aircraft Weapon Systems
Repairer

Equipment Conditions:
In shop on bench.

DISASSEMBLY

1. REMOVE MOUNTING BLOCK (1).

   Remove four bolts (2), two screws (3), two screws (4), and mounting block (1).

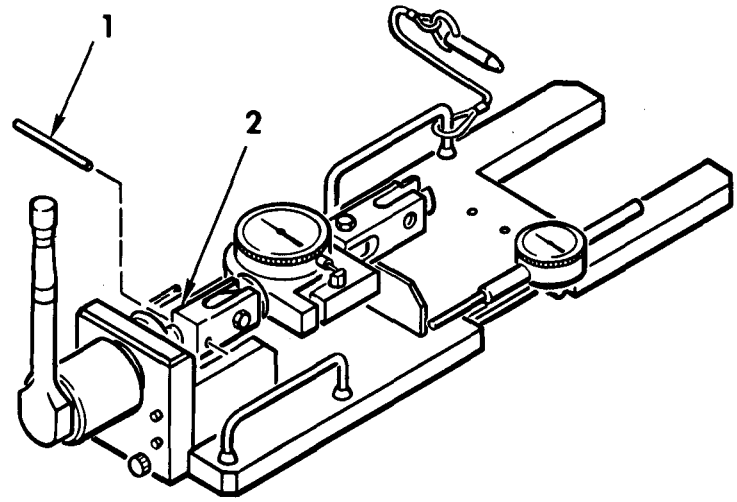


ARR82-27540

DISASSEMBLY (cont)

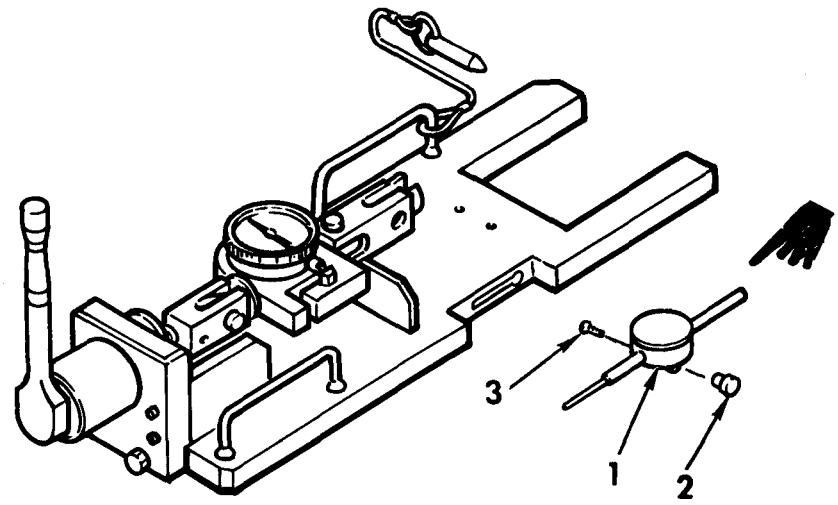
2. REMOVE STUD (1).

Using a 7/32-inch pin punch, drive out stud (1) from clevis (2).



2.1. REMOVE INDICATOR DIAL (1).

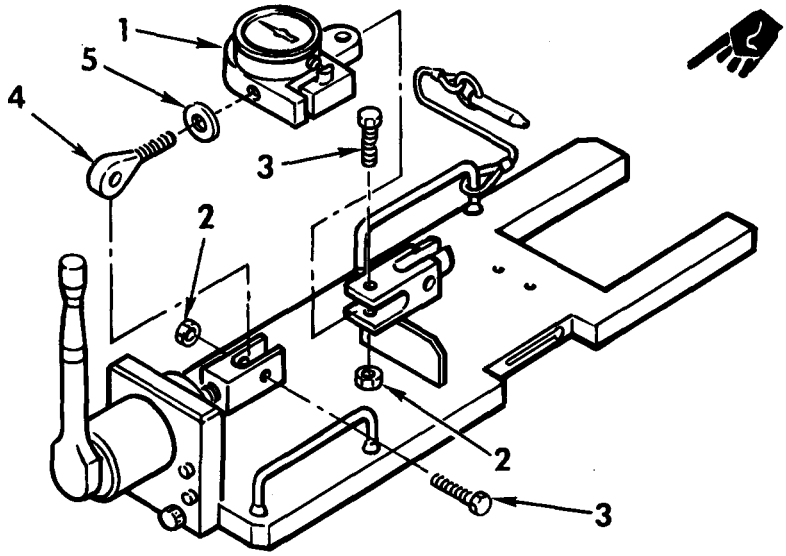
Remove knurled knob (2), dial indicator (1), and bolt (3).



3-1. REPAIR OF RECOIL ADAPTER PRELOAD GAGE (cont)

2.2. REMOVE FORCE GAGE (1).

Remove two nuts (2), two screws (3), and force gage (1), Unscrew eyebolt (4) and remove shim (5).



CLEANING

3. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH CHAPTER 2, SECTION IV.

INSPECTION

4. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH CHAPTER 2, SECTION IV.

ASSEMBLY

4.1. INSTALL FORCE GAGE (1).

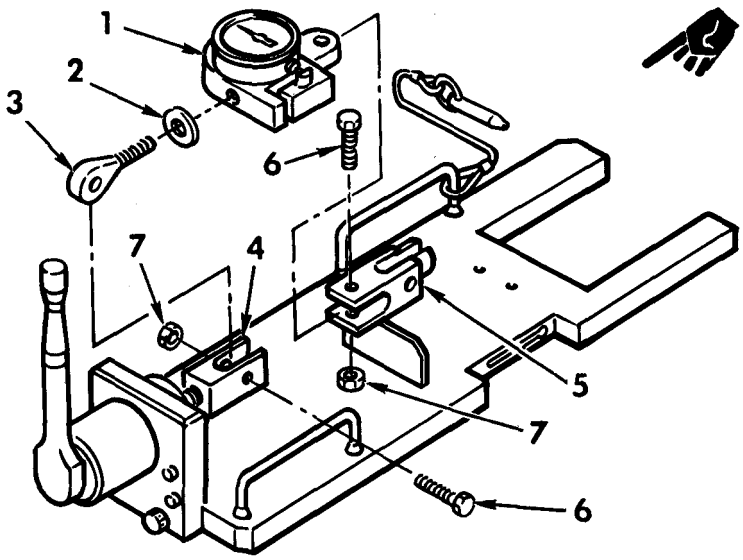
a. Place shim (2) on eyebolt (3) and assemble to force gage (1).

b. Aline two eyebolts on force gage with clevis (4) and clevis (5).

c. Install two bolts (6) and two nuts (7). Hand tighten.

NOTE

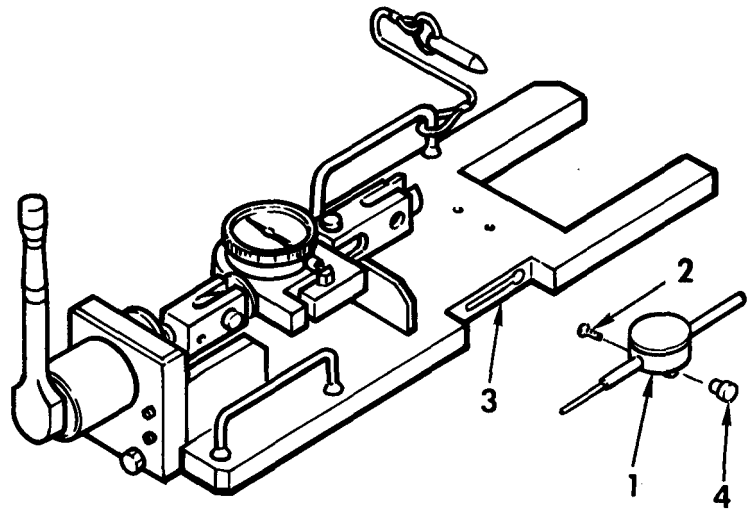
Force gage is to be installed in approximately the horizontal position by adding or removing shim stock.



ASSEMBLY (cont)

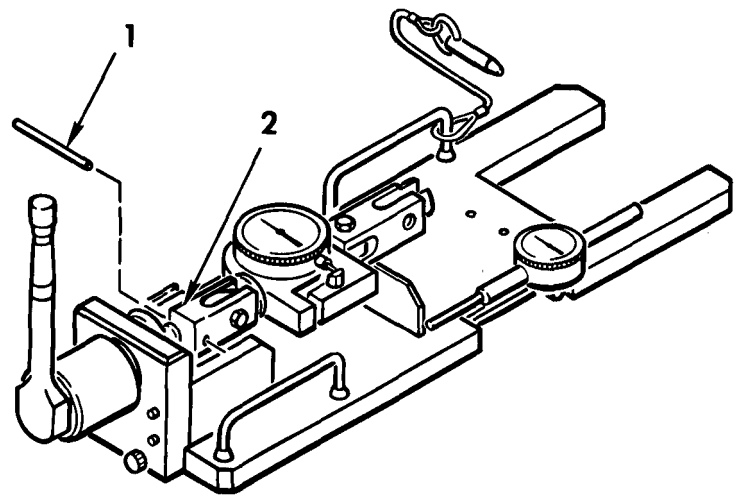
4.2. INSTALL DIAL INDICATOR (1).

Install bolt (2) in slot (3). Attach dial indicator (1) and secure with knurled knob (4).



5. INSTALL STUD (1).

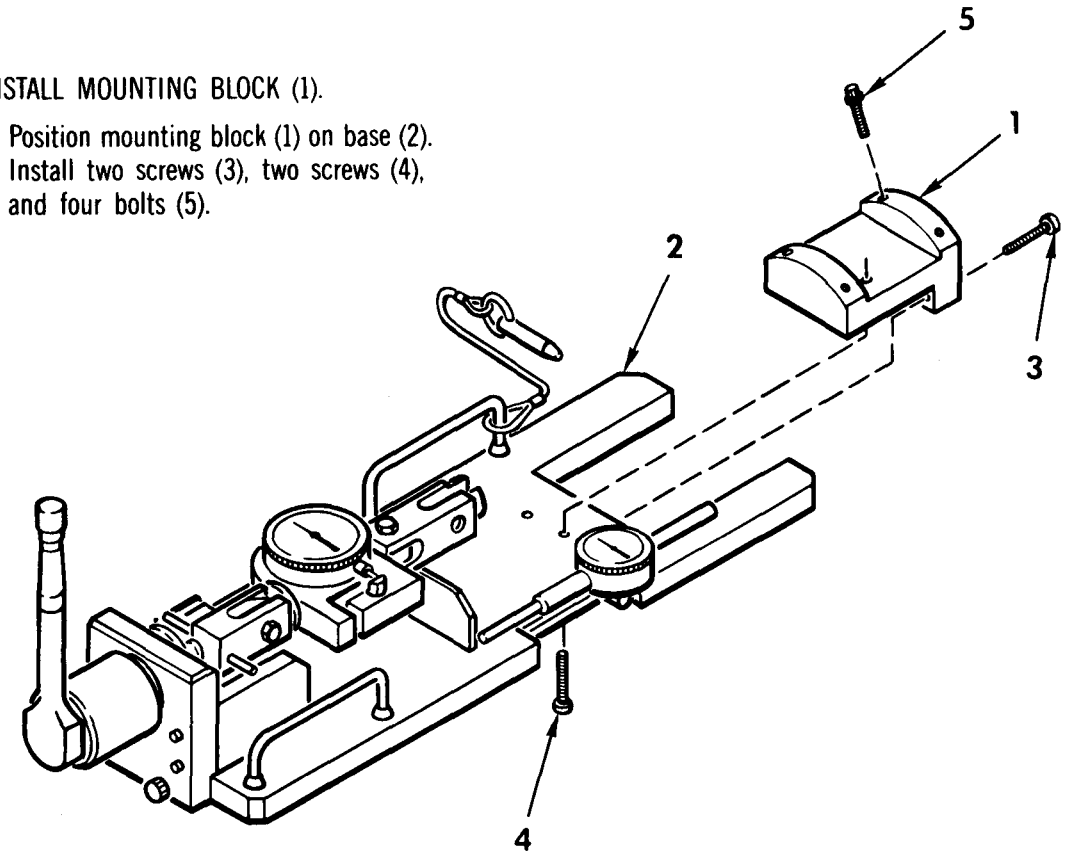
Using a 7/32-inch pin punch, drive stud (1) into clevis (2), so that stud protrudes equally on both sides of clevis.



3-1. REPAIR OF RECOIL ADAPTER PRELOAD GAGE (cont)

6. INSTALL MOUNTING BLOCK (1).

Position mounting block (1) on base (2). Install two screws (3), two screws (4), and four bolts (5).



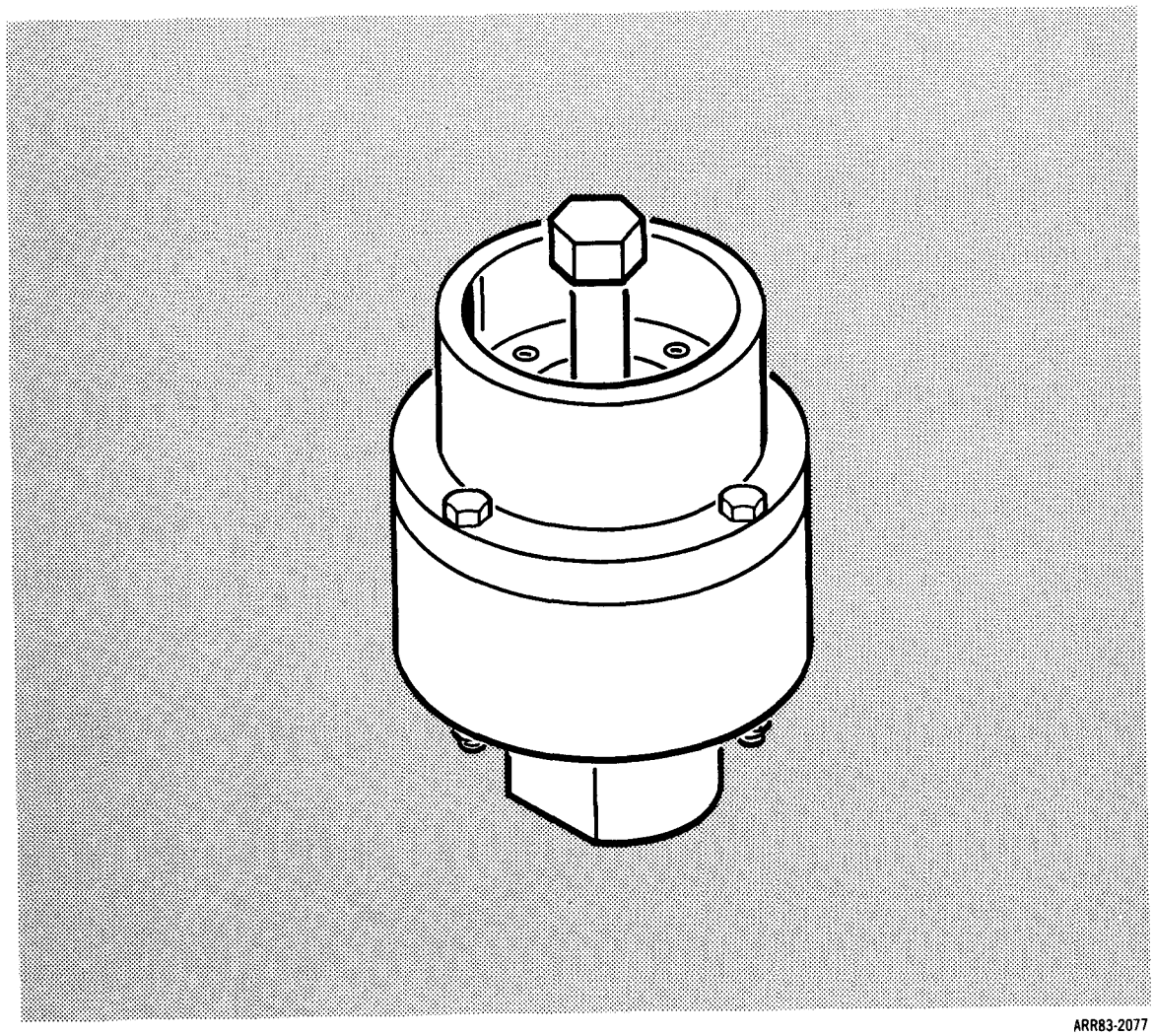
ARR82-27543

END OF TASK

CALIBRATION OF FORCE GAGE AND DIAL INDICATOR

3-2. Both the force gage and dial indicator require calibration every 365 days. Calibrate the force gage in accordance with Air Force Technical Order (TO) 33K6-4-1-4 and calibrate the dial indicator in accordance with TO 33K6-4-1-5.

Section II. MAINTENANCE OF CLUTCH ADJUSTER HOLDING FIXTURE



ARR83-2077

3-2. REPAIR OF CLUTCH ADJUSTER HOLDING FIXTURE

DESCRIPTION

This task covers: Disassembly, cleaning, inspection, and assembly.

INITIAL SETUP

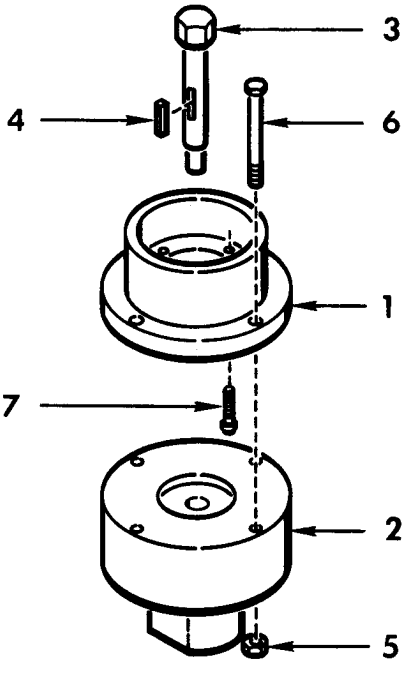
Tools/Test and Support Equipment:
Tool Set, A/C Armament
Repairman: Basic
Tool Set, A/C Armament
Repairman: Supplemental

Personnel Required:
68M Aircraft Weapon Systems
Repairer

Equipment Conditions:
In shop on bench.

DISASSEMBLY

1. DISASSEMBLE UPPER HOUSING (1) FROM LOWER HOUSING (2).
   a. Remove torque rod (3). Remove key (4) from torque rod.
   b. Remove four nuts (5) and four bolts (6) and separate upper housing (1) from lower housing (2).
   c. Remove four screws (7) from upper housing (1).



ARR82-27648

CLEANING

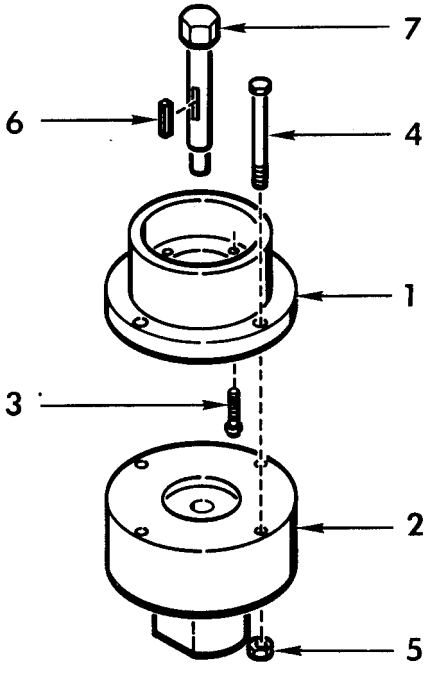
2. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH CHAPTER 2, SECTION IV.

INSPECTION

3. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH CHAPTER 2, SECTION IV.

ASSEMBLY

4. ASSEMBLE UPPER HOUSING (1) TO LOWER HOUSING (2).
   a. Install four screws (3) in upper housing (1).
   b. Place upper housing (1) on lower housing (2) and install four bolts (4) and four nuts (5).
   c. Install key (6) in torque rod (7). Install torque rod.

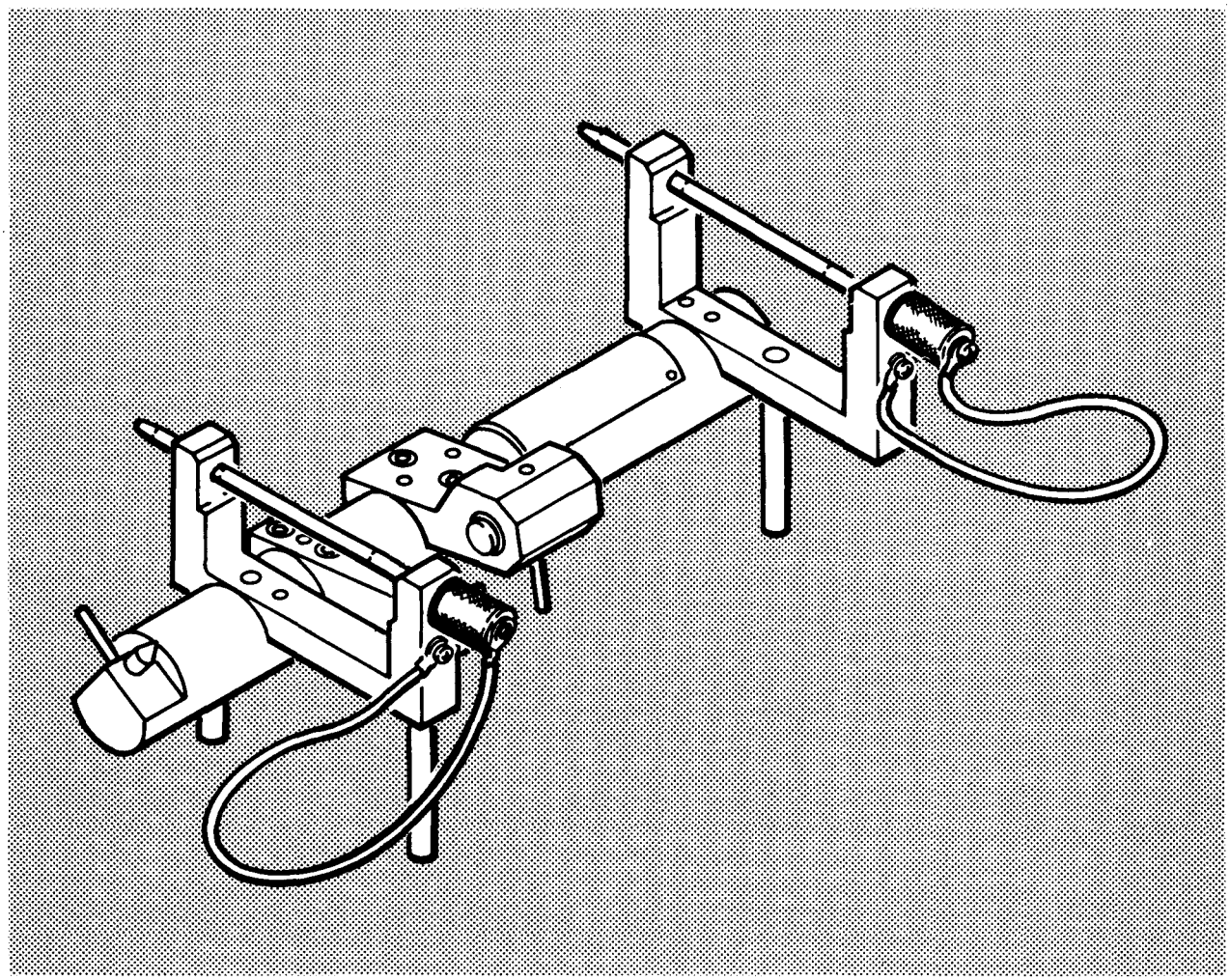


ARR82-27649

END OF TASK

Section III. MAINTENANCE OF FEEDER CHECKING FIXTURE

Section Contents	Para
Repair of Feeder Checking Fixture	3-3



ARR83-2078

3-3. REPAIR OF FEEDER CHECKING FIXTURE

DESCRIPTION

This task covers: Disassembly, cleaning, inspection, and assembly.

INITIAL SETUP

Tools/Test and Support Equipment:
Tool Set, A/C Armament
Repairman: Basic
Tool Set, A/C Armament
Repairman: Supplemental

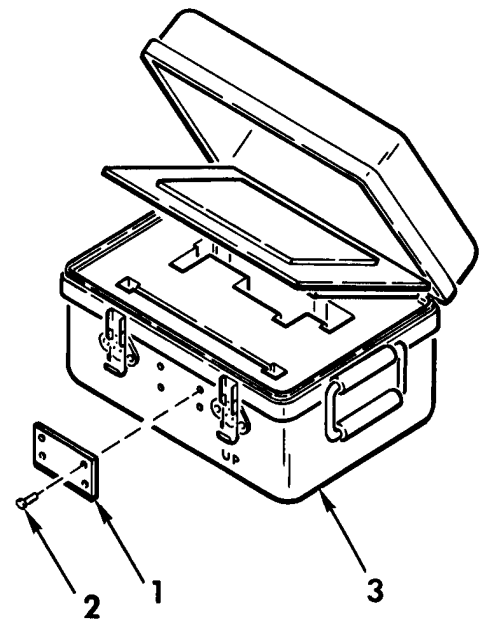
Personnel Required:
68M Aircraft Weapon Systems
Repairer

Equipment Conditions:
In shop on bench.

DISASSEMBLY

1. REMOVE CASE IDENTIFICATION PLATE (1).

Remove four rivets (2) and identification plate (1) from case (3).

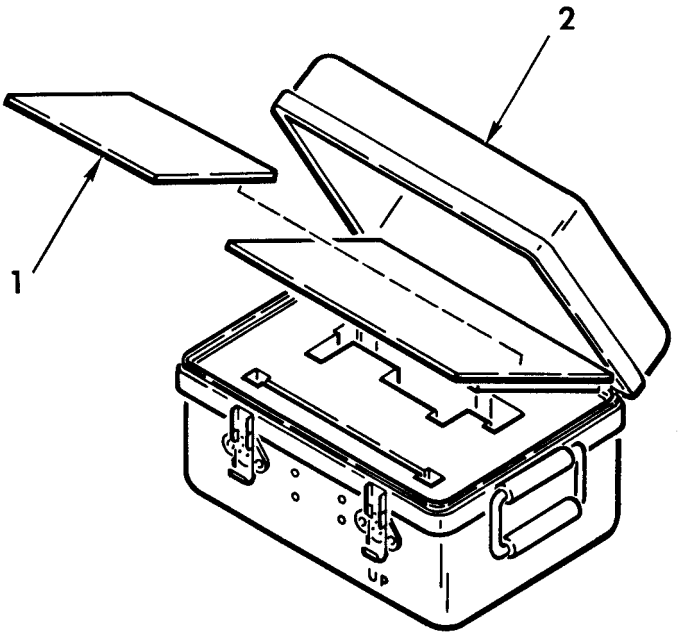


ARR82-27410A

DISASSEMBLY (cont)

2. REMOVE INSTRUCTION PLATE (1).

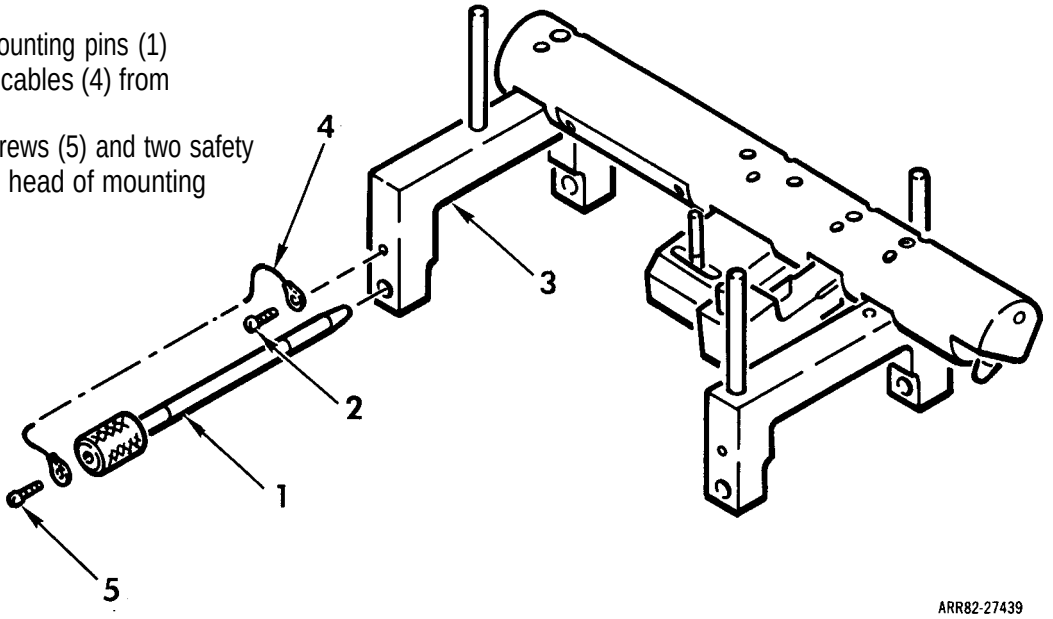
Remove instruction plate (1) from case (2).



ARR82-27411

3. REMOVE MOUNTING PINS (1).

a. Remove two screws (2) from brackets (3).
b. Remove two mounting pins (1) and two safety cables (4) from brackets (3).
c. Remove two screws (5) and two safety cables (4) from head of mounting pins (1).

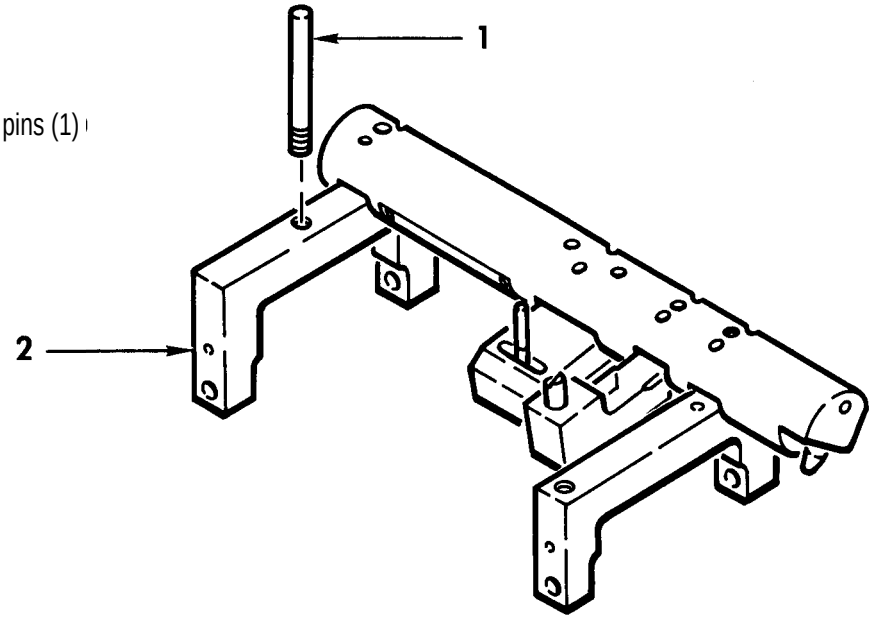


ARR82-27439

3-3. REPAIR OF FEEDER CHECKING FIXTURE (cont)

4. REMOVE SUPPORT PINS (1).

Remove three threaded support pins (1) from brackets (2).

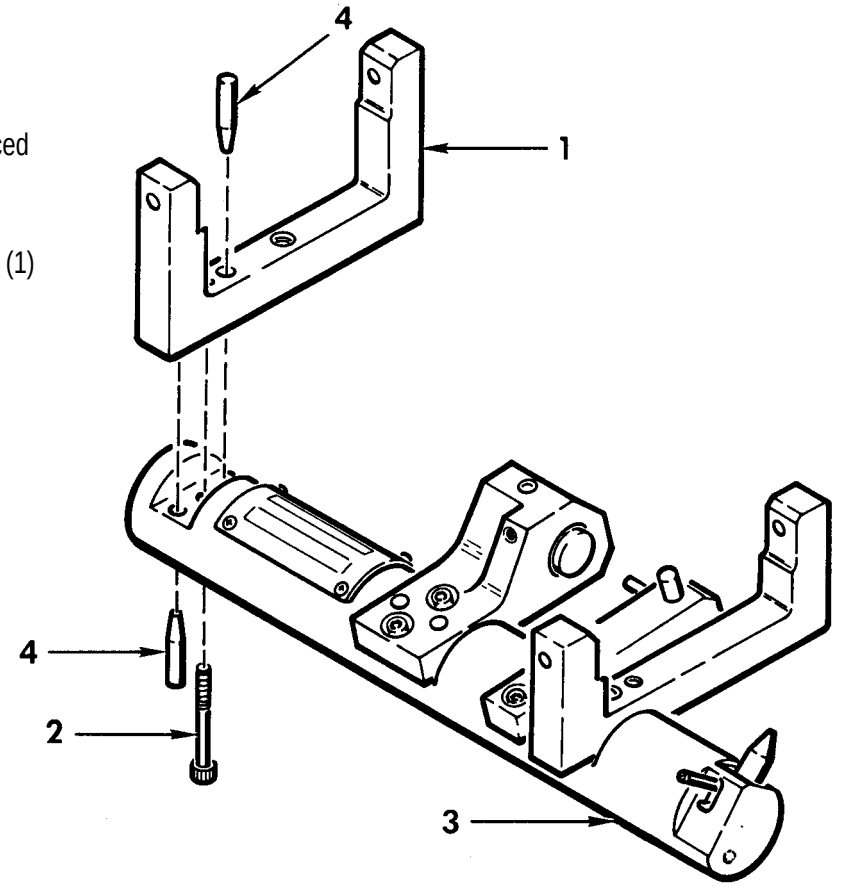


ARR82-27412

5. REMOVE FORWARD BRACKET (1).

a. Remove screw (2). Using a soft-faced hammer, remove bracket (1) from guide bar (3).

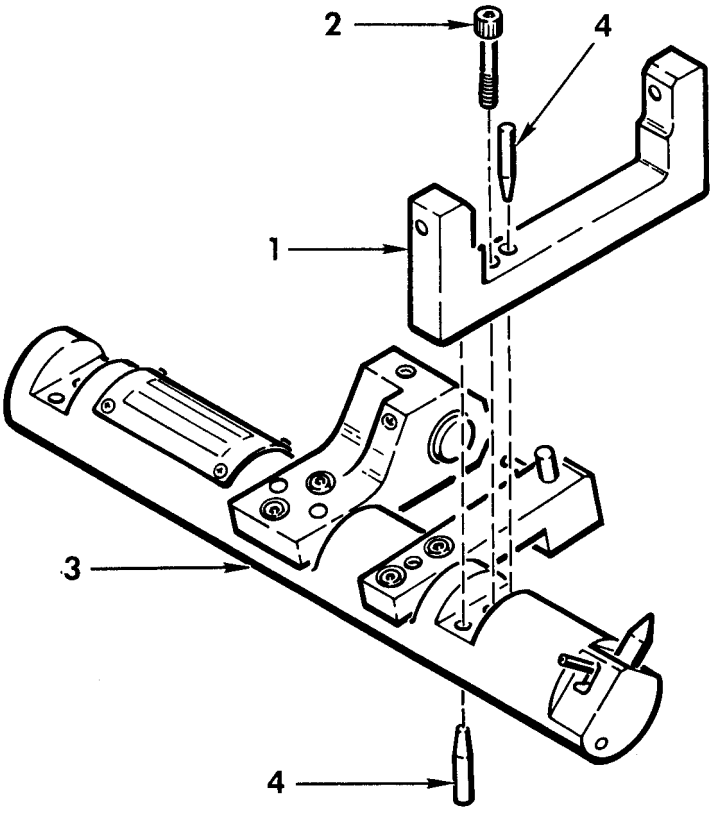
b. Remove two pins (4) from bracket (1) and guide bar (3).



ARR82-27413

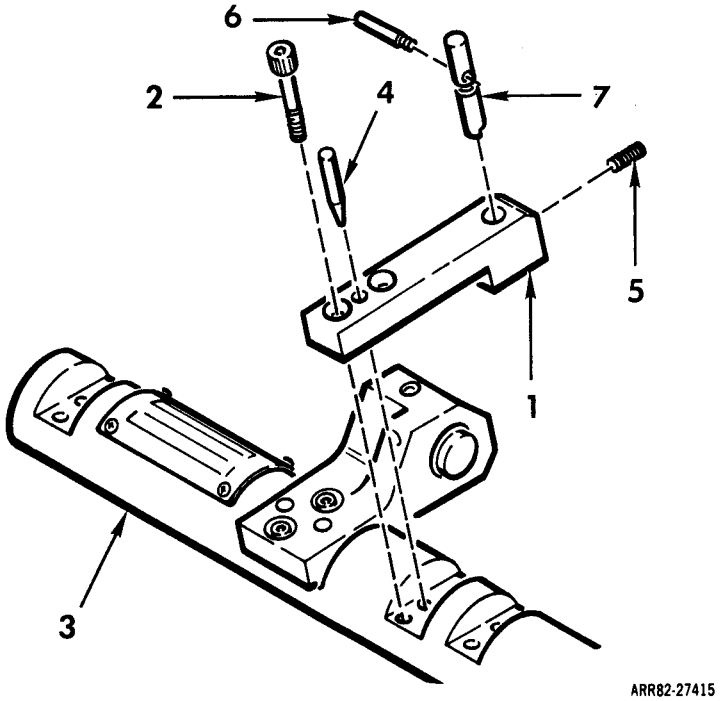
DISASSEMBLY (cont)

6. REMOVE AFT BRACKET (1).
   a. Remove screw (2). Using a soft-faced hammer, remove bracket (1) from guide bar (3).
   b. Remove two pins (4) from bracket (1) and guide bar (3).



ARR82-27414

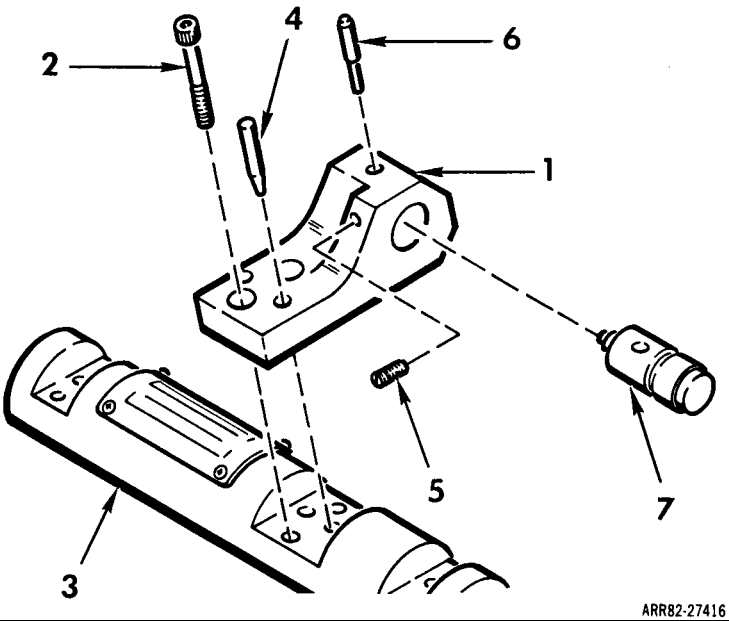
7. REMOVE ROUND GUIDE GAGE SUPPORT (1).
   a. Remove two screws (2) and support (1) from guide bar (3).
   b. Support gage support (1). Using a 7/32-inch pin punch, remove pin (4) from support (1).
   c. Remove ball plunger (5), threaded pin (6) and round guide gage (7) from support (1).



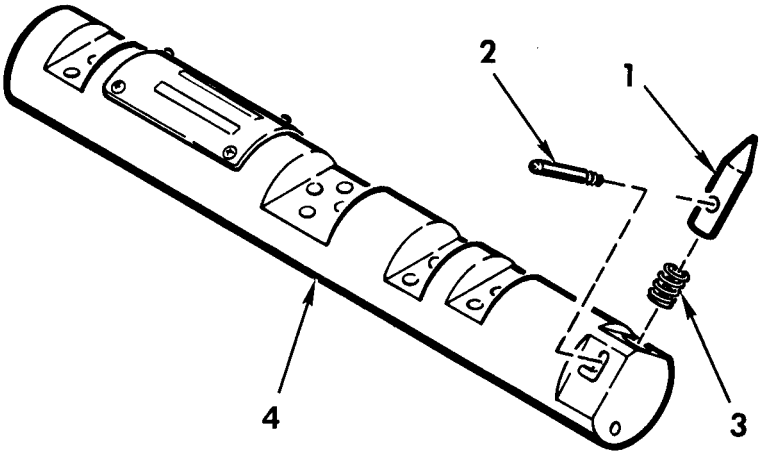
ARR82-27415

3-3. REPAIR OF FEEDER CHECKING FIXTURE (cont)

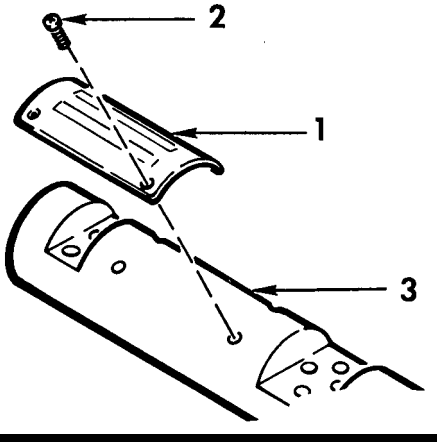
8. REMOVE SPROCKET GAGE SUPPORT (1).
   a. Remove two screws (2) and support (1) from guide bar (3).
   b. Support gage support (1). Using a 7/32-inch pin punch, remove two pins (4) from support (1).
   c. Remove ball plunger (5). Support gage support (1). Using a 1/8-inch pin punch, remove pin (6) from support (1). Remove sprocket gage (7).



9. REMOVE TIMING LOCK PIN (1).
   Remove threaded pin (2), timing lock pin (1) and spring (3) from guide bar (4).



10. REMOVE IDENTIFICATION PLATE (1).
    Remove four drive screws (2) and plate (1) from guide bar (3).



CLEANING

11. CLEAN ALL PARTS IN ACCORDANCE WITH GENERAL CLEANING PROCEDURES IN CHAPTER 2, SECTION IV.

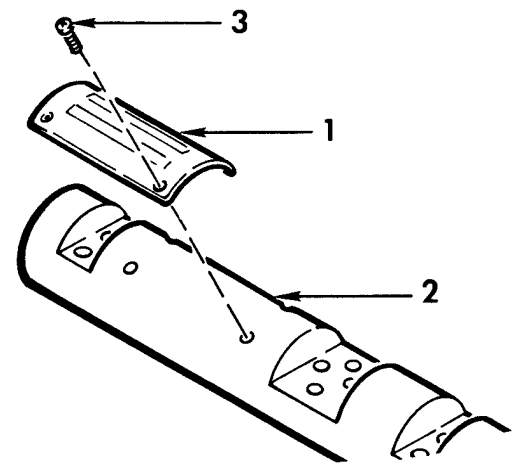
INSPECTION

12. PERFORM GENERAL INSPECTION IN ACCORDANCE WITH CHAPTER 2, SECTION IV.

ASSEMBLY

13. INSTALL IDENTIFICATION PLATE (1).

    Install plate (1) on guide bar (2) using four drive screws (3).

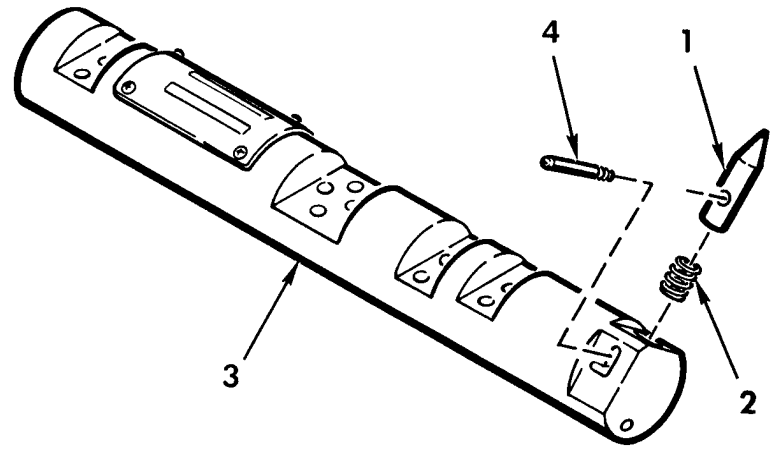


ARR82-27419

14. INSTALL TIMING LOCK PIN (1).

    a. Insert spring (2) and timing lock pin (1) into into guide bar (3).

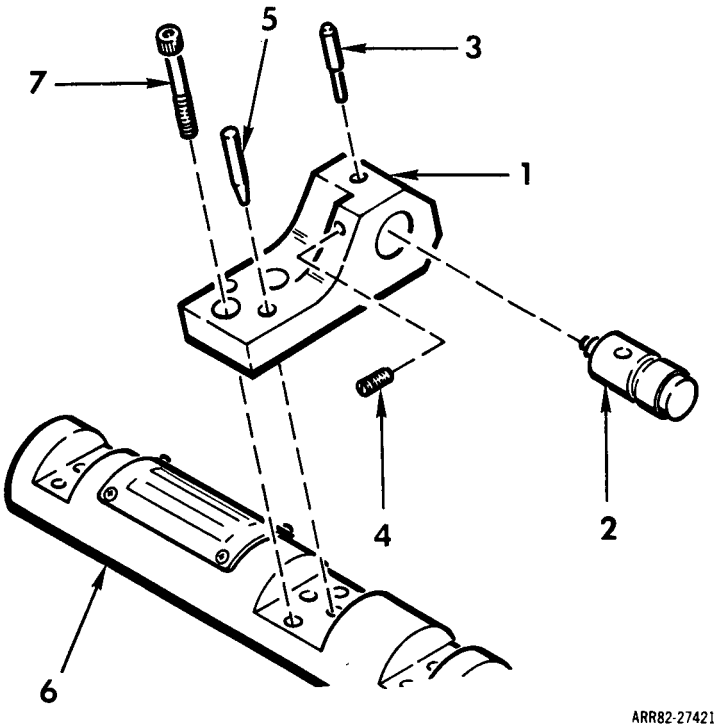
    b. Install threaded pin (4) through slot in guide bar (3) and into timing lock pin (1).



ARR82-27420

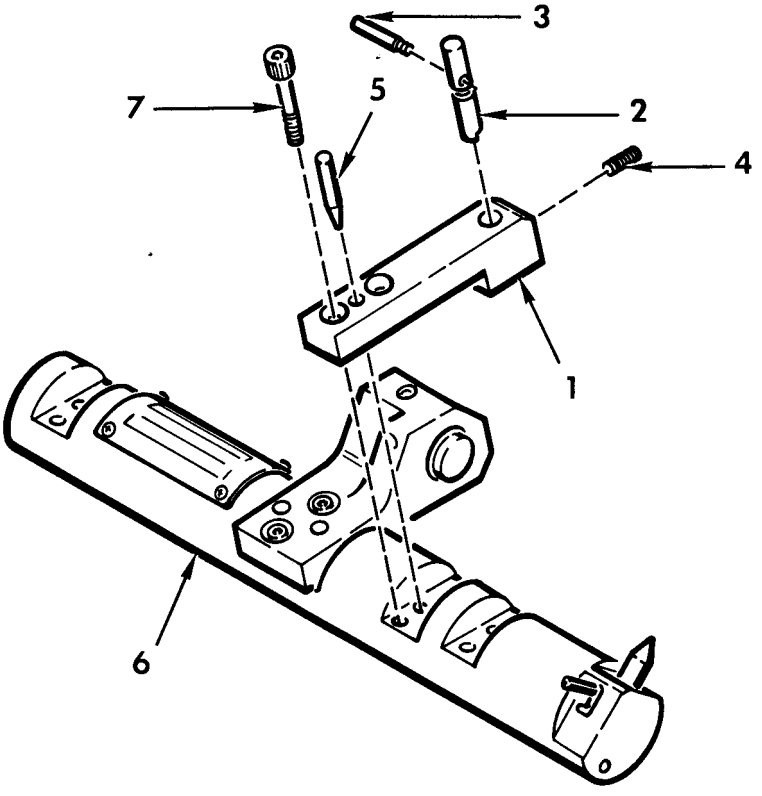
3-3. REPAIR OF FEEDER CHECKING FIXTURE (cont)

15. INSTALL SPROCKET GAGE SUPPORT (1).
    a. Insert sprocket gage (2) into support (1).
    b. Install pin (3) through support (1) into sprocket gage (2).
    c. Screw ball plunger (4) fully into support (1), then turn 1/2 turn CCW.
    d. Insert two pins (5) into support (1), and install support on guide bar (6), using two screws (7).



ARR82-27421

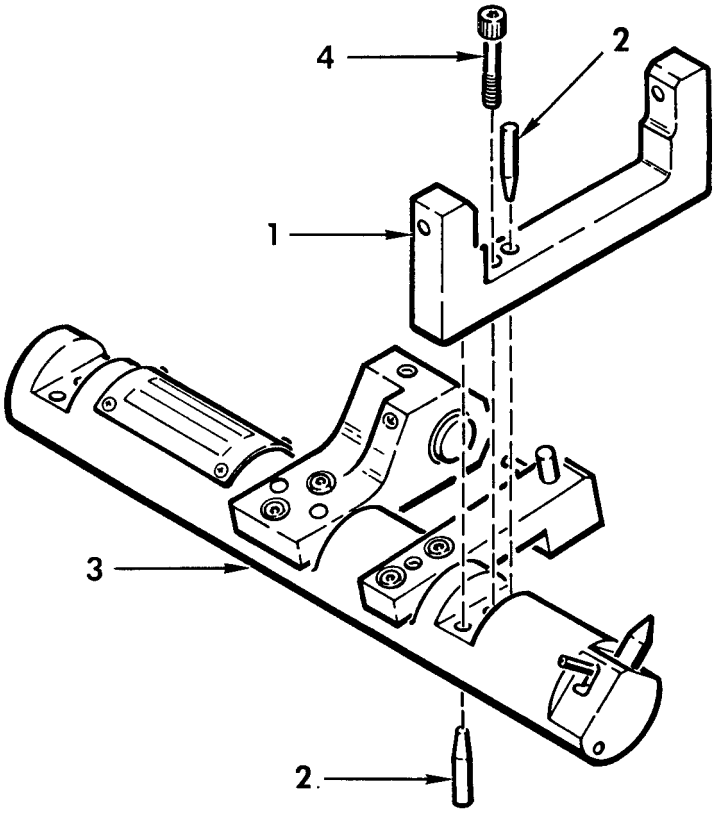
16. INSTALL ROUND GUIDE GAGE SUPPORT (1).
    a. Insert round guide gage (2) into support (1).
    b. Install threaded pin (3) through support (1) into round guide gage (2).
    c. Screw ball plunger (4) fully into support (1), then turn 1/2 turn CCW.
    d. Insert pin (5) into support (1).
    e. Install support (1) on guide bar (6), using two screws (7).



ARR82-27422

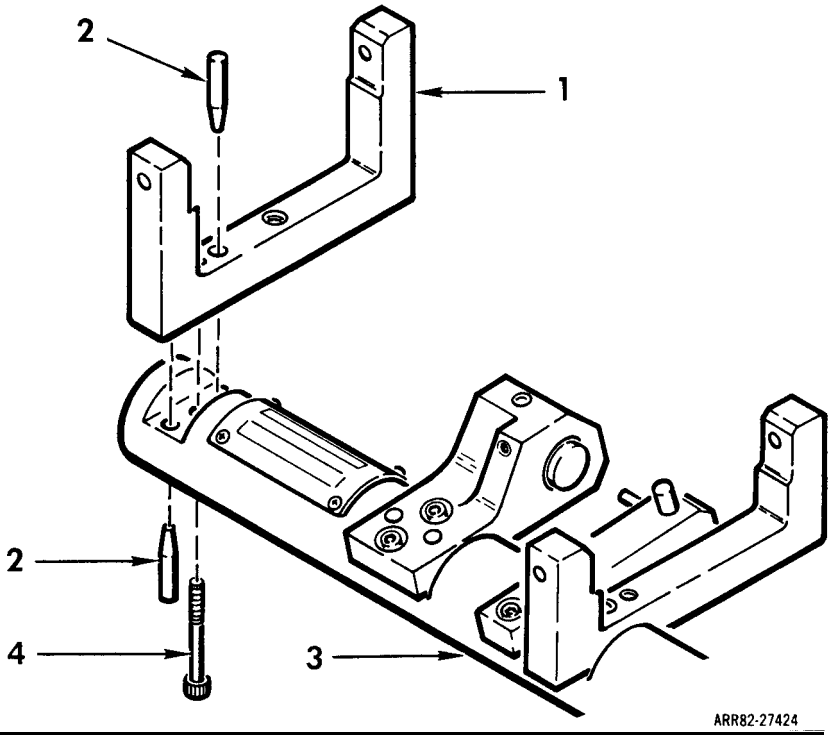
ASSEMBLY (cont)

17. INSTALL AFT BRACKET (1).
    a. Insert two pins (2) into bracket (1) and guide bar (3).
    b. Install bracket (1) on guide bar (3) using screw (4).



ARR82-27423

18. INSTALL FORWARD BRACKET (1).
    a. Insert two pins (2) into bracket (1) and guide bar (3).
    b. Install bracket (1) on guide bar (3) using screw (4).

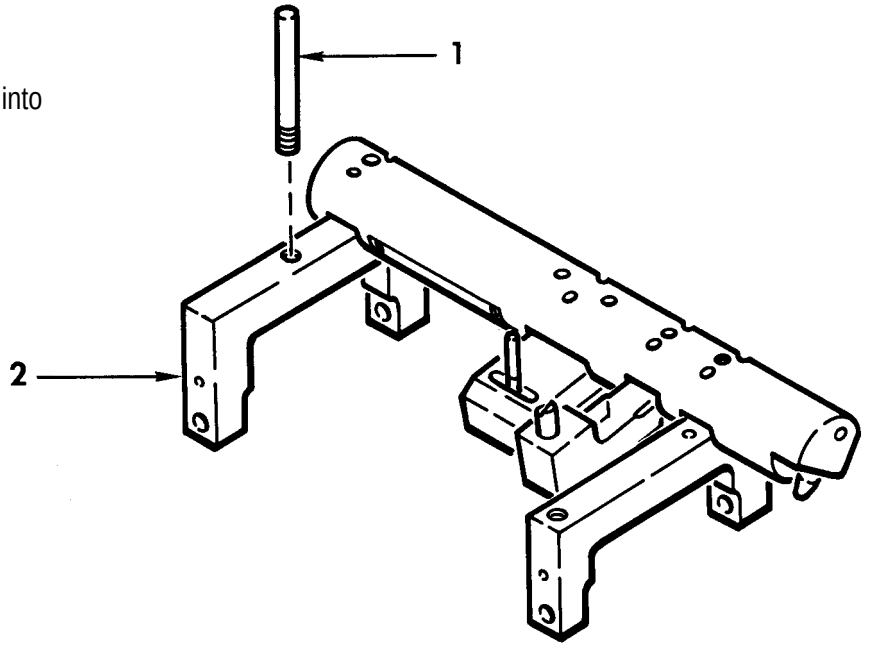


ARR82-27424

3-3. REPAIR OF FEEDER CHECKING FIXTURE (cont)

19. INSTALL SUPPORT PINS (1).

Install three support pins (1) into brackets (2).



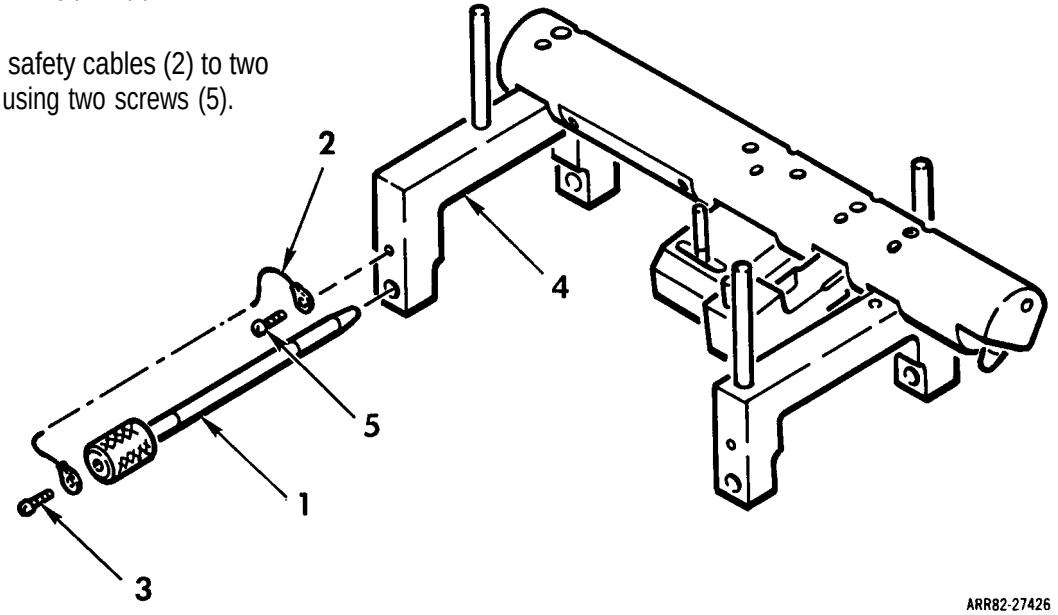
ARR82-27425

20. INSTALL MOUNTING PINS (1).

a. Install two safety cables (2) on two mounting pins (1) using two screws (3).

b. Insert two mounting pins (1) into brackets (4).

c. Install two safety cables (2) to two brackets (4) using two screws (5).

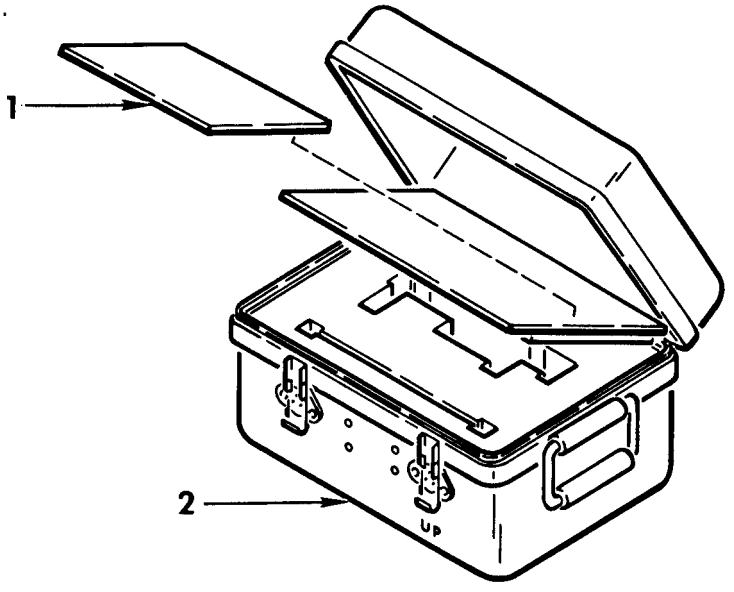


ARR82-27426

ASSEMBLY (cont)

21. INSTALL INSTRUCTION PLATE (1).

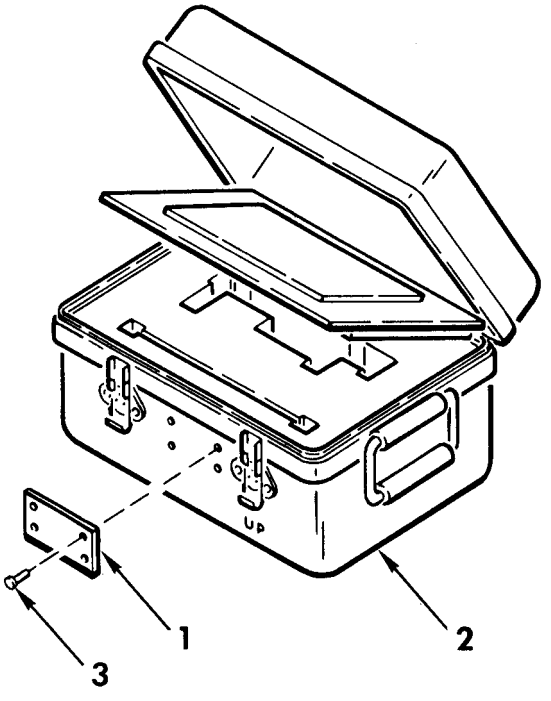
Install instruction plate (1) in case (2).



ARR82-27427

22. INSTALL CASE IDENTIFICATION PLATE (1).

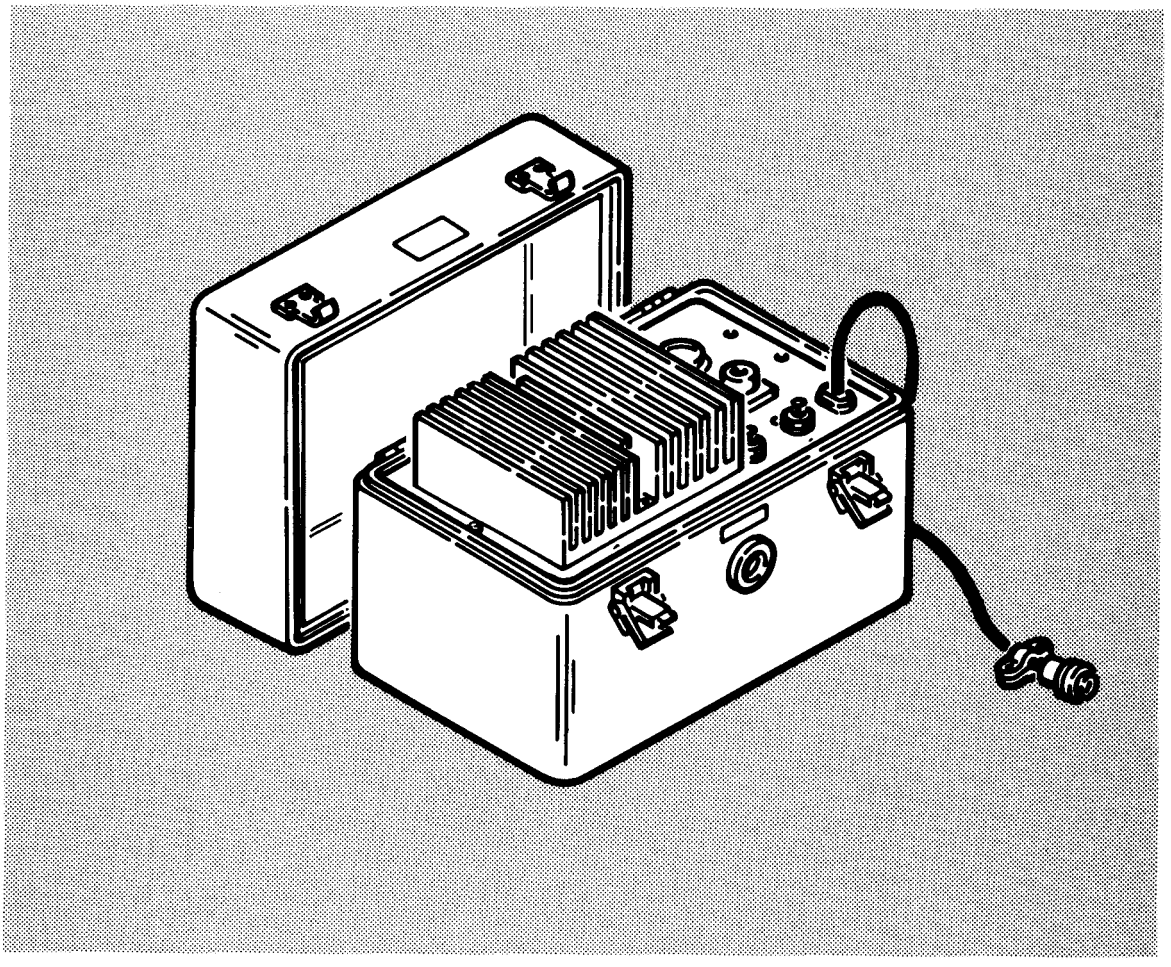
Install case identification plate (1) on case (2) using four rivets (3).



ARR82-27428A

END OF TASK

Section IV. MAINTENANCE OF 28 VDC/115 V 400 HZ POWER SUPPLY



ARR83-2079

3-4. REPAIR OF 28 VDC/115 V 400 HZ POWER SUPPLY

DESCRIPTION

This task covers: Checkout, disassembly, cleaning, inspection, and assembly.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental
- Multimeter: AN/USM-223

Materials:
- Electrical Cable (Item 10, Appx B)
- Insulation Sleeving (Item 14, Appx B)
- Silicone Compound (Item 25, Appx B)
- Solder (Item 27, Appx B)
- Wire (Item 33, Appx B)

Personnel Required:
- 68J Aircraft Fire Control Repairer

Equipment Conditions:
- In shop on bench.

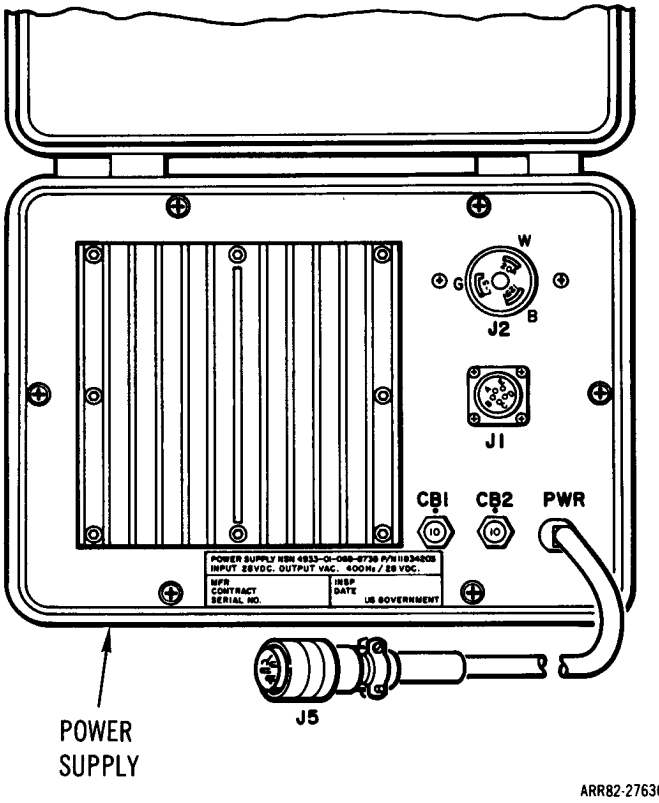
CHECKOUT

1. CHECKOUT OF POWER SUPPLY.

   a. Connect connector J5 to appropriate shop 28 Vdc power source, Make sure both circuit breakers CB1 and CB2 are pushed in.

   b. Perform checkout of power supply in accordance with tabulated data.

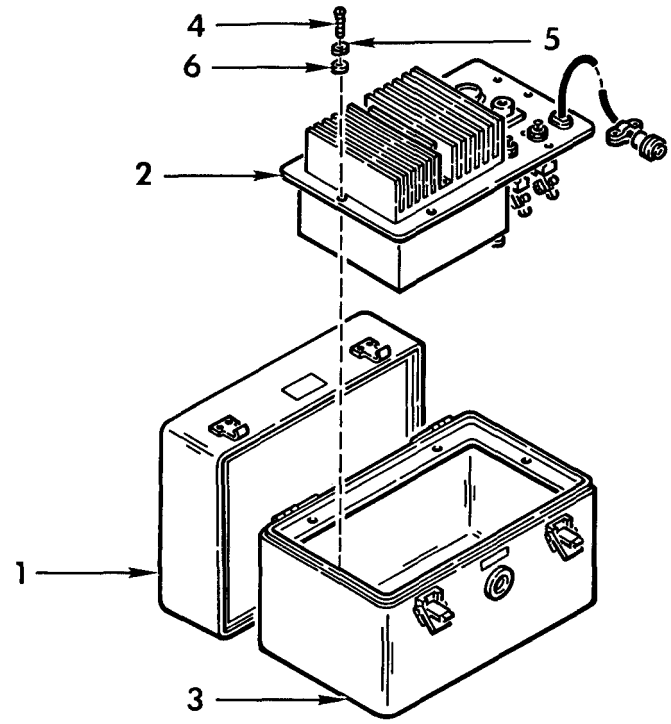
Condition	Possible Faults
No 28 Vdc at connector J1 pins A and B	Connector J1 Circuit Breaker CB2 Connector J5 Cable or wiring
No 115 Vac at connector J1 pins C and D	Connector J1 Power module Circuit Breaker CB1 Connector J5 Cable or wiring
No 115 Vac at connector J2 pins B and W	Connector J2 Power Module Circuit Breaker CB1 Connector J5 Cable or wiring



ARR82-27630

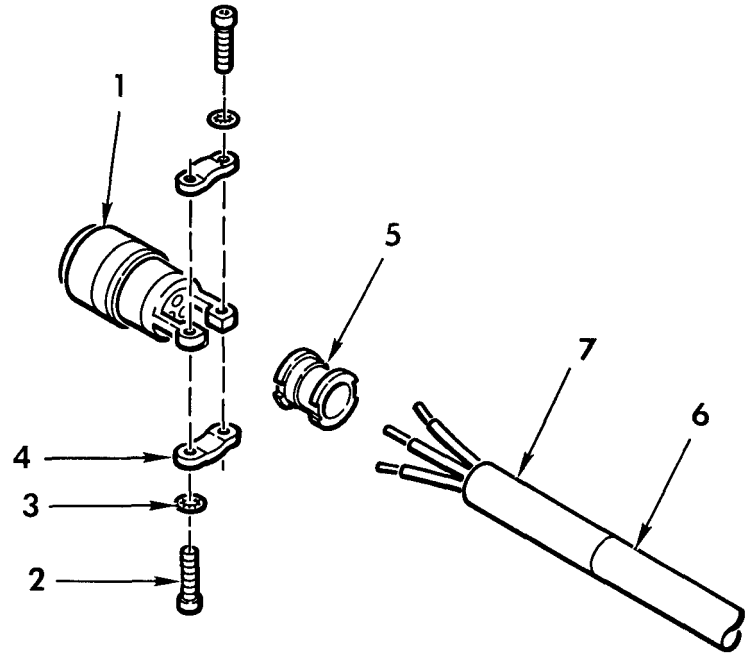
DISASSEMBLY

2. REMOVE COVER (1) AND PANEL (2).
   a. Remove cover (1) from case (3).
   b. Remove six screws (4), six lockwashers (5), six washers (6), and panel (2) from case (3).



ARR82-27631

3. REMOVE POWER CABLE CONNECTOR J5 (1).
   a. Remove two screws (2), two lockwashers (3), and two clamps (4).
   b. Slide grommet (5) back on cable (6) and remove wire ends from connector J5 (1).
   c. Remove grommet (5) and insulation sleeving (7) from cable (6).



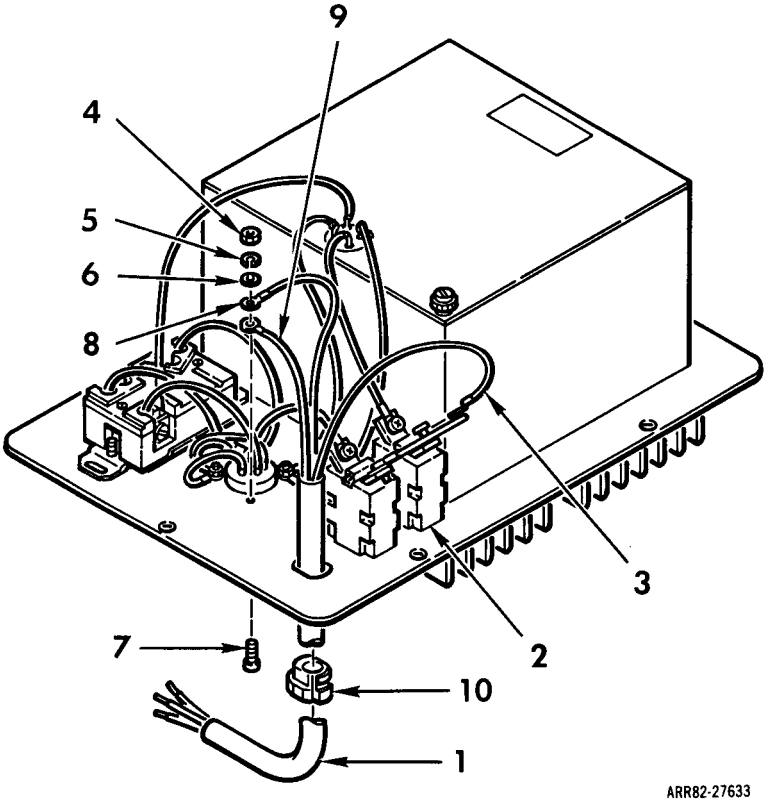
ARR82-27632

3-4. REPAIR OF 28 VDC/115 V 400 HZ POWER SUPPLY (cont)

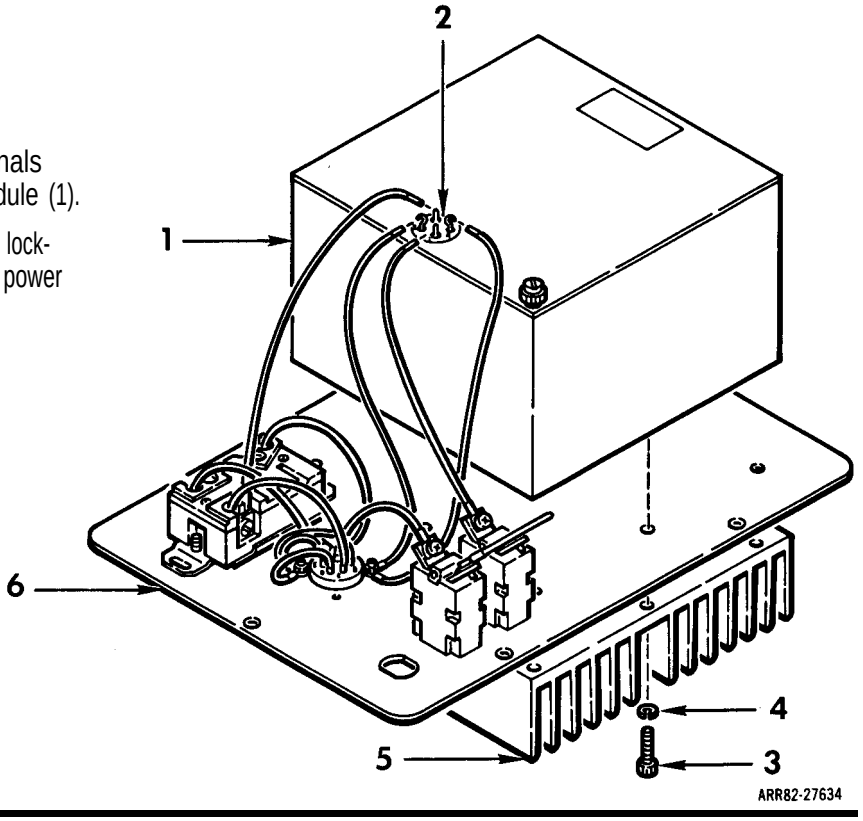
NOTE

Circuit breaker wires may be reversed.

4. REMOVE CABLE (1).
   a. Loosen terminal on circuit breaker (2) and disconnect white wire (3).
   b. Remove nut (4), lockwasher (5), washer (6), screw (7), and disconnect green and black wires (8 and 9).
   c. Compress keeper section of strain relief bushing (10) into body of bushing and remove cable (1) and bushing.



5. REMOVE POWER MODULE (1).
   a. Unsolder four wires from terminals T1, 2, 3, and 4 (2) on power module (1).
   b. Remove eight screws (3), eight lockwashers (4), heatsink (5), and power module (1) from panel (6).

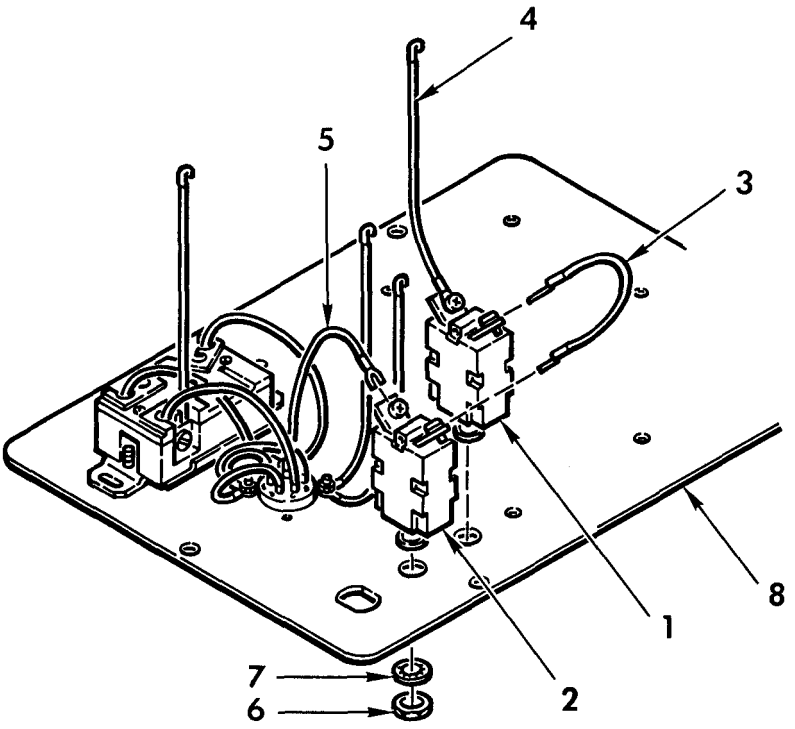


DISASSEMBLY (cont)

NOTE

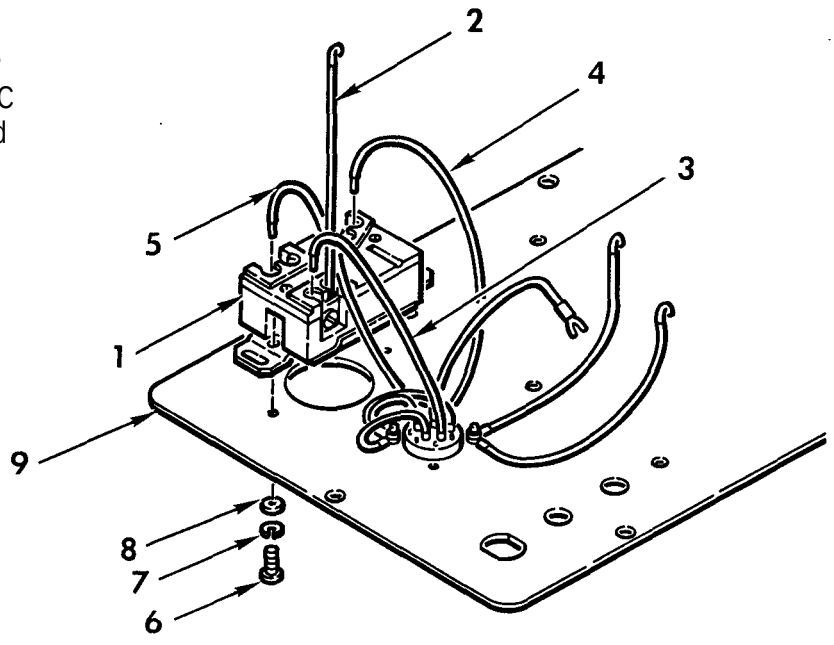
Circuit breaker wires may be reversed.

6. REMOVE CIRCUIT BREAKERS CB1 AND CB2 (1 AND 2).
   a. Loosen terminals on circuit breakers (1 and 2).
   b. Remove jumper wire (3) and T1 wire (4). Disconnect J1A wire (5).
   c. Remove two nuts (6), two lockwashers (7) and circuit breakers (1 and 2) from panel (8).



ARR82-27635

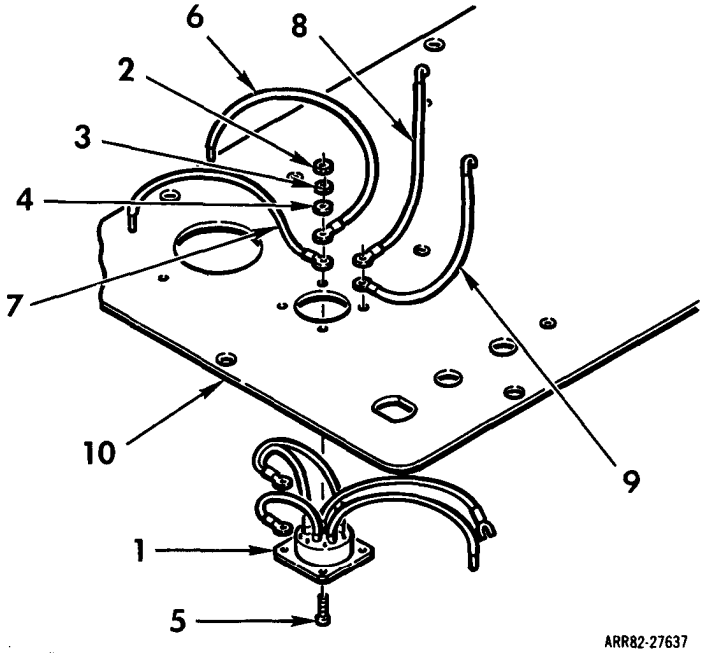
7. REMOVE RECEPTACLE J2 (1).
   a. Loosen terminals on receptacle (1).
   b. Remove T3 wire (2). Disconnect J1C wire (3) and ground wires J2G and J2W (4 and 5).
   c. Remove two screws (6), two lockwashers (7), two washers (8) and receptacle (1) from panel (9).



ARR82-27636

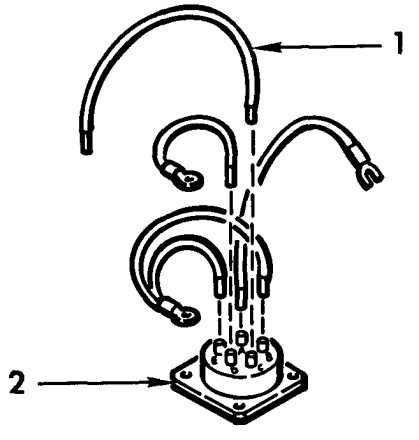
3-4. REPAIR OF 28 VDC/115 V 400 HZ POWER SUPPLY (cont)

8. REMOVE CONNECTOR J1 (1).
   a. Remove three nuts (2), three lockwashers (3), three washers (4), and three screws (5).
   b. Remove connector (1), and J2G, J2W, T2 and T4 wires (6, 7, 8, and 9) from panel (10).



ARR82-27637

9. UNSOLDER FIVE WIRES (1) FROM CONNECTOR J1 (2).



ARR82-27638

CLEANING

10. PERFORM GENERAL CLEANING PROCEDURES IN ACCORDANCE WITH CHAPTER 2, SECTION IV.

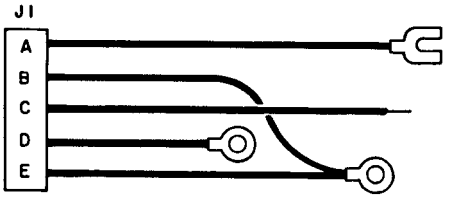
INSPECTION

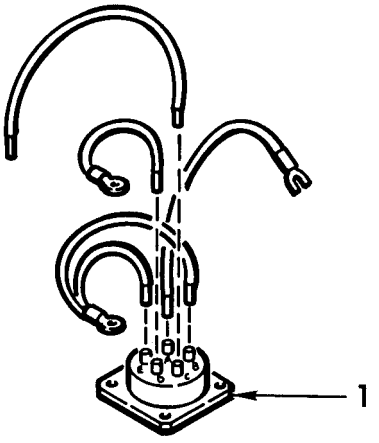
11. PERFORM GENERAL INSPECTION PROCEDURES IN ACCORDANCE WITH CHAPTER 2, SECTION IV.

ASSEMBLY

12. SOLDER FIVE WIRES TO CONNECTOR J1 (1).

    Solder wires to connector (1). Refer to diagram.





13. INSTALL CONNECTOR J1 (1).

    a. Position connector J1 (1) in panel (2).

    b. Install screw (3).

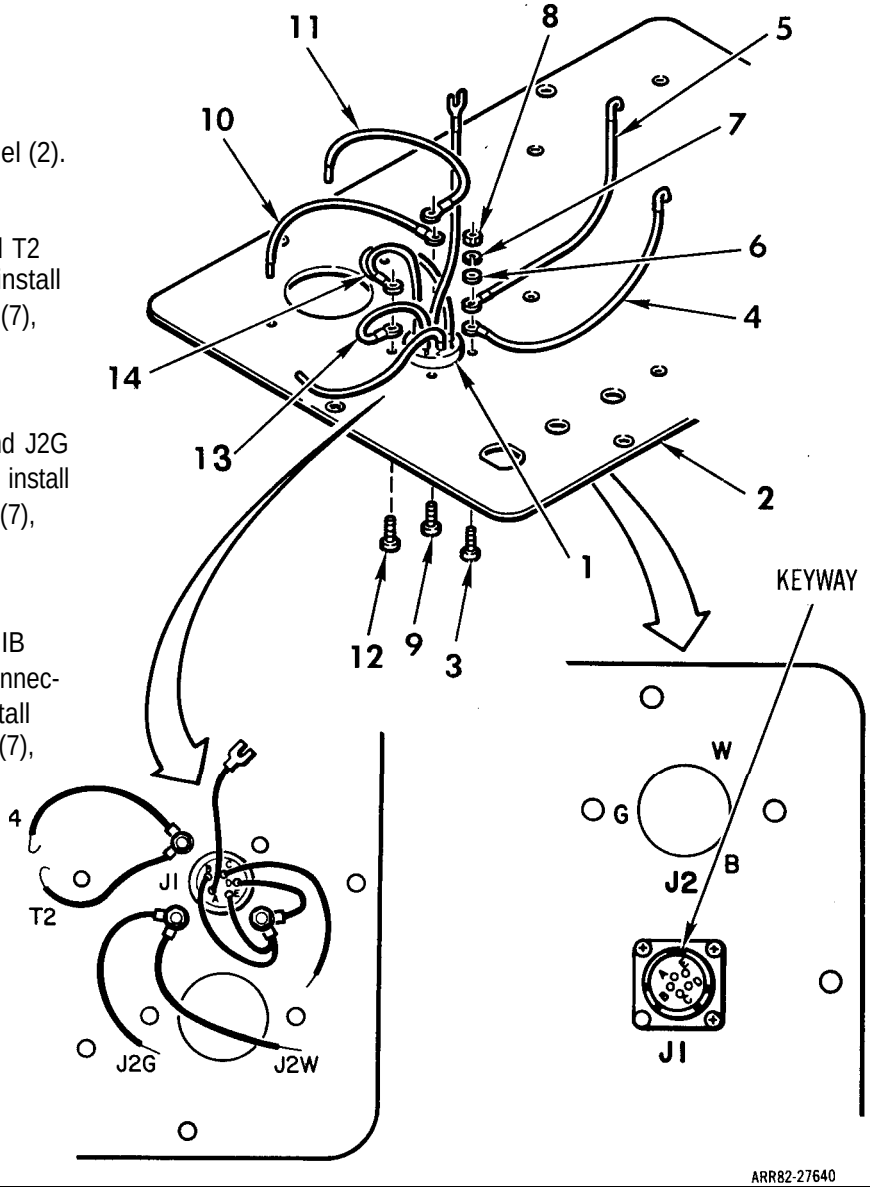
    c. Place terminals of wires T4 and T2 (4 and 5) onto screw (3), then install one washer (6), one lockwasher (7), and one nut (8).

    d. Install screw (9).

    e. Place terminals of wires J2W and J2G (10 and 11) onto screw (9), then install one washer (6), one lockwasher (7), and one nut (8).

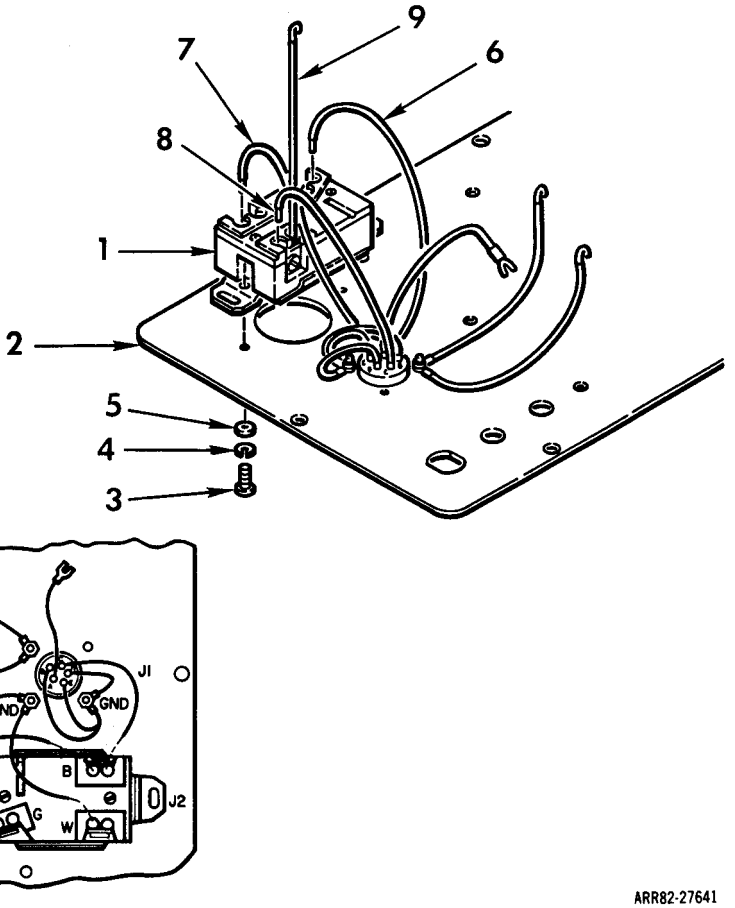
    f. Install screw (12).

    g. Place terminals of wires from JIB (13) and J1E and J1D (14) of connector (1) onto screw (12), then install one washer (6), one lockwasher (7), and one nut (8).



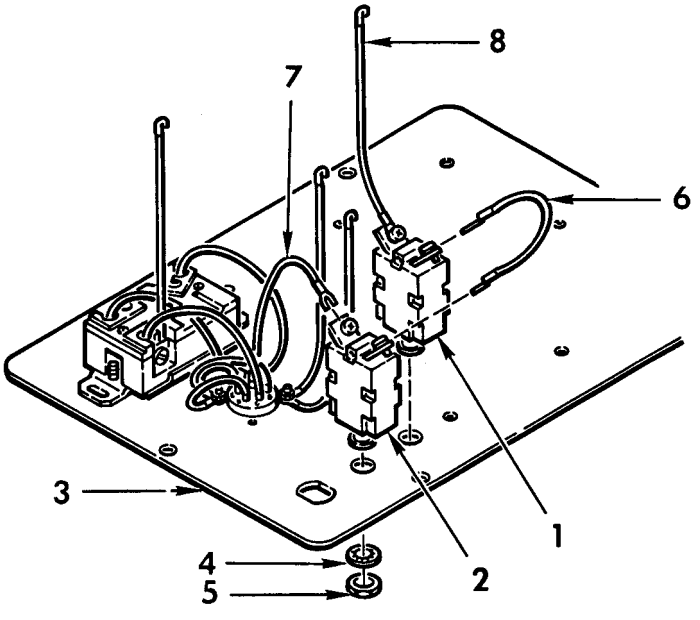
3-4. REPAIR OF 28 VDC/115 V 400 HZ POWER SUPPLY (cont)

14. INSTALL RECEPTACLE J2 (1).
    a. Position receptacle (1) on panel (2). Secure with two screws (5), two lockwashers (4), and two washers (3).
    b. Connect one ground wire (6) to receptacle terminal G, and one ground wire (7) to receptacle terminal W.
    c. Connect wire (8) from J1 pin C to receptacle terminal B.
    d. Connect wire T3 (9) to receptacle terminal B.



ARR82-27641

15. INSTALL CIRCUIT BREAKERS CB1 AND CB2 (1 AND 2).
    a. Position circuit breakers (1 and 2) in panel (3). Install two lockwashers (4) and two nuts (5).
    b. Connect jumper wire (6) to circuit breakers (1 and 2) input side.
    c. Connect wire (7) from J1A to circuit breaker CB2 (2) output side.
    d. Connect wire T1 (8) to circuit breaker CB1 (1) output side.



ARR82-27642

ASSEMBLY (cont)

16. INSTALL POWER MODULE (1).

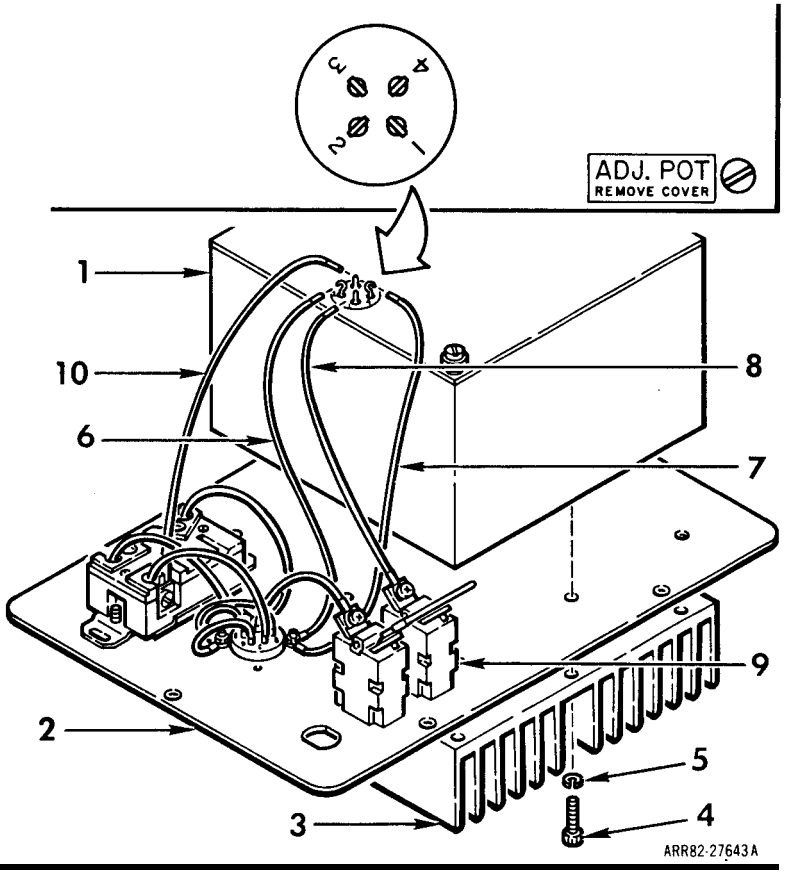
a. Apply silicone compound to each side of panel (2) in area where power module (1) and heatsink (3) mate to panel.

b. Position power module (1) and heatsink (3), on panel (2) and secure with eight screws (4) and eight lockwashers (5).

c. Solder ground wires (6 and 7) to power module (1) terminals 2 and 4.

d. Solder wire (8) from CB1 (9) to power module terminal 1.

e. Solder wire (10) from J2W to power module terminal 3.



17. INSTALL CABLE (1).

a. Place strain relief bushing (2) on cable (1) approximately 7 inches from terminal ends.

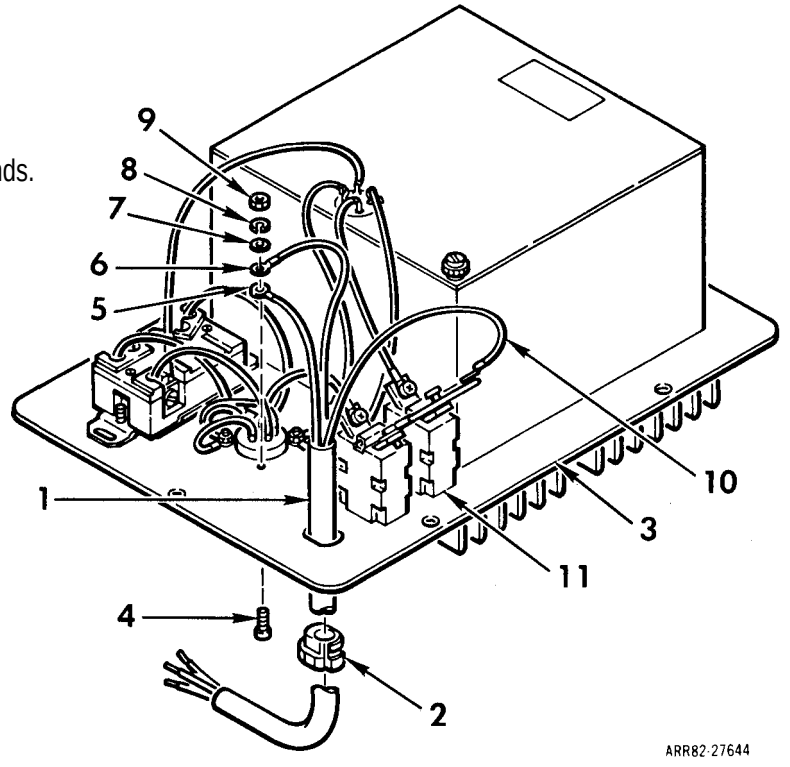
b. Insert cable (1) with strain relief bushing (2) partway into panel (3).

c. Aline flats on strain relief bushing (2) with flats of panel hole.

d. Compress keeper section of strain relief bushing (2) into body of bushing and push bushing into place in panel (3), securing cable (1).

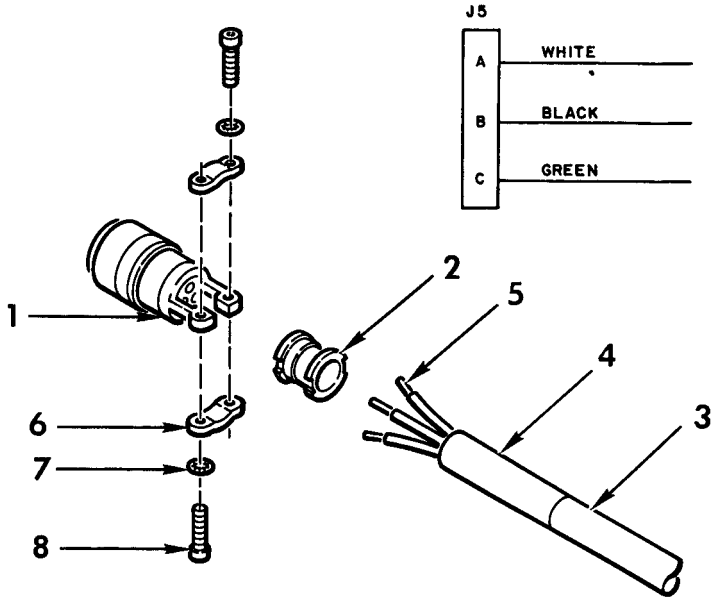
e. Install screw (4) into panel (3), then place terminals of green wire (5) and black wire (6) onto screw. Secure with washer (7), lockwasher (8) and nut (9).

f. Connect white wire (10) to circuit breaker CB1 (11) input side.



3-4. REPAIR OF 28 VDC/115 V 400 HZ POWER SUPPLY (cont)

18. INSTALL CONNECTOR J5 (1).
    a. Place grommet (2) over end of cable (3).
    b. Place insulation sleeving (4) over end of cable (3).
    c. Install wires (5) in connector (1).
    d. Slide insulation sleeving (4) into position against back of connector (1), then shrink with heat gun.
    e. Slide grommet (2) into position against back of connector (1).
    f. Position two clamps (6) over grommet (2) and secure with two screws (7) and two lockwashers (8).



ARR82-27645

19. USING MULTIMETER, CHECK CONTINUITY AND ADJUST VOLTAGE IN ACCORDANCE WITH TABULATED DATA.

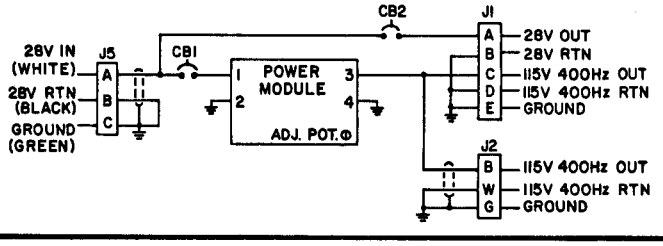
CONTINUITY CHECK	
J1A	— CB2 (OUT)
J1B	— J1 GND
J1C	— J2B
J1D	— J1 GND
J1E	— J1 GND
J2B	— T3
J2W	— J1 GND
J2G	— J1 GND
J5A	— CB1 (IN)
J5B	— J1 GND
J5C	— J1 GND
T1	— CB1 (OUT)
T2	— J1 GND
T4	— J1 GND
CB2 (IN)	—CB1 (IN)

VOLTAGE CHECK
(with 28 Vdc applied to connector J5)

J1A (OUT), J1B (RTN)	24-30 Vdc
J1C (OUT), J1D (RTN), J1E (GND)	115 V 400 Hz
J2B (OUT), J2W (RTN), J2G (GND)	115 V 400 Hz

NOTE

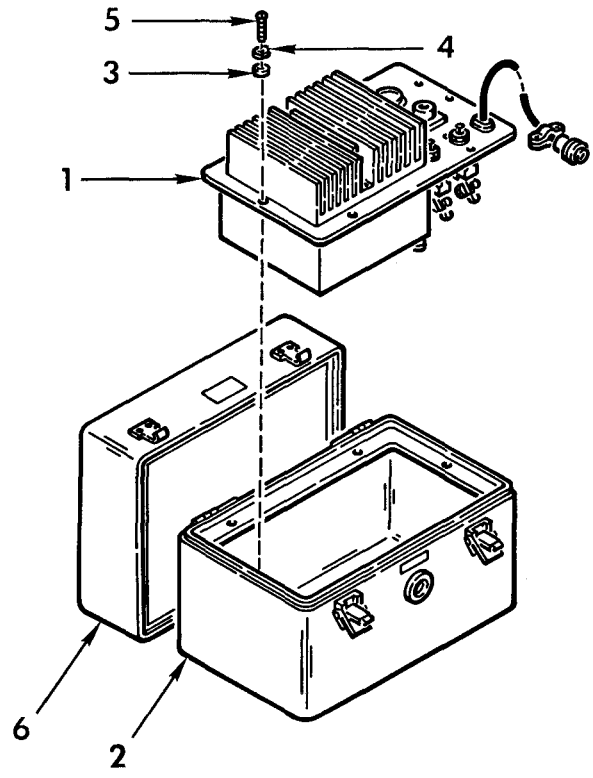
Adjust potentiometer on power module as necessary to obtain 115 Vac output.



ARR82-27646

ASSEMBLY (cont)

20. INSTALL PANEL (1).
    a. Position panel (1) in case (2) and secure with six screws (3), six lockwashers (4), and six washers (5).
    b. Install cover (6) on case (2).



ARR82-27647

END OF TASK

CHAPTER 4

ALINEMENT AND BORESIGHTING PROCEDURES USING BORESIGHT ASSEMBLY GROUND SUPPORT EQUIPMENT (BAGSE)

CHAPTER CONTENTS

CHAPTER OVERVIEW

This chapter provides maintenance tasks for alinement and boresighting of the armament subsystems. These tasks use BAGSE to provide a common reference plane for all the armament subsystems. BAGSE is alined to the helicopter roII, pitch, and yaw axes by being mounted and alined to the TSU.

Section I. GENERAL PROCEDURES

Section Contents

TASK LAYOUT

4-1. The boresighting and alinement procedures are presented as a series of tasks. Each task provides the alinement and boresighting procedures for a particular part of the subsystem. Each task may be accomplished as a single boresighting and alinement procedure or all the tasks may be accomplished to proved a complete boresighting and alinement of the helicopter. Certain tasks require prior completion of another task. These tasks will callout the prior task under the equipment condition heading in Initial Setup. All the tasks require the BAGSE Alinement to Helicopter be performed. When any or all

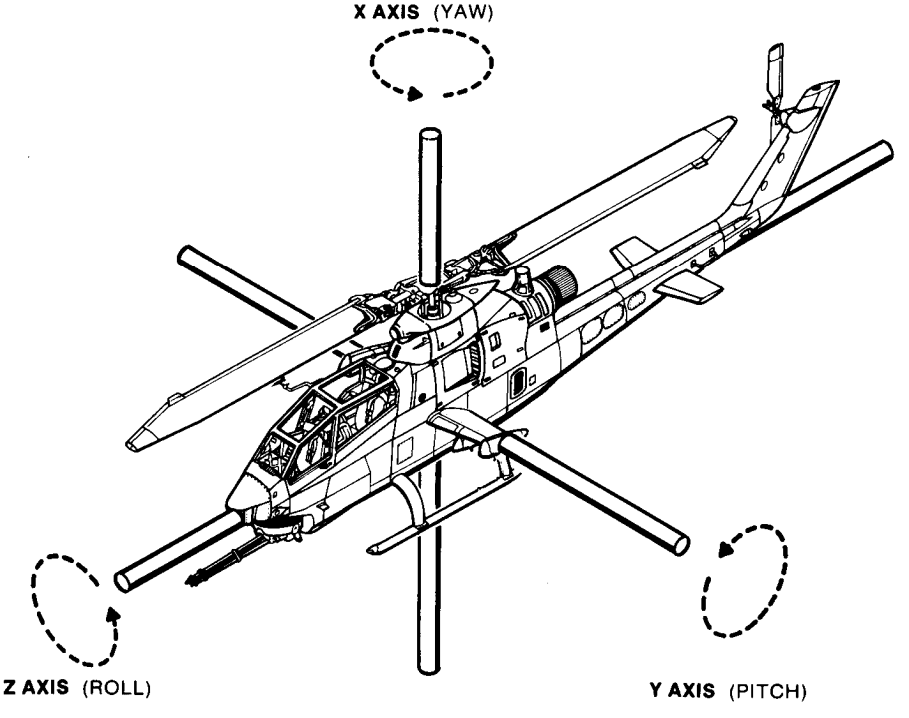
boresighting and alinement tasks have been completed, post boresighting procedures should be performed to put the helicopter back to a maintenance setup condition.

PERSONNEL REQUIREMENTS

4-2. Most of the boresighting and alinement tasks require three technicians. One technician will be required to sight through the TSU, track the appropriate weapon/sight system, and hold the TSU on target during the actual alinement. This technician should be familiar with the tracking characteristics of the TSU and have a working knowledge of all the armament modes of operation. Another technician will be required to make optical measurements. This technician should be familiar with all the applications of BAGSE, including the adjustment and operation of boresight telescopes. A third technician will be required to make actual adjustments and assist the other two technicians as necessary. Where space permits, it is recommended that intercom headsets be worn to make communication easy. All of the tasks require a high degree of teamwork.

BORESIGHTING THEORY

4-3. Boresighting with BAGSE is defined as bringing into proper parallel alinement the weapon systems and sight systems of the helicopter. BAGSE provides an aiming point for each armament subsystem and alinement devices for sighting to those aiming points. Boresight telescopes are provided to sight from the alinement devices to the aiming points. Alining the armament subsystems so that the target scope and sighting scope reticles are coincident is the goal of boresighting with BAGSE. Since BAGSE is alined to the helicopter in roll, pitch, and yaw, the armament subsystems will also be alined to the helicopter's roll, pitch, and yaw axes.



TABULATED DATA

4-4. The following data provides a quick reference of target and sight points for all the armament subsystems and the tolerances in milliradians (mr) for each.

Sight and Target Point Identification	Tolerance (Milliradians) Desired	Required
TF30 TSU	1/3	1
HS33 UP33	<1	2
TL31 TSU	113	1
TR32 TSU	1/3	1
GD29 FG29	<1	3
GD29 LG29	<1	3
GD29 RG29	<1	3
AD35 UP35	<4	8
HS36 AD36	<4	8
HS34 UP34	<1	2
UP37 AL37	<2	2
HD38 UP38	<1	2
RT42 LW42	<1	3
RT43 RW43	<1	3
RT44 LW44	<1	3
RT45 RW45	<1	3
RT46 LW46	<1	3
RT47 RW47	<1	3
RT48 LW48	<1	3
RT49 RW49	<1	3

<= LESS THAN

Section II. ALINEMENT AND BORESIGHTING PROCEDURES

Section Contents — Para

4-5. BAGSE ALINEMENT TO HELICOPTER

DESCRIPTION

This task covers: BAGSE alinement to helicopter roll, yaw, and pitch axes prior to boresighting.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental
- Boresight Assembly Ground
  - Support Equipment (BAGSE)

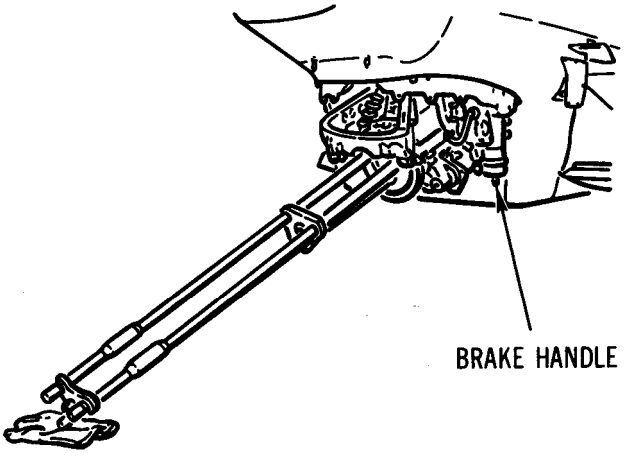
Personnel Required:
- 68J Aircraft Fire Control
  - Repairer (3)

References:
- TM 9-1090-206-20-1
- TM 55-1520-236-23
- TM 9-4931-583-30&P

Equipment Conditions:
- Helicopter ARMAMENT SUBSYSTEM
  - MAINTENANCE SETUP performed,
  - TM 9-1090-206-20-1.
- Aux electrical power applied, see
  - TM 9-1090-206-20-1.
- BAGSE assembled and alined, see
  - TM 9-4391-583-30&P.
- TSU nose fairing, left and right side fairing,
  - azimuth rod, window cover, and
  - wirecutter deflector bar removed;
  - see TM 55-1520-236-23.

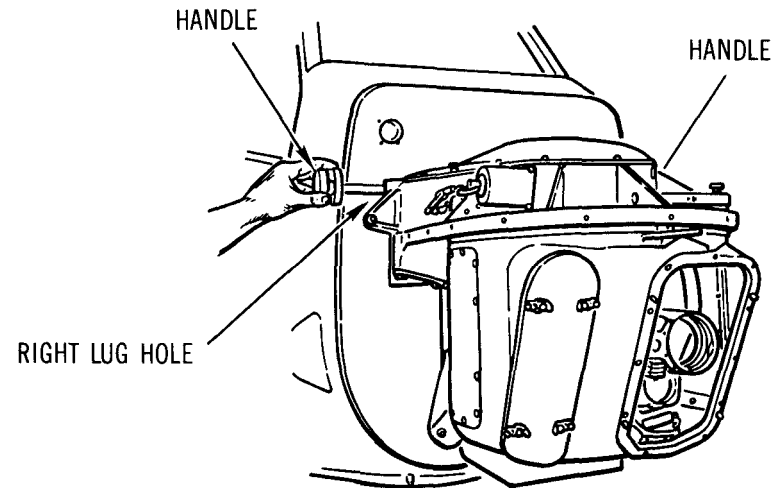
ALINEMENT SETUP

1. RELEASE ELEVATION DRIVE MOTOR BRAKE HANDLE AND LOWER GUN BARRELS ONTO SUITABLE PAD.



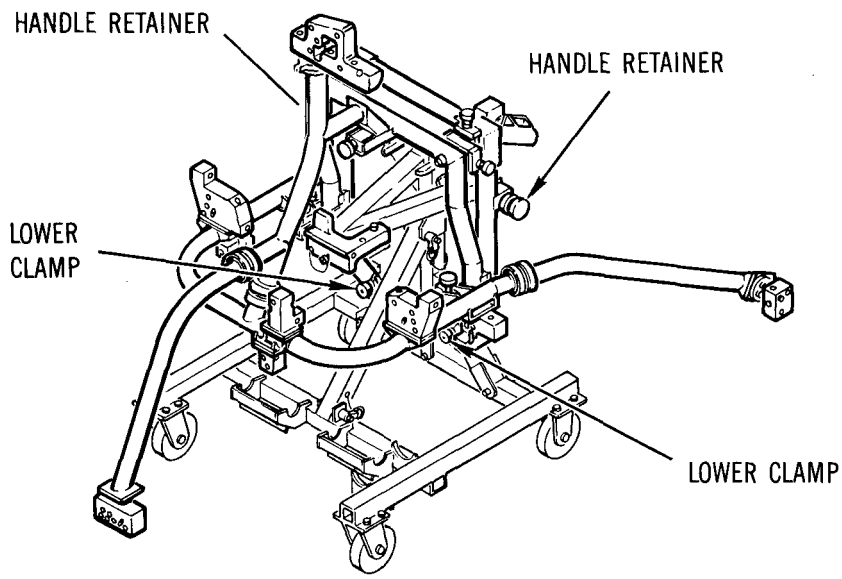
ALINEMENT SETUP (cont)

2. INSTALL TWO HANDLES FROM BAGSE IN LEFT AND RIGHT TSU LIFTING LUG HOLES AND FASTEN SECURELY.



ARR82-25337

3. ON BAGSE, LOOSEN TWO LOWER CLAMPS AND TWO HANDLE RETAINERS.



ARR82-25338

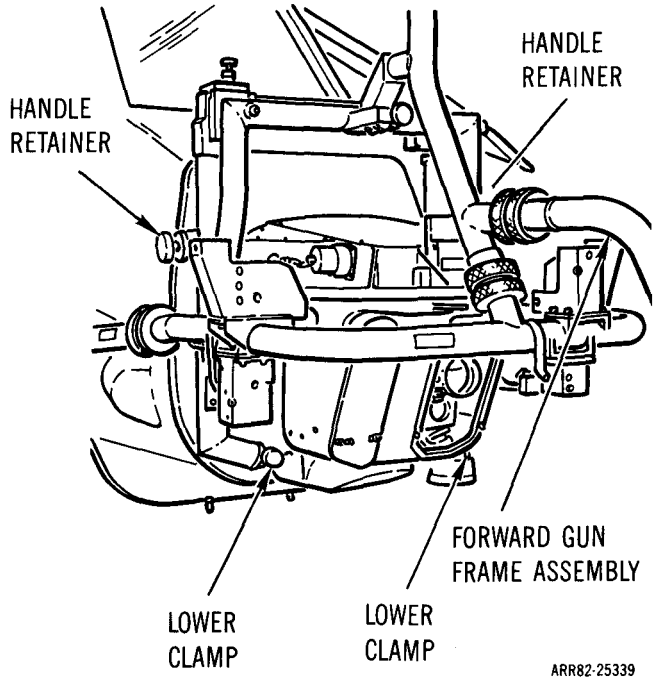
4-5. BAGSE ALINEMENT TO HELICOPTER (cont)

CAUTION

Do not use forward gun frame assembly as a handhold when lifting BAGSE.

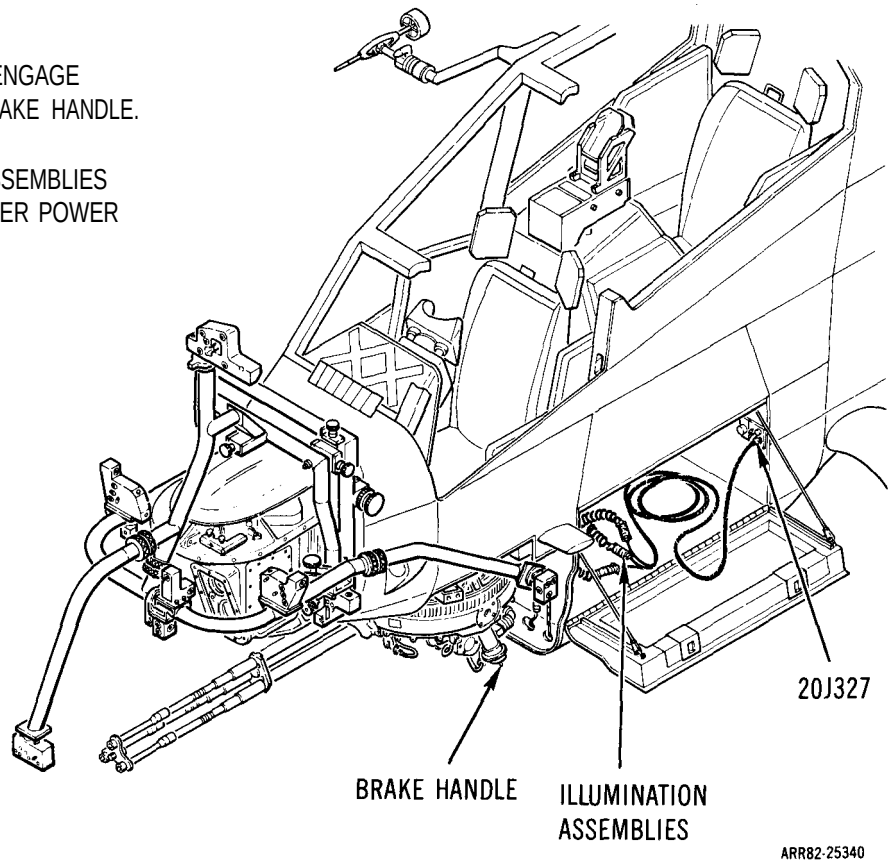
4. TRANSFER BAGSE TO HELICOPTER AND SUSPEND ON TWO HANDLES IN TSU.

5. TIGHTEN TWO HANDLE RETAINERS AND SECURE TWO LOWER CLAMPS TO TSU.



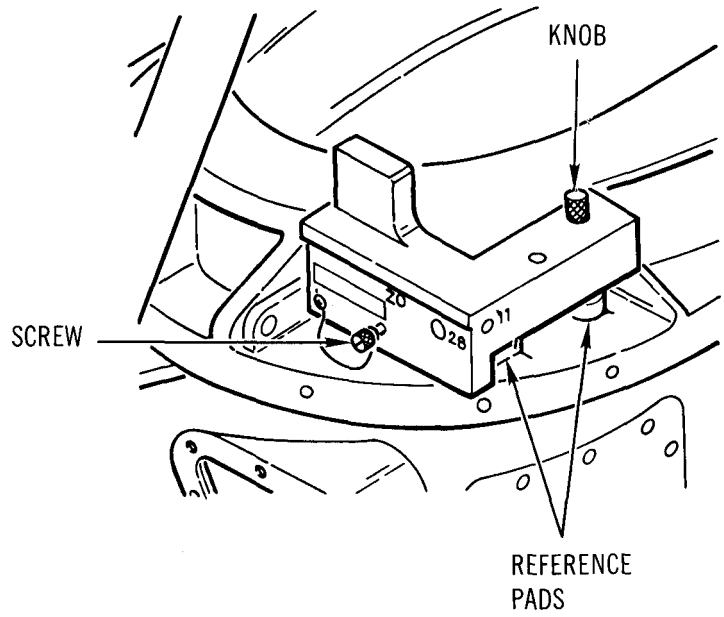
6. RAISE GUN BARRELS AND ENGAGE ELEVATION DRIVE MOTOR BRAKE HANDLE.

7. CONNECT ILLUMINATION ASSEMBLIES POWER CABLE TO HELICOPTER POWER CONNECTOR 20J237.



ALINEMENT SETUP (cont)

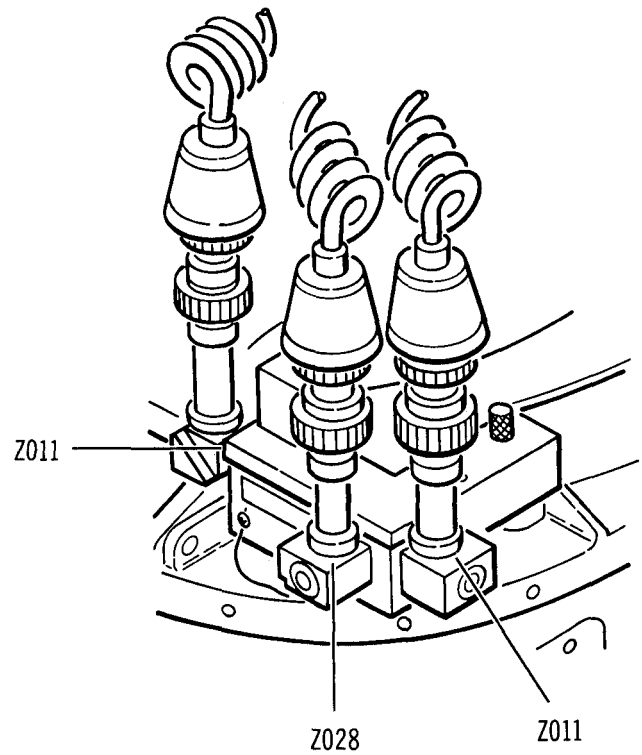
8. INSTALL GSE BORESIGHT REFERENCE BLOCK (Z0) ON TSU REFERENCE PADS.
   a. Install screw and tighten knob.
   b. Make sure knob and screw are tight enough to prevent rocking.



ARR82-25341

9. INSTALL THREE BORESIGHT TELESCOPES IN ZO BLOCK AT FORWARD HOLE (Z028), LEFT HOLE (Z011), AND RIGHT HOLE (Z011).

   Install illumination assemblies on boresight telescopes.



ARR82-25342

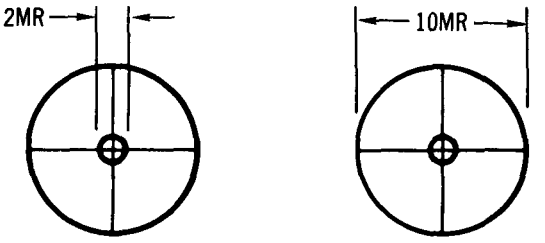
4-5. BAGSE ALINEMENT TO HELICOPTER (cont)

NOTE

Boresight telescope retitles large diameter circle equals 10 milliradians (mr) and small diameter circle equals 2 mr.

10. INSTALL BORESIGHT TELESCOPE IN HOLES AT LW11, RW11, AND FR28, SIGHTING TARGET SCOPES TO VERIFY FOLLOWING TOLERANCES:

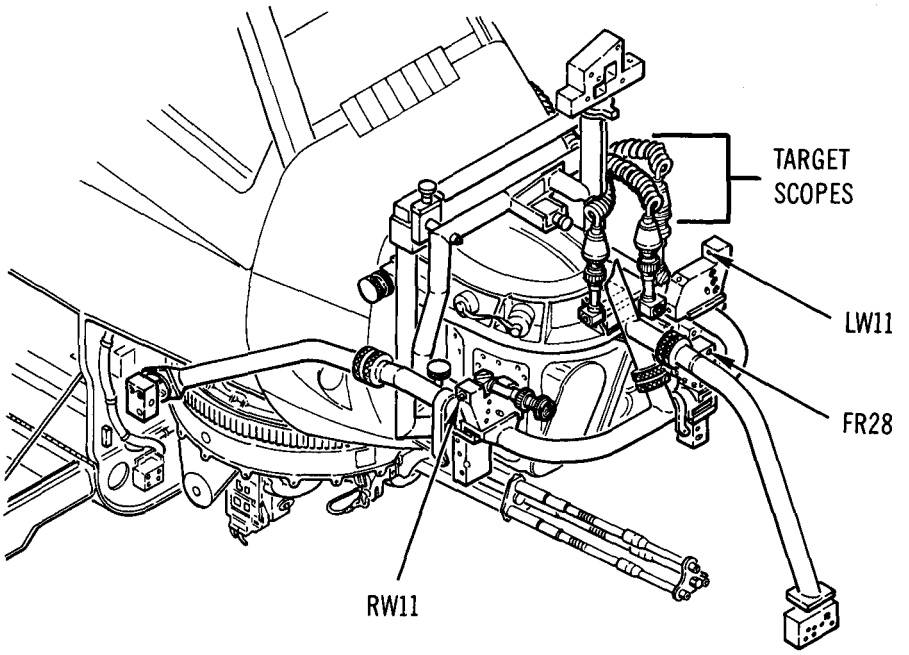
Sight Scope	Target Scope	Tolerance Milliradians
LW11	Z011	1/2 mr
RW11	Z011	1/2 mr
FR28	Z028	1/2 mr



BORESIGHT TELESCOPE RETICLES

NOTE

If BAGSE meets tolerance, alinement is not required, proceed to boresighting tasks. If not, proceed to alinement procedures.

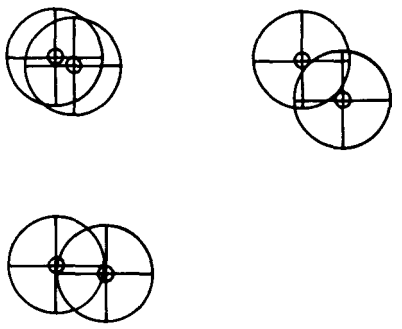


ARR82-25343

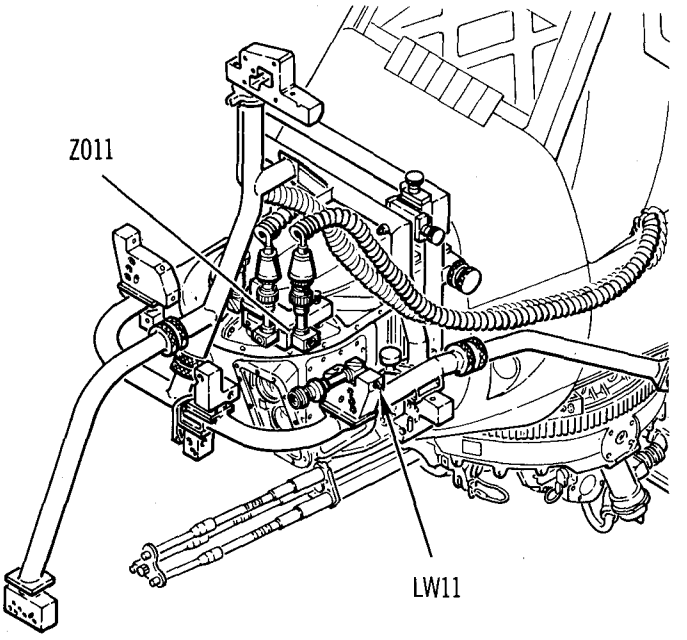
ROLL ALINEMENT

11. SIGHT THROUGH SCOPE AT LW11 TO TARGET SCOPE AT Z011 AND OBSERVE RETICLES.

    An offset in roll and yaw will usually exist. See samples.



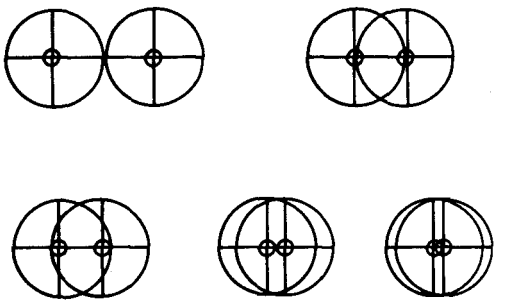
SAMPLES — ROLL OFFSET



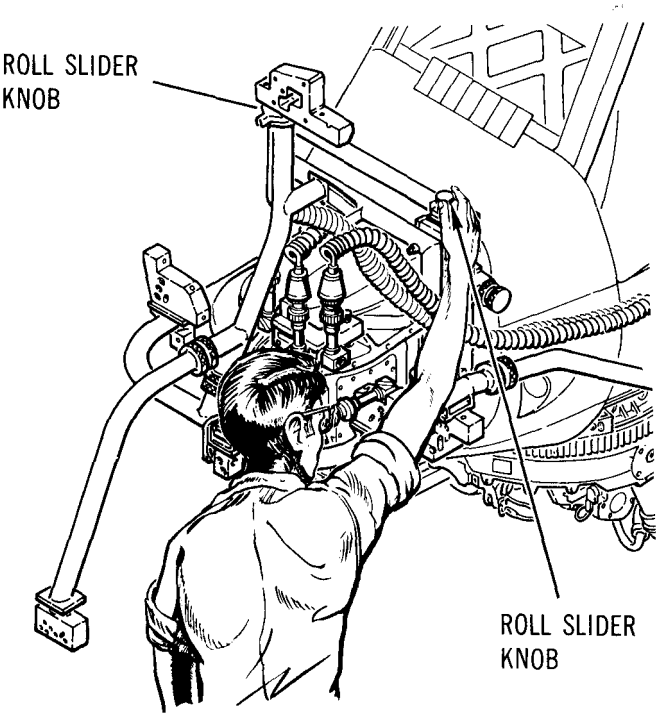
ARR82-25344

12. ADJUST ROLL SLIDER KNOBS TO CENTER RETICLE HORIZONTAL CROSSHAIRS.

    An offset in yaw will usually exist. See samples.



SAMPLES — ROLL CORRECTED



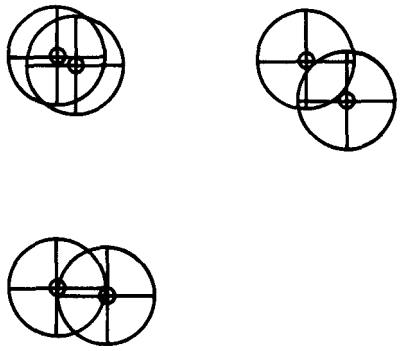
ARR82-25345

4-5. BAGSE ALINEMENT TO HELICOPTER (cont)

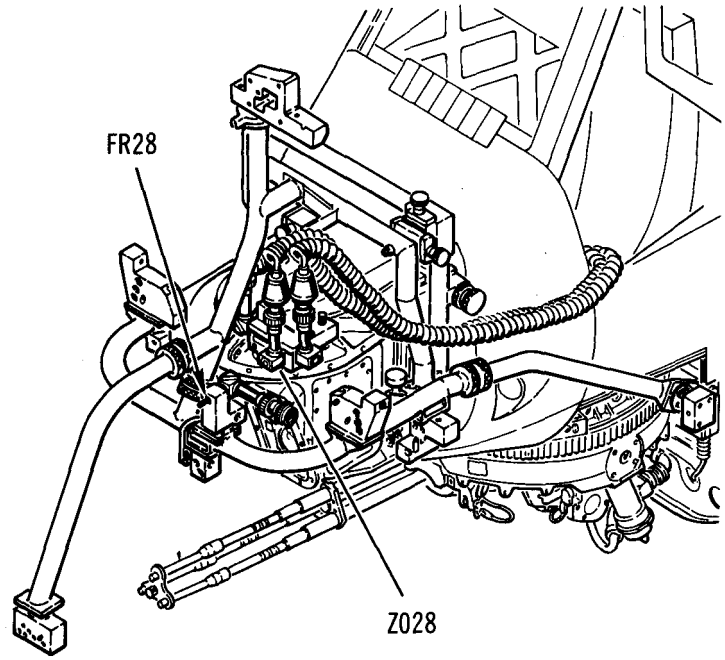
YAW ALINEMENT

13. SIGHT THROUGH SCOPE AT FR28 TO TARGET SCOPE AT Z028 AND OBSERVE RETICLES.

An offset in yaw and pitch will usually exist. See samples.



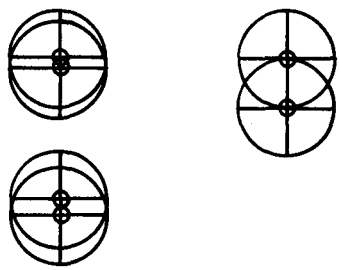
SAMPLES — YAW OFFSET



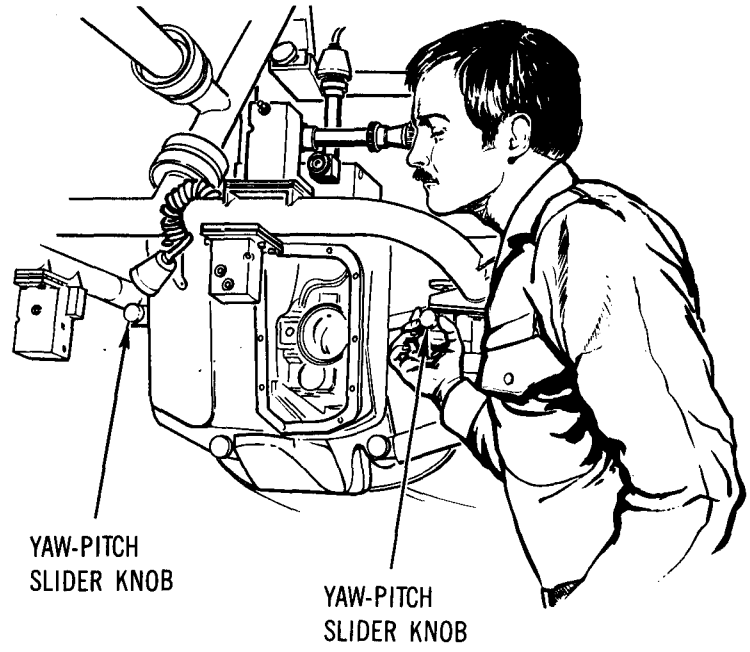
ARR82-25346

14. ADJUST YAW-PITCH SLIDER KNOBS TO CENTER RETICLE VERTICAL CROSSHAIRS.

An offset in pitch will usually exist. See samples.



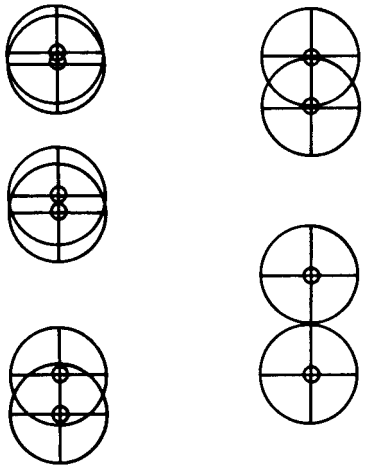
SAMPLES — YAW CORRECTED



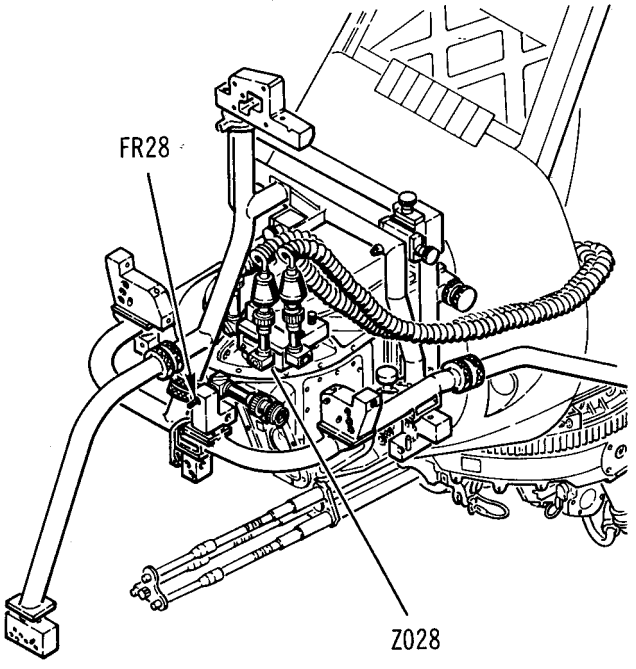
ARR82-25347

PITCH ALINEMENT

15. SIGHT THROUGH SCOPE AT FR28 TO TARGET SCOPE AT Z028 AND OBSERVE RETICLES. SEE SAMPLES.



SAMPLES — PITCH OFFSET

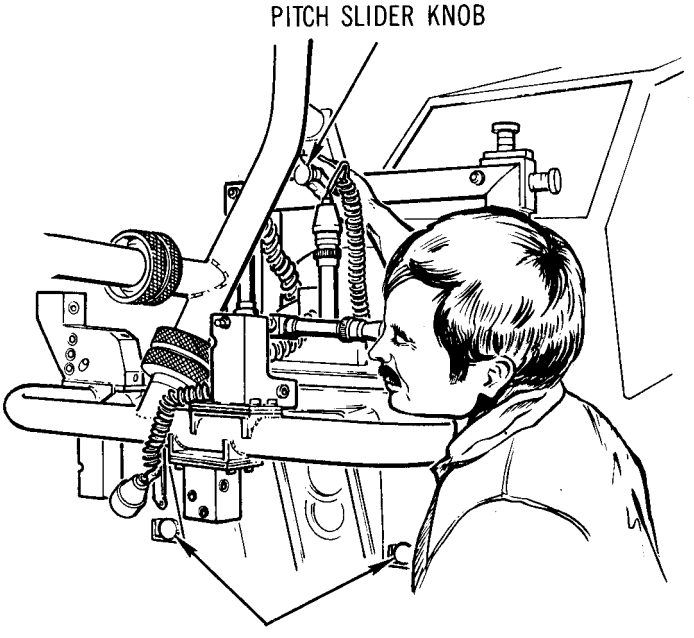


ARR82-25348

16. ADJUST PITCH SLIDER KNOB AND BOTH YAW-PITCH SLIDER KNOBS TO CENTER HORIZONTAL CROSSHAIRS.

17. REPEAT ADJUSTMENTS AS NECESSARY TO MEET 1/2 mr TOLERANCES LISTED IN STEP 10.

18. WHEN TOLERANCES HAVE BEEN MET, BAGSE IS ALINED TO HELICOPTER. MONITOR AND MAINTAIN THIS ALINEMENT DURING ALL BORESIGHTING TASKS.



ARR82-25349

END OF TASK

4-6. TURRET SUBSYSTEM BORESIGHTING

DESCRIPTION

This task covers: TSU to turret subsystem boresighting and boresight corrections using boresight controller.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Boresight Assembly Ground Support Equipment (BAGSE)
- Boresight Controller

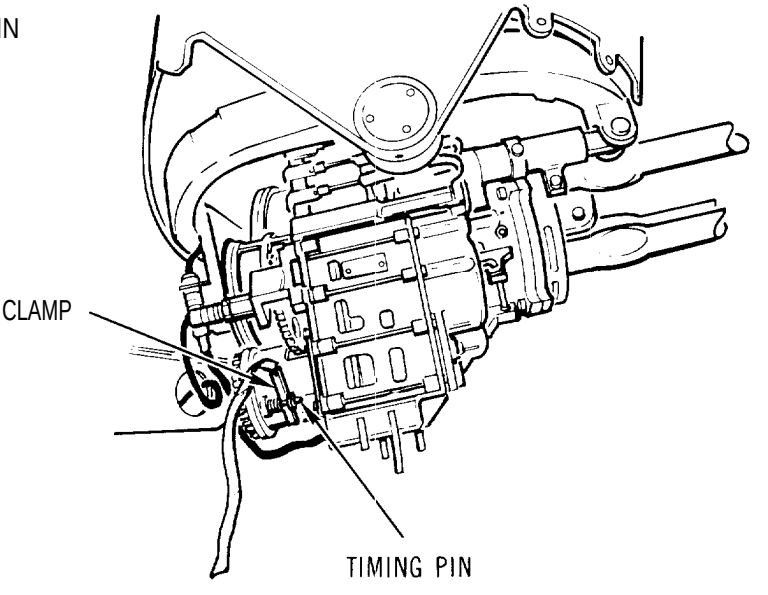
Personnel Required:
- 68J Aircraft Fire Control Repairer (3)

References:
- TM 55-1520-236-23

Equipment Conditions:
- BAGSE ALINEMENT TO HELICOPTER performed, para 4-5.
- ELEVATION AND AZIMUTH RESOLVER ALINEMENT performed, para 2-69.

BORESIGHTING SETUP

1. ON M89E1 FEEDER, CLAMP TIMING PIN IN DEPRESSED POSITION.



ARR82-25352

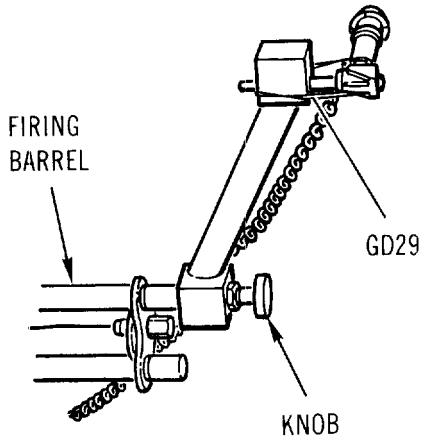
BORESIGHTING SETUP (cont)

2. INSTALL GUN ALINEMENT DEVICE IN FIRING BARREL AND SECURE WITH KNOB.

3. INSTALL BORESIGHT TELESCOPE IN GUN ALINEMENT DEVICE AT GD29.

   a. Secure scope with elastic retainer.

   b. Install illumination device on scope.



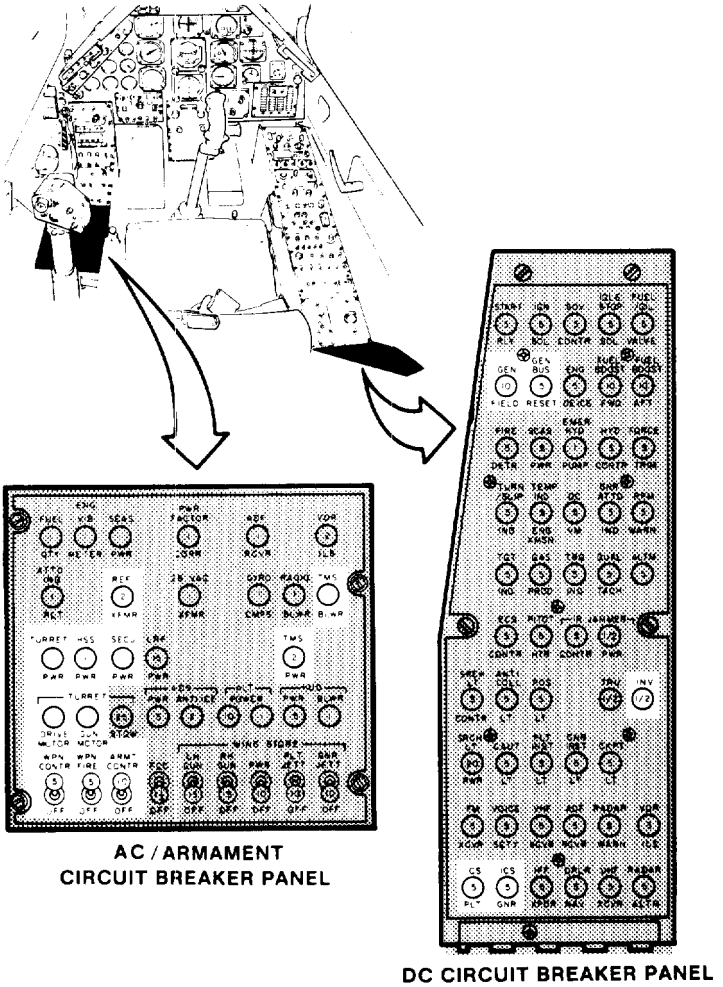
ARR82-25353

NOTE

ICS PLT and ICS GNR circuit breaker may be closed to provide internal communications.

4. CLOSE FOLLOWING CIRCUIT BREAKERS ON DC CIRCUIT BREAKER PANEL:
   - GEN FIELD
   - GEN BUS RESET
   - INV
   - ICS PLT
   - ICS GNR

5. CLOSE FOLLOWING CIRCUIT BREAKERS ON AC/ARMAMENT CIRCUIT BREAKER PANEL:
   - REF XFMR
   - TURRET PWR
   - HSS PWR
   - SECU PWR
   - TMS PWR
   - TMS BLWR
   - TURRET DRIVE MOTOR
   - TURRET GUN MOTOR
   - WPN CONTR
   - WPN FIRE
   - ARMT CONTR



AC / ARMAMENT CIRCUIT BREAKER PANEL

DC CIRCUIT BREAKER PANEL

ARR82-25272

4-6. TURRET SUBSYSTEM BORESIGHTING (cont)

TURRET SUBSYSTEM BORESIGHTING CHECK

NOTE

Three technicians are required to perform following operations:

1. **First technician sights through TSU to target reticle, tracking gun to TSU.**
2. **Second technician makes optical measurements.**
3. **Third technician adjusts resolvers and assists other technicians as necessary.**

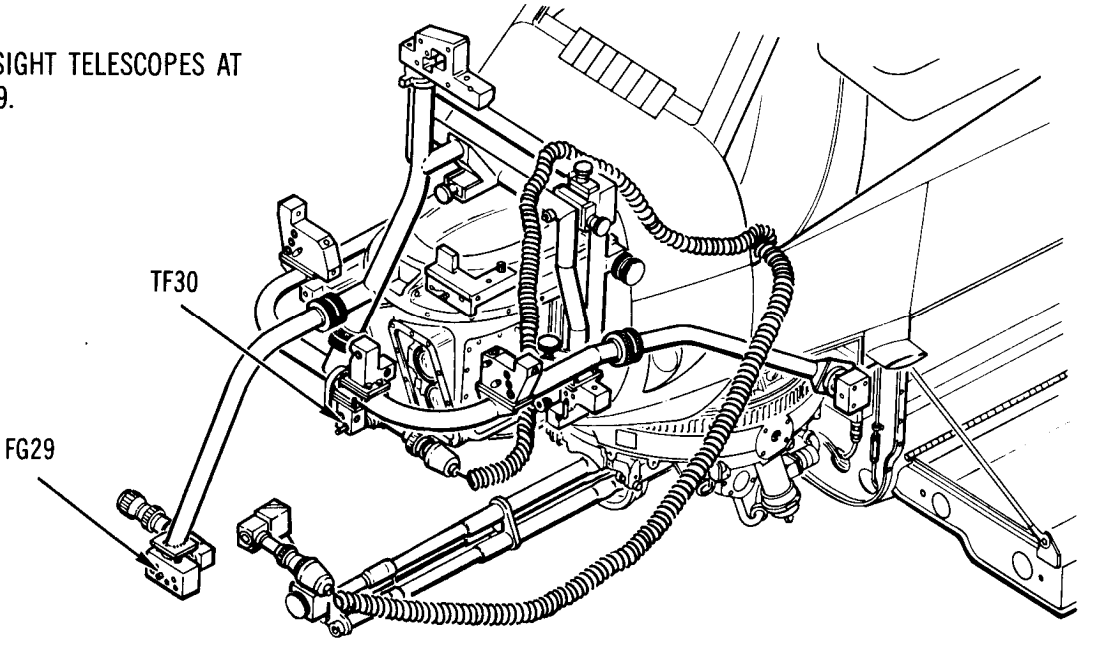
Intercom headsets are recommended for communication between technicians during these operations.

During following procedures, first technician may cease tracking as directed by second technician.

To avoid erroneous optical measurements, personnel must not lean on or apply pressure to BAGSE or any armament subsystem components during boresighting.

Angular alinement established in BAGSE ALINEMENT TO HELICOPTER, paragraph 4-5, should be monitored and maintained throughout boresighting.

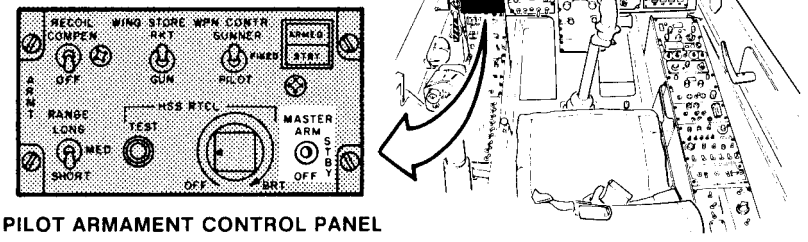
6. INSTALL BORESIGHT TELESCOPES AT TF30 AND FG29.



ARR82-25354

TURRET SUBSYSTEM BORESIGHTING CHECK (cont)

7. ON PILOT ARMAMENT CONTROL PANEL, SET MASTER ARM SWITCH TO STBY.



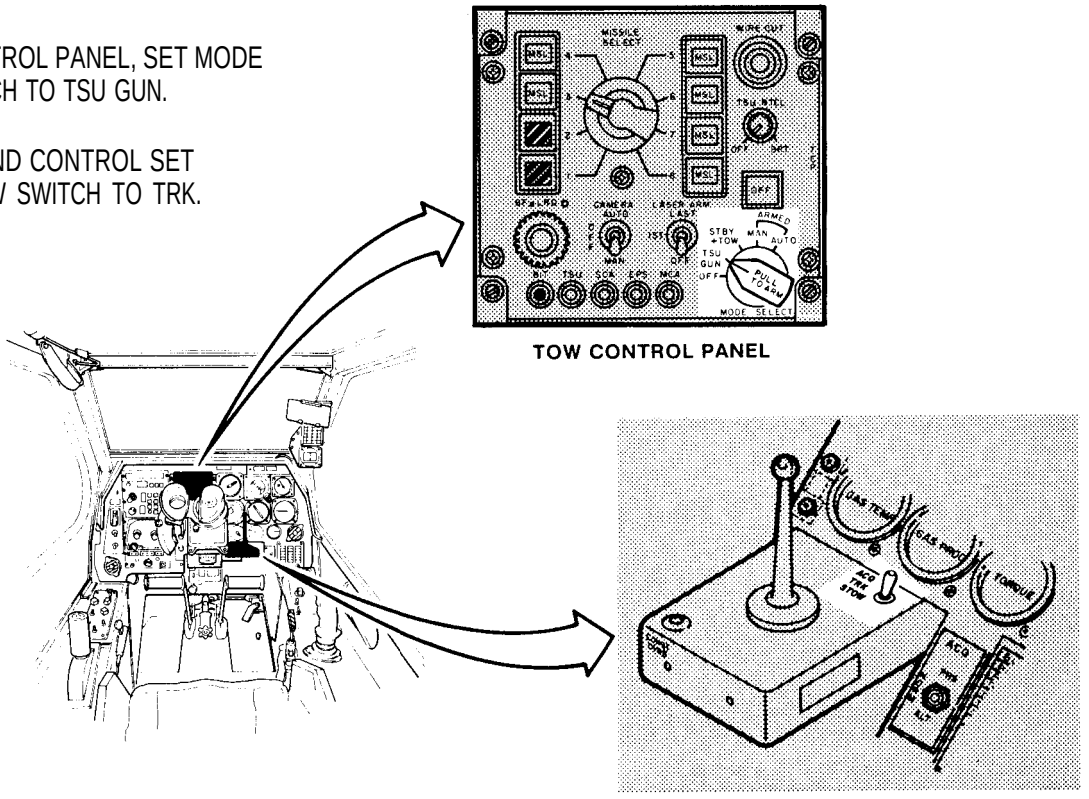
PILOT ARMAMENT CONTROL PANEL

NOTE

First technician takes position in gunner's cockpit.

8. ON TOW CONTROL PANEL, SET MODE SELECT SWITCH TO TSU GUN.

9. ON SIGHT HAND CONTROL SET ACQ/TRK/STOW SWITCH TO TRK.



TOW CONTROL PANEL

SIGHT HAND CONTROL

ARR82-25356

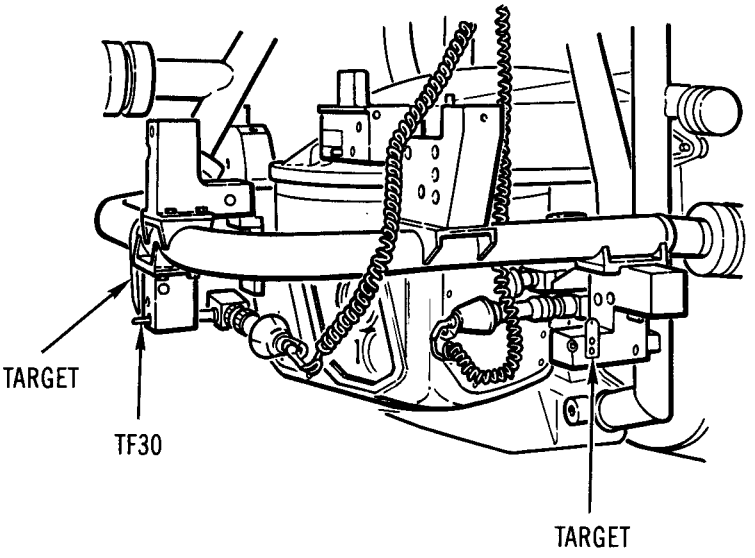
4-6. TURRET SUBSYSTEM BORESIGHTING (cont)

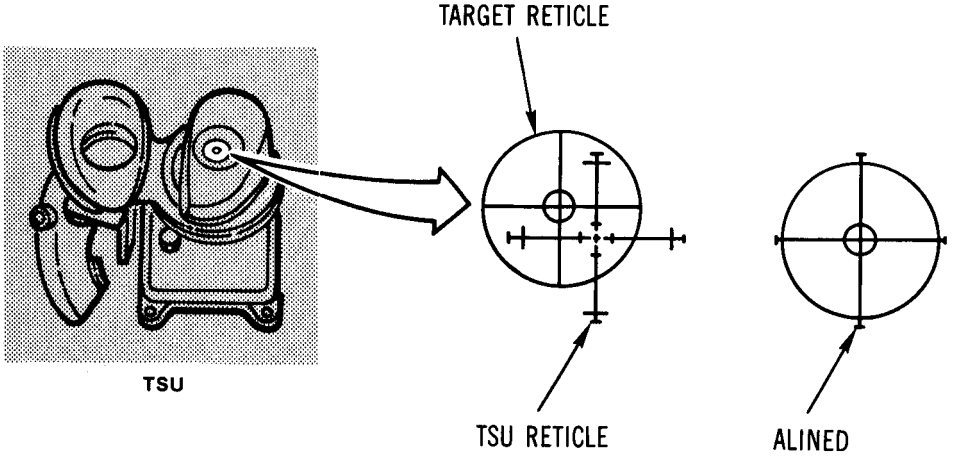
NOTE

Targets are provided to the right of each BAGSE TSU sighting hole. Center TSU reticle on target hole in LOW MAG, then switch to HI MAG. Target scope reticle should be visible.

10 DEPRESS LEFT-HAND GRIP ACTION SWITCH AND ALINE TSU RETICLE WITH TARGET RETICLE AT TF30.

Retitles are held within 1/2 mr during following procedures.

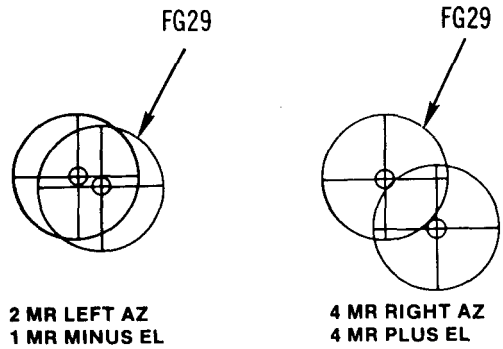




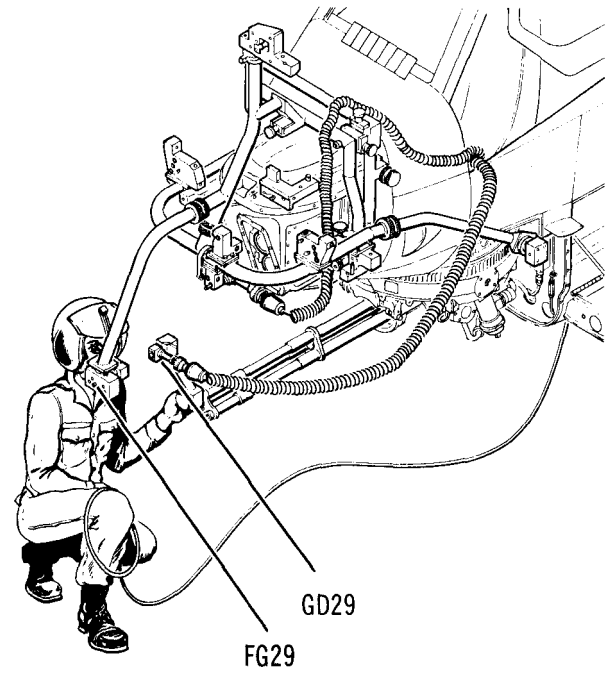
ARR82-25357A

TURRET SUBSYSTEM BORESIGHTING CHECK (cont)

11. SECOND TECHNICIAN SIGHTS THROUGH SCOPE AT FG29 TO TARGET SCOPE AT GD29.
    a. Desired offset is less than 1 mr. Maximum offset is 3 mr.
    b. Record magnitude and direction of offset. See samples.



SAMPLES — RETICLE OFFSET

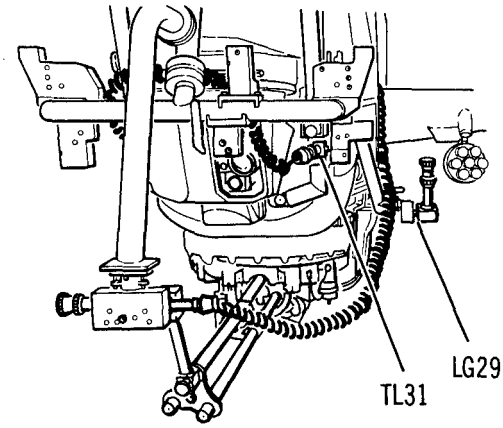


ARR82-25358

NOTE

For sighting at left and right gun positions, target scope at GD29 is put in the aft facing hole.

12. INSTALL BORESIGHT TELESCOPES AT TL31 AND LG29.



ARR82-25359

4-6. TURRET SUBSYSTEM BORESIGHTING (cont)

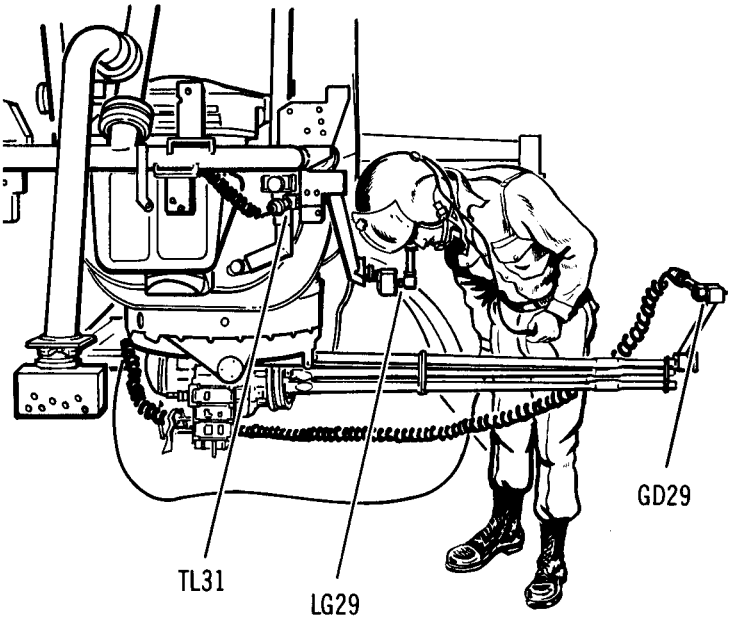
13. FIRST TECHNICIAN ALINES TSU RETICLE WITH TARGET RETICLE AT TL31.

    Retitles are held within 1/2 mr during following procedures.

14. SECOND TECHNICIAN SIGHTS THROUGH SCOPE AT LG29 TO TARGET SCOPE AT GD29.

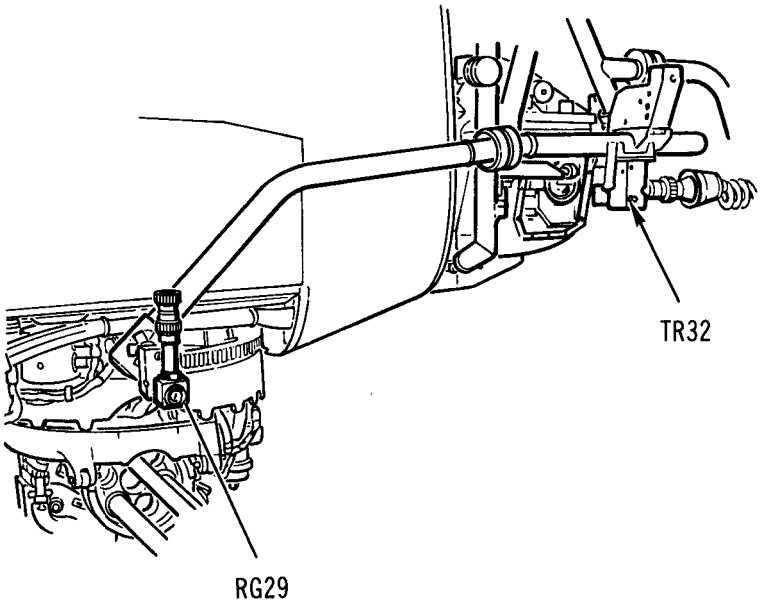
    a. Desired offset is less than 1 mr. Maximum offset is 3 mr.

    b. Record direction and magnitude of offset.



ARR82-25360

15. INSTALL BORESIGHT TELESCOPES AT TR32 AND RG29.



ARR82-25361

TURRET SUBSYSTEM BORESIGHTING CHECK (cont)

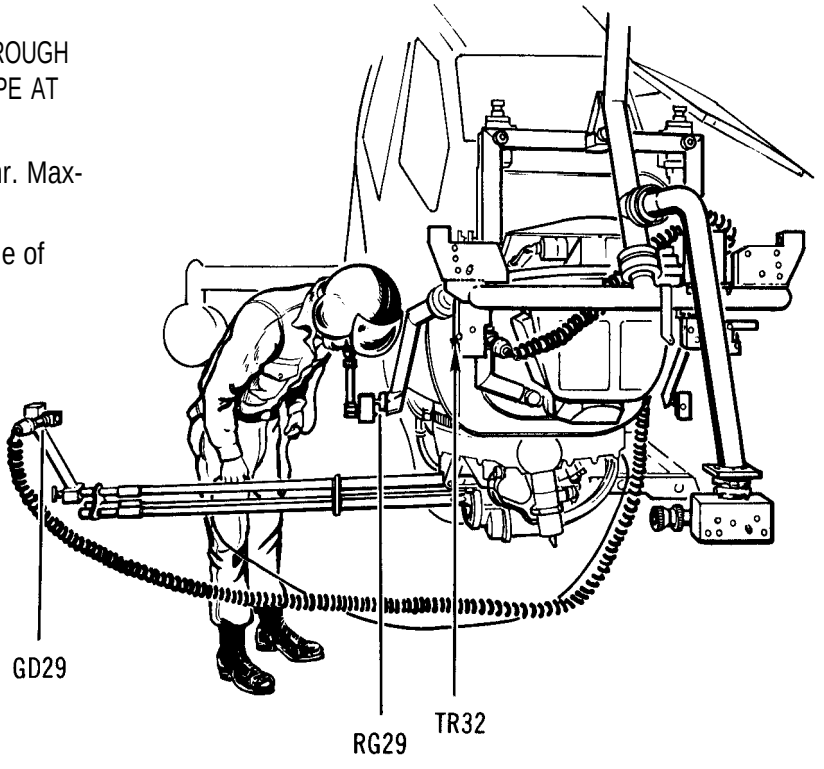
16. FIRST TECHNICIAN ALINES TSU RETICLE WITH TARGET RETICLE AT TR32.

    Retitles are held within 1/2 mr during following procedures.

17. SECOND TECHNICIAN SIGHTS THROUGH SCOPE AT RG29 TO TARGET SCOPE AT GD29.

    a. Desired offset is less than 1 mr. Maximum offset is 3 mr.

    b. Record direction and magnitude of offset.



ARR82-25362

18. COMPARE RECORDED ELEVATION AND AZIMUTH OFFSETS WITH TOLERANCES LISTED IN TABLE.

19. IF OFFSETS ARE WITHIN TOLERANCES GO TO TURRET SUBSYSTEM BORESIGHTING, CONTROLLER CORRECTIONS. IF NOT, GO TO NEXT STEP.

POSITION		TOLERANCE (MR)	
SIGHT	TARGET	DESIRED	REQUIRED
FG29	GD29	< 1	3
LG29	GD29	< 1	3
RG29	GD29	< 1	3

BORESIGHT TOLERANCES — TSU TO GUN

ARR82-25363

4-6. TURRET SUBSYSTEM BORESIGHTING (cont)

TURRET SUBSYSTEM BORESIGHTING ALINEMENT

20. REMOVE TURRET LEFT AND RIGHT FAIRINGS, SEE TM 55-1520-236-23.

NOTE

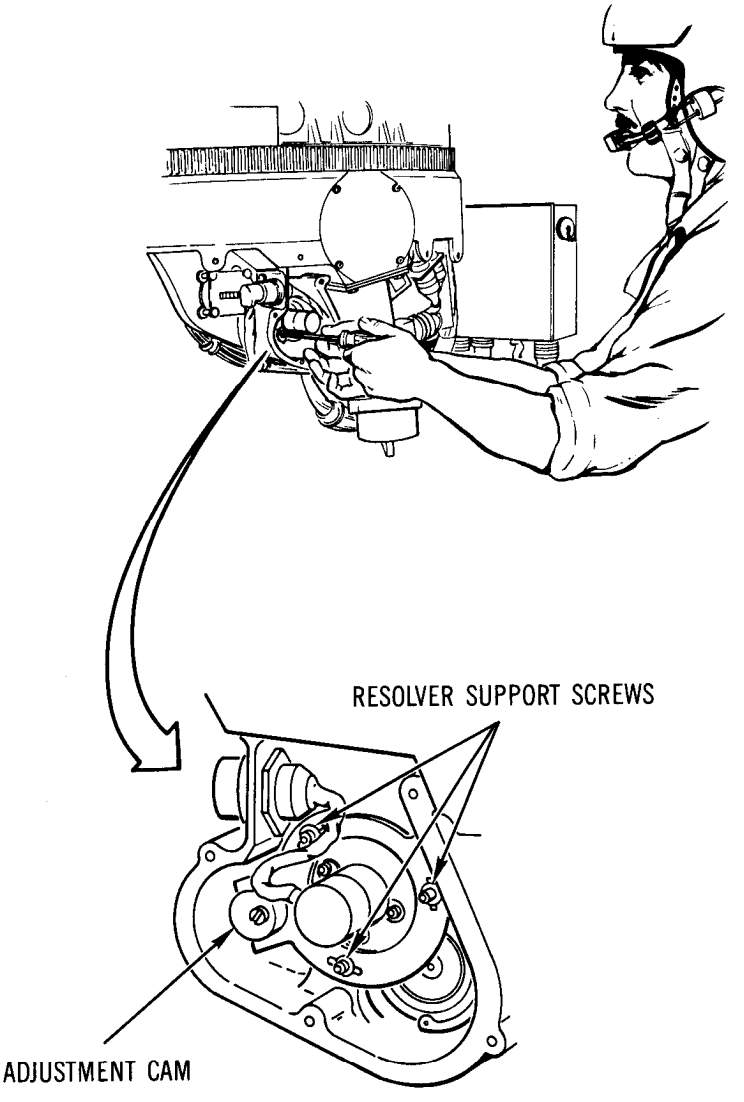
The following procedures are used to reduce elevation and/or azimuth boresight errors (offsets in milliradians) by adjusting elevation and azimuth resolvers. Elevation alinement is given first, followed by azimuth alinement.

21. REMOVE ELEVATION RESOLVER COVER.

22. LOOSEN BUT DO NOT REMOVE THREE RESOLVER SUPPORT SCREWS.

23. THIRD TECHNICIAN TURNS ADJUSTMENT CAM, AS DIRECTED BY SECOND TECHNICIAN TO ALINE RETICLES AS CLOSE AS POSSIBLE (HORIZONTAL CROSSHAIRS) AT FORWARD BORESIGHT POSITION AS DIRECTED IN STEPS 10 AND 11. CHECK LEFT AND RIGHT POSITIONS.

24. TORQUE THREE RESOLVER SUPPORT SCREWS TO 12-20 LB.-IN. (1.36-2.26 N.m).



ARR82-25364

TURRET SUBSYSTEM BORESIGHTING ALINEMENT (cont)

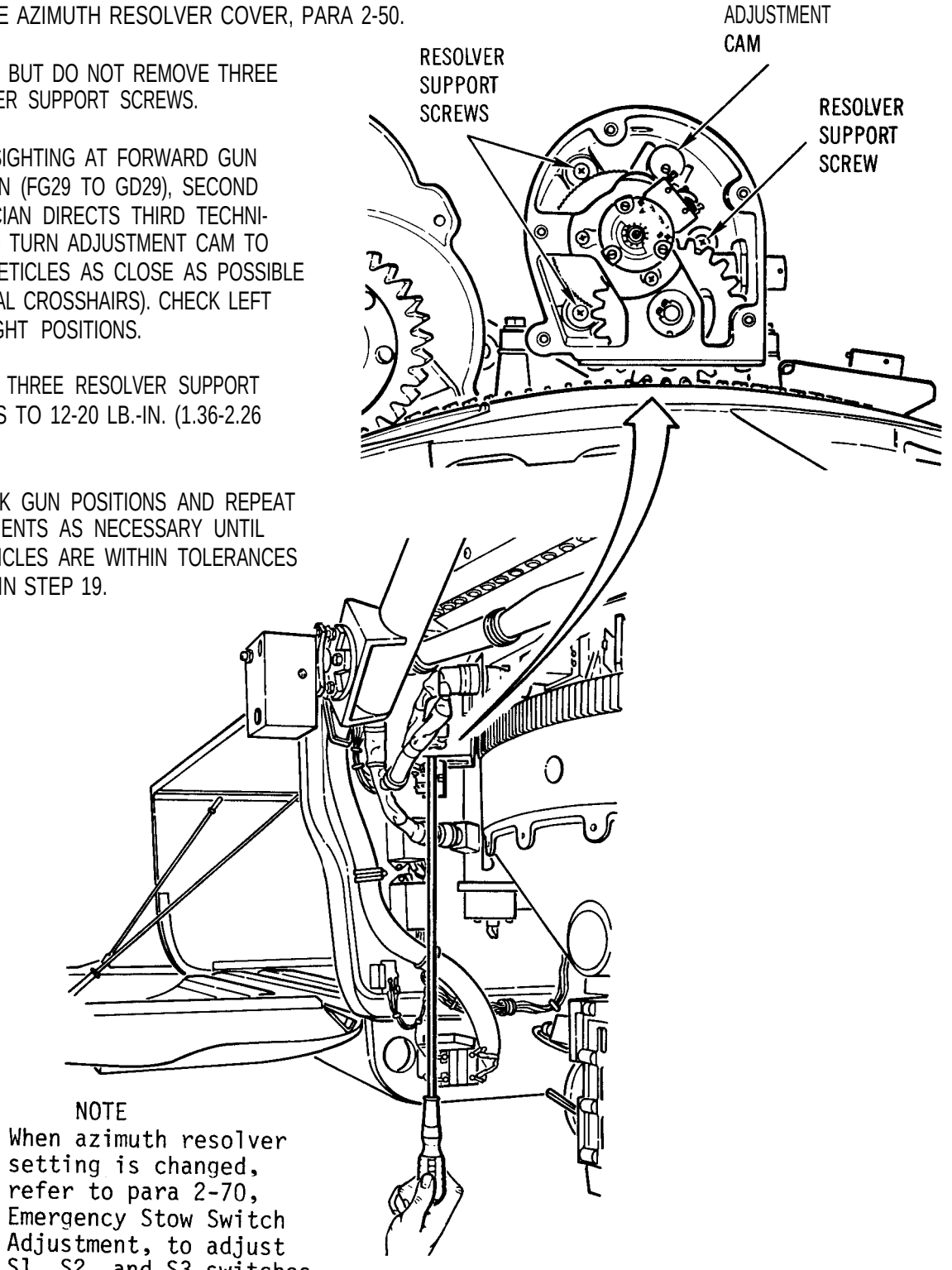
25 REMOVE AZIMUTH RESOLVER COVER, PARA 2-50.

26. LOOSEN BUT DO NOT REMOVE THREE RESOLVER SUPPORT SCREWS.

27. WHILE SIGHTING AT FORWARD GUN POSITION (FG29 TO GD29), SECOND TECHNICIAN DIRECTS THIRD TECHNICIAN TO TURN ADJUSTMENT CAM TO ALINE RETICLES AS CLOSE AS POSSIBLE (VERTICAL CROSSHAIRS). CHECK LEFT AND RIGHT POSITIONS.

28. TORQUE THREE RESOLVER SUPPORT SCREWS TO 12-20 LB.-IN. (1.36-2.26 N.m).

29. RECHECK GUN POSITIONS AND REPEAT ADJUSTMENTS AS NECESSARY UNTIL ALL RETICLES ARE WITHIN TOLERANCES LISTED IN STEP 19.



NOTE
When azimuth resolver setting is changed, refer to para 2-70, Emergency Stow Switch Adjustment, to adjust S1, S2, and S3 switches.

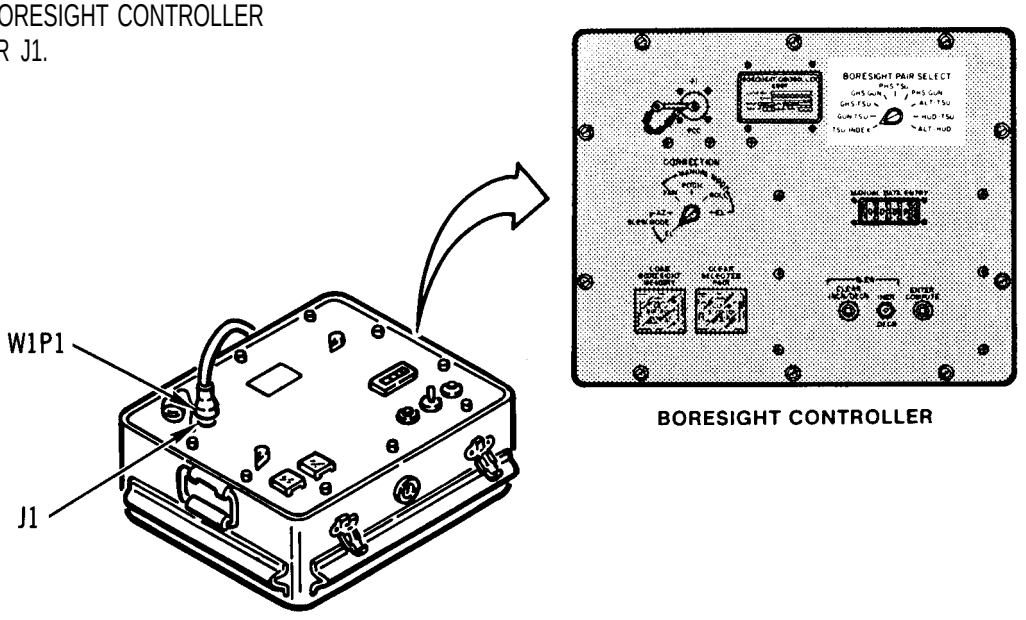
ARR82-25365

4-6. TURRET SUBSYSTEM BORESIGHTING (cont)

TURRET SUBSYSTEM BORESIGHTING, CONTROLLER CORRECTIONS

30. ON BORESIGHT CONTROLLER, SET BORESIGHT PAIR SELECT SWITCH TO TSU-INDEX.

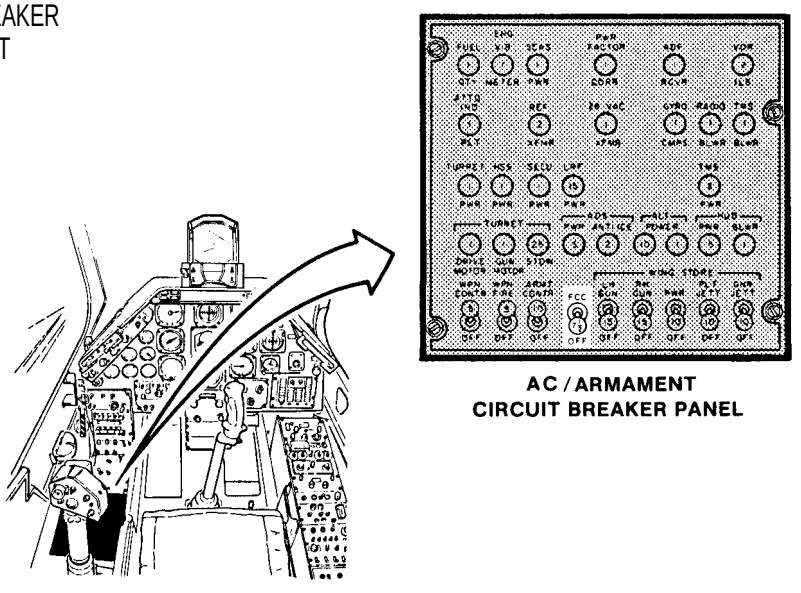
31. CONNECT BORESIGHT CABLE ASSEMBLY W1P1 TO BORESIGHT CONTROLLER CONNECTOR J1.



BORESIGHT CONTROLLER

ARR82-25366

32. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, MAKE SURE FCC CIRCUIT BREAKER IS SET TO OFF.

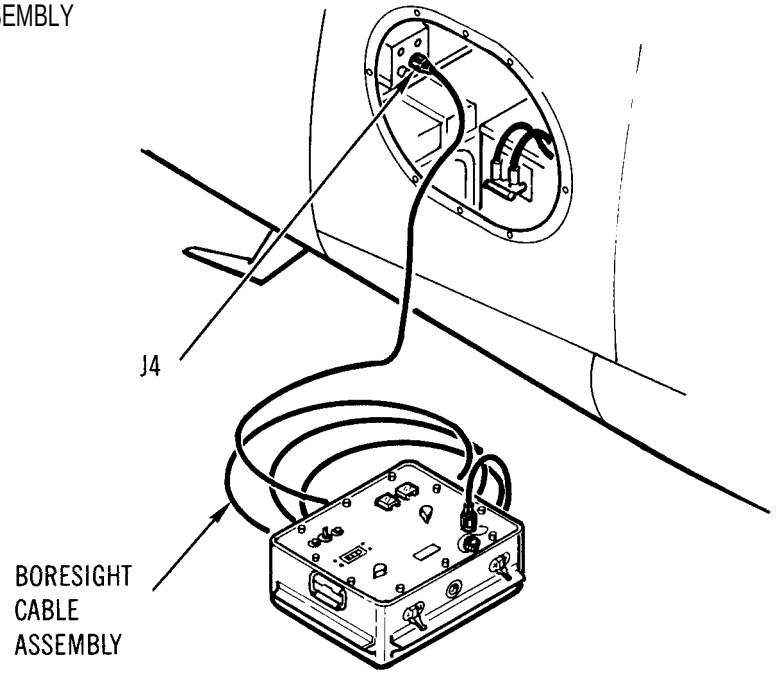


AC / ARMAMENT CIRCUIT BREAKER PANEL

ARR82-25367

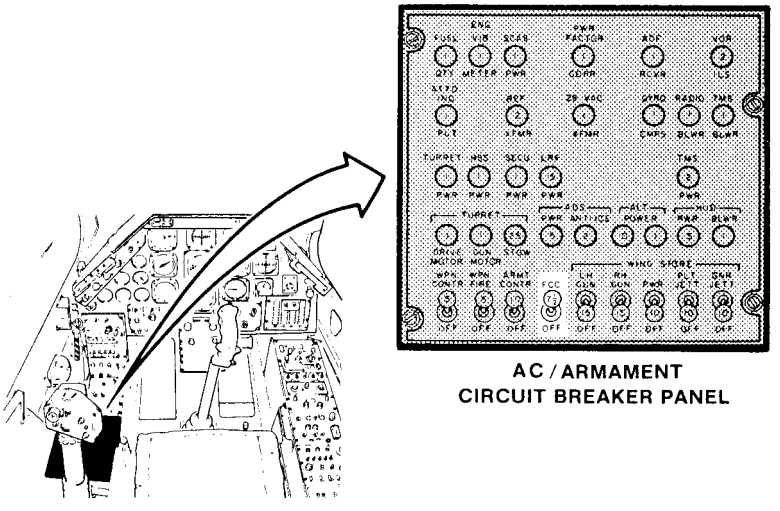
TURRET SUBSYSTEM BORESIGHTING, CONTROLLER CORRECTIONS (cont)

33. CONNECT BORESIGHT CABLE ASSEMBLY TO FCC TEST CONNECTOR J4.



ARR82-25368

34. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, SET FCC CIRCUIT BREAKER TO ON.



AC / ARMAMENT
CIRCUIT BREAKER PANEL

ARR82-25369

4-6. TURRET SUBSYSTEM BORESIGHTING (cont)

NOTE

If a power interruption or shutdown causes removal of power from FCC, entire boresight correction procedure must be repeated.

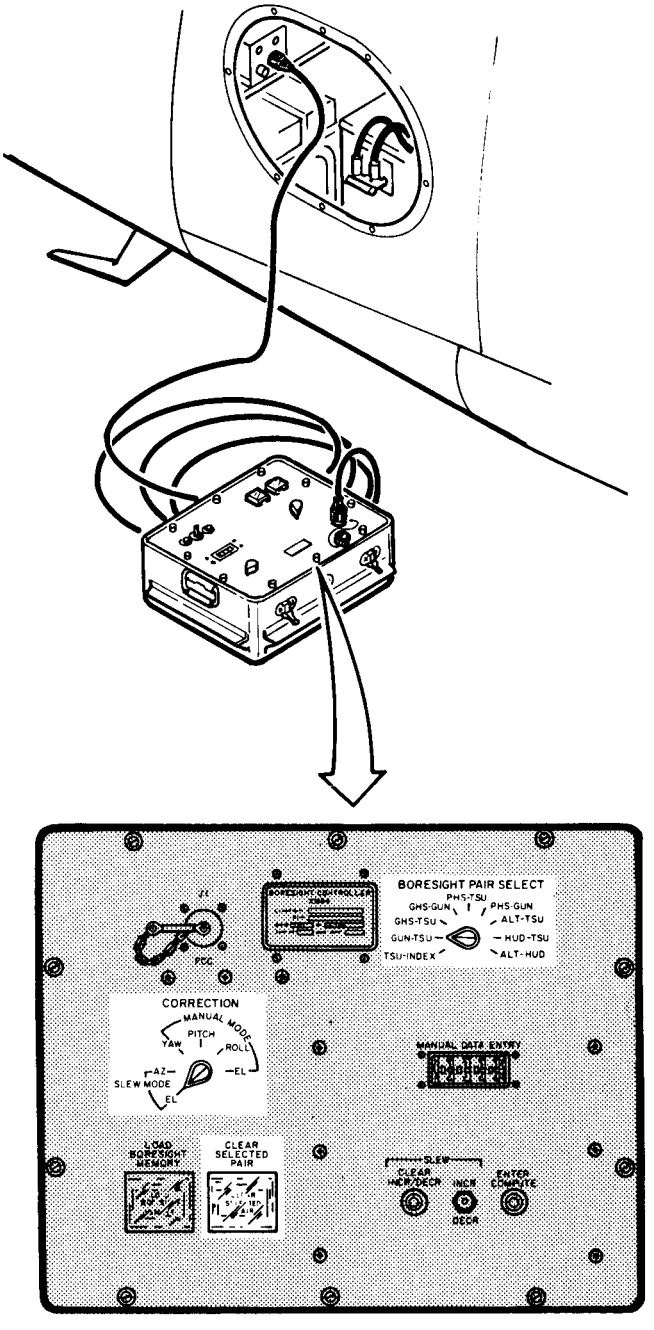
35. ON BORESIGHT CONTROLLER, SET BORESIGHT PAIR SELECT SWITCH TO GUN-TSU.

36. LIFT PLASTIC COVER AND PRESS CLEAR SELECTED PAIR SWITCH.

NOTE

After correction switch is set to SLEW MODE, FCC may require approximately 25 minutes to initialize. A non-initialized FCC will cause INCR/DECR switch to have no effect.

37. SET CORRECTION SWITCH TO SLEW MODE EL.



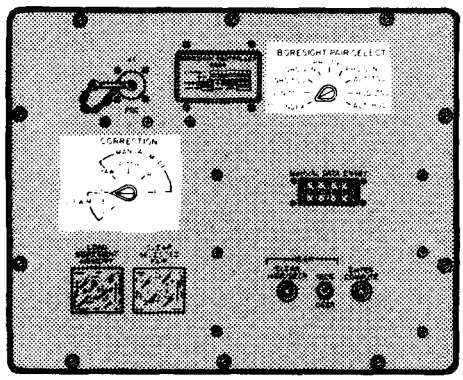
BORESIGHT CONTROLLER

ARR82-25370

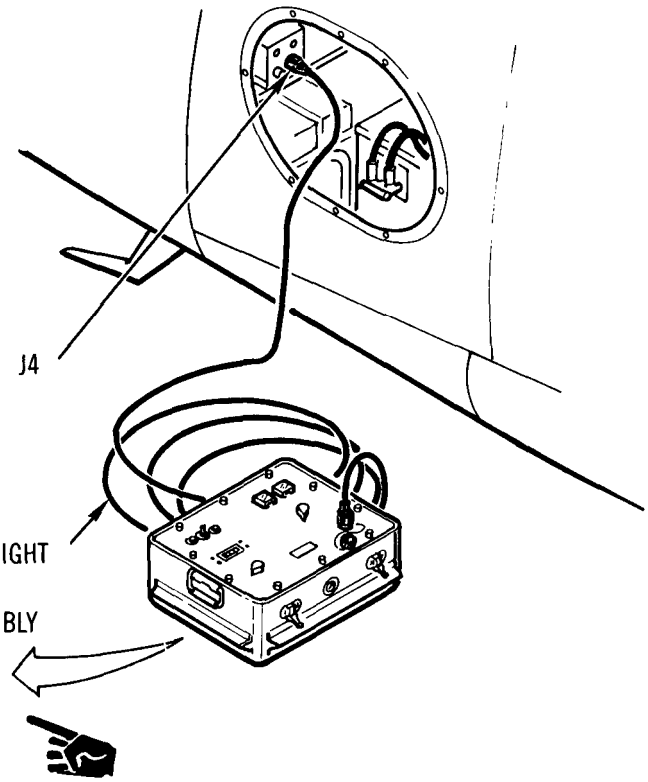
TURRET SUBSYSTEM BORESIGHTING, CONTROLLER CORRECTIONS (cont)

33. CONNECT BORESIGHT CABLE ASSEMBLY TO FCC TEST CONNECTOR J4.

33.1. PLACE CORRECTION SWITCH ON SLEW MODE AZIMUTH. MOVE TSU SLEW MODE TO INDEX.

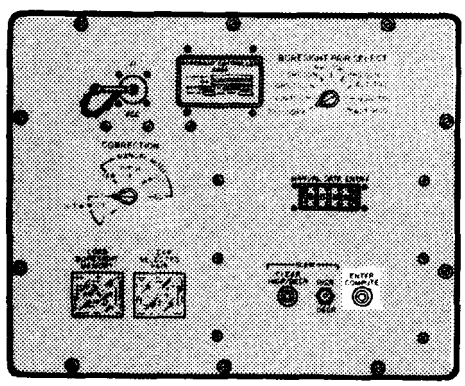


BORESIGHT CONTROLLER

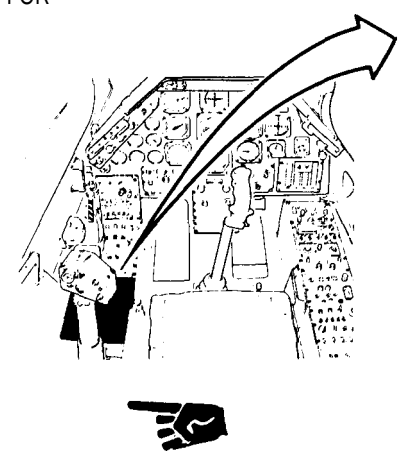


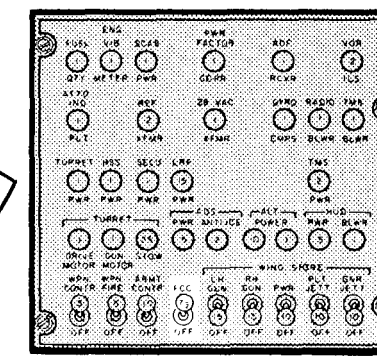
34. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, SET FCC CIRCUIT BREAKER TO ON.

34.1. DEPRESS AND HOLD "ENTER COMPUTE" FOR THREE SECONDS, WAIT FIVE MINUTES BEFORE PROCEEDING TO NEXT STEP.



BORESIGHT CONTROLLER





AC / ARMAMENT
CIRCUIT BREAKER PANEL

4-6. TURRET SUBSYSTEM BORESIGHTING (cont)

NOTE

If a power interruption or shutdown causes removal of power from FCC, entire boresight correction procedure must be repeated.

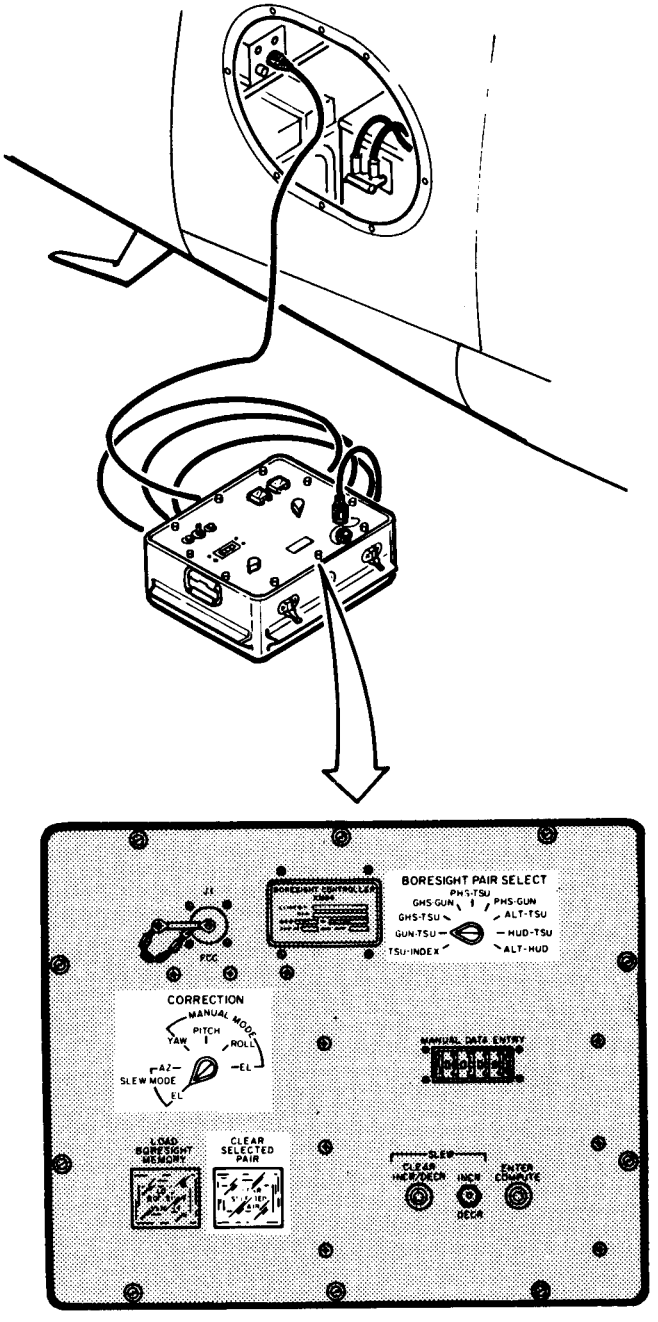
35. ON BORESIGHT CONTROLLER, SET BORESIGHT PAIR SELECT SWITCH TO GUN-TSU.

36. LIFT PLASTIC COVER AND PRESS CLEAR SELECTED PAIR SWITCH.

NOTE

After correction switch is set to SLEW MODE, FCC may require approximately 25 minutes to initialize. A non-initialized FCC will cause INCR/DECR switch to have no effect.

37. SET CORRECTION SWITCH TO SLEW MODE EL.



BORESIGHT CONTROLLER

ARR82-25370

TURRET SUBSYSTEM BORESIGHTING, CONTROLLER CORRECTIONS (cont)

NOTE

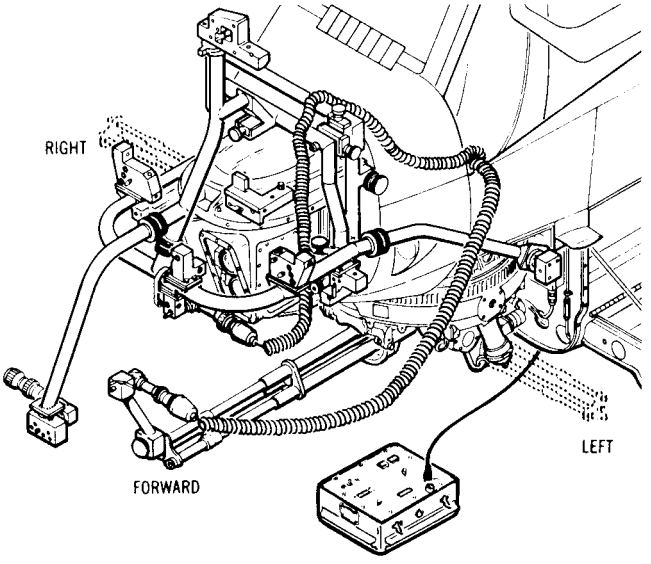
The following steps require clearing INCR/DECR registers in forward, left, and right gun positions.

38. WHILE FIRST TECHNICIAN DEPRESSES LEFT-HAND GRIP ACTION SWITCH AND HOLDS GUN IN FORWARD POSITION, SECOND TECHNICIAN PRESSES CLEAR INCR/DECR SWITCH ON BORESIGHT CONTROLLER IN SLEW MODE EL AND AZ.

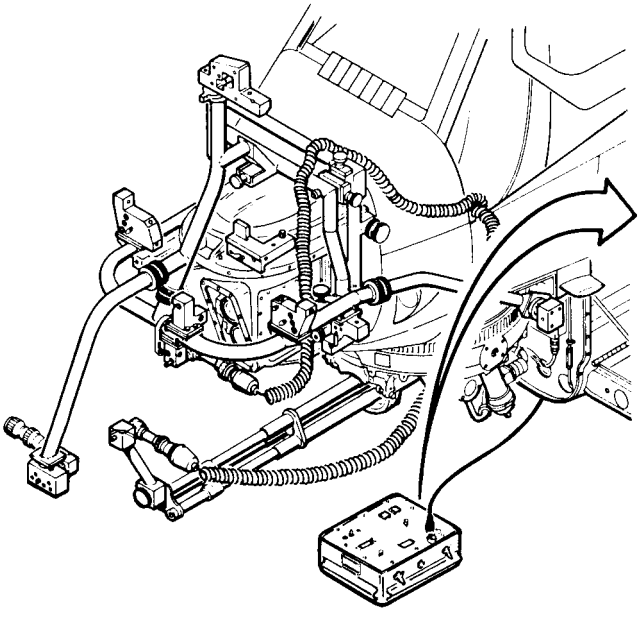
    Second technician announces INCR/DECR registers cleared in forward gun position.

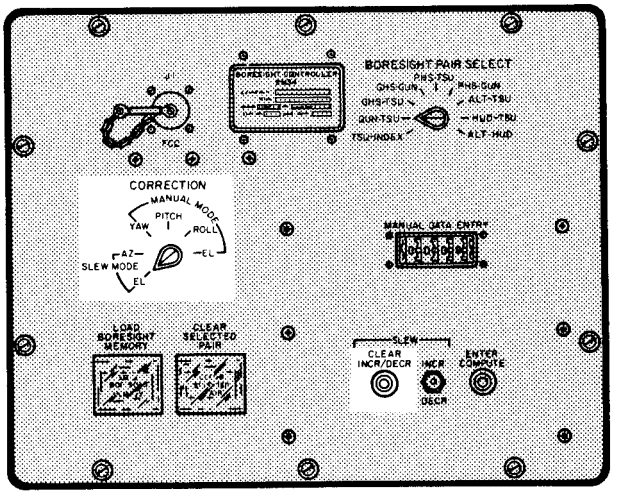
39. REPEAT CLEARING SEQUENCE IN STEP 38 FOR LEFT AND RIGHT GUN POSITIONS.

40. ON BORESIGHT CONTROLLER, SET CORRECTION SWITCH TO SLEW MODE EL.



GUN POSITIONS





BORESIGHT CONTROLLER

ARR82-25371

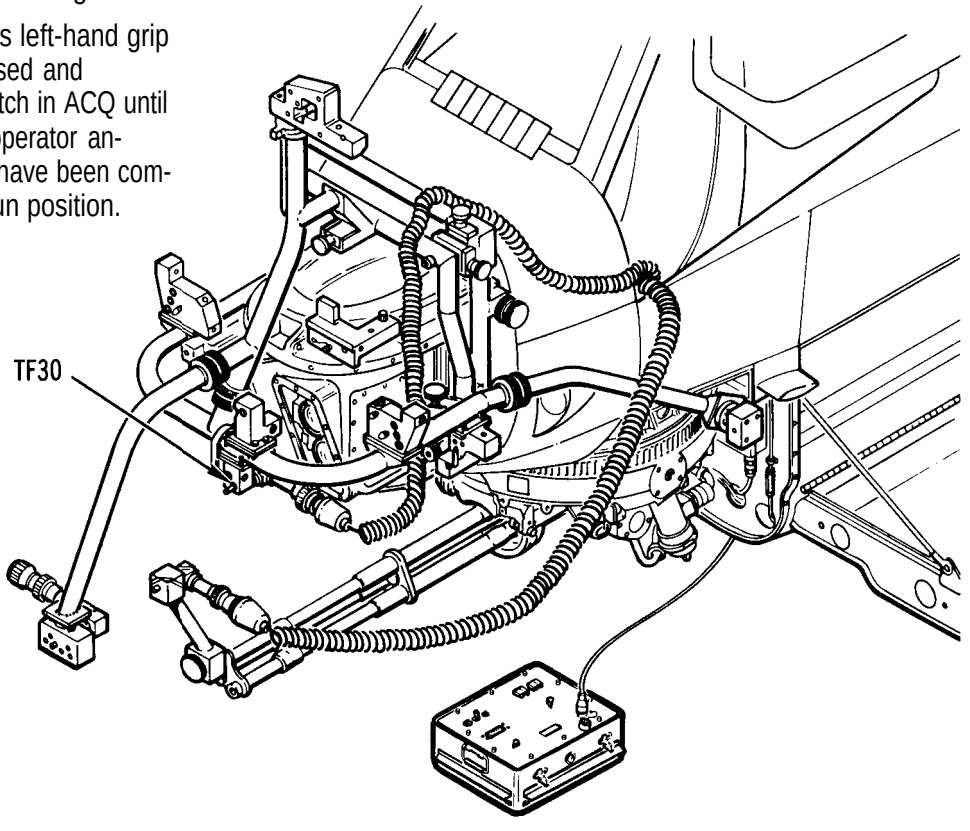
4-6. TURRET SUBSYSTEM BORESIGHTING (cont)

NOTE

The following procedures require checking both AZ and EL in forward, left, and right gun positions. Check each gun position in EL and AZ before proceeding to next position.

41. INFORM FIRST TECHNICIAN BORESIGHT CONTROLLER IS READY TO IMPLEMENT EL/AZ CORRECTIONS.

42. FIRST TECHNICIAN DIRECTS TSU LOS TO TARGET SCOPE AT TF30, USING LEFT-HAND GRIP ACTION SWITCH AND ACQ SWITCH.
    a. First technician will maintain TSU reticle within 1/2 mr of target reticle.
    b. First technician holds left-hand grip action switch depressed and ACQ/TRK/STOW switch in ACQ until boresight controller operator announces corrections have been completed for forward gun position.



ARR82-25372

TURRET SUBSYSTEM BORESIGHTING, CONTROLLER CORRECTIONS (cont)

NOTE

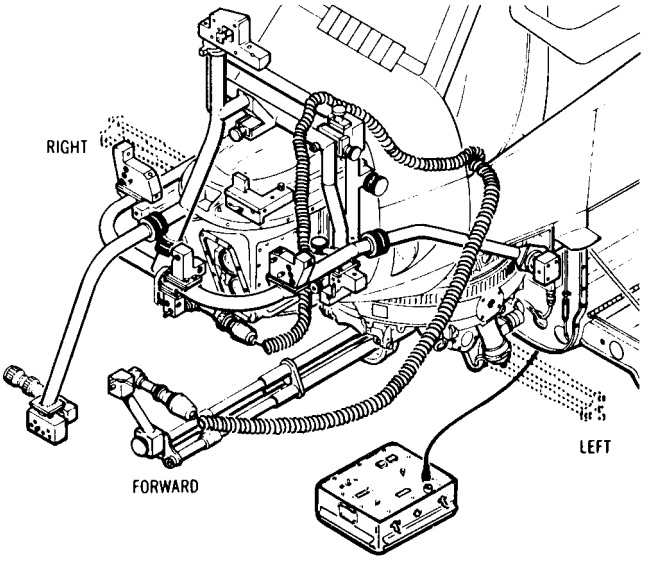
The following steps require clearing INCR/DECR registers in forward, left, and right gun positions.

38. WHILE FIRST TECHNICIAN DEPRESSES LEFT-HAND GRIP ACTION SWITCH AND HOLDS GUN IN FORWARD POSITION, SECOND TECHNICIAN PRESSES CLEAR INCR/DECR SWITCH ON BORESIGHT CONTROLLER IN SLEW MODE EL AND AZ.

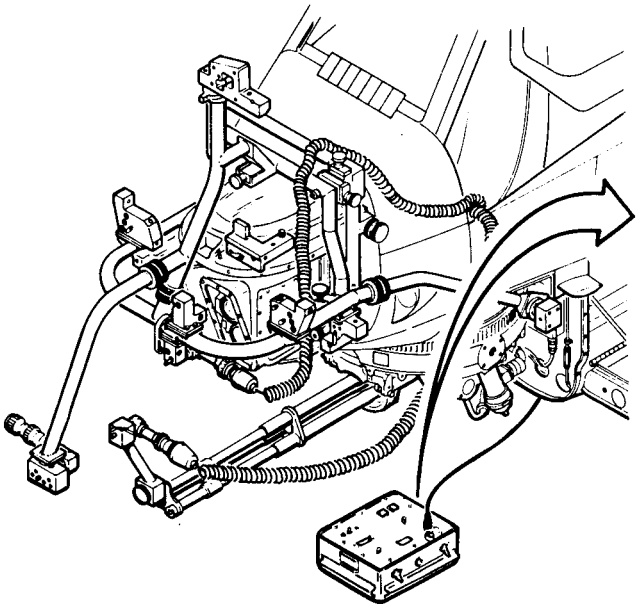
    Second technician announces INCR/DECR registers cleared in forward gun position.

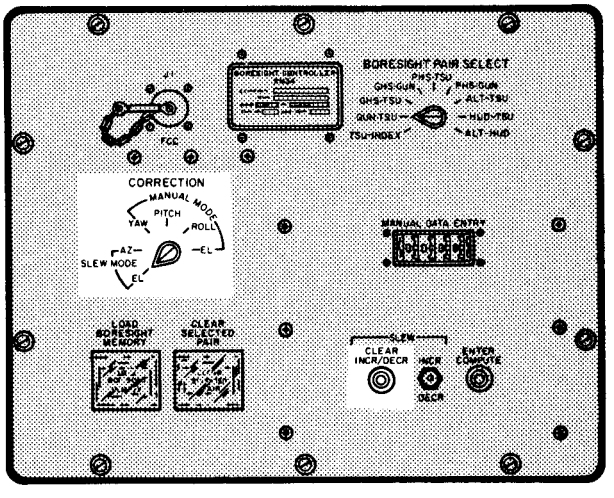
39. REPEAT CLEARING SEQUENCE IN STEP 38 FOR LEFT AND RIGHT GUN POSITIONS.

40. ON BORESiGHT CONTROLLER, SET COR-RECTION SWITCH TO SLEW MODE EL.



GUN POSITIONS





BORESIGHT CONTROLLER

ARR82-25371

4-6. TURRET SUBSYSTEM BORESIGHTING (cont)

NOTE

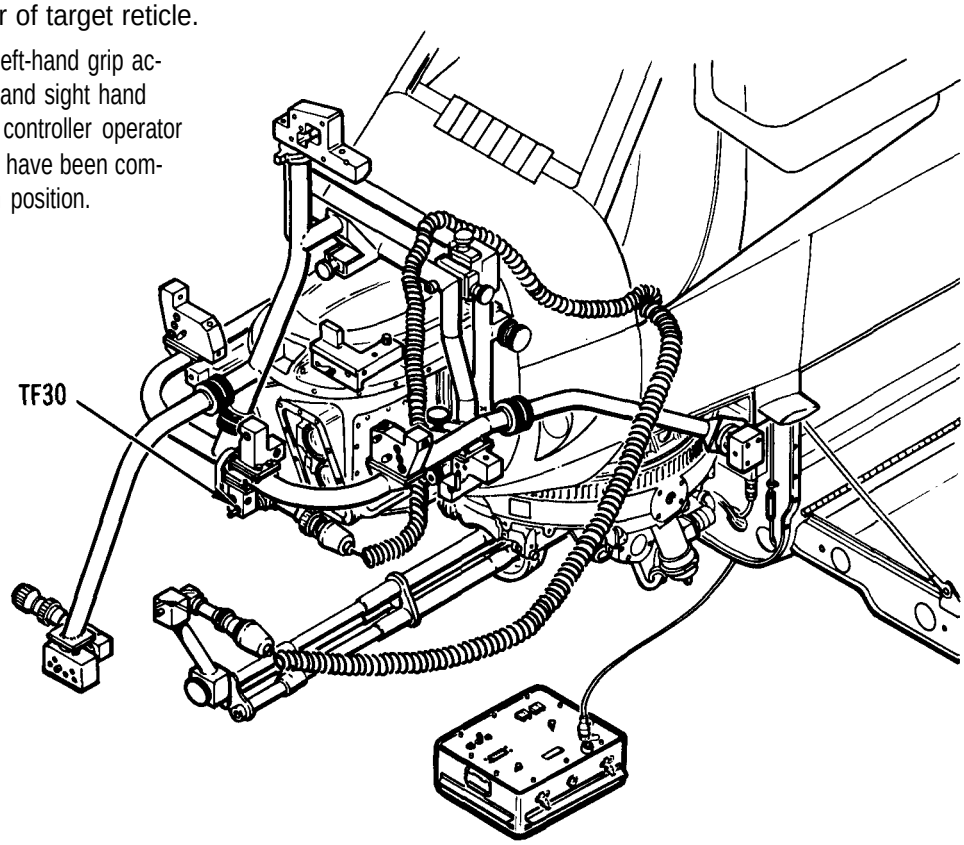
The following procedures require checking both AZ and EL in forward, left, and right gun positions. Check each gun position in EL and AZ before proceeding to next position.

41. INFORM FIRST TECHNICIAN BORESIGHT CONTROLLER IS READY TO IMPLEMENT EL/AZ CORRECTIONS.

42. FIRST TECHNICIAN DIRECTS TSU LOS TO TARGET SCOPE AT TF30, USING LEFT-HAND GRIP ACTION SWITCH AND SIGHT HAND CONTROL.

a. First technician will maintain TSU reticle within 1/2 mr of target reticle.

b. First technician holds left-hand grip action switch depressed and sight hand control until boresight controller operator announces corrections have been completed for forward gun position.



ARR82-25372

TURRET SUBSYSTEM BORESIGHTING, CONTROLLER CORRECTIONS (cont)

43. SECOND TECHNICIAN SIGHTS THROUGH SCOPE AT FG29 TO TARGET SCOPE AT GD29.

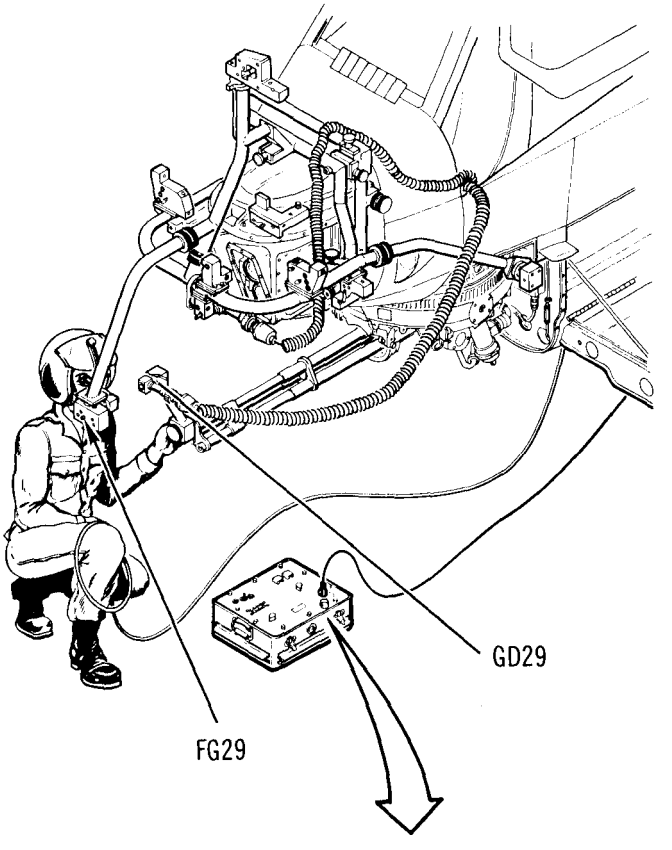
NOTE

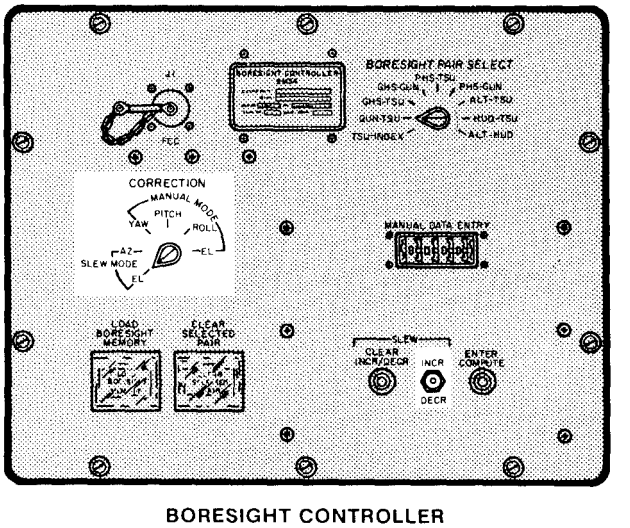
If INCR/DECR switch fails to move target reticle, FCC may not be initialized. Return to step 38 and try INCR/DECR switch at five minute intervals. FCC may take approximateiy 25 minutes to initialize.

44. ON BORESIGHT CONTROLLER, USE INCR/DECR SWITCH TO ALINE SIGHT RETICLE WITH TARGET RETICLE IN ELEVATION.

45. SET CORRECTION SWITCH TO SLEW MODE AZ AND USE INCR/DECR SWITCH TO ALINE SIGHT RETICLE WITH TARGET RETICLE IN AZIMUTH.

46. BORESIGHT CONTROLLER OPERATOR ANNOUNCES CORRECTIONS COMPLETE FOR FORWARD GUN POSITION.



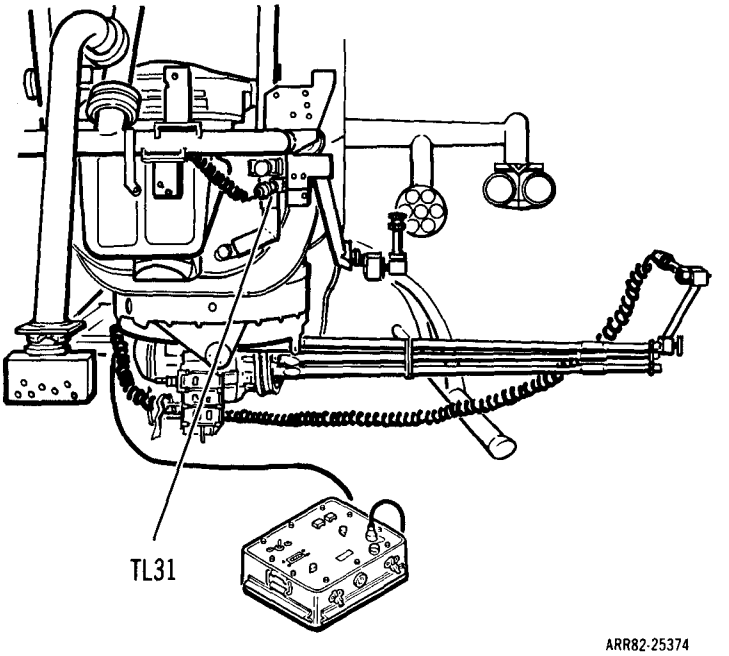


BORESIGHT CONTROLLER

ARR82-25373

4-6. TURRET SUBSYSTEM BORESIGHTING (cont)

47. FIRST TECHNICIAN DIRECTS TSU LOS TO TARGET SCOPE AT TL31.
    a. First technician maintains TSU reticle within 1/2 mr of target reticle.
    b. First technician continues tracking until boresight controller operator announces corrections have been completed for left gun position.

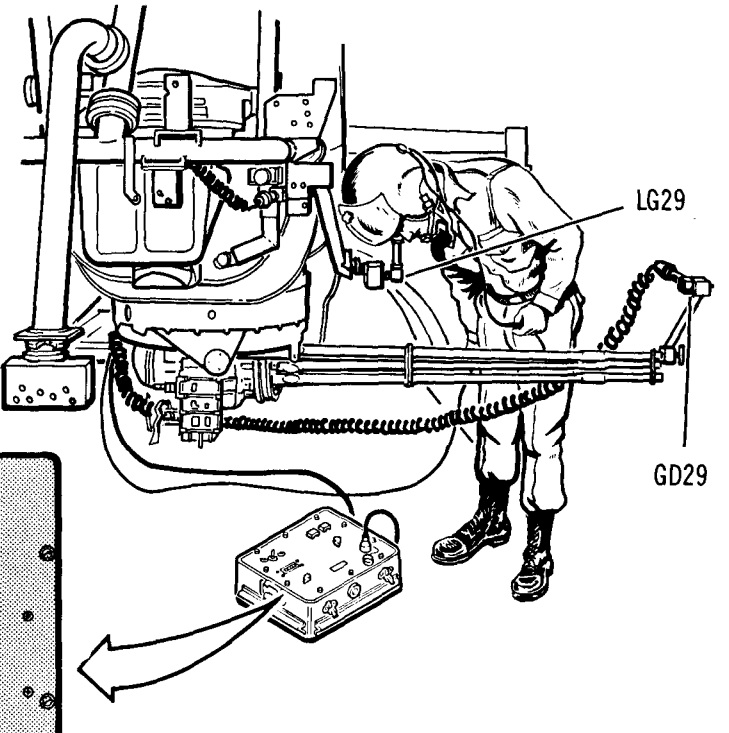


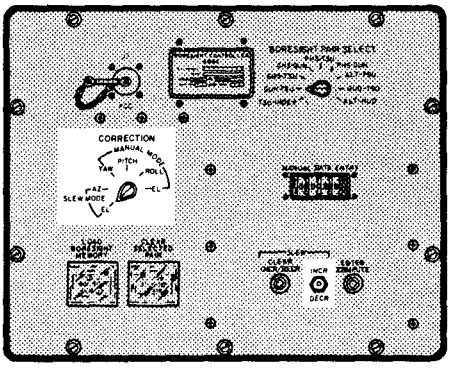
ARR82-25374

48. SECOND TECHNICIAN SIGHTS THROUGH SCOPE AT LG29 TO TARGET SCOPE AT GD29.

49. USE INCR/DECR SWITCH IN CORRECTION SWITCH SLEW MODES EL THEN AZ TO ALINE TARGET RETICLE WITH SIGHT RETICLE.

50. SECOND TECHNICIAN ANNOUNCES CORRECTIONS COMPLETE FOR LEFT GUN POSITION.



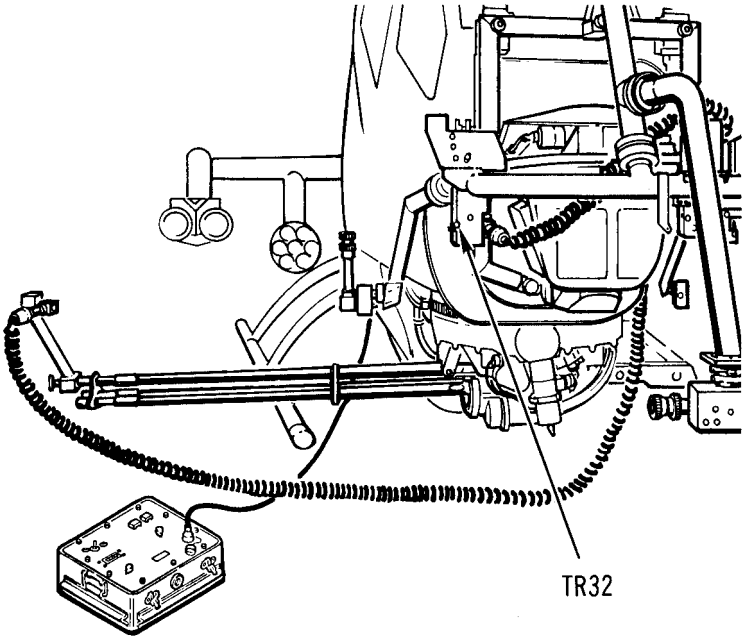


BORESIGHT CONTROLLER

ARR82-25375

TURRET SUBSYSTEM BORESIGHTING, CONTROLLER CORRECTIONS (cont)

51. FIRST TECHNICIAN DIRECTS TSU LOS TO TARGET SCOPE AT TR32.
    a. First technician maintains TSU reticle within 1/2 mr of target reticle.
    b. First technician continues tracking until boresight controller operator announces corrections have been completed for right gun position.

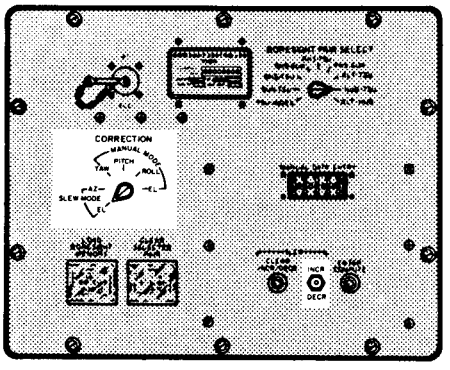


ARR82-25376

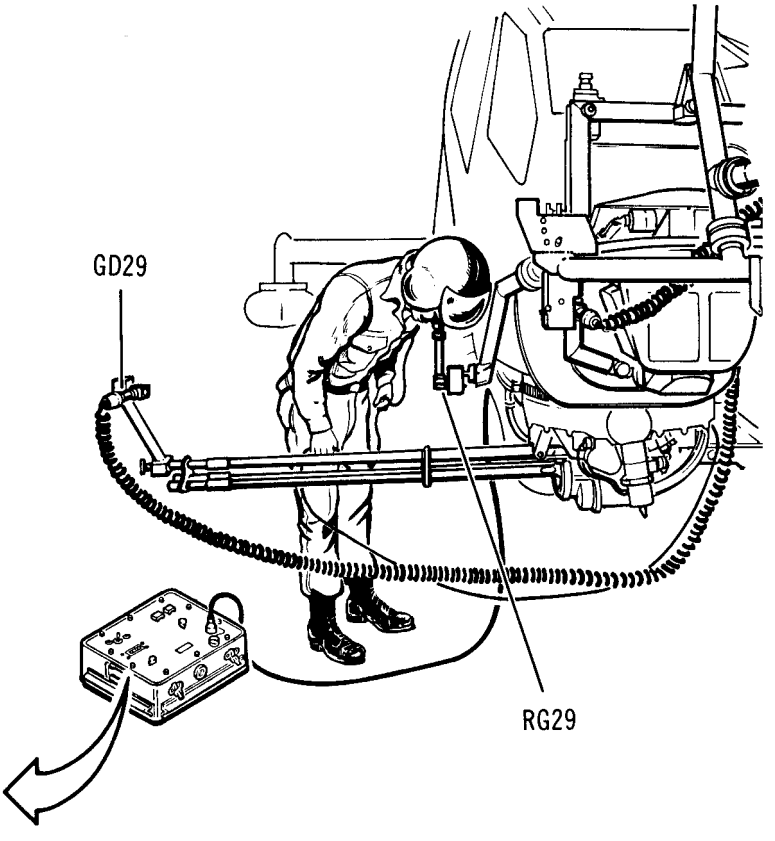
52. SECOND TECHNICIAN SIGHTS THROUGH SCOPE AT RG29 TO TARGET SCOPE AT GD29.

53. USE INCR/DECR SWITCH IN CORRECTION SWITCH SLEW MODES EL THEN AZ TO ALINE TARGET RETICLE WITH SIGHT RETICLE.

54. SECOND TECHNICIAN ANNOUNCES CORRECTIONS COMPLETE FOR RIGHT GUN POSITION.



BORESIGHT CONTROLLER

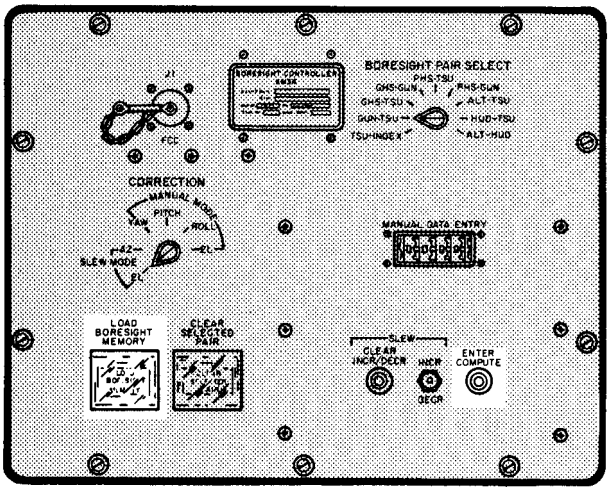


ARR82-25377A

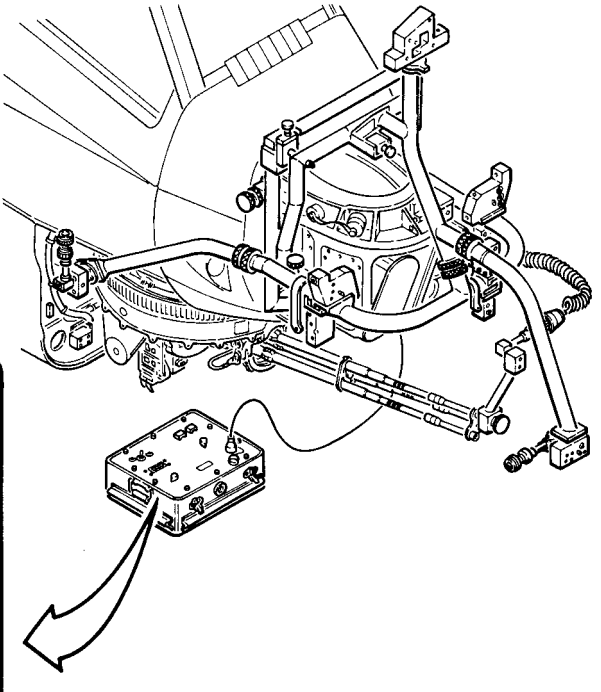
4-6. TURRET SUBSYSTEM BORESIGHTING (cont)

55. ON BORESIGHT CONTROLLER, PRESS AND HOLD ENTER COMPUTE BUTTON FOR APPROXIMATELY THREE SECONDS.

56. LIFT PLASTIC COVER AND PRESS LOAD BORESIGHT MEMORY SWITCH. OBSERVE THAT SWITCH ILLUMINATES BRIEFLY.



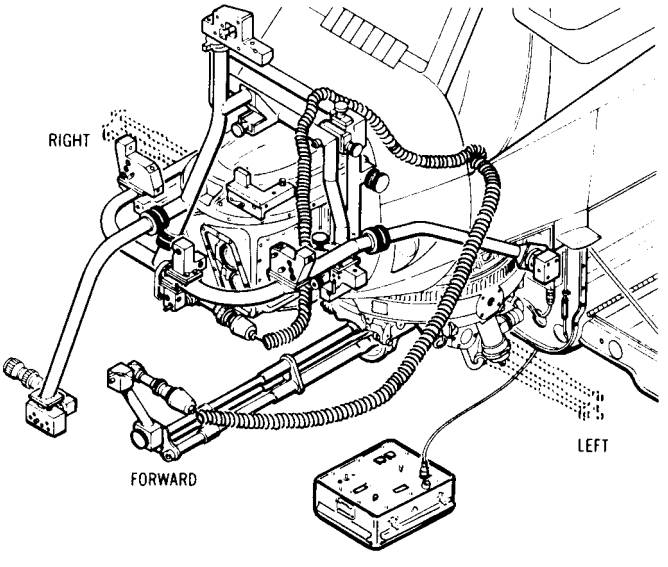
BORESIGHT CONTROLLER



ARR82-25378

57. FIRST TECHNICIAN WILL DIRECT TSU LOS AND GUN TO FORWARD, LEFT, AND RIGHT GUN POSITIONS, ALLOWING SECOND TECHNICIAN TO CHECK BORESIGHT CORRECTIONS AT EACH POSITION.

58. TECHNICIANS WILL REPEAT BORESIGHT PROCEDURES AS NECESSARY TO MINIMIZE BORESIGHT ERRORS.

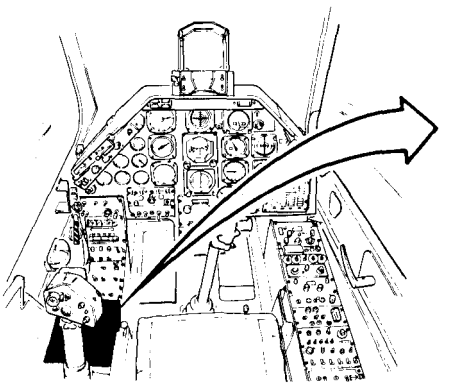


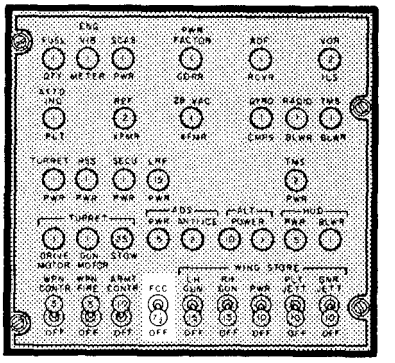
GUN POSITIONS

ARR82-25379

TURRET SUBSYSTEM BORESIGHTING, CONTROLLER CORRECTIONS, (cont)

59. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, SET FCC CIRCUIT BREAKER TO OFF.

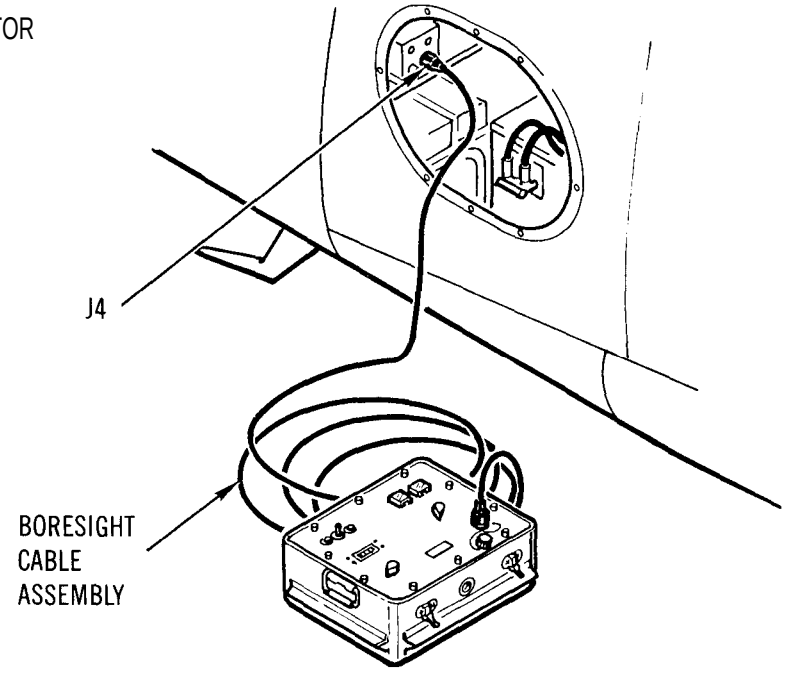




AC / ARMAMENT
CIRCUIT BREAKER PANEL

ARR82-25273

60. DISCONNECT FORESIGHT CABLE ASSEMBLY FROM FCC TEST CONNECTOR J4.



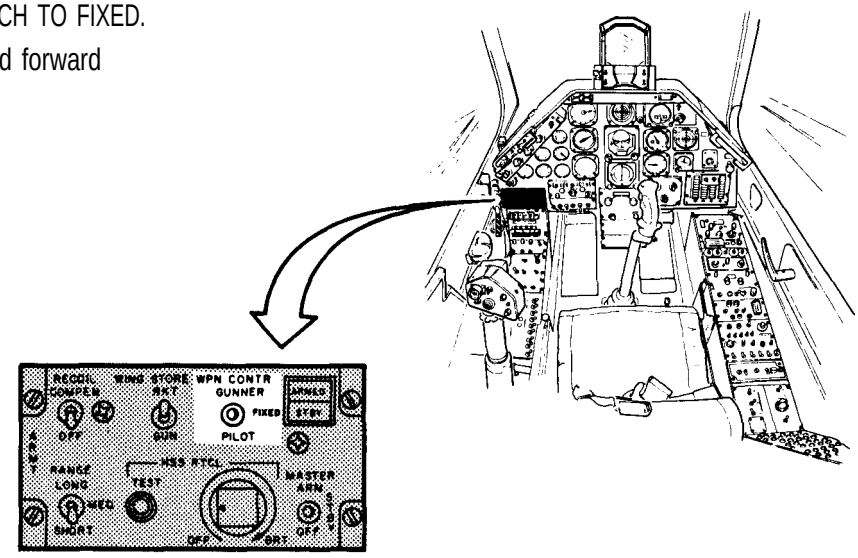
ARR82-25274

4-6. TURRET SUBSYSTEM BORESIGHTING (cont)

TURRET SUBSYSTEM BORESIGHTING, FIXED MODE

61. ON PILOT ARMAMENT CONTROL PANEL, SET WPN CONTR SWITCH TO FIXED.

    Turret moves to fixed forward position.

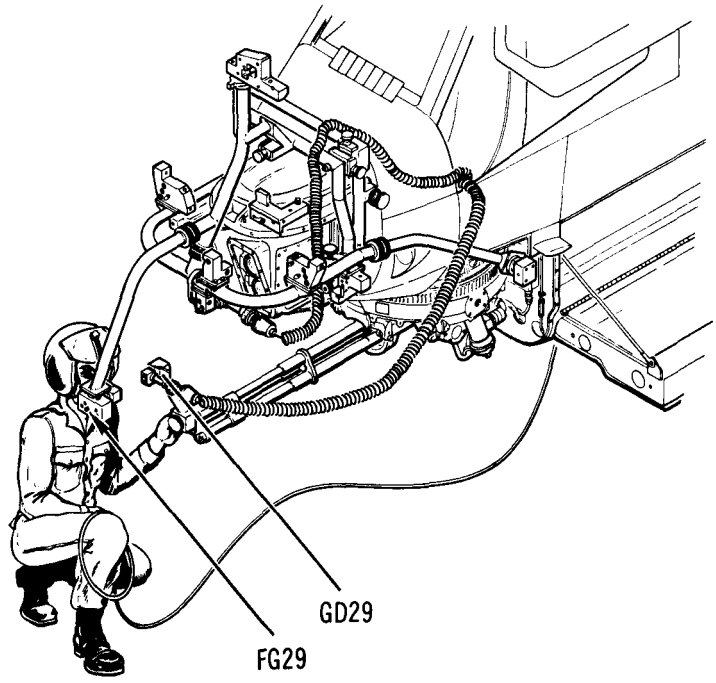


PILOT ARMAMENT CONTROL PANEL

ARR82-25380

62. SECOND TECHNICIAN SIGHTS THROUGH SCOPE AT FG29 TO TARGET SCOPE AT GD29.

    Desired offset of retitles is less than 1 mr. Maximum allowable offset is 3 mr.



ARR82-25381

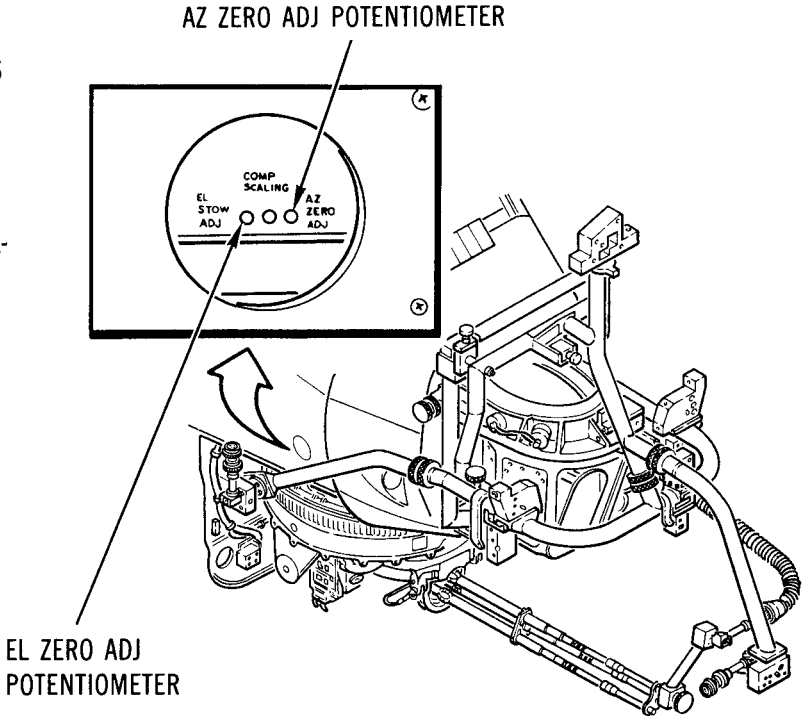
TURRET SUBSYSTEM BORESIGHTING, FIXED MODE (cont)

63. REMOVE STOW POTENTIOMETER ACCESS HOLE COVER.

64. THIRD TECHNICIAN ADJUSTS EL STOW ADJ POTENTIOMETER AS DIRECTED BY SECOND TECHNICIAN TO REDUCE ELEVATION ERROR.

65. THIRD TECHNICIAN ADJUSTS AZ ZERO ADJ POTENTIOMETER TO REDUCE AZIMUTH ERROR.

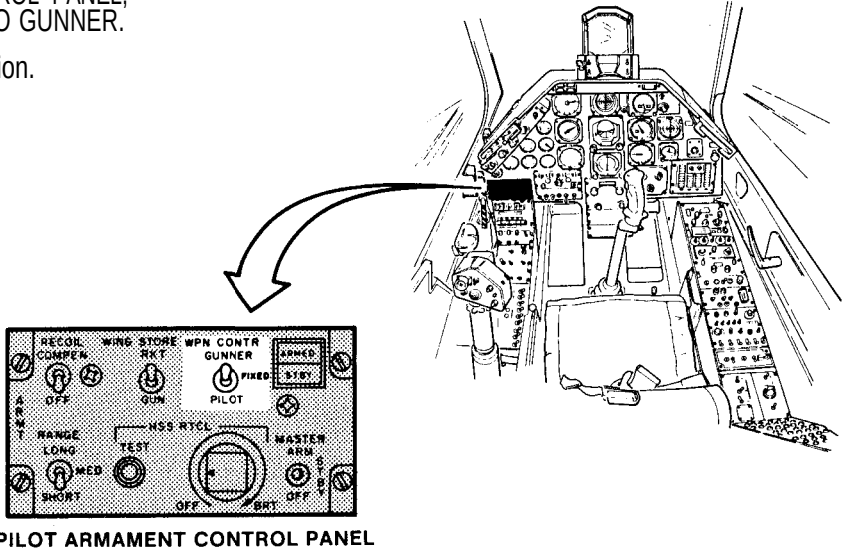
66. INSTALL STOW POTENTIOMETER ACCESS HOLE COVER.



ARR82-25382

67. ON PILOT ARMAMENT CONTROL PANEL, SET WPN CONTR SWITCH TO GUNNER.

Turret moves to stow position.



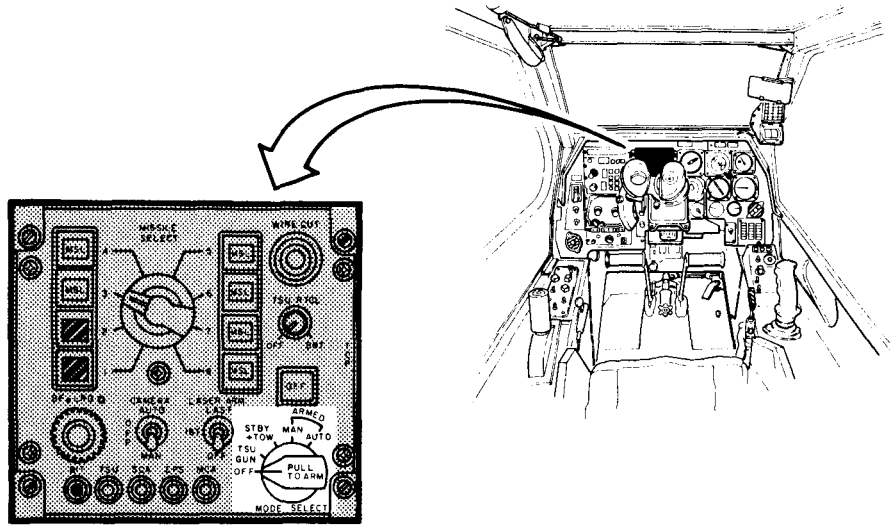
PILOT ARMAMENT CONTROL PANEL

ARR82-25275

4-6. TURRET SUBSYSTEM BORESIGHTING (cont)

POST TURRET SUBSYSTEM BORESIGHTING PROCEDURES

68. ON TOW CONTROL PANEL, SET MODE SELECT SWITCH TO OFF.

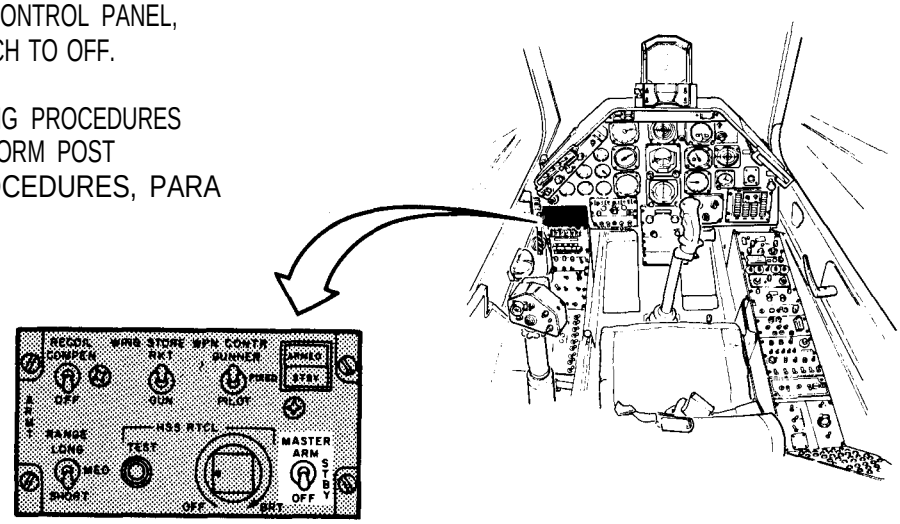


TOW CONTROL PANEL

ARR82-25276

69. ON PILOT ARMAMENT CONTROL PANEL, SET MASTER ARM SWITCH TO OFF.

70. CONTINUE BORESIGHTING PROCEDURES AS REQUIRED OR PERFORM POST BORESIGHTING PROCEDURES, PARA 4-14.



PILOT ARMAMENT CONTROL PANEL

ARR82-25277

END OF TASK

4-7. GUNNER HSS BORESIGHTING

DESCRIPTION

This task covers: Alinement of gunner shelf and pedestal assemblies; and rail assembly yaw, twist, roll, and pitch alinements.

INITIAL SETUP

Tool/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Boresight Assembly Ground Support Equipment (BAGSE)
- Boresight Controller
- Shorting connector from Fire Control Subsystem Test Set, AN/GSM-249

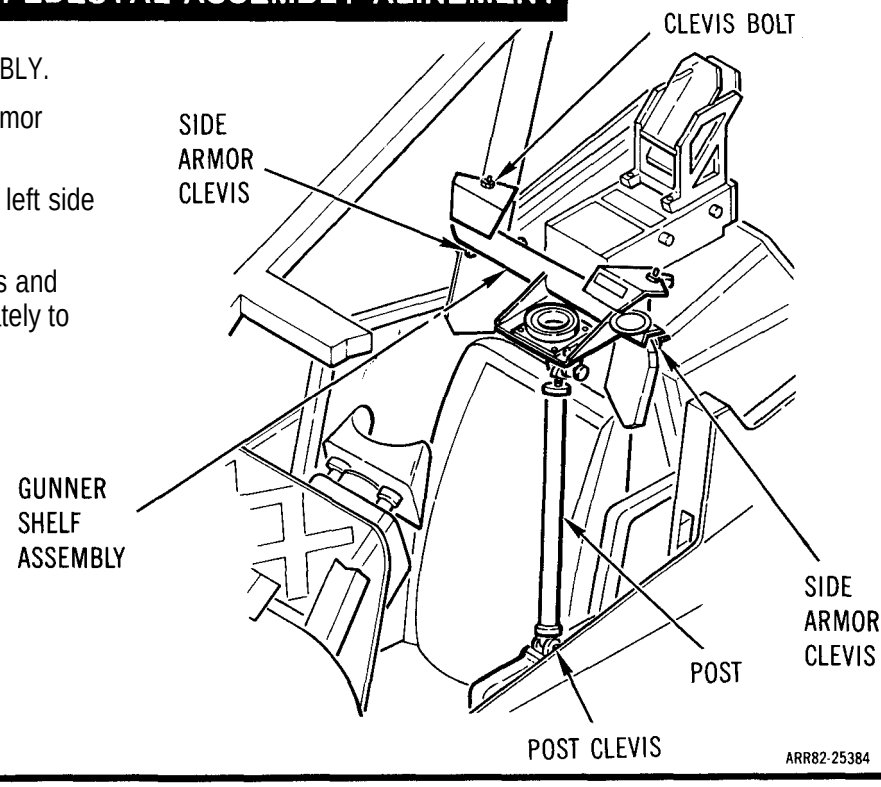
Personnel Required:
- 68J Aircraft Fire Control Repairer (3)

References:
- TM 9-1270-212-14&P

Equipment Conditions:
- HSS installed, see TM 9-1270-212-14&P.
- Shorting connector installed in gunner cockpit.
- BAGSE ALINEMENT TO HELICOPTER performed, para 4-5.
- TURRET SUBSYSTEM BORESIGHTING performed, para 4-6.

GUNNER HSS SHELF AND PEDESTAL ASSEMBLY ALINEMENT

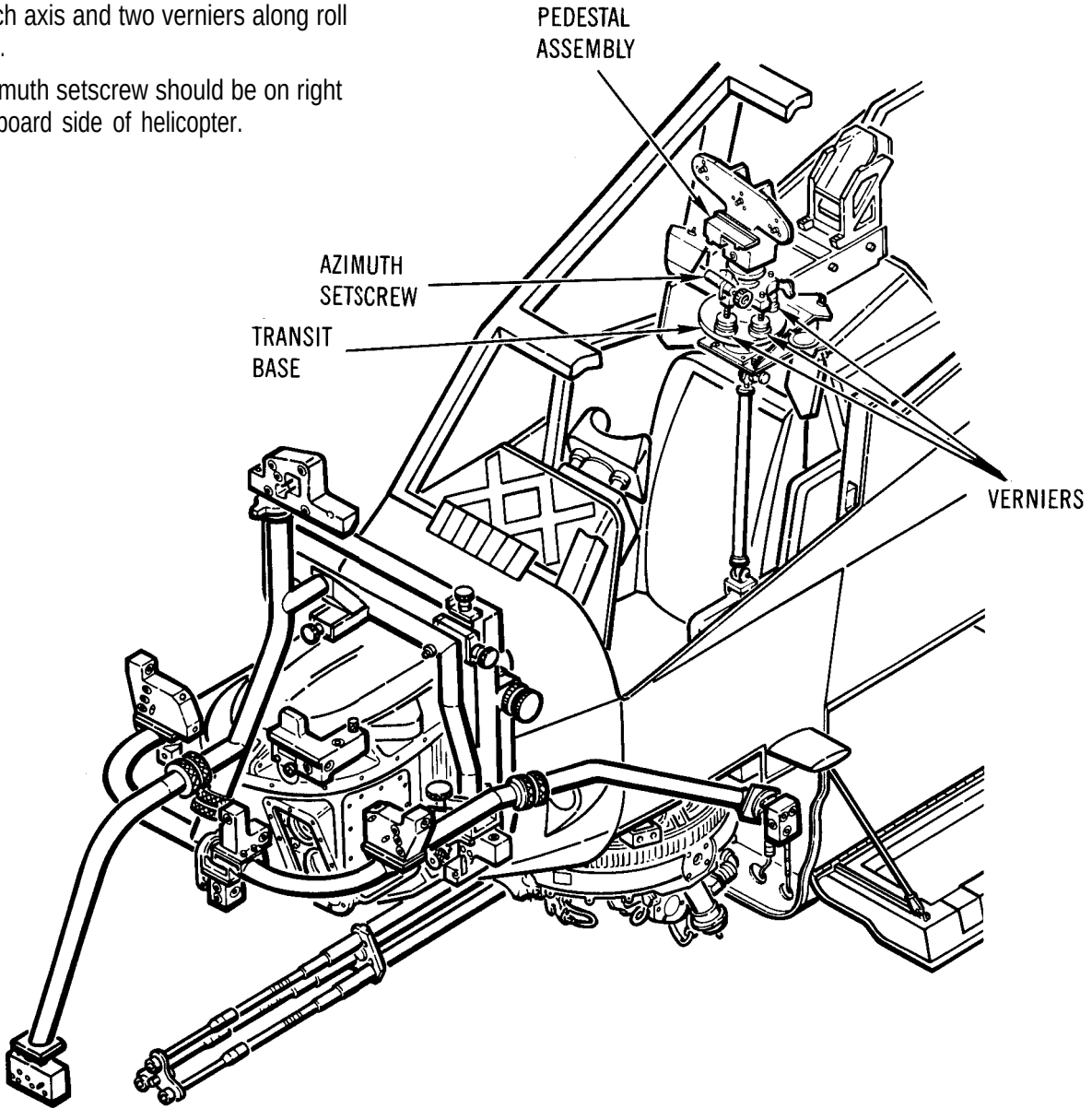
1. INSTALL GUNNER SHELF ASSEMBLY.
   a. Support shelf on two side armor clevises.
   b. Place forward post clevis on left side armor.
   c. Adjust side armor clevis bolts and post to level shelf approximately to level of helicopter.



4-7. GUNNER HSS BORESIGHTING (cont)

GUNNER HSS SHELF AND PEDESTAL ASSEMBLY ALINEMENT (cont)

2. THREAD PEDESTAL ASSEMBLY INTO RING ON SHELF ASSEMBLY UNTIL HAND TIGHT.
   a. Orient transit base of pedestal assembly with two verniers along pitch axis and two verniers along roll axis.
   b. Azimuth setscrew should be on right outboard side of helicopter.



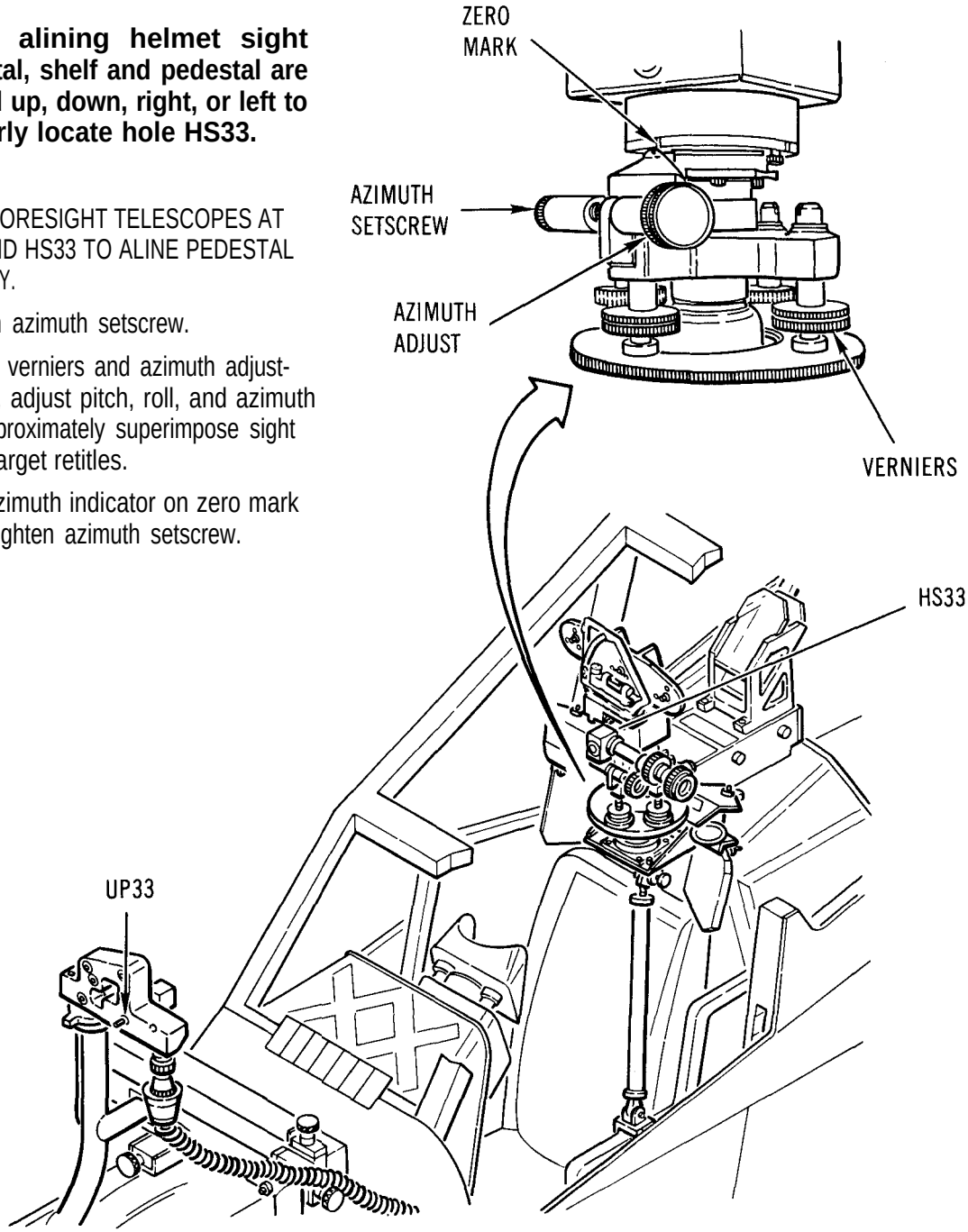
ARR82-25385

GUNNER HSS SHELF AND PEDESTAL ASSEMBLY ALINEMENT (cont)

NOTE

When alining helmet sight pedestal, shelf and pedestal are moved up, down, right, or left to properly locate hole HS33.

3. INSTALL BORESIGHT TELESCOPES AT UP33 AND HS33 TO ALINE PEDESTAL ASSEMBLY.
   a. Losen azimuth setscrew.
   b. Using verniers and azimuth adjustment, adjust pitch, roll, and azimuth to approximately superimpose sight and target retitles.
   c. Set azimuth indicator on zero mark and tighten azimuth setscrew.



ARR82-25386

4-7. GUNNER HSS BORESIGHTING (cont)

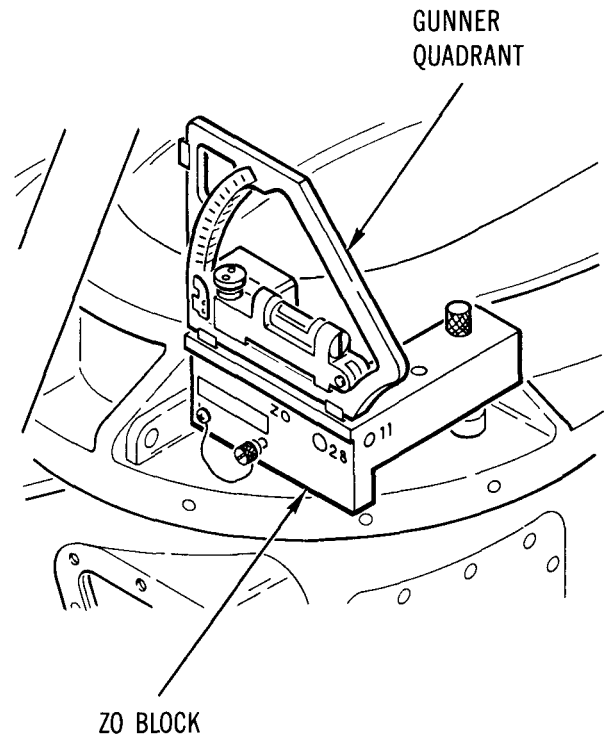
NOTE

During alinement procedure using gunner quadrant, helicopter must remain level. Technicians will take their positions prior to alinement and will remain at their positions until boresight of the particular unit is complete.

4. PLACE GUNNER QUADRANT ON Z0 BLOCK.

   Position quadrant so level bubble will sense roll.

5. ADJUST QUADRANT SCALE TO CENTER LEVEL BUBBLE.

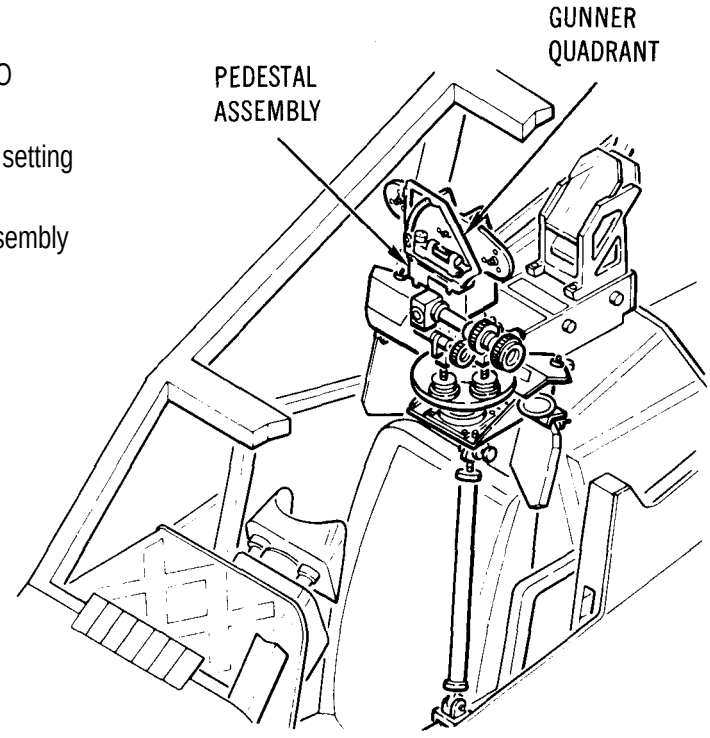


ARR82-25387

6. TRANSFER GUNNER QUADRANT TO PEDESTAL ASSEMBLY.

   a. Do not change quadrant scale setting established at Z0 block.

   b. Place quadrant on pedestal assembly in same transverse orientation established at Z0 block.



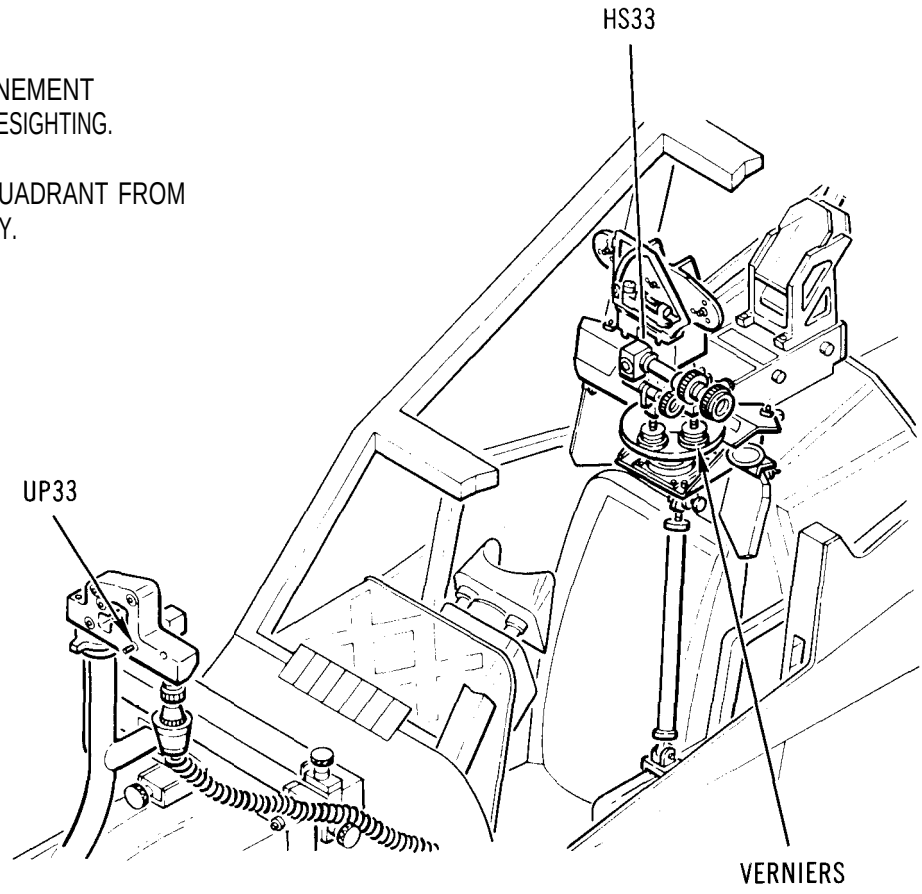
ARR82-25388

GUNNER HSS SHELF AND PEDESTAL ASSEMBLY ALINEMENT (cont)

7. ALINE PEDESTAL ASSEMBLY TO GUNNER QUADRANT AND TARGET SCOPE AT UP33.
   a. Adjust roll verniers to center quadrant level bubble.
   b. Sight through scope at HS33 to target scope at UP33 and adjust verniers to center sight reticle and target reticle.
   c. Adjust verniers and shelf assembly to keep quadrant level bubble centered and retitles within ½ mr of each other.

8. MAINTAIN THIS ALINEMENT THROUGHOUT BORESIGHTING.

9. REMOVE GUNNER QUADRANT FROM PEDESTAL ASSEMBLY.

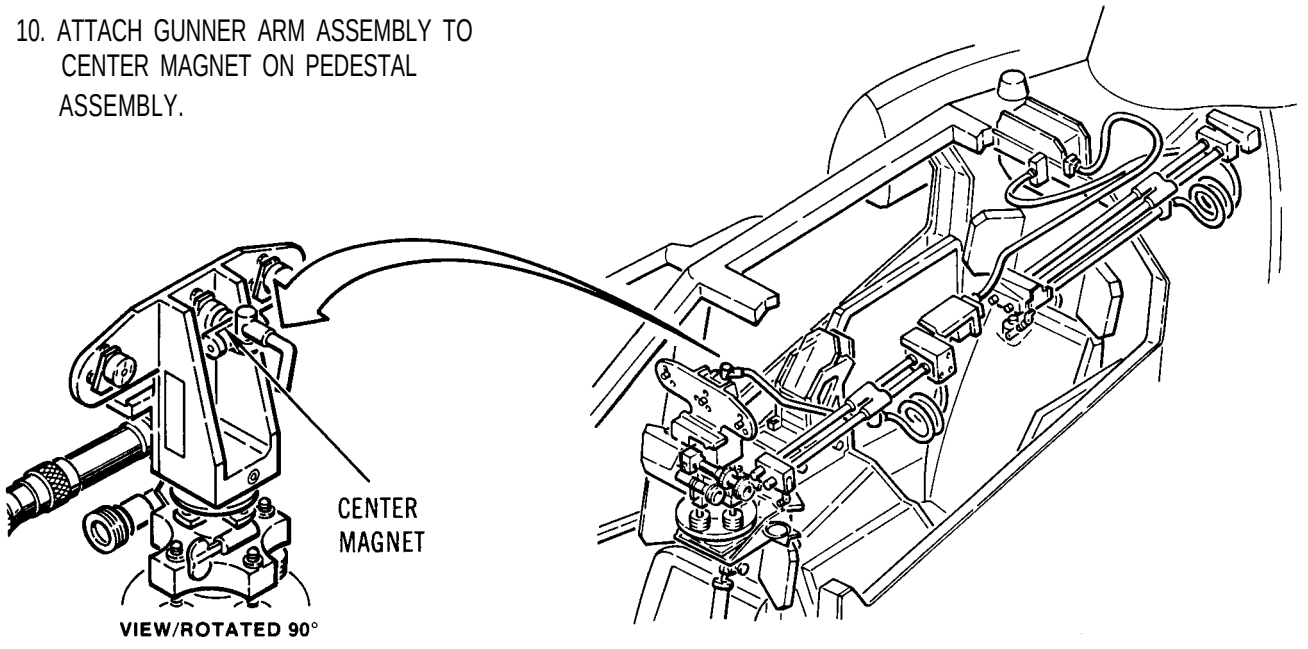


ARR82-25389

4-7. GUNNER HSS BORESIGHTING (cont)

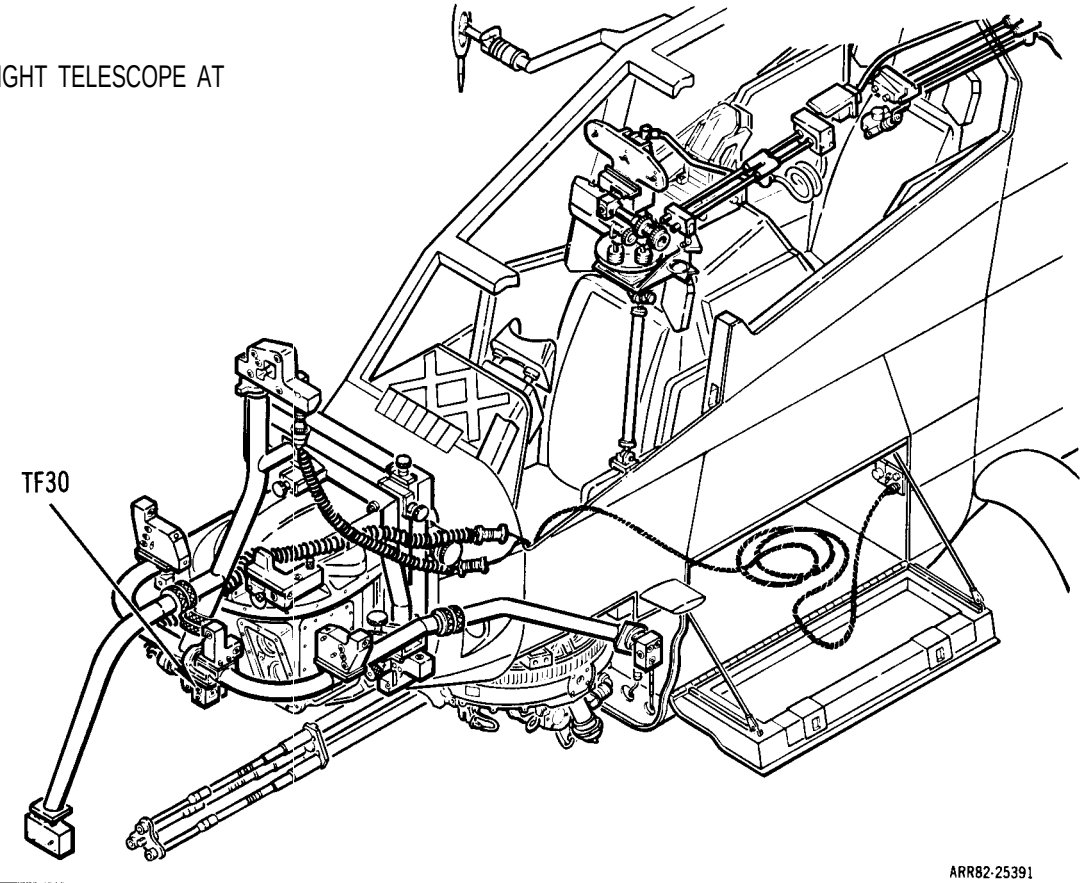
GUNNER HSS BORESIGHTING YAW ALINEMENT

10. ATTACH GUNNER ARM ASSEMBLY TO CENTER MAGNET ON PEDESTAL ASSEMBLY.



ARR82-25390

11. INSTALL BORESIGHT TELESCOPE AT TF30.

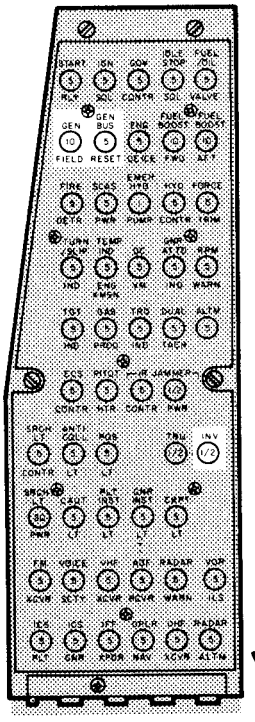


ARR82-25391

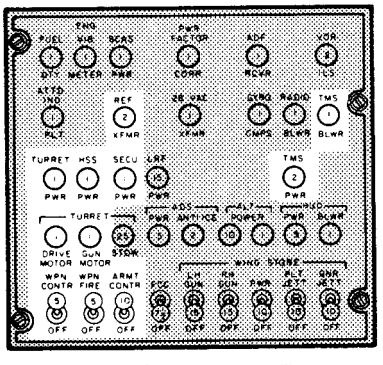
GUNNER HSS BORESIGHTING YAW ALINEMENT (cont)

12. CLOSE FOLLOWING CIRCUIT BREAKERS ON DC CIRCUIT BREAKER PANEL:
    - GEN FIELD
    - GEN BUS RESET
    - INV

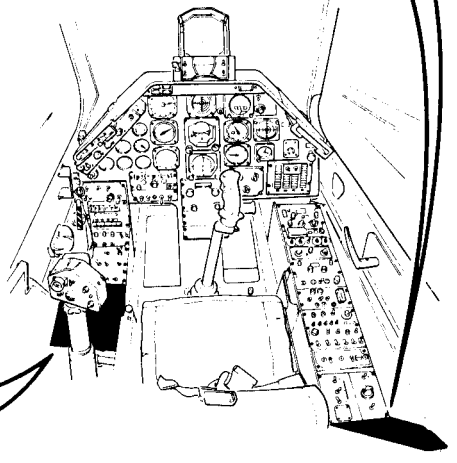
13. CLOSE FOLLOWING CIRCUIT BREAKERS ON AC/ARMAMENT CIRCUIT BREAKER PANEL:
    - REF XFMR
    - TURRET PWR
    - HSS PWR
    - SECU PWR
    - TMS PWR
    - TMS BLWR
    - TURRET DRIVE MOTOR
    - TURRET GUN MOTOR
    - WPN CONTR
    - WPN FIRE
    - ARMT CONTR



DC CIRCUIT BREAKER PANEL



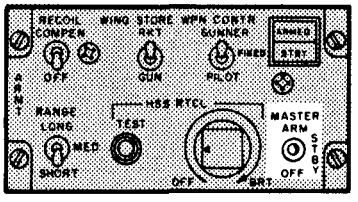
AC / ARMAMENT CIRCUIT BREAKER PANEL



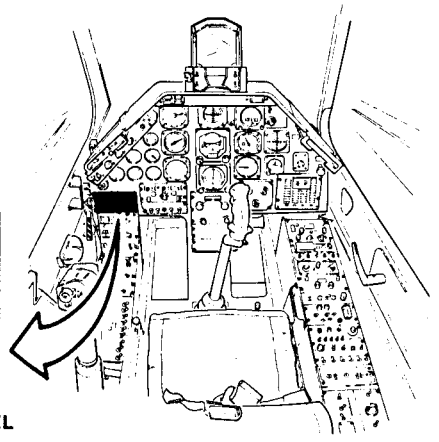
ARR82-25383

4-7. GUNNER HSS BORESIGHTING (cont)

14. ON PILOT ARMAMENT CONTROL PANEL, SET MASTER ARM SWITCH TO STBY.

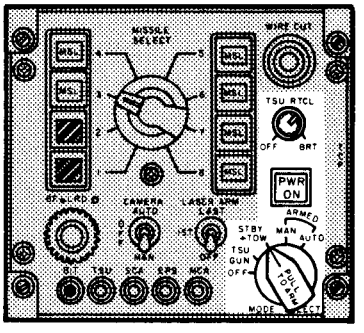


PILOT ARMAMENT CONTROL PANEL



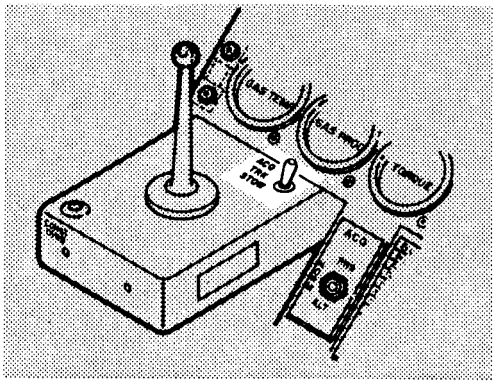
ARR82-25392

15. ON TOW CONTROL PANEL, SET MODE SELECT SWITCH TO STBY TOW.
    a. System status annunciator indicates PWR ON after approximately two minutes.
    b. Adjust TSU RTCL for desired brightness.

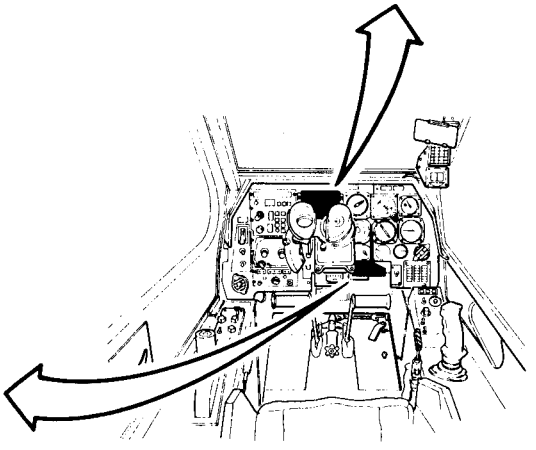


TOW CONTROL PANEL

16. ON SIGHT HAND CONTROL, HOLD ACQ/TRK/STOW SWITCH TO ACQ.



SIGHT HAND CONTROL



ARR82-25393

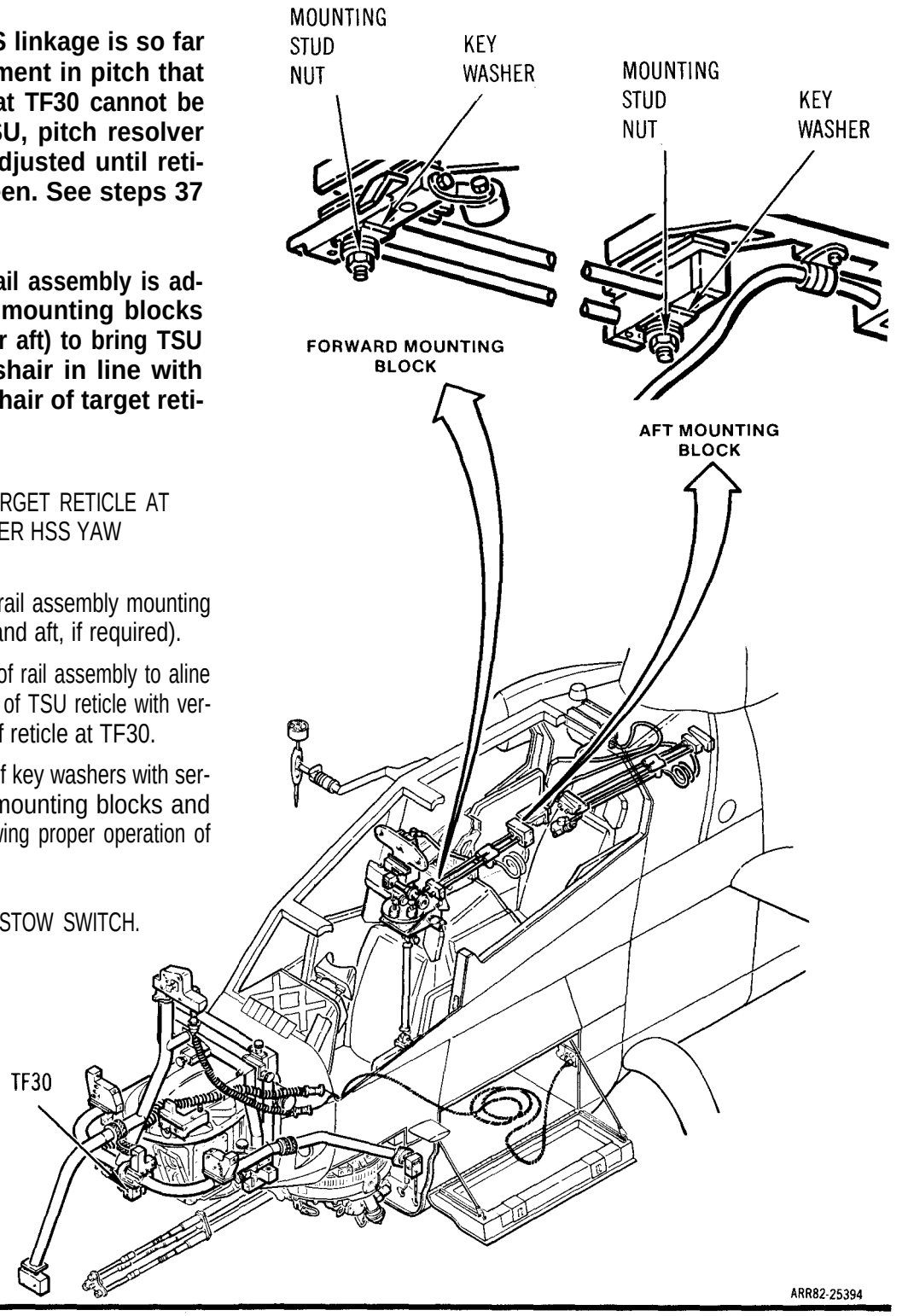
GUNNER HSS BORESIGHTING YAW ALINEMENT (cont)

NOTE

If gunner HSS linkage is so far out of adjustment in pitch that target reticle at TF30 cannot be seen from TSU, pitch resolver SE2 maybe adjusted until reticle can be seen. See steps 37 thru 39.

Gunner HSS rail assembly is adjusted at rail mounting blocks (forward and/or aft) to bring TSU vertical crosshair in line with vertical crosshair of target reticle at TF30.

17. WHILE VIEWING TARGET RETICLE AT TF30, MAKE GUNNER HSS YAW ALINEMENT.
    a. Loosen nuts on rail assembly mounting studs (forward and aft, if required).
    b. Move either end of rail assembly to aline vertical crosshair of TSU reticle with vertical crosshair of reticle at TF30.
    c. Aline serrations of key washers with serrations in rail mounting blocks and tighten nuts allowing proper operation of spring plungers.
18. RELEASE ACQ/TRK/STOW SWITCH.



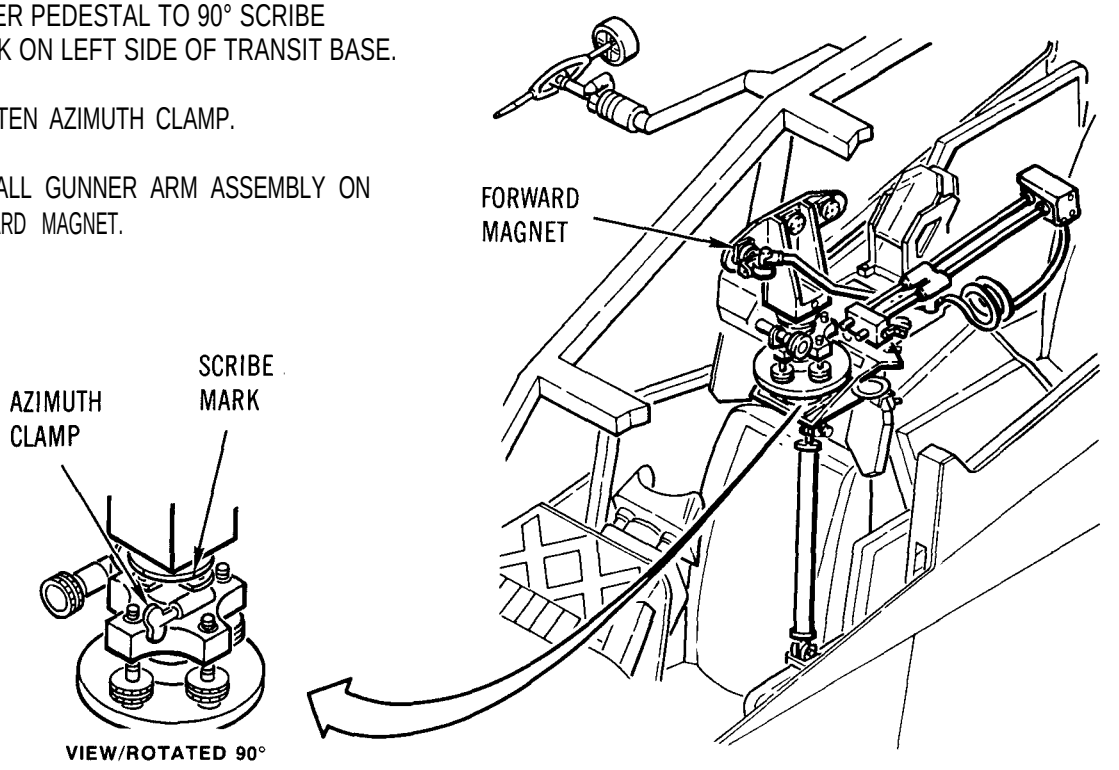
4-7. GUNNER HSS BORESIGHTING (cont)

GUNNER HSS BORESIGHTING RAIL TWIST ALINEMENT

19. LOOSEN AZIMUTH CLAMP AND ROTATE UPPER PEDESTAL TO 90° SCRIBE MARK ON LEFT SIDE OF TRANSIT BASE.

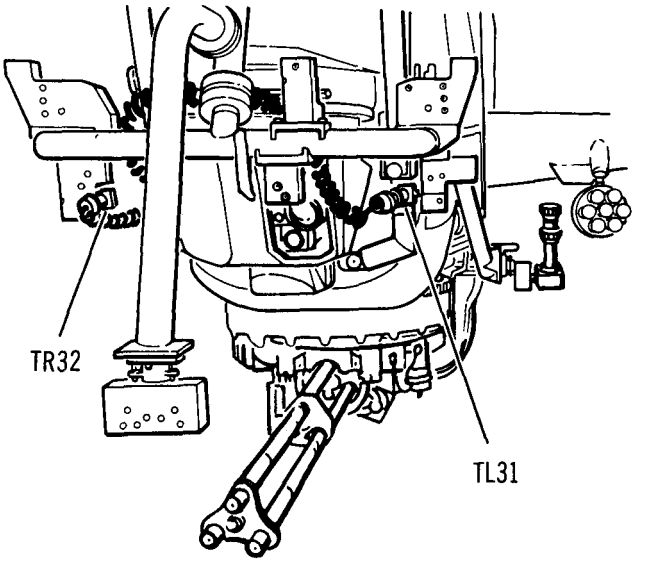
20. TIGHTEN AZIMUTH CLAMP.

21. INSTALL GUNNER ARM ASSEMBLY ON FOWARD MAGNET.



ARR82-25395

22. INSTALL BORESIGHT TELESCOPES AT TL31 AND TR32.



ARR82-25396

GUNNER HSS BORESIGHTING RAIL TWIST ALINEMENT (cont)

NOTE

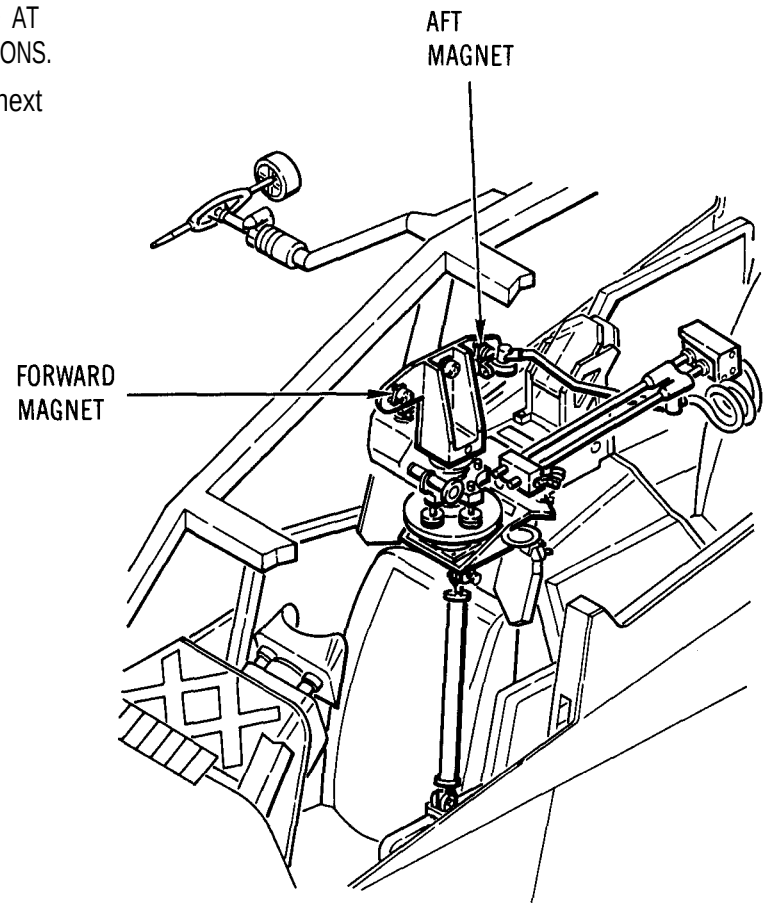
Rail twist exists when roll offset from forward magnet exceeds roll offset from aft magnet by more than 1 mr.

23. HOLD ACQ/TRK/STOW SWITCH TO ACQ.

24. CHECK RAIL TWIST.
    a. Sight through TSU and record roll offset at TR32.
    b. Move gunner arm assembly to aft magnet.
    c. Sight through TSU and record roll offset at TR32.

25. COMPARE ROLL ERRORS RECORDED AT FORWARD AND AFT MAGNET POSITIONS.

    If roll errors exceed 1 mr, go to next step. If not, go to step 27.



ARR82-25397

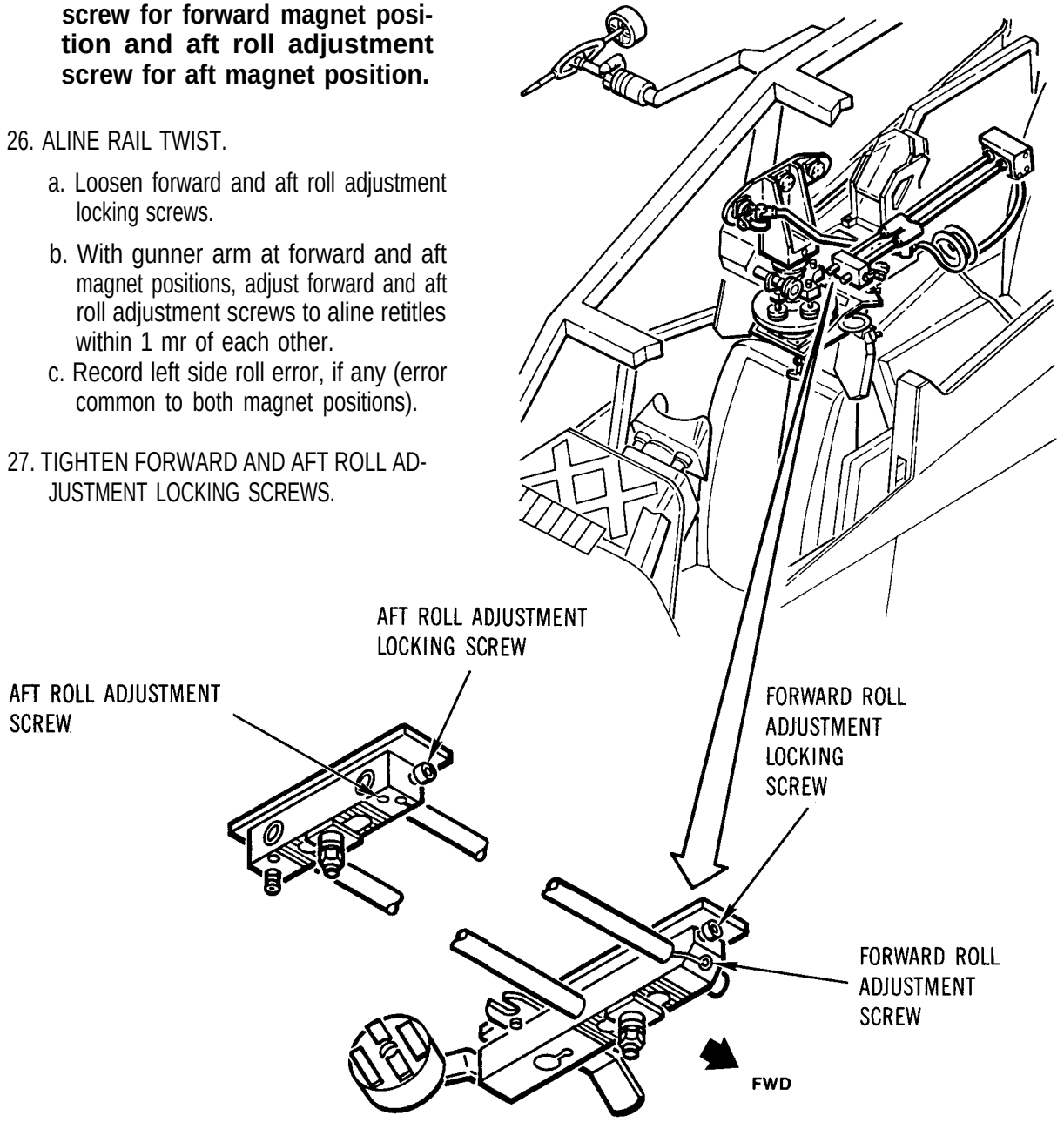
4-7. GUNNER HSS BORESIGHTING (cont)

NOTE

Adjust forward roll adjustment screw for forward magnet position and aft roll adjustment screw for aft magnet position.

26. ALINE RAIL TWIST.
    a. Loosen forward and aft roll adjustment locking screws.
    b. With gunner arm at forward and aft magnet positions, adjust forward and aft roll adjustment screws to aline retitles within 1 mr of each other.
    c. Record left side roll error, if any (error common to both magnet positions).

27. TIGHTEN FORWARD AND AFT ROLL ADJUSTMENT LOCKING SCREWS.



ARR82-25398

GUNNER HSS BORESIGHTING RAIL ROLL ALINEMENT

NOTE

Rail roll error exists when roll offset from right sightings exceeds roll offset from left sightings by more than 2 mr.

28. INSTALL GUNNER ARM ASSEMBLY ON CENTER MAGNET.

29. HOLD ACQ/TRK/STOW SWITCH TO ACQ WHEN MAKING SIGHTINGS.

30. CHECK RAIL ROLL.

    a. Sight through TSU and record roll offset at TR32.

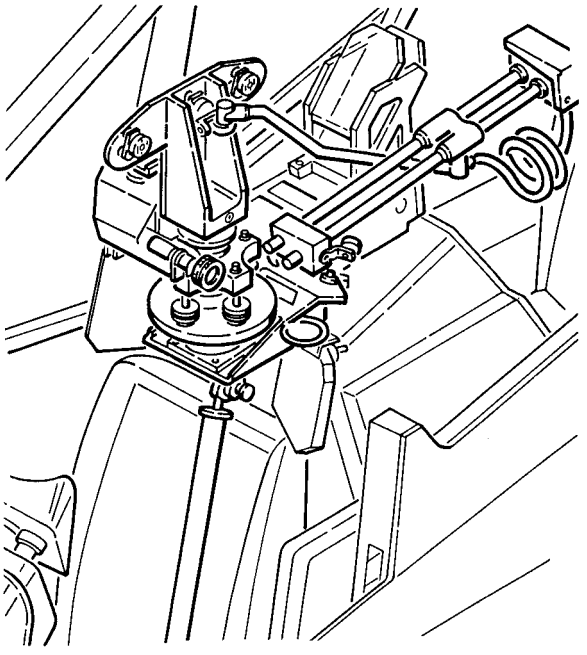
    b. Remove gunner arm assembly, loosen azimuth clamp, and rotate upper pedestal to 90° scribe mark on right side of transit base. Tighten azimuth clamp.

    c. Install gunner arm assembly on center magnet.

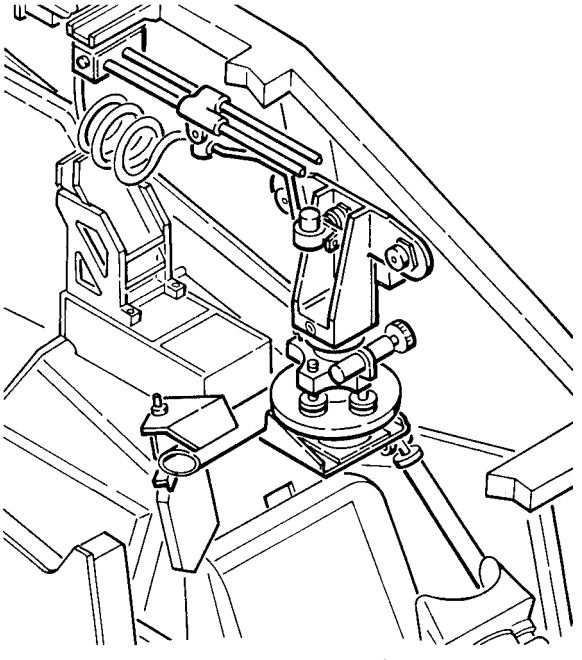
    d. Sight through TSU and record roll offset at TL31.

31. COMPARE ROLL OFFSETS.

    If roll offsets exceed 2 mr, go to next step. If not, go to step 33.



GHS IN RIGHT POSITION



GHS IN LEFT POSITION

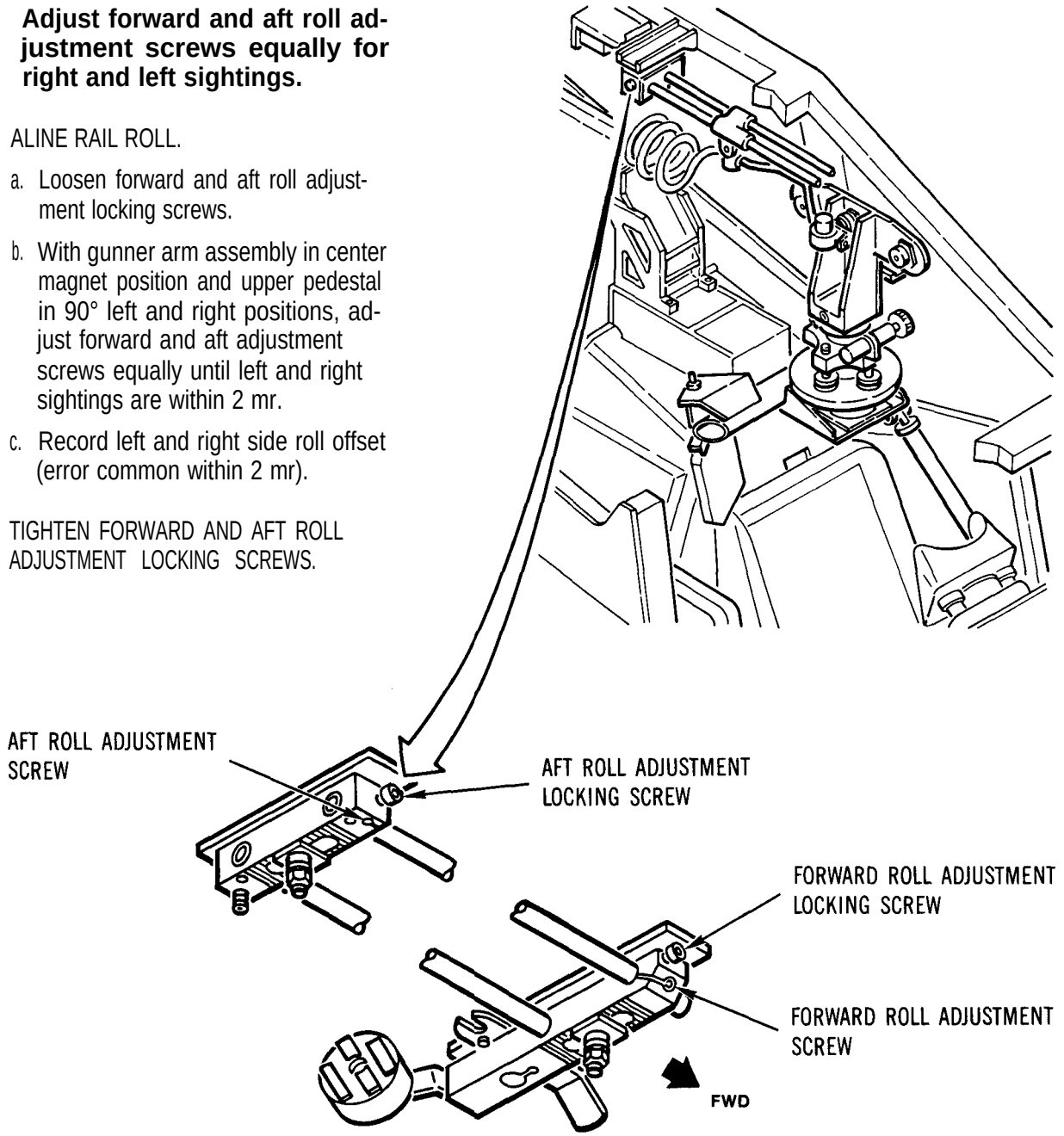
ARR82-25399

4-7. GUNNER HSS BORESIGHTING (cont)

NOTE

Adjust forward and aft roll adjustment screws equally for right and left sightings.

32. ALINE RAIL ROLL.
    a. Loosen forward and aft roll adjustment locking screws.
    b. With gunner arm assembly in center magnet position and upper pedestal in 90° left and right positions, adjust forward and aft adjustment screws equally until left and right sightings are within 2 mr.
    c. Record left and right side roll offset (error common within 2 mr).
33. TIGHTEN FORWARD AND AFT ROLL ADJUSTMENT LOCKING SCREWS.



ARR82-25400

GUNNER HSS BORESIGHTING SE2 RESOLVER PITCH ALINEMENT

34. ROTATE PEDESTAL TO FORWARD POSITION.

a. Loosen azimuth clamp.

b. Rotate pedestal to forward position and aline zero azimuth scribe marks.

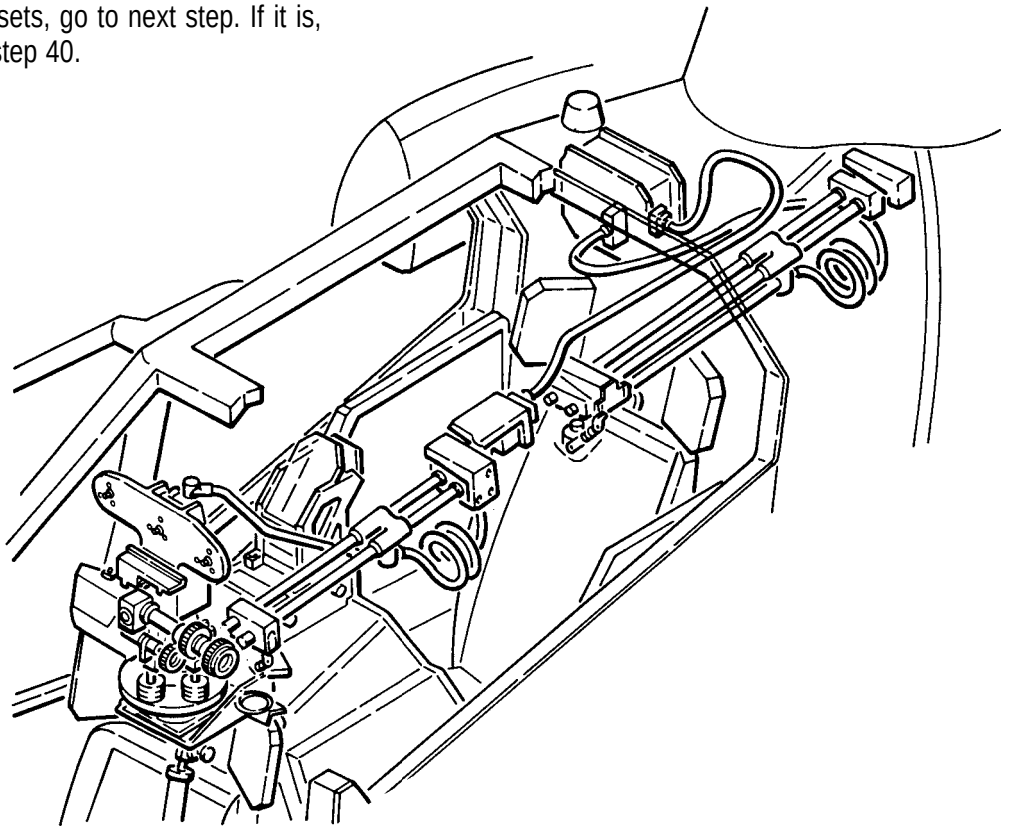
c. Tighten azimuth clamp.

35. CHECK PITCH ALINEMENT.

Sight through TSU and record pitch offset at TF30.

36. COMPARE PITCH OFFSET WITH ROLL OFFSET RECORDED IN STEP 30 OR 32.

If pitch offset is not within 2 mr (common to both) of right and left roll offsets, go to next step. If it is, go to step 40.



ARR82-25401

4-7. GUNNER HSS BORESIGHTING (cont)

NOTE

SE2 resolver is sensitive to adjustment. A slight adjustment to SE2 resolver results in a large displacement of TSU LOS.

Two technicians are required to make SE2 pitch resolver adjustment, one to sight through TSU at TF30 and one to adjust resolver.

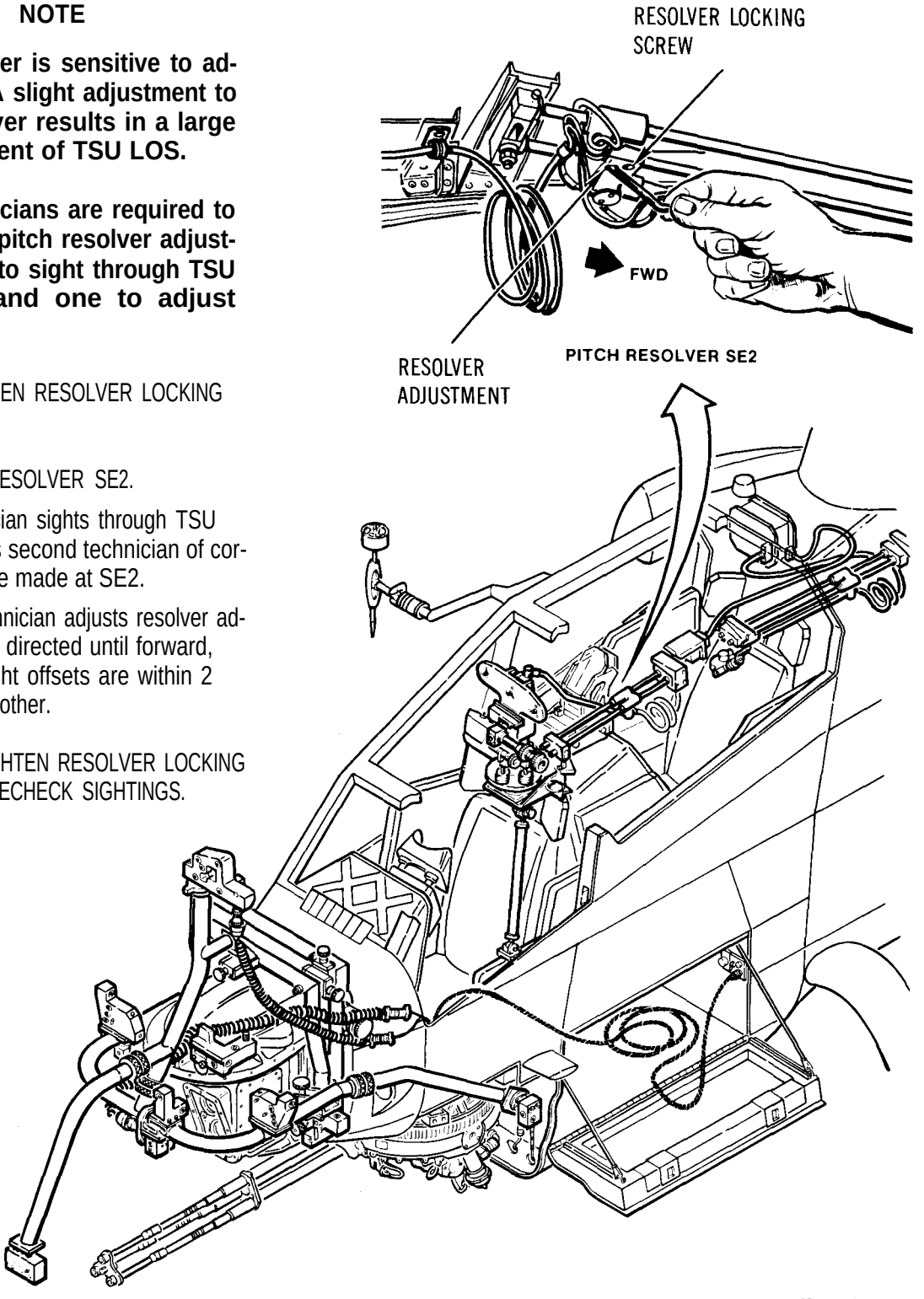
37. SLIGHTLY LOOSEN RESOLVER LOCKING SCREW.

38. ALINE PITCH RESOLVER SE2.

a. First technician sights through TSU and informs second technician of correction to be made at SE2.

b. Second technician adjusts resolver adjustment as directed until forward, left, and right offsets are within 2 mr of each other.

39. CAREFULLY TIGHTEN RESOLVER LOCKING SCREW AND RECHECK SIGHTINGS.

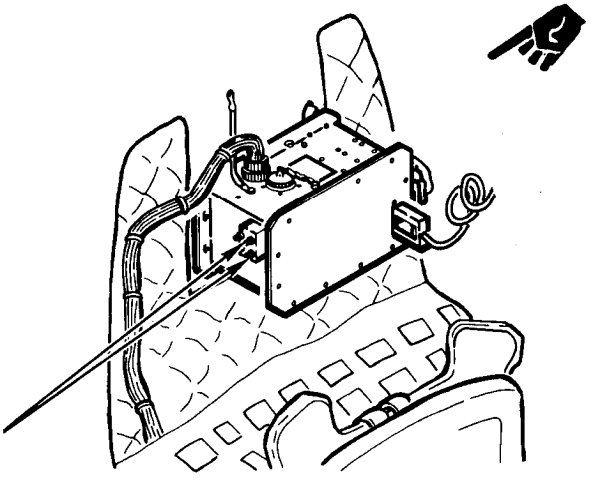


GUNNER HSS BORESIGHTING SE2 RESOLVER PITCH ALINEMENT (cont)

39.1. ALINE HSS, IN PITCH.

a. Direct TSU and LOD to forward target assembly.

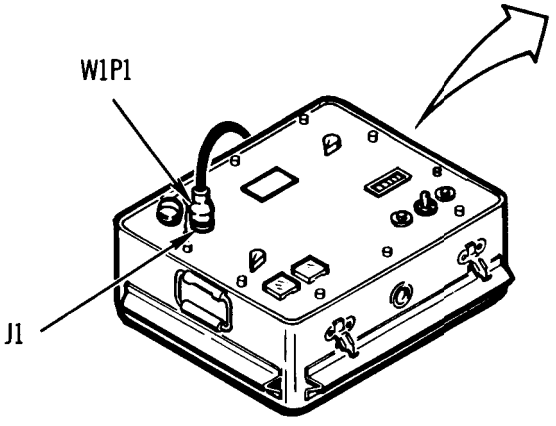
b. While viewing forward target assembly, adjust GUNNER AZ and EL potentiometers until TSU reticle crosshair coincides with TSU optics target crosshairs.

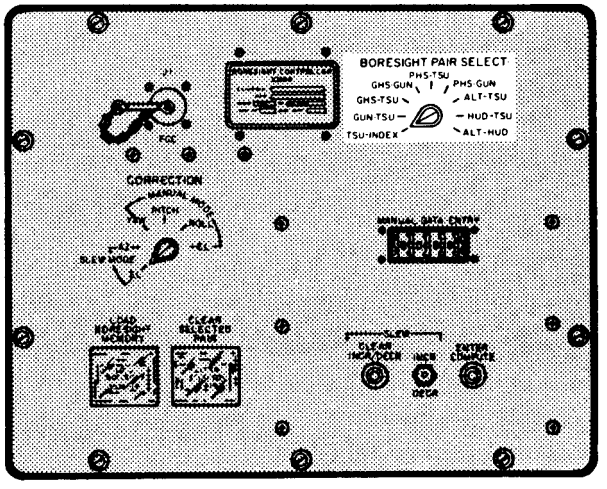


GUNNER HSS BORESIGHTING GHS-TSU CONTROLLER CORRECTIONS

40. ON BORESIGHT CONTROLLER, SET BORESIGHT PAIR SELECT SWITCH TO TSU-INDEX.

41. CONNECT BORESIGHT CABLE ASSEMBLY W1P1 TO BORESIGHT CONTROLLER CONNECTOR J1.

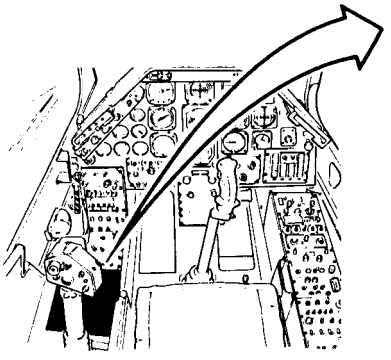


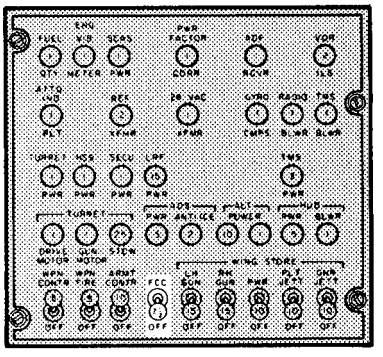


BORESIGHT CONTROLLER

ARR82-25403

42. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, MAKE SURE FCC CIRCUIT BREAKER IS SET TO OFF.





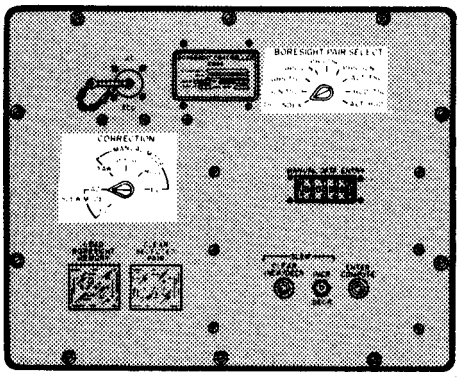
AC / ARMAMENT CIRCUIT BREAKER PANEL

ARR82-25404

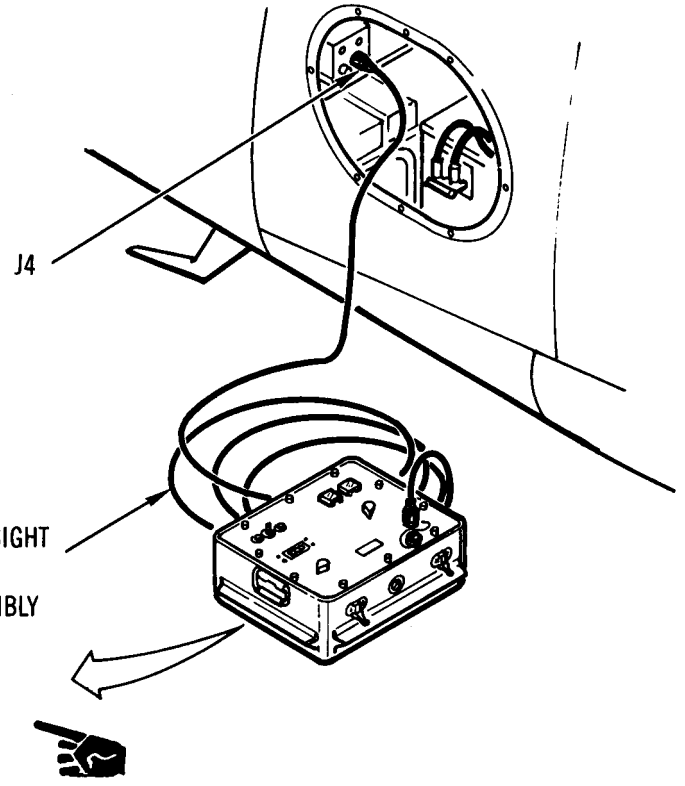
4-7. GUNNER HSS BORESIGHTING (cont)

43. CONNECT BORESIGHT CABLE ASSEMBLY TO FCC TEST CONNECTOR J4.

43.1 PLACE CORRECTION SWITCH ON SLEW MODE AZIMUTH. MOVE TSU SLEW MODE TO INDEX.



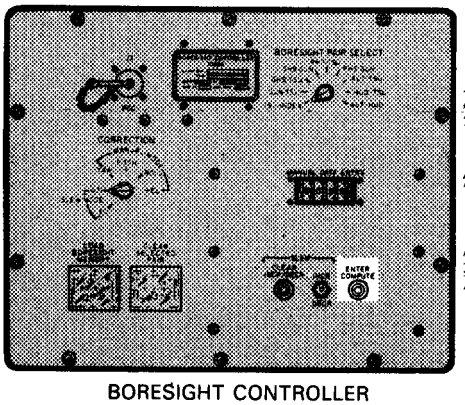
BORESIGHT CONTROLLER



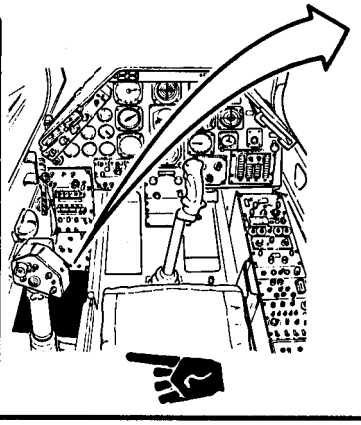
ARR82-25405

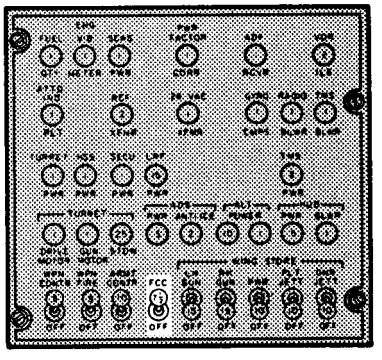
44. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, SET FCC CIRCUIT BREAKER TO ON.

44.1 DEPRESS AND HOLD "ENTER COMPUTE" FOR THREE SECONDS, WAIT FIVE MINUTES BEFORE PROCEEDING TO NEXT STEP.



BORESIGHT CONTROLLER





AC / ARMAMENT
CIRCUIT BREAKER PANEL

ARR82-25406

GUNNER HSS BORESIGHTING GHS-TSU CONTROLLER CORRECTIONS (cont)

NOTE

If power interruption or shutdown causes removal of power from FCC, entire boresight correction procedure must be repeated.

45. ON BORESIGHT CONTROLLER, SET BORESIGHT PAIR SELECT SWITCH TO GHS-TSU.

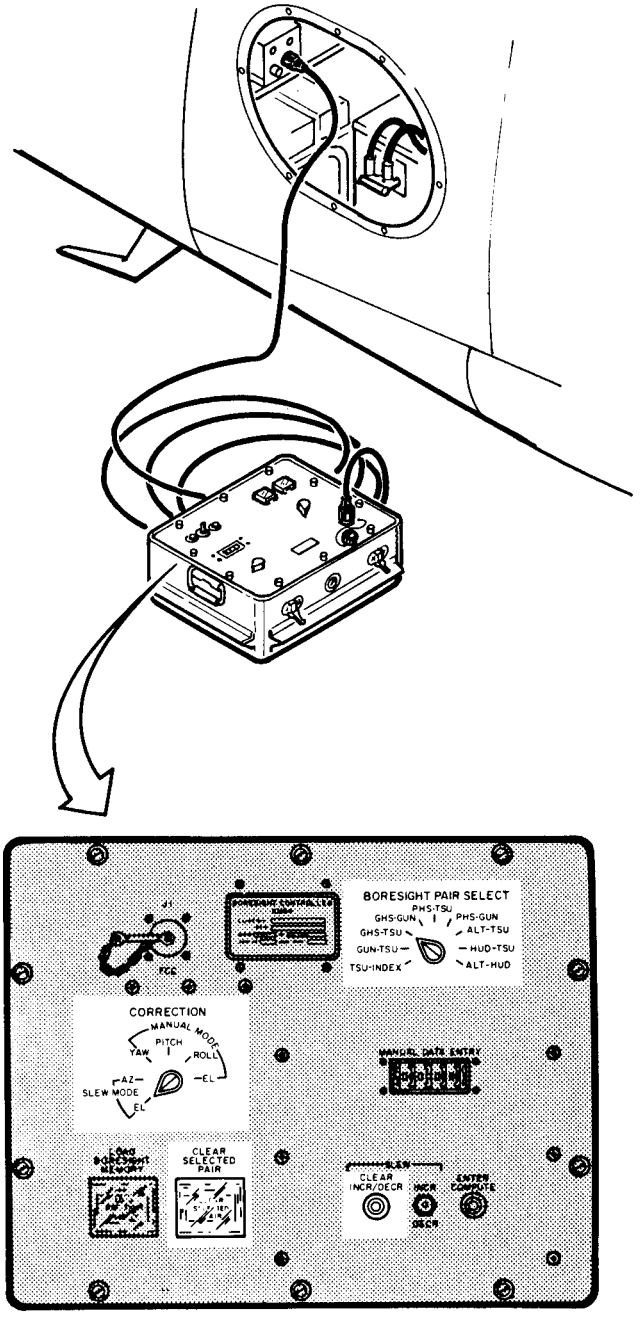
46. LIFT PLASTIC COVER AND PRESS CLEAR SELECTED PAIR SWITCH.

NOTE

After correction switch is set to SLEW MODE, FCC may require approximately 25 minutes to initialize. A non-initialized FCC will cause INCR/DECR switch to have no effect.

47. SET CORRECTION SWITCH TO SLEW MODE EL.

48. PRESS AND RELEASE CLEAR INCR/DECR SWITCH.



BORESIGHT CONTROLLER

ARR82-25407

4-7. GUNNER HSS BORESIGHTING (cont)

NOTE

Maintain pedestal assembly alinement established in steps 1 thru 9.

If INCR/DECR switch fails to move TSU reticle during boresight corrections, FCC may not be initialized. Return to step 46 and try INCR/DECR switch at five minute intervals. FCC may take 25 minutes to initialize.

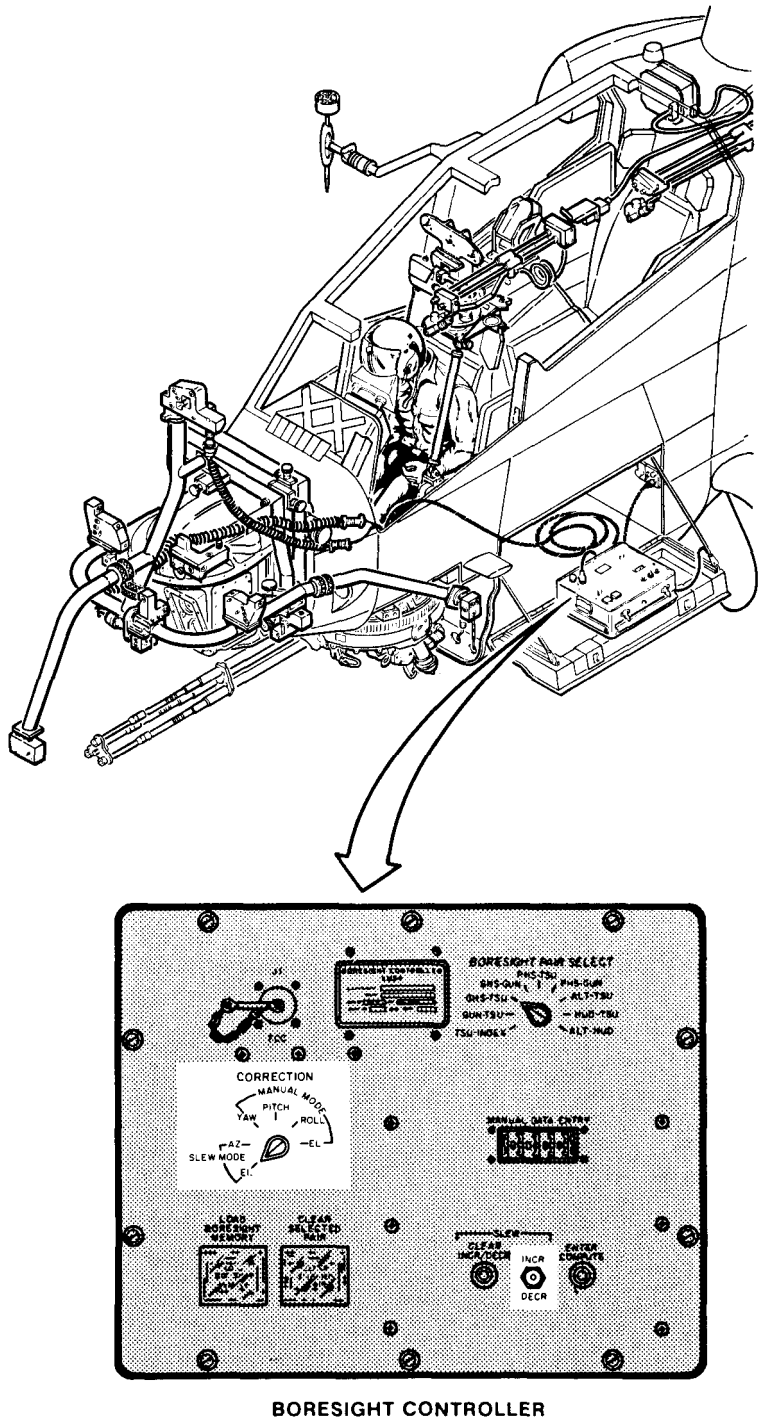
49 WHEN MAKING CORRECTIONS, HOLD ACQ/TRK/STOW SWITCH IN ACQ TO SLAVE TSU TO HSS.

50. SIGHT THROUGH TSU TO TARGET SCOPE AT TF30.

51. ON BORESIGHT CONTROLLER, USE INCR/DECR SWITCH TO ALINE TSU RETICLE WITH TARGET RETICLE IN ELEVATION.

52. ON BORESIGHT CONTROLLER, SET CORRECTION SWITCH TO SLEW MODE AZ AND USE INCR/DECR SWITCH TO ALINE TSU RETICLE WITH TARGET RETICLE IN AZIMUTH.

53. ON BORESIGHT CONTROLLER SET CORRECTION SWITCH TO SLEW MODE EL.



BORESIGHT CONTROLLER

ARR82-25408

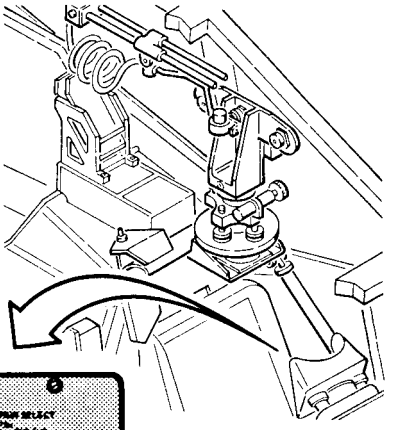
GUNNER HSS BORESIGHTING GHS-TSU CONTROLLER CORRECTIONS (cont)

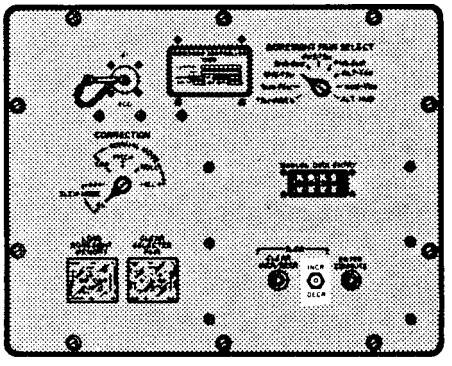
54. ROTATE PEDESTAL TO 90° LEFT POSITION.

55. WHEN MAKING CORRECTIONS, HOLD ACQ/TRK/STOW SWITCH IN ACQ.

56. SIGHT THROUGH TSU TO TARGET SCOPE AT TL31.

57. ON BORESIGHT CONTROLLER, USE INCR/DECR SWITCH TO ALINE TSU RETICLE WITH TARGET RETICLE IN ELEVATION.





BORESIGHT CONTROLLER

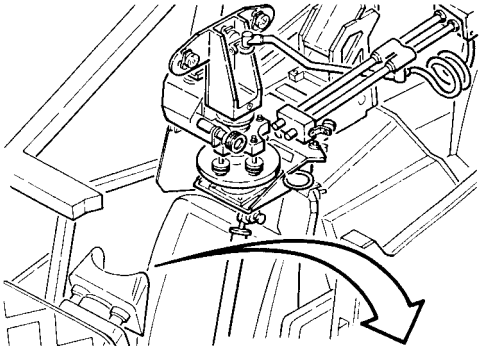
ARR82-25409

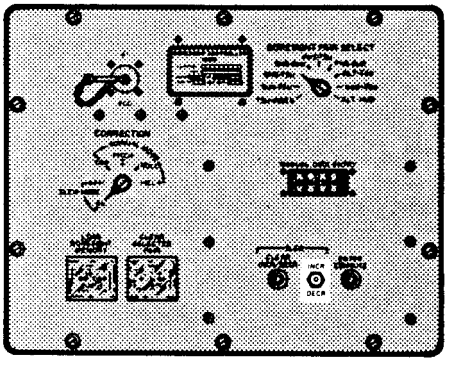
58. ROTATE PEDESTAL TO 90° RIGHT POSITION.

59. WHEN MAKING CORRECTIONS, HOLD ACQ/TRK/STOW SWITCH IN ACQ.

60. SIGHT THROUGH TSU TO TARGET SCOPE AT TR32.

61. ON BORESIGHT CONTROLLER, USE INCR/DECR SWITCH TO ALINE TSU RETICLE WITH TARGET RETICLE IN ELEVATION.





BORESIGHT CONTROLLER

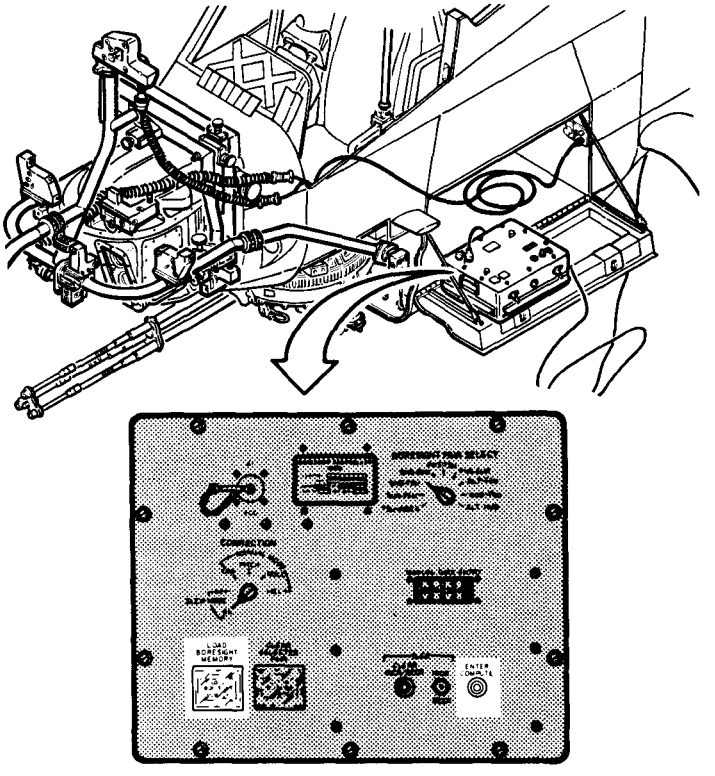
ARR82-25410

4-7. GUNNER HSS BORESIGHTING (cont)

62. ON BORESIGHT CONTROLLER, PRESS AND HOLD ENTER COMPUTE BUTTON FOR APPROXIMATELY THREE SECONDS.

63. LIFT PLASTIC COVER AND PRESS LOAD BORESIGHT MEMORY SWITCH. OBSERVE THAT SWITCH ILLUMINATES BRIEFLY.

64. ROTATE PEDESTAL TO FORWARD POSITION AND ALINE 0° AZIMUTH SCRIBE MARKS.



BORESIGHT CONTROLLER

ARR82-25411

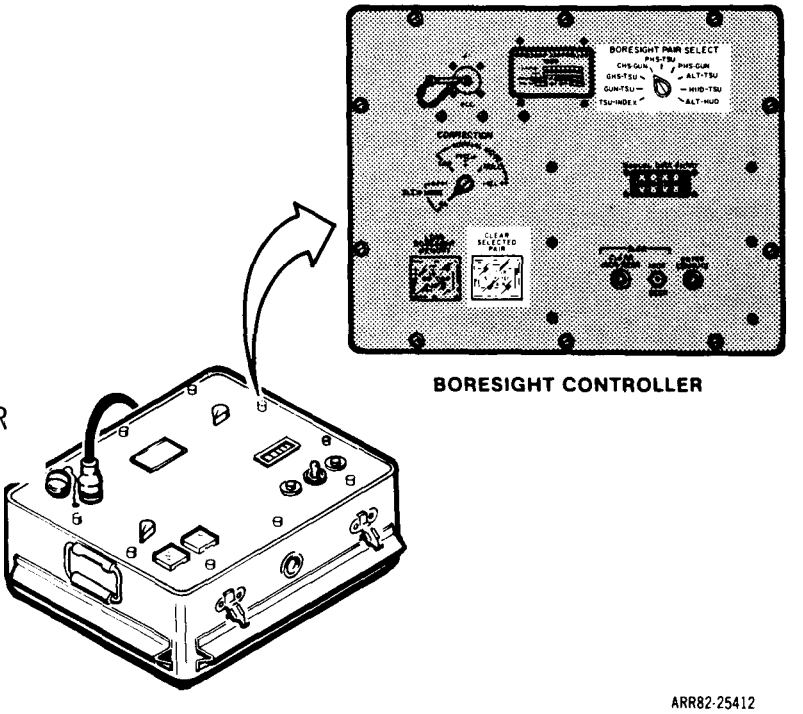
GUNNER HSS BORESIGHTING GHS-GUN CONTROLLER CORRECTIONS

NOTE

If a power interruption or shutdown causes removal of power from FCC, entire boresight correction procedure must be repeated.

65. ON BORESIGHT CONTROLLER, SET BORESIGHT PAIR SELECT SWITCH TO GHS-GUN.

66. LIFT PLASTIC COVER AND PRESS CLEAR SELECTED PAIR SWITCH.



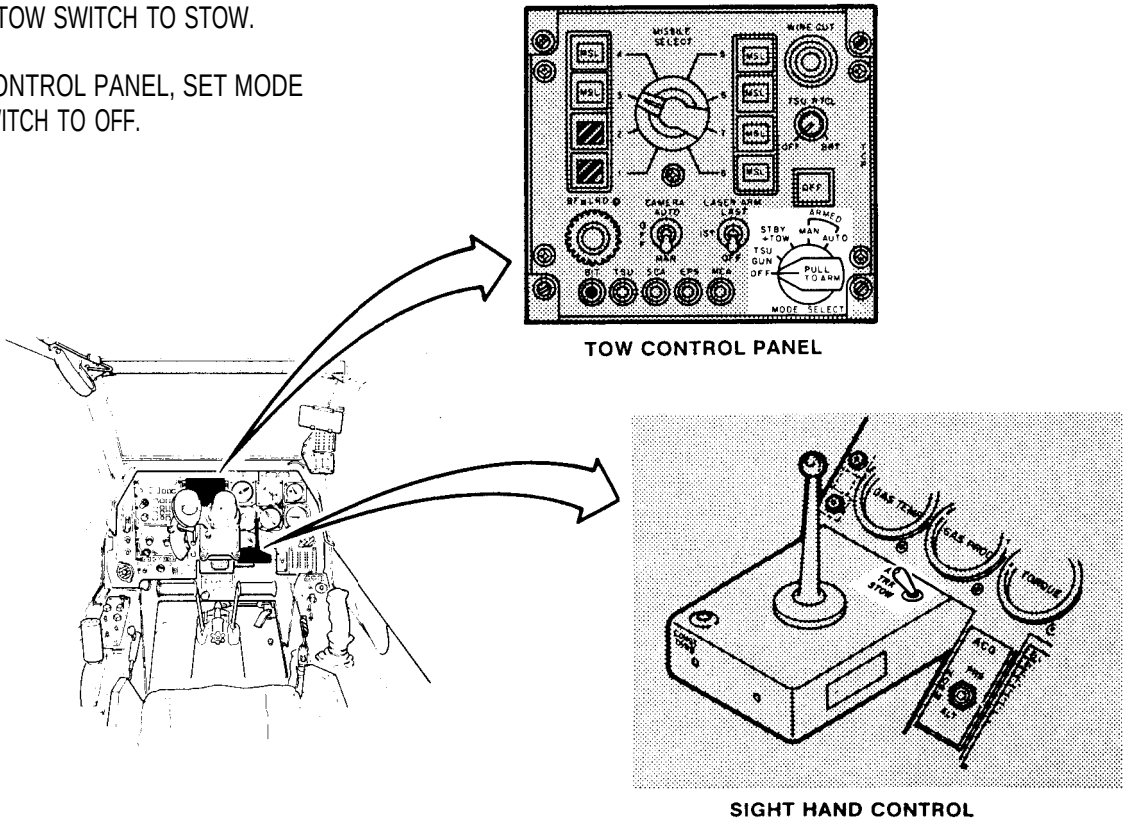
BORESIGHT CONTROLLER

ARR82-25412

GUNNER HSS BORESIGHTING GHS-GUN CONTROLLER CORRECTIONS (cont)

67. ON SIGHT HAND CONTROL, SET ACQ/TRK/STOW SWITCH TO STOW.

68. ON TOW CONTROL PANEL, SET MODE SELECT SWITCH TO OFF.

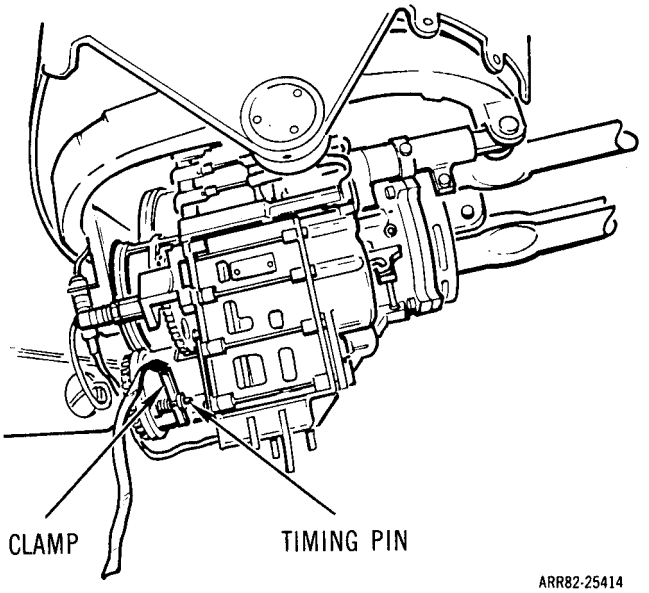


TOW CONTROL PANEL

SIGHT HAND CONTROL

ARR82-25413

69. ON M89E1 FEEDER, CLAMP TIMING PIN IN DEPRESSED POSITION.

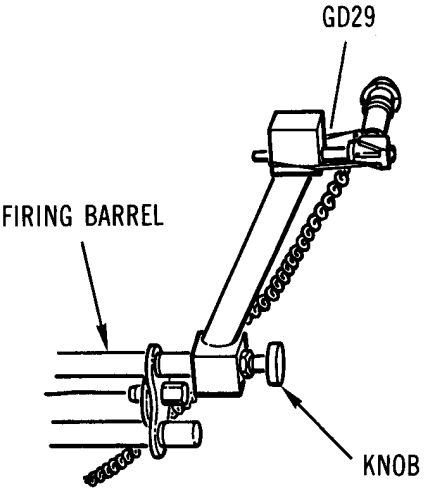


ARR82-25414

4-7. GUNNER HSS BORESIGHTING (cont)

70. INSTALL GUN ALINEMENT DEVICE IN FIRING BARREL AND SECURE WITH KNOB.

71. INSTALL BORESIGHT TELESCOPE IN GUN ALINEMENT DEVICE AT GD29.
    a. Secure scope with elastic retainer.
    b. Install illumination device on scope.

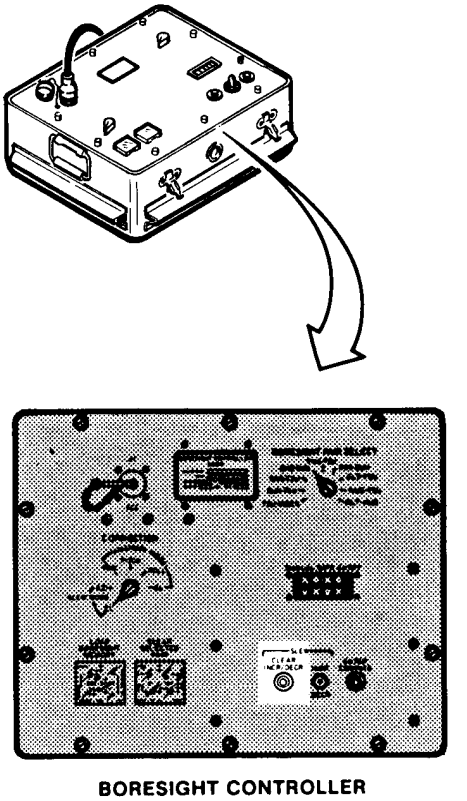


ARR82-25415

NOTE

In following procedures, first technician will occupy gunner's cockpit, position pedestal, and track gun as directed by second technician. Second technician will position pedestal, make sightings, and implement corrections with boresight controller.

72. ON BORESIGHT CONTROLLER, PRESS CLEAR INCR/DECR SWITCH.



BORESIGHT CONTROLLER

ARR82-25416

GUNNER HSS BORESIGHTING GHS-GUN CONTROLLER CORRECTIONS (cont)

NOTE

Boresight telescopes will be placed at FG29, LG29, and RF29 as required.

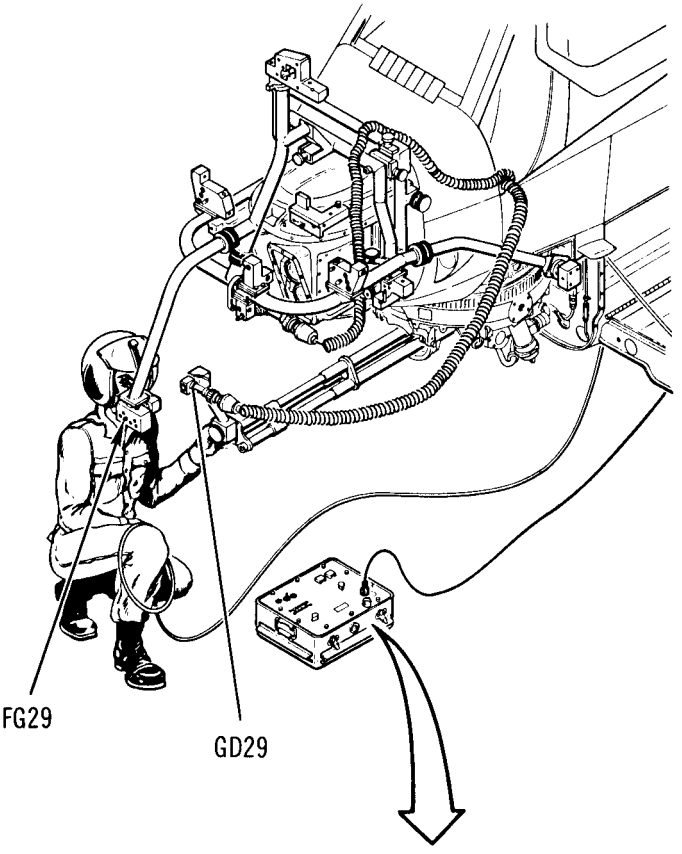
73. INFORM FIRST TECHNICIAN BORESIGHT CONTROLLER IS READY TO IMPLEMENT EL/AZ CORRECTIONS.

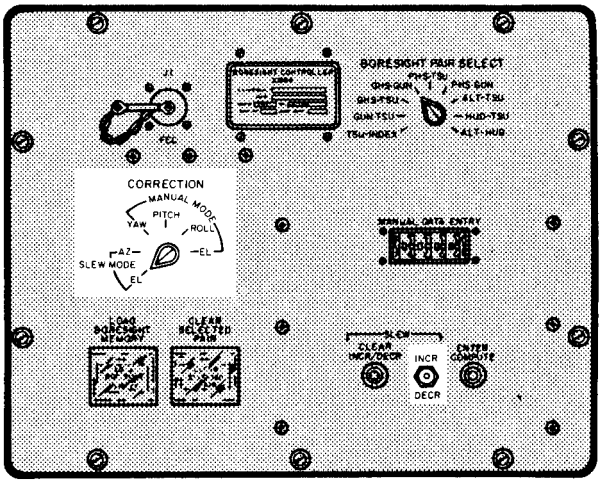
74. FIRST TECHNICIAN PRESSES LEFT-HAND GRIP ACTION SWITCH TO SLAVE GUN TO FORWARD PEDESTAL POSITION.

75. SECOND TECHNICIAN SIGHTS THROUGH SCOPE AT FG29 TO TARGET SCOPE AT GD29.

76. USE INCR/DECR SWITCH IN CORRECTION SWITCH SLEW MODES EL THEN AZ TO ALINE TARGET RETICLE WITH SIGHT RETICLE.

77. SECOND TECHNICIAN ANNOUNCES CORRECTIONS COMPLETE FOR FORWARD PEDESTAL POSITION.





BORESIGHT CONTROLLER

ARR82-25417

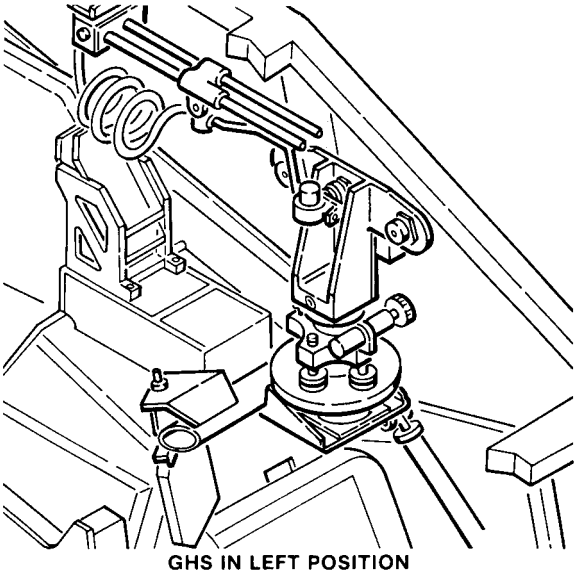
4-7. GUNNER HSS BORESIGHTING (cont)

NOTE

For sighting at left and right gun positions, target scope at GD29 Is put in aft facing hole.

78. ROTATE PEDESTAL TO LEFT POSITION AND ALINE 90° SCRIBE MARKS.

79. FIRST TECHNICIAN PRESSES LEFT-HAND GRIP ACTION SWITCH TO SLAVE GUN TO PEDESTAL LEFT POSITION.



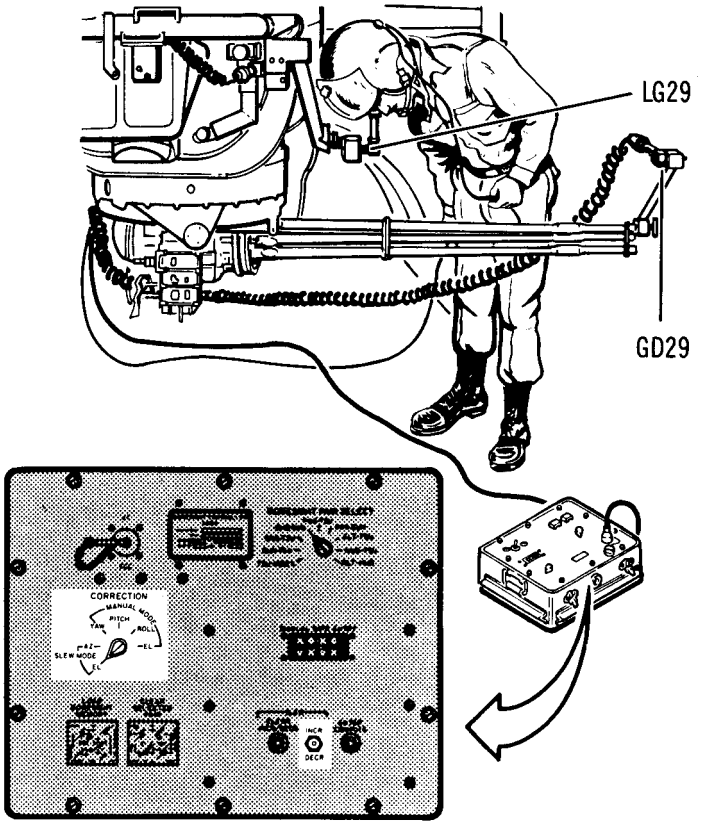
GHS IN LEFT POSITION

ARR82-25418

80. SECOND TECHNICIAN SIGHTS THROUGH SCOPE AT LG29 TO TARGET SCOPE AT GD29.

81. USE INCR/DECR SWITCH IN CORRECTION SWITCH SLEW MODES EL THEN AZ TO ALINE TARGET RETICLE WITH SIGHT RETICLE.

82. SECOND TECHNICIAN ANNOUNCES CORRECTIONS COMPLETE FOR LEFT GUN POSITION.



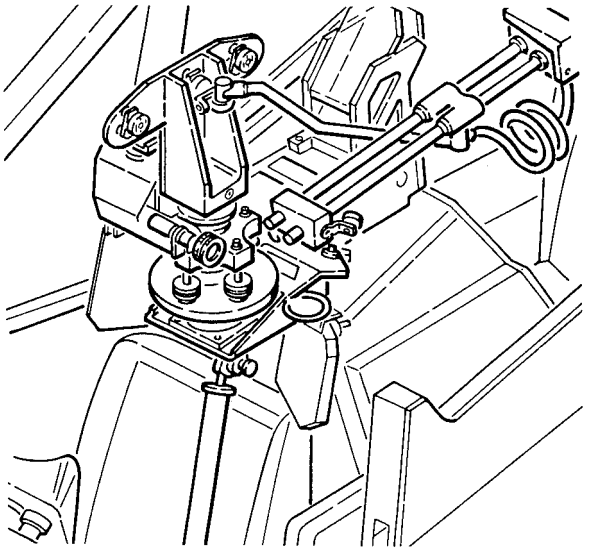
BORESIGHT CONTROLLER

ARR82-25419

GUNNER HSS BORESIGHTING GHS-GUN CONTROLLER CORRECTIONS (cont)

83. ROTATE PEDESTAL TO RIGHT POSITION AND ALINE 90° SCRIBE MARK.

84. FIRST TECHNICIAN PRESSES LEFT-HAND GRIP ACTION SWITCH TO SLAVE GUN TO PEDESTAL RIGHT POSITION.



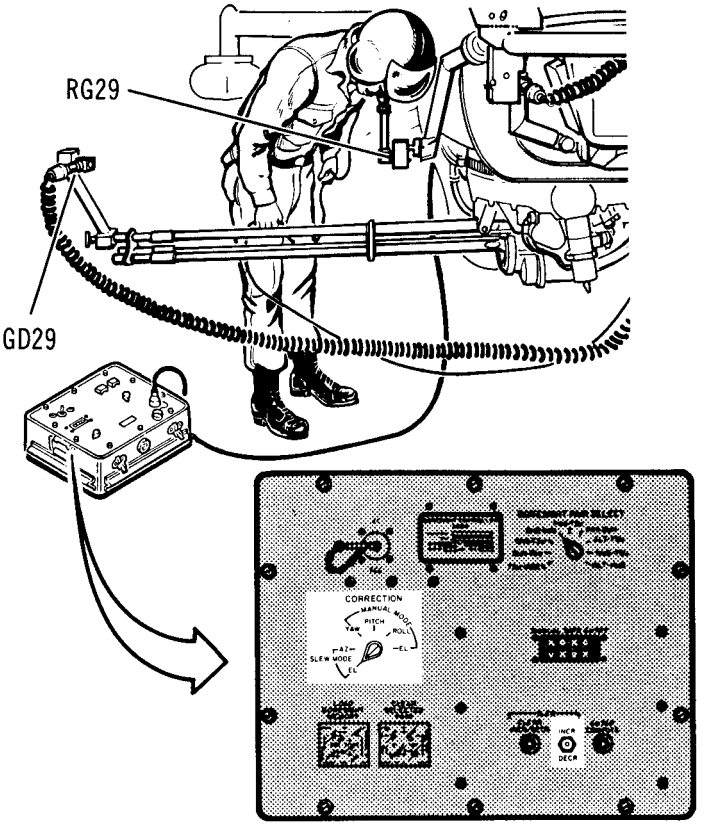
GHS IN RIGHT POSITION

ARR82-25420

85. SECOND TECHNICIAN SIGHTS THROUGH SCOPE AT RG29 TO TARGET SCOPE AT GD29.

86. USE INCR/DECR SWITCH IN CORRECTION SWITCH SLEW MODES EL THEN AZ TO ALINE TARGET RETICLE WITH SIGHT RETICLE.

87. SECOND TECHNICIAN ANNOUNCES CORRECTIONS COMPLETE FOR RIGHT GUN POSITION.



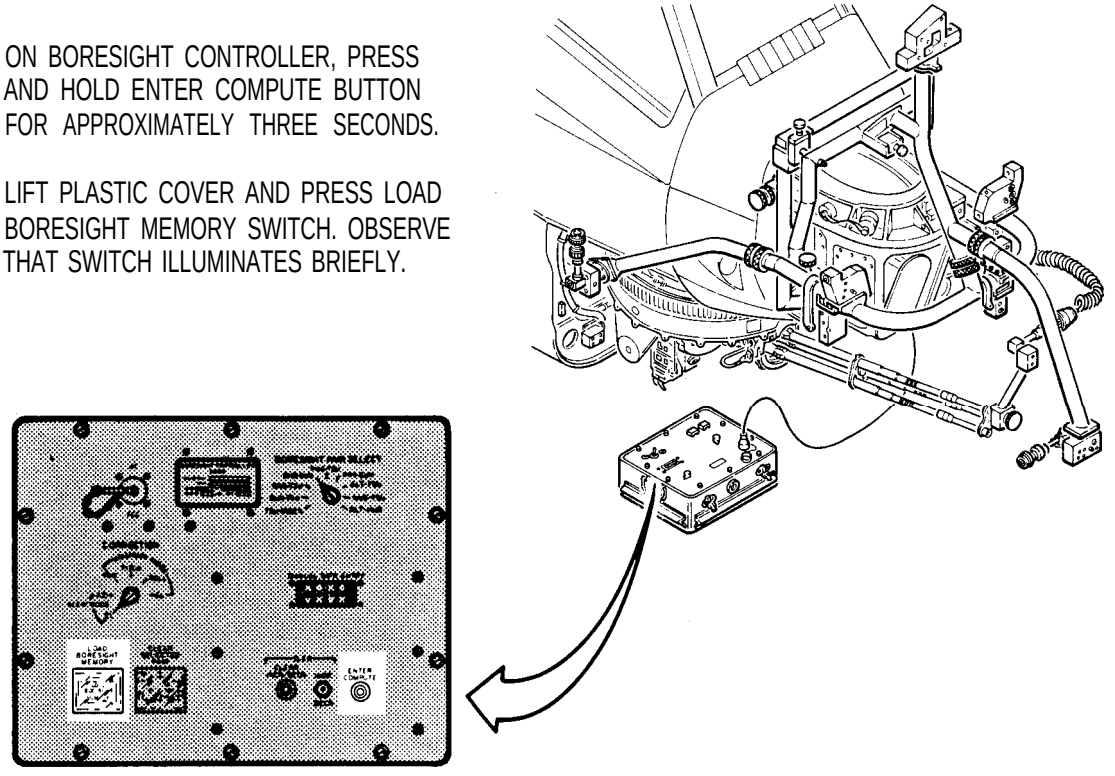
BORESIGHT CONTROLLER

ARR82-25421

4-7. GUNNER HSS BORESIGHTING (cont)

88. ON BORESIGHT CONTROLLER, PRESS AND HOLD ENTER COMPUTE BUTTON FOR APPROXIMATELY THREE SECONDS.

89. LIFT PLASTIC COVER AND PRESS LOAD BORESIGHT MEMORY SWITCH. OBSERVE THAT SWITCH ILLUMINATES BRIEFLY.

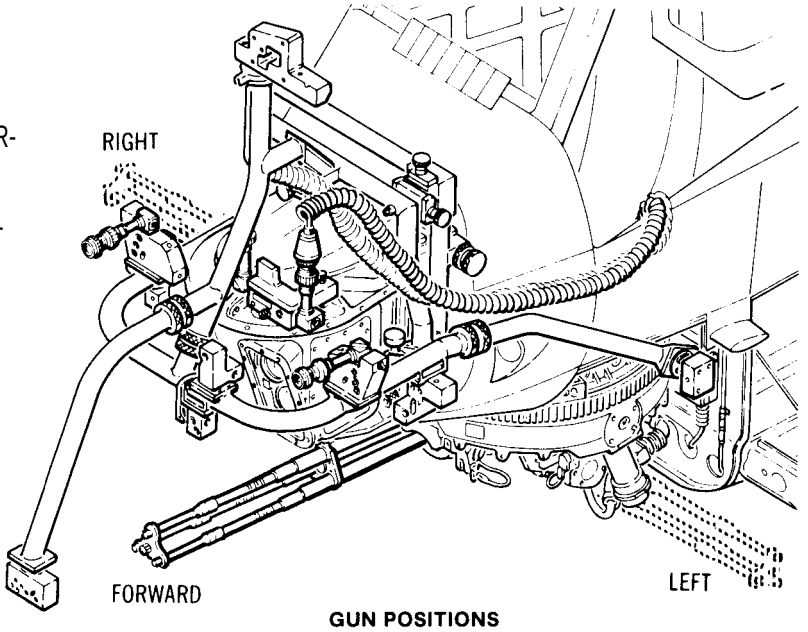


BORESIGHT CONTROLLER

ARR82-25422

90. FIRST TECHNICIAN WILL DIRECT PEDESTAL AND GUN TO LE17 AND RIGHT POSITIONS, ALLOWING SECOND TECHNICIAN TO CHECK BORESIGHT CORRECTIONS AT EACH POSITION.

91. TECHNICIANS WILL REPEAT BORESIGHT PROCEDURES AS NECESSARY TO MINIMIZE BORESIGHT ERRORS.

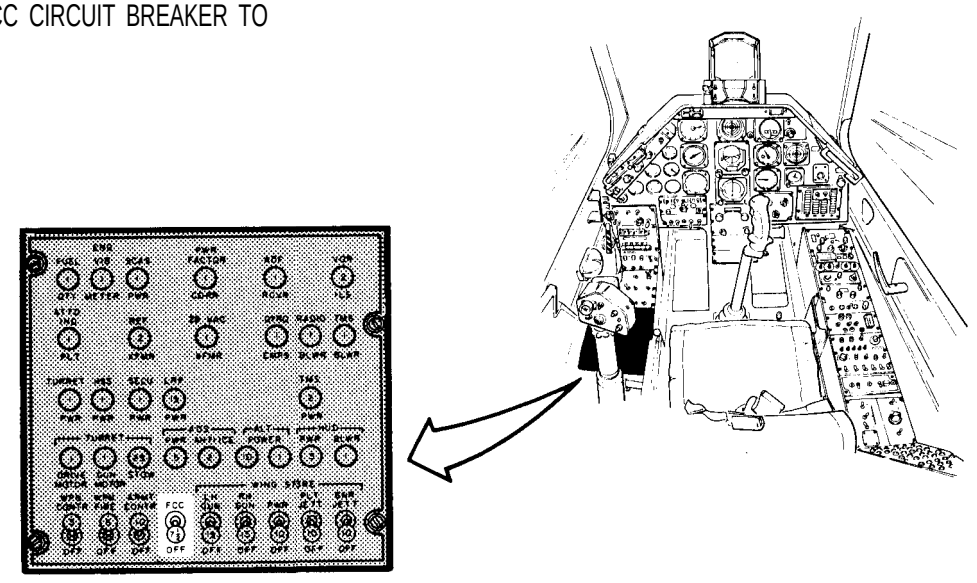


GUN POSITIONS

ARR82-25288

GUNNER HSS BORESIGHTING GHS-GUN CONTROLLER CORRECTIONS (cont)

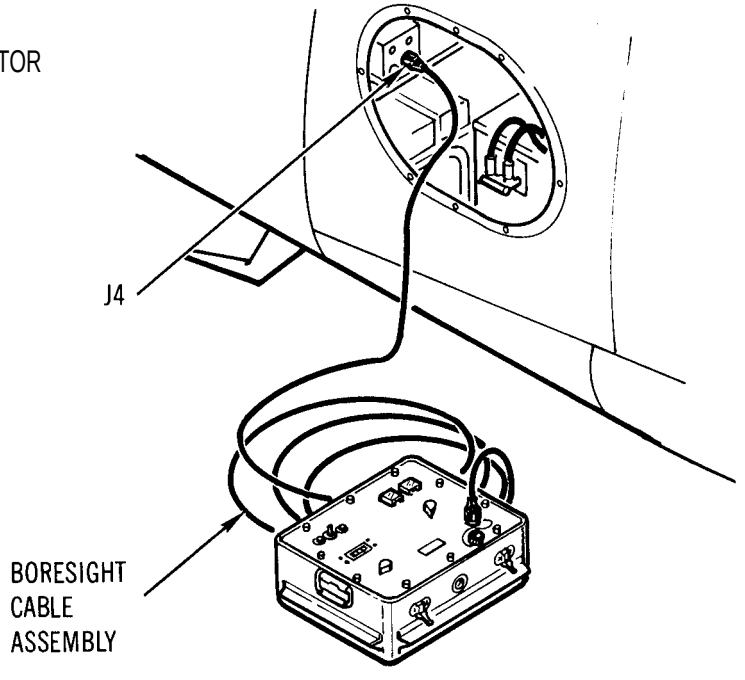
92. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, SET FCC CIRCUIT BREAKER TO OFF.



AC / ARMAMENT
CIRCUIT BREAKER PANEL

ARR82-25289

93. DISCONNECT BORESIGHT CABLE ASSEMBLY FROM FCC TEST CONNECTOR J4.



ARR82-25290

4-7. GUNNER HSS BORESIGHTING (cont)

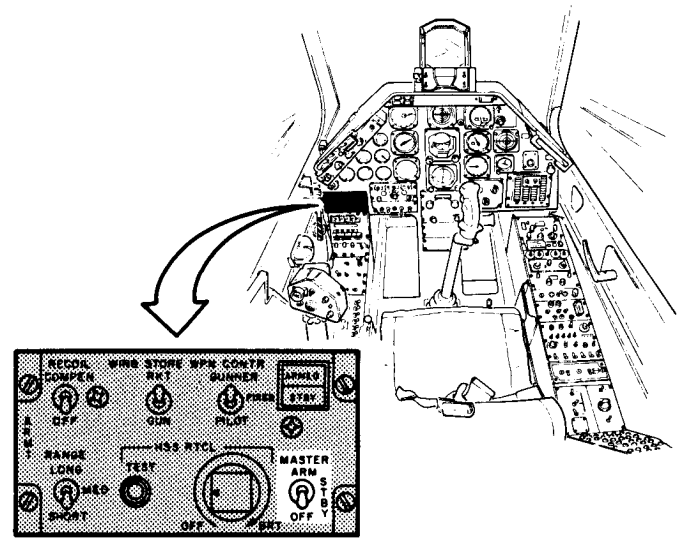
POST GUNNER HSS BORESIGHTING PROCEDURES

94. ON PILOT ARMAMENT CONTROL PANEL, SET MASTER ARM SWITCH TO OFF.

NOTE

If Air Data Subsystem (ADS) is to be boresighted, perform ADS BORESIGHTING. BAGSE is in position to do this task.

95. CONTINUE BORESIGHTING AS REQUIRED OR PERFORM POST BORESIGHTING PROCEDURES, PARA 4-14.



PILOT ARMAMENT CONTROL PANEL

ARR82-25291

END OF TASK

4-8. PILOT HSS BORESIGHTING

DESCRIPTION

This task covers: Alinement of pilot shelf and pedestal assemblies; and rail assembly yaw, twist, roll, and pitch alinements.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Boresight Assembly Ground Support Equipment (BAGSE)
- Boresight Controller
- Shorting connector from Fire Control Subsystem Test Set, AN/GSM-249

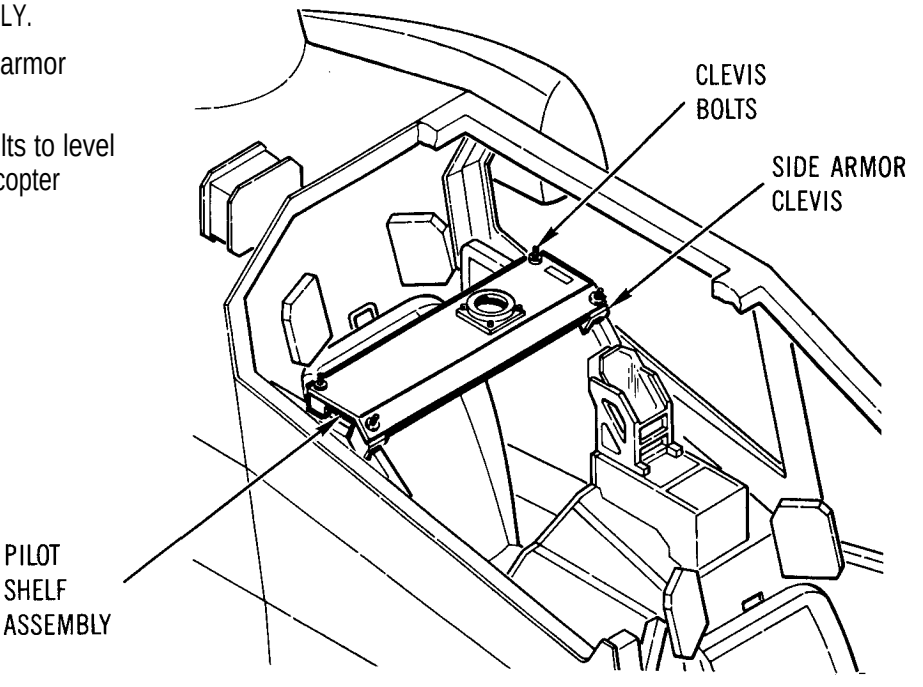
Personnel Required:
- 68J Aircraft Fire Control Repairer (3)

References:
- TM 9-1270-212-14&P

Equipment Conditions:
- HSS installed, see TM 9-1270-212-14&P.
- Shorting connector installed in pilot cockpit
- BAGSE ALINEMENT TO HELICOPTER performed, para 4-5.
- TURRET SUBSYSTEM BORESIGHTING performed, para 4-6.

PILOT HSS BORESIGHTING, SHELF AND PEDESTAL ALINEMENT

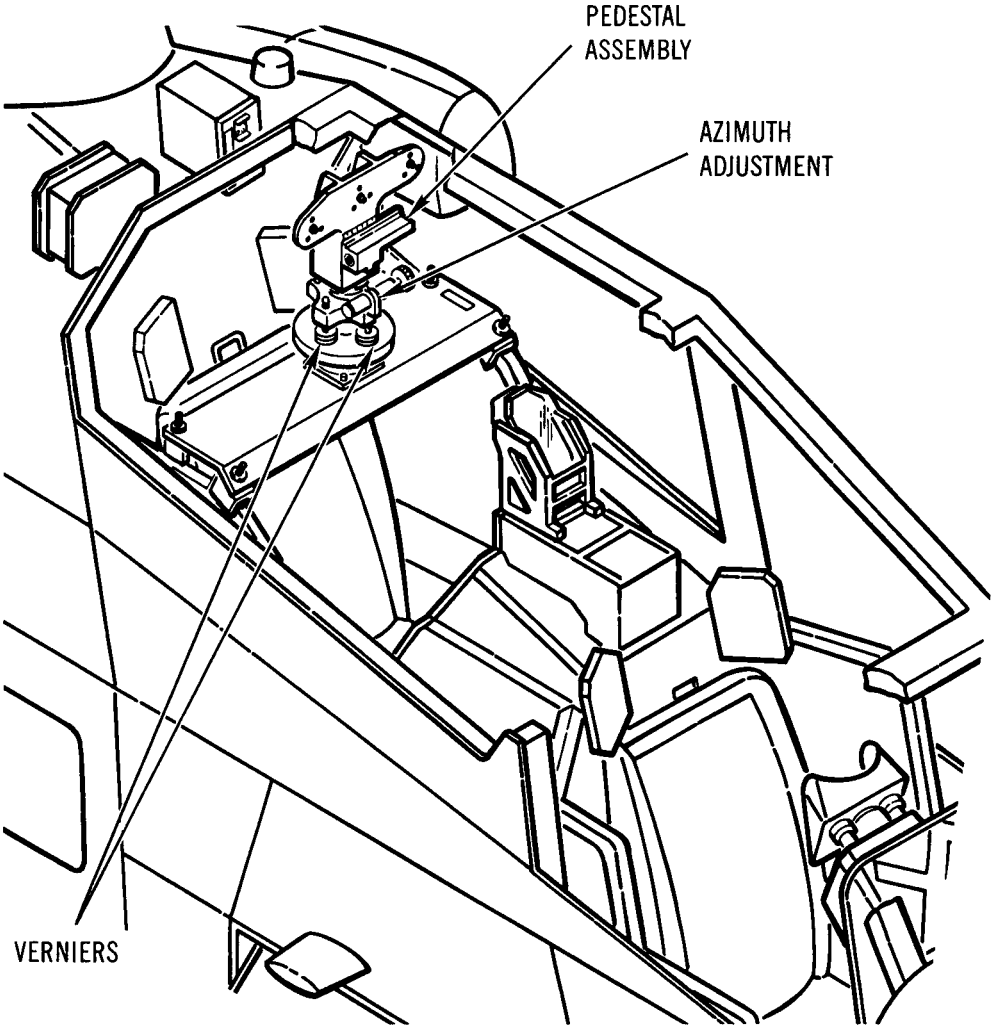
1. INSTALL PILOT SHELF ASSEMBLY.
   a. Support shelf on four side armor clevises.
   b. Adjust side armor clevis bolts to level shelf approximately to helicopter level.



ARR82-25424

4-8. PILOT HSS BORESIGHTING (cont)

2. THREAD PEDESTAL INTO RING ON SHELF ASSEMBLY UNTIL HAND TIGHT.
   a. Orient transit base of pedestal assembly with two verniers along pitch axis and two verniers along roll axis.
   b. Azimuth adjustment should be on left outboard side of helicopter.



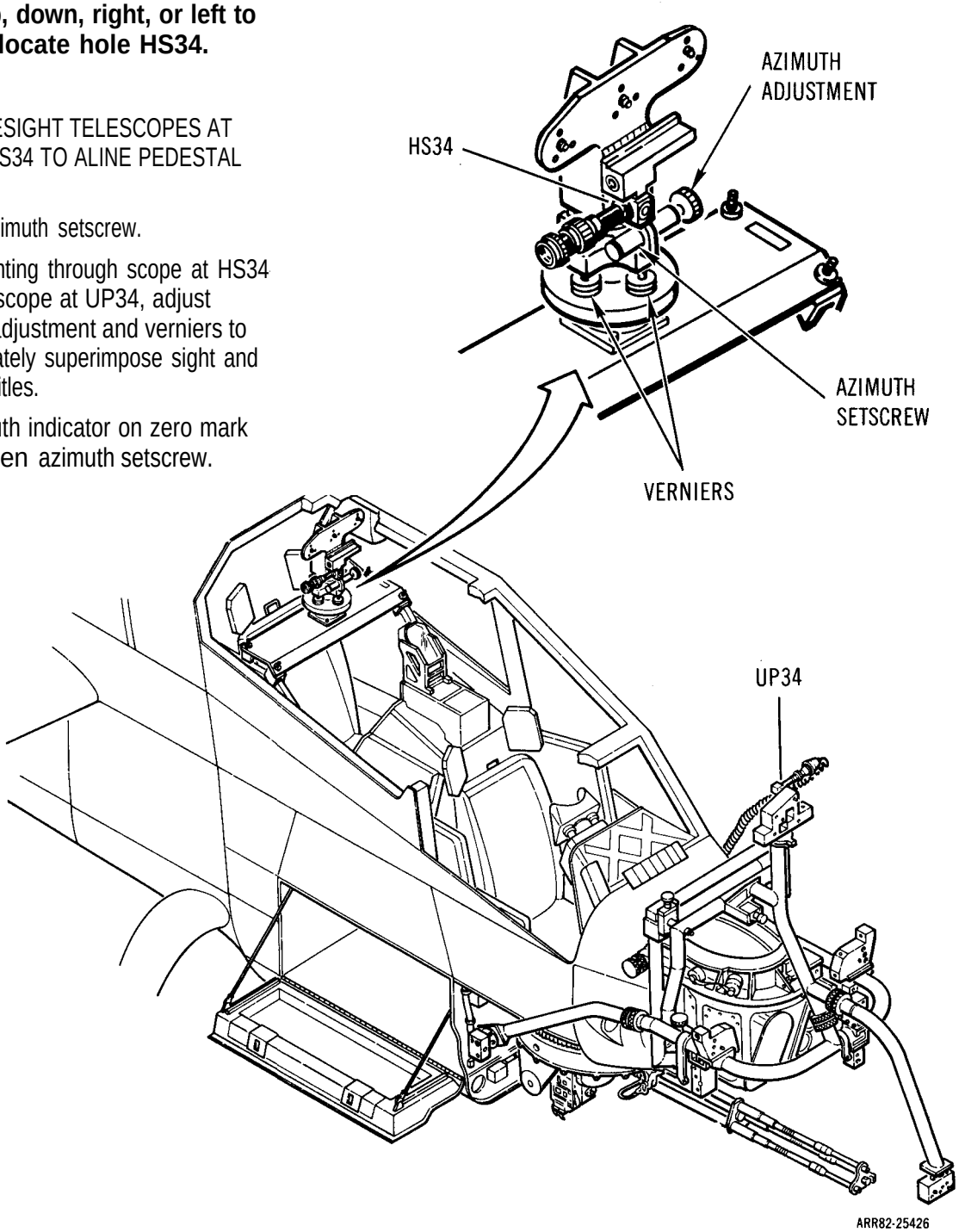
ARR82-25425

PILOT HSS BORESIGHTING, SHELF AND PEDESTAL ALINEMENT (cont)

NOTE

When alining helmet sight pedestal, shelf and pedestal are moved up, down, right, or left to properly locate hole HS34.

3. INSTALL BORESIGHT TELESCOPES AT UP34 AND HS34 TO ALINE PEDESTAL ASSEMBLY.
   a. Loosen azimuth setscrew.
   b. While sighting through scope at HS34 to target scope at UP34, adjust azimuth adjustment and verniers to approximately superimpose sight and target retitles.
   c. Set azimuth indicator on zero mark and tighten azimuth setscrew.



4-8. PILOT HSS BORESIGHTING (cont)

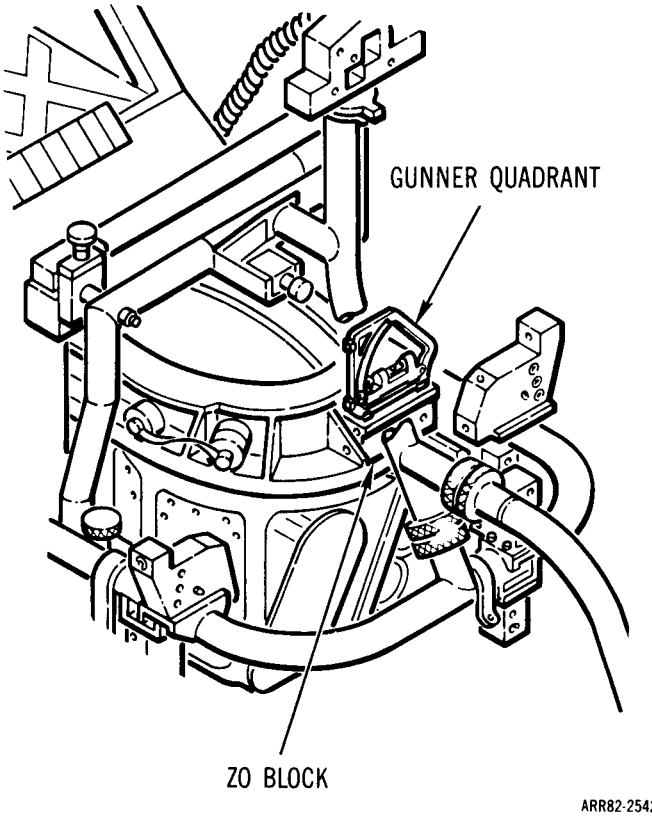
NOTE

During alinement procedure using gunner quadrant, helicopter must remain level. Technicians will take their positions prior to alinement and maintain these positions while boresighting.

4. PLACE GUNNER QUADRANT ON Z0 BLOCK.

   Position quadrant so level bubble will sense roll.

5. ADJUST QUADRANT SCALE TO CENTER LEVEL BUBBLE.

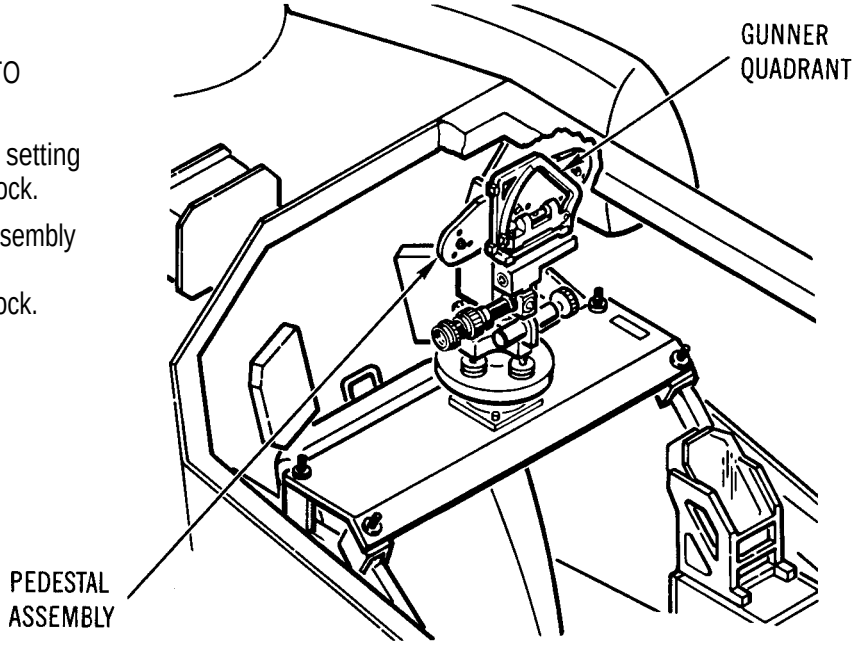


ARR82-25427

6. TRANSFER GUNNER QUADRANT TO PEDESTAL ASSEMBLY.

   a. Do not change quadrant scale setting established at Z0 reference block.

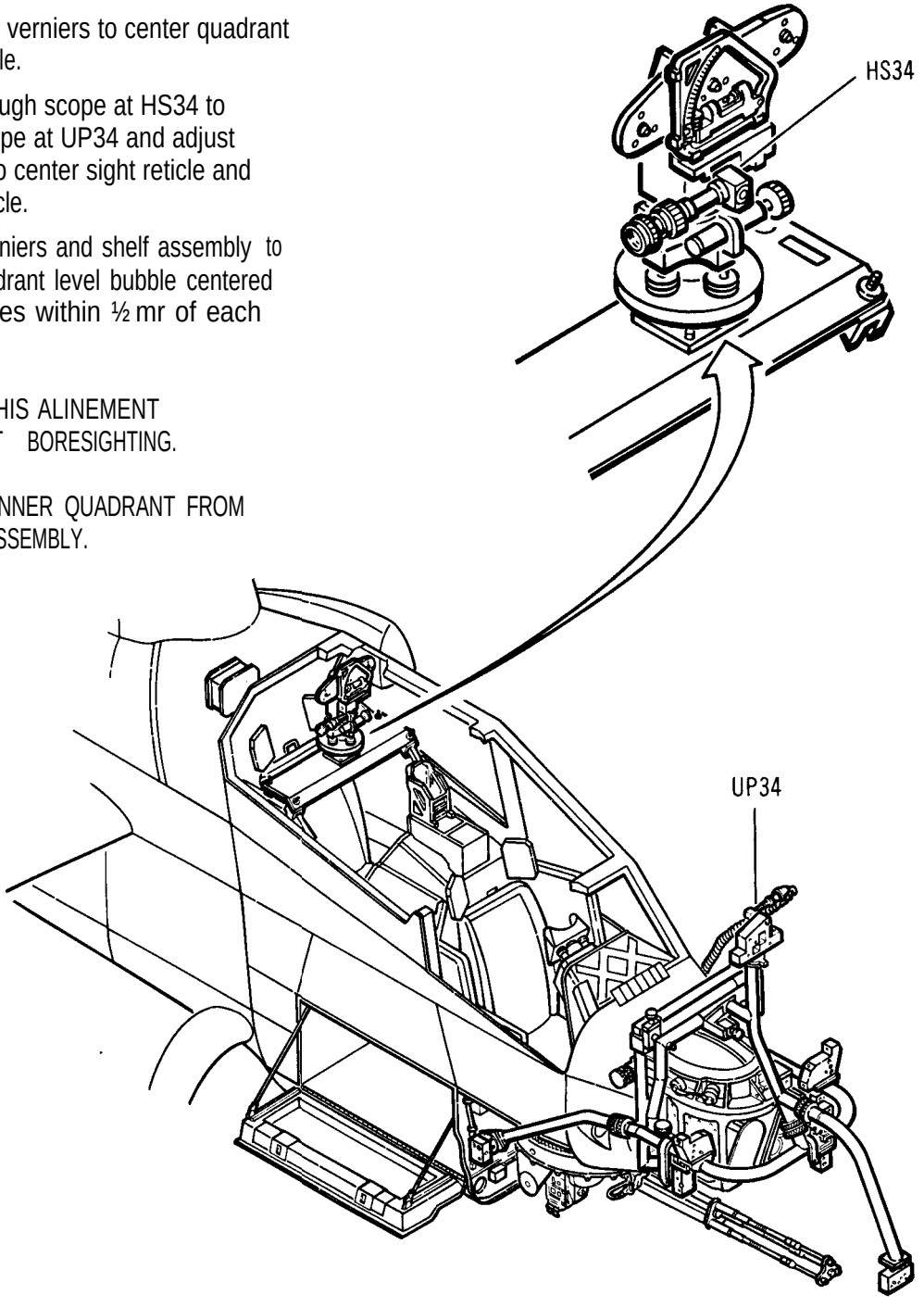
   b. Place quadrant on pedestal assembly in same transverse orientation established at Z0 reference block.



ARR82-25428

PILOT HSS BORESIGHTING, SHELF AND PEDESTAL ALINEMENT (cont)

7. ALINE PEDESTAL ASSEMBLY TO GUNNER QUADRANT AND TARGET SCOPE AT UP34.
   a. Adjust roll verniers to center quadrant level bubble.
   b. Sight through scope at HS34 to target scope at UP34 and adjust verniers to center sight reticle and target reticle.
   c. Adjust verniers and shelf assembly to keep quadrant level bubble centered and retitles within ½ mr of each other.
8. MAINTAIN THIS ALINEMENT THROUGHOUT BORESIGHTING.
9. REMOVE GUNNER QUADRANT FROM PEDESTAL ASSEMBLY.

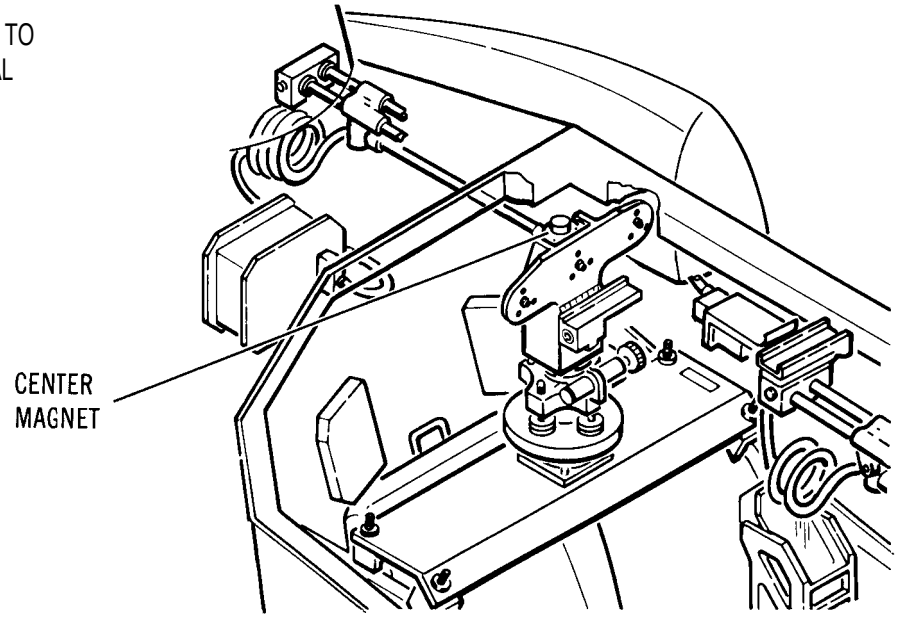


ARR82-25429

4-8. PILOT HSS BORESIGHTING (cont)

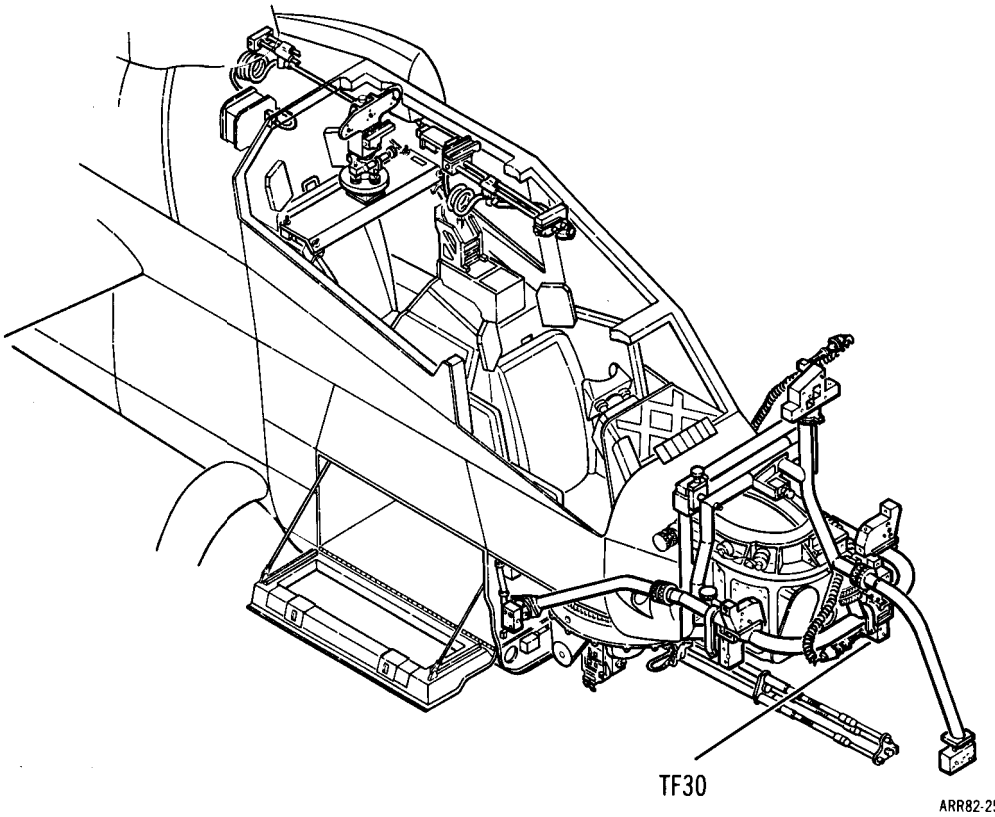
PILOT HSS BORESIGHTING, YAW ALINEMENT

10. ATTACH PILOT ARM ASSEMBLY TO CENTER MAGNET ON PEDESTAL ASSEMBLY.



ARR82-25430

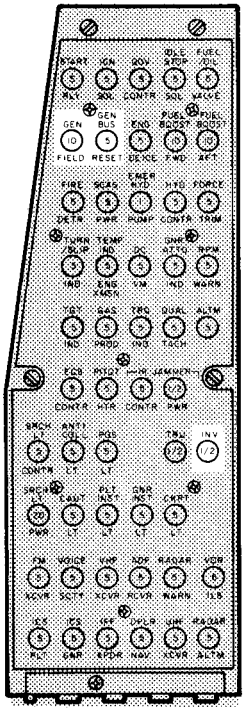
11. INSTALL BORESIGHT TELESCOPE AT TF30.



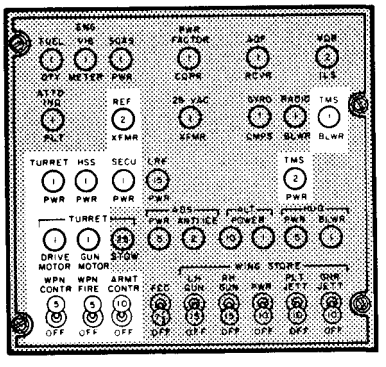
ARR82-25431

12. CLOSE FOLLOWING CIRCUIT BREAKERS ON DC CIRCUIT BREAKER PANEL:
    - GEN FIELD
    - GEN BUS RESET
    - INV

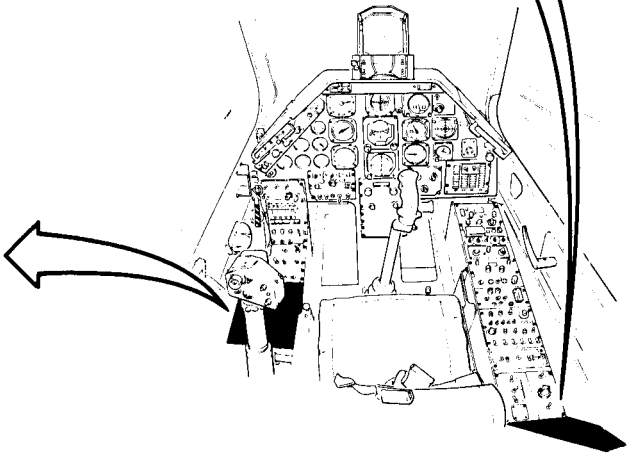
13. CLOSE FOLLOWING CIRCUIT BREAKERS ON AC/ARMAMENT CIRCUIT BREAKER PANEL:
    - REF XFMR
    - TURRET PWR
    - HSS PWR
    - SECU PWR
    - TMS PWR
    - TMS BLWR
    - TURRET DRIVE MOTOR
    - TURRET GUN MOTOR
    - WPN CONTR
    - WPN FIRE
    - ARMT CONTR



DC CIRCUIT BREAKER PANEL



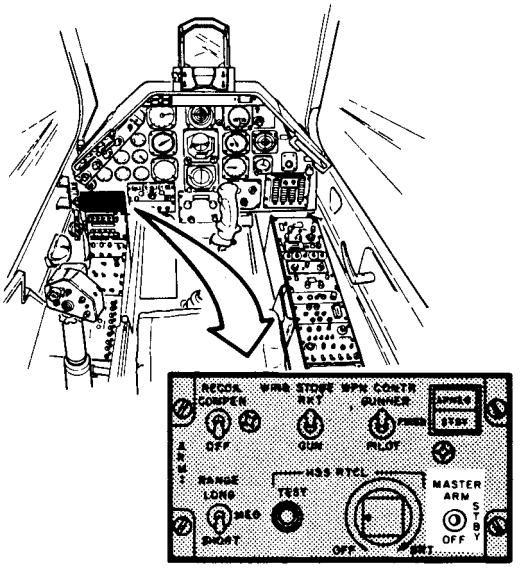
AC / ARMAMENT
CIRCUIT BREAKER PANEL



ARR82-25423

4-8. PILOT HSS BORESIGHTING (cont)

14. ON PILOT ARMAMENT CONTROL PANEL, SET MASTER ARM SWITCH TO STBY.

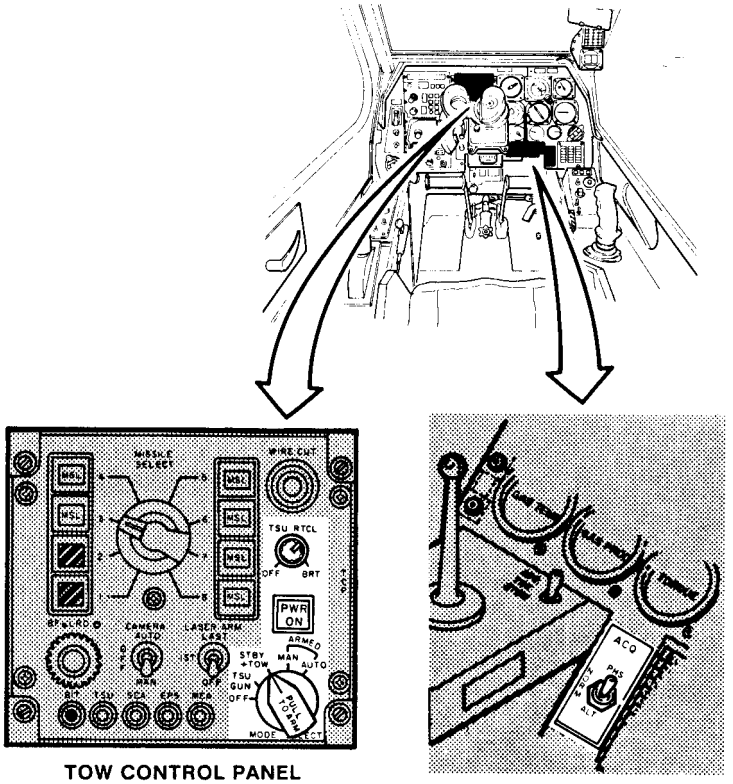


PILOT ARMAMENT CONTROL PANEL

ARR82-25432

15. ON TOW CONTROL PANEL, SET MODE SELECT SWITCH TO STBY TOW.
    a. System status annunciator indicates PWR ON after approximately two minutes.
    b. Adjust TSU RTCL for desired brightness.

16. ON ACQ PANEL, HOLD PHS/NORM/ALT SWITCH TO PHS.



TOW CONTROL PANEL

ACQUISITION PANEL

ARR82-25433

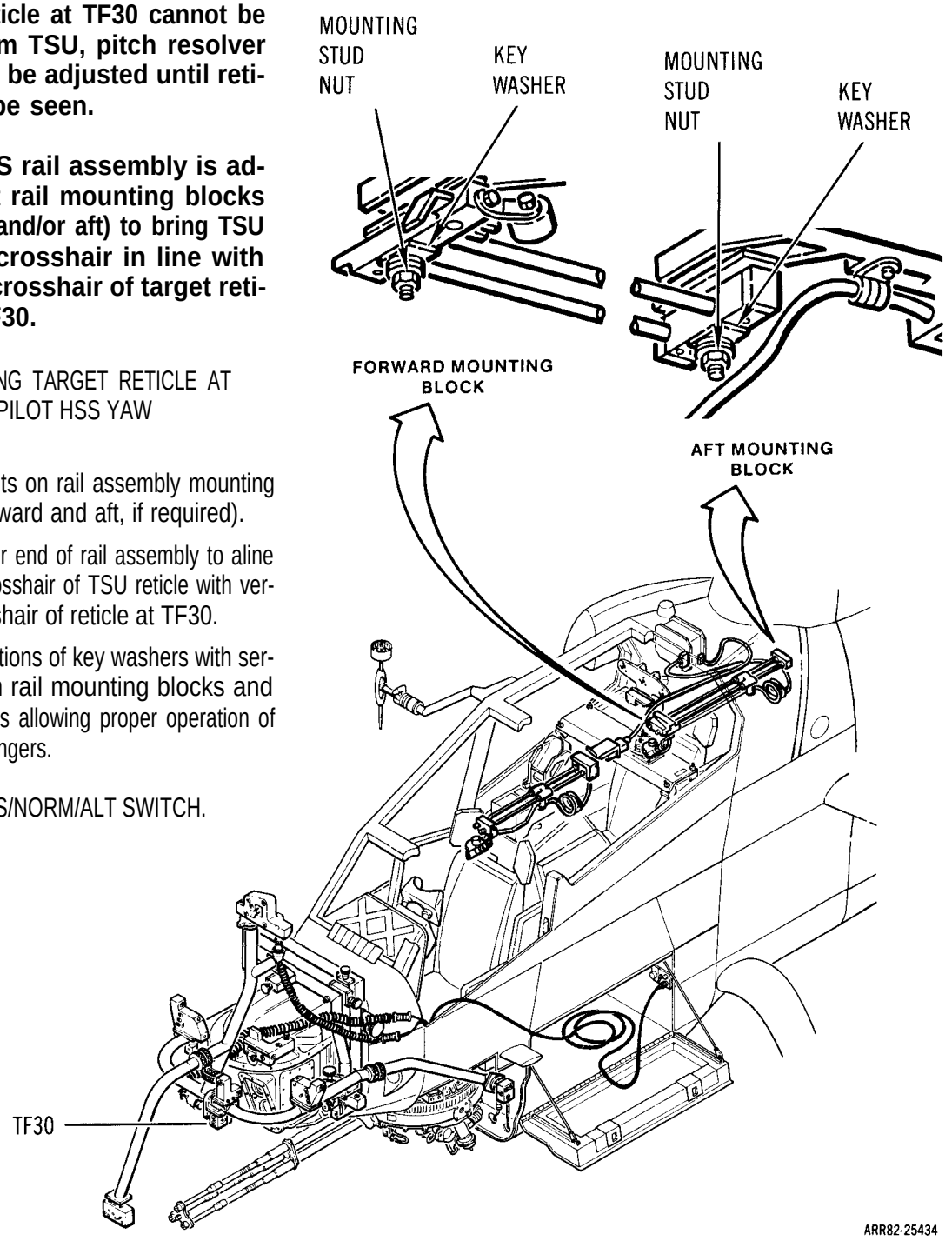
PILOT HSS BORESIGHTING, YAW ALINEMENT (cont)

NOTE

If pilot HSS linkage is so far out of adjustment in pitch that target raticle at TF30 cannot be seen from TSU, pitch resolver SE2 may be adjusted until reticle can be seen.

Pilot HSS rail assembly is adjusted at rail mounting blocks (forward and/or aft) to bring TSU vertical crosshair in line with vertical crosshair of target reticle at TF30.

17. WHILE VIEWING TARGET RETICLE AT TF30, MAKE PILOT HSS YAW ALINEMENT.
    a. Loosen nuts on rail assembly mounting studs (forward and aft, if required).
    b. Move either end of rail assembly to aline vertical crosshair of TSU reticle with vertical crosshair of reticle at TF30.
    c. Aline serrations of key washers with serrations in rail mounting blocks and tighten nuts allowing proper operation of spring plungers.
18. RELEASE PHS/NORM/ALT SWITCH.



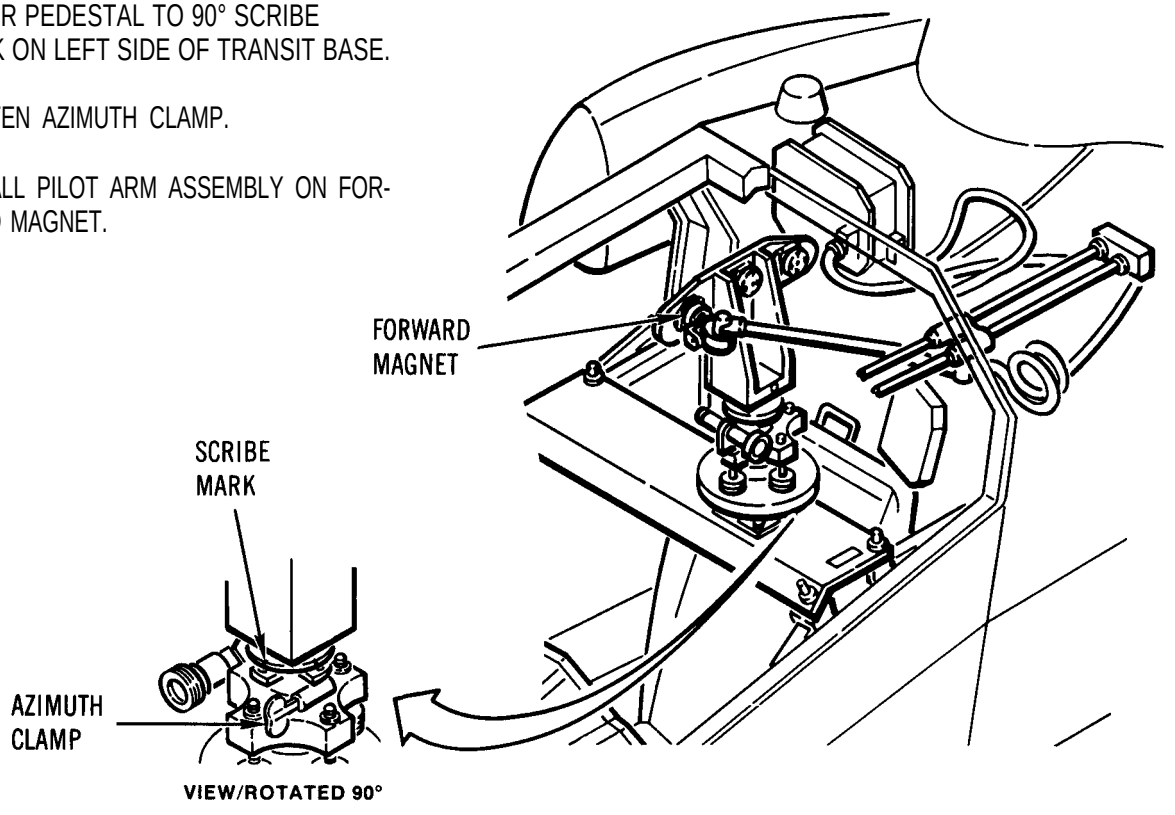
4-8. PILOT HSS BORESIGHTING (cont)

PILOT HSS BORESIGHTING, RAIL TWIST ALINEMENT

19. LOOSEN AZIMUTH CLAMP AND ROTATE UPPER PEDESTAL TO 90° SCRIBE MARK ON LEFT SIDE OF TRANSIT BASE.

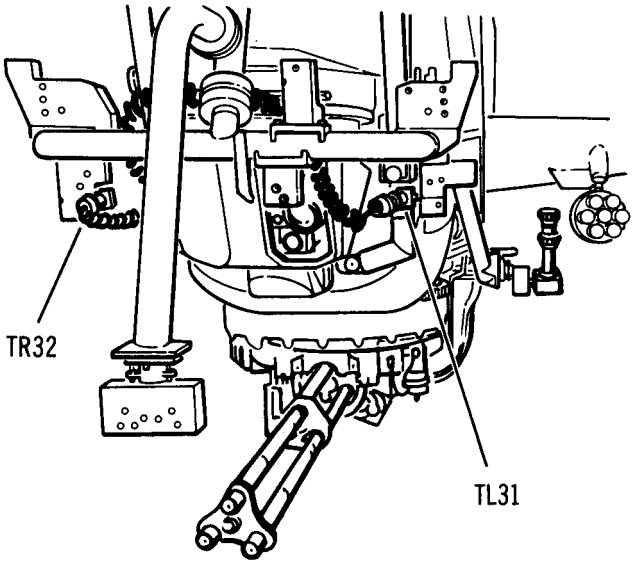
20. TIGHTEN AZIMUTH CLAMP.

21. INSTALL PILOT ARM ASSEMBLY ON FORWARD MAGNET.



ARR82-25435

22. INSTALL BORESIGHT TELESCOPES AT TL31 AND TR32.



ARR82-25436

NOTE

Rail twist exists when roll offset from forward magnet exceeds roll offset from aft magnet by more than 1 mr.

23. ON ACQ PANEL, HOLD PHS/NORM/ALT SWITCH TO PHS.

24. CHECK RAIL TWIST.

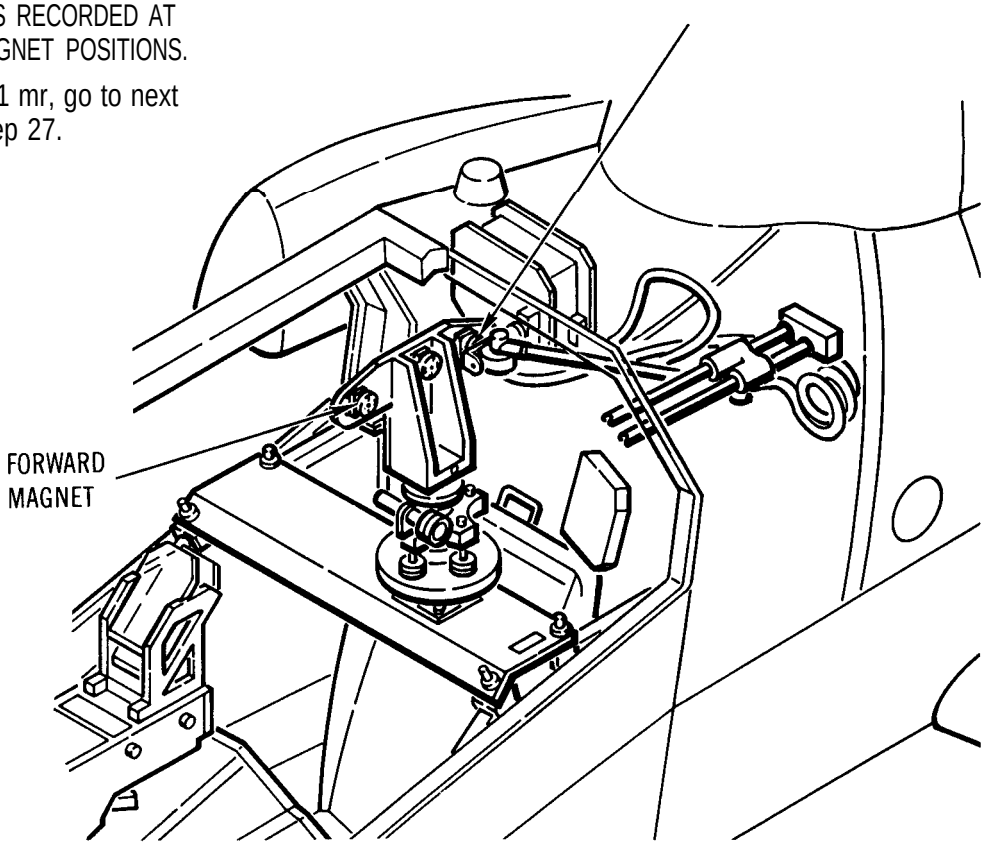
    a Sight through TSU and record roll offset at TR32.

    b. Move pilot arm assembly to aft magnet.

    c. Sight through TSU and record roll offset at TR32.

25. COMPARE ROLL ERRORS RECORDED AT FORWARD AND AFT MAGNET POSITIONS.

    If roll errors exceed 1 mr, go to next step. If not, go to step 27.



ARR82-25437

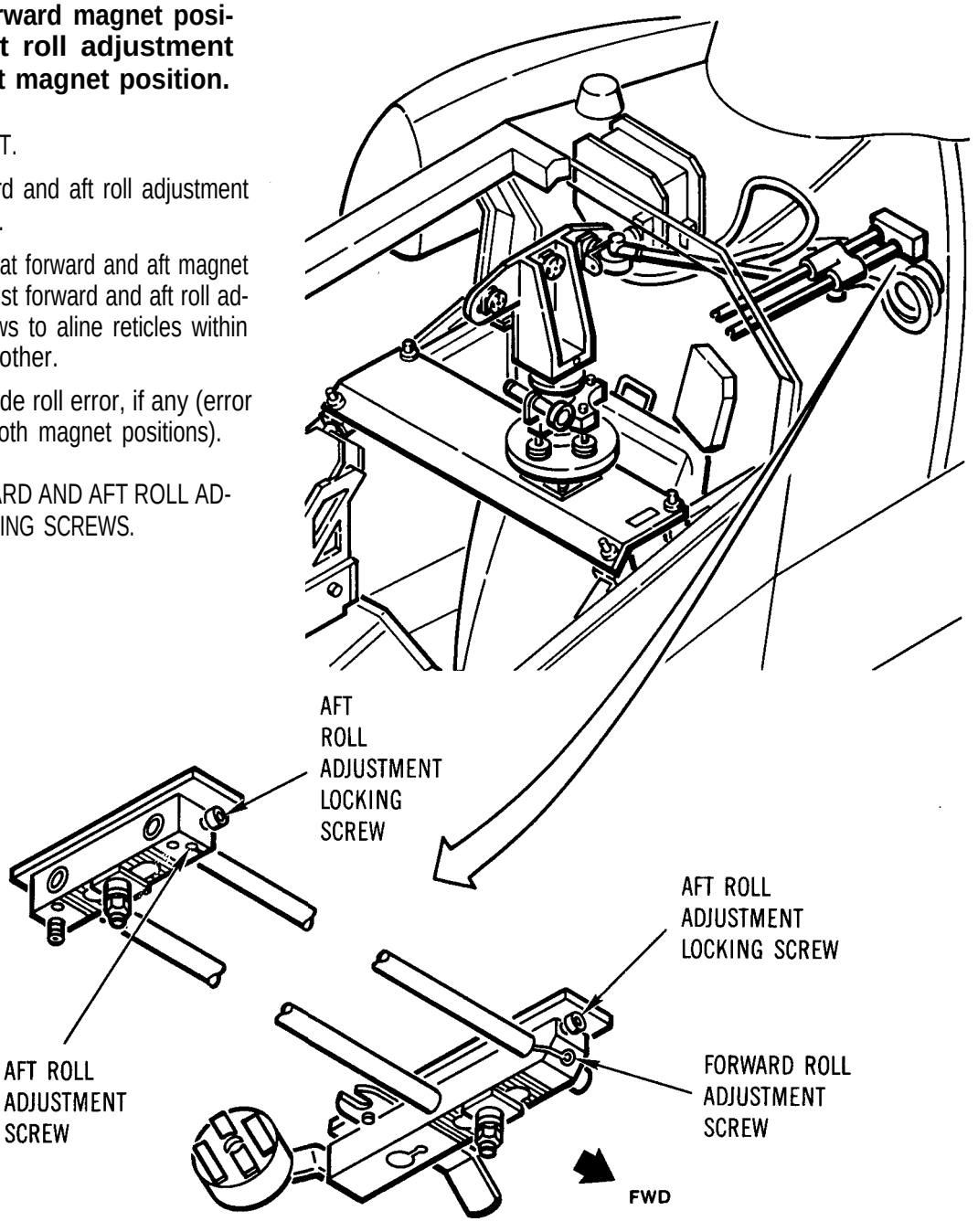
4-8. PILOT HSS BORESIGHTING (cont)

NOTE

Adjust forward roll adjustment screw for forward magnet position and aft roll adjustment screw for aft magnet position.

26. ALINE RAIL TWIST.
    a. Loosen forward and aft roll adjustment locking screws.
    b. With pilot arm at forward and aft magnet positions, adjust forward and aft roll adjustment screws to aline reticles within 1 mr of each other.
    c. Record left side roll error, if any (error common to both magnet positions).

27. TIGHTEN FORWARD AND AFT ROLL ADJUSTMENT LOCKING SCREWS.



ARR82-25438

PILOT HSS BORESIGHTING, RAIL ROLL ALINEMENT

NOTE

Rail roll error exists when roll offset from right sightings exceeds roll offset from left sightings by more than 2 mr.

28. INSTALL PILOT ARM ASSEMBLY ON CENTER MAGNET.

29. ON ACQ PANEL, HOLD PHS/NORM/ALT TO PHS WHEN MAKING CORRECTIONS.

30. CHECK RAIL ROLL.

    a. Sight through TSU and record roll offset at TR32.

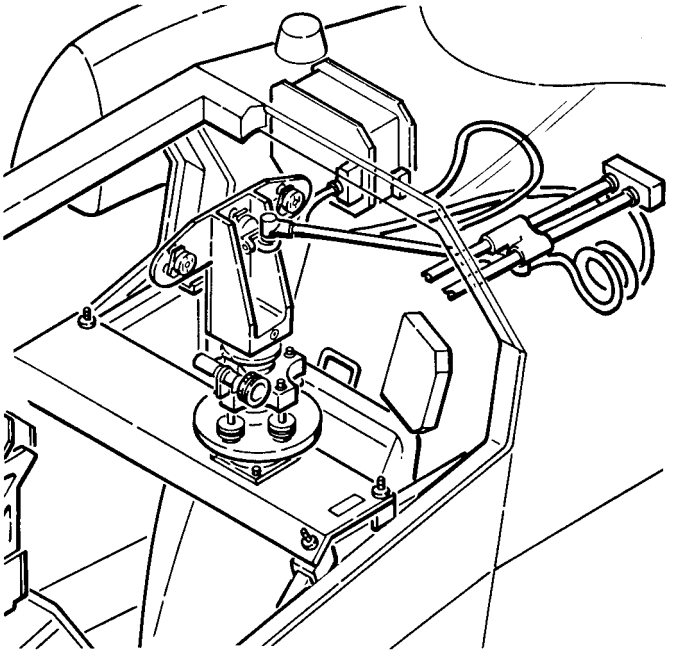
    b. Remove pilot arm assembly, loosen azimuth clamp, and rotate upper pedestal to 90° scribe mark on right side of transit base. Tighten azimuth clamp.

    c. Install pilot arm assembly on center magnet.

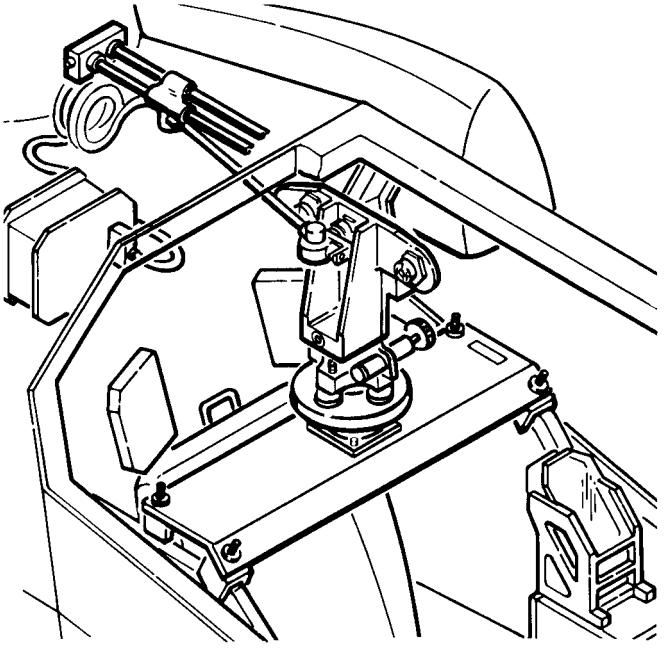
    d. Sight through TSU and record roll offset at TL31.

31. COMPARE ROLL OFFSETS.

    If roll offsets exceed 2 mr, go to next step. If not, go to step 33.



PHS IN RIGHT POSITION



PHS IN LEFT POSITION

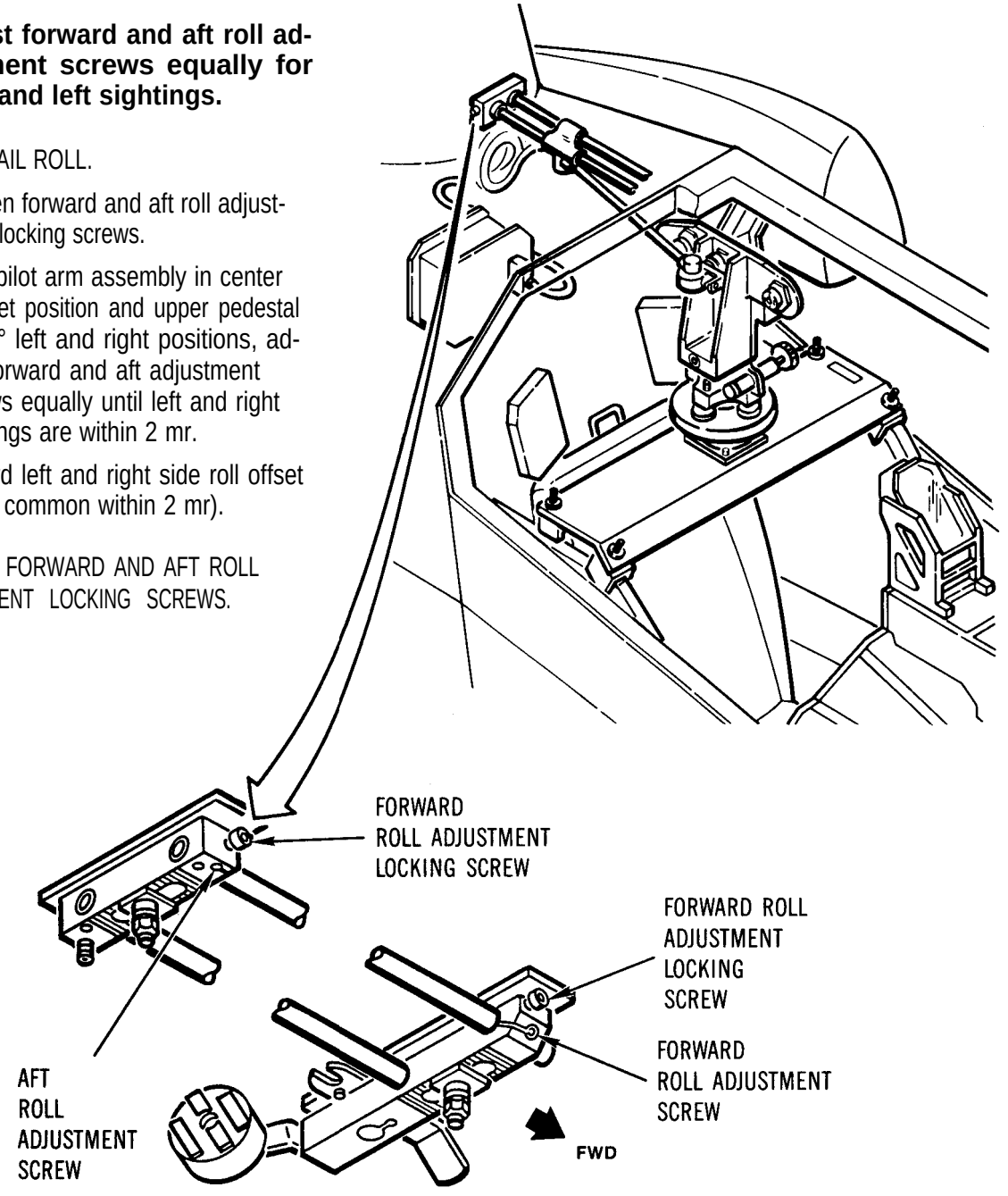
ARR82-25439

4-8. PILOT HSS BORESIGHTING (cont)

NOTE

Adjust forward and aft roll adjustment screws equally for right and left sightings.

32. ALINE RAIL ROLL.
    a. Loosen forward and aft roll adjustment locking screws.
    b. With pilot arm assembly in center magnet position and upper pedestal in 90° left and right positions, adjust forward and aft adjustment screws equally until left and right sightings are within 2 mr.
    c. Record left and right side roll offset (error common within 2 mr).
33. TIGHTEN FORWARD AND AFT ROLL ADJUSTMENT LOCKING SCREWS.



ARR82-25440

PILOT HSS BORESIGHTING, SE2 RESOLVER PITCH ALINEMENT

34. ROTATE PEDESTAL TO FORWARD POSITION.

a. Loosen azimuth clamp.

b. Rotate pedestal to forward position and aline zero azimuth scribe marks.

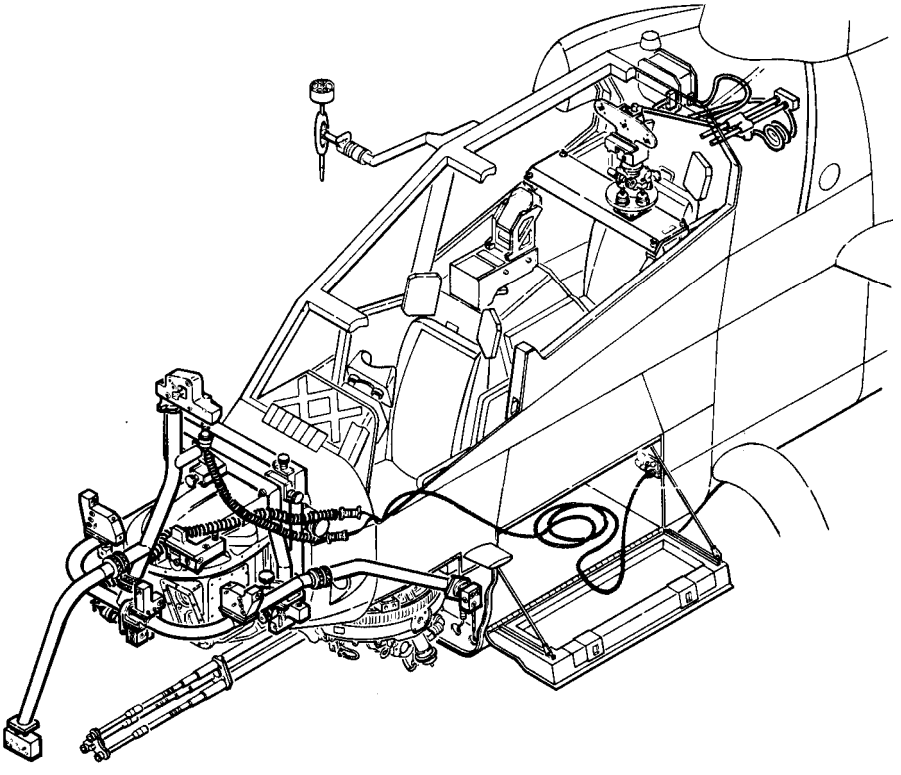
c. Tighten azimuth clamp.

35. CHECK PITCH ALINEMENT.

Sight through TSU and record pitch offset at TF30.

36. COMPARE PITCH OFFSET WITH ROLL OFFSET RECORDED IN STEP 30 OR 32.

If pitch offset is not within 2 mr (common to both) of right or left roll offsets, go to next step. If it is, go to step 40.



ARR82-25441

4-8. PILOT HSS BORESIGHTING (cont)

NOTE

SE2 resolver is sensitive to adjustment. A slight adjustment to SE2 resolver results in a large displacement of TSU LOS.

Two technicians are required to make SE2 pitch resolver adjustment, one to sight through TSU at TF30 and one to adjust resolver.

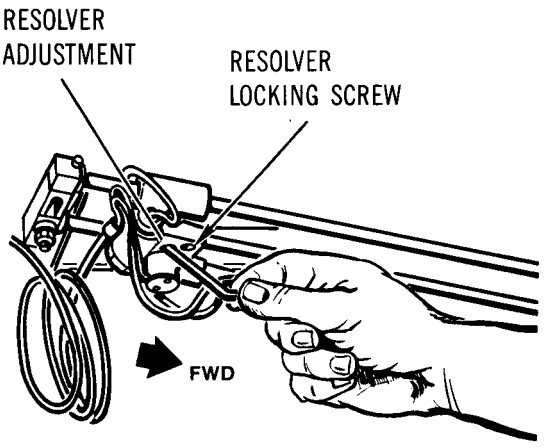
37. SLIGHTLY LOOSEN RESOLVER LOCKING SCREW.

38. ALINE PITCH RESOLVER SE2.

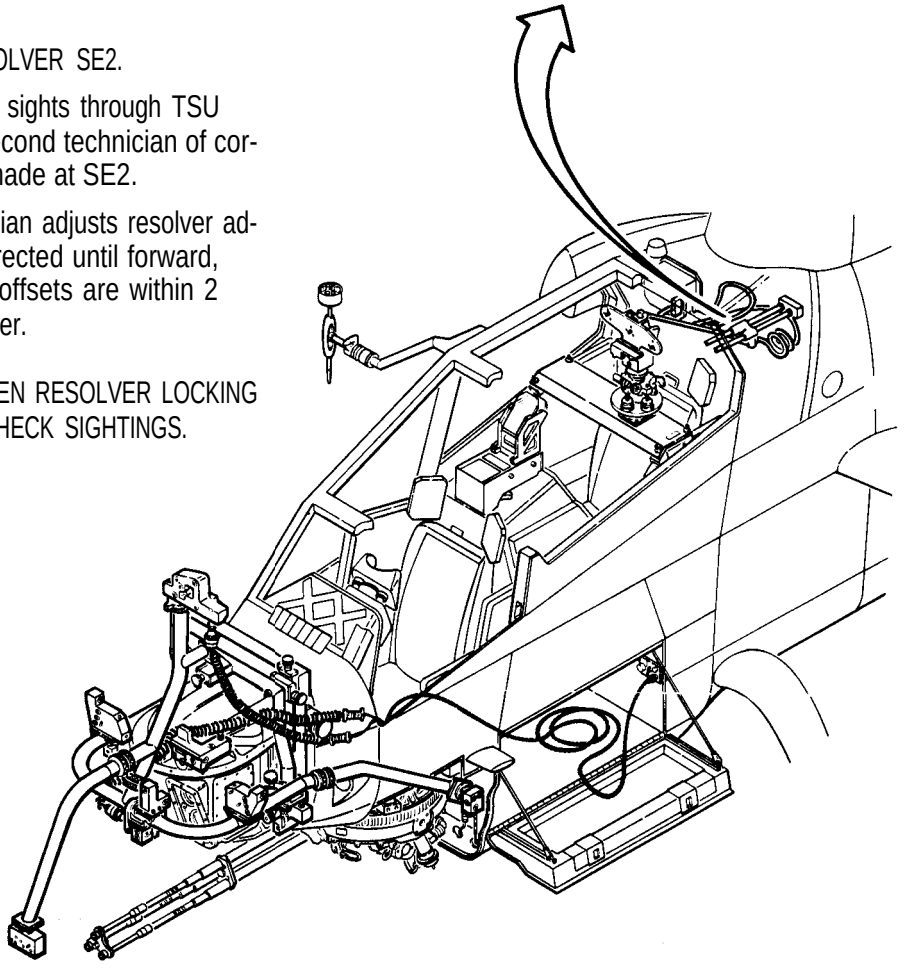
    a. First technician sights through TSU and informs second technician of correction to be made at SE2.

    b. Second technician adjusts resolver adjustment as directed until forward, left, and right offsets are within 2 mr of each other.

39. CAREFULLY TIGHTEN RESOLVER LOCKING SCREW AND RECHECK SIGHTINGS.



PITCH RESOLVER SE2

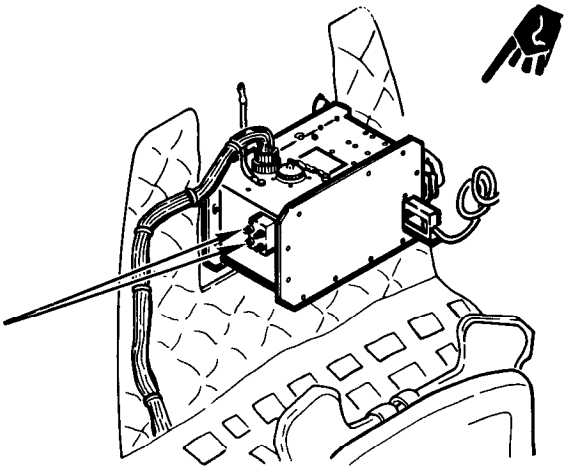


ARR82-25442

PILOT HSS BORESIGHTING, SE2 RESOLVER PITCH ALINEMENT (cont)

39.1. FOR PITCH ALINEMENT, PILOT AZ AND EL POTENTIOMETERS WILL BE USED.

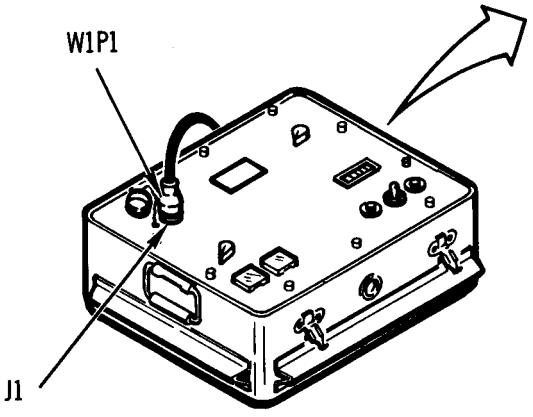
NOTE
After completing the pilot HSS boresighting procedure, perform the post HSS boresighting procedures.

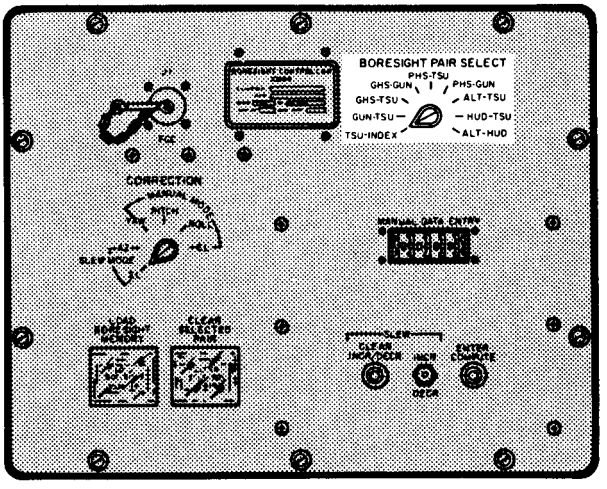


PILOT HSS BORESIGHTING, PHS-TSU CONTROLLER CORRECTIONS

40. ON BORESIGHT CONTROLLER, SET BORESIGHT PAIR SELECT SWITCH TO TSU-INDEX.

41. CONNECT BORESIGHT CABLE ASSEMBLY W1P1 TO BORESIGHT CONTROLLER CONNECTOR J1.

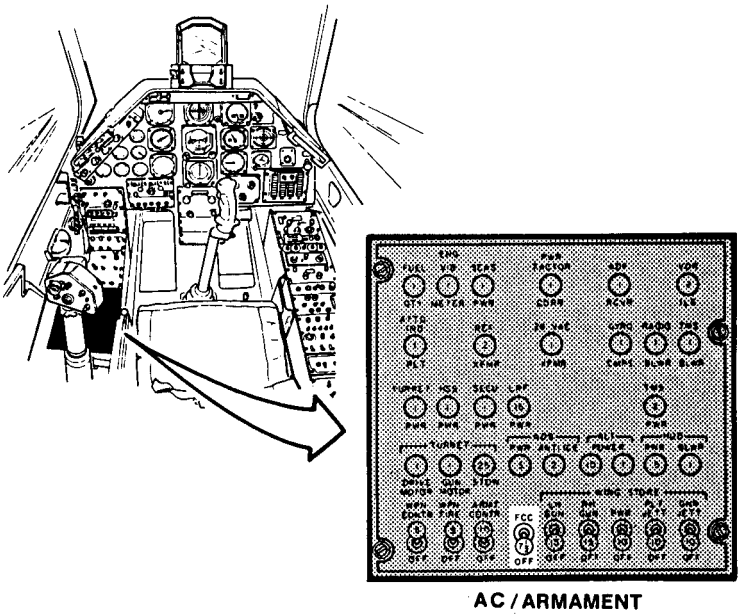




BORESIGHT CONTROLLER

ARR82-25443

42. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, MAKE SURE FCC CIRCUIT BREAKER IS SET TO OFF.



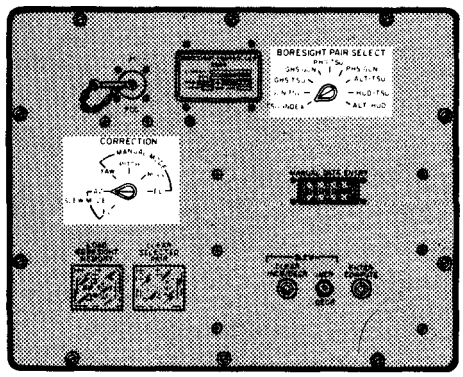
AC / ARMAMENT CIRCUIT BREAKER PANEL

ARR82-25444

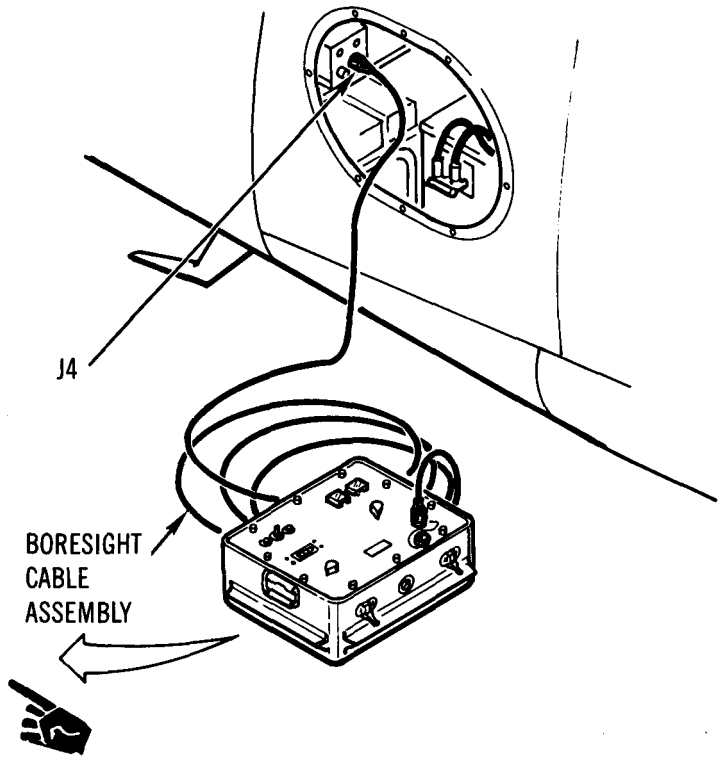
4-8. PILOT HSS BORESIGHTING (cont)

43. CONNECT BORESIGHT CABLE ASSEMBLY TO FCC TEST CONNECTOR J4.

43.1. PLACE CORRECTION SWITCH ON SLEW MODE AZIMUTH. MOVE TSU SLEW MODE TO INDEX.

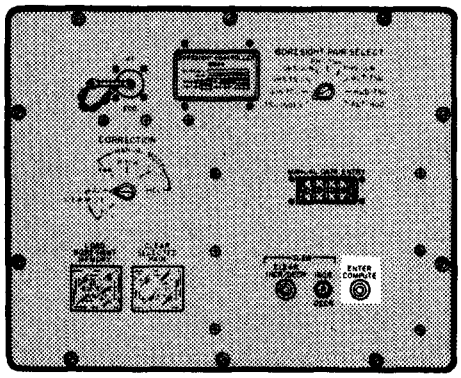


BORESIGHT CONTROLLER

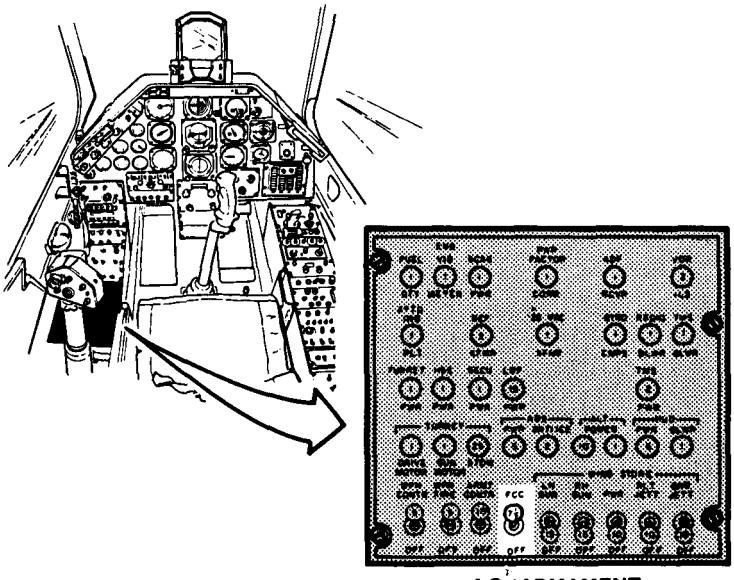


44. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, SET FCC CIRCUIT BREAKER TO ON.

44.1. DEPRESS AND HOLD "ENTER COMPUTE" FOR THREE SECONDS. WAIT FIVE MINUTES BEFORE PROCEEDING TO NEXT STEP.



BORESIGHT CONTROLLER



AC / ARMAMENT
CIRCUIT BREAKER PANEL

PILOT HSS BORESIGHTING, PHS-TSU CONTROLLER CORRECTIONS (cont)

NOTE

If power interruption or shutdown causes removal of power from FCC, entire boresight correction procedure must be repeated.

45. ON BORESIGHT CONTROLLER, SET BORESIGHT PAIR SELECT SWITCH TO PHS-TSU.

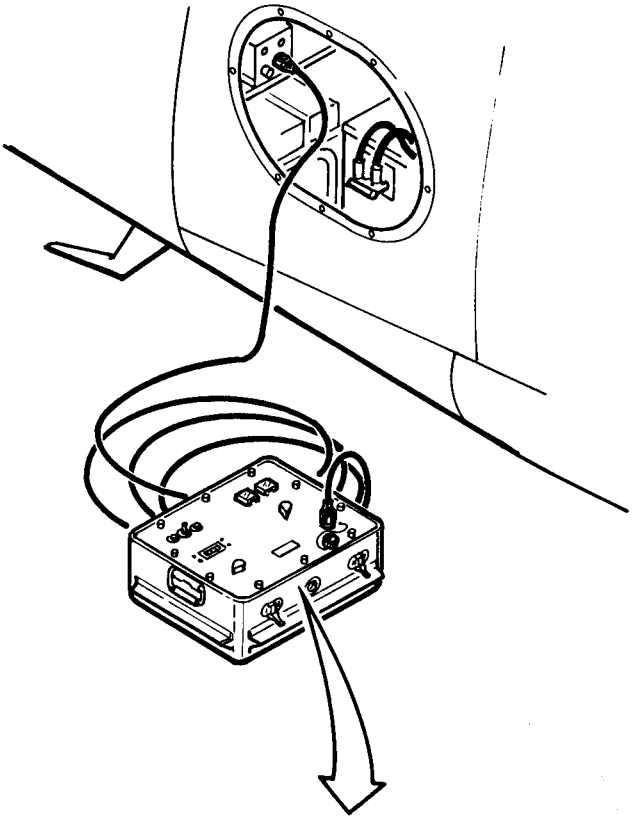
46. LIFT PLASTIC COVER AND PRESS CLEAR SELECTED PAIR SWITCH.

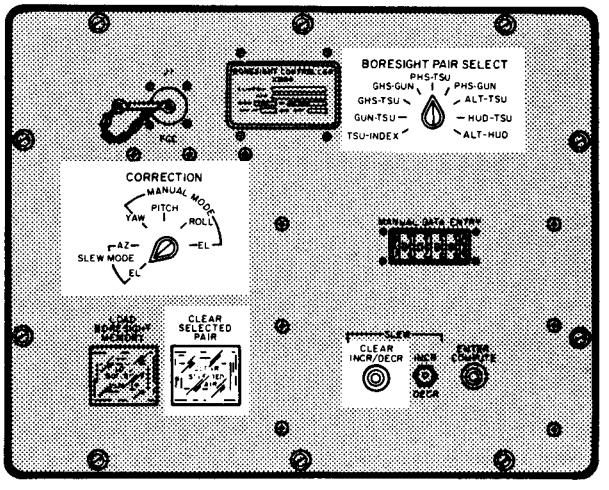
NOTE

After correction switch is set to SLEW MODE, FCC may require approximately 25 minutes to initialize. A non-initialized FCC will cause INCR/DECR switch to have no effect.

47. SET CORRECTION SWITCH TO SLEW MODE EL.

48. PRESS AND RELEASE CLEAR INCR/DECR SWITCH.





BORESIGHT CONTROLLER

ARR82-25447

4-8. PILOT HSS BORESIGHTING (cont)

NOTE

Maintain pedestal assembly alinement established in steps 1 thru 9.

If INCR/DECR switch fails to move TSU reticle during boresight corrections, FCC may not be initialized. Return to step 46 and try INCR/DECR switch at five minute intervals. FCC may take 25 minutes to initialize.

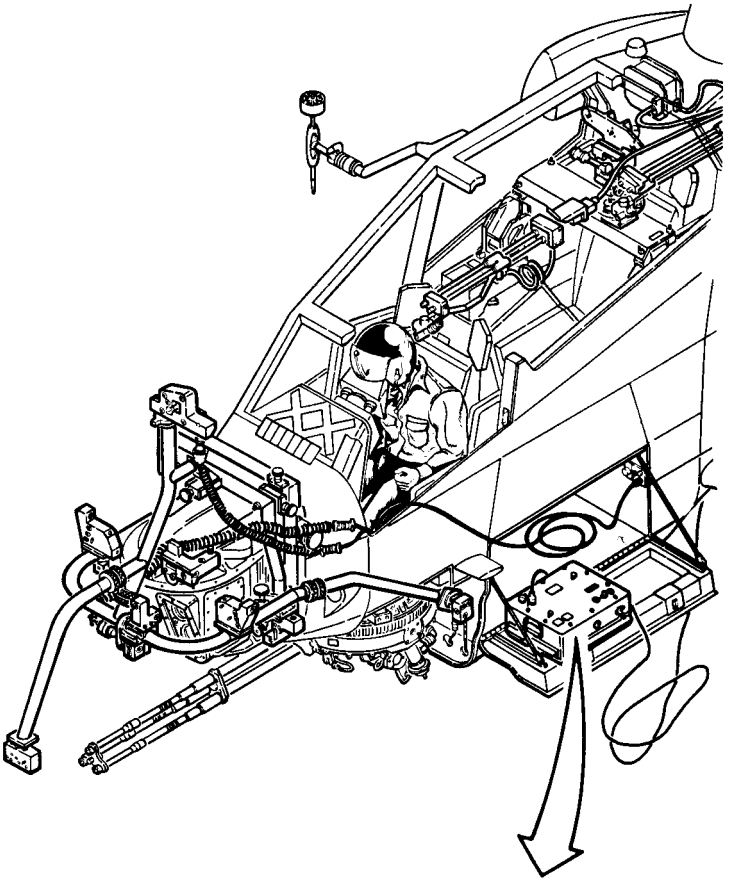
49. ON ACQ PANEL, HOLD PHS/NORM/ALT SWITCH TO PHS WHEN MAKING CORRECTIONS.

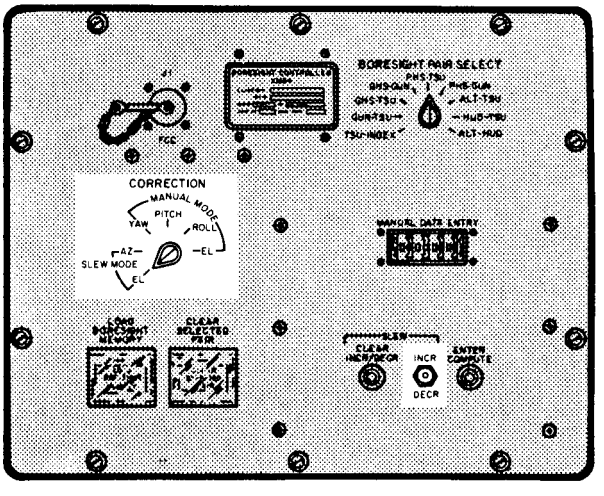
50. SIGHT THROUGH TSU TO TARGET SCOPE AT TF30.

51. ON BORESIGHT CONTROLLER, USE INCR/DECR SWITCH TO ALINE TSU RETICLE WITH TARGET RETICLE IN ELEVATION.

52. ON BORESIGHT CONTROLLER, SET CORRECTION SWITCH TO SLEW MODE AZ AND USE INCR/DECR SWITCH TO ALINE TSU RETICLE WITH TARGET RETICLE IN AZIMUTH.

53. ON BORESIGHT CONTROLLER, SET CORRECTION SWITCH TO SLEW MODE EL.





BORESIGHT CONTROLLER

ARR82-25448

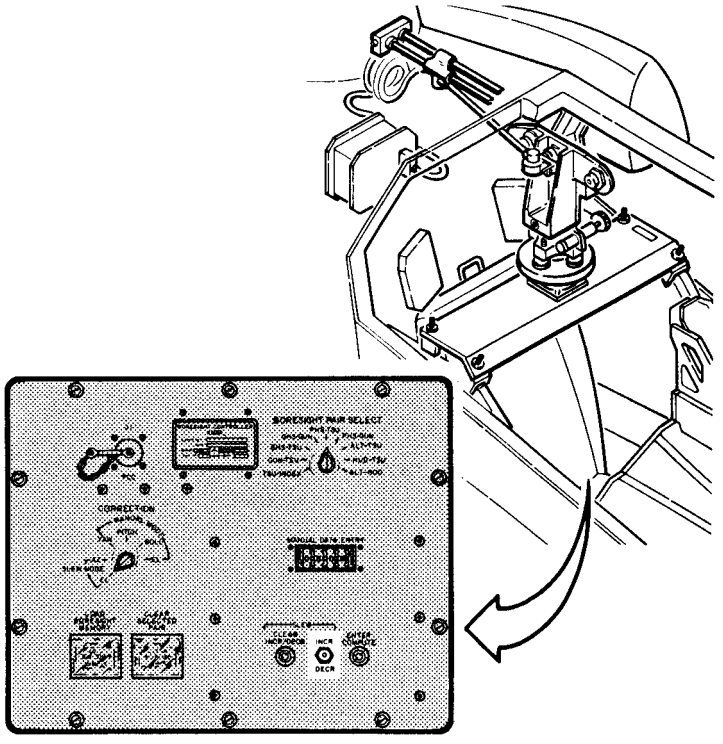
PILOT HSS BORESIGHTING, PHS-TSU CONTROLLER CORRECTIONS (cont)

54. ROTATE PEDESTAL TO 90° LEFT POSITION.

55. ON ACQ PANEL, HOLD PHS/NORM/ALT SWITCH TO PHS WHEN MAKING CORRECTIONS.

56. SIGHT THROUGH TSU TO TARGET SCOPE AT TL31.

57. ON BORESIGHT CONTROLLER, USE INCR/DECR SWITCH TO ALINE TSU RETICLE WITH TARGET RETICLE IN ELEVATION.



BORESIGHT CONTROLLER

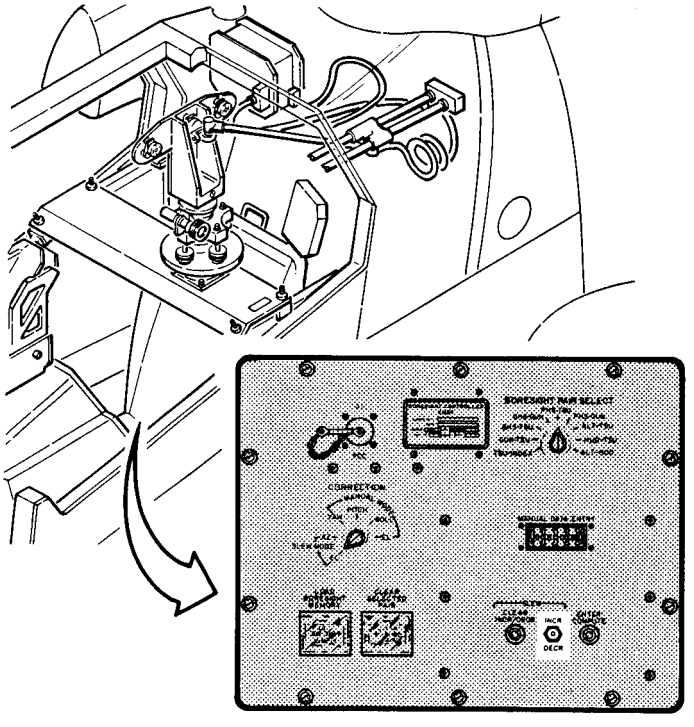
ARR82-25449

58. ROTATE PEDESTAL TO 90° RIGHT POSITION.

59. ON ACQ PANEL, HOLD PHS/ALT/NORM SWITCH TO PHS WHEN MAKING CORRECTIONS.

60. SIGHT THROUGH TSU TO TARGET SCOPE AT TR32.

61. ON BORESIGHT CONTROLLER, USE INCR/DECR SWITCH TO ALINE TSU RETICLE WITH TARGET RETICLE IN ELEVATION.



BORESIGHT CONTROLLER

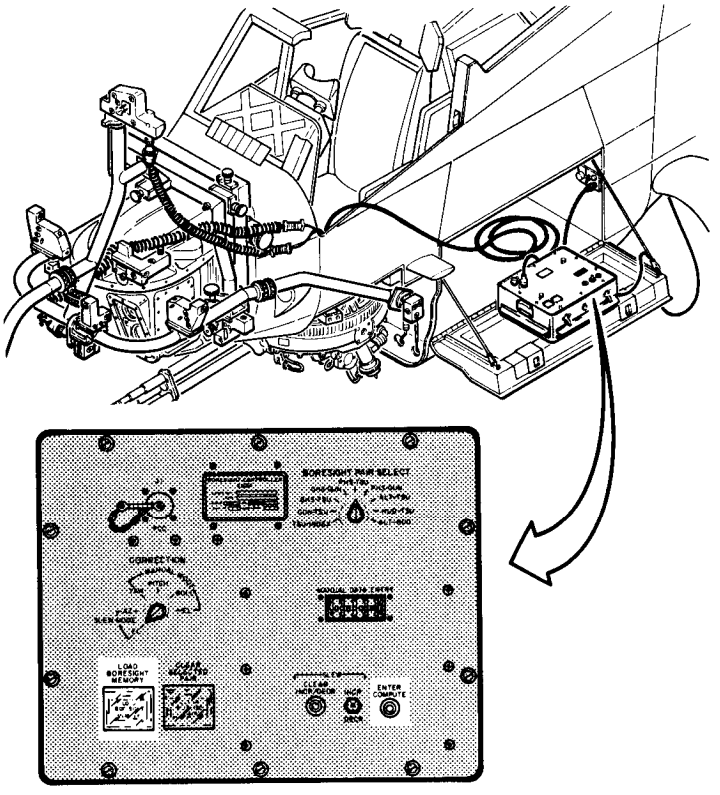
ARR82-25450

4-8. PILOT HSS BORESIGHTING (cont)

62. ON BORESIGHT CONTROLLER, PRESS AND HOLD ENTER COMPUTE BUTTON FOR APPROXIMATELY THREE SECONDS.

63. LIFT PLASTIC COVER AND PRESS LOAD BORESIGHT MEMORY SWITCH, OBSERVE THAT SWITCH ILLUMINATES BRIEFLY.

64. ROTATE PEDESTAL TO FORWARD POSITON AND ALINE 0° AZIMUTH SCRIBE MARKS.



BORESIGHT CONTROLLER

ARR82-25451

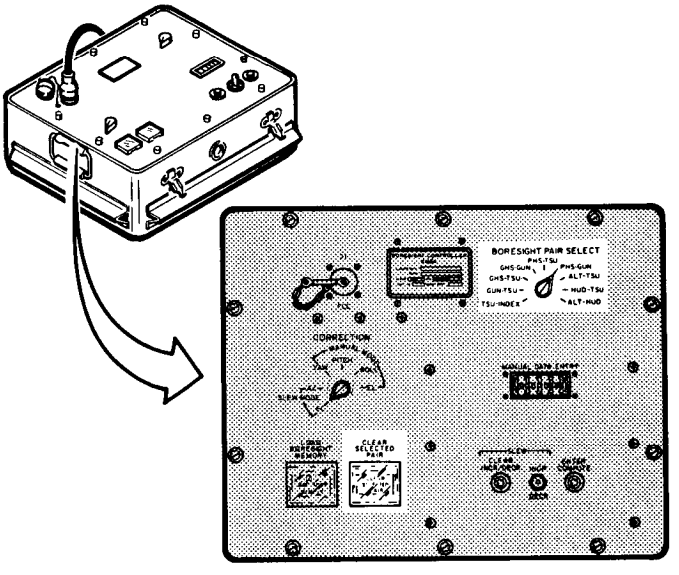
PILOT HSS BORESIGHTING, PHS-GUN CONTROLLER CORRECTIONS

NOTE

If a power interruption or shutdown causes removal of power from FCC, entire boresight correction procedure must be repeated.

65. ON BORESIGHT CONTROLLER, SET BORESIGHT PAIR SELECT SWITCH TO PHS-GUN.

66. LIFT PLASTIC COVER AND PRESS CLEAR SELECTED PAIR SWITCH.



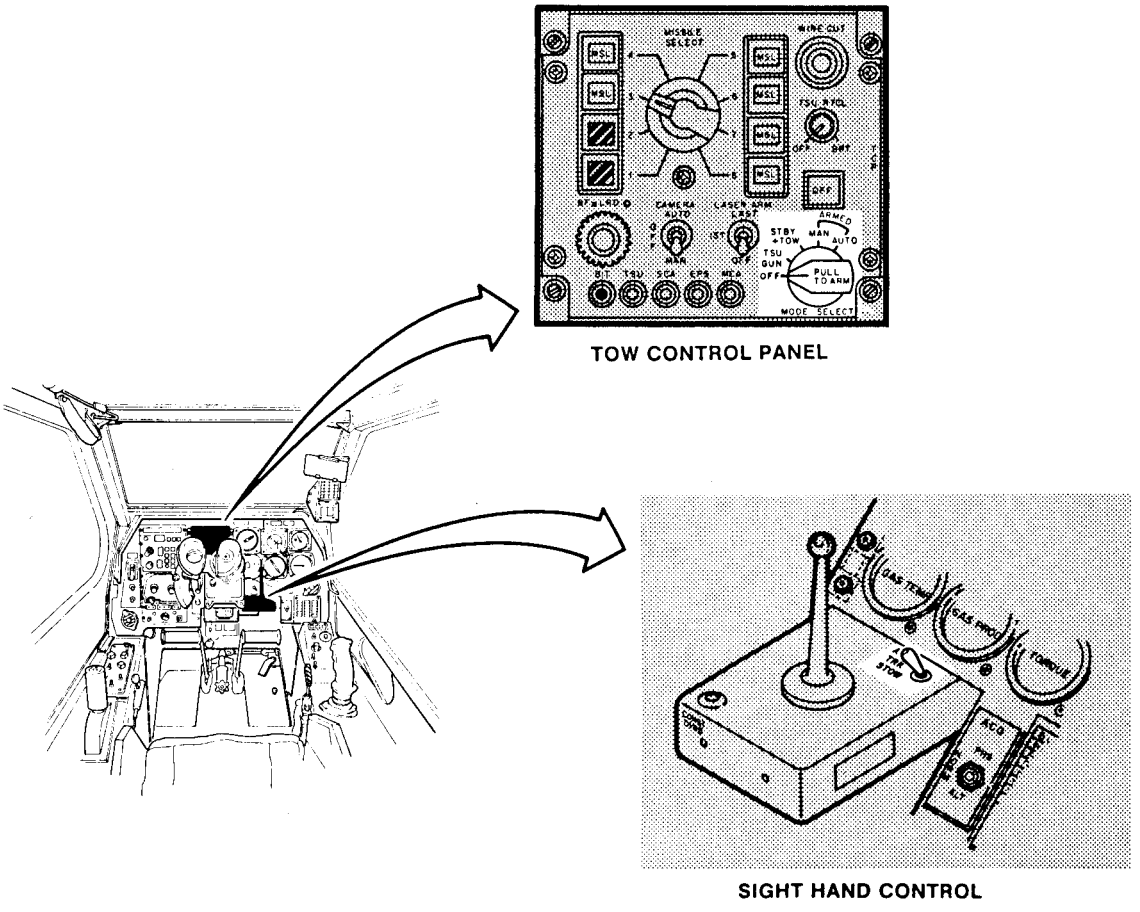
BORESIGHT CONTROLLER

ARR82-25452

PILOT HSS BORESIGHTING, PHS-GUN CONTROLLER CORRECTIONS (cont)

67. ON SIGHT HAND CONTROL, SET ACQ/TRK/STOW SWITCH TO STOW.

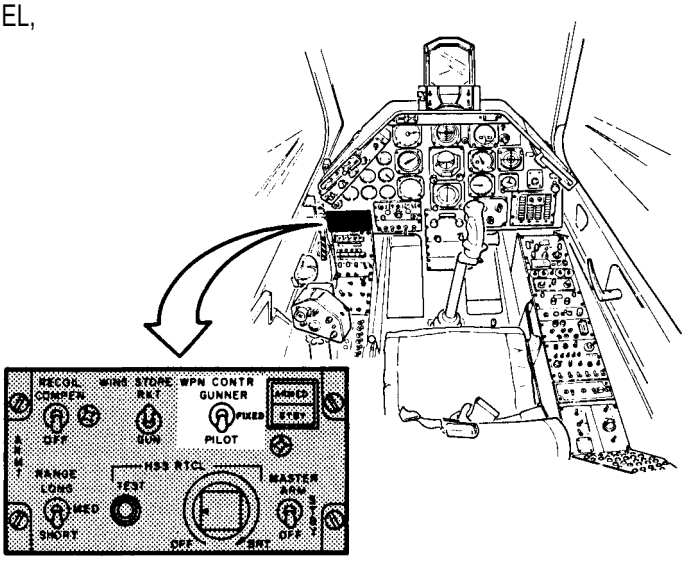
68. ON TOW CONTROL PANEL, SET MODE SELECT SWITCH TO OFF.



ARR82-25453

4-8. PILOT HSS BORESIGHTING (cont)

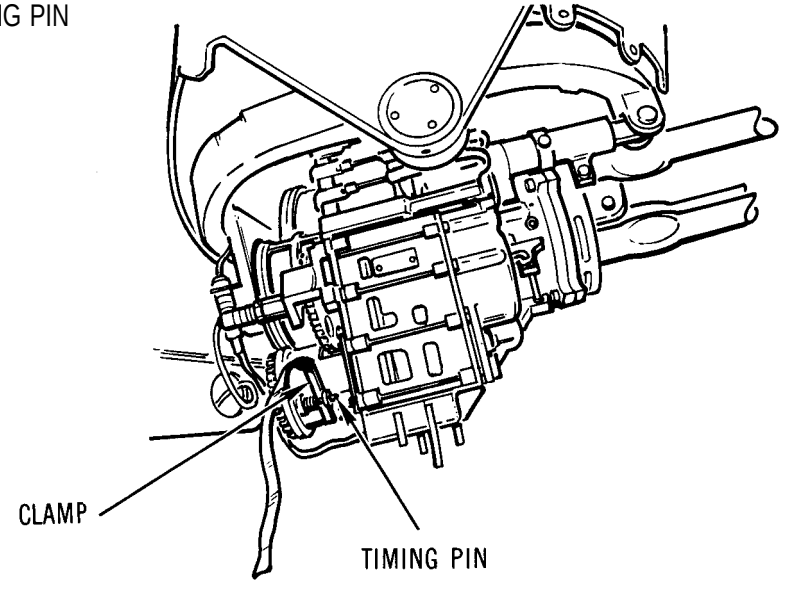
69. ON PILOT ARMAMENT CONTROL PANEL, SET WEAPON CONTROL SWITCH TO PILOT.



PILOT ARMAMENT CONTROL PANEL

ARR82-25278

70. ON M89E1 FEEDER, CLAMP TIMING PIN IN DEPRESSED POSITION.

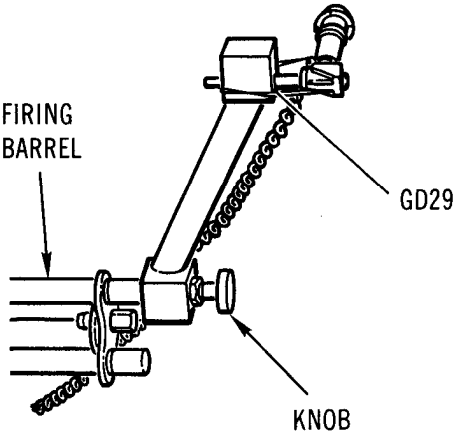


ARR82-25454

PILOT HSS BORESIGHTING, PHS-GUN CONTROLLER CORRECTIONS (cont)

71. INSTALL GUN ALINEMENT DEVICE IN FIRING BARREL AND SECURE WITH KNOB.

72. INSTALL BORESIGHT TELESCOPE IN GUN ALINEMENT DEVICE AT GD29.
    a. Secure scope with elastic retainer.
    b. Install illumination device on scope.

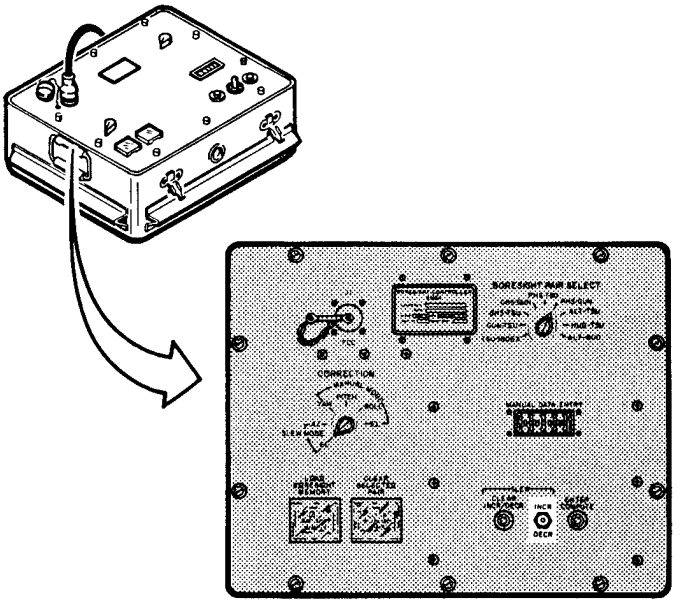


ARR82-25455

NOTE

In following procdures, first technician will occupy pilot's cockpit, position pedestal, and track gun, as directed by seconc technician, Second technician will make sightings and implement corrections with boresight controller.

73. ON BORESIGHT CONTROLLER, PRESS CLEAR INCR/DECR SWITCH.



BORESIGHT CONTROLLER

ARR82-25456

4-8. PILOT HSS BORESIGHTING (cont)

NOTE

Boresight telescopes will be placed at FG29, LG29, and RG29 as required.

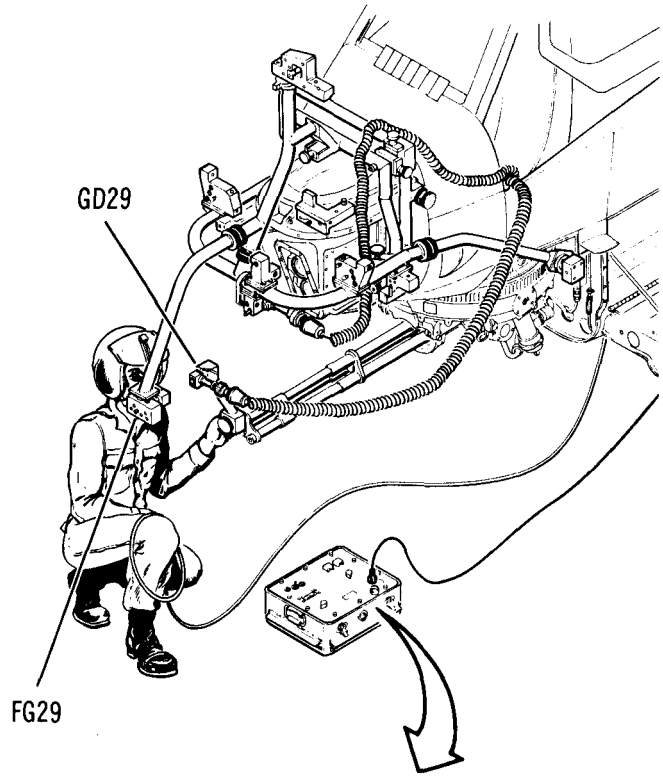
74. INFORM FIRST TECHNICIAN BORESIGHT CONTROLLER IS READY TO IMPLEMENT EL/AZ CORRECTIONS.

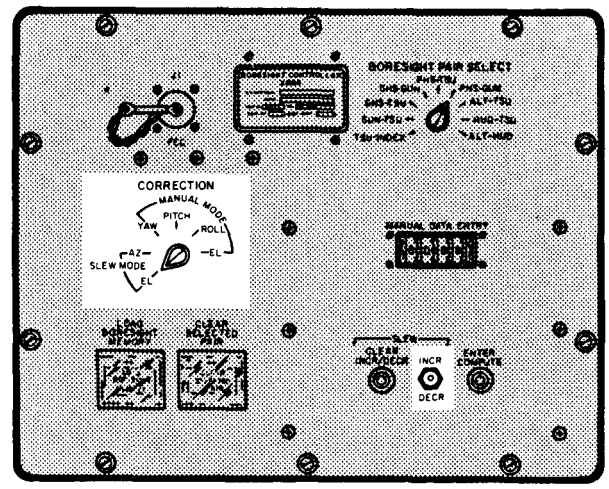
75. FIRST TECHNICIAN PRESSES PILOT CYCLIC STICK ACTION SWITCH TO SLAVE GUN TO FORWARD PEDESTAL POSITION.

76. SECOND TECHNICIAN SIGHTS THROUGH SCOPE AT LG29 TO TARGET SCOPE AT GD29.

77. ON BORESIGHT CONTROLLER, USE INCR/DECR SWITCH IN CORRECTION SWITCH SLEW MODES EL THEN AZ TO ALINE TARGET RETICLE WITH SIGHT RETICLE.

78. SECOND TECHNICIAN ANNOUNCES CORRECTIONS COMPLETE FOR FORWARD PEDESTAL POSITION.





BORESIGHT CONTROLLER

ARR82-25457

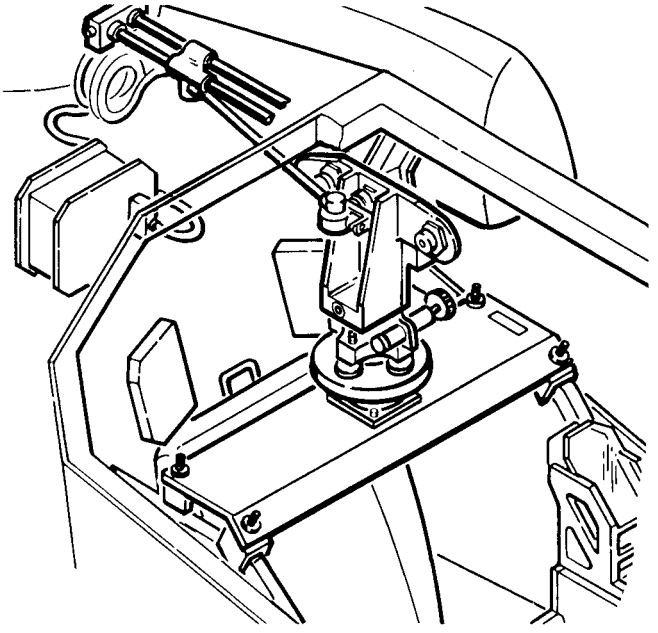
PILOT HSS BORESIGHTING, PHS-GUN CONTROLLER CORRECTIONS (cont)

NOTE

For sighting at left and right gun positions, target scope at GD29 is put in aft facing hole.

79. ROTATE PEDESTAL TO LEFT POSITION AND ALINE 90° SCRIBE MARKS.

80. FIRST TECHNICIAN PRESSES PILOT CYCLIC STICK ACTION SWITCH TO SLAVE GUN TO PEDESTAL LEFT POSITION.



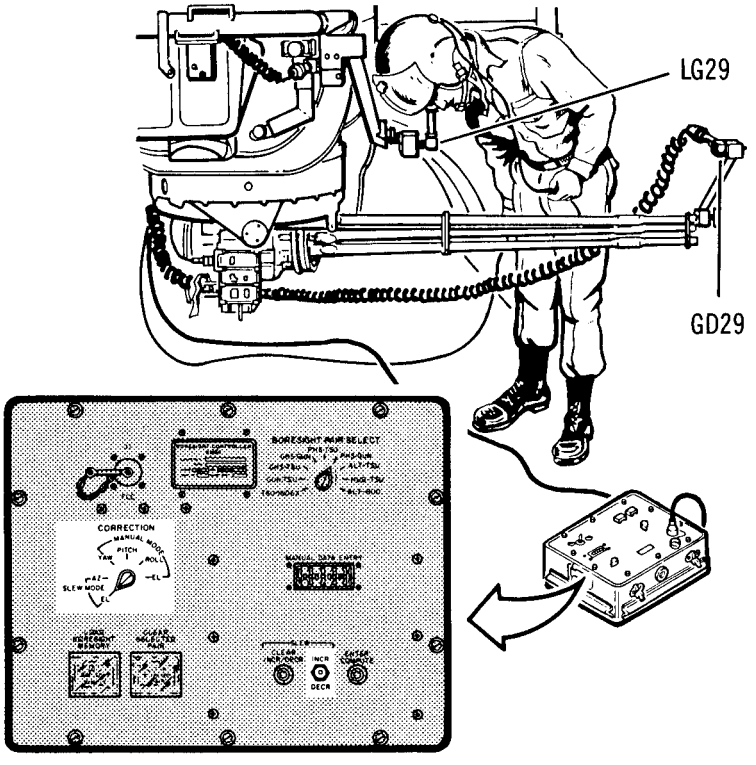
PHS IN LEFT POSITION

ARR82-25458

81. SECOND TECHNICIAN SIGHTS THROUGH SCOPE AT LG29 TO TARGET SCOPE AT GD29 ON BORESIGHT CONTROLLER.

82. USE INCR/DECR SWITCH IN CORRECTION SWITCH SLEW MODES EL THEN AZ TO ALINE TARGET RETICLE WITH SIGHT RETICLE.

83. SECOND TECHNICIAN ANNOUNCES CORRECTIONS COMPLETE FOR LEFT GUN POSITION.



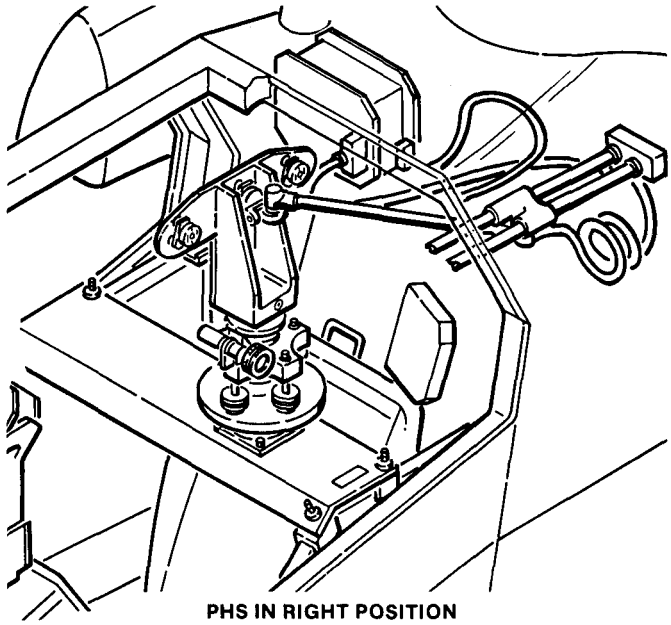
BORESIGHT CONTROLLER

ARR82-25459

4-8. PILOT HSS BORESIGHTING (cont)

84. ROTATE PEDESTAL TO RIGHT POSITION AND ALINE 90° SCRIBE MARK.

85. FIRST TECHNICIAN PRESSES PILOT CYCLIC STICK ACTION SWITCH TO SLAVE GUN TO PEDESTAL RIGHT POSITION.



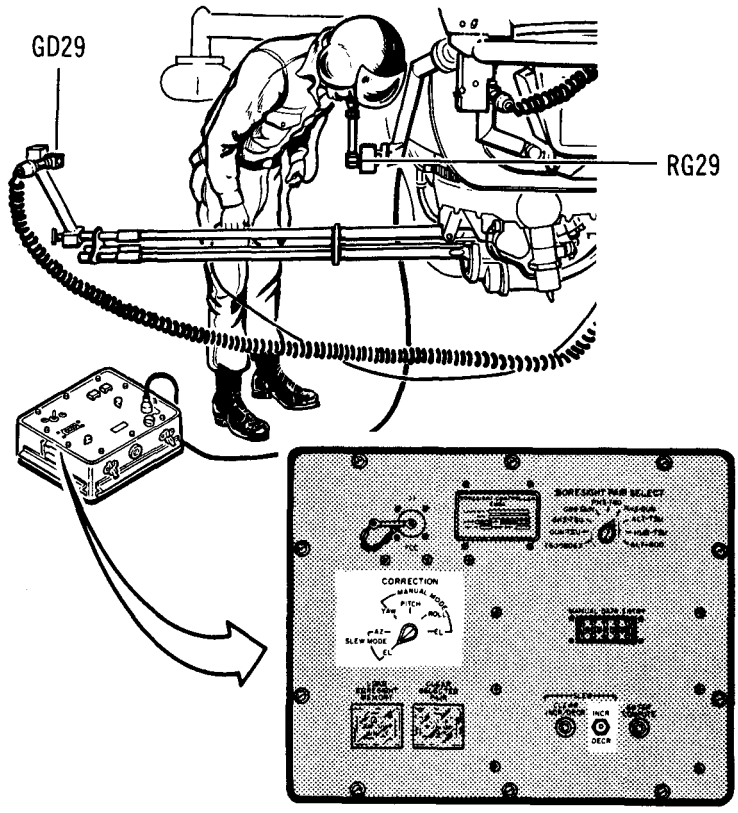
PHS IN RIGHT POSITION

ARR82-25460

86. SECOND TECHNICIAN SIGHTS THROUGH SCOPE AT RG29 TO TARGET SCOPE AT GD29.

87. ON BORESIGHT CONTROLLER, USE INCR/DECR SWITCH IN CORRECTION SWITCH SLEW MODES EL THEN AZ TO ALINE TARGET RETICLE WITH SIGHT RETICLE.

88. SECOND TECHNICIAN ANNOUNCES CORRECTIONS COMPLETE FOR RIGHT GUN POSITION.



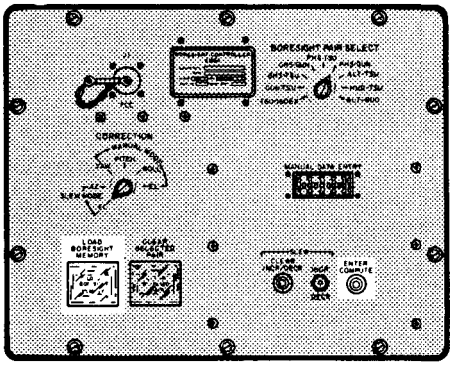
BORESIGHT CONTROLLER

ARR82-25461

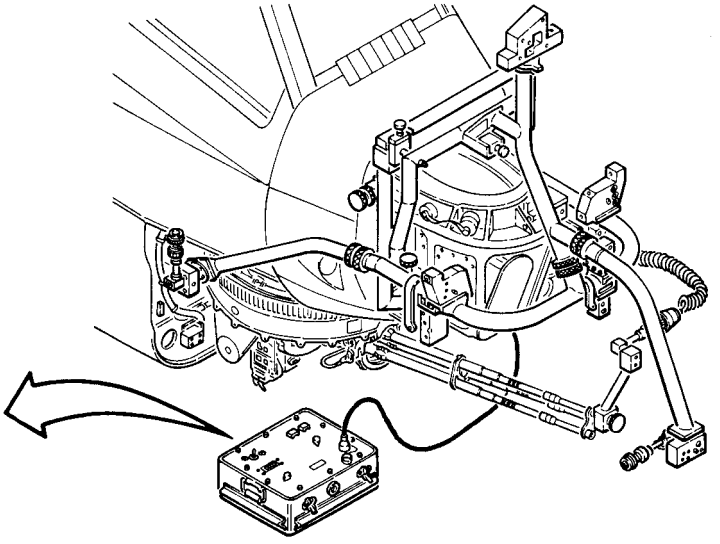
PILOT HSS BORESIGHTING, PHS-GUN CONTROLLER CORRECTIONS (cont)

89. ON BORESIGHT CONTROLLER, PRESS AND HOLD ENTER COMPUTE BUTTON FOR APPROXIMATELY THREE SECONDS.

90. LIFT PLASTIC COVER AND PRESS LOAD BORESIGHT MEMORY SWITCH. OBSERVE THAT SWITCH ILLUMINATES BRIEFLY.



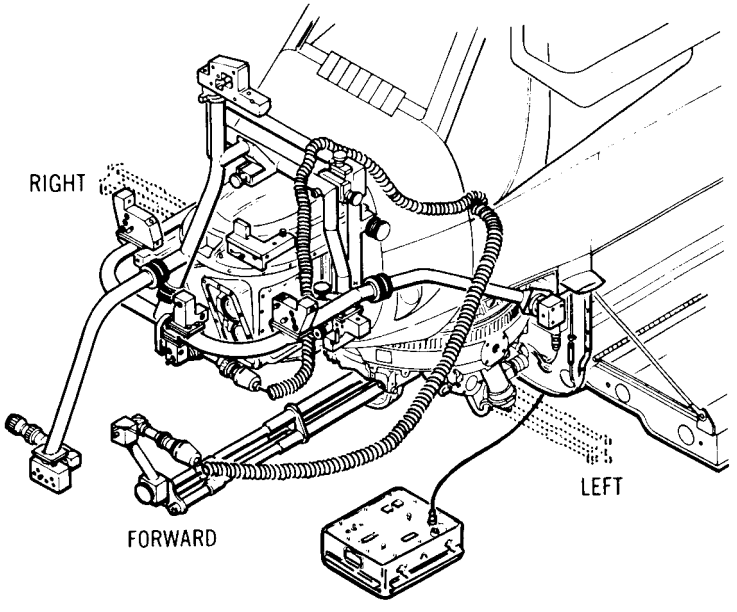
BORESIGHT CONTROLLER



ARR82-25280

91. FIRST TECHNICIAN WILL DIRECT PEDESTAL AND GUN TO FORWARD LEFT AND RIGHT POSITIONS, ALLOWING SECOND TECHNICIAN TO CHECK BORESIGHT CORRECTIONS AT EACH POSITION.

92. TECHNICIANS WILL REPEAT BORESIGHT PROCEDURES AS NECESSARY TO MINIMIZE BORESIGHT ERRORS.

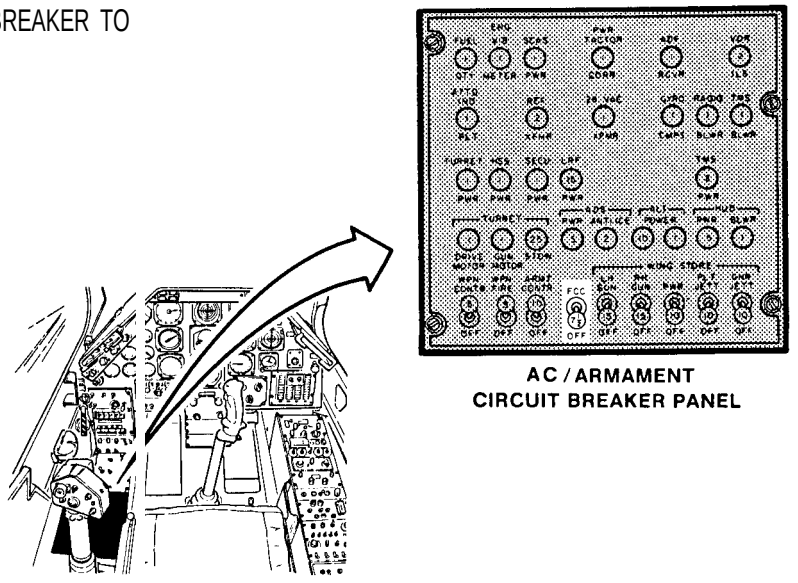


GUN POSITIONS

ARR82-25281

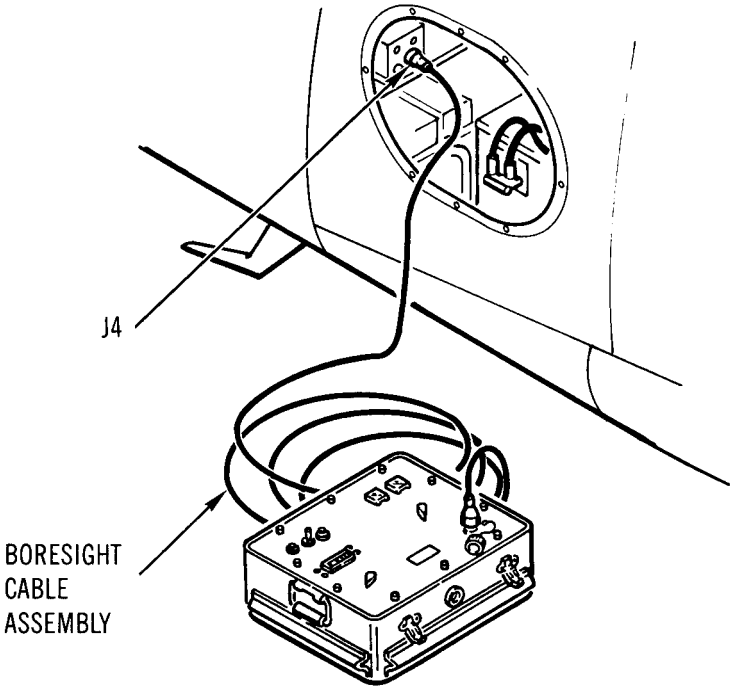
4-8. PILOT HSS BORESIGHTING (cont)

93. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, SET FCC CIRCUIT BREAKER TO OFF.



ARR82-25284

94. DISCONNECT BORESIGHT CABLE ASSEMBLY FROM FCC TEST CONNECTOR J4.

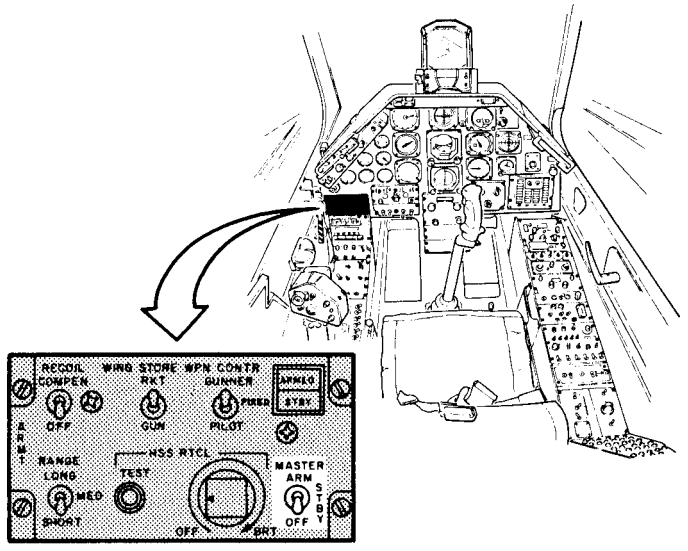


ARR82-25285

POST PILOT HSS BORESIGHTING PROCEDURES

95. ON PILOT ARMAMENT CONTROL PANEL, SET MASTER ARM SWITCH TO OFF.

96. CONTINUE BORESIGHTING AS REQUIRED OR PERFORM POST BORESIGHTING PROCEDURES, PARA 4-14.



PILOT ARMAMENT CONTROL PANEL

ARR82-25287

END OF TASK

4-9. ADS ALINEMENT

DESCRIPTION

This task covers: ADS pitot assembly alinement.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Boresight Assembly Ground Support Equipment (BAGSE)

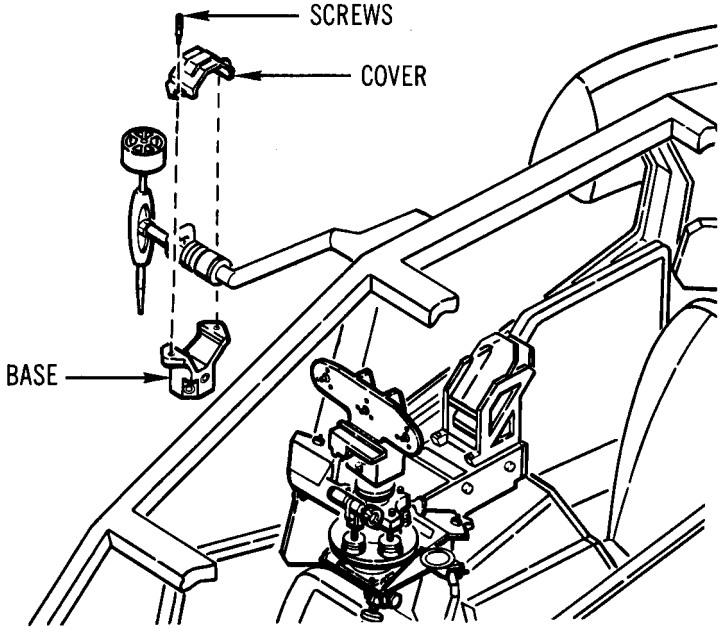
Materials:
- Lockwire (Item 17, Appx B)

Personnel Required:
- 68J Aircraft Fire Control Repairer (3)

Equipment Conditions:
- BAGSE ALINEMENT TO HELICOPTER performed, para 4-5.
- Gunner HSS shelf and pedestal installed and alined, see para 4-7.

ADS ALINEMENT

1. INSTALL ADS ALINEMENT DEVICE.
   a. Install alinement device base on ADS boom with aline pin engaging in aline hole on sensor support assembly.
   b. Install alinement device cover over support assembly and clamp to base with two screws.

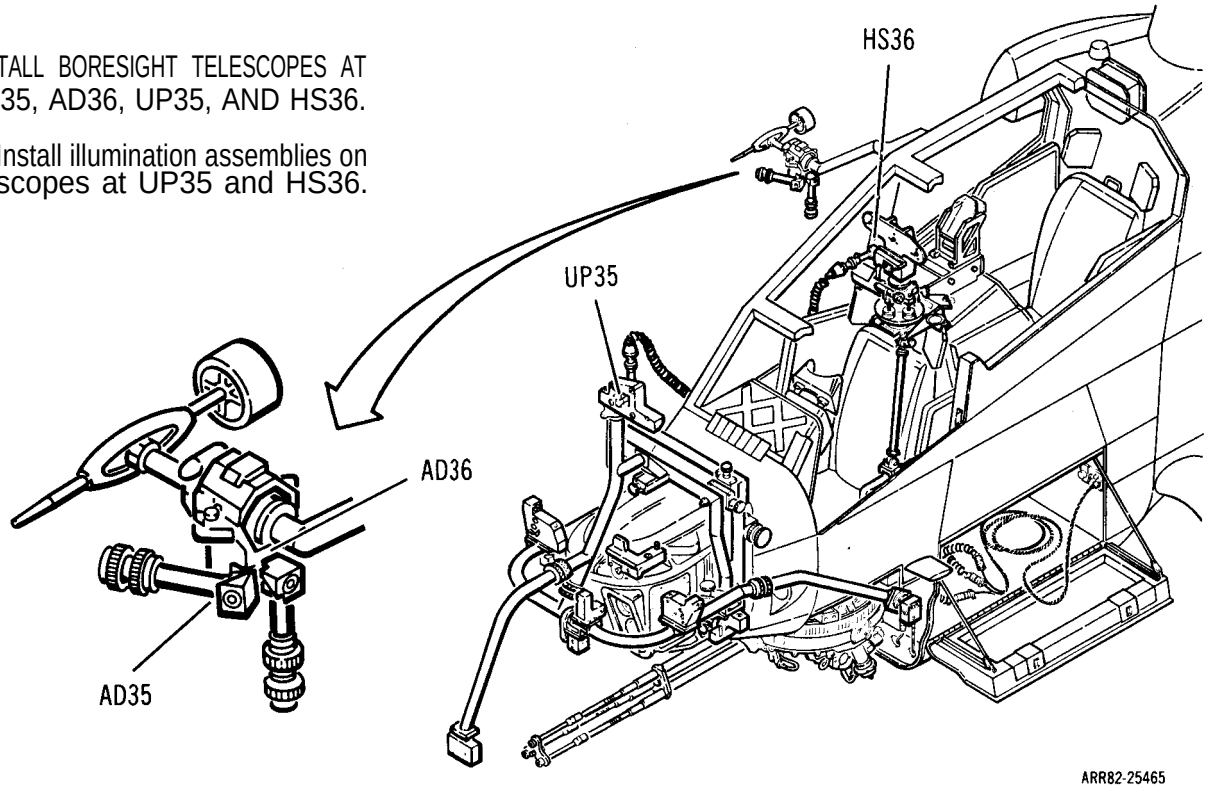


ARR82-25464

ADS ALINEMENT (cent)

2. INSTALL BORESIGHT TELESCOPES AT AD35, AD36, UP35, AND HS36.

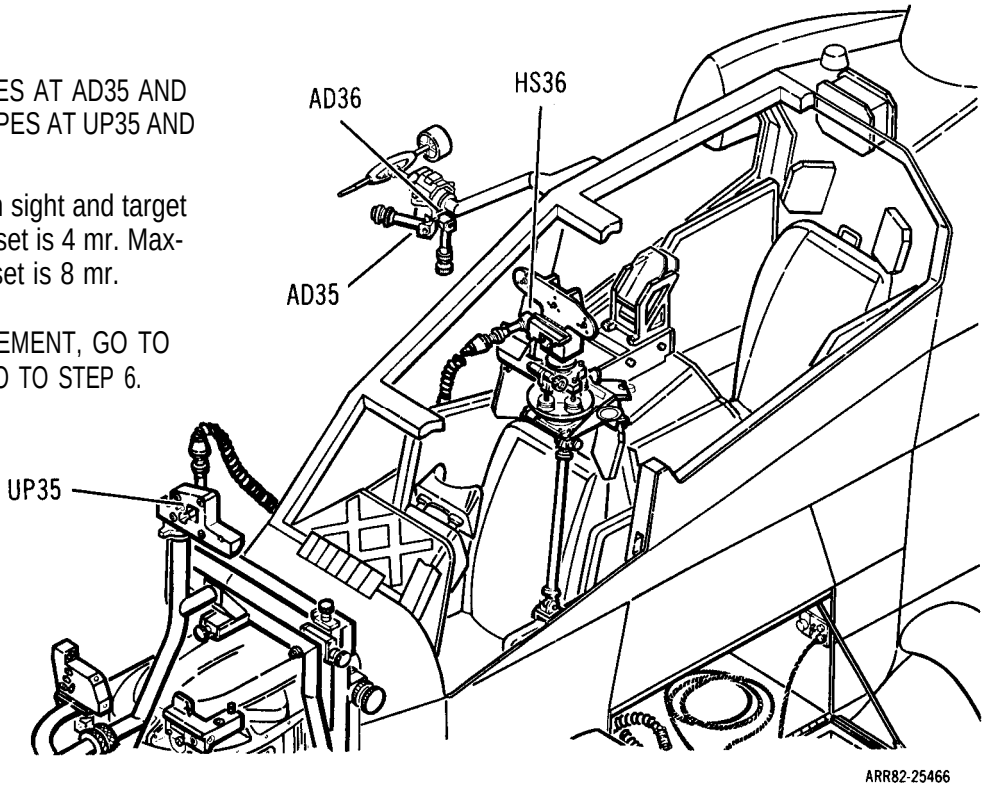
   Install illumination assemblies on scopes at UP35 and HS36.



3. SIGHT THROUGH SCOPES AT AD35 AND AD36 TO TARGET SCOPES AT UP35 AND HS36.

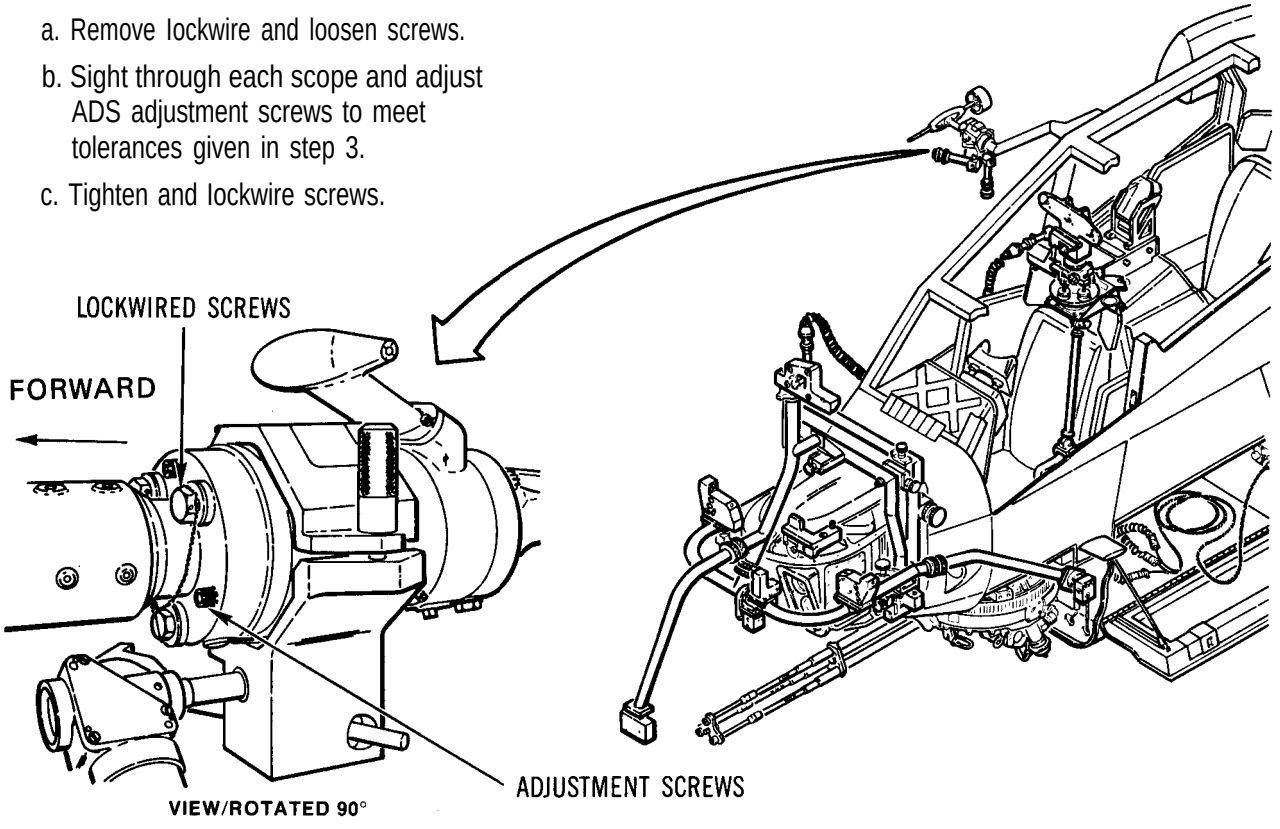
   Note offset between sight and target reticles. Desired offset is 4 mr. Maximum allowable offset is 8 mr.

4. IF ADS REQUIRES ALINEMENT, GO TO NEXT STEP. IF NOT, GO TO STEP 6.



4-9. ADS ALINEMENT (cont)

5. ALINE ADS.
   a. Remove lockwire and loosen screws.
   b. Sight through each scope and adjust ADS adjustment screws to meet tolerances given in step 3.
   c. Tighten and lockwire screws.

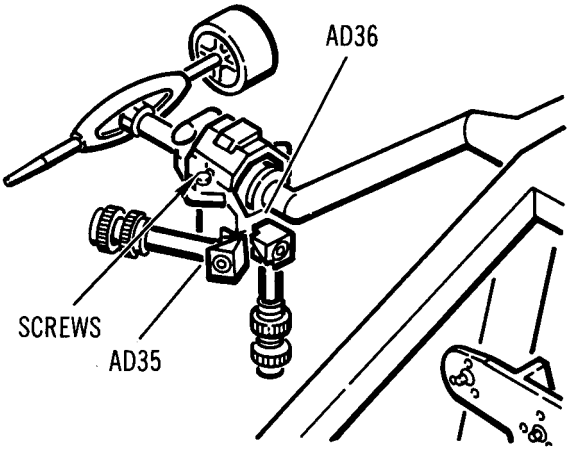


ARR82-25467

6. REMOVE BORESIGHT TELESCOPES FROM AD36 AND AD35.

7. REMOVE TWO SCREWS AND REMOVE ADS ALINEMENT DEVICE.

8. CONTINUE BORESIGHTING AS REQUIRED OR PERFORM POST BORESIGHTING PROCEDURES, PARA 4-14.



ARR82-25463

END OF TASK

4-10. AIRBORNE LASER TRACKER (ALT) ALINEMENT

DESCRIPTION

This task covers: ALT mount alinement procedures.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Boresight Assembly Ground Support Equipment (BAGSE)

Personnel Required:
- 68J Aircraft Fire Control Repairer (3)

References:
- TM 11-5860-200-12
- TM 55-1520-236-23

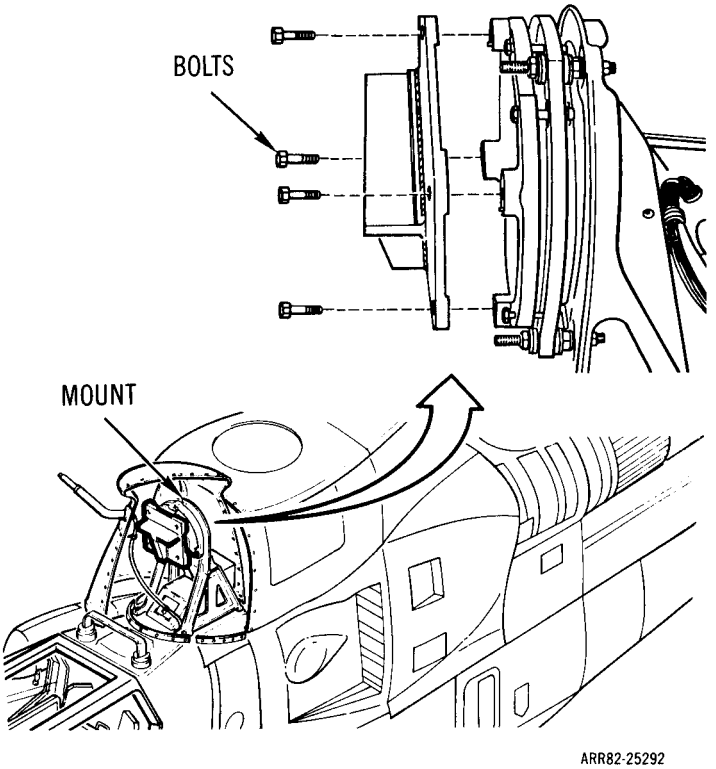
Equipment Conditions:
- Forward pylon fairing assembly partially removed, see TM 55-1520-236-23.
- ALT receiver/tracker removed from mount, see TM 11-5860-200-12.
- BAGSE ALINEMENT TO HELICOPTER performed, para 4-5.

ALT MOUNT ALINEMENT SETUP

NOTE

Alinement device is installed using mounting bolts from ALT receiver/tracker.

1. INSTALL ALT ALINEMENT DEVICE.
   a. Position alinement device on alinement pins on mount.
   b. Attach device using four bolts from receiver/tracker.

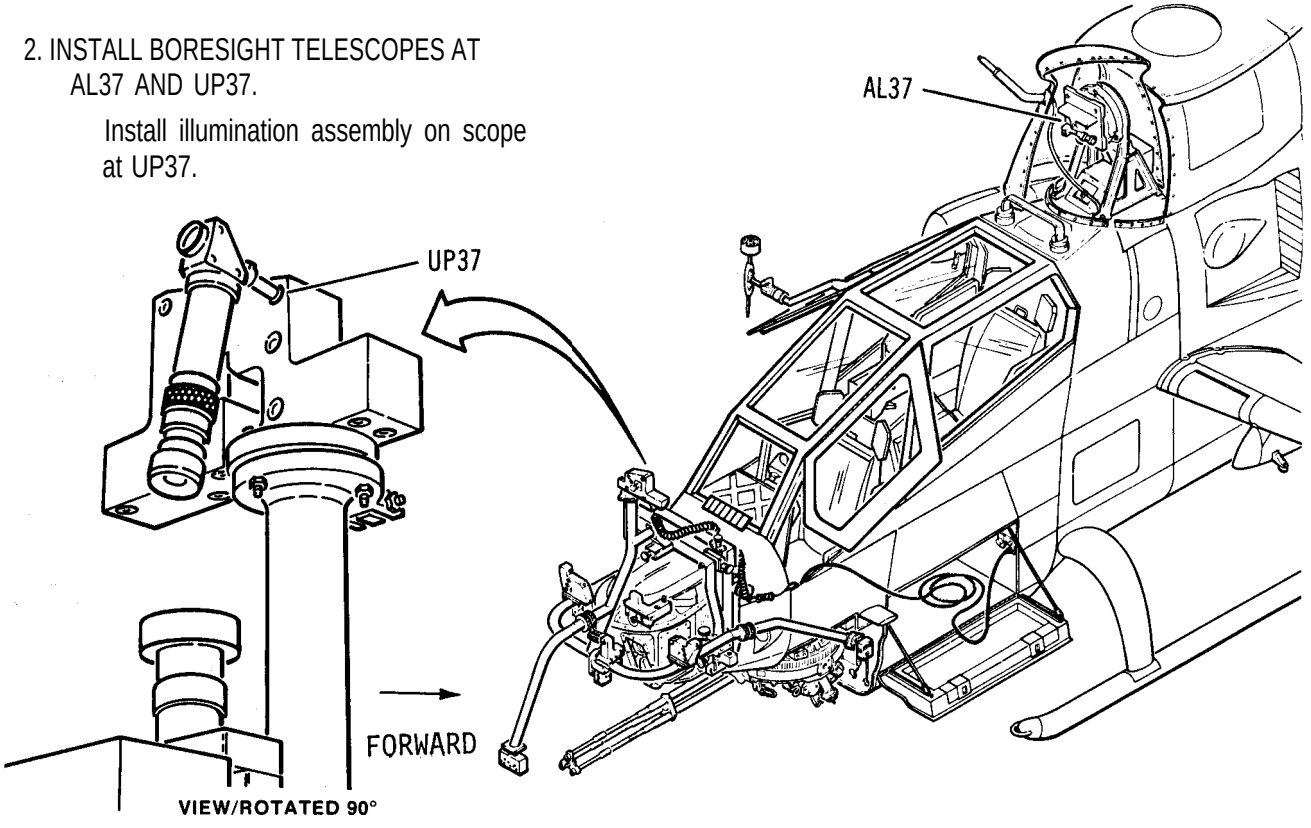


ARR82-25292

4-10. AIRBORNE LASER TRACKER (ALT) ALINEMENT (cont)

2. INSTALL BORESIGHT TELESCOPES AT AL37 AND UP37.

   Install illumination assembly on scope at UP37.



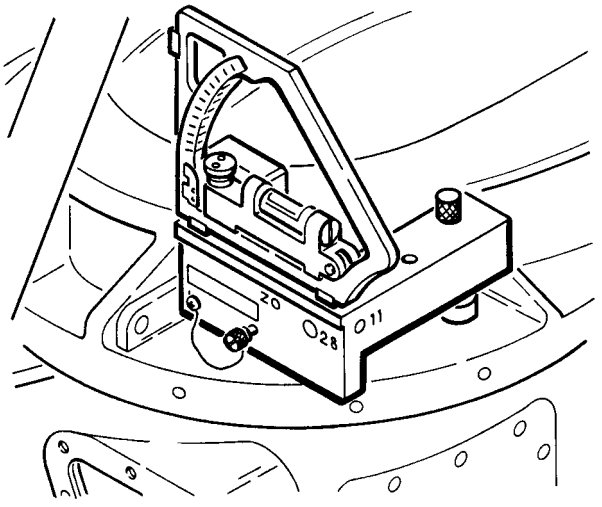
NOTE

During alinement procedures using gunner quadrant, helicopter must remain level.

3. PLACE GUNNER QUADRANT ON Z0 BLOCK.

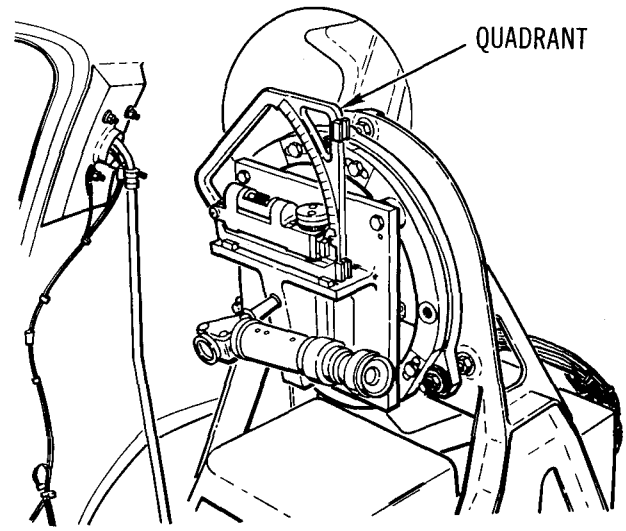
   a. Place quadrant so that level bubble senses roll.

   b. Adjust quadrant scale to center level bubble.



ALT MOUNT ALINEMENT SETUP (cont)

4. TRANSFER GUNNER QUADRANT TO ALT ALINEMENT DEVICE.
   a. Do not change quadrant scale setting.
   b. Maintain same transverse orientation as at Z0 block.

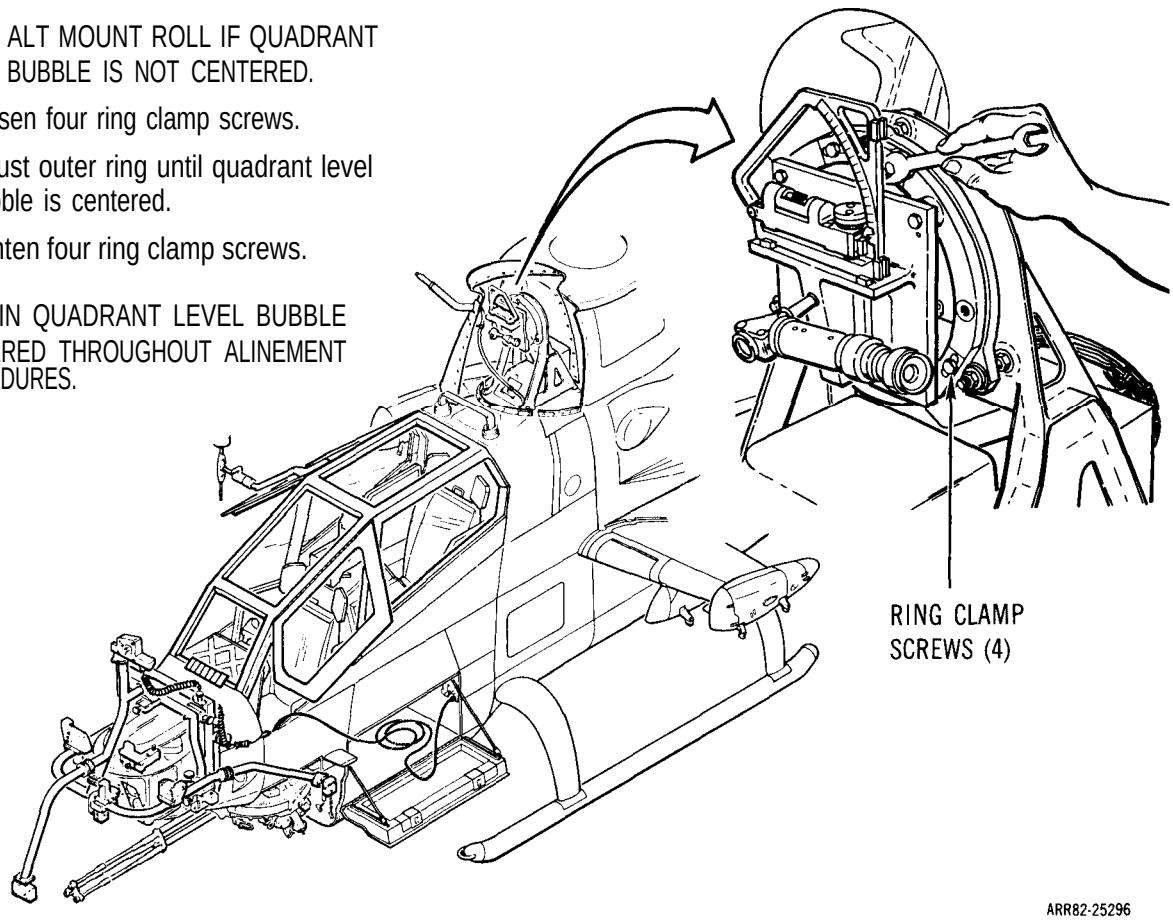


ARR82-25295

ALT MOUNT ALINEMENT

5. ADJUST ALT MOUNT ROLL IF QUADRANT LEVEL BUBBLE IS NOT CENTERED.
   a. Loosen four ring clamp screws.
   b. Adjust outer ring until quadrant level bubble is centered.
   c. Tighten four ring clamp screws.

6. MAINTAIN QUADRANT LEVEL BUBBLE CENTERED THROUGHOUT ALINEMENT PROCEDURES.



ARR82-25296

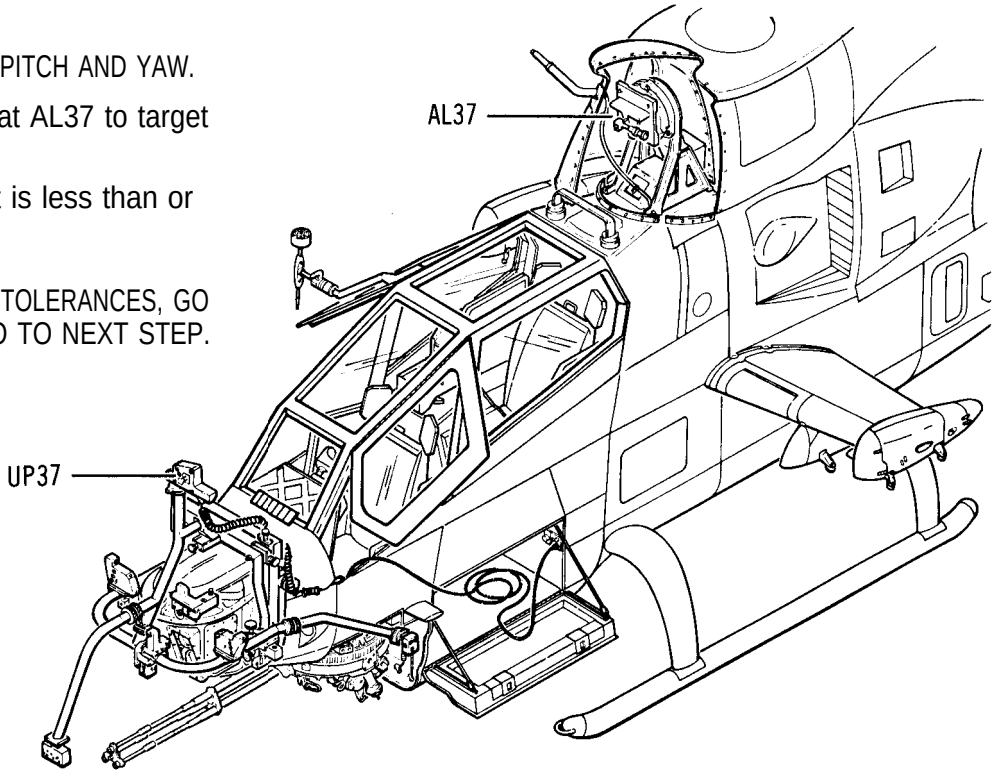
4-10. AIRBORNE LASER TRACKER (ALT) ALINEMENT (cont)

7. CHECK ALT MOUNT IN PITCH AND YAW.

a. Sight through scope at AL37 to target scope at UP37.

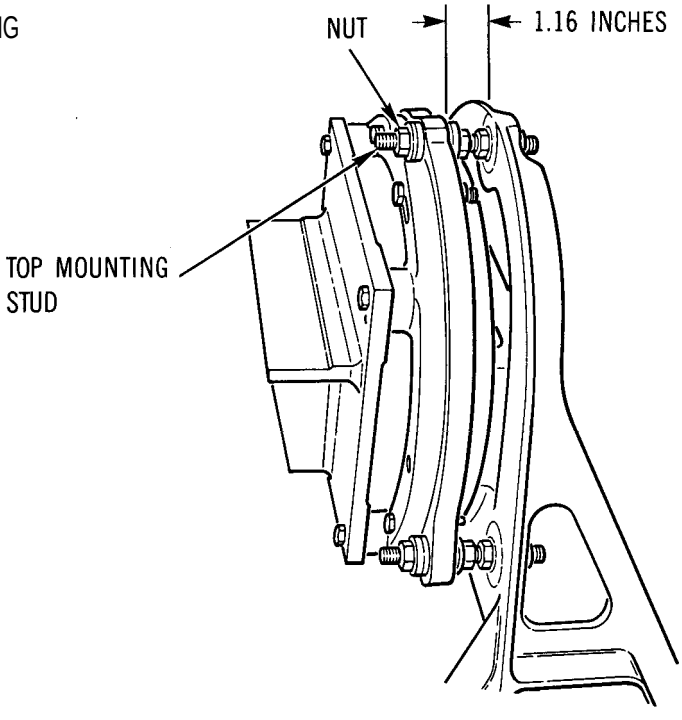
b. Desired reticle offset is less than or equal to 2 mr.

8. IF ALT MOUNT MEETS TOLERANCES, GO TO STEP 13. IF NOT, GO TO NEXT STEP.



ARR82-25297

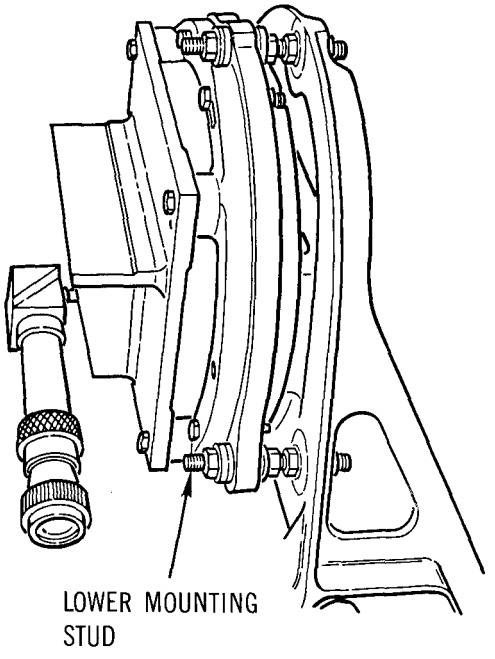
9. ADJUST TWO NUTS ON TOP MOUNTING STUD UNTIL ALT MOUNT IS 1.16 INCHES (2.95 CM) FROM SUPPORT ASSEMBLY.



ARR82-25298

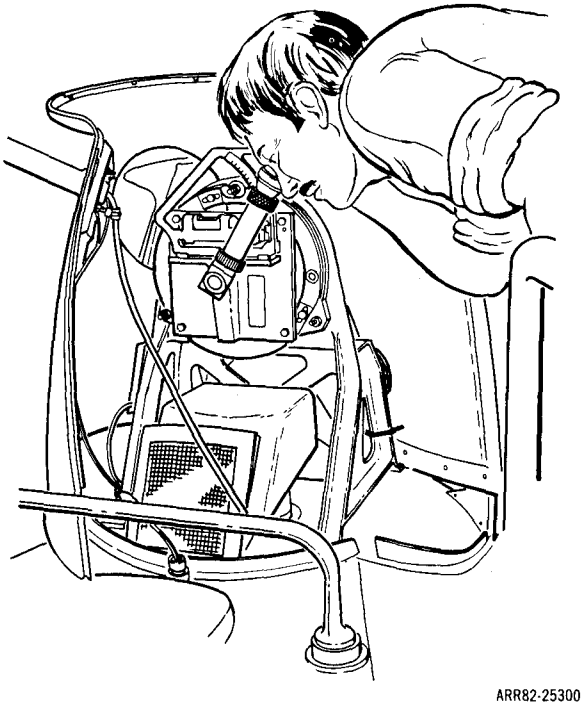
ALT MOUNT ALINEMENT (cont)

10. SIGHT THROUGH SCOPE AT AL37 TO TARGET SCOPE AT UP37 AND ADJUST ALT MOUNT IN PITCH AND YAW.
    a. Loosen two forward nuts on two lower studs.
    b. Adjust aft nuts to center reticle vertical crosshairs.
    c. Adjust two aft nuts equally forward or aft to center reticle horizontal crosshairs.
11. TIGHTEN TWO FORWARD NUTS ON TWO LOWER STUDS.
12. TORQUE THREE FORWARD NUTS TO 160 TO 190 LB-IN (18.1 TO 21.5 N.m).



ARR82-25299

13. CHECK SIGHTINGS FOR 2 MR TOLERANCE AND CHECK TO MAKE SURE QUADRANT LEVEL BUBBLE IS STILL CENTERED. REPEAT ADJUSTMENTS AS NECESSARY TO MINIMIZE BORESIGHT ERRORS.



ARR82-25300

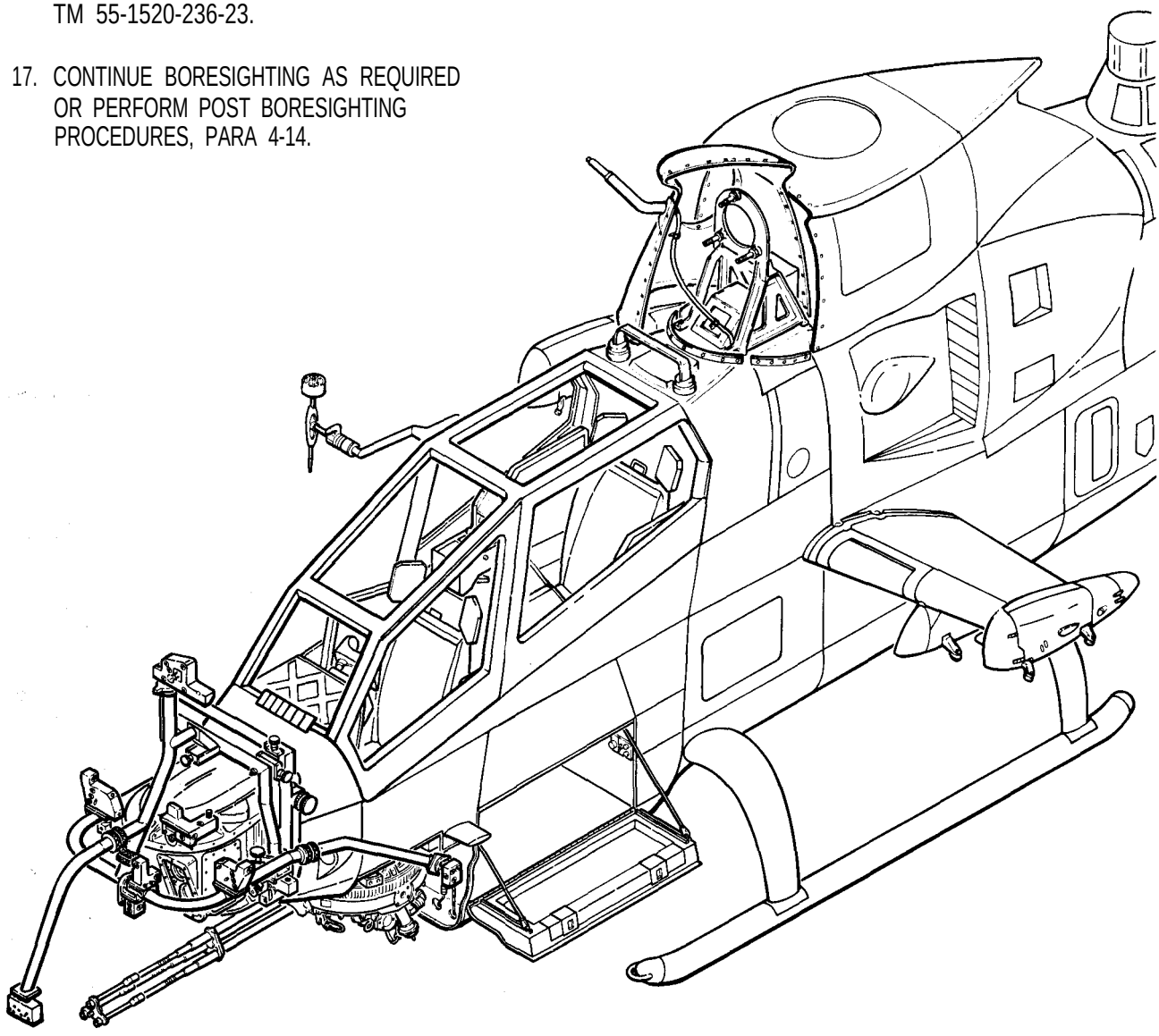
4-10. AIRBORNE LASER TRACKER (ALT) ALINEMENT (cont)

14. REMOVE FOUR BOLTS AND REMOVE ALT ALINEMENT DEVICE.

15. REINSTALL ALT RECEiVER/TRACKER, SEE TM 11-5860-200-12.

16. INSTALL FORWARD PYLON FAIRING, SEE TM 55-1520-236-23.

17. CONTINUE BORESIGHTING AS REQUIRED OR PERFORM POST BORESIGHTING PROCEDURES, PARA 4-14.



ARR82-25301

END OF TASK

4-11. HEAD UP DISPLAY SUBSYSTEM (HUDS) BORESIGHTING

DESCRIPTION

This task covers: Alinement of HUD mount and boresight controller corrections of HUDS.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Boresight Assembly Ground Support Equipment (BAGSE)

Personnel Required:
- 68J Aircraft Fire Control Repairer (3)

References:
- TM 9-1270-220-13&P

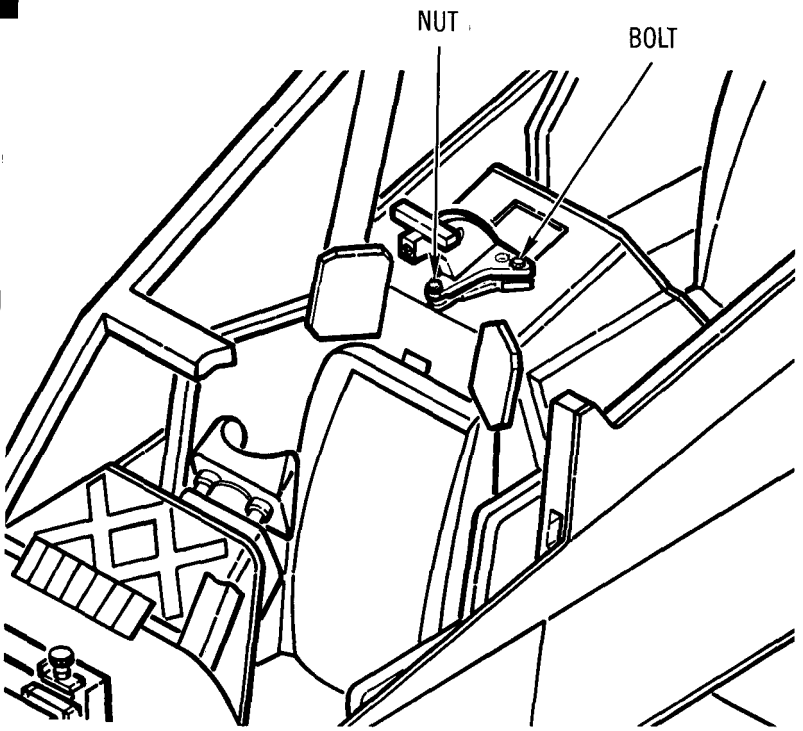
Equipment Conditions:
- HUD removed, see TM 9-1270-220-13&P.
- BAGSE ALINEMENT TO HELICOPTER performed, para 4-5.

HUD MOUNT ALINEMENT SETUP

NOTE

Alinement device is installed using mounting hardware from HUD.

1. INSTALL HUDS ALINEMENT DEVICE.
   a. Position alinement device over alining pins on HUD mount.
   b. Install two bolts and nut.

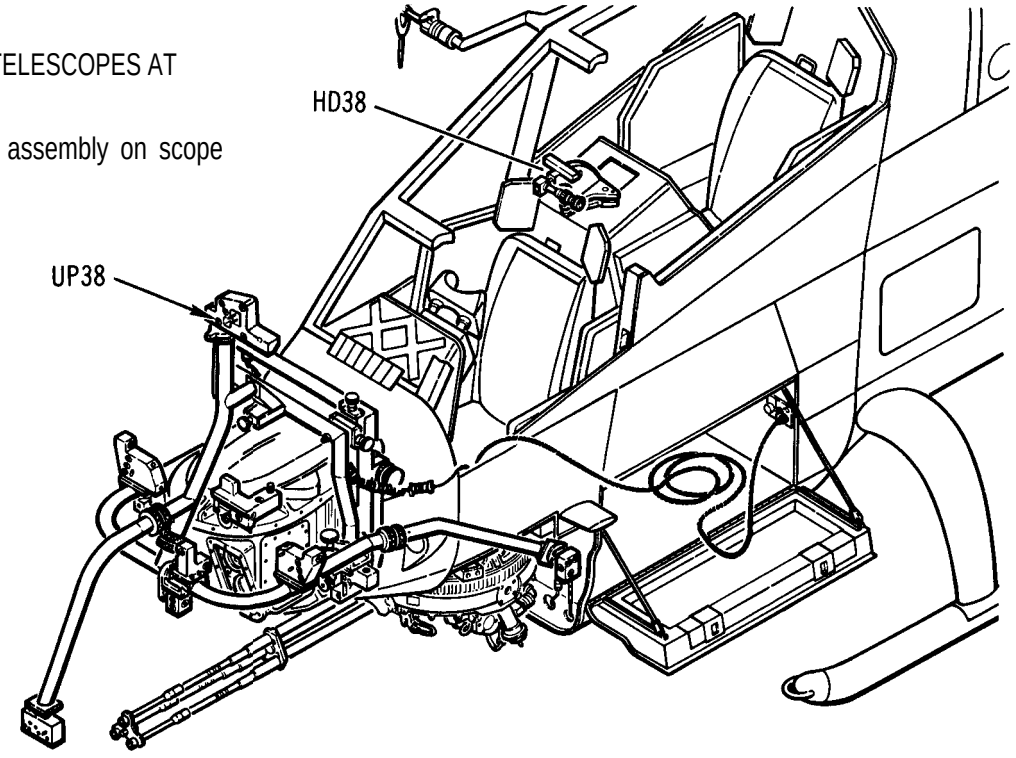


ARR82-25485

4-11. HEAD UP DISPLAY SUBSYSTEM (HUDS) BORESIGHTING (cont)

2. INSTALL BORESIGHT TELESCOPES AT HD38 AND UP38.

   Install illumination assembly on scope at UP38.



ARR82-25486

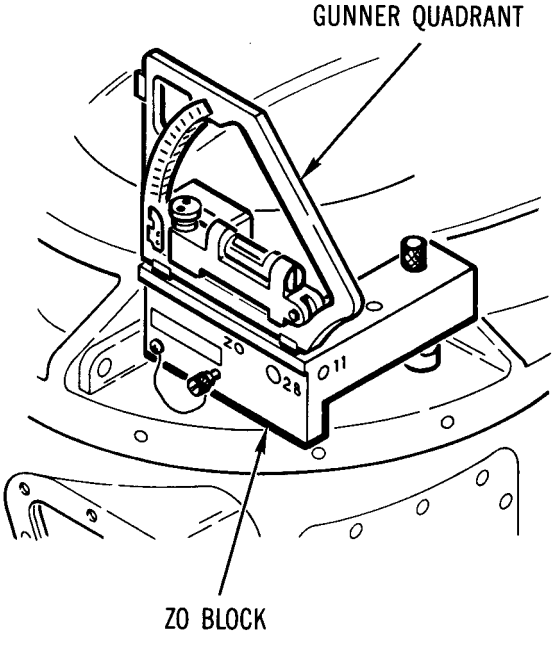
NOTE

During alinement procedures using gunner quadrant, helicopter must remain level. All personnel will take their positions prior to alinement and remain at their positions until alinement is complete.

3. PLACE GUNNER QUADRANT ON Z0 BLOCK.

   a. Place quadrant so that level bubble senses roll.

   b. Adjust quadrant scale to center level bubble.



ARR82-25487

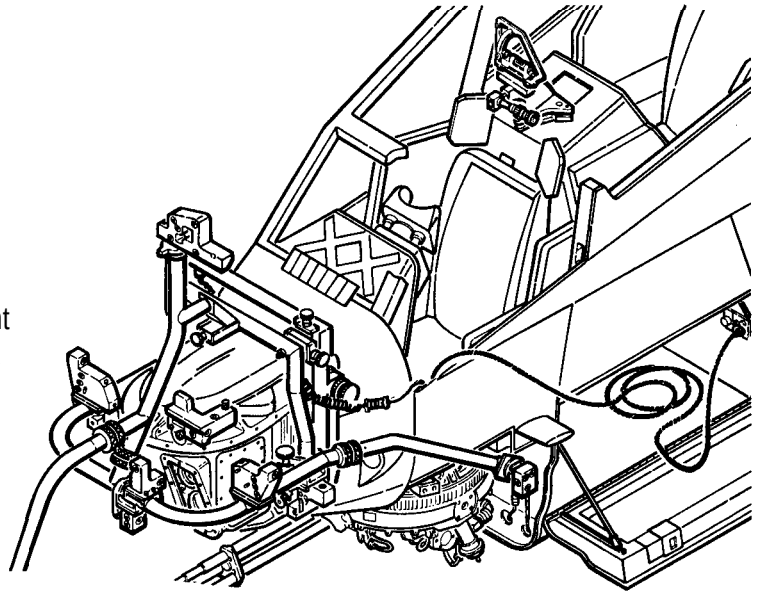
HUD MOUNT ALINEMENT

4. TRANSFER GUNNER QUADRANT TO HUDS ALINEMENT DEVICE.

   Maintain transverse orientation.

5. CHECK GUNNER QUADRANT FOR CENTERED BUBBLE.

   If quadrant level bubble is not centered, go to next step. If quadrant level bubble is centered, HUD mount is alined in roll; go to step 7.



ARR82-25488

NOTE

Raise or lower either side of HUD mount by removing or adding 0.002 inch shims.

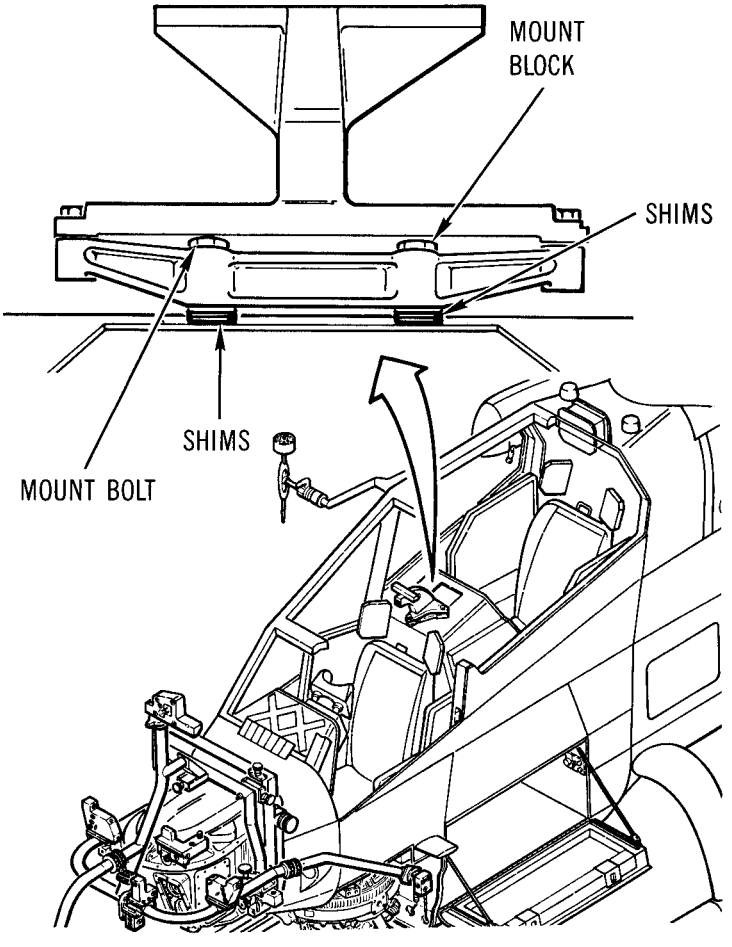
Shims removed from one side may be added to other side.

6. ALINE HUD MOUNT IN ROLL.

   a. Loosen front mounting nut.

   b. Remove rear mount bolts and change thickness of shims under one or both rear mounting points to center quadrant level bubble.

   c. Install rear mount bolts.



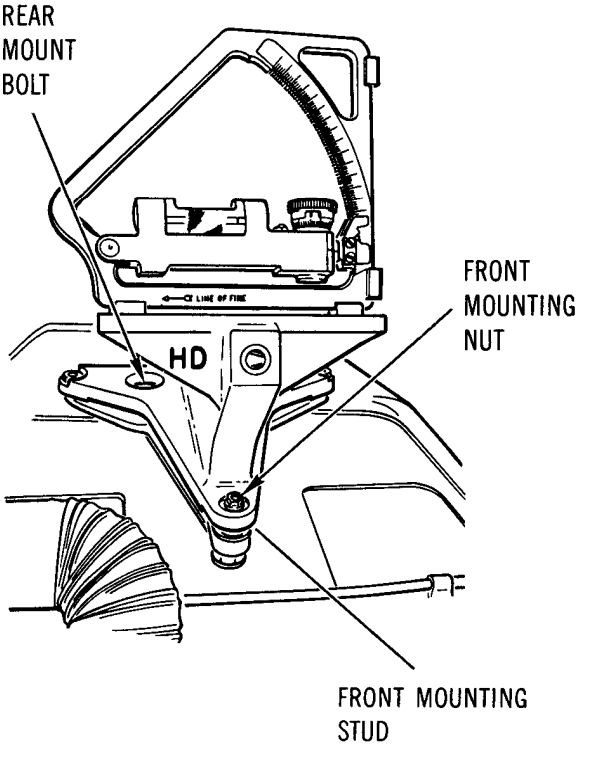
ARR82-25489

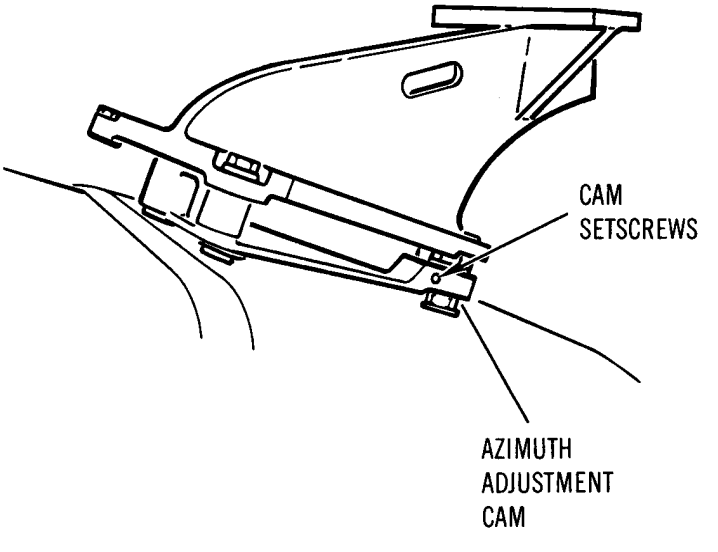
4-11. HEAD UP DISPLAY SUBSYSTEM (HUDS) BORESIGHTING (cont)

7. ALINE HUD MOUNT IN AZIMUTH.
   a. If necessary, loosen front mounting nut, front mounting stud, and two rear mount bolts.
   b. Loosen two azimuth adjustment cam setscrews.
   c. Turn azimuth adjustment cam until centered laterally.
   d. Sight through scope at HD38 to target scope at UP38 and position rear of HUD mount laterally until reticle vertical lines are approximately alined.

8. TIGHTEN TWO REAR MOUNT BOLTS WHILE MAINTAINING QUADRANT LEVEL BUBBLE CENTERED. Torque to 50-60 inch-pounds (5.75–6.9 N.m)

9. ADJUST AZIMUTH ADJUSTMENT CAM.
   a. Sight through scope at HD38 to target scope at UP38 and adjust cam until reticle vertical lines are alined. Desired offset is less than 1 mr. Maximum offset is 2 mr.
   b. Tighten two azimuth adjustment cam setscrews.

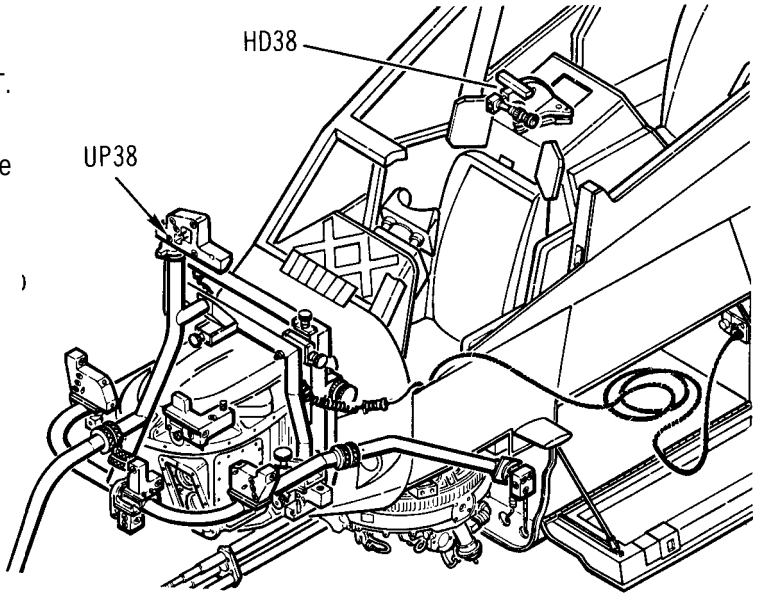




ARR82-25490

HUD MOUNT ALINEMENT (cont)

10. CHECK HUD MOUNT PITCH ALINEMENT.
    a. Sight through scope at HD38 to target scope at UP38. Desired reticle offset is less than 1 mr. Maximum offset is 2 mr.
    b. If HUD mount meets tolerances, go to step 12. If HUD mount does not meet tolerances, go to next step.



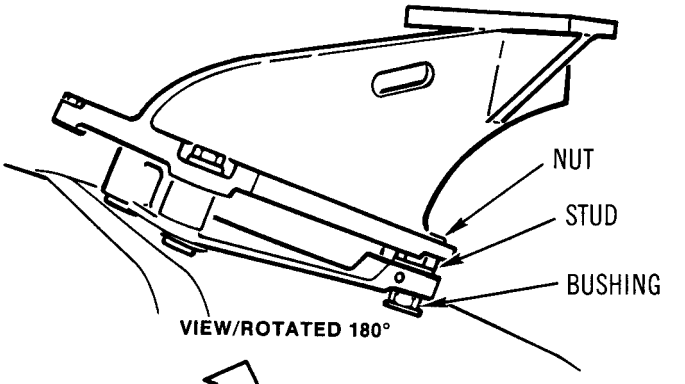
ARR82-25491

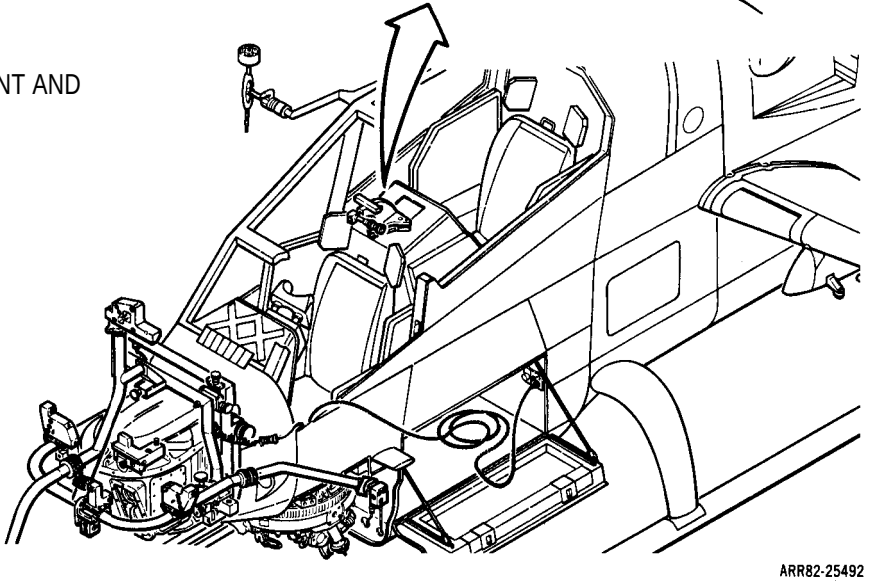
11. ADJUST HUD MOUNT IN PITCH.

    Sight through scope at HD38 to target scope at UP38 and turn bushing to aline reticle horizontal crosshairs. Desired reticle offset is less than 1 mr. Maximum offset is 2 mr.

12. TIGHTEN FRONT MOUNTING STUD AND NUT.

13. CHECK HUD MOUNT ALINEMENT AND ADJUST AS NECESSARY UNTIL TOLERANCES HAVE BEEN MET.




ARR82-25492

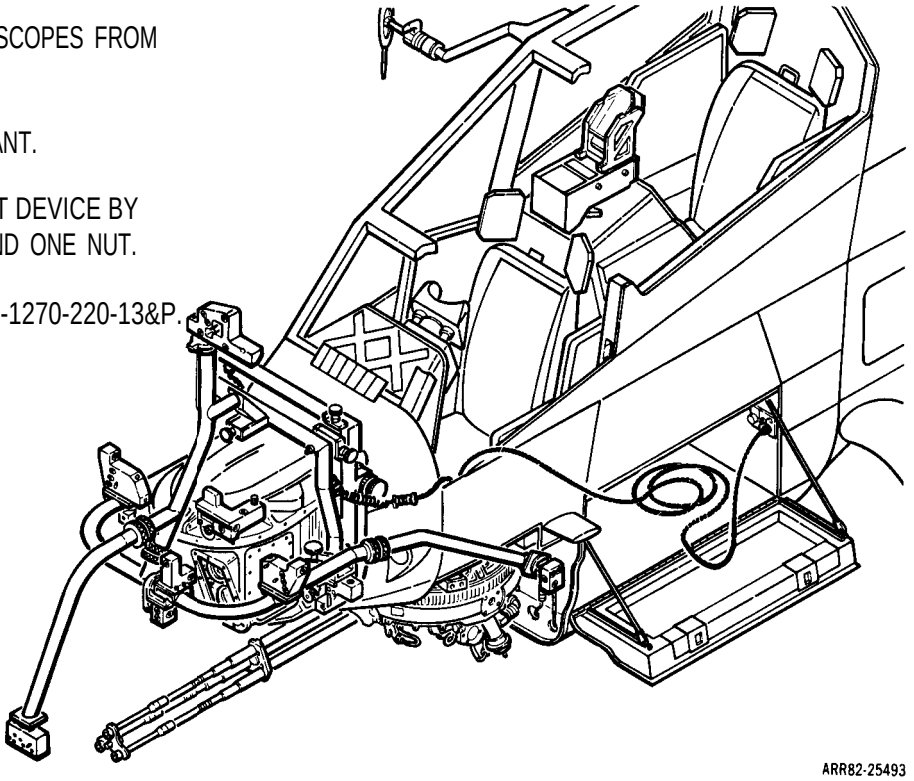
POST HUD MOUNT ALINEMENT PROCEDURES

14. REMOVE BORESIGHT TELESCOPES FROM HD38 AND UP38.

15. REMOVE GUNNER QUADRANT.

16. REMOVE HUDS ALINEMENT DEVICE BY REMOVING TWO BOLTS AND ONE NUT.

17. INSTALL HUD, SEE TM 9-1270-220-13&P.

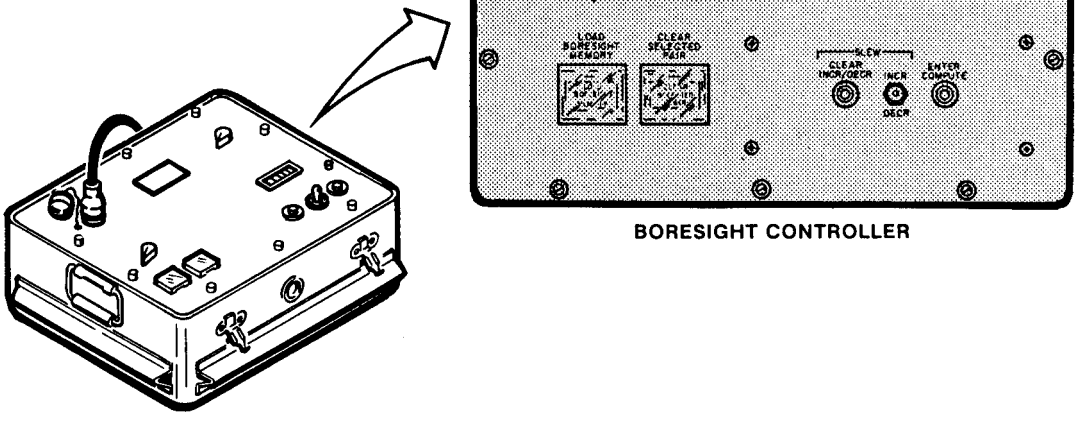


ARR82-25493

HUDS BORESIGHTING, HUD-TSU CONTROLLER CORRECTIONS

18. ON BORESIGHT CONTROLLER, SET BORESIGHT PAIR SELECT SWITCH TO TSU-INDEX.

19. CONNECT BORESIGHT CABLE ASSEMBLY W1P1 TO BORESIGHT CONTROLLER CONNECTOR J1.

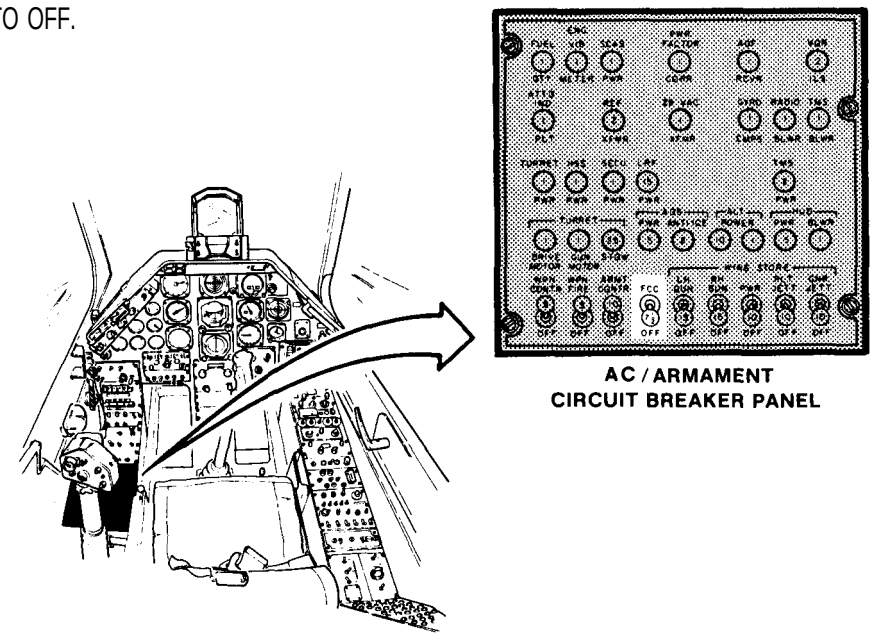


BORESIGHT CONTROLLER

ARR82-25494

HUDS BORESIGHTING, HUD-TSU CONTROLLER CORRECTIONS (cont)

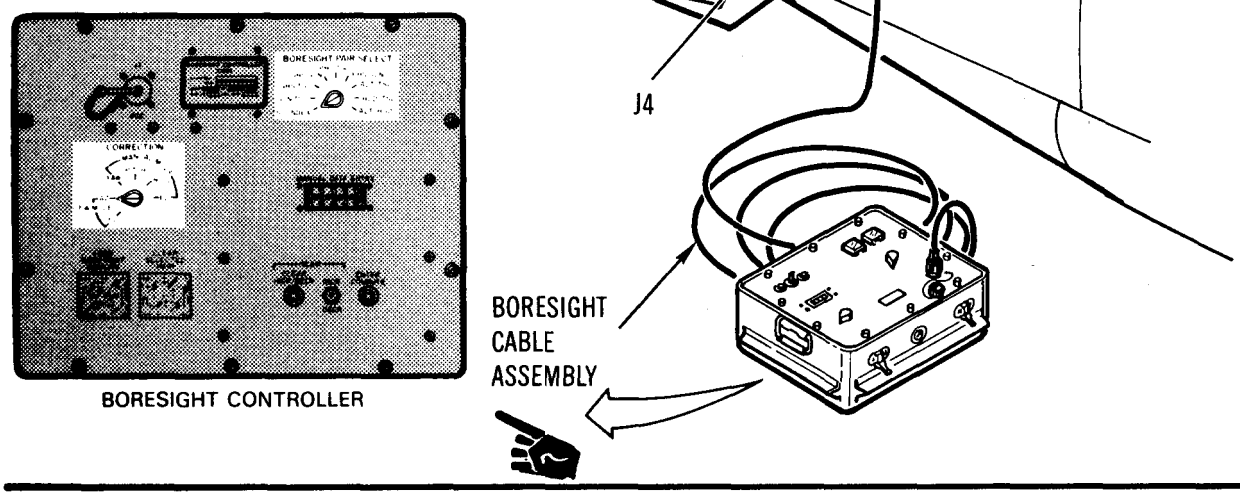
20. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, MAKE SURE FCC CIRCUIT BREAKER IS SET TO OFF.



ARR 82-25496

21. CONNECT BORESIGHT CABLE ASSEMBLY TO FCC TEST CONNECTOR J4.

21.1. PLACE CORRECTION SWITCH ON SLEW MODE AZIMUTH, MOVE TSU SLEW MODE TO INDEX.

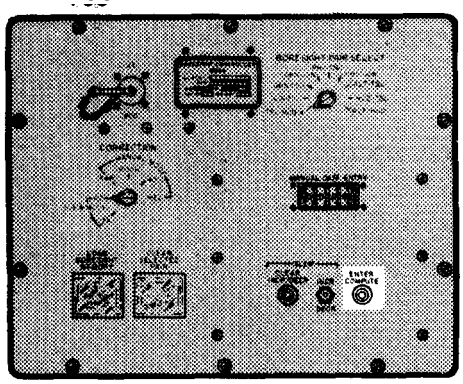


4-11. HEAD UP DISPLAY SUBSYSTEM (HUDS) BORESIGHTING (cont)

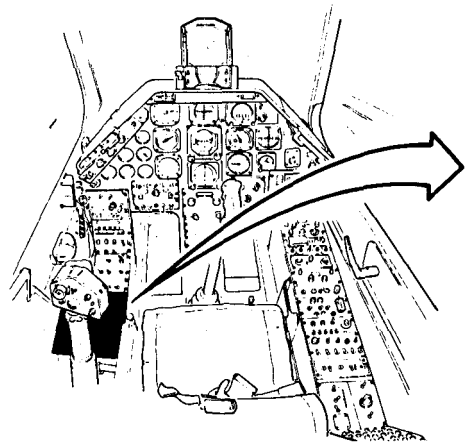
HUDS BORESIGHTING, HUD-TSU CONTROLLER CORRECTIONS (cont)

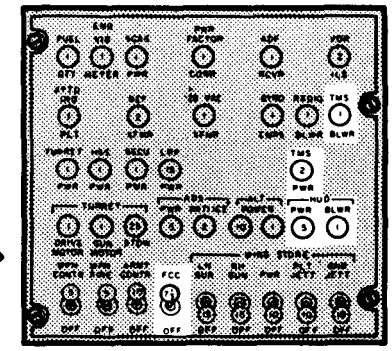
21.2. APPLY POWER TO FCC, DEPRESS AND HOLD "ENTER COMPUTE" FOR THREE SECONDS. WAIT FIVE MINUTES BEFORE PROCEEDING TO NEXT STEP.

22. ON AC/ARMAMENT CIRCUET BREAKER PANEL, CLOSE FOLLOWING CIRCUIT BREAKERS:
    - TMS BLWR
    - TMS PWR
    - HUD PWR
    - HUD BLWR
    - FCC



BORESIGHT CONTROLLER

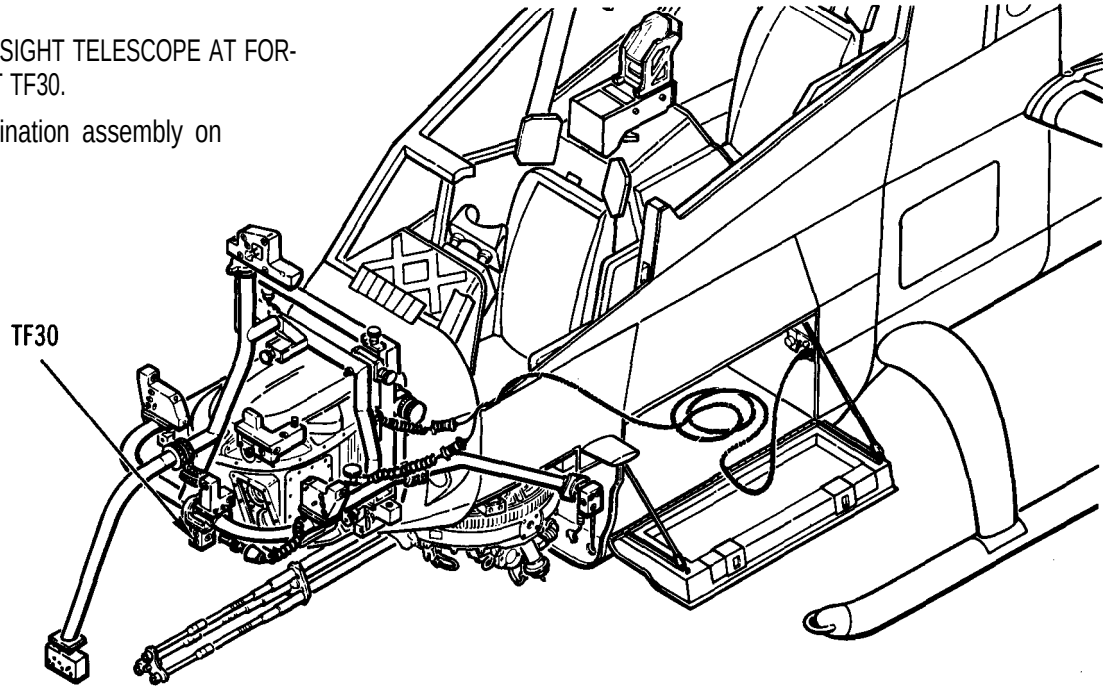




AC / ARMAMENT CIRCUIT BREAKER PANEL

23. INSTALL BORESIGHT TELESCOPE AT FORWARD TARGET TF30.

    Install illumination assembly on scope.



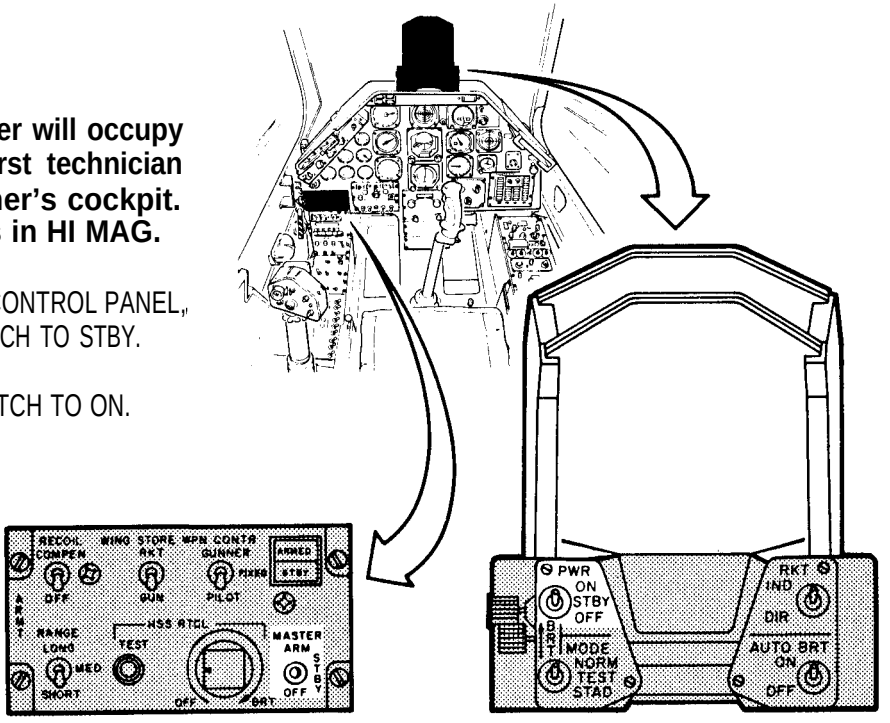
HUDS BORESIGHTING, HUD-TSU CONTROLLER CORRECTIONS (cont)

NOTE

Boresight controller will occupy pilot's cockpit. First technician will occupy gunner's cockpit. Make sure TSU is in HI MAG.

24. ON PILOT ARMAMENT CONTROL PANEL, SET MASTER ARM SWITCH TO STBY.

25. ON HUD, SET PWR SWITCH TO ON.



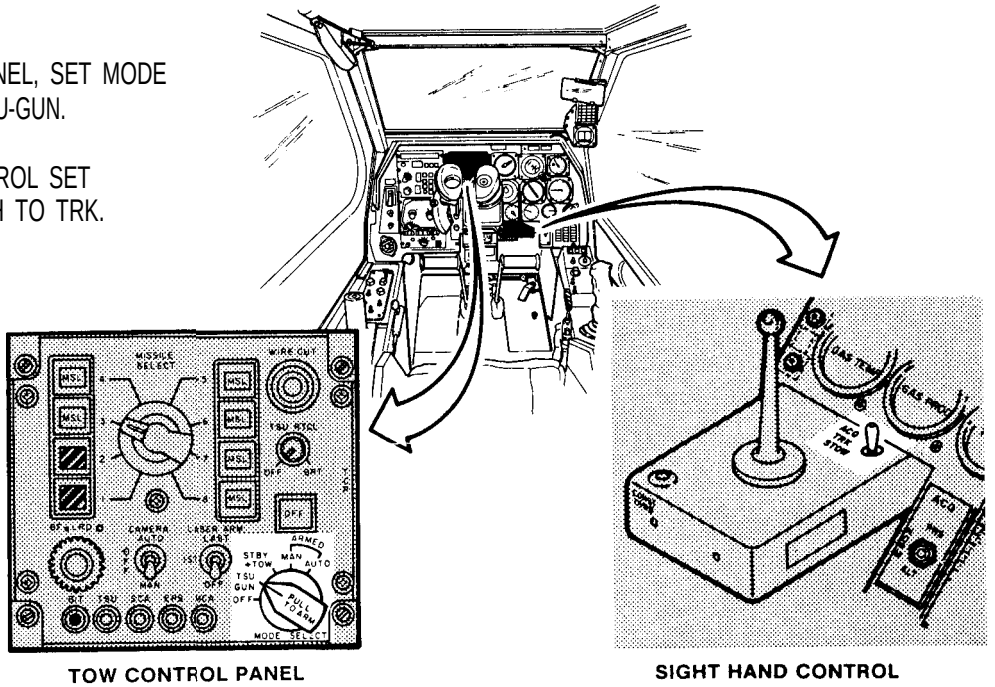
PILOT ARMAMENT CONTROL PANEL

HEAD UP DISPLAY

ARR82-25499

26. ON TOW CONTROL PANEL, SET MODE SELECT SWITCH TO TSU-GUN.

27. ON SIGHT HAND CONTROL SET ACQ/TRK/STOW SWITCH TO TRK.



TOW CONTROL PANEL

SIGHT HAND CONTROL

ARR82-25500

4-11. HEAD UP DISPLAY SUBSYSTEM (HUDS) BORESIGHTING (cont)

HUDS BORESIGHTING, HUD-TSU CONTROLLER CORRECTIONS (cont)

NOTE

If power interruption or shutdown causes removal of power from FCC, entire boresight correction procedure must be repeated.

28. ON BORESiGHT CONTROLLER, SET BORESIGHT PAIR SELECT SWITCH TO HUD-TSU.

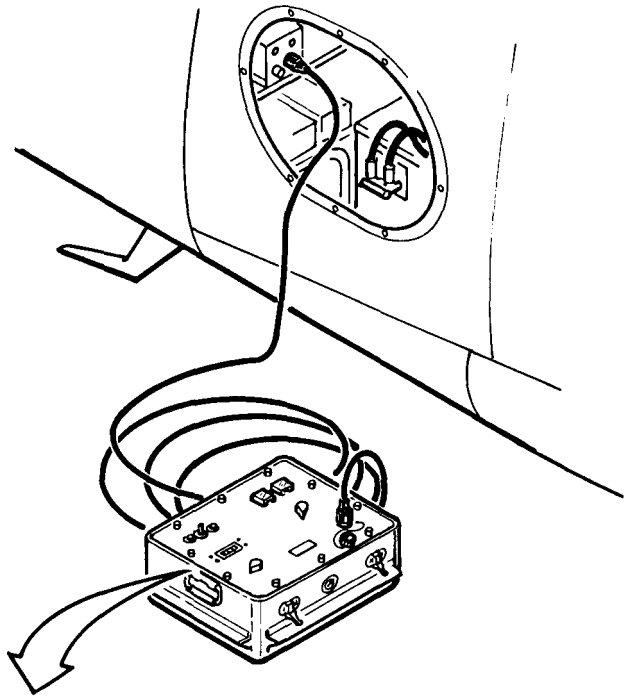
29. LIFT PLASTIC COVER AND PRESS CLEAR SELECTED PAIR SWITCH.

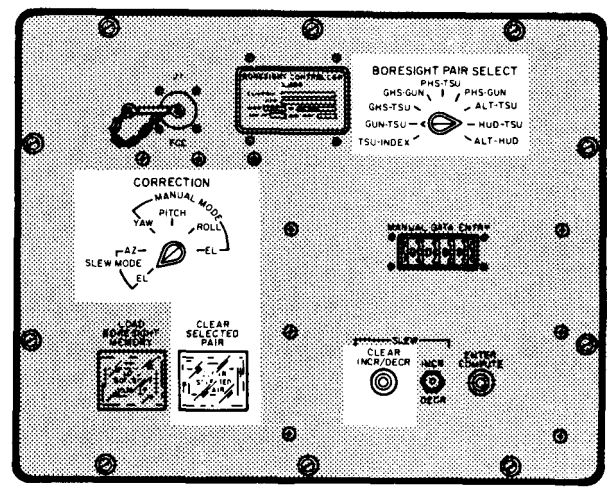
NOTE

After correction switch is set to SLEW MODE, FCC may require approximately 25 minutes to initialize. A non-initialized FCC will cause INCR/DECR switch to have no effect.

30. SET CORRECTION SWITCH TO SLEW MODE EL.

31. PRESS AND RELEASE CLEAR INCR/DECR SWITCH.





BORESIGHT CONTROLLER

ARR82-26611

HUDS BORESIGHTING, HUD-TSU CONTROLLER CORRECTIONS (cont)

NOTE

If INCR/DECR switch fails to move TSU reticle during boresight corrections, FCC may not be initialized. Return to step 29 and try INCR/DECR switch at five minute intervals. FCC may take 25 minutes to initialize.

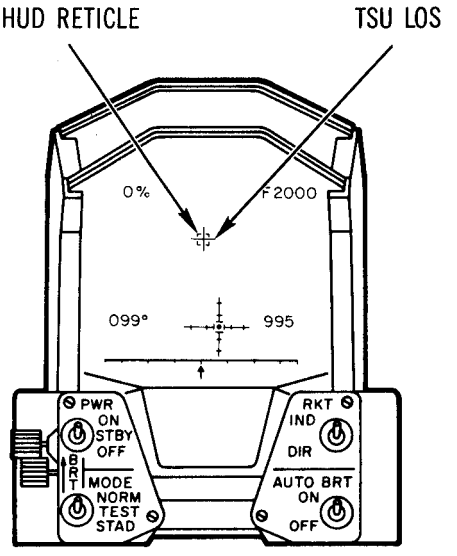
32. FIRST TECHNICIAN ALINES TSU RETICLE WITH TARGET RETICLE AT TF30.

    Reticles are held within 1/2 mr until boresight controller announces boresight corrections are complete.

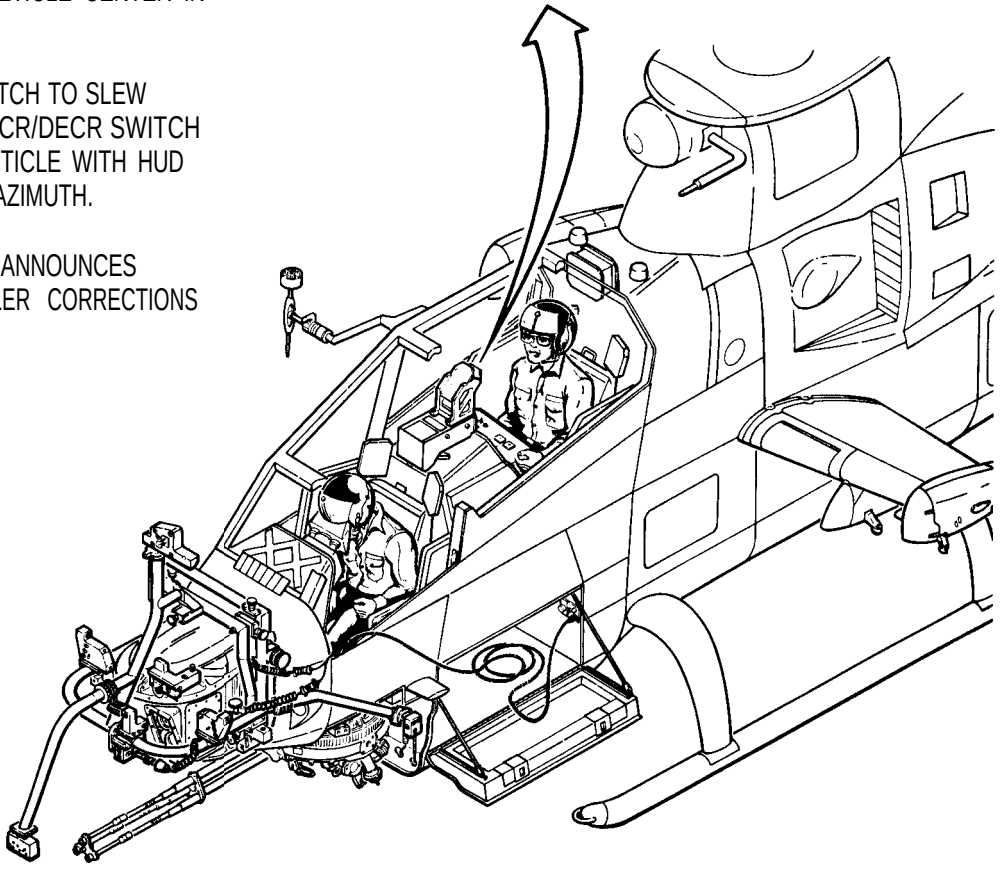
33. ON BORESIGHT CONTROLLER, USE INCR/DECR SWITCH TO ALINE TSU-LOS RETICLE WITH HUD RETICLE CENTER IN ELEVATION.

34. SET CORRECTION SWITCH TO SLEW MODE AZ AND USE INCR/DECR SWITCH TO ALINE TSU-LOS RETICLE WITH HUD RETICLE CENTER IN AZIMUTH.

35. SECOND TECHNICIAN ANNOUNCES BORESIGHT CONTROLLER CORRECTIONS COMPLETE.



HEAD UP DISPLAY

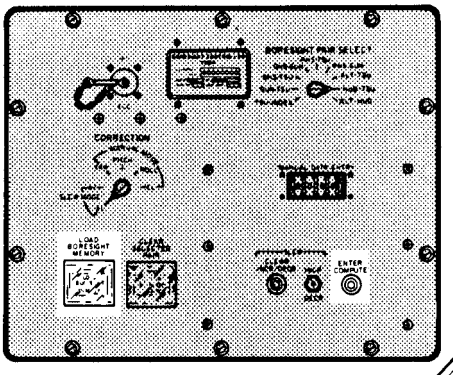


ARR82-26612

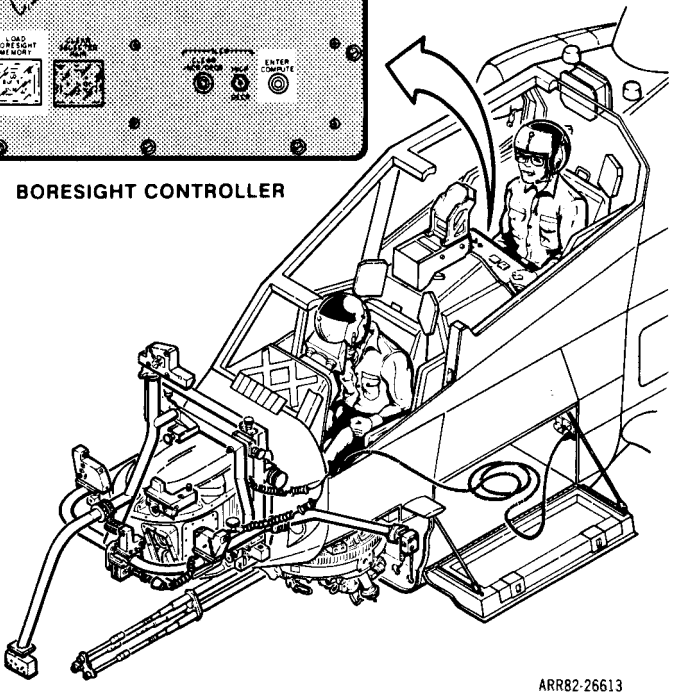
4-11. HEAD UP DISPLAY SUBSYSTEM (HUDS) BORESIGHTING (cont)

36. ON BORESIGHT CONTROLLER, PRESS AND HOLD ENTER COMPUTE BUTTON FOR APPROXIMATELY THREE SECONDS.

37. LIFT PLASTIC COVER AND PRESS LOAD BORESIGHT MEMORY SWITCH, OBSERVE THAT SWITCH ILLUMINATES BRIEFLY.

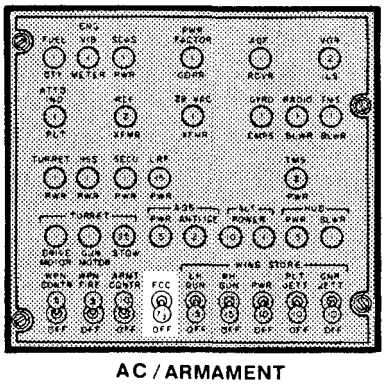


BORESIGHT CONTROLLER

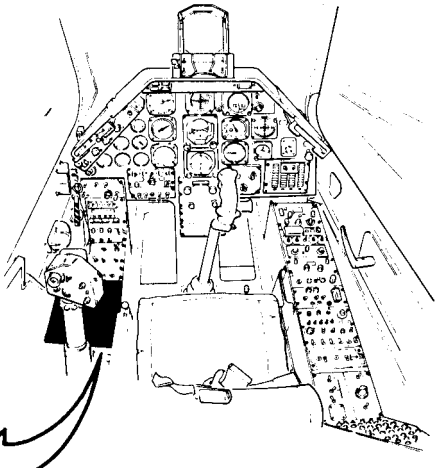


ARR82-26613

38. ON AC/ARMAMENT CIRCUIT BREAKER PANEL, SET FCC CIRCUIT BREAKER TO OFF.



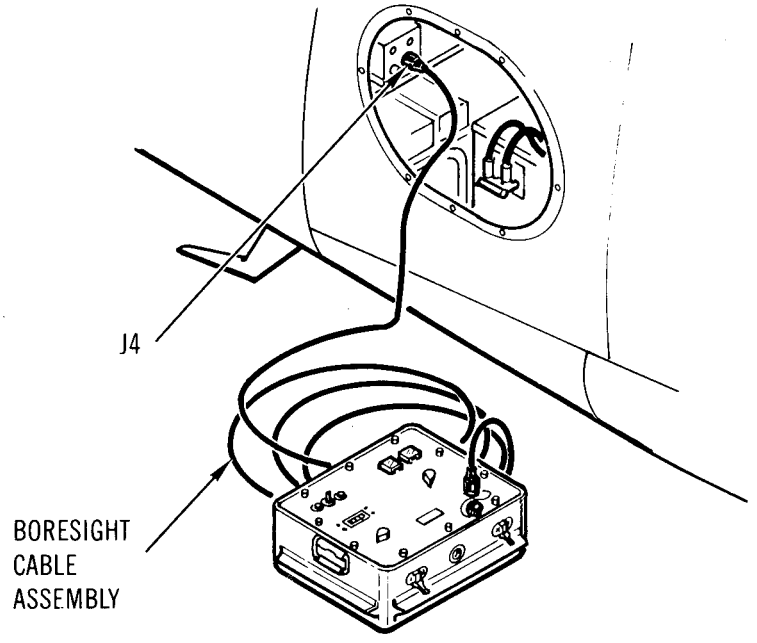
AC / ARMAMENT
CIRCUIT BREAKER PANEL



ARR82-26614

HUDS BORESIGHTING, HUD-TSU CONTROLLER CORRECTIONS (cont)

39. DISCONNECT BORESIGHT CABLE ASSEMBLY FROM FCC TEST CONNECTOR J4.

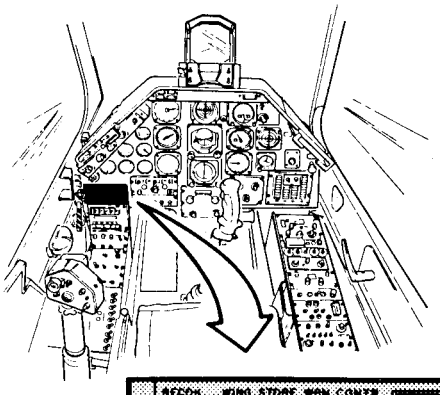


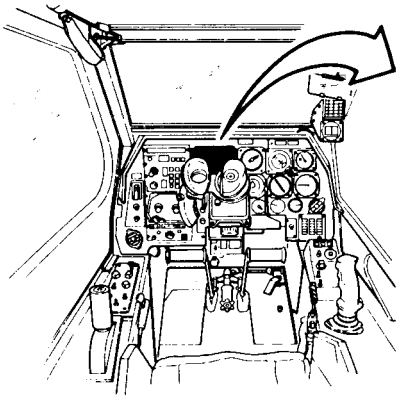
POST HUDS BORESIGHTING PROCEDURES

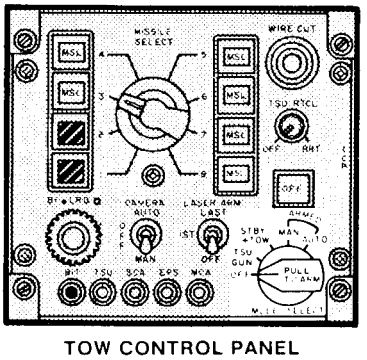
40. ON TOW CONTROL PANEL, SET MODE SELECT SWITCH TO OFF.

41. ON PILOT ARMAMENT CONTROL PANEL, SET MASTER ARM SWITCH TO OFF.

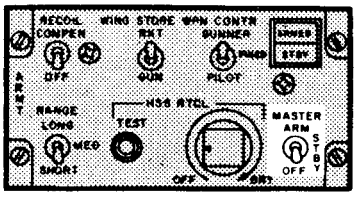
42. CONTINUE BORESIGHTING AS REQUIRED OR PERFORM POST BORESIGHTING PROCEDURES,PARA 4-14.







TOW CONTROL PANEL



PILOT ARMAMENT CONTROL PANEL

END OF TASK

PARAGRAPH 4-12 DELETED

4-13. ROCKET LAUNCHER BORESIGHTING

DESCRIPTION

This task covers the following subtasks:

Inboard seven-tube rocket launcher boresighting
Inboard 19-tube rocket launcher boresighting
Outboard seven-tube rocket launcher boresighting
Outboard 19-tube rocket launcher boresighting

INITIAL SETUP

Tools/Test and Support Equipment:
ToolSet, A/C Armament Repairman: Basic
Tool Set, A/C Armament Repairman: Supplemental
Boresight Assembly Ground Support Equipment (BAGSE)
Ejector Rack Wrench

Personnel Required:
68J Aircraft Fire Control Repairer (3)

References:
TM 9-1055-460-13&P
TM 55-1520-236-23

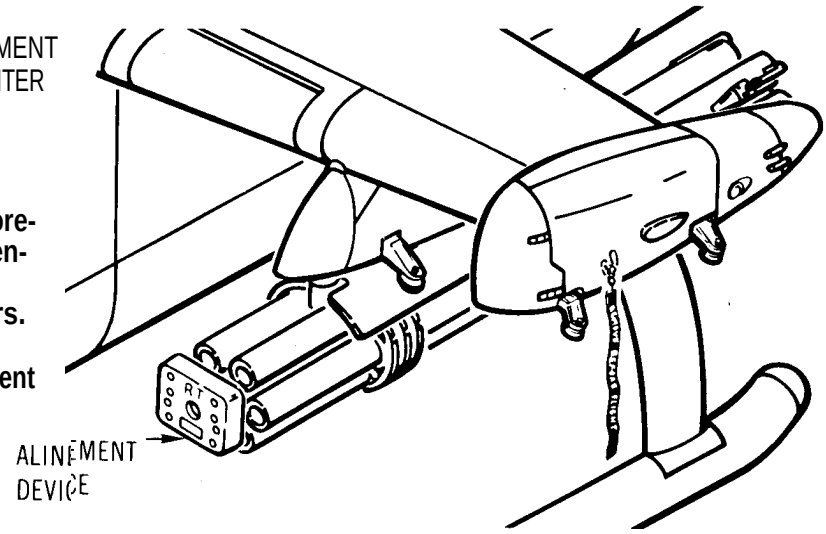
Equipment Conditions:
Outboard and inboard ejector racks installed and alined, see TM 55-1520-236-23.
BAGSE ALINEMENT TO HELICOPTER performed, para 4-5.
Rocket launchers installed on inboard or outboard ejector rack, see TM 9-1055-460-13&P.

INBOARD SEVEN-TUBE ROCKET LAUNCHER BORESIGHTING

1. INSTALL ROCKET LAUNCHER ALINEMENT DEVICE IN ROCKET LAUNCHER CENTER TUBE.

NOTE

The following procedure is for boresighting the M158 and M260 seven-tube launchers. Procedures are similar for both rocket launchers. When boresighting the M260, use boresight telescope in the alinement hole ending with the letter A.



INBOARD SEVEN-TUBE ROCKET LAUNCHER BORESIGHTING (cont)

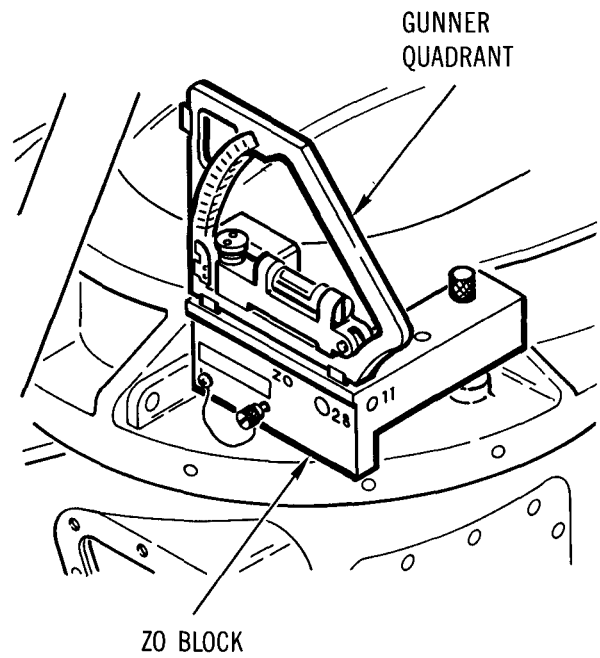
NOTE

During alinement procedure using gunner quadrant, helicopter must remain level. Technicians will take their positions prior to alinement and will remain at their positions until boresight of the particular unit is complete.

2. PLACE GUNNER QUADRANT ON ZO BLOCK.

   Position quadrant so level bubble will sense roll.

3. ADJUST QUADRANT SCALE TO CENTER LEVEL BUBBLE.



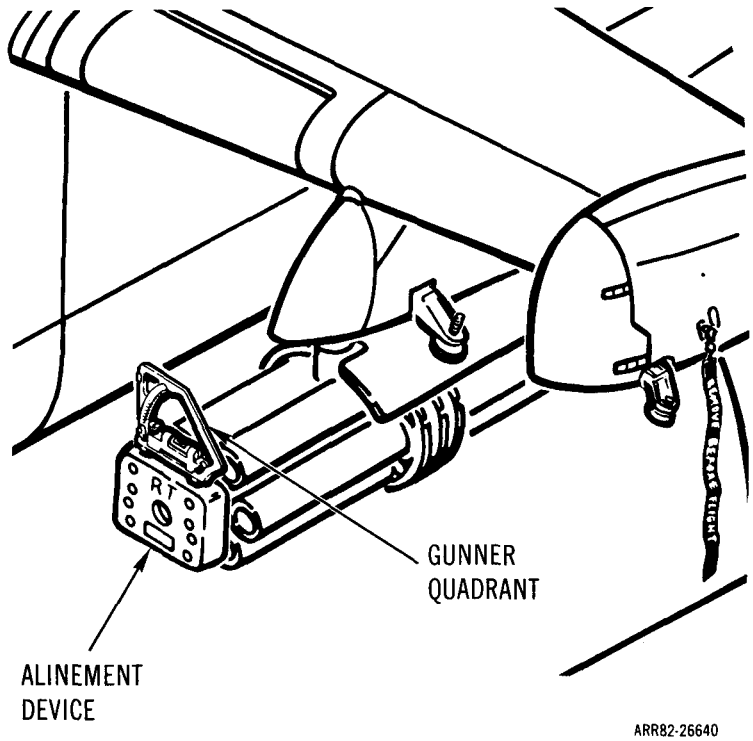
ARR82-26639

4. TRANSFER GUNNER QUADRANT TO ROCKET LAUNCHER ALINEMENT DEVICE.

   a. Do not change quadrant scale setting established at Z0 block.

   b. Place quadrant on alinement device in same transverse orientation established at Z0 block.

5. ROTATE ALINEMENT DEVICE TO CENTER QUADRANT LEVEL BUBBLE AND MAINTAIN THIS ALINEMENT THROUGHOUT PROCEDURE.

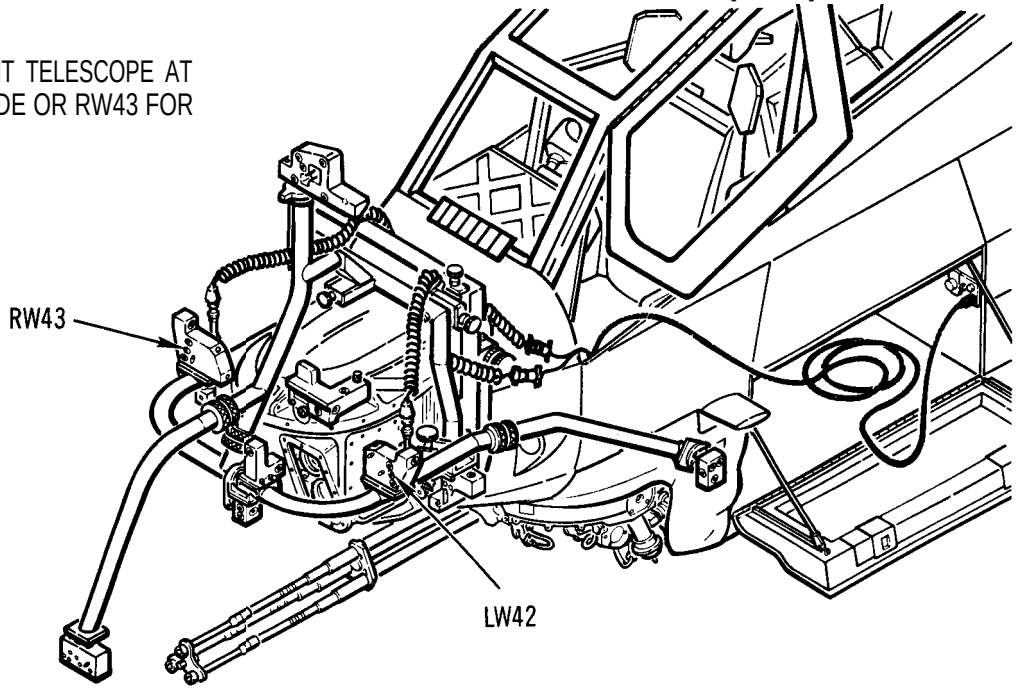


ARR82-26640

4-13. ROCKET LAUNCHER BORESIGHTING (cont)

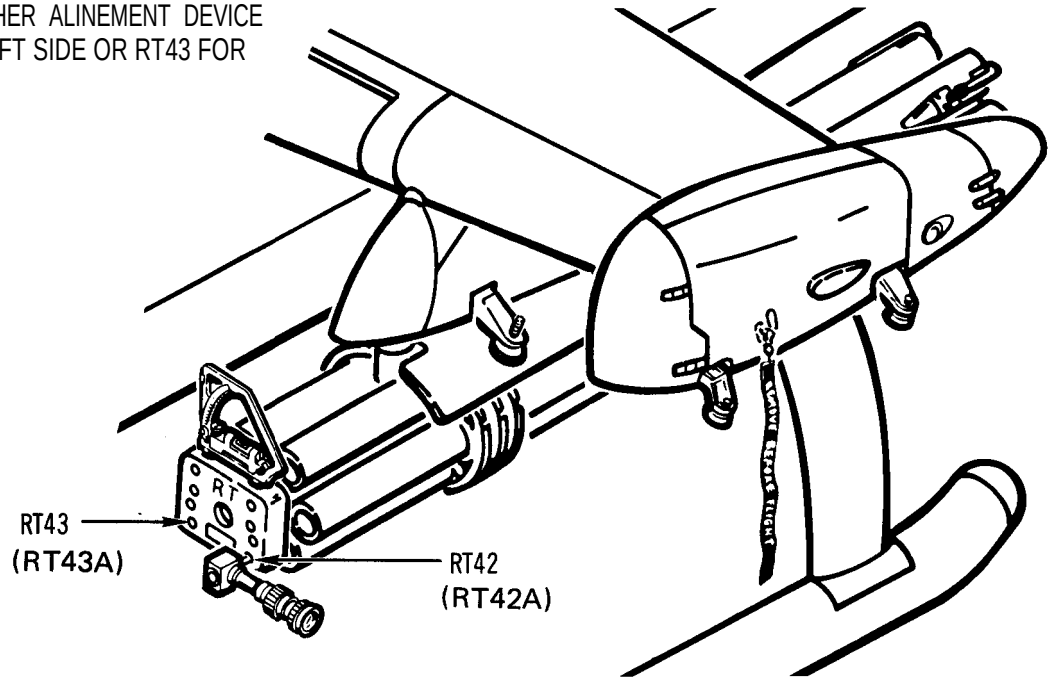
INBOARD SEVEN-TUBE ROCKET LAUNCHER BORESIGHT (cont).

6. INSTALL BORESIGHT TELESCOPE AT LW42 FOR LEFT SIDE OR RW43 FOR RIGHT SIDE.



ARR82-26641

7. INSTALL BORESIGHT TELESCOPE IN ROCKET LAUNCHER ALINEMENT DEVICE AT RT42 FOR LEFT SIDE OR RT43 FOR RIGHT SIDE.



ARR82-26642

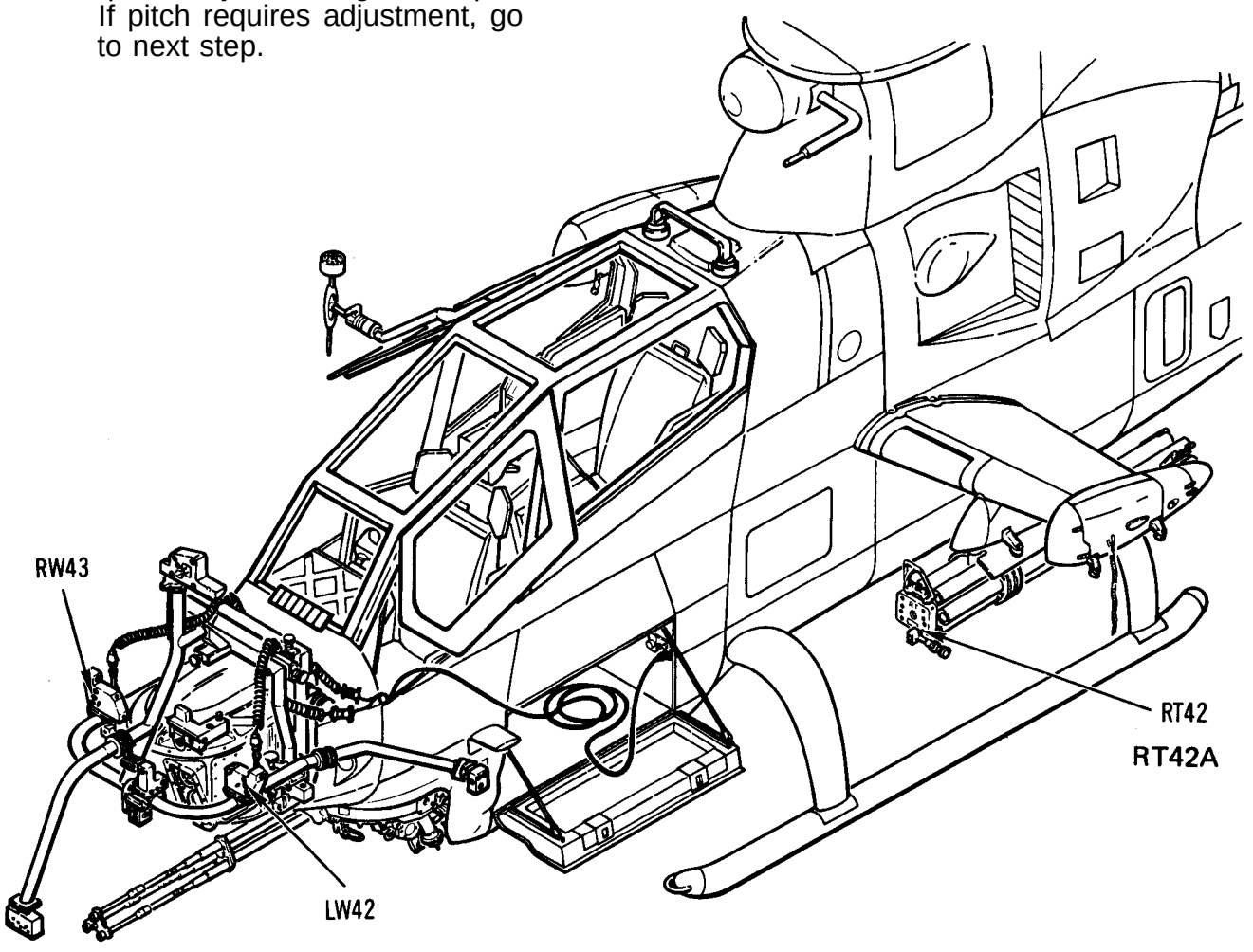
INBOARD SEVEN-TUBE ROCKET LAUNCHER BORESIGHTING (cont)

8. CHECK ROCKET LAUNCHER ALINEMENT.

   a. Sight through scope at RT42 (RT43 for right side) to target scope at LW42 (RW43 for right side) and view reticles. Desired reticle offset is less than 1 mr. Maximum offset is 3 mr.

   b. If reticles are within tolerance, alinement is not required; go to step 15.

   If reticles are not alined, yaw and/or pitch must be adjusted; go to next step. If yaw only requires adjustment, go to step 12. If pitch requires adjustment, go to next step.



ARR82-26643

4-13. ROCKET LAUNCHER BORESIGHTING (cont)

INBOARD SEVEN-TUBE ROCKET LAUNCHER BORESIGHTING (cont)

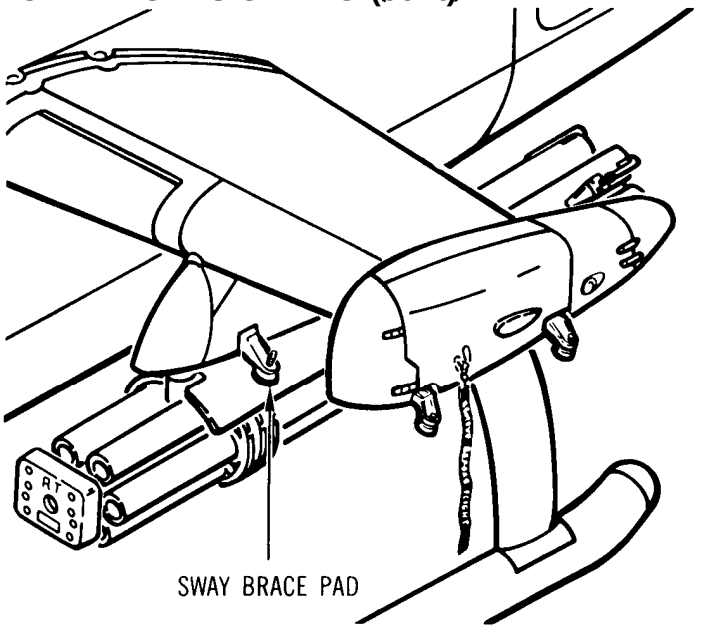
CAUTION

Remove gunner quadrant and boresight telescope when removing and installing rocket launcher.

NOTE

Rocket launcher must be removed to make pitch adjustment.

9. LOOSEN SWAY BRACE PADS AND REMOVE ROCKET LAUNCHER, SEE TM 9-1055-460-13&P.



ARR82 26644

CAUTION

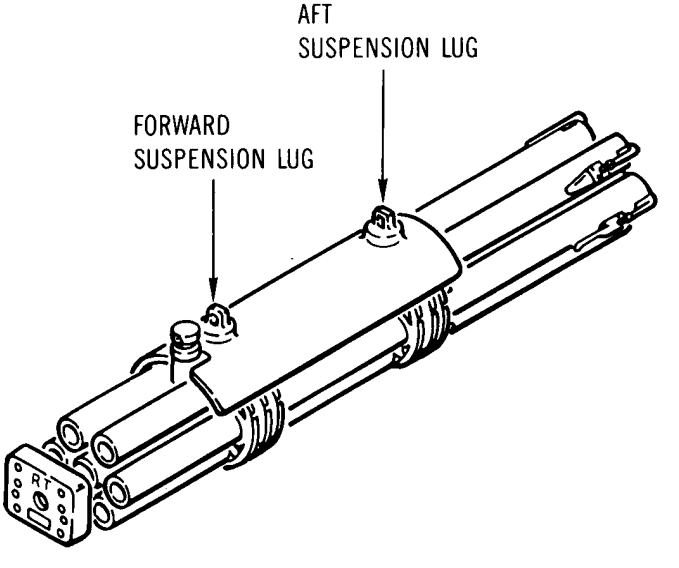
Do not loosen suspension lug more than one full turn from setting established at installation of lugs. See TM 9-1055-460-13&P.

NOTE

- **One half turn of suspension lug equals approximately 3 mr elevation of the launcher.**
- **V1260 and M261 launcher Suspension lugs are not adjustable. Recheck ejector rack aline ment. See TM 55-1520-236-23.**

10. ADJUST FORWARD AND/OR AFT SUSPENSION LUGS IN OR OUT.

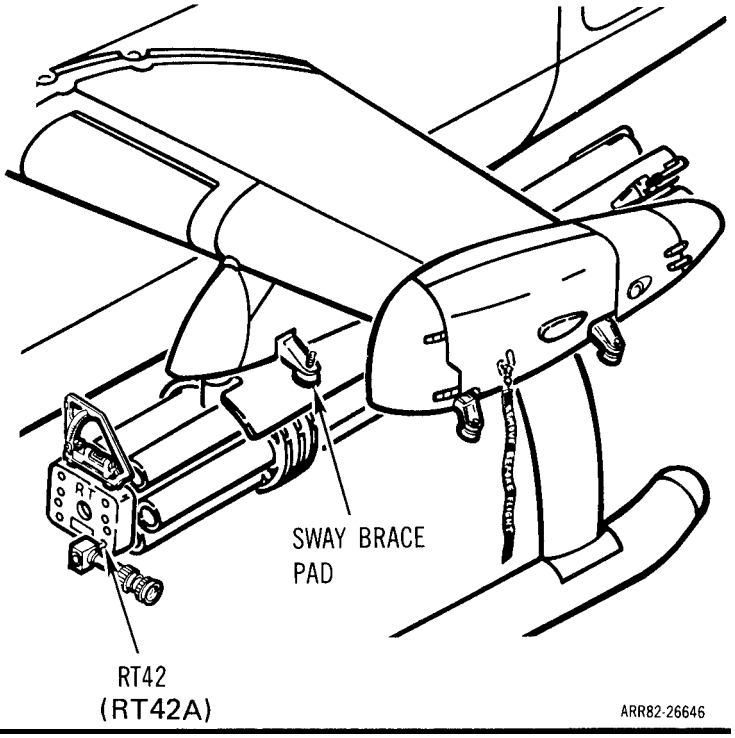
11. INSTALL ROCKET LAUNCHER, SEE TM 9-1055-460-13&P. CHECK SIGHTINGS, AND REPEAT PITCH ADJUSTMENT AS NECESSARY.



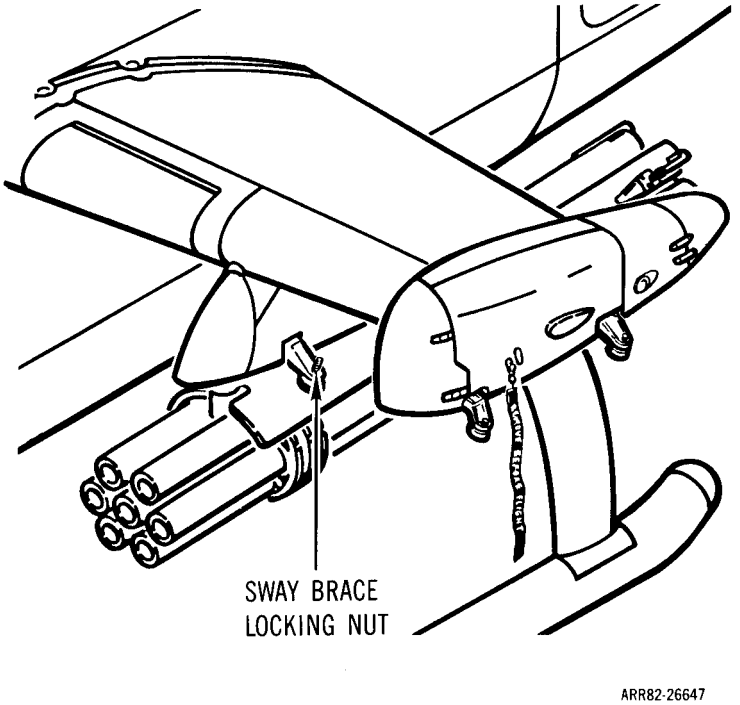
ARR82 26645

INBOARD SEVEN-TUBE ROCKET LAUNCHER BORESIGHTING (cont)

12. ALINE ROCKET LAUNCHER IN YAW.
    a. Sight through scope at RT42 (RT43 for right side) to target scope at LW42 (RW43 for right side).
    b. Adjust sway brace pads in or out to aline vertical reticles.
13. TORQUE SWAY BRACE PADS TO 60 LB-IN. (6.78 N.m) WHILE MAINTAINING PITCH AND YAW ALINEMENT.



14. TIGHTEN SWAY BRACE LOCKING NUTS WHILE HOLDING SWAY BRACE PADS IN FIXED POSITION.
15. REMOVE GUNNER QUADRANT, BORESIGHT TELESCOPE, AND ROCKET LAUNCHER ALINEMENT DEVICE.
16. CONTINUE BORESIGHTING AS REQUIRED OR PERFORM POST BORESIGHTING PROCEDURES, PARA 4-14.



END OF SUBTASK

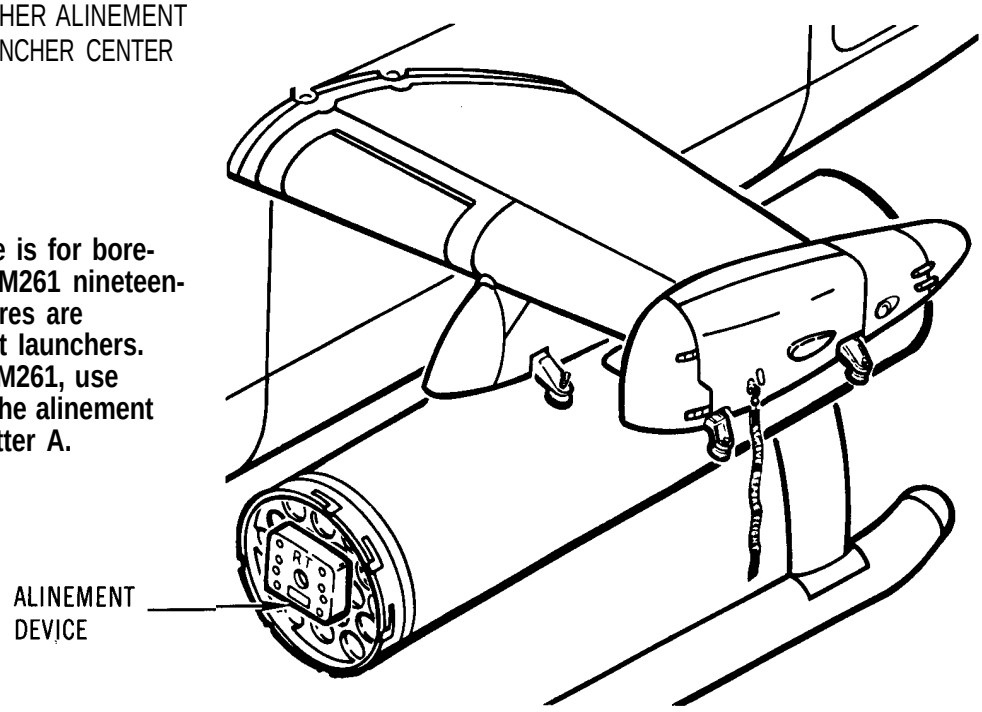
4-13. ROCKET LAUNCHER BORESIGHTING (cont)

INBOARD 19-TUBE ROCKET LAUNCHER BORESIGHTING

1. INSTALL ROCKET LAUNCHER ALINEMENT DEVICE IN ROCKET LAUNCHER CENTER TUBE.

NOTE

The following procedure is for boresighting the M200 and M261 nineteen-tube launchers. Procedures are identical for both rocket launchers. When boresighting the M261, use boresight telescope in the alinement hole ending with the letter A.



ARR82-26648

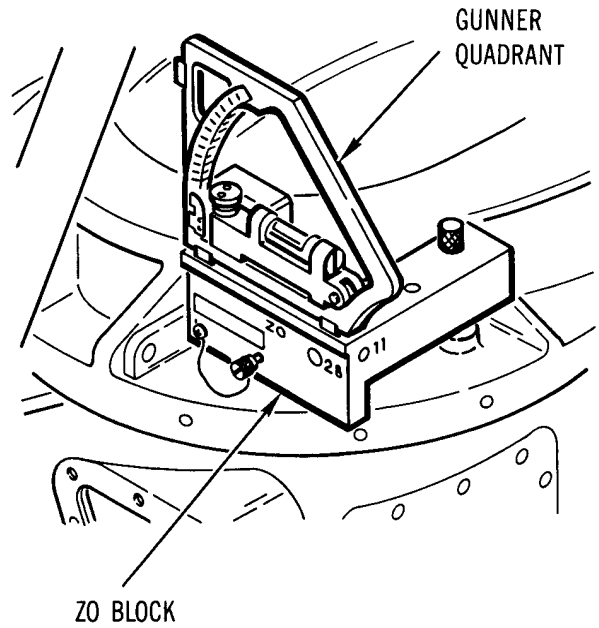
NOTE

During alinement procedure using-gunner quadrant, helicopter must remain level. Technicians will take their positions prior to alinement and will remain at their positions until boresight of the particular unit is complete.

2. PLACE GUNNER QUADRANT ON Z0 BLOCK.

   Position quadrant so level bubble will sense roll.

3. ADJUST QUADRANT SCALE TO CENTER LEVEL BUBBLE.

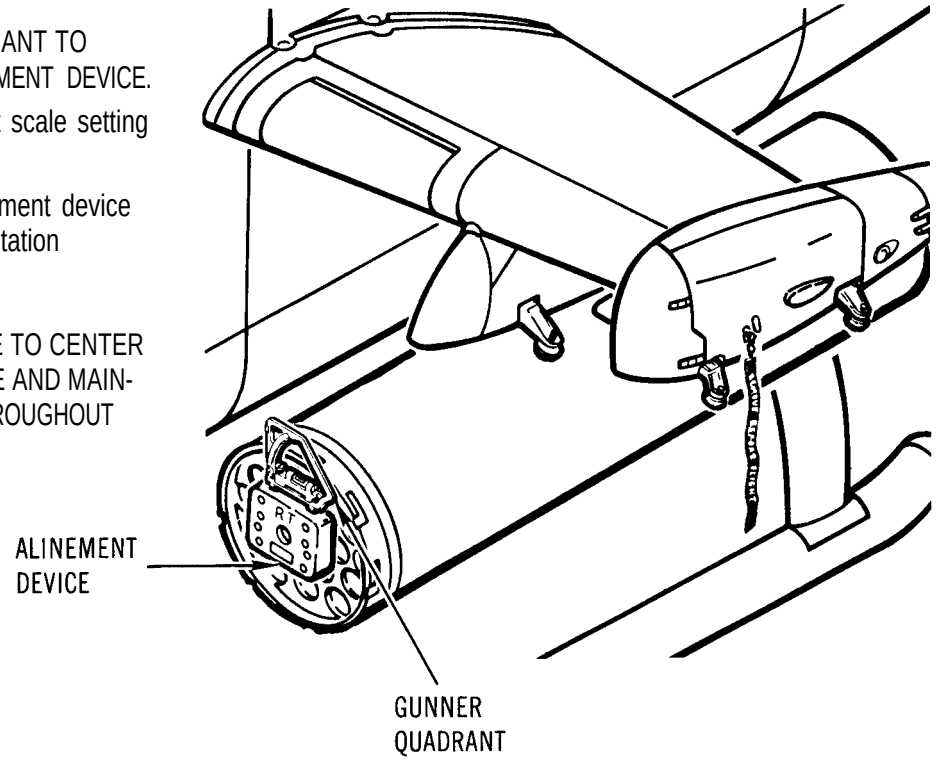


ARR82-26649

INBOARD 19-TUBE ROCKET LAUNCHER BORESIGHTING (cont)

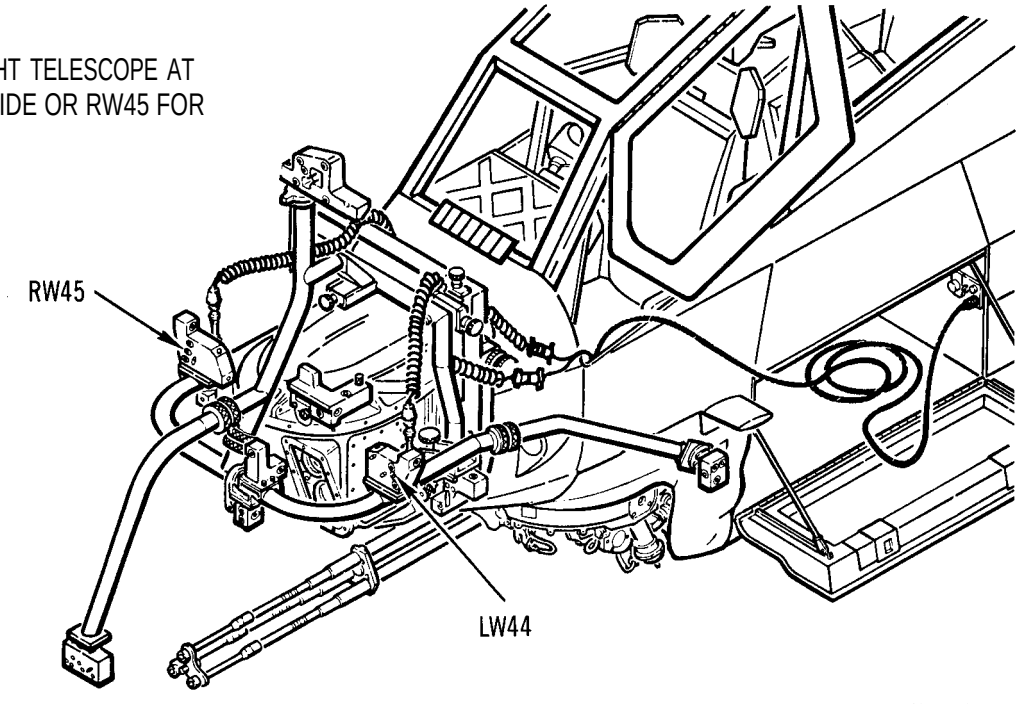
4. TRANSFER GUNNER QUADRANT TO ROCKET LAUNCHER ALINEMENT DEVICE.
   a. Do not change quadrant scale setting established at Z0 block.
   b. Place quadrant on alinement device in same transverse orientation established at Z0 block.

5. ROTATE ALINEMENT DEVICE TO CENTER QUADRANT LEVEL BUBBLE AND MAINTAIN THIS ALINEMENT THROUGHOUT PROCEDURE.



ARR82-26650

6. INSTALL BORESIGHT TELESCOPE AT LW44 FOR LEFT SIDE OR RW45 FOR RIGHT SIDE.



ARR82-26651

4-13. ROCKET LAUNCHER BORESIGHTING (cont)

INBOARD 19-TUBE ROCKET LAUNCHER BORESIGHTING (cont)

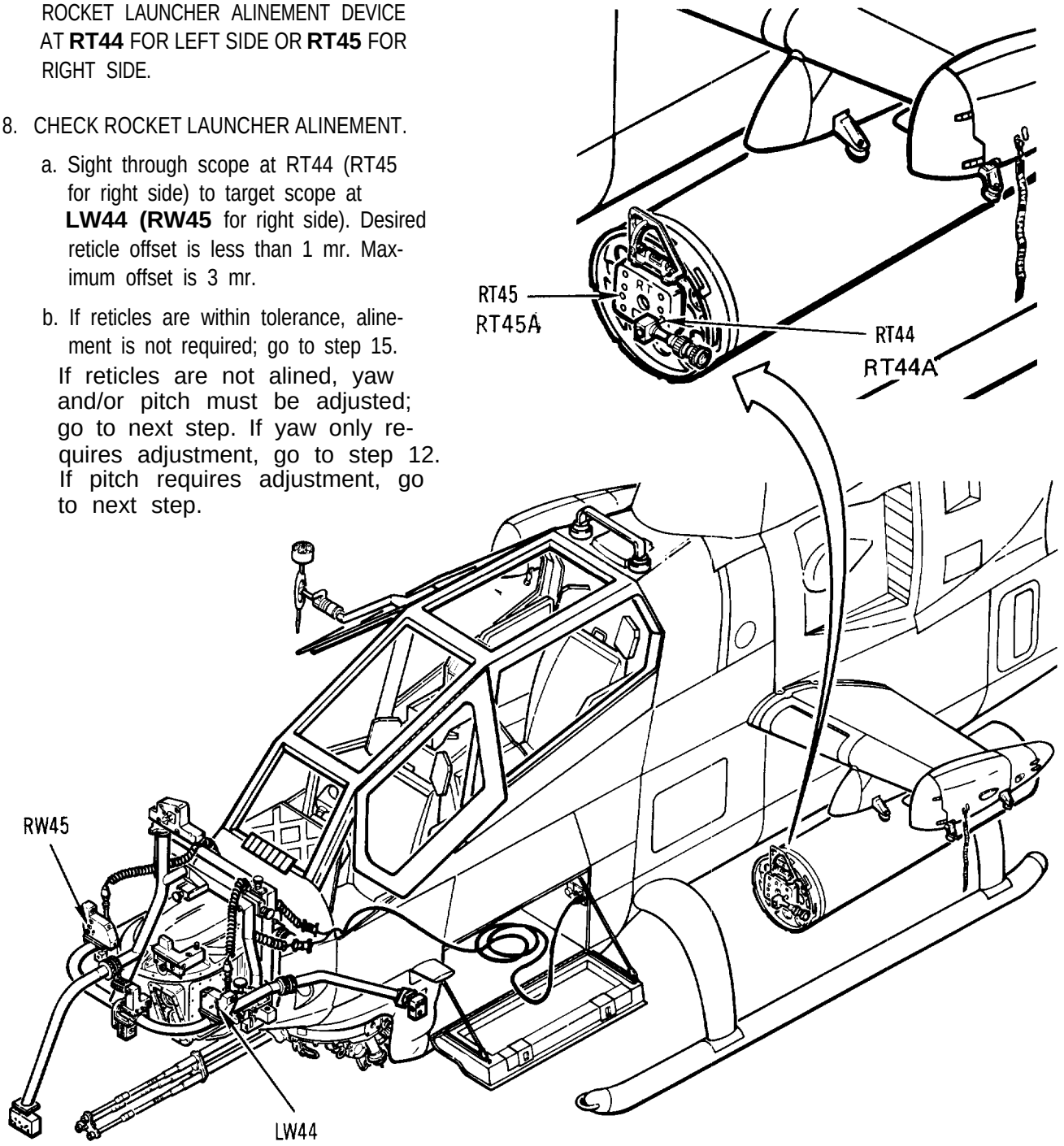
7. INSTALL BORESIGHT TELESCOPE IN ROCKET LAUNCHER ALINEMENT DEVICE AT **RT44** FOR LEFT SIDE OR **RT45** FOR RIGHT SIDE.

8. CHECK ROCKET LAUNCHER ALINEMENT.

   a. Sight through scope at RT44 (RT45 for right side) to target scope at **LW44 (RW45** for right side). Desired reticle offset is less than 1 mr. Maximum offset is 3 mr.

   b. If reticles are within tolerance, alinement is not required; go to step 15.

   If reticles are not alined, yaw and/or pitch must be adjusted; go to next step. If yaw only requires adjustment, go to step 12. If pitch requires adjustment, go to next step.



ARR82-26652

INBOARD 19-TUBE ROCKET LAUNCHER BORESIGHTING (cont)

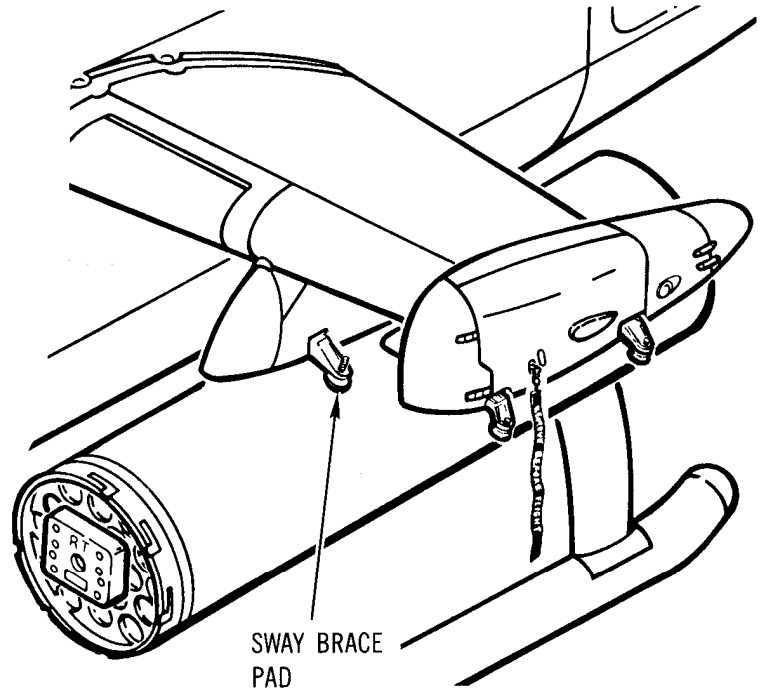
CAUTION

Remove gunner quadrant and boresight telescope when removing and installing rocket launcher.

NOTE

Rocket launcher must be removed to make pitch adjustment.

9. LOOSEN SWAY BRACE PADS AND REMOVE ROCKET LAUNCHER, SEE TM 9-1055-460-13&P.



ARR82-26653

CAUTION

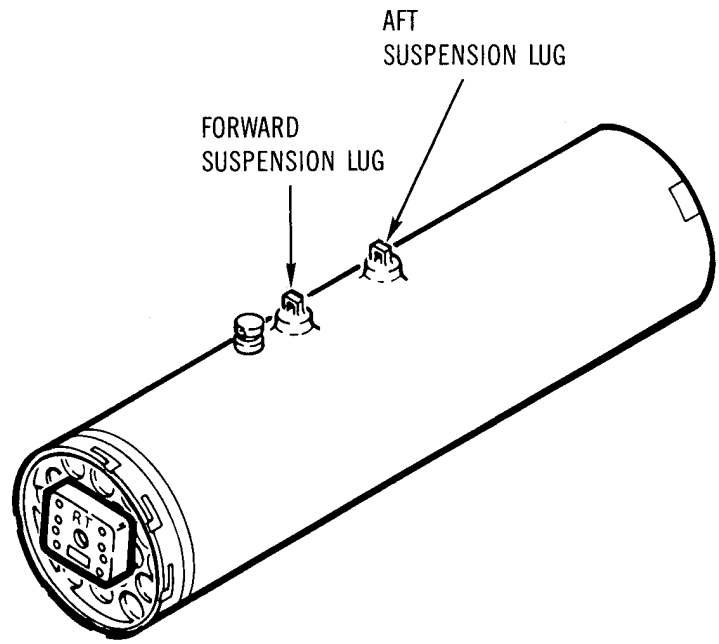
Do not loosen suspension lug more than one full turn from setting established at installation.

NOTE

One half turn of suspension lug equals approximately 3 mr elevation of rocket launcher.

10. ADJUST FORWARD AND/OR AFT SUSPENSION LUGS IN OR OUT.

11. INSTALL ROCKET LAUNCHER, SEE TM 9-1055-460-13&P. CHECK SIGHTINGS, AND REPEAT PITCH ADJUSTMENT AS NECESSARY.



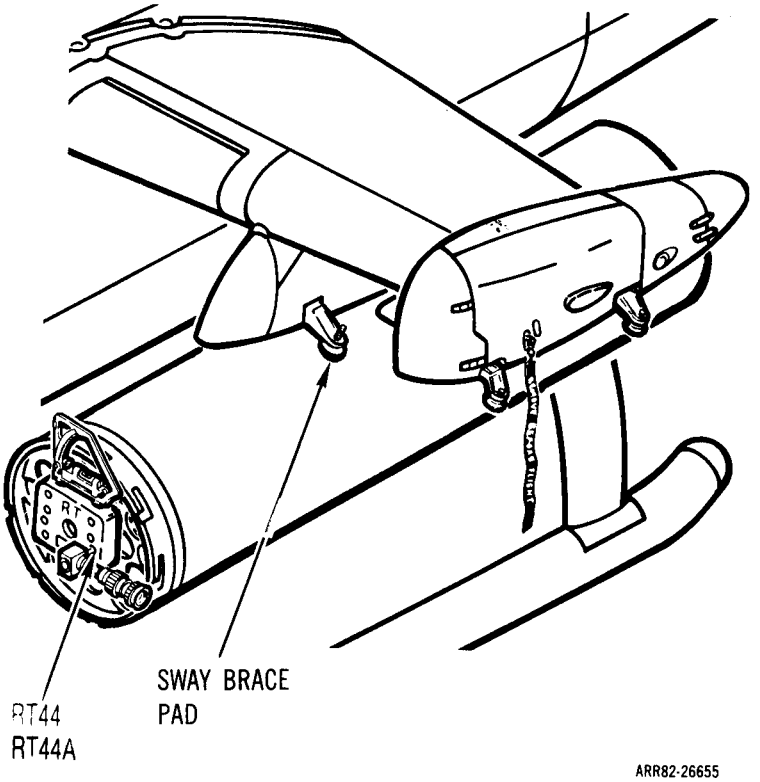
ARR82-26654

4-13. ROCKET LAUNCHER BORESIGHTING (cont)

INBOARD 19-TUBE ROCKET LAUNCHER BORESIGHTING (cont)

12. ALINE ROCKET LAUNCHER IN YAW.
    a. Sight through scope at RT44 (RT45 for right side) to target scope at LW44 (RW45 for right side).
    b. Adjust sway brace pads in or out to aline verticle reticles.

13. TORQUE SWAY BRACE PADS TO 60 LB-IN. (6.78 N.m) WHILE MAINTAINING PITCH AND YAW ALINEMENT.

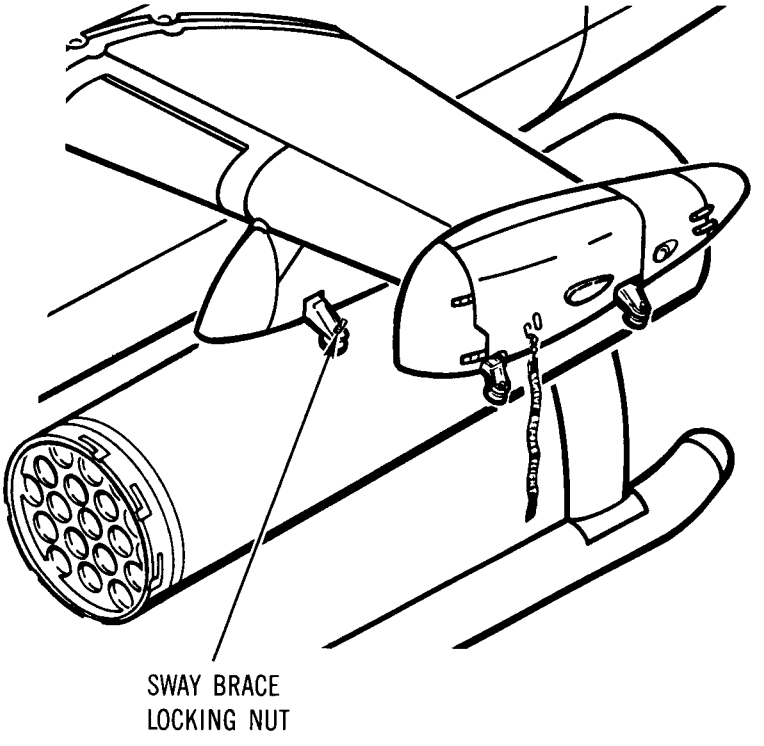


ARR82-26655

14. TIGHTEN SWAY BRACE LOCKING NUTS WHILE HOLDING SWAY BRACE PADS IN FIXED POSITION.

15. REMOVE GUNNER QUADRANT, BCXE-SIGHT TELESCOPE, AND ROCKET LAUNCHER ALINEMENT DEVICE.

16. CONTINUE BORESIGHTING AS REQUIRED OR PERFORM POST BORESIGHTING PROCEDURES, PARA 4-14.



ARR82-26656

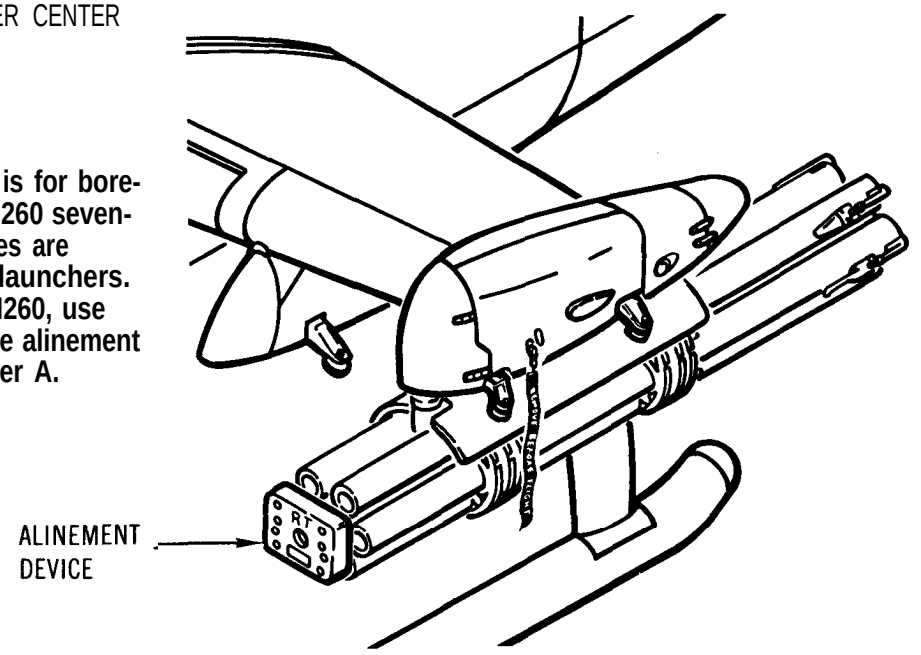
END OF SUBTASK

OUTBOARD SEVEN-TUBE ROCKET LAUNCHER BORESIGHTING

1. INSTALL ROCKET LAUNCHER ALINEMENT DEVICE IN ROCKET LAUNCHER CENTER TUBE.

NOTE

The following procedure is for boresighting the M 158 and M260 seven-tube launchers. Procedures are similar for both rocket launchers. When boresighting the M260, use boresight telescope in the alinement hole ending with the letter A.



ARR82-26657

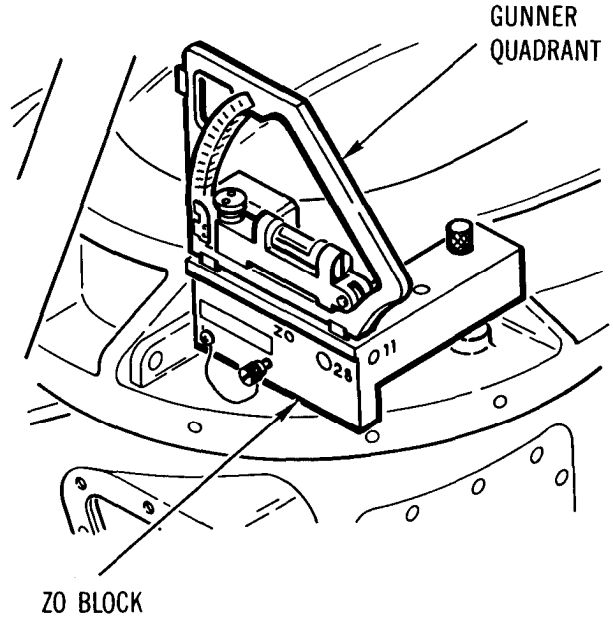
NOTE

During alinement procedure using gunner quadrant, helicopter must remain level. Technicians will take their positions prior to alinement and will remain at their positions until boresight of the particular unit is complete.

2. PLACE GUNNER QUADRANT ON Z0 BLOCK.

   Position quadrant so level bubble will sense roll.

3. ADJUST QUADRANT SCALE TO CENTER LEVEL BUBBLE.



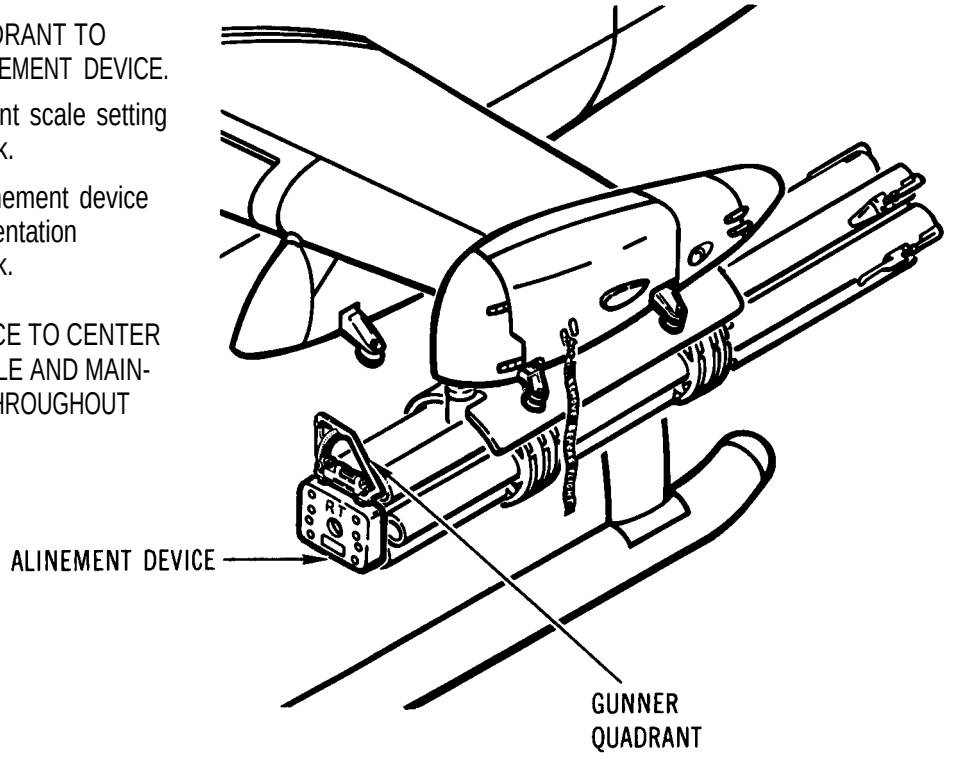
ARR82-26658

4-13. ROCKET LAUNCHER BORESIGHTING (cont)

OUTBOARD SEVEN-TUBE ROCKET LAUNCHER BORESIGHTING (cont)

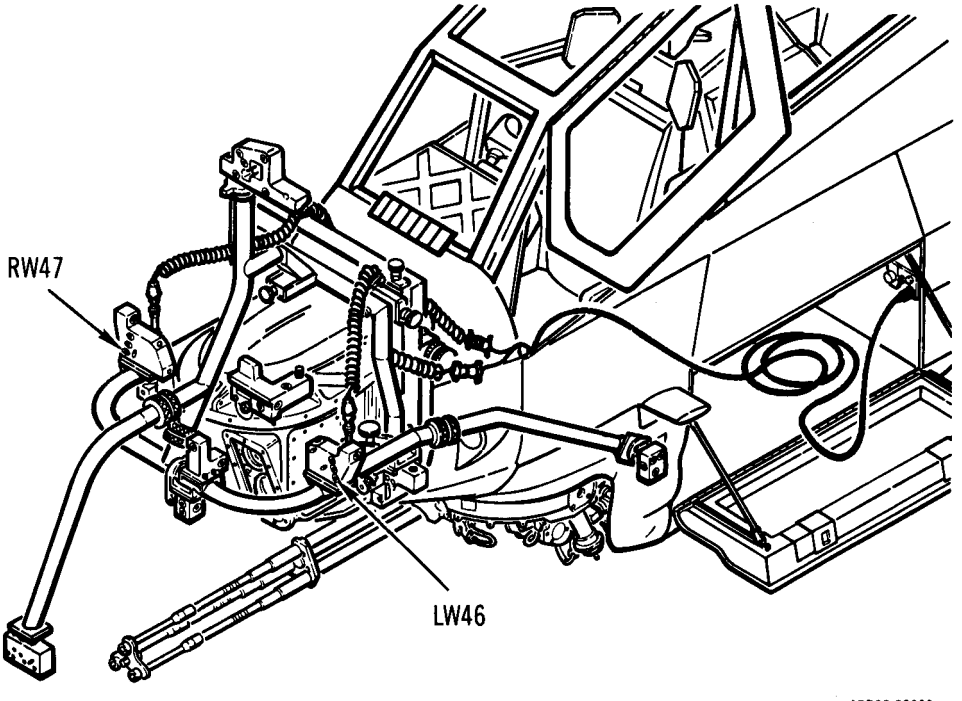
4. TRANSFER GUNNER QUADRANT TO ROCKET LAUNCHER ALINEMENT DEVICE.
   a. Do not change quadrant scale setting established at Z0 block.
   b. Place quadrant on alinement device in same transverse orientation established at Z0 block.

5. ROTATE ALINEMENT DEVICE TO CENTER QUADRANT LEVEL BUBBLE AND MAINTAIN THIS ALINEMENT THROUGHOUT PROCEDURE.



ARR82-26659

6. INSTALL BORESIGHT LW46 FOR LEFT SIDE RIGHT SIDE.



ARR82-26660

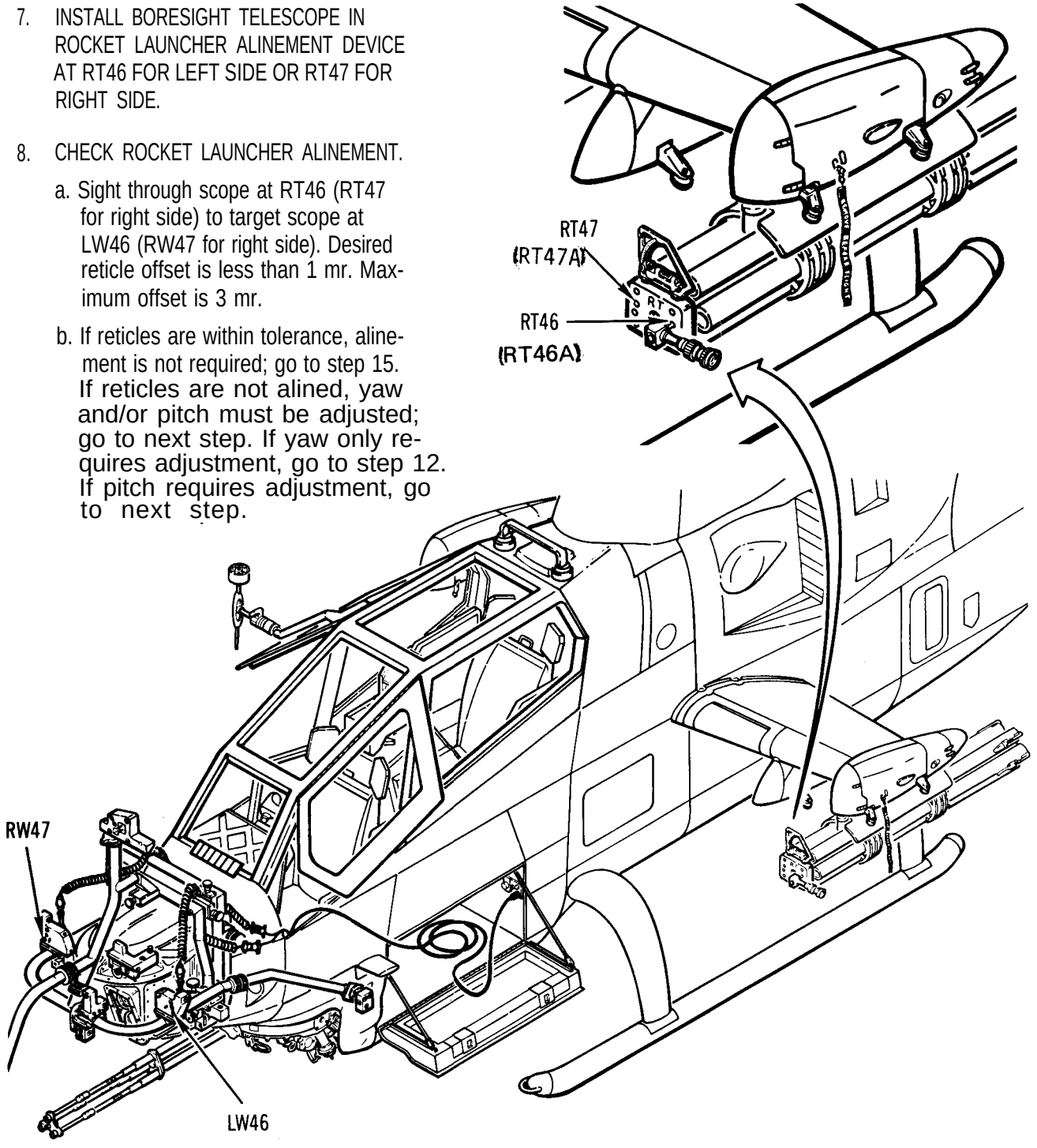
OUTBOARD SEVEN-TUBE ROCKET LAUNCHER BORESIGHTING (cont)

7. INSTALL BORESIGHT TELESCOPE IN ROCKET LAUNCHER ALINEMENT DEVICE AT RT46 FOR LEFT SIDE OR RT47 FOR RIGHT SIDE.

8. CHECK ROCKET LAUNCHER ALINEMENT.

   a. Sight through scope at RT46 (RT47 for right side) to target scope at LW46 (RW47 for right side). Desired reticle offset is less than 1 mr. Maximum offset is 3 mr.

   b. If reticles are within tolerance, alinement is not required; go to step 15. If reticles are not alined, yaw and/or pitch must be adjusted; go to next step. If yaw only requires adjustment, go to step 12. If pitch requires adjustment, go to next step.



ARR82-26661

4-13. ROCKET LAUNCHER BORESIGHTING (cont)

OUTBOARD SEVEN-TUBE ROCKET LAUNCHER BORESIGHTING (cont)

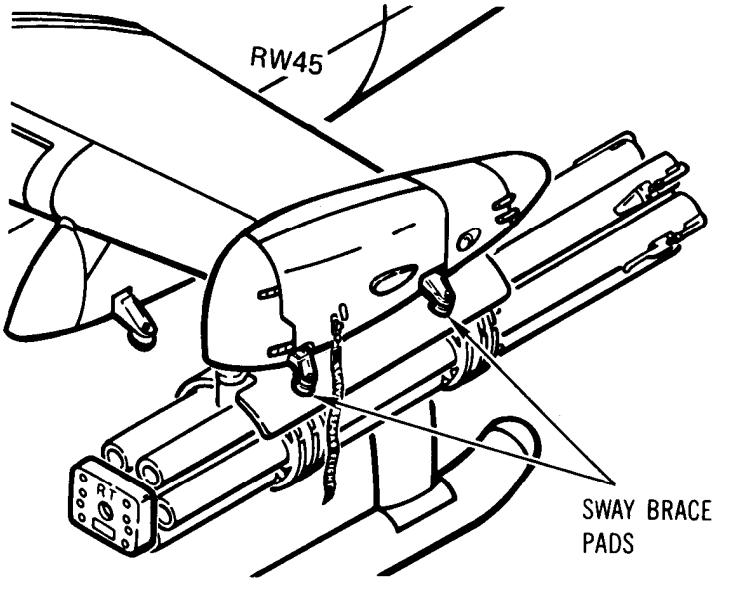
CAUTION

Remove gunner quadrant and boresight telescope when removing and installing rocket launcher.

NOTE

Rocket launcher must be removed to make pitch adjustment.

9. LOOSEN SWAY BRACE PADS AND REMOVE ROCKET LAUNCHER, SEE TM 9-1055-460-13&P.



ARR82-26662

CAUTION

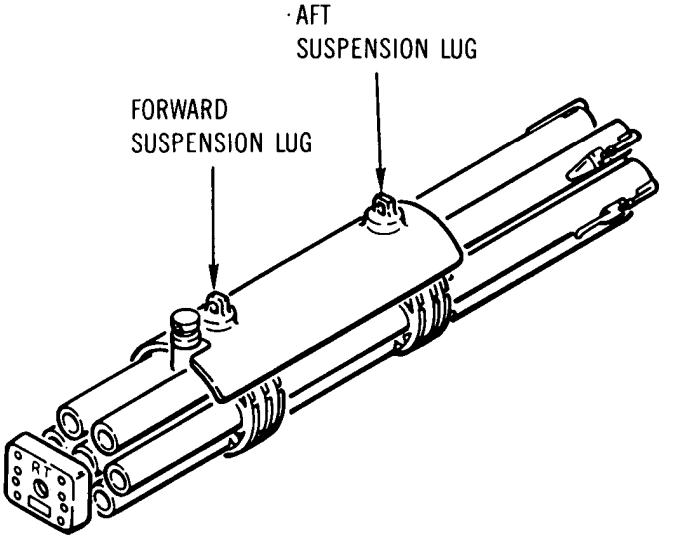
Do not loosen suspension lug more than one full turn from setting established at installation of lugs. See TM 9-1055-46O-13&P.

NOTE

- **One half turn of suspension lug equals approximately 3 mr elevation of the launcher.**
- **M260 and M261 launcher suspension lugs are not adjustable. Recheck ejector rack alinement. See TM 55-1520-236-23.**

10. ADJUST FORWARD AND/OR AFT SUSPENSION LUGS IN OR OUT.

11. INSTALL ROCKET LAUNCHER, SEE TM 9-1055-460-13&P. CHECK SIGHTINGS, AND REPEAT PITCH ADJUSTMENT AS NECESSARY.

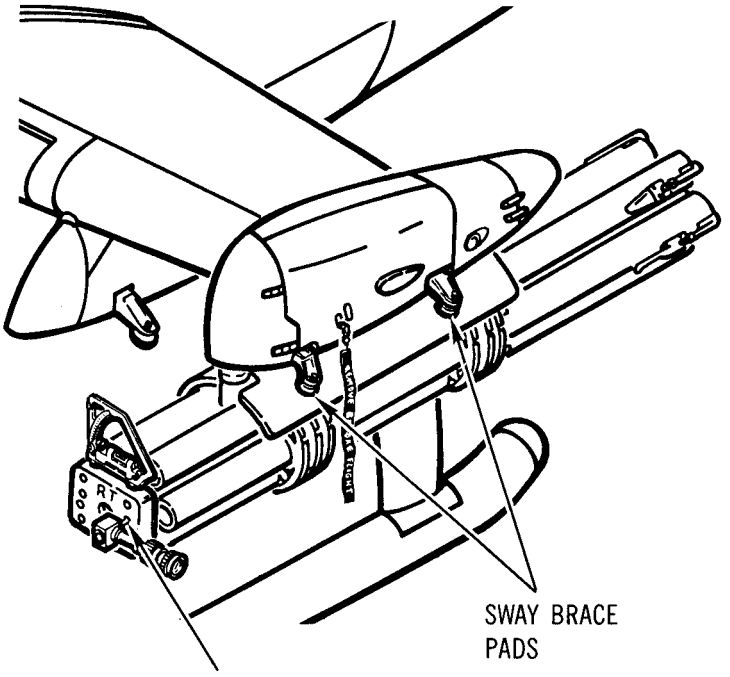


ARR82-26663

OUTBOARD SEVEN-TUBE ROCKET LAUNCHER BORESIGHTING (cont)

12. ALINE ROCKET LAUNCHER IN YAW.
    a. Sight through scope at RT46 (RT47 for right side) to target scope at LW46 (RW47 for right side).
    b. Adjust sway brace pads in or out to aline vertical reticles.

13. TORQUE SWAY BRACE PADS TO 60 LB-IN. (6.78 N.m) WHILE MAINTAINING PITCH AND YAW ALINEMENT.

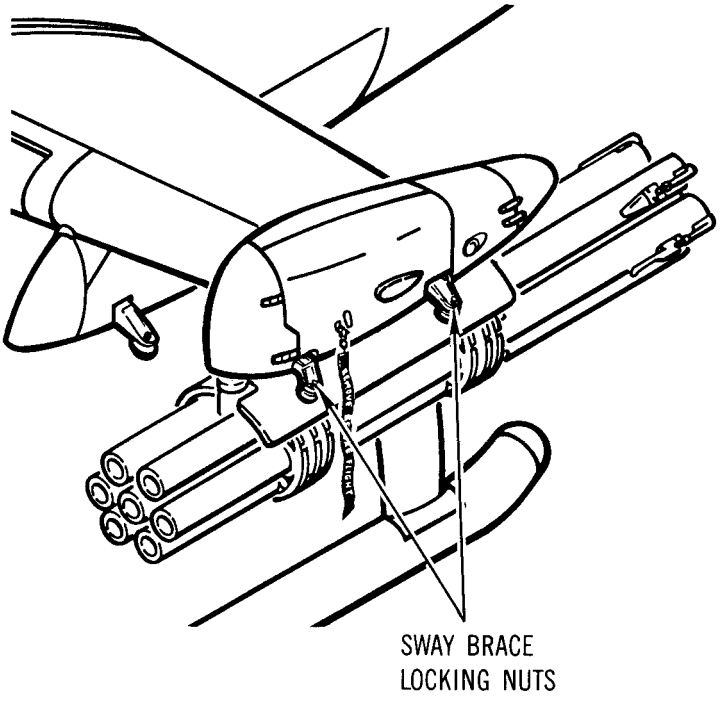


ARR82-26664

14. TIGHTEN SWAY BRACE LOCKING NUTS WHILE HOLDING SWAY BRACE PADS IN FIXED POSITION.

15. REMOVE GUNNER QUADRANT, BORESIGHT TELESCOPE, AND ROCKET LAUNCHER ALINEMENT DEVICE.

16. CONTINUE BORESIGHTING AS REQUIRED OR PERFORM POST BORESIGHTING PROCEDURES, PARA 4-14.



ARR82-26665

END OF SUBTASK

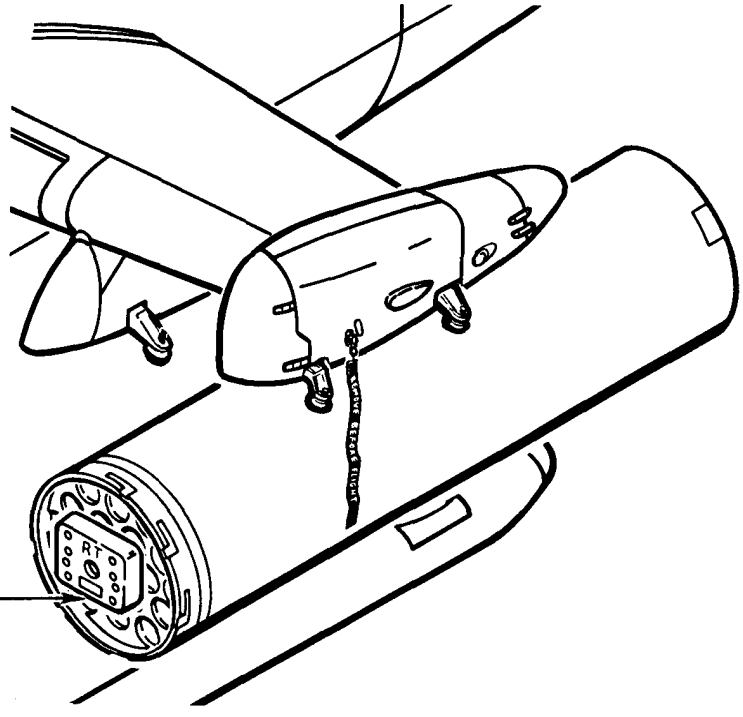
4-13. ROCKET LAUNCHER BORESIGHTING (cont)

OUTBOARD 19-TUBE ROCKET LAUNCHER BORESIGHTING

1. INSTALL ROCKET LAUNCHER ALINEMENT DEVICE IN ROCKET LAUNCHER CENTER TUBE.

NOTE

The following procedure is for boresighting the M200 and M261 nineteen-tube launchers. Procedures are identical for both rocket launchers. When boresighting the M261, use boresight telescope in the alinement hole ending with the letter A.



ARR82-26666

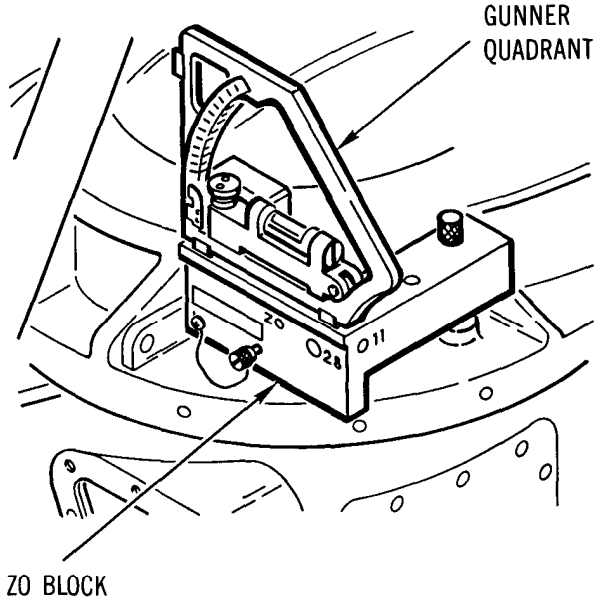
NOTE

During alinement procedure using gunner quadrant, helicopter must remain level. Technicians will take their positions prior to alinement and will remain at their positions until boresight of the particular unit is complete.

2. PLACE GUNNER QUADRANT ON Z0 BLOCK.

   Position quadrant so level bubble will sense roll.

3. ADJUST QUADRANT SCALE TO CENTER LEVEL BUBBLE.

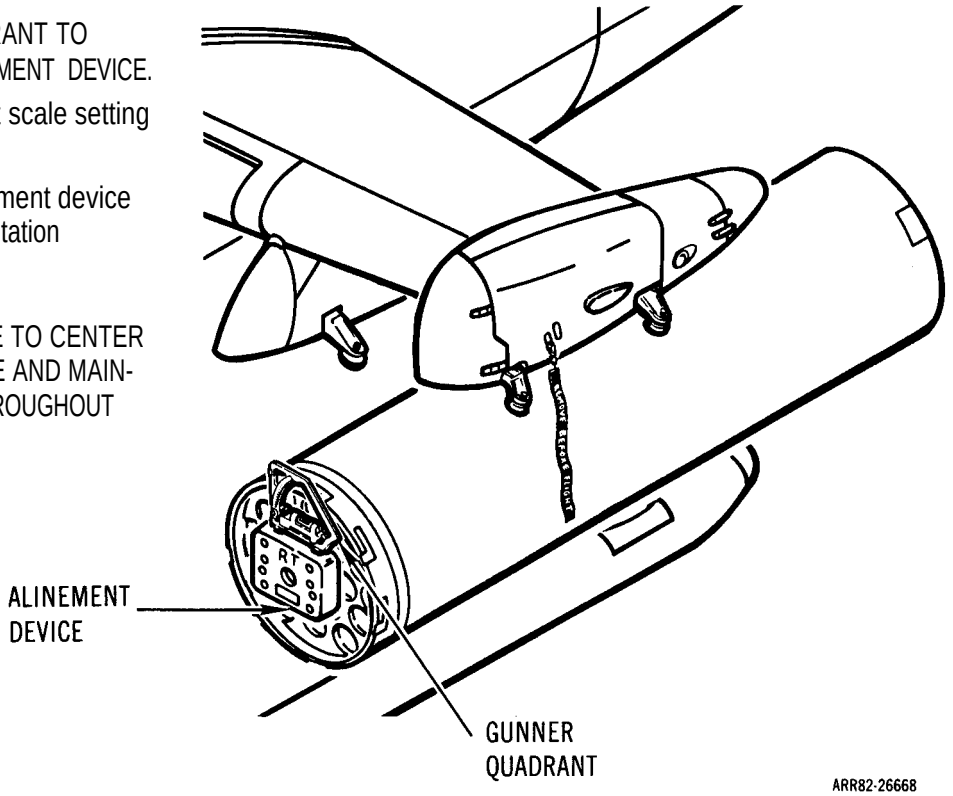


ARR82-26667

OUTBOARD 19-TUBE ROCKET LAUNCHER BORESIGHTING (cont)

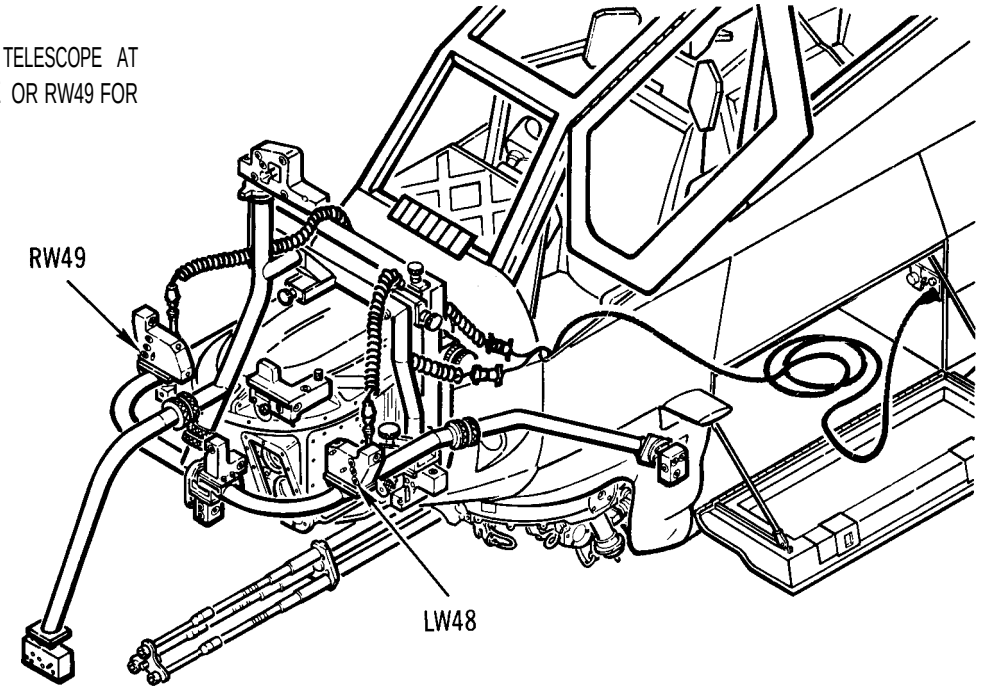
4. TRANSFER GUNNER QUADRANT TO ROCKET LAUNCHER ALINEMENT DEVICE.
   a. Do not change quadrant scale setting established at Z0 block.
   b. Place quadrant on alinement device in same transverse orientation established at Z0 block.

5. ROTATE ALINEMENT DEVICE TO CENTER QUADRANT LEVEL BUBBLE AND MAINTAIN THIS ALINEMENT THROUGHOUT PROCEDURE.



ARR82-26668

6. INSTALL BORESIGHT TELESCOPE AT LW48 FOR LEFT SIDE OR RW49 FOR RIGHT SIDE.



ARR82-26669

4-13. ROCKET LAUNCHER BORESIGHTING (cont)

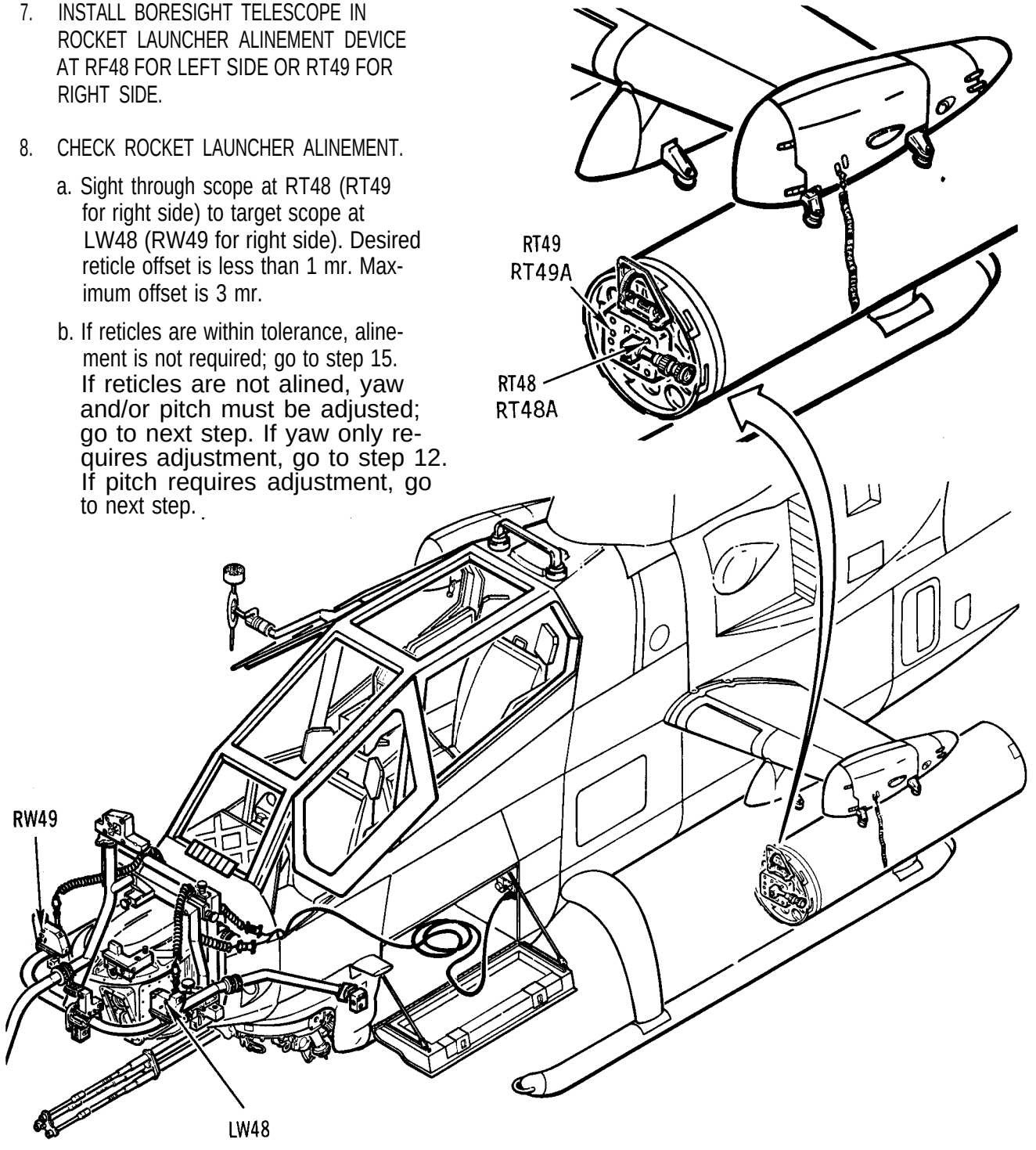
OUTBOARD 19-TUBE ROCKET LAUNCHER BORESIGHTING (cont)

7. INSTALL BORESIGHT TELESCOPE IN ROCKET LAUNCHER ALINEMENT DEVICE AT RF48 FOR LEFT SIDE OR RT49 FOR RIGHT SIDE.

8. CHECK ROCKET LAUNCHER ALINEMENT.

   a. Sight through scope at RT48 (RT49 for right side) to target scope at LW48 (RW49 for right side). Desired reticle offset is less than 1 mr. Maximum offset is 3 mr.

   b. If reticles are within tolerance, alinement is not required; go to step 15. If reticles are not alined, yaw and/or pitch must be adjusted; go to next step. If yaw only requires adjustment, go to step 12. If pitch requires adjustment, go to next step.



ARR82-26670

OUTBOARD 19-TUBE ROCKET LAUNCHER BORESIGHTING (cont)

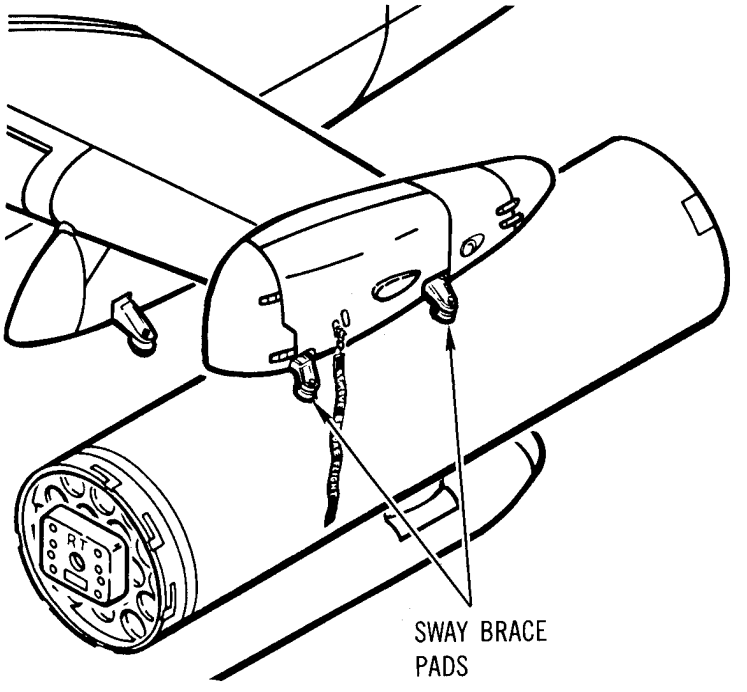
CAUTION

Remove gunner quadrant and boresight telescope when removing and installing rocket launcher.

NOTE

Rocket launcher must be removed to make pitch adjustment.

9. LOOSEN SWAY BRACE PADS AND REMOVE ROCKET LAUNCHER, SEE TM 9-1055-460-13&P.



ARR82-26671

CAUTION

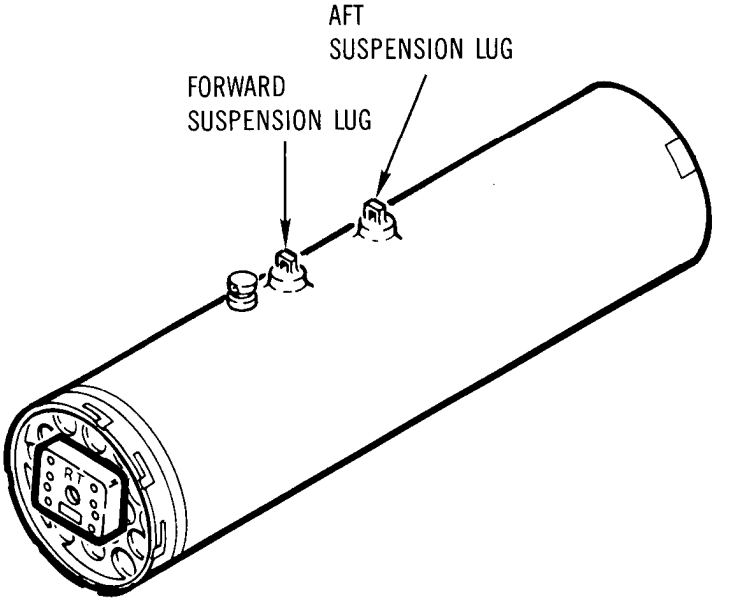
Do not loosen suspension lug more than one full turn from setting established at installation.

NOTE

One half turn of suspension lug equals approximately 3 mr elevation of rocket launcher.

10. ADJUST FORWARD AND/OR AFT SUSPENSION LUGS IN OR OUT.

11. INSTALL ROCKET LAUNCHER, SEE TM 9-1055-460-13&P. CHECK SIGHTINGS, AND REPEAT PITCH ADJUSTMENT AS NECESSARY.

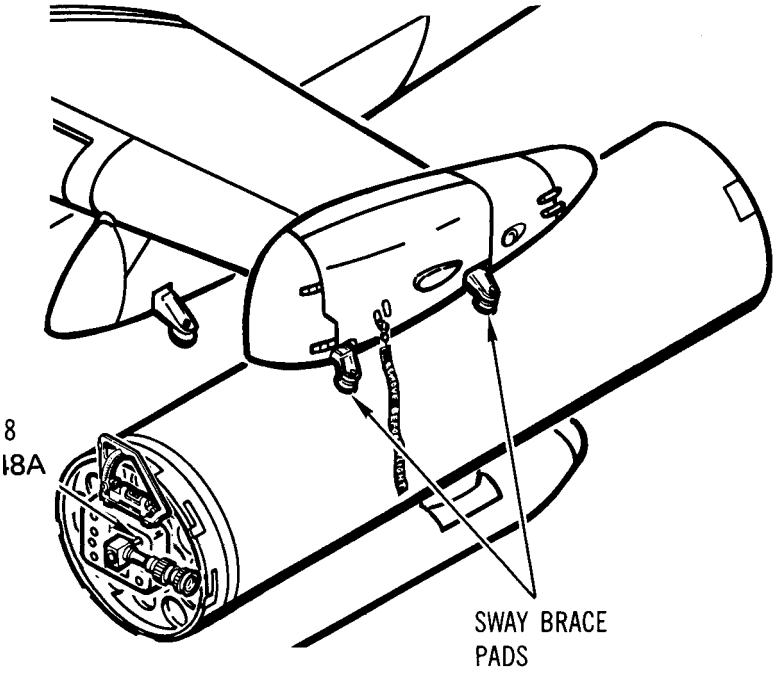


ARR82-26672

4-13. ROCKET LAUNCHER BORESIGHTING (cont)

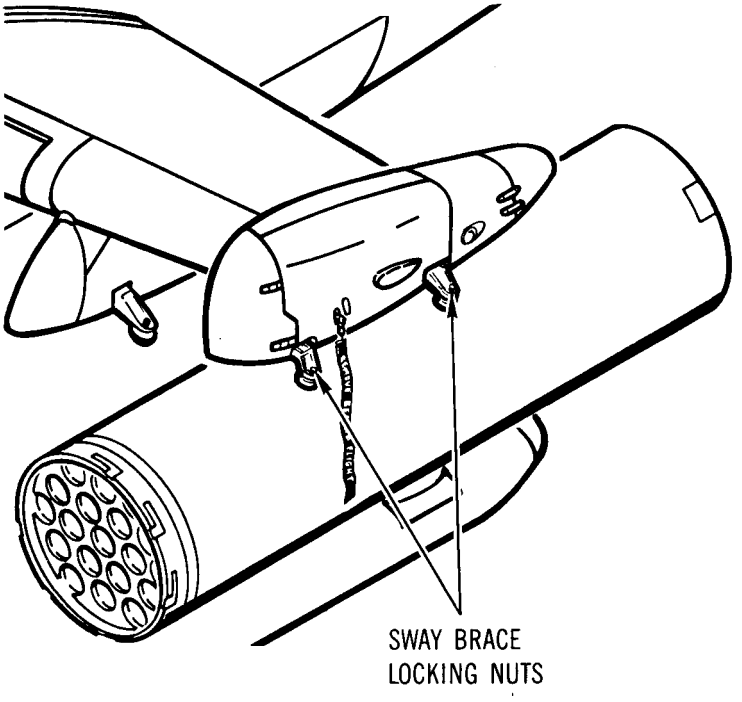
OUTBOARD 19-TUBE ROCKET LAUNCHER BORESIGHTING (cont)

12. ALINE ROCKET LAUNCHER IN YAW.
    a. Sight through scope at RT48 (RT49 for right side) to target scope at LW48 (RW49 for right side).
    b. Adjust sway brace pads in or out to aline verticle reticles.
13. TORQUE SWAY BRACE PADS TO 60 LB-IN. (6.78 N.m) WHILE MAINTAINING PITCH AND YAW ALINEMENT.



ARR82-26673

14. TIGHTEN SWAY BRACE LOCKING NUTS WHILE HOLDING SWAY BRACE PADS IN FIXED POSITION.
15. REMOVE GUNNER QUADRANT, BORE-SIGHT TELESCOPE, AND ROCKET LAUNCHER ALINEMENT DEVICE.
16. CONTINUE BORESIGHTING AS REQUIRED OR PERFORM POST BORESIGHTING PROCEDURES, PARA 4-14.



ARR82-26674

END OF TASK

4-14. POST BORESIGHTING PROCEDURES

DESCRIPTION

This task covers: BAGSE removal from helicopter and post boresighting procedures.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament
  - Repairman: Basic
- Tool Set, A/C Armament
  - Repairman: Supplemental

Personnel Required:
- 68J Aircraft Fire Control
  - Repairer (3)

References:
- TM 9-1090-206-20-1
- TM 55-1520-236-23

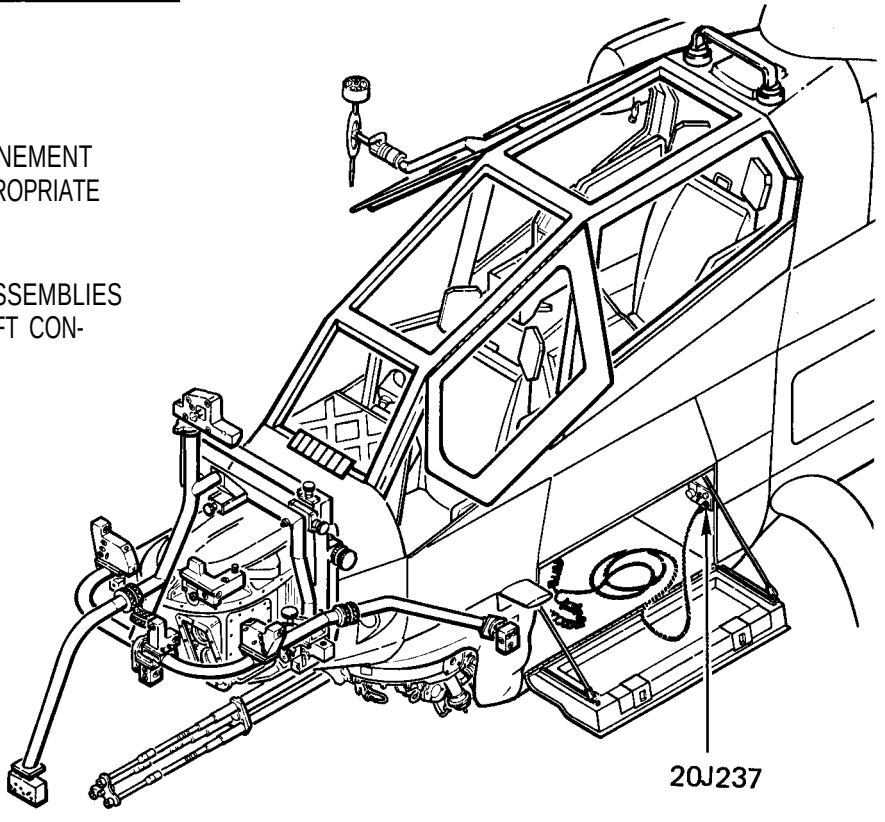
Equipment Conditions:
- Boresighting completed.

POST BORESIGHTING PROCEDURES

1. REMOVE POWER, SEE TM 9-1090-206-20-1.

2. REMOVE ANY BORESIGHT ALINEMENT DEVICES AND STORE IN APPROPRIATE CASE.

3. DISCONNECT ILLUMINATION ASSEMBLIES POWER CABLE FROM AIRCRAFT CONNECTOR 20J237.



ARR82-26676

4-14. POST BORESIGHTING PROCEDURES (cont)

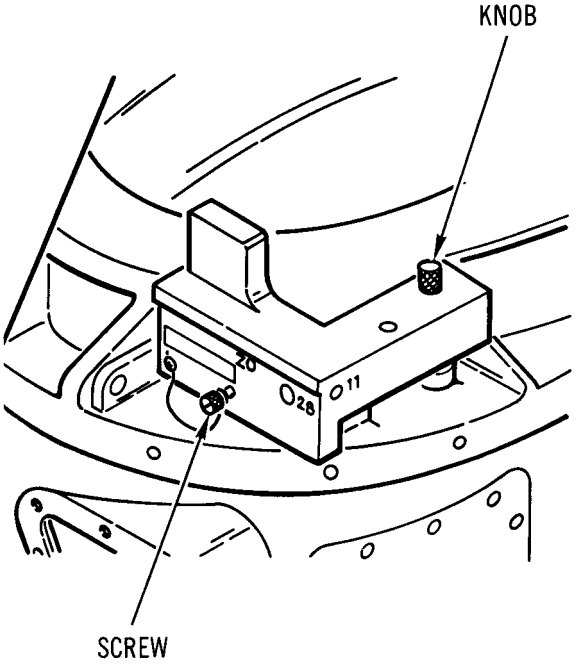
4. REMOVE ILLUMINATION ASSEMBLIES AND STORE IN APPROPRIATE CASE.

5. REMOVE BORESIGHT TELESCOPES AND STORE IN APPROPRIATE CASE.

6. REMOVE Z0 BLOCK.

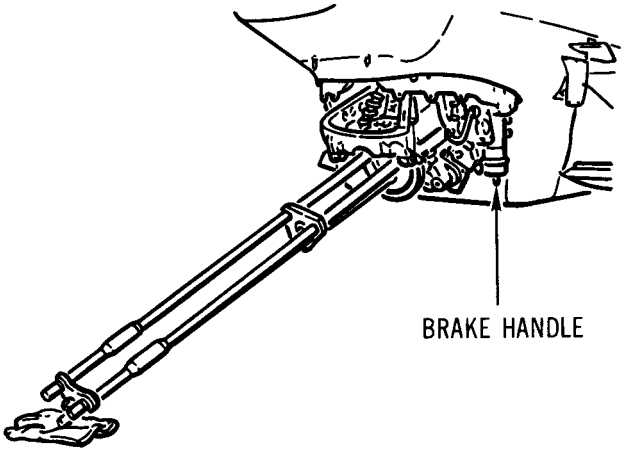
   a. Remove screw and loosen knob.

   b. Store Z0 block in appropriate case.



ARR82-26677

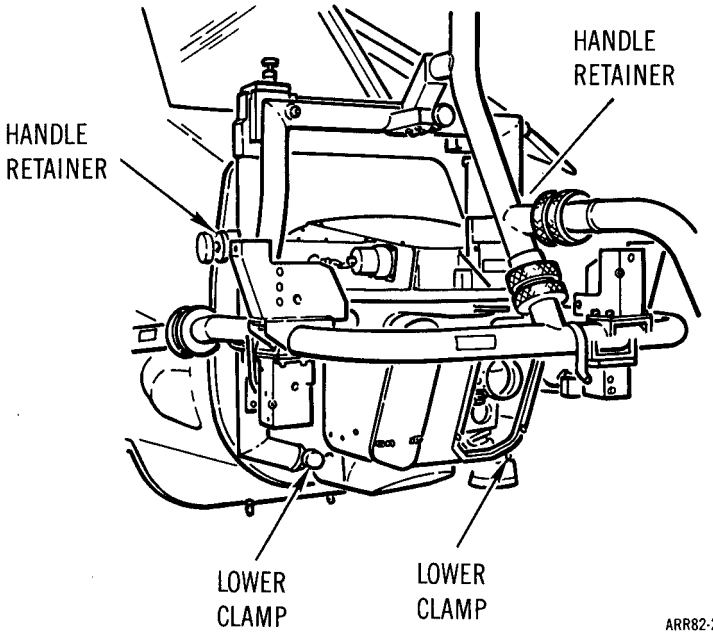
7. RELEASE ELEVATION DRIVE MOTOR BRAKE HANDLE AND LOWER GUN BARRELS ONTO SUITABLE PAD.



ARR82-26678

POST BORESIGHTING PROCEDURES (cont)

8. LOOSEN TWO HANDLE RETAINERS AND REMOVE TWO LOWER CLAMPS FROM TSU.

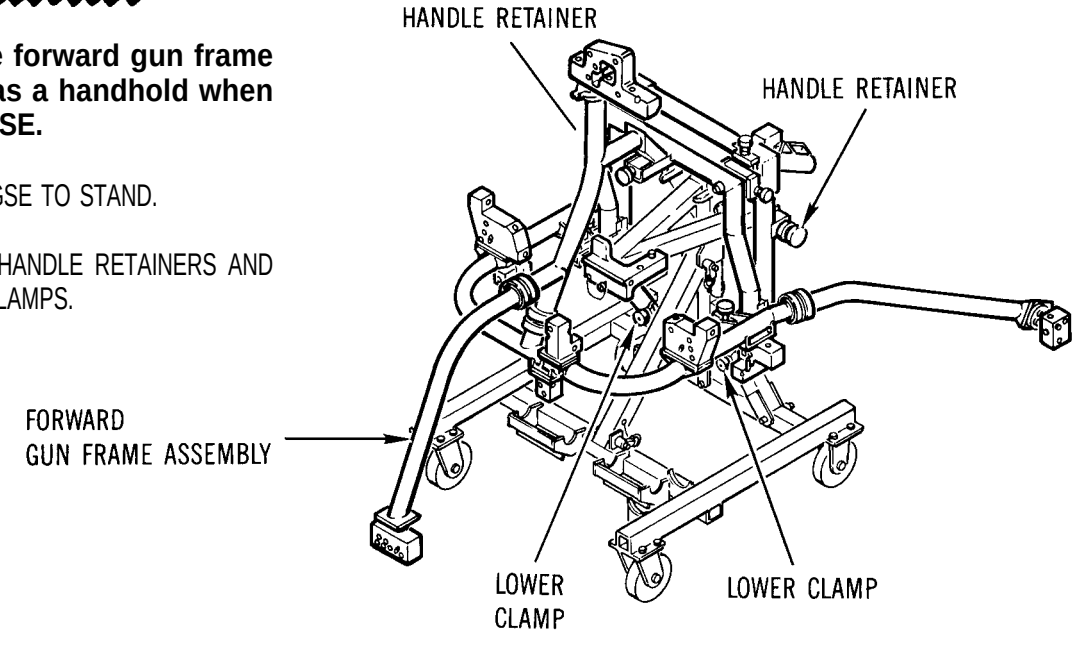


CAUTION

Do not use forward gun frame assembly as a handhold when lifting BAGSE.

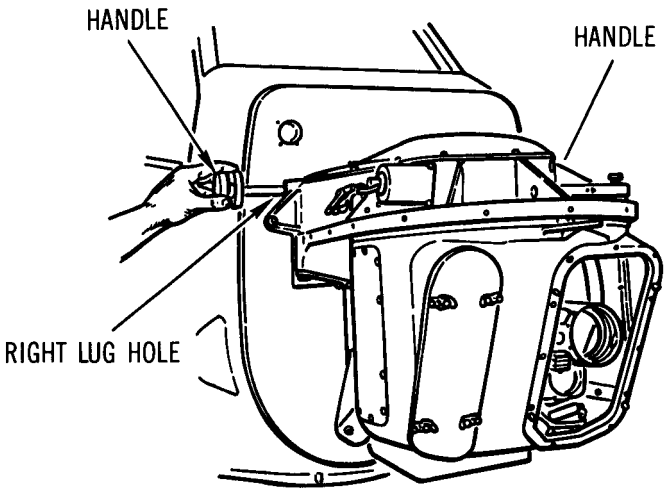
9. TRANSFER BAGSE TO STAND.

10. SECURE TWO HANDLE RETAINERS AND TWO LOWER CLAMPS.



4-14. POST BORESIGHTING PROCEDURES (cont)

11. REMOVE TWO HANDLES FROM RIGHT AND LEFT TSU LIFTING LUG HOLES AND STORE ON STAND.

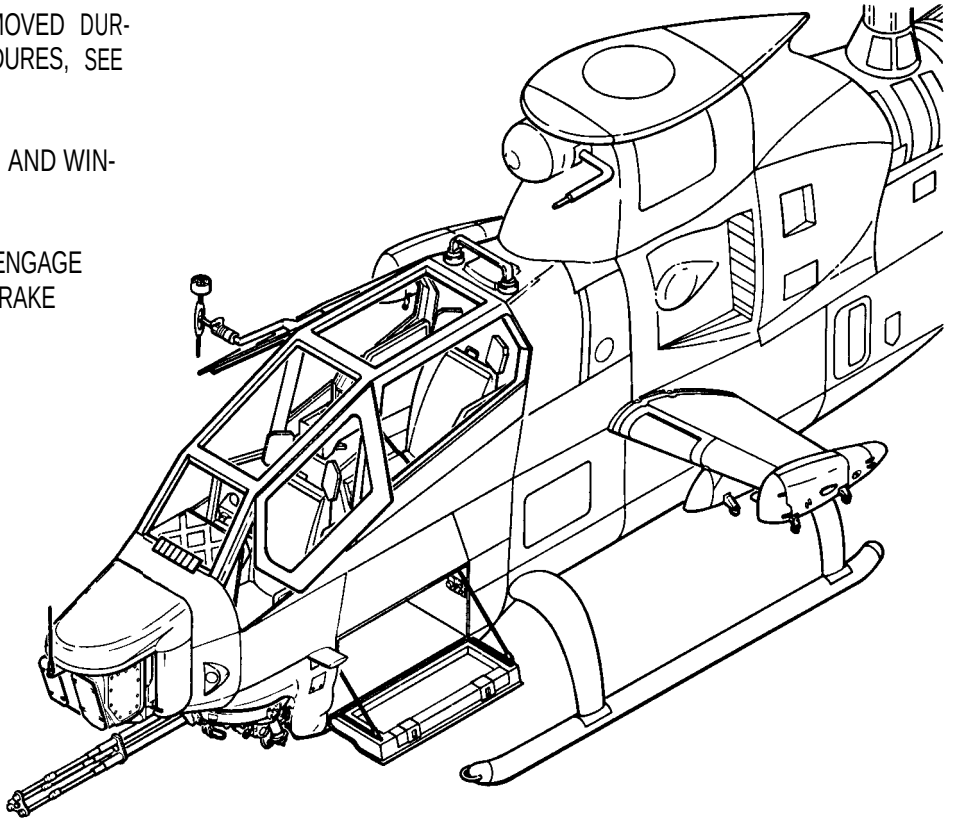


ARR82-26681

12. INSTALL ANY FAIRINGS REMOVED DURING BORESIGHTING PROCEDURES, SEE TM 55-1520-236-23.

13. INSTALL TSU AZIMUTH ROD AND WINDOW COVER.

14. RAISE GUN BARRELS AND ENGAGE ELEVATION DRIVE MOTOR BRAKE HANDLE.



ARR82-26682

END OF TASK

CHAPTER 5

COMPOSITE ALINEMENT AND BORESIGHTING PROCEDURES

CHAPTER CONTENTS

CHAPTER OVERVIEW

This chapter provides maintenance tasks for alinement and bloresighting of armament subsystems which are part of the Armament Subsystem M97A3. These tasks use target assemblies to provide a common reference plane for the armament subsystems. Target assemblies are alined to the helicopter roll, pitch, and yaw axes by being alined to the TSU.

Section I. M65 TOW GUIDED MISSILE SYSTEM ALINEMENT AND BORESIGHTING

Section Contents

GENERAL

5-1. Boresighting of the M65 TOW Missile Subsystem is accomplished after replacement of the upper TOW Missile Launcher (TML), or whenever boresighting problems are suspected as cause of system malfunctions. Refer to TM 9-1425-473-34.

The M65 TOW Missile Subsystem alinement and boresighting procedures may be performed either independently from or in sequence with other armament subsystems.

PARAGRAPH 5-2 IS DELETED

Section II. TURRET SUBSYSTEM AND REFLEX SIGHT ALINEMENT AND BORESIGHTING

GENERAL

5-3. This section contains procedures for alining and boresighting the turret subsystem and reflex sight. The turret subsystem and reflex sight are alined and boresighted using three emplaced target assemblies.

The three targets are emplaced forward, left, and right of the helicopter. The targets are alined with the TSU to provide pitch, roll, and yaw reference planes. Boresighting and alinement is accomplished by slaving the turret to the TSU so that when the TSU is alined to its target, the turret is alined with its corresponding target.

5-4. TURRET SUBSYSTEM AND REFLEX SIGHT ALINEMENT AND BORESIGHTING

This task covers: Helicopter preparation and target emplacement, boresighting turret subsystem to TSU LOS, elimination of pitch and roll error, turret subsystem alinement in fixed mode, reflex sight alinement and boresighting and post alinement and boresighting procedures.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Test Set: Guided Missile Launcher Alinement-Circuit Amplitude
- Boresight Targets for AH-1S (ECAS)
- Boresighting Kit,

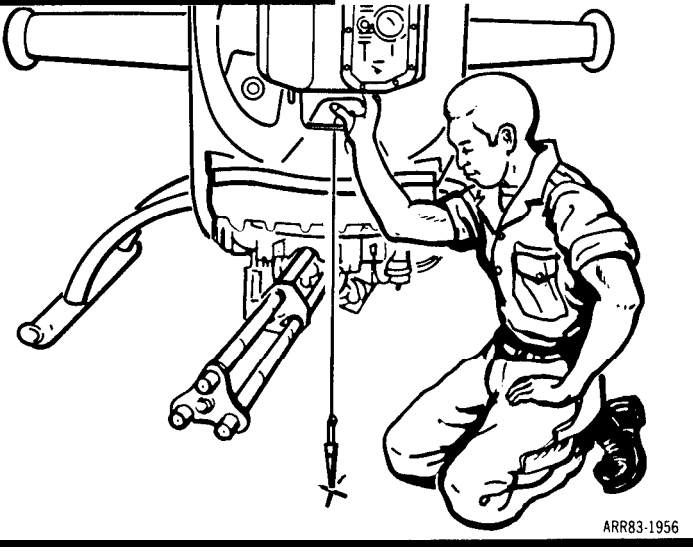
Personnel Required: (3)
- 68M/68J Aircraft Fire Control Repairer

References:
- TM 9-1090-206-20-2
- TM 55-1520-236-23

Equipment Conditions:
- HELICOPTER ARMAMENT SUBSYSTEM MAINTENANCE SETUP performed, TM 9-1090-206-20-2.
- ELEVATION AND AZIMUTH RESOLVER ALINEMENT performed, para 2-69.
- Helicopter positioned on level surface and leveled.
- TSU nose fairing and window cover removed, see TM 55-1520-236-23.
- TSU window cover removed, see TM 55-1520-236-23.
- M89E1 Feeder timing pin clamped in depressed position, step 1, para 4-6.

HELICOPTER PREPARATION AND TARGET EMPLACEMENT

1. DROP A PLUMB BOB FROM PIVOT POING BENEATH TSU AND MARK POINT ON GROUND.

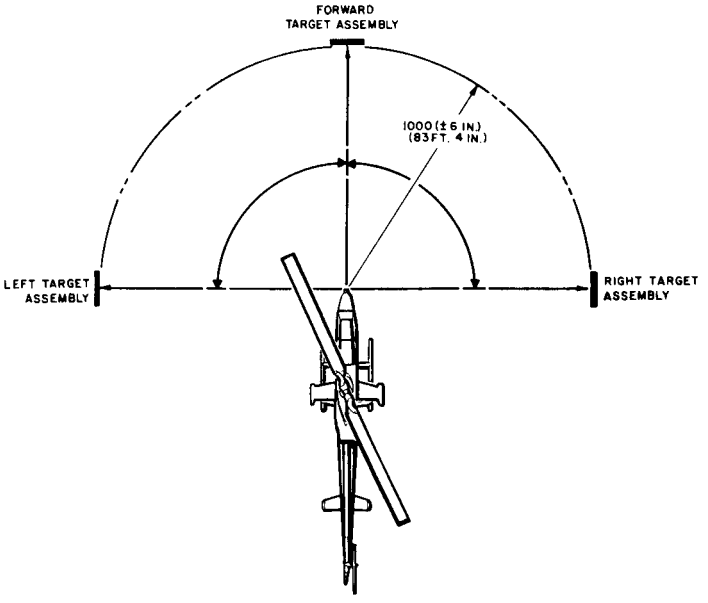


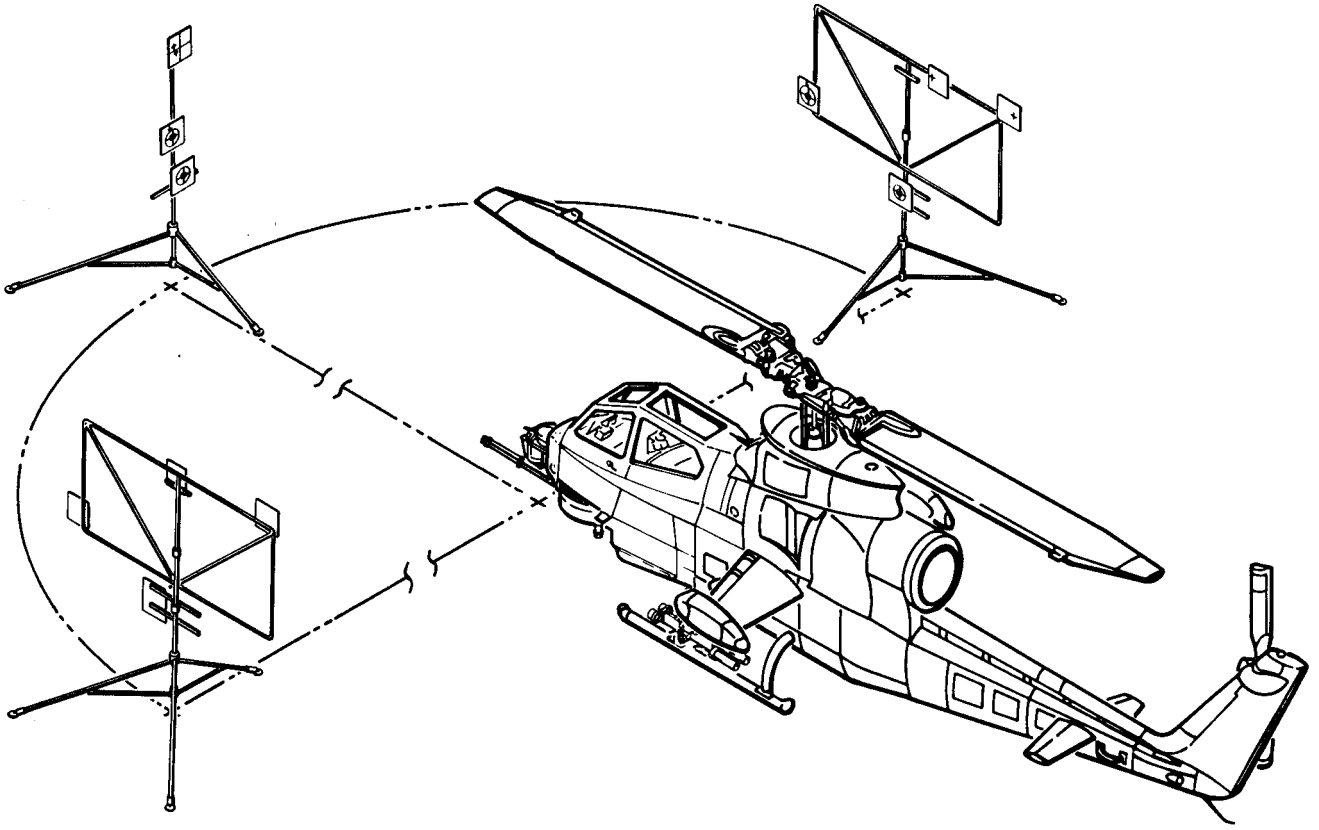
5-4. TURRET SUBSYSTEM AND REFLEX SIGHT ALINEMENT AND BORESIGHTING (cont)

HELICOPTER PREPARATION AND TARGET EMPLACEMENT (cont)

2. MEASURE AND MARK POINTS 1000 (±6) INCHES (83 FEET 4 INCHES) FORWARD, LEFT, AND RIGHT OF HELICOPTER FROM TSU PIVOT POINT MARK.

3. POSITION FORWARD, LEFT, AND RIGHT TARGET ASSEMBLIES AT 1000-INCH MARKS KEEPING TARGET ASSEMBLIES PERPENDICULAR TO TSU LOS.





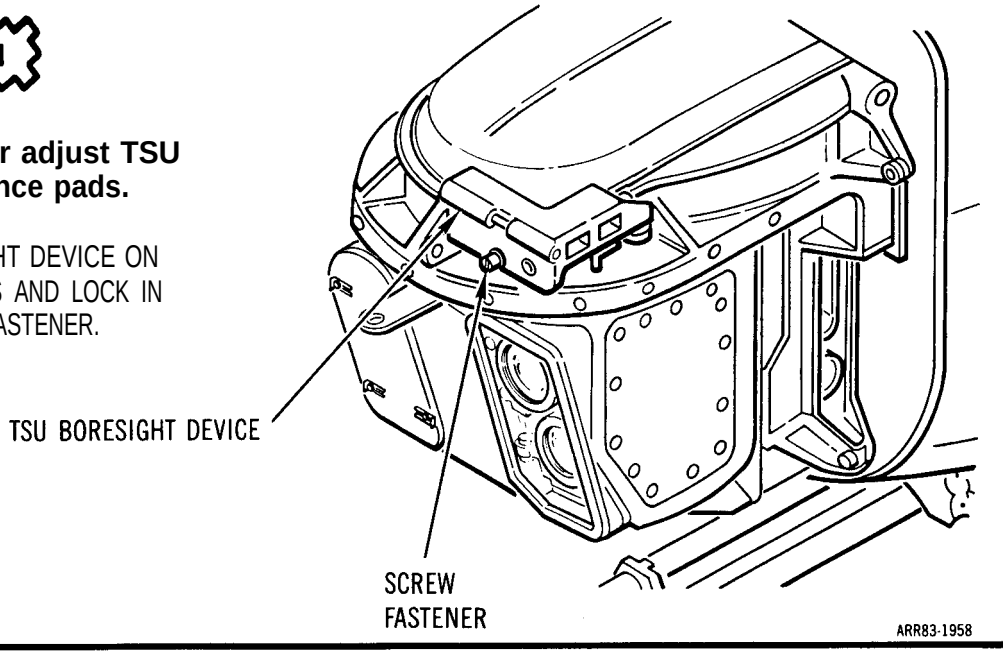
ARR83-1957

HELICOPTER PREPARATION AND TARGET EMPLACEMENT (cont)

CAUTION

Do not remove or adjust TSU factory set reference pads.

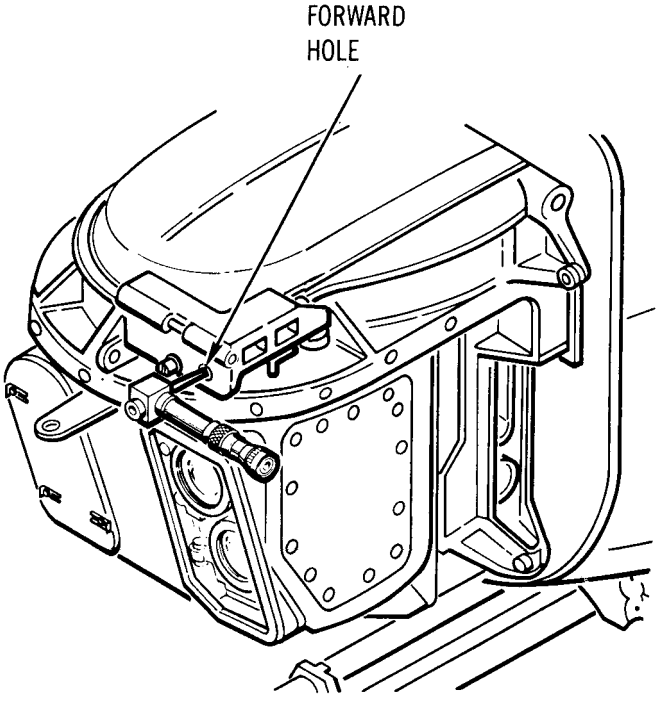
4. INSTALL TSU BORESIGHT DEVICE ON TSU REFERENCE PADS AND LOCK IN PLACE WITH SCREW FASTENER.



5-4. TURRET SUBSYSTEM AND REFLEX SIGHT ALINEMENT AND BORESIGHTING (cont)

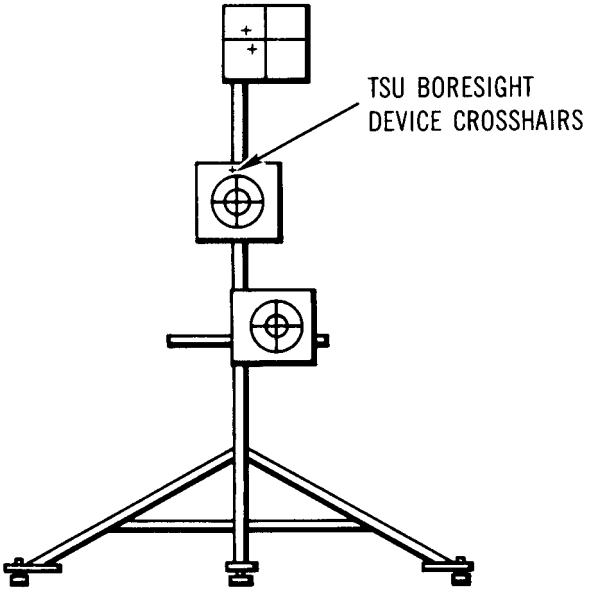
HELICOPTER PREPARATION AND TARGET EMPLACEMENT (cont)

5. INSERT BORESIGHT TELESCOPE INTO FORWARD HOLE OF TSU BORESIGHT DEVICE.



ARR83-1963

6. SIGHT THROUGH BORESIGHT TELESCOPE TO FORWARD TARGET ASSEMBLY AND DIRECT TECHNICIAN TO MOVE FORWARD TARGET ASSEMBLY IN AZIMUTH AND ELEVATION TO ALINE TSU BORESIGHT DEVICE CROSSHAIRS WITH BORESIGHT TELESCOPE CROSSHAIRS.

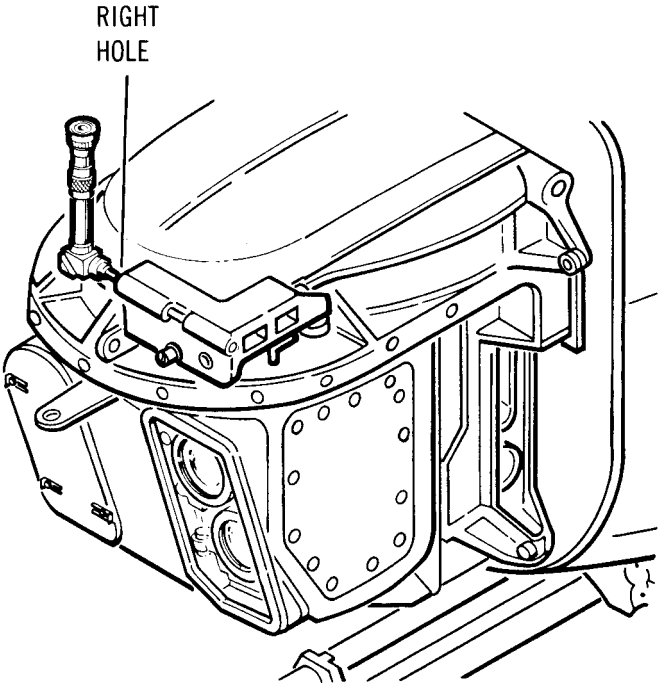


FORWARD TARGET ASSEMBLY

ARR83-1964

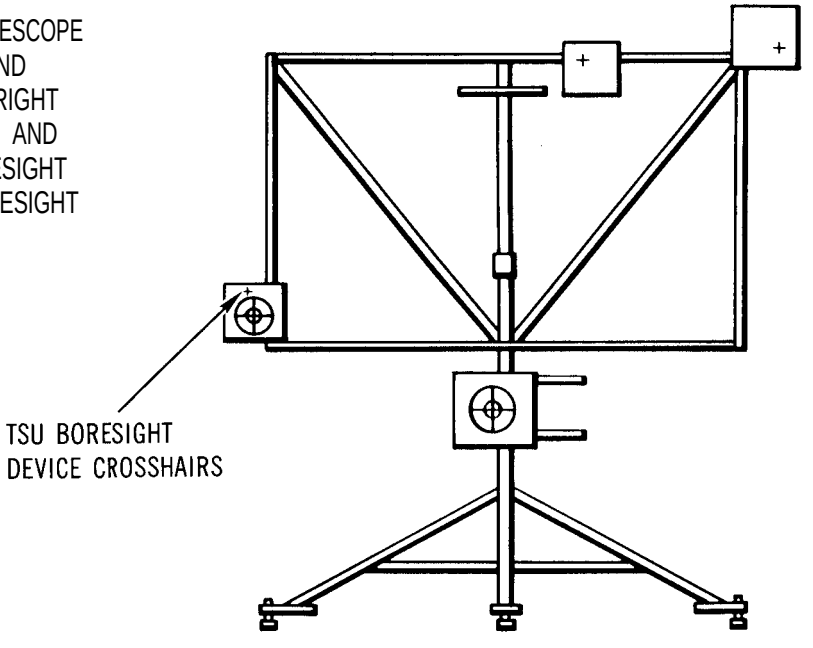
HELICOPTER PREPARATION AND TARGET EMPLACEMENT (cont)

7, INSERT BORESIGHT TELESCOPE IN RIGHT HOLE OF TSU BORESIGHT DEVICE.



ARR83-1965

8. SIGHT THROUGH BORESIGHT TELESCOPE TO RIGHT TARGET ASSEMBLY AND DIRECT TECHNICIAN TO MOVE RIGHT TARGET ASSEMBLY IN AZIMUTH AND ELEVATION TO ALINE TSU BORESIGHT DEVICE CROSSHAIRS WITH BORESIGHT TELESCOPE CROSSHAIRS.



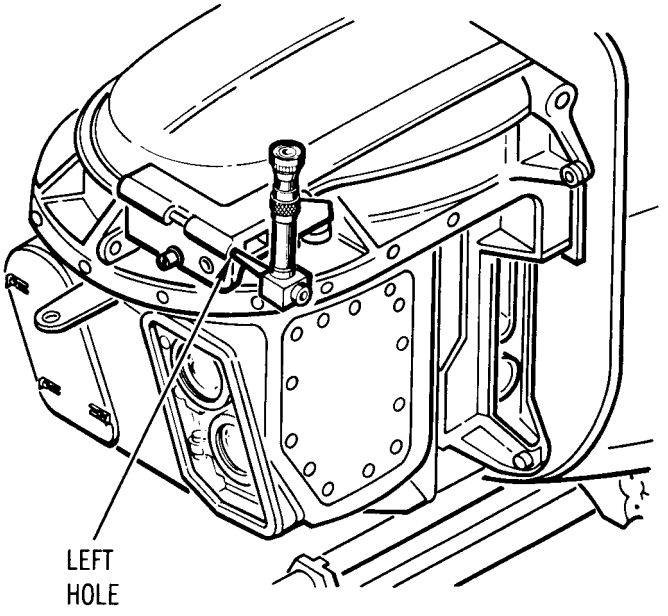
RIGHT TARGET ASSEMBLY

ARR83-1966

5-4. TURRET SUBSYSTEM AND REFLEX SIGHT ALINEMENT AND BORESIGHTING (cont)

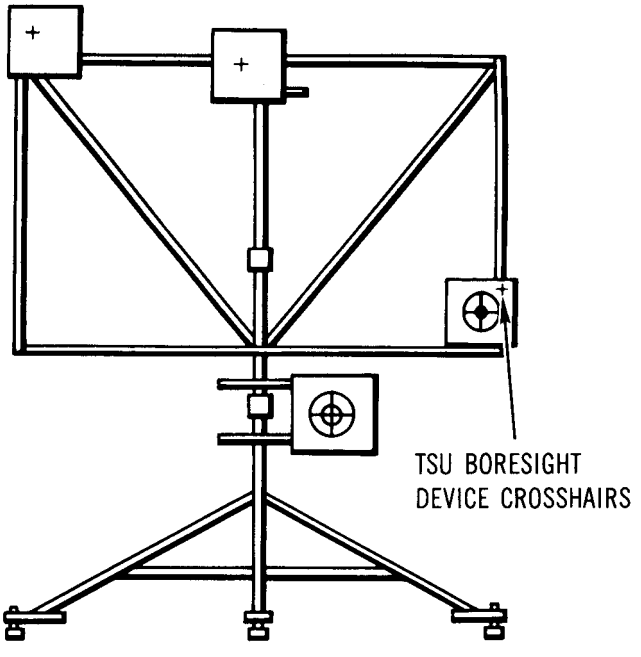
HELICOPTER PREPARATION AND TARGET EMPLACEMENT (cont)

9. INSERT BORESIGHT TELESCOPE IN LEFT HOLE OF TSU BORESIGHT DEVICE.



ARR83-1967

10. SIGHT THROUGH BORESIGHT TELESCOPE TO LEFT TARGET ASSEMBLY AND DIRECT TECHNICIAN TO MOVE LEFT TARGET ASSEMBLY IN AZIMUTH AND ELEVATION TO ALINE TSU BORESIGHT DEVICE CROSSHAIRS WITH BORESIGHT TELESCOPE CROSSHAIRS.



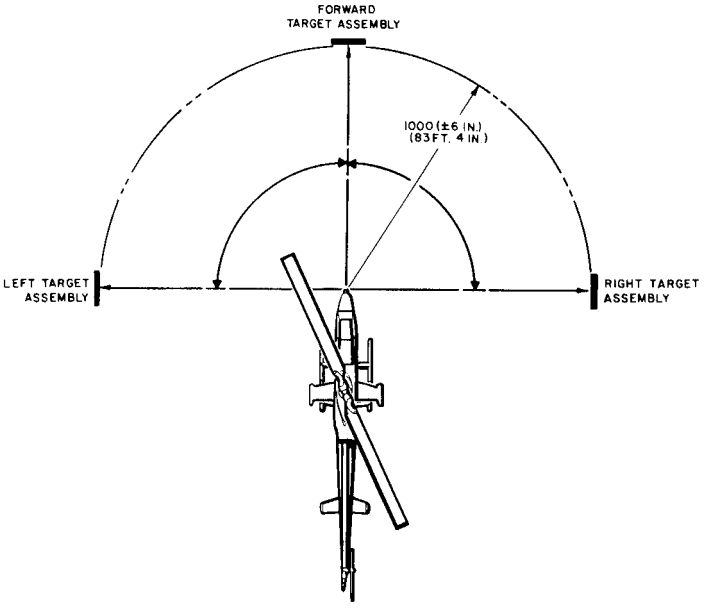
LEFT TARGET ASSEMBLY

ARR83-1968

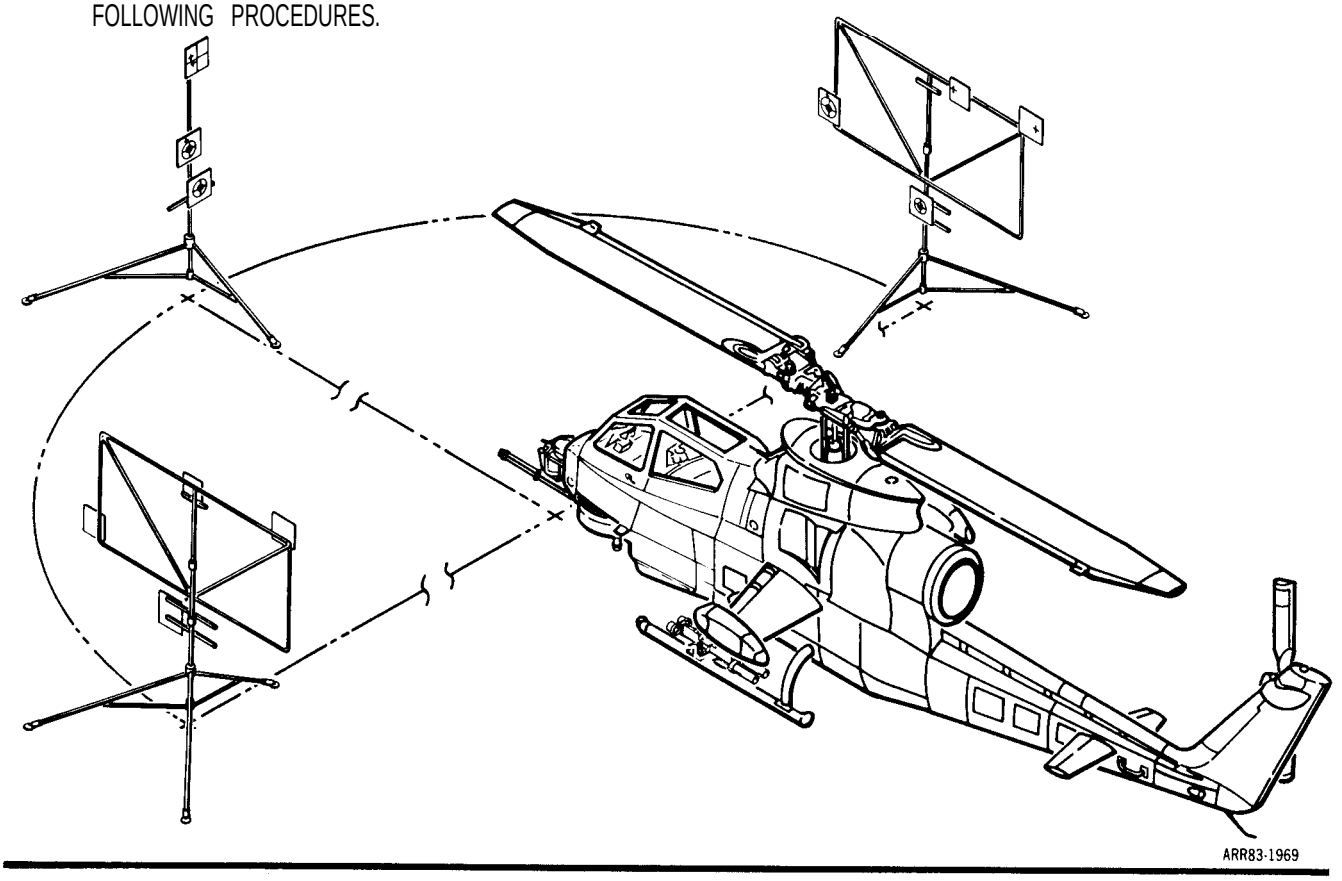
HELICOPTER PREPARATION AND TARGET EMPLACEMENT (cont)

NOTE

Target alinement for left and right target assemblies is not critical. A tolerance of 6 inches from target crosshairs is acceptable for both azimuth and elevation sighting points. Azimuth sighting point for forward target must be held to within 1/2 inch of target crosshairs. Elevation sighting point for forward target must be held to within 2 inches of target crosshairs.



11. RECHECK TARGET EMPLACEMENT TO VERIFY THAT EACH TARGET IS PLACED AS SPECIFIED IN PRECEDING PROCEDURES. MONITOR AND MAINTAIN TARGET EMPLACEMENT THROUGHOUT FOLLOWING PROCEDURES.



5-4. TURRET SUBSYSTEM AND REFLEX SIGHT ALINEMENT AND BORESIGHTING (cont)

HELICOPTER PREPARATION AND TARGET EMPLACEMENT (cont)

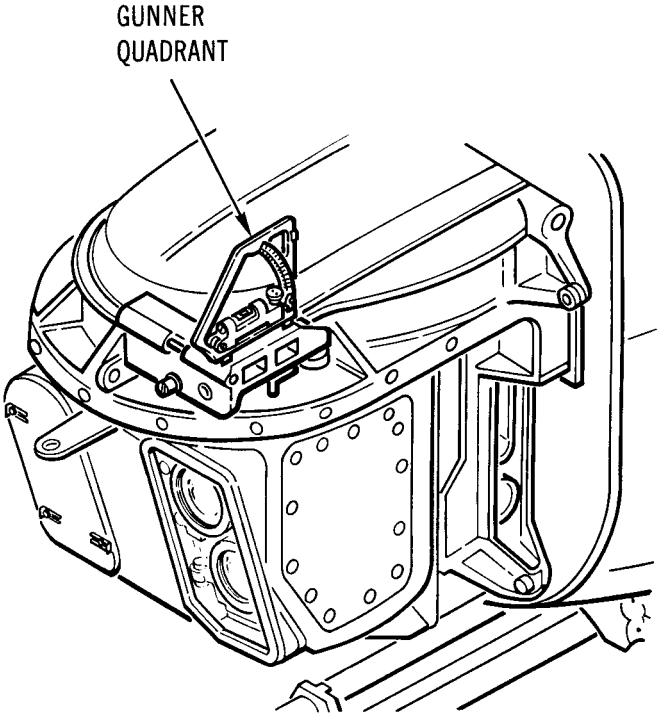
NOTE

During alinement procedure using gunner quadrant, helicopter must remain level. Technicians will take their positions prior to alinement and will remain at their positions until alinement and boresighting is complete.

12. PLACE GUNNER QUADRANT ON TSU BORESIGHT DEVICE.

    Position quadrant so level bubble will sense pitch.

13. ADJUST QUADRANT SCALE TO CENTER LEVEL BUBBLE.



ARR83-1959

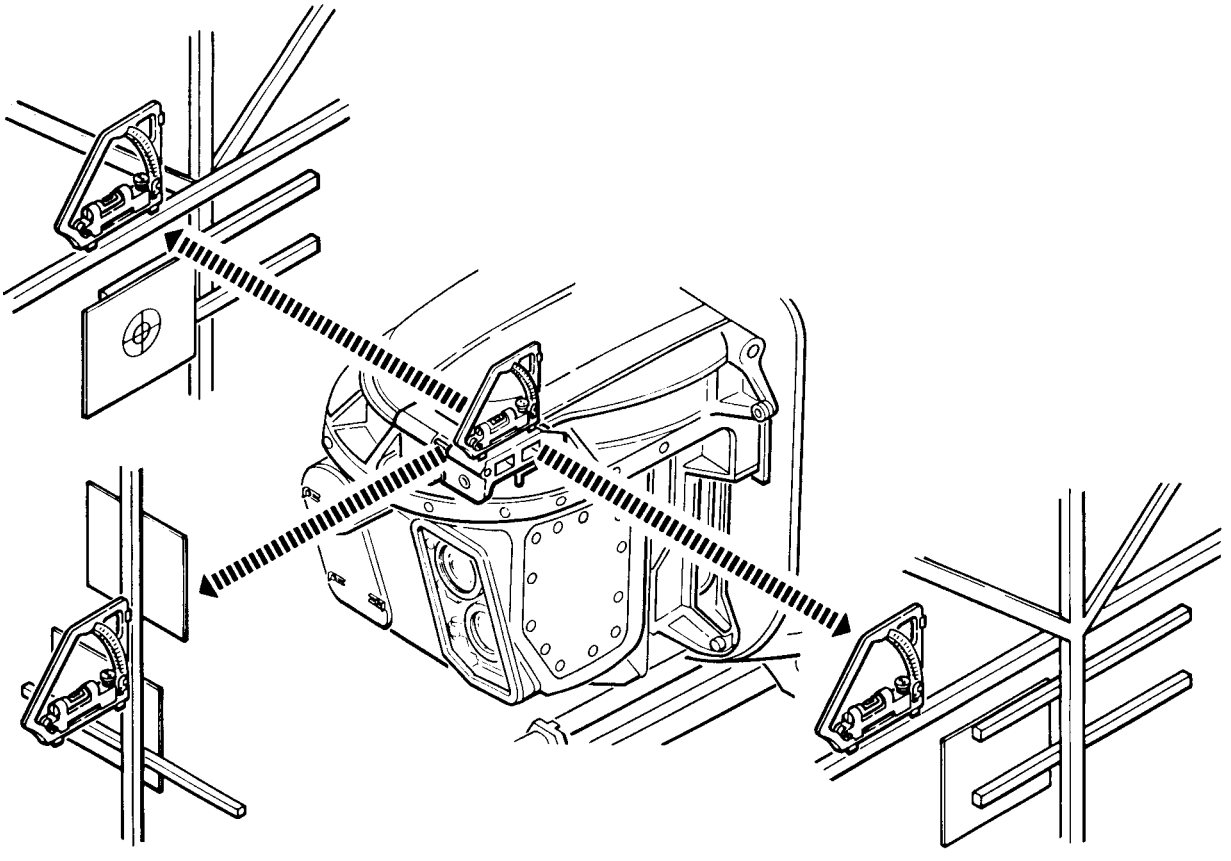
HELICOPTER PREPARATION AND TARGET EMPLACEMENT (cont)

14. MAINTAIN ORIENTATION OF GUNNER QUADRANT (KEEP ARROW ON BASE POINTING IN SAME DIRECTION FOR ALL THREE TARGET ASSEMBLIES) AND MOVE GUNNER QUADRANT TO FORWARD, LEFT, AND RIGHT TARGET ASSEMBLIES. PLACE GUNNER QUADRANT AGAINST VERTICAL FRAME OF FORWARD TARGET ASSEMBLY AND ON HORIZONTAL FRAME OF LEFT AND RIGHT TARGET ASSEMBLIES.

NOTE

Only the right and left target assemblies must be adjusted to the approximate pitch of the helicopter.

15. ADJUST EACH TARGET ASSEMBLY TO CENTER QUADRANT LEVEL BUBBLE, TO APPROXIMATE PITCH OF HELICOPTER.



ARR83-1960

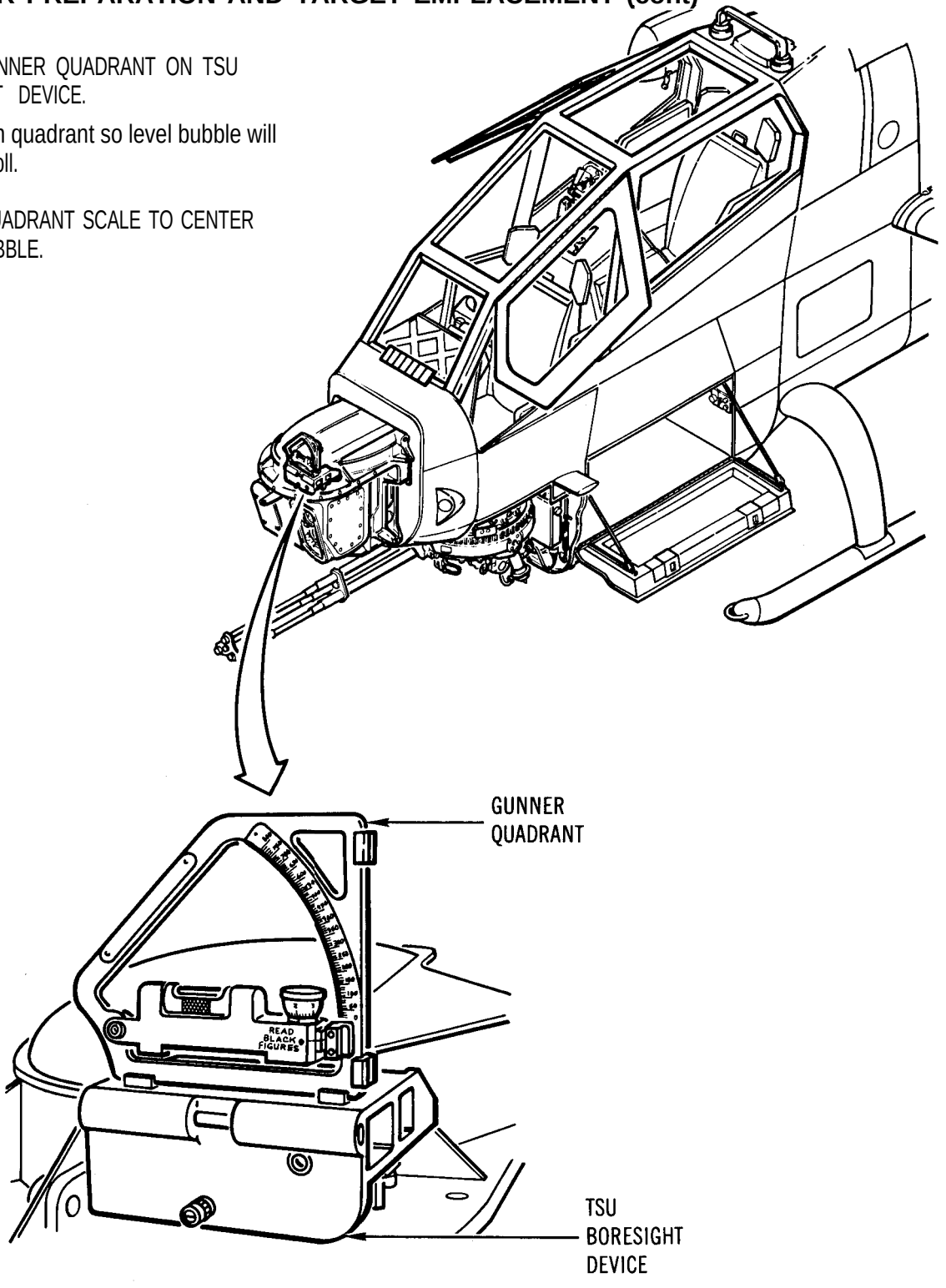
5-4. TURRET SUBSYSTEM AND REFLEX SIGHT ALINEMENT AND BORESIGHTING (cont)

HELICOPTER PREPARATION AND TARGET EMPLACEMENT (cont)

16. PLACE GUNNER QUADRANT ON TSU BORESIGHT DEVICE.

    Position quadrant so level bubble will sense roll.

17. ADJUST QUADRANT SCALE TO CENTER LEVEL BUBBLE.



ARR83-1961

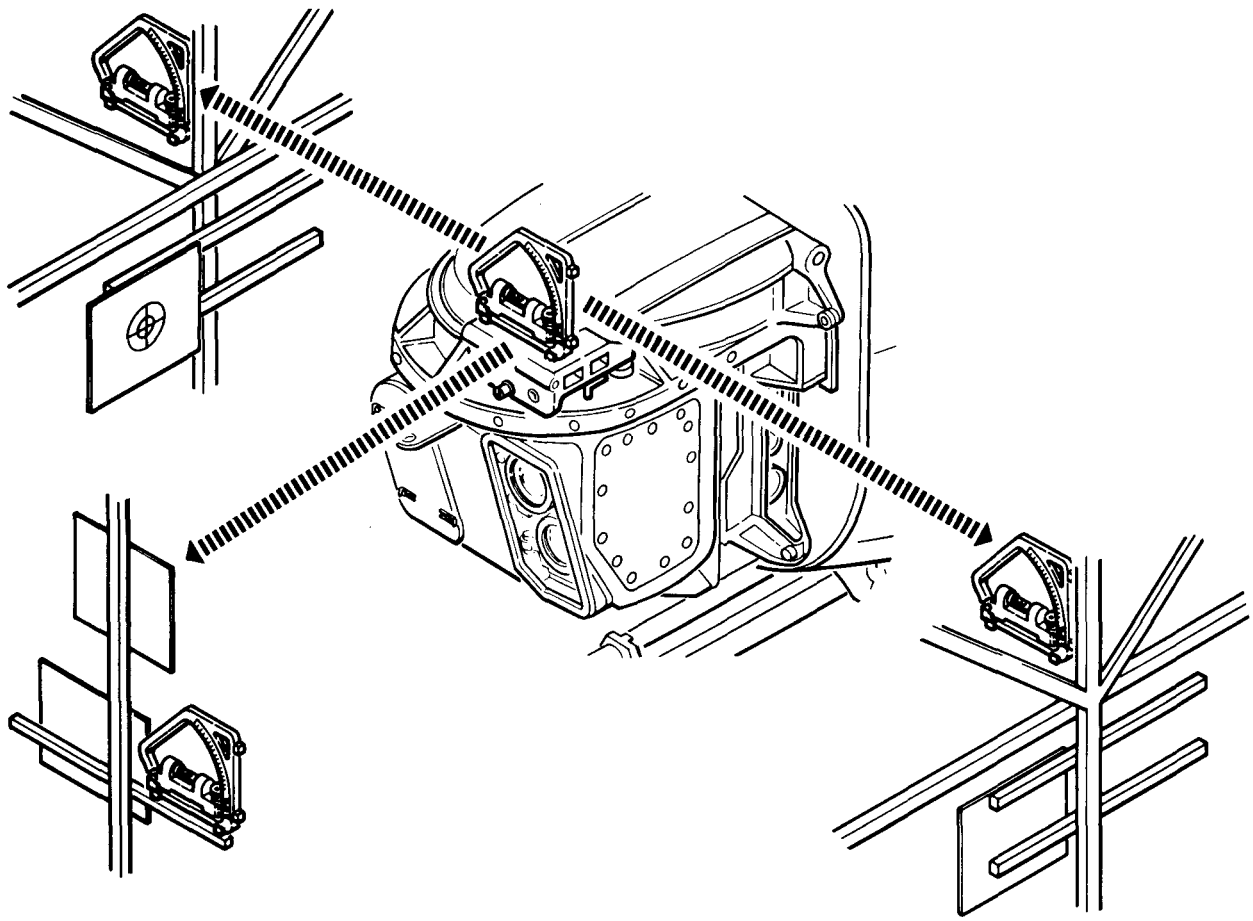
HELICOPTER PREPARATION AND TARGET EMPLACEMENT (cont)

18. MAINTAIN ORIENTATION OF GUNNER QUADRANT (KEEP ARROW ON BASE POINTING IN SAME DIRECTION FOR ALL THREE TARGET ASSEMBLIES) AND MOVE GUNNER QUADRANT TO FORWARD, LEFT, AND RIGHT TARGET ASSEMBLIES. PLACE GUNNER QUADRANT ON HORIZONTAL PLANE OF FORWARD TARGET AND AGAINST VERTICAL FRAME OF LEFT AND RIGHT TARGET ASSEMBLIES.

NOTE

Only the forward target assembly must be adjusted to the approximate roll of the helicopter.

19. ADJUST EACH TARGET ASSEMBLY TO FORWARD QUADRANT BUBBLE TO APPROXIMATE ROLL OF HELICOPTER.



5-4. TURRET SUBSYSTEM AND REFLEX SIGHT ALINEMENT AND BORESIGHTING (cont)

HELICOPTER PREPARATION AND TARGET EMPLACEMENT (cont)

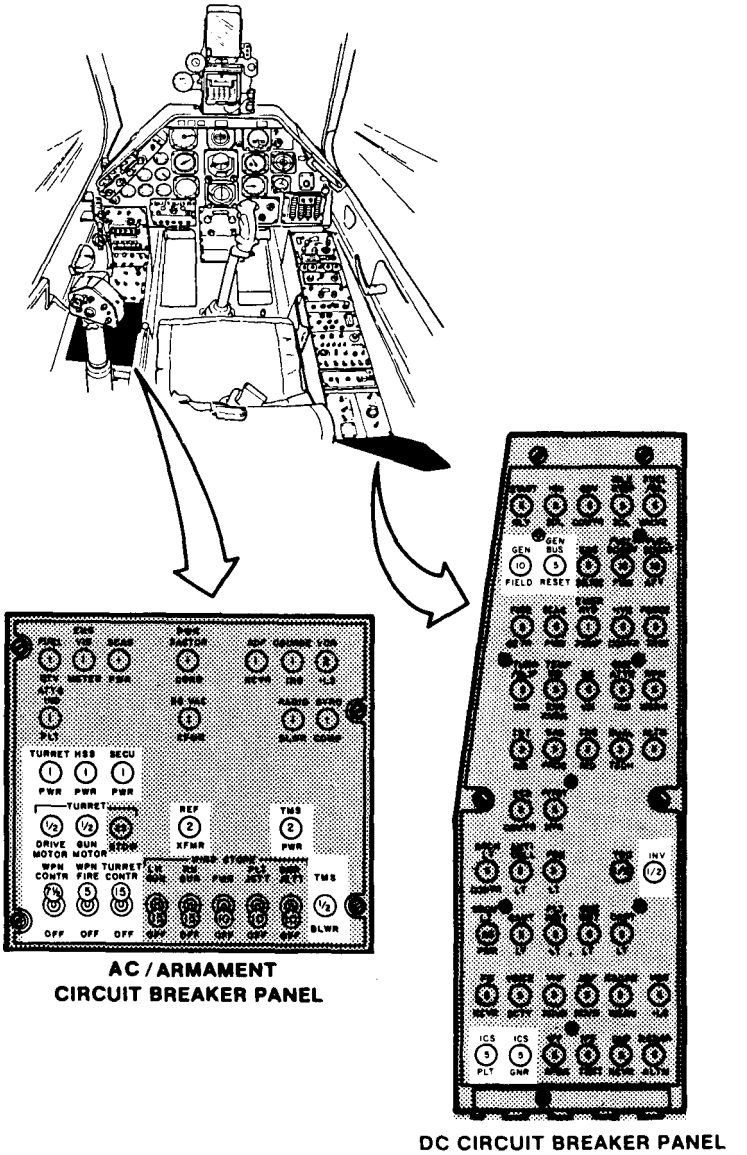
20. APPLY POWER, SEE TM 9-1090-206-20-2.

NOTE

ICS PLT and ICS GNR circuit breaker may be closed to provide internal communications.

21. CLOSE FOLLOWING CIRCUIT BREAKERS ON DC CIRCUIT BREAKER PANEL:
    - GEN FIELD
    - GEN BUS RESET
    - INV
    - ICS PLT
    - ICS GNR

22. CLOSE FOLLOWING CIRCUIT BREAKERS ON AC/ARMAMENT CIRCUIT BREAKER PANEL:
    - REF XFMR
    - TURRET PWR
    - HSS PWR
    - SECU PWR
    - TMS PWR
    - TMS BLWR
    - TURRET DRIVE MOTOR
    - TURRET GUN MOTOR
    - WPN CONTR
    - WPN FIRE
    - TURRET CONTR



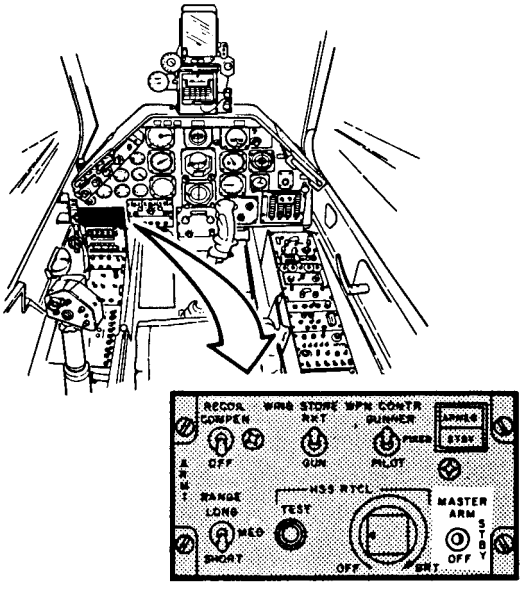
AC / ARMAMENT CIRCUIT BREAKER PANEL

DC CIRCUIT BREAKER PANEL

ARR83-1970

HELICOPTER PREPARATION AND TARGET EMPLACEMENT (cont)

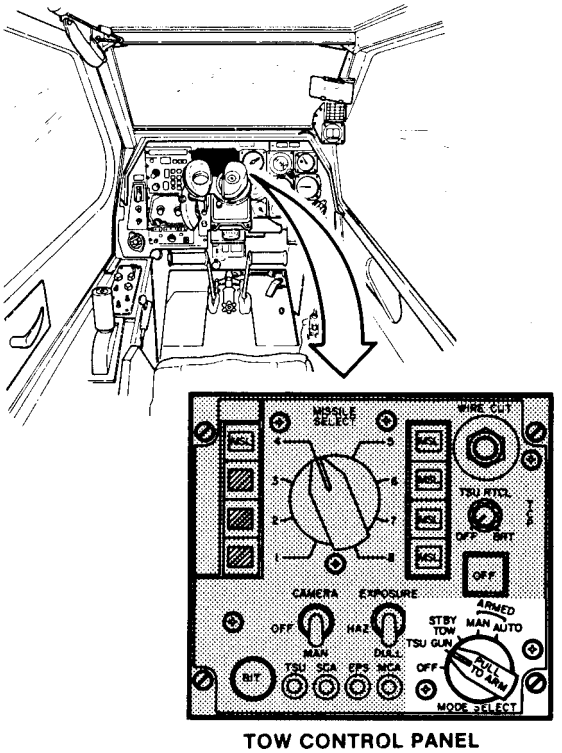
23. ON PILOT ARMAMENT CONTROL PANEL, SET MASTER ARM SWITCH TO STBY.



PILOT ARMAMENT CONTROL PANEL

ARR83-1971

24. ON TOW CONTROL PANEL, SET MODE SELECT SWITCH TO TSU/GUN.



TOW CONTROL PANEL

ARR83-1972

BORESIGHTING TURRET SUBSYSTEM TO TSU LOS

NOTE

Three technicians are required to perform following operations.

1. **First technician sights through TSU to TSU target crosshairs, tracking gun to TSU.**
2. **Second technician makes optical measurements.**
3. **Third technician adjusts resolvers and assists other technicians as necessary.**

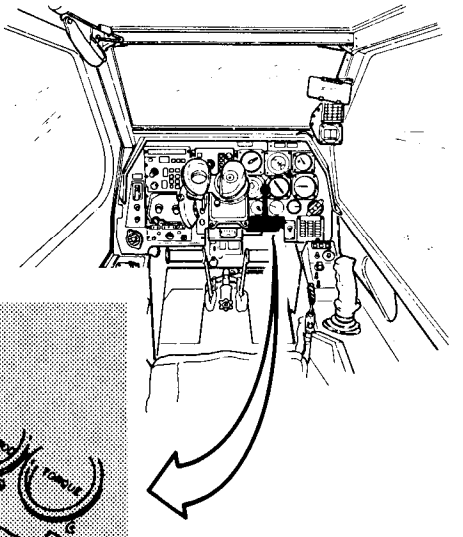
Intercom headsets are recommended for communication between technicians during these operations.

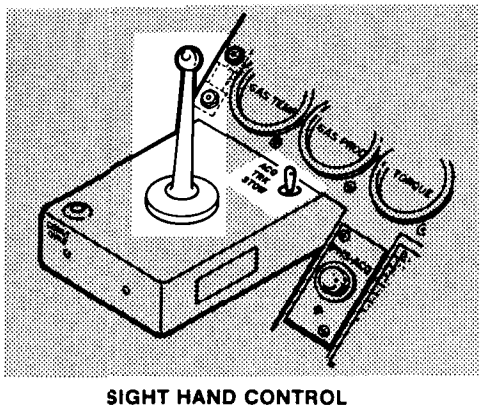
During following procedures, first technician may cease tracking as directed by second technician.

To avoid erroneous optical measurements, personnel must not lean on or apply pressure to target assemblies or any armament subsystem components during boresighting.

Target emplacement should be monitored and maintained throughout boresighting.

25. ON SIGHT HAND CONTROL, SET ACQ/TRK/STOW SWITCH TO TRK.
26. USING SIGHT HAND CONTROL STICK, ALINE TSU RETICLE WITH FORWARD TARGET ASSEMBLY TSU TARGET CROSSHAIRS.





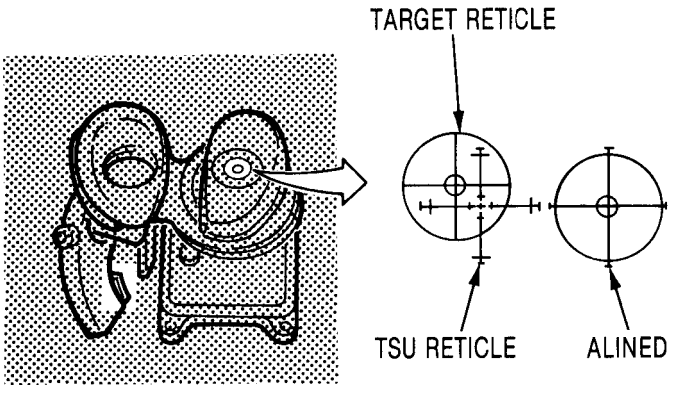
SIGHT HAND CONTROL

ARR83-1973

BORESIGHTING TURRET SUBSYSTEM TO TSU LOS (cont)

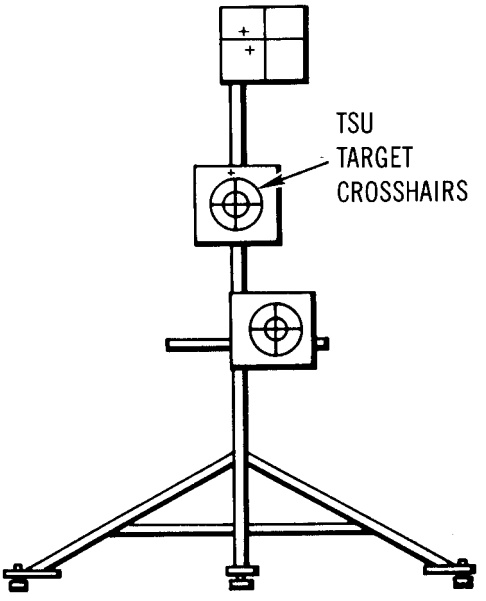
27. WHILE MAINTAINING ALINEMENT BETWEEN TSU RETICLE AND TSU TARGET CROSSHAIRS, PRESS AND HOLD LEFT-HAND GRIP ACTION SWITCH.

    Turret tracks TSU LOS.



TSU

ARR82-25357



FORWARD TARGET ASSEMBLY

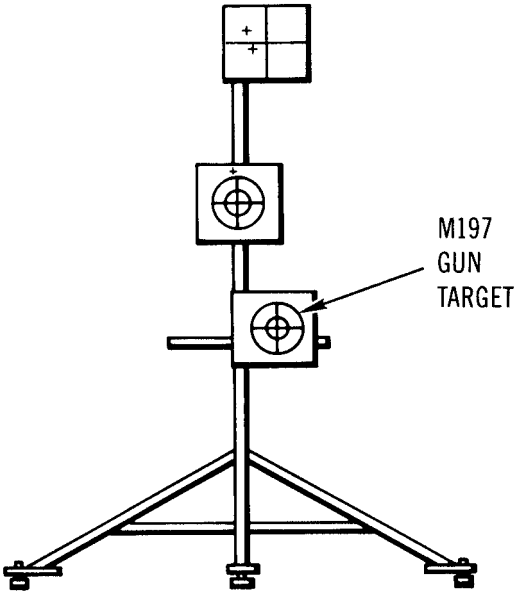
ARR83-1974

28. CHECK FORESIGHT OF TURRET SUBSYSTEM.

    a. Insert muzzle adapter and boresight telescope in firing barrel of M197 gun.

    b. Sight from scope to M197 gun target.

    c. Scope reticle should aline with target crosshairs. If alinement is required, go to step 29. If alinement is okay, go to step 38.



FORWARD TARGET ASSEMBLY

ARR83-1975

5-4. TURRET SUBSYSTEM AND REFLEX SIGHT ALINEMENT AND BORESIGHTING (cont)

BORESIGHTING TURRET SUBSYSTEM TO TSU LOS (cont)

29. **REMOVE TURRET LEFT AND RIGHT FAIR-**
INGS, SEE TM 55-1520-236-23.

NOTE

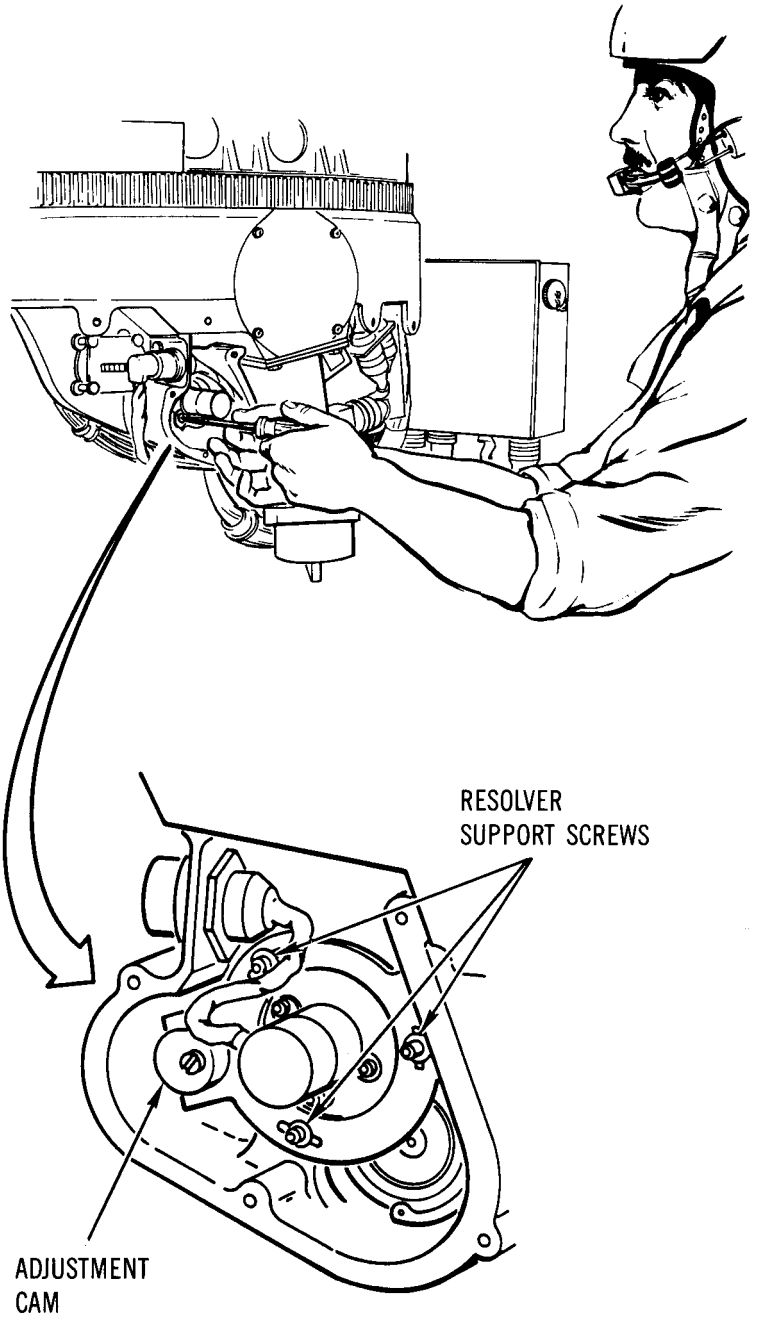
The following procedures are used to reduce elevation and/or azimuth boresight errors by adjusting the elevation and azimuth resolvers. Elevation alinement is given first, followed by azimuth alinement.

30. REMOVE ELEVATION RESOLVER COVER.

31. LOOSEN BUT DO NOT REMOVE THREE RESOLVER SUPPORT SCREWS.

32. WHILE FIRST TECHNICIAN MAINTAINS TURRET TRACKING; SECOND TECHNICIAN DIRECTS THIRD TECHNICIAN TO TURN ADJUSTMENT CAM TO ALINE SCOPE RETICLE (HORIZONTAL CROSSHAIR) WITH HORIZONTAL CROSSHAIR OF M197 GUN TARGET.

33. TORQUE THREE RESOLVER SUPPORT SCREWS TO 12-20 LB. IN. (1.36-2.26 N.m).



ARR83-1976

BORESIGHTING TURRET SUBSYSTEM TO TSU LOS (cont)

34. REMOVE AZIMUTH RESOLVER COVER.

35. LOOSEN BUT DO NOT REMOVE THREE RESOLVER SUPPORT SCREWS.

36. WHILE FIRST TECHNICIAN MAINTAINS TURRET TRACKING, SECOND TECHNICIAN DIRECTS THIRD TECHNICIAN TO TURN ADJUSTMENT CAM TO ALINE SCOPE RETICLE (VERTICAL CROSSHAIR) WITH VERTICAL CROSSHAIR OF M197 GUN TARGET.

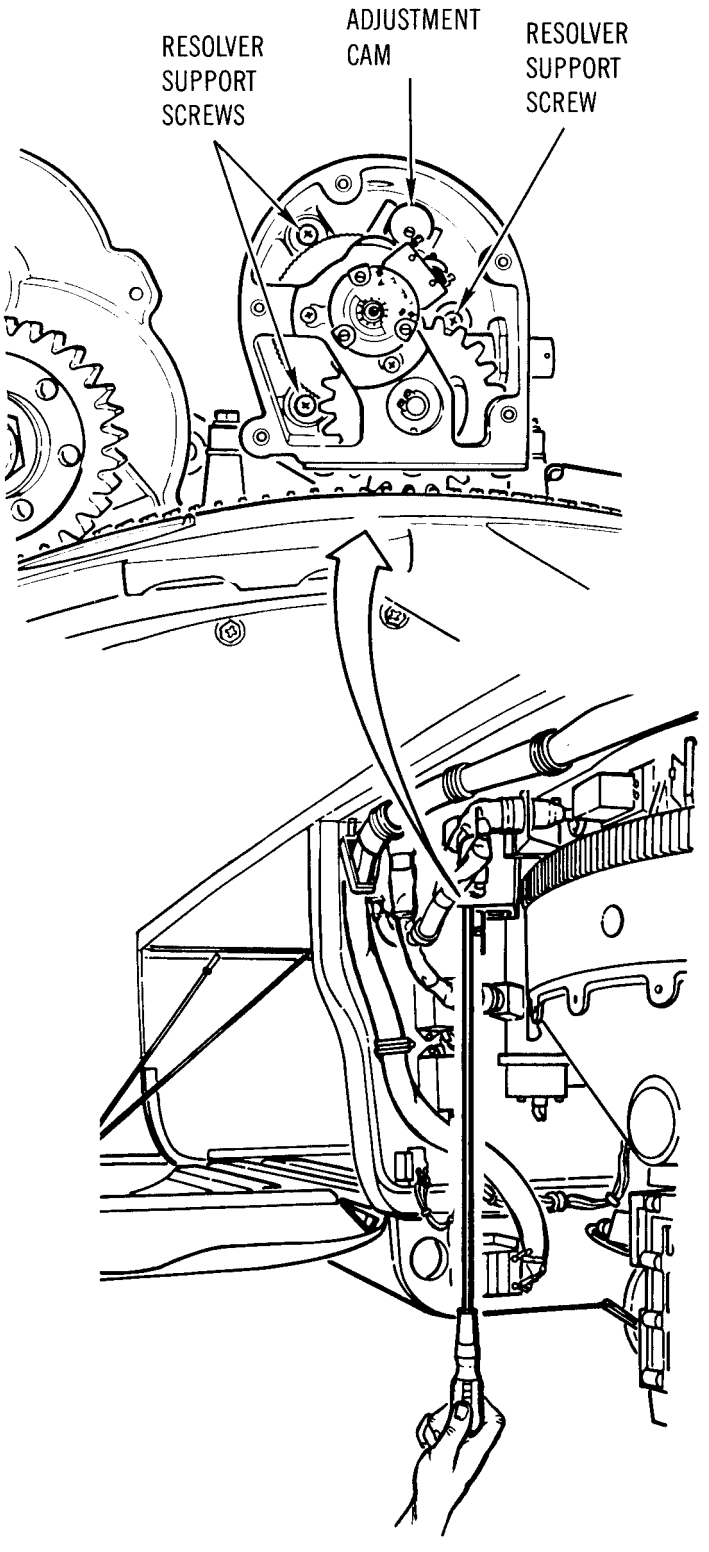
37. TORQUE THREE RESOLVER SUPPORT SCREWS TO 12-20 LB. IN. (1.36-2.26 N.m).

NOTE

If azimuth/elevation resolvers were adjusted, emergency stow switch adjustment must be done per para 2-70.

38. REMOVE BORESIGHT TELESCOPE AND MUZZLE ADAPTER.

39. FIRST TECHNICIAN MAY CEASE TRACKING AT DIRECTION OF SECOND TECHNICIAN.

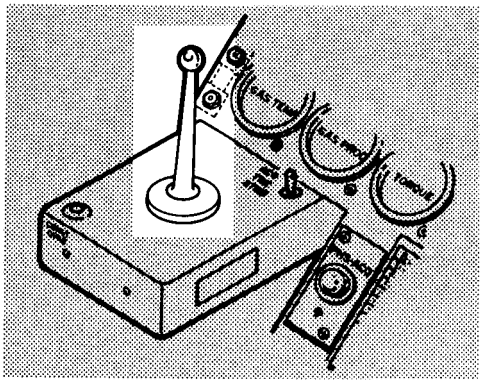


ARR83-1977

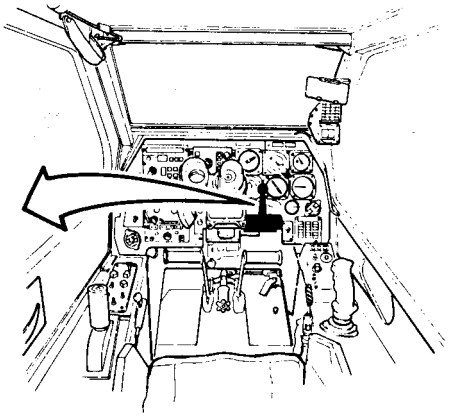
5-4. TURRET SUBSYSTEM AND REFLEX SIGHT ALINEMENT AND BORESIGHTING (cont)

ELIMINATION OF PITCH AND ROLL ERROR

40. USING SIGHT HAND CONTROL STICK, ALINE TSU RETICLE WITH RIGHT TARGET ASSEMBLY TSU TARGET CROSSHAIRS.



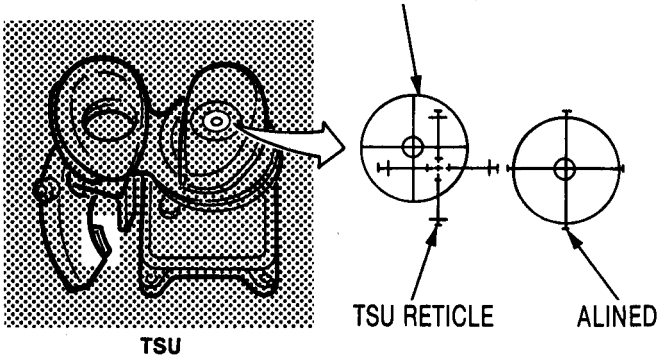
SIGHT HAND CONTROL



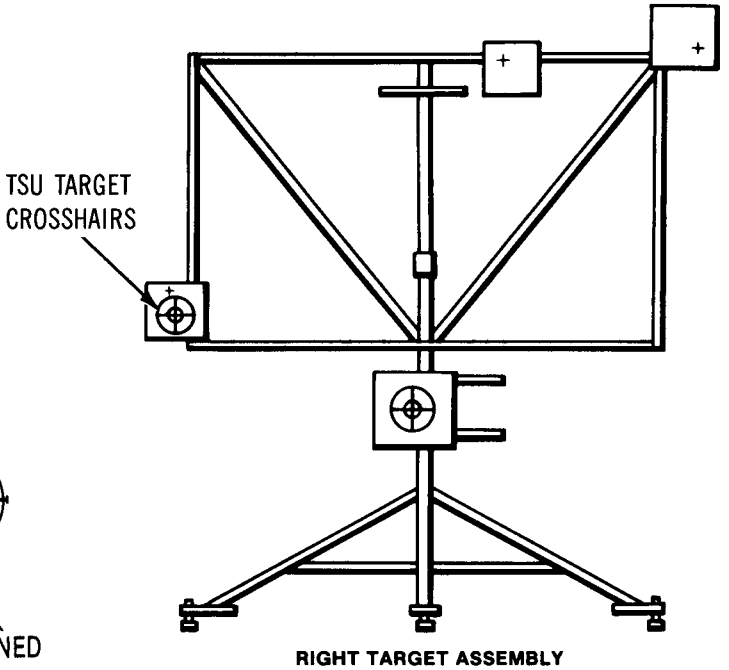
ARR83-1978

41. WHILE MAINTAINING ALINEMENT BETWEEN TSU RETICLE AND TSU TARGET CROSSHAIRS, PRESS AND HOLD LEFT-HAND GRIP ACTION SWITCH.

Turret tracks TSU LOS.



TSU



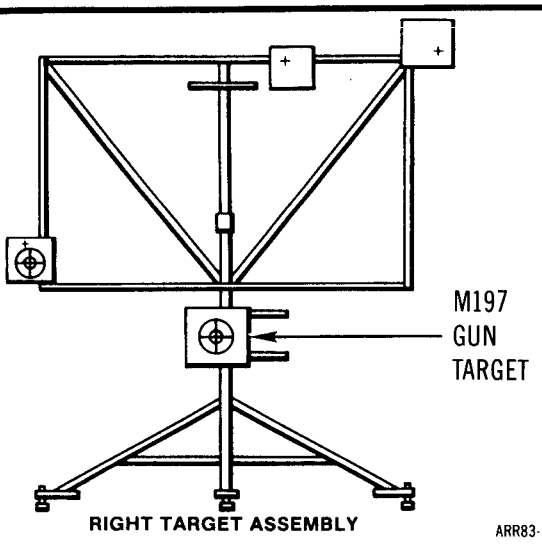
RIGHT TARGET ASSEMBLY

ARR82-25357

ARR83-1979

ELIMINATION OF PITCH AND ROLL ERROR (cont)

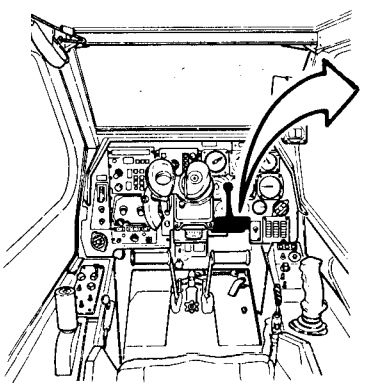
42. CHECK ROLL ERROR AT RIGHT TARGET ASSEMBLY.
    a. Insert muzzle adapter and boresight telescope in firing barrel of M197 gun.
    b. Sight from scope to M197 gun target.
    c. Record error between scope horizontal crosshair and M197 gun target horizontal crosshair (measured at target in inches).

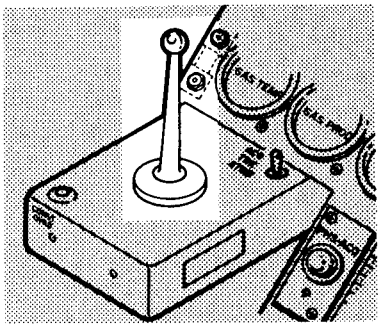


RIGHT TARGET ASSEMBLY

ARR83-1980

43. USING SIGHT HAND CONTROL STICK, ALINE TSU RETICLE WITH LEFT TARGET ASSEMBLY TSU TARGET CROSSHAIRS.

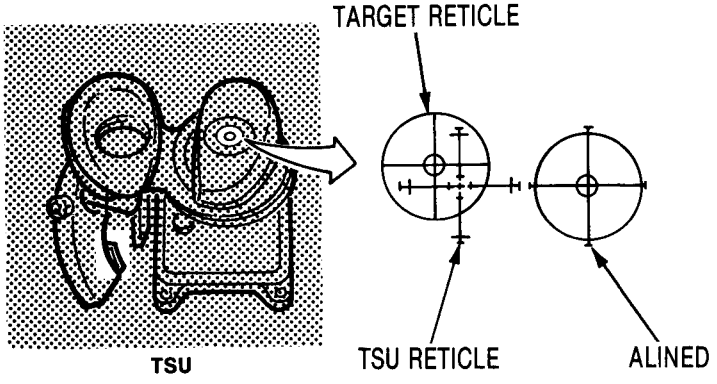


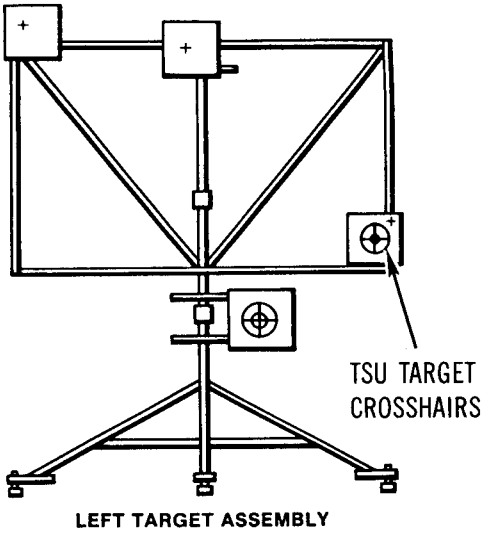

SIGHT HAND CONTROL

ARR83-1981

44. WHILE MAINTAINING ALINEMENT BETWEEN TSU RETICLE AND LEFT TSU TARGET CROSSHAIRS, PRESS AND HOLD LEFT-HAND GRIP ACTION SWITCH.

    Turret tracks TSU LOS.





LEFT TARGET ASSEMBLY

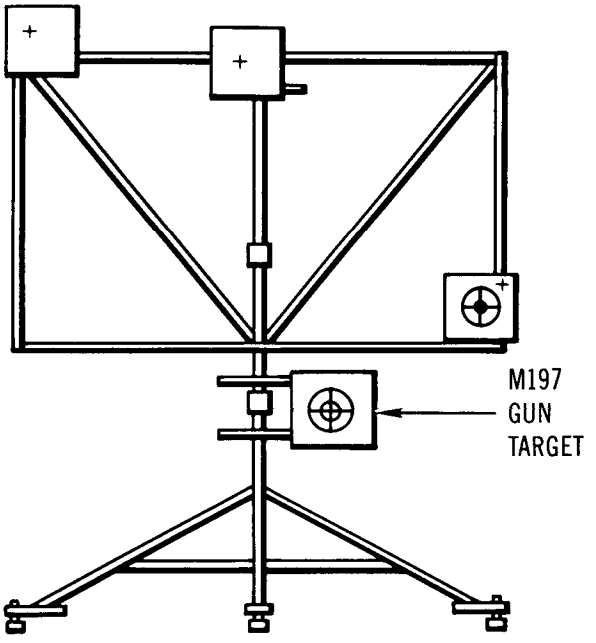
ARR82-25357

ARR83-1982

5-4. TURRET SUBSYSTEM AND REFLEX SIGHT ALINEMENT AND BORESIGHTING (cont)

ELIMINATION OF PITCH AND ROLL ERROR (cont)

45. CHECK ROLL ERROR AT LEFT TARGET ASSEMBLY.
    a. Insert muzzle adapter and boresight telescope in firing barrel of M197 gun.
    b. Sight from scope to M197 gun target.
    c. Record error between scope horizontal crosshair and M197 gun target horizontal crosshair (measured at target in inches).



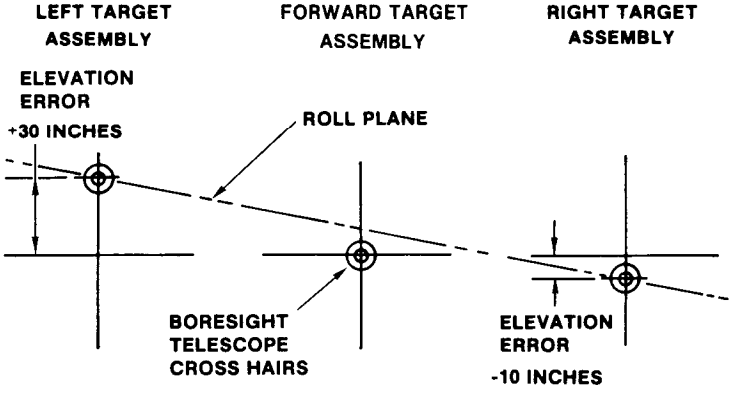
LEFT TARGET ASSEMBLY

ARR83-1983

46. COMPARE RIGHT AND LEFT ROLL ERRORS TO DETERMINE ROLL CORRECTION. IF ANY.

    If the total difference between left and right roll error exceeds four inches, roll alinement must be corrected; record difference and go to step 48. If roll alinement is okay, go to next step.

47. RECORD ELEVATION ERRORS, IF ANY, BETWEEN SCOPE HORIZONTAL CROSSHAIR AND M197 GUN HORIZONTAL CROSSHAIR, THIS VALUE WILL BE USED DURING PITCH ADJUSTMENT. THEN GO TO STEP 54.



RIGHT ERROR = -10 INCHES
LEFT ERROR = +30 INCHES
TOTAL DIFFERENCE = 40 INCHES

TYPICAL ROLL ERROR

ARR83-1984

ELIMINATION OF PITCH AND ROLL ERROR (cont)

48. REMOVE IFCU ACCESS PANEL FROM HELICOPTER AND RESOLVER ACCESS PANEL FROM IFCU.

49. USING SIGHT HAND CONTROL STICK, ALINE TSU RETICLE WITH EITHER RIGHT OR LEFT TSU TARGET CROSSHAIRS AND PRESS LEFT-HAND GRIP ACTION SWITCH.

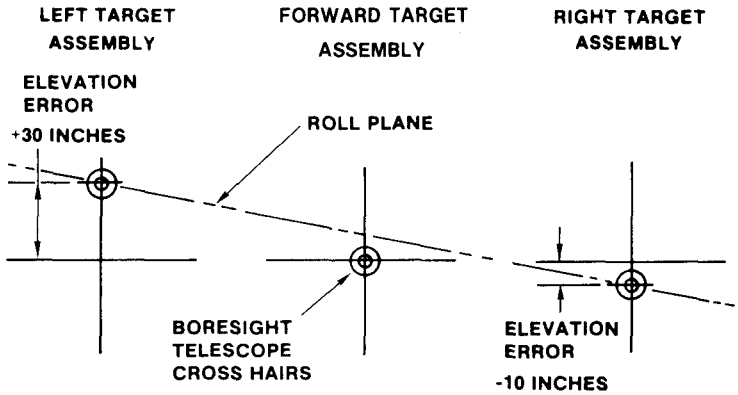
    Turret tracks TSU LOS.

50. INSERT MUZZLE ADAPTER AND BORESIGHT TELESCOPE IN FIRING BARREL OF M197 GUN.

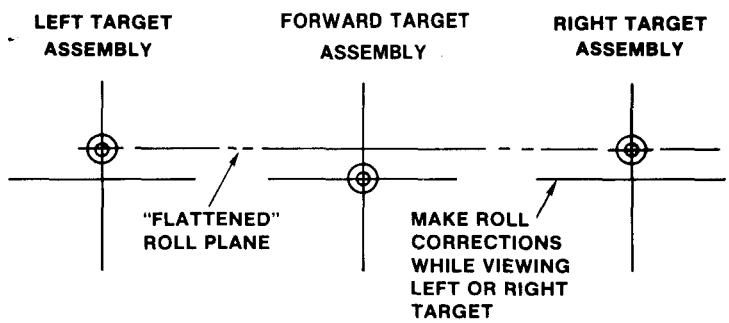
51. ADJUST ROLL RESOLVER B2.

    a. Loosen four setscrews and coarse adjustment clamping screw.

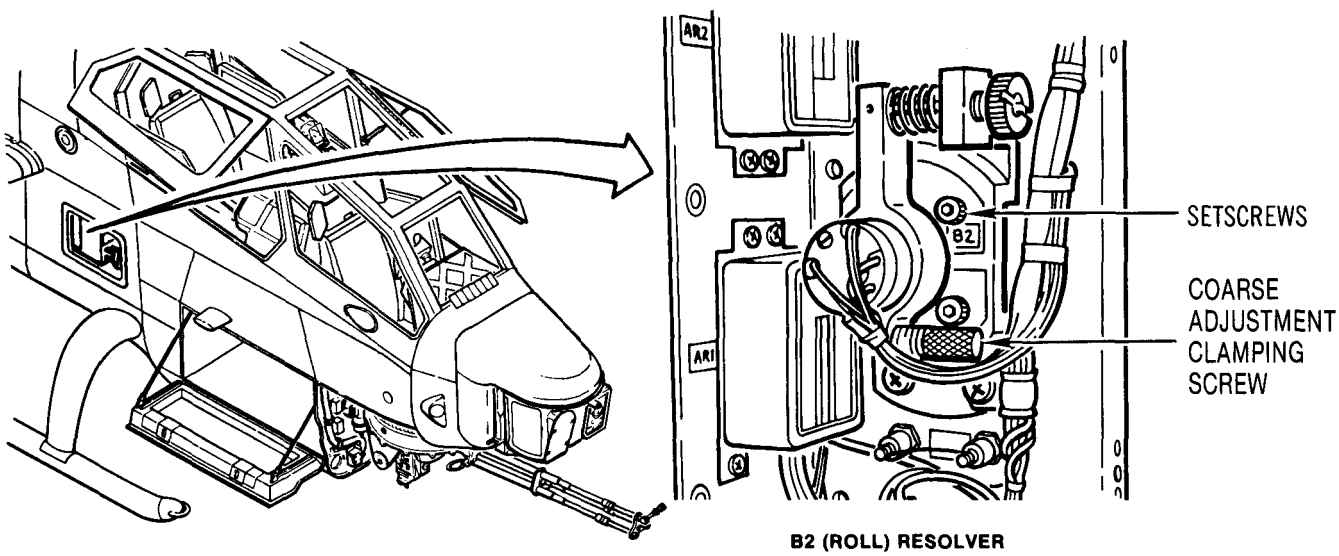
    b. Second technician sights through scope and directs third technician to rotate resolver body until amount of correction is equal to one half the total difference. Adjustment is made in direction which flattens roll plane.



TYPICAL ROLL ERROR BEFORE CORRECTION
CORRECTION EQUALS ONE HALF TOTAL DIFFERENCE. IN THIS EXAMPLE 1/2 OF 40 IN. = 20 IN.



AFTER ELIMINATION OF ROLL ERROR



B2 (ROLL) RESOLVER

ARR83-1986

5-4. TURRET SUBSYSTEM AND REFLEX SIGHT ALINEMENT AND BORESIGHTING (cont)

ELIMINATION OF PITCH AND ROLL ERROR (cont)

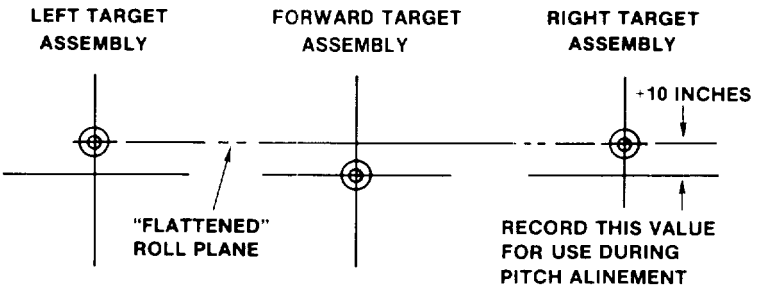
52. AFTER ADJUSTING RESOLVER, RECORD ELEVATION ERROR, IF ANY, BETWEEN SCOPE HORIZONTAL CROSSHAIR AND M197 GUN TARGET HORIZONTAL CROSSHAIR.

    This value will be used during pitch adjustment.

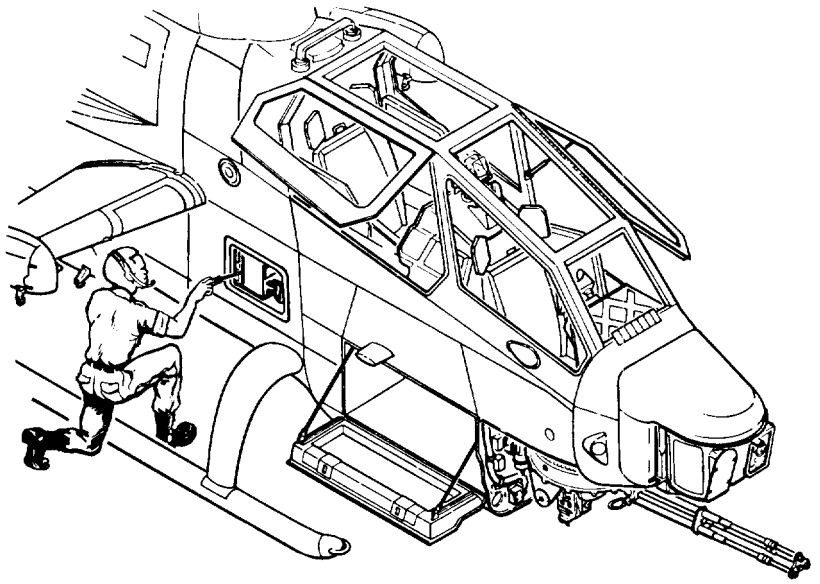
53. TIGHTEN RESOLVER SETSCREWS AND CLAMPING SCREW.

54. REMOVE MUZZLE ADAPTER AND BORE-SIGHT TELESCOPE.

55. RELEASE LEFT-HAND GRIP ACTION SWITCH.



TYPICAL ELEVATION ERROR AFTER ELIMINATION OF ROLL ERROR



ELIMINATION OF PITCH AND ROLL ERROR (cont)

56. USING SIGHT HAND CONTROL STICK, ALINE TSU RETICLE WITH FORWARD TARGET ASSEMBLY TSU TARGET CROSSHAIRS AND PRESS LEFT-HAND GRIP ACTION SWITCH.

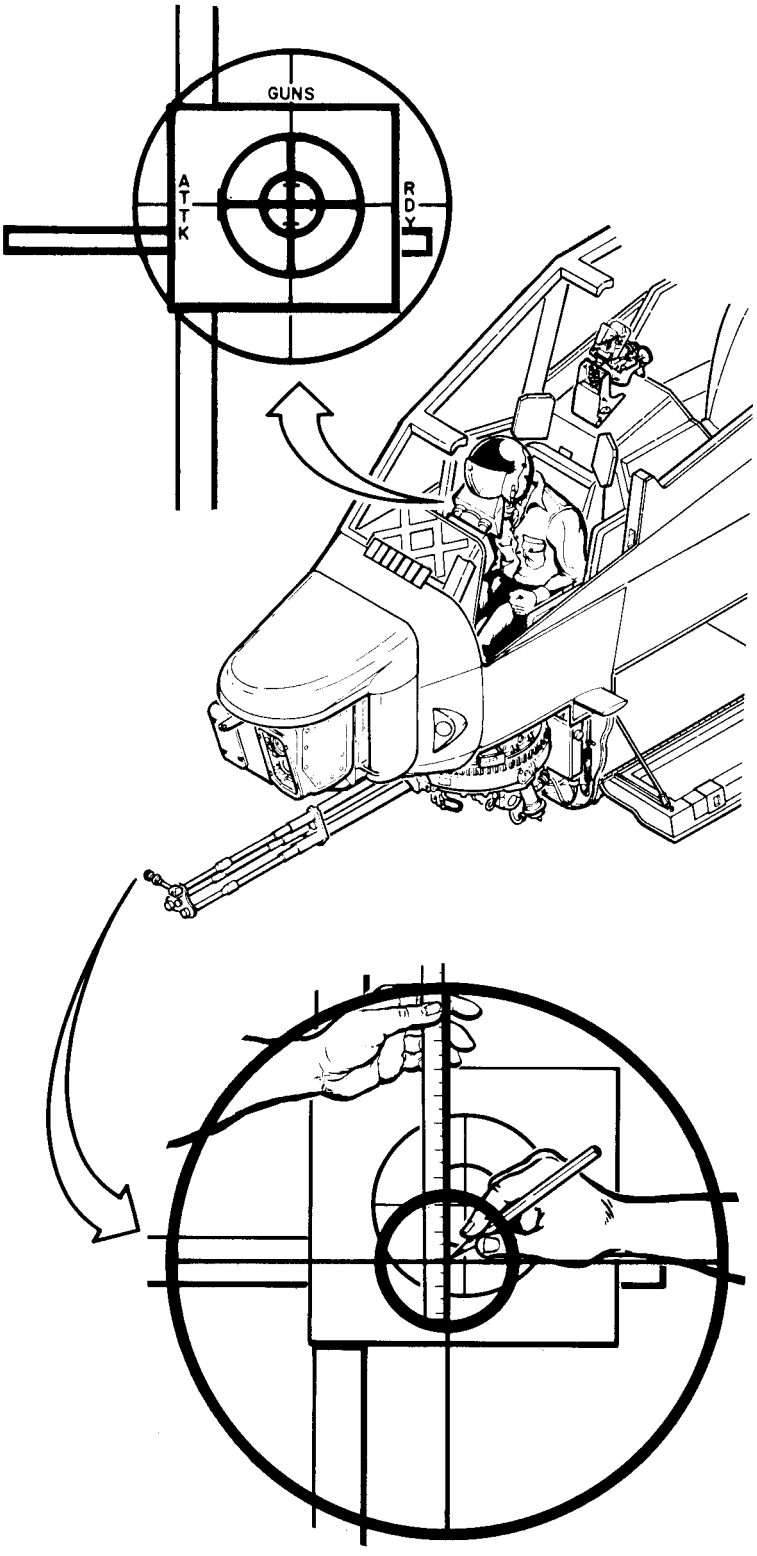
    Turret tracks TSU LOS.

57. INSERT MUZZLE ADAPTER AND BORE-SIGHT TELESCOPE IN FIRING BARREL OF M197 GUN.

56. SIGHT FROM SCOPE TO M197 GUN TARGET AND RECORD ELEVATION ERROR (MEASURED AT TARGET IN INCHES) BETWEEN SCOPE HORIZONTAL-CROSSHAIR AND M197 GUN TARGET HORIZONTAL CROSSHAIR.

    COMPARE ELEVATION ERROR AT FORWARD TARGET WITH ERROR RECORDED IN STEP 47 OR 52.

    If total difference exceeds four inches, pitch alinement must be corrected; go to next step. If pitch alinement is okay, go to step 62.



ARR83-1988

5-4. TURRET SUBSYSTEM AND REFLEX SIGHT ALINEMENT AND BORESIGHTING (cont)

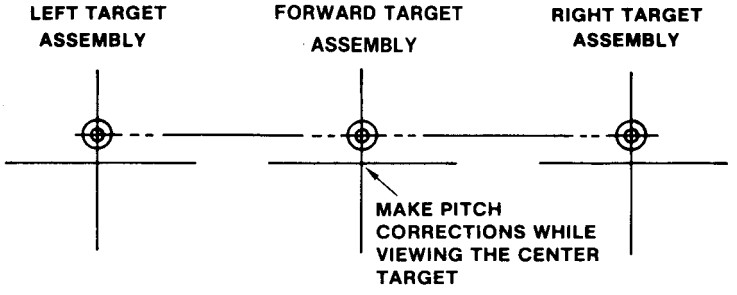
ELIMINATION OF PITCH AND ROLL ERROR (cont)

60. ADJUST PITCH RESOLVER B1.
    a. Loosen four setscrews and coarse adjustment clamping screw.
    b. Second technician sights through scope and directs third technician to rotate resolver body until elevation offset equals offset recorded in step 58. The roll plane should now be flat for all three targets.

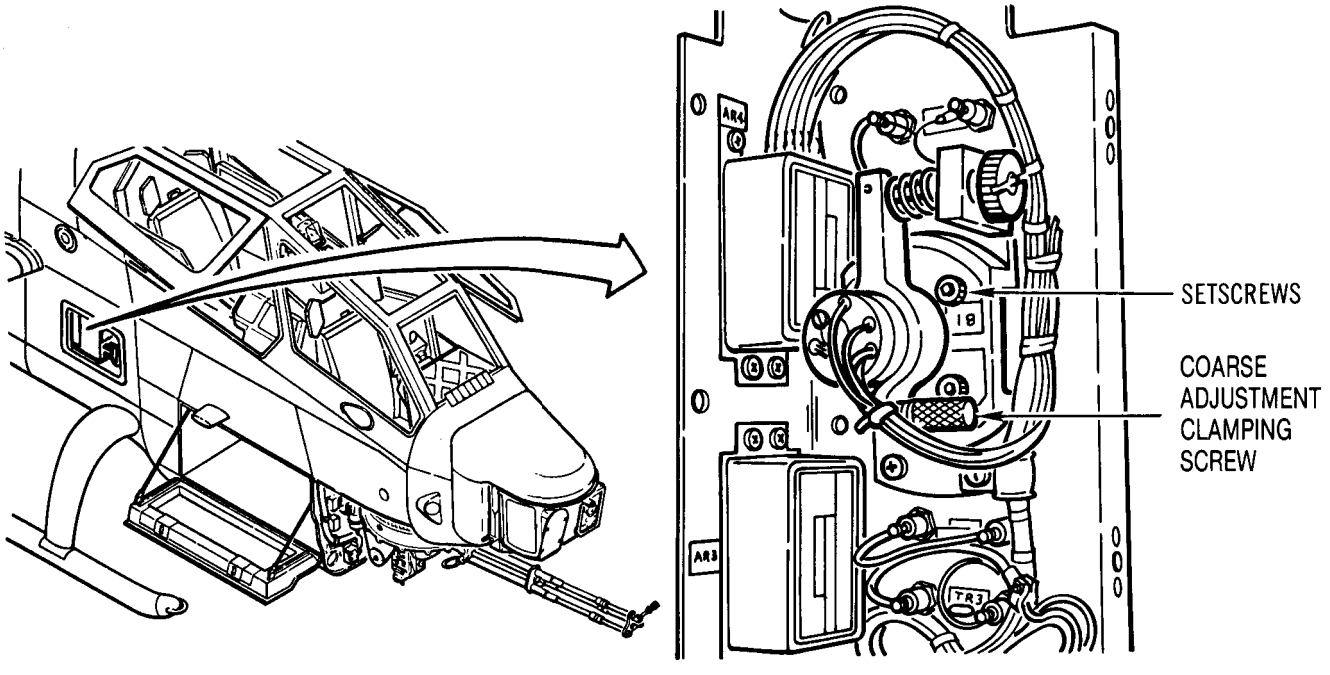
61. TIGHTEN RESOLVER SETSCREWS AND CLAMPING SCREW.

62. REMOVE MUZZLE ADAPTER AND BORESIGHT TELESCOPE.

63. RELEASE LEFT-HAND GRIP ACTION SWITCH.



TYPICAL PITCH AND ROLL CORRECTED SIGHTINGS



B1 (ROLL) RESOLVER

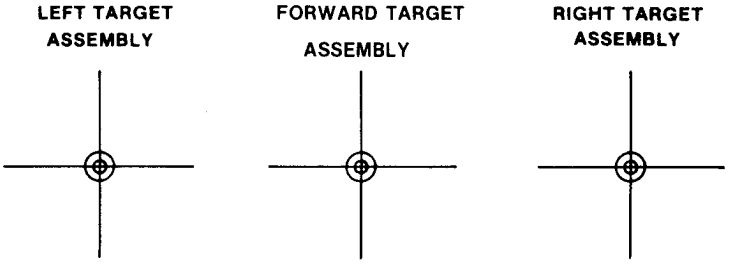
ARR83-1989

ELIMINATION OF PITCH AND ROLL ERROR (cont)

NOTE

If necessary the elevation resolver can be readjusted in order to make the scope horizontal crosshair coincident with the forward M197 Gun target horizontal crosshair.

64. AS A FINAL CHECK, DIRECT TSU AND TURRET TO ALL THREE TARGET ASSEMBLIES TO RECHECK BORESIGHT READINGS AT EACH ONE. AN OVERALL M197 GUN-TO-TSU ACCURACY OF SIX INCHES (MEASURED AT TARGET) IS REQUIRED; HOWEVER, EFFORT SHOULD BE MADE TO BORESIGHT AS ACCURATELY AS POSSIBLE.



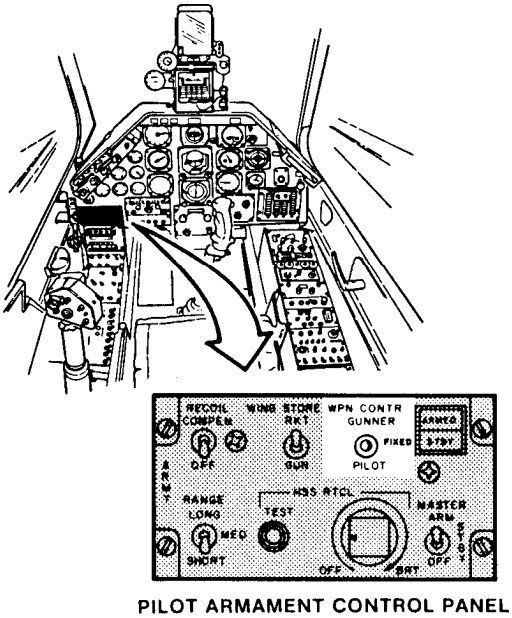
FINAL DESIRED SIGHTING PICTURE

ARR83-1990

TURRET SUBSYSTEM ALINEMENT IN FIXED MODE

65. ON PILOT ARMAMENT CONTROL PANEL, SET WPN CONTR SWITCH TO FIXED.

Turret slews to fixed forward position.



PILOT ARMAMENT CONTROL PANEL

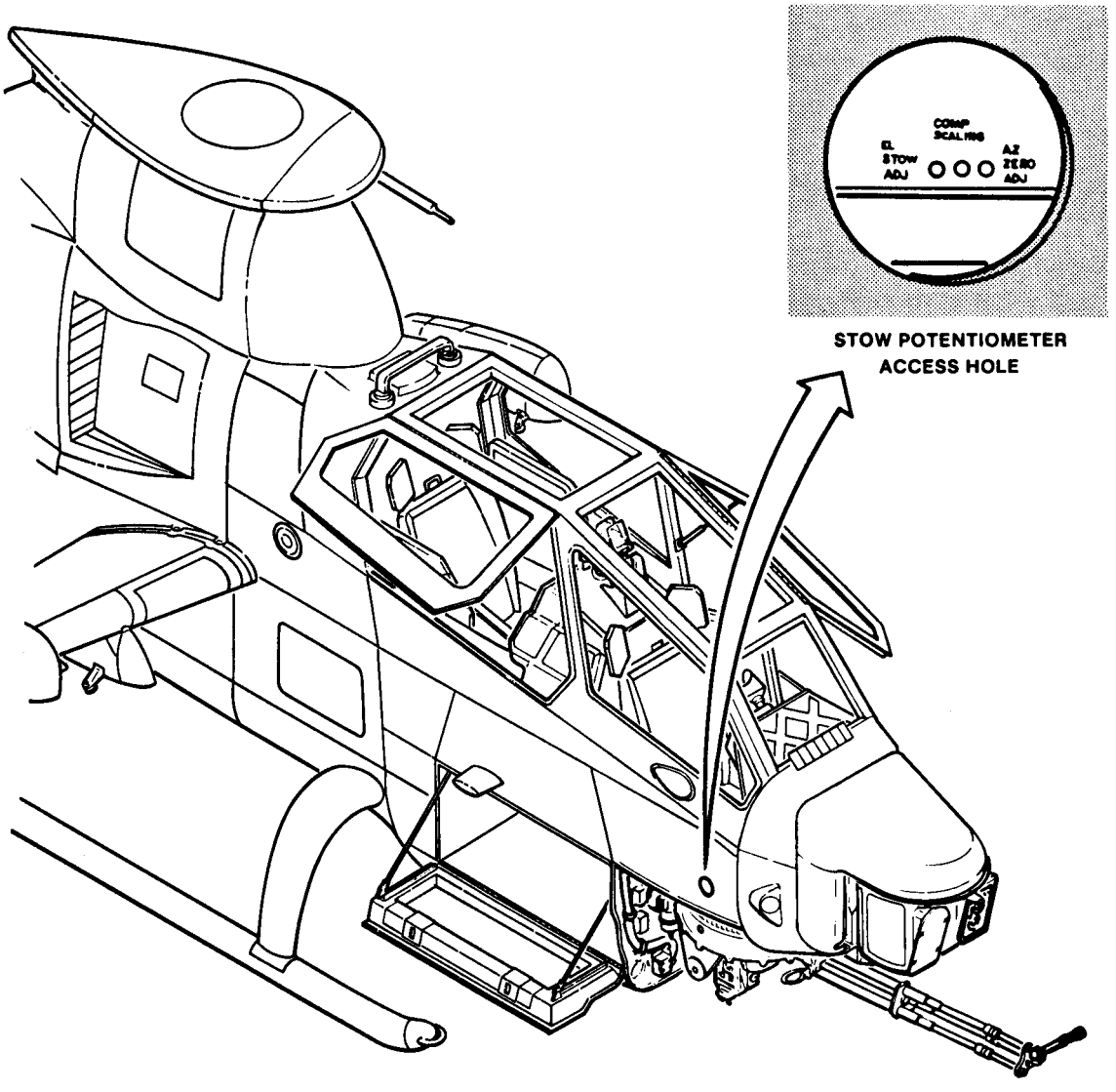
ARR83-1991

5-4. TURRET SUBSYSTEM AND REFLEX SIGHT ALINEMENT AND BORESIGHTING (cont)

TURRET SUBSYSTEM ALINEMENT IN FIXED MODE (cont)

66. REMOVE STOW POTENTIOMETER ACCESS HOLE COVER.

67. INSTALL MUZZLE ADAPTER AND BORESIGHT TELESCOPE IN FIRING BARREL OF M197 GUN.



ARR83-1992

TURRET SUBSYSTEM ALINEMENT IN FIXED MODE (cont)

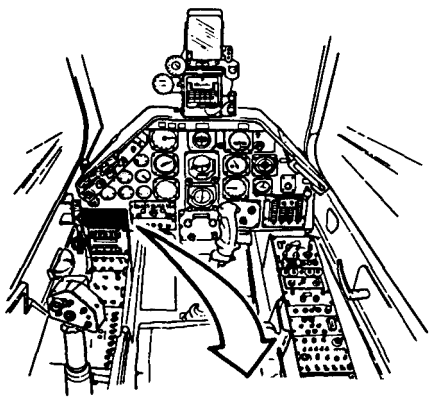
66. SECOND TECHNICIAN VIEWS FORWARD TARGET ASSEMBLY AND DIRECTS THIRD TECHNICIAN TO ADJUST AZ ZERO ADJ POTENTIOMETER UNTIL SCOPE VERTICAL CROSSHAIR IS COINCIDENT WITH M197 GUN TARGET VERTICAL CROSSHAIR.

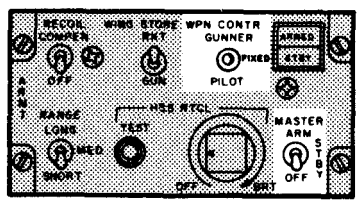
69. SECOND TECHNICIAN VIEWS FORWARD TARGET ASSEMBLY AND DIRECTS THIRD TECHNICIAN TO ADJUST EL STOW ADJ POTENTIOMETER UNTIL SCOPE HORIZONTAL CROSSHAIR IS COINCIDENT WITH M197 GUN TARGET HORIZONTAL CROSSHAIR.

70. REMOVE BORESIGHT TELESCOPE AND MUZZLE ADAPTER.

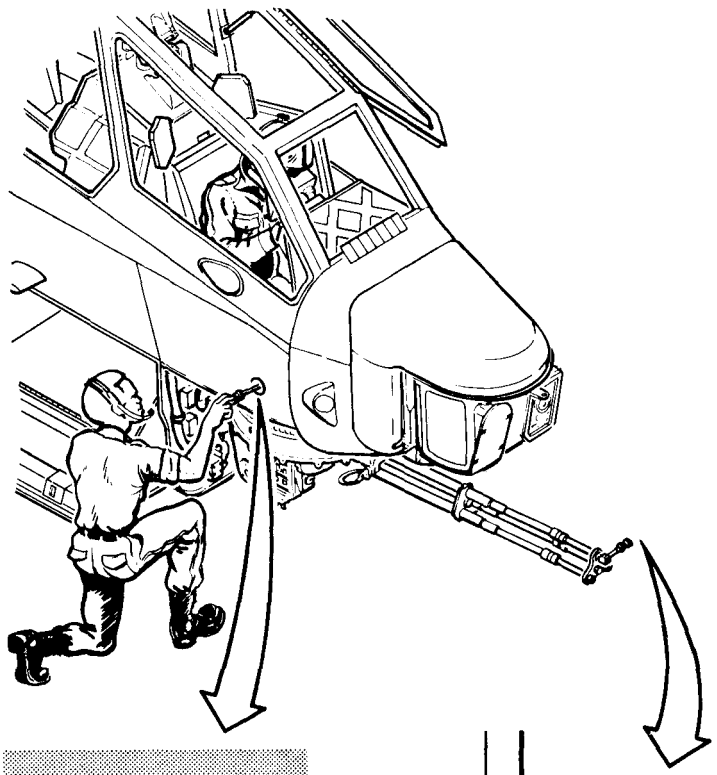
71. ON PILOT ARMAMENT CONTROL PANEL, SET WPN CONTR SWITCH TO GUNNER AND MASTER ARM SWITCH TO OFF.

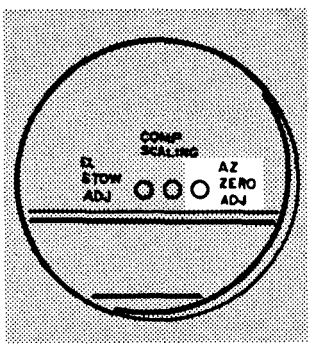
Turret slews to stow position.

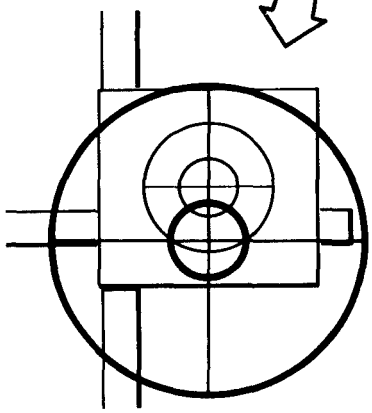


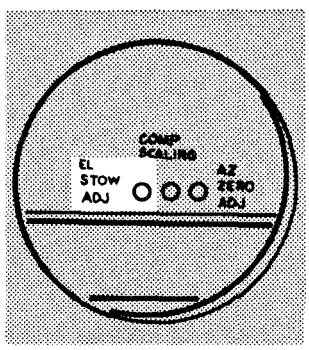


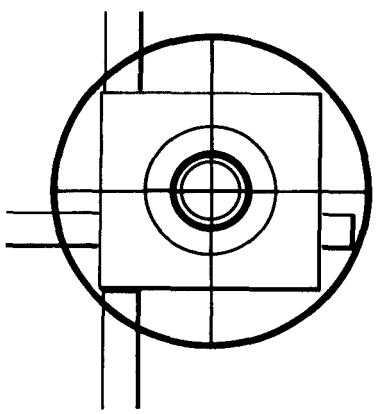
PILOT ARMAMENT CONTROL PANEL











ARR83-1993A

REFLEX SIGHT ALINEMENT AND BORESIGHTING

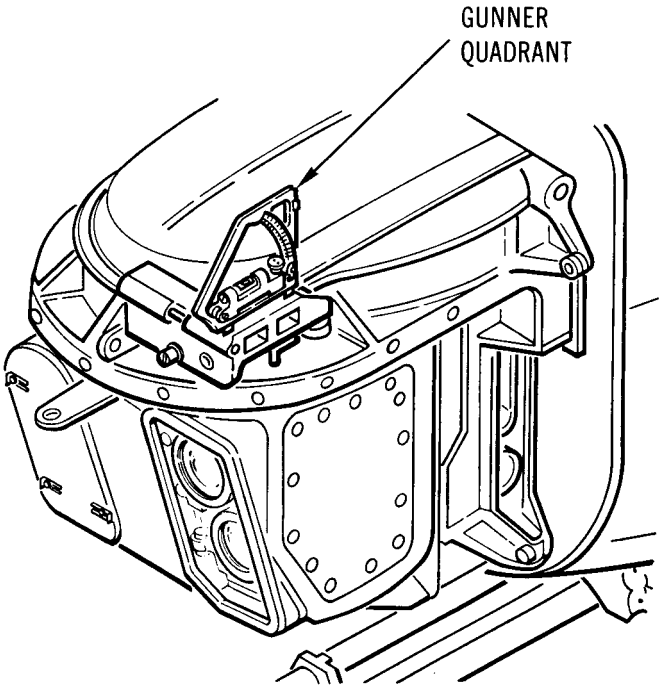
NOTE

During alinement procedure using gunner quadrant, helicopter must remain level. Technicians will take their positions prior to alinement and will remain at their positions until alinement and boresighting is complete.

72. PLACE GUNNER QUADRANT ON TSU BORESIGHT DEVICE.

    Position quadrant so level bubble will sense pitch.

73. ADJUST QUADRANT SCALE TO CENTER LEVEL BUBBLE.



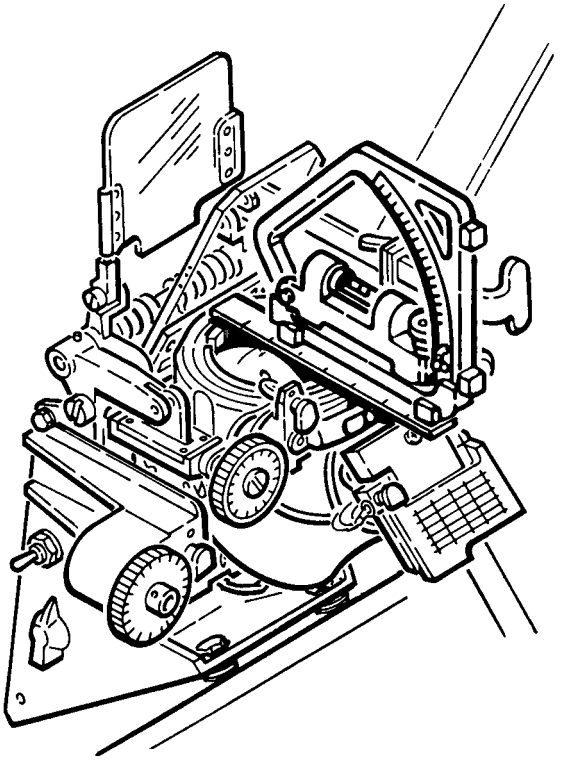
ARR83-1994

NOTE

A straight edge may be placed across sight head to facilitate quadrant measurement.

74. TRANSFER GUNNER QUADRANT TO SIGHT HEAD ON REFLEX SIGHT. GUNNER QUADRANT SHOULD READ 5 TO 7 DEGREES GREATER THAN READING ESTABLISHED AT TSU BORESIGHT DEVICE.

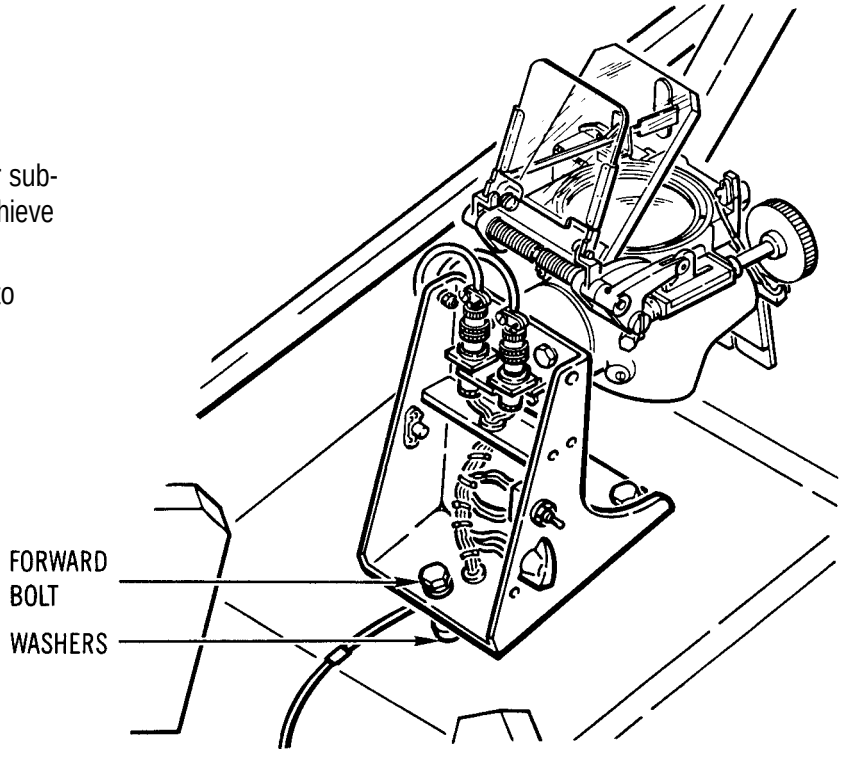
    If adjustment is required, go to next step. If not, go to step 76.



ARR83-1995

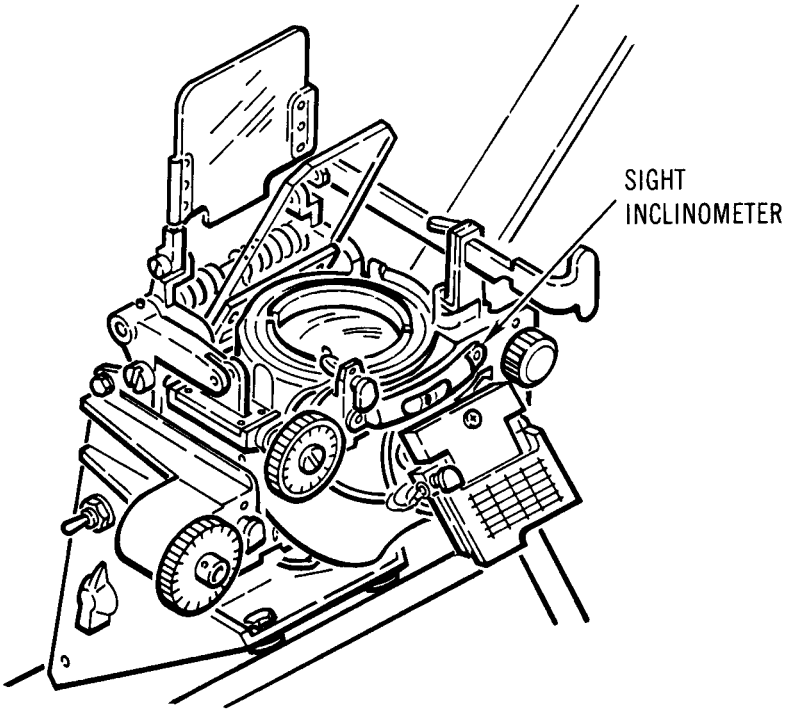
REFLEX SIGHT ALINEMENT AND BORESIGHTING (cont)

75. ALINE SIGHT SUPPORT IN PITCH.
    a. Remove sight support cover.
    b. Remove forward bolt and add or subtract washers as necessary to achieve proper quadrant reading.
    c. Install forward bolt and torque to 30-40 lb-in. (3.4-4.5 N.m).
    d. Install sight support cover.



ARR83-1996

76. CHECK ROLL ALINEMENT OF REFLEX SIGHT.
    a. Observe sight inclinometer to see if ball is centered between two reference lines.
    b. If ball is not centered, sight requires alinement in roll; go to next step. If ball is centered; go to step 78.



ARR83-1997

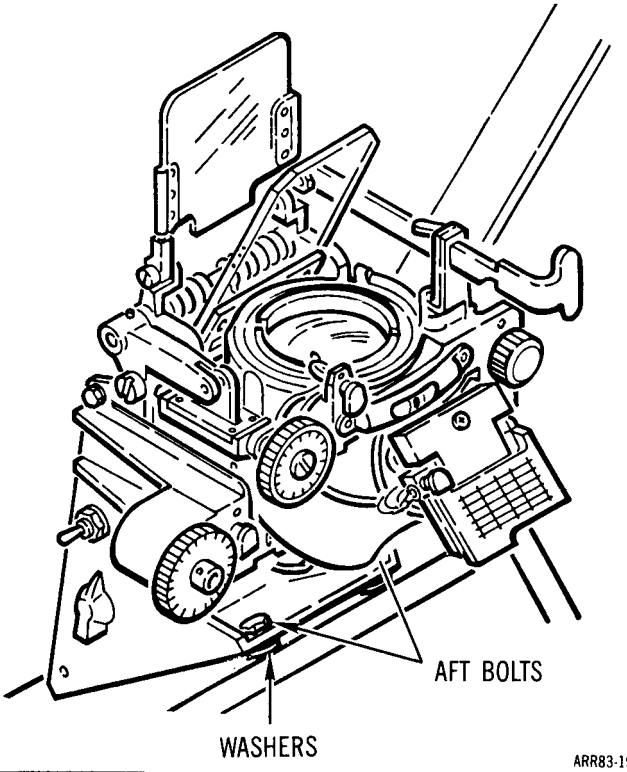
5-4. TURRET SUBSYSTEM AND REFLEX SIGHT ALINEMENT AND BORESIGHTING (cont)

REFLEX SIGHT ALINEMENT AND BORESIGHTING (cont)

77. ALINE SIGHT SUPPORT IN ROLL.

a. Remove one or both aft bolts and add or subtract washers as necessary to center ball between two reference lines on inclinometer.

b. Install aft bolt(s) and torque to 30-40 lb-in. (3.4-4.5 N.m).

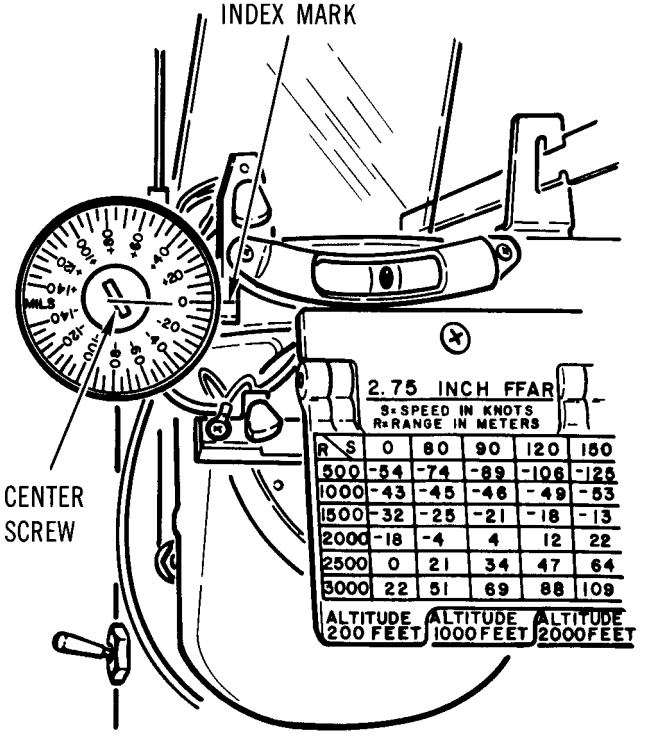


78. CHECK ELEVATION DEPRESSION KNOB ALINEMENT.

a. Aline zero mark on knob with index mark on sight base.

b. Check for full movement in elevation and depression (+ 140 mils and -140 mils).

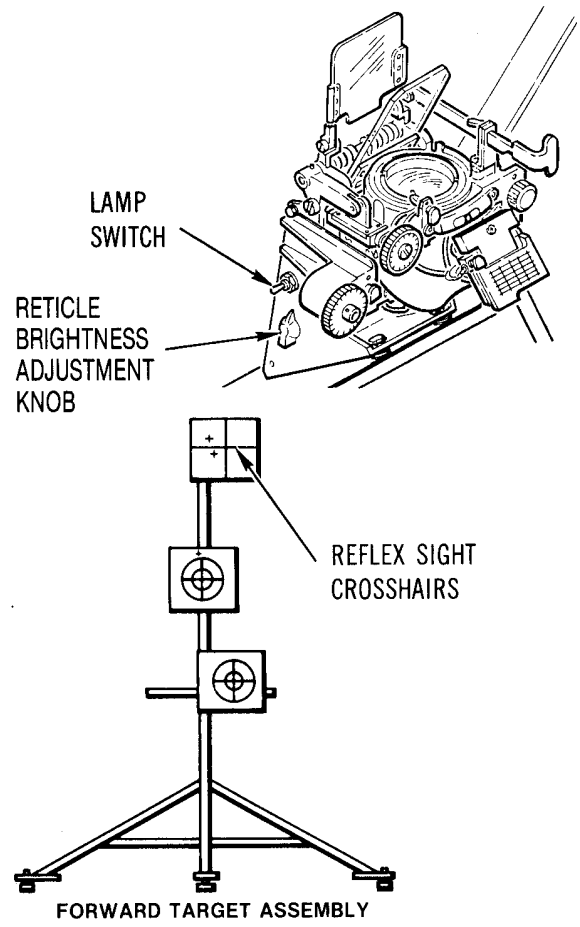
c. If rotation is not equal in both directions, adjust to approximate midpoint, Loosen center screw and rotate dial until zero mark is alined with index mark, then tighten center screw.



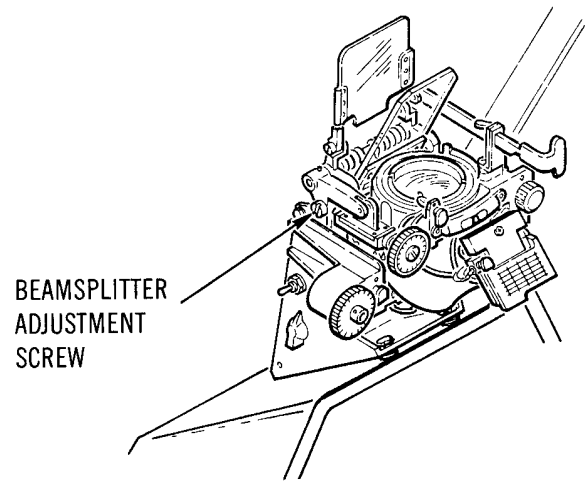
R \ S	0	80	90	120	150
500	-54	-74	-89	-106	-125
1000	-43	-45	-46	-49	-53
1500	-32	-25	-21	-18	-13
2000	-18	-4	4	12	22
2500	0	21	34	47	64
3000	22	51	69	88	109

REFLEX SIGHT ALINEMENT AND BORESIGHTING (cont)

79. CHECK PITCH ALINEMENT OF REFLEX SIGHT.
    a. Turn reflex sight lamp switch on and adjust reticle for desired brightness.
    b. Look through reflex sight and check to see that horizontal line of sight reticle is alined with horizontal crosshair of reflex sight crosshairs.
    c. If misalinement exists, go to next step. If not, go to step 81.

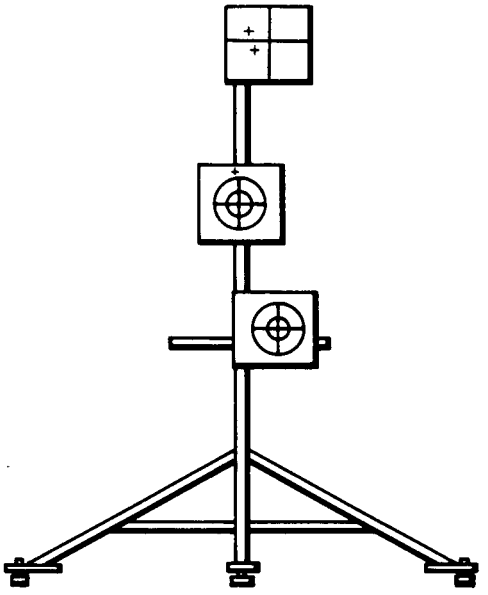


80. ALINE REFLEX SIGHT IN PITCH.
    a. While sighting on reflex sight crosshairs, loosen beamsplitter adjustment screw and move combining glass to aline reflex sight horizontal crosshair with horizontal crosshair of reflex sight target.
    b. Tighten beamsplitter adjustment screw.



REFLEX SIGHT ALINEMENT AND BORESIGHTING (cont)

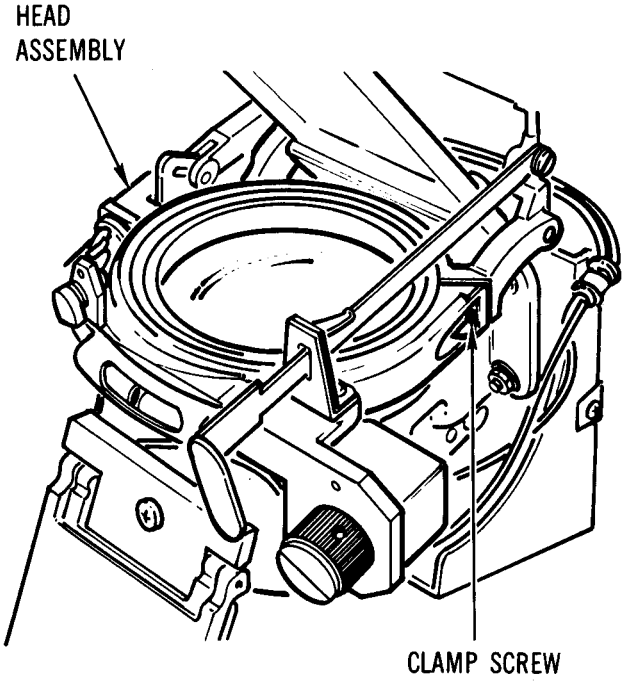
81. CHECK YAW ALINEMENT OF REFLEX SIGHT.
    a. Look through reflex sight and check to see that vertical line of sight reticle is alined with vertical crosshair of reflex sight crosshairs.
    b. If misalinement exists, go to next step. If not, go to step 83.



FORWARD TARGET ASSEMBLY

ARR83-2002

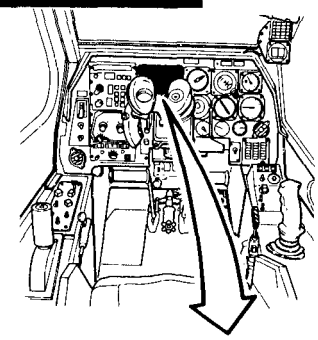
82. ALINE REFLEX SIGHT IN YAW.
    a. While sighting on reflex sight crosshairs, loosen clamp screw and rotate head assembly to right or left to aline reflex sight vertical crosshair with vertical crosshair of reflex sight target.
    b. Tighten clamp screw.

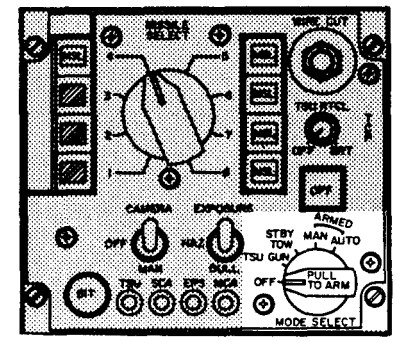


ARR83-2003

POST TURRET SUBSYSTEM BORESIGHTING PROCEDURES

83. ON TOW CONTROL PANEL, SET MODE SELECT SWITCH TO OFF.





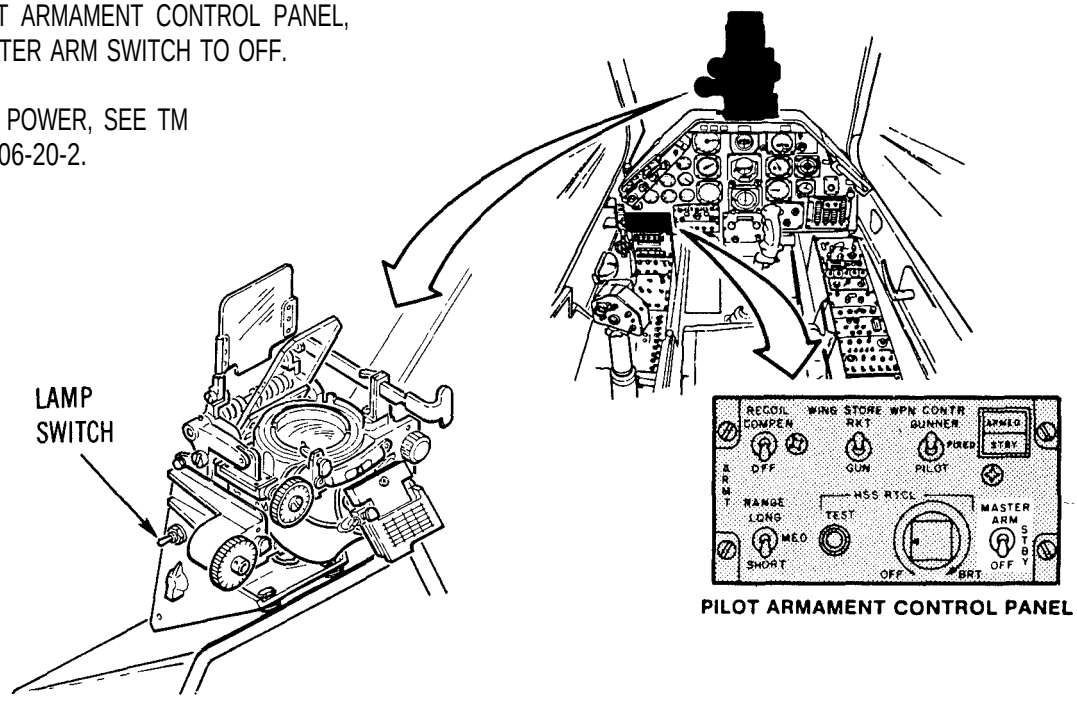
TOW CONTROL PANEL

ARR83-2004

84. ON REFLEX SIGHT, SET LAMP SWITCH TO OFF.

85. ON PILOT ARMAMENT CONTROL PANEL, SET MASTER ARM SWITCH TO OFF.

86. REMOVE POWER, SEE TM 9-1090-206-20-2.



PILOT ARMAMENT CONTROL PANEL

ARR83-2005A

5-4. TURRET SUBSYSTEM AND REFLEX SIGHT ALINEMENT AND BORESIGHTING (cont)

POST TURRET SUBSYSTEM BORESIGHTING PROCEDURES (cont)

87. INSTALL ELEVATION AND AZIMUTH RESOLVER COVERS.

88. INSTALL RESOLVER ACCESS PANEL ON IFCU AND IFCU ACCESS PANEL ON HELICOPTER.

89. INSTALL TURRET FAIRINGS.

90. CLOSE AND SECURE STOW POTENTIOMETER ACCESS HOLE COVER.

91. RELEASE FEEDER TIMING PIN.

NOTE

Leave TSU boresight device in place and targets emplaced, if proceeding to HSS alinement and boresighting.

92. RETURN BORESIGHT TELESCOPES AND TSU BORESIGHT DEVICE TO TEST SET CASE(S).

93. INSTALL TSU FAIRING.

94. RETURN TARGET ASSEMBLIES TO STORAGE.

END OF TASK

Section III. HELMET SIGHT SUBSYSTEM ALINEMENT AND BORESIGHTING

GENERAL

5-5. This section contains procedures for alining and boresighting the Helmet Sight Subsystem. The Pilot Helmet Sight (PHS) and Gunner Helmet Sight (GHS) are alined and boresighted using the emplaced targets from the turret subsystem and reflex sight alinement and boresighting procedures.

In the helicopter, the pilot and gunner helmet sights are alined to the TSU of the TOW missile system; that is, the helmet sight is sighted on a target and the TSU is electrically slaved to the helmet sight. Adjustments are made until the TSU sights exactly on the same object. During actual boresighting, a special tool and standard boresight telescope attached to each linkage take the place of the helmet sight to provide stability and accuracy; and three emplaced targets take the place of the object. The targets are emplaced straight ahead, 90 degrees right, and 90 degrees left of the TSU in the nose of the helicopter. Boresight telescope sightings are made and boresighting adjustments are accomplished until the sighting error differences at the three targets are coincident. Boresighting adjustments are made at each linkage and at the EIA.

5-6. HELMET SIGHT SUBSYSTEM ALINEMENT AND BORESIGHTING

DESCRIPTION

This task covers: Alinement and boresighting of gunner and pilot helmet sights.

INITIAL SETUP

Tools/Test and Support Equipment:
- Tool Set, A/C Armament Repairman: Basic
- Tool Set, A/C Armament Repairman: Supplemental
- Boresight Telescope
- TSU boresight device.
- Test set, fire control subsystem, AN/GSM-249

Personnel Required: (2)
- 68M/68J Aircraft Fire Control Repairer

References:
- TM 9-1090-206-20-2

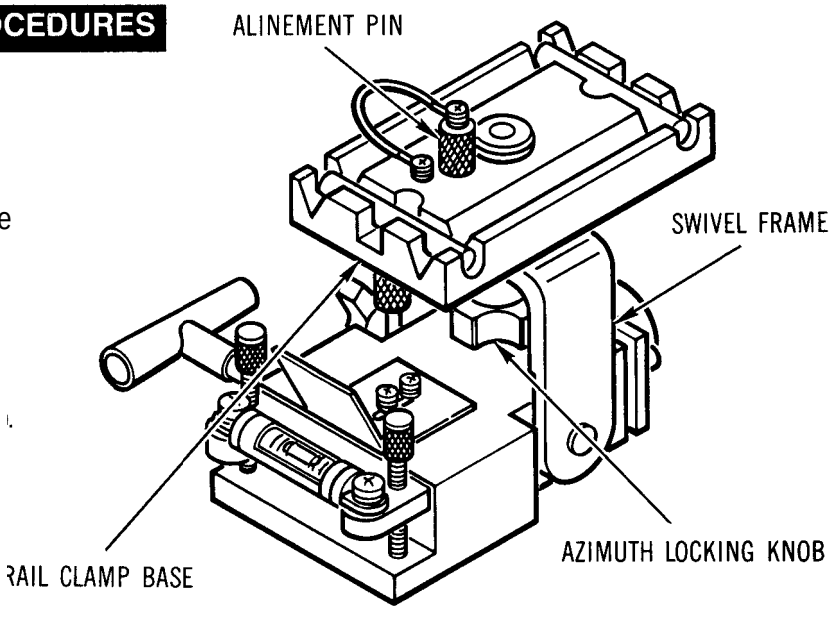
Equipment Conditions:
- TURRET SUBSYSTEM AND REFLEX SIGHT ALINEMENT AND BORESIGHTING performed, para 5-4.
- Pilot and gunner arm assemblies removed from stow brackets and laid carefully to side of cockpits.
- HSS shorting connector connected in pilot or gunner cockpits as required.

NOTE

Do not boresight HSS until after alinement and boresighting of turret subsystem has been accomplished. Helicopter preparation and target emplacement were accomplished and remain set up from Section II procedures.

PRELIMINARY ALINEMENT PROCEDURES

1. LOCK LINKAGE ORIENTATION DEVICE (LOD) IN ZERO DEGREE POSITION.
   a. Loosen azimuth locking knob and rotate rail clamp base until 0° line on rail clamp base is alined with notch in swivel frame.
   b. Insert alinement pin in hole in rail clamp base.
   c. Firmly tighten azimuth locking knob.



LINKAGE ORIENTATION DEVICE (LOD) ARR83-2006

PRELIMINARY ALINEMENT PROCEDURES (cont)

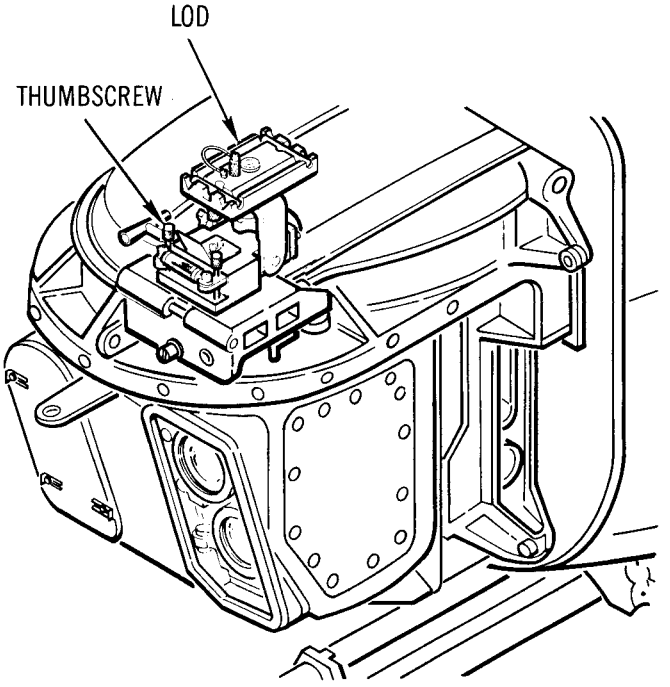
NOTE

The following procedures require a minimum of two technicians, one to act as the operator in the cockpit, and one to act as the observer and perform mechanical adjustment.

For gunner rail boresighting, go to next step; for pilot rail boresighting, go to step 45. If both rails require boresighting, go to next step.

Technician shall assume position in applicable cockpit and remain there for the remainder of alinement and boresighting.

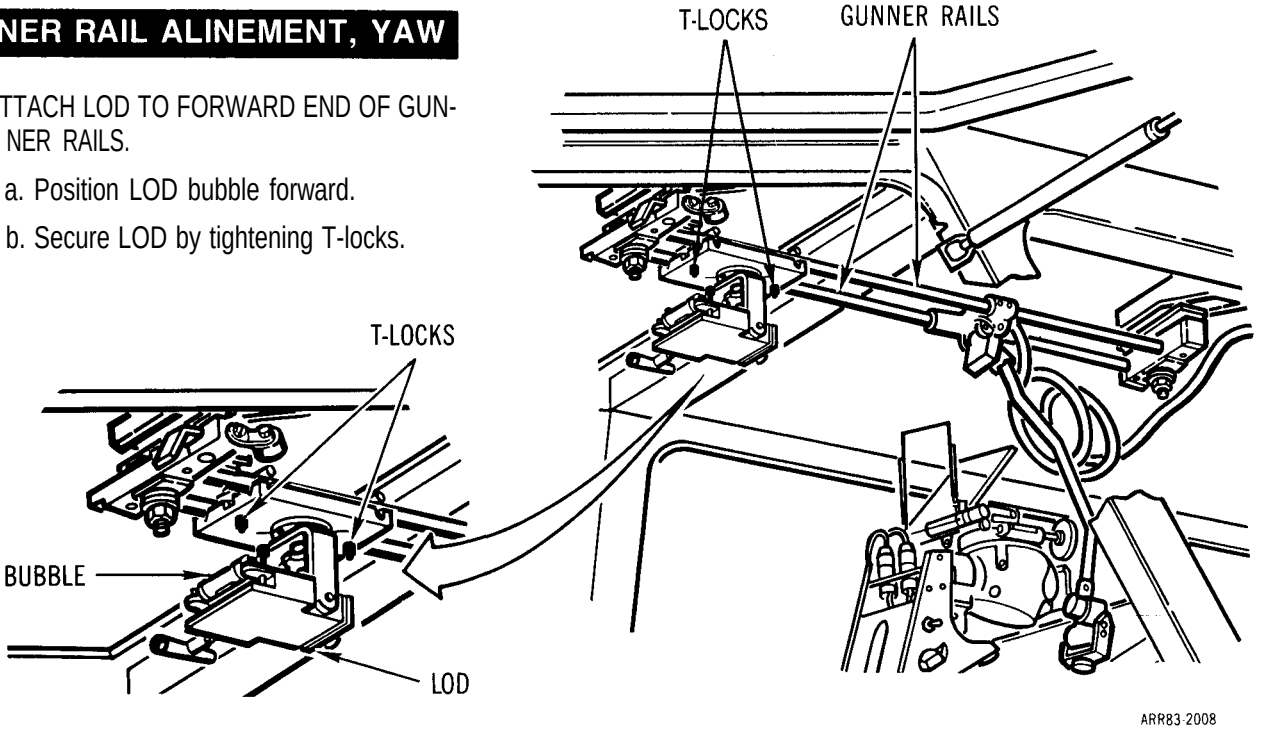
2. PLACE LOD ON TSU BORESIGHT DEVICE WITH BUBBLE FACING FORWARD.
   a. Center bubble with thumbscrews.
   b. Lock bubble in place.



ARR83-2007

GUNNER RAIL ALINEMENT, YAW

3. ATTACH LOD TO FORWARD END OF GUNNER RAILS.
   a. Position LOD bubble forward.
   b. Secure LOD by tightening T-locks.

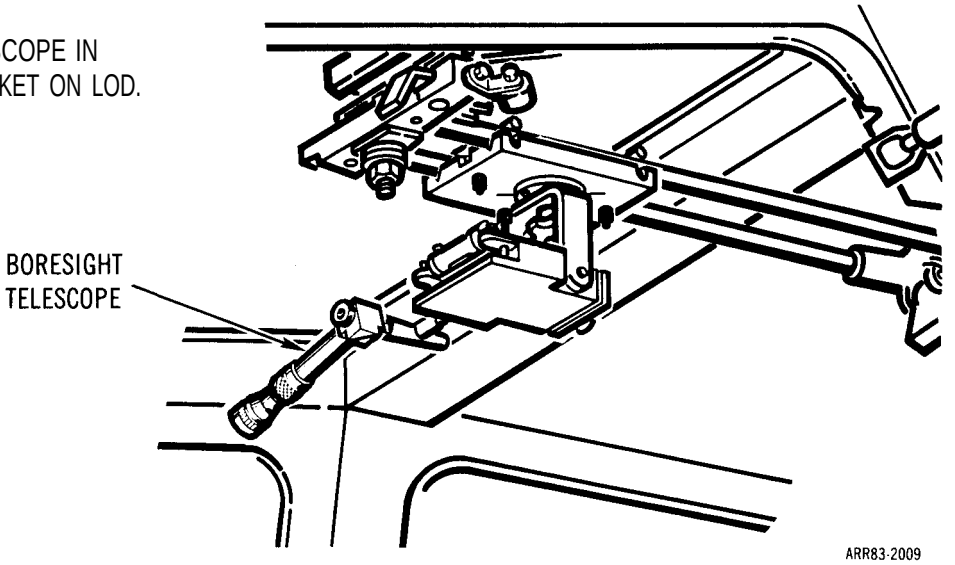


ARR83-2008

5-6. HELMET SIGHT SUBSYSTEM ALINEMENT AND BORESIGHTING (cont)

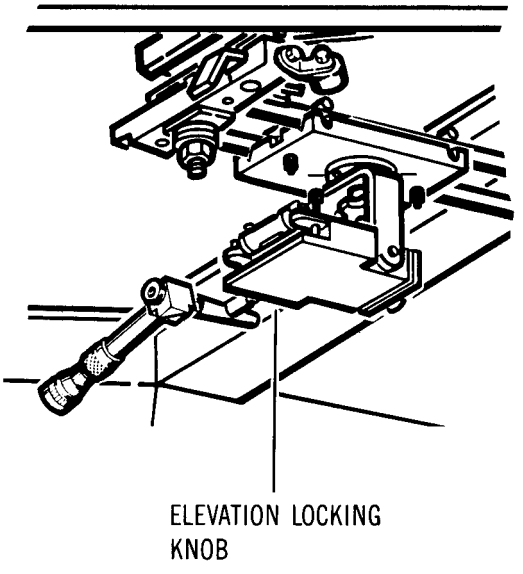
GUNNER RAIL ALINEMENT, YAW (cont)

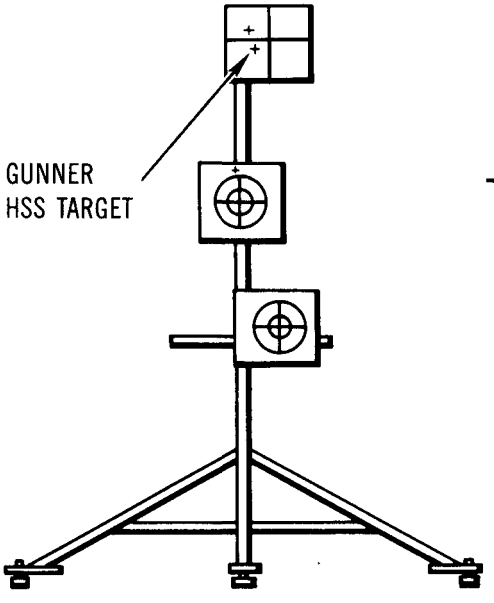
4. INSERT BORESIGHT TELESCOPE IN BORESCOPE ANGLE BRACKET ON LOD.



ARR83-2009

5. ADJUST LOD IN ELEVATION.
   a. Loosen elevation locking knob.
   b. While sighting through scope, adjust LOD in elevation until gunner HSS target is visible.
   c. Tighten elevation locking knob.



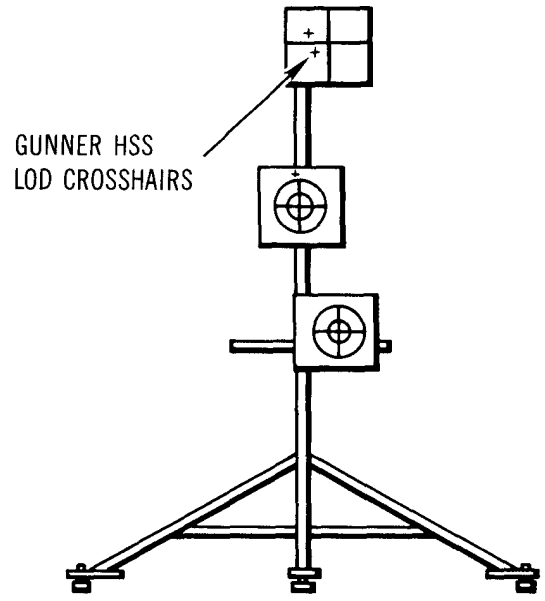


FORWARD TARGET ASSEMBLY

ARR83-2010

GUNNER RAIL ALINEMENT, YAW (cont)

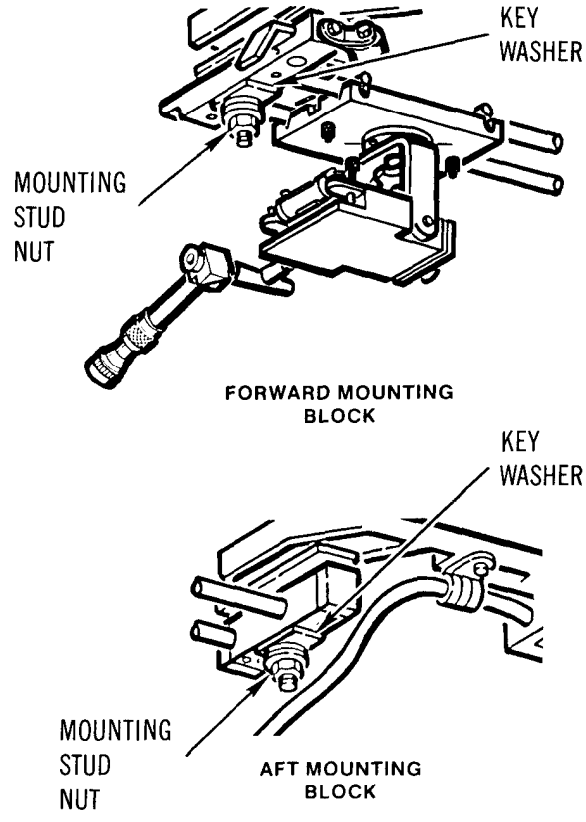
6. CHECK GUNNER RAIL ALINEMENT IN YAW.
   a. Sight through scope to gunner HSS LOD crosshairs.
   b. If vertical crosshair of scope reticle is alined with vertical crosshair of target, yaw alinement is okay; go to step 8. If crosshairs are not alined, go to next step.



FORWARD TARGET ASSEMBLY

ARR83-2011

7. WHILE SIGHTING THROUGH SCOPE TO GUNNER HSS TARGET, ALINE GUNNER RAILS IN YAW.
   a. Loosen nuts on rail assembly mounting studs (forward and aft, if required).
   b. Move either end of rail assembly to aline vertical crosshair of scope reticle with vertical crosshair of gunner HSS LOD crosshairs.
   c. Aline serrations of key washers with serrations in rail mounting blocks and tighten nuts allowing proper operation of spring plungers.
   d. Recheck yawalinement and readjust as necessary.
8. REMOVE FORESIGHT TELESCOPE FROM LOD.

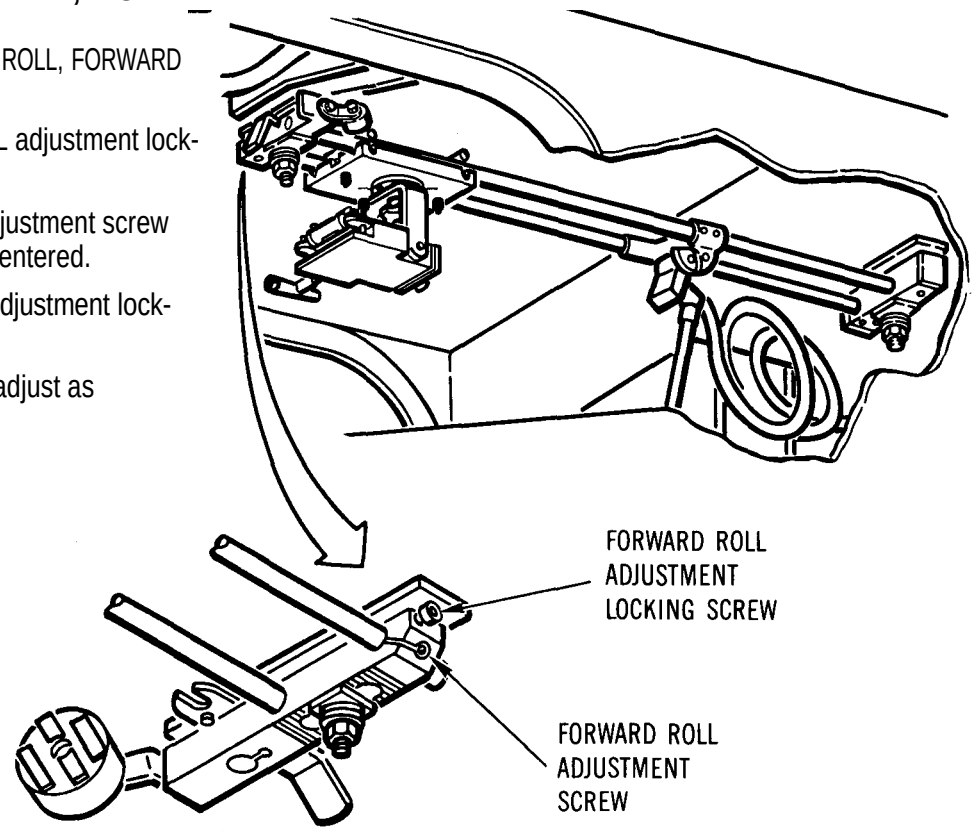


ARR83-2012

5-6. HELMET SIGHT SUBSYSTEM ALINEMENT AND BORESIGHTING (cont)

GUNNER RAIL ALINEMENT, ROLL

9. ALINE GUNNER RAILS IN ROLL, FORWARD POSITION.
   a. Loosen forward ROLL adjustment locking screw.
   b. Adjust forward roll adjustment screw until LOD bubble is centered.
   c. Tighten forward roll adjustment locking screw.
   d. Check bubble and readjust as necessary.

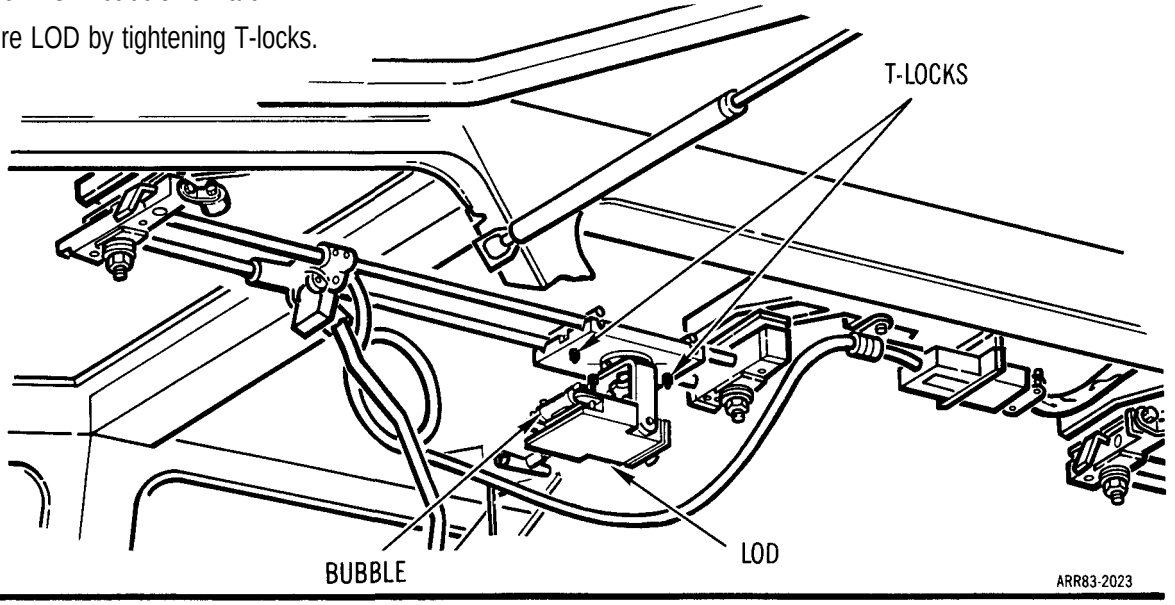


VIEW/ROTATED 180°

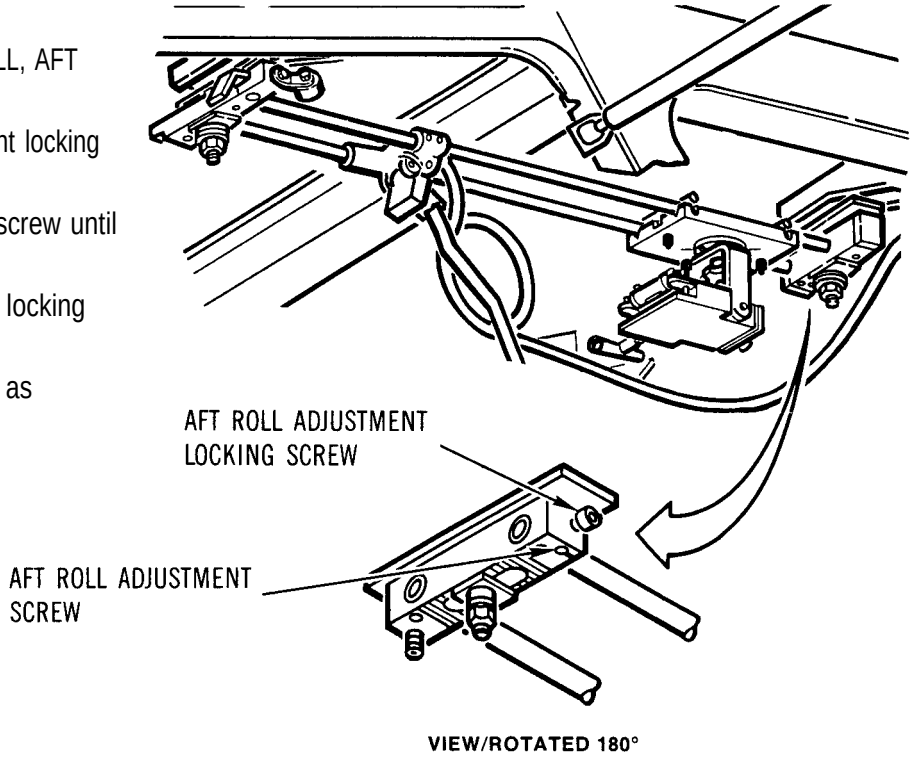
ARR83-2027

GUNNER RAIL ALINEMENT, ROLL (cont)

10. ATTACH LOD TO AFT END OF GUNNER RAILS.
    a. Position LOD bubble forward.
    b. Secure LOD by tightening T-locks.



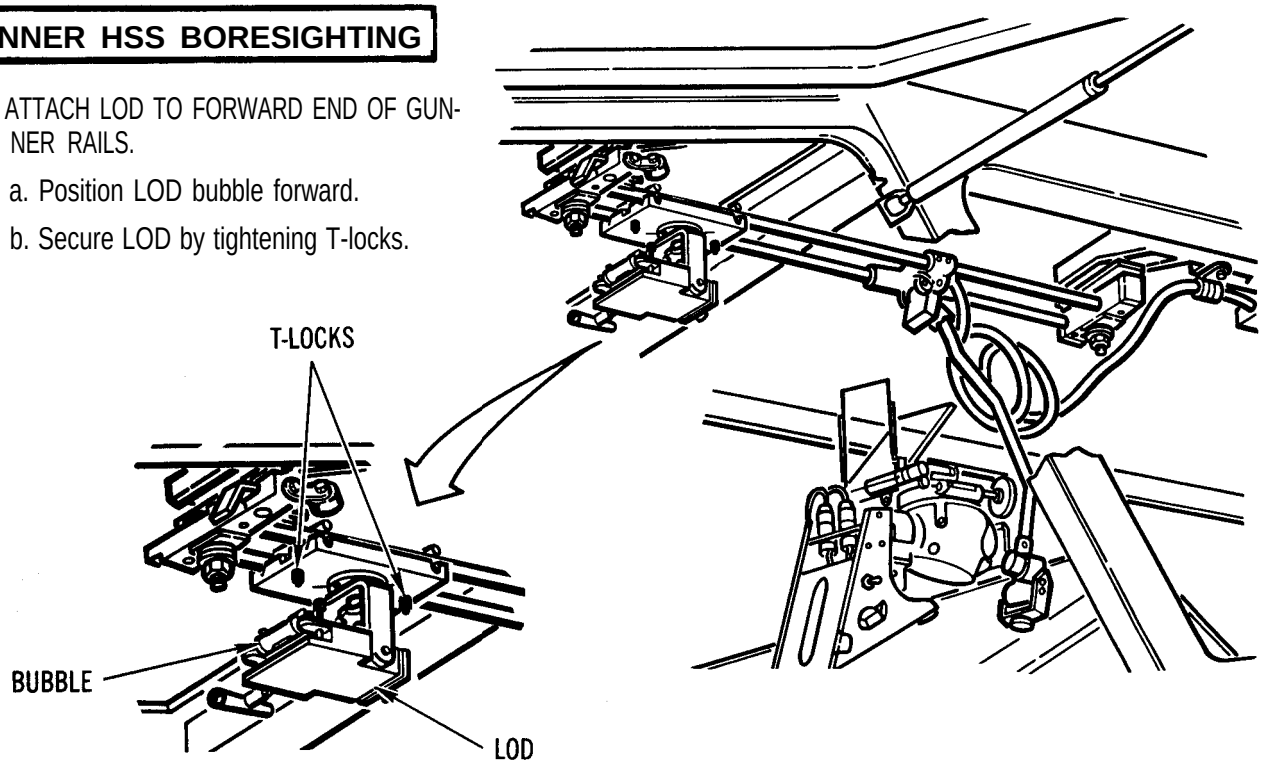
11. ALINE GUNNER RAILS IN ROLL, AFT POSITION.
    a. Loosen aft ROLL adjustment locking screw.
    b. Adjust aft roll adjustment screw until LOD bubble is centered.
    c. Tighten aft roll adjustment locking screw.
    d. Check bubble and readjust as necessary.



5-6. HELMET SIGHT SUBSYSTEM ALINEMENT AND BORESIGHTING (cont)

GUNNER HSS BORESIGHTING

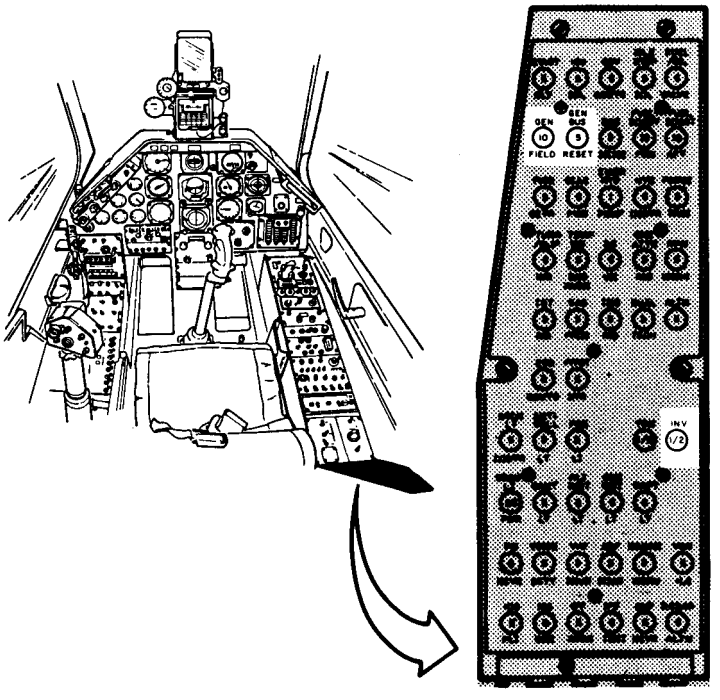
12. ATTACH LOD TO FORWARD END OF GUNNER RAILS.
    a. Position LOD bubble forward.
    b. Secure LOD by tightening T-locks.



ARR83-2031

13. APPLY POWER, SEE TM 9-1090-206-20-2.

14. CLOSE FOLLOWING CIRCUIT BREAKERS ON DC CIRCUIT BREAKER PANEL:
    GEN FIELD
    GEN BUS RESET
    INV

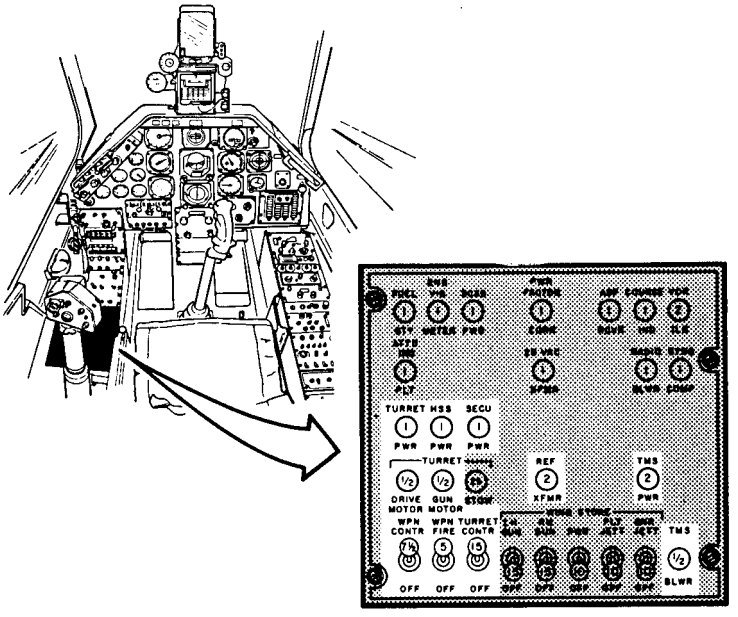


DC CIRCUIT BREAKER PANEL

ARR83-2032

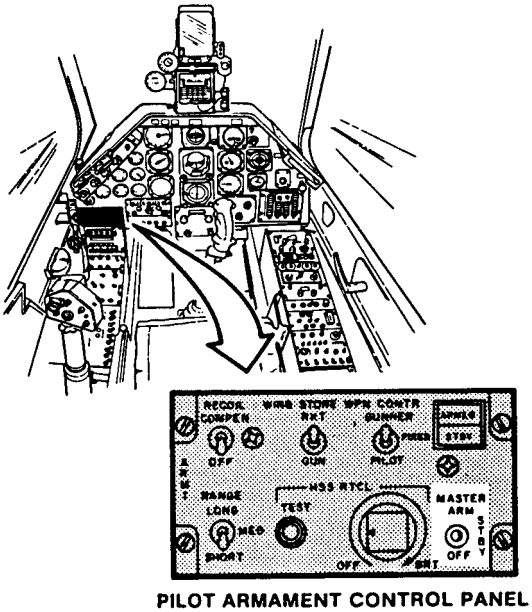
GUNNER HSS BORESIGHTING (cont)

15. CLOSE FOLLOWING CIRCUIT BREAKERS ON AC ARMAMENT CIRCUIT BREAKER PANEL:
    - REF XFMR
    - TURRET PWR
    - HSS PWR
    - SECU PWR
    - TMS PWR
    - TMS BLWR
    - TURRET DRIVE MOTOR
    - TURRET GUN MOTOR
    - WPN CONTR
    - WPN FIRE
    - TURRET CONTR



AC / ARMAMENT CIRCUIT BREAKER PANEL

ARR83-2033



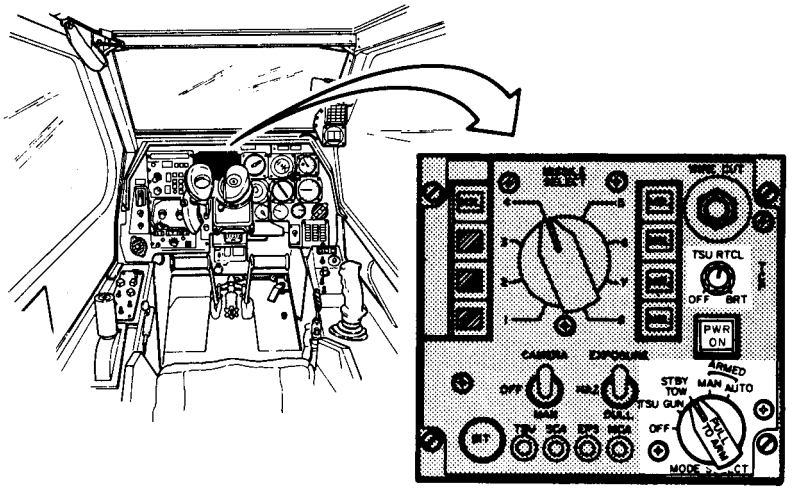
PILOT ARMAMENT CONTROL PANEL

ARR83-2034

5-6. HELMET SIGHT SUBSYSTEM ALINEMENT AND BORESIGHTING (cont)

GUNNER HSS BORESIGHTING (cont)

17. ON TOW CONTROL PANEL, SET MODE SELECT SWITCH TO STBY TOW.
    a. System status annunciator indicates PWR ON after approximately two minutes.
    b. Adjust TSU RTCL for desired brightness.

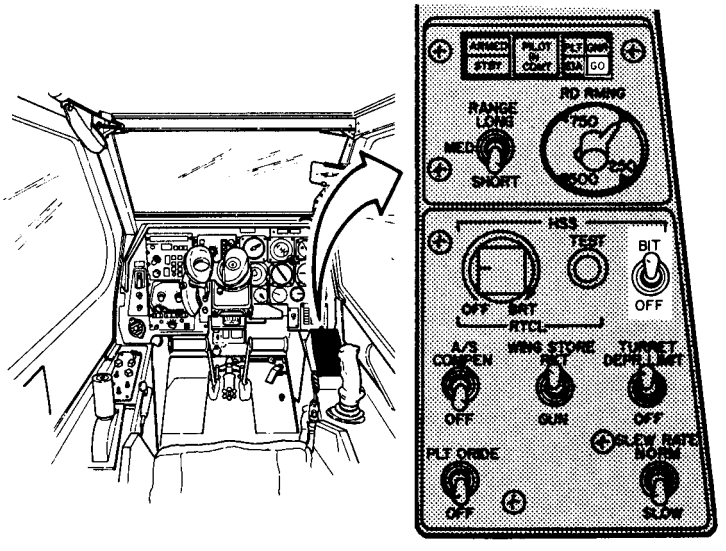


TOW CONTROL PANEL

ARR83-2035

18. POSITION GUNNER AND PILOT ARM ASSEMBLIES IN THEIR RESPECTIVE BIT BRACKETS.

19. ON GUNNER ARMAMENT CONTROL PANEL, PUSH BIT SWITCH AND CONFIRM GO INDICATOR LIGHTS.



GUNNER ARMAMENT CONTROL PANEL

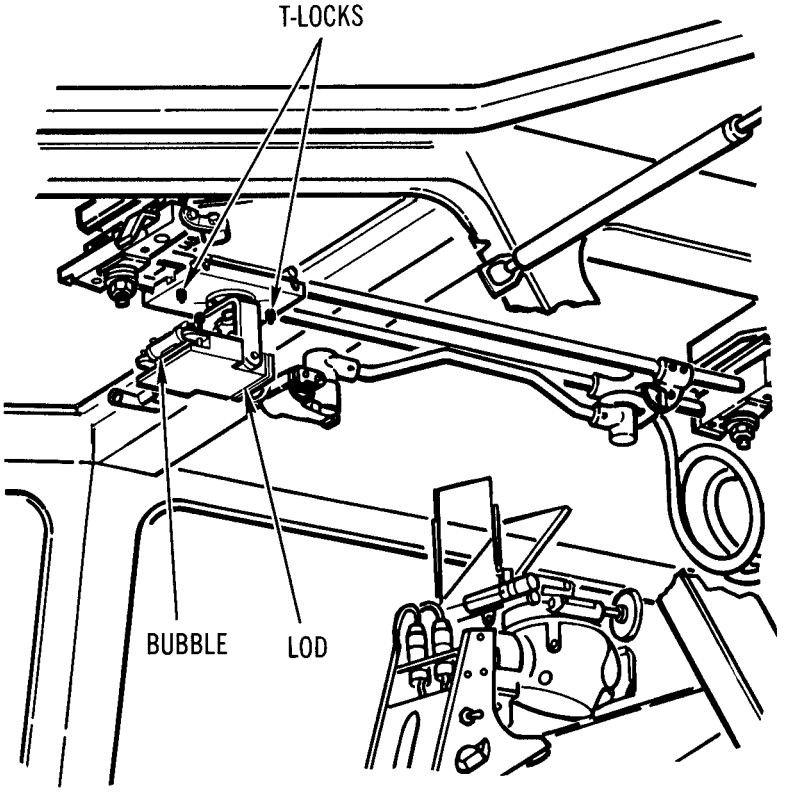
ARR83-2036

GUNNER HSS BORESIGHTING (cont)

20. ATTACH GUNNER ARM MAGNET ON LOD.

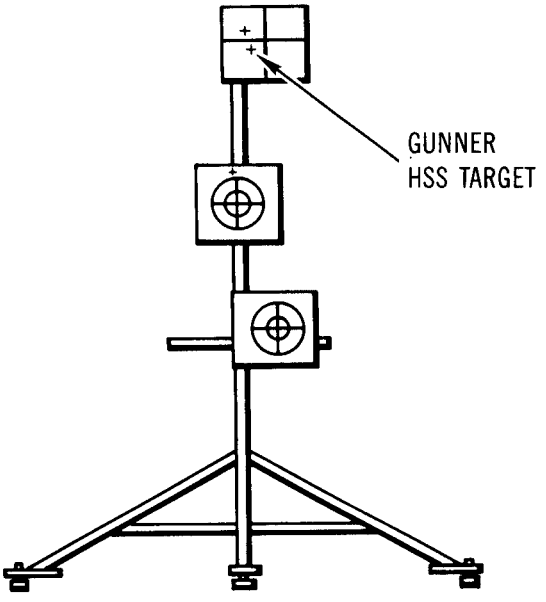
21. SLIGHTLY LOOSEN AZIMUTH AND ELEVATION LOCKING KNOBS.

22. INSERT BORESIGHT TELESCOPE IN LOD.



ARR83-2037

23. SIGHT THROUGH SCOPE AND ADJUST LOD IN AZIMUTH AND ELEVATION UNTIL SCOPE RETICLE IS COINCIDENT WITH CROSSHAIRS ON GUNNER HSS TARGET.
    a. Tighten azimuth and elevation locking knobs.
    b. Recheck sighting and readjust as necessary.
    c. Remove boresight telescope.



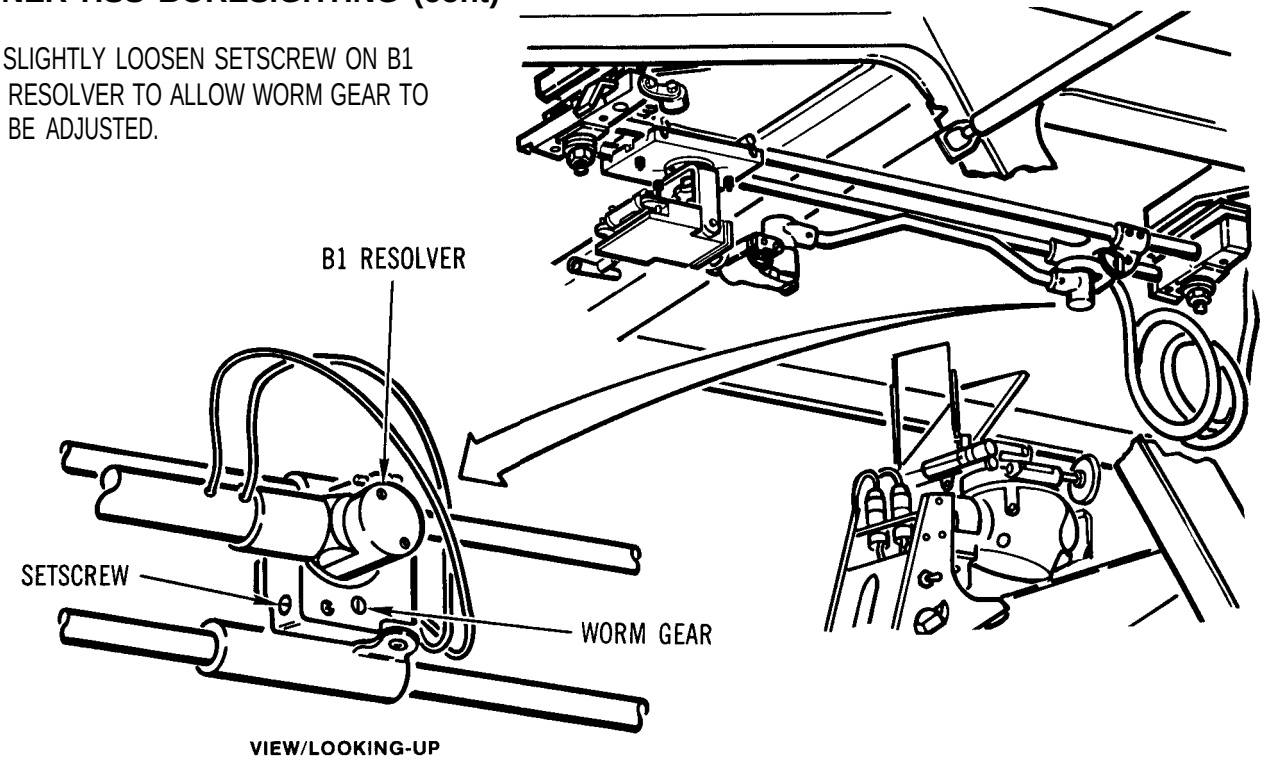
FORWARD TARGET ASSEMBLY

ARR83-2038

5-6. HELMET SIGHT SUBSYSTEM ALINEMENT AND BORESIGHTING (cont)

GUNNER HSS BORESIGHTING (cont)

24. SLIGHTLY LOOSEN SETSCREW ON B1 RESOLVER TO ALLOW WORM GEAR TO BE ADJUSTED.



VIEW/LOOKING-UP

ARR83-2039

25. HOLD ACQ/TRK/STOW SWITCH TO ACQ WHEN MAKING SIGHTINGS.

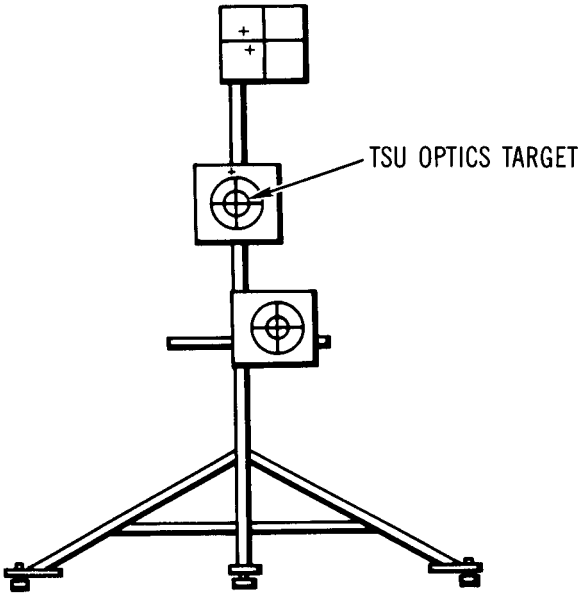
NOTE

B1 resolver is very sensitive to adjustment. Avery slight adjustment results in a large displacement in TSU LOS.

26. ALINE B1 RESOLVER.

a. First technician sights through TSU and informs second technician to adjust B1 resolver worm gear until TSU reticle coincides with TSU optics target horizontal crosshair.

b. Tighten B1 resolver setscrew.



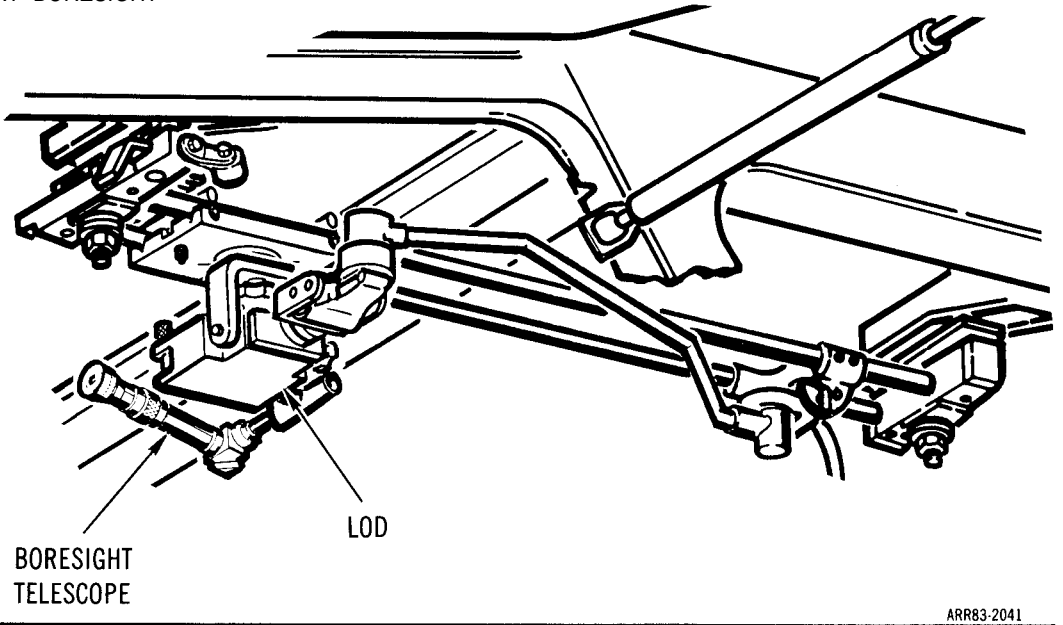
FORWARD TARGET ASSEMBLY

ARR83-2040

GUNNER HSS BORESIGHTING (cont)

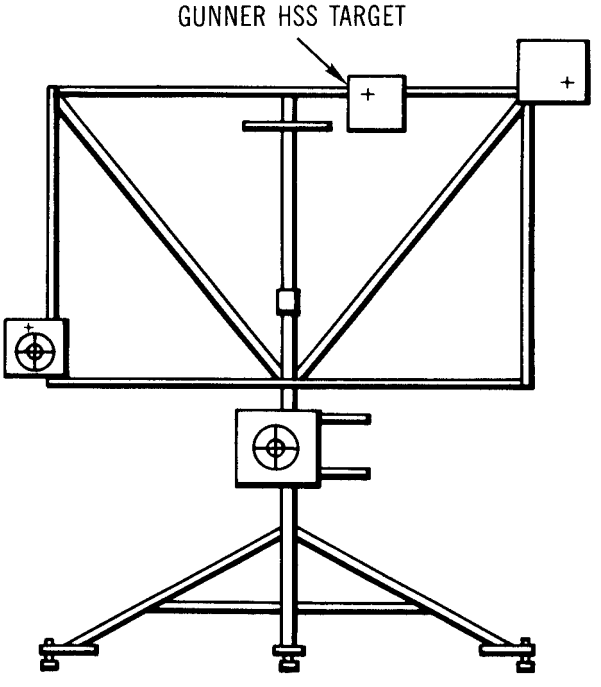
27. SLIGHTLY LOOSEN AZIMUTH AND ELEVATION LOCKING KNOBS.

28. ROTATE LOD TO APPROXIMATELY 900 RIGHT AND INSERT BORESIGHT TELESCOPE.



ARR83-2041

29. SIGHT THROUGH SCOPE AND ADJUST LOD IN AZIMUTH AND ELEVATION UNTIL SCOPE RETICLE IS COINCIDENT WITH CROSSHAIRS ON GUNNER HSS TARGET.
    a. Tighten azimuth and elevation locking knobs.
    b. Recheck sighting and readjust as necessary.
    c. Remove boresight telescope.



RIGHT TARGET ASSEMBLY

ARR83-2042

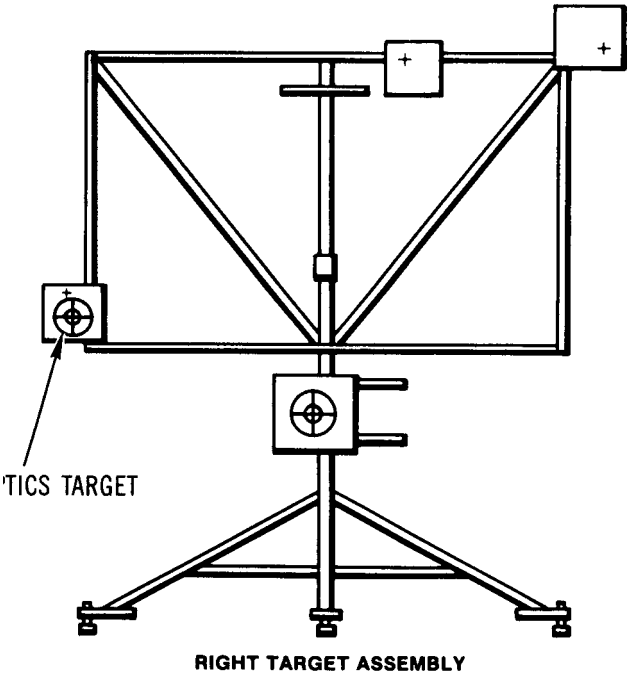
5-6. HELMET SIGHT SUBSYSTEM ALINEMENT AND BORESIGHTING (cont)

GUNNER HSS BORESIGHTING (cont)

30. ON SIGHT HAND CONTROL, HOLD ACQ/TRK/STOW SWITCH TO ACQ WHEN MAKING SIGHTINGS.

31. CHECK AND RECORD ELEVATION ERROR AT RIGHT TARGET ASSEMBLY.

    First technician sights through TSU to TSU optics target and directs second technician to record error (measured in inches at target) between TSU horizontal crosshair and TSU optics target horizontal crosshair.

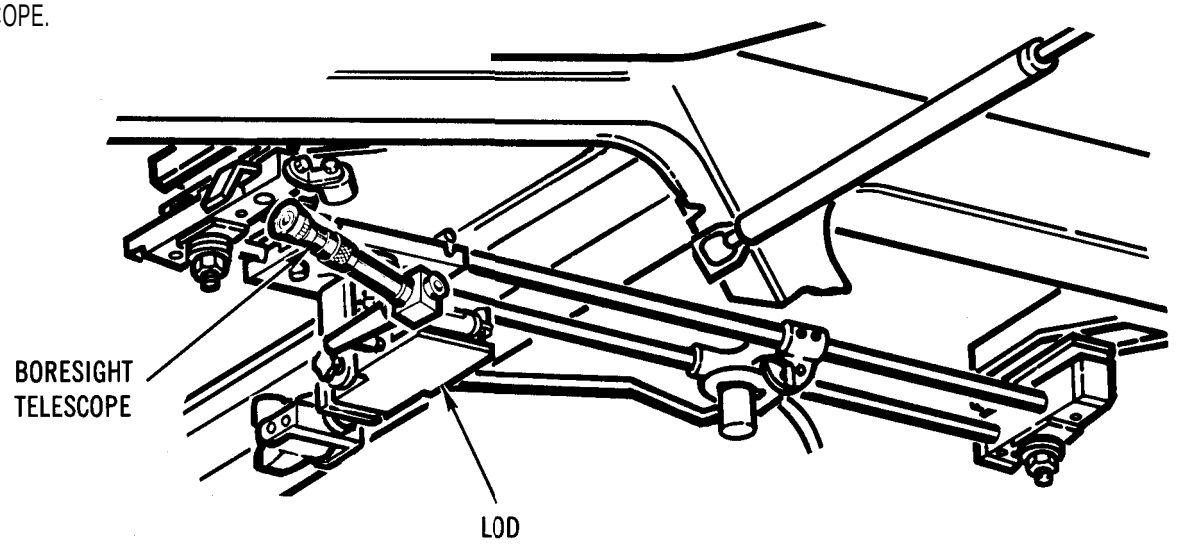


RIGHT TARGET ASSEMBLY

ARR83-2044

32. ON LOD, SLIGHTLY LOOSEN AZIMUTH AND ELEVATION LOCKING KNOBS.

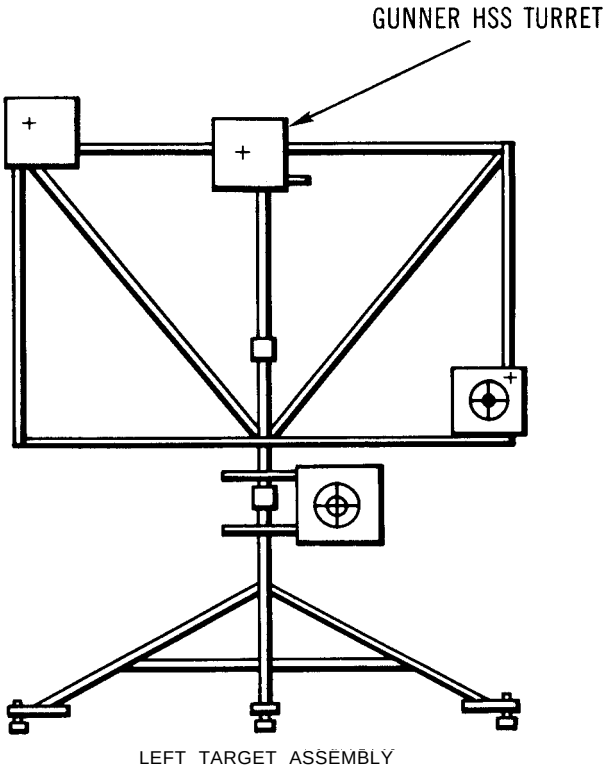
33. ROTATE LOD TO APPROXIMATELY 900 LEFT AND INSERT BORESIGHT TELESCOPE.



ARR83-2043

GUNNER HSS BORESIGHTING (cont)

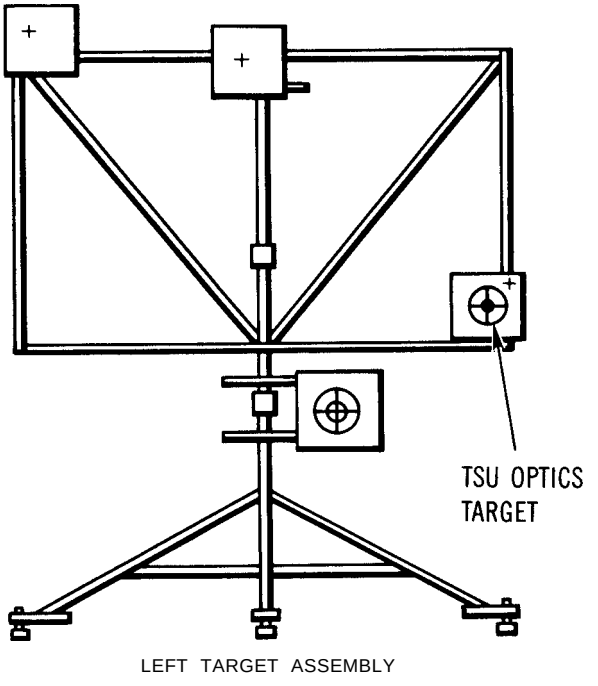
34. SIGHT THROUGH SCOPE AND ADJUST LOD IN AZIMUTH AND ELEVATION UNTIL SCOPE RETICLE IS COINCIDENT WITH CROSSHAIRS ON GUNNER HSS TARGET.
    a. Tighten azimuth and elevation locking knobs.
    b. Recheck sighting and readjust as necessary.
    c. Remove boresight telescope.



ARR83-2045

35. CHECK AND RECORD ELEVATION ERROR AT LEFT TARGET ASSEMBLY.

    First technician sights through TSU to TSU optics target and directs second technician to record error (measured in inches at target) between TSU horizontal crosshair and TSU optics target horizontal crosshair.

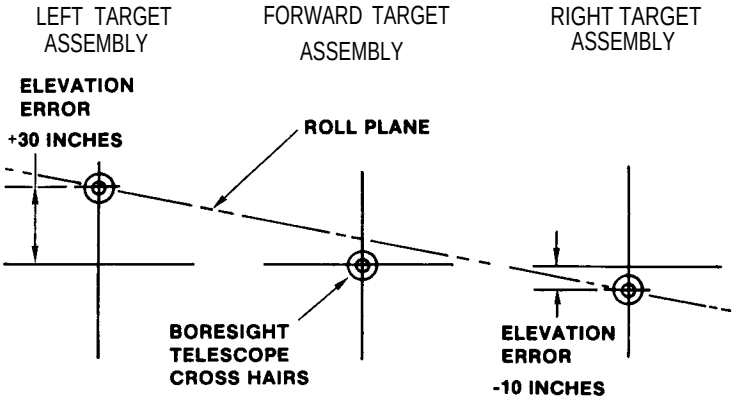


ARR83-2046

56. HELMET SIGHT SUBSYSTEM ALINEMENT AND BORESIGHTING (cont)

GUNNER HSS BORESIGHTING (cont)

36. COMPARE ELEVATION ERRORS RECORDED AT LEFT AND RIGHT TARGET ASSEMBLIES.
    a. Total difference between elevation errors equals roll error.
    b. If total difference between elevation error exceeds four inches, HSS rails must be adjusted; go to next step.
    c. If total difference between elevation error does not exceed four inches, go to step 39.

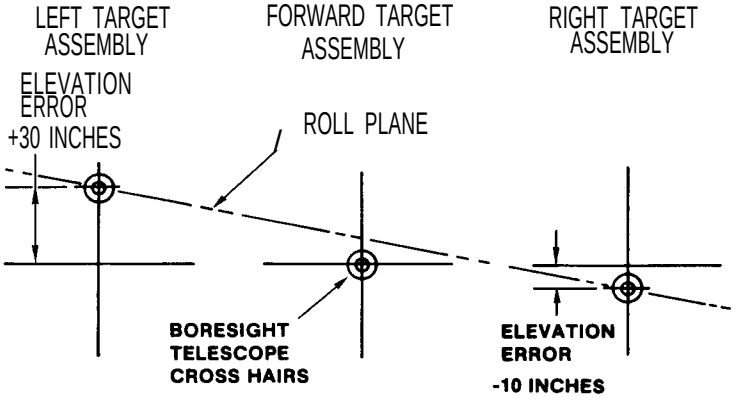


RIGHT ERROR = -10 INCHES
LEFT ERROR = +30 INCHES
TOTAL DIFFERENCE = 40 INCHES

TYPICAL ROLL ERROR

ARR83-2047

37. TO ELIMINATE ROLL ERROR, LOOSEN ROLL ADJUSTMENT LOCKING SCREWS AND READJUST RAILS BY TURNING BOTH FORWARD AND AFT ROLL ADJUSTMENT SCREWS IN EQUAL AMOUNTS TO RAISE OR LOWER TSU LOS.
    a. To raise TSU LOS, sight through scope and using roll adjustment screws, lower sighting point by number of inches computed as correction.
    b. To lower TSU LOS, sight through scope and using roll 'adjustment screws, raise sighting point by number of inches computed as correction,



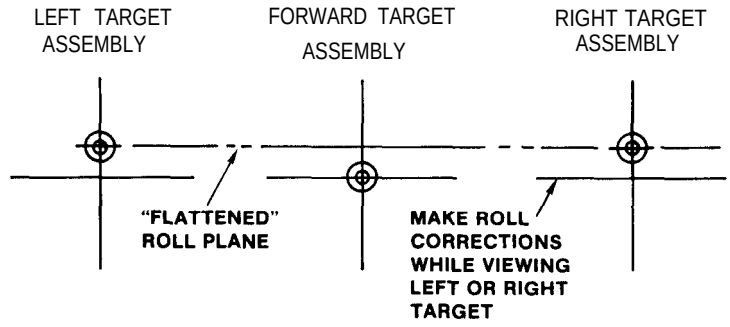
TYPICAL ROLL ERROR BEFORE CORRECTION
CORRECTION EQUALS ONE HALF TOTAL DIFFERENCE. IN THIS EXAMPLE 1/2 OF 40 IN. = 20 IN.

ARR83-2048

GUNNER HSS BORESIGHTING (cont)

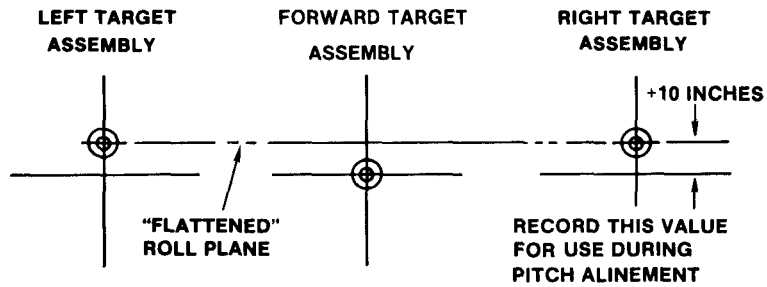
38. TIGHTEN ROLL ADJUSTMENT LOCKING SCREWS AND RECHECK ELEVATION ERRORS AT RIGHT AND LEFT TARGET ASSEMBLIES.

    Continue to check and eliminate roll error until roll plane has been "flattened".



AFTER ELIMINATION OF ROLL ERROR

39. ONCE ROLL PLANE HAS BEEN FLATTENED, RECORD TARGET ELEVATION ERROR (COMMON TO LEFT AND RIGHT TARGETS) FOR USE IN PITCH ALINEMENT.

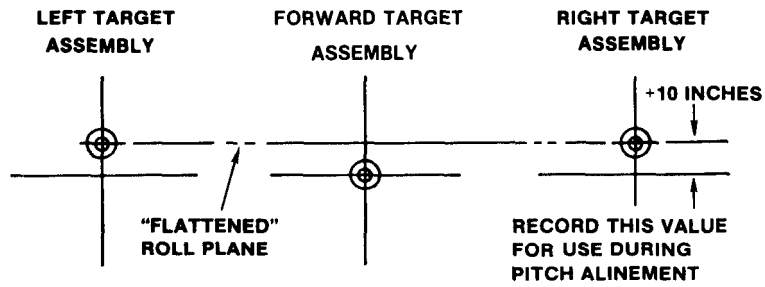


TYPICAL ELEVATION ERROR AFTER ELIMINATION OF ROLL ERROR

40. COMPARE ELEVATION ERROR AT FORWARD TARGET ASSEMBLY WITH ELEVATION ERROR RECORDED IN STEP 56.

    a. Direct TSU and LOD to forward target assembly and record elevation error.

    b. If elevation error at forward target assembly exceeds elevation error recorded in step 39 by more than four inches, adjust B1 resolver until elevation error at forward target equals elevation error recorded in step 39.



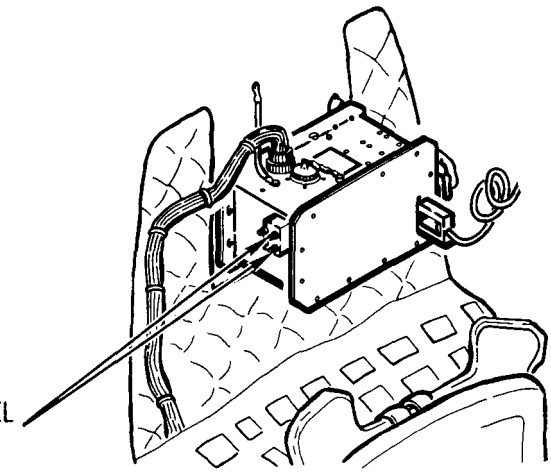
TYPICAL ELEVATION ERROR AFTER ELIMINATION OF ROLL ERROR

ARR83-2051

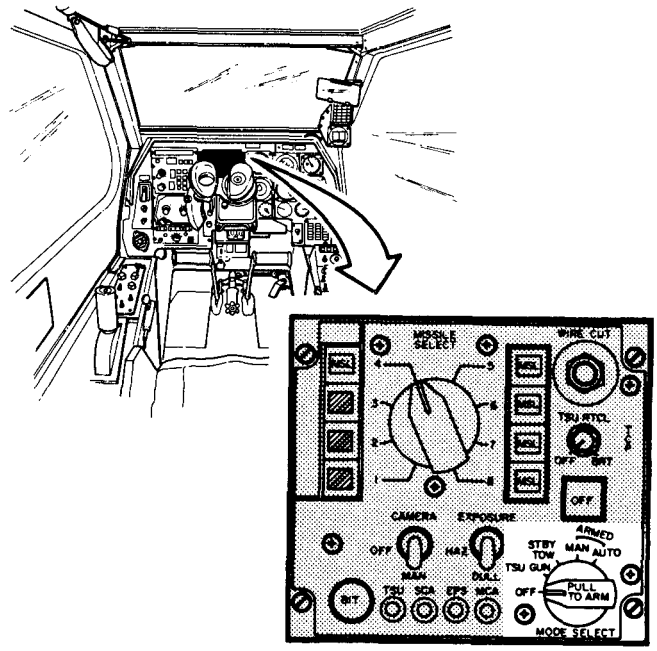
5-6. HELMET SIGHT SUBSYSTEM ALINEMENT AND BORESIGHTING (cont)

GUNNER HSS BORESIGHTING (cont)

41. ALINE HSS, IN PITCH.
    a. Direct TSU and LOD to forward target assembly.
    b. While viewing forward target assembly, adjust GUNNER AZ and EL potentiometers until TSU reticle crosshair coincides with TSU optics target crosshairs.



42. ON TOW CONTROL PANEL, SET MODE SELECT SWITCH TO OFF.



TOW CONTROL PANEL

ARR83-2057

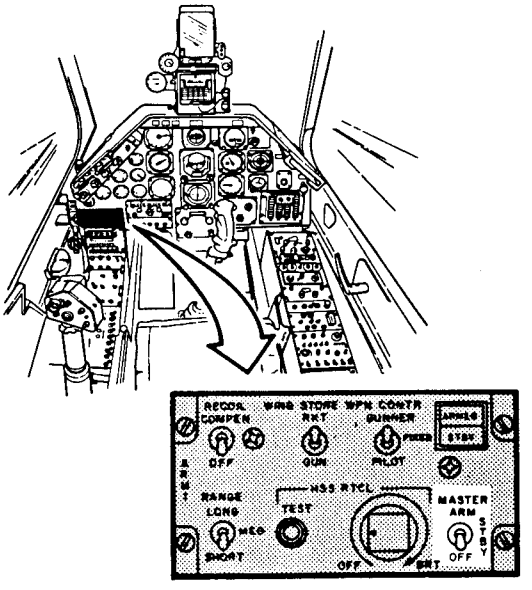
GUNNER HSS BORESIGHTING (cont)

43. ON PILOT ARMAMENT CONTROL PANEL, SET MASTER ARM SWITCH TO OFF.

44. REMOVE POWER, SEE TM 9-1090-206-20-2.

NOTE

If pilot HSS requires boresighting, go to next step. If pilot HSS does not require boresighting, go to step 58.



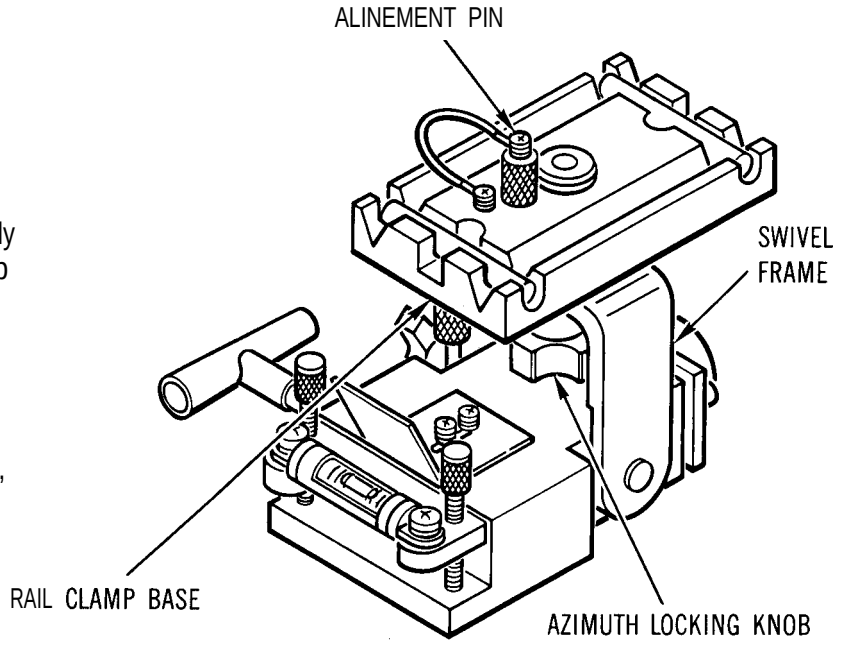
PILOT ARMAMENT CONTROL PANEL

ARR83-2058

5-6. HELMET SIGHT SUBSYSTEM ALINEMENT AND BORESIGHTING (cont)

PILOT RAIL ALINEMENT, YAW

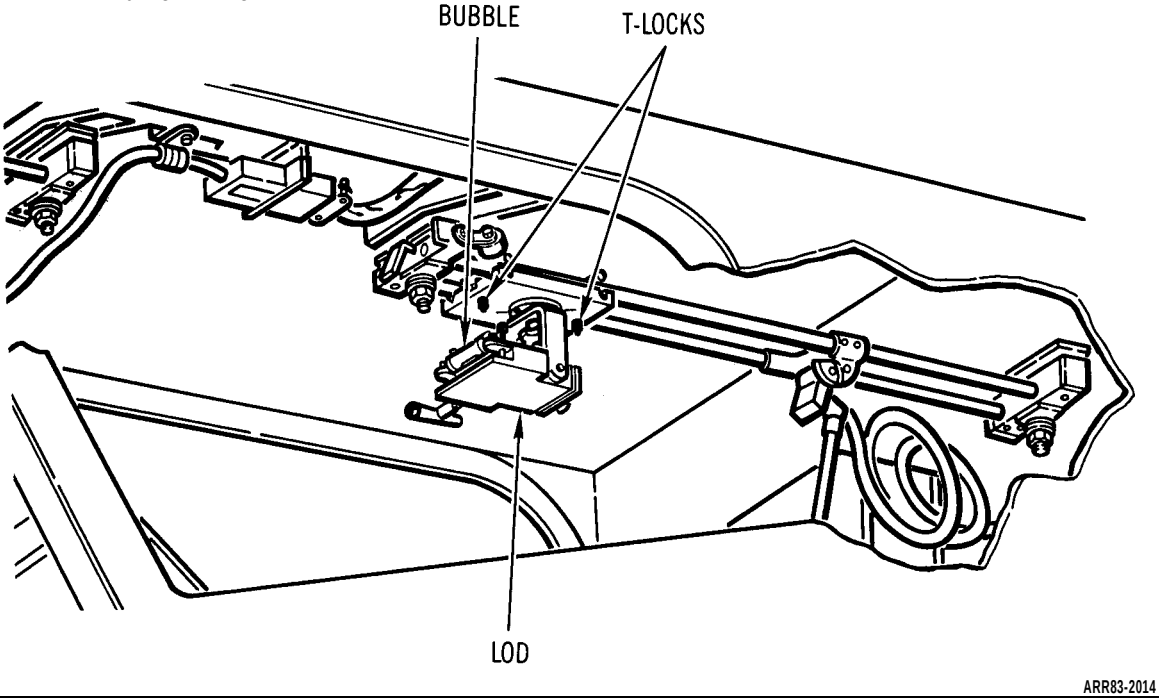
45. REMOVE LOD FROM GUNNER RAILS AND LOCK IN 5.5° POSITION.
    a. Loosen azimuth locking knob and remove alinement pin.
    b. Rotate rail clamp base approximately 1800 until 5.5° line on rail damp base is alined with notch in swivel frame.
    c. Insert alinement pin in hole in rail clamp base.
    d. Firmly tighten azimuth locking knob,



LINKAGE ORIENTATION DEVICE (LOD)

ARR83-2013

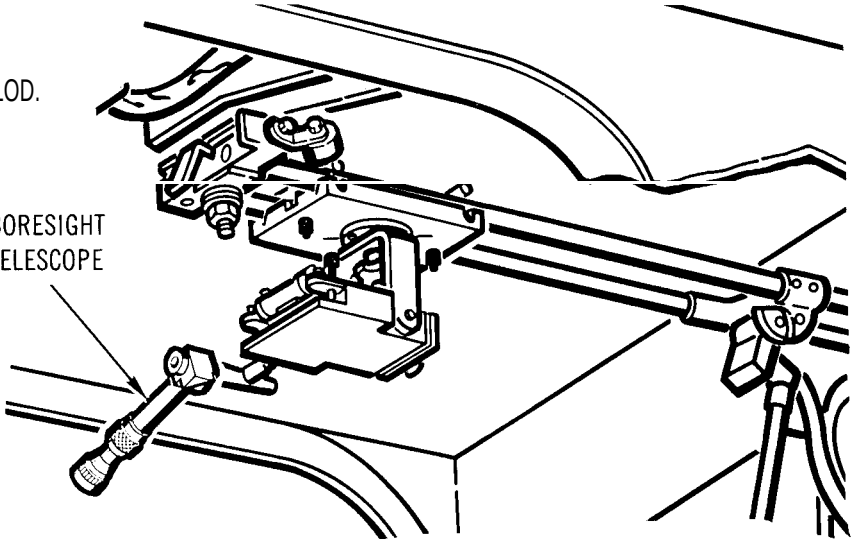
46. ATTACH LOD TO FORWARD END OF PILOT RAILS.
    a. Position LOD bubble forward.
    b. Secure LOD by tightening T-locks.



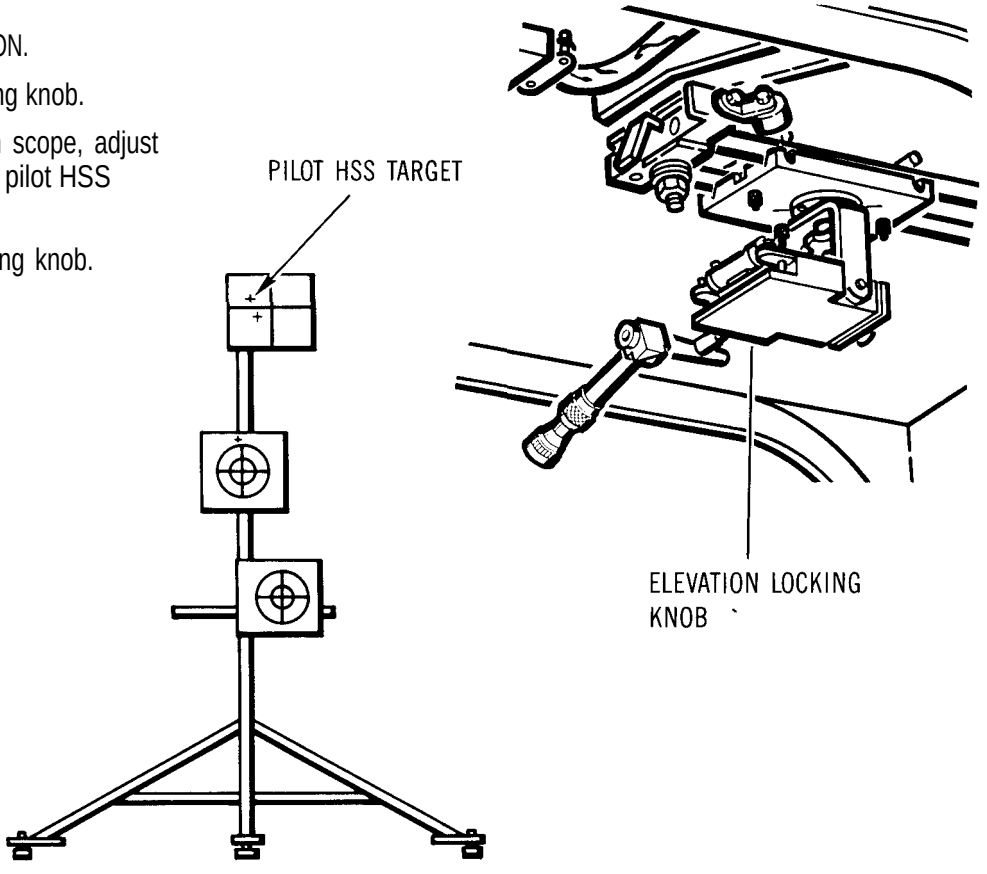
ARR83-2014

PILOT RAIL ALINEMENT, YAW (cont)

47. INSERT BORESIGHT TELESCOP E IN BORESCOPE ANGLE BRACKET ON LOD.



48. ADJUST LOD IN ELEVATION.
    a. Loosen elevation locking knob.
    b. While sighting through scope, adjust LOD in elevation until pilot HSS target is visible.
    c. Tighten elevation locking knob.



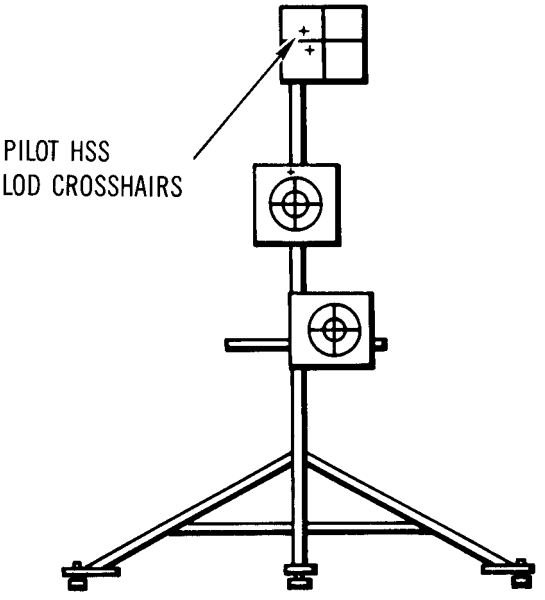
FORWARD TARGET ASSEMBLY

ARR83-2016

5-6. HELMET SIGHT SUBSYSTEM ALINEMENT AND BORESIGHTING (cont)

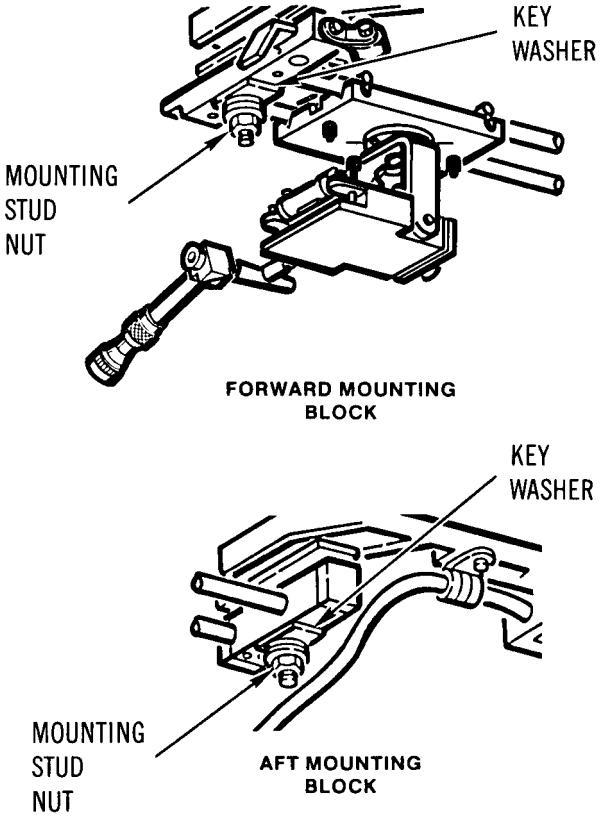
PILOT RAIL ALINEMENT, YAW (cont)

49. CHECK PILOT RAIL ALINEMENT IN YAW.
    a. Sight through scope to pilot HSS LOD crosshairs.
    b. If vertical crosshair of scope reticle is alined with vertical crosshair of target, yaw alinement is okay; go to step 51, If crosshairs are not alined, go to next step.



FORWARD TARGET ASSEMBLY

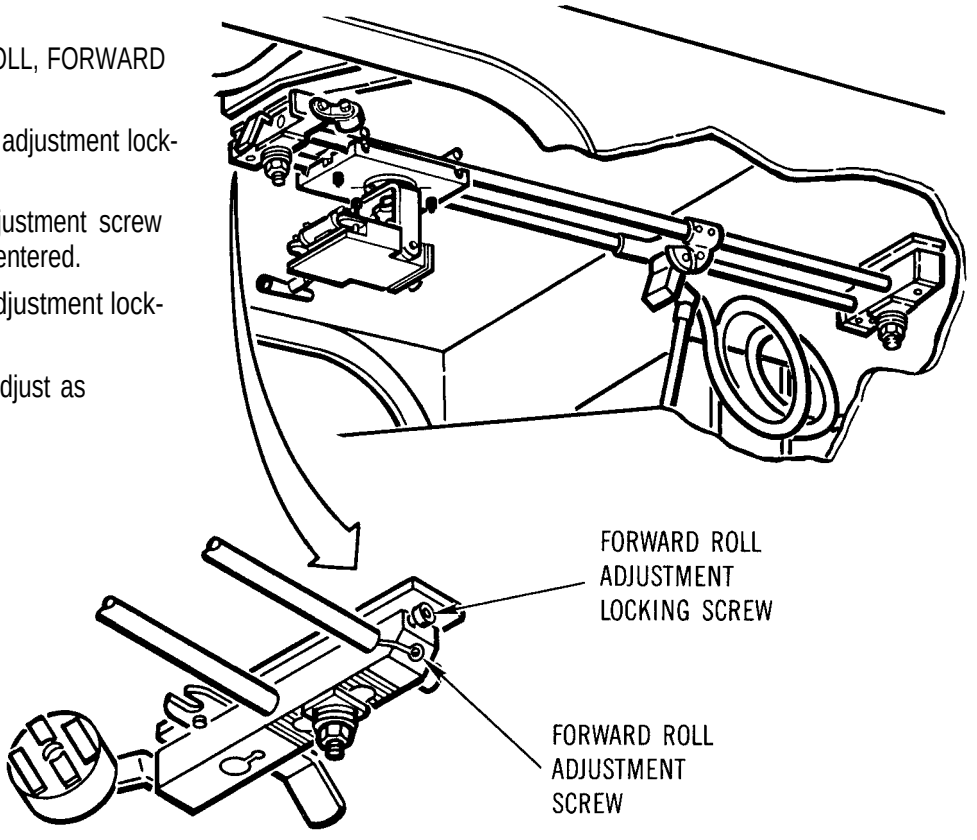
50. WHILE SIGHTING THROUGH SCOPE TO HSS TARGET, ALINE PILOT RAILS IN YAW.
    a. Loosen nuts on rail assembly mounting studs (forward and aft, if required).
    b. Move either end of rail assembly to aline vertical crosshair of scope reticle with vertical crosshair of pilot HSS LOD crosshairs.
    c. Aline serrations of key washers with serrations in rail mounting blocks and tighten nuts allowing proper operation of spring plungers.
    d. Recheck yaw alinement and readjust as necessary.



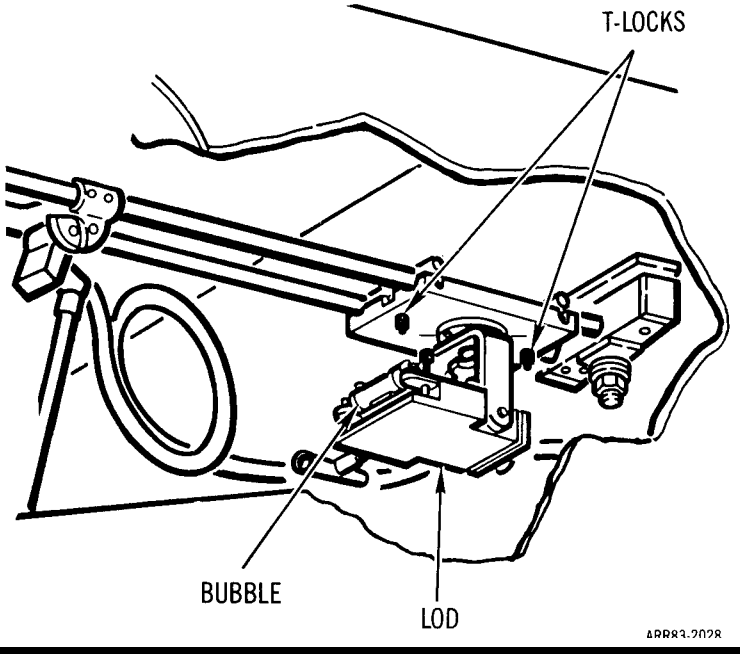
ARR83-2018

PILOT RAIL ALINEMENT, ROLL

51. ALINE PILOT RAILS IN ROLL, FORWARD POSITION.
    a. Loosen forward ROLL adjustment locking screw.
    b. Adjust forward roll adjustment screw until LOD bubble is centered.
    c. Tighten forward roll adjustment locking screw.
    d. Check bubble and readjust as necessary.



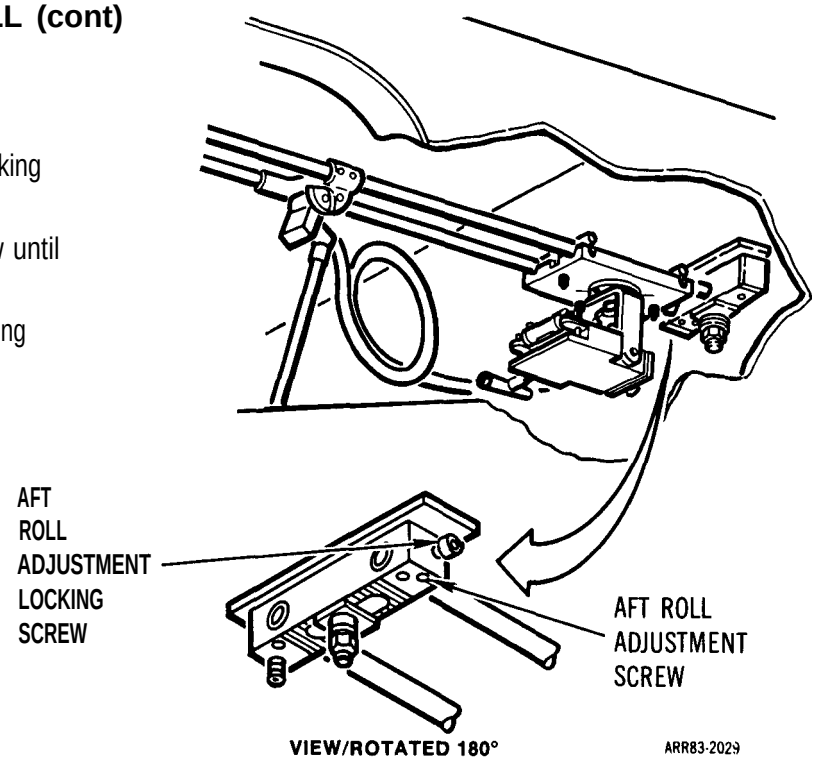
52. ATTACH LOD TO AFT END OF PILOT RAIL.
    a. Position LOD bubble forward.
    b. Secure LOD by tightening T-locks.



5-6. HELMET SIGHT SUBSYSTEM ALINEMENT AND BORESIGHTING (cont)

PILOT RAIL ALINEMENT, ROLL (cont)

53. ALINE PILOT RAILS IN ROLL, AFT POSITION.
    a. Loosen aft ROLL adjustment locking screw.
    b. Adjust aft roll adjustment screw until LOD bubble is centered.
    c. Tighten aft roll adjustment locking screw.
    d. Check bubble and readjust as necessary.

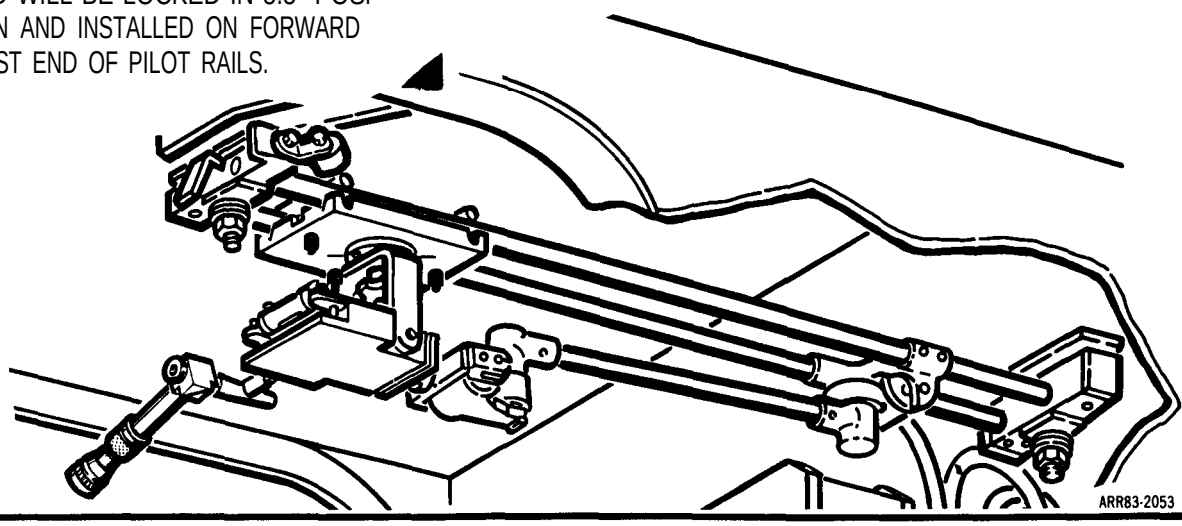


PILOT HSS BORESIGHTING

NOTE

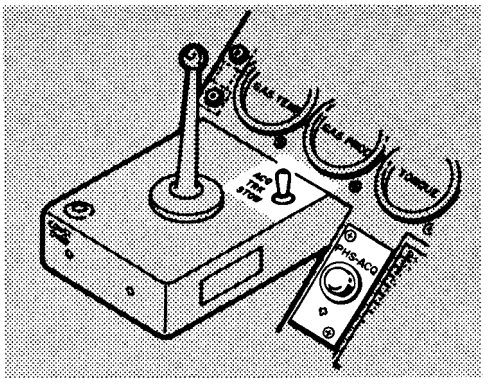
Boresighting of the pilot HSS will be done in the same man. ner as the gunner HSS (steps 12 thru 44) with the following exceptions.

54. LOD WILL BE LOCKED IN 5.5° POSITION AND INSTALLED ON FORWARD MOST END OF PILOT RAILS.



PILOT HSS BORESIGHTING (cont)

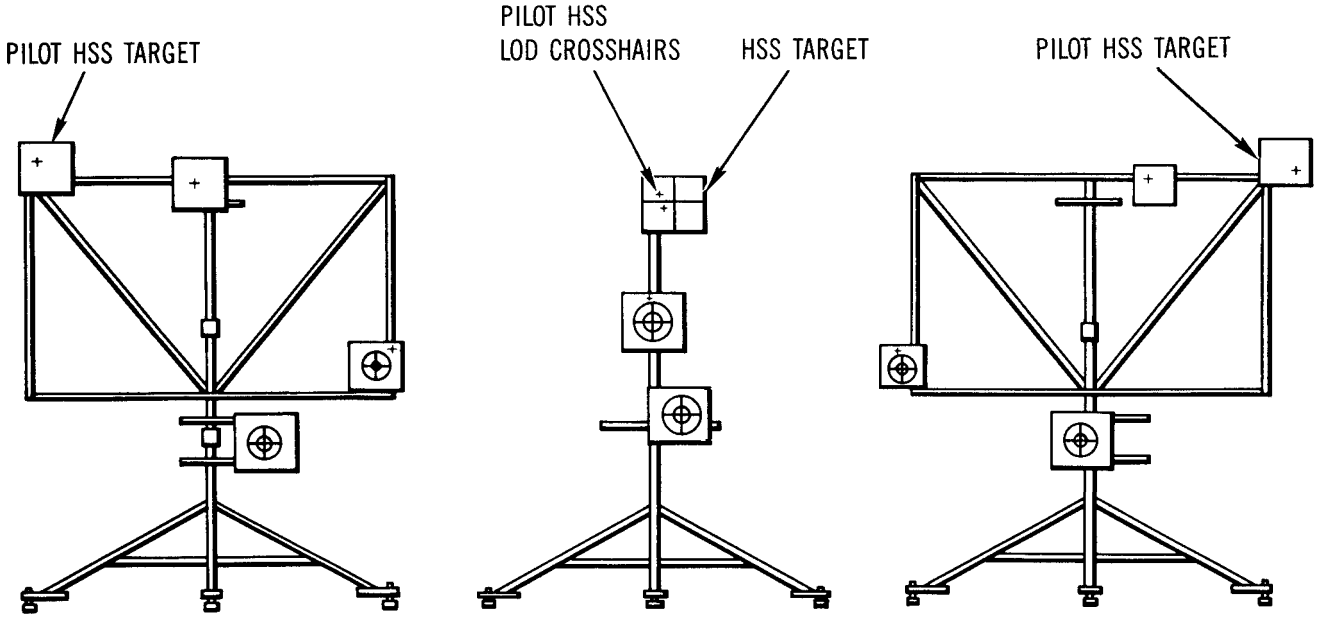
55. ACQ/TRK/STOW SWITCH WILL BE SET TO TRK AND PHS ACQ SWITCH ON ACQ PANEL MUST BE PUSHED TO SLAVE TSU TO PHS.



SIGHT HAND CONTROL

ARR83-2055

56. PILOTS HSS TARGETS ON TARGET ASSEMBLIES WILL BE USED.



LEFT TARGET ASSEMBLY

FORWARD TARGET ASSEMBLY

RIGHT TARGET ASSEMBLYi

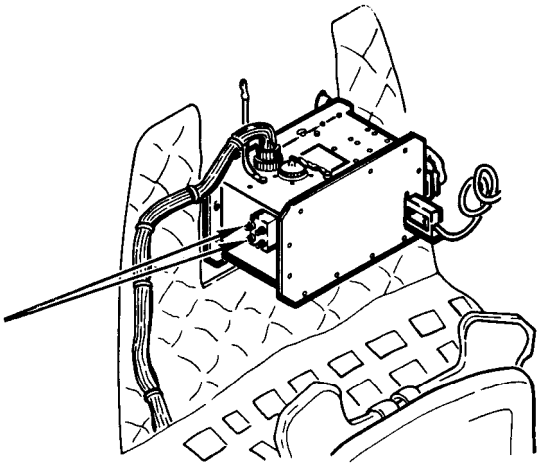
ARR83-2054

5-6. HELMET SIGHT SUBSYSTEM ALINEMENT AND BORESIGHTING (cont)

PILOT HSS BORESIGHTING (cont)

57. **FOR PITCH ALINEMENT, PILOT AZ AND EL POTENTIOMETERS WILL BE USED.**

NOTE
After completing the pilot HSS boresighting procedure, perform the post HSS boresighting procedures.



ARR83-2056

POST HSS BORESIGHTING

58. REMOVE TSU BORESIGHT DEVICE AND BORESIGHT TELESCOPE AND RETURN TO STORAGE.

59. REMOVE HSS SHORTING CONNECTOR AND LOD AND STORE IN TEST SET CASE.

60. RETURN PILOT AND GUNNER ARM ASSEMBLIES TO STOW BRACKETS.

61. CHECK THAT ALL ACCESS PANELS, FAIRINGS, DOORS, AND COVERS REMOVED DURING BORESIGHTING AND ALINEMENT PROCEDURES ARE REINSTALLED.

END OF TASK

APPENDIX A

REFERENCES

PURPOSE

A-1. This appendix lists publications which apply to maintaining the Armament Subsystem, Helicopter; 20-mm Automatic Gun: **M97A4** and **M97A3.**

ARRANGEMENT

A-2. The publications are arranged by type and then in alphanumeric order by publication number

ARMY REGULATIONS

AR 70-50	Designating and Naming Military Aircraft, Rockets, and Guided Missiles
AR 95-1	Army Aviation General Provisions and Flight Regulations
AR 385-40	Accident Reporting and Records

DA PAMPHLETS

DA PAM 738-751	**Functional Users Manual for the Army Maintenance Management System - Aviation (TAMMS-A)**

FIELD MANUAL

FM 10-68	Aircraft Refueling
FM 17-40	Helicopter Gunnery
FM 21-11	First Aid for Soldiers

TECHNICAL BULLETIN

TB MED 251	Noise and Conservation of Hearing

TECHNICAL MANUALS

TM 9-1055-460-13&P	Operator, Aviation Unit and Intermediate Maintenance Manual (Including Repair Parts and Special Tools) for 2.75-inch Rocket Launchers
TM 9-1090-206-20-1	Aviation Unit Maintenance Manual for Armament Subsystem, Helicopter; 20-mm Automatic Gun: **M97A4**
TM 9-1090-206-20-2	Aviation Unit Maintenance Manual for Armament Subsystem, Helicopter; 20-mm Automatic Gun: **M97A3**

TM 9-1090-206-23P	Aviation Unit and Intermediate Maintenance Repair Parts and Special Tools List for Armament Subsystem, Helicopter; 20-mm Automatic Gun: M97A4, M97A3
TM 9-1090-207-13&P	Aviation Unit and Intermediate Maintenance Manual with Repair Parts and Special Tools List (RPSTL) (Including Depot Maintenance Repair Parts and Special Tools) for M147 Rocket Management Subsystem.
TM 9- 270-212-14&P	Aviation Unit and Aviation Intermediate Maintenance Manual with Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts) for M128 and Ml 36 Helmet-Directed Fire Control Subsystem.
TM 9- 270-218-23&P	Aviation Unit, and Aviation Intermediate Maintenance Manual with Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) for M26 Digital Fire Control Computer.
TM 9-1270-219-13&P	Operator, Aviation Unit, and Intermediate Instructions with Repair Parts and Special Tool Lists (RPSTL) (Including Depot Maintenance Repair Parts and Special Tool List for Ml 43 Helicopter Armament Fire and Flight Air Data Subsystem.
TM 9-1270-220-23&P	Aviation Unit and Aviation Intermediate Maintenance Manual with Repair Parts and Special Tools List (RPSTL) (Including Depot Maintenance Repair Parts and Special Tools) for Sight, Helicopter Head-Up Display Subsystem: M76.
TM 9-1300-206	Care, Handling, Preservation and Destruction of Ammunition
TM 9-1425-473-34	Direct and General Support Maintenance Instructions Armament Subsystem, Helicopter, TOW Guided Missile M65
TM 9-214	Inspection, Care, and Maintenance of Antrifiction Bearings
TM 9-4931-583-30&P	Aviation Intermediate Maintenance Instructions (Including Repair Parts and Special Tools List) for Boresight Kit
TM 9-4933-224-13&P	Operators Aviation Unit and Intermediate Maintenance Instructions With Repair Parts and Special Tools List (RPSTL) (Including Depot Maintenance Repair Parts and Special Tools) for Electronics Systems Test Set: Ml 37
TM 9-4933-224-13-HR	Hand Receipt Covering Contents of End Item (COEI) for Electronics Systems Test Set Ml 37 (4933-01-063-7678)
TM 11-5860-200-12	Operator's and Aviation Unit Maintenance Manual for Airborne Laser Tracking System
TM 55-1500-204-25/1	General Aircraft Maintenance Manual
TM 55-1520-236-10	Operators Instructions-AH-IS Helicopter

TM 55-1520-236-T	Troubleshooting Instructions, Aviation Unit Maintenance (AVUM) Level and Intermediate Maintenance (AVIM) Level for AH-1S (MC) Integrated Armament and Fire Control System
TM 55-1520-236-23	Aviation Unit and Intermediate Maintenance Instructions, AH-1S Helicopter
TM 55-1520-239-CL	Operators and Crewmembers Checklist—AH-1G/S (MC) Helicopter
TM 55-1520-239-23	Aviation Unit and Intermediate Maintenance Instructions, AH-1G/S (MC) Helicopter
TM 740-90-1	Administrative Storage of Equipment
TM 750-244-1-5	Procedures for the Destruction of Aircraft and Associated Equipment to Prevent Enemy Use

APPENDIX B

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

SCOPE

B-1. This appendix lists expendable supplies and materials you will need to operate and maintain the Armament Subsystems. These items are authorized to you by CTA 50-970, Expendable Items.

EXPLANATION OF COLUMNS

B-2. An explanation of columns is provided below.

a. Column 1, Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use abrasive cloth, item 1, Appx B".)

b. Column 2, Level. This column identifies the lowest level of maintenance that requires the listed item.

O—Aviation Unit Maintenance
F—Aviation Intermediate Maintenance

c. Column 3, National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

d. Column 4, Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parentheses, if applicable.

e. Column 5, Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea. in pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE SUPPLIES AND MATERIALS

(1) Number	(2) Level	(3) National Stock Number	Description	U/M
1	F	5350-00-221-0872	Abrasive Cloth	pk
2	F	8040-00-869-8792	Adhesive MIL-A-5092 (81349)	oz
3	F	8040-01-036-3771	Adhesive MIL-A-8623 (81349)	oz
4	F	8040-00-142-9193	Adhesive, Superbinder 495	oz
5	F	8040-01-059-1524	Adhesive 11830434 (19203)	ca
6	F	8040-00-281-1972	Adhesive 8437662 (19204)	gl
7	F		Adhesive 8437677 (19204)	
8	F	8040-01-066-6442	Adhesive 8437692 (19204)	gl
8.1	F	8040-01-147-9957	Adhesive 11831147	ea
9	F	6810-00-753-4993	Alcohol, Isopropyl TT-I-735 (81349)	oz
10	F	6145-00-299-4417	Cable, AWG 18, 300 V Four Conductor J-C-580 SJ03CK3/18SRNJ	ft
11	F	6850-00-224-6663	Cleaning Compound, Rifle Bore Cleaner (81349) MIL-C-372	oz
12	F	9150-00-985-7244	Grease, Aircraft MIL-G-23827 (81349)	oz
12.1	F	9150-01-071-0749	Grease, Aircraft Ord Graphite	lb
13	F	5970-00-181-0190	Insulating Compound MIL-I-46058 (81349)	kt
13.1	F	5970-01-076-5120	Insulation Sleeving 11830624	ft

(1) Number	(2) Level	(3) National Stock Number	Description	U/M
14	F	5970-00-815-1295	Insulation Sleeving 11830621-151 (19203)	ft
14.1	F	5970-01-107-5090	Insulation Sleeving 11830621-169 (19203)	ft
15	F		Insulation Sleeving 11830621-170 (19200)	ft
15.1	F	5970-00-812-2968	Insulation Sleeving 11830621-143 (19203)	ft
16	F		Lens Paper NNN-P-40B	
17	F	9505-00-221-2650	Lockwire MS20995C20 (96906)	lb
18	F	9505-00-293-4208	Lockwire MS20995C32 (96906)	lb
19	F		Locking Compound 8438614-4 (19204)	
20	F	9150-01-104-5227	Lubricant, All Weather (Automatic Weapons) (DOD-L-85336)	qt
20.1	F	9150-00-168-2000	Lubricant, Solid Film, Air-Cured (Corrosion-Inhibiting) MIL-L-46147	oz
21	F	4510-00-220-6078	Lumber, Softwood (1 x 4)	bf

APPENDIX B. EXPENDABLE SUPPLIES AND MATERIALS LIST (Cont)

(1) Number		(3) National Stock Number	Description	U/M
22	F	9330-01-088-2600	Polycarbonate Strip 11831031 (19200)	ea
23	F	8030-00-275-8114	Sealing Compound MIL-S-11030	
24		Deleted		
25	F	6850-00-927-9461	Silicone Compound MIL-C-47113	
26	F	6850-00-880-7616	Silicone Compound MIL-S-8660	tu
27	F	3439-00-453-5472	Solder QQS571SN60WRMAP2 (81348)	ea
28	F		Solder QQS571SN63BS (81348)	ea
29	F	6850-00-224-6663	Solvent, Cleaning Compound P-D-680, TY11 (81349)	
30	F	5975-00-727-5153	Strap, Cable Tiedown MS 3367-4-9 (96906)	bx
30.1	F	4970-00-847-7345	Tape 60 (20999)	ro
31	F	4020-01-115-0890	Tape, Lacing 8438617-1 (19204)	ea
32	F	8010-00-527-2897	Thinner MIL-T-1 9544	
33	F	6145-01-110-8905	Wire, Type E-20 White MIL-W-1 6878/4	
34	F	6145-01-109-3864	Wire, Type E-20 Black MIL-W-1 6878/4	

APPENDIX C

ILLUSTRATED LIST OF MANUFACTURED ITEMS

INTRODUCTION

C-1. This appendix includes complete instructions for making items authorized to be manufactured or fabricated by aviation intermediate maintenance personnel. A part number index in alphanumeric order is provided for cross-referencing the part number of the item to the figure which cover fabrication criteria. All bulk materials needed for manufacture of an item are listed by part number or specification number on the illustration.

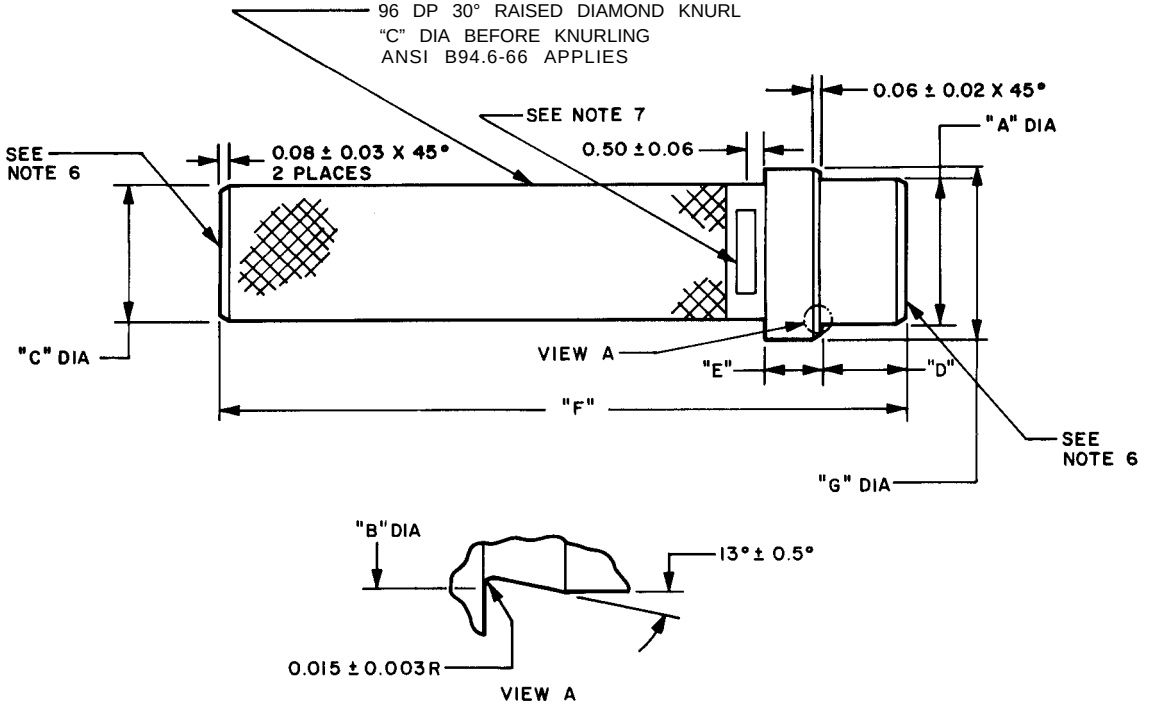
PART NUMBER INDEX

C-2. The part number index contains the part numbers of all manufactured items illustrated in this appendix. The part numbers are listed in alphanumeric order and are cross-referenced to the illustration which provides fabrication criteria.

Part Number	Figure Number	Nomenclature
IMI 3001	C-1	Bearing Installation Tool
IMI 3002	C-1	Bearing Removal Tool
IMI 3003	C-1	Bearing Installation Tool
IMI 3004	C-1	Bearing Removal Tool
IMI 3005	C-1	Bearing Installation Tool
IMI 3006	C-2	Bearing Removal Tool
IMI 3007	C-3	Bolt Head Lock Installation Tool
IMI 3008	C-4	Circuit Card Puller
IMI 3009	C-5	Machine Plug Wrench
IMI 3010	C-6	Range Potentiometer Torque Adapter
IMI 3011	C-7	Shim Wand
IMI 3012	C-7	Shim Wand
IMI 3013	C-7	Shim Wand
IMI 3014	C-7	Shim Wand
IMI 3015	C-8	Turret Installation/Removal Fixture
IMI 3016	C-9	Elevation/Depression Knob Torque Adapter
	C-10	Target Fabrication

APPENDIX C - ILLUSTRATED LIST OF MANUFACTURED ITEMS (cont)

PART NUMBER	A	B	C	D	E	F	G
IMI 3001	1.122 ± 0.002	1.105 ± 0.007	0.88 ± 0.01	1.00 ± 0.01	0.38 ± 0.03	6.38	1.63 ± 0.01
IMI 3002	1.122 ± 0.002	1.105 ± 0.007	0.88 ± 0.01	1.00 ± 0.01	0.38 ± 0.03	6.38	I.59 ± 0.01
IMI 3003	1.496 ± 0.002	1.479 ± 0.007	0.88 ± 0.01	1.25 ± 0.01	0.38 ± 0.03	6.62	2.26 ± 0.01
IMI 3004	1.496 ± 0.002	1.479 ± 0.007	0.88 ± 0.01	1.25 ± 0.01	0.36 ± 0.03	6.62	2.03 ± 0.01
IMI 3005	0.4956-0.0005	0.480 ± 0.005	0.88 ± 0.01	0.50 ± 0.01	0.36 ± 0.03	5.88	0.92 ± 0.01



NOTES:

1 MATERIAL: STEEL ALLOY; ASTM-A322, HOT ROLLED OR ASTM-A331, COLD FINISH. ED 4140 OR 41L40.

2 ANSI Y14 5.73 AND A103O5 APPLY.

3 HEAT TREATMENT: MIL-H-6875, QUENCH AND TEMPER TO 32.38 ROCKWELL "C".

4 FINISH BLACK OXIDE 3.3.1 OF MIL-STD-171.

5 PARTS SHALL BE MAGNETIC PARTICLE INSPECTED PER MIL-I-6868, NO CRACKS, SEAMS OR LAPS PERMITTED, USE PENETRANT INSPECTION MIL-1-6666, TYPE AND METHOD OPTIONAL TO VERIFY CRACKS IN LEADED STEEL.

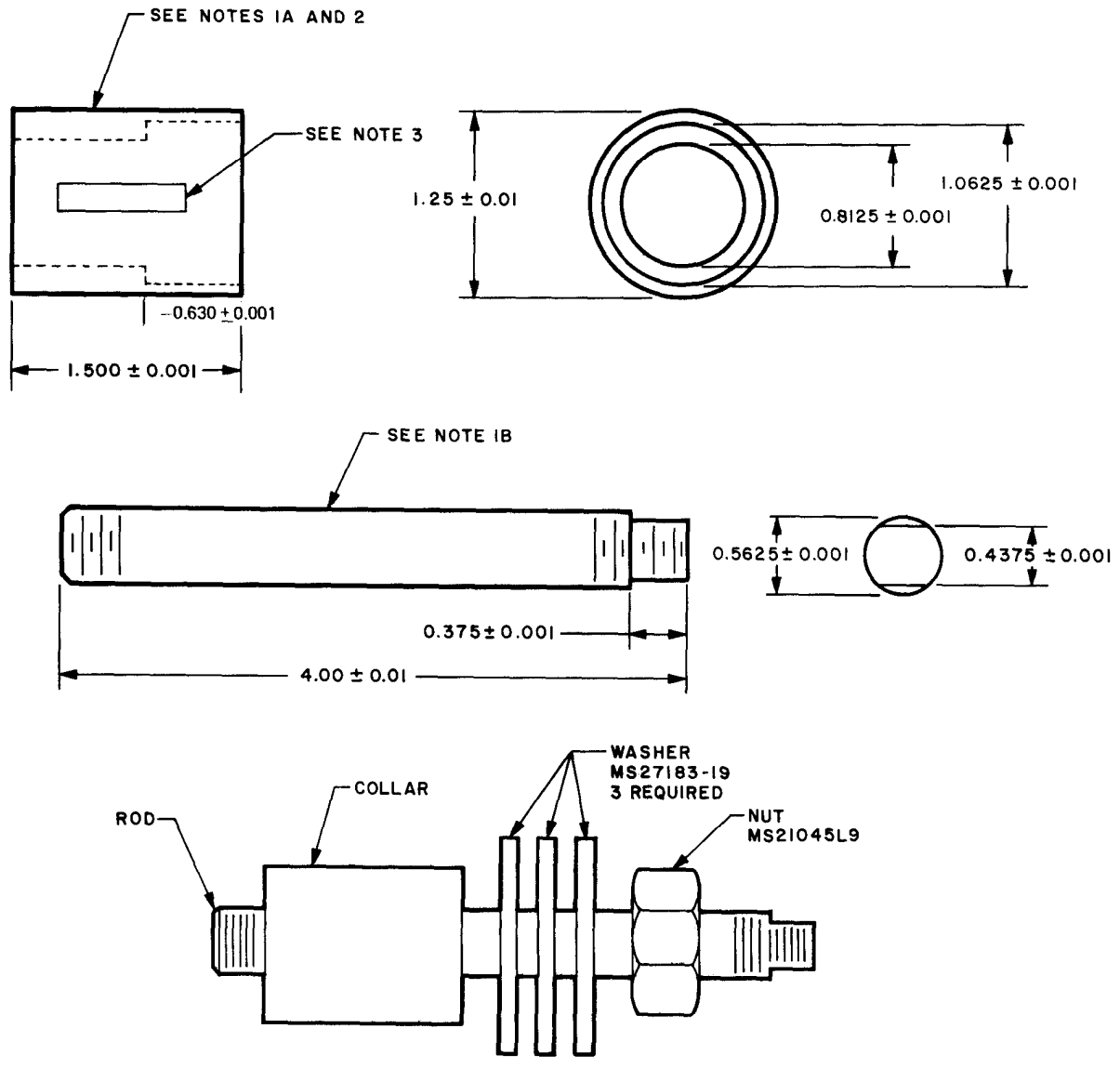
6 LATHE CENTER IS PERMITTED.

7 VIBRO ETCH PART NUMBER. CHARACTERS SHALL BE APPROXIMATELY 0.125 INCH HIGH.

8 ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED.

ARR82-26841

Figure C-1. Bearing Installation/Removal Tools



NOTES:

1 MATERIAL
A. STEEL ALLOY; ASTM-A322, HOT ROLLED OR ASTM-331, COLD FINISHED 4140 OR 41L40.

B. 9/16-18NF CADMIUM PLATED STEEL THREADED ROD.

2 FINISH 3.3.1 OF MIL-STD-171.

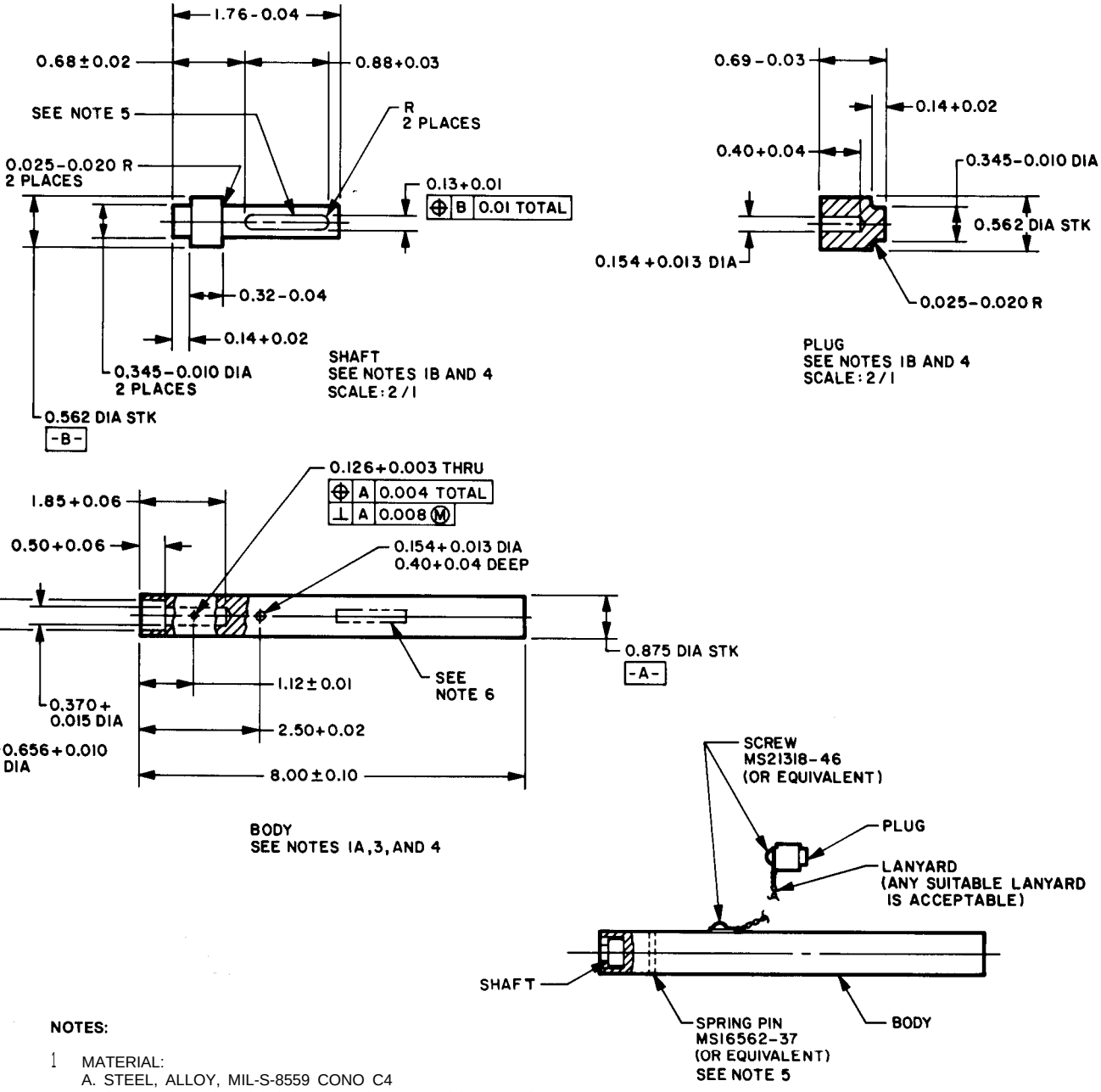
3 VIBRO ETCH PART NUMBER IMI 3006. CHARACTERS SHALL BE APPROXIMATELY 0.125 INCHES HIGH.

4 ALL DIMENSIONS IN INCHES.

ARR82-26842

Figure C-2. Bearing Removal Tool

APPENDIX C - ILLUSTRATED LIST OF MANUFACTURED ITEMS (cont)



NOTES:

1 MATERIAL:
A. STEEL, ALLOY, MIL-S-8559 CONO C4
B. STEEL, CARBON: QQ-S-647:1117 OR 11L17 COLD FINISHED.

2 125 ALL MACHINED SURFACES.

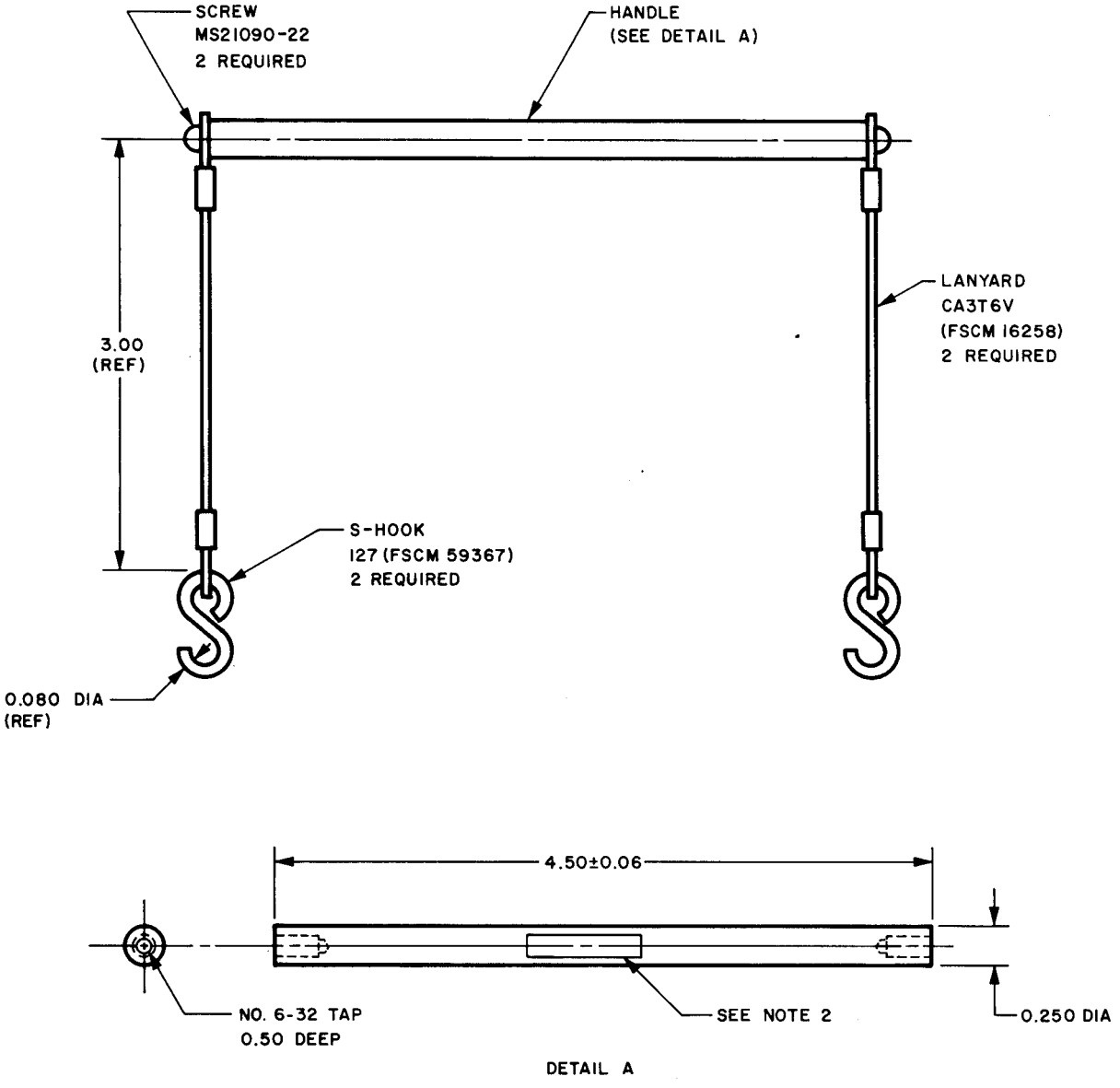
3 HEAT TREATMENT: MIL-H-6875, QUENCH AND TEMPER TO 46.51 ROCKWELL "C". HEAT TREATMENT MAY BE OMITTED; HOWEVER, TOOL LIFE WILL BE SIGNIFICANTLY REDUCED.

4 FINISH; 5.3.1.2 OR 5.3.2.2 OF MIL-STD-171.

5 MACHINED SLOT IN SHAFT AND ASSOCIATED SPRING PIN ARE CONVENIENCE ITEMS TO PREVENT SEPARATION AND SUBSEQUENT LOSS OF PARTS AND DO NOT AFFECT FUNCTION.

8 VIBRO ETCH PART NUMBER UMI 1001. CHARACTERS SHALL BE APPROXIMATELY 0.125 INCH HIGH.

Figure C-3. Bolt Head Lock Installation Tool



NOTES:

1 MATERIAL: 0.250 DIAMETER 4140 STEEL ROD.

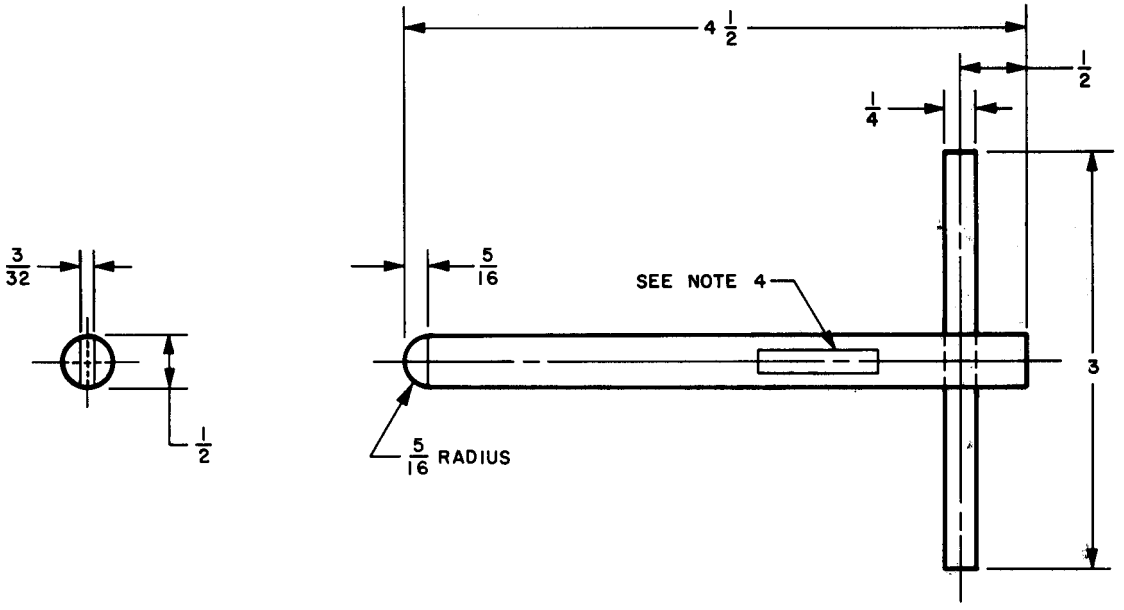
2 VIBRO ETCH PART NUMBER IMI 3008. CHARACTERS SHALL BE APPROXIMATELY 0.125 INCH HIGH.

3 ALL DIMENSIONS IN INCHES.

ARR82-26843

Figure C-4. Circuit Card Puller

APPENDIX C - ILLUSTRATED LIST OF MANUFACTURED ITEMS (cont)



NOTES:

1 MATERIAL — STEEL

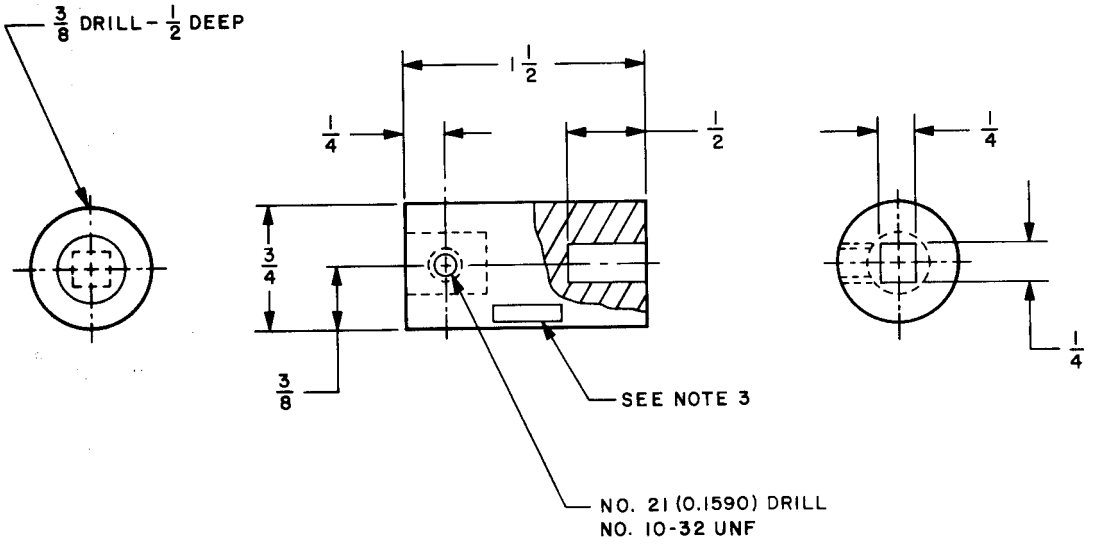
2 FRACTIONS ±1/64

3 DECIMALS ±.005

4 VIBRO ETCH PART NUMBER IMI 3009. CHARACTERS SHALL BE APPROXIMATELY 0.125 INCH HIGH.

ARR82-26844

Figure C-5. Machine Plug Wrench



NOTES:

1 MATERIAL — STEEL

2 FRACTIONS ± 1/64

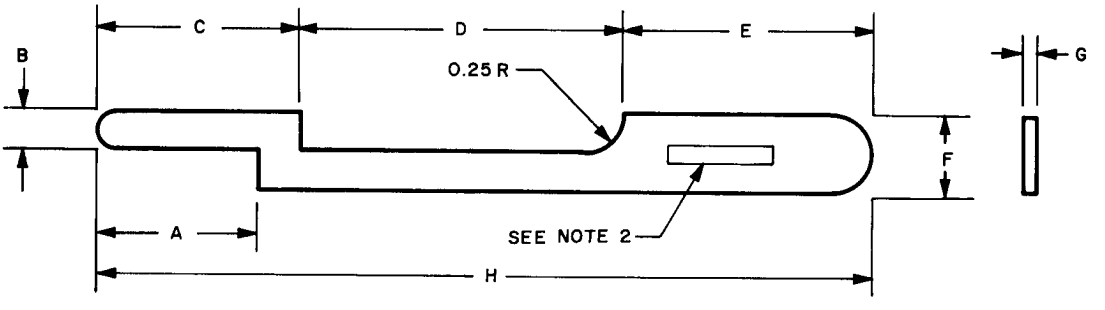
3 VIBRO ETCH PART NUMBER IMI 3010. CHARACTERS SHALL BE APPROXIMATELY 0.125 INCH HIGH.

ARR82-26845

Figure C-6. Range Potentiometer Torque Adapter

APPENDIX C - ILLUSTRATED LIST OF MANUFACTURED ITEMS (cont)

PART NUMBER	A	B	C	D	E	F	G	H
IMI 3011	2.25 ± 0.01	0.25 ± 0.01	2.50 ± 0.01	5.00 ± 0.01	4.5 ± 0.01	0.50 ± 0.01	0.003	12.00 ± 0.01
IMI 3012	2.25 ± 0.01	0.25 ± 0.01	2.50 ± 0.01	5.00 ± 0.01	4.5 ± 0.01	0.50 ± 0.01	0.009	12.00 ± 0.01
IMI 3013	1.25 ± 0.01	0.25 ± 0.01	1.50 ± 0.01	5.50 ± 0.01	5.00 ± 0.01	0.50 ± 0.01	0.001	12.00 ± 0.01
IMI 3014	1.25 ± 0.01	0.25 ± 0.01	1.50 ± 0.01	5.50 ± 0.01	5.00 ± 0.01	0.50 ± 0.01	0.005	12.00 ± 0.01



NOTES:

1 MATERIAL: STEEL FEELER STOCK

2 VIBRO ETCH PART NUMBER. CHARACTERS SHALL BE APPROXIMATELY 0.125 INCHES HIGH.

3 ALL DIMENSIONS IN INCHES.

ARR82-26846

Figure C-7. Shim Wand

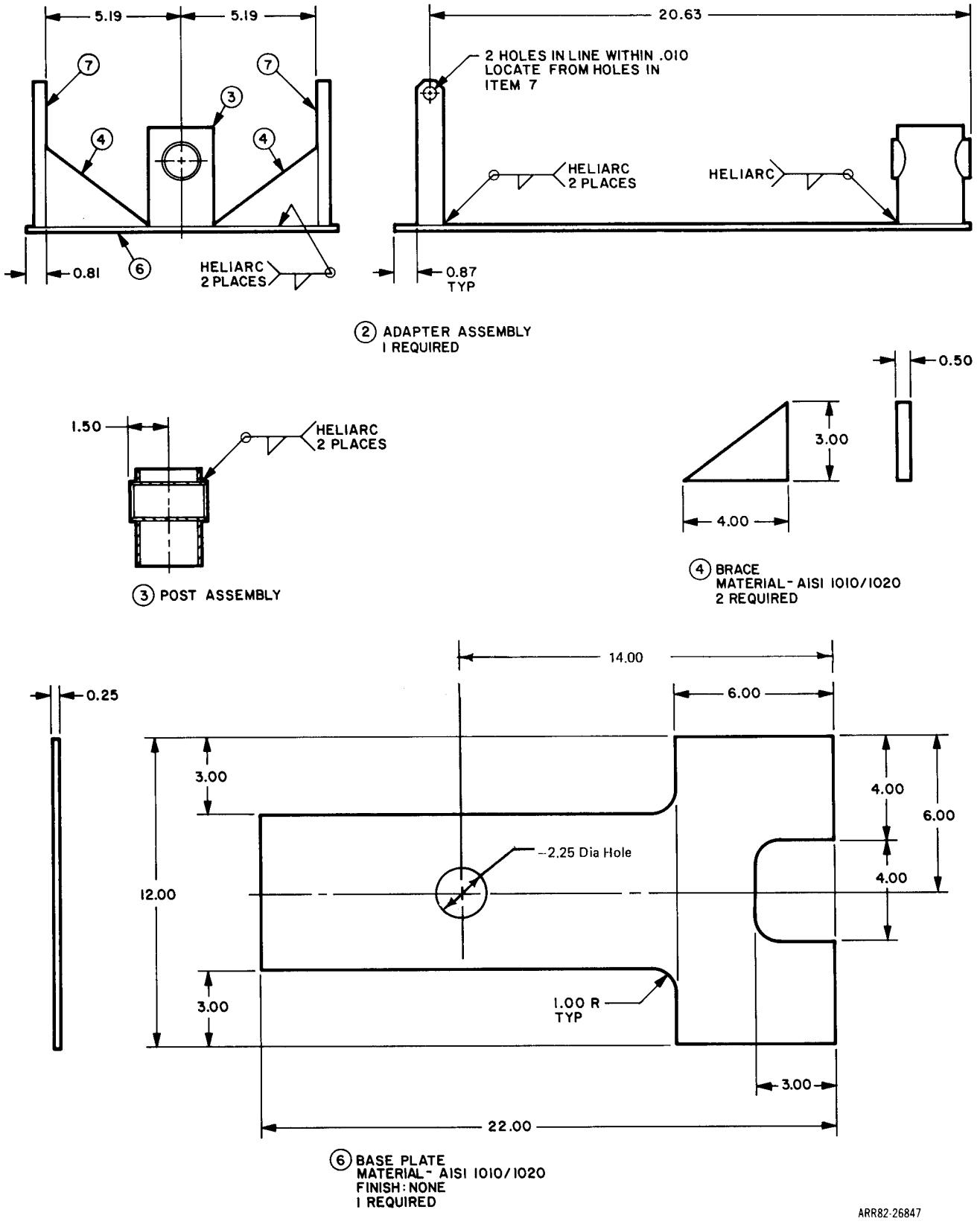


Figure C-8. Turret Installation/Removal Fixture (Sheet 1 of 2)

APPENDIX C - ILLUSTRATED LIST OF MANUFACTURED ITEMS (cont)

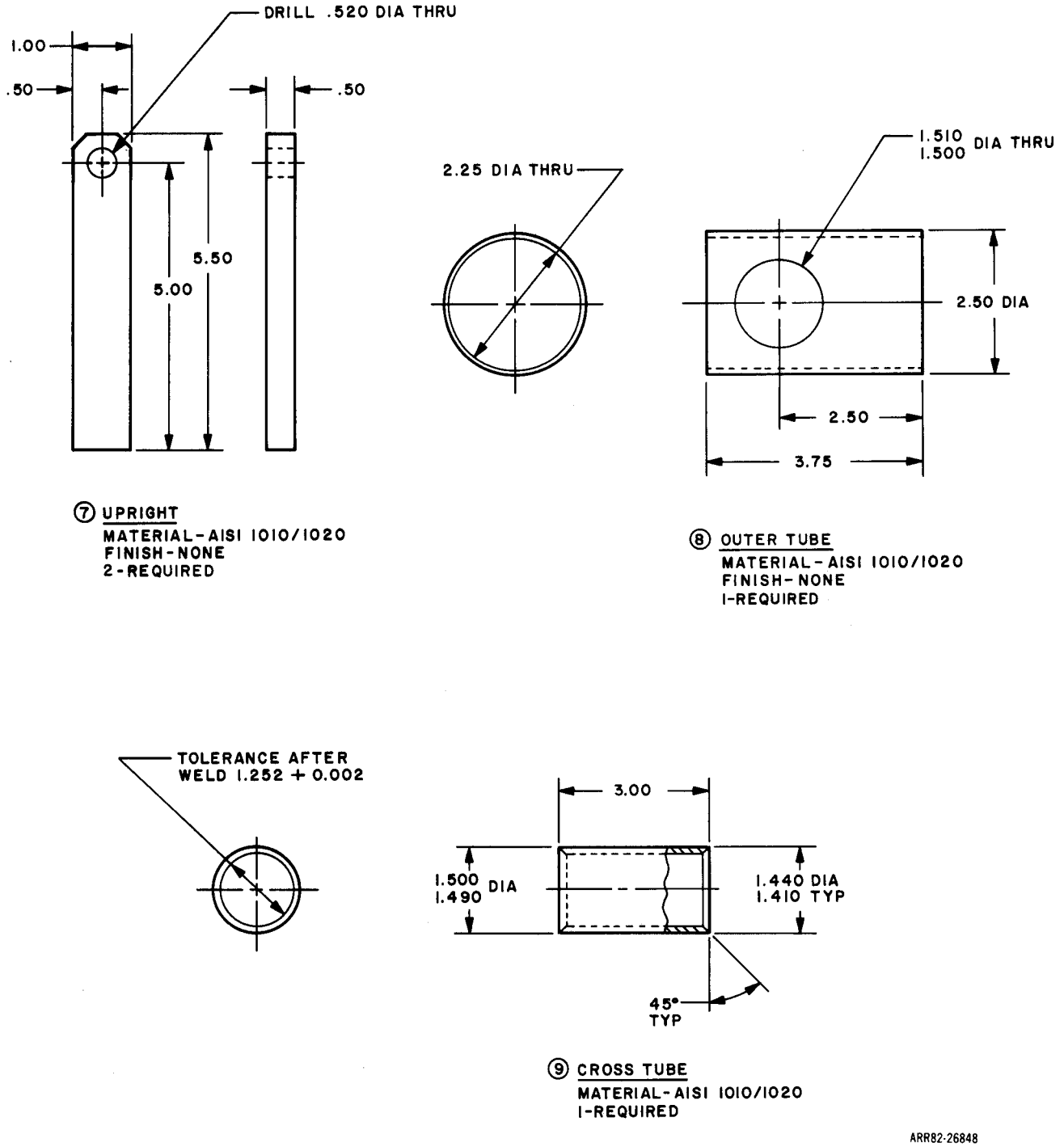


Figure C-8. Turret Installation/Removal Fixture (Sheet 2 of 2)

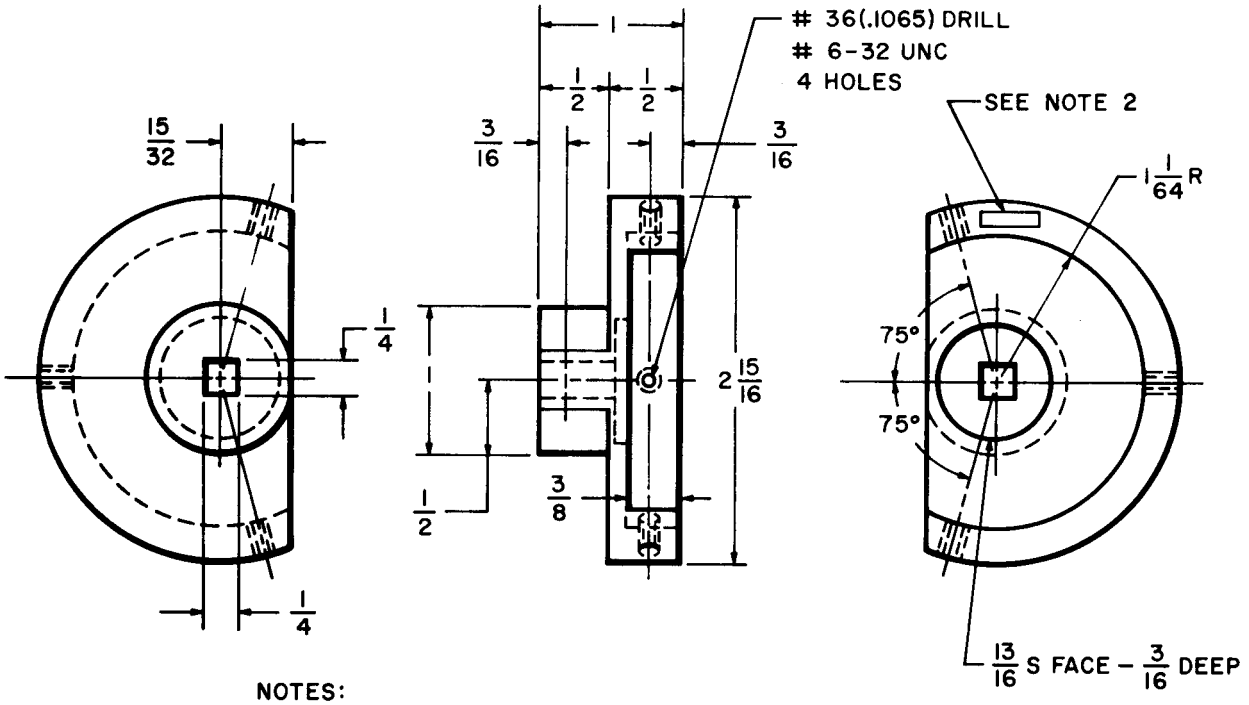
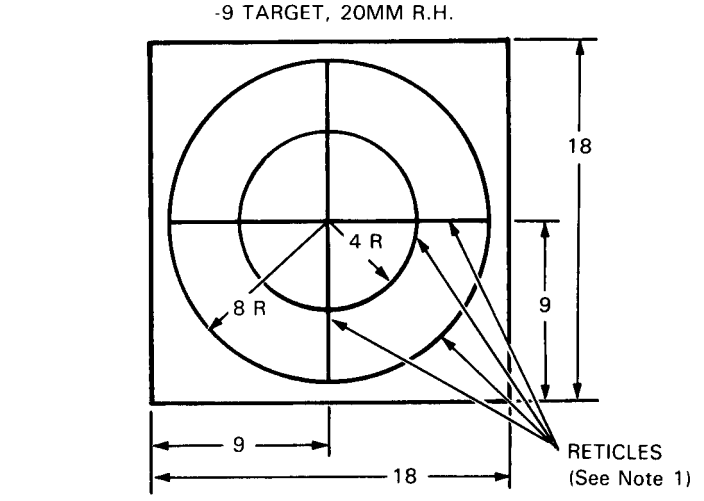
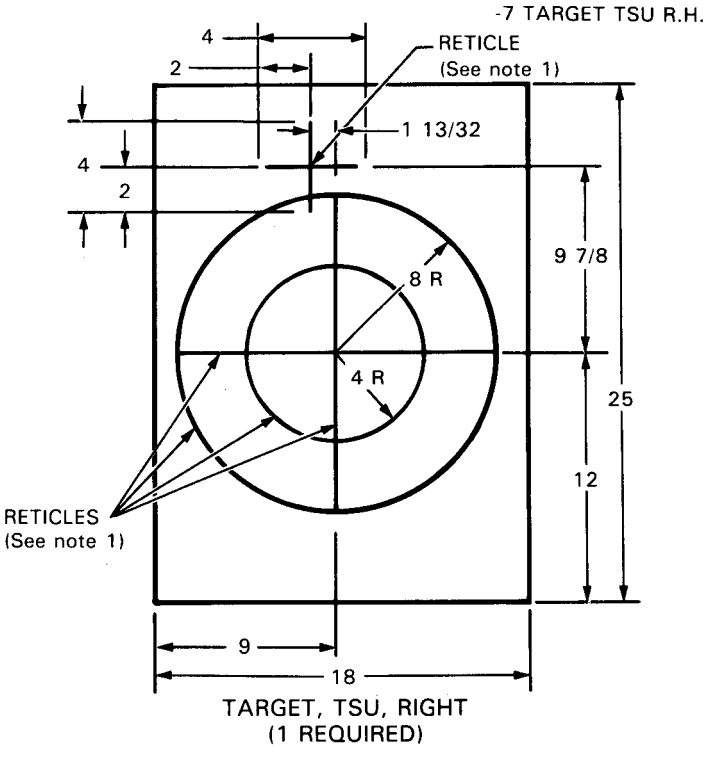


Figure C-9. Elevation/Depression Knob Torque Adapter

APPENDIX C - ILLUSTRATED LIST OF MANUFACTURED ITEMS (cont)



TARGET, 20MM, RIGHT
(1 REQUIRED)



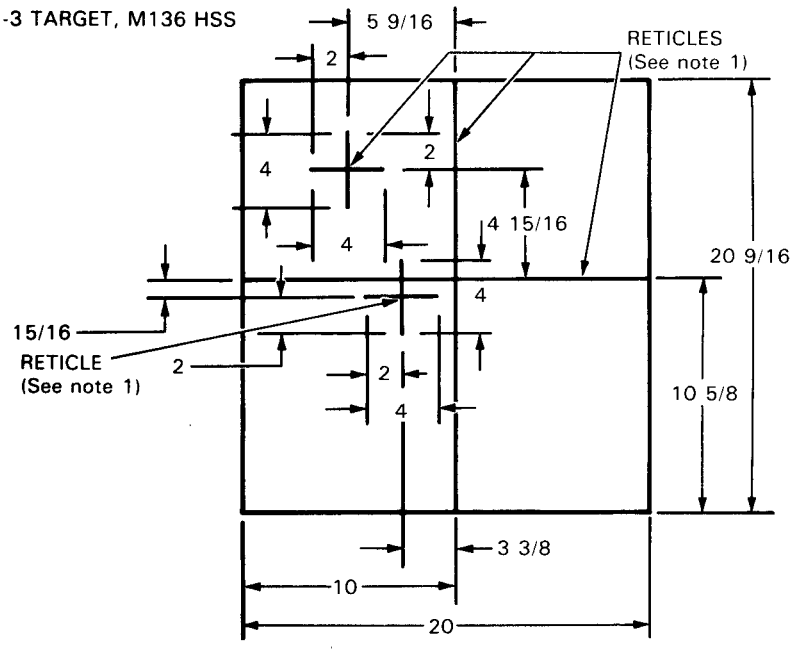
TARGET, TSU, RIGHT
(1 REQUIRED)

SEE SHEET 3 FOR TARGET, PILOT
AND GUNNERS, HSS, RIGHT

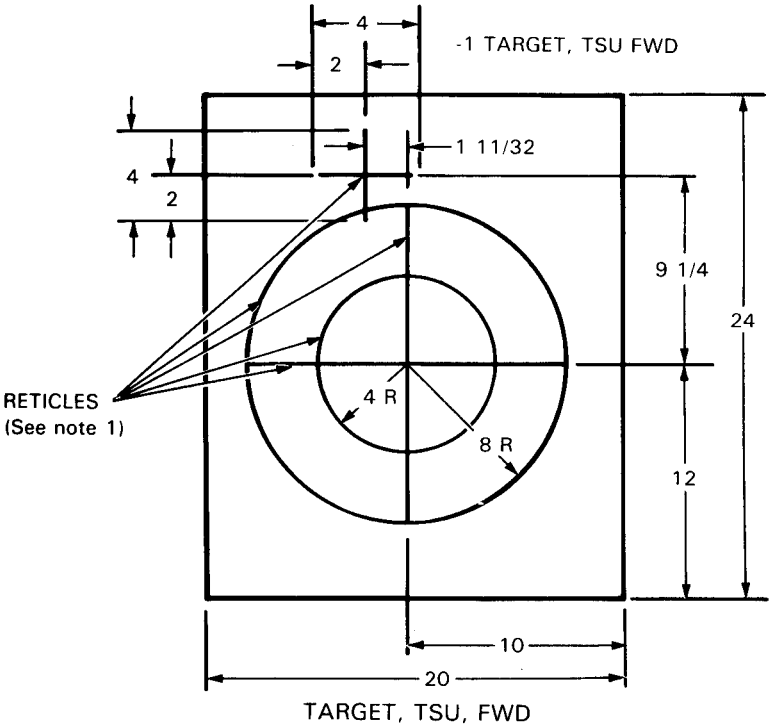
NOTES

1. ALL RETICLES ARE .12 WIDE AND ARE TO BE CENTERED ON THE DIMENSIONS GIVEN. ACRYLIC LACQUER COLOR BLACK NO. 17038 PER FED. STD. 595.
2. TARGET BOARDS PAINTED WITH ACRYLIC LACQUER COLOR WHITE NO. 17875 PER FED. STD. 595.

Figure C-10. Target Fabrication (sheet 1 of 7)



TARGET, HSS & M73 FWD
(1 REQUIRED)



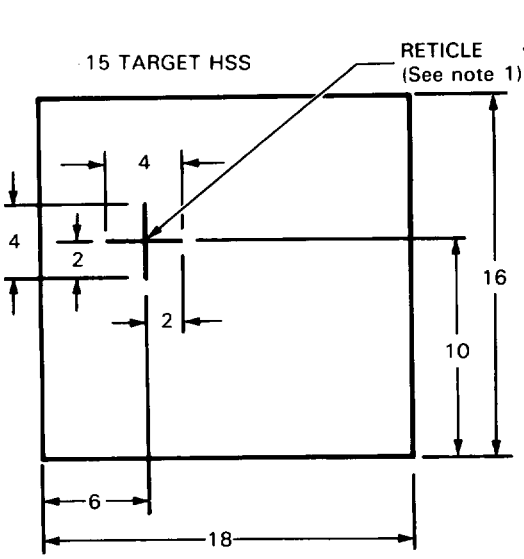
TARGET, TSU, FWD
(1 REQUIRED)

NOTES

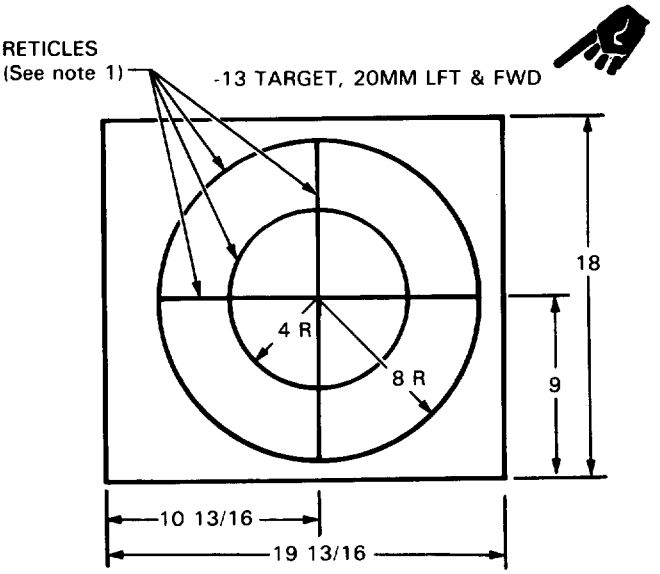
1. ALL RETICLES ARE .12 WIDE AND ARE TO BE CENTERED ON THE DIMENSIONS GIVEN. ACRYLIC LACQUER COLOR BLACK NO. 17038 PER FED. STD. 595.
2. TARGET BOARDS PAINTED WITH ACRYLIC LACQUER COLOR WHITE NO. 17875 PER FED. STD. 595.

Figure C-10. Target Fabrication (sheet 2 of 7)

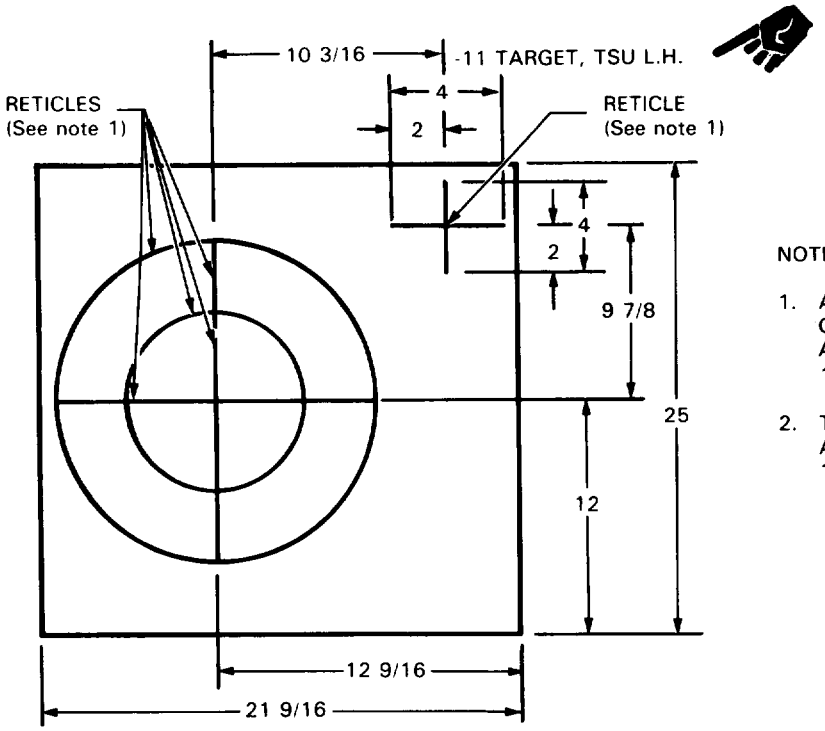
APPENDIX C - ILLUSTRATED LIST OF MANUFACTURED ITEMS (cont)



TARGET, PILOT & GUNNERS, HSS
RIGHT & LEFT (4 REQUIRED)



TARGET, 20MM, LEFT & FORWARD
(2 REQUIRED)



TARGET, TSU, LEFT
(1 REQUIRED)

NOTES

1. ALL RETICLES ARE .12 WIDE AND ARE TO BE CENTERED ON THE DIMENSIONS GIVEN. ACRYLIC LACQUER COLOR BLACK NO. 17038 PER FED. STD. 595.
2. TARGET BOARDS PAINTED WITH ACRYLIC LACQUER COLOR WHITE NO. 17875 PER FED. STD. 595.

Figure C-10. Target Fabrication (sheet 3 of 7)

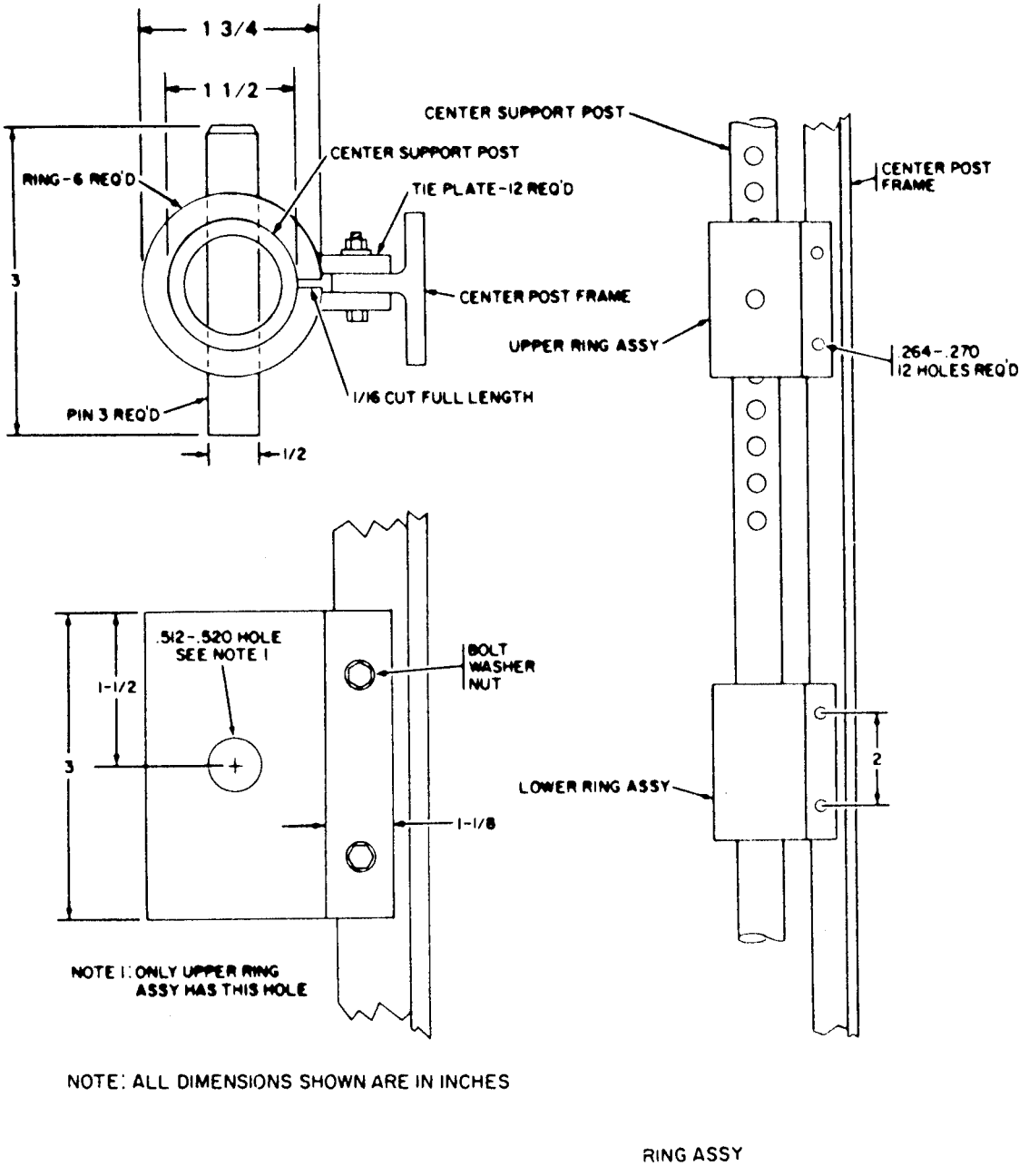
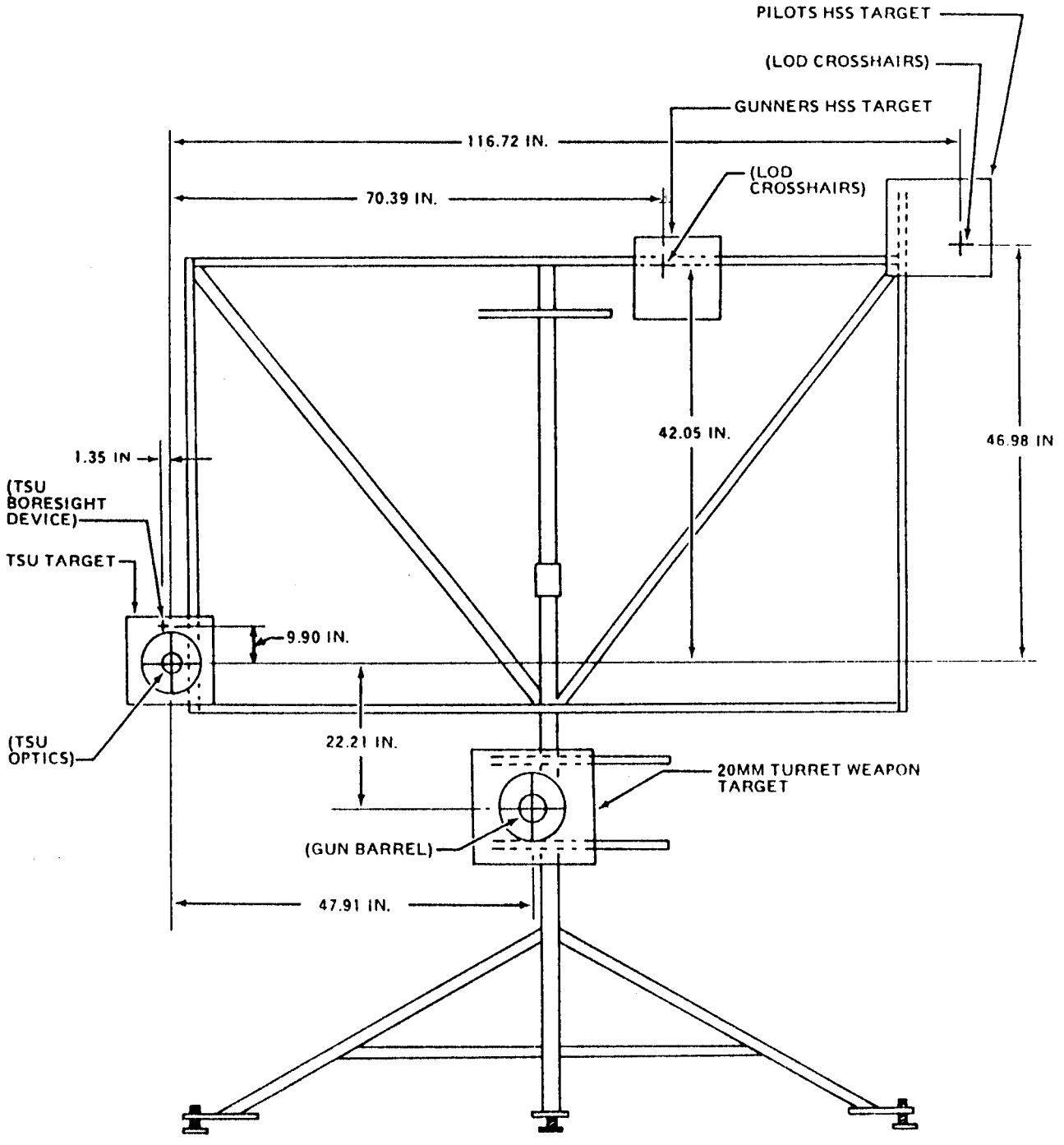


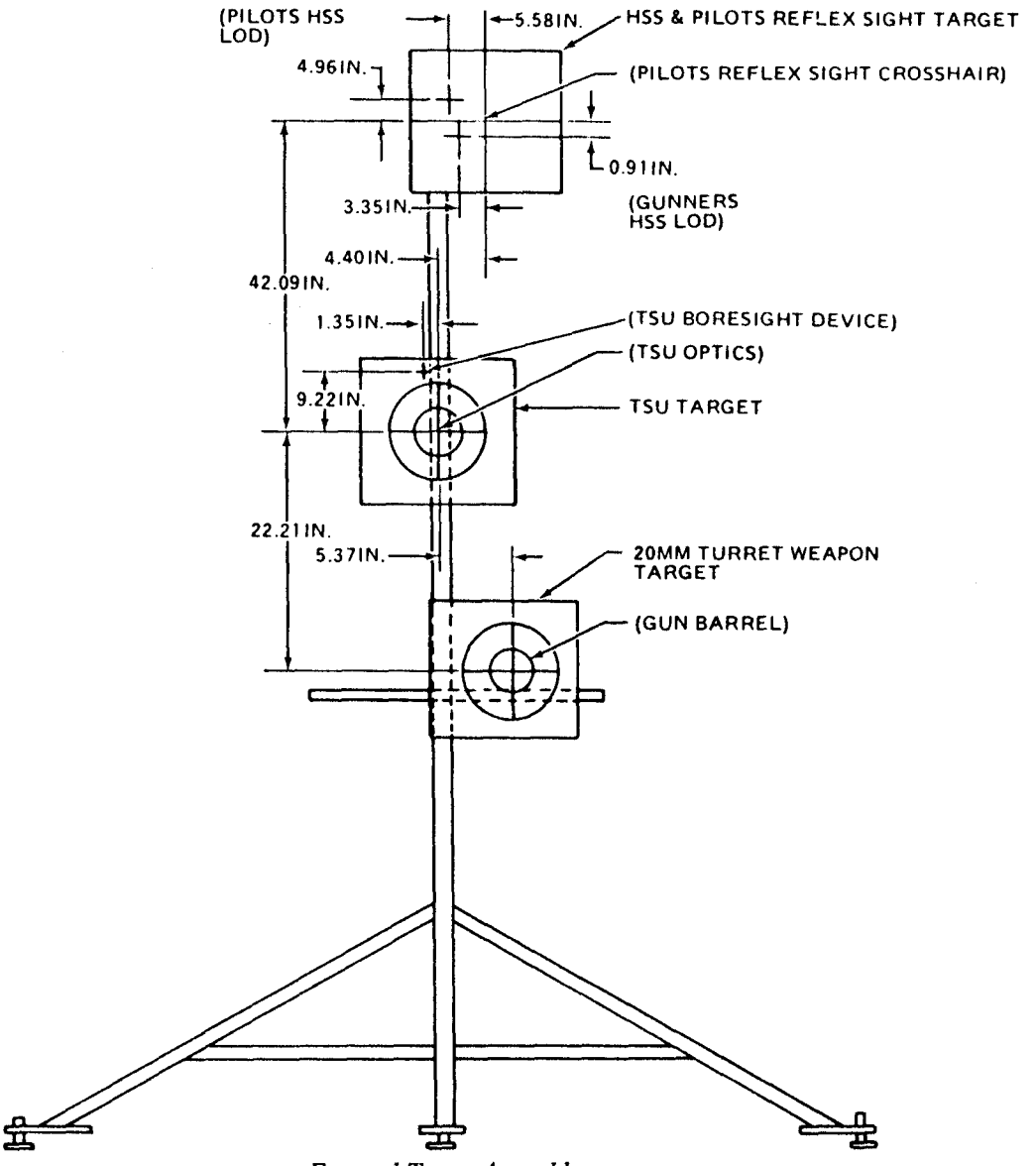
Figure C-10. Target Fabrication (Sheet 4 of 7)

APPENDIX C - ILLUSTRATED LIST OF MANUFACTURED ITEMS (cont)



Right Target Assembly

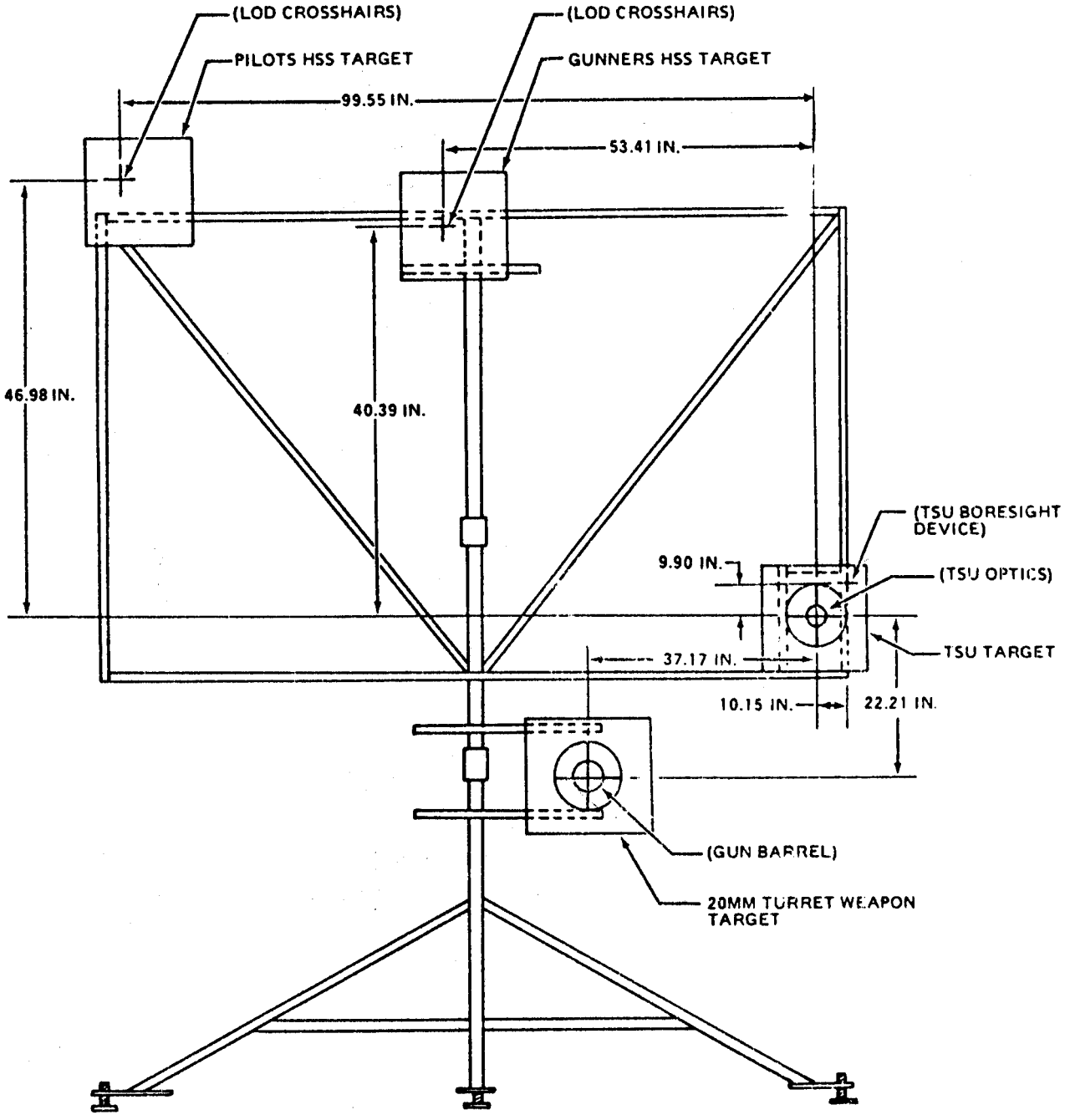
Figure C-10. Target Fabrication (Sheet 5 of 7)



Forward Target Assembly

Figure C-20. Target Fabrication (Sheet 6 of 7)

APPENDIX C - ILLUSTRATED LIST OF MANUFACTURED ITEMS (cont)



Left Target Assembly

Figure C-10. Target Fabrication (Sheet 7 of 7)

APPENDIX D

TORQUE LIMITS

GENERAL

D-1. This appendix contains selected general information and methods for applying torque. Special torquevaluesand sequences are indicated inthetask relating to aspecific part. For complete general information and instructions for applying torque, refer toTM 55-1500-204-25/1.

TORQUE DEFINITIONS

D-2. Definitions of breakaway torque, tare torque, and final torque are provided in the following paragraphs.

BREAKAWAY TORQUE

The torque necessary to begin turning a nut off a bolt with no axial load on the nut and with the bolt completely through the nut.

TARE TORQUE

The torque necessary to overcome the internal friction between a self-locking nut and bolt as the nut is being turned on the bolt but before the nut contacts the washer.

FINAL TORQUE

The sum of the tare torque (rundown resistance) and the standard torque.

TORQUE VALUES

D-3. There is a correct torque value for tightening every fastener. In some instances, torque value will be specified in the maintenance tasks. These special torque values take precedence over the recommended standard torque values contained in this appendix. In most instances, however, the torque values will be obtained from a listing of recommended standard torque values provided in paragraph D-4. This paragraph should be consulted for the correct torque value for any fastener that does not have a special torque value specified in the maintenance tasks.

TORQUE SPECIFICATIONS

D-4. General torque requirements and standard torque values are provided in the following paragraphs.

TORQUE REQUIREMENTS

1. Fasteners with less than 125,000 psi tensile strength (heat treat) do not require a mandatory torque value.

APPENDIX D - TORQUE LIMITS (cont)

2. Fasteners with more than 125,000 psi tensile strength (heat treat) will be torqued in accordance with the specified special or standard torque values.

3. Round or chamfered-end bolts must extend through nuts by at least the full round or chamfer plus one thread pitch beyond nut when torqued.

4. Flat-end bolts must extend at least two thread pitches beyond nut when torqued.

5. Self-locking fasteners must be checked for damaged threads and must permit tightening with fingers up to the locking element.

6. Torque values must be calculated when non-concentric attachments are used with torque wrenches.

STANDARD TORQUE VALUES

Recommended standard torque values are listed in the following tabulated data.

Fine Thread

Size	Plain and Castellated Steel Nuts Used with Bolts in Tension Loading				Thin Plain and Castellated Steel Nuts Used with Bolts in Shear Loading			
	Torque (Lb-in.)		Torque (N.m)		Torque (Lb-in.)		Torque (N.m)	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
8-36	12	15	1.4	1.7	7	9	0.8	1.0
10-32	20	25	2.3	2.8	12	15	1.4	1.7
1/4-28	50	70	5.7	7.9	30	40	3.4	4.5
5/16-24	100	140	11.3	15.8	60	85	6.8	9.6
318-24	160	190	18,1	21.5	95	110	10.7	12.4
7/16-20	450	500	50.9	56.5	270	300	30.5	33.9
1/2-20	480	690	54.2	78.0	290	410	32.8	46.3
9/16-18	800	1000	90.4	113	480	600	54.2	67.8
5/8-18	1100	1300	124.3	146.9	600	780	67.8	88.1
3/4-16	2300	2500	259.9	282.5	1300	1500	146.9	169.5
7/8-14	2500	3000	282.5	339.0	1500	1800	169.5	203.4
1-12	3700	5500	418.1	621.5	2200 (See Note)	3300	248.6 (See Note)	372.9
1-1/8-12	5000	7000	565.0	791.0	3000 (See Note)	4200	339.0 (See Note)	474.6
1 -1/4-12	9000	11000	1017.0	1243.0	5400 (See Note)	6000	610.2 (See Note)	678.0
Coarse Thread								
8-32	12	15	1.4	1.7	7	9	0.8	1.0
10-24	20	25	2.3	2.8	12	15	1.4	1.7
1/4-20	40	50	4.5	5.7	25	30	2.8	3.4

Coarse Thread

Size	Plain and Castellated Steel Nuts Used with Bolts in Tension Loading				Thin Plain and Castellated Steel Nuts Used with Bolts in Shear Loading			
	Torque (Lb-in.)		Torque (N.m)		Torque (Lb-in.)		Torque (N.m)	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
5/16-18	80	90	9.0	10.2	50	55	5.7	6.2
3/8-16	160	185	18.1	20.9	95	100	10.7	11.3
7/16-14	235	255	26.6	28.8	140	155	15.8	17.5
1/2-13	400	480	45.2	54.2	240	290	27.1	32.8
9/16-12	500	700	56.5	79.1	300	420	33.9	47.5
5/8-11	700	900	79.1	101.7	420	540	47.5	61.0
3/4-10	1150	1600	130.0	180.8	700	950	79.1	107.4
7/8-9	2200	3000	248.6	339.0	1300	1800	146.9	203.4

NOTES:

1. Estimated corresponding values.
2. Torque values are derived from oil-free cadmium-plated threads.
3. Torque values are based on use of 125KS1 bolts.
4. Torque values are for turning nuts on stationary bolts.
5. Torque values may be used for all cadmium-plated steel nuts of the fine or coarse thread series which have approximately equal number of threads and equal face bearing areas.
6. Average torque values in shear loading are approximately 60 percent of average torque value in tension loading.
7. Torque values are applicable to self-locking nuts as well. The final torque of a self-locking nut is the sum of the tare torque (rundown resistance) plus the standard torque.
8. Divide torque values in pound-inches by 12 to convert torque values to pound-feet.
9. Multiply torque values in pound-inches by 0.113 to convert torque values to Newton-meters.
10. Multiply torque values in pound-feet by 1.356 to convert torque values to Newton-meters.

SELF-LOCKING NUT TORQUE

Do not use self-locking nuts if the tare torque (rundown resistance) is less than the minimum value listed in the following tabulated data. Make certain that a minimum of two threads of matching bolt are exposed past locking element of nut when checking tare torque. The final torque of a self-locking nut is the sum of the standard torque plus the tare torque.

APPENDIX D - TORQUE LIMITS (cont)

Fine Thread

Size	Minimum Tare Torque (Lb-in.)	Minimum Tare Torque (N.m)
10-32	(See Note)	(See Note)
1/4-28	(See Note)	(See Note)
5/16-24	6.5	0.7
318-24	9.5	1.1
7/16-20	14.0	1.6
1/2-20	18.0	2.0
9/16-18	24.0	2.7
5/8-18	32.0	3.6
3/4-16	50.0	5.7
7/8-14	70.0	7.9
1-12	90.0	10.2
1-1/8-12	117.0	13.2
1-1/4-12	143.0	16.2
1-3/8-12	180.0	20.3
1-1/2-12	210.0	23.7

Coarse Thread

4-40	(See Note)	(See Note)
6-32	(See Note)	(See Note)
8-32	(See Note)	(See Note)
10-24	(See Note)	(See Note)
1/4-20	(See Note)	(See Note)
5/16-18	7.5	0.9
3/8-16	12.0	1,4
7/16-14	16.5	1.9
1/2-13	24.0	2.7
9/16-12	30.0	3.4
5/8-11	40.0	4,5
3/4-10	60.0	6.8
718-9	82.0	9.3
1-8	110.0	12.4
1-1/8-7	137.0	15.5
1-1/4-7	165.0	18.7
1 -3/8-6	200,0	22.6
1-1/2-6	230.0	26.0
1 -3/4-5	300.0	34.0

NOTE:

Check tare torque by attempting to thread self-locking nut onto matching bolt. Reuse only those self-locking nuts that cannot be tightened down with fingers after locking element engages threads of matching bolt. Discard self-locking nuts that do not meet this requirement.

SELECTING A TORQUE WRENCH

D-5. Indicating dial and audible indicating type torque wrenches are usually selected in preference to the flexiblebeam-type torque wrench. The audible indicating torque isgenerally recommended because it can be used in applications where it would be difficult to read a dial or scale. Additional criteria to be considered when selecting a torque wrench are as follows:

ACCURACY

The accuracy of most torque wrenches tends to decrease at the extremes of the torque range. The torque value being applied should be between the 30 and 80 percent points of the torque wrench range.

GRADUATION INCREMENTS

The graduation increments of the torque wrench should not be greater than 10 percent of the torque value being applied.

CALIBRATION UNITS

The torque wrench should be calibrated in the same units as the specified torque for the fastener. However, if the torque wrench is not calibrated in the desired units, the units may be converted.

TORQUE APPLICATION

D-6. The information provided in the following paragraphs should be carefully considered before applying torque to any fastener.

THREAD CONDITION

Threads must be clean and free from nicks, burrs, paint, grease, or oil to obtain the correct torque when it is tightened to the specified torque value. In applications where lubrication or anti-seize compound is used on threads, special torque values will be specified.

CHECKING APPLIED TORQUE

The torque of an installed fastener cannot be checked. Back off fastener one-half to one turn and retighten it to the specified torque.

TIGHTENING NEW FASTENERS

Tighten fastener to desired torque. Back off fastener one-half to one turn. Retighten fastener to desired torque. This practice aids in cleaning and smoothing the threads and results in more accurately applied torque.

TIGHTENING SELF-LOCKING NUTS

Self-locking nuts contain an internal locking element. The tare torque (rundown resistance) of this locking element must be measured as the nut is being turned but before the nut touches the washer. The final torque is the sum of the tare torque plus the standard torque.

APPENDIX D - TORQUE LIMITS (cont)

TIGHTENING A FASTENER ON THE HEAD END

Apply torque to a bolt head only when torque cannot be applied to the nut. When a fastener is tightened from the head end, some of the torque applied is absorbed in turning the bolt in the hole. Since the amount of torque that is absorbed will vary, the torque values specified are for tightening fasteners on the nut end. When fasteners must be tightened from the head end, torque them as follows:

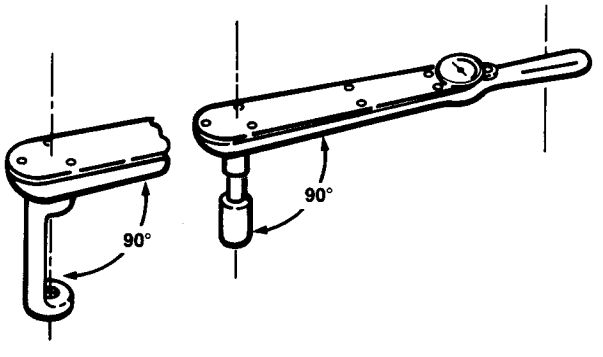
1. If the fastener can be inserted through the hole and started into the nut by the fingers, use the recommended standard torque.

2. If the fastener is inserted in a hole that increases the tightening resistance, record the amount of resistance as tare torque. Add the tare torque to the recommended standard torque and tighten the fastener to this value.

3. If the fastener is installed in a threaded hole with hole thread length more than diameter of fastener, use the recommended standard torque value. If the fastener is installed in a threaded hole with hole thread length less than diameter of fastener, use a reduced torque value from the value stated.

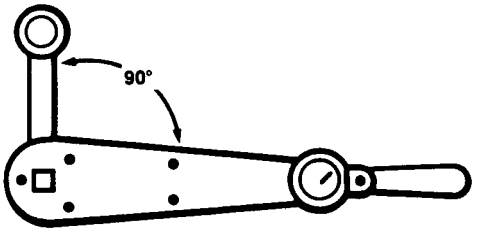
USING A CONCENTRIC ATTACHMENT ON A TORQUE WRENCH

The use of an attachment which operates concentrical with the torque wrench drive square as shown below does not present a problem, The torque value applied is the torque value indicated.



CONCENTRIC TORQUE WRENCH ATTACHMENTS

ARR82-26828

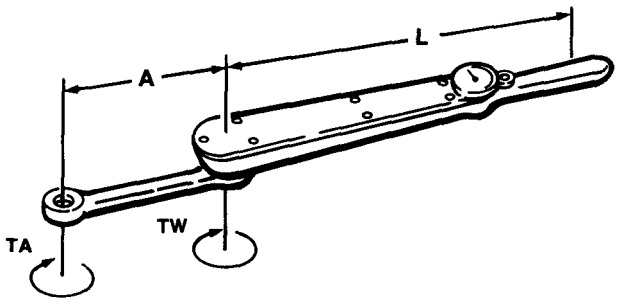


RIGHT ANGLE OFFSET CONCENTRIC TORQUE WRENCH ATTACHMENT

ARR82-26829

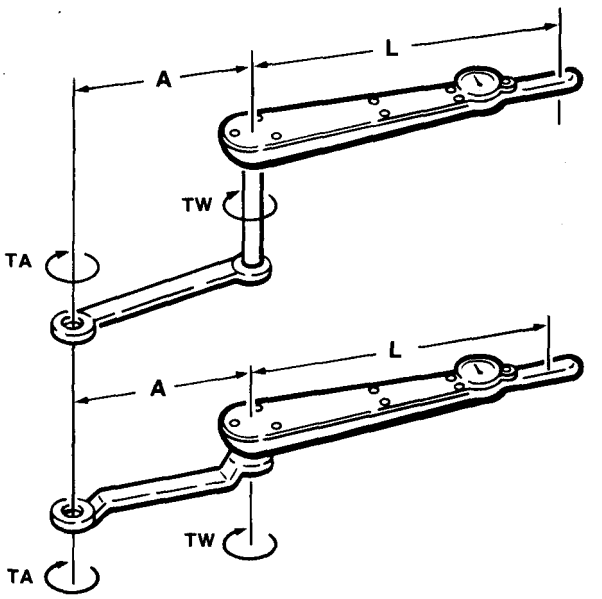
USING A NONCONCENTRIC ATTACHMENT ON A TORQUE WRENCH

The use of a nonconcentric attachment which does not operate concentrically with the torque wrench drive square as shown below presents a problem. This type of attachment affects the lever length and the torque value applied is not the torque value indicated.



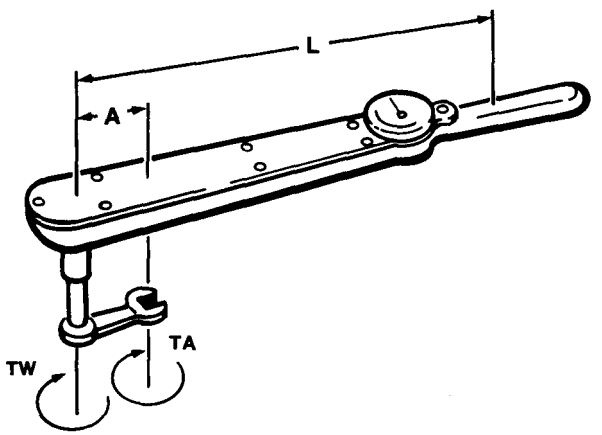
STRAIGHT EXTENSION TORQUE WRENCH ATTACHMENT

ARR82-26830



OFFSET EXTENSION TORQUE WRENCH ATTACHMENTS

ARR82-26831



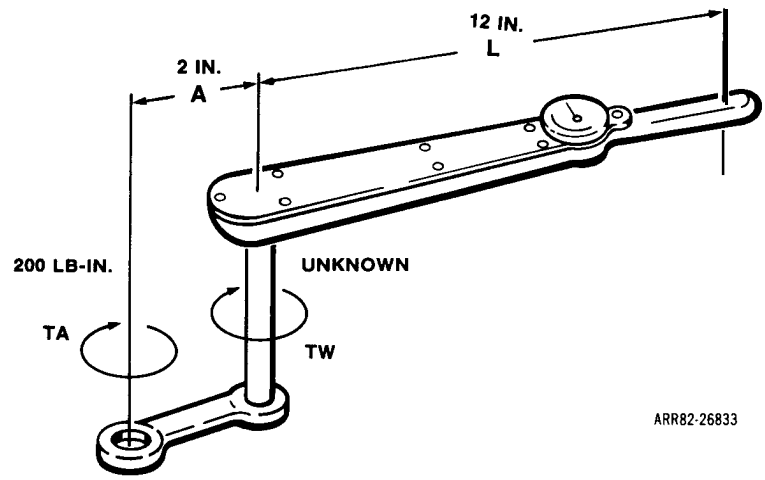
OFFSET REVERSE EXTENSION TORQUE WRENCH ATTACHMENT

ARR82-26832

The correct indicated torque value for nonconcentric attachments is determined by calculating the effect of the lever arm as shown in examples 1 through 3.

APPENDIX D - TORQUE LIMITS (cont)

EXAMPLE 1



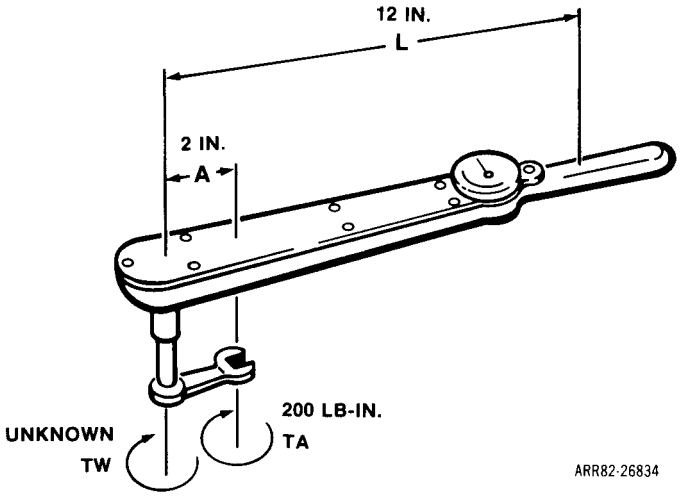
T W = Indicated torque value on torque wrench
TA = Actual torque value applied to fastener
L = Lever length
A = Attachment length

$$T W = \frac{TA \times L}{L + A}$$

$$T W = \frac{200 \times 12}{12+2} = \frac{2400}{14} = 171.4 \text{ Lb-In.}$$

FASTENER IS TORQUED TO 200 LB-IN. WHEN TORQUE WRENCH INDICATES 171.4 LB-IN.

EXAMPLE 2



T W = Indicated torque value on torque wrench
TA = Actual torque value applied to fastener
L = Lever length
A = Attachment length

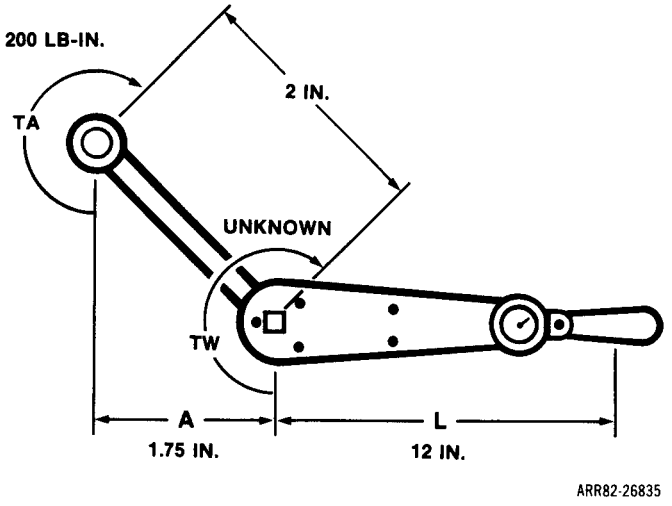
$$T_w = \frac{TA \times L}{L - A}$$

$$T W = \frac{200 \times 12}{12-2} = \frac{2400}{10} = 240 \text{ Lb-In.}$$

FASTENER IS TORQUED TO 200 LB-IN. WHEN TORQUE WRENCH INDICATES 240 LB-IN.

APPENDIX D - TORQUE LIMITS (cont)

EXAMPLE 3



T W = Indicated torque value on torque wrench
TA = Actual torque value applied to fastener
L = Lever length
A = Attachment length

$$T W = \frac{TA \times L}{L + A}$$

$$T W = \frac{200 \times 12 = 2400}{12 + 1.75 \quad 13.75} = 174.5 \text{ Lb-in}$$

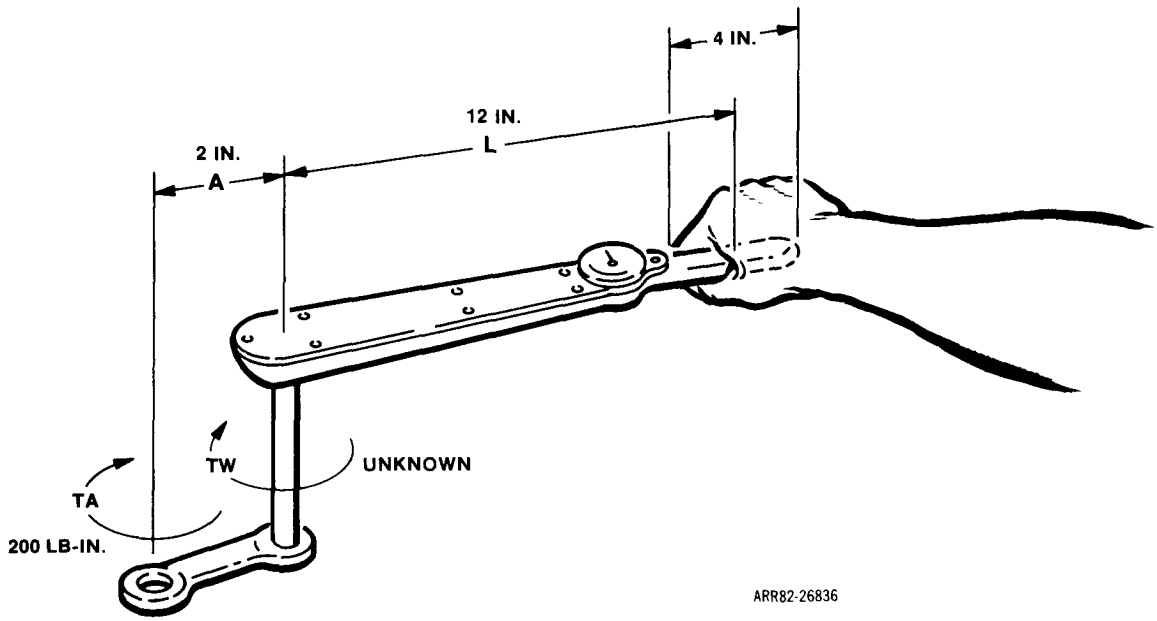
FASTENER IS TORQUED TO 200 LB-IN. WHEN TORQUE WRENCH INDICATES 174.5 LB-IN.

The point of force on the torque wrench must also be considered as follows:

1. The point of force applied on a flexible beam-type torque wrench pivoted grip will not affect the calculated torque applied to the fastener.

2. The point of force applied on rigid frame and audible indicating torque wrench grips will affect the calculated torque applied to the fastener. The effects of proper and improper application of force is shown in examples 4 through 6.

EXAMPLE 4–PROPER APPLICATION OF FORCE



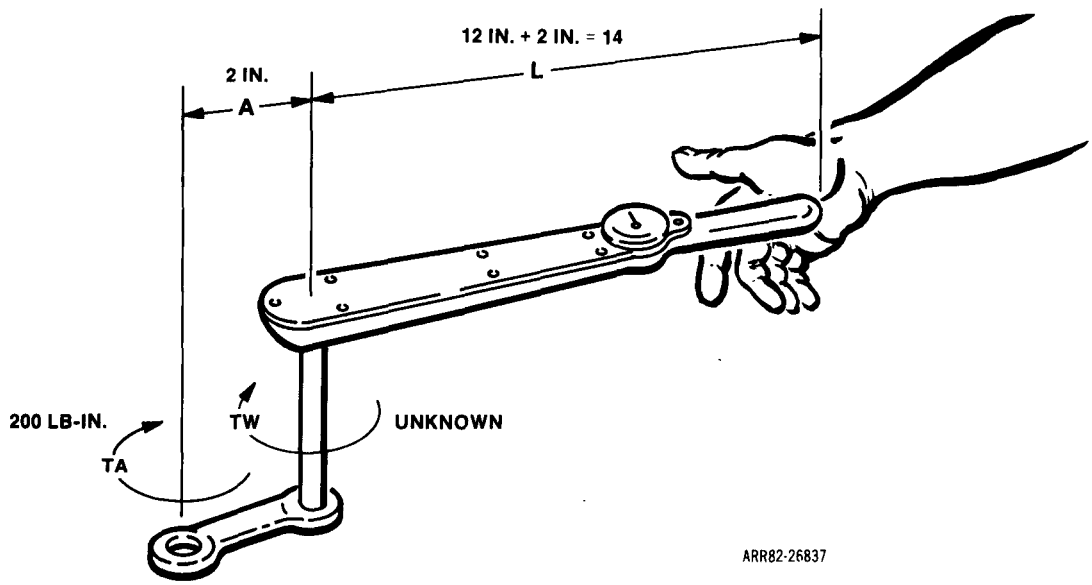
T w = Indicated torque value on torque wrench
TA = Actual torque value applied to fastener
L = Lever length
A = Attachment length

$$T_w = \frac{TA \times L}{L + A} = \frac{200 \times 12}{12+2} = \frac{2400}{14} = 171.4 \text{ Lb-In}$$

FASTENER IS TORQUED TO 200 LB-IN. WHEN TORQUE WRENCH INDICATES 171.4 LB-IN.

APPENDIX D - TORQUE LIMITS (cont)

EXAMPLE 5—IMPROPER APPLICATION OF FORCE



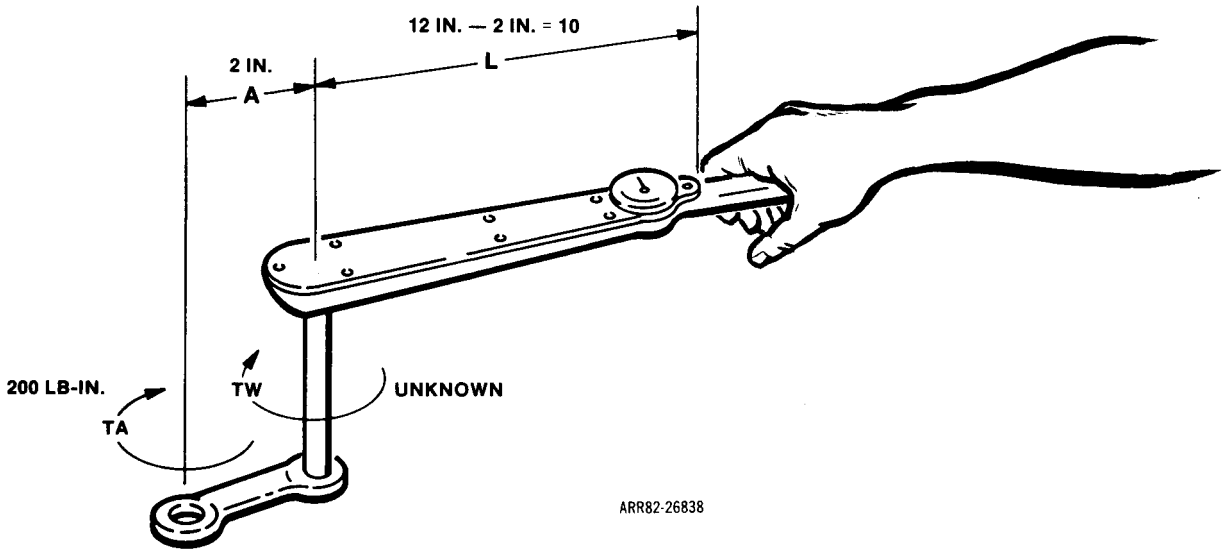
TW = Indicated torque value on torque wrench
TA = Actual torque value applied to fastener
L = Lever length
A = Attachment length

$$TW = \frac{TA \times L}{L + A}$$

$$Tw = \frac{200 \times (12 + 2)}{(12 + 2) + 2} = \frac{2800}{16} = 175 \text{ Lb-In.}$$

FASTENER IS TORQUED TO 200 LB-IN. WHEN TORQUE WRENCH INDICATES 174.5 LB-IN.

EXAMPLE 6



TW = Indicated torque value on torque wrench
TA = Actual torque value applied to fastener
L = Lever length
A = Attachment length

$$TW = \frac{TA \times L}{L + A}$$

$$TW = \frac{200 \times (12 - 2)}{(12 - 2) + 2} = \frac{2000}{12} = 166.6 \text{ Lb-In.}$$

FASTENER IS TORQUED TO 200 LB-IN. WHEN TORQUE WRENCH INDICATES 166.6 LB-IN.

GLOSSARY

AADS	Airspeed and Direction Sensor
ACQ	Acquisition
ADS	Air Data Subsystem
ALT	Airborne Laser Tracker
AP	Articulated Pylon
ATS	Acquisition/Track/Stow (Switch on SHC)
ATTK	Attack (Flag in PSI, Light in TSU)
AZ	Azimuth
BAGSE	Boresight Assembly Ground Support Equipment
BIT	Built-In-Test
BITE	Built-In-Test Equipment
BKC	Boresight Kit Case
BL	Buttline (Fuselage Lateral Lines from Center Line)
CCA	Circuit Card Assembly
CCW	Counterclockwise
CW	Clockwise
DNS	Doppler Navigation System
EIA	Electronic Interface Assembly (HSS)
EL	Elevation
EPS	Electronic Power Supply (TMS)
EPU	Electronic Processing Unit
ESCU	Emergency Stow Control Unit
FCC	Fire Control Computer
FCS	Fire Control System
FCSTS	Fire Control Subsystem Test Set (HSS)
FFAR	Folding Fin Aerial Rocket
FISS	Failure Isolation Shop Set
FOV	Field-of-View
FS	Fuselage Station (Fuselage Longitudinal Lines)
FRL	Fuselage Reference Line
FRP	Fuselage Reference Plane
GACP	Gunners Armament Control Panel (UTS)
GAZAP	Gunners Accuracy Control Panel (Used with TMS)
GCU	Gun Control Unit
GHS	Gunner Helmet Sight (HSS)
HSS	Helmet Sight Subsystem
HUD	Head Up Display
IFCU	Interface Control Unit
IR	In fared
I_t	Resolver Error Signal Cos Az Cos El
J_t	Resolver Error Signal Sin Az Cos El
K_t	Resolver Error Signal Sin El
LAI	Low Airspeed Indicator
LASER	Light Amplification by Stimulated Emission of Radiation
LCU	Logic Control Unit
LHG	Left Hand Grip

LOD	Linkage Orientation Device
LOS	Line-of-Sight
LRF	Laser Range Finder
LRU	Line Replaceable Unit
MAG	Magnification (TMS)
PACP	Pilot Armament Control Panel (UTS)
PFS	Pilot Fixed Sight
RMS	Rocket Management Subsystem
SCAS	Stability and Control Augmentation System
SHC	Sight Hand Control
SRU	Shop Replaceable Unit
TBA	Turret Buffer Amplifier
TCP	TOW Control Panel (TMS)
TCU	Turret Control Unit (UTS)
TML	TOW Missile Launcher
TMS	TOW Missile System
TOW	Tube-Launched, Optically Tracked, Wire-Guided Command Link Missile.
TSEM	TOW System Evaluator Missile (Part of TSGMS)
TSGMLACA	Test Set, Guided Missile Launcher Alinement-Circuit Amplitude
TSGMS	Test Set, Guided Missile System (Formerly TASTS)
TSU	Telescopic Sight Unit
UTS	Universal Turret Subsystem
UUT	Unit Under Test
V_S	Velocity Jump Correction Voltage
WL	Waterline (Fuselage Vertical Lines)
WS	Wing Station (Wing Lateral Lines)

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PAGE NO.	PARAGRAPH	FIGURE NO.	TABLE NO.	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
3		2		Item 10. Change illustration. Reason: Tube end shown assembled on wrong side of lever cam.
109		51		Item 3. The NSN and P/N are not listed on the AMDF nor the MCRL. Request correct NSN and P/N be furnished.
2-8			2-1	Preventive Maintenance Checks and Services. Item 7 under "Items to be inspected" should be changed to read as follows: Firing linkage and firing mechanism pawl.
12	1-6a			Since there are both 20- and 30- round magazines for this rifle, data on both should be listed.

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THE METRIC SYSTEM AND EQUIVALENTS

'NEAR MEASURE

. Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

'VEIGHTS

Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 lb.
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches
1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

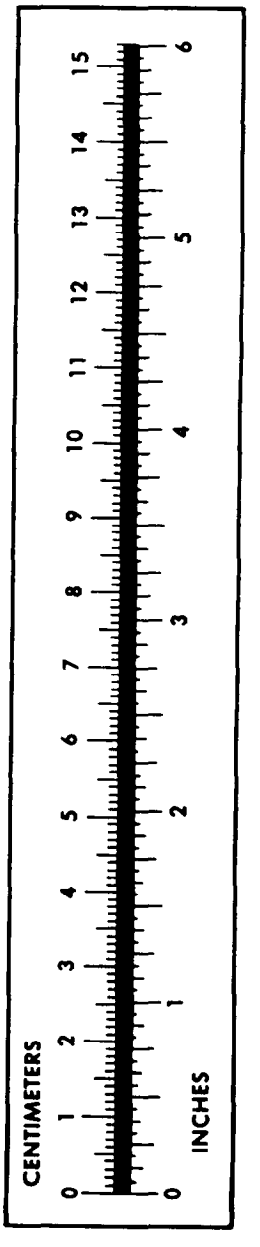
TEMPERATURE

5/9(°F - 32) = °C
212° Fahrenheit is evuivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5C° + 32 =°F

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
ıts	Liters	0.473
arts	Liters	0.946
allons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
ers	Gallons	0.264
ms	Ounces	0.035
ograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pounds-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
lometers per Liter	Miles per Gallon	2.354
meters per Hour	Miles per Hour	0.621



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