

DEPARTMENT OF THE ARMY
TECHNICAL MANUAL

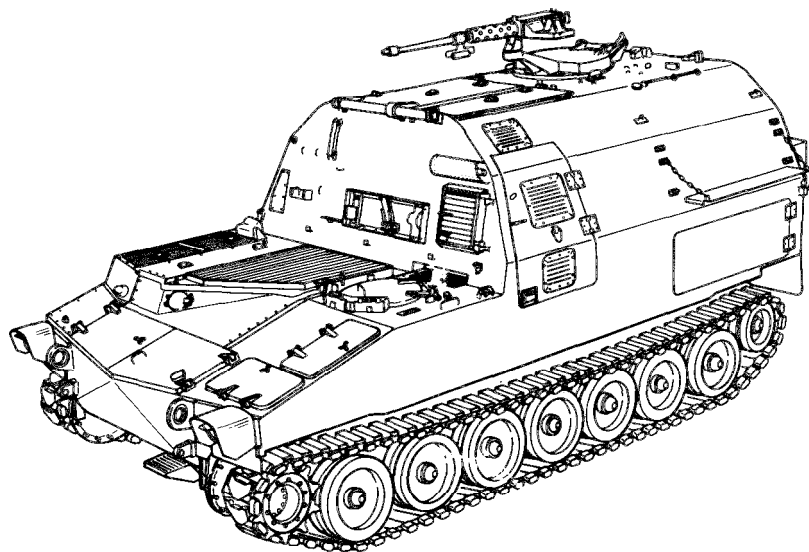
TM 9-2350-267-34

DIRECT SUPPORT AND GENERAL SUPPORT
MAINTENANCE MANUAL

FOR

HULL, POWERPACK, DRIVE CONTROLS,
TRACKS, SUSPENSION AND
ASSOCIATED COMPONENTS

CARRIER, AMMUNITION, TRACKED



M992

(NSN 2350-01-110-4660)

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OCTOBER 1985

TA309655

WARNING**CARBON MONOXIDE POISONING IS DEADLY**

Carbon monoxide is a colorless, odorless, deadly poisonous gas, which, when breathed, deprives the body of oxygen and causes suffocation. Exposure to air contaminated with carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, apparent drowsiness, coma, permanent brain damage or death can result from severe exposure.

It occurs in the exhaust fumes of fuel-burning heaters and internal-combustion engines and becomes dangerously concentrated under conditions of inadequate ventilation. The following precautions must be observed to ensure the safety of personnel whenever the personnel heater, main, or auxiliary engine of any vehicle is operated for maintenance purposes or tactical use.

- 1 Do not operate heater, engine or vehicle in an enclosed area unless it is adequately ventilated.
- 2 Do not idle engine for long periods without maintaining adequate ventilation in personnel compartments.
- 3 Do not drive any vehicle with inspection plates, cover plates, or engine compartment doors removed unless necessary for maintenance purposes.
- 4 Be alert at all times during vehicle operation for exhaust odors and exposure symptoms. If either are present, immediately ventilate personnel compartments. If symptoms persist, remove affected personnel from vehicle and treat as follows:
 - Expose to fresh air
 - Keep warm
 - Do not permit physical exercise
 - If necessary, administer artificial respiration, FM 21-11.

**THE BEST DEFENSE AGAINST CARBON MONOXIDE
POISONING IS ADEQUATE VENTILATION.**

WARNING

Serious injury may occur at any time. Read FM 21-11 for information on first aid before accident happens.

CHANGE
No. 4

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D. C., 27 July 1994

**Direct Support and General Support Maintenance
Maintenance Manual
for
CARRIER, AMMUNITION, TRACKED
M992
(NSN 2350-01-110-4660)**

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Approved for public release; distribution unlimited

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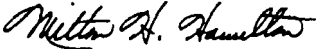
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By Order of the Secretary of the Army:

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Administrative Assistant to the
Secretary of the Army
07087

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

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To be distribution in accordance with DA Form 12-37-E (Block 1216) requirements for TM9-2350-267-34.

TM 9-2350-267-34
C3

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HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 1 November 1988

Direct Support and General Support Maintenance
Maintenance Manual
for

HULL, POWERPACK, DRIVE CONTROLS,
TRACKS, SUSPENSION AND
ASSOCIATED COMPONENTS

CARRIER, AMMUNITION, TRACKED
M992
(NSN 2350-01-110-4660)

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26 Oct 88
[Signature]
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WILLIAM J. MEEHAN II
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The Adjutant General

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

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To be distributed in accordance with DA Form 12-37R, Direct Support and General Support Maintenance Requirements for Carrier, Cargo, FA Ammunition Support Vehicle, M992 (FAASV).

CHANGE
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HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 25 March 1988

Direct Support and General Support Maintenance
Maintenance Manual
For
CARRIER, AMMUNITION, TRACKED
M992
(NSN 2350-01-110-4660)

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- ✓ 7-29 and 7-30
- ✓ 12-1 and 12-2
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- ✓ D-3 and D-4
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Insert Pages

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- ✓ B-7 thru B-9
- ✓ D-3 and D-4
- ✓ E-1 and E-2
- ✓ Index-1 thru Index-4

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Edith D. [unclear]*

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The Adjutant General

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General, United States Army
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HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D.C., 21 July 1987

CHANGE
No. 1

**Direct Support and General Support
Maintenance Manual
For
CARRIER, AMMUNITION, TRACKED
M992
(NSN 2350-01-110-4660)**

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- Insert Pages*
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FP-1 thru FP-18

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The Adjutant General

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General, United States Army
Chief of Staff

Distribution:

To be distributed in accordance with DA Form 12-37R, Direct Support and General Support
Maintenance requirement for Carrier, Ammunition, Tracked: M992.

WARNING

Ammunition containing explosives must be handled with care at all times. The explosive in primers and fuzes is very sensitive to shock and high temperature. If ammunition is dropped, thrown, tumbled, or dragged, an explosion may result, causing death or injury and destruction of equipment. Disassembly of ammunition is not authorized.

WARNING

High pressure hydraulic fluid is used to operate equipment. Serious injury may result when high pressure fluid comes in contact with human skin. Shut off all hydraulic system components before performing any maintenance.

WARNING

Compressed air used for cleaning purposes will not exceed 30 psi. Use only with effective chip guarding and personal protective equipment (such as goggles or shield, and gloves).

WARNING

Serious injury may result from electrical burns. Before working on electrical equipment, harnesses and battery cables, turn OFF MASTER switch and disconnect battery ground cables.

WARNING

Dry-cleaning solvent (PD-680) is toxic and flammable. To prevent personal injury when using PD-680, use only in a well-ventilated area. Avoid breathing vapors. If you become dizzy, get fresh air immediately and seek medical attention. Avoid contact with eyes, skin and clothing. Use protective goggles, gloves, and clothing. If contact is made, immediately flush with water and seek medical attention. The flashpoint for Type I dry-cleaning solvent is 100°F (38°C); for Type II, it is 138°F (50°C). Do not use near open flame or excessive heat.

WARNING

A protective fan screen must be installed prior to performing any maintenance in the engine compartment when engine is running. The screen is also needed if engine is running in ground hop mode. Contact with rotating fans can cause serious personal injury.

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL

FOR

CARRIER, AMMUNITION, TRACKED

M992

(NSN 2350-01-110-4660)

REPORTING OF ERRORS

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 or DA Form 2028-2 directly to Commander, U.S. Army Tank-Automotive Command, ATTN: AMSTA-MBC, Warren, MI 48397-5000. A reply will be furnished to you.

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HOW TO USE THIS MANUAL

GENERAL

This manual contains direct and general support maintenance procedures for the M992.

Chapter 1 contains general information.

Chapter 2 contains the following:

- Special tools list
- Troubleshooting procedures
- General maintenance procedures

Chapters 3 through 12 contain instructions for repair of direct and general support components.

IMPORTANT

Read, and be sure you understand the entire maintenance procedure before beginning any maintenance task.

Also, read the general information in Chapter 1 (p 1-1) and the general maintenance procedures (p 2-16).

SAMPLE PROBLEM

How do I repair the suspension system?

A Look at the index (p Index-4) for ROADWHEEL ARM ASSEMBLY-UPPER SPINDLE.

B Turn to the page listed (p 7-15) and follow the repair instructions.

The engine vibrates excessively. How do I find what is wrong?

A Turn to the quick guide to troubleshooting (p 2-3). Find the name of the item that doesn't work (ENGINE).

B Find the problem with the item (VIBRATES EXCESSIVELY).

C Turn to the page referenced for troubleshooting (p 2-5).

D Follow the troubleshooting steps until you find what is wrong (DAMAGED VIBRATION DAMPER).

E Turn to the page referenced for repair of the damaged component or follow the instructions.

CHAPTER 1 INTRODUCTION

CHAPTER OVERVIEW

This chapter provides the mechanic with basic information on the M992. It contains a physical description of the major components which the technician is required to maintain, service, inspect and replace or repair.

Reference and guidance information is provided on the use of forms, maintenance of records and filing of reports (p 1-2).

This chapter consists of the following sections:

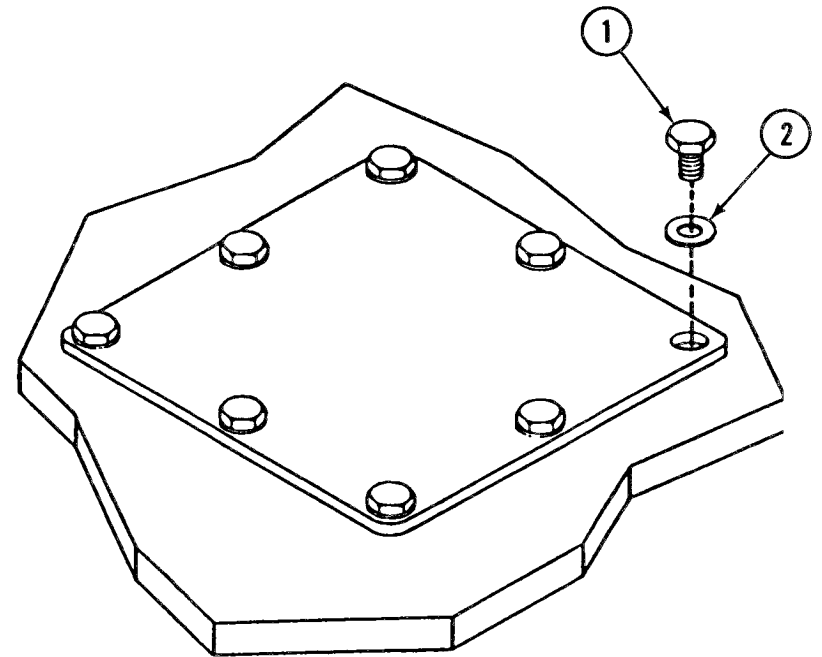
Section I General Information

Section II Description and data

Section I GENERAL INFORMATION

SCOPE

- A This technical manual has instructions for Direct/General Support Maintenance of the Carrier, Ammunition, Tracked M992.
- B Steps in which maintenance procedures are to be performed are indicated by letters: step A is performed before step B, and B before C. Step AA follows step Z.
- C Text and illustrations use numbers to help you identify parts. Example: to tell how to remove the screws and washers in the picture to the right, your instructions would be:
 - Remove eight screws (1) and eight washers (2).
- D Dotted lines on illustrations indicate where parts are located.



APPENDIX A is a list of current references, including supply manuals, forms and other applicable publications.

APPENDIX B lists the Expendable Supplies and Materials required to support the M992 maintenance functions.

APPENDIX C lists the torque limits for the M992.

APPENDIX D lists the common tools and supplements and special tools/fixtures for the M992 maintenance functions.

APPENDIX E is an illustrated list of manufactured items for the M992. It includes complete instructions for making items authorized to be manufactured or fabricated at direct and general support maintenance.

MAINTENANCE FORMS, RECORDS AND REPORTS

Refer to DA Pam 738-750, The Army Maintenance Management System, for the listing of authorized Department of the Army forms and for instructions on how to use these forms.

Accidents involving injury to personnel or damage to materiel will be reported on DA Form 285 (Accident Report) in accordance with AR 385-40.

Explosive ammunition malfunctions will be reported in accordance with AR 75-1.

METRIC TOOLS

The M992 vehicle described in this manual is non-metric; metric tools are not required.

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR's)

EIRs must be submitted by anyone who is aware of unsatisfactory equipment design or operation. It is not necessary to show a new design or list a better way to perform a procedure. Tell why the procedure is unfavorable or difficult. EIR's will be submitted on Standard Form 368. Mail directly to Commander, U.S. Army Tank-Automotive Command, ATTN: AMSTA-Q, Warren, MI 48090.

NOTE

When equipment failure occurs that is not caused by normal wear, poor operation, or accident, you must submit an Equipment Improvement Recommendation.

ADMINISTRATIVE STORAGE

Basic requirements for administrative storage are covered in TM 740-90-1.

DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

Refer to TM 750-244-6 for procedures on how to destroy the M992.

Section II EQUIPMENT DESCRIPTION AND DATA

DESCRIPTION

The description of the M992 and major components is contained in TM 9-2350-267-10 and TM 9-2350-267-20.

DATA

Data relative to the M992 equipment and configuration are contained in TM 9-2350-267-20.

CHAPTER 2

DIRECT SUPPORT AND GENERAL SUPPORT INTEGRATED MAINTENANCE

CHAPTER OVERVIEW

This chapter contains procedures and guidance for performing maintenance functions. References are also provided for maintenance procedures not within the scope of this manual (eg, welding).

This chapter consists of the following sections:

Section I Repair Parts, Special Tools, TMDE and Support Equipment
Section II Troubleshooting
Section III General Maintenance

Section I REPAIR PARTS, SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT

COMMON TOOLS AND EQUIPMENT

Standard and commonly used tools and equipment having general application to hull items are authorized by Tables of Allowances (TA) and Tables of Organization and Equipment (TOE).

SPECIAL TOOLS AND SUPPORT EQUIPMENT

The special tools and equipment listed and illustrated in TM 9-2350-267-34P are the only special tools and equipment necessary to perform maintenance operations described in this manual. TM 9-2350-267-34P is the authority for requisitioning special tools and equipment for supporting maintenance use.

REPAIR PARTS

Repair parts are listed and illustrated in the Repair Parts and Special Tools List (RPSTL) covering direct support and general support maintenance for this equipment (TM 9-2350-267-34P).

FABRICATED TOOLS

NOTE

Fabricated tools are not available for issue.

The fabricated tools listed in this manual are of particular value to shops engaged in repairing a number of identical components. The tools are listed in this manual to allow supporting maintenance shops to fabricate them locally.

Section II TROUBLESHOOTING

GENERAL INSTRUCTIONS

NOTE

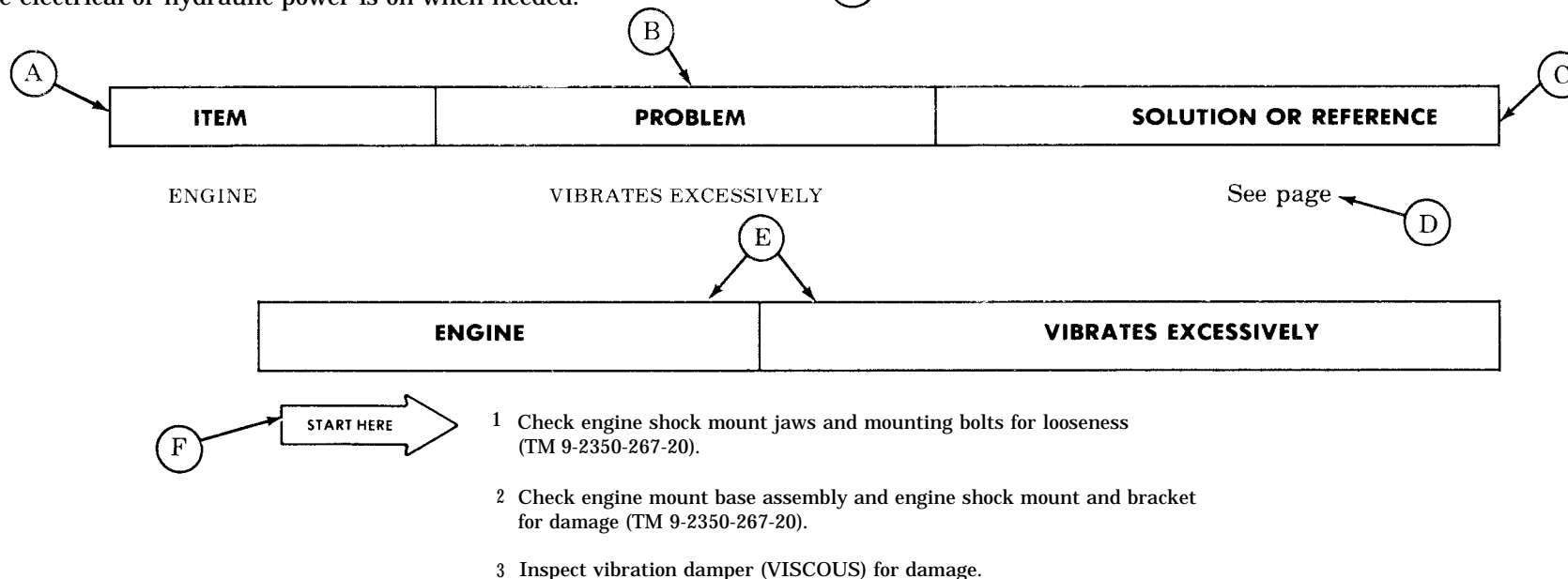
This manual does not cover crew or organizational maintenance. Refer to TM 9-2350-267-10 and TM 9-2350-267-20 if necessary.

This section contains troubleshooting and test and repair information for the M992 hull systems and components.

Before starting troubleshooting procedures make sure the problem is real. Perform basic system tests as listed in TM 9-2350-267-20. Make sure electrical or hydraulic power is on when needed.

Use the Quick Guide to Troubleshooting (p 2-3) and the troubleshooting chart (p 2-5) by following the instructions below:

- (A) Find the name of the item that doesn't work (eg ENGINE).
- (B) Find the problem with the item (eg VIBRATES EXCESSIVELY).
- (C) Find the solution to the problem.
- (D) Turn to the referenced TM or page.
- (E) Recheck the item and problem.
- (F) Follow the steps to fix the item.



QUICK GUIDE TO TROUBLESHOOTING

ITEM	PROBLEM	SOLUTION OR REFERENCE
ENGINE	VIBRATES EXCESSIVELY	See page 2-5
	BLACK EXHAUST	Refer to TM 9-2815-202-34
	WHITE EXHAUST	Refer to TM 9-2815-202-34
	USES TOO MUCH OIL	Refer to TM 9-2815-202-34
	HAS LOW OR NO OIL PRESSURE	Refer to TM 9-2815-202-34
TRANSMISSION	VIBRATES EXCESSIVELY	See page 2-5
	OVERHEATS	See page 2-6 and TM 9-2520-234-35
	VEHICLE DOESN'T DRIVE	Refer to TM 9-2520-234-35
	VEHICLE STEERS EASILY IN ONE DIRECTION ONLY	Refer to TM 9-2520-234-35
AIR CLEANER DUST BLOWER MOTORS	DO NOT OPERATE	see pag 2-6
	ENGINE LOSES POWER	See page 2-7
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QUICK GUIDE TO TROUBLESHOOTING (CONTINUED)

ITEM	PROBLEM	SOLUTION OR REFERENCE
COOLING SYSTEM	ENGINE OVERHEATS	See page 2-8
	ENGINE COOLING FANS DON'T OPERATE WHEN ENGINE IS RUNNING	See page 2-8
ELECTRICAL SYSTEM	ELECTRICAL COMPONENTS INOPERATIVE	See pages 2-9 through 2-11
FINAL DRIVE ASSEMBLY	EXCESSIVE OIL LEAKAGE AROUND FINAL DRIVE	See page 2-14
	DOESN'T TURN FREELY	See page 2-12
	DRIVE SPROCKETS DO NOT TURN WHEN POWER IS APPLIED TO FINAL DRIVE	See page 2-12
SUSPENSION SYSTEM	OIL LEAKS FROM UPPER SPINDLE HOUSING	See page 2-13
	SPINDLE HOUSING OVERHEATS	See page 2-13
BILGE PUMP	PUMP DOESN'T OPERATE WHEN MASTER AND BILGE PUMP SWITCHES ARE IN THE ON POSITION	See page 2-14
	PUMP OPERATES BUT DOES NOT PUMP SUFFICIENT WATER	See page 2-15
PERSONNEL HEATER	WILL NOT IGNITE/IMPROPER OPERATION	See page 2-15

ENGINE

VIBRATES EXCESSIVELY

START HERE 

- 1 Inspect vibration damper (viscous) for damage.
- 2 Inspect mass ring and coupler for damage.
Repair or replace broken components as required.
- 3 If problem still exists, refer to TM 9-2815-202-34.

TRANSMISSION	OVERHEATS
---------------------	------------------



START HERE

Check oil cooler core (TM 9-2520-234-35). Repair or replace oil cooler core.

AIR CLEANER DUST BLOWER MOTORS	DO NOT OPERATE
---------------------------------------	-----------------------



START HERE

1 Repair blower motor (p 4-30).

2 Check impeller housing for clogging (p 4-30).

WARNING

Use low pressure air and wear approved eye protection.
--

3 Check for damaged impeller (p 4-31).

Replace impeller if damaged.

AIR CLEANER DUST BLOWER MOTORS	ENGINE LOSES POWER
---------------------------------------	---------------------------



- 1 Check impeller housing outlet for blockage (p 4-30).

WARNING

Use low pressure air and wear approved eye protection.
Clean housing outlet and chamber.

- 2 Inspect for weak or damaged impeller (p 4-31).
Replace impeller as required.

FUEL SYSTEM	FUEL LEAKAGE IN ENGINE COMPARTMENT
--------------------	---



- Inspect fuel tanks for damage, deterioration or cracks (p 4-10).
Repair or replace fuel tanks as appropriate (p 4-10 and 4-20.1).

FLAME HEATER	MOTOR AND PUMP ASSEMBLY DOESN'T OPERATE
---------------------	--



- 1 Repair or replace motor and pump assembly as appropriate (TM 9-2815-202-34).
- 2 Replace ignition unit (coil) (TM 9-2815-202-34).

FLAME HEATER

INSUFFICIENT OR NO FUEL FLOW THROUGH THE FLAME HEATER
SOLENOID-OPERATED VALVESTART HERE

- 1 Repair or replace solenoid appropriate (TM 9-2350-267-20).
- 2 Troubleshoot fuel-return system (TM 9-2815-202-34).

COOLING SYSTEM

ENGINE OVERHEATS

START HERE

- 1 Repair radiator as appropriate (refer to FM 43-2).
- 2 Repair defective coolant pump (TM 9-2815-202-34).

COOLING SYSTEM

ENGINE COOLING FANS DON'T OPERATE WHEN ENGINE IS
RUNNINGSTART HERE

- 1 Check for broken, damaged, or defective fan drive assembly.
- 2 Replace defective parts as necessary (p 5-3).

ELECTRICAL SYSTEM

ELECTRICAL COMPONENTS INOPERATIVE

START HERE

NOTE

Refer to TM 9-4910-571-12P, DA Pam 750-33 and TM 9-6140-200-14 when troubleshooting electrical system.

1 DEFECTIVE GENERATOR.

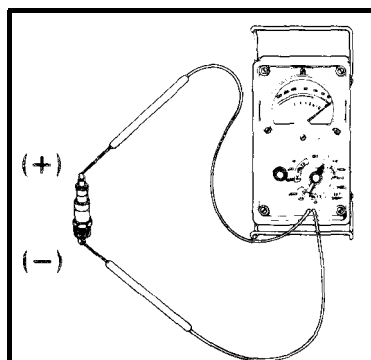
Repair or replace generator (TM 9-2920-225-34).

2 DEFECTIVE MASTER RELAY

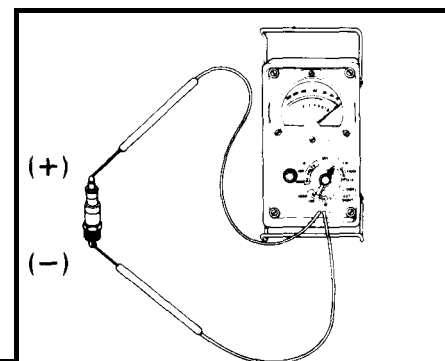
Replace master relay (TM 9-2350-267-20).

3 DEFECTIVE RECTIFIER

A Testing diodes



A Place red lead of multimeter on positive terminal of diode and black lead of multimeter on negative terminal of diode. Multimeter reading should be 3 (Ω) ohms. If reading is 3 (Ω) ohms, go to step B. If not, diode is defective. Replace.



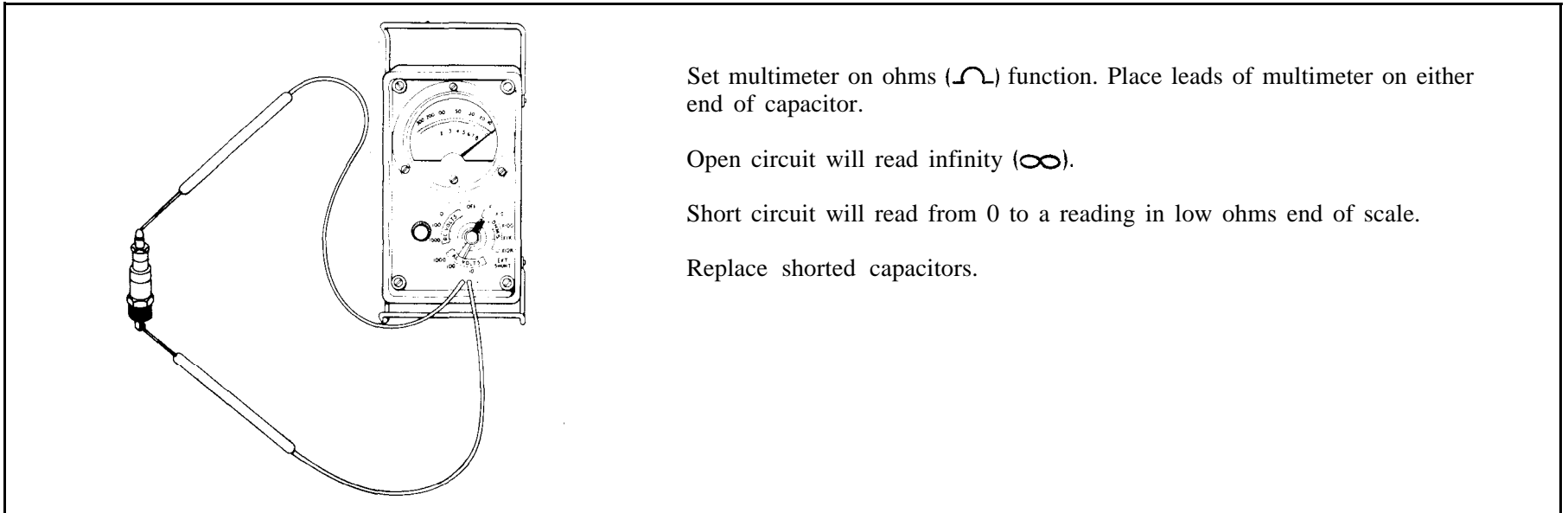
B Place red lead of multimeter on negative terminal of diode and black lead of multimeter on positive terminal of diode. Multimeter should read infinity (∞). If reading is not infinity (∞), diode is defective. Replace.

B Testing capacitors

- 1 Test capacitor using a capacitor bridge, a multimeter with a built-in capacitance test function or bench test with oscilloscope, as appropriate, and as test equipment is available.
- 2 If capacitance test equipment is not available, test capacitors for shorts.

NOTE

Testing capacitors for shorts does not indicate if the capacitor is operating within design limits.



Set multimeter on ohms (Ω) function. Place leads of multimeter on either end of capacitor.

Open circuit will read infinity (∞).

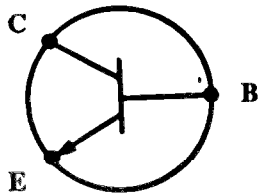
Short circuit will read from 0 to a reading in low ohms end of scale.

Replace shorted capacitors.

4 DEFECTIVE VOLTAGE REGULATOR

Testing transistors

NPN TRANSISTOR (SCHEMATIC)



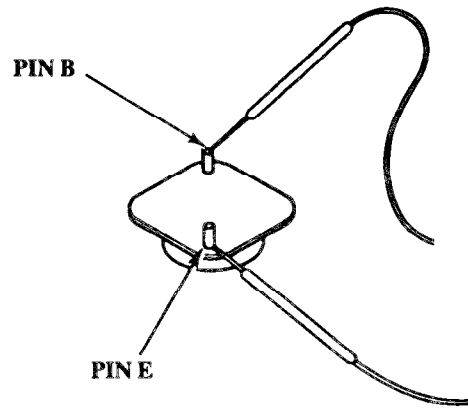
B = BASE

E = EMITTER

C = COLLECTOR

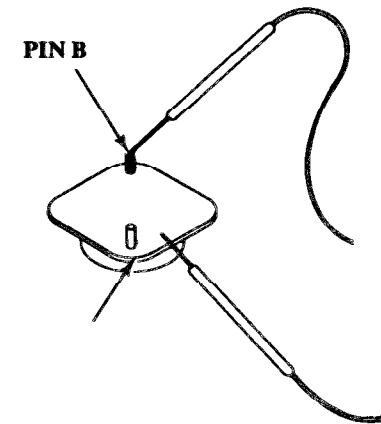
NOTE

Case of transistor is collector



A Place red lead of multimeter on Pin B and black lead on Pin E. Multimeter should read low resistance.

B Place black lead on Pin B and red lead on Pin E. Multimeter should read high resistance. If either A or B readings are not as specified transistor is faulty. Replace.



C Place red lead of multimeter on Pin B and black lead to case (C). Multimeter should read low resistance.

D Place red lead on case (C) and black lead on Pin B. Multimeter should read high resistance. If either C or D readings are not as specified, transistor is faulty. Replace.

FINAL DRIVE ASSEMBLY	DOESN'T TURN FREELY
-----------------------------	----------------------------



Disassemble final drive (p 7-7).

Inspect for worn or seized bearings (p 7-11). Replace bearings as required. (Refer to TM 9-214 for inspection and care of bearings.)

FINAL DRIVE ASSEMBLY	DRIVE SPROCKETS DO NOT TURN WHEN POWER IS APPLIED TO FINAL DRIVE
-----------------------------	---



Disassemble final drive (p. 7-7).

Inspect for stripped splines and for stripped or seized gears.

Repair or replace the final drive as appropriate.

SUSPENSION SYSTEM	OIL LEAKS FROM UPPER SPINDLE HOUSING
--------------------------	---



Disassemble upper spindle housing (p 7-16).

Inspect for defective inner and outer seals. Replace seals as required.

SUSPENSION SYSTEM	SPINDLE HOUSING OVERHEATS
--------------------------	----------------------------------



1. Disassemble upper spindle housing (p 7-15).

Inspect for seized bearings or spacers. Replace as required (p 7-16). Inspect for proper adjustment. Adjust as required (p 7-16).

FINAL DRIVE ASSEMBLY**EXCESSIVE OIL LEAKAGE AROUND FINAL DRIVE****START HERE**

Disassemble final drive and inspect for defective seals and gaskets (p 7-7).

Replace faulty seals and gaskets.

BILGE PUMP**PUMP DOESN'T OPERATE WHEN MASTER AND BILGE PUMP SWITCHES ARE IN THE ON POSITION****START HERE**

Disassemble bilge pump (p 9-1).

Replace worn or pitted brushes.

Test field coil and rotor assembly for short.

Repair bilge pump if short exists.

BILGE PUMP	PUMP OPERATES BUT DOES NOT PUMP SUFFICIENT WATER
-------------------	---



Check for bent or damaged impeller (p 9-3).
Repair or replace impeller as required.

PERSONNEL HEATER	WILL NOT IGNITE/IMPROPER OPERATION
-------------------------	---



NOTE

Refer to TM 9-2540-205-24&P for personnel heater troubleshooting.

Section III GENERAL MAINTENANCE**REPAIR METHODS**

- A Complete disassembly is not always necessary to make a repair. Exercise good judgement to keep disassembly and assembly to a minimum.
- B Repair or replace unserviceable parts and hardware. Always replace packings, gaskets, seals, lockwashers, locknuts, locking wire, rivets and cotter pins with new parts.
- C Remove burrs with a stone or file. Remove burrs on closely fitted mating surfaces by lapping the surfaces with abrasive-grade compound.
- D Remove corrosion or rust with sandblasting, vapor-blast cleaning, or crocus cloth. Use the method that will not damage the surface being cleaned. Crocus cloth should be used to remove corrosion and rust from polished surfaces. Make sure that critical dimensions are not changed when using crocus cloth.
- E Repair damaged threads with a thread restorer file by chasing in a lathe or using a tap or die. Replace defective threaded inserts. See page 2-17 for procedure.
- F When welding is authorized, procedure in TM 9-237 must be followed. Welds must be inspected for cracks.
- G Bearings should be inspected and maintained per TM 9-214.

Dry-cleaning solvent (PD-680) is toxic and flammable. To prevent personal injury when using PD-680, use only in a well ventilated area. Avoid breathing vapors. If you become dizzy get fresh air immediately and seek medical attention. Avoid contact with eyes, skin, and clothing. Use protective goggles, gloves, and clothing. If contact is made, immediately flush with water and seek medical attention. The flashpoint for Type I dry-cleaning solvent is 100°F (38°C); for Type II it is 138°F (50°C). Do not use near open flame or excessive heat.

TORQUE VALUES

Torque values given in these procedures apply to unlubricated threads. Follow torque values given throughout this manual. When no torque value is given, follow the Torque Value Guide (Appendix C) to prevent damaging parts.

E Apply appropriate shade of CARC paint (items 62 and 63, Appx B) to exterior of vehicle.

F Apply deck-covering compound (item 55, Appx B) to areas where personnel walk, such as front deck plates and crew-compartment interiors.

LUBRICATION

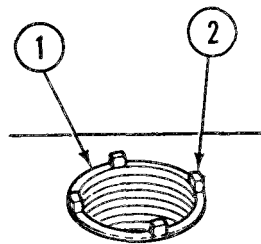
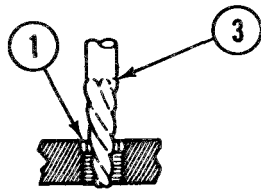
Apply a light coat of lubricating oil (item 32, Appx B) to parts during repair procedures to prevent rusting. Lubricate parts during repair and assembly as required by LO 9-2350-267-12.

THREADED INSERTS: REMOVAL AND INSTALLATION

INITIAL SETUP

Test Equipment/Special Tools:

Are welding machine (item 2, Appx D)
Extractor set (item 9, Appx D)
Gas shielded torch (item 12, Appx D)
Portable electrical drill (item 8, Appx D)
Threading setscrew (item 21, Appx D)
Twist drill set (item 23, Appx D)



REMOVAL

A Remove insert (1) using a 1/16-inch drill bit and a 1/4-inch drill, drill out four insert locking lugs (2) of insert (1).

B Using an appropriate size screw extractor (3) on a 10-inch adjustable wrench, back out insert (1).

NOTE

If necessary, repeat step A with a slightly larger drill bit size and then repeat step B to remove insert (1).

INSTALLATION

A Weld four holes that were drilled to release locking lugs (2).

B Grind or file weld areas smooth.

C Using appropriate size tap and tap holder, retap insert hole.

D Brush off any metal shavings in and around insert hole.

E Screw in new insert (1) flush.

F Using a ball-peen hammer, tap in locking lugs (2). Break off excess tips and file off any excess protruding metal.

G Insert insert (1) by screwing in appropriate screw and removing it. Operation should be smooth.

SPLINED NUT: REMOVAL AND INSTALLATION**INITIAL SETUP**Tools/Test Equipment:

General mechanic's tool kit

References:

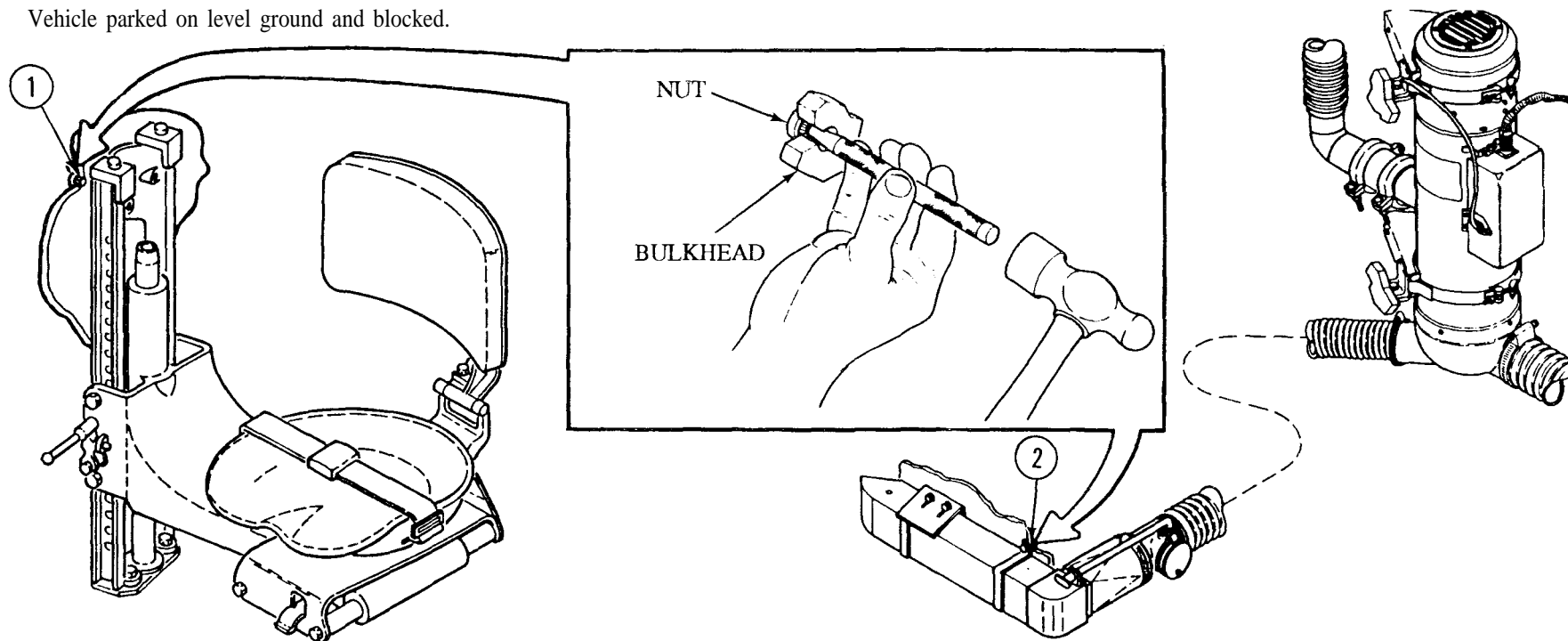
TM 9-2350-267-20

Equipment Condition:

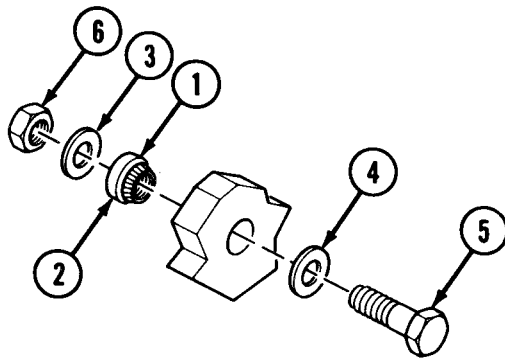
Vehicle parked on level ground and blocked.

REMOVAL

- A Remove powerpack (TM 9-2350-267-20).
- B Remove driver's seat (for nut 1) (TM 9-2350-267-20). Remove driver's heating duct (for nut 2) (TM 9-2350-267-20).
- C Remove driver's side bulkhead shield and insulation (p 14-13).
- D From driver's compartment, use suitable hammer and punch to drive insert (1 or 2) from bulkhead into engine compartment.



SPLINED NUT: REMOVAL AND INSTALLATION (CONTINUED)



INSTALLATION

- A Position new nut (1 or 2) against engine side of hole. Position large steel flat washer (3) against nut (1 or 2).
- B Have assistant position large steel flat washer (4) and screw (5) from driver's side of bulkhead.

NOTE

Screw (5) and nut (6) for nut (1) must be 3/8-20.
For nut (2), screw and nut must be 3/16-28.

- C Install nut (6) on screw (5). Have assistant hold screw (5). Tighten nut (6) to drive nut into fully nested position.
- D Remove nut (6), screw (5) and washers (3 and 4).
- E Make sure nut (1 or 2) is fully seated.
- F Inspect nut (1 or 2) by screwing in appropriate screw and removing it. Operation should be smooth.
- G Install driver's side bulkhead shield and insulation (p 14-13).
- H Install driver's seat (for nut 1) (TM 9-2350-267-20). Install driver's heating duct (for nut 2) (TM 9-2350-267-20).
- I Install powerpack (TM 9-2350-267-20).

CHAPTER 3 POWERPACK MAINTENANCE PROCEDURES

CHAPTER OVERVIEW

This chapter illustrates and describes procedures for:

Section I Engine Shipping and Storage Containers

Section II Engine and Transmission Separation and Assembly

Section III Engine Accessories Removal and Installation

Section IV Test and Adjustment

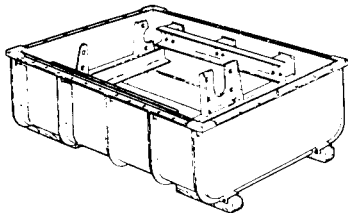
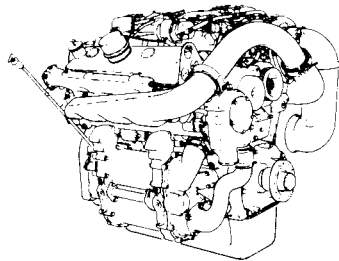
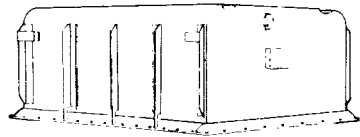
ENGINE REPAIR

Refer to TM 9-2815-202-34&P for repair of engine.

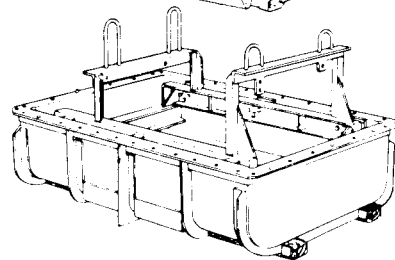
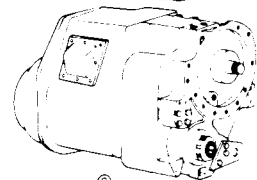
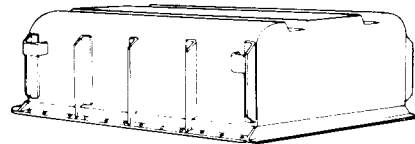
TRANSMISSION AND TRANSFER ASSEMBLY REPAIR

Refer to TM 9-2520-234-35 for repair of transmission and transfer assembly.

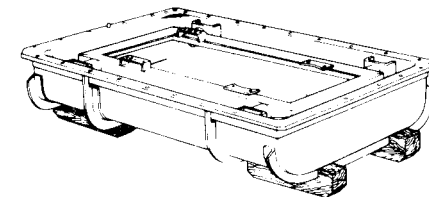
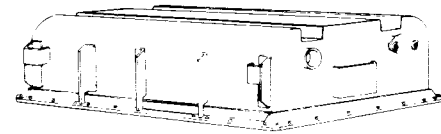
Section I POWERPACK SHIPPING AND STORAGE CONTAINERS



ENGINE ASSEMBLY
WITH
SHIPPING AND STORAGE
CONTAINER



TRANSMISSION
ASSEMBLY
WITH
SHIPPING AND STORAGE
CONTAINER



TRANSFER ASSEMBLY
WITH
SHIPPING AND STORAGE
CONTAINER

ENGINE PARTS AND ACCESSORIES LIST (CONTAINER COMPONENTS)

GENERAL

The following engine parts and accessories are required to return an unserviceable repairable engine to the overhaul depot for replacement.

Each assembly returned to overhaul depot must include parts and accessories listed below prior to issuance of a replacement.

Engine W/Container

Engine Assembly

Oil Pan, Engine

Cover Assembly

Cover Assembly

Manifold, Water

Manifold, Exhaust R/B

Manifold, Exhaust L/B

Fuel Pump

Filter, Fuel

Filter, Fuel

Starter Engine

Relay Solenoid

Filter Assembly

Heater Air Box

Water Pump

Turbocharger Assembly

Blower Assembly, Turbocharger

Governor, Limited Speed

Pipe Exhaust, Crossover

Hose Assembly, Crossover

Hose Assembly, Crossover

Oil Cooler Assembly

Gage Rod Cap

Container, Top

Container, Bottom

Pipe Breather

Housing Air Filter

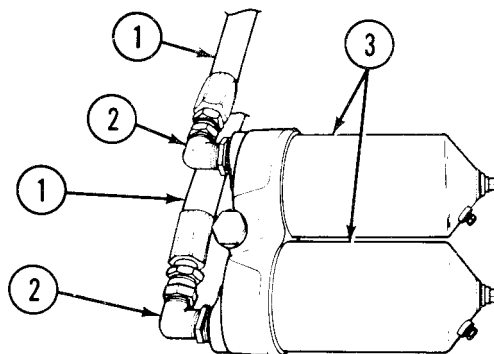
Pipe Breather

Section II ENGINE AND TRANSMISSION REPAIR

SEPARATION

NOTE

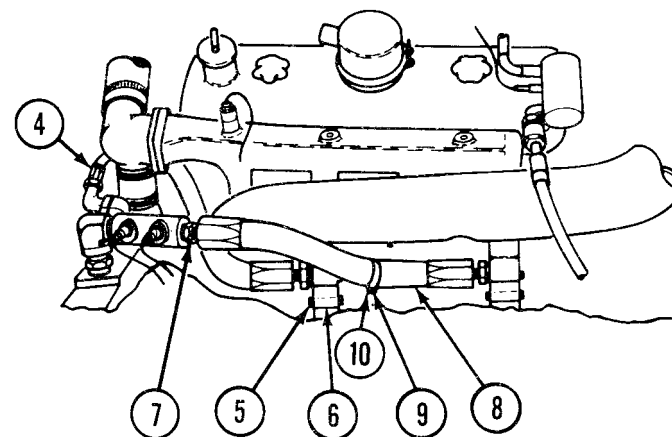
Repair of the engine and transmission is direct support maintenance.



CAUTION

Make sure powerpack is evenly balanced and stable and properly supported on stand or blocks.

- A Disconnect two oil filter hoses (1).
- B Remove two elbows (2) from oil filters (3).
- C Install two elbows (2) on ends of hoses (1).

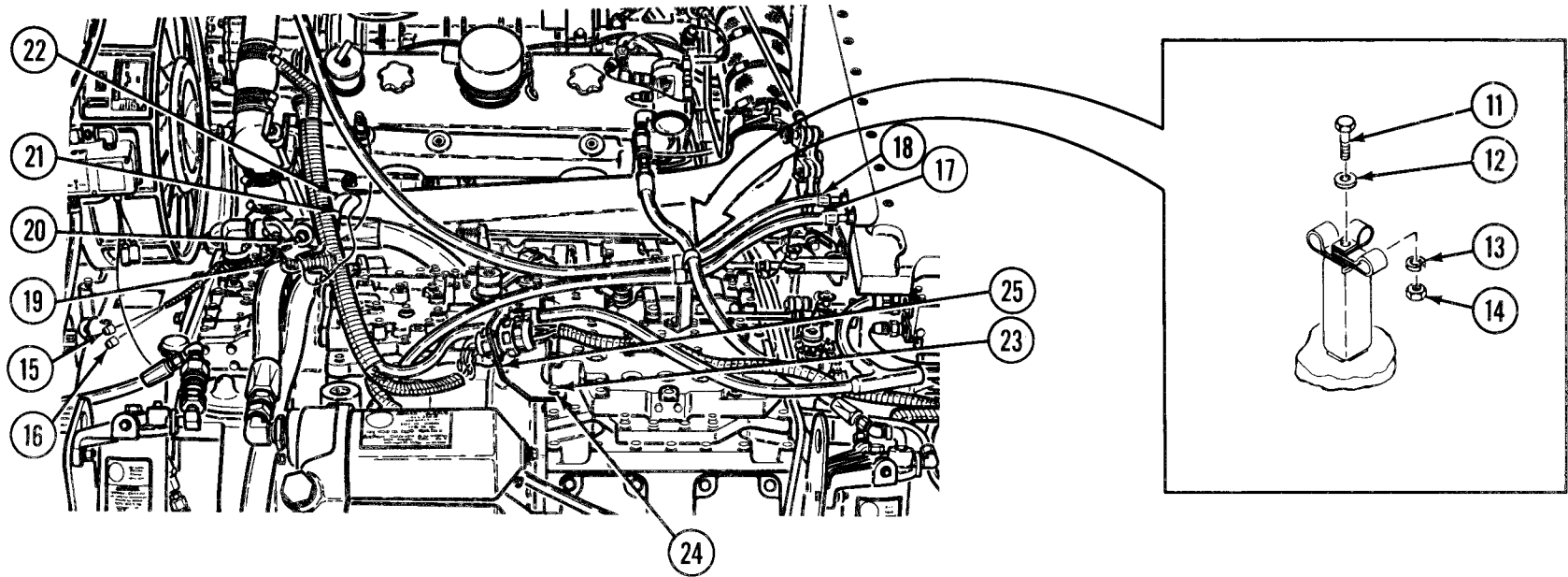


NOTE

All hoses are disconnected at the transmission. See TM 9-2350-267-20 for disconnection of hoses from engine after separation.

- D Disconnect oil cooler to transmission hose (4).
- E Loosen four screws (5) at oil cooler housing (6).
- F Unscrew connector (7) to disconnect transmission to oil cooler hose (8).
- G Remove one screw (9) and one lockwasher (10).

ENGINE AND TRANSMISSION REPAIR (CONTINUED)



H Remove one screw (11), one flat washer (12), one lockwasher (13) and one nut (14) at bracket.

I Install one screw (11), one flat washer (12), one lockwasher (13) and one nut (14) on bracket.

J Disconnect tachometer cable (18) at engine near generator.

NOTE

Aeration detector leads (15 and 16) are disconnected when shroud is removed.

K Remove speedometer cable (17) and tachometer cable (18).

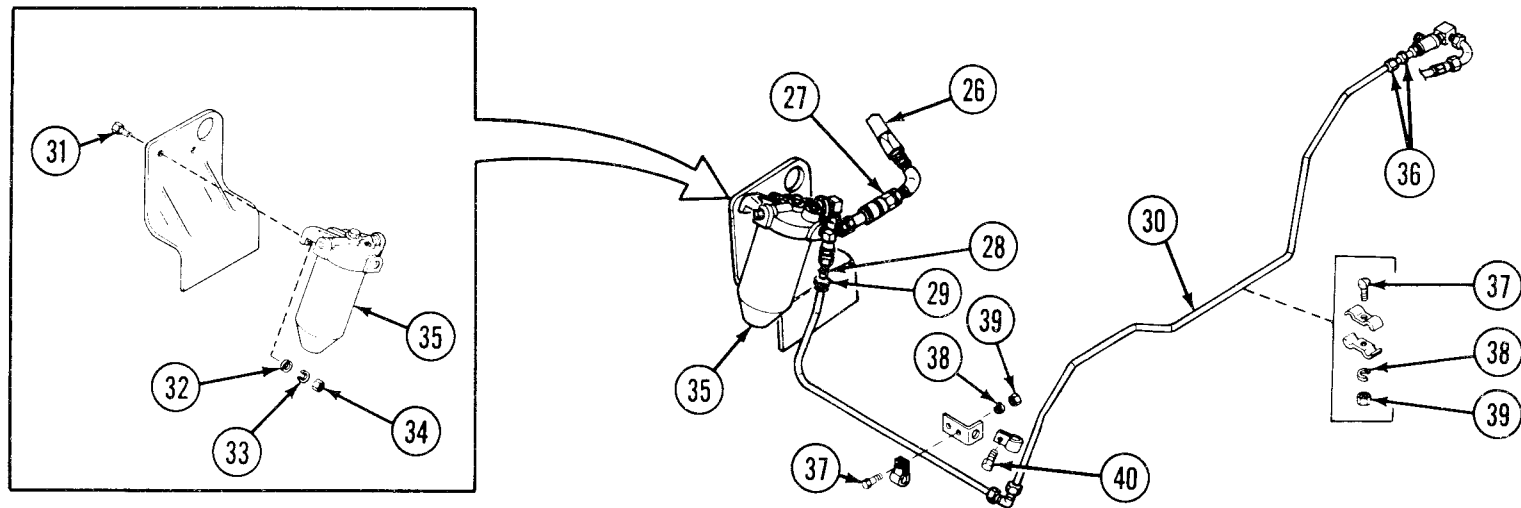
L Disconnect electrical connectors (19, 20, 21, and 22).

M Remove two screws (23) and two lockwashers (24).

N Install two screws (23) and two lockwashers (24) in transmission.

O Place bracket (25) on engine.

ENGINE AND TRANSMISSION REPAIR (CONTINUED)

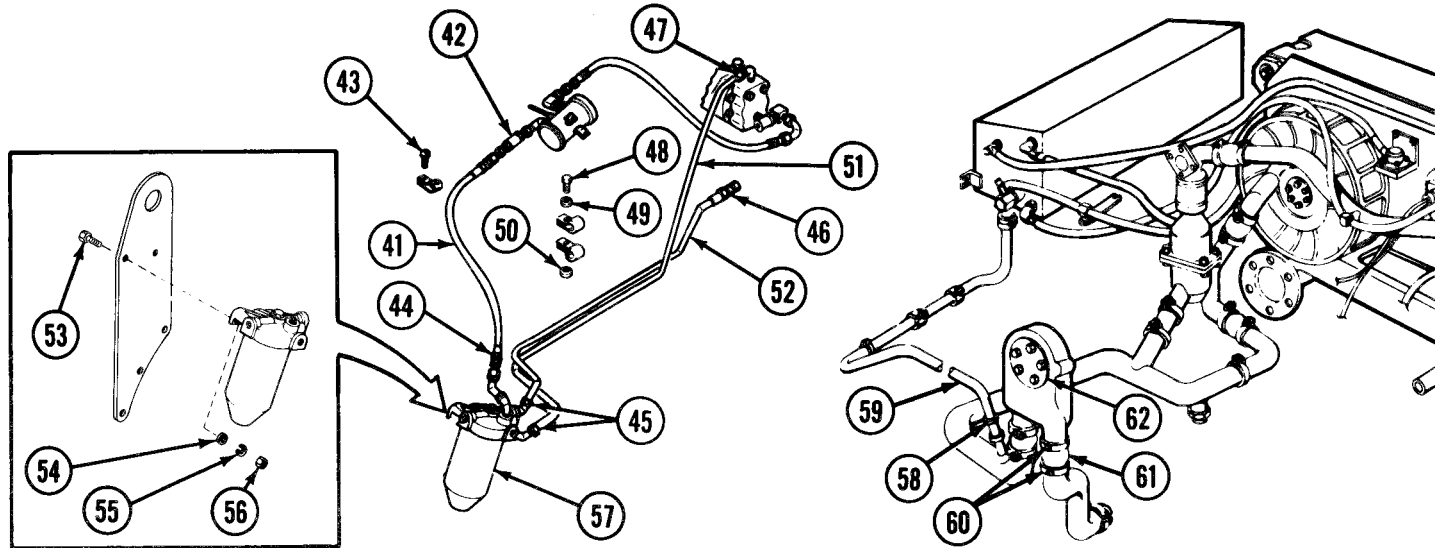
**NOTE**

Remove all tubes between transmission and engine to prevent damaging tubes during separation.

- P Disconnect hose (26) between fuel tank and primary filter, at quick-disconnect (27).
- Q Remove nut (28) and sleeve (29).
- R Disconnect primary filter to engine-driven fuel pump tube (30).
- S Remove two screws (31), two flat washers (32), two lockwashers (33) and two nuts (34).

- T Remove primary filter (35).
- U Remove adapter (36) at T-connector.
- V Remove three screws (37), three flat washers (38) and three nuts (39).
- W Remove screw (40).
- X Remove tube (30).
- Y Install three screws (37), three flat washers (38), three nuts (39) and screw (40) into transmission housing.

ENGINE AND TRANSMISSION REPAIR (CONTINUED)



Z Disconnect electric fuel pump air purge to secondary filter hose (41) at quick-disconnect (42).

AA Remove screw (43).

AB Unscrew nut (44), remove hose (41).

AC Unscrew two adapters (45).

AD Unscrew two adapters (46 and 47).

AE Remove five screws (48), five flat washers (49) and five nuts (50).

AF Remove two tubes (51 and 52).

AG Remove two screws (53), two flat washers (54), two lockwashers (55) and two nuts (56).

AH Remove secondary filter (57).

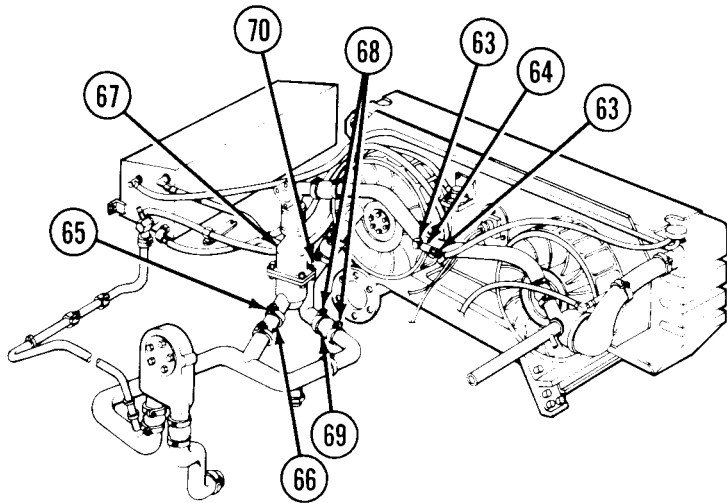
AI Loosen hose clamp (58).

AJ Disconnect surge tank to coolant main tube hose (59).

AK Loosen two hose clamps (60).

AL Pull hose connector (61) away from coolant pump (62).

ENGINE AND TRANSMISSION REPAIR (CONTINUED)

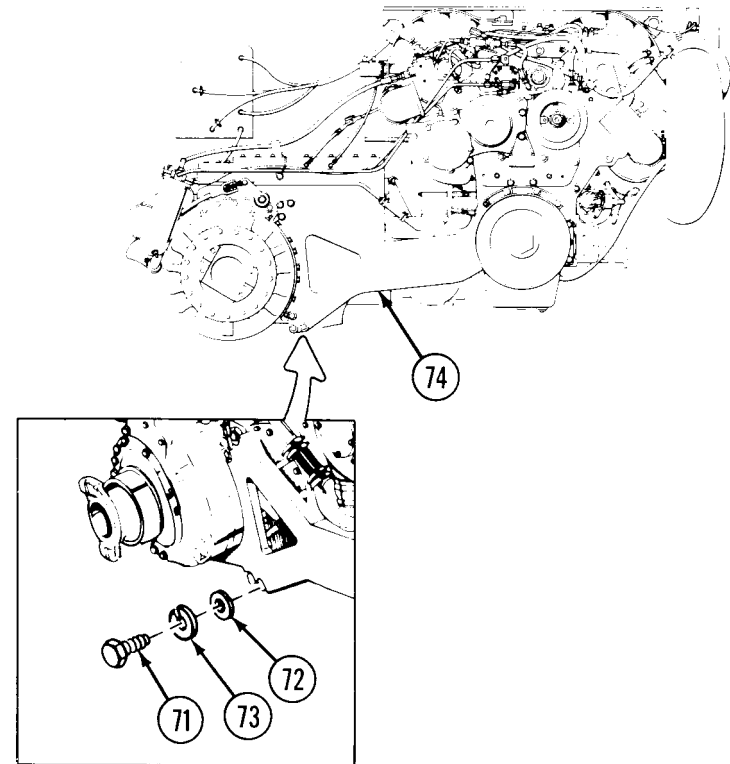


AM Unscrew two adapters (63) at crossover tube T-connector (64).

AN Unscrew hose clamp (65).

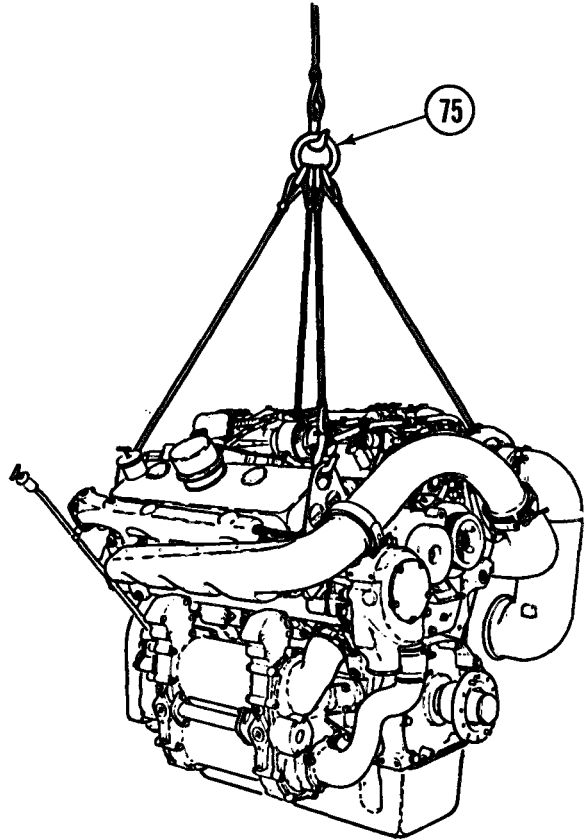
AO Pull hose connector (66) away from bypass thermostat housing (67).

AP Unscrew two hose clamps (68) and disconnect tube (69) from tube (70).



AQ Remove six screws (71), six flat washers (72), and six lockwashers (73) from bar (74).

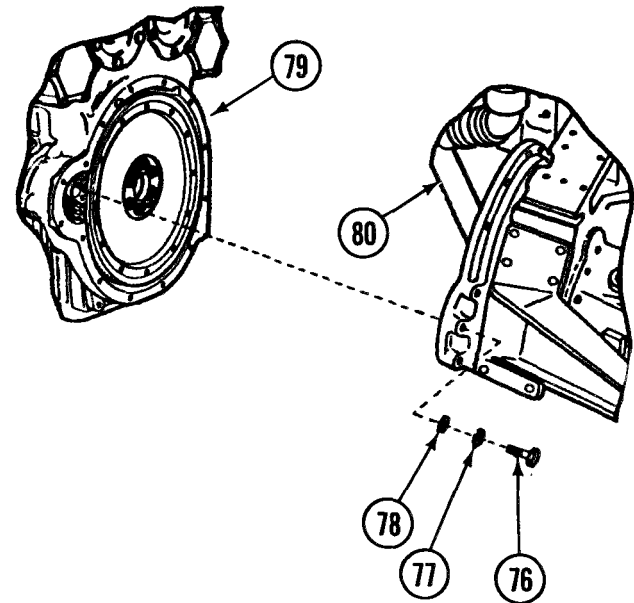
ENGINE AND TRANSMISSION REPAIR (CONTINUED)



AR Attach sling (75) to engine at four lifting eyes and take up slack in sling lines.

NOTE

Make sure that transmission support at transfer assembly will prevent transmission from rolling when engine is disconnected.



AS Remove 14 screws (76), 14 lockwashers (77) and 14 flat washers (78).

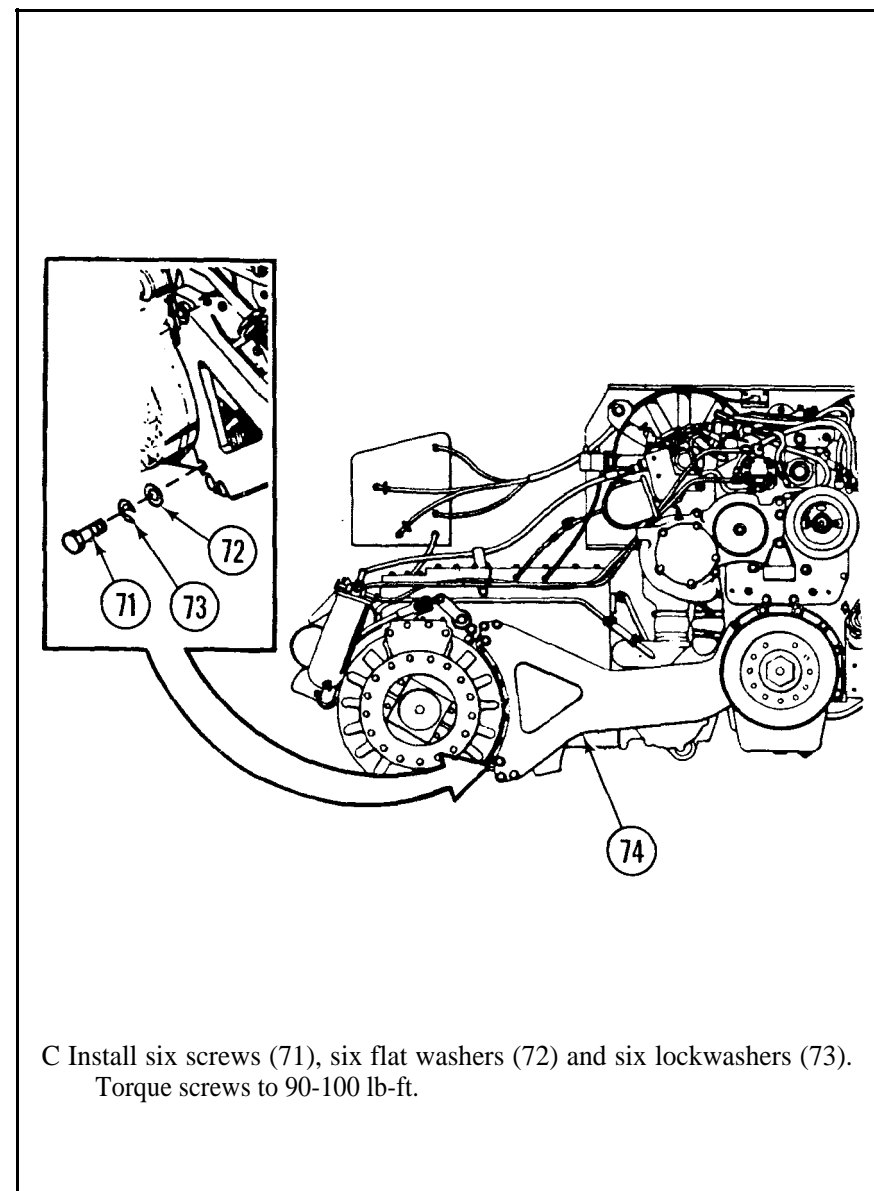
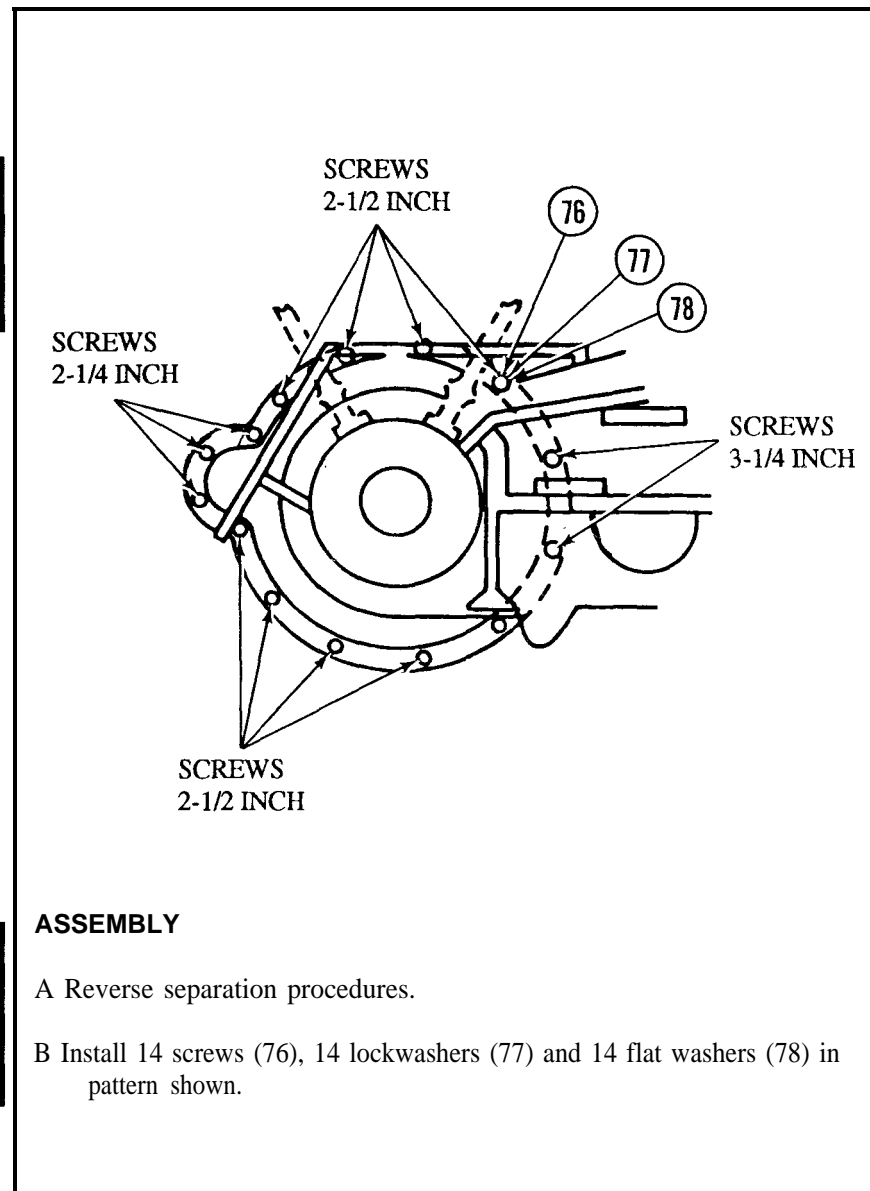
NOTE

Refer to TM 9-2350-267-20 for removal of: electrical harnesses, oil tubes, coolant hoses, oil filters and main coolant tube.

AT Remove wooden blocks.

AU Pull engine (79) away from transfer assembly (80).

ENGINE AND TRANSMISSION REPAIR (CONTINUED)



Section III ENGINE ACCESSORIES REPAIR

NOTE

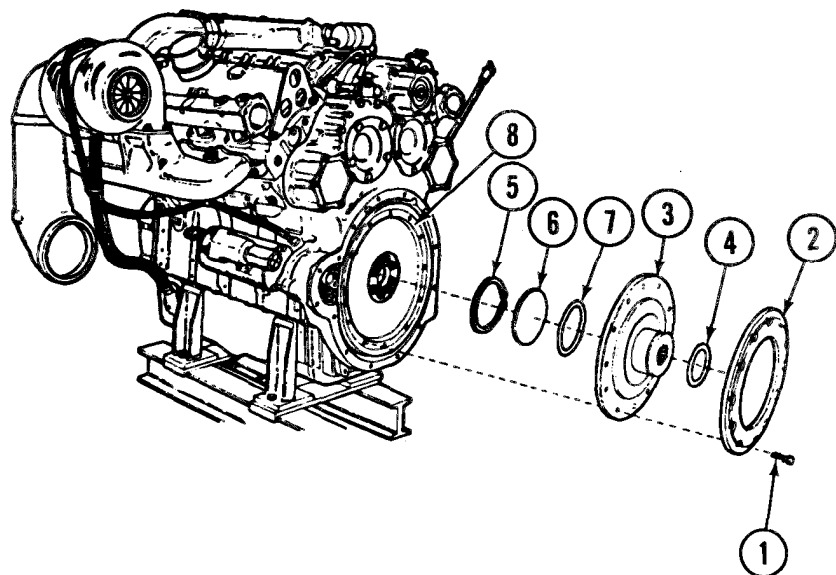
Repair of the mass ring and coupler, vibration damper (viscous) and transmission trunnion caps is direct support maintenance.

MASS RING AND COUPLER REPAIR

REMOVAL

NOTE

Ring (5), cover (6) and seal (7) are only the optional coupler. Other coupler is built with a solid backplate. If coupler has a solid backplate, do not do step E.



- A Separate engine from transmission (p 3-4).
- B Remove 12 screws (1).

NOTE

If rear surface of coupler is oil soaked, or if springs or washers are broken or coupler plate is distorted, replace coupler.

- C. Remove mass ring (2) and coupler (3).
- D. Remove and discard seal (4).
- E Remove ring (5), cover (6), seal (7), and gasket (8).
- F Discard seal (7) and gasket (8).

COUPLER REPAIR (CONTINUED)

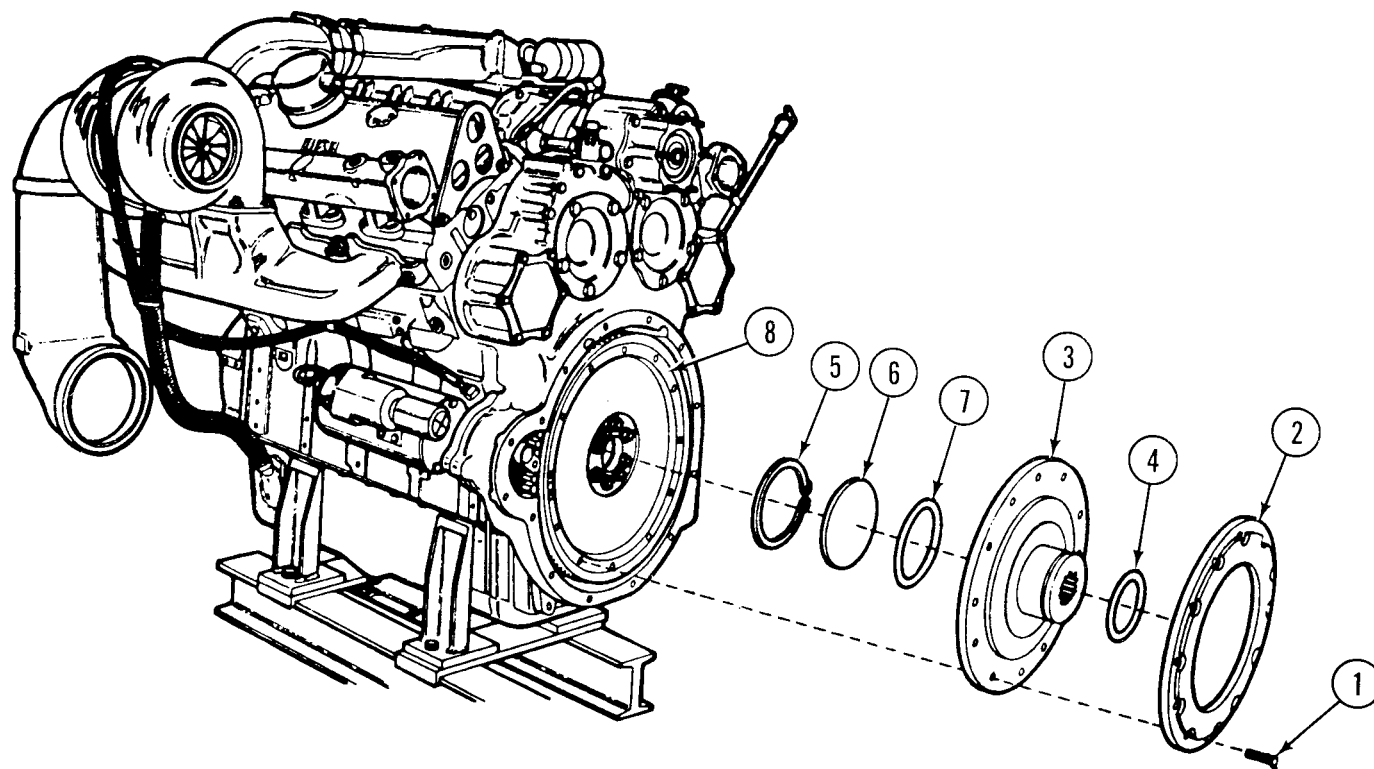
INSTALLATION

NOTE

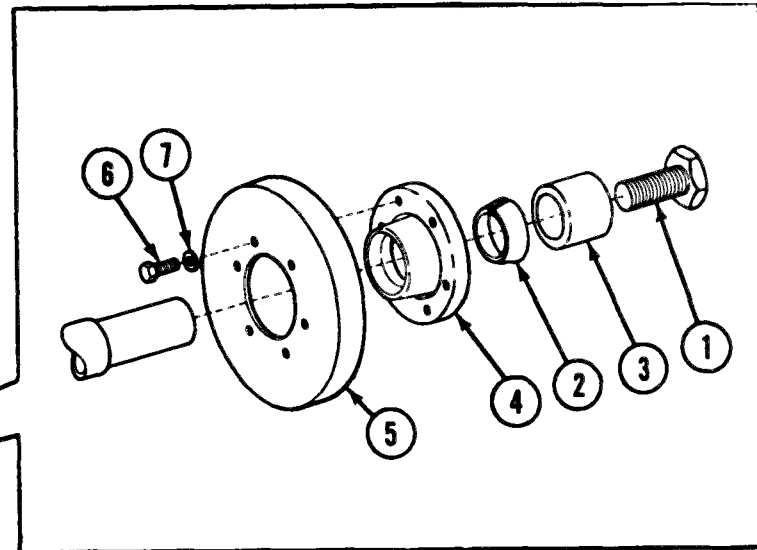
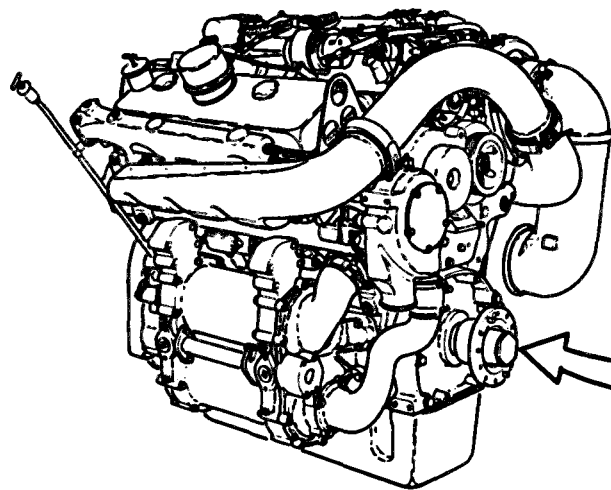
Coat coupling seal grooves, splined, teeth and seals with silicone lubricant (item 51, Appx B).

- A Install ring (5), cover (6), new seal (7), and new gasket (8).
- B Install new seal (4).

- C Install mass ring (2) and coupler (3).
- D Check for 0.010-to 0.015-inch clearance between mass ring (2) and engine.
- E Install 12 screws (1).
- F Torque 12 screws (1) to 40-50 lb-ft.



VIBRATION DAMPER (VISCOUS) REPAIR



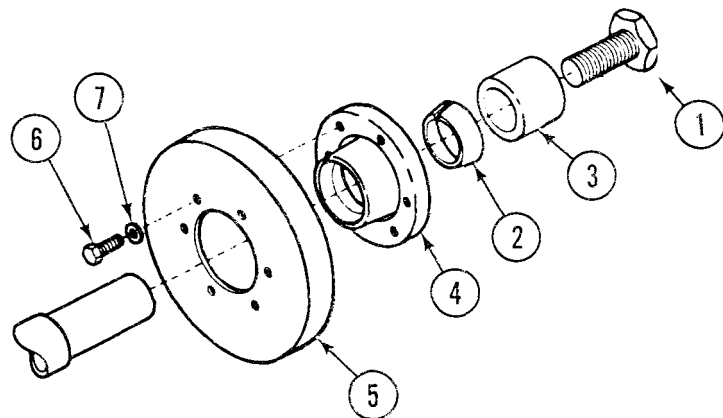
REMOVAL

- A Loosen bolt (1) about 1/8 inch.
- B Strike bolt (1) with hammer to loosen split cone (2).
- C Remove bolt (1), spacer (3), and split cone (2).

- D Remove hub (4) and damper (5) as an assembly.

DISASSEMBLY

- A Remove six bolts (6) and six washers (7).
- B Separate hub (4) from damper (5).

VIBRATION DAMPER (VISCOUS) REPAIR (CONTINUED)**INSPECTION**

Inspect spacer (3), hub (4), and damper (5) for damage.

Replace any damaged item.

ASSEMBLY

A Join hub (4) and damper (5) with six bolts (6) and six washers (7).

B Torque bolts (6) to 60-70 lb-ft.

INSTALLATION

A Install hub (4) and damper (5) as an assembly.

B Install split cone (2), spacer (3) and bolt (1).

C Torque bolt (1) to 300-330 lb-ft.

TRANSMISSION TRUNNION CAPS REPAIR

MATING/REPLACING

- A Remove speedometer adapter (1) at transmission.
- B Remove two bolts (2) and two lockwashers (3).
- C Remove and discard defective trunnion cap (4).

NOTE

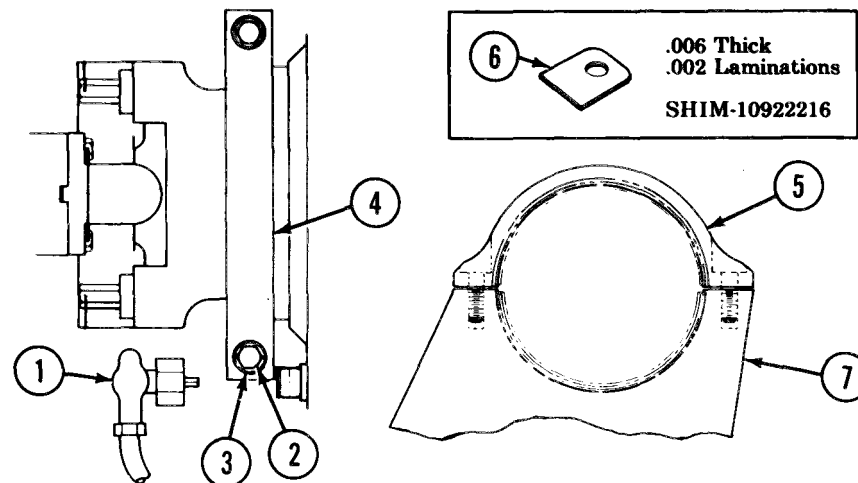
Identify cap with stamp die as left or right front trunnion cap (LF = Left Front, RF = Right Front).

- D Install replacement cap (5).
- E Install two bolts (2) and two lockwashers (3).

NOTE

Primary filter bracket must be removed to torque right trunnion cap bolts.

- F Torque bolts (2) to 80-90 lb-ft.
- G Measure clearance between cap and support with feeler gage.
- H Compute thickness of shims required by subtracting 0.006 inch from clearance measured in Step G.
- I Remove two bolts (2) and two lockwashers (3).
- J Remove cap (5).



INSTALLATION

- A Install shims (6) on supports (7).
- B Install replacement cap (5).
- C Install two bolts (2) and two lockwashers (3).
- D Torque bolts (2) to 80-90 lb-ft.

Section IV TEST AND ADJUSTMENT**ENGINE**

Refer to TM 9-2815-202-34 for engine test and adjustment procedures.

TRANSMISSION

Refer to TM 9-2520-234-35 for transmission test and adjustment procedures.

POWERPACK

Refer to TM 9-2350-267-20 for test and adjustment procedures on the shifting controls, brake controls, and throttle controls when the powerpack is installed in the vehicle.

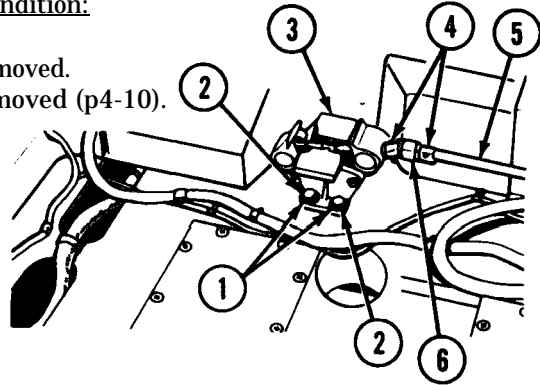
SECTION V MOUNT BASE ASSEMBLY REPAIR

MOUNT BASE ASSEMBLY REPAIR

INITIAL SETUP

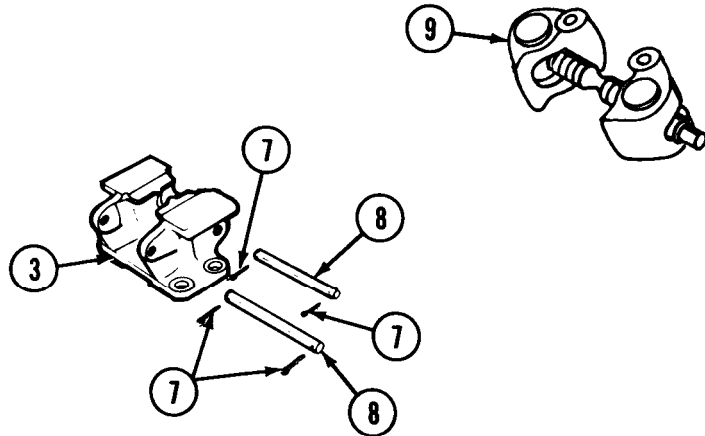
Equipment Condition:

Powerpack removed.
Fuel tanks removed (p4-10).



REMOVAL

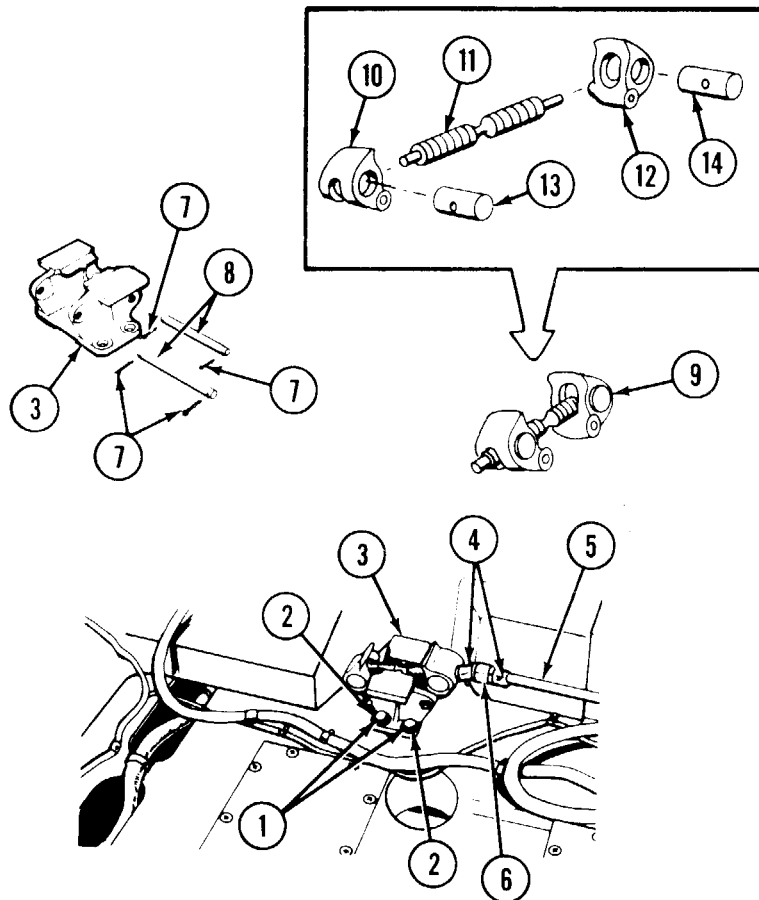
- A Remove four screws (1), four lockwashers (2) and mount base assembly (3).
- B Remove two cotter pins (4).
- C Separate and remove mount handle (5) and universal joint (6) from mount base (3).



DISASSEMBLY

- A Remove four cotter pins (7) and two jaw pins (8).
- B Remove jaw assembly (9) from mount base (3).

MOUNT BASE ASSEMBLY REPAIR (CONTINUED)

**NOTE**

Inspect mount base, jaws, bolt and jaw nuts for cracks and damaged threads.

- C Turn jaw (10) counterclockwise to remove from bolt (11).

- D Turn jaw (12) clockwise to remove from bolt (11).
E Slide jaw nuts (13 and 14) out of jaws (10 and 12)

ASSEMBLY

- A Slide jaw nuts (13 and 14) into jaws (10 and 12).

NOTE

Make sure jaws are evenly spaced on bolt during installation.

- B Install jaw (12) on bolt (11) by turning counterclockwise.
C Install jaw (10) on bolt (11) by turning clockwise.

NOTE

Make sure hexhead on bolt is installed on high side of mount base.

- D Install jaw assembly (9) on mount base (3).
E Install two jaw pins (8) and four new cotter pins (7).

INSTALLATION

- A Install universal joint (6) on mount base (3) and secure with new cotter pin (4).
B Install handle (5) on universal joint (6) and secure with new cotter pin (4).
C Install mount base assembly (3) with four screws (1) and four new lockwashers (2).

CHAPTER 4
MAINTENANCE PROCEDURES
FUEL, AIR INTAKE AND EXHAUST SYSTEMS

CHAPTER OVERVIEW

This chapter illustrates and describes repair procedures for:

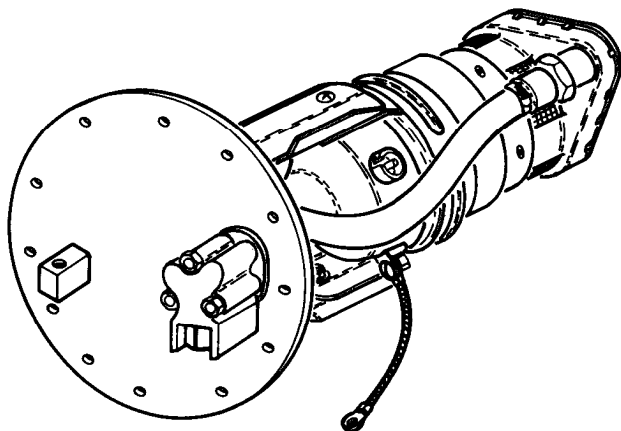
Section I Fuel System
Section II Air Cleaner Blower Motor

Section I FUEL SYSTEM

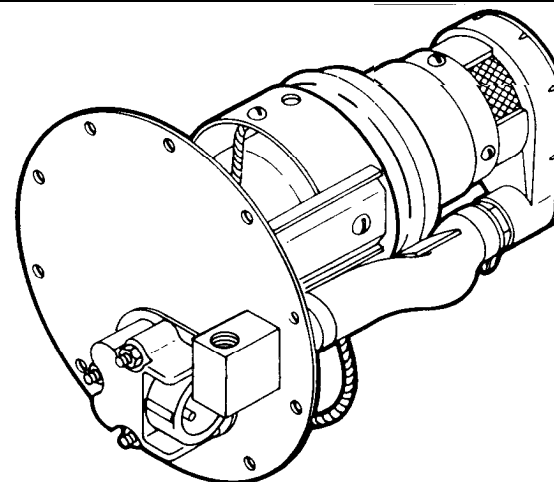
NOTE

Repair of the listed fuel system components is direct support maintenance.

FUEL PUMP ELECTRICAL (FUEL TANK) REPAIR



RIGHT FUEL PUMP AND HANGER ASSEMBLY - REFERENCE VIEW



LEFT FUEL PUMP AND HANGER ASSEMBLY - REFERENCE VIEW

FUEL PUMP ELECTRICAL (FUEL TANK) REPAIR (CONTINUED)

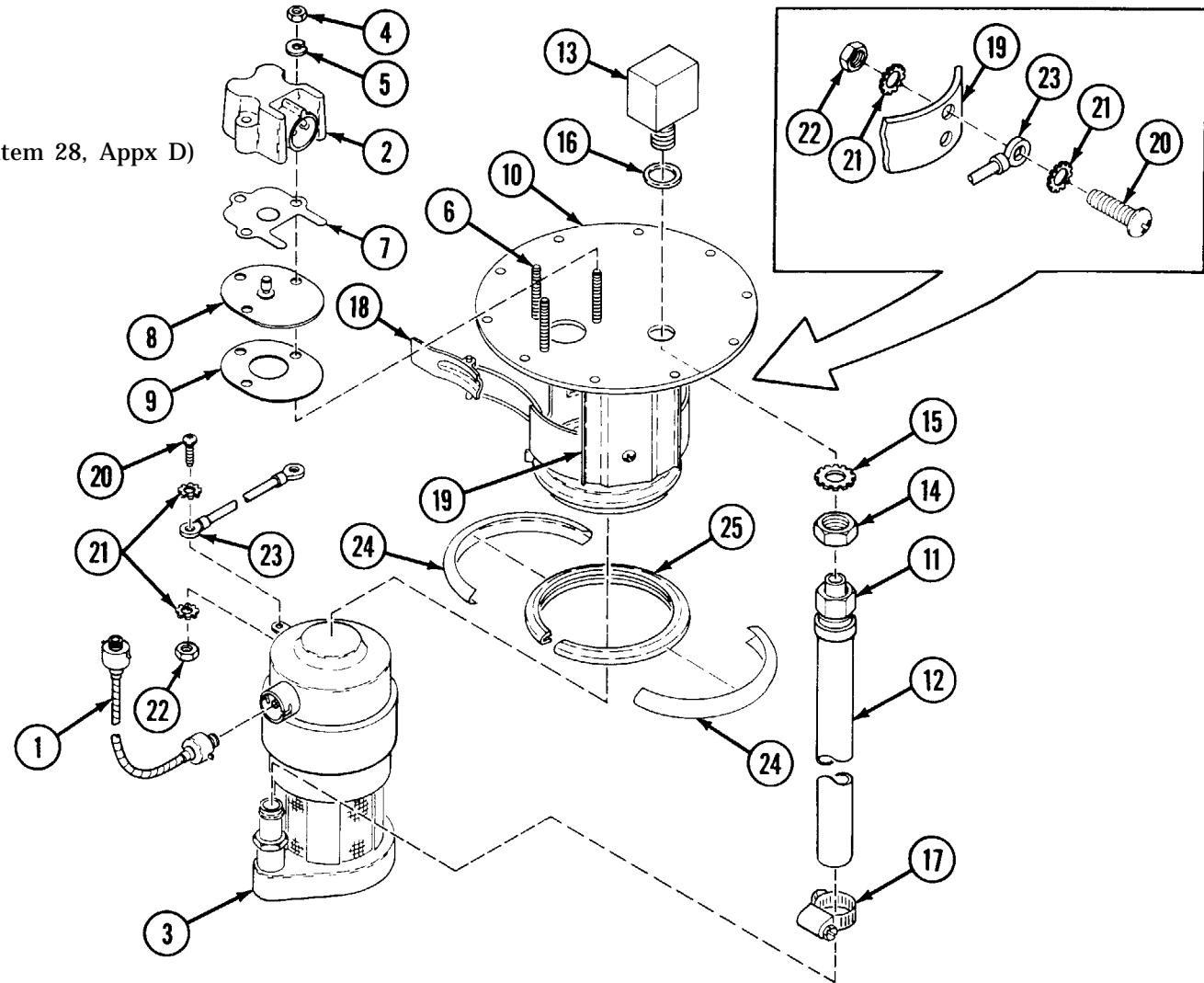
INITIAL SETUP

Test Equipment/Special Tools:

Wrench, combination 11/32 in. (item 28, Appx D)

Materials/Parts:

Diesel fuel (item 73, Appx B)



FUEL PUMP ELECTRICAL (FUEL TANK) REPAIR (CONTINUED)

DISASSEMBLY

LEFT FUEL PUMP

- A Disconnect electrical cable assembly (1) at terminal assembly (2) and at fuel pump (3).
- B Remove three nuts (4) and three lockwashers (5) from three studs (6).
- C Remove terminal assembly (2), gasket (7), plate and terminal assembly (8) and gasket (9) from plate cover (10).
- D Loosen nut (11) and remove hose (12) from elbow (13).
- E Remove nut (14) and serrated washer (15) from elbow (13).
- F Remove elbow (13) and preformed packing (16) from plate cover (10).
- G Remove clamp (17) and hose (12) from fuel pump (3). Discard hose.
- H Pull open latch (18).
- I Separate fuel pump (3) and hanger assembly (19).
- J Remove two screws (20), four lockwashers (21) and two nuts (22) at hanger assembly (19) and fuel pump (3).
- K Remove ground lead (23).
- L Remove two retainer halves (24) and rubber mount (25) from fuel pump (3). Discard rubber mount.

NOTE

No disassembly of fuel pump is required. Test and replace pump if defective.

FUEL PUMP ELECTRICAL (FUEL TANK) REPAIR (CONTINUED)

RIGHT FUEL PUMP

- M Disconnect electrical cable (26) at terminal assembly (27) and at fuel pump (28).
- N Remove three nuts (29) and three lockwashers (30) from studs (31).
- O Remove terminal assembly (27), gasket (32), plate and terminal assembly (33) and gasket (34) from plate cover (35).
- P Loosen nut (36) and remove pipe (37) from elbow (38).
- Q Remove sleeve (38A) from pipe (37).
- R Remove nut (39) and serrated washer (40) from elbow (38).
- S Remove elbow (38) and preformed packing (41).
- T Loosen two clamps (42) and remove hose (43) from pipe (37) and fuel pump (28). Discard hose.

- U Pull open latch (44).
- V Separate fuel pump (28) and hanger assembly (45).
- W Remove two screws (46), four lockwashers (47), two nuts (48) and ground lead (49) from hanger assembly (45) and fuel pump (28).
- X Remove two retainer halves (50) and rubber mount (51) from fuel pump (28). Discard rubber mount.

NOTE

No disassembly of fuel pump is required. Test and replace pump if defective.

FUEL PUMP ELECTRICAL (FUEL TANK) REPAIR (CONTINUED)

INSPECTION AND REPAIR

A FUEL PUMP

- 1 Troubleshoot electrical portion of fuel pump (TM 9-2350-267-20).
- 2 Inspect housing for cracks. Replace if damaged or defective.
- 3 Inspect inlet screens. Clean if clogged.
- 4 Replace if fuel flow test (p 4-7) is not within specifications.

B ELECTRICAL CABLE

Replace cable if shielding is torn or frayed. Test for continuity, Replace if shorted.

C GROUND LEAD

Replace if shielding is torn or frayed. Test for continuity. Replace if shorted.

D TERMINAL ASSEMBLY

Inspect for broken terminals, cracked housing and deteriorated rubber fittings. Check continuity between terminal and terminal plate. Repair or replace components as appropriate.

E HANGER ASSEMBLY

Replace if structure is damaged.

F ELBOW

Inspect for defects, stripped threads or other damage. Replace if damaged or defective.

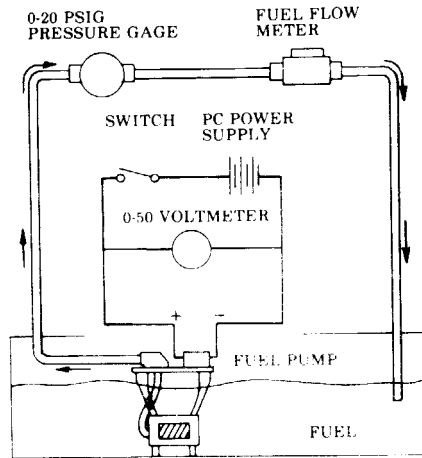
G HOSE AND FITTINGS

Inspect for cracks, deterioration and signs of leaks. Replace if defective.

H RETAINER

Inspect for damage. Replace if damaged.

FUEL PUMP ELECTRICAL (FUEL TANK) REPAIR (CONTINUED)



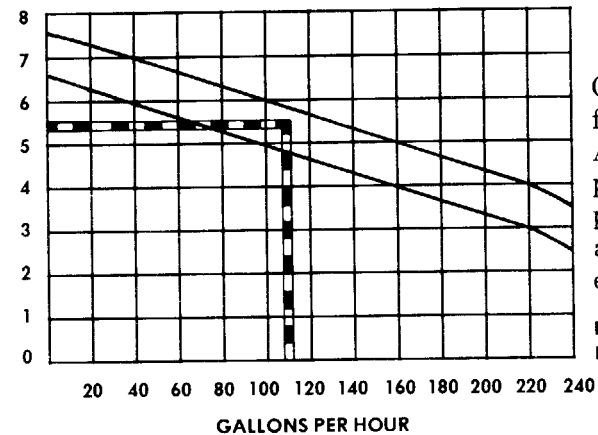
TEST EQUIPMENT

- A 0 to 20 psig direct reading fuel pressure gage.
- B Fuel flow meter (variable restriction) 0 to 250 gallons per hour.
- C Fuel container.
- D Voltmeter (0 to 50 volts).
- E Switch.
- F DC power supply (manually variable from 18 to 28 volts).

TEST SETUP

Set up fuel pump and test equipment as shown in illustration above.

PERFORMANCE CURVE



NOTE

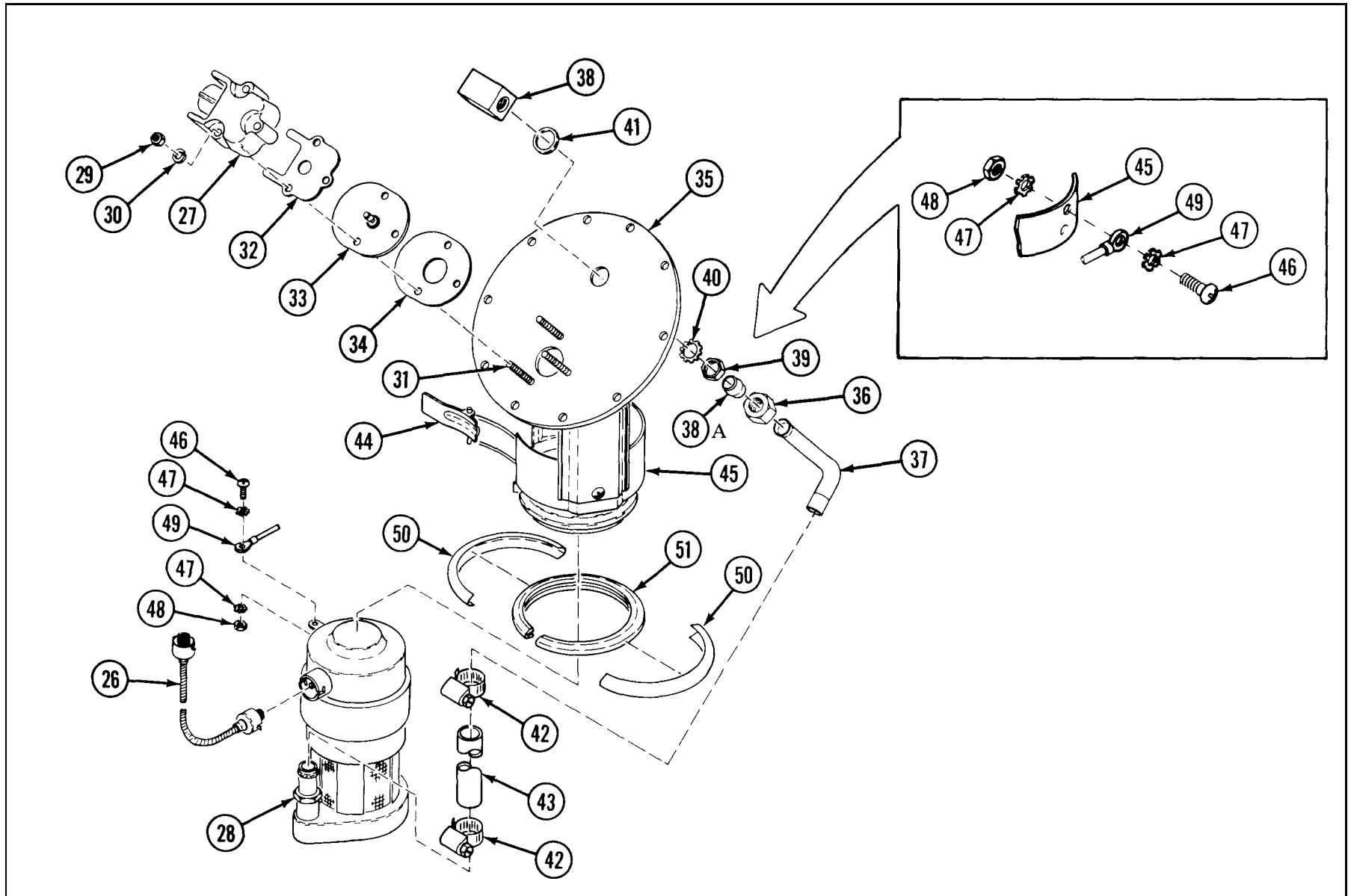
Curve is for 800 feet elevation. Allow 0.5 (1/2) pound pressure per 1000 feet altitude differential.

PUMP DELIVERY MUST BE WITHIN THIS BAND.

FUEL FLOW TESTING

- A Close switch to allow current flow.
- B Adjust power source to 27.5-volt reading on voltmeter.
- C Read pressure gage and fuel flow meter for fuel pressure and fuel flow rate.
- D Enter pressure and flow rate readings on performance chart. Project pressure reading across chart and flow rate reading up chart (eg, pressure 5.5 psi and fuel flow rate 110 gph).
- E Evaluate fuel pump performance from chart. If not within range, repair or replace pump.

FUEL PUMP ELECTRICAL (FUEL TANK) REPAIR (CONTINUED)



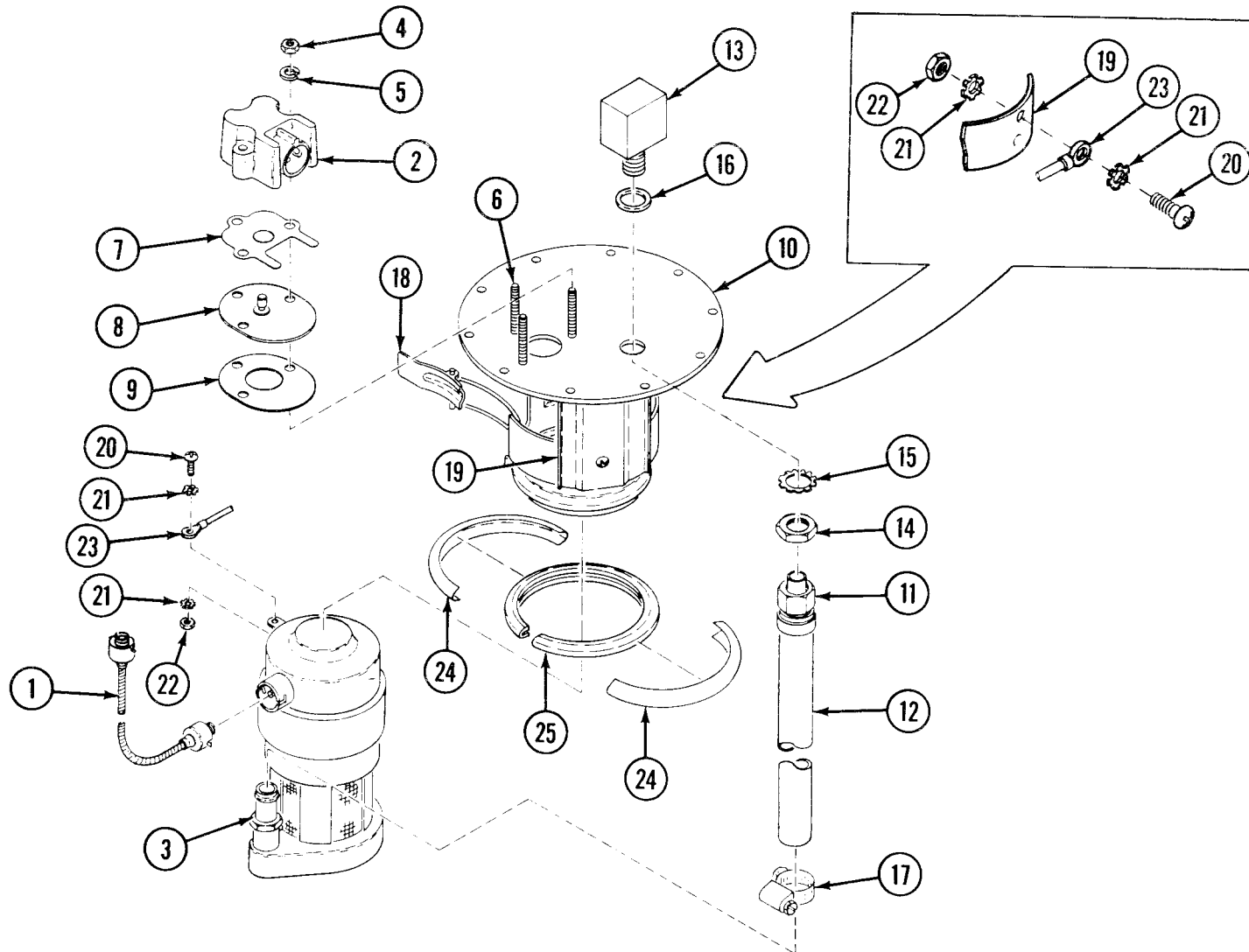
FUEL PUMP ELECTRICAL (FUEL TANK) REPAIR (CONTINUED)

ASSEMBLY

RIGHT FUEL PUMP

- A Install new rubber mount (51) and two retainer halves (50) on fuel pump (28).
- B Install ground lead (49) on hanger assembly (45) and fuel pump (28) with two screws (46), four new lockwashers (47) and two nuts (48).
- C Install fuel pump (28) in hanger assembly (45) and close latch (44).
- D Install new hose (43) on fuel pump (28) and pipe (37) with two clamps (42).
- E Install new preformed packing (41) and elbow (38).
- F Install serrated washer (40) and nut (39) on elbow (38).
- G Install sleeve (38A) on pipe (37).
- H Install pipe (37) on elbow (38) by tightening nut (36).
- I Install new gasket (34), plate and terminal assembly (33), new gasket (32) and terminal assembly (27) on plate cover (35).
- J Install three new lockwashers (30) and three nuts (29) on studs (31).
- K Connect electrical cable (26) at terminal assembly (27) and at fuel pump (28).

FUEL PUMP ELECTRICAL (FUEL TANK) REPAIR (CONTINUED)



FUEL PUMP ELECTRICAL (FUEL TANK) REPAIR (CONTINUED)

LEFT FUEL PUMP

L Install new rubber mount (25) and two retainer halves (24) on fuel pump (3).

M Install ground lead (23) on hanger assembly (19) and fuel pump (3) with two screws (20), four new lockwashers (21) and two nuts (22).

N Install fuel pump (3) in hanger assembly (19) and close latch (18).

O Install new hose (12) on fuel pump (3) with clamp (17).

P Install new preformed packing (16) and elbow (13) on plate cover (10).

Q Install serrated washer (15) and nut (14) on elbow (13).

R Install hose (12) on elbow (13) by tightening nut (11).

S Install new gasket (9), plate and terminal assembly (8), new gasket (7) and terminal assembly (2) on plate cover (10).

T Install three new lockwashers (5) and three nuts (4) on three studs (6).

U Connect electrical cable assembly (1) at terminal assembly (2) and at fuel pump (3).

FUEL TANKS: REMOVAL AND INSTALLATION

INITIAL SETUP

Test Equipment/Special Tools:

Wrench, open-end, 1-1/4 inch (item 29, Appx D)
 Wrench, open-end, 1-1/2 inch (item 30, Appx D)
 Fuel hose (item 10, Appx D)
 Wrench, torque (item 31, Appx D)
 Suitable lifting device

Materials/Parts:

Sealing compound (item 46, Appx B)
 Gasket material (item 74, Appx B)
 Tape, antiseize (item 71, Appx B)

Personnel:

Three

References:

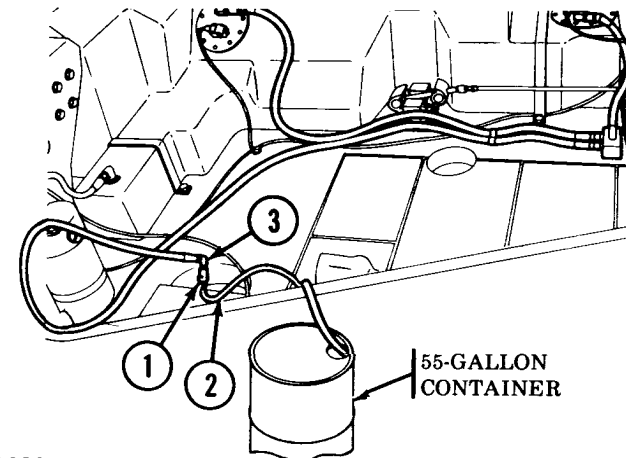
TM 9-2350-267-20

Equipment Condition:

Engine exhaust and outlet tube and pipe removed (TM 9-2350-267-20).
 Air cleaner duct and elbow removed (TM 9-2350-267-20).
 Heat shield removed (TM 9-2350-267-20).
 Battery ground cables disconnected.

General Safety Instructions:

No smoking or open flames when removing fuel tanks.



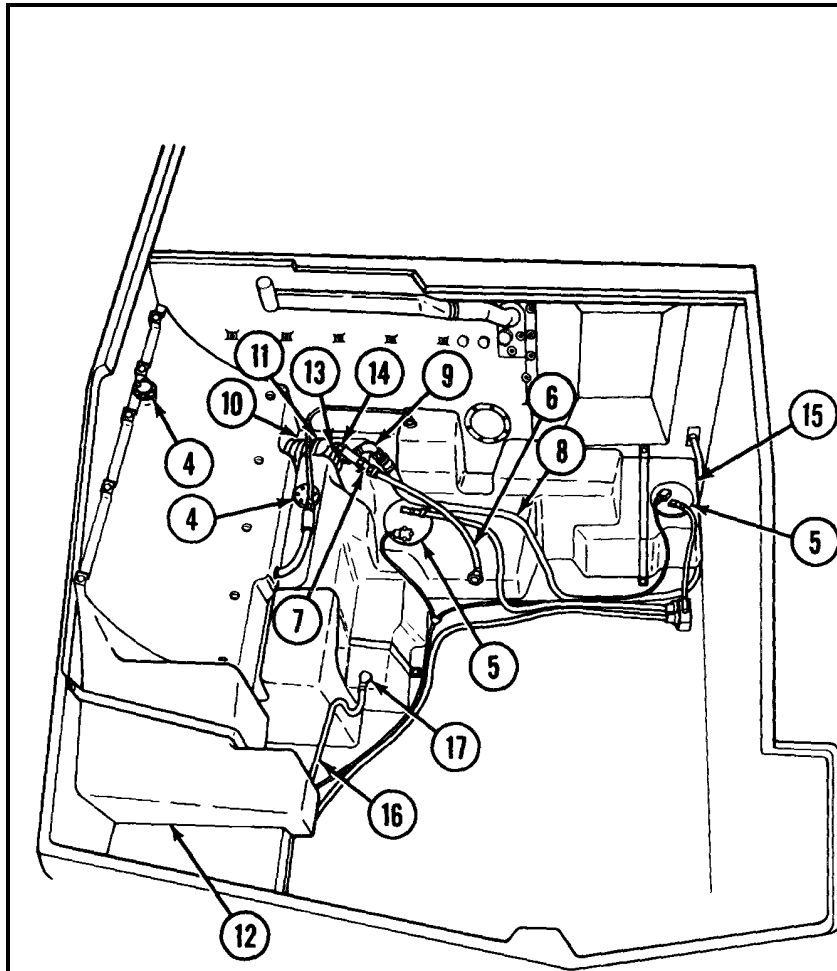
REMOVAL

NOTE

Fuel tank capacity is 135 gallons. Fuel tank(s) may be drained by removing drain plug at bottom of vehicle or by using fuel tank electric fuel pumps to pump fuel from tanks. Ensure master relay is connected with power cable. Pumping requires one-and-a-half to two hours to drain a full system. Using drain plug at bottom of vehicle allows draining the system in less than 30 minutes. If draining fuel, refer to TM 9-2350-267-20. If pumping tanks dry, perform steps A thru E.

- A Connect battery ground cables.
- B Attach adapter (1) and fuel extension (2) to main fuel line at quick-disconnect (3).
- C Place free end of fuel hose extension (2) into a clean 55-gallon container.

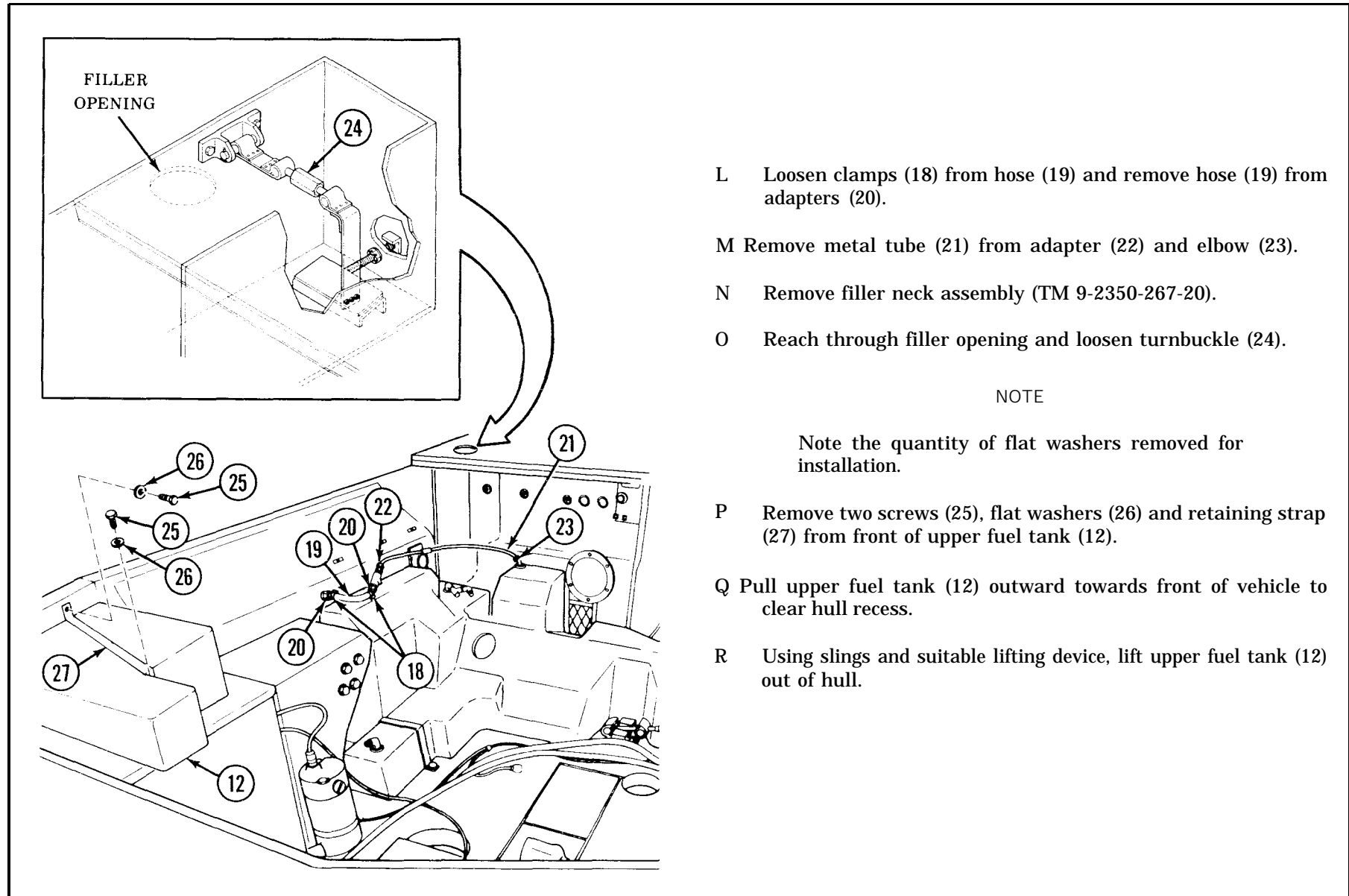
FUEL TANKS: REMOVAL AND INSTALLATION (CONTINUED)



- D Position MASTER switch to ON position. Fuel tanks will drain.
- E Position MASTER switch OFF when pumps stop pumping fuel. Disconnect battery ground cables.
- F Remove two fuel level transmitters (4) and two fuel pumps (5) (TM 9-2350-267-20).
- G Disconnect APU return hose (6) at adapter (7) connection.
- H Disconnect fuel injector return hose (8) at elbow (9) connection.
- I Remove clamps (10) securing lower fill hose (11) to upper fuel tank (12). Disconnect lower fill hose (11) from upper fuel tank (12).
- J Remove clamp (13) and hose flange (14) from lower fuel tank (15). Remove lower fill hose (11).
- K Disconnect hose (16) at elbow (17) connecting upper fuel tank (12) and lower fuel tank (15). Remove hose (16) from hidden adapter on upper fuel tank (12).

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FUEL TANKS: REMOVAL AND INSTALLATION (CONTINUED)



L Loosen clamps (18) from hose (19) and remove hose (19) from adapters (20).

M Remove metal tube (21) from adapter (22) and elbow (23).

N Remove filler neck assembly (TM 9-2350-267-20).

O Reach through filler opening and loosen turnbuckle (24).

NOTE

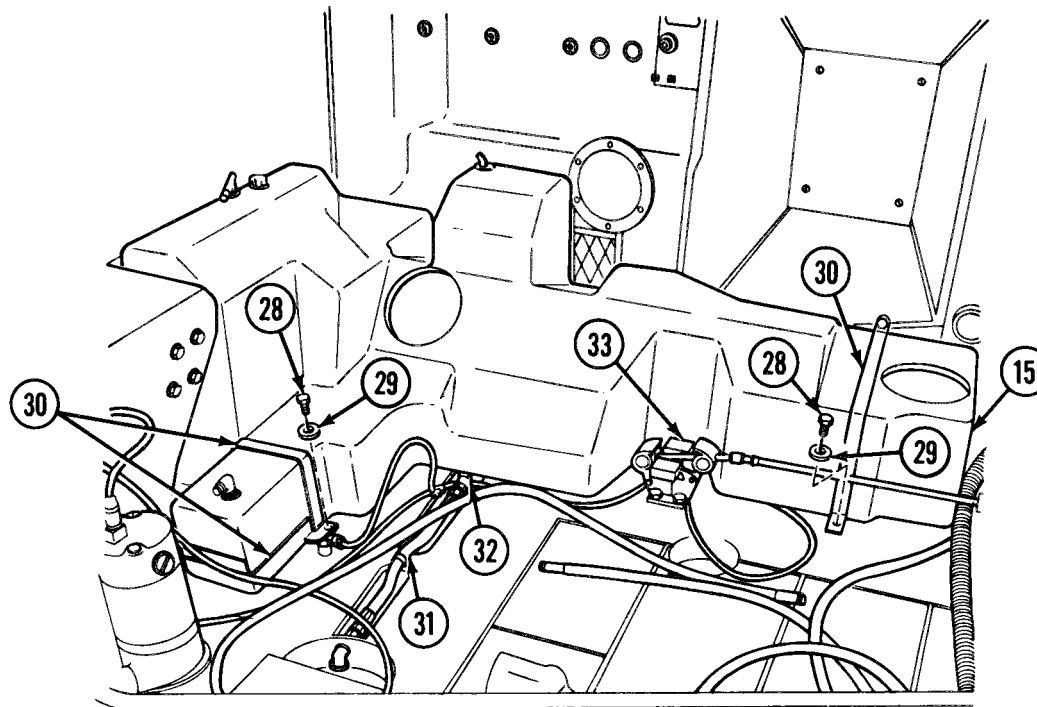
Note the quantity of flat washers removed for installation.

P Remove two screws (25), flat washers (26) and retaining strap (27) from front of upper fuel tank (12).

Q Pull upper fuel tank (12) outward towards front of vehicle to clear hull recess.

R Using slings and suitable lifting device, lift upper fuel tank (12) out of hull.

■ FUEL TANKS: REMOVAL AND INSTALLATION (CONTINUED)



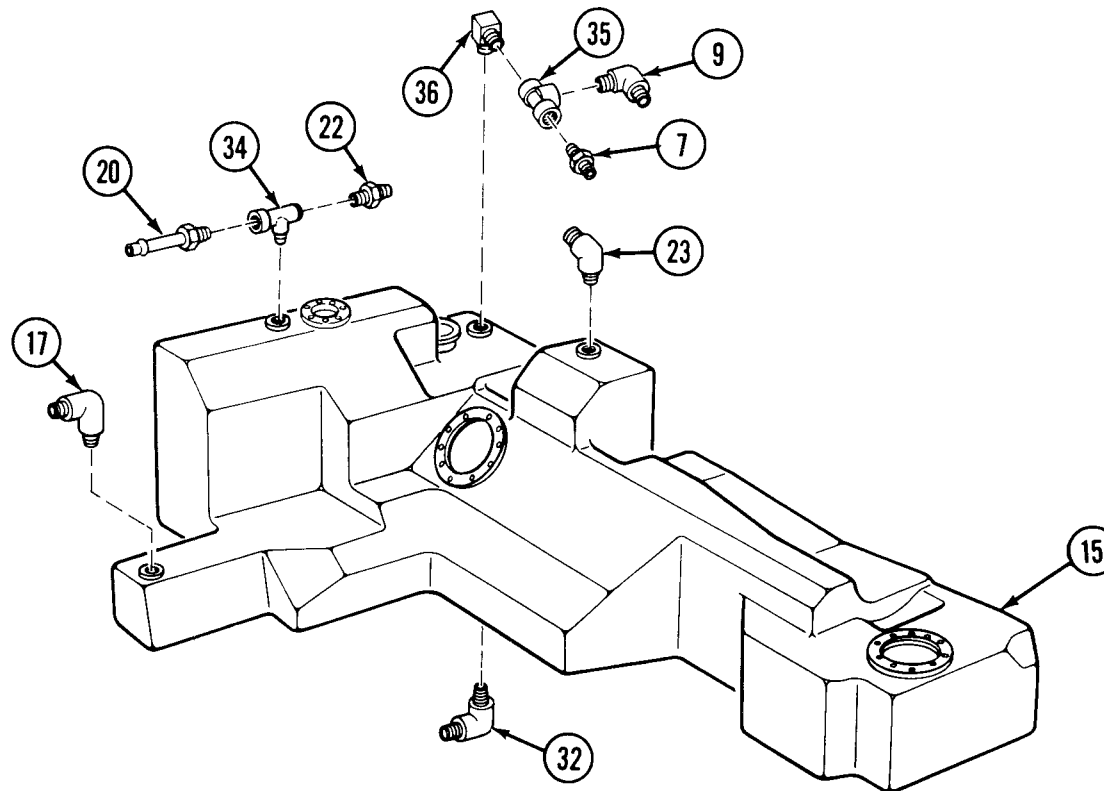
S Remove four screws (28) and four flat washers (29).

T Remove three retaining straps (30).

U Disconnect fuel drain hose (31) from elbow (32).

V Attach slings and suitable lifting device and lift lower fuel tank (15) over engine mount assembly (33) and remove from vehicle.

FUEL TANKS: REMOVAL AND INSTALLATION (CONTINUED)



W Remove elbow (17) from lower fuel tank (15).

X Remove adapters (20 and 22) from tee (34).

Y Remove tee (34) from lower fuel tank (15).

Z Remove elbow (9) and adapter (7) from tee (35).

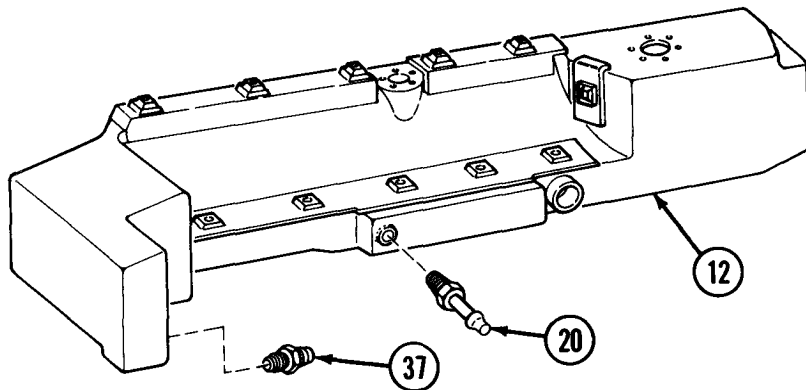
AA Turn tee (35) and elbow (36) toward rear, then remove tee (35) from elbow (36).

AB Remove elbow (36) from lower fuel tank (15).

AC Remove elbow (32) from lower fuel tank (15).

AD Remove elbow (23) from lower fuel tank (15).

FUEL TANKS: REMOVAL AND INSTALLATION (CONTINUED)



AE Remove adapter (37) from upper fuel tank (12).

AF Remove adapter (20) from upper fuel tank (12).

INSTALLATION

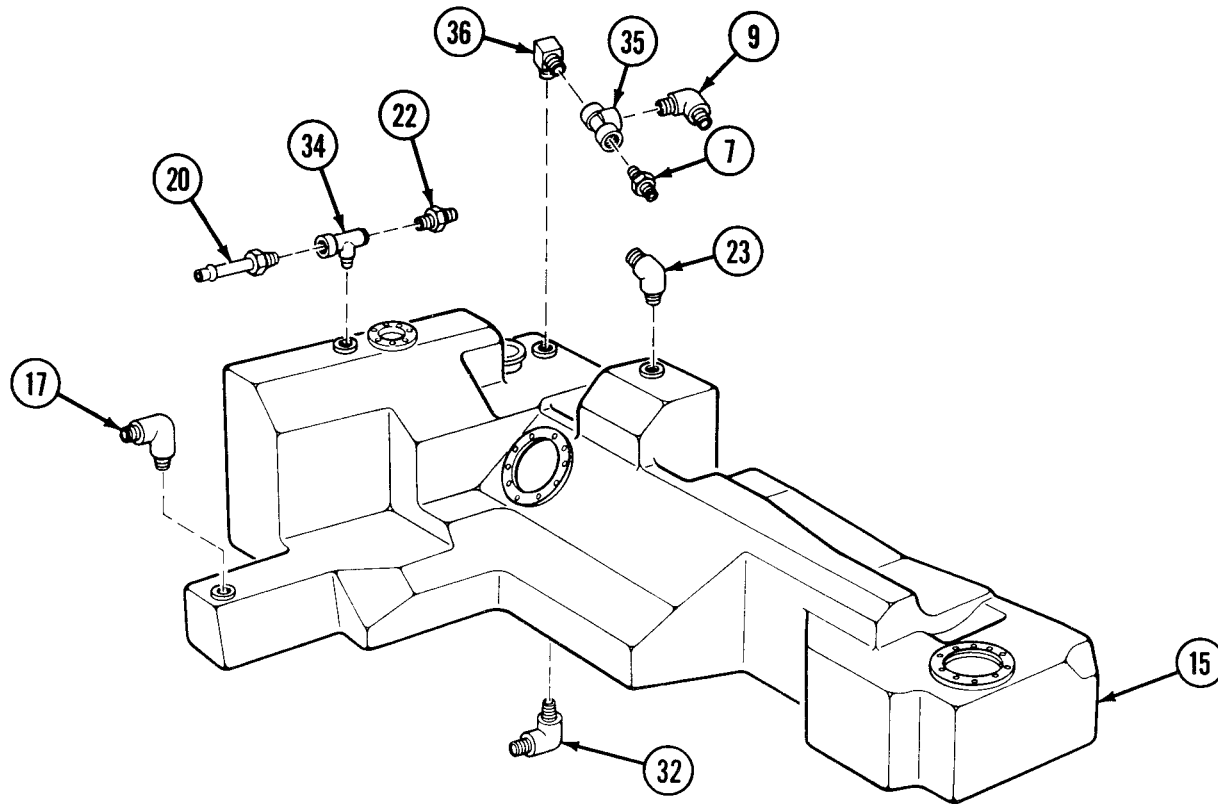
NOTE

- Before installing fuel tanks, perform required repairs on tanks and components (retaining straps, turnbuckle and pads).
- Apply antiseize tape (item 71, Appx B) to all male pipe threads before installation.

A Install adapter (20) to upper fuel tank (12).

B Install adapter (37) to upper fuel tank (12).

FUEL TANKS: REMOVAL AND INSTALLATION (CONTINUED)



C Install elbow (32) on lower fuel tank (15).

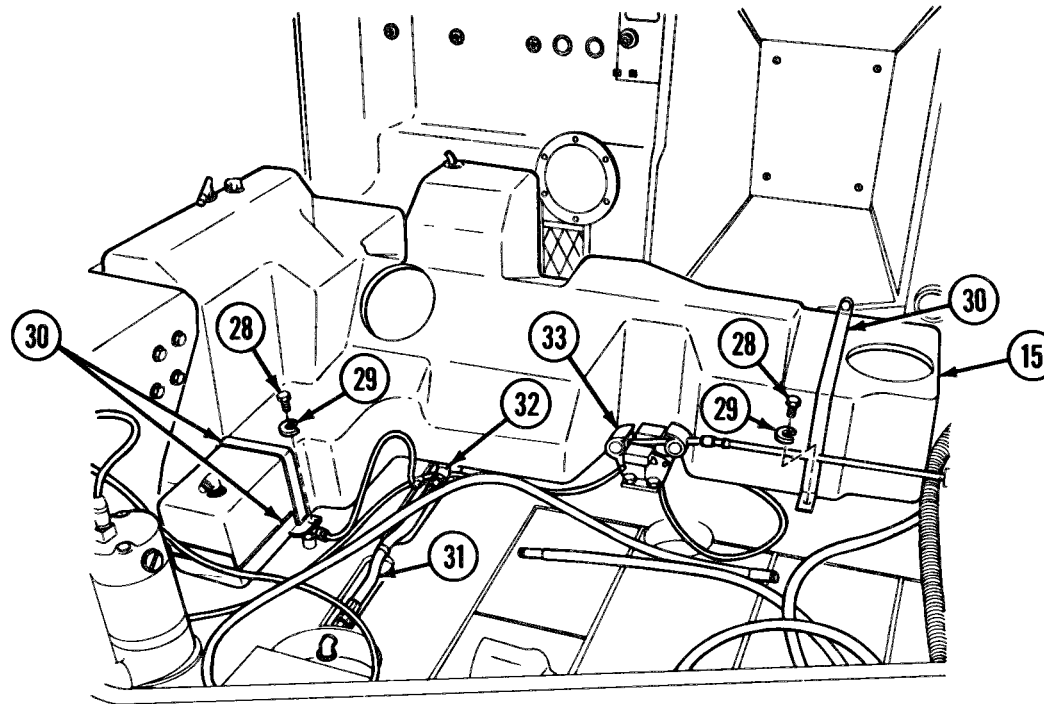
D Install elbow (36), tee (35) elbow (9) and adapter (7) on lower fuel tank (15).

E Install tee (34) with adapters (20, 22) on lower fuel tank (15).

F Install elbow (17) on lower fuel tank (15).

G Install elbow (23) on lower fuel tank (15).

FUEL TANKS: REMOVAL AND INSTALLATION (CONTINUED)



H Using slings, lift and position lower fuel tank (15) in vehicle behind engine mount assembly (33).

NOTE

- After positioning fuel tank in vehicle, check tank for alinement and movement. Use any combination of standard and custom pads required to aline and immobilize both fuel tanks. When a custom pad is required, cut it from gasket material (item 74, Appx B). Apply per installation procedure, page 4-23.

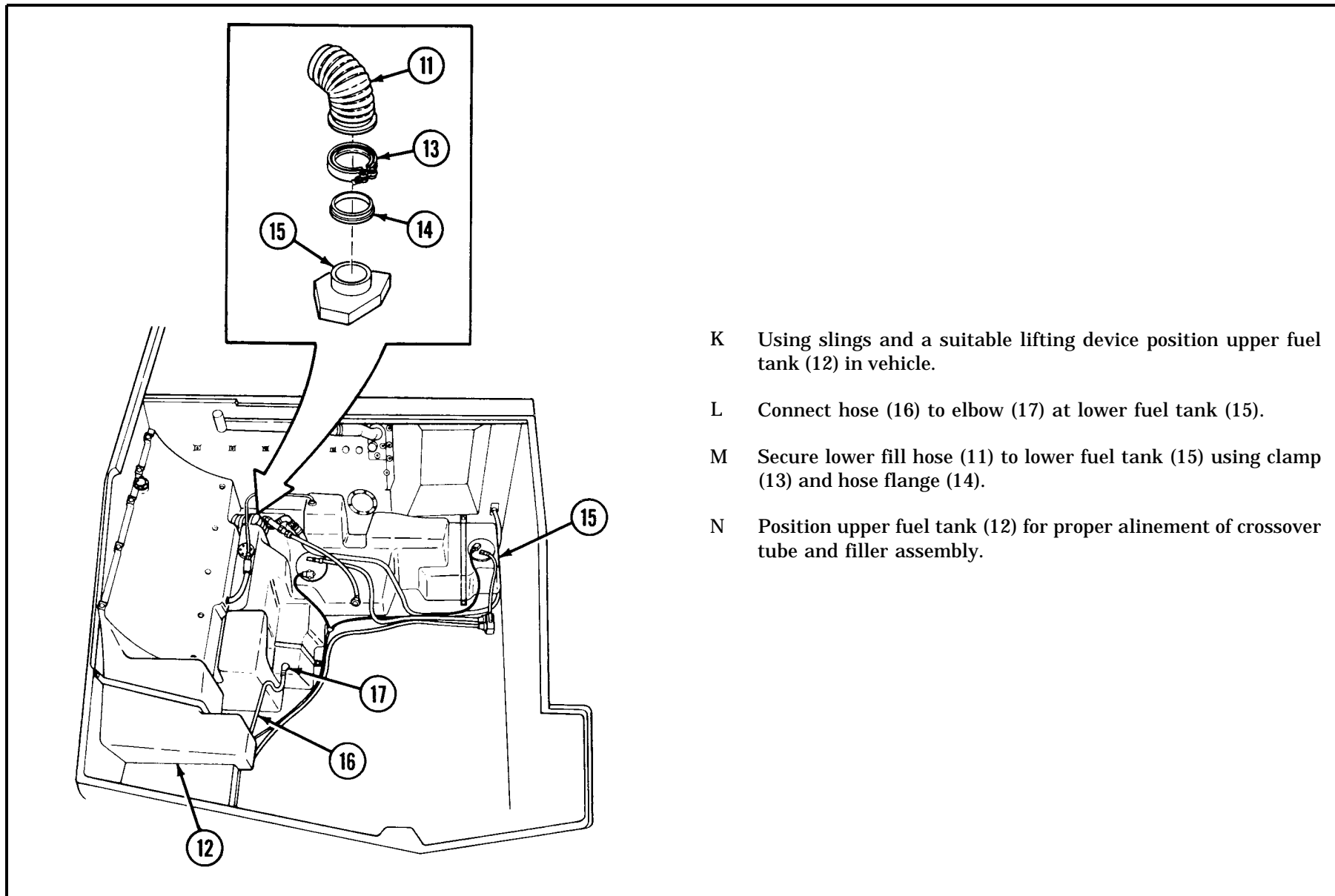
- Apply sealing compound (item 46, Appx B) to retainer strap screws before installation.

- Quantity of flat washers varies with the vehicle.

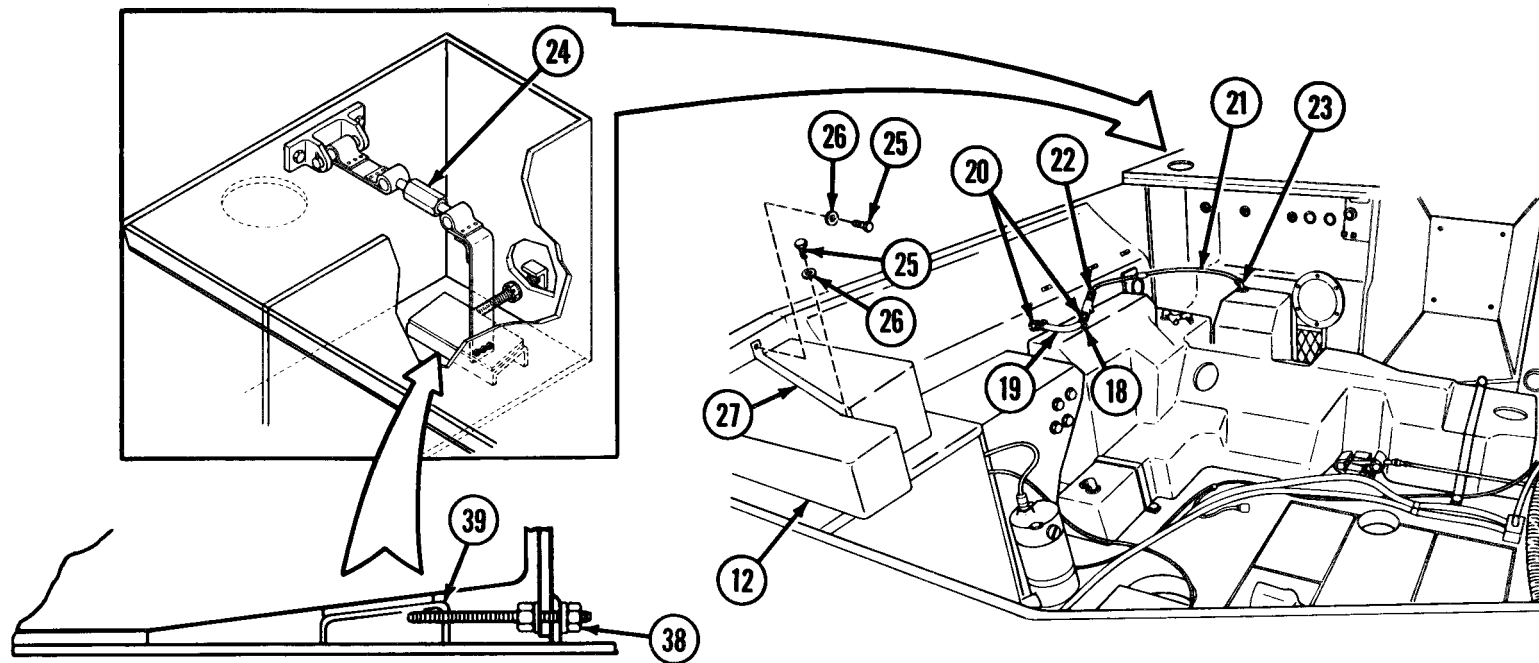
I Install three retaining straps (30) using four screws (28) and flat washers (29) as required for proper fit.

J Connect fuel drain hose (31) to elbow (32).

FUEL TANKS: REMOVAL AND INSTALLATION (CONTINUED)



FUEL TANKS: REMOVAL AND INSTALLATION (CONTINUED)



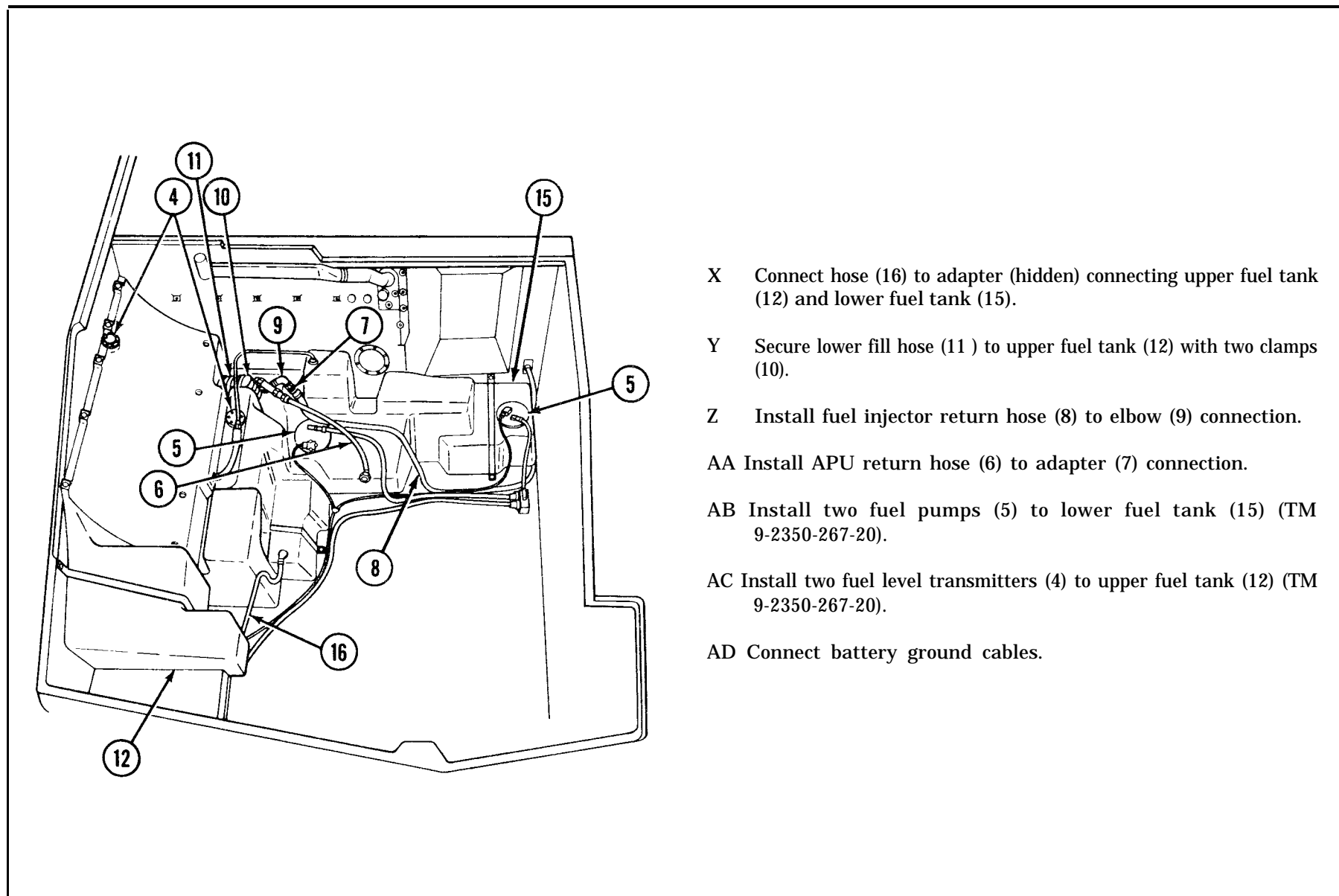
- O Hold nut (38) and retract channel (39) fully. Push upper fuel tank to rear of vehicle into hull access.
- P Hold nut (38) and wedge channel (39) against upper fuel tank, handtight.
- Q Torque nut (38) to 10 lb-ft (13.5 N.m).
- R Position and align upper fuel tank (12).

NOTE

Apply sealing compound (item 46, Appx B) to retaining strap screws before installation.

- S Install retaining strap (27) using two screws (25) and flat washers (26) as required for proper fit.
- T Tighten turnbuckle (24).
- U Install metal tube (21) to adapter (22) and elbow (23). Install filler neck assembly (TM 9-2350-267-20).
- V Connect hose (19) to adapters (20).
- W Install and tighten clamps (18).

FUEL TANKS: REMOVAL AND INSTALLATION (CONTINUED)



FUEL TANK REPAIR

INITIAL SETUP

Material/Parts:

Dry-cleaning solvent (item 17, Appx B)
Cleaning solvent (item 56, Appx B)
Repair kit, fiberglass (item 64, Appx B)
Epoxy cement (item 61, Appx B)
Fire retardant paint (item 57, Appx B)

General Safety Instructions:

Wear respirator and rubberized protective clothing when working on fiberglass. Fiberglass dust inhalation can cause severe respiratory problems. Fiberglass particles embedded in the skin will cause irritation and possible infection. Particles in the skin are extremely difficult to remove.

NOTE

FUEL TANK CONSTRUCTION

- The fuel tanks on the M992 vehicle are constructed of fiberglass, which is formed by laminated sheets of glass cloth held together with synthetic resin. When liquid resin cures (hardens), it binds together filaments of glass in cloth to create a solid panel. The strength of the panel is provided by the glass fiber while the resin acts merely as a bonding agent, supplying only limited additional strength to the panel. Damaged sections in reinforced fiberglass tanks can be repaired by patching with materials contained in repair kits.

- The following repair procedures apply to both the upper and lower fuel tanks.
- For minor repairs, 1-inch or smaller, use repair kit (item 75, Appx B).
- Applying fiberglass and epoxy repair materials in a cold shop retards curing.
- CONTENTS OF REPAIR KIT (10941900)
(LARGE HOLES - 1-INCH OR LARGER)
 - (1) One-pint can epoxy resin (1)
 - (2) One-quarter pint can hardener (1)
 - (3) Glass cloth (1) roll
 - (4) Aluminum screen wire (1) piece
 - (5) Regenerated silica (1) bag
 - (6) Hardwood depressors (1) dozen
 - (7) Acid brushes (6)
 - (8) Release file (2) pieces
 - (9) Instructions

NOTE

To repair holes bigger than 1/2 inch across, do steps A-R.
To repair cracks or punctures less than 1/2 inch across (or in length), do steps R-V.

A For holes larger than 1/2 inch across at any point, cut away damaged area. Make smooth-edged circular opening. (Sharp angular cuts make repair more difficult.)

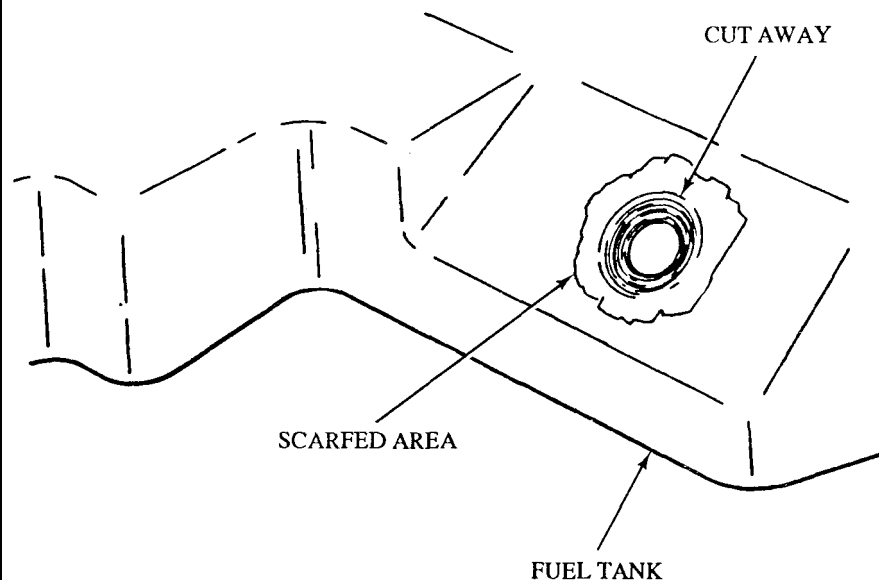
Scarf crater to at least 1-1/2 inch. Shape sides down to opening.

C Blow away dust and clean repair area with dry-cleaning solvent (item 17, Appx B).

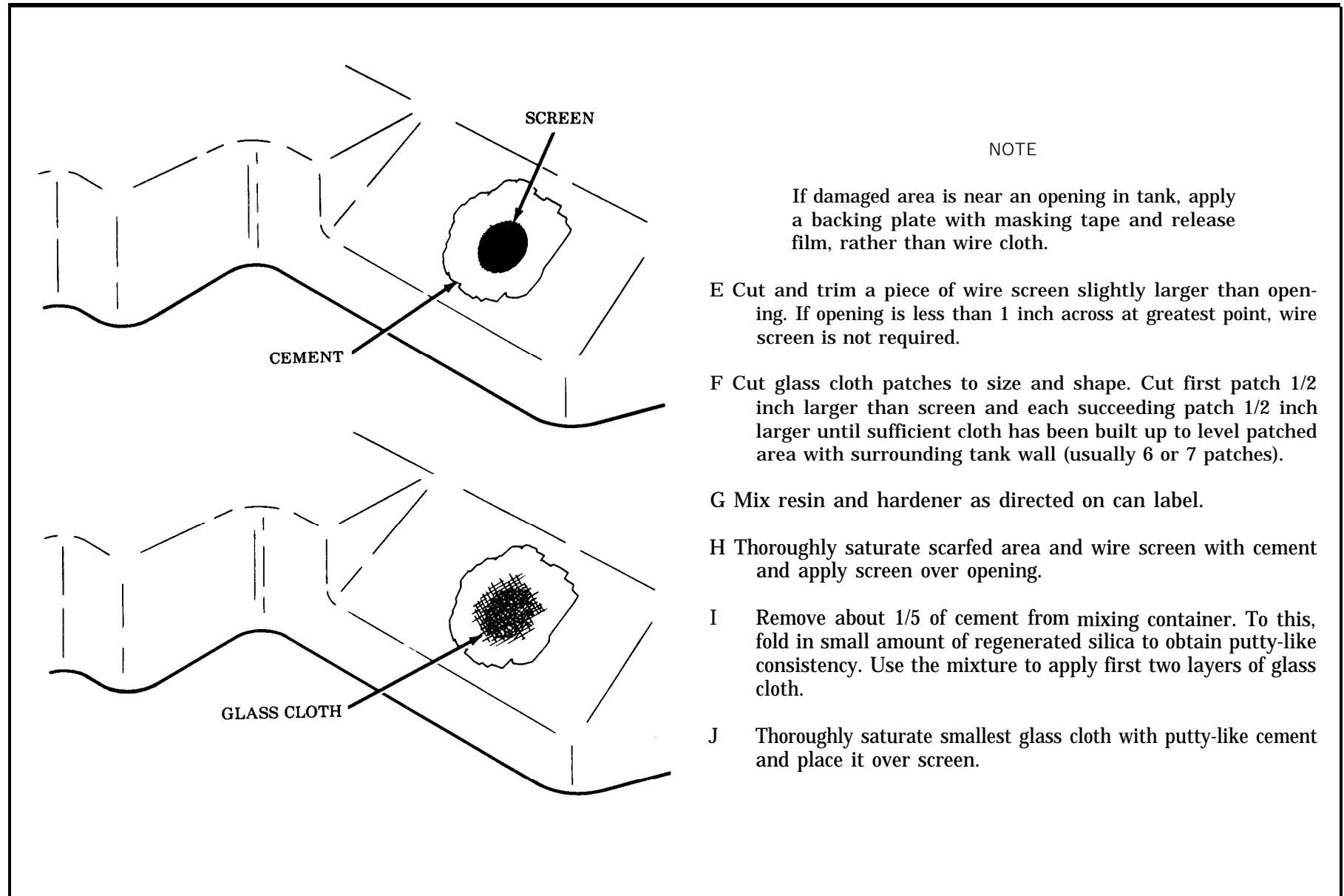
NOTE

Presence of oil in repair area will result in poor adhesion. A 1/8-inch application of regenerated silica (item 5 - Repair Kit) compacted under a warm pad will withdraw oil for improved adhesion.

D Measure repair area and estimate material requirement.



FUEL TANK REPAIR (CONTINUED)



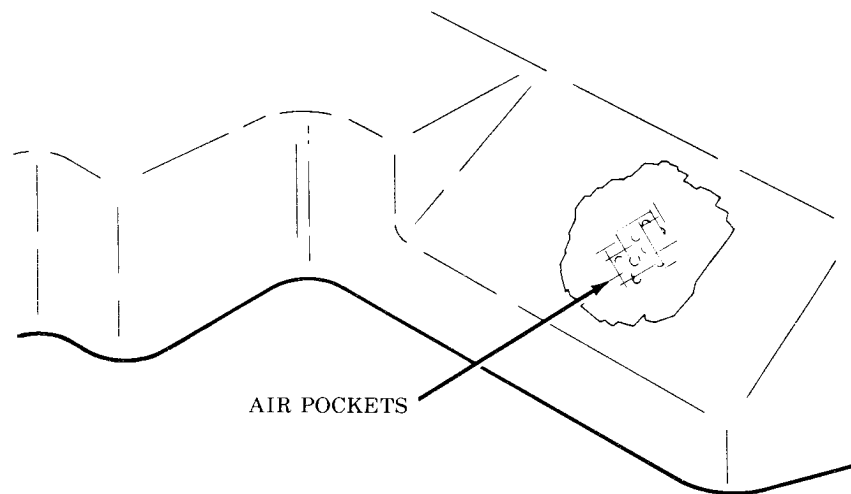
NOTE

If damaged area is near an opening in tank, apply a backing plate with masking tape and release film, rather than wire cloth.

- E Cut and trim a piece of wire screen slightly larger than opening. If opening is less than 1 inch across at greatest point, wire screen is not required.
- F Cut glass cloth patches to size and shape. Cut first patch 1/2 inch larger than screen and each succeeding patch 1/2 inch larger until sufficient cloth has been built up to level patched area with surrounding tank wall (usually 6 or 7 patches).
- G Mix resin and hardener as directed on can label.
- H Thoroughly saturate scarfed area and wire screen with cement and apply screen over opening.
- I Remove about 1/5 of cement from mixing container. To this, fold in small amount of regenerated silica to obtain putty-like consistency. Use the mixture to apply first two layers of glass cloth.
- J Thoroughly saturate smallest glass cloth with putty-like cement and place it over screen.

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FUEL TANK REPAIR (CONTINUED)



AIR POCKETS

NOTE

Apply release film and work out air pockets after each lamination. Work from center of patch outward.

- K Place piece of release film on patch and, with hardwood depressor, work out air pockets. Work from center of patch outward.
- L Remove release film.
- M Repeat steps J-L for second patch application.
- N Saturate remaining patches with mixture without silica and apply to crater.
- O Allow completed patch to set undisturbed for 16 to 24 hours.

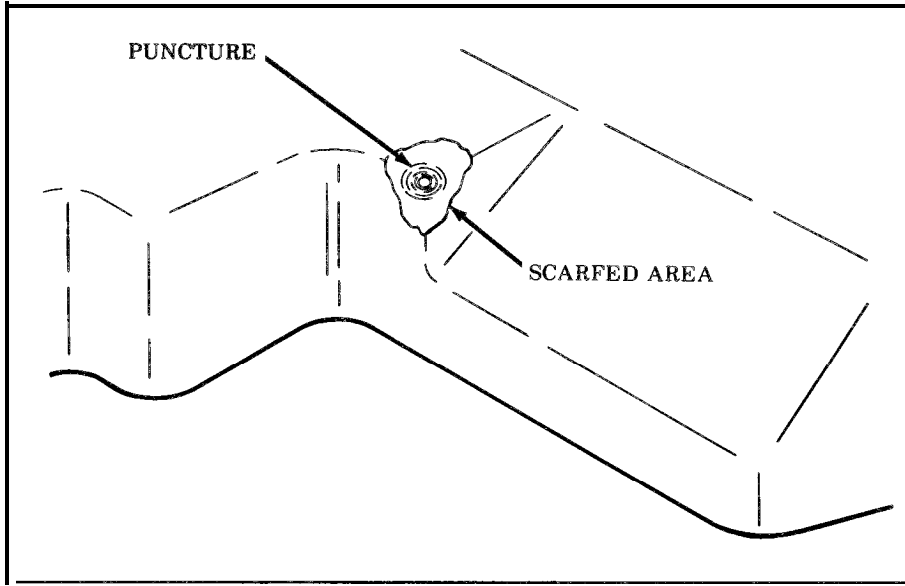
NOTE

Cure will be slow in temperature below 70°F. However, during first hour of cure, temperature should not exceed 100°F.

To reduce cure time to about 4 hours, place heat lamp over patch and gradually increase intensity. Keep lamp at least 2 feet away from patch. Do not allow temperature to exceed 250°F.

- P When cure is complete, and patch flush with surrounding surface, clean and paint with fire retardant paint (item 57, Appx B).
- Q Pressure test the repaired tank using low pressure compressed air at 3 psi.

FUEL TANK REPAIR (CONTINUED)

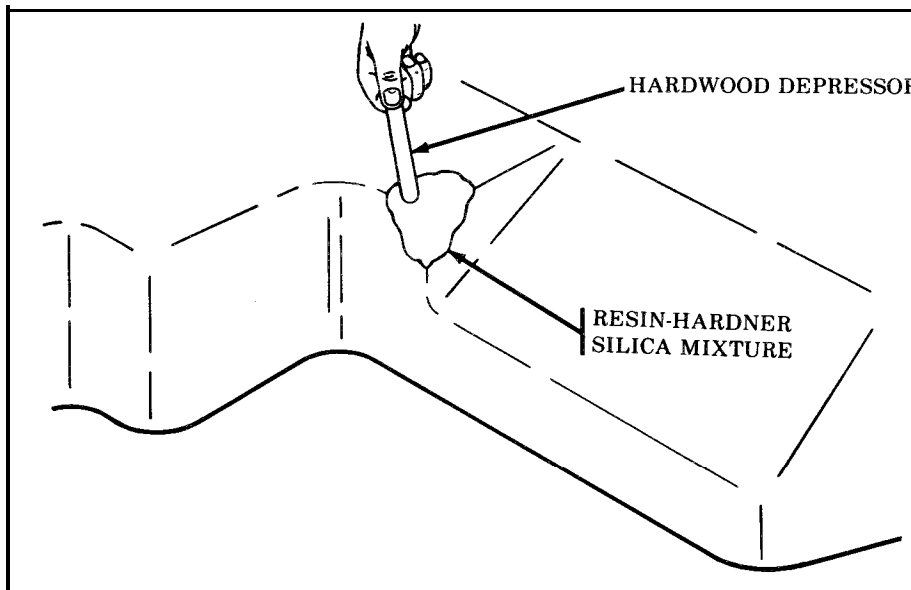


NOTE

Do steps R through V for holes smaller than 1/2 inch across at any point.

R Scarf crater (step B, p 4-20.2).

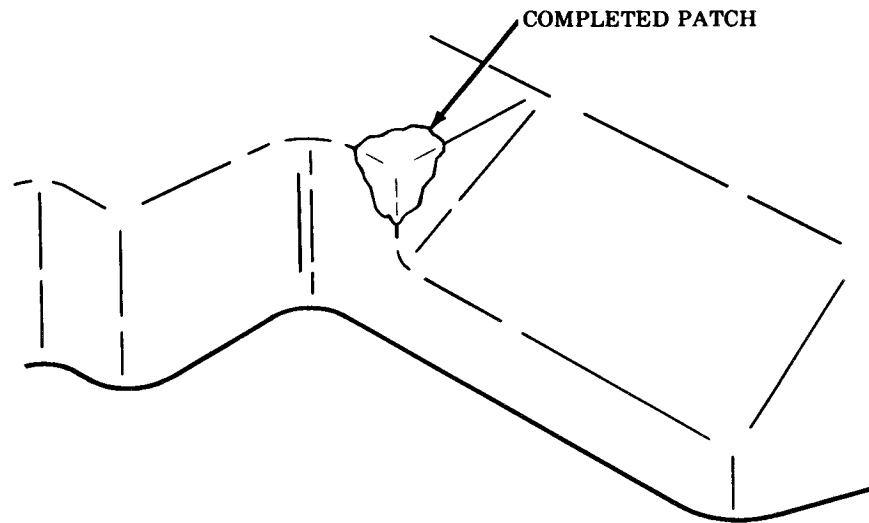
S Clean area to be repaired (step C, p 4-20.2).



T Mix sufficient cement to cover hole by following instructions on cement can. Apply cement directly to puncture or crack. (Fill in entire scarfed area.)

NOTE

A small amount of regenerated silica may be mixed with cement for added consistency, if desired.



U Allow patch to cure 16 to 24 hours.

V Sand patch smooth, clean with cleaning solvent (item 56, Appx B) and paint with fire retardant paint (item 57, Appx B).

WARNING

Immediately after working with fiberglass and resin, thoroughly wash any exposed skin surfaces. If fiber particles are embedded in the skin, DO NOT SCRUB - RINSE IN WARM SOAPY WATER AND SEEK MEDICAL ASSISTANCE.

FUEL TANK PAD: REMOVAL AND INSTALLATION

INITIAL SETUP

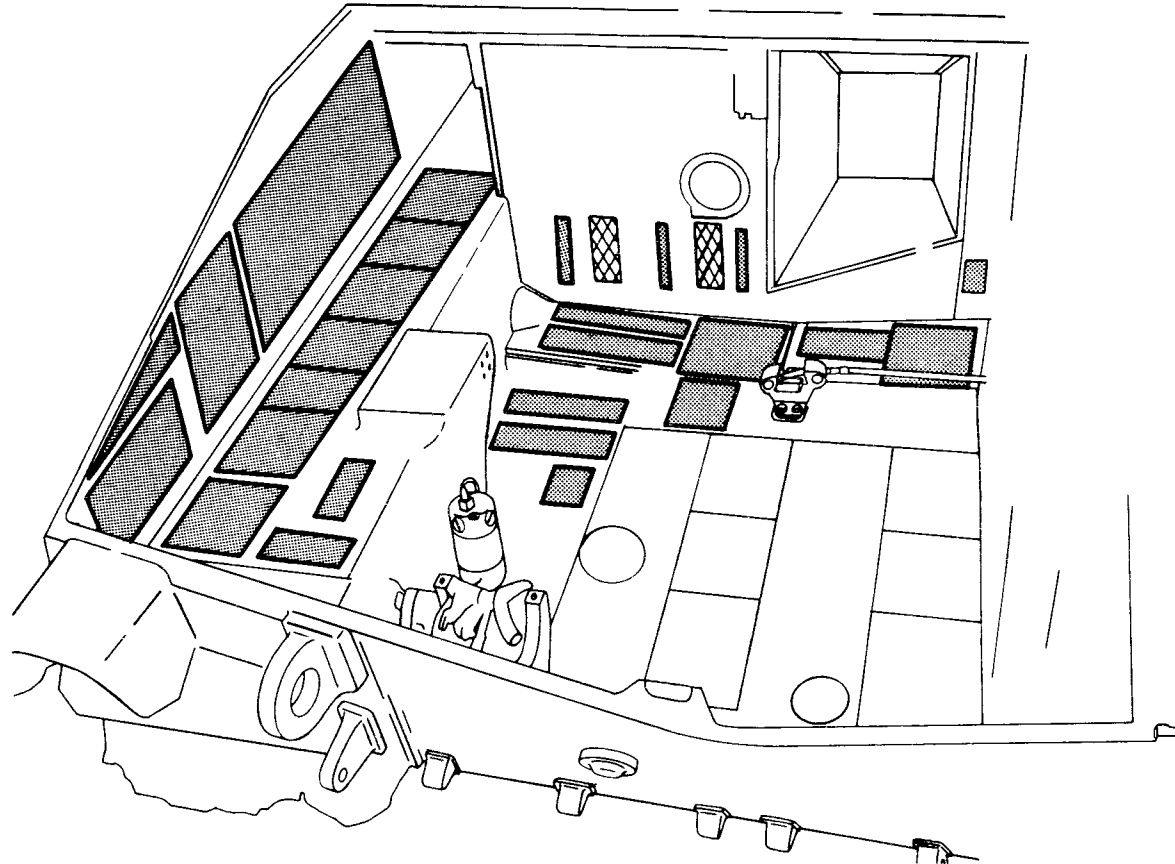
Materials/Parts:

Adhesive (item 4, Appx B)

Equipment Condition:

Powerpack removed

Fuel tanks removed (p 4-10)



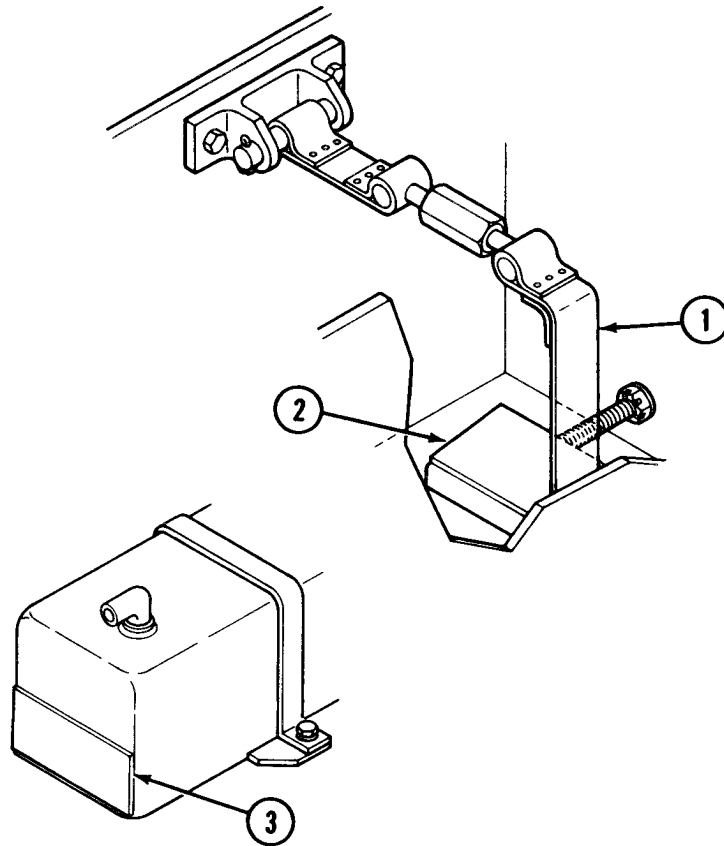
REMOVAL

CAUTION

Only remove pads that are defective and need to be replaced. Illustrations show pad location on hull, fuel tanks and retaining straps. When removing pads from fuel tank, use extreme caution to avoid puncturing or damaging tank.

A Use scraper or similar tool to pry and scrape hull-mounted pads from hull.

FUEL TANK PAD: REMOVAL AND INSTALLATION (CONTINUED)



- B Remove rear retaining strap pad (1) if required. See page 4-24 for removal of retaining strap.
- C Remove channel pad (2) if required. See page 4-24 for removal of channel.

CAUTION

Avoid damaging fuel tanks when removing fuel tank pads.

NOTE

All fuel tanks are not constructed the same. If the side retaining strap fits flush against the lower fuel tank when installed, a pad is not required. If a space exists between the tank and retaining strap, a pad is required.

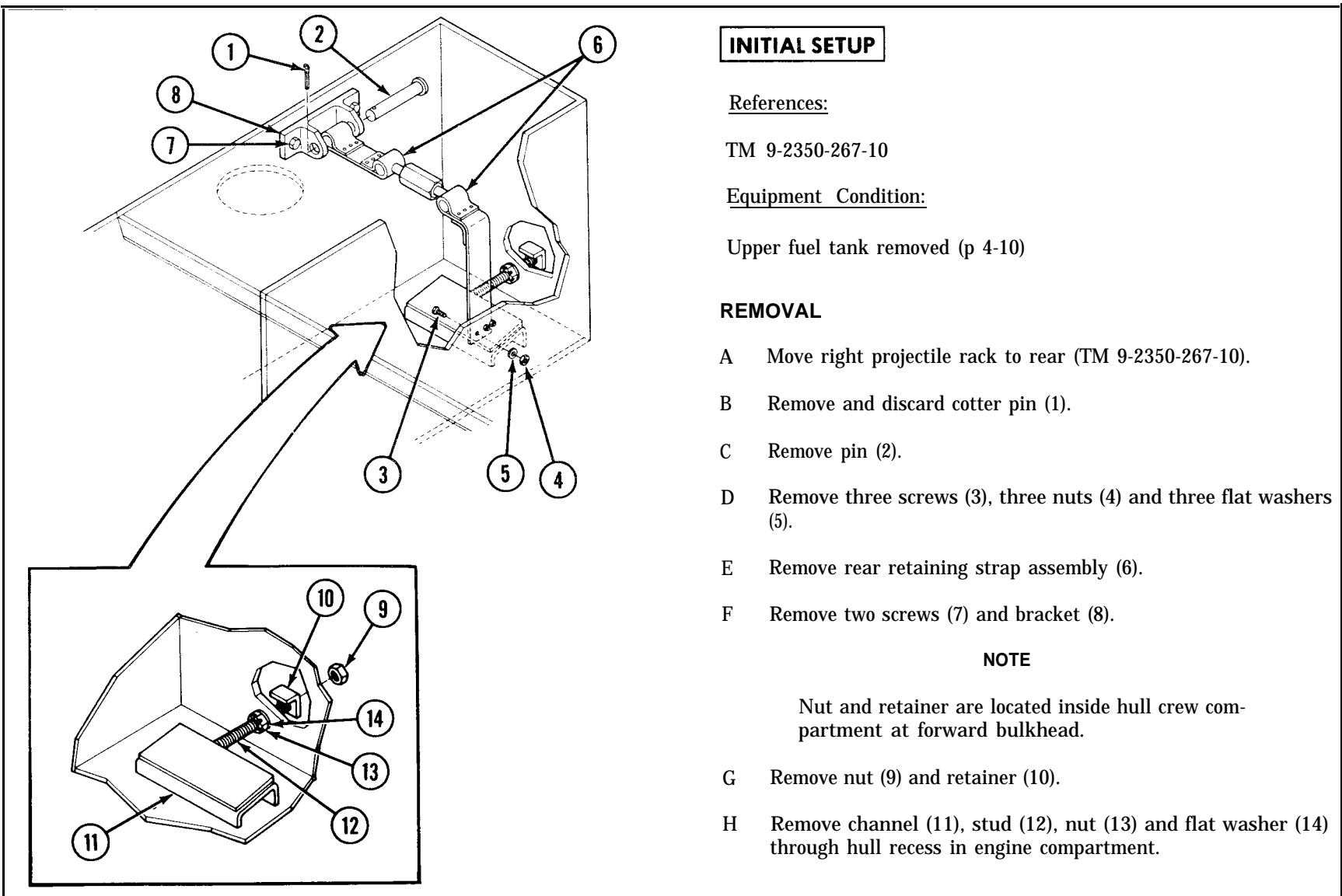
- D Remove fuel tank pads (3).

INSTALLATION

- A Clean pad mounting surfaces thoroughly to remove all residue from old pad and adhesives.
- B Remove all paint from hull mounting surface.
- C Apply adhesive (item 4, Appx B) to pad and mounting surface and let dry until tacky. Install hull-mounted pads.
- D Install rear retaining strap pad (1) and channel pad (2). (See installation steps A-C.)
- E Trim fuel tank pads (3) to proper thickness for alignment and shim of fuel tanks.
- F Install fuel tank pads (3). (See installation steps A-C.)

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RETAINING STRAP AND CHANNEL GROUP REPAIR



INITIAL SETUP

References:

TM 9-2350-267-10

Equipment Condition:

Upper fuel tank removed (p 4-10)

REMOVAL

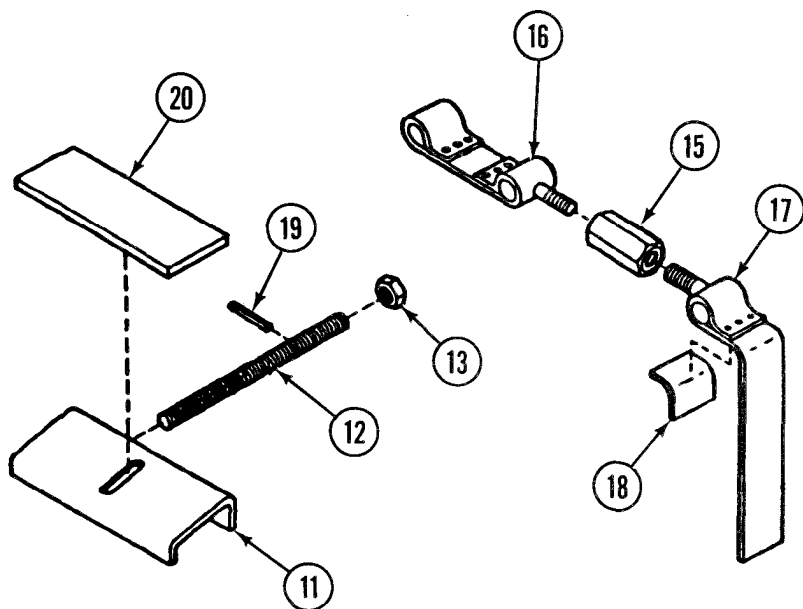
- A Move right projectile rack to rear (TM 9-2350-267-10).
- B Remove and discard cotter pin (1).
- C Remove pin (2).
- D Remove three screws (3), three nuts (4) and three flat washers (5).
- E Remove rear retaining strap assembly (6).
- F Remove two screws (7) and bracket (8).

NOTE

Nut and retainer are located inside hull crew compartment at forward bulkhead.

- G Remove nut (9) and retainer (10).
- H Remove channel (11), stud (12), nut (13) and flat washer (14) through hull recess in engine compartment.

RETAINING STRAP AND CHANNEL GROUP REPAIR (CONTINUED)



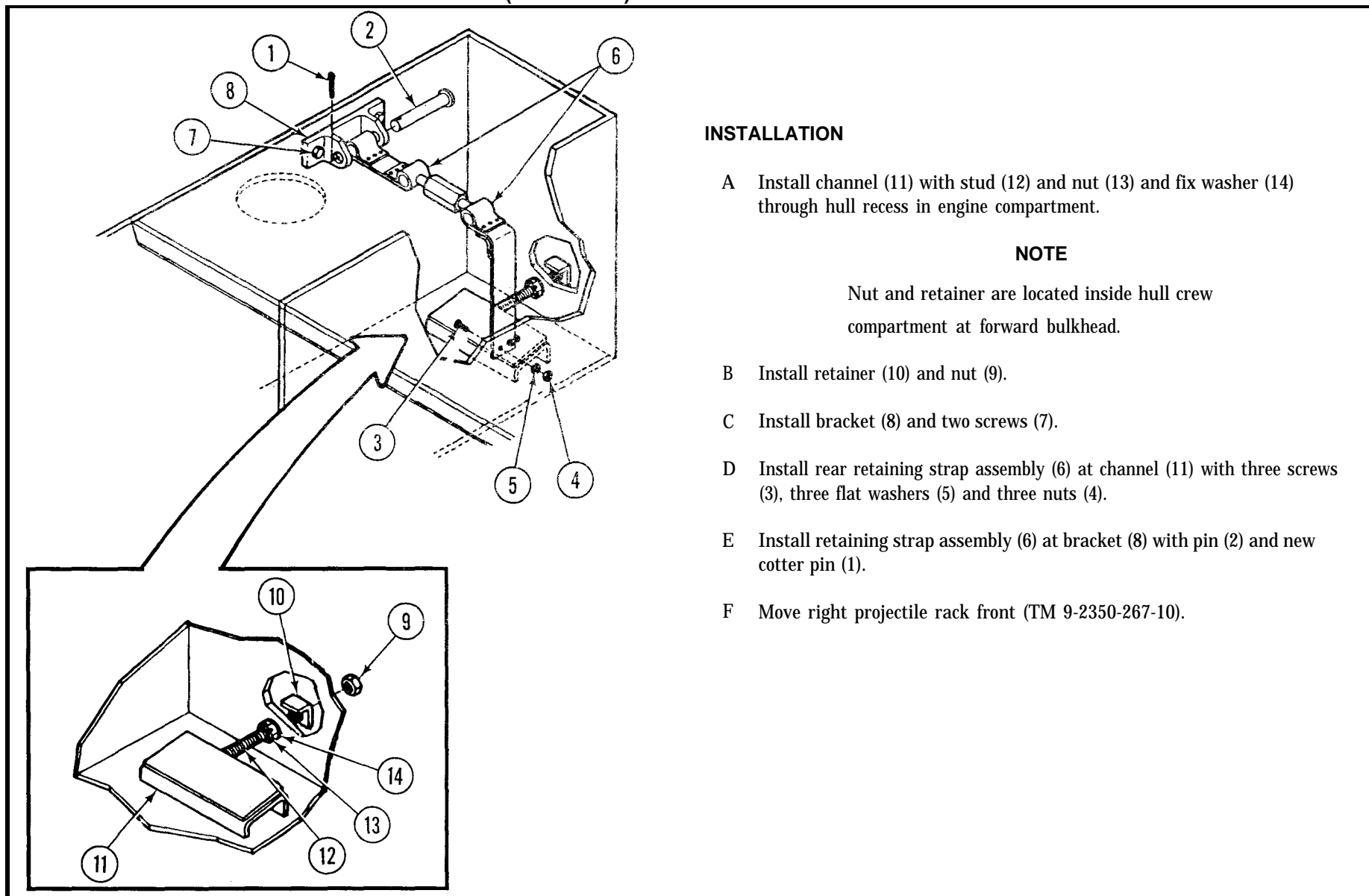
DISASSEMBLY

- A Unscrew turnbuckle (15) to separate top retaining strap (16) from side retaining strap (17).
- B Discard and replace defective straps (16 and 17) or turnbuckle (15).
- C Remove and discard pad (18) if required (p 4-22).
- D Separate channel (11), stud (12), nut (13), and spring pin (19).
- E Remove and discard pad (20) if required (p 4-22).

ASSEMBLY

- A Replace pads (18 and 20) if necessary (p 4-22).
- B Screw stud (12) into channel (11).
- C Install nut (13) and spring pin (19) on stud (12).
- D Join side retaining strap (17) and top retaining strap (16) using turnbuckle (15).

RETAINING STRAP AND CHANNEL GROUP REPAIR (CONTINUED)



INSTALLATION

- A Install channel (11) with stud (12) and nut (13) and fix washer (14) through hull recess in engine compartment.

NOTE

Nut and retainer are located inside hull crew compartment at forward bulkhead.

- B Install retainer (10) and nut (9).
- C Install bracket (8) and two screws (7).
- D Install rear retaining strap assembly (6) at channel (11) with three screws (3), three flat washers (5) and three nuts (4).
- E Install retaining strap assembly (6) at bracket (8) with pin (2) and new cotter pin (1).
- F Move right projectile rack front (TM 9-2350-267-10).

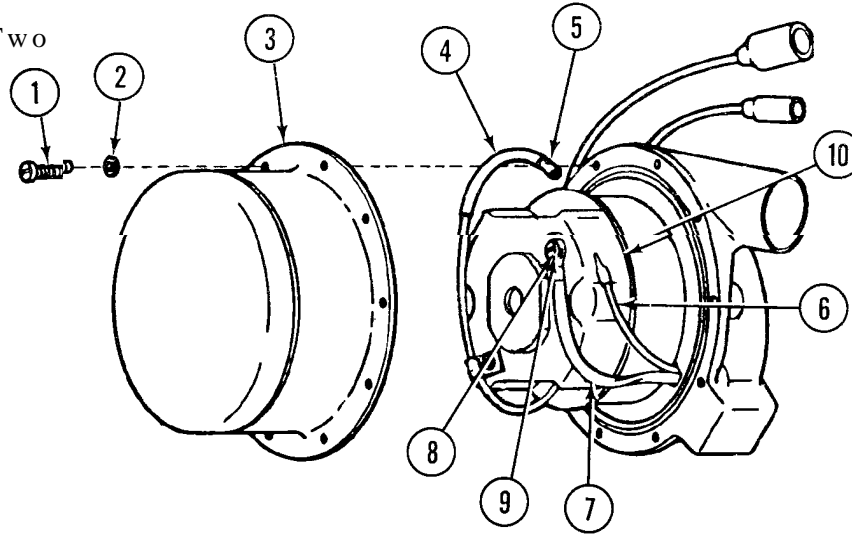
All data on pages 4-25 thru 4-29 deleted.

AIR CLEANER BLOWER

INITIAL SETUP

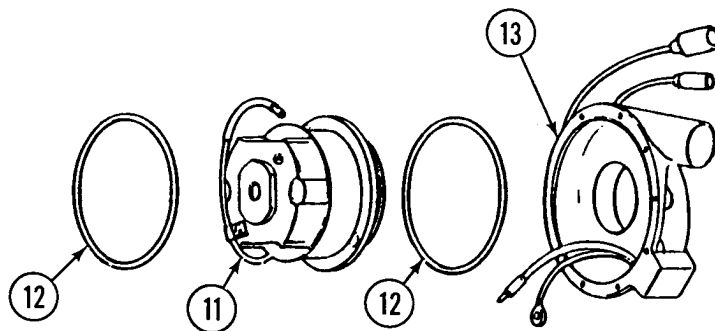
Personnel Required:

Two



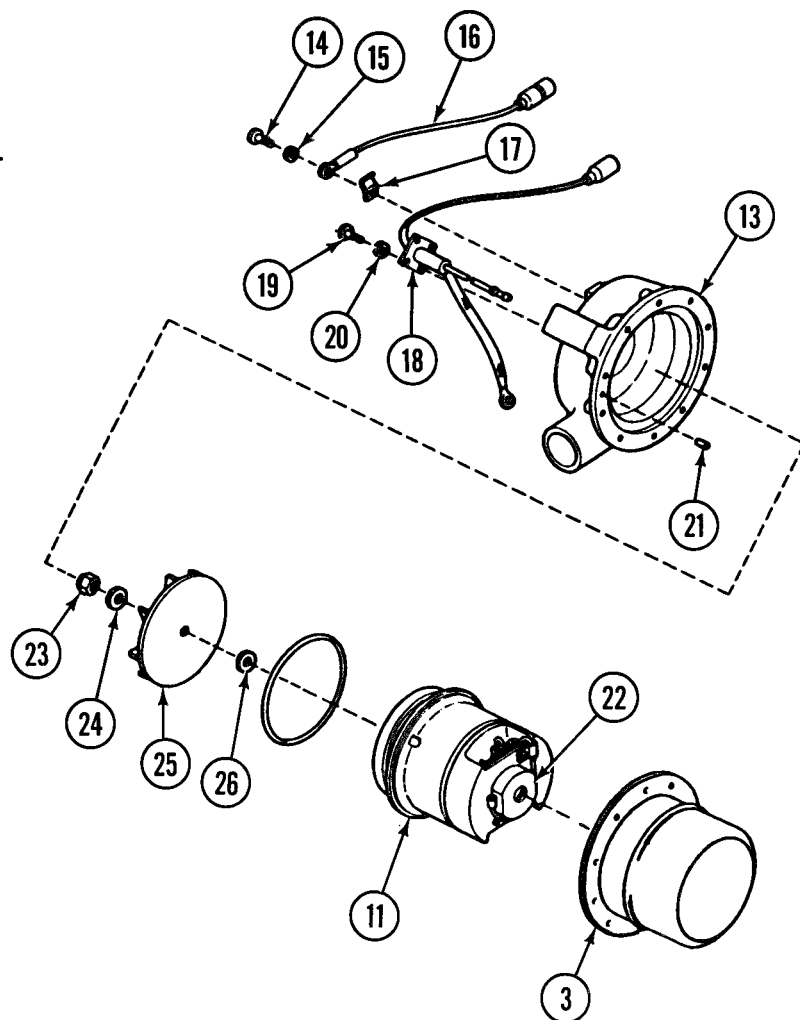
DISASSEMBLY

- A Remove 10 screws (1) and 10 lockwashers (2). Discard lockwashers.
- B Remove motor cover (3).
- C Slide electrical lead insulator (4) away from junction of electrical leads (5 and 6).
- D Disconnect electrical lead (5) from electrical lead (6).
- E Disconnect ground lead (7) by removing screw (8) and lockwasher (9). Discard lockwasher.
- F Install screw (8) into end bell (10).



- G Remove motor assembly (11) and two seals (12) from impeller housing (13).
- H Discard seals (12).

AIR CLEANER BLOWER (CONTINUED)



I Remove screws (14), lockwasher (15), ground lead (16) and retaining strap (17) from impeller housing (13). Discard lockwasher.

J Remove lead assembly with capacitor (18) from impeller housing (13) by removing four screws (19) and four lockwashers (20). Discard lockwashers.

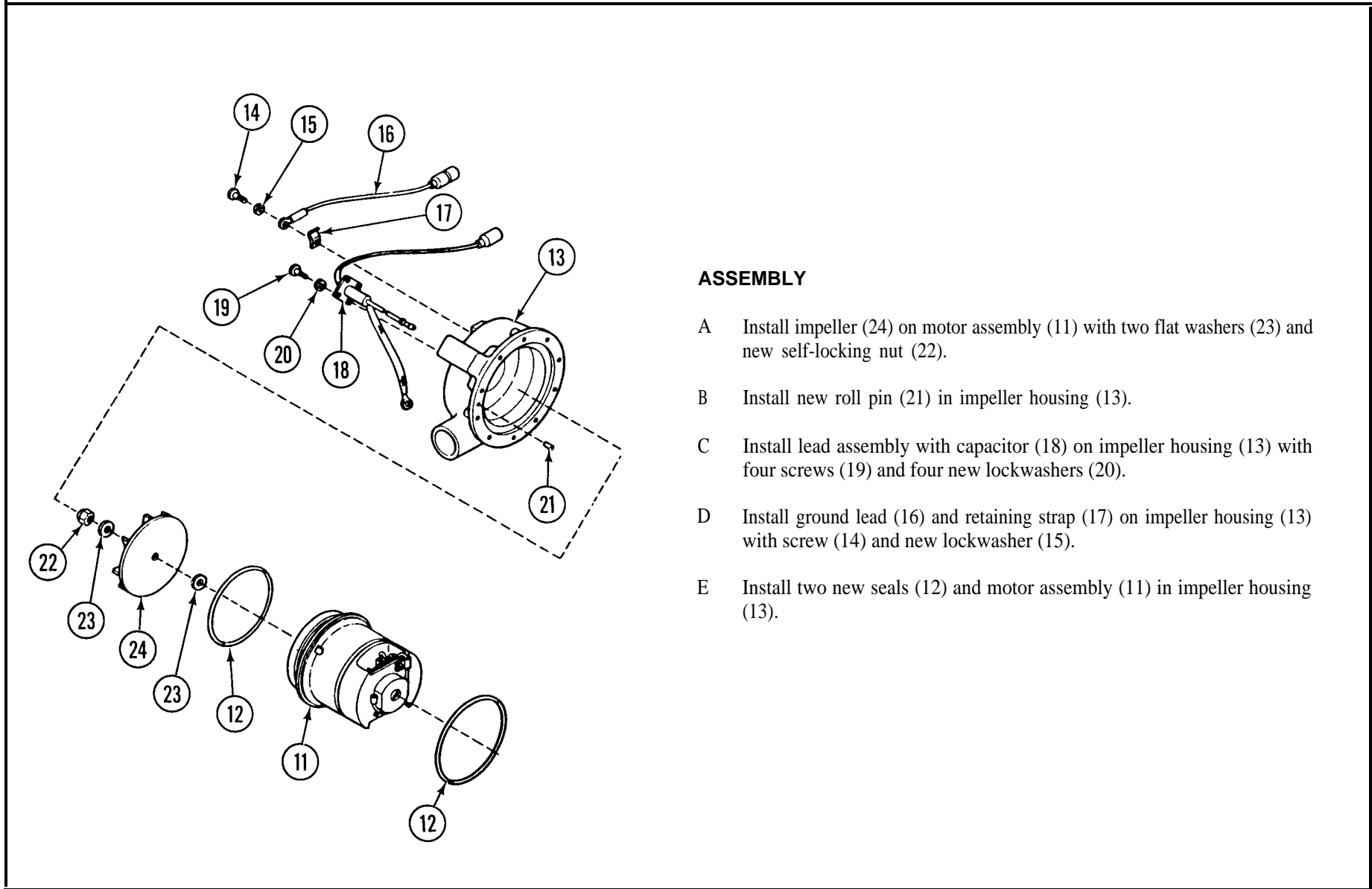
K Remove and discard roll pin (21).

L Using screwdriver in slot (22) to hold motor shaft, remove self-locking nut (23), flat washer (24), threaded impeller (25), and flat washer (26) from motor assembly (11). Discard self-locking nut.

INSPECTION AND REPAIR

A Check impeller housing (13) for cracks or damage. Replace as necessary.

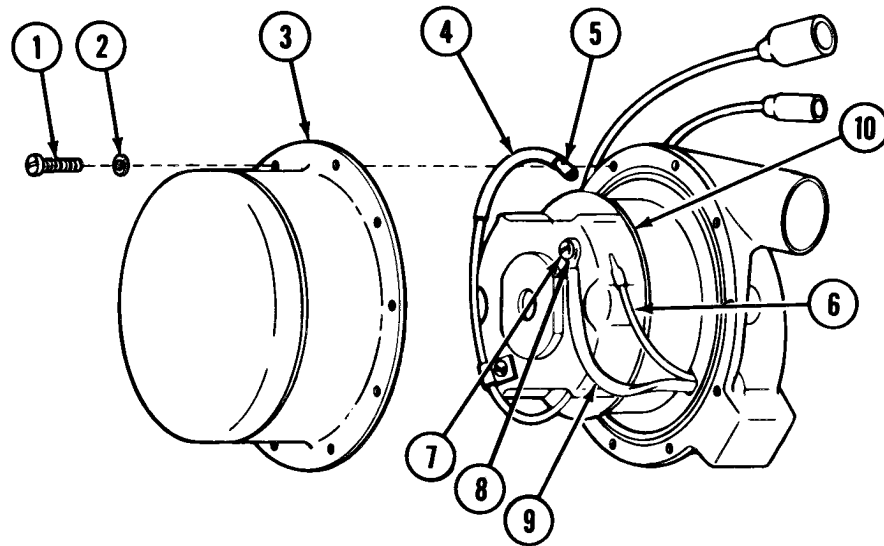
B Check motor cover (3) for cracks, dents or other damage. Replace as necessary.



ASSEMBLY

- A Install impeller (24) on motor assembly (11) with two flat washers (23) and new self-locking nut (22).
- B Install new roll pin (21) in impeller housing (13).
- C Install lead assembly with capacitor (18) on impeller housing (13) with four screws (19) and four new lockwashers (20).
- D Install ground lead (16) and retaining strap (17) on impeller housing (13) with screw (14) and new lockwasher (15).
- E Install two new seals (12) and motor assembly (11) in impeller housing (13).

AIR CLEANER BLOWER (CONTINUED)



- F Connect ground lead (9) to end bell (10) using screw (7) and new lockwasher (8).
- G Connect electrical lead (5) and electrical lead (6) and slide electrical lead insulator (4) over junction.
- H Install motor cover (3) using 10 screws (1) and 10 new lockwashers (2).

TA57379

CHAPTER 5 MAINTENANCE PROCEDURES COOLING SYSTEM

CHAPTER OVERVIEW

This chapter illustrates and describes maintenance procedures for:

- Section I Cooling Fan Drive Assembly and Universal Joints
- Section II Radiator Shroud and Vane Axial Cooling Fan Assemblies
- Section III Surge Tank

Procedures for removal, inspection, repair and installation of coolant manifolds and coolant pumps are contained in TM 9-2815-202-34.

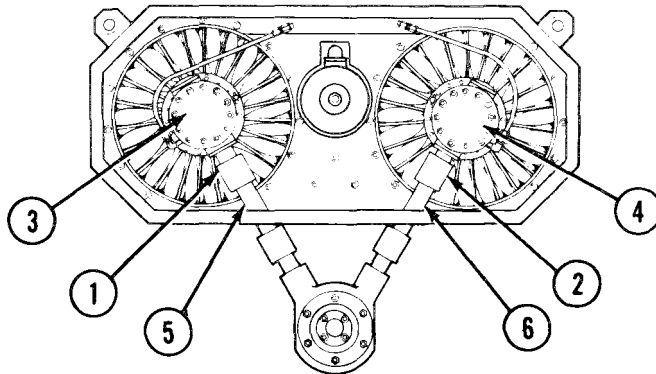
Refer to TM 750-254 for repair of Cooling System.

Section I COOLING FAN DRIVE ASSEMBLY AND UNIVERSAL JOINTS

NOTE

Repair of cooling fan drive assembly and universal joints is direct support maintenance.

UNIVERSAL JOINTS REPAIR



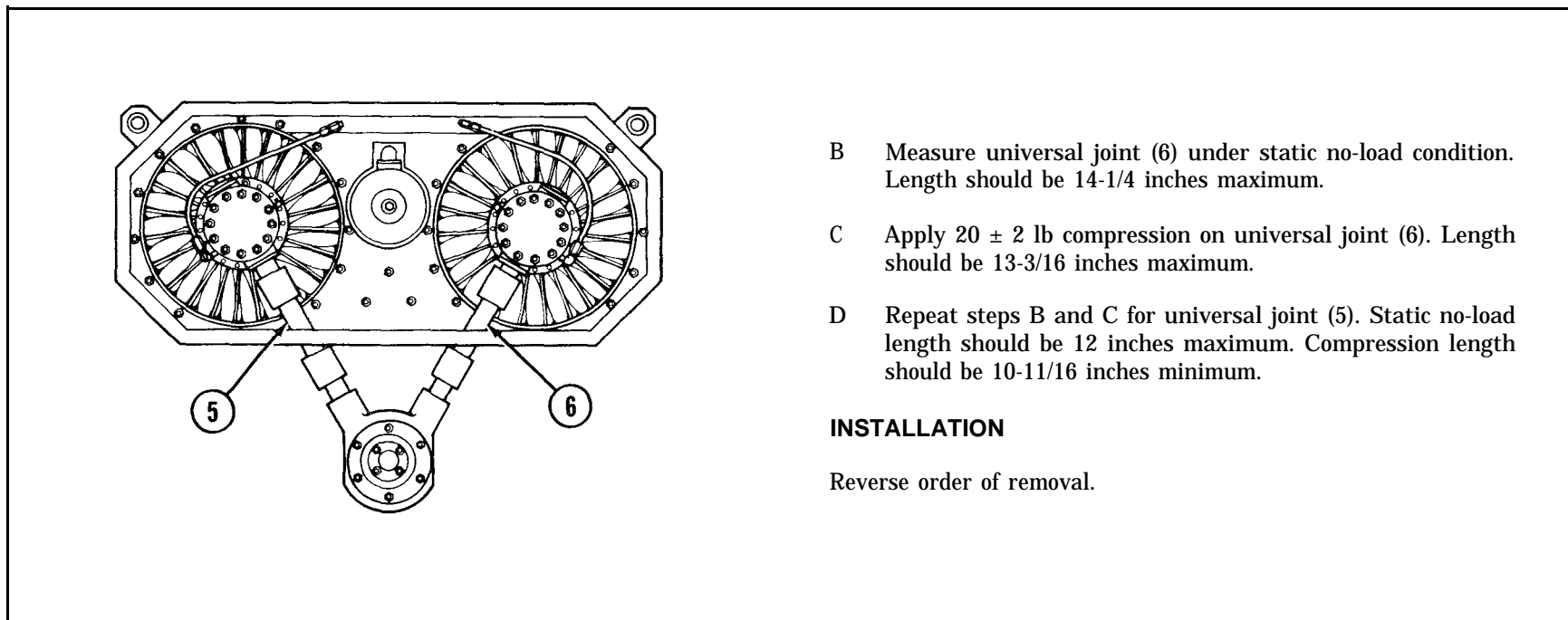
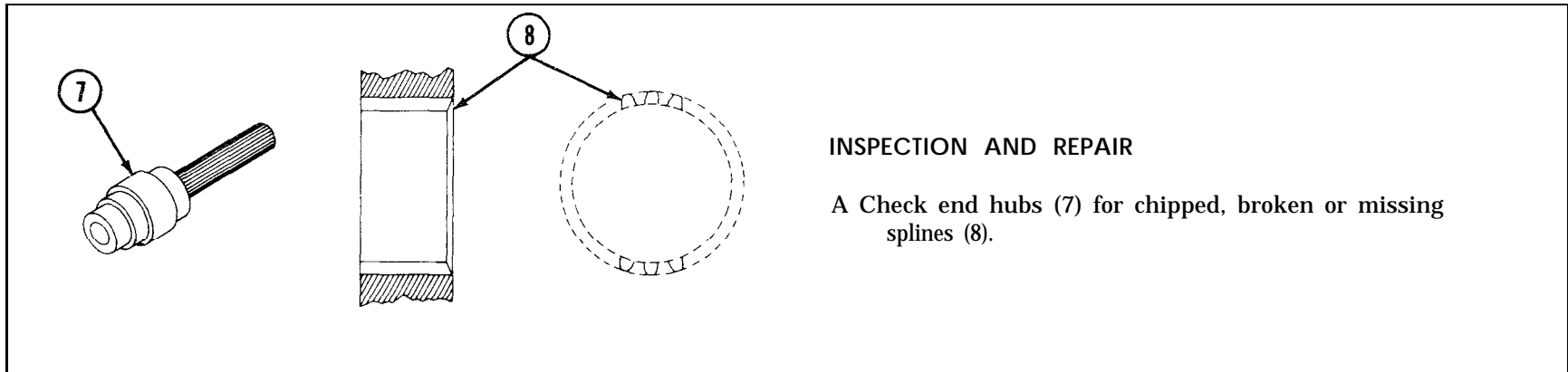
NOTE

Replace entire universal joint if any item is defective.

REMOVAL

- A Push skeeve joints (1 and 2) downward to remove from splined shafts on fan gear boxes (3 and 4).
- B Pull universal joints (5 and 6) away from axial drive shaft assembly and up through opening in shroud.

UNIVERSAL JOINTS REPAIR (CONTINUED)



COOLING FAN DRIVE ASSEMBLY REPAIR

INITIAL SETUP

Test Equipment/Special Tools:

Arbor press (Item 1, Appendix D)
Depth micrometer gage (Item 10.1, Appendix D)
Dial indicator (Item 7.2, Appendix D)
Fabricated fan drive bracket (Appendix E)
Outside micrometer caliper set (Item 7.1, Appendix D)
Snapping pliers (Item 17.1, Appendix D)
Torque wrench (Item 31, Appendix D)
Wire twist pliers (Item 18, Appendix D)

Materials/Parts:

Dry cleaning solvent (Item 18, Appendix B)
Repair kit, 57K0975

Reference: TM 9-214

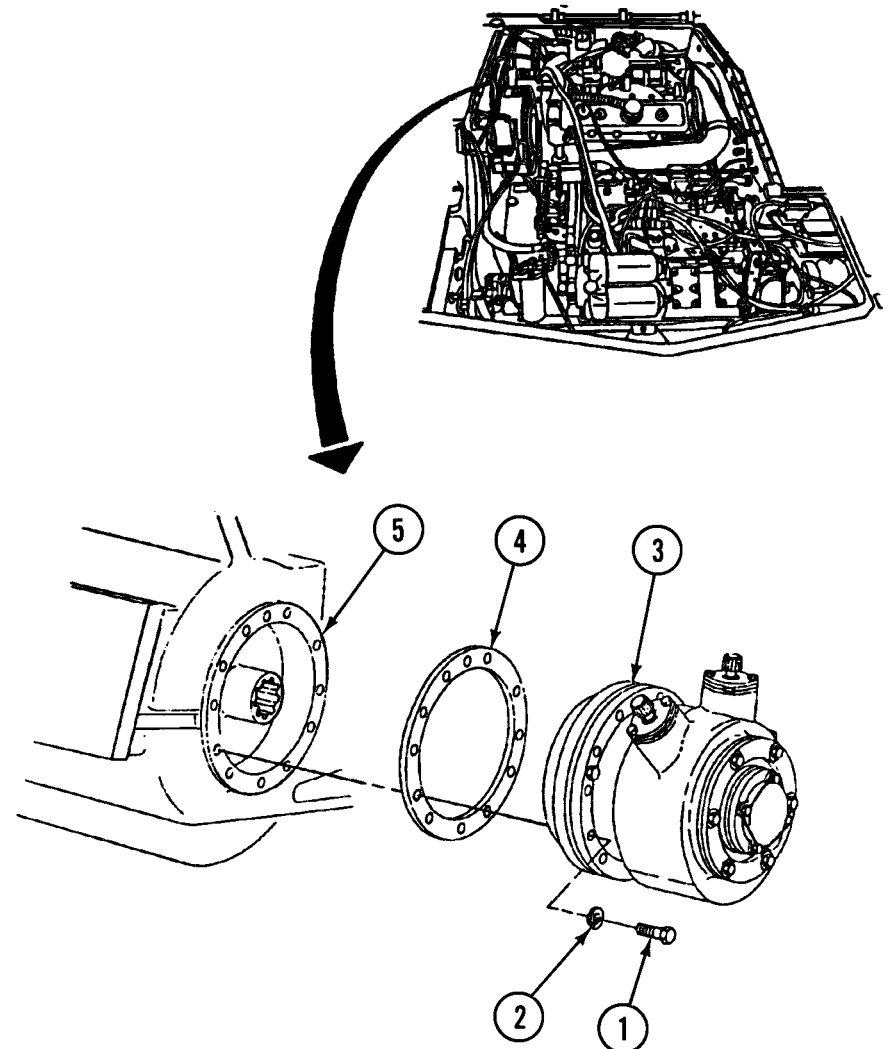
Equipment Conditions:

Fan drive shafts removed (TM 9-2350-267-20).

REMOVAL

A Remove 12 screws (1) and 12 lockwashers (2) from cooling fan drive assembly (3). Discard lockwashers.

B Remove cooling fan drive assembly (3) and gasket (4) from transfer assembly (5). Discard gasket.



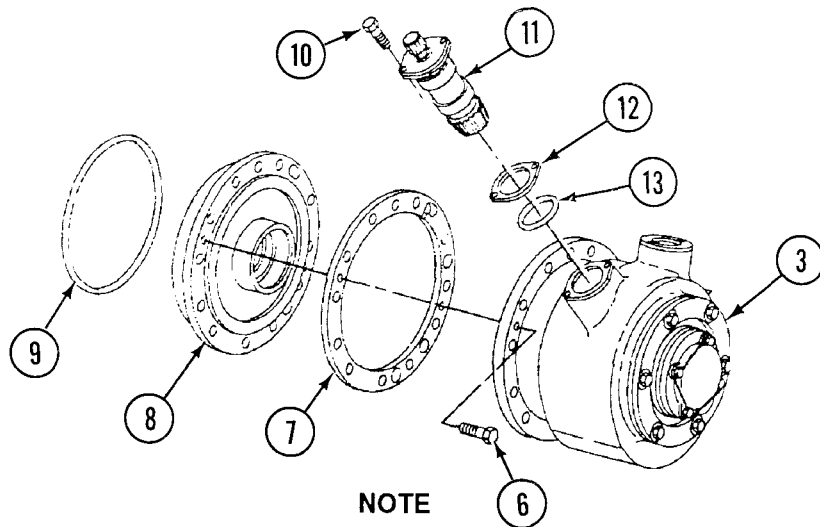
COOLING FAN DRIVE ASSEMBLY REPAIR (CONTINUED)

DISASSEMBLY

A Remove two screws (6), gasket (7), and inner housing cover (8) from cooling fan drive assembly (3). Discard gasket.

B Remove preformed packing (9) from inner housing cover (8). Discard preformed packing.

C Remove four screws (10), two bevel gear assemblies (11), two shims (12), and two preformed packings (13) from cooling fan drive assembly (3). Discard preformed packings.



- There are two bevel gear case assemblies. Both assemblies are disassembled in the same manner. This task disassembles only one bevel gear case assembly.
- Perform steps D through H for disassembly of bevel gear case assembly.

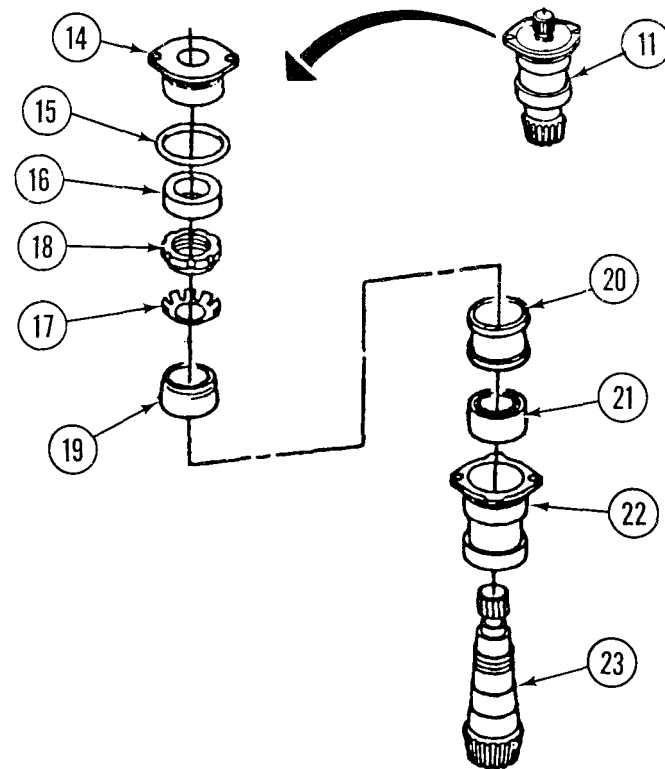
D Remove retainer (14) from bevel gear case assembly (11).

E Remove preformed packing (15) and seal (16). Discard preformed packing and seal.

F Straighten locking tabs on key washer (17).

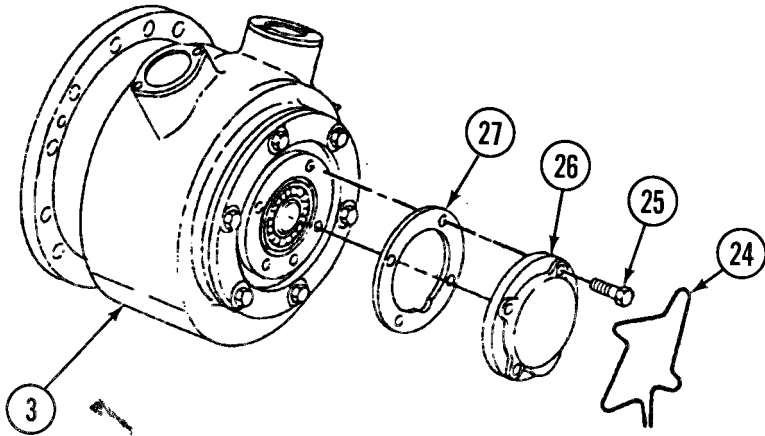
G Remove nut (18) and key washer (17). Discard key washer.

H Remove bearing (19), spacer (20), bearing (21), and sleeve (22) from gear shaft (23).



COOLING FAN DRIVE ASSEMBLY REPAIR (CONTINUED)

- I Remove lockwire (24), four screws (25), cover (26), and bearing gasket (27) from cooling fan drive assembly (3). Discard gasket and lockwire.



NOTE

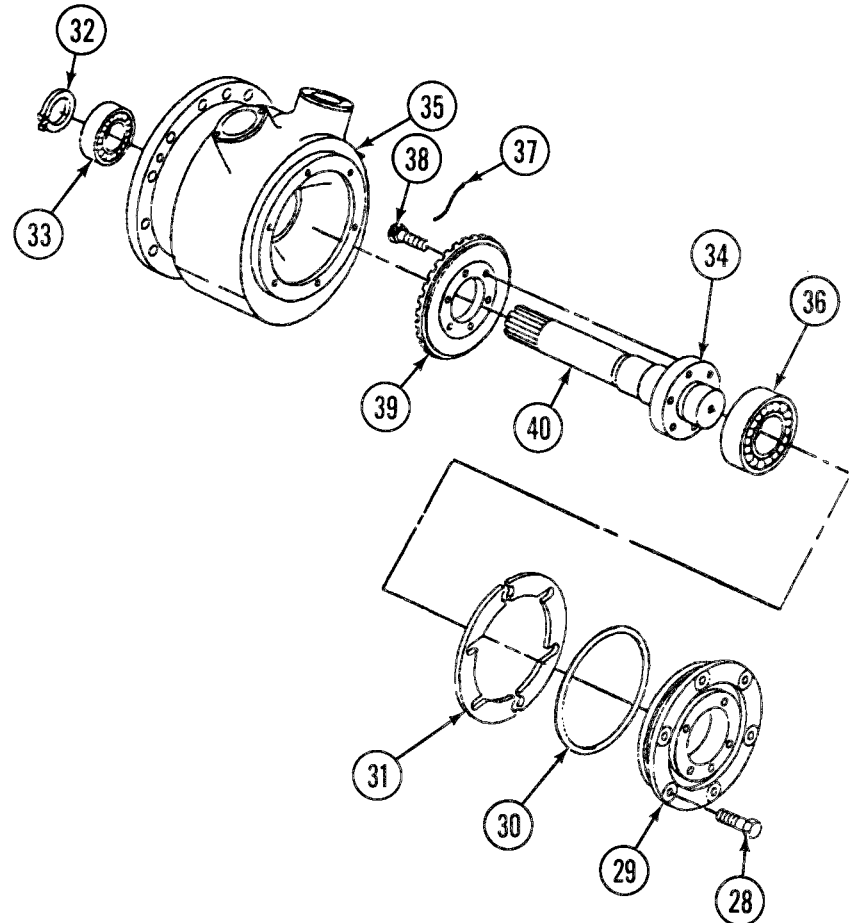
Quantity of shims will vary. Measure thickness of shims and record information for use during assembly.

- J Remove six screws (28), housing (29), preformed packing (30), and shims (31). Discard shim(s) and preformed packing.

WARNING

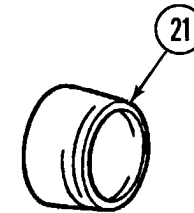
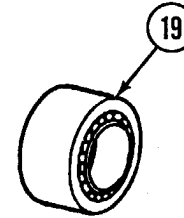
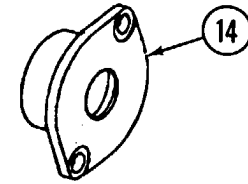
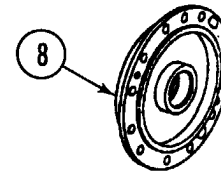
Use care when removing snap and retaining rings. Snap and retaining rings are under spring tension and can act as projectiles when released and could cause severe eye injury.

- K Remove retaining ring (32) and bearing (33). Discard retaining ring.
L Remove drive shaft assembly (34) from fan drive housing (35).
M Remove bearing (36) from drive shaft assembly (34).
N Remove lockwire (37), six screws (38), and gear (39) from drive shaft (40). Discard lockwire.



COOLING FAN DRIVE ASSEMBLY REPAIR (CONTINUED)**CLEANING AND INSPECTION****WARNING**

Dry-cleaning solvent (PD-680) is toxic and flammable. To prevent personal injury when using PD-680, use only in a well ventilated area. Avoid breathing vapors. If you become dizzy get fresh air immediately and seek medical attention. Avoid contact with eyes, skin, and clothing. Use protective goggles, gloves, and clothing. If contact is made, immediately flush with water and seek medical attention. The flashpoint for Type I dry-cleaning solvent is 100°F (38°C); for Type II it is 138°F (50°C). Do not use near open flame or excessive heat.

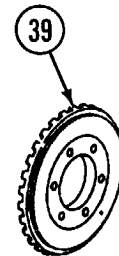
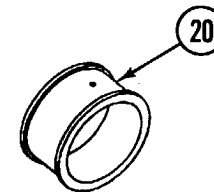
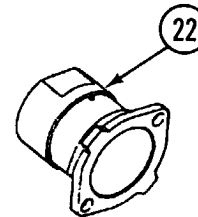


- A Clean all parts with dry-cleaning solvent before inspection.
- B Inspect inner housing cover (8) for cracks or distortion. Replace if cracked or distorted.
- C Inspect two retainers (14) for burrs, cracks or chips. Replace if burred, cracked or chipped.
- D Inspect bearing (19) and bearing (21) for damage or defects (TM 9-214). Replace if defective.

E Inspect sleeve (22) for cracks. Replace if cracked.

F Inspect spacer (20) for burrs or sharp edges. Replace if burred or defective.

G Inspect gear (39) for burrs, or cracked or broken splines. Replace if splines are cracked or broken. Remove burrs with fine file or stone.

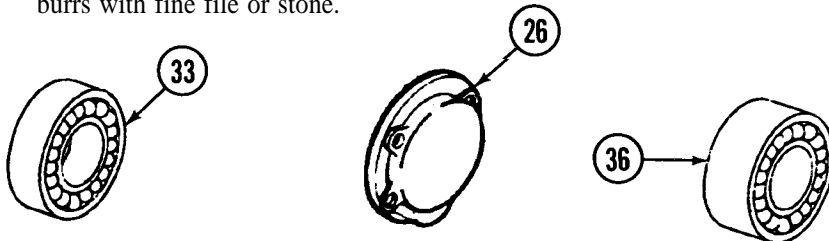


COOLING FAN DRIVE ASSEMBLY REPAIR (CONTINUED)

- H Inspect gearshaft (23) for burrs or chipped or broken splines. Replace if burred or splines are chipped or broken.
- I Inspect drive shaft (40) for burrs or cracked or broken splines. Replace if splines are cracked or broken. Remove burrs with fine file or stone.



- J Inspect bearing (33) and bearing (36) for damage or defects (TM 9-214). Replace if defective.
- K Inspect cover (26) for burrs and cracks. Replace if cracked. Remove burrs with fine file or stone.



- L Inspect housing (29) for nicks or damage. Replace if nicked or damaged.
- M Inspect fan drive housing (35) for cracks or damage. Replace if cracked or damaged.

ASSEMBLY

- A Install gear (39), six screws (38), and new lockwire (37) on drive shaft (40). Torque screws to 32 ft-lb (43 N•m).

- B Install bearing (36) on drive shaft assembly (34).
- C Install drive shaft assembly (34) in fan drive housing (35).

NOTE

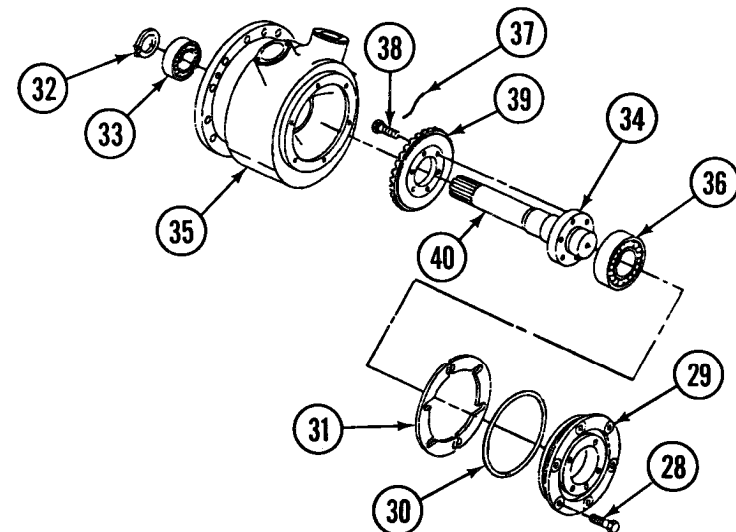
Install shims using thickness recorded during disassembly.

- D Install new shims (31), new preformed packing (30), housing (29), and six screws (28) on fan drive housing (35).

WARNING

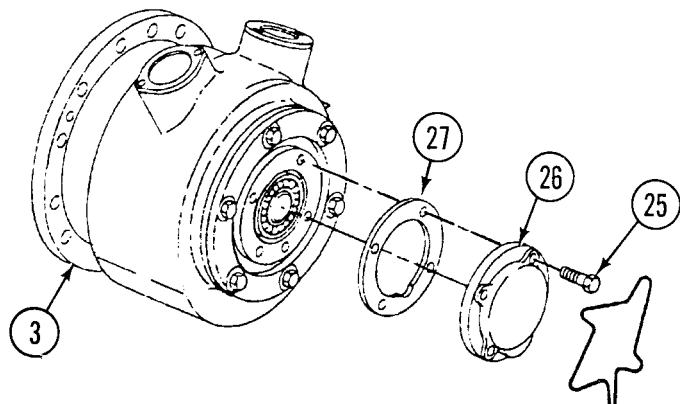
Use care when installing snap and retaining rings. Snap and retaining rings are under spring tension and can act as projectiles when released and could cause severe eye injury.

- E Install bearing (33) and new retaining ring (32).



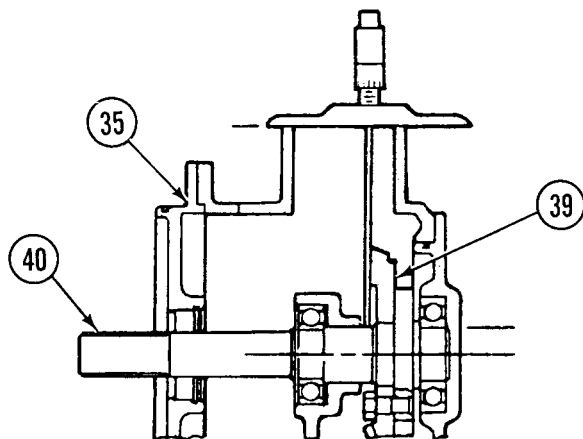
COOLING FAN DRIVE ASSEMBLY REPAIR (CONTINUED)

- F Install new bearing gasket (27), cover (26), and four screws (25) on fan drive assembly (3). Torque screws to 19-21 ft-lb (25-28 N•m).



- G Measure distance between retainer boss and top of drive shaft (40) at a point between fan drive housing (35) and gear (39).

- H Add 0.671 inch (17.04 mm) to distance measured in disassembly step J and record total as dimension B.



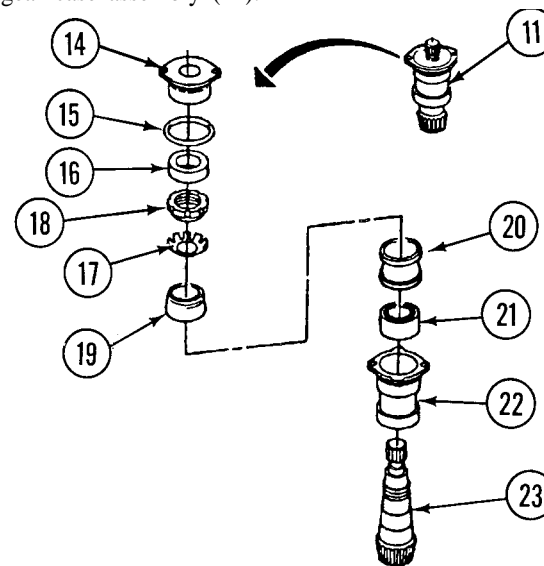
NOTE

- There are two bevel gear case assemblies. Both assemblies are assembled in the same manner. This task assembles only one bevel gear case assembly.
- Perform steps I through K for assembly of bevel gear case assembly.
- Clean and lubricate new seal members in step K before assembly.

- I Install sleeve (22), bearing (21), spacer (20), and bearing (19) on gear shaft (23).

- J Install new key washer (17) and nut (18).

- K Install new seal (16), new preformed packing (15), and retainer (14) on bevel gear case assembly (11).

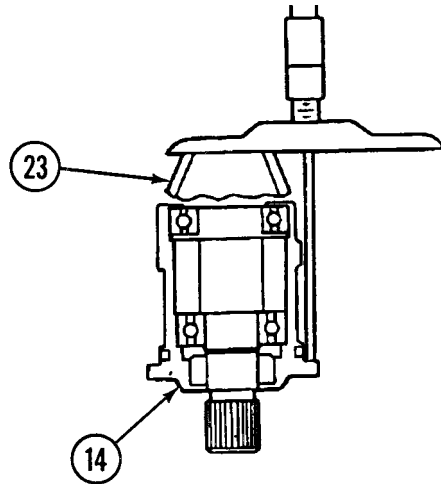


COOLING FAN DRIVE ASSEMBLY REPAIR (CONTINUED)

L Measure distance from end of gear shaft (23) to flange on retainer (14).

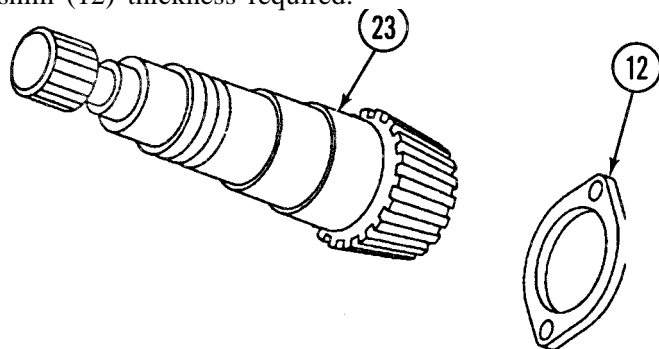
M Record distance measured in step L as dimension A.

N Subtract dimension A from dimension B (step H) and record result as dimension C.



O Read dimension Z from face of gear shaft (23).

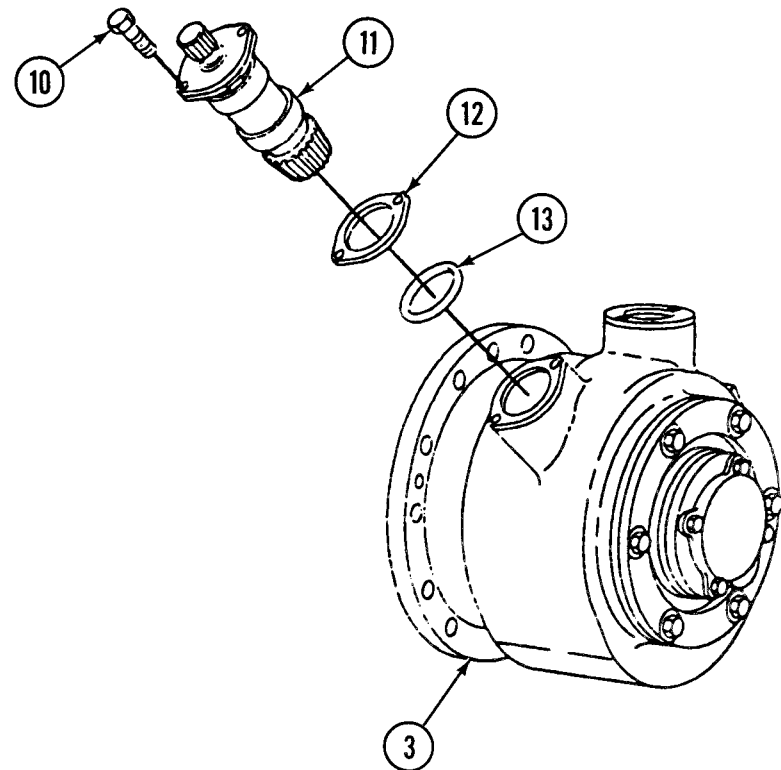
P Subtract dimension C (step N) from dimension Z and record result as the shim (12) thickness required.



NOTE

Use shim thickness as determined in step P.

Q Install two new preformed packings (13), shims (12), and two bevel gear ease assemblies (11) into fan drive assembly (3) with four screws (10). Torque screws to 19-21 ft-lb (25-28 N•m).

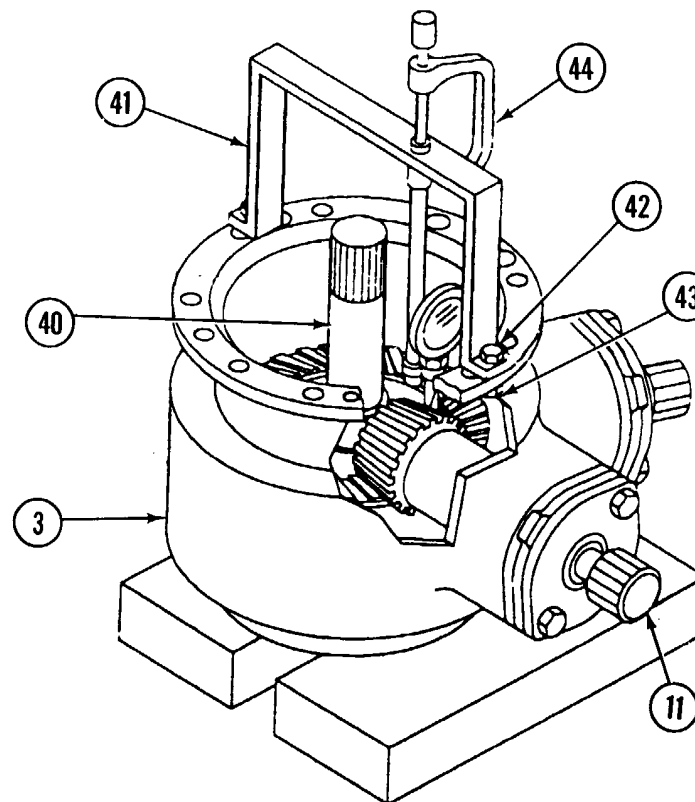


COOLING FAN DRIVE ASSEMBLY REPAIR (CONTINUED)

NOTE

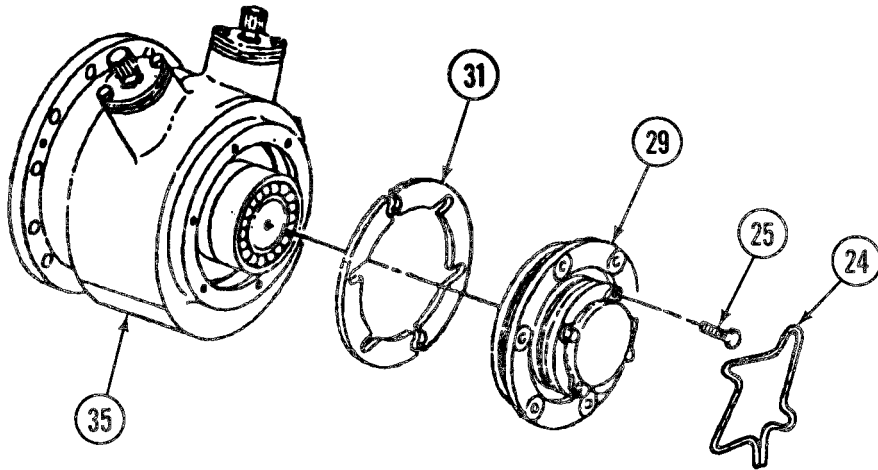
- Backlash between gear shaft and draft shaft must be between 0.002 and 0.004 inch.
- Perform steps R through W to check backlash.

- R Set cooling fan drive assembly (3) on support blocks on a flat surface.
- s Install fabricated fan drive bracket (41) in line with bevel gear case assembly (11) on cooling fan drive assembly (3) with two screws (42) and nuts (43).
- T Install dial indicator (44) on fabricated fan drive bracket (41) with plunger positioned on bevel gear teeth.
- U Hold drive shaft (40) secure to prevent any movement and rotate gear shaft (11) counterclockwise as far as possible. Do not force.
- V Zero dial indicator and slowly rotate gear shaft (11) clockwise as far as possible. Read backlash measurement.



(COOLING FAN DRIVE ASSEMBLY REPAIR (CONTINUED))

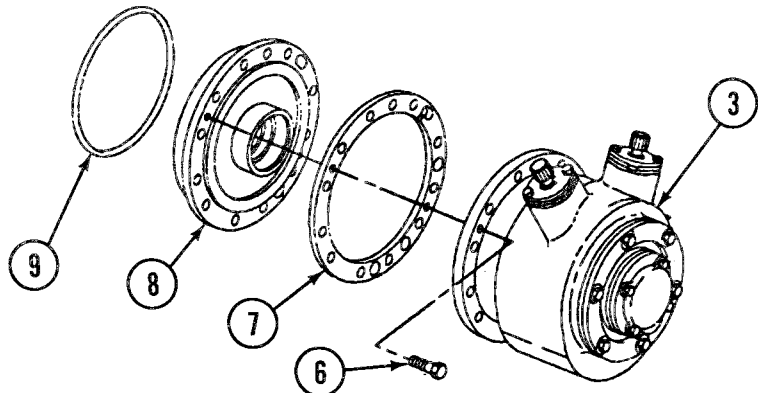
W Add or remove shim(s) (31) between fan drive housing (35) and housing (29) to obtain required backlash.



X Install new lockwire (24) on four screws (25).

Y Install new gasket (7) and inner housing cover (8) on cooling fan drive assembly (3) with two screws (6).

Z Install new preformed packing (9) on inner housing cover (8).



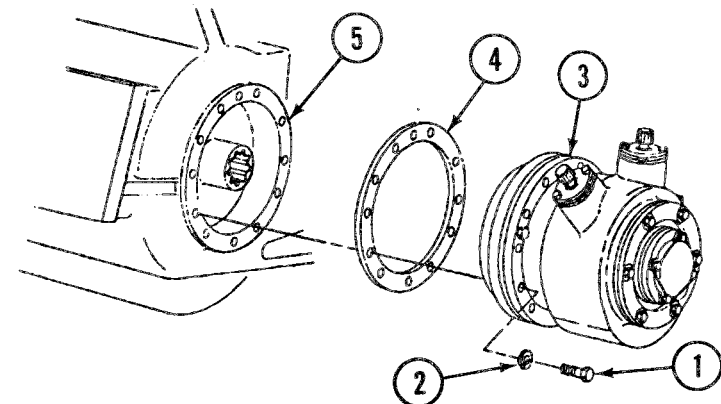
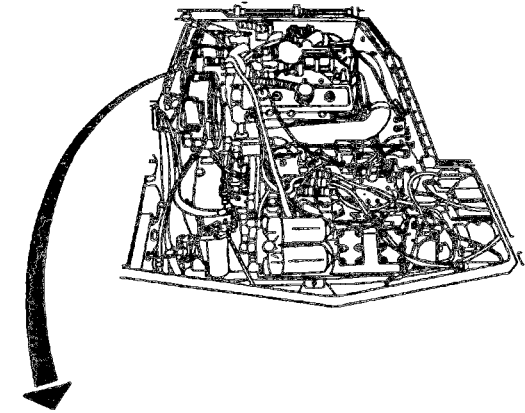
INSTALLATION

A Install new gasket (4).

NOTE

Rubber hammer may be needed to seat cooling fan drive assembly during installation.

B Install 12 screws (1), 12 new lockwashers (2), and cooling fan drive assembly (3) on transfer assembly (5).



Section II RADIATOR SHROUD AND AXIAL COOLING FAN ASSEMBLIES

RADIATOR SHROUD REPAIR

INITIAL SETUPTest Equipment/Special Tools:

Blind hand riveter (item 6, Appx D)

Equipment Condition:

Powerpack removed (refer to TM 9-2350-267-20).

Radiator removed from powerpack (refer to TM 9-2350-267-20).

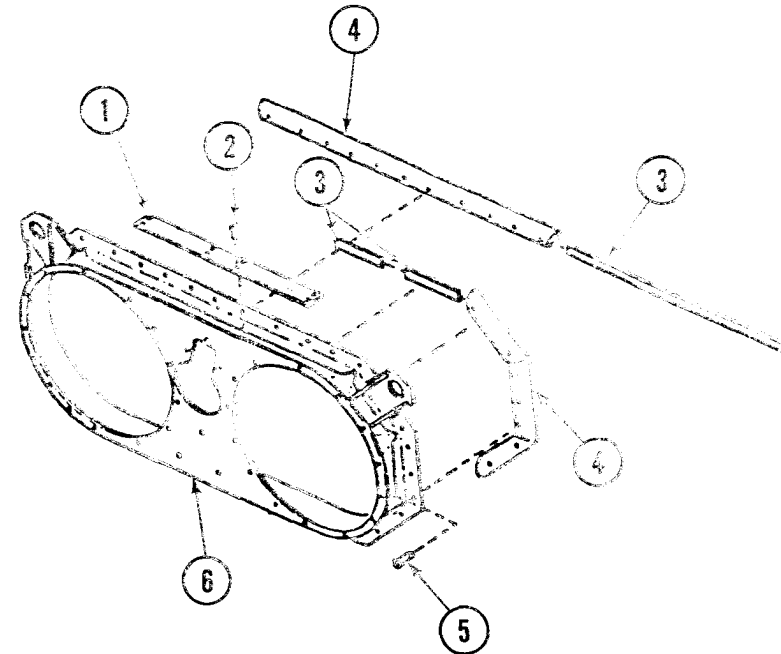
Radiator shroud removed (refer to TM 9-2350-267-20).

DISASSEMBLY

- A Remove cover (1) from shroud (6) by removing eight screws (2).
- B Remove and discard seals (4) and retainers (3) by removing 36 rivets (5).

ASSEMBLY

- A Install new seals (4) and new retainers (3) with 36 new rivets (5).
- B Install cover (1) on shroud (6) with eight screws (2).



VANE AXIAL COOLING FAN ASSEMBLIES REPAIR

INITIAL SETUP

Test Equipment/Special Tools:

Tool kit: precision instrument repair (item 22, Appx D).

References:

TM 9-214

Equipment Conditioned:

Powerpack removed (refer to TM 9-2350-267-20).
Radiator removed from powerpack (refer to TM 9-2350-267-20).
Radiator shroud removed (refer to TM 9-2350-267-20).

Personnel Required:

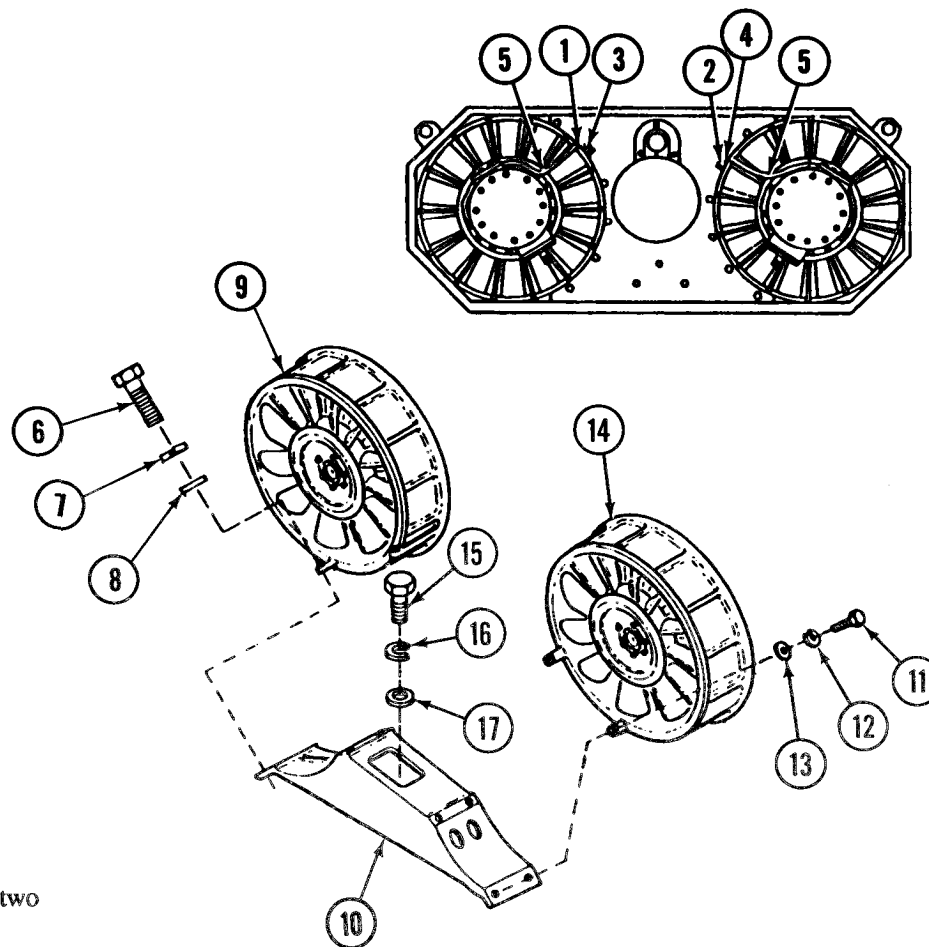
Two

NOTE

Repair of the vane axial cooling fan assembly is direct support maintenance.

REMOVAL

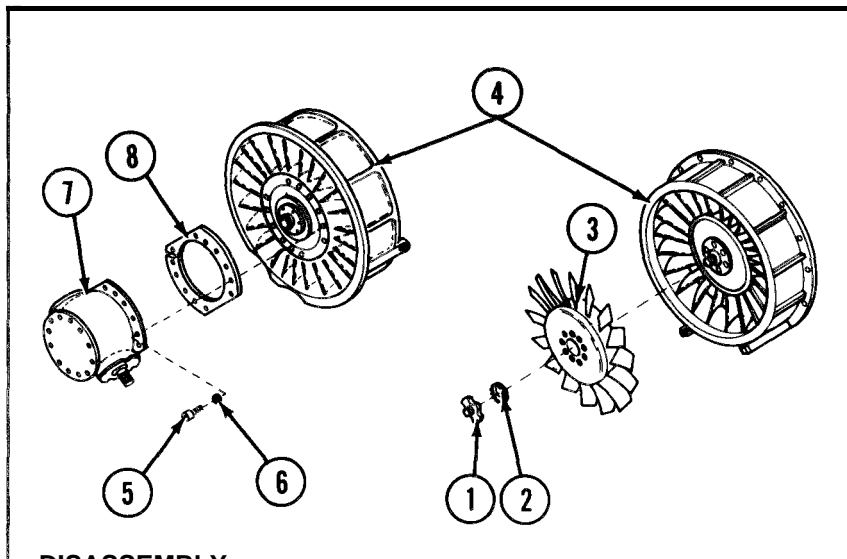
- A Remove two screws (1), two lockwashers (2), two flat washers (3), two clamps (4) and two lubrication tubes (5).
- B Remove four screws (6), four lockwashers (7) and four flat washers (8).
- C Remove fan (9) from mount (10).
- D Remove four screws (11), four lockwashers (12) and four flat washers (13).



E Removal fan (14) from mount (10).

F Remove four screws (15), four lockwashers (16) and four flat washers (17) and remove mount (10) from transfer housing.

VANE AXIAL COOLING FAN ASSEMBLIES REPAIR (CONTINUED)



DISASSEMBLY

A Remove nut (1), key washer (2) and impeller (3) from housing (4).

NOTE

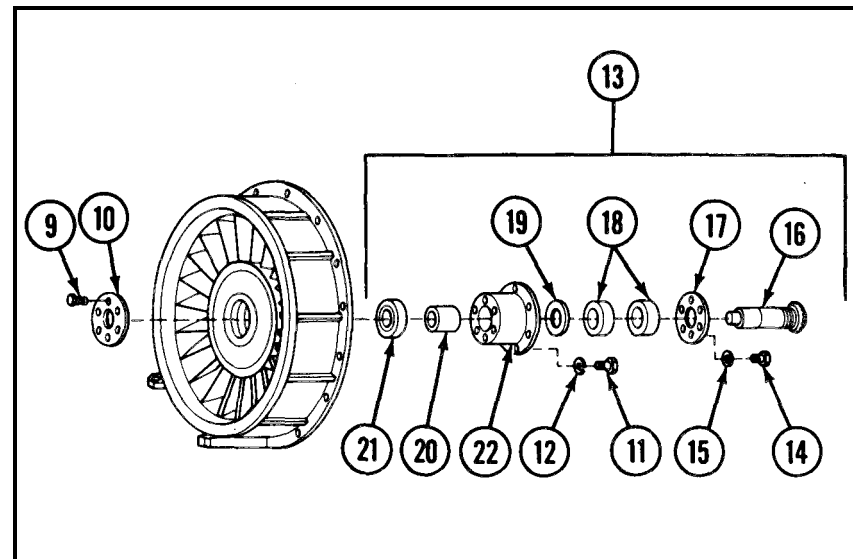
Do not disassemble or try to repair impeller. It is dynamically balanced and spin tested to 10,000 rpm. If impeller is damaged, replace with identical part number impeller.

B Remove 12 socket head screws (5) and 12 flat washers (6).

NOTE

Retain shims. Use to obtain tolerances during assembly (p 5-25).

c Remove fan drive gear box assembly (7) and shim (8).



D Remove six screws (9) and retaining plate (10).

NOTE

Do not discard items unless damaged.

E Remove six screws (11) and six lockwashers (12).

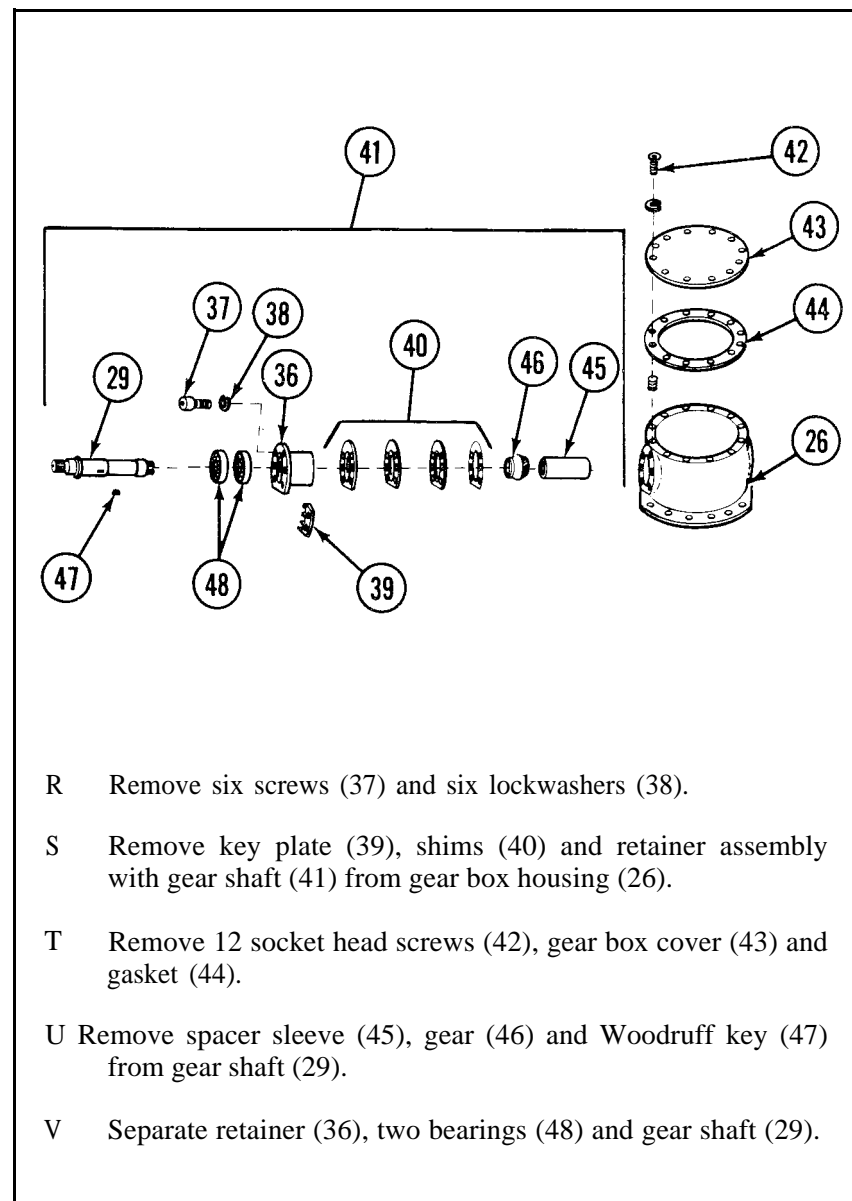
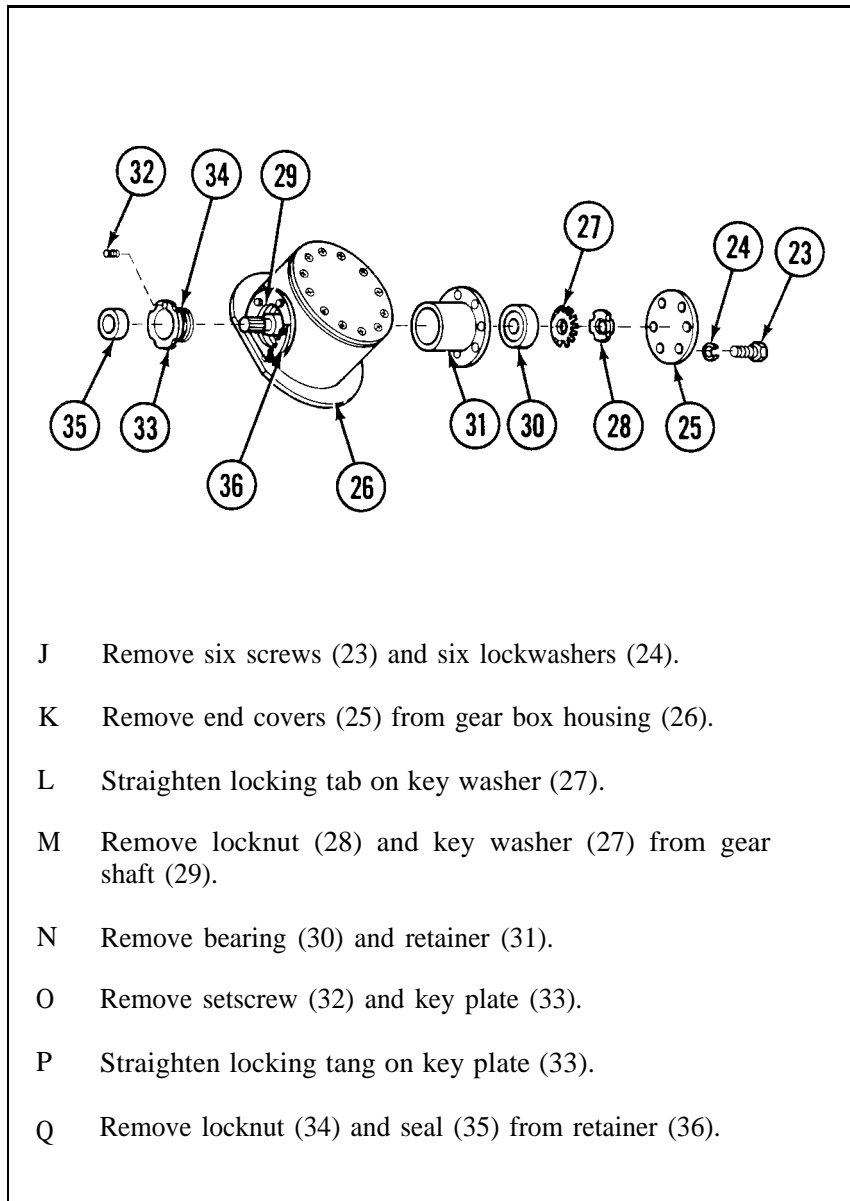
F Remove gland assembly (13).

G Remove six screws (14) and six lockwashers (15).

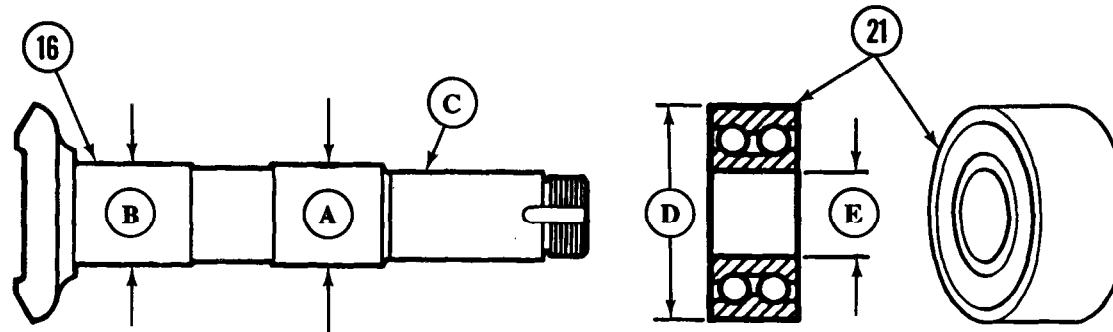
H Remove gear shaft (16) and retaining plate (17).

I Remove two bearings (18), shield (19), spacer (20) and bearing (21) from gland (22).

VANE AXIAL COOLING FAN ASSEMBLIES REPAIR (CONTINUED)



VANE AXIAL COOLING FAN ASSEMBLIES REPAIR (CONTINUED)



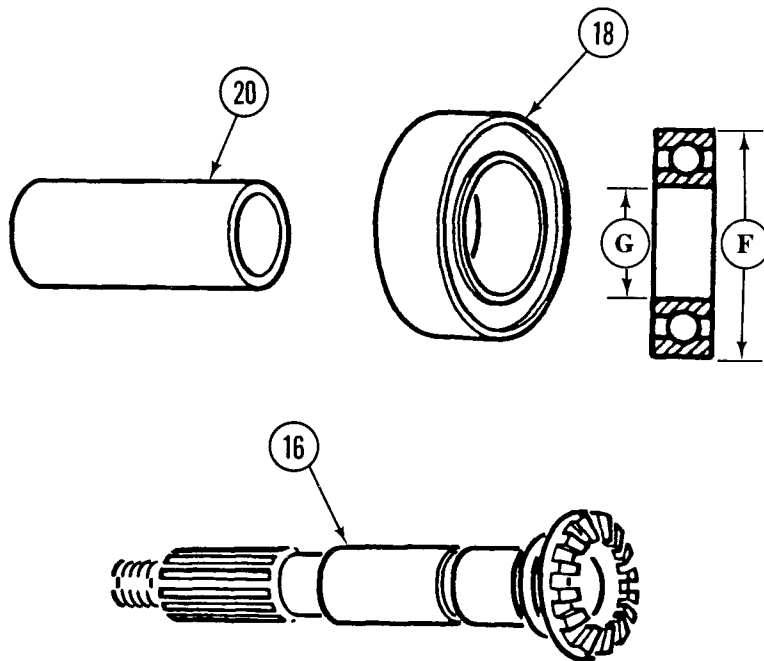
INSPECTION AND REPAIR

NOTE

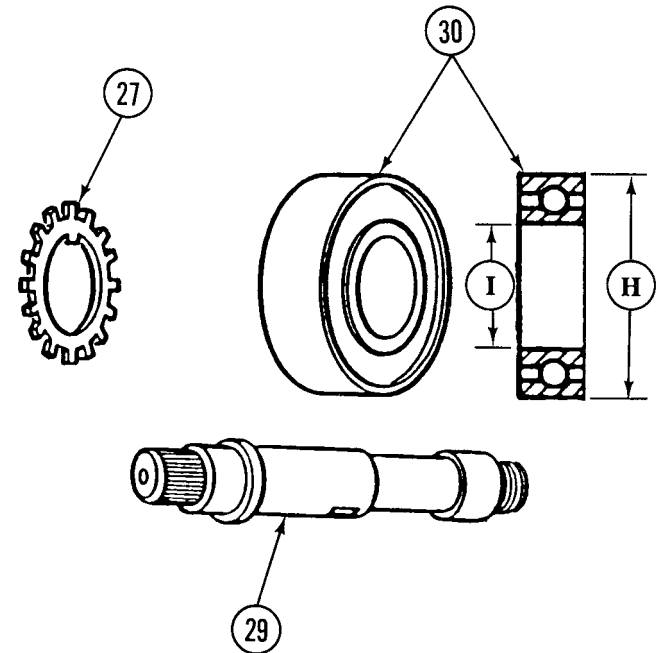
Gears in Joy assembly are a matched set (Gear Set 10925646). If one gear requires replacement both must be replaced.

- | | |
|---|---|
| <p>A Check gear shaft (16) for broken, missing or chipped gear teeth. Replace gear if defective.</p> <p>B Measure gear shaft (16) diameter at (A). Replace gear shaft (16) if diameter (A) is not 1.1803-1.1808 inches (within ± 0.0025 inch).</p> <p>C Measure gear shaft (16) diameter at (B). Replace gear shaft (16) if diameter is not 1.1807-1.1811 inches (within ± 0.0025 inch).</p> <p>D Check concentricity of shaft (16) surface at (A) with surface (B) and spline surface (C).</p> | <p>E Refer to TM 9-214 for inspection of bearing (21).</p> <p>F Measure outer diameter (OD) at (D) of bearing (21). Replace bearing (21) if OD (D) is not 2.8342-2.8346 inches.</p> <p>G Measure internal diameter (ID) (E) of bearing (21). ID should be 1.1807-1.1811 inch.</p> <p>H Measure fit of bearing (21) to gear shaft (16). Fit should be 0.0001T-0.0007L.</p> |
|---|---|

VANE AXIAL COOLING FAN ASSEMBLIES REPAIR (CONTINUED)

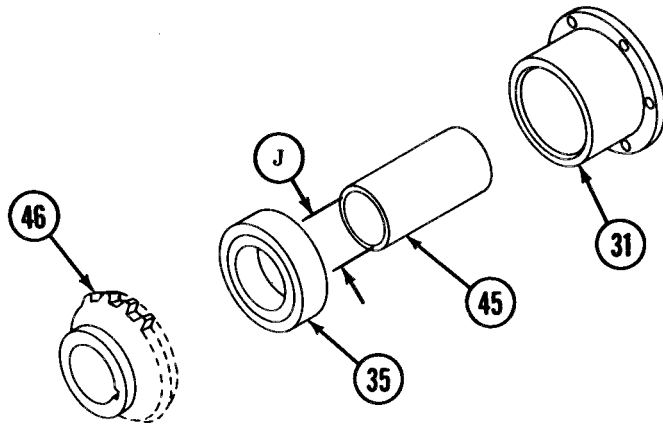


- I Check spacer (20) for cracks or distortion. Replace spacer if defective.
- J Refer to TM 9-214 for inspection of bearings (18 and 30).
- K Measure OD (F) of bearings (18). Replace bearings (18) if OD (F) is not 2.4404-2.4409 inches.
- L Measure ID(G) of bearings (18). Replace bearings (18) if ID (G) is not 1.1807-1.1811 inch.
- M Measure fit of bearings (18) to shaft (16). Fit should be 0.0004T-0.0004L.



- N Replace key washer (27).
- O Measure OD(H) of bearing (30). Replace bearing (30) if OD (H) is not 2.0467-2.0472 inches.
- P Measure ID (I) of bearing (30). Replace bearing (30) if ID (I) is not 0.9839-0.9843 inch.
- Q Measure fit of bearing (30) to shaft (29). Fit should be 0.0003T-0.0008L.

VANE AXIAL FAN ASSEMBLIES REPAIR (CONTINUED)



R Check retainer (31) for cracks or distortion. Replace retainer if defective.

S Replace seal (35).

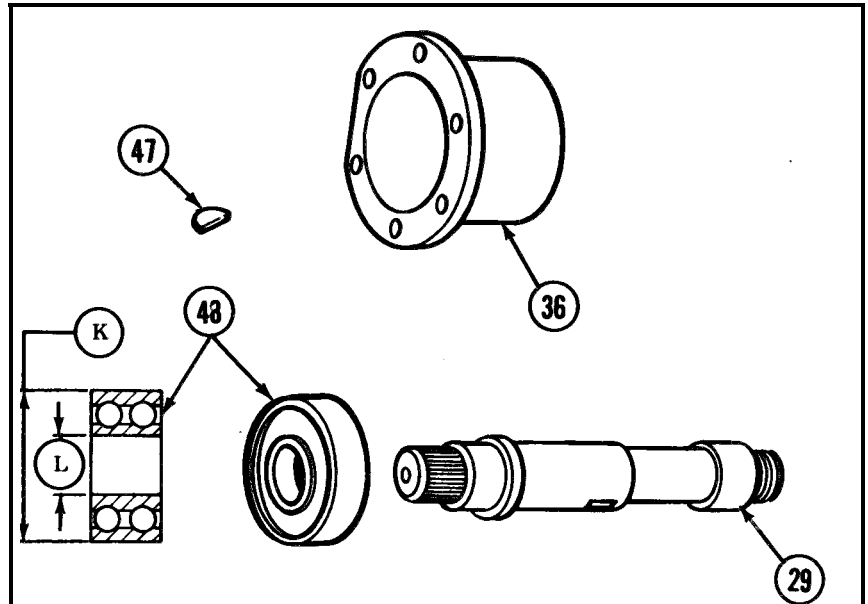
T Check spacer sleeve (45) for cracks or distortion. Replace sleeve (45) if defective.

U Measure ID (J) of spacer sleeve (45). Replace spacer sleeve (45) if ID (J) is not 0.9860-0.9870 inch.

NOTE

Gears in Joy are a matched set (Gear Set 10925646). If one gear is damaged or requires replacement, both gears must be replaced.

V Check gear (46) for broken, chipped or missing gear teeth. Replace gear (46) if defective.



W Check Woodruff key (47) for mutilation, distortion, or excessive wear. Replace if defective.

X Check retainer (36) for cracks or distortion. Replace retainer (36) if defective.

Y Refer to TM 9-214 for inspection of bearings (48).

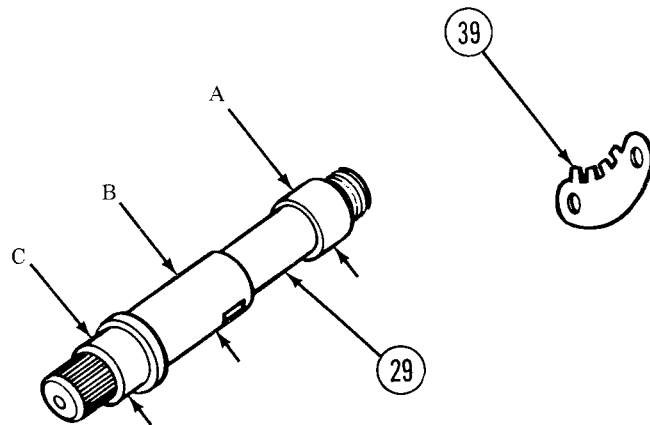
Z Measure OD (K) of bearings (48). Replace bearings (48) if OD (K) is not 2.0467-2.0472 inches.

AA Measure ID (L) of bearings (48). Replace bearings (48) if ID (L) is not 0.9839-0.9843 inch.

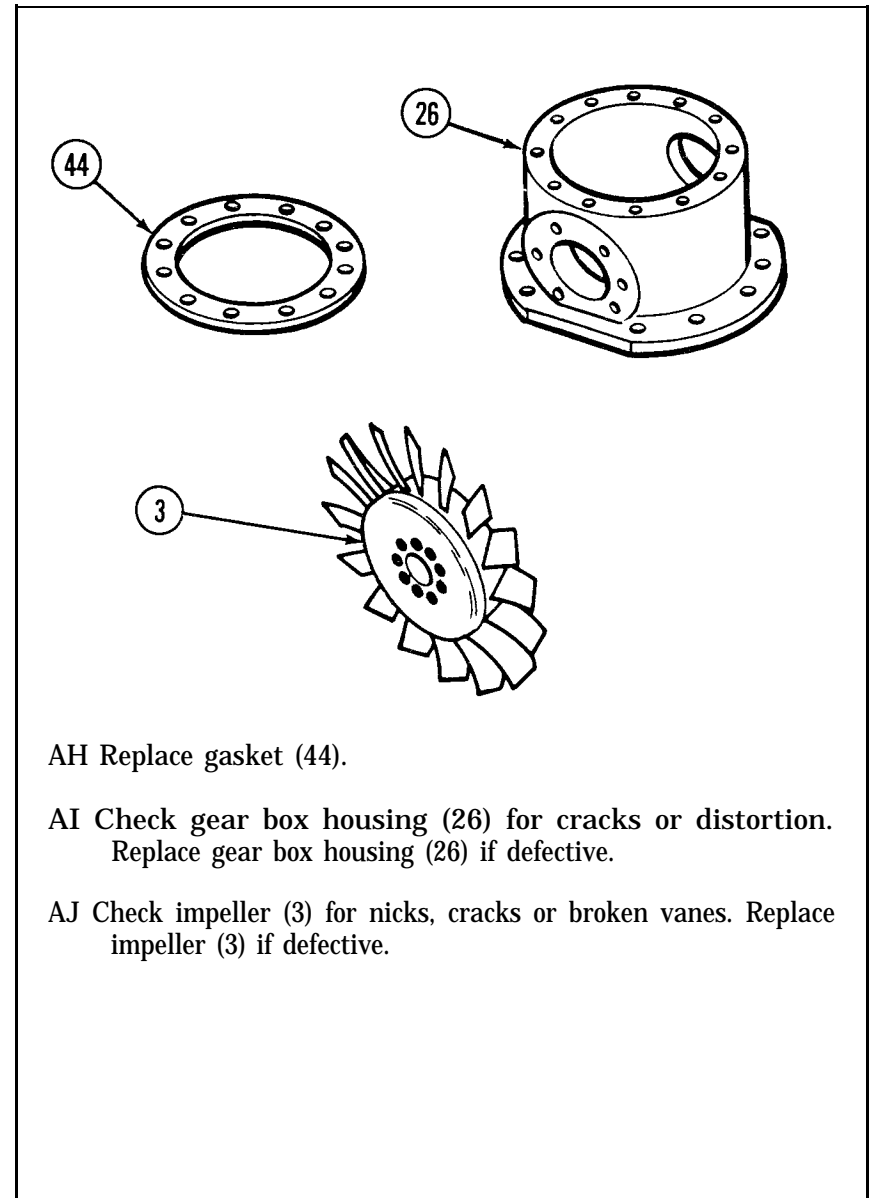
AB Measure fit of bearings (48) to shaft (29). Fit should be 0.0004T-0.0004L. (Wear limit 0.0006L).

VANE AXIAL FAN ASSEMBLIES REPAIR (CONTINUED)

AC Replace key plate (39) if unserviceable.

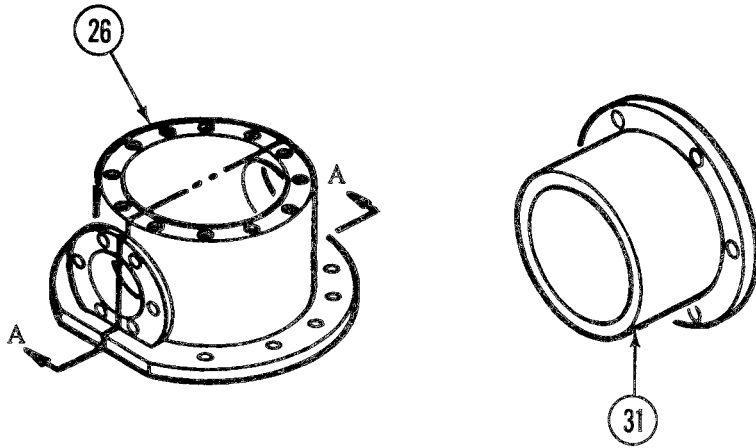


- AD Measure OD of gear shaft (29) at (A). Replace shaft (29) if OD (A) is not 0.9835-0.9840 inch.
- AE Measure OD of gear shaft (29) at (B). Replace shaft if OD (B) is not 0.9839-0.9843 inch.
- AF Measure OD of gear shaft (29) at (C). Normal size 0.9950-1.0020 inch. Wear limit 0.9930 inch.
- AG Measure concentricity of gear shaft (29) A to B to C. Concentricity should be within 0.0010 inch TIR (Total Indicator Reading).



- AH Replace gasket (44).
- AI Check gear box housing (26) for cracks or distortion. Replace gear box housing (26) if defective.
- AJ Check impeller (3) for nicks, cracks or broken vanes. Replace impeller (3) if defective.

VANE AXIAL COOLING FAN ASSEMBLIES REPAIR (CONTINUED)



ASSEMBLY

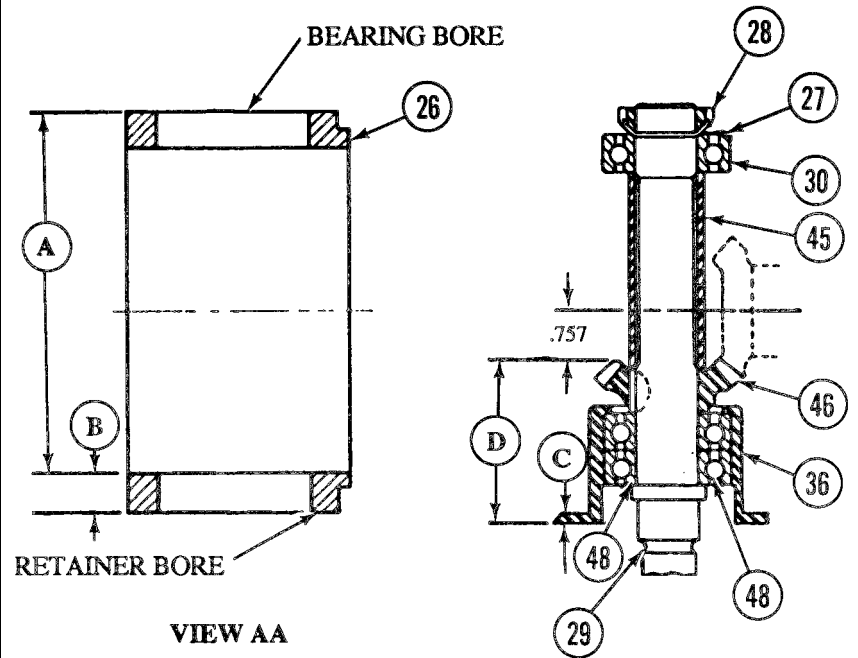
A Measure ID (A) of gear box housing (26) to three decimal places (0.00X). Record as dimension A.

B Measure flange thickness (B) of gear box housing (26) to three decimal places (0.00X). Record as dimension B.

C Measure flange thickness (C) of retainer (36) to three decimal places (0.00X). Record as dimension C.

NOTE

Do not install retainer (31) at this time. Do not install retainer and shaft assembly in housing.



D Assemble two bearings (48), retainer (36), Woodruff key (47), gear (46), spacer sleeve (45), bearing (30), key washer (27), locknut (28), and shaft (29).

NOTE

Use vernier gage to measure D.

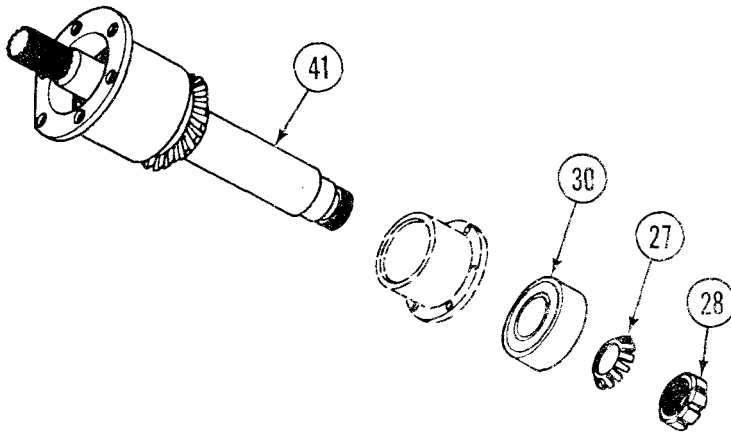
E Measure distance (D) from retainer (36) outer surface to farthest edge of gear (46) to three decimal points (0.00X). Record as dimension D.

VANE AXIAL COOLING FAN ASSEMBLIES REPAIR (CONTINUED)

F Using dimensions recorded in Steps A, B, C and E, compute shim thickness:

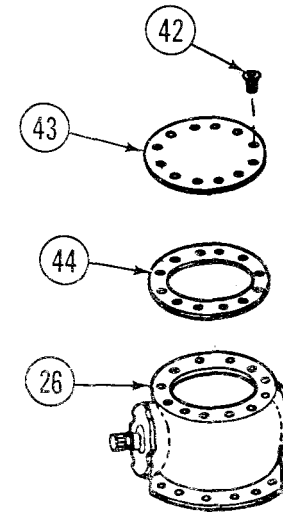
$$(1) \frac{A}{2} + B = C - D = X$$

$$(2) \text{ Required shim thickness} = 0.757 - X$$



G Remove locknut (28), key washer (27) and bearing (30) from retainer and shaft assembly (41).

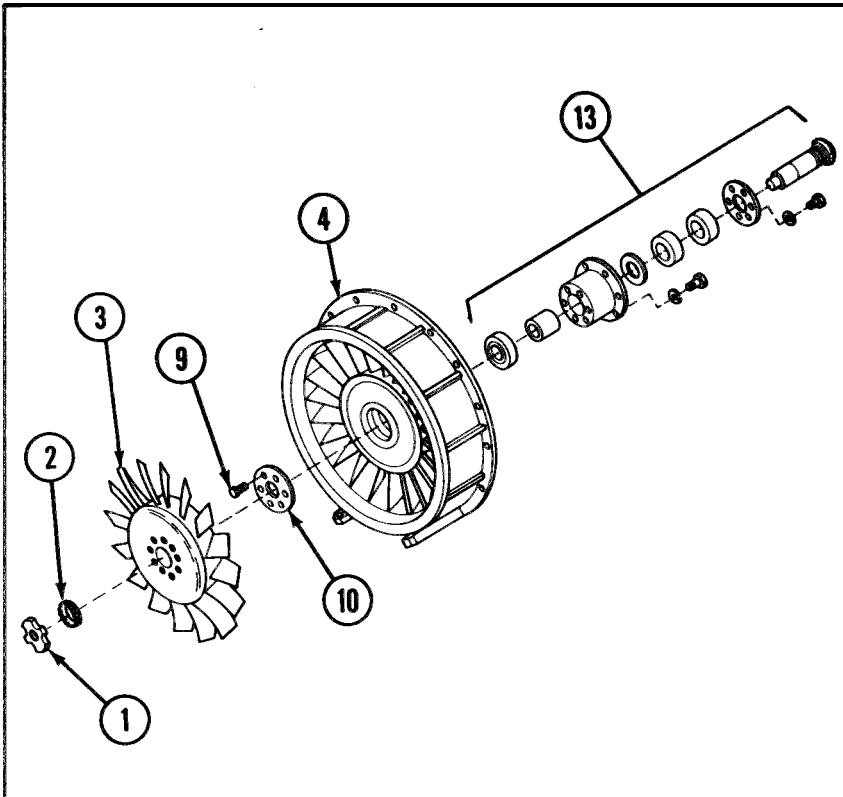
H Install new key washer (27).

**NOTE**

Use shim thickness computed in Step F.

- I Assemble gear box by reversing order of disassembly.
- J Pack gear box housing (26) 90% full of grease.
- K Install new gasket (44).
- L Install cover (43) and 12 socket head screws (42).

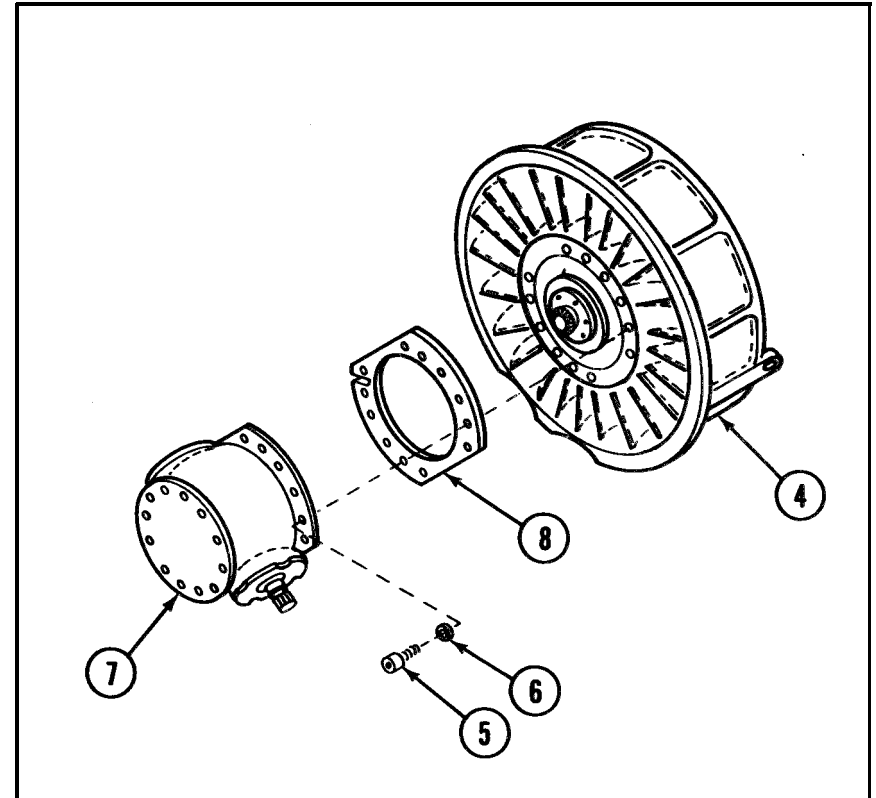
VANE AXIAL COOLING FAN ASSEMBLIES REPAIR (CONTINUED)



M Assemble gland assembly (13) by reversing order of disassembly.

N Install gland assembly (13) and retaining plate (10) in fan housing (4) with six screws (9).

O Install impeller (3) and new key washer (2) on fan housing (4) with nut (1).

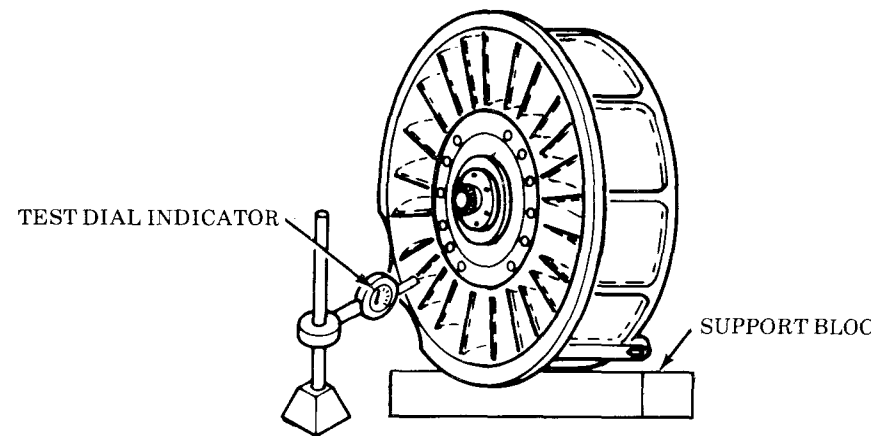
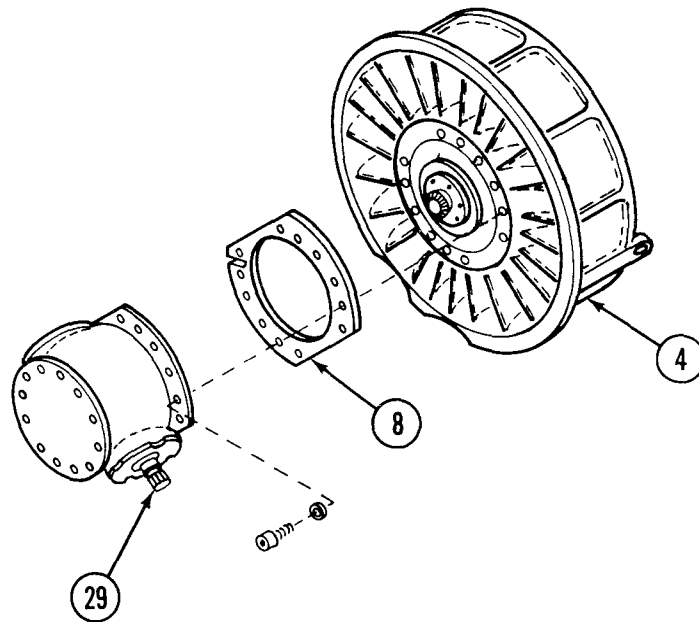


NOTE

Use 0.045-inch shim thickness.

P Install shim (8), gear box assembly (7), 12 flat washers (6) and 12 socket head screws (5) on fan housing (4).

VANE AXIAL COOLING FAN ASSEMBLIES REPAIR (CONTINUED)



BACKLASH 0.007 to 0.021 INCH

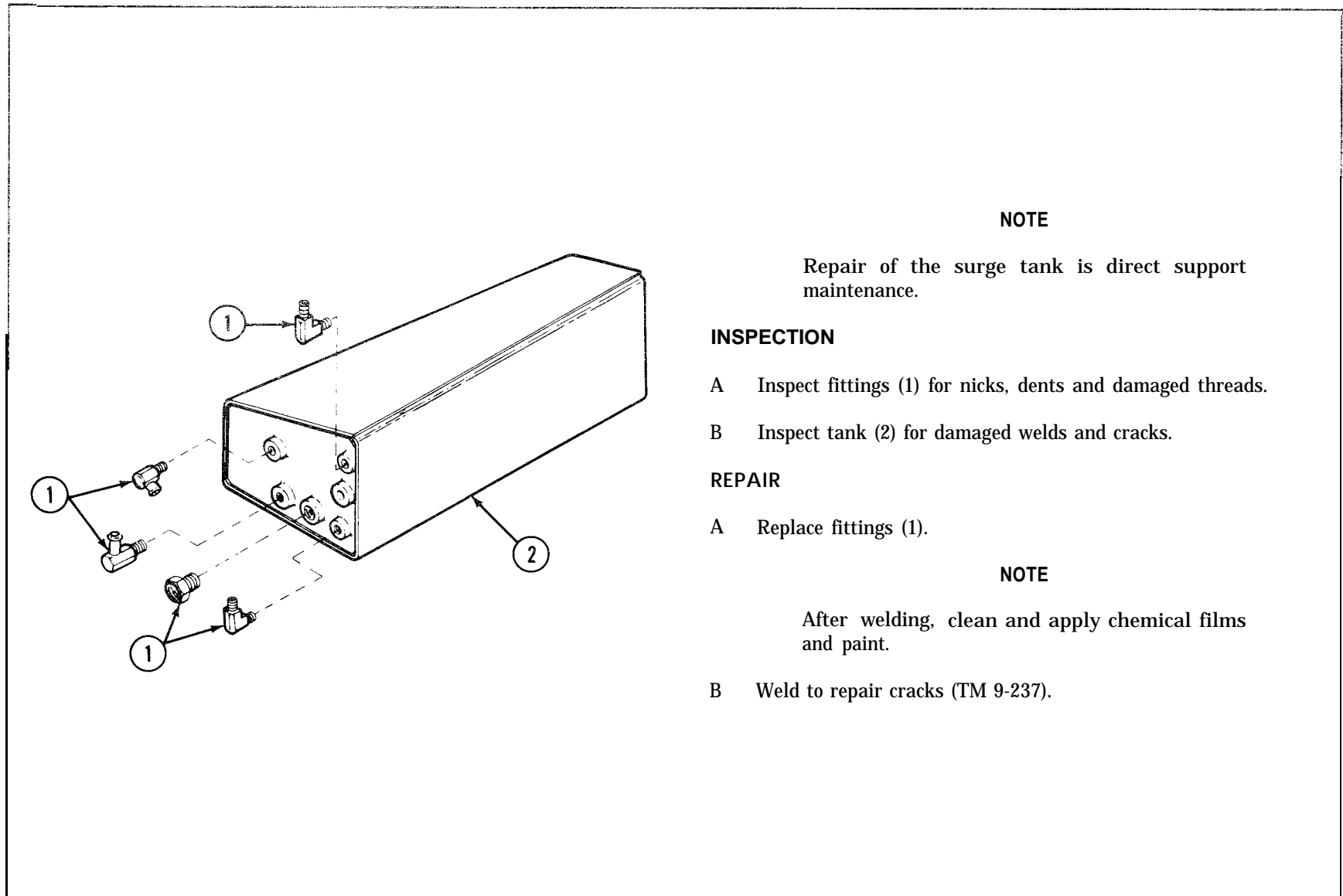
NOTE

Backlash must be within 0.007-0.021 inch.

- Q Install clamp or collar on shaft (29).
- R Set up and secure fan housing (4) on support blocks on hot surface.
- S Set up dial test indicator (zeroed) at outer tip of one blade.

- T Move fan blade by hand and read backlash on dial test indicator.
- U Remove or install shims (8) as required to obtain 0.007- to 0.021-inch backlash.

Section III SURGE TANK

**NOTE**

Repair of the surge tank is direct support maintenance.

INSPECTION

- A Inspect fittings (1) for nicks, dents and damaged threads.
- B Inspect tank (2) for damaged welds and cracks.

REPAIR

- A Replace fittings (1).

NOTE

After welding, clean and apply chemical films and paint.

- B Weld to repair cracks (TM 9-237).

**CHAPTER 6
MAINTENANCE PROCEDURES
ELECTRICAL COMPONENTS AND WIRING HARNESS**

CHAPTER OVERVIEW

This chapter illustrates and describes maintenance procedures for:

Section I Cable Assembly - Cargo Compartment (12330252)

Section II Hull Electrical Components

Section I CABLE ASSEMBLY - CARGO COMPARTMENT (12330252)

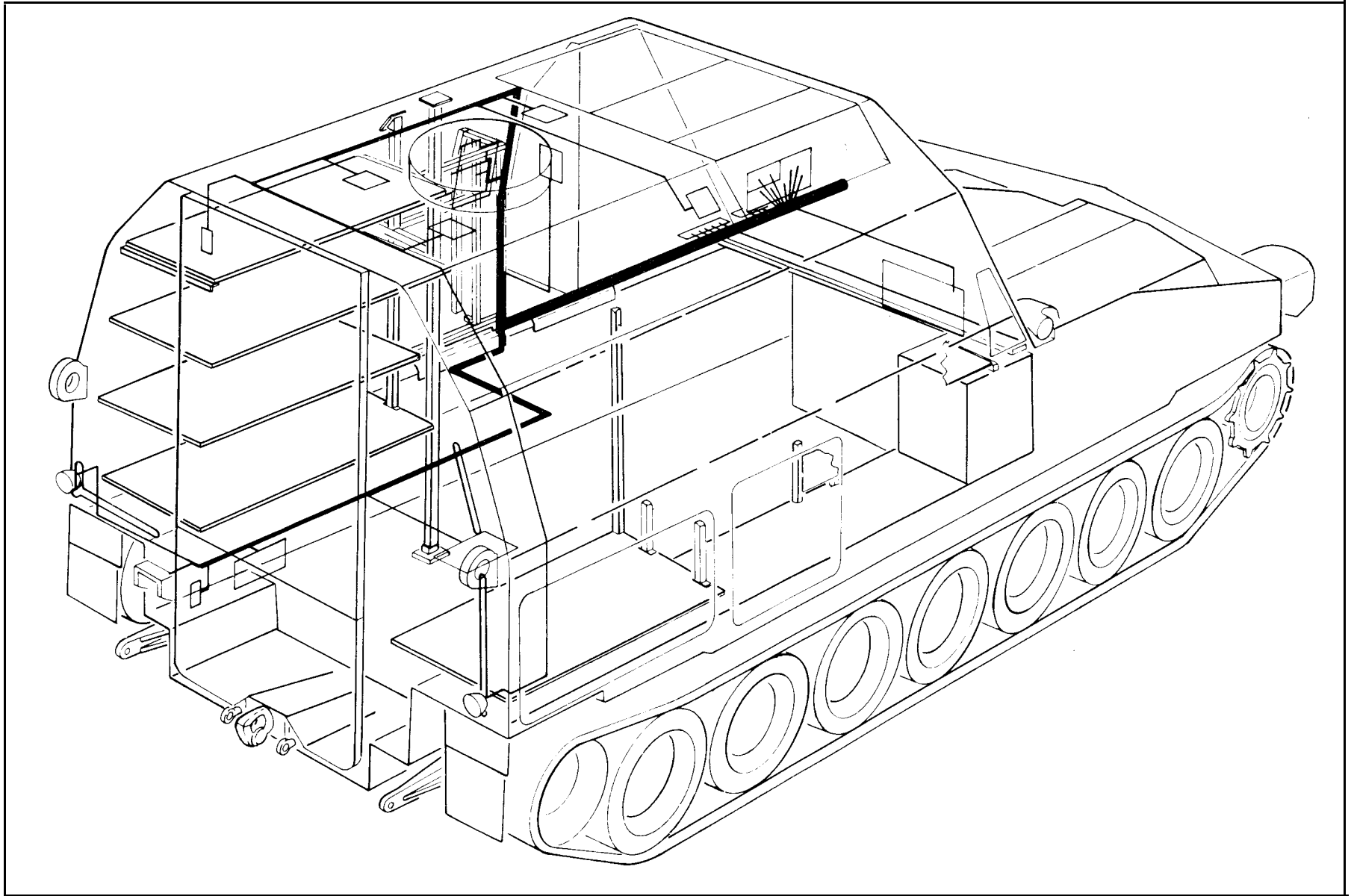
WARNING

Disconnect battery ground leads before performing maintenance.

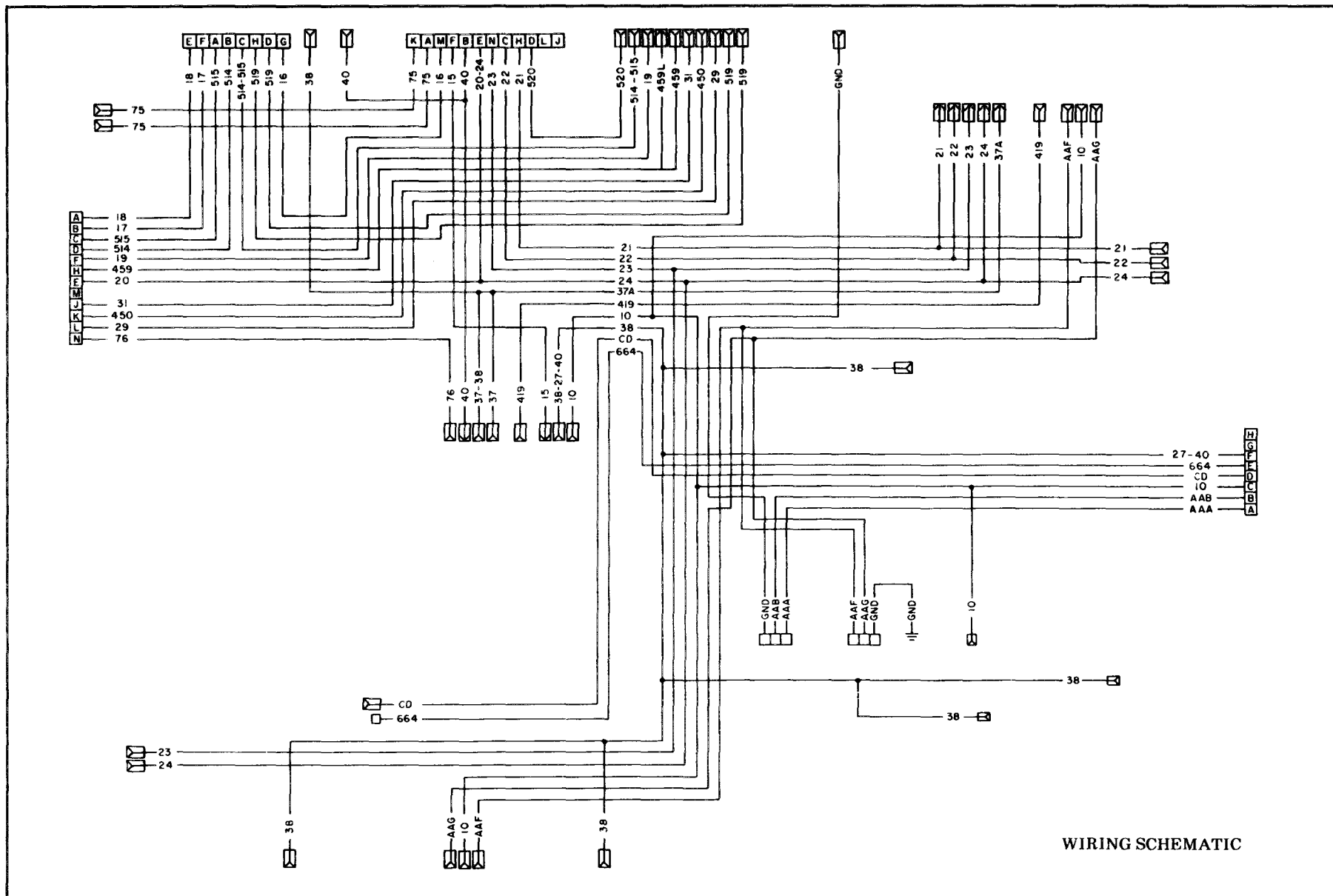
NOTE

Repair of cargo compartment cable assembly (12330252) is general support maintenance.

CABLE ASSEMBLY - CARGO COMPARTMENT (12330252) REPAIR (CONTINUED)



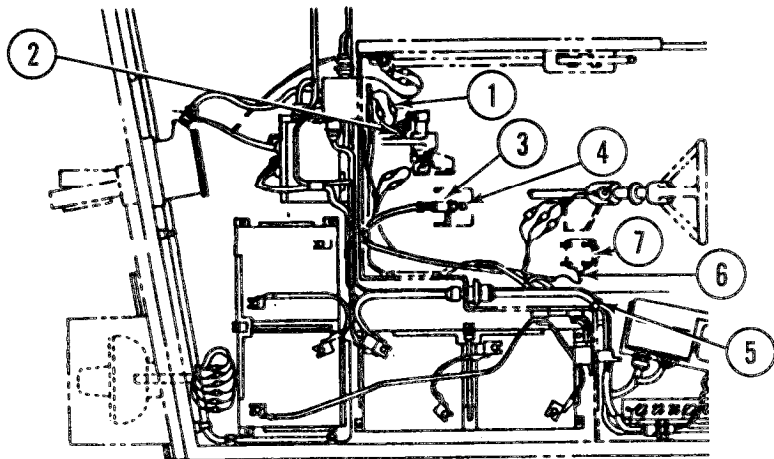
CABLE ASSEMBLY — CARGO COMPARTMENT (12330252) REPAIR (CONTINUED)



WIRING SCHEMATIC

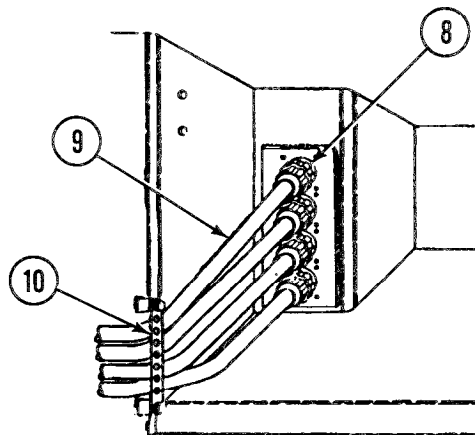
CABLE ASSEMBLY-CARGO COMPARTMENT (12330252) REPAIR (CONTINUED)

DRIVER'S COMPARTMENT - TOP VIEW



REMOVAL

- A Disconnect two stoplight wires no. 75 (1) from stoplight switch (2).
- B Disconnect connector (3) from dimmer switch (4). Remove harness from strap (5).
- C Disconnect wire no. 38 (6) from domelight (7).



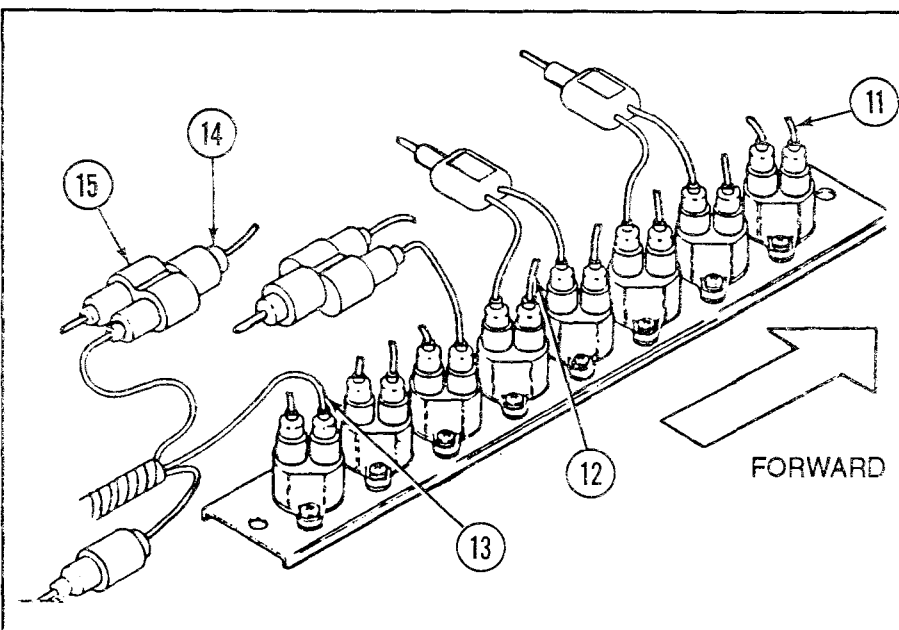
- D Disconnect connector (8) at driver's compartment forward bulkhead.

NOTE

Do not remove other harnesses from straps.

- E Remove harness (9) from two harness straps (10).

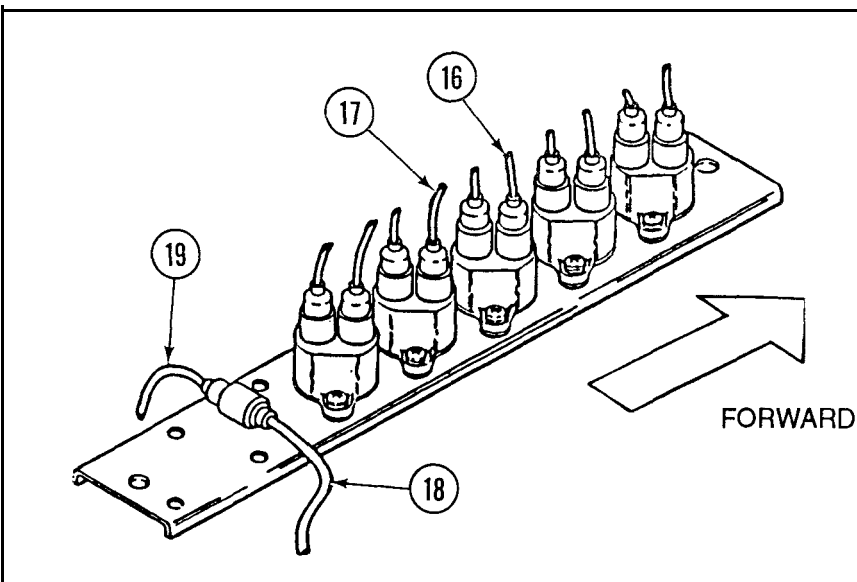
CABLE ASSEMBLY - CARGO COMPARTMENT (1230252) REPAIR (CONTINUED)



NOTE

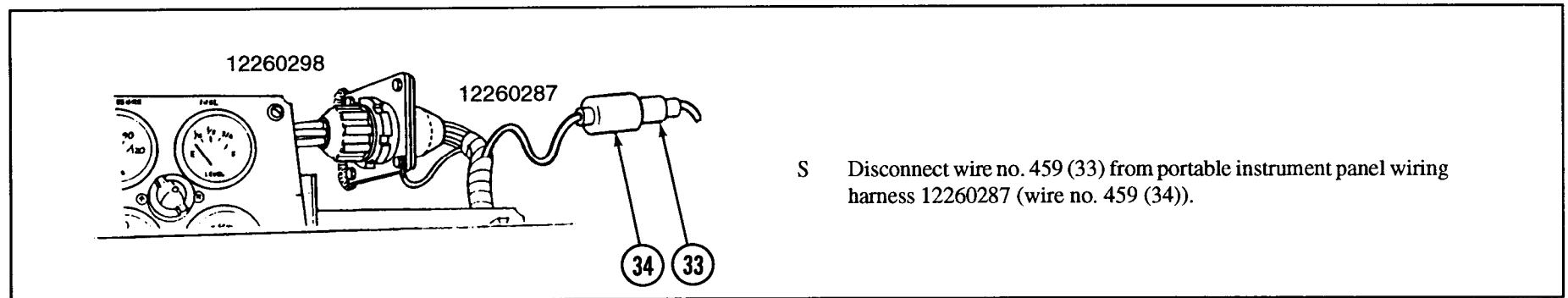
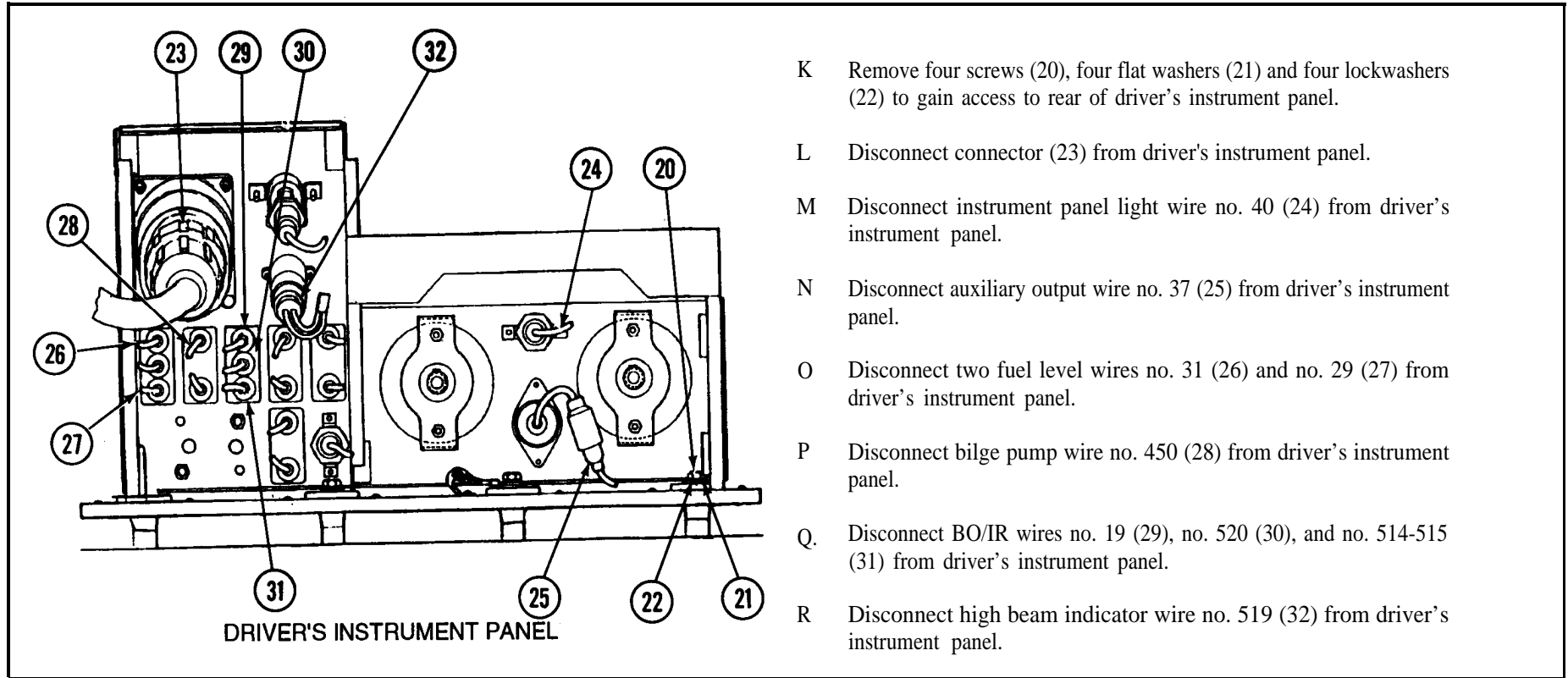
Circuit breaker panels are located on left side of driver's compartment.

- F Disconnect wire no. 37/38 (11) from circuit breaker position 1.
Disconnect wire no. 76 (12) from circuit breaker position 5.
Disconnect wire 419 (13) from circuit breaker position 8.
- G Disconnect wire no. 40 (14) from connector (15).

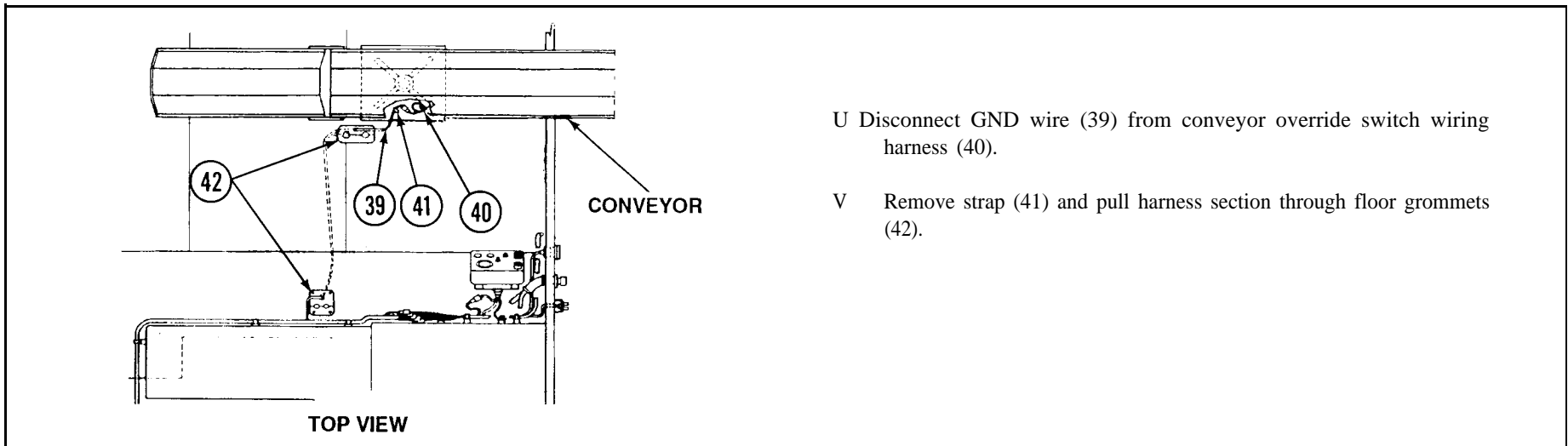
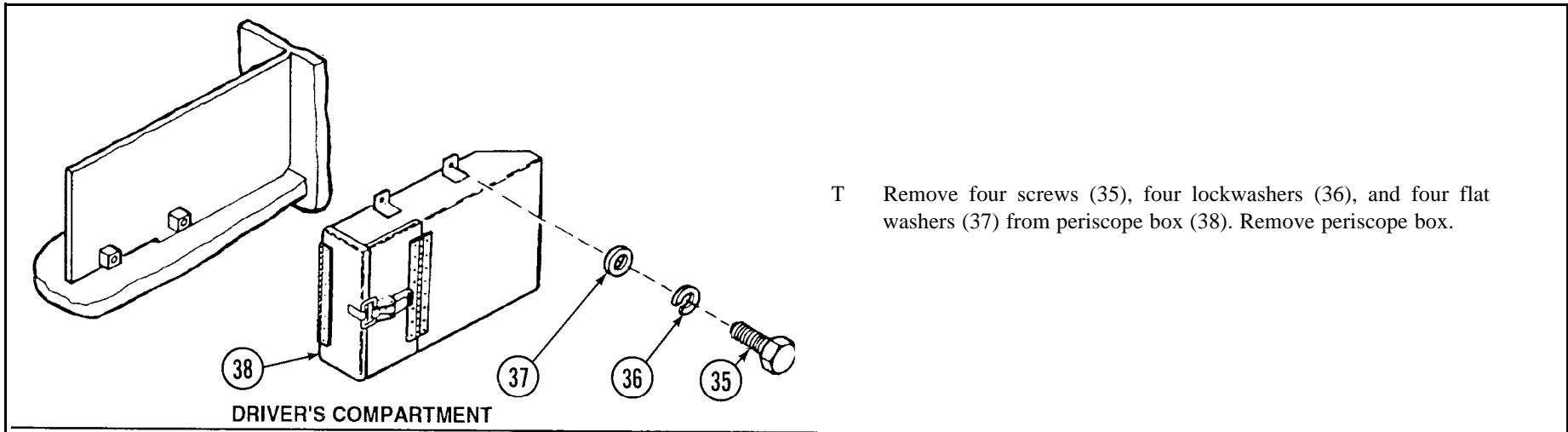


- H Disconnect wires no. 38, 27 and 40 (16) from position no. 5 on circuit breaker panel no. 2.
- I Disconnect wire no. 10 (17) from position no. 4 on circuit breaker panel no. 2.
- J Disconnect wire no. 15 (18) from wiring harness 12330257 circuit no. 10 (19) on circuit breaker panel no. 2.

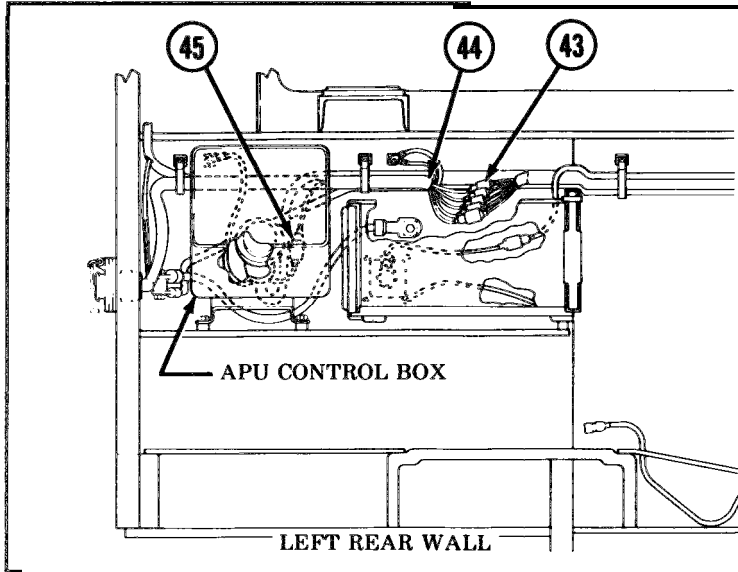
CABLE ASSEMBLY - CARGO COMPARTMENT (12330252) REPAIR (CONTINUED)



CABLE ASSEMBLY - CARGO COMPARTMENT (12330252) REPAIR (CONTINUED)



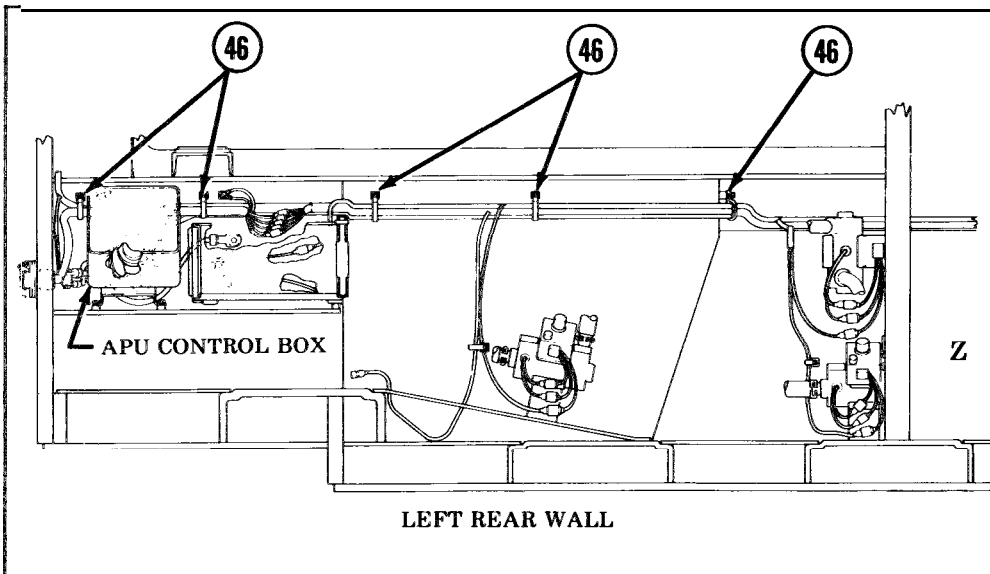
CABLE ASSEMBLY — CARGO COMPARTMENT (12330252) REPAIR (CONTINUED)



W Remove NBC air purifier (TM 9-2350-267-20).

X Disconnect trailer accessory wires no. 37A, 23, 21, 22 and 24 (43) from trailer receptacle wiring harness 12330246 (44).

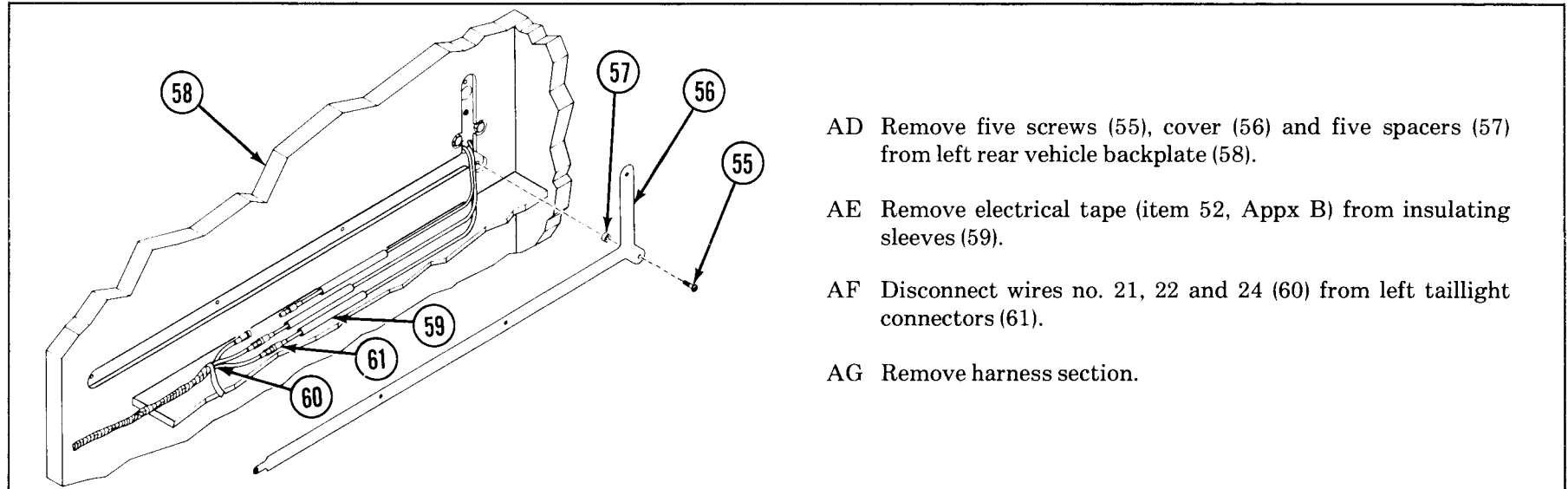
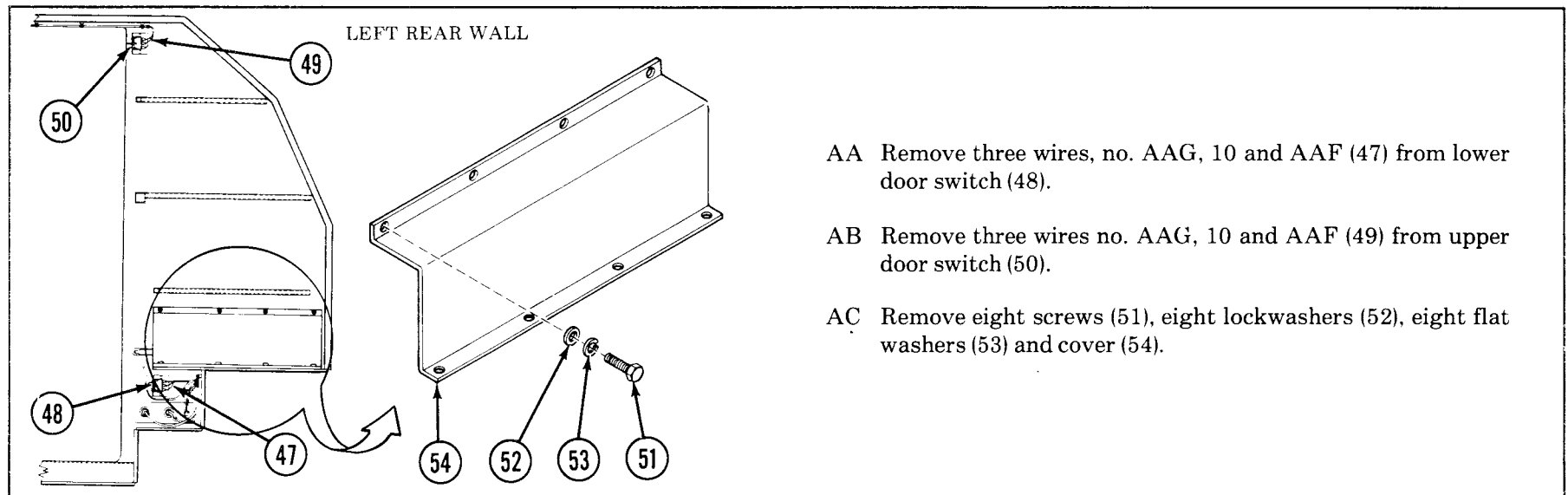
Y Disconnect wire no. 419 (45) from APU wiring harness 12330248.



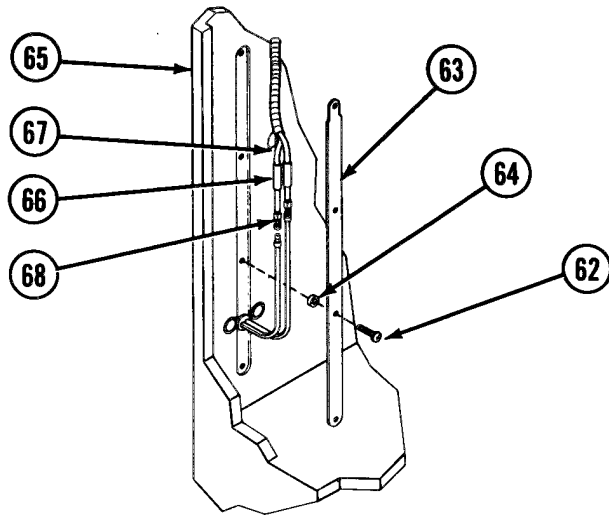
NOTE

Do not remove other cable assemblies from harness straps.

Z Remove harness from five harness straps (46). Replace straps after harness is removed.

CABLE ASSEMBLY — CARGO COMPARTMENT (12330252) REPAIR (CONTINUED)


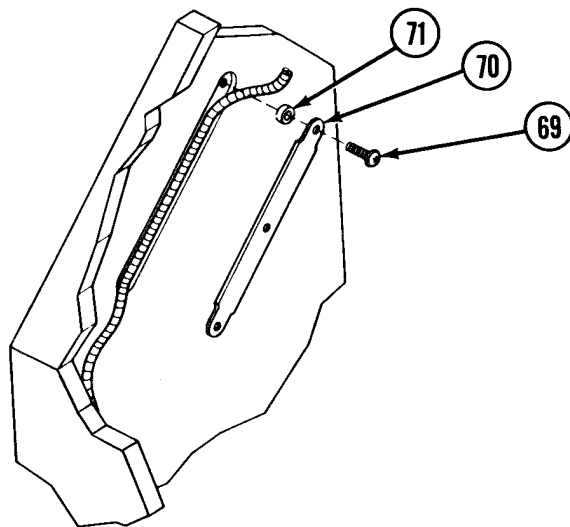
CABLE ASSEMBLY - CARGO COMPARTMENT (12330252) REPAIR (CONTINUED)



AH Remove four screws (62), cover (63) and four spacers (64) from right rear vehicle backplate (65).

AI Remove electrical tape (item 52, Appx B) from insulating sleeves (66).

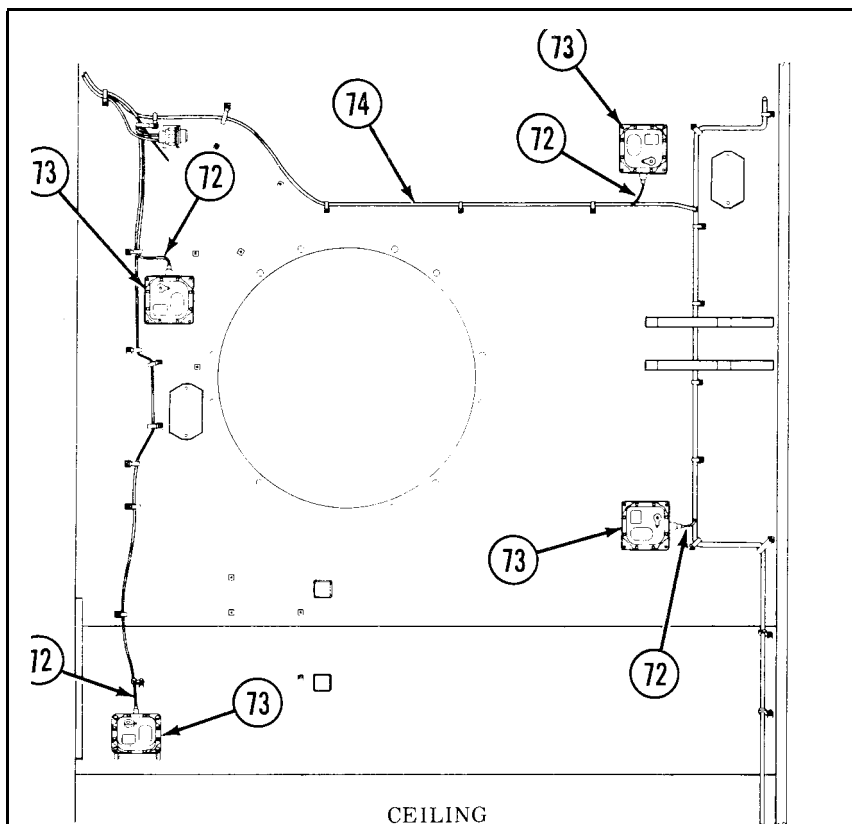
AJ Disconnect wires no. 23 and 24 (67) from right taillight connectors (68).



AK Remove three screws (69), upper cover (70) and three spacers (71).

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CABLE ASSEMBLY — CARGO COMPARTMENT (12330252) REPAIR (CONTINUED)

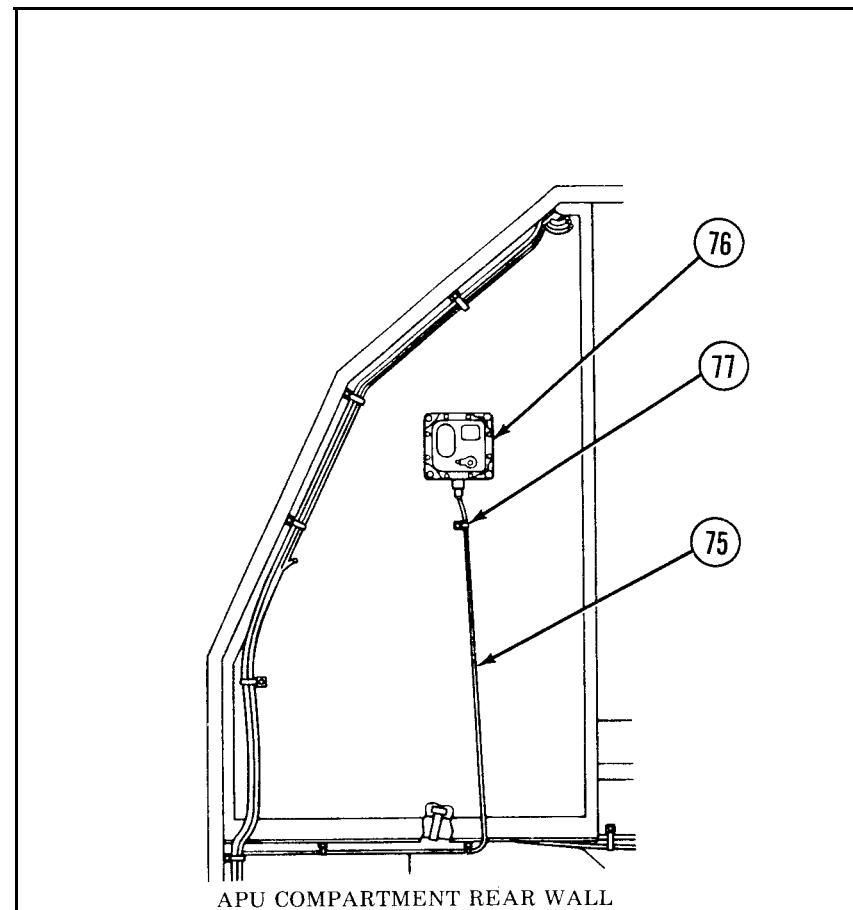


AL Disconnect four domelight wires no. 38 (72) from domelights (73).

NOTE

Do not remove other wiring harness from straps.

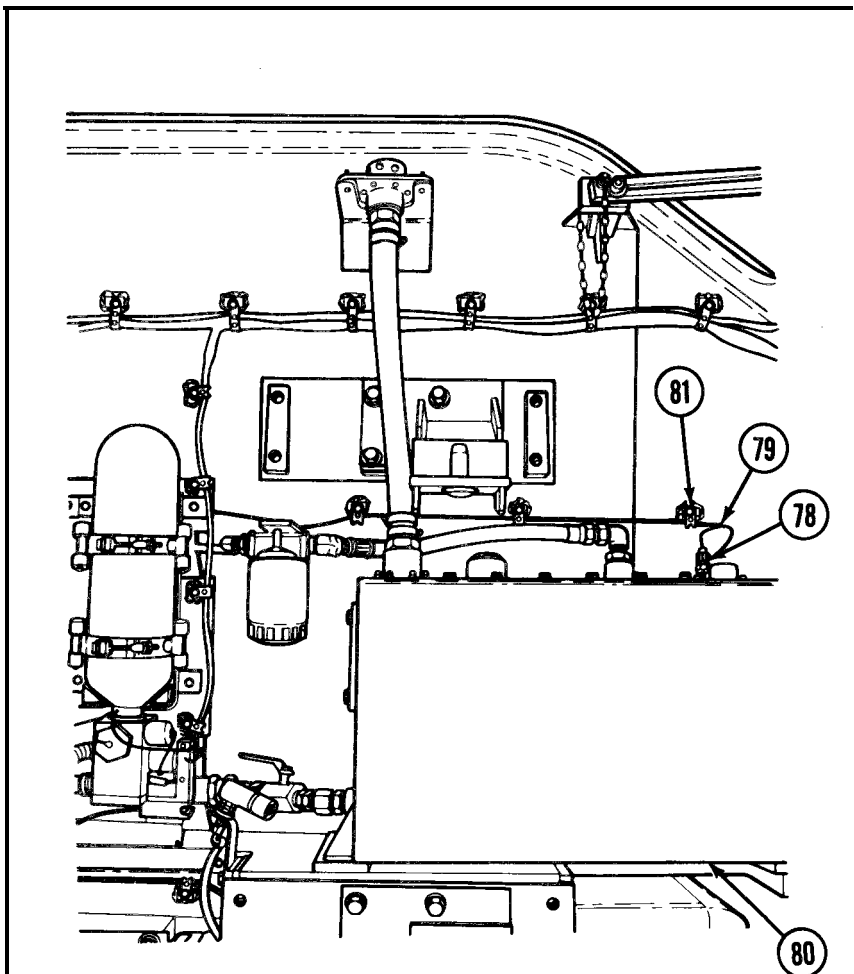
AM Remove 30 straps (74) and remove cable from vehicle ceiling. Replace strap hardware after harness removal.



AN Disconnect domelight wire no. 38 (75) from domelight (76).

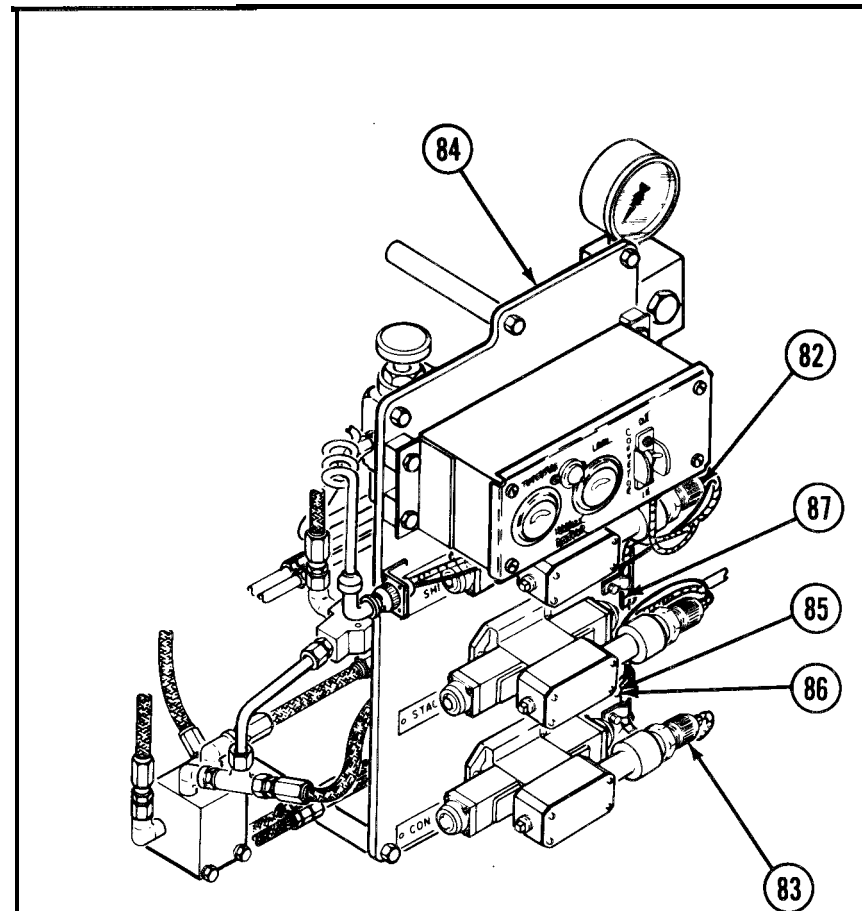
AO Remove three straps (77).

CABLE ASSEMBLY — CARGO COMPARTMENT (1233252) REPAIR (CONTINUED)



AP Disconnect hydraulic reservoir sending unit connector (78) and wire CD (79) from hydraulic reservoir (80).

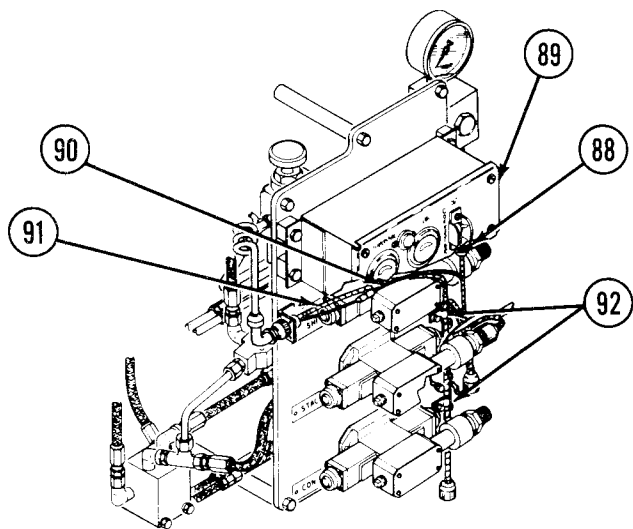
AQ Remove seven straps (81) and harness.



AR Disconnect ballistic shield solenoid connector (82) and conveyor solenoid plug (83) from hydraulic control panel (84).

AS Remove screw (85), two washers (86) and GND wire (87).

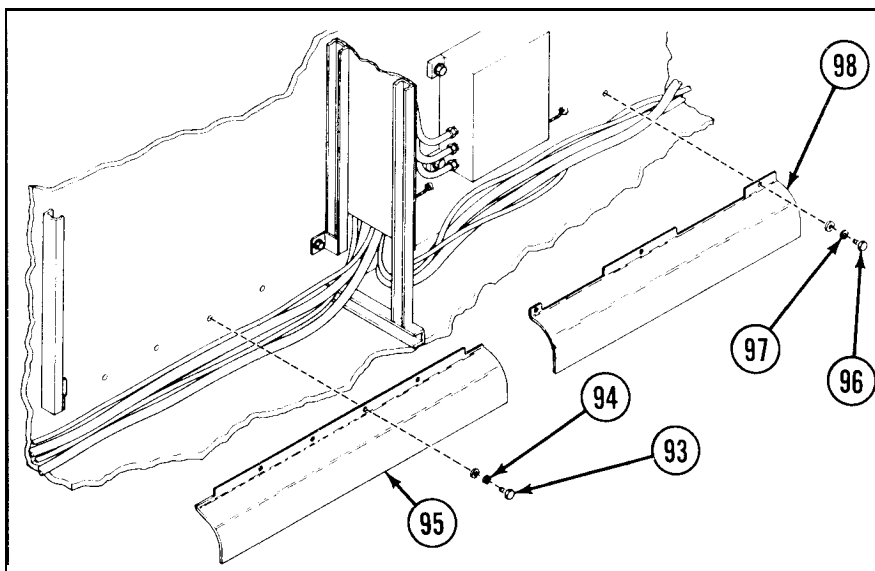
CABLE ASSEMBLY — CARGO COMPARTMENT (12330252) REPAIR (CONTINUED)



AT Disconnect connector (88) from hydraulic gage panel (89).

AU Disconnect wire no. 10 (90) from stacker control box wiring harness (91).

AV Remove two straps (92) and harness section.

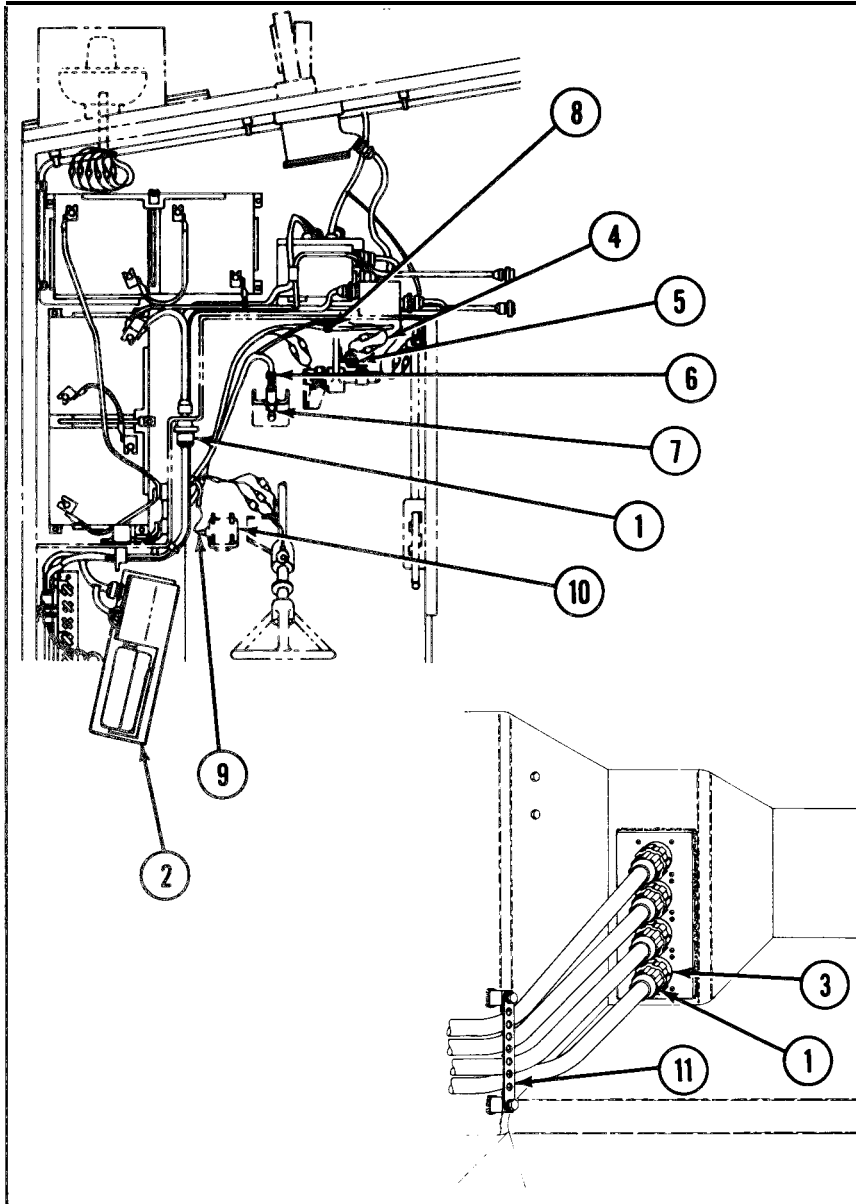


AW Remove four screws (93), four lockwashers (94) and guard (95).

AX Remove three screws (96), three washers (97) and guard (98).

AY Remove harness from vehicle.

CABLE ASSEMBLY – CARGO COMPARTMENT (12330252) REPAIR (CONTINUED)



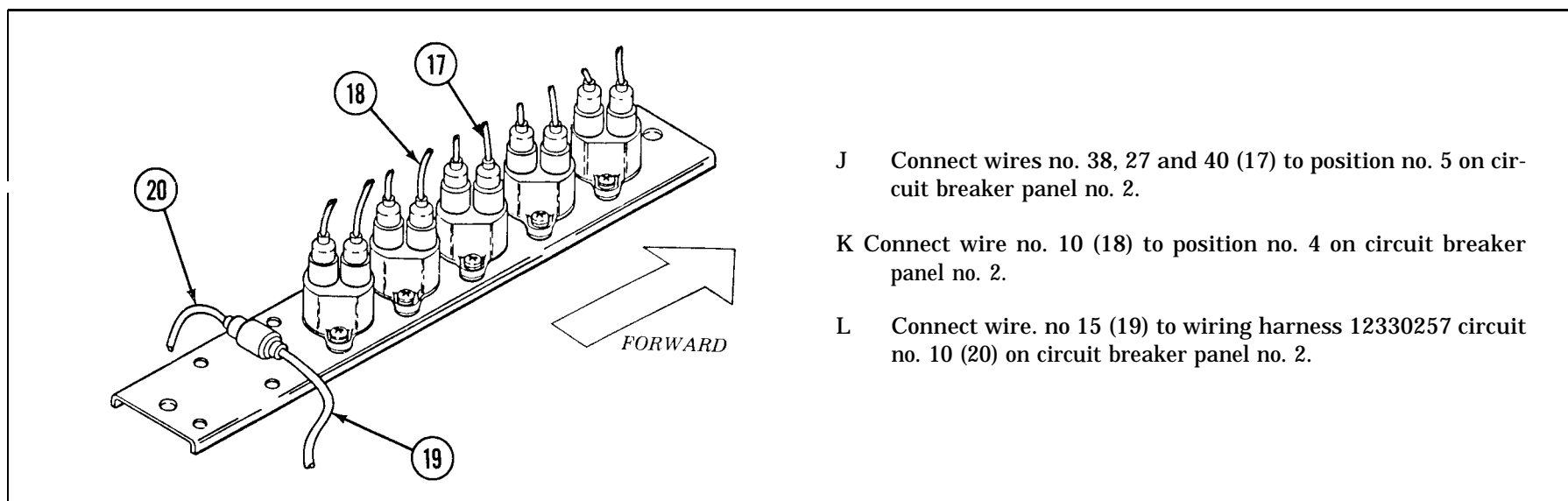
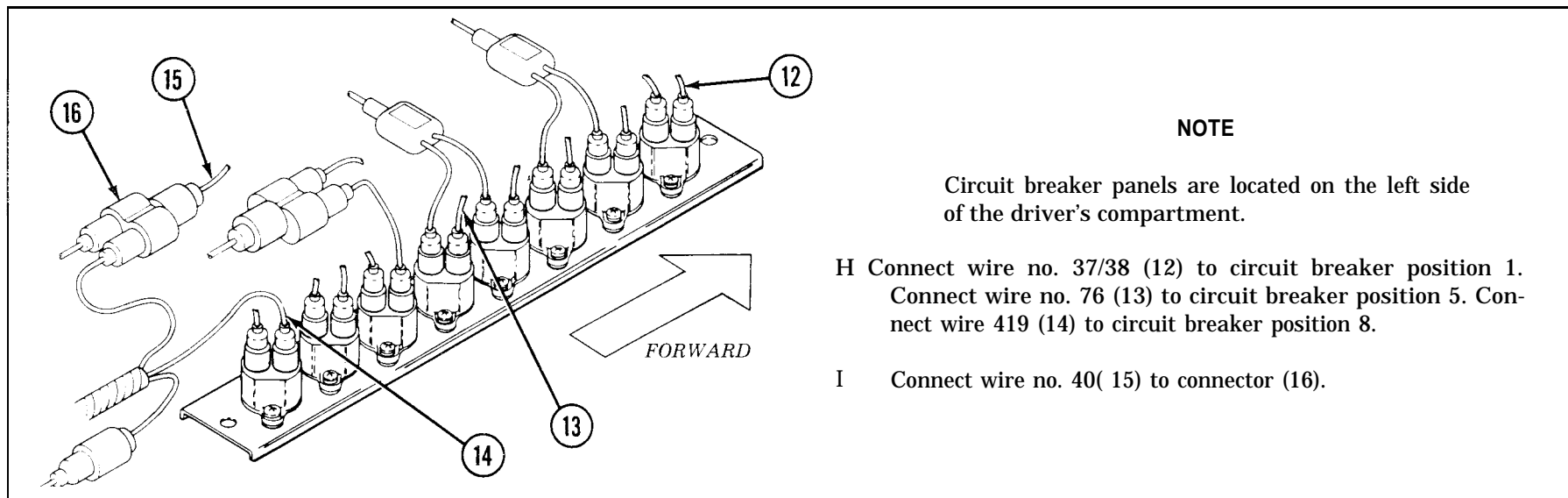
INSTALLATION

Refer to pages 6-2, 6-3 and 6-4 to identify connectors and terminals.

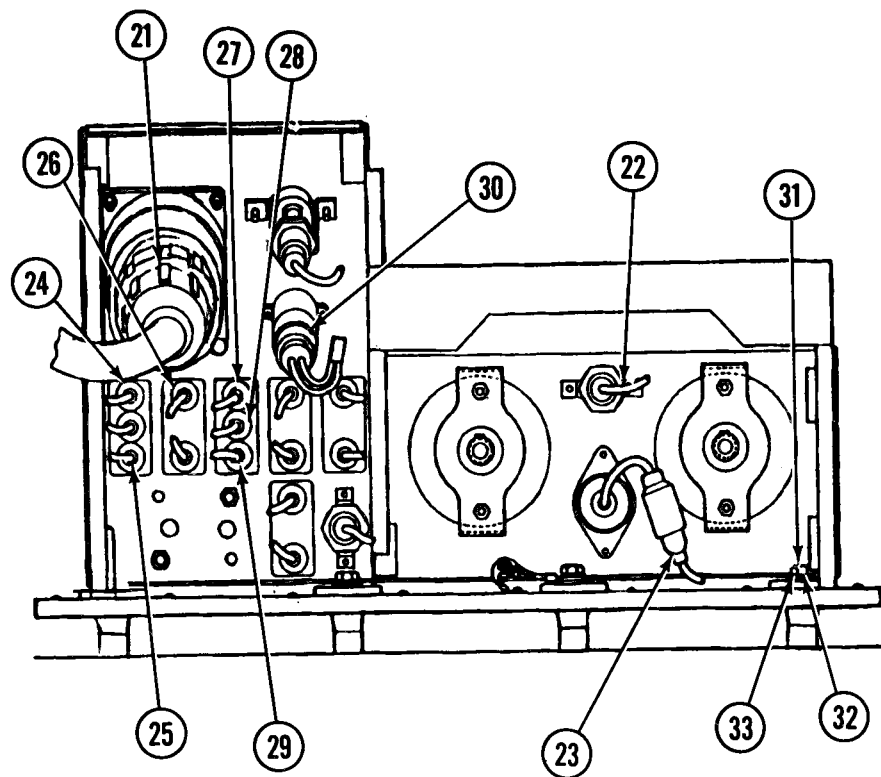
- A Route harness driver's bulkhead connector (1) along sponson under APU compartment up to and behind driver's instrument panel (2).
- B Connect driver's bulkhead connector (1) to bulkhead connector (3).
- C Route two stoplight wires no. 75 (49 to front of driver's compartment and connect to stoplight switch (5).
- D Connect connector (6) to dimmer switch (7).
- E Secure forward wires with strap (8).
- F Connect wire no. 38 (9) to domelight (10).
- G Secure harness in two strap assemblies (11).

TA309778

CABLE ASSEMBLY — CARGO COMPARTMENT (12330252) REPAIR (CONTINUED)



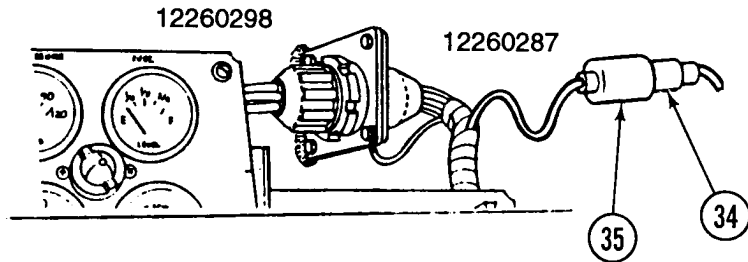
CABLE ASSEMBLY - CARGO COMPARTMENT (12330252) REPAIR (CONTINUED)



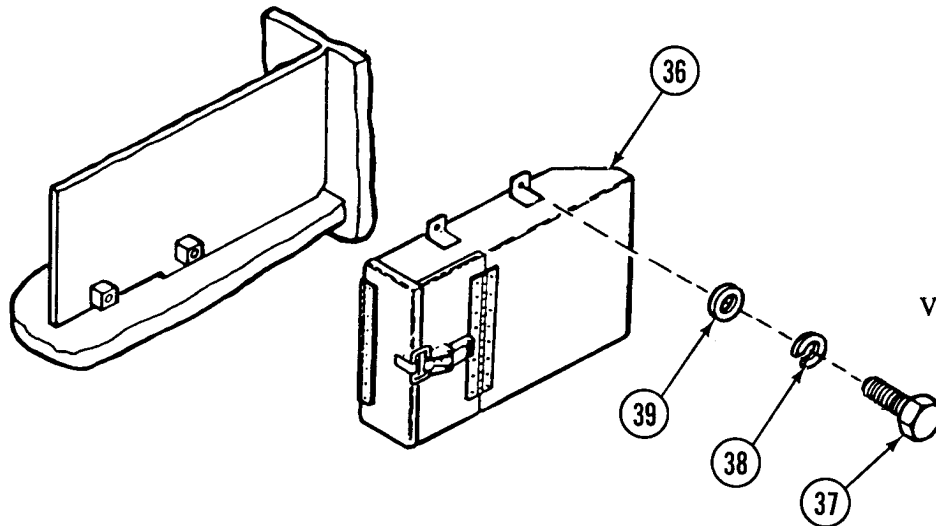
DRIVER'S INSTRUMENT PANEL

- M Connect connector (21) to driver's instrument panel.
- N Connect instrument panel light wire no. 40 (22) to instrument panel.
- O Connect auxiliary output wire no. 37 (23) to driver's instrument panel.
- P Connect two fuel level wires no. 31 (24) and no. 29 (25) to driver's instrument panel.
- Q Connect bilge pump wire no. 450 (26) to driver's instrument panel.
- R Connect BO/IR wires no. 19 (27), no. 520 (28), and no. 514-515 (29) to driver's instrument panel.
- S Connect high beam indicator wire no. 519 (30) to driver's instrument panel.
- T Install driver's instrument panel by installing four screws (31), four flatwashers (32), and four lockwashers (33).

CABLE ASSEMBLY - CARGO COMPARTMENT (12330252) REPAIR (CONTINUED)

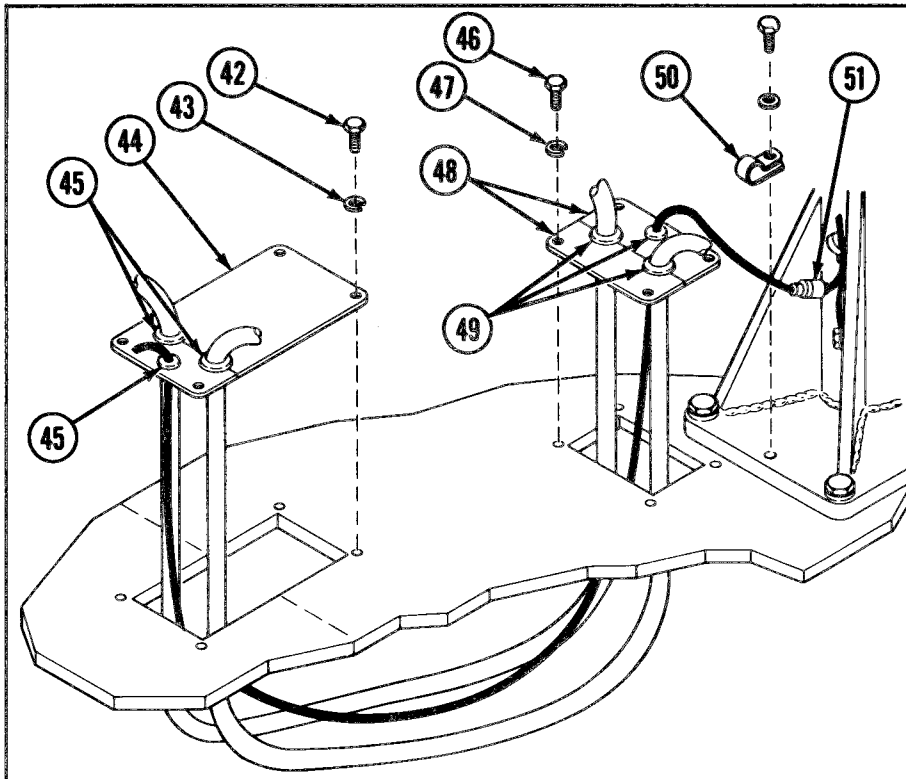


- U Connect wire no. 459 (34) to portable instrument panel wiring harness 12260287 wire no. 459 (35).

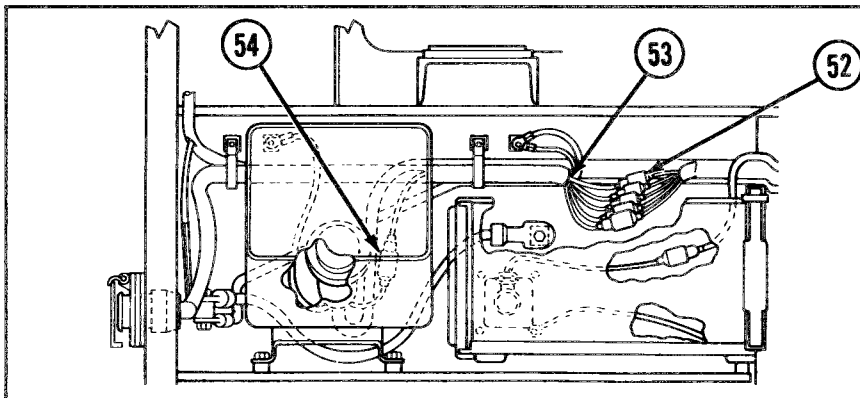


- V Install periscope box (36) in driver's compartment by installing four screws (37), four lockwashers (38) and four flat washers (39).

CABLE ASSEMBLY - CARGO COMPARTMENT (12330252) REPAIR (CONTINUED)



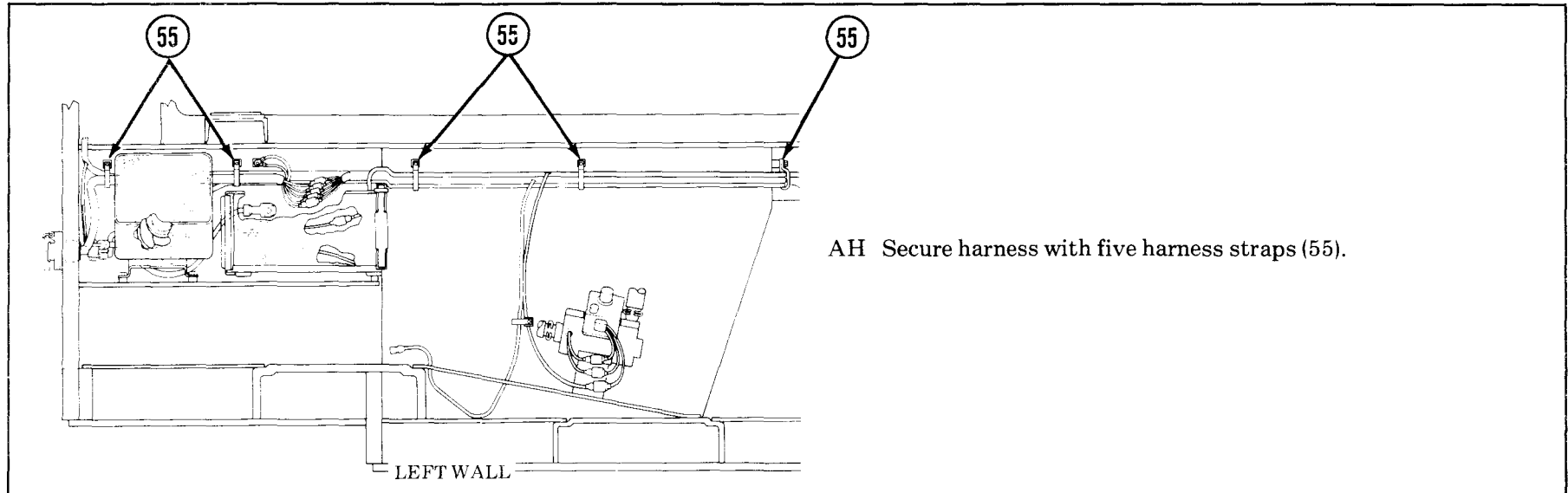
- W Remove two screws (42), two lockwashers (43) and slide floor plate (44) away from grommets (45). Rotate floor plate (44) and remove.
- X Push GND wire through grommet (45).
- Y Remove four screws (46), four lockwashers (47) and two plates (48).
- Z Feed GND wire under floor boards.
- AA Push GND wire through grommet (49).
- AB Secure GND wire with strap (50) and connect to conveyor override switch wiring harness (51).
- AC Install two plates (48) and two grommets (49) with hoses and GND wire with four screws (46) and four lockwashers (47).
- AD Install plate (44), making sure that plate fits in grommets (45), and install two screws (42) and two lockwashers (43).



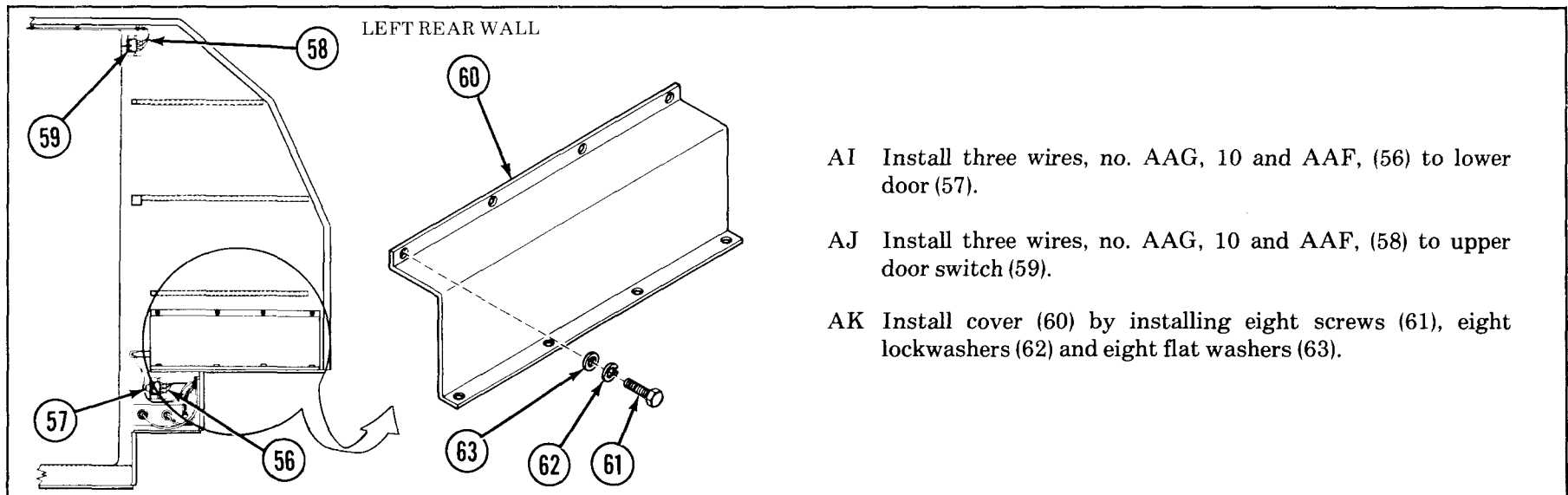
- AE Install NBC air purifier (TM 9-2350-267-20).
- AF Connect trailer accessory wires no. 37A, 23, 21, 22 and 24 (52) to trailer receptacle wiring harness 12330246 (53).
- AG Connect wire no. 419 (54) from APU wiring harness 12330248.

TA309782

CABLE ASSEMBLY - CARGO COMPARTMENT (12330252) REPAIR (CONTINUED)



AH Secure harness with five harness straps (55).

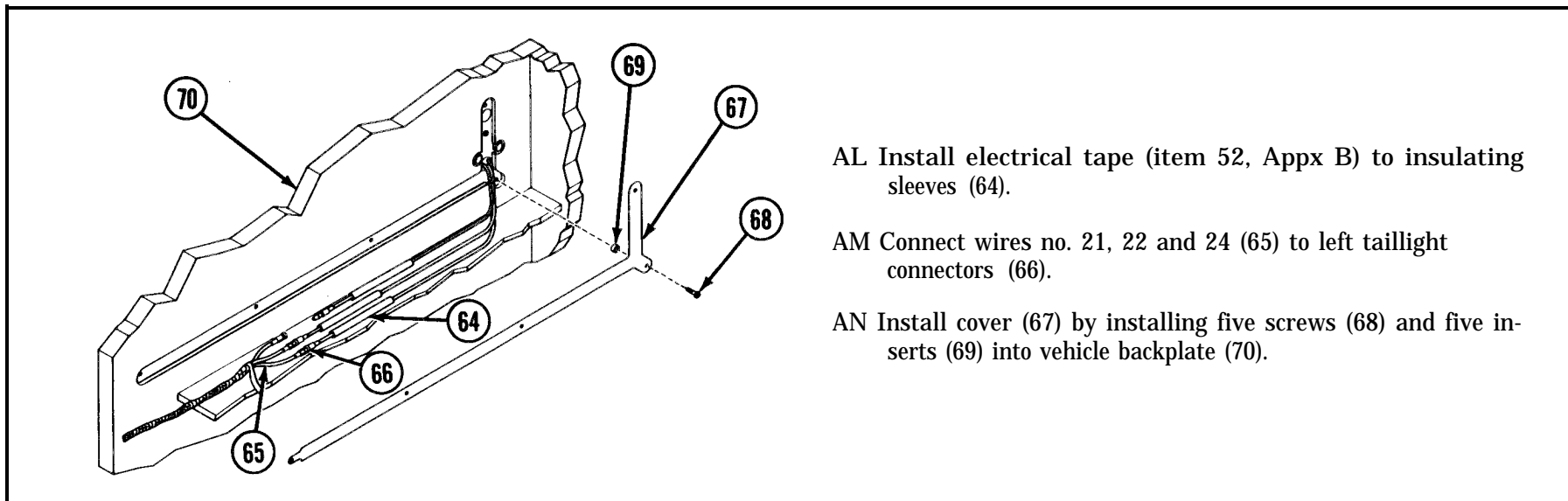


AI Install three wires, no. AAG, 10 and AAF, (56) to lower door (57).

AJ Install three wires, no. AAG, 10 and AAF, (58) to upper door switch (59).

AK Install cover (60) by installing eight screws (61), eight lockwashers (62) and eight flat washers (63).

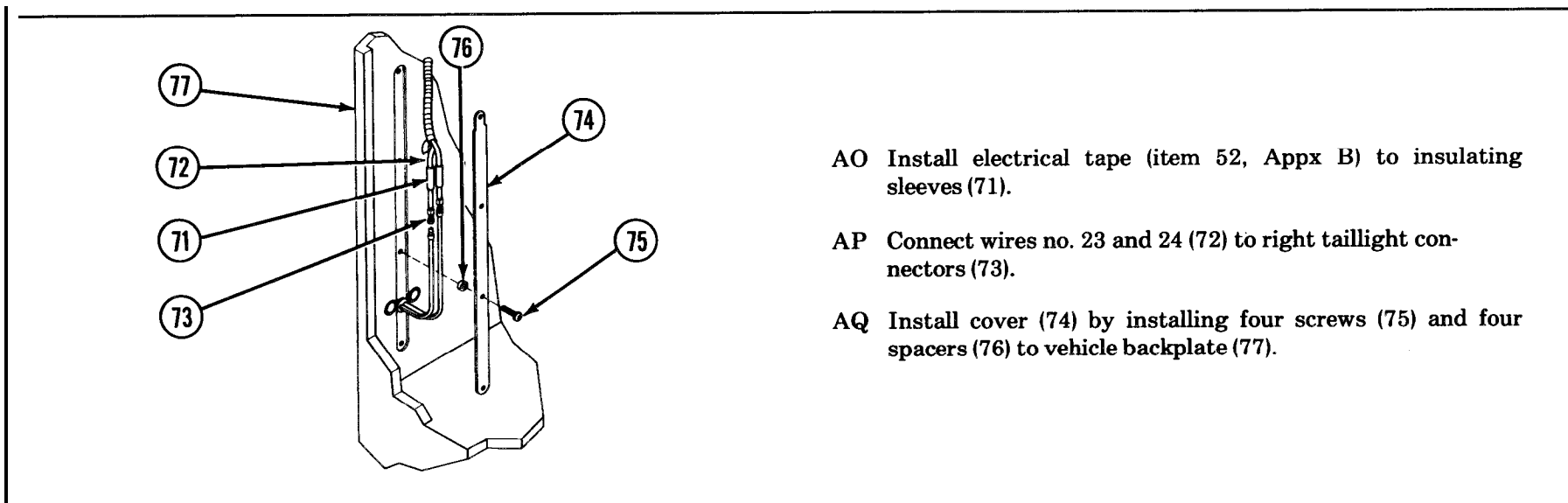
CABLE ASSEMBLY — CARGO COMPARTMENT (12330252) REPAIR (CONTINUED)



AL Install electrical tape (item 52, Appx B) to insulating sleeves (64).

AM Connect wires no. 21, 22 and 24 (65) to left taillight connectors (66).

AN Install cover (67) by installing five screws (68) and five inserts (69) into vehicle backplate (70).



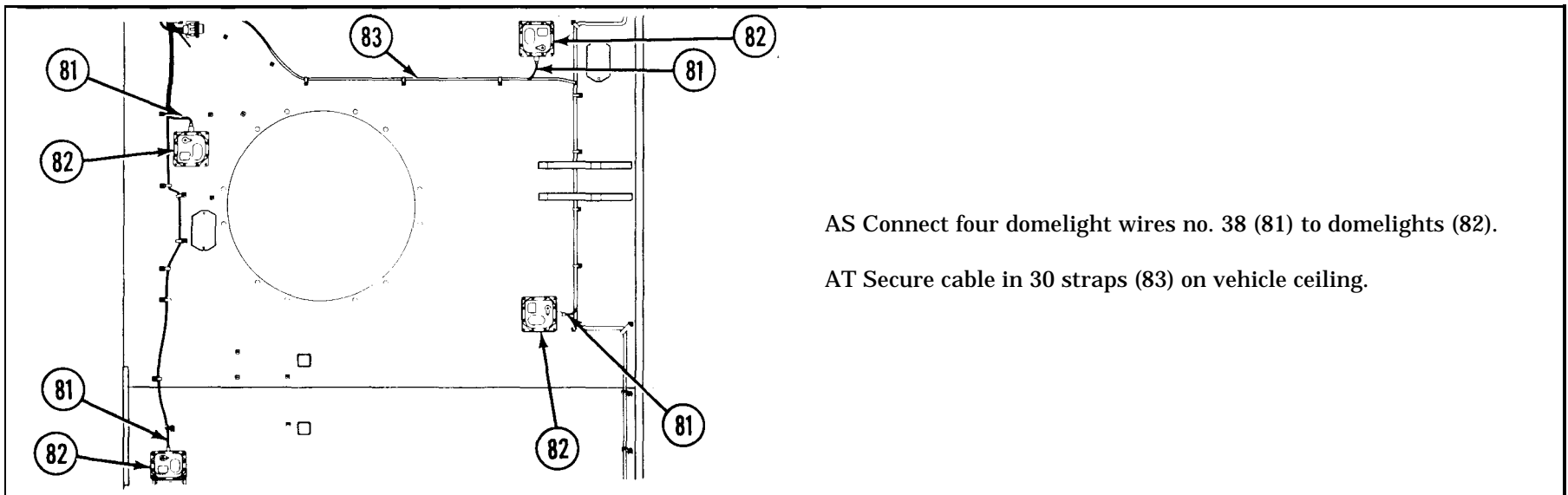
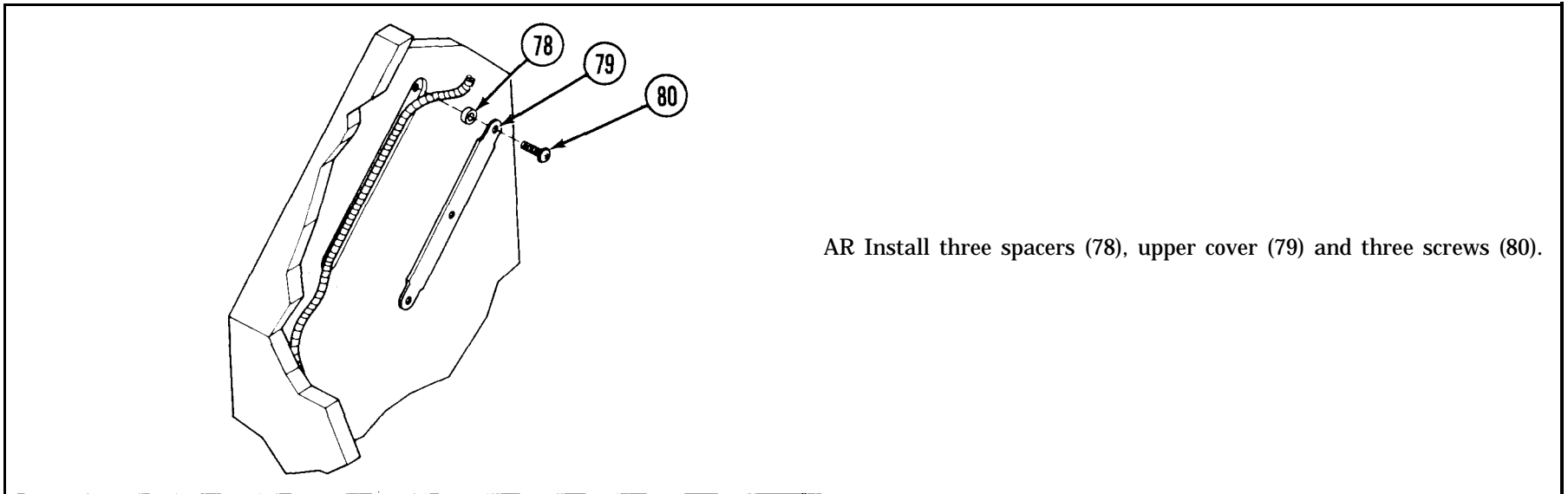
AO Install electrical tape (item 52, Appx B) to insulating sleeves (71).

AP Connect wires no. 23 and 24 (72) to right taillight connectors (73).

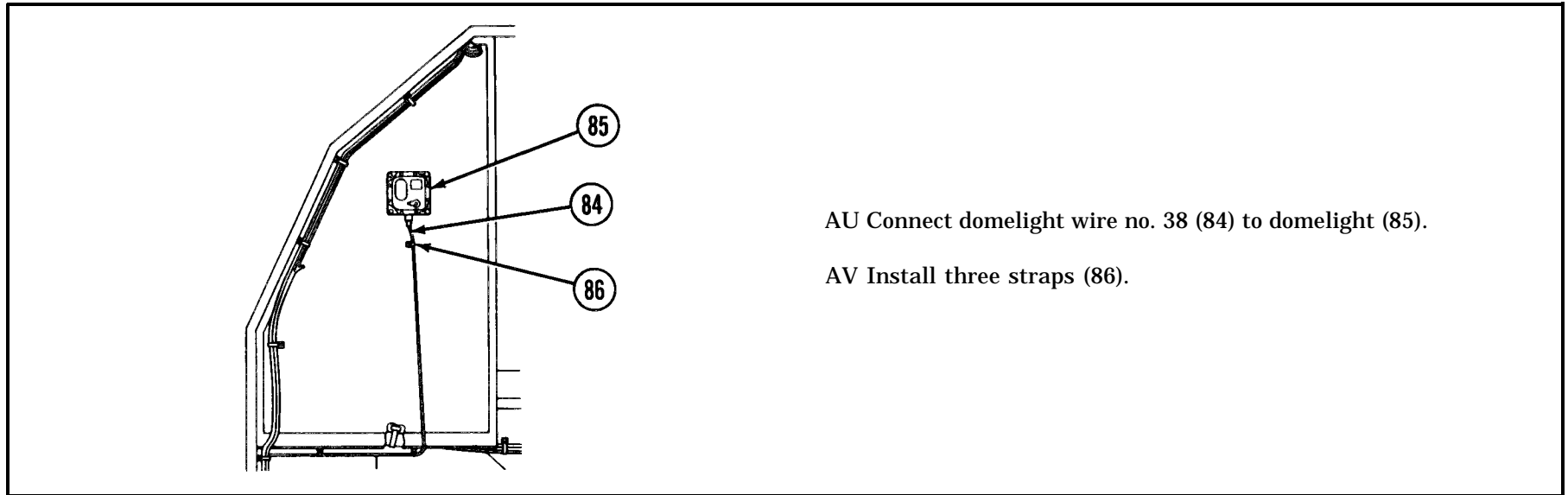
AQ Install cover (74) by installing four screws (75) and four spacers (76) to vehicle backplate (77).

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CABLE ASSEMBLY — CARGO COMPARTMENT (12330252) REPAIR (CONTINUED)

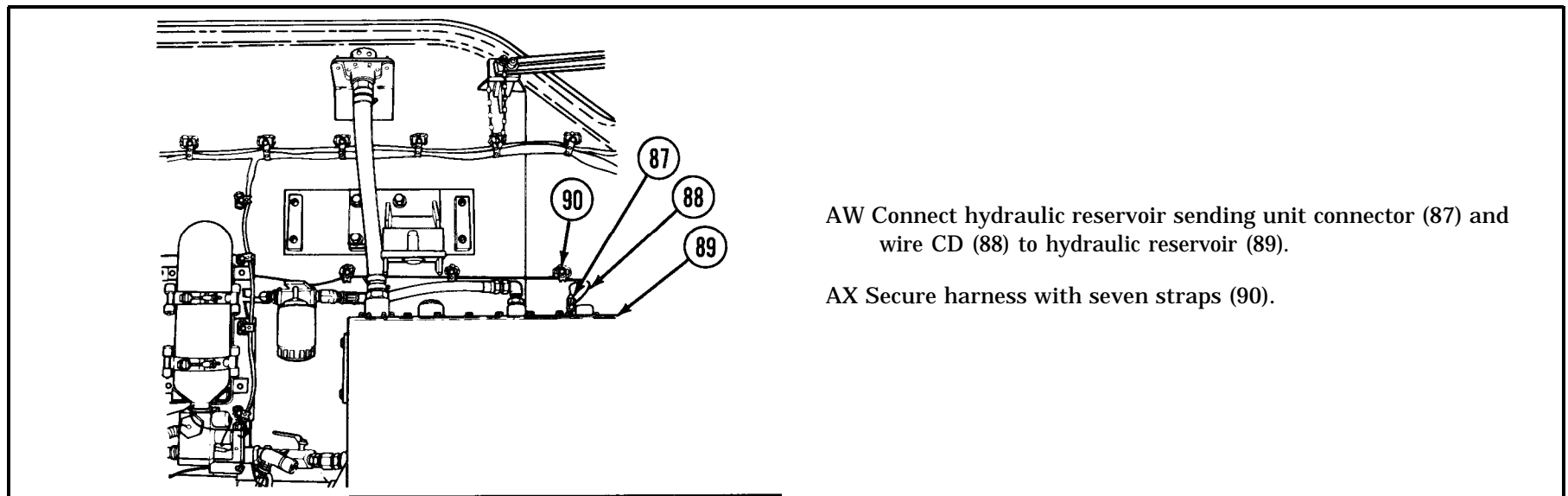


CABLE ASSEMBLY — CARGO COMPARTMENT (12330252) REPAIR (CONTINUED)



AU Connect domelight wire no. 38 (84) to domelight (85).

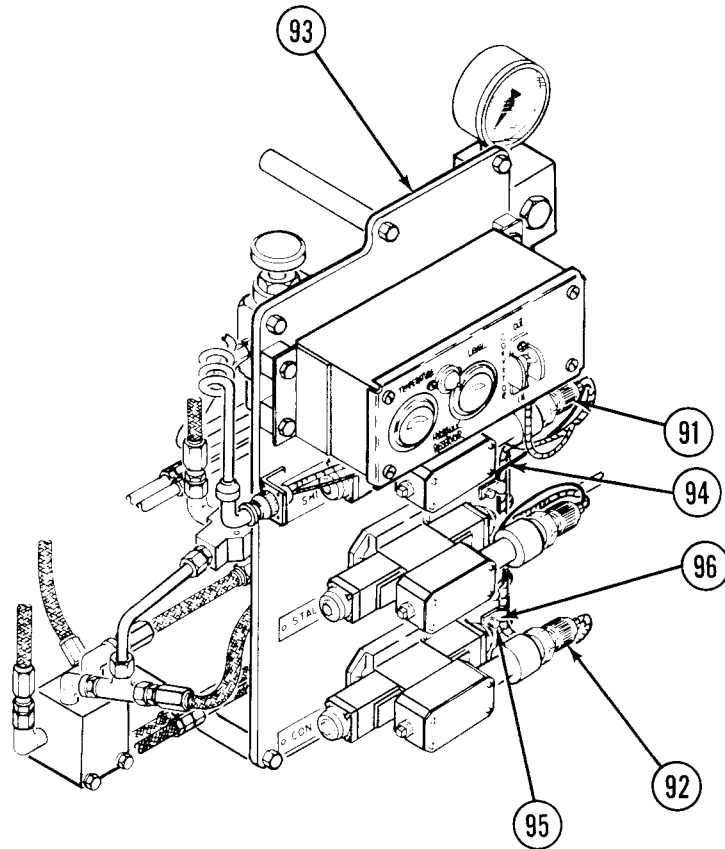
AV Install three straps (86).



AW Connect hydraulic reservoir sending unit connector (87) and wire CD (88) to hydraulic reservoir (89).

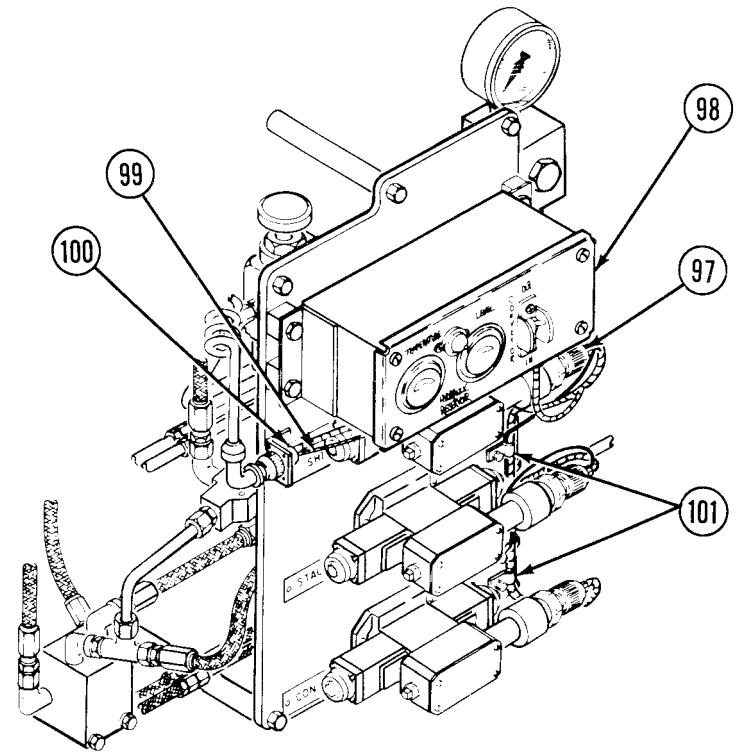
AX Secure harness with seven straps (90).

CABLE ASSEMBLY — CARGO COMPARTMENT (12330252) REPAIR (CONTINUED)



AY Connect ballistic shield solenoid connector (91) and conveyor solenoid plug (92) to hydraulic control panel (93).

AZ Install GND wire (94) by installing screw (95) and two washers (96).

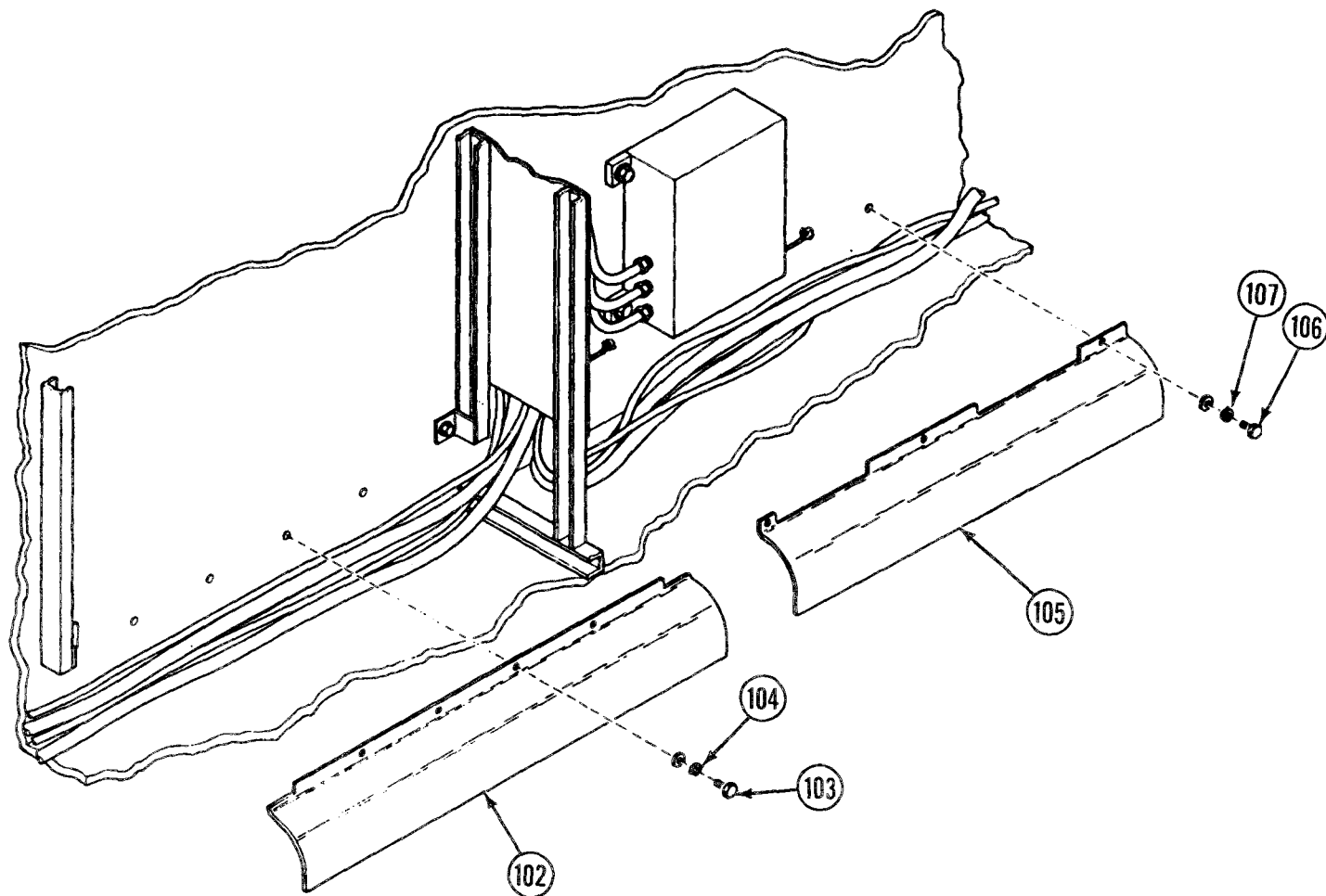


BA Connect connector (97) to hydraulic gage panel (98).

BB Connect wire no. 10 (99) to stacker control box wiring harness (100).

BC Secure harness section in two straps (101).

CABLE ASSEMBLY - CARGO COMPARTMENT (12330252) REPAIR (CONTINUED)



BD Install guard (102) by installing four screws (103) and four lockwashers (104).

BE Install guard (105) by installing three screws (106) and three lockwashers (107).

RECTIFIER: DISASSEMBLY, INSPECTION AND REPAIR, AND ASSEMBLY

INITIAL SETUPTest Equipment/Special Tools:

Multimeter

Materials/Parts:

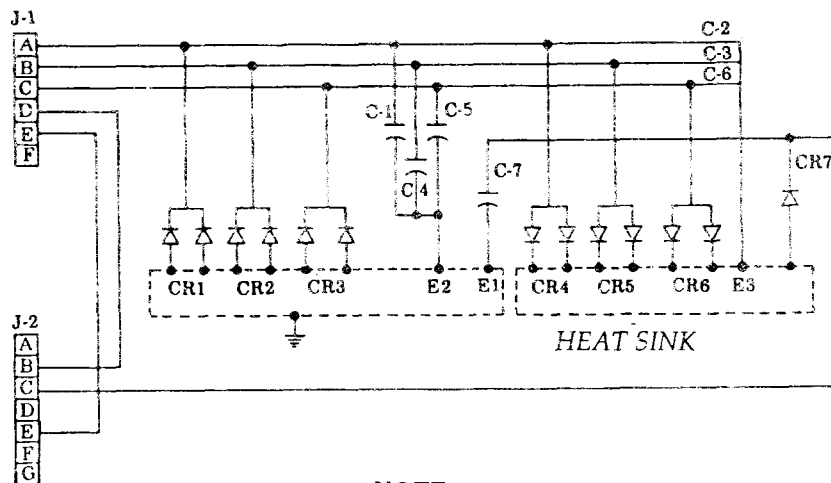
Acetone, Technical (item 76, Appx B)

Sealing Compound (item 48, Appx B)

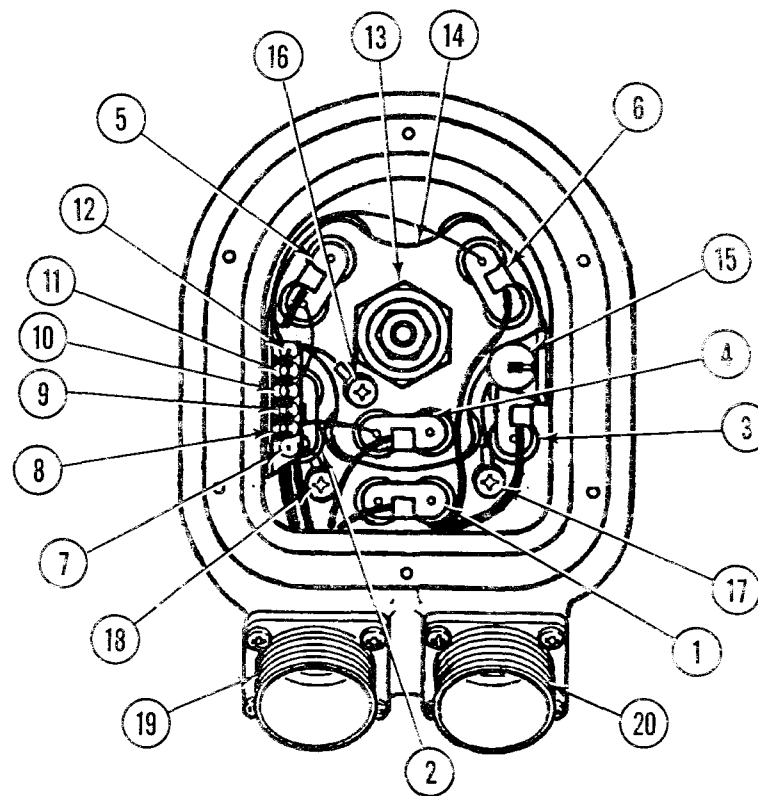
Silicone Compound (item 51, Appx B)

Solder (item 66, Appx B)

RECTIFIER

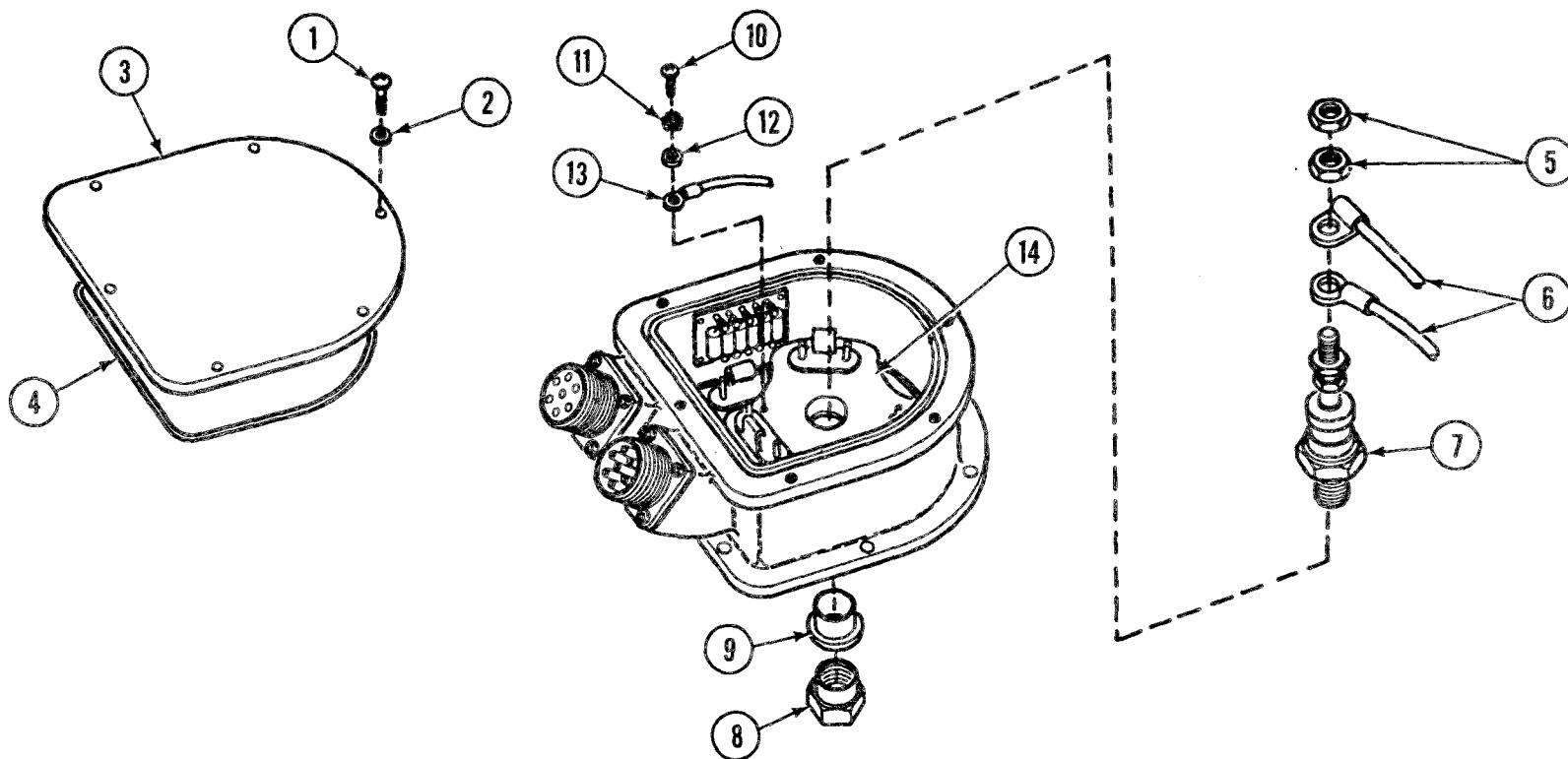
**NOTE**

Point of symbol indicates direction of conventional current flow. Semiconductors consist of two diodes and one terminal, except for CR-7.

**LEGEND:**

- | | | | |
|----|--------------------|----|-------------------|
| 1 | Semiconductor CR-1 | 11 | Capacitor C-5 |
| 2 | Semiconductor CR-2 | 12 | Capacitor C-6 |
| 3 | Semiconductor CR-3 | 13 | Semiconductor C-7 |
| 4 | Semiconductor CR-4 | 14 | Heat sink |
| 5 | Semiconductor CR-5 | 15 | Capacitor C-7 |
| 6 | Semiconductor CR-6 | 16 | Terminal E-3 |
| 7 | Capacitor C-1 | 17 | Terminal E-2 |
| 8 | Capacitor C-2 | 18 | Terminal E-1 |
| 9 | Capacitor C-3 | 19 | Connector J-1 |
| 10 | Capacitor C-4 | 20 | Connector J-2 |

RECTIFIER: DISASSEMBLY, INSPECTION AND REPAIR, AND ASSEMBLY (Continued)

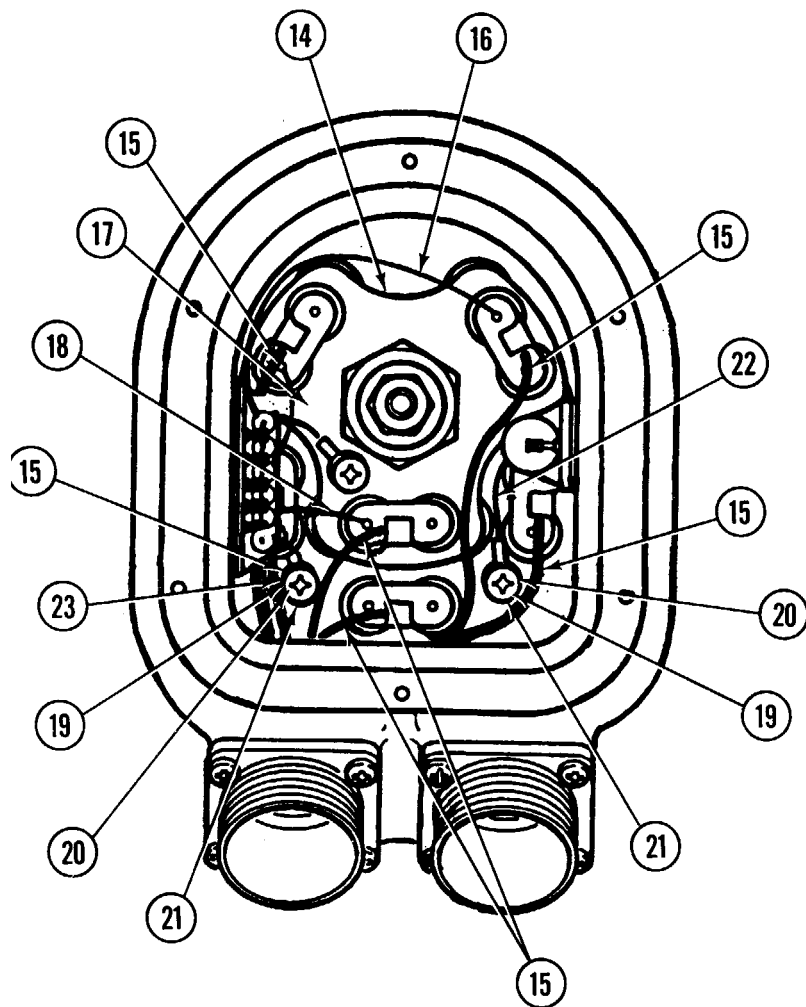


DISASSEMBLY

- A Remove six screws (1) and six flat washers (2).
- B Remove cover (3) and seal (4).

- C Remove two nuts (5).
- D Remove two electrical leads (6) (wire 2-J-2 and lead C-7) from semiconductor CR-7 (7).
- E Remove one nut (8), bushing (9), and semiconductor CR-7 (7).
- F Remove one screw (10), serrated washer (11), flat washer (12), and lead C-6 to E-3 (13) from heat sink (14).

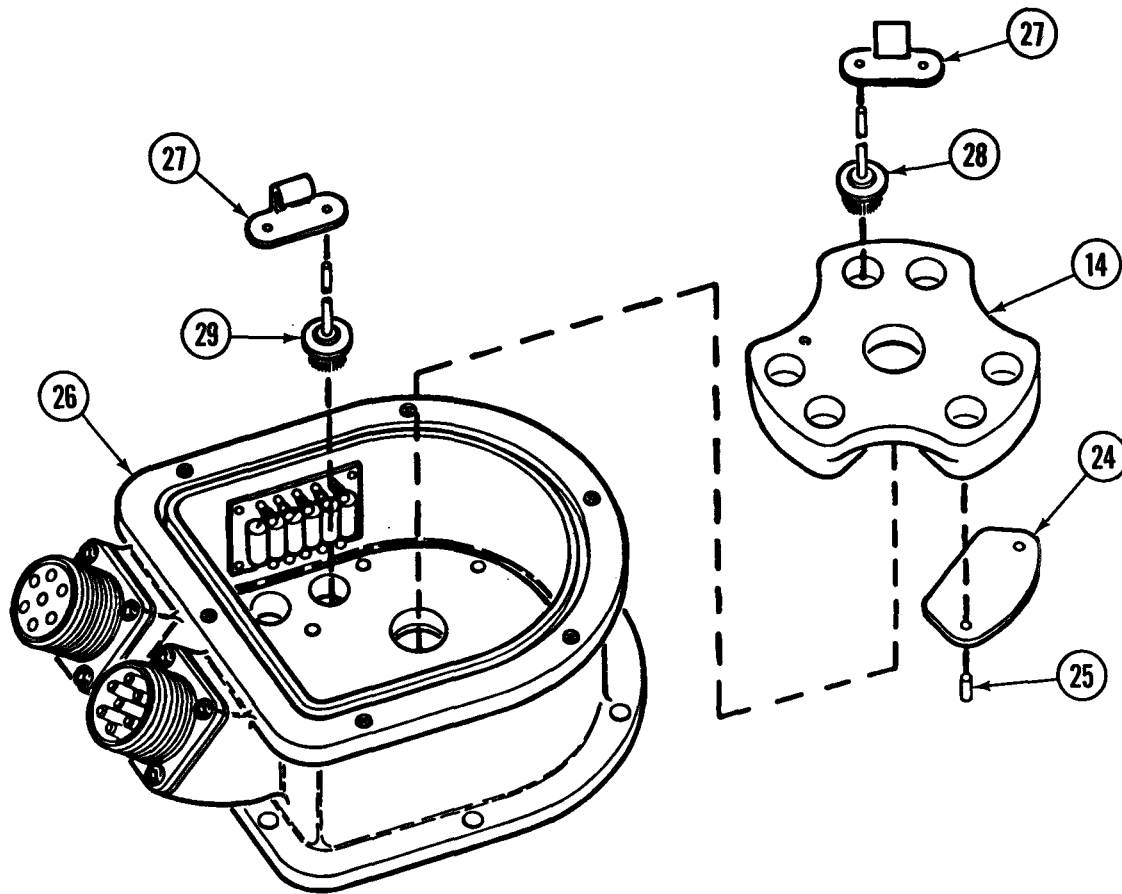
RECTIFIER: DISASSEMBLY, INSPECTION AND REPAIR, AND ASSEMBLY (Continued)

**NOTE**

Refer to schematic (p6-26) for identification of electrical leads.

- G Unsolder six electrical leads (15) to CR-1 thru CR-6 at CR terminals.
- H Unsolder electrical lead C-6 to CR-6 (16) at diode.
- I Unsolder electrical lead C-4 to CR-5 (17) at diode.
- J Unsolder electrical lead C-2 to CR-4 (18) at diode.
- K Remove two screws (19), two serrated washers (20) and two flat washers (21) from heat sink (14), releasing electrical leads C-7 to E-2 (22) and C-2 to E-1 (23).

RECTIFIER: DISASSEMBLY, INSPECTION AND REPAIR, AND ASSEMBLY (CONTINUED)



L Remove heat sink (14), three insulators (24), and six pins (25) from housing (26).

NOTE

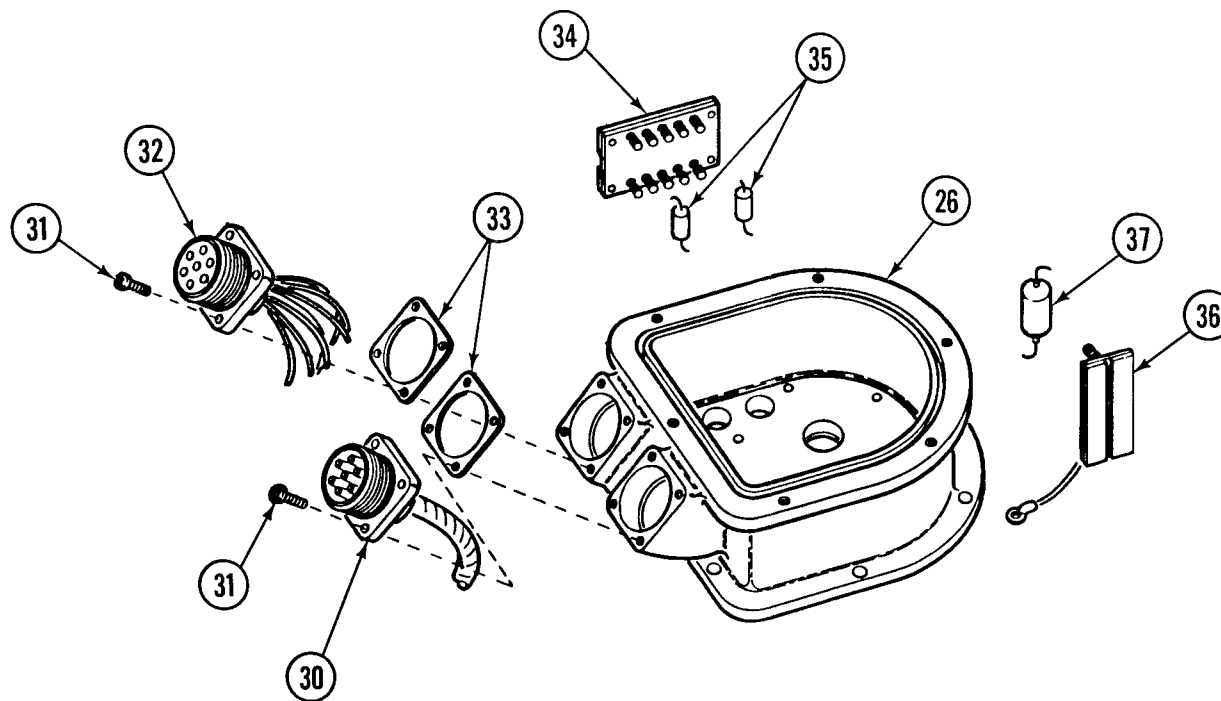
Unsolder at diode poles to remove terminals.

M Unsolder and remove six terminals (27) at semiconductors CR-1 thru CR-6.

N Unscrew six diodes (28) from heat sink (14).

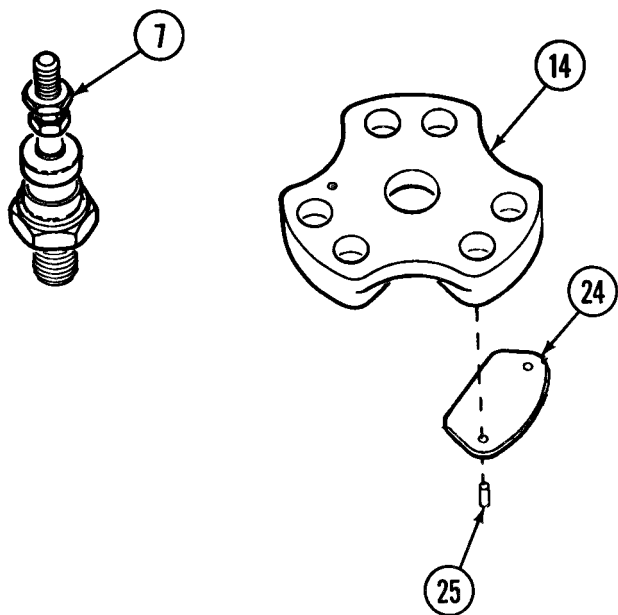
O Unscrew six diodes (29) from housing (26).

RECTIFIER: DISASSEMBLY, INSPECTION AND REPAIR, AND ASSEMBLY (CONTINUED)

**NOTE**

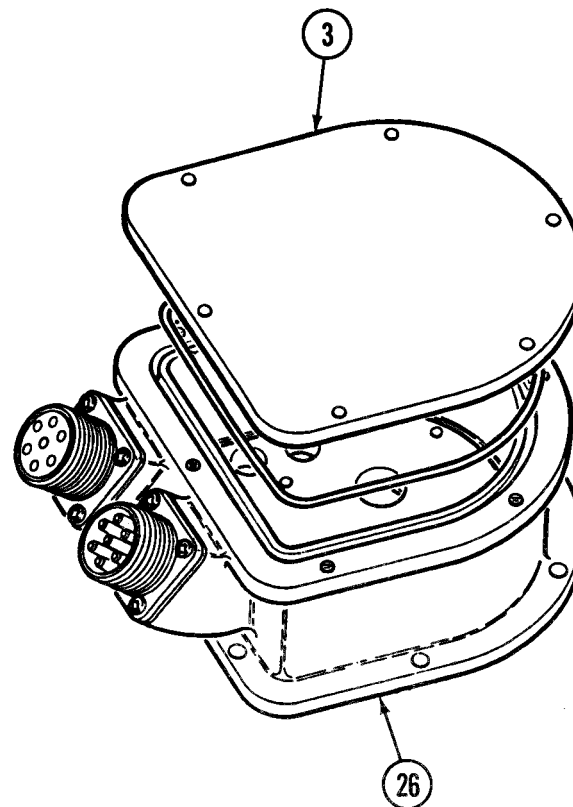
- | | |
|--|---|
| <p>P Unsolder wire 1 on pin B and wire 3 on pin E of connector J-2 (30).</p> <p>Q Remove eight screws (31) from housing (26).</p> <p>R Remove connectors J-1 (32) and J-2 (30) and two gaskets (33).</p> | <p>Capacitor boards are held to housing with adhesive.
Capacitor board and capacitors issued as an assembly.</p> <p>S Remove capacitor board (34) and six capacitors (35) from housing (26).</p> <p>T Remove capacitor board (36) and capacitor C-7 (37) from housing (26).</p> |
|--|---|

RECTIFIER: DISASSEMBLY, INSPECTION AND REPAIR, AND ASSEMBLY CONTINUED



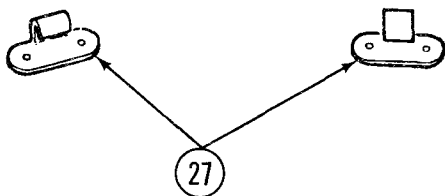
INSPECTION AND REPAIR

- A Test semiconductor CR-7 (7) for 3 ohms in conductive direction. Replace if defective.
- B Check heat sink (14) for cracks or distortion. Replace if defective.
- C Check three insulators (24) for cracks. Replace if cracked or broken.
- D Check six pins (25) for burrs or broken ends. Replace if defective.

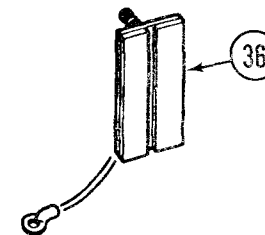
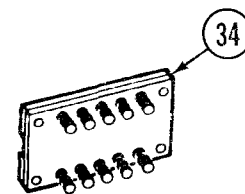


- E Check cover (3) and housing, (26) for cracks or distortions. Replace if defective.

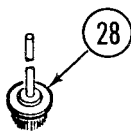
RECTIFIER: DISASSEMBLY, INSPECTION AND REPAIR. AND ASSEMBLY (CONTINUED)



F Check six terminals (27) for cracks. Replace if defective.

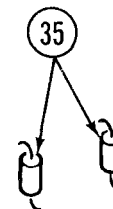


I Check capacitor boards (34 and 36) for cracks, breaks, loose or missing terminals. Replace if defective.

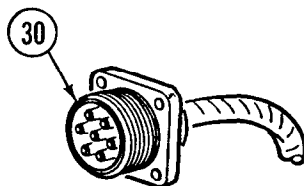
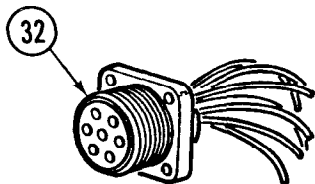
**NOTE**

Diodes (28 and 29) are opposite polarity.

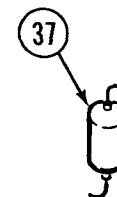
G Test six diode pairs (28 and 29) (p2-9) for 3 ohms in conductive direction. Test J for nonconductive direction. Replace if defective.



Test six capacitors (35) (p2-10). Capacitance should be 0.01 mfd \pm 10%. Replace assembly if defective.

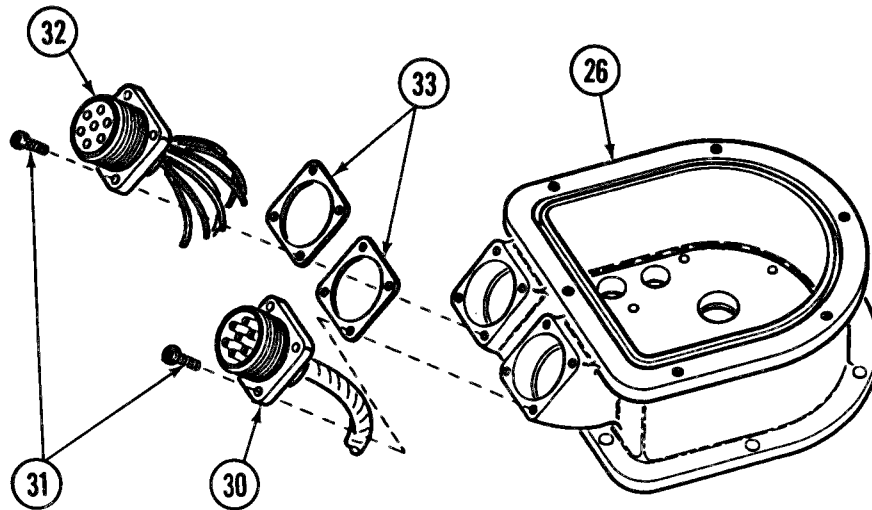


H Check connectors J-1 (32) and J-2 (30) for broken pins and loose leads. K Replace if pins broken. Crimp or resolder leads if loose.



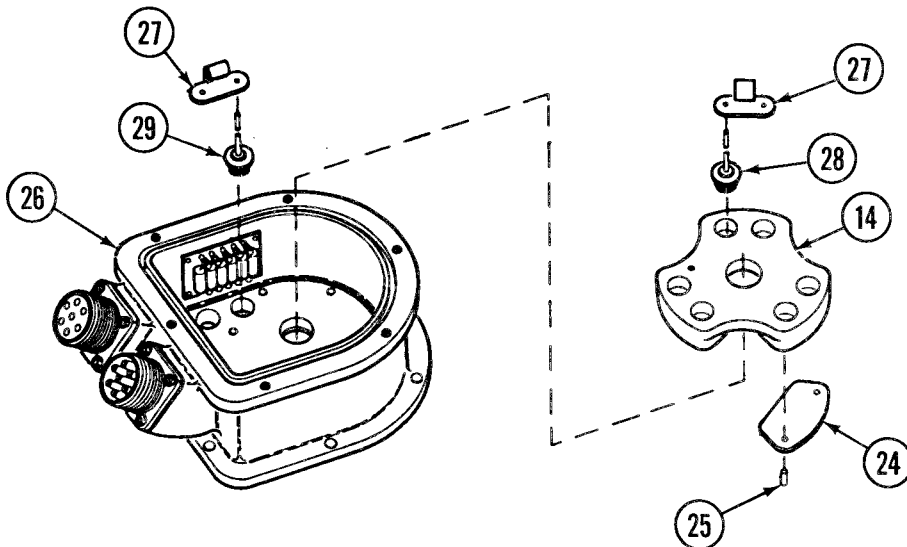
Test capacitor C-7 (37) (p2-10). Capacitance should be 3.0 mfd \pm 10%. Replace assembly if defective.

RECTIFIER: DISASSEMBLY, INSPECTION AND REPAIR, AND ASSEMBLY (CONTINUED)



ASSEMBLY

- A Install two connectors (30 and 32) and two gaskets (33) on housing (26) with eight screws (31).
- B Solder wire 1 on pin B and wire 3 on pin E of J-2 (30).

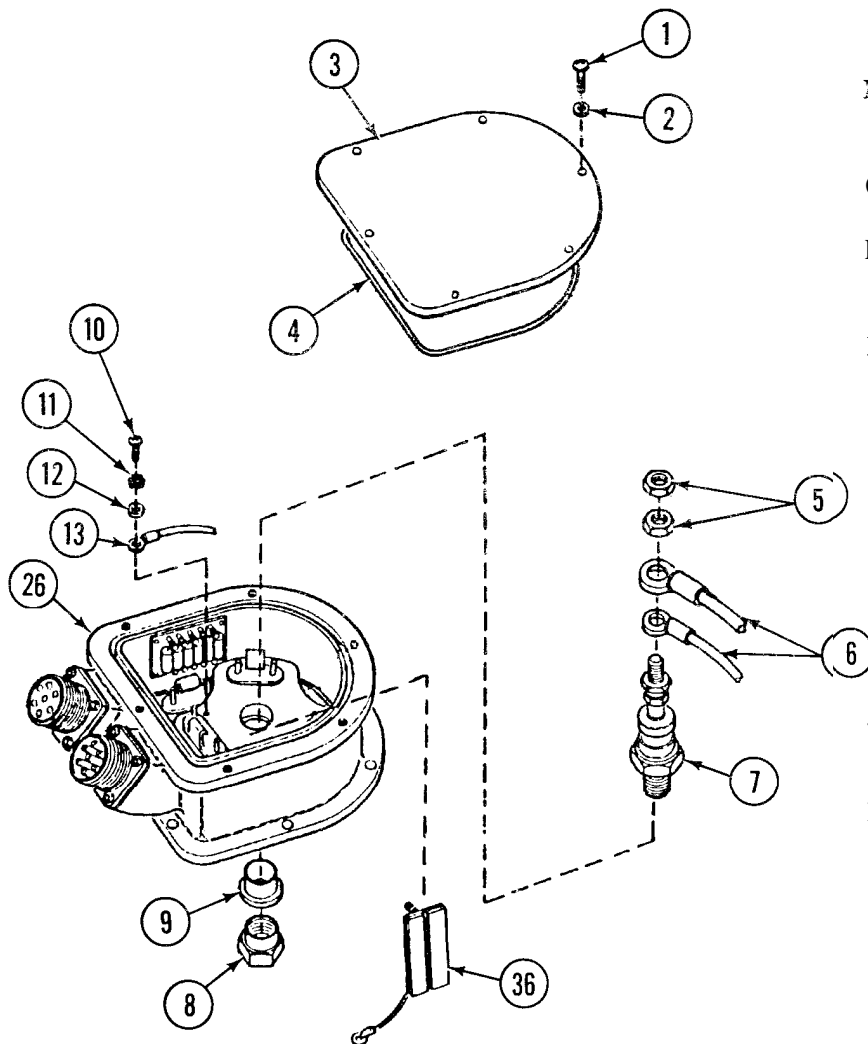


NOTE

For steps C-F, coat all mating surfaces with silicone compound (item 51, Appx B).

- C Install six diodes (28) in heat sink (14) and six diodes (29) in housing (26).
- D Solder six terminals (27) to 12 diodes (28 and 29).
- E Install six pins (25), three insulators (24) and heat sink (14) in housing (26).

RECTIFIER: DISASSEMBLY, INSPECTION AND REPAIR, AND ASSEMBLY (CONTINUED)



F Install lead C-6 to E-3 (13) on heat sink (14) with screw 10), serrated washer (11), and flat washer (12).

G Install semiconductor CR-7 (7), bushing (9), and nut (8).

H Install two electrical leads (6) on semiconductor CR-7 (7) with two nuts (5).

I Solder electrical leads to connection points except capacitor board assemblies (34 and 36) (p 6-26 and 6-28).

WARNING

Acetone-type solvent is toxic and flammable. Use only in a well-ventilated area. Do not breathe vapors. Do not use near open flame or excessive heat. Failure to heed warning could cause **SERIOUS INJURY** or even death.

J Clean capacitor bead assemblies (34 and 36) mounting surfaces with acetone-type solvent (item 76, Appx B).

K Install capacitor board assemblies (34 and 36) in housing (26) using pressure sensitive tape.

L Solder remaining electrical leads to connection points (p 6-26) and 6-28).

NOTE

Apply sealing compound (item 48, Appx B) to screws prior to installation.

M Install new seal (4) and cover (3) with six screws (1) and six flat washers (2).

PORTABLE INSTRUMENT PANEL WIRING HARNESS (12260298) REPAIR

This task covers:

- a. Disassembly
- b. Assembly

INITIAL SETUP

Tools/Test Equipment

Solder gun (item 19, Appx D)

Materials/Parts:

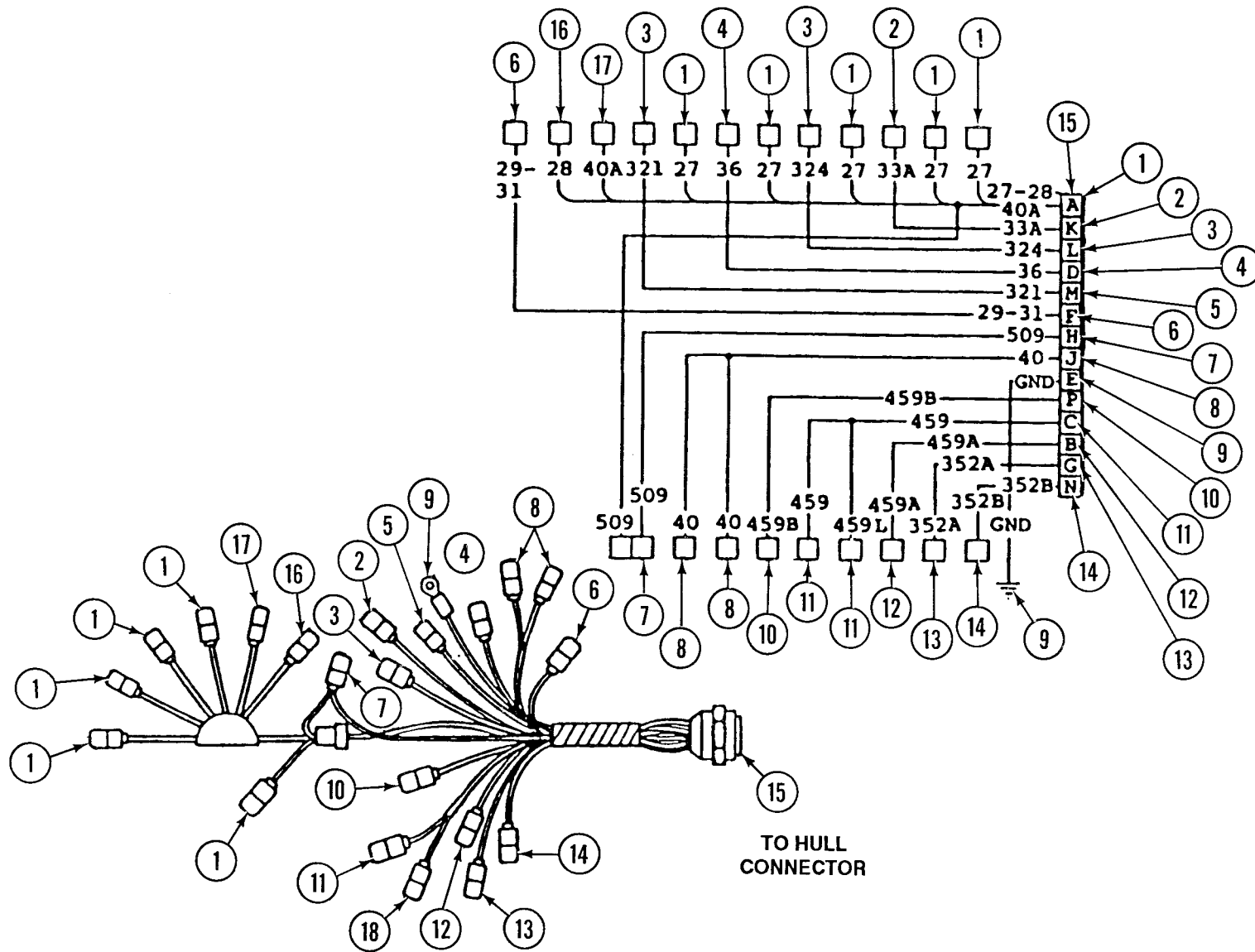
Electrical tape (item 52, Appx B)

Tin alloy solder (item 66, Appx B)

Connector number	Electrical Lead To	Wire No.	Connector number	Electrical Lead To	wire No.
1.	Power lead: engine instrumentation	27	10.	Master switch output lead	459B
2.	Engine water temperature lead	33A	11.	Master switch input	459
3.	Transmission oil temperature lead	324	12.	Dummy plug	459A
4.	Engine oil pressure lead	36	13.	Coolant indicator	352A
5.	Transmission oil pressure lead	321	14.	Coolant indicator	352B
6.	Fuel gage lead	29-31	15.	Connector harness 12260258	
7.	Warning lamp lead	509	16.	Battery indicator	28
8.	Panel lights	40	17.	Fuel gage	40A
9.	Ground	GND	18.	Master Switch Warning Light	459L

D Check six pins (25) for burrs or broken ends. Replace if defective.

PORTABLE INSTRUMENT PANEL WIRING HARNESS (12260298) REPAIR (CONTINUED)



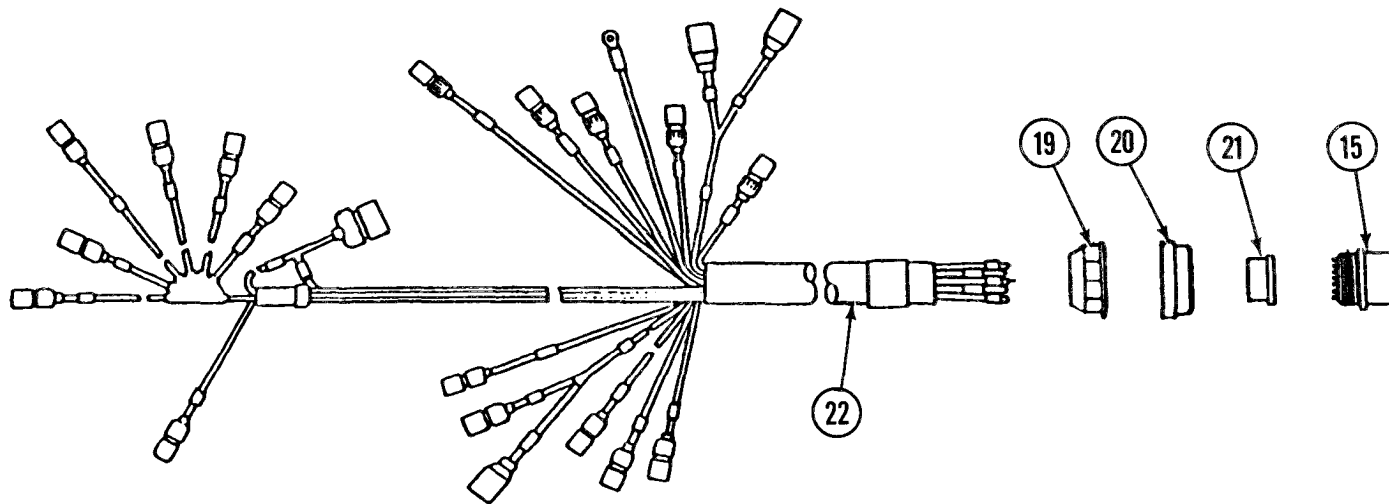
PORTABLE INSTRUMENT PANEL WIRING HARNESS (12260298) REPAIR (CONTINUED)

DISASSEMBLY

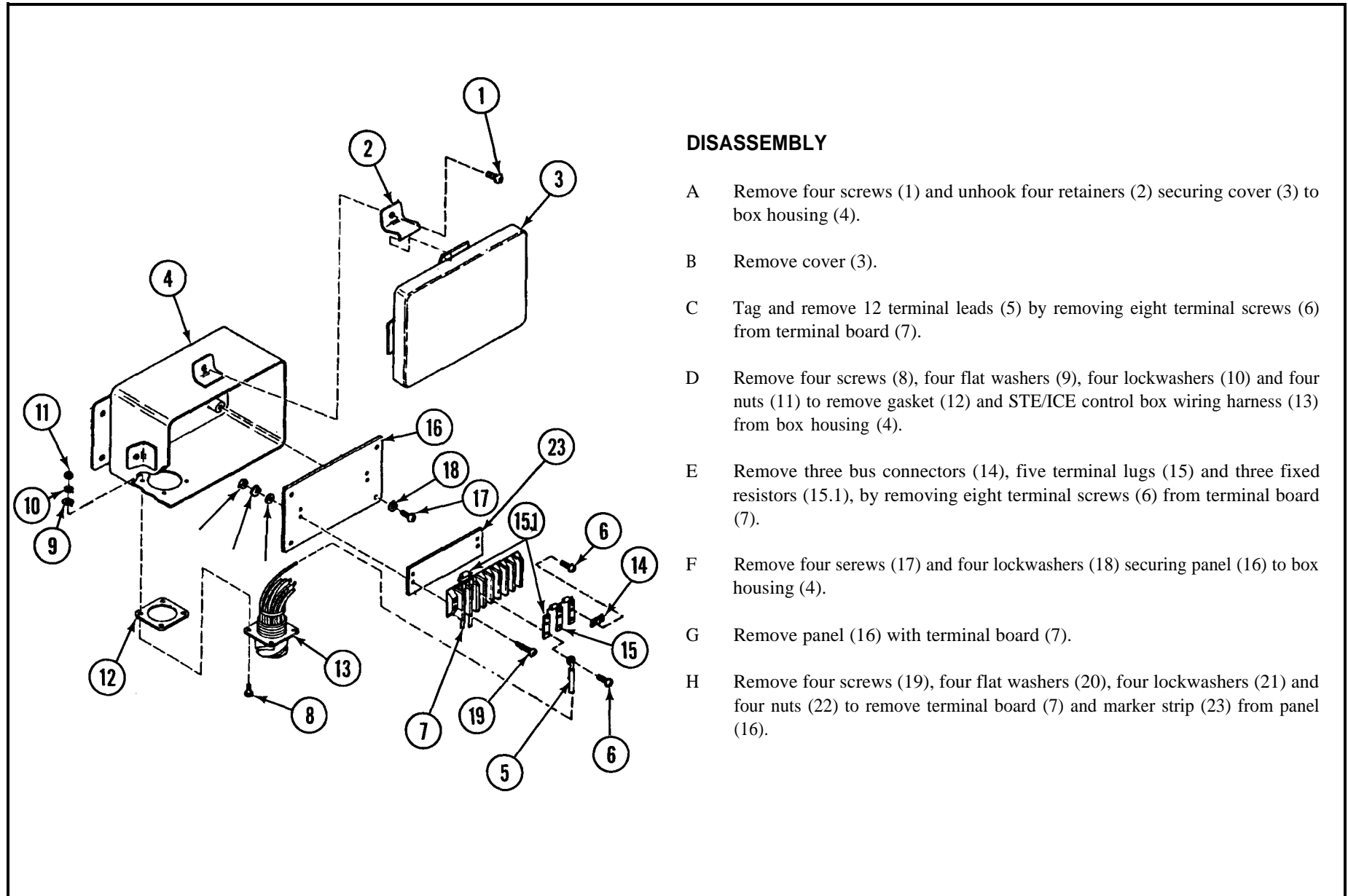
- A Loosen nut (19) and slide rearward over wiring harness (22).
- B Remove nut (20), grommet (21) and electrical connector (15) from wiring harness (22).
- C Remove insulation as needed to repair damaged wire.

ASSEMBLY

- A Replace insulation on repaired wire.
- B Install nut (20), grommet (21) and electrical connector (15) on wiring harness (22).
- C Install nut (19) on electrical connector (15) and tighten.



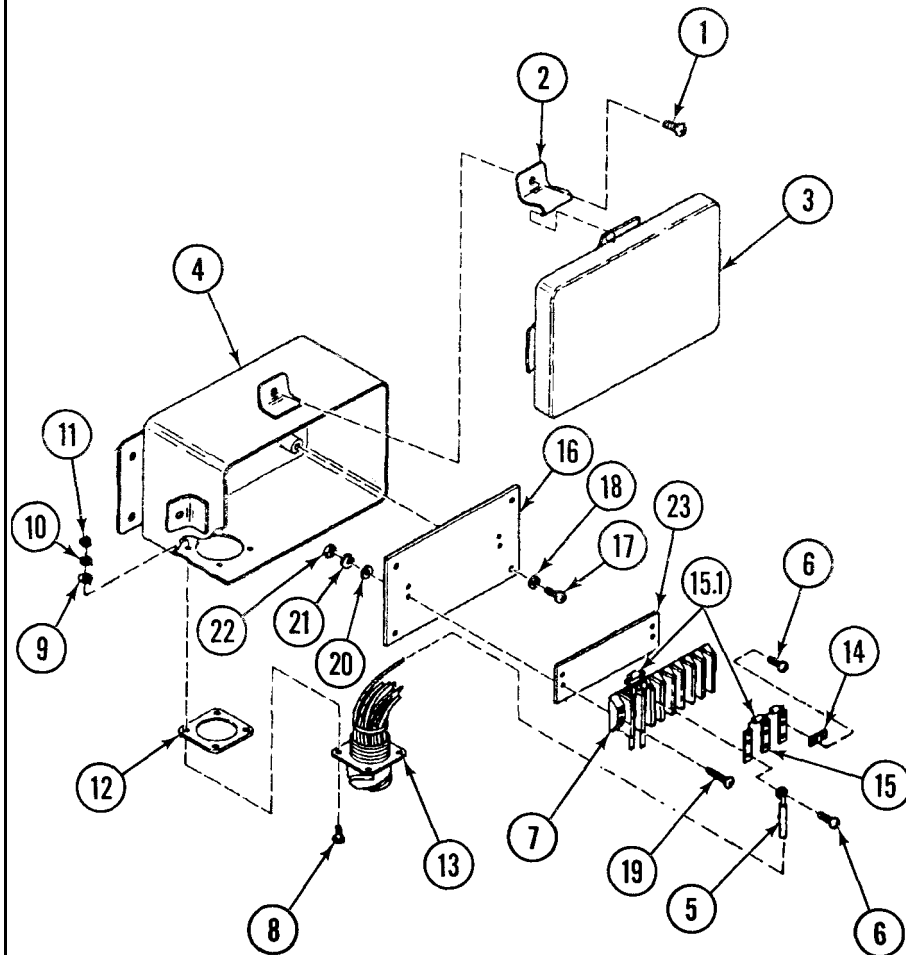
STE/ICE RESISTOR BOX DISASSEMBLY AND ASSEMBLY



DISASSEMBLY

- A Remove four screws (1) and unhook four retainers (2) securing cover (3) to box housing (4).
- B Remove cover (3).
- C Tag and remove 12 terminal leads (5) by removing eight terminal screws (6) from terminal board (7).
- D Remove four screws (8), four flat washers (9), four lockwashers (10) and four nuts (11) to remove gasket (12) and STE/ICE control box wiring harness (13) from box housing (4).
- E Remove three bus connectors (14), five terminal lugs (15) and three fixed resistors (15.1), by removing eight terminal screws (6) from terminal board (7).
- F Remove four screws (17) and four lockwashers (18) securing panel (16) to box housing (4).
- G Remove panel (16) with terminal board (7).
- H Remove four screws (19), four flat washers (20), four lockwashers (21) and four nuts (22) to remove terminal board (7) and marker strip (23) from panel (16).

STE/ICE RESISTOR BOX DISASSEMBLY AND ASSEMBLY(CONTINUED)

**ASSEMBLY**

- A Secure terminal board (7) and marker strip (23) to panel (16) with four screws (19), four flat washers (20), four lockwashers (21) and four nuts (22).
- B Install panel (16) with terminal board (7) in box housing (4) with four screws (17) and four lockwashers (18).
- C Install five terminal lugs (15), three fixed resistors (15.1) and three bus connectors (14) with eight terminal screws (6).
- D Install new gasket (12) and STE/ICE control box wiring harness (13) in box housing (4) with four screws (8), four flat washers (9), four lockwashers (10) and four nuts (11).
- E Install 12 terminal leads (5) on terminal board (7) with eight terminal screws (6).
- F Install cover (3) on box housing (4) and secure by hooking four retainers (2).
- G Install four screws (1) in retainers (2).

CHAPTER 7
MAINTENANCE PROCEDURES
FINAL DRIVE AND TRACK SUSPENSION ASSEMBLIES

CHAPTER OVERVIEW

This chapter illustrates and describes maintenance procedures for:

- Section I Deleted
- Section II Final Drive Assembly
- Section III Track Suspension

Removal and installation procedures for these components are contained in TM 9-2350-267-20.

Section II FINAL DRIVE ASSEMBLY

FINAL DRIVE ASSEMBLY REPAIR

INITIAL SETUP

Test Equipment/Special Tools:

Torque wrench, 0-175 lb-ft (item 24, Appx D)
Torque wrench, 0-600 lb-ft (item 25, Appx D)

Materials/Parts:

Lubricating oil (item 32, Appx B)
Sealing compound (item 48, Appx B)

Personnel Required:

Two

References:

TM 9-214

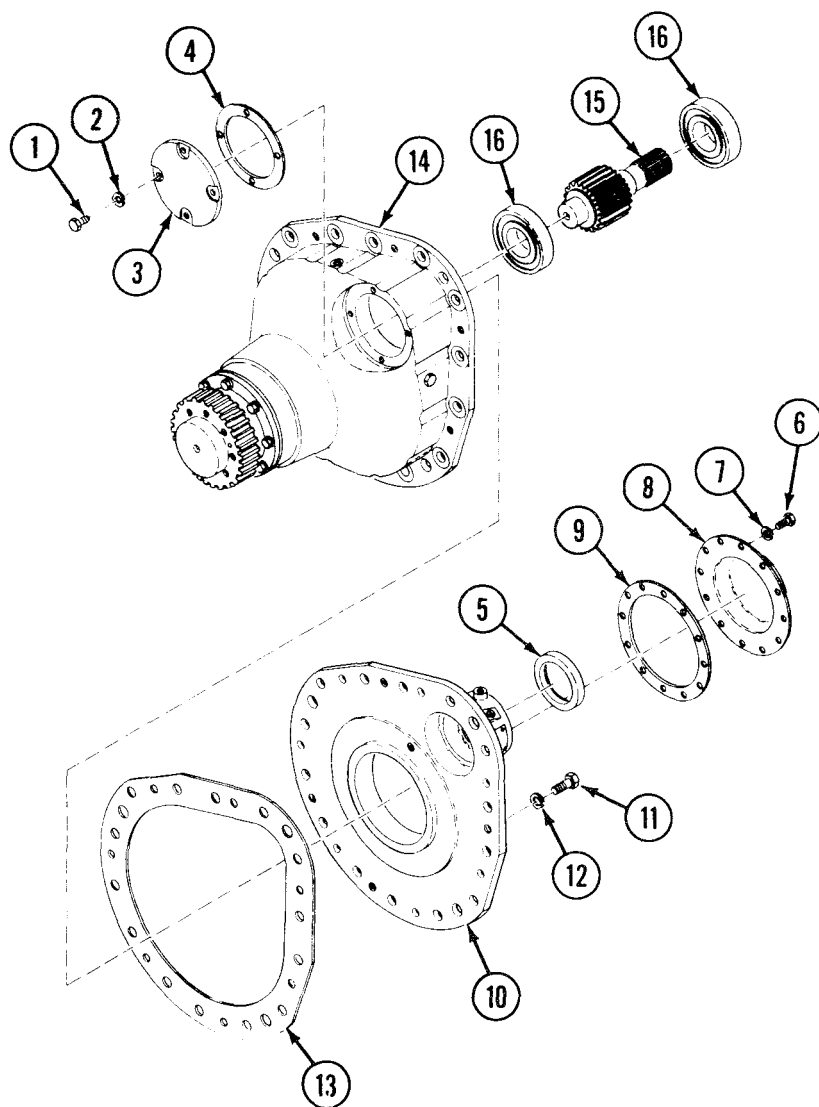
Equipment Condition:

Final drive assembly removed.

NOTE

Repair of the final drive assembly is general support maintenance.

FINAL DRIVE ASSEMBLY REPAIR (CONTINUED)



DISASSEMBLY

- A Remove four screws (1), four lockwashers (2), cover (3) and gasket (4).

NOTE

If optional seal is used, remove two seals.

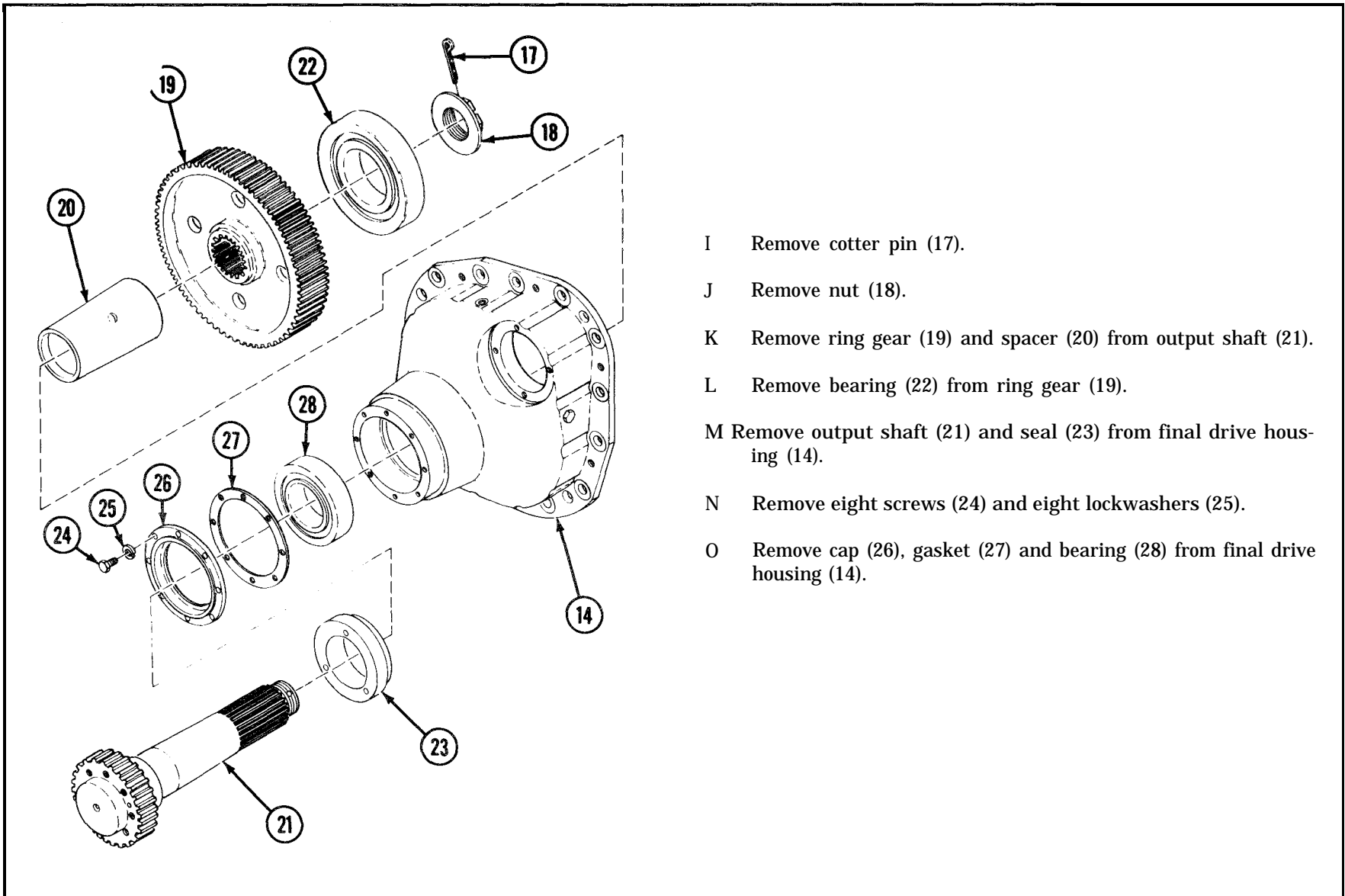
- B Remove and discard seal (5).
 C Remove 12 screws (6) and 12 lockwashers (7).
 D Remove cover (8) and gasket (9) from housing cover (10).
 E Remove seven screws (11) and seven lockwashers (12).
 F Remove housing cover (10) and gasket (13) from final drive housing (14).

NOTE

Housing cover and final drive housing are a matched set. Input splined gearshaft and ring gear are also a matched set.

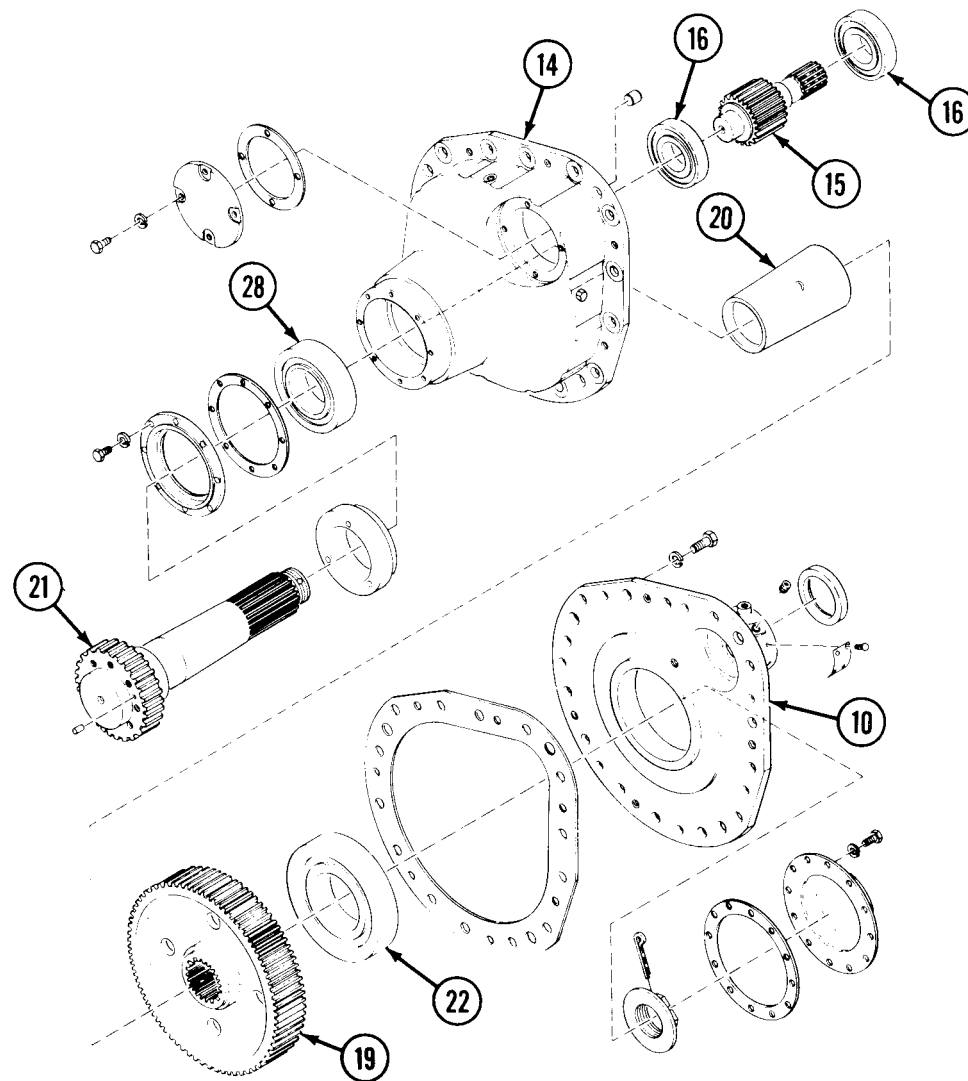
- G Remove input splined gearshaft (15) from final drive housing (14).
 H Remove two bearings (16) from input splined gearshaft (15).

FINAL DRIVE ASSEMBLY REPAIR (CONTINUED)



- I Remove cotter pin (17).
- J Remove nut (18).
- K Remove ring gear (19) and spacer (20) from output shaft (21).
- L Remove bearing (22) from ring gear (19).
- M Remove output shaft (21) and seal (23) from final drive housing (14).
- N Remove eight screws (24) and eight lockwashers (25).
- O Remove cap (26), gasket (27) and bearing (28) from final drive housing (14).

FINAL DRIVE ASSEMBLY REPAIR (CONTINUED)



FINAL DRIVE ASSEMBLY REPAIR (CONTINUED)

INSPECTION AND REPAIR

NOTE

Housing cover and final drive housing are a matched set. If either is defective, replace both.

- A Inspect housing cover (10) for cracks. Repair or replace as matched set if cracked.
- B Inspect housing cover (10) for stripped threads. Retap stripped threads.
- C Check final drive housing (14) for cracks or damage. Replace as matched set if defective.
- D Refer to TM 9-214 for inspection of bearing races in place.
- E Refer to TM 9-214 for inspection of bearings (16).

NOTE

Input splined gearshaft and ring gear are a matched set. If either is defective, replace both.

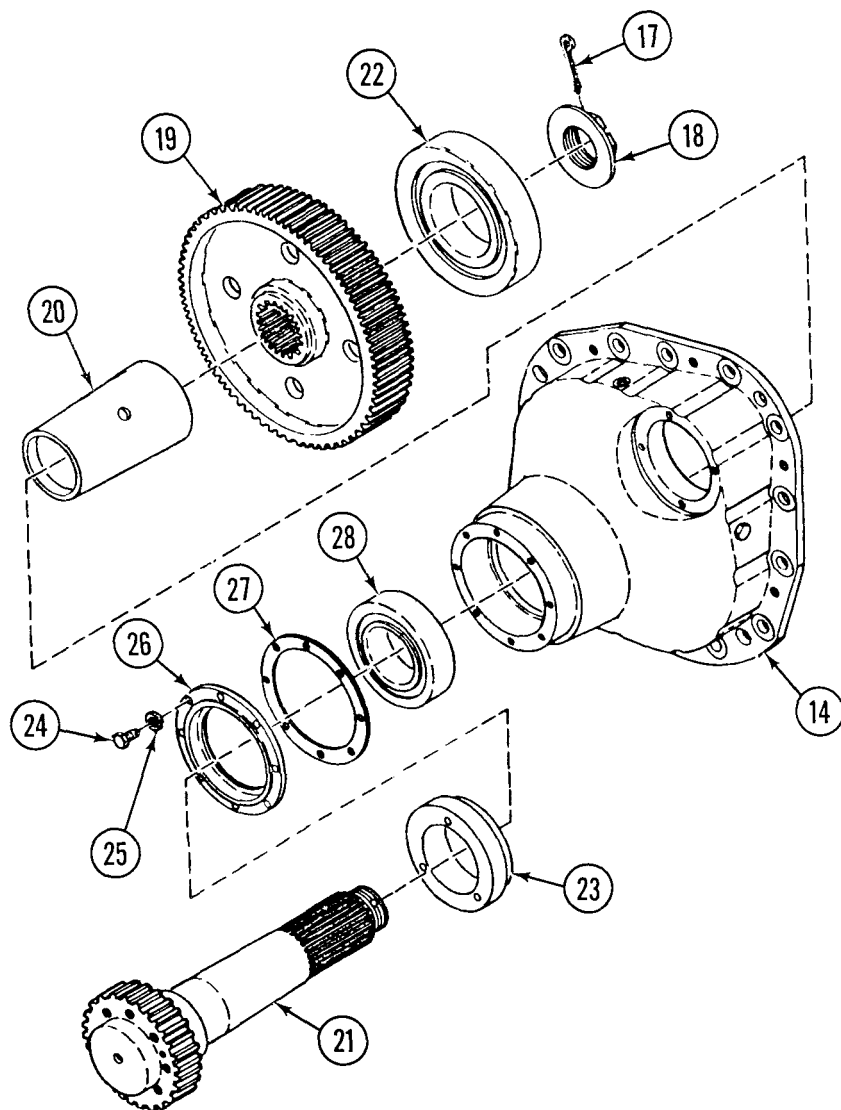
- F Inspect input splined gearshaft (15) for damage or defects. Replace if damaged or defective.
- G Inspect input splined gearshaft (15) for broken or missing splines and gear teeth. Replace if splines or gear teeth are missing or broken.
- H Inspect output shaft (21) for damage or defects, and for broken or missing splines on both ends of shaft. Replace if splines are broken or missing.

NOTE

Input splined shaft and ring gear are a matched set. If either is defective, replace both.

- I Inspect ring gear (19) for broken or missing teeth. Replace as matched set if teeth are broken or missing.
- J Check spacer (20) for cracks or distortion. Replace if defective.
- K Refer to TM 9-214 for inspection of bearings (22 and 28).

FINAL DRIVE ASSEMBLY REPAIR (CONTINUED)

**ASSEMBLY**

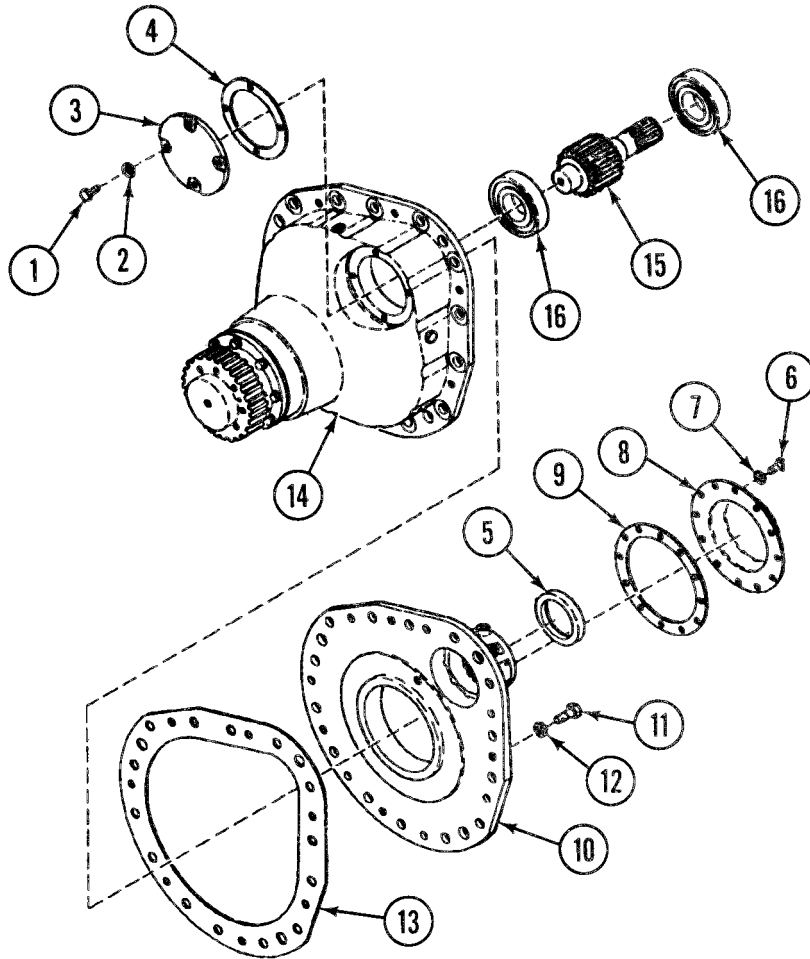
- A Install bearing (28), new gasket (27) and cap (26) in final drive housing (14).
- B Secure with eight new lockwashers (25) and eight screws (24). Torque screws (24) to 35-40 lb-ft.
- C Install new seal (23) on output shaft (21). Insert output shaft (21) into final drive housing (14).
- D Install bearing (22) on ring gear (19).
- E Stack spacer (20) and ring gear (19) on output shaft (21).
- F Apply lubricating oil (item 32, Appx B) to threads of nut (18) and output shaft (21). Torque nut (18) to 450 to 475 lb ft to make sure bearing (22), spacer (20) and ring gear (19) are all thoroughly seated on output shaft (21).

NOTE

Bend long leg of cotter pin on to flat of nut. Bend short leg only so far as to not protrude beyond end of output shaft.

- G If slot in nut (18) aligns with hole in output shaft (21), insert new cotter pin (17). If slot in nut (18) does not align with hole in output shaft (21), torque nut up to 30 lb ft more until a slot in nut (18) aligns with hole in output shaft (21). Insert new cotter pin (17).

FINAL DRIVE ASSEMBLY REPAIR (CONTINUED)



- H Install two bearings (16) on input splined gearshaft (15).
- I Install input splined gearshaft (15) into final drive housing (14).

NOTE

Housing cover and final drive housing are a matched set. If replacing one, replace both.

- J Position new gasket (13) and housing cover (10) on final drive housing (14) using dowel pins in housing face as alignment guides.
- K Apply lubricating oil (item 32, Appx B) to threads of seven screws (11). Secure housing cover (10) to final drive housing (14) with seven screws (12). Torque to 75-80 lb ft.
- L Position new gasket (9) and cover (8) on housing cover (10). Align mounting holes. Secure with 12 new lockwashers (7) and 12 screws (6). Torque to 35-40 lb ft.

NOTE

If optional seal is used, install two seals (5) back-to-back in housing cover.

- M Coat outside diameter of new seal (5) with sealing compound (item 48, Appx B). Install in housing cover (10).
- N Position new gasket (4) and cover (3) on final drive housing (14). Align mounting holes. Secure with four new lockwashers (2) and four screws (1). Torque to 35-40 lb ft.

NOTE

Final drive gearcase will be filled with lubricating oil after installation.

Section III TRACK SUSPENSION

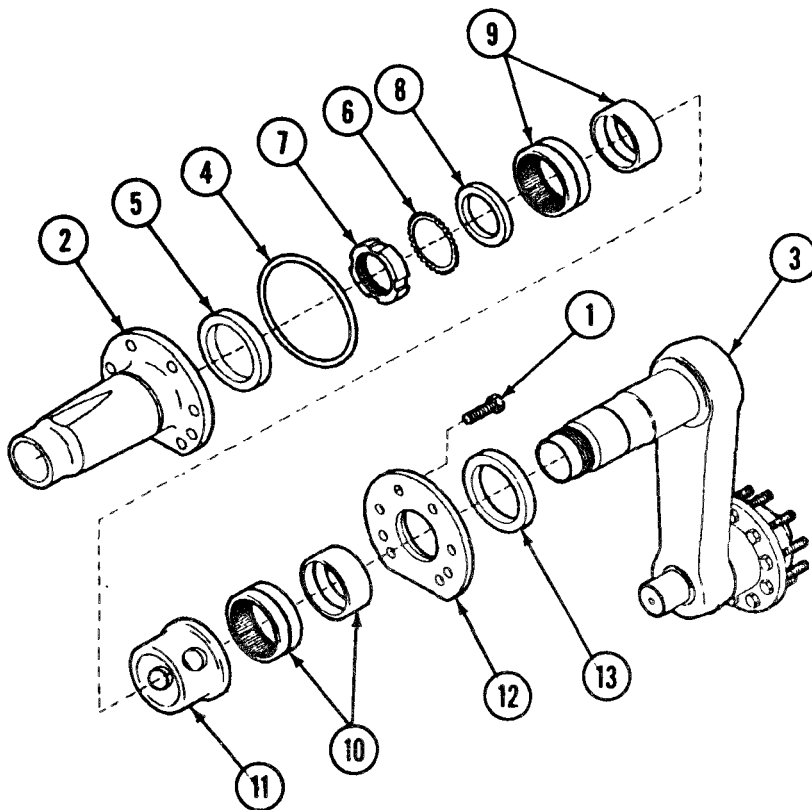
ROADWHEEL ARM ASSEMBLY - UPPER SPINDLE

INITIAL SETUP

Test equipment/Special Tools

Replacer, plain, encasing (item 34, Appx D)

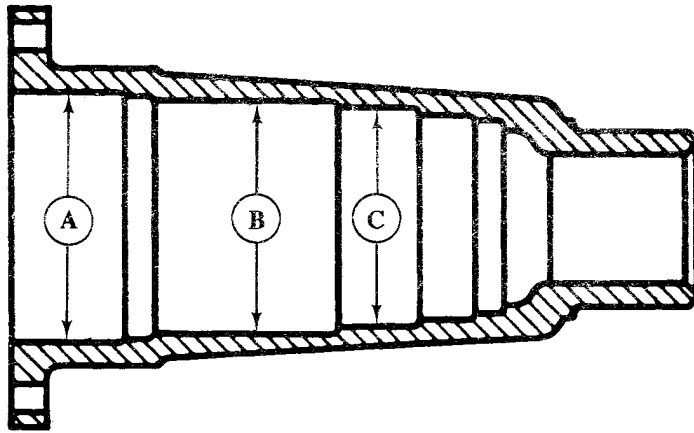
Socket, wrench, face (item 33, Appx D)



DISASSEMBLY

- A Remove two screws (1) and housing (2) from upper spindle (3).
- B Remove and discard packing (4) and seal (5).
- C Straighten tangs on lockwasher (6).
- D Using socket wrench (item 33, Appx B) remove locknut (7) from upper spindle (3).
- E Remove lockwasher (6), thrust spacer (8), and inner bearing with race (9) from upper spindle (3).
- F Remove outer bearing with race (10), bearing spacer (11), and retainer (12).
- G Remove and discard seal (13).

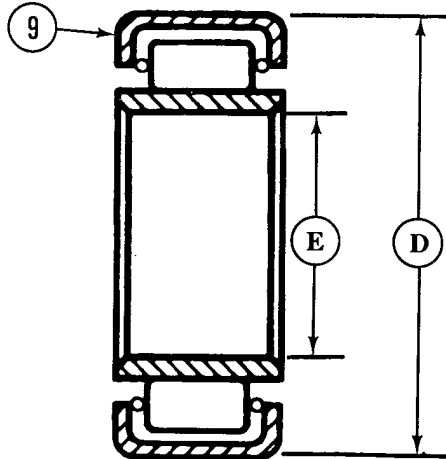
ROADWHEEL ARM ASSEMBLY - UPPER SPINDLE REPAIR (CONTINUED)

**INSPECTION AND REPAIR**

- A Inspect housing (2) for cracks, damage or defects. Replace if cracked, damaged, or defective.
- B Check inner diameter (ID) of seal bore (A). ID of new part is 3.7500-3.7520 inches. Wear limit is 3.7540 inches.
- C Check ID of inner bearing bore (B). ID of new part is 4.3755-4.3770 inches. Wear limit is 4.3780 inches.
- D Check ID of outer bearing bore (C). ID of new part is 4.6255-4.6270 inches. Wear limit is 4.6280 inches.

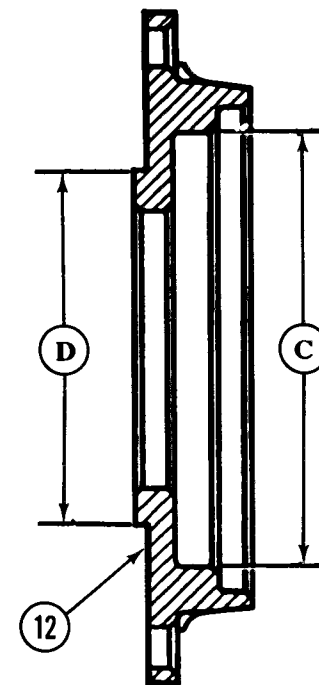
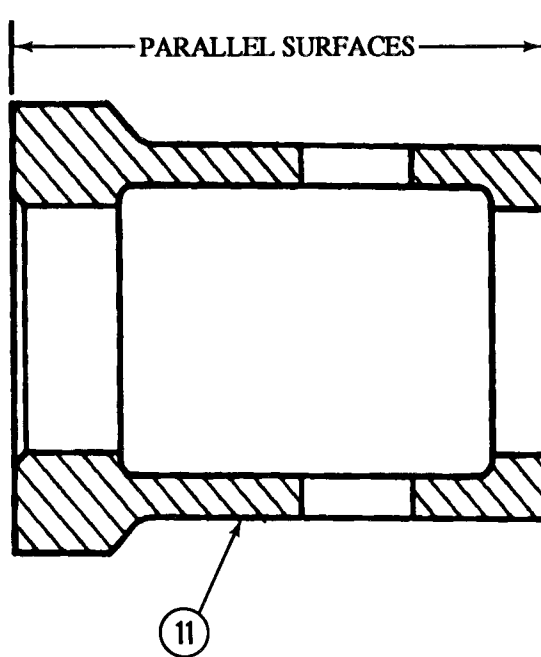
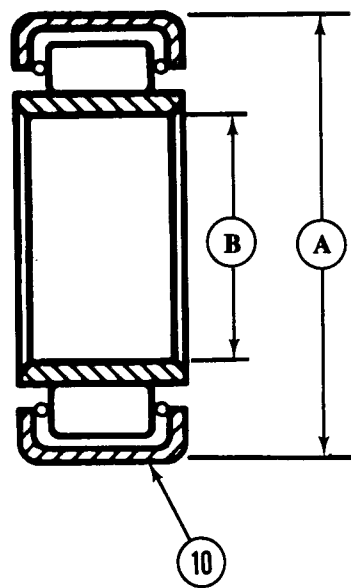


- E Inspect thrust spacer (8) for flatness and smoothness of surfaces. Replace if not flat and smooth.



- F Refer to TM 9-214 for inspection of inner bearing with race (9).
- G Check bearing outer diameter (OD (D)). OD of new part is 4.3742-4.3750 inches.
- H Check fit of bearing in housing. New part fit is 0.0005L to 0.0028L.
- I Check race ID (E). ID (E) of new part is 3.4492-3.5000 inches. Wear limit is 3.5000 inches.
- J Check fit of race to spindle. New part fit is 0.0004L-0.0014T.

ROADWHEEL ARM ASSEMBLY - UPPER SPINDLE REPAIR (CONTINUED)



K Refer to TM 9-214 for inspection of outer bearing with race (10).

L Check OD (A) of bearing. OD (A) of new part is 4.6242-4.6250 inches.

M Check fit of bearing in housing. New part fit is 0.0005L-0.0028L.

N Check race ID (B). ID (B) of new part is 3.7492-3.7500 inches.

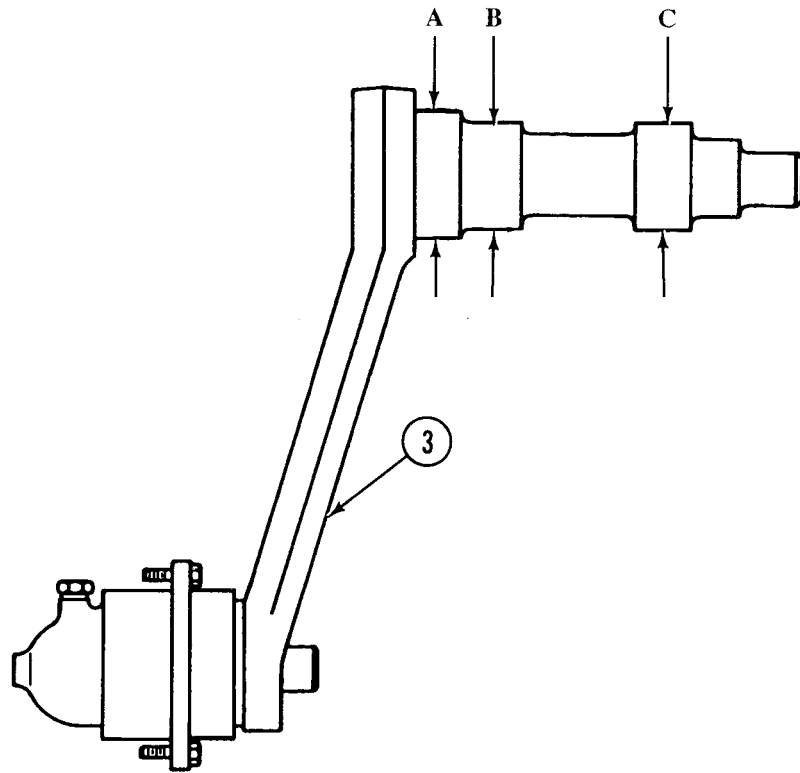
O Check fit of race on spindle. New part fit is 0.0003L-0.0015L.

P Inspect bearing spacer (11) for damage or distortion. Replace if damaged or distorted, or if ends are not parallel within 0.0010 inch.

Q Check ID of seal counterbore (C) of retainer (12). ID (C) of new part is 5.6200-5.6220 inches. Wear limit is 5.6240 inches.

R Check OD of shoulder (D). OD (D) of new part is 4.6220-4.6240 inches. Wear limit is 4.6180 inches.

ROADWHEEL ARM ASSEMBLY - UPPER SPINDLE REPAIR (CONTINUED)



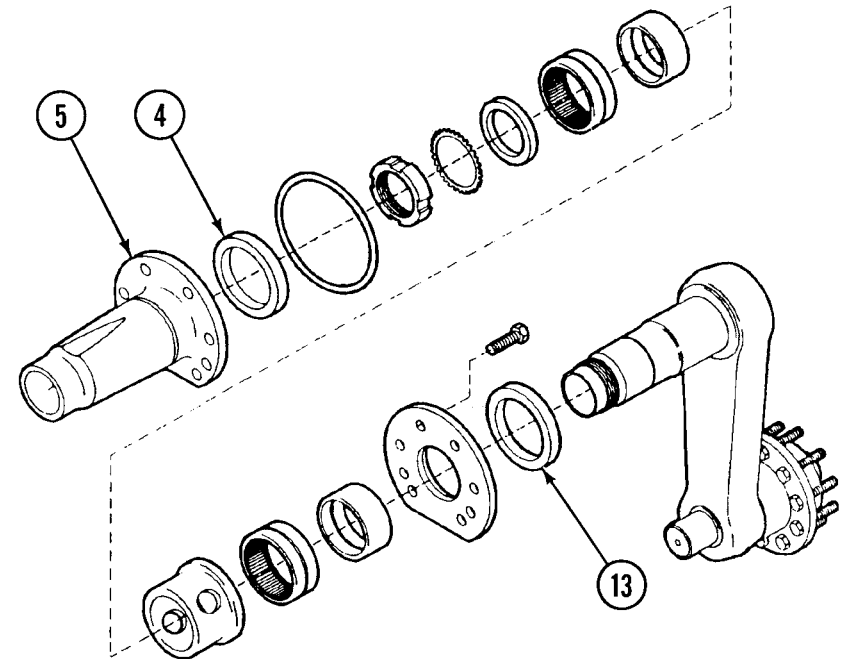
S Check OD of seal journal (A). OD (A) of new part is 4.0050-4.0070 inches. Wear limit is 4.0030 inches.

T Check OD of outer bearing journal (B). New part is 3.7497-3.7507 inches. Wear limit is 3.7490 inches.

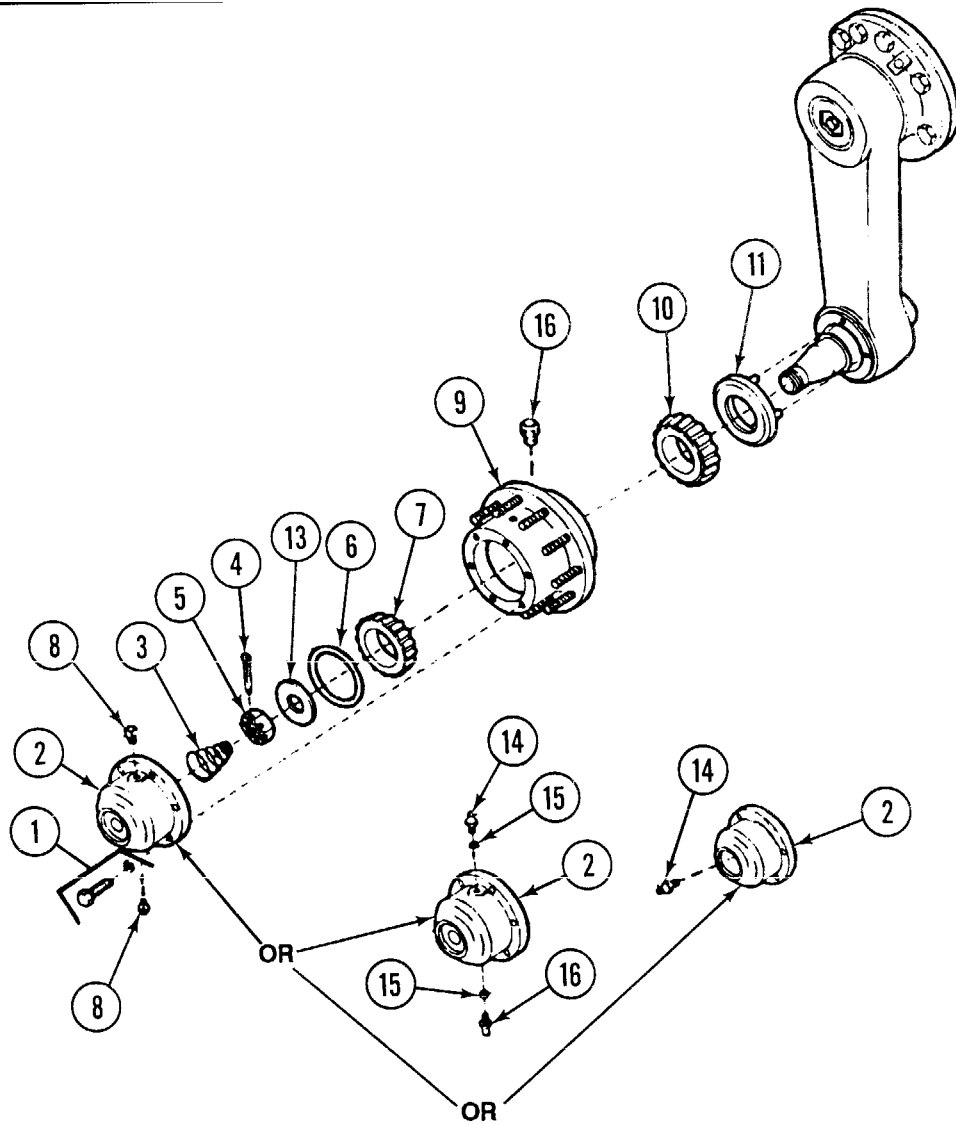
U Check OD of inner bearing journal (C). New part is 3.4996-3.5006 inches. Wear limit is 3.4490 inches.

ASSEMBLY

- A Use seal replacer (item 34, Appx D) to install new seals (5 and 13),
- B Install new packing (4).
- C Torque locknut to 225-275 lb-ft.
- D Bend all lockwasher tangs into locknut recesses or into recessed diameter of locknut.
- E Reverse order of disassembly.



ROADWHEEL ARM ASSEMBLY - HUB REPAIR (CONTINUED)



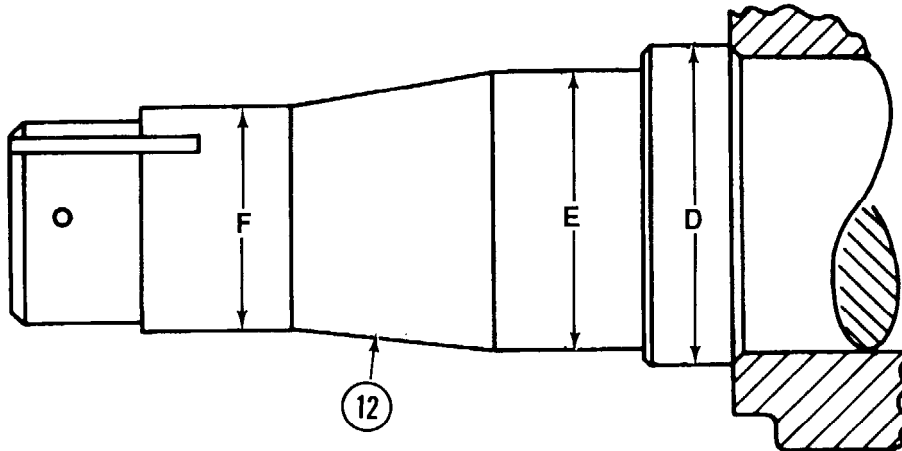
LEGEND

- 1 Screws and lockwashers(6)
- 2 Cap
- 3 Static spring
- 4 Cotter pin
- 5 Nut
- 6 Packing
- 7 Outer bearing cone
- 8 Plug (2) (oil lubrication only)
- 9 Hub
- 10 Inner bearing cone
- 11 Seal
- 12 Spindle
- 13 Key washer
- 14 Grease fitting (grease lubrication only)
- 15 Bushing (2) (grease lubrication only)
- 16 Relief valve (grease lubrication only)

NOTE

Illustration is for identification of parts only and is used to provide numerical part identification for inspection and repair.

ROADWHEEL ARM ASSEMBLY - HUB REPAIR (CONTINUED)



- L Inspect spindle (12) for damage or defects. Replace if damaged or defective.
- M Check OD of seal journal (D). OD (D) of new part is 2.8750-2.8800 inches. Wear limit is 2.8700 inches.
- N Check OD of inner bearing journal (E). OD (E) of new part is 2.4988-2.4903 inches. Wear limit is 2.4980 inches.
- O Check OD of outer bearing journal (F). OD (F) of new part is 1.9988 - 1.9993 inches. Wear limit is 1.9983 inches.
- P Check fit of inner and outer bearing journals. New part fit is 0.0007-0.0017L.

IDLER ARM ASSEMBLY REPAIR

INITIAL SETUPTest Equipment/Special Tools:

Tool kit precision instrument repair (item 22, Appx D)

Materials/Parts:

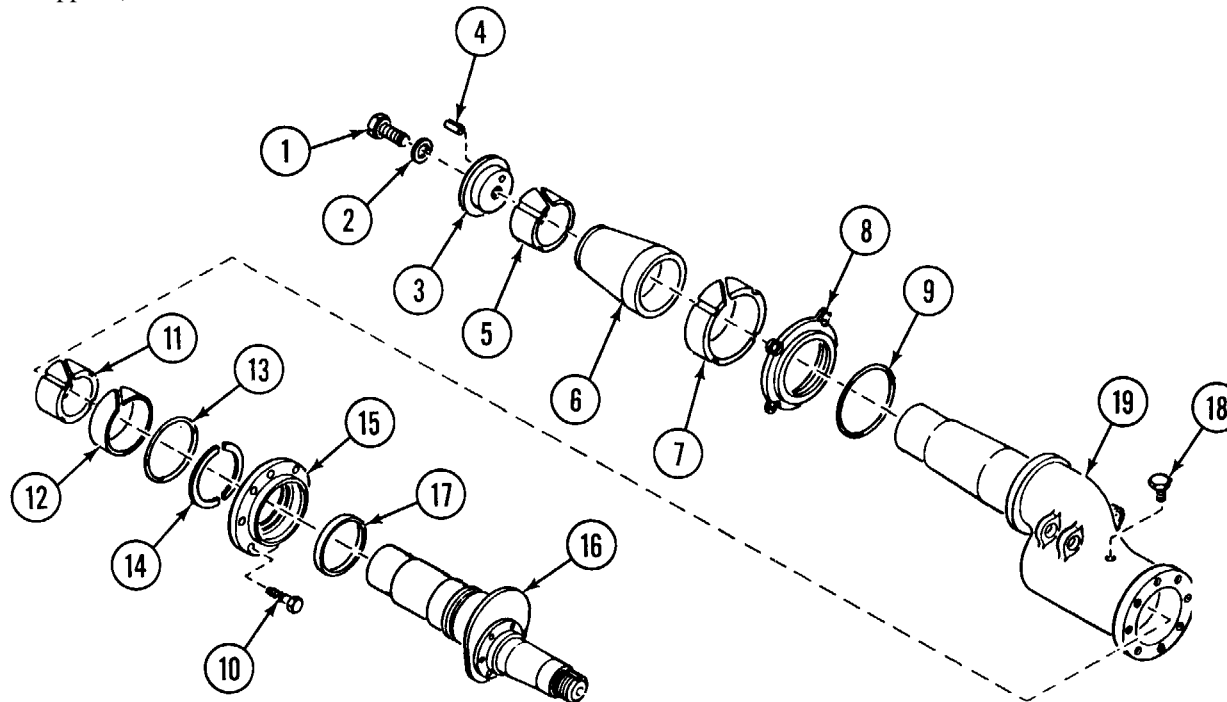
Grease, automotive (item 26, Appx B)

DISASSEMBLY

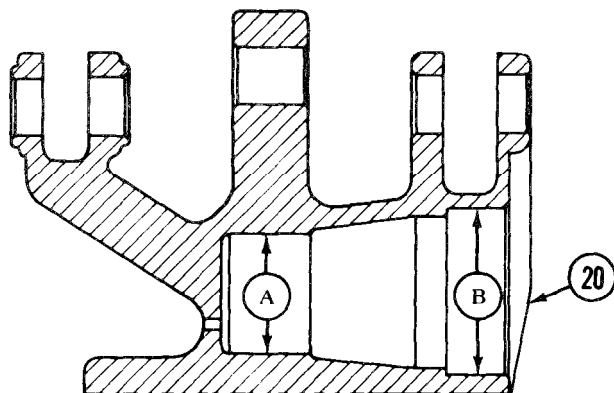
A Remove screw (1), flat washer (2), idler arm cap (3), and spring pin (4).

B Remove inner sleeve bearing (5), bearing spacer (6), outer sleeve bearing (7), idler arm retainer (8), and preformed packing (9).

C Remove eight screws (10), inner sleeve bearing (11), outer sleeve bearing (12), preformed packing (13), ring (14), retainer (15), spindle (16), seal (17), and plug (18) from idler arm (19).

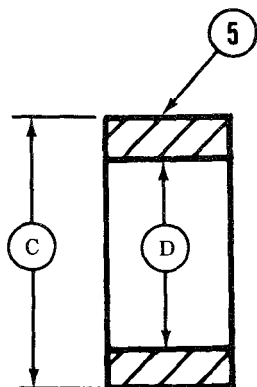


IDLER ARM ASSEMBLY REPAIR (CONTINUED)



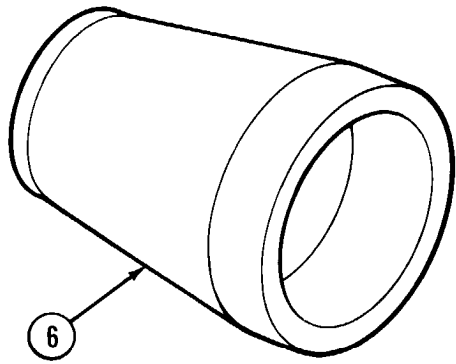
INSPECTION AND REPAIR

- A Inspect housing (20) for damage or defects. Replace if damaged or defective.
- B Check ID of inner bearing bore (A). ID (A) of new part is 3.5040-3.5060 inches. Wear limit is 3.5080 inches.
- C Check ID of outer bearing bore (B). ID (B) of new part is 5.2540-5.2560 inches. Wear limit is 5.2580 inches.

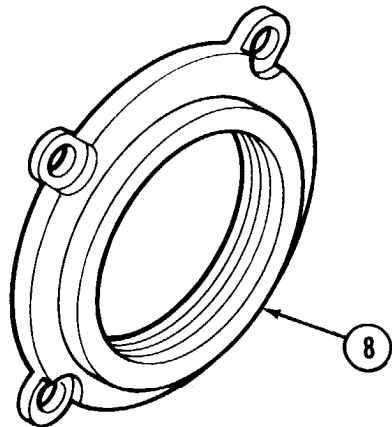


- D Refer to TM 9-214 for inspection of bearing (5).
- E Check OD (C) of bearing (5). OD (C) of new bearing is 3.4970-3.4990 inches. Wear limit is 3.4950 inches.
- F Check ID (D) of bearing (5). ID (D) of new bearing is 3.0000-3.0010 inches. Wear limit is 3.0015 inches.
- G Check fit of bearing (5) in housing. New part fit is 0.0050T-0.0090L. Wear limit is 0.0135L.

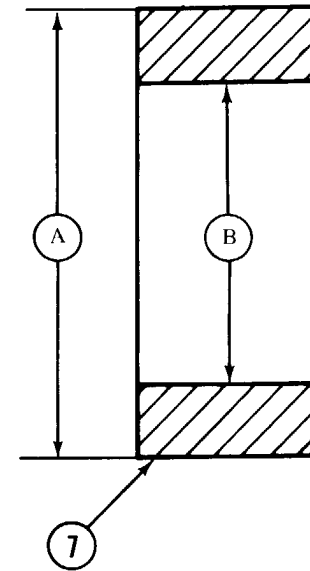
IDLER ARM ASSEMBLY REPAIR (CONTINUED)



H Inspect bearing spacer (6) for smooth, flat and parallel ends, and cracks or damage. Replace if ends not smooth, flat and parallel, or if cracked or damaged.



I Inspect retainer (8) for damage or defects. Replace if damaged or defective.



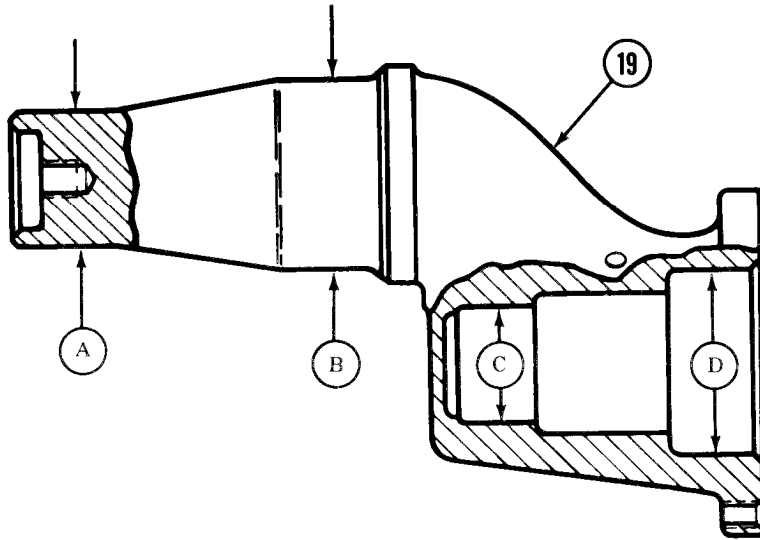
J Refer to TM 9-214 for inspection of outer sleeve bearing (7).

K Check OD (A) of bearing (7). OD (A) of new bearing is 5.2470-5.2490 inches. Wear limit is 5.2450 inches.

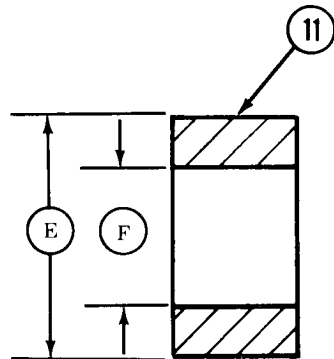
L Check ID (B) of bearing (7). ID (B) of new bearing is 4.2500-4.2510 inches. Wear limit is 4.2520 inches.

M Check fit of bearing (7) in housing. New part fit is 0.0050-0.0090L. Wear limit is 0.0130L.

IDLER ARM ASSEMBLY REPAIR (CONTINUED)

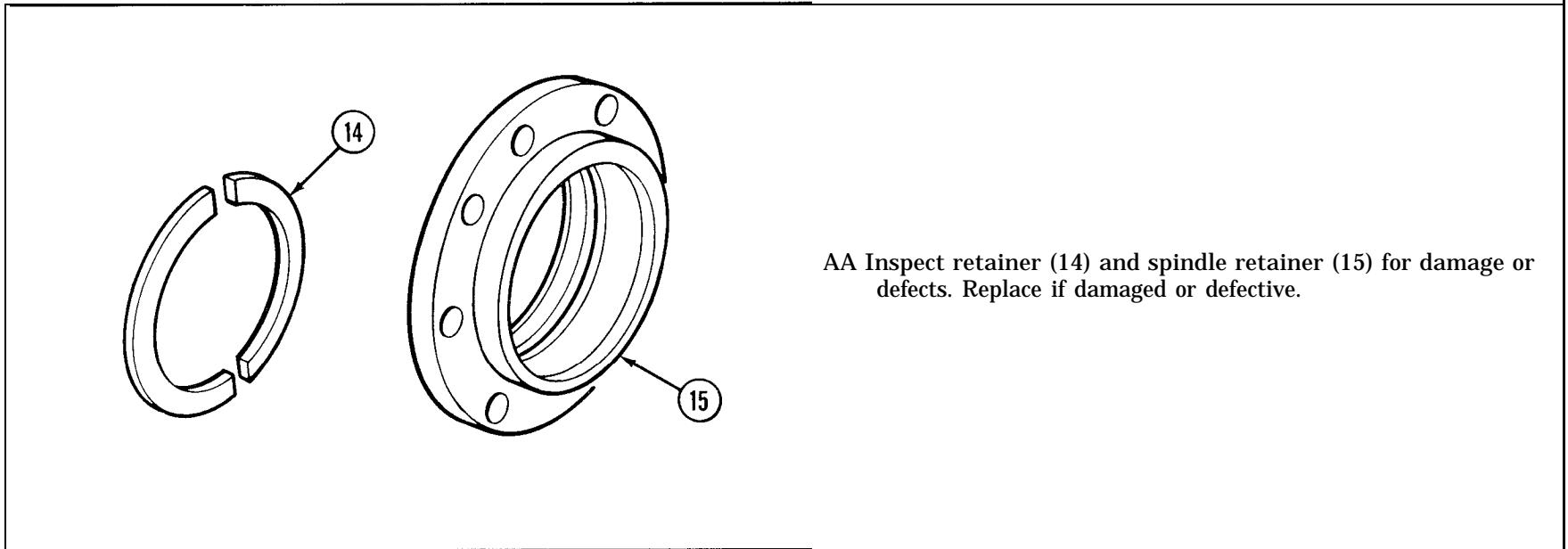
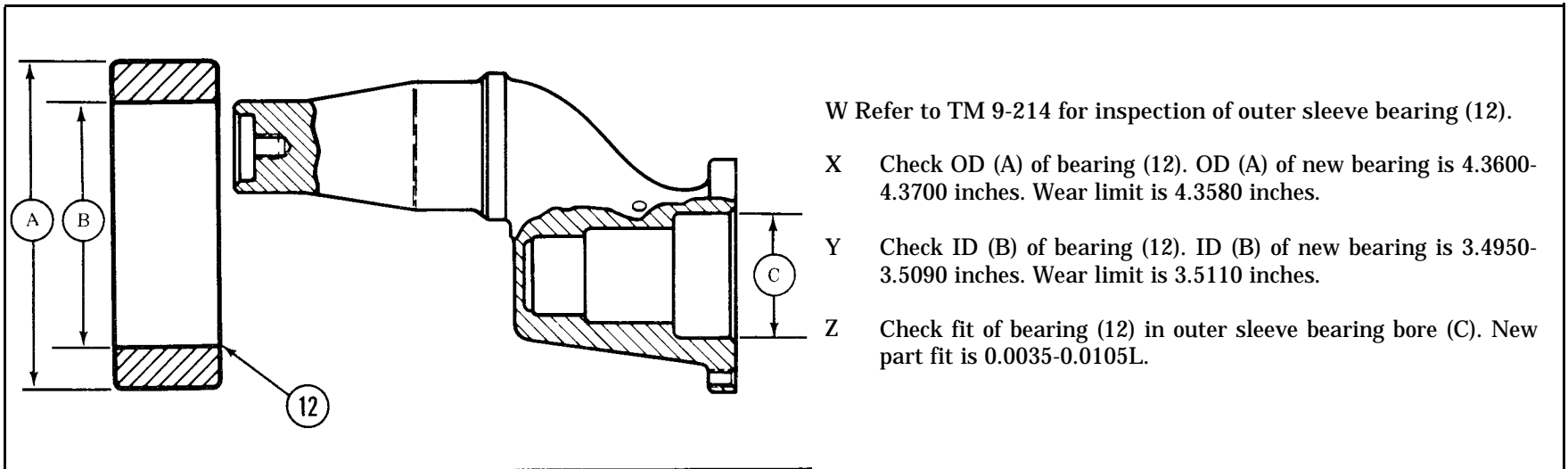


- N Inspect idler arm (19) for damage or defects. Replace if damaged or defective.
- O Check OD of inner sleeve bearing journal (A). OD (A) of new part is 3.0000-3.0010 inches. Wear limit is 2.990 inches.
- P Check OD of outer sleeve bearing journal (B). OD (B) of new part is 4.2500-4.2510 inches. Wear limit is 4.2490 inches.
- Q Check ID of inner sleeve bearing bore (C). ID (C) of new part is 3.5003-3.5013 inches. Wear limit is 3.5020 inches.
- R Check ID of outer sleeve bearing bore (D). ID (D) of new part is 4.3755-4.3770 inches. Wear limit is 3.2780 inches.

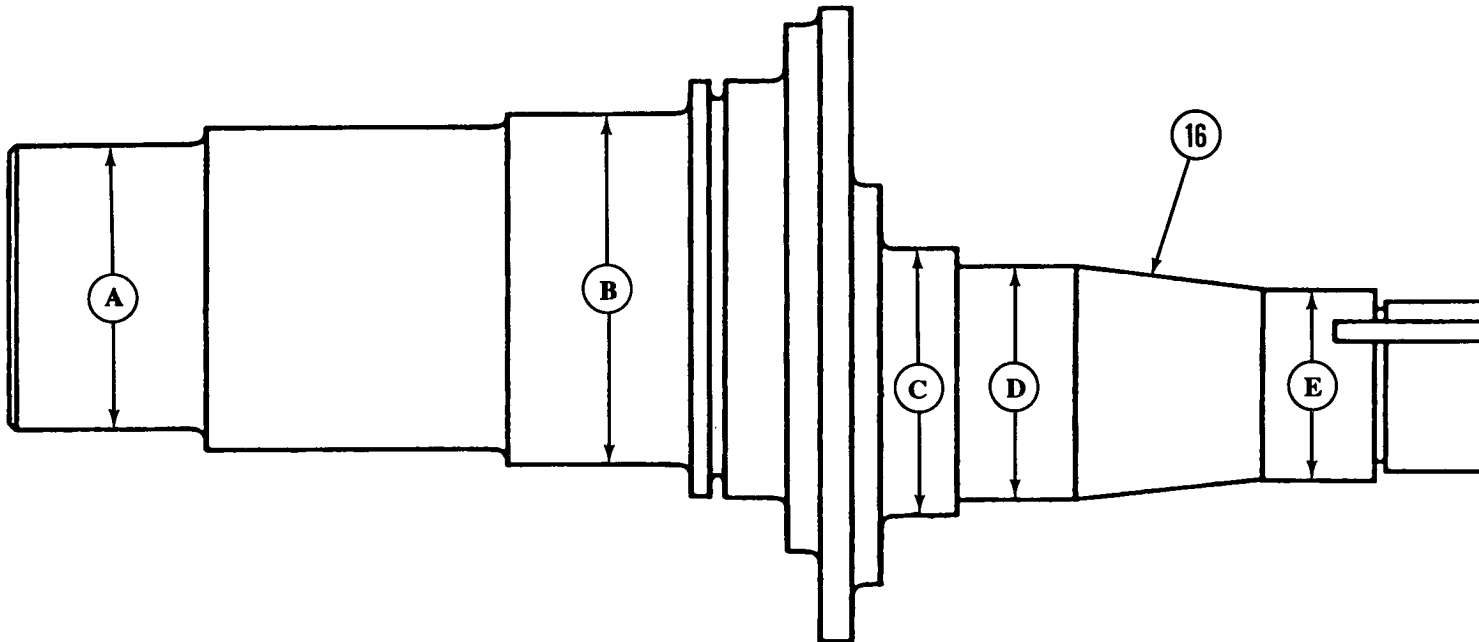


- S Refer to TM 9-214 for inspection of inner sleeve bearing (11).
- T Check OD (E) of bearing (11). OD (E) of new bearing is 3.4920-3.5020 inches. Wear limit is 3.4900 inches.
- U Check ID (F) of bearing (11). ID (F) of new bearing is 2.9960-3.0100 inches. Wear limit is 3.0120 inches.
- V Check fit of inner sleeve bearing. New part fit is 0.0070-0.0140L.

IDLER ARM ASSEMBLY REPAIR (CONTINUED)



IDLER ARM ASSEMBLY REPAIR (CONTINUED)



AB Inspect spindle (16) for damage or defects. Replace if damaged or defective.

AC Check OD of inner sleeve bearing journal (A). OD (A) of new part is 3.0000-3.0010 inches. Wear limit is 2.9990 inches.

AD Check OD of outer sleeve bearing journal (B). OD (B) of new part is 3.5055-3.5070 inches. Wear limit is 3.5030 inches.

AE Check OD of spindle seal journal (C). OD (C) of new part is 2.8750-2.8800 inches. Wear limit is 2.8700 inches.

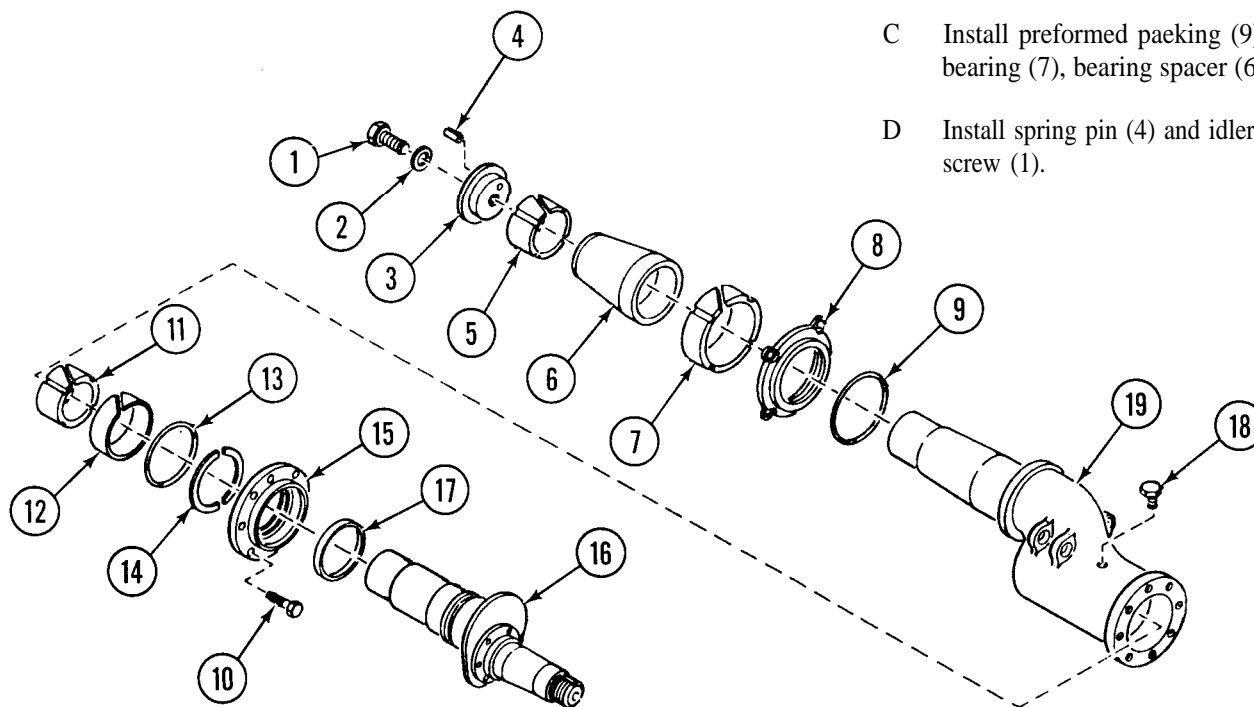
AF Check OD of spindle inner bearing journal (D). OD (D) of new part is 2.4988-2.4993 inches. Wear limit is 2.4980 inches.

AG Check OD of spindle outer bearing journal (E). OD (E) of new part is 1.9988-1.9993 inches. Wear limit is 1.9983 inches.

IDLER ARM ASSEMBLY REPAIR (CONTINUED).

ASSEMBLY

- A Pack idler arm (19) with grease (item 26, Appx B).
- B Install plug (18), new seal (17), spindle (16), retainer (15), ring (14), preformed packing (13), outer sleeve bearing (12), and inner sleeve bearing (11) on idler arm (19) and secure with eight screws (10). Torque screws to 351 lb-ft.
- C Install preformed packing (9), idler arm retainer (8), outer sleeve bearing (7), bearing spacer (6), and inner sleeve bearing (5).
- D Install spring pin (4) and idler arm cap (3) using flat washer (2) and screw (1).



TORSION BAR ANCHORS FOR ROADWHEEL 3: REMOVAL, CLEANING AND INSTALLATION

INITIAL SETUP

Test Equipment/Special Tools

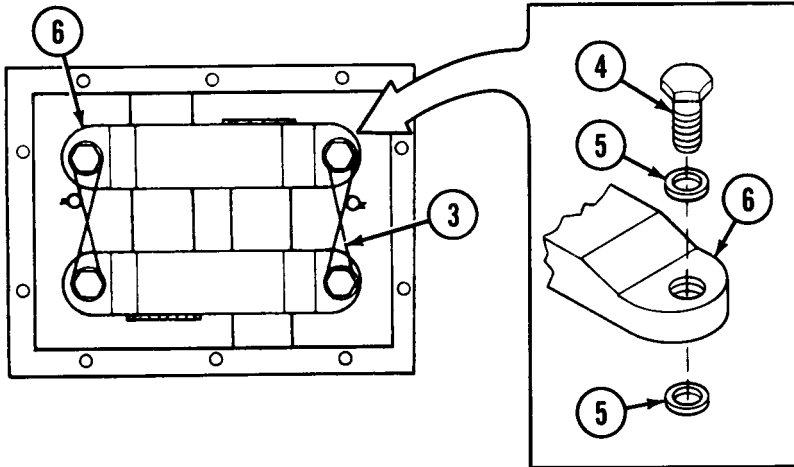
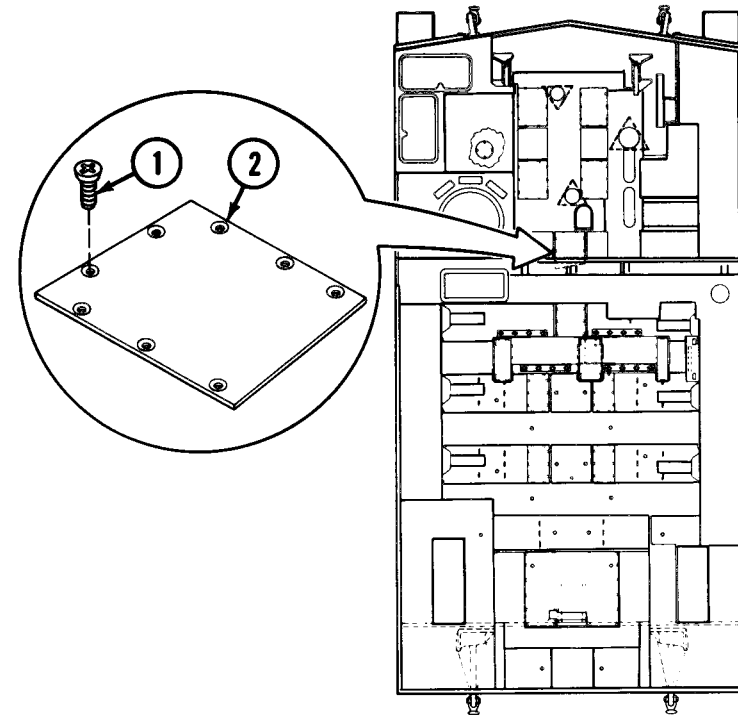
Torque wrench, 0-600 lb-ft (item 25, Appx D).

Materials/Parts:

Dry-cleaning solvent (item 18, Appx B)
Sealing compound (item 65, Appx B).
Wire, non-electrical

Equipment Condition:

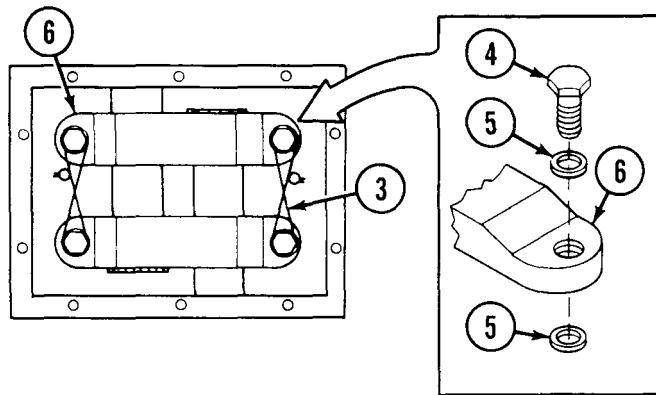
PowerPack removed (TM 9-2350-267-20).
Fuel tanks removed (p 4-10).
Torsion bar removed (See TM 9-2350-267-20).



REMOVAL

- A Remove eight screws (1) securing cover plate (2) to floor of hull at crew compartment bulkhead.
- B Cut locking wire (3), remove and discard.
- C Remove two screws (4) and four flat washers (5) from each torsion bar anchor (6).
- D Remove torsion bar anchor (6).

■ TORSION BAR ANCHORS FOR ROADWHEEL 3: REMOVAL, CLEANING AND INSTALLATION (CONTINUED)

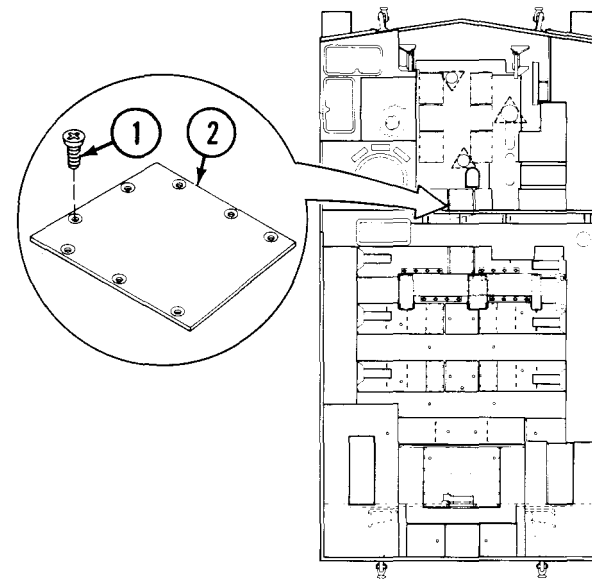


CLEANING

WARNING

Dry-cleaning solvent (PD-680) is toxic and flammable. To prevent personal injury when using PD-680, use only in a well-ventilated area. Avoid breathing vapors. If you become dizzy, get fresh air immediately and seek medical attention. Avoid contact with eyes, skin and clothing. Use protective goggles, gloves, and clothing. If contact is made, immediately flush with water and seek medical attention. The flashpoint for Type I dry-cleaning solvent is 100°F (38°C); for Type II it is 138°F (50°C). Do not use near open flame or excessive heat.

- A Clean cover plate (2) and hull floor.
- B Clean torsion bar anchor cavity in hull. Remove dirt and water. D
Dry thoroughly.



INSTALLATION

- A Install torsion bar anchor (6).
- B Install two screws (4) and four flat washers (5).
- C Torque screws (4) to 245 ± 15 lb-ft and install new locking wire (3).

NOTE

Apply sealing compound (item 65, Appx B) around entire edge of cover plate.

Position cover (2) on floor of hull at crew compartment bulkhead. Aline mounting holes. Secure with eight screws (1).

TRACK ADJUSTER: DISASSEMBLY AND ASSEMBLY

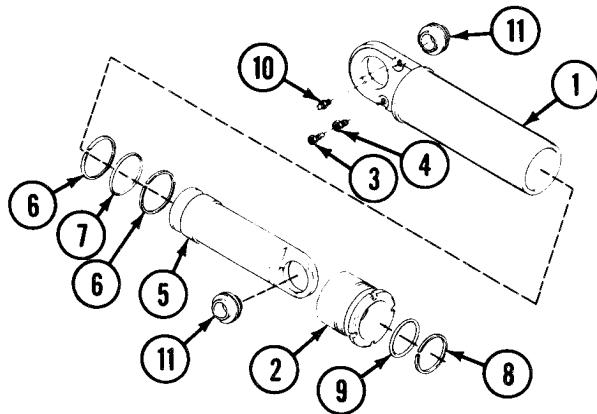
INITIAL SETUP

Test Equipment/Special Tools:

Arbor press (item 1, Appx D)
Vise
Vise jaw caps

Materials/Parts:

Automotive grease (item 25, Appx B)
Dry-cleaning solvent (item 17, Appx B)



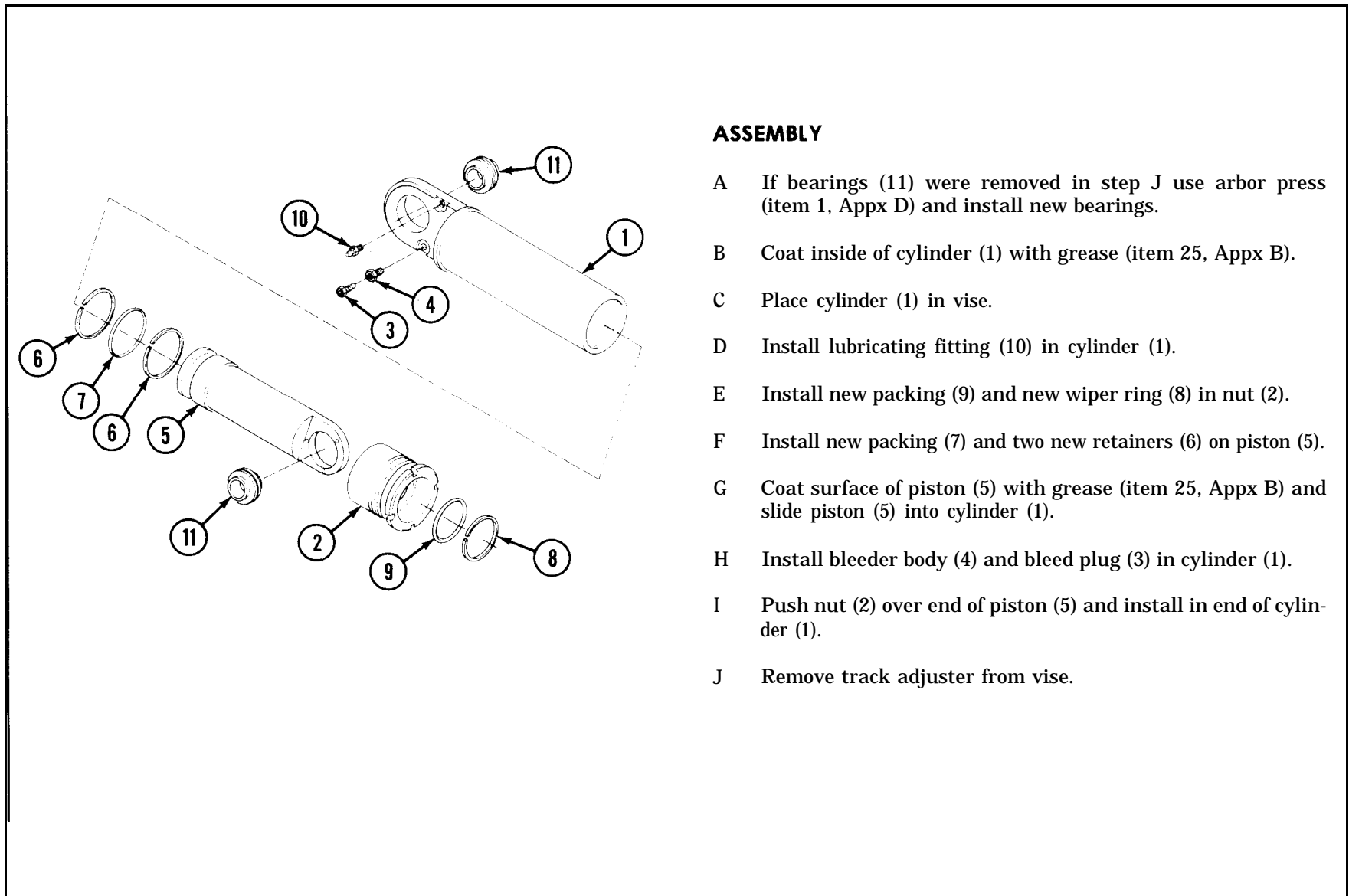
DISASSEMBLY

- A Place cylinder (1) of track adjuster in vise.
- B Remove nut (2), bleeder plug (3) and bleeder body (4) from cylinder (1).
- C Pull piston (5) from cylinder (1).
- D Remove two retainers (6) and packing (7) from piston (5). Discard retainers and packing.
- E Remove wiper ring (8) and packing (9) from nut (2). Discard wiper ring and packing.
- F Remove lubricating fitting (10) from cylinder (1).
- G Remove cylinder (1) from vise.
- H Check two bearings (11) for smoothness of operation, security of installation or other damage. If bearings (11) are good, go to step J.
- I Using arbor press (item 1, Appx D), press bearing(s) (11) from end of cylinder (1) and/or piston (5). Discard bearing(s).
- J Clean all parts using dry-cleaning solvent (item 17, Appx B).

WARNING

Dry-cleaning solvent (PD-680) is toxic and flammable. To prevent personal injury when using PD-680, use only in a well ventilated area. Avoid breathing vapors. If you become dizzy get fresh air immediately and seek medical attention. Avoid contact with eyes, skin and clothing. Use protective goggles, gloves, and clothing. If contact is made, immediately flush with water and seek medical attention. The flashpoint for Type I dry-cleaning solvent is 100° F (38 °C); for Type II it is 138 °F (50 °C). Do not use near open flame or excessive heat.

TRACK ADJUSTER: DISASSEMBLY AND ASSEMBLY (CONTINUED)

**ASSEMBLY**

- A If bearings (11) were removed in step J use arbor press (item 1, Appx D) and install new bearings.
- B Coat inside of cylinder (1) with grease (item 25, Appx B).
- C Place cylinder (1) in vise.
- D Install lubricating fitting (10) in cylinder (1).
- E Install new packing (9) and new wiper ring (8) in nut (2).
- F Install new packing (7) and two new retainers (6) on piston (5).
- G Coat surface of piston (5) with grease (item 25, Appx B) and slide piston (5) into cylinder (1).
- H Install bleeder body (4) and bleed plug (3) in cylinder (1).
- I Push nut (2) over end of piston (5) and install in end of cylinder (1).
- J Remove track adjuster from vise.

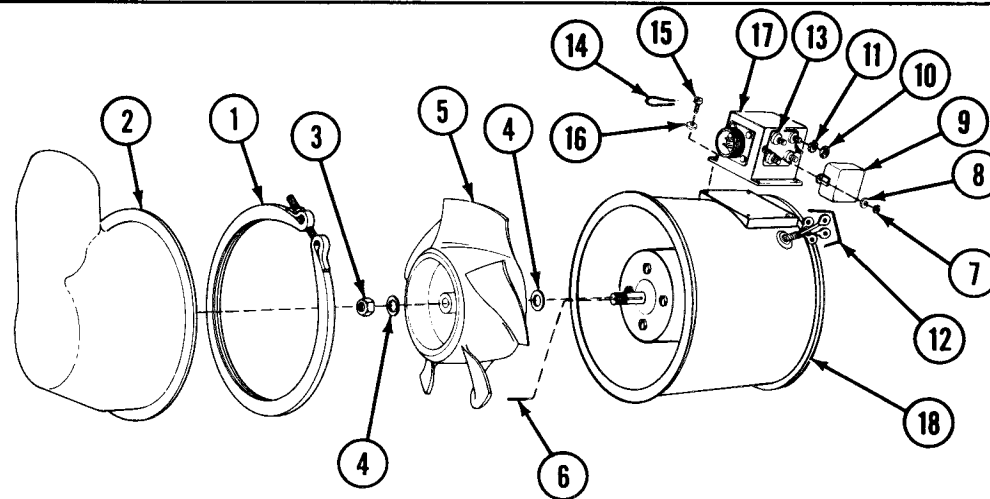
CHAPTER 8
MAINTENANCE PROCEDURES:
PERSONNEL AIR DUCT VENTILATING FAN

GENERAL

This chapter contains instructions for the disassembly, inspection and repair, and assembly of the personnel air duct ventilating fan.

Repair of the personnel air duct ventilating fan is direct support maintenance.

PERSONNEL AIR DUCT VENTILATING FAN REPAIR



DISASSEMBLY

A Remove clamp (1) and elbow (2).

B Remove nut (3) and two washers (4).

C Remove impeller (5) and key (6).

D Remove two nuts (7) and two lockwashers (8).

E Remove noise filter cover (9).

F Remove four nuts (10) and four lockwashers (11).

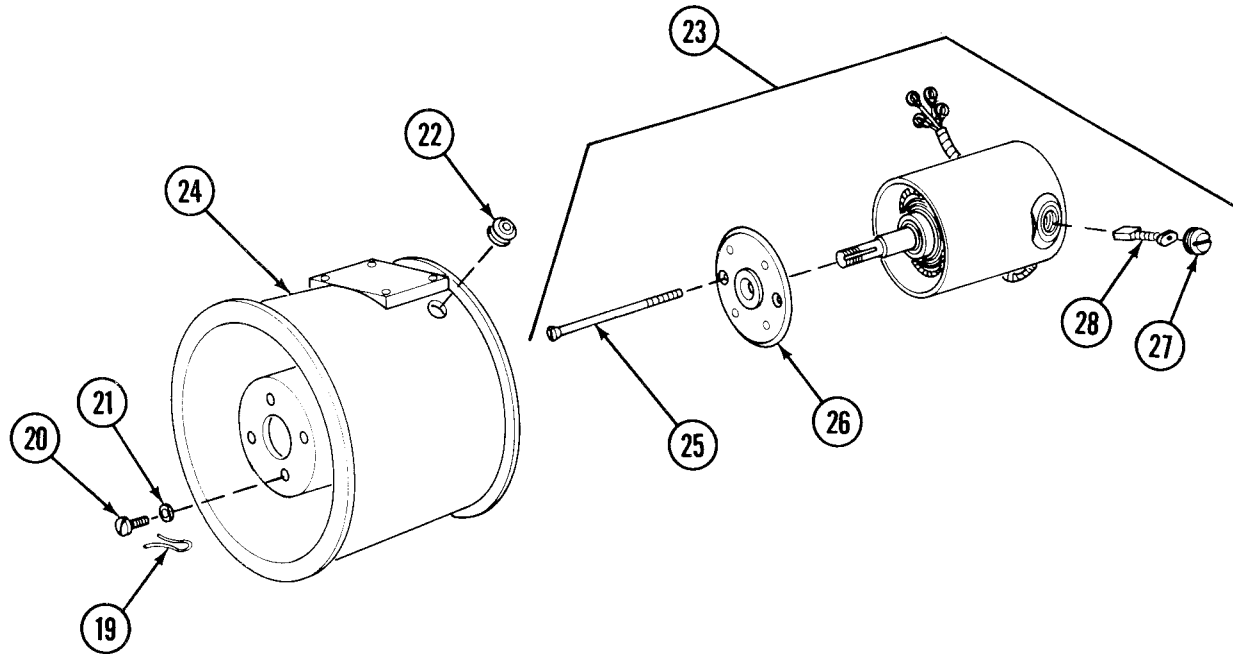
G Remove four electrical leads (12) from noise filter terminals (13).

H Remove and discard lock wire (14).

I Remove four screws (15) and four flat washers (16).

J Remove noise filter (17) from blower assembly (18).

PERSONNEL AIR DUCT VENTILATING FAN REPAIR (CONTINUED)



K Remove and discard lock wire (19).

L Remove four screws (20) and four flat washers (21).

M Remove and discard grommet (22).

N Remove motor assembly (23) from housing (24).

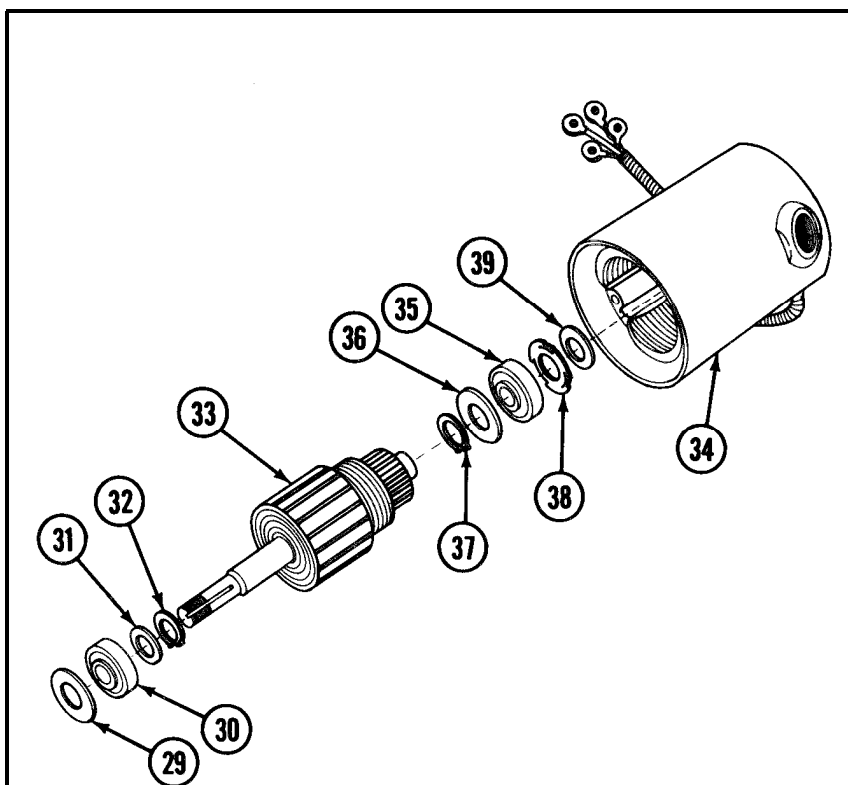
O Remove two screws (25) and end cover (26).

P Remove two screws (27) and two electrical brushes (28).

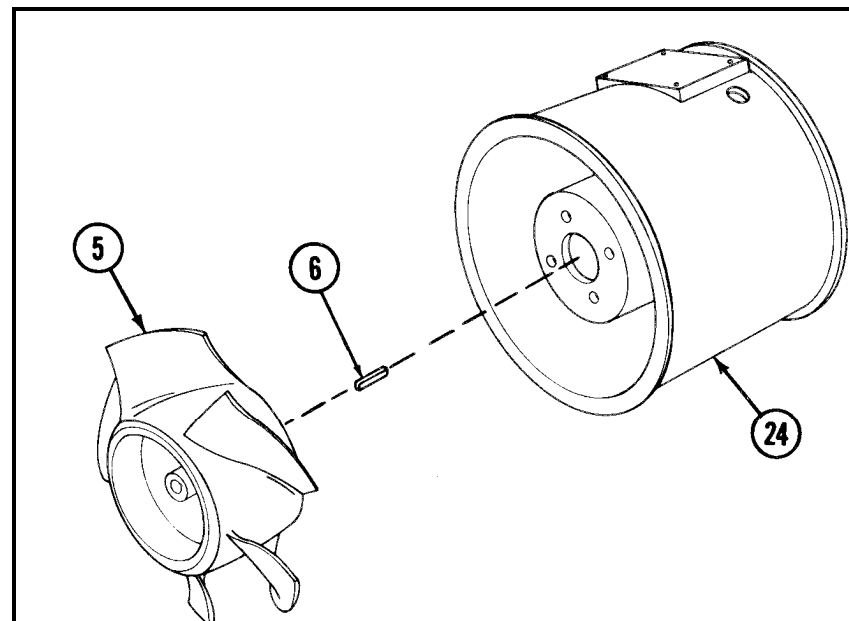
CAUTION

Feed electrical leads through hole in housing carefully to avoid damaging wires.

PERSONNEL AIR DUCT VENTILATING FAN REPAIR (CONTINUED)



- Q Remove flat washers (29), bearing (30), flat washers (31), and lock ring (32) from armature (33).
- R Remove armature (33) from motor field and frame assembly (34).
- S Remove bearing (35), flat washer (36) and lock ring (37) from armature (33).
- T Remove spring tension washer (38) and flat washer (39) from motor field and frame assembly (34).



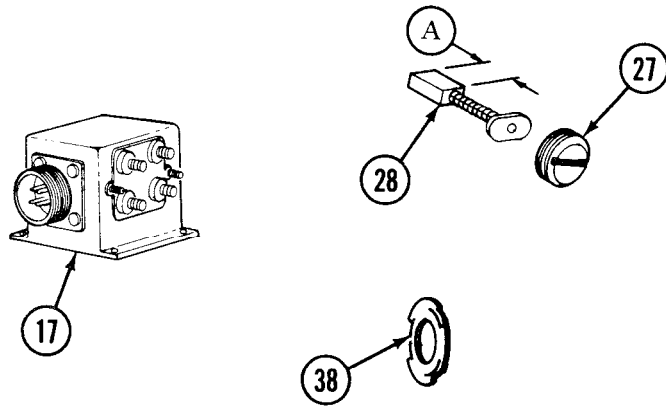
INSPECTION AND REPAIR

NOTE

Rebalance impeller after removing nicks.

- A Inspect impeller (5) for cracks. Replace if cracked.
- B Inspect impeller (5) for nicks. Remove nicks with soft stone or fine mill file.
- C Inspect housing (24) for damage. Repair as appropriate.
- D Inspect housing (24) for damage due to impeller (5) rubbing. Straighten housing or remove high spots as appropriate.
- E Inspect shaft key (6) for damage. Replace if damaged.

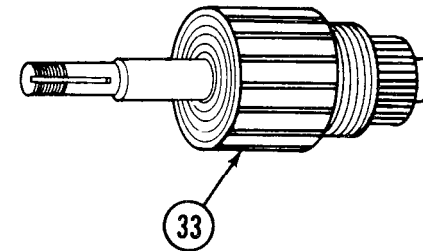
PERSONNEL AIR DUCT VENTILATING FAN REPAIR (CONTINUED)



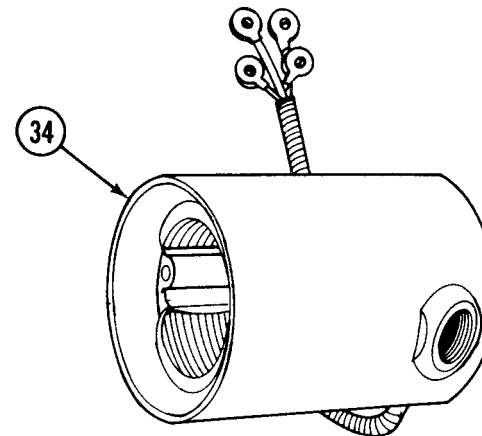
- F Test noise filter (17) for continuity (p 9-9). Replace as necessary.
- G Measure length (A) of two electrical brushes (28). Length of new brushes (28) is 0.8250-0.8650 inch.
- H Inspect two screws (27) for damaged threads. Replace if threads are damaged.
- I Inspect spring tension washer (38) for damage. Replace if damaged.

NOTE

If armature and/or motor field and frame assembly are damaged or defective, or if armature shaft is worn beyond limits for proper bearing fit, replace motor assembly as a unit.

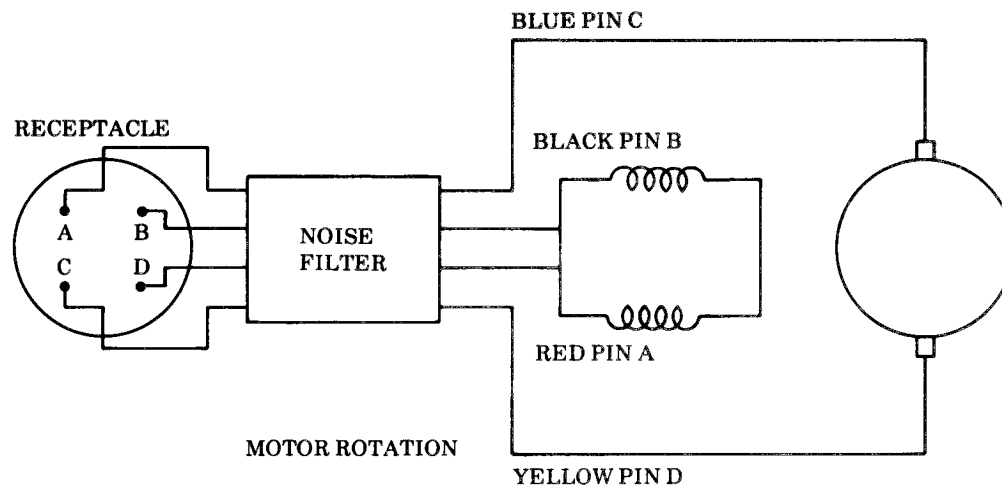
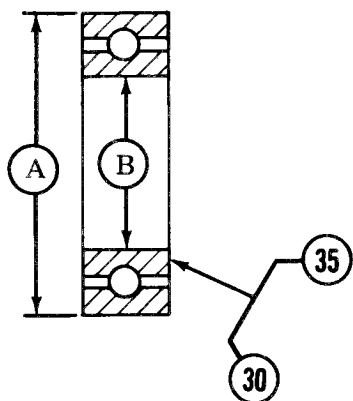


- J Test armature (33) on growler.



- K Test motor field and frame assembly (34) for open or short field windings.

PERSONNEL AIR DUCT VENTILATING FAN REPAIR (CONTINUED)



MOTOR ROTATION

Clockwise shaft end - Pin B pos., connect Pin A to Pin C, Pin D neg.

Counterclockwise shaft end - Pin A pos., connect Pin B to Pin C, Pin D neg.

NOISE FILTER SCHEMATIC DIAGRAM

ASSEMBLY

A Assemble motor assembly. Reverse order of disassembly.

NOTE

Use new lockwire for assembly.

B Assemble ventilating fan assembly. Reverse order of disassembly.

C Rewire noise filter.

- L Refer to TM 9-214 for inspection of bearings (30 and 35).
- M Measure OD (A) of bearings (30 and 35). OD of new bearings (30 and 35) is 1.3775-1.3780 inches.
- N Measure ID (B) of bearings (30 and 35). ID of new bearings is 0.5903-0.5906 inch.
- o Check fit of bearings (30 and 35) to armature shaft. New part fit is 0.0004T-0.0002.

CHAPTER 9
MAINTENANCE PROCEDURES
BILGE PUMP

GENERAL

This chapter contains instructions for the disassembly, inspection and repair and assembly of the M992 Bilge Pump.

NOTE

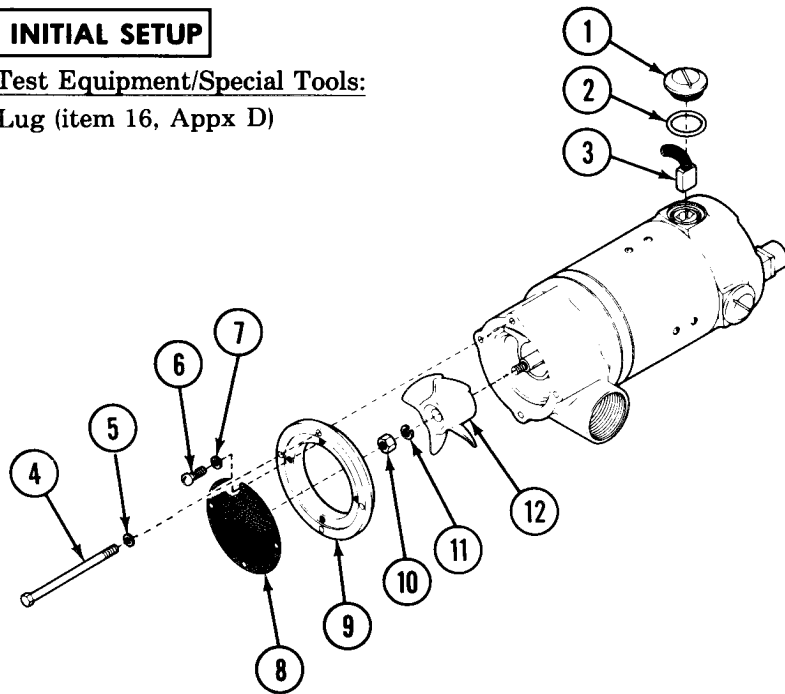
Repair of the bilge pump is direct support maintenance.

BILGE PUMP REPAIR

INITIAL SETUP

Test Equipment/Special Tools:

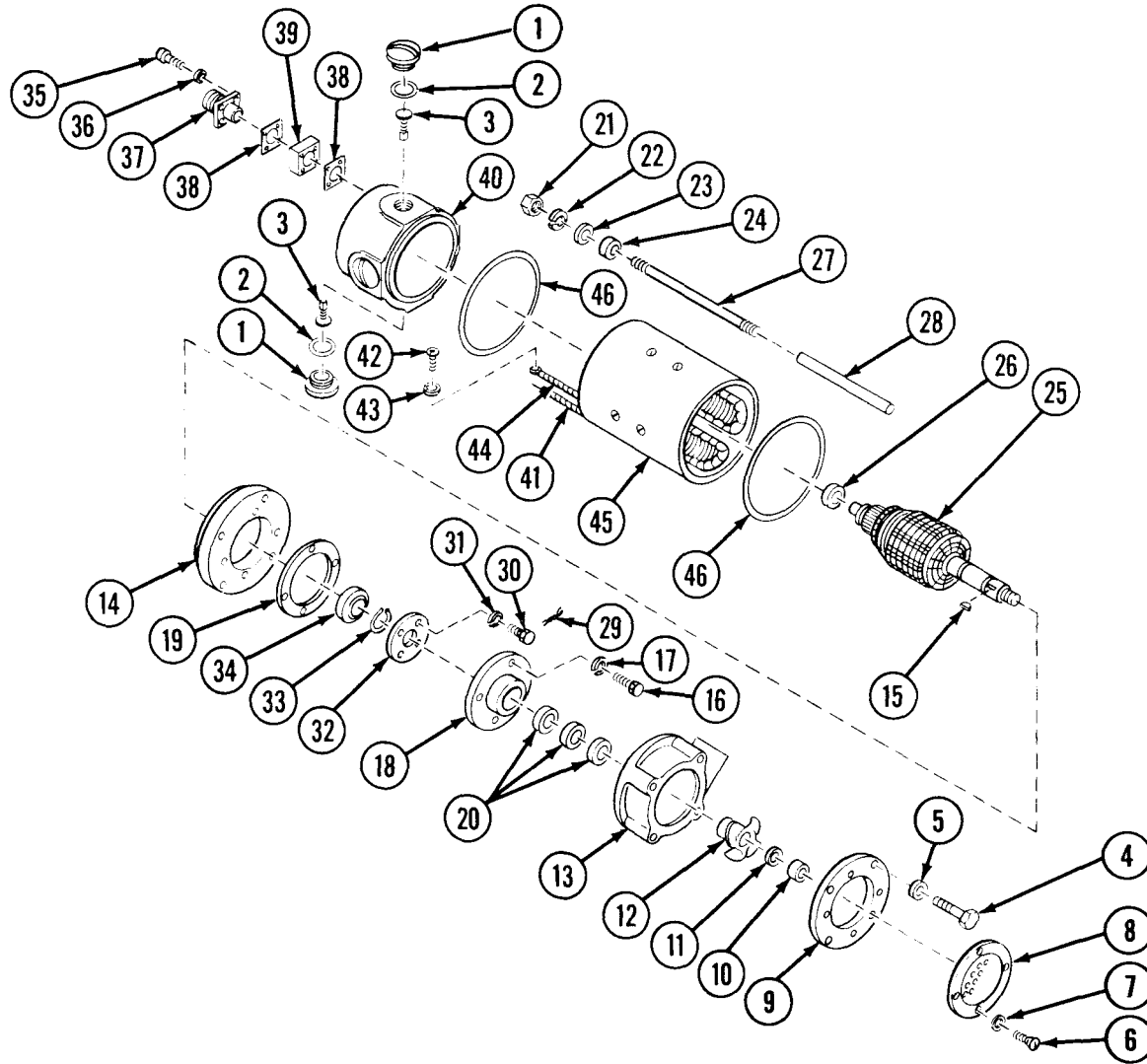
Lug (item 16, Appx D)



DISASSEMBLY

- A Remove four brush cap assemblies (1) and four preformed packings (2).
- B Remove and discard four brushes (3).
- C Remove four screws (4) and four lockwashers (5).
- D Remove four screws (6) and four flat washers (7).
- E Remove inlet screen (8) and impeller cover (9).
- F Remove nut (10) and lockwasher (11).
- G Remove impeller (12).

BILGE PUMP REPAIR (CONTINUED)



BILGE PUMP REPAIR (CONTINUED)

- H Pull impeller housing (13) from end bell (14).
- I Remove key (15).
- J Remove four screws (16), four lockwashers (17), seal cover (18) and gasket (19).
- K Remove and discard three shaft seals (20).
- L Remove four nuts (21), four lockwashers (22), four flat washers (23) and four gaskets (24).
- M Remove end bell (14), motor armature (25), bearing (26), four studs (27) and four glass sleeves (28) as an assembly.
- N Remove four glass sleeves (28).
- O Remove four studs (27) from end bell (14).
- P Remove and discard lockwire (29).
- Q Remove four screws (30), four lockwashers (31), plate (32) and snapping (33). Discard snapping.
- R Remove bearing (34), end bell (14) and bearing (26) from motor armature (25).
- S Remove four screws (35) and four lockwashers (36) from capacitor (37).
- T Pull capacitor (37), two gaskets (38), and spacer (39) away from end bell (40). Desolder wire (41) from capacitor (37).
- U Remove capacitor (37), two gaskets (38) and spacer (39) from end bell (40).

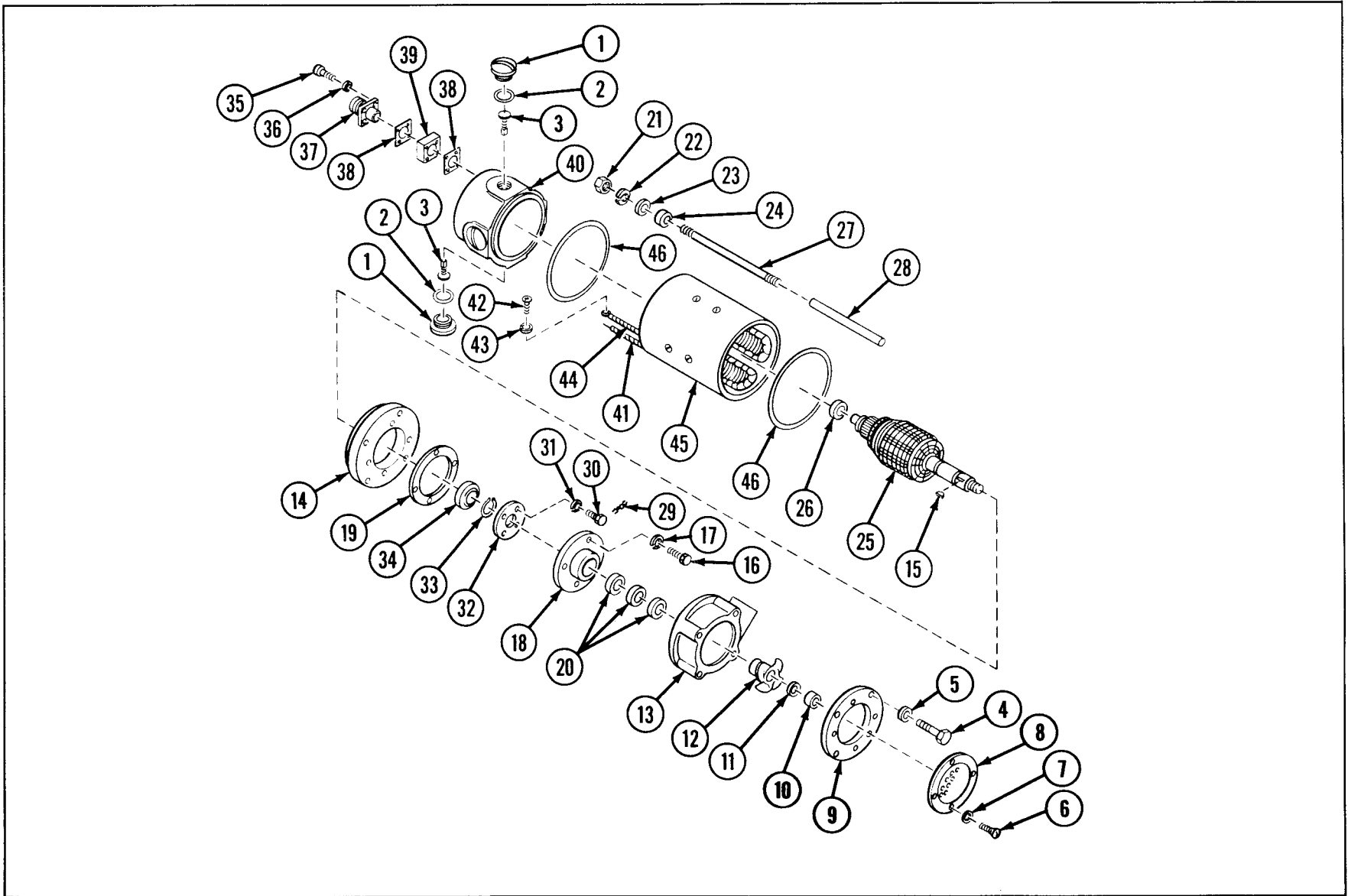
V Remove screw (42) and lockwasher (43) to release wire (44) from inside of end bell (40).

W Remove motor stator (45) and two gaskets (46) from end bell (40).

INSPECTION AND REPAIR

- A Clean and inspect inlet screen (8). Blow out mesh with compressed air. Replace if torn.
- B Inspect impeller (12) for damage and defects. Smooth out nicks and burrs with soft stone or fine mill file. Replace if damaged or defective.
- C Inspect impeller housing (13) for cracks, warped mating surface or other damage. Replace if damaged or defective.
- D Inspect key (15) for damage. Replace if necessary.
- E Inspect seal cover (18) for cracks, warped mating surface and other damage. Replace if damaged or defective.
- F Inspect glass sleeves (28) for chips or breaks. Replace as necessary.
- G Inspect end bell (14) for cracks, defects and warped mating surfaces. Replace if defective.
- H Test motor armature (25) on growler. Replace if defective.

BILGE PUMP REPAIR (CONTINUED)



BILGE PUMP REPAIR (CONTINUED)

ASSEMBLY

- A Connect wire (44) to inside of end bell (40) with screw (42) and new lockwasher (43).
- B Install motor stator (45) and two gaskets (46) on end bell (40), making sure wire (41) goes through opening at top end of end bell (40).
- C Install capacitor (37), two gaskets (38) and spacer (39) on end bell (40).
- D Solder wire (41) to capacitor (37).
- E Install four screws (35) and four lockwashers (36).
- F Install bearing (26), end bell (14) and bearing (34) on motor armature (25).
- G Install new snapping (33), plate (32), four screws (30) and four lockwashers (31).
- H Install new lockwire (29).
- I Install four studs (27) on end bell (14).
- J Install four glass sleeves (28).
- K Install end bell (14), motor armature (25), bearing (26), four studs (27) and four glass sleeves (28) as an assembly.
- L Install four new gaskets (24), four flat washers (23), four new lockwashers (22) and four nuts (21).
- M Install three new shaft seals (20).
- N Install new gasket (19), seal cover (18), four new lockwashers (17) and four screws (16).
- O Install key (18).
- P Install impeller housing (13) on end bell (14).
- Q Install impeller (12).
- R Install new lockwasher (11) and nut (10) using lug (item 16, Appx D).
- S Install inlet screen (8) and impeller cover (9) with four screws (6) and four flat washers (7).
- T Install four screws (4) and four new lockwashers (5).
- U Install four new brushes (3), four new preformed packings (2) and four brush cap assemblies (1).

CHAPTER 10 MAINTENANCE PROCEDURES: WINTERIZATION KIT

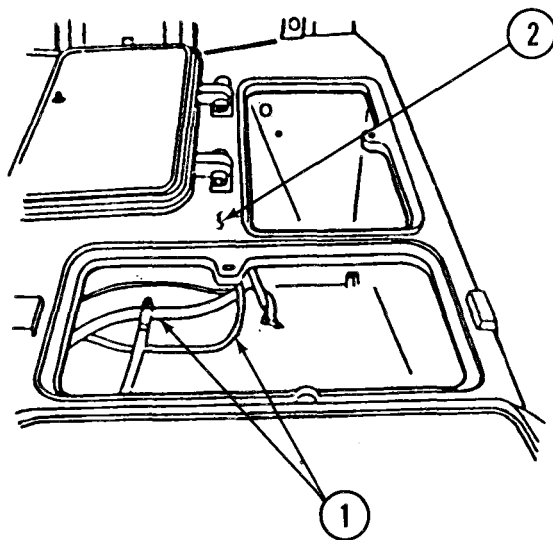
CHAPTER OVERVIEW

This chapter contains instructions for the following:

- Section I Winterization Kit Initial Installation
- Section II Winterization Kit Coolant Heater Repair

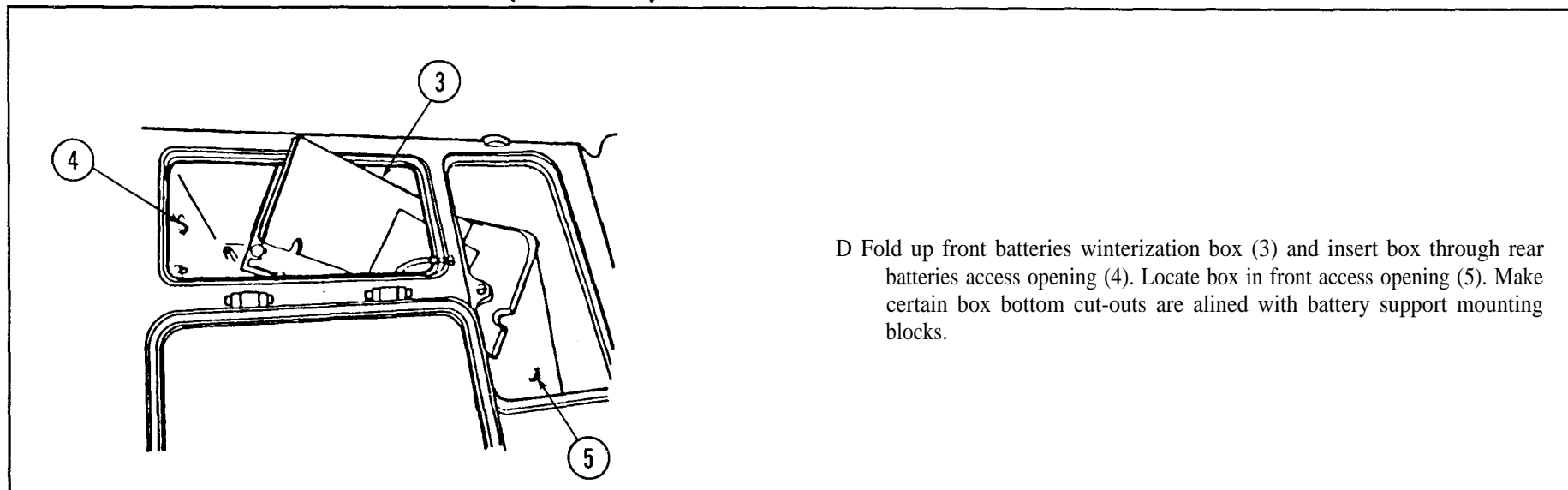
Section I WINTERIZATION KIT: INITIAL INSTALLATION

WINTERIZATION KIT: INITIAL INSTALLATION

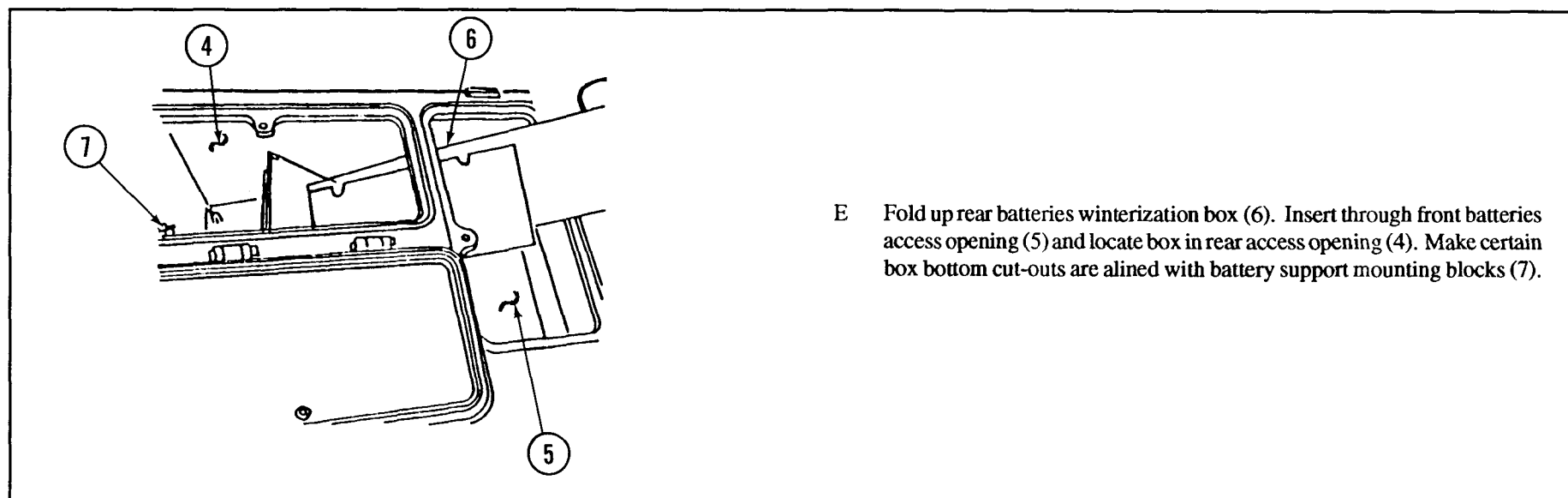


- A Drain powerplant cooling system (TM 9-2350-267-10).
- B Remove batteries and mounting components (TM 9-2350-267-20-1). Retain all parts for kit installation except battery support hold-down screws.
- C Move batteries' wiring harness (1) over hull slope plate (2) to allow clearance for installation of winterization kit components.

WINTERIZATION KIT: INITIAL INSTALLATION (CONTINUED)

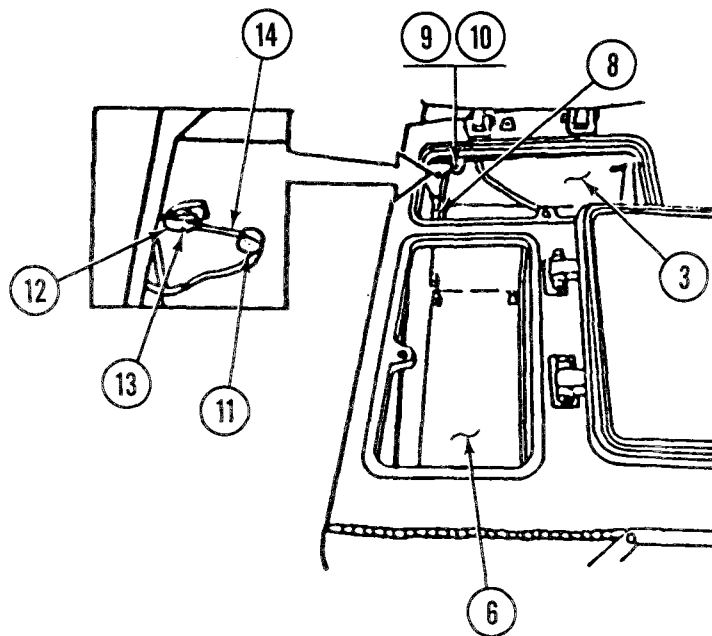


D Fold up front batteries winterization box (3) and insert box through rear batteries access opening (4). Locate box in front access opening (5). Make certain box bottom cut-outs are aligned with battery support mounting blocks.



E Fold up rear batteries winterization box (6). Insert through front batteries access opening (5) and locate box in rear access opening (4). Make certain box bottom cut-outs are aligned with battery support mounting blocks (7).

WINTERIZATION KIT: INITIAL INSTALLATION (CONTINUED)

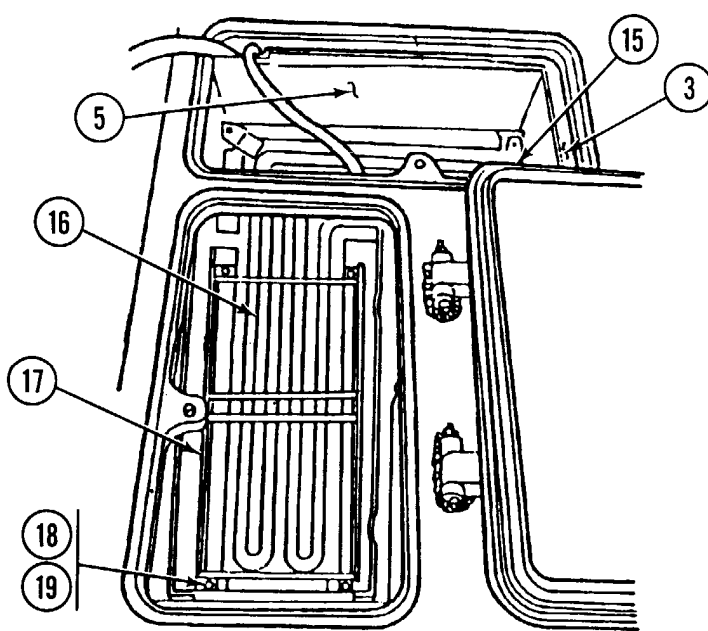


NOTE

Screw (9) and lockwasher (10) were removed in step B.

- F Attach front ground cable (8) to hull front plate with screw (9) and lockwasher (10).
- G Unfold sides of front and rear winterization boxes (3) and (6) and insert six retainer wires (11).
- H Secure four straps (12) to rivets (13) with lockwire (14).

WINTERIZATION KIT: INITIAL INSTALLATION (CONTINUED)



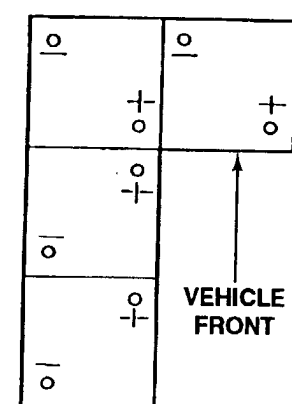
The diagram shows a battery heater (16) being installed through a front battery access opening (5). The heater is supported by battery supports (17) which are attached to a sponson using screws (18) and lockwashers (19). Grommets (15) are placed on the heater's inlet and outlet tubes, and these tubes are inserted into cut-outs in the front winterization box (3).

I Place grommets (15) (hidden) on battery heater (16) inlet and outlet tubes, and install heater through front batteries access opening (5). Insert tube grommets in front winterization box (3) cut-outs.

NOTE

Screws (18) and lockwashers (19) were removed in step B. Four 3/8-16 x 7/8-inch screws and 16 flat washers are provided for shimming adjustment of support to make it level. Use of shims (washers) should be kept to a minimum.

J Install battery supports (17) and attach supports and heater (16) to sponson with eight furnished 3/8-16 x 3/4-inch screws (18) and eight lockwashers (19).



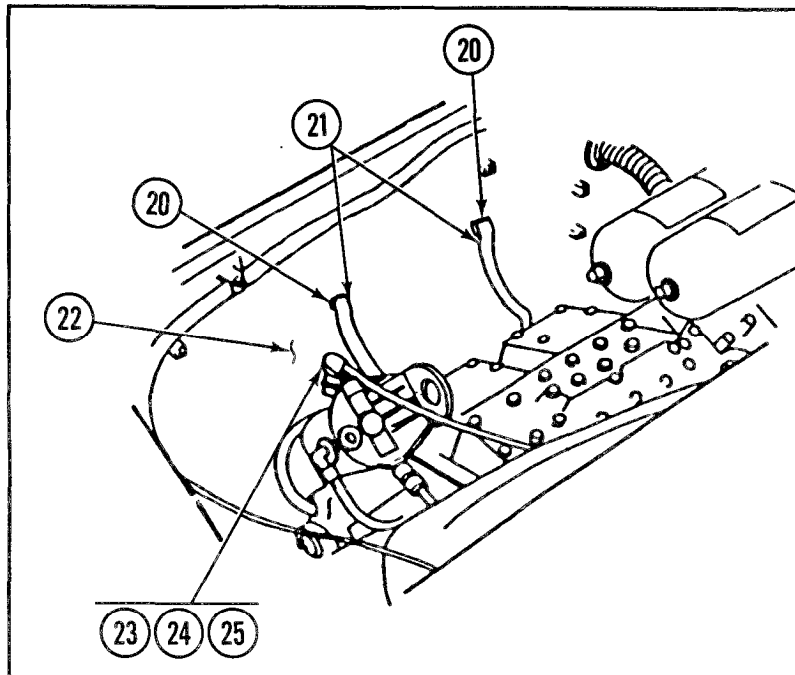
The diagram illustrates the arrangement of four batteries on two battery supports. The batteries are organized into two columns. The left column has a positive terminal (+) on top and a negative terminal (-) on the bottom. The right column has a negative terminal (-) on top and a positive terminal (+) on the bottom. An arrow labeled 'VEHICLE FRONT' points upwards from the bottom of the diagram.

NOTE

Hold-down bars, bolts, washers and nuts were removed in step B.

K Place four batteries on two battery supports with battery terminals positioned as illustrated. Secure with hold-down bars, bolts, washers, and nuts.

WINTERIZATION KIT: INITIAL INSTALLATION (CONTINUED)

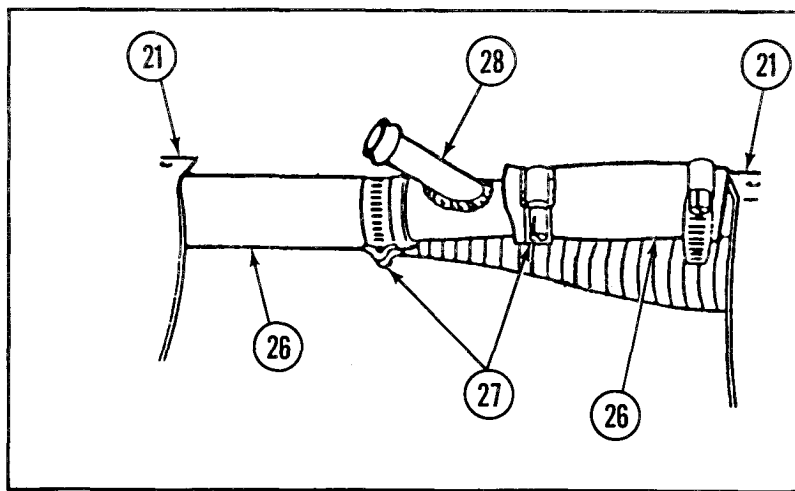


- L Install four mounts (20) into hull tapping blocks.

NOTE

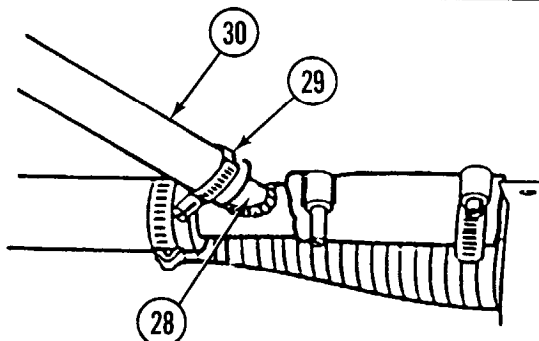
Brackets have two mounting positions (due to offset holes) to accommodate several coolant heater models. The distance between brackets should be 10-1/4 inches for coolant heater 11601698.

- M Install two brackets (21) using four washers (24) and four nuts.
- N Install two bands onto lower portion of brackets using two screws. Do not completely tighten screws at this time.



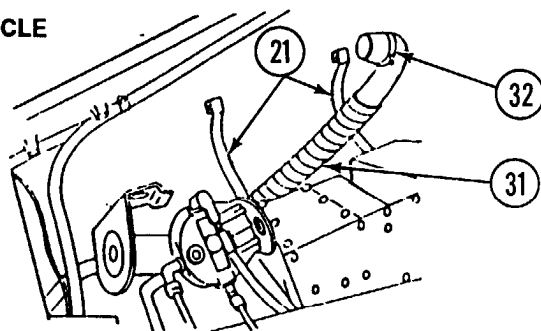
- O Cut three inches out of existing engine inlet coolant hose (26) at a point midway between coolant heater mounting brackets (21) and discard this hose section. Place clamp (27) over each hose end, insert "Y" tube (28) in indicated position and tighten clamps.

WINTERIZATION KIT: INITIAL INSTALLATION (CONTINUED)

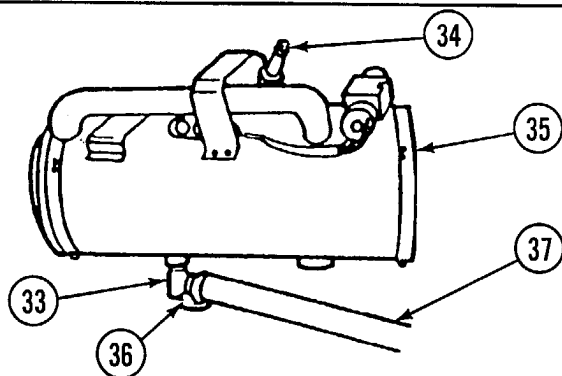


- P Place hose clamp (29) over end of 5/8 ID x 16-inch long hose (30). Install hose on "Y" tube (28) and tighten clamp.

FRONT OF VEHICLE

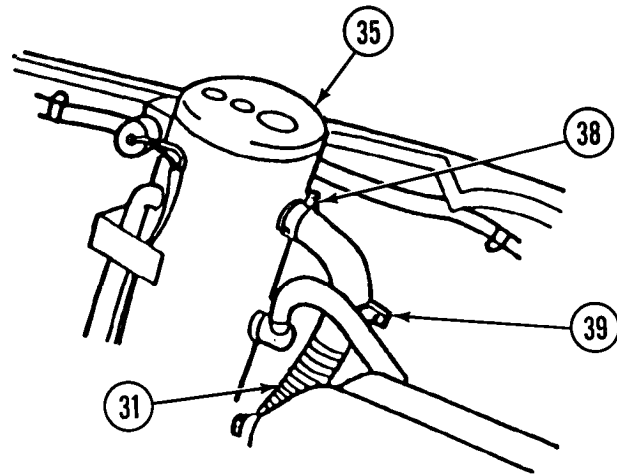


- Q Place heater exhaust assembly (31) with hose clamp (32) in relative mounted position between coolant heater mounting brackets (21).

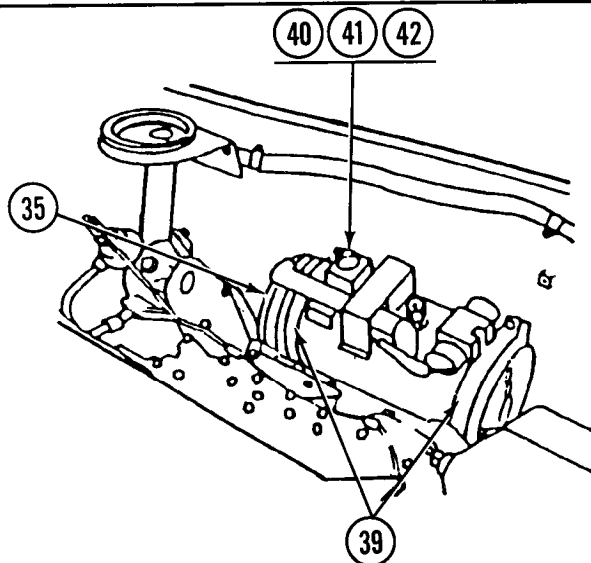


- R Install inlet elbow (33) and outlet elbow (34) on coolant heater assembly (35).
- S Place hose clamp (36) over end of 5/8 ID x 18-inch long hose (37), install on heater inlet elbow (33), and tighten clamp.

WINTERIZATION KIT: INITIAL INSTALLATION (CONTINUED)

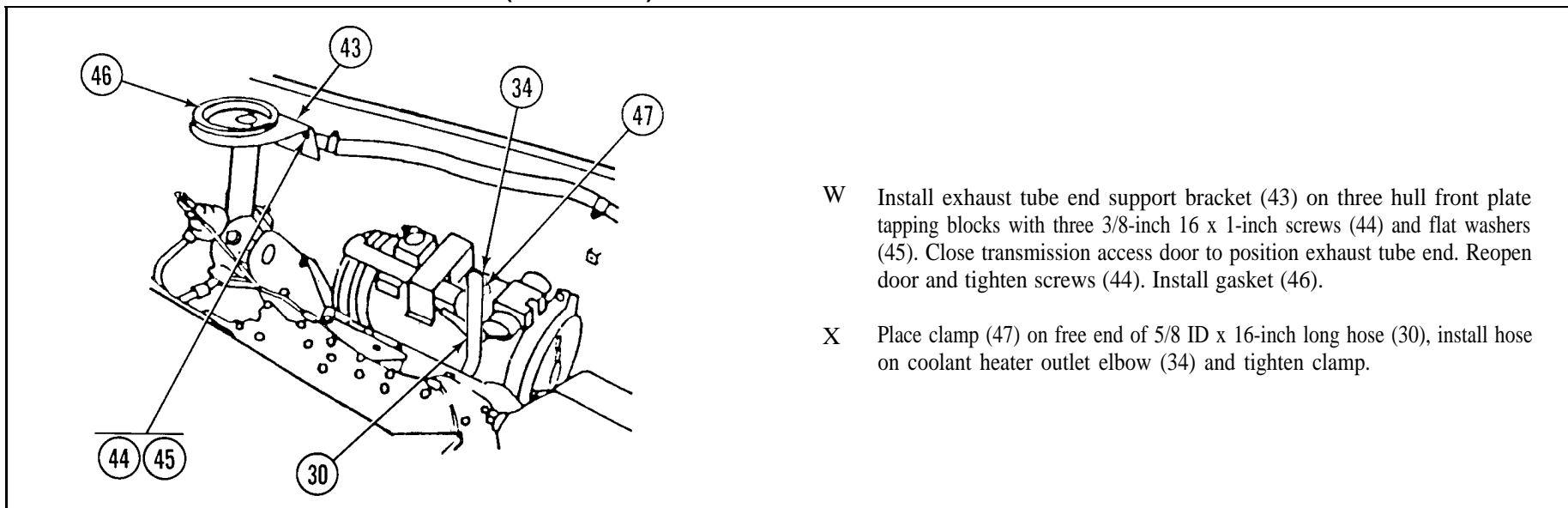


- T Place coolant heater assembly (35) in powerplant compartment (as shown). Attach heater exhaust assembly (31) and tighten hose clamp (38). Install heater exhaust hose bracket (39).

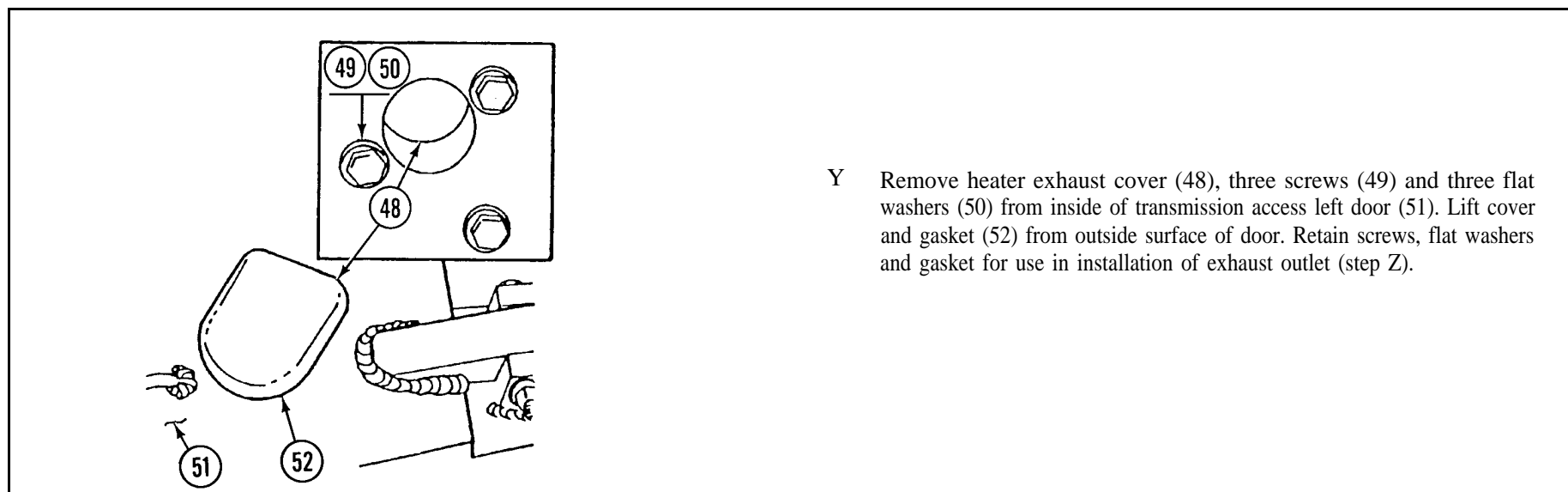


- U Place heater assembly (35) on mounting brackets and clamp securely with two upper brackets (39), four 1/4-20 x 1-1/8-inch screws (40), flat washers (41) and nuts (42).
- V Install exhaust tube bracket (under coolant heater assembly (35)) on tapping block on hull front plate using 1/4-20 x 3/4-inch screw and lockwasher.

WINTERIZATION KIT: INITIAL INSTALLATION (CONTINUED)

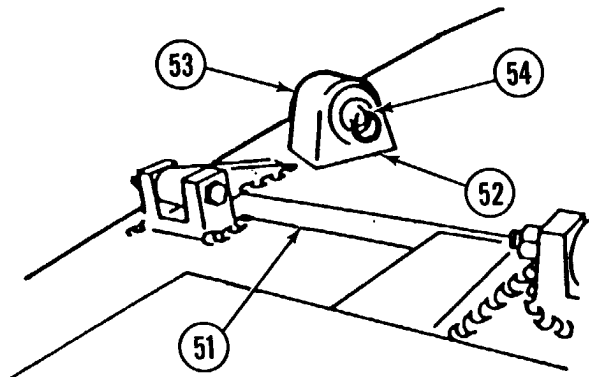


- W Install exhaust tube end support bracket (43) on three hull front plate tapping blocks with three 3/8-inch 16 x 1-inch screws (44) and flat washers (45). Close transmission access door to position exhaust tube end. Reopen door and tighten screws (44). Install gasket (46).
- X Place clamp (47) on free end of 5/8 ID x 16-inch long hose (30), install hose on coolant heater outlet elbow (34) and tighten clamp.



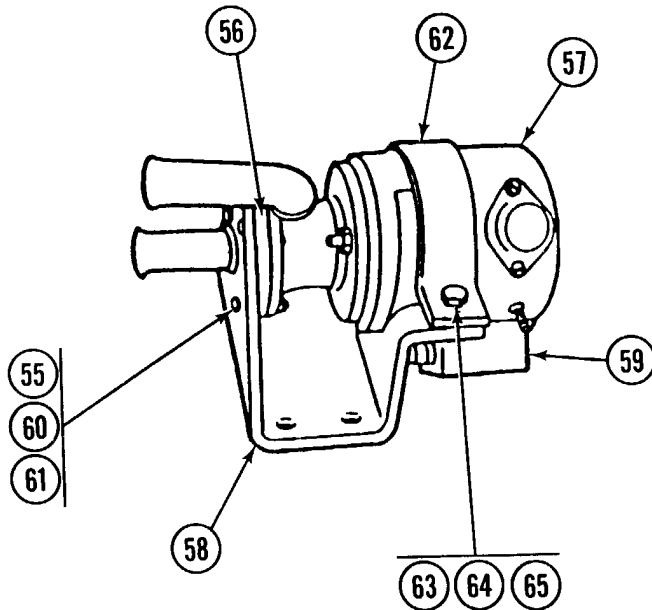
- Y Remove heater exhaust cover (48), three screws (49) and three flat washers (50) from inside of transmission access left door (51). Lift cover and gasket (52) from outside surface of door. Retain screws, flat washers and gasket for use in installation of exhaust outlet (step Z).

WINTERIZATION KIT: INITIAL INSTALLATION (CONTINUED)



Z Install exhaust outlet (53) on transmission access left door (51) using three screws (49), three flat washers (50) and gasket (52) retained from heater exhaust cover removal (step Y).

AA Install exhaust outlet plug (54) in exhaust outlet (53).



CAUTION

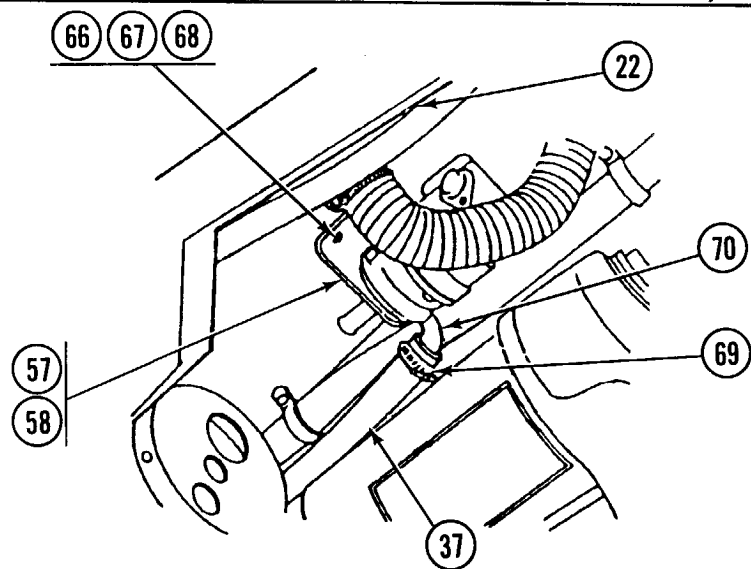
Remove plug from exhaust outlet before operating winterization kit to avoid damaging vehicle.

AB Remove three screws (55) from engine coolant pump inlet adapter (56) and discard screws.

AC Position pump (57) and adapter against base bracket (58) so that pump suppressor (59) is 30° forward from a vertical position (to clear hull front plate) and install three No. 8-32 x 5/8-inch screws (60) and three lockwashers (61).

AD Place curved bracket (62) over pump and secure to base bracket with two 1/4-20 x 7/8-inch screws (63), two lockwashers (64) and two nuts (65).

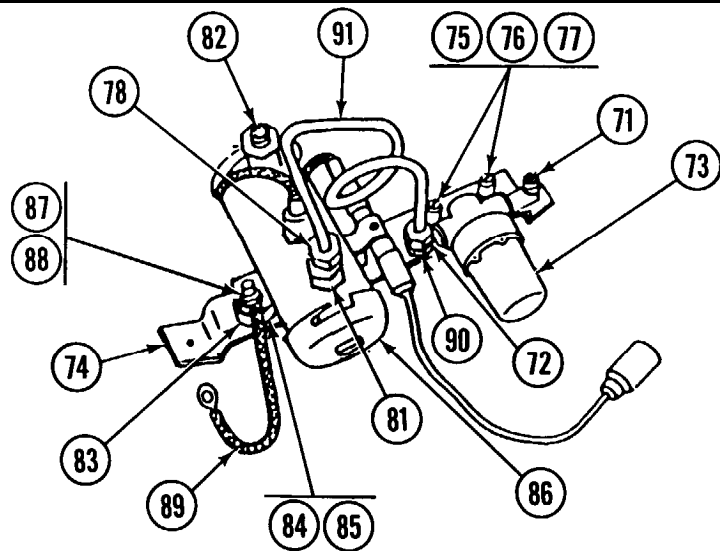
WINTERIZATION KIT: INITIAL INSTALLATION (CONTINUED)



NOTE

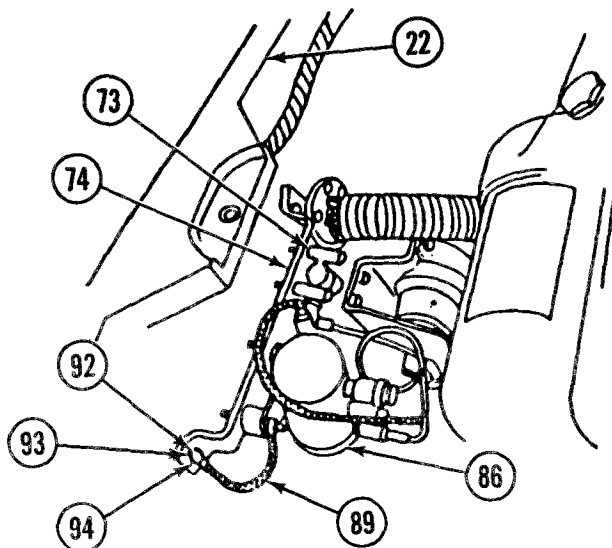
Install lockwashers (68) on any two screws for grounding pump on hull.

- AE Install assembled pump (57) and bracket (58) on hull front plate (22) with four 1/4-20 x 5/8-inch screws (66), two flat washers (67) and two lockwashers (68).
- AF Place hose clamp (69) over free end of 5/8 ID x 18-inch long hose (37), connect hose to coolant pump outlet (70) and tighten clamp. Cut hose (37) as required.



- AG Install elbows (71) and (72) in fuel filter (73) inlet and outlet openings.
- AH Install fuel filter (73) with elbows (71) on bracket (74) with two No. 10-32 x 1-3/4-inch screws (75), two flat washers (76) and two nuts (77).
- AI Install adapter (79) into inlet side of fuel pump. Install adapter (78) into outlet (82) of fuel pump.
- AJ Install two shock mounts (83) with two nuts (84) and two flat washers (85) on bracket (74). Install electric fuel pump (86) on shock mounts using two nuts (87) and two lockwashers (88) to secure pump, ground strap (89) and pump suppressor (90). Install fuel tube (91) between filter outlet elbow (72) and fuel pump body inlet (81).

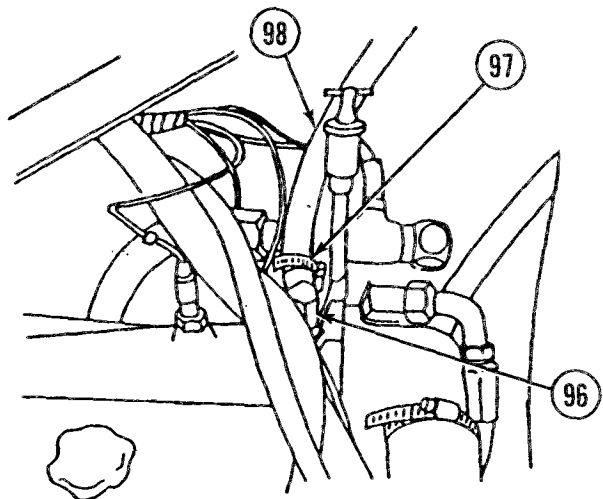
WINTERIZATION KIT: INITIAL INSTALLATION (CONTINUED)



NOTE

Install lockwasher (94) between ground strap and screw head.

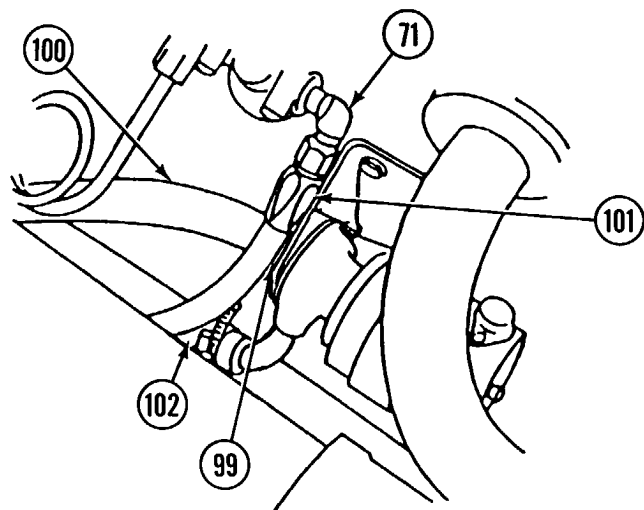
AK Install bracket (74) with fuel filter (73), pump (86) and ground strap (89) to hull front plate (22) with two 1/4-20 x 5/8-inch screws (92), two flat washers (93) and two lockwashers (94).



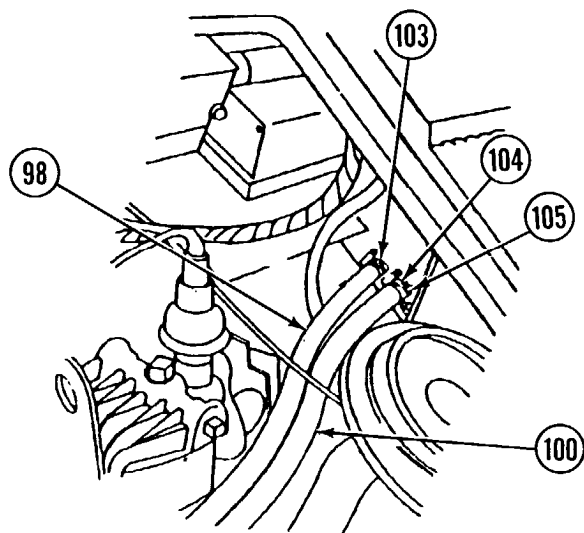
AL Remove plug from engine coolant left manifold (95) and install elbow (96).

AM Place hose clamp (97) over end of 5/8 ID x 78-inch long hose (98), install hose on elbow (96) and tighten clamp.

WINTERIZATION KIT: INITIAL INSTALLATION (CONTINUED)



- AN Place hose clamp (99) over end of 5/8 ID x 60-inch long coolant hose (100). Install hose on engine coolant pump inlet adapter (101) and tighten clamp.
- AO Install engine primary fuel filter-to-coolant heater fuel filter hose (102) on filter inlet elbow (71).

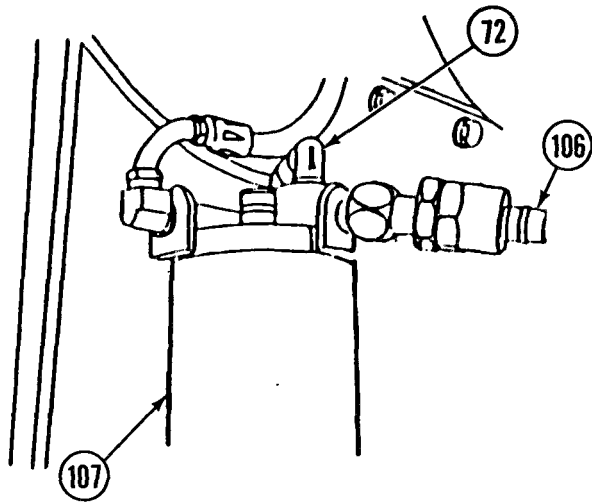


NOTE

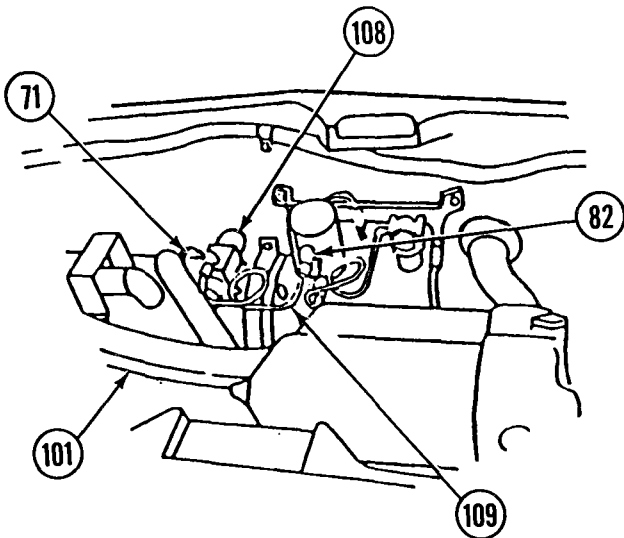
Secure hoses in steps AP and AQ to transmission with strap material using transmission screws and washers.

- AP Place coolant manifold hose (98) along the side and front of transmission and connect to the battery heater inlet tube. Trim hose to fit and install on heater inlet tube with hose clamp (103).
- AQ Place coolant pump inlet hose (100) along front of transmission and connect to battery heater outlet tube (104). Trim hose to fit, and install on heater outlet tube with hose clamp (105).

WINTERIZATION KIT: INITIAL INSTALLATION (CONTINUED)

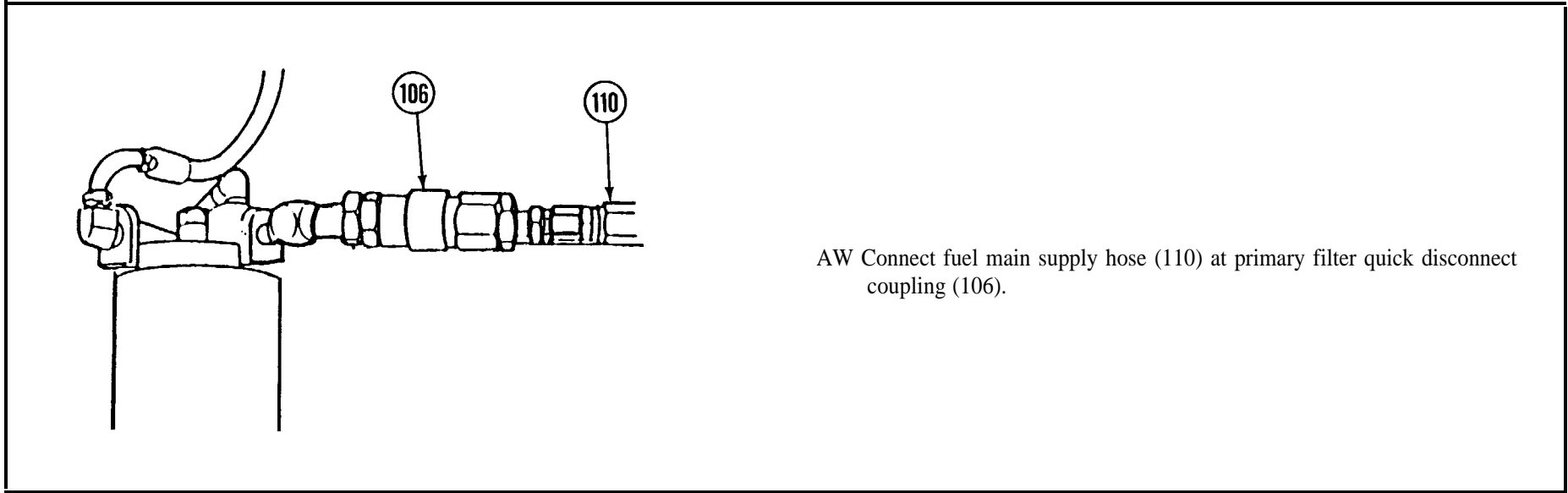


- AR Disconnect fuel main supply hose at quick-disconnect coupling (106) on primary fuel filter (107).
- AS Remove plug at inlet of primary filter (107) and install elbow (72).
- AT Connect hose to elbow (72) and assemble hose fittings. Secure using clamp.

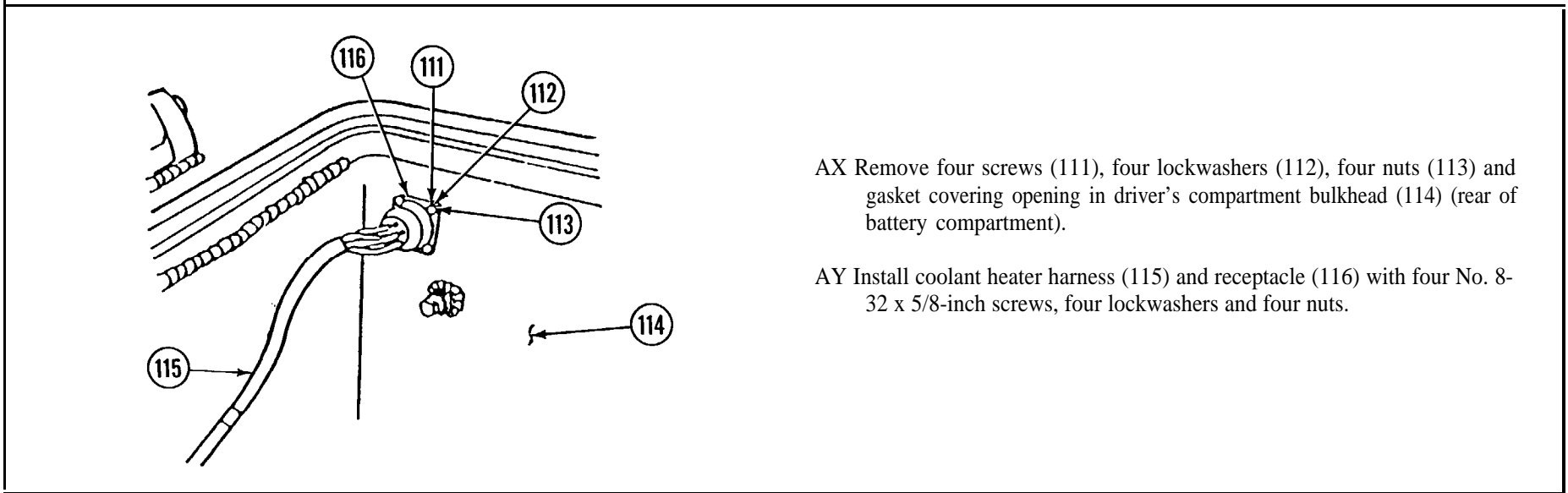


- AU Install elbow (71) on inlet side of heater control valve (108).
- AV Connect hose (109) to elbow (71) and to outlet (82). Secure fittings.

WINTERIZATION KIT: INITIAL INSTALLATION (CONTINUED)



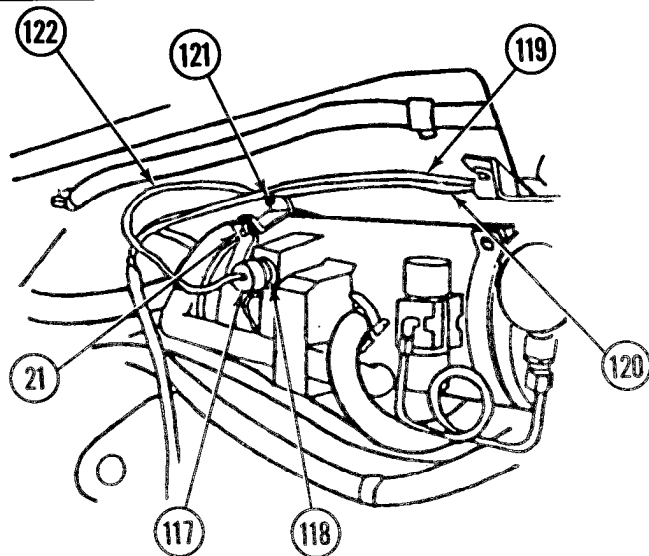
AW Connect fuel main supply hose (110) at primary filter quick disconnect coupling (106).



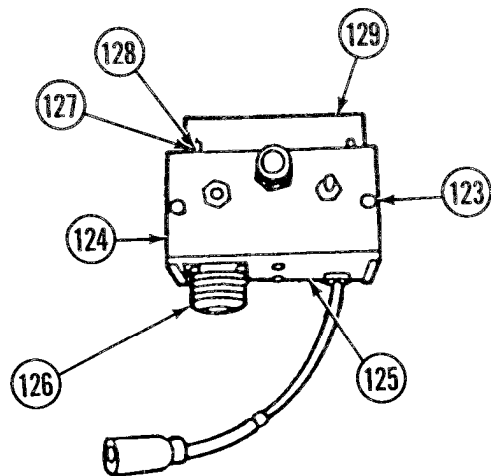
AX Remove four screws (111), four lockwashers (112), four nuts (113) and gasket covering opening in driver's compartment bulkhead (114) (rear of battery compartment).

AY Install coolant heater harness (115) and receptacle (116) with four No. 8-32 x 5/8-inch screws, four lockwashers and four nuts.

WINTERIZATION KIT: INITIAL INSTALLATION (CONTINUED)



- AZ Connect coolant heater harness plug (117) to heater receptacle (118).
- BA Connect harness lead (circuit 403B)(119) connector to heater coolant pump. Support harness lead with right headlight group support strap. Also, place clamp over harness and attach to transmission using existing screw and washer.
- BB Connect harness lead (circuit 402C)(120) to electric fuel pump connector.
- BC Remove mounting screw (121) from coolant heater mounting bracket (21) and install harness ground lead (122).

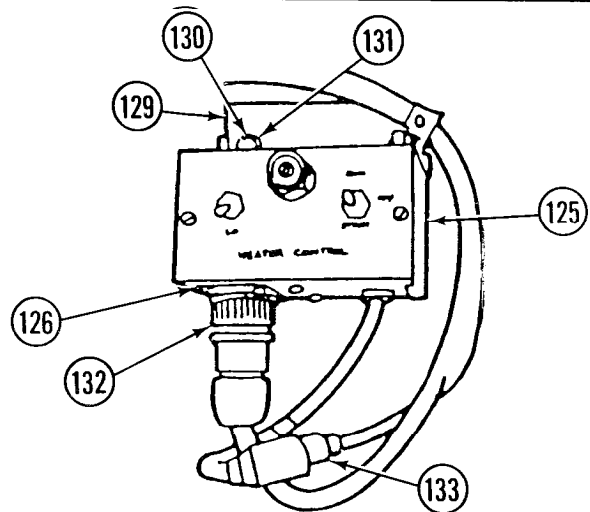


- BD Remove two screws (123) and remove cover (124) from winterization kit heater control box (125).

NOTE

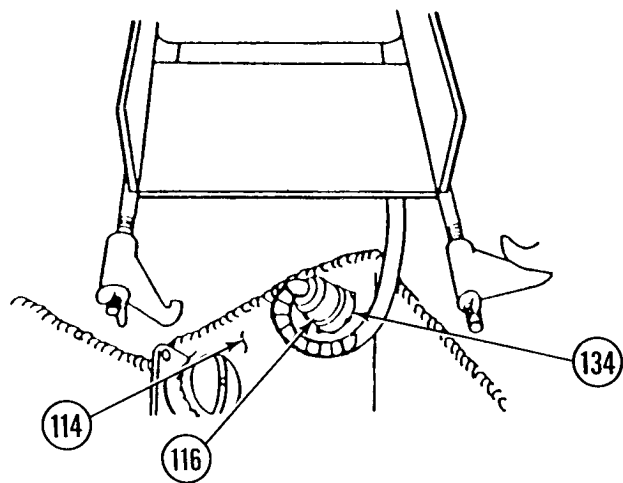
Harness receptacle (126) must face downward.
Reposition if necessary.

- BE Remove two nuts (127) and two flat washers (128) from screws on top of box, place mounting bracket (129) on screws, and reinstall two nuts and two flat washers.
- BF Install cover (124) on box with two screws (123).



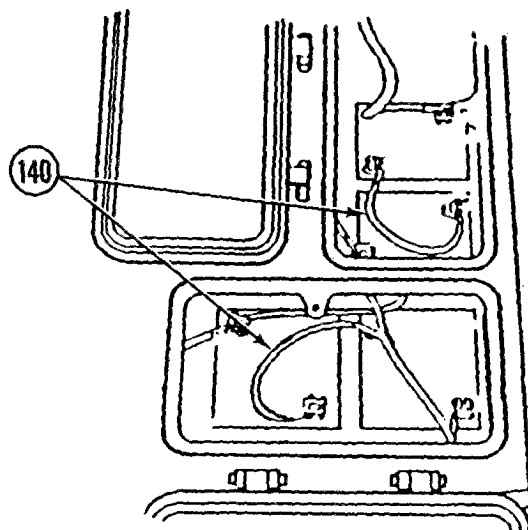
BG Use two 1/4-20 x 1/2-inch screws (130) and two flat washers (131) and install control box (125) and bracket (129) on driver's compartment bulkhead tapping blocks (above engine compartment access door).

BH Connect control box-to-driver's compartment harness plug (132) at box receptacle (126). Connect harness branch lead (circuit No. 400) (133) to box lead connector.



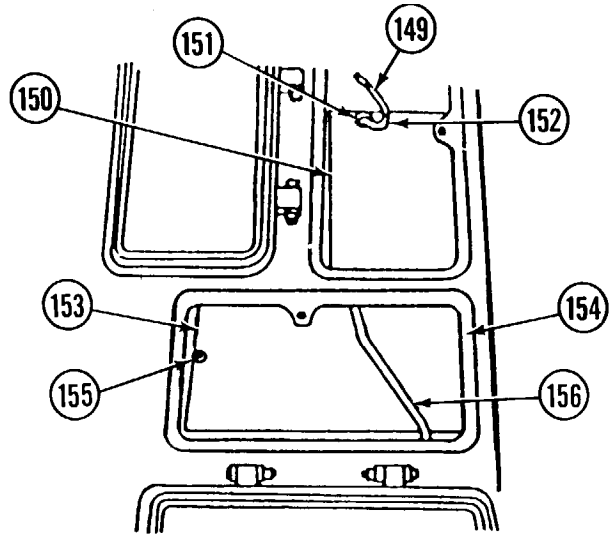
BI Connect control box-to-driver's compartment harness plug (134) to coolant heater harness receptacle (116) in driver's compartment bulkhead (114).

WINTERIZATION KIT: INITIAL INSTALLATION (CONTINUED)

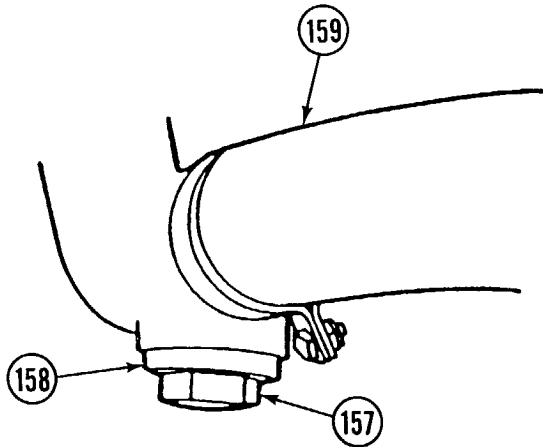


- BJ Remove shell 8338561 and plug 7982907 from unused terminal of cable assembly 12351754. Do not discard.
- BK Plug male shell (circuit 415) of harness 12351411 into unused female shell (circuit 415) of cable assembly 12351754.
- BL Reinstall shell 8338561 and plug 7982907 into unused female shell of harness 12351411.
- BM Reinstall two battery jumper lead assemblies (140). Secure lugs to battery terminals.
- BN Connect battery ground lead assembly 12330348. Secure lug end to negative terminal of battery B.
- B0 Insert grommet into battery box side slot. Reinstall lead assembly between positive terminals of batteries A and C and master relay cable assembly.
- BP Insert grommet into battery box side slot. Reinstall lead assembly from driver's compartment bulkhead (and STE/ICE leads from harness 12329994, if applicable).

WINTERIZATION KIT: INITIAL INSTALLATION (CONTINUED)

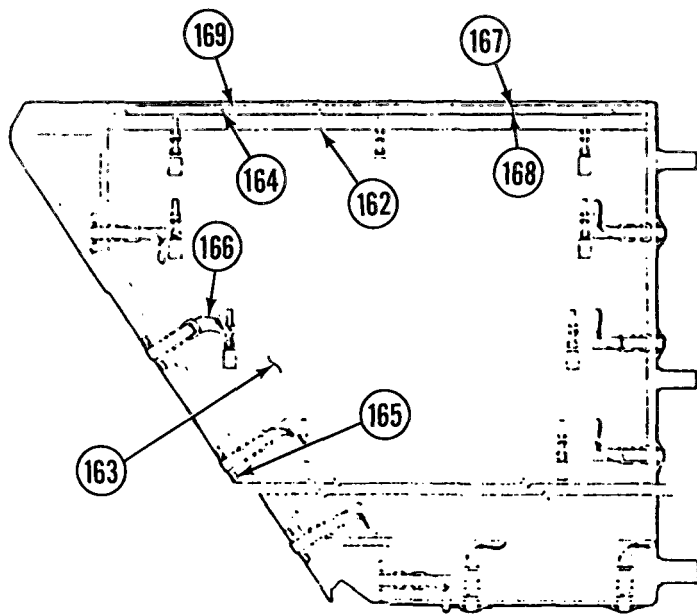


- BQ Slide rear insulation blanket (150) over batteries. Guide free end of rear batteries ground lead (circuit 7) (149) through grommet (151) in blanket and position rear of blanket under rear winterization box tab (152).
- BR Place front insulation blanket (153) over batteries, position outer side of blanket under rear winterization box side tab (154) and position slot on inner side of blanket over stud (155) on front box. Install flat washers and wing nut on stud.
- BS Install rear batteries ground lead (circuit 7)(149) on bulkhead with two existing screws and two lockwashers. Reroute left headlight wiring harness (156) and place on top of blankets (150) and (153).



- BT Install engine coolant drain plug (157) and gasket (158) in lower main coolant tube (159).
- BU Fill engine coolant system to FULL level in accordance with vehicle article preparation procedures and air bleed note at end of this section.

WINTERIZATION KIT: INITIAL INSTALLATION (CONTINUED)



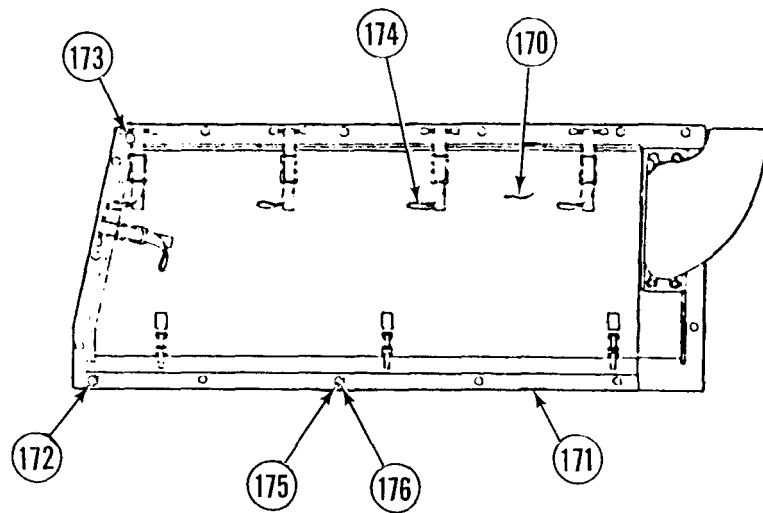
BV Place hold-down strip (162) for intake grille cover tarpaulin (163) on grille to serve as a template for screw holes. Mark and remove strip. Drill and tap six 5/16-24 UNF-28 holes (164).

BW Locate ten footman loop type fasteners (165) and weld into place.

BX Place intake grille winterization tarpaulin (163) in position (with straps (166) and webbing down) and install six 5/16-24 x 3/4-inch screws (167) and flat washers (168) in strip (169).

BY Secure tarpaulin (163) by installing straps (166) into ten footman's loop fasteners (165).

WINTERIZATION KIT: INITIAL INSTALLATION (CONTINUED)



BZ Place exhaust grille tarpaulin (170) hold-down strip (171) on grille to serve as template. Locate hole at front end of grille and tap six 5/16-24 UNF-2B holes (172).

CA Locate five footman's loop fasteners (173) and weld into position.

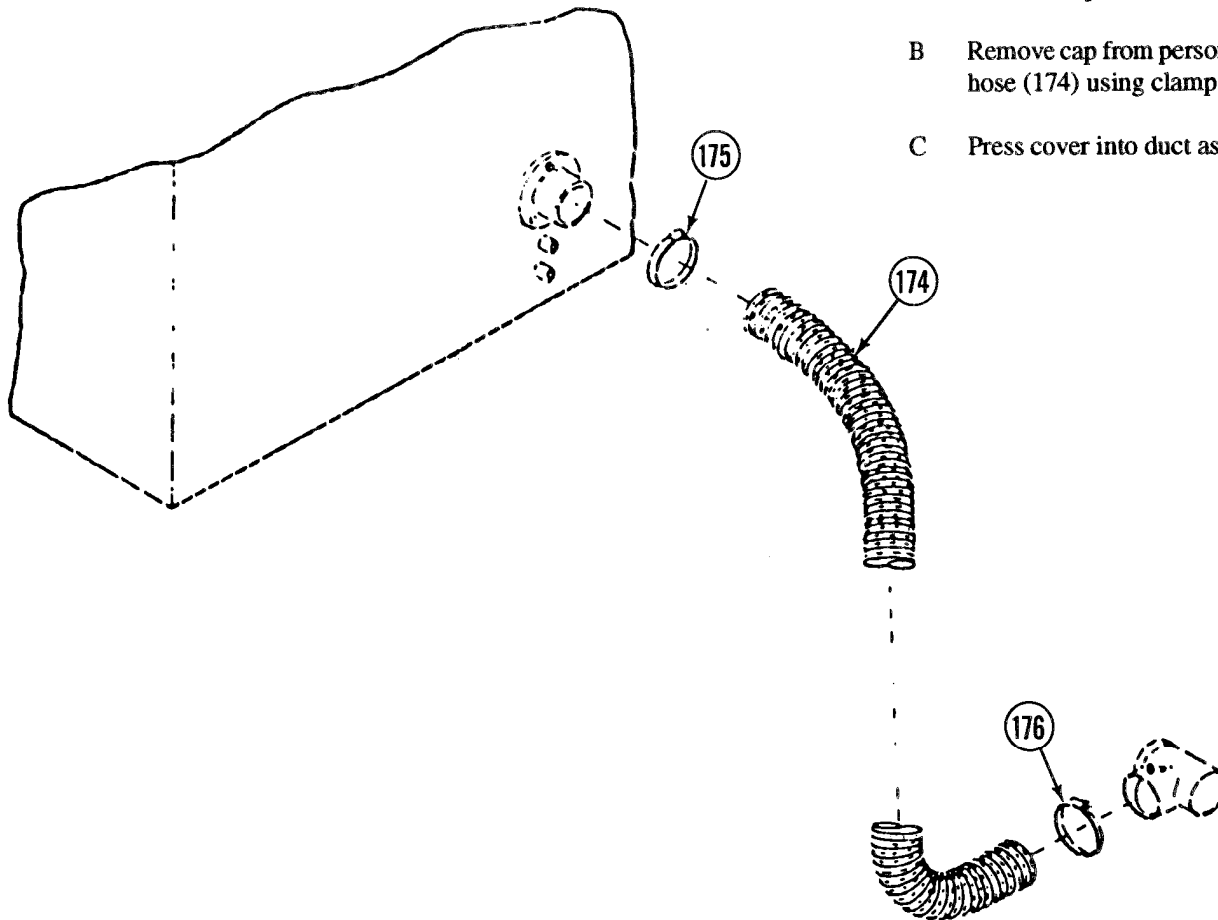
CB Place exhaust grille tarpaulin (170) in position (with straps (174) up and webbing down) and install five screws 1-5/16-24 x 3/4 & 4-1/2-20 x 1-3/8 (175) and five flatwashers (176) after removing four existing screws.

CC Secure tarpaulin by attaching five straps (174) to five footman's loop fasteners (173).

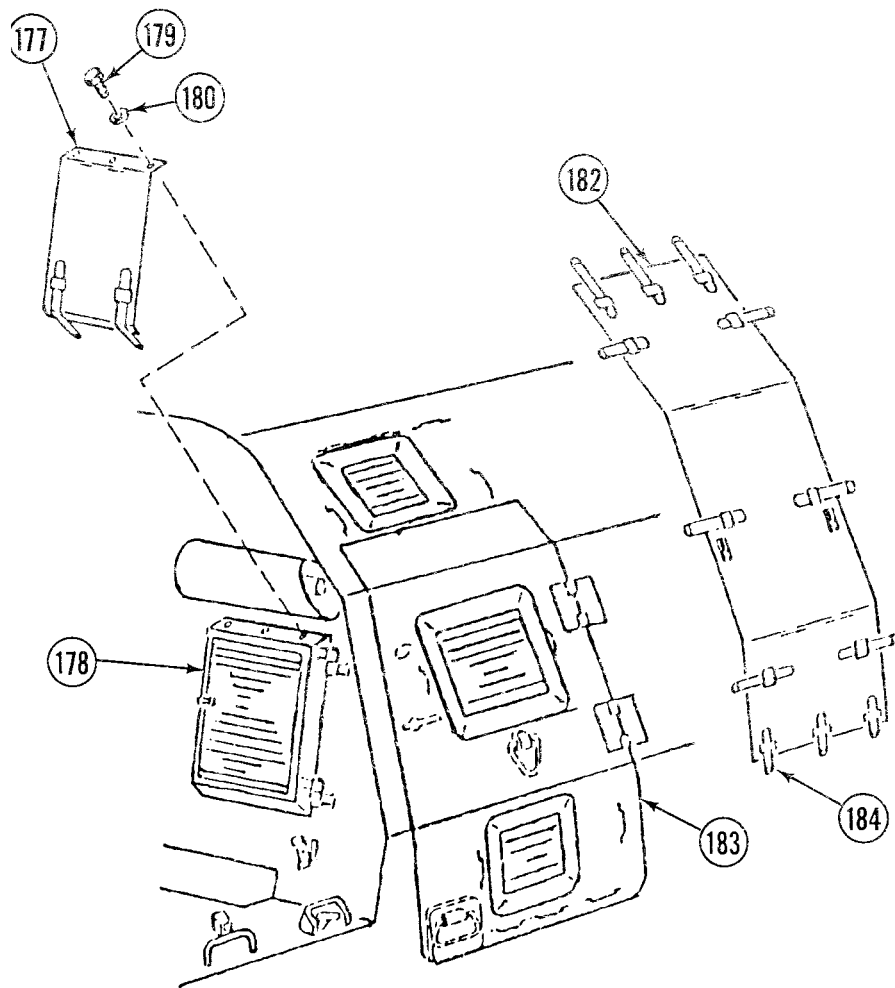
WINTERIZATION KIT: INITIAL INSTALLATION (CONTINUED)

WINTERIZATION KIT APU COMPARTMENT INSTALLATION

- A Remove cap. Connect hose (174) using clamp (175).
- B Remove cap from personnel heater air duct at floor. Connect other end of hose (174) using clamp (176).
- C Press cover into duct assembly until flush.

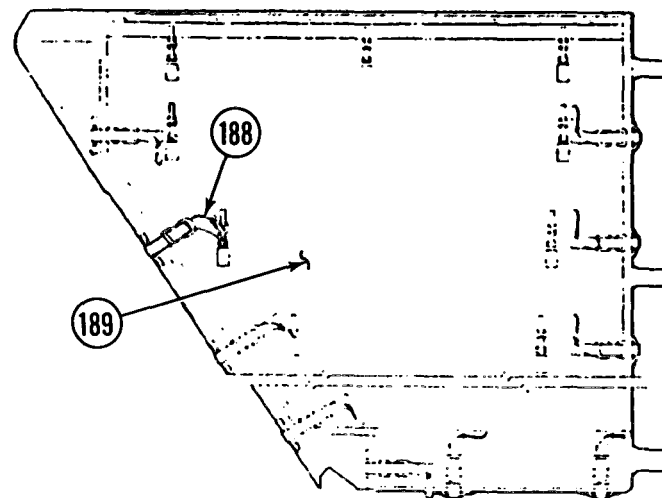
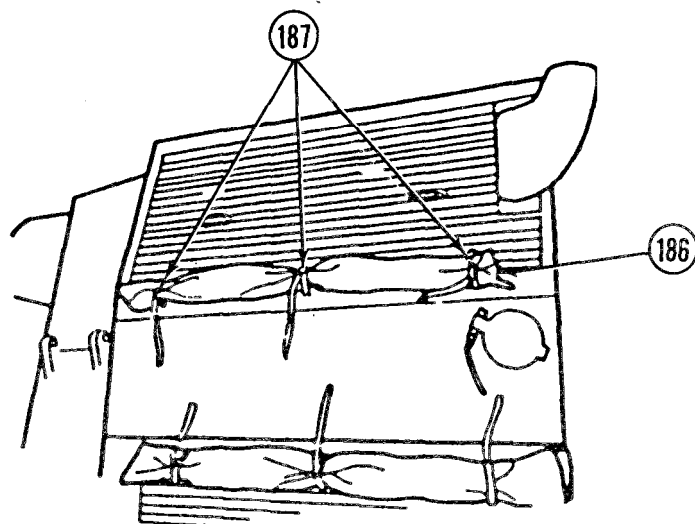
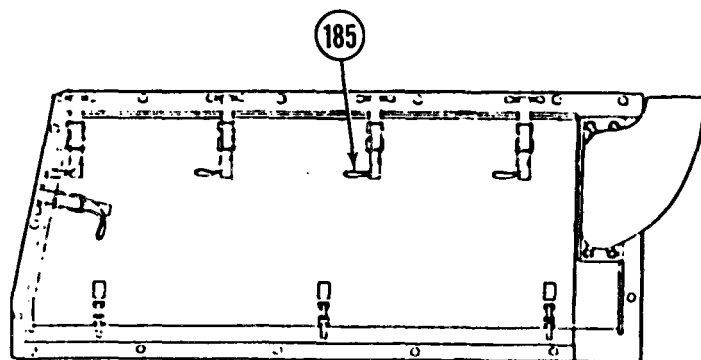


WINTERIZATION KIT: INITIAL INSTALLATION (CONTINUED)



- D Place cover (177) over door assembly (178). Weld two fasteners.
- E Place strip in tarpaulin cover (177) over top edge of door assembly (178) and transfer drill .2040 3 holes thru; tap. 250-20 UNC-2B thru.
- F Install cover (177) to door assembly (178) using three screws (179) and three washers (180).
- G Connect cover (177) to air grill door assembly (178) by securing two strap assemblies (181) to two fasteners.
- H Place APU side door winterization tarpaulin (182) over door assembly (183). Weld eleven fasteners (10930388) and one fastener (12351835).
- I Connect APU side door winterization tarpaulin (182) to door assembly (183) by securing twelve strap assemblies (184) to twelve fasteners.

WINTERIZATION KIT: INITIAL INSTALLATION (CONTINUED)



PRELIMINARY START AND OPERATION PROCEDURE

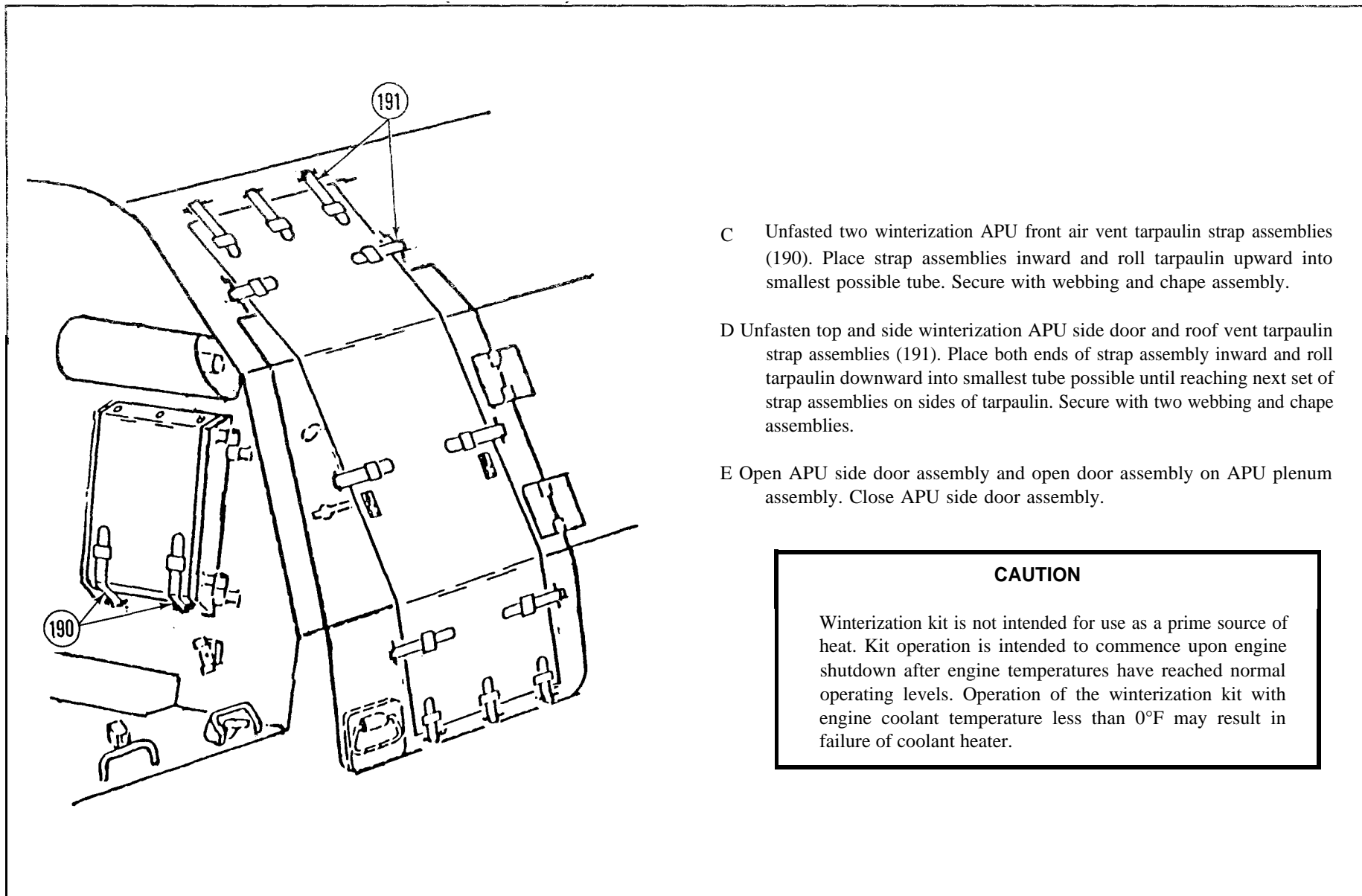
A Unfasten exhaust grille tarpaulin strap assemblies (185). Place assemblies inward and roll tarpaulin (186) into smallest possible tube. Secure with three webbing and chape assemblies (187).

NOTE

Vehicle operator determines number of straps to be unfastened.

B Unfasten four, six eight or ten strap assemblies (188) of intake grille winterization tarpaulin (189). Place unfastened assemblies inward and roll tarpaulin into smallest possible tube. Secure with webbing and chape assembly.

WINTERIZATION KIT: INITIAL INSTALLATION (CONTINUED)



C Unfasten two winterization APU front air vent tarpaulin strap assemblies (190). Place strap assemblies inward and roll tarpaulin upward into smallest possible tube. Secure with webbing and chape assembly.

D Unfasten top and side winterization APU side door and roof vent tarpaulin strap assemblies (191). Place both ends of strap assembly inward and roll tarpaulin downward into smallest tube possible until reaching next set of strap assemblies on sides of tarpaulin. Secure with two webbing and chape assemblies.

E Open APU side door assembly and open door assembly on APU plenum assembly. Close APU side door assembly.

CAUTION

Winterization kit is not intended for use as a prime source of heat. Kit operation is intended to commence upon engine shutdown after engine temperatures have reached normal operating levels. Operation of the winterization kit with engine coolant temperature less than 0°F may result in failure of coolant heater.

WINTERIZATION KIT: INITIAL INSTALLATION (CONTINUED)

CAUTION

To avoid coolant heater malfunction and possible failure, perform an air bleed on the winterization kit and engine coolant system after the kit has been installed, after reinstallation of the coolant heater, or after reinstallation of coolant lines.

F Before refilling radiator, disconnect winterization kit coolant hose at elbow on engine right bank coolant manifold.

G Temporarily plug open end of elbow and hold disconnected coolant hose end in a container.

H Fill radiator.

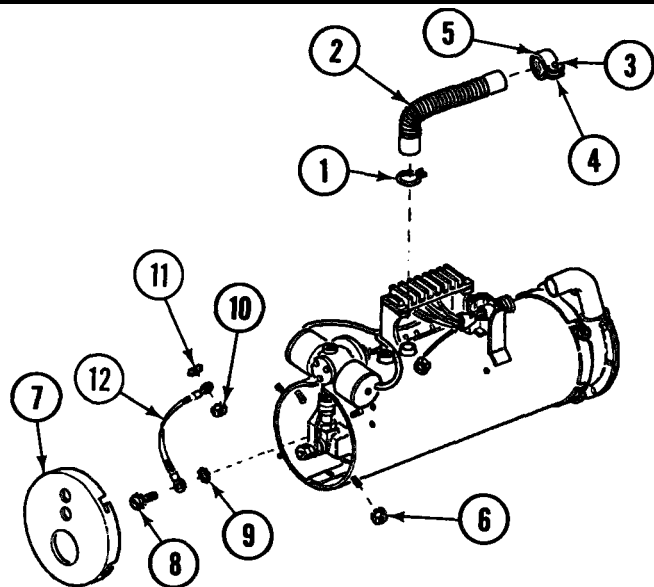
NOTE

Do not overdrain coolant system. As necessary, return drained coolant to radiator, then continue air bleed procedure.

I Start engine and run it for a short period, observing flow of air and coolant from disconnected hose. A continuous flow of coolant without air bubbles indicates that the air bleed is complete.

Section II WINTERIZATION KIT COOLANT HEATER REPAIR

WINTERIZATION KIT: COOLANT HEATER REPAIR



A Squeeze ends of clamp (1) with pliers.

B Remove end of tube (2) from heater.

C Loosen screw (3) and locknut (4).

D Remove clamp (5) and tube (2).

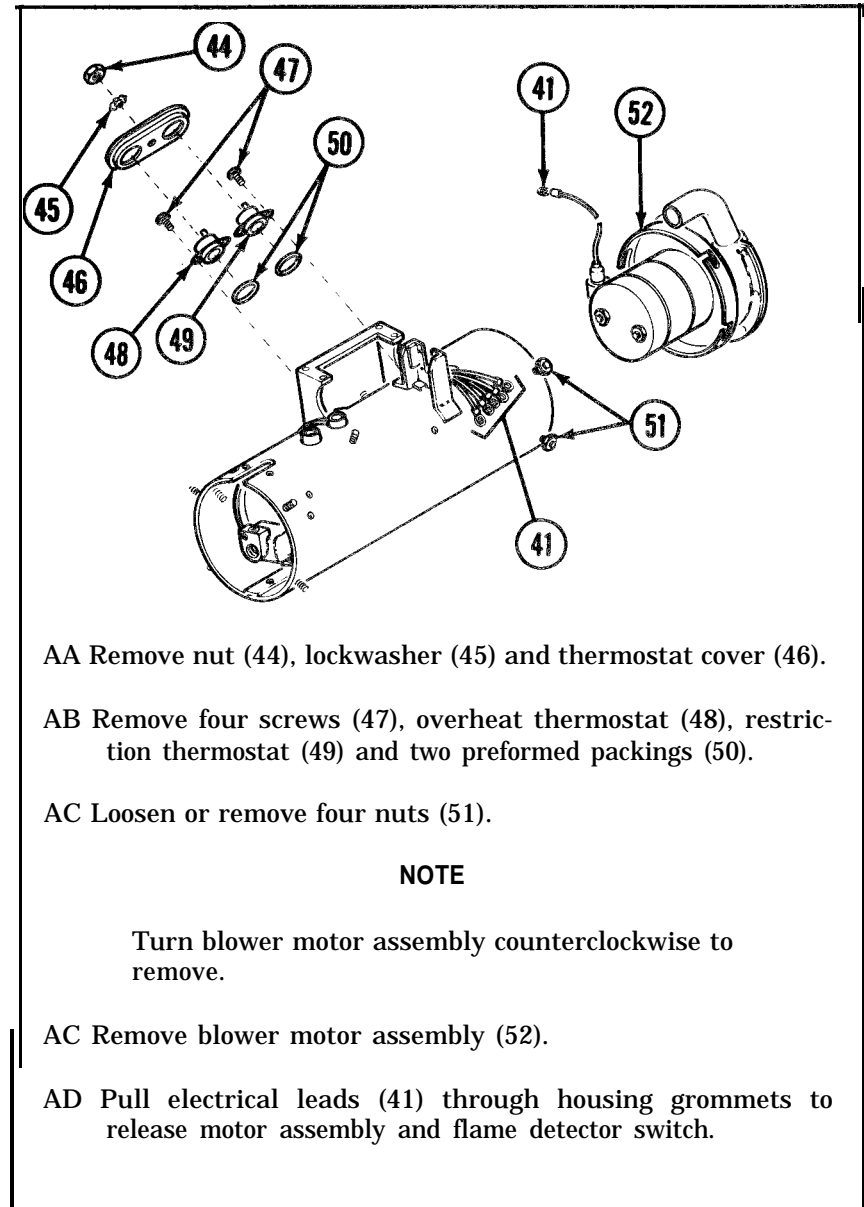
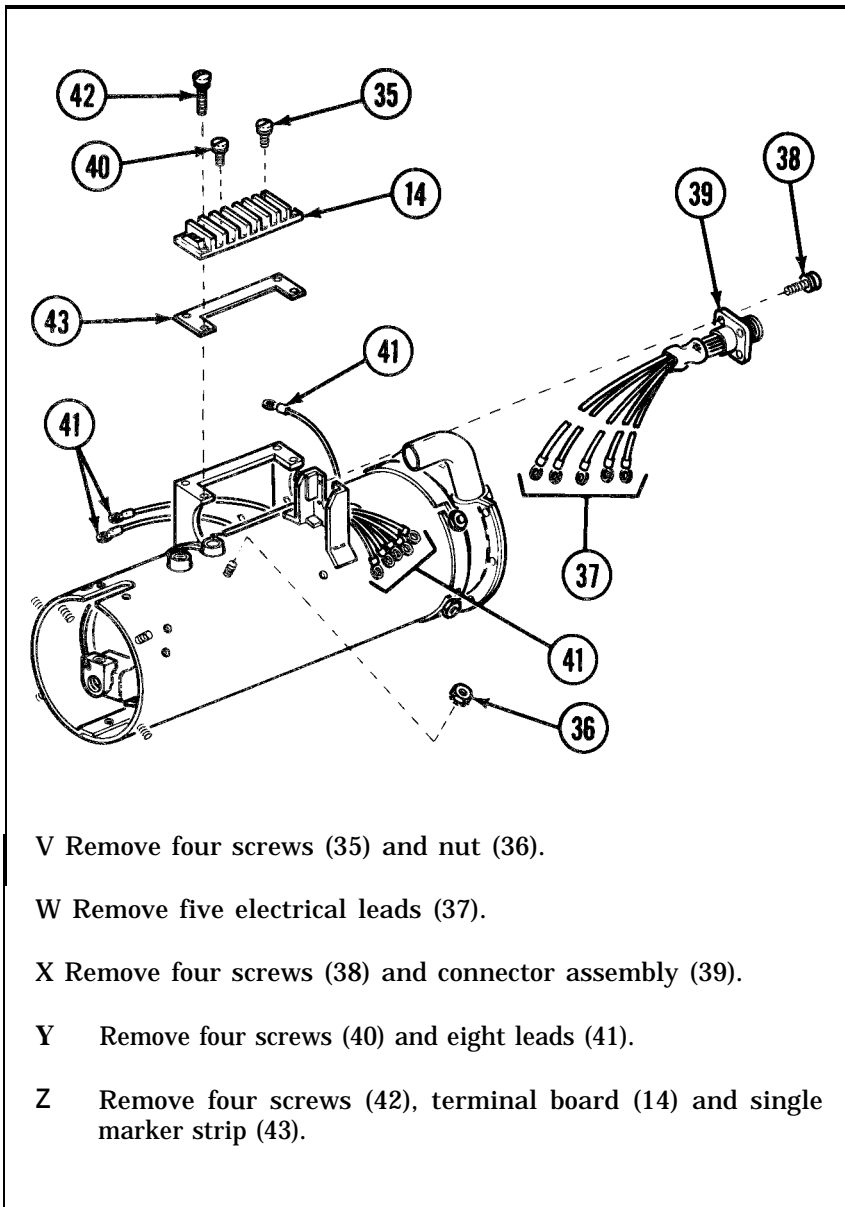
E Loosen four nuts (6).

F Turn end plate (7) clockwise.

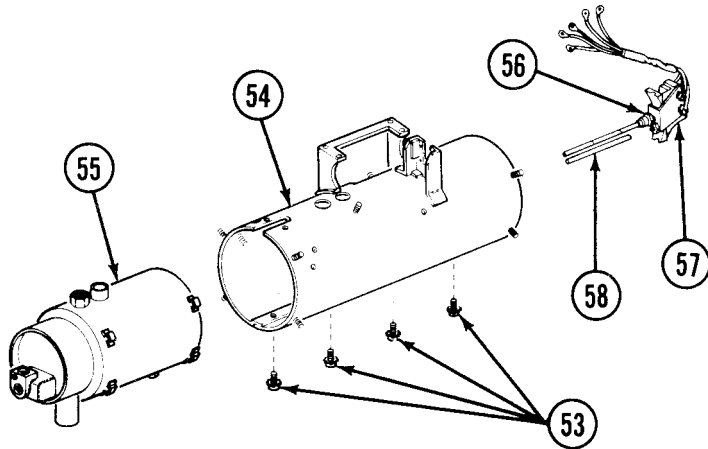
G Remove end plate (7).

H Remove screw (8), lockwasher (9), locknut (10), lockwasher(11), and ground strap (12).

WINTERIZATION KIT, COOLANT HEATER REPAIR (CONTINUED)



WINTERIZATION KIT, COOLANT HEATER REPAIR (CONTINUED)



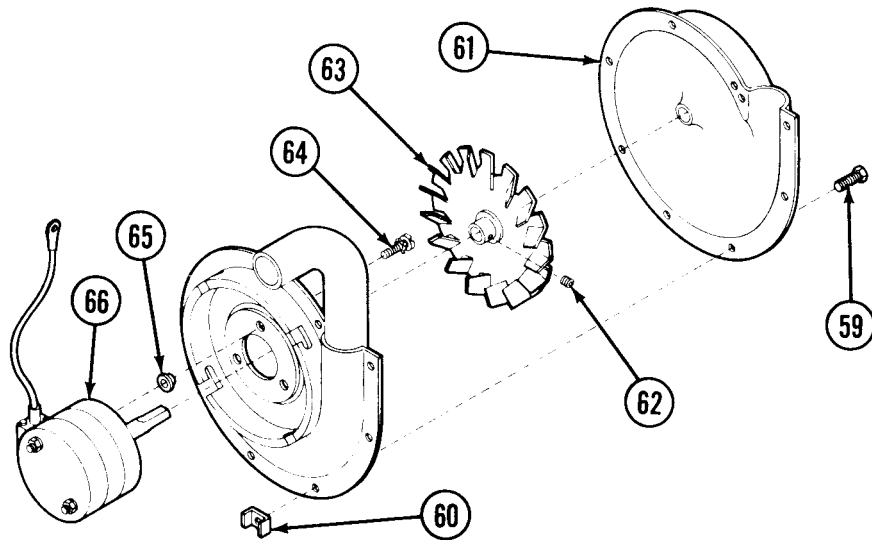
AE Remove four screws (53).

AF Spread housing (54) and remove heat exchanger (55).

AG Loosen nut (56).

AH Remove flame detector switch (57) from heat exchanger (55).

AI Remove rod (58).



AJ Remove nine screws (59) and nine nuts (60).

AK Remove blower cover (61).

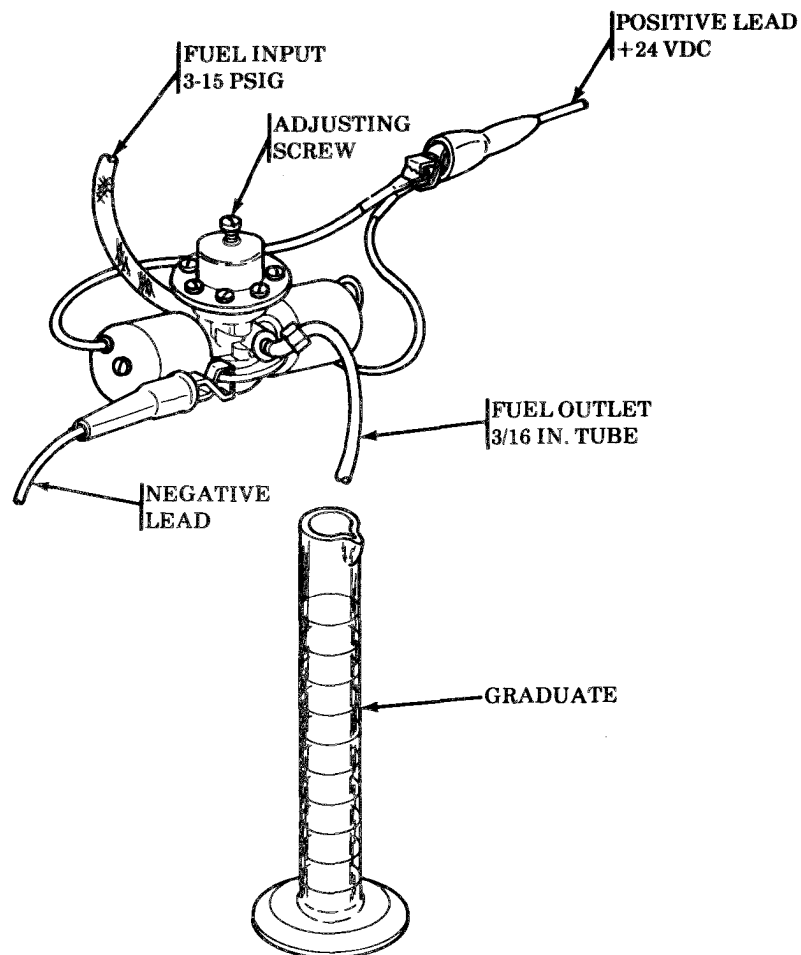
AL Remove setscrew (62) and blower wheel (63).

AM Remove three screws (64) and three spacers (65).

AN Remove motor assembly (66).

WINTERIZATION KIT, COOLANT HEATER REPAIR (CONTINUED)

FUEL CONTROL VALVE—TEST AND ADJUSTMENT



NOTE

Heater control is automatic. A cycling switch reduces fuel flow to LOW when coolant inlet temperature exceeds 190°F. Fuel flow is returned to HIGH when temperature falls to 120°F. Overheat switch shuts off fuel flow when coolant temperature reaches 245°F.

- A Set up fuel control valve as shown.
- B Apply 24 vdc to solenoid leads.

NOTE

Timing must be exact.

- C Allow fuel to flow from outlet tube for a few seconds.
- D Place graduate under fuel outlet tube and start timing fuel flow.
- E Remove power from solenoid at end of timing cycle.
- F Weigh fuel in graduate (0.071 ± 0.005 lbs/min).
- G If fuel flow is not within tolerance, turn adjusting screw clockwise to increase rate, or counterclockwise to decrease rate.
- H Repeat steps B-E.
- I Disconnect electrical leads to restriction solenoid and repeat steps B-E.
- J Adjust for flow rate 0.036 ± 0.005 lbs/min.

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WINTERIZATION KIT, COOLANT HEATER REPAIR (CONTINUED)

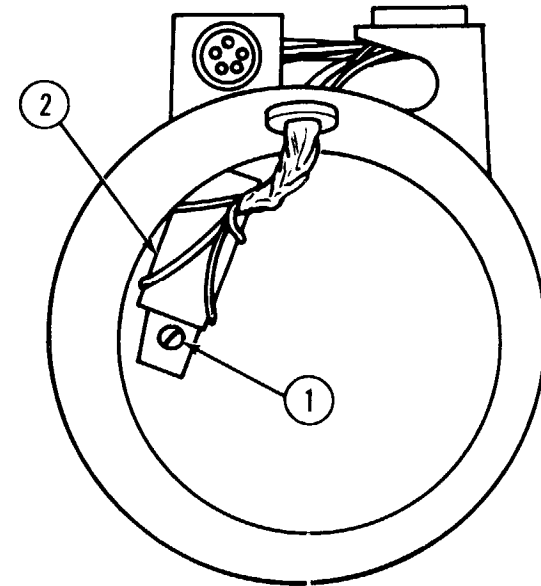
WARNING

Handle restriction orifice plate with care. Do not drop or force any object through plate openings. The slightest distortion in plate or orifices will interfere with proper operation of fuel control valve.

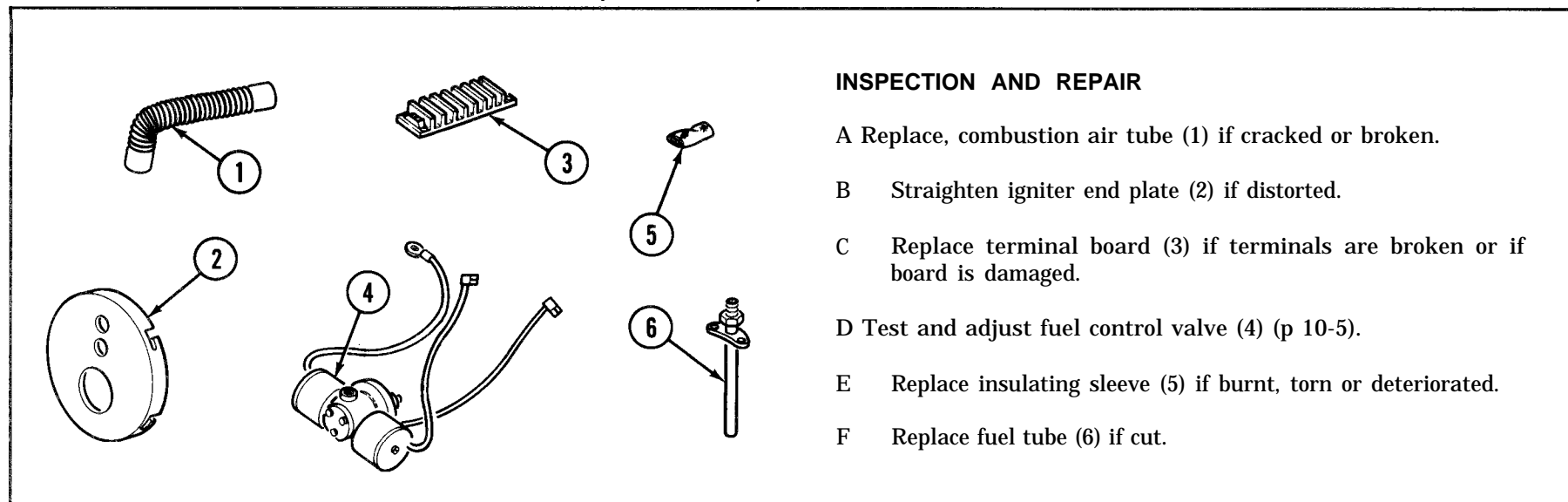
- K If flow rate is not within limits, remove and clean orifice plate.
- L Replace fuel control valve if proper adjustment cannot be obtained.

FLAME DETECTOR SWITCH**ADJUSTMENT**

- A Back off adjusting screw (1) until detector switch (2) clicks.
- B Turn screw (1) in until switch (2) clicks again.
- C Turn screw (1) in 3/4 inch past click point.
- D Coat screw (1) with varnish (item 52, Appx B).

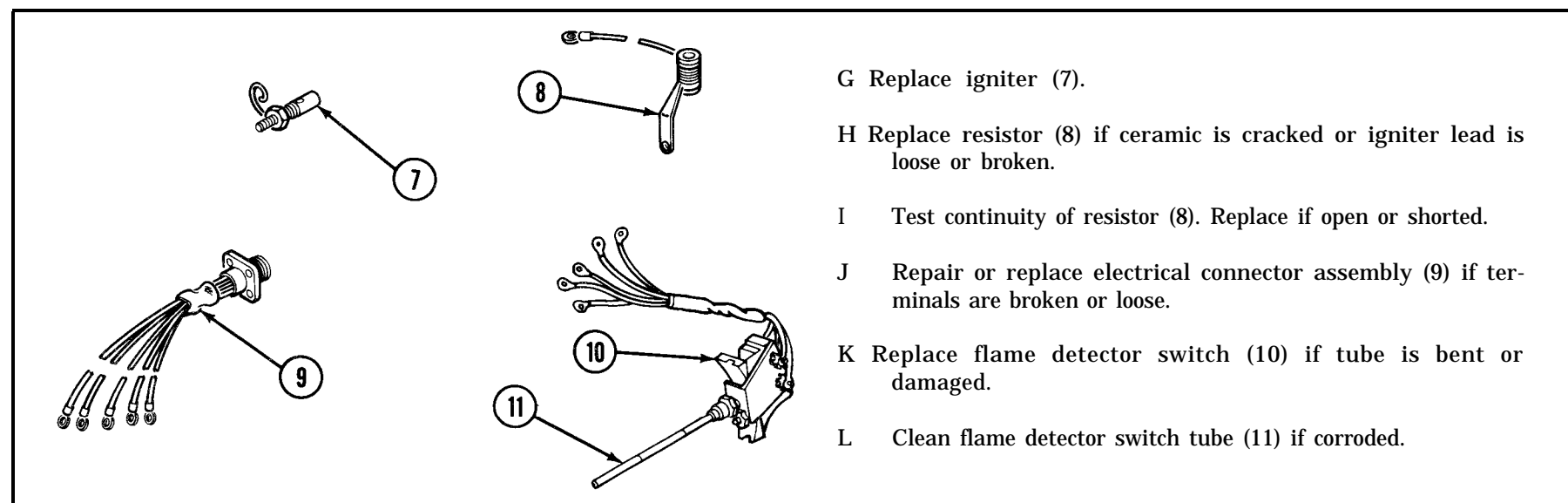


WINTERIZATION KIT, COOLANT HEATER REPAIR (CONTINUED)



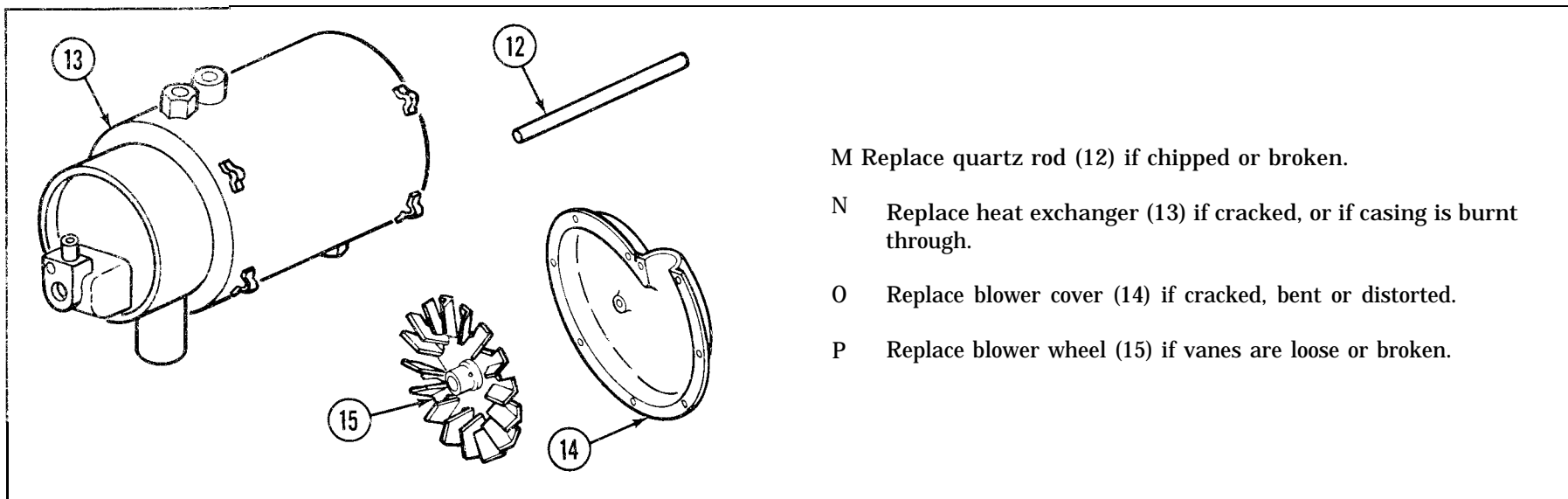
INSPECTION AND REPAIR

- A Replace, combustion air tube (1) if cracked or broken.
- B Straighten igniter end plate (2) if distorted.
- C Replace terminal board (3) if terminals are broken or if board is damaged.
- D Test and adjust fuel control valve (4) (p 10-5).
- E Replace insulating sleeve (5) if burnt, torn or deteriorated.
- F Replace fuel tube (6) if cut.



- G Replace igniter (7).
- H Replace resistor (8) if ceramic is cracked or igniter lead is loose or broken.
- I Test continuity of resistor (8). Replace if open or shorted.
- J Repair or replace electrical connector assembly (9) if terminals are broken or loose.
- K Replace flame detector switch (10) if tube is bent or damaged.
- L Clean flame detector switch tube (11) if corroded.

WINTERIZATION KIT, COOLANT HEATER REPAIR (CONTINUED)

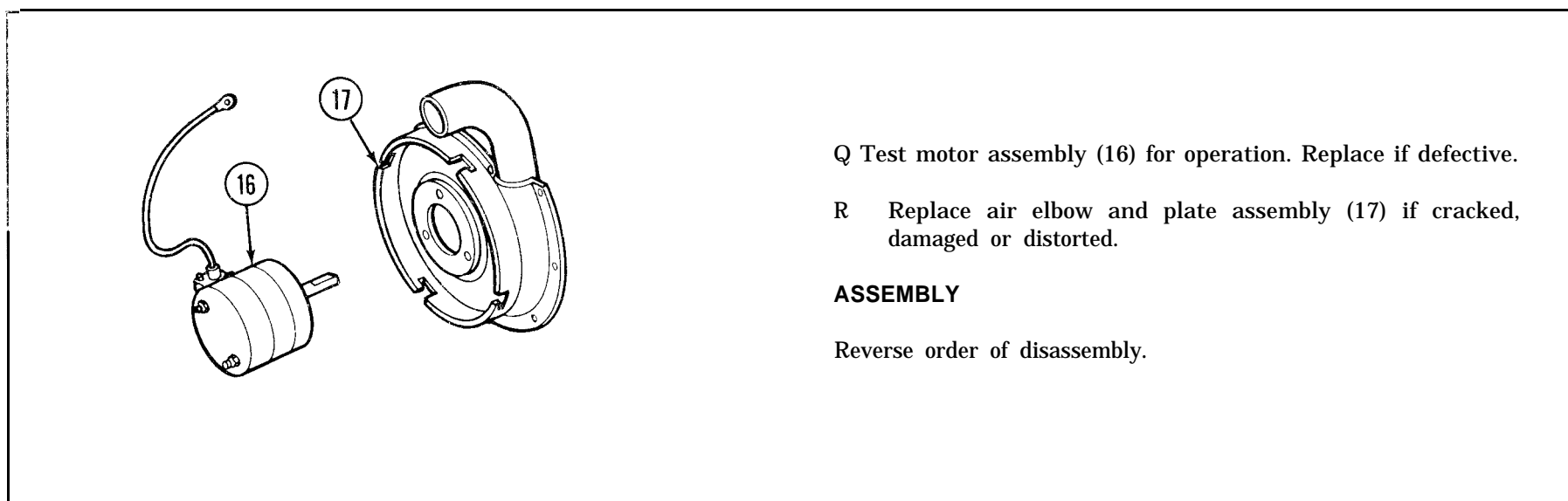


M Replace quartz rod (12) if chipped or broken.

N Replace heat exchanger (13) if cracked, or if casing is burnt through.

O Replace blower cover (14) if cracked, bent or distorted.

P Replace blower wheel (15) if vanes are loose or broken.



Q Test motor assembly (16) for operation. Replace if defective.

R Replace air elbow and plate assembly (17) if cracked, damaged or distorted.

ASSEMBLY

Reverse order of disassembly.

CHAPTER 11
MAINTENANCE PROCEDURES:
HYDRAULIC BRAKE, HYDRAULIC CLUTCH AND HYDRAULIC ACTUATOR

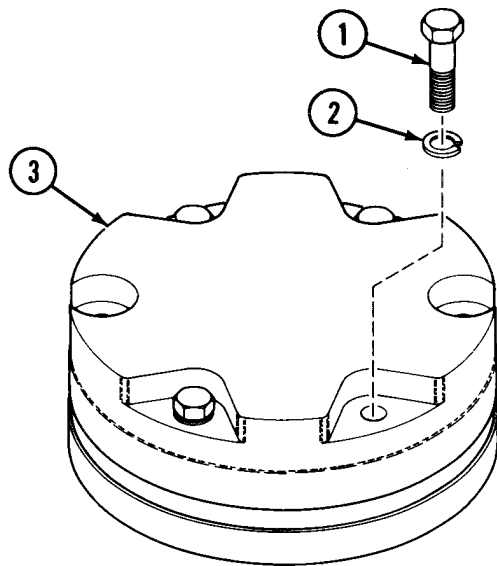
CHAPTER OVERVIEW

This chapter illustrates and describes maintenance procedures for the following hydraulic system components:

Section I Hydraulic Brake
Section II Hydraulic Clutch
Section III Hydraulic Actuator

Section I HYDRAULIC BRAKE

HYDRAULIC BRAKE REPAIR



INITIAL SETUP

Test Equipment/Special Tools:

Torque wrench, 0-175 lb-ft (item 24, Appx D)

Materials/Parts:

Dry-cleaning solvent (item 17, Appx B)
Hydraulic fluid (item 30, Appx B)

NOTE

Repair of hydraulic brake is direct support maintenance.

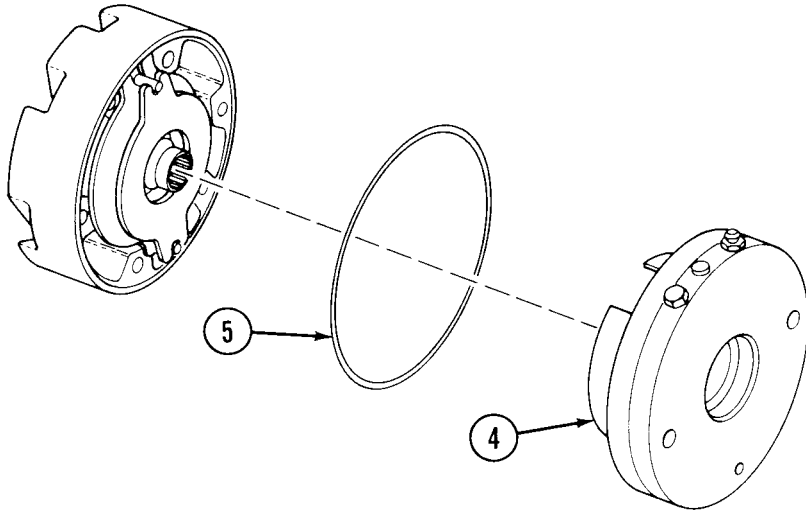
DISASSEMBLY

- A Position brake with shaft end pointing down.
- B Remove four bolts (1) and four lockwashers (2) from housing (3).

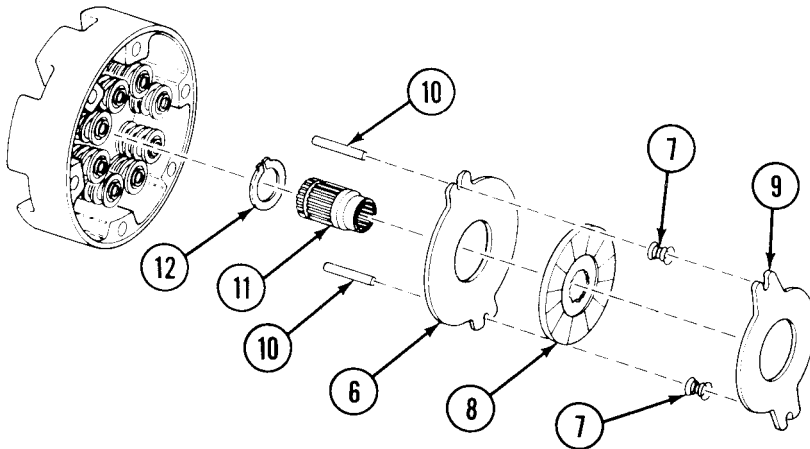
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HYDRAULIC BRAKE REPAIR (CONTINUED)

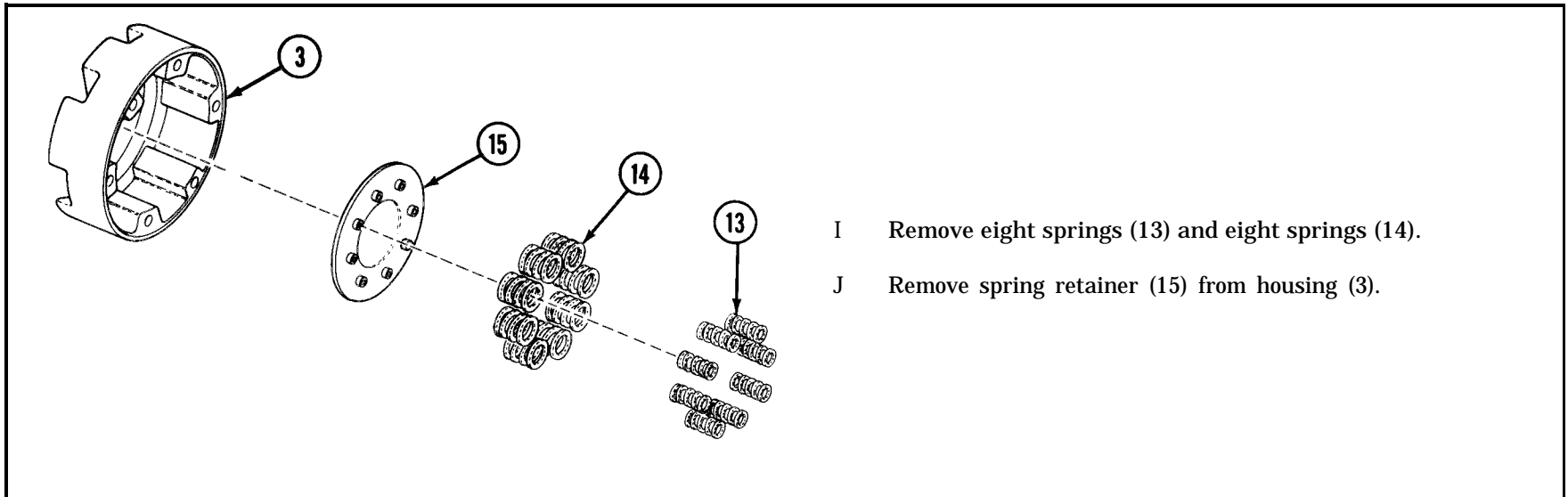


- C Position brake with shaft end pointing up.
- D Remove power plate (4) and packing (5). Discard packing.

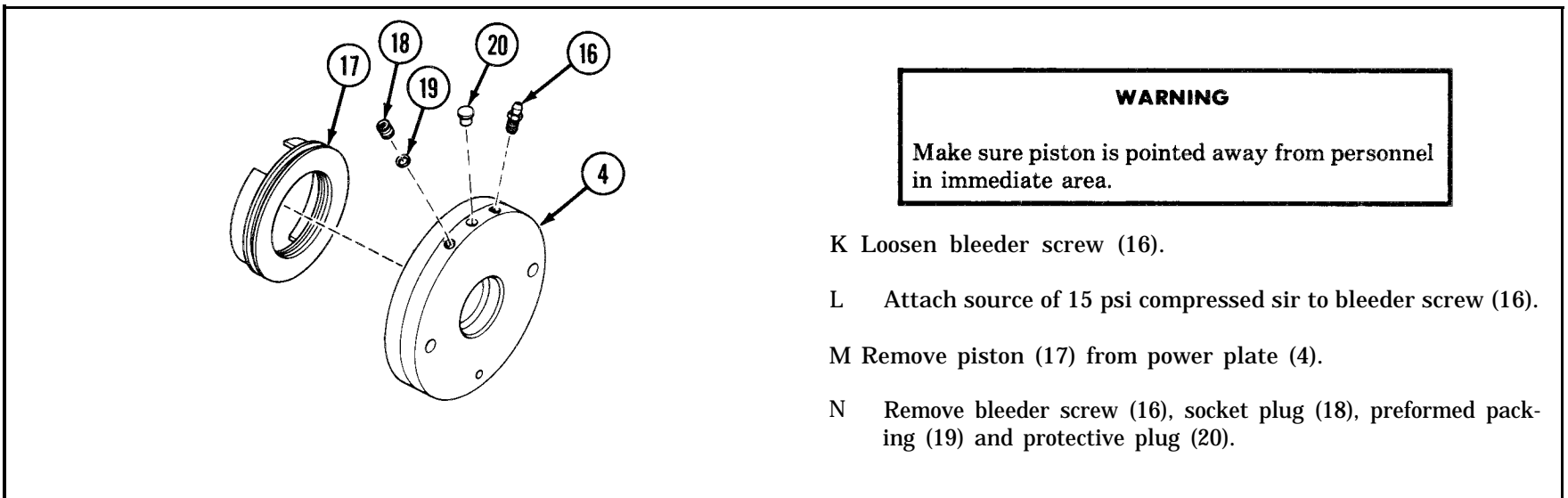


- E Remove primary disk (6), two springs (7), rotating disk (8) and stationary disk (9).
- F Remove two torque pins (10).
- G Remove shaft (11).
- H Remove retaining ring (12) from shaft (11) if retaining ring (12) is damaged.

HYDRAULIC BRAKE REPAIR (CONTINUED)



- I Remove eight springs (13) and eight springs (14).
- J Remove spring retainer (15) from housing (3).

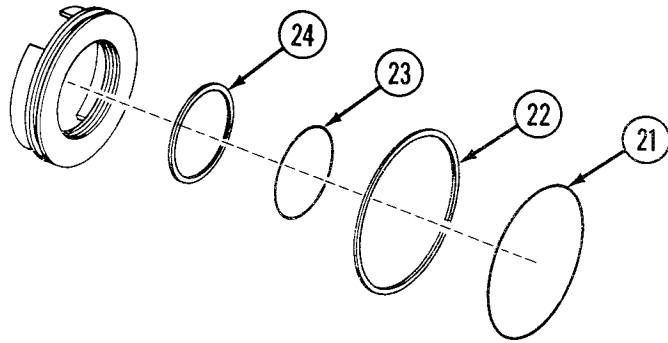


WARNING

Make sure piston is pointed away from personnel in immediate area.

- K Loosen bleeder screw (16).
- L Attach source of 15 psi compressed air to bleeder screw (16).
- M Remove piston (17) from power plate (4).
- N Remove bleeder screw (16), socket plug (18), preformed packing (19) and protective plug (20).

HYDRAULIC BRAKE REPAIR (CONTINUED)



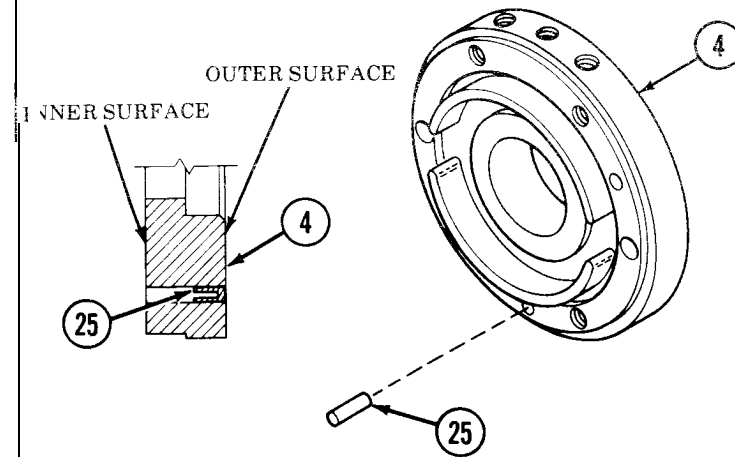
- O Remove and discard packing (21) and backup ring (22).
 P Remove and discard packing (23) and backup ring (24).

CLEANING

WARNING

Dry-cleaning solvent (PD-680) is toxic and flammable. To prevent personal injury when using PD-680, use only in a well ventilated area. Avoid breathing vapors. If you become dizzy get fresh air immediately and seek medical attention. Avoid contact with eyes, skin and clothing. Use protective goggles, gloves, and clothing. If contact is made, immediately flush with water and seek medical attention. The flashpoint for Type I dry-cleaning solvent is 100°F (38°C); for Type II it is 138°F (50°C). Do not use near open flame or excessive heat.

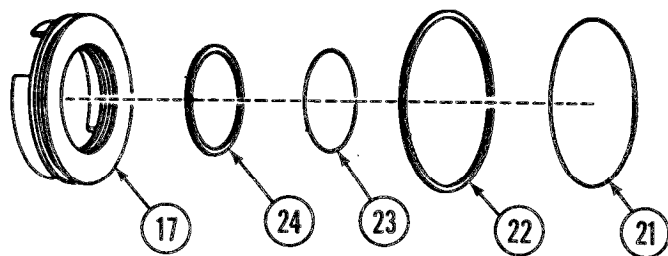
Wipe parts dry with clean, lint-free cloth. Clean all parts with dry-cleaning solvent (item 17, Appx B).



INSPECTION AND REPAIR

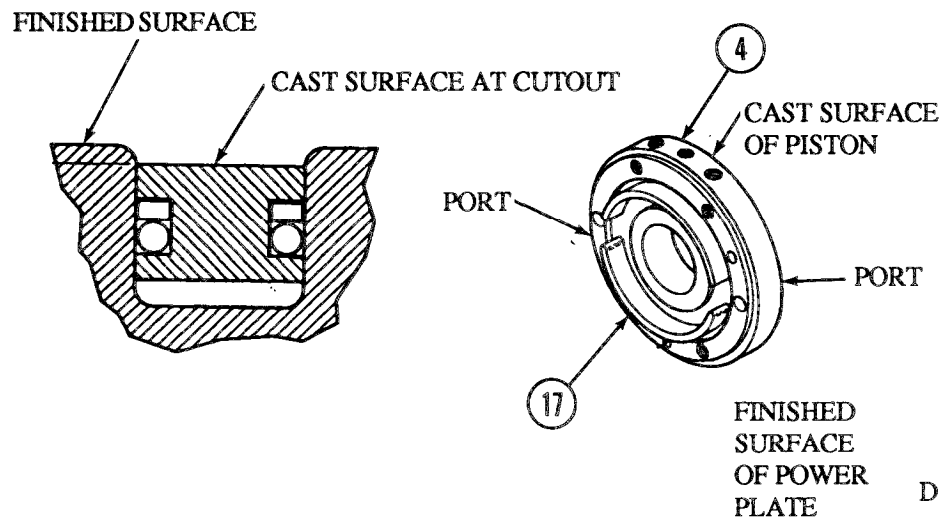
- A Inspect all parts for damage. Replace if necessary.
 B Check that oil relief plug (25) hole is clear of obstructions.
 C Remove relief plug (25) and clean hole if necessary.
 D Lightly coat new relief plug (25) with hydraulic fluid (item 30, Appx B). Insert new plug (25), closed end first, into inner surface of power plate (4). Tap plug lightly with flat object until open end of plug is flush with inside surface of plate.

HYDRAULIC BRAKE REPAIR (CONTINUED)



ASSEMBLY

- A Lubricate new packings (21 and 23), new backup rings (22 and 24) and piston (17) with hydraulic fluid (item 30, Appx B).
- B Install new packings (21 and 23) and new backup rings (22 and 24) in piston (17).



- C Lubricate all mating surfaces of piston (17) and power plate (4) with a light coating of hydraulic fluid (item 30, Appx B). Aline center of cutouts in piston (17) with torque pin holes in power plate (4).

CAUTION

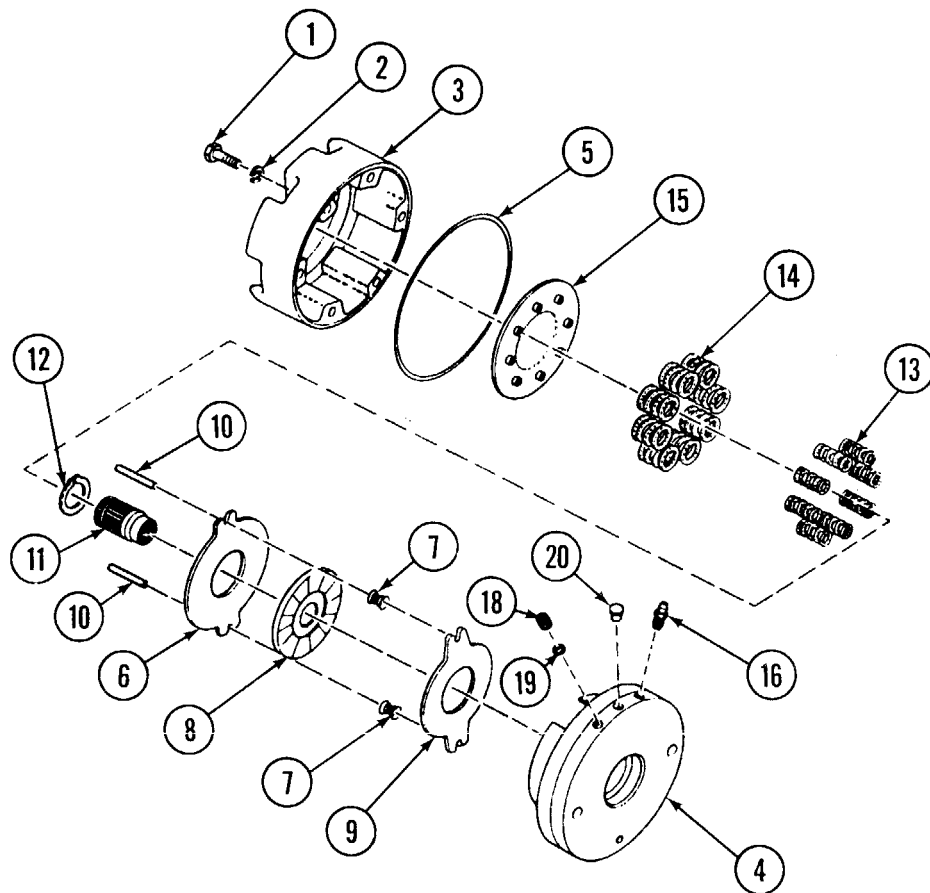
Ensure piston is installed flush with surface. If piston is below surface of power plate, piston may cock, resulting in complete loss of braking.

NOTE

Be careful not to damage packings or backup rings when installing piston.

- D Using shop press, install piston (17) into power plate (4) until cast surface of piston at cutouts is flush with finished surface of power plate.

HYDRAULIC BRAKE REPAIR (CONTINUED)



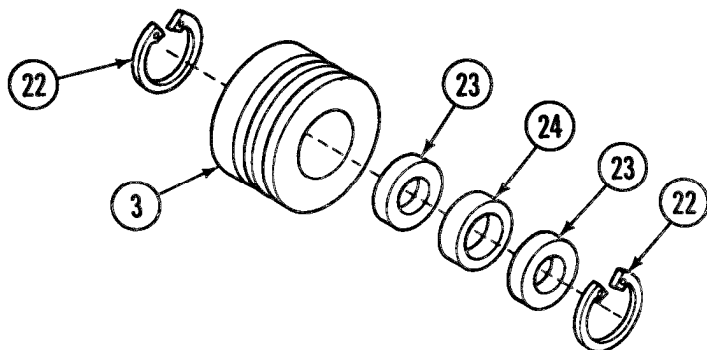
- E Install protective plug (20), new preformed packing (19), socket plug (18) and bleeder screw (16).
- F Install spring retainer (15) into housing (3).
- G Install eight springs (14) and eight springs (13) in spring retainer (15).
- H Install new packing (5) into housing (3).

WARNING

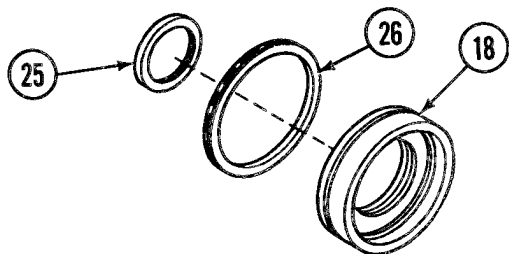
Rotating disk must be clean and dry before installing. There should be no presence of oil on any lining material or mating surface of stationary disks. Contamination may cause failure.

- I Install new retaining ring (12) on shaft (11) if removed during disassembly.
- J Install shaft (11), stationary disk (9), rotating disk (8), two springs (7), primary disk (6) and two torque pins (10).
- K Install four bolts (1) and four new lockwashers (2) in housing (3). Thread bolts into power plate (4). Torque bolts evenly to 50-60 lb-ft.

HYDRAULIC CLUTCH REPAIR (CONTINUED)



- P Remove two snaprings (22) and press out two bearings (23) and spacer (24) from pulley (3).



- Q Remove seals (25 and 26) from piston (18).

CLEANING

WARNING

Dry-cleaning solvent (PD-680) is toxic and flammable. To prevent personal injury when using PD-680, use only in a well ventilated area. Avoid heating vapors. If you become dizzy get fresh air immediately and seek medical attention. Avoid contact with eyes, skin, and clothing. Use protective goggles, gloves, and clothing. If contact is retie, immediately flush with water and seek medical attention. The flashpoint for Type I dry-cleaning solvent is 100°F (38°C); for Type II it is 140°F (60°C). Do not use near open flame or excessive heat.

Clean inner outer disks with dry-cleaning solvent (item 17, Appx B).

INSPECTION

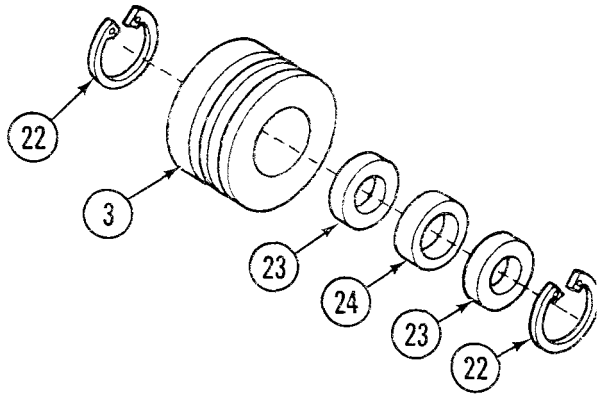
A Inspect all parts for defects.

B Inspect bearings per TM 9-214.

REPAIR

Replace defective parts.

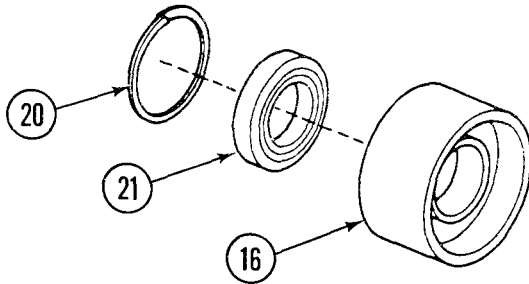
HYDRAULIC CLUTCH REPAIR (CONTINUED)

**ASSEMBLY**

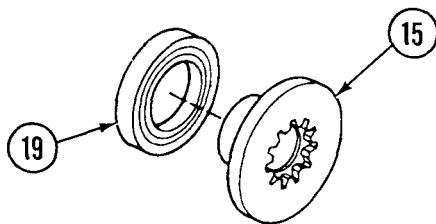
A Install one snapring (22) on pulley (3).

Using a suitable press, press two bearings (23) and spacer (24) into

C Install remaining snapring (22) on pulley (3).

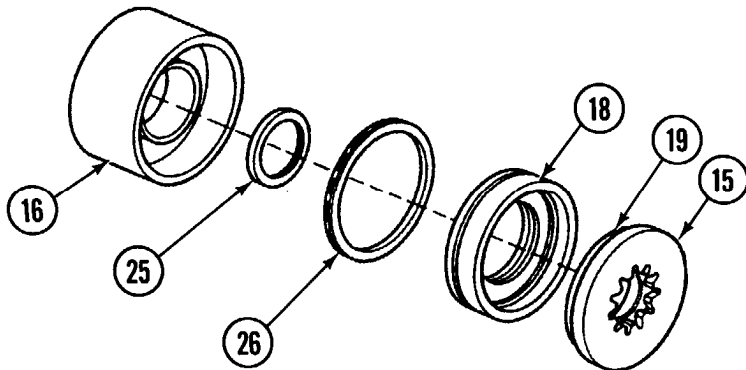


D Press bearing (21) into housing (16) and install retaining ring (20).



E Press bearing (19) onto pressure ring (15).

HYDRAULIC CLUTCH REPAIR (CONTINUED)

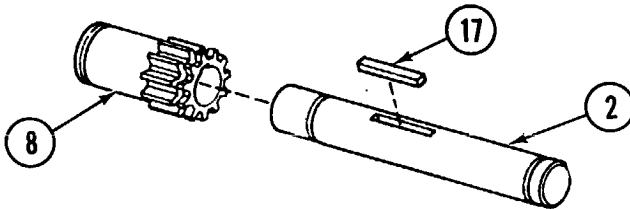


- F Install two new packings (25 and 26) on piston (18).
- G Insert pressure ring (15) and bearing (19) as an assembly, into piston (18).

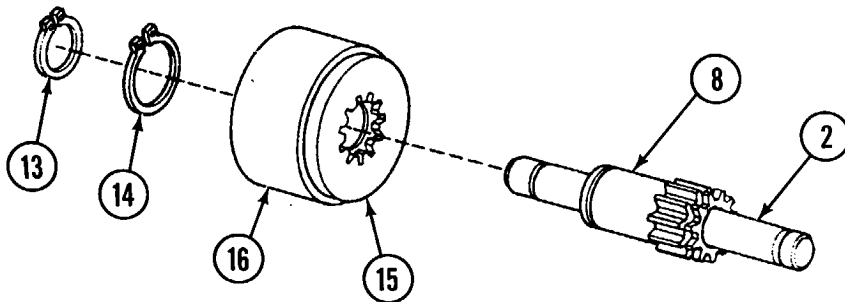
CAUTION

Do not damage packings when installing piston assembly into housing.

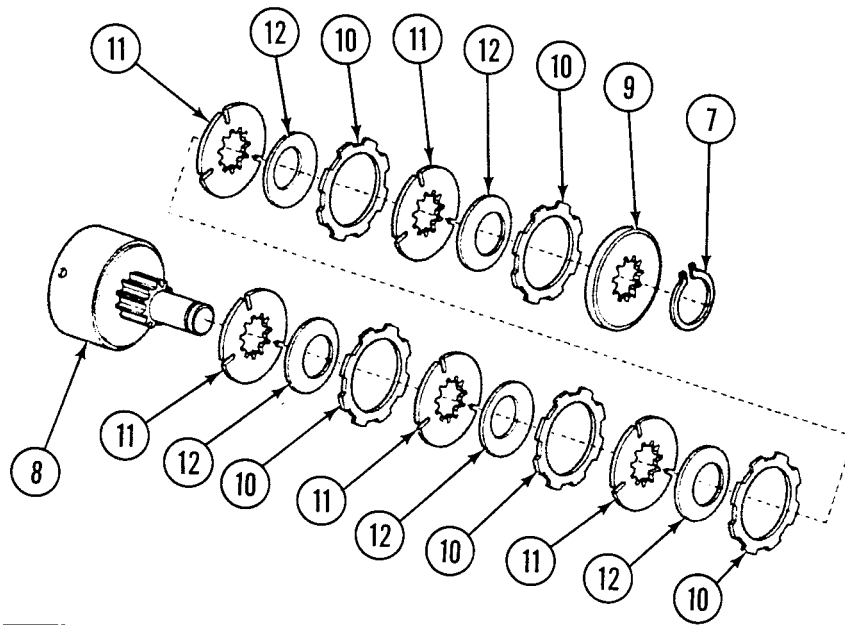
- H Insert piston (18) into housing (16),



- I Insert key (17) into keyway of shaft (2) and press shaft into body (8).

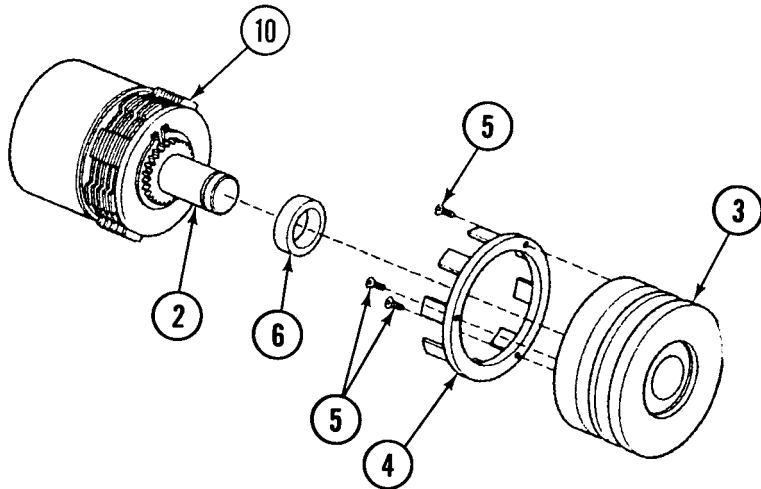


- J Insert assembled body (8) and shaft (2) into housing (16) and pressure ring (15). Tap in with a hammer and a brass drift. Align body (8) with pressure ring (15).
- K Install snapring (14) on body (8).
- L Install snapring (13) on shaft (2).



M Install five inner disks (11), five outer disks (10), and five springs (12) on body (8). Sequence as shown in illustration.

N Install spacer (9) and snapping (7) on body (8).



O Install spacer (6) on shaft (2).

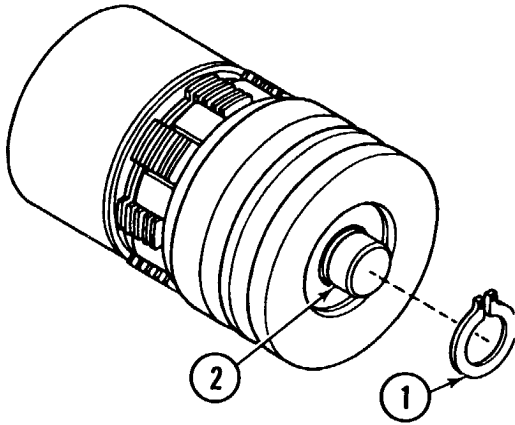
P Install internal flange driving cup (4) on pulley (3) and secure with screws (5). Use adhesive sealant (item 5, Appx B) to lock screws.

CAUTION

Aline tabs of outer disks to engage driving cup flanges properly. As driving cup flange passes each outer disk, stop press and check alinement of next disk.

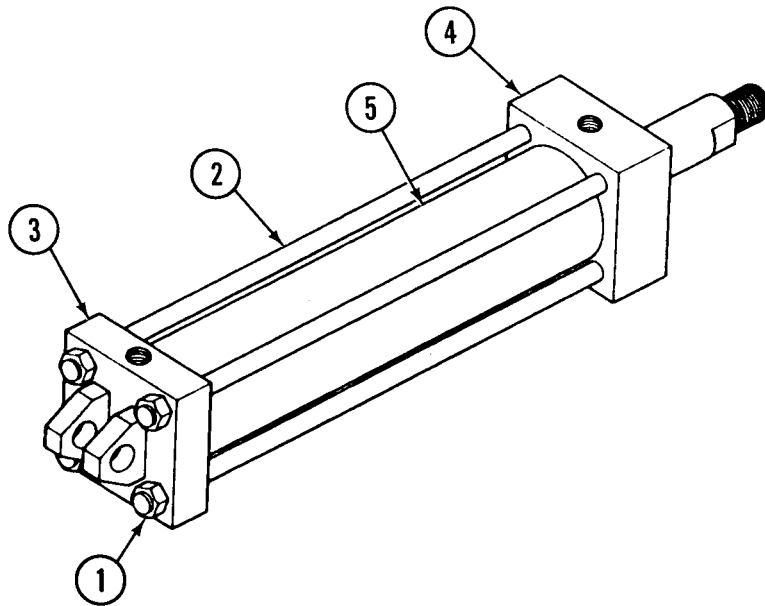
Q Using suitable press, press pulley assembly (3) on shaft (2). Aline outer disks (10) so driving cup (4) flanges will engage tabs of outer disks.

HYDRAULIC CLUTCH REPAIR (CONTINUED)



R Install snapring (1) on shaft (2).

HYDRAULIC ACTUATOR REPAIR

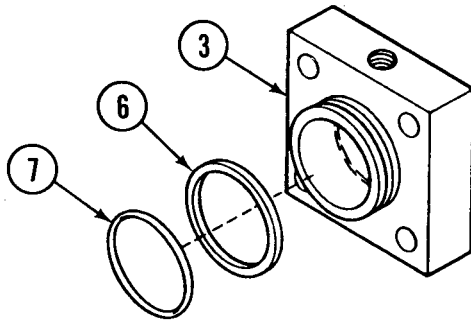
**DISASSEMBLY**

- A Remove four nuts (1).
- B Remove four tie rods (2) from end cap (3) by pulling tie rods (2) through gland (4).

NOTE

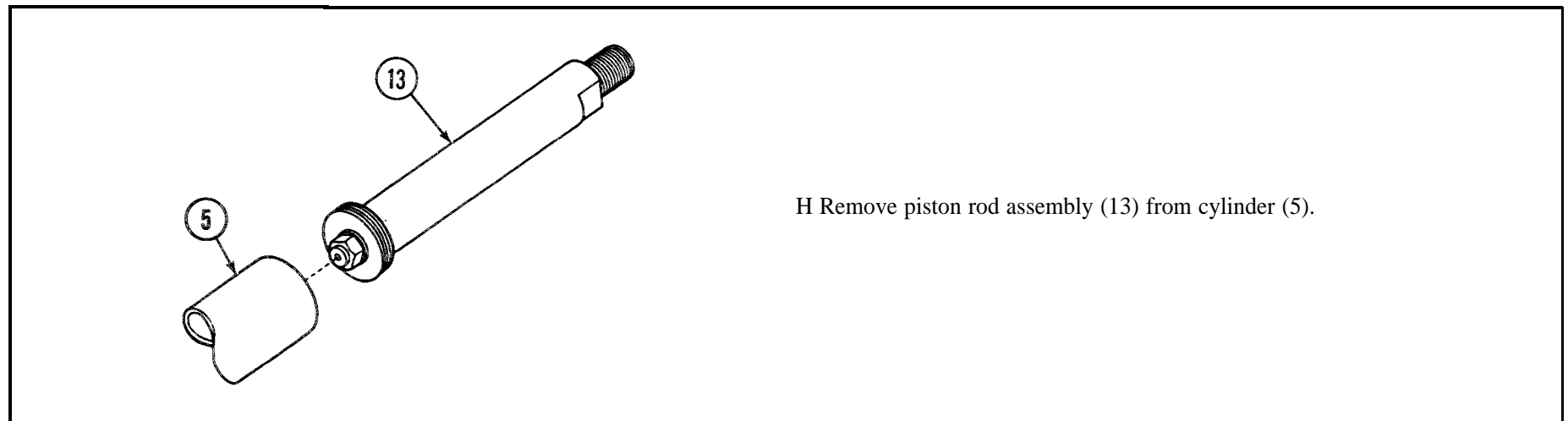
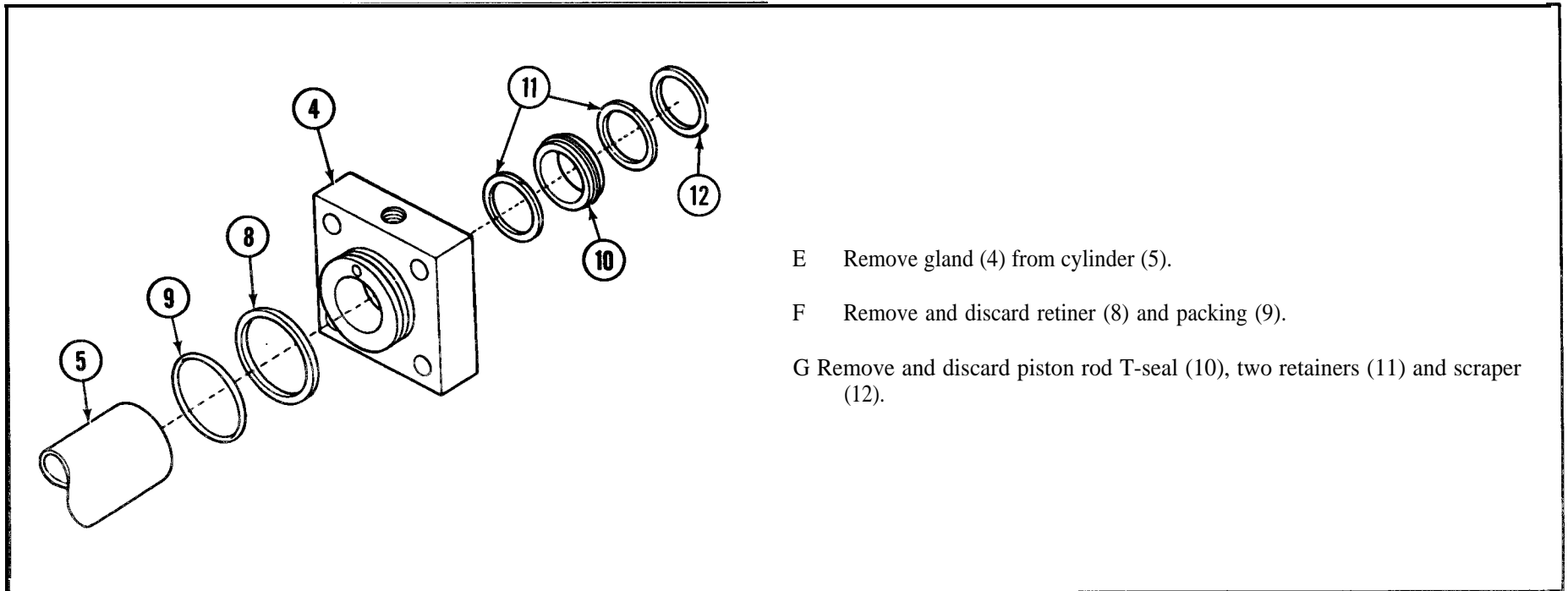
Drain excess oil into suitable container.

- C Remove end cap (3) from cylinder (5).

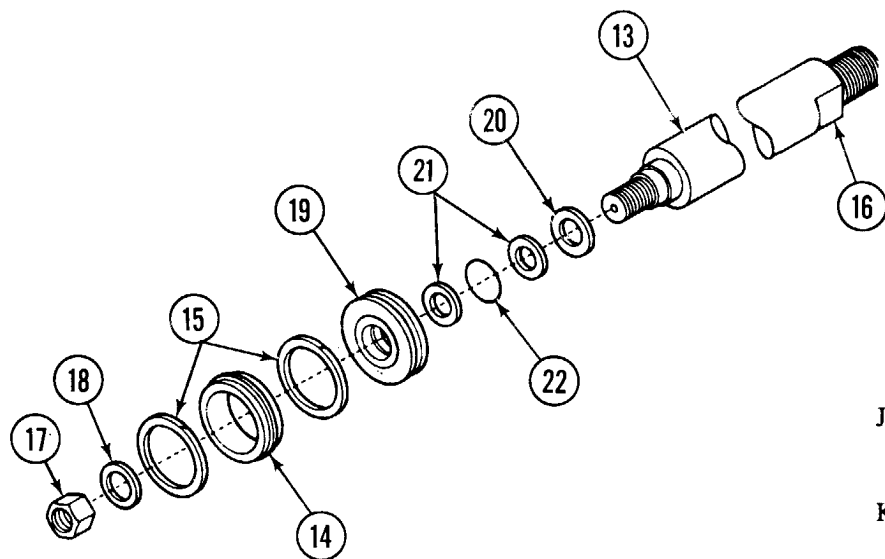


- D Remove and discard retainer (6) and packing (7).

HYDRAULIC ACTUATOR REPAIR (CONTINUED)



HYDRAULIC ACTUATOR REPAIR (CONTINUED)



- I Remove and discard piston T-seal (14) and two retainers (15).

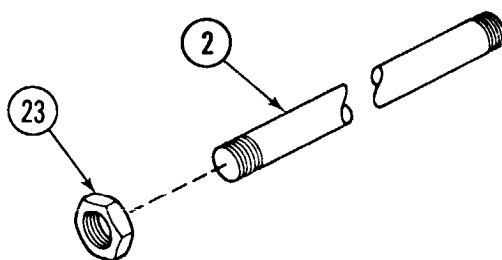
CAUTION

When clamping piston rod in vise, make sure piston threads and finished surfaces of rod are not clamped. Damage to rod or piston could result. Always use shop cloths to protect clamped parts.

NOTE

An assistant is required to restrain rod during nut removal.

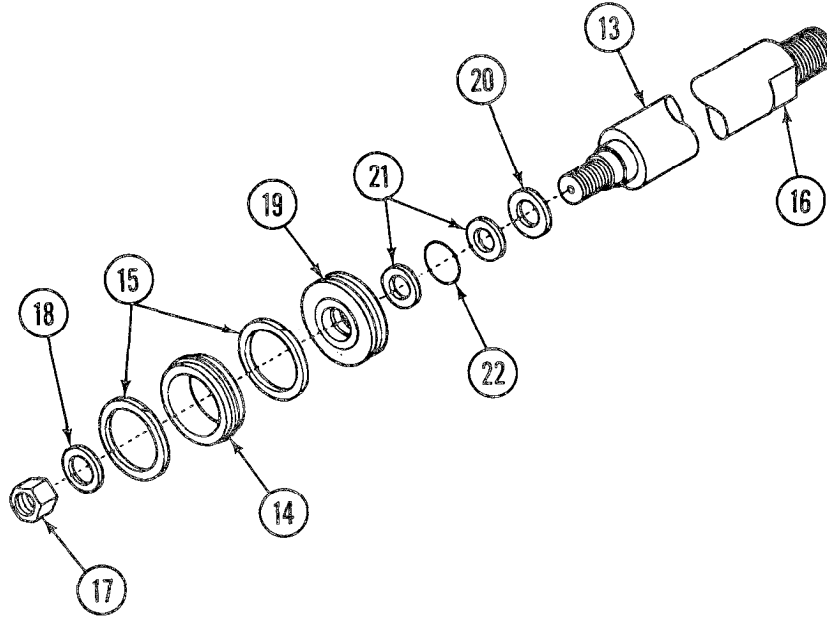
- J Position rod horizontally and clamp flatted end (16) of piston rod (13) in soft-jawed vise. Ensure threaded portion of rod is protected from damage.
- K Remove nut (17), washer (18), piston head (19), and washer (20) from piston rod (13).
- L Remove and discard two retainers (21) and packing (22).

**CAUTION**

When clamping tie rods in vise, do not clamp threaded portions of rods.

- M Place each tie rod in vise. Remove nut (23) from each of four tie rods (2).

HYDRAULIC ACTUATOR REPAIR (CONTINUED)



ASSEMBLY

- A Install new packing (22) and two new retainers (21) on piston rod (13).
- B Install washer (20) on piston rod (13) with chamfer side of washer toward piston head (19).

- C Install piston head (19) on piston rod (13).
- D Install washer (18) on piston rod (13).
- E Coat threads on piston head (19) end of piston rod (13) with grease (item 59, Appx B).

CAUTION

When clamping piston rod in vise, make sure threads, piston and finished surfaces of rod are not clamped. Damage to rod or piston could result. Always use shop cloths to protect clamped parts.

NOTE

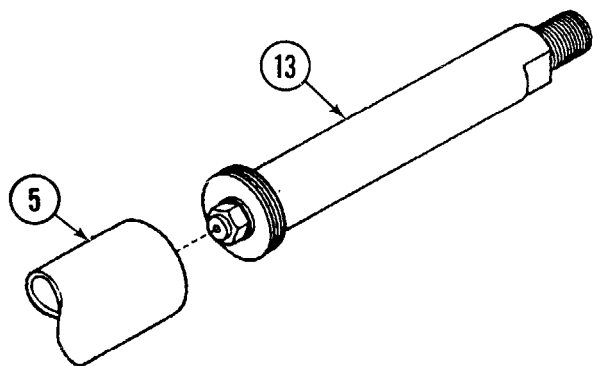
An assistant is required to restrain rod during nut installation.

- F Clamp flatted end (16) of piston rod (13) in vise. Ensure threaded portion of rod is protected from damage. Install nut (17) on piston rod.

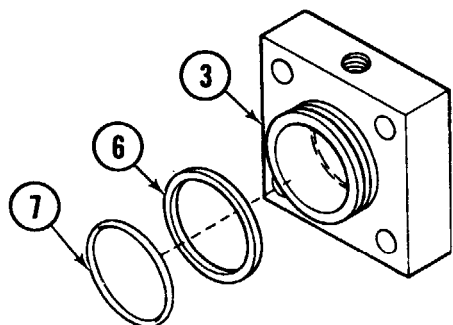
NOTE

Make sure washer (18) is flat against recess in piston head (19).

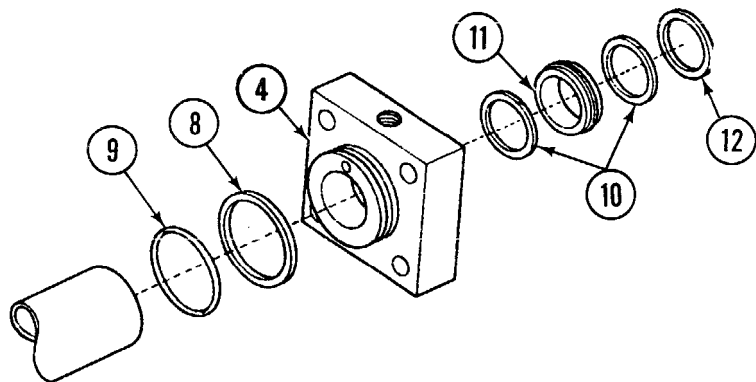
- G Torque nut (17) to 250-280 lb-ft.
- H Install new piston T-seal (14) and two retainers (15) in piston.



- I Lightly lubricate piston rod assembly (13) with hydraulic fluid and install in cylinder (5).

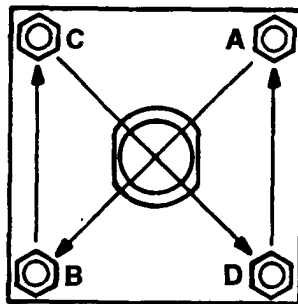
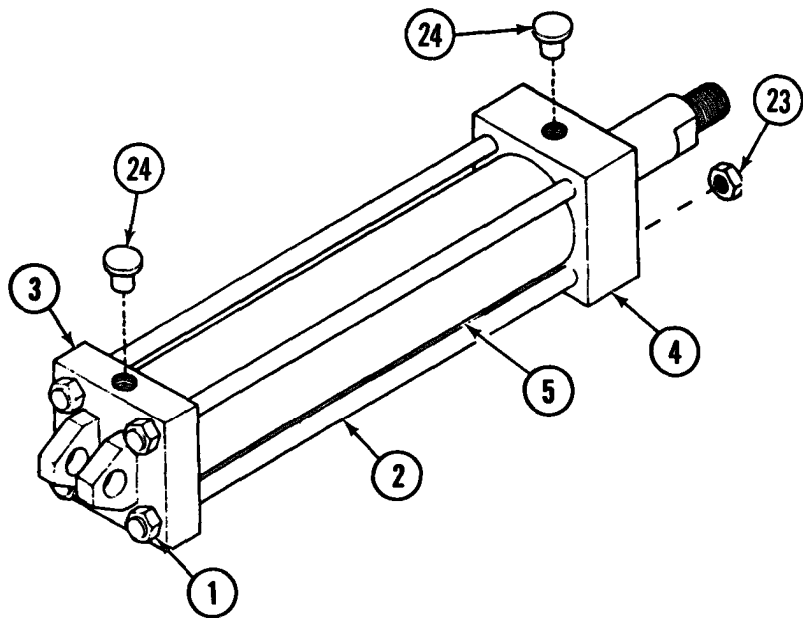


- J Install new packing (7) and new retainer (6) on end cap (3).



- K Install new scraper (12), new T-seal (10), and two retainers (11) in gland (4).
L Install new packing (9) and new retainer (8) in gland (4).

HYDRAULIC ACTUATOR REPAIR (CONTINUED)



- M Lightly lubricate end cap seals and gland seals with hydraulic fluid. Install end cap (3) and gland (4) on cylinder (5).
- N Install four tie rods (2) through gland (4) and end cap (3).
- O Install four nuts (1) on cap-end of four tie rods (2).
- P Install four nuts (23) on gland end of tie rods. Torque four gland-end nuts evenly in a cross pattern style (see illustration for sequence) as follows:
1. Torque all four bolts to 5 lb-ft on first cycle.
 2. Torque all bolts to 20 lb-ft on second cycle.
 3. Torque all bolts to 40 lb-ft on third cycle.
 4. Finally, torque all bolts to 60-64 lb-ft on fourth cycle.

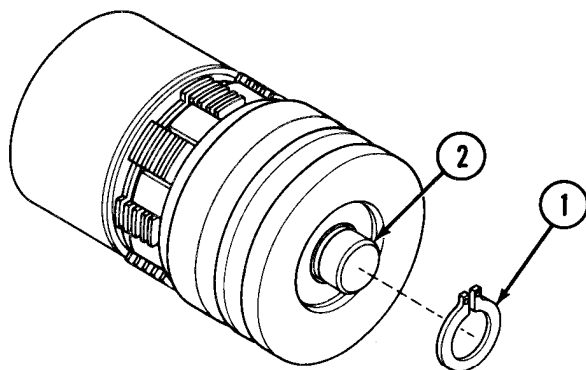
NOTE

If actuator is to be shipped or stored, coat non-painted areas with corrosion preventive (item 60, Appx B).

Q Install caps (24) in each fluid port.

Section II HYDRAULIC CLUTCH

HYDRAULIC CLUTCH REPAIR

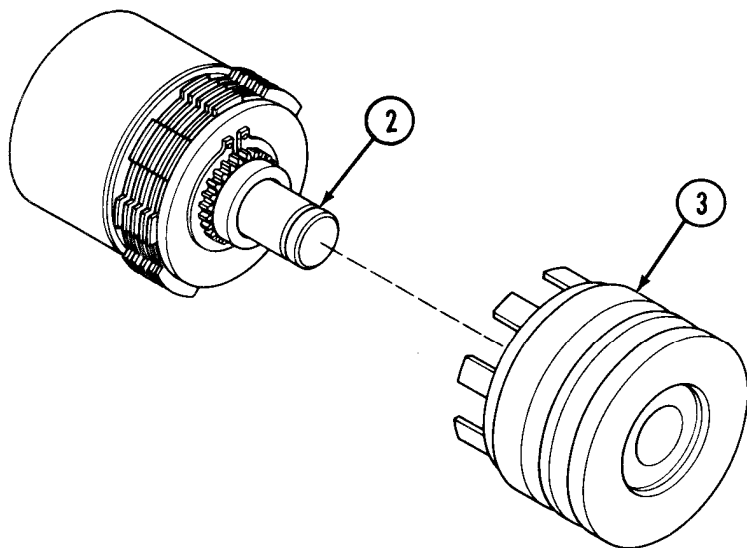


NOTE

Repair of hydraulic clutch is direct support maintenance.

DISASSEMBLY

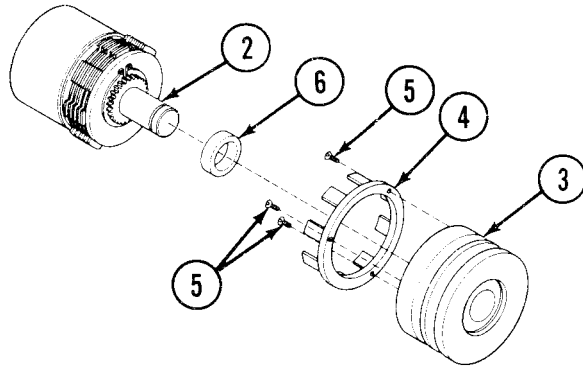
A Remove snapring (1) from shaft (2).



B Remove pulley (3) from shaft (2) by tapping out with a hammer and a brass drift if necessary.

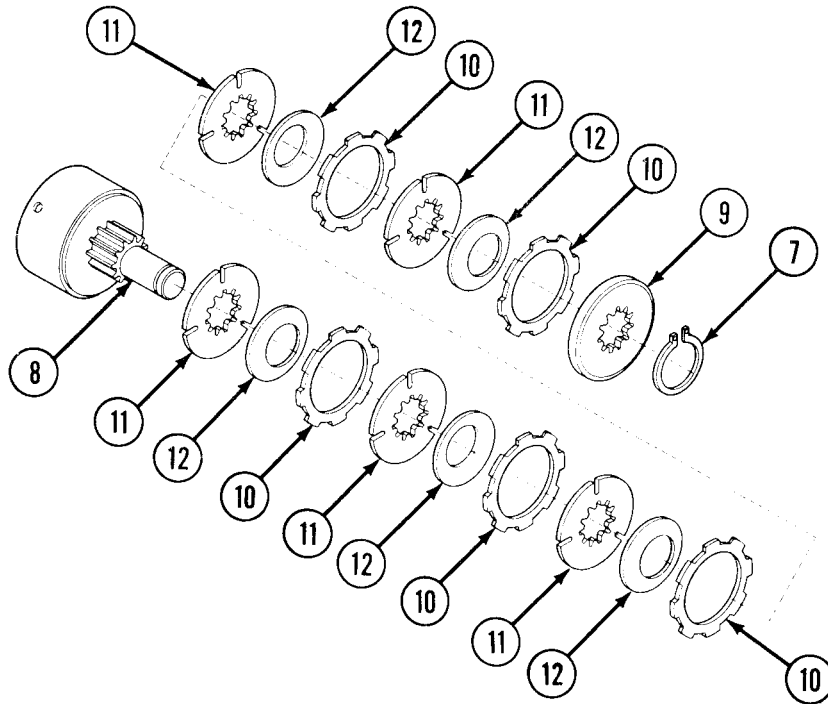
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HYDRAULIC CLUTCH REPAIR (CONTINUED)



C Remove internal flange driving cup (4) from pulley (3) by removing three screws (5) and tapping off with a hammer and a brass drift.

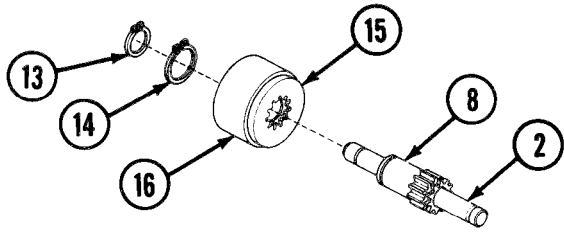
D Remove spacer (6) from shaft (2).



E Remove snapping (7) from body (8).

F Remove spacer (9), five outer disks (10), five inner disks (11) and five springs (12).

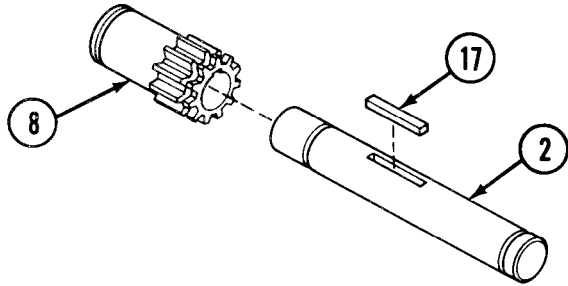
HYDRAULIC CLUTCH REPAIR (CONTINUED)



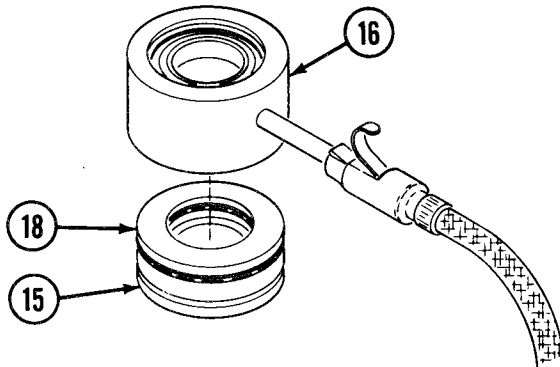
G Remove snapring (13) from shaft (2).

H Remove snapring (14) from body (8).

I Remove assembled shaft (2) and body (8) from pressure ring (15) and housing (16) by tapping out with a hammer and a brass drift if necessary.



J Separate shaft (2) from body (8) with press. Remove key (17).

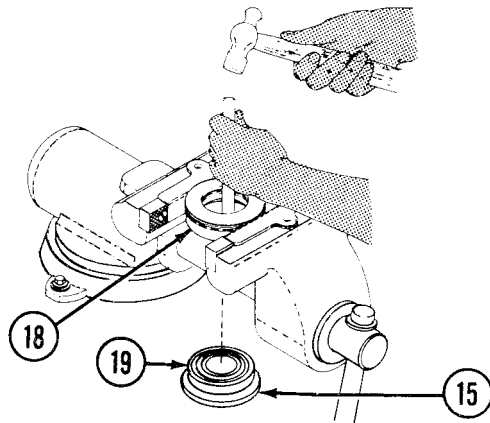


WARNING

Compressed air used for cleaning purposes will not exceed 30 psi. Use only with effective chip guarding and personal protective equipment (goggles, shield, gloves, etc.).

K Place housing (16) with pressure ring (15) face down. Use a compressed air source to apply low pressure through inlet port of housing (16). Remove assembled pressure ring (15) and piston (18) from housing (16).

HYDRAULIC CLUTCH REPAIR (CONTINUED)

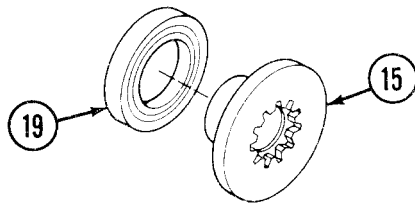
**CAUTION**

When placing piston (18) in vise, DO NOT OVERTIGHTEN vise. Use soft vise inserts and rags to protect piston. Grip piston only enough to prevent piston from slipping. Do not nick or distort piston.

NOTE

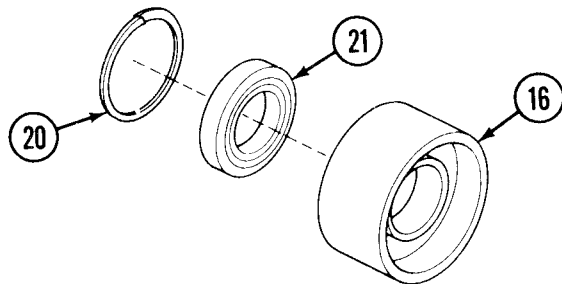
Make sure pressure ring is not clamped by vise.

- L Secure piston (18) in a vise, and use a brass drift to gently tap assembled pressure ring (15) and bearing (19) from piston (18).

**CAUTION**

DO NOT remove bearing unless replacing with new bearing. Removal will destroy bearing.

- M Pry bearing (19) from pressure ring (15).



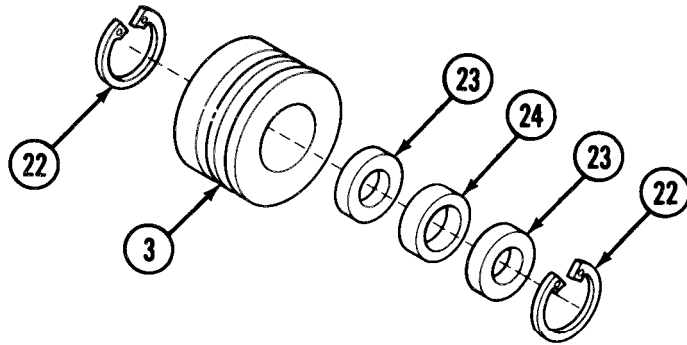
- N Remove retaining ring (20) from piston housing (16).

NOTE

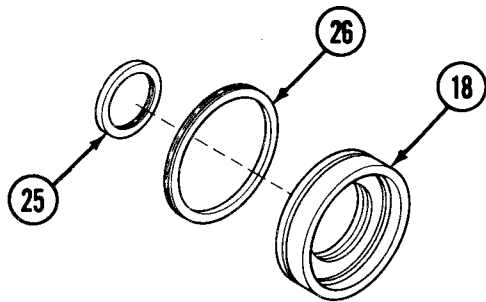
Tap bearing from inside of housing.

- O Use a brass drift to tap bearing (21) from housing (16).

HYDRAULIC CLUTCH REPAIR (CONTINUED)



P Remove two snaprings (22) and press out two bearings (23) and spacer (24) from pulley (3).



Q Remove packings (25 and 26) from piston (18).

CLEANING

Clean inner and outer disks with dry-cleaning solvent (item 17, Appx B).

INSPECTION

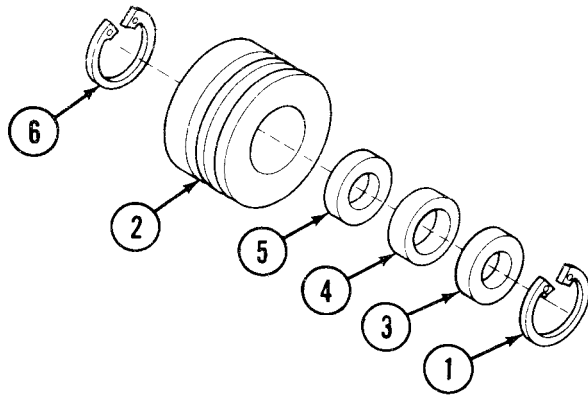
A Inspect all parts for defects.

B Inspect bearings per TM 9-214.

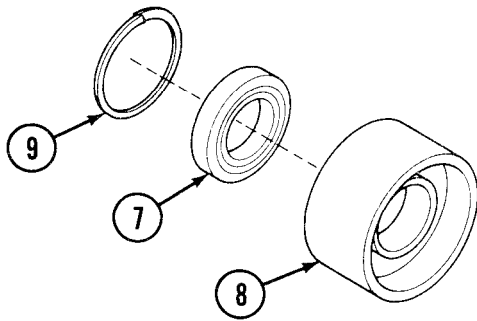
REPAIR

Replace defective parts.

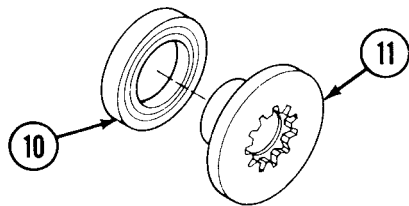
HYDRAULIC CLUTCH REPAIR (CONTINUED)

**ASSEMBLY**

- A Install snapring (1) in pulley (2).
- B Using a suitable press, press bearing (3) into pulley (2).
- C Press spacer (4) into pulley (2).
- D Press bearing (5) into pulley (2), and install snapring (6).

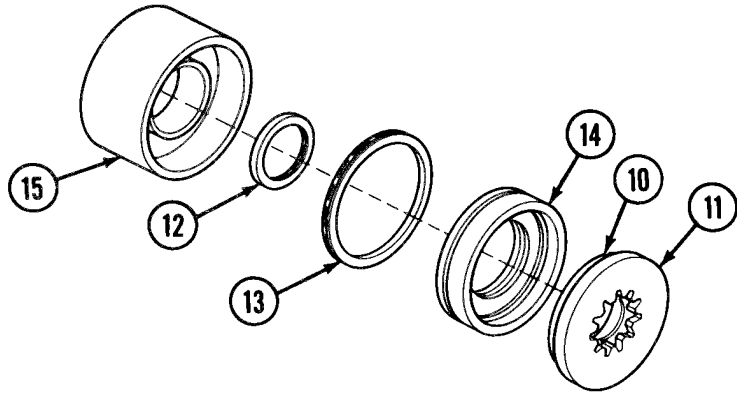


- E Press bearing (7) into housing (8), and install retaining ring (9).



- F Press bearing (10) onto pressure ring (11).

HYDRAULIC CLUTCH REPAIR (CONTINUED)



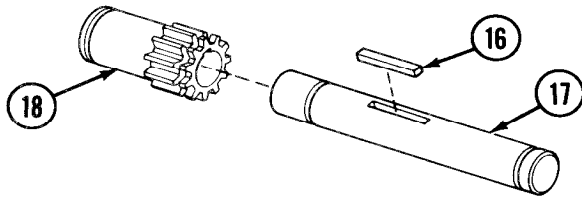
G Install two new packings (12 and 13) on piston (14).

H Insert pressure ring (11) and bearing (10) as an assembly, into piston (14).

CAUTION

Do not damage packings when installing piston assembly into housing.

I Insert piston (14) into housing (15).



J Insert key (16) into keyway of shaft (17) and press shaft into body (18).

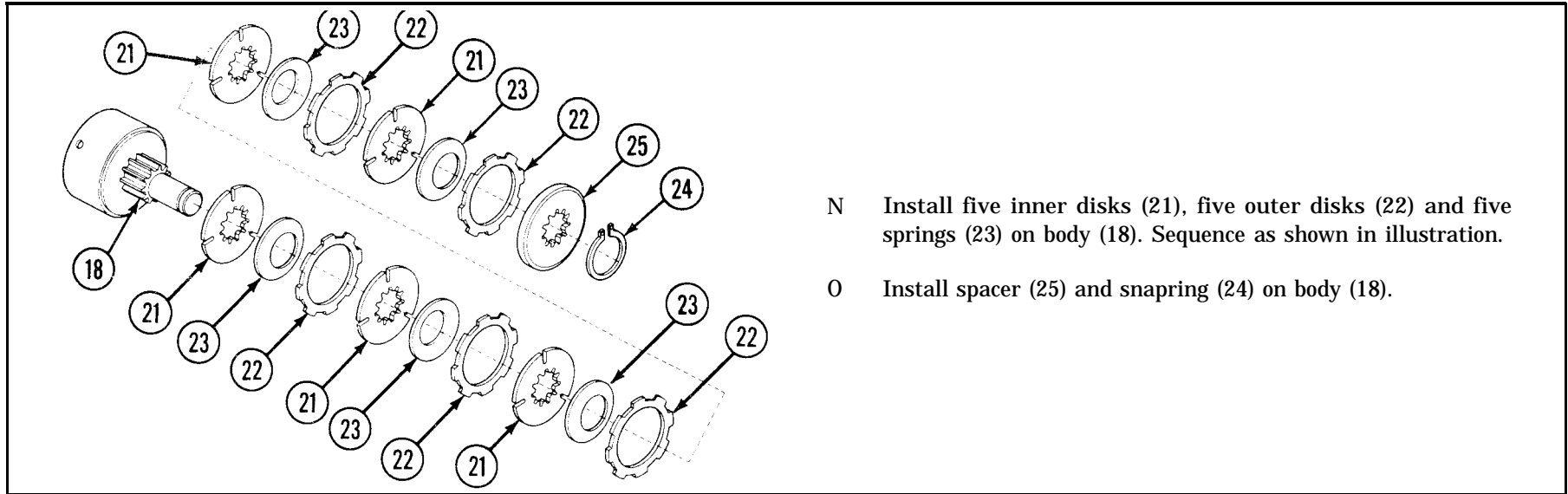
K Insert assembled body (18) and shaft (17) into housing (15) and pressure ring (11). Tap in with a hammer and a brass drift. Aline body (18) with pressure ring (11).

L Install snapping (19) on body (18).

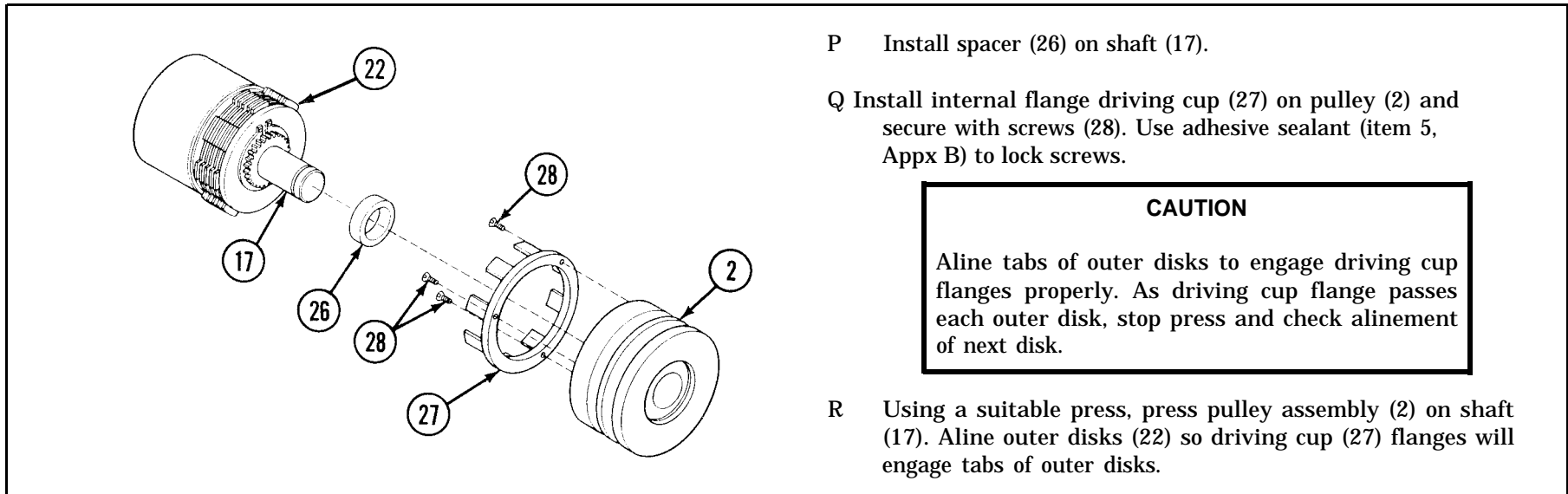
M Install snapping (20) on shaft (17).

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HYDRAULIC CLUTCH REPAIR (CONTINUED)



- N Install five inner disks (21), five outer disks (22) and five springs (23) on body (18). Sequence as shown in illustration.
- O Install spacer (25) and snapping (24) on body (18).



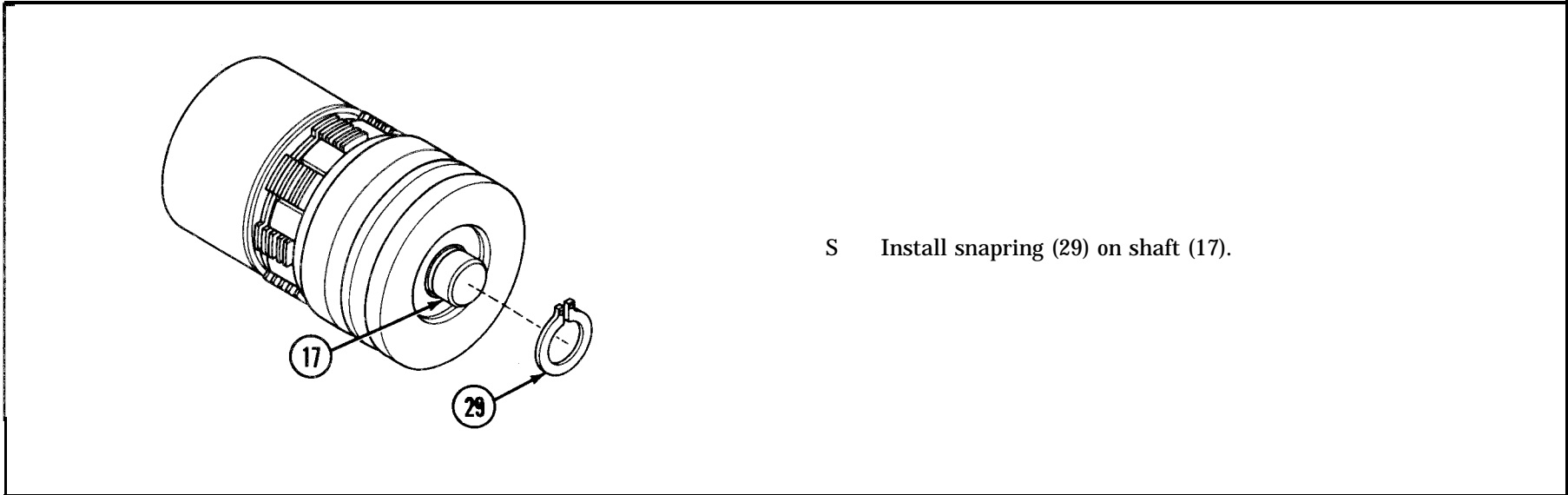
- P Install spacer (26) on shaft (17).
- Q Install internal flange driving cup (27) on pulley (2) and secure with screws (28). Use adhesive sealant (item 5, Appx B) to lock screws.

CAUTION

Aline tabs of outer disks to engage driving cup flanges properly. As driving cup flange passes each outer disk, stop press and check alinement of next disk.

- R Using a suitable press, press pulley assembly (2) on shaft (17). Aline outer disks (22) so driving cup (27) flanges will engage tabs of outer disks.

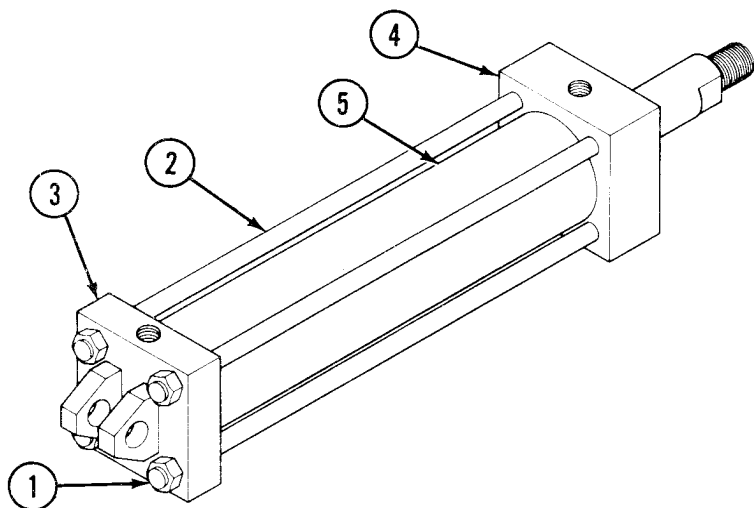
HYDRAULIC CLUTCH REPAIR (CONTINUED)



S Install snapring (29) on shaft (17).

Section III HYDRAULIC ACTUATOR

HYDRAULIC ACTUATOR REPAIR

**NOTE**

Repair of hydraulic actuator is direct support maintenance.

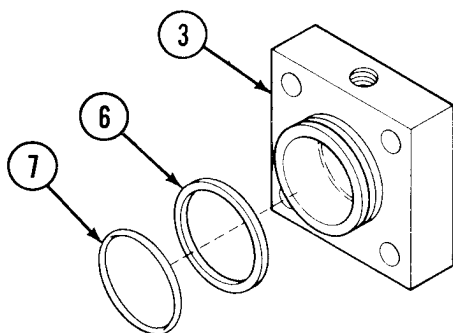
DISASSEMBLY

- A Remove four nuts (1).
- B Remove four tie rods (2) from end cap (3) by pulling tie rods (2) through gland (4).

NOTE

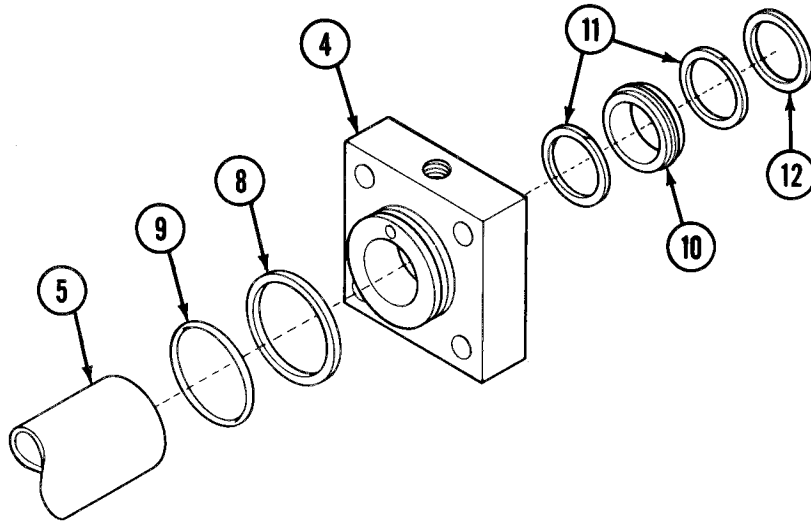
Drain excess oil into suitable container.

- C Remove end cap (3) from cylinder (5).



- D Remove and discard retainer (6) and packing (7).

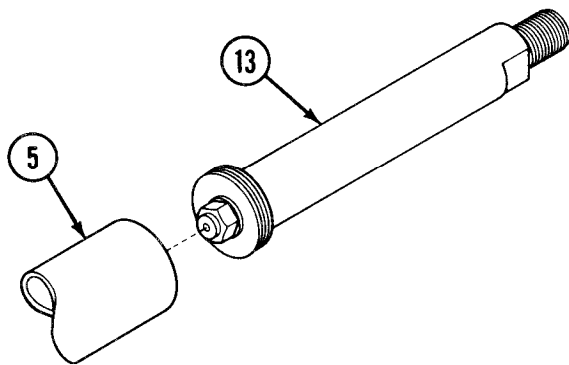
HYDRAULIC ACTUATOR REPAIR (CONTINUED)



E Remove gland (4) from cylinder (5).

F Remove and discard retainer (8) and packing (9).

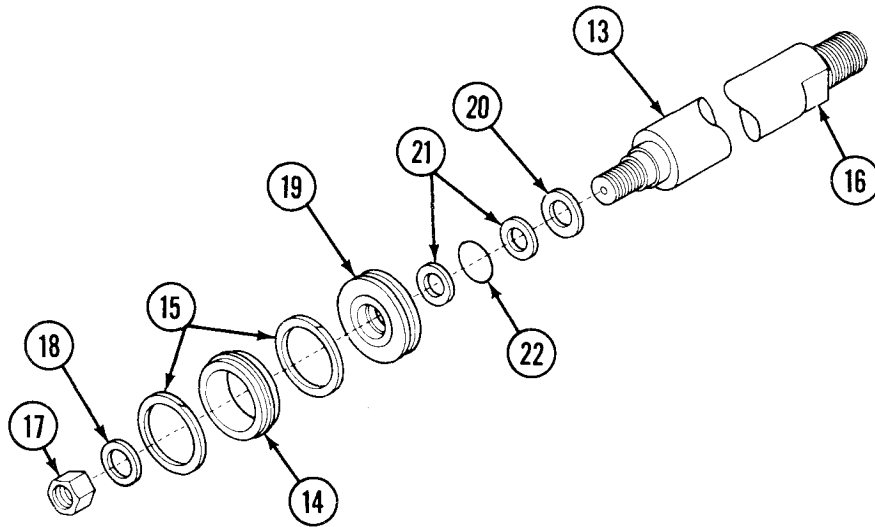
G Remove and discard piston rod T-seal (10), two retainers (11) and scraper (12).



H Remove piston rod assembly (13) from cylinder (5).

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HYDRAULIC ACTUATOR REPAIR (CONTINUED)



- I Remove and discard piston T-seal (14) and two retainers (15).

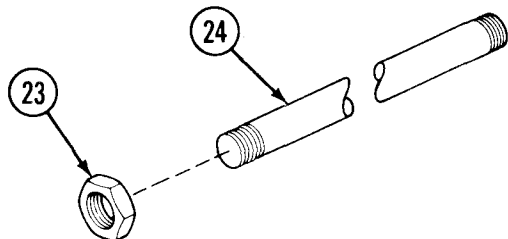
CAUTION

When clamping piston rod in vise, make sure piston threads and finished surfaces of rod are not clamped. Damage to rod or piston could result. Always use shop cloths to protect clamped parts.

NOTE

An assistant is required to restrain rod during nut removal.

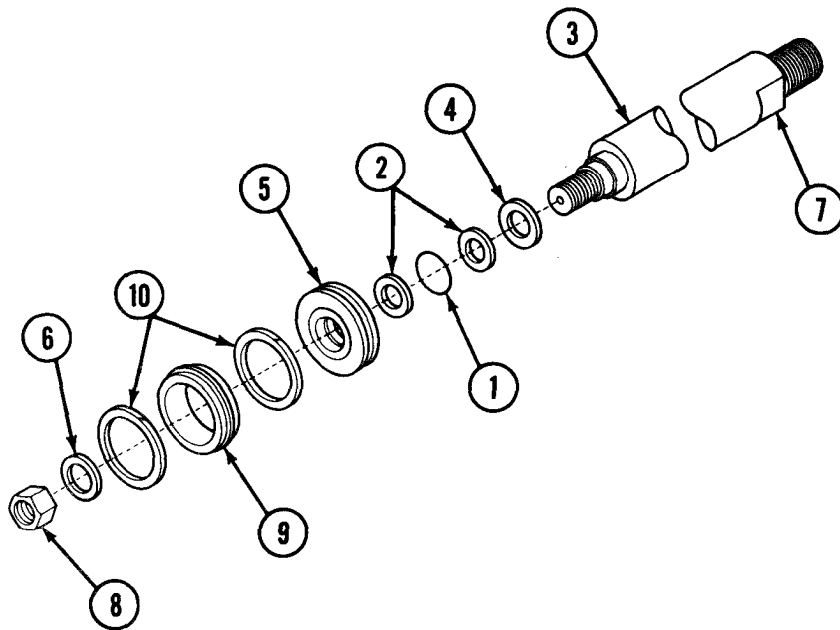
- J Position rod horizontally and clamp flatted end (16) of piston rod (13) in soft-jawed vise. Ensure threaded portion of rod is protected from damage.
- K Remove nut (17), washer (18), piston head (19) and washer (20) from piston rod (13).
- L Remove and discard two retainers (21) and packing (22).

**CAUTION**

When clamping tie rods in vise, do not clamp threaded portions of rods.

- M Place each tie rod in vise. Remove nut (23) from each of four tie rods (24).

HYDRAULIC ACTUATOR REPAIR (CONTINUED)



ASSEMBLY

- A Install new packing (1) and two new retainers (2) on piston rod (3).
- B Install washer (4) on piston rod (3) with chamfer side of washer (4) toward piston head (5).

C Install piston head (5) on piston rod (3).

D Install washer (6) on piston rod (3).

E Coat threads on piston head (5) end of piston rod (3) with grease (item 59, Appx B).

CAUTION

When clamping piston rod in vise, make sure threads, piston and finished surface of rod are not clamped. Damage to rod or piston could result. Always use shop cloths to protect clamped parts.

NOTE

An assistant is required to restrain piston rod during nut installation.

F Clamp flatted end (7) of piston rod (3) in vise. Ensure threaded portion of rod is protected from damage. Install nut (8) on piston rod (3).

NOTE

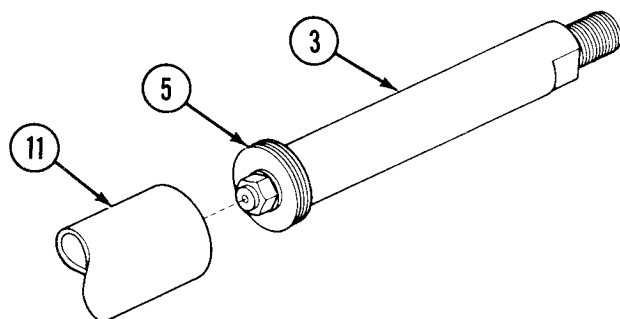
Make sure washer (6) is flat against recess in piston head (5).

G Torque nut (8) to 250-280 lb-ft.

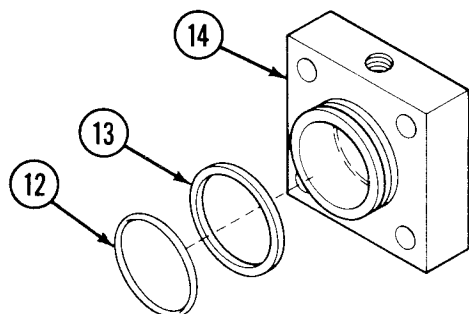
H Install new piston T-seal (9) and two retainers (10) in piston (5).

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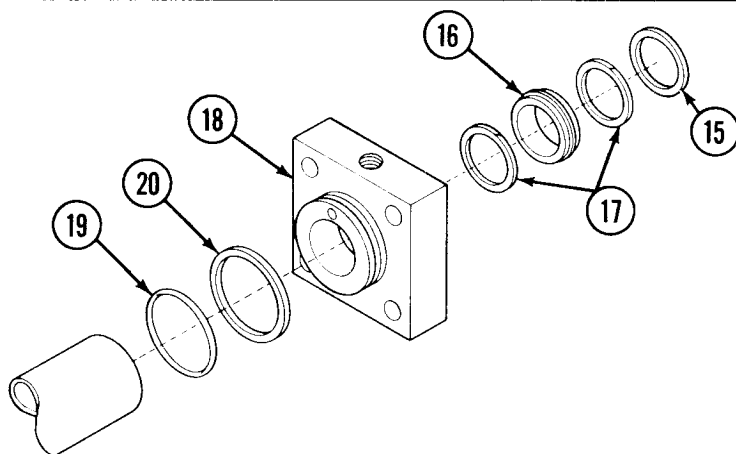
HYDRAULIC ACTUATOR REPAIR (CONTINUED)



- I Lightly lubricate piston (5) and T-seal with hydraulic fluid. Install piston (5) and piston rod (3) in cylinder (11).

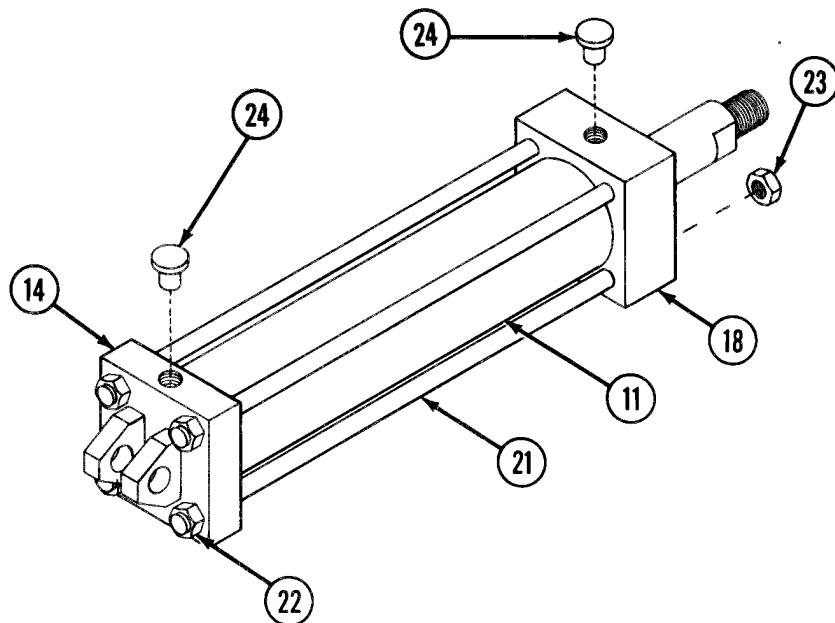


- J Install new packing (12) and new retainer (13) on end cap (14).



- K Install new scraper (15), new T-seal (16) and two retainers (17) in gland (18).
- L Install new packing (19) and new retainer (20) in gland (18).

HYDRAULIC ACTUATOR REPAIR (CONTINUED)



Lightly lubricate end cap seals and gland seals with hydraulic fluid. Install end cap (14) and gland (18) on cylinder (11).

Install four tie rods (21) through gland (18) and end cap (14).

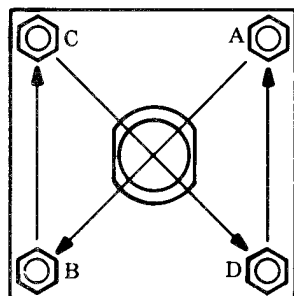
Install four nuts (22) on cap-end of four tie rods (21).

Install four nuts (23) on gland end of tie rods. Torque four gland-end nuts evenly in a cross pattern style (see illustration for sequence) as follows:

1. Tighten all four bolts to 5 lb-ft on first cycle.
2. Tighten all bolts to 20 lb-ft on second cycle.
3. Tighten all bolts to 40 lb-ft on third cycle.
4. Finally, tighten all bolts to 60-64 lb-ft on fourth cycle.

NOTE

If actuator is to be shipped or stored, coat non-painted areas with corrosion preventive (item 60, Appx B).



Q Install caps (24) in each fluid port.

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CHAPTER 12
MAINTENANCE PROCEDURES
AUXILIARY POWER UNIT (APU)

CHAPTER OVERVIEW

This chapter illustrates and describes repair procedures for:

- Section I APU Starter/Generator Brushes
- Section II APU Chain Cover
- Section III APU Gear Case

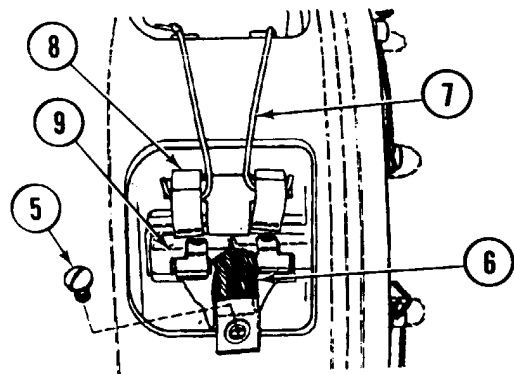
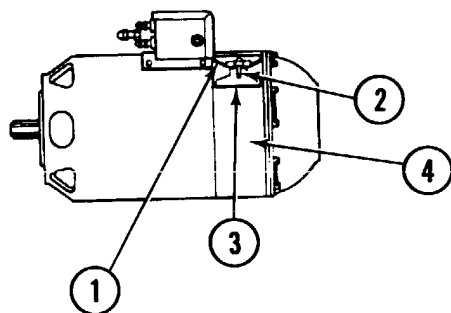
Section I APU STARTER/GENERATOR BRUSHES

APU STARTER/GENERATOR BRUSHES: REPAIR

INITIAL SETUP

Materials/Parts

Sandpaper (item 47, Appx B)



NOTE

These procedures apply to both brushes in any one of six brush sets.

Note position of dust cover band before removal to ensure proper installation.

REMOVAL

A Remove and discard lockwire (1).

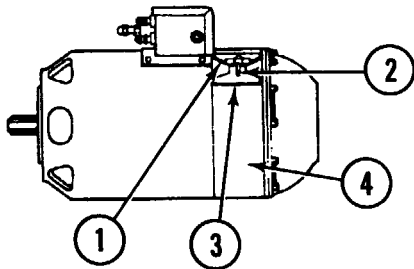
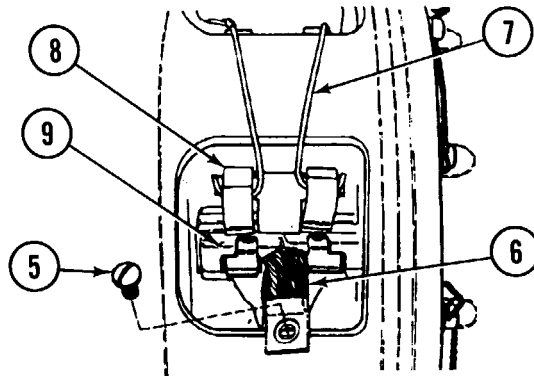
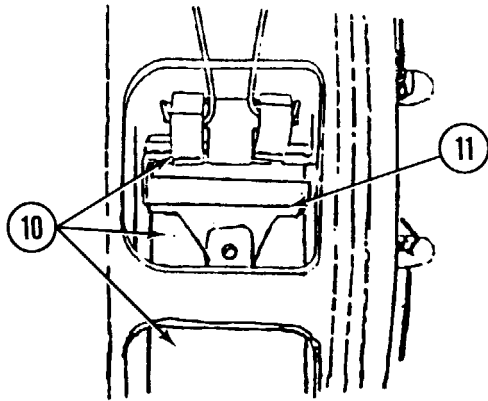
B Remove guard band latch screw (2), push back dust cover band (3) and remove brush guard (4).

C Remove screw (5) and lead wire (6).

NOTE

A screwdriver or stiff piece of wire bent into shape of a hook (7) maybe used in step D.

D Carefully pull or pry brush retainer springs (8) up far enough to clear brushes (9) and remove brushes (9).

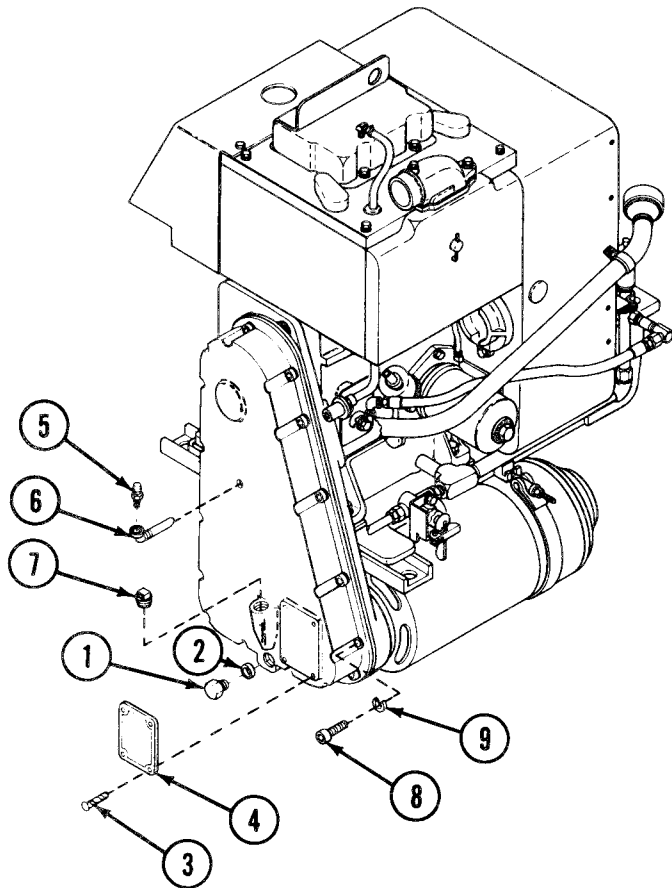
APU STARTER/GENERATOR BRUSHES: REPAIR (CONTINUED)**REPAIR**

- A Insert sandpaper (10) (item 47, Appx B) under brush holder (11) and rotate armature.
- B Remove sandpaper (10) and clean residue.

INSTALLATION

- A Install brushes (9) into brush holder (11) and check position.
- B Install lead wire (6) with screw (5).
- C Remove stiff wire (7) and release retainer springs (8).
- D Install brush guard (4) and properly position dust cover band (3).
- E Secure dust cover band (3) with screw (2) and new lockwire (1).

Section II APU CHAIN COVER



NOTE

Repair of APU chain cover is direct support maintenance.

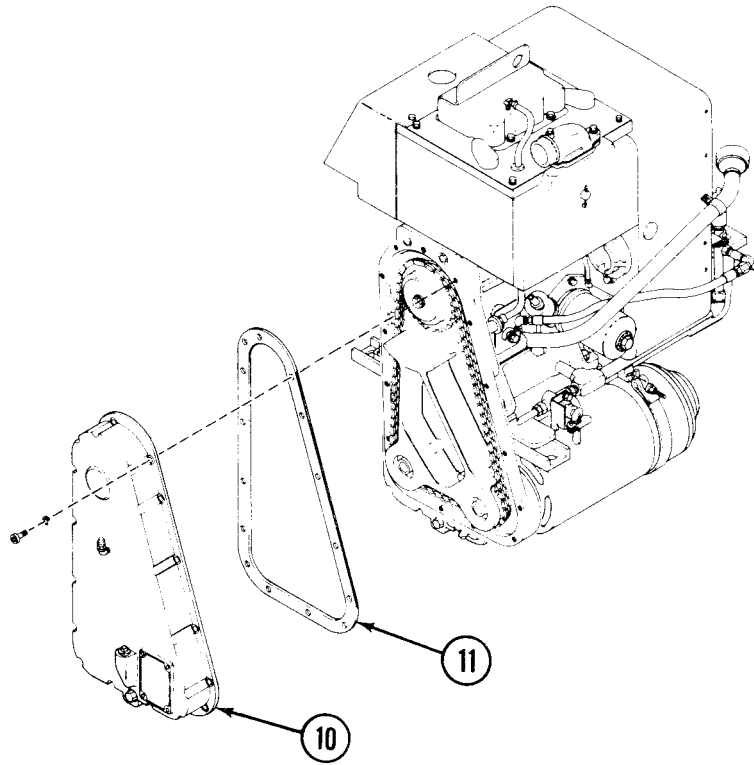
REMOVAL

- A Place container under drain plug (1).
- B Remove drain plug (1) and gasket (2).
- C Drain and discard gear case oil.

NOTE

Omit steps D-F if not replacing cover.

- D Remove four screws (3) and data plate (4).
- E Remove breather (5) and elbow (6).
- F Remove fill plug (7).
- G Remove 15 screws (8) and 15 lockwashers (9).

APU CHAIN COVER REPAIR (CONTINUED)**NOTE**

Tap chain cover (10) with plastic hammer to aid in removal.

- H Remove chain cover (10) and gasket (11).
- I Discard gasket (11).

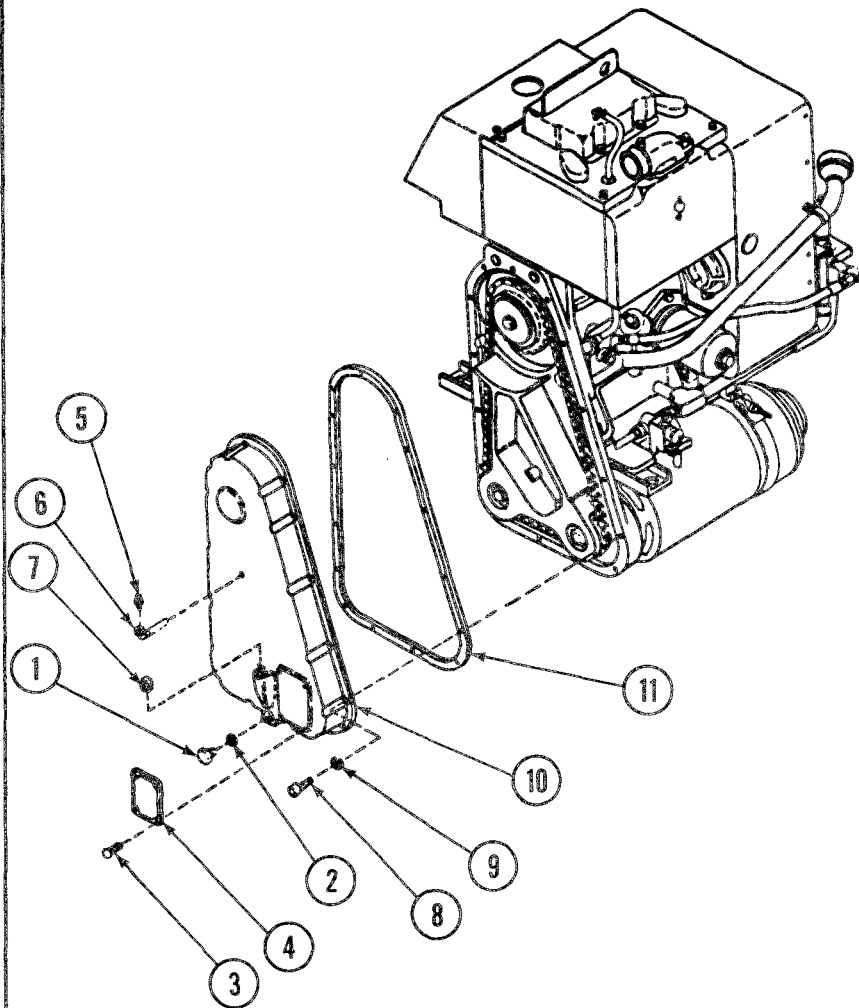
INSPECTION

- A Inspect for stripped or crossed threads.
- B Inspect cover for cracks or damage to gasket mating surface.

REPAIR

Replace damaged parts as necessary.

APU CHAIN COVER REPAIR (CONTINUED)



INSTALLATION

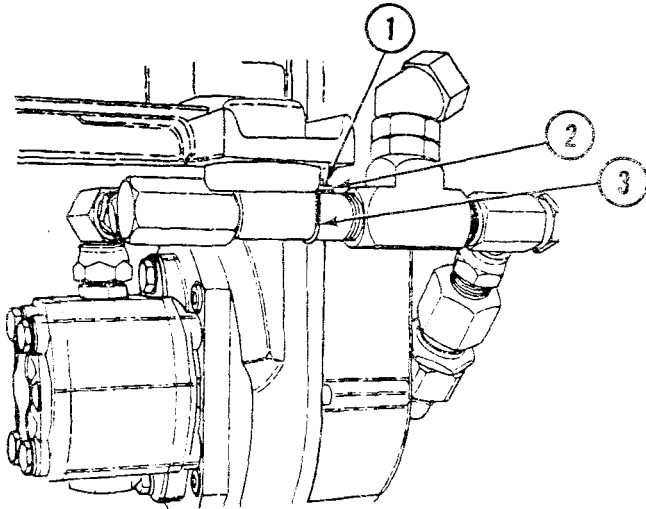
- A Coat new gasket (11), gasket mating surface of chain cover (10), and screw (8) threads with adhesive sealant (item 4, Appx B).
- B Install chain cover (10) and new gasket (11) with 15 screws and 15 new lockwashers (9).

NOTE

Omit steps C and F if not replacing cover.

- C Install data plate (4) with four screws (3).
- D Apply sealant compound (item 48, Appx B) to threads on drain plug (1), breather elbow (6), and breather (5).
- E Install drain plug (1) and new gasket (2).
- F Install breather elbow (6) and breather (5).
- G Fill gear case with oil (LO 9-2350-267-12) and install fill plug (7).

APU GEAR CASE: DISASSEMBLY, INSPECTION, REPAIR AND ASSEMBLY

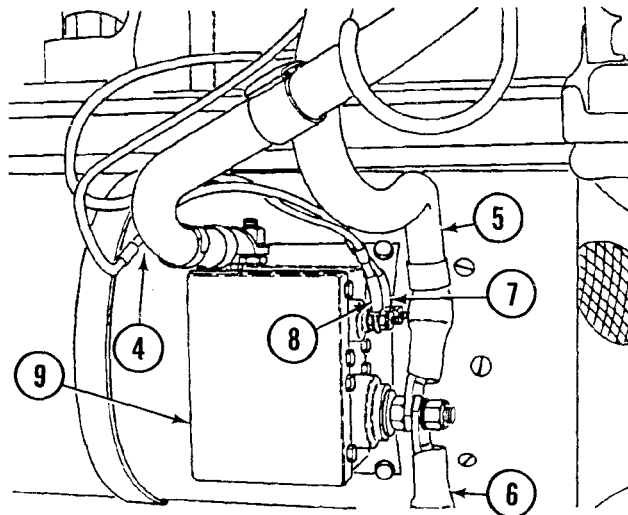
**DISASSEMBLY**

- A Drain oil from gear case and remove chain cover (p 12-4)

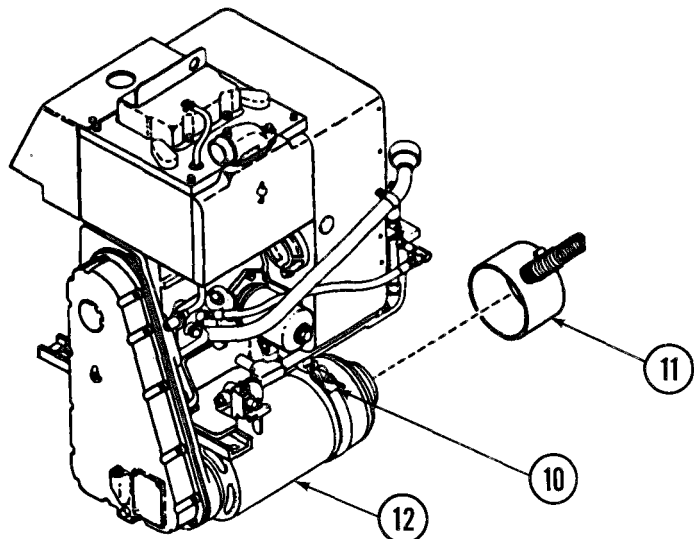
NOTE

Record cable number and connection points before disconnecting cables.

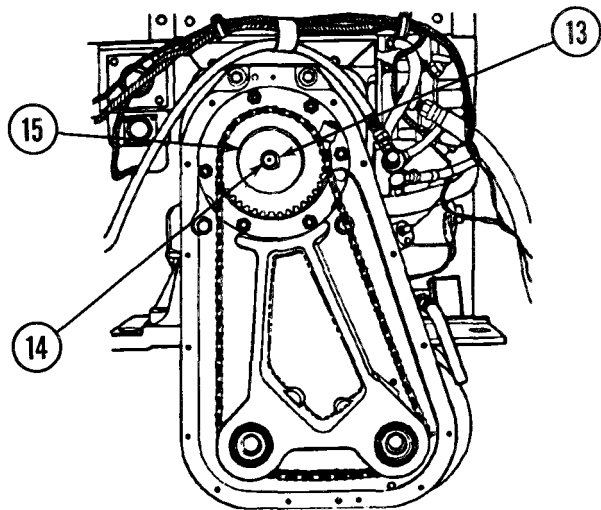
- E Remove two nuts (1), two lockwashers (2), and U-clamp (3) that secure hydraulic outlet fittings to engine. Discard lockwashers.
- C Disconnect three electrical cables (4, 5 and 6) and two electrical leads (7 and 8) from generator terminal box (9).



APU GEAR CASE: DISASSEMBLY, INSPECTION, REPAIR AND ASSEMBLY (CONTINUED)



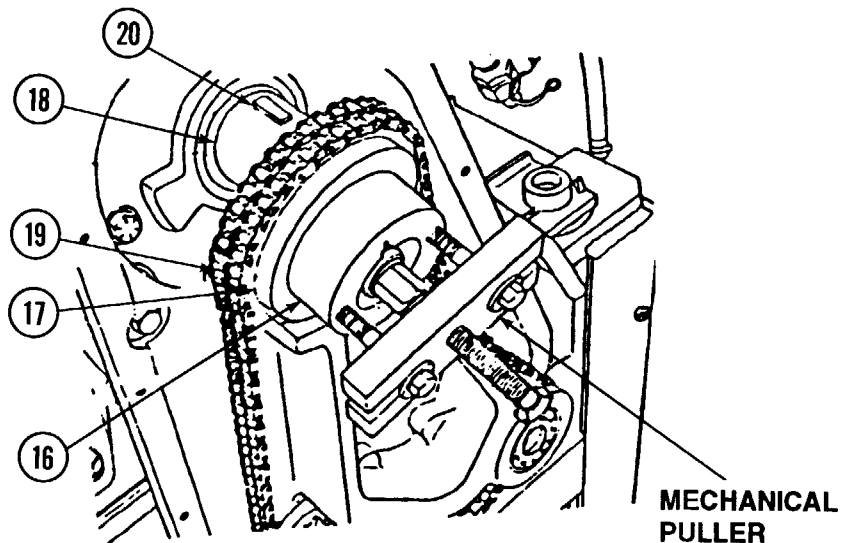
D Release strap (10) and remove air duct (11) from generator (12).



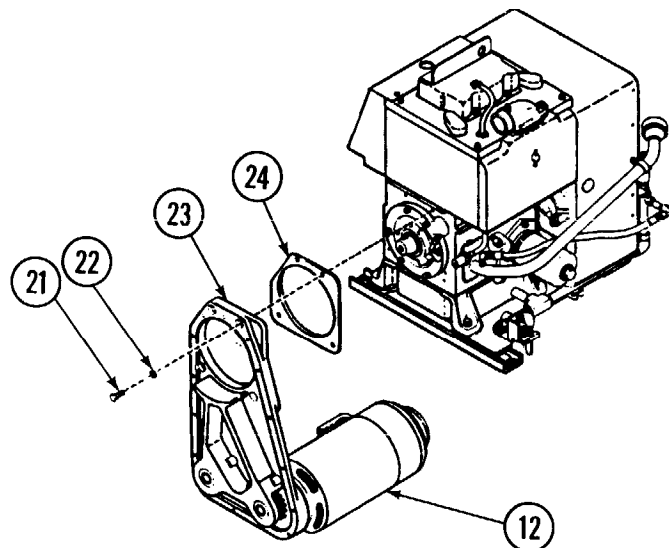
E Remove screw (13) and lockwasher (14). Discard lockwasher.

F Remove spacer plate (15).

APU GEAR CASE: DISASSEMBLY, INSPECTION, REPAIR AND ASSEMBLY (Continued)



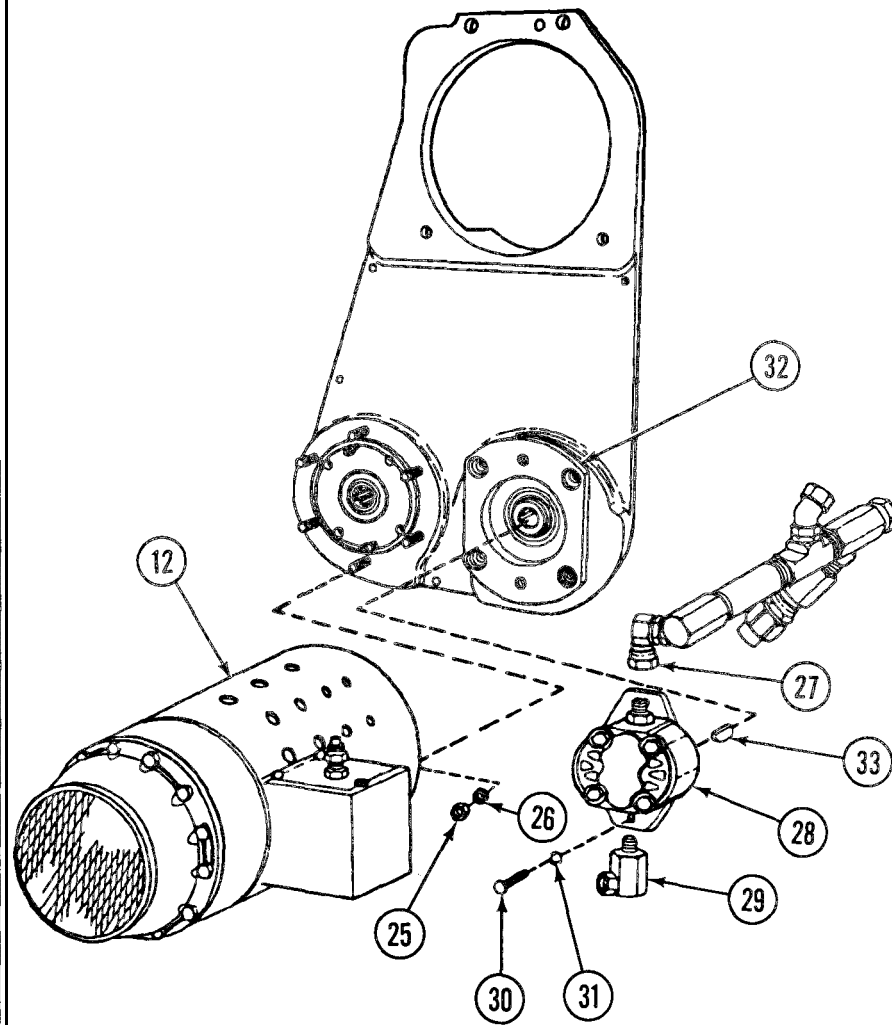
- G Install mechanical puller (item 27, Appx D) on bushing (16).
- H Tighten mechanical puller (item 27, Appx D) until drive sprocket (17) and bushing (16) are pulled from output shaft (18).
- I Remove bushing (16), sprocket (17), chain (19), and key (20).
- J Remove mechanical puller (item 27, Appx D) from bushing (16).

**NOTE**

Support generator pump and chain housing with block of wood to prevent units from dropping when last bolt is taken out. Lift engine from housing assembly.

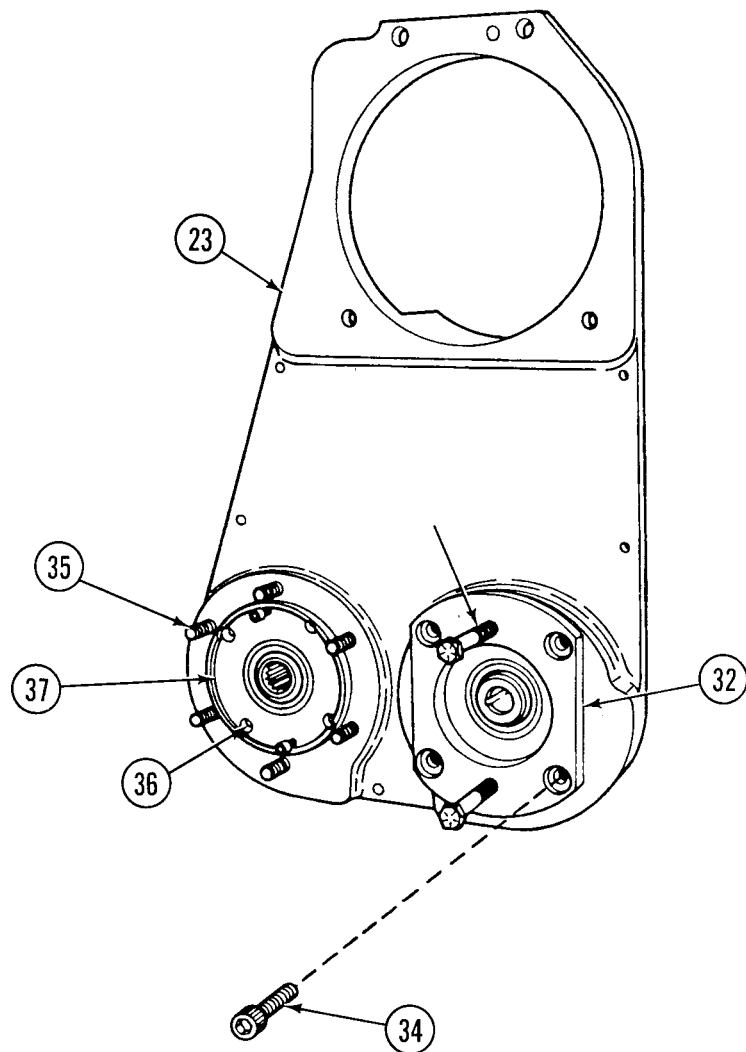
- K Remove four screws (21) and four lockwashers (22) from chain housing (23). Discard lockwashers.
- L Remove chain housing (23) and gasket (24) with hydraulic pump (hidden) and generator (12) attached.
- M Discard gasket (24).

APU GEAR CASE: DISASSEMBLY, INSPECTION, REPAIR AND ASSEMBLY (CONTINUED)



- N Remove six nuts (25) and six flat washers (26).
- O Remove generator (12).
- P Remove top outlet fittings at swivel elbow (27) from hydraulic pump (28).
- Q Remove bottom inlet elbow fitting and adapter (29) from hydraulic pump (28).
- R Remove two screws (30), two lockwashers (31), and remove hydraulic pump (28) from pump adapter (32). Remove key (33) from pump shaft. Discard lockwashers.

APU GEAR CASE: DISASSEMBLY, INSPECTION, REPAIR AND ASSEMBLY (CONTINUED)



S Remove four screws (34) from adapter (32).

T Install two 3/8-16 screws in adapter (32).

U Alternately tighten 3/8-16 screws until adapter (32) is pushed free from chain housing (23).

V Remove adapter (32).

NOTE

Remove studs (35) only if damaged.

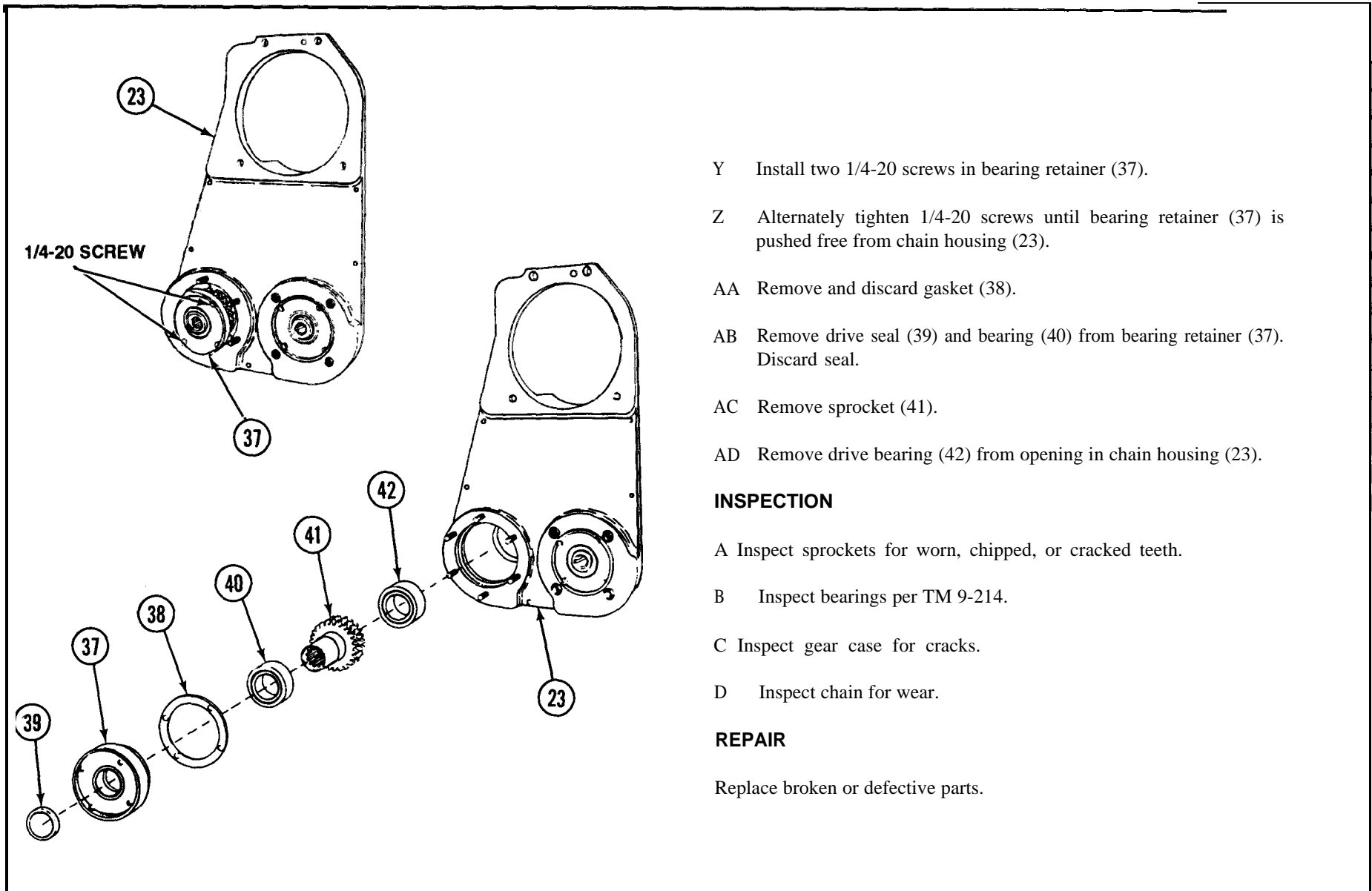
W Remove six studs (35).

NOTE

The remaining steps are the same for both sides of chain housing.

X Remove four screws (36) from bearing retainer (37).

APU GEAR CASE: DISASSEMBLY, INSPECTION, REPAIR AND ASSEMBLY (CONTINUED)



Y Install two 1/4-20 screws in bearing retainer (37).

Z Alternately tighten 1/4-20 screws until bearing retainer (37) is pushed free from chain housing (23).

AA Remove and discard gasket (38).

AB Remove drive seal (39) and bearing (40) from bearing retainer (37). Discard seal.

AC Remove sprocket (41).

AD Remove drive bearing (42) from opening in chain housing (23).

INSPECTION

A Inspect sprockets for worn, chipped, or cracked teeth.

B Inspect bearings per TM 9-214.

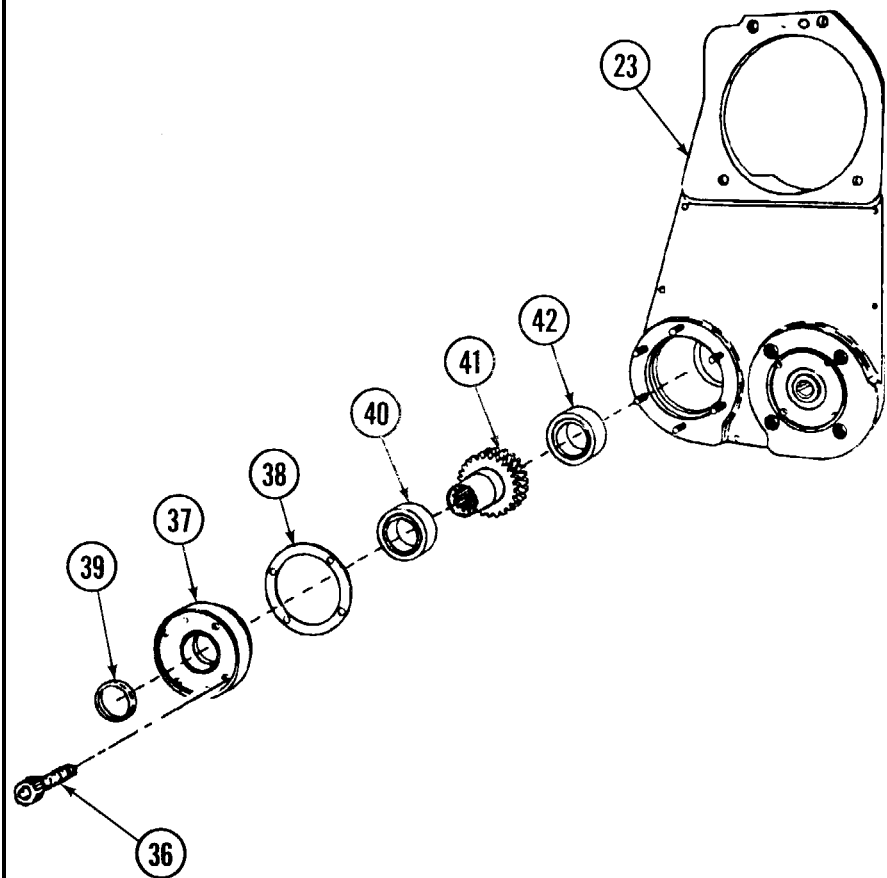
C Inspect gear case for cracks.

D Inspect chain for wear.

REPAIR

Replace broken or defective parts.

APU GEAR CASE: DISASSEMBLY, INSPECTION, REPAIR AND ASSEMBLY (Continued)

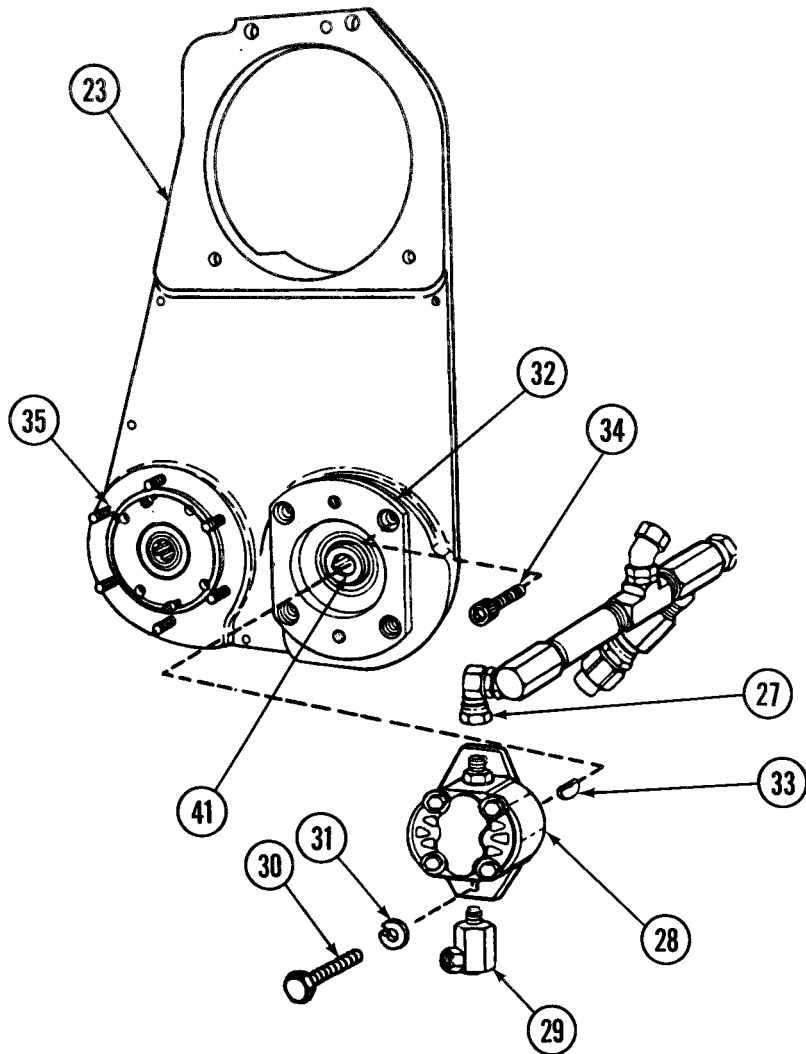
**ASSEMBLY****NOTE**

Apply adhesive (item 4, Appx B) to all gaskets, screw threads and exposed electrical terminals.

Steps A-F apply to both sides of chain housing.

- A Install bearings (42) in chain housing (23).
- B Install bearing (40) and new seal (39) in bearing retainer (37).
- C Install new gasket (38) on bearing retainer (37).
- D Install sprocket (41) and bearing retainer (37) with bearing (40), new seal (39), and new gasket (38) in chain housing (23).
- E Aline screw holes in bearing retainer (37) with holes in chain housing (23).
- F Tap bearing retainer (37) into place with plastic hammer and secure with four screws (36).

APU GEAR CASE: DISASSEMBLY, INSPECTION, REPAIR AND ASSEMBLY (CONTINUED)



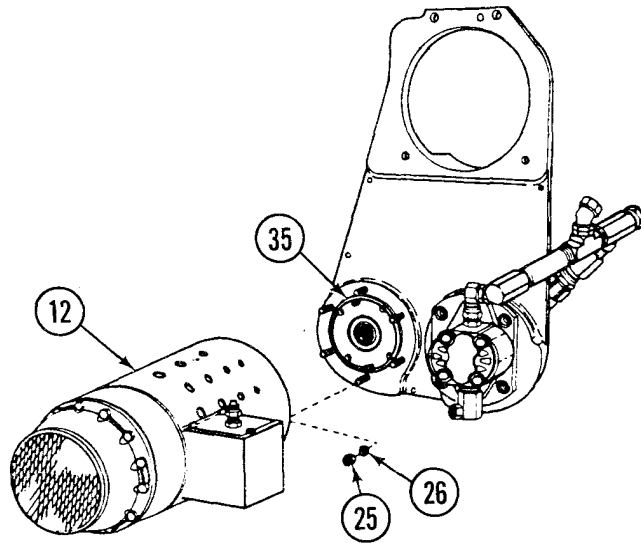
G Install six studs (35) in chain housing (23) if previously removed.

H Install adapter (32) with four screws (34).

I Install key (33) in shaft of hydraulic pump (28). Install hydraulic pump in chain housing (23) with two screws (30) and two new lockwashers (31). Make sure slot in sprocket (41) lines up with key (33) in pump shaft.

J Connect adapter (29) and inlet fittings at swivel connection (27).

APU GEAR CASE: DISASSEMBLY, INSPECTION, REPAIR AND ASSEMBLY (CONTINUED)

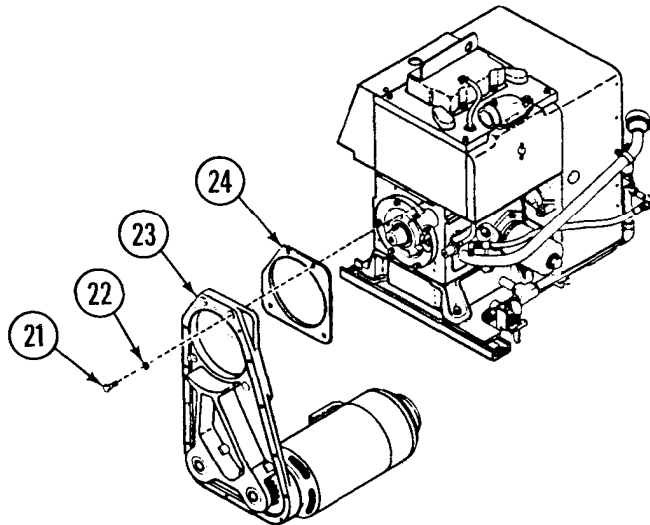


K Install six flat washers (26) and six nuts (25) loosely on studs (35).

L Aline six nuts (25) with slots on generator (12).

M Install generator (12) over six nuts (25) and six flat washers (26) and rotate generator (12) clockwise.

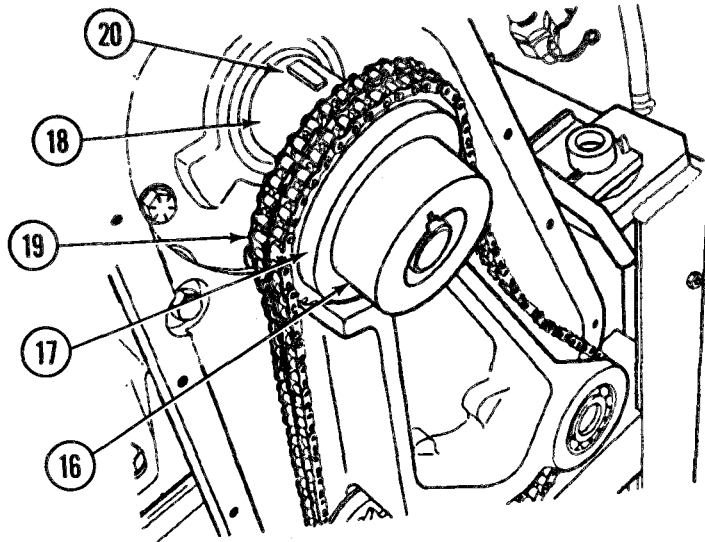
N Tighten six nuts (25).



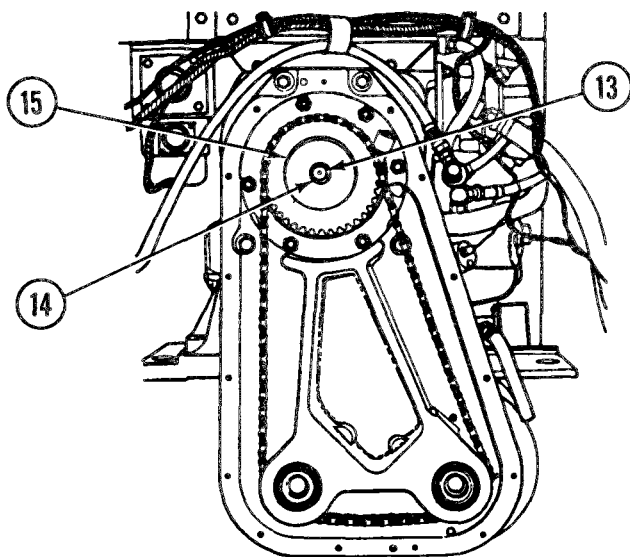
O Install new gasket (24) on engine assembly.

P Install chain housing (23) on engine assembly with four screws (21) and four new lockwashers (22).

APU GEAR CASE: DISASSEMBLY, INSPECTION, REPAIR AND ASSEMBLY (CONTINUED)

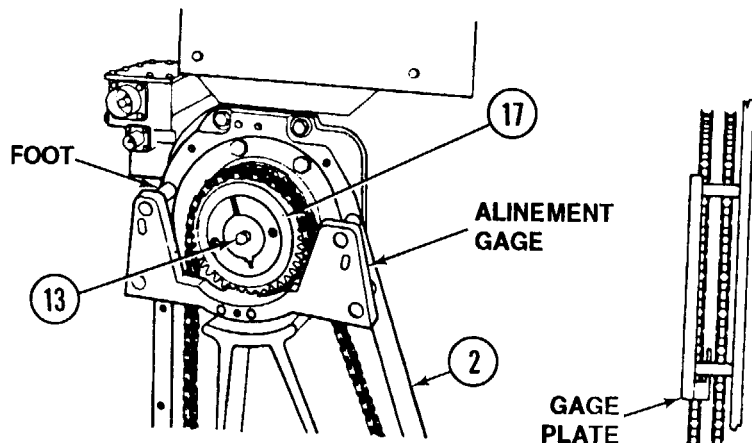


- Q Install drive sprocket (17) over bushing (16).
- R Install chain (19) around drive sprocket (17) and around hydraulic pump and generator sprockets.
- S Place key (20) on engine output shaft (18).
- T Install drive sprocket (17) over key (20) and engine output shaft (18).



- U Install spacer plate (15) on engine output shaft with screw (13) and new lockwasher (14).

APU GEAR CASE: DISASSEMBLY, INSPECTION, REPAIR AND ASSEMBLY (Continued)

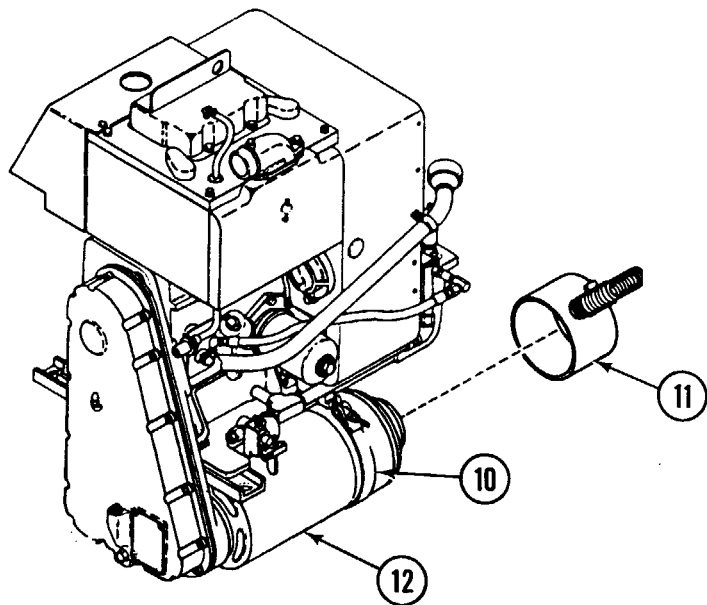


- V Install alinement gage (item 26, Appx D) with four feet flat against machined section of chain housing (23).
- W Position gage plate between two rows of drive sprocket teeth. Gage plate should fit just touching rear drive sprocket teeth.

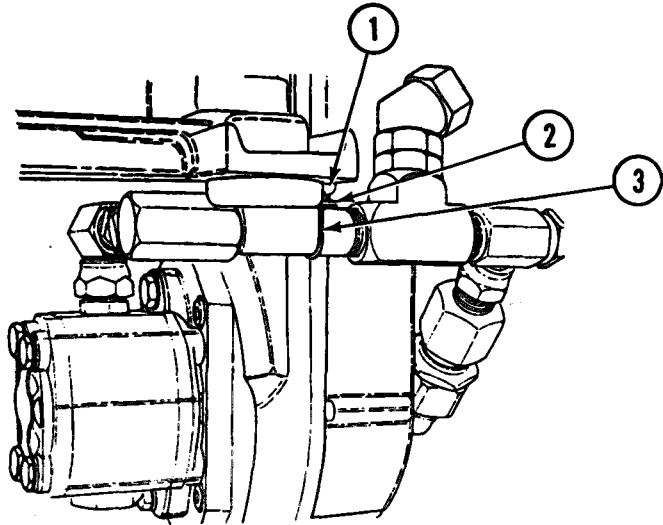
NOTE

Prior to tightening screw (13), note position of sprocket edge and bushing edge to aid in adjustment of sprocket.

- X With alinement gage in held position, torque screw (13) to 50-55 lb-ft. Gage plate should not be touching either row of teeth at this point.
- Y Repeat steps Wand X to aline sprocket (17) if necessary.
- Z Install generator cooling air duct (11) on generator (12).
- AA Tighten strap (10).



APU GEAR CASE: DISASSEMBLY, INSPECTION, REPAIR AND ASSEMBLY (CONTINUED)

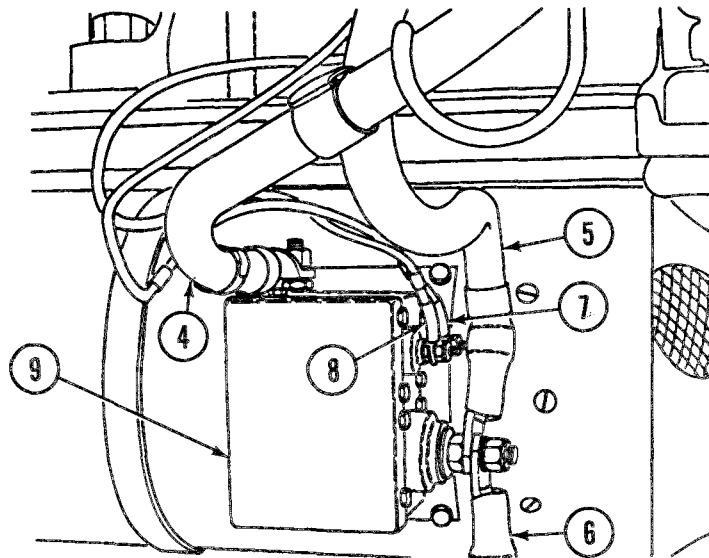


AB Connect two electrical leads (7 and 8) and three electrical cables (4, 5 and 6) to generator terminal box (9).

AC Secure hydraulic outlet fittings to engine with U-clamp (3), two new lockwashers (2), and two nuts (1).

AD Install chain cover (p 12-5).

AE Test APU per TM 9-2815-221-34&P.



CHAPTER 13 MAINTENANCE PROCEDURES: PROJECTILE RACK ASSEMBLY

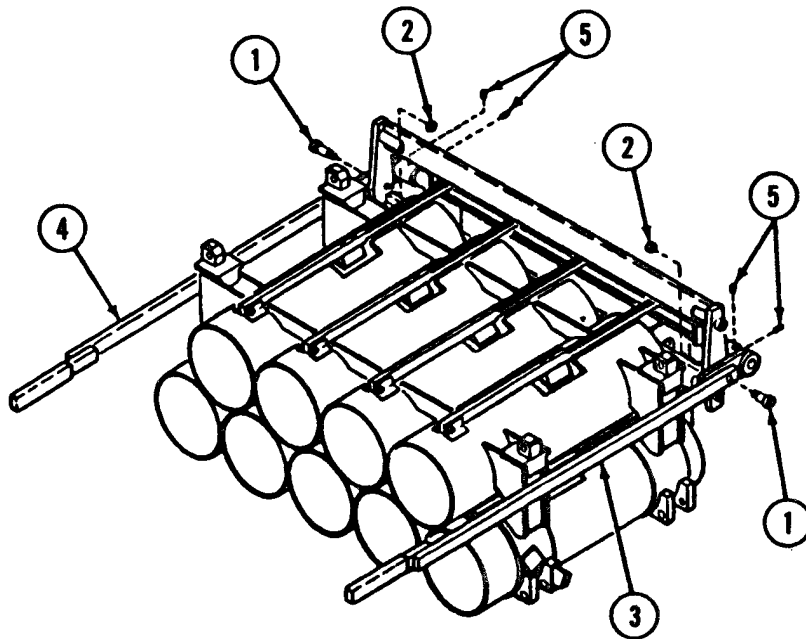
GENERAL

This chapter illustrates and describes the maintenance and test procedures for the projectile rack assembly.

NOTE

Repair of projectile rack assembly is direct support maintenance.

PROJECTILE RACK ASSEMBLY REPAIR



INITIAL SETUP

Test Equipment/Special Tools:

Pliers, wire twisting (item 54, Appx D)

Equipment Condition:

Projectile rack assembly removed (TM 9-2350-267-20).

DISASSEMBLY

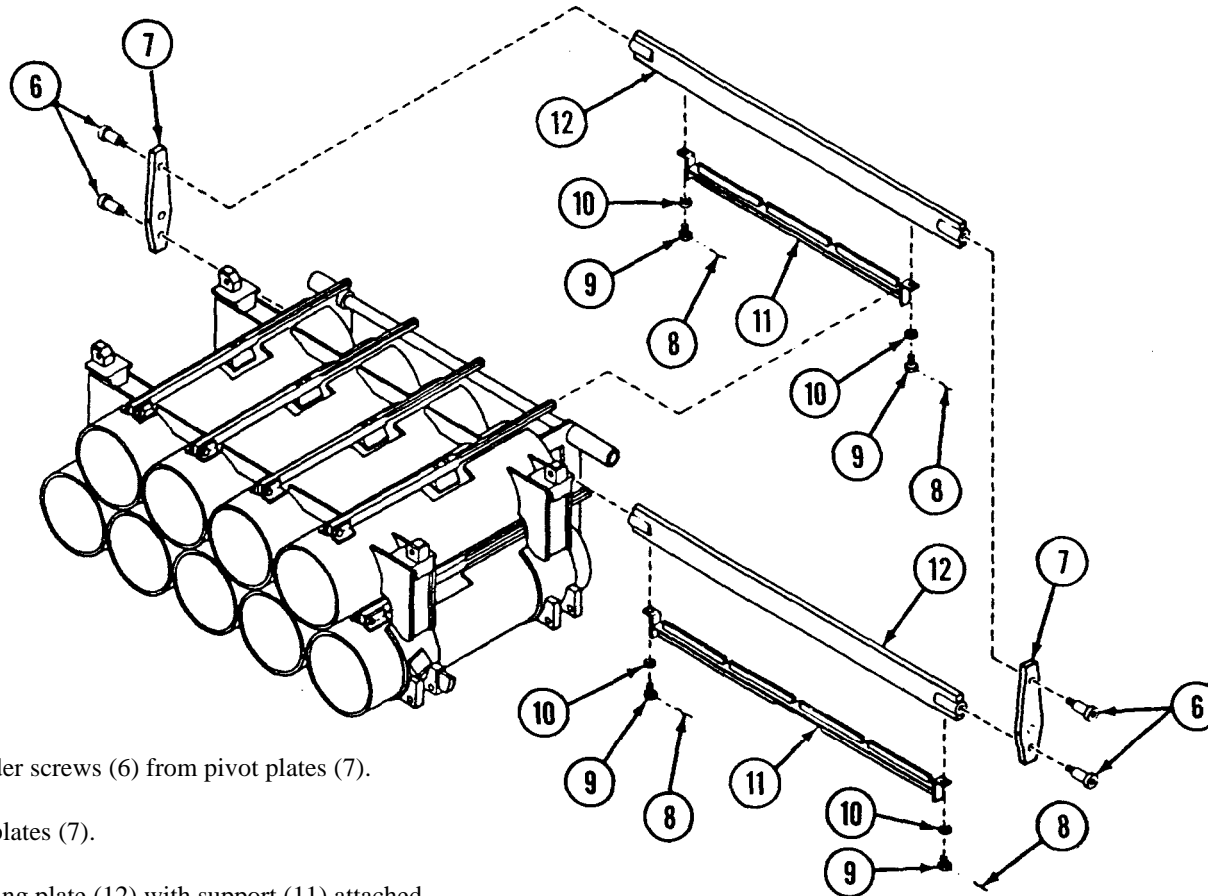
NOTE

Handles must be in release position before starting disassembly.

A Remove screw (1) and self-locking nut (2) from right handle (3) and left handle (4). Discard self-locking nuts.

B Loosen two setscrews (5) on right handle (3) and left handle (4).

C Remove right handle (3) and left handle (4).



D Remove four shoulder screws (6) from pivot plates (7).

E Remove two pivot plates (7).

F Remove upper locking plate (12) with support (11) attached.

G Remove two lockwires (8) from upper support bar (11). Discard lockwires.

H Remove two screws (9) and washers (10) from upper support bar (11)

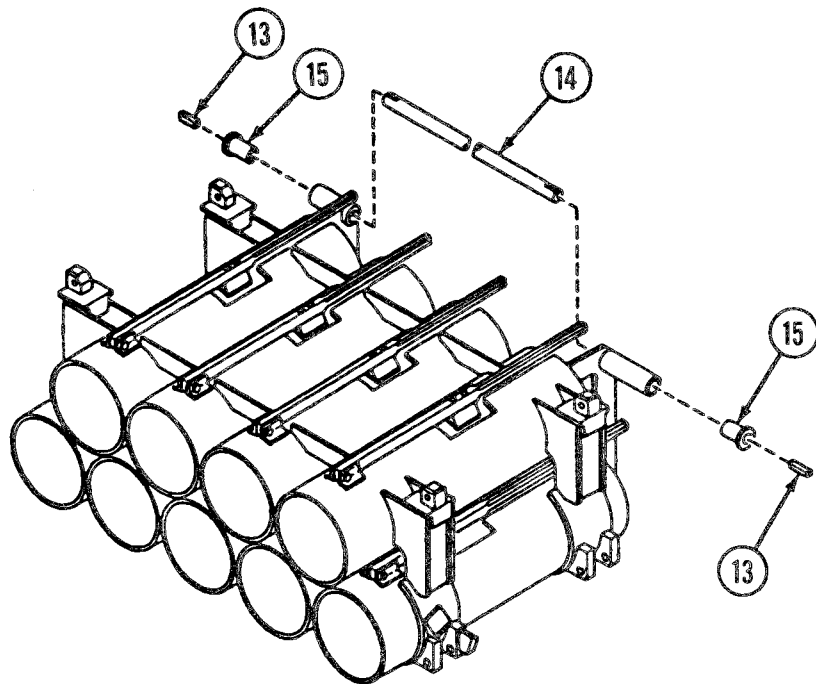
I Remove upper support bar (11) from upper locking plate (12).

J Remove two lockwires (8) from lower support bar (11). Discard lockwires.

K Remove two screws (9) and washers (10) from lower support bar (11).

L Remove lower support bar (11) from lower locking plate (12).

PROJECTILE RACK ASSEMBLY: REPAIR-(Continued)

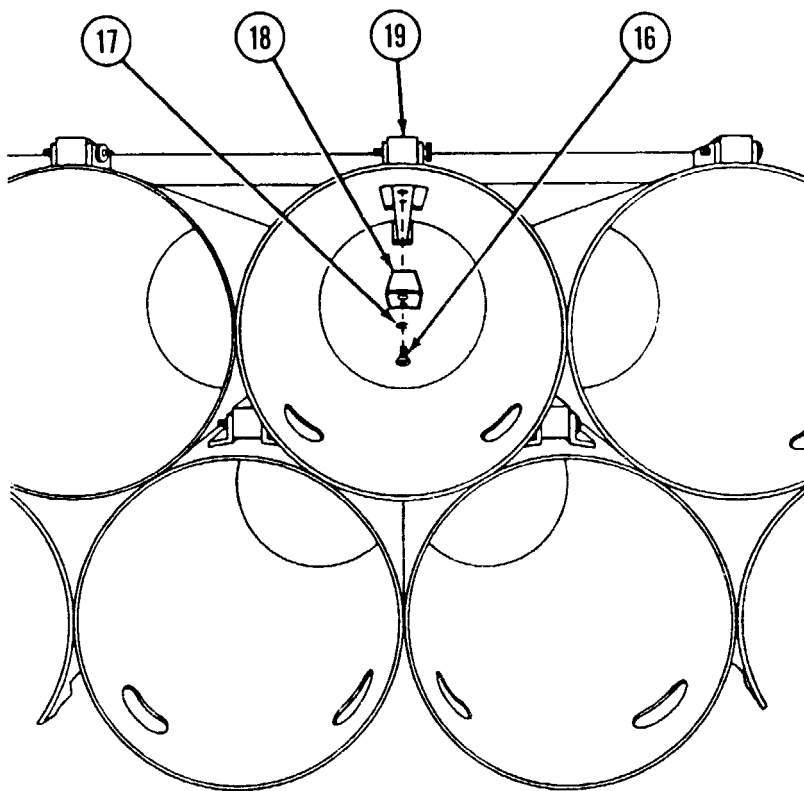


M Remove two keys (13).

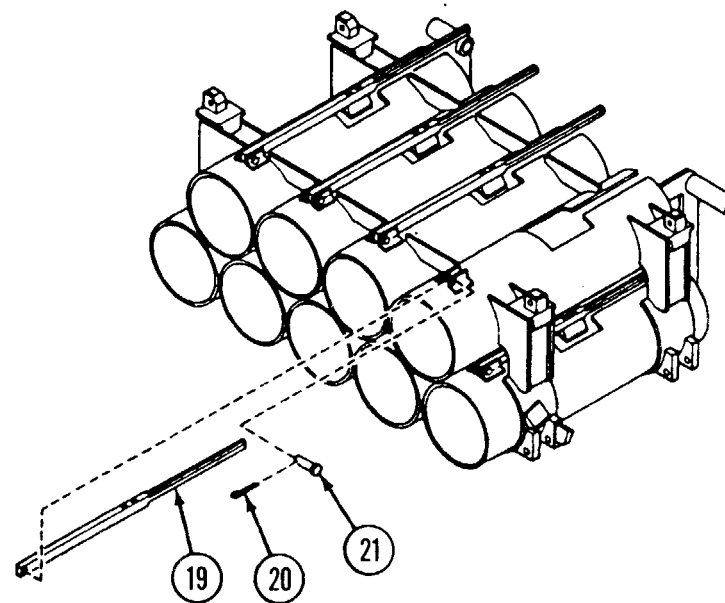
N Remove shaft (14).

O Remove two sleeve bearings (15).

PROJECTILE RACK ASSEMBLY: REPAIR (Continued)



P Remove two screws (16), two lockwashers (17) and locking shoe (18) from each locking bar (19). Discard lockwashers.



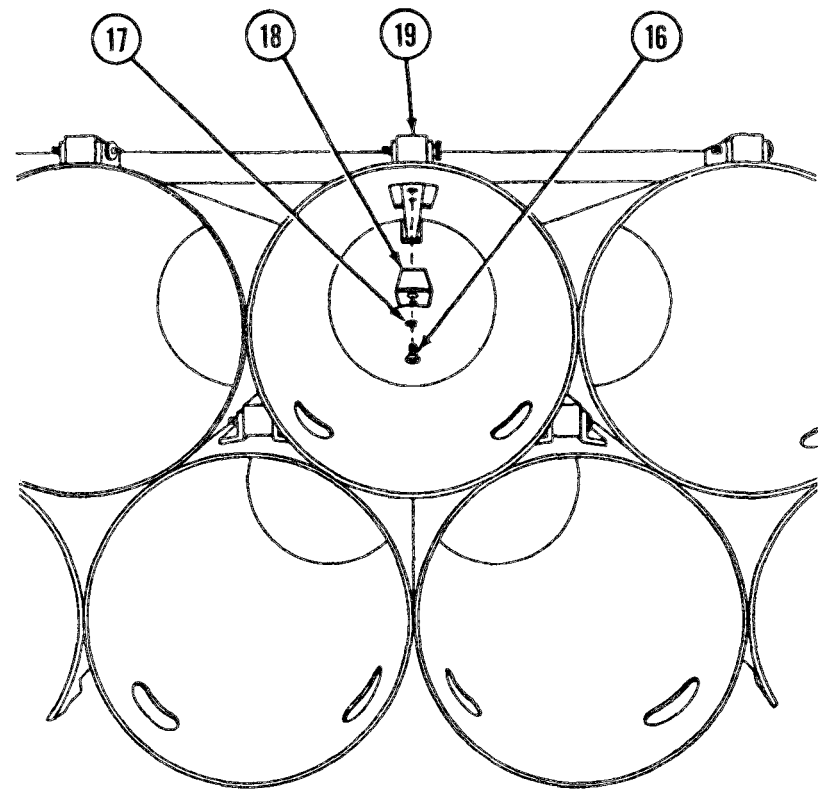
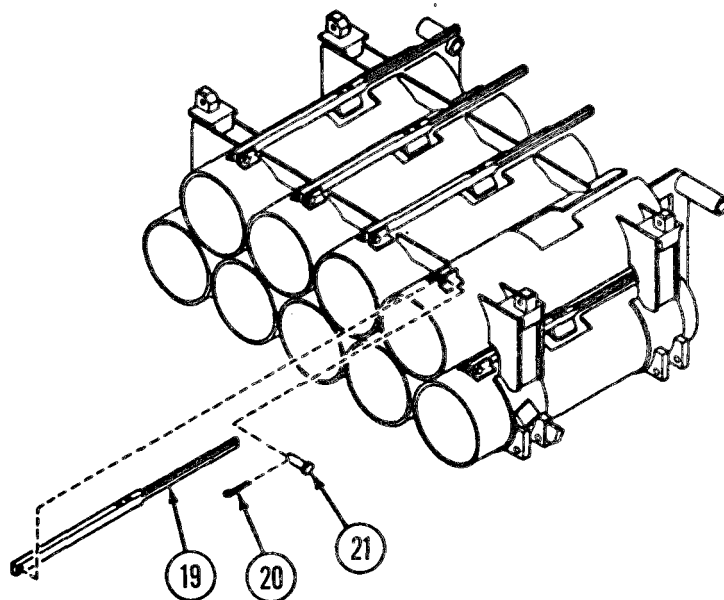
Q Remove nine cotter pins (20) and nine pins (21). Discard cotter pins.

R Remove nine locking bars (19).

INSPECTION AND REPAIR

Inspect all parts for excessive wear or damage. Replace as necessary.

PROJECTILE RACK ASSEMBLY: REPAIR-(Continued)



ASSEMBLY

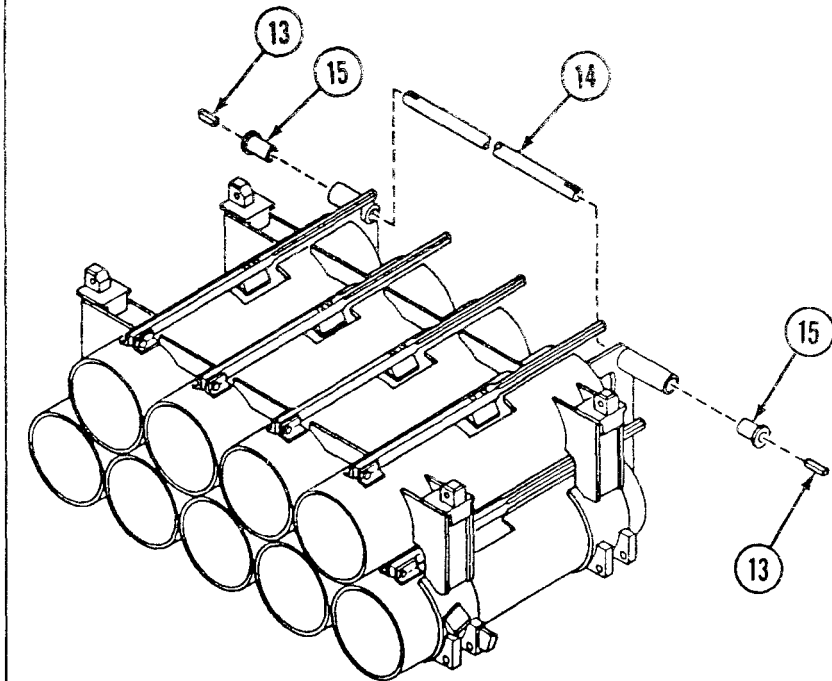
NOTE

To install top locking bars, perform Step B then Step A. To install bottom five locking bars, begin with step A.

A Install nine locking bars (19) with nine pins (21) and nine new cotter pins (20).

B Install locking shoe (18) on each locking bar (19) with two screws (16) and two new lockwashers (17).

PROJECTILE RACK ASSEMBLY: REPAIR (Continued)



- C Install two sleeve bearings (15), shaft (14), and two keys (13).

PROJECTILE RACK ASSEMBLY: REPAIR-(Continued)

D Install lower support bar (11) on lower locking plate (12) with two screws (9) and washers (10).

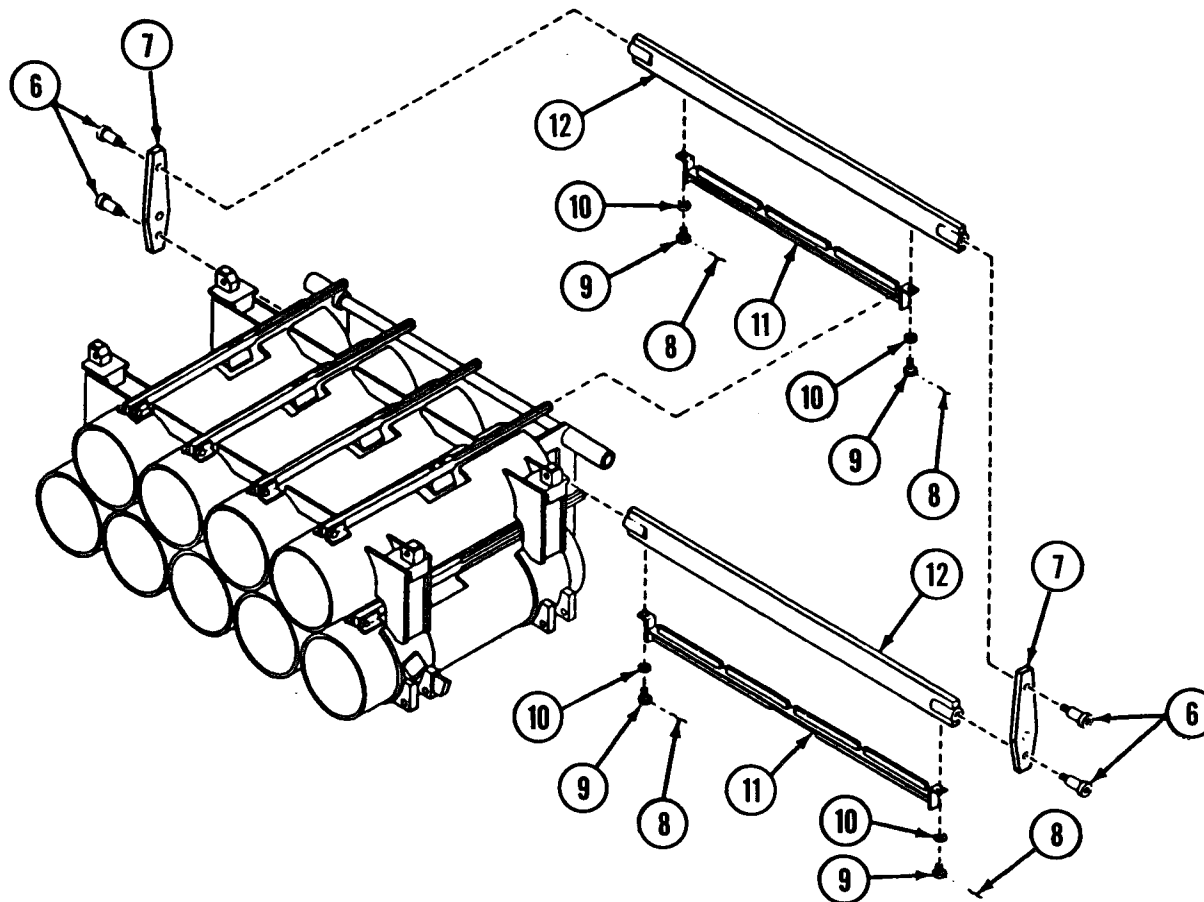
E Install two new lockwires (8) on lower support bar (11).

F Install upper support bar (11) on upper locking plate (12) with two screws (9) and washers (10).

G Install two new lockwires (8) on upper support bar (11).

H Install upper and lower locking plate (12).

I Install two pivot plates (7) with four shoulder screws (6).

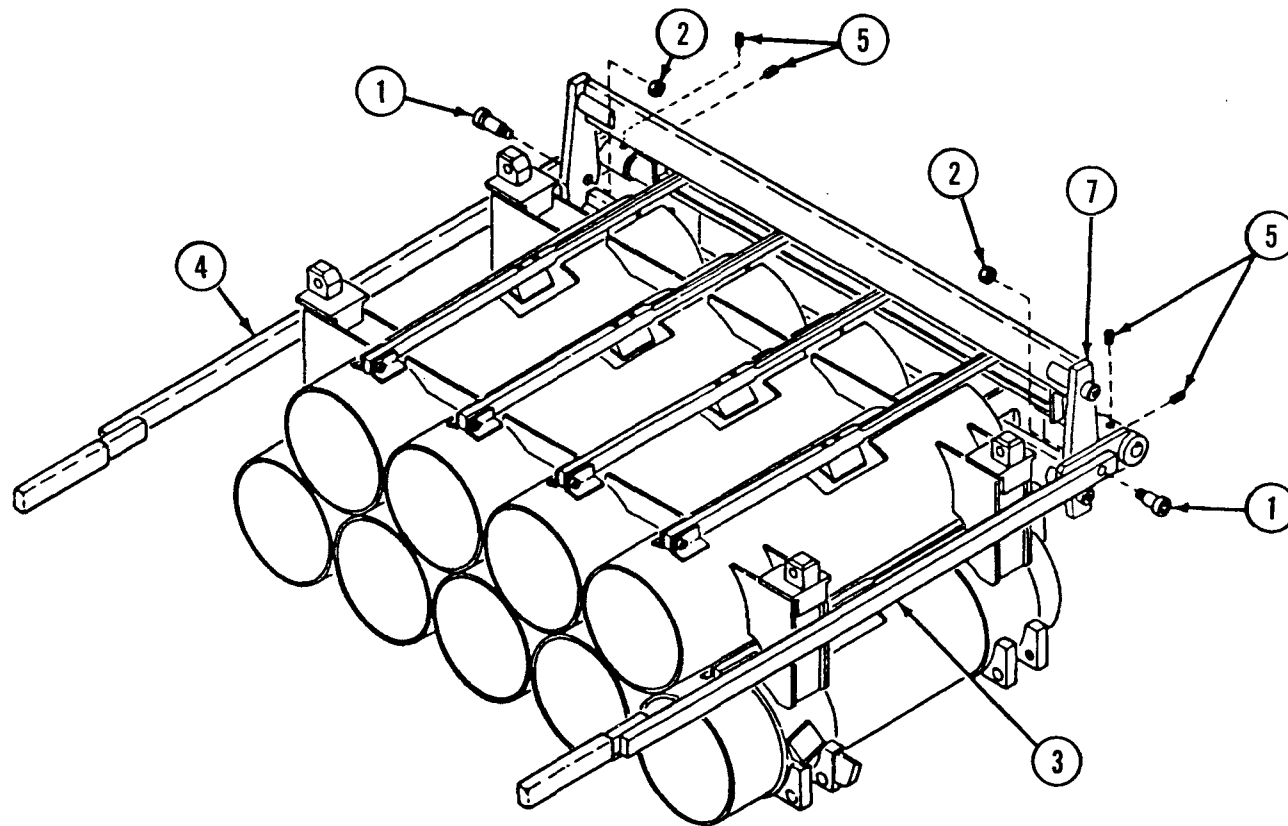


PROJECTILE RACK ASSEMBLY: REPAIR (Continued)

J Install right handle (3) and left handle (4) and tighten two setscrews (5) on each handle.

K Secure handles (3 and 4) with screw (1) and new self-locking nut (2) for each handle.

L Perform projectile rack pull test (p 13-9).



PROJECTILE RACK PULL TEST STAND

The projectile rack pull test stand will be built according to the specifications shown in Appx E.

PROJECTILE RACK PULL TEST

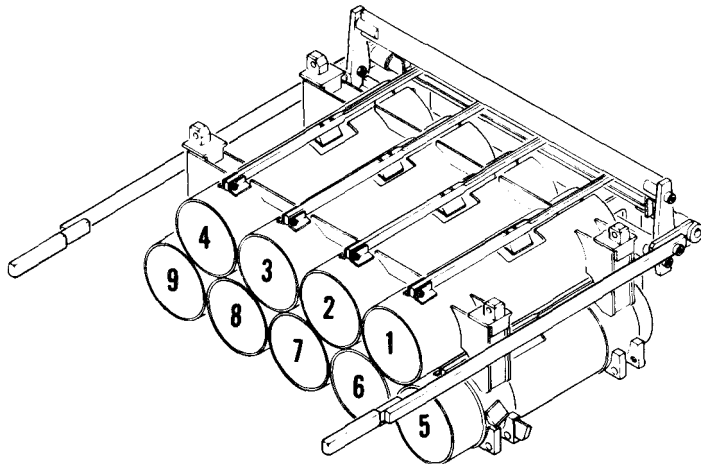
INITIAL SETUP

Test Equipment/Special Tools:

Force gage, 0-600 lb. (item 11, Appx D).
Pull test stand (p 13-9).

Personnel Required:

Two



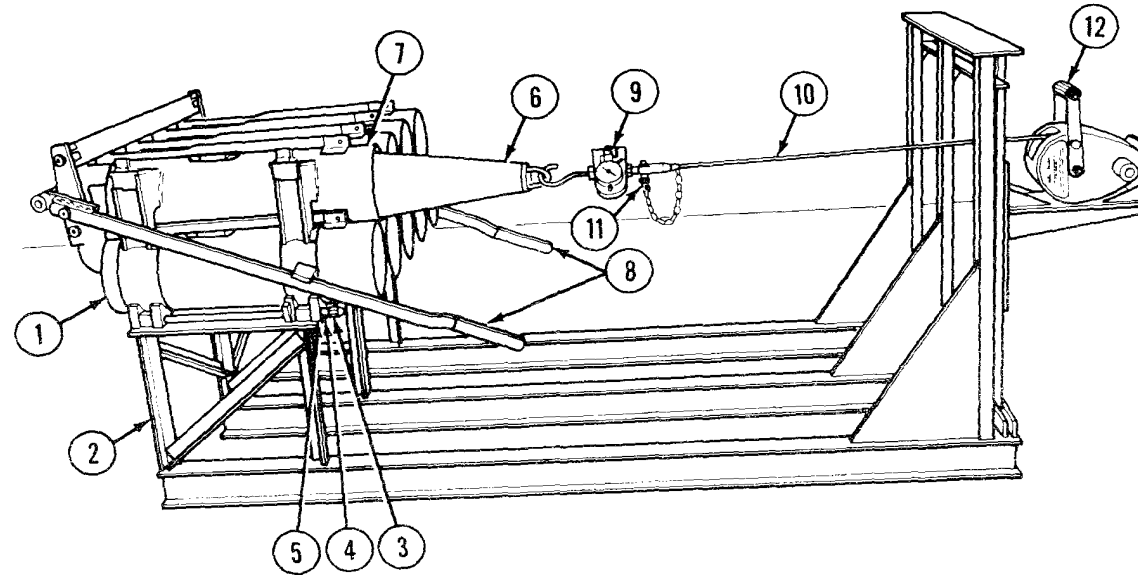
NOTES

Use M824, 155MM projectile or inert 155MM projectile when performing this test.

This test will be performed on tubes 2, 3, 6, 7 and 8. See locator view to identify tube positions to be tested.

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PROJECTILE RACK PULL TEST (CONTINUED)



TEST

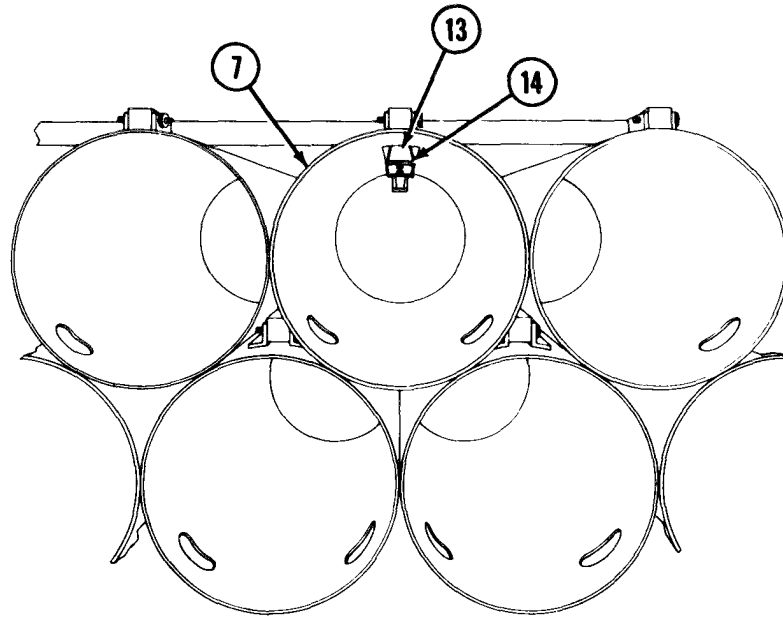
- A Install projectile rack (1) on test stand (2) using two rods (3), two flat washers (4) and two lockwashers (5).
- B Place projectile (6) in tube (7).
- C Depress and lock two handles (8).
- D Attach line gage (9) to cable (10) using quick-release pin (11).
- E Attach line gage (9) to projectile (6).
- F Apply 400 lb of pressure, as measured by line gage (9), by turning winch (12).

NOTE

Slippage may occur before full load is applied. This should only occur until rotating band encounters locking shoe. If projectile rotating band goes under locking shoe, test should be considered a failure.

- G Remove line gage (9) from projectile (6)
- H Remove quick-release pin (11) and remove line gage (9) from cable (10).
- I Raise both handles (8) and remove projectile from tube (7).

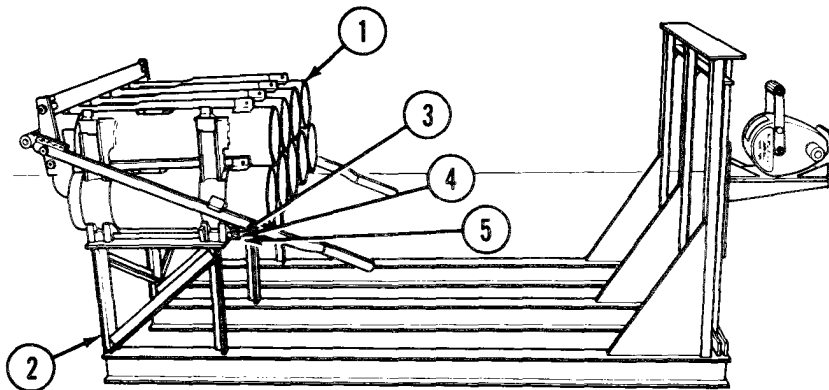
PROJECTILE RACK PULL TEST (CONTINUED)



- J Inspect tube (7) for damage or deformation. Inspect locking shoe (13) for separation of plastisol coating (14). Test can be considered a pass if no irregularities are found.

NOTE

If test fails for any reason, refer to Projectile Rack Repair (p 13-1).



- K Remove projectile rack (1) from test stand (2) by removing two rods (3), two flat washers (4) and two lockwashers (5).

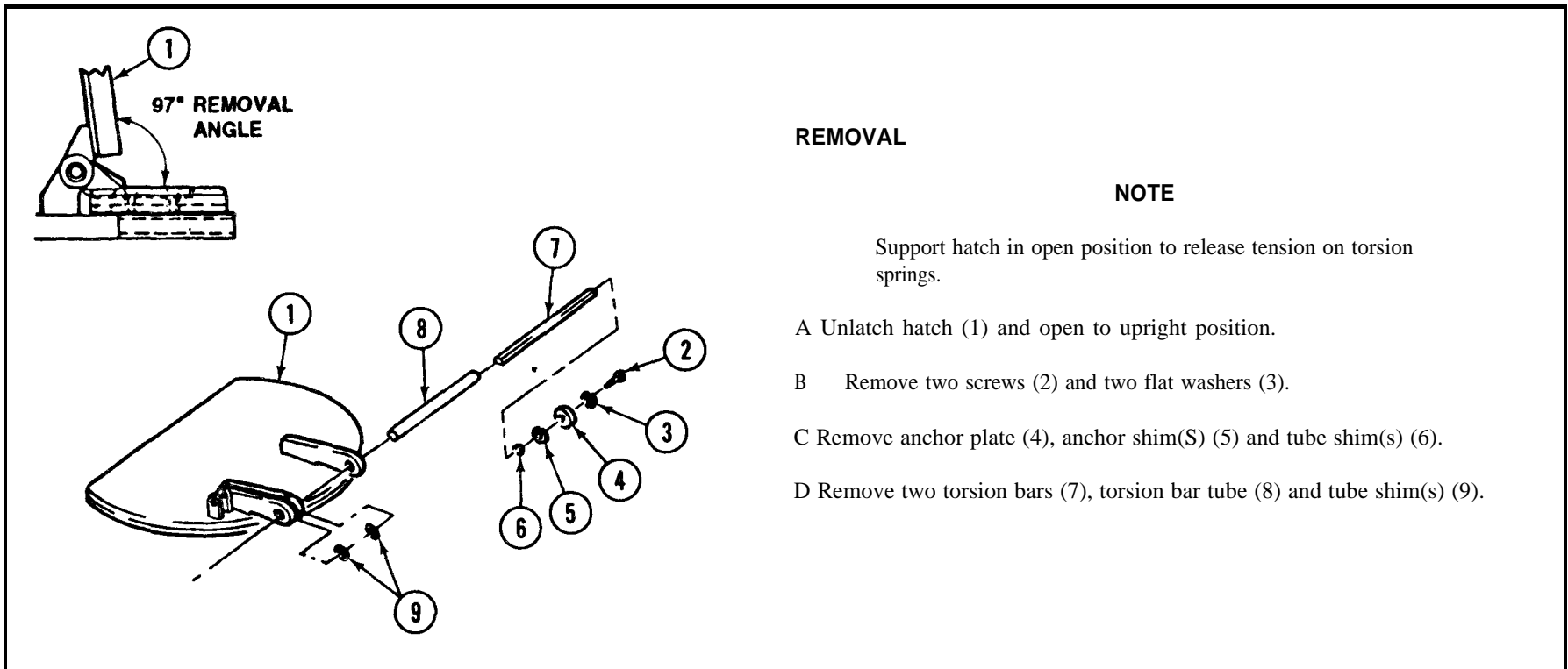
CHAPTER 14 MISCELLANEOUS HULL COMPONENTS

CHAPTER OVERVIEW

This chapter illustrates and describes maintenance procedures for the following hull components:

Section I Commander's Cupola Cover Assembly
Section II Commander's Cupola Body
Section III Commander's Cupola Race Ring
Section IV Engine Compartment Bulkhead Insulation and Shields

Section I COMMANDER'S CUPOLA COVER ASSEMBLY

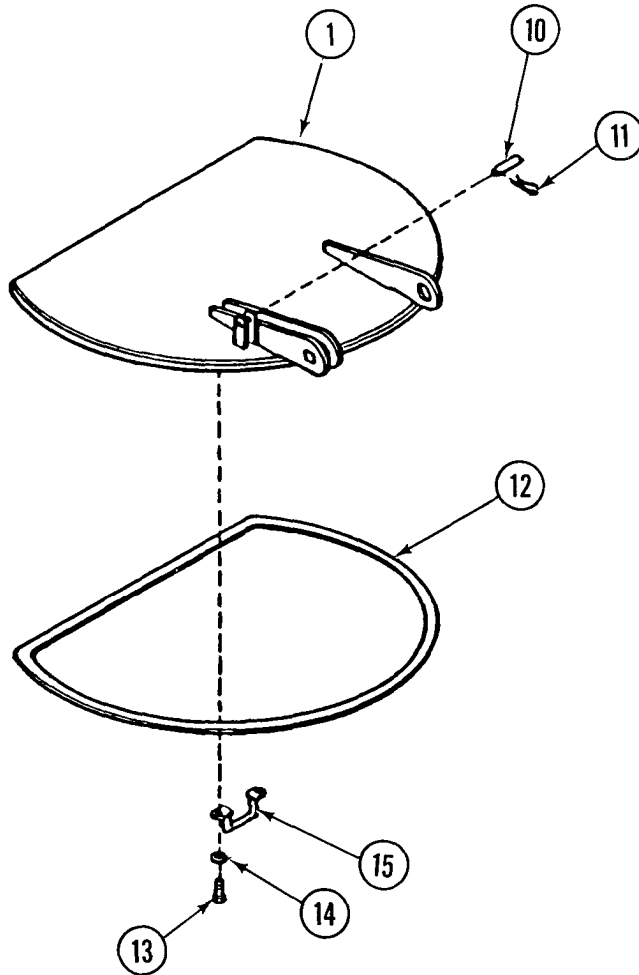


REMOVAL

- A Unlatch hatch (1) and open to upright position.
- B Remove two screws (2) and two flat washers (3).
- C Remove anchor plate (4), anchor shim(S) (5) and tube shim(s) (6).
- D Remove two torsion bars (7), torsion bar tube (8) and tube shim(s) (9).

NOTE

Support hatch in open position to release tension on torsion springs.

COMMANDER'S CUPOLA COVER ASSEMBLY (CONTINUED)

Remove pin (10) and pin (11).

F Remove and discard seal (12). Scrape dirt and adhesive from seal seat.

G Remove hatch (1).

DISASSEMBLY

B Remove handle (15).

ASSEMBLY

Reverse order of disassembly.

INSTALLATION

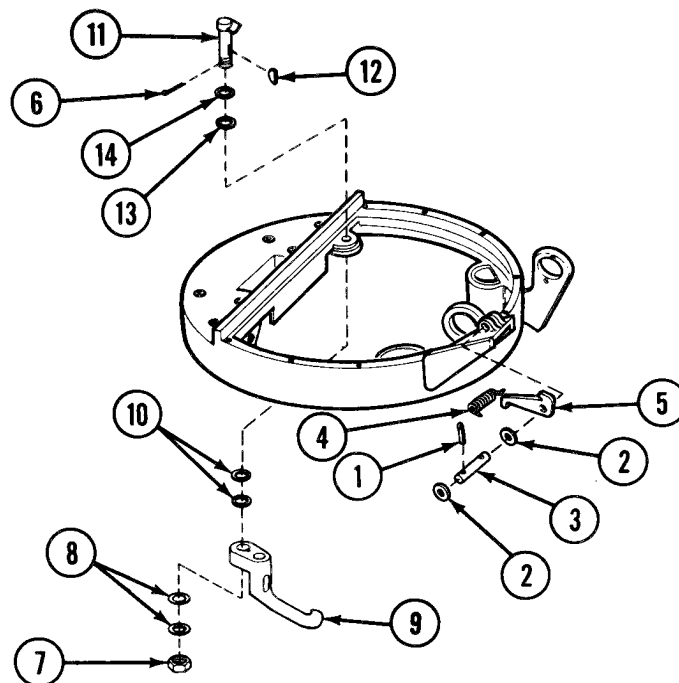
A Install new cover seal (12) using adhesive (item 3, Appx B).

B Coat each torsion bar (7) with grease (item 27, Appx B).

C Install torsion bars with cover at 106-degree, 30-minute angle from closed position.

D Reverse order of removal.

Section II COMMANDER'S CUPOLA BODY



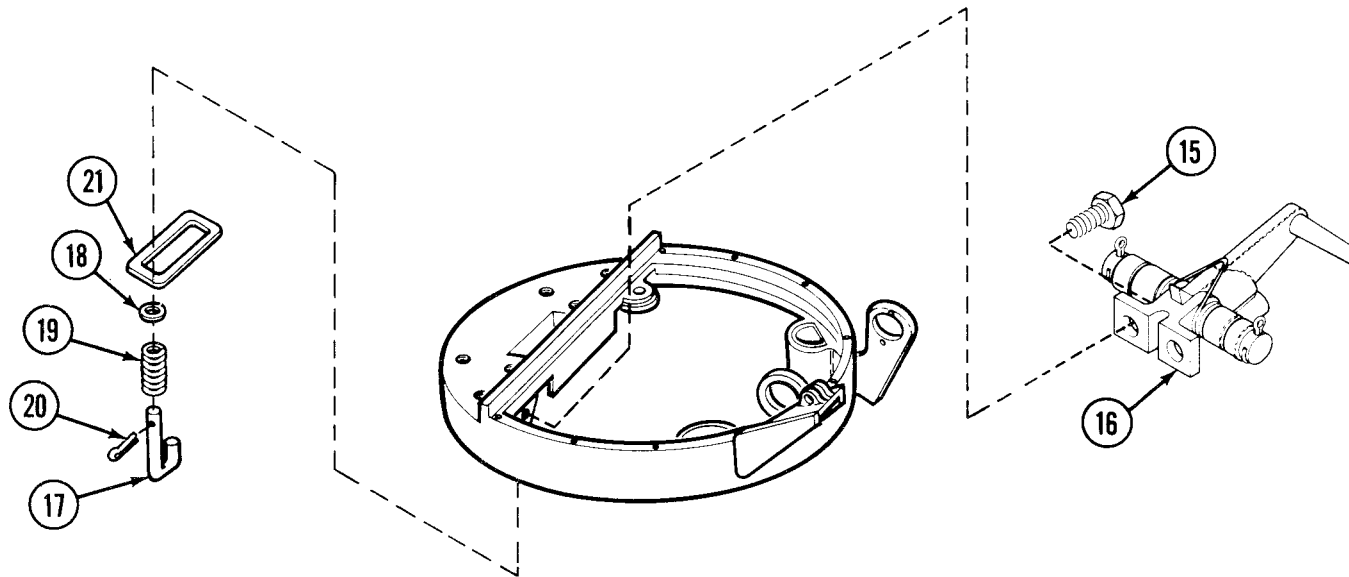
NOTE

Repair of commander's cupola body is direct support maintenance.

DISASSEMBLY

- A Remove and discard two cotter pins (1).
- B Remove two flat washers (2), latch pin (3), latch spring (4) and latch (5).
- C Remove and discard cotter pin (6).
- D Remove castle nut (7), shim(s) (8), latch handle (9) and shim(s) (10).
- E Remove locking cam (11), cam key (12), shim(s) (13) and bowed washer (14).
- F Discard bowed washer.

COMMANDER'S CUPOLA BODY REPAIR (CONTINUED)



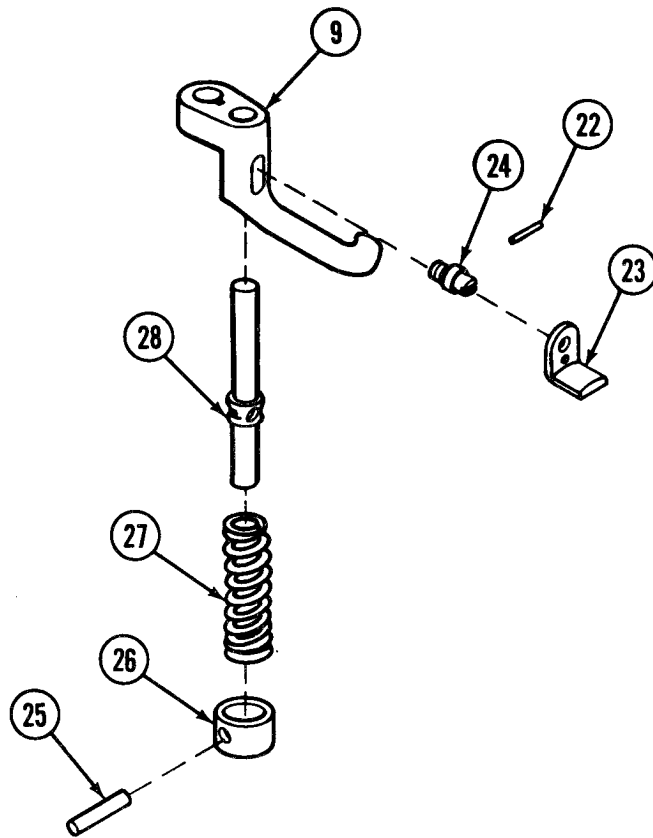
G Remove two bolts (15) and locking latch (16).

H Remove and discard two cotter pins (17).

I Remove two flat washers (18), two springs (19) and two periscope hooks (20).

J Remove and discard gasket (21). Clean dirt and adhesive from gasket seat.

COMMANDER'S CUPOLA BODY REPAIR (CONTINUED)



K Remove pin (22) and release lever (23) latch handle (9).

L Unscrew and remove pin (24).

M Remove pin (25), retainer (26), spring (27) and guide (28).

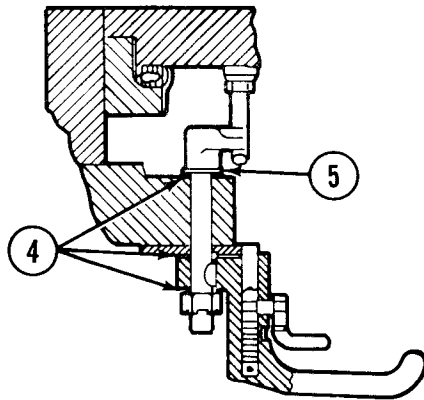
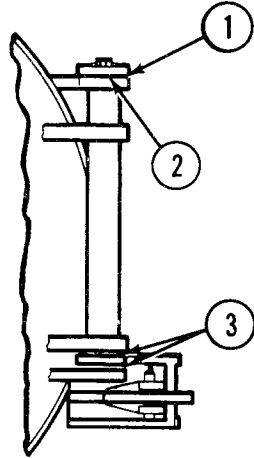
ASSEMBLY

A Replace gasket using adhesive (item 3, Appx B).

B Install new cotter pins and bowed washer.

C Reverse order of disassembly.

COMMANDER'S CUPOLA BODY REPAIR (CONTINUED)



ADJUSTMENT

- A Install shim(s) (1) as required to provide $1/64 + 1/16$ -inch clearance between spring ends and anchor plate.
- B Install shim(s) (2) as required to provide 0.005 ± 0.020 -inch clearance between tube end and cover hinge.
- C Install shim(s) (3) as required to center hatch in cupola body to within $\pm 3/64$ inch.
- D Install shim(s) (4) as required to provide bowed washer (5) depression of about $1/32$ inch in unlocked position.

Section III COMMANDER'S CUPOLA RACE RING

COMMANDER'S CUPOLA (RACE RING) REPAIR

INITIAL SETUP

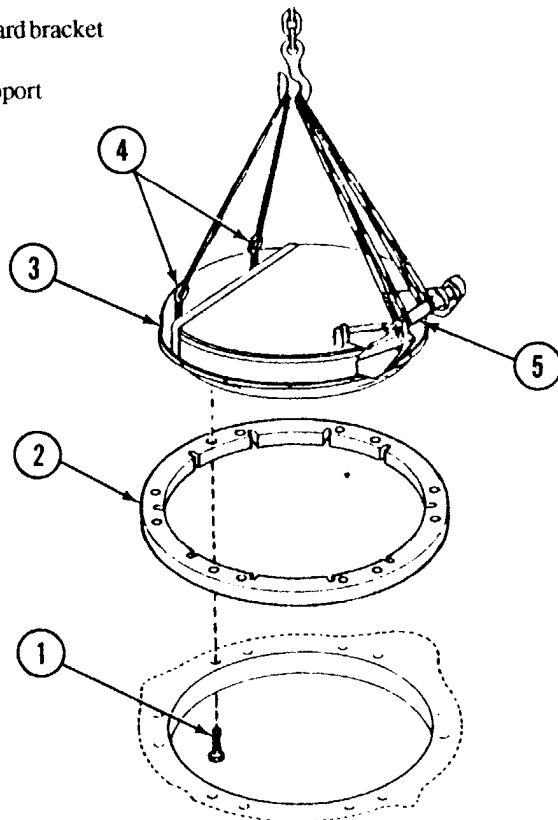
Personnel Required:

Two

Equipment Condition:

Commander's seat forward bracket removed.

Machinegun mount support removed.



REMOVAL

WARNING

Have an assistant hold lock ring in place as screws are removed. A falling ring could cause injury.

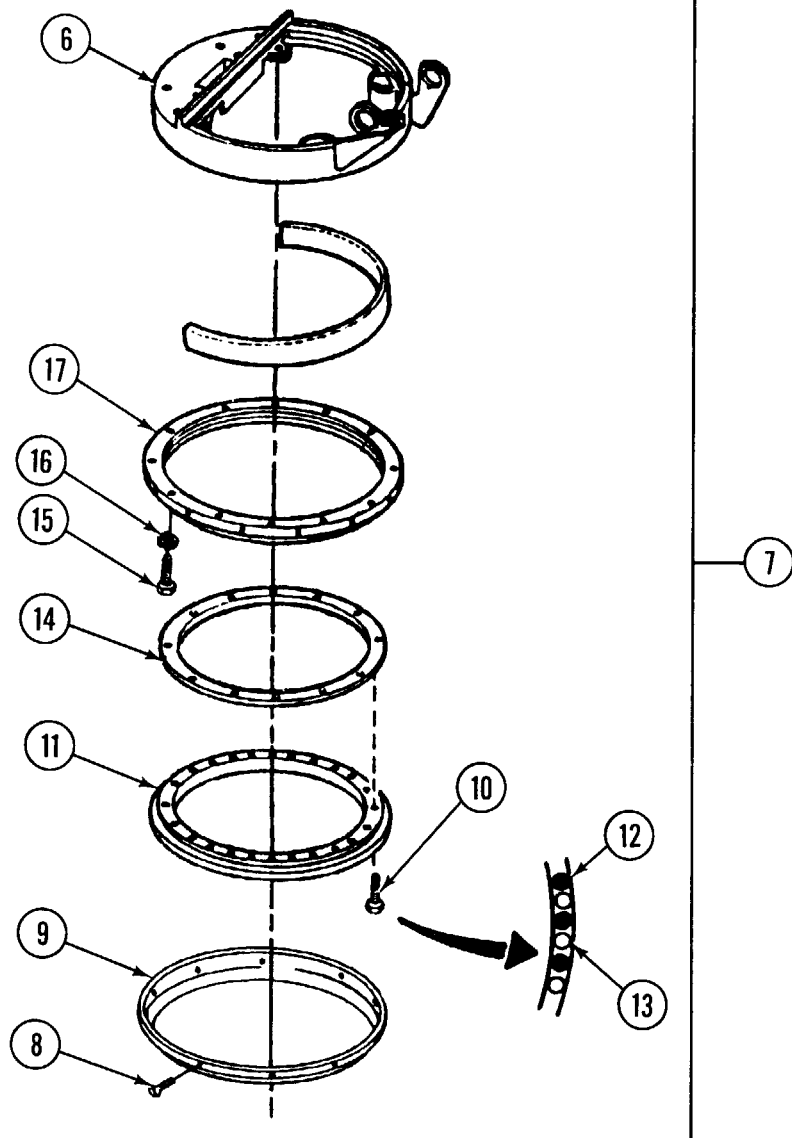
- A Remove 10 screws (1) releasing lock ring (2) from vehicle ceiling and cupola (3) from roof of vehicle.
- B Install two eyebolts (4) in machinegun support screw holes.

WARNING

Cupola weighs 360 pounds. Use hoist and sling capable of lifting 1000 pounds.

- C Attach suitable sling to two eyebolts (4) and hinge tube cover (5).
- D Attach suitable lifting device to sling.
- E Remove cupola (3) from vehicle.

COMMANDER'S CUPOLA (RACE RING) REPAIR (CONTINUED)

**DISASSEMBLY**

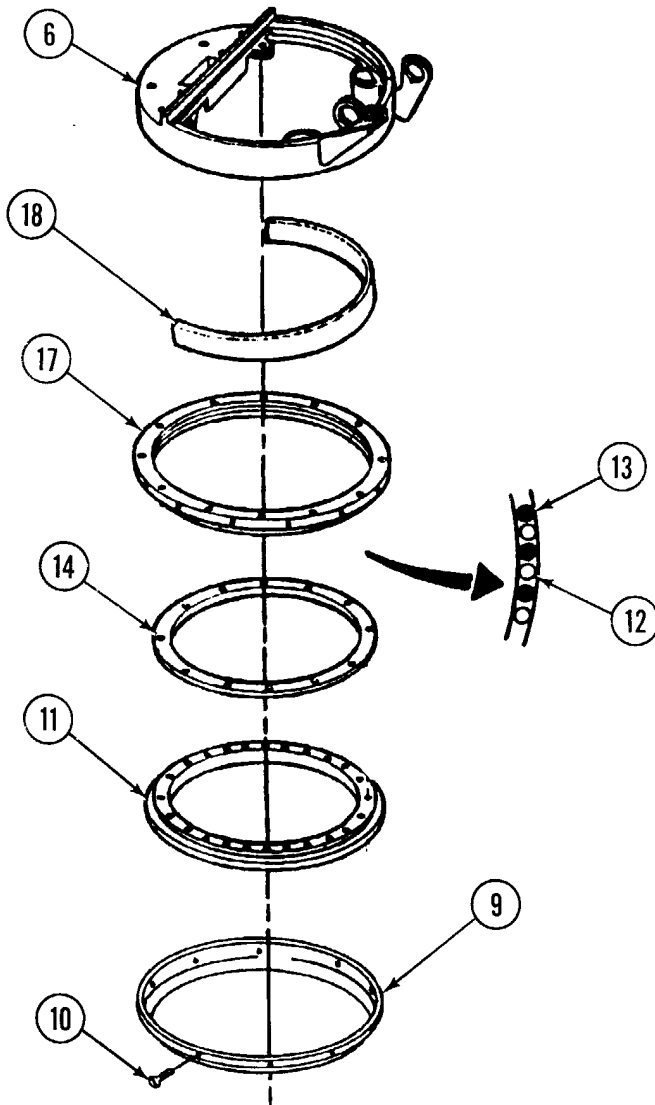
- A Remove cupola cover (p 14-1).
- B Disassemble body assembly (6) (p 14-3).

NOTE

Note slot on inside of each ring. Slots are in-line.

- C Turn cupola body and ring assembly (7) over.
- D Remove 12 screws (8) and race ring shield (9).
- E Remove 12 screws (10) and lower race ring (11).
- F Remove 128 white or cream colored ball bearings (12) and 128 ball bearings (13) that are other than white or cream-colored.
- G Remove upper (inner) ring (14).
- H Remove 12 screws (15), 12 lockwashers (16), and outer race ring (17). Discard lockwashers.

COMMANDER'S CUPOLA (RACE RING) REPAIR (CONTINUED)



INSPECTION AND REPAIR

A Clean all parts of race ring assembly (p 2-16).

CAUTION

Ball bearings must be replaced as a set.

B Inspect 128 white or cream-colored ball bearings (12) and replace if scored or damaged.

C Measure diameter of 128 white or cream-colored ball bearings (12). Replace ball bearings (12) if outer diameter is less than 0.4058 inch.

D Inspect 128 ball bearings (13) that are other white or cream-colored and replace if scored or damaged.

E Inspect race rings (9, 11, 14 and 17). Replace if cracked or distorted.

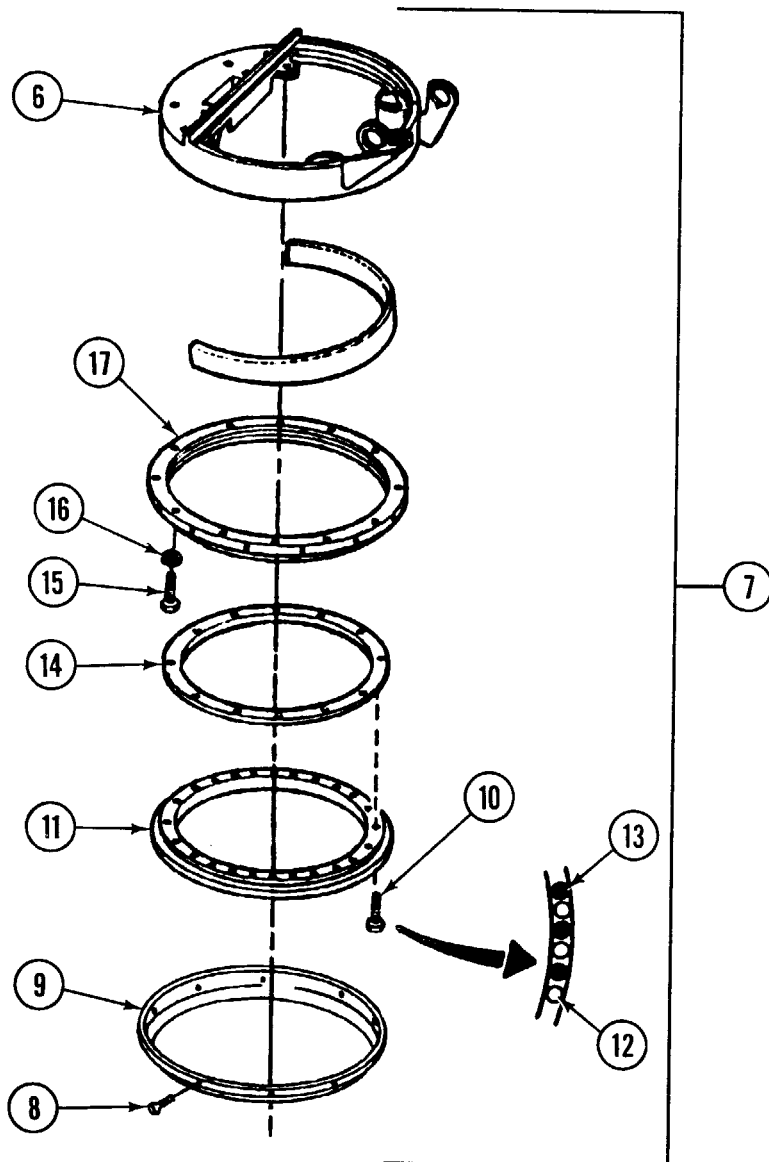
F Inspect threads in race rings (9, 11, 14 and 17) and body assembly (6). Retap threads if damaged.

NOTE

Apply adhesive (item 3, Appx B) to pad and body assembly. Let set for 15 minutes, then cement together.

G Replace cushioning pads (18) if torn or missing.

COMMANDER'S CUPOLA (RACE RING) REPAIR (CONTINUED)



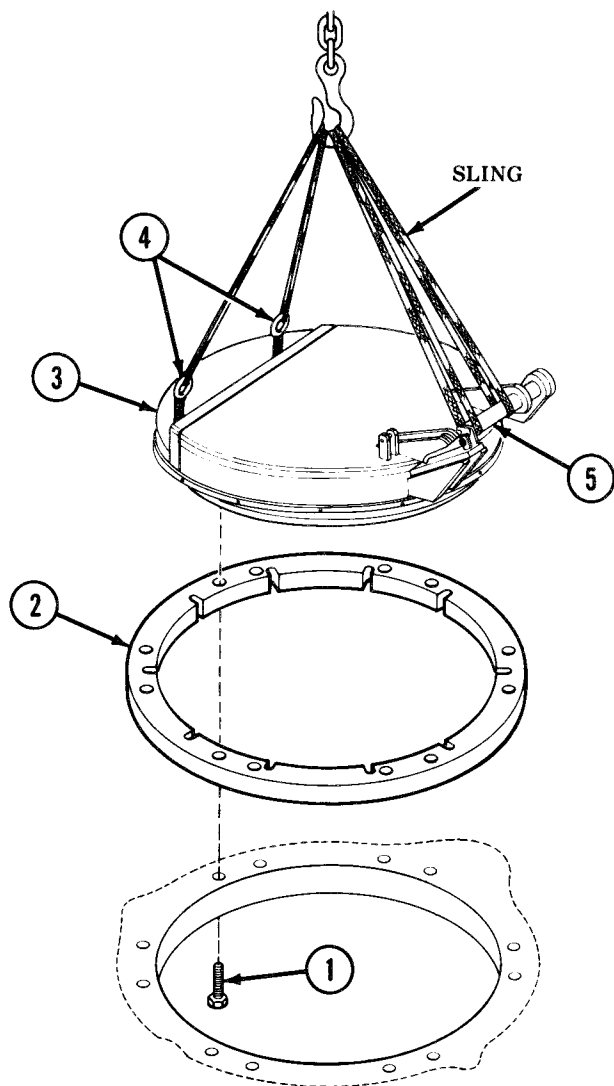
ASSEMBLY

NOTE

Slot on inside of each ring must be in line when rings are assembled.

- A Install outer race ring (17) with 12 screws (15) and 12 new lockwashers (16).
- B Install upper (inner) ring (14).
- C Install 128 cream-colored or white ball bearings (12) and alternately install 128 ball bearings (13) that are other than white or cream-colored.
- D Install lower race ring (11) and 12 screws (10).
- E Install race ring shield (9) and 12 screws (8).
- F Turn cupola body and ring assembly (7) over.
- G Assemble body assembly (6) (p 14-5).
- H Install cupola cover (p 14-2).

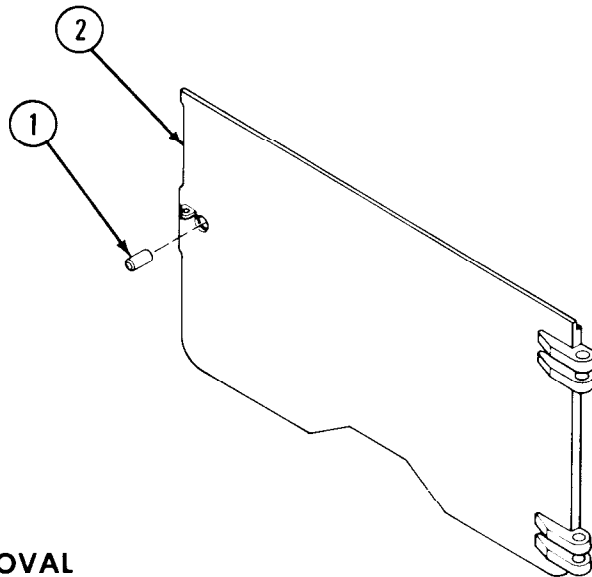
COMMANDER'S CUPOLA RACE RING REPAIR (CONTINUED)



INSTALLATION

- A Install two eyebolts (4) in machinegun support screw holes.
- B Attach sling to eyebolts (4) and hinge tube cover (5).
- C Attach suitable lifting device to sling.
- D Lift cupola (3) into position on roof of vehicle. Aline mounting holes.
- E Have assistant help position lock ring (2) in place against vehicle ceiling. Aline mounting holes. Install 10 screws (1) securing lock ring (2) to ceiling and to cupola (3).
- F Remove lifting device and sling and two eyebolts (4).
- G Adjust per instructions on page 14-6.

LOWER REAR DOOR, DOOR HANDLE BEARING: REMOVAL AND INSTALLATION



REMOVAL

- A Remove inner and outer door handle (TM 9-2350-267-20).

CAUTION

Be careful not to score bearing hole when removing bearing.

- B Use shop press to push bearing (1) from lower rear door (2).

INSTALLATION

CAUTION

Use care not to damage or score bearing during installation.

- A Position bearing (1) over hole in door and press into place using shop press.
- B Install inner and outer door handle (TM 9-2350-267-20).

Section IV ENGINE COMPARTMENT BULKHEAD INSULATION AND SHIELDS

ENGINE COMPARTMENT BULKHEAD INSULATION AND SHIELDS: REMOVAL AND INSTALLATION

INITIAL SETUP

Test Equipment/Special Tools:

Torque wrench, 0-175 lb-ft (item 24, Appx D)

Materials/Parts:

Adhesive (item 4, Appx B)
Dry-cleaning solvent (item 17, Appx B)
Sealing compound (item 46, Appx B)

Personnel Required:

Three

References:

TM 9-2350-267-10
TM 9-2350-267-20

Equipment Condition:

Vehicle parked on level ground and blocked.
Powerpack removed.
Fuel tanks removed (p 4-10).

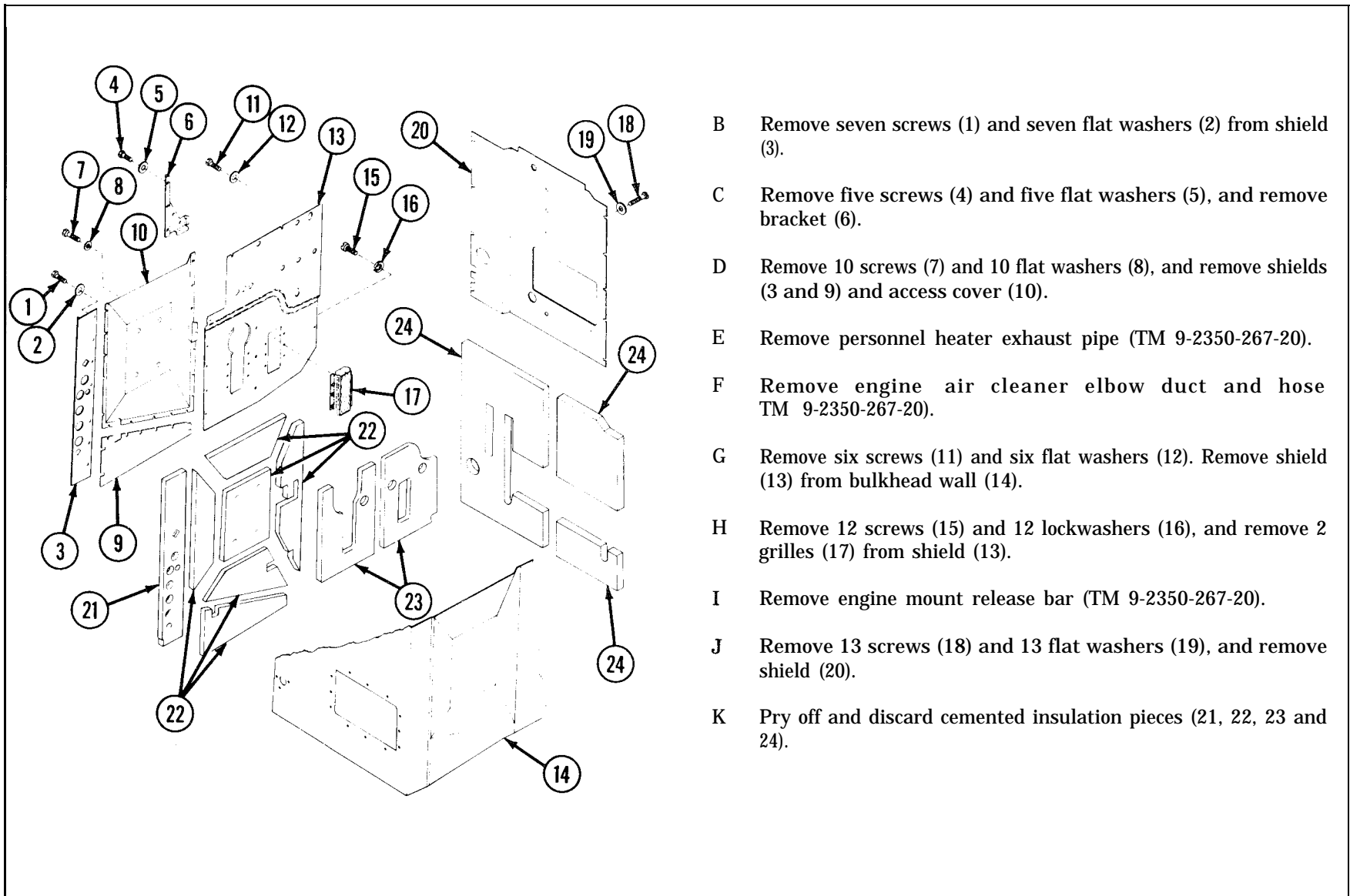
REMOVAL

WARNING

Before disconnecting AFES engine compartment halon distribution tube, thoroughly read the AFES deactivation procedure in TM 9-2350-267-20. Accidental halon discharge at 750 psi can cause frostbite and suffocation and can propel small parts or tools to cause serious injury.

- A Remove bulkhead wall connections mounted through insulation and shield (TM 9-2350-267-20).

ENGINE COMPARTMENT BULKHEAD INSULATION AND SHIELDS: REMOVAL AND INSTALLATION (CONTINUED)



- B Remove seven screws (1) and seven flat washers (2) from shield (3).
- C Remove five screws (4) and five flat washers (5), and remove bracket (6).
- D Remove 10 screws (7) and 10 flat washers (8), and remove shields (3 and 9) and access cover (10).
- E Remove personnel heater exhaust pipe (TM 9-2350-267-20).
- F Remove engine air cleaner elbow duct and hose (TM 9-2350-267-20).
- G Remove six screws (11) and six flat washers (12). Remove shield (13) from bulkhead wall (14).
- H Remove 12 screws (15) and 12 lockwashers (16), and remove 2 grilles (17) from shield (13).
- I Remove engine mount release bar (TM 9-2350-267-20).
- J Remove 13 screws (18) and 13 flat washers (19), and remove shield (20).
- K Pry off and discard cemented insulation pieces (21, 22, 23 and 24).

ENGINE COMPARTMENT BULKHEAD INSULATION AND SHIELDS: REMOVAL AND INSTALLATION (CONTINUED)

WARNING

Dry-cleaning solvent (PD-680) is toxic and flammable. To prevent personal injury when using PD-680, use only in a well ventilated area. Avoid breathing vapors. If you become dizzy get fresh air immediately and seek medical attention. Avoid contact with eyes, skin, and clothing. Use protective goggles, gloves, and clothing. If contact is made, immediately flush with water and seek medical attention. The flashpoint for Type I dry-cleaning solvent is 100°F (38°C); for Type II it is 138°F (50°C). Do not use near open flame or excessive heat.

L Using clean rags and dry-cleaning solvent (item 18, Appx B), thoroughly clean and dry seal channel and insulation mounting surfaces. Be sure to remove all seal particles.

INSTALLATION

A Apply adhesive (item 4, Appx B) to insulation pieces (21, 22, 23, and 24). Install new insulation pieces to bulkhead wall (14) before installing shields (3, 9, and 13). Apply sealing compound (item 46, Appx B) to all screws.

B Torque screws (11 and 18) to 23 lb-ft. Torque screws (1, 4, and 7) to 10 lb-ft.

- C Position shield (20) against driver's compartment bulkhead. Aline mounting holes. Secure with 13 screws (18) and 13 flat washers (19). Torque to 23 lb-ft.
- D Install engine mount release bar (TM 9-2350-267-20).
- E Position two grilles (17) so they nest in rectangular cutouts in insulation pieces (23). Position shield (13) against grilles (17). Secure grilles to shield (13) with 12 screws (15) and 12 new lockwashers (16).
- F Position shield (13) against bulkhead wall (14). Aline mounting holes. Secure with six screws (11) and six flat washers (12). Torque to 23 lb-ft.
- G Install engine air cleaner elbow duct and hose (TM 9-2350-267-20).
- H Install personnel heater exhaust pipe (TM 9-2350-267-20).
- I Position shields (3 and 9) and access cover (10) against bulkhead wall (14). Aline mounting holes. Position bracket (6). Secure with 10 screws (7) and 10 flat washers (8). Torque to 10 lb-ft.
- J Install five screws (4) and five flat washers (5) in bracket (6). Torque to 10 lb-ft.
- K Position shield (3) over the bulkhead wall connections. Aline mounting holes. Secure with seven screws (1) and seven flat washers (2). Torque to 10 lb-ft.
- L Connect bulkhead wall connections (TM 9-2350-267-20).

CHAPTER 15
MAINTENANCE PROCEDURES:
AUTOMATIC FIRE EXTINGUISHER SYSTEM (AFES)

AFES CYLINDERS RECHARGING

Procedure for recharging AFES cylinders is contained in
TM 5-4210-218-13&P.

AFES ELECTRICAL WIRING HARNESSES (12351498, 12351499, 12351500 AND 12351501 ON VEHICLES 1 THRU 344 OR 12352315, 12352316, 12352353 AND 12352354 ON VEHICLES 345 AND ABOVE REPAIR

INITIAL SETUP

Test Equipment/Special Tools:

Gun, thermal heat (item 14, Appx D)
Insert, pliers, electrical (item 15, Appx D)
Pliers, slipjoint (item 17, Appx D)
Stripper, thermal (item 20, Appx D)
AFES repair tool kit (item 32, Appx D).

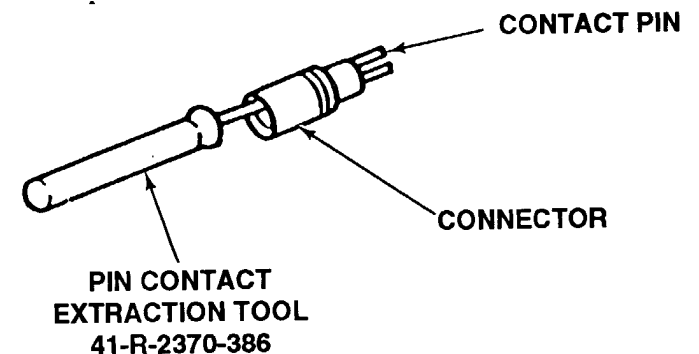
Material/Parts

Tags, marking (item 67, Appx B)
Tape, insulation (item 52, Appx B)

REPAIR

Replace electrical connector contact pins as follows:

A Align contact pin extraction tool with contact pin to be removed,
and slide tool over pin.



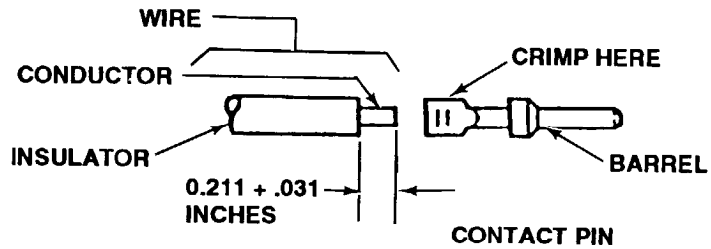
B With contact pin extraction tool perpendicular to connector face,
push pin part way out of the connector.

C Remove pin and connected wire from rear face of connector.

AFES ELECTRICAL WIRING HARNESSSES (12351498, 12351499, 12351500, AND 12351501 ON VEHICLES 1 THRU 344 OR 12352315, 12352316, 12352353, AND 12352354 ON VEHICLES 345 AND ABOVE) HEPAIR (CONTINUED)

D Remove pin from wire.

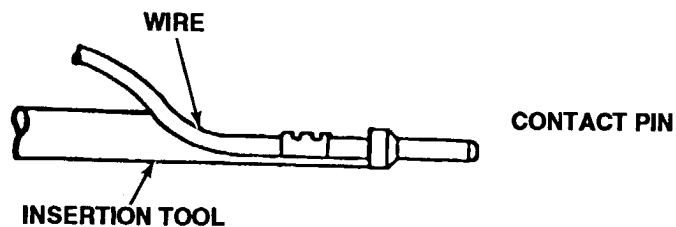
E Prepare wire and crimp pin, using contact pin crimping tool on wire.



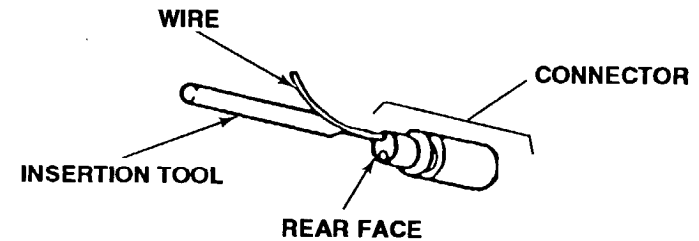
F Lay pin and wire into semicircular groove of insertion tool bit as shown in figure below.

NOTE

Position pin so that should of barrel butts against tip of tool bit. Hold pin and wire firmly in place with thumb.



G Position pin at desired cavity in rest of connnetor face.



H Push pin straight into cavity slowly until tool bit should is flush with rear face of connector.

I Release wire and pull out insertion tool.

CHAPTER 16
MAINTENANCE PROCEDURES
NBC SYSTEMS

Direct support maintenance procedures for the M2A2 Air Purifier and the M1A1 Precleaned and Particulate Filter are contained in TM 3-4240-276-30&P.

Direct and general support maintenance procedures for the Heater, Air, Electric, Filter Unit, M3 are contained in TM 3-4240-240-25P.

APPENDIX A REFERENCES

PUBLICATION INDEXES

The following indexes should be consulted often for latest changes or revisions of references given in this appendix and for new publications relating to materiel covered in this manual.

- AR 310-25 Dictionary of United States Army Terms
- AR 310-50 Authorized Abbreviations and Brevity Codes
- DA Pam 108-4 Index of Army Motion Pictures and Related Audio Visual Aids
- DA Pam 25-30 Consolidated Index of Army Publications and Blank Forms
- FM 21-30 Military Symbols

PUBLICATION REFERENCES

- AR 385-40 Accident Reporting and Records
- AR 385-55 Prevention of Motor Vehicle Accidents
- AR 746-1 Packaging of Army Materiel for Shipment and Storage
- AR 750-1 Army Materiel Maintenance Policies
- CTA 50-970 Expendable/Durable Items (Except: Medical, Class V, Repair Parts and Heraldic)
- DA Pam 738-750 The Army Maintenance Management System (TAMMS)

- DA Pam 750-10 US Army Equipment Index of Modification Work Orders
- FM 21-11 First Aid For Soldiers
- FM 43-2 Metal Body Repair and Related Operations
- LO 9-2350-267-12 Lubrication Order: Carrier, Ammunition, Tracked, M992
- TB SIG 222 Solder and Soldering
- TB 750-651 Use of Antifreeze Solutions and Cleaning Compounds in Engine Cooling Systems
- TB 43-0210 Non-Aeronautical Equipment Army Oil Analysis Program (AOAP)
- TM 3-4240-276-30&P M2A1, M2A2 and Precleaned and Particulate Filter Assy: M1A1-A
- TM 9-214 Inspection, Care and Maintenance of Anti-friction Bearings
- TM 9-237 Operator's Manual, Welding Theory and Application
- TM 38-230-1 Packaging of Materiel: Preservation (VOL I)
- TM 38-230-2 Packaging of Materiel: Packing (VOL II)
- TM 43-0139 Painting Instructions for Field Use
- TM 740-90-1 Administrative Storage of Equipment
- TM 743-200-1 Storage and Materials Handling
- TM 750-254 Cooling Systems: Tactical Vehicles
- TM 750-244-6 Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use

PUBLICATION REFERENCES (CONTINUED)

- | | |
|--|--|
| <p>TM 9-2530-200-24 Organizational, Direct Support and General Support Maintenance Manual: Standards for Inspection and Classification of Tracks, Track Components and Solid-Rubber Tires (FSC 2530)</p> <p>TM 5-4210-218-13&P Halon 1301 Recharging System</p> <p>TM 9-2350-267-10 Operator's Manual, Carrier, Ammunition, Tracked, M992</p> <p>TM 9-2350-267-20 Organizational Maintenance Manual, Carrier, Ammunition, Tracked, M992</p> <p>TM 9-2520-234-35 Field and Depot Maintenance Manual for Power Train Assembly (Allison Model XTG-411-2A)</p> <p>TM 9-2520-234-34P Direct Support and General Support Maintenance Repair Parts and Special Tools List for Power Train Assembly (Allison Model XTG-411-2A)</p> | <p>TM 9-2815-202-34&P Engine, Diesel: Turbocharged, Fuel-Injected, Liquid-Cooled, V8 Type, 8-Cylinder w/Container, Assembly, Detroit Diesel-GMC Series 8V71T</p> <p>TM 9-2920-225-34&P Generator, Engine Accessory, AC, Prestolite Model AMA-510 ZUT; Leece-Neville Models 300ZAC and 300ZAD, 5504AA and 5504AB, 2184AC and 5300GP, and Regulator, Generator Leece-Neville Model 3392R12P</p> <p>TM 9-6140-200-14 Maintenance Manual for Lead-Acid Storage Batteries</p> |
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AR 310-50	Authorized Abbreviations and Brevity Codes
DA Pam 108-4	Index of Army Motion Pictures and Related Audio Visual Aids
DA Pam 25-30	Consolidated Index of Army Publications and Blank Forms
FM 21-30	Military Symbols

PUBLICATION REFERENCES

AR 385-40	Accident Reporting and Records
AR 385-55	Prevention of Motor Vehicle Accidents
AR 746-1	Packaging of Army Materiel for Shipment and Storage
AR 750-1	Army Materiel Maintenance Concepts and Policies
CTA 50-970	Expendable/Durable Items (Except: Medical, Class V, Repair Parts and Heraldic)
DA Pam 738-750	The Army Maintenance Management System (TAMMS)

DA Pam 750-10	US Army Equipment Index of Modification Work Orders
FM 21-11	First Aid For Soldiers
FM 43-2	Metal Body Repair and Related Operations
LO 9-2350-267-12	Lubrication Order: Carrier, Ammunition, Tracked, M992
TB SIG222	Solder and Soldering
TB 750-651	Use of Antifreeze Solutions and Cleaning Compounds in Engine Cooling Systems
TB 43-0210	Non-Aeronautical Equipment Army Oil Analysis Program (AOAP)
TM 3-4240-276-30&P	M2A1, M2A2 and Precleaner and Particulate Filter Assy: M1A1-A
TM 9-214	Inspection, Care, and Maintenance of Antifriction Bearings
TM 9-237	Operator's Manual, Welding Theory and Application
TM 38-230-1	Packaging of Materiel Preservation (VOL I)
TM 38-230-2	Packaging of Materiel: Packing (VOL II)
TM 43-0139	Painting Instructions for Field Use
TM 740-90-1	Administrative Storage of Equipment
TM 743-200-1	Storage and Materials Handling
TM 750-254	Cooling Systems: Tactical Vehicles
TM 750-244-6	Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use

PUBLICATION REFERENCES (CONTINUED)

TM 5-4210-218-13&P	Operator's, Organizational, and Direct Support Maintenance Manual Including Repair Parts and Special Tools List for Recharger, Fire Extinguisher, Monobromotrifluoromethane, Skid Mounted, Electric Motor Driver Model RHA-101-M, Part Number 350501-001 S/N 3505-1 to 3505-368 (NSN 4210-01-176-3511)	7395 (NSN 2815-01-043-7092) (2815-01-260-0211) Engine, Diesel with Container Model 7093-7396 (2815-01-040-3120) (2815-01-260-0212) Engine, Diesel with Container Model 7083-7398 (2815-00-936-7659) Engine, Diesel with Container Model 7083-7399 (2815-00-134-4845)	
TM 9-2530-200-24	Unit, Direct Support and General Support Maintenance Manual: Standards for Inspection and Classification of Tracks, Track Components and Solid-Rubber Tires (FSC 2530)	TM 9-2815-202-34P	Direct Support and General Support Maintenance Repair Parts and Special Tools Lists (Including Depot Maintenance Repair Parts and Special Tools Lists) for 8V71T Diesel Engine Model 7083-7395 (NSN 2815-01-043-7092) and (2815-01-260-0211) Model 7083-7396 (2815-01-040-3120) and (2815-01-260-0212) Model 7083-7398 (2815-00-936-7659) Model 7083-7399 (2815-00-134-4845)
TM 9-2350-267-10	Operator's Manual, Carrier, Ammunition, Tracked, M992 (2350-01-110-4660)	TM 9-2815-221-34&P	Direct Support and General Support Maintenance (Including Repair Parts and Special Tools List); for Engine, Diesel, Industrial Type Model DJEAM and DJBMA (NSN 2815-01-175-7342) and (2815-00-615-8740)
TM 9-2350-267-20	Organizational Maintenance Manual for Hull, Powerpack, Drive Controls, Tracks, Suspension and Associated Components. Carrier, Ammunition, Tracked, M992 (NSN 2350-01-110-4660).	TM 9-2920-224-34&P	Direct Support and General Support Maintenance Manual Including Repair Parts and Special Tools List for Generator Assembly, Engine (300 AMP) 8717421 (NSN 2920-00-795-6627), 10889713 (2920-00-830-6660), and 11642898
TM 9-2520-234-35	Field and Depot Maintenance Manual for Power Train Assembly (8351100) (Allison Model XTG-411-A2) composed of: Transfer Assembly, Transmission Input (NSN 2520-00-894-9535, Transmission Assembly (2520-00-894-9533) Drive Assembly, Transmission Output, Vehicle Left (2520-00-894-9534) and Drive Assembly, Transmission Output, Vehicle Right (2520-00-894-9532)	TM 9-2920-225-34&P	Direct Support and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools): Generator, Engine Accessory (AC) (Prestolite Model AMA-510201) (FSN 2920-909-2483), (Leece-Neville Models 3002AC and 3002AD) (2920-909-2483), Models 5504AA and 5504AB) (2920-475-1446), (Model 2184AC) (2920-782-1955) and (Model 5300GP) (2920-818-8635) [22 July 74]
TM 9-2520-234-34P	Direct Support and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) for Power Train Assembly (8351100) (Allison Model XTG-411-2A)	TM 9-6140-200-14	Operator's, Unit, Intermediate Direct Support and Intermediate General Support Maintenance Manual for Lead-Acid Storage Batteries
TM 9-2540-205-24&P	Organization, Direct Support and General Support Maintenance Manual (Including Repair Parts and Special Tools) for Heaters, Vehicular Compartment		
TM 9-2815-202-34	Direct Support and General Support Maintenance for Engine, Diesel with Container Mode 7083-		

APPENDIX B
EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I INTRODUCTION

SCOPE

This appendix lists expendable supplies and materials needed to operate and maintain the M992. These items are authorized by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts and Heraldic Items).

EXPLANATION OF COLUMNS

- a Column 1 - Item Number. Number assigned to entry in listing and referenced in narrative instructions to identify material (eg, "Use cleaning compound, item 5, Appx B").
- b Column 2 - Level. Identifies lowest level of maintenance that requires listed item:
 - C - Operator/Crew
 - O - Organizational Maintenance
 - F - Direct Support Maintenance
 - H - General Support Maintenance

- c Column 3 - National Stock Number. National stock number assigned to item; use it to request or requisition item.
- d Column 4 - Description. Federal item name and, if required, a description to identify item. Last line for each item indicates part number followed by Federal Supply Code for Manufacturer (FSCM) in parenthesis, if applicable.
- e Column 5 - Unit of Measure (U/M). Measure used in performing actual maintenance function. Measure is expressed by two-character alphabetical abbreviation (such as ea, in., pr). If unit of measure differs from unit of issue, requisition lowest unit of issue necessary.

Section II EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) (U/M)
1		8040-00-262-9025	ADHESIVE: MIL-A-5092 Type I (81349)	OZ
2		8040-00-262-9026	ADHESIVE: MIL-A-5092 Type I (81349)	PT
3		8040-00-221-3811	ADHESIVE: Type II Reclaimed Rubber, Liquid, General Purpose	OZ
4			ADHESIVE: MMM-A-617	
5			ADHESIVE SEALANT, SILICON RTV MIL-A-46106	PT
6		6850-00-181-7929	ANTIFREEZE, PERM-O-A-548, 1-GAL. CAN MIL-A-46153 (81349)	
7		6850-00-181-7933	ANTIFREEZE, PERM-O-A-548, GAL. CAN MIL-A-46153 (81349)	GL
8		6850-00-174-1806	ANTIFREEZE, ARCTIC TYPE, 55-GAL. DRUM MIL-A-11755 (81349)	DR
9		6850-00-598-7328	CLEANING COMPOUND, 2 CCMP CAN MIL-C-10597 (81349)	KT
10		6850-00-227-1887	CLEANING COMPOUND MIL-C-43454 (81349)	QT

Section II EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) (U/M)
11		6850-00-224-6665	CLEANING COMPOUND MIL-C-11090 (81349)	CN
12		6850-00-224-6657	CLEANING COMPOUND, RIFLE MIL-C-372 (81349)	CN
13		6850-00-224-6663	CLEANING COMPOUND, RIFLE MIL-C-372 (81349)	CL
14		5350-00-221-0872	CLOTH, ABRASIVE CROCUS .50, SHEETS PC-458 (81348)	PG
15		7920-00-044-9281	CLOTH, CLEANING, LOW-LINT MIL-C-85043	LB
16		6850-00-901-0591	DEICING-DEFROSTING COMPOUND, 5-GAL. CAN MIL-A-8243 (81349)	GL
17		6850-00-281-1905	DRY-CLEANING SOLVENT PS-661 (02978)	GL
18		6850-00-281-3061	DRY-CLEANING SOLVENT, 4-OZ CAN PD-680 (81348)	DR
19		8010-00-527-2020	ENAMEL, GLOSS, BLACK, 1-GAL. CAN TTE-489 CLASS A (81348)	PT
20		8010-00-527-2053	ENAMEL, GLOSS, BLACK, 1-QT CAN TTE-489 CLASS A (81348)	QT

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Section II EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) (U/M)
21			ENAMEL, SEMIGLOSS, FOREST GREEN, TYPE II MIL-E-52798	QT
22		8010-00-664-7653	ENAMEL, SYN, GLOSS, WHITE TTE-489 (81348)	QT
23		9110-00-391-7813	FUEL, JELLIED, ALCOHOL 2.625-OZ CAN 4006 (50616)	CN
24		9150-00-935-1017	GREASE, AUTOMOTIVE ART, 14-OZ CAN MIL-G-10924 (81349)	TY
25		9150-00-190-0904	GREASE, AUTOMOTIVE ART, MIL-G-10924 BRAYCOTE610 (98308)	LB
26		9150-00-190-0905	GREASE, AUTOMOTIVE ART, MIL-G-10924 BRAYCOTE610 (98308)	LB
27		9150-00-190-0917	GREASE, GRAPHITE, SOFT GRADE 1, W-G-671	CN
28			GREASE LUBTEC	
29		9150-00-935-9808	HYDRAULIC FLUID, PET, OHT, MIL-H-6083 BRAYCO783C (98308)	GL
30		9150-00-935-9807	HYDRAULIC FLUID, PET, OHT, MIL-H-6083 BRAYCO783C (98308)	QT

Section II EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) (U/M)
31		6850-00-753-4967	INHIBITOR, CORROSION O-I-0049OB (81348)	OZ
32		9150-00-231-6689	LUBRICATING OIL, GEN. PL. SPC VV-L-800 (81348)	QT
33		9150-00-189-6727	LUBRICATING OIL: MIL-L-2104B (81349)	QT
34		9150-00-188-9858	LUBRICATING OIL MIL-L-2104B (81349)	CN
35		9150-00-186-6668	LUBRICATING OIL ENG: MIL-L-2104B (81349)	CN
36		9150-00-186-6681	LUBRICATING OIL ENG: MIL-L-2104B (81349)	QT
37		9150-00-231-9062	LUBRICATING OIL, GEN, 5-GAL. CAN VV-L-800 (81348)	GL
38		9150-00-231-2361	LUBRICATING OIL, GEN. MIL-L-3150 (81349)	QT
39		9150-00-231-2356	LUBRICATING OIL, GEN. MIL-L-3150 (81349)	CN
40		9150-00-402-2372	LUBRICATING OIL, OES 5-GAL. CAN CONOCODN600 FLUID TYPE I (15445)	CN

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Section II EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) (U/M)
41		9150-00-402-4478	LUBRICATION OIL, OES 1-QT CAN CONOCOO600 FLUID (15445)	QT
42		6640-00-285-4694	PAPER, LENS NNN-P-40 (81348)	HD
43		9150-00-250-0926	PETROLATUM, TECHNICAL: VV-P-236 (81348)	LB
44		9150-00-250-0933	PETROLATUM, TECHNICAL: 5-LB CAN VV-P-236 (81348)	LB
45		7920-00-205-1711	RAG, WIPING: DDD-R-30 (81348)	BE
46			SEALING COMPOUND MIL-S-22473	
47			SANDPAPER, CLASS B, TYPE II MIL-S-7124	PK
48		8030-00-159-8176	SEALING COMPOUND MIL-S-45180 (81349)	TU
49		8030-00-204-9149	SEALING COMPOUND (05972)	CC
50		8030-00-252-3391	SEALING COMPOUND AGASKETH02 (77247)	OZ

Section II EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) (U/M)
51			SILICONE LUBRICANT	
52		5970-00-284-8410	TAPE, INSULATION, ELECTRICAL MIL-I-7798 (81349)	FT
53		8010-00-242-2089	THINNER, PAINT MIXER TT-T-291 GR1 GAL (81348)	GL
54		8010-00-558-7026	THINNER, PAINT, MINERAL TT-T-291 (81348)	GN
55		5610-00-141-7838	WALKWAY COMPOUND 1-GAL. CAN MIL-W-5044 TYPE 2 (81349)	GL
56		6850-00-281-1985	CLEANING SOLVENT	GL
57		8020-00-655-9228	PAINT, FIRE RETARDANT	GL
58		8030-00-794-6807	GE GLYPTAL VARNISH NO. 1201B (89473)	PT
59		9150-00-181-7724	GREASE, AIRCRAFT MIL-G-81322 (81349)	OZ
60		8030-00-244-1297	CORROSION PREVENTIVE MIL-C-16173 GRADE 2 (80244)	EA

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Section II EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) (U/M)
61		8040-00-738-6429	CEMENT, EPOXY, ALUMINUM	KT
62		8010-01-160-6744	COATING, ALIPHATIC POLYURETHANE, CHEMICAL RESISTANT, BROWN MIL-C-46168	
63		8010-01-160-6741	COATING, ALIPHATIC POLYURETHANE, CHEMICAL RESISTANT, GREEN MIL-C-46168	
64		2910-00-078-4065	REPAIR KIT, FIBERGLASS (10941900)	EA
65		8030-00-530-6608	SEALING COMPOUND, TYPE III MIL-S-11030	RO
66		3439-00-555-4629	SOLDER, TIN ALLOY	LB
67		9905-00-537-8954	TAG, MARKER MIL-T-12755	BD
68		9320-01-102-8292	TAPE, ADHESIVE, RUBBER (12287273)	RO

Section III EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) (U/M)
69		8030-00-087-8630	ANTISEIZE COMPOUND MIL-T-83484 (81349)	RO
70		8030-00-067-6746	SEALING COMPOUND, GRADE AV MIL-S-22473	TU
71		8030-00-889-3534	TAPE, ANTISEIZE	RO
72		7510-00-198-5831	TAPE, MASKING	RO
73			ITEM DELETED	
74		5330-00-223-2657	GASKET MATERIAL P2246-A PER MIL-G-12803	SH
75		8040-01-108-6660	REPAIR KIT	KT
76		6810-00-184-4796	ACETONE, TECHNICAL; 5 gallon can; OA-51 (81348)	CN

**Section II COMMON TOOLS AND SUPPLEMENTS
AND SPECIAL TOOLS/FIXTURES LIST (CONT)**

(1) ITEM NUMBER	(2) ITEM NAME	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) REFERENCE
14	Gun, thermal heat	4940-00-561-1002	8031088	SC 4910-95-CL-A72
15	Insert, pliers, electrical	5120-01-143-1258	12830-05P	TM 9-2350-267-24P
16	Lug	5120-00-034-8443	8390124	TM 9-2350-267-24P
17	Pliers, slipjoint	5120-01-143-1219	12830-00P	TM 9-2350-267-24P
18	Pliers, wire twist	5120-00-542-4171	GGG-W-340 SIZE 12	SC 4910-95-CL-A31
19	Solder gun	3439-00-618-6623	D-550-3	SC 4910-95-CL-A31
20	Stripper, thermal	5130-00-176-3991	TW1	TM 9-2350-267-34P
21	Threading setscrew	5180-00-422-4975	GGG-T-330	SC 4910-95-CL-A31
22	Tool kit precision instrument repair	5180-00-596-1538	SC5180-90-CL N53	SC 5180-90-CL-N53
23	Twist drill set	5133-00-293-0983	DB129 B	SC 4910-95-CL-A74
24	Wrench, torque, 1/2 in. drive, 0-175 lb-ft	5120-00-640-6364	1753LDF	SC 4910-95-CL-A74
25	Wrench, torque, 3/4 in. drive, 0-600 lb-ft	5120-00-221-7983	SW 130-301	SC 4910-95-CL-A74
26	Gage, alinement	5120-00-613-6779	11671961	TM 9-2350-267-24P
27	Puller, mechanical	5120-00-613-6775	11671732	TM 9-2350-267-24P

**Section II COMMON TOOLS AND SUPPLEMENTS
AND SPECIAL TOOLS FIXTURES LIST (CONT)**

(1) ITEM NUMBER	(2) ITEM NAME	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) REFERENCE
28	Wrench, combination 11/32 in.	5120-00-277-8313 (part of tool kit, automotive electrical 5120-00-422-8594)	A-A-1355	SC 4910-95-CL-A31
29	Wrench, open-end, 1-1/4 in.	5120-00-277-2322	A-A-1356	SC 4910-95-CL-A31
30	Wrench, open-end, 1-1/2 in.	5120-00-277-2323	A-A-1356	SC 4910-95-CL-A31
31	Wrench, torque, 1/2 in. drive, (0-150 lb ft)	5120-00-247-2540	J-1313-B	SC 4910-95-CL-A31
32	Tool Kit, AFES Repair	4210-01-269-8368	5705554	TM 9-2350-267-24P
33	Socket, Wrench, Face;	5120-00-034-0867	10914193	
34	Replacer, plain, encasing	5120-00-034-0878	10914185	

APPENDIX D COMMON TOOLS AND SUPPLEMENTS AND SPECIAL TOOLS/FIXTURES LIST

Section I INTRODUCTION

SCOPE

This appendix lists all common tools and supplements and special tools/fixtures needed to maintain the M992.

EXPLANATION OF COLUMNS

- a Column 1- Item Number. This number is assigned to the entry in the listing and is referenced in the Initial Setup to identify the item (e.g., "Brush, wire (item 7, Appx D)").
- b Column 2 - Name. This column lists the item by noun nomenclature and other descriptive features (e.g., "Insert, pliers, electrical").
- c Column 3- National Stock Number. This is the National Stock Number (NSN) assigned to the item; use it to requisition the item.
- d Column 4- Part Number. Indicates the primary number used by the manufacturer (individual, company, firm, corporation or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards and inspection requirements to identify an item or range of items.
- e Column 5- Reference. This column identifies the authorizing Supply Catalog (SC) or Repair Parts and Special Tools List (RPSTL) for items listed in this appendix.

**Section II COMMON TOOLS AND SUPPLEMENTS
AND SPECIAL TOOLS/FIXTURES LIST**

(1) ITEM NUMBER	(2) ITEM NAME	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) REFERENCE
1	Arbor press	3444-00-449-7295		SC 4910-95-CL-A31
2	Arc welding machine	3431-00-067-6742		SC 3431-95-CL-A01
3	Automotive electrical tool kit	5180-00-422-8594		SC 4940-95-CL-A08
4	Bit, drill, 3/16 in.	5133-00-227-9654		SC 4910-95-CL-A72
5	Bit, drill, 5/32 in.	5133-00-227-9652		SC 4910-95-CL-A72
6	Blind hand riveter (kit)	5120-00-017-2849		SC 4910-95-CL-A74
7	Brush, wire, scratch	7920-00-291-5815		SC 4910-95-CL-A74
8	Drill, portable electric, 1/4 in.	5130-00-889-8994		SC 4910-95-CL-A72
9	Extractor set	5120-00-610-1888		SC 4910-95-CL-A31
10	Fuel hose	4720-00-080-8586		TM 9-2350-267-34P
11	Gage, force, 0-600 lb		BML 64840	TM 9-2350-267-34P
12	Gas shielded torch	3431-00-165-4112		SC 3431-97-CL-E02
13	General mechanic's tool kit: automotive	5180-00-177-7033		SC 5180-90-CL-N26

**Section II COMMON TOOLS AND SUPPLEMENTS
AND SPECIAL TOOLS/FIXTURES LIST (CONT)**

(1)	(2)	(3)	(4)	(5)
ITEM NUMBER	ITEM NAME	NATIONAL STOCK NUMBER	PART NUMBER	REFERENCE
14	Gun, thermal heat	4940-00-561-1002	8031088	SC 4910-95-CL-A72
15	Insert, pliers, electrical	5120-01-143-1258		TM 9-2350-267-34P
16	Lug	5120-00-034-8443		TM 9-2350-267-34P
17	Pliers, slipjoint	5120-01-143-1219		TM 9-2350-267-34P
18	Pliers, wire twist	5120-00-542-4171		SC 4910-95-CL-A31
19	Solder gun	3439-00-618-6623		SC 4910-95-CL-A31
20	Stripper, thermal	5130-00-176-3991		TM 9-2350-267-34P
21	Threading setscrew	5180-00-422-4975		SC 4910-95-CL-A31
22	Tool kit: precision instrument repair	5180-00-596-1538		SC 5180-90-CL-N53
23	Twist drill set	5133-00-293-0983		SC 4910-95-CL-A74
24	Wrench, torque, 1/2 in. drive, 0-175 lb-ft	5120-00-640-6364		SC 4910-95-CL-A74
25	Wrench, torque, 3/4 in. drive, 0-600 lb-ft	5120-00-221-7983		SC 4910-95-CL-A74
26	Gage, alinement	5120-00-613-6779	11671961	TM 9-2350-267-34P
27	Puller, mechanical	5120-00-613-6775	11671732	TM 9-2350-267-34P

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**Section II COMMON TOOLS AND SUPPLEMENTS
AND SPECIAL TOOLS/FIXTURES LIST (CONT)**

(1)	(2)	(3)	(4)	(5)
ITEM NUMBER	ITEM NAME	NATIONAL STOCK NUMBER	PART NUMBER	REFERENCE
28	Wrench, combination 11/32 in.	5120-00-277-8313 (part of tool kit, automotive elec- trical 5120-00-422-8594)		SC 4910-95-CL-A31
29	Wrench, open-end, 1-1/4 in.	5120-00-276-2322		SC 4910-95-CL-A31
30	Wrench, open-end, 1-1/2 in.	5120-00-277-2323		SC 4910-95-CL-A31
31	Wrench, torque, 1/2 in. drive, (0-150 lb-ft)	5120-00-247-2540		SC 4910-95-CL-A31

APPENDIX E
ILLUSTRATED LIST OF MANUFACTURED ITEMS

Section I INTRODUCTION

GENERAL

This appendix includes complete instructions for making items authorized to be manufactured or fabricated at direct and general support maintenance.

All bulk materials needed for manufacture of an item are listed by part number in a tabular list on the illustration.

A part number index in alphanumeric order is provided for cross-referencing the part number of the item to be manufactured to the figure which covers fabrication criteria.

Section II ILLUSTRATED LIST OF MANUFACTURED ITEMS

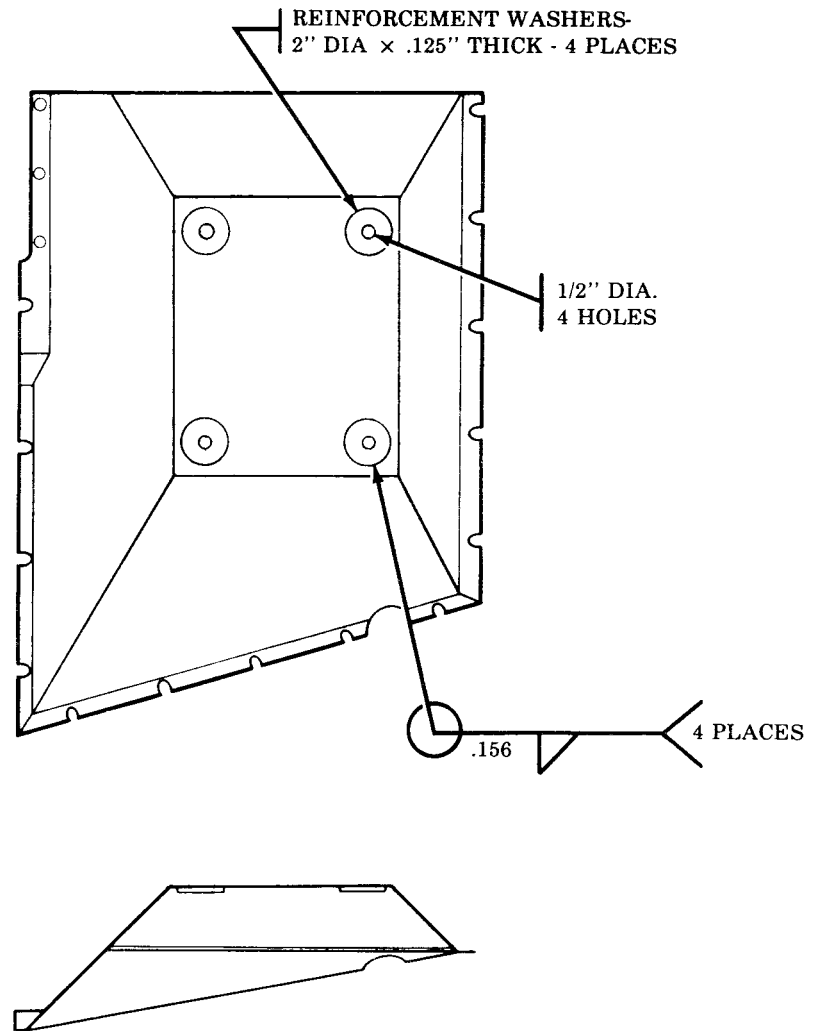
■ FABRICATION PROCEDURES FOR PROJECTILE RACK TEST STAND

Directions for manufacturing the projectile rack test stand are located in the back of this manual.

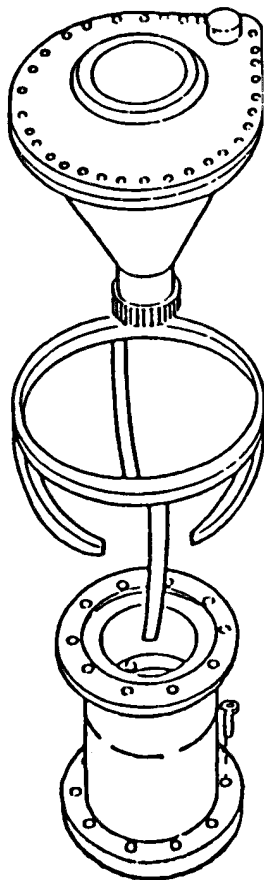
HEAT SHIELD REINFORCEMENT

NOTE

1. Drill or punch 1/2" hole through center of stainless steel washers.
2. Weld washers to heat shield in four places (ref. TM 9-237).



WORK STAND, FINAL DRIVE



Construct from an old sprocket hub (PN 19207) 10936277, NSN 2520-00-066-0239.

Using 1/8 in. flat steel, make a rack to support the weight of the final drive.

Make certain final drive fits comfortably in rack. Bolt rack to upper ring or weld rack to hub.

Before using the stand, bolt it securely to the floor through the lower ring.

GLOSSARY

Section I ABBREVIATIONS

amps	amperes	lb-ft	pound-force foot
cap	capacitor	lbs/min	pounds per minute
°C	degrees Celsius	mfd	microfarad
cfm	cubic foot (feet) per minute	od	outer diameter
cr	crystal rectifier	psi	pound- force per square inch
°F	degrees Fahrenheit	psig	pound-form per square inch gage
gph	gallons per hour	rpm	revolutions per minute
id	inside diameter	tir	total indicator reading
in.	inch	vdc	volts, direct current
lb.....	pound		

Section II DEFINITION OF UNUSUAL TERMS

backlash	the play between adjacent movable gears	fabricate	make, construct
concentricity	having a common center or axis	growler	a device used for finding short-circuited coils
continuity	uninterrupted connection between points, a complete circuit	perpendicularity	being at right angles to a given line or plane
counterbore	an enlargement of the mouth of a cylindrical bore	trueness	bring or restore to a desired mechanical accuracy or form

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PARTS LIST

ITEM NO	QTY	NAME	PN/SPEC
MANUFACTURED ITEMS			
1	1	PLATE	ASTM A575 OR A576
2	1	PLATE	ASTM A575 OR A576
3	4	GUSSET	ASTM A575 OR A576
4	2	GUSSET	ASTM A575 OR A576
5	1	PLATE	ASTM A575 OR A576
6	1	BRACKET	
7	6	GUSSET	ASTM A575 OR A576
8	1	PLATE	ASTM A575 OR A576
9	3	GUSSET	ASTM A575 OR A576
10	1	RAIL	ASTM A575 OR A576
11	1	CHANNEL	ASTM A36
12	2	CHANNEL	ASTM A36
13	2	PLATE	ASTM A575 OR A576
14	3	BEAM	ASTM A36
15	1	PLATE	ASTM A575 OR A576
16	1	ANGLE	ASTM A36
17	1	ANGLE	ASTM A36
18	6	ANGLE	ASTM A36
19	1	ADAPTER	ASTM A108
20	1	HOOK	ASTM A108
21	1	PLATE	ASTM A575 OR A576
22	1	TEST FIXTURE	
23	1	SUPPORT STAND	
24	6	BLOCK	ASTM A36
25	3	ANGLE	ASTM A36
26	2	ANGLE	ASTM A36
27	2	PLATE	ASTM A575 OR A576
PROCURED ITEMS			
28	1	FORCE GAGE	BML 64840
29	4	NUT	MS 51968-14
30	2	LOCKWASHER	MS 35338-48
31	4	FLAT WASHER	MS 27183-18
32	2	CAM FOLLOWER	12332904
33	1	WINCH	12333546
34	2	SCREW	MS 90728-60
35	10	FLAT WASHER	MS 27183-14
36	6	LOCKWASHER	MS 35338-46
37	4	NUT	MS 51967-8
38	1	PIN	MS 17990-510
39	2	CHAIN 12351791-9	42C15120-205
40	2	HOOK	MS 87006-3
41	4	SCREW	MS 90728-63
42	1	SCREW	MS 90725-4
43	1	LOCKWASHER	MS 35338-44
44	1	PIN	MS 17990-507
45	1	CLEVIS	12333545

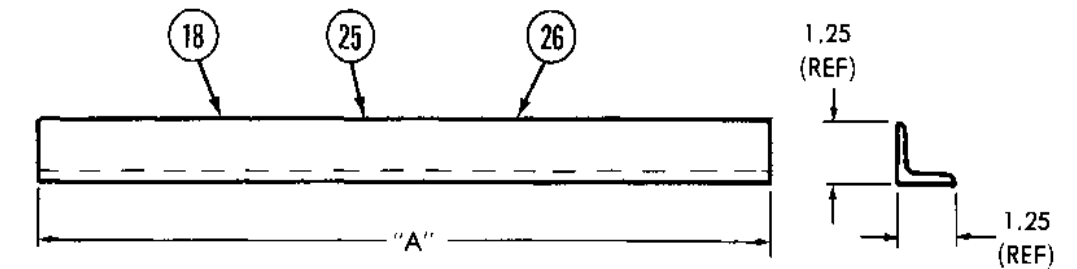
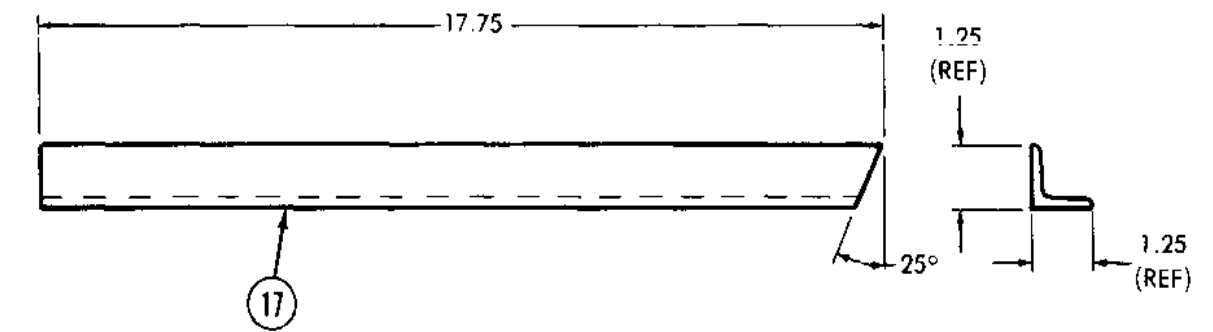
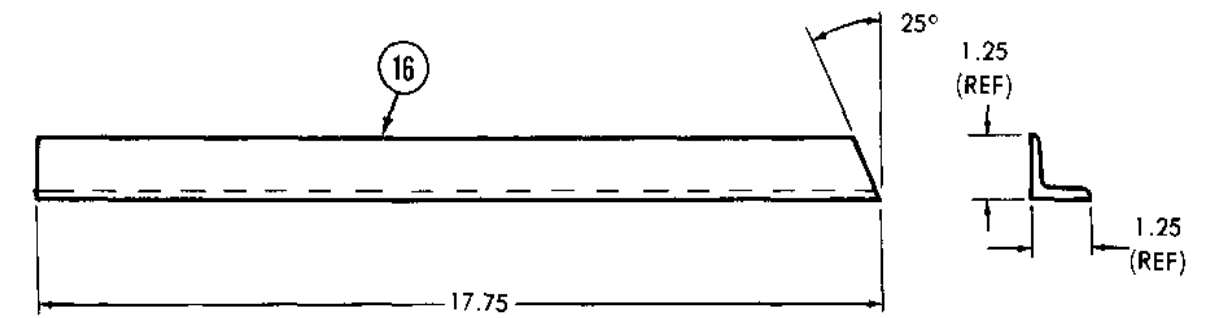
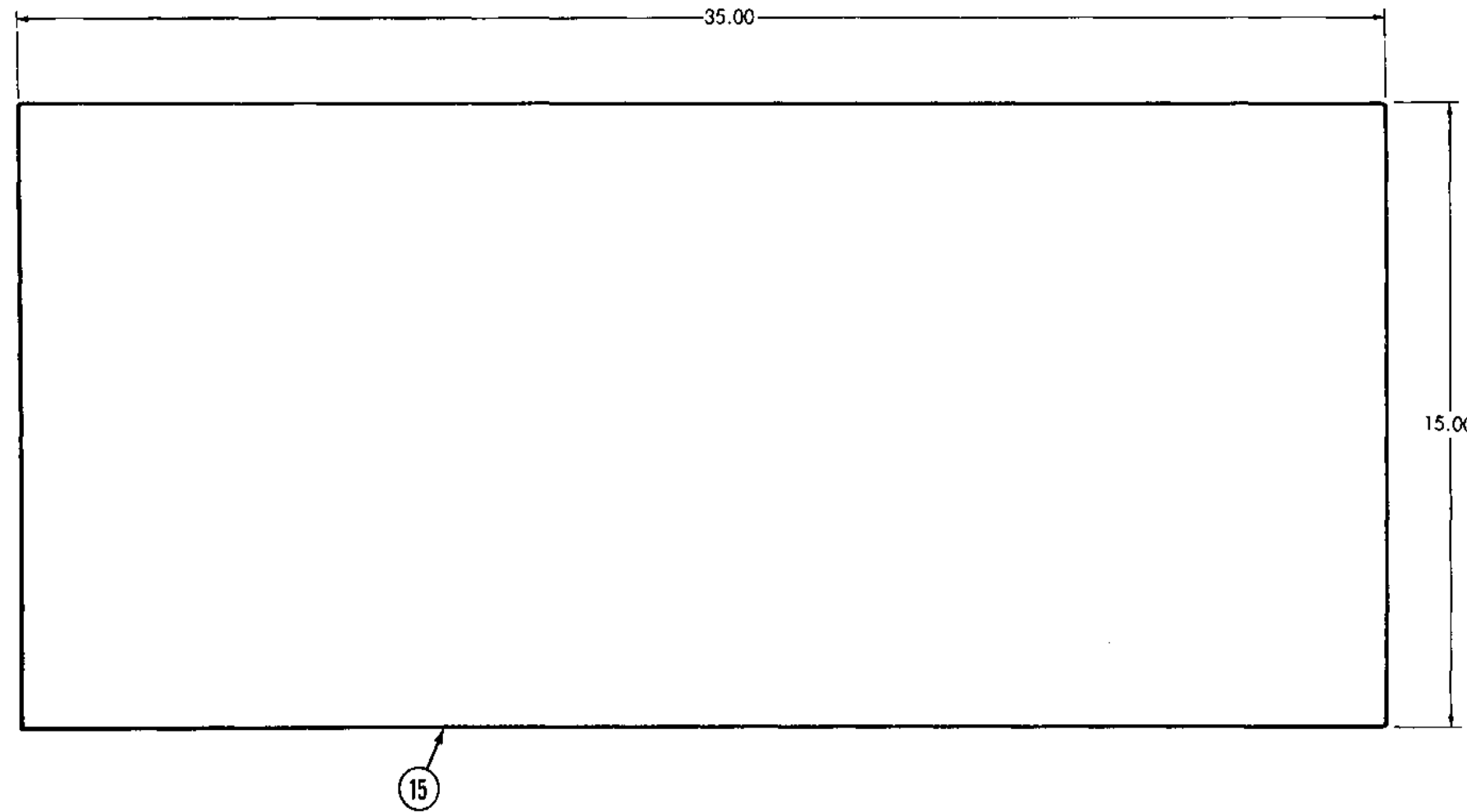
BILL OF MATERIAL

QTY	DESCRIPTION	SPEC
20 FT.	STEEL ANGLE 1.25 × 1.25 × .187	ASTM A36
2 SQ FT	STEEL, CARBON M1010-M1025 .375 THK	ASTM A575 OR A576
15 SQ FT	STEEL, CARBON M1010-M1025 .250 THK	ASTM A575 OR A576
1 FT	STEEL, CARBON M1010-M1025 .500 DIA	ASTM A108
20 FT	STEEL "I" BEAM I3 × 7.5	ASTM A36
10 FT	STEEL CHANNEL 2.00 × 1.00 × .187	ASTM A36
1 FT	STEEL CARBON 1.00 × 1.25	ASTM A36

NOTES:

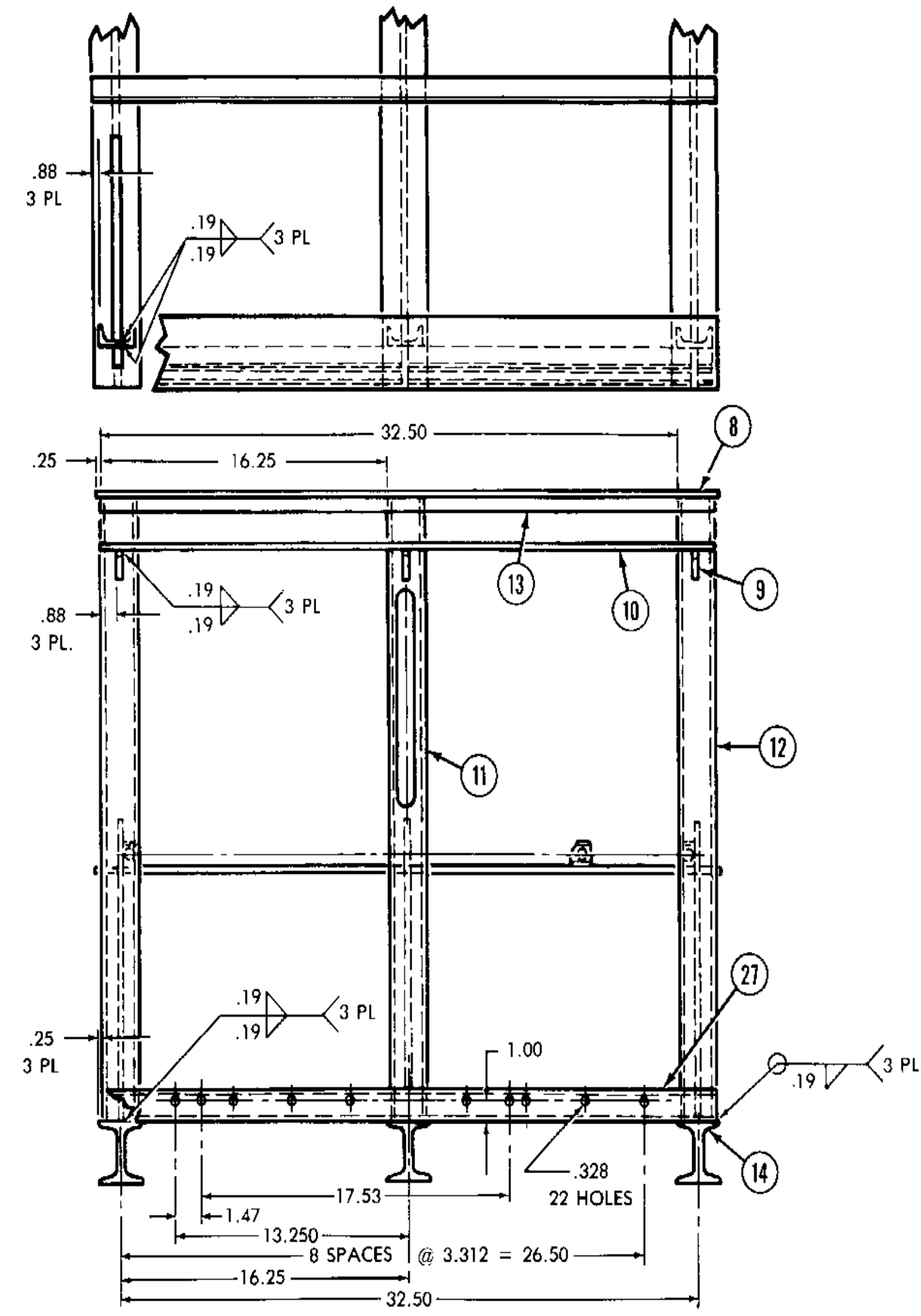
1. Steel carbon
M1010-M1025
Spec ASTM A575 or A576
.250 thick
2. Steel angle
Per ASTM A36
1.25 x 1.25 x .187
3. Remove all burrs and sharp edges.

TOLERANCES ON		
FRACT.	DECIMALS	ANGLES
±	± .03	± 2°



ITEM NO	"A"
18	12.12
25	15.50
26	34.00

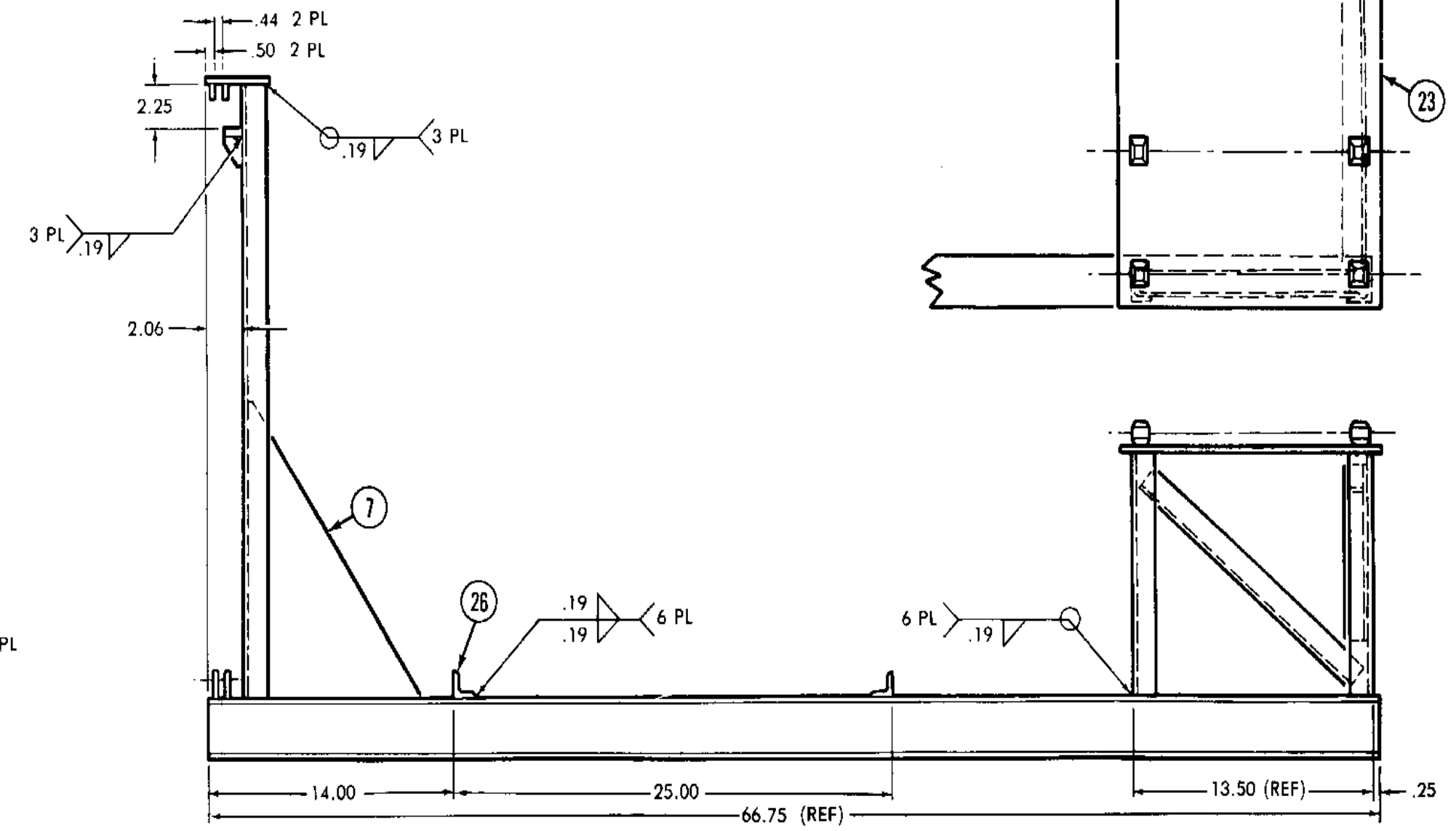
FO-3. Projectile Rack Test



NOTES:

- 1. Weld per Spec MIL-STD 1261, Class 1.
- 2. All weld sizes are minimum

FRACT.	DECIMALS	ANGLES
±	± .03 ± .010	± 2"

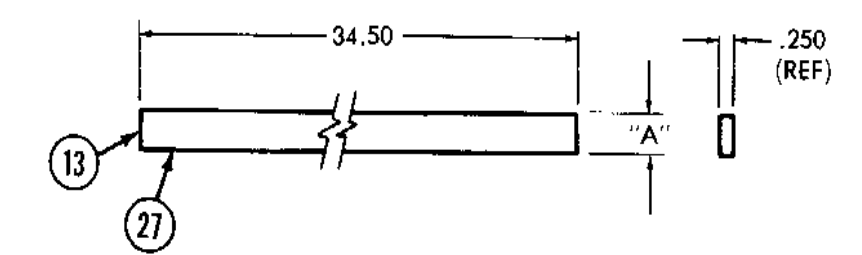
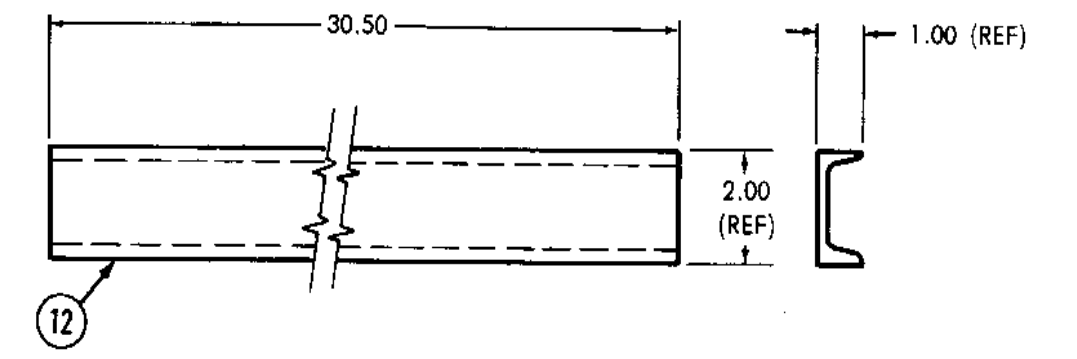
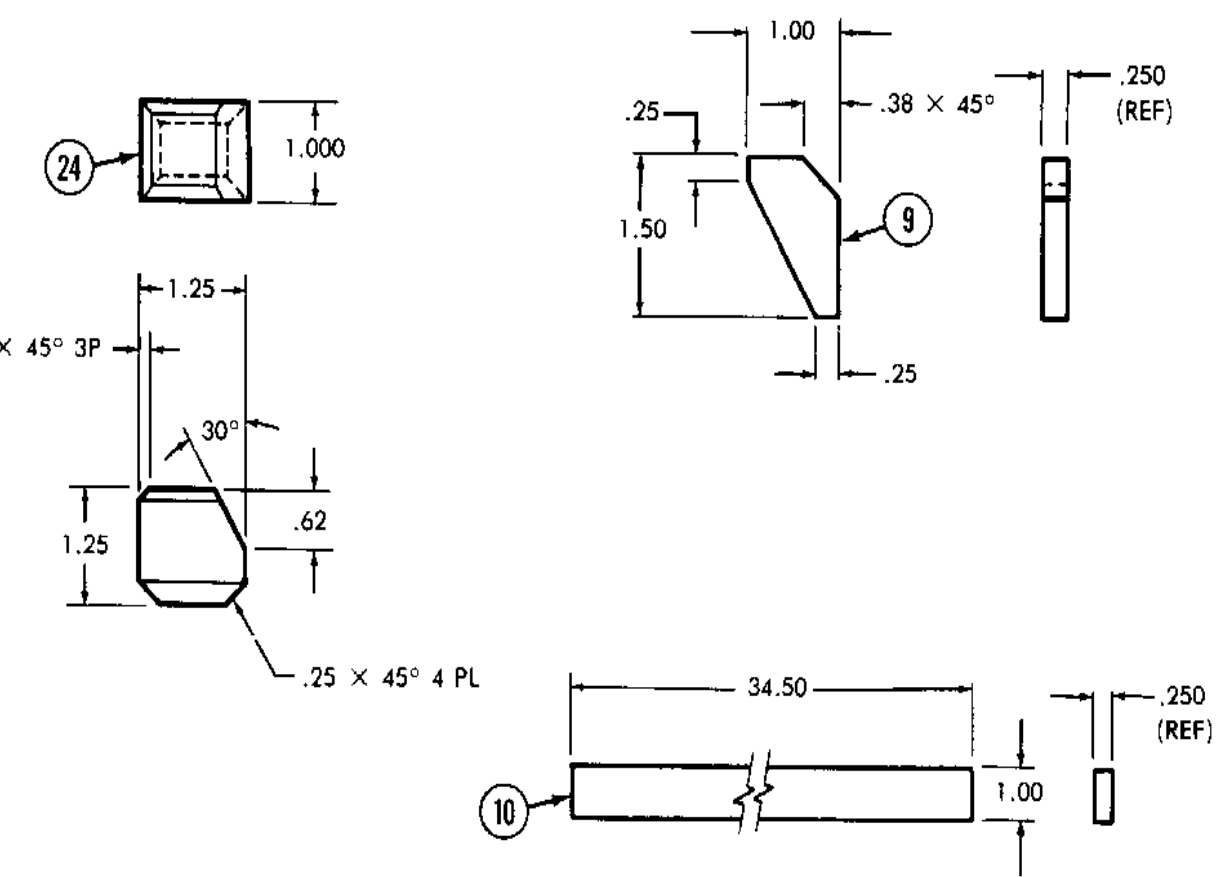
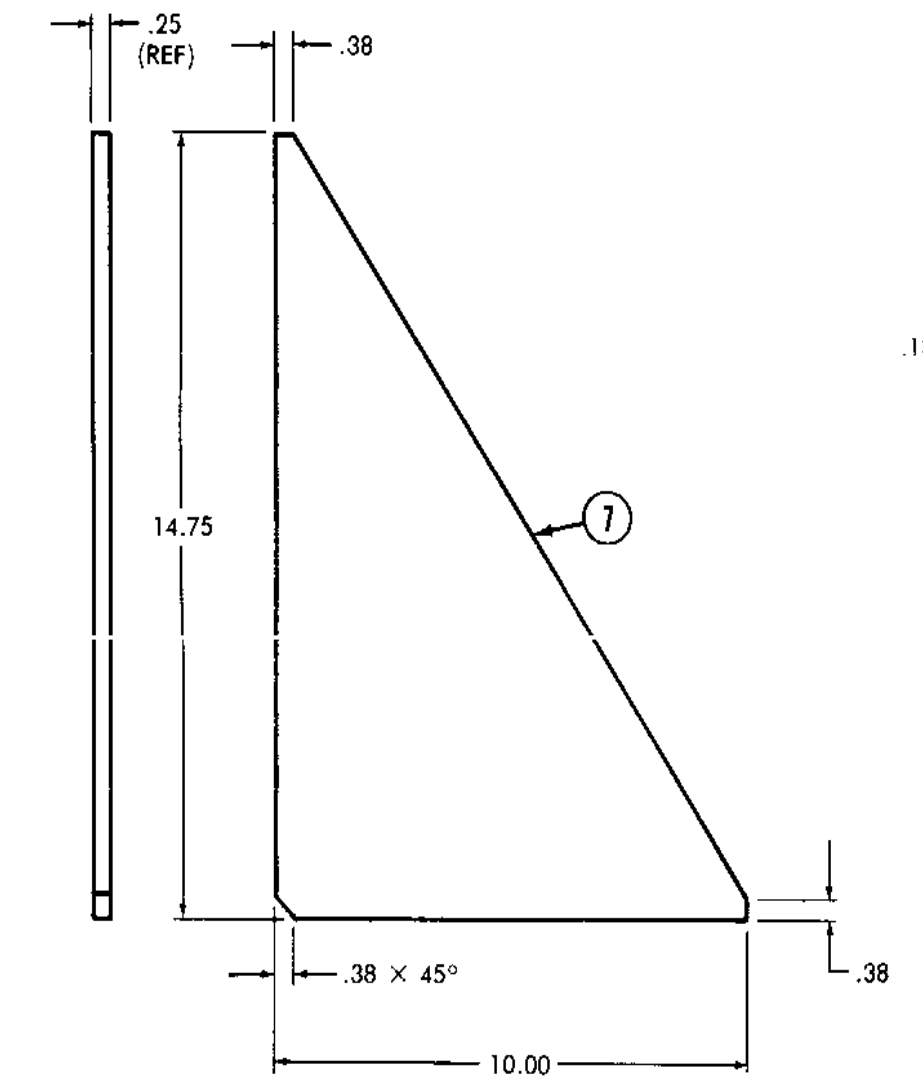


FO-4. Projectile Rack Test Stand - Test Fixture Weldment

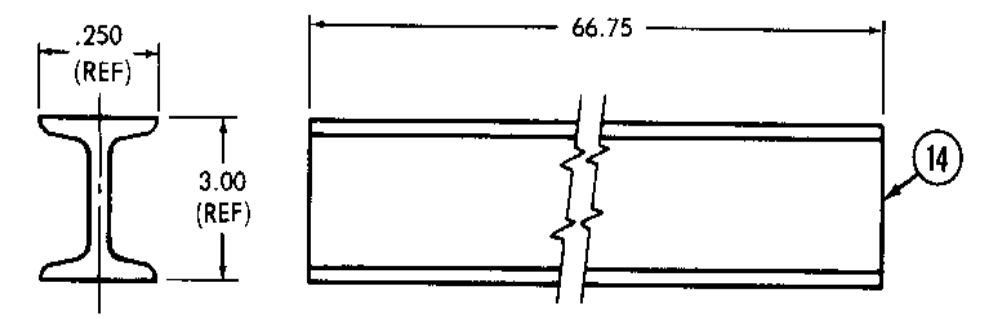
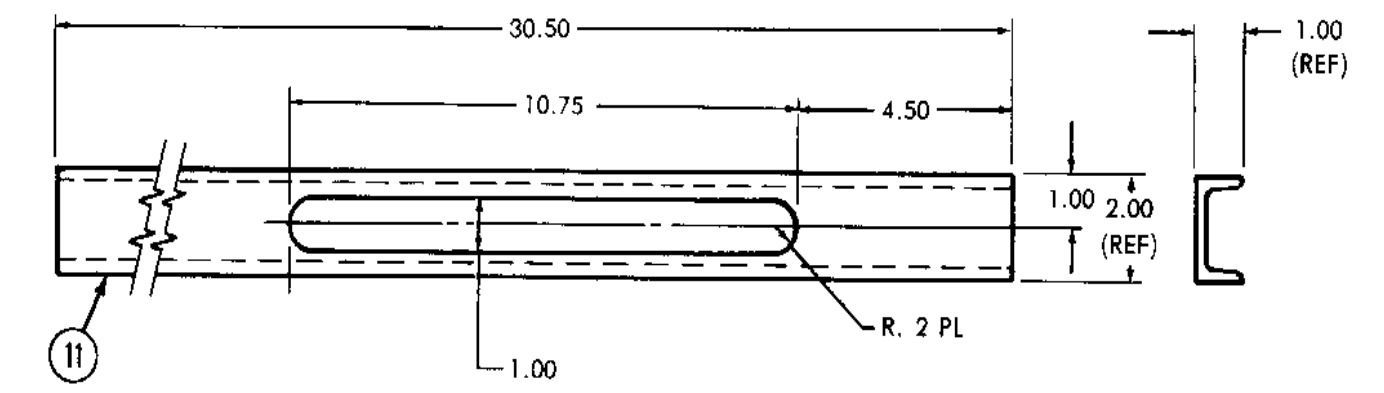
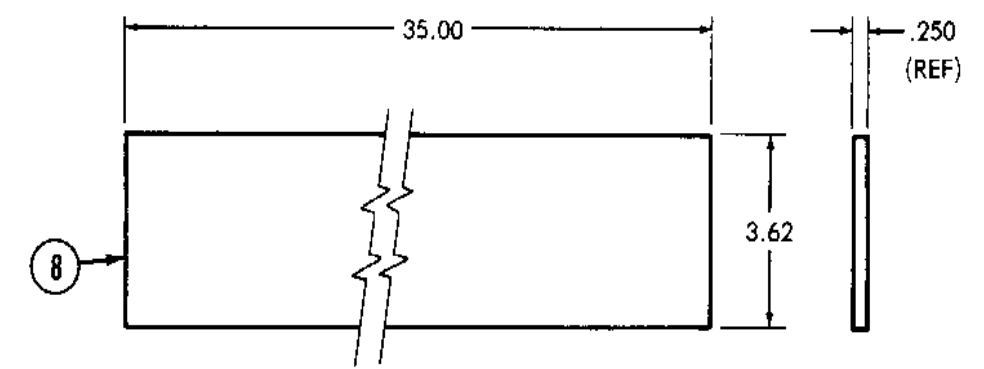
NOTES:

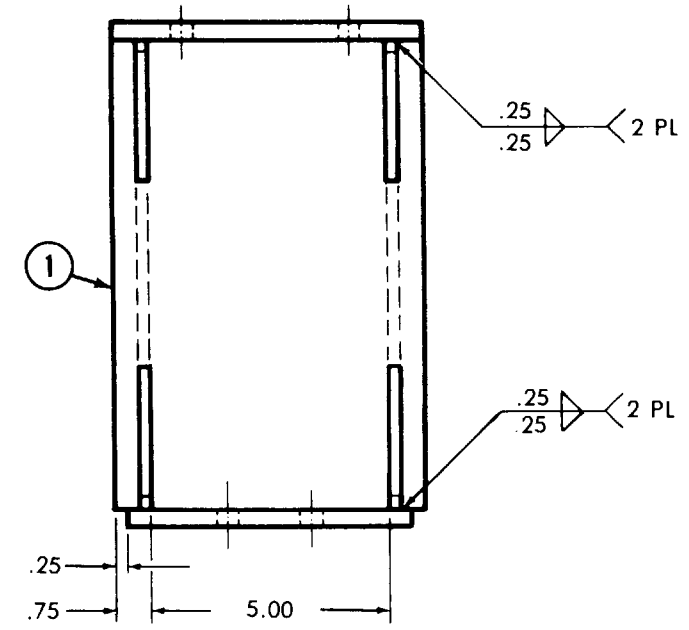
1. Steel carbon
M1010-M1025
Spec ASTM A575 or A576
.250 thick
2. Steel channel - bar size
per ASTM A36
2.00 x 1.00 x .187
3. Steel "I" beam
per ASTM A36
I3 x 7.5
4. Remove all burrs and
break sharp edges.

TOLERANCES ON		
FRACT.	DECIMALS	ANGLES
±	± .03	± 2°
	± .010	



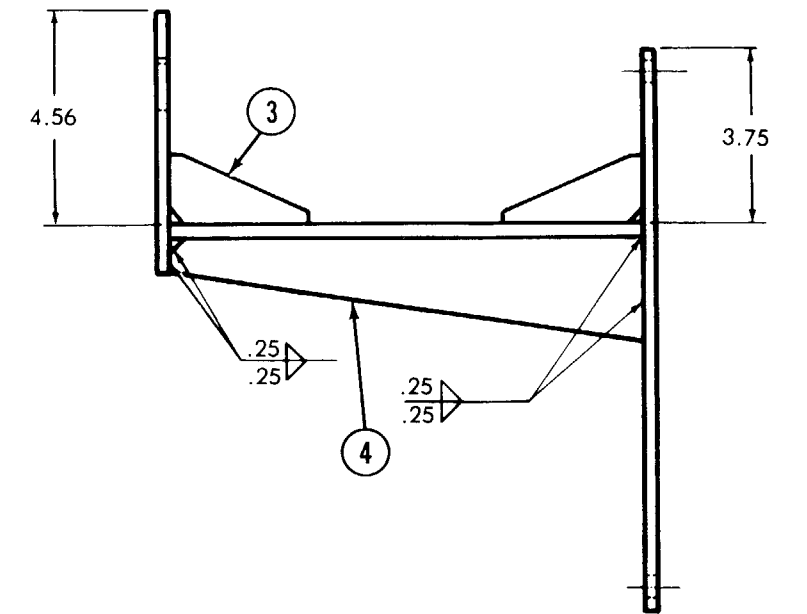
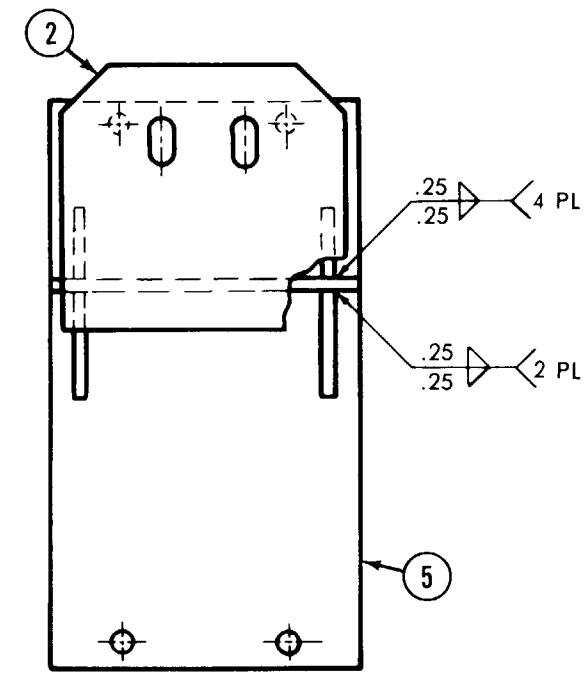
ITEM NO	"A"
13	.75
27	1.50





- NOTES**
1. Weld per Spec MIL-STD-1261 Class 1.
 2. All weld sizes are minimum

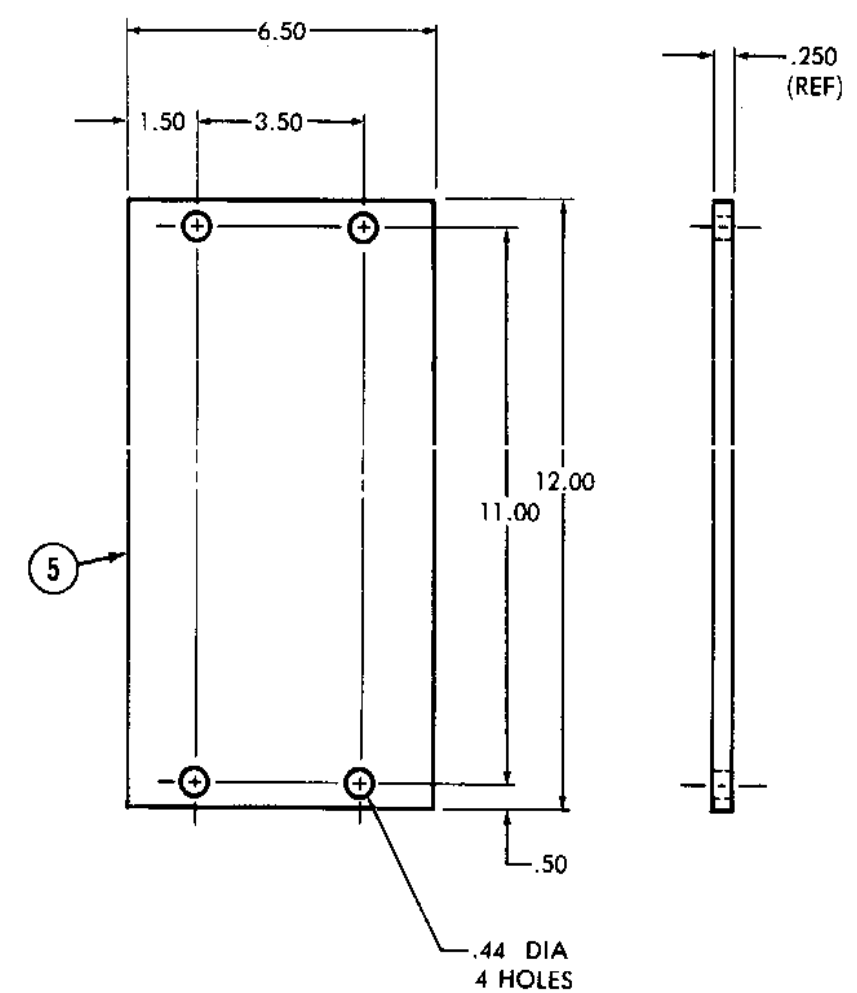
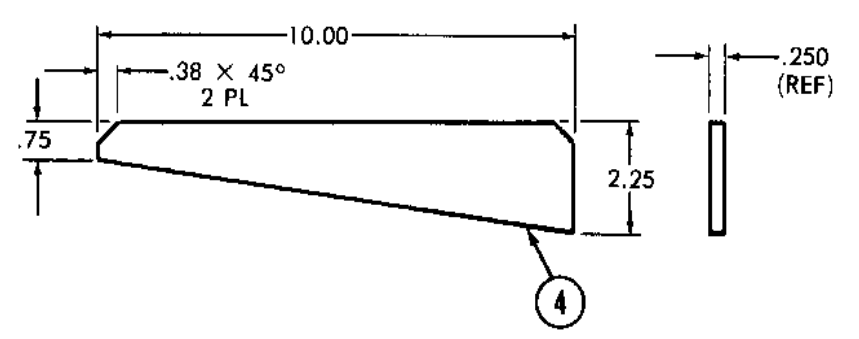
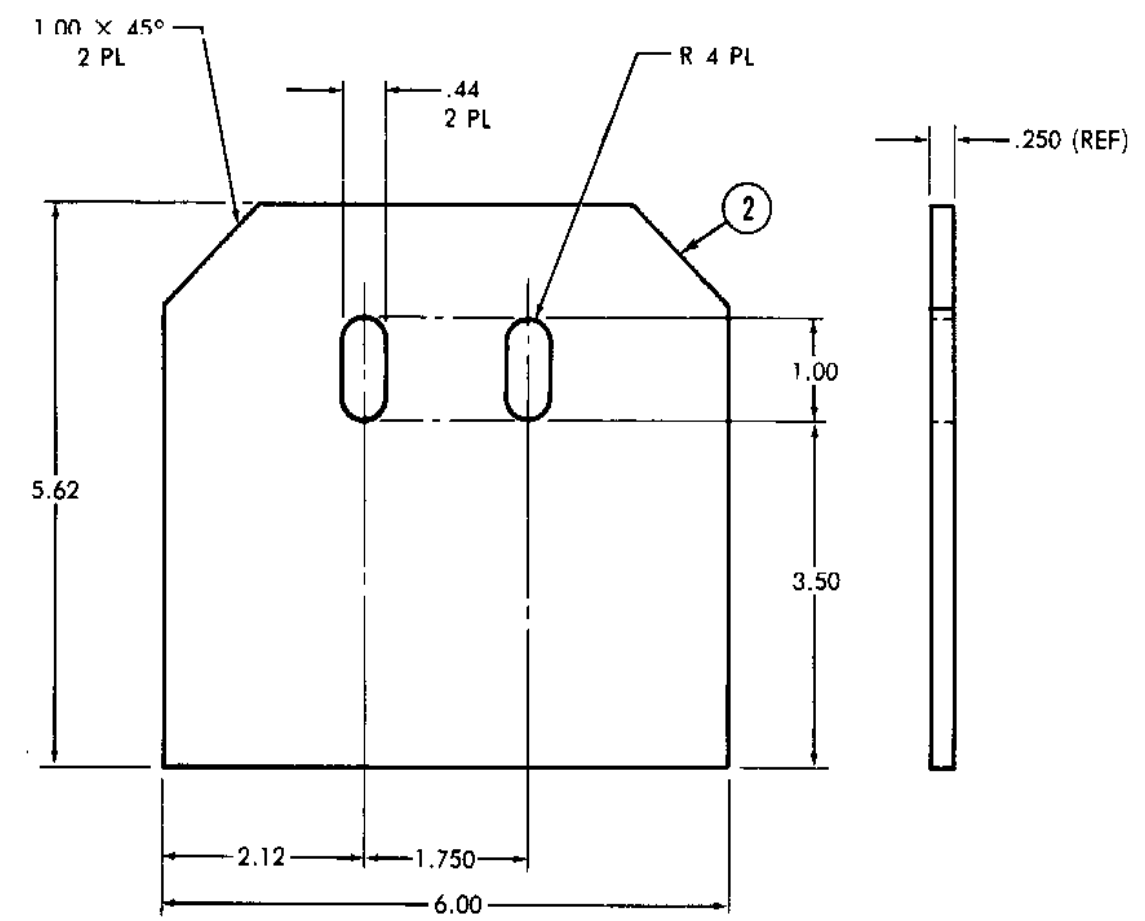
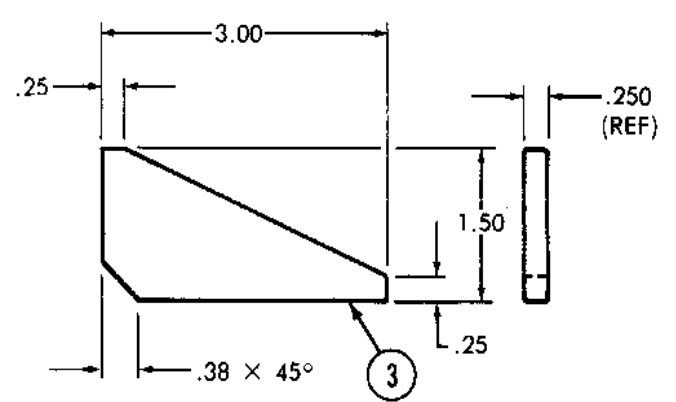
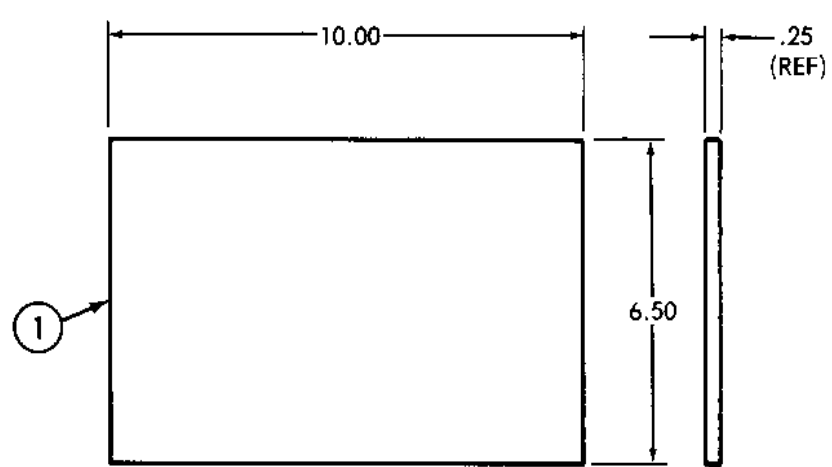
TOLERANCES ON		
FRACT.	DECIMALS	ANGLES
±	± .03	±



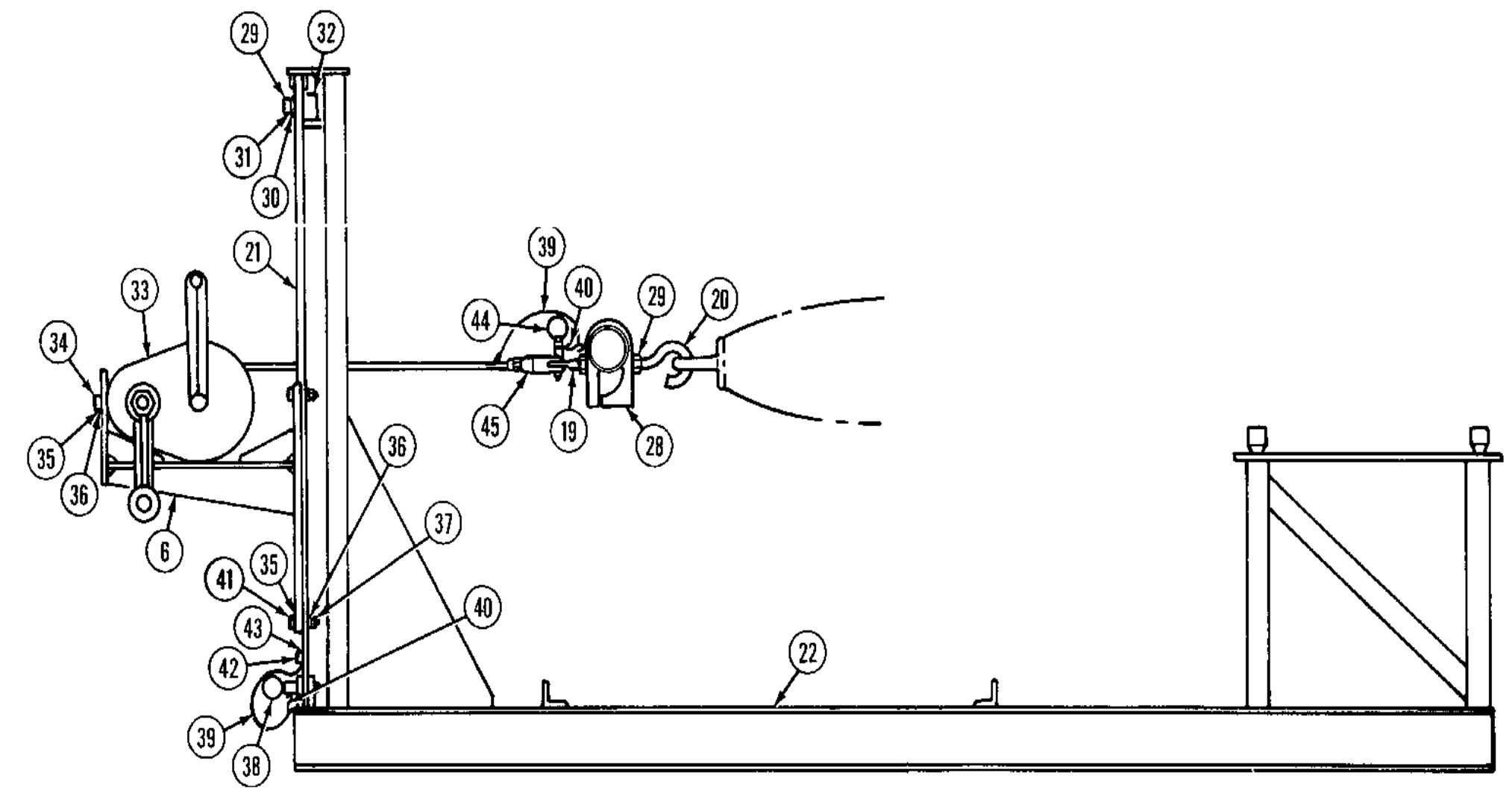
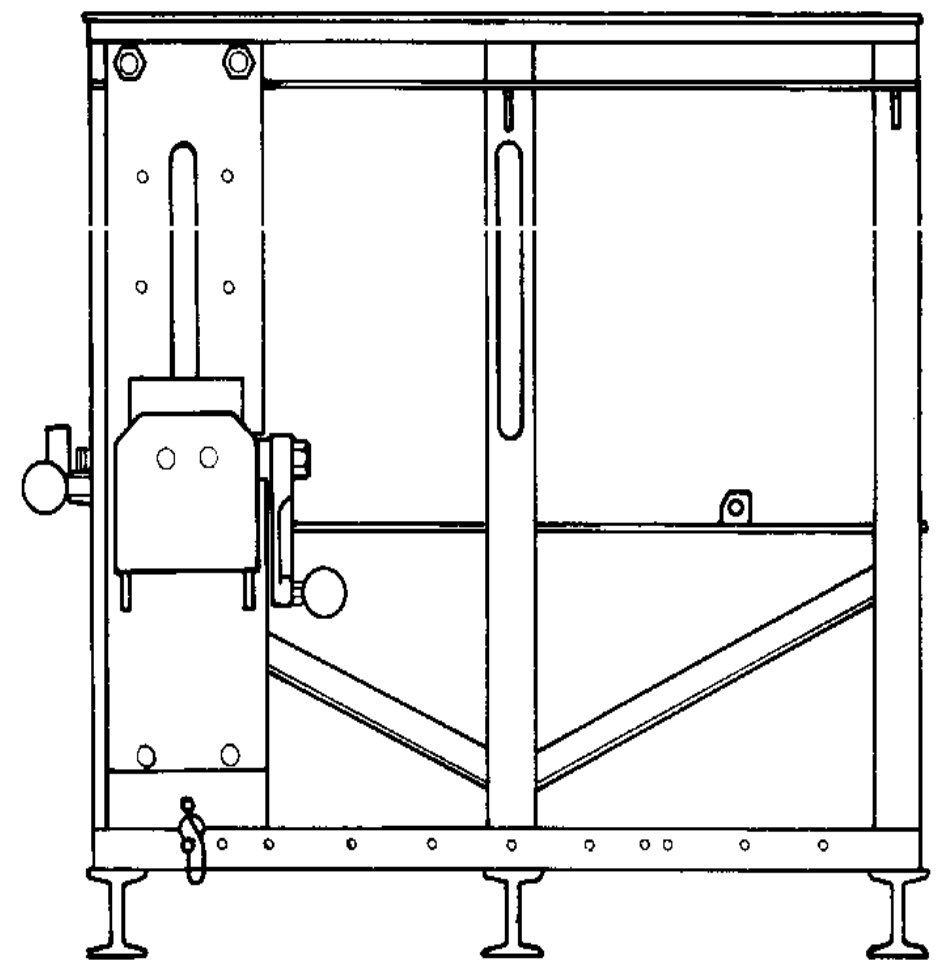
FO-6. Projectile Rack Test Stand - Bracket Weldment

- NOTES:**
1. Steel, carbon
M1010-M1025
Spec ASTM A575 or A576
.250 thick
 2. Remove all burrs and
break sharp edges.

TOLERANCES ON		
FRACT.	DECIMALS	ANGLES
±	± .03	± 2°



FO-7. Projectile Rack Test Stand

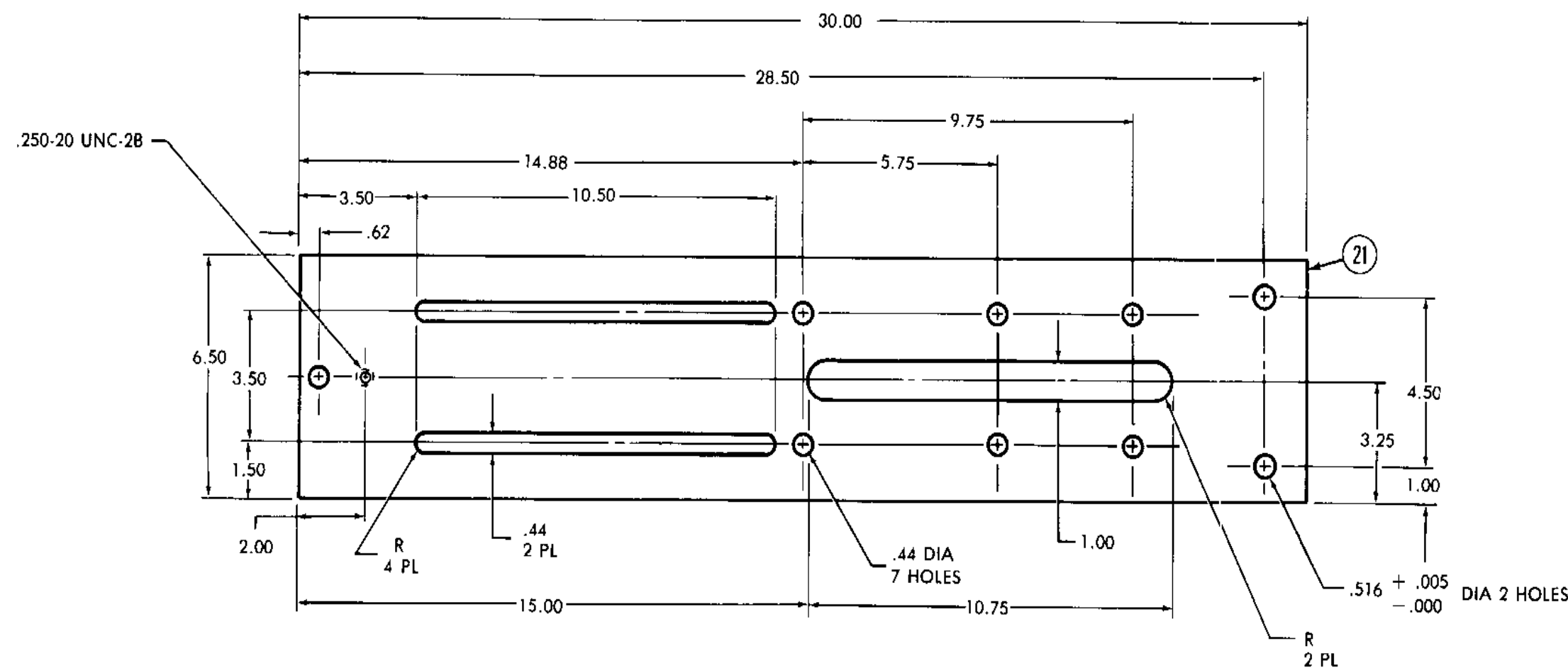
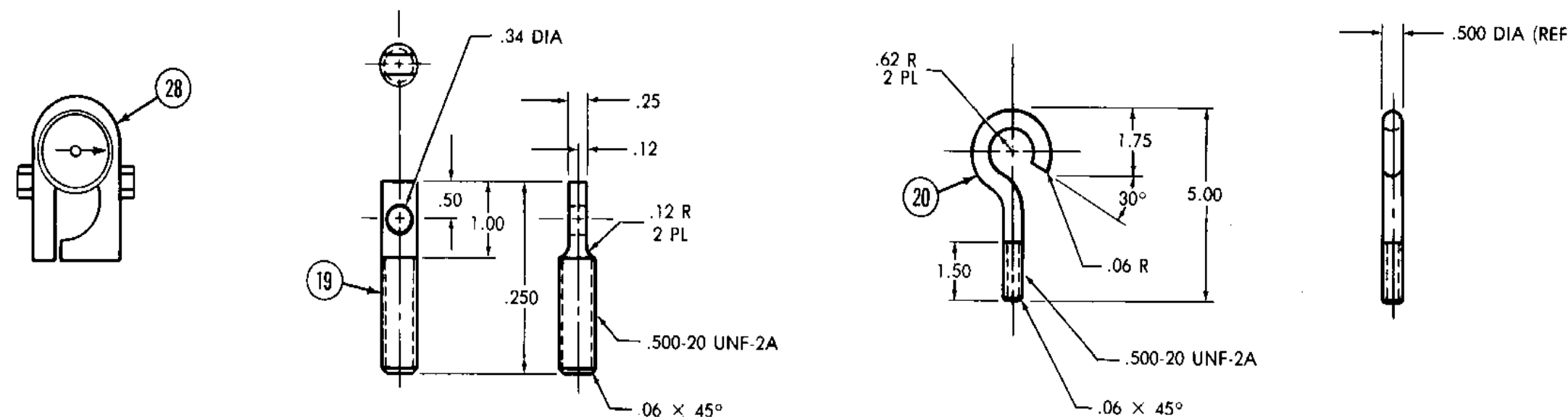


FO-8. Projectile Rack Test Stand - Ammo Rack Pull Test Fixture

NOTES:

1. Steel, carbon
Grade 1010-1025
Spec ASTM A108
.500 dia
2. Steel, carbon
M1010-M1025
Spec ASTM A575 or A576
.375 thick
3. Remove all burrs and
break sharp edges.

TOLERANCES ON FRACT.	DECIMALS	ANGLES
±	± .03	± 2°



FO-9. Projectile Rack Test Stand

By Order of the Secretary of the Army:

JOHN A. WICKHAM, Jr.
General, United States Army
Chief of Staff

Official:

MILDRED E. HEDBERG
Brigadier General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-37, direct support and general support maintenance requirements for Carrier, Ammunition, Tracked, M992.

TM 9-2350-267-34

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PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO
3-14			

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

Installation step C. Torque should be 250 lb-ft.

SAMPLE

TEAR ALONG DOTTED LINE

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER
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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

$\frac{5}{9}(^{\circ}\text{F} - 32) = ^{\circ}\text{C}$
 212° Fahrenheit is equivalent to 100° Celsius
 90° Fahrenheit is equivalent to 32° Celsius
 32° Fahrenheit is equivalent to 0° Celsius
 $\frac{5}{9}(^{\circ}\text{C} + 32) = ^{\circ}\text{F}$

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
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	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
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621

