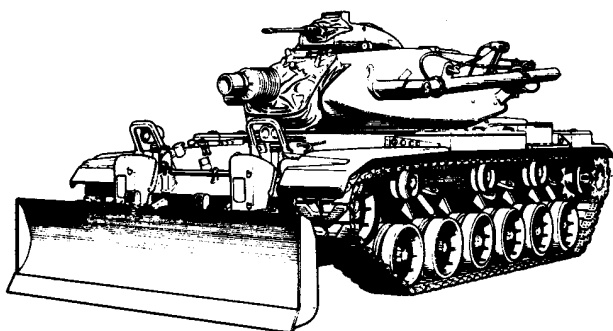


TECHNICAL MANUAL

DIRECT SUPPORT AND  
GENERAL SUPPORT  
MAINTENANCE



COMBAT ENGINEER VEHICLE,

FULL TRACKED, M728

2350-00-795-1797

(HULL)

This copy is a reprint which includes current pages from Changes 1 through 5.

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**WARNING**

**The following summary list is adapted from the warnings within the manual. However, all warnings should be observed as noted in the text.**

Under Arctic winter conditions, there is danger of frostbite due to the inhalation of extremely cold air. Do not connect air duct hose to M25A1 protective mask until heater produces warm air. As long as 20 minutes may be required for some models to produce air.

When draining or filling fuel tanks, post notice that smoking is not allowed in or near vehicle.

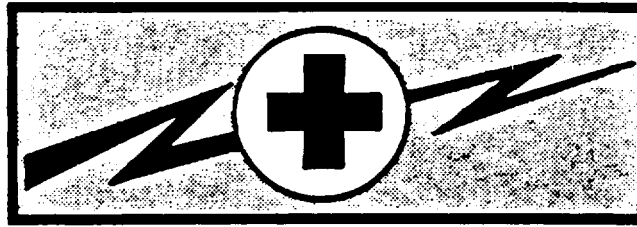
Cleaning agent specified is flammable. Use only in well ventilated areas. Keep away from flames, sparks, or heat. Do not smoke while using. Prevent contact with eyes, mouth, and/or skin. Wear rubber gloves when performing cleaning procedures.

Keep hands and feet away from carrier when installing drive gear.

Make sure powerplant is level and will not move.

Make sure to disconnect three battery ground straps.

When removing fuel tank, post notice that smoking is not allowed in or near work area.



**WARNING**

**CARBON MONOXIDE POISONING CAN BE DEADLY**

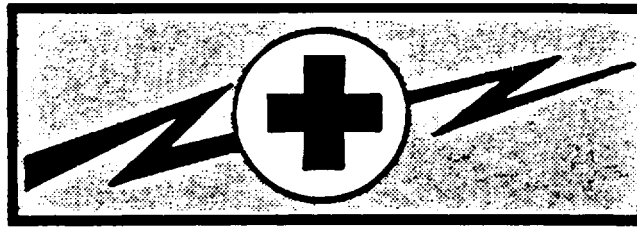
Carbon monoxide is a colorless, odorless, deadly poisonous gas, which when breathed deprives the body of oxygen and causes suffocation. Exposure to air contaminated with carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, apparent drowsiness, and/or coma. Permanent brain damage or death can result from severe exposure. Carbon monoxide 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 make sure of 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 or engine of vehicle in an enclosed area unless the area 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**.

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS GOOD VENTILATION.

For artificial respiration, refer to FM 21-11.

TA130422

**WARNING****WARNING  
HIGH VOLTAGE**

Used in the operation of this equipment

**DEATH ON CONTACT**

May result if personnel fail to observe safety precautions.

Never work on electronic equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment and who is competent in administering first aid. When a technician is aided by operators, he must warn them about dangerous areas.

Whenever possible, the master battery switch and battery ground straps should be either turned off or disconnected before beginning work on the equipment.

Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazard of current flowing through vital organs of the body.

Before you work around tracked vehicles, remove rings, bracelets and wrist watches. These items may be caught on projections and cause injury or may be shorted across an electrical circuit and cause severe burns and electrical shock.

For artificial respiration, refer to FM 21-11.

**WARNING**

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flash point for Type II Dry Cleaning Solvent is 100°F (38°C) and for Type #2 is 138°F (50°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

**WARNING**

Wear goggles and cover relief valve with a rag to prevent grease from getting in eyes. Relief valve opens at 2150-2250 psi and blows a fine spray of grease.

Change 2 c



CHANGE  
NO. 5

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
Washington D.C., 20 April 1993

TECHNICAL MANUAL

DIRECT SUPPORT AND  
GENERAL SUPPORT  
MAINTENANCE

COMBAT ENGINEER VEHICLE,  
FULL TRACKED, M728  
2350-00-795-1797  
(HULL)

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None  
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I-1 and I-2  
I-5 and I-6  
MI-1 thru MI-4

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*Chief of Staff*

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CHANGE

NO. 4

HEADQUARTERS  
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Washington D.C., 30 July 1991**DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE  
COMBAT ENGINEER VEHICLE, FULL-TRACKED, M728  
NSN 2350-00-795-1797  
(HULL)**

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**Direct Support and General Support Maintenance**  
**COMBAT ENGINEER VEHICLE, FULL-TRACKED, M728**  
**2350-00-795-1797**  
**(HULL)**

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None	7-19 thru 7-30
8-1 thru 8-4	8-1 thru 8-4
8-15 thru 8-18	8-15 thru 8-18
9-1 and 9-2	9-1 and 9-2
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None	12-60.1 /(12-60.2 blank)
12-61 thru 12-64	12-61 thru 12-64
13-3 and 13-4	13-3 and 13-4
B-1 and B-2	B-1 and B-2
None	D-3/(D-4 blank)
I-1 and 1-2	1-1 and 1-2
MI-1 and MI-2	MI-1 and MI-2

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COMBAT ENGINEER VEHICLE, FULL-TRACKED, M728  
NSN 2350-00-795-1797  
(HULL)**

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DA Forms 2028-2

None

Insert Pages

b and c

i and ii

1-1 and 1-2

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4-1 and 4-2	4-1 and 4-2
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4-69 and 4-70	4-69 and 4-70
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4-71 and 4-72	4-71 and 4-72
None	4-72.1/(4-72.2 blank)
4-73 thru 4-80	4-73 thru 4-80
None	4-80.1 thru (4-80.7 blank)/4-80.8
4-81 thru 4-84	4-81 thru 4-84
None	4-84.1 thru 4-84.6
4-85 and 4-86	4-85 and 4-86
4-97 and 4-98	4-97 and 4-98
5-1 thru 5-4	5-1 thru 5-4
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**DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE  
 COMBAT ENGINEER VEHICLE, FULL-TRACKED, M728  
 NSN 2350-00-795-1797  
 (HULL)**

**REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS**

You can help improve this manual. If you find any mistake or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual, direct to: Commander, U.S. Army Tank-Automotive Command, Attn: AMSTA-MBC, Warren, Michigan 48397-5000. A reply will be furnished to you.

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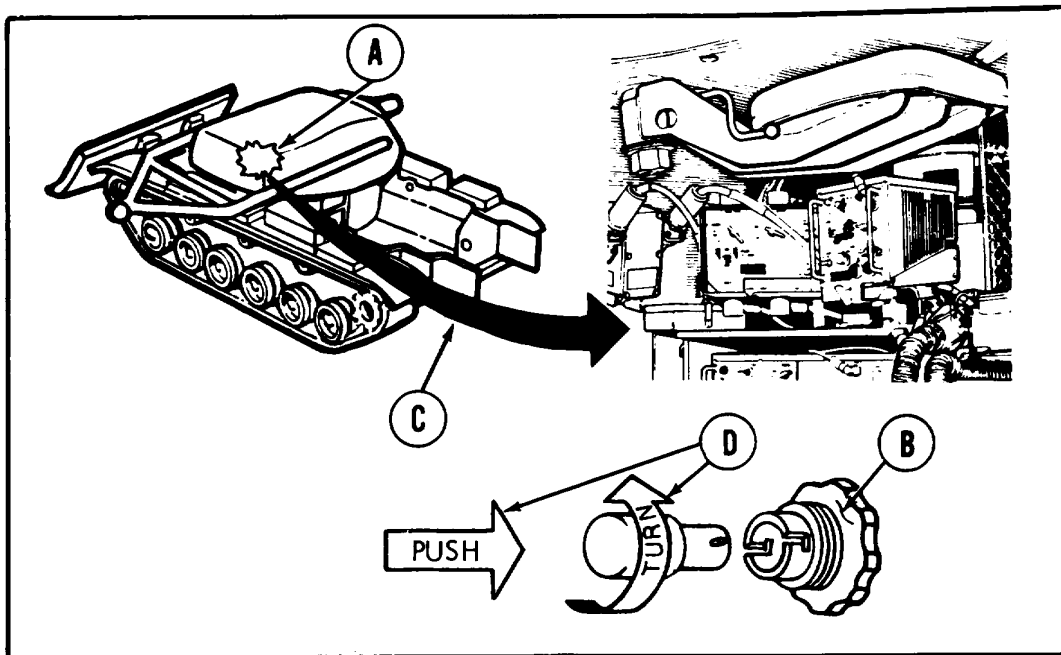
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**\*This manual supersedes portions of TM 9-2300-378-35/1, dated 24 January 1978, including changes.**

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**HOW TO USE THIS MANUAL:**

- Manual is divided into chapters.
- Chapters are by functional group code and presented in same order as the RPSTL (Repair Parts and Special Tool List).
- Procedure indexes are on procedures that are four pages or more, and indicate how the procedure is set up, i.e., Disassembly, Removal, Cleaning and Inspection, etc.
- All manual references refer to page numbers.
- Steps are numbered and are to be performed in that order.
- Be sure to read all NOTES, WARNINGS, AND CAUTIONS.
- Locator views are included wherever necessary. These will help you locate the item for which the procedure is referencing.
- Jagged circle (✱) on locator (A) indicates a cutout and item is inside of vehicle.
- A (~) symbol represents the outside surface (B) of a piece of equipment that cannot be shown in its entirety.
- Callouts are shown by a circle with a letter inside.
- Locator arrows (C) are black and mechanical motion arrows (D) are white.
- Broken leader arrow (— →) indicates the item is either inside or under the tank and cannot be seen.



TA130425

## CHAPTER 1

### INTRODUCTION

#### Section I. GENERAL INFORMATION

##### SCOPE

Type of Manual : Direct Support and General Support Maintenance.

Model Number and Equipment Name : Combat Engineer Vehicle, Full-Tracked, M728.

Purpose of Equipment : Provide a mobile and maneuverable weapon for combat support of ground troops and vehicles. It is equipped with a hydraulically-operated bulldozer mounted to the front of the hull. A winch and a boom are mounted to the turret for lifting, carrying, and winching. The M728 vehicle is used for breaching, obstacle removal, transportation of demolition teams, and pioneering operations.

##### MAINTENANCE FORMS, RECORDS, AND REPORTS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750, The Army Maintenance Management System (TAMMS).

##### REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR's)

If your M728 Engineer Vehicle needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about our equipment. Let us know why you don't like the design. Tell us why a procedure is hard to perform. Put it on an SF 368 (Quality Deficiency Report). Mail it to Commander, U.S Army Tank-Automotive Command, AMSTA-Q, Warren, Michigan 48397-5000. We'll send you a reply.

##### CALIBRATION

There are no calibration requirements for the maintenance of any component of the hull.

##### ENGLISH AND METRIC SYSTEM UNITS

Torque values specified in this manual are expressed in pound feet (lb-ft) or pound inches (lb-in) followed by the metric equivalent in parenthesis. The metric equivalent is expressed in system international units Newton meters (Norm). There is a metric equivalents chart located on the inside rear cover of this manual.

**Section II. EQUIPMENT DESCRIPTION AND DATA**

**DESCRIPTION**

Refer to TM 9-2350-222-20-1.

**DATA**

Refer to TM 9-2350-222-20-1.

**CHAPTER 2**

**HULL MAINTENANCE INSTRUCTIONS**

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

**COMMON TOOLS AND EQUIPMENT**

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

**SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT**

Special tools for direct support and general support maintenance are listed and illustrated in TM 9-2350222-34P-1, which is the authority for requisitioning replacements.

**ENGINE**

---

1. Engine and Transmission Sling (12257229)	Remove and install power plant.
--	---------------------------------

---

**TRANSMISSION**

---

2. Mechanical Puller Adapter (7082774)	Disengage transmission input shaft from engine flywheel (used with slide hammer puller 7082201).
3. Deleted	
4. Deleted	
5. Pinion Turning Wrench (7081564)	Turn transmission gearing.

---

**FINAL DRIVE**

---

6. Box Wrench (12251988)	Remove and install final drive output shaft nut.
7. Bearing Remover Tool (12291062)	Remove bearings from final drive output shaft and drive gear.
8. Seal Inserter (8355822)	Install final drive output shaft seal.

---



---

 SUSPENSION
 

---

- |      |  |  |
|------|--|--|
| 9.   | Shock Absorber Bearing Replacer (11654533) | Remove and replace bearing in shock absorber.                          |
| 10.  | Bearing Tool Assembly (12325917)           | Remove No. 1 left and right roadwheel arm track adjusting bearing      |
| 10.1 | Spanner Wrench (12301553)                  | Loosen or tighten grease actuated track adjusting link locking collar. |
| 10.2 | Test Fixture (12326061)                    | Test grease actuated track adjusting link.                             |
| 10.3 | Bearing Driver (12290993)                  | Remove and replace bearing in track adjusting link mount.              |
- 

---

 HYDRAULICS
 

---

- |     |                             |  |
|-----|-----------------------------|--|
| 11. | Spanner Wrench (MS 16153-9) | Remove and install suction line bulkhead bushing.            |
| 12  | Spanner Wrench (10952095)   | Remove and install threaded retainer from right angle drive. |

## SPARE AND REPAIR PARTS

Spares and repair parts are listed and illustrated in the repair parts and special tools list covering direct support and general support maintenance for this equipment (TM 9 2350-222-34P-1).

**Change 5 2-2**

**Section II. SERVICE UPON RECEIPT**

1. This section contains information on services to be performed upon issue of the vehicle to the using organization. Where practicable, the crew will assist in services described. For services to be performed on turret components, refer to TM 9-2350-222-34-2. Some of the services contained herein may not be required, depending upon the degree of preservation provided by the shipper and the planned use of the vehicle.
2. Cut hold-down straps and remove wooden boxes, containers of equipment, and any other vehicle components secured to the exterior or interior of the vehicle.
  - a. Inspect equipment for damage incurred during shipment. If equipment has been damaged, report damage on DD Form 6, Packaging Improvement Report.
  - b. Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with instructions of TM 38-750.
3. Conduct service upon receipt of the vehicle in accordance with the procedures specified on pages 2-4 and 2-5.

TA130429

## SERVICE UPON RECEIPT - Continued

Step	Item	Action	Remarks
1. Hull	Exterior	Check vehicle hull for damage	—
2. Hull	Fender stowage boxes	Inspect for water in two center and two rear fender stowages boxes.	Para 4a, page 2-6
3. Hull	Hatches	Remove wrapping, barrier material, and tape.	—
4. Hull	Periscope shields	Remove wrapping, barrier material, and tape.	—
5. Hull	Optical glass	Remove wrapping, barrier material, and tape.	—
6. Hull (right side)	Personnel heater exhaust assembly	Remove tape.	Item 1, page 2-6
7. Hull (right and left sides)	Air cleaner (precleaner) centrifugal fan (blower motor) exhaust elbows	Remove tape and protective barrier plugs.	Item 2, Para 4b, page 2-6
8. Hull (top deck)	Turbosupercharger and tubes	Open two top deck hatch door assemblies and remove tape and plugs from two turbosuperchargers and two tubes.	Item 3, Para 4c, page 2-6
9. Hull (top deck)	Air cleaner inlet screens	Open two top deck hatch door assemblies and remove tape from two air cleaner inlet screens at bulkhead.	Item 3, page 2-6
10. Hull (right rear fender)	External handset box	Remove tape from external handset box.	Item 4, page 2-6, Para 4d, page 2-7
11. Hull (front and rear)	Tow hooks	Remove four tow hooks stowed inside hull. Install two hooks at front and two hooks at rear of vehicle.	Item 5, page 2-6, Para 4e, page 2-7
12. Hull (rear)	Pintle	Remove pintle stowed inside of hull. Install pintle at rear of vehicle.	Item 6, page 2-6, Para 4f, page 2-7

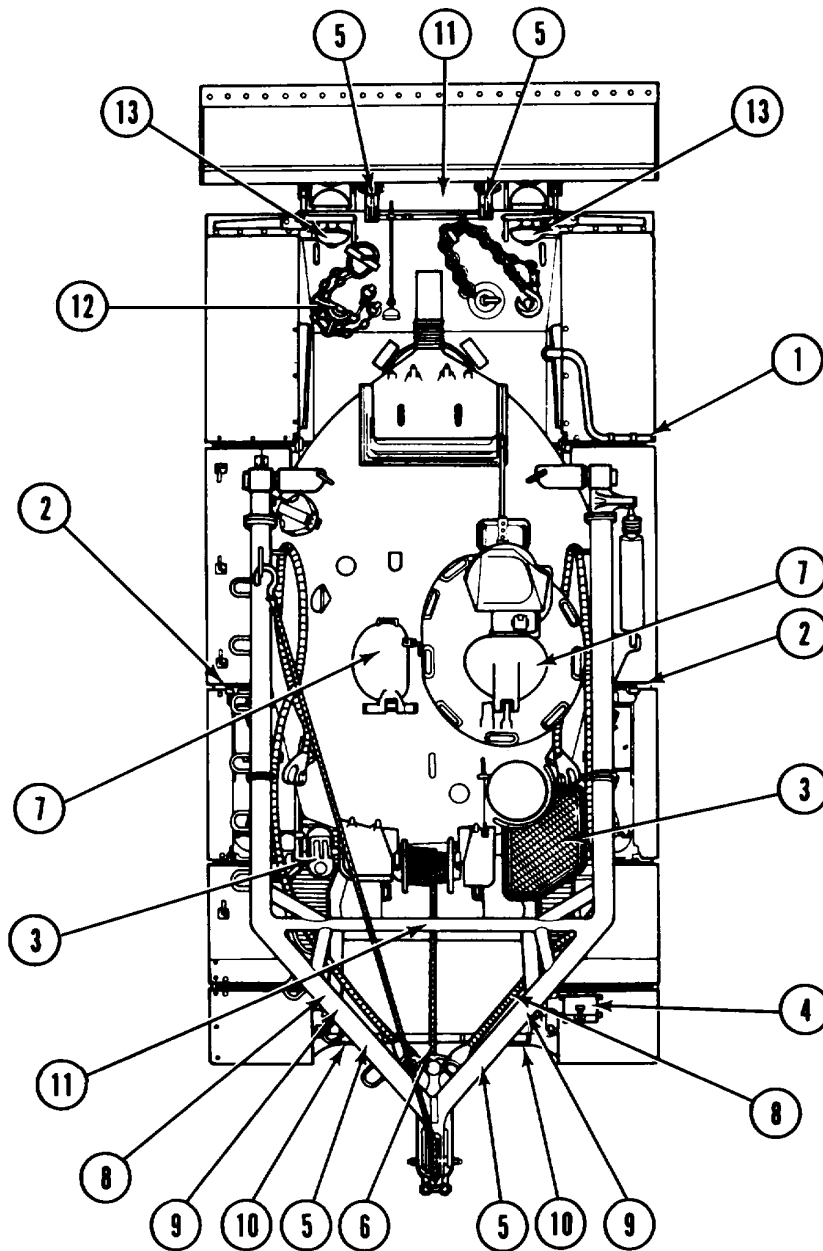
TA130430

## SERVICE UPON RECEIPT -Continued

Step	Item	Action	Remarks
13. Hull (underside)	Fuel tank drain access openings	Remove two screens at two fuel tank drain access openings.	Item 7, page 2-6, Para 4g, page 2-7
14. Hull (underside)	Brake control access openings	Remove two screens at two brake con- trol access openings.	Item 8, page 2-6, Para 4h, page 2-7
15. Hull (underside)	Brake control access covers access openings.	Remove two brake control access cov- ers stowed inside hull and install on	Para 4i, page 2-7
16. Hull (underside)	Front and rear drain valve openings	Remove screens from front and rear drain valve openings.	Item 11, page 2-6, Para 4j, page 2-7
17. Hull (rear)	Engine ex- haust outlet doors	Open engine exhaust outlet doors and remove tape from engine exhaust out- let pipes.	Item 9, page 2-6
18. Hull (rear)	Taillights taillight lenses.	Remove wrapping and tape from two page 2-6	Item 10,
19. Hull (front)	Fire extin- guisher handles	Remove tape from fire extinguisher handles protective shield.	Item 12, page 2-6, Para 4k, page 2-7
20. Hull (interior)	CO2 cylinder plastic blow- off cap	Check for presence of shrunk tubing on service valve of CO2 cylinder, lo- cated next to driver's compartment.	Para 4l, page 2-7
21. Hull (front)	Headlight mounting receptacles	Remove dust covers from two hull headlight mounting receptacles.	Item 13, page 2-6, Para 4m, page 2-7

TA130431

SERVICE UPON RECEIPT - Continued



4. Corrective action for items listed in paragraph 3 found deficient will be corrected as follows:

- a. Water in fender stowage boxes should be drained by removing 1/4 inch headless drain plugs (two in each box) as required to allow water to drain. After water has drained, reinstall and tighten plugs.
- b. Protective barrier plugs should be reinstalled and tightened after water has drained.
- c. Connect tubes to turbosupercharger. Refer to TM 9-2350-222-20-1.

TA130432

**SERVICE UPON RECEIPT - Continued**

- d. Open external handset box and check box interior for moisture. If moisture is present, use clean rags to dry.
- e. Refer to TM 9-2350-222-20-1 for installation of four tow hooks.
- f. Refer to TM 9-2350-222-20-1 for installation of pintle.
- g. Loosen two 1/4 inch square head fuel tank drain plugs and allow water in fuel tanks to drain. After water has drained, tighten drain plugs. Refer to TM 9-2350-222-20-1.
- h. Remove two 1/4 inch square head drain plugs from brake housing and allow water to drain. After water has drained, reinstall and tighten drain plugs.
- i. Refer to TM 9-2350-222-20-1.
- j. Refer to TM 9-2350-222-20-1.
- k. Check that lead seals on both handles are intact. If lead seal is broken, service fire extinguisher cylinders. Install new exterior fire extinguisher handle lead seal. Refer to TM 9-2350-222-20-1.
- l. If missing shrunk tubing, service CO2 cylinder.
- m. Remove headlights from stowage brackets in driver's compartment. Install dust covers on stowage brackets. Install headlights on hull mounting receptacles. Refer to TM 9-2350-222-20-1.

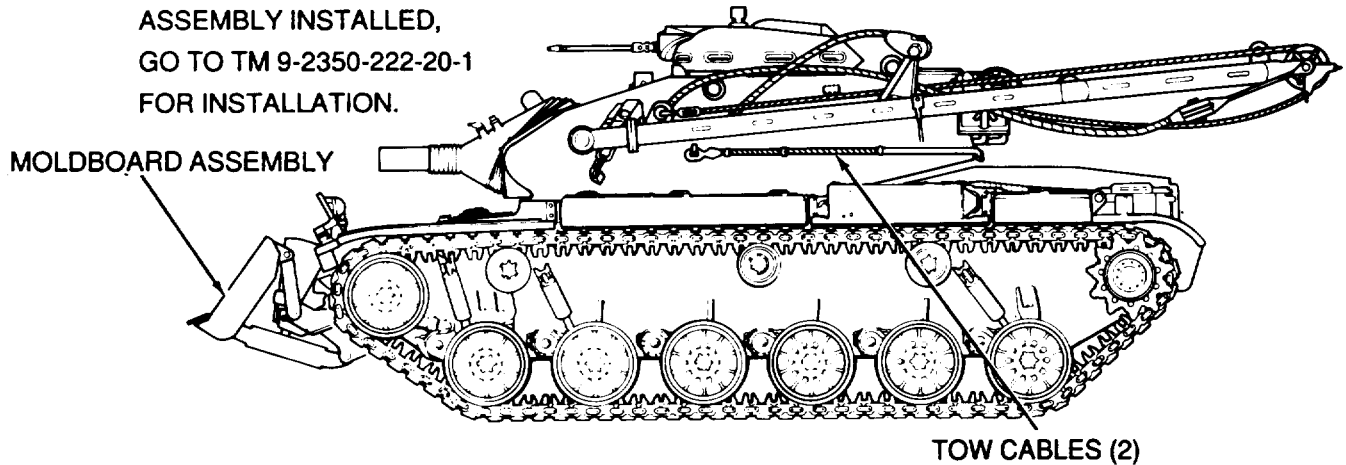
**Section III. PRELIMINARY SERVICING AND ADJUSTMENT OF HULL EQUIPMENT****WARNING**

Dry cleaning solvent P-DI680 is toxic and flammable. To avoid injury, wear protective goggles and gloves and use in a well ventilated area. Avoid contact with skin, eyes, and clothes, and do not breathe vapors. Do not use near open fire or excessive heat. The flash point for Type I dry cleaning solvent is 100° F (38° C) and for Type II is 140° F (60° C). If you become dizzy while using dry cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

1. If any exterior surfaces of the hull are coated with rust preventive compound, remove the coating with dry cleaning solvent (Item 12, Appendix B).
2. Paint the vehicle in accordance with unit camouflage requirements. After painting, apply exterior non-skid paint, stenciled markings, and insignia. Refer to TM 9-2350-222-10.
3. Follow instructions specified on tag DD Form 1397 regarding processing record and stowage of the vehicle and its equipment if the vehicle is not to be placed into immediate service. Tag DD Form 1397 will be found in the driver's compartment, attached to the steering control or transmission shift lever. If the using organization plans to place the vehicle into immediate service:
  - a. Open each wooden box and container. Inventory contents with packing list. Record missing items.
  - b. Check packing list against Basic Issue Items List (BII) in TM 9-2350-222-10 to make sure all items have been received.
  - c. Open inner packs and remove material.
  - d. Remove grease from equipment such as tools and hardware with dry cleaning solvent (Item 12, Appendix B).
  - e. Thoroughly clean armaments coated with rust preventive preservatives received from storage with wiping cloth or a brush saturated with dry cleaning solvent (Item 12, Appendix B). After complete removal of preservatives and cleaning compound, lubricate armaments as specified in TM 9-2350-222-10.
4. Open the fuel water separator manual drain cock to remove any moisture accumulation in the fuel water separator. Refer to TM 9-2350-222-20-1.

5. Check clearance between turret and hull to make sure turret can be manually traversed without encountering any obstacle.
6. Stow basic issue items as shown.

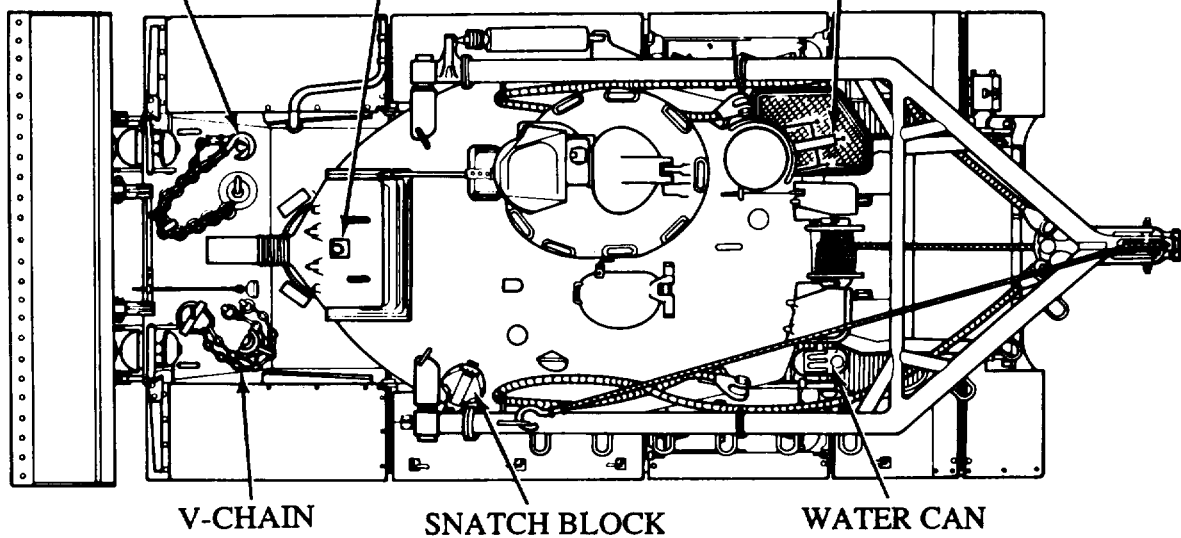
**NOTE. IF VEHICLE IS SHIPPED WITHOUT MOLD BOARD ASSEMBLY INSTALLED, GO TO TM 9-2350-222-20-1 FOR INSTALLATION.**



**SEARCHLIGHT MOUNTING BRACKET AND BALLS (SEE ITEM 1)**

**HOOK AND RING CHAIN (2)**

**SEARCHLIGHT MOUNTING BRACKET AND BALLS (SEE ITEM 1)**



MISCELLANEOUS ITEMS:  
 TOWING HOOK(1), SEARCHLIGHT MOUNTING BRACKET (1) AND BALLS (6). STOW IN RIGHT FENDER BOX WHEN NOT IN USE.  
 TARPULIN (12X17) - STRAPPED ON TURRET BUSTLE CARGO RACK.



**WARNING**

**Always wear goggles, rubber gloves, and rubber apron when handling batteries. Battery acid is harmful to skin and will ruin clothing.**

7. Remove six vehicle batteries and electrolyte from wooden equipment boxes. Fill batteries with electrolyte and check specific gravity. (Refer to TM 9-6140-200-14). Install batteries in vehicle and connect cables. Refer to TM 9-2350-222-20-1.
8. Check out the gas particulate filter unit. Refer to TM 9-2350-222-10. After the unit has been checked out, test the unit as follows:
  - a. Pull and lift spring clip from air intake opening on filter unit. Set GAS PARTICULATE switch on master control panel to ON. Set MASTER BATTERY switch ON. Disconnect air duct hose from stowage connector and place hand over opening in hose to check for air flow.
  - b. Turn the filter unit heater air control knob clockwise and check to see that the indicator light operates.

**WARNING**

**Under Arctic winter conditions, there is danger of frostbite due to the inhalation of extremely cold air. Do not connect air duct hose to M25A1 protective mask until heater produces warm air. As long as 20 minutes may be required for some models to produce heat.**

- c. Connect breakaway socket coupling of air duct hose to canister coupling on the M25A1 protective mask and make sure a sufficient volume of air reaches each face piece. Adjust the heat control knob to obtain a comfortable air temperature. Have a crewmember don and adjust his M25A1 protective mask. Resistance to breathing should not be noticeable. If the precleaner and particulate filter assembly has an adjustable iris valve, turn the valve clockwise to decrease and counterclockwise to increase flow.
9. Check all hull bulkhead, under turret, and engine electrical connectors, jacks, and plugs for routing, installation, and firm seating.

**Change 5 2-10**

10. Fuel the vehicle. While fueling, check for leaks at filler connections, fuel tank drain plugs, fuel line quick-disconnects, fuel valve, and filters. Correct any leaks found.
11. Check oil level in engine and transmission in accordance with LO 9-2350-222-12. Check processing tag DD Form 1397 for grade of engine oil installed in the vehicle. Change the engine oil only if a different type or grade is required.
12. Service engine air cleaner filters. Refer to TM 9-2350-222-20-1.
13. Check operation of all controls. Refer to TM 9-2350-222-10.
14. Making sure hand brake is set, start engine. Refer to TM 9-2350-222-10. Check immediately for fuel and oil leaks. Shut down engine and correct leaks if any are found.

**NOTE**

**The engine may start hard, smoke excessively and run erratically. However, operation should generally improve after about 5 minutes of running time. Failure to obtain full engine power will require performing troubleshooting to isolate and correct the problem.**

15. Perform the semi-annual(S) Preventive Maintenance Checks and Services (PMCS) listed in TM 9-2350-222-20-1, including a complete suspension lubrication in accordance with LO 9-2350222-12.
16. Equipment faults found during preliminary servicing or during the break in period will be corrected by the using organization or by the supporting maintenance unit as appropriate, depending upon the nature of the fault.
17. Serious equipment faults which appear to involve unsatisfactory design or material will be reported using Quality Deficiency Report SF 368, as prescribed in DA PAM 738-750.

**Change 4 2-11/(2-12 blank)**

CHAPTER 3

ENGINE MAINTENANCE INDEX

Procedure	Page
Engine Replacement (2D Engine) .....	3-18

**ENGINE REPLACEMENT (2D ENGINE) (Sheet 1 of 18)**

**PROCEDURE INDEX**

PROCEDURE	PAGE
Removal	3-20
Cleaning	3-26
Installation	3-27

- TOOLS:**
- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>Ratchet with 1/2 in. drive</li> <li>7/16 in. combination box and open end wrench (2 required)</li> <li>7/8 in. combination box and open end wrench</li> <li>1 in. combination box and open end wrench</li> <li>1-1/8 in. open end wrench</li> <li>1-1/2 in. open end wrench</li> <li>1-5/8 in. open end wrench</li> <li>1/2 in. socket with 1/2 in</li> <li>1/2 in. combination box and open end wrench</li> <li>Transmission sling (7081593)</li> </ul> | <ul style="list-style-type: none"> <li>3/4 in. combination box and open end wrench</li> <li>1-3/16 in. open end wrench</li> <li>5/8 in. combination box and open end wrench</li> <li>1-1/8 in socket with 1/2 in. drive</li> <li>5 in. extension with 1/2 in. drive</li> <li>Flat-tip screwdriver</li> <li>Spanner wrench</li> <li>Retaining ring pliers</li> <li>drive. Torque wrench with 1/2 in. drive (0-175 lb-ft) (0-237 N.m)</li> <li>5/8 in. socket with 1/2 in drive</li> <li>Puller attachment (7082201)</li> </ul> |
|---|---|

**SPECIAL TOOLS:** Pinion turning wrench (Item 5, Chapter 2, Section I) Engine and transmission sling (Item 1, Chapter 2, Section I) Mechanical puller adapter (Item 2, Chapter 2, Section I)

**FABRICATED TOOLS:** Wrench (Item 1, Appendix D)

- SUPPLIES:**
- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>Gasket (10864007)</li> <li>Preformed packing (7723892)</li> <li>Drain pan</li> <li>Gloves (Item 13.1, Appendix B)</li> <li>Dry cleaning solvent (Item 12, Appendix B)</li> </ul> | <ul style="list-style-type: none"> <li>Rags (Item 31, Appendix B)</li> <li>Wooden blocks, 10 x 10 x 12 in. (2 required)</li> <li>I.D. tags</li> <li>Goggles (Item 13.2, Appendix B)</li> <li>Gasket (7767860)</li> </ul> |
|---|--|

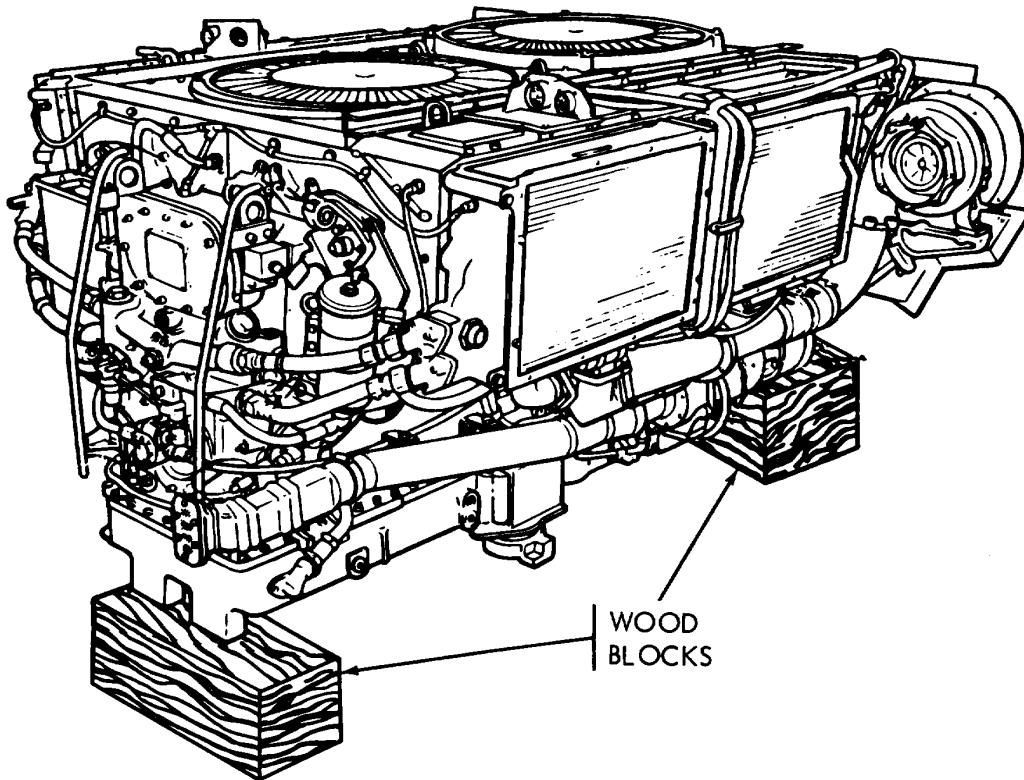
**REFERENCES:** TM 9-2350-222-20-1  
LO 9-2350-222-12

**PERSONNEL:** Two

- PRELIMINARY PROCEDURES:**
- Remove powerplant (TM 9-2350-222-20-1)
  - Remove steering linkage and brackets (TM 9-2350-222-20-1)
  - Remove shifting linkage and brackets (TM 9-2350-222-20-1)
  - Remove engine shroud and supports (TM 9-2350-222-20-1)
  - Remove engine mounts (IM 9-2350-222-20-1)
  - Remove right angle drive, clutch, and pump (TM 9-2350-222-20-1)
  - Remove generator exhaust valve (TM 9-2350-222-20-1)

**Go on to Sheet 2**

All data on pages 3-2 thru 3-17 deleted.



**WARNING**

Make sure powerplant is level and will not move.

**NOTE**

Position powerplant on two wooden blocks positioned under each end of oil pan.

These procedures are for the removal of the 2D or 2DA engine.

Go on to Sheet 3

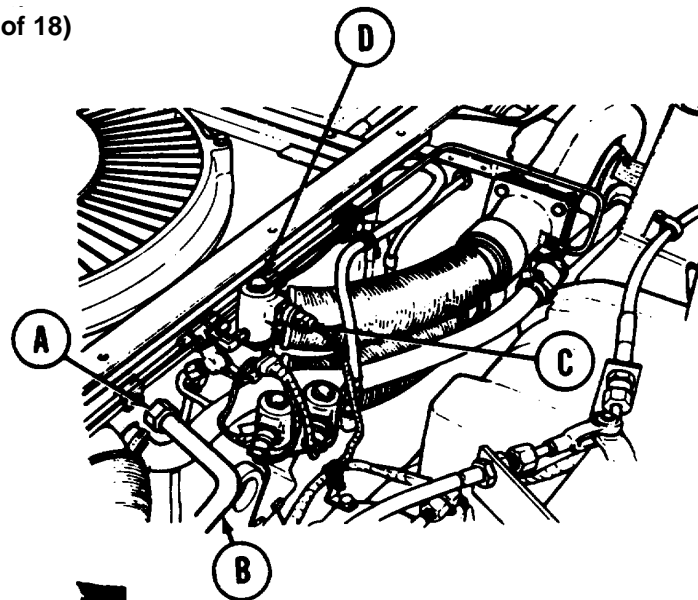
TA248757

Change 2 3-19

**ENGINE REPLACEMENT (2D ENGINE) (Sheet 3 of 18)**

**REMOVAL:**

1. Using 1-1/8 inch wrench, loosen connection (A). Remove line (B) from engine.
2. Using hand, remove lead (C) from fuel solenoid (D).

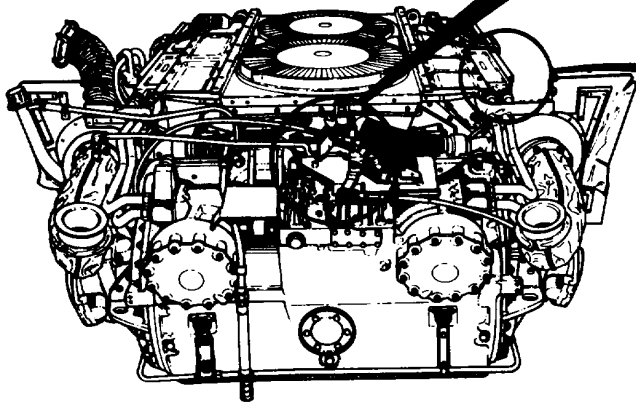


**NOTE**

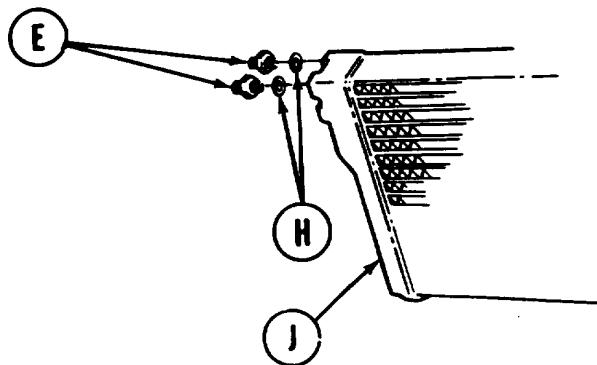
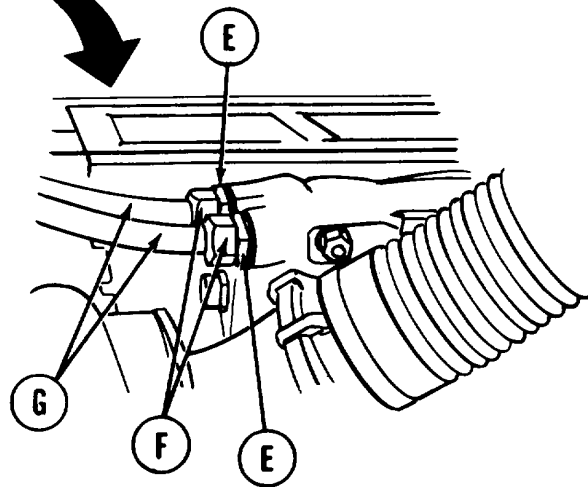
Tag oil cooler tubes as they are removed for later installation. Removal of left and right side oil cooler tubes are the same.

**NOTE**

When removing the oil cooler tubes, remove the outer tube and its adapter before removing the inner tube and its adapter.



3. Using 1-5/8 inch wrench to hold adapter (E), use 1-1/2 inch wrench to remove outer nut (F) securing outer tube (G). Pull outer tube (G) towards transmission until it is free of outer adapter (E).



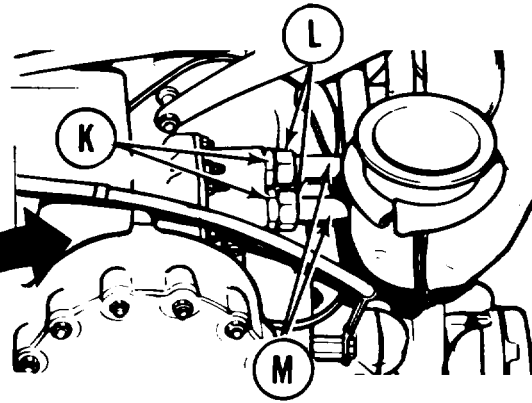
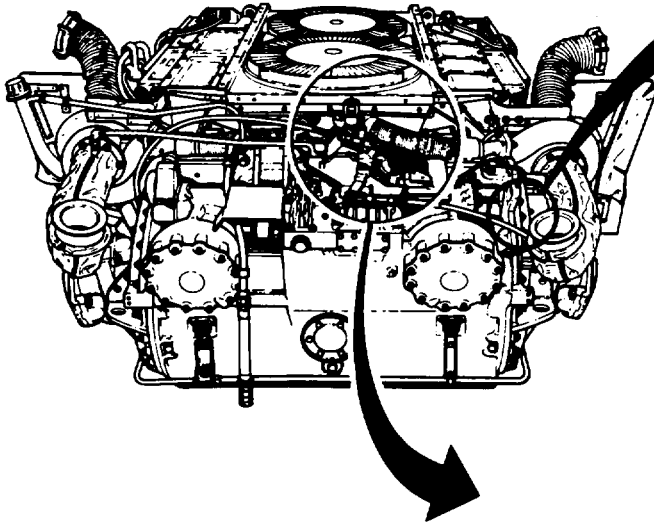
4. Using 1-5/8 inch wrench, remove outer adapter (E) and washer (H) from oil cooler (J).
5. Perform steps 3 and 4 to remove the inner oil cooler tube (G), the inner adapter (E), and washer (H) from oil cooler (J).

Go on to Sheet 4

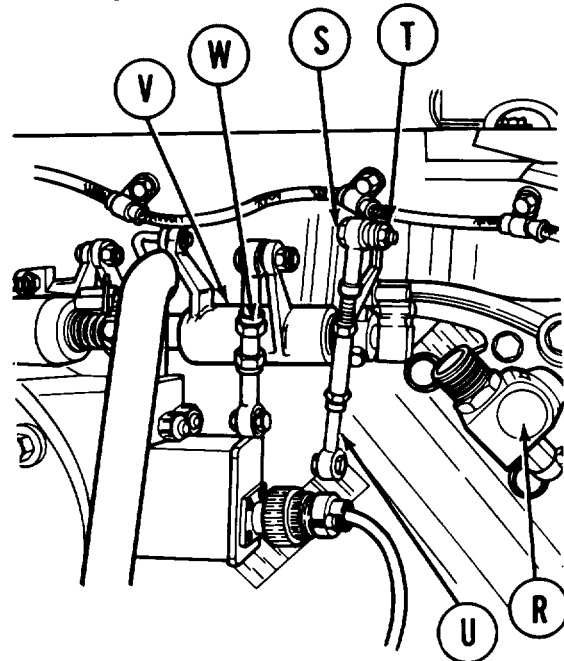
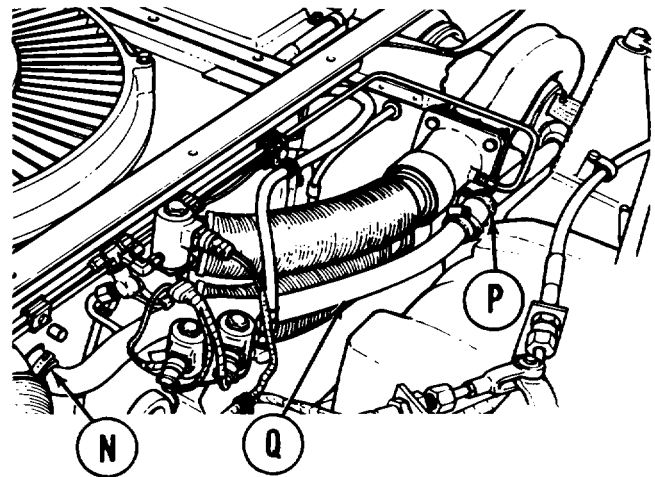
TA130451

**ENGINE REPLACEMENT (2D ENGINE) (Sheet 4 of 18)**

6. Using 1-5/8 inch wrench to hold adapters (K), use 1-1/2 inch wrench to remove two nuts (L) from adapters (K).
7. Remove oil cooler tube assemblies (M).



8. Using screwdriver, remove clamps (N) and (P).
9. Remove engine breather tube (Q) from powerplant.
10. Using 1 inch wrench, remove tachometer adapter (R) from engine.
11. Using 7/16 inch wrench to hold screw (S), use 1/16 inch wrench and remove nut (T). Remove linkage (U) from accelerator cross shaft (V).
12. Use procedure described in step 11 and remove linkage (W).



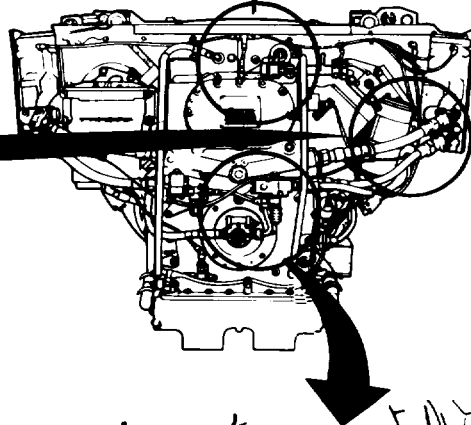
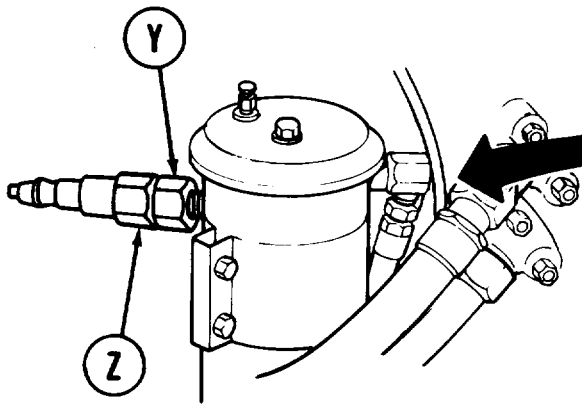
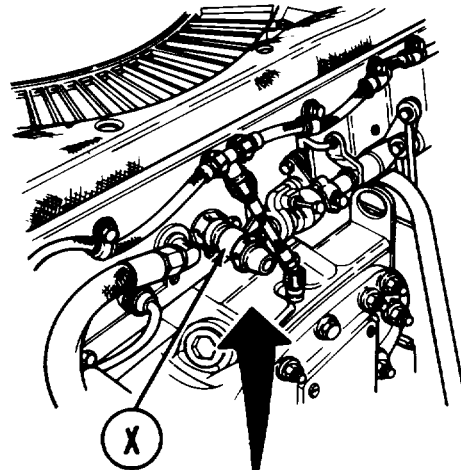
FRONT OF ENGINE

Go on to Sheet 5

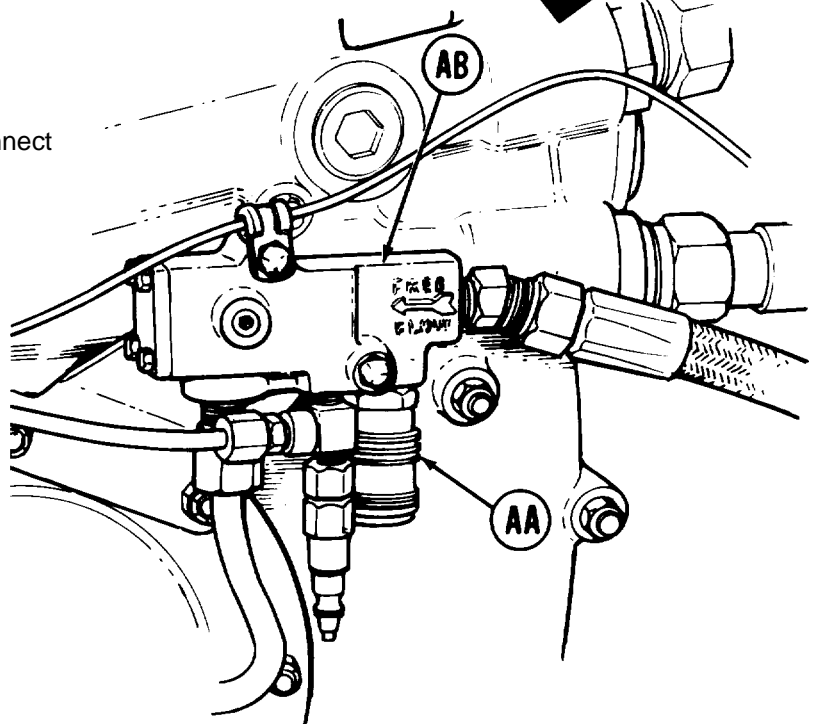
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**ENGINE REPLACEMENT (2D ENGINE) (Sheet 5 of 18)**

13. Using 1 inch wrench, remove fire extinguisher adapter (X).
14. Using 1-1/8 inch wrench to hold fitting (Y), use 1-3/16 inch wrench and remove coupling (Z).
15. Using 1-1/8 inch wrench, remove fitting (Y).



16. Using 3/4 inch wrench, remove quick- disconnect coupling (AA) from fuel check valve (AB).



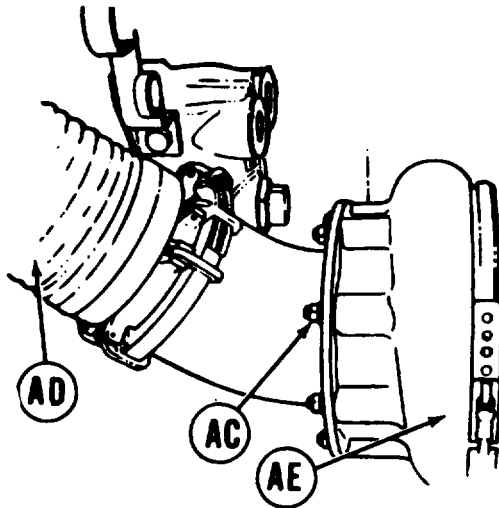
Go on to Sheet 6



ENGINE REPLACEMENT (2D ENGINE) (Sheet 6 of 18)

**NOTE**

Tag air cleaner hoses as they are removed for later installation.



17. Using 1/2 inch wrench, remove eight nuts, washers, and lockwashers (AC). Remove left air cleaner hose and elbow assembly (AD) from turbocharger (AE).
18. Using procedure described in step 17, remove right air cleaner hose and elbow assembly.

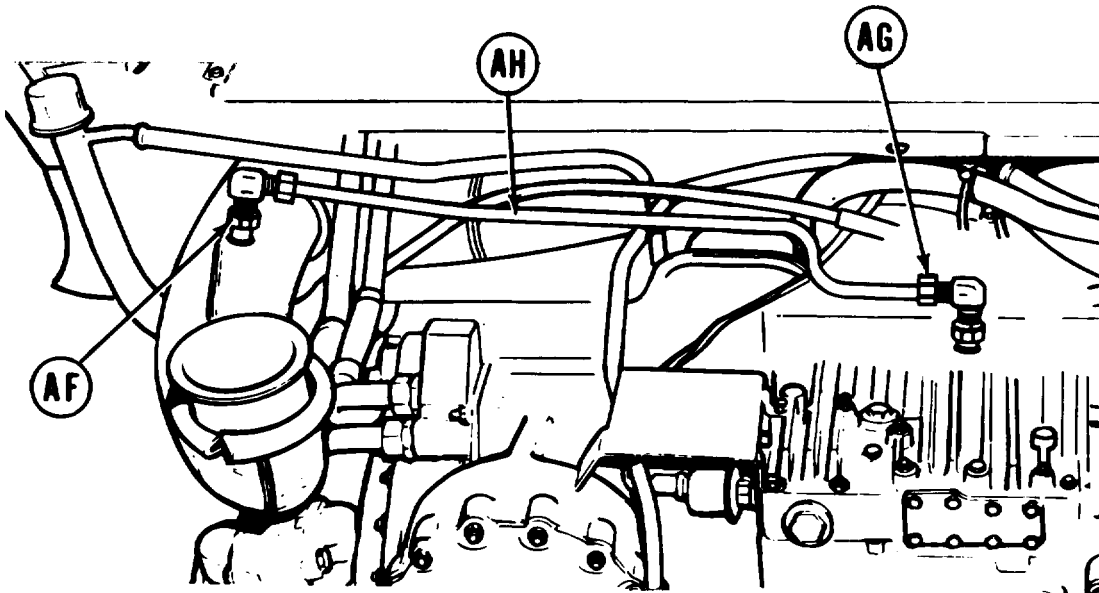
**WARNING**

Cover all openings to prevent entrance of foreign material to prevent damage to engine.

**NOTE**

- Perform steps 19, 20, and 21 only if you are replacing a 2D engine.
- Remove left and right exhaust ejector tubes (TM 9-2350-222-20-1-3) if replacing 2DA engine.

19. Using 7/8 inch wrench, loosen connecting nut (AF) and connecting nut (AG). Remove transmission vent line (AH) from transmission.



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Go on to Sheet 7

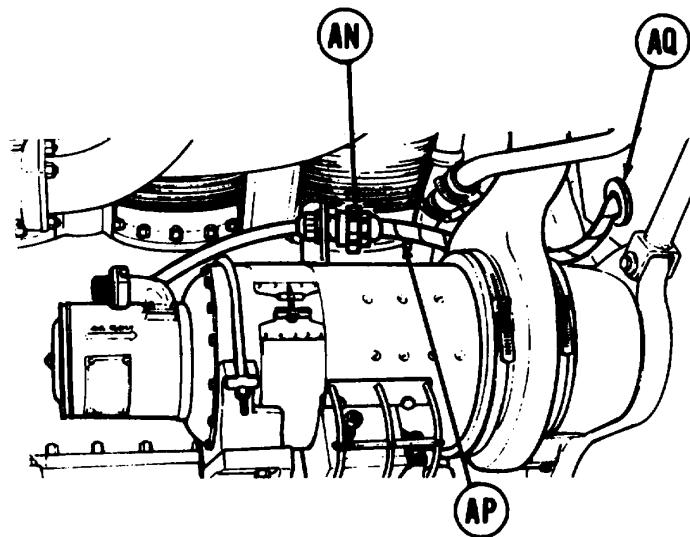
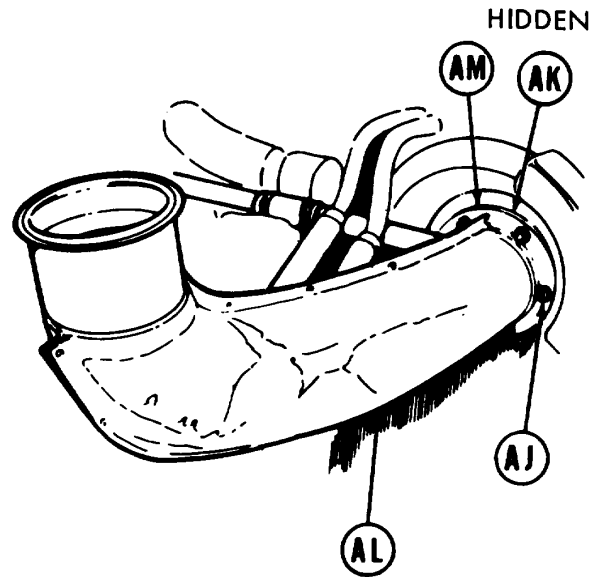
**ENGINE REPLACEMENT (2D ENGINE) (Sheet 7 of 18)**

20. Using 1/2 inch socket and 5 inch extension, remove six nuts (AJ) from right exhaust pipe flange (AK). Remove exhaust pipe (AL) and gasket (AM) from turbocharger.
21. Using procedures described in step 20, remove left exhaust pipe.

**WARNING**

**Cover all openings to prevent entrance of foreign material to prevent damage to engine.**

22. Using spanner wrench, disconnect cannon plug (AN).
23. Using hands, feed wiring harness (AP) through grommet (AQ) until cannon plug (AN) is flush with grommet (AQ).



24. Remove engine wiring harness (TM 9-2350-222-20-1).

**Go on to Sheet 8**

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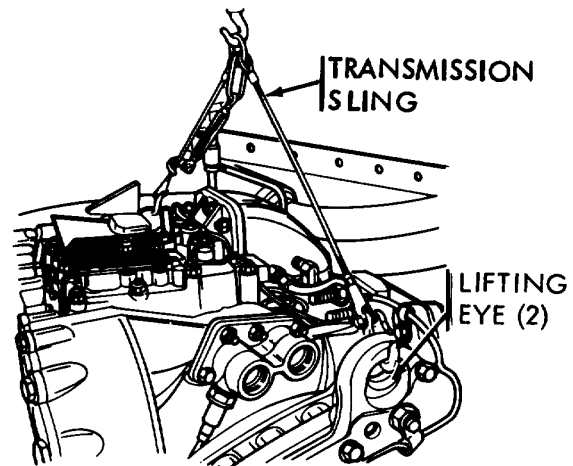
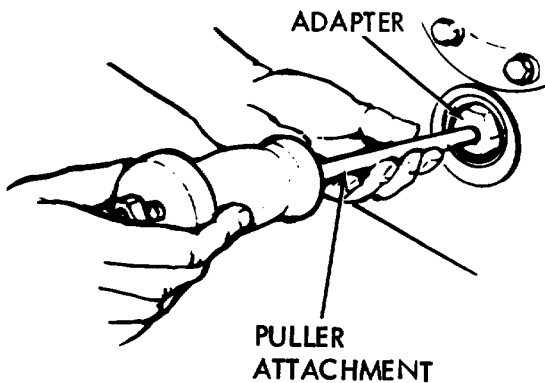
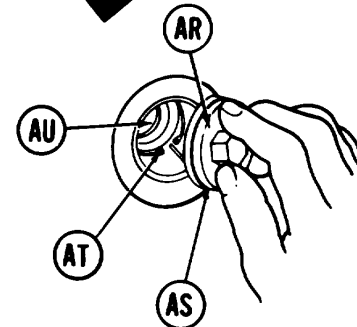
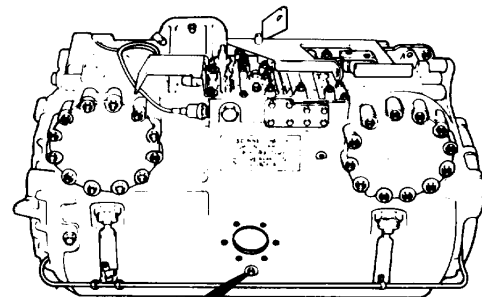
**ENGINE REPLACEMENT (2D ENGINE) (Sheet 8 of 18)**

25. Using 1-1/8 inch wrench, remove input shaft plug (AR) and gasket (AS) from transmission.

**CAUTION**

It may be necessary to place finger through retaining ring (AT) to make sure that it does not fall into transmission housing during removal.

26. Using retaining ring pliers, remove retaining ring (AT) at rear of input shaft (AU).
27. Using puller attachment and mechanical puller adapter, draw input shaft (AU) rearward until disengaged from engine drive connection.

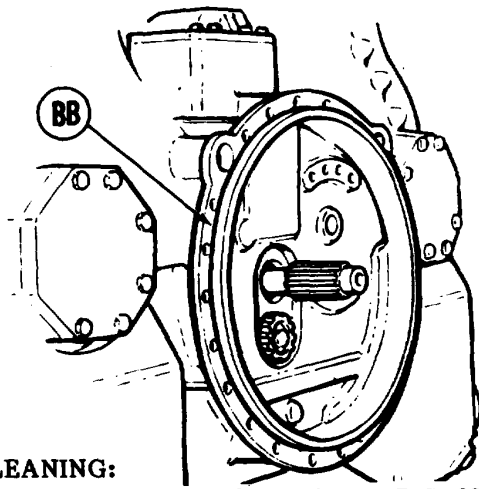
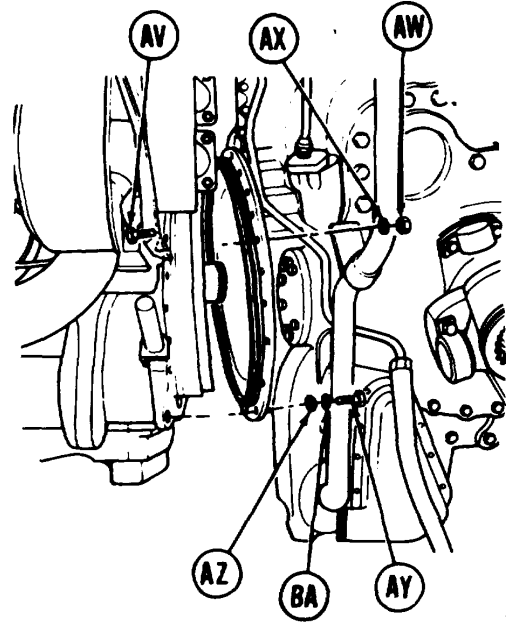


28. Attach transmission sling to transmission lifting eyes. Using a suitable hoist, take up slack until sling supports weight of transmission without lifting powerplant from blocks.
29. Place a pan under engine and transmission at separation point to catch oil.

Go on to Sheet 9

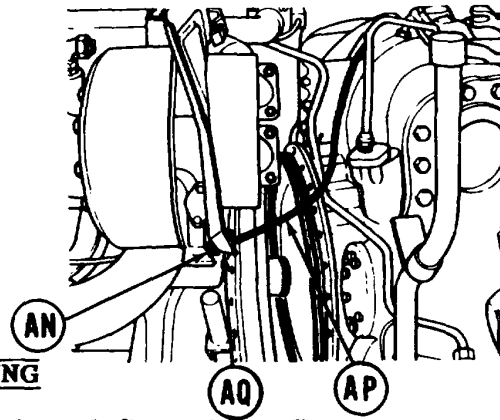
**ENGINE REPLACEMENT (20 ENGINE) (Sheet 9 of 18)**

30. Using fabricated wrench and 5/8 inch socket, remove screw (AV), nuts (AW), and washer (AX) from left and right side of transmission.
31. Using fabricated wrench or 5/8 inch wrench, remove 17 screws (AY), lockwashers (AZ), and washers (BA) that secure transmission to engine.
32. Carefully move transmission rearward to separate from engine.
33. Using hands, grasp wiring harness (AP) and carefully pull towards transmission until grommet (AQ) and cannon plug (AN) are free of shroud.
34. Remove transmission-to-engine preformed packing (BB). Throw packing away.



**CLEANING:**

**WARNING**



Dry cleaning solvent PD680 is toxic and flammable.. To prevent personal injury, wear protective goggles and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flash point for type #1 Dry Cleaning Solvent is 1000F (380C) and for Type 1#2 is 1380F (500C). If you become dizzy while using cleaning. solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

Clean all parts that have been removed from transmission and engine with dry cleaning solvent. Wipe dry with clean, lint-free rags.

Go on to Sheet 10

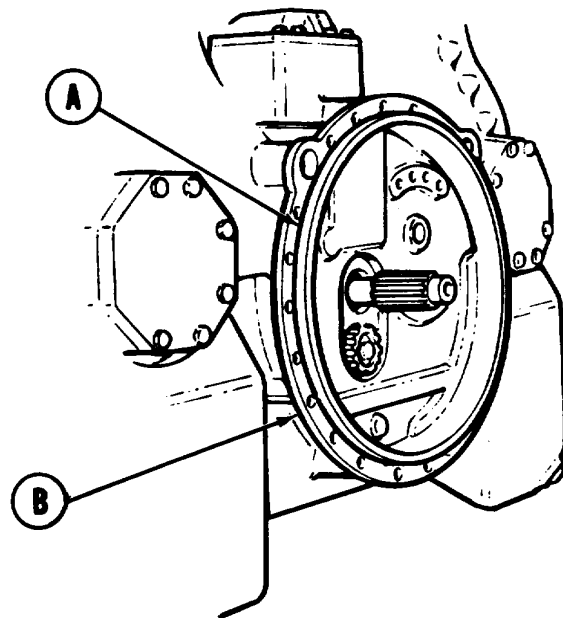
**ENGINE REPLACEMENT (2D ENGINE) (Sheet 10 of 18)****INSTALLATION:****WARNING**

**Make sure powerplant is level and will not move.**

1. Using engine and transmission sling and suitable hoist (engine weighs approximately 5,000 pounds), remove replacement engine from container and place on two 10 x 10 x 12 inch wooden blocks. Position blocks under each end of engine oil pan. Remove sling from engine.

**NOTE**

**Remove shipping caps, plugs, covers, and mounts from replacement engine as components are installed and install them on unserviceable engine.**

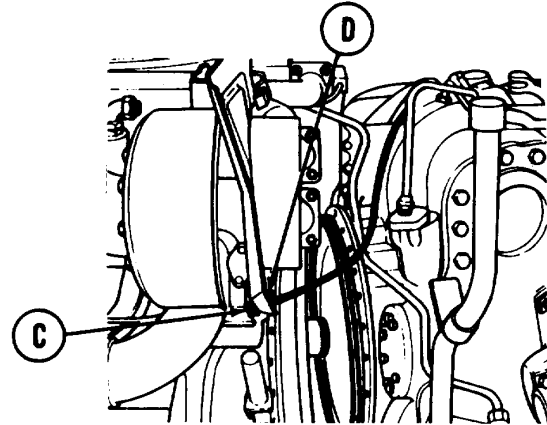


2. Position new preformed packing (A) on transmission mounting flange (B).

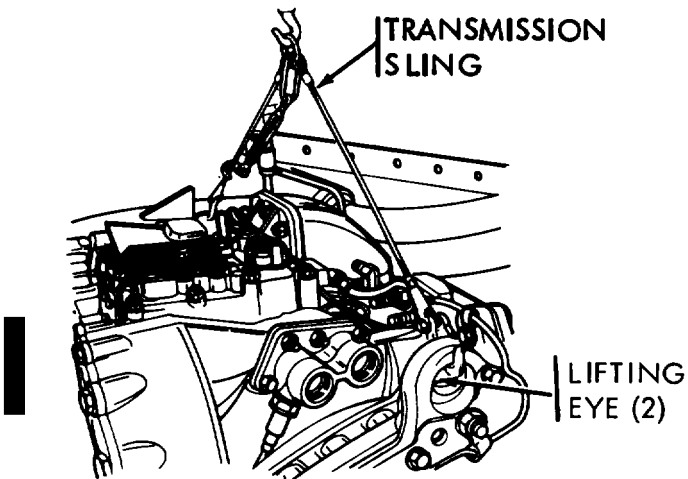
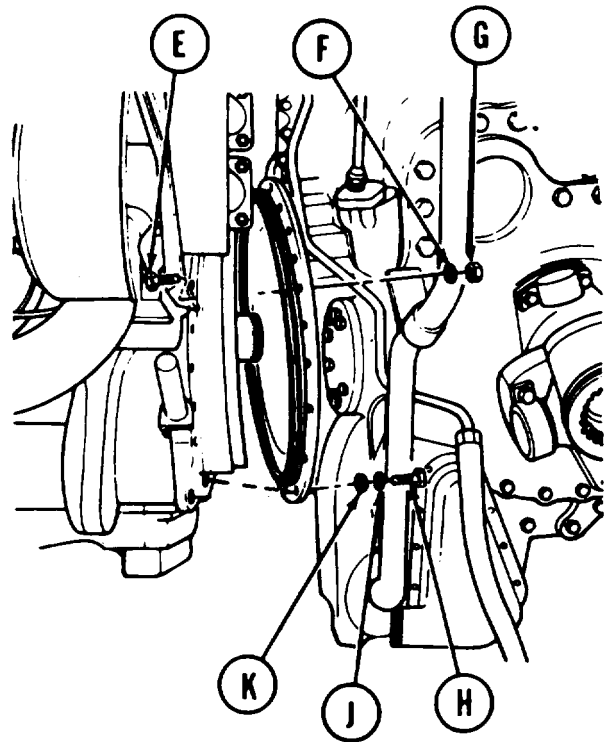
**Go on to Sheet 11**

**ENGINE REPLACEMENT (2D ENGINE) (Sheet 11 of 18)**

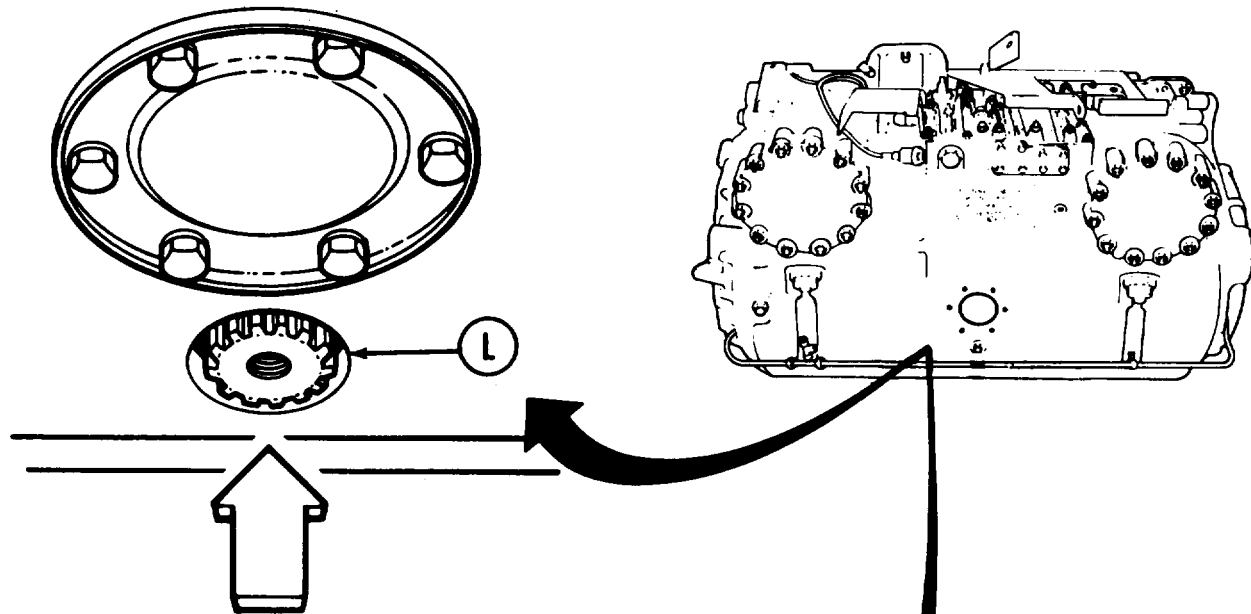
- Using hands, feed cannon plug (C) through shroud and secure grommet (D) to shroud.



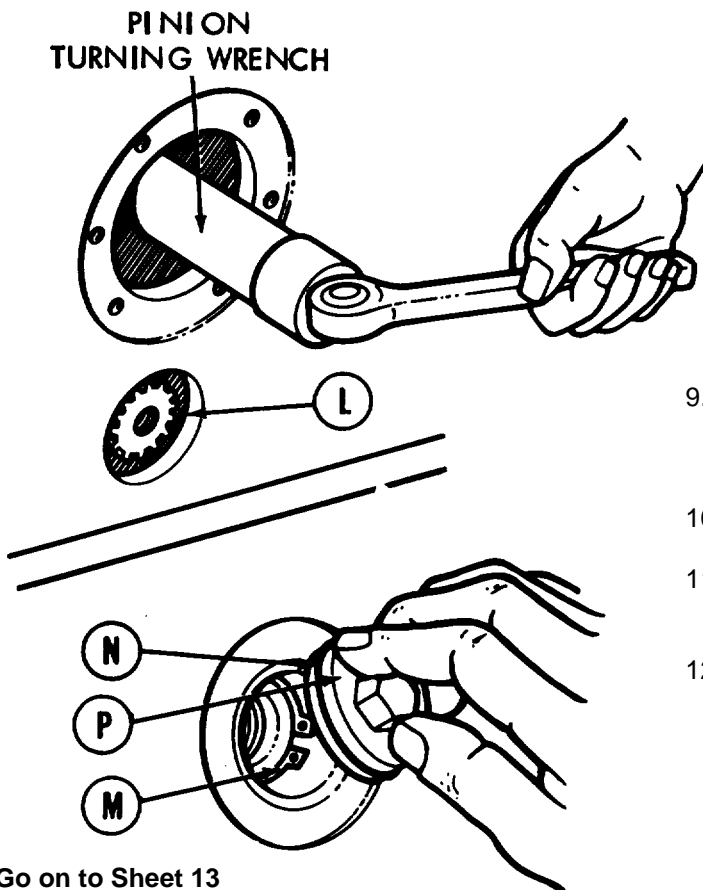
- Using transmission sling and a suitable hoist (transmission weighs approximately 3,000 pounds), align transmission dowel pins with engine and carefully advance transmission until transmission mounting flange is in contact with engine transmission adapter.
- Using fabricated wrench and 5/8 inch socket, install and tighten screw (E), washer (F), and nut (G) on left and right side of transmission/engine.
- Using fabricated wrench or 5/8 inch wrench, install and tighten 17 screws (H), lockwashers (J), and flat washers (K) securing transmission to engine flange.
- Remove transmission sling from transmission.



Go on to Sheet 12



8. Push transmission input shaft (L) into transmission.

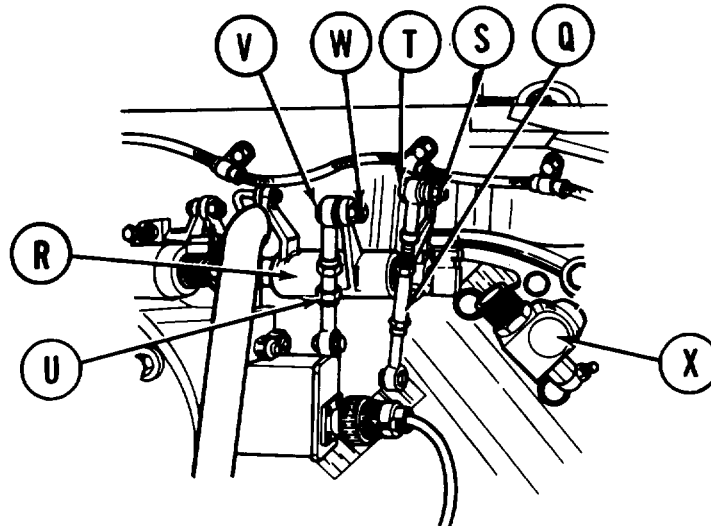


9. Using pinion turning wrench, turn transmission until splines align and shaft (L) will slide in and seat properly.
10. Remove pinion turning wrench.
11. Using retaining ring pliers, install retaining ring (M) on input shaft.
12. Position gasket (N) onto plug (P), and using 1-1/8 inch socket and torque wrench, tighten plug (P) to 50-60 lb-ft (68-81 N•m).

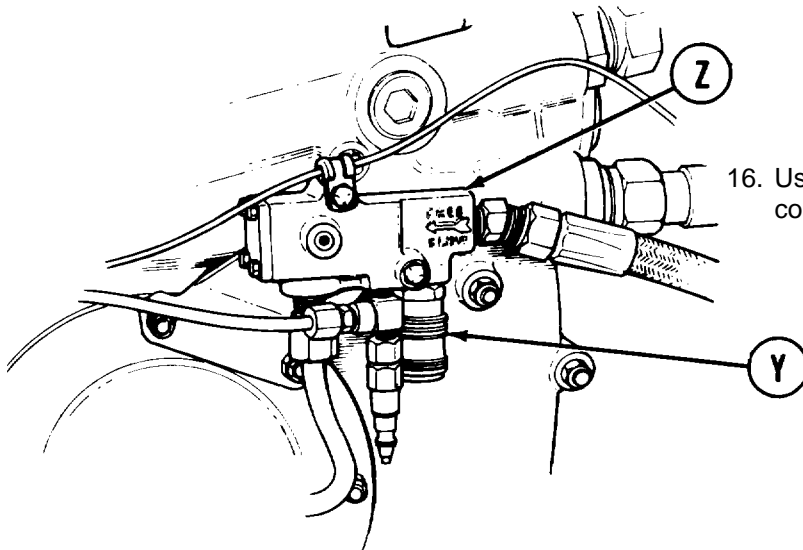
Go on to Sheet 13

**ENGINE REPLACEMENT (2D ENGINE) (Sheet 13 of 18)**

13. Position linkage (Q) (long piece) onto cross shaft (R), and using 7/16 inch wrench to hold nut (S), use 7/16 inch wrench to install screw (T) through linkage (Q).
14. Position linkage (U) (short piece) onto cross shaft (R), and using 7/16 inch wrench to hold nut (V), use 7/16 inch wrench and install screw (W) through linkage (U).



15. Using 1 inch wrench, install tachometer adapter (X).



16. Using 3/4 inch wrench, connect quick disconnect coupling (Y) to fuel check valve (Z).

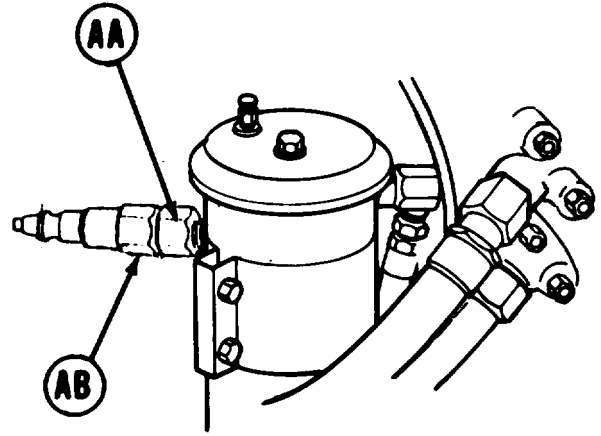
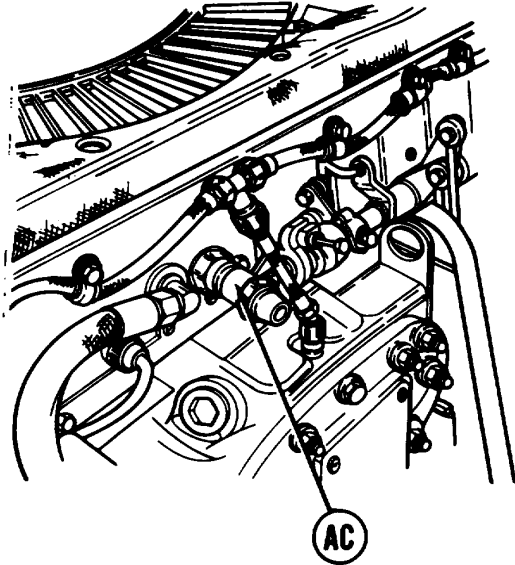
Go on to Sheet 14

TA130461



**ENGINE REPLACEMENT (2D ENGINE) (Sheet 14 of 18)**

17. Using 1-1/8 inch wrench, install fitting (AA).
18. Using 1-3/16 inch wrench, install coupling (AB) to fitting (AA).



19. Using 1 inch wrench, install fire extinguisher adapter (AC).

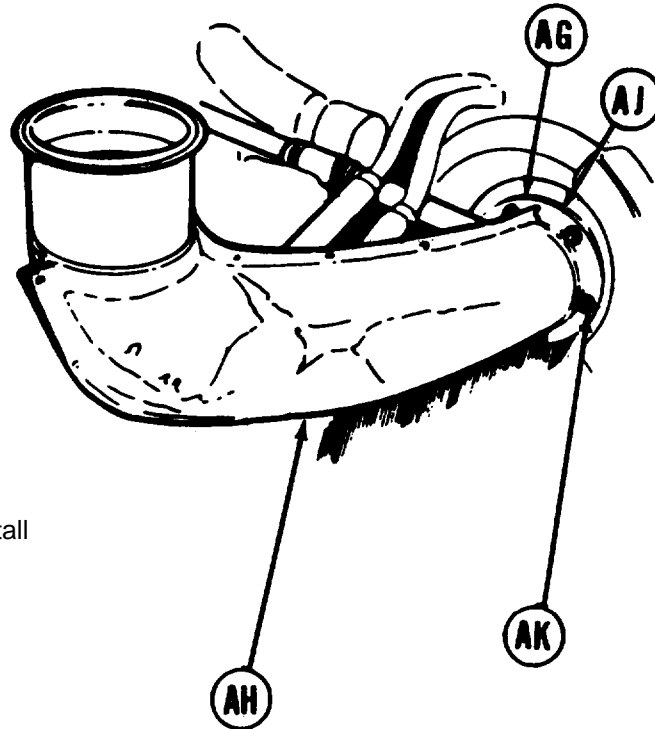
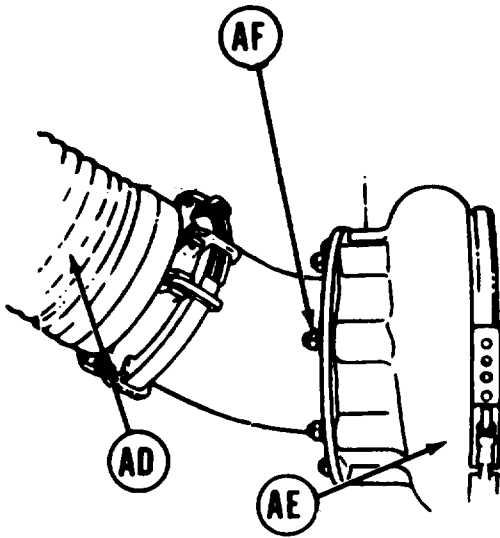
20. Install engine wiring harness (TM 9-2350-222-20-1).

**Go on to Sheet 15**

**TA130462**

**ENGINE REPLACEMENT (2D ENGINE) (Sheet 15 of 18)**

21. Position left air cleaner hose and elbow assembly (AD) onto turbocharger (AE), and using 1/2 inch wrench, install eight flat washers, lockwashers, and nuts (AF) securing air cleaner hose and elbow assembly to turbocharger (AE).



22. Using procedure described in step 21, install right air cleaner hose and elbow assembly.

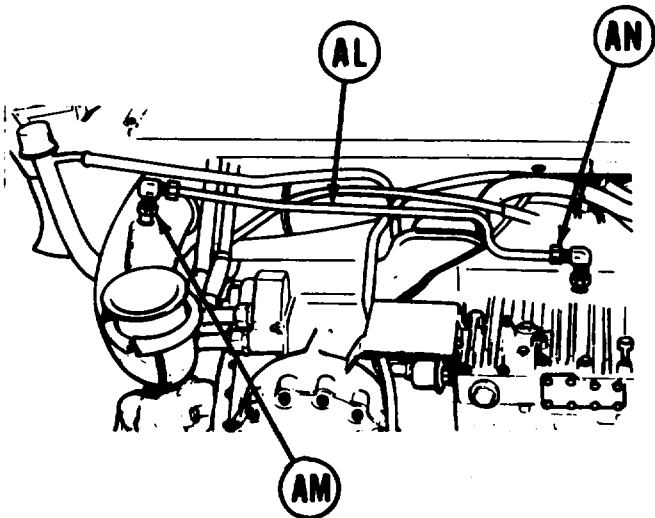
**NOTE**

Perform steps 23, 24, and 25 only if you are replacing a 2D engine.

23. Position exhaust pipe gasket (AG) and right exhaust pipe (AH) onto exhaust flange (AJ), and using 1/2 inch socket, install six nuts (AK) securing right exhaust pipe (AH) to flange (AJ).

24. Using procedure described in step 23, install left exhaust pipe.

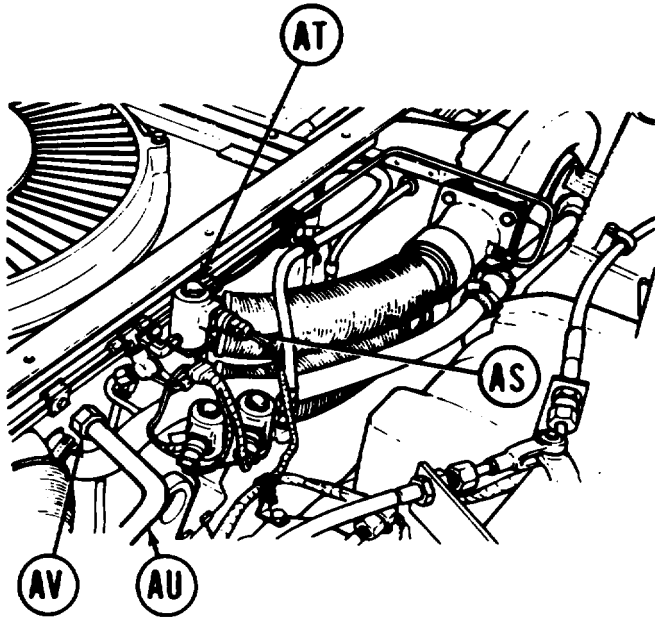
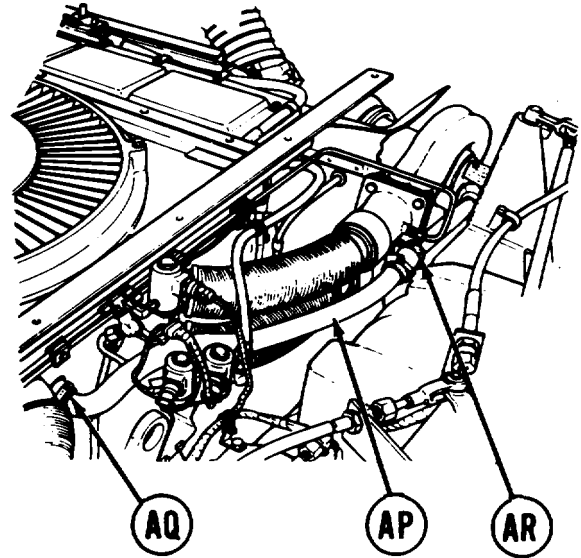
25. Position transmission vent line (AL) onto transmission, and using 7/8 inch wrench, secure line (AL) by tightening connecting nut (AM) and connecting nut (AN).



Go on to Sheet 16

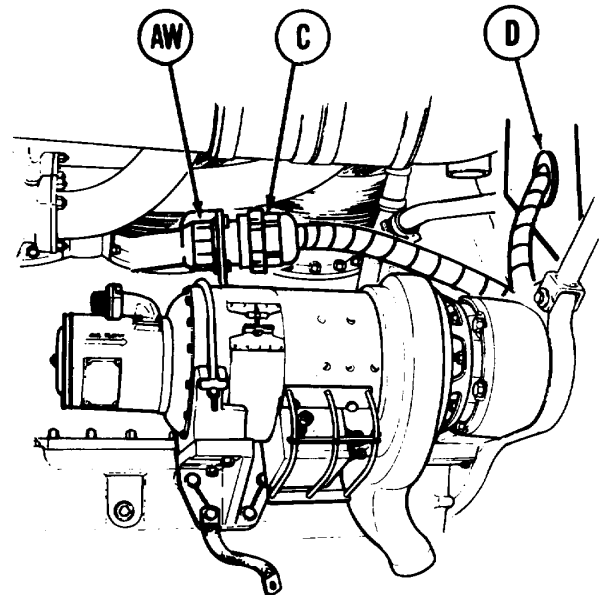
**ENGINE REPLACEMENT (2D ENGINE) (Sheet 16 of 18)**

26. Position engine breather tube (AP) and clamps (AQ) and (AR) onto engine.
27. Using screwdriver, tighten two screws securing clamps (AQ) and (AR) and engine breather tube (AP) to engine.



28. Connect electrical connector (AS) to solenoid (AT).
29. Position fuel return line (AU) onto connection on engine, and using 1-1/8 inch wrench, tighten connector (AV).

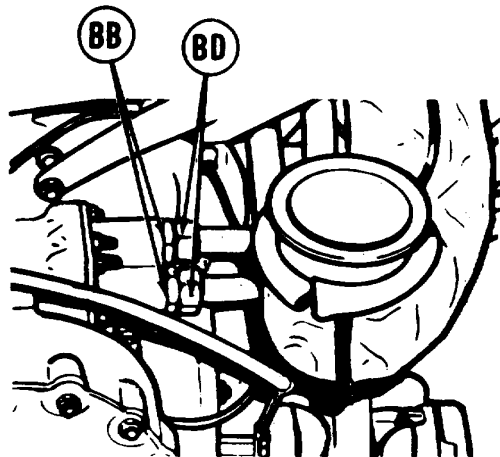
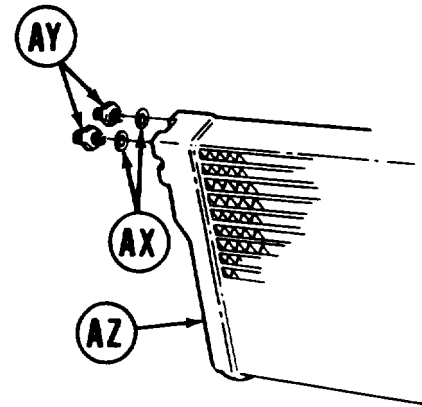
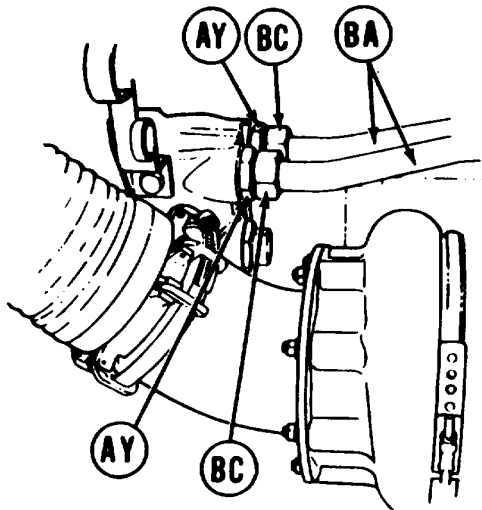
30. Using hands, position cannon plug (C) from grommet (D) to connector (AW).
31. Using spanner wrench, install cannon plug (C) to connector (AW).



TA130464

**ENGINE REPLACEMENT (2D ENGINE) (Sheet 17 of 18)**

32. Using 15/8 inch wrench, install two washers (AX) and adapters (AY) to oil cooler (AZ) on right side of engine.



33. Position inner oil cooler tubes (BA) to inner adapters (AY) and (BB).
34. Using 1-1/2 inch wrench, tighten nut (BC) to adapter (AY).
35. Using 1-1/2 inch wrench, tighten nut (BD) to adapter (BB).
36. Position outer oil cooler tube (BA) to adapter (BB).
37. Using 1-1/2 inch wrench, tighten nut (BC) to adapter (AY).
38. Using 1-1/2 inch wrench, tighten nut (BD) to adapter (BB).
39. Using procedures described in steps 32 thru 38, install the two tubes, adapters, and washers to left oil cooler.

40. Install engine mounts (TM 9-2350-222-20-1).

40.1 Install left and right exhaust ejector tube (TM 9-2350-222-20-1-3) if replacing a 2DA engine.

41. Install engine shroud and supports (TM 92350-222-20-1).

**Go on to Sheet 18**

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**ENGINE REPLACEMENT (2D ENGINE) (Sheet 18 of 18)**

42. Install shifting linkage and brackets (TM 9-2350-222-20-1).
43. Install steering linkage and brackets (TM 9-2350-222-20-1).
44. Check engine oil for proper level. Drain or fill if necessary (LO 9-2350-222-12).
45. Check transmission oil for proper level. Drain or fill if necessary (LO 9-2350-222-12).
46. Test run engine using powerplant test (ground hop) kit (TM 92350-222-20-1).
47. Install powerplant (TM 9-2350-222-20-1).
48. Install right angle drive, clutch, and pump (TM 9-2350-222-20-1).
49. Install generator exhaust valve (TM 9-2350-222-20-1).

**End of Task**

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## CHAPTER 4

## FUEL SYSTEM MAINTENANCE INDEX

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**AIR CLEANER FAN REPAIR (Sheet 1 of 11)**

**PROCEDURE INDEX**

PROCEDURE	PAGE
Disassembly	4-2
Cleaning and Inspection	4-5
Testing	4-5
Repair	4-6
Assembly	4-7
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**TOOLS:** Flat-tip screwdriver with 1/4 in. blade  
 Long round nose pliers  
 Air supply source  
 Vise  
 Hammer  
 1/2 in. socket with 1/2 in. drive  
 Ratchet with 1/2 in. drive  
 Rule  
 Flat-tip screwdriver with 3/8 in. blade

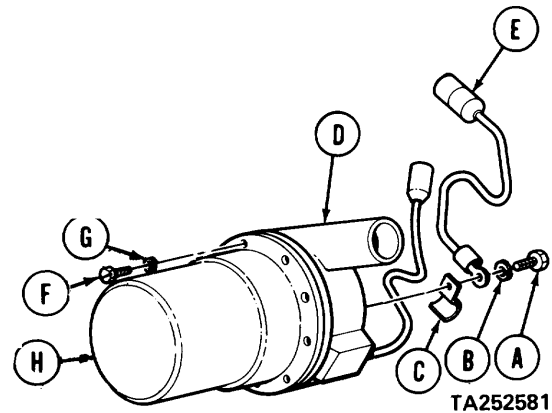
**TEST EQUIPMENT:** Multimeter  
 24 volt power supply

**SUPPLIES** Dry cleaning solvent (Item 12, Appendix B)  
 Rags  
 Blower fan parts kit (5703549)  
 Motor parts kit (5702404)  
 Lockwasher (MS35338-57) (10 required)

**REFERENCE:** TM 9-2350-222-20-1

**DISASSEMBLY:**

1. Using 3/8 inch screwdriver, remove screw (A) and lockwasher (B) securing retaining strap (C) holding both leads to housing (D). Throw lockwasher away.
2. Remove retaining strap (C) and lead (E).
3. Using 1/4 inch screwdriver, remove 10 scr (F) and lockwashers (G) attaching cover ( impeller housing (D).
4. Separate cover (H) from housing (D).

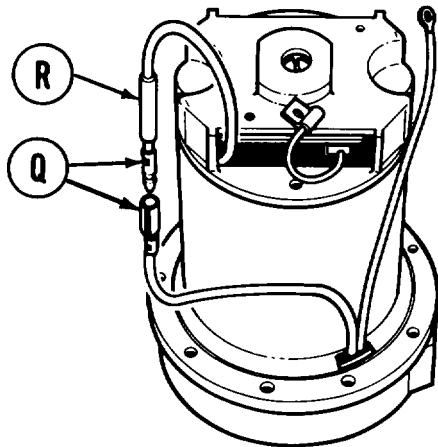
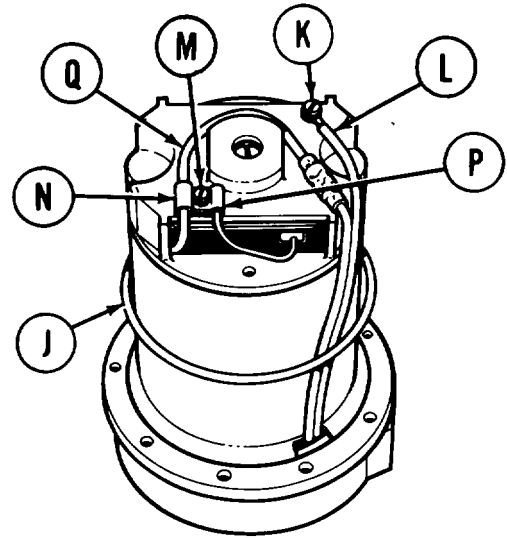


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**Go on to Sheet 2**

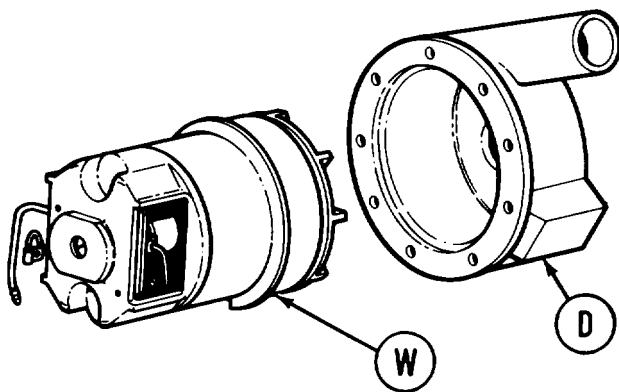
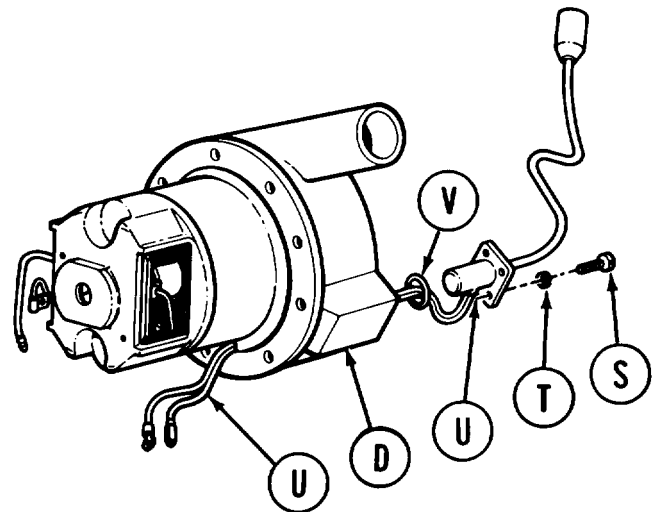
**AIR CLEANER FAN REPAIR (Sheet 2 of 11)**

5. Remove preformed packing (J) from motor.
6. Using 1/4 inch screwdriver, remove screw and washer (K) securing ground strap (L).
7. Using 1/4 inch screwdriver, remove screw and washer (M), securing retaining strap (N), brush lead (P), and power lead (Q).



8. Slide insulator (R) aside to expose lead connector. Pull leads (Q) apart and remove insulator (R).

9. Using 1/4 inch screwdriver, remove four screws (S) and lockwashers (T) securing capacitor and leads (U). Pull leads and capacitor (U) out from housing (D).
10. Remove packing (V) from capacitor and leads (U). Throw packing away.



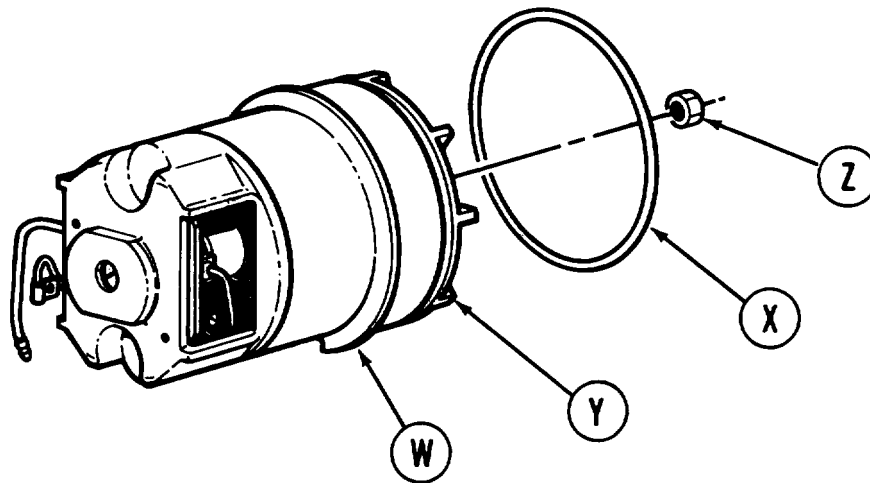
11. Holding motor (W) in one hand, tap housing (D) with hammer to loosen motor from housing. Remove motor (W) from housing (D).

Go on to Sheet 3

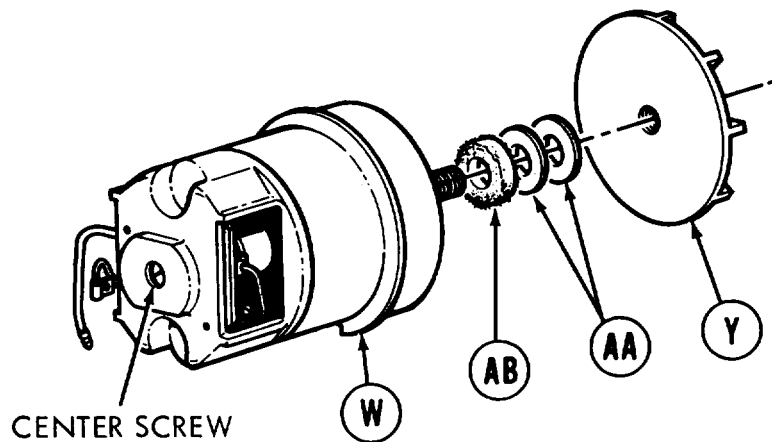
TA130467



AIR CLEANER FAN REPAIR (Sheet 3 of 11)



12. Remove packing (X) from motor (W). Throw packing away.
13. Hold impeller (Y) and using socket, remove nut (Z). Throw nut away.



14. Using 1/4 inch screwdriver to hold center screw (hidden) at armature end of motor (W), unscrew impeller (Y) from threaded shaft.
15. Remove shim washers (AA) and felt washer (AB). Throw washers away.

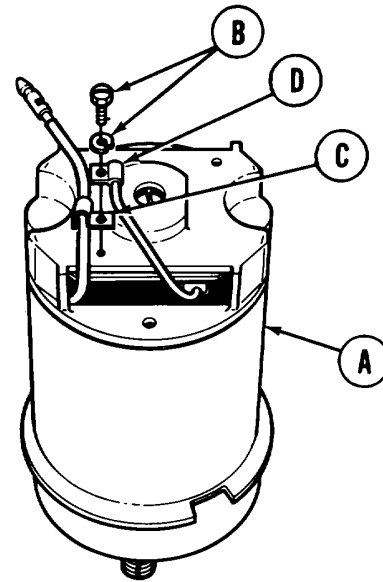
Go on to Sheet 4

TA130468

**AIR CLEANER FAN REPAIR (Sheet 4 of 11)**

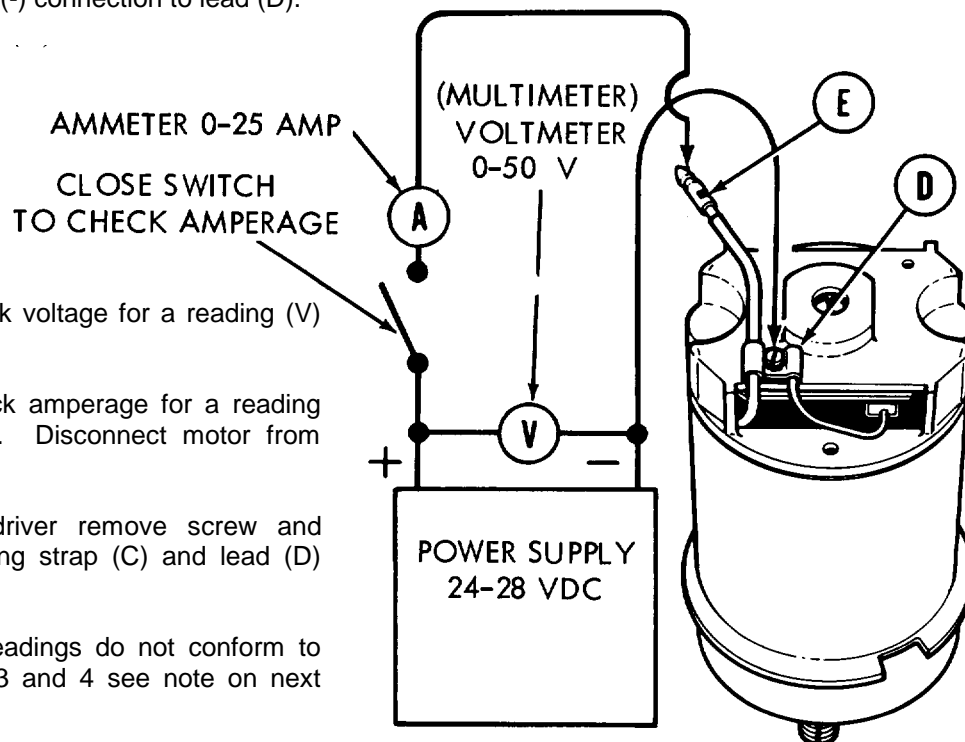
**CLEANING AND INSPECTION**

1. Using dry cleaning solvent (Item 12, Appendix B) and rag clean all parts.
2. Dry parts with compressed air.
3. Check both leads for fraying, torn insulation or oil soakage. Replace leads if damaged.
4. Using multimeter (ohms scale), check leads for continuity. If continuity does not exist replace leads.
5. Check cover and impeller for damage. If parts are damaged replace them.



**TESTING:**

1. Secure air cleaner blower motor (A) to bench with vise so motor is stable. Using screwdriver install screw and lockwasher (B), retaining strap (C) and brush lead (D) to motor (A) as shown.
2. Connect motor to 24 volt power source as shown. With (+) connection to lead (E) and (-) connection to lead (D).



3. Using multimeter, check voltage for a reading (V) of 22-24 volts.
4. Using multimeter, check amperage for a reading (A) of 5 to 7.5 amps. Disconnect motor from power source.
5. Using ¼ inch screwdriver remove screw and lockwasher (B), retaining strap (C) and lead (D) from motor (A).
6. If voltage or current readings do not conform to those stated in steps 3 and 4 see note on next page.

**Go on to Sheet 5**

**TA130469**

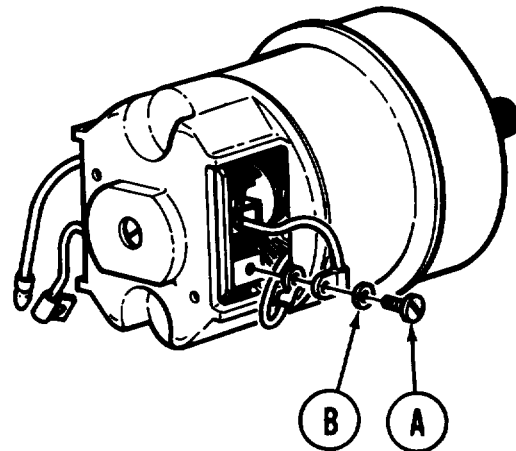
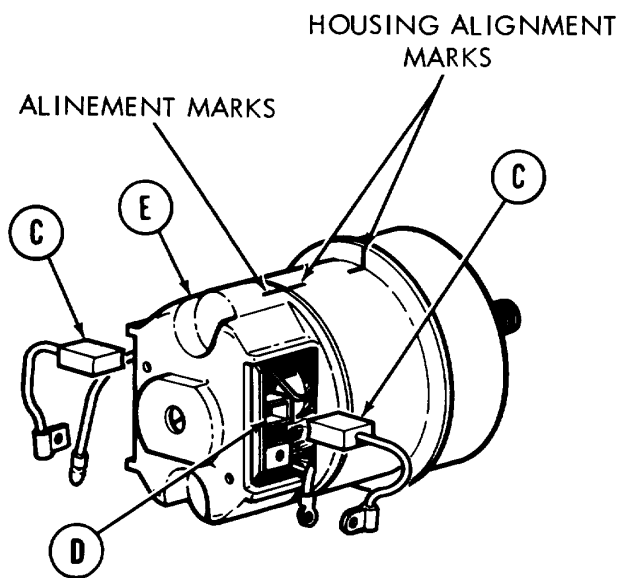
## AIR CLEANER FAN REPAIR (Sheet 5 of 11)

## NOTE

There are two different types of motors. The early model motor can be repaired with a parts kit and is identified by the number 10905006 stamped into the brush end of the motor. The late model motor, which is not repairable, can be identified by the number 12270348 stamped into the brush end of the motor. After testing, if the late model motor is defective, replace it. If the early model motor is found defective, repair as indicated below.

## REPAIR:

1. Using 1/4 inch screwdriver, remove screw (A) and lockwasher (B) securing brush leads.

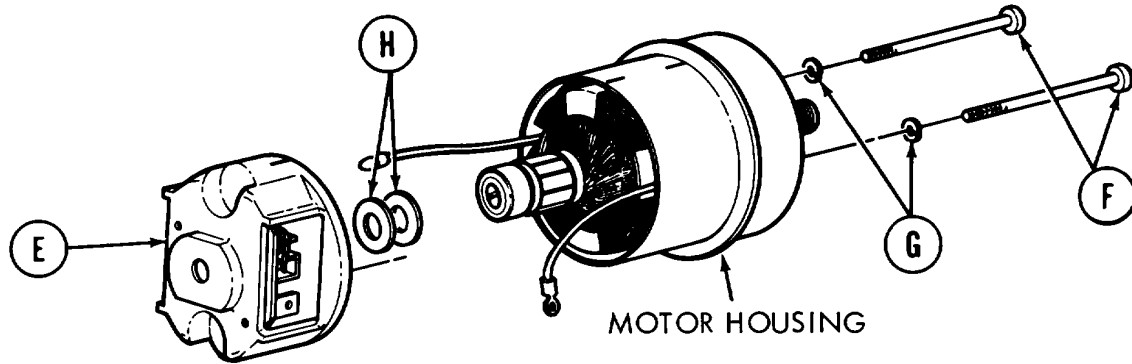


2. Using pliers, release two brush springs holding brushes (C) in place.
3. Pull two brushes (C) from holders (D) and throw brushes away.
4. Make alinement marks on front end (E) to match lines on housing.

Go on to Sheet 6

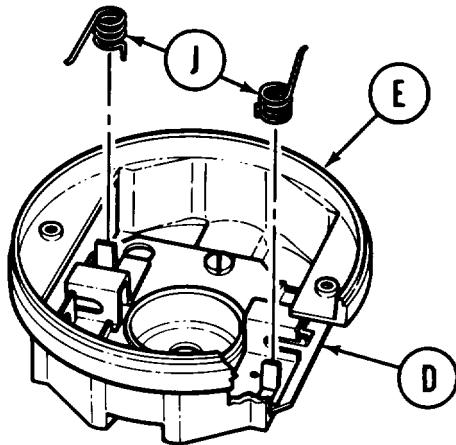
TA130470

**AIR CLEANER FAN REPAIR (Sheet 6 of 11)**



5. Using 3/8 inch screwdriver, remove two screws (F) and lockwashers (G) securing front head (E).
6. Remove front head (E) from motor housing.
7. Remove shims (H) from head (E).
8. Using pliers, remove two springs (J) from holder (D). Throw springs (J) away.

**NOTE**  
Brush holder (D) is still inside front head (E).

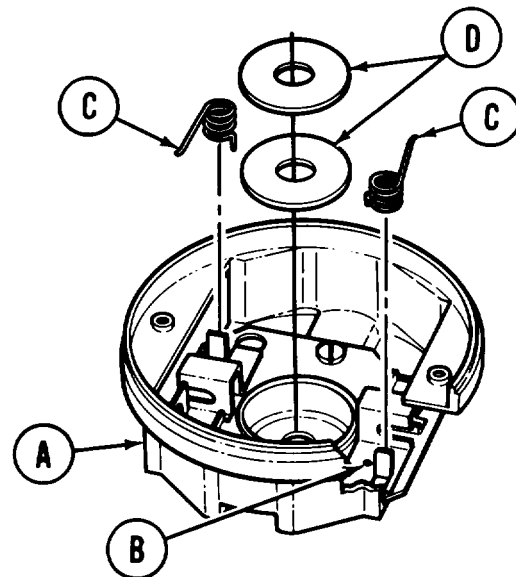


**ASSEMBLY:**

**NOTE**  
Steps 1 thru 5 are to be performed before head (A) and brush holder (B) are installed on motor housing.

1. Position two new springs (C) with short stem of springs in holder holes (B).
2. Using fingers, place shims (D) inside center of front head (A).

**Go on to Sheet 7**

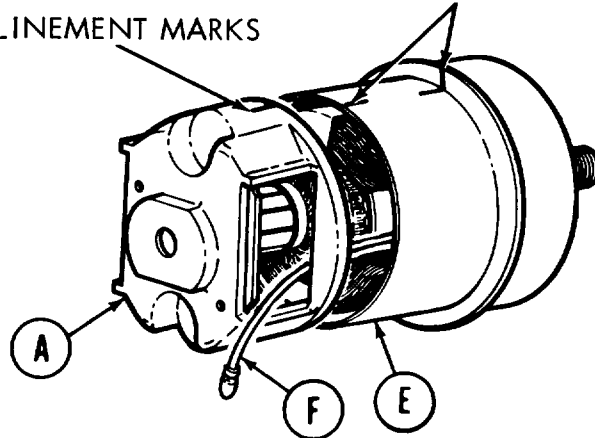
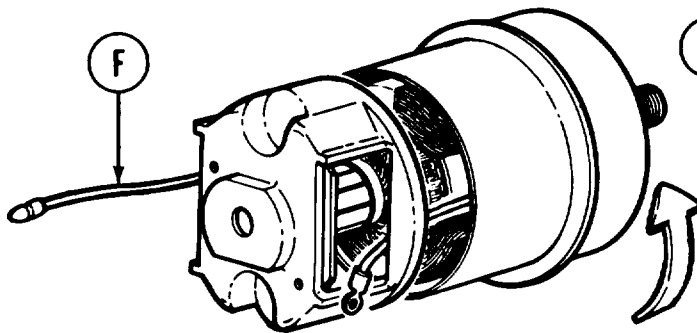


**AIR CLEANER FAN REPAIR (Sheet 7 of 11)**

3. Aline marks on front end head (A) with alinement marks on motor housing (E).
4. Using fingers, push end of power cable lead (F) from motor housing (E) thru opening in front end head (A) as shown.

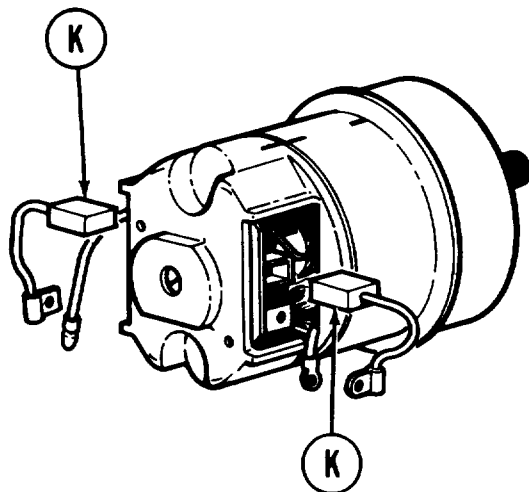
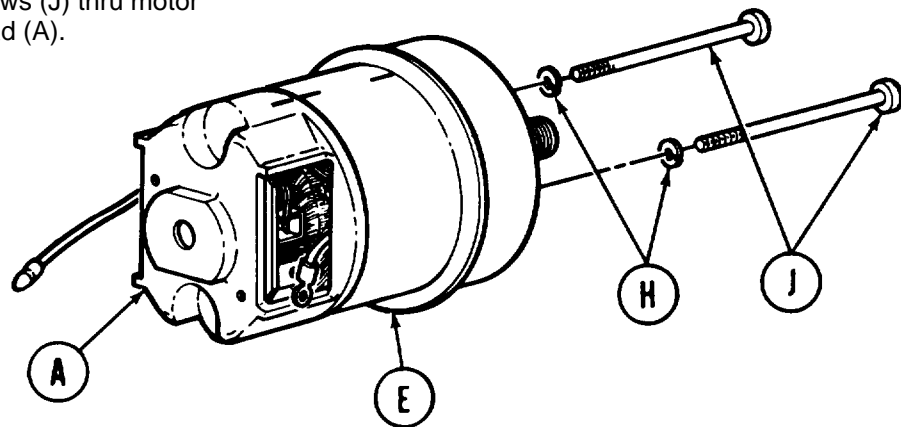
**HOUSING ALINEMENT MARKS**

**ALINEMENT MARKS**



5. Turn fan over and using fingers pull brush ground lead (G) thru opening in front end head (A) as shown.

6. Using 3/8 inch screwdriver, install and tighten two lockwashers (H) and screws (J) thru motor housing (E) into front end head (A).

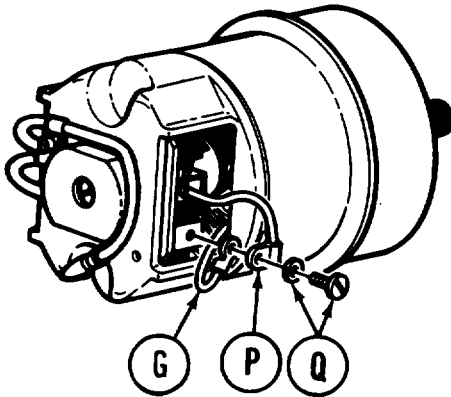
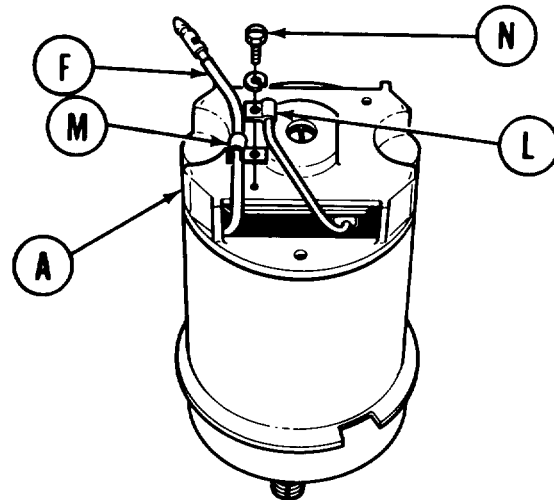


7. Install brushes (K) by pulling out on long arm of spring with needle nose pliers and holding aside while brush is inserted.
8. Position springs (C) over end of brushes (K).

Go on to Sheet 8

**AIR CLEANER FAN REPAIR (Sheet 8 of 11)**

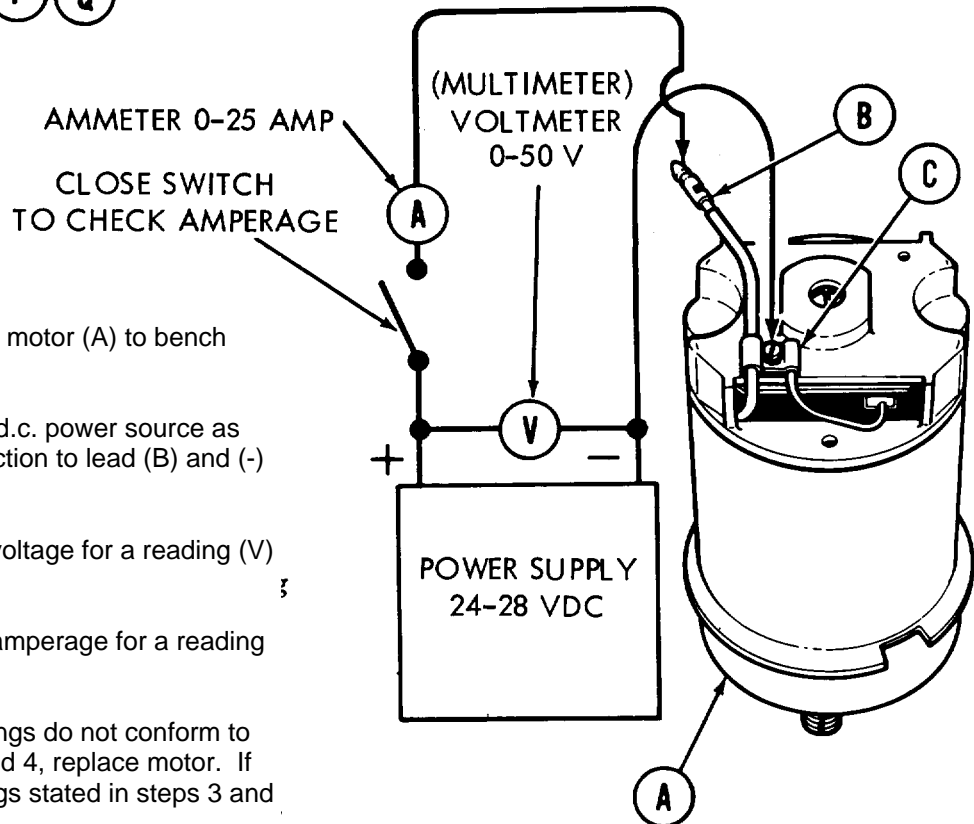
- Place brush lead (L) and power cable lead (F) on front end head (A) as shown and secure retaining strap (M) with screw and lockwasher (N) to front end head (A) as shown.



- Position ground lead (G) and brush lead (P) over terminal as shown.
- Using screwdriver, install screw (Q) and lockwasher to secure leads (L) and (P) to terminal.

**TESTING:**

- Secure air cleaner blower motor (A) to bench vise so motor is stable.
- Connect motor to 24 volt d.c. power source as shown. With (+) connection to lead (B) and (-) connection to lead (C).
- Using multimeter, check voltage for a reading (V) of 22-24 volts.
- Using multimeter, check amperage for a reading (A) of 5 to 7.5 amps.
- If voltage or current readings do not conform to those stated in steps 3 and 4, replace motor. If motor conforms to readings stated in steps 3 and 4, go on to assembly.



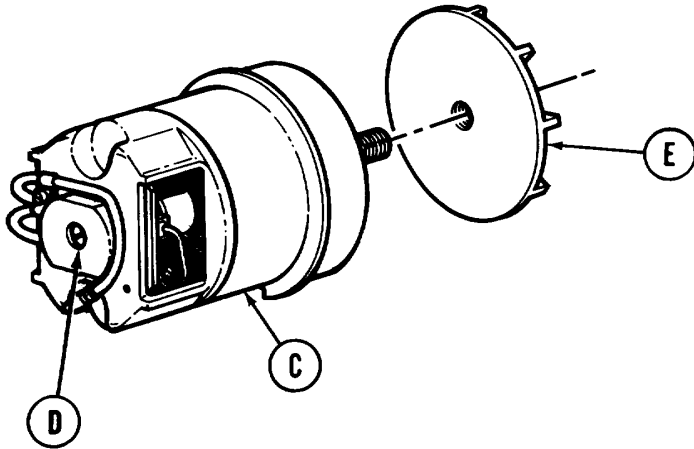
Go on to Sheet 9

TA130473

**AIR CLEANER FAN REPAIR (Sheet 9 of 11)**

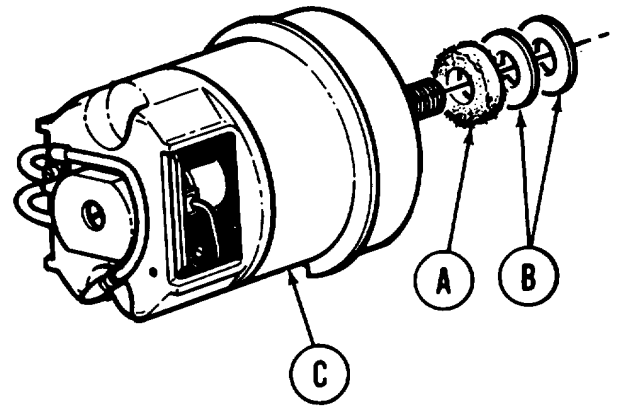
**ASSEMBLY:**

1. Position new felt washer (A) and two new shim washers (B) onto threaded shaft of motor (C).



3. Position new nut (F) onto threaded shaft of motor (C).
4. Using 1/4 inch screwdriver to hold end of shaft, use socket to tighten nut (F) securing impeller (E) onto shaft.

**Go on to Sheet 10**

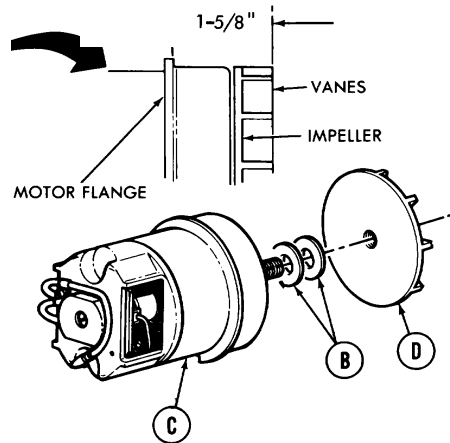
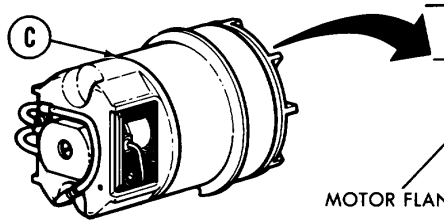


2. Using 1/4 inch screwdriver to hold center screw (D) at armature end of motor (C), screw impeller (E) onto threaded shaft of motor.

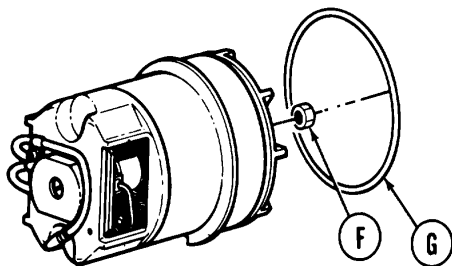
**TA130474**

**AIR CLEANER FAN REPAIR (Sheet 10 of 11)**

5. Using a rule, measure distance between outside end of vanes and flange on motor (C).



6. This distance should be 1-5/8 inch. If distance is not correct, remove impeller (D) and add on (or take away) shim washers (B) as necessary.



7. Using socket, install nut (F).

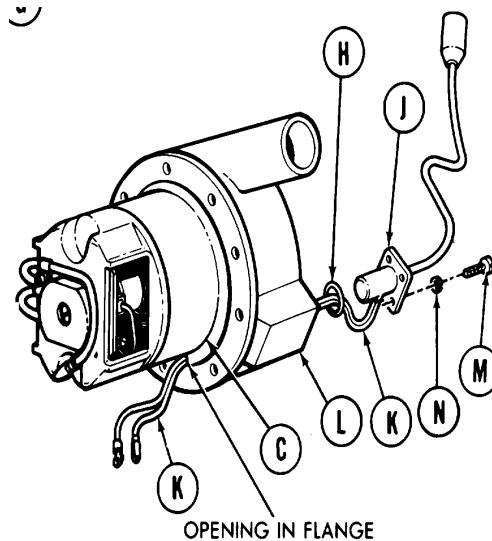
8. Install new packing (G) in motor groove.

9. Install new packing (H) over leads and onto capacitor (J).

10. Insert leads (K) and capacitor (J) through mounting place on housing (L) and opening in flange of motor (C).

11. Install motor (C) into housing (L) and through opening in flange.

12. Using 1/4 inch screwdriver, install four screws (M) with new lockwashers (N).



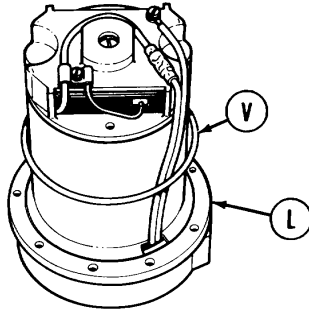
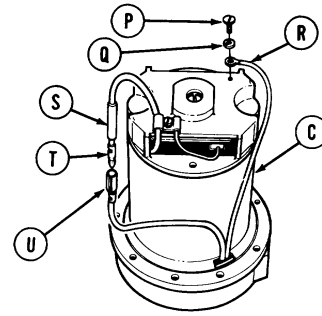
Go on to Sheet 11

TA252582



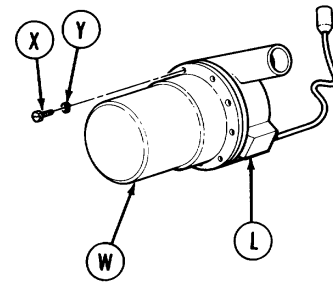
**AIR CLEANER FAN REPAIR (Sheet 11 of 11)**

13. Using 1/4 inch screwdriver, install screw (P) and new lockwasher (Q) to secure capacitor ground strap (R) to armature end of motor (C).
14. Slide insulator (S) over end capacitor lead (T) and connect lead (T) to lead (U) at end of motor as shown, then slide insulator (S) over connectors.

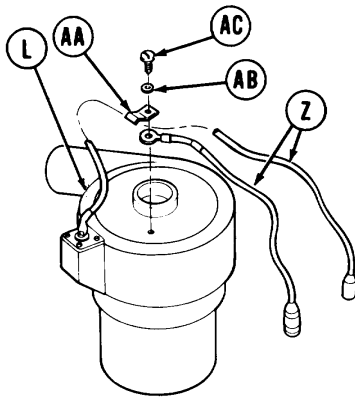


15. Install new packing (V) in groove in housing (L).

16. Position cover (W) to housing (L).
17. Install 10 screws (X) and 10 new lockwashers (Y) to secure cover (W) to housing (L).
18. Using 1/4 inch screwdriver, tighten 10 screws (X).



19. Place both electrical leads (Z) in position and secure with retaining strap (AA). Using 1/4 inch screwdriver, secure retaining strap (AA) to housing (L) with new lockwasher (AB) and screw (AC).



End of Task

TA252583

**FUEL TANK (LEFT) LOWER FRONT MOUNT REPLACEMENT (Sheet 1 of 4)**

PROCEDURE	PROCEDURE INDEX	PAGE
Removal		4-14
Cleaning and Inspection		4-15
Installation		4-15

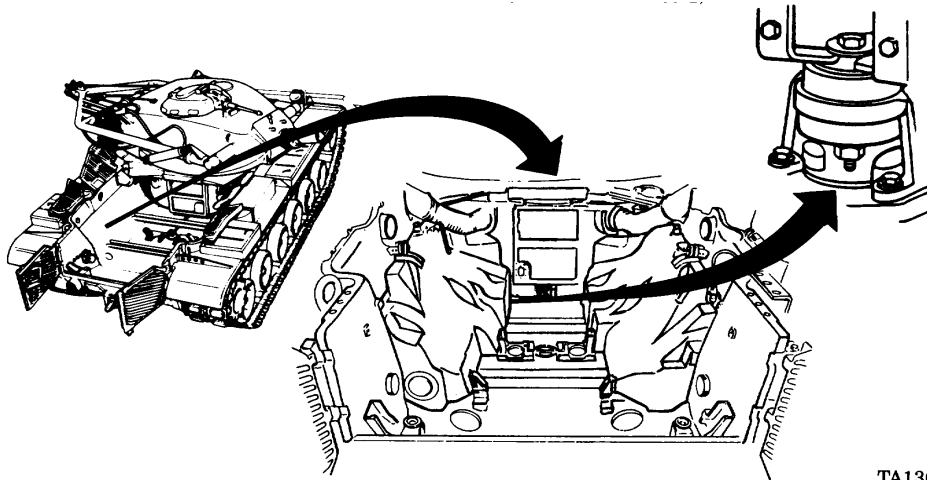
**TOOLS:** 15/16 in. combination box and open end wrench (2 required)  
 1/2 in. combination box and open end wrench  
 Hammer

**SUPPLIES:** Liquid detergent (Item 11, Appendix B)  
 Dry cleaning solvent (Item 12, Appendix B)  
 Rags (Item 31, Appendix B)

**PERSONNEL:** Two

**REFERENCE:** TM 9-2350-222-20-1

**PRELIMINARY PROCEDURES:** Remove powerplant (TM 9-2350-222-20-1)  
 Remove accelerator linkage assembly (page 4-98)  
 Remove fire extinguisher coupling and tube assembly (TM 9-2350-222-20-1)  
 Remove fuel shutoff cable assembly (page 4-69)  
 Drain left fuel tank (TM 9-2350-222-20-1)



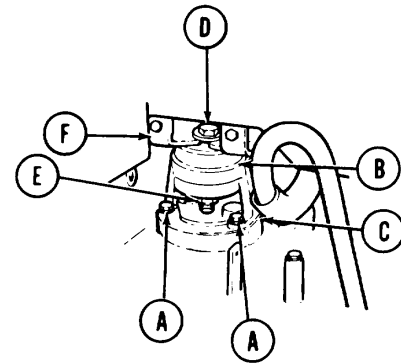
TA130477

Go on to Sheet 2

**FUEL TANK (LEFT) LOWER FRONT MOUNT REPLACEMENT (Sheet 2 of 4)**

**REMOVAL:**

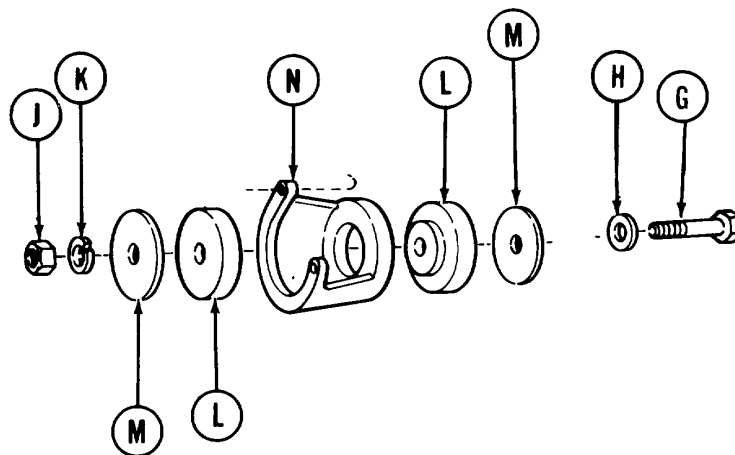
1. Using 1/2 inch wrench, remove two screws and washers (A) holding front mount (B) to hull floor (C).
2. Using two 15/16 inch wrenches, loosen screw (D) and nut (E).



**NOTE**

**If bracket and mount will not rotate, loosen upper rear mount (page 4-34 step 1) and upper front mount (page 4-29 step 9). Have second man lift fuel tank while rotating mount. Use hammer if required.**

3. Rotate lower bracket and mount (B) 180 degrees and remove from upper bracket (F).



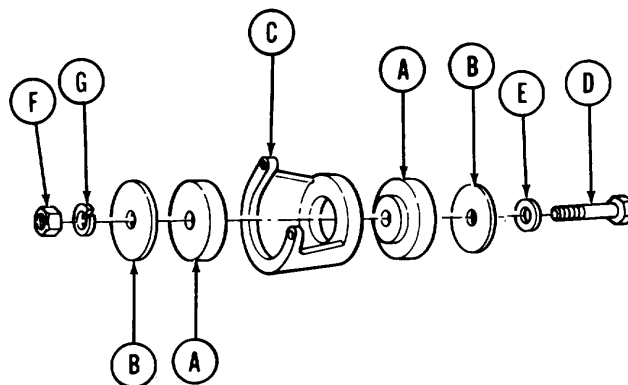
4. Using two 15/16 inch wrenches, remove screw (G), washer (H), nut (J) and washer (K).
5. Separate rubber mounts (L) and washers (M) from bracket (N).

Go on to Sheet 3

TA130478

**FUEL TANK (LEFT) LOWER FRONT MOUNT REPLACEMENT (Sheet 3 of 4)****CLEANING AND INSPECTION:**

1. Clean rubber mounts using detergent (Item 11, Appendix B) and water. Rinse clean using water.
2. Clean metal parts with dry cleaning solvent (Item 12, Appendix B). Wipe dry with rags.
3. Visually inspect rubber mounts for cuts, deterioration, or wear.
4. Visually inspect metal parts for wear.
5. Replace unserviceable parts.

**INSTALLATION:**

1. Install rubber mounts (A), and washers (B) to bracket (C) using screw (D), washer (E), nut (F) and washer (G).

Go on to Sheet 4

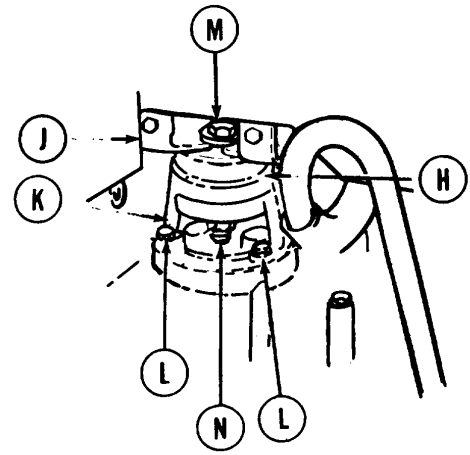
TA130479

## FUEL TANK (LEFT) LOWER FRONT MOUNT REPLACEMENT (Sheet 4 of 4)

**NOTE**

If bracket will not install, have second person lift bracket on tank. If upper rear and upper front mounts were loosened during removal, tighten upper rear mount (page 4-35, step 7) and upper front mount (page 4-32, steps 12 and 13).

2. Install assembled mount (H) to fuel tank bracket (J). After mount is installed rotate 180 degrees to align bracket (K) to hull floor. Secure to hull floor using two screws and washers (L).
3. Using two 15/16 inch wrenches, tighten screw (M) and nut (N).
4. Using 1/2 inch wrench, tighten two screws (L).
5. Install fire extinguisher tube and coupling (TM 9-2350-222-20-1).
6. Install fuel shut-off cable assembly (page 4-72).
7. Install accelerator linkage assembly (page 4101).
8. Install powerplant (TM 9-2350-222-20-1).
9. Fill left fuel tank.



End of Task

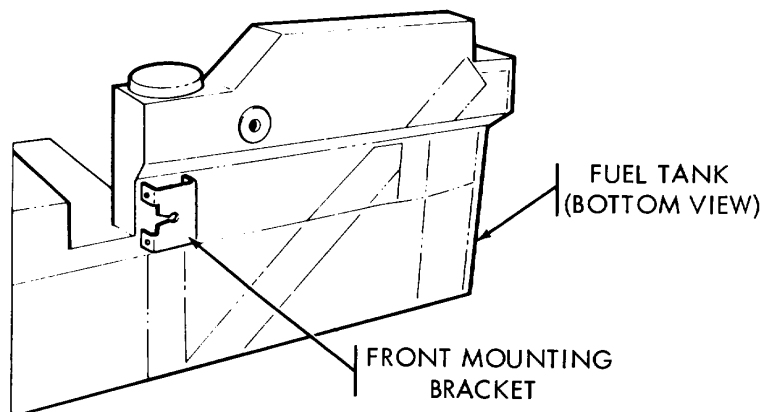
TA130480

## FUEL TANK (LEFT) LOWER FRONT MOUNTING BRACKET REPLACEMENT (Sheet 1 of 2)

TOOLS: 1/2 in. combination box and open end wrench (2 required).

PRELIMINARY PROCEDURE: Remove left fuel tank (page 4-51).

REMOVAL:

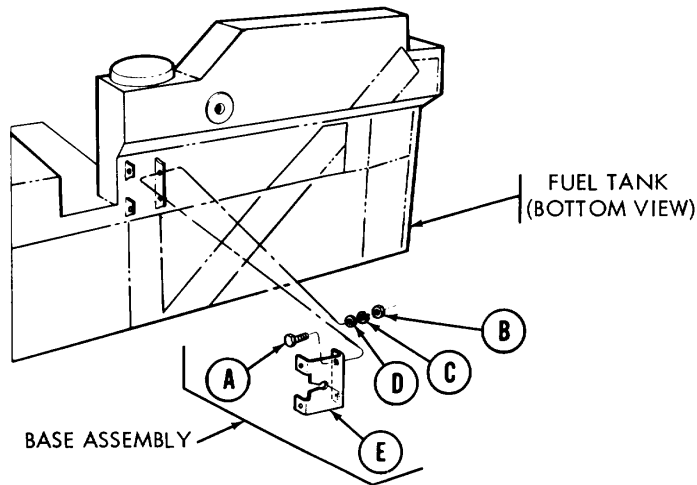


1. Position fuel tank so lower front mounting bracket can be removed from bottom of fuel tank.

Go on to Sheet 2

TA130481

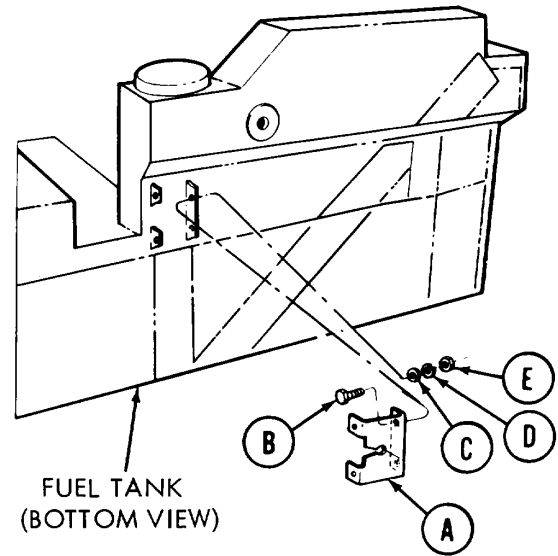
**FUEL TANK (LEFT) LOWER FRONT MOUNTING BRACKET REPLACEMENT (Sheet 2 of 2)**



2. Using 1/2 inch wrench to hold screw (A) and another 1/2 inch wrench to loosen nut (B), remove four nuts (B), lockwashers (C), flat washers (D), and screws (A).
3. Remove mounting bracket (E) from fuel tank.

**INSTALLATION:**

1. Position mounting bracket (A) onto mounting brackets of fuel tank. Insert four screws (B) through aligned holes.
2. Install four flat washers (C), lockwashers (D), and nuts (E) onto screws (B) securing mounting bracket assembly to fuel tank.
3. Using fingers, tighten four nuts (E).
4. Using 1/2 inch wrench to hold screw (B) and another 1/2 inch wrench to nut (E), tighten all four nuts (E).
5. Install left fuel tank (page 4-59).



End of Task

TA130482

**FUEL TANK (RIGHT) LOWER FRONT MOUNT REPLACEMENT (Sheet 1 of 4)**

PROCEDURE INDEX

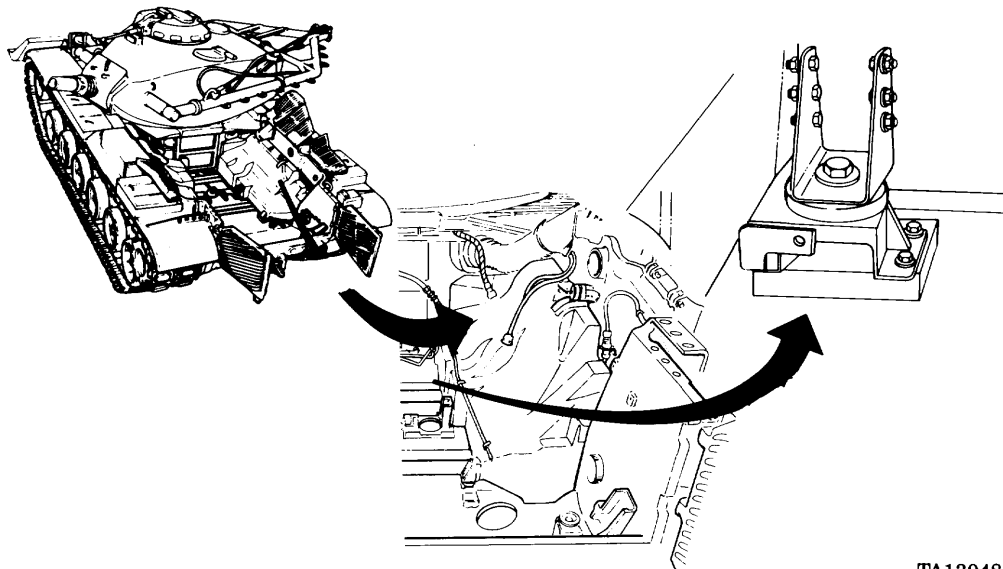
PROCEDURE	PAGE
Removal	4-20
Cleaning and Inspection	4-21
Installation	4-21

**TOOLS:** 15/16 in. combination box and open end wrench  
 15/16 in. socket with 1/2 in. drive  
 Ratchet with 1/2 in. drive  
 1/2 in. combination box and open end wrench (2 required)

**SUPPLIES:** Liquid detergent (Item 11, Appendix B)  
 Dry cleaning solvent (Item 12, Appendix B)  
 Rags (Item 31, Appendix B)

**REFERENCE:** TM 9-2350-222-20-1

**PRELIMINARY PROCEDURES:** Remove powerplant (TM 9-2350-222-20-1)  
 Remove fire extinguisher lines (manifold to right fuel tank) (TM 9-2350-222-20-1)  
 Drain right fuel tank (TM 9-2350-222-20-1)



TA130483



**FUEL TANK (RIGHT) LOWER FRONT MOUNT REPLACEMENT (Sheet 2 of 4)**

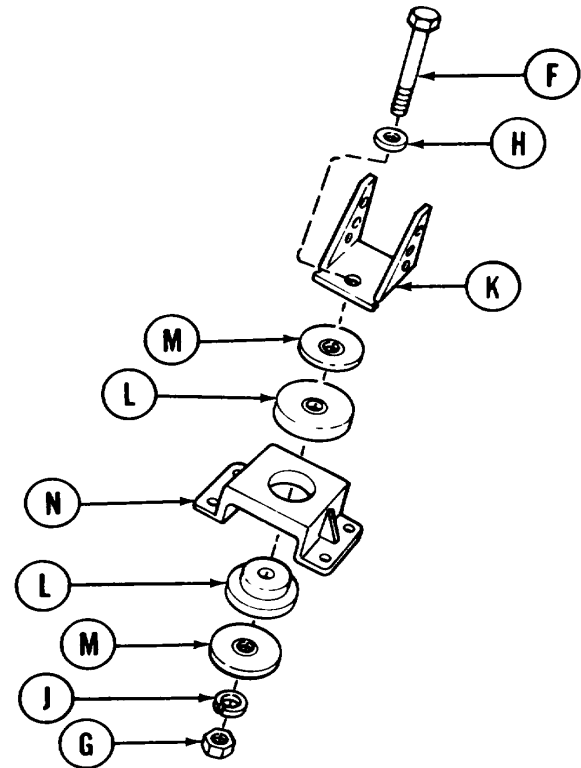
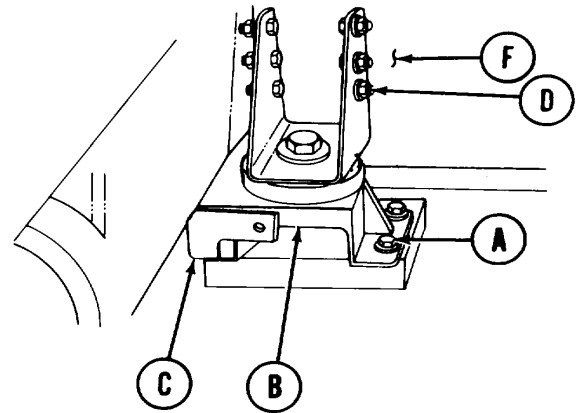
**REMOVAL:**

1. Using 1/2 inch wrench, remove four screws and washers (A) holding mount (B).
2. Remove bracket (C).

**NOTE**

It may be necessary to loosen lower rear mount (page 4-24), upper rear mount (page 4-34) and upper front mount (page 4-29, step 9) to remove mount (B).

3. Using two 1/2 inch wrenches, remove six screws, washers, and nuts (D) holding mount (B) to fuel tank (E). Remove mount (B) from fuel tank (E).
4. Using 15/16 inch socket on screw (F) and 15/16 inch wrench on nut (G), remove screw (F), washer (H), nut (G) and washer (J).
5. Separate bracket (K), rubber mounts (L), washer (M) and bracket (N).



TA130484

Go on to Sheet 3

TA130484

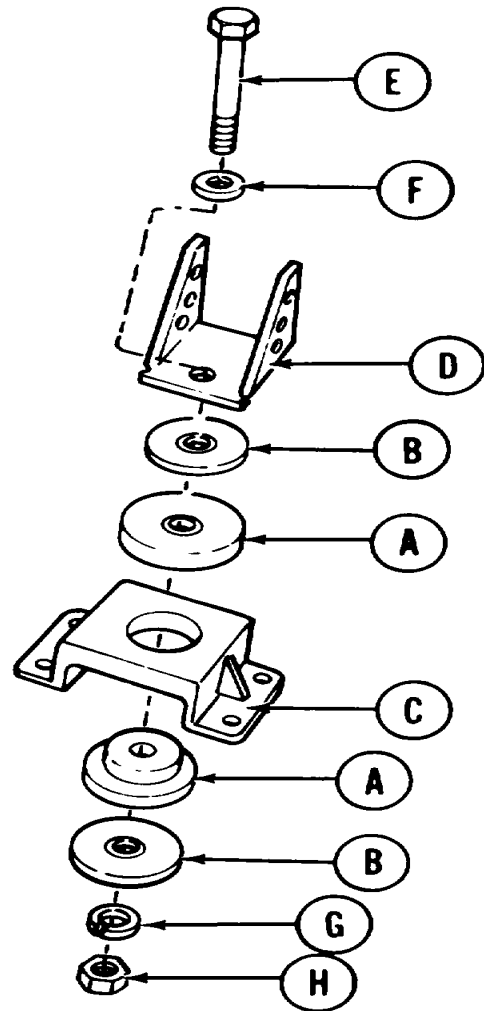
**FUEL TANK (RIGHT) LOWER FRONT MOUNT REPLACEMENT (Sheet 3 of 4)**

**CLEANING AND INSPECTION:**

1. Clean rubber mounts with detergent (Item 11, Appendix B) and water. Rinse clean with water.
2. Clean metal parts using dry cleaning solvent (Item 12, Appendix B). Wipe dry with rags.
3. Visually inspect rubber mounts for cuts, deterioration, or wear.
4. Visually inspect metal parts for wear.
5. Replace unserviceable parts.

**INSTALLATION:**

1. Install rubber mounts (A) and washers (B) to brackets (C) and (D) using screw (E), washer (F), washer (G), and nut (H).
2. Using 15/16 inch socket on screw (E) and 15/16 inch wrench on nut (H), tighten screw (E) and nut (H).

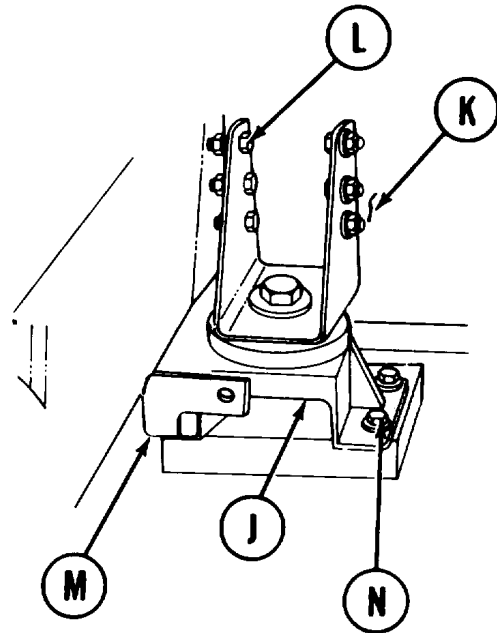


Go on to Sheet 4

TA130485

**FUEL TANK (RIGHT) LOWER FRONT MOUNT REPLACEMENT (Sheet 4 of 4)**

3. Install mount (J) to fuel tank (K) using six screws, washers and nut (L).
4. Using two 1/2 inch wrenches, tighten screws, washers, and nuts (L).
5. Install bracket (M).
6. Using 1/2 inch wrench, install four screws and washers (N).
7. Install fire extinguisher lines (TM 9-2350222-20-1).
8. Install powerplant (TM 9-2350-222-20-1).
9. Fill fuel tanks.



End of Task

TA130486

**FUEL TANKS (LEFT AND RIGHT) LOWER REAR MOUNT REPLACEMENT (Sheet 1 of 4)**

PROCEDURE INDEX

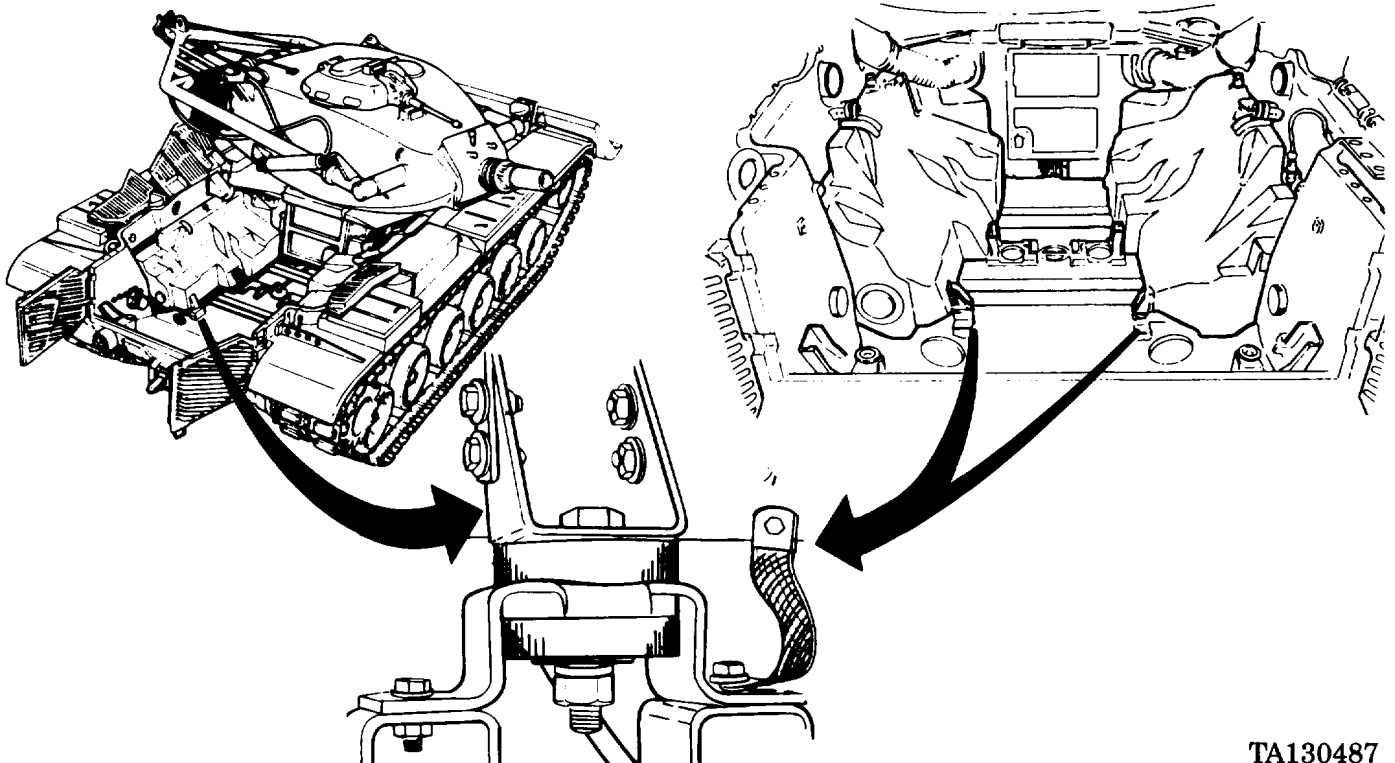
PROCEDURE	PAGE
Removal	4-24
Cleaning and Inspection	4-25
Installation	4-25

TOOLS: 9/16 in. socket with 1/2 in. drive  
 1/2 in. socket with 1/2 in. drive  
 Ratchet with 1/2 in. drive  
 1/2 in. combination box and open end wrench (2 required)  
 15/16 in. socket with 1/2 in. drive  
 15/16 in. combination box and open end wrench (2 required)

SUPPLIES: Liquid detergent (Item 11, Appendix B)  
 Dry cleaning solvent (Item 12, Appendix B)  
 Rags (Item 31, Appendix B)

REFERENCE: TM 9-2350-222-20-1

PRELIMINARY PROCEDURE: Remove powerplant (TM 9-2350-222-20-1)



TA130487

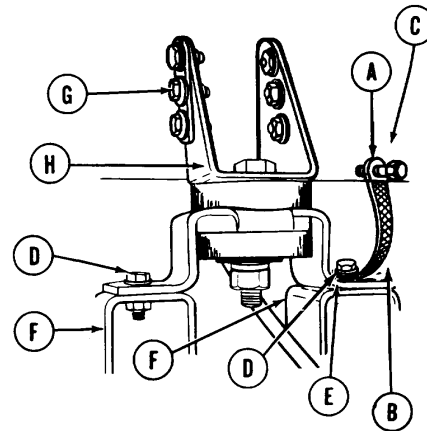
Go on to Sheet 2

TA130487

**FUEL TANKS (LEFT AND RIGHT) LOWER REAR MOUNT REPLACEMENT (Sheet 2 of 4)**

**REMOVAL:**

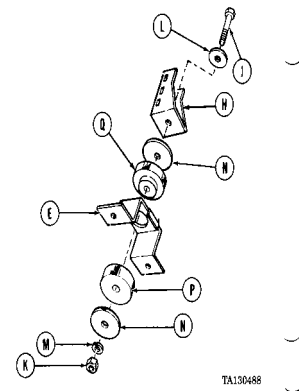
1. Using 1/2 inch socket, remove screw and washer (A) holding ground strap (B) to fuel tank (C).
2. Using 9/16 inch socket, remove two screws, washers and nuts (D) holding bracket (E) to hull bracket (F).
3. Remove ground strap (B).
4. Using two 1/2 inch wrenches, remove six screws, washers, and nuts (G) holding bracket (H) to fuel tank (C).



**NOTE**

**There may be extra washers (N) added between rubber mount (Q) and upper bracket (H) to raise fuel tank.**

5. Using 15/16 inch socket on screw (J) and 15/16 inch wrench on nut (K), remove screw (J), washer (L), nut (K), lockwasher (M), washer (N), and rubber mount (P).
6. Remove rubber mount (Q) and washer (N) between holding brackets (E and H).



TA130488

Go on to Sheet 3

TA 130488

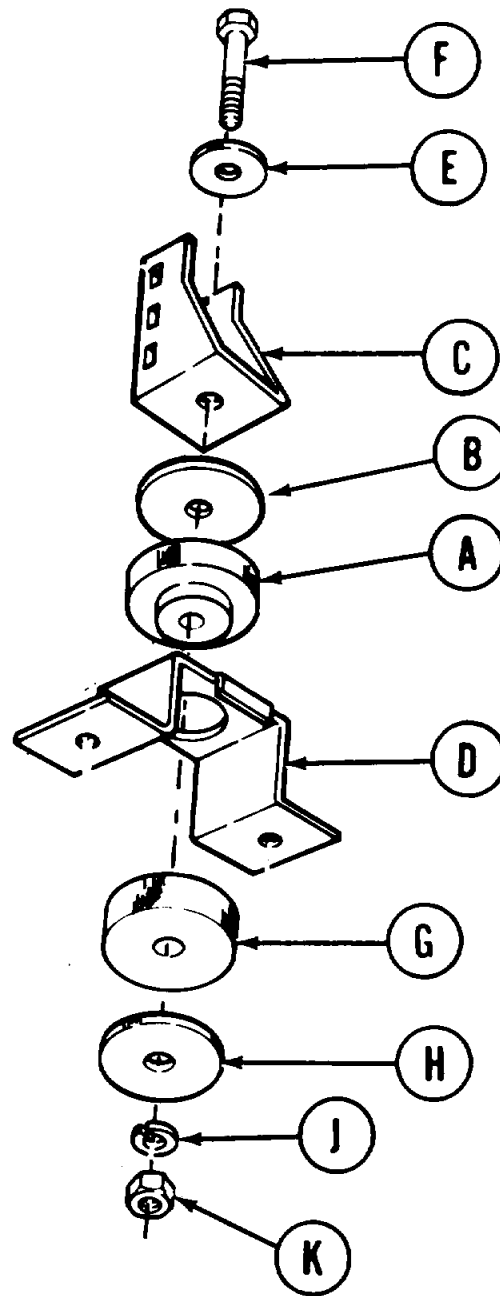
**FUEL TANKS (LEFT AND RIGHT) LOWER REAR MOUNT REPLACEMENT (Sheet 3 of 4)**

**CLEANING AND INSPECTION:**

1. Clean rubber mounts with detergent (Item 11, Appendix B) and water. Rinse clean with water.
2. Clean all metal parts with dry cleaning solvent (Item 12, Appendix B). Wipe dry with rags.
3. Visually inspect rubber mounts for cuts, deterioration, or wear.
4. Visually inspect metal parts for wear.
5. Replace unserviceable parts.

**INSTALLATION:**

1. Install rubber mount (A) and washer (B) between holding brackets (C and D).
2. Insert screw (F) through washer (E) and holding brackets (C and D), then install rubber mount (G), washer (H), lockwasher (J), and nut (K).
3. Using 15/16 inch socket on screw (F) and 15/16 inch wrench on nut (K), tighten screw (F) and nut (K).

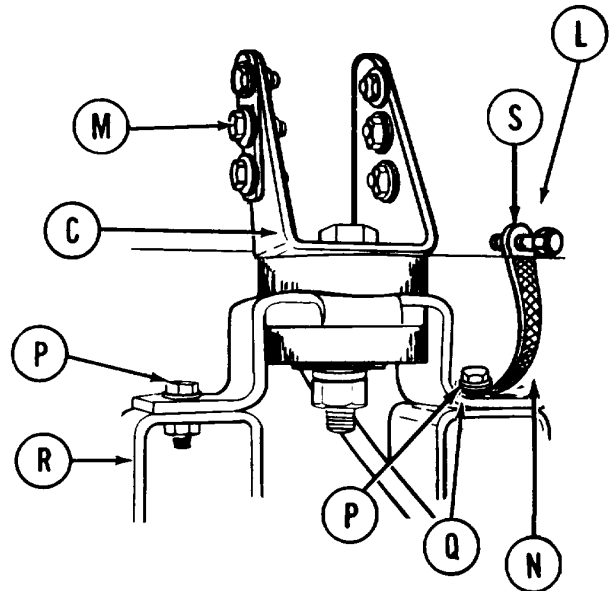


Go on to Sheet 4

TA130489

**FUEL TANKS (LEFT AND RIGHT) LOWER REAR MOUNT REPLACEMENT (Sheet 4 of 4)**

4. Install bracket (C) to fuel tank (L) using six screws, washers and nuts (M).
5. Using two 1/2 inch wrenches, tighten six screws and nuts (M).
6. Install ground strap (N) and two screws, washers and nuts (P) to secure bracket (Q) to hull bracket (R).
7. Using 9/16 inch socket, tighten screws and nuts (P).
8. Install ground strap (N) to fuel tank (L) using one screw and washer (S).
9. Using 1/2 inch socket, tighten screw and washer (S).
10. Install powerplant (TM 9-2350-222-20-1).



End of Task

TA130490

**FUEL TANKS (LEFT AND RIGHT) UPPER FRONT MOUNT REPLACEMENT (Sheet 1 of 6)**

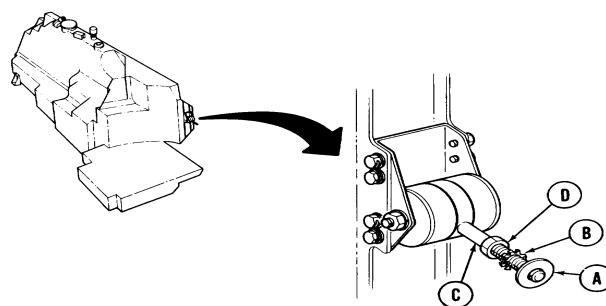
PROCEDURE INDEX

PROCEDURE	PAGE
Removal	4-27
Cleaning and Inspection	4-29
Installation	4-30

**TOOLS:** 9/16 in. deep socket with 1/2 in. drive  
 Slip joint pliers  
 Ratchet with 1/2 in. drive  
 15/16 in. socket with 1/2 in. drive  
 Torque wrench with 1/2 in. drive (0-175 lb-ft) (0-237 Nom)  
 15/16 in. combination box and open end wrench  
 1/2 in. socket with 1/2 in. drive

**SUPPLIES:** Dry cleaning solvent (Item 12, Appendix B)      Gloves (Item 13.1, Appendix B)  
 Rags (Item 31, Appendix B)      Goggles (Item 13.2, Appendix B)  
 Liquid detergent (Item 11, Appendix B)      Sealing Compound (Item 35, Appendix B)  
 Lockwire (Item 29, Appendix B)

**PRELIMINARY PROCEDURES:** Remove right fuel tank (page 4-36) (as required)  
 Remove left fuel tank (page 4-51) (as required)



**REMOVAL:**

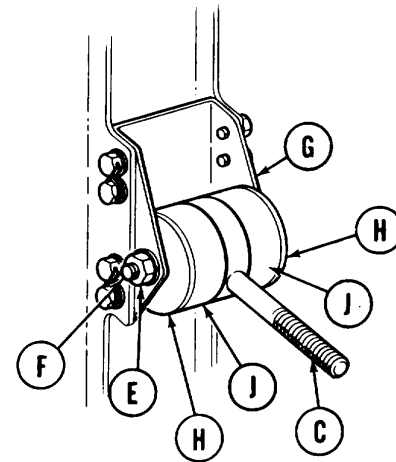
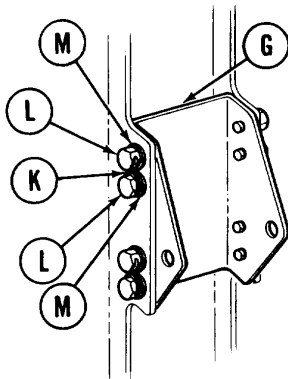
1. Remove washer (A) and lockwasher (B) from threaded end of eye bolt (C).
2. Using 15/16 inch wrench, remove nut (D) from eye bolt (C) end.

Go on to Sheet 2



**FUEL TANKS (LEFT AND RIGHT) UPPER FRONT MOUNT REPLACEMENT (Sheet 2 of 6)**

3. Using 15/16 inch wrench to hold screw and 15/ 16 inch socket to loosen nut (E), remove nut (E) and lockwasher.
4. Pull screw (F) out of bracket (G).
5. Remove two washers (H), two rubber mounts (J), and eye bolt (C) from bracket (G).

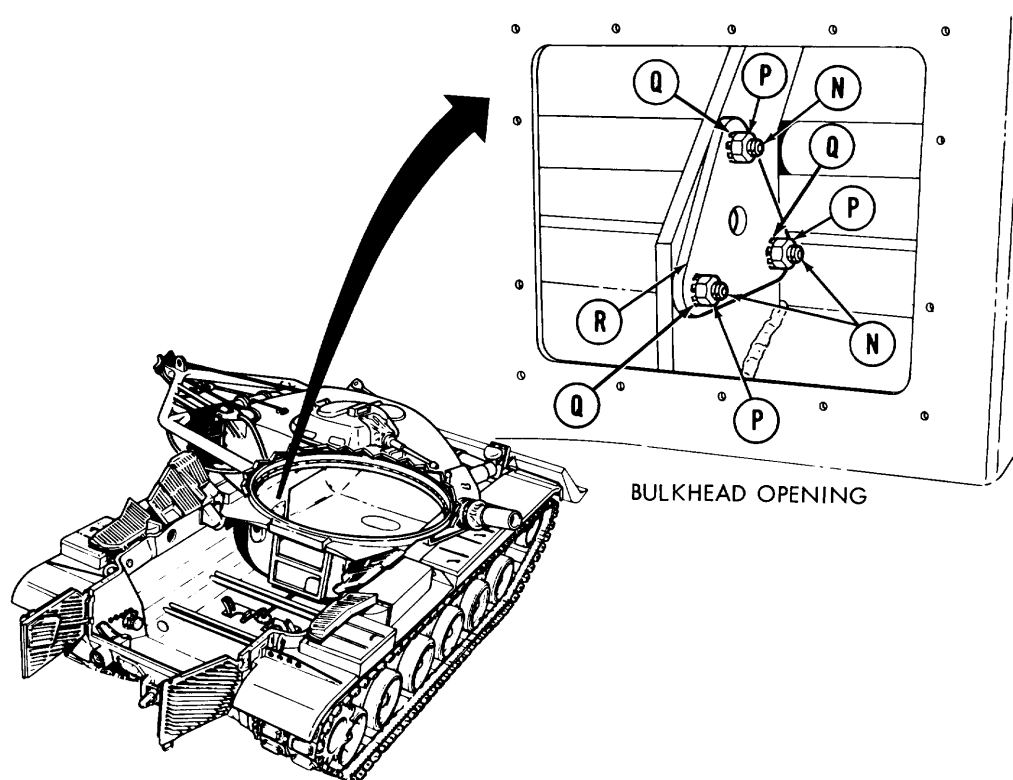


6. Using pliers, cut Lockwire (K) from eight screws (L).
7. Using 1/2 inch socket, remove eight screws (L) and lockwashers (M) securing bracket (G) to fuel tank.
8. Remove bracket (G).

Go on to Sheet 3

TA130492

## FUEL TANKS (LEFT AND RIGHT) UPPER FRONT MOUNT REPLACEMENT (Sheet 3 of 6)



9. Go into vehicle and, using 9/16 inch wrench to hold screws (N) and 9/16 inch socket to loosen nuts (P), remove three nuts (P), lockwashers (Q), and screws (N) securing plate (R) at corner bulkhead opening.
10. Remove mounting plate (R).

### CLEANING AND INSPECTION:

1. Clean rubber mounts with detergent (Item 11, Appendix B) and warm water.
2. Clean metal parts with dry cleaning solvent (Item 12, Appendix B). Using rag, wipe parts dry.
3. Inspect mounts for cuts or wear.
4. Inspect metal parts for damage, wear, or stripped threads.

Go on to Sheet 4

TA130493

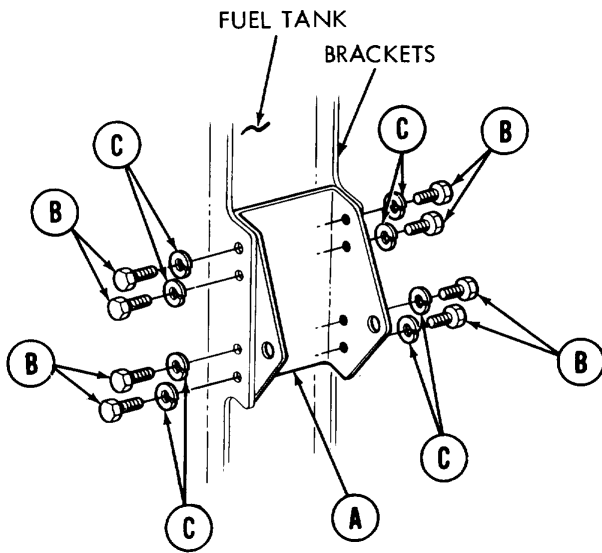
**FUEL TANKS (LEFT AND RIGHT) UPPER FRONT MOUNT REPLACEMENT (Sheet 4 of 6)**

**INSTALLATION:**

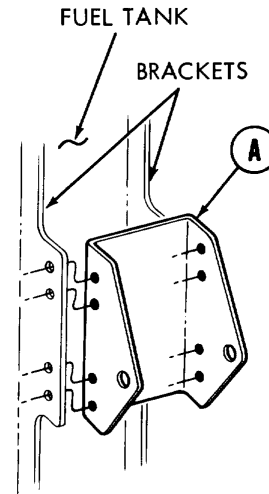
**CAUTION**

**Make sure bracket (A) is not installed upside down.**

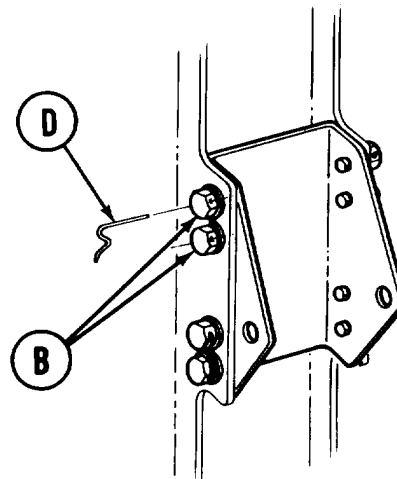
1. Position mounting bracket (A) as shown to brackets on fuel tank.
2. Aline eight holes of mounting bracket (A) to holes on fuel tank.



4. Using 1/2 inch socket and torque wrench, tighten eight screws (B) to 12 lb-ft (18 N-m).
5. Using pliers, wire eight screws (B) in pairs, using safety wire (Item 29, Appendix B).



3. Insert eight screws (B) with washers (C) to secure bracket (A) to fuel tank



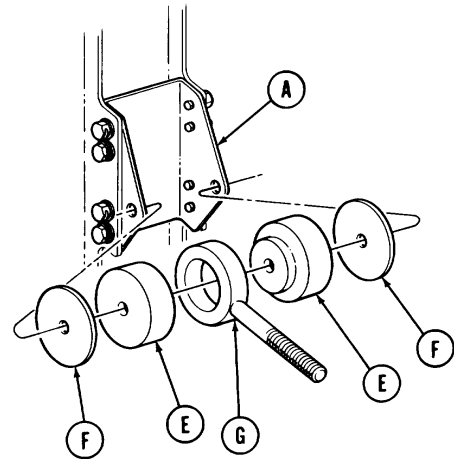
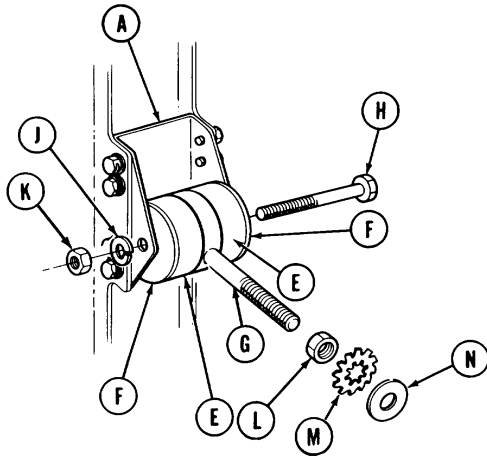
TA130494

Go on to Sheet 5

TA130494

**FUEL TANKS (LEFT AND RIGHT) UPPER FRONT MOUNT REPLACEMENT (Sheet 5 of 6)**

6. Assemble the two rubber mounts (E) and two washers (F) to eye bolt (G) and install assembly in bracket (A).

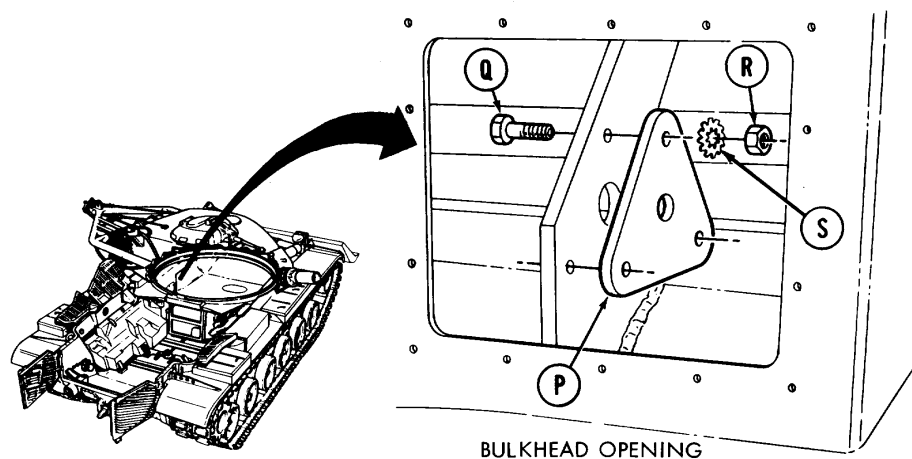


7. Insert screw (H) through aligned holes of mounts (E), washers (F), and bracket (A).
8. Apply sealing compound to all male threads. Install lockwasher (J) and nut (K) on threaded end of screw (H). Using 15/16 inch wrench to hold screw (H), use 15/16 inch socket and tighten nut (K).
9. Using 15/16 inch wrench, screw nut (L) onto threaded end of eye bolt (G). Install lockwasher (M) and washer (N) onto eye bolt.

Go on to Sheet 6

**Change 5 4-31**

## FUEL TANKS (LEFT AND RIGHT) UPPER FRONT MOUNT REPLACEMENT (Sheet 6 of 6)



10. If mounting plate (P) was removed, go into vehicle and position plate (P) to mounting holes.
11. Insert three screws (Q) securing plate.
12. Install three nuts (R) and lockwashers (S) onto screws (Q) securing plate (P) at corner bulkhead opening.
13. Using 9/16 inch socket and torque wrench, tighten three nuts (R) to 14-16 lb-ft (18-22 N-m).
14. Install right fuel tank (page 4-44) (as required).
15. Install left fuel tank (page 4-59) (as required).

End of Task

TA130496

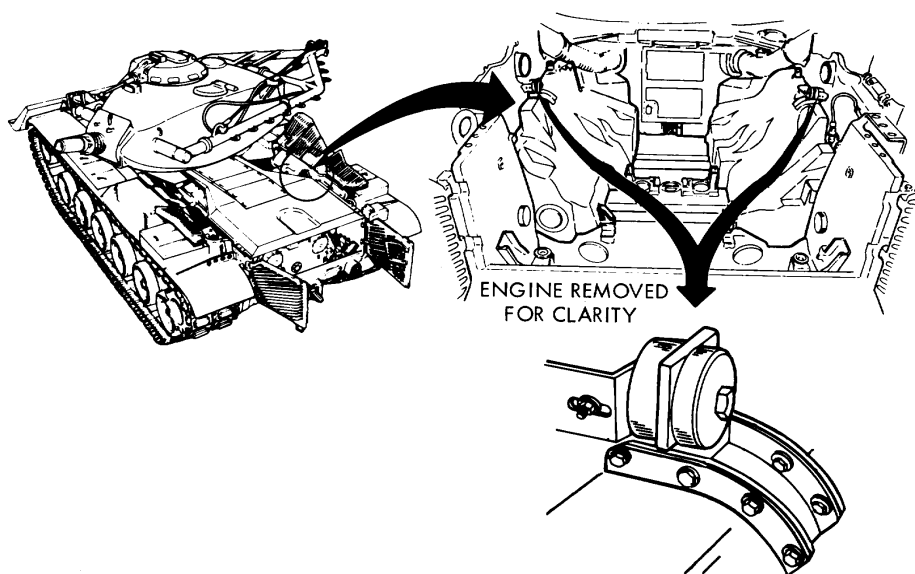
**FUEL TANKS (LEFT AND RIGHT) UPPER REAR MOUNT REPLACEMENT (Sheet 1 of 3)**

**TOOLS:** Ratchet with 1/2 in. drive  
1/2 in. combination box and open end wrench (2 required)  
15/16 in. socket with 1/2 in. drive  
15/16 in. combination box and open end wrench  
Aligning punch  
Hammer  
1/2 in. socket with 1/2 in. drive

**SUPPLIES:** Liquid detergent (Item 11, Appendix B)  
Dry cleaning solvent (Item 12, Appendix B)  
Rags (Item 31, Appendix B)

**REFERENCES:** TM 9-2350-222-20-1  
TM 9-2350-222-10

**PRELIMINARY PROCEDURES:** Open intake grille doors to gain access to fuel tank (TM 9-2350-222-10)  
Remove air cleaner intake hoses (TM 9-2350-222-20-1)

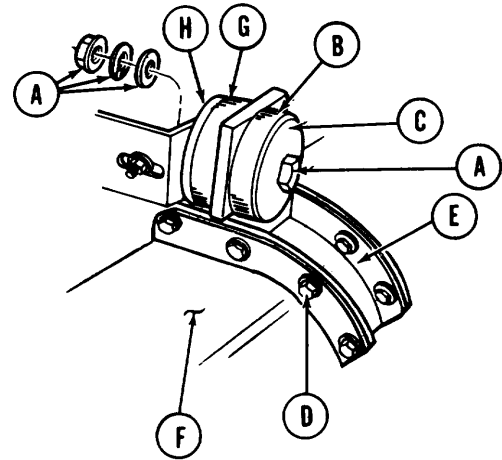


Go on to Sheet 2

TA130497

**FUEL TANKS (LEFT AND RIGHT) UPPER REAR MOUNT REPLACEMENT (Sheet 2 of 3)****REMOVAL:**

1. Using 15/16 inch socket and 15/16 inch wrench, remove screw, washers and nut (A), rubber mount (B) and washer (C).
2. Using 1/2 inch wrench and 1/2 inch socket, remove eight screws, washers, and nuts (D) holding bracket (E) to fuel tank (F).
3. Remove bracket (E), mount (G) and washer (H).

**CLEANING AND INSPECTION:**

1. Clean rubber mounts with detergent (Item 11, Appendix B) and water. Rinse clean with water.
2. Clean all metal parts with dry cleaning solvent (Item 12, Appendix B). Wipe dry with rags.
3. Visually inspect rubber mounts for cuts, deterioration, or wear.
4. Visually inspect all metal parts for wear.
5. Replace unserviceable parts.

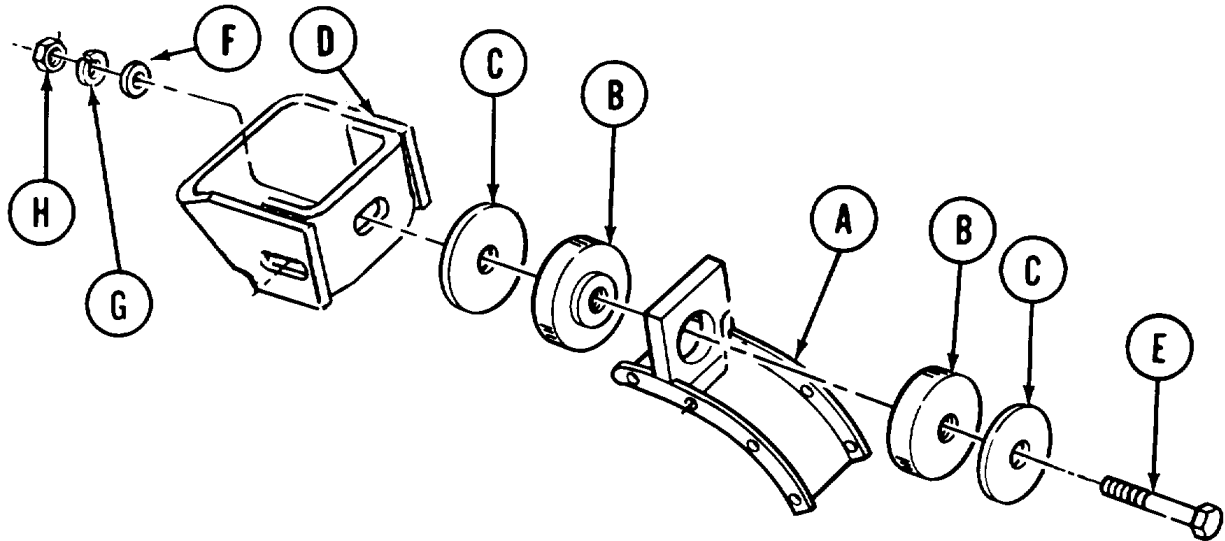
Go on to Sheet 3

TA130498

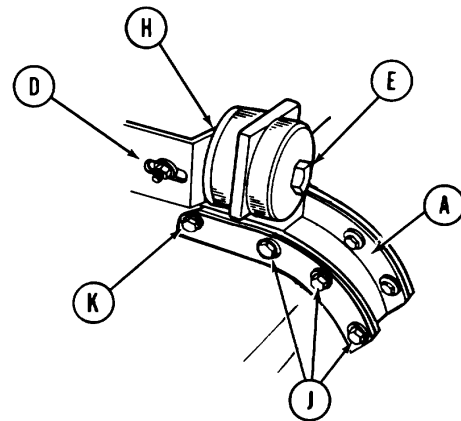
**FUEL TANKS (LEFT AND RIGHT) UPPER REAR MOUNT REPLACEMENT (Sheet 3 of 3)**

**INSTALLATION:**

1. Install bracket (A), rubber mounts (B), washers (C) to hull bracket (D) using screw (E), washer (F), lockwasher (G) and nut (H). Finger tighten.



2. Using aligning punch, install six screws, washers and nuts (J) and finger tighten.
3. Insert aligning punch into hole for screw (K) facing rear of vehicle, and align bracket (A) and mount (D).
4. Using 1/2 inch wrench and 1/2 inch socket, tighten screws (J).
5. Remove punch. Install screws, washers and nuts (K).
6. Using two 1/2 inch wrenches tighten two screws (K).
7. Using 15/16 inch socket on screw (E) and 15/16 inch wrench on nut (H), tighten screw (E).
8. Install air cleaner intake hoses (TM 9-2350222-20-1).
9. Close intake grille doors (TM 9-2350-222-10).



End of Task

TA130499



**FUEL TANK (RIGHT) REPLACEMENT (Sheet 1 of 15)**

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	4-37
Installation	4-44

- TOOLS:
- 1-7/16 in. open end wrench
  - 1-5/8 in. open end wrench
  - Torque wrench with 3/4 in. drive (0-600 lb-ft) (0-813 Nom)
  - 15/16 in. crowfoot wrench with 3/4 in. drive
  - 15/16 in. combination box and open end wrench (2 required)
  - Ratchet with 1/2 in. drive
  - 1/2 in. socket with 1/2 in. drive
  - 1/2 in. combination box and open end wrench
  - 7/8 in. combination box and open end wrench
  - 9/16 in. combination box and open end wrench
  - 1-1/8 in. open end wrench
  - 9/16 in. socket with 1/2 in. drive
  - 7/16 in. socket with 1/2 in. drive
  - 1 in. combination box and open end wrench
  - 1-1/2 in. open end wrench
  - 8 in. adjustable wrench
  - 6 in. ruler
  - Putty knife

- SUPPLIES:
- Spacers (10863910)
  - Dry cleaning solvent (Item 12, Appendix B)
  - Adhesive (Item 1, Appendix B)
  - Rags (Item 31, Appendix B)
  - Sealing compound (Item 7, Appendix B)
  - Seal (10870458)
  - Seal (10870459)

PERSONNEL: Four

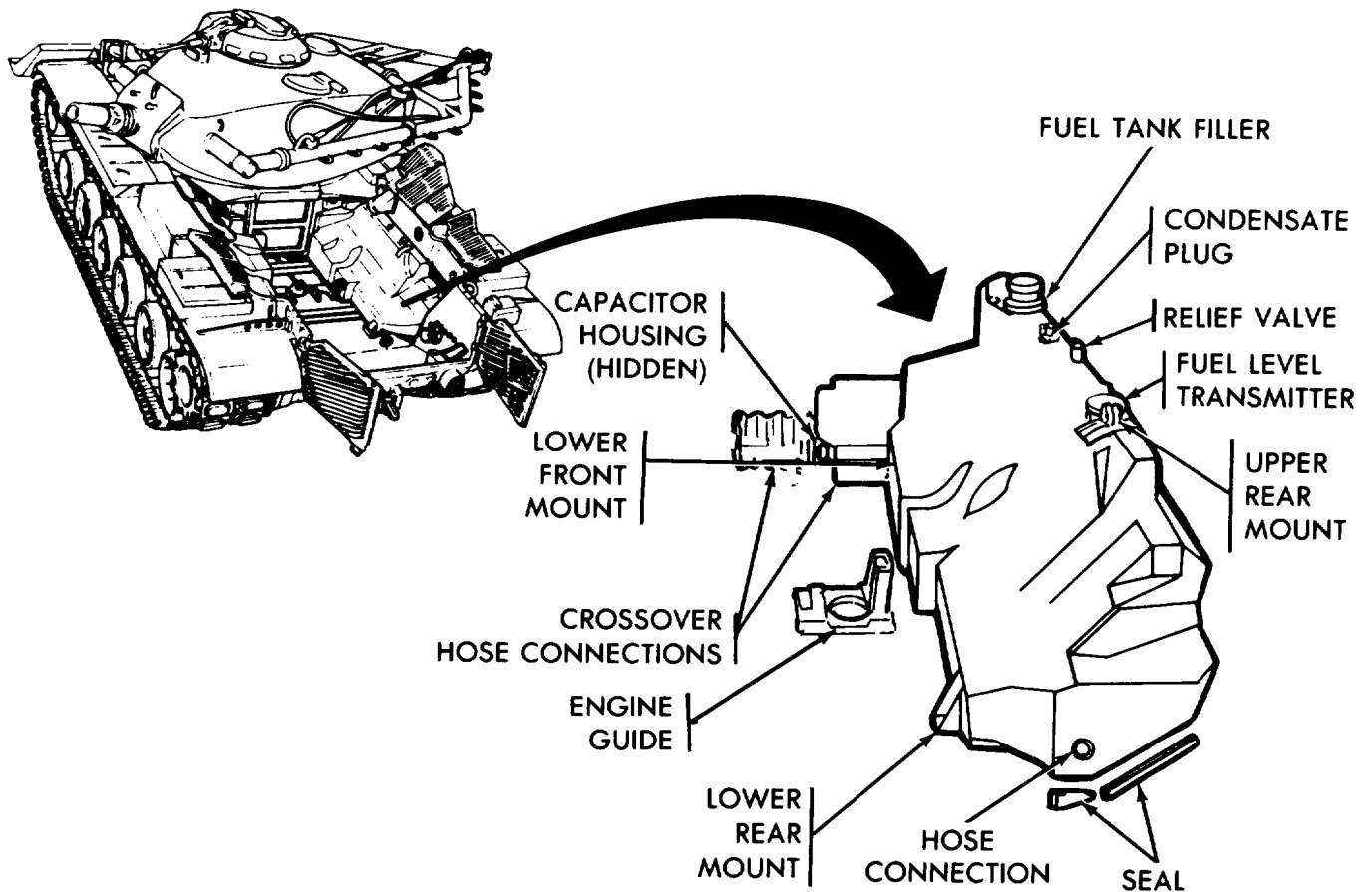
REFERENCES: TM 9-2350-222-20-1

- PRELIMINARY PROCEDURES:
- Remove powerplant (TM 9-2350-222-20-1)
  - Remove right air intake assembly (TM 9-2350-222-20-1)
  - Remove number four and five torsion bars (TM 9-2350-222-20-1)
  - Drain fuel tanks (TM 9-2350-222-20-1)
  - Remove right bulkhead access cover (TM 9-2350-222-20-1)

**Go on to Sheet 2**

**TA130410**

FUEL TANK (RIGHT) REPLACEMENT (Sheet 2 of 15)

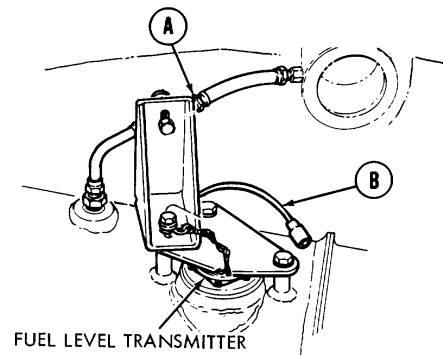


REMOVAL:

**WARNING**

When removing fuel tank, post notice that smoking is not allowed in or near vehicle.

1. Using 9/16 inch wrench, remove fuel tank vent line (A) coupling on top of check valve.
2. Disconnect electrical lead (B) from fuel level transmitter.



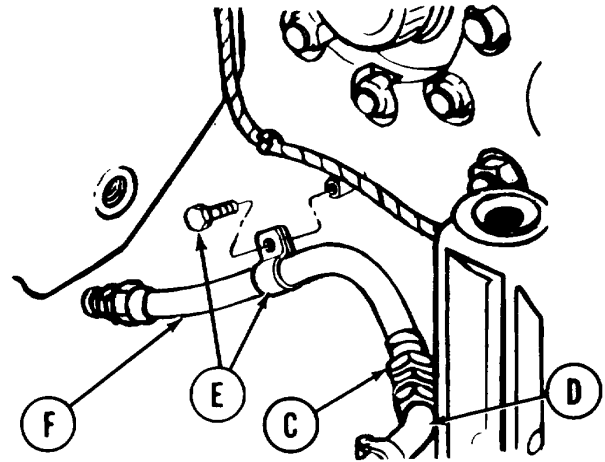
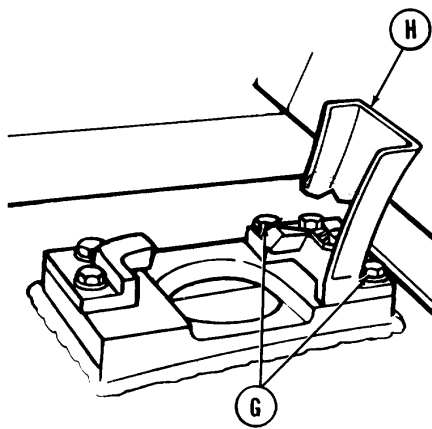
TA130500

Go on to Sheet 3

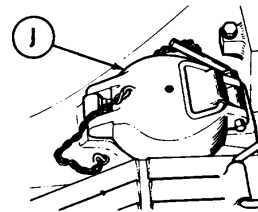
TA130500

**FUEL TANK (RIGHT) REPLACEMENT (Sheet 3 of 15)**

3. Using 1-1/2 inch and 1-5/8 inch wrenches, disconnect fuel return line hose at point (C) from tube assembly (D) coupling.
4. Using 1/2 inch socket, remove screw and clamp (E) from hull.
5. Using 1-7/16 inch wrench, remove hose (F) from fuel tank.
6. Using 1 inch wrench, remove four screws and lockwashers (G) securing right powerplant guide (H) to hull. Remove guide from vehicle.

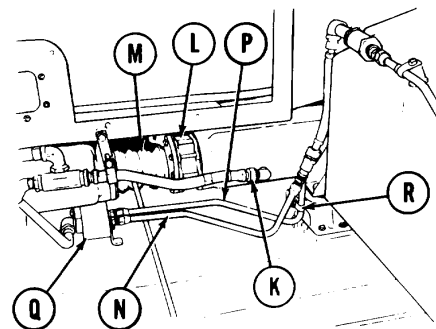


7. Open fuel filler cover (J) and remove fuel tank filter assembly from vehicle (TM 9-2350-22220-1).



**CAUTION**  
Fuel may leak, have drip pan ready.

8. Using 1-1/8 inch wrench, disconnect fuel hose coupling (K) from elbow on fuel tank.
9. Remove fuel isolation valve assembly (L) with hose and flange (M) (TM 9-2350-222-20-1).
10. Using 7/8 inch wrench, disconnect two fire extinguisher lines (N and P) from manifold (Q).
11. Using 1/2 inch socket, remove screw and clamp (R) securing tube (P) to hull.



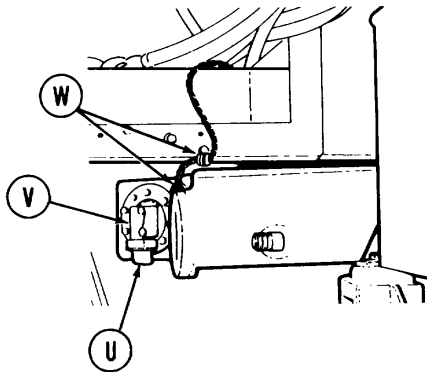
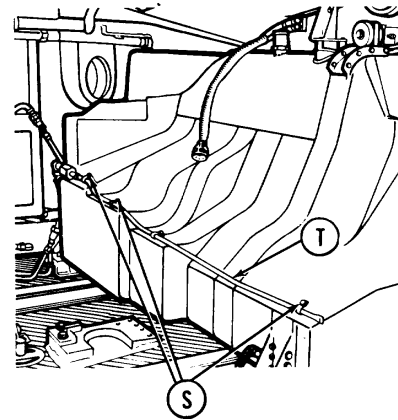
TA130501

Go on to Sheet 4

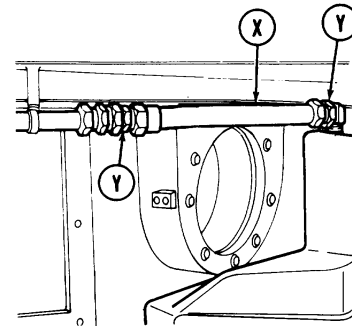
TA 130501

**FUEL TANK (RIGHT) REPLACEMENT (Sheet 4 of 15)**

12. Using 1/2 inch socket, remove screws (S) holding fire extinguisher tube and clamps to fuel tank. Remove the tube assembly (T) from vehicle.
13. Disconnect electrical connector (U) from capacitor housing (V).
14. Using 7/16 inch socket, remove screws and washers securing two cable clamps (W). Position cable and clamps aside.



15. Using 1-1/2 inch wrench, disconnect fuel vent hose (X) from couplings (Y) on fuel tank and remove.



TA130502

Go on to Sheet 5

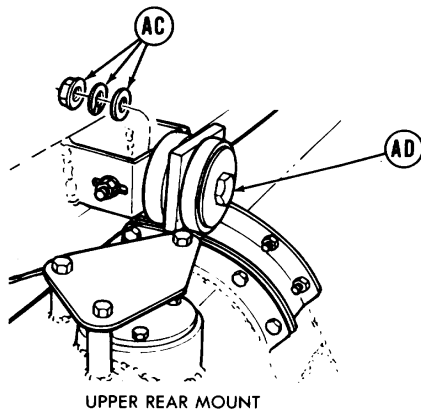
TA130502

## FUEL TANK (RIGHT) REPLACEMENT (Sheet 5 of 15)

## NOTE

Step 16 is performed in crew compartment.

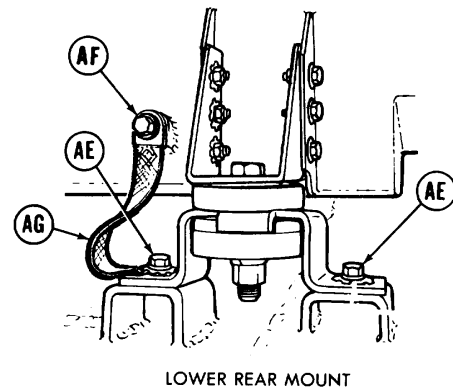
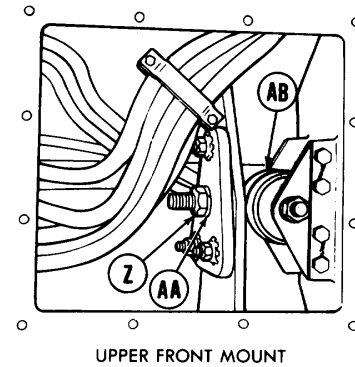
16. Using 15/16 inch wrench, remove nut (Z) and lockwasher (AA) securing upper front mount (AB) to bulkhead.



17. Using two 15/16 inch wrenches, remove nut and washers (AC). Remove screw (AD), two washers, two rubber mounts.

18. Using 9/16 inch wrench, remove two screws and two washers (AE).

19. Using 1/2 inch wrench, remove screw and lockwasher (AF) securing ground strap (AG) to fuel tank. Remove ground strap (AG) from fuel tank.



Go on to Sheet 6

TA130503

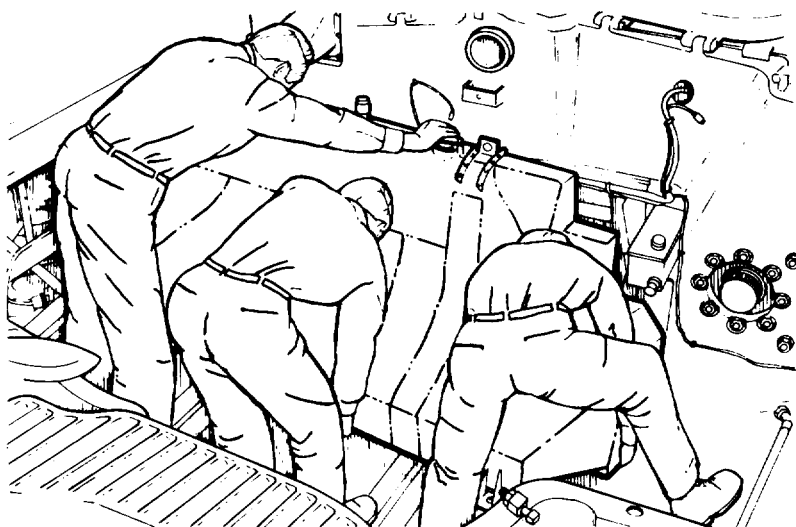
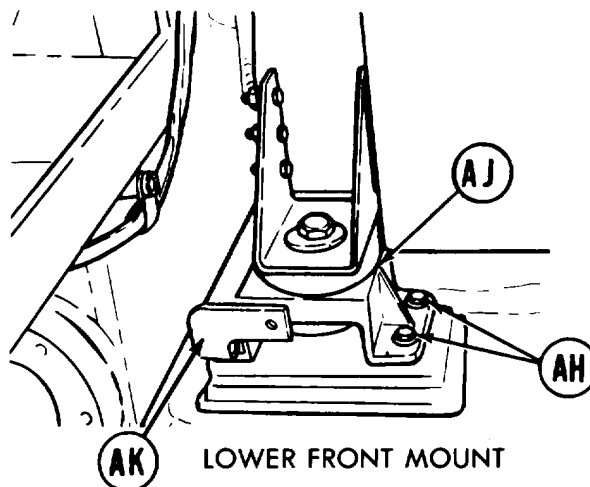
**FUEL TANK (RIGHT) REPLACEMENT (Sheet 6 of 15)**

20. Using 1/2 inch socket, or 1/2 inch wrench, remove four screws and washers (AH) securing mount (AJ) and bracket (AK) to hull.

**CAUTION**

Fuel tank is fabricated of aluminum and is therefore subject to damage from sharp objects. Use utmost care during handling. Do not force fuel tank with poles or bars as damage may result. During disassembly, several fuel tank openings may be exposed. Close these openings to prevent entry of foreign matter.

21. Using three persons, pivot fuel tank toward center of hull while slowly moving fuel tank rearward until rear end of fuel tank clears curve in hull.

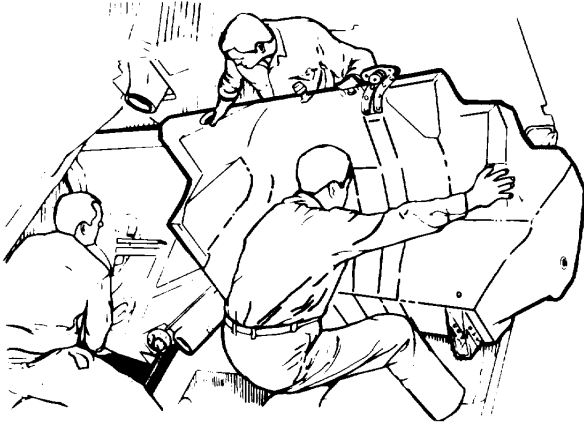
**NOTE**

Flat lower front section of fuel tank must be held horizontal while under turret floor to avoid binding.

Go on to Sheet 7 TA130504

**FUEL TANK (RIGHT) REPLACEMENT (Sheet 7 of 15)**

22. Continue moving fuel tank to rear until front section is clear of turret floor.



**WARNING**

When draining or filling fuel tank, post notice that smoking is not allowed in or near vehicle.

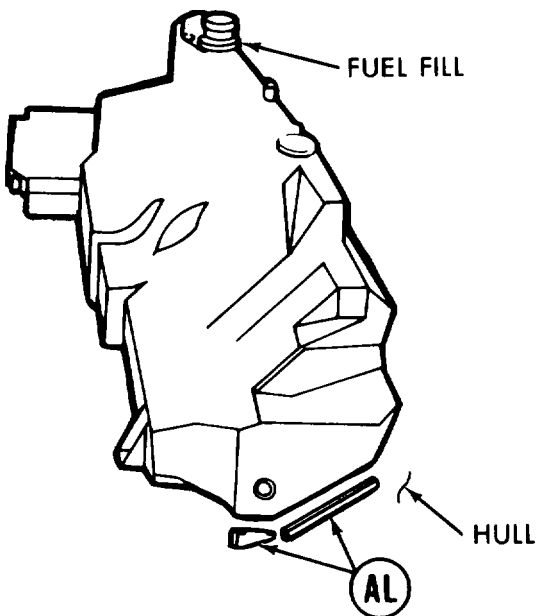
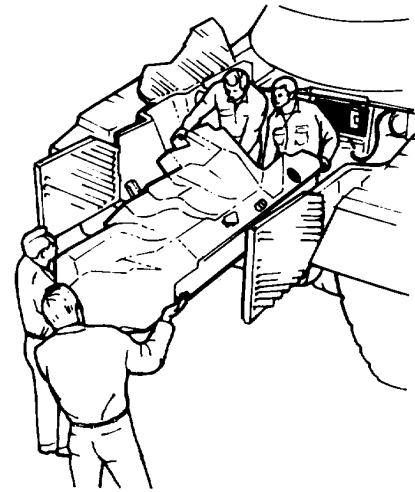
**CAUTION**

A small amount of fuel may still be in the fuel tank. Drain into container by tilting fuel tank carefully.

23. Using four persons, remove fuel tank from vehicle.

**WARNING**

Cleaning agent specified is flammable. Use only in well ventilated areas. Keep away from flames, sparks, or heat. Do not smoke while using. Prevent contact with eyes, mouth, and/or skin. Wear rubber gloves when performing cleaning procedures.



24. Use putty knife and dry cleaning solvent (Item 12, Appendix B) to remove seals (AL) from the hull. Clean area of all adhesive and mask area on hull where seals had been.

**NOTE**

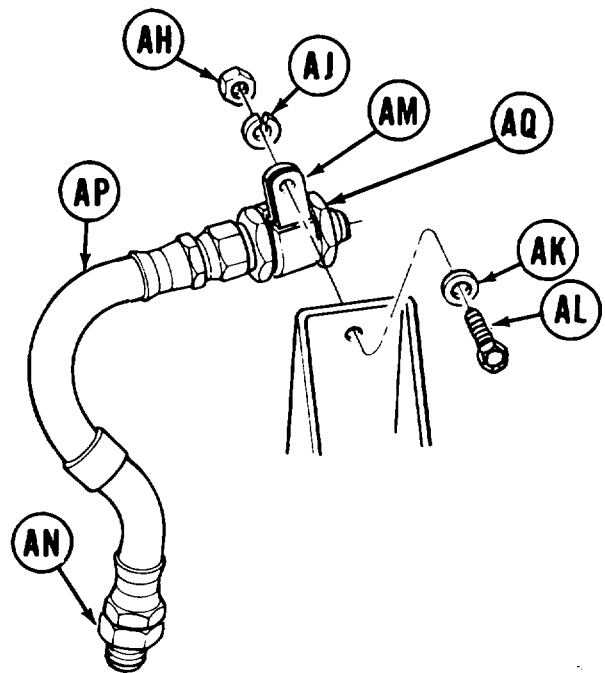
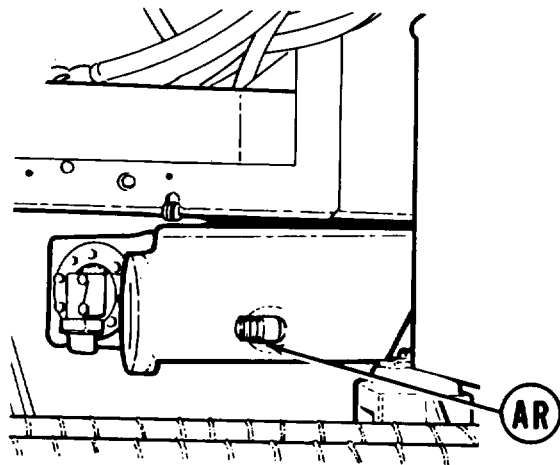
If fuel tank is to be repaired, go to page 4-67. If fuel tank is to be replaced, go to step 25.

TA130505

Go on to Sheet 8

**FUEL TANK (RIGHT) REPLACEMENT (Sheet 8 of 15)**

25. Remove fuel tank upper front mount (page 4-27).
26. Remove fuel tank upper rear mount (page 4-33).
27. Remove fuel tank lower rear mount (page 4-23).
28. Remove fuel tank lower front mount (page 4-19).
29. Remove capacitor housing (TM 9-2350-22220-1).
30. Remove right fuel pump (TM 9-2350-222-201).
31. Remove condensate plug and plug adapter (TM 9-2350-222-20-1).
32. Using 7/16 inch socket and 7/16 inch wrench, remove nut (AH), lockwasher (AJ), flat washer (AK), and screw (AL) securing clamp (AM) to bracket.
33. 1 inch wrench, remove bushing (AN), hose (AP), clamp (AM), and valve (AQ) from fuel tank as a unit.
34. Remove fuel level transmitter (TM 9-2350-222-20-1).



35. Using adjustable wrench, remove fuel hose elbow (AR) from fuel tank.

Go on to Sheet 9

TA130506



**FUEL TANK (RIGHT) REPLACEMENT (Sheet 9 of 15)**

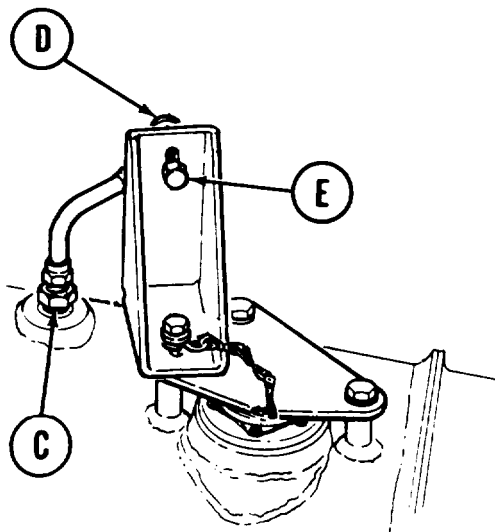
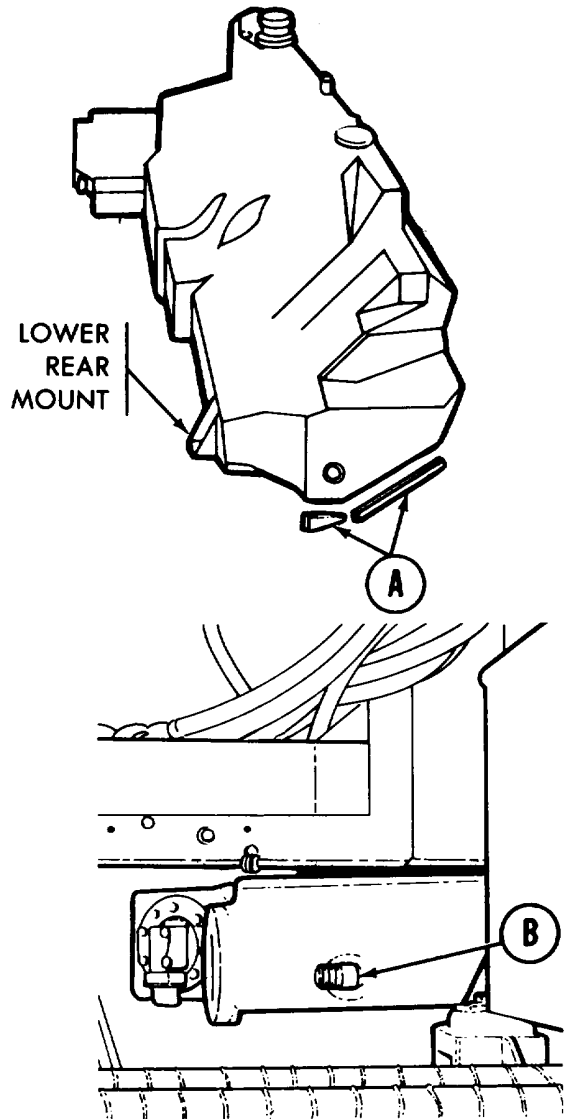
**INSTALLATION:**

1. If required, use adhesive (Item 1, Appendix B) to install new seals (A) in marked position on hull.

**NOTE**

**If fuel tank was removed for repair, go to page 4-67. If fuel tank to be installed is a new fuel tank, go to step 2.**

2. Install upper front mount on fuel tank (page 4-30, steps 1 thru 5).
3. Install upper rear mount bracket on fuel tank (page 4-35, steps 2 thru 4).
4. Apply sealing compound (Item 7, Appendix B) to male threads of elbow (B) and using adjustable wrench, install elbow (B) in fuel tank. Tighten to position shown.
5. Install fuel tank lower front mount (page 4-21 Steps 1 thru 6.)
6. Install fuel tank lower rear mount (page 4-25 Steps 1 thru 9.)
7. Install fuel tank upper front mount (page 4-31 Steps 6 thru 9.)
8. Install fuel tank upper rear mount (page 4-35 Steps 1 and 7.)
9. Install right fuel pump (TM 9-2350-222-20-1).



10. Install capacitor housing (TM 9-2350-222-20-1).
11. Install fuel level transmitter (TM 9-2350-222-20-1).
12. Using 1 inch wrench, install bushing (C), hose clamp and valve in fuel tank.
13. Install clamp (D) onto bracket and, using 7/16 inch wrench, secure with screw, flat washer, lockwasher, and nut (E).

Go on to Sheet 10

**TA130507**

## FUEL TANK (RIGHT) REPLACEMENT (Sheet 10 of 15)

14. Install condensate plug adapter and condensate plug (TM 9-2350-222-20-1).

**CAUTION**

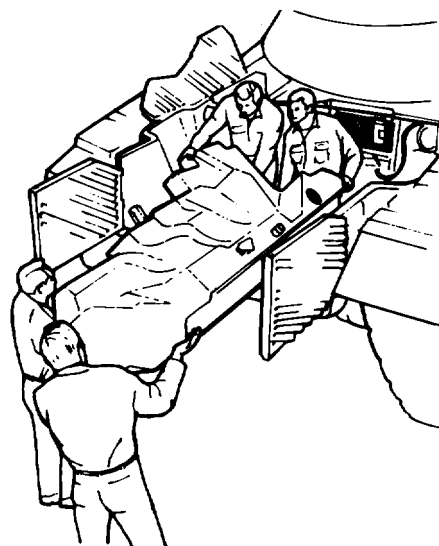
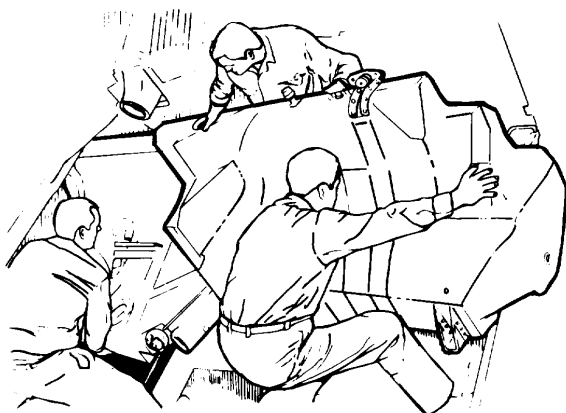
Fuel tank is fabricated of aluminum and is therefore subject to damage from sharp objects. Use utmost care during handling. Do not force fuel tank with poles or bars as damage may result.

15. Using four persons, place fuel tank into the vehicle.

**NOTE**

Flat lower front section of fuel tank must be held horizontal while under turret floor to avoid binding.

16. Using three persons, place fuel tank into position shown with the front section of the fuel tank just under the turret floor.



Go on to Sheet 11 TA130508

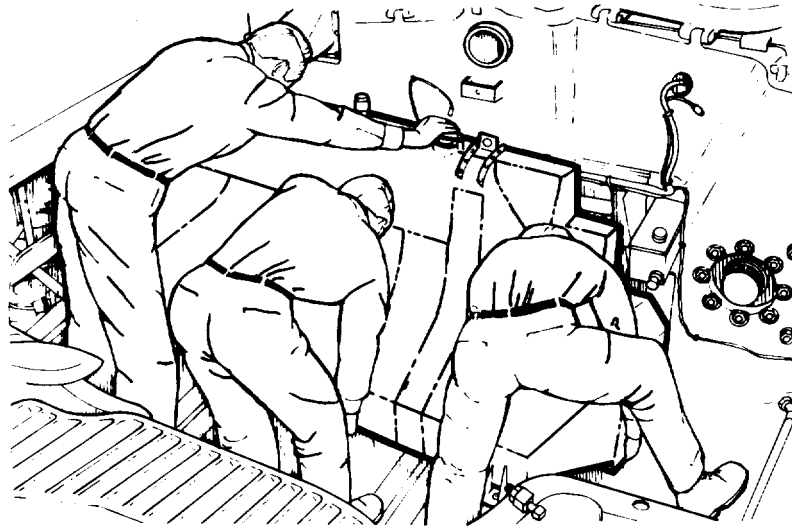
TA130508

**FUEL TANK (RIGHT) REPLACEMENT (Sheet 11 of 15)**

**CAUTION**

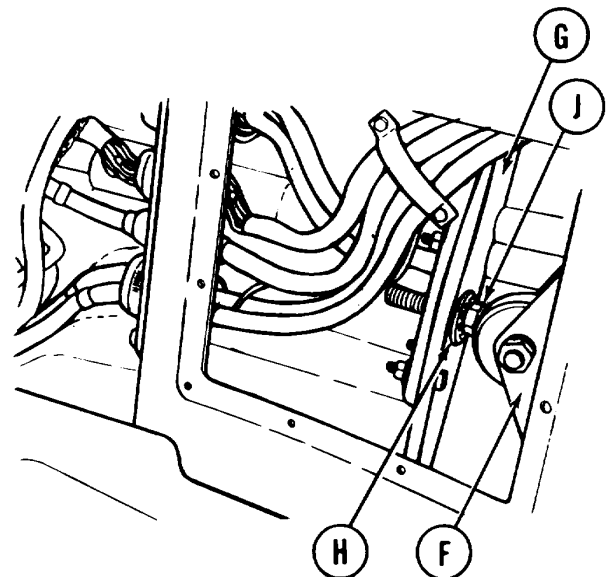
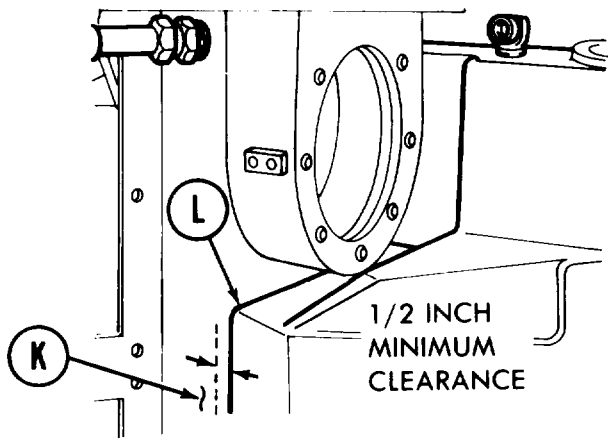
**Make sure the front section of fuel tank does not bind when moving fuel tank into position.**

17. Pivot fuel tank toward hull while moving fuel tank forward until curve of hull is cleared and fuel tank is in position against hull.



18. Have 4th person aline top front mount (F) with hole in bulkhead plate (G). Make sure flat washer (H) and star washer nut (J) are on eye bolt and move fuel tank forward until washer on eye bolt is seated against bulkhead.

19. Using 15/16 inch wrench, adjust nut (J) as required to obtain 1/2 inch clearance between bulkhead (K) and fuel tank (L).



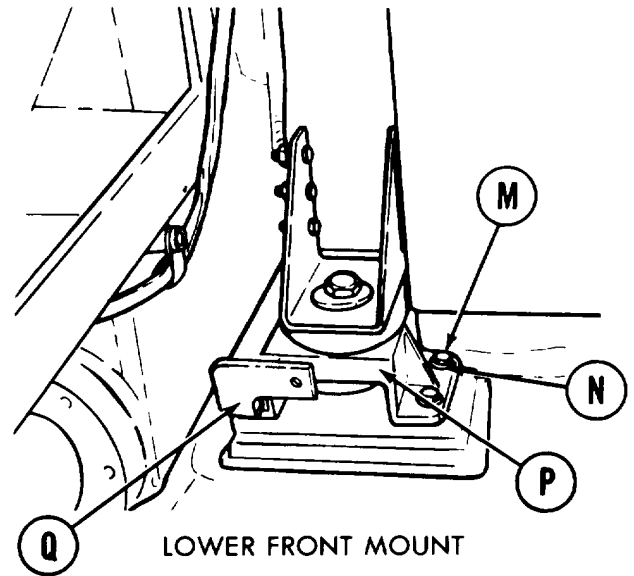
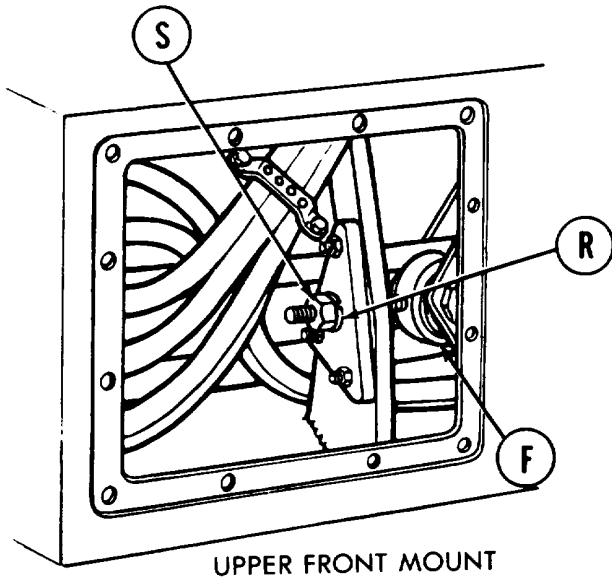
TA130509

Go on to Sheet 12

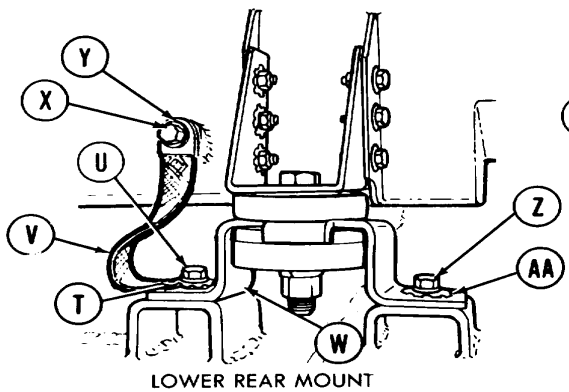
TM130509

**FUEL TANK (RIGHT) REPLACEMENT (Sheet 12 of 15)**

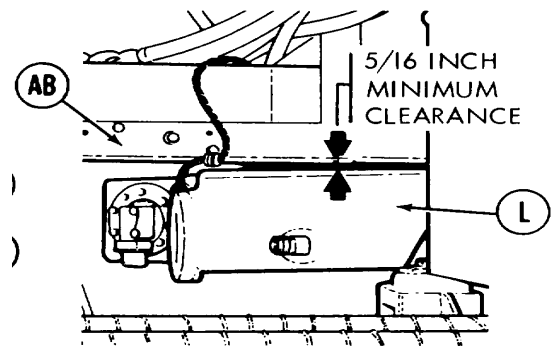
20. Using 1/2 inch socket, install four screws (M) and new lockwashers (N) securing lower front mount (P) and bracket (Q) to hull.
21. Using 15/16 inch wrench, install new lockwasher (R) and nut (S) onto mount (F).



22. Using 9/16 inch socket, install new lockwasher and flat washer m and screw (U) securing one end of ground strap (V) and mount (W) to hull.
23. Using 1/2 inch socket, install other end of ground strap (V) to fuel tank using screw (X) and new lockwasher (Y).



24. Using 1/2 inch socket, install screw (Z) and new lockwasher (AA) securing mount (W) to hull.
25. If required, install spacers under lower rear mount to obtain 5/16 inch clearance between fuel tank (L) and turret wall (AB).

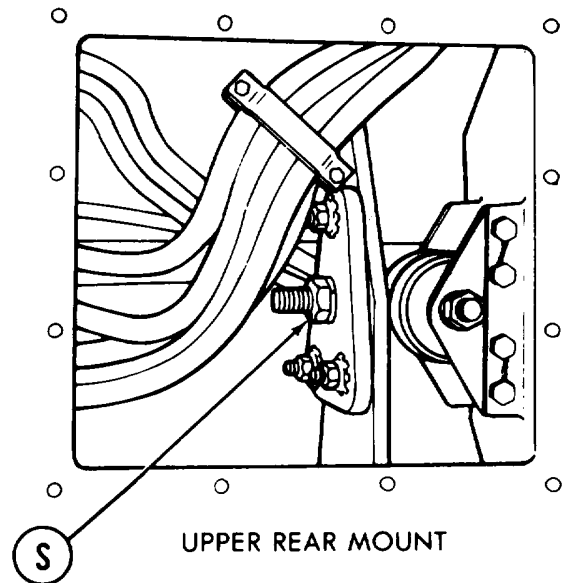
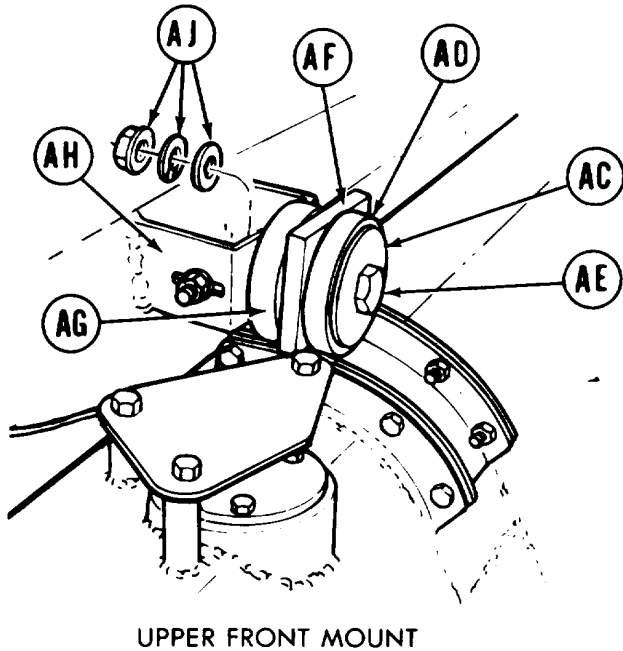


Go on to Sheet 13

TA252584

**FUEL TANK (RIGHT) REPLACEMENT (Sheet 13 of 15)**

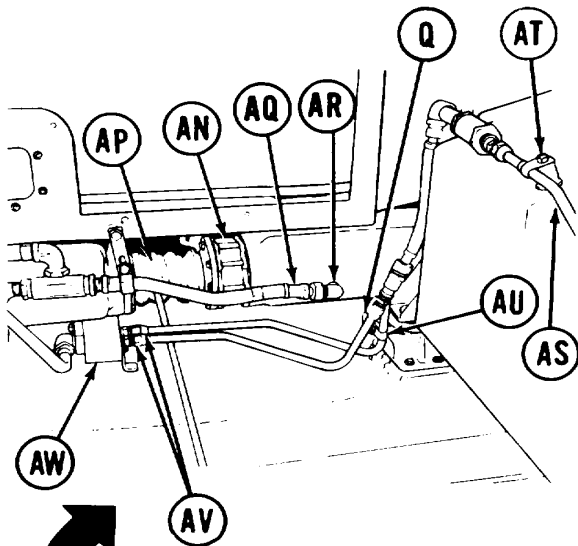
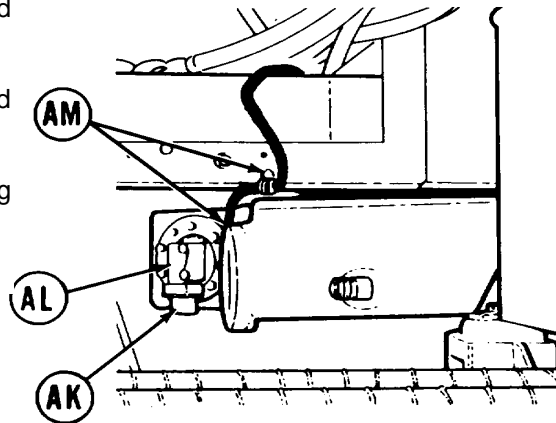
26. Using 15/16 inch crowfoot and torque wrench on nut (S), tighten nut to 185-190 lb-ft (250257 N.m).



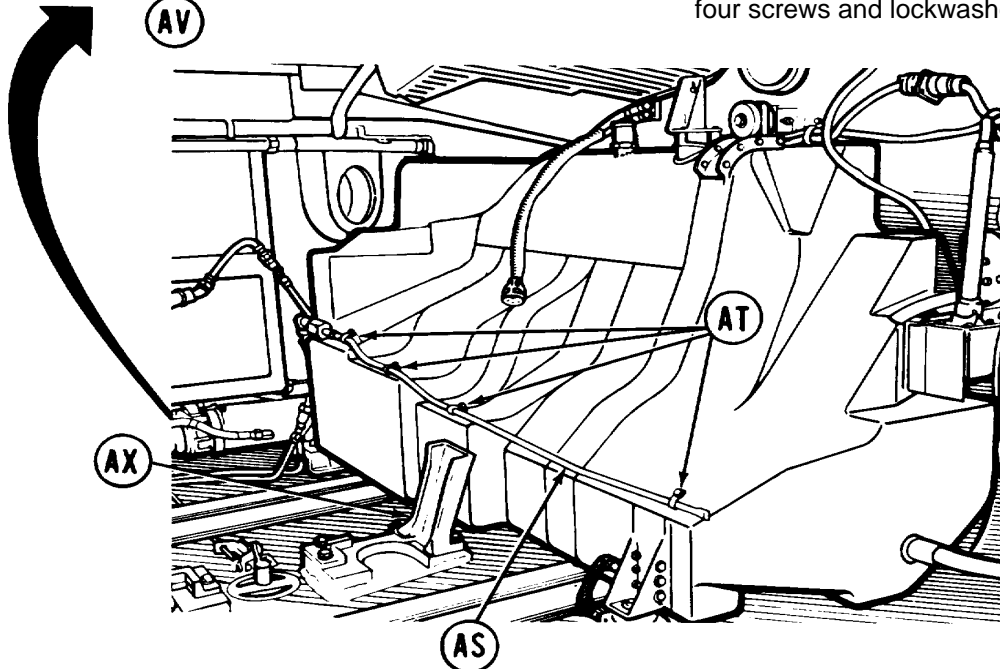
27. Position washer (AC) and rubber mount (AD) onto screw (AE). Position screw (AE) through hole in bracket (AF) and through rubber mount and washer (AG).
28. Push screw (AE) through hole in hull mount (AH), install two washers and nut (AJ) on screw (AE), and tighten using two 15/16 inch wrenches.
29. Install right bulkhead access cover (TM 9-2350-222-20-1).

**FUEL TANK (RIGHT) REPLACEMENT (Sheet 14 of 15)**

30. Install connector (AK) on capacitor housing (AL).
31. Using 7/16 inch socket, install screws and washers to secure two clamps (AM).
32. Install fuel isolation valve assembly (AN) and hose (AP) (TM 9-2350-222-20-1).
33. Using 1-1/8 inch wrench, install hose coupling (AQ) onto elbow (AR).



34. Using 1/2 inch socket, position and secure fire extinguisher tube assembly (AS) to fuel tank with four clamps (AT).
35. Position short fire extinguisher tube assembly clamp (AU) to bracket (Q). Using 1/2 inch socket, install screw to secure clamp (AU).
36. Using 7/8 inch wrench, connect two couplings (AV) to manifold (AW).
37. Using 1 inch wrench, install powerplant guide (AX) with four screws and lockwashers.

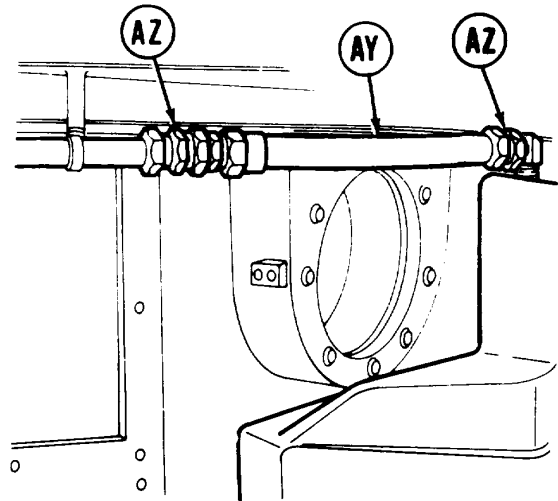


Go on to Sheet 15

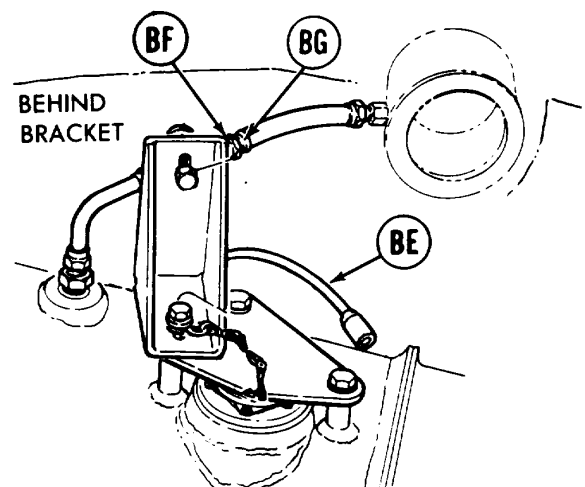
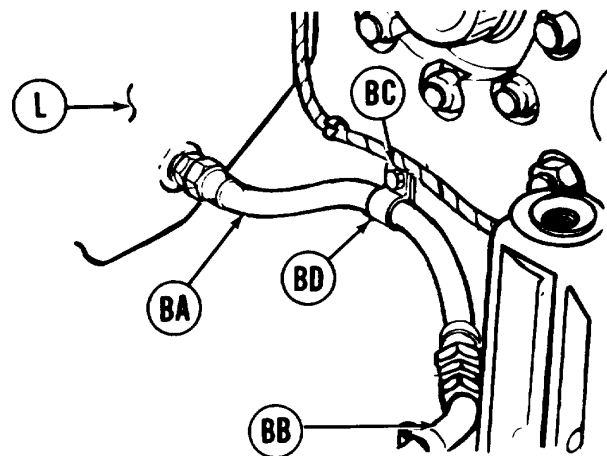
TA130512

**FUEL TANK (RIGHT) REPLACEMENT (Sheet 15 of 15]**

- 38. Using 1-1/2 inch wrench, connect fuel vent hose (AY) onto couplings (AZ).
- 39. Open fuel cap and install fuel tank filter assembly (TM 9-2350-222-20-1).



- 40. Using 1-7/16 inch wrench, install fuel return hose (BA) fitting into fuel tank (L). (At rear of fuel tank.)
- 41. Using 1-1/2 inch and 1-5/8 inch wrench, connect fuel return line hose (BA) to tube assembly (BB) coupling.
- 42. Using 1/2 inch socket, install screw (BC), securing clamp (BD).
- 43. Connect electrical lead (BE) to fuel level transmitter.
- 44. Connect coupling (BF) to the top of check valve (BG).
- 45. Fill fuel tanks and check for leaks.
- 46. Install number four and five torsion bars (TM 9-2350-222-20-1).
- 47. Install right air intake assembly (TM 9-2350222-20-1).
- 48. Install powerplant (TM 9-2350-222-20-1).
- 49. Purge fuel system (TM 9-2350-222-20-1).



TA130513

**FUEL TANK (LEFT) REPLACEMENT (Sheet 1 of 16)**

PROCEDURE	PROCEDURE INDEX	PAGE
Removal		4-52
Installation		4-59

**TOOLS:**

- Torque wrench with 3/4 in. drive (0-600 lb-ft) (0-813 N-m)
- 15/16 in. crowfoot wrench with 3/4 in. drive
- 15/16 in. combination box and open end wrench (2 required)
- 1 in. combination box and open end wrench
- 1-1/2 in. open end wrench
- Ratchet with 1/2 in. drive
- 9/16 in. socket with 1/2 in. drive
- 8 in. adjustable wrench
- 1/2 in. combination box and open end wrench
- 9/16 in. combination box and open end wrench (2 required)
- 7/16 in. socket with 1/2 in. drive
- 1/2 in. socket with 1/2 in. drive
- 15/16 in. socket with 1/2 in. drive

**SUPPLIES:**

- Drain pan
- Rags (Item 31, Appendix B)
- Spacers (10863910)
- Dry cleaning solvent (Item 12, Appendix B)
- Adhesive (Item 1, Appendix B)
- Sealing compound (Item 7, Appendix B)
- Seal (10870458)
- Seal (10870459)
- Seal (10870460)

**REFERENCE:** TM 9-2350-222-20-1

**PRELIMINARY PROCEDURES:**

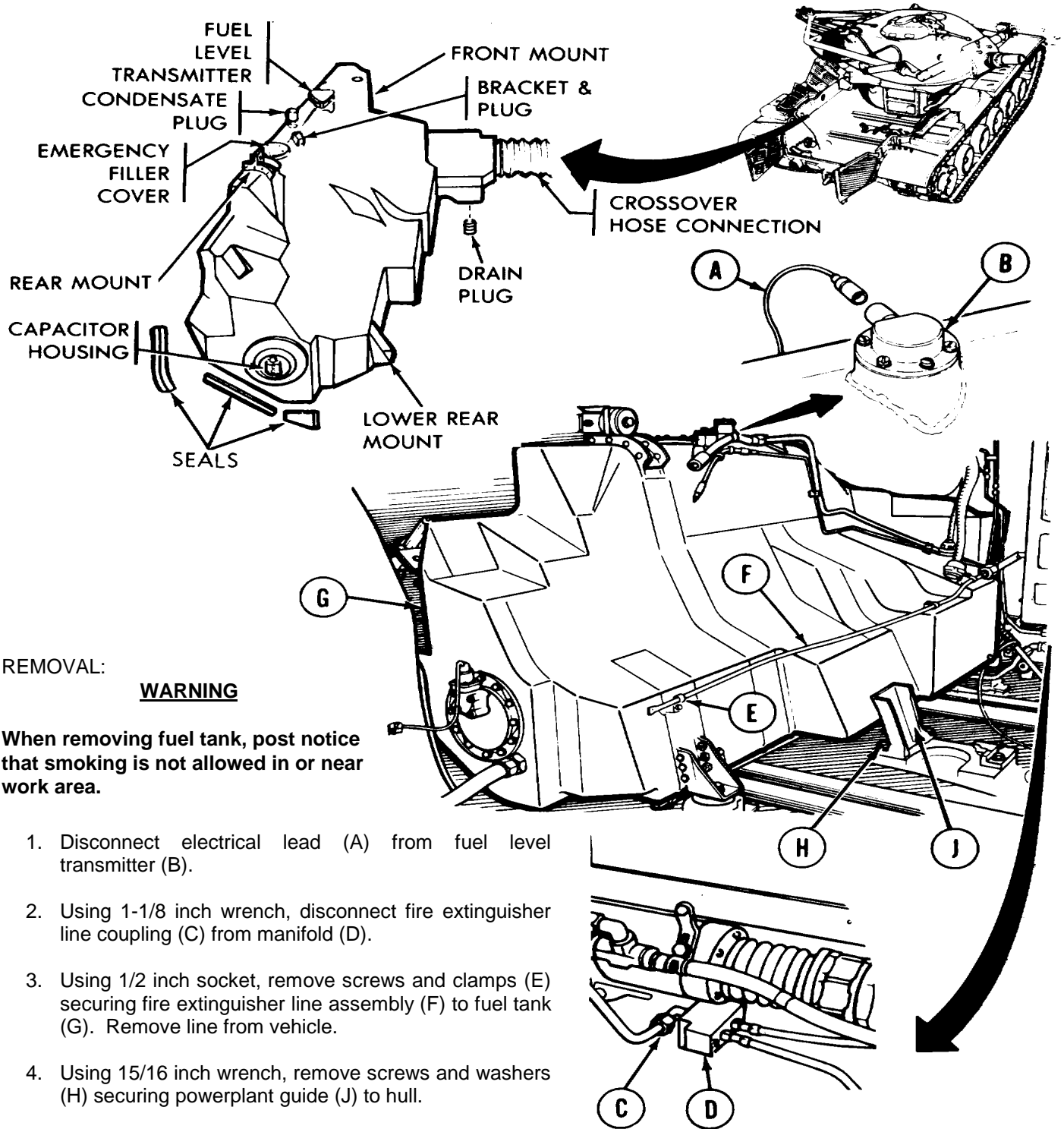
- Remove powerplant (TM 9-2350-222-20-1)
- Remove left air intake assembly (TM 9-2350-222-20-1)
- Remove number four (left and right) torsion bars (TM 9-2350-222-20-1)
- Drain fuel tanks (TM 9-2350-222-20-1)
- Remove left bulkhead access cover (TM 9-2350-222-20-1)

Go on to Sheet 2

**TA130405**



FUEL TANK (LEFT) REPLACEMENT (Sheet 2 of 16)



REMOVAL:

**WARNING**

When removing fuel tank, post notice that smoking is not allowed in or near work area.

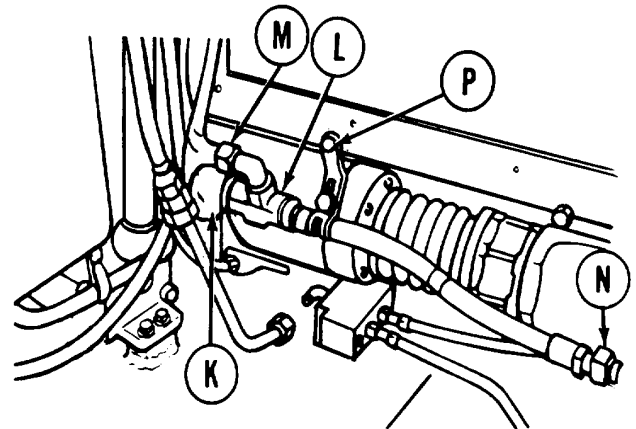
1. Disconnect electrical lead (A) from fuel level transmitter (B).
2. Using 1-1/8 inch wrench, disconnect fire extinguisher line coupling (C) from manifold (D).
3. Using 1/2 inch socket, remove screws and clamps (E) securing fire extinguisher line assembly (F) to fuel tank (G). Remove line from vehicle.
4. Using 15/16 inch wrench, remove screws and washers (H) securing powerplant guide (J) to hull.

TA130514

Go on to Sheet 3

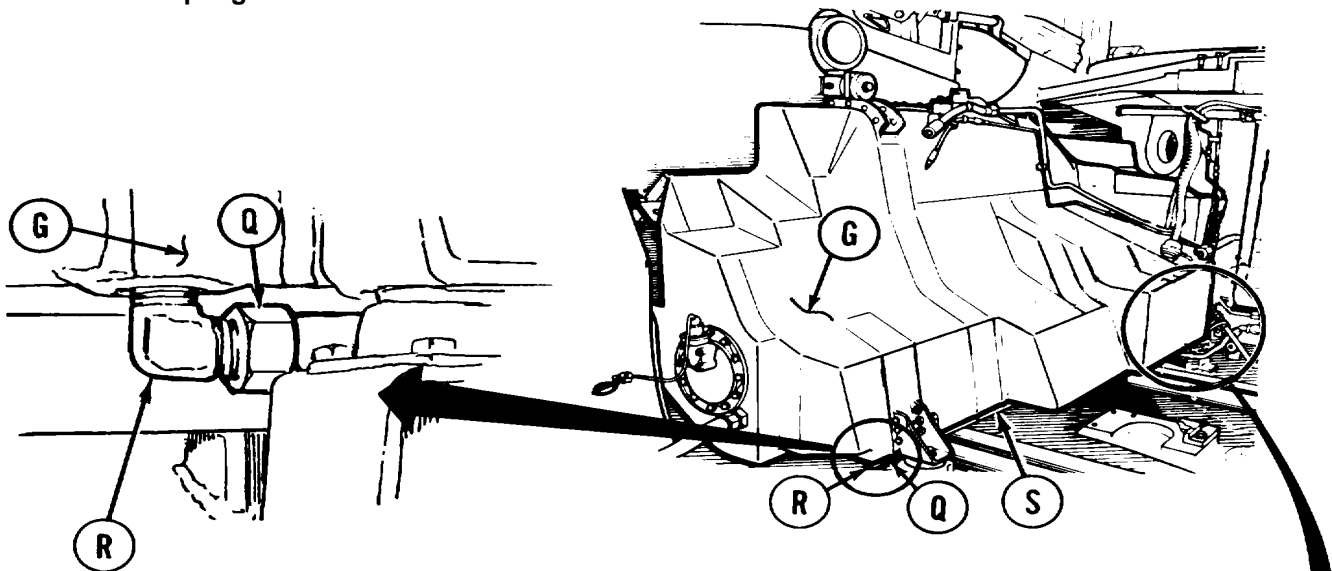
FUEL TANK (LEFT) REPLACEMENT (Sheet 3 of 16)

5. Using 1 inch wrench, disconnect tube assembly coupling (K) from check valve (L).
6. Using 1-1/8 inch wrench, disconnect coupling (M) from check valve (L).
7. Using 1-1/8 inch wrench, disconnect coupling (N) from right fuel tank.
8. Using 9/16 inch socket, remove cap screw and washers (P) securing valve, and hose assembly to the forward wall. Remove check valve (L) with hose assembly from vehicle.

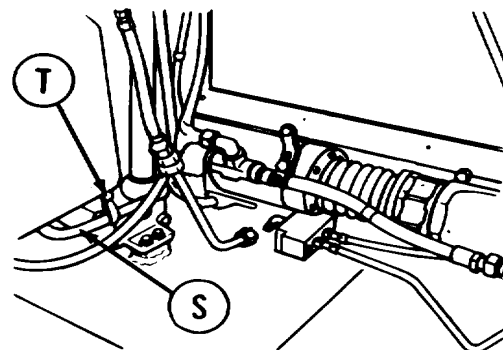


**NOTE**

**Use pan and rags to catch any fuel when coupling is disconnected.**



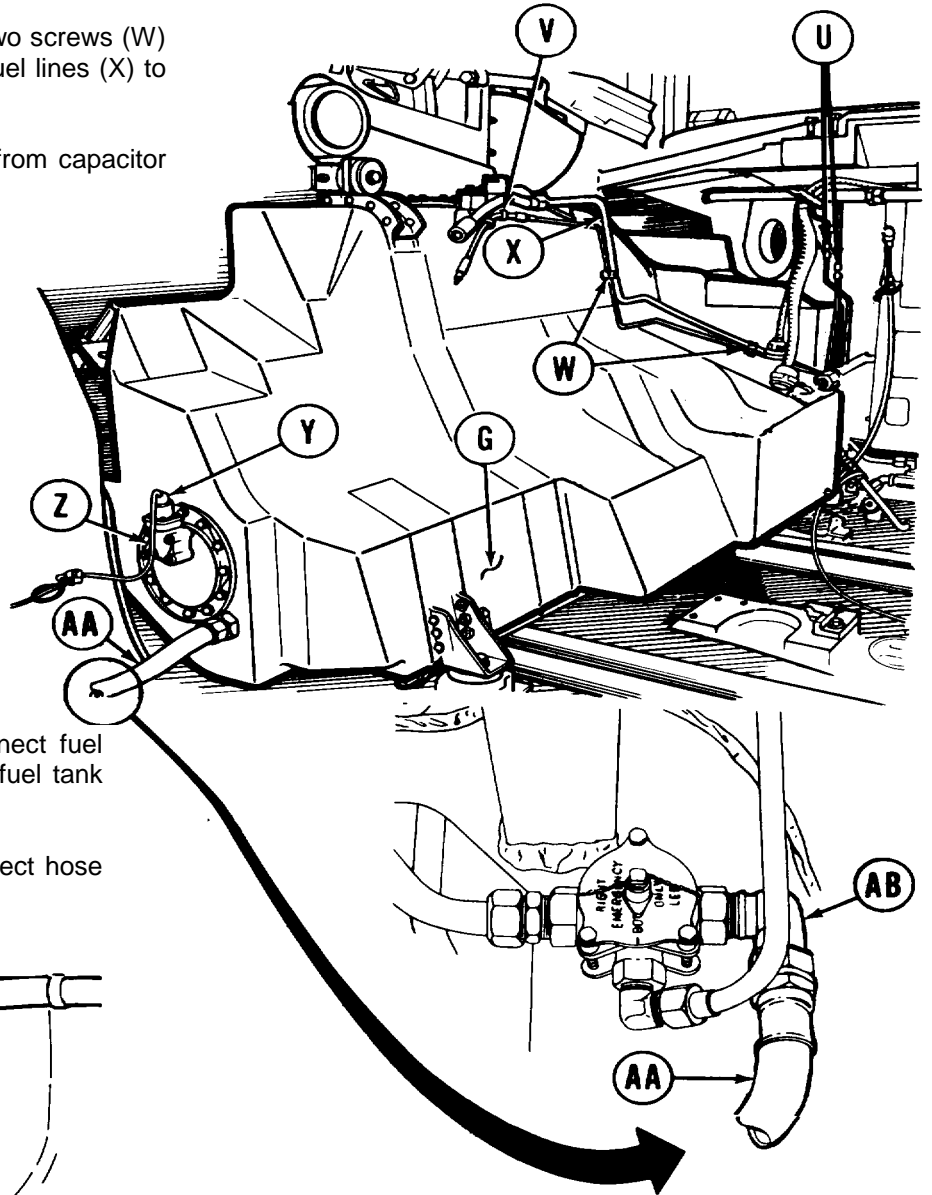
9. Using 1-1/8 inch wrench, disconnect coupling (Q) from elbow (R) connected to tube (S).
10. Using 7/16 inch socket, remove screw, lockwasher and clamp (T) securing tube assembly (S) to fuel tank. Remove tube assembly (S) from vehicle.
11. Using adjustable wrench, remove elbow (R) from fuel tank (G). Plug hole to stop any draining of fuel when fuel tank is moved.
12. Remove accelerator linkage assembly (page 4-98).



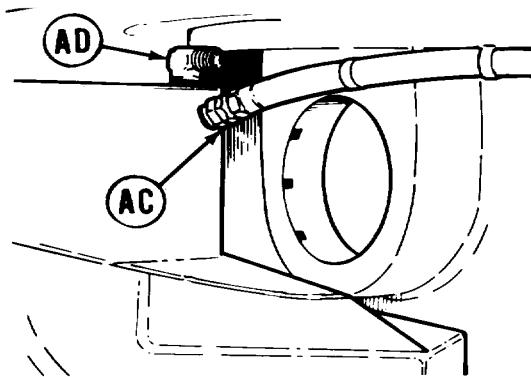
Go on to Sheet 4

**FUEL TANK (LEFT) REPLACEMENT (Sheet 4 of 16)**

13. Using two 9/16 inch wrenches, disconnect the purge and main fuel line couplings (U).
14. Using 1/2 inch socket and wrench, remove screw, nut and washers (V) securing two lines to fuel tank (G).
15. Using 7/16 inch socket, remove two screws (W) securing clamps and purge and fuel lines (X) to the fuel tank (G). Remove lines.
16. Remove electrical connector (Y) from capacitor housing (Z).



17. Using 1-1/8 inch wrench, disconnect fuel return hose assembly (AA) from fuel tank (G).
18. Using 1-1/8 inch wrench, disconnect hose assembly (AA) from elbow (AB).



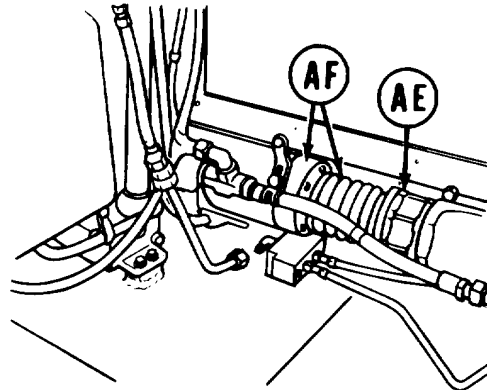
19. Using 1-1/2 inch wrench, disconnect fuel vent hose (AC) from elbow (AD).

Go on to Sheet 5

TA130516

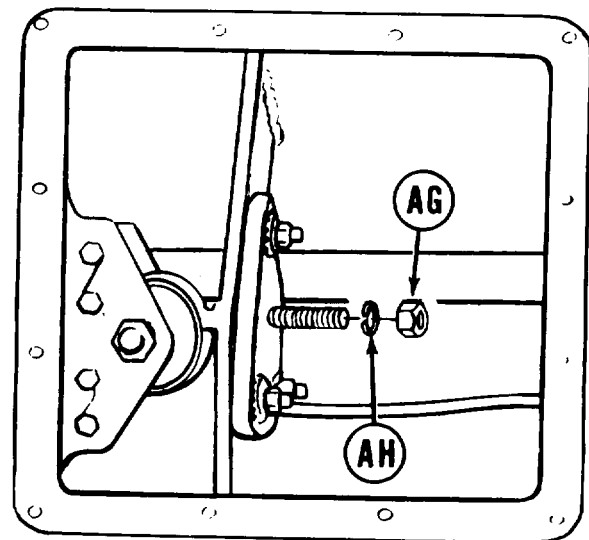
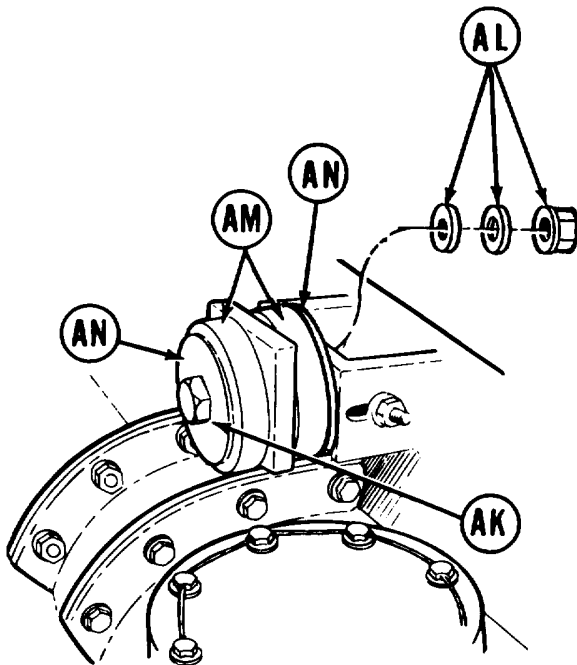
**FUEL TANK (LEFT) REPLACEMENT (Sheet 5 of 16)**

20. Remove fuel isolation valve assembly (AE) and hose (AF) (TM 9-2350-222-20-1).



**NOTE**  
Step 21 is performed in crew compartment.

21. Using 15/16 inch wrench, remove nut (AG) and lockwasher (AH) securing upper front mount to bulkhead.



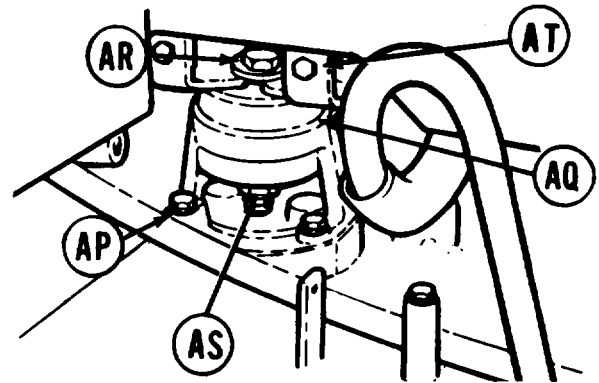
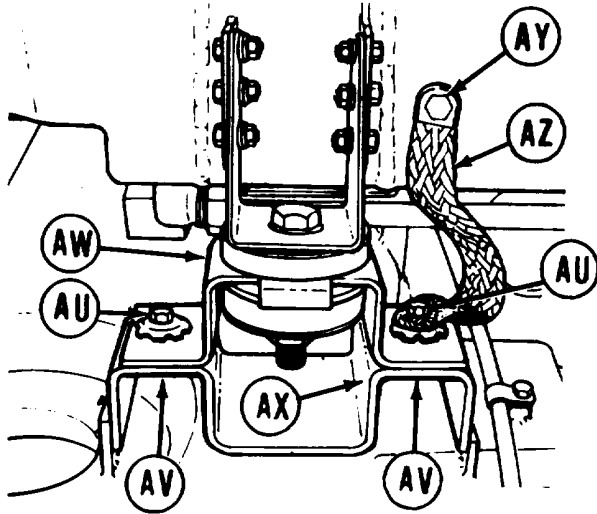
22. Using 15/16 inch socket and 15/16 inch wrench, remove screw (AK), nut and two washers (AL), and rubber mounts (AM) and two washers (AN) from brackets.

Go on to Sheet 6

TA130517

**FUEL TANK (LEFT) REPLACEMENT (Sheet 6 of 16)**

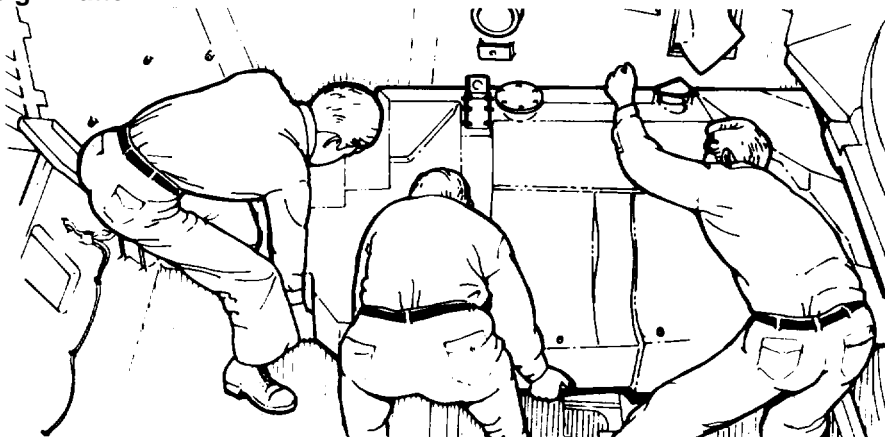
23. Using 1/2 inch wrench, remove screws and washers (AP) securing lower front mount bracket (AQ) to hull floor.
24. Using two 15/16 inch wrenches, loosen screw (AR) and nut (AS).



25. Rotate lower front mount bracket (AQ) 180 degrees and remove from fuel tank bracket (AT).
26. Using 1/2 inch wrench and 1/2 inch socket, remove two screws (AU) and nuts and washers (AV) securing lower rear mount bracket (AW) to hull bracket (AX).
27. Using 9/16 inch wrench, remove screw and two washers (AY) securing ground strap (AZ) to fuel tank. Remove strap.

**CAUTION**

Fuel tank is fabricated of aluminum and is therefore subject to damage from sharp objects. Use utmost care during handling. Do not force fuel tank with poles or bars as damage may result. During disassembly several fuel tank openings may be exposed. Cover these openings to prevent entry of foreign matter.



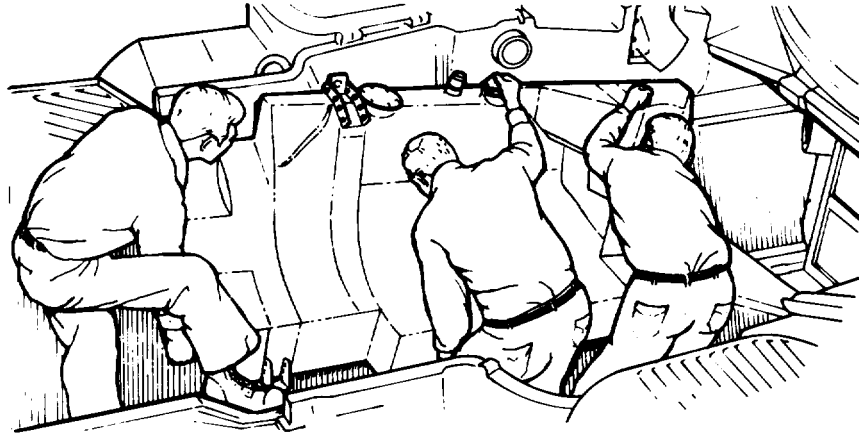
28. Using three persons, pivot fuel tank toward center of hull while slowly moving fuel tank toward rear, until rear end of fuel tank clears curve in hull.

Go on to Sheet 7

TA130518

**FUEL TANK (LEFT) REPLACEMENT (Sheet 7 of 16)**

29. Using a fourth person to guide and lift that part of the fuel tank located under the turret, remove fuel tank from its position and carefully rest it on hull.

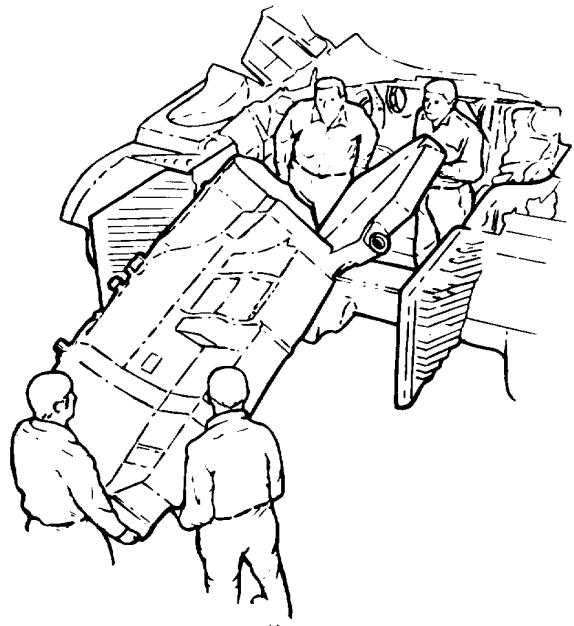


**WARNING**

When draining or filling fuel tank, put notice that smoking is not allowed in or near vehicle.

**CAUTION**

A small amount of fuel may still be in the fuel tank. Drain into container by tilting fuel tank carefully.



30. Using four persons, lift fuel tank out of hull.

TA130519

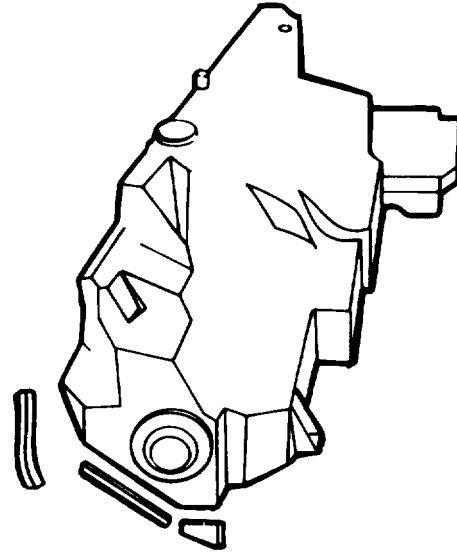
Go on to Sheet 8

**FUEL TANK (LEFT) REPLACEMENT (Sheet 8 of 16)****NOTE**

If fuel tank is to be repaired, go to page 4-67. If fuel tank is to be replaced, go to step 31.

**WARNING**

Cleaning agent specified is flammable. Use only in well ventilated areas. Keep away from flames, sparks, or heat. Do not smoke while using. Prevent contact with eyes, mouth, and/or skin. Wear rubber gloves when performing cleaning procedures.



31. If required, use putty knife and dry cleaning solvent (Item 12, Appendix B) to remove seals from hull. Clean area of all adhesive and mark area on hull where seals had been.
32. Remove fuel tank upper front mount bracket (page 4-27).
33. Remove fuel tank upper rear mount bracket (page 4-33).
34. Remove capacitor housing and fuel pump (TM 9-2350-222-20-1).
35. Remove emergency filler cover, gasket, and strainer (TM 9-2350-222-20-1)
36. Remove fuel tank pipe plug and bracket from top of fuel tank (TM 9-2350-222-20-1).
37. Remove condensate plug and outlet (TM 9-2350-222-20-1).
38. Remove fuel vent elbow from fuel tank (TM 9-2350-222-20-1).
39. Remove fuel level transmitter (TM 9-2350-222-20-1).
40. Remove fuel tank lower front mount bracket (page 4-13).
41. Remove fuel tank lower rear mount bracket (page 4-23).

Go on to Sheet 9

TA130520

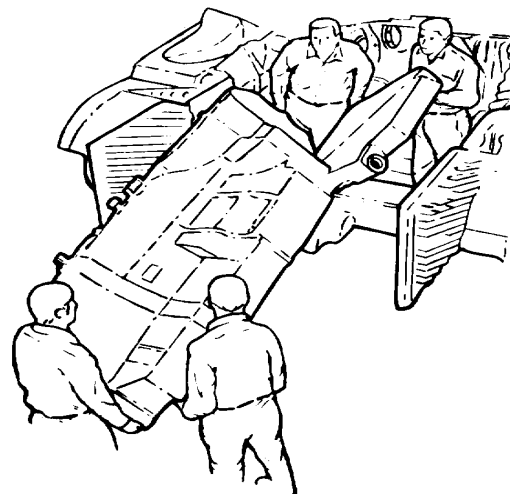
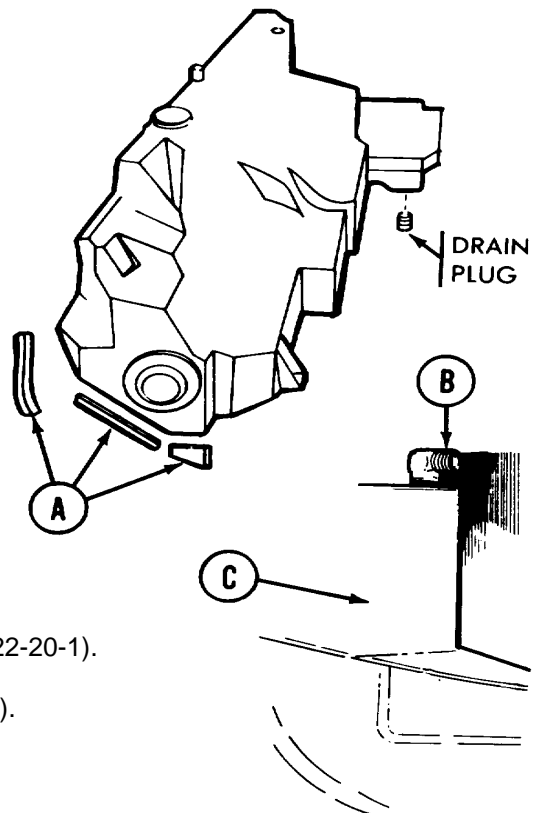
**FUEL TANK (LEFT) REPLACEMENT (Sheet 9 of 16)**

INSTALLATION:

**NOTE**

If fuel tank was removed for repair, go to step 12. If fuel tank to be replaced is a new fuel tank, go to step 2.

1. If required, use adhesive (Item 1, Appendix B) to install new seals (A) in marked positions on hull.
2. Install upper front mount on fuel tank (page 4-30).
3. Install upper rear mount on fuel tank (page 435).
4. Apply sealing compound (Item 7, Appendix B) to male threads of fuel vent elbow (B), and using adjustable wrench, install and position elbow (B) in fuel tank (C) as shown.
5. Install condensate outlet and plug in fuel tank (TM 9-2350-222-20-1).
6. Install fuel level transmitter in fuel tank (TM 9-2350-222-20-1).
7. Install emergency filler strainer, gasket and cover (TM 9-2350-222-20-1).
8. Install fuel pump and capacitor housing in fuel tank (TM 9-2350-222-20-1).
9. Install plug and bracket on top of fuel tank and drain plug in the side of fuel tank (TM 92350-222-20-1).
10. Install lower front mount on fuel tank (page 4-15).
11. Install lower rear mount on fuel tank (page 4-25).



**CAUTION**

**Do not use pry bars or wood poles to force fuel tank into place. Take care not to scrape, puncture, or otherwise damage fuel tank.**

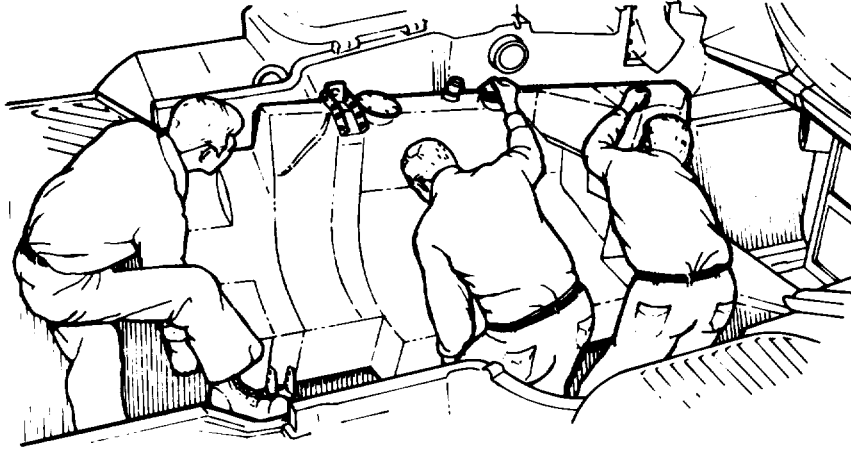
12. Using four persons, place fuel tank into vehicle.  
Go on to Sheet 10

TA130521

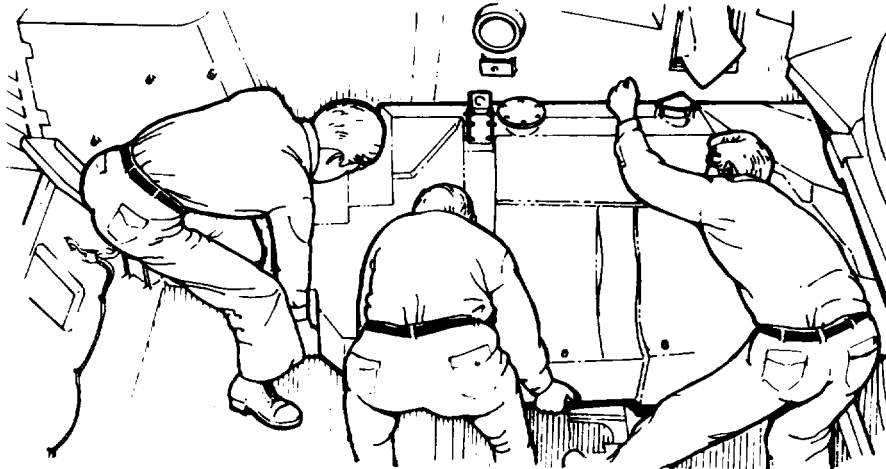


**FUEL TANK (LEFT) REPLACEMENT (Sheet 10 of 16)**

13. Using three persons, move fuel tank forward and slide front section of fuel tank under turret floor. AP rear of fuel tank clears rear of hull, lower fuel tank while continuing forward motion until curve in side of hull is cleared.



14. Swing fuel tank toward left side of hull, position upper front mount, and move fuel tank forward into position.

**NOTE**

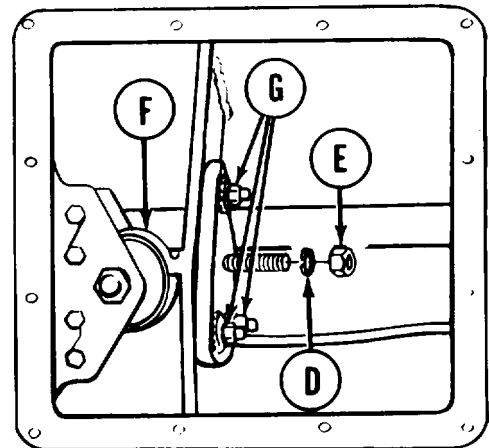
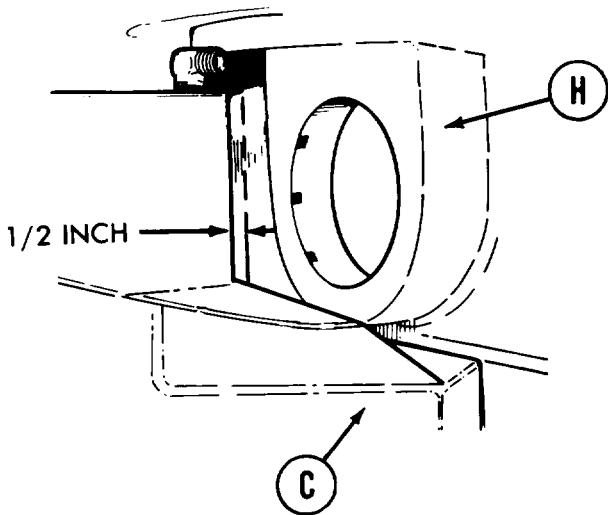
**Make sure that front-upper mount bolt is guided into position while moving fuel tank into place.**

Go on to Sheet 11

TA130522

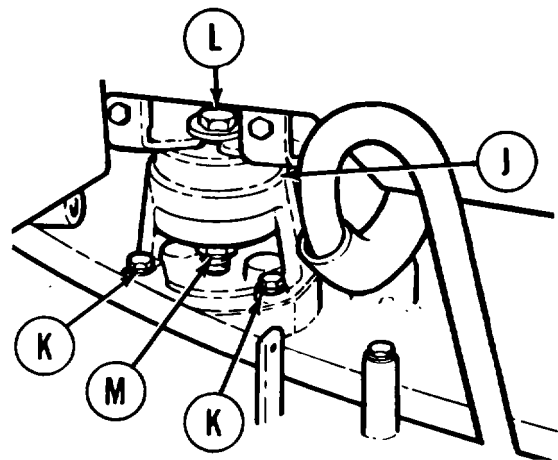
**FUEL TANK (LEFT) REPLACEMENT (Sheet 11 of 16)**

15. Using 15/16 inch wrench, install washer (D) and nut (E) to front mount (F). Tighten three nuts (G).
16. Using 15/16 inch wrench, adjust front mount (F) until 1/2 inch clearance is obtained between fuel tank (C) and bulkhead (H).



17. Using 1/2 inch wrench, install lower front mount (J) to hull floor using two screws and washers (K).

18. Using two 15/16 inch wrenches, tighten screw (L) and nut (M).



Go on to Sheet 12

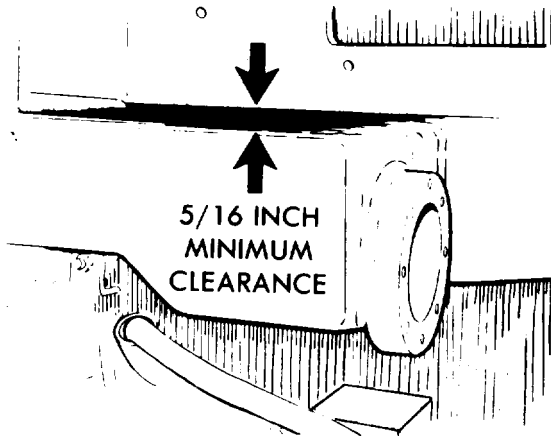
TA130400

FUEL TANK (LEFT) REPLACEMENT (Sheet 12 of 16)

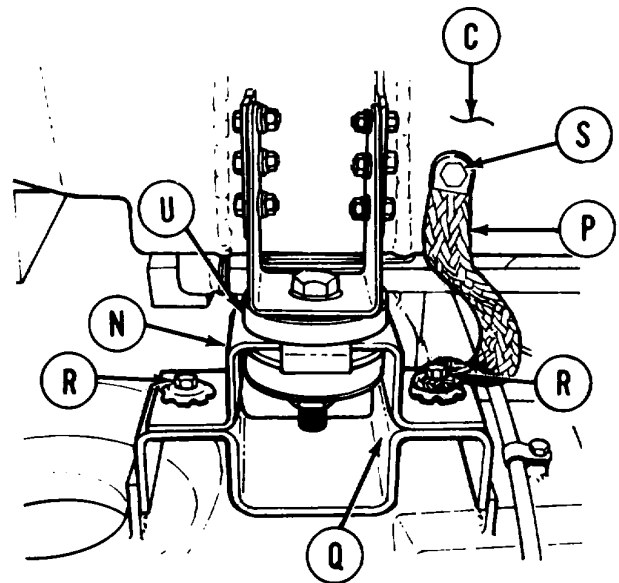
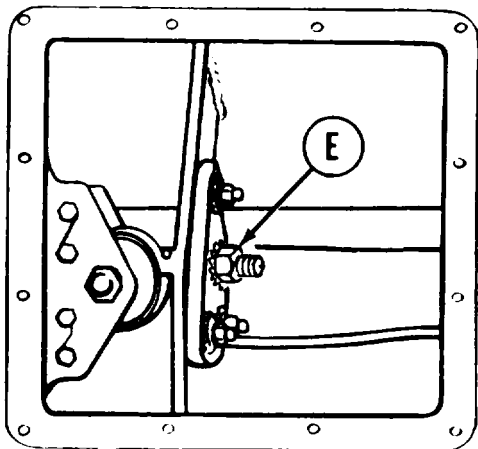
**NOTE**

Use spacer/washer as required for proper clearance between fuel tank and turret floor.

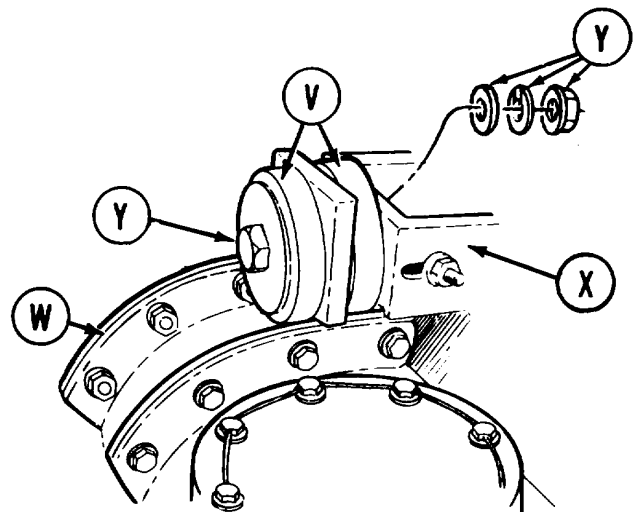
19. Secure lower rear mount (N) and ground strap (P) to hull bracket (Q) using two screws, washers, and nuts (R).
20. Using 1/2 inch wrench and 1/2 inch socket, tighten screws and nuts (R).



23. Using two 15/16 inch wrenches, install two rubber mounts and washers (V) to fuel tank bracket (W) and hull bracket (X) with screw, washers, and nut (Y).



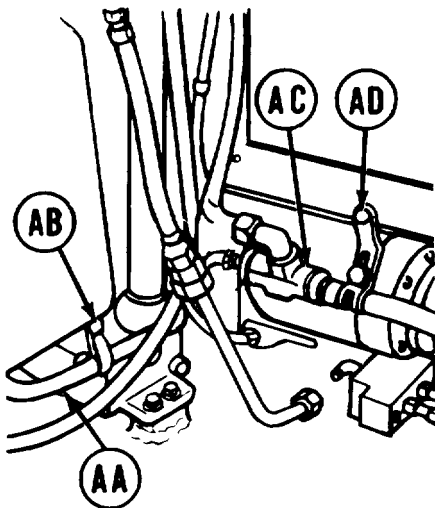
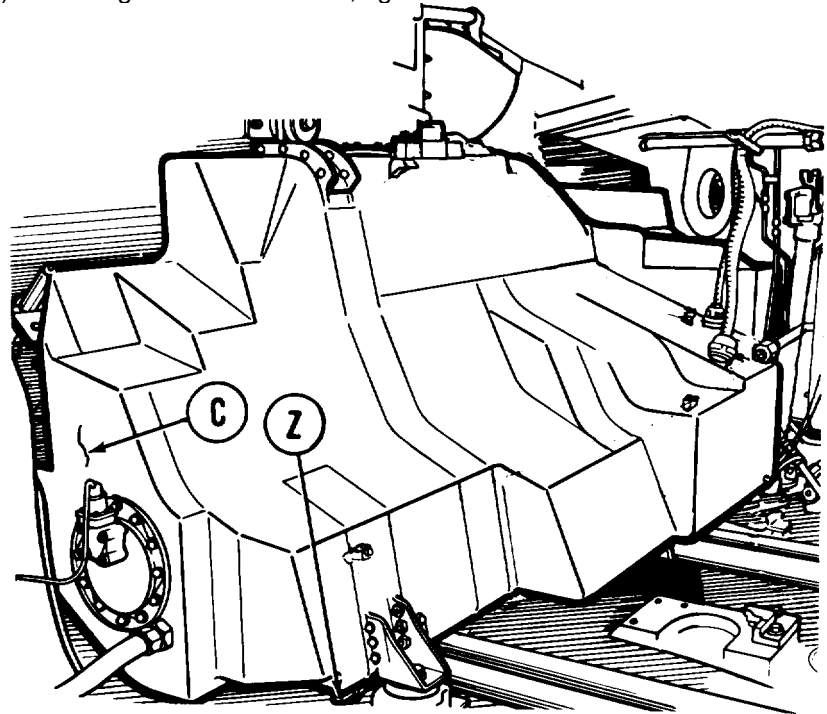
21. Using 9/16 inch wrench, install ground strap (P) to fuel tank (C) with washer and screw (S).
22. Check for 5/16 inch clearance between fuel tank (C) and turret floor. Add spacers (U) if required in lower rear mount (N) for correct clearance.



24. Using torque wrench and 15/16 inch crowfoot, torque nut (E) to 130-145 lb-ft (176-196 N-m).
25. After tightening all mounts, recheck clearance in steps 16 and 22 above. Readjust for proper clearance as required.

**FUEL TANK (LEFT) REPLACEMENT (Sheet 13 of 16)**

26. Install left bulkhead access cover (TM 9-2350-222-20-1).
27. Install crossover valve and hose between left and right fuel tank (TM 9-2350-222-20-1).
28. Install accelerator linkage assembly (page 4-101).
29. Apply sealing compound (Item 7, Appendix B) to threads of elbow (Z) and using adjustable wrench, install elbow (Z) in fuel tank (C).
30. Position tube assembly (AA) under fuel tank and using 7/16 inch socket, install clamp, washer and screw (AB) onto fuel tank (C).
31. Install tube assembly (AA) onto elbow (Z) and using 1-1/8 inch wrench, tighten.



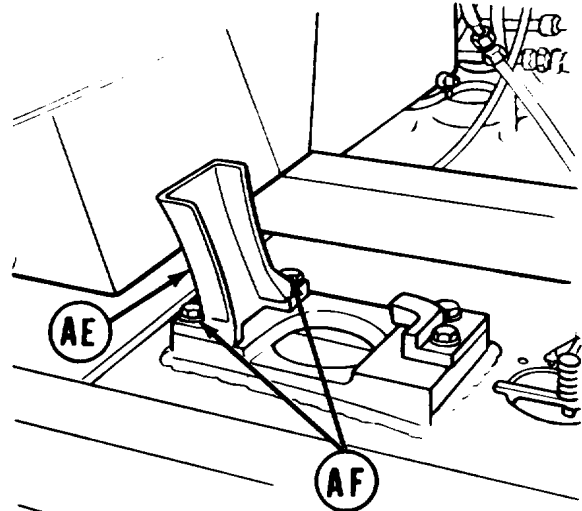
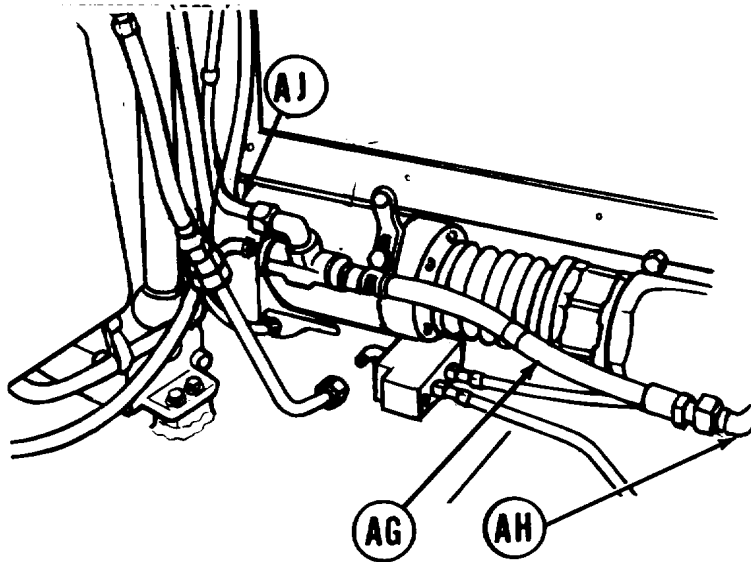
32. Using 9/16 inch wrench, install check valve (AC) and hose assembly with bracket onto bulkhead wall with washer and screw (AD).
33. Using 1-1/8 inch wrench, connect tube assembly (AA) to check valve (AC).

Go on to Sheet 14

TA130524

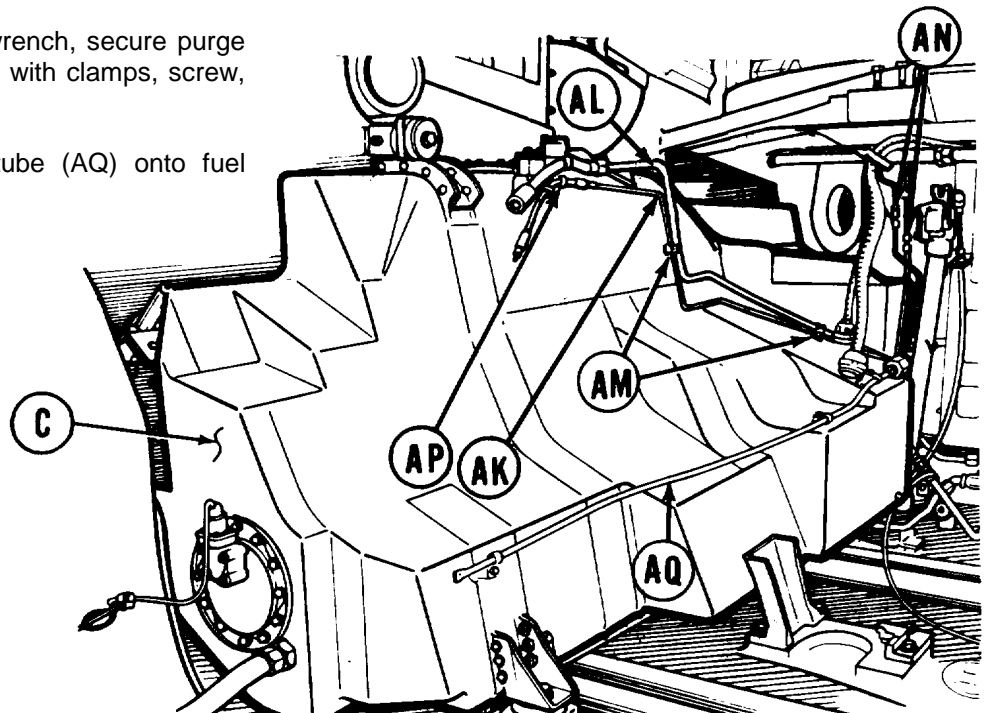
**FUEL TANK (LEFT) REPLACEMENT (Sheet 14 of 16)**

34. Install powerplant guide (AE) to hull. Using 15/16 inch wrench install four screws and washers (Aft).



35. Using 1-1/8 inch wrench connect hose assembly (AG) to elbow (AH) on right fuel tank.
36. Using 1-1/8 inch wrench, connect coupling (AJ)
37. Install purge (AK) and main fuel (AL) lines on fuel tank (C) and using 7/16 inch socket, secure lines to fuel tank with clamps and screws (AM).

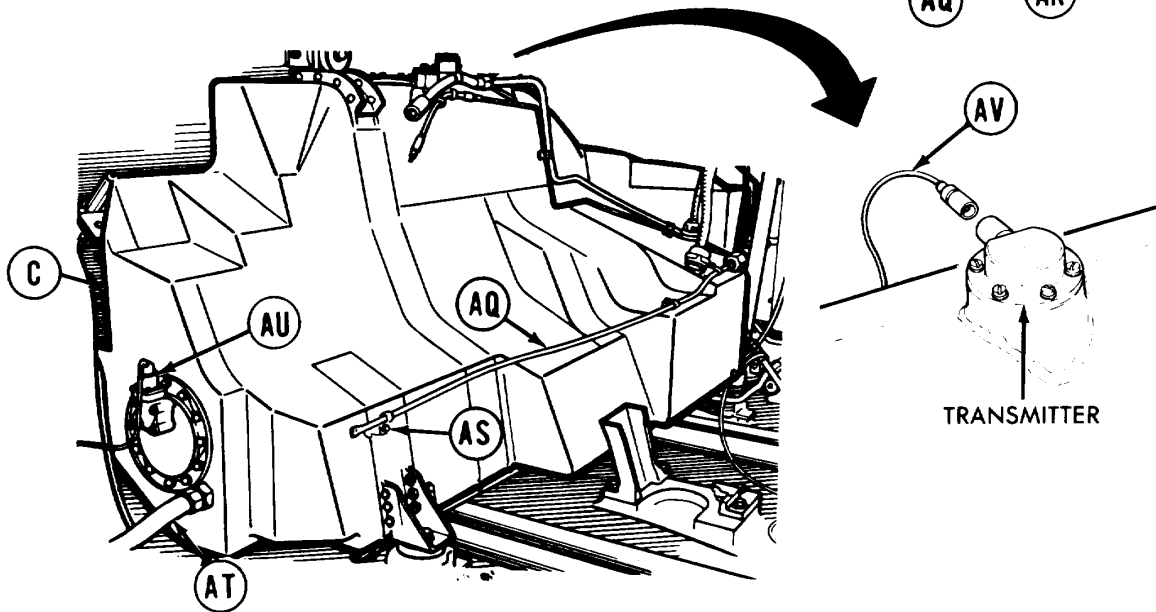
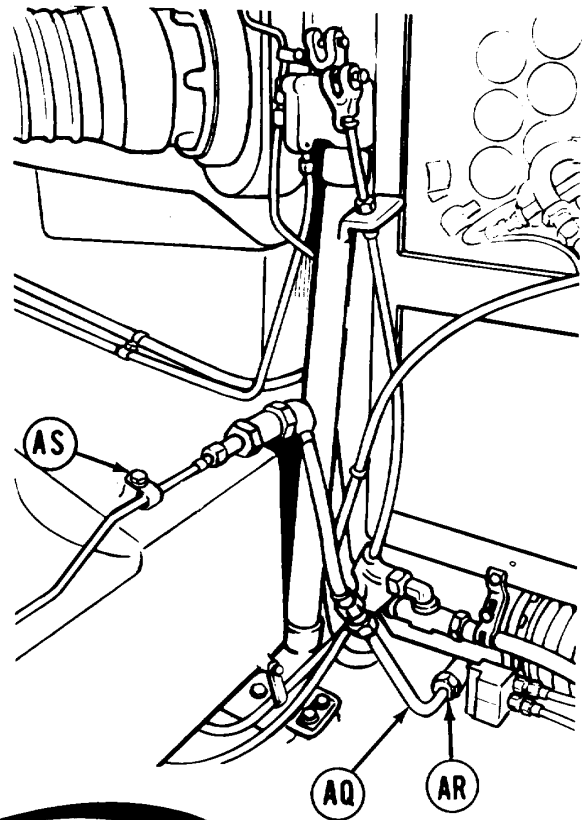
38. Using two 9/16 inch wrenches, connect the purge and main fuel line couplings (AN).
39. Using 1/2 inch socket and wrench, secure purge and main fuel line to bracket with clamps, screw, washer, and nut (AP).
40. Position fire extinguishers tube (AQ) onto fuel tank.



Go on to Sheet 15

**FUEL TANK (LEFT) REPLACEMENT (Sheet 15 of 16)**

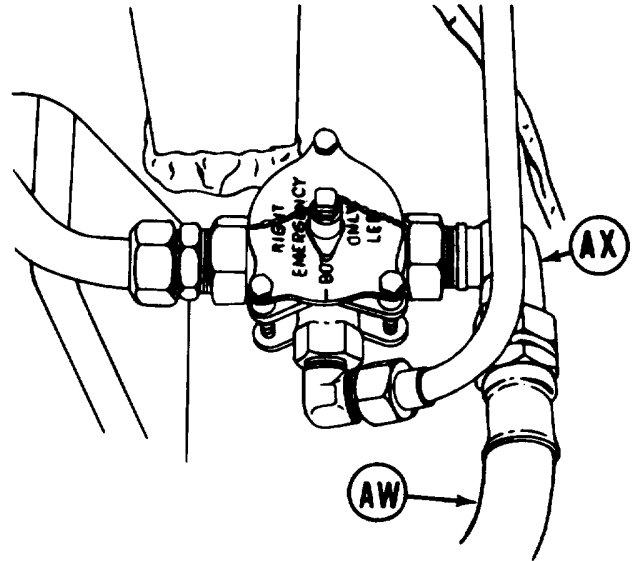
41. Using 1-1/8 inch wrench, connect fire extinguisher tube (AQ) to elbow (AR).
42. Using 1/2 inch wrench, install screw and clamp (AS).
43. Install fuel return hose assembly (AT) into fuel tank (C).
44. Install cable connector (AU) onto capacitor housing.
45. Connect fuel level transmitter electrical lead (AV) to transmitter.



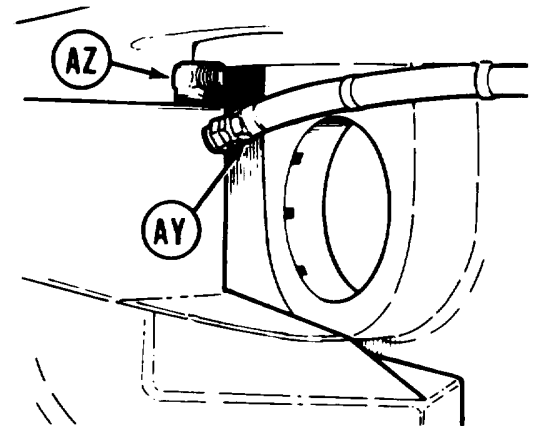
Go on to Sheet 16

## FUEL TANK (LEFT) REPLACEMENT (Sheet 16 of 16)

46. Using 1-1/8 inch wrench, install fuel return hose assembly (AW) onto elbow (AX).



47. Using 1-1/2 inch wrench, connect fuel vent hose (AY) to elbow (AZ).
48. Install number four (left and right) torsion bars (TM 9-2350-222-20-1).
49. Fill fuel tank.
50. Install air intake assembly (TM 9-2350-22220-1).
51. Install powerplant (TM 9-2350-222-20-1).



End of Task

TA130527

**FUEL TANK REPAIR (Sheet 1 of 2)**

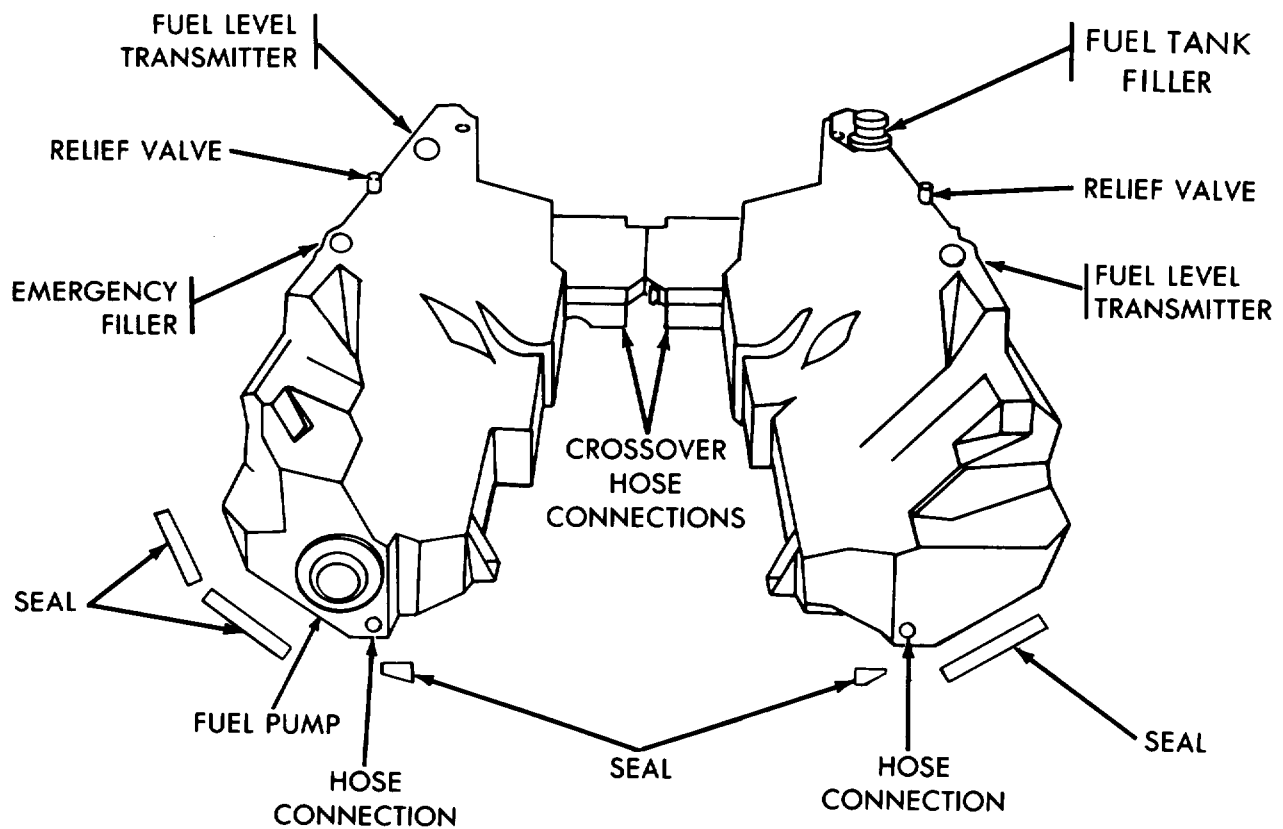
**TOOLS:** Steam cleaner  
 Radiator repair kit  
 Coil insert thread tool kit  
 Tap and die set  
 Depth gage  
 Low pressure compressed air

**FABRICATED TOOLS:** Covers (Filler and crossover hose openings) (Fig 3, Appendix D)

**SUPPLIES:** Liquid detergent (Item 11, Appendix B)  
 Adhesive (Item 1, Appendix B)  
 Cleaning compound (Item 5, Appendix B)

**REFERENCES:** TM 9-237

**PRELIMINARY PROCEDURE:** Remove right fuel tank (page 4-36)  
 Remove left fuel tank (page 4-51)



**CLEANING AND INSPECTION:**

1. Using steam cleaner, apply a solution of cleaning compound (Item 5, Appendix B) and water to exterior and interior of fuel tanks. Rinse fuel tank thoroughly with hot water after cleaning.

Go on to Sheet 2

TA130528



## FUEL TANK REPAIR (Sheet 2 of 2)

2. Inspect for cracks, fractures, deformation, and nicks. Fuel tank must be free of cracks, fractures, and deformation, and must be free of nicks and scores in excess of 1/32 inch deep.
3. Inspect threaded screw holes for worn or damaged threads.
4. Inspect for flaked or chipped paint.
5. Inspect all welds for defects.
6. Inspect seals that are bonded to hull for looseness and wear.

## REPAIR:

1. To weld cracks, fractures, broken or damaged welds, or nicks and scores, refer to TM 9-237.
2. Replace loose or worn seals using adhesive.
3. Repair worn or damaged threads by chasing with a proper size tap or by installation of a new coil insert.

## TEST:

1. Install fabricated covers (Fig. 3, Appendix D) and new gaskets on crossover hose opening and on fuel tank filler openings. Seal all other openings except one with radiator repair kit. In the remaining opening install a suitable fitting from the radiator repair kit and introduce compressed air into fuel tank until a pressure of 3 psi has been reached.
2. Hold pressure at 3 psi and inspect all joints for leaks by applying a soap (Item 11, Appendix B) and water solution on the joints.
3. There must be no leakage. Leakage, if present, will be indicated by the presence of air bubbles in the soapy water area, or by loss of air pressure as indicated by the gage.
4. Relieve pressure and rinse exterior of fuel tank with hot water. Allow to dry.
5. Install right fuel tank (page 4-44).
6. Install left fuel tank (page 4-59).

End of Task

FUEL SHUTOFF CABLE ASSEMBLY REPLACEMENT (Sheet 1 of 6)

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	4-70
Cleaning and Inspection	4-71
Installation	4-72

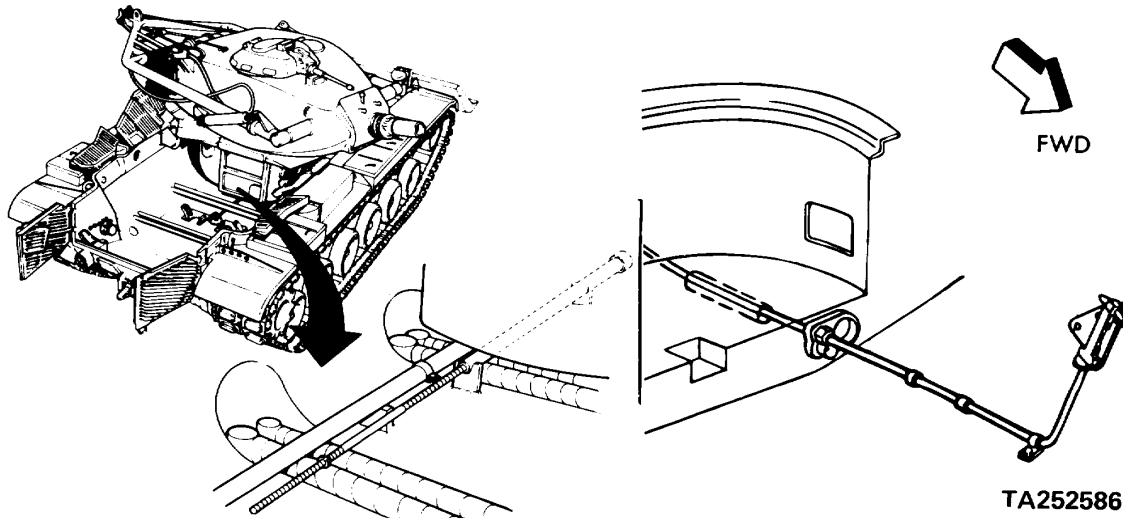
TOOLS: 7/16 in. socket with 1/2 in. drive  
 Ratchet with 1/2 in. drive  
 Wire brush  
 1 in. combination box and open end wrench  
 Knife  
 7/16 in. combination box and open end wrench  
 9/16 in. combination box and open end wrench (2 required)  
 3/4 in. combination box and open end wrench  
 15/16 in. combination box and open end wrench (2 required)  
 Adjustable wrench, 10 in.

SUPPLIES: Adhesive (Item 1, Appendix B)  
 Packing (10873904)  
 Wire (810 ft) (Item 27, Appendix B)  
 Silicone compound (Item 10, Appendix B)  
 Grommet (8730213)  
 Lockwasher (MS35338-44) (3 required)

PERSONNEL: Two

REFERENCES: TM 9-2350-222-10  
 TM 9-2350-222-20-1

PRELIMINARY PROCEDURES: Remove left bulkhead floor access cover (TM 9-2350-222- 20-1)  
 Remove fuel shutoff cable mounting bracket (TM 9-2350-222-20-1)  
 Remove left fuel tank (page 4-51)

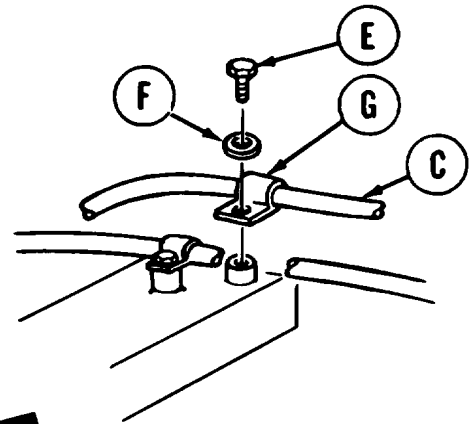
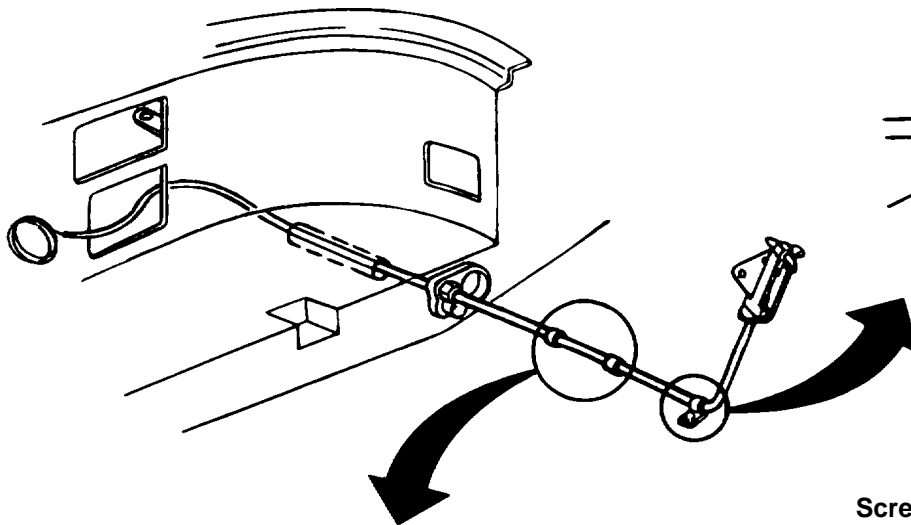
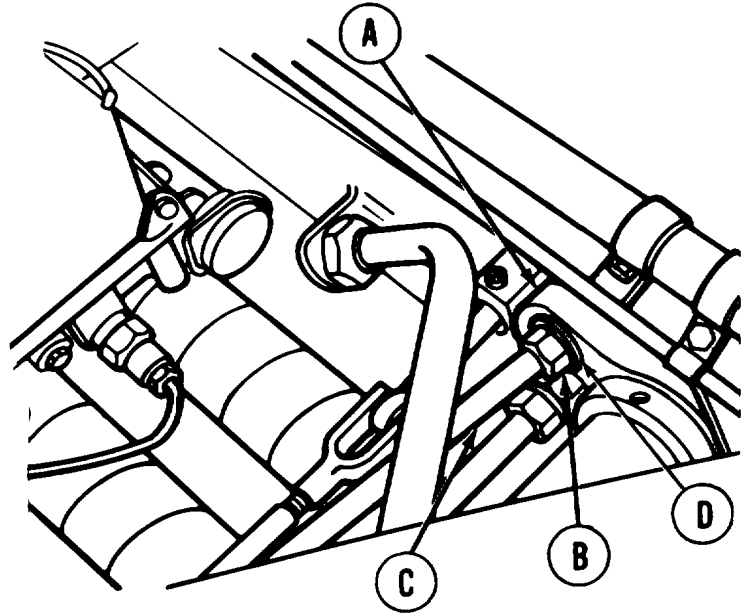


Go on to Sheet 2

**FUEL SHUTOFF CABLE ASSEMBLY REPLACEMENT (Sheet 2 of 5)**

**REMOVAL:**

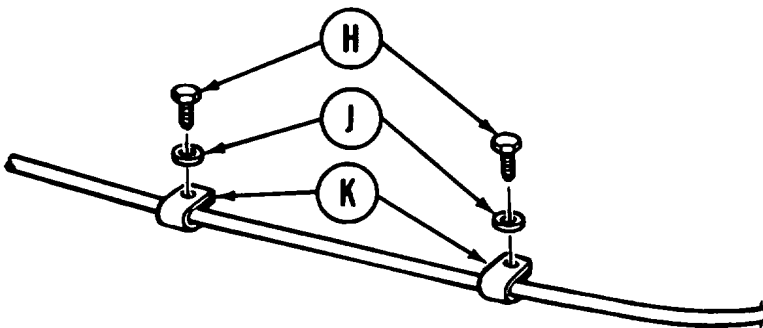
1. Open turret platform access door and traverse turret (TM 9-2350-222-10) to gain access to bulkhead housing (A).
2. Using 1 inch wrench, remove nut (B) from bulkhead housing (A).
3. Slide nut (B) back onto cable assembly (C).
4. Slide washer (D) back onto cable assembly (C).
5. Using 7/16 inch socket, remove screw (E) and lockwasher (F) holding front cable clamp (G) to mounting block on torsion bar cover. Remove clamp (G). Throw lockwasher away.



**NOTE**

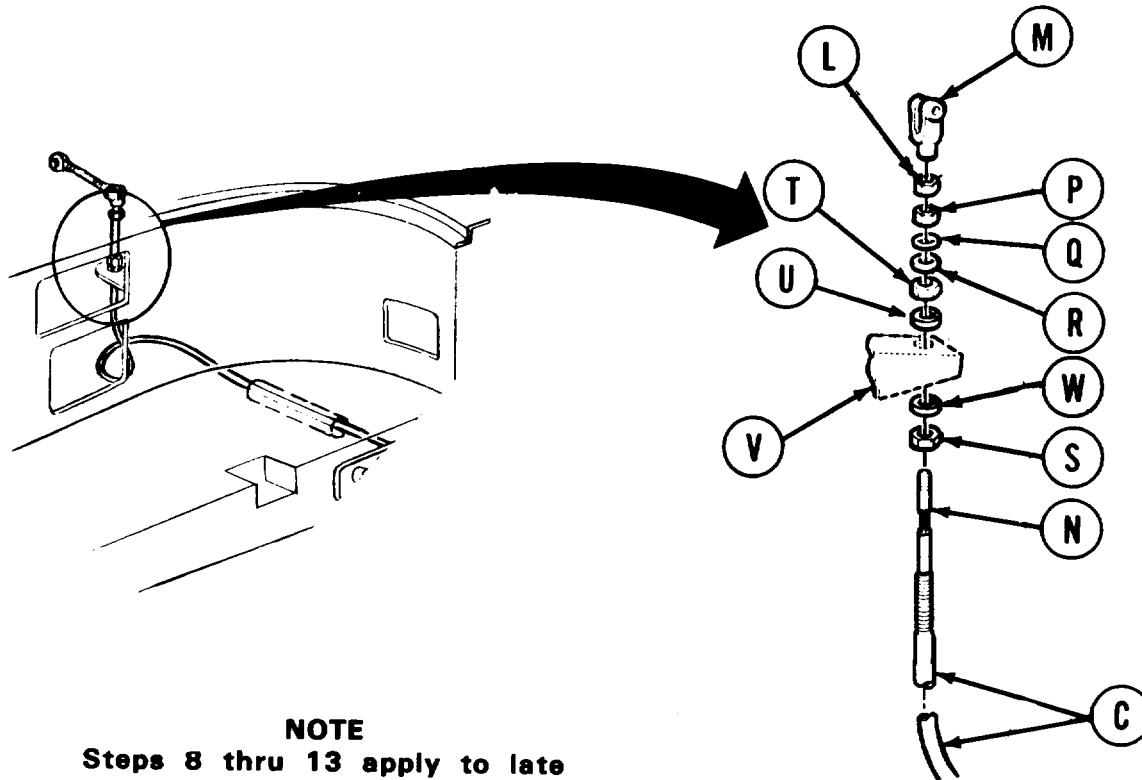
**Screws (H) may be hidden beneath suction hose.**

6. 7/16 inch socket and 7/16 inch wrench, remove two screws (H) and lockwashers (J) from mounting blocks on hull. Throw lockwashers away.
7. Remove clamps (K) from cable assembly.



Go on to Sheet 2.1

## FUEL SHUTOFF CABLE ASSEMBLY REPLACEMENT (Sheet 2.1 of 5)



**NOTE**  
**Steps 8 thru 13 apply to late models only. For early models, skip steps 8 thru 13.**

8. Using 9/16 inch wrench to hold nut (L), use adjustable wrench and remove clevis (M).
9. Using 9/16 inch wrench to hold cable core (N), use 9/16 inch wrench and remove nut (L).
10. Using 9/16 inch wrench to hold cable core (N), use 3/4 inch wrench and remove nut (P), preformed packing (Q), and washer (R). Throw preformed packing away.
11. Using one 15/16 inch wrench to hold nut (S), use other 15/16 inch wrench and remove nut (T) and lockwasher (U). Throw lockwasher away.
- ] 12. Pull cable assembly (C) from bracket (V).
13. Using 15/16 inch wrench, remove lockwasher (W) and nut (S) from cable assembly. Throw lockwasher away.

Go on to Sheet 3

TA252588

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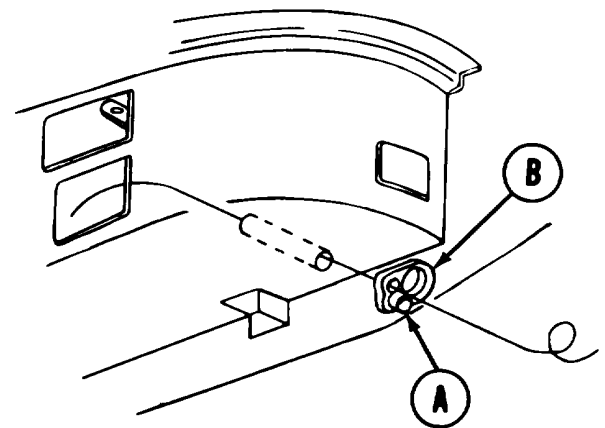
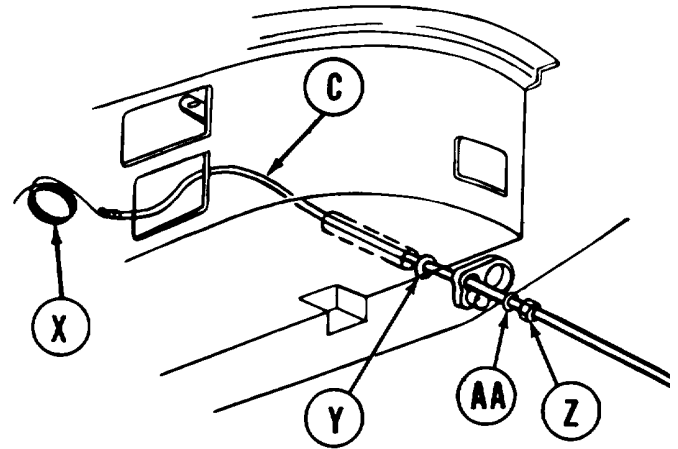
**FUEL SHUTOFF CABLE ASSEMBLY REPLACEMENT (Sheet 3 of 6)**

14. Wrap and securely tie 8 to 10 feet of wire (X) (Item 27, Appendix B) around end of cable assembly (C) in engine compartment.

**NOTE**

Wire (X) will be used during installation to thread cable assembly through bulkhead connector and guide tube.

15. Using knife, remove grommet (Y) from cable U assembly (C). Throw grommet away.
16. Using two persons, remove cable assembly (C) I by slowly pulling cable assembly into driver's compartment allowing wire (X) to thread through bulkhead connector and guide tube. Keep any parts remaining on cable assembly on the wire and the front side of the bulkhead.
17. Untie wire from cable assembly (C) and U remove cable assembly from hull. Leave wire in hull to aid in cable installation.
18. Remove nut (Z) and packing (AA) from cable I assembly (C). Throw packing away.



**CLEANING AND INSPECTION:**

1. Using wire brush, clean threaded parts.
2. Inspect threaded components for thread damage. Replace or repair if defective.
3. Inspect bushing assembly (A) in bulkhead housing (B) for tears, breaks, and cracks. Replace if defective.

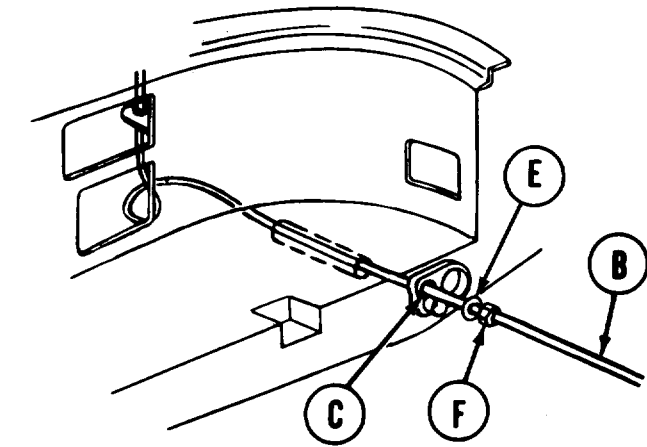
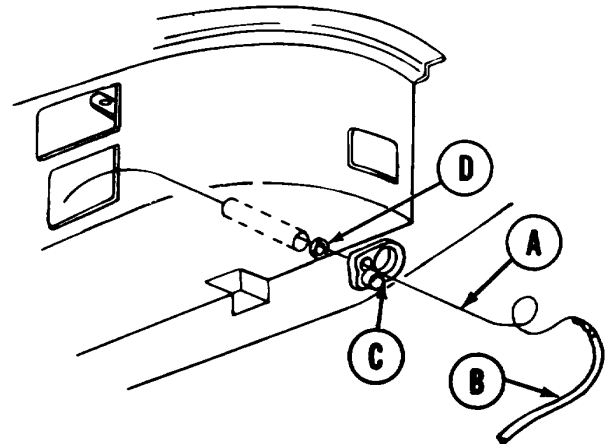
Go on to Sheet 4

TA252589

**FUEL SHUTOFF CABLE ASSEMBLY REPLACEMENT (Sheet 4 of 6)**

**INSTALLATION:**

1. Tie driver's compartment end of wire (A) to one end of cable assembly (B).
2. Apply a thin coat of silicone compound (Item 10, Appendix B) to outer surface of cable assembly (B).
3. Pull cable assembly (B) through bulkhead housing (C).
4. Remove wire (A) from cable (B).
5. Install grommet (D) over cable (B).
6. Tie wire (A) to cable (B).
7. As one person pulls wire in engine compartment, have another person guide cable assembly (B) through bulkhead housing (C).
8. After cable assembly has been threaded into place, remove wire (A).

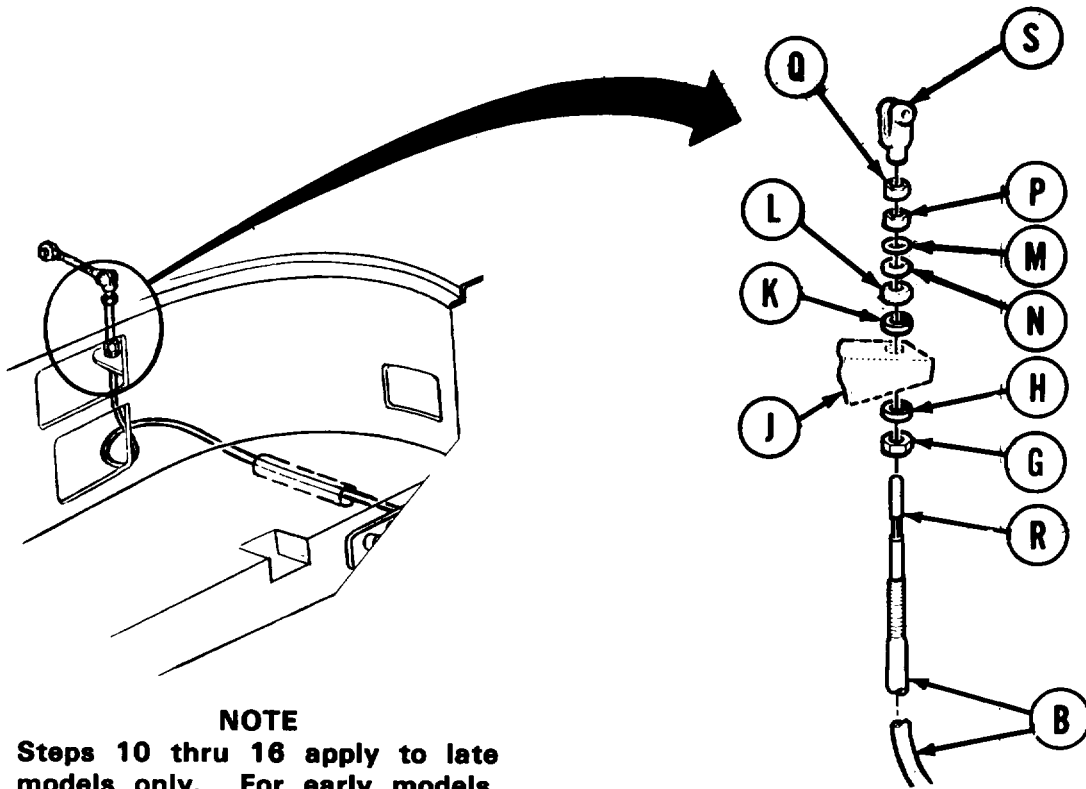


9. Install new packing (E) and nut (F) onto cable assembly (B) and slide up to bulkhead housing (C)

Go on to Sheet 4.1

TA252590

## FUEL SHUTOFF CABLE ASSEMBLY REPLACEMENT (Sheet 4.1 of 5)

**NOTE**

**Steps 10 thru 16 apply to late models only. For early models, skip steps 10 thru 16.**

10. Install nut (G) and new lockwasher (H) onto cable assembly (B).
11. Install cable assembly (B) through bracket (J).
12. Install new lockwasher (K) and nut (L) onto cable assembly (B).
13. Install new preformed packing (M), washer (N), and nut (P) onto cable assembly (B). Tighten nut (P) finger tight onto cable assembly.
14. Tighten nut (L) finger tight up against nut (P).
15. Pull cable assembly (B) down. Using 9/16 inch wrench to hold cable core (R), use 15/16 inch wrench to tighten nut (G) up against bracket (J).
16. Install nut (Q) onto cable core (R). Install clevis (S) onto cable core (R). Hold clevis (S) with adjustable wrench and, using 9/16 inch wrench, tighten nut (Q) up against clevis (S).

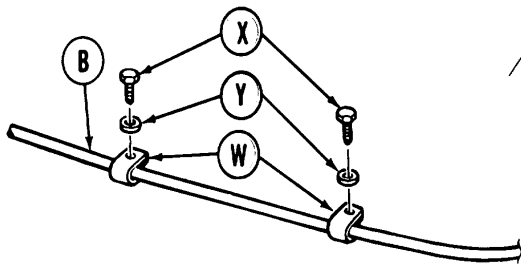
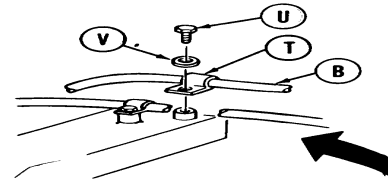
Go on to Sheet 5

TA252591

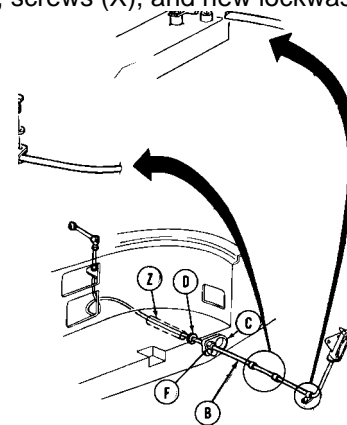
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**FUEL SHUTOFF CABLE ASSEMBLY REPLACEMENT (Sheet 5 of 5)**

17. Install clamp (T) onto cable assembly (B).
18. Using 7/16 inch socket, secure cable clamp (T) to torsion bar cover with screw (U) and new lockwasher (V).



19. Using 7/16 inch socket and 7/16 inch wrench secure cable (B) to hull floor with two clamps (W), screws (X), and new lockwashers (Y).



20. Using 1 inch wrench, install nut (F) into bulkhead housing (C).
21. Apply adhesive (Item 1, Appendix B) to new grommet (D) and secure to cable (B), flush with guide tube (Z).
22. Install fuel shutoff cable mounting bracket (TM 9-2350-222-20-1).
23. Install left fuel tank (page 4-59).
24. Install left bulkhead, floor access cover (TM 9-2350-222-20-1).

End of Task

TA252592



**FUEL PRIMER OUTLET FROM ENGINE TUBE ASSEMBLY REPLACEMENT (EARLY MODEL)**  
 (Sheet 1 of 6)

**PROCEDURE INDEX**

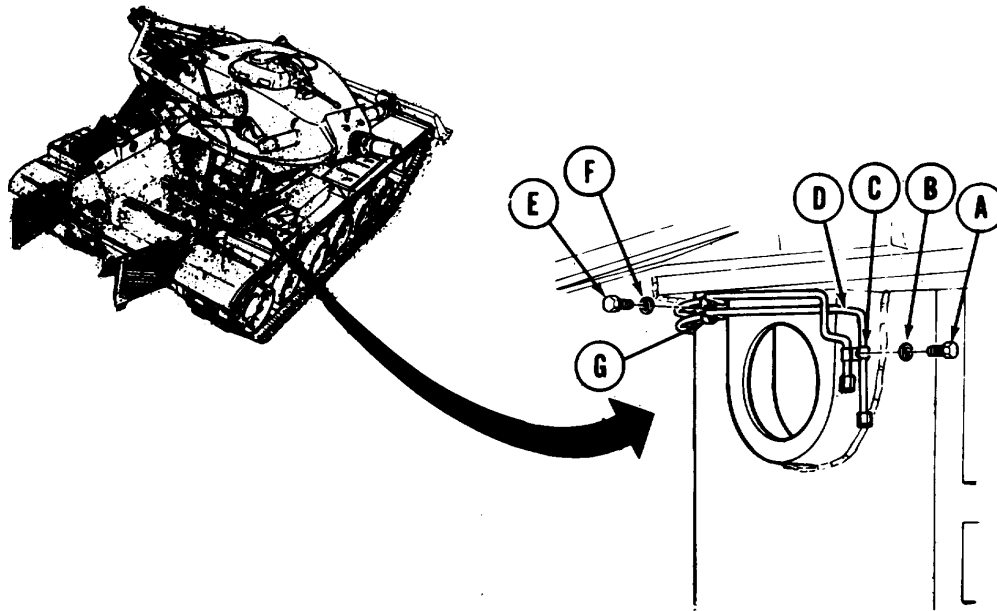
PROCEDURE	PAGE
Removal	4-74
Inspection	4-76
Installation	4-76

**TOOLS:** 9/16 in. combination box and open end wrench  
 11/16 in. combination box and open end wrench (2 required)  
 7/16 in. socket with 1/2 in. drive  
 Ratchet with 1/2 in. drive

**SUPPLIES:** Lockwasher (MS3533844) (2 required)

**REFERENCE:** TM 9-2350-222-20-1

**PREIMINARY PROCEDURES:** Remove powerplant (TM 92350(222-20-1)  
 Remove left bulkhead access cover (TM 9-2350-222-20-1)  
 Remove left air cleaner inlet hose (TM 92350-22220-1)  
 Remove left fuel tank (page 4-51)



**REMOVAL:**

1. Using 7/16 inch socket, remove screw (A) and lockwasher (B) holding rear clamp (C) and tube (D) to clamp mount. Throw lock washer away.
2. Using 7/16 inch socket, remove screw (g) and lockwasher (F) holding center clamp (G) and tube (D) to clamp mount. Throw lockwasher away.

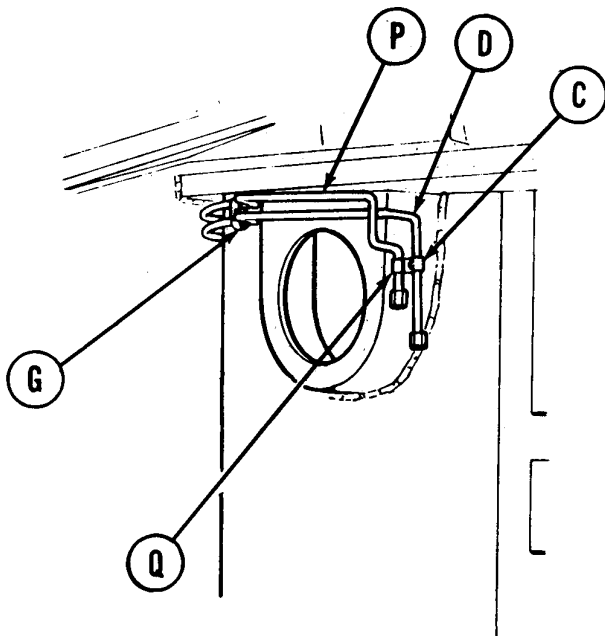
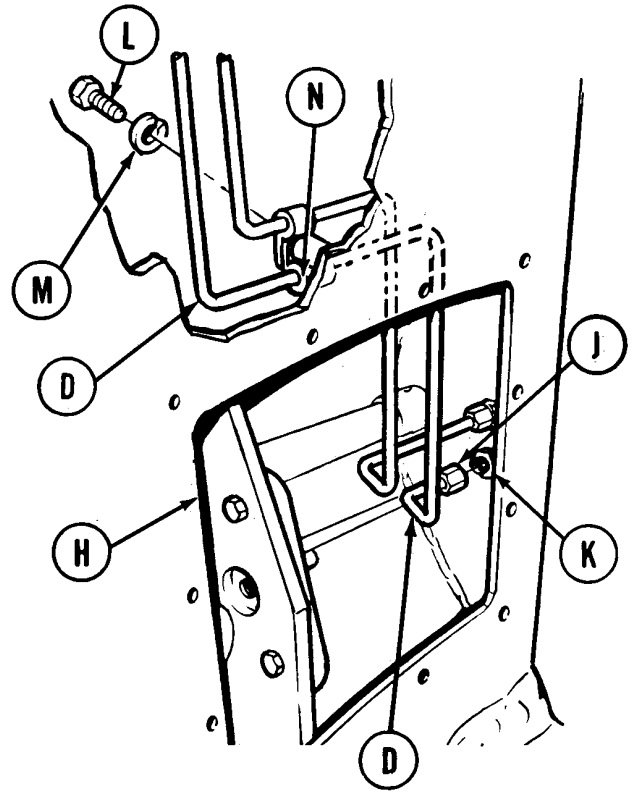
TA252593

**FUEL PRIMER OUTLET FROM ENGINE TUBE ASSEMBLY REPLACEMENT (EARLY MODEL)**  
 (Sheet 2 of 6)

**NOTE**

Gain access to rear of bulkhead through left access opening (H) located in turret compartment.

3. Using 9/16 inch wrench, reach through access opening (H) and disconnect front nut (J) of tube (D) from nipple (K).
4. Using 7/16 inch socket, remove screw (L) and lockwasher (M) holding front clamps (N) to clamp mount. Throw lockwasher away.



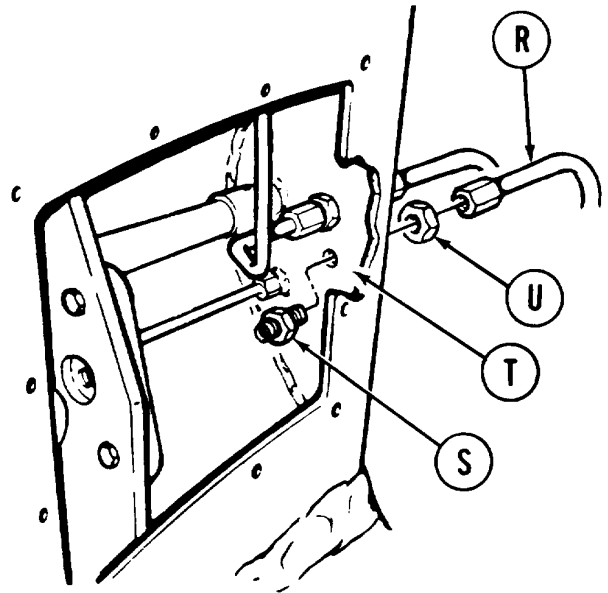
5. Remove tube (D) through engine compartment by passing rear end of tube behind primer inlet tube (P) and clamp (Q).
6. Remove clamps (C), (G), and (N) from tube (D).

Go on to Sheet 3

TA252594

**FUEL PRIMER OUTLET FROM ENGINE TUBE ASSEMBLY REPLACEMENT (EARLY MODEL)**  
**(Sheet 3 of 6)**

7. Using 9/16 inch wrench and 11/16 inch wrench, disconnect front outlet tube (R) from nipple (S) in front of bulkhead (T).
8. Using two 11/16 inch wrenches, remove nut (U) from nipple (S) and remove nipple (S) from rear of bulkhead (T).

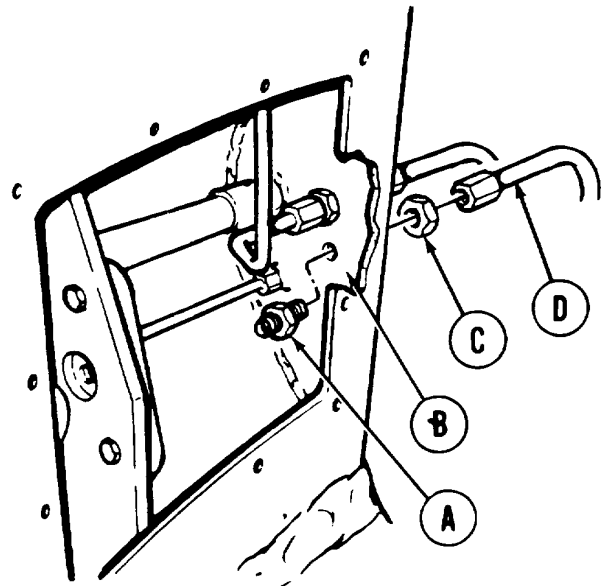


**INSPECTION:**

Inspect threaded components for thread damage. Replace or repair if defective.

**INSTALLATION:**

1. Using two 11/16 inch wrenches, install nipple (A) to rear of bulkhead (B) and secure with nut (C).
2. Using 9/16 inch wrench and 11/16 inch wrench, install front outlet tube (D) to nipple (A).



Go on to Sheet 4

TA252595

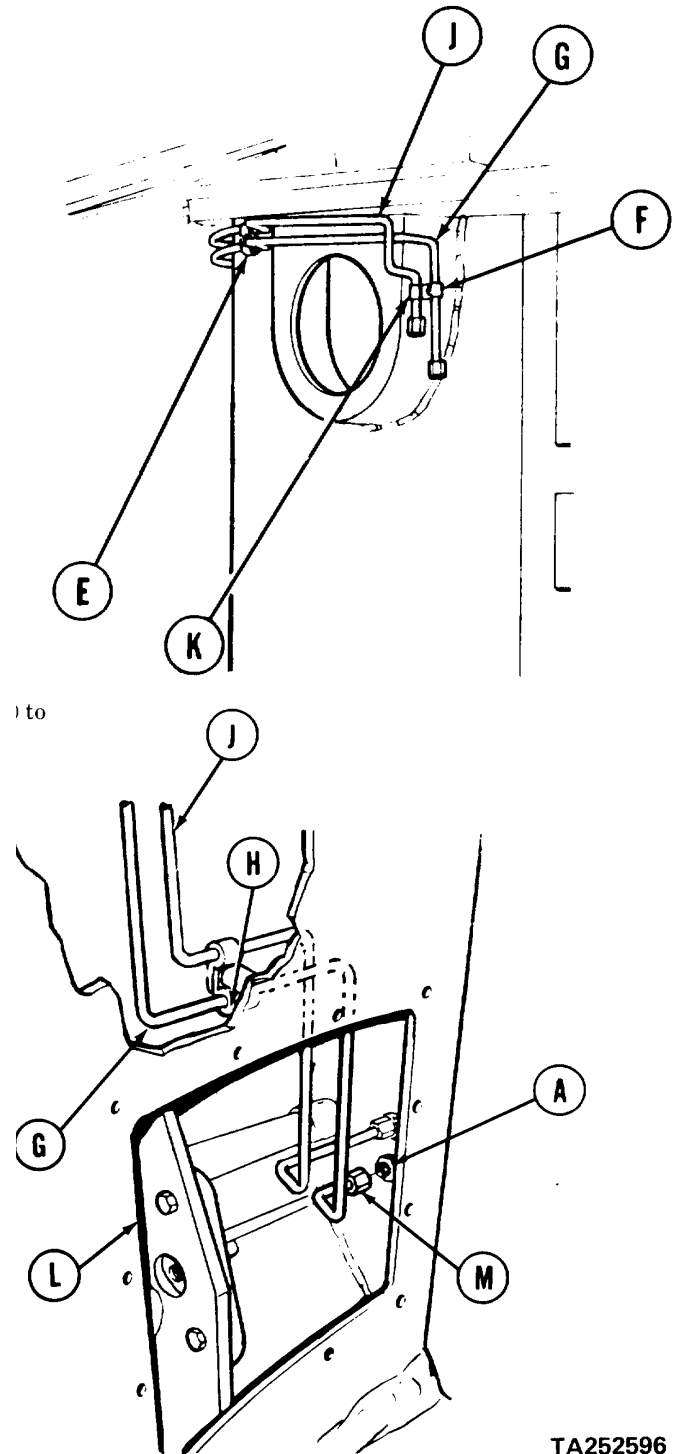
**FUEL PRIMER OUTLET FROM ENGINE TUBE ASSEMBLY REPLACEMENT (EARLY MODEL)**  
**(Sheet 4 of 6)**

3. Install two clamps (E) and (F) on primer outlet tube (G).

4. Place clamp (H) in position on primer outlet tube (G).

5. Place tube in position by inserting it from engine compartment and passing rear end of tube (G) behind primer inlet tube (J) and clamp (K).

6. Using 9/16 inch wrench, reach through access opening (L) and connect nut (M) of tube (G) nipple (A).



TA252596

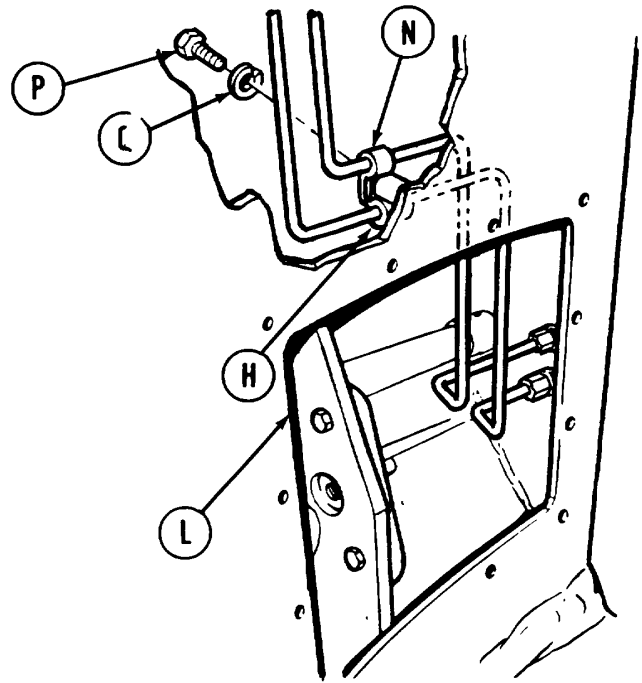
Go on to Sheet 5

TA252596

**FUEL PRIMER OUTLET FROM ENGINE TUBE ASSEMBLY REPLACEMENT (EARLY MODEL)**  
(Sheet 5 of 6)**NOTE**

Make sure that front inlet tube damp (N) is also secured with front outlet tube clamp (H) attaching hardware

- Using 7/16 inch socket, reach through access opening (L) and secure front tube clamp (N) and tube clamp (H) to clamp mount with screw (P) and new lockwasher (Q).



Go on to Sheet

TA252597

Change 1 4-78

**FUEL PRIMER OUTLET FROM ENGINE TUBE ASSEMBLY REPLACEMENT (EARLY MODEL)**  
**(Sheet 6 of 6)**

**NOTE**

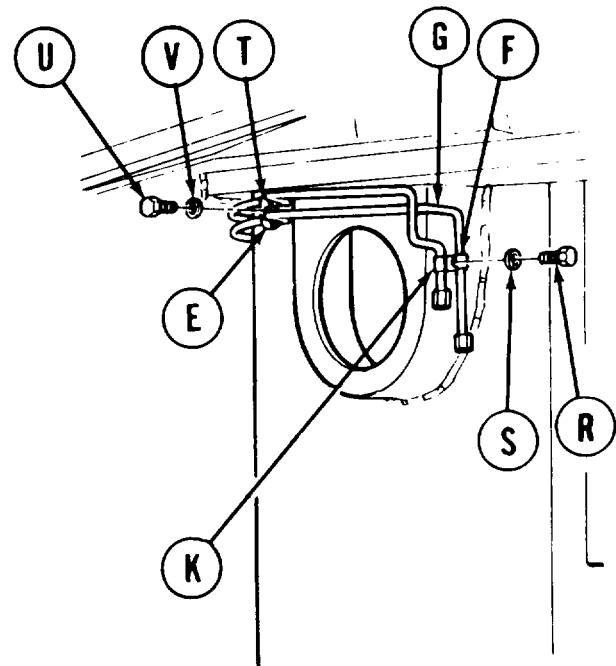
Make sure that rear inlet tube clamp (K) is also secured with rear outlet tube clamp (F) attaching hardware.

8. Using 7/16 inch socket, secure rear tube clamps (F) and (K) to clamp mount with screw (R) and new lockwasher (S).

**NOTE**

Make sure that center inlet tube clamp (T) is also secured with center outlet tube clamp (E) attaching hardware.

9. Using 7/16 inch socket, secure center tube clamps (E) and (T) to clamp mount with screw (U) and new lockwasher (V).
10. Install left bulkhead side access cover (TM 9-2350-222-20-1).
11. Install left air cleaner inlet hose (TM 9-2350-222-20-1).
12. Install left fuel tank (page 4-59).
13. Install powerplant (TM 9-2350-222-20-1).



End of Task

TA252598

Change 1 4-79

**FUEL PRIMER (OUTLET TO ENGINE) TUBE ASSEMBLY REPLACEMENT (LATE MODEL)**  
 (Sheet 1 of 7)

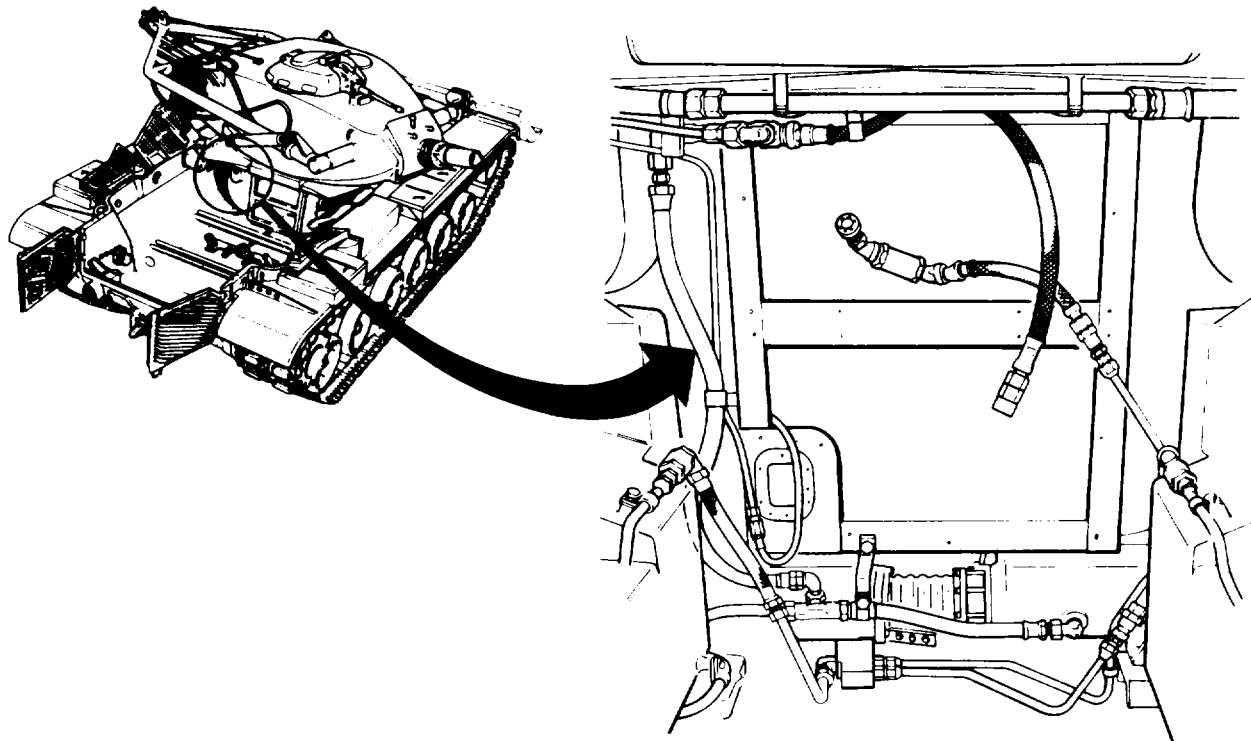
**PROCEDURE INDEX**

PROCEDURE	PAGE
Removal	4-80
Inspection	4-80.3
Installation	4-80.3

**TOOLS:** 9/16 in. combination box and open end wrench (2 required)  
 7/16 in. combination box and open end wrench  
 11/16 in. combination box and open end wrench (2 required)  
 7/16 in. socket with 1/2 in. drive  
 Ratchet with 1/2 in. drive

**SUPPLIES:** Lockwasher (MS3533844) (3 required)

**PRELIMINARY PROCEDURE:** Remove left fuel tank (page 4-51)



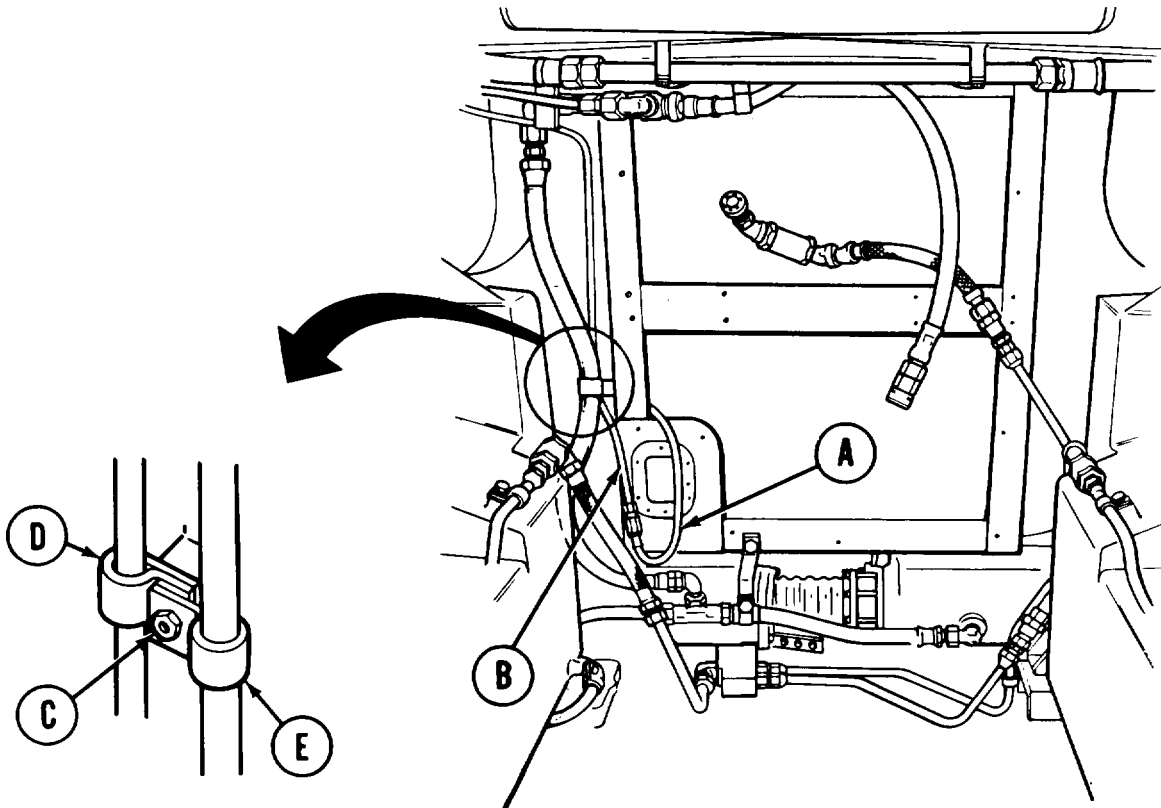
Go on to Sheet 2

TA252599

## FUEL PRIMER (OUTLET TO ENGINE) TUBE ASSEMBLY REPLACEMENT (LATE MODEL) (Sheet 2 of 7)

### REMOVAL:

1. Using two 9/16 inch wrenches, disconnect hose assembly (A) from tube assembly (B).
2. Remove hose assembly (A) from hull.



3. Using 7/16 inch socket and 7/16 inch wrench, remove screw, lockwasher, and nut (C) securing clamps (D) and (E). Throw lockwasher away.

Go on to Sheet 3

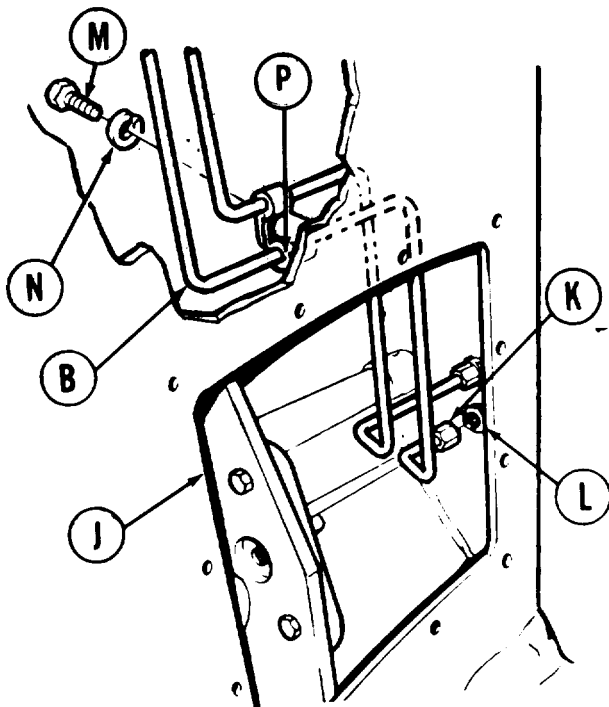
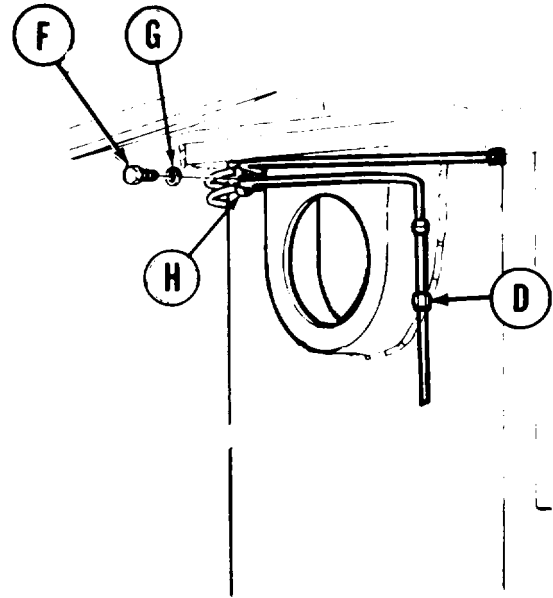
TA252600

Change 1 4-80.1



**FUEL PRIMER (OUTLET TO ENGINE) TUBE ASSEMBLY REPLACEMENT (LATE MODEL)**  
 (Sheet 3 of 7)

4. Using 7/16 inch socket, remove screw (F) and 1 lockwasher (G) securing clamp (H). Throw lockwasher away.



**NOTE**

Gain access to rear of bulkhead through left access opening (J) located in turret compartment.

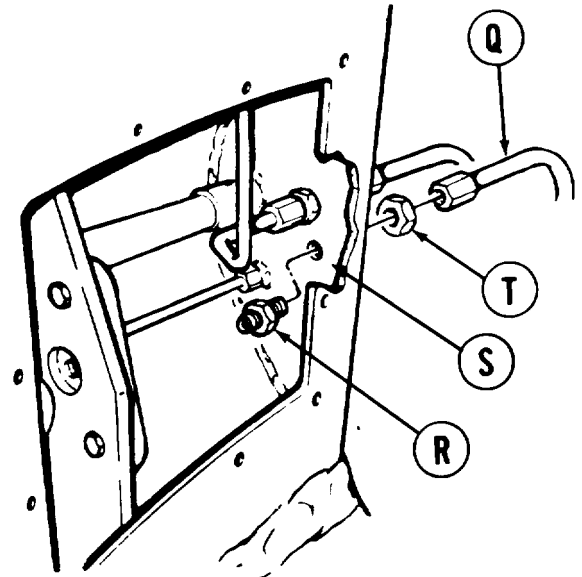
5. Using 9/16 inch wrench, reach through access opening (J) and disconnect front nut (K) of tube (B) from nipple (L).
6. Using 7/16 inch socket, remove screw (M) and lockwasher (N) holding front clamps (P) to clamp mount. Throw lockwasher away.
7. Remove tube (B) through engine compartment. Remove clamps (D), (H), and (P) from tube (B).

Go on to Sheet 4

TA252601

**FUEL PRIMER (OUTLET TO ENGINE) TUBE ASSEMBLY REPLACEMENT (LATE MODEL)**  
**(Sheet 4 of 7)**

8. Using 9/16 inch wrench and 11/16 inch wrench, disconnect front outlet tube (Q) from nipple (R) in front of bulkhead (S).
9. Using two 11/16 inch wrenches, remove nut (T) from nipple (R) and remove nipple (R) from rear of bulkhead (S).

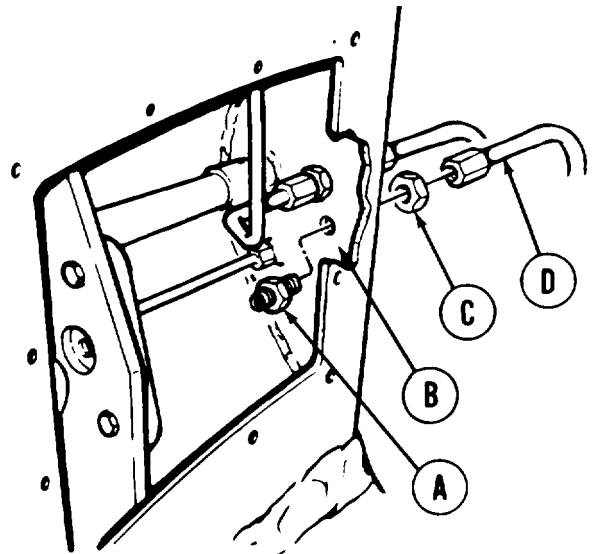


**INSPECTION:**

Inspect threaded components for thread damage. Replace or repair if defective.

**INSTALLATION:**

1. Using two 11/16 inch wrenches, install nipple (A) to rear of bulkhead (B) and secure with nut (C).
2. Using 9/16 inch wrench and 11/16 inch wrench, install front outlet tube (D) to nipple (A).

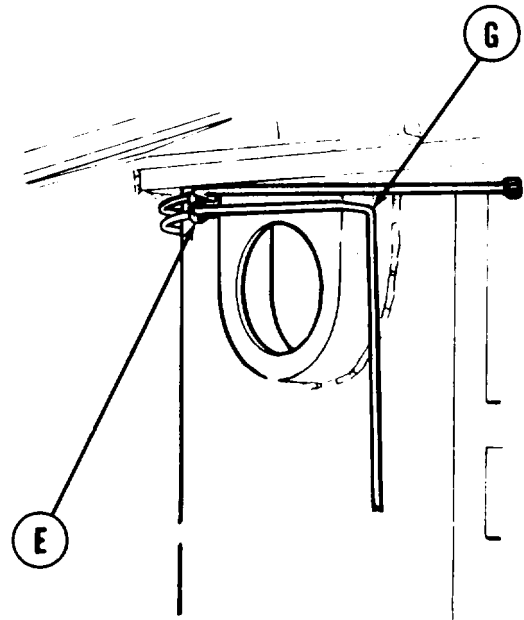


Go on to Sheet 5

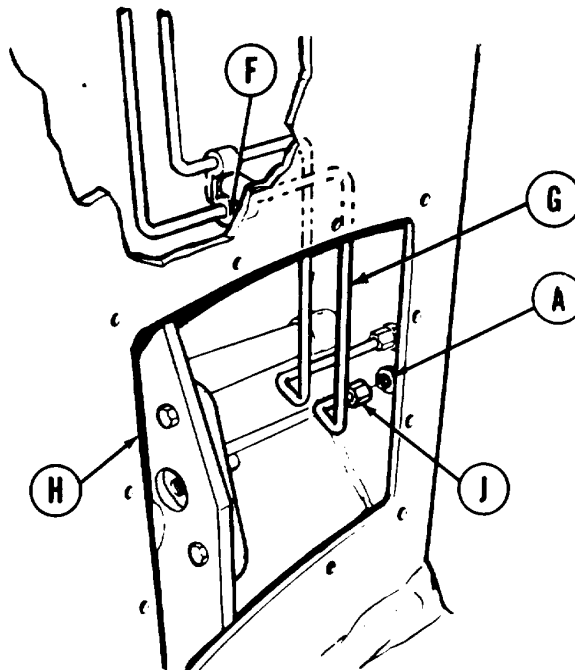
TA252602

**FUEL PRIMER (OUTLET TO ENGINE) TUBE ASSEMBLY REPLACEMENT (LATE MODEL)**  
**(Sheet 5 of 7)**

3. Install two clamps (E) and (F) on primer outlet tube (G).



4. Place tube in position by inserting it from engine compartment.
5. Using 9/16 inch wrench, reach through access opening (H) and connect nut (J) of tube (G) to nipple (A).



Go on to Sheet 6

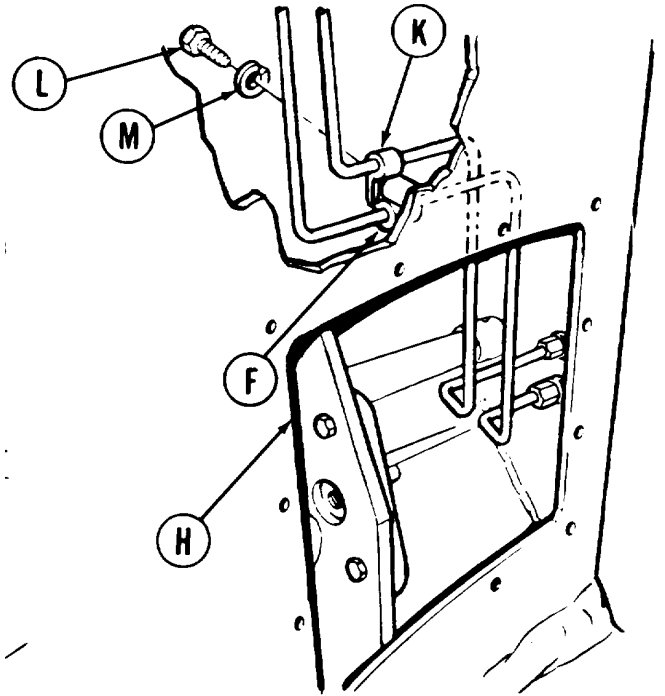
TA252603

**FUEL PRIMER (OUTLET TO ENGINE) TUBE ASSEMBLY REPLACEMENT (LATE MODEL)**  
 (Sheet 6 of 7)

**NOTE**

Make sure that front inlet tube clamp (F) is also secured with front outlet tube clamp (K) attaching hardware.

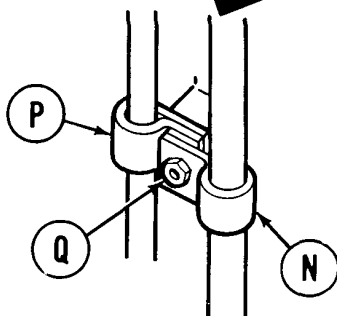
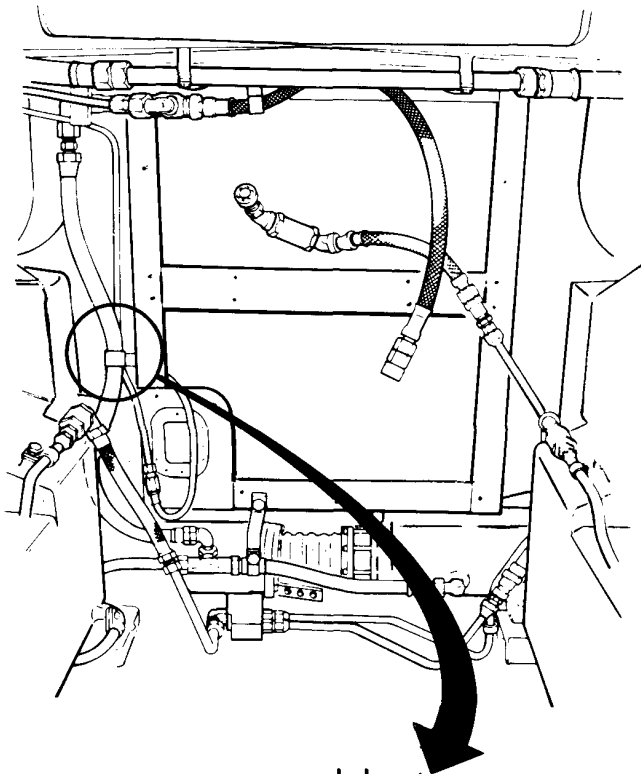
- Using 7/16 inch socket, reach through access opening (H) and secure front tube clamp (K) and tube clamp (F) to clamp mount with screw (L) and new lockwasher (M).



**NOTE**

Make sure that main fuel line clamp (N) is also secured with outlet tube clamp (P) attaching hardware.

- Install clamp (P) onto outlet tube (G).
- Using 7/16 inch socket and 7/16 inch wrench, install and tighten screw, new lockwasher, and nut (Q) securing clamps (N) and (P) to bracket.

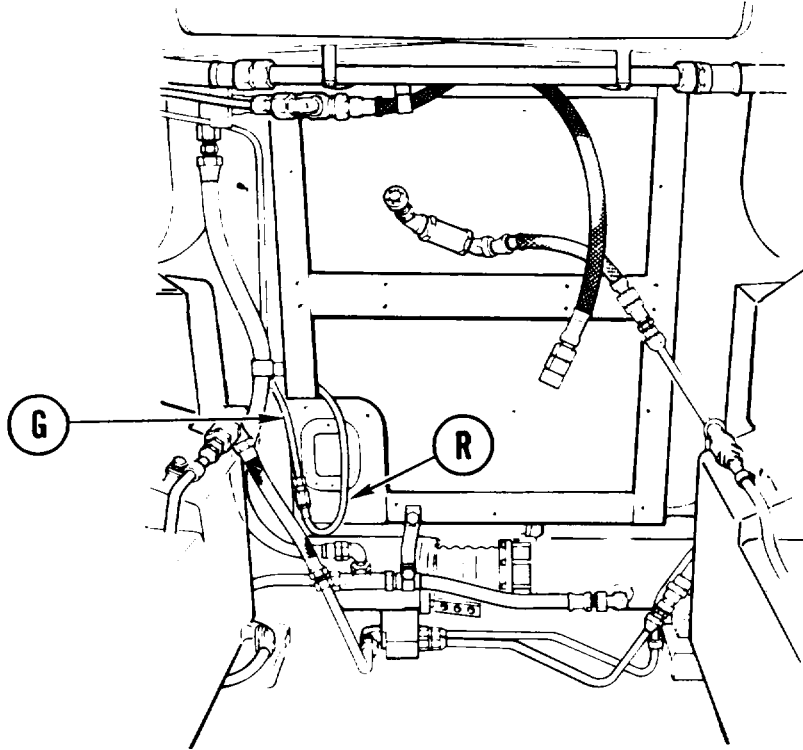


Go on to Sheet 7

TA252604

**FUEL PRIMER (OUTLET TO ENGINE) TUBE ASSEMBLY REPLACEMENT (LATE MODEL)**  
(Sheet 7 of 7)

9. Connect hose assembly (R) to tube (G).
10. Using two 9/16 inch wrenches, tighten hose assembly (R) to tube (G).



11. Install left fuel tank (page 4-59).

End of Task

TA252605

Change 1 4-80.6

**FUEL PRIMER INLET TO ENGINE TUBE ASSEMBLY REPLACEMENT (EARLY MODEL)**  
**(Sheet 1 of 6)**

**PROCEDURE INDEX**

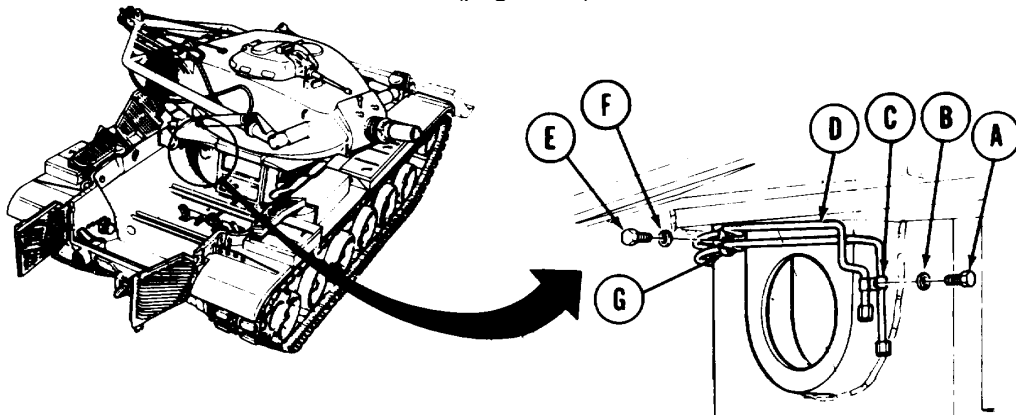
PROCEDURE	PAGE
Removal	4-80.8
Inspection	4-82
Installation	4-82

**TOOLS:** 9/16 in. combination box and open end wrench  
 7/16 in. socket with 1/2 in. drive  
 Ratchet with 1/2 in. drive  
 11/16 in. combination box and open end wrench (2 required)

**SUPPLIES:** Lockwasher (MS35338-44) (3 required)

**REFERENCE:** TM 9-2350-222-20-1

**PRELIMINARY PROCEDURES:** Remove powerplant (TM 9-2350-222-20-1)  
 Remove left bulkhead access cover (TM 9-2350-222-20-1)  
 Remove left air cleaner inlet hose (TM 9-2350-222-20-1)  
 Remove left fuel tank (page 4-51)



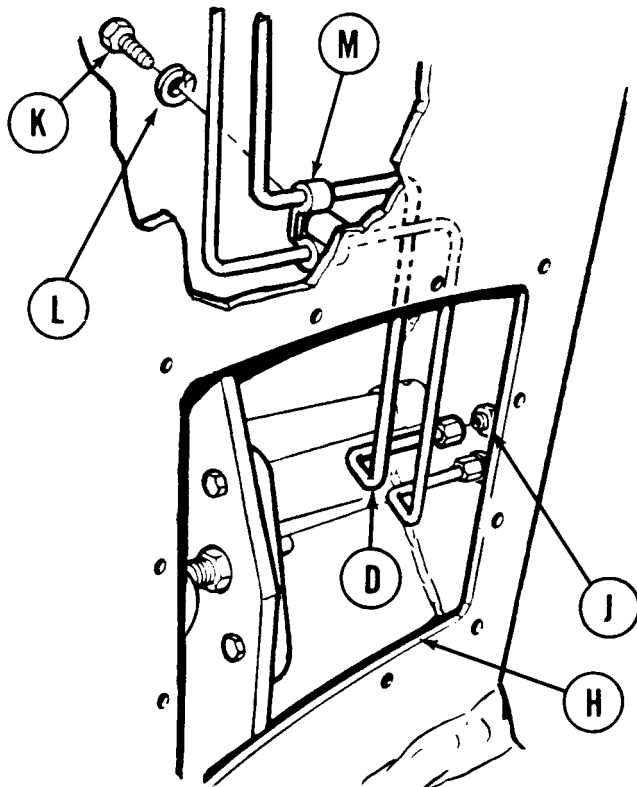
**REMOVAL:**

1. Using 7/16 inch socket, remove screw (A) and lockwasher (B) holding rear clamp (C) and tube (D) to clamp mount. Throw lockwasher away.
2. Using 7/16 inch socket, remove screw (E) and lockwasher (F) holding center clamp (G), located left of air cleaner opening. Throw lockwasher away.

TA252606

**Change 1 (4-80.7 blank)/4-80.8**

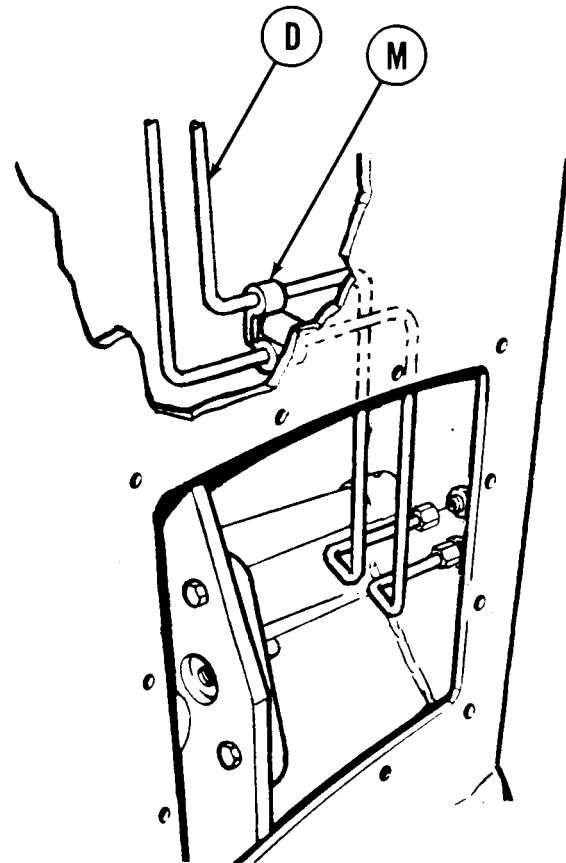
**FUEL PRIMER INLET TO ENGINE TUBE ASSEMBLY REPLACEMENT (EARLY MODEL)**  
 (Sheet 2 of 6)



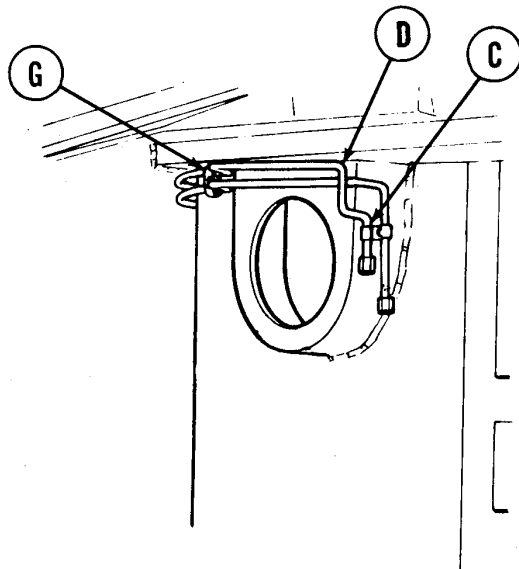
**NOTE**

Gain access to rear of bulkhead through left bulkhead access opening located in turret compartment.

3. Using 9/16 inch wrench, reach through access opening (H) and disconnect front nut of tube (D) from bulkhead nipple (J).
4. Using 7/16 inch socket, remove screw (K) and lockwasher (L) holding front clamp (M) and tube (D) to clamp mount. Throw lockwashers away.



5. Remove tube (D) through engine compartment.
6. Remove three clamps (C), (G), and (M) from tube (D).



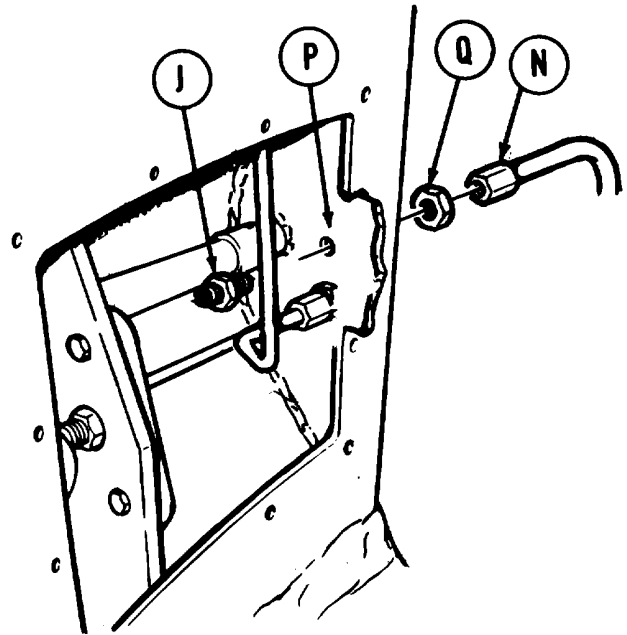
TA252607

Go on to Sheet 3

TA252607

## FUEL PRIMER INLET TO ENGINE TUBE ASSEMBLY REPLACEMENT (EARLY MODEL) (Sheet 3 of 6)

7. Using 9/16 inch wrench and 11/16 inch wrench, disconnect front inlet tube (N) from nipple (J) in front of bulkhead (P).
8. Using two 11/16 inch wrenches, remove nut (Q) from nipple (J) and remove nipple (J) from bulkhead (P).

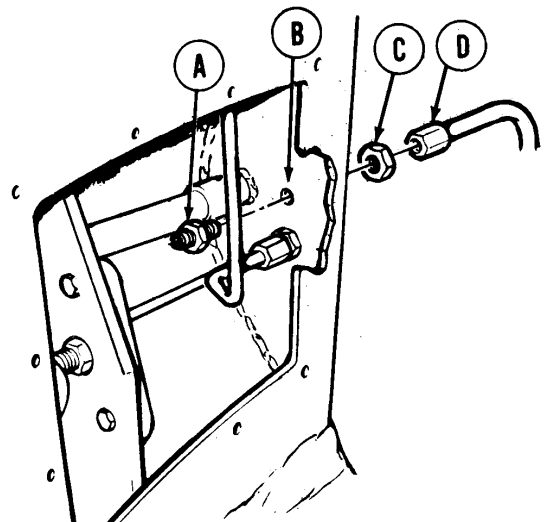


### INSPECTION:

Inspect threaded components for thread damage. Replace or repair if stripped, cracked, or broken.

### INSTALLATION:

1. Using two 11/16 inch wrenches, install nipple e (A) to bulkhead (B) and secure with nut (C).
2. Using 9/16 inch wrench and 11/16 inch wrench, install front inlet tube (D) to nipple c



TA252608

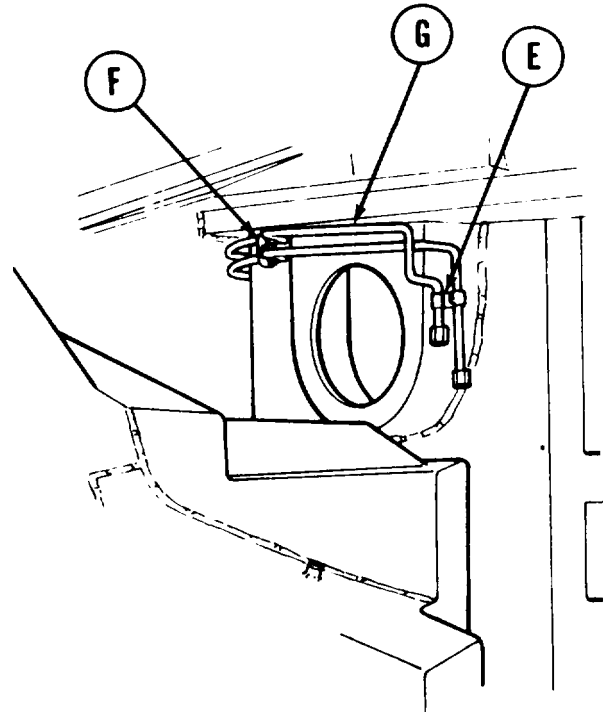
Go on to Sheet 4

TA252608

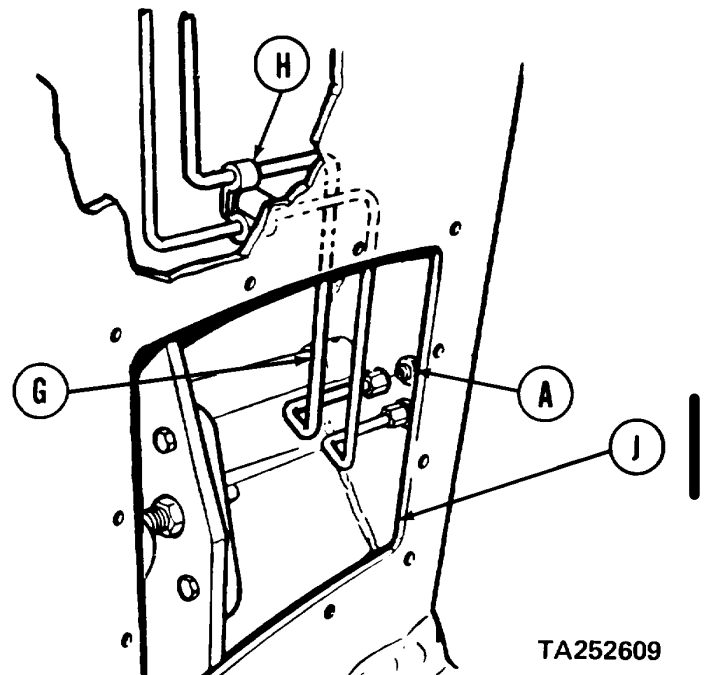


**FUEL PRIMER INLET TO ENGINE TUBE ASSEMBLY REPLACEMENT (EARLY MODEL)**  
**(Sheet 4 of 6)**

3. Install two clamps (E) and (F) to primer inlet tube (G).



4. Place clamp (H) in position on primer inlet tube (G).
5. Place tube (G) in position by inserting it from engine compartment.
6. Using 9/16 inch wrench, reach through access opening (J) and connect front tube (G) to bulkhead nipple (A).



TA252609

Go on to Sheet 5

Change 1 4-83.

## FUEL PRIMER INLET TO ENGINE TUBE ASSEMBLY REPLACEMENT (EARLY MODEL)

(Sheet 5 of 6)

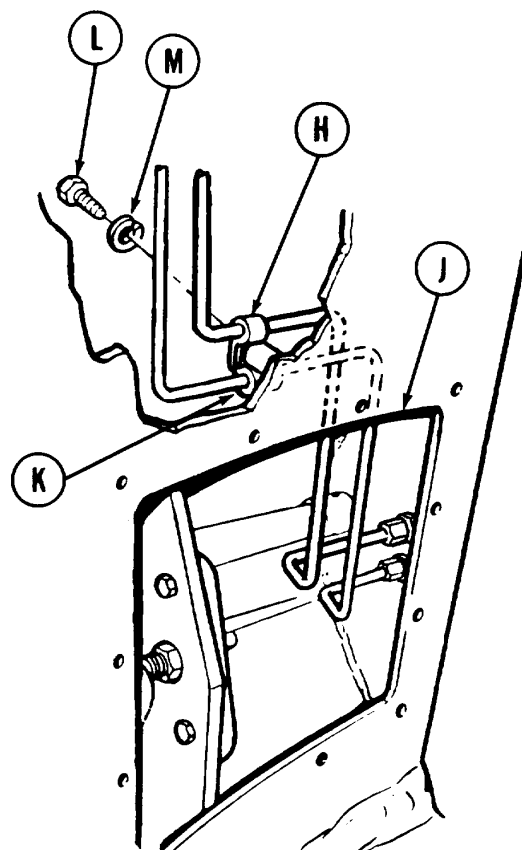
### NOTE

Make sure that front outlet tube clamp (K) is also secured with front inlet tube clamp (H) attaching hardware.

7. Using 7/16 inch socket, reach through access opening (J) and secure front tube clamp (H) and clamp (K) to clamp mount with screw (L) and new lockwasher (M).

### NOTE

Move to engine compartment.



Go on to Sheet 6

TA252610

Change 1 4-84

**FUEL PRIMER INLET TO ENGINE TUBE ASSEMBLY REPLACEMENT (EARLY MODEL) I**  
**(Sheet 6 of 6)**

**NOTE**

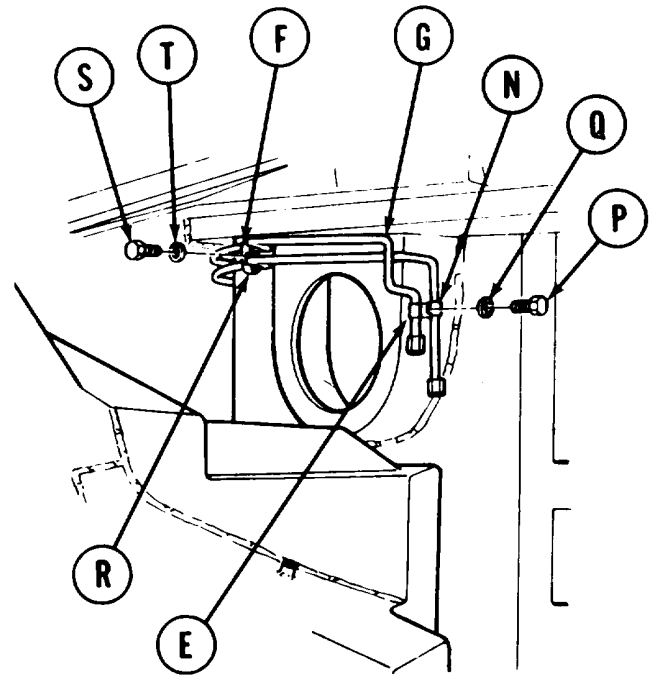
**Make sure that rear outlet tube clamp (N) is also secured with rear inlet tube clamp (E) attaching hardware.**

8. Using 7/16 inch socket, secure rear tube clamps (E) and (N) to clamp mount with screw (P) and new lockwasher (Q).

**NOTE**

**Make sure that center outlet tube clamp (R) is also secured with center inlet tube clamp (F) attaching hardware.**

9. Using 7/16 inch socket, secure center tube clamp (F) and clamp (R) to clamp mount with screw (S) and new lockwasher (T).
10. Install left bulkhead access cover (TM 9-2350-222-20-1).
11. Install left air cleaner inlet hose (TM 9-2350-222-20-1).
12. Install left fuel tank (page 4-59).
13. Install powerplant (TM 9-2350-222-20-1).



End of Task

TA252611

Change 1 4-84.1/(4-84.2 blank)

**FUEL PRIMER INLET (TEE-TO-BULKHEAD) TUBE ASSEMBLY PLACEMENT (LATE MODEL)**  
 (Sheet 1 of 5)

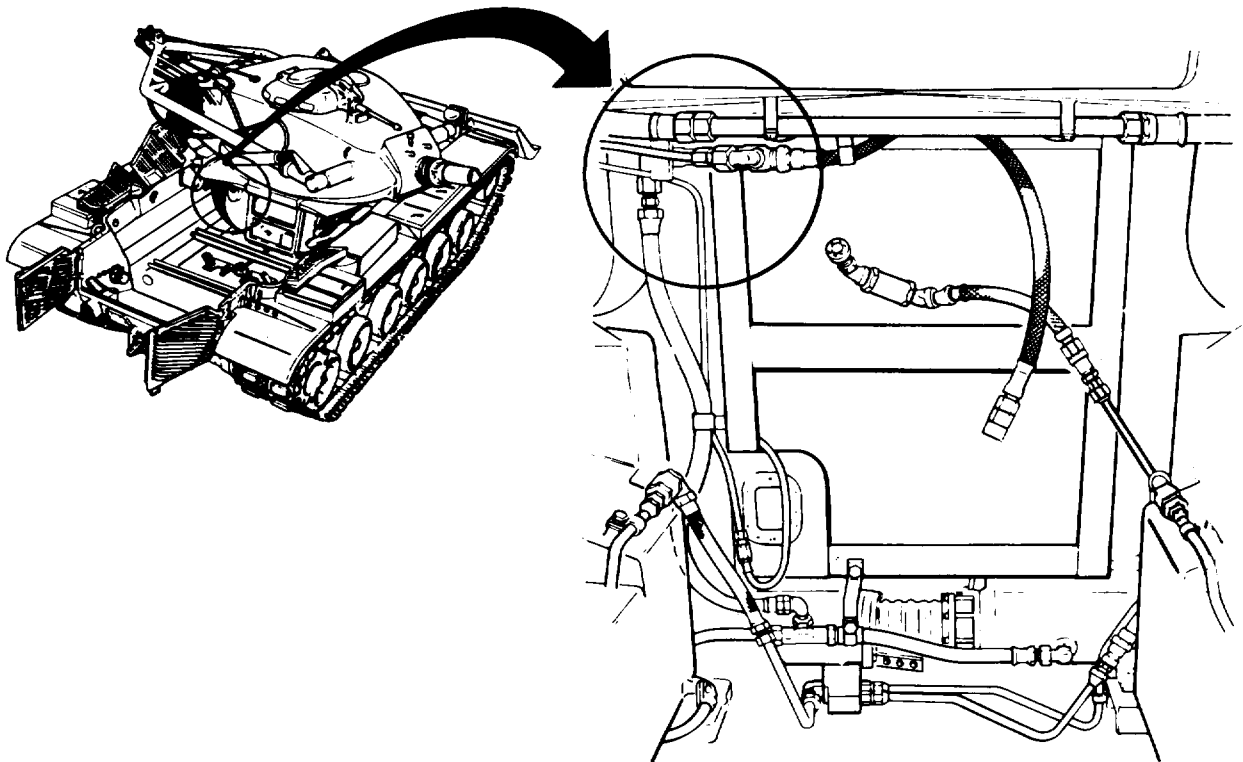
**PROCEDURE INDEX**

PROCEDURE	PAGE
Removal	4-84.4
Inspection	4-84.6
Installation	4-84.6

**TOOLS:** 9/16 in. combination box and open end wrench  
 5/8 in. combination box and open end wrench  
 7/16 in. socket with 1/2 in. drive  
 Ratchet with 1/2 in. drive  
 11/16 in. combination box and open end wrench (2 required)

**SUPPLIES:** Lockwasher (MS35338-44) (2 required)

**PRELIMINARY PROCEDURE:** Remove left fuel tank (page 4-51)



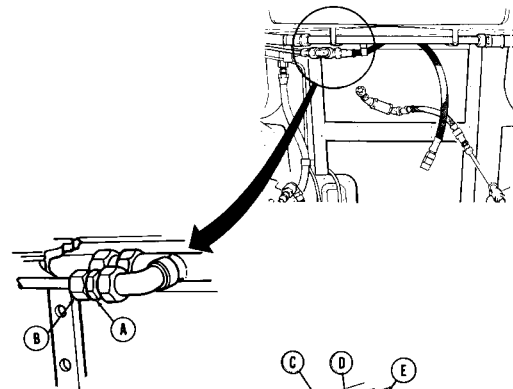
Go on to Sheet 2

TA252612

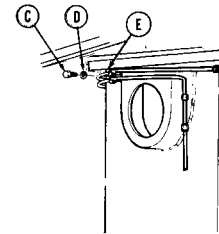
Change 1 4-84.3

**FUEL PRIMER INLET (TEE-TO-BULKHEAD) TUBE ASSEMBLY REPLACEMENT (LATE MODEL)**  
(Sheet 2 of 5)**REMOVAL:**

1. Using 11/16 inch wrench to hold reducer (A), use 5/8 inch wrench and disconnect tube nut (B) from reducer (A).



2. Using 7/16 inch socket, remove screw (C) and lockwasher (D) securing clamp (E). Throw lockwasher away. Remove clamp (E).



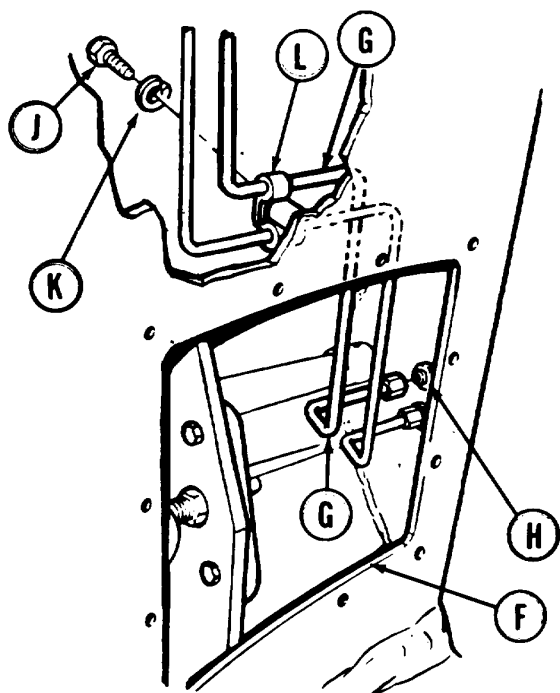
TA252613

Go on to Sheet 3

TA252613

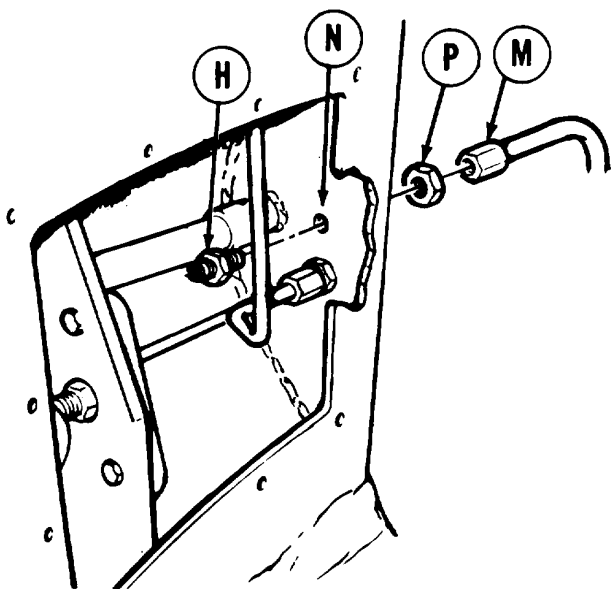
Change 1 4-84.4

## FUEL PRIMER INLET (TEE-TO-BULKHEAD) TUBE ASSEMBLY REPLACEMENT (LATE MODEL) (Sheet 3 of 5)

**NOTE**

Gain access to rear of bulkhead through left access opening located in turret compartment.

3. Using 9/16 inch wrench, reach through access opening (F) and disconnect front nut of tube (G) from bulkhead nipple (H).
4. Using 7/16 inch socket, remove screw (J) and lockwasher (K) holding front clamp (L) and tube (G). Throw lockwasher away.
5. Remove tube (G) through engine compartment.
6. Remove clamp (L) from tube (G).
7. Using 9/16 inch wrench and 11/16 inch wrench, disconnect front inlet tube (M) from nipple (H) in front of bulkhead (N).
8. Using two 11/16 inch wrenches, remove nut (P) from nipple (H) and remove nipple (H) from bulkhead (N).



Go on to Sheet 4

TA252614

Change 1 4-84.5

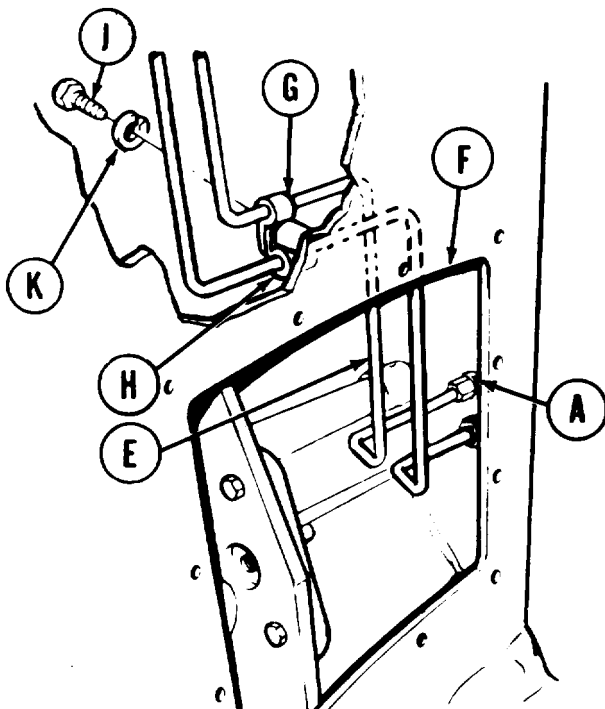
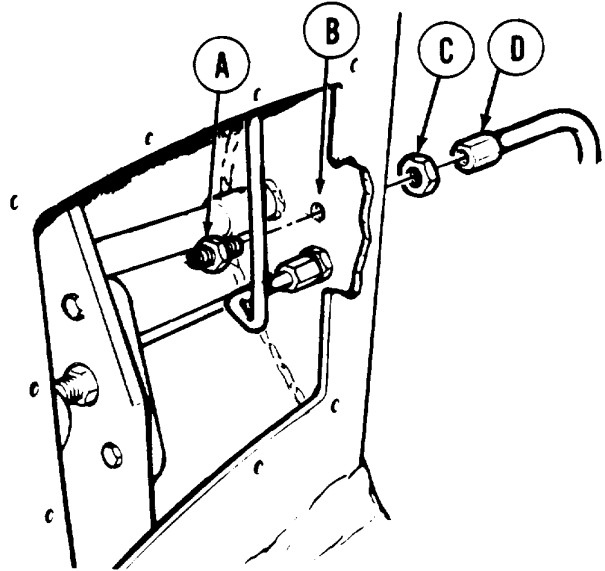
FUEL PRIMER INLET (TEE-TO-BULKHEAD) TUBE ASSEMBLY REPLACEMENT (LATE MODEL) (Sheet 4 of 5)

INSPECTION:

Inspect threaded components for thread damage. Replace if stripped, cracked, or broken.

INSTALLATION:

1. Using two 11/16 inch wrenches, install nipple (A) to bulkhead (B) and secure with nut (C).
2. Using 9/16 inch and 11/16 inch wrenches, install front inlet tube (D) to nipple (A).



3. Place tube (E) in position by inserting it from engine compartment.
4. Using 9/16 inch wrench, reach through access opening (F) and connect inlet tube (E) to bulkhead nipple (A).
5. Place clamp (G) in position on primer inlet tube (E).

**NOTE**

**Make sure that front outlet tube clamp (H) is also secured with front inlet tube clamp (G) attaching hardware.**

6. Using 7/16 inch socket, reach through access opening (F) and secure tube clamp (G) and clamp (H) to clamp mount with screw (J) and new lockwasher (K).

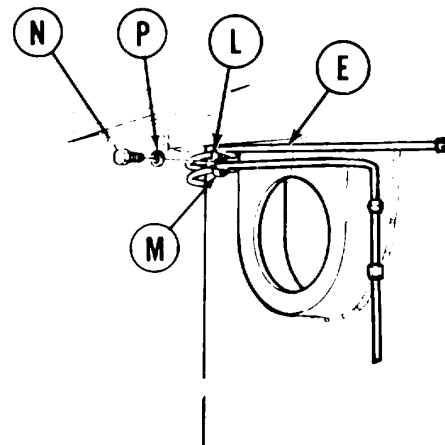
Go on to Sheet 5

## FUEL PRIMER INLET (TEE-TO-BULKHEAD) TUBE ASSEMBLY REPLACEMENT (LATE MODEL) (Sheet 5 of 5)

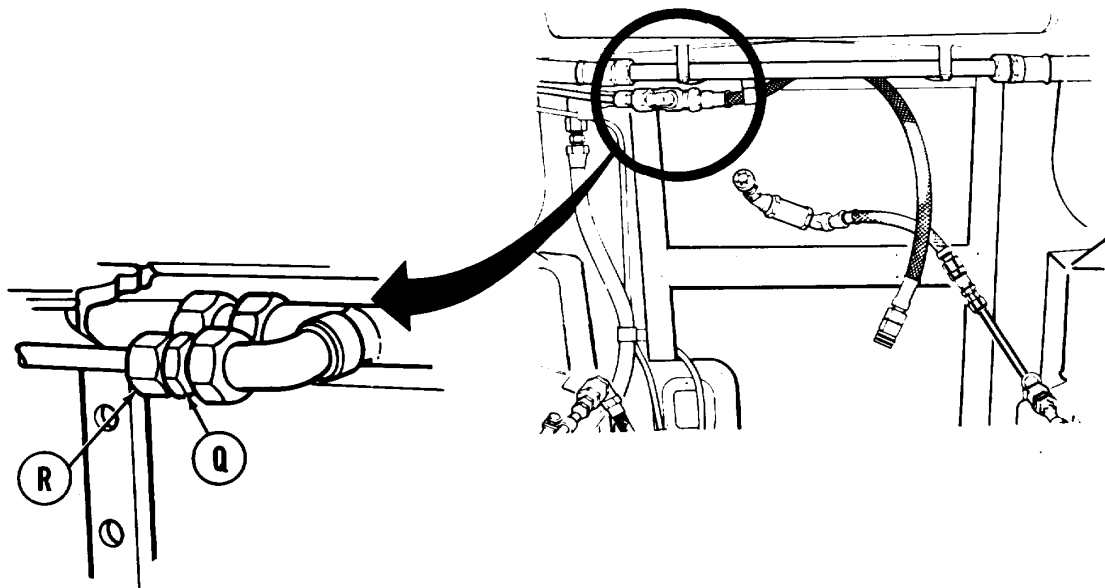
7. Install clamp (L) on tube (E).

## NOTE

Make sure that rear outlet tube clamp (M) is also secured with rear inlet tube clamp (L) attaching hardware.



8. Using 7/16 inch socket, secure rear tube clamps (L) and (M) to clamp mount with screw (N) and new lockwasher (P).
9. Using 11/16 inch wrench to hold reducer (Q), use 5/8 inch wrench and connect tube nut (R) to reducer (Q).



10. Install left fuel tank (page 4-59).

End of Task

TA252616

Change 1 4-85



FUEL PRIMER PUMP REPAIR (Sheet 1 of 6)

PROCEDURE INDEX

PROCEDURE	PAGE
Test	4-86
Disassembly	4-87
Cleaning and Inspection	4-89
Assembly	4-90

TOOLS: Vacuum gage (0 to 50 in)  
 Pressure gage (0 to 300 psi) w/release valve  
 Long round nose pliers (needle nose)  
 Flat-tip screwdriver  
 7/16 in. combination box and open end wrench  
 Diagonal cutting pliers  
 1-1/2 in. open end wrench  
 Vise  
 9/16 in. combination box and open end wrench  
 1-1/8 in. open end wrench

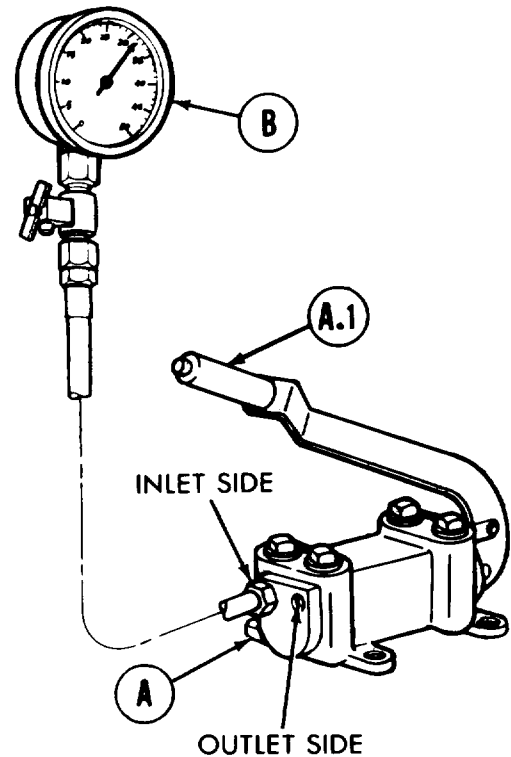
SUPPLIES: Parts kit (5704213)  
 Fuel source  
 Lockwire (Item 27, Appendix B)  
 Rags (Item 31, Appendix B)

TEST:

**NOTE**

**If any tests fail, pump must be repaired or replaced.**

1. Connect inlet side of primer pump (A) to a fuel source to lubricate internal part. Pump handle (A.1).
2. Remove from fuel source, then pump handle (A.1) until no fuel flows from outlet side of primer pump.
3. Connect vacuum gage (B) to inlet side of primer pump (A).
4. Operate pump handle (A.1). Pump must maintain a minimum of 12 inches of vacuum while pumping.
5. Remove vacuum gage from pump.

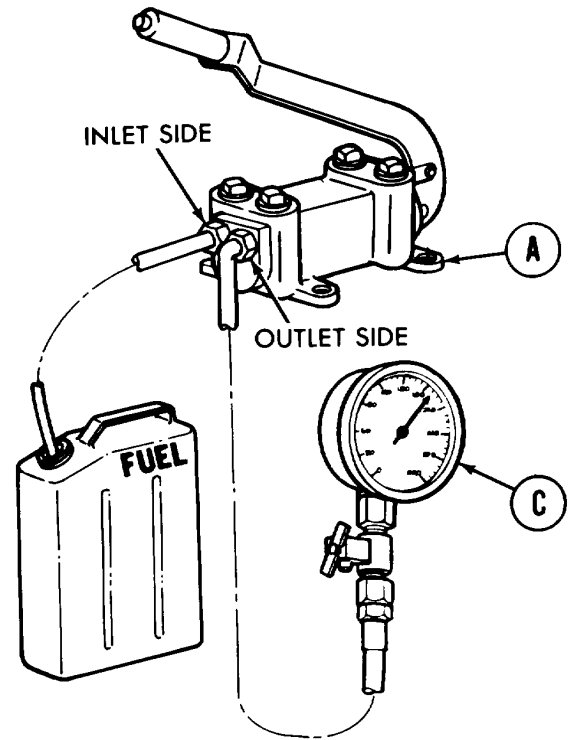


Go on to Sheet 2

TA252617

**FUEL PRIMER PUMP REPAIR (Sheet 2 of 6)**

6. Reconnect inlet side of primer pump (A) to fuel source.
7. Attach pressure gage (C) to outlet side of primer pump (A).
8. Operate primer pump handle. Pump should develop minimum pressure of 200 psi, with no external leakage.
9. Relieve pressure at gage (C).
10. With pressure gage (C) still connected to primer pump (A), operate handle until 30 psi has been obtained.
11. Remove inlet line from primer pump (A).
12. Observe for internal leakage. Leakage should not exceed 20 drops per minute.

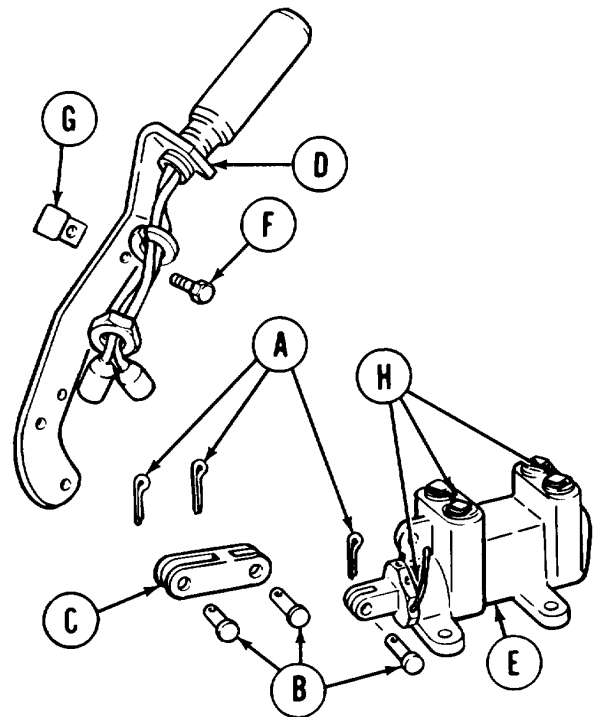


**DISASSEMBLY:**

**NOTE**

**It may be necessary to place primer pump in vise during disassembly.**

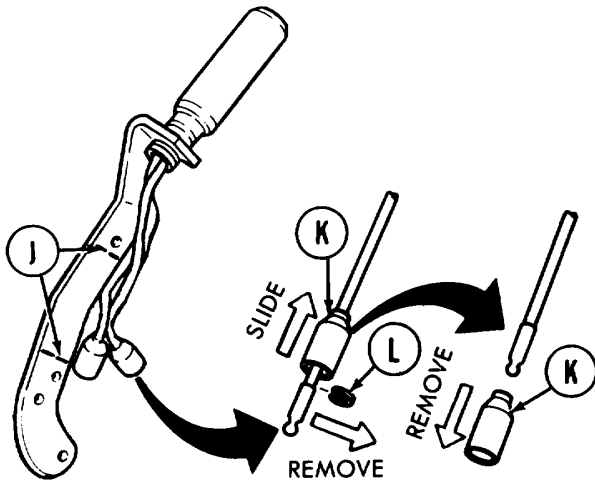
1. Using needle nose pliers, remove three cotter pins (A), three pins (B) and one link (C) securing handle assembly (D) to primer pump (E).
2. Using 7/16 inch wrench, remove screw (F) and clamp (G) from handle assembly (D).
3. Using diagonal pliers, cut and remove lockwire (H). Throw lockwire away.



TA130546

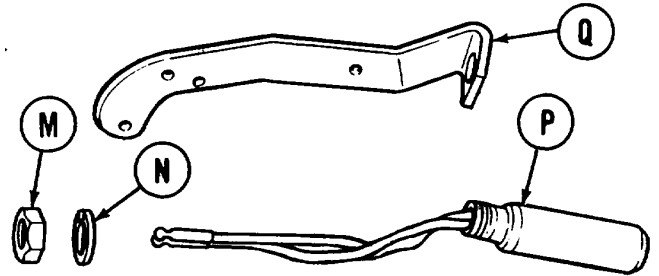
Go on to Sheet 3

FUEL PRIMER PUMP REPAIR (Sheet 3 of 6)

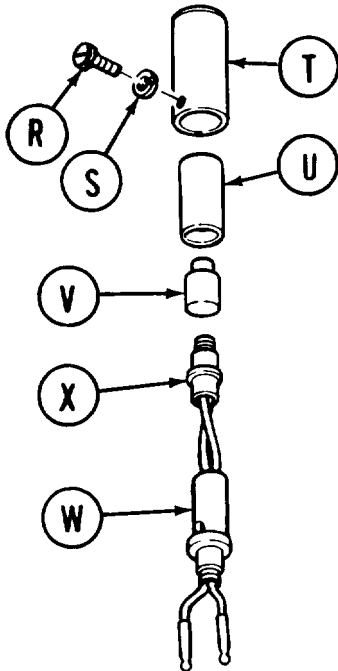


4. Place handle assembly in vise with vise head between points (J) as shown in picture.
5. Slide two connector shells (K) back on leads and remove two slotted washers (L).
6. Remove connector shells (K) by sliding down and off.

7. Using 1-1/8 inch wrench, remove nut (M) and lockwasher (N) from operating handle (P).
8. Remove operating handle (P) from lever (Q).
9. Remove lever (Q) from vise and set aside.



10. Using screwdriver, remove screw (R) and lockwasher (S) from handle (T).
11. Remove handle (T), upper sleeve (U) and plunger (V).
12. Remove lower sleeve (W) from switch assembly (X).

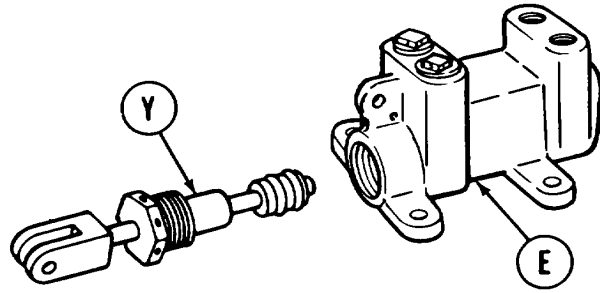


Go on to Sheet 4

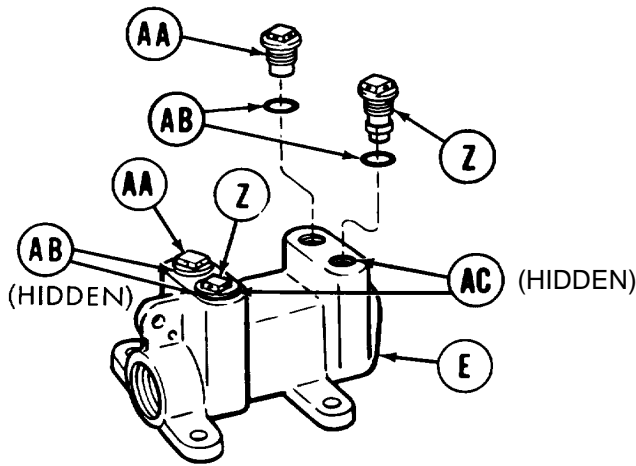
TA130547

FUEL PRIMER PUMP REPAIR (Sheet 4 of 6)

- Using 1-1/2 inch wrench, remove rod assembly (Y) from primer pump (E). If rod assembly requires repair, go to page 4-92.



- Using 9/16 inch wrench, remove inlet valves (Z) and outlet valves (AA) from primer pump (E). If inlet valve requires repair, go to page 4-95. If outlet valve requires repair, go to page 4-96.
- Remove and throw away preformed packings (AB and AC) located in primer pump (E).



CLEANING AND INSPECTION:

- Clean handle, lever, sleeves, and retainer as required.
- Inspect switch assembly for dirt or corrosion. Clean if necessary. If leads are cut or damaged, replace.
- Inspect nuts, screws, and valves for worn or damaged threads. Replace as required.

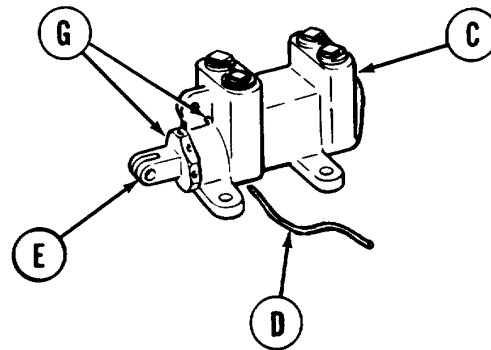
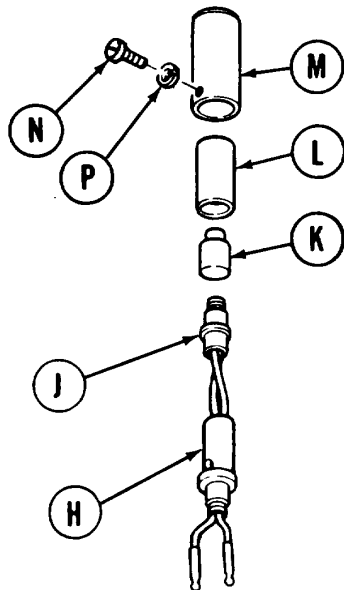
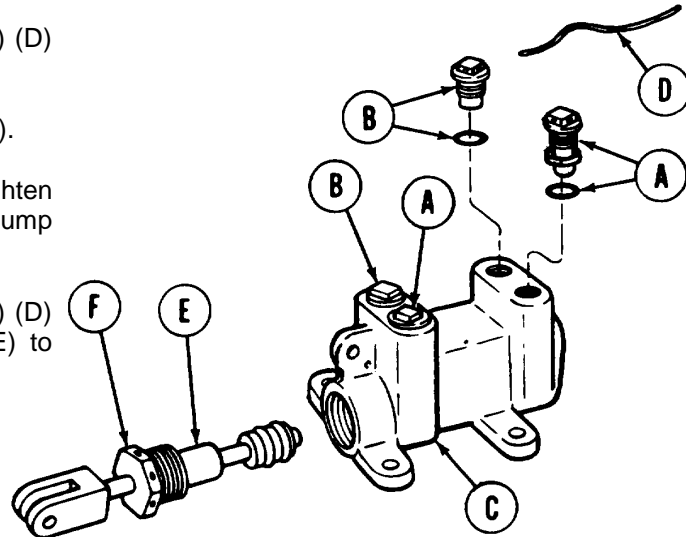
Go on to Sheet 5

TA130548

**FUEL PRIMER PUMP REPAIR (Sheet 5 of 6)**

**ASSEMBLY:**

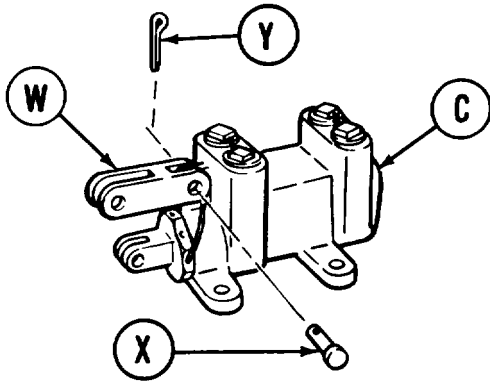
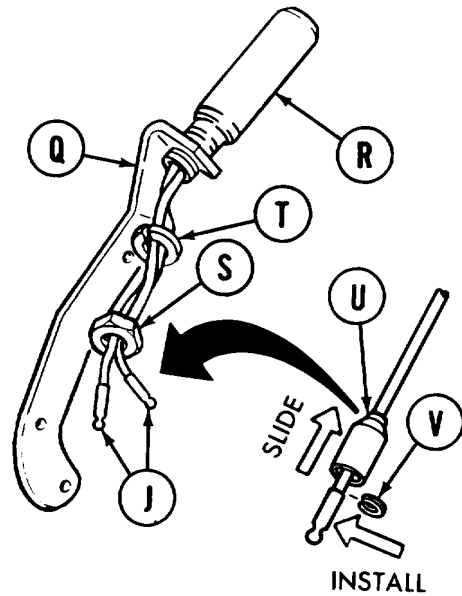
1. Using 9/16 inch wrench, install two inlet valves and new preformed packings (A) and two outlet valves and new preformed packings (B) in primer pump (C).
2. Install new lockwire (Item 27, Appendix B) (D) securing inlet and outlet valves (A and B).
3. Install rod assembly (E) in primer pump (C).
4. Using 1-1/2 inch wrench, install and tighten gland (F) of rod assembly (E) into primer pump (C).
5. Install new lockwire (Item 27, Appendix B) (D) thru holes (G) securing rod assembly (E) to primer pump (C).



6. Install lower sleeve (H) on switch assembly (J).
7. Place plunger (K) over switch assembly (J).
8. Place flat end of upper sleeve (L) over switch assembly (J).
9. Place handle (M) over assemblies (H, J, K, L) and align holes in handle (M) and lower sleeve (H).
10. Using screwdriver, install screw (N) and lockwasher (P).

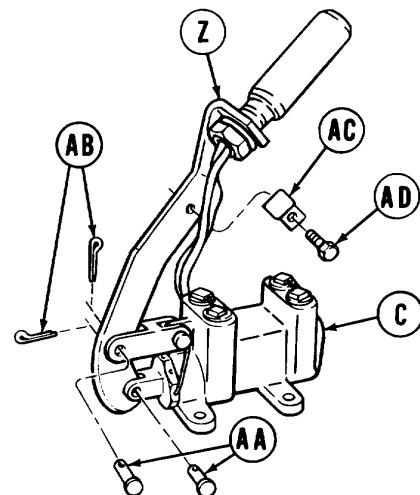
**FUEL PRIMER PUMP REPAIR (Sheet 6 of 6)**

11. Place lever (Q) in vise.
12. Place operating handle (R) in position on lever (Q).
13. Using 1-1/8 inch wrench, install nut (S) and lockwasher (T).
14. Slide two connector shells (U) on two leads of switch assembly (J).
15. Install two slotted washers (V) and slide connector shells (U) down until seated.
16. Remove handle assembly from vise.



17. Place link (W) in position on primer pump (C).
18. Install pin (X) through link (W) and primer pump (C).
19. Using pliers, install cotter pin (Y).

20. Place handle assembly (Z) in position on primer pump (C).
21. Install two pins (AA).
22. Using pliers, install two cotter pins (AB).
23. Place clamp (AC) in position.
24. Using 7/16 inch wrench, install screw (AD).
25. Perform test (page 4-86 steps, 1 through 12).



TA130550

End of Task

**FUEL PRIMER PUMP PISTON ROD ASSEMBLY REPAIR (Sheet 1 of 3)**

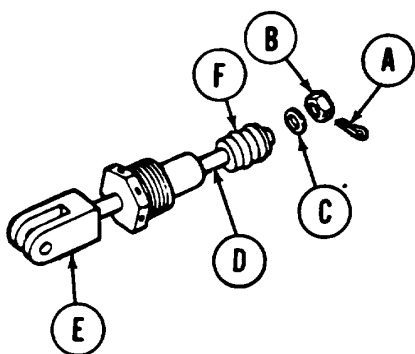
**TOOLS:** 10 in. adjustable wrench  
 Long round nose pliers (needle nose)  
 7/16 in. combination box and open end wrench  
 Hammer  
 1/8 in. drive punch  
 Inside micrometer  
 Outside micrometer

**SUPPLIES:** Parts kit (5704213)

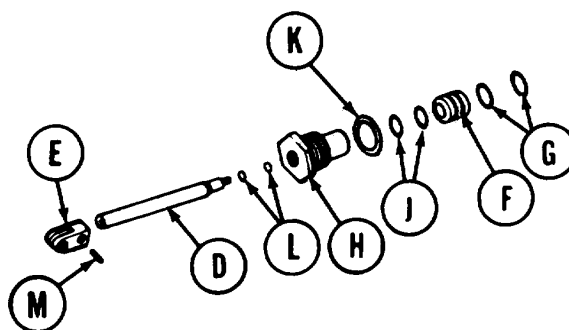
**PRELIMINARY PROCEDURE:** Remove piston rod assembly from primer pump (page 4-87, steps 1-3 and page 4-89, step 13).

**DISASSEMBLY:**

1. Using pliers, remove cotter pin (A). Throw cotter pin away.
2. Using 7/16 inch wrench, remove nut (B) and flat washer (C) from piston rod (D) while holding clevis (E) with adjustable wrench.
3. Slide piston (F) off rod (D).



4. Remove and throw away two preformed packings (G) from piston (F).
5. Slide gland (H) from rod (D).
6. Remove two preformed packings (J) from inside of gland (H). Throw packings away.
7. Remove preformed packing (K) and throw away.
8. Remove two preformed packings (L) from rod (D) and throw away:
9. Using hammer and punch, remove pin (M) from clevis (E) and separate clevis (E) from rod (D).



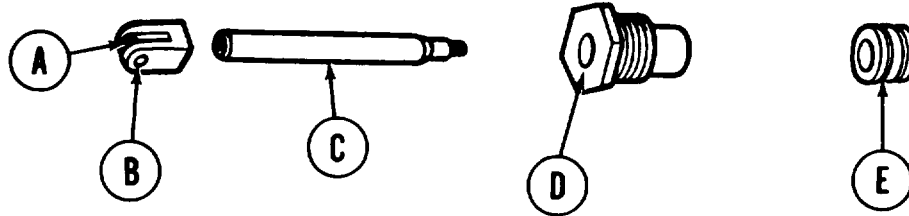
TA130551

Go on to Sheet 2

**FUEL PRIMER PUMP PISTON ROD ASSEMBLY REPAIR (Sheet 2 of 3)**

**CLEANING AND INSPECTION:**

1. Clean all parts of piston assembly as required.
2. Using an inside and outside micrometer, check parts for wear as indicated. Replace all parts that do not meet wear limits.



**PRIMER PUMP WEAR LIMITS**

Reference Letter	Point of Measurement	Size and fit of New Parts	Wear Limits
A	ID of clevis bore	0.248 to 0.253	0.256
B	Fit of pin in yoke	0.000 to 0.010L	0.008L
C	OD of piston rod	0.497 to 0.499	(*)
D	ID of gland	0.505 to 0.507	(*)
C-D	Fit of rod in gland	0.006L to 0.010L	(*)
E	OD of piston	0.990 to 0.995	(*)

An asterisk (\*) in the wear limits column indicates part should be replaced when worn beyond limits given in size and fit of new parts column.

An L following a dimension indicates loose fit.

3. Inspect all parts for cracks or deformities. Replace as required.

Go on to Sheet 3

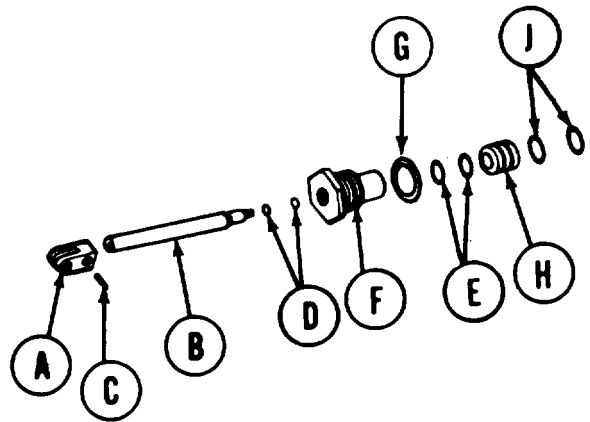
TA130552



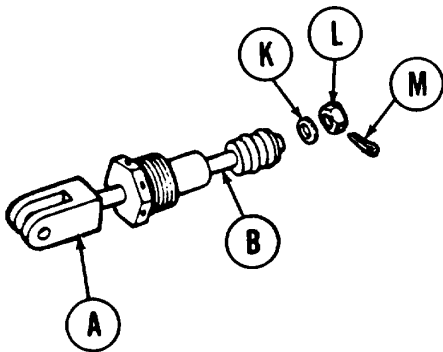
**FUEL PRIMER PUMP PISTON ROD ASSEMBLY REPAIR (Sheet 3 of 3)**

**ASSEMBLY:**

1. Place clevis (A) in position on piston rod (B).  
Aline holes.
2. Using hammer, install pin (C).
3. Install two new packings (D) on piston rod (B).
4. Install two new packings (E) inside gland (F).
5. Install new packing (G) onto gland (F).
6. Slide gland (F) on piston rod (B).
7. Slide piston (H) on piston rod (B).
8. Install two new packings (J) on piston (H).



9. Using 7/16 inch wrench, install flat washer (K) and nut (L) on piston rod (B), while holding clevis (A) with adjustable wrench.
10. Using pliers, install cotter pin (M).
11. Install piston rod assembly in primer pump (page 4-90, steps 3-4 and 17-24).



End of Task

TA130553

**FUEL PRIMER PUMP INLET VALVE ASSEMBLY REPAIR (Sheet 1 of 1)**

TOOLS: Retaining ring pliers  
6 in. steel rule

SUPPLIES: Lubricating oil (Item 16, Appendix B)  
Parts kit (5704213)

PRELIMINARY PROCEDURE: Remove inlet valve assemblies from primer pump (page 4-87, step 3 and 14)

**NOTE**

**Repair of two inlet valve assemblies in primer pump is identical.**

**DISASSEMBLY:**

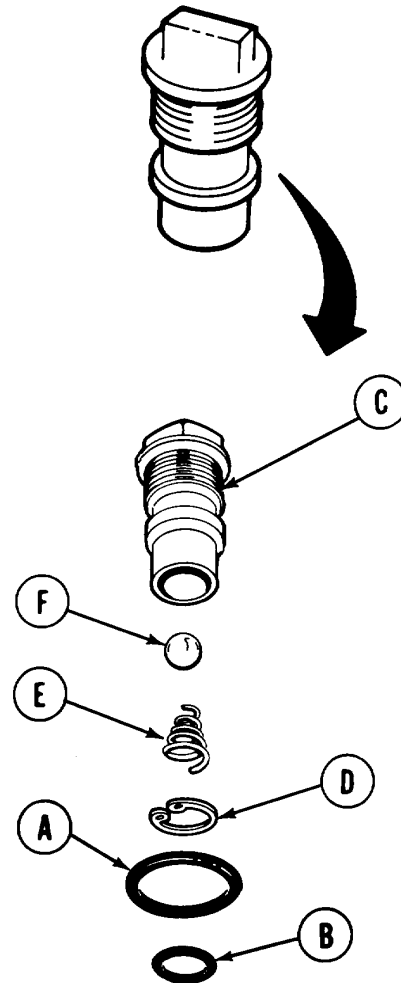
1. Remove preformed packing (A and B) from valve assembly (C) and throw away packings.
2. Using pliers, remove retaining ring (D) from inside of valve assembly (C).
3. Remove spring (E) and ball bearing (F).

**CLEANING AND INSPECTION:**

1. Clean all parts of inlet valve assembly as required.
2. Using steel rule, check spring for wear. Free length of spring should be between 51/64 inch to 13/16 inch. Replace if not within limits.

**ASSEMBLY:**

1. Install ball bearing (F) and spring (E) in valve assembly (C).
2. Using retaining ring pliers, install retaining ring (D).
3. Apply lubricating oil (Item 16, Appendix B) to preformed packings (A and B).
4. Install new packings (A and B) on valve assembly (C).
5. Install inlet valve assembly in primer pump (page 4-90).



TA130390

End of Task

**FUEL PRIMER PUMP OUTLET VALVE ASSEMBLY REPAIR (Sheet 1 of 2)**

**TOOLS:** Retaining ring pliers (internal and external)  
6 in. steel rule

**SUPPLIES:** Lubricating oil (Item 16, Appendix B)  
Parts kit (5704213)

**PRELIMINARY PROCEDURE:** Remove outlet valve assemblies from primer pump (page 4-87, step 3 and 14)

**NOTE**

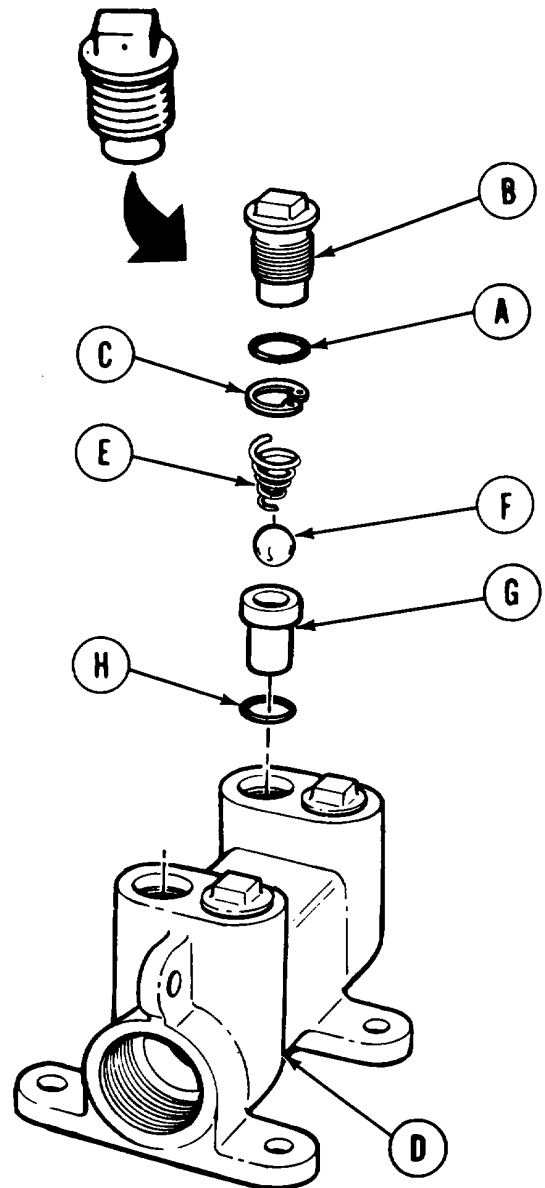
**Repair of the two outlet valve assemblies in primer pump is identical.**

**DISASSEMBLY:**

1. Remove packing (A) from valve retainer (B). Throw packing away.
2. Using retaining ring pliers, remove retaining ring (C) from primer pump housing (D).
3. Remove spring (E) and ball bearing (F) from pump housing (D).
4. Remove outlet valve (G) from pump housing (D).
5. Remove preformed packing (H) from pump housing (D). Throw packing away.

**CLEANING AND INSPECTION:**

1. Clean all parts of outlet valve assembly as required.
2. Using steel rule, measure length of spring. Spring should be between 51/64 inch to 13/16 inch. If not, replace.



TA130554

Go on to Sheet 2

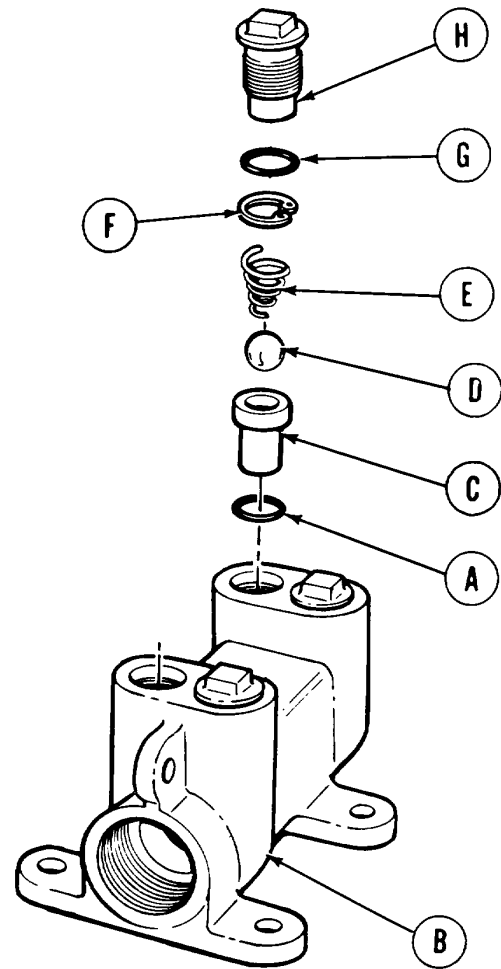
**FUEL PRIMER PUMP OUTLET VALVE ASSEMBLY REPAIR (Sheet 2 of 2)**

**ASSEMBLY:**

**NOTE**

**Apply lubricating oil (Item 16, Appendix B) to packing.**

1. Install new preformed packing (A) into pump housing (B).
2. Install outlet valve (C) into pump housing (B).
3. Place ball bearing (D) and spring (E) in primer pump housing (B).
4. Using pliers, install retaining ring (F) in primer pump housing (B).
5. Place packing (G) on retainer (H).
6. Install outlet valve assemblies in primer pump (page 4-90).



End of Task

**ACCELERATOR LINKAGE ASSEMBLY REPLACEMENT (Sheet 1 of 5)**

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	4-99
Cleaning and Inspection	4-101
Installation	4-101

**TOOLS:** Long, round nosed pliers  
 9/16 in. socket with 1/2 in. drive  
 Ratchet with 1/2 in. drive  
 9/16 in. combination box and open end wrench  
 1-7/16 in. combination box and open end wrench  
 5/16 in. combination box and open end wrench  
 3/32 in. socket head screw key (allen wrench)

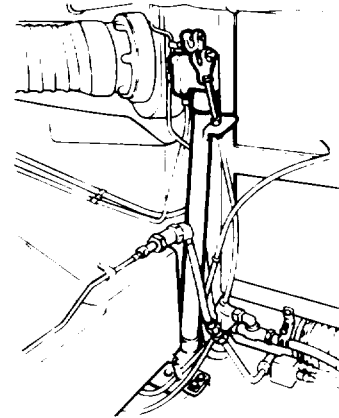
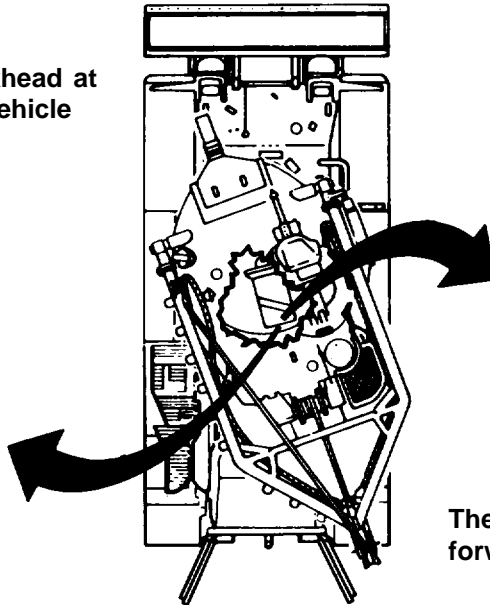
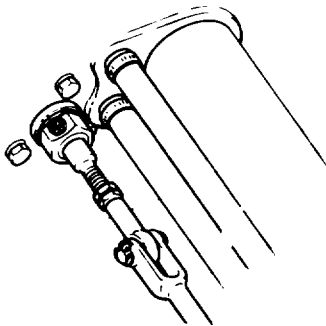
**SUPPLIES:** Cotter pin (MS24665-132)  
 Dry cleaning solvent (Item 12, Appendix B)  
 Rags (Item 31, Appendix B)  
 Seals (8711329) (2 required)

**REFERENCES:** TM 9-2350-222-10  
 TM 9-2350-222-20-1

**PRELIMINARY PROCEDURES:** Remove powerplant (TM 9-2350-222-20-1)  
 Traverse turret until access is gained to accelerator linkage through turret platform access door CIM 9-2350-222-10)

**NOTE**

Linkage passes through bulkhead at center of turret near floor of vehicle



**NOTE**

The linkage assembly is located in the left forward end of the engine compartment.

TA252618

Go on to Sheet 2

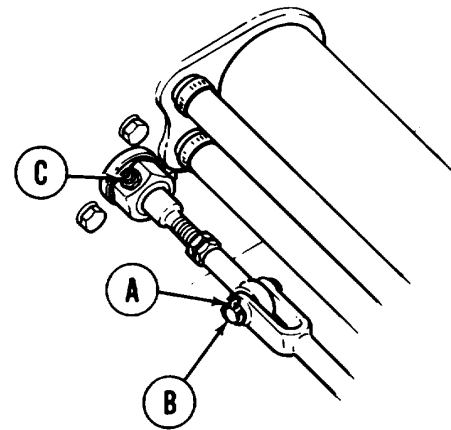
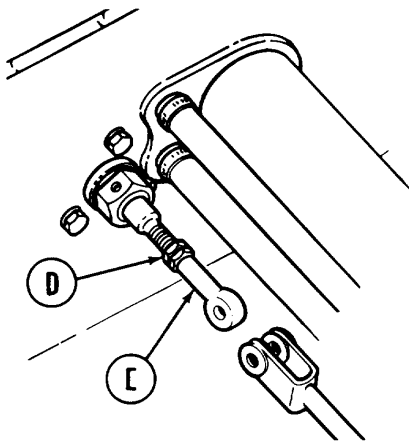
## ACCELERATOR LINKAGE ASSEMBLY REPLACEMENT (Sheet 2 of 5)

## REMOVAL:

## NOTE

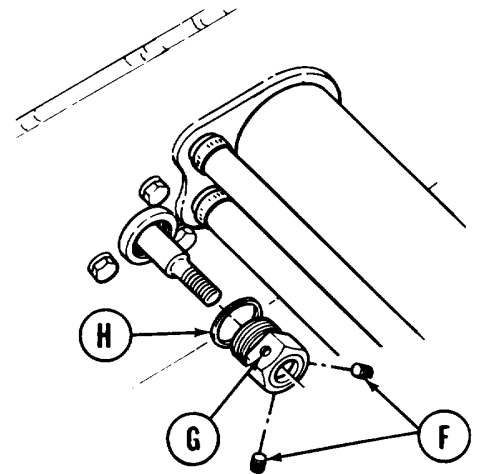
Steps 1 thru 10 are performed inside vehicle turret at the rear left bulkhead near floor of vehicle.

1. Using pliers, remove cotter pin (A). Throw cotter pin away.
2. Remove pin (B).
3. Using 3/8 inch wrench, remove grease fitting (C).



4. Using 1/2 inch wrench, back off nut (D).
5. Using 1/2 inch wrench, remove rod end (E).
6. Using 1/2 inch wrench, remove nut (D).

7. Using allen wrench, remove two setscrews (F).
8. Using 1-7/16 inch wrench, remove nut (G) and washer (H).

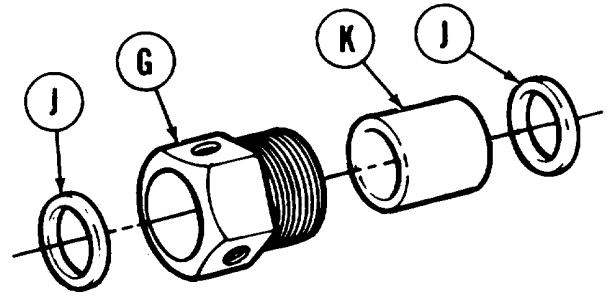
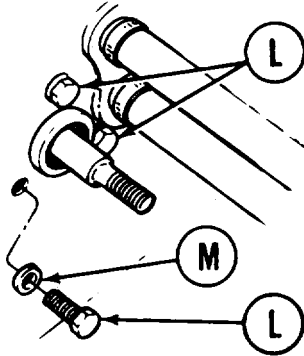


TA130557

Go on to Sheet 3

**ACCELERATOR LINKAGE ASSEMBLY REPLACEMENT (Sheet 3 of 5)**

9. Using brass drift and hammer, remove two seals (J) and bushing (K) from nut (G). Throw two seals away.

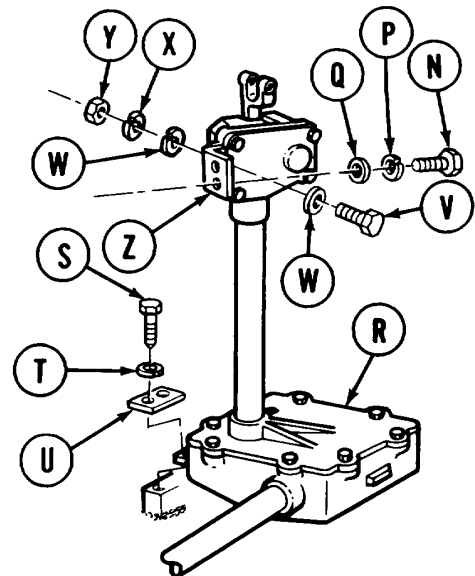


10. Using 9/16 inch socket, remove three screws (L) and washers (M).

**NOTE**

Steps 11 through 14 are performed in left forward end of engine compartment.

11. Using 9/16 inch socket, remove two screws (N), lockwashers (P), and flat washers (Q) securing upper end of accelerator linkage assembly (R) to bulkhead.
12. Using 9/16 inch socket, remove two screws (S), lockwashers (T), and plate (U) from base of housing accelerator linkage assembly (R).



13. Using both hands, slide entire accelerator linkage assembly ® toward rear of vehicle until tube assembly is free of bulkhead.
14. Using both hands, lift and remove accelerator linkage assembly from engine compartment.
15. Using 9/16 inch socket and 9/16 inch wrench, remove two screws (V), four flatwashers (W), two lockwashers (X), and two nuts (Y) securing bracket (Z) to accelerator linkage assembly (R). Remove and retain bracket (Z) for installation onto replacement accelerator linkage assembly.

Go on to Sheet 4

TA130558

**ACCELERATOR LINKAGE ASSEMBLY REPLACEMENT (Sheet 4 of 5)**

**CLEANING AND INSPECTION:**

1. Using rags and dry cleaning solvent (Item 12, Appendix B), clean entire housing assembly.
2. Inspect for cracks, damage, and wear. Replace if required.

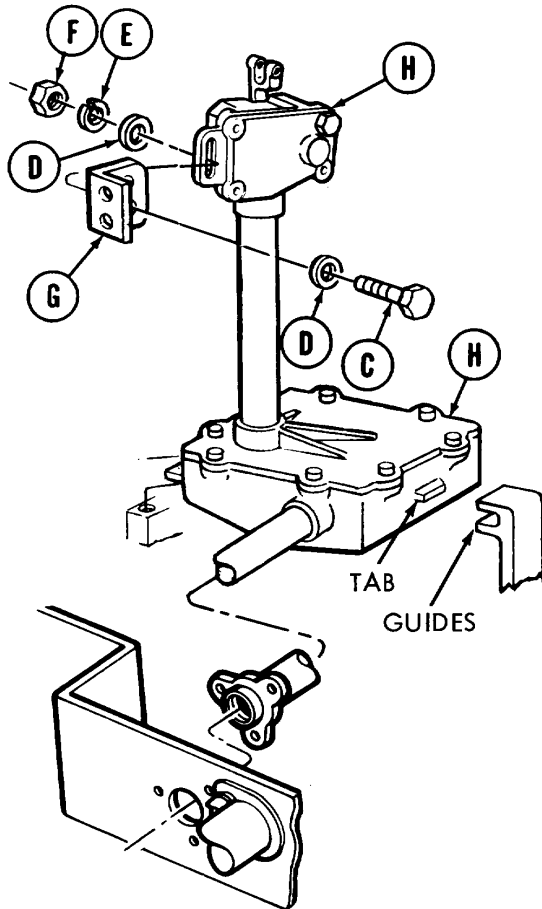
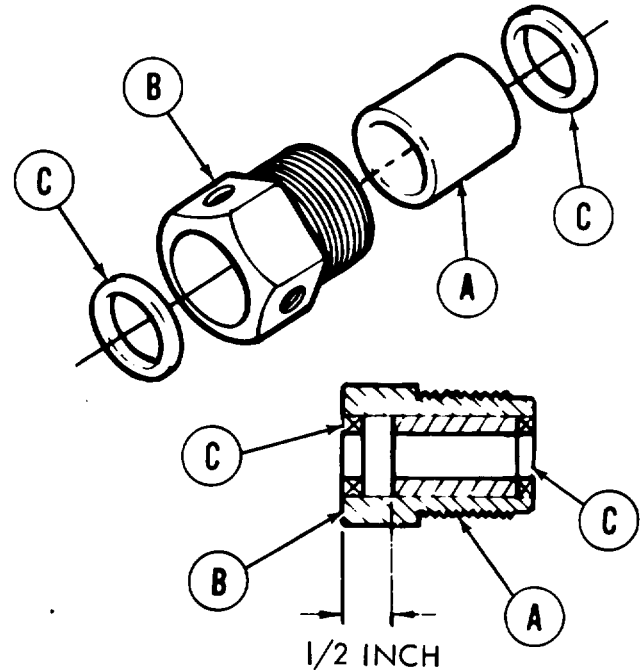
**INSTALLATION:**

1. Using brass drift and hammer, install bushing (A) into nut (B). Install bushing (A) so end of bushing is 1/2 inch in from end of nut as shown.

**NOTE**

New seals (C) must be installed with lips facing out and flush with ends of nut.

2. Using hammer, install two new seals (C) into nut (B).



3. Using 9/16 inch wrench and 9/16 inch socket, install two screws (C), four flat washers (D), two lockwashers (E), and two nuts (F) to secure bracket (G) to accelerator linkage assembly (H).
4. Position accelerator linkage assembly (H) into engine compartment.
5. Push accelerator linkage assembly forward and align tube with access hole in bulkhead.

**NOTE**

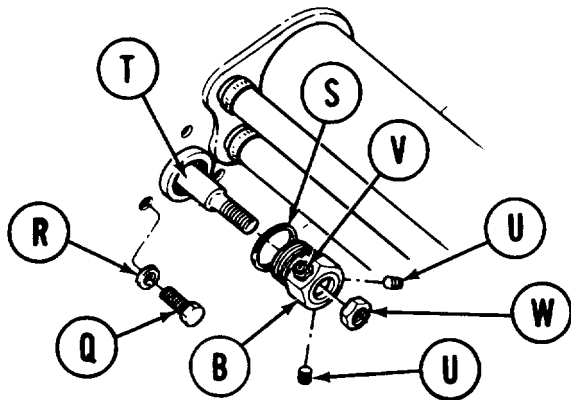
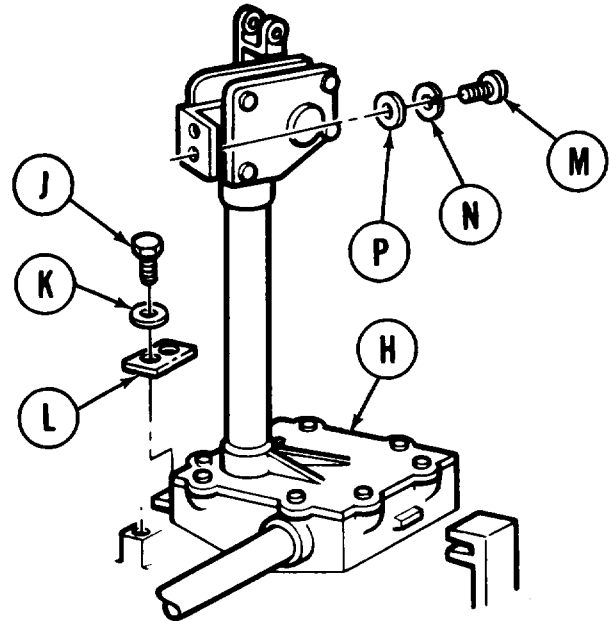
**Make sure that tab on side of housing slides between two guides welded to floor of hull.**

Go on to Sheet 5



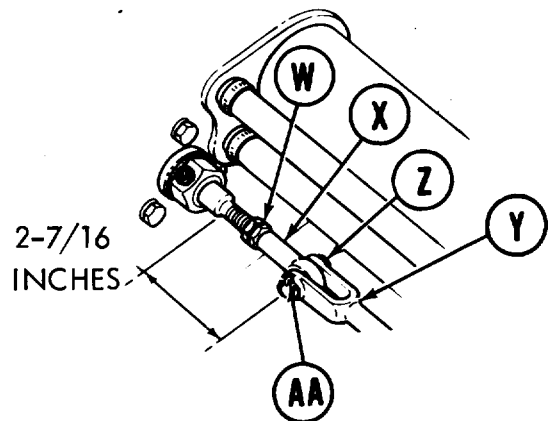
**ACCELERATOR LINKAGE ASSEMBLY REPLACEMENT (Sheet 5 of 5)**

6. Aline two holes in base of accelerator linkage assembly (H) with two mounting holes on floor of engine compartment.
7. Using 9/16 inch socket, install and secure two screws (J), lockwashers (K), and plate (L) to secure housing to floor.
8. Using 9/16 inch socket, install and secure two screws (M), lockwashers (N) and flat washers (P) to secure upper housing to bulkhead.
9. Using 9/16 inch socket, install and secure three screws (Q) and lockwashers ® to secure tube assembly of linkage assembly to bulkhead.
10. Install washer (S) and nut (B) over shaft (T). Using 1-7/16 inch wrench, tighten nut (B).
11. Using allen wrench, install two setscrews (U) into two holes in nut, leaving the uppermost hole empty for grease fitting.



12. Using 3/8 inch wrench, install grease fitting (V) into uppermost hole in nut (B).
13. Using 1/2 inch wrench, install nut (W). Screw nut onto shaft (T) until it bottoms.
14. Using 1/2 inch wrench, install rod end (X) onto shaft. Install rod end until measurement of 2-7/16 inches is attained between center of rod and shoulder of shaft as shown.

15. Position rod end (X) into clevis (Y) and install pin (Z).
16. Using pliers, install new cotter pin (AA) through end of pin. Bend cotter pin to prevent it from falling out.
17. Using 1/2 inch wrench, tighten nut (W) up against rod end (X).
18. Install powerplant (TM 9-2350-222-20).



TA130560

End of Task

**ACCELERATOR CONNECTING LINK (RISER) AND (LOWER) TUBE ASSEMBLY REPLACEMENT (Sheet 1 of 4)**

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	4-103
Cleaning and Inspection	4-105
Installation	4-105

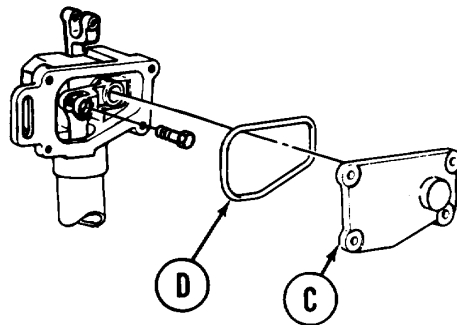
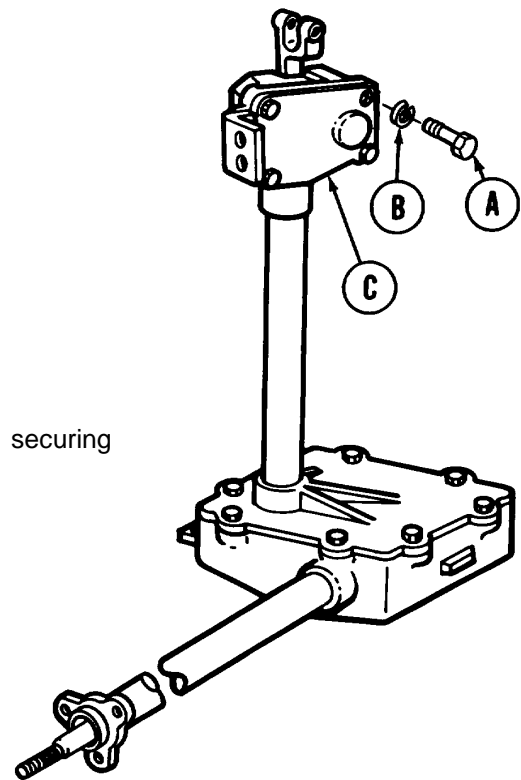
TOOLS: 7/16 in. combination box and open end wrench  
 1/2 in. socket with 1/2 in. drive  
 Ratchet with 1/2 in. drive  
 Pry bar

SUPPLIES: Rags (Item 31, Appendix B)  
 Dry cleaning solvent (Item 12, Appendix B)  
 Gasket (11610571)  
 Seal (11610579)  
 Rubber gloves

PRELIMINARY PROCEDURE: Remove linkage assembly (page 4-98)

REMOVAL:

1. Using socket, remove four screws (A) and lockwashers (B) securing cover (C).
2. Using pry bar, remove cover (C) and seal (D).
3. Throw seal (D) away.

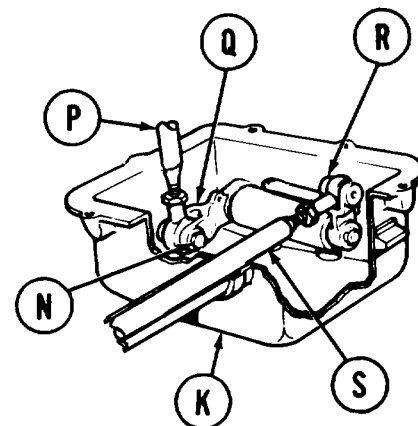
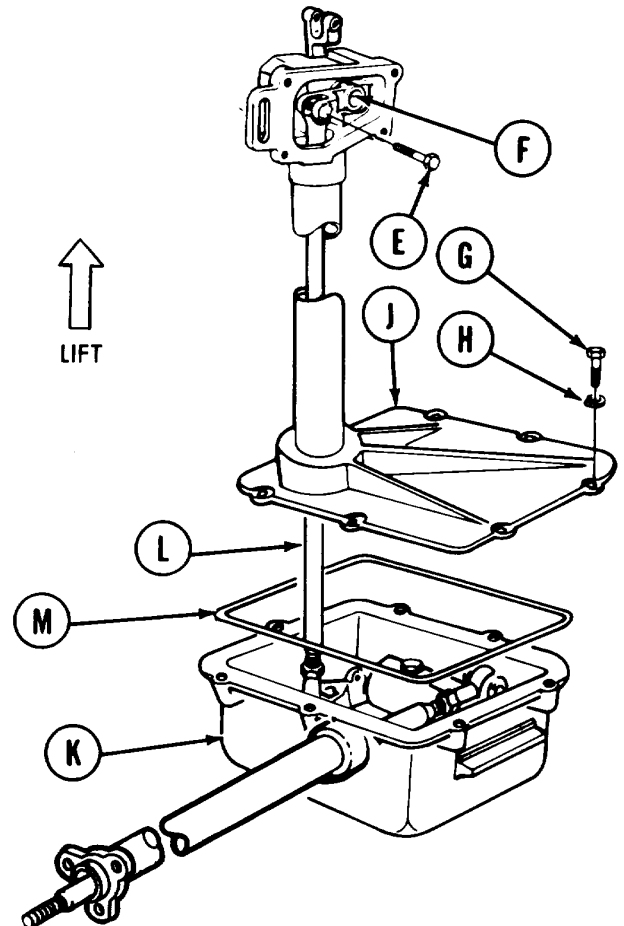


Go on to Sheet 2

TA130561

**ACCELERATOR CONNECTING LINK (RISER) AND (LOWER) TUBE ASSEMBLY REPLACEMENT (Sheet 2 of 4)**

4. Using wrench, remove bolt (E) from lever (F).
5. Using socket, remove seven screws (G) and lockwashers (H) securing riser housing (J).
6. Using pry bar, separate riser housing (J) from control housing (K).
7. Using both hands, lift riser housing (J) up until it is clear of connecting link (L).
8. Remove and throw gasket (M) away.
9. Using wrench, remove bolt (N). Remove connecting link assembly (P) from clevis (Q).
10. Using wrench, remove bolt (R). Pull lower tube assembly (S) out through lower tube of control housing (K).



LOWER HOUSING  
CUT AWAY FOR  
VISIBILITY

TA130562

Go on to Sheet 3

**ACCELERATOR CONNECTING LINK (RISER) AND (LOWER) TUBE ASSEMBLY REPLACEMENT (Sheet 3 of 4)**

**CLEANING AND INSPECTION:**

**WARNING**

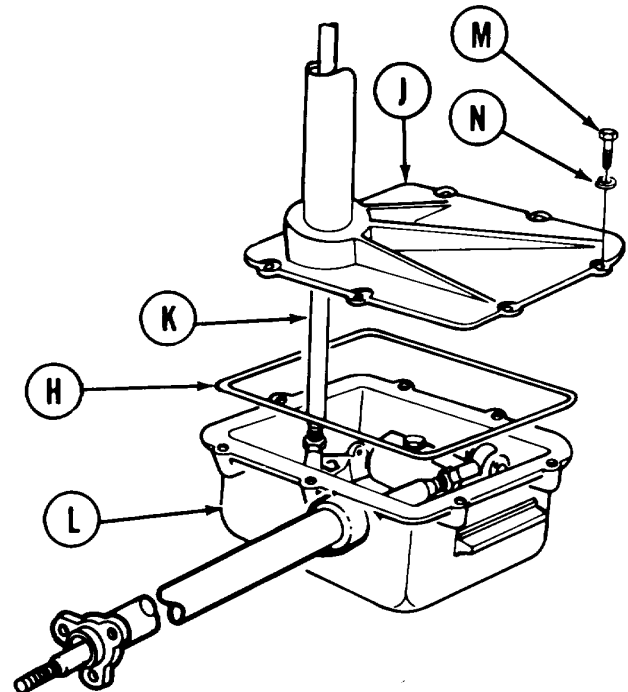
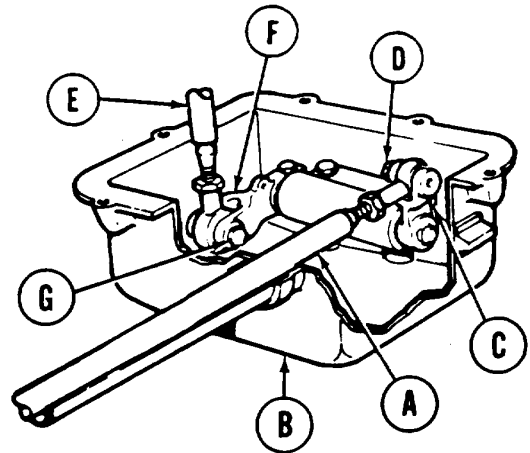
Cleaning agent specified is flammable. Use only in well ventilated areas. Keep away from flames, sparks, or heat. Do not smoke while using. Prevent contact with eyes, mouth and/or skin. Wear rubber gloves when performing cleaning procedures.

1. Using clean rags and dry cleaning solvent (Item 12, Appendix B), clean all metallic parts.
2. Inspect all parts for damage or wear.
3. Replace all unserviceable parts.

**INSTALLATION:**

1. Push lower tube assembly (A) in through lower tube of control housing (B), and position tube assembly in clevis (C).
2. Using wrench, install bolt (D).
3. Position end of connecting link (E) in clevis (F).
4. Using wrench, install bolt (G).
5. Carefully place new gasket (H) in groove of riser housing (J).
6. Using both hands, lower riser housing (J) over connecting link (K) onto control housing (L).
7. Aline holes of riser housing (J) with control housing (L).
8. Using socket, install seven screws (M) and lockwashers (N).

LOWER HOUSING  
CUT AWAY FOR  
VISIBILITY

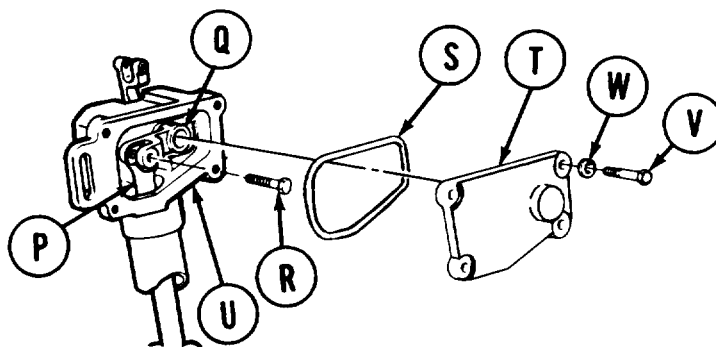


Go on to Sheet 4

TA130563

**ACCELERATOR CONNECTING LINK (RISER) AND (LOWER) TUBE ASSEMBLY REPLACEMENT (Sheet 4 of 4)**

9. Aline connecting link rod end (P) with clevis of lever (Q).
10. Using wrench, install bolt Ⓞ through lever clevis (Q) and connecting link bearing rod end (P).
11. Carefully position new seal (S) in cover (T).
12. Position cover (T) and seal (S) on riser housing (U) with all holes alined.



13. Using socket, install four screws (V) and washers (W) in cover (T) and riser housing (U).
14. Install linkage assembly (page 4-101).

End of Task

TA130564

**ACCELERATOR TUBE ASSEMBLY REPAIR (LOWER) (Sheet 1 of 2)**

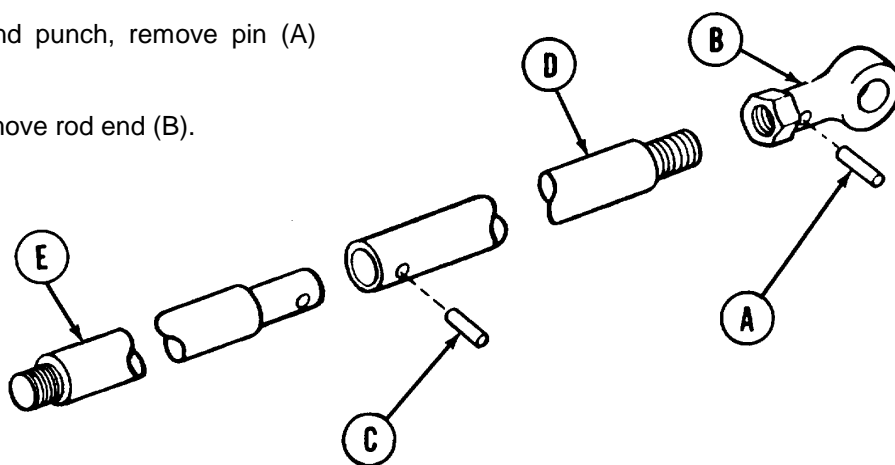
**TOOLS:** 1-lb. hammer  
 1/8 in. drive punch  
 7/16 in. combination box and open end wrench  
 Slip joint pliers  
 Vise  
 5/64 in. drill bit  
 1/4 in. electric drill  
 6 in. rule

**SUPPLIES:** Dry cleaning solvent (Item 12, Appendix B)  
 Rags (Item 31, Appendix B)

**PRELIMINARY PROCEDURE:** Remove accelerator tube assembly from linkage assembly (page 4-104)

**DISASSEMBLY:**

1. Using hammer and punch, remove pin (A) from rod end (B).
2. Using wrench, remove rod end (B).

**NOTE**

**Place tube assembly (D) in vise while removing pins.**

3. Using hammer and punch, remove pin (C) from tube (D).
4. Using pliers, remove shoulder pin (E) from tube (D).

**CLEANING AND INSPECTION:**

1. Using a rag and dry cleaning solvent (Item 12, Appendix B) clean all parts.
2. Inspect rod end (B), tube assembly (D), and pin (E) for damage and wear.

Go on to Sheet 2

TA130565

**ACCELERATOR TUBE ASSEMBLY REPAIR (Lower) (Sheet 2 of 2)**

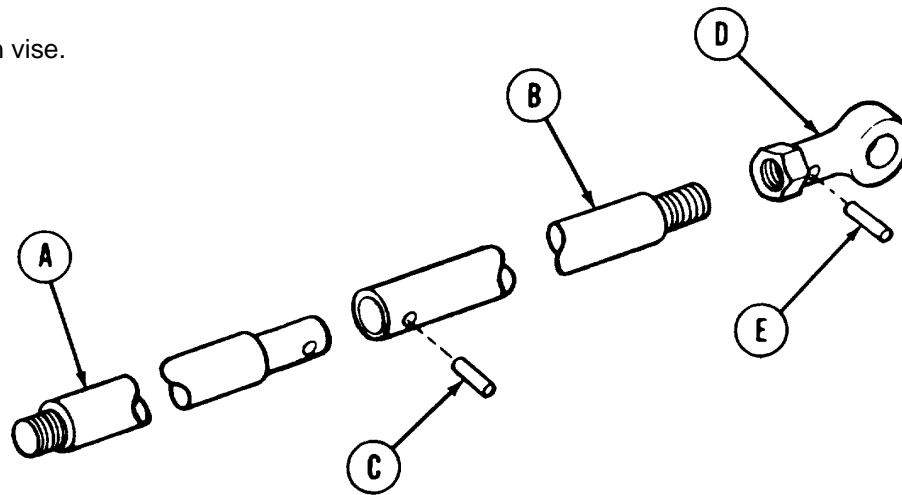
**ASSEMBLY:**

1. Position shoulder pin (A) in tube (B) with holes aligned.
2. Using hammer and punch, install pin (C).

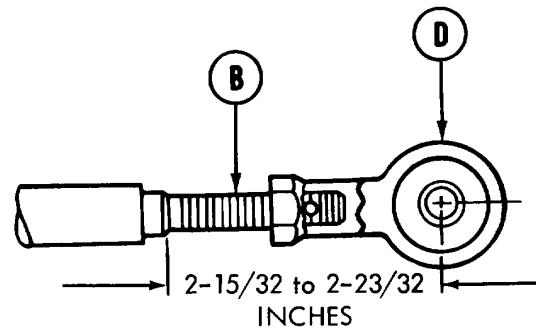
**CAUTION**

**Do not apply excessive pressure with vise which might bend tube.**

3. Place tube (B) in vise.



4. Using wrench and 6 inch rule, install rod end (D) on tube (B) to the dimension shown below.
5. Insert 5/64 inch drill bit in existing hole in rod end (D) and drill through tube (B).
6. Using hammer and punch, install pin (E).
7. Install tube assembly (page 4-105).



End of Task

TA130566

**ACCELERATOR TUBE ASSEMBLY REPAIR (RISER) (Sheet 1 of 2)**

- TOOLS: Hammer  
 Vise  
 Deburring stone  
 7/16 in. combination box and open end wrench  
 1/8 in. drive punch  
 Slip joint pliers  
 5/64 in. drill bit  
 1/4 in. electric drill  
 6 in. steel rule

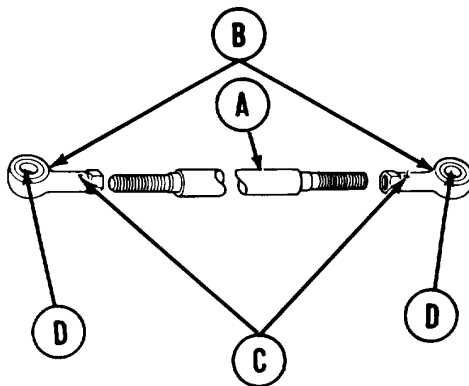
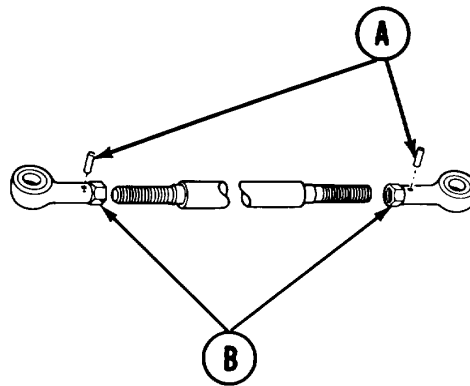
PRELIMINARY PROCEDURE: Remove accelerator tube assembly from linkage assembly (page 4-104)

DISASSEMBLY:

**CAUTION**

**Do not apply excessive pressure with vise which might deform assembly.**

1. Place tube assembly in vise. Tighten vise.
2. Using hammer and punch, loosen two pins (A).
3. Using pliers, remove two pins (A).
4. Using wrench, remove two rod ends (B).



INSPECTION:

1. Visually check tube (A) for distortion, bends, and crossed threads. Replace tube (A) if defective.
2. Visually check rod ends (B) for elongated pin holes (C) or cracks. Replace rod ends (B) if defective.
3. Check two rod end bearings (D) for free movement, nicks, burrs, and crossed threads. If nicks or burrs cannot be removed with a deburring stone or if free movement is impaired for any reason, replace defective rod end.

Go on to Sheet 2

TA130567

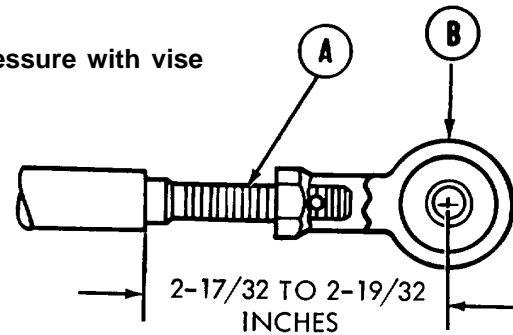


**ACCELERATOR TUBE ASSEMBLY REPAIR (RISER) (Sheet 2 of 2)**

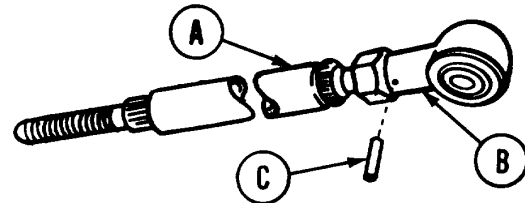
ASSEMBLY:

**CAUTION**

**Do not apply excessive pressure with vise which might bend tube.**



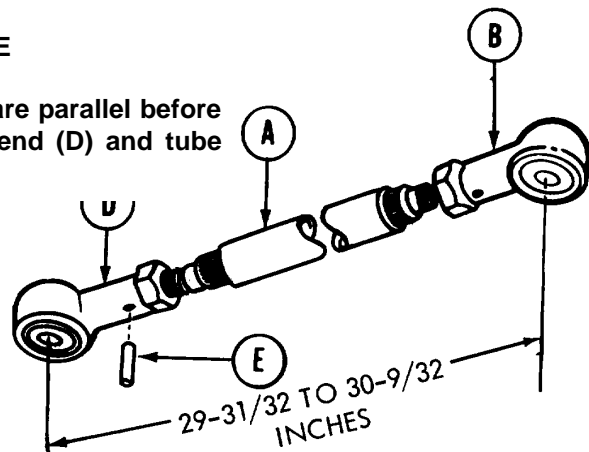
1. Place tube assembly (A) in vise. Tighten vise.
2. Using wrench, tighten rod end (B) on tube (A) to dimension shown.
3. Insert 5/64 inch drill bit in existing hole in rod end (B) and drill through tube (A).
4. Using hammer and punch, install pin (C) in hole in rod end bearing (B) and tube assembly (A).
5. Using wrench and 6 inch rule, tighten rod end (D) on tube (A) to dimension shown, between centers of rod ends (B) and (D).



**NOTE**

**Make sure rod ends are parallel before drilling through rod end (D) and tube (A).**

6. Insert 5/64 inch drill bit in existing hole in rod end (D) and drill through tube (A).
7. Using hammer and punch, install pin (E).
8. Install tube assembly (page 4-105).



TA130568

End of Task

## ACCELERATOR CONTROL LINKAGE ASSEMBLY REPAIR (Sheet 1 of 13)

## PROCEDURE INDEX

PROCEDURE	PAGE
Disassembly	4-112
Cleaning	4-116
Inspection and Repair	4-116
Assembly	4-119

TOOLS: 7/16 in. combination box and open end wrench  
 9/16 in. combination box and open end wrench  
 1/2 in. combination box and open end wrench  
 3/16 in. socket head screw key  
 Hammer  
 Flat-tip screwdriver  
 Ratchet with 1/2 in. drive  
 1/2 in. socket with 1/2 in. drive  
 Slip-joint pliers  
 Pinch bar  
 Deburring stone  
 Vise  
 3/8 in. drive punch  
 Puller  
 Scribe  
 5 in. extension with 1/2 in. drive  
 Pry bar  
 5/32 in. drive punch

SUPPLIES: Rags (Item 31, Appendix B)  
 Seal (11610579)  
 Gasket (11610571)  
 Preformed packing (MS-28775-115)  
 Dry cleaning solvent (Item 12, Appendix B)  
 Rubber gloves  
 Woodruff key (MS35756-5)

PRELIMINARY PROCEDURE: Remove accelerator linkage assembly (page 4-98)

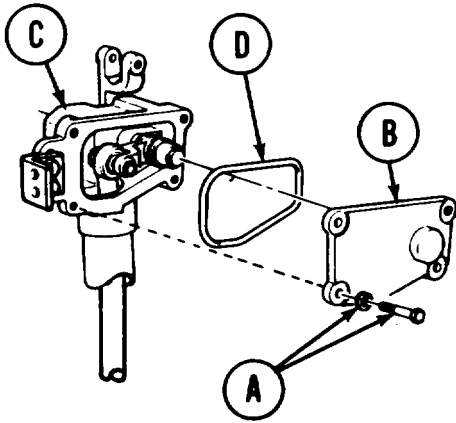
Go on to Sheet 2

TA130415

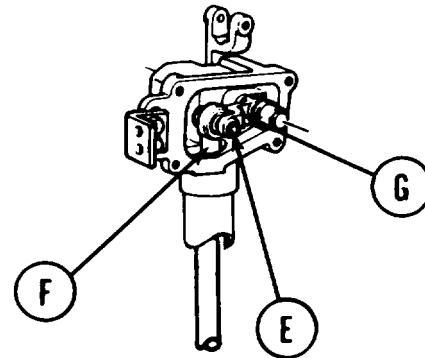
**ACCELERATOR CONTROL LINKAGE ASSEMBLY REPAIR (Sheet 2 of 13)**

**DISASSEMBLY:**

1. Using ½ inch wrench, remove four screws and lockwashers (A) holding cover (B) to riser housing (C).

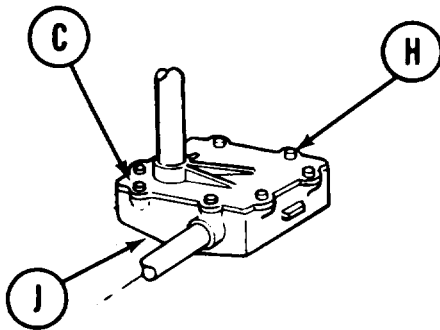


2. Using pinch bar, pull away cover (B).
3. Pull away seal (D). Throw seal (D) away.



4. Using 7/16 inch wrench, remove bolt (E) holding connecting link (F) to lever assembly (G).
5. Move connecting link (F) away from lever assembly (G).

6. Using 1/2 inch wrench, remove seven screws and lockwashers (H) holding riser housing (C) to control housing assembly (J).

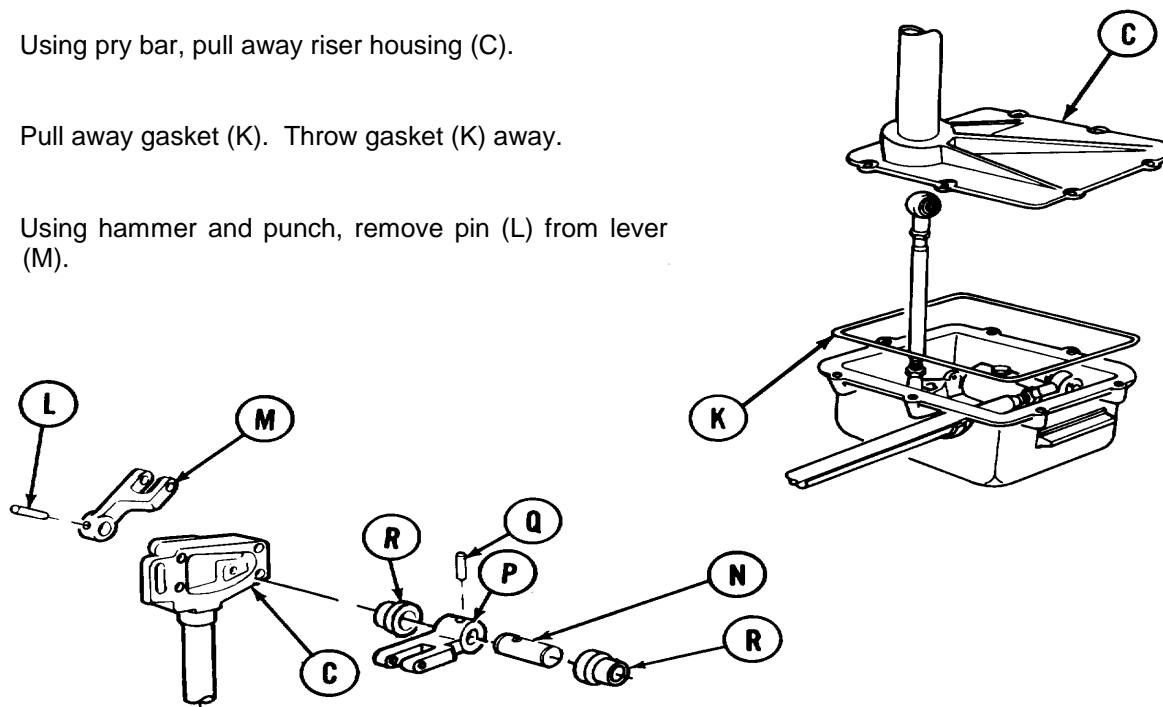


Go on to Sheet 3

TA130569

ACCELERATOR CONTROL LINKAGE ASSEMBLY REPAIR (Sheet 3 of 13)

7. Using pry bar, pull away riser housing (C).
8. Pull away gasket (K). Throw gasket (K) away.
9. Using hammer and punch, remove pin (L) from lever (M).



12. Using hammer and punch, remove pin (Q) from shaft (N).
13. Slide lever (P) off of shaft (N).

10. Using pinch bar, pry lever (M) from shaft (N).

Go on to Sheet 4

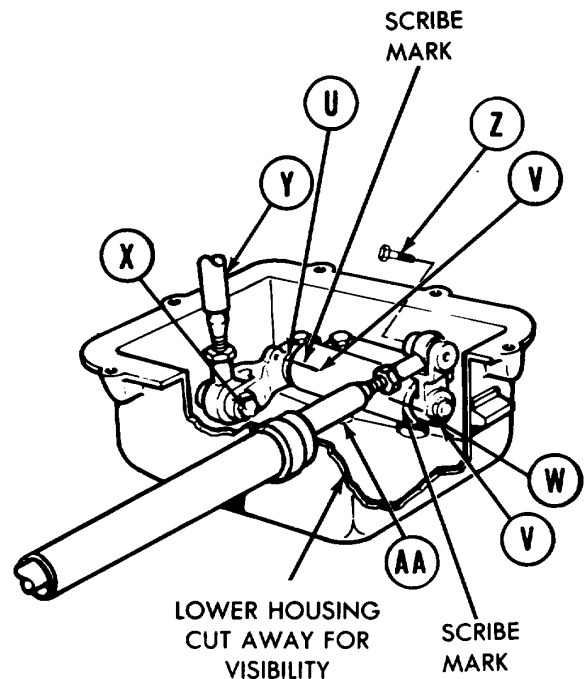
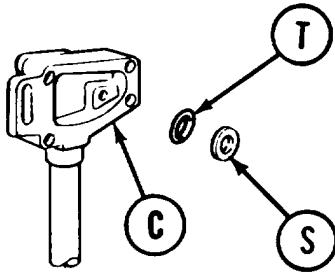
**CAUTION**

**Do not remove bearings (R) from housing (C) unless ID (inside diameter) is beyond wear limits (page 4-117).**

11. Pull shaft (N), lever (P), pin (Q), and two bearings (R) from riser housing (C) as an assembly

TA130570

ACCELERATOR CONTROL LINKAGE ASSEMBLY REPAIR (Sheet 4 of 13)

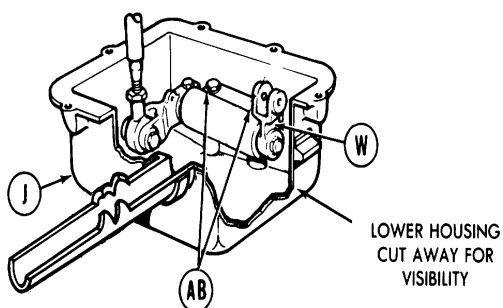


14. Pull washer (S) and preformed packing (T) from riser housing (C). Discard preformed packing (T).
15. Using scribe, mark rod end clevis (U) and housing (V) to provide a reference during assembly.
16. Using scribe, mark clevis with shaft (W) and housing (V) to provide a reference during assembly.
17. Using 7/16 inch wrench, remove bolt (X) holding tube assembly (Y) to rod end clevis (U).
18. Move tube assembly (Y) away from rod end clevis (U).
19. Using 7/16 inch wrench, remove bolt (Z) holding tube assembly (AA) to clevis with shaft (W).
20. Move tube assembly (AA) away from clevis with shaft (W).

Go on to Sheet 5

**ACCELERATOR CONTROL LINKAGE ASSEMBLY REPAIR (Sheet 5 of 13)**

21. Using 1/2 inch wrench, remove two screws and two lockwashers (AB) holding clevis with shaft (W) to control housing (J).



22. Pull clevis with shaft (W), two bearings (AC), housing (V), and rod end clevis (U) from control housing (J) as an assembly.

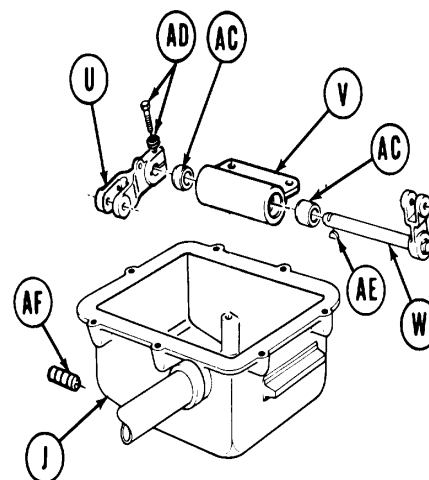
23. Using 7/16 inch wrench, remove bolt and lockwasher (AD) from rod end clevis (U).

24. Pull rod end clevis (U) from clevis with shaft (W).

25. Using screwdriver remove woodruff key (AE) from clevis with shaft (W). Throw key away.

26. Pull housing (V) from clevis shaft (W). Do not try to remove two bearings (AC) from housing (V) unless beyond wear limits (page 4-118).

27. Using socket head screw key, remove drain plug (AF) from control housing (J).



Go on to Sheet 6

TA130572

**ACCELERATOR CONTROL LINKAGE ASSEMBLY REPAIR (Sheet 6 of 13)****CLEANING:****NOTE**

**When cleaning linkage assembly components, make sure scribe marks made during disassembly are maintained for reference during assembly.**

Wearing rubber gloves and using dry cleaning solvent (Item 12, Appendix B), and rags, clean all linkage assembly components.

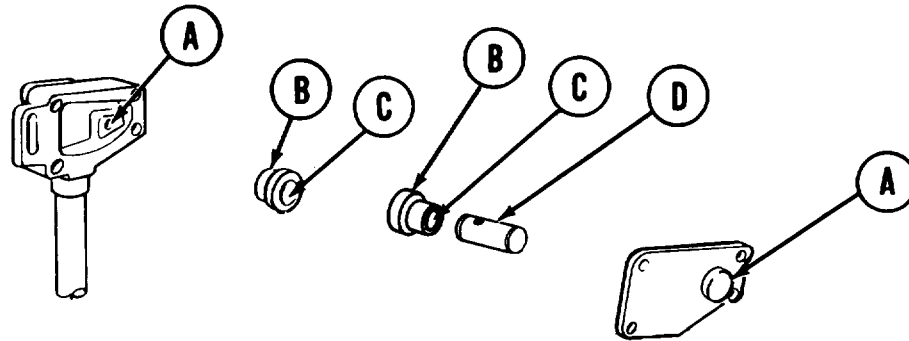
**INSPECTION AND REPAIR:**

1. Check all linkage assembly bushing-type bearings.
2. Check and repair all linkage assembly cast parts and mechanical surfaces.
3. Visually check all linkage assembly tubes for distortion or bends. Replace any defective tube.
4. Visually check all linkage assembly shafts, and levers, for elongated or cracked pin holes. Replace any defective part.
5. Check all linkage assembly rod end bearings for free movement, nicks, and burrs. Replace any rod end with nicks or burrs which cannot be removed with a fine stone, or if free movement is impaired.

Go on to Sheet 7

**ACCELERATOR CONTROL LINKAGE ASSEMBLY REPAIR (Sheet 7 of 13)**

7. Check linkage assembly components for wear as specified in the following tables. Replace all components which do not meet wear limits. Bearings may be removed using hammer and drift pin or puller. Use vise to install new bearings.



ACCELERATOR LINKAGE WEAR LIMITS

Reference Letters	Point of Measurement	Size and fit of New Parts in.	Wear Limits In.
A	ID of bore in cover & housing	0.875 to 0.876	N/A
B	OD of bearings	0.876 to 0.878	N/A
A-B	Fit of bearing in cover & housing	0.000 to 0.003T	*
C	ID of bearings	0.626 to 0.627	0.632
D	OD of shaft	0.618 to 0.620	*
C-D	Fit of shaft in bearings	0.006L to 0.009L	0.014L

Go on to Sheet 8

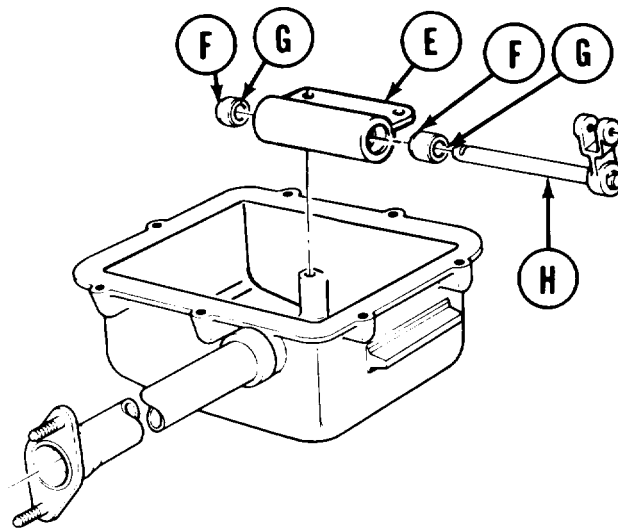
TA130573



ACCELERATOR CONTROL LINKAGE ASSEMBLY REPAIR (Sheet 8 of 13)

ACCELERATOR LINKAGE WEAR LIMITS - Continued

Reference Letters	Point of Measurement	Size and fit of New Parts in.	Wear Limits In.
E	ID of bore in housing	0.875 to 0.876	N/A
F	OD of bearings	0.877 to 0.878	N/A
E-F	Fit of bearing in bore	0.001T to 0.003T	*
G	ID of bearings	0.503 to 0.504	0.509
H	OD of shaft	0.4955 to 0.5005	*
G-H	Fit of shaft in bearings	0.003L to 0.009L	0.014L



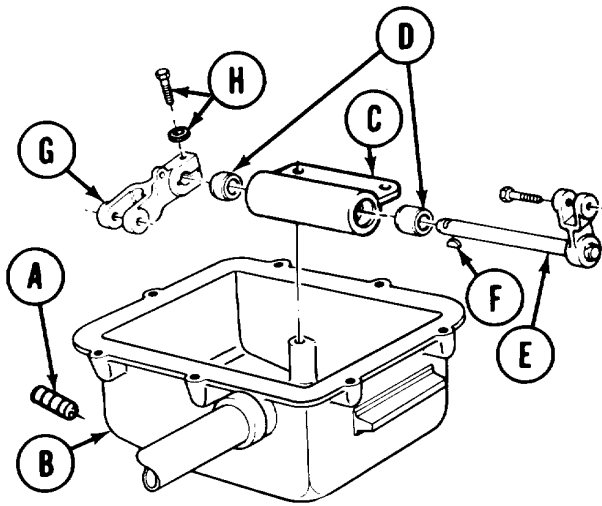
An asterisk (\*) in the wear limits column indicates part should be replaced when worn beyond limits given in size and fit of new parts column.

An L following a dimension indicates loose fit.

A T following a dimension indicates a tight fit.

**ACCELERATOR CONTROL LINKAGE ASSEMBLY REPAIR (Sheet 9 of 13)**

**ASSEMBLY:**



1. Using socket head screw key, install drain plug (A) into control housing (B).

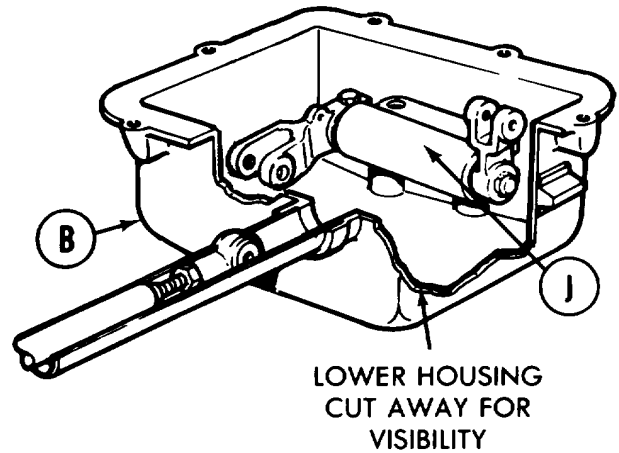
2. Push housing (C) with two bearings (D) onto clevis with shaft (E). Line up scribe marks on housing (C) and clevis with shaft (E).

3. Using hammer, install new woodruff key (F) into clevis with shaft (E).

4. Push rod end clevis (G) onto clevis with shaft (E). Line up reference marks on housing (C) and clevis rod end (G).

5. Using 7/16 inch wrench, install bolt and lockwasher (H) into rod end clevis (G).

6. Assemble clevis with shaft (E), two bearings (D), housing (C), and rod end clevis (G) and install into lower housing (B) as lever assembly (J).

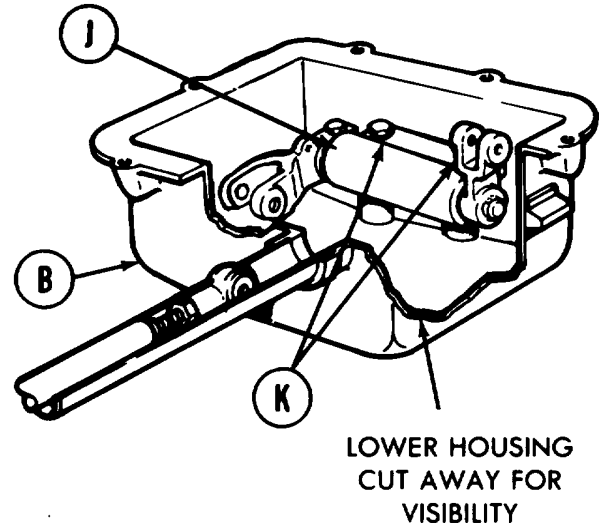


Go on to Sheet 10

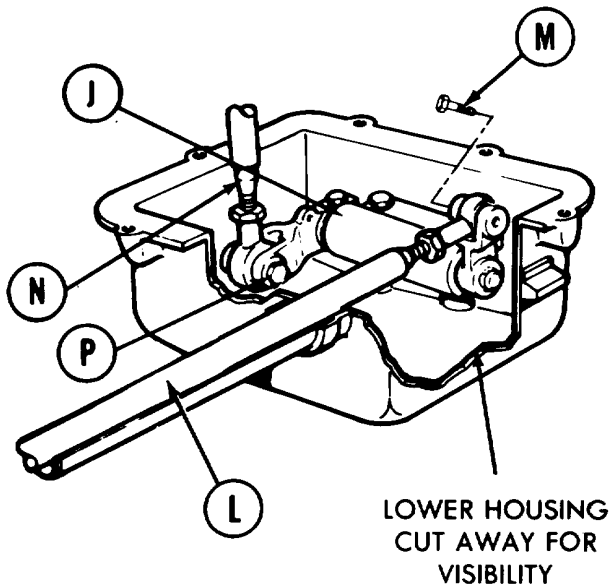
TA130575

**ACCELERATOR CONTROL LINKAGE ASSEMBLY REPAIR (Sheet 10 of 13)**

7. Using 1/2 inch wrench, install two screws and two lockwashers (K) holding lever assembly (J) to control housing (B).



8. Position tube assembly (L) into mating clevis of lever assembly (J).

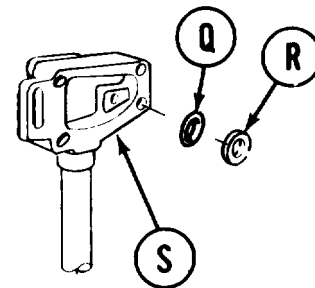


9. Using 7/16 inch wrench, install bolt (M) to hold tube assembly (L) to lever assembly (J).

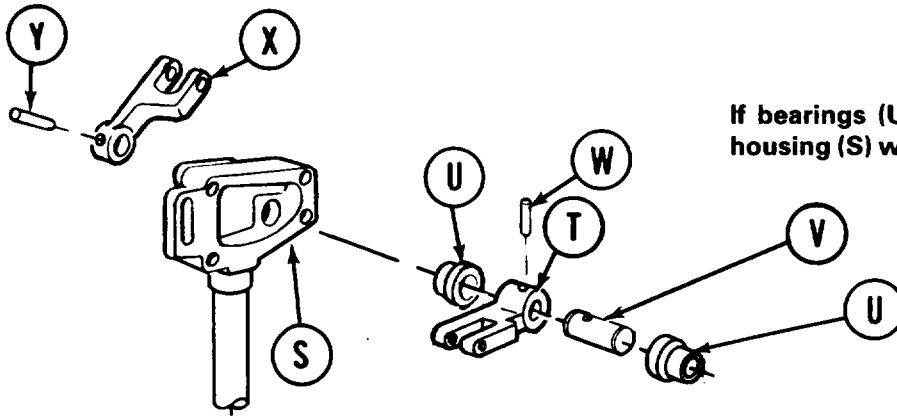
10. Position connecting link (N) into remaining rod end clevis of lever assembly (J).

11. Using 7/16 inch wrench, install bolt (P) to hold connecting link (N) to rod end clevis of lever assembly (J).

12. Insert new preformed packing (Q) and washer (R) into riser housing (S).



ACCELERATOR CONTROL LINKAGE ASSEMBLY REPAIR (Sheet 11 of 13)



**NOTE**

If bearings (U) were removed, install in housing (S) with vise.

13. Slide lever (T) onto shaft (V). Line up pin holes.
14. Using pliers, insert pin (W) into lever (T).
15. Using hammer and punch, install pin (W) into lever (T) and shaft (V).
16. Install shaft (V), lever (T), and pin (W) into riser housing (S) as an assembly.
17. Using hammer, tap lever (X) onto shaft (V) until lever and shaft pin holes line up.
18. Using pliers, insert pin (Y) into lever (X).
19. Using hammer and punch, install pin (Y) into lever (X) and shaft (V).

Go on to Sheet 12

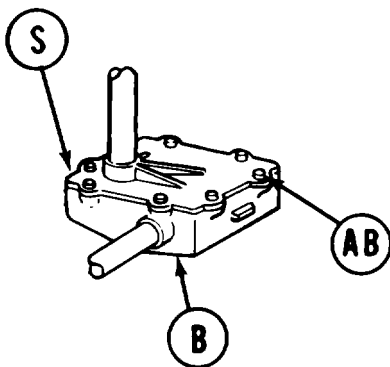
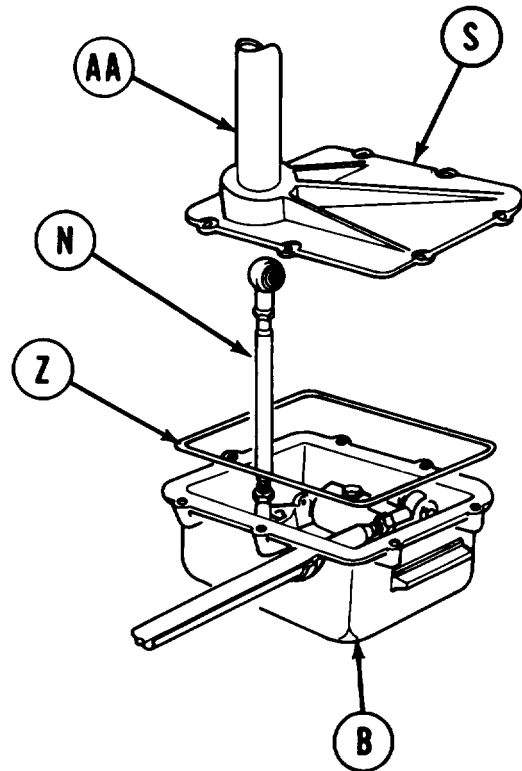
TA130577

**ACCELERATOR CONTROL LINKAGE ASSEMBLY REPAIR (Sheet 12 of 13)**

20. Install new gasket (Z) into groove on bottom of riser housing (S).

21. Slide tube assembly (N) through shaft (AA).

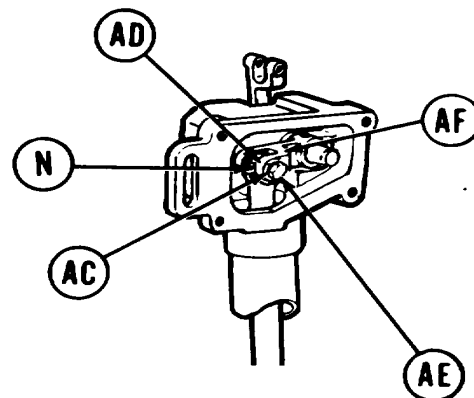
22. Place riser housing (S) with gasket (Z) onto control housing assembly (B).



23. Using 1/2 inch wrench, install seven screws and lockwashers (AB) to hold riser housing (S) to control housing assembly (B).

24. Aline tube assembly bearing (AC) within lever (AD).

25. Using 7/16 inch wrench, install screw (AE) to hold tube assembly (N) to lever assembly (AF).

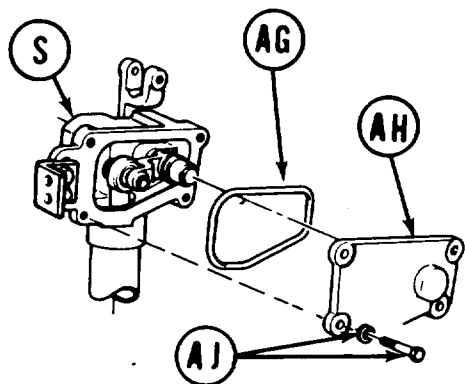


TA130578

Go on to Sheet 13

**ACCELERATOR CONTROL LINKAGE ASSEMBLY REPAIR (Sheet 13 of 13)**

26. Install new seal (AG) into groove in cover (AH).
27. Position cover (AH) onto riser housing (S).



28. Using 1/2 inch wrench, install four screws and lockwashers (AJ) to hold cover (AH) to riser housing (S).

29. Make sure tube assembly and accelerator lever operate smoothly when tube assembly is moved within its limits.
30. Install accelerator control linkage assembly into vehicle (page 4-101).

End of Task

TA130579

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## CHAPTER 5

## ELECTRICAL SYSTEM MAINTENANCE INDEX

<b>Procedure</b>	<b>Page</b>
Hull-Front Master Harness Assembly Replacement	5-2
Hull Power Wiring Harness Assembly Replacement	5-23
Heater Control Wiring Harness Assembly Replacement	5-37
Slave Receptacles and Relay Lead Assembly Replacement (2D Engine)	5-42
Slave Receptacle and Relay Lead Harness Assembly Replacement (Late Model)	5-48.2
Rear Accessory Wiring Harness Replacement	5-49
Engine Accessory Harness Assembly Replacement (2D Engine)	5-61
Starter Relay Cable Assembly Replacement	5-66
Starter Feed Harness Assembly Replacement (2D Engine)	5-76
Engine Disconnect Lead Assembly Replacement (2D Engine)	5-85
Rear Intermediate Interphone Cable Assembly Replacement	5-90

**HULL-FRONT MASTER HARNESS ASSEMBLY REPLACEMENT (Sheet 1 of 21)**

PROCEDURE	PROCEDURE INDEX	PAGE
Removal		5-3
Installation		5-13

**TOOLS:** 8 in. adjustable wrench  
 1/2 in. combination box and open end wrench  
 7/16 in. socket with 1/2 in. drive  
 Ratchet with 1/2 in. drive  
 5 in. extension with 1/2 in. drive  
 Spanner wrench  
 7/16 in. combination box and open end wrench  
 Slip joint pliers  
 7/8 in. combination box and open end wrench  
 9/16 in. combination box and open end wrench

**SUPPLIES:** Silicone compound (Item 10, Appendix B)  
 I.D. tags

**REFERENCES:** TM 9-2350-222-20-1  
 TM 9-2350-222-34-2

**PRELIMINARY PROCEDURE:** Remove turret (TM 9-2350-222-34-2)  
 Remove right ammunition rack (page 11-28)  
 Remove personnel heater (TM 9-2350-222-20-1)  
 Remove fire extinguisher cylinders (TM 9-2350-222-20-1)  
 Remove left heater duct (TM 9-2350-222-20-1)  
 Remove generator regulator (TM 9-2350-222-20-1)  
 Remove driver's escape hatch (TM 9-2350-222-20-1)

**WARNING**

**Make sure to disconnect three battery ground straps (TM 9-230-222-20-1).**

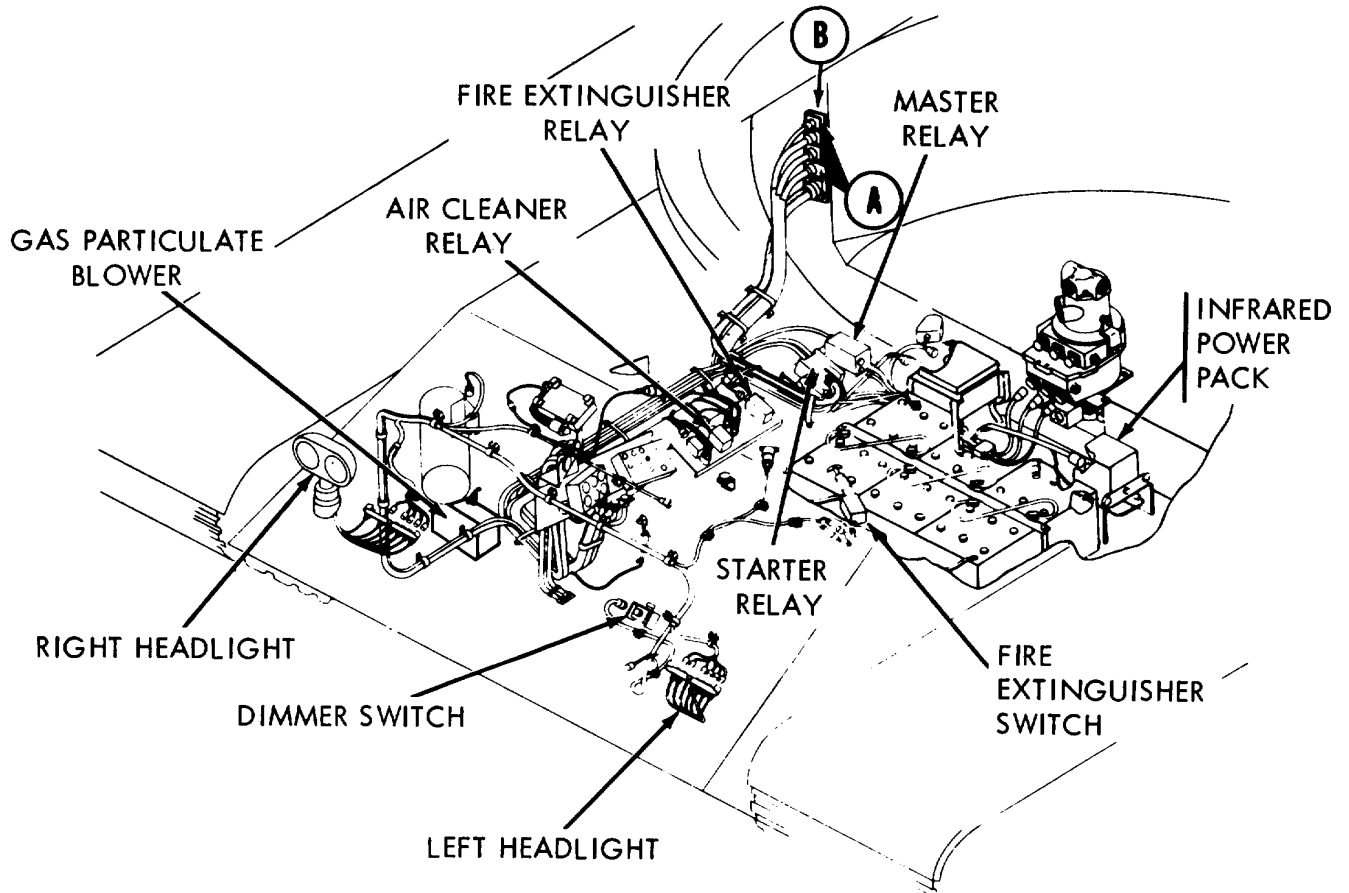


HULL-FRONT MASTER HARNESS ASSEMBLY REPLACEMENT (Sheet 2 of 21)

REMOVAL:

NOTE

The following illustration will aid in removing the harness assembly.



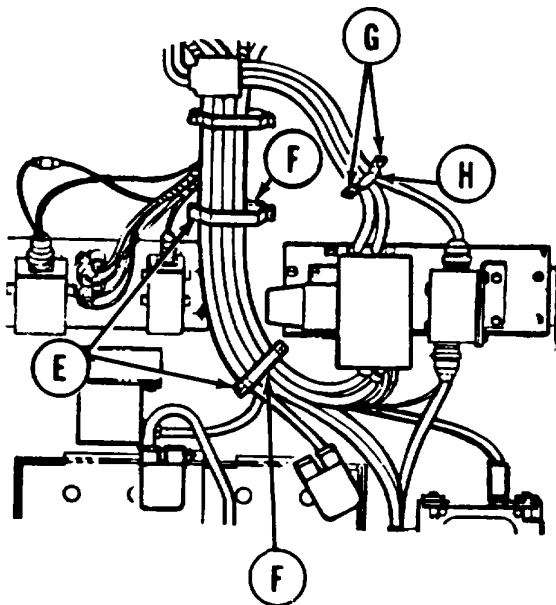
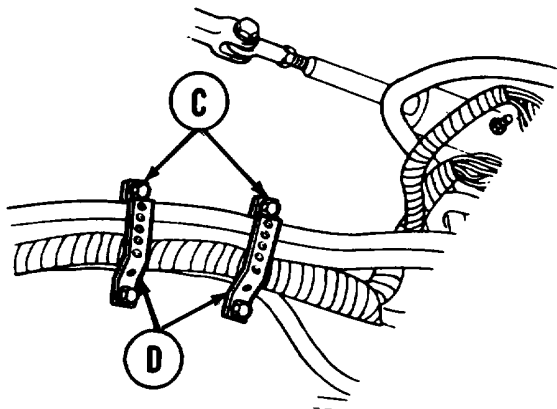
1. Using spanner wrench, disconnect four connectors (A) from bulkhead (B). Begin with top connector and proceed downward.

Go on to Sheet 3

TA130582

**HULL FRONT MASTER HARNESS ASSEMBLY REPLACEMENT (Sheet 3 of 21)**

- Using socket, remove two screws and washers (C) securing one end of straps (D).

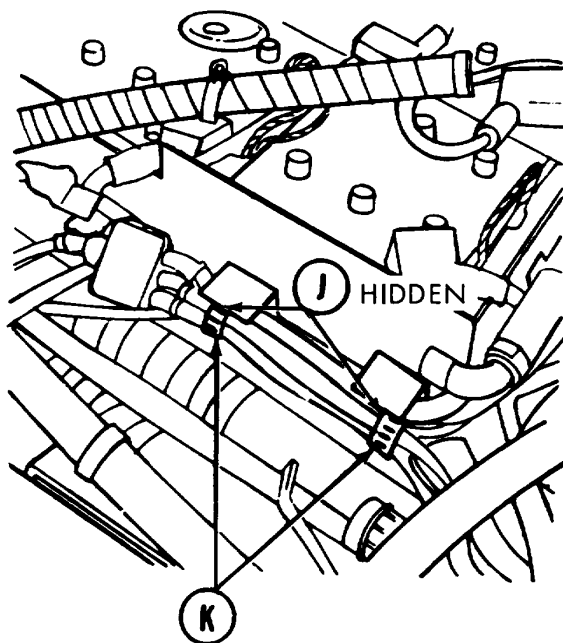


- Using socket, remove four screws and washers (E) and two straps (F).
- Using socket, remove two screws and washers (G) and strap (H).

**NOTE**

Perform steps 5 through 8 if your vehicle is equipped with the infrared powerpack.

- Using socket, remove two screws and washers (J) securing one end of straps (K).

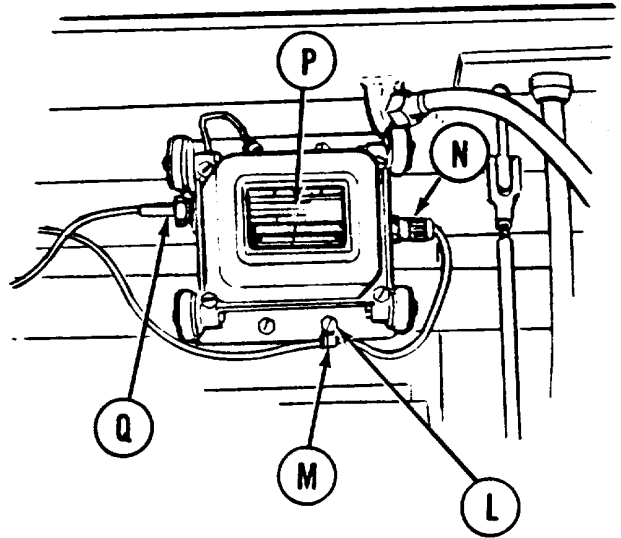


Go on to Sheet 4

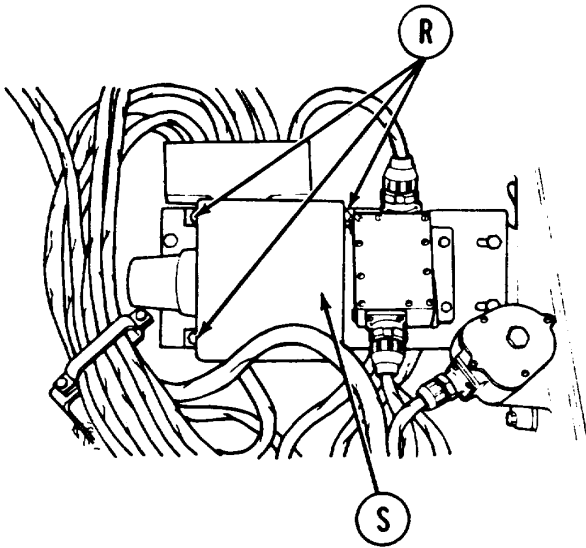
TA252619

**HULL-FRONT MASTER HARNESS ASSEMBLY REPLACEMENT (Sheet 4 of 21)**

6. Using 1/2 inch wrench, remove screw and washer (L) and clamp (M).
7. Using pliers, disconnect connector (N) from infrared power pack (P).
8. Using adjustable wrench, disconnect connector (Q) from infrared power pack (P).



9. Using socket, remove three screws and washers (R) securing cover (S) on starter relay. Remove cover.

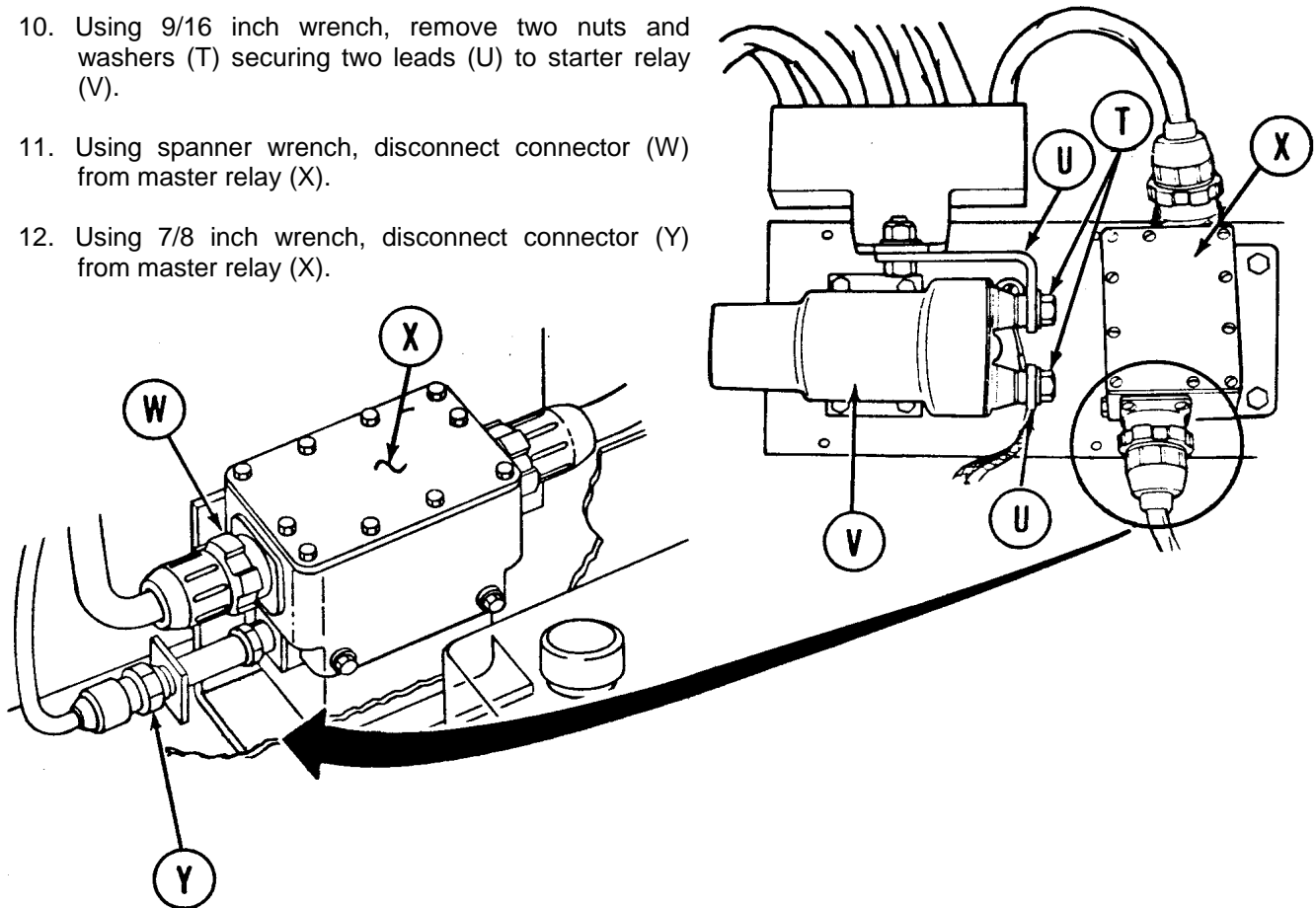


Go on to Sheet 5

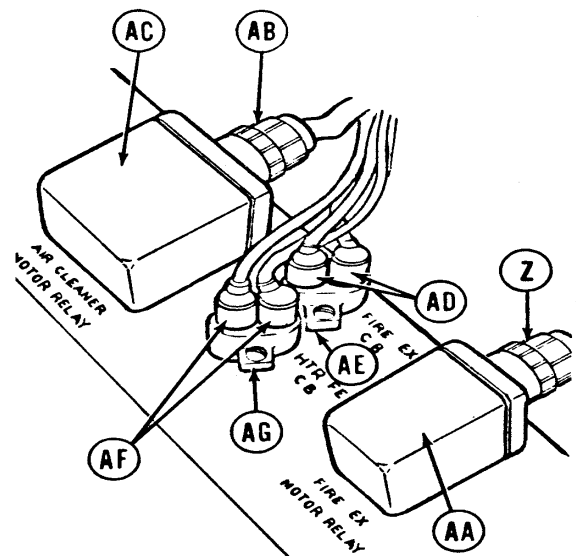
TA130584

**HULL-FRONT MASTER HARNESS ASSEMBLY REPLACEMENT (Sheet 5 of 21)**

10. Using 9/16 inch wrench, remove two nuts and washers (T) securing two leads (U) to starter relay (V).
11. Using spanner wrench, disconnect connector (W) from master relay (X).
12. Using 7/8 inch wrench, disconnect connector (Y) from master relay (X).



13. Using spanner wrench, disconnect connector (Z) from fire extinguisher relay (AA).
14. Using spanner wrench, disconnect connector (AB) from air cleaner relay (AC).
15. Using hands, disconnect two connectors (AD) from fire extinguisher circuit breaker (AE).
16. Using hands, disconnect two connectors (AF) from heater feed circuit breaker (AG).

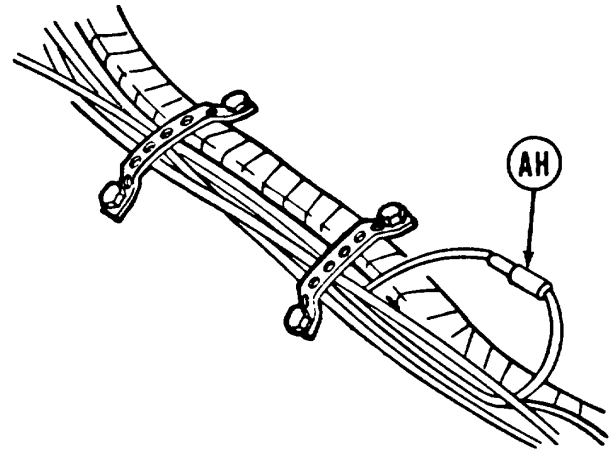
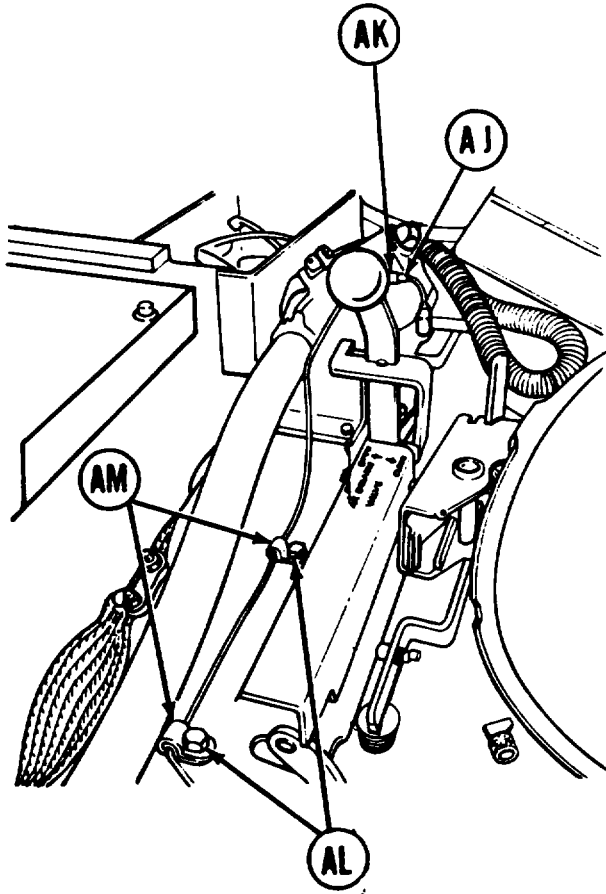


Go on to Sheet 6

TA130585

**HULL-FRONT MASTER HARNESS ASSEMBLY REPLACEMENT (Sheet 6 of 21)**

17. Using hands, disconnect intermediate bilge pump connector (AH).



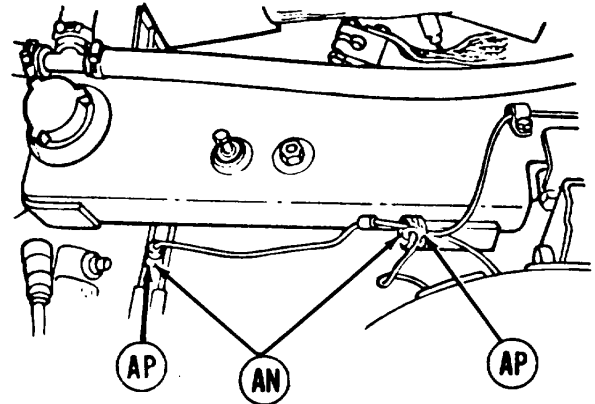
18. Using hands, disconnect connector (AJ) from gas particulate heater lead (AK).
19. Using socket, remove two screws and washers (AL), and clamps (AM).

Go on to Sheet 7

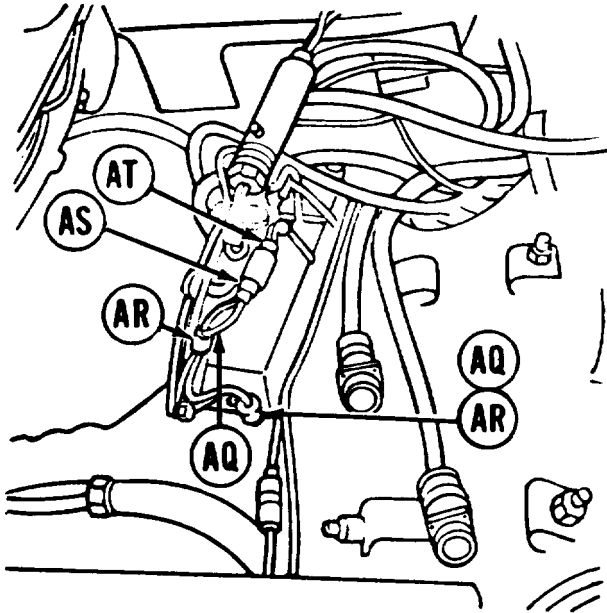
TA130586

**HULL-FRONT MASTER HARNESS ASSEMBLY REPLACEMENT (Sheet 7 of 21)**

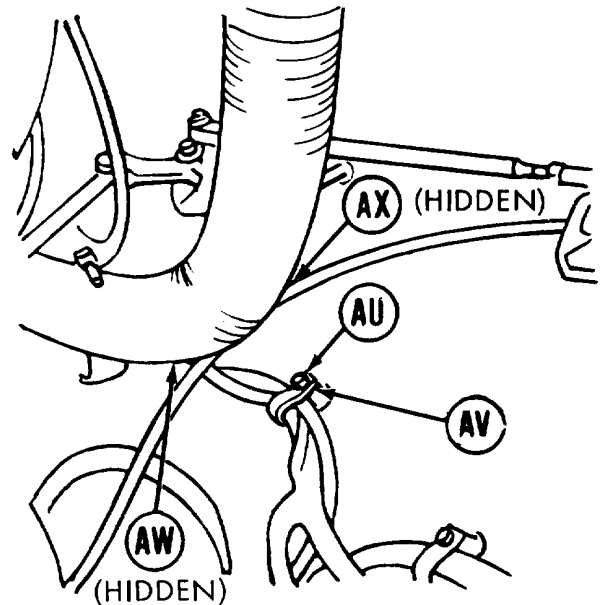
20. Using socket, remove two screws and washers (AN), and clamps (AP).



21. Using socket, remove two screws and washers (AQ), and clamps (AR).
22. Using hands, disconnect two connectors (AS) from primer pump leads (AT).

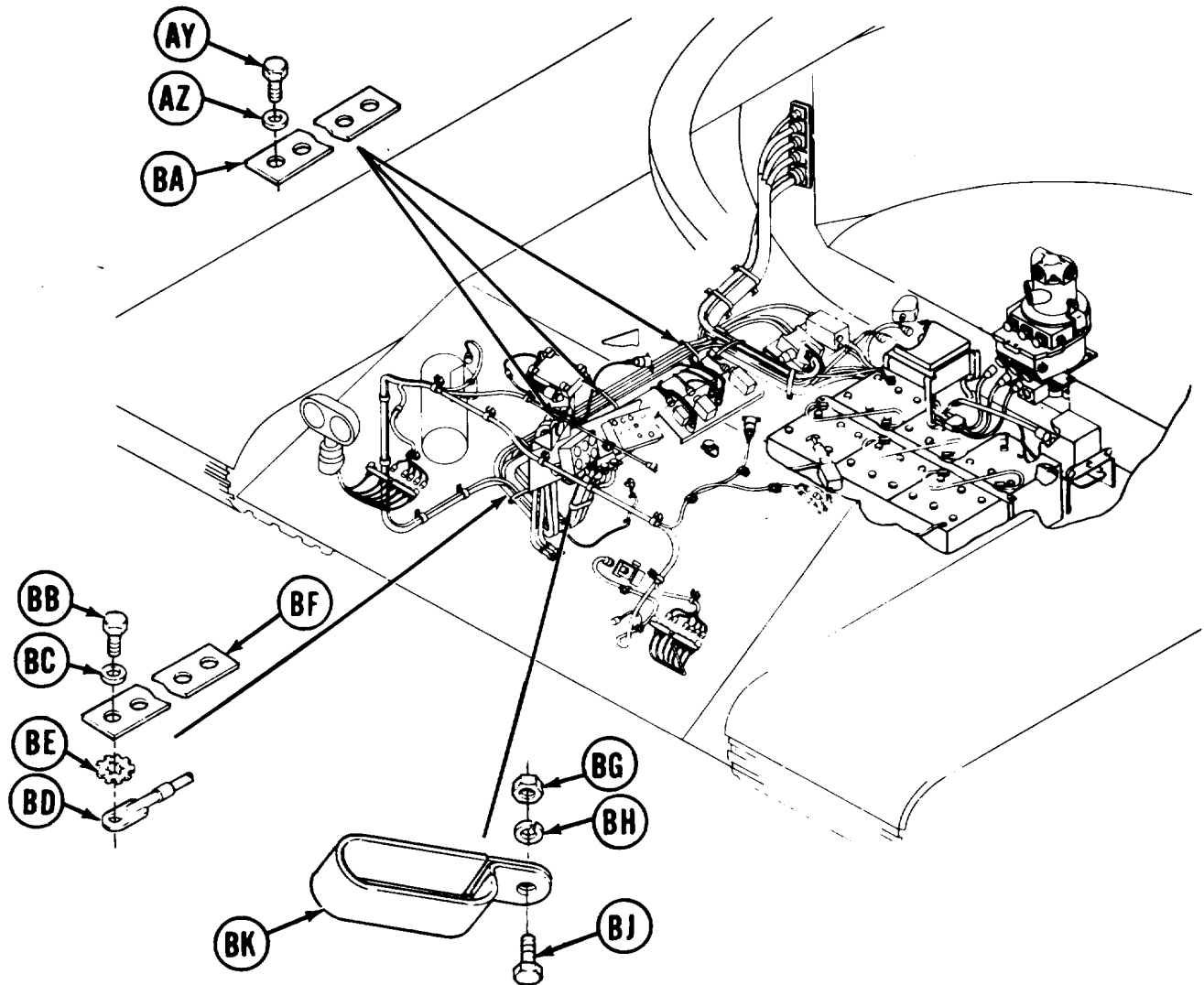


23. Using socket, remove screw and washer (AU), and clamp (AV).
24. Using socket, remove screw and washer (AW), and clamp (AX).



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## HULL-FRONT MASTER HARNESS ASSEMBLY REPLACEMENT (Sheet 8 of 21)

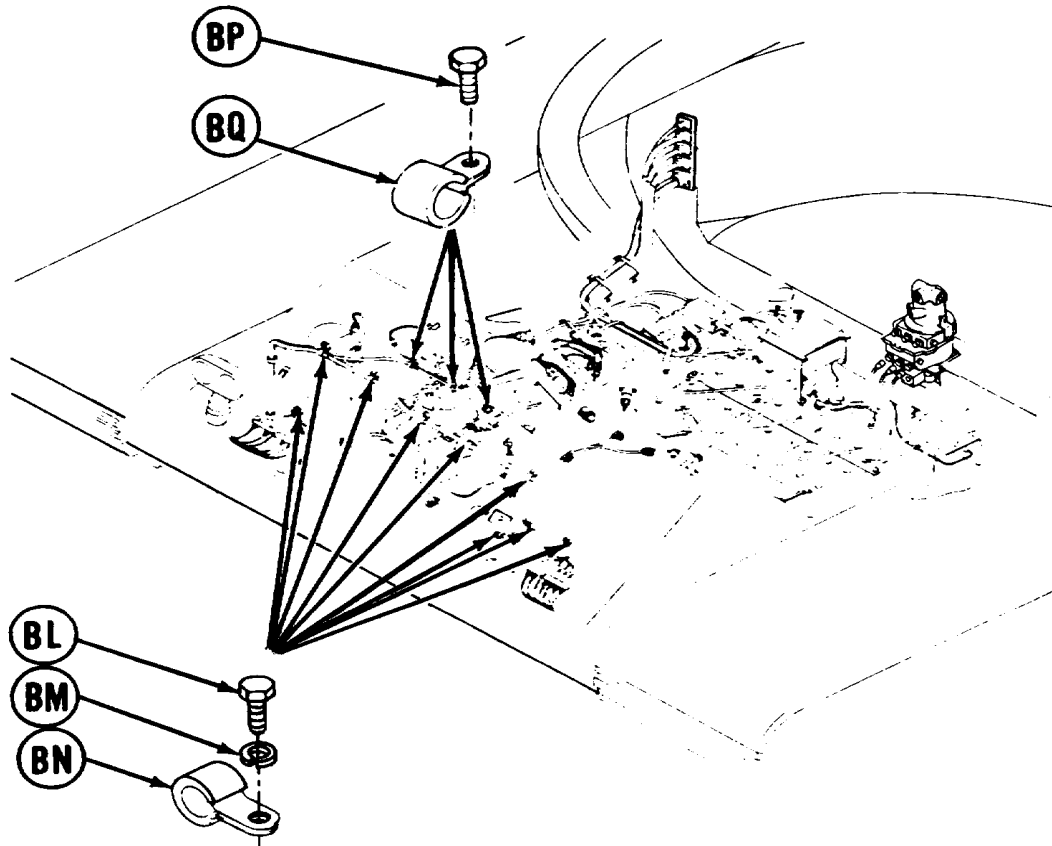


25. Using socket, remove three screws (AY) and washers (AZ) securing one end of straps (BA).
26. Using socket, remove screw (BB), washer (BC), ground lead (BD), and lockwasher (BE) from strap (BF).
27. Using socket and 7/16 inch wrench, remove nut (BG), washer (BH), bolt (BJ), and clamp (BK).

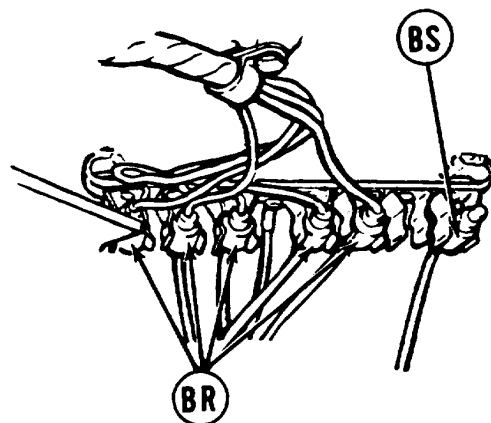
Go on to Sheet 9

TA130588

HULL-FRONT MASTER HARNESS ASSEMBLY REPLACEMENT (Sheet 9 of 21)



28. Using socket, remove nine screws (BL), washers (BM), and clamps (BN).
29. Using socket, remove three screws (BP) and clamps (BQ).
30. Using hands, remove five mated connectors (BR) from retainer bracket (BS). Pull connectors apart.



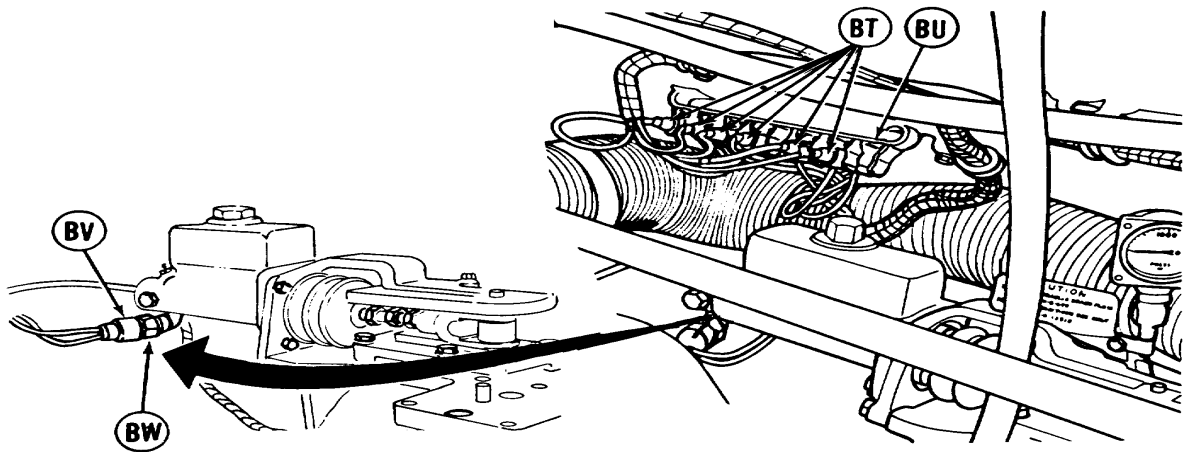
TA130589

Go on to Sheet 10

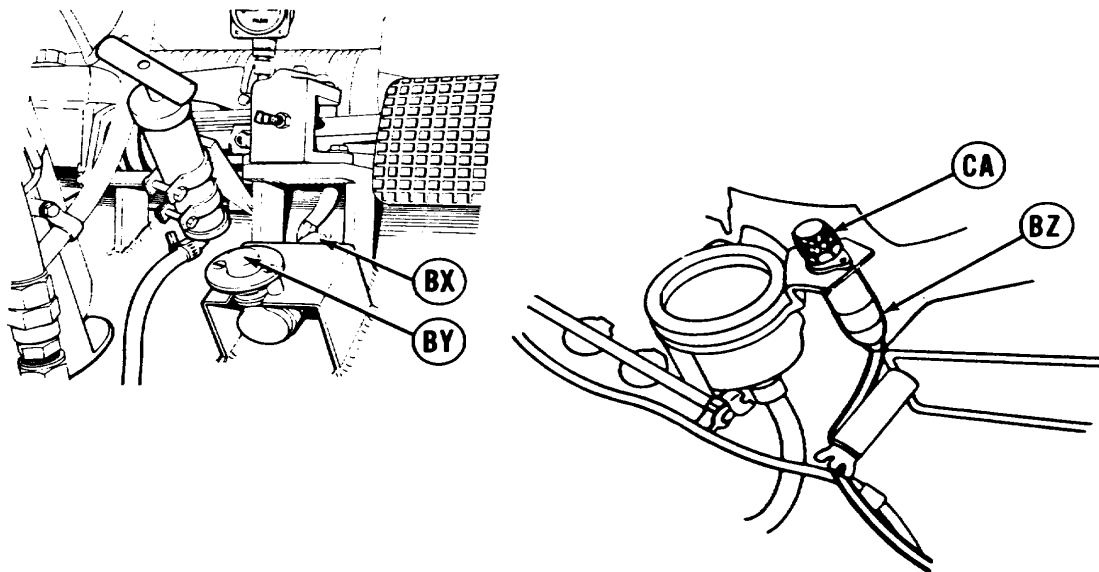


**HULL-FRONT MASTER HARNESS ASSEMBLY REPLACEMENT (Sheet 10 of 21)**

31. Using hands, remove six mated connectors (BT) from retainer bracket (BU). Pull connectors apart.
32. Using hands, disconnect connector (BV) from stoplight switch (BW).



33. Using spanner wrench, disconnect connector (BX) from dimmer switch (BY).



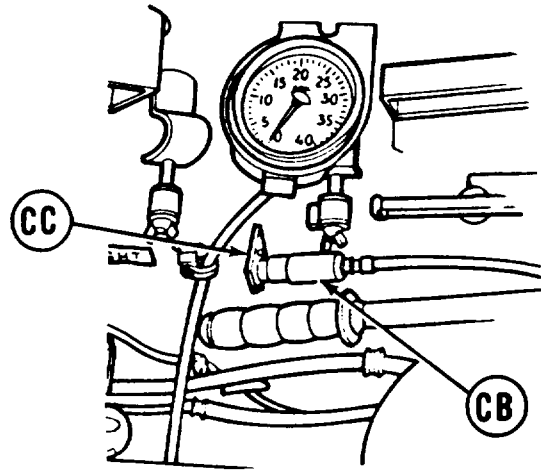
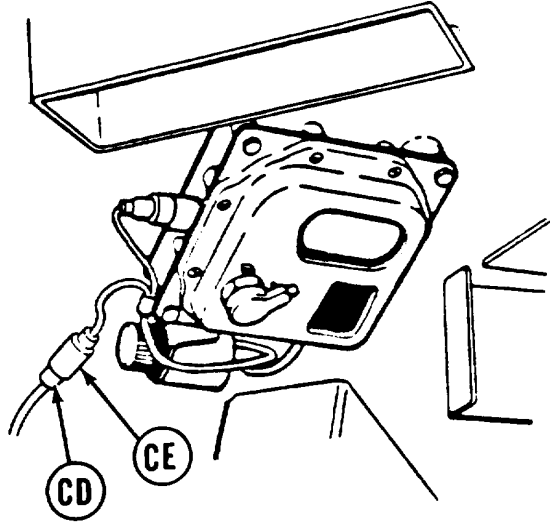
34. Using hands, disconnect connector (BZ) from powerplant warning light (CA).

Go on to Sheet 11

TA130590

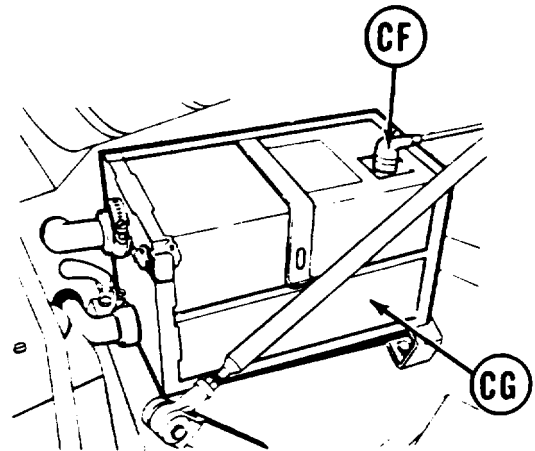
**HULL-FRONT MASTER HARNESS ASSEMBLY REPLACEMENT (Sheet 11 of 21)**

35. Using pliers, disconnect connector (BC) from stowage receptacle (CC).



36. Using hands, disconnect connector (CD) from domelight rheostat lead (CE).

37. Using pliers, disconnect connector (CF) from gas particulate blower (CG).



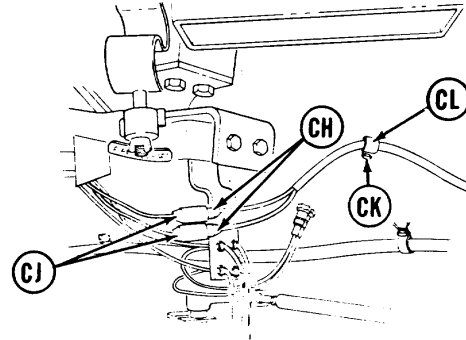
LOCATED IN RIGHT FRONT AREA  
OF DRIVER'S COMPARTMENT

Go on to Sheet 12

TA130591

**HULL-FRONT MASTER HARNESS ASSEMBLY REPLACEMENT (Sheet 12 of 21)**

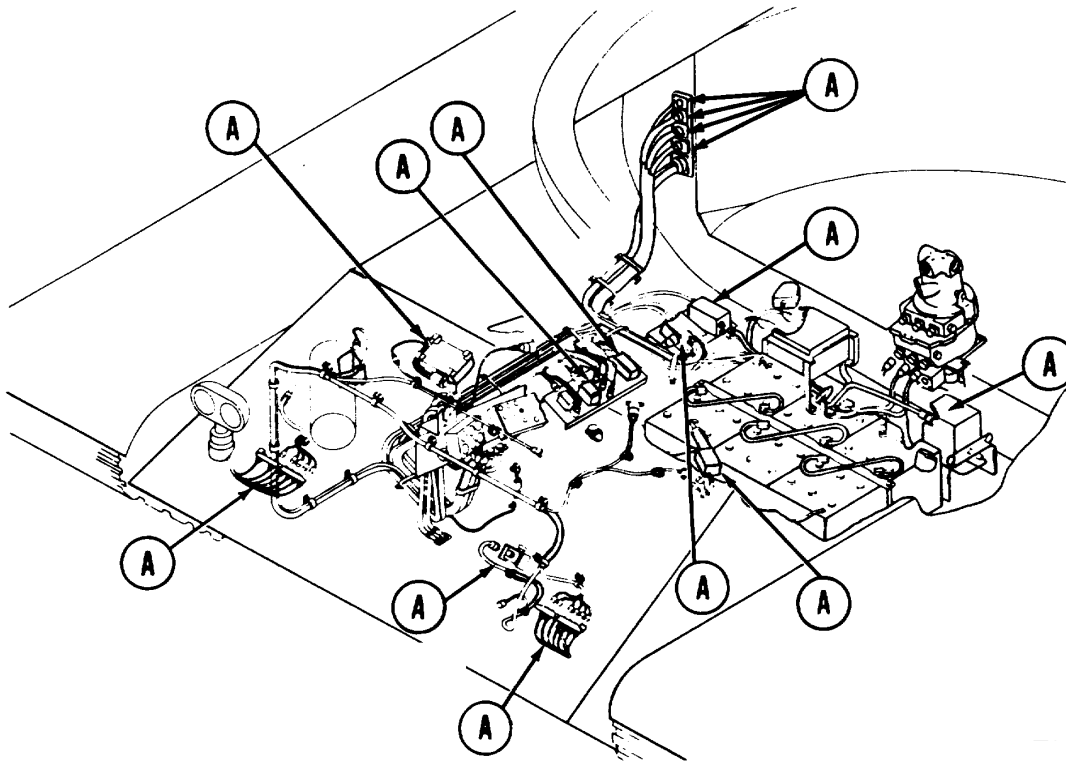
38. Using hands, disconnect two connectors (CH) from fire extinguisher leads (CJ).
39. Using socket, remove screw and washer (CK) and clamp (CL).
40. Remove harness assembly from vehicle.



**INSTALLATION:**

**NOTE**

The following illustration will aid in installing the harness assembly.



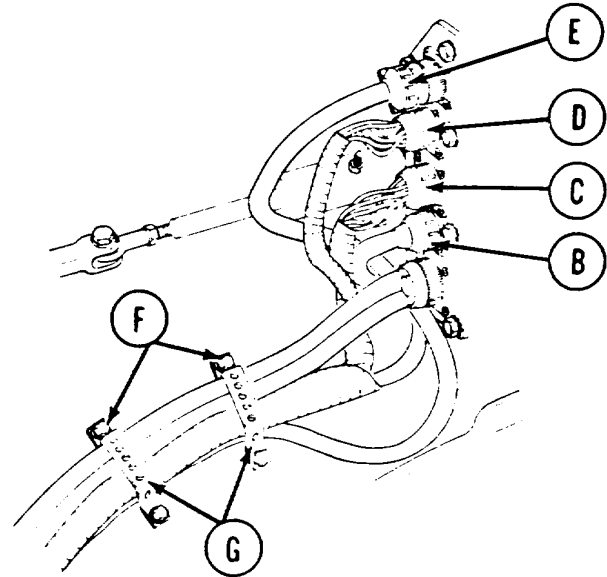
1. Position harness assembly (A) in vehicle as shown.

Go on to Sheet 13

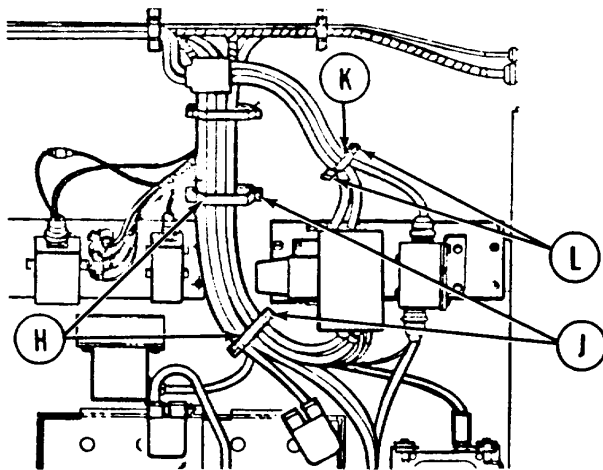
TA130592

**HULL-FRONT MASTER HARNESS ASSEMBLY REPLACEMENT (Sheet 13 of 21)**

2. Connect connector (B) to bulkhead connector. Using spanner wrench, tighten connector.
3. Connect connector (C) to bulkhead connector. Using spanner wrench, tighten connector.
4. Connect connector (D) to bulkhead connector. Using spanner wrench, tighten connector.
5. Connect connector (E) to bulkhead connector. Using spanner wrench, tighten connector.
6. Install two washers and screws (F) in end of straps (G). Using socket, tighten screws.



7. Install two straps (H) and four screws and washers (J). Using socket, tighten screws.
8. Install strap (K) and two screws and washers (L). Using socket, tighten screws.



Go on to Sheet 14

TA130593

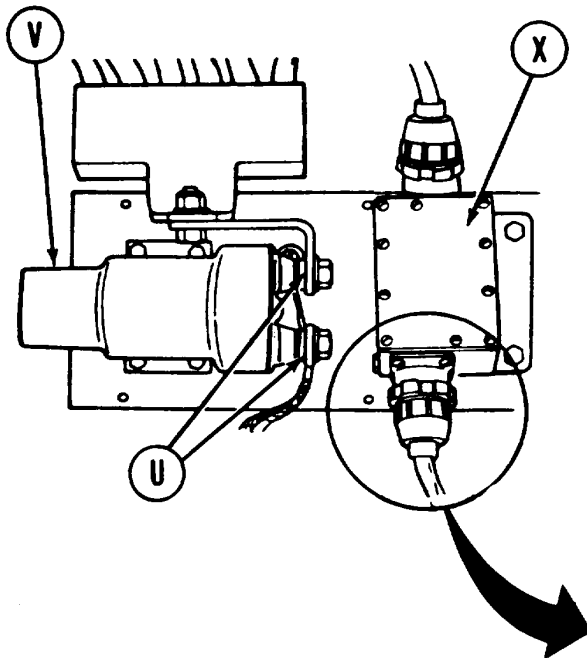
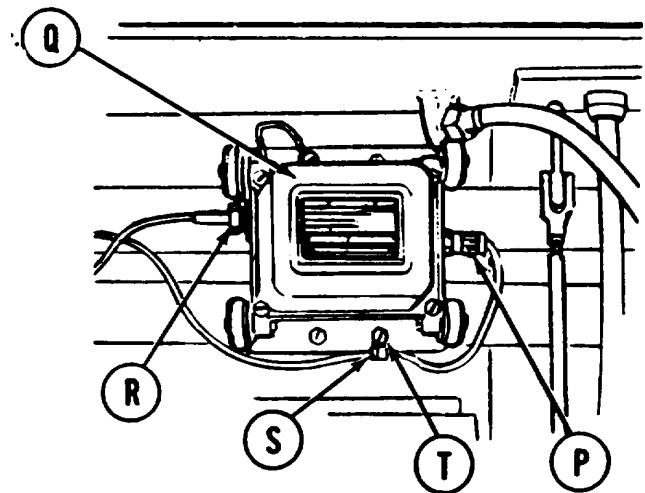
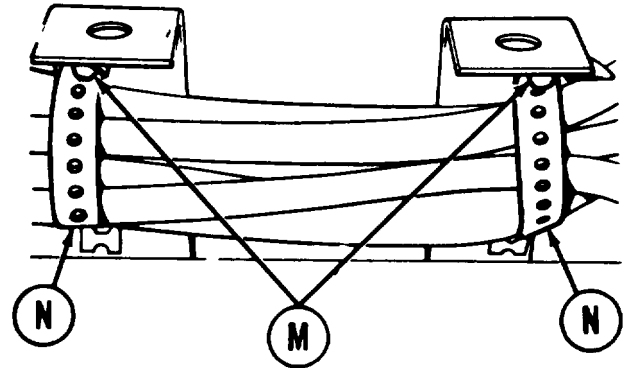
**HULL FRONT MASTER HARNESS ASSEMBLY REPLACEMENT (Sheet 14 of 21)**

9. Install two screws and washers (M) in one end of straps (N). Using socket, tighten screws.

**NOTE**

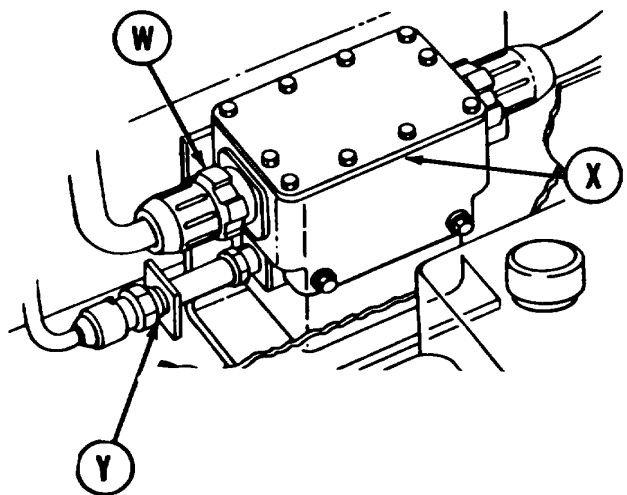
**Perform steps 9 through 12 if your vehicle is equipped with the infrared powerpack.**

10. Connect connector (P) to infrared powerpack (Q). Using pliers, tighten connector.
11. Connect connector (R) to infrared powerpack (Q). Using adjustable wrench, tighten connector.
12. Install clamp (S), screw, and washer (T). Using 1/2 inch wrench, tighten screw.



1:

3. Install two leads, washers, and nuts (U) on starter relay (V). Using 9/16 inch wrench, tighten nuts.



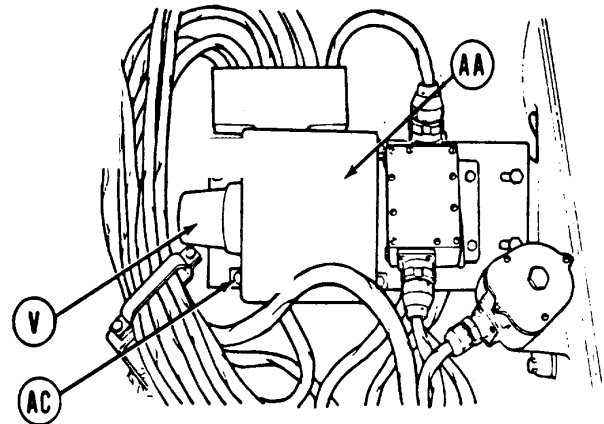
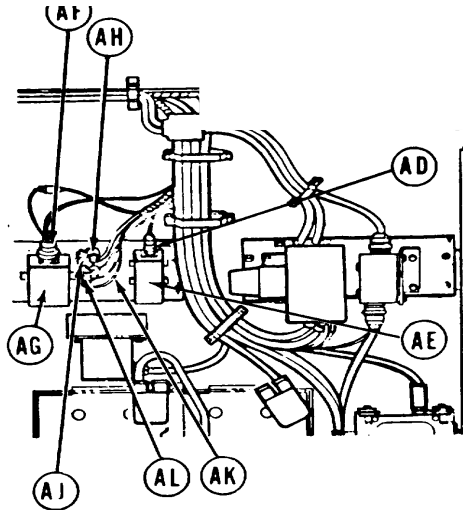
14. Using spanner wrench, connect connector (W) to master relay (X).
15. Using 7/8 inch wrench, connect connector (Y) to master relay (X).

TA252621

Go on to Sheet 15

**HULL-FRONT MASTER HARNESS ASSEMBLY REPLACEMENT (Sheet 15 of 21)**

16. Position cover (AA) over starter relay (V).
17. Install three screws and washers (AC). Using socket, tighten screws.



18. Connect connector (AD) to fire extinguisher relay (AE). Using spanner wrench, tighten connector.
19. Connect connector (AF) to air cleaner relay (AG). Using spanner wrench, tighten connector.

**NOTE**

**Apply silicone compound (Item 10, Appendix B) to male and female rubber electrical connectors. Be sure silicone compound does not get onto electrical contacts.**

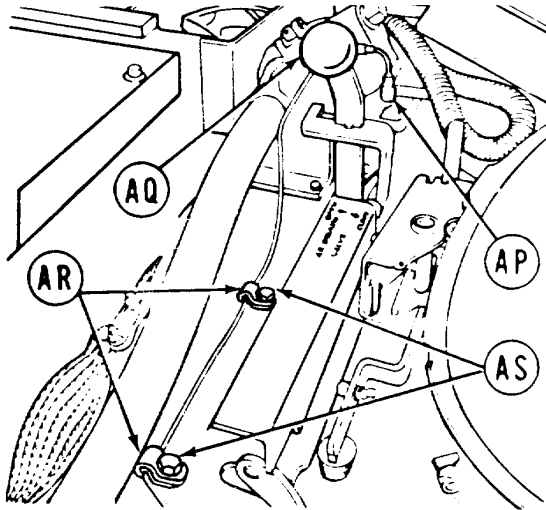
20. Connect two leads (AH) to fire extinguisher circuit breaker (AJ).
21. Connect two leads (AK) to heater feed circuit breaker (AL).

Go on to Sheet 16

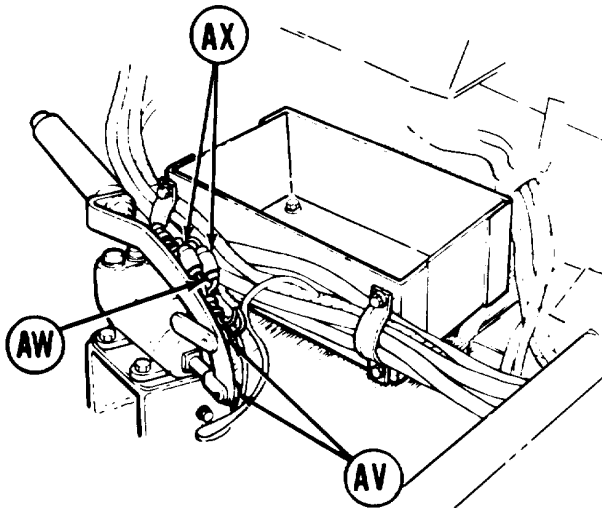
TA130595

**HULL-FRONT MASTER HARNESS ASSEMBLY REPLACEMENT (Sheet 16 of 21)**

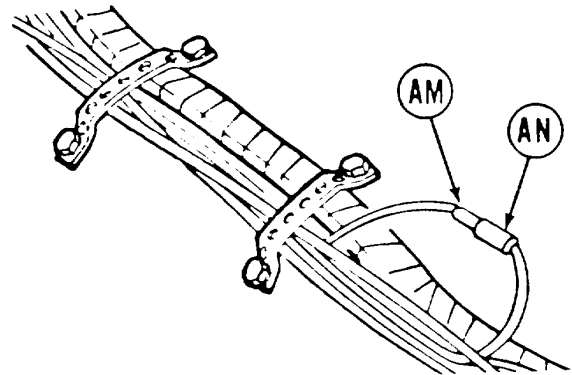
22. Connect connector (AM) to intermediate bilge pump connector (AN).



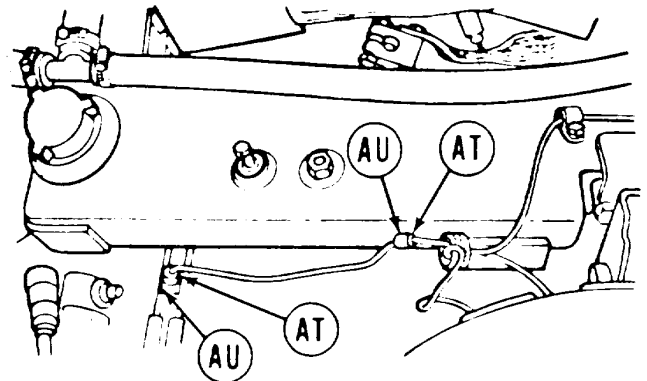
25. Install two clamps (AT) and screws and washers (AU). Using socket, tighten screws.



Go on to Sheet 17



23. Connect two connectors (AP) to gas particulate heater lead (AQ).
24. Install two clamps (AR) and screws and washers (AS). Using socket, tighten screws.

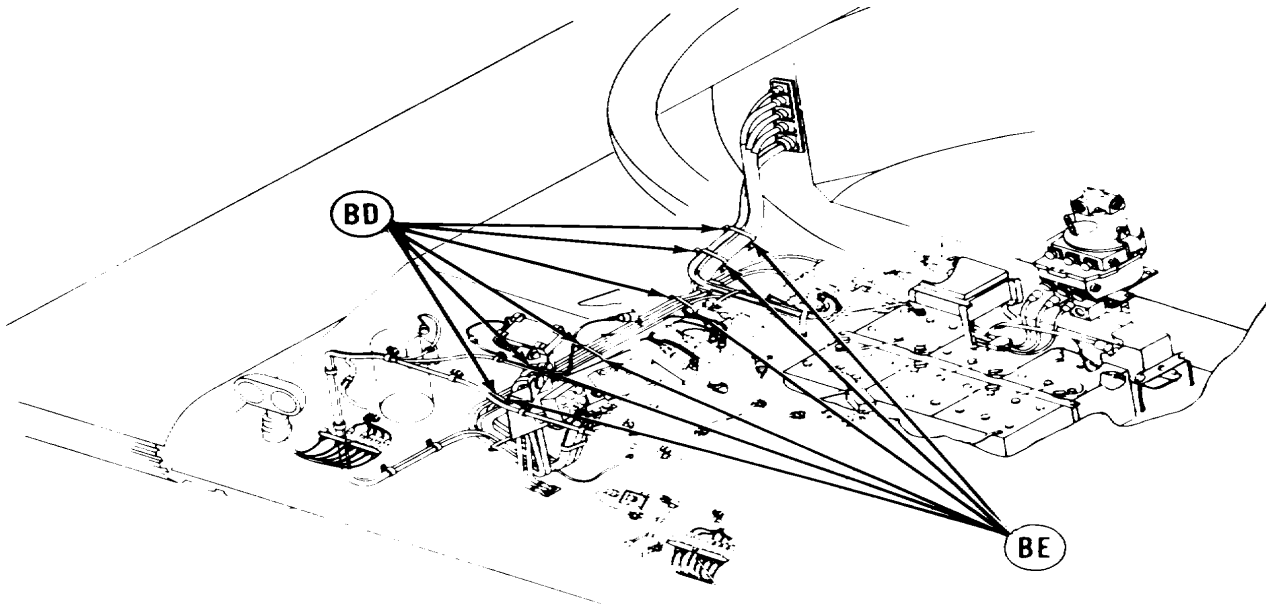
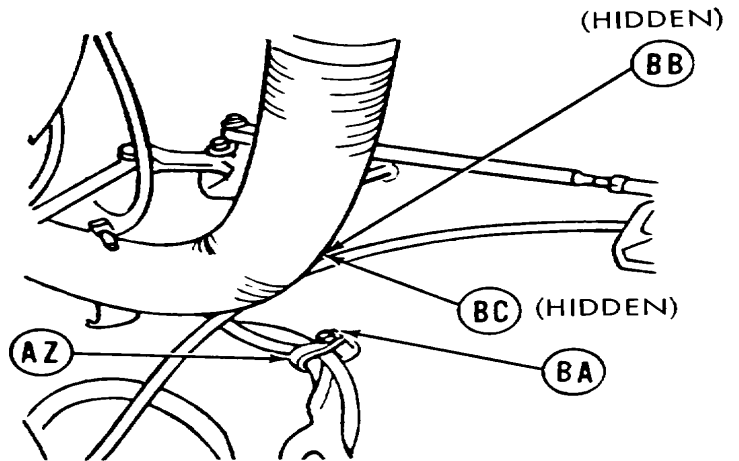


26. Install two clamps, screws, and washers (AV). Using socket, tighten screws.
27. Apply silicone compound (Item 10, Appendix B) to connectors (AW) and connect to purge pump connectors (AX).

TA252622

**HULL-FRONT HARNESS ASSEMBLY REPACEMENT (Sheet 17 of 21)**

- 28. Install clamp (AZ) and screw and washer (BA). Using socket, tighten screw.
- 29. Install clamp (BB) and screw and washer (BC). Using socket, tighten screw.



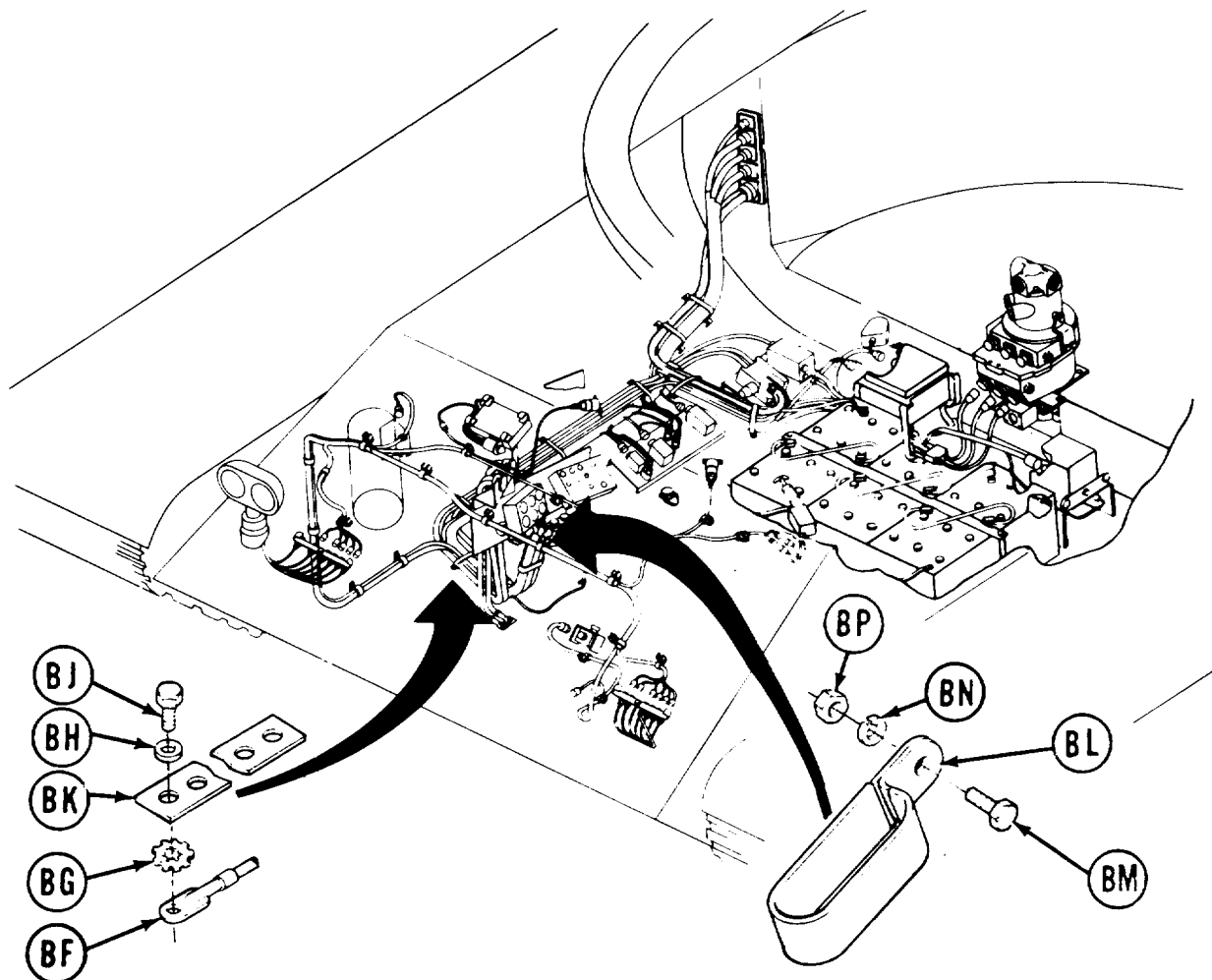
- 30. Install six screws and washers (BD) into one end of straps (BE). Using socket, tighten screws.

Go to Sheet 18

TA252623



HULL-FRONT MASTER HARNESS ASSEMBLY REPLACEMENT (Sheet 18 of 21)



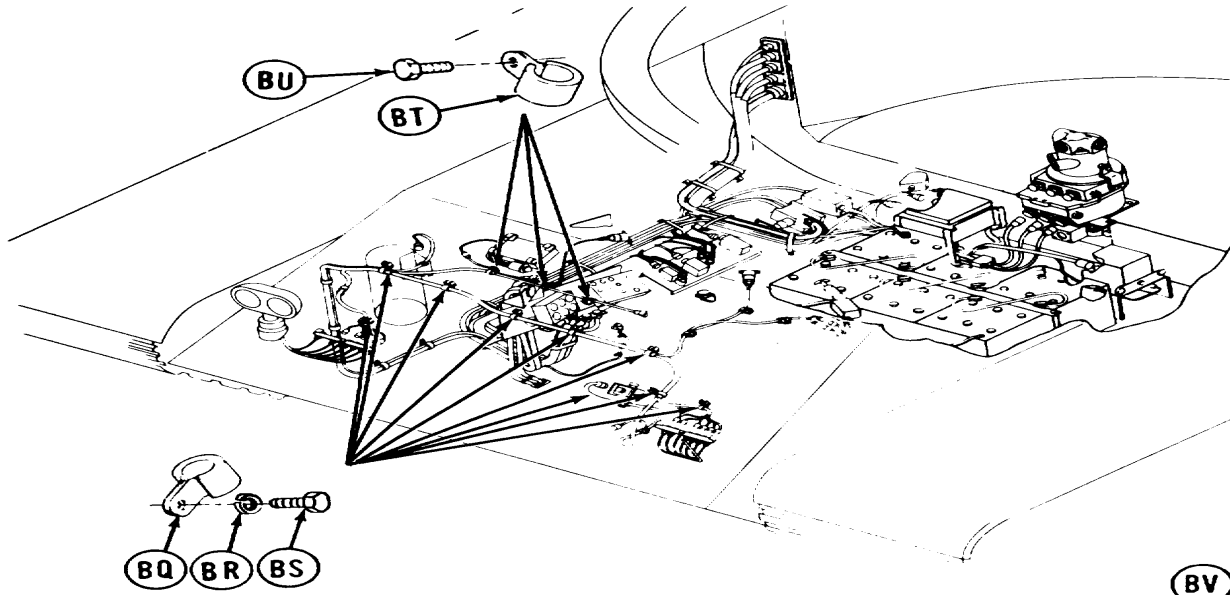
31. Install ground lead (BF), lockwasher (BG), washer (BH), and screw (BJ) into one end of strap (BK). Using socket, tighten screw.

32. Install clamp (BL), bolt (BM), washer (BN), and nut (BP). Using socket and 7/16 inch wrench, tighten nut.

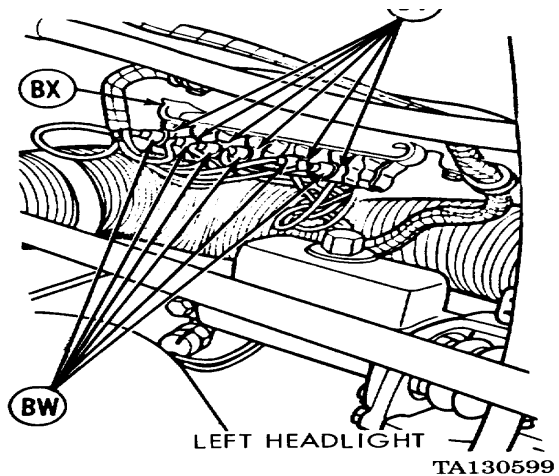
Go on to Sheet 19

TA130598

HULL-FRONT MASTER HARNESS ASSEMBLY REPLACEMENT (Sheet 19 of 21)



33. Install nine clamps (BQ), lockwashers (BR), and screws (BS). Using socket, tighten screws.
34. Install three clamps (BT) and three screws (BU). Using socket, tighten screws.
35. Apply silicone compound (Item 10, Appendix B) to six connectors (BV) and connect to connectors (BW).
36. Using hands, insert connectors into retainer bracket (BX).

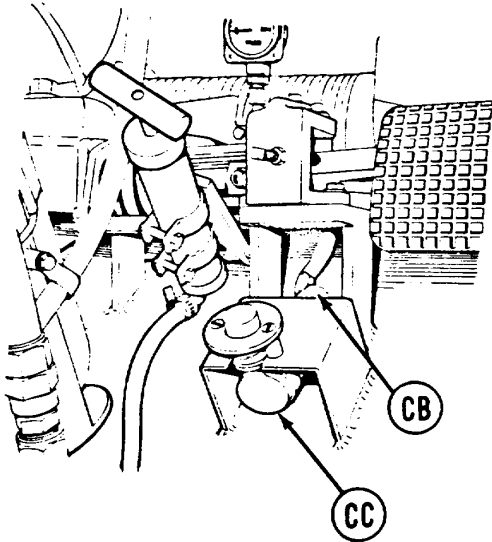


Go on to Sheet 20

**HULL-FRONT MASTER HARNESS ASSEMBLY REPLACEMENT (Sheet 20 of 21)**

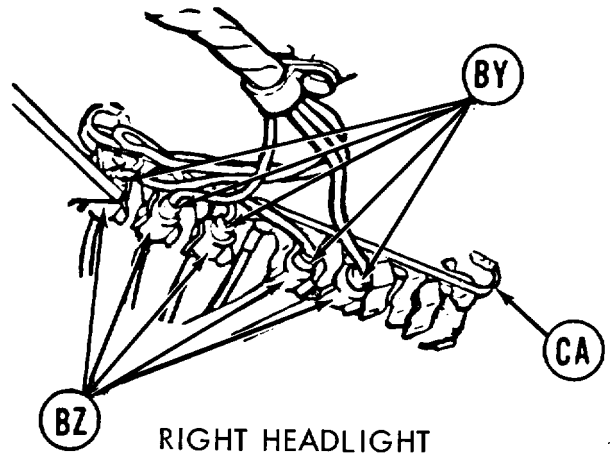
37. Apply silicone compound (Item 10, Appendix B) to five connectors (BY) and connect to connectors (BZ).

38. Using hands, insert connectors into retainer (CA).

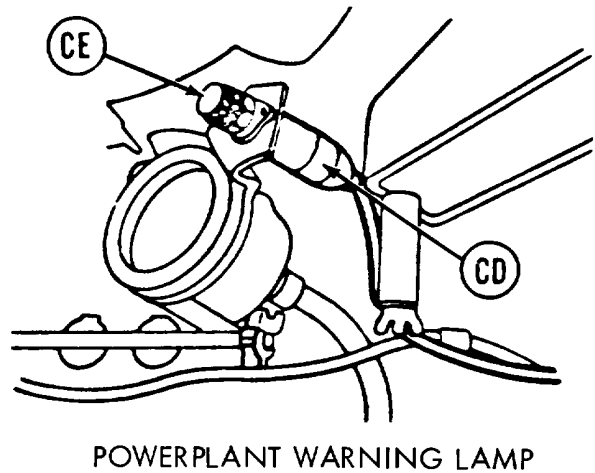


40. Connect connector (CD) to powerplant warning light (CE).

41. Using hands, tighten connector (CD).



39. Connect connector (CB) to dimmer switch (CC). Using spanner wrench, tighten connector.

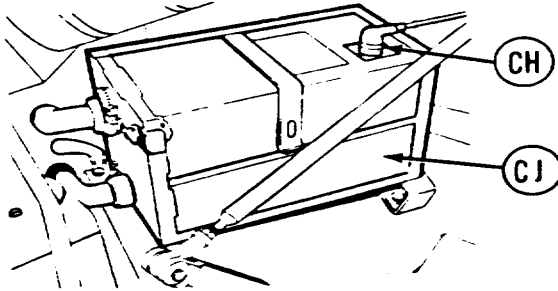


Go on to Sheet 21

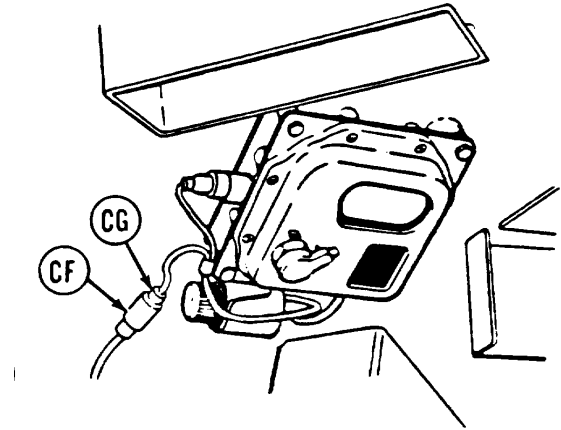
TA130600

**HULL-FRONT MASTER HARNESS ASSEMBLY REPLACEMENT (Sheet 21 of 21)**

42. Apply silicone compound (Item 10, Appendix B) to connector (CF) and connect to domelight rheostat lead (CG).



LOCATED IN RIGHT FRONT AREA  
OF DRIVER'S COMPARTMENT



44. Install right ammunition rack (page 11-28).
45. Install personnel heater (TM 9-2350-222-20-1).
46. Install fire extinguisher cylinders (TM 9-2350-222-20-1).
47. Install left heater duct (TM 9-2350-222-20-1).
48. Install generator regulator (TM 9-2350-222-20-1).
49. Install driver's escape hatch (TM 9-2350-222-20-1).
50. Install turret (TM 9-2350-222-34-2).
43. Connect connector (CH) to gas particulate blower (CJ). Using pliers, tighten connector.

End of Task

TA130601

**HULL POWER WIRING HARNESS ASSEMBLY REPLACEMENT (Sheet 1 of 14)**

PROCEDURE INDEX

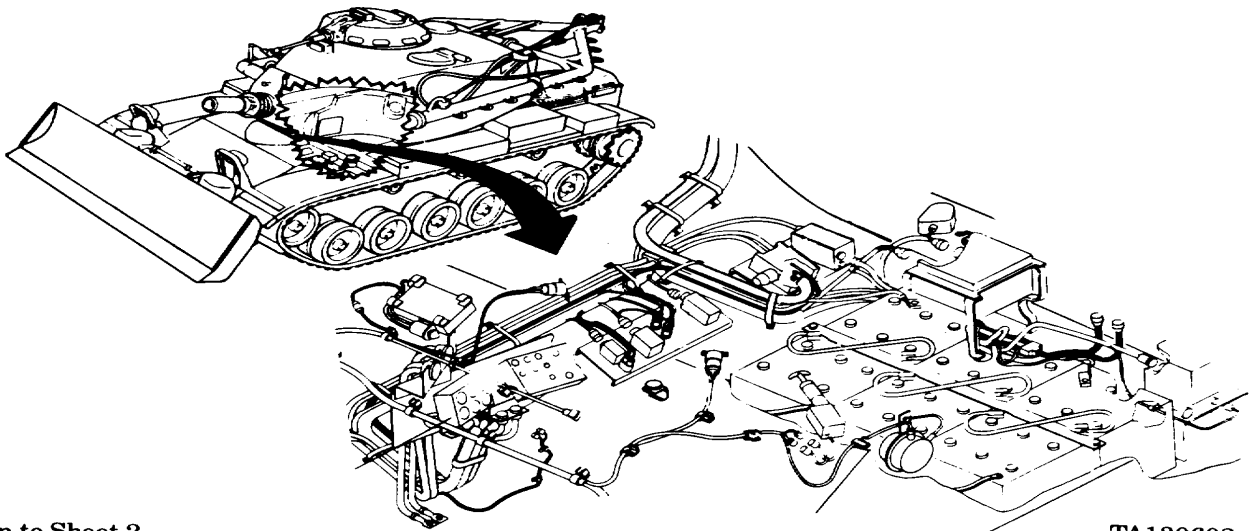
PROCEDURE	PAGE
Removal	5-24
Installation	5-30

TOOLS: Spanner wrench  
 12 in. adjustable wrench  
 Ratchet with 1/2 in. drive  
 7/16 in. socket with 1/2 in. drive  
 7/16 in. combination box and open end wrench  
 9/16 in. combination box and open end wrench  
 1/2 in. combination box and open end wrench  
 1-1/8 in. open end wrench

SUPPLIES: Silicone compound (Item 10, Appendix B)

REFERENCES: TM 9-2350-222-10  
 TM 9-2350-222-20-1

PRELIMINARY PROCEDURE: Remove bilge pump connector from dummy shell (TM 9-2350-222-20-1)  
 Disconnect three battery ground straps (TM 9-2350-222-20-1)  
 Remove generator regulator (TM 9-2350-222-20-1)  
 Remove gas particulate slipping air hoses (TM 9-2350-222-20-1)  
 Remove gas particulate air filters (TM 9-2350-222-20-1)  
 Traverse turret as required for access to harnesses under turret platform (TM 9-2350-222-10)

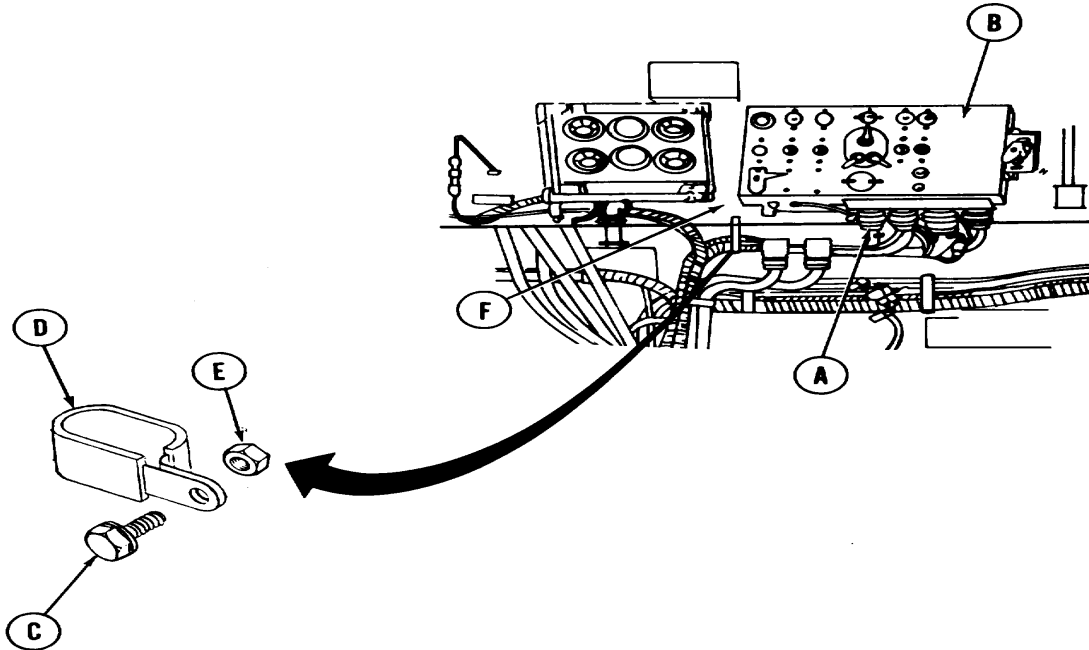


Go on to Sheet 2

TA130602

**HULL POWER WIRING HARNESS ASSEMBLY REPLACEMENT (Sheet 2 of 14)****REMOVAL:**

1. Using spanner wrench, disconnect connector (A) from master control panel (B).

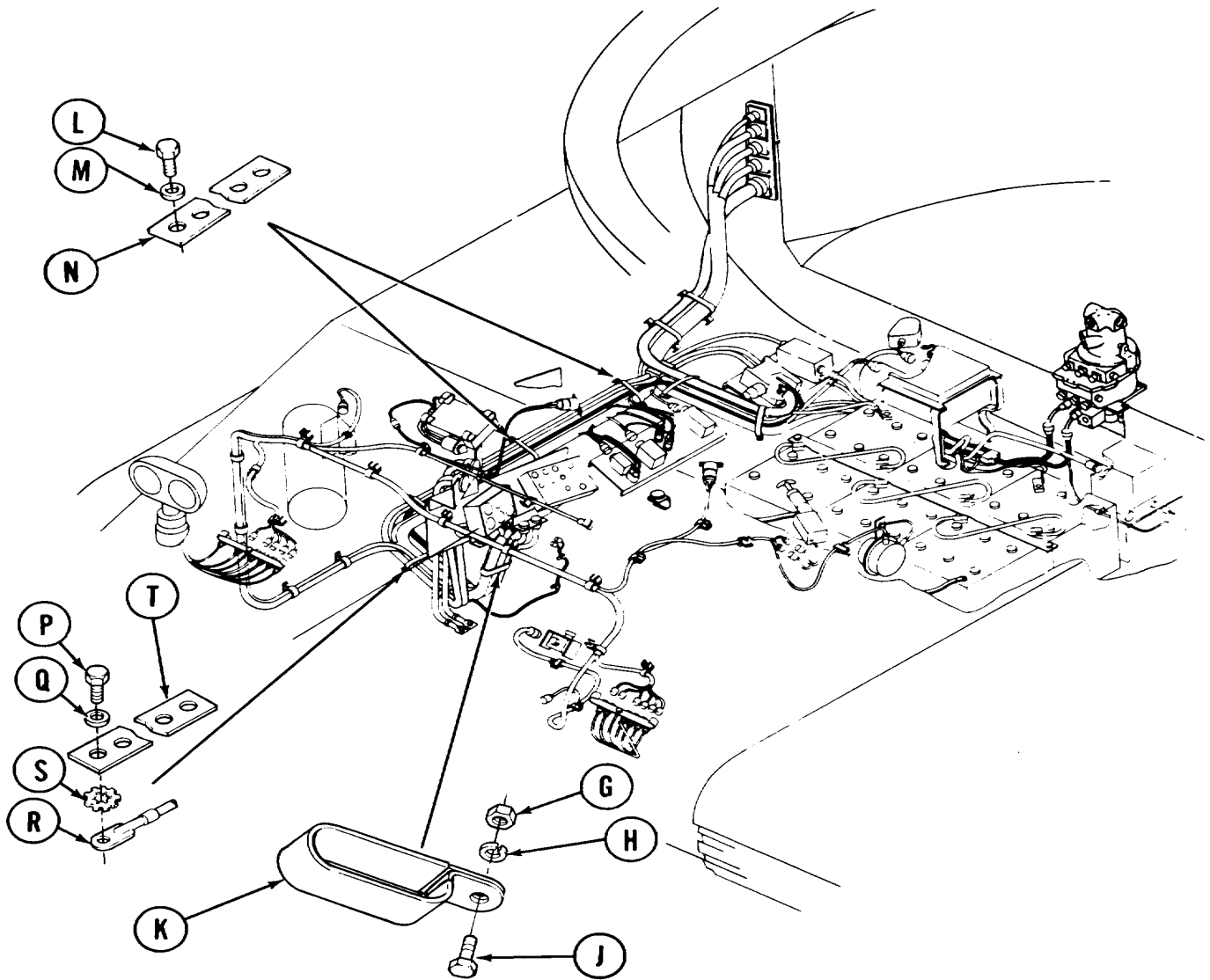


2. Using 7/16 inch wrench and socket, remove screw and lockwasher (C), clamp (D), and nut (E) from plate (F). Remove clamp from wiring harness.

Go on to Sheet 3

TA130603

HULL POWER WIRING HARNESS ASSEMBLY REPLACEMENT (Sheet 3 of 14)



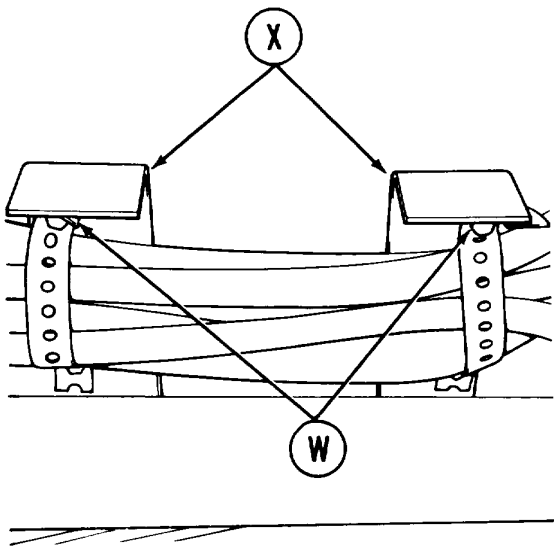
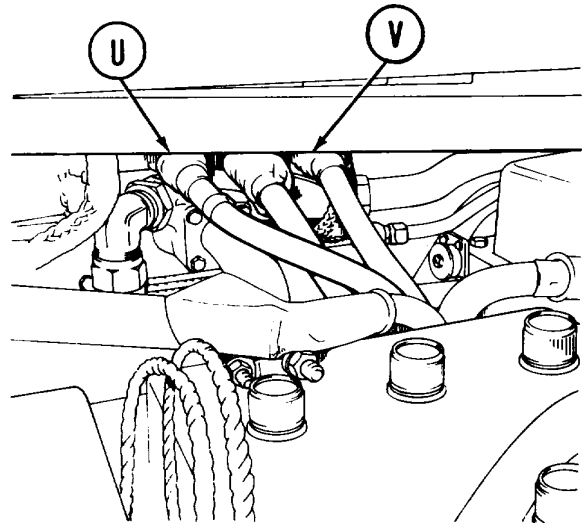
3. Using socket and 7/16 inch wrench, remove nut (G), washer (H), bolt (J), and clamp (K).
4. Using socket, remove two screws (L) and washers (M) securing one end of straps (N).
5. Using socket, remove screw (P), washer (Q), ground lead (R), and lockwasher (S) from strap (T).

Go on to Sheet 4

TA130604

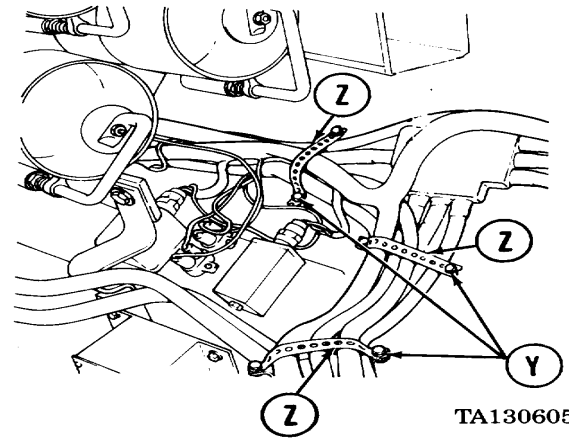
**HULL POWER WIRING HARNESS ASSEMBLY REPLACEMENT (Sheet 4 of 14)**

6. Using spanner wrench, loosen connector (U) from slipring.
7. Manually remove connector (U) from slipring.
8. Using spanner wrench, loosen connector (V) from slipring.
9. Manually remove connector (V) from slipring.



10. Using socket, remove two screws (W) from brackets (X). Move cable to top of brackets (X).

11. Using socket, remove three screws (Y) from straps (Z).



TA130605

Go on to Sheet 5

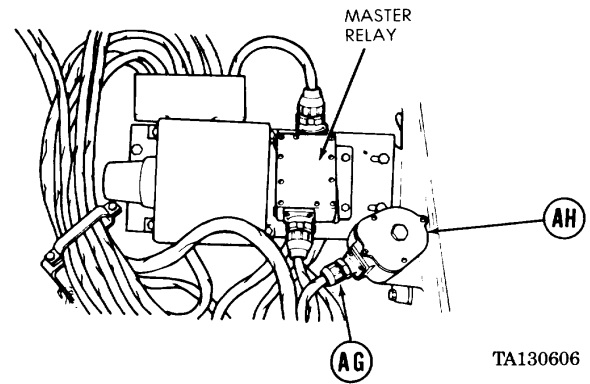
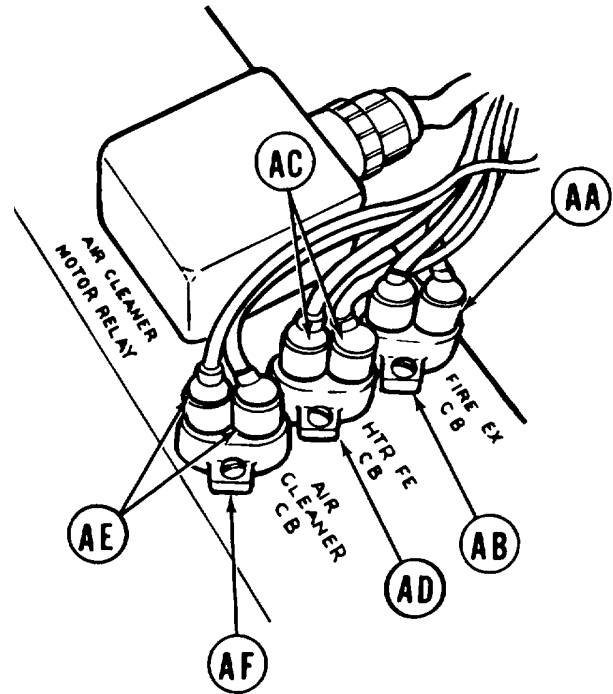


HULL POWER WIRING HARNESS ASSEMBLY REPLACEMENT (Sheet 5 of 14)

**NOTE**

**Steps 12-15 only for vehicles equipped as shown.**

12. Using fingers, disconnect two connectors (AA) from fire extinguisher circuit breaker (AB).
13. Using fingers, disconnect two connectors (AC) from heater fuel circuit breaker (AD).
14. Using fingers, disconnect two connectors (AE) from air cleaner circuit breaker (AF).
15. Using 1-1/8 inch wrench, disconnect connector (AG) from voltage adjusting rheostat control box (AH).

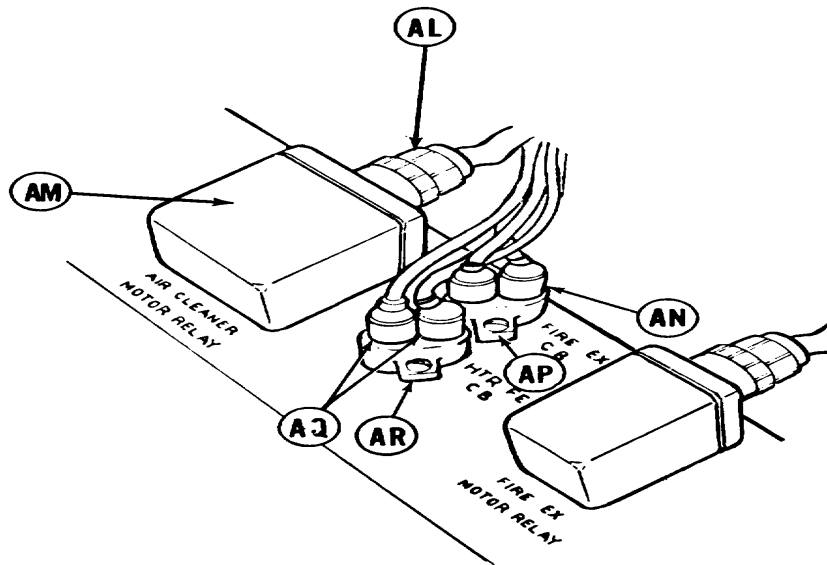
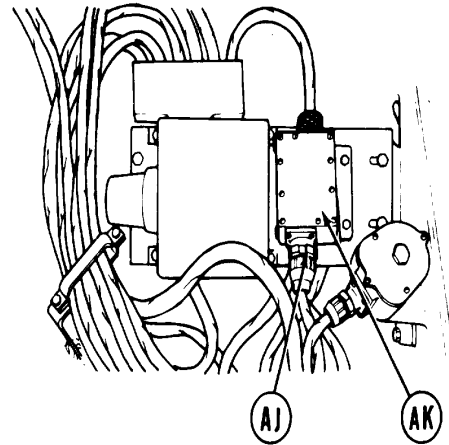


TA130606

Go on to Sheet 6

**HULL POWER WIRING HARNESS ASSEMBLY REPLACEMENT (Sheet 6 of 14)**

16. Using spanner wrench, disconnect connector (AJ) from master relay (AK).
17. Using spanner wrench, disconnect connector (AL) from air cleaner motor relay (AM).
18. Using hands, disconnect two leads (AN) from fire extinguisher circuit breaker (AP).
19. Using hands, disconnect two connectors (AQ) from heater feed circuit breaker (AR).



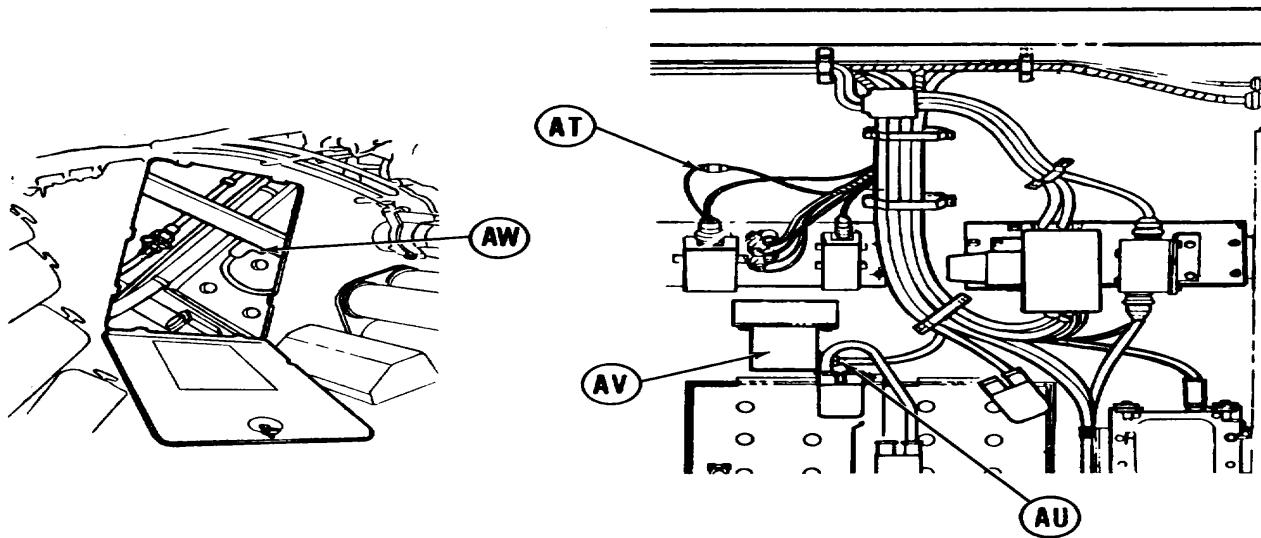
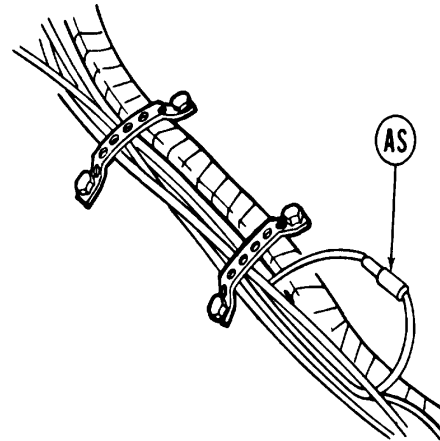
TA130607

Go on to Sheet 7

TA130607

**HULL POWER WIRING HARNESS ASSEMBLY REPLACEMENT (Sheet 7 of 14)**

20. Using hands, disconnect intermediate bilge pump connector (AS).
21. Using hands, disconnect air cleaner motor relay connector (AT).
22. Using spanner wrench, disconnect connector (AU) from enclosure assembly (AV).
23. Slide boot off center battery terminal.
24. Using 1/2 inch and 9/16 inch wrenches, disconnect small lead (CKT 400,459, 975) from center battery (AW).
25. Remove hull power wiring harness assembly from vehicle.



TA130608

Go on to Sheet 8

TA130608

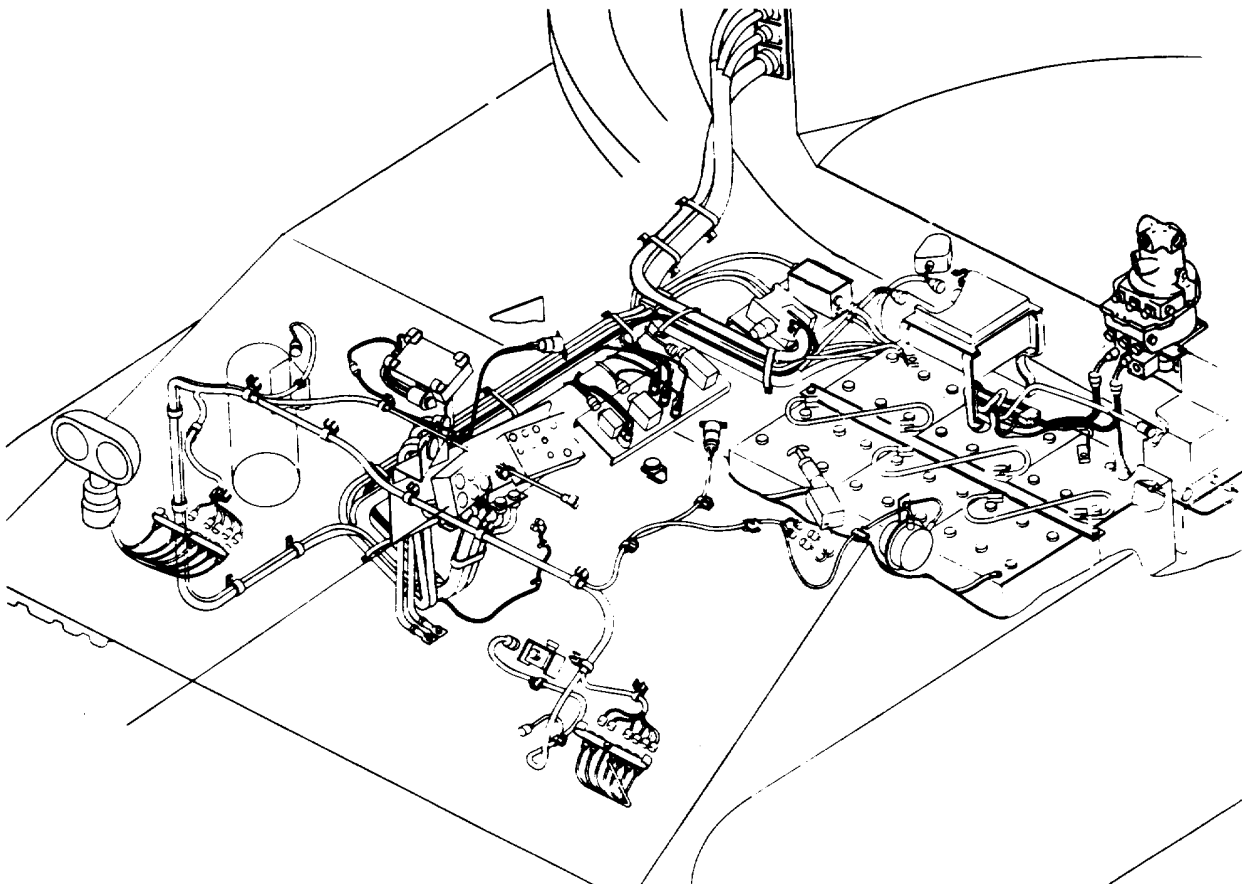
**HULL POWER WIRING HARNESS ASSEMBLY REPLACEMENT (Sheet 8 of 14)****INSTALLATION:****NOTE**

**Step 1 should be done with two people to make sure hull power wiring harness assembly is placed correctly into vehicle.**

1. With assistance from another person, position hull power wiring harness assembly into vehicle as shown, under turret platform from slipring, past voltage regulator, between master relay and fire extinguisher relay, passing harness against hull wall under ammunition rack and up to master control panel.

**NOTE**

**The following illustration will aid in installing the harness assembly.**

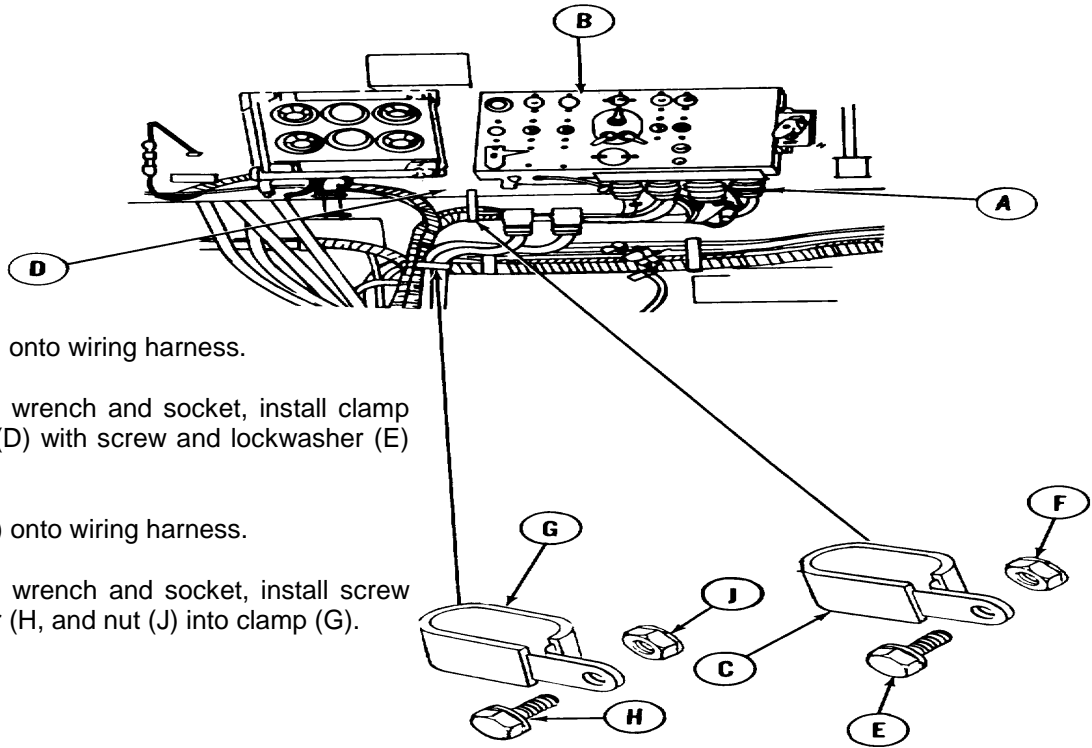


Go on to Sheet 9

TAZ230609

**HULL POWER WIRING HARNESS ASSEMBLY REPLACEMENT (Sheet 9 of 14)**

2. Using spanner wrench, connect connector (A) to master control panel (B).
3. Install bilge pump connector onto dummy shell (TM 9-2350-222-20-1).



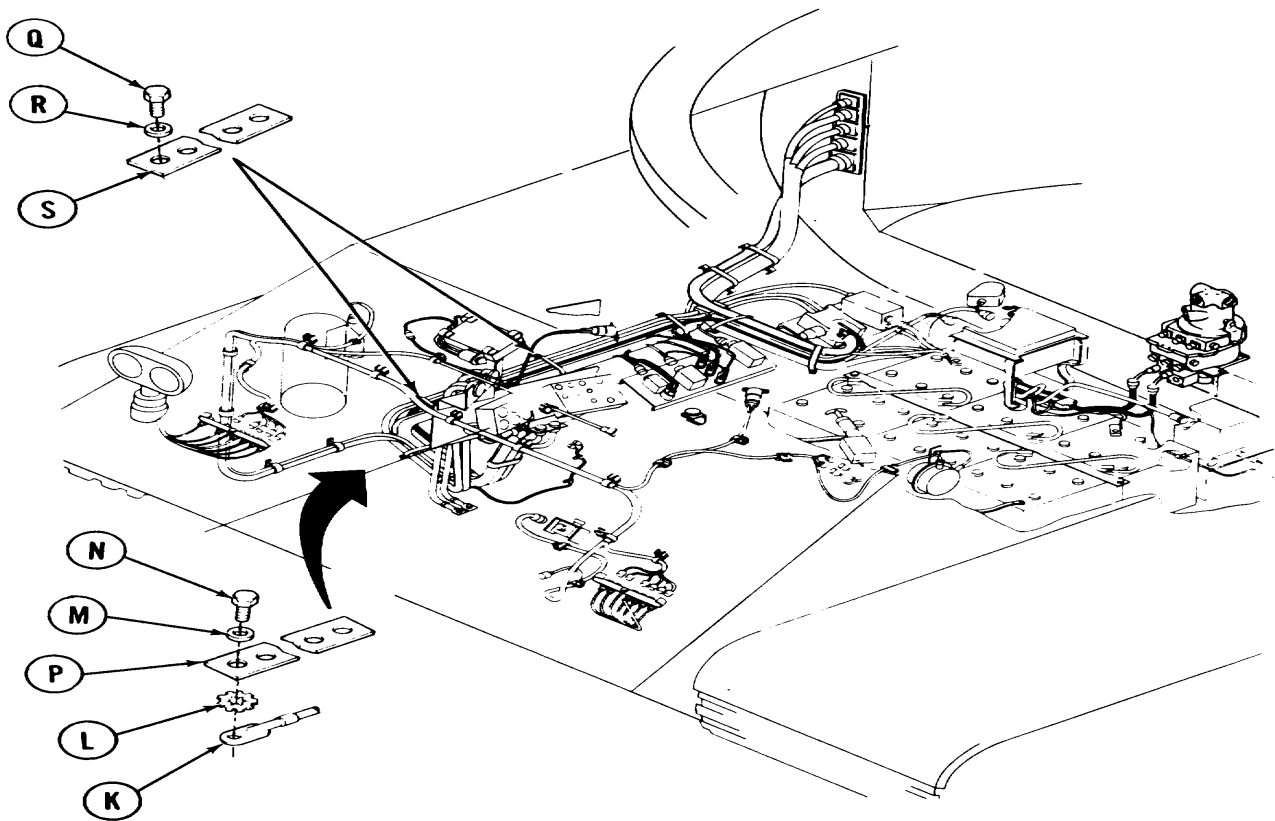
4. Install clamp (C) onto wiring harness.
5. Using 7/16 inch wrench and socket, install clamp (C) onto plate (D) with screw and lockwasher (E) and nut (F).
6. Install clamp (G) onto wiring harness.
7. Using 7/16 inch wrench and socket, install screw and lockwasher (H, and nut (J) into clamp (G).

TA130610

Go on to Sheet 10

TA130610

## HULL POWER WIRING HARNESS ASSEMBLY REPLACEMENT (Sheet 10 of 14)

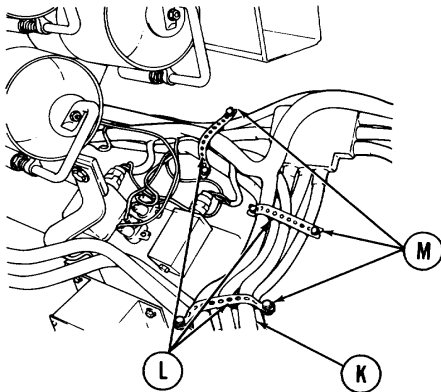


8. Install ground lead (K), lockwasher (L), washer (M), and screw (N) into one end of strap (P). Using socket, tighten screw.
9. Install screws (Q) and lockwashers (R) into one end of two straps (S). Using socket, tighten screws.

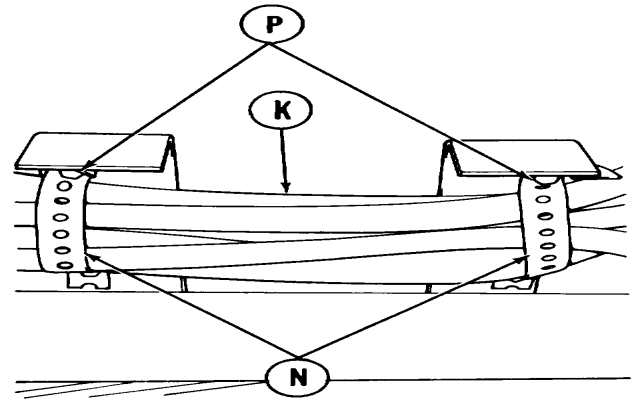
Go on to Sheet 11

TA130611

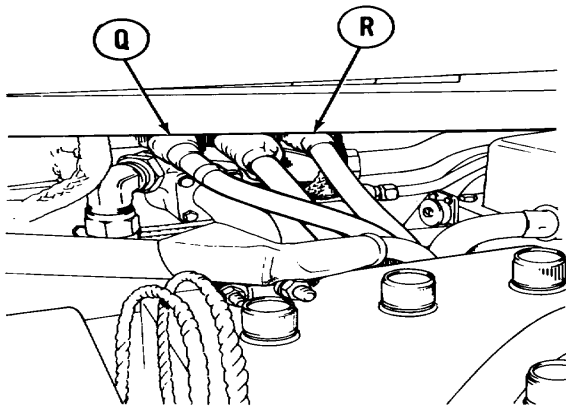
**HULL POWER WIRING HARNESS ASSEMBLY REPLACEMENT (Sheet 11 of 14).**



10. Positioning hull power wiring harness (K) under three straps (L), use socket to install one screw (M) through each of the three straps.



11. Positioning hull power wiring harness (K) behind two straps (N), use socket to install one screw (P)



12. Manually start connector (Q) onto slipping.
13. Using spanner wrench, install connector (Q).
14. Manually start connector (R) onto slipping.
15. Using spanner wrench, install connector (R).

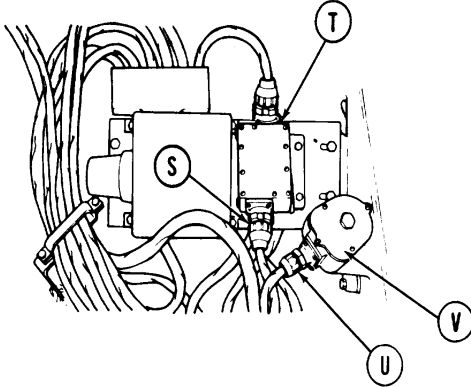
Go on to Sheet 12

TA130612

**HULL POWER WIRING HARNESS ASSEMBLY REPLACEMENT (Sheet 12 of 14)**

**NOTE**

**Steps 16-21 only for vehicles equipped as shown.**



16. Using spanner wrench, connect connector (S) (CKT 81-5) to master relay solenoid (T).

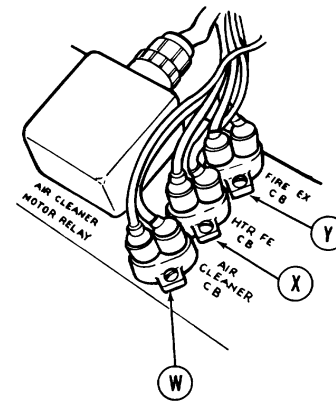
17. Using 1-1/8 inch wrench, connect connector (U) to voltage adjusting rheostat control box (V).

18. Apply silicone compound (Item 10, Appendix B) to all male connectors.

19. Connect two connectors (CKT 415) to air cleaner circuit breaker (W).

20. Connect two connectors (CKT 400-459) to heater feed circuit breaker (X).

21. Connect two connectors (CKT 975) to fire extinguisher circuit breaker (Y).



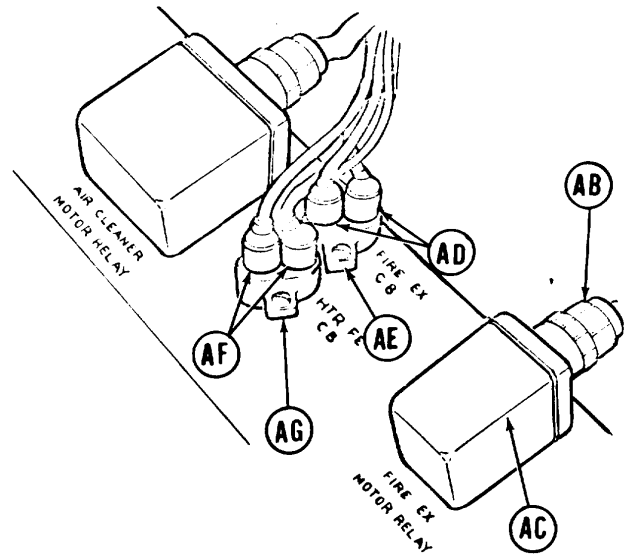
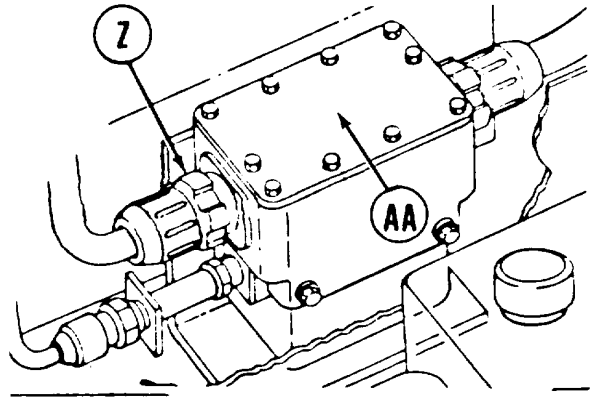
Go on to Sheet 13

TA130613



**HULL POWER WIRING HARNESS ASSEMBLY REPLACEMENT (Sheet 13 of 14)**

22. Using spanner wrench, connect connector (Z) to master relay (AA).
23. Using spanner wrench, connect connector (AB) to fire extinguisher relay (AC).
24. Using hands, connect one leads (AD) to fire extinguisher circuit breaker (AE).
25. Using hands, connect two connectors (AF) to heater feed circuit breaker (AG).

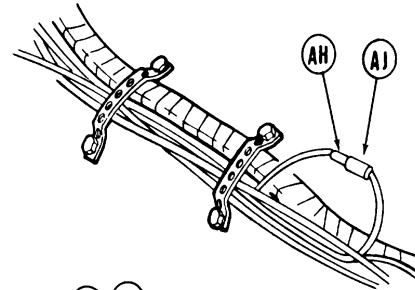


Go on to Sheet 14

TA130614

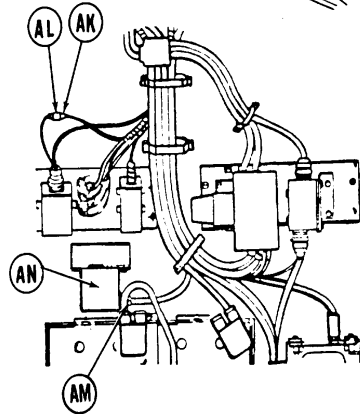
**HULL POWER WIRING HARNESS ASSEMBLY REPLACEMENT (Sheet 14 of 14)**

26. Apply silicone compound (Item 10, Appendix B) to connector (AH) and connect to intermediate bilge pump connector (AJ).



27. Apply silicone compound (Item 10, Appendix B) to connector (AK) and connect to air cleaner motor relay connector (AL).

28. Using spanner wrench, connect connector (AM) to enclosure assembly (AN).



29. Using 9/16 inch and 1/2 inch wrenches, connect lead (CKT 400-459-975) to center battery (AP).

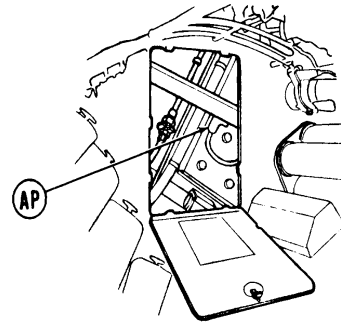
30. Slide boot over battery terminal (AP).

31. Install generator regulator (TM 9-2350-22220-1).

32. Install gas particulate slipping air hoses (TM 9-2350-222-20-1).

33. Install gas particulate air filters (TM 9-2350222-20-1).

34. Install three battery ground straps (TM 92350-222-20-1).



TA130615

End of Task

TA130615

**HEATER CONTROL WIRING HARNESS ASSEMBLY REPLACEMENT (Sheet 1 of 5)**

PROCEDURE INDEX

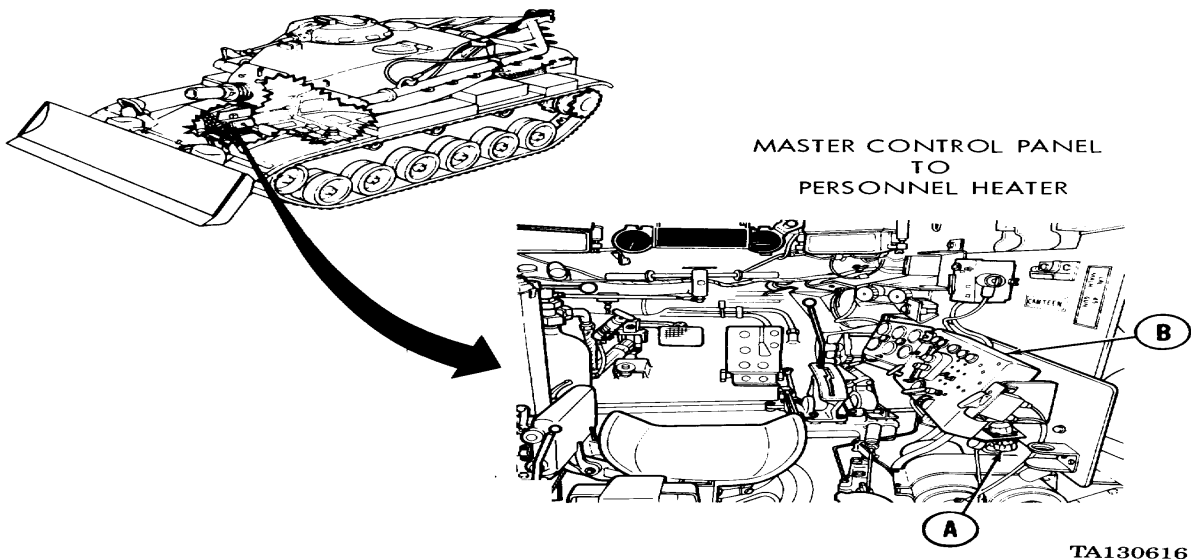
PROCEDURE	PAGE
Removal	5-37
Installation	5-40

TOOLS: Ratchet with 1/2 in. drive  
 Slip joint pliers  
 Spanner wrench  
 7/16 in. combination box and open end wrench  
 7/16 in. socket with 1/2 in. Drive

SUPPLIES: Silicone compound (Item 10, Appendix B)

REFERENCES: TM 9-2350-222-20-1  
 TM 9-2350-222-10

PRELIMINARY PROCEDURE: Disconnect three battery ground straps (TM 9-2350-222-20-1)  
 Remove personnel heater (TM 9-2350-222-20-1)



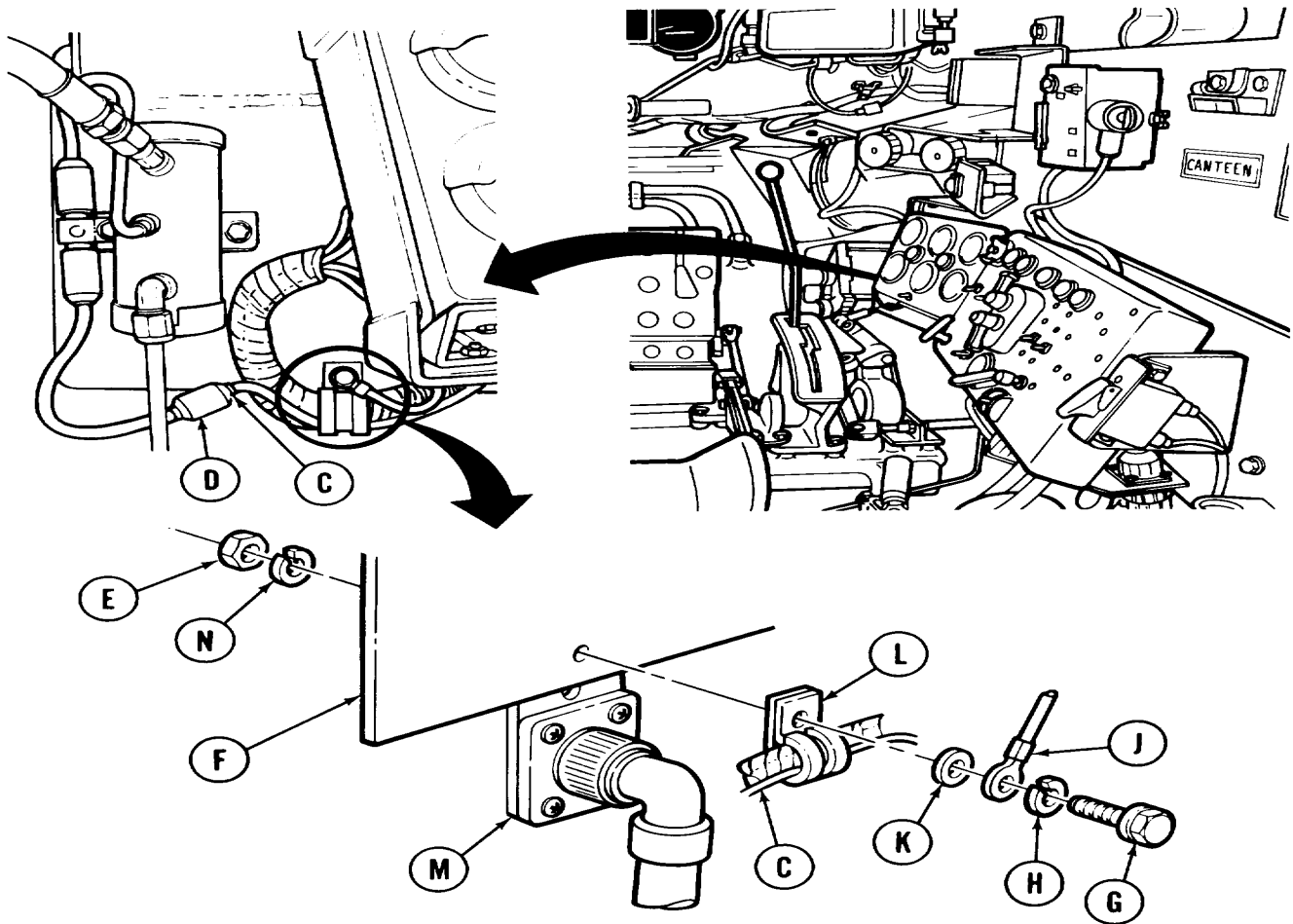
REMOVAL :

1. Using spanner wrench, disconnect heater control wiring harness (A) (first connector from the right) from master control panel (B).

Go on to Sheet 2

TA130616

HEATER CONTROL WIRING HARNESS ASSEMBLY REPLACEMENT (Sheet 2 of 5)



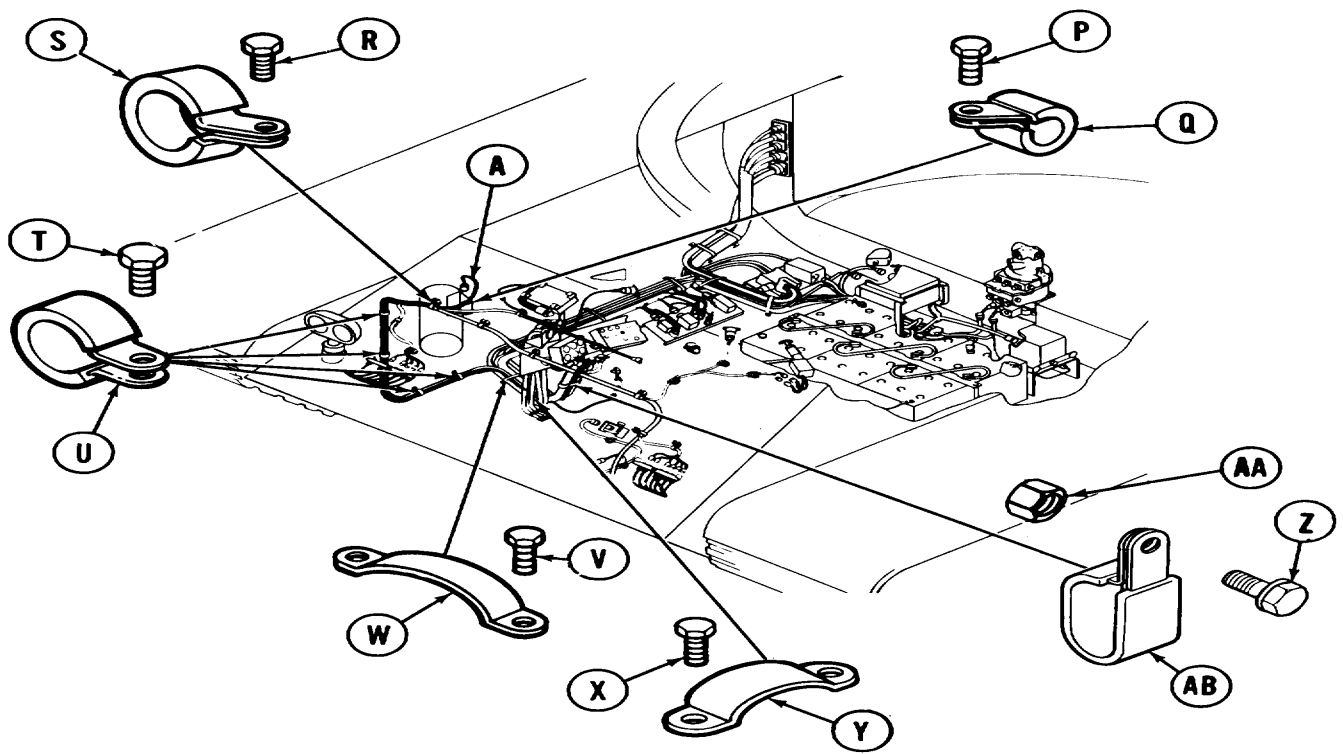
2. Disconnect connector (C) from personnel heater fuel pump lead (D) by pulling apart.
3. Using 7/16 inch wrench on nut (E) behind plate (F), and socket on screw (G), remove screw (G), lockwasher (H), lead (J), flat washer (K), clamp (L), dummy housing (M), lockwasher (N), and nut (E) from plate (F). Loosely replace dummy housing with screw, washers, and nut. Remove lead (C) from clamp (L). Do not remove clamp (L) from harness.

Go on to Sheet 3

TA130617

**HEATER CONTROL WIRING HARNESS ASSEMBLY REPLACEMENT (Sheet 3 of 5)**

4. Using 7/16 inch wrench, remove screw (P) and clamp (Q).
5. Using 7/16 inch wrench, remove screw (R) and clamp (S).
6. Using 7/16 inch wrench, remove four screws (T) and four clamps (U).
7. Using 7/16 inch wrench, remove two screws (V) and strap (W).
8. Using 7/16 inch wrench, remove two screws (X) and strap (Y).
9. Using 7/16 inch wrench, remove two screws (Z), nuts (AA), and clamps (AB).
10. Remove wiring harness (A) from vehicle.



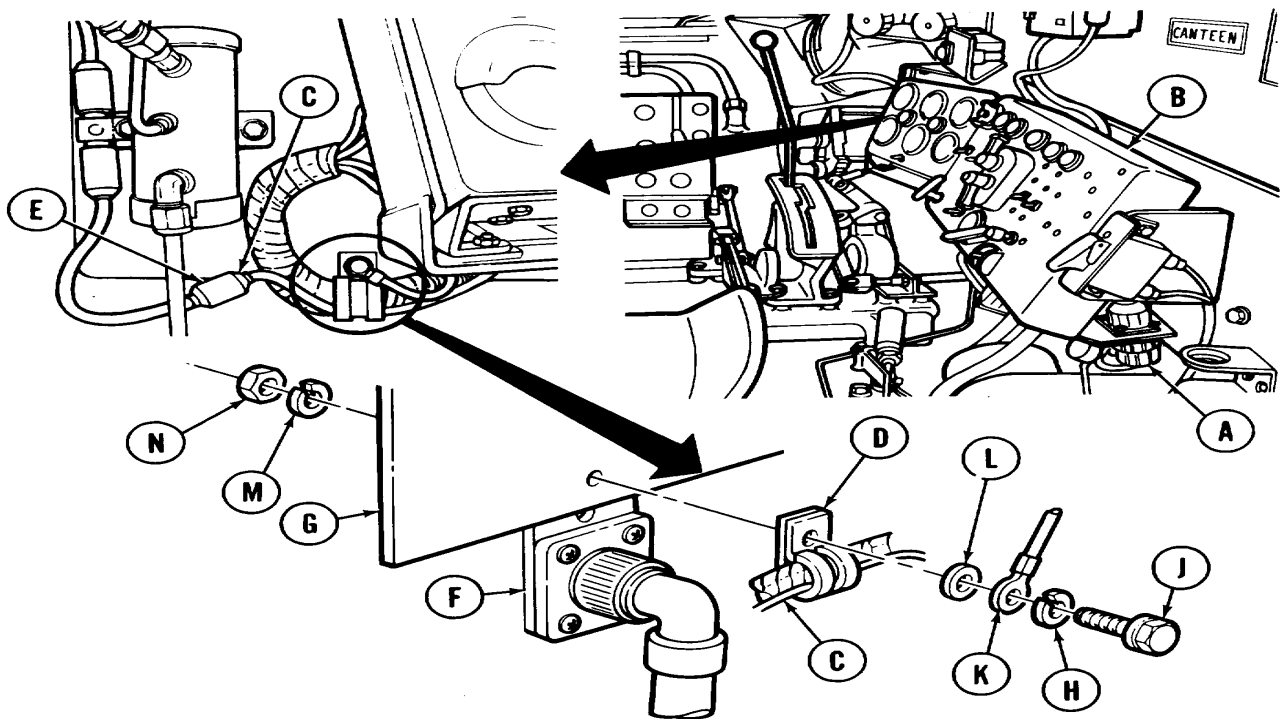
Go on to Sheet 4

TA130618

**HEATER CONTROL WIRING HARNESS ASSEMBLY REPLACEMENT (Sheet 4 of 5)**

**INSTALLATION:**

1. Place wiring harness (A) in position in vehicle.
2. Using spanner wrench, connect one end of wiring harness (A) to master control panel (B).
3. Place lead (C) into clamp (D).
4. Lubricate connectors (C) and (E) with silicone compound (Item 10, Appendix B). Using fingers, connect connectors (C) and (E).
5. Remove dummy housing (F) from plate (G).



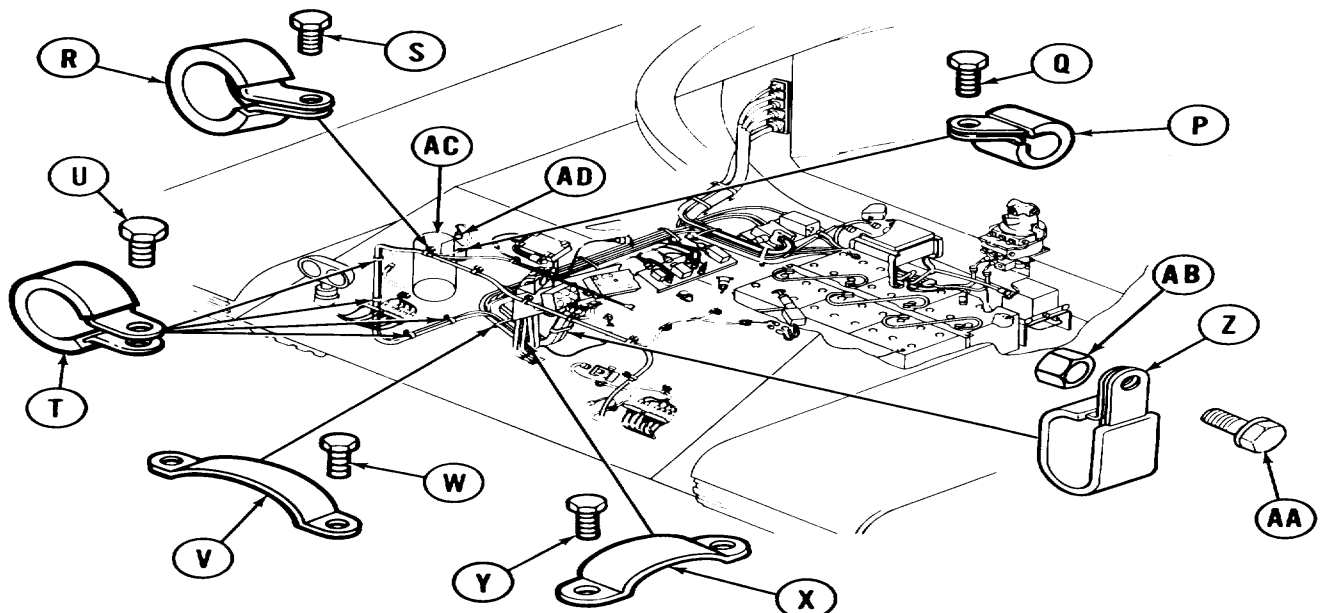
6. Using fingers, install lockwasher (H) onto screw (J), screw (J) through lead (K), flat washer (L) onto screw (J), screw (J) through clamp (C), plate (G) and dummy housing (F). Place lockwasher (M) and nut (N) onto screw (J).
7. Using 7/16 inch wrench on nut (N) and socket on screw (J), tighten assembly.

Go on to Sheet 5

TA130619

**HEATER CONTROL WIRING HARNESS ASSEMBLY REPLACEMENT (Sheet 5 of 5)**

8. Place clamp (P) in position. Using 7/16 inch wrench, install screw (Q).
9. Place clamp (R) in position. Using 7/16 inch wrench, install screw (S).
10. Place four clamps (T) in position. Using 7/16 inch wrench, install four screws (U).
11. Place strap (V) in position. Using 7/16 inch wrench, install two screws (W).
12. Place strap (X) in position. Using 7/16 inch wrench, install two screws (Y).
13. Place two clamps (Z) in position. Using 7/16 inch wrench, install screw (AA) and lockwasher (AB).



14. Install personnel heater (TM 9-2350-222-20-1).
15. Using pliers, connect connector (AD) to personnel heater (AC).
16. Connect three battery ground straps (TM 9-2350-222-20-1).
17. Perform functional check of personnel heater (TM 9-2350-222-10).

End of Task

TA130620

**SLAVE RECEPTACLES AND RELAY LEAD ASSEMBLY REPLACEMENT (2D ENGINE) (Sheet 1 of 7)**

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	5-42
Installation	5-45

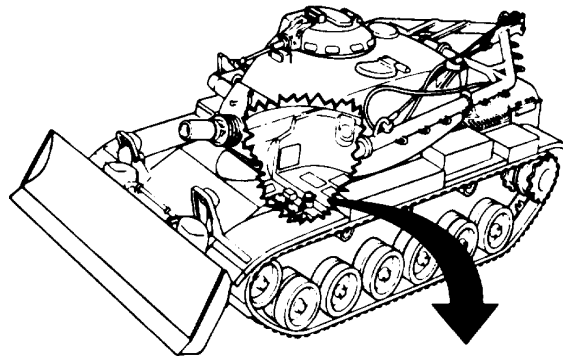
**TOOLS:** 7/16 inch socket with 1/2 in. drive  
 5 in. extension with 1/2 in. drive  
 Ratchet with 1/2 in. drive  
 9/16 in. combination box and open end wrench (2 required)  
 Spanner wrench  
 Slip joint pliers

**SUPPLIES:** GAA grease (Item 14, Appendix B)

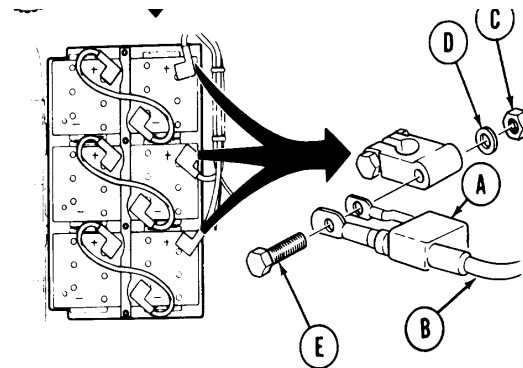
**REFERENCES:** TM 9-2350-222-20-1  
 TM 9-2350-222-34-2

**PRELIMINARY PROCEDURES:** Remove turret (TM 9-2350-222-34-2)  
 Remove right ammunition rack (page 11-28)

**REMOVAL:**



1. Lift up boots (A) on three positive ( + ) battery terminals. Slide boots up cables (B) to expose battery terminal connections.
2. Using two 9/16 inch wrenches, remove three nuts (C) and washers (D). Remove cables (B) from bolts (E).
3. Slide boots (A) off cables (B). Keep boots.



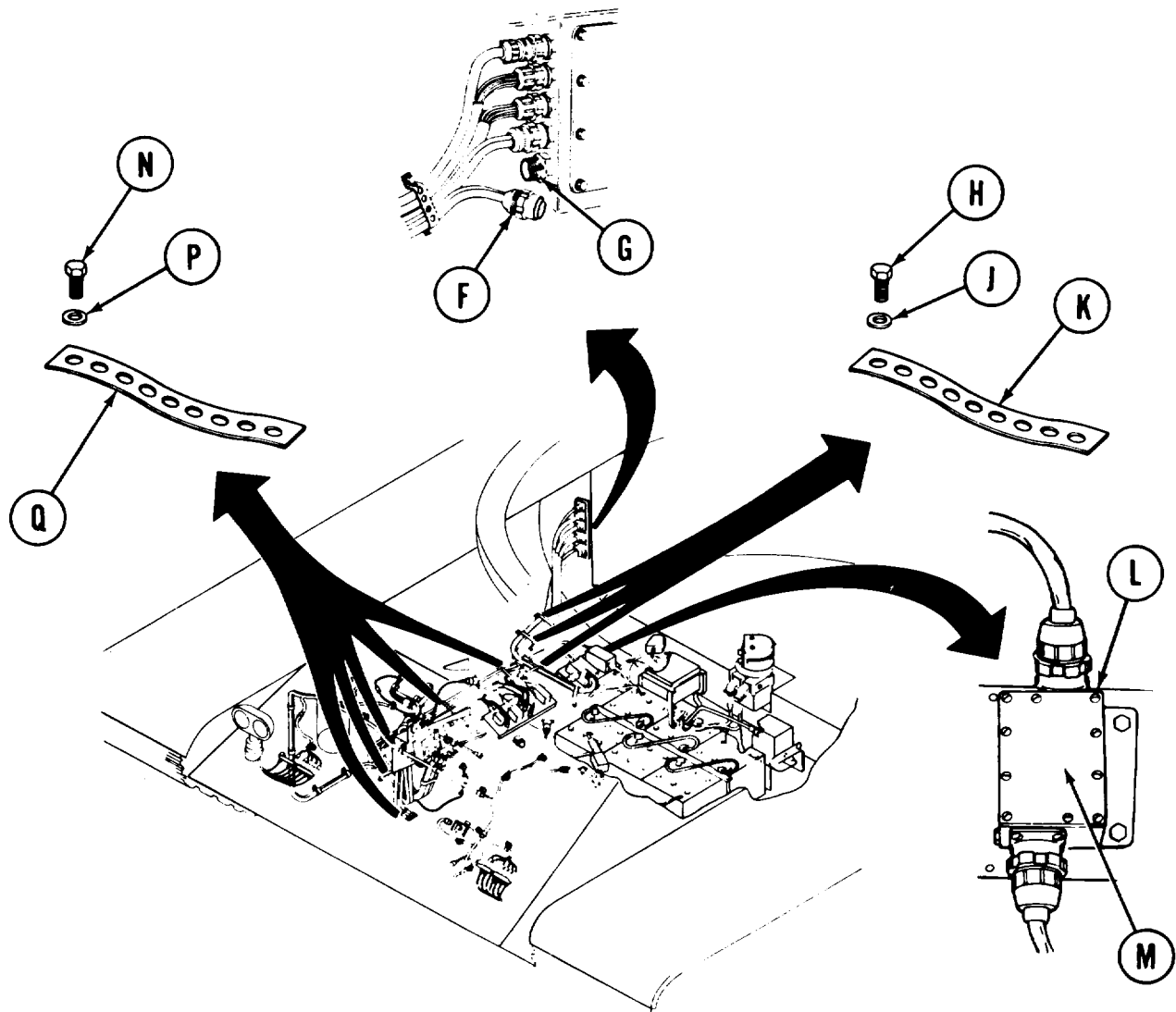
TA130621

Go on to Sheet 2

TA130621



## SLAVE RECEPTACLES AND RELAY LEAD ASSEMBLY REPLACEMENT (2D ENGINE) (Sheet 2 of 7)

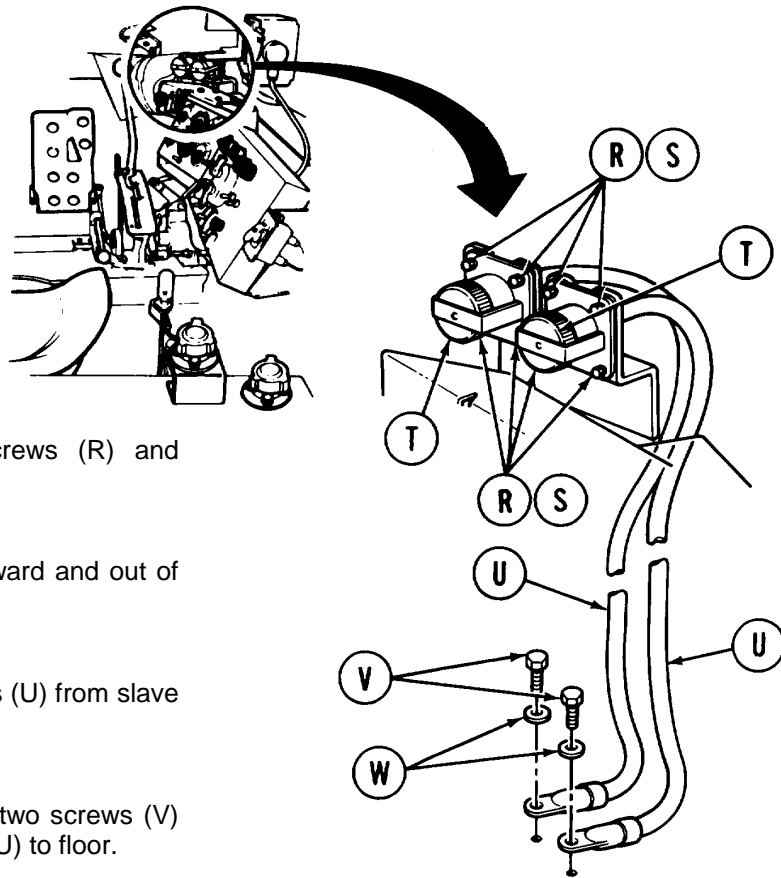


4. 1 sing spanner wrench, disconnect lower connector (F) from bulkhead connector (G).
5. Using 7/16 inch wrench, remove three screws (H) and washers (J) securing one end of straps (K).
6. Using pliers, disconnect connector (L) from master relay (M).
7. Using socket, remove five screws (N) and washers (P) to release one end of straps (Q).

Go on to Sheet 3

TA130622

SLAVE RECEPTACLES AND RELAY LEAD ASSEMBLY REPLACEMENT (2D ENGINE) (Sheet 3 of 7)



8. Using socket, remove eight screws (R) and washers (S).
9. Lift two slave receptacles (T) upward and out of mounting bracket.
10. Follow routing of two ground leads (U) from slave receptacles (T) to floor.
11. Using 9/16 inch wrench, remove two screws (V) and washers (W) securing leads (U) to floor.

Go on to Sheet 4

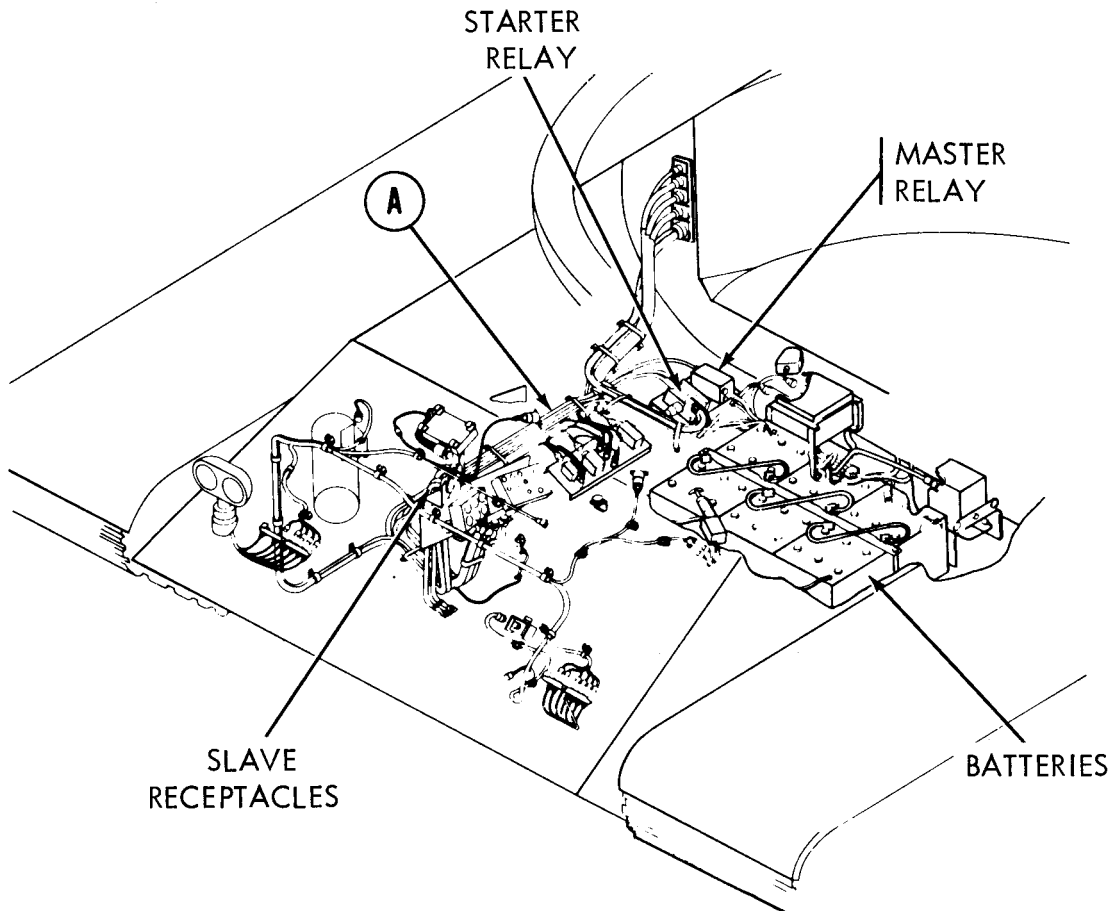
TA130623

**SLAVE RECEPTACLES AND RELAY LEAD ASSEMBLY REPLACEMENT (2D ENGINE) (Sheet 4 of 7)**

INSTALLATION:

**NOTE**

The following illustration will aid in installing the slave receptacles and relay lead assembly.

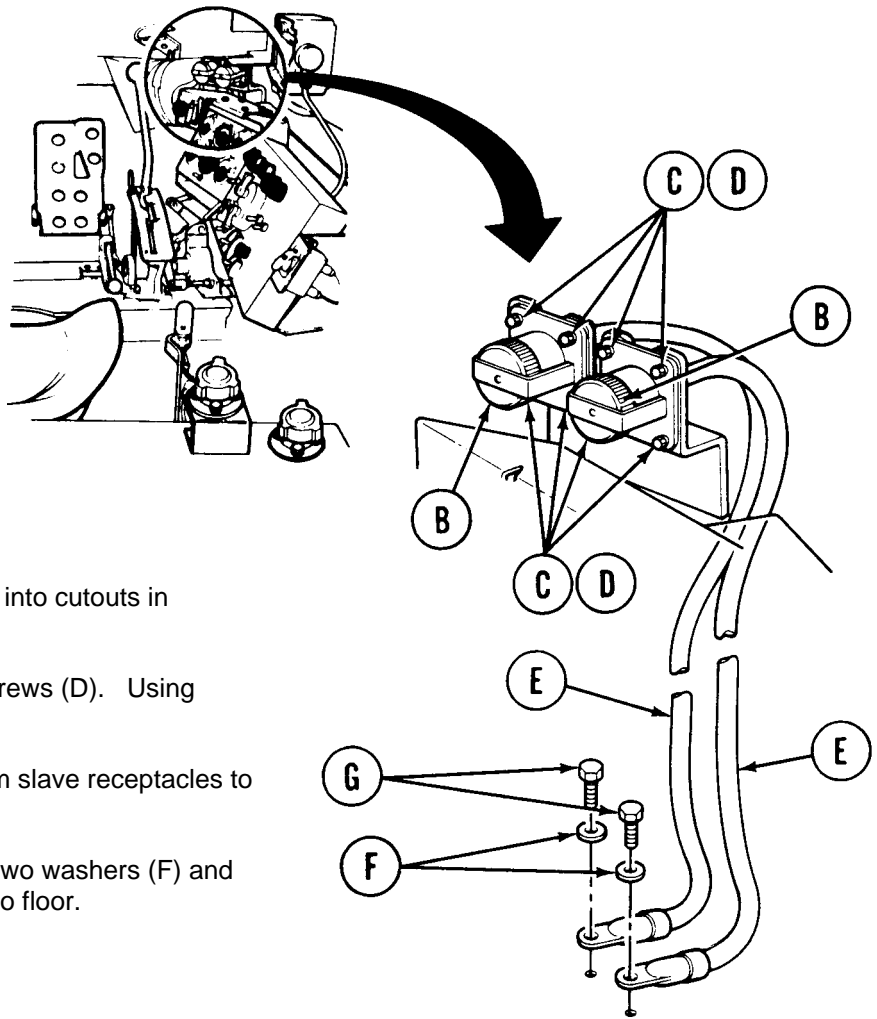


1. Position slave receptacles and relay lead assembly (A) in vehicle as shown.

Go on to Sheet 5

TA130624

SLAVE RECEPTACLES AND RELAY LEAD ASSEMBLY REPLACEMENT (2D ENGINE) (Sheet 5 of 7)

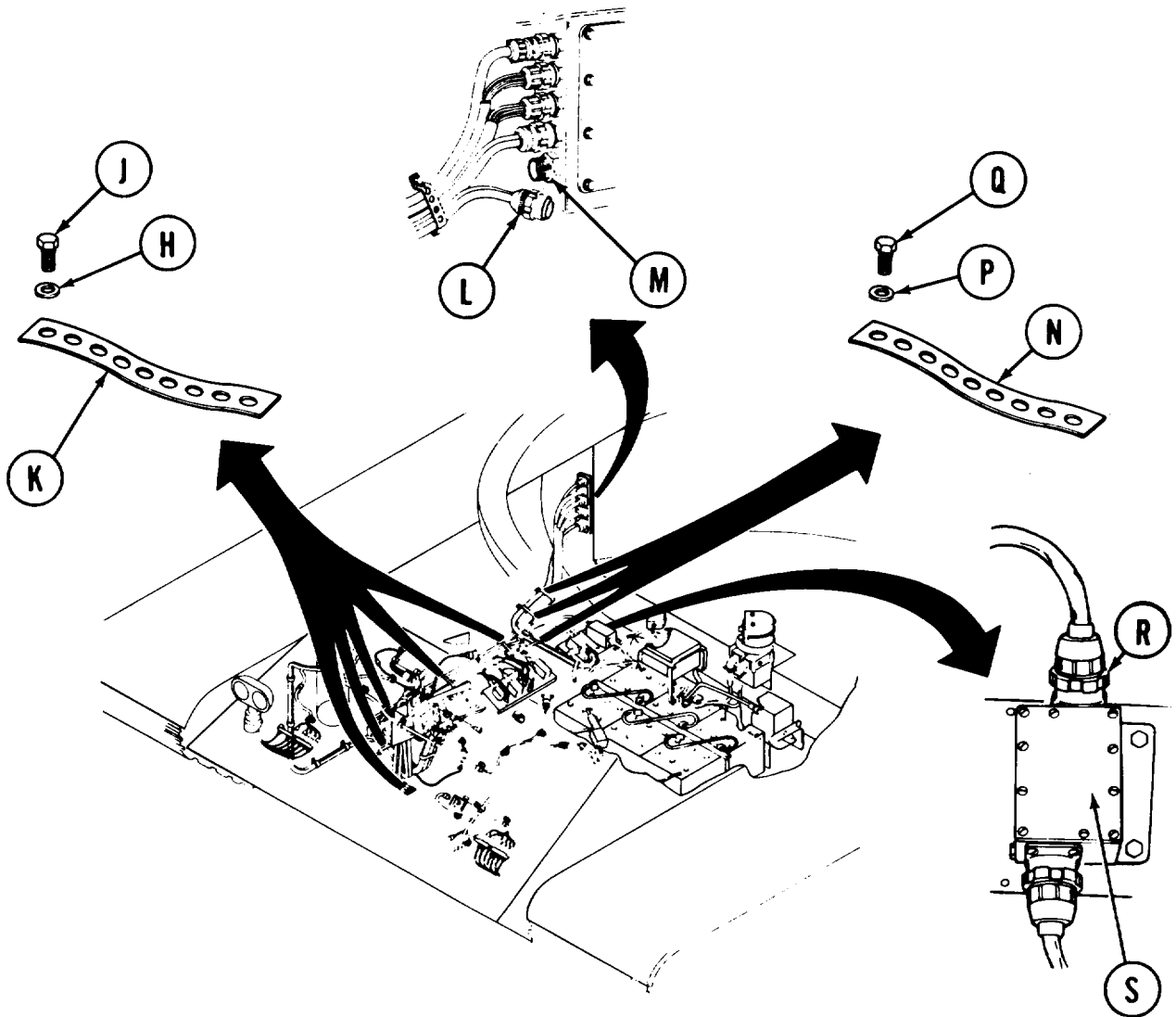


2. Place two slave receptacles (B) into cutouts in mounting brackets.
3. Install eight washers (C) and screws (D). Using socket, tighten screws.
4. Route two ground leads (E) from slave receptacles to mounting place on hull floor.
5. Using 9/16 inch wrench, install two washers (F) and screws (G) to secure leads (E) to floor.

Go on to Sheet 6

TA130625

## SLAVE RECEPTACLES AND RELAY LEAD ASSEMBLY REPLACEMENT (2D ENGINE) (Sheet 6 of 7)

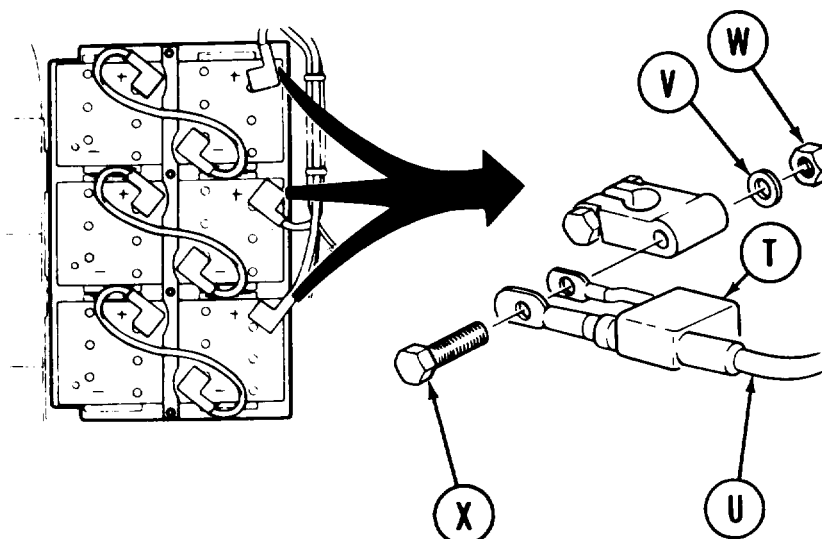


6. Install five washers (H) and screws (J) into one end of straps (K). Using socket, tighten screws.
7. Connect connector (L) to bulkhead connector (M). Using spanner wrench, tighten connector (L).
8. Install three straps (N), washers (P), and screws (Q). Using socket, tighten screws.
9. Connect connector (R) to master relay (S). Using pliers, tighten connector.

Go on to Sheet 7

TA130626

## SLAVE RECEPTACLES AND RELAY LEAD ASSEMBLY REPLACEMENT (2D ENGINE) (Sheet 7 of 7)



10. Slide three boots (T) onto leads (U).
11. Install three leads (U), washers (V), and nuts (W) on bolts (X). Using two 9/16 inch wrenches, tighten nuts.
12. Coat terminals with grease (Item 14, Appendix B).
13. Slide three boots (T) down leads (U) and place boots over terminals.
14. Install right ammunition rack (page 11-28).
15. turret (TM 9-2350-222-34-2).

End of Task

TA130627

**SLAVE RECEPTACLE AND RELAY LEAD HARNESS ASSEMBLY REPLACEMENT (LATE MODEL)**  
 (Sheet 1 of 7)

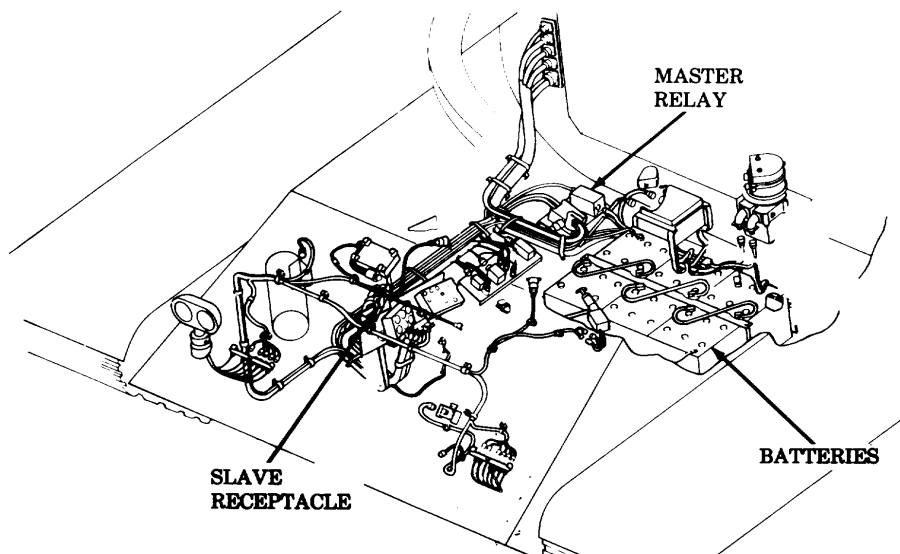
**PROCEDURE INDEX**

PROCEDURE	PAGE
Removal	5-48.3
Installation	5-48.5

**TOOLS:** 7/16 in. socket with 1/2 in. drive  
 5 in. extension with 1/2 in. drive  
 Ratchet with 1/2 in. drive  
 9/16 in. combination box and open end wrench (2 required)  
 Spanner wrench  
 Slip joint pliers  
 Offset cross-tip screwdriver  
 9/16 in. socket with 1/2 in. drive

**SUPPLIES:** GAA grease (Item 14, Appendix B)  
 Lockwasher (MS35338-42) (6 required)

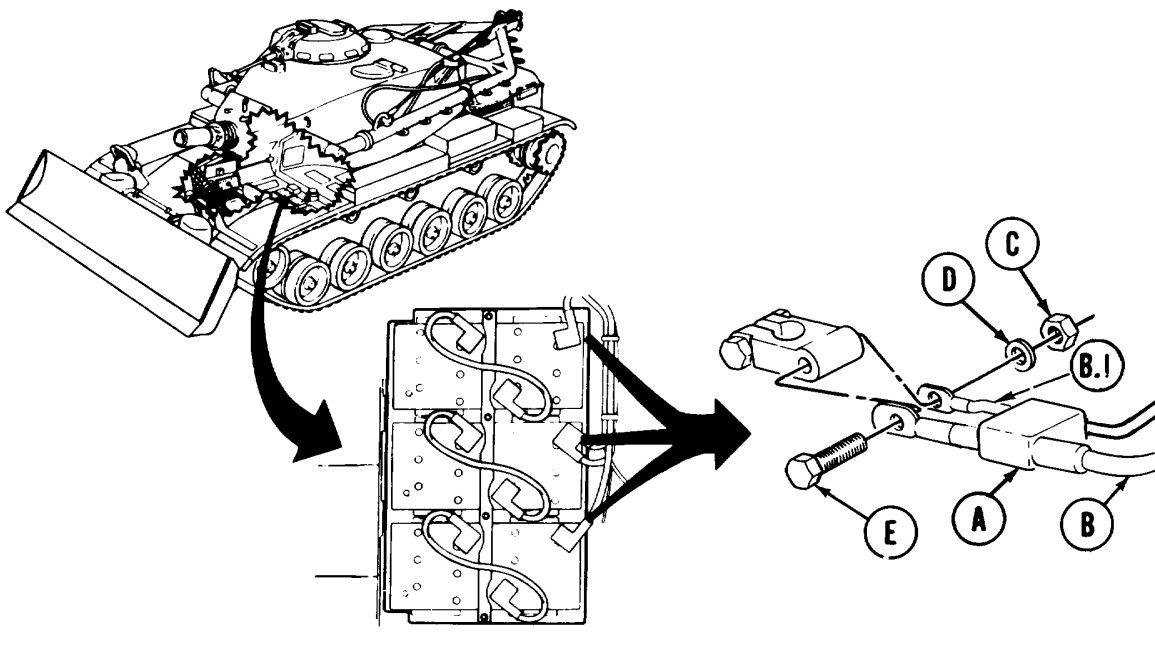
**PRELIMINARY PROCEDURES:** Disconnect battery ground strap (TM 9-2350-222-20-1)  
 Remove right ammunition rack (page 11-28)



TA252624

Go on to Sheet 2

## SLAVE RECEPTACLE AND RELAY LEAD HARNESS ASSEMBLY REPLACEMENT (LATE MODEL) (Sheet 2 of 7)



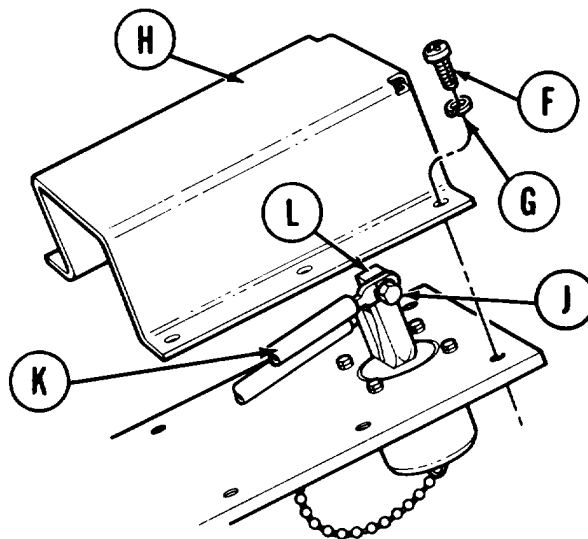
### REMOVAL:

1. Lift up boots (A) on three positive (+) battery terminals. Slide boots up cables (B) to expose battery terminals connections.

#### NOTE

**Cable (B.1) is only attached to center battery terminal.**

2. Using two 9/16 inch wrenches, remove three nuts (C) and washers (D). Remove cables (B and B.1) and bolts (E) from terminals.
3. Slide boots (A) off cables (B). Keep boots.
4. Using off-set cross-tip screwdriver, remove six screws (F) and lockwashers (G) securing cover (H). Throw lockwashers away.
5. Remove cover (H).
6. Using 9/16 inch socket, remove bolt and lockwasher (J) securing cable (K) to positive terminal of receptacle (L). Throw lockwasher away.

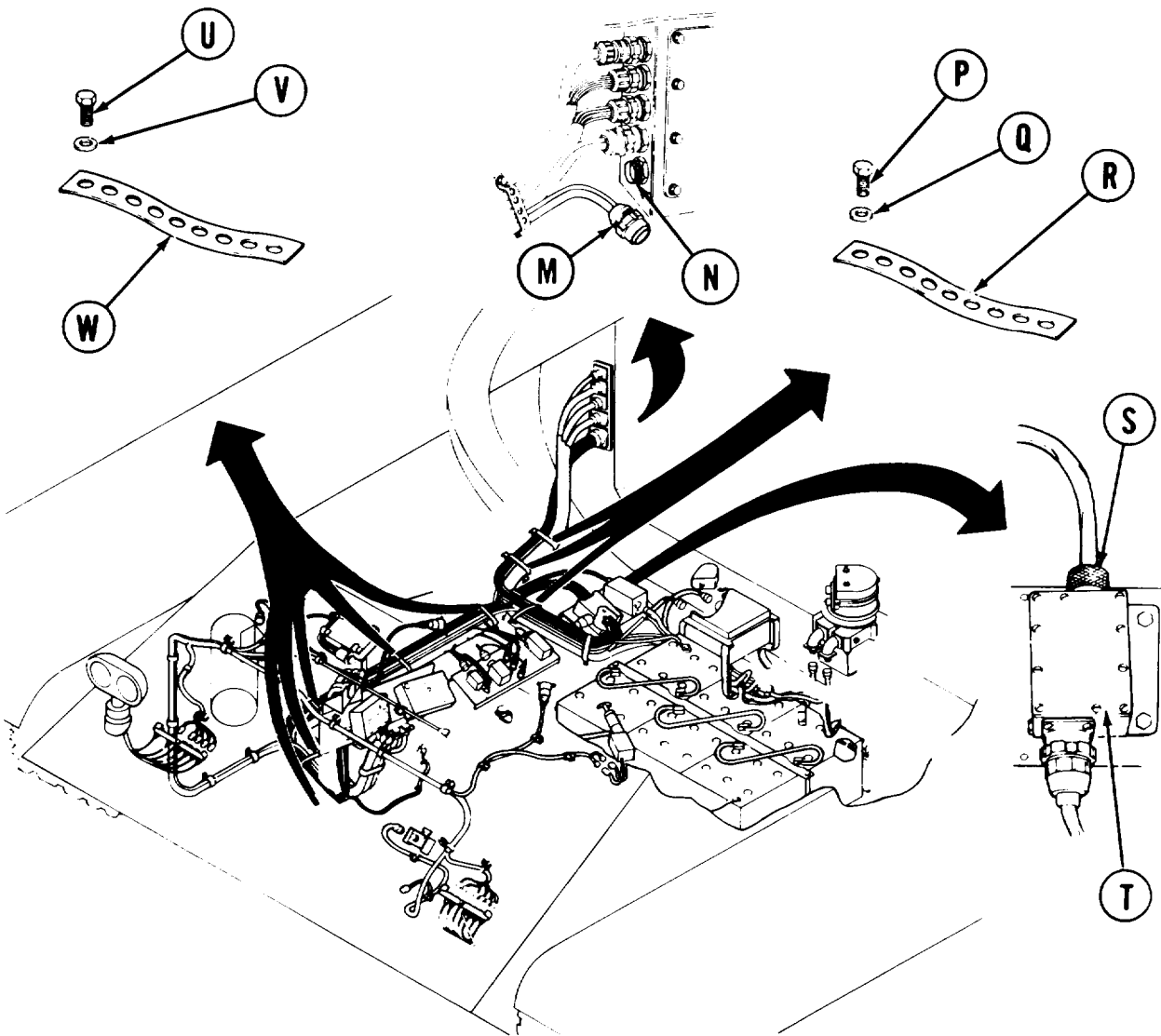


Go on to Sheet 3

TA252625



**SLAVE RECEPTACLE AND RELAY LEAD HARNESS ASSEMBLY REPLACEMENT (LATE MODEL)**  
 (Sheet 3 of 7)



7. Using spanner wrench, disconnect lower connector (M) from bulkhead connector (N).
8. Using 7/16 inch socket, remove three screws (P) and washers (Q) securing one end of straps (R).
9. Using pliers, disconnect connector (S) from master relay (T).
10. Using 7/16 inch socket, remove five screws (U) and washers (V) to release one end of straps (W).
11. Remove harness assembly from hull.

Go on to Sheet 4

TA252626

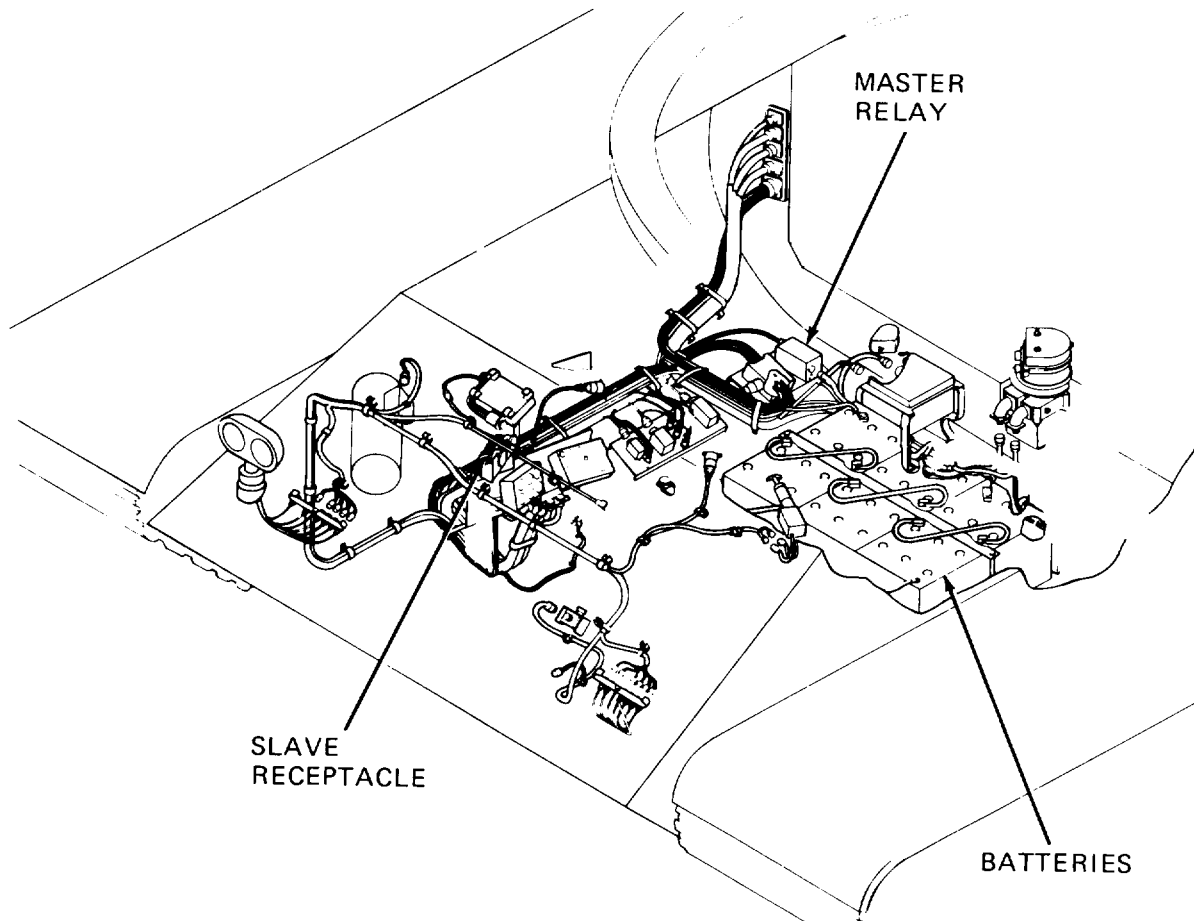
Change 1 5-48.4

**SLAVE RECEPTACLE AND RELAY LEAD HARNESS ASSEMBLY REPLACEMENT (LATE MODEL)**  
(Sheet 4 of 7)

INSTALLATION:

**NOTE**

The following illustration will aid in installing the slave receptacle and relay lead harness assembly.



1. Position slave receptacle and relay lead harness assembly in hull as shown.

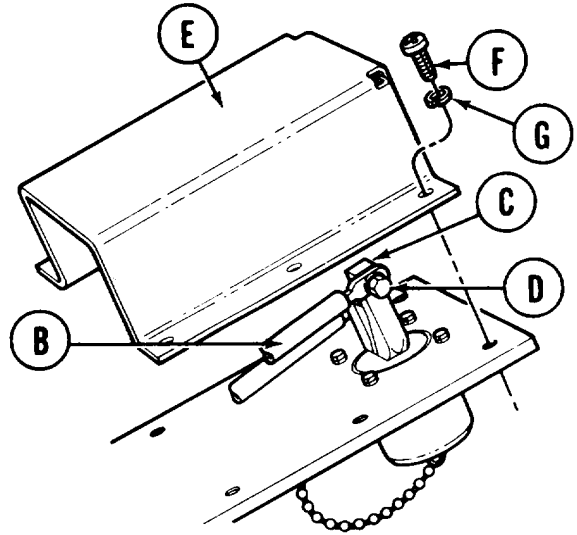
Go on to Sheet 5

TA252627

Change 1 5-48.5

**SLAVE RECEPTACLE AND RELAY LEAD HARNESS ASSEMBLY REPLACEMENT (LATE MODEL)**  
**(Sheet 5 of 7)**

2. Position cable lead (B) to positive terminal of receptacle (C)
3. Using 9/16 inch socket, install and tighten screw and new lockwasher (D) to secure cable lead (B) to receptacle (C).
4. Position cover (E) over receptacle (C).
5. Using off-set cross-tip screwdriver, install and tighten six screws (F) and new lockwashers (G) securing cover (E) to support bracket.

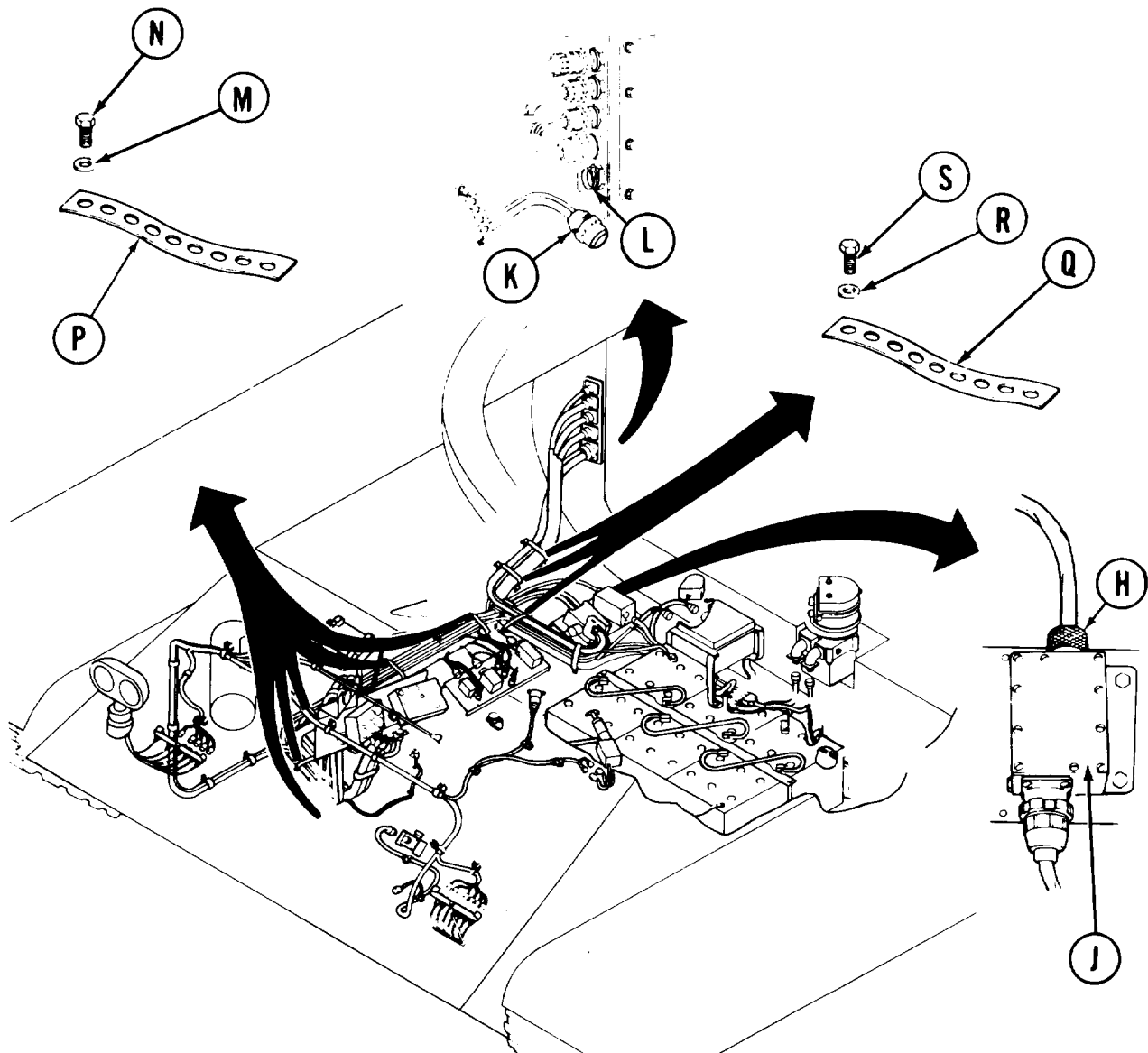


Go on to Sheet 6

TA252628

Change 1 5-48.6

**SLAVE RECEPTACLE AND RELAY LEAD HARNESS ASSEMBLY REPLACEMENT (LATE MODEL)**  
 (Sheet 6 of 7)

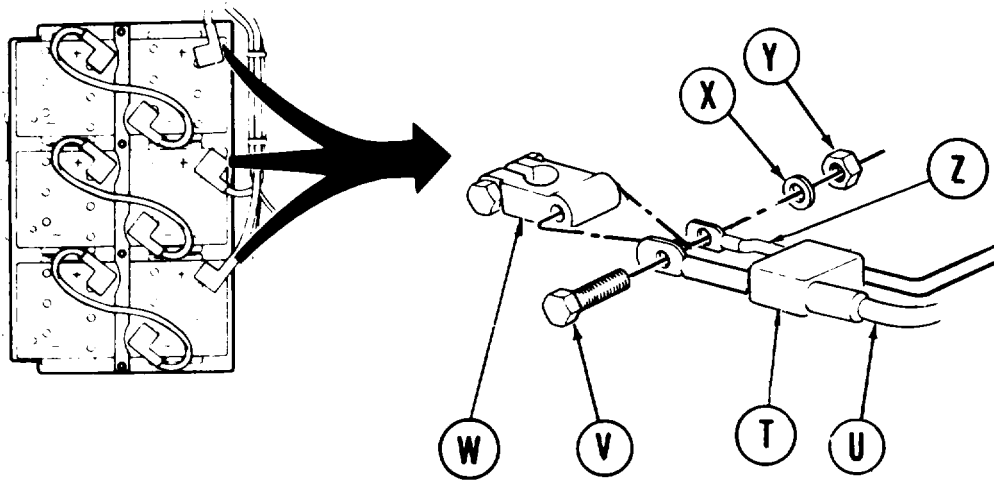


6. Connect connector (H) to master relay (J). Using pliers, tighten connector.
7. Connect connector (K) to bulkhead connector (L). Using spanner wrench, tighten connector (K).
8. Install five washers (M) and screws (N) into one end of straps (P). Using 7/16 inch socket, tighten screws.
9. Install three straps (Q), washer (R), and screws (S). Using 7/16 inch socket, tighten screws.

Go on to Sheet 7

TA252629

**SLAVE RECEPTACLE AND RELAY LEAD HARNESS ASSEMBLY REPLACEMENT (LATE MODEL)**  
**(Sheet 7 of 7)**



10. Slide three boots (T) onto leads (U).
11. Install three leads (U) onto bolt (V) and install bolt to terminal (W).
12. Install washer (X) and nut (Y) onto bolt (V) on two outer terminals. Using two 9/16 inch wrenches, tighten nuts.
13. Install lead (Z), washer (X) and nut (Y) onto bolt (V) on center terminal. Using two 9/16 inch wrenches, tighten nuts.
4. Coat terminals with grease (Item 14, Appendix B).
15. Slide three boots (T) down leads (U) and place boots over terminals.
16. Install right ammunition rack (page 11-28).
17. Connect battery ground strap (TM 9-2350-222-20-1).

End of Task

TA252630

**REAR ACCESSORY WIRING HARNESS REPLACEMENT (Sheet 1 of 8)**

**PROCEDURE INDEX**

PROCEDURE	PAGE
Removal	5-50
Installation	5-54

TOOLS: 9/16 in. socket with 1/2 in. drive  
 7/16 in. socket with 1/2 in. drive  
 5 in. extension with 1/2 in. drive  
 Ratchet with 1/2 in. drive  
 12 in. adjustable wrench  
 Spanner wrench

REFERENCES: TM 9-2350-222-10  
 TM 9-2350-222-20-1

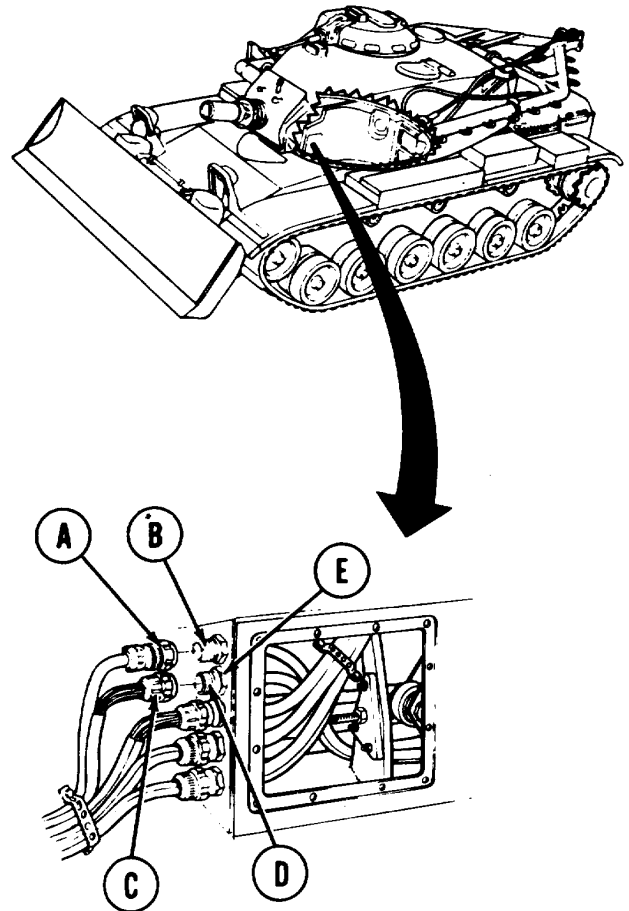
PRELIMINARY PROCEDURE: Disconnect three ground cables from battery terminals (TM 9-2350-222-20-1)  
 Remove right fuel tank (page 4-36)  
 Remove left fuel tank (page 4-51)

Go on to Sheet 2

**TA130628**

**REAR ACCESSORY WIRING HARNESS REPLACEMENT (Sheet 2 of 8)****REMOVAL:**

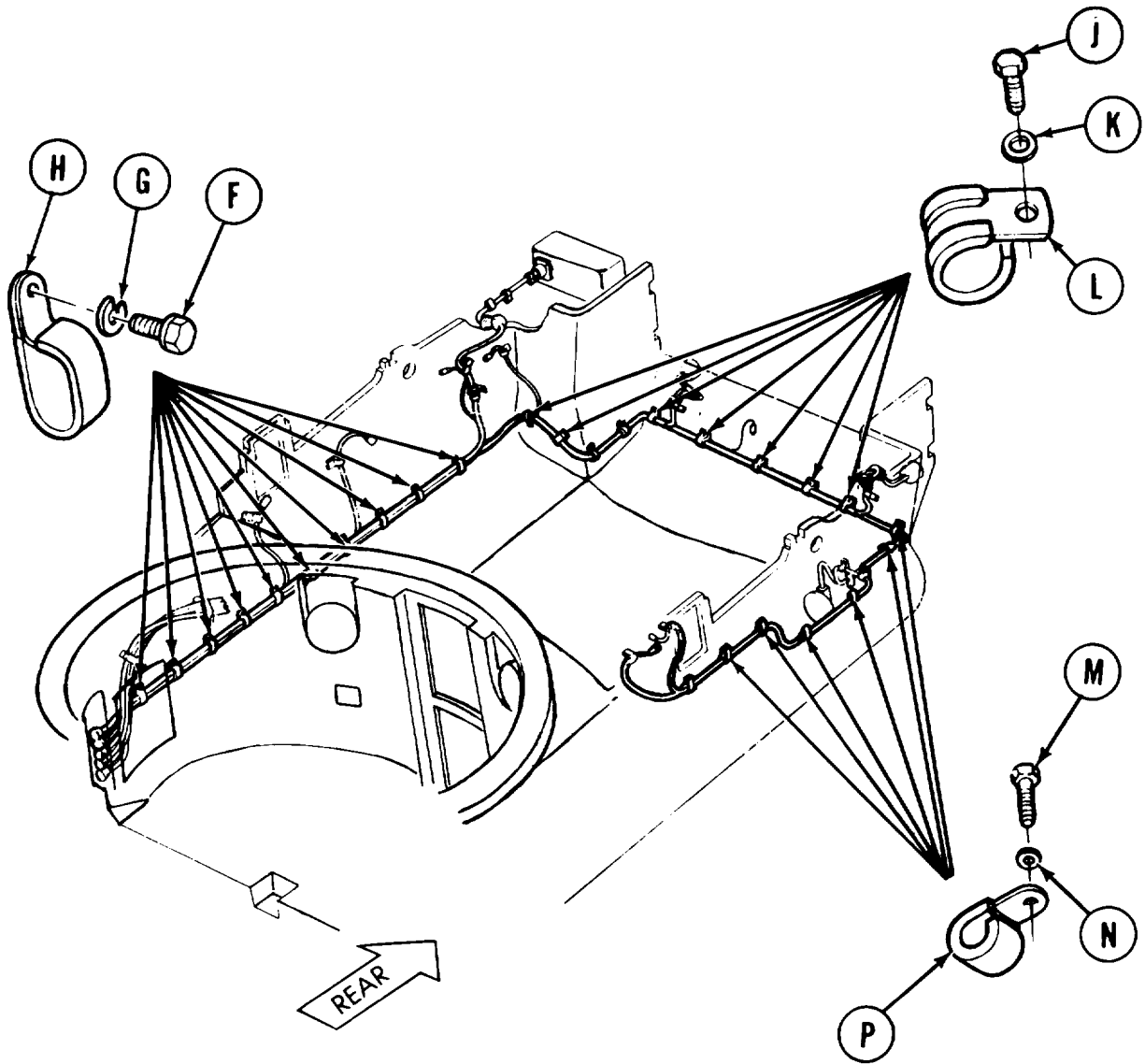
1. Using spanner wrench, disconnect connector (A) from bulkhead connector (B).
2. Using spanner wrench, disconnect connector (C) from bulkhead connector (D).
3. Using adjustable wrench, remove jamnut (E) from bulkhead connector (D).



Go on to Sheet 3

TA130629

REAR ACCESSORY WIRING HARNESS REPLACEMENT (Sheet 3 of 8)



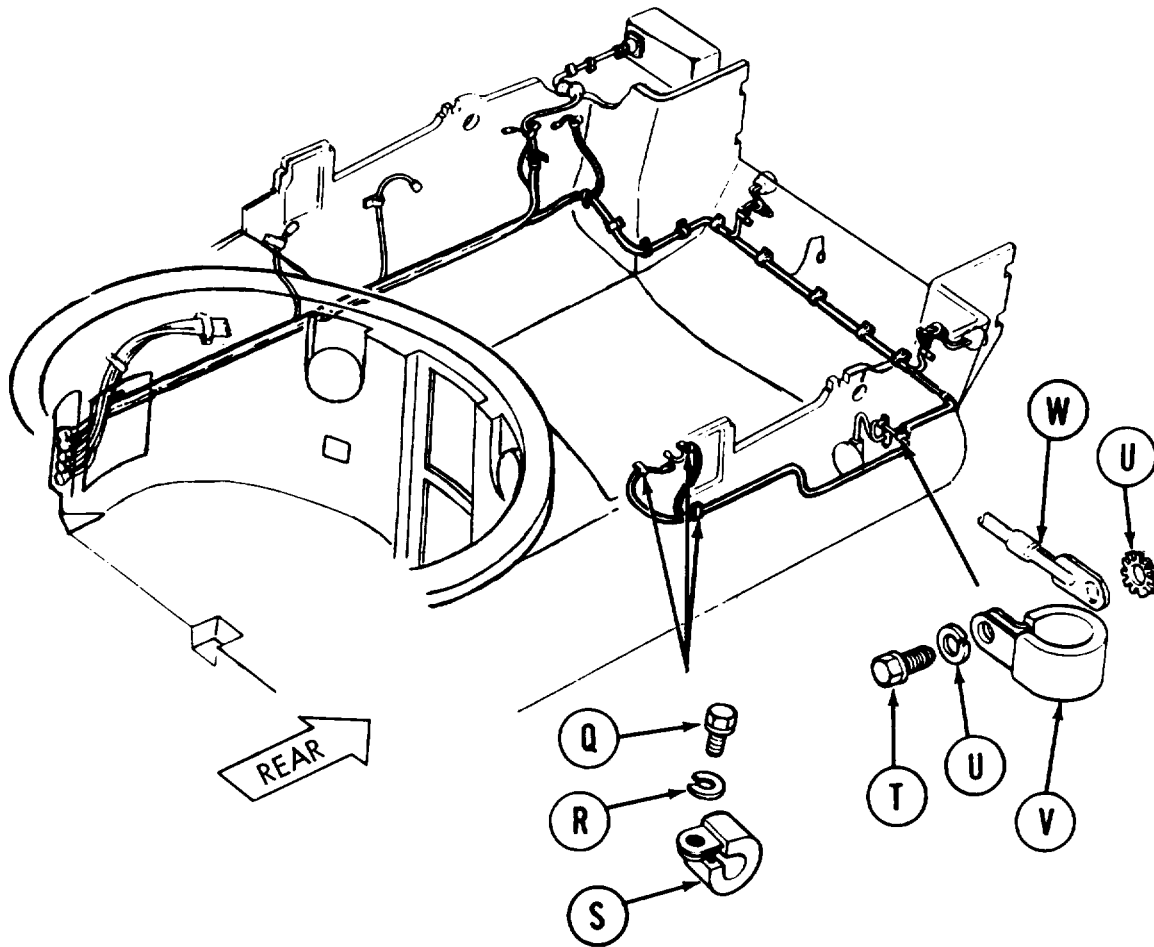
4. Using 7/16 inch socket, remove 10 screws (F), lockwashers (G), and clamps (H).
5. Using 7/16 inch socket, remove seven screws (J), lockwashers (K), and clamps (L).
6. Using 7/16 inch socket, remove six screws (M), lockwashers (N), and clamps (P).

Go on to Sheet 4

TA130630



REAR ACCESSORY WIRING HARNESS REPLACEMENT (Sheet 4 of 8)

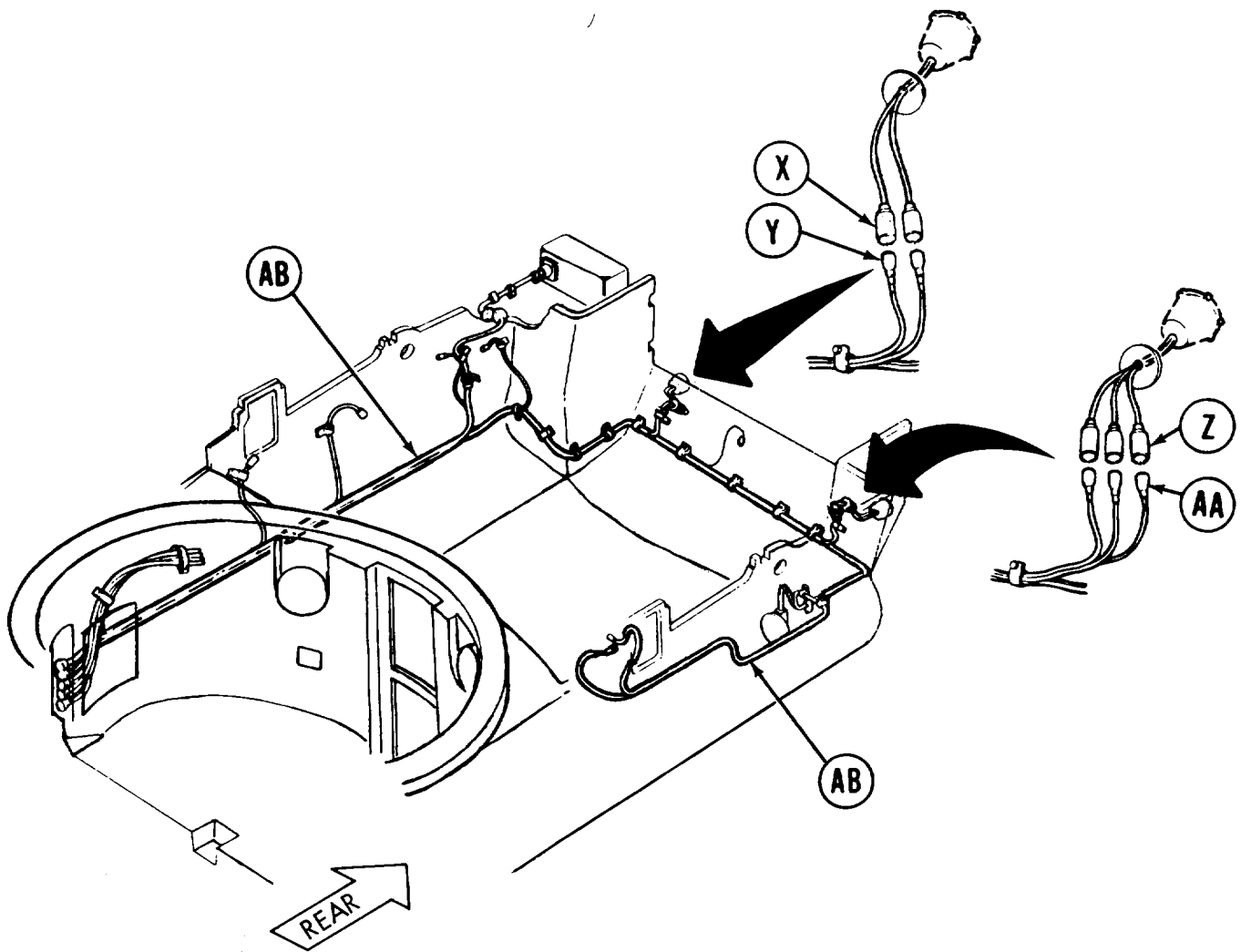


7. Using 7/16 inch socket, remove three screws (Q), lockwashers (R), and clamps (S).
8. Using 7/16 inch socket, remove screw (T), two lockwashers (U), clamp (V), and lead (W).

Go on to Sheet 5

TA130631

## REAR ACCESSORY WIRING HARNESS REPLACEMENT (Sheet 5 of 8)

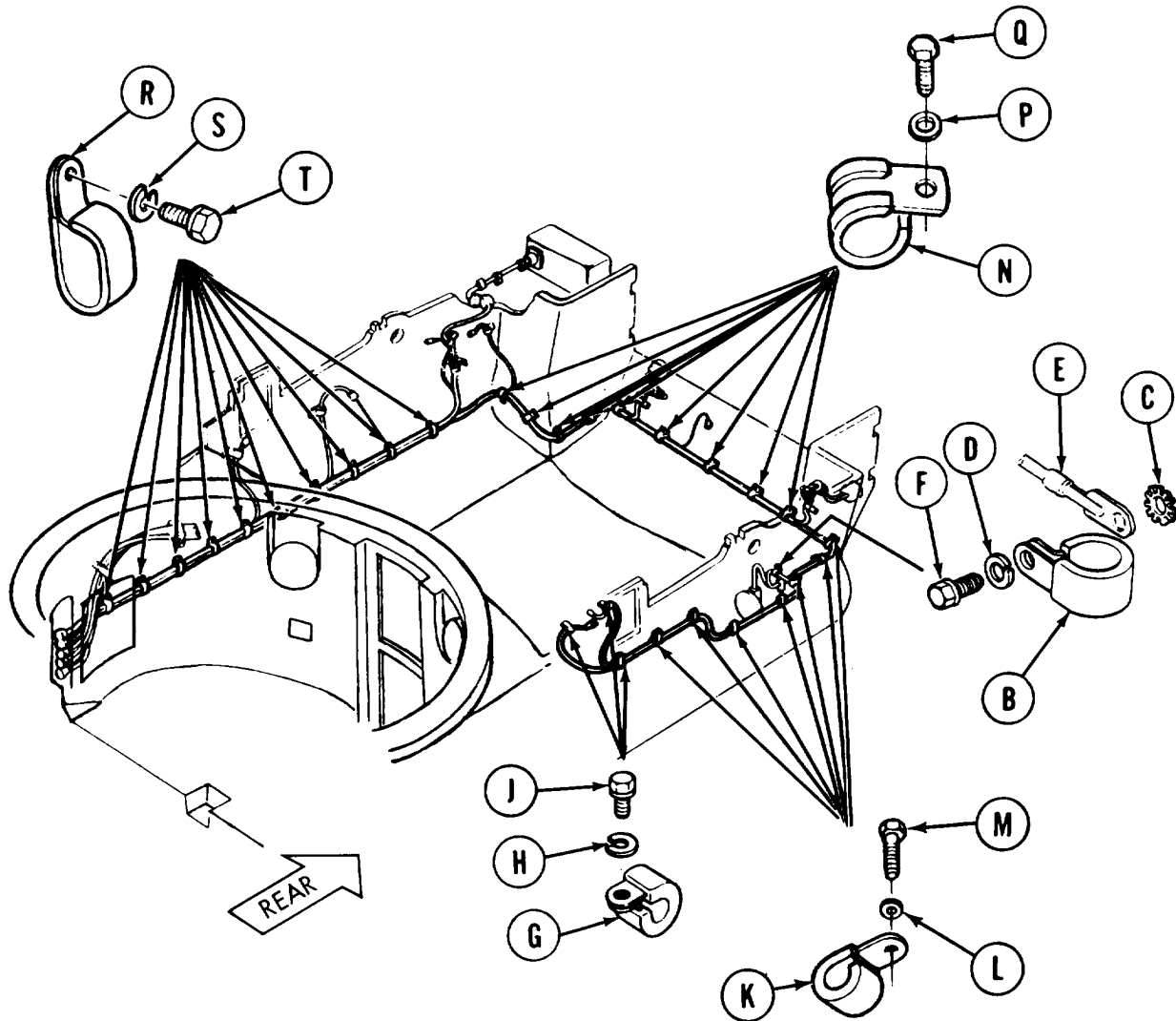


9. Pull two connectors (X) from connectors (Y).
10. Pull three connectors (Z) from connectors (AA).
11. Remove harness (AB) from vehicle.

Go on to Sheet 6

TA130632

**REAR ACCESSORY WIRING HARNESS REPLACEMENT (Sheet 6 of 8)**  
**INSTALLATION:**

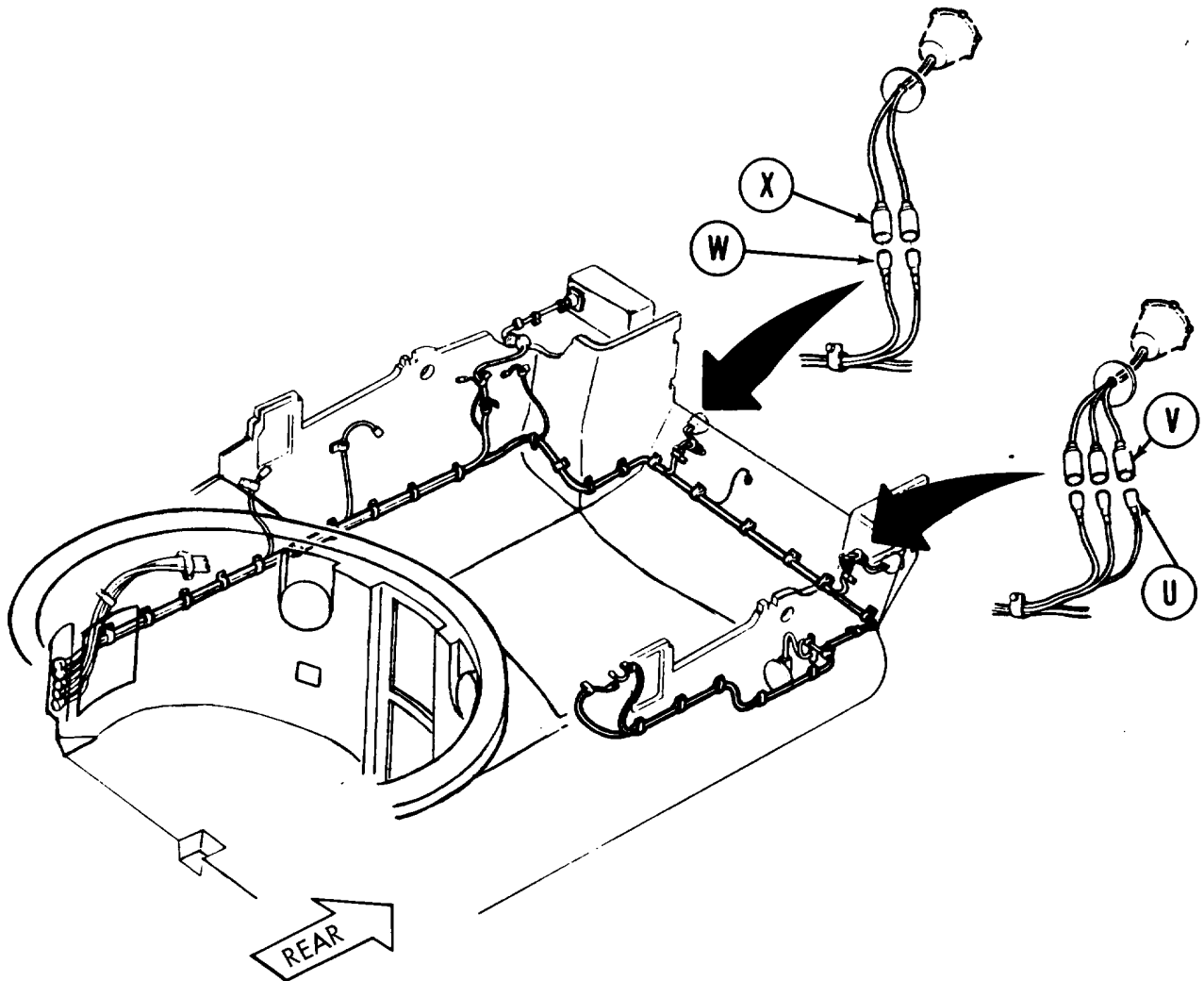


1. Position harness (A) into vehicle as shown.
2. Install clamp (B), two lockwashers (C) and (D), terminal connector (E), and screw (F). Using 7/16 inch socket, tighten screw.
3. Install three clamps (G), lockwashers (H), and screws (J). Using 7/16 inch socket, tighten screws.
4. Install six clamps (K), lockwashers (L), and screws (M). Using 7/16 inch socket, tighten screws.
5. Install seven clamps (N), lockwashers (P), and screws (Q). Using 7/16 inch socket, tighten screws.
6. Install 10 clamps (R), lockwashers (S), and screws (T). Using 7/16 inch socket, tighten screws.

Go on to Sheet 7

TA130633

REAR ACCESSORY WIRING HARNESS REPLACEMENT (Sheet 7 of 8)



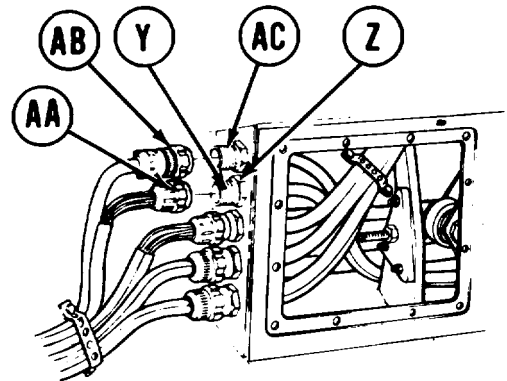
7. Check metal marker bands and connect three connectors (U) to matching connectors (V).
8. Check metal marker bands and connect two connectors (W) to matching connectors (X).

Go on to Sheet 8

TA130634

**REAR ACCESSORY WIRING HARNESS REPLACEMENT (Sheet 8 of 8)**

9. Insert bulkhead connector (Y) through bulkhead.
10. Install jamnut (Z) on bulkhead connector (Y). Using adjustable wrench, tighten jamnut.
11. Connect connector (AA) to bulkhead connector (Y). Using spanner wrench, tighten connector (AA).
12. Connect connector (AB) to bulkhead connector (AC). Using spanner wrench, tighten connector (AB).
13. Install left fuel tank (page 4-59).
14. Install right fuel tank (page 4-44).
15. Connect three ground cables to battery terminals (TM 9-2350-215-20-1).



End of Task

TA130635

## ENGINE ACCESSORY HARNESS ASSEMBLY REPLACEMENT (2A ENGINE) (Sheet 1 of 4)

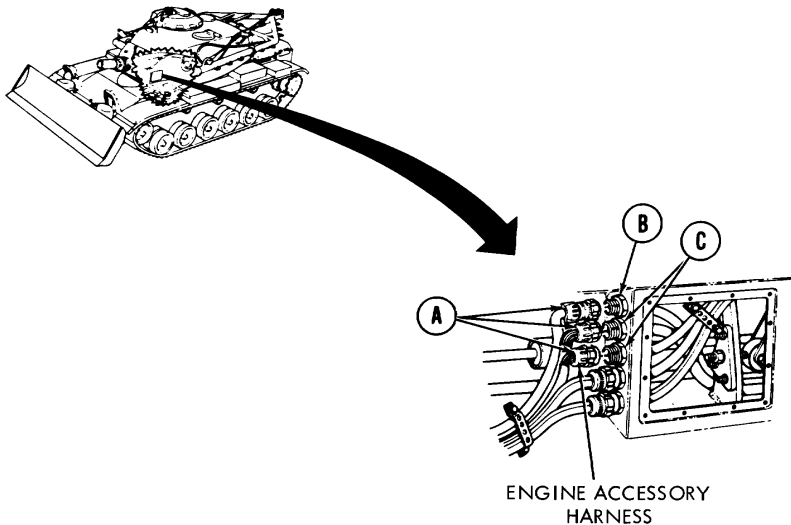
## PROCEDURE INDEX

PROCEDURE	PAGE
Removal	5-57
Installation	5-59

TOOLS: Spanner wrench  
 1-9/16 in. socket with 3/4 in. drive  
 7/16 in. combination box and open end wrench  
 2 in. socket with 3/4 in. drive  
 Ratchet with 3/4 in. drive

REFERENCE: TM 9-2350-222-20-1

PRELIMINARY PROCEDURE: Remove right fuel tank (page 4-36)

**NOTE**

Top two cables are disconnected to gain access to the third harness which is the accessory harness.

**REMOVAL:**

1. Using spanner wrench, disconnect three cables (A) from bulkhead connectors.
2. Using 1-9/16 inch socket, disconnect jamnut (B).
3. Using 2 inch socket, disconnect jamnuts (C).
4. Remove cables (A) from bulkhead.

Go on to Sheet 2

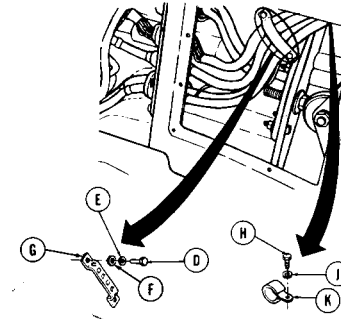
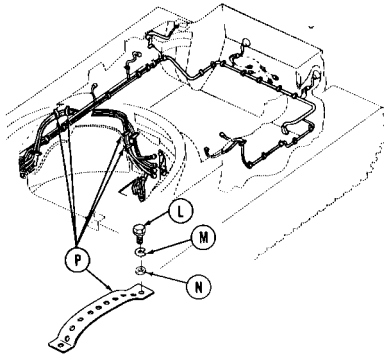
TA130636

## ENGINE ACCESSORY HARNESS ASSEMBLY REPLACEMENT (2A ENGINE) (Sheet 2 of 4)

## NOTE

Strap type clamps should be left in place by removing only one screw. If replacement of strap is required, remove both screws.

5. Using 7/16 inch wrench, remove screw (D), lockwasher (E), and flat washer (F) from strap (G).
6. Using 7/16 inch wrench, remove screw (H) and lockwasher (J) which is hidden by bulkhead.
7. Remove clamp (K).



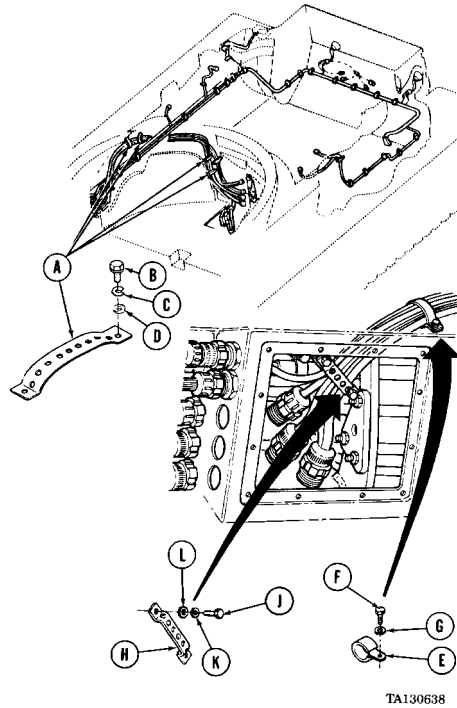
8. From engine compartment, using 7/16 inch wrench, remove four screws (L), lockwashers (M), and flat washers (N) from straps (P).
9. Remove engine accessory harness from vehicle.

Go on to Sheet 3

TA130637

**ENGINE ACCESSORY HARNESS ASSEMBLY REPLACEMENT (2A ENGINE) (Sheet 3 of 4)****INSTALLATION:**

1. Place engine accessory wiring harness in position in vehicle.
2. From engine compartment, place four straps (A) in position over wiring harness.
3. Using 7/16 inch wrench, install four screws (B), lockwashers (C), and flat washers (D).



4. Place clamp (E) in position.
5. Using 7/16 inch wrench, install screw (F) and lockwasher (G).
6. Place strap (H) in position.
7. Using 7/16 inch wrench, install screw (J), lockwasher (K), and flat washer (L).

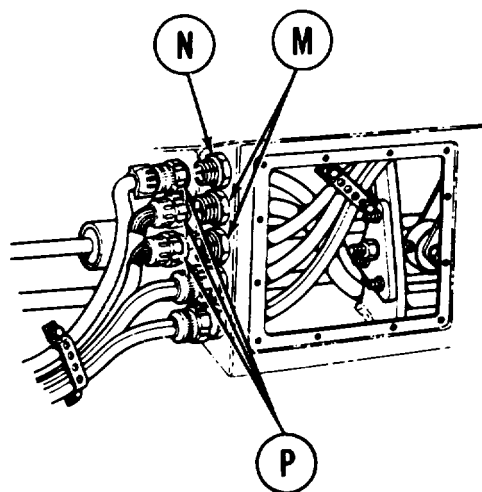
Go on to Sheet 4

TA130638



**ENGINE ACCESSORY HARNESS ASSEMBLY REPLACEMENT (2A ENGINE) (Sheet 4 of 4)**

8. Using 2 inch socket, install two jamnuts (M).
9. Using 1-9/16 inch socket, install jamnut (N).
10. Using spanner wrench, connect three connectors (P).
11. Install right fuel tank (page 4-44).



End of Task

TA130639

## ENGINE ACCESSORY HARNESS ASSEMBLY REPLACEMENT (2D ENGINE) (Sheet 1 of 5)

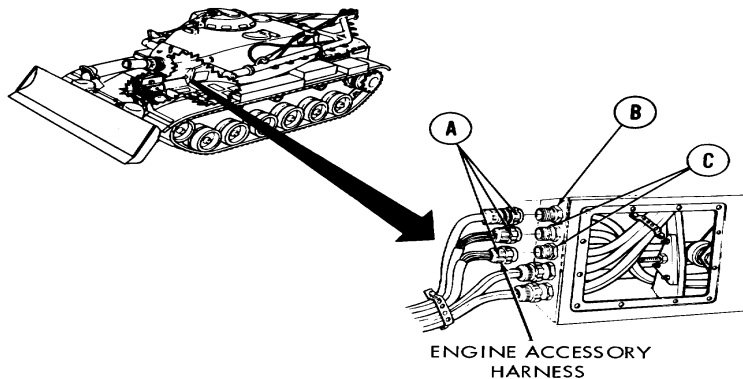
## PROCEDURE INDEX

PROCEDURE	PAGE
Removal	5-61
Installation	5-63

TOOLS: Spanner wrench  
 1-9/16 in. socket with 3/4 in. drive  
 7/16 in. combination box and open end wrench  
 2 in. socket with 3/4 in. drive  
 Ratchet with 3/4 in. drive

REFERENCE: TM 9-2350-222-20-1

PRELIMINARY PROCEDURE: Remove right fuel tank (page 4-36)

**NOTE**

**Top two cables are disconnected to gain access to the third harness which is the accessory harness.**

**REMOVAL:**

1. Using spanner wrench, disconnect three cables (A) from bulkhead connectors.
2. Using 1-9/16 inch socket, disconnect jamnut (B).
3. Using 2 inch socket, disconnect jamnuts (C).
4. Remove three cables (A) from bulkhead.

Go on to Sheet 2

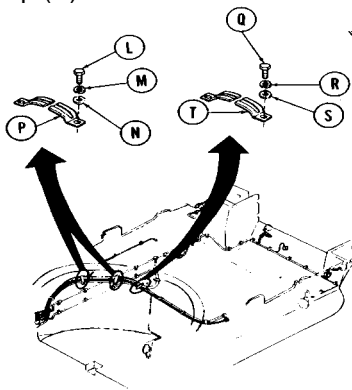
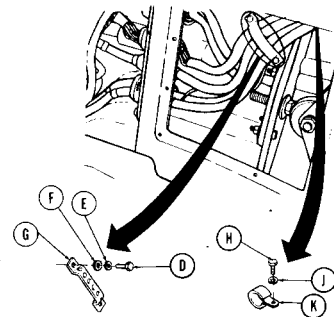
■ All data on pages 5-57 thru 5-60 deleted.

**ENGINE ACCESSORY HARNESS ASSEMBLY REPLACEMENT (2D ENGINE) (Sheet 2 of 5)**

**NOTE**

**Strap type clamps should be left in place by removing only one screw. If replacement of strap is required, remove both screws.**

5. Using 7/16 inch wrench, remove screw (D), lockwasher (E), and flat washer (F) from strap (G).
6. Using 7/16 inch wrench, remove screw (H) and lockwasher (J) which is hidden by bulkhead.
7. Remove clamp (K).



8. From engine compartment, using 7/16 inch wrench, remove two screws (L), lockwashers (M), and flat washers (N) from covers (P).
9. Using 7/16 inch wrench, remove screw (Q), lockwashers (R) and flat washer (S) from cover (T).

Go on to Sheet 3

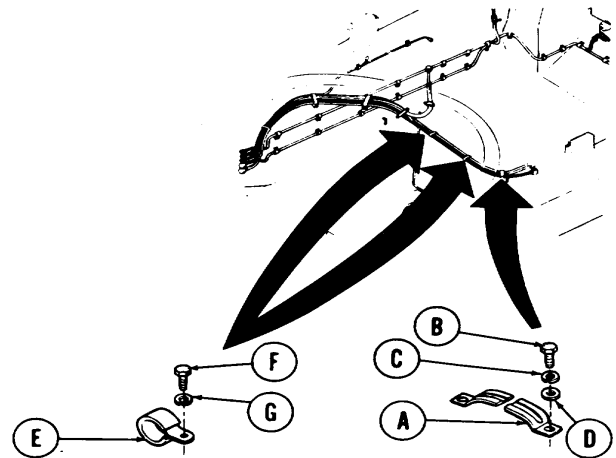
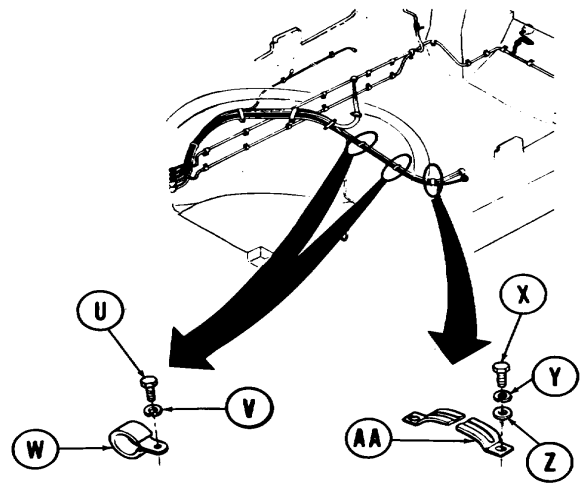
TA130641

**ENGINE ACCESSORY HARNESS ASSEMBLY REPLACEMENT (2D ENGINE) (Sheet 3 of 5)**

10. Using 7/16 inch wrench, remove two screws (U) and lockwashers (V).
11. Remove two clamps (W).
12. Using 7/16 inch wrench, remove screw (X), lockwasher (Y), and flat washer (Z) from cover (AA).
13. Remove engine accessory harness from vehicle.

**INSTALLATION:**

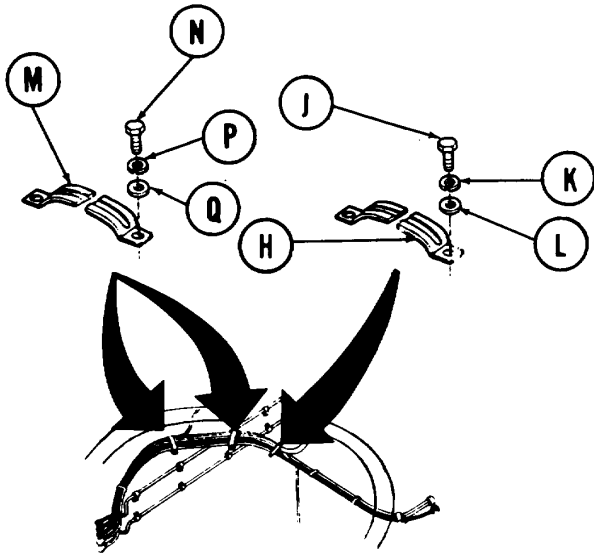
1. Place engine accessory wiring harness in position in vehicle.
2. From engine compartment, place cover (A) in position.
3. Using 7/16 inch wrench, install screw (B), lockwasher (C), and flat washer (D).
4. Place two clamps (E) in position.
5. Using 7/16 inch wrench, install two screws (F) and lockwashers (G).



Go on to Sheet 4

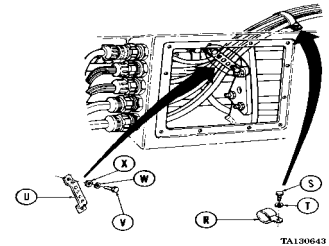
TA130642

ENGINE ACCESSORY HARNESS ASSEMBLY REPLACEMENT (2D ENGINE) (Sheet 4 of 5)



6. Place cover (H) in position.
7. Using 7/16 inch wrench, install screw (J), lockwasher (K), and flat washer (L).
8. Place two covers (M) in position.

9. Using 7/16 inch wrench, install two screws (N), lockwashers (P), and flat washers (Q).
10. Place clamp (R) in position (hidden behind bulkhead).
11. Using 7/16 inch wrench, install screw (S) and lockwasher (T).
12. Place strap (U) in position.
13. Using 7/16 inch wrench, install screw (V), lockwasher (W), and flat washer (X).

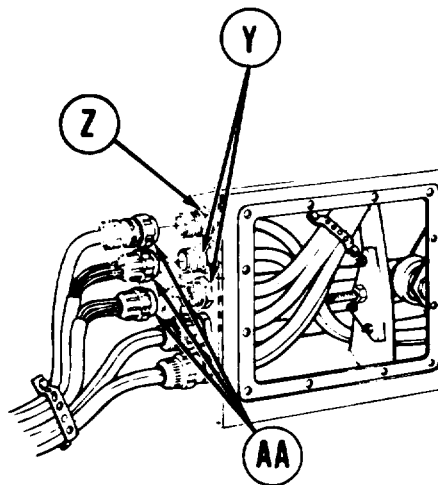


Go on to Sheet 5

TA130643

**ENGINE ACCESSORY HARNESS ASSEMBLY REPLACEMENT (2D ENGINE) (Sheet 5 of 5)**

14. Using 2 inch socket, install two jamnuts (Y).
15. Using 1-9/16 inch socket, install jamnut (Z).
16. Using spanner wrench, connect three connectors (AA).
17. Install right fuel tank (page 4-44).



End of Task

TA130644

**STARTER RELAY CABLE ASSEMBLY REPLACEMENT (Sheet 1 of 6)**

**PROCEDURE INDEX**

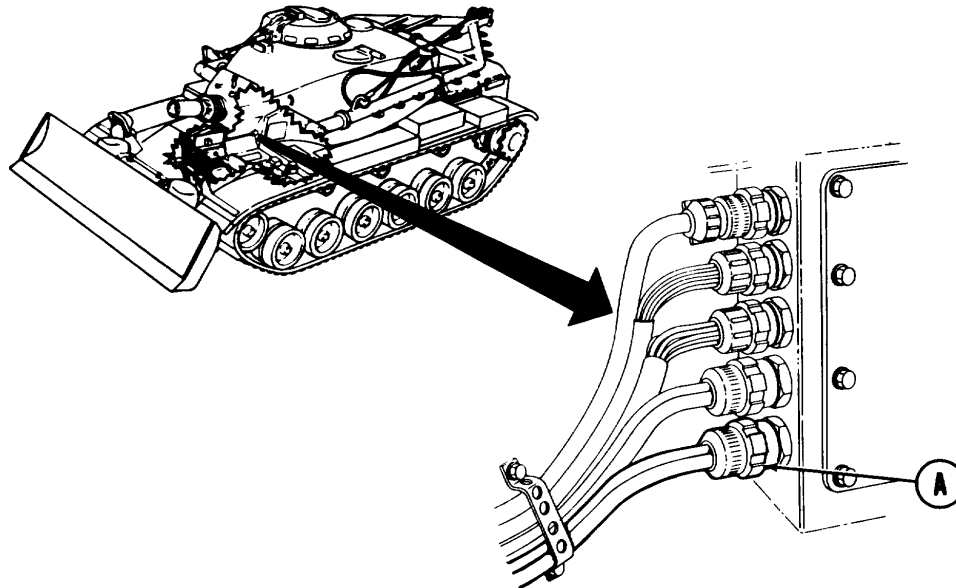
PROCEDURE	PAGE
Removal	5-66
Installation	5-69

**TOOLS:** 7/16 in. socket with 1/2 in. drive  
 10 in. extension with 1/2 in. drive  
 Ratchet with 1/2 in. drive  
 9/16 in. combination box and open end wrench (two required)  
 Spanner wrench

**SUPPLIES:** Adhesive sealant (Item 1, Appendix B)

**REFERENCES:** TM 9-2350-222-10  
 TM 9-2350-222-20-1

**PRELIMINARY PROCEDURE:** Disconnect three ground cables from battery terminals (TM 9-2350-222-20-1)



**REMOVAL:**

1. Manually traverse turret to gain access to connector (A) (TM 9-2350-222-10).
2. Using spanner wrench, disconnect connector (A).

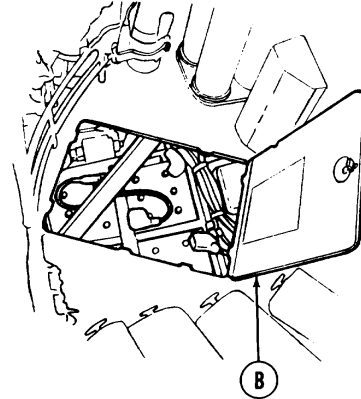
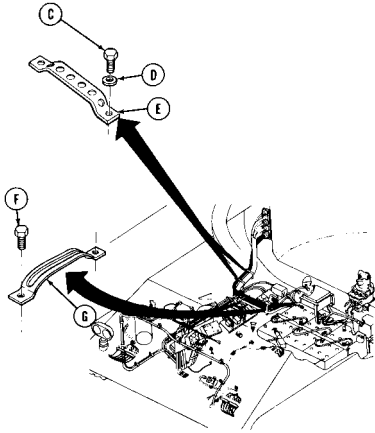
Go on to Sheet 2

TA130645

**STARTER RELAY CABLE ASSEMBLY REPLACEMENT (Sheet 2 of 6)****NOTE**

It will be necessary to manually traverse the turret to gain access to cable clamps.

3. Raise turret platform access door (B) to gain access to cable clamps (TM 9-2350-222-10).
4. Using socket, remove two screws (C) and two washers (D) from two clamps (E).

**NOTE**

Strap type clamps should remain in position by removing only one screw from strap. If replacing, remove both screws.

5. Using socket, remove two screws (F) from two clamps (G).

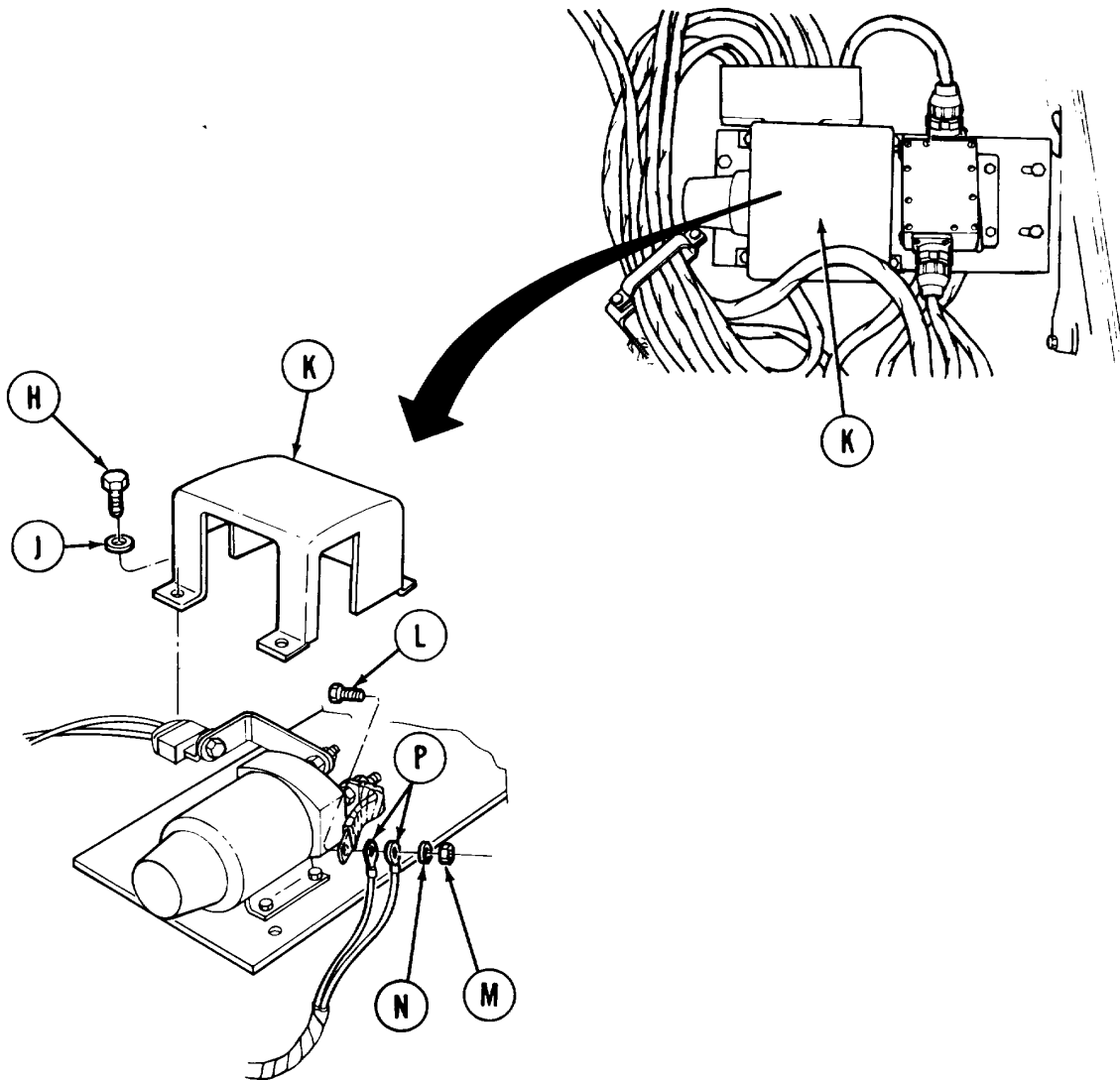
Go on to Sheet 3

TA130646



**STARTER RELAY CABLE ASSEMBLY REPLACEMENT (Sheet 3 of 6)**

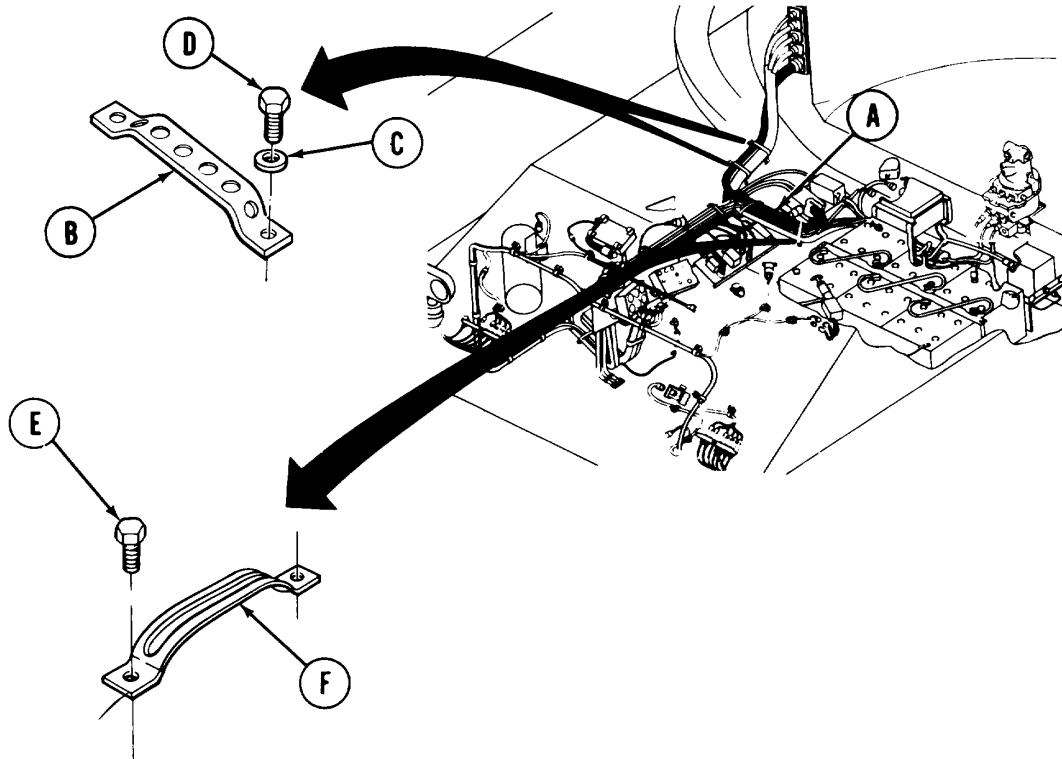
6. Using socket, remove four screws (H) and washers (J). Remove cover (K).



7. Using one 9/16 inch wrench on bolt (L) and other on nut (M), remove bolt (L), nut (M), washer (N), and two terminal connectors (P).
8. Remove cable assembly from vehicle.

Go on to Sheet 4

TA130647

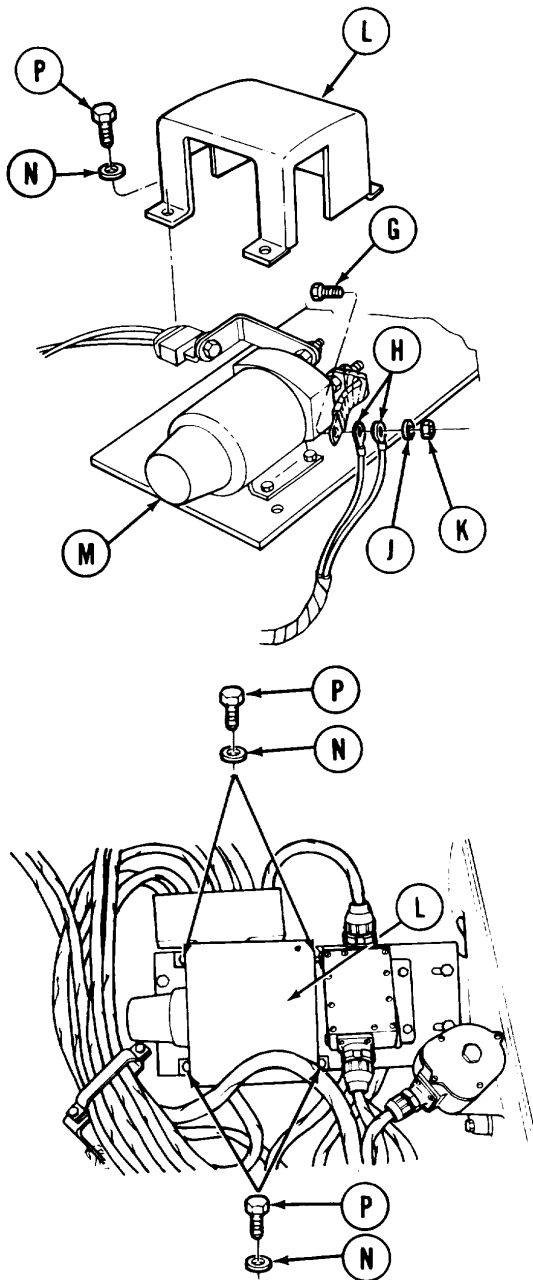
**STARTER RELAY CABLE ASSEMBLY REPLACEMENT (Sheet 4 of 6)****INSTALLATION:**

1. Position cable assembly (A) into straps (B) in vehicle as shown.
2. Install two washers (C) and screws (D) on straps (B). Using socket, tighten screws.
3. Install two screws (E) on clamps (F). Using socket, tighten screws.

Go on to Sheet 5

TA130648

STARTER RELAY CABLE ASSEMBLY REPLACEMENT (Sheet 5 of 6)



4. Install bolt (G), two terminal connectors (H), washer (J), and nut (K).
5. Using one 9/16 inch wrench on bolt (G) and other on nut (K), tighten nut.
6. Apply adhesive sealant (Item 1, Appendix B) to connection.
7. Position cover (L) over starter relay (M).
8. Install four washers (N) and screws (P). Using socket, tighten screws

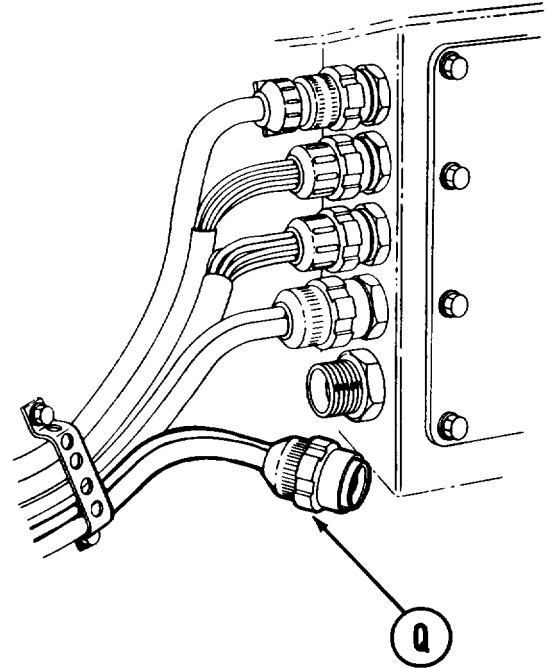
Go on to Sheet 6

TA130649

**STARTER RELAY CABLE ASSEMBLY REPLACEMENT (Sheet 6 of 6)**

- 9. Connect connector (Q) to bulkhead fitting.
- 10. Connect three ground cables to battery terminals (TM 9-2350-222-20-1).

End of Task



TA130650

## STARTER FEED HARNESS ASSEMBLY REPLACEMENT (2D ENGINE) (Sheet 1 of 5)

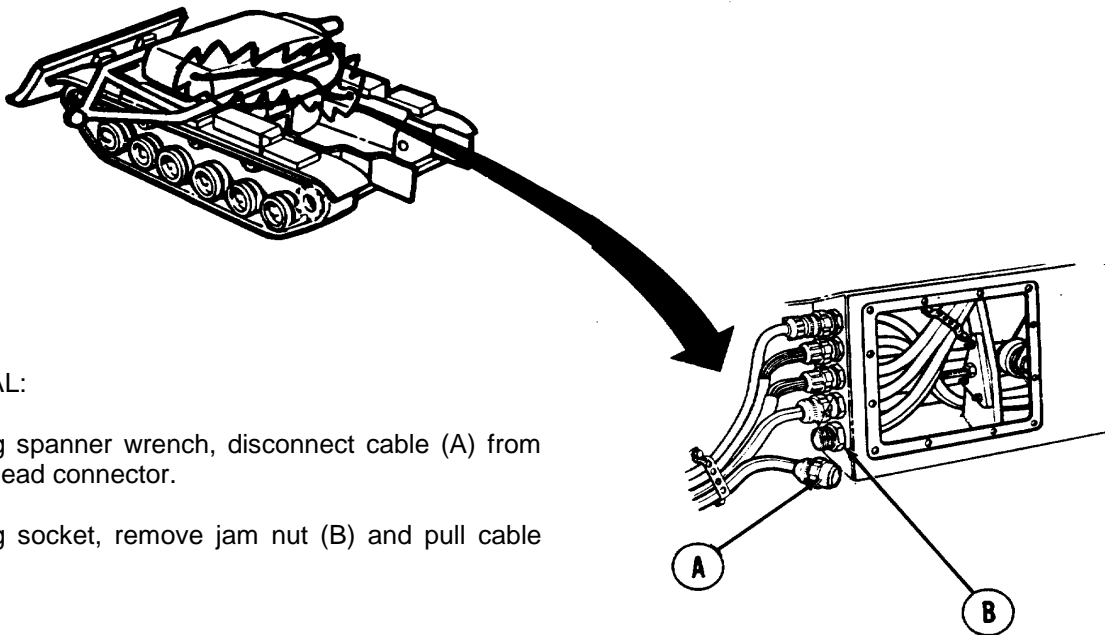
## PROCEDURE INDEX

PROCEDURE	PAGE
Removal	5-76
Installation	5-78

TOOLS: Spanner wrench  
 2-1/2 in. socket with 1 in. drive  
 7/16 in. combination box and open end wrench  
 Ratchet with 1 in. drive

REFERENCES: TM 9-2350-222-20-1  
 TM 9-2350-222-10

PRELIMINARY PROCEDURE: Remove right fuel tank (page 4-36)



## REMOVAL:

1. Using spanner wrench, disconnect cable (A) from bulkhead connector.
2. Using socket, remove jam nut (B) and pull cable back.

Go on to Sheet 2

All data on pages 5-72 thru 5-75 deleted.

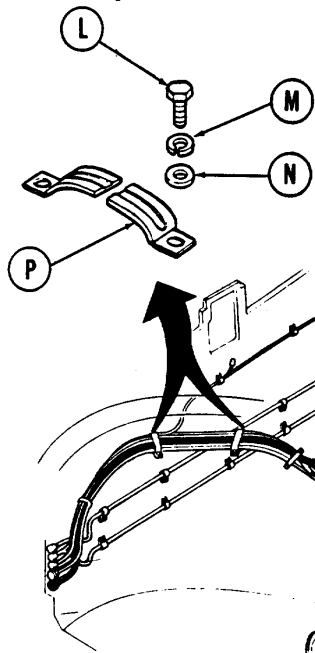
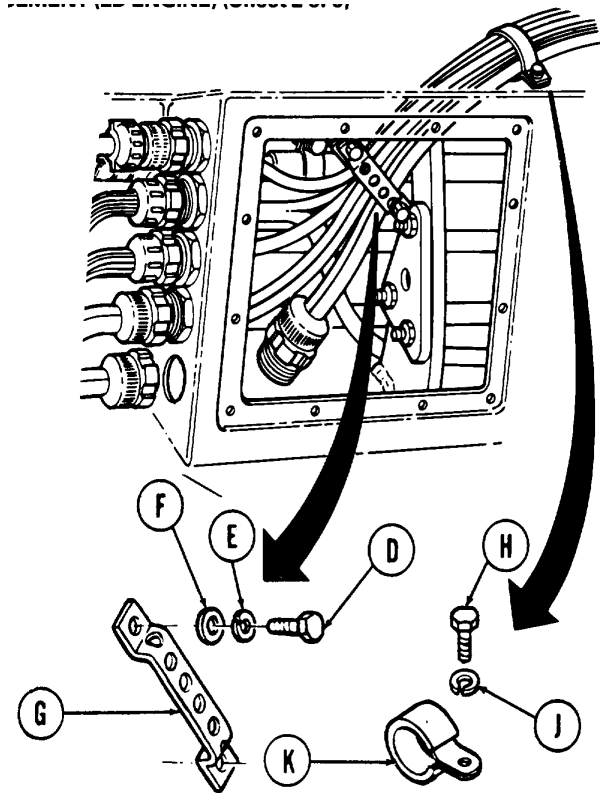
Change 5 5-76

STARTER FEED HARNESS ASSEMBLY REPLACEMENT (2D ENGINE) (Sheet 2 of 5)

NOTE

Strap type clamps should be left in place by removing only one screw. If replacement of strap is required, remove both screws.

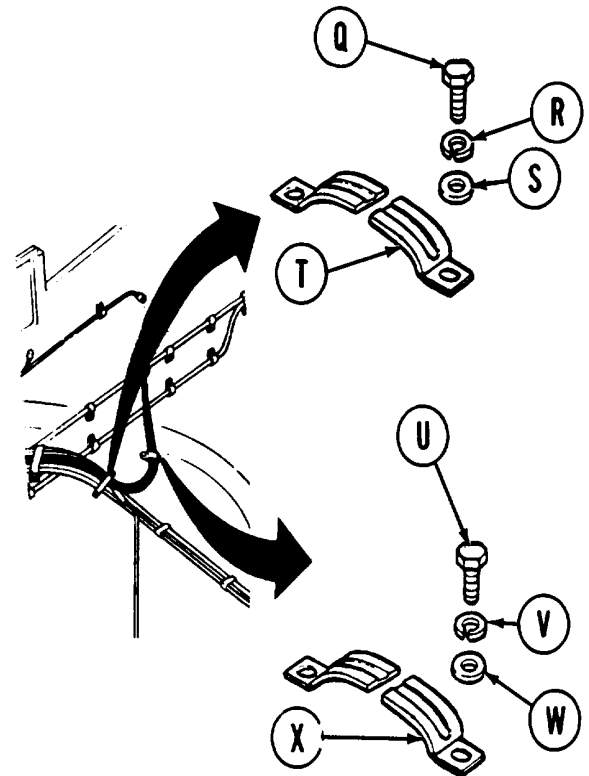
3. Remove starter feed harness (C) from bulkhead.
4. Using wrench, remove screw (D), lockwasher (E), and flat washer (F) from strap (G).
5. Using wrench, remove screw (H) and lockwasher (J).
6. Remove clamp (K).



7. From engine compartment, using wrench, remove screws (L), lockwashers (M), and flat washers (N) from two covers (P).

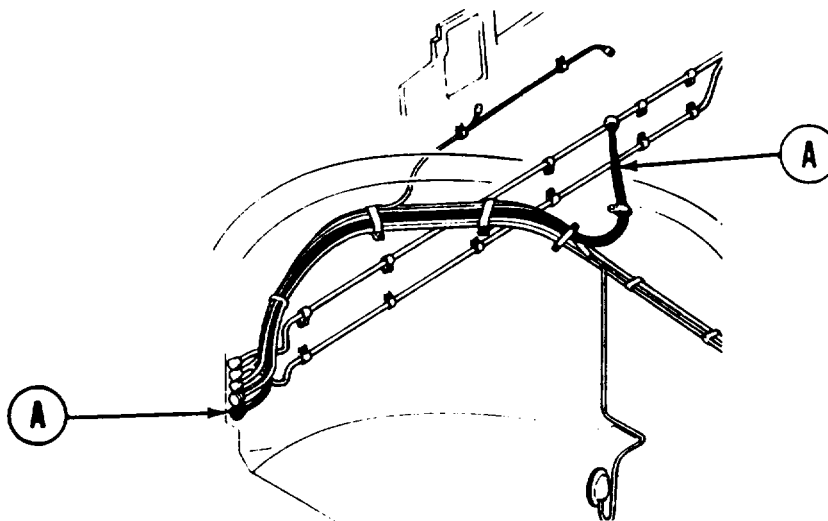
**STARTER FEED HARNESS ASSEMBLY REPLACEMENT (2D ENGINE) (Sheet 3 of 5)**

8. Using wrench, remove screw (Q), lockwasher (R), and flat washer (S) from cover (T).
9. Using wrench, remove screw (U), lockwasher (V), and flat washer (W) from cover (X).
10. Remove starter feed wiring harness from vehicle.



**INSTALLATION:**

1. Position starter feed wiring harness (A) in vehicle.

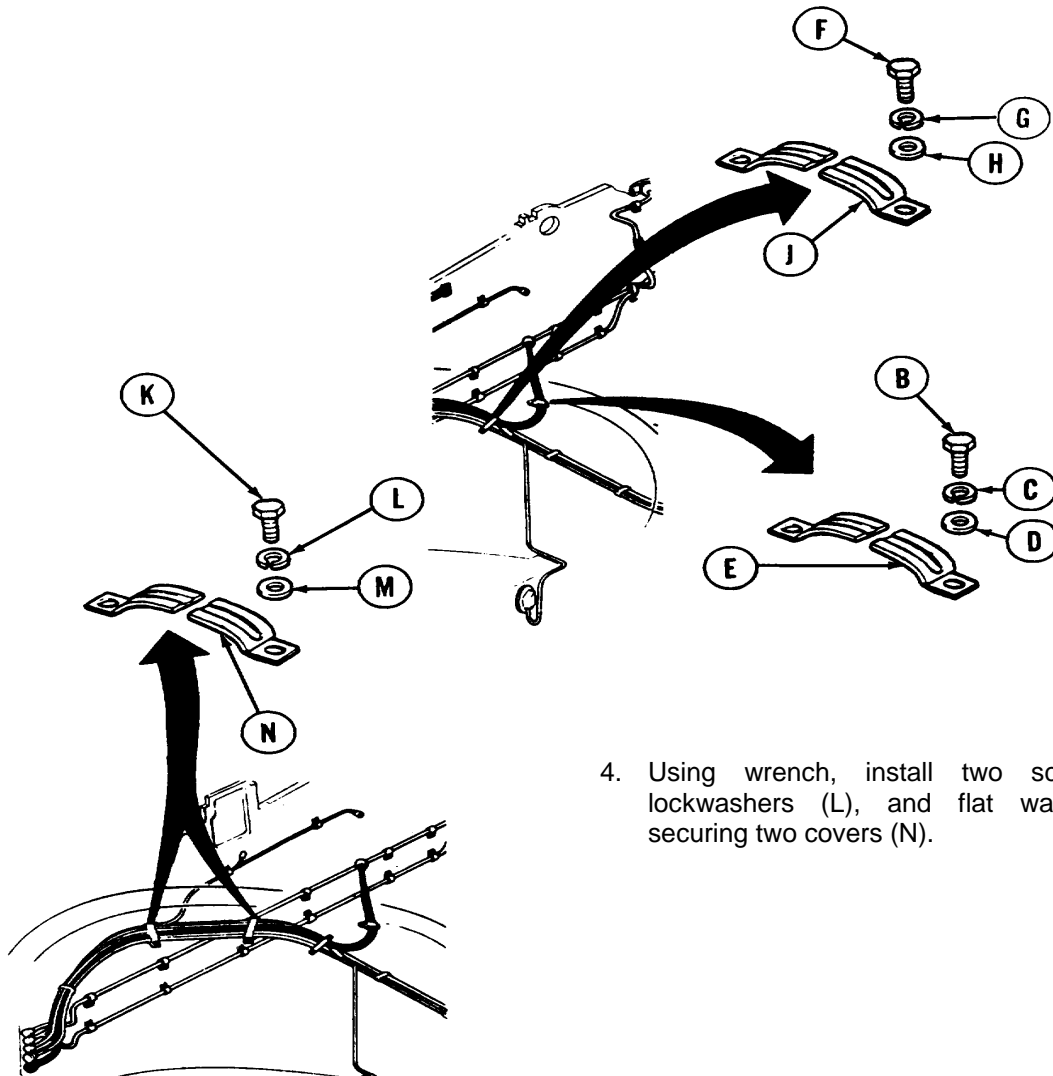


Go on to Sheet 4

TA130657

**STARTER FEED HARNESS ASSEMBLY REPLACEMENT (2D ENGINE) (Sheet 4 of 5)**

2. Using wrench, install screw (B), lockwasher (C), and flat washer (D) securing cover (E).
3. Using wrench, install screw (F), lockwasher (G), and flat washer (H) securing cover (J).



4. Using wrench, install two screws (K), lockwashers (L), and flat washers (M) securing two covers (N).

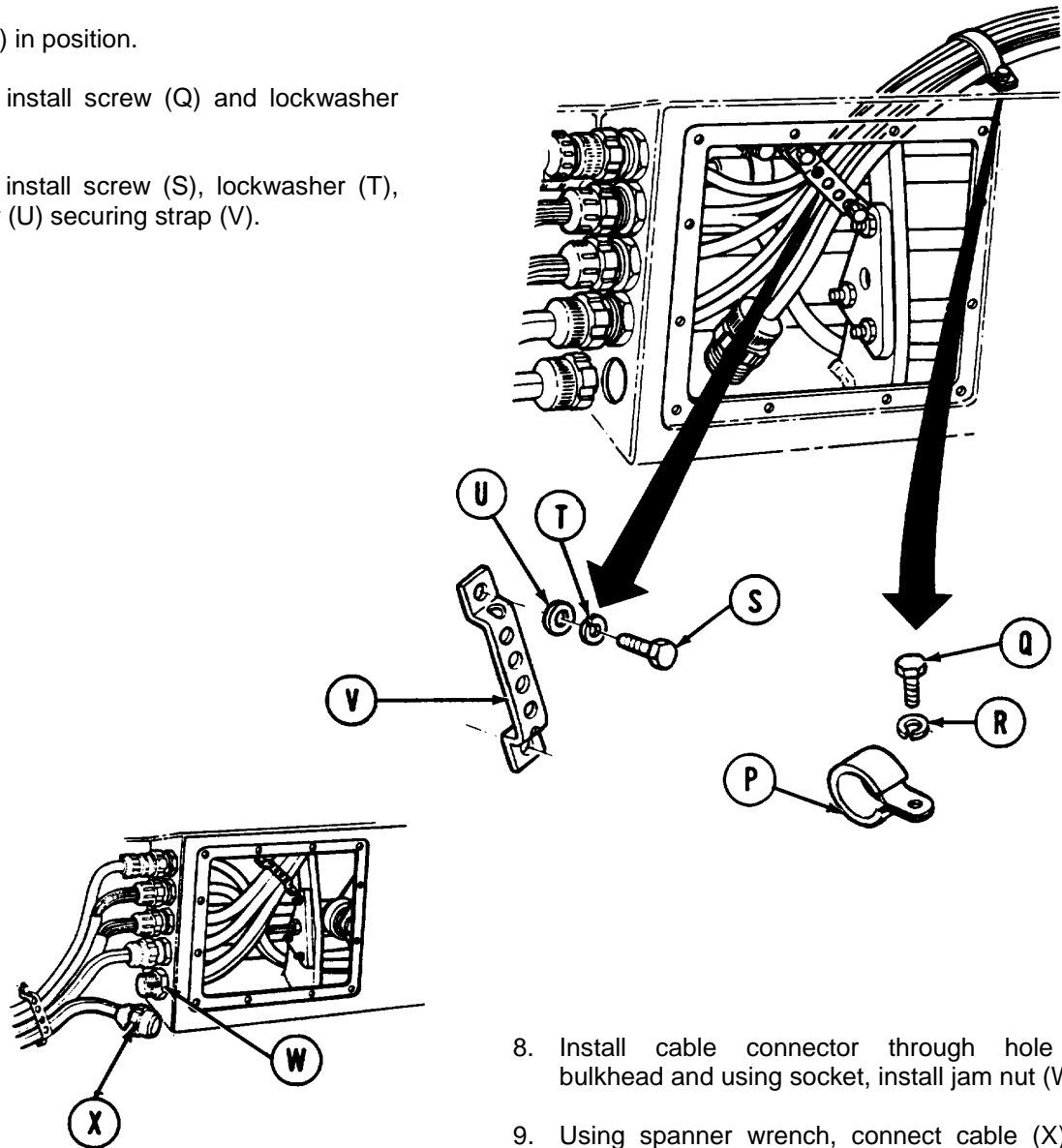
Go on to Sheet 5

TA130658



**STARTER FEED HARNESS ASSEMBLY REPLACEMENT (2D ENGINE) (Sheet 5 of 5)**

5. Place clamp (P) in position.
6. Using wrench, install screw (Q) and lockwasher (R).
7. Using wrench, install screw (S), lockwasher (T), and flat washer (U) securing strap (V).



8. Install cable connector through hole in bulkhead and using socket, install jam nut (W).
9. Using spanner wrench, connect cable (X) to bulkhead connector.
10. Install right fuel tank (page 4-44).

End of Task

TA1306595

**ENGINE DISCONNECT LEAD ASSEMBLY REPLACEMENT (2A ENGINE) (Sheet 1 of 4)**

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	5-81
Installation	5-83

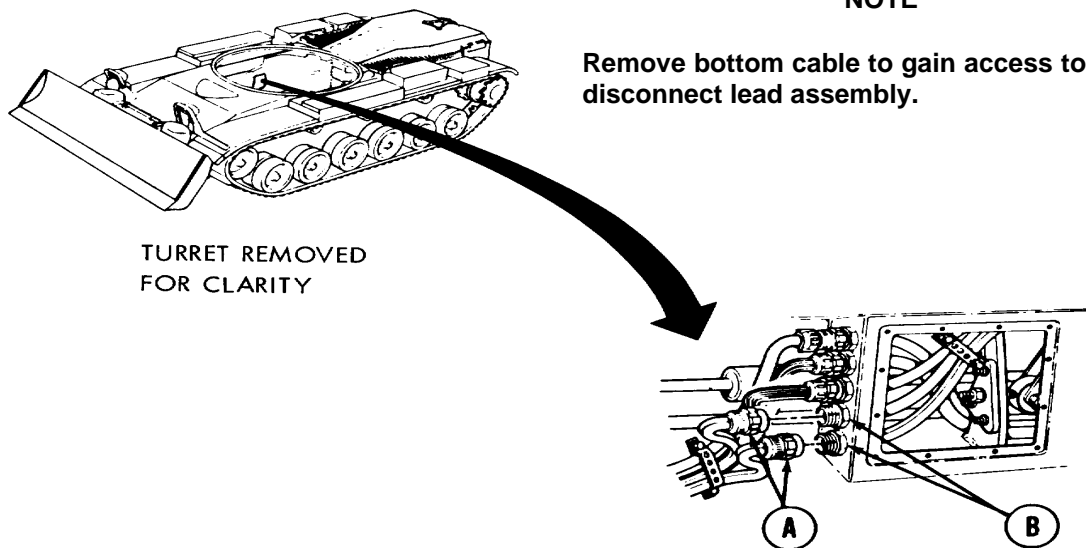
**TOOLS:** Spanner wrench  
 2-1/2 in. socket with 1 in. drive  
 7/16 in. combination box and open end wrench  
 Ratchet with 1 in. drive

**REFERENCE:** TM 9-2350-222-20-1

**PRELIMINARY PROCEDURE:** Remove right fuel tank (page 4-36)

**NOTE**

Remove bottom cable to gain access to engine disconnect lead assembly.



**REMOVAL:**

1. Using spanner wrench, disconnect cables (A) from bulkhead.
2. Using 2-1/2 inch socket, remove jamnuts (B) one at a time pulling cables back as jamnuts are removed.

Go on to Sheet 2

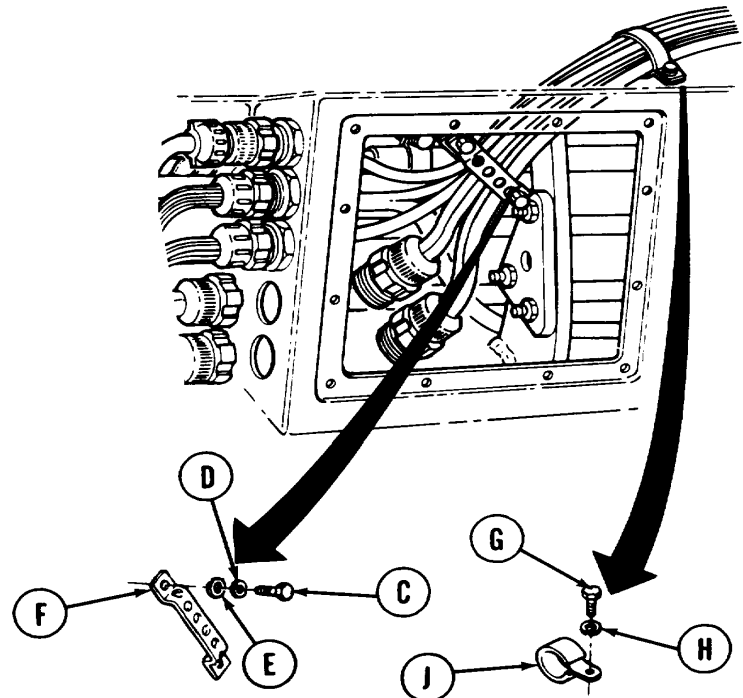
TA130660

ENGINE DISCONNECT LEAD ASSEMBLY REPLACEMENT (2A ENGINE) (Sheet 2 of 4)

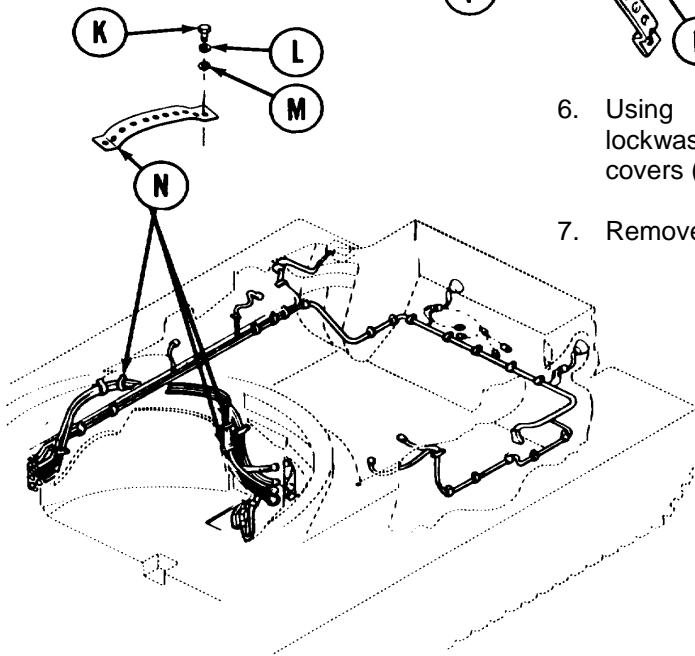
NOTE

Straps and covers should be left in place by removing only one screw. If replacement of strap is required, remove both screws.

3. Using 7/16 inch wrench, remove screw (C), lockwasher (D), and flat washer (E) from strap (F).
4. Using 7/16 inch wrench, remove screw (G) and lockwasher (H) (hidden by bulkhead).
5. Remove clamp (J).



6. Using 7/16 inch wrench, remove screw (K), lockwasher (L), and flat washer (M) from three covers (N).
7. Remove engine disconnect lead from vehicle.



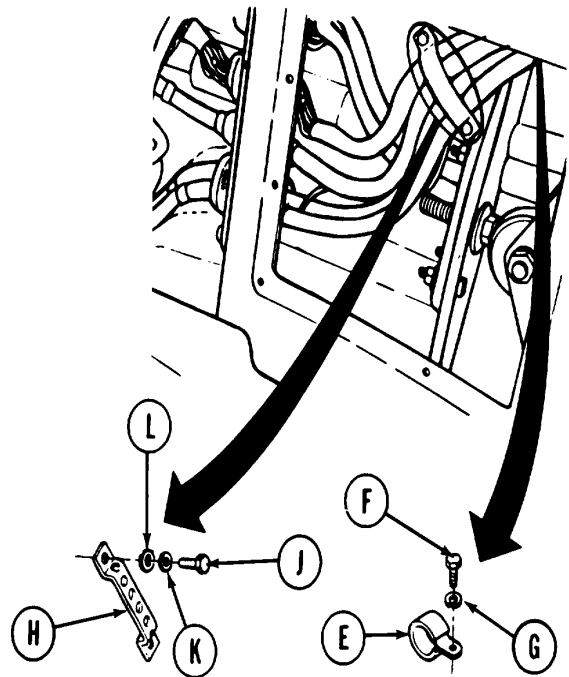
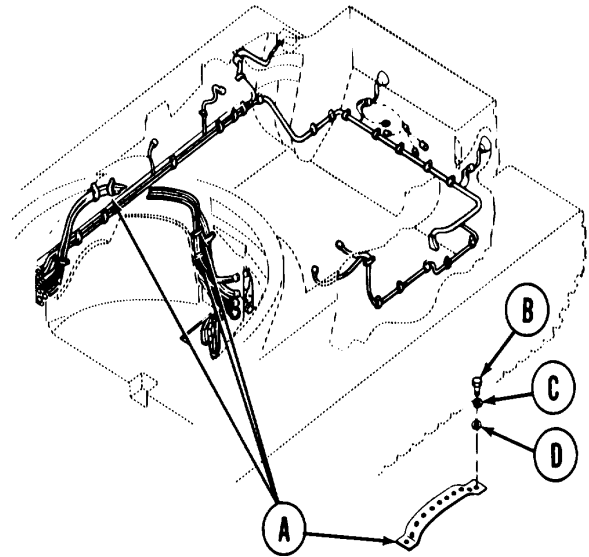
Go on to Sheet 3

TA130661

**ENGINE DISCONNECT LEAD ASSEMBLY REPLACEMENT (2A ENGINE) (Sheet 3 of 4)**

**INSTALLATION:**

1. Place engine disconnect lead assembly in position in vehicle.
2. Place three covers (A) in position.
3. Using 7/16 inch wrench, install screws (B), lockwasher (C), and flat washer (D) into covers (A).
4. Place clamp (E) (hidden by bulkhead) in position.
5. Using 7/16 inch wrench, install screw (F) and lockwasher (G).
6. Place strap (H) in position.
7. Using 7/16 inch wrench, install screw (J), lockwasher (K), and flat washer (L).



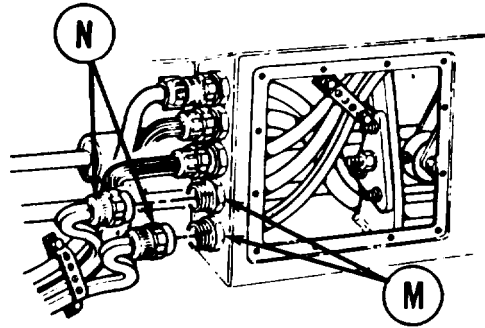
Go on to Sheet 4

TA130662

**ENGINE DISCONNECT LEAD ASSEMBLY REPLACEMENT (2A ENGINE) (Sheet 4 of 4)**

8. Install two cable connectors through hole in bulkhead.
9. Using 2-1/2 inch socket, install jamnuts (M).
10. Using spanner wrench, connect connectors (N).
11. Install right fuel tank (page 4-44).

End of Task



TA130663

## ENGINE DISCONNECT LEAD ASSEMBLY REPLACEMENT (2D ENGINE) (Sheet 1 of 5)

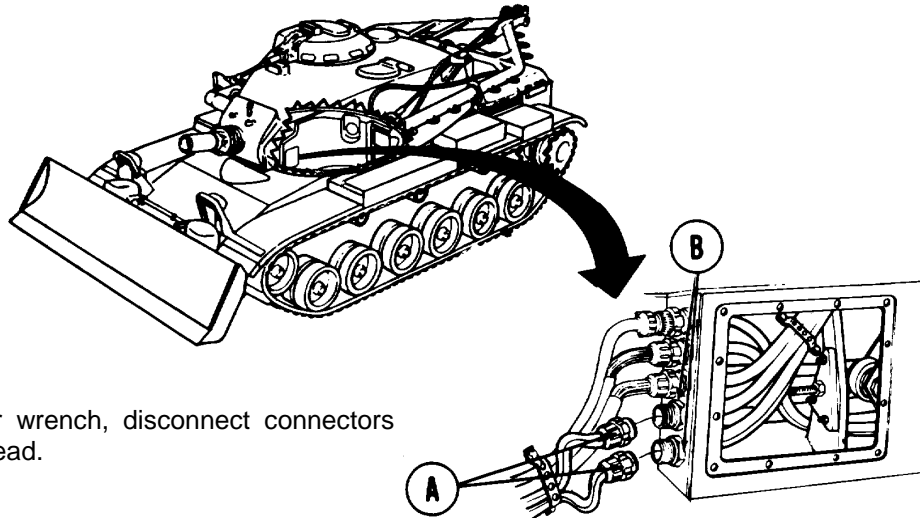
## PROCEDURE INDEX

PROCEDURE	PAGE
Removal	5-85
Installation	5-87

TOOLS: Spanner wrench  
 2-1/2 in. socket with 1 in. drive  
 7/16 in. combination box and open end wrench  
 Ratchet with 1 in. drive

REFERENCE: TM 9-2350-222-20-1

PRELIMINARY PROCEDURE: Remove right fuel tank (page 4-36)



## REMOVAL:

1. Using spanner wrench, disconnect connectors (A) from bulkhead.

## NOTE

**Remove bottom cable to gain access to engine disconnect lead assembly.**

2. Using 2-1/2 inch socket, remove jamnuts (B) one at a time pulling cables back as jamnuts are removed.

Go on to Sheet 2

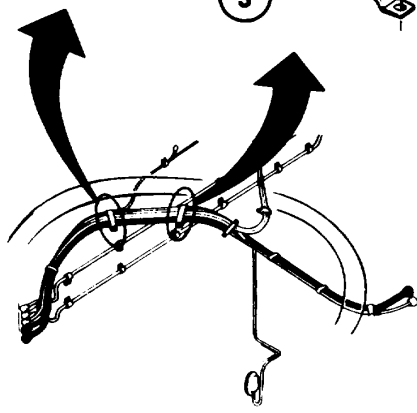
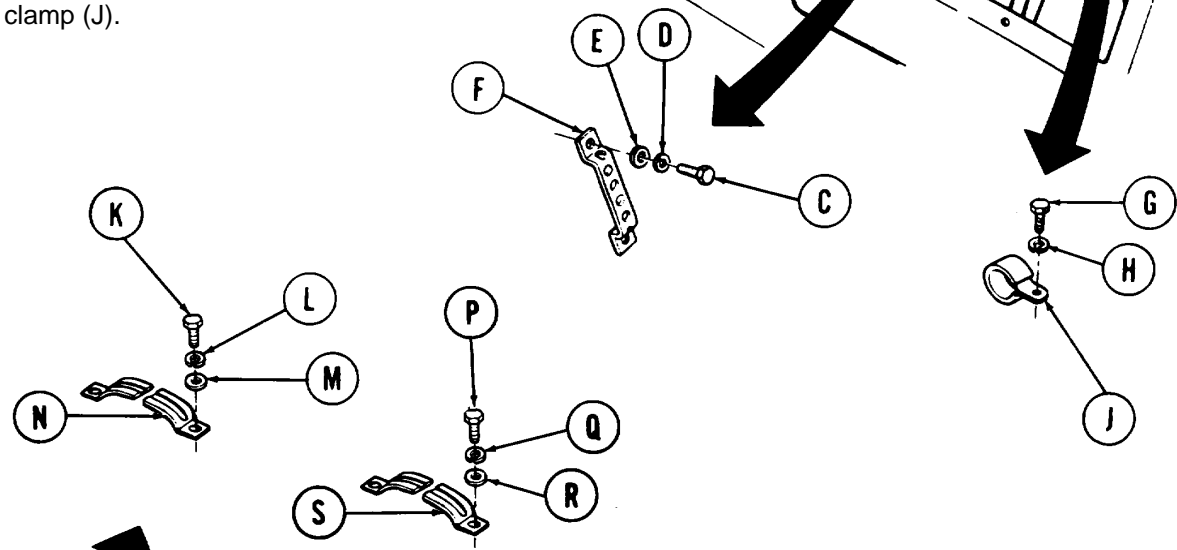
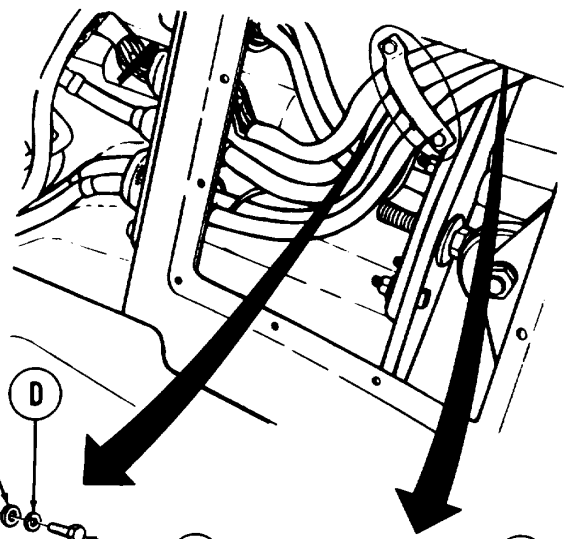
All data on pages 5-81 thru 5-84 deleted.

ENGINE DISCONNECT LEAD ASSEMBLY REPLACEMENT (2D ENGINE) (Sheet 2 of 5)

NOTE

Straps and covers should be left in place by removing only one screw. If replacement of strap is required, remove both screws.

3. Using 7/16 inch wrench, remove screw (C), lockwasher (D), and flat washer (E) from strap (F).
4. Using 7/16 inch wrench, remove screw (G) and lockwasher (H) (hidden by bulkhead).
5. Remove clamp (J).



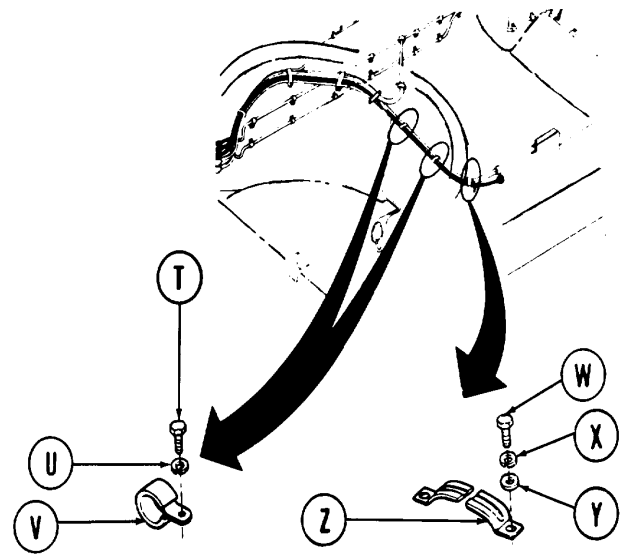
6. Using 7/16 inch wrench, remove screw (K), lockwasher (L), and flat washer (M) from cover (N).
7. Using 7/16 inch wrench, remove screw (P), lockwasher (Q), and flat washer (R) from cover (S).

Go on to Sheet 3

TA130665

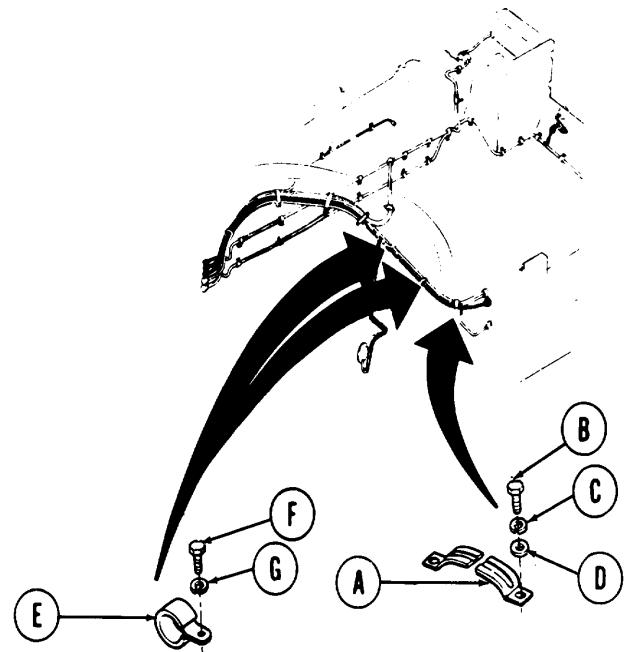
**ENGINE DISCONNECT LEAD ASSEMBLY REPLACEMENT (2D ENGINE) (Sheet 3 of 5)**

8. Using 7/16 inch wrench, remove two screws (T) and lockwashers (U).
9. Remove two clamps (V).
10. Using 7/16 inch wrench, remove screw (W), lockwasher (X), and flat washer (Y) from cover (Z).
11. Remove engine disconnect lead from vehicle.



**INSTALLATION:**

1. Place engine disconnect lead assembly in position in vehicle.
2. Place cover (A) in position.
3. Using 7/16 inch wrench, install screws (B), lockwasher (C), and flat washer (D).
4. Place two clamps (E) in position.
5. Using 7/16 inch wrench, install two screws (F) and lockwashers (G).



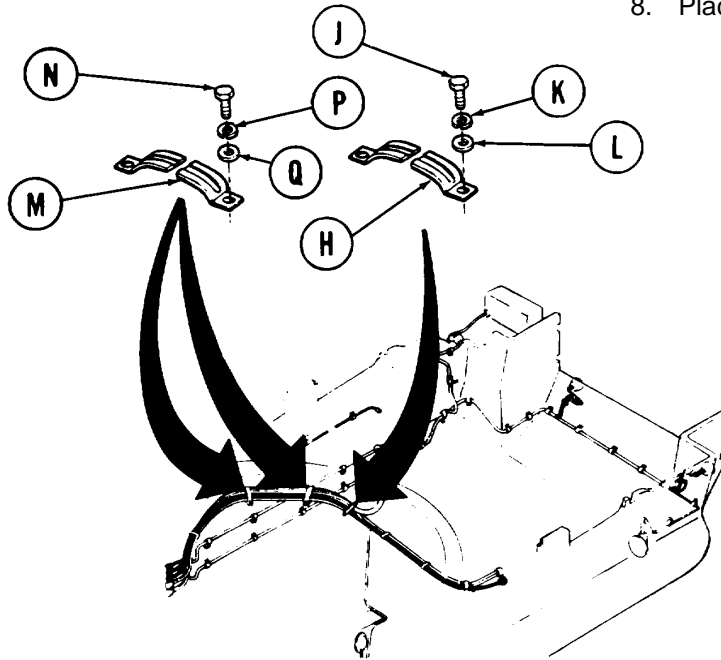
Go on to Sheet 4

TA130666

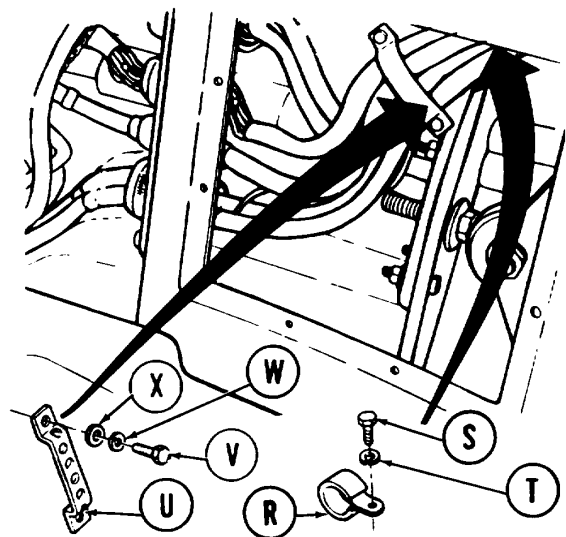


ENGINE DISCONNECT LEAD ASSEMBLY REPLACEMENT (2D ENGINE) (Sheet 4 of 5)

6. Place covers (H) in position.
7. Using 7/16 inch wrench, install screw (J), lockwasher (K), and flat washer (L).
8. Place two covers (M) in position.



9. Using 7/16 inch wrench, install two screws (N), lockwashers (P), and flat washers (Q).
10. Place clamp (R) (hidden by bulkhead) in position.
11. Using 7/16 inch wrench, install screw (S) and lockwasher (T).
12. Place strap (U) in position.
13. Using 7/16 inch wrench, install screw (V), lockwasher (W), and flat washer (X).



Go on to Sheet 5

TA130667

**ENGINE DISCONNECT LEAD ASSEMBLY REPLACEMENT (2D ENGINE) (Sheet 5 of 5)**

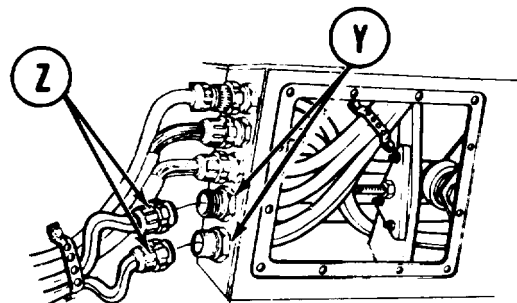
14. Install two cable connectors through holes in bulkhead.

15. Using 2-1/2 inch socket, install jamnuts (Y).

16. Using spanner wrench, connect connectors (Z).

17. Install right fuel tank (page 4-44).

End of Task



TA130668

**REAR INTERMEDIATE INTERPHONE CABLE ASSEMBLY REPLACEMENT (Sheet 1 of 3)**

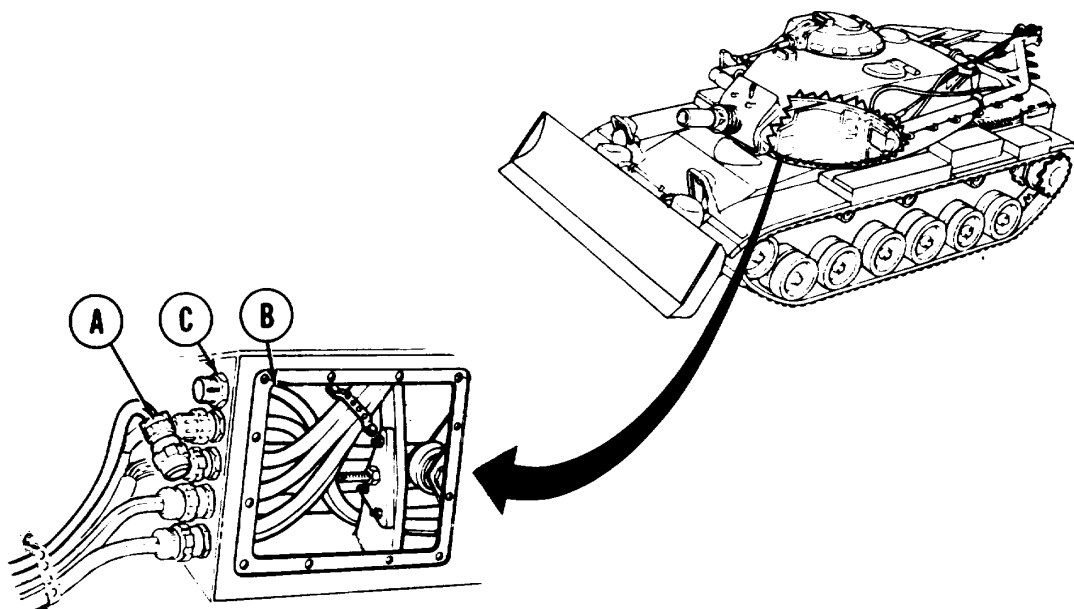
**TOOLS:** 7/16 in. socket with 1/2in. drive  
5 in. extension with 1/2 in. drive  
Universal joint with 1/2 in. drive  
Ratchet with 1/2 in. drive  
Spanner wrench  
12 in. adjustable wrench  
Slip joint pliers

**REFERENCES:** TM 9-2350-222-10  
TM 9-2350-222-20-1

**PRELIMINARY PROCEDURE:** Remove three ground cables from battery terminals (TM 9-2350-222-20-1)  
Remove right fuel tank (page 4-36)

**REMOVAL:**

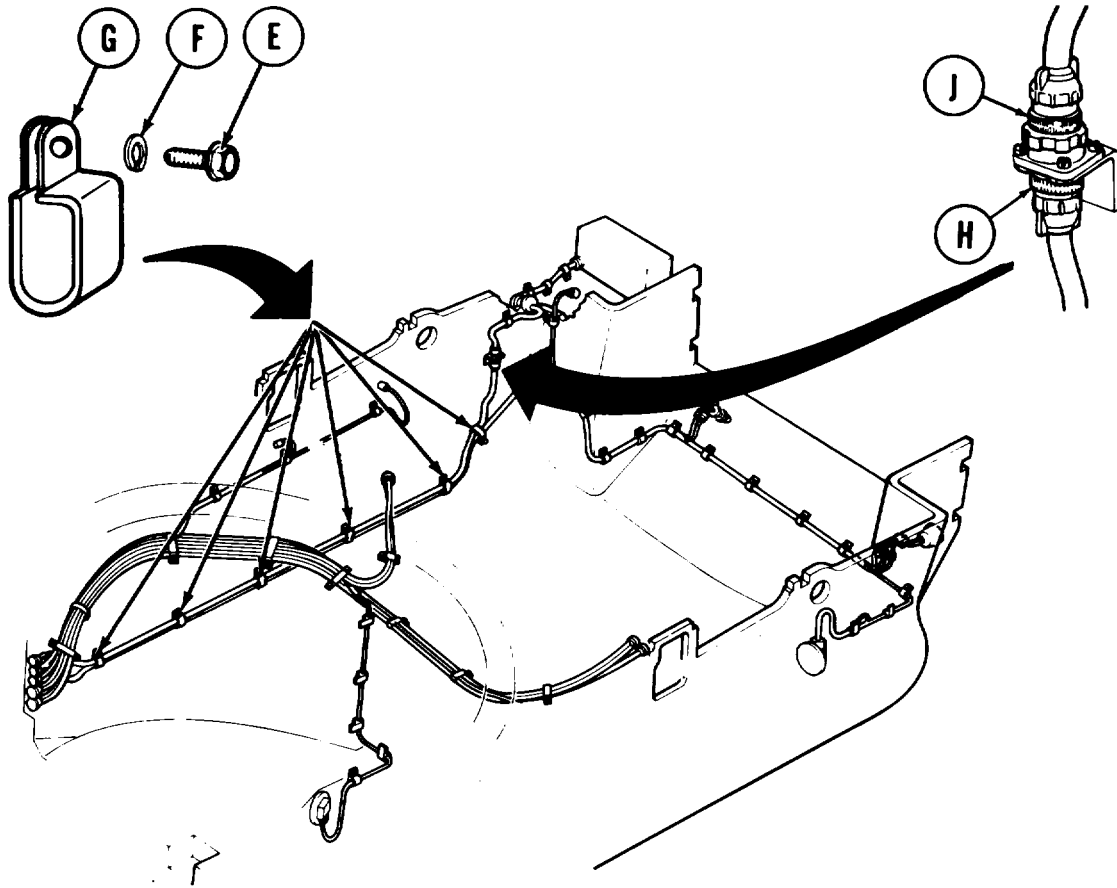
1. Using spanner wrench, disconnect connector (A) from bulkhead connector (B).
2. Using adjustable wrench, remove jamnut (C) from bulkhead connector (B).
3. Remove bulkhead connector (B) from bulkhead.



Go on to Sheet 2

TA130669

## REAR INTERMEDIATE INTERPHONE CABLE ASSEMBLY REPLACEMENT (Sheet 2 of 3)



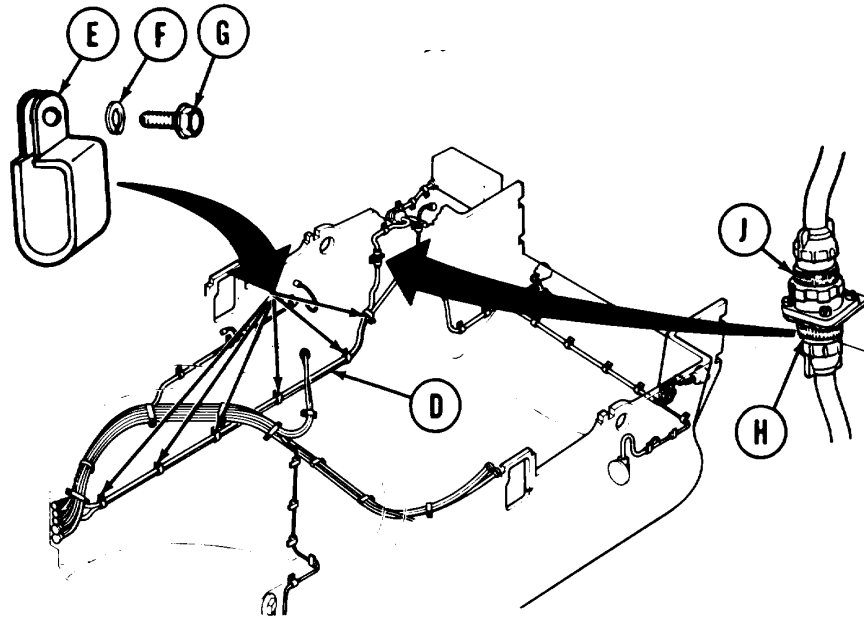
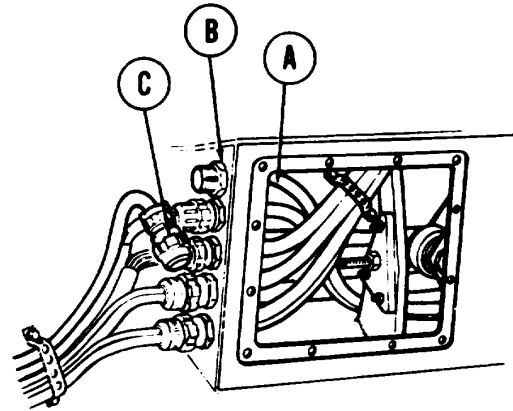
4. Using 7/16 inch socket, remove seven screws (E) and lockwashers (F) and clamps (G).
5. Using pliers, disconnect connector (H) from connector (J).
6. Remove cable assembly from vehicle.

Go on to Sheet 3

TA130670

**REAR INTERMEDIATE INTERPHONE CABLE ASSEMBLY REPLACEMENT (Sheet 3 of 3)****INSTALLATION:**

1. Insert bulkhead connector (A) through bulkhead.
2. Install jamnut (B) on bulkhead connector. Using adjustable wrench, tighten jamnut.
3. Connect connector (C) to bulkhead connector (A). Using spanner wrench, tighten connector (C).



4. Position cable assembly (D) in vehicle as shown.
5. Install seven clamps (E), washers (F), and screws (G). Using 7/16 inch socket, tighten screws.
6. Connect connector (H) to connector (J). Using pliers, tighten connectors.
7. Install right fuel tank (page 4-44).
8. Connect three battery ground straps (TM 9-2350-222-20-1).

End of Task

TA130671

**INFRARED POWER SUPPLY (SHEET 1 of 6)**

PROCEDURE INDEX

PROCEDURE	PAGE
Disassembly	5-93
Cleaning	5-94
Inspection and Repair	5-94
Assembly	5-95
Testing	5-96
Installation	5-98

TOOLS: Screwdriver  
 1/8-inch pipe thread fitting  
 Pressure gage

TEST EQUIPMENT: Tube tester

SUPPLIES: Dry cleaning solvent (Item 12, Appendix B)

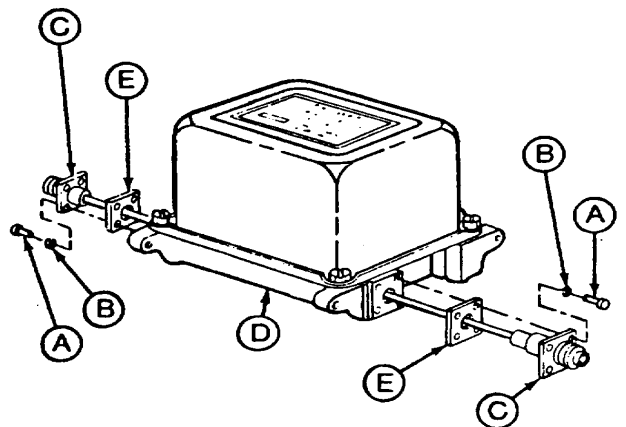
- Rags
- Compressed air
- Lockwasher
- Rubber gloves
- Crocus cloth
- Caskets

REFERENCE (TM 9-2350-222-20-1-4)

PRELIMINARY PROCEDURE: Remove infrared power supply (TM 9-2350-222-20-1-3)

DISASSEMBLY:

1. Remove eight screws (A) and lockwasher (B) securing two connectors (C) to base (D). Discard lockwashers.
2. Pull connectors (C) away from base (D) and unsolder leads.
3. Remove two connecting gaskets (E).



Go to Sheet 2

**INFRARED POWER SUPPLY (SHEET 2 of 6)**

4. Unscrew, four captive screws (F) securing cover (G) to base (D), and remove cover (G).
5. Remove and discard cover seal (H).
6. Remove two tube caps (I) from tubes (J).
7. Pull three tubes (J) and vibrator (K) from sockets.
8. Remove three screws (L) securing potting assembly (M) to base (D), and remove potting assembly (M).

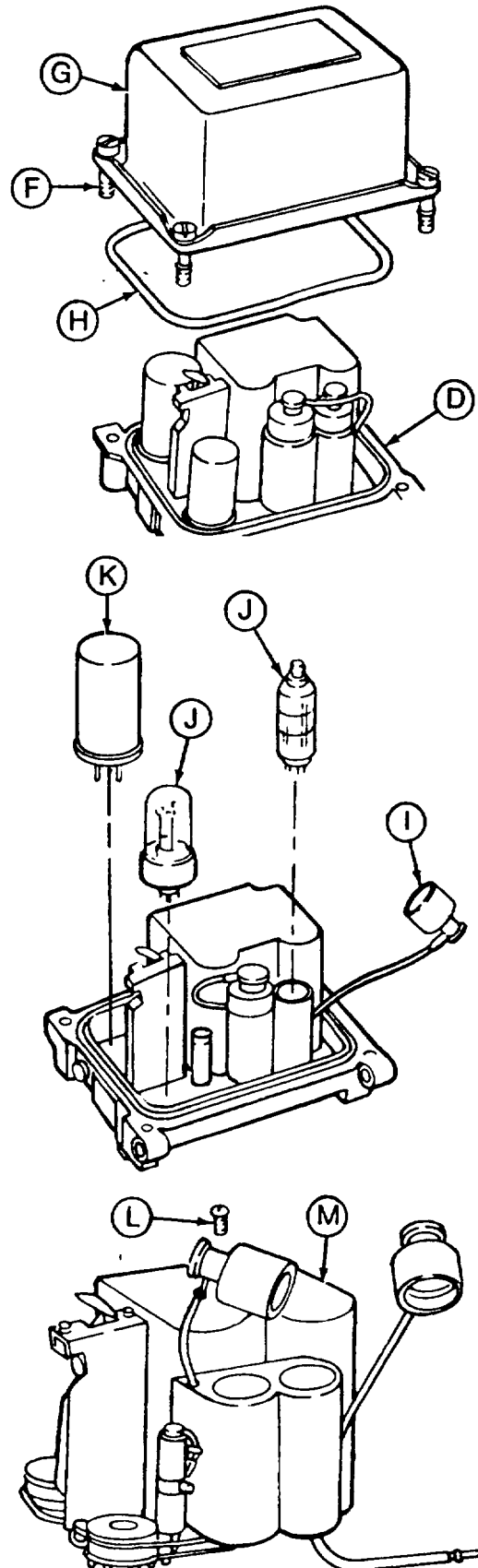
**CLEANING:**

**WARNING**

Use drycleaning solvent only in well ventilated areas. Keep away from flames, sparks, or heat. Do not smoke while using. Prevent contact with eyes, mouth, and/or skin. wear rubber gloves when performing cleaning procedures. Clean parts by using a cloth soaked in drycleaning solvent. Dry parts thoroughly by using cleaning procedures.

**INSPECTION AND REPAIR:**

1. Inspect cover (G) for any defects that may cause leaks. If cover is defective and not repairable, replace power supply assembly.
2. Inspect tube and vibrator hold down springs (located inside of cover) for serviceability. If springs are defective, replace power supply assembly.
3. Inspect base (D) for cracks or fractures. Inspect interior for scores and burs. Inspect machined surfaces for cracks, fractures, galling, pitting, scoring, or corrosion. Remove minor scores and bur from machine surfaces and interiors of cast parts with crocus cloth that has been dipped in drycleaning solvent. Replace part if cracked, fractured, or excessively scored, worn, or burred. Inspect all threaded parts for worn or damaged threads. Repair by chasing damaged threads with a tap or die.

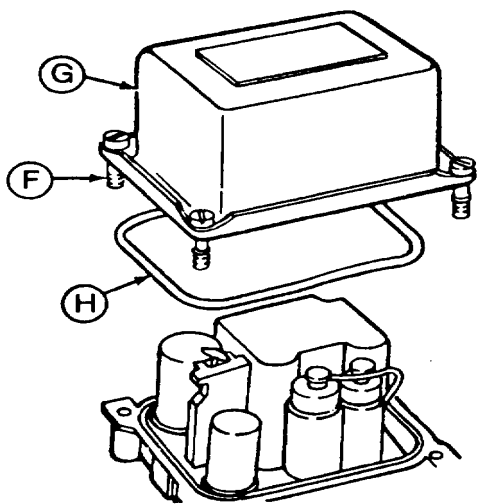
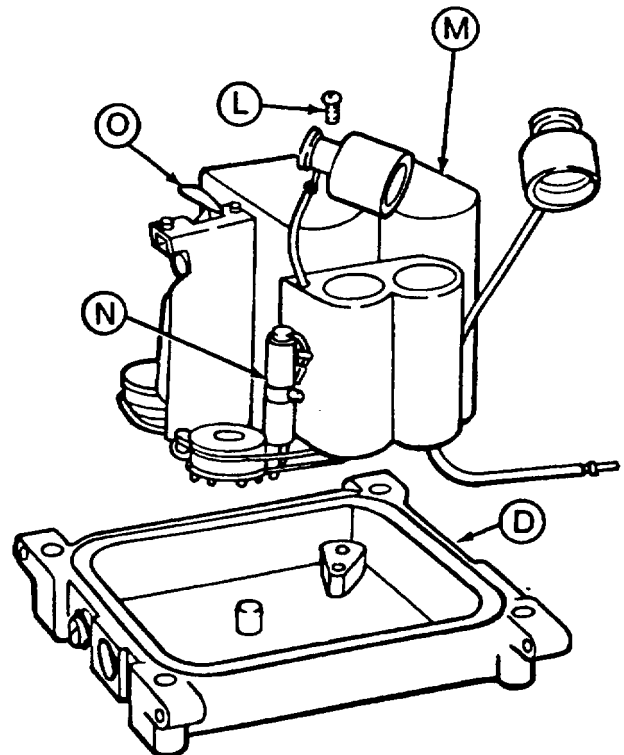
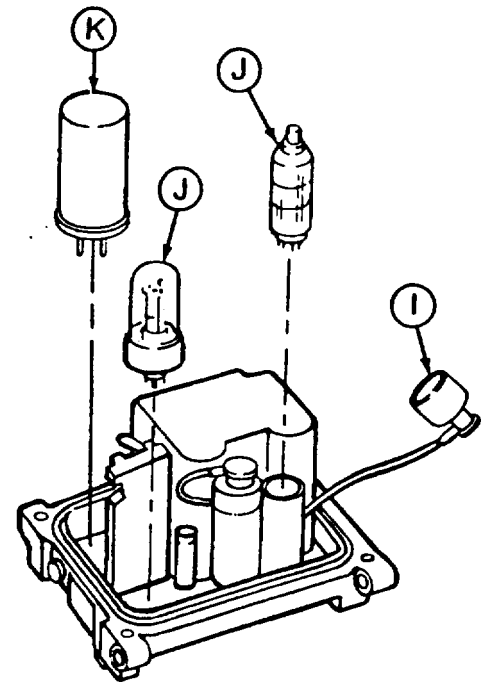


**INFRARED POWER SUPPLY (SHEET 3 OF 6)**

4. Using a tube tester, test tubes (O) and vibrator (K) Replace tube(S) and/or vibrator if defective.
5. Inspect resistor (N) for cracks and indications of overheating. Replace potting assembly if resistor is defective.
6. Inspect tube sockets for damaged or corroded pins. If socket pins are damaged and not reparable, replace potting assembly (M). Clean socket pins if corroded.
7. Inspect potting assembly (M) for damage and indications of overheating. Replace potting assembly if defective.
8. Depress and release interlock switch (O). If switch is sluggish in returning to the released position, replace potting assembly (M).

**ASSEMBLY:**

1. Position three screws (L) on potting assembly (M) securing potting assembly to base (D).
2. Install vibrator (K) and three tubes (O) to socket.
3. Install two tube caps (I) to tubes (J).
4. Install new cover seal (N).
5. Install cover (6) to base (D) and secure with four captive screws (F).





**INFRARED POWER SUPPLY (SHEET 4 of 6)**

6. Install two new connecting gaskets (E).
7. Attach connectors (C) to base (D) and solder.
8. Install eight screws (A) and eight new lock washers (B) to base.

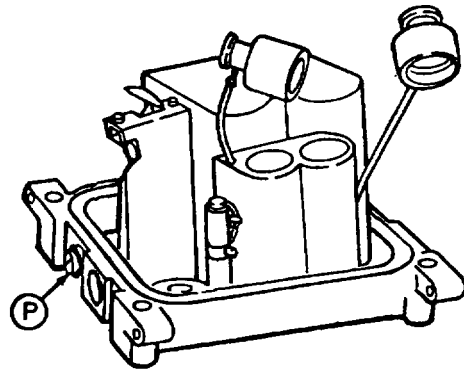
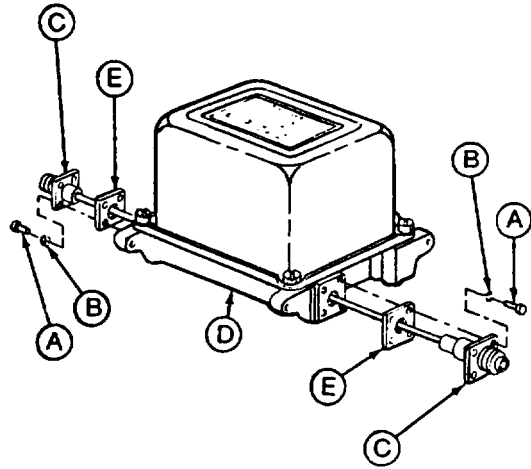
**TESTING:**

1. Leakage Test.
  - a. Remove screw from test port (P).
  - b. Using a 1/8-inch pipe thread fitting, connect an air source and pressure gage to test port (P).

**CAUTION**

**Do not exceed 6 psi pressure to test port and submerge power supply in water. If bubbles are present, repair leak and retest.**

- c. Apply 6 psi pressure to test port (P) and submerge power supply in water. If bubbles are present, repair leak and retest.
- d. Dry power supply with compressed air, re-move fitting from test port (P). and install test port screw.



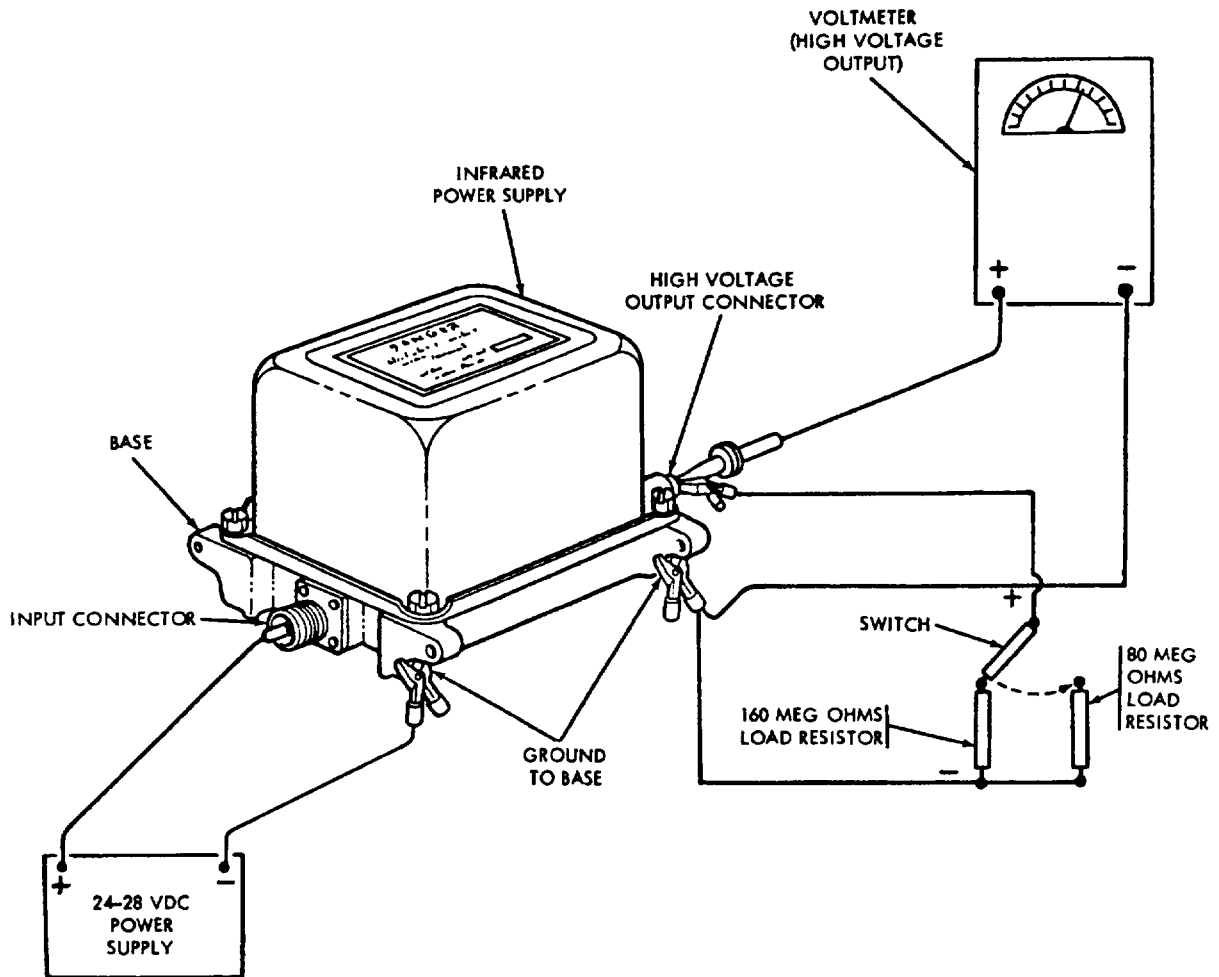
INFRARED POWER SUPPLY (SHEET 5 of 6)

2. Electrical Test

**WARNING**

Use high voltage components in test circuit. Do not touch high voltage components while power is on.

- a. Connect power supply to test circuit.



Go to Sheet 6

Change 4 5-97

**INFRARED POWER SUPPLY (SHEET 6 of 6)**

b. Perform tests as specified in the following table. Output voltage should not exceed 15 kilovolts during tests.

vdc input	load resistors	High voltage output (minimum kilovolts)
24	160 megohms	15.2
18	1-megohms	15.5
24	8 megohms	13.8
28	80 megohms	14.0

INSTALLATION: Refer to 9-2350-222-20-1-4

End of Task

CHAPTER 6

TRANSMISSION MAINTENANCE INDEX

Procedure	Page
Shifting Bellcrank Replacement .....	6-2
Connecting Link Replacement .....	6-5
Shifting Control Bulkhead Link Replacement .....	6-7
Shifting Control Bulkhead Link Repair .....	6-9
Shifting Control Sleeve Assembly Replacement .....	6-10
Shifting Connecting Link Replacement and Repair .....	6-12
Shifting Control Rod Assembly Replacement .....	6-15
Rear Shifting Linkage Shield Assembly Repair .....	6-17
Rear Shifting Control Rod Replacement .....	6-20
Transmission Replacement .....	6-22

**SHIFTING BELLCRANK REPLACEMENT (Sheet 1 of 3)**

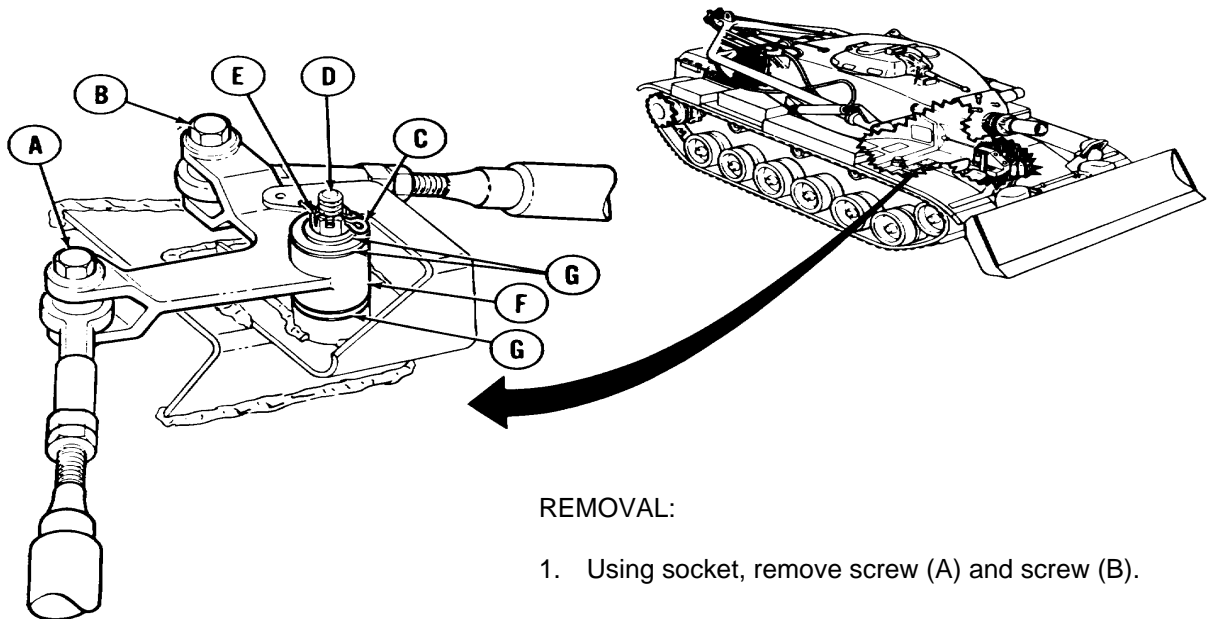
**TOOLS:** Slip joint pliers  
 Ratchet with 1/2 in. drive  
 9/16 in. socket with 1/2 in. drive  
 Torque wrench with 1/2 in. drive (0-175 lb-ft) (0-237 N.m)  
 Hammer  
 3/8 in. drive punch  
 Vice

**SUPPLIES:** Cotter pin (MS24665-283)

**PRELIMINARY PROCEDURE:** Displace ammunition rack (TM 9-2350-222-20-1)

**NOTE**

**Shifting bellcrank located on right side of driver's compartment, behind right ammo rack.**

**REMOVAL:**

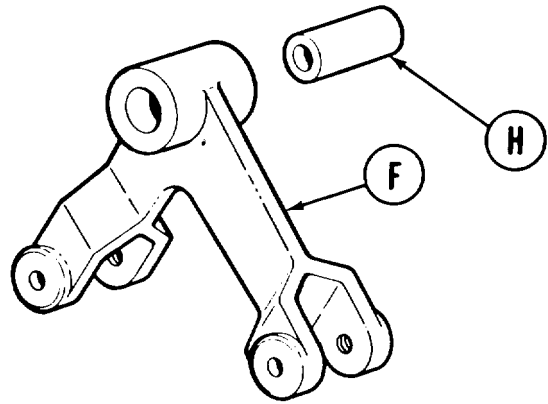
1. Using socket, remove screw (A) and screw (B).
2. Using pliers, remove cotter pin (C) from stud (D). Throw pin (C) away.
3. Using socket, remove nut (E) from stud (D).
4. Lift bellcrank (F) and three washers (G) from stud (D).

Go on to Sheet 2

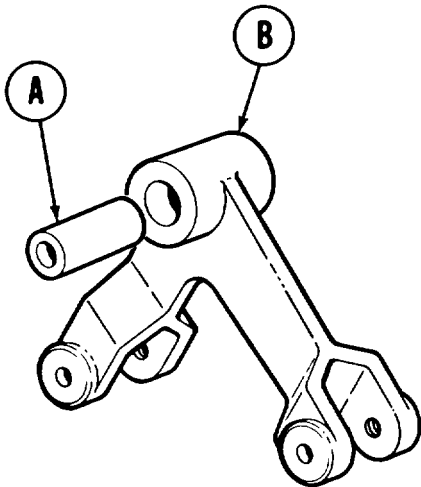
TA252631

**SHIFTING BELLCRANK REPLACEMENT (Sheet 2 of 3)**

5. Inspect bearing (H). If bearing needs replacing, proceed to step 6.
6. Position bellcrank (F) in vise and, using hammer and drive punch, remove bearing (H) from bellcrank (F).

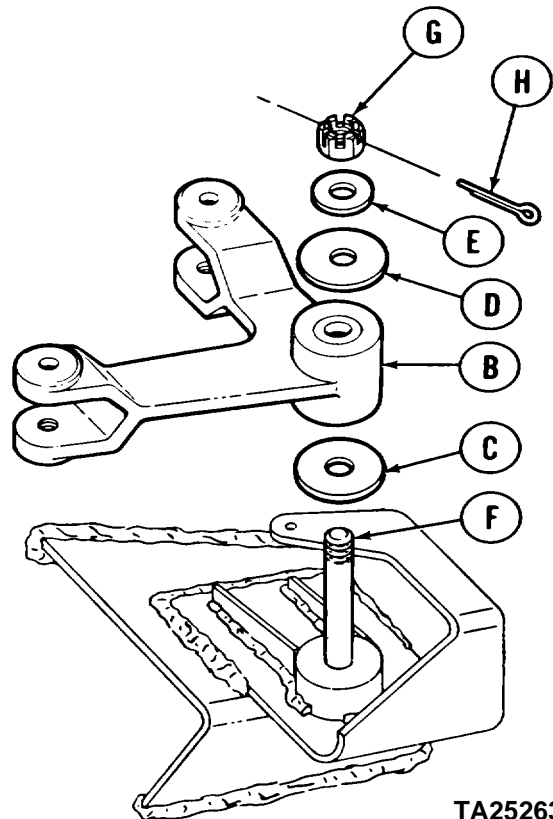


**INSTALLATION:**



1. If new bearing is needed, use vise and install bearing (A) into bellcrank (B). If new bearing is not needed, proceed to step 2.

2. Position washer (C), bellcrank (B), washer (D), and washer (E) onto stud (F).
3. Using socket and ratchet, install nut (G) onto stud (F).
4. Using pliers, install new cotter pin (H) through nut (G) and stud (F).

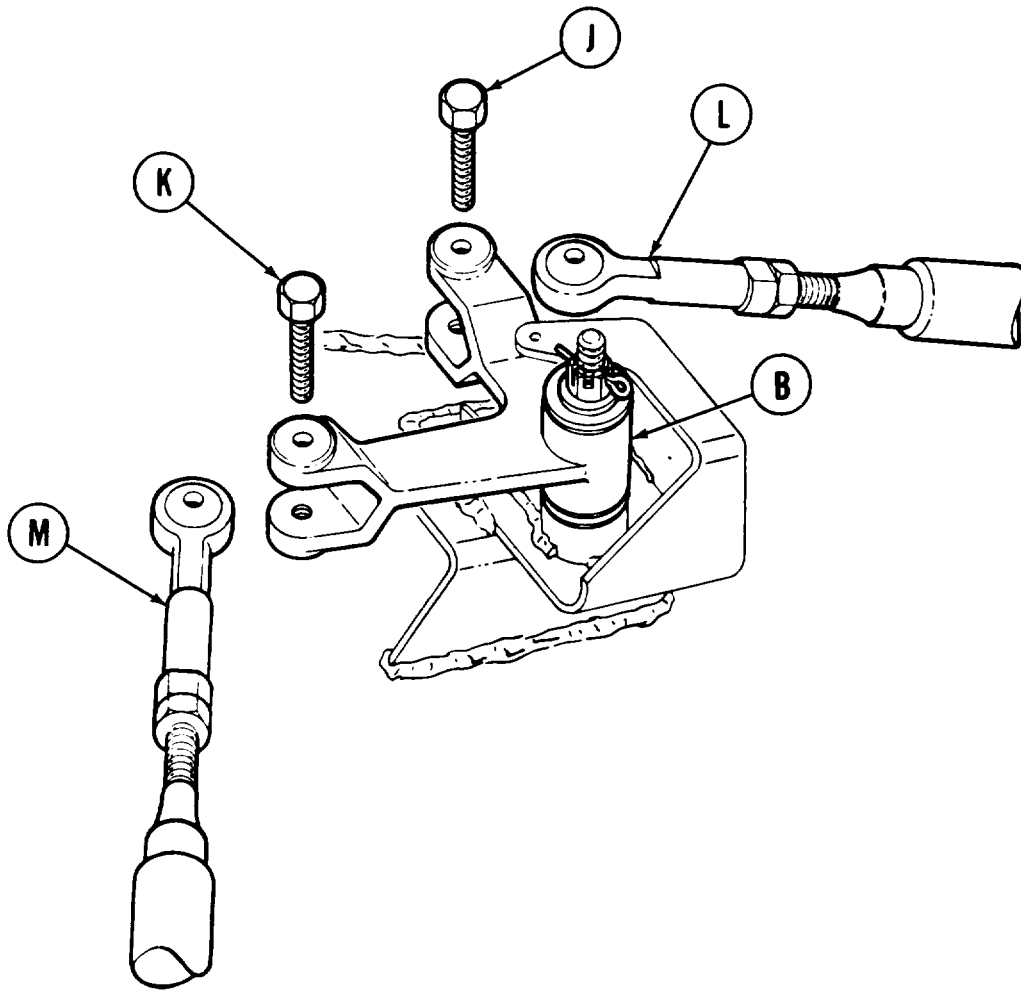


TA252632

Go on to Sheet 3

**SHIFTING BELLCRANK REPLACEMENT (Sheet 3 of 3)**

5. Using socket, install screw (J) and screw (K) through bellcrank (B), rod end (L), and rod end (M).
6. Using socket and torque wrench, tighten screw (J) and screw (K) to 15-20 lb-ft (20-27 N.m).
7. Install right ammunition rack (TM 9-2350-222-20-1).



End of Task

TA252633

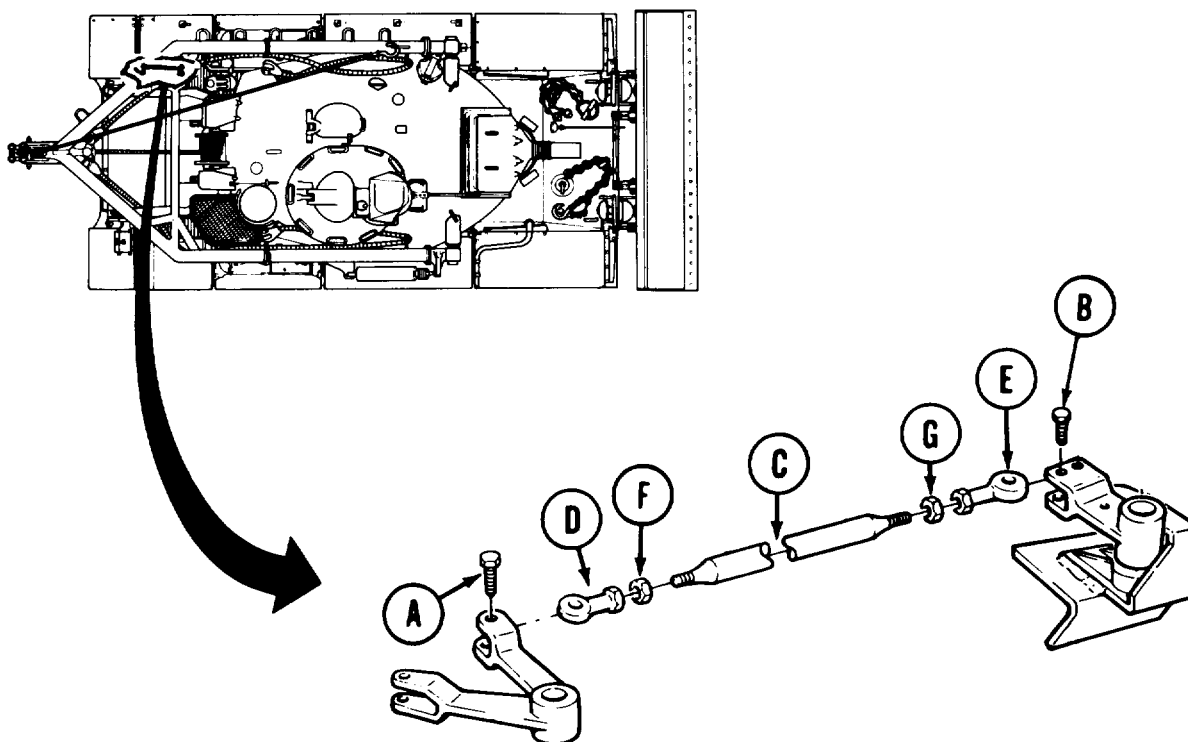
Change 1 6-4

**SHIFTING CONTROL CONNECTING LINK REPLACEMENT (Sheet 1 of 2)**

TOOLS: 9/16 in. socket with 1/2 in. drive  
 9/16 in. combination box and open end wrench  
 Ratchet with 1/2 in. drive

REFERENCE: TM 9-2350-222-20-1

PRELIMINARY PROCEDURE: Displace right ammunition rack (TM 9-2350-222-20-1)

**REMOVAL:**

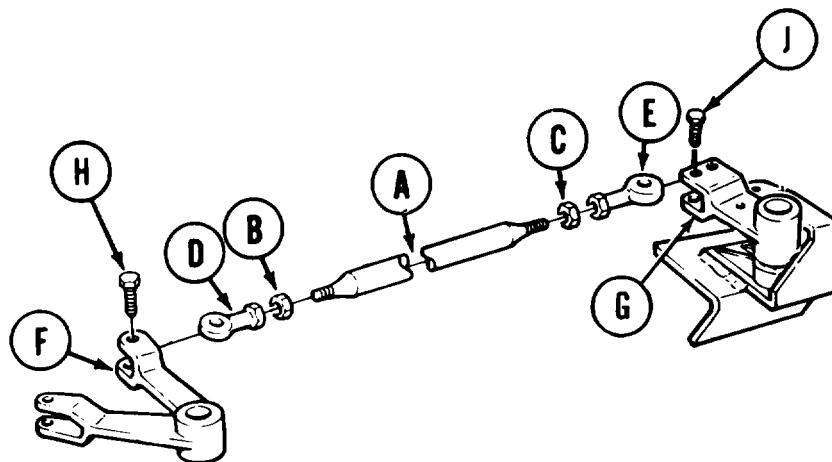
1. Using socket, remove screw (A) and screw (B). Remove link assembly (C) from vehicle.
2. Position link assembly in vise. Using wrench, remove rod ends (D and E) and nuts (F and G) from link (C).

Go on to Sheet 2

TA130675



## SHIFTING CONTROL CONNECTING LINK REPLACEMENT (Sheet 2 of 2)



## INSTALLATION:

1. Position link (A) in vise. Using wrench, install nuts (B and C) onto link (A).
2. Using wrench, install rod end (D and E) onto link (A).
3. Position link assembly (A) into brackets (F and G) and using socket install screws (H and J) through brackets (F and G) and rod ends (D and E).
4. Perform linkage adjustment (TM 9-2350-222-20-1).
5. Install right ammunition rack (TM 9-2350-222-20-1).

End of Task

TA130676

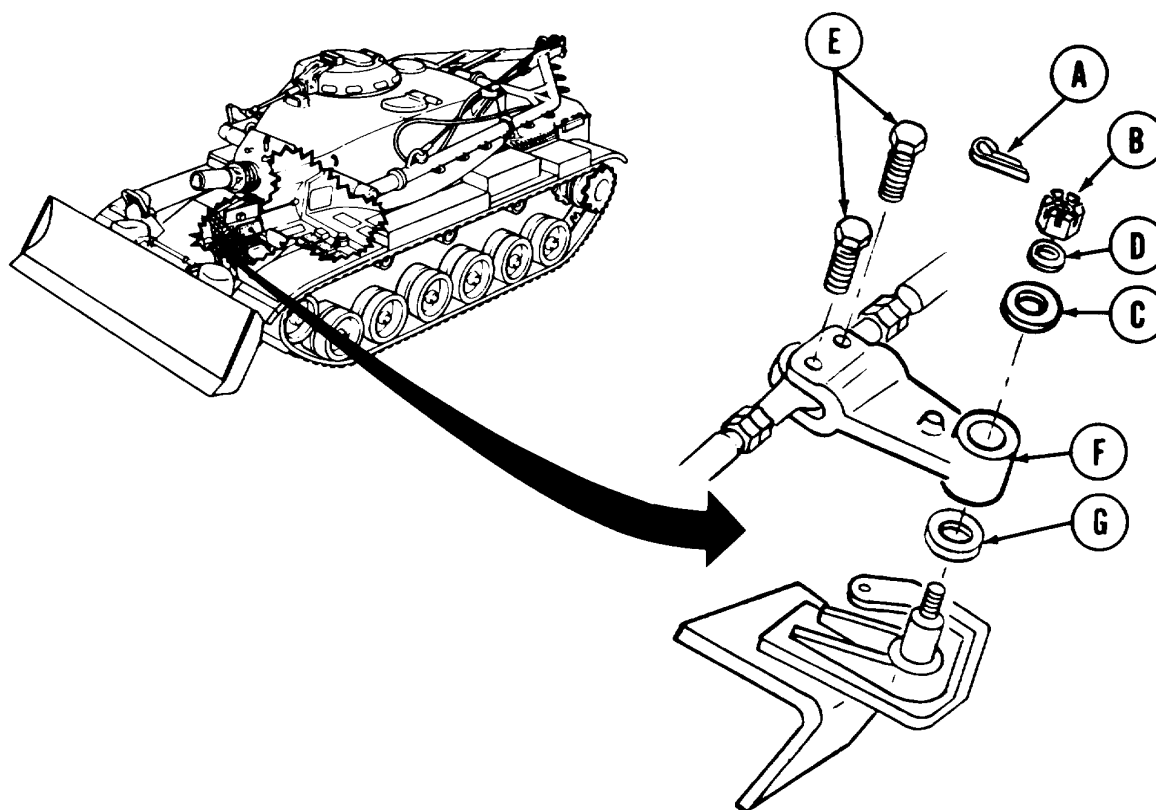
**SHIFTING CONTROL BULKHEAD LINK REPLACEMENT (Sheet 1 of 2)**

TOOLS: 9/16 in. combination box and open end wrench  
 Slip joint pliers  
 Torque wrench with 1/2 in. drive (0-175 lb-ft) (0-237 N.m)  
 9/16 in. socket with 1/2 in. drive

SUPPLIES: Cotter pin (MS24665-283)

REFERENCE: TM 9-2350-222-20-1

PRELIMINARY PROCEDURE: Displace right ammunition rack (TM 9-2350-222-20-1)

**REMOVAL:**

1. Using pliers, remove cotter pin (A). Throw cotter pin away.
2. Using wrench, remove nut (B), washer (C), and washer (D).
3. Using wrench, remove two bolts (E).
4. Remove link (F) and washer (G).

Go on to Sheet 2

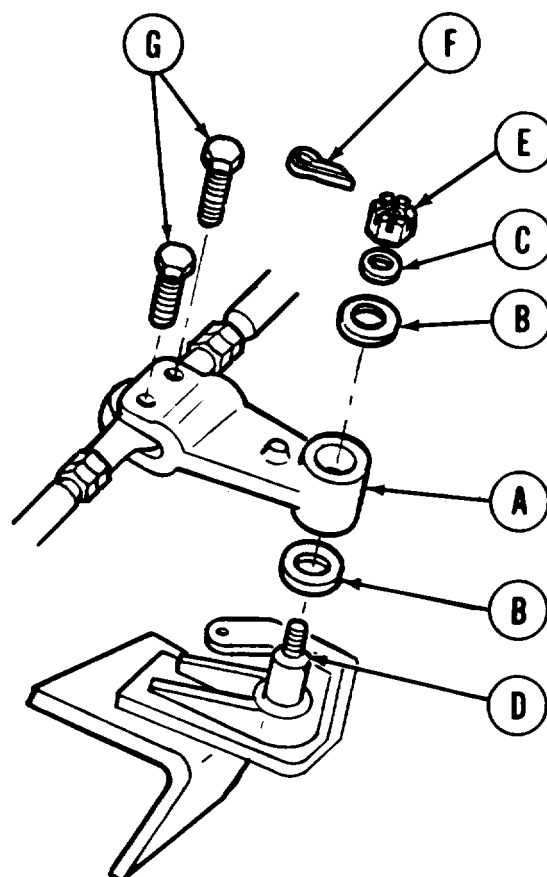
TA252634

**SHIFTING CONTROL BULKHEAD LINK REPLACEMENT (Sheet 2 of 2)****INSPECTION:**

1. Inspect nut, washers, and link for wear or damage.
2. Replace worn or damaged parts.

**INSTALLATION:**

1. Assemble link (A), washers (B), and washer (C) on stud (D).
2. Using wrench, install nut (E).
3. Using pliers, install new cotter pin (F) in nut (E) and stud (D).
4. Install two bolts (G).
5. Using socket and torque wrench, tighten two bolts (G) to 15-20 lb-ft (20-27 N.m).
6. Install right ammunition rack (TM 9-2350-222-20-1).



End of Task

TA252635

**SHIFTING CONTROL BULKHEAD LINK REPAIR (Sheet 1 of 1)**

TOOLS: 2 lb. hammer  
3/8 in. drive punch  
Vise

SUPPLIES: Bearing (7954599)

PRELIMINARY PROCEDURE: Remove link assembly from vehicle (page 6-7)

**INSPECTION:**

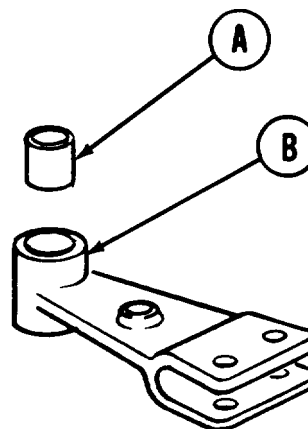
Inspect bearing (A) for damage or wear.

**DISASSEMBLY:**

Using hammer, punch, and vise, remove bearing (A).

**ASSEMBLY:**

1. Using vise, press new bearing (A), if required, into link (B).
2. Install link in vehicle (page 6-8).



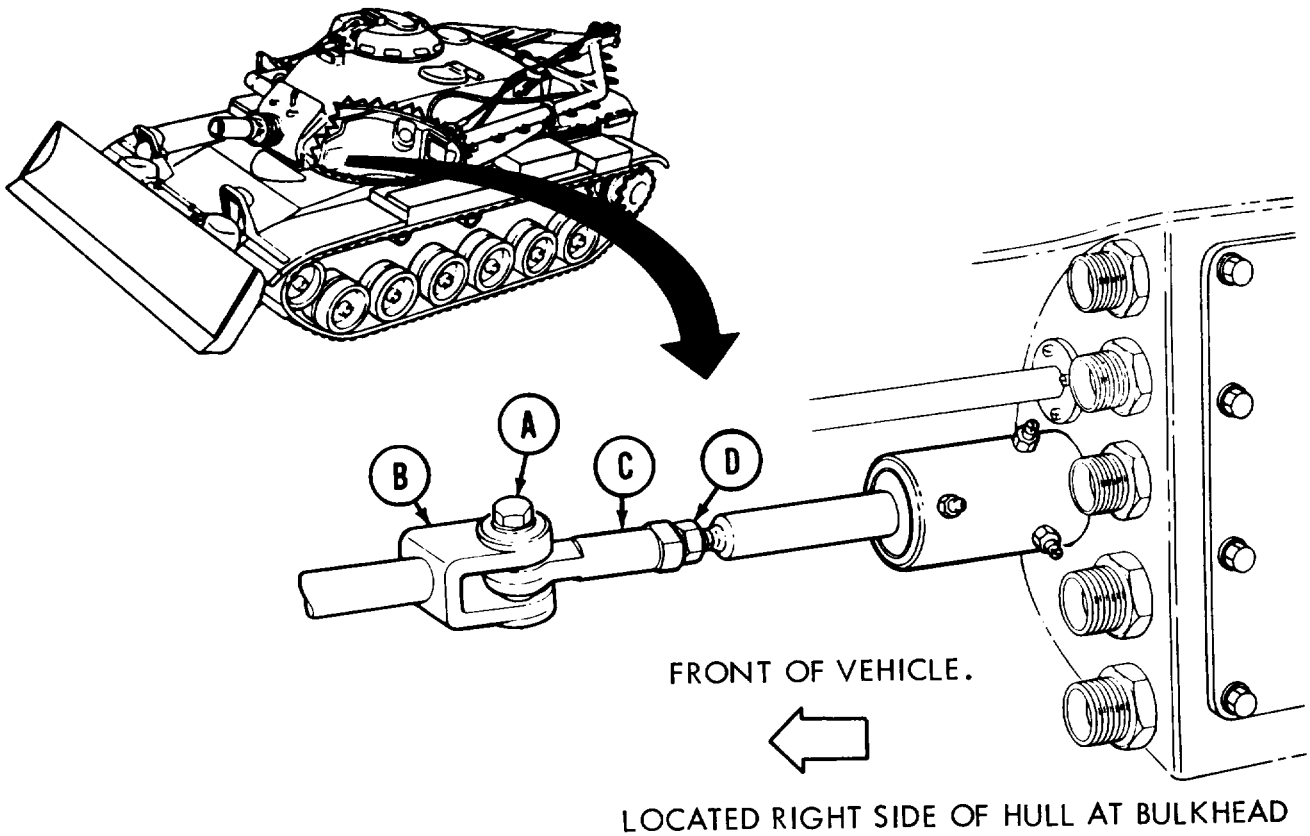
End of Task

TA130679

**SHIFTING CONTROL SLEEVE ASSEMBLY REPLACEMENT (Sheet 1 of 2)**

TOOLS: 7/16 in. combination box and open end wrench  
 9/16 in. combination box and open end wrench(2 required)  
 Torque wrench with 1/2 in. drive (0-175 lb-ft) (0-237 N-m)  
 7/16 in. socket with 1/2 in. drive  
 9/16 in. crowfoot wrench with 1/2 in. drive  
 9/16 in. socket with 1/2 in. drive

REFERENCE: TM 9-2350-222-20-1

**REMOVAL:**

1. Using 9/16 inch wrench, remove screw (A) securing front intermediate rod (B) to bulkhead shaft rod end (C).
2. Using 9/16 inch wrench to hold nut (D), use 9/16 inch wrench and remove rod end (C).

Go on to Sheet 2

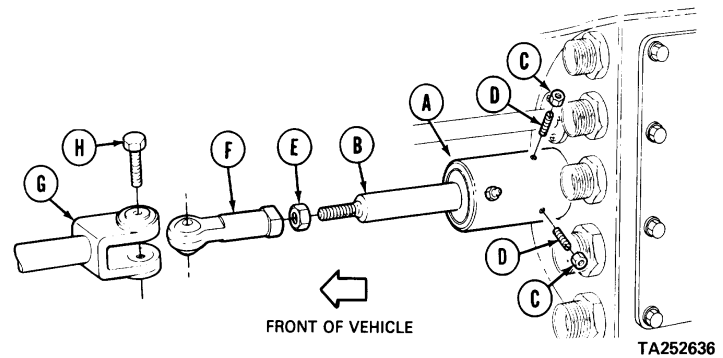
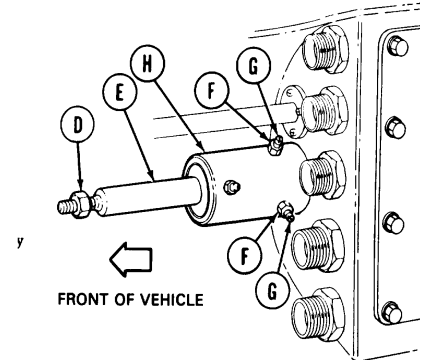
TA130680

**SHIFTING CONTROL SLEEVE ASSEMBLY REPLACEMENT (Sheet 2 of 2)**

3. Using 9/16 inch wrench, remove nut (D) from bulkhead shaft (E).
4. Using 7/16 inch wrench on screw locking nuts (F), loosen and remove nuts (F) and screws (G).
5. Slide sleeve assembly ((H) toward front of vehicle and off shaft (E).

**INSTALLATION:**

1. Slide sleeve assembly (A) over shaft assembly (B) as far as it will go.
2. Using 7/16 inch wrench to hold nut (C), install two sleeve holding screws (D) through nuts (C) into sleeve (A) until screws bottom out on hull connector. Using torque wrench and 7/16 inch socket, hold screw and tighten nut (C) to 7.5 lb-ft (10 N m).
3. Using 9/16 inch wrench, install nut (E) onto shaft (B).
4. Using one 9/16 inch wrench to hold nut (E), use other 9/16 inch wrench to install rod end (F) onto shaft (B). Using torque wrench and 9/16 inch crowfoot, tighten rod end (F) to 15- 20 lb-ft (20-27 N.m).
5. Position rod end (F) into clevis end (G) and, using 9/16 inch wrench, install screw (H) through rod end (F) and clevis end (G). Using torque wrench and 9/16 inch socket tighten screw to 15-20 lb-ft (20-27 N.m).
6. Perform shifting control adjustment as required (TM 9-2350-222-20-1).



End or Task

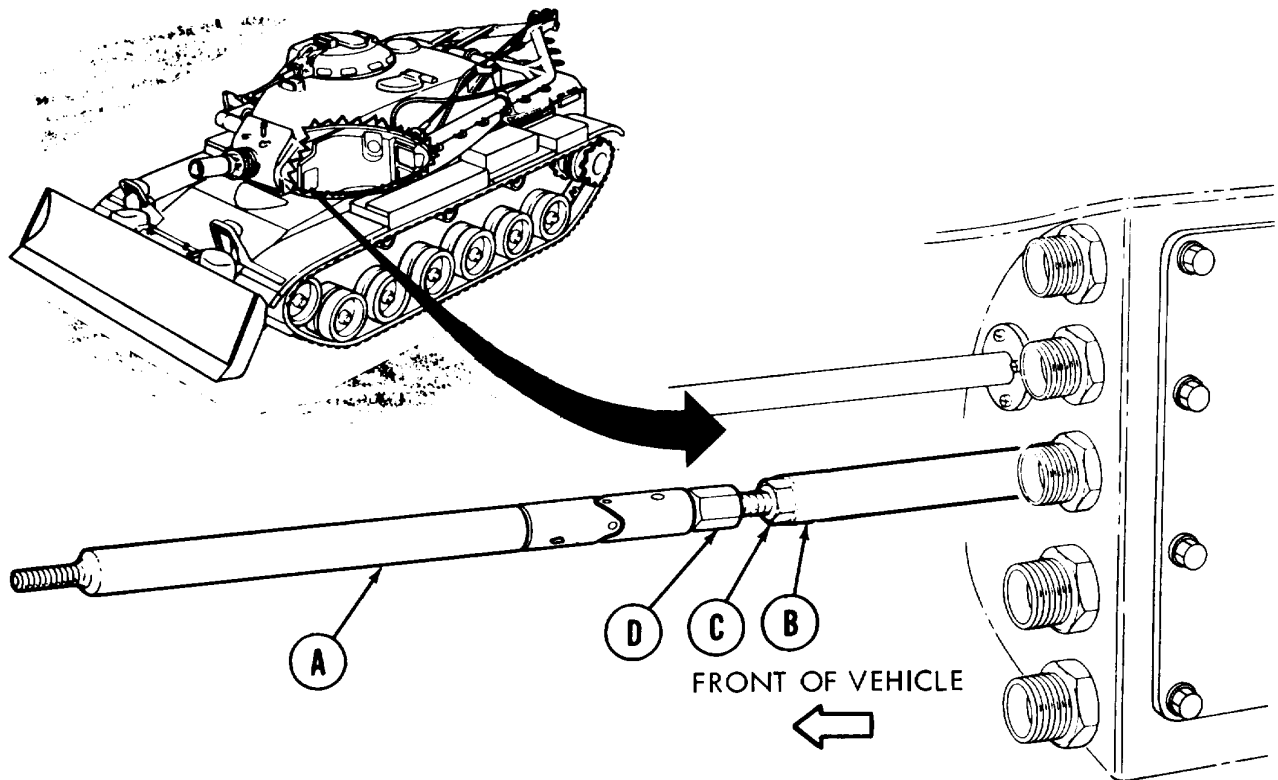
**SHIFTING CONNECTING LINK REPLACEMENT AND REPAIR (Sheet 1 of 3)**

TOOLS: Hammer  
 1/8 in. drive punch  
 5/8 in. combination box and open end wrench (2 required)  
 Vice

SUPPLIES: Pin (MS9390-440) (2 required)

REFERENCE: TM 9-2350-222-20-1

PRELIMINARY PROCEDURES: Remove shifting control sleeve (page 6-10)  
 Remove rod assembly, engine compartment rear rod (TM 9-2350-222-20-1)



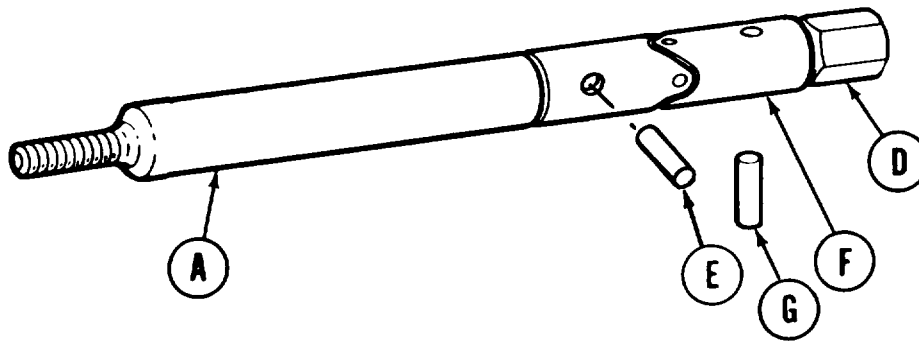
**REMOVAL:**

1. Using hands, pull shaft (A) forward until shaft (B) is exposed at bulkhead.
2. Using one 5/8 inch wrench to hold jamnut (C), use other 5/8 inch wrench on plug (D) to remove shaft assembly (A).

Go on to Sheet 2

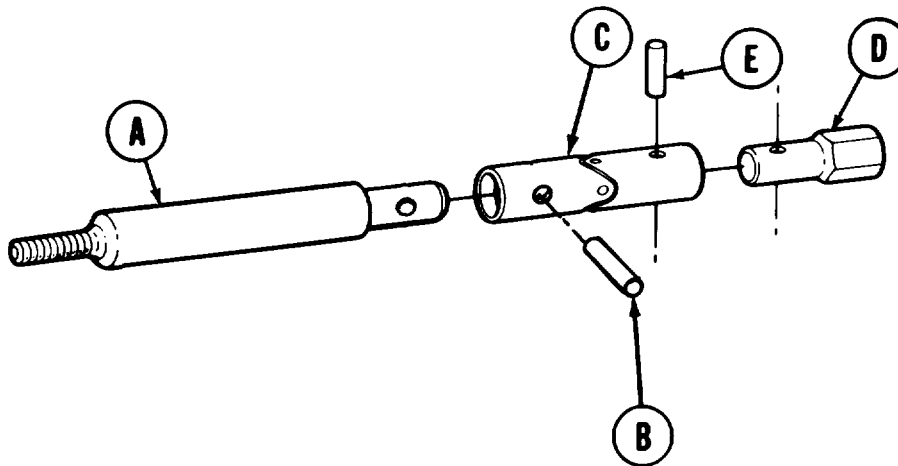
TA130682

SHIFTING CONNECTING LINK REPLACEMENT AND REPAIR (Sheet 2 of 3)



3. Position shaft (A) in vise and, using hammer and punch, remove pin (E) from universal joint (F). Throw pin (E) away.
4. Using hammer and punch, remove pin (G) from universal joint (F). Throw pin (G) away.
5. Remove plug (D) from universal joint (F).
6. Remove shaft (A) from universal joint (F).
7. Inspect shaft (A), universal joint (F), and plug (D) for looseness and wear. Replace defective parts.

INSTALLATION:



1. Position shaft (A) in vise and, using hammer and punch, install new pin (B) into universal joint (C) and shaft (A).
2. Position plug (D) into universal joint (C) and, using hammer and punch, install new pin (E) into universal joint (C) and plug (D).

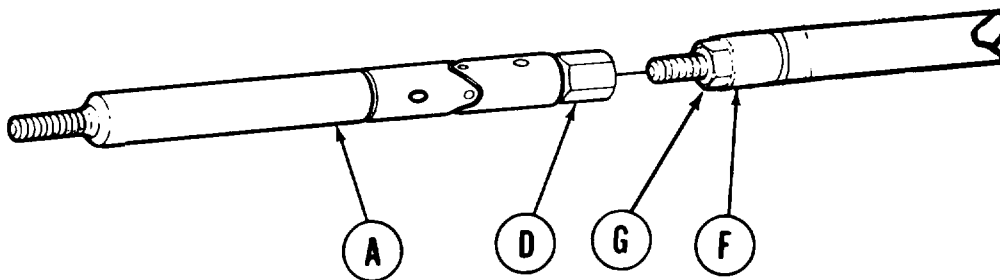
Go on to Sheet 3

TA130683



**SHIFTING CONNECTING LINK REPLACEMENT AND REPAIR (Sheet 3 of 3)**

3. Remove shaft assembly (A) from vise and take it to turret compartment.



4. Position shaft assembly (A) onto shaft (F). Using 5/8 inch wrench to hold jamnut (G), use other 5/8 inch wrench on plug (D), tighten plug (D) against jamnut (G).
5. Install shifting control sleeve (page 6-11).
6. Install rod assembly, engine compartment rear rod (TM 9-2350-222-20-1).
7. Adjust shifting linkage (TM 9-2350-222-20-1).

End of Task

TA130684

**SHIFTING CONTROL ROD ASSEMBLY REPLACEMENT (Sheet 1 of 2)**

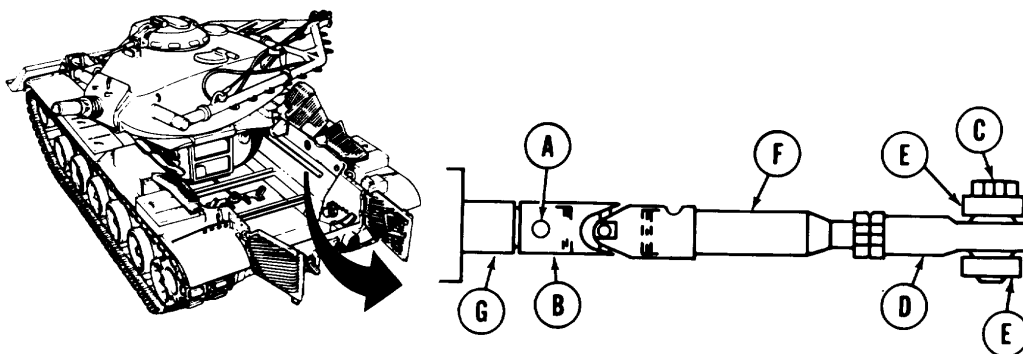
TOOLS: 1-1/2 lb. hammer  
 1/4 in. drive punch  
 5/8 in. combination box and open end wrench  
 9/16 in. combination box and open end wrench (2 required)

9/16 in. crowfoot wrench with 1/2 in. drive  
 Torque wrench with 1/2 in. drive  
 (0-175 lb-ft) (0-237 N-m)  
 9/16 in. socket with 1/2 in. drive  
 Ratchet with 1/2 in. drive

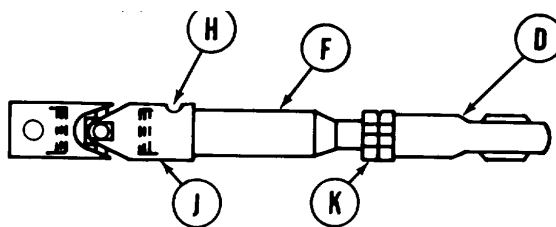
SUPPLIES: Pin (MS9390-440) (2 required)

REFERENCE: TM 9-2350-222-20-1 Remove right fuel tank (page 4-36)  
 Remove shield (page 6-17)

PRELIMINARY PROCEDURES:

**REMOVAL:**

1. Using hammer and punch, remove pin (A) from universal joint (B). Throw pin (A) away.
2. Using 9/16 inch wrench, remove screw (C) from rod end (D).
3. Pull rod end (D) from clevis (E).
4. Remove shaft (F) from rod (G).



5. Using hammer and punch, remove pin (H) from universal joint (J). Throw pin (H) away.
6. Remove shaft (F) from universal joint (J).
7. Using 9/16 inch wrench to hold nut (K), use 9/16 inch wrench to remove rod end (D) from shaft (F).
8. Using 9/16 inch wrench, remove jamnut (K) from shaft (F).

Go on to Sheet 2

TA252637

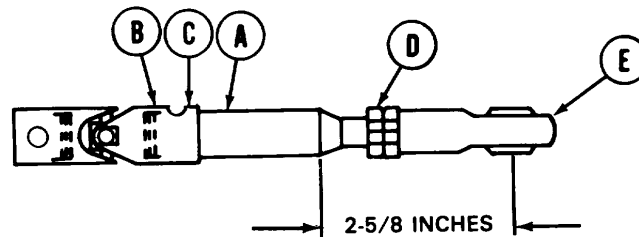
**SHIFTING CONTROL ROD ASSEMBLY REPLACEMENT (Sheet 2 of 2)**

**INSPECTION:**

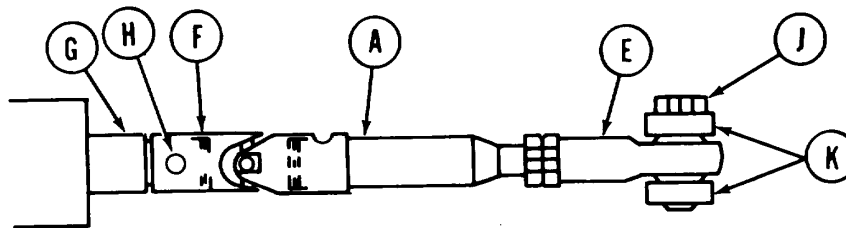
Inspect universal joint for ease of movement, rust, and out-of-round holes. Inspect threaded ends for burrs or damaged threads.

**INSTALLATION:**

1. Position shaft (A) in vise and install universal joint (B) on shaft (A) with holes aligned. Using hammer and punch, install new pin (C) through universal joint (B) and shaft (A).
2. Using 9/16 inch wrench, install jamnut (D) onto shaft (A).



3. Install rod end (E) on shaft (A) until center of rod end is 2-5/8 inches from rod (A). Move jamnut (D) tight against rod end (E).
4. Using torque wrench and 9/16 inch crowfoot, tighten rod end (E) to 15-20 lb-ft (20-27 Nm).



5. Take shaft (A) and universal joint (F) assembly out of vise. Position universal joint to rod (G) with holes aligned. Using hammer, install new pin (H).
6. Using 9/16 inch wrench, install screw (J) through bracket (K) and rod end (E). Using torque wrench and 9/16 inch socket, tighten nut (J) to 15-20 lb-ft (20-27 N-m).
7. Adjust shifting linkage (TM 9-2350-222-20-1).
8. Install shield (page 6-19).
9. Install right fuel tank (page 4-44).

End of Task

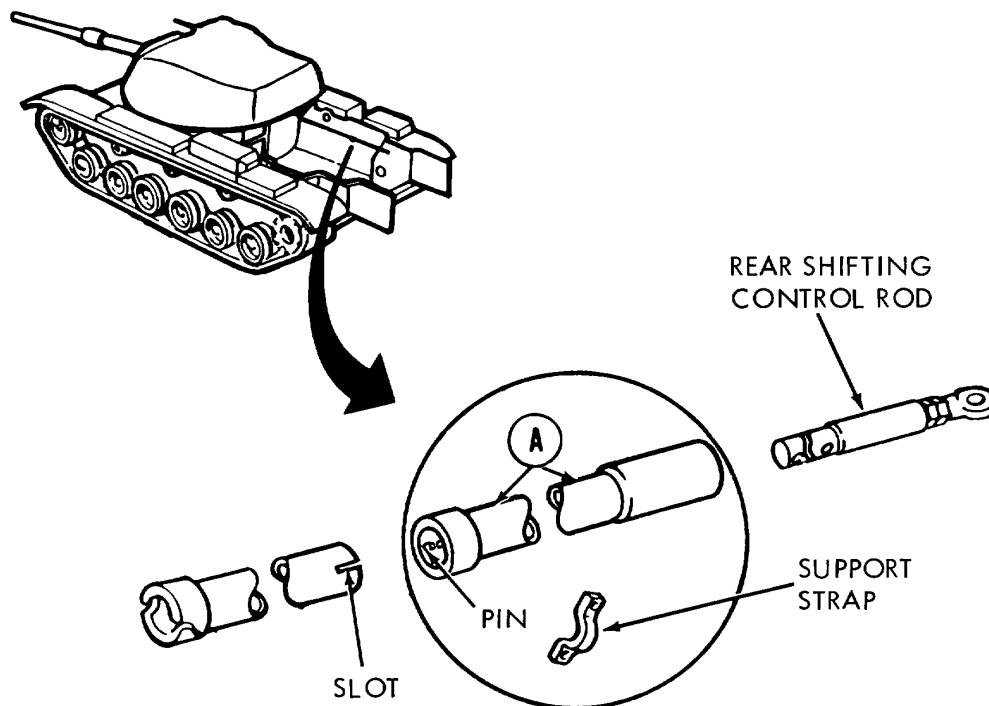
TA252638

**REAR SHIFTING LINKAGE SHIELD ASSEMBLY REPAIR (Sheet 1 of 3)**

TOOLS: Hammer  
Vise

SUPPLIES: Bearing (8720489)  
Seals (7748748) (2 required)  
Knockout rod (1-1/8 to 1-3/16 in. diameter - 51 in. long)  
Knockout rod (7/8 in. diameter - 12 in. long)

PRELIMINARY PROCEDURES: Remove rear shifting control rod (page 6-20)  
Remove support straps (center and rear) (page 10-10)  
Remove right fuel tank (page 4-36)



REMOVAL:

**NOTE**

**If linkage shield (A) is stuck and hard to move, shake it with hands or tap it lightly with hammer.**

1. Using both hands pull shield assembly (A) to rear of vehicle.
2. Remove shield assembly (A).

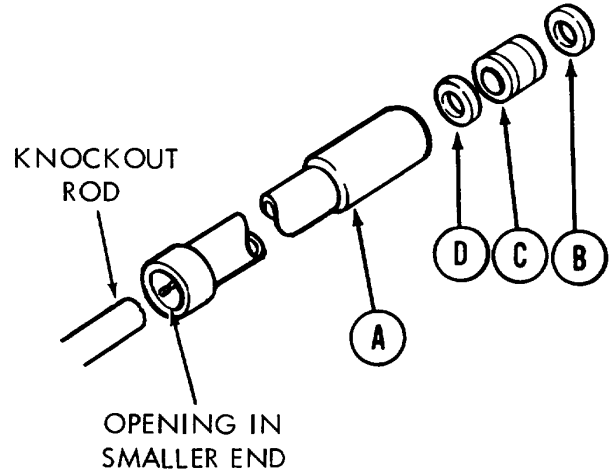
Go on to Sheet 2

TA130687

**REAR SHIFTING LINKAGE SHIELD ASSEMBLY REPAIR (Sheet 2 of 3)**

**DISASSEMBLY:**

1. Put shield (A) in vise (or hold shield with smaller end up).
2. Insert 51 inch long knockout rod through opening at smaller end of shield (A).
3. Using hammer, tap knockout rod to drive out seal (B), bearing (C), and inner seal (D). Throw seals and bearing away.

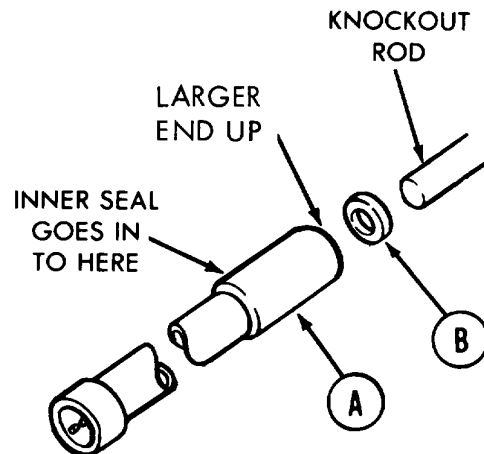


**INSPECTION:**

Inspect shield for cracks, bends, or other damage.

**ASSEMBLY:**

1. Position shield (A) in vise (or on ground) with larger end up.
2. Place inner seal (B) in larger end of shield (A).
3. Insert 12 inch long knockout rod into larger end of shield (A). Using hammer, tap rod to drive seal (B) in as far as it will go.

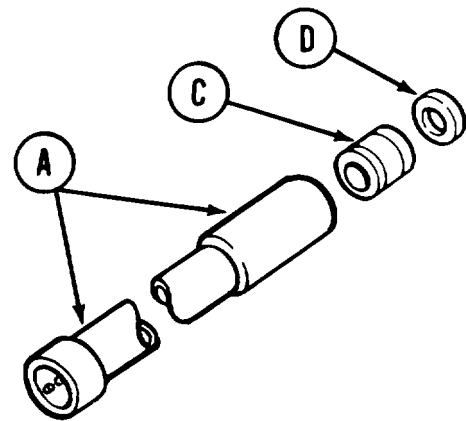


Go on to Sheet 3

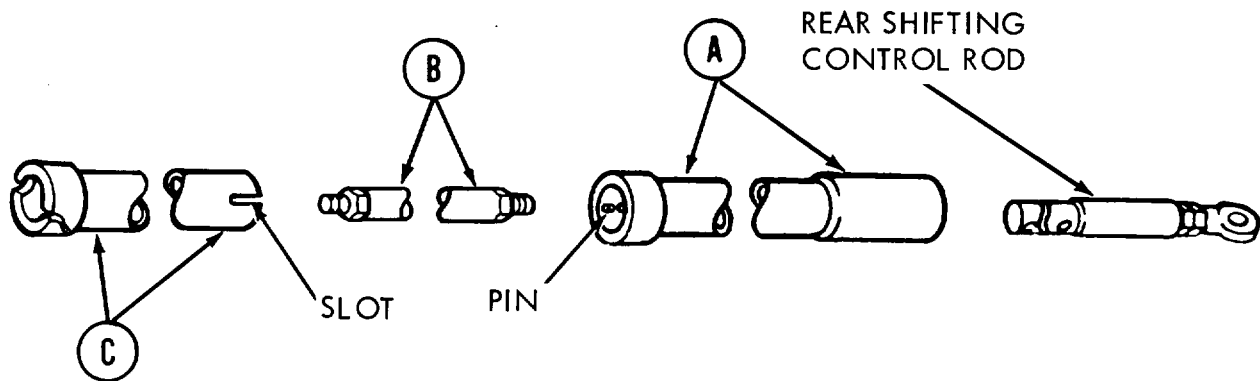
TA130688

**REAR SHIFTING LINKAGE SHIELD ASSEMBLY REPAIR (Sheet 3 of 3)**

4. Position bearing (C) in shield (A).
5. Insert 12 inch long knockout rod to larger end of shield (A).
6. Using hammer, tap rod to drive bearing (C) in as far as it will go.
7. Place outer seal (D) in shield (A).
8. Insert 12 inch long knockout rod, and using hammer, tap rod to drive seal (D) in as far as it will go.



**INSTALLATION:**



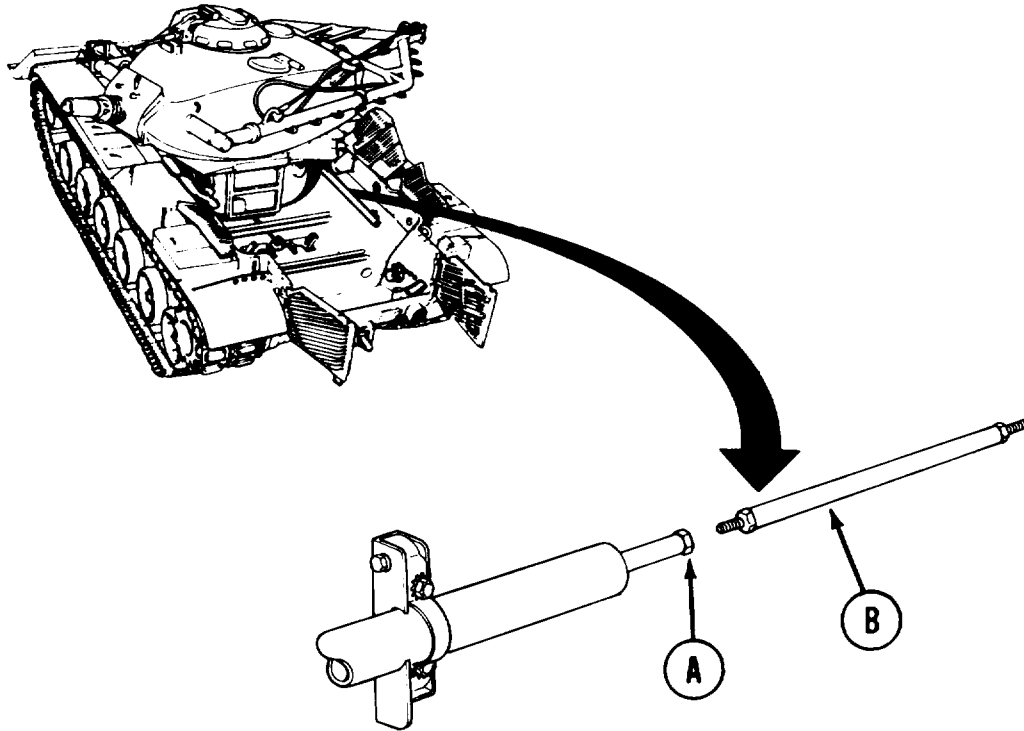
1. Slide shield (A) over shifting control rod (B).
2. Aline pins of front shield (A) to slot of rear shield (C).
3. Push shield (A) all the way forward.
4. Install support straps (page 10-11).
5. Install rear shifting control rod (page 6-21).
6. Install right fuel tank (page 4-44).

End of Task

**REAR SHIFTING CONTROL ROD REPLACEMENT (Sheet 1 of 2)**

TOOLS: 5/8 in. combination box and open end wrench (2 required)

PRELIMINARY PROCEDURE: Remove rear shifting linkage shield (page 6-17)

**REMOVAL:**

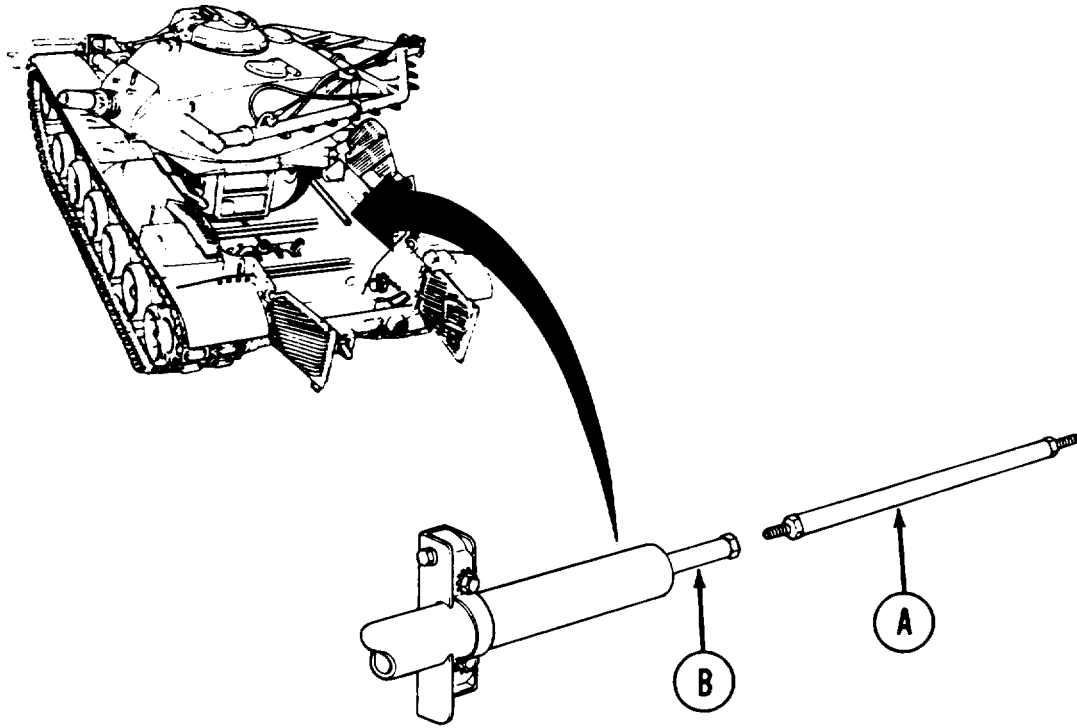
1. Using one 5/8 inch wrench to hold front control rod (A), use another 5/8 inch wrench and loosen shifting control rod (B).
2. Remove rod (B) from vehicle.

Go on to Sheet 2

TA130690

**REAR SHIFTING CONTROL ROD REPLACEMENT (Sheet 2 of 2)****INSPECTION:**

1. Check rod for cracks, bends, or warpage.
2. Inspect rod for stripped threads. Replace damaged rod.

**INSTALLATION:**

1. Install rod (A) into vehicle.
2. Using 5/8 inch wrench to hold rod (B), use another 5/8 inch wrench to tighten rod (A).
3. Install rear shifting linkage shield (page 6-19).

End of Task

TA130691



**TRANSMISSION REPLACEMENT (Sheet 1 of 24)**

PROCEDURE	PROCEDURE INDEX	PAGE
Removal		6-23
Cleaning		6-33
Installation		6-33

**TOOLS:** 1/2 in. combination box and open end wrench (2 required)  
 9/16 in. combination box and open end wrench  
 3/4 in. combination box and open end wrench  
 7/8 in. combination box and open end wrench  
 15/16 in. combination box and open end wrench  
 5/8 in. combination box and open end wrench  
 1-1/2 in. open end wrench  
 1-5/8 in. open end wrench  
 1/2 in. socket with 1/2 in. drive  
 9/16 in. socket with 1/2 in. drive  
 5/8 in. socket with 1/2 in. drive  
 3/4 in. socket with 1/2 in. drive  
 Universal joint with 1/2 in. drive  
 5 in. extension with 1/2 in. drive  
 1-1/8 in. socket with 3/4 in. drive  
 Ratchet with 3/4 in. drive  
 torque wrench with 3/4 in. drive (0-600 lb-ft) (0-813 N-m)  
 Flat-tip screwdriver  
 Slip joint pliers  
 Hose clamp pliers  
 Snap ring pliers  
 Ratchet with 1/2 in. drive  
 Putty knife  
 Pry bar  
 Transmission sling (7081593)  
 Puller attachment (7082201)

**SPECIAL TOOLS:** Mechanical puller adapter (Item 2, Chapter 2, Section I)  
 Pinion turning wrench (Item 5, Chapter 2, Section I)

**FABRICATED TOOLS:** Wrench (Item 1, Appendix D)

**SUPPLIES:** Gaskets (10864007) (2 required)  
 Cotter pins (2 required)  
 Preformed packing (7723892)  
 Dry cleaning solvent (Item 12, Appendix B)  
 Drain pan  
 Rags (Item 31, Appendix B)  
 Wooden blocks 10 x 10 x 12 in. (2 required)  
 ID tags  
 Gasket (8357269) (2 required)  
 Gaskets (7707806) (2 required)  
 Metallic gaskets (MS35769-31) (4 required)  
 Gloves (Item 13.1, Appendix B)  
 Goggles (Item 13.2, Appendix B)  
 Gasket (7767860)

**PERSONNEL:** Two

**REFERENCES:** TM 9-2350-222-20-1  
 LO 9-2350-222-12

**PRELIMINARY PROCEDURES:** Remove powerplant (TM 9-2350-222-20-1)  
 Remove engine shroud and supports (TM 9-2350-222-20-1)  
 Go on to Sheet 2 Remove right angle drive, clutch and pump (TM 9-2350-222-20-1)

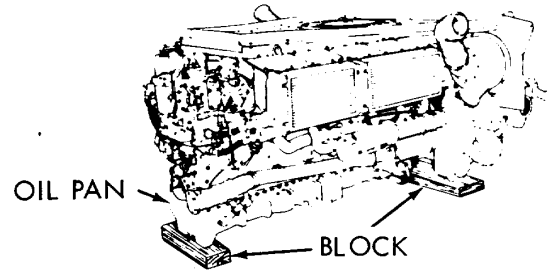
TRANSMISSION REPLACEMENT (Sheet 2 of 24)

**NOTE**

Position powerplant on two 10 x 10 x 12 inch wooden blocks. Position blocks under each end of engine oil pan.

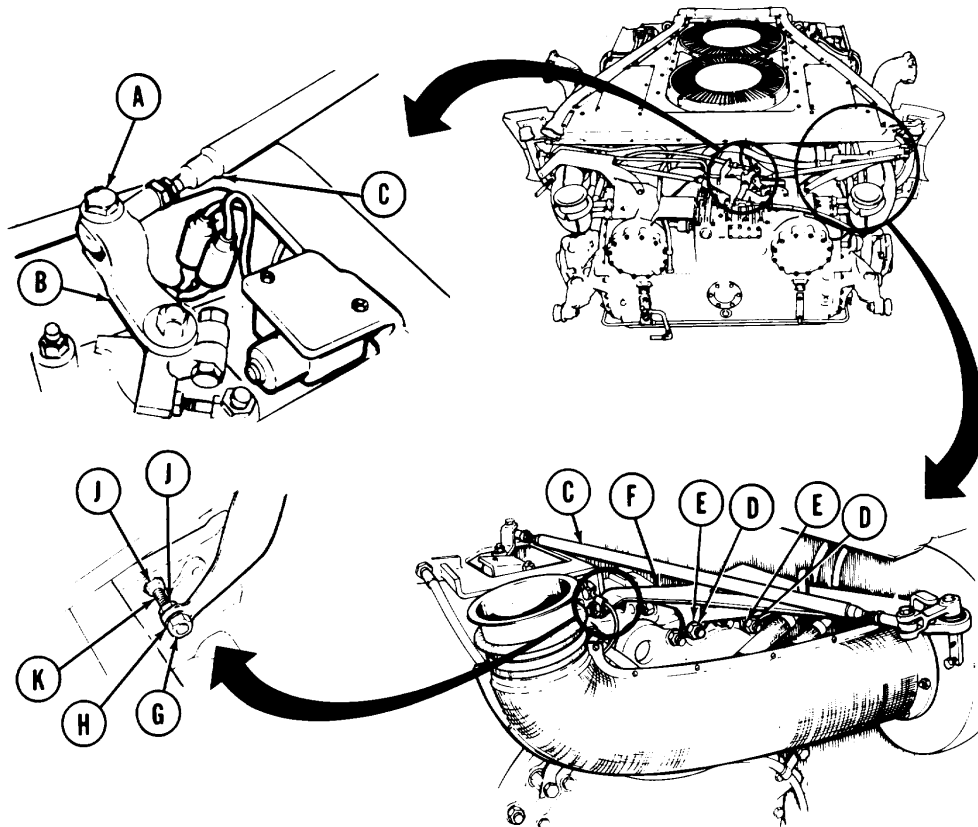
**WARNING**

Make sure powerplant is level and will not move.



REMOVAL:

1. Using 9/16 inch wrench, remove screw (A) from bracket (B). Remove rod (C) from bracket (B).



2. Using 3/4 inch socket, remove two nuts (D) and two washers (E) securing bracket (F).

**NOTE**

It may be necessary to loosen nuts and move stud back to remove bracket (F).

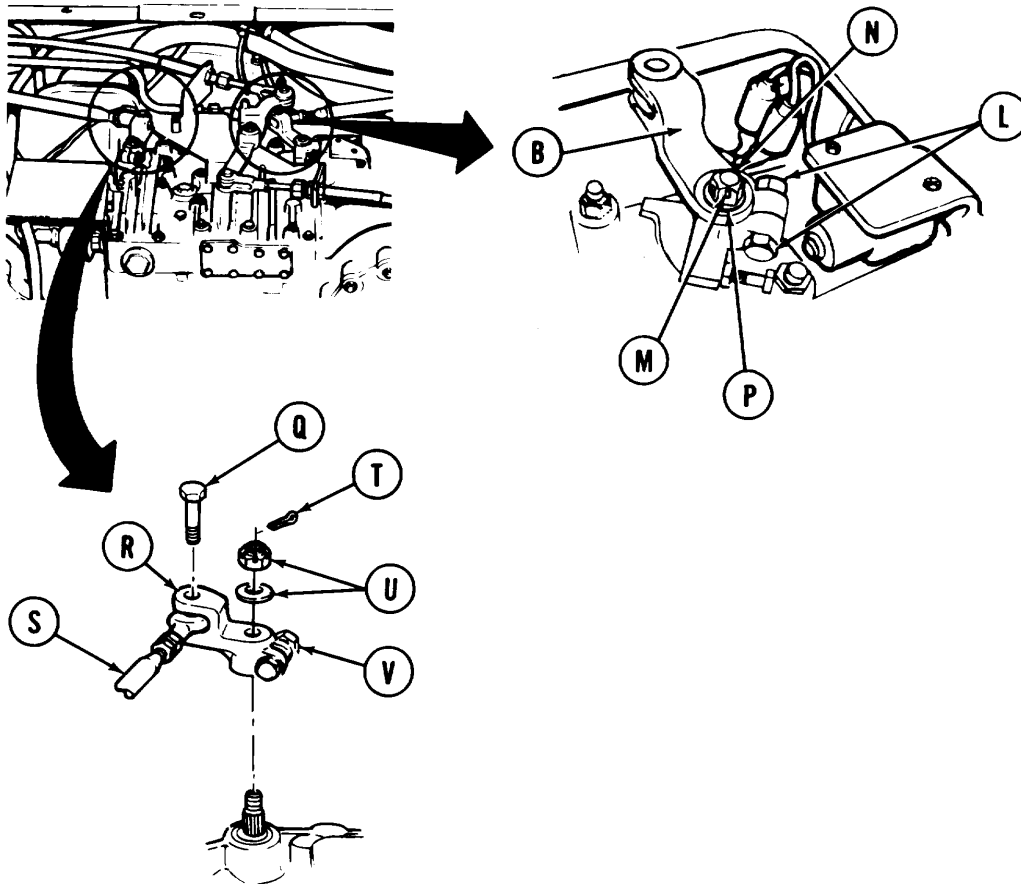
3. Using 3/4 inch wrench, remove nut (G) and washer (H).
4. Remove bracket (F) and rod (C) as a unit.
5. Using 3/4 inch wrench, remove two lockwashers, nuts (J) and stud (K).

Go on to Sheet 3

TA130693

**TRANSMISSION REPLACEMENT (Sheet 3 of 24)**

6. Using two 9/16 inch wrenches, loosen nut (L) on bracket (B).
7. Using pliers, remove cotter pin (M). Throw pin away.
8. Using 9/16 inch wrench, remove nut (N) and washer (P) from stud.
9. Using pry bar, lift bracket (B) from stud.



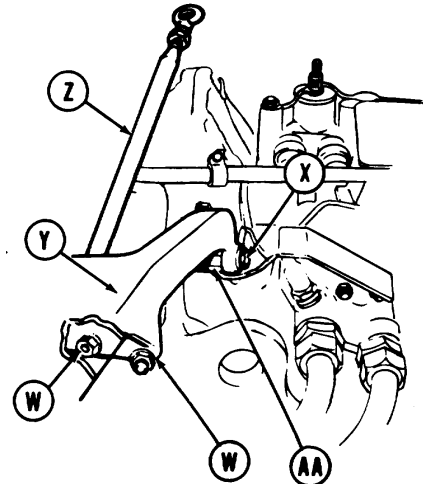
10. Using 9/16 inch socket, remove screw (Q) from lever (R). Remove rod (S) from lever (R).
11. Using pliers, remove cotter pin (T). Throw cotter pin away.
12. Using 9/16 inch socket, remove nut and washer (U).
13. Using two 9/16 inch wrenches, loosen nut (V).
14. Using pry bar, lift lever (R) from shaft.

Go on to Sheet 4

TA130694

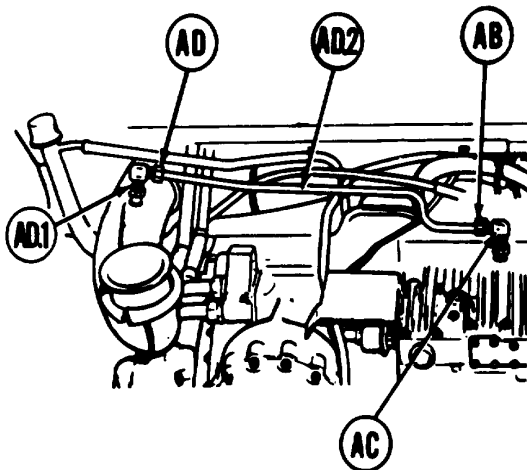
**TRANSMISSION REPLACEMENT (Sheet 4 of 24)**

15. Using 3/4 inch socket, remove two nuts and washers (W).
16. Using 3/4 inch wrench, remove screw and washer (X).
17. Remove bracket (Y) and rod (Z) from transmission as a unit.
18. Using 3/4 inch wrench, remove nut (AA).



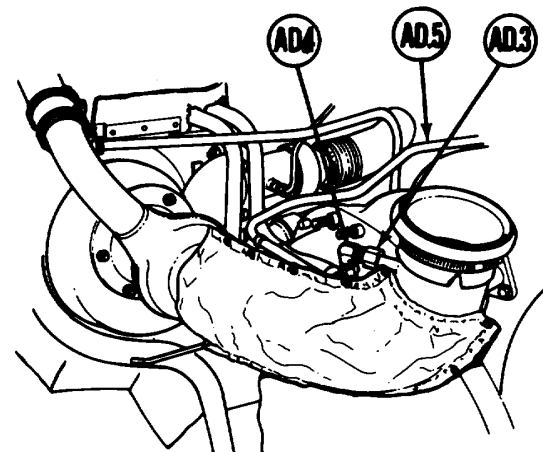
LEFT SIDE OF TRANSMISSION

- 18.1. Using 7/8 inch wrench, disconnect nut (AB) from elbow (AC).
- 18.2. Using adjustable wrench, remove elbow (AC).



REAR OF TRANSMISSION

19. If transmission is mated to a 2D engine, use a 7/8 inch wrench and disconnect nut (AD) from elbow (AD.1). Remove transmission vent line (AD. 2) from transmission.
20. If transmission is mated to a 2DA engine, use a 3/4 inch wrench and disconnect nut (AD.3) from elbow (AD.4). Remove transmission vent line (AD.5) from transmission.



Go on to Sheet 5

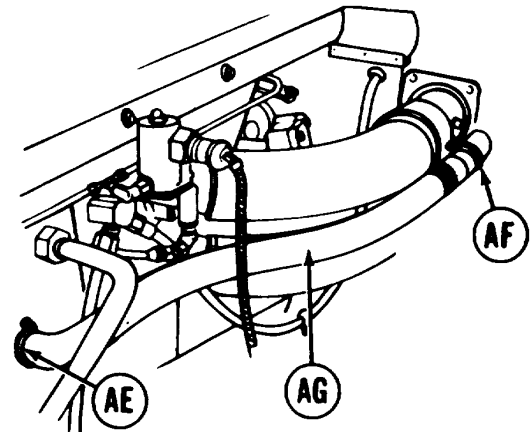
TA248762

**TRANSMISSION REPLACEMENT (Sheet 5 of 24)**

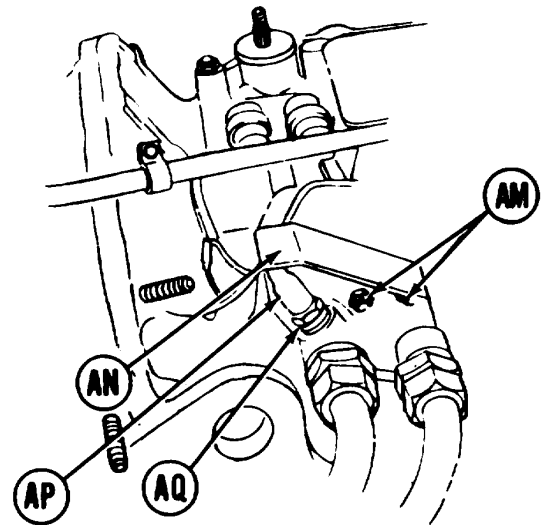
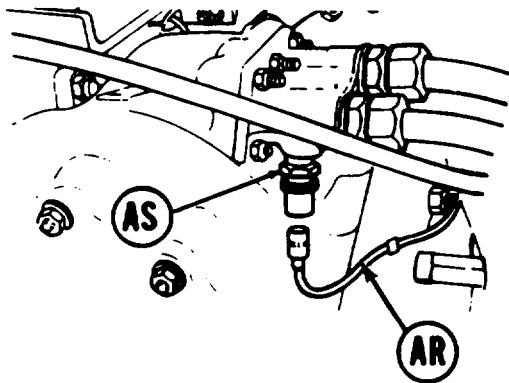
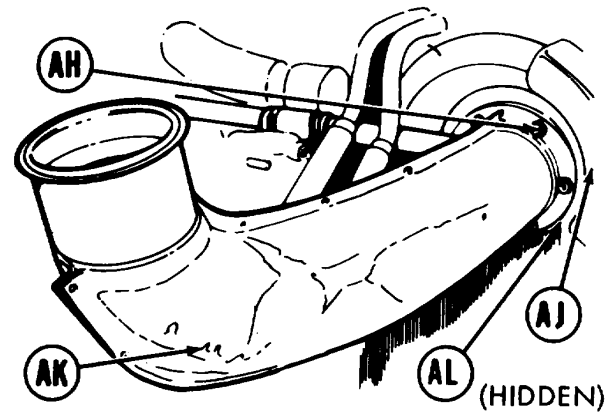
**NOTE**

Some engine breather tubes are secured to exhaust by two 1/2 inch hex head screws.

20. Using screwdriver, loosen clamp (AE) and clamp (AF). Remove engine breather tube (AG).
21. Using 9/16 inch socket, remove six nuts (AH) from right turbosupercharger housing (AJ). Remove exhaust pipe (AK) and gasket (AL) from powerplant. Throw gasket away.
22. Using procedure described in step 21, remove left exhaust pipe.
23. Using 9/16 inch socket, remove two nuts (AM).
24. Remove protector (AN) from studs.
25. Unplug lead (AP) from oil temperature transmitter (AQ). Using 15/16 inch wrench, remove oil temperature transmitter (AQ) from transmission, and tag for proper installation.
26. Unplug lead (AR) from thermostatic switch (AS) on right side of transmission.
27. Using 15/16 inch wrench, remove switch (AS) from transmission and tag for proper installation.



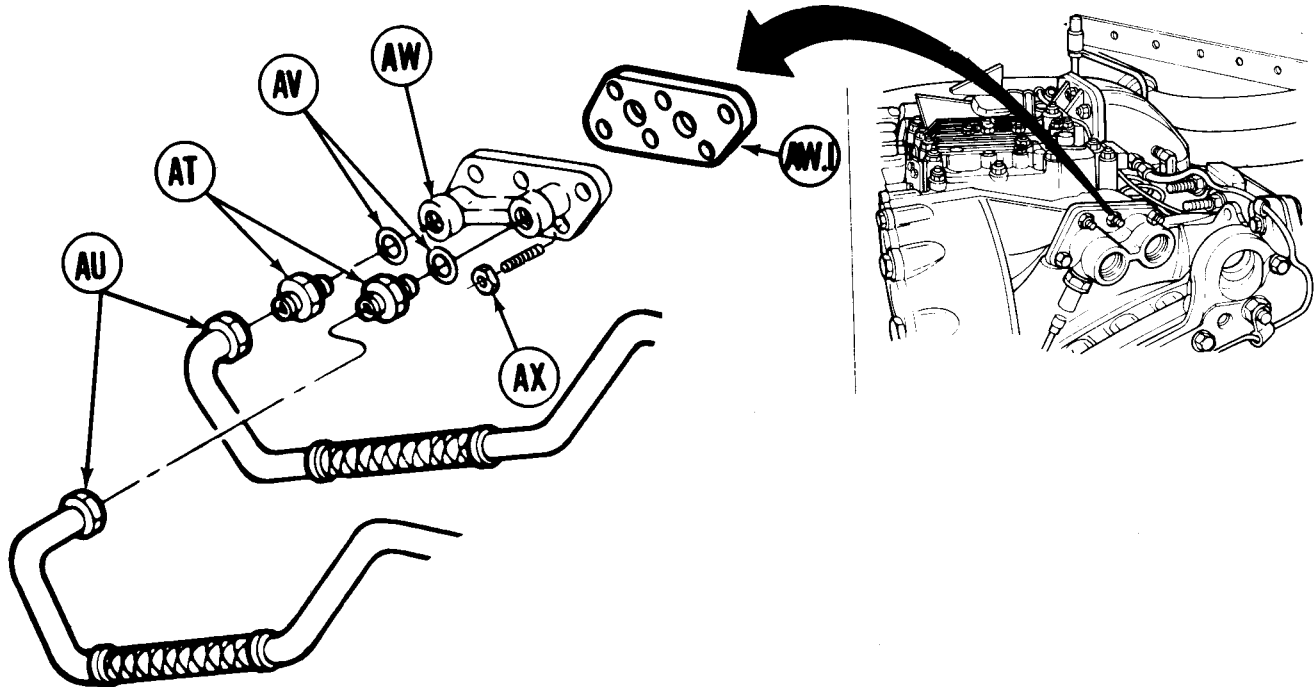
**CENTER FRONT OF TRANSMISSION**



Go on to Sheet 6

**TRANSMISSION REPLACEMENT (Sheet 6 of 24)**

28. Using 1-5/8 inch wrench to hold adapter (AT), use 1-1/2 inch wrench and remove two tubes (AU) from adapters (AT) on right side of transmission.
29. Using 1-5/8 inch wrench, remove two adapters (AT) and washers (AV) from adapter (AW).



30. Using procedures described in steps 28 and 29, remove two tubes (AU), adapters (AT), and washers (AV) from adapter (AW) on left side of transmission.

**NOTE**

**It may be necessary to tap adapter (AW) with hammer to loosen.**

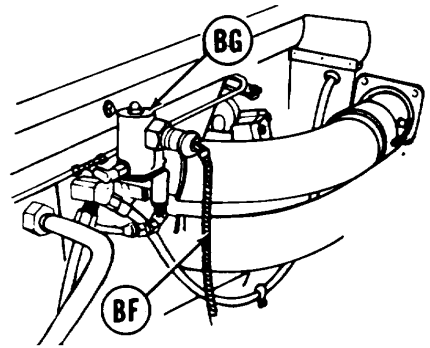
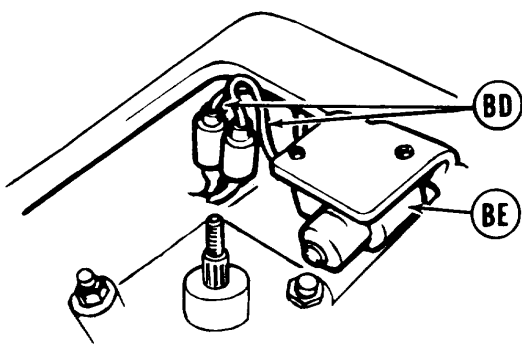
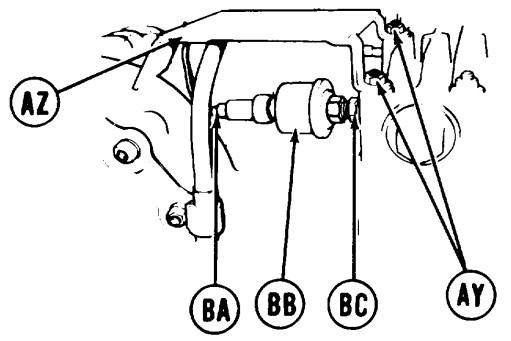
31. On right side of transmission, using 9/16 inch socket, remove four nuts (AX). Remove adapter (AW) and gasket (AW.1) from transmission.
32. On left side of transmission, using 9/16 inch socket, remove six nuts (AX). Remove adapter (AW) and gasket (AW.1) from transmission..

Go on to Sheet 7

TA252639

**TRANSMISSION REPLACEMENT (Sheet 7 of 24)**

33. Using 9/16 inch socket, remove two nuts (AY) that secure plate (AZ) to transmission.
34. Remove plate (AZ) from transmission.
35. Unplug lead (BA) from oil pressure transmitter (BB)
36. Using 3/4 inch wrench to hold adapter (BC), use 7/8 inch wrench and remove oil pressure transmitter (BB) from adapter (BC).
37. Using 3/4 inch wrench, remove adapter (BC) from transmission.



38. Unplug two leads (BD) from neutral shift switch (BE).
39. Using hand, unscrew lead (BF) from engine fuel solenoid (BG).
40. Remove transmission wiring harness (TM 9-2350-222-20-1).
- 40.1. If vehicle is equipped with two-piece parking brake control assembly, remove engine mounted (rear section) brake control (TM 9-2350-222-20-1).

Go on to Sheet 8

TA252640

**TRANSMISSION REPLACEMENT (Sheet 8 of 24)**

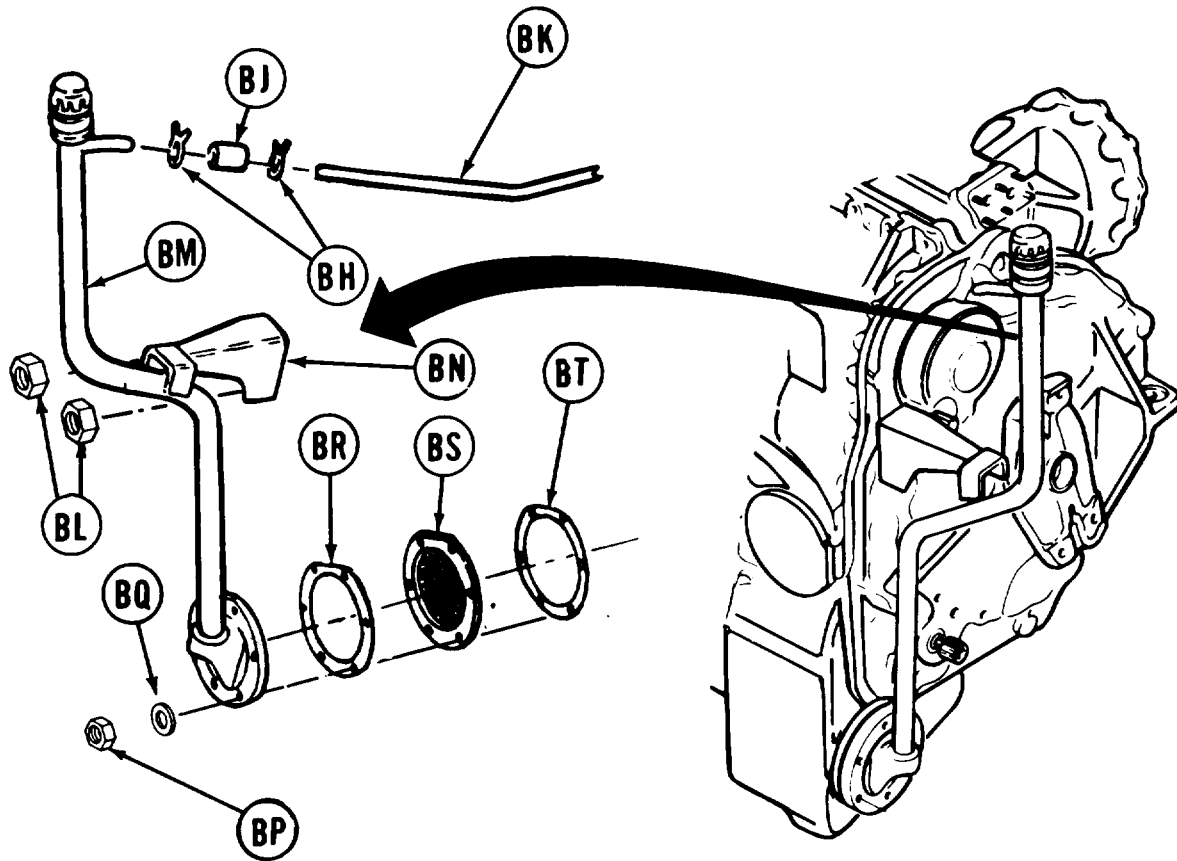
41. Remove brake control assembly (TM 9-2350-222-20-1).
42. Remove brake bellcrank assembly (TM 9-2350-222-20-1).
43. Remove left brake lever assembly (TM 9-2350-222-20-1).
44. Remove right brake lever assembly (TM 9-2350-222-20-1).
45. Remove brake tube quick-disconnect (TM 9-2350-222-20-1).
46. Remove left brake housing assembly (TM 9-2350-222-20-1).
47. Remove right brake housing assembly (TM 9-2350-222-20-1).
48. Remove left and right brake slave cylinder assemblies and tubes (TM 9-2350-222-20-1).
49. Remove left and right universal joint assemblies (TM 9-2350-222-20-1).
50. Remove left and right transmission mount assemblies (TM 9-2350-222-20-1).
51. Remove fuel return line (TM 9-2350-222-20-1).
52. Drain oil from transmission (TM 9-2350-222-20-1).

Go on to Sheet 9



**TRANSMISSION REPLACEMENT (Sheet 9 of 24)**

53. Using hose clamp pliers, remove two hose clamps (BH) and hose (BJ) from tube (BK).
54. Using 3/4 inch socket, remove two nuts (BL) that secure tube (BM) and bracket (BN) to transmission.
55. Using 1/2 inch socket, remove six nuts (BP) and washers (BQ).
56. Remove gasket (BR), strainer (BS), gasket (BT), and tube (BM) from transmission. Throw gaskets (BR) and (BT) away.

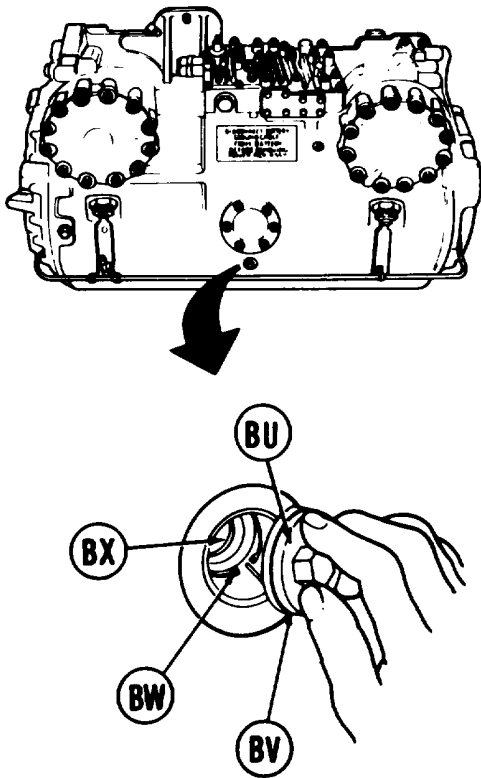


Go on to Sheet 10

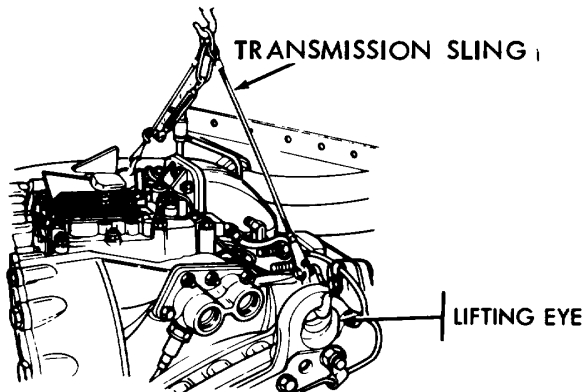
TA130699

**TRANSMISSION REPLACEMENT (Sheet 10 of 24)**

57. Using 1-1/8 inch socket, remove input shaft plug (BU) and gasket (BV) from transmission.

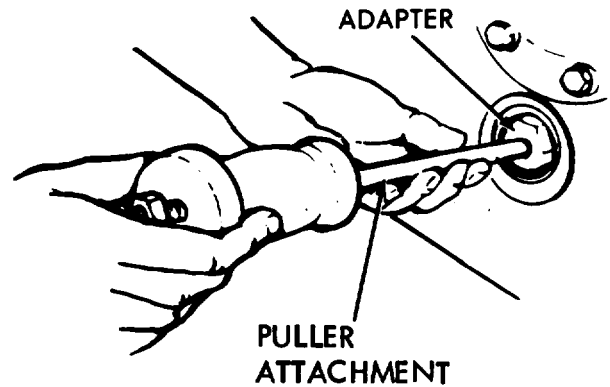


60. Remove engine fuel return tube assembly (TM 9-2350-222-20-1).



Go on to Sheet 11

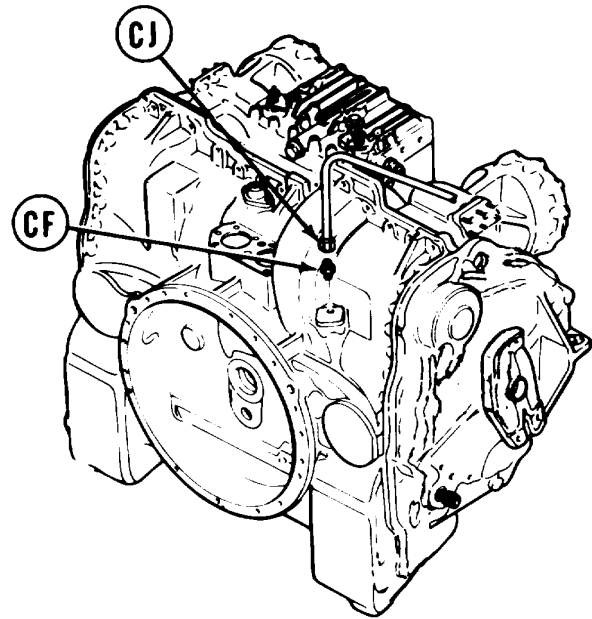
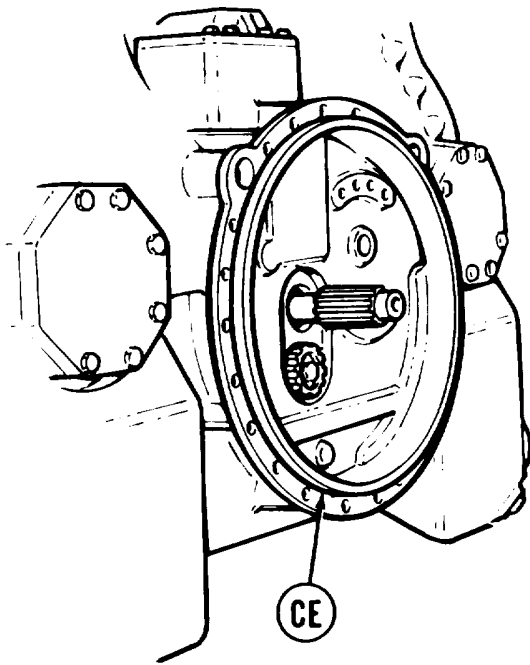
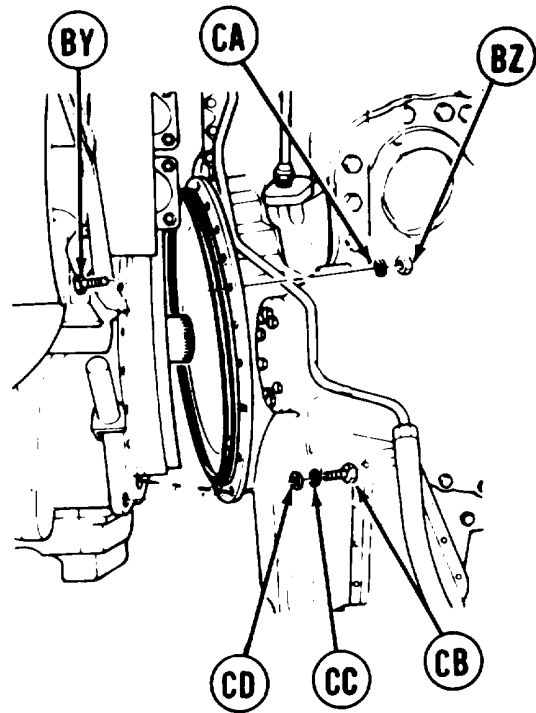
58. Using snap ring pliers, remove retaining ring (BW) at rear of input shaft (BX).
59. Using puller attachment and mechanical puller adapter, draw input shaft (BX) rearward until disengaged from engine drive connection.



61. Attach transmission sling to transmission. Take up slack, but do not lift transmission.
62. Place a pan under engine and transmission at separation point to catch oil.

**TRANSMISSION REPLACEMENT (Sheet 11 of 24)**

63. Using fabricated wrench (Fig. 1, Appendix D) and 5/8 inch socket, remove screw (BY), nut (BZ), and washer (CA) from left and right side of transmission.
64. Using fabricated wrench or 5/8 inch wrench, remove 17 screws (CB), lockwashers (CC), and washers (CD) that secure transmission to engine.
65. Carefully move transmission rearward to separate from engine.
66. Remove transmission-to-engine preformed packing (CE) and throw it away.



67. Using 3/4 inch wrench to hold adapter (CF), use 7/8 inch wrench to loosen nut (CG).
68. Using 3/4 inch wrench, remove adapter (CF) from transmission.

Go on to Sheet 12

## TRANSMISSION REPLACEMENT (Sheet 12 of 24)

## CLEANING:

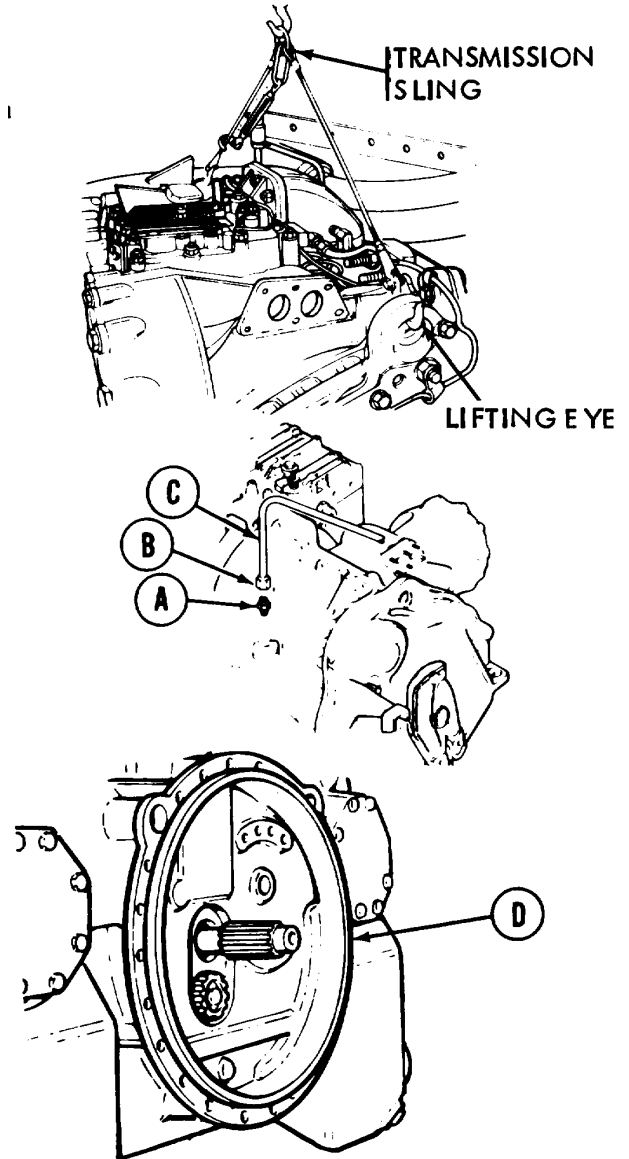
**WARNING**

Dry cleaning solvent P-D-680 is toxic and flammable. To prevent personal injury, wear protective goggles and gloves and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flash point for Type #1 Dry Cleaning Solvent is 100° F (38°C) and for Type #2 is 138°F (50°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

1. Using dry cleaning solvent, clean all transmission parts removed. Wipe dry with clean, lint-free rags.
2. Using putty knife, clean surfaces where gaskets have been removed.

## INSTALLATION:

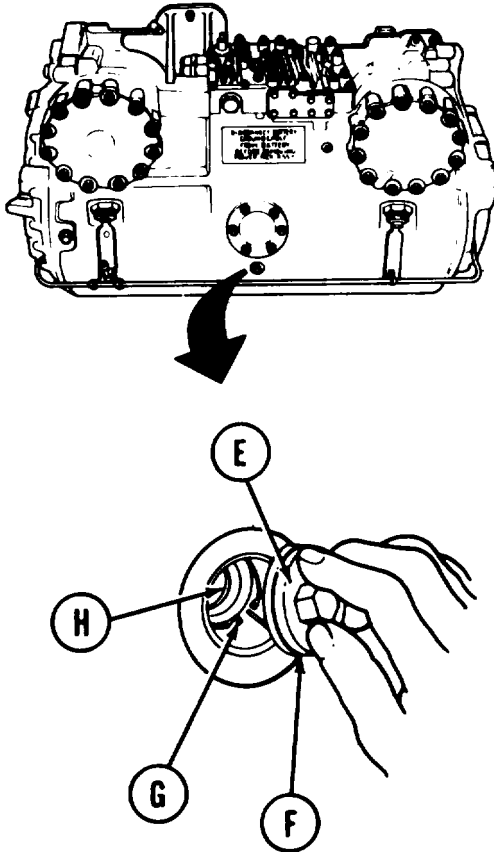
1. Using transmission sling and a suitable hoist, remove replacement transmission from container.
2. Remove shipping caps, plugs, covers, and mounts from replacement transmission as components are installed and install them on unserviceable transmission.
3. Using 3/4 inch wrench, install adapter (A) on transmission.
4. Using 3/4 inch wrench to hold adapter (A), use 7/8 inch wrench on nut (B) to secure tube (C) to adapter (A).
5. Position new preformed packing (D), to transmission mounting flange.



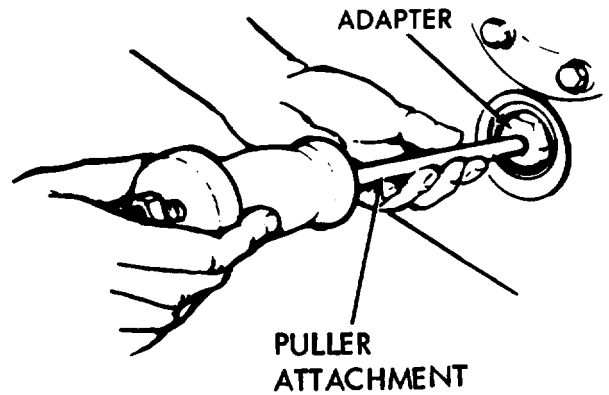
Go on to Sheet 13

**TRANSMISSION REPLACEMENT (Sheet 13 of 24)**

- Using 1-1/8 inch socket, remove input shaft plug (E) and gasket (F) from transmission.



- Using snap ring pliers, remove retaining ring (G) at rear of input shaft (H).



- Using puller attachment and mechanical puller adapter, draw input shaft (H) rear-ward.

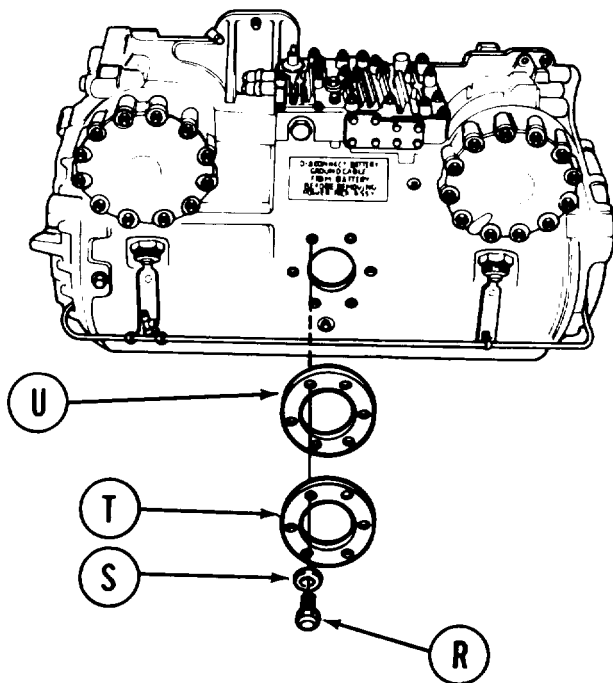
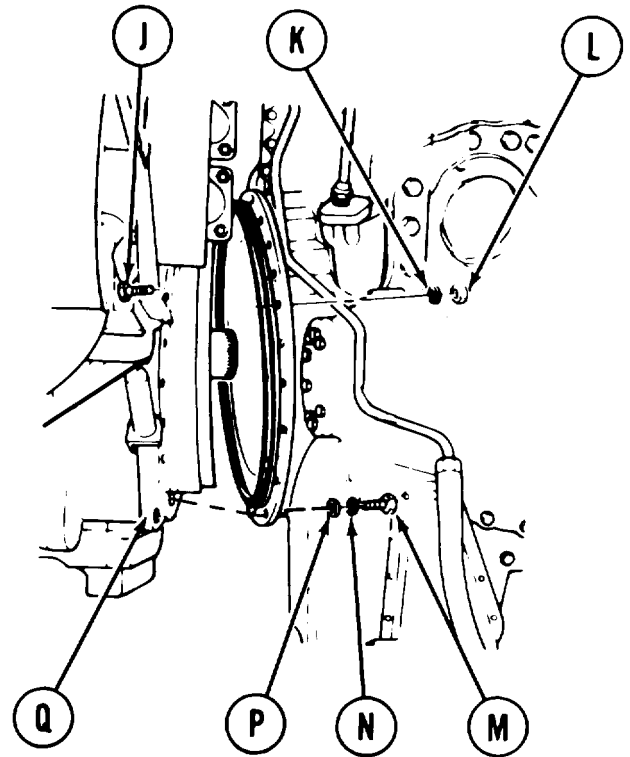
Go on to Sheet 14

TRANSMISSION REPLACEMENT (Sheet 14 of 24)

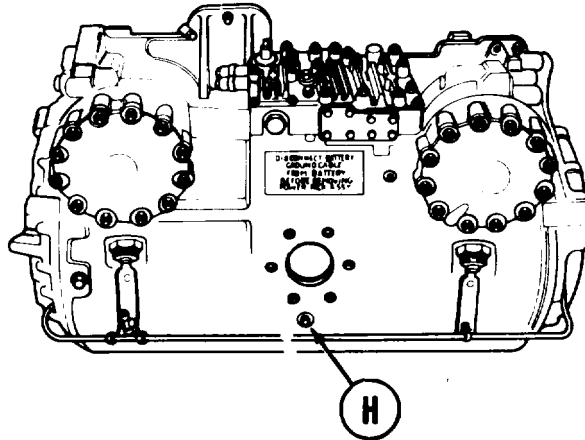
**CAUTION**

When mating transmission to engine, be sure to position electrical wiring aside to prevent wiring from being caught between mounting surfaces.

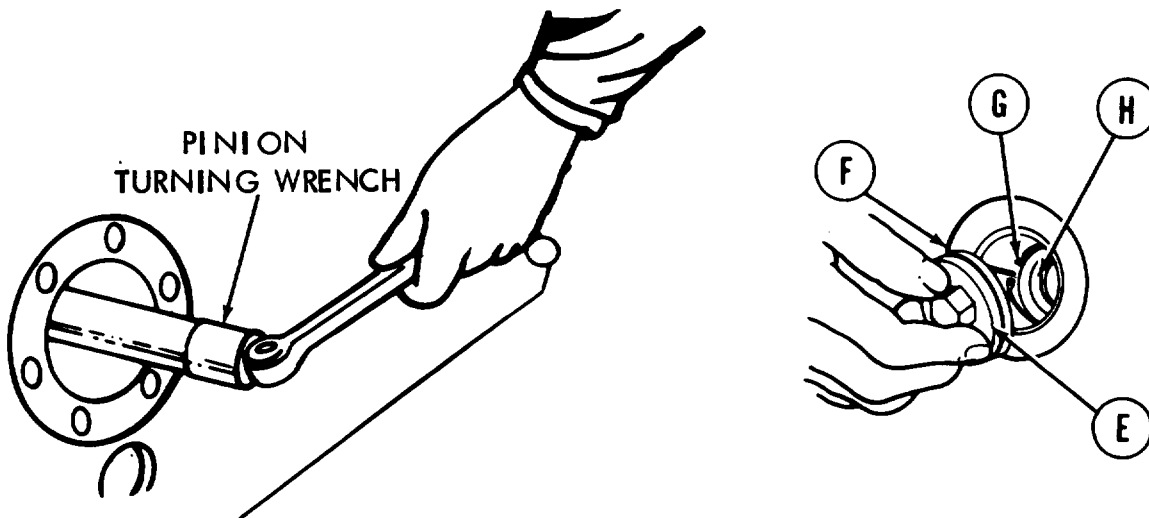
9. Aline transmission dowel pins with engine, and carefully advance transmission until transmission mounting flange is in contact with engine transmission adapter.
10. Using fabricated wrench (Fig. 1, Appendix D) and 5/8 inch socket, install screw (J), washer (K), and nut (L) on left and right side of transmission.
11. Using fabricated wrench or 5/8 inch wrench, install 17 screws (M), lockwashers (N), and flat washers (P) that secure transmission to engine (Q).
12. Remove transmission sling from transmission.
13. Using 5/8 inch socket, remove six screws (R) and lockwashers (S). Remove cover (T) and gasket (U). Throw gasket away and turn cover in to maintenance office for disposition.



## TRANSMISSION REPLACEMENT (Sheet 15 of 24)



14. Push transmission input shaft (H) into transmission.
15. Using pinion turning wrench, turn transmission until splines aline and shaft (H) will slide in and seat properly.
16. Remove pinion turning wrench.
17. Using snap ring pliers, install retaining ring (G) on input shaft (H).



18. Position gasket (F) onto plug (E) and, using 1-1/8 inch socket and torque wrench, tighten plug (E) to 50-60 lb-ft (68-81 N-m).
19. Install engine fuel return tube assembly (TM 9-2350-222-20-1).

Go on to Sheet 16

**TRANSMISSION REPLACEMENT (Sheet 16 of 24)**

20. Install left and right transmission mount assemblies (TM 923560222-20-1).
21. Install left and right universal joint assemblies CIM 92350-222-21).
22. Install left and right brake slave cylinder assemblies (TM 9-2350-222-20-1).
23. Install right brake housing assembly (TM 92350-222-20-1).
24. Install left brake housing assembly (TM 92350-222-20-1).
25. Install brake tube quick-disconnect (TM 92350-222-201).
26. Install right brake lever assembly (TM 92350-222-20-1).
27. Install left brake lever assembly (TM 9-2350-222-20-1).
28. Install brake bellcrank assembly (TM 9-2350-222-20-1).
29. Install brake control assembly (TM 92350-222-20-1).
- 29.1 If equipped, install engine mounted parking brake control assembly (TM 9-2350-222-20- 1).
30. Install transmission wiring harness (TM 92350-222-2-1 .

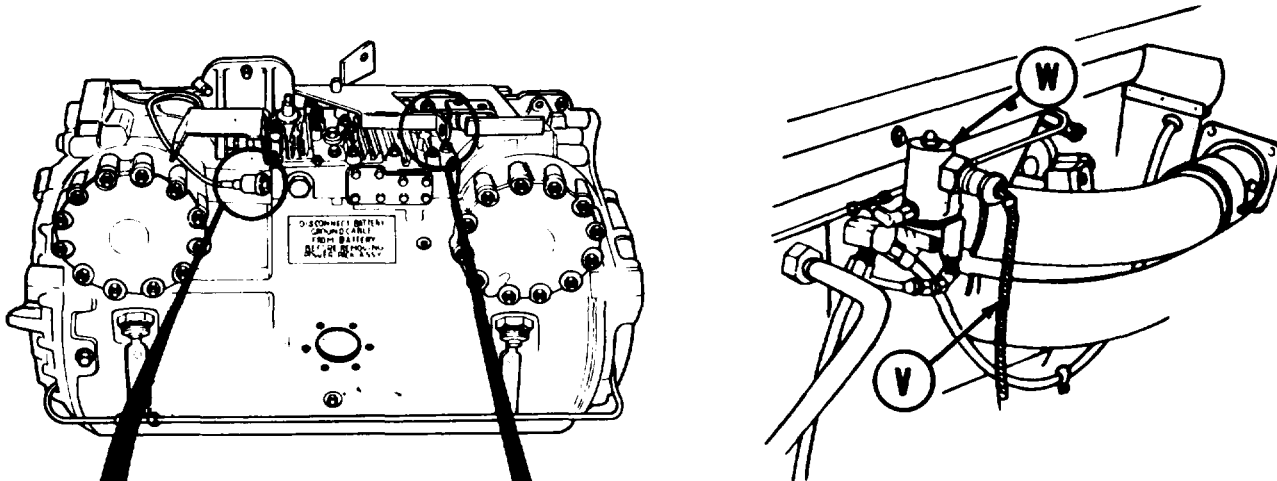
Go on to Sheet 17

**Change 1 6-37**

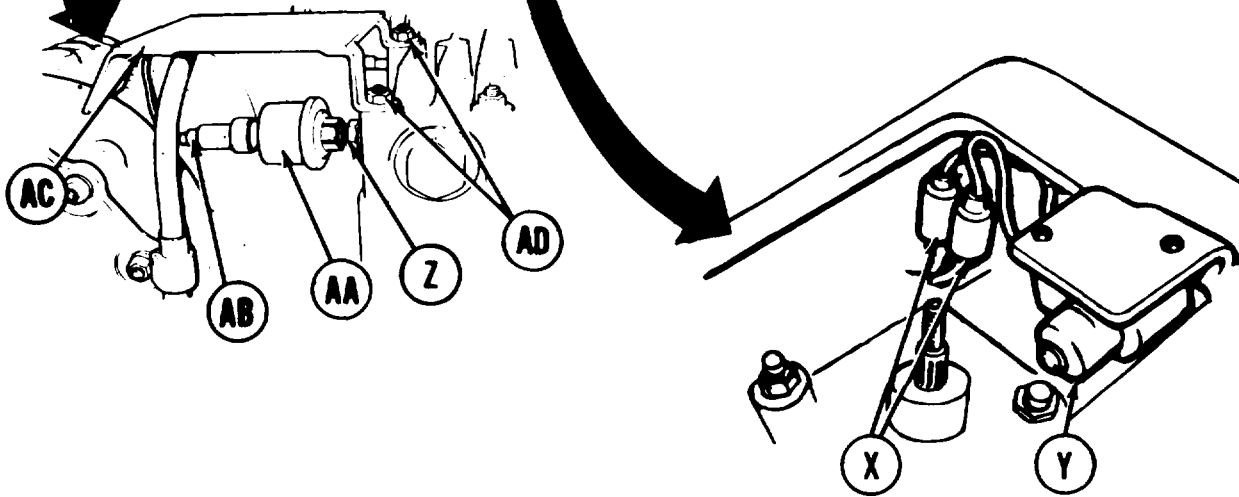


## TRANSMISSION REPLACEMENT (Sheet 17 of 24)

31. Using hand, install lead (V) onto engine fuel solenoid (W).



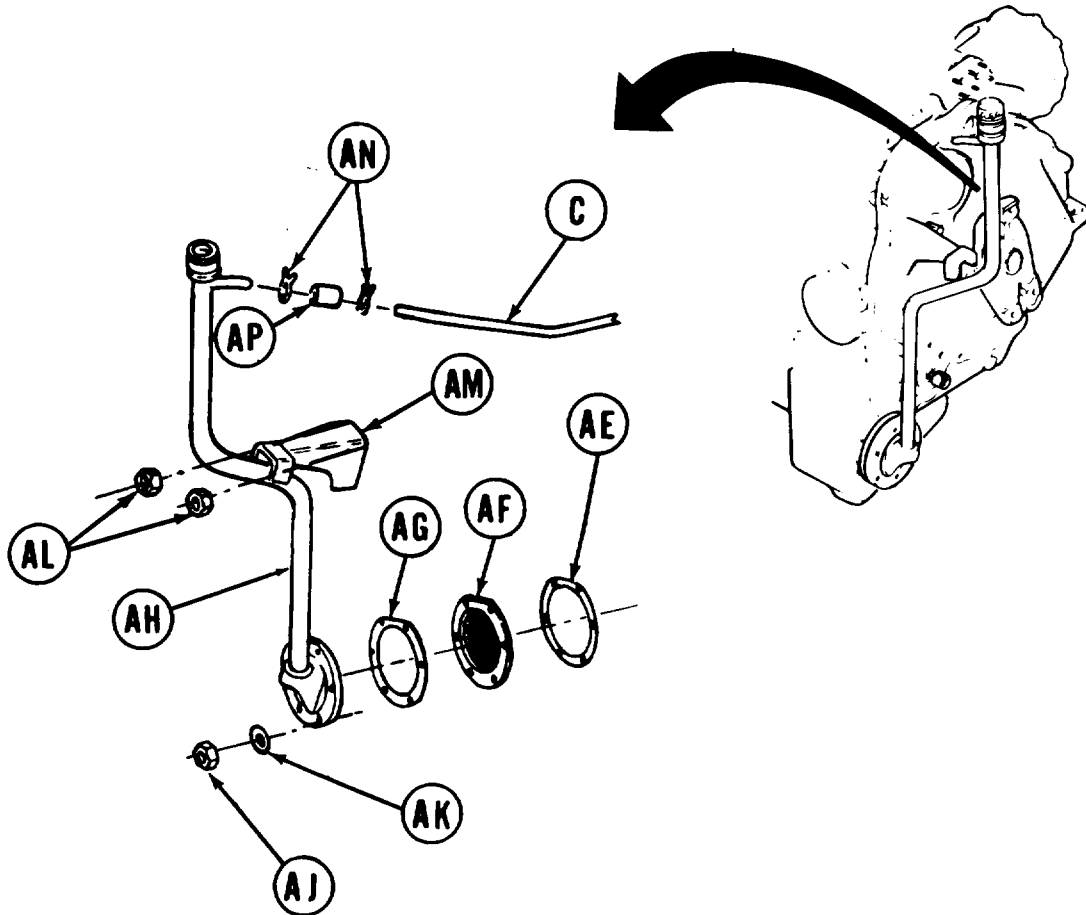
32. hand, plug two leads (X) into neutral shift switch (Y).



33. Using 3/4 inch wrench, install adapter (Z) into transmission.
34. Using 15/16 inch wrench, install oil pressure transmitter (AA) into adapter (Z).
35. Using hand, plug lead (AB) into transmitter (AA).
36. Position plate (AC) onto transmission and, using 9/16 inch socket, install two nuts (AD) to hold mounting plate (AC) to transmission.

**TRANSMISSION REPLACEMENT (Sheet 18 of 24)**

37. Position gasket (AE), strainer (AF), gasket (AG), and tube (AH) onto six studs located on bottom left side of transmission.
38. Using 1/2 inch socket, install six nuts (AJ) and washers (AK) securing tube (AH) to transmission.
39. Using 3/4 inch socket, install two nuts (AL) securing bracket (AM) to transmission.



40. Position hose clamps (AN) onto tube (C) and install hose (AP) onto tubes (C and AH) Using hose clamp pliers, install two clamps (AN) onto hose (AP).

Go on to Sheet 19

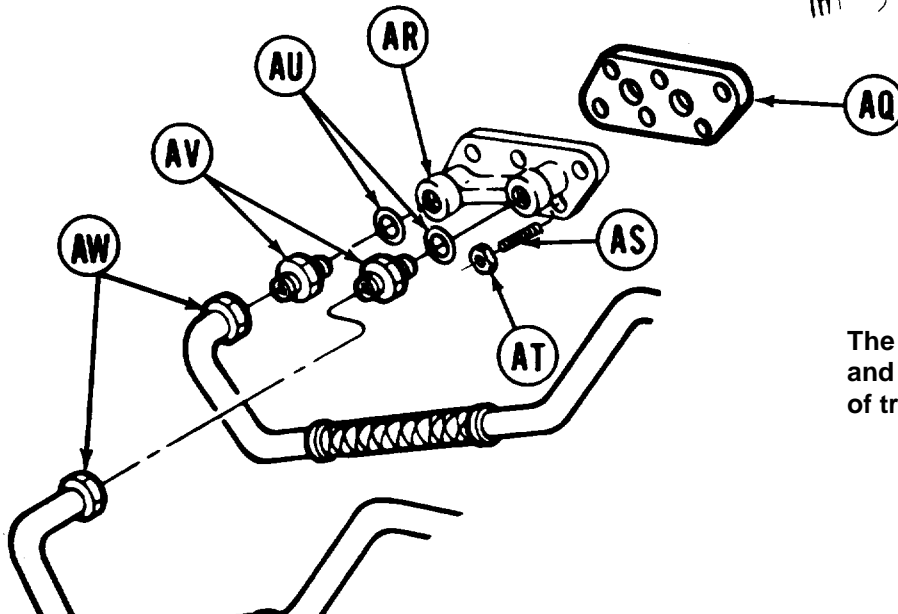
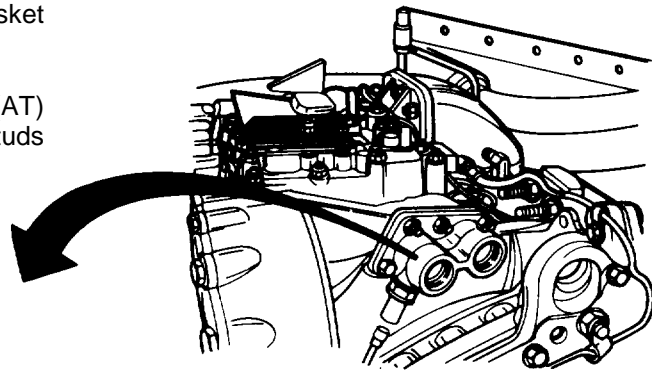
TA130707

TRANSMISSION REPLACEMENT (Sheet 19 of 24)

**NOTE**

Adapter (AR) must be positioned properly. Left side adapter has threaded hole for thermostatic switch which is angled downward. Right side adapter has threaded hole of oil temperature sensor angled upward.

41. On right side of transmission position gasket (AQ) and adapter (AR) on studs (AS).
42. Using 9/16 inch socket, install six nuts (AT) on studs (AS).
43. On left side of transmission, position gasket (AQ) and adapter (AR) onto studs (AS).
44. Using 9/16 inch socket, install four nuts (AT) onto studs (AS). Do not install nuts on two studs located at top right side of adapter (AR).



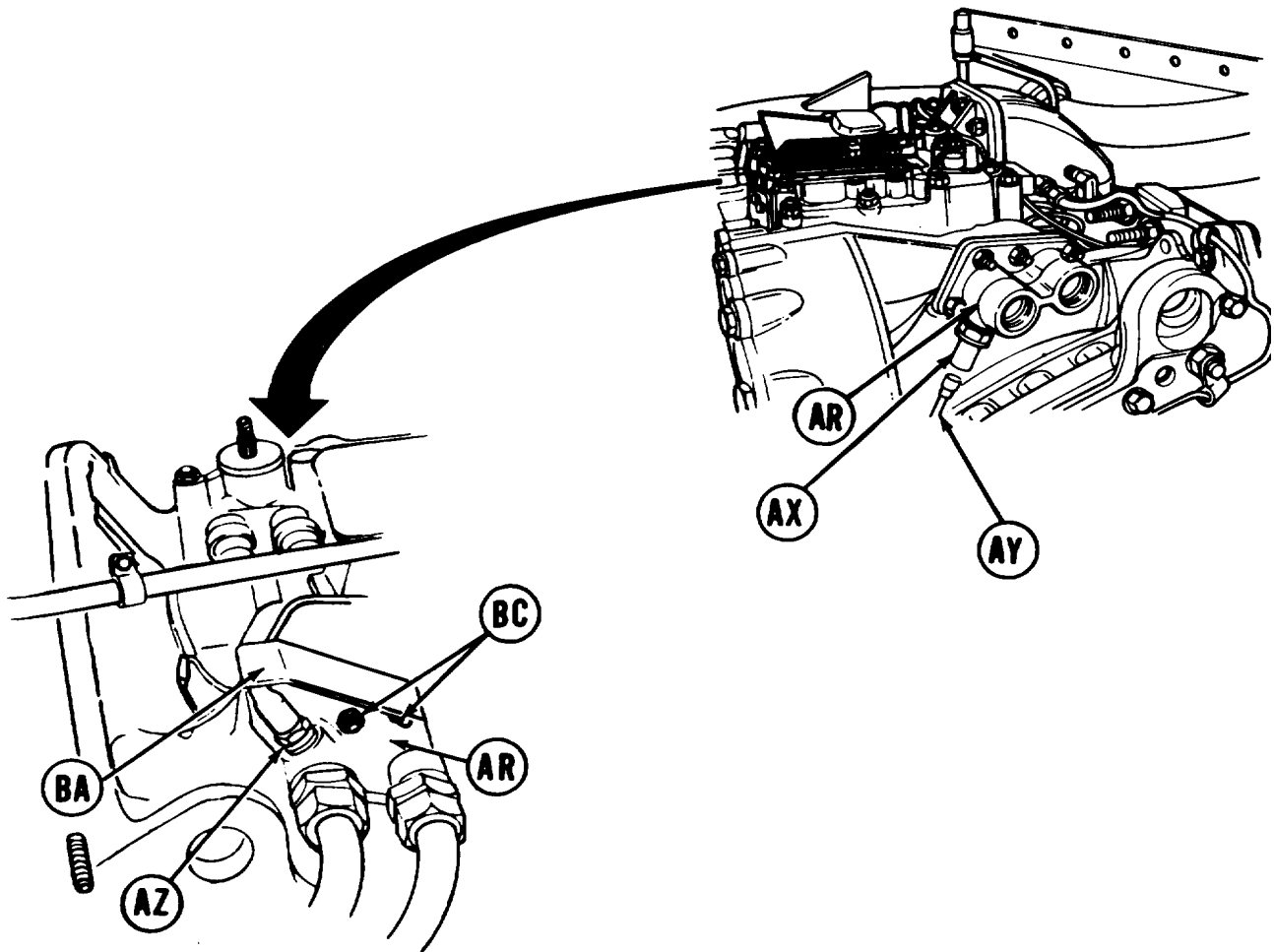
**NOTE**

The procedures described in steps 46 and 46 apply to the left and right side of transmission.

45. Press O-ring gaskets (AU) into adapter (AR) and, using 1-5/8 inch wrench, install adapters (AV) into adapters (AR).
46. Using 1-1/2 inch wrench, install tubes (AW) onto adapters (AV).

**TRANSMISSION REPLACEMENT (Sheet 20 of 24)**

47. Using 15/16 inch wrench, install thermostatic switch (AX) into adapter (AR) on right side of transmission.
48. Connect connector (AY) to thermostatic switch (AX).
49. Using 15/16 inch wrench, install oil temperature transmitter (AZ) into adapter (AR) on left side of transmission.



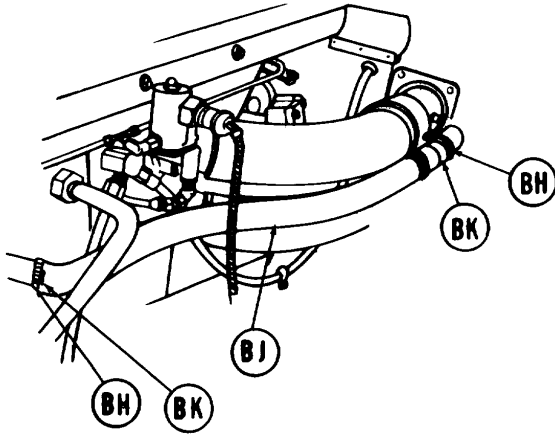
50. Connect connector to oil temperature transmitter (AZ).
51. Position protector (BA) onto studs and, using 9/16 inch socket, install two nuts (BC) securing protector (BA) to adapter (AR).

Go on to Sheet 21

TA130709

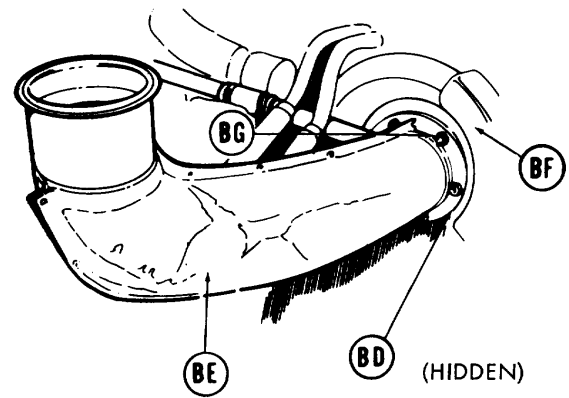
**TRANSMISSION REPLACEMENT (Sheet 21 of 24)**

52. Position gasket (BD) and exhaust pipe (BE) onto turbocharger (BF) and, using 1/2 inch socket, install six nuts (BG) securing exhaust pipe to turbocharger (BF).



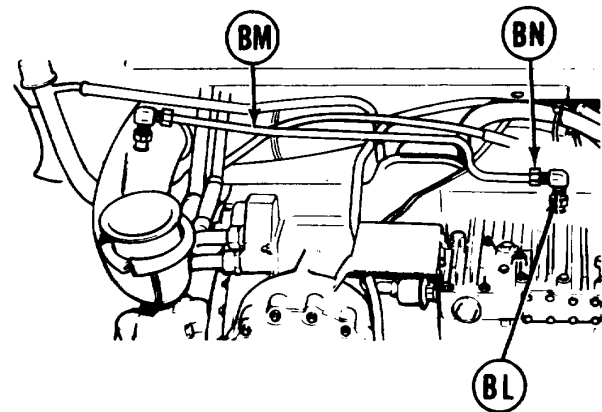
54. Using adjustable wrench, install elbow (BL) onto transmission.
55. Position transmission vent line (BM) to transmission and, using 7/8 inch wrench, install nut (BN) to elbow (BL).

**NOTE**  
The procedure described in step 52 applies to the right and left side of transmission.



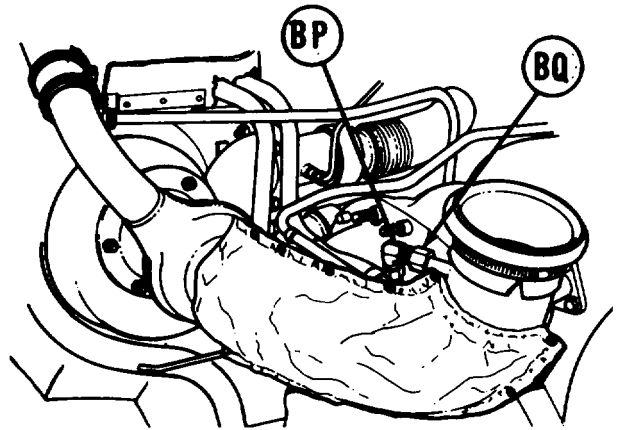
**NOTE**  
Some engine breather tubes are secured to exhaust by two 1/2 inch hex head screws.

53. Install clamps (BH) onto engine breather tube (BJ) and position tube (BJ) onto mounts (BK). Using screwdriver, tighten clamps (BH) securing tube (BJ) to mounts (BK).

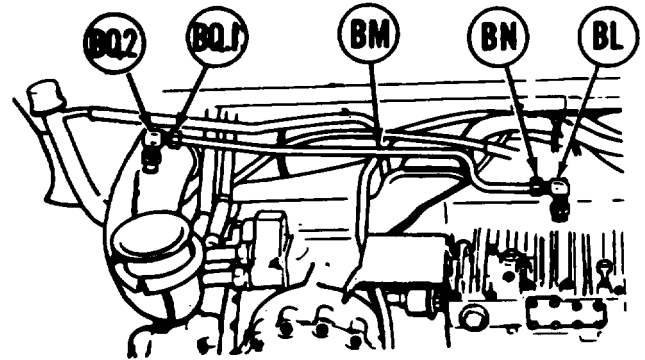


## TRANSMISSION REPLACEMENT (Sheet 21.1 of 24)

55.1 .If transmission is mated to a 2DA engine, connect transmission vent line elbow (BP) to nut (BQ). Using 3/4 inch wrench, tighten transmission vent line nut (BQ) to elbow (BP). Using 7/8 inch wrench, tighten transmission vent line nut (BN) to elbow (BL).



55.2 If transmission is mated to a 2D engine, connect transmission vent line nut (BQ.1) to elbow (BQ.2). Using a 7/8 inch wrench, tighten transmission vent line nuts (BN and BQ.1) to elbows (BL and BQ.2).



REAR OF TRANSMISSION

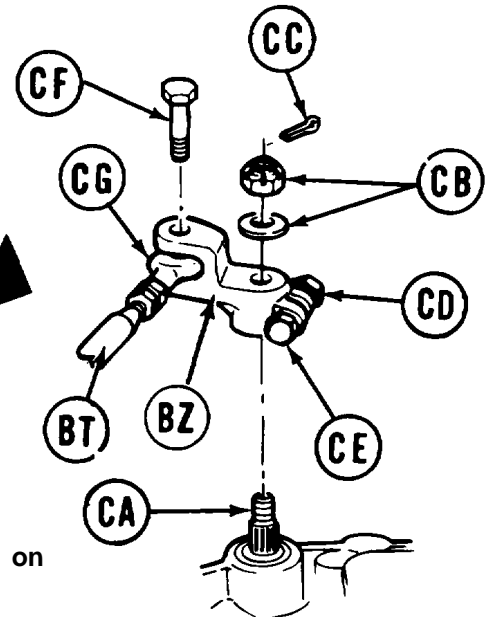
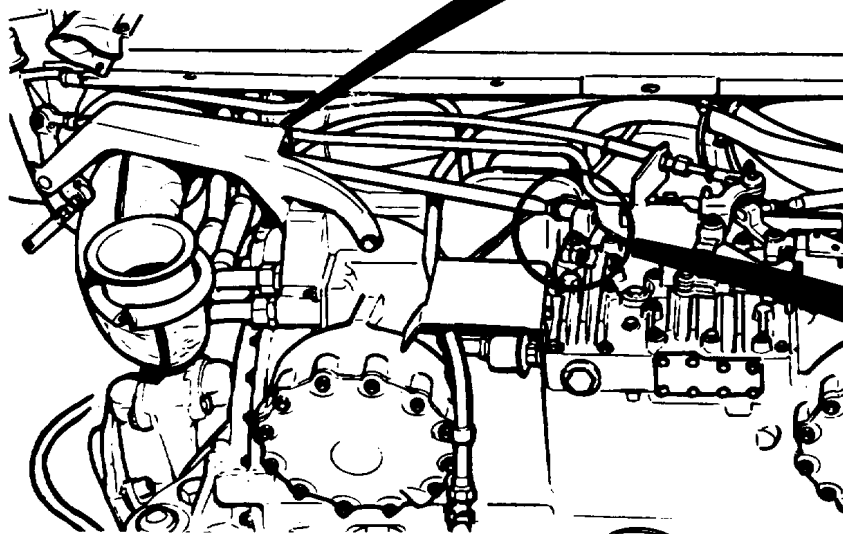
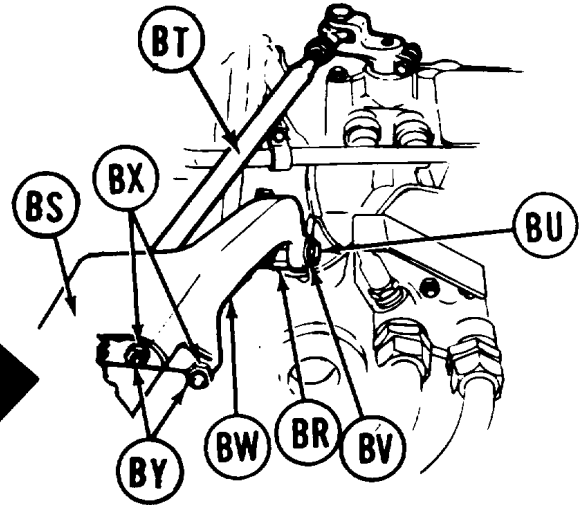
Go on to Sheet 22

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**TRANSMISSION REPLACEMENT (Sheet 22 of 24)**

56. Using 3/4 inch wrench, install spacer (BR) on stud.
57. Position bracket (BS) and rod (BT) onto transmission. Using 3/4 inch wrench, install screw (BU) through washer (BV) and bracket (BS) into spacer (BR) and into mounting bracket (BW).
58. Using 3/4 inch socket, install two nuts (BX) onto studs (BY).



**NOTE**

**Make sure to align lever (BZ) with slot on shaft (CA).**

59. Position lever (BZ) onto shaft (CA). Using 9/16 inch socket, install nut and washer (CB) onto shaft (CA).
60. Using pliers, install new cotter pin (CC) through shaft (CA).
61. Using two 9/16 inch wrenches, tighten nut (CD) and screw (CE).
62. Position rod (BT) into lever (BZ) and, using 1/2 inch socket, install screw (CF) through lever (BZ) and rod end (CG).

Go on to Sheet 23

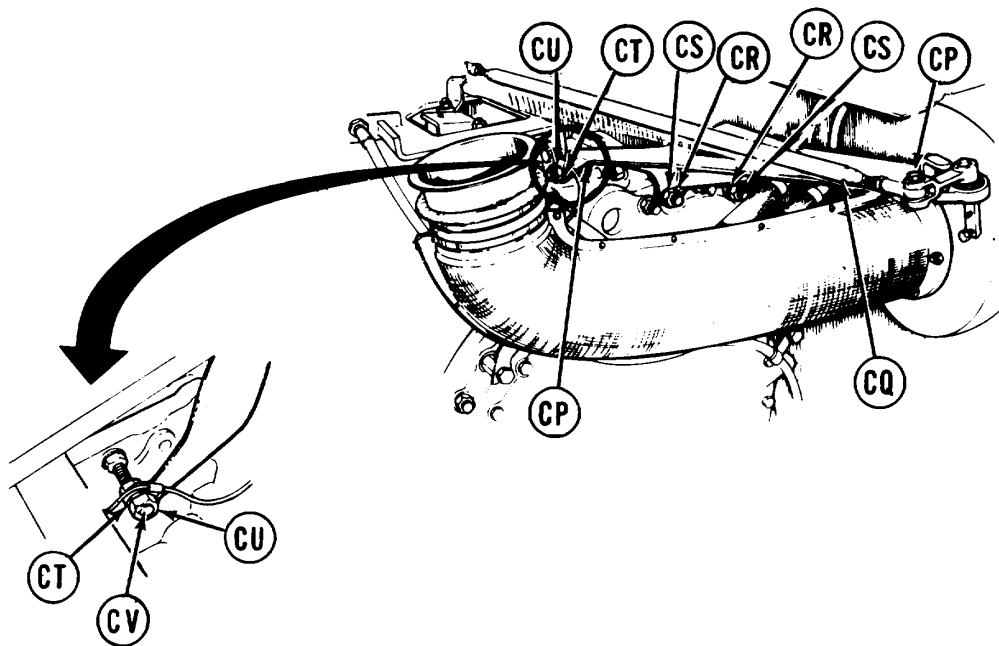
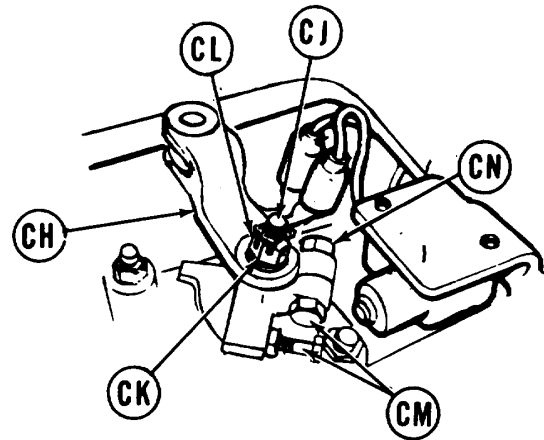
TA130711

**TRANSMISSION REPLACEMENT (Sheet 23 of 24)**

63. Position bracket (CH) onto stud (CJ) and, using 1/2 inch wrench, install nut and washer (CK) onto stud (CJ).

64. Using pliers, install new cotter pin (CL) through stud (CJ).

65. Using two 9/16 inch wrenches, tighten screw (CM) and nut (CN) onto bracket (CH).



**NOTE**

It may be necessary to move stud (CV) back to original position to accommodate nut (CU) and washer (CT).

66. Position bracket (CP) and rod (CQ) onto transmission as a unit.

67. Using 3/4 inch socket, install washers (CR) and nuts (CS) securing bracket (CP) to transmission.

68. Using 3/4 inch socket, install washer (CT) and nut (CU) onto stud (CV).

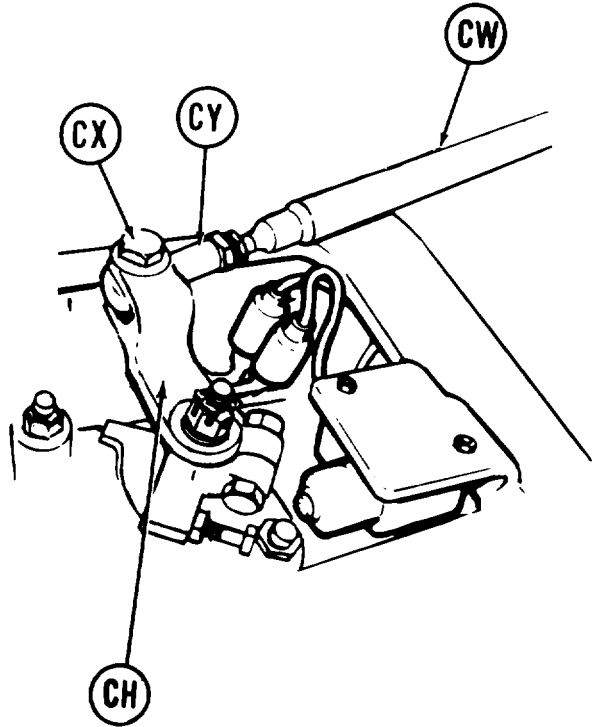
Go on to Sheet 24

TA130712



**TRANSMISSION REPLACEMENT (Sheet 24 of 24)**

69. Position rod (CW) into bracket (CH) and, using 9/16 inch wrench, install screw (CX) through bracket (CH) and rod end (CY).
70. Fill transmission with oil (LO 9-2350-222-12).
71. Install engine shroud and supports (TM 92350-222-20-1).
72. Install right angle drive, clutch and pump (TM 9-2350-222-20-1).
73. Install powerplant (TM 9-2350-222-20-1).



End of Task

TA130713

CHAPTER 7

FINAL DRIVE MAINTENANCE

FINAL DRIVE REPAIR (Sheet 1 of 30)

PROCEDURE	PAGE
Disassembly	7-3
Assembly	7-18
Axial Play and Backlash Tests	7-29

- TOOLS:**
- 3/16 in. socket head screw key (allen wrench)
  - 5/8 in. socket head screw key (allen wrench)
  - 5/16 in. socket head screw key (allen wrench)
  - Lifting device (2000 lb capacity)
  - 3/4 in. socket with 1/2 in. drive
  - 1 in. socket with 1/2 in. drive
  - Ratchet with 1/2 in. drive
  - 7/16 in. combination box and open end wrench
  - Diagonal cutting pliers
  - 7/8 in. socket with 1/2 in. drive
  - Brass drift
  - Dial indicator (5120-00-227-8840)
  - Chisel
  - Putty knife
  - C-clamp (3 in. min.) (2 required)
  - Micrometer depth gage (5210-00-619-4045)
  - 5 in. extension with 1/2 in. drive
  - Hammer
  - 3/4 in. combination box and open end wrench
  - Arbor press
  - Torque wrench with 3/4 in. drive (0-600 lb-ft) (0-813 N.m)
  - 3/4 in. crowfoot wrench with 1/2 in. drive
  - Torque wrench (PD 1201)
  - 6 in. steel rule
  - Micrometer set (inside)
  - Micrometer set (outside)
  - Drain pan
  - Hinged bar with 1/2 in. drive
  - Pry bar (2 required)
  - Inspection mirror (5120-00-448-2455)
  - Crowbar
  - Parallel straight bar (5220-00-501-7462)
  - Stud remover and setter (5120-00-596-0980)
  - Mechanical puller kit (5120-00-423-1596)
  - Mechanical puller kit (5120-00-313-9496)
  - Torque wrench reactor bar (5120-01-008-3632)

- SPECIAL TOOLS:**
- Seal inserter (Item 8, Chapter 2, Section I)
  - Box wrench (Item 6, Chapter 2, Section I)
  - Bearing remover tool (Item 7, Chapter 2, Section I)

- FABRICATED TOOLS:**
- Bearing installer (Figure 4, Appendix D)
  - Output shaft lifting attachment (Figure 5, Appendix D)

Go on to Sheet 2

**FINAL DRIVE REPAIR (Sheet 2 of 30)**

**SUPPLIES:**

Assorted sized blocks (wood)	Lockwire (Item 28, Appendix B)
Metal block	Oil (Item 16, Appendix B)
Crocus cloth (Item 3, Appendix B)	Gasket (8694076)
Dry cleaning solvent (Item 12, Appendix B)	Seal (11668698)
Sealing compound (Item 7, Appendix B)	Gasket (12290966)
Sealing compound (Item 8, Appendix B)	Seal assembly (12304107)
Sealing compound (Item 9, Appendix B)	Rags (Item 31, Appendix B)
Nut (11668951)	Primer (Item 21, Appendix B)
Gasket (7379209)	Preformed packing (M83248/1-258)
Spacer (12304134)	Preformed packing (M83248/1-250)
Bearing (11669119)	Gloves (Item 13.1, Appendix B)
Adhesive (Item 33, Appendix B)	Goggles (Item 13.2, Appendix B)
Penetrating dye (Item 13, Appendix B)	Grease (Item 32, Appendix B)
Screw (5/8 x 18 x 4 inch) (4 required)	Tape (Item 25, Appendix B)
	Pipe (3-1/8 in. dia.)

**PERSONNEL:** Two

**REFERENCES:** TM 9-214  
LO 9-2350-222-12  
TM 9-2350-222-20-1

**PRELIMINARY PROCEDURE:** Remove final drive (TM 9-2350-222-20-1)

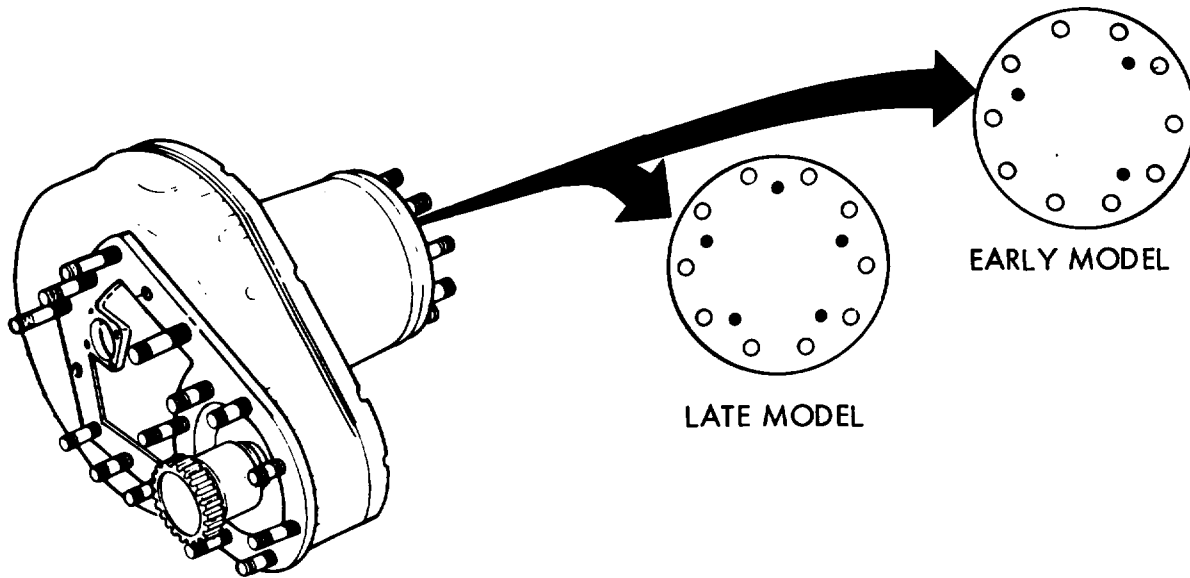
Go on the Sheet 3

**Change 3 7-2**

## FINAL DRIVE REPAIR (Sheet 3 of 30)

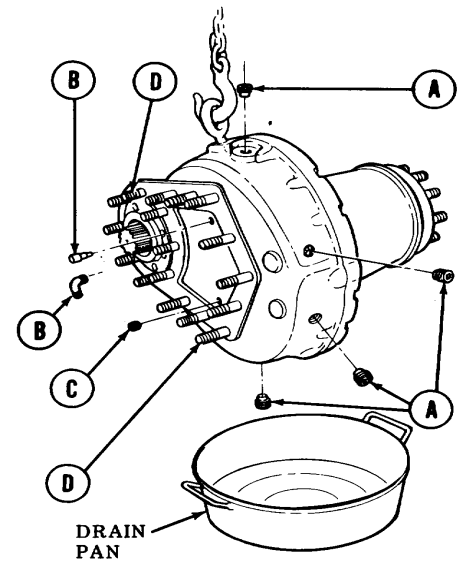
## NOTE

There are two different types of final drives. Early model has three holes in end of shaft and late model shaft has five holes. Before performing this procedure identify which final drive you have (early or late). Where the final drive repair differs it will be noted.

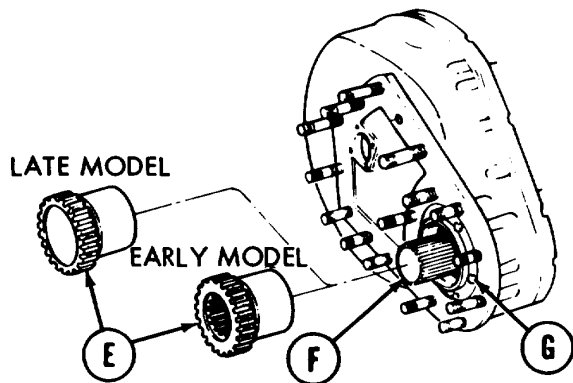


## DISASSEMBLY:

1. Using lifting device, position final drive over drain pan.
2. Using hinged bar with 1/2 inch drive or 5/8 inch socket head screw key (alien wrench) remove four pipe plugs (A).
3. Allow oil to drain completely. When drained, place final drive assembly on working area.
4. Using 7/16 inch wrench, remove pressure relief valve (B) or vent elbow (B).
5. Using 3/16 inch allen wrench, remove plug (C).
6. Inspect 17 studs (D) for wear or damage. Replace as necessary.



Go on to Sheet 4

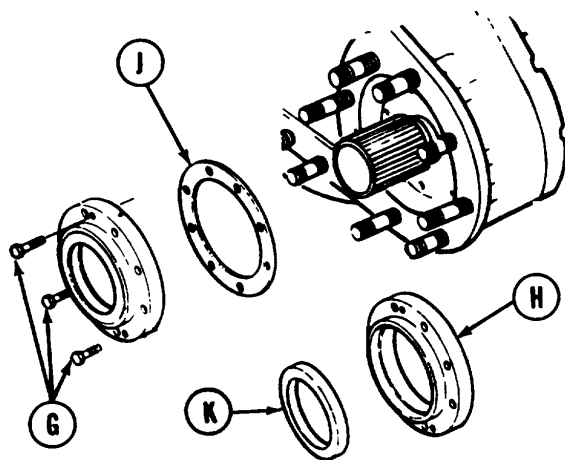
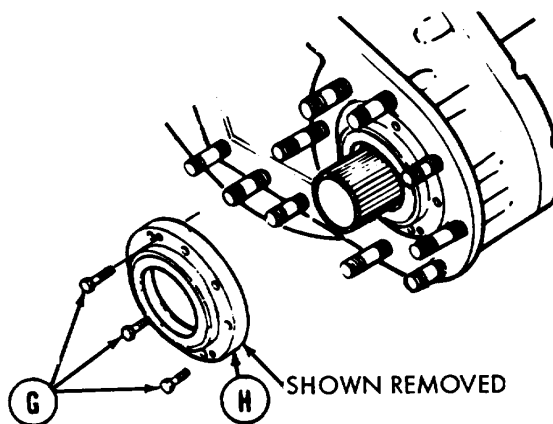


**NOTE**

Late model final drive has different type adapter (E).

7. Using fingers, remove adapter (E) from pinion gear (F).
8. Using pliers cut and remove lockwire from eight screws (G).
9. Using 3/4 inch socket, hinged bar, and extension with 1/2 inch drive, remove eight screws (G).

10. Using fingers, install three screws (use; screws (G)) in bearing cap (H) holes (use screws (G); as jackscrews).
11. Using 3/4 inch socket, tighten three screws (G) evenly to remove bearing cap (H) and gasket (J).
12. Using 3/4 inch socket, remove three screws (G) from bearing cap (H).
13. Throw gasket (J) away.



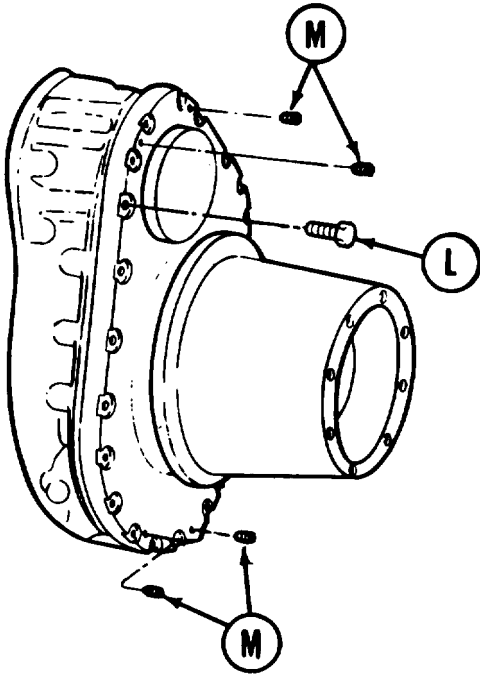
14. Using hammer and drift, remove oil seal (K) from bearing cap (H). Throw seal (K) away.

**NOTE**

For ease of handing, install fabricated lifting attachments on studs as required.

15. Use suitable lifting device, position final drive to gain access to opposite side.

Go on to Sheet 5

**NOTE**

Early model final drives have 7/8 inch head bolts and late models have 1 inch head bolts.

**NOTE**

It may be necessary to use a handle extension on hinged handle to remove bolts (L).

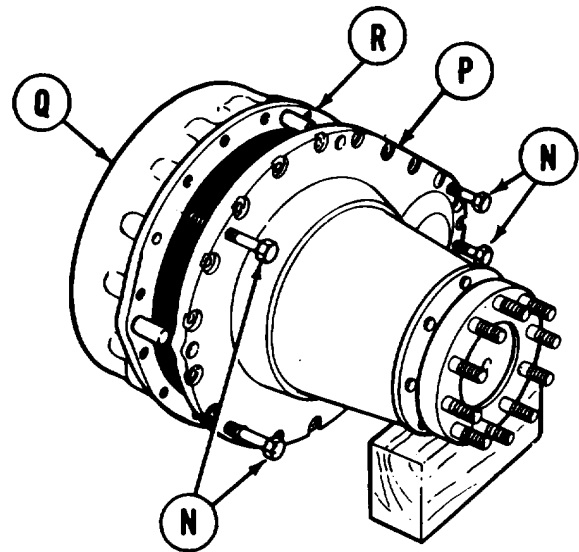
16. Using a 7/8 inch or 1 inch socket and hinged bar with 1/2 inch drive, remove twenty bolts (L).
17. Using 5/16 inch allen wrench, remove four setscrews (M).

**CAUTION**

Make sure setscrew holes have been tapped prior to installing jackscrews to avoid stripping.

\* Keep surfaces of case and carrier parallel to avoid binding during separation.

18. Using fingers, install four 5/8 x 18 x 4 inch jackscrews (N) in setscrew holes.
19. Using 5/8 inch socket, slowly and evenly tighten the-four jackscrews (N) to separate final drive carrier (P) from case (Q).
20. Using 5/8 inch socket, remove four jackscrews (N) from frame carrier (P).
21. Using fingers, remove gasket (R). Throw gasket away.
22. Using suitable lifting device, position final drive on its side.



Go on to Sheet 6

**FINAL DRIVE REPAIR (Sheet 6 of 30)**

**CAUTION**

Protect threads of studs (8) with several layers of tape.

23. Place crowbar between output shaft studs (S) to prevent shaft from turning and stabilize carrier during nut removal.

**NOTE**

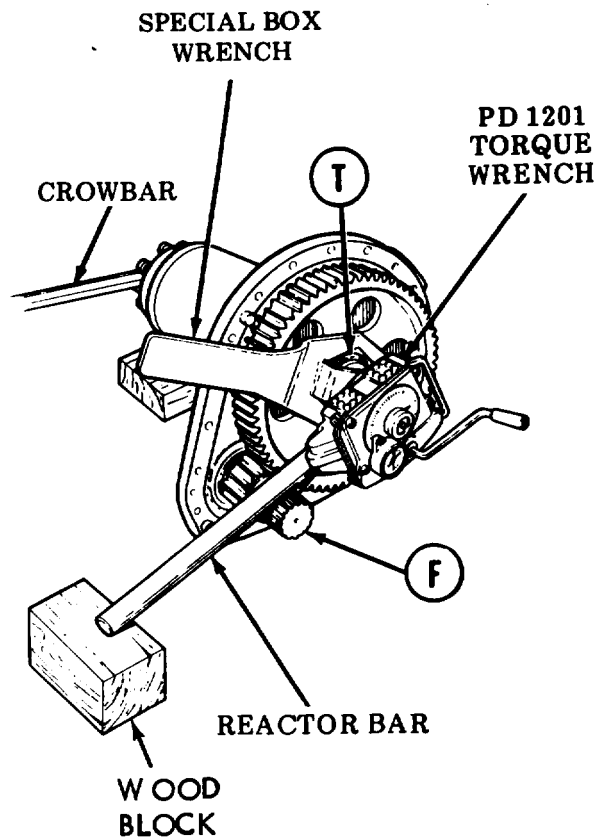
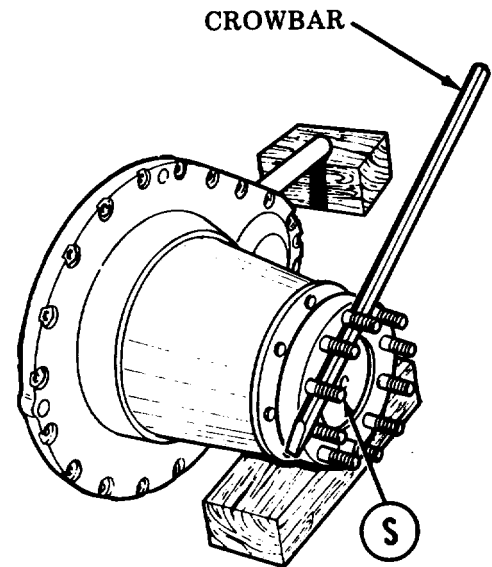
Late model nut does not have a lockwasher.

24. If required, use hammer and chisel to bend tangs of lockwasher away from nut (T).
25. Place special box wrench onto nut (T).

**CAUTION**

Support end of reaction bar against fixtured object (wood block). DO NOT rest against pinion gear (F).

26. Using PD 1201 torque wrench with 3/4inch drive and reactor bar, loosen nut (T).
27. Remove nut (T) and lockwasher if present. Throw nut and lockwasher away.



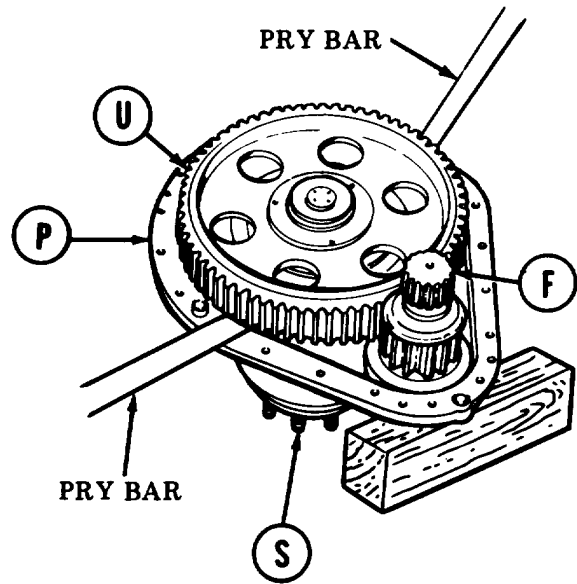
Go on to Sheet 7

FINAL DRIVE REPAIR (Sheet 7 of 30)

**NOTE**

Drive gear (U) and pinion gear (F) are a matched set and if replaced must be replaced as a set.

28. Remove crowbar from between output shaft studs (S).
29. Using two people, position final drive carrier (P) on floor with studs down and drive gear (U) up. Support carrier (P) with wooden blocks. Using two pry bars placed directly across from each other, carefully pry drive gear (U) upward, while pushing inward on pinion (F) with hand. Remove pinion (F) and drive gear (U).



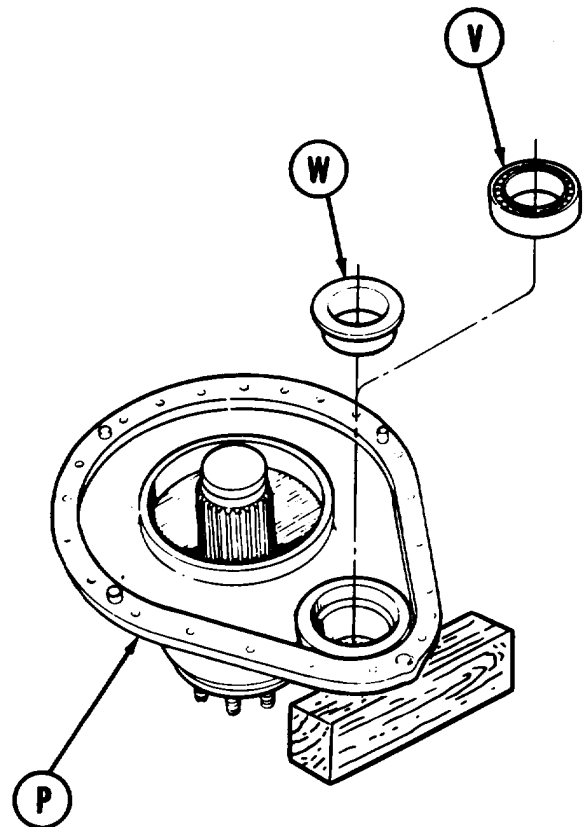
**CAUTION**

Care must be taken not to damage carrier assembly during gear removal.

**NOTE**

Two types of pinion bearings may be found during disassembly

30. On final drive with late model pinion gear, remove bearing (V) from carrier (P).
31. On early model pinion gear, remove bearing outer race (W) from carrier (P). Old style bearing must be replaced.



Go on to Sheet 8



**FINAL DRIVE REPAIR (Sheet 8 of 30)**

32. Using hammer and brass drift or wood block, remove bearing race (X) (early model) or bearing (Y) (late model) from case (Q).

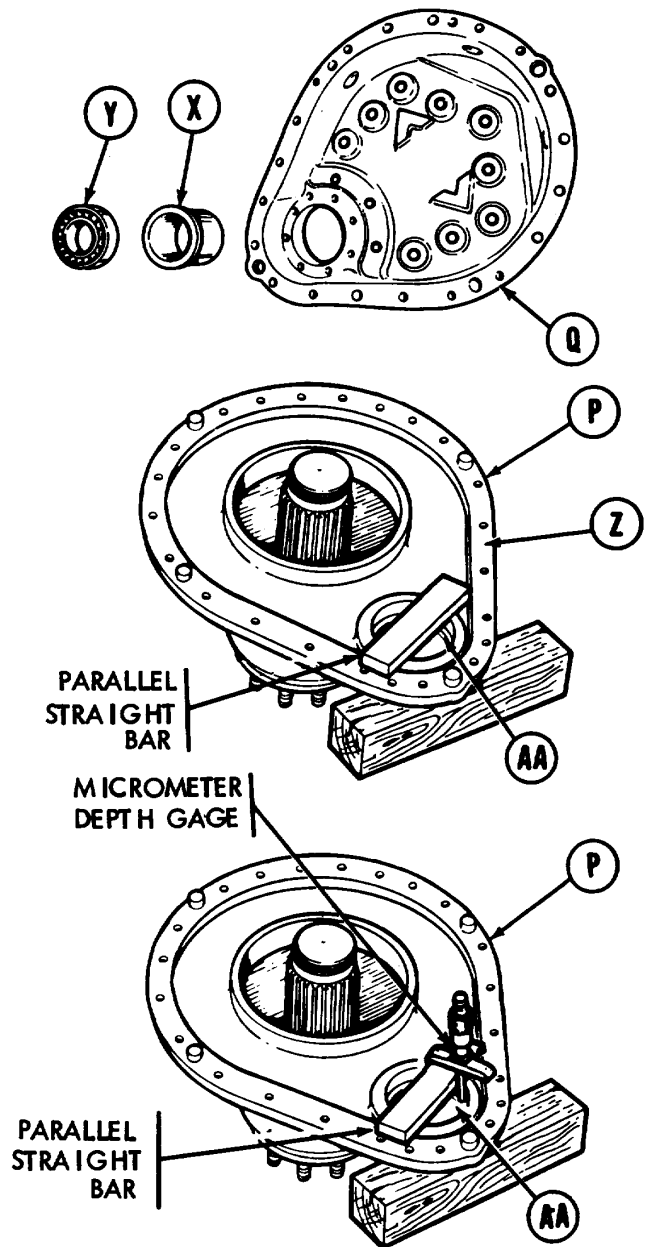
**CAUTION**

**Early model bearing and race must be replaced as part of up**

**NOTE**

**Do not replace any parts until after bearing pocket/bore cheeks are made.**

33. Make sure carrier (P) gasket surface (Z) and bearing shelf (AA) are clean prior to positioning parallel straight bar.
34. Position parallel straight bar on gasket surface (Z) across bearing pocket of carrier (P).
35. Using micrometer depth gage, measure from top of parallel bar to bearing shelf (AA) of carrier (P) and record reading.
36. Repeat measurement a minimum of four times in four equally spaced points. Record measurements.
37. Measure thickness of parallel bar and subtract from recorded measurements. If all measurements are between inches and 1.357 inches, go to step 39.

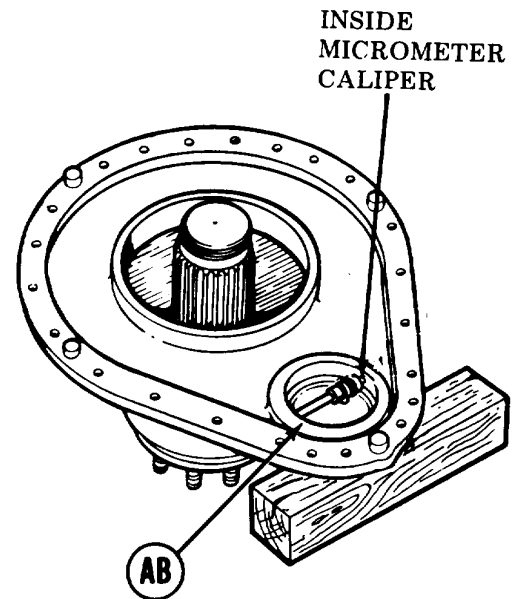


Go on to Sheet 9

Change 3 7-8

**FINAL DRIVE REPAIR (Sheet 9 of 30)**

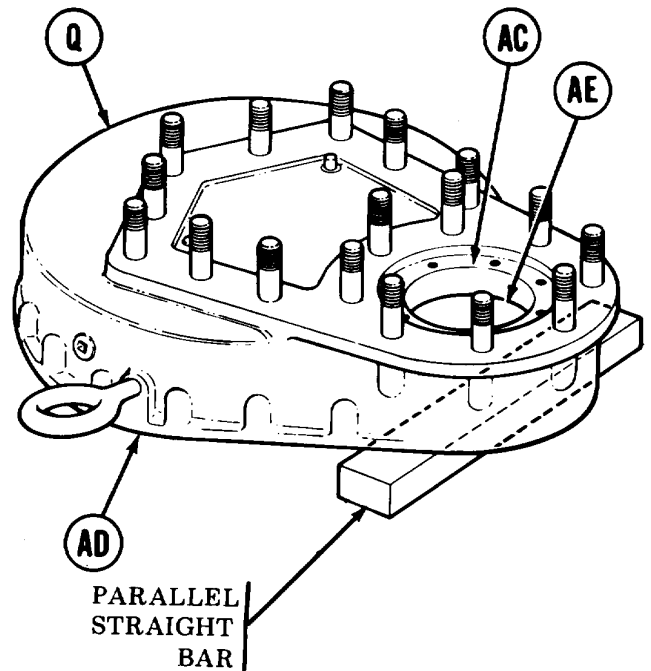
38. If any measurement is not within tolerance, reassemble final drive and tag "UNSERVICEABLE (CARRIER POCKET DEPTH)." Return final drive to supply for depot rework.
39. Using inside micrometer, measure carrier bearing bore (AB) diameter a minimum of four times in four equally spaced points. Record readings.
40. If all measurements are between 5.5112 and 5.5130 inches (139.9845 and 140.0302 mm), go to step 42.
41. If any measurement is not within tolerance, reassemble final drive and tag "UNSERVICEABLE (CARRIER BEARING BORE)." Return final drive to supply for depot rework.



**NOTE**

Ensure ease (Q) bearing cap surface (AC) and gasket surface (AD) are clean.

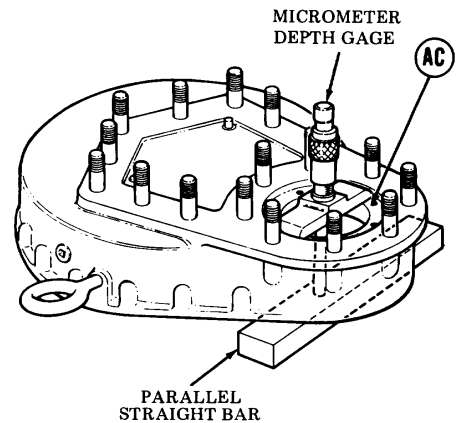
42. Position case (Q) on wood blocks with gasket surface (AD) down.
43. Hold parallel straight bar in place across gasket surface (AD) below bearing bore (AE).



Go on to Sheet 10

**FINAL DRIVE REPAIR (Sheet 10 of 30)**

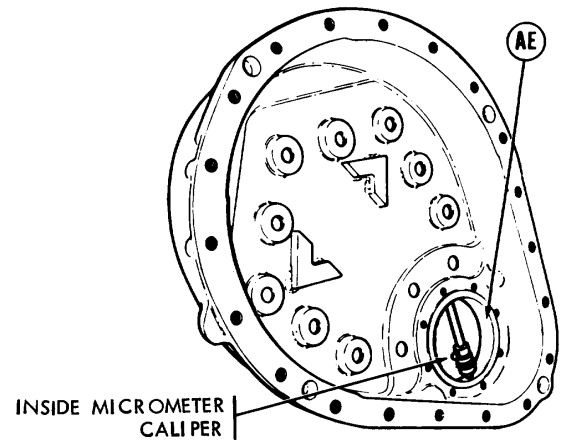
44. Using micrometer depth gage, measure from top of case bearing cap surface (AC) to top of parallel straight bar a minimum of four times at four equally spaced points. Record measurements.
45. If all measurements are between p4479 inches and 4.489 inches (113.7666 and 114.0206 mm), go to step 47.
46. If any measurement is not within tolerance, reassemble final drive and tag "UNSERVICEABLE (CASE BEARING BORE DEPTH)." Return final drive to supply for depot rework.



**NOTE**

**Ensure case bearing bore surface (AE) is clean.**

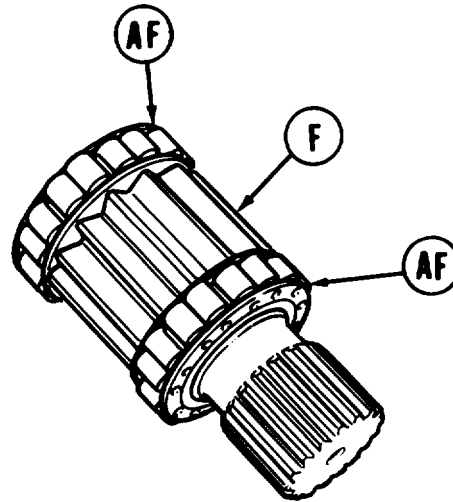
47. Using inside micrometer caliper, measure bearing bore (AE) diameter a minimum of four times at four equally spaced points. Record measurements.
48. If all measurements are between 5.5112 inches and 5.5130 inches (139.9845 and 140.0302 mm), go to step 50.
49. If any measurement is not within tolerance, reassemble final drive and tag "UNSERVICEABLE (CASE BEARING BORE DIAMETER)." Return final drive to supply for depot rework.



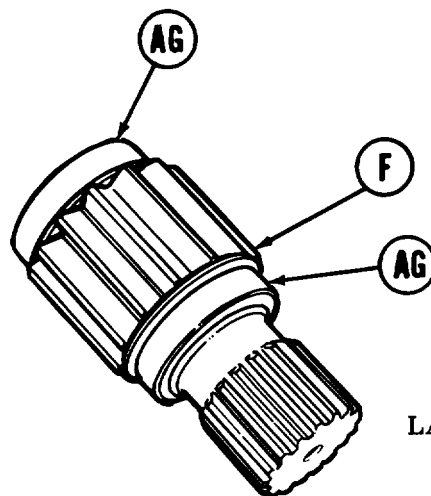
Go on to Sheet 11

**FINAL DRIVE REPAIR (Sheet 11 of 30)**

50. Using bearing puller or hammer and drift, remove bearings (AF early model) or bearing inner races (AG late model) from pinion (F). Throw away pinion bearings and races.
51. Pinion bearings (AF or AG) must be replaced as part of overhaul.



EARLY MODEL

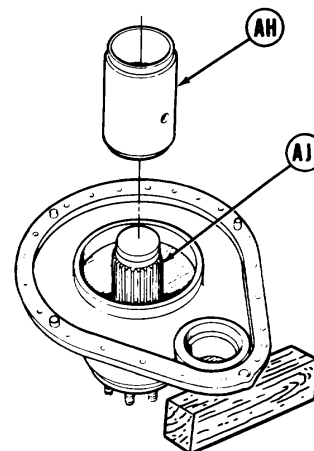


LATE MODEL

52. Remove spacer (AH) from output shaft (AJ).
53. Inspect spacer (AH) for damage or pitting.
54. If unserviceable, discard, or fabricate special tool.

**NOTE**

**Spacer (AH) may be used to fabricate the special tool required to seat output shaft and drive gear bergs (Figure 4, Appendix D).**



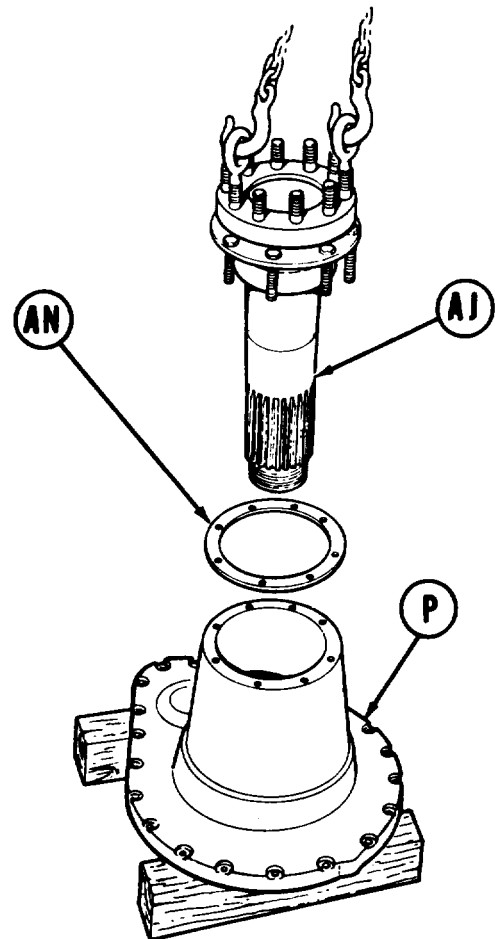
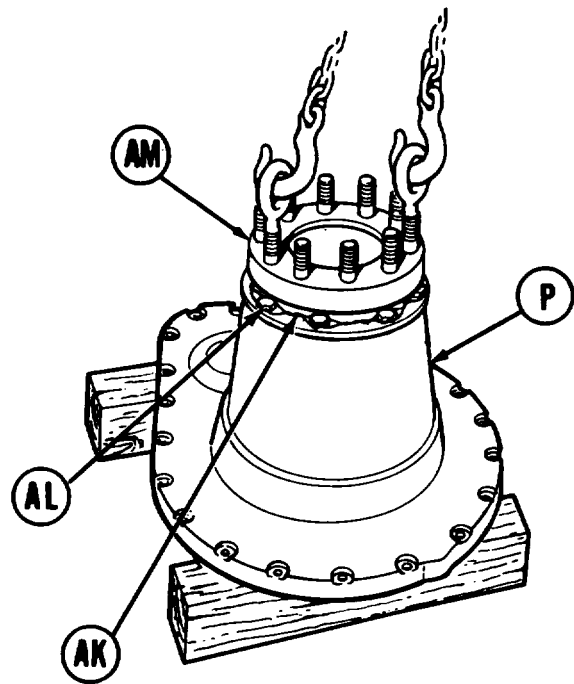
**FINAL DRIVE REPAIR (Sheet 12 of 30)**

55. Using suitable lifting device, position final drive carrier (P) on two wood blocks.
56. Using diagonal cutting pliers, cut and remove lockwire (AK) from bolts (AL).
57. Using 3/4-inch wrench, loosen bolts (AL) until heads of bolts touch output shaft flange (AM).
58. Using suitable lifting device, carefully lift output shaft (AJ) while continuing to loosen bolts.
59. Lift output shaft (AJ) free of carrier (P).

**NOTE**

To free output shaft (AJ) from carrier (P), it may be necessary to tap side of carrier (P) while lifting output shaft (AJ).

60. Remove and throw away gasket (AN).



Go on to Sheet 13

## FINAL DRIVE REPAIR (Sheet 13 of 30)

**NOTE**

Before completing disassembly, perform cleaning and inspection of case, carrier, and gears.

61. Clean gasket surfaces as necessary, using putty knife or gasket scraper.

**WARNING**

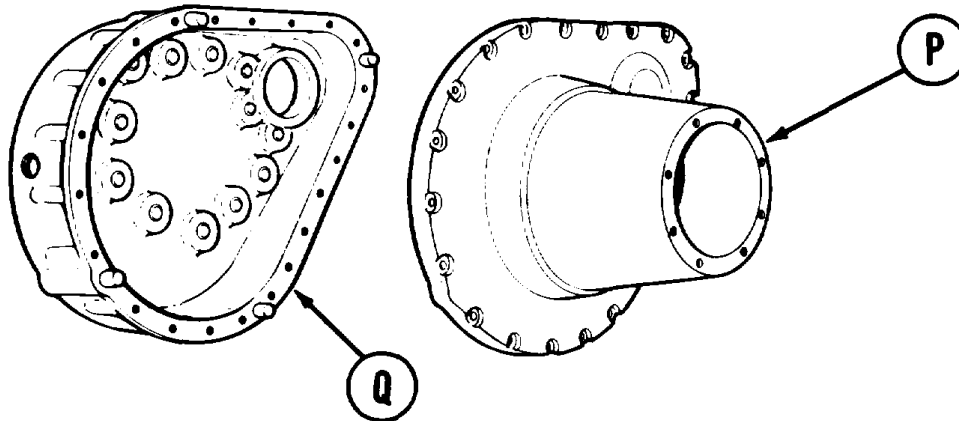
Dry cleaning solvent P-D680 is toxic and flammable. To avoid injury, wear protective goggles and gloves and use in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and do not breathe vapors. Do not use near open fire or excessive heat. The flash point for Type I dry cleaning solvent is 100F (38' C) and for Type II is 140' F (60' C). If you become dizzy while using dry cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

62. Clean all parts, using dry cleaning solvent and clean rags.

**NOTE**

Case and carrier are a matched set. If either part is unserviceable, reassemble final drive, using old parts, tag unserviceable, and return through supply channels for depot overhaul. Case and carrier must be thoroughly cleaned before inspection.

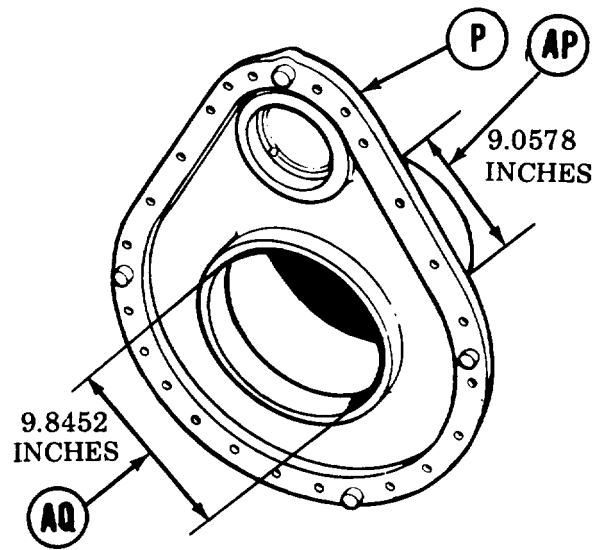
63. Using penetrating dye, inspect carrier (Q) and case (P) for cracks or fractures.  
64. Using crocus cloth, remove minor scores and burrs from machined surfaces.



Go on to Sheet 14

**FINAL DRIVE REPAIR (Sheet 14 of 30)**

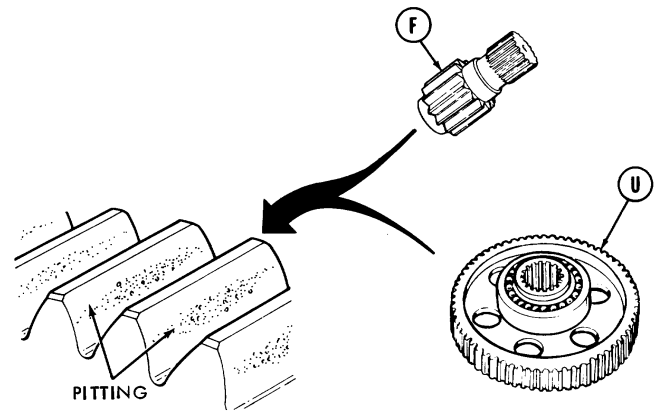
65. Using inside micrometer, measure case (P) bore diameters (AP and AQ) a minimum of four times at four equally spaced points. Record measurements.
66. If measurements do not exceed 9.0578 inches, (230.681 mm) at (AP) and 9.8452 inches, (250.0681 mm) at (AQ), go to step 68.
67. If any measurement exceeds the above, reassemble final drive and tag "UNSERVICEABLE (CARRIER BEARING BORE)." Return final drive to supply for depot rework.



**NOTE**

**Drive gear (U) and pinion gear (F) are a matched set. If either gear is unserviceable, both gears must be replaced as a set.**

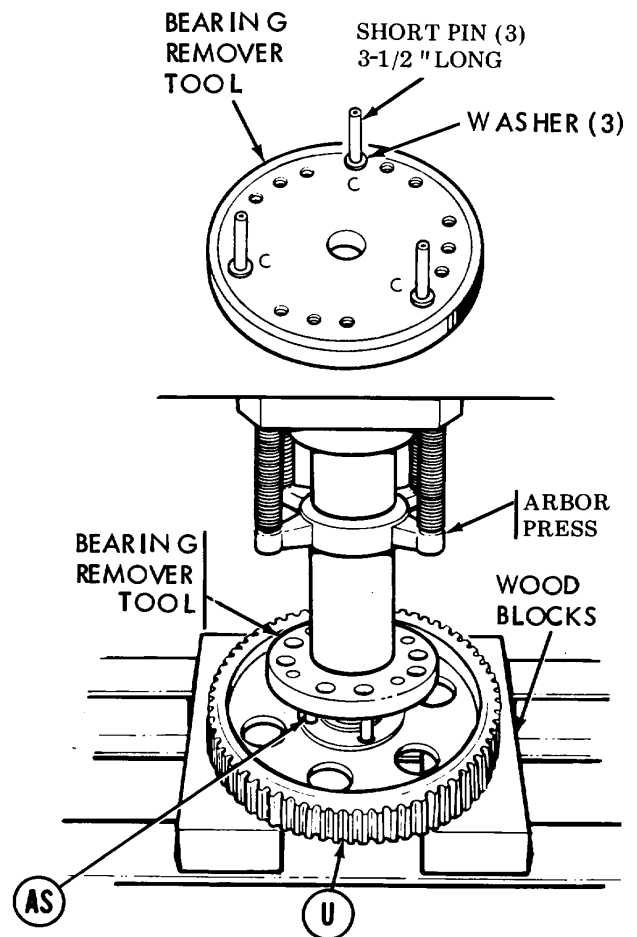
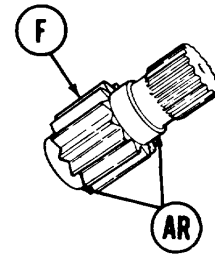
68. Check drive gear (U) and pinion gear (F) for cracked, broken, or chipped teeth. Replace set if either gear is unserviceable.
69. Using penetrating dye, check drive gear (U) and pinion gear (F) for pitting.



Go on to Sheet 15

**FINAL DRIVE REPAIR (Sheet 15 of 30)**

70. Using outside micrometer caliper, measure pinion gear (F) race surface diameters (AR) each a minimum of four times at four different points. Record measurements.
71. If all measurements are between 3.1511 inches and 3.1504 inches (80.0379 and 80.0202 mm), go to step 78.
72. If all measurements are not within tolerance, replace gear set and go to step 73.
73. Install three short (3-1/2 inches) pins and washers in bearing remover tool holes marked "C."
74. Using two persons, support drive gear (U) on blocks (4 inches high) on arbor press.
75. Position bearing remover on drive gear (U) with pins on drive gear bearing (AS).
76. Using arbor press, apply pressure to center of bearing remover tool and push bearing (AS) from drive gear (U).
77. Remove bearing remover tool from drive gear (U).

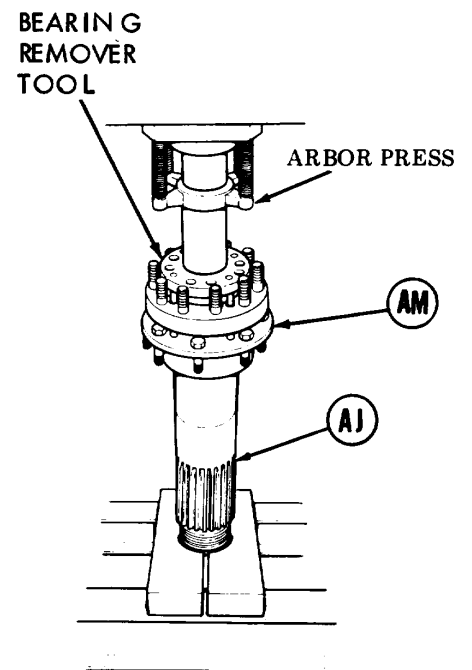
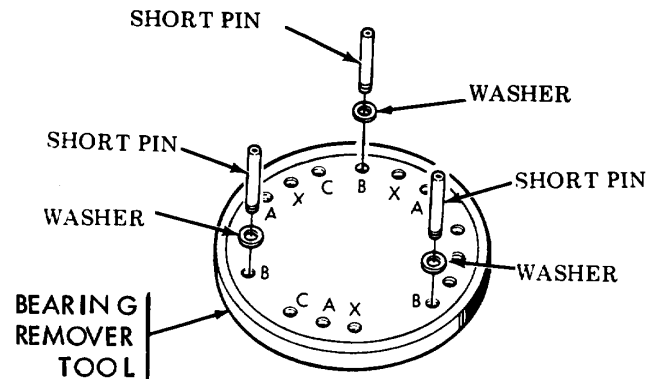


Go on to Sheet 16



**FINAL DRIVE REPAIR (Sheet 16 of 30)**

78. Install three short pins (3-1/2 inches long) and washers into holes marked "B" in bearing remover tool.
79. Check that three pins match holes in output shaft (AJ).
80. Position bearing remover tool above output shaft (AJ) assembly with pins through matching holes in flange (AM) of output shaft (AJ) assembly.
81. Using two people, support output shaft (AJ) and position bearing remover tool and output shaft (AJ) under arbor press.
82. Using arbor press, apply pressure to center of bearing remover tool until remover touches face of output shaft(AJ).
83. Release arbor press pressure and remove bearing remover tool from output shaft (AJ).
84. Remove short pins from bearing remover tool and replace with 5 inch pins.



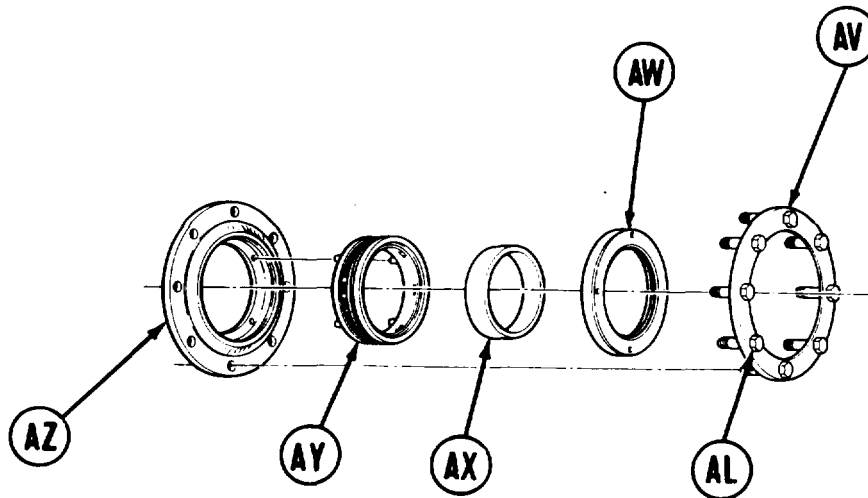
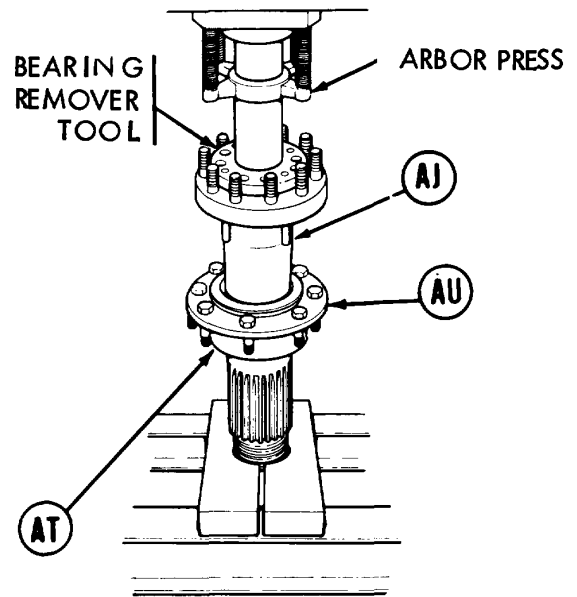
Go on to Sheet 17

FINAL DRIVE REPAIR (Sheet 17 of 30)

**WARNING**

Keep hands clear of bearing (AT) during pressing operation. Bearing will fall free of shaft and injury could result.

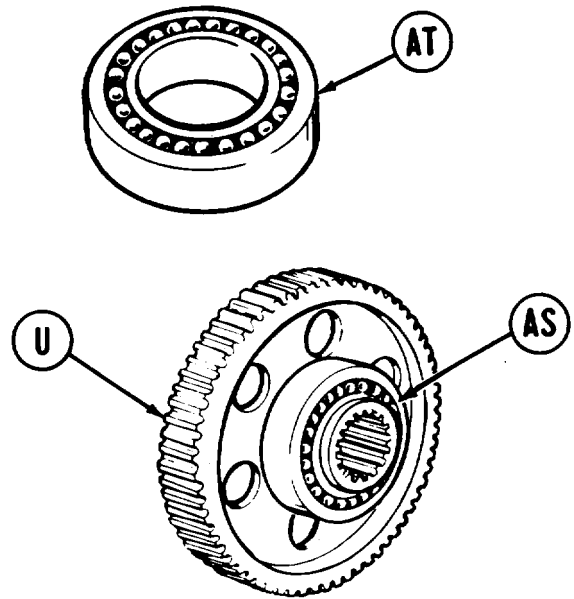
85. Repeat steps 82 and 83 until bearing (AT) is forced from shoulder of output shaft (AJ).
86. Release arbor press pressure and remove bearing remover tool and output shaft (AJ) from press.
87. Remove bearing remover tool from output shaft (AJ).
88. Remove bearing (AT) and cap assembly (AU) from output shaft (AJ). Dispose of old style output shaft in accordance with AR755-1.
89. Remove ring (AV) with eight bolts (AL). Remove bolts (AL) from ring (AV). Retain ring (AV).
90. Remove seal (AW), spacer (AX), and seal (AY) from cap (AZ). Retain cap (AZ). Throw away seal (AW), seal (AY), and spacer (AX).



Go on to Sheet 18

**FINAL DRIVE REPAIR (Sheet 18 of 30)**

91. Inspect output shaft bearing (AT) and drive gear bearing (AS) for serviceability in accordance with TM 9-214. Replace bearings as necessary. If bearing (AS) must be replaced, refer to steps 73 thru 77 for removal of bearing from drive gear (U).



**ASSEMBLY:**

**NOTE**

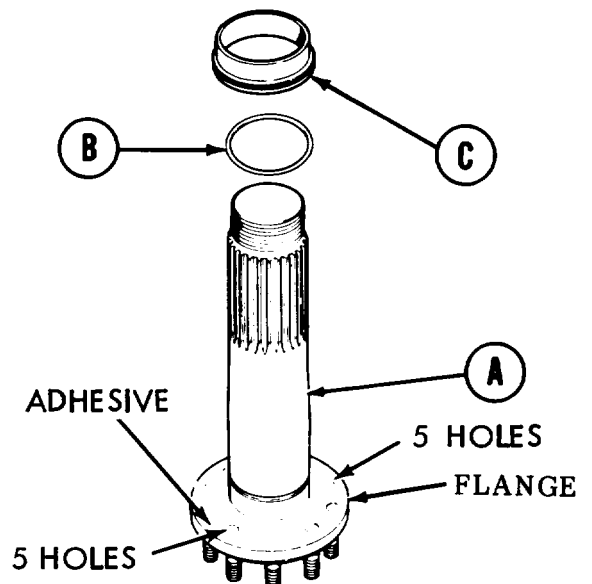
When installing preformed packings or o-rings, ensure there are no burrs, nicks, or sharp edges which could cut or damage these parts during installation. Use oil (Item 16, Appendix B) to lubricate both packings (o-rings) and parts for ease of installation.

1. Apply adhesive to output shaft (A) in area indicated, and to five output shaft holes, 1/8 inch below flange surface.

**NOTE**

Preformed packing (B) is part of late model spacers (C). If preformed packing (B) is installed on spacer (C), go to step 3.

2. Apply oil to preformed packing (B) and install on spacer (C).
3. Install spacer (C) onto shaft (A), with wide portion toward shaft flange, and seat spacer (C) against flange.

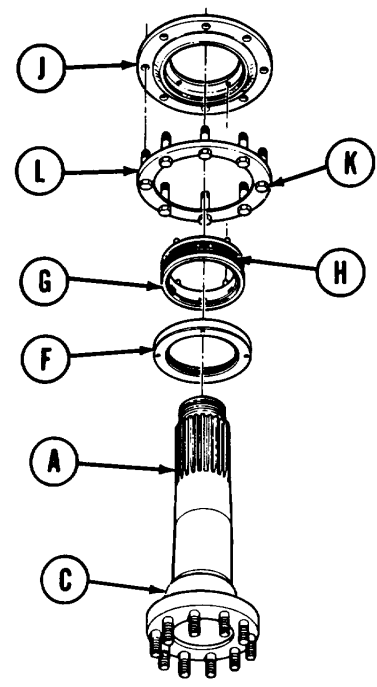
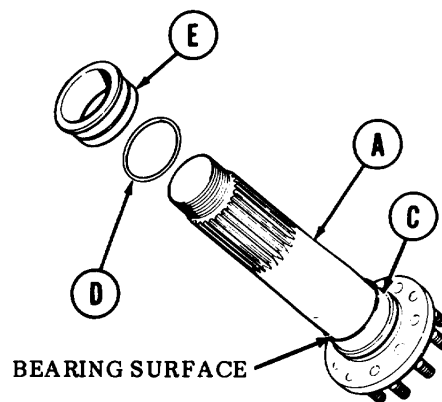


Go on to Sheet 19

**FINAL DRIVE REPAIR (Sheet 19 of 30)**

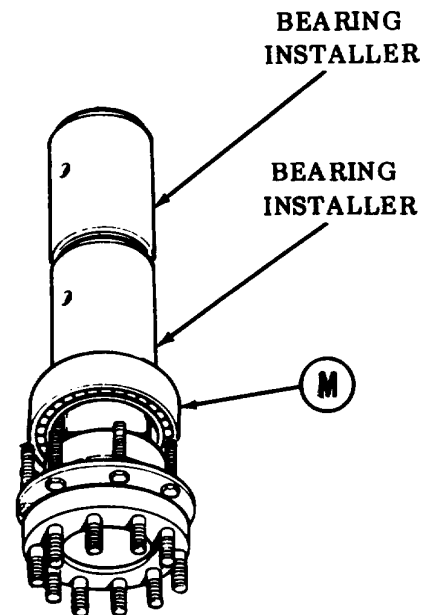
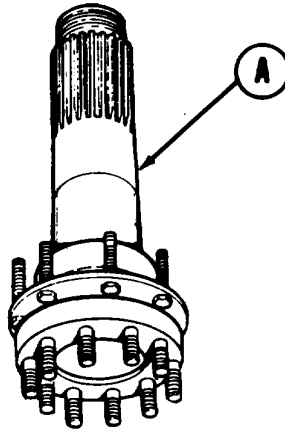
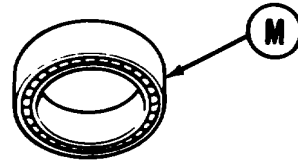
4. Apply oil to preformed packing (D) and install onto special tool oil seal replacer (E).
5. Install oil seal replacer (E) over splined end of shaft (A) with preformed packing end down. Push replacer down to bearing surface of shaft.
6. Roll preformed packing (D) off replacer (E) and onto shaft (A).
7. With replacer (E) in same position, carefully press preformed packing (D) into recessed area between spacer (C) and shaft (A). Seat preformed packing (D) flush or below top edge of spacer (C).
8. Remove replacer (E) from shaft (A).
9. Using clean, lint-free rag, wipe both inner and outer parts of seals (F) and (G) to remove any foreign material. Apply oil to surfaces of seals (F) and (G).
10. Apply oil to o-ring (H). Install o-ring (H) on spring seal (G).
11. Install spring seal (G) in cap (J) with four pins thru four holes in cap (J).
12. Place seal (F) over output shaft (A). Aline seal (F) hole with output shaft (A) pin and press down to engage spacer (C).
13. Install eight bolts (K) in ring (L).
14. Using two persons, lift ring (L) and position on output shaft (A).
15. With cap (J) seal side facing spacer (C), place cap (J) over spacer (C) with eight bolts (K) thru eight holes of cap (J).
16. Grasp cap (J) and press down firmly. Cap (J) will spring back when properly installed.

Go on to Sheet 20



**FINAL DRIVE REPAIR (Sheet 20 of 30)**

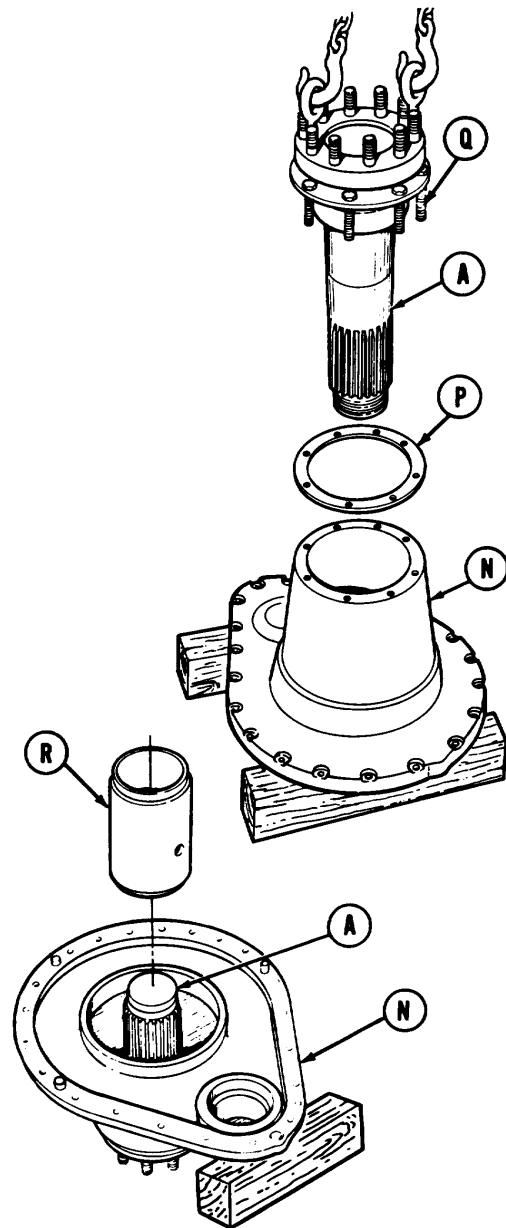
17. Apply light coat of grease to machined surface of output shaft (A).
18. Position bearing (M) on output shaft (A).
19. Using two persons, or lifting device, position output shaft (A) in arbor press.
  
20. Place one output shaft bearing installer over output shaft (A) with small opening facing bearing (M). Bearing installer must engage bearing (M) inner race.
  
21. Place second output shaft bearing installer over output shaft (A) with large opening facing first bearing installer.
  
22. Place metal block on bearing installer.
23. Aline output shaft (A) under arbor press ram.
24. Apply arbor press pressure to seat bearing (M) on output shaft (A).
25. Release pressure. Remove metal block and two bearing installers.



Go on to Sheet 21

**FINAL DRIVE REPAIR (Sheet 21 of 30)**

26. Position carrier (N) on wood blocks.
27. Place new gasket (P) on carrier (N). Aline holes.
28. Using suitable lifting device, install assembled shaft (A) into carrier (N). It may be necessary to tap sides of carrier (N) to seat shaft. Make sure gasket (P) is on screws (Q) and screws line up with holes in carrier (N).
29. Using 3/4 inch wrench, tighten eight screws (Q). Using torque wrench with crowfoot, tighten screws to 90-130 lb-ft (122-176 N.m).
30. Install lockwire in pairs on screws (Q).
  
31. Using suitable lifting device, turn carrier (N) over and support with wood blocks for further assembly.
32. Install spacer (R) onto output shaft (A) assembly, wide end towards output shaft flange.



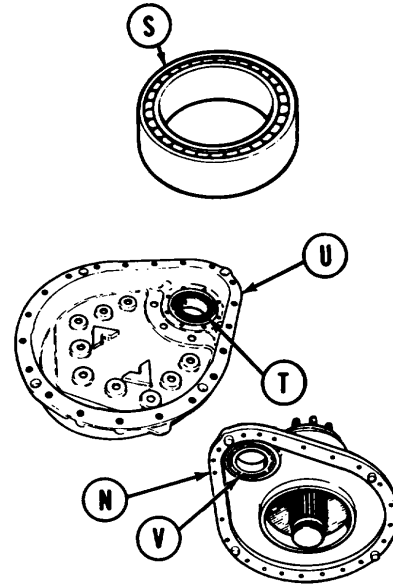
Go on to Sheet 22

FINAL DRIVE REPAIR (Sheet 22 of 30)

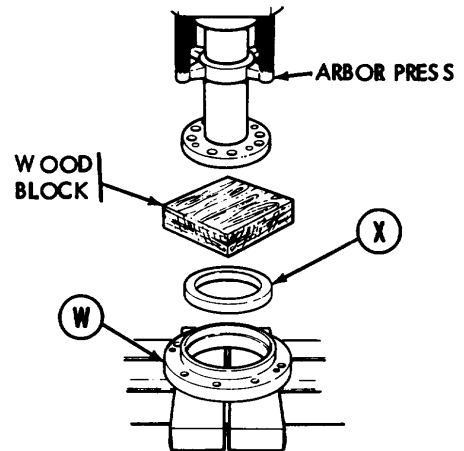
**NOTE**

Tag both parts of each bearing so that same parts can be paired up later. Keep both parts of a bearing together, except when heating or cooling.

- 33. Place two bearings (S) (outer races with rollers) on dry ice or in refrigerator freezer for 30 to 45 minutes.
- 34. Ensure bearing bore (T) of case (U) and bearing pocket (V) of carrier (N) are clean, dry, and free of foreign material.



- 35. Position cap (W) in arbor press. Position seal (X) on cap (W) with rubber seal facing down. Using wood block and arbor press, press seal (X) into cap (W) until seal (X) is flush with cap (W).



Go on to Sheet 23

**FINAL DRIVE REPAIR (Sheet 23 of 30)**

- 36. Position new gasket (Y) and assembled cap (W) and seal (X) onto case (U).
- 37. Apply primer to all threaded holes in case (U).
- 38. Apply sealing compound (Item 7, Appendix B) to threads of eight screws (Z). Using 3/4 inch socket, install eight screws (Z) to secure cap (W).

**WARNING**

**Wear gloves when handling frozen parts to prevent serious injury to your hands.**

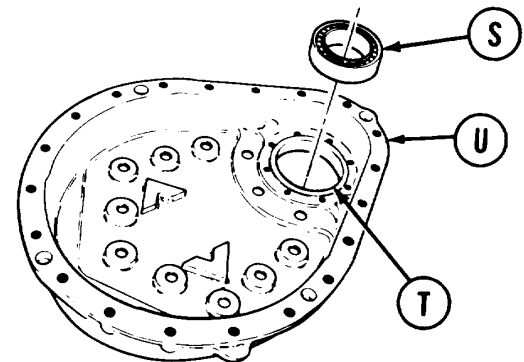
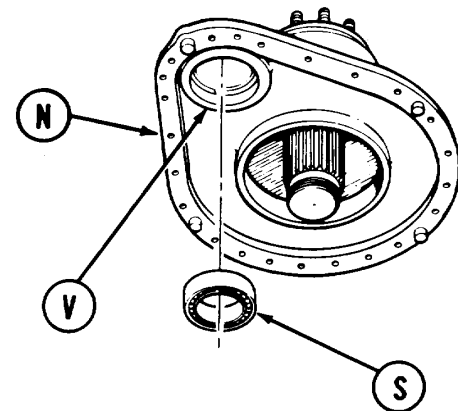
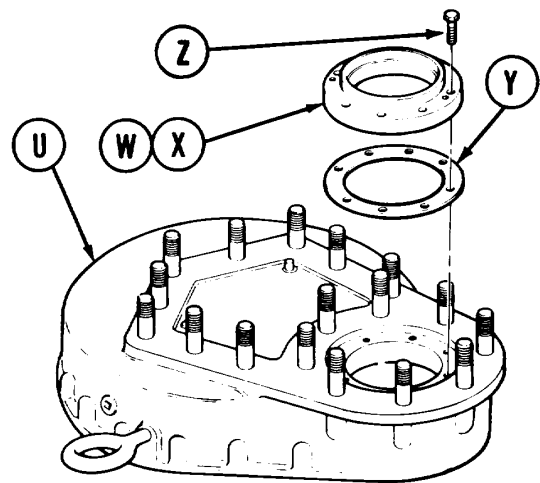
- 39. Remove one bearing (S) from refrigerant and quickly install in carrier (N) bearing pocket (V). Ensure bearing (S) is seated in bearing pocket (V).
- 40. Remove second bearing (S) from refrigerant and quickly install in case (U) bearing bore (T). Ensure bearing (S) is seated in bearing bore (T).
- 41. Using inspection mirror, ensure bearings (S) are fully seated in bearing pocket (V) and bearing bore (T). If bearings (S) are seated, go to step 43. If bearings (S) are not seated, go to step 42.
- 42. If bearing (S) is not seated in carrier (N), using bearing mechanical puller kit, remove bearing (S) from carrier (N). Repeat steps 33, 39, and 41. If bearing (S) is not seated in case (U), using universal mechanical puller, remove bearing (S) from case (U). Repeat steps 33, 40, and 41.

**CAUTION**

**If staking of bearing (S) is required, do not hit bearing with punch or hammer. Damage to the bearing could result.**

- 43. Check bearing (S) for looseness. If loose, using hammer and center punch, stake bearing (S) pocket in three places to hold bearing (S) in place during assembly.

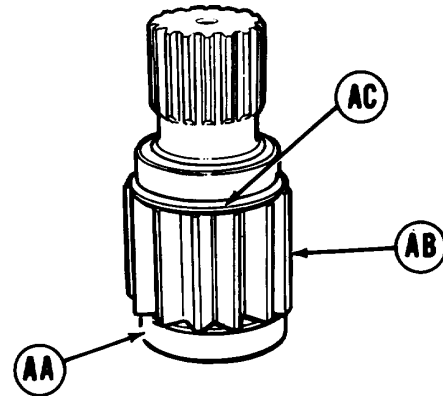
Go on to Sheet 24





**FINAL DRIVE REPAIR (Sheet 24 of 30)**

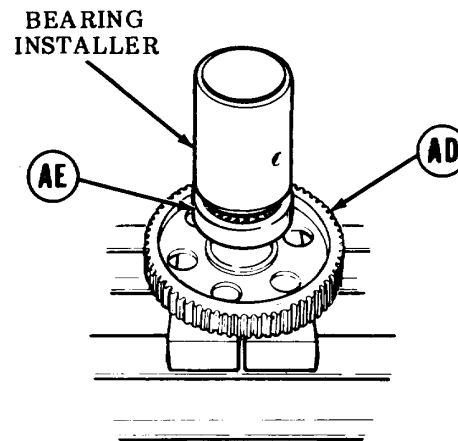
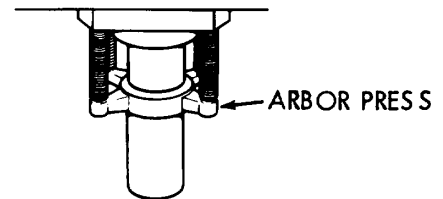
- 44. Install inner race (AA) on pinion gear (AB) with flange toward gear segments.
- 45. Place race (AA) and pinion gear (AB) in press with splined end up.
- 46. Apply pressure to splined end of pinion (AB) until race (AA) is seated on pinion gear. Release arbor press pressure.
- 47. Install second race (AC) on pinion gear (AB). Place 10 inch section of 3-1/8 inch I.D. pipe over splined end of pinion (AB) so pipe engages race (AC).
- 48. Using arbor press, apply pressure to pipe until race (AC) is fully seated on pinion bearing shoulder.



**NOTE**

**If output bearing or gear set was replaced, go to step 49. If bearing or gear set was not replaced, the bearing is still on the drive gear; go to step 54.**

- 49. Lightly grease drive gear (AD) mating surface.
- 50. Position drive gear (AD) in arbor press on supporting material.
- 51. Position bearing (AE) on drive gear (ADs)
- 52. Position bearing installer over drive gear (AD) shaft on bearing (AE) inner race.



Go on to Sheet 25

FINAL DRIVE REPAIR (Sheet 25 of 30)

**CAUTION**

Place supports under center of drive gear (AD) to prevent damage during pressing operation.

53. Position metal block on bearing installer. Using arbor press, apply pressure to plate until bearing (AE) is fully seated on drive gear (AD).

54. Position drive gear (AD) in carrier (N).

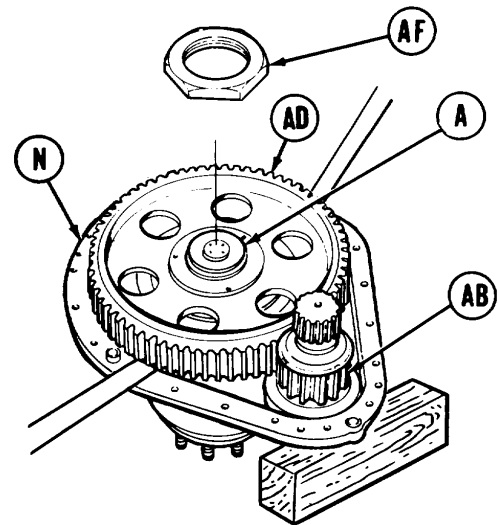
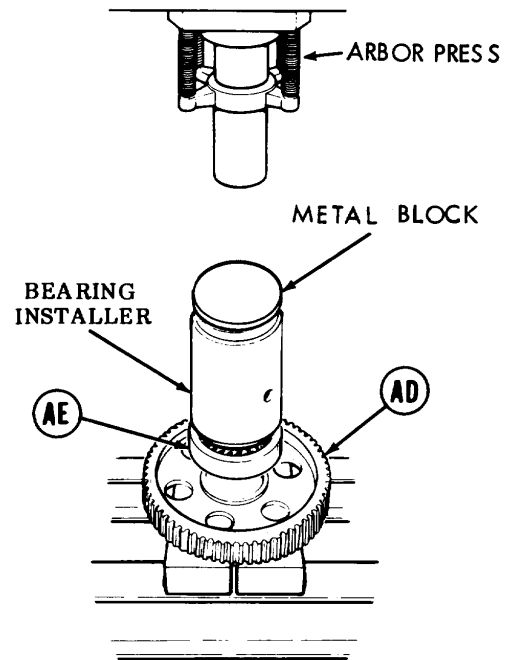
55. Using two pry bars positioned directly across from each other, carefully pry drive gear (AD) up and mesh drive gear (AD) with pinion gear (AB).

56. Carefully lower drive gear (AD) and pinion gear (AB) into carrier (N) until seated.

57. Apply oil to threads of output shaft (A) and nut (AF).

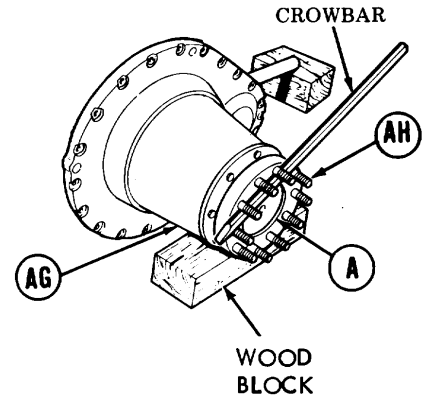
58. Install self-locking nut (AF) onto output shaft (A). Using special box wrench, tighten nut (AF).

Go on to Sheet 26



FINAL DRIVE REPAIR (Sheet 26 of 30)

- 59. Using suitable lifting device, position final drive (AG) on wood block.
- 60. Using tape, cover threads on stud (AH) to prevent thread damage during assembly.
- 61. Position crowbar between studs (AH) to prevent output shaft (A) from turning and to stabilize final drive (AG).

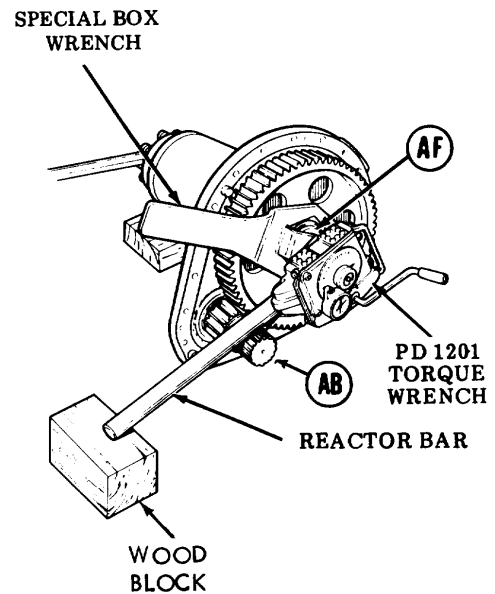


- 62. Position special box wrench on nut (AF). Attach PD 1201 torque wrench to box wrench.

**CAUTION**

**Do not rest reactor bar against pinion gear (AB). Damage to gear will result.**

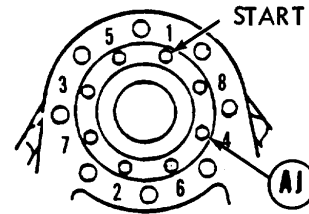
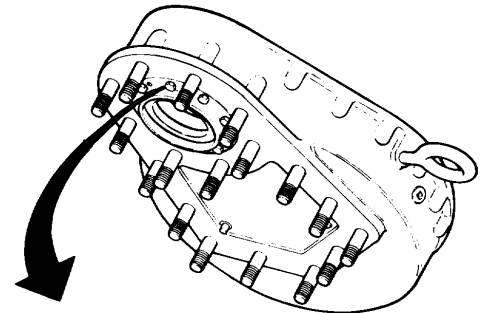
- 63. With reactor bar supported against wood block, apply 1100-1500 lb-ft (1492-2034 N.m) torque to nut (AF).
- 64. Wait one minute. Apply torque again.
- 65. Continue to apply torque until reading stabilizes between 1100-1500 lb-ft (1492-2034.N m).



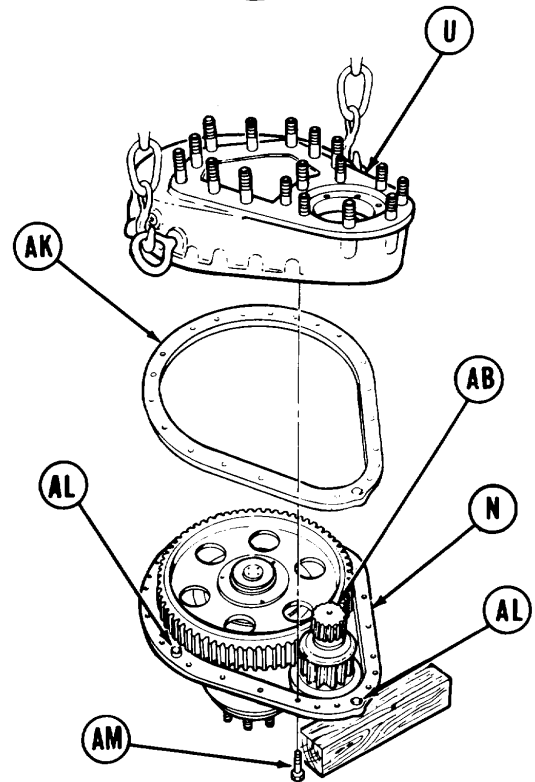
Go on to Sheet 27

**FINAL DRIVE REPAIR (Sheet 27 of 30)**

- 66. Using torque wrench, tighten eight screws (AJ) to 50-60 lb-ft (68-81 N.m) in sequence shown.
- 67. Using torque wrench, retighten screws (AJ) to 95-115 lb-ft (129-156 N.m).
- 68. Install lockwire in pairs.



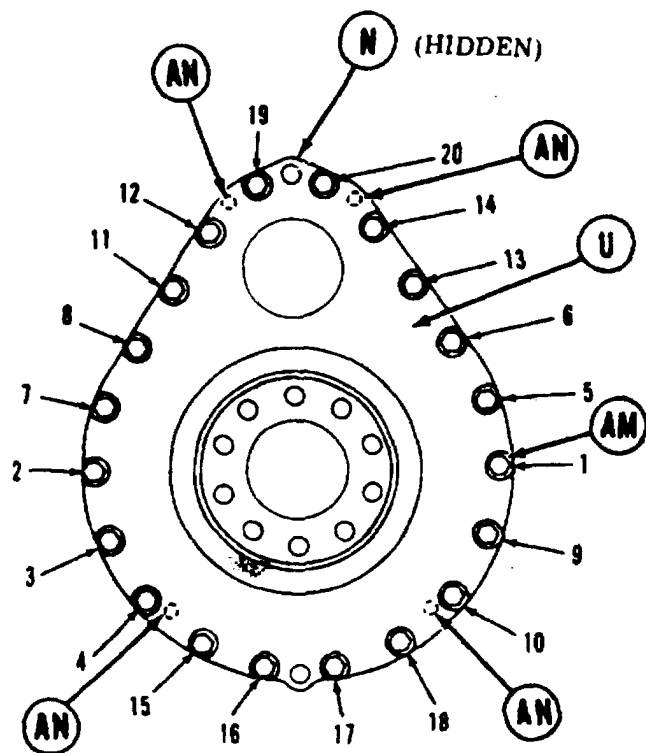
- 69. Position carrier (N) on wood blocks.
- 70. Place new gasket (AK) onto carrier (N).
- 71. Using suitable lifting device, position case (U) over carrier (N).
- 72. Carefully guide pinion gear (AB) thru bearing and seal in case (U) and align case with dowel pins (AL) in carrier (N). Apply pressure evenly to mate case (U) with carrier (N).
- 73. Install three bolts (AM) through carrier (N) into case (U) to keep units together.



Go on to Sheet 28

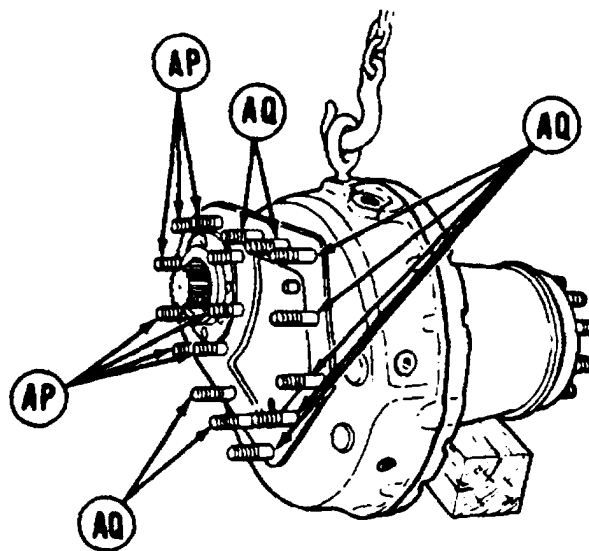
**FINAL DRIVE REPAIR (Sheet 28 of 30)**

74. Using suitable lifting device, position assembled carrier (N) on its side and support with wood blocks.
75. Install remaining 17 bolts (AM) to secure case (U) to carrier (N). Use 7/8 or 1 inch socket as required to tighten bolts.
76. Using torque wrench, tighten 20 bolts (AM) to 110-130 lb-ft (149-176 N.m) in sequence indicated.
77. Using torque wrench, retighten 20 bolts (AM) to 190-230 lb-ft (257-312 N.m) in same sequence.
78. Apply sealing compound (Item 9, Appendix B) to threads of setscrews (AN) and, using 5/16 inch allen wrench, install and tighten four setscrews (AN) into case (U).



79. If studs (AP or AQ) were removed from case (U) during disassembly or repair, apply sealing compound (Item 9, Appendix B) to stud threads and sealing compound (item 8, Appendix B) to threads in case (U). Install studs into case (U) so that remaining length above case surface is as listed below:

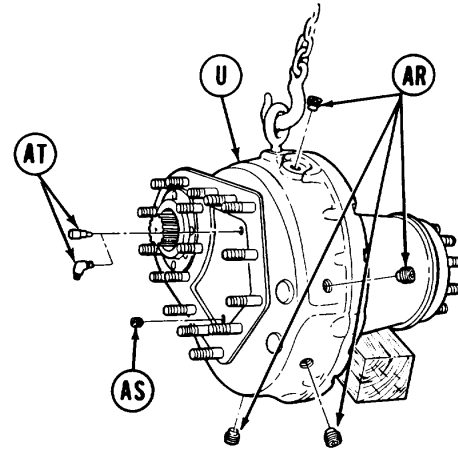
- Studs AP -  $225 \pm 0.06$  in. ( $57.150 \pm 1.52$  mm)
- Studs AQ -  $2.88 + 0.06$  in. ( $73.152 \pm 1.52$  mm)
- $-0.00$  in.                       $- 0.00$  mm)



Go on to Sheet 29

**FINAL DRIVE REPAIR (Sheet 29 of 30)**

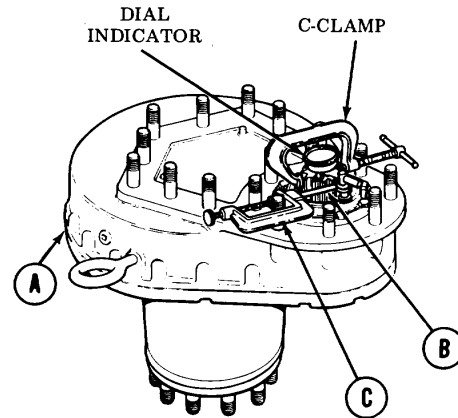
- 80. Apply sealing compound (Item 9, Appendix B) to threads of plugs (AR).
- 81. Using 1/2 inch drive hinged bar or 5/8 inch allen wrench as necessary, install four plugs (AR) in case (U).
- 82. Using 3/16 inch allen wrench, install plug (AS) in case (U).
- 83. Using 7/16 inch wrench, install air pressure valve or vent line elbow (AT) in case (U).
- 84. Fill final drive with lubricant (LO 9-2350-222-12).
- 85. Inspect for oil leaks. Correct as necessary.
- 86. Perform axial play and backlash tests.



**AXIAL PLAY AND BACKLASH TESTS**

**WARNING**

**Properly support final drive (A) to prevent movement and possible injury to personnel.**



- 1. Secure C-clamp to pinion shaft (B) with care to prevent damage to pinion shaft spline.
- 2. Secure dial indicator to final drive stud (C) with dial resting on pinion shaft (B). Set dial to zero.
- 3. Using C-clamp as a handle, pull pinion shaft (B) up and push down and record dial indicator reading. Repeat procedure four times.
- 4. If all measurements are between 0.011 to 0.077 inches (0.279 to 1.956 mm), remove dial indicator and go to step 5. If all measurements are not within tolerance, tag final drive (A) "UNSERVICEABLE (NO AXIAL END PLAY)" and return final drive (A) to supply for depot rebuild.

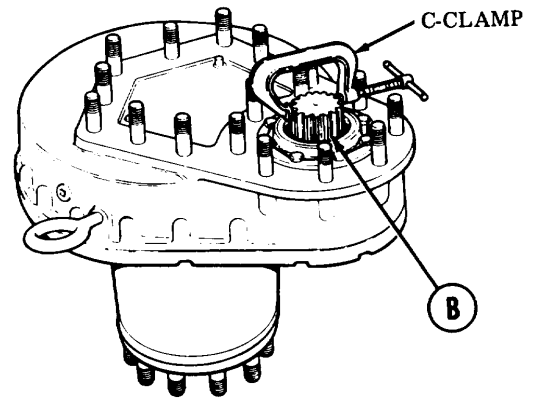
Go on to Sheet 30

**FINAL DRIVE REPAIR (Sheet 30 of 30)**

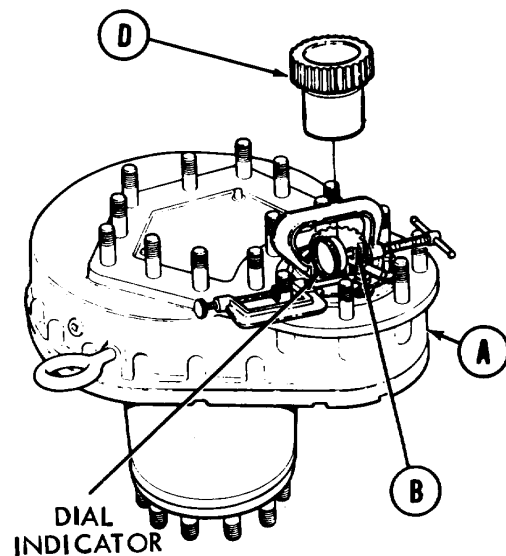
5. Using C-clamp, rotate pinion gear shaft (B) counterclockwise until slight pressure (drag) is felt.

**NOTE**

**Ensure pinion splines are clean and free of chips, burrs, oil, and dirt before installing dial indicator.**



6. Install dial indicator. Set dial indicator to zero.
7. Rotate pinion shaft (B) clockwise until slight pressure (drag) is felt.
8. Record dial indicator reading.
9. Remove dial indicator. Rotate pinion shaft (B) one complete revolution.
10. Repeat steps 5 thru 9 three times.
11. If all four readings are between 0.006 and 0.032 inches (0.15424 and 0.8128 mm), remove Clamp and install adapter (D). Package final drive (A) for shipment and return to supply. If readings are not within tolerance, go to step 12.



12. Replace pinion gear and drive gear (matched set.) (Disassemble steps 1 thru 29.) (Assembly steps 54 thru 86.) If replacement gears are not within tolerance, tag final drive (A) "UNSERVICEABLE (BACKLASH)" and return to supply for depot rebuild.

End of Task

CHAPTER 8

BRAKE SYSTEM MAINTENANCE INDEX

Procedure	Page
Brake Master Cylinder Repair .....	8-2
Master Cylinder-To-Bulkhead lube Assembly Replacement .....	8-7
Bulkhead-To-Brake Line Quick-Disconnect Hose Tube Assembly Replacement .....	8-11
Brake Slave Cylinder Repair .....	8-15
Parking Brake Tube Assembly Replacement .....	8-21



**BRAKE MASTER CYLINDER REPAIR (Sheet 1 of 5)**

**PROCEDURE INDEX**

PROCEDURE	PAGE
Disassembly	8-2
Cleaning and Inspection	8-4
Assembly	8-5

- TOOLS:**
- Micrometer
  - 1-1/8 in. open end wrench
  - 3/8 in. combination box and open end wrench
  - 3/4 in. combination box and open end wrench
  - Vise
  - Flat-tip screwdriver (2 required)
  - Cross-tip screwdriver

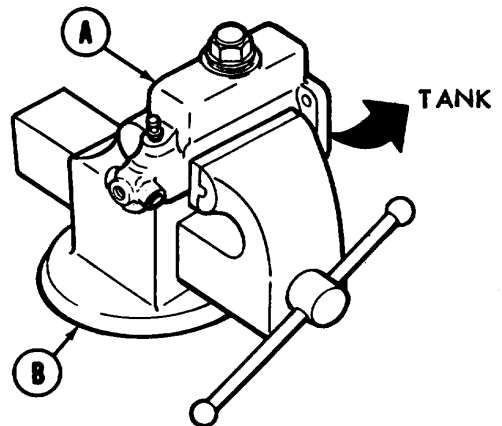
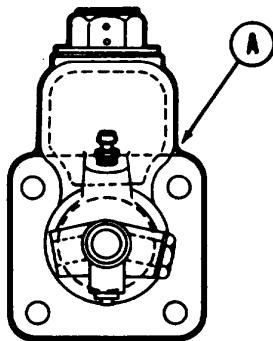
- SUPPLIES:**
- Parts kit (5703508)
  - Dry cleaning solvent (Item 12, Appendix B)
  - Hydraulic brake fluid (Item 15, Appendix B)
  - Gloves (Item 13.1, Appendix B)
  - Goggles (Item 13.2, Appendix B)

**DISASSEMBLY:**

**NOTE**

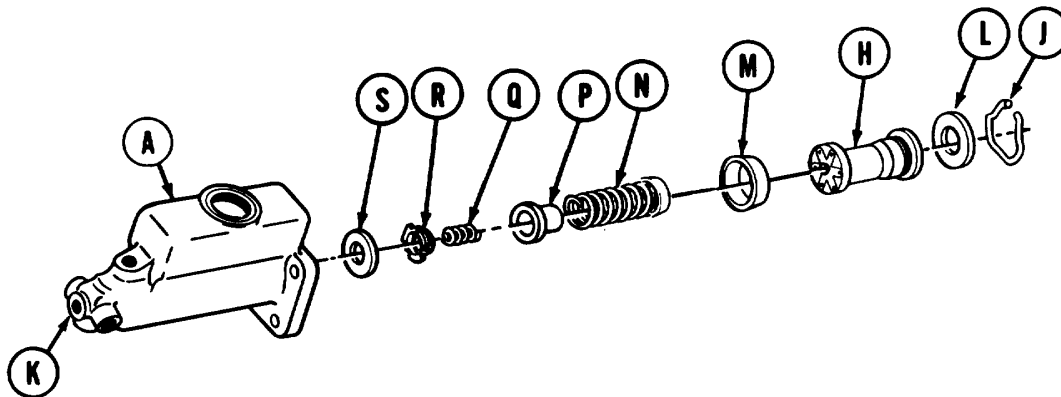
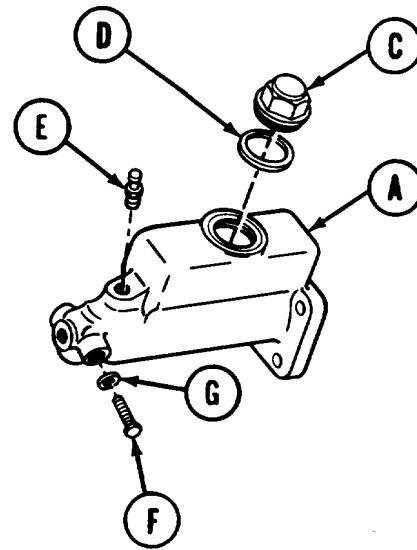
Tracked vehicle master cylinder are identified with "TANK" stamped on the mounting flange.

1. Place master cylinder (A) in vise (B).



**BRAKE MASTER CYLINDER REPAIR (Sheet 2 of 5)**

2. Using 1-1/8 inch wrench, remove filler cap (C) and gasket (D) from cylinder (A).
3. Using 3/8 inch wrench, remove bleeder valve (E).
4. Using 3/4 inch wrench, remove plug (F) and gasket (G).
5. Insert cross-tip screwdriver in cylinder (A) and press in on piston (H) while removing retaining ring (J) with flat-tip screwdriver.
6. Insert flat-tip screwdriver through hole (K) and push out washer (L), piston (H), rubber cup (M), spring (N), and retainer (P).
7. Remove retainer (P) from spring (N).
8. Separate spring (Q) from retainer (P) by pressing on valve (R) and turning.
9. Insert screwdriver through hole (K) and remove seat (S) from cylinder (A).



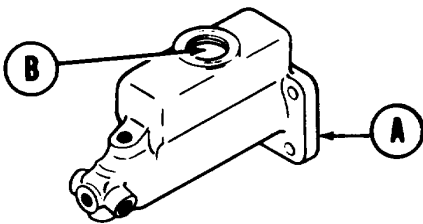
Go on to Sheet 3

TA130733

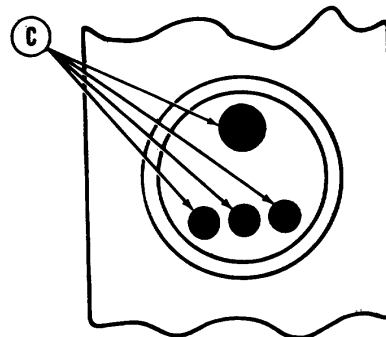
**BRAKE MASTER CYLINDER REPAIR (Sheet 3 of 5)****CLEANING AND INSPECTION:****WARNING**

Dry cleaning solvent P-D-680 is toxic and flammable. To prevent personal injury, wear protective goggles and gloves and use only in a well-ventilated area. Avoid contact with in eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flash point for Type 1 Dry Cleaning Solvent is 100 F (38 C) and for Type 12 is 138PF (50"C). If you become dizzy while using leaning solvent, get fresh air immediately and get medical aid. It contact with eyes is made, wash your eyes with water and get medical aid immediately.

1. Clean all metallic parts in dry cleaning solvent.
2. Visually inspect cylinder bore (A) for scratches, pits, or glazing. Replace cylinder if unserviceable.
3. Visually inspect inside cylinder by looking in hole (B) and check hole pattern (C) on bottom of master cylinder.

**NOTE**

Four holes (C) as shown is acceptable



Go on to Sheet 4

Change 3 8-4

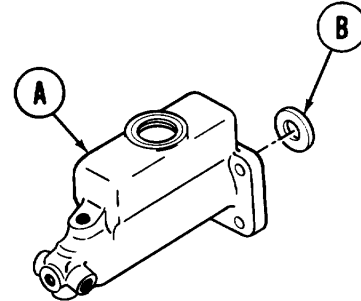
**BRAKE MASTER CYLINDER REPAIR (Sheet 4 of 5)**

**NOTE**

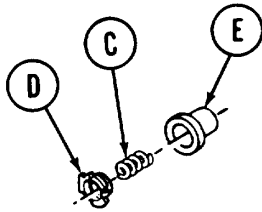
**Coat cylinder hose, valve seat, and valve cup with hydraulic fluid (Item 15, Appendix B).**

**ASSEMBLY:**

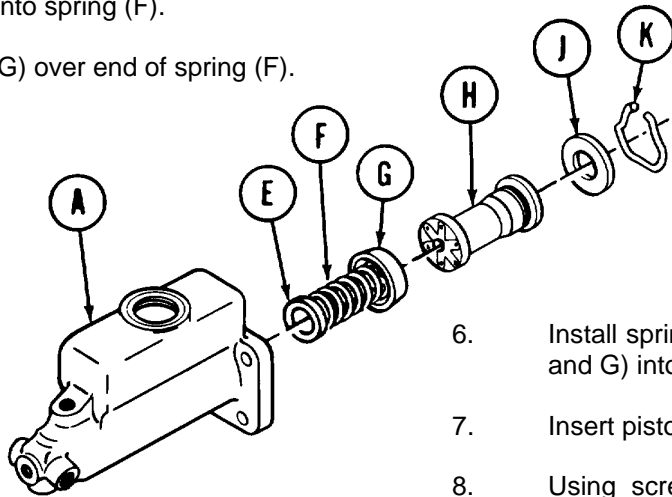
1. Place cylinder (A) in vise with bore facing up.
2. Install seat (B) with flat portion facing down into cylinder (A).



3. Install spring (C) and valve (D) into retainer (E). Press down and turn to seat valve (D) into retainer (E).



4. Place retainer (E) into spring (F).
5. Place rubber cup (G) over end of spring (F).



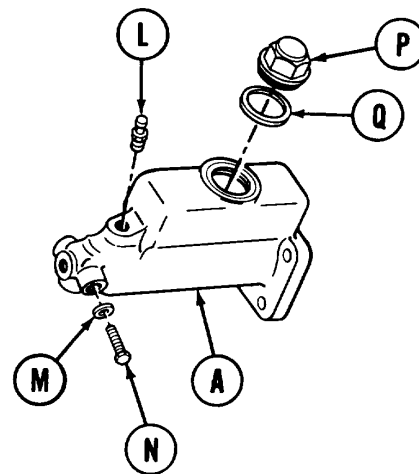
6. Install spring (F) with assembled components (E and G) into cylinder (A).
7. Insert piston (H) and washer (J) into cylinder (A).
8. Using screwdriver, press down on piston (H), install retaining ring (K).

Go on to Sheet 5

TA130735

**BRAKE MASTER CYLINDER REPAIR (Sheet 5 of 5)**

9. Place cylinder (A) in horizontal position in vise.
10. Using 3/8 inch wrench, install bleeder valve (L).
11. Using 3/4 inch wrench, install gasket (M) and plug (N).
12. Using 1-1/8 inch wrench, install filler cap (P) and gasket (Q).
13. Remove master cylinder (A) from vise.



End of Task

TA130736

**MASTER CYLINDER-TO-BULKHEAD TUBE ASSEMBLY REPLACEMENT (Sheet 1 of 4)**

**PROCEDURE INDEX**

PROCEDURE	PAGE
Removal	8-8
Installation	8-9

**TOOLS:** Ratchet with 1/2 in. drive  
 5 in. extension with 1/2 in. drive  
 7/16 in. socket with 1/2 in. drive  
 11/16 in. combination box and open end wrench

**SUPPLIES:** Drip pan  
 Rags (Item 31, Appendix B)  
 Flashlight

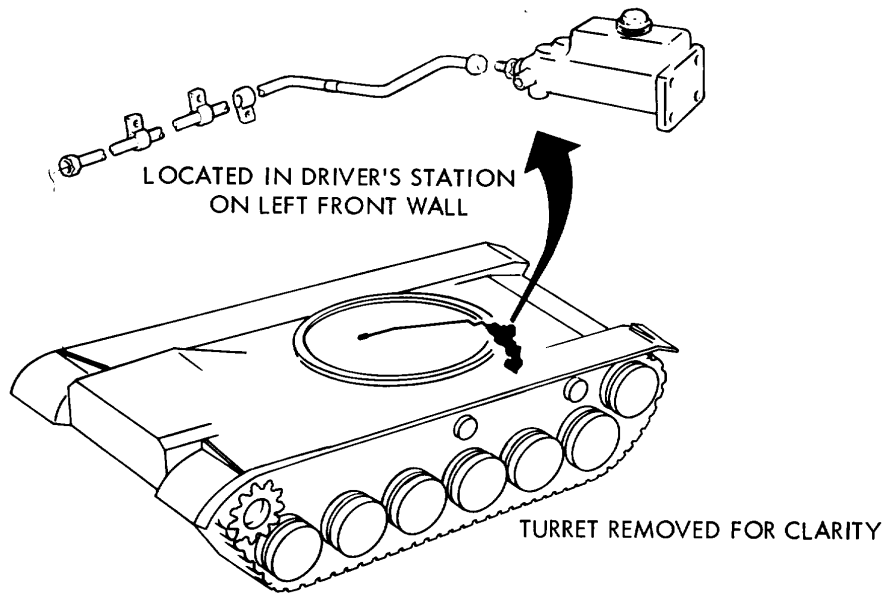
**REFERENCES:** TM 9-2350-222-10  
 TM 9-2350-222-20-1

**PRELIMINARY PROCEDURES:** Place transmission in neutral and block vehicle tracks (TM 9-2350-222-10)  
 Traverse turret to gain access to tubing (TM 9-2350-222-10)  
 Displace personnel heater hose (TM 9-2350-222-20-1)  
 Displace left front ammo rack (TM 9-2350-222-20-1)

Go on to Sheet 2

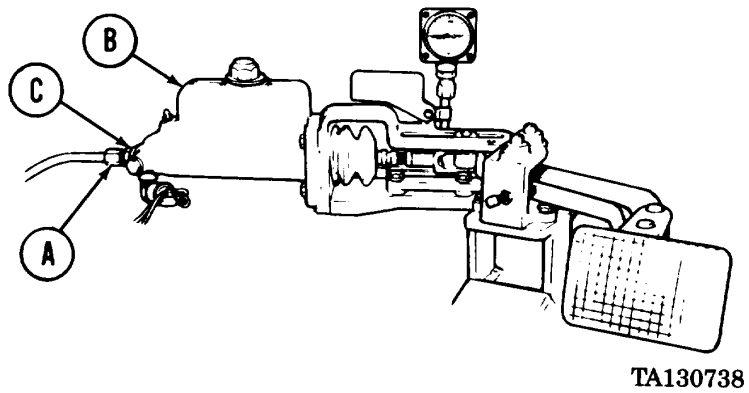
TA130737

**MASTER CYLINDER-TO-BULKHEAD TUBE ASSEMBLY REPLACEMENT (Sheet 2 of 4)**



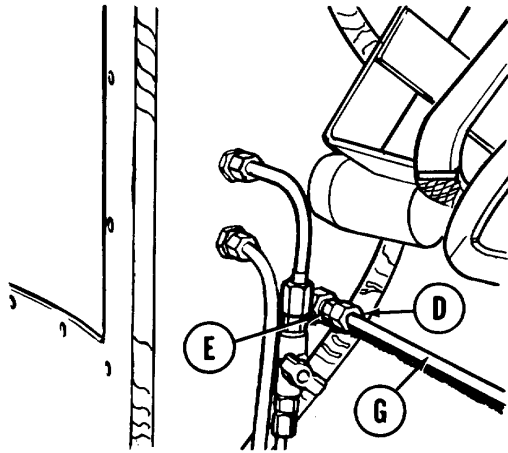
**REMOVAL:**

1. Place drip pan or rags under tube nut (A) at master cylinder (B).
2. Using wrench, remove tube nut (A) from master cylinder reducer (C).

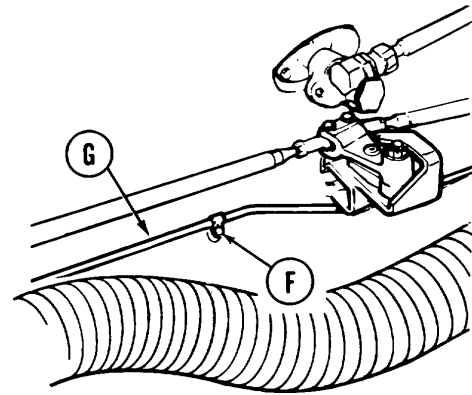


Go on to Sheet 3

MASTER CYLINDER-TO-BULKHEAD TUBE ASSEMBLY REPLACEMENT (Sheet 3 of 4)



- Using wrench, remove tube nut (D) from bulkhead union (E). (Located in turret compartment.)



- Using socket, remove three screws, washers, and loop clamps (F), holding tubing to hull wall.
- Remove tubing (G) from vehicle.
- Check loop clamps (F) for serviceability. Replace as required.

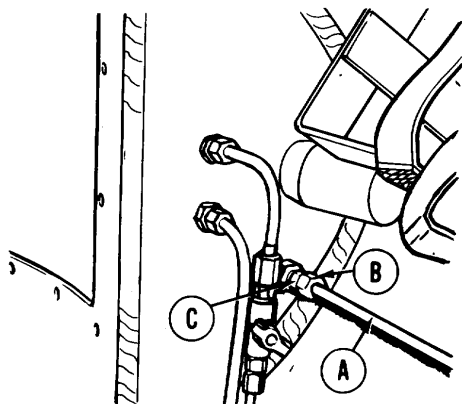
INSTALLATION:

- Position tubing (A) in vehicle.

**NOTE**

**Start tube nuts by hand first.**

- Using wrench, install tube nut (B) to bulkhead union (C).



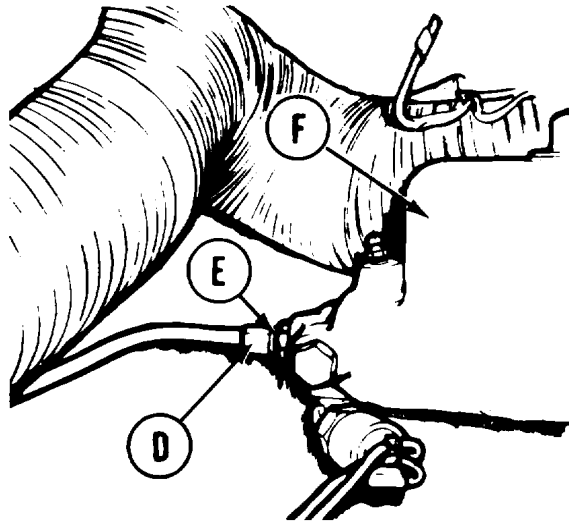
Go on to Sheet 4

TA130739

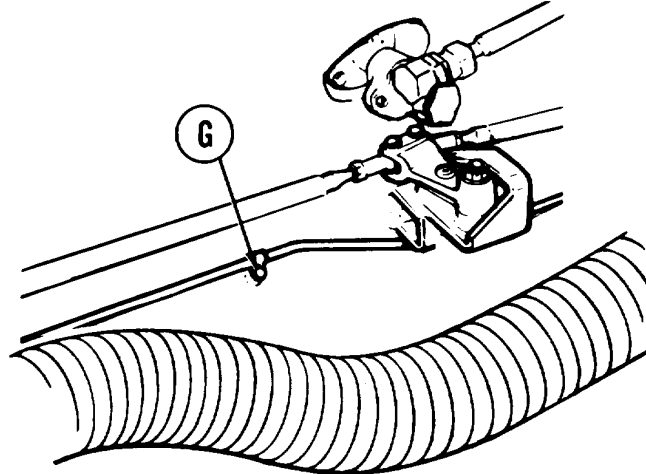


**MASTER CYLINDER-TO-BULKHEAD TUBE ASSEMBLY REPLACEMENT (Sheet 4 of 4)**

3. Using wrench, install tube nut (D) to master cylinder reducer (E).
4. Remove drip pan or rags from under tube nut (D) at master cylinder (F).



5. Using socket, install three screws, washers, and loop clamps (G) holding tubing to hull wall.



6. Fill and bleed hydraulic system (TM 9-2350-222-20-1).
7. Install personnel heater hose (TM 9-2350-222-20-1).
8. Install left front ammo rack (TM 9-2350-222-20-1).
9. Unblock vehicle tracks (TM 9-2350-222-10).

End of Task

TA130740

**BULKHEAD-TO-BRAKE LINE QUICK-DISCONNECT HOSE TUBE ASSEMBLY REPLACEMENT (Sheet 1 of 4)**

**PROCEDURE INDEX**

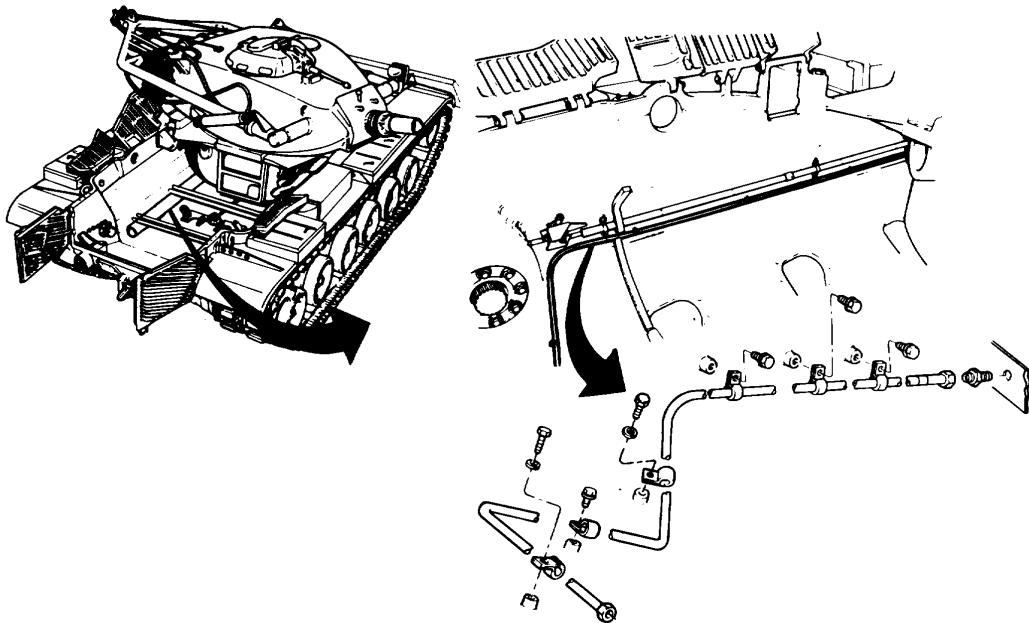
PROCEDURE	PAGE
Removal	8-12
Installation	8-13

**TOOLS:** Ratchet with 1/2 in. drive  
 7/16 in. socket with 1/2 in. drive  
 9/16 in. socket with 1/2 in. drive  
 11/16 in. combination box and open end wrench

**SUPPLIES:** Drip pan  
 Rags (Item 31, Appendix B)  
 Flashlight

**REFERENCES:** TM 9-2350-222-10  
 TM 9-2350-222-20-1

**PRELIMINARY PROCEDURES:** Place transmission in neutral (TM 9-2350-222-10)  
 Remove left fuel tank (page 4-51)  
 Drain hydraulic system (TM 9-2350-222-20-1)

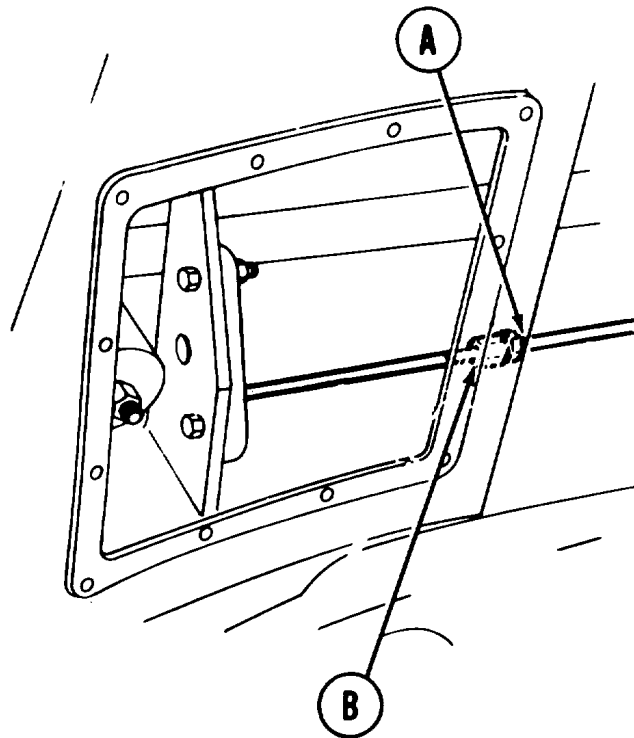


TA130741

Go on to Sheet 2

**BULKHEAD-TO-BRAKE LINE QUICK-DISCONNECT HOSE TUBE ASSEMBLY REPLACEMENT (Sheet 2 of 4)****REMOVAL:**

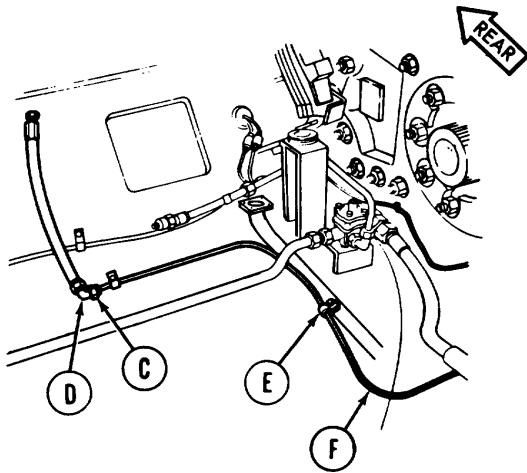
1. Place drip pan or rags under bulkhead union (A).
2. Using 11/16 inch wrench, remove tube nut (B) from bulkhead union (A).



Go on to Sheet 3

TA130742

**BULKHEAD-TO-BRAKE LINE QUICK-DISCONNECT HOSE TUBE ASSEMBLY REPLACEMENT (Sheet 3 of 4).**

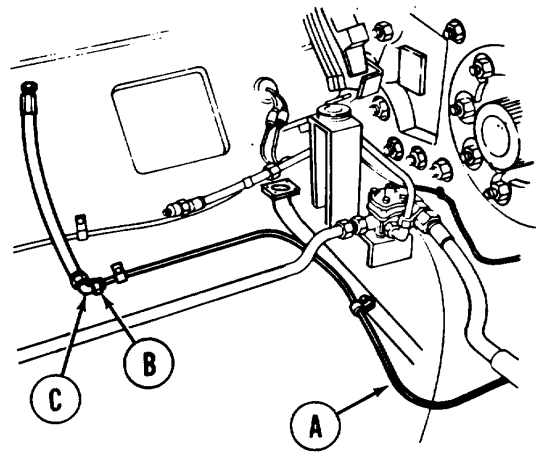


3. Using 11/16 inch wrench, remove tube nut (C) from elbow (D).
4. Using 7/16 inch socket, remove six screws, washers, and loop clamps (E).

5. Remove tubing (F) from vehicle.
6. Check loop clamps for serviceability. Replace as required.

**INSTALLATION:**

1. Position tubing (A) in vehicle.
2. Using 11/16 inch wrench, install tube nut (B) to elbow (C).

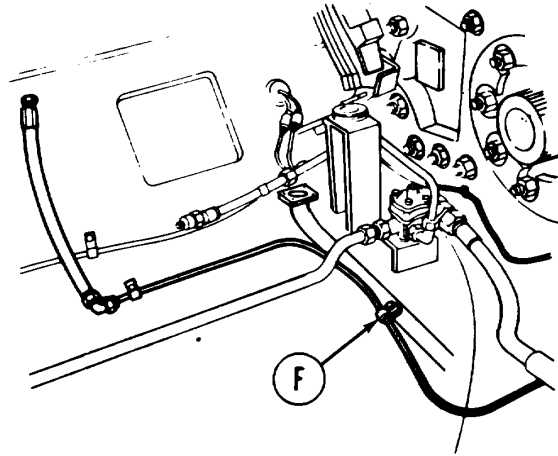


Go on to Sheet 4

TA130743

**BULKHEAD-TO-BRAKE LINE QUICK-DISCONNECT HOSE TUBE ASSEMBLY REPLACEMENT (Sheet 4 of 4)**

3. Using 1/16 inch wrench, install tube nut (D) to bulkhead union (E).



End of Task

TA130744

**BRAKE SLAVE CYLINDER REPAIR (Sheet 1 of 6)**

**PROCEDURE INDEX**

PROCEDURE	PAGE
Disassembly	8-15
Cleaning and Inspection	8-17
Assembly	8-18

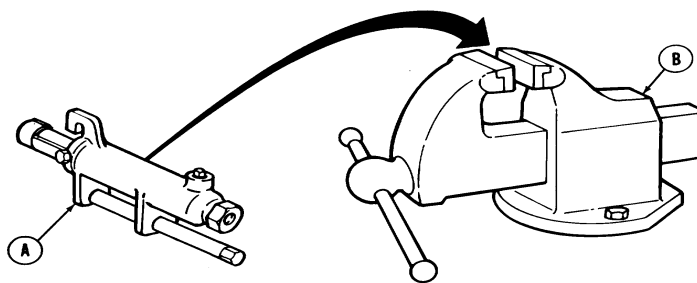
- TOOLS:**
- 3/8 in. combination box and open end wrench
  - 1/2 in. combination box and open end wrench
  - 1 in. open end wrench
  - Drift punch
  - Torque wrench with 3/8 in. drive (0-200 lb-in) (0-23 N m)
  - 9/16 in. socket with 3/8 in. drive
  - Knife
  - Hammer
  - Vise
  - Flat-tip screwdriver
  - 3/8 in. socket with 3/8 in. drive
  - 9/16 in. combination box and open end wrench

- SUPPLIES:**
- Parts kit (5704212)
  - Dry cleaning solvent (Item 12, Appendix B)
  - Silicone brake fluid (Item 15, Appendix B)
  - Gloves (Item 13.1, Appendix B)
  - Goggles (Item 13.2, Appendix B)
  - Rags (Item 31, Appendix B)
  - Preformed packing (11626795)
  - Screw 3/8-16 UNC 2B
  - Masking tape (Item 25, Appendix B)

**PRELIMINARY PROCEDURE:** Remove brake slave cylinder (TM 9-2350-222-20-1)

**DISASSEMBLY:**

1. Place slave cylinder (A) in vise (B) for disassembly.

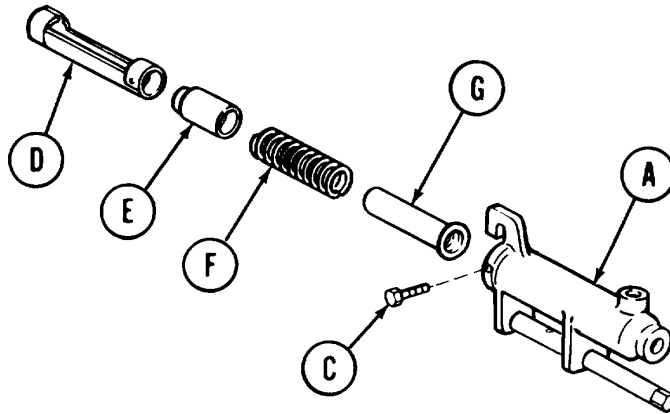


Go on to Sheet 2

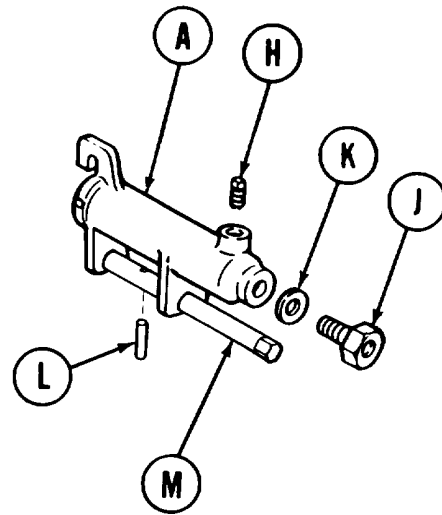
**CAUTION**

**Hold tube (D) in position while removing screws (C) as spring is compressed in cylinder.**

- Using 1/2 inch wrench, remove two screws (C) holding tube (D) in slave cylinder (A).



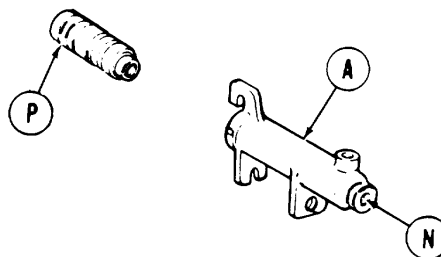
- Remove tube (D), retainer (E), spring (F), and tube (G) from slave cylinder (A). Throw tube (G) and spring (F) away.
- Using 3/8 inch wrench, remove bleeder valve (H) from slave cylinder (A).
- Using 1 inch wrench, remove plug (J) and preformed packing (K). Throw away packing (K).
- Move slave cylinder in vise to expose pin (L).
- Using drift punch and hammer, remove pin (L) and remove slave nut (M) from slave cylinder (A).



Go on to Sheet 3

**BRAKE SLAVE CYLINDER REPAIR (Sheet 3 of 6)**

8. Insert screwdriver through hole in cylinder (A) at point (N), push piston (P) and related parts from slave cylinder (A). Throw away piston (P) and related parts.

**CLEANING AND INSPECTION:****WARNING**

Dry cleaning solvent P-D680 is toxic and flammable. To avoid injury, wear protective goggles and gloves and use in a well ventilated area. Avoid contact with skin, eyes, and clothes, and do not breathe vapors. Do not use near open fire or excessive heat. The flash point for Type I dry cleaning solvent is 100° F (38° C) and for Type II is 140° F (60° C). If you become dizzy while using dry cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

1. Remove slave cylinder from vise. Clean slave cylinder and parts not discarded, using dry cleaning solvent and clean rags.
2. Visually inspect cylinder hole for scratches. Replace slave cylinder if unserviceable.

Go on to Sheet 4

Change 5 8-17



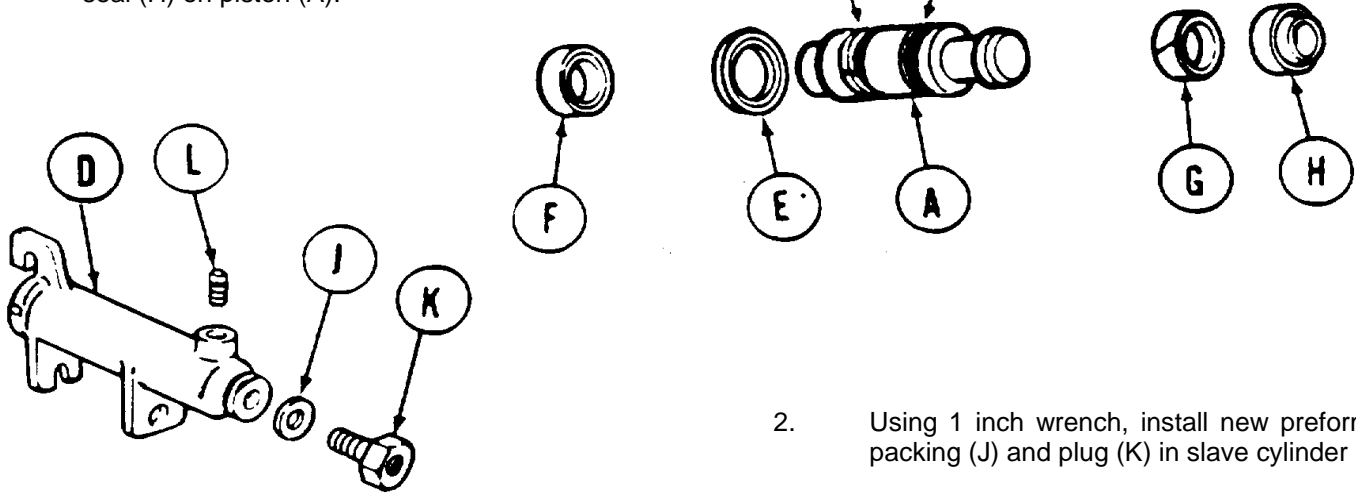
**BRAKE SLAVE CYLINDER REPAIR (Sheet 4 of 6)**

**NOTE**

Late kits include piston (A) with rings (B) and (C) installed.

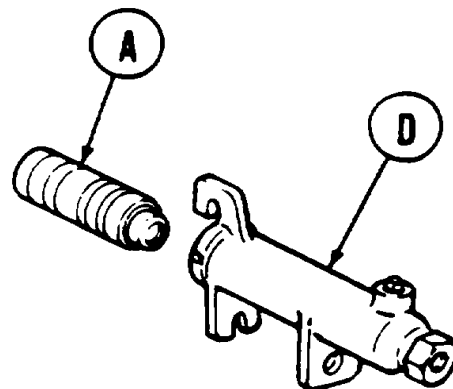
**ASSEMBLY:**

1. Coat all kit parts and slave cylinder (D) bore with silicone brake fluid. Install seal (E), ring (F), ring (G), and seal (H) on piston (A).



2. Using 1 inch wrench, install new preformed packing (J) and plug (K) in slave cylinder (D).

3. Using 3/8 inch wrench, install bleeder valve (L) in slave cylinder (D).
4. Install assembled piston (A) in slave cylinder (D).



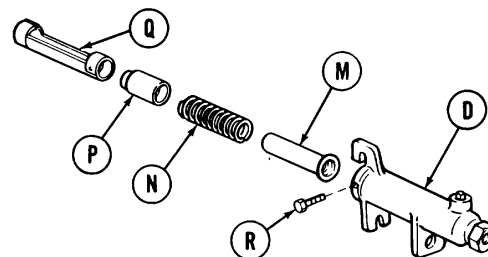
Go on to Sheet 5

**BRAKE SLAVE CYLINDER REPAIR (Sheet 5 of 6)**

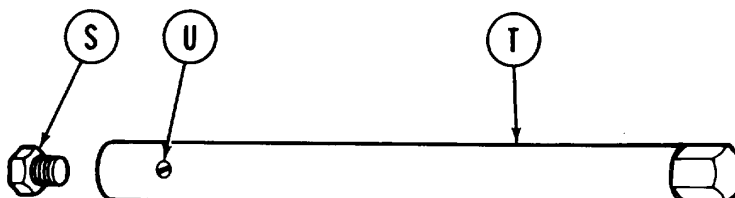
5. Assemble new tube (M), new spring (N), retainer (P), and tube (Q) into slave cylinder (D). Compress tube (Q) into slave cylinder (D) until holes in slave cylinder (D) align with holes in tube (Q).

**CAUTION**

**To ensure proper installation, hold spring (N) in position while performing step 6.**



6. Using 1/2 inch wrench, install and tighten two screws (R) securing tube (Q) in slave cylinder (D).
7. Remove slave cylinder from vise.
8. Thread 3/8-16 UNC 2B screw (S) into end of mounting nut (T). Using 9/16 inch wrench, tighten screw (S).

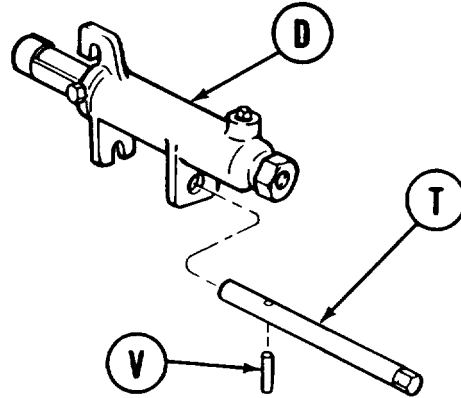


9. Secure mounting nut (T) (head end) in vise.
10. Using screwdriver, tighten pellet (U) until 8 to 16 lb-in (.90 to 1.80 N-m) is required to remove screw (S) from nut (T). Remove screw (S) from nut (T).

Go on to Sheet 6

**BRAKE SLAVE CYLINDER REPAIR (Sheet 6 of 6)**

11. Remove mounting nut (T) from vise.
12. Position mounting nut (T) on slave cylinder (D). Using hammer, install pin (V) through mounting nut (T).
13. If cylinder (D) will not be used immediately, seal open port with masking tape (Item 25, Appendix B).
14. Install brake slave cylinder (TM 9-2350-22220-1).



End of Task

TA130750

Change 5 8-20

**PARKING BRAKE TUBE ASSEMBLY REPLACEMENT (Sheet 1 of 4)**

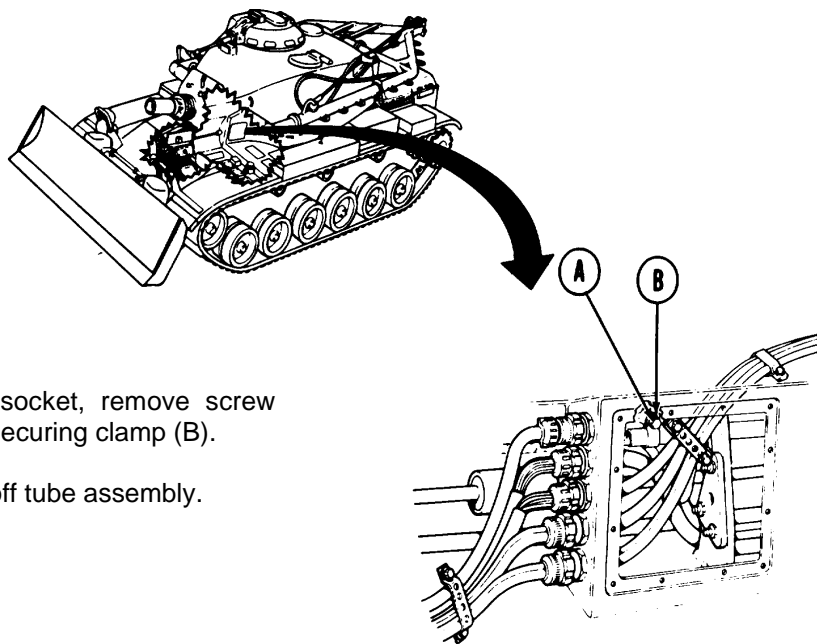
**PROCEDURE INDEX**

PROCEDURE	PAGE
Removal	8-21
Installation	8-23

**TOOLS:** 1/2 in. combination box and open end wrench (2 required)  
 1/2 in. socket with 1/2 in. drive  
 5 in. extension with 1/2 in. drive  
 Ratchet with 1/2 in. drive  
 6 in. steel rule

**REFERENCE:** TM 9-2350-222-20-1

**PRELIMINARY PROCEDURES:** Remove right fuel tank (page 4-36)  
 Remove control assembly (TM 9-2350-222-20-1)



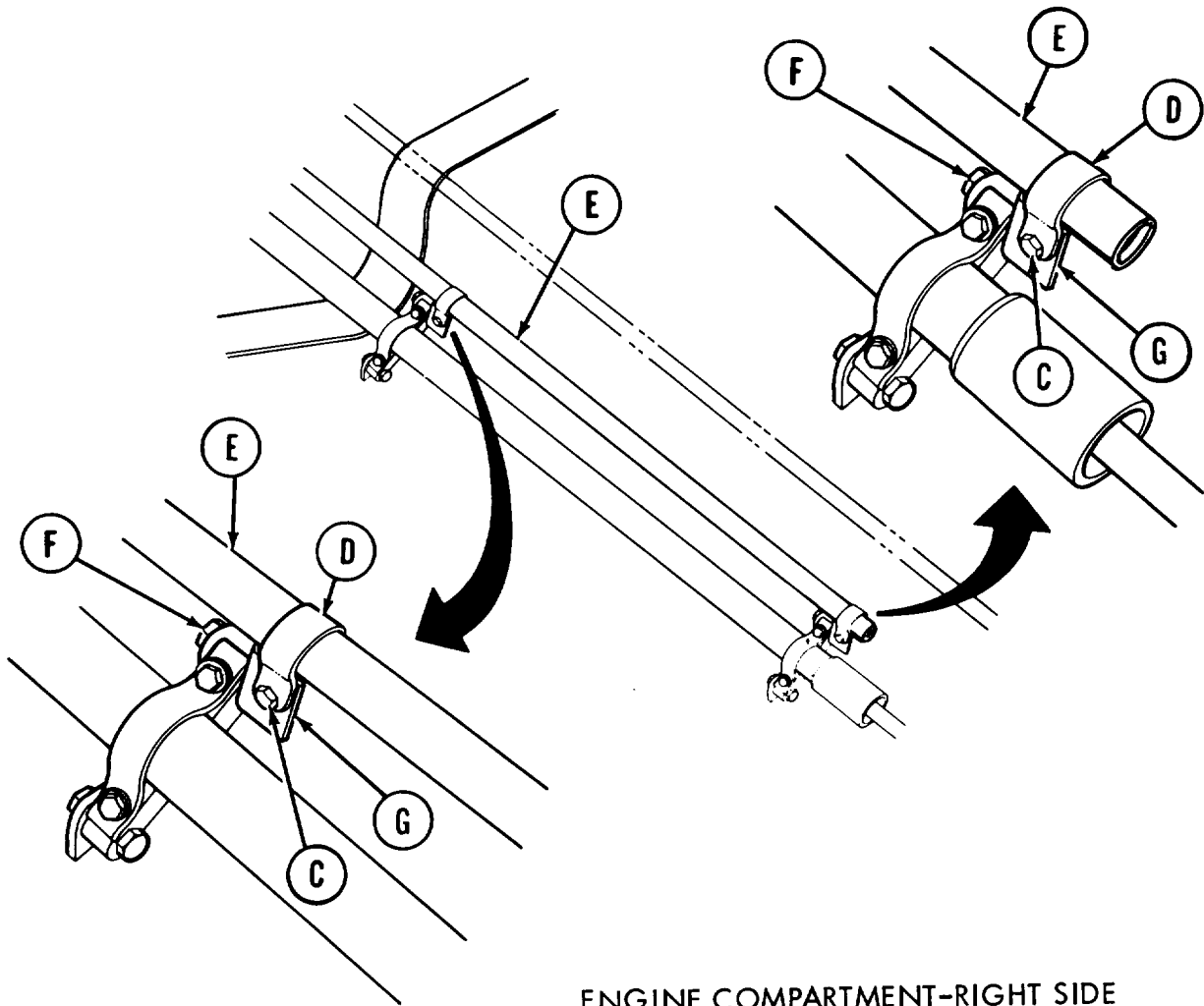
**REMOVAL:**

1. Using 1/2 inch socket, remove screw and washer (A) securing clamp (B).
2. Slide clamp (B) off tube assembly.

Go on to Sheet 2

TA130751

## PARKING BRAKE TUBE ASSEMBLY REPLACEMENT (Sheet 2 of 4)



## ENGINE COMPARTMENT-RIGHT SIDE

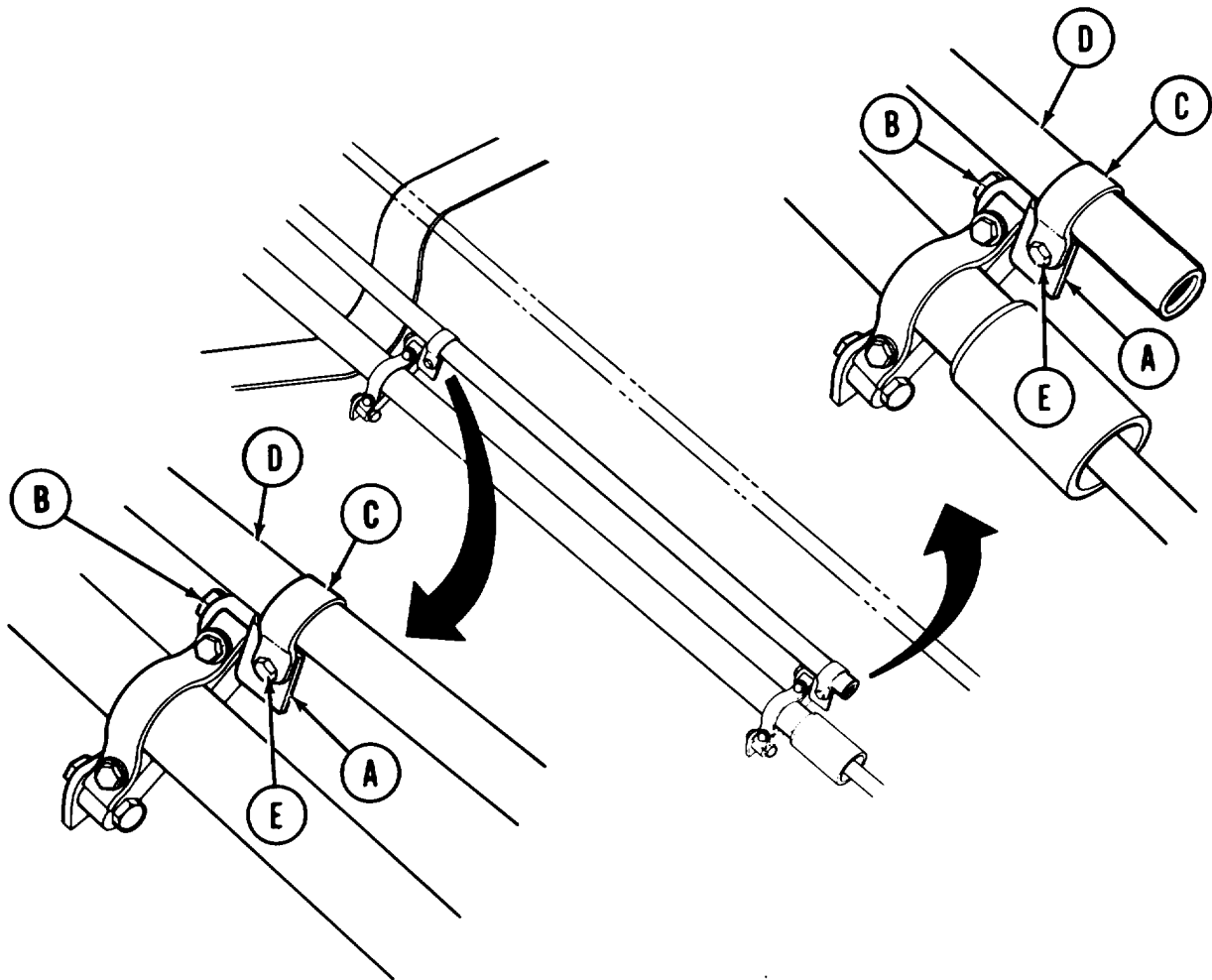
3. From engine compartment, using two 1/2 inch wrenches, remove two screws, washers, and nut (C) securing two clamps (D).
4. Remove tube assembly (E) and clamps (D).
5. Remove clamps (D) from tube assembly (E).
6. Using 1/2 inch socket, remove two screws, washers, and nuts (F) securing two brackets (G).
7. Remove brackets (G).

Go on to Sheet 3

TA130752

## PARKING BRAKE TUBE ASSEMBLY REPLACEMENT (Sheet 3 of 4)

## INSTALLATION:

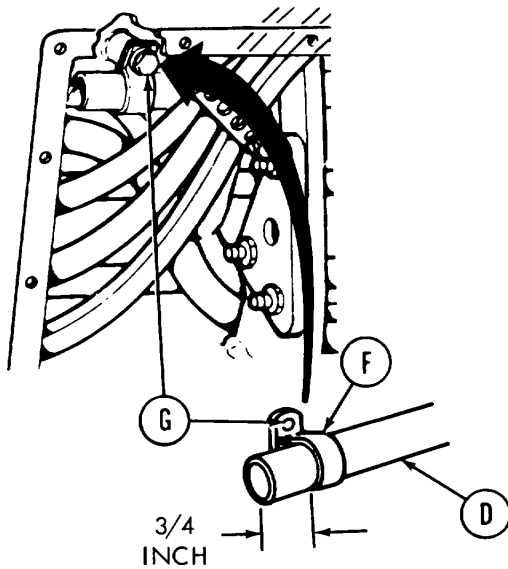


1. Position two brackets (A) to support.
2. Install two screws, washers, and nuts (B).
3. Using 1/2 inch wrench, tighten two screws and nuts (B).
4. Install two clamps (C) onto tube assembly (D).
5. Place tube assembly (D) into position in vehicle.
6. Install two screws, washers, and nuts (E) and secure clamps (C) to bracket (A), making sure some of tube extends past clamps (C).

Go on to Sheet 4

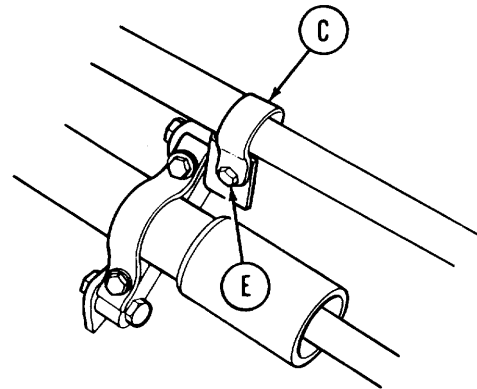
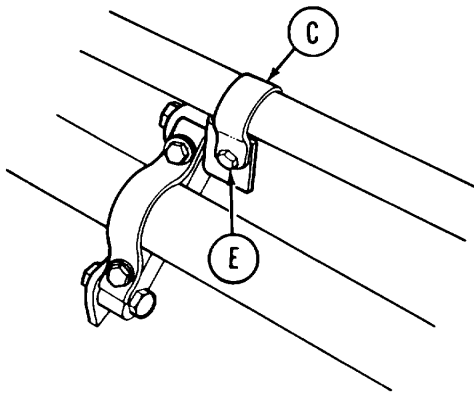
TA130753

PARKING BRAKE TUBE ASSEMBLY REPLACEMENT (Sheet 4 of 4)



7. From turret compartment, adjust tube assembly (D) to make sure tube extends past clamp (F) 3/4 of an inch.
8. Install screw (G) to secure clamp (F) to hull. Using 1/2 inch wrench, tighten screw.

9. From engine compartment, using two 1/2 inch wrenches, tighten screws and nuts (E) securing clamps (C).



10. Install right fuel tank (page 4-44).
11. Install control assembly (TM 9-2350-222-20-1).

End of Task

TA130754

**CHAPTER 9**

**SUSPENSION SYSTEM MAINTENANCE INDEX**

Procedure	Page
Roadwheel Arm Repair (Number 1 Left and Right).....	9-2
Roadwheel Arm Repair (Numbers 2 and 6 Left and Right).....	9-9
Roadwheel Arm Repair (Numbers 3, 4, 5 Left and Right).....	9-16
Track Support Axle Assembly Repair (Number 1 through 3 Left and Right).....	9-22
Compensating Idler Arm Assembly Repair (Left and Right) .....	9-24
Track Adjusting Link Repair .....	9-29

**Change 2 9-1**



**ROADWHEEL ARM REPAIR (NUMBER 1 LEFT AND RIGHT) (Sheet 1 of 7)**

**PROCEDURE INDEX**

PROCEDURE	PAGE
Disassembly	9-2
Assembly	9-5

**TOOLS:** Hammer  
 Chisel  
 Arbor press-  
 Drive collar bushing 4 in. inside dia. 8 in. lg.  
 Drive collar bushing 4-9/16 in. inside dia. 10 in. lg.  
 Drive collar bushing 6 in. inside dia. 12 in. lg.  
 Oxygen-acetylene torch

**SPECIAL TOOLS:** Shock absorber bearing replacer (Item 9, Chapter 2 Section 1)  
 Bearing tool assembly (Item 10 Chapter 2, Section 1)  
 Bearing Driver (Item 10.3, Chapter 2; Section 1)

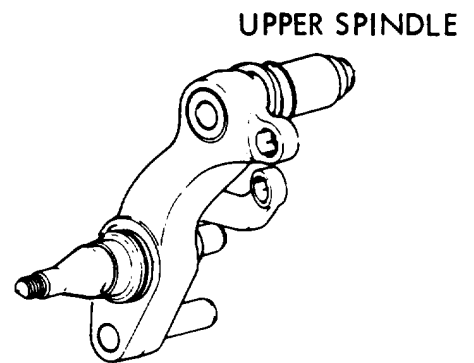
**SUPPLIES:** Crocus cloth (Item 3, Appendix B)  
 Gloves (Item 13.1, Appendix B)  
 Goggles (Item 13.2, Appendix B)

**PRELIMINARY PROCEDURES:** Remove hub and bearings (TM 9-2350-222-20-1)  
 Remove roadwheel arm (TM 9 2350-222-20-1)

**DISASSEMBLY:**

**NOTE**

Roadwheel arm has two spindles, one spindle end is tapered and is referred to as the lower spindle. The other spindle is not tapered and is referred to as the upper spindle.

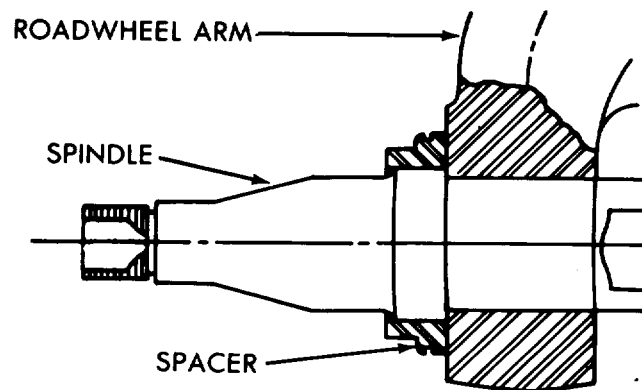
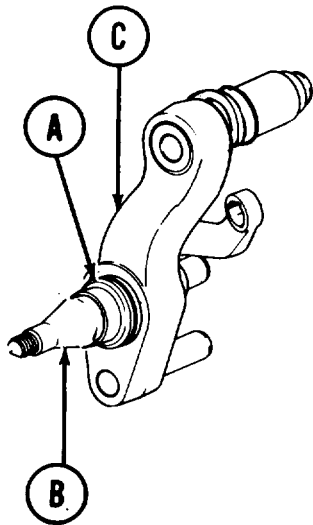


**LOWER SPINDLE**

Go on to Sheet 2

**ROADWHEEL ARM REPAIR (NUMBER 1 LEFT AND RIGHT) (Sheet 2 of 7)**

1. Place roadwheel arm assembly on work bench.
2. Using oxygen-acetylene torch as a heat source, apply heat to spacer (A). Using hammer and chisel, drive spacer (A) off lower spindle (B) of roadwheel arm (C). Throw spacer (A) away. ■
3. Examine bearing surface of lower spindle (B) for any cuts or marks made during removal of spacer (A).
4. Using crocus cloth (Item 3, Appendix B) smooth cuts or marks made on lower spindle (B) during removal.



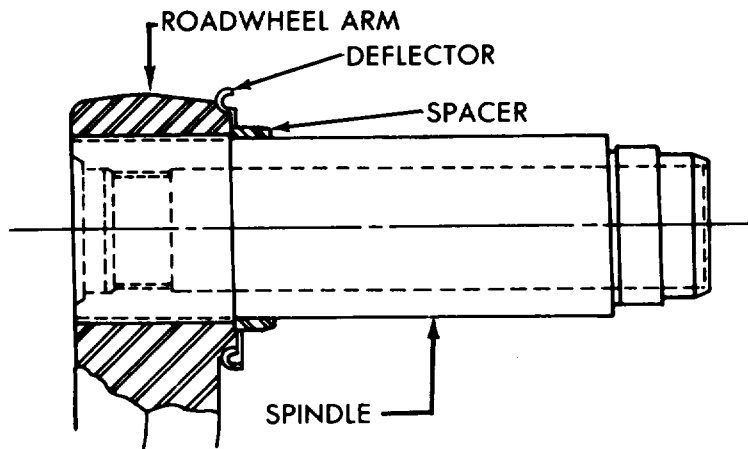
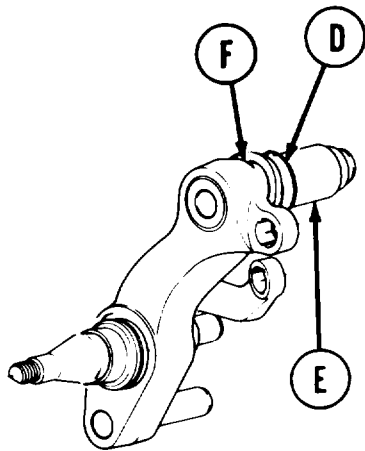
Go on to Sheet 3

TA130756

Change 5 9-3

ROADWHEEL ARM REPAIR (NUMBER 1 LEFT AND RIGHT) (Sheet 3 of 7)

5. Using oxygen-acetylene torch as a heat source, apply heat to spacer (D). Using hammer and chisel, drive spacer (D) and deflector (F) off upper spindle (E). Throw spacer (D) and deflector (F) away.



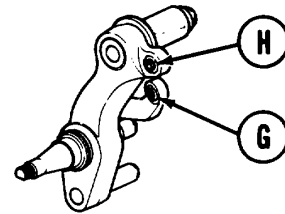
6. Examine bearing surfaces and upper spindle (E) for any cuts or marks made during removal of spacer (D) and deflector (F).
7. Using crocus cloth (Item 3, Appendix B), smooth cuts or marks made on upper spindle (E) during removal.

Go on to Sheet 4

Change 5 9-4

**ROADWHEEL ARM REPAIR (NUMBER 1 LEFT AND RIGHT) (Sheet 4 of 7)**

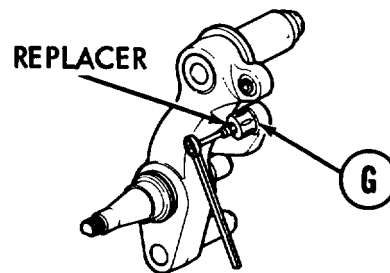
8. Using hammer and chisel cut off stakes on three places each side of shock absorber bearing (G) and track adjusting link bearing (H).



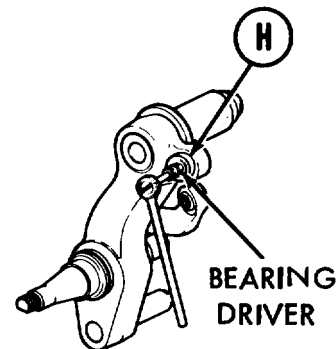
**NOTE**

if your vehicle is equipped with mechanical track adjusting link perform steps 9 and 10; if equipped with grease actuated track adjusting ink perform steps 9 and 11.

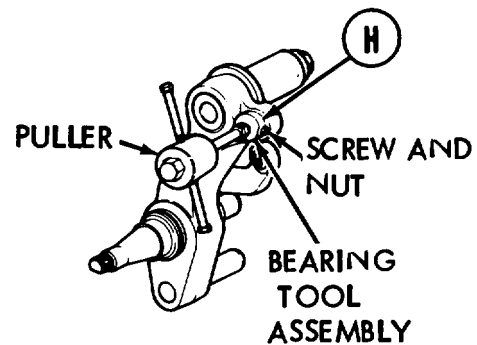
9. Install replacer on bearing (G). Turn replacer nut until bearing (G) is removed. Throw bearing (G) away.



10. Install bearing driver on bearing (H). Turn nut of bearing driver until bearing (H) is removed. Throw bearing (H) away.



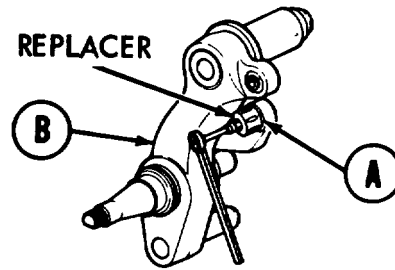
11. Secure bearing tool assembly to bearing (H) with screw and nut. Install puller to bearing tool assembly and remove bearing (H). Throw bearing (H) away.



**ROADWHEEL ARM REPAIR (NUMBER 1 LEFT AND RIGHT) (Sheet 4.1 of 7)**

**ASSEMBLY:**

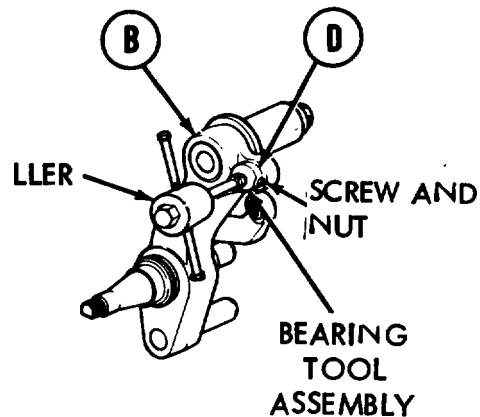
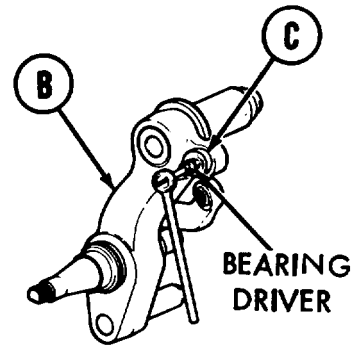
1. Position shock absorber bearing (A) on arm (B). Install replacer over bearing (A) and arm (B). Turn replacer nut until bearing (A) is centered in arm (B). Remove replacer.
2. Stake bearing (A) to arm (B) at three equally spaced locations on each side of bearing (A).



**NOTE**

**If replacing bearing for mechanical track adjusting link, perform steps 2.1 and 2.2. If replacing bearing for grease actuated track adjusting link, perform steps 2.3 and 2.4.**

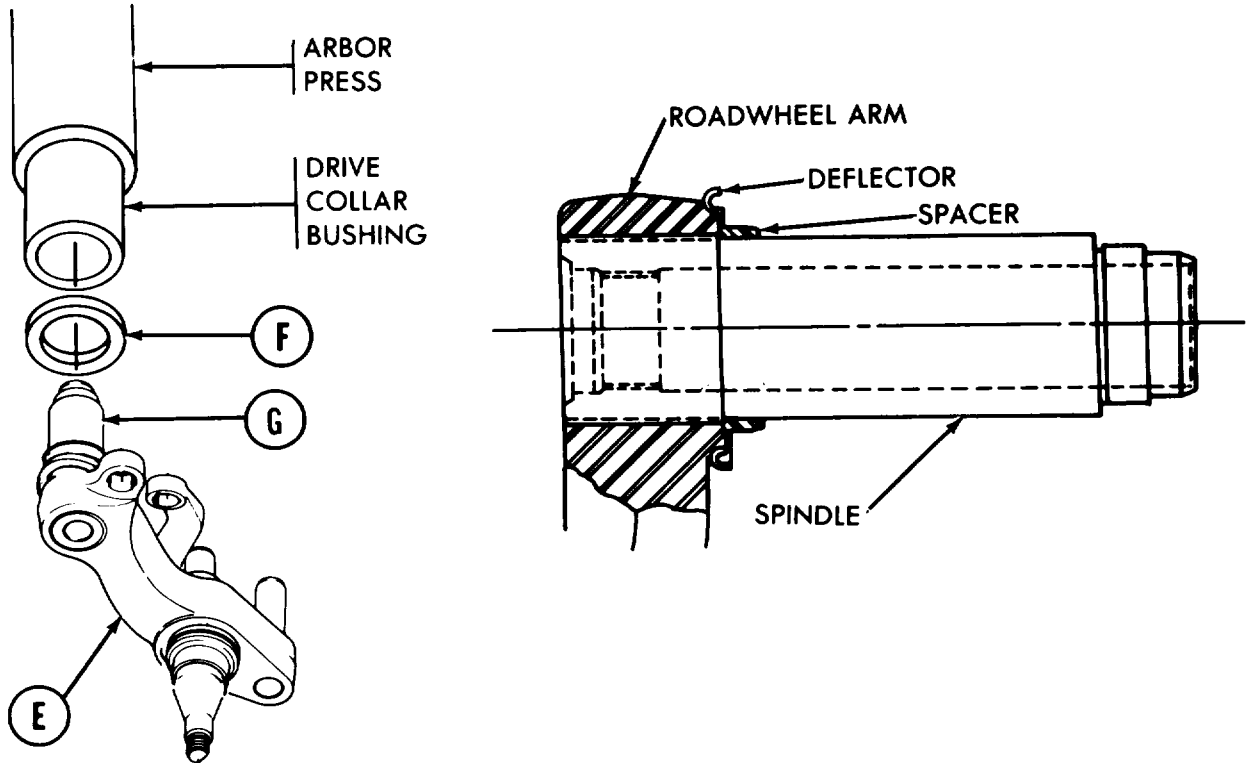
- 2.1. Position bearing (C) on arm (B). Install bearing driver over bearing (C). Turn nut of bearing driver until bearing (C) is centered in arm (B). Remove bearing driver.
- 2.2. Stake bearing (C) to arm (B) at three equally spaced locations on each side of bearing (C). Go to step 3.
- 2.3. Position bearing (D) on arm (B). Secure bearing tool assembly to bearing (D) with screw and nut. Install puller to bearing tool assembly and drive bearing (D) in arm until centered. Remove bearing tool assembly and puller.
- 2.4. Stake bearing (D) to arm (B) at three equally spaced locations on each side of bearing (D). Go on to step 3.



Go on to Sheet 5

**ROADWHEEL ARM REPAIR (NUMBER 1 LEFT AND RIGHT) (Sheet 5 of 7)**

3. Using two persons, position roadwheel arm (E) on arbor press.



4. Position deflector (F) over roadwheel arm upper spindle (G).
5. Position 6 inch inside diameter drive collar bushing over upper spindle (G) onto deflector (F) and using arbor press drive deflector (F) onto upper spindle (G) of roadwheel arm (E).

**NOTE**

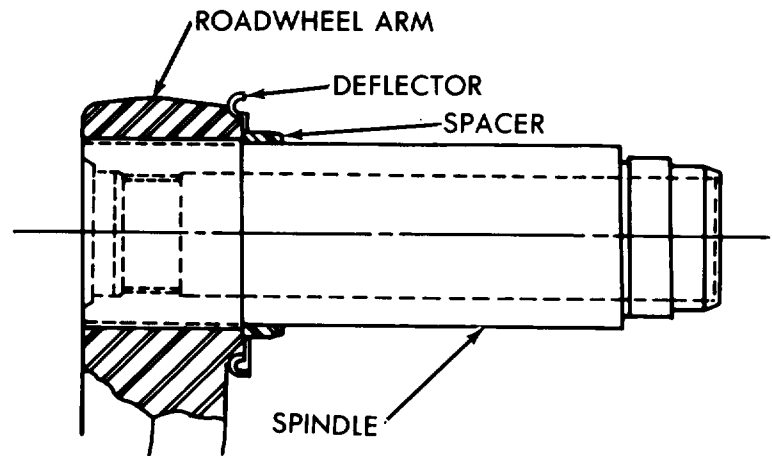
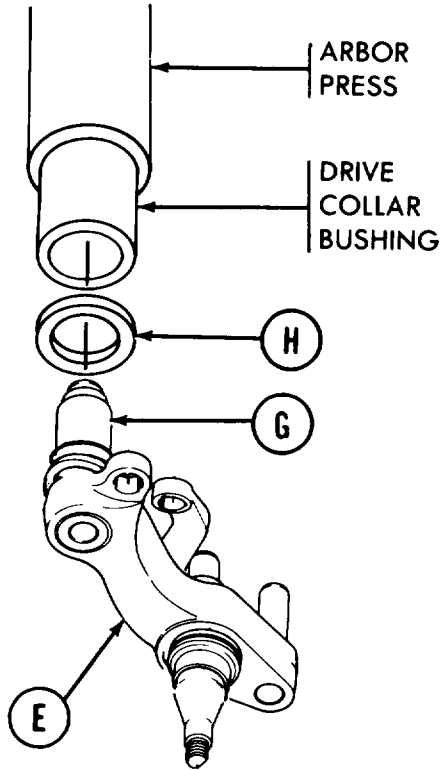
**Seat deflector firmly all the way to the bottom of the upper spindle.**

Go on to Sheet 6

TA130759

**ROADWHEEL ARM REPAIR (NUMBER 1 LEFT AND RIGHT) (Sheet 6 of 7)**

6. Position spacer (H) over roadwheel arm upper spindle (G).
7. Position 4-9/16 inch inside diameter drive collar bushing over spacer (H).



8. Using arbor press, drive spacer (H) onto upper spindle (G) of roadwheel arm (E).

**NOTE**

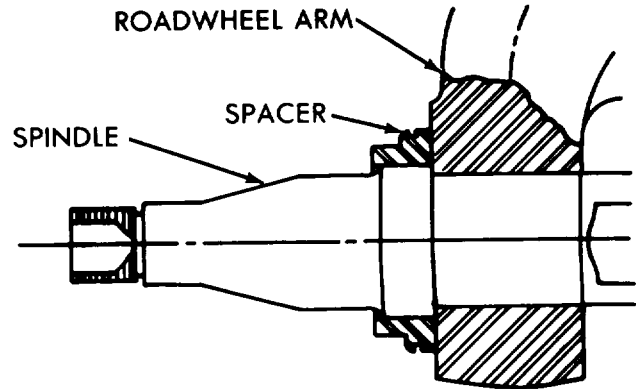
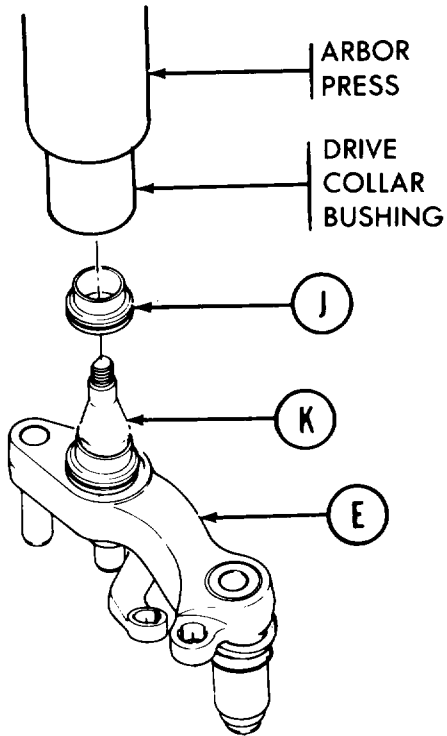
**Seat spacer firmly all the way down upper spindle against deflector.**

Go on to Sheet 7

TA130760

**ROADWHEEL ARM REPAIR (NUMBER 1 LEFT AND RIGHT) (Sheet 7 of 7)**

9. Using two persons, reposition roadwheel arm (E) on arbor press.
10. Position spacer (J) over roadwheel arm lower spindle (K).



11. Position 4 inch inside diameter drive collar bushing over spacer (J).
12. Using arbor press, drive spacer (J) onto upper spindle (K) of roadwheel arm (E).

**NOTE**

**Seat spacer firmly all the way to the bottom of the lower spindle.**

End of Task

TA130761



**ROADWHEEL ARM REPAIR (NUMBERS 2 AND 6 LEFT AND RIGHT) (Sheet 1 of 7)**

**PROCEDURE INDEX**

PROCEDURE	PAGE
Disassembly	9-9
Assembly	9-12

**TOOLS:** Hammer  
 Chisel  
 Arbor Press  
 Drive collar bushing 4 in. inside dia 8 in. lg.  
 Drive collar bushing 4-9/16 in. inside dia 10 in. lg.  
 Drive collar bushing 6 in. inside dia 12 in. lg.  
 Oxygen-acetylene torch

**SPECIAL TOOLS:** Replacer Shock absorber bearing replacer (Item 9, Chapter 2, Section I)

**SUPPLIES:** Crocus cloth (Item 3, Appendix B)  
 Gloves (Item 13.1 Appendix B)  
 Goggles (Item 13.2 Appendix B)

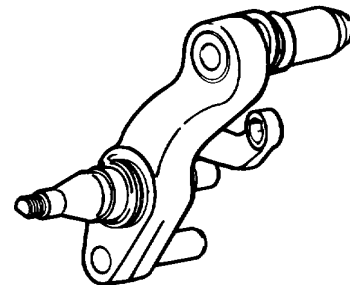
**PRELIMINARY PROCEDURES:** Remove hub and bearings (TM 9-2350-222-20-1)  
 Remove roadwheel arm (TM 9-2350-222-20-1)

**DISASSEMBLY:**

**NOTE**

Roadwheel arm has two spindles. One spindle end is tapered and is referred to as the lower spindle. The other spindle is not tapered and is referred to as the upper spindle.

**UPPER SPINDLE**

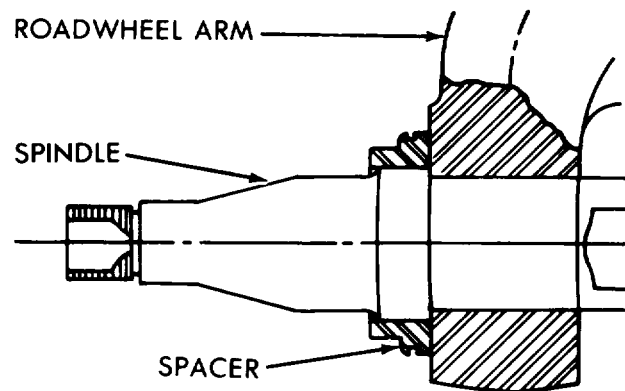
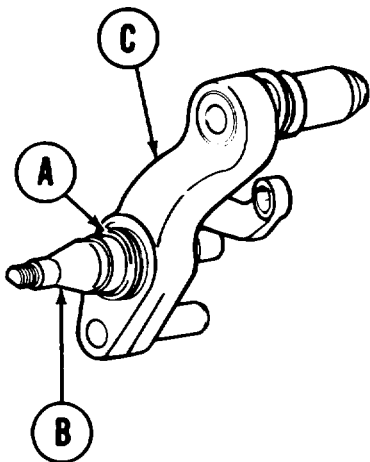


**LOWER SPINDLE**

Go on to Sheet 2

**ROADWHEEL ARM REPAIR (NUMBERS 2 AND 6 LEFT AND RIGHT) (Sheet 2 of 7)**

1. Place roadwheel arm assembly on work bench.
2. Using oxygen-acetylene torch as a heat source, apply heat to spacer (A). Using hammer and chisel, drive spacer (A) off lower spindle (B) of roadwheel arm (C). Throw spacer (A) away.
3. Examine bearing surface of lower spindle (B) for any cuts or marks made during removal of spacer (A).
4. Using crocus cloth, smooth cuts or marks made on lower spindle (B) during removal.

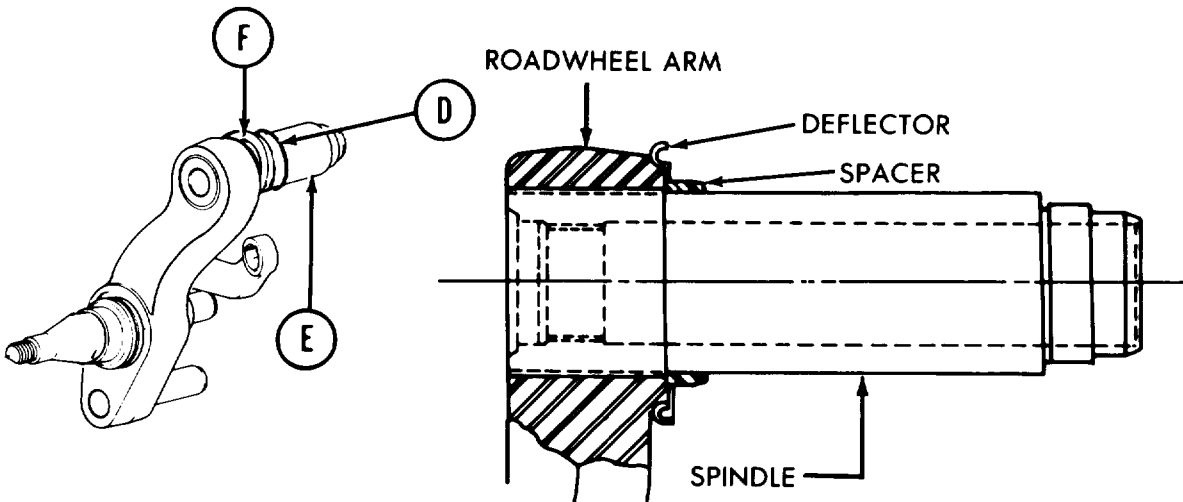


Go on to Sheet 3

Change 5 9-10

**ROADWHEEL ARM REPAIR (NUMBERS 2 AND 6 LEFT AND RIGHT) (Sheet 3 of 7)**

5. Using oxygen-acetylene torch as a heat source, apply heat to spacer (D). Using hammer and chisel, drive II spacer (D) and deflector (F) off upper spindle (E). Throw spacer (D) and deflector (F) away.



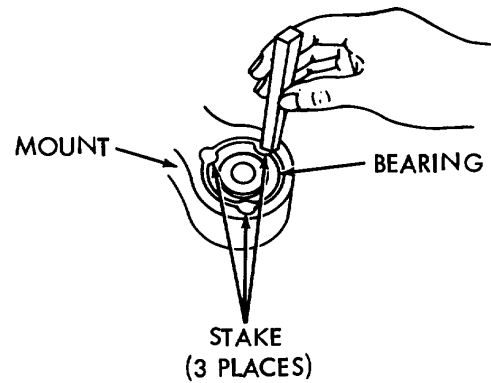
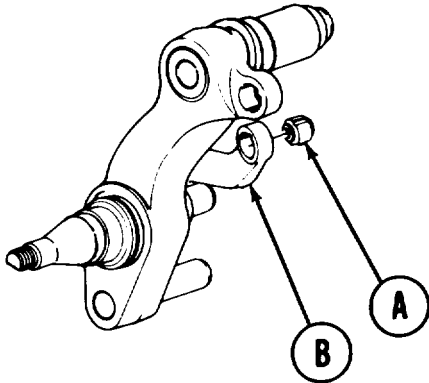
6. Examine bearing surfaces and upper spindle (E) for any cuts or marks made during removal of spacer (D) and deflector (F).
7. Using crocus cloth (Item 3, Appendix B), smooth cuts or marks made on upper spindle (E) during removal.

Go on to Sheet 4

**Change 5 9-11**

**ROADWHEEL ARM REPAIR (NUMBERS 2 AND 6 LEFT AND RIGHT) (Sheet 4 of 7)**

8. Using hammer and chisel, cut off stakes at three places on each side of shock absorber mount (G).



9. Using replacer, remove bearing (H) from shock absorber mount (G). Throw bearing (H) away

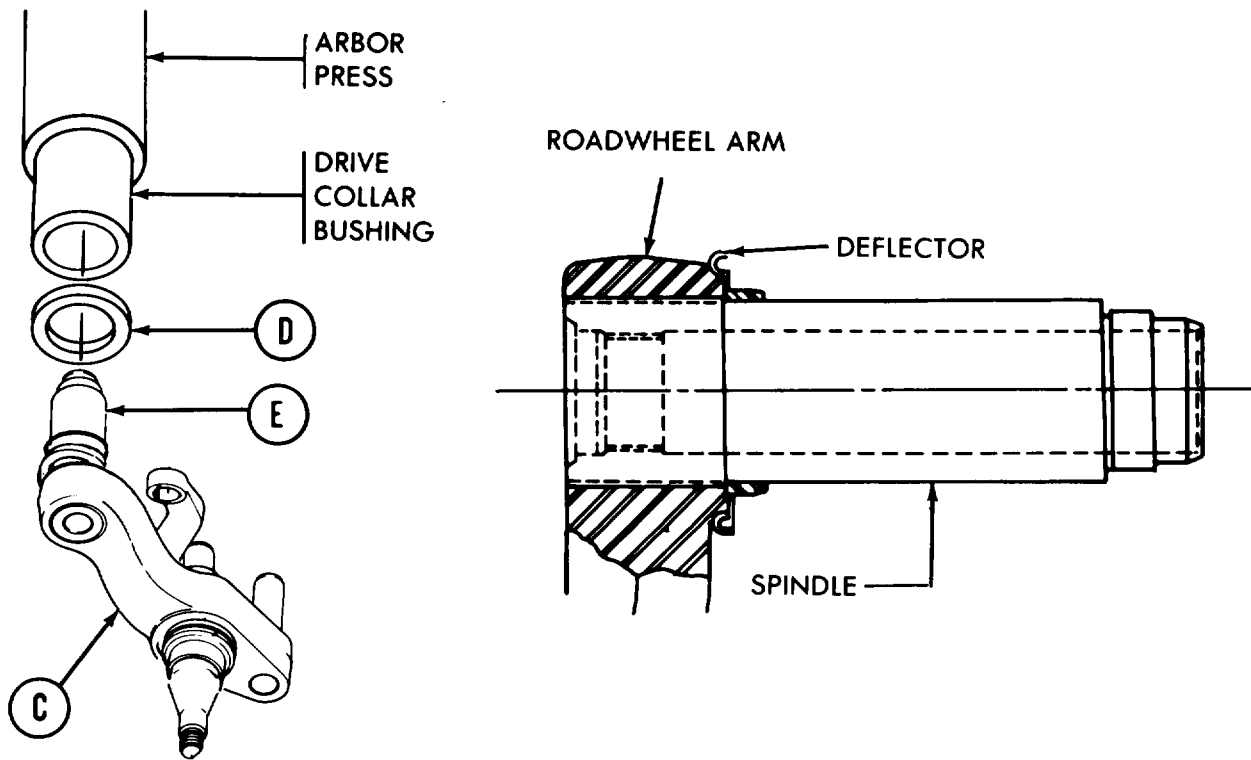
**ASSEMBLY:**

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. Using replacer, replace bearing (A) in shock absorber mount (B)</li> </ol> | <ol style="list-style-type: none"> <li>2. Using hammer and chisel, stake both sides of mount (B) in three places.</li> </ol> |
|--|--|

Go on to Sheet 5

**ROADWHEEL ARM REPAIR (NUMBERS 2 AND 6 LEFT AND RIGHT) (Sheet 5 of 7)**

- Using two persons, position roadwheel arm (C) on arbor press.



- Position deflector (D) over roadwheel arm upper spindle (E).
- Position 6 inch inside diameter drive collar bushing over upper spindle (E) onto deflector (D) and using arbor press, drive deflector (D) onto upper spindle (E) of roadwheel arm (C).

**NOTE**

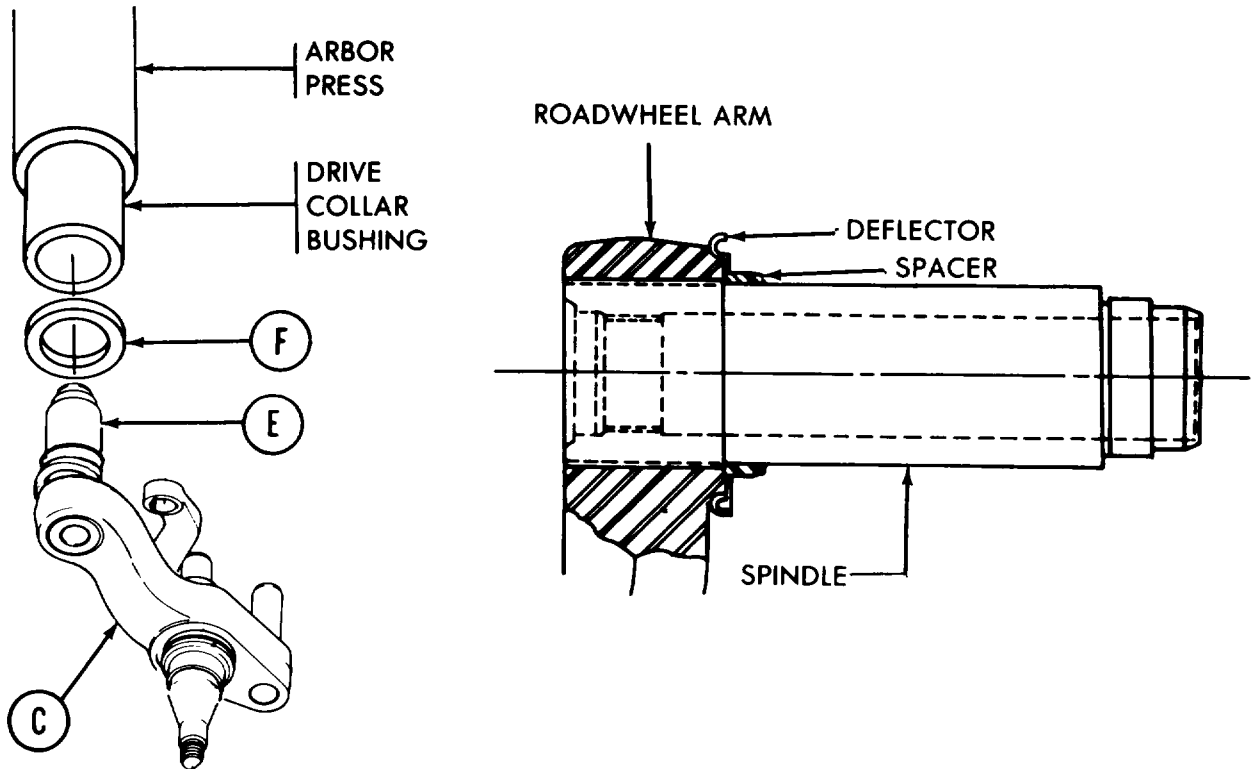
**Seat deflector firmly all the way to the bottom of the spindle.**

Go on to Sheet 6

TA130766

**ROADWHEEL ARM REPAIR (NUMBERS 2 AND 6 LEFT AND RIGHT) (Sheet 6 of 7)**

6. Position spacer (F) over roadwheel arm upper spindle (E).
7. Position 4-9/16 inch inside diameter drive collar bushing over spacer (F).



8. Using arbor press, drive spacer (F) onto upper spindle (E) of roadwheel arm (C).

**NOTE**

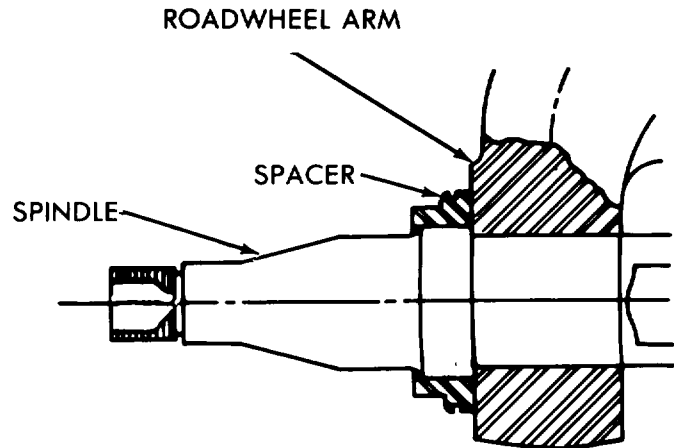
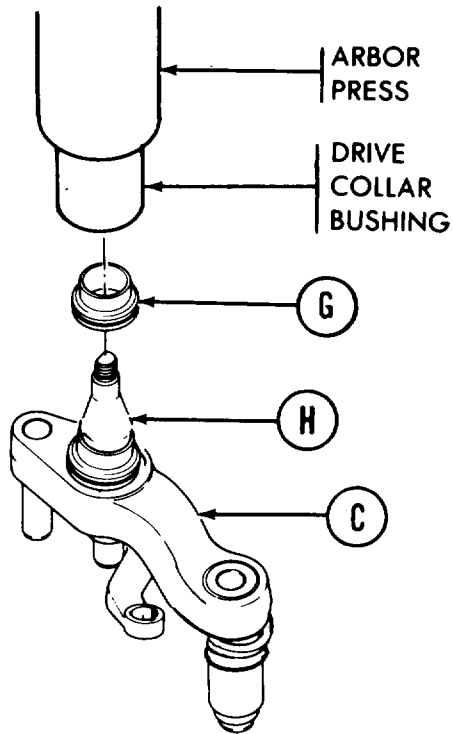
**Seat spacer firmly all the way down upper spindle against deflector.**

Go on to Sheet 7

TA130767

**ROADWHEEL ARM REPAIR (NUMBERS 2 AND 6 LEFT AND RIGHT) (Sheet 7 of 7)**

9. Reposition roadwheel arm (C) on arbor press.
10. Position spacer (G) over roadwheel arm lower spindle (H).



11. Position 4 inch inside diameter drive collar bushing over spacer (G).
12. Using arbor press, drive spacer (G) onto lower spindle (H) of roadwheel arm (C).

**NOTE**

**Seat spacer firmly all the way to the bottom of the lower spindle.**

End of Task

TA130768

**ROADWHEEL ARM REPAIR (NUMBERS 3, 4, 5 LEFT AND RIGHT) (Sheet 1 of 6)**

**PROCEDURE INDEX**

PROCEDURE	PAGE
Disassembly	9-16
Assembly	9-19

**TOOLS:** Hammer  
 Chisel  
 Arbor press  
 Drive collar bushing 4 in. inside dia. 8 in. lg.  
 Drive collar bushing 4-9/16 in. inside dia. 10 in. lg.  
 Drive collar bushing 6 in. inside dia. 12 in. lg.  
 Welding outfit  
 Oxygen-acetylene torch

**SUPPLIES:** Crocus cloth (Item 3, Appendix B)  
 Gloves (Item 13.1, Appendix B)  
 Goggles (Item 13.2, Appendix B)

**PERSONNEL:** Two

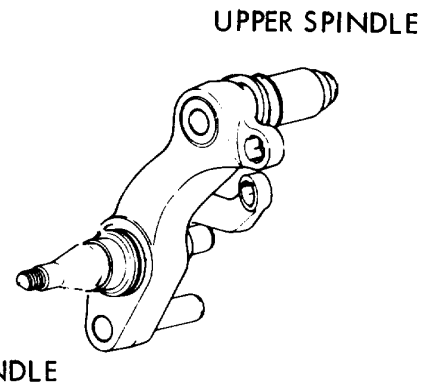
**REFERENCE:** TM 9-2350-222-20-1

**PRELIMINARY PROCEDURE:** Remove roadwheel arm (TM 9-2350-222-20-1)

**DISASSEMBLY:**

**NOTE**

Roadwheel arm has two spindles. One spindle end is tapered and is referred to as the lower spindle. The other spindle is not tapered and is referred to as the upper spindle.

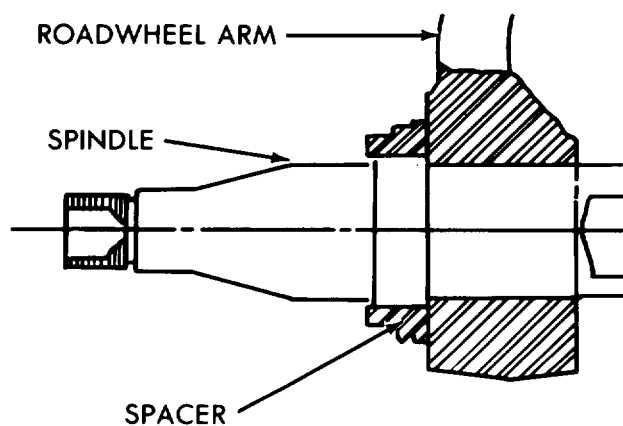
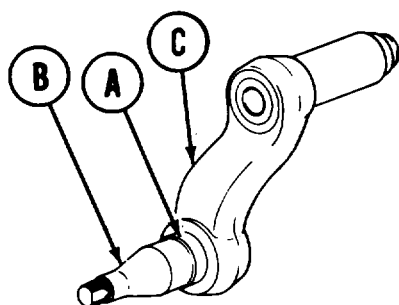


Go on to Sheet 2



**ROADWHEEL ARM REPAIR (NUMBERS 3,4,5 LEFT AND RIGHT) (Sheet 2 of 6)**

1. Using two persons, place roadwheel arm assembly on work bench.
2. Using oxygen-acetylene torch as a heat source, apply heat to spacer (A). Using hammer and chisel, drive spacer (A) off lower spindle (B) of roadwheel arm (C). Throw spacer (A) away.
3. Examine bearing surface of lower spindle (B) for any cuts or marks made during removal of spacer (A).
4. Using crocus cloth (Item 3, Appendix B), smooth cuts or marks made on lower spindle (B) during removal.



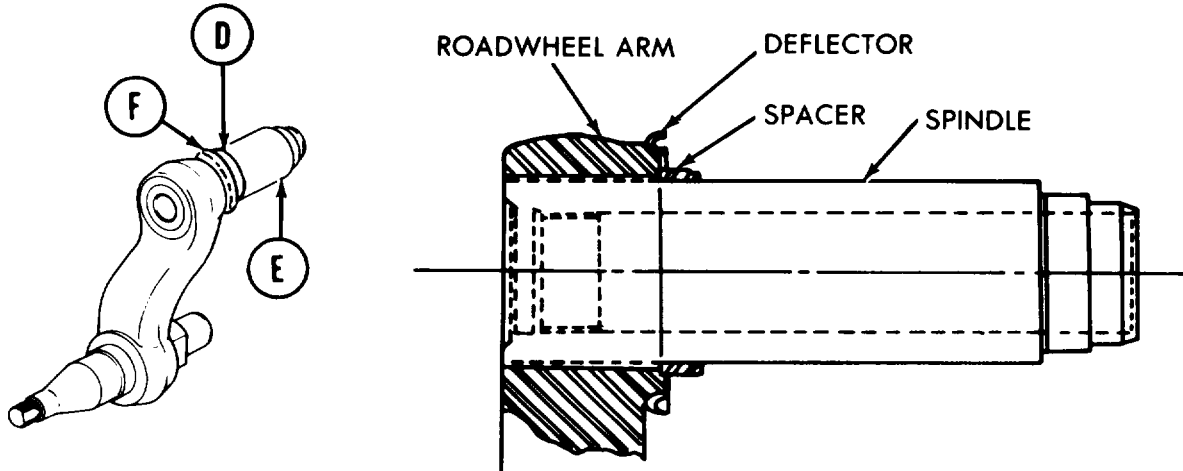
Go on to Sheet 3

TA130770

Change 5 9-17

**ROADWHEEL ARM REPAIR (NUMBERS 3,4,5 LEFT AND RIGHT) (Sheet 3 of 6)**

5. Using oxygen-acetylene torch as a heat source, apply heat to spacer (D). Using hammer and chisel drive spacer (D) and deflector (F) off upper spindle (E). Throw spacer (D) and deflector (F) away.



6. Examine bearing surface of upper spindle (E) for any cuts or marks made during removal of spacer (D) and deflector (F).
7. Using crocus cloth (Item 3, Appendix B), smooth cuts or marks made on upper spindle (E) during removal.

Go on to Sheet 4

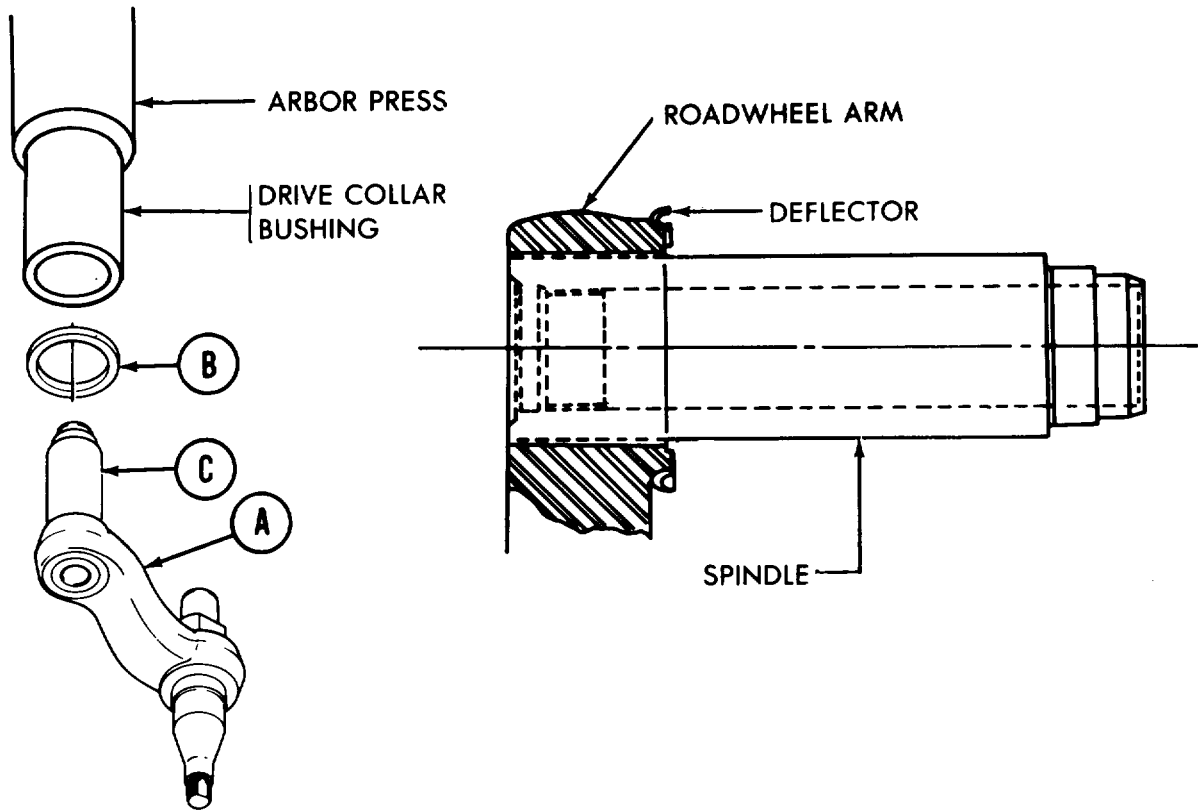
TA130771

Change 5 9-18

**ROADWHEEL ARM REPAIR (NUMBERS 3,4, 5 LEFT AND RIGHT) (Sheet 4 of 6)**

**ASSEMBLY:**

1. Using two persons, position roadwheel arm (A) on arbor press.



2. Position deflector (B) over roadwheel arm upper spindle (C).
3. Position 6 inch inside diameter drive collar bushing over upper spindle (C) onto deflector (B), and using arbor press, drive deflector (B) onto spindle (C) of roadwheel arm (A).

**NOTE**

**Seat deflector firmly all the way to the bottom of the upper spindle.**

Go on to Sheet 5

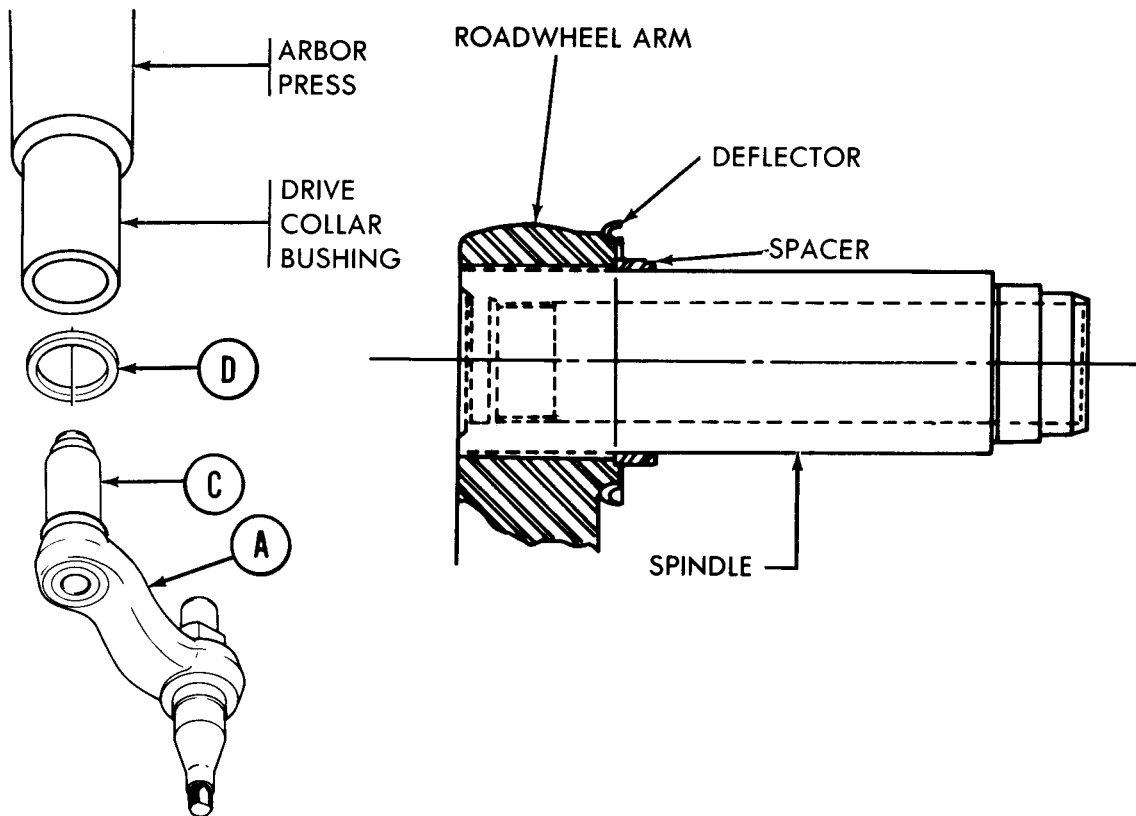
TA130772

**ROADWHEEL ARM REPAIR (NUMBERS 3,4,5 LEFT AND RIGHT) (Sheet 5 of 6)**

4. Position spacer (D) over roadwheel arm upper spindle (C).
5. Position 4-9/16 inch inside diameter drive collar bushing over spacer (D).
6. Using arbor press, drive spacer (D) onto upper spindle (C) of roadwheel arm (A).

**NOTE**

**Seat spacer firmly all the way down upper spindle against deflector.**



Go on to Sheet 6

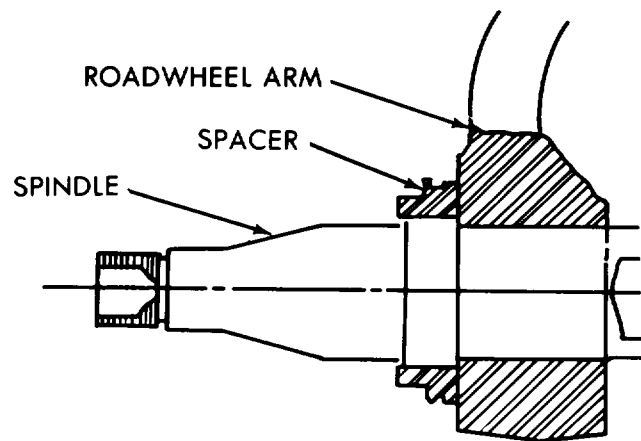
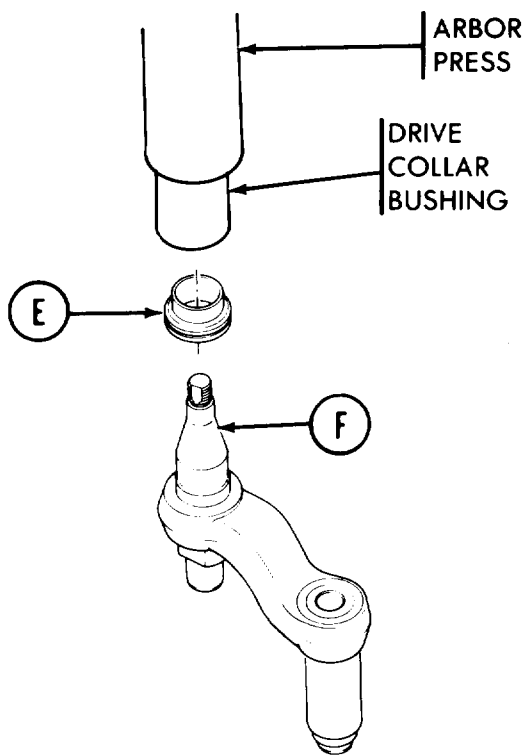
TA130773

**ROADWHEEL ARM REPAIR (NUMBERS 3,4,5 LEFT AND RIGHT) (Sheet 6 of 6)**

7. Using two persons, reposition roadwheel arm on arbor press.
8. Position spacer (E) over roadwheel arm lower spindle (F).
9. Position 4 inch inside diameter drive collar bushing over spacer (E).
10. Using arbor press, drive spacer (E) onto lower spindle (F) of roadwheel arm (A).

**NOTE**

**Seat spacer firmly all the way down to the bottom of the lower spindle.**



End of Task

TA130774

**TRACK SUPPORT AXLE ASSEMBLY REPAIR (NUMBER 1 THROUGH 3 LEFT AND RIGHT) (Sheet 1 of 2)**

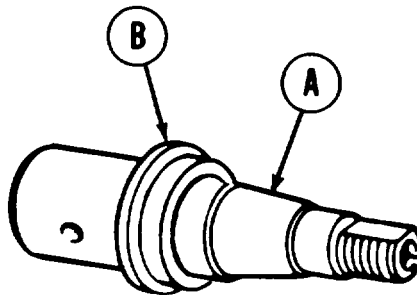
**TOOLS:** Hammer  
Chisel  
Arbor press  
Drive collar bushing 2-9/16 in. inside dia. 8 in. lg.  
Vise  
Oxygen-acetylene torch

**SUPPLIES:** Crocus cloth (Item 3, Appendix B)  
Gloves (Item 13.1, Appendix B)  
Goggles (Item 13.2, Appendix B)

**PRELIMINARY PROCEDURES:** Remove hub and bearings (TM 9-2350-222-20-1)  
Remove axle assembly (TM 9-2350-222-20-1)

**DISASSEMBLY:**

1. Secure axle assembly (A) in vise.
2. Using hammer and chisel, remove spacer (B). Throw spacer (B) away.
3. If spacer (B) will not come off, use welding outfit as a heat source and apply heat to spacer (B) and repeat step 2.

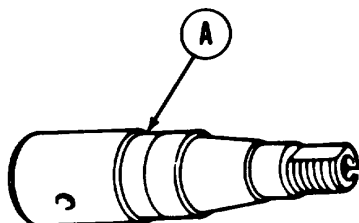


Go on to Sheet 2

Change 5 9-22

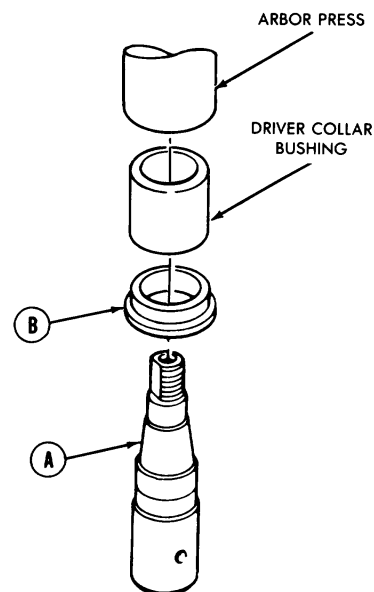
**TRACK SUPPORT AXLE ASSEMBLY REPAIR (NUMBER 1 THROUGH 3 LEFT AND RIGHT) (Sheet 2 of 2)**

4. Examine bearings surface of axle (A) for cuts or marks made during removal of spacer (B).
5. Using crocus cloth (Item 3, Appendix B), smooth any cuts or marks made on axle (A) during removal.
6. Remove axle assembly from vise.



**ASSEMBLY:**

1. Position axle assembly (A) on arbor press.
2. Position new spacer (B) over axle (A) as shown.
3. Position 2-9/16 inch inside diameter drive collar over axle (A) onto spacer (B) and, using arbor press, drive spacer (B) onto axle (B).



**NOTE**

**Seat spacer firmly all the way down on the axle shaft.**

End of Task

TA130776

**COMPENSATING IDLER ARM ASSEMBLY REPAIR (LEFT AND RIGHT) (Sheet 1 of 5)**

PROCEDURE INDEX

PROCEDURE	PAGE
Disassembly	9-24
Assembly	9-27

TOOLS: Hammer  
 Chisel  
 Arbor press  
 Drive collar bushing 4 in. inside dia. 8 in. lg.  
 Drive collar bushing 4-9/16 in. inside dia. 10 in. lg.  
 Oxygen-acetylene torch

SUPPLIES: Crocus cloth (Item 3, Appendix B)  
 Gloves (Item 13.1, Appendix B)  
 Goggles (Item 13.2, Appendix B)

PERSONNEL: Two

REFERENCE: TM 9-2350-222-20-1

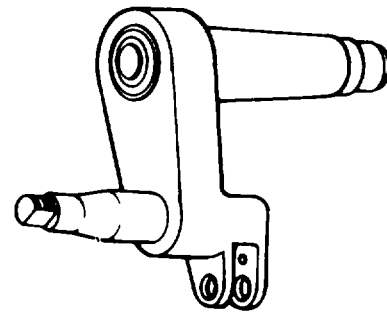
PRELIMINARY PROCEDURE: Remove compensating idler arm (TM 9-2350-222-20-1)

DISASSEMBLY:

**NOTE**

**Compensating idler arm has two spindles. One spindle is tapered and is referred to as the lower spindle. The other spindle is not tapered and is referred to as the upper spindle.**

UPPER SPINDLE



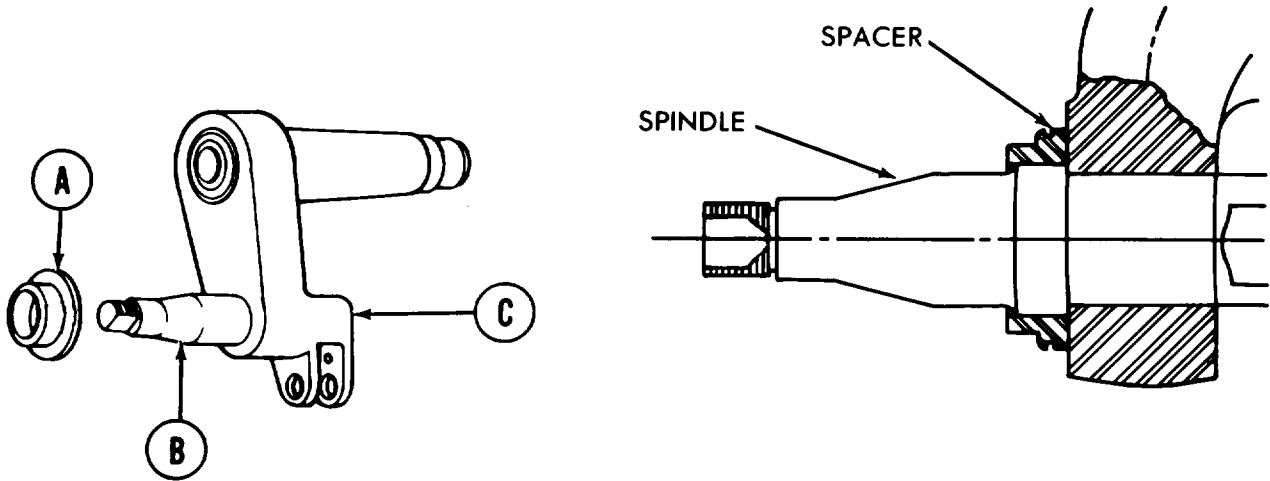
LOWER SPINDLE

Go on to Sheet 2



## COMPENSATING IDLER ARM ASSEMBLY REPAIR (LEFT AND RIGHT) (Sheet 2 of 5)

1. Using two persons, place compensating idler arm assembly on work bench.
2. Using oxygen-acetylene torch as a heat source, apply heat to spacer (A). Using hammer and chisel, drive spacer (A) off lower spindle (B) of roadwheel arm (C). Throw spacer (A) away.
3. Examine bearing surface of spindle (B) for any cuts or marks made during removal of spacer (A).
4. Using crocus cloth (Item 3, Appendix B), smooth cuts or marks made on spindle (B) during removal.

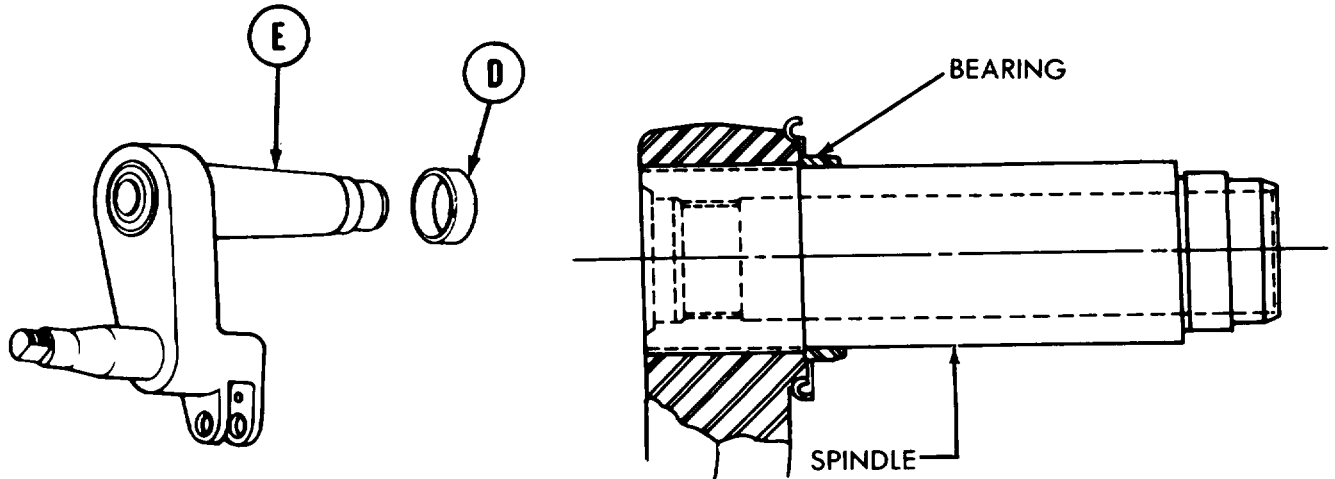


Go on to Sheet 3

Change 5 9-25

**COMPENSATING IDLER ARM ASSEMBLY REPAIR (LEFT AND RIGHT) (Sheet 3 of 5)**

5. Using oxygen-acetylene torch as a heat source, apply heat to bearing (D). Using hammer and chisel, drive bearing (D) off spindle (E). Throw bearing (D) away.



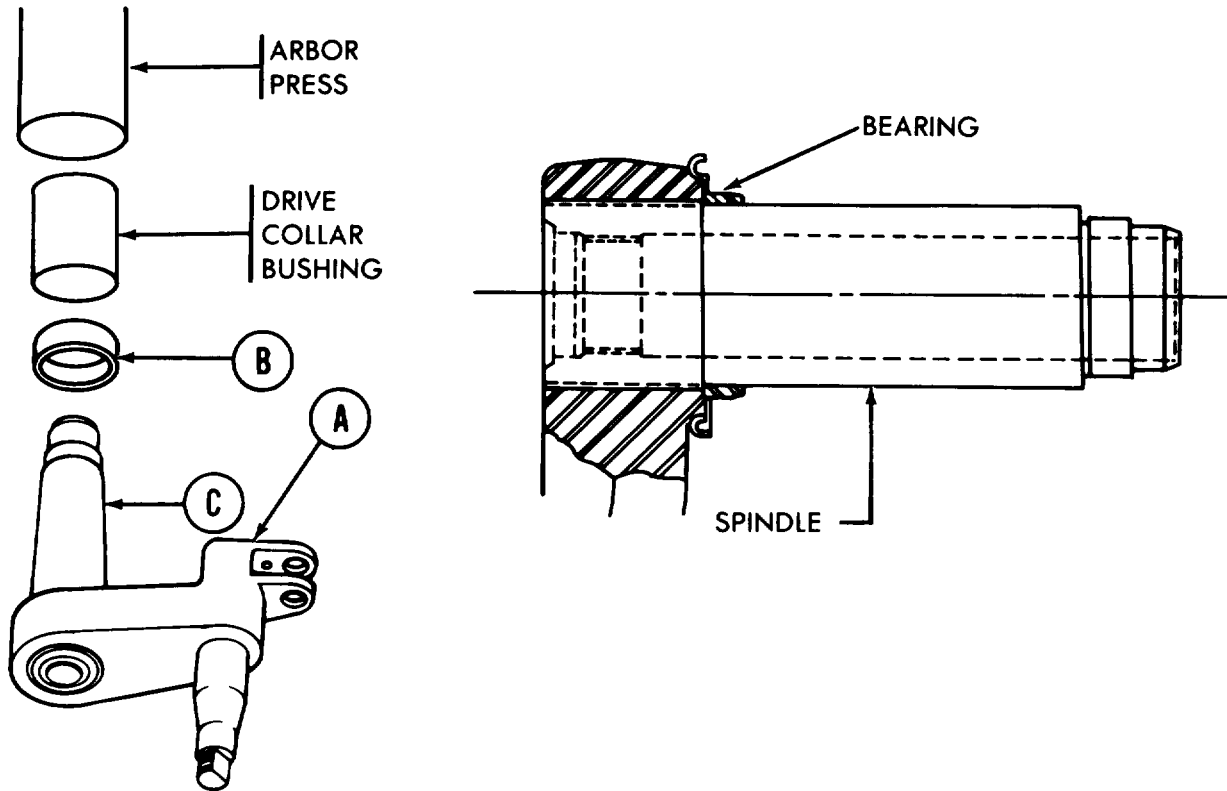
6. Examine bearing surface of spindle (E) for any cuts or marks made during removal of bearing (D).
7. Using crocus cloth (Item 3, Appendix B), smooth cuts or marks made on spindle (E) during removal.

Go on to Sheet 4

Change 5 9-26

**COMPENSATING IDLER ARM ASSEMBLY REPAIR (LEFT AND RIGHT) (Sheet 4 of 5)****ASSEMBLY:**

- Using two persons, position compensating idler arm (A) on arbor press.



- Position bearing (B) over idler arm upper spindle (C).
- Position 4-9/16 inch inside diameter drive collar bushing over spindle (C) onto bearing (B), and using arbor press, drive bearing (B) onto spindle (C) of idler arm (A).

**NOTE**

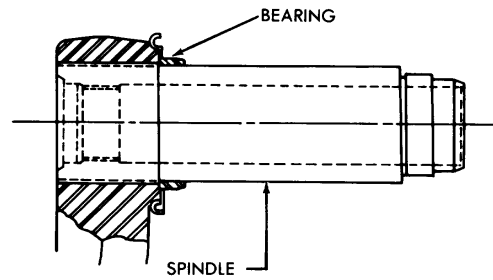
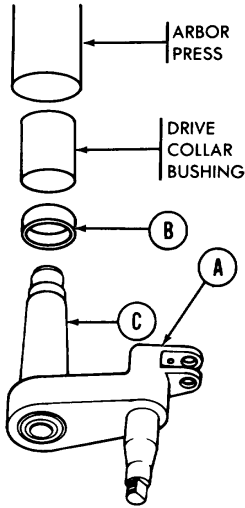
**Seat bearing firmly all the way to the bottom of the spindle.**

Go on to Sheet 5

TA130780

**COMPENSATING IDLER ARM ASSEMBLY REPAIR (LEFT AND RIGHT) (Sheet 5 of 5)**

4. Using two persons, reposition idler arm on arbor press.
5. Position spacer (F) over idler arm spindle (G).



6. Position 4 inch inside diameter drive collar bushing over spacer (F).
7. Using arbor press, drive spacer (E) onto spindle (G) of the compensating idler arm (C).

**NOTE**

**Seat spacer firmly all the way down to the bottom of the spindle.**

End of Task

TA130781

## TRACK ADJUSTING LINK REPAIR (Sheet 1 of 13)

## PROCEDURE INDEX

PROCEDURE	PAGE
Disassembly	9-30
Inspection	9-32
Assembly	9-33
Testing	9-35

TOOLS:

7/16 in. socket with 1/2 in. drive	Grease gun
3/4 in. socket with 1/2 in. drive	Hammer, dead blow
15/16 in. socket with 1/2 in. drive	Knife, pocket
3/8 in. combination box and open end wrench	Pliers, slip joint
1/2 in. combination box and open end wrench	Ratchet with 1/2 in. sq. drive
5/8 in. combination box and open end wrench	Tape, measuring
7/8 in. combination box and open end wrench	Torque wrench with 1/2 in. drive (0-175 lb-ft) (0-237 N•m)
	Vise

SPECIAL TOOLS: Spanner wrench (Item 10.1, Chapter 2, Section I)  
Test fixture (Item 10.2, Chapter 2, Section I)

SUPPLIES:

Bearing (7974760)	Packing (MS28775-333)
Brush (Item 1.1, Appendix B)	Packing (NAS1523C-10B) (as required)
Cup (30781) (CT2875-500)	Rags (Item 22.1, Appendix B)
Fitting, grease (MS15003-1) (2 required)	Retainer, packing (MS28782-36)
Goggles (Item 13.2, Appendix B)	Rubber gloves (Item 13.1, Appendix B)
Grease lockwasher (Item 14, Appendix )	Sealing compound (Item 9.1, Appendix B)
Lockwasher (MS35338-44) (2 required)	Solvent (Item 12, Appendix B)
Packing (MS28775-125)	Wood block, 8 in. x 8 in. x 18 in. (Make from Item 15.1, Appendix B)

Go on to Sheet 2

TA248766

Change 2 9-29

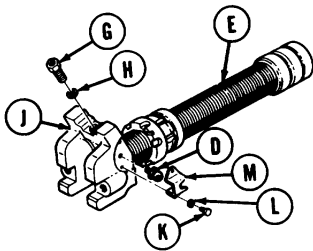
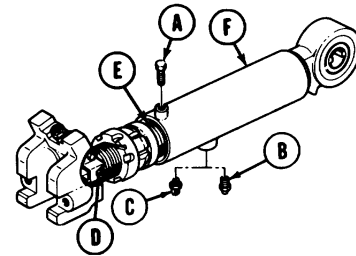
## TRACK ADJUSTING LINK REPAIR (Sheet 2 of 13)

## DISASSEMBLY:

**WARNING**

Dry cleaning solvent P-D-80 is toxic and flammable. Wear protective goggles and glove and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flash point for Type #1 Dry Cleaning solvent is 100°F (38°C) and for Type #2 is 138°F (50°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

1. Clean dirt and rust from track adjusting link with solvent (Item 12, Appendix B) and rag (Item 22.1, Appendix B).
2. Using 3/4 inch socket, remove lockscrew (A).
3. Using 7/16 inch socket, remove safety relief valve (B). Using 7/16 inch socket, install grease fitting (C) in safety relief valve hole.



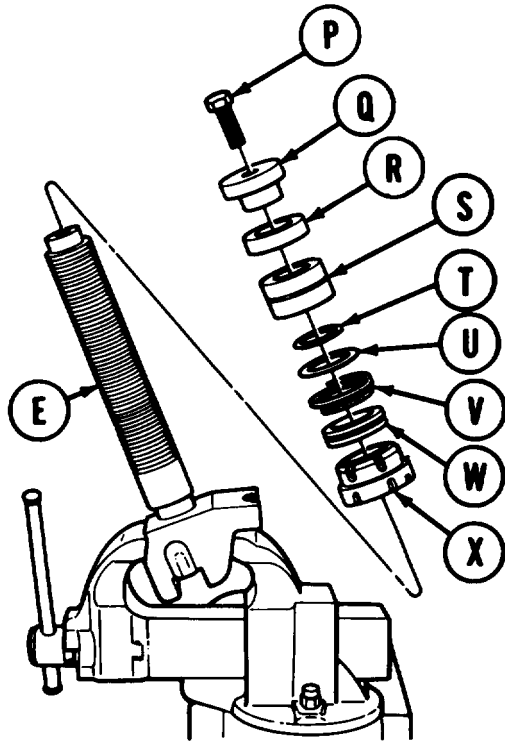
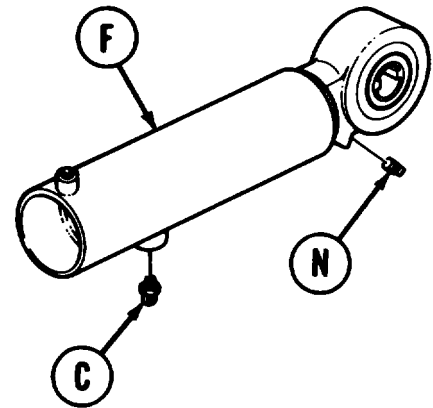
4. Using grease gun, pump grease into fitting (D) until shaft assembly (E) comes out of cylinder (F). Wipe excess grease from shaft assembly (E) and cylinder (F) using rags (Item 22.1, Appendix B) soaked in solvent (Item 12, Appendix B).
5. Using 15/16 inch socket, remove relief valve (G) and packing (H) from shaft assembly yoke (J). Throw packing (H) away.
6. Using 7/16 inch socket, remove two screws (K) and lockwashers (L) securing support (M) to yoke (J). Remove support (M) from yoke (J). Throw lockwashers (L) away.
7. Using 7/16 inch socket, remove grease fitting (D) from yoke (J). Throw fitting (D) away.

Go on to Sheet 3

TA248767

**TRACK ADJUSTING LINK REPAIR (Sheet 3 of 13)**

8. Using 7/16 inch socket, remove grease fitting (C) from cylinder (F).
9. Using 3/8 inch wrench, remove pipe plug (N) from cylinder (F).



10. Put shaft assembly (E) in vise.
11. Using 15/16 inch socket, remove screw (P) from shaft (E).
12. Remove follower (Q), cup (R), and piston assembly (S) from shaft (E). Throw cup (R) away.
13. Remove packing (T) from inside edge of piston (S) with knife. Throw packing (T) away.
14. Remove packing (U) and packing retainer (V) from groove in piston assembly (S) with knife. Throw packing (U) and retainer (V) away.
15. Remove support (W) and nut (X) from shaft (E). Take shaft (E) out of vise.

Go to Sheet 4

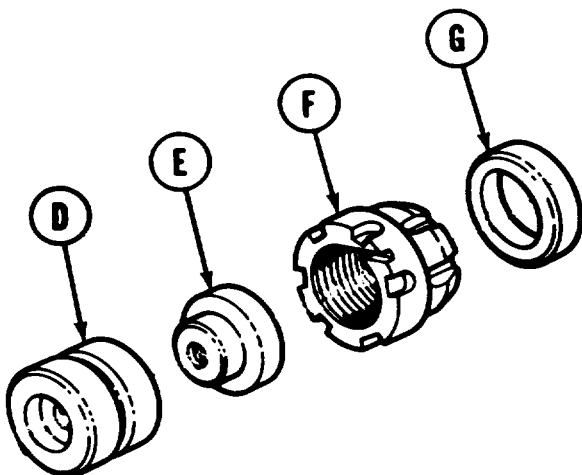
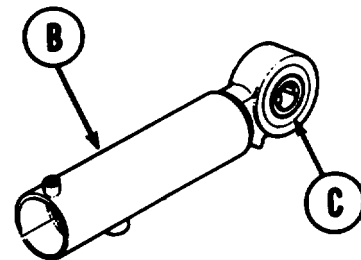
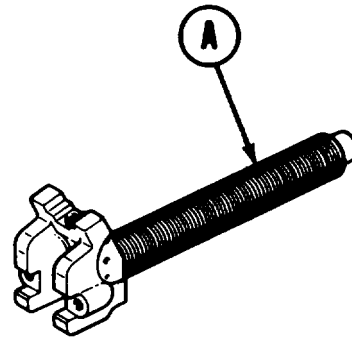
TA248768

**TRACK ADJUSTING LINK REPAIR (Sheet 4 of 13)**  
**INSPECTION:**

**WARNING**

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles and gloves and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flash point for Type #1 Dry Cleaning solvent is 100°F (38°C) and for Type #2 is 138°F (50°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

1. Clean all parts thoroughly with dry cleaning solvent (Item 12, Appendix B) and rags (Item 22.1, Appendix B).
2. Inspect shaft (A) for chipped threads, bends, and cracks. Replace if unserviceable.
3. Inspect cylinder (B) for cracks, dents, and scratches or grooves inside cylinder (B). Replace if unserviceable.
4. Inspect bearing (C) for cracks, dents, scratches, and freedom of movement. If unserviceable, replace bearing (C) (TM 92350-222-20-1-4).



5. Inspect piston (D) and follower (E) for cracks, scrapes, and excessive wear. Replace if unserviceable.
6. Inspect nut (F) and support (G) for cracks, chips, and stripped threads. Replace if unserviceable.

Go on to Sheet 5

TA248769

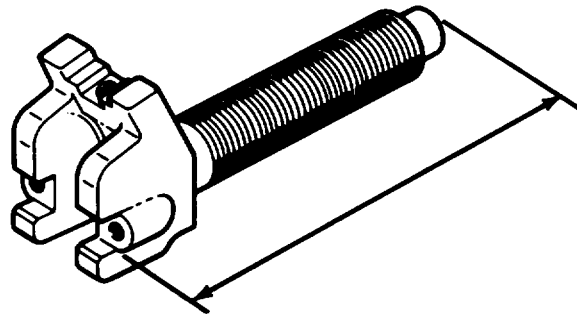


## TRACK ADJUSTING LINK REPAIR (Sheet 5 of 13)

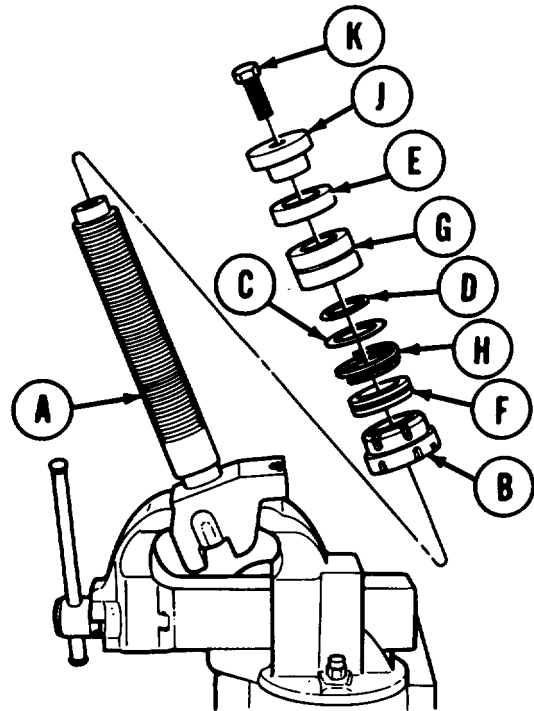
## ASSEMBLY:

## NOTE

Shafts are not interchangeable. Right side adjusting link shaft is approximately 16 5/8 inches long and left side is approximately 13 3/8 inches long. Measure shaft as shown to distinguish right side from left.



1. Put shaft (A) in vise.
2. Apply a light coat of grease (Item 14, Appendix B) to threads of shaft (A), nut (B), new packings (C and D), and cup (E).
3. Install nut (B) and support (F) on shaft (A).
4. Install new packing (D) inside piston (G).
5. Install new packing (C) and retainer (H) in groove on piston (G).
6. Put piston (G), cup (E), and follower (J) on shaft (A).
7. Apply a coat of sealing compound (Item 9.1, Appendix B) to threads of screw (K) with brush (Item 1.1, Appendix B).
8. Using 15/16 inch socket, install screw (K) and tighten to end of shaft (A).
9. Torque screw (K) to 90-110 lb-ft (122149 N•m).
10. Remove assembled shaft (A) from vise.

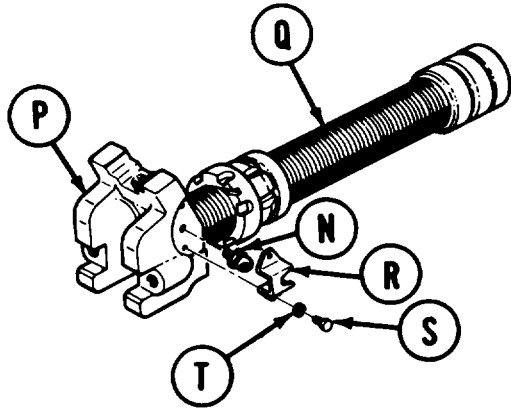
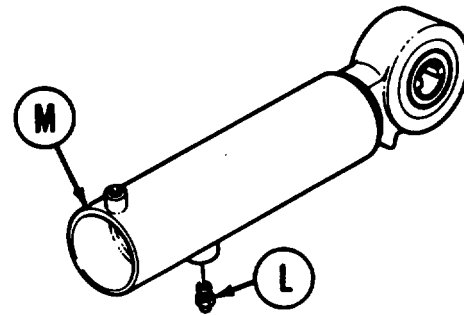


Go on to Sheet 6

TA248770

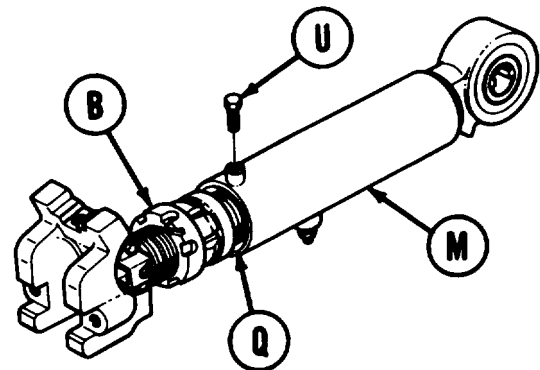
**TRACK ADJUSTING LINK REPAIR (Sheet 6 of 13)**

11. Using 7/16 inch socket, install safety relief valve (L) in cylinder (M).



12. Using 7/16 inch socket, install grease fitting (N) in yoke (P) of shaft assembly (Q).
13. Using 7/16 inch socket, install support (R) on yoke (P) with two screws (S) and new lockwashers (T).

14. Apply a heavy coat of grease (Item 14, Appendix B) to inside of cylinder (M) and to shaft assembly (Q).
15. Insert shaft assembly (Q) into cylinder (M) until shaft assembly (Q) is fully seated in cylinder (M).
16. Using spanner wrench (Item 10.1, Chapter 2, Section I), tighten nut (B) on shaft assembly (Q) until nut (B) is seated against cylinder (M).
17. Using 3/4 inch socket, install locking screw (U) in cylinder (M) to hold nut (B), but do not tighten screw (U) fully.



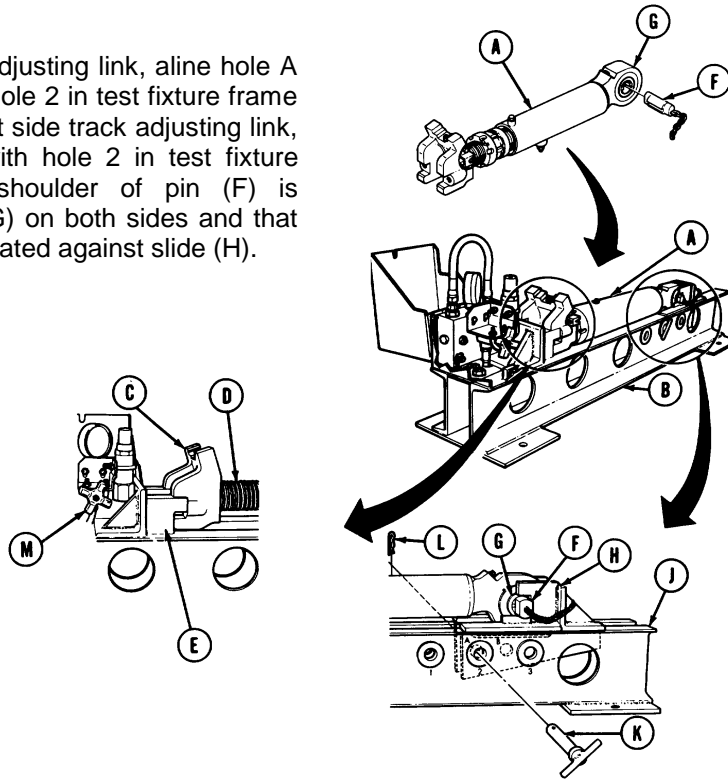
Go on to Sheet 7

TA248771

## TRACK ADJUSTING LINK REPAIR (Sheet 7 of 13)

## TESTING:

1. Put track adjusting link (A) in test fixture (B) (Item 10.2, Chapter 2, Section I) with yoke (C) of link shaft (D) against test fixture stop block (E).
2. Put test fixture pin (F) in bearing (G) of track adjusting link (A).
3. If testing a right side track adjusting link, aline hole A of test fixture slide (H) with hole 2 in test fixture frame (J) as shown. If testing a left side track adjusting link, aline hole B of slide (H) with hole 2 in test fixture frame (J). Make sure shoulder of pin (F) is completely inside bearing (G) on both sides and that flat side of pin (F) is firmly seated against slide (H).



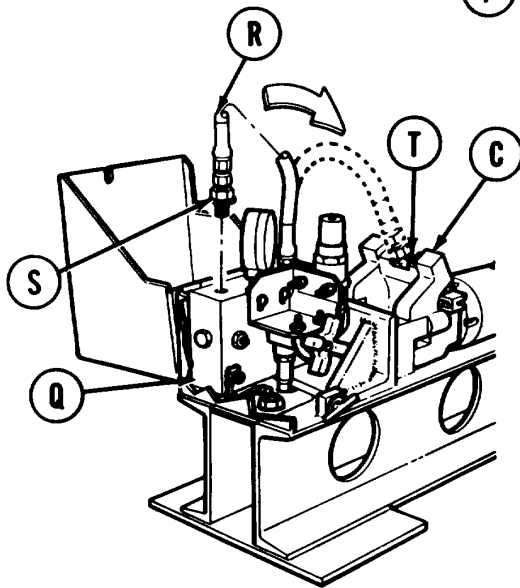
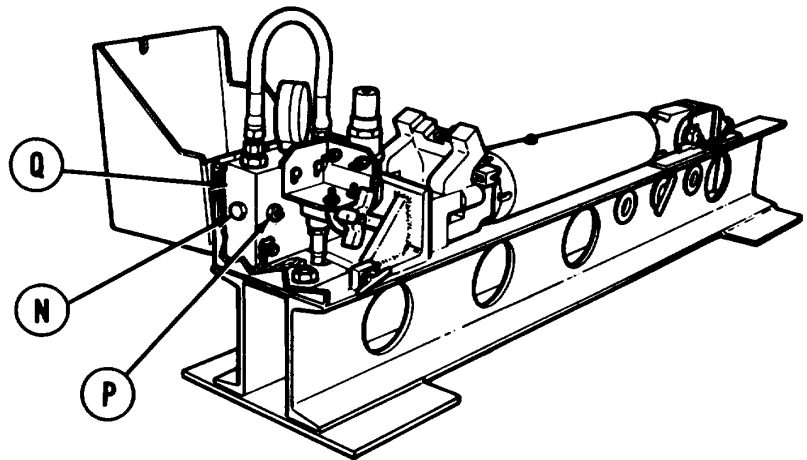
4. Lock slide (H) in position with locking pin (K) through hole 2 of test fixture frame (J). Secure pin (K) with clip (L).
5. Turn needle valve handle (M) fully clockwise to close.

Go on to Sheet 8

TA248772

## TRACK ADJUSTING LINK REPAIR (Sheet 8 of 13)

6. Using 1/2 inch wrench, loosen bleed plug (N) about three turns.
7. Using grease gun, pump grease into fitting (P) in manifold block (Q) until grease comes out of bleed plug (N). 8. Using 1/2 inch wrench, tighten bleed plug (N).



9. Using 7/8 inch wrench and 5/8 inch wrench, disconnect hose assembly (R) with adapter (S) from manifold block (Q).
10. Using 7/8 inch wrench and 5/8 inch wrench, install hose assembly (R) with adapter (S) in relief valve hole (T) in adjusting link yoke (C).

Go on to Sheet 9

TA248773

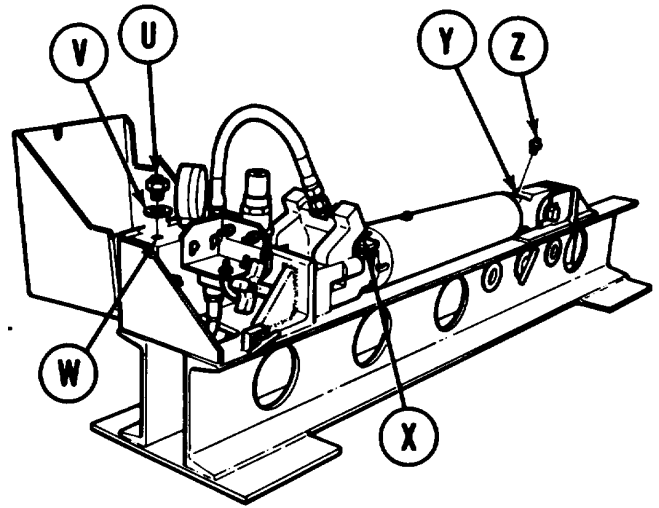
Change 2 9-36

## TRACK ADJUSTING LINK REPAIR (Sheet 9 of 13)

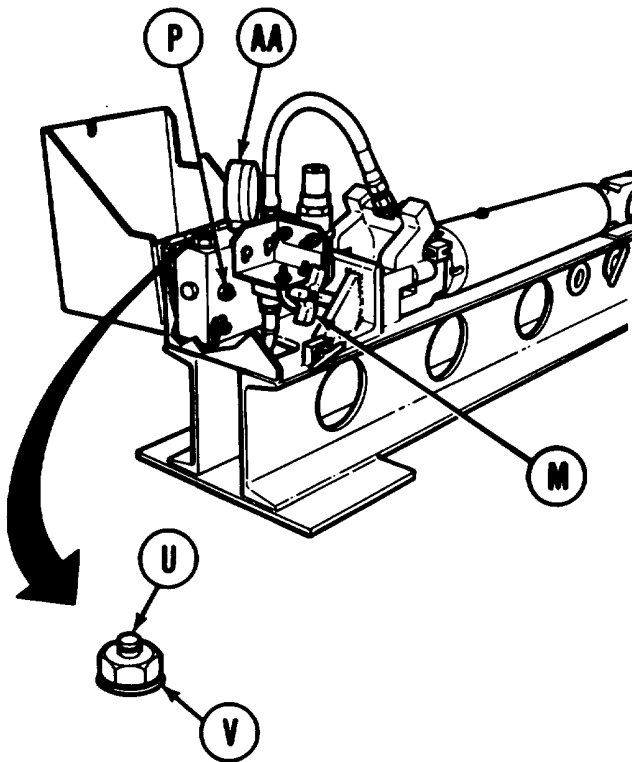
## NOTE

Relief valve (U) used in next step was removed from track adjusting link yoke at disassembly.

11. Install new packing (V) on relief valve assembly (U). Coat threads of valve assembly (U) with grease (Item 14, Appendix B).
12. Using 15/16 inch socket and torque wrench, install valve assembly (U) into manifold block hole (W) and tighten to 40-60 lb-ft (54-81 N•m).
13. Using grease gun, pump grease into fitting (X) until grease comes out pipe plug hole (Y) on end of adjusting link. Using 3/8 inch wrench, install and tighten pipe plug (Z).

**WARNING**

Wear goggles and cover relief valve with a rag to prevent grease from getting in eyes. Relief valve opens at 2150-2250 psi and blows a fine spray of grease.

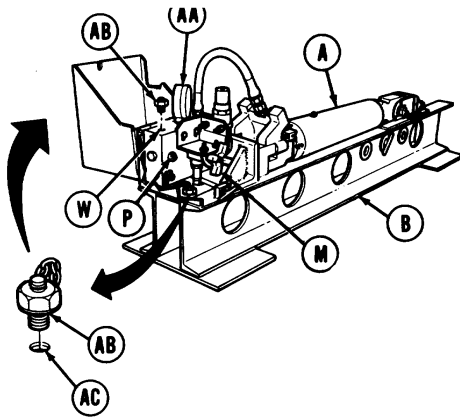


14. Watch gage (AA) and pump grease into manifold grease fitting (P) until relief valve (U) opens between 2150 and 2250 psi. If valve (U) opens between 2150 and 2250 psi, turn needle valve handle (M) counterclockwise to release pressure. Remove valve (U) and packing (V), throw packing (V) away, and go to step 15. If relief valve (U) does not open between 2150 and 2250 psi, turn needle valve handle (M) counterclockwise to relieve pressure. Remove valve (U) and packing (V) and throw away valve (U) and packing (V). Install new valve (U) and new packing (V) (steps 11 and 12) and repeat this step.

Go on to Sheet 10

TA248774

## TRACK ADJUSTING LINK REPAIR (Sheet 10 of 13)



15. Using 7/8 inch wrench, remove test fixture plug (AB) from storage hole (AC) in test fixture frame and install plug (AB) in manifold block hole (W).
16. Turn needle valve handle (M) fully clockwise to close.
17. Using grease gun, pump grease into manifold grease fitting (P) until gage (AA) indicates 2500 psi.
18. Inspect track adjusting link (A) for grease leaks. If any leaks are found, turn needle valve handle (M) counterclockwise to release pressure, remove adjusting link (A) from test fixture (B), and tag link (A) unserviceable.
19. Turn needle valve handle (M) slowly counterclockwise until gage (AA) indicates 700 psi, then turn needle valve (M) clockwise to close.
20. Wait 5 minutes, then check gage (AA). If gage (AA) indicates drop of more than 100 psi, repeat steps 17, 18, 19, and 20. If gage (AA) still indicates drop of more than 100 psi, turn needle valve handle (M) counterclockwise to release pressure, remove adjusting link (A) from fixture (B), and tag link (A) unserviceable.

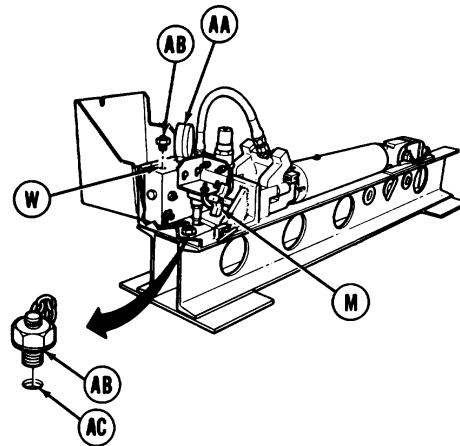
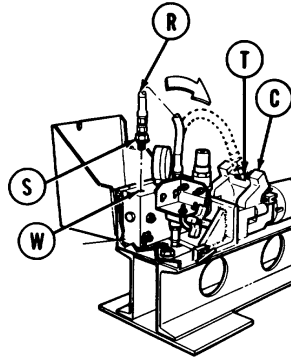
Go on to Sheet 11

TA248775

Change 2 9-38

**TRACK ADJUSTING LINK REPAIR (Sheet 11 of 13)**

21. Turn needle valve handle (M) counterclockwise until gage (AA) indicates zero psi, then turn handle (M) clockwise until closed.
22. Using 7/8 inch wrench, remove test fixture plug (AB) from manifold block hole (W) and return plug (AB) to its storage hole (AC) in test fixture frame.



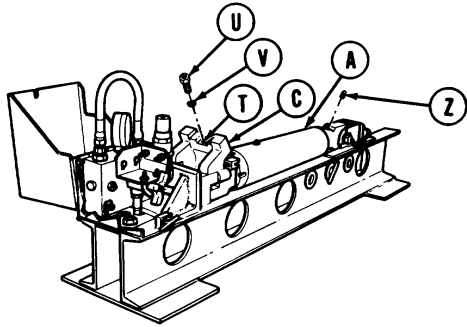
23. Using 7/8 inch and 5/8 inch wrenches, disconnect hose assembly (R) with adapter (S) from relief valve hole (T) in adjusting link yoke (C).
24. Using 7/8 inch and 5/8 inch wrenches, install hose assembly (R) with adapter (S) in manifold block hole (W).

Go on to Sheet 12

TA248776

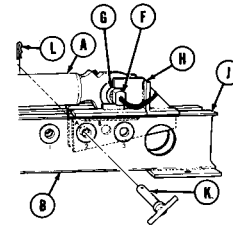
**Change 2 9-39**

TRACK ADJUSTING LINK REPAIR (Sheet 12 of 13)



25. Install new packing (V) on relief valve assembly (U). Coat threads of valve assembly (U) with grease (Item 14, Appendix B).
26. Using 15/16 inch socket and torque wrench, install valve assembly (U) and packing (V) in hole (T) in adjusting link yoke (C). Tighten valve assembly to 40-60 lb-ft (54-81 N•m)
27. Using 3/8 inch wrench, remove pipe plug (Z) from track adjusting link (A).

28. Using pliers, take clip (L) out of locking pin (K).
29. Pull locking pin (K) out of hole 2 in frame (J) to unlock slide (H).
30. Push slide (H) back and pull test fixture pin (F) out of adjusting link bearing (G).



31. Take track adjusting link (A) out of test fixture (B).

Go on to Sheet 13

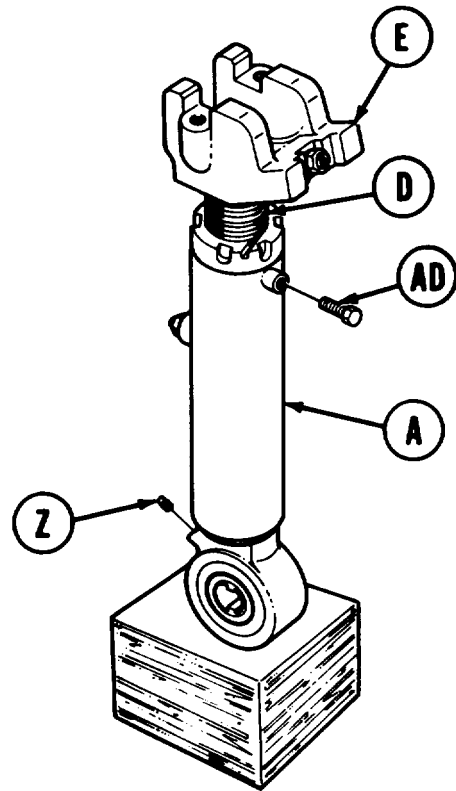
TA248777

Change 2 9-40



**TRACK ADJUSTING LINK REPAIR (Sheet 13 of 13)**

32. Stand track adjusting link (A) on wooden block (Item 15.1., Appendix B). Tap yoke (E) with hammer until shaft (D) is fully retracted.
33. Using 3/8 inch wrench, install pipe plug (Z).
34. Using 3/4 inch socket, install and tighten lockscrew (AD).



End of Task

TA248778

Change 2 9-41/(9-42 blank)

CHAPTER 10

STEERING SYSTEM MAINTENANCE INDEX

Procedure	Page
Steering Control Mount Assembly Repair .....	10-2
Steering Control Sleeve Assembly Replacement.....	10-3
Steering Shaft Assembly Repair and Replacement .....	10-5
Steering Control Rod Replacement.....	10-8
Steering Control Shield Support Replacement.....	10-10
Steering Control Shield Replacement .....	10-12
Rear Steering Control Rod Replacement.....	10-16

**STEERING CONTROL MOUNT ASSEMBLY REPAIR (Sheet 1 of 1)**

TOOLS: Arbor press

SUPPLIES: Brass bar stock 1-15/16 in. diameter

REFERENCE: TM 9-2350-222-20-1

PRELIMINARY PROCEDURE: Remove steering control mount assembly (TM 9-2350-222-20-1)

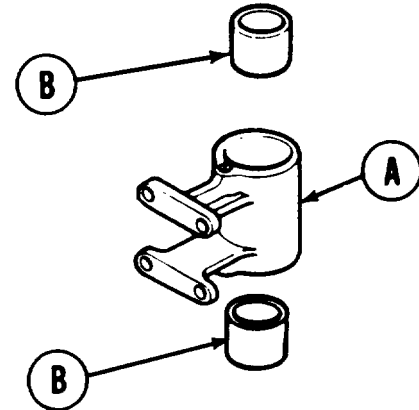
## INSPECTION AND REPAIR:

1. Inspect mount (A) and bearings (B) for cuts, nicks, deterioration, or wear.
2. Replace bearings and mount as required.

**NOTE**

**When bearings (B) need to be replaced, go to step 3.**

3. Using press and brass bar, remove two bearings (B) from mount (A).
4. Using press and brass bar, install two bearings (B) into mount (A).
5. Install steering control mount assembly (TM 9-2350-222-20-1).



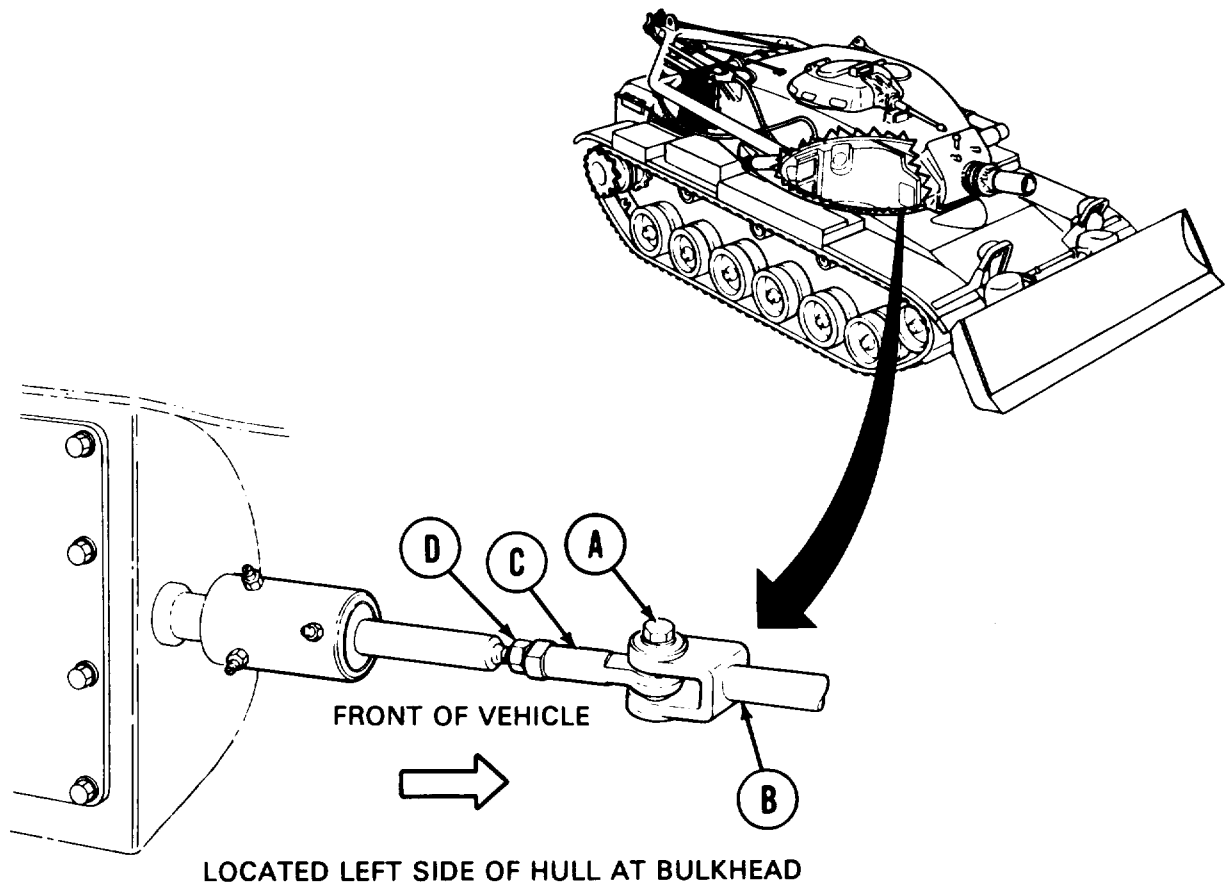
End of Task

TA130782

**STEERING CONTROL SLEEVE ASSEMBLY REPLACEMENT (Sheet 1 of 2)**

**TOOLS:** 7/16 in. combination box and open end wrench  
 9/16 in. combination box and open end wrench (2 required)  
 Torque wrench with 1/2 in. drive (0-175 lb-ft) (0-237 N•m)  
 7/16 in. crowfoot wrench with 1/2 in. drive  
 9/16 in. crowfoot wrench with 1/2 in. drive  
 9/16 in. socket with 3/8 in. drive  
 Flat-tip screwdriver  
 Ratchet with 3/8 in. drive

**REFERENCE:** TM 9-2350-222-20-1

**REMOVAL:**

1. Using 9/16 inch wrench, remove screw (A) securing front intermediate rod (B) to bulkhead shaft rod end (C).
2. Using one 9/16 inch wrench to hold nut (D), use other 9/16 inch wrench to remove rod end (C).

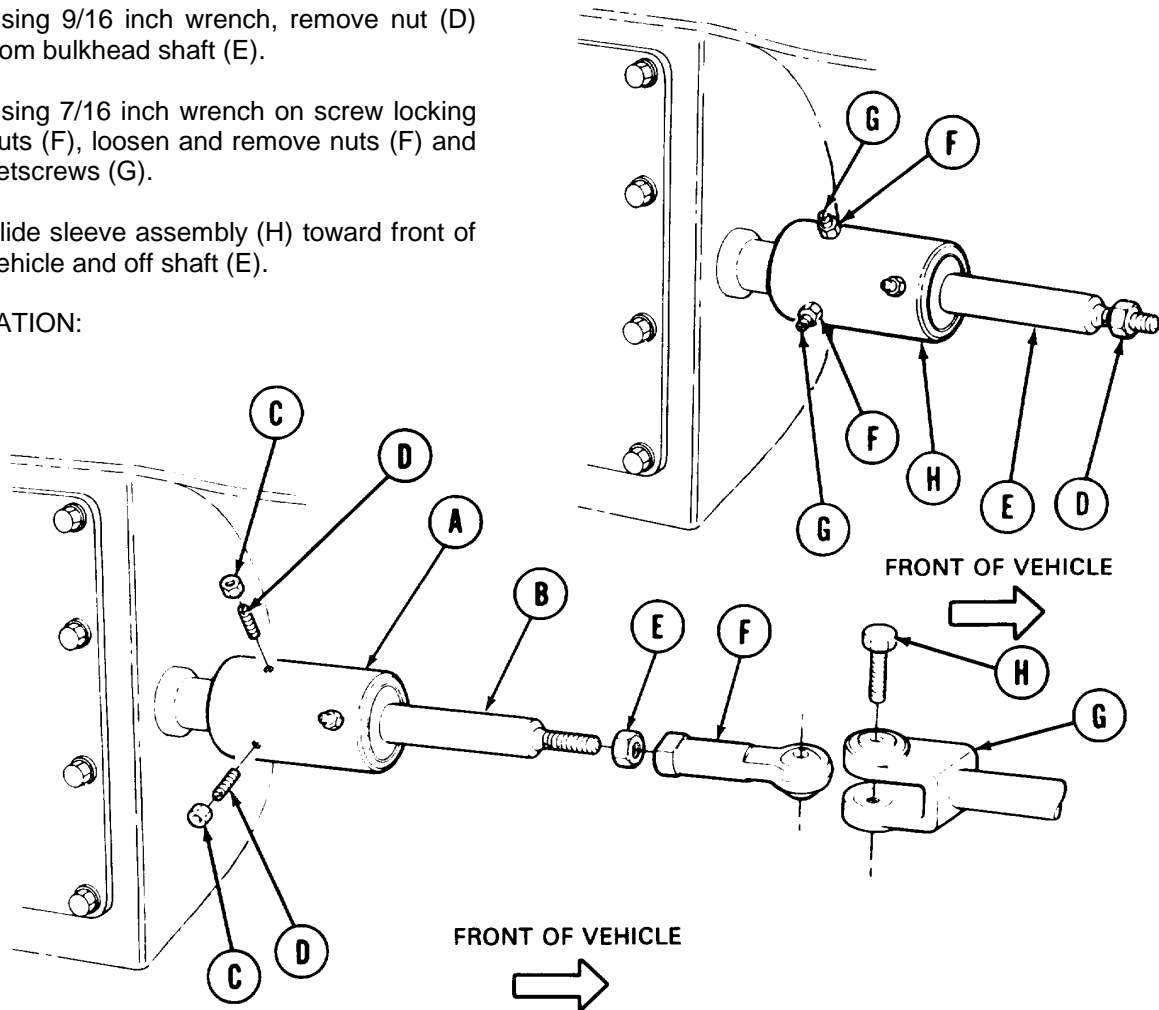
Go on to Sheet 2

TA252643

**STEERING CONTROL SLEEVE ASSEMBLY REPLACEMENT (Sheet 2 of 2)**

3. Using 9/16 inch wrench, remove nut (D) from bulkhead shaft (E).
4. Using 7/16 inch wrench on screw locking nuts (F), loosen and remove nuts (F) and setscrews (G).
5. Slide sleeve assembly (H) toward front of vehicle and off shaft (E).

**INSTALLATION:**



1. Slide sleeve assembly (A) over shaft assembly (B) as far as it will go.
2. Using 7/16 inch wrench to hold nut (C), install two screws (D) through lock nuts (C) into sleeve (A) until screws bottom out on hull connector. Using screwdriver, hold screw (D) and, using torque wrench and 7/16 inch crowfoot wrench, tighten nut (C) to 810 lb-ft (10-13 N•m).
3. Using 9/16 inch wrench, install nut (E) onto shaft (B).
4. Using one 9/16 inch wrench to hold nut (E), use other 9/16 inch wrench to install rod end (F) into shaft (B).
5. Position rod end (F) into clevis end (G) and, using 9/16 inch wrench, install screw (H) through rod end (F) and clevis end (G).
6. Adjust steering linkage (TM 9-2350-222-20-1).

End of Task

TA252644

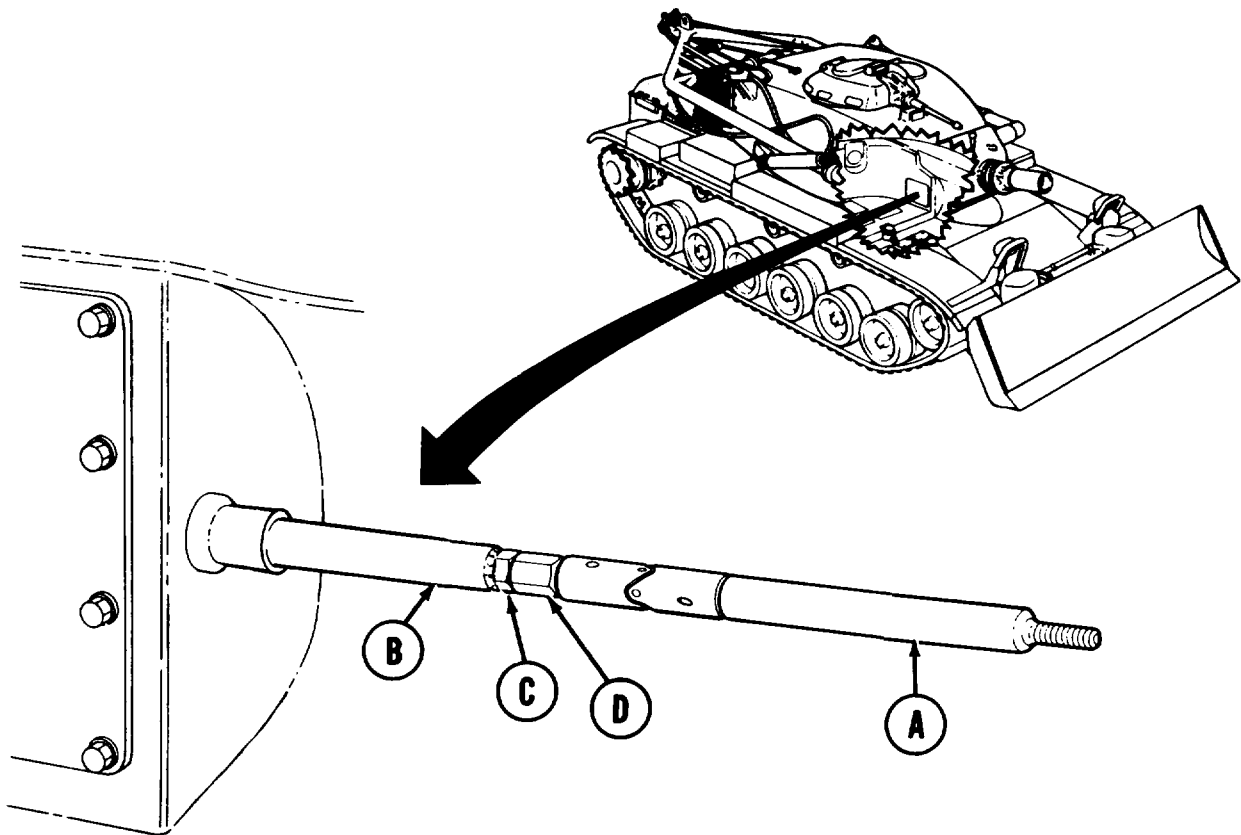
**STEERING SHAFT ASSEMBLY REPAIR AND REPLACEMENT (Sheet 1 of 3)**

**TOOLS:** Hammer  
 1/8 in. drive punch  
 5/8 in. combination box and open end wrench (2 required)  
 Vice

**SUPPLIES:** Pins (2 required)

**REFERENCE:** TM 9-2350-222-20-1

**PRELIMINARY PROCEDURES:** Remove steering control sleeve (page 10-3)  
 Disconnect rear steering control rod end (page 10-13, steps 1-4)



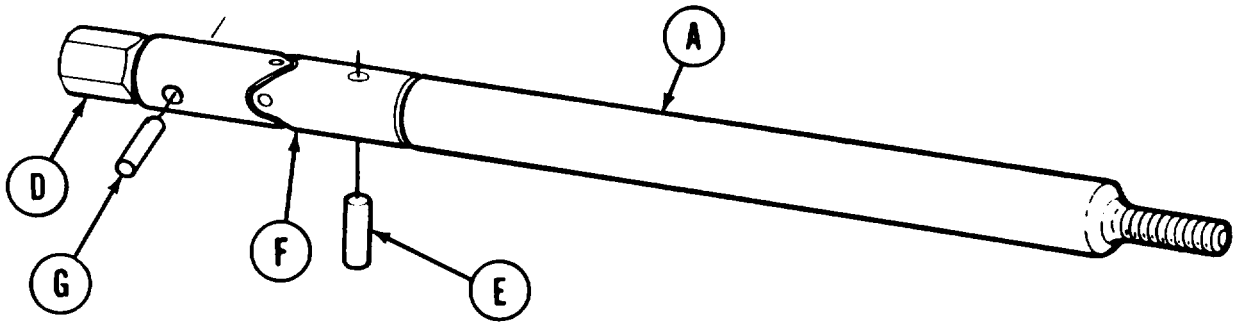
**REMOVAL:**

1. Using hands, pull shaft (A) forward until shaft (B) is exposed at bulkhead.
2. Using one 5/8 inch wrench to hold jamnut (C), use other 5/8 inch wrench on plug (D) and remove shaft assembly (A).

Go on to Sheet 2

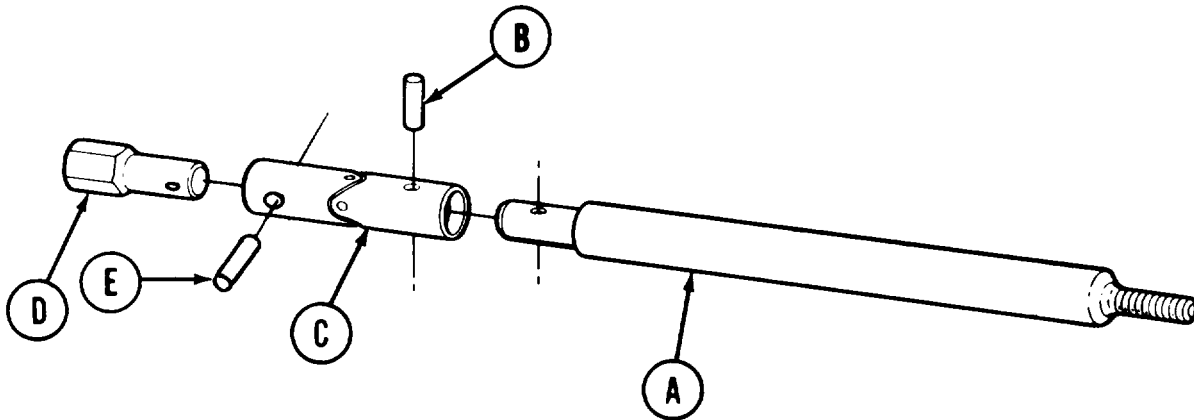
TA130785

## STEERING SHAFT ASSEMBLY REPAIR AND REPLACEMENT (Sheet 2 of 3)



3. Position shaft (A) in vise and using hammer and punch, remove pin (E) from universal joint (F). Throw pin (E) away.
4. Using hammer and punch, remove pin (G) from universal joint (F). Throw pin (G) away.
5. Remove plug (D) from universal joint (F).
6. Remove shaft (A) from universal joint (F).
7. Inspect shaft (A), universal joint (F), and plug (D) for looseness and wear. Replace defective parts.

## INSTALLATION:



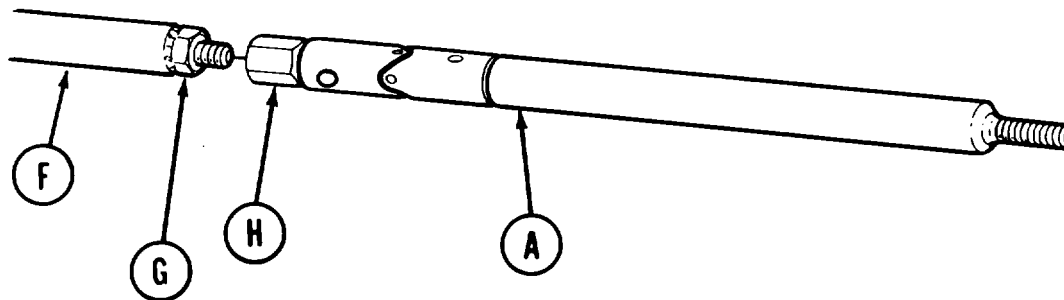
1. Position shaft (A) in vise and using hammer and punch, install new pin (B) into universal joint (C) and shaft (A).
2. Position plug (D) into universal joint (C) and using hammer and punch, install new pin (E) into universal joint (C) and plug (D).

Go on to Sheet 3

TA130786

**STEERING SHAFT ASSEMBLY REPAIR AND REPLACEMENT (Sheet 3 of 3)**

3. Remove shaft assembly (A) from vise and take it to turret compartment.
4. Position shaft assembly (A) onto shaft (F). Using 5/8 inch wrench to hold jamnut (G), use 5/8 inch wrench on plug (H) and tighten plug (H) against jamnut (G).
5. Install steering control sleeve (page 10-4).



6. Connect rear steering control rod end (page 10-18 and 19, steps 6-10).
7. Adjust steering linkage (TM 9-2350-222-20-1).

End of Task

TA130787



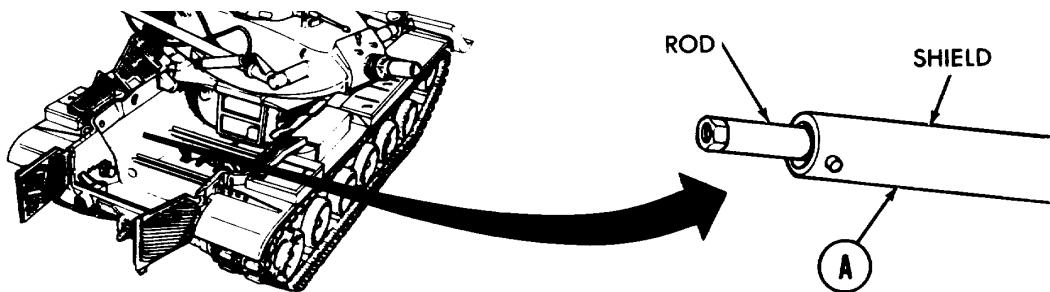
**STEERING CONTROL ROD REPLACEMENT (Sheet 1 of 2)**

TOOLS: 5/8 in. combination box and open end wrench (2 required)

REFERENCES: TM 9-2350-222-20-1

PRELIMINARY PROCEDURES: Remove left fuel tank (Page 4-51)  
 Remove outer riser link shield at rear of powerplant (TM 9-2350-222-20-1)  
 Remove support straps (page 10-10)  
 Remove rear steering linkage shield and rear control rod (page 10-10)

**REMOVAL:**



**NOTE**

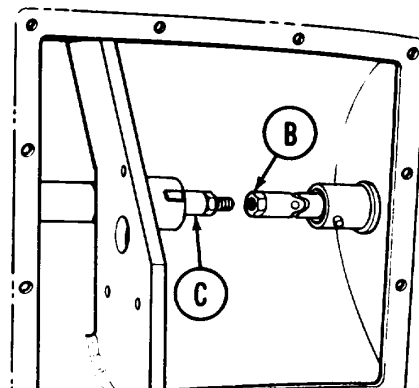
Connecting rod is located at left side of powerplant compartment.

1. Pull shield (A) to rear of vehicle and remove.

**NOTE**

Go to turret compartment and locate left access hatch.

2. Using one 5/8 inch wrench to hold plug (B) and other 5/8 inch wrench on end of rod (C), remove rod (C).



Go on to Sheet 2

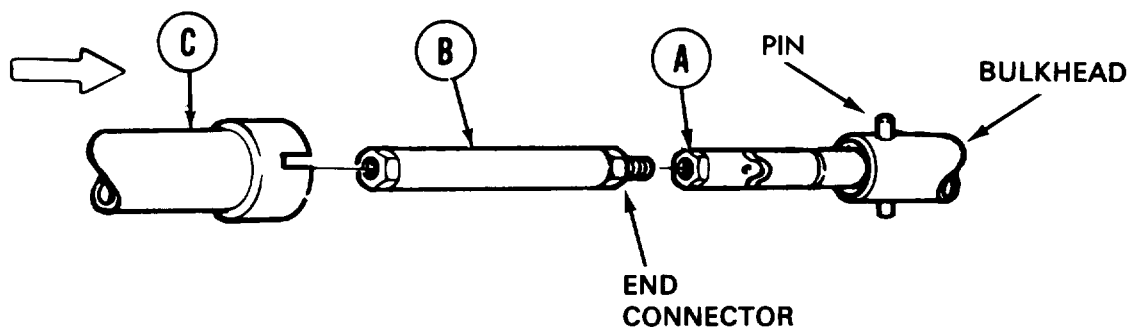
TA130788

**STEERING CONTROL ROD REPLACEMENT (Sheet 2 of 2)****INSPECTION:**

1. Inspect shield (C) for cracks, dents, or warpage.
2. Inspect steering control rod (B) for bends, breaks, or stripped threads.

**INSTALLATION:****NOTE**

**Make sure universal plug (A) is tight and secure.**



1. Using both hands, screw connector rod (B) into universal (A) near bulkhead.
2. Using one 5/8 inch wrench at end of connector rod (B) and the other 5/8 inch wrench to hold universal plug (A), tighten rod (B) into end plug (A).
3. Slide shield (C) over rod (B) so pin near bulkhead fits into slot of shield.
4. Install support strap (page 10-11).
5. Install rear connector rod and its cover shield (page 10-11).
6. Install outer riser link shield at rear of powerplant compartment (TM 9-2350-222-20-1).
7. Install left fuel tank (page 4-59).

End of Task

TA252645

**STEERING CONTROL SHIELD SUPPORT REPLACEMENT (Sheet 1 of 2)**

- TOOLS:** Torque wrench with 1/2 in. drive (0-175 lb-ft) (0-237 N•m)  
 1/2 in. socket with 1/2 in. drive  
 1/2 in. combination box and open end wrench  
 Ratchet with 1/2 in. drive  
 5/8 in. combination box and open end wrench (2 required)

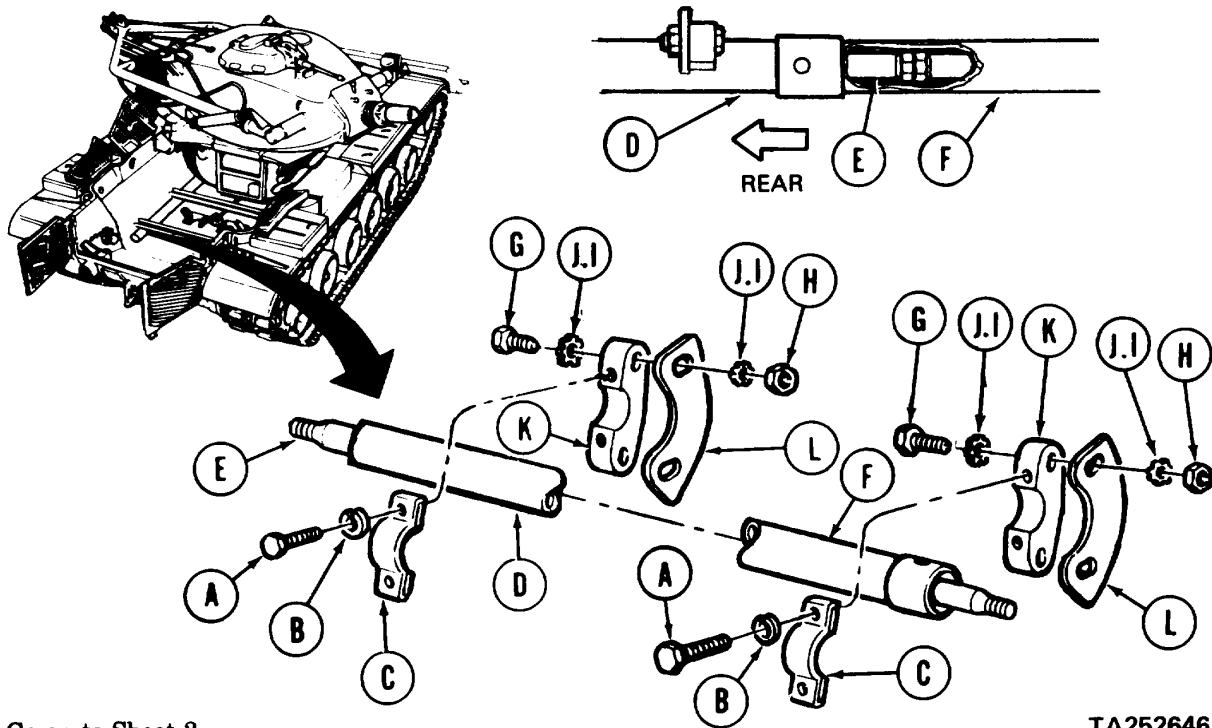
- SUPPLIES:** Lockwashers (MS35335-34) (12 required)

REFERENCE: TM 9-2350-222-20-1

PRELIMINARY PROCEDURES: Remove left fuel tank (page 4-51)  
 Disconnect control rod at rear clevis (TM 9-2350-222-20-1)

**REMOVAL:**

- Using socket, remove four screws (A) and lockwashers (B). Remove straps (C). Throw lockwashers away.
- Slide shield (D) back approximately 2 inches toward rear of vehicle.
- Using two 5/8 inch wrenches, disconnect rear control rod (E).
- Remove shield (D) and control rod (E).
- Remove front shield (F) from vehicle.
- Using 1/2 inch wrench to hold screw (G), use socket to remove four nuts (H) and lockwashers (J) from screws (G). Throw lockwashers away.
- Remove four screws (G), four lockwashers (J.1), and two supports (K) from plates (L). Throw lockwashers away.

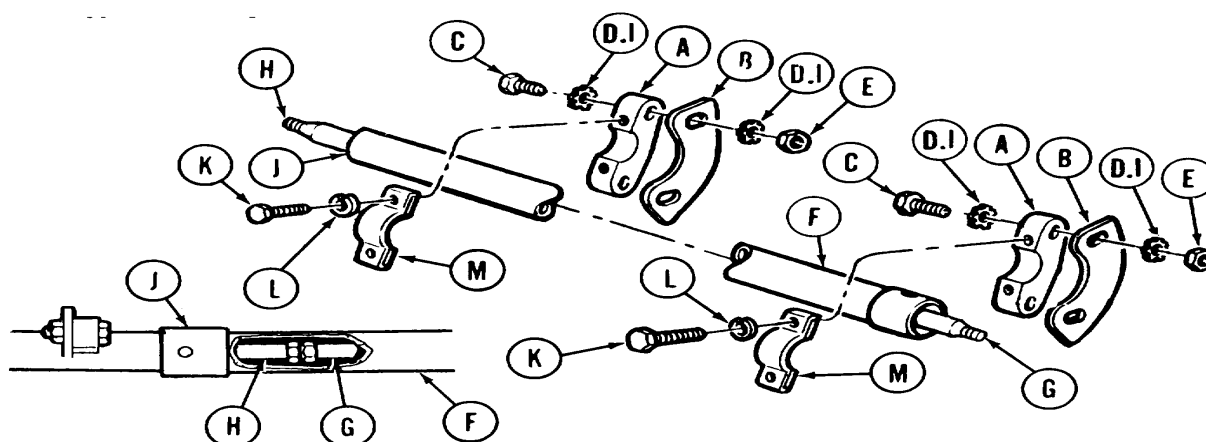


Go on to Sheet 2

TA252646

**STEERING CONTROL SHIELD SUPPORT REPLACEMENT (Sheet 2 of 2)****INSTALLATION:**

1. Position support (A) onto plate (B) and install four screws (C) and new lockwashers (D) through support (A) and plate (B).



2. Position four new lockwashers (D.1) and nuts (E) onto four screws (C).
3. Using 1/2 inch wrench to hold screws (C), use torque wrench and socket to tighten four nuts (E) to 15-20 lb-ft (20-27 N.m).
4. Place front shield (F) over rod (G).
5. Place rear rod (H) and shield (J) in position. Using two 5/8 inch wrenches, connect front rod (G) and rear rod (H).
6. Move front shield (F) and rear shield (J) toward front of vehicle until secure.
7. Position four screws (K) and four new lockwashers (L) through straps (M) into supports (A). Use torque wrench and socket to tighten four screws (K) to 15-20 lb-ft (20-27 N.m).
8. Connect rear control rod to clevis (TM 9-2350-222-20-1).
9. Install fuel tank (page 4-59).

End of Task

Change 1 10-11

TA252647

**STEERING CONTROL SHIELD REPLACEMENT (Sheet 1 of 4)**

PROCEDURE INDEX

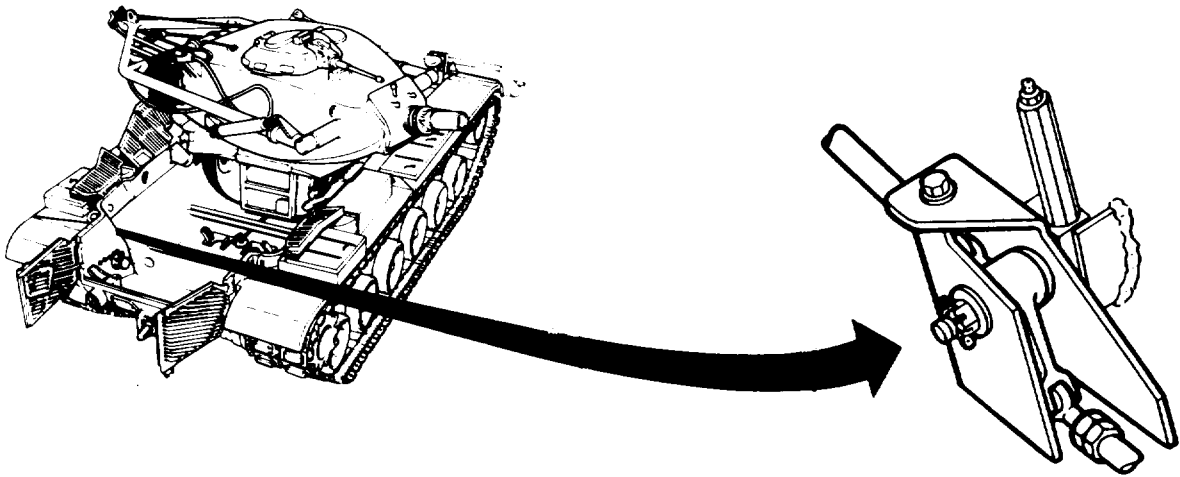
PROCEDURE	PAGE
Removal	10-13
Cleaning and Inspection	10-14
Installation	10-14

**TOOLS:** Slip joint pliers  
 .3/4 in. combination box and open end wrench  
 7/16 in. combination box and open end wrench  
 9/16 in. combination box and open end wrench  
 Torque wrench with 1/2 in. drive (0-175 lb-ft) (0-237 N.m)  
 9/16 in. socket with 1/2 in. drive  
 Ratchet with 1/2 in. drive

**SUPPLIES:** Cotter pin (MS24665-287)  
 Dry cleaning solvent (Item 12, Appendix B)  
 Rags (Item 31, Appendix B)  
 Lockwasher (MS35335-35) (2 required)

**REFERENCE:** TM 9-2350-222-20-1

**PRELIMINARY PROCEDURE:** Remove left fuel tank (page 4-51)

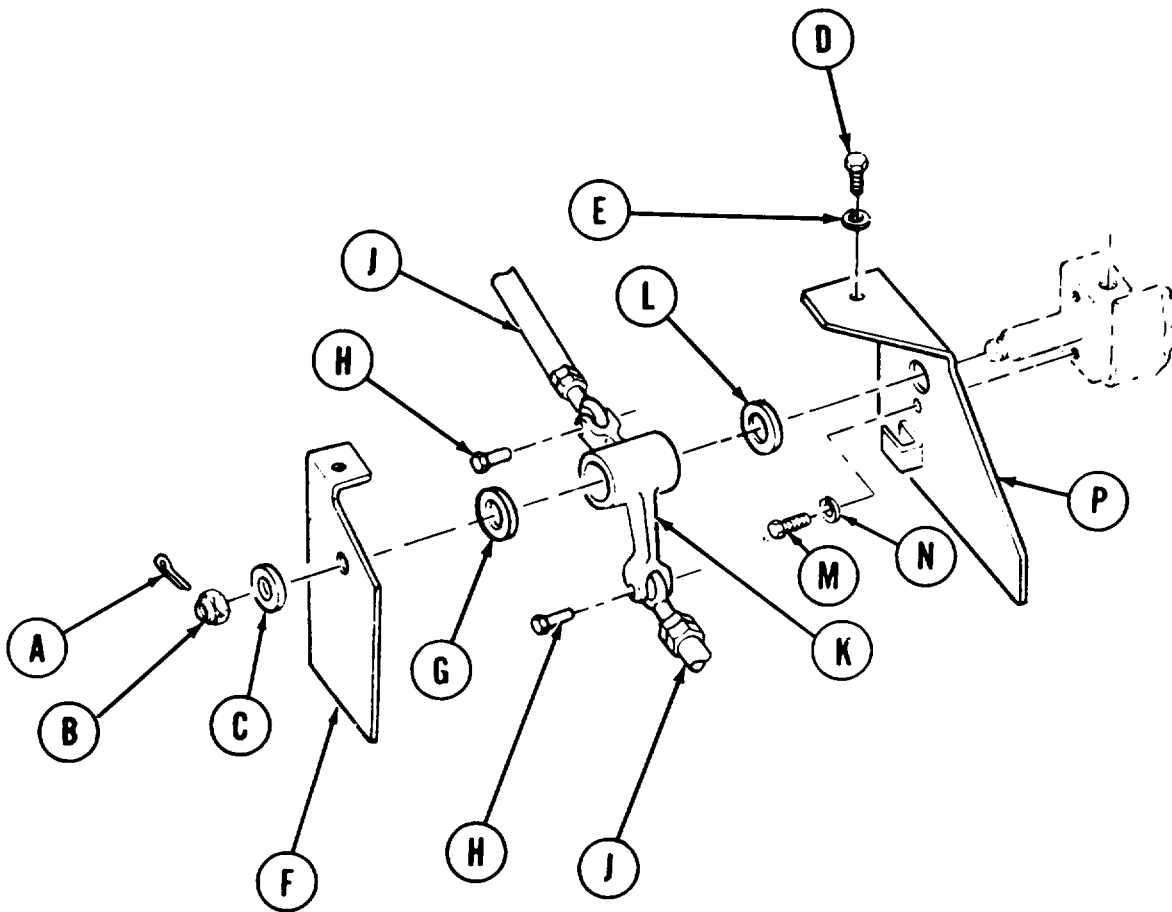


Go on to Sheet 2

TA252648

**STEERING CONTROL SHIELD REPLACEMENT (Sheet 2 of 4)****REMOVAL:**

1. Using pliers, remove cotter pin (A). Throw cotter pin away.
2. Using 3/4 inch wrench, remove nut (B) and washer (C).
3. Using 7/16 inch wrench, remove screw (D) and washer (E).
4. Remove shield (F) and washer (G).
5. Using 9/16 inch wrench, remove both rod end bolts (H) to free connecting link assembly from rod ends (J).
6. Using both hands, carefully pull connecting link assembly (K) and washer (L) clear of hull wall.
7. Using 9/16 inch wrench, remove two screws (M) and two lockwashers (N). Throw lockwashers away.
8. Remove shield (P).



Go on to Sheet 3

TA252649

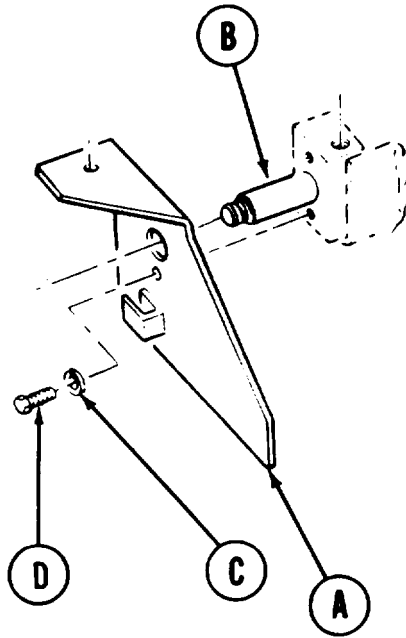
Change 1 10-13

**STEERING CONTROL SHIELD REPLACEMENT (Sheet 3 of 4)****CLEANING AND INSPECTION:**

1. Using rags (Item 31, Appendix B) and dry cleaning solvent (Item 12, Appendix B), clean all parts.
2. Inspect all parts for damage or wear. Replace if required.

**INSTALLATION:**

1. Position shield (A) over shaft (B).
2. Using 9/16 inch wrench, install two new lockwashers (C) and two screws (D).
3. Using torque wrench and socket, tighten screws (D) to 15-20 lb-ft (20-27 N.m).



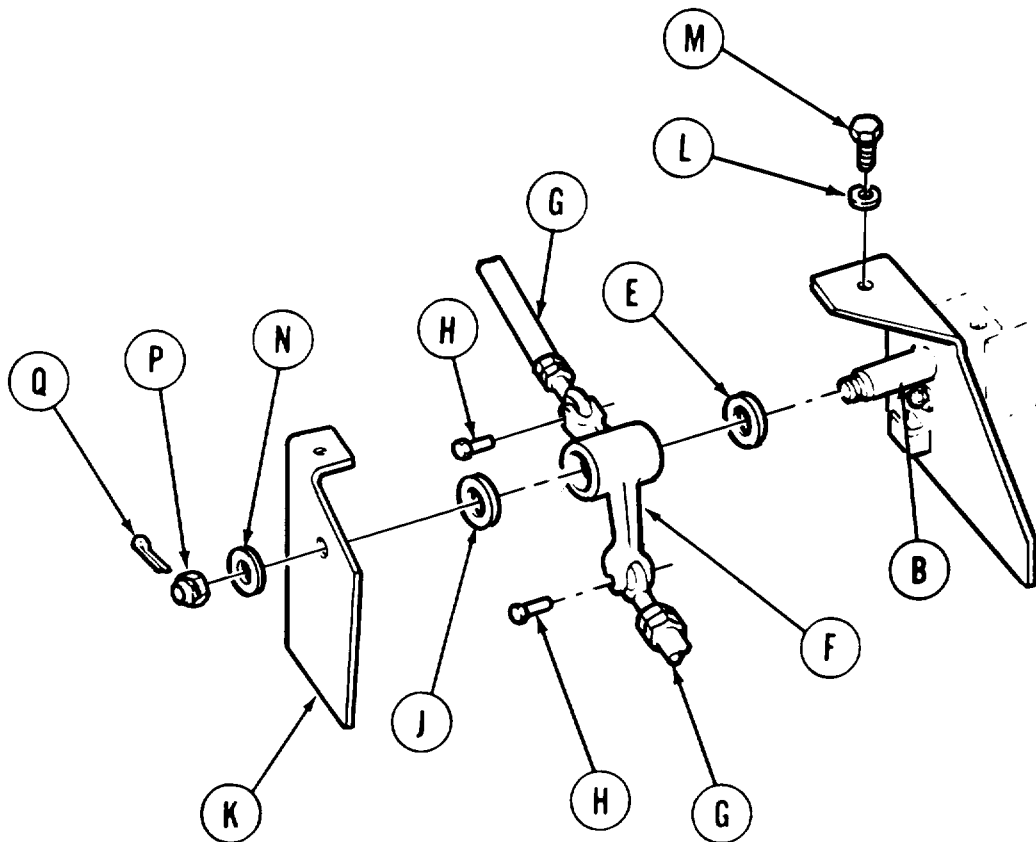
Go on to Sheet 4

TA252650

Change 1 10-14

## STEERING CONTROL SHIELD REPLACEMENT (Sheet 4 of 4)

4. Position washer (E) on shaft (B).
5. Using both hands, align and push connecting link assembly (F) over shaft (B).
6. Install rod ends (G) in devices of connecting link assembly (F) and, using 9/16 inch socket, install bolts (H).
7. Using torque wrench and socket, tighten bolts (H) to 15-20 lb-ft (20-27 N.m).
8. Position washer (J) and shield (K) on shaft (B).
9. Using 7/16 inch wrench, install flat washer (L) and screw (M).
10. Using 3/4 inch wrench, install washer (N) and nut (P).
11. Using pliers, install new cotter pin (Q).
12. Install left fuel tank (page 4-59).
13. Adjust steering linkage (TM 9-2350-222-20-1).



End of Task

TA252651

Change 1 10-15

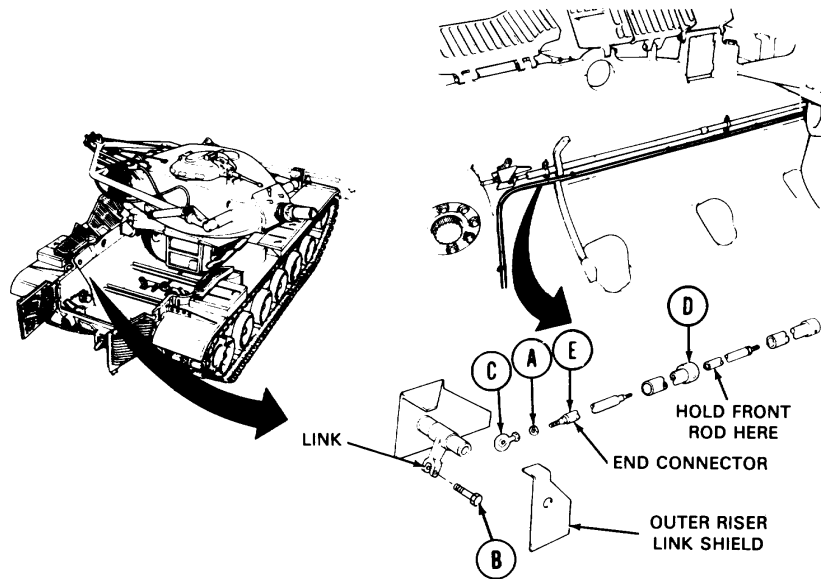


## REAR STEERING CONTROL ROD REPLACEMENT (Sheet 1 of 3)

**TOOLS:** Torque wrench with 1/2 in. drive (0-175 lb-ft) (0-237 N-m)  
 9/16 in. crowfoot wrench with 1/2 in. drive  
 9/16 in. combination box and open end wrench  
 5/8 in. combination box and open end wrench (2 required)  
 9/16 in. socket with 1/2 in. drive

**REFERENCE** TM 9-2350-222-20-1

**PRELIMINARY PROCEDURES:** Remove left fuel tank (page 4-51)  
 Remove support straps (page 10-10)  
 Remove outer riser link shield at rear of vehicle (TM 9-2350-222-20-1)



2. Using 9/16 inch wrench, remove self-locking bolt (B).
3. Disconnect connector rod end (C) from link.
4. Using 9/16 inch wrench, remove rod end (C) and jamnut (A).
5. Pull shield (D) to rear. Pull it off rod (E) toward rear of vehicle.
6. Using two 5/8 inch wrenches, one to hold front rod while loosening connecting rod at end connector, remove rear steering control rod (E).

Go on to Sheet 2

**Change 1 10-16**

TA252652

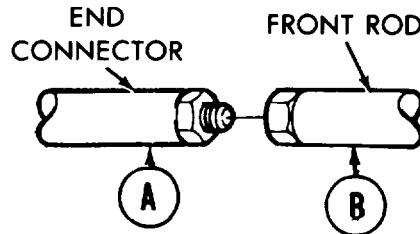
**REAR STEERING CONTROL ROD REPLACEMENT (Sheet 2 of 3)**

**INSPECTION:**

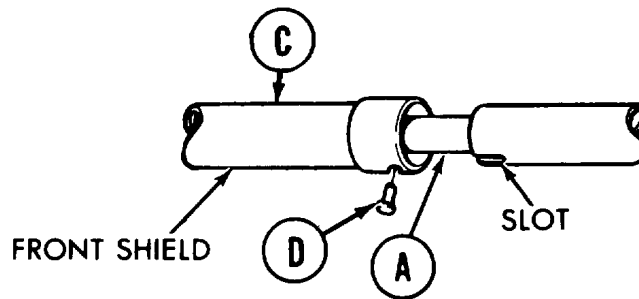
1. Inspect rod for cracks and bends.
2. Inspect threads for stripped areas.

**INSTALLATION:**

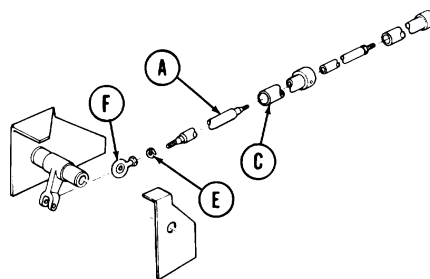
1. Using both hands, tighten rear steering control rod (A) onto front rod (B)

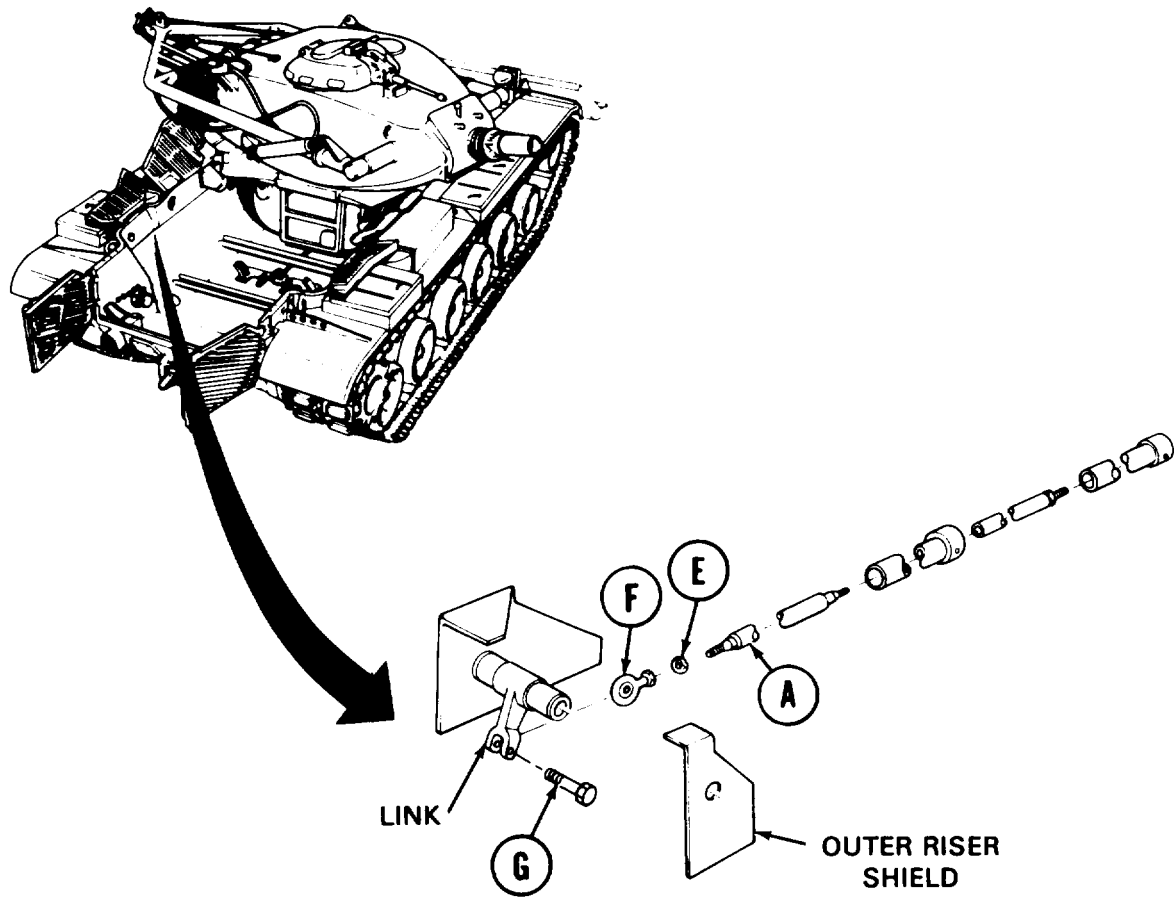


2. Using one 5/8 inch wrench to hold front rod (B) and other 5/8 inch wrench on end connector of rear steering rod (A), tighten rod (A) in place.



3. Slide shield (C) over rod (A).
4. Connect shield (C) by inserting rear shield pin (D) into slot of shield (C) and pushing forward on shield (C) (to lock in place).
5. Screw jamnut (E) onto threaded end of rod (A).
6. Screw rod end (F) into threaded end of rod (A).





7. Adjust rod end (F) on rod (A) so rod end will align to link.
8. Screw bolt (G) into link and rod end (F) connection.
9. Using 9/16 inch socket and torque wrench, tighten bolt (G) to 15-20 lb-ft (20-27 N m).
10. Using crowfoot and torque wrenches, tighten jamnut (E) up to rod end (F) to 15 20 lb-t (20-27 N m).
11. Install outer riser link shield at rear of vehicle (TM 9-2350-222-20-1).
12. Install support straps (page 10-11).
13. Install left fuel tank (page 4-59).

End of Task

TA252654

CHAPTER 11

HULL INTERIOR MAINTENANCE INDEX

Procedure	Page
Hull-Turret Inflatable Seal Replacement .....	11-2
Rear Drain Valve Control Rod Guides Replacement .....	11-6
Rear Drain Valve Front Control Rod Replacement .....	11-9
Rear Drain Valve Interconnecting (Intermediate) Control Rods and Universal Joints Replacement .....	11-13
Rear Drain Valve Control Rod Bushing and Seals Replacement .....	11-22
Rear Drain Valve Rear Intermediate Control Rod Replacement.....	11-25
Ammunition Rack (Left and Right) Replacement .....	11-28
Ammunition Rack Repair.....	11-29

**HULL-TURRET INFLATABLE SEAL REPLACEMENT (Sheet 1 of 4)**

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	11-2
Cleaning and Inspection	11-3
Test	11-4
Installation	11-5

**TOOLS:** Putty knife  
Flat-tip screwdriver  
Wire brush

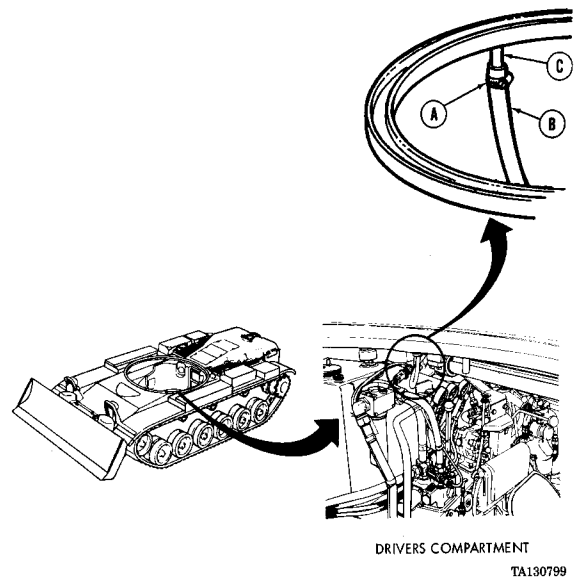
**SUPPLIES:** Silicone compound (Item 10, Appendix B)  
Dry cleaning solvent (Item 12, Appendix B)  
Channel brush (Item 2, Appendix B)

**REFERENCE:** TM 9-2350-222-34-2

**PRELIMINARY PROCEDURE:** Remove turret (TM 9-2350-222-34-2)

**REMOVAL:**

- Using screwdriver, loosen clamp (A) and remove hose (B) and clamp (A) from turret seal stem (C).

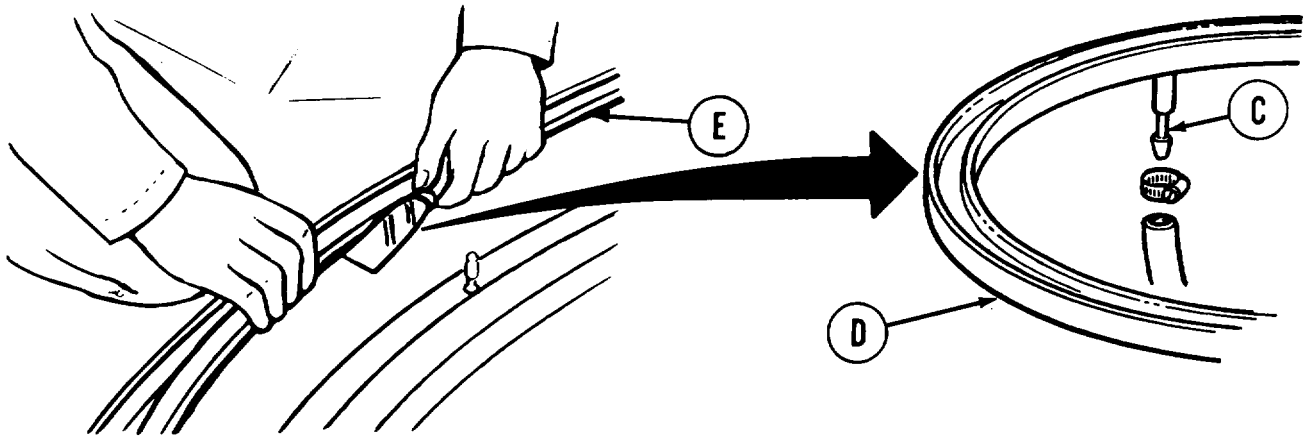


Go on to Sheet 2

TA130799

**HULL-TURRET INFLATABLE SEAL REPLACEMENT (Sheet 2 of 4)**

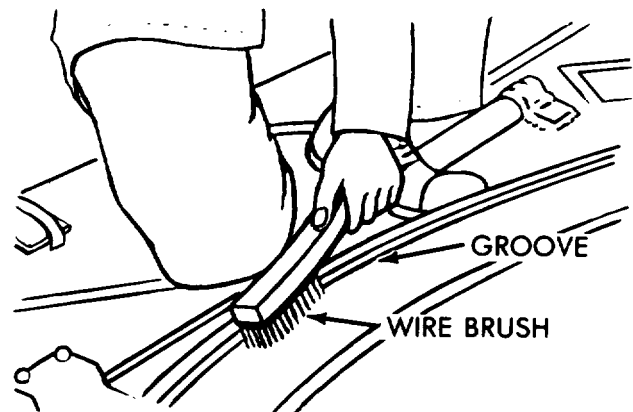
- Using putty knife, pry seal (D) from hull groove (E) about 10 inches on each side of stem (C).



- Pull turret seal (D) and stem (C) through hull groove (E).
- Using putty knife, pry remainder of turret seal (D) from hull groove (E).

**CLEANING:**

Using wire brush and dry cleaning solvent (Item 12, Appendix B), clean hull groove of excess paint, dirt, oil, or grease.



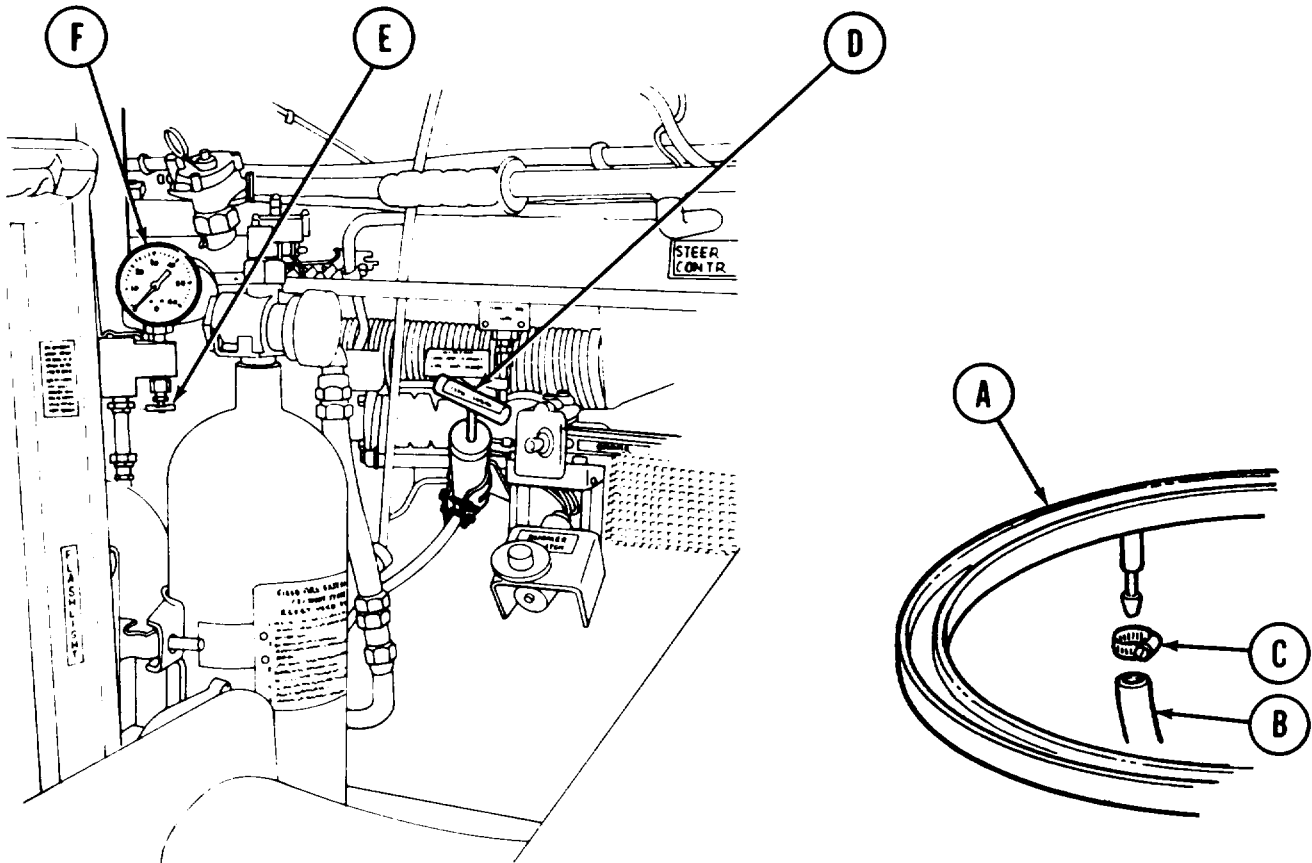
TA130800

Go on to Sheet 3

## HULL-TURRET INFLATABLE SEAL REPLACEMENT (Sheet 3 of 4)

## TEST:

1. Connect new turret seal (A) to hose (B) and clamp (C), and tighten clamp (C), using screwdriver.
2. Using pump (D) in driver's compartment, inflate turret seal (A) to 25 psi. Read gage (F). After four hours there shall be no more than 1 psi pressure drop.



3. Release pressure from seal by turning petcock (E) counterclockwise.
4. Once pressure is released, tighten petcock (E).
5. Disconnect hose (B) and clamp (C) from turret seal (A).

Go on to Sheet 4

TA130801

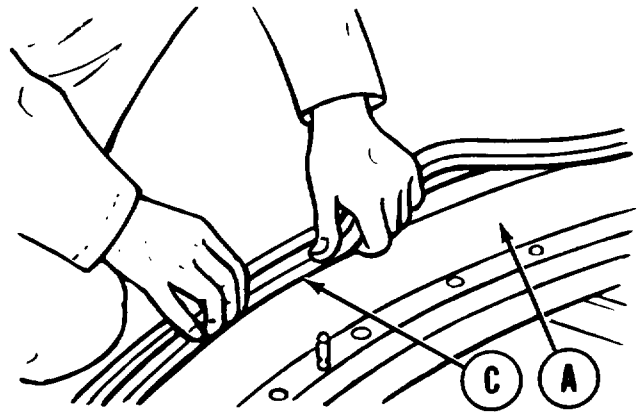
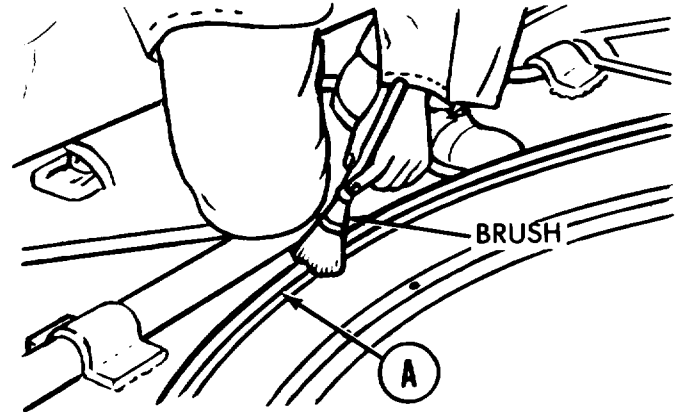
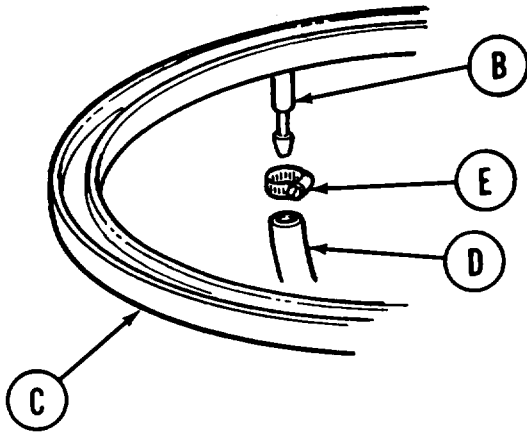
## HULL-TURRET INFLATABLE SEAL REPLACEMENT (Sheet 4 of 4)

## INSTALLATION:

1. Using channel brush (Item 2, Appendix B), apply silicone compound (Item 10, Appendix B) to hull groove (A).
2. Starting at seal stem (B), install seal (C) into hull groove (A).

**NOTE**

**Make sure seal is fully seated in groove.**



3. Install hose (D) and clamp (E) to stem (B).
4. Using screwdriver, tighten clamp (E).
5. Install turret (TM 9-2350-222-34-2).

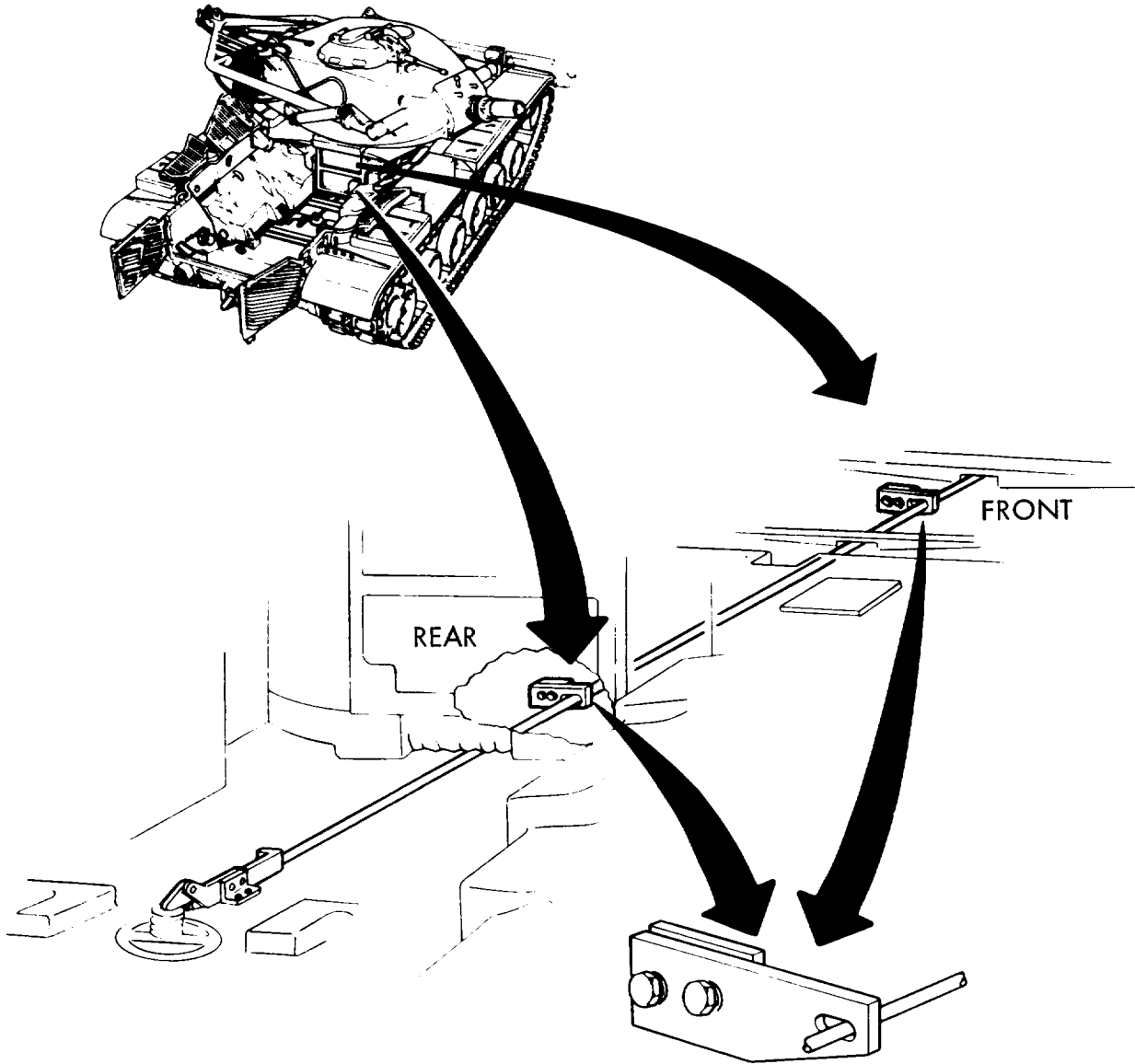
End of Task

TA130802



REAR DRAIN VALVE CONTROL ROD GUIDES REPLACEMENT (Sheet 1 of 3)

TOOLS:  
 Ratchet with 1/2 in. drive  
 12 in. extension with 1/2 in. drive  
 5 in. extension with 1/2 in. drive  
 7/16 in. socket with 1/2 in. drive



Go on to Sheet 2

TA130803

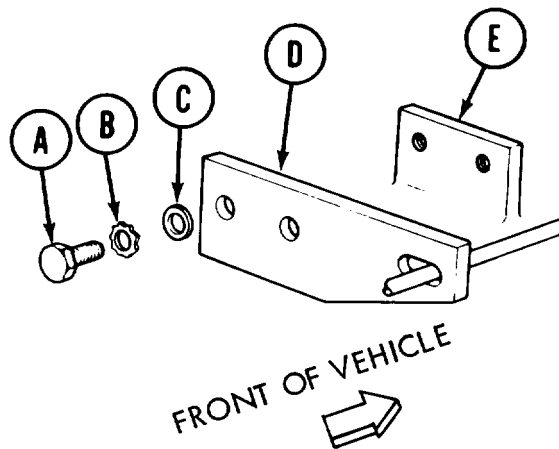
## REAR DRAIN VALVE CONTROL ROD GUIDES REPLACEMENT (Sheet 2 of 3)

## REMOVAL:

## NOTE

To remove front guide, perform steps 1 thru 3. To remove rear guide, perform steps 4 and 5.

1. Remove batteries (TM 9-2350-222-20-1).
2. Remove front control rod (page 11-9).
3. Using socket, remove two screws (A), lockwashers (B), and flat washers (C) holding front guide (D) to support flange (E).



4. Remove rear intermediate control rod (page 11-13).

## NOTE

Access to rear guide (D) is through engine compartment lower access opening from engine compartment.

5. Using socket and two extensions, remove two screws (A), lockwashers (B), and flat washers (C) holding rear guide (D) to support flange (E).

Go on to Sheet 3

TA130804

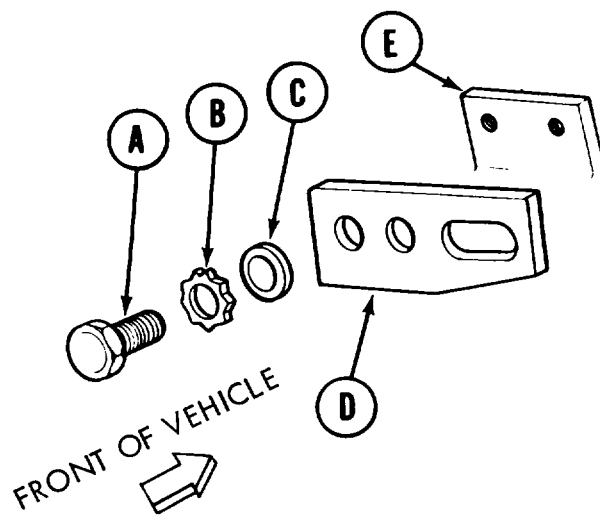
## REAR DRAIN VALVE CONTROL ROD GUIDES REPLACEMENT (Sheet 3 of 3)

## INSTALLATION:

## NOTE

To install front guide perform steps 1 thru 3. To install rear guide, perform steps 4 and 5.

1. Using socket, install two screws (A), lockwashers (B), and flat washers (C) to hold front guide (D) to support flange (E).
2. Install front control rod (page 11-11).
3. Install batteries (TM 9-2350-222-20-1).



4. Using socket and two extensions, install two screws (A), lockwashers (B), and flat washers (C) to hold rear guide (D) to support flange (E).
5. Install rear intermediate control rod (page 11-18).

End of Task

TA130805

**REAR DRAIN VALVE FRONT CONTROL ROD REPLACEMENT (Sheet 1 of 4)**  
**PROCEDURE INDEX**

PROCEDURE	PAGE
Removal	11-9
Installation	11-11

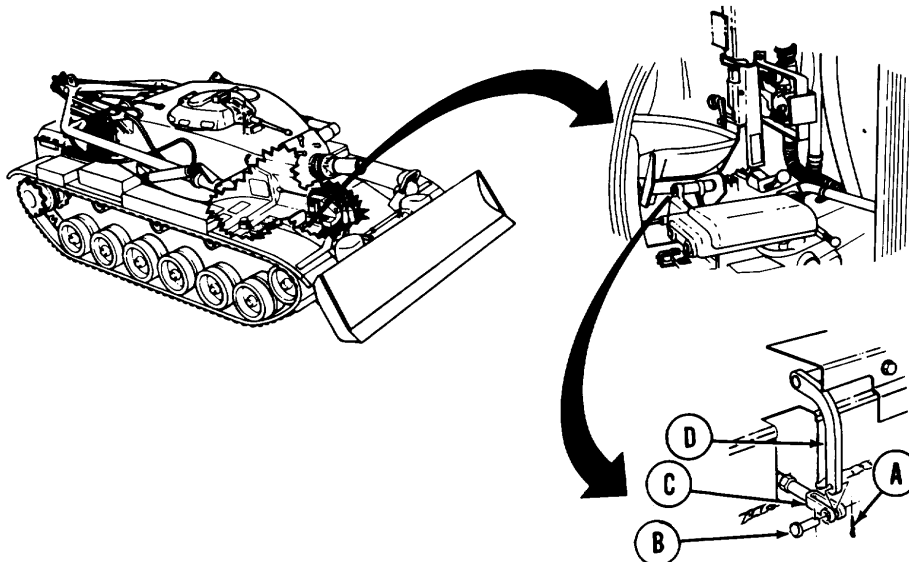
**TOOLS:** Slip joint pliers  
 Hammer  
 9/16 in. combination box and open end wrench  
 3/8 in. drive punch  
 Flashlight  
 Vise

**SUPPLIES:** 3/4 in. wood block (7 in. x 3 in.)  
 Cotter pin  
 Spring pin (MS9048-38)  
 Welding rod, 1/16 in. diameter, cut to 10 in. length

**REFERENCES:** TM 9-2350-222-20-1  
 TM 9-2350-222-20-2  
 TM 9-2350-222-10

**PRELIMINARY PROCEDURES:** Dump driver's seat (TM 9-2350-222-10)  
 Remove sliping (TM 9-2350-222-20-2)  
 Close engine compartment drain valve (TM 9-2350-222-10)

**REMOVAL:**

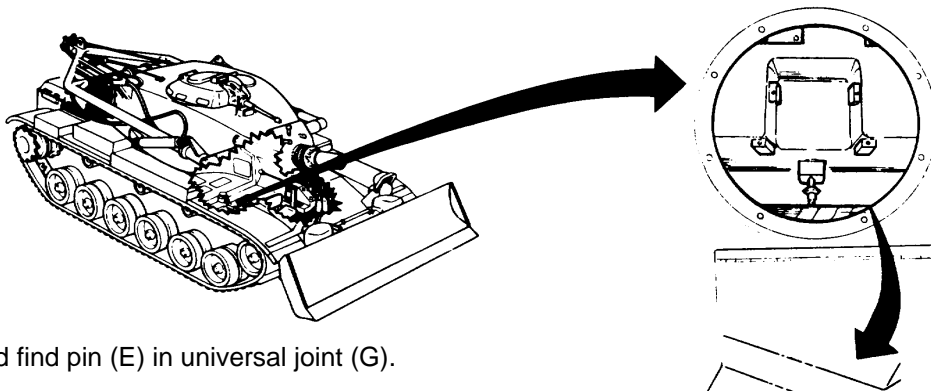


1. Using pliers, remove cotter pin (A) from clevis pin (B). Throw cotter pin away.
2. Remove clevis pin (B) from clevis (C) and lever (D).

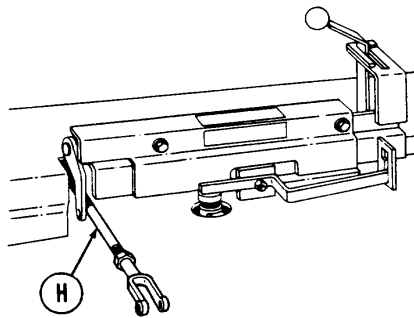
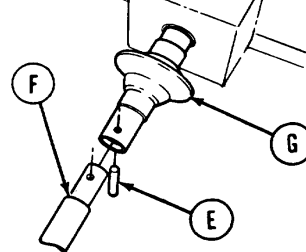
Go on to Sheet 2

NOTE

To perform step 3, pin (E) must be in straight up position. If pin (E) is not in straight up position, remove rod end from clevis at engine compartment drain valve (page 11-25, steps 1 and 2) and turn rod (F) so pin (E) is in straight up position.



3. Go to turret and find pin (E) in universal joint (G).
4. Using hammer and welding rod, drive pin (E) out of universal joint (G). Throw pin away.
5. Open engine compartment drain valve (TM 92350-222-10).

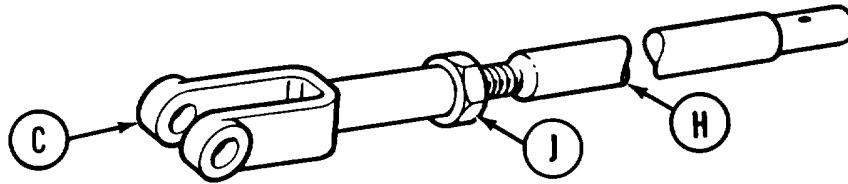


6. Go to driver's compartment and using hands, remove rod assembly (H) from under turret floor. Carry rod assembly (H) to vise.

Go on to Sheet 3

TA130807

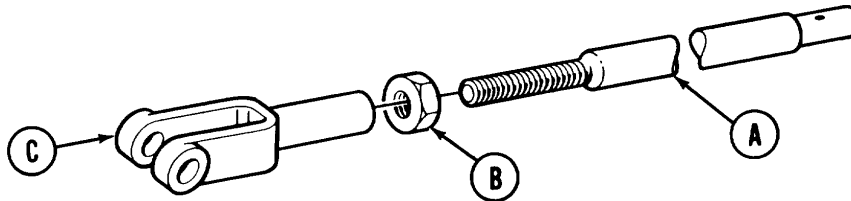
## REAR DRAIN VALVE FRONT CONTROL ROD REPLACEMENT (Sheet 3 of 4)



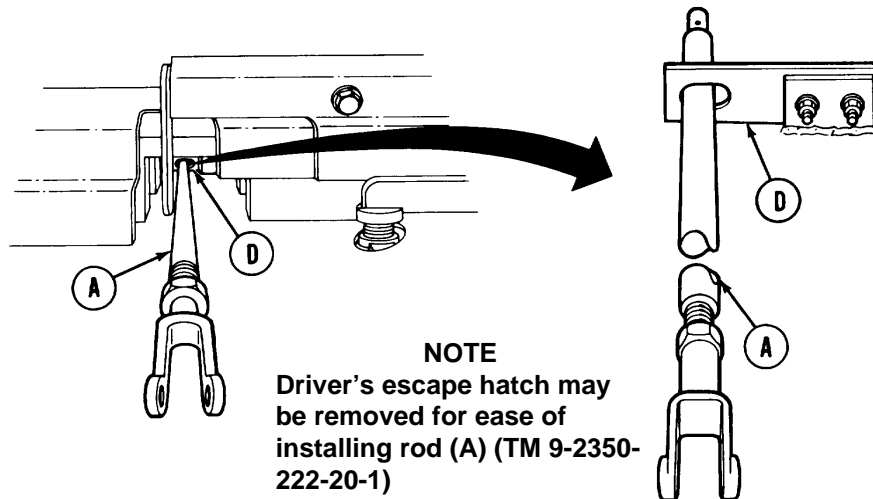
7. Securing rod assembly (H) in vise, use 9/16 inch wrench to loosen jamnut (J).
8. Using 9/16 inch wrench on flats of clevis (C), remove clevis (C) from rod (H).
9. Remove jamnut (J) from rod (H).

## INSTALLATION:

1. Securing rod (A) in vise, use 9/16 inch wrench to install jamnut (B) onto rod (A).
2. Using 9/16 inch wrench, install clevis (C) onto rod (A).



3. Remove rod assembly (A) from vise and go to driver's compartment.

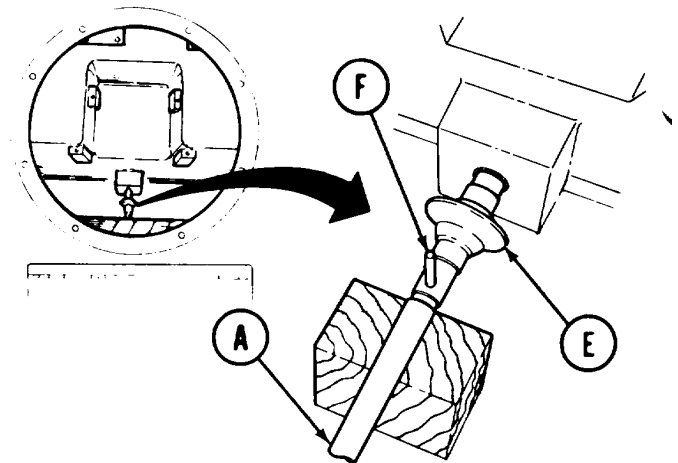


4. Push unthreaded end of rod (A) through hole in guide (D). Guide is located under turret floor so it may be necessary to use a flashlight.

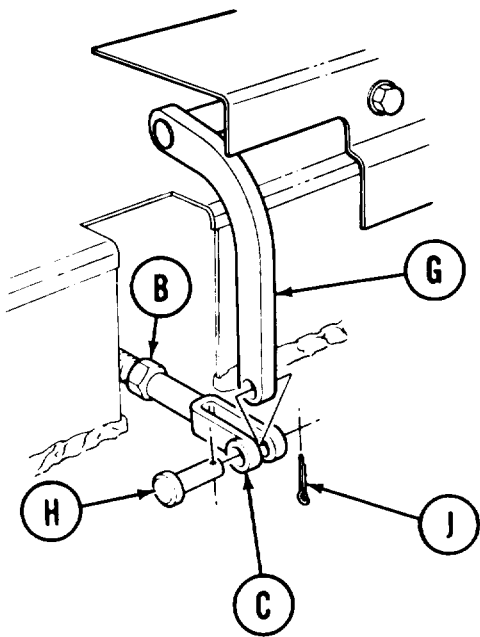
Go on to Sheet 4

REAR DRAIN VALVE FRONT CONTROL ROD REPLACEMENT (Sheet 4 of 4)

5. Go to turret and find universal joint (E).
6. Position rod (A) into universal joint (E).
7. Place wood block under rod (A) as shown.
8. Aline holes in rod (A) and universal joint (E).
9. Using hammer and punch, drive new pin (F) all the way in hole until pin is flush with universal joint (E).
10. Remove wood block from under rod (A).
11. If rod end at engine compartment drain valve was removed during removal, install clevis (page 11-26). If clevis was not removed, go to step 13.
12. In driver's compartment, position clevis (C) onto lever (G).
13. Close engine compartment drain valve.



14. Push pin (H) through holes in clevis (C) and lever (G).
15. Using pliers, install new cotter pin (J) through pin (H).
16. Open engine compartment drain valve.
17. Using 9/16 inch wrench, tighten jamnut (B).
18. If removed, install driver's escape hatch (TM 9-2350-222-20-1).
19. Install driver's seat (TM 9-2350-222-10).
20. Install slipring (TM 9-2350-222-20-2).
21. Perform rear drain valve adjustment (TM 92350-222-20-1).



End of Task

TA130809

**REAR DRAIN VALVE INTERCONNECTING (INTERMEDIATE) CONTROL ROD AND UNIVERSAL JOINTS REPLACEMENT (Sheet 1 of 9)**

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	11-14
Inspection	11-17
Installation	11-18

TOOLS: Ratchet with 1/2 in. drive  
 Vise  
 Hammer  
 9/16 in. socket with 1/2 in. drive  
 Slip joint pliers  
 Putty knife  
 Pry bar

SUPPLIES: Gasket (8721204)  
 Cotter pins  
 1/16 in. diameter steel rod (10.0 in. long)  
 Wood block (3/4 in. x 7 in. x 3 in.)  
 Spring pins (MS9048-38) (2 required)

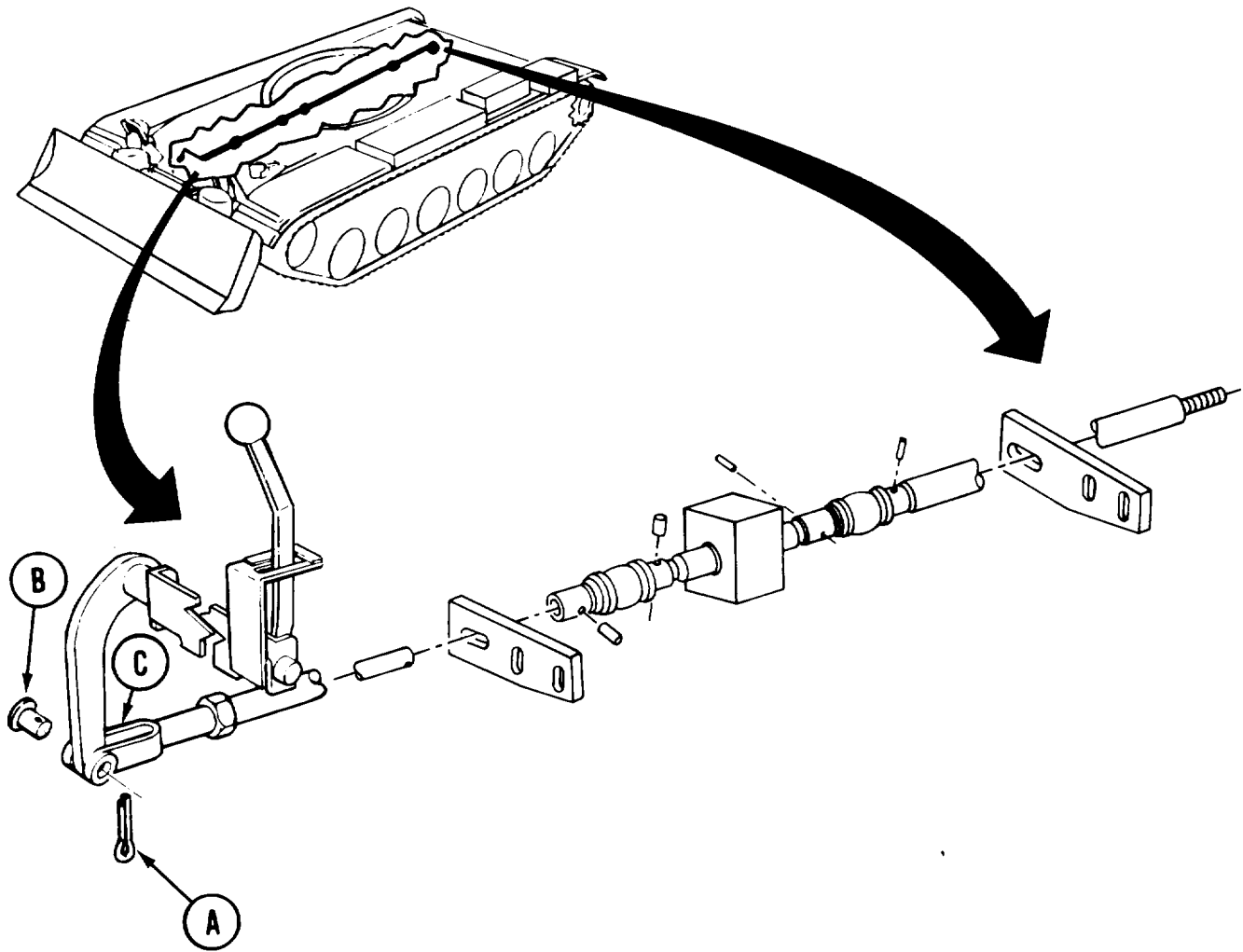
REFERENCES: TM 9-2350-222-20-1  
 TM 9-2350-222-34-2

PRELIMINARY PROCEDURES: Remove powerplant (TM 9-2350-222-20-1)  
 Remove turret (TM 9-2350-222-34-2)  
 Remove engine compartment drain valve rod (TM 9-2350-222-20-1)

Go on to Sheet 2

TA130810



REAR DRAIN VALVE INTERCONNECTING (INTERMEDIATE) CONTROL ROD AND UNIVERSAL JOINTS  
REPLACEMENT (Sheet 2 of 9)

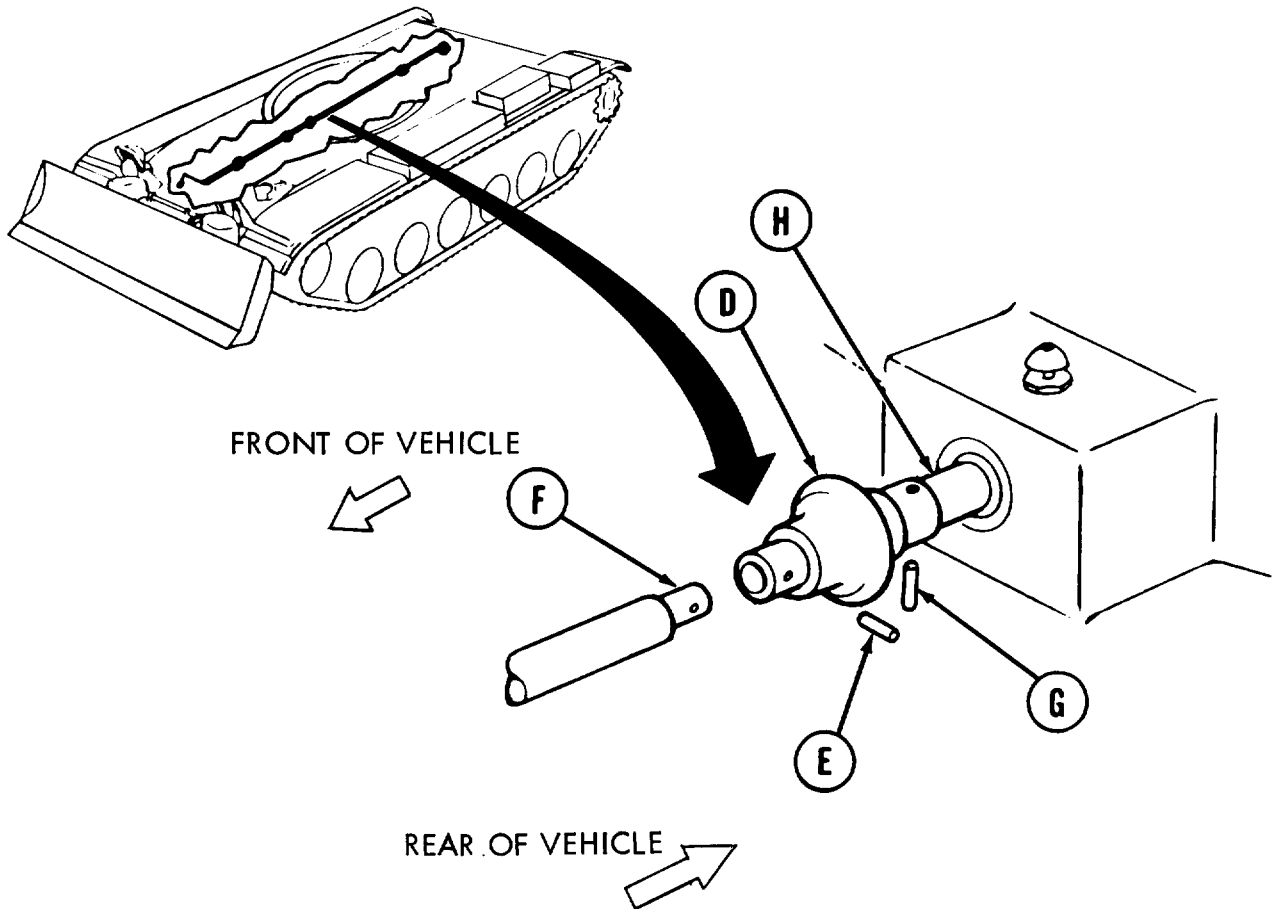
## REMOVAL:

1. Using pliers, remove cotter pin (A) from clevis pin (B).
2. Remove clevis pin (B) from clevis (C).

Go on to Sheet 3

TA130811

# REAR DRAIN VALVE INTERCONNECTING (INTERMEDIATE) CONTROL ROD AND UNIVERSAL JOINTS REPLACEMENT (Sheet 3 of 9)

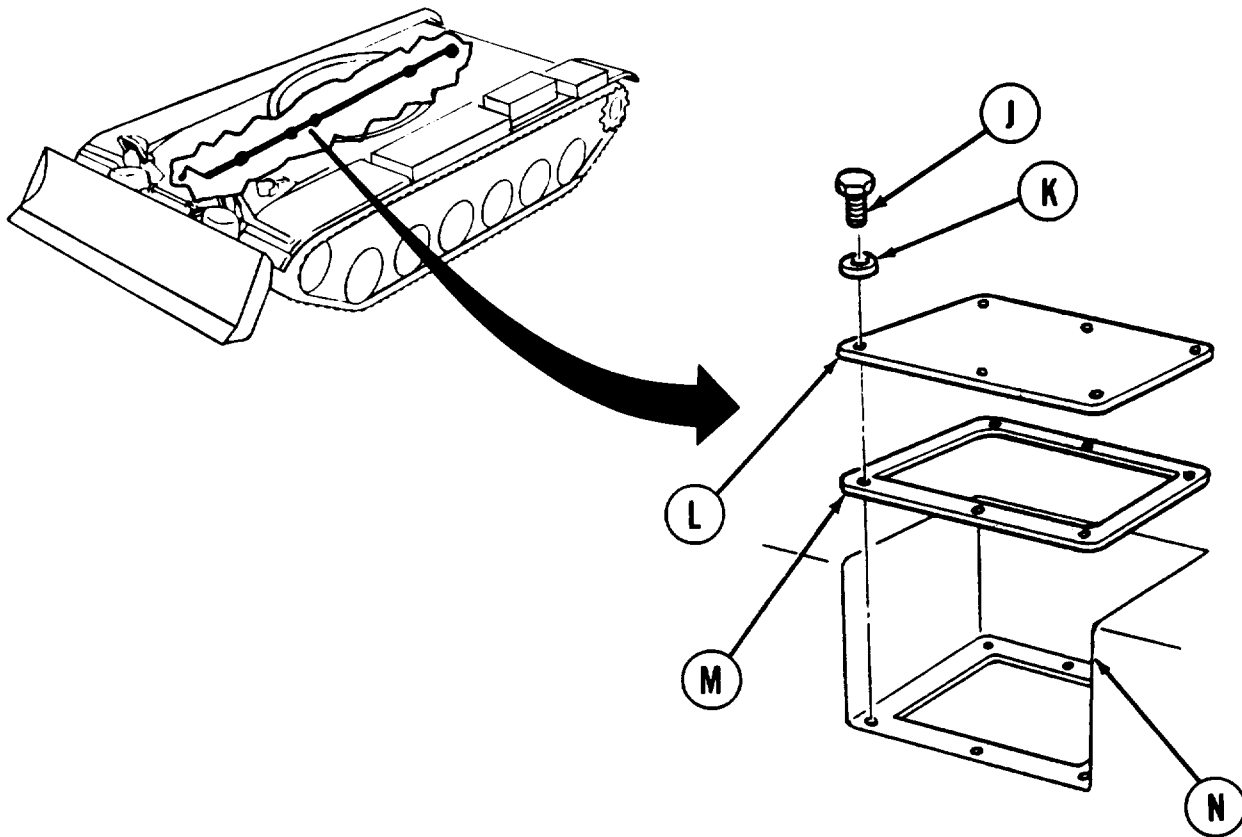


3. Using fingers, turn universal joint (D) until pin (E) points straight up.
4. Using hammer and steel rod, drive pin (E) out of hole in universal joint (D) and hole in front rod (F). Throw pin away.
5. Pull front rod (F) towards driver's station and away from universal joint (D).
6. Using fingers, turn universal joint (D) until pin (G) points straight up.
7. Using hammer and steel rod, drive pin (G) out of hole in universal joint (D) and hole in rod (H). Throw pin away.
8. Pull universal joint (D) from rod (H) and from front rod (F).

Go on to Sheet 4

TA130812

REAR DRAIN VALVE INTERCONNECTING (INTERMEDIATE) CONTROL ROD AND UNIVERSAL JOINTS  
REPLACEMENT (Sheet 4 of 9)



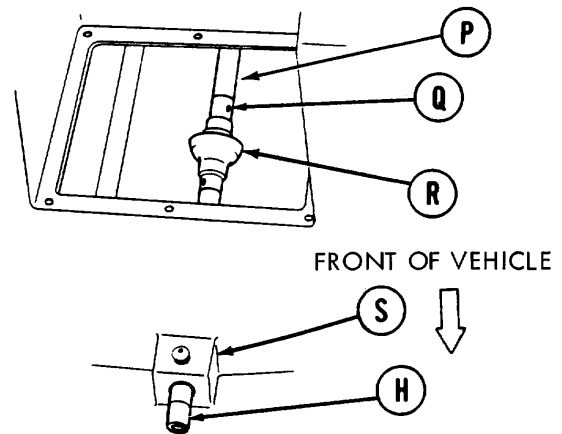
9. Using socket, remove six screws (J) and lockwashers (K) from access plate (L).
10. Using pry bar, remove access plate (L) and gasket (M) from bulkhead (N).
11. If required, use putty knife to scrape gasket (M) from access plate (L) and bulkhead (N). Throw gasket away.

Go on to Sheet 5

TA130813

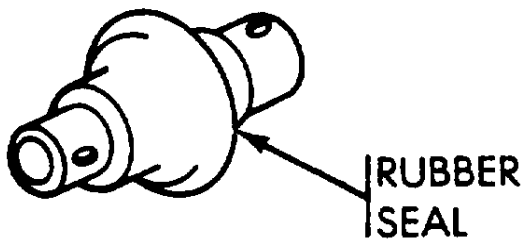
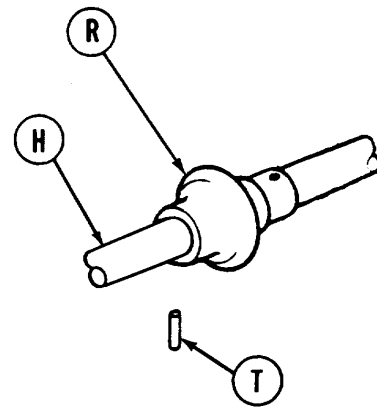
**REAR DRAIN VALVE INTERCONNECTING (INTERMEDIATE) CONTROL ROD AND UNIVERSAL JOINTS REPLACEMENT (Sheet 5 of 9)**

12. Pull rod (H) toward front of vehicle.
13. Turn rear intermediate rod (P) until pin (Q) in universal joint (R) points straight up.
14. Using hammer and steel rod, drive pin (Q) out of hole in universal joint (R). Throw pin (Q) away.
15. Pull rear intermediate rod (P) from universal joint (R).
16. Pull universal joint (R) and front intermediate rod (H) toward rear of vehicle and out of hole in block (S). Remove universal joint (R) and rod (H) from vehicle.
17. With rod (H) clamped in vise, use hammer and steel rod and drive pin (T) out of hole in universal joint (R). Throw pin (T) away.
18. Pull universal joint (R) from rod (H).



**INSPECTION:**

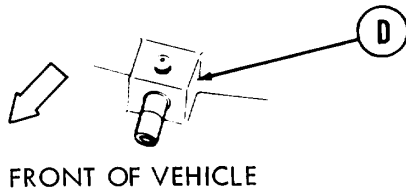
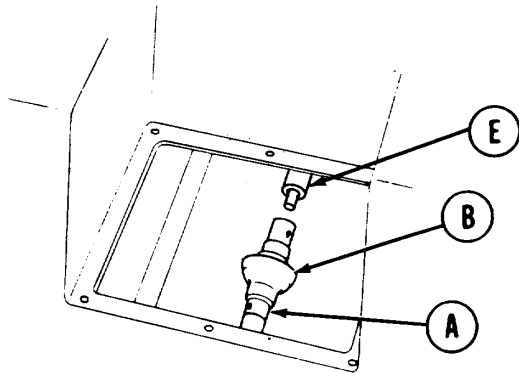
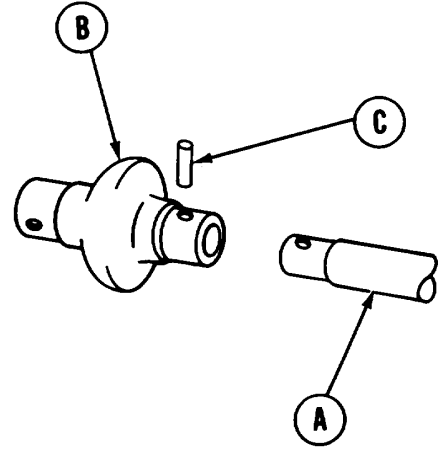
1. Inspect universal joint for tears in rubber seal, wear, or other defects. Replace defective universal joints.
2. Visually inspect seals and bushing inside block (S) for damage. Replace parts if defective (page 11-23).



**REAR DRAIN VALVE INTERCONNECTING (INTERMEDIATE) CONTROL ROD AND UNIVERSAL JOINTS REPLACEMENT (Sheet 6 of 9)**

**INSTALLATION:**

1. With rod (A) in vise, push universal joint (B) on either end of rod (A).
2. Using steel rod, line up hole in universal joint (B) with hole in rod (A).
3. Using pliers, start new pin (C) in hole in universal joint (B).
4. Using hammer, drive new pin (C) in hole of universal joint (B).



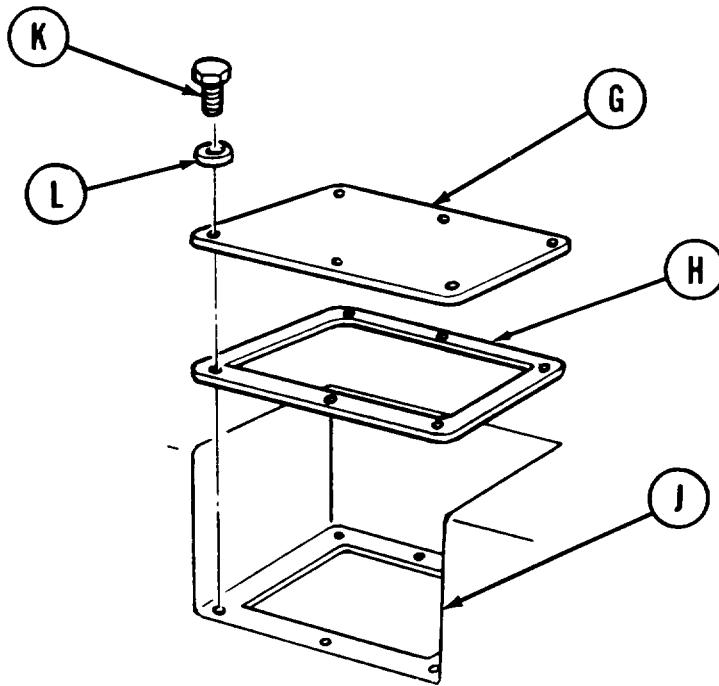
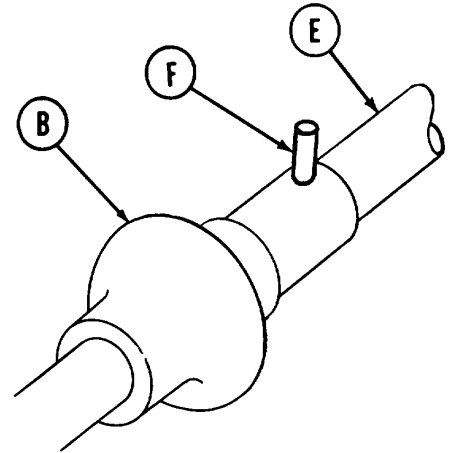
5. Push rod (A) through hole in block (D).
6. Pull rod (A) toward front of vehicle.
7. Push rear intermediate control rod (E) in universal joint (B).
8. Using steel rod, line up hole in universal joint (B) with hole in rear intermediate control rod (E).

Go on to Sheet 7

TA130815

**REAR DRAIN VALVE INTERCONNECTING (INTERMEDIATE) CONTROL ROD AND UNIVERSAL JOINTS REPLACEMENT (Sheet 7 of 9)**

9. Using pliers, start new pin (F) in hole in universal joint (B).
10. Using hammer, drive new pin (F) in hole in universal joint (B) and rod (E).
11. Line up holes in access plate (G) and new gasket (H) with holes in bulkhead (J).
12. Using socket, install six screws (K) and lockwashers (L).

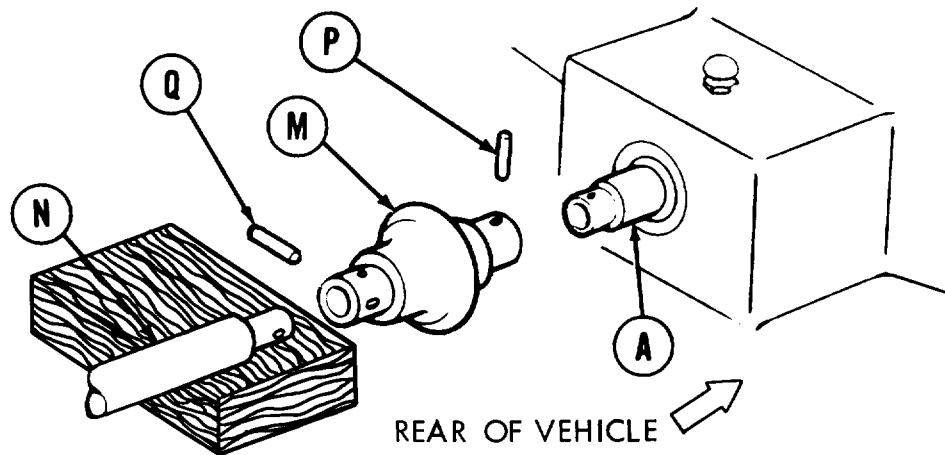


TA130816

Go on to Sheet 8

TA130816

# REAR DRAIN VALVE INTERCONNECTING (INTERMEDIATE) CONTROL ROD AND UNIVERSAL JOINTS REPLACEMENT (Sheet 8 of 9)

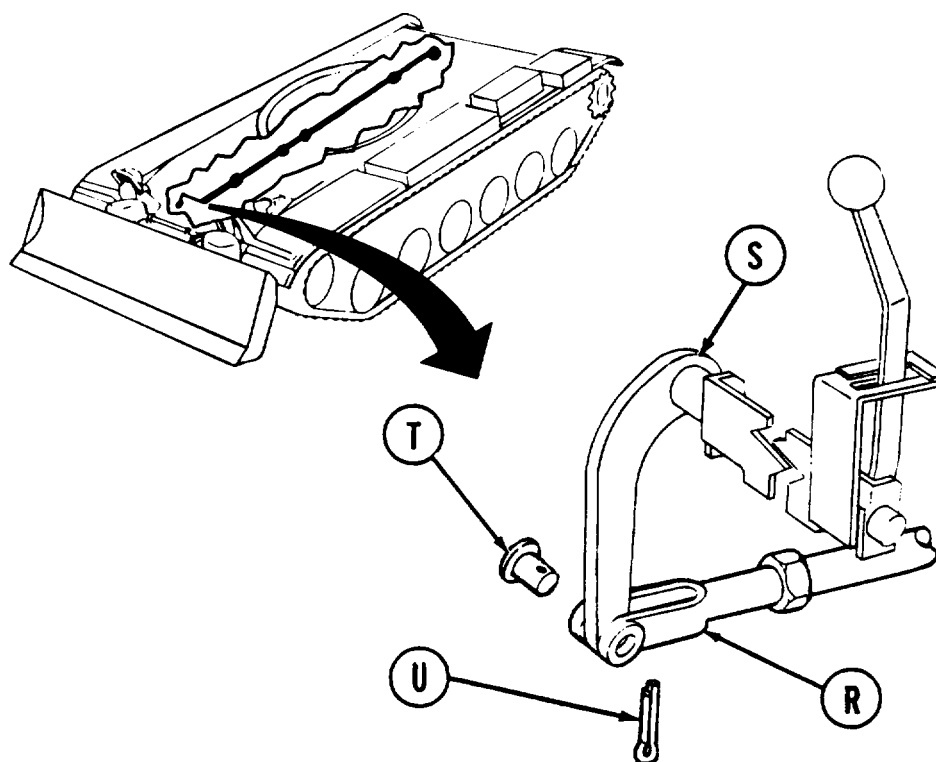


13. Push universal joint (M) on rod (A) and front rod (N), making sure to hold rod ends when pushing universal joint (M) on rods (A and N).
14. Line up hole in universal joint (M) with hole in rod (A).
15. Using pliers, start new pin (P) in hole in universal joint (M) and hole in rod (A).
16. Using hammer, drive new pin (P) all the way in hole.
17. Using steel rod, line up hole in universal joint (M) with hole in front rod (N).
18. Using pliers, start new pin (Q) in hole in universal joint (M) and hole in front rod (N).
19. Place wood block under rod (P) as shown, and using hammer, drive new pin (Q) all the way in hole. Remove wood block.

Go on to Sheet 8

TA130816

## REAR DRAIN VALVE INTERCONNECTING (INTERMEDIATE) CONTROL ROD AND UNIVERSAL JOINTS REPLACEMENT (Sheet 9 of 9)



20. Line up holes in clevis (R) with hole in lever (S).
21. Install clevis pin (T) in hole.
22. Using pliers, install new cotter pin (U) in hole in clevis pin (T).
23. Install engine compartment drain valve rod (TM 9-2350-222-20-1).
24. Perform operational test of rear drain valve.
25. Install powerplant (TM 9-2350-222-20-1).
26. Install turret (TM 9-2350-222-34-2).

End of Task

TA130818

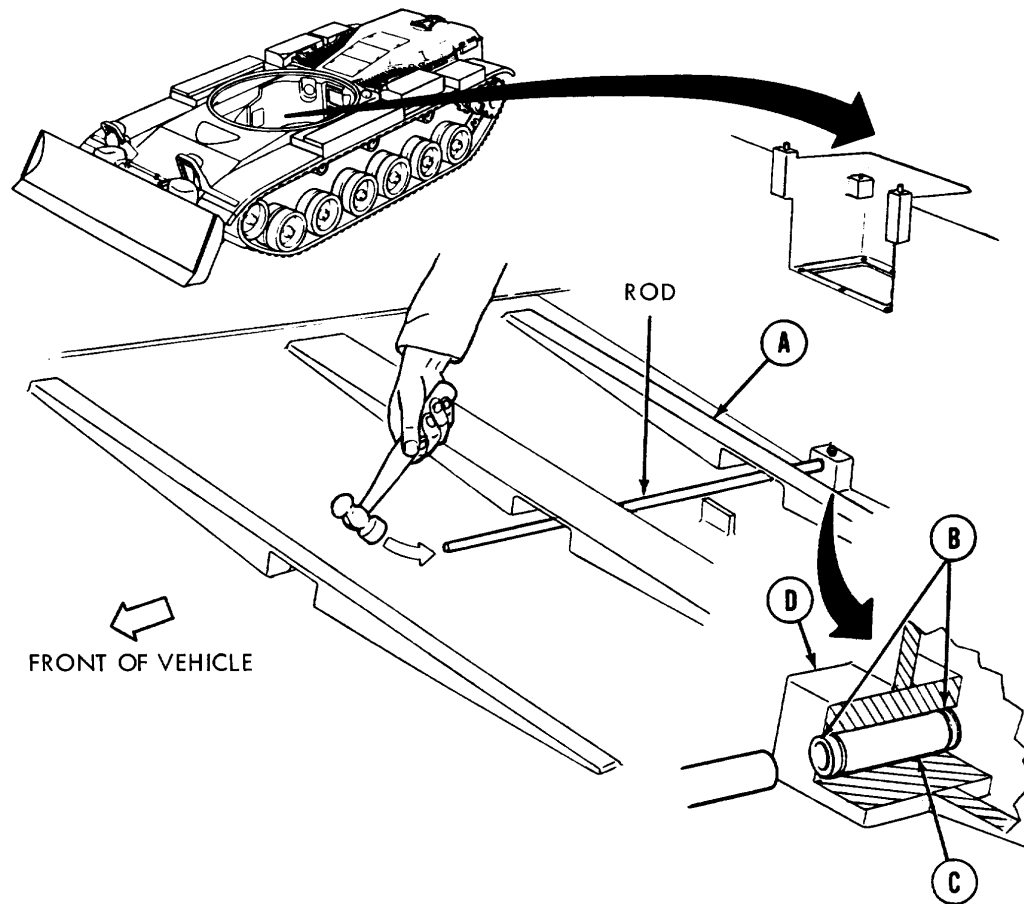


## REAR DRAIN VALVE CONTROL ROD BUSHING AND SEALS REPLACEMENT (Sheet 1 of 3)

TOOLS: Hammer  
Grease gun

SUPPLIES: 3/4 in. diameter metal rod (approximate 28 in. long)

PRELIMINARY PROCEDURES: Remove batteries (TM 9-2350-222-20-1)  
Remove front guide (page 11-6)  
Remove front intermediate rod (page 11-13)



TA130819

### REMOVAL:

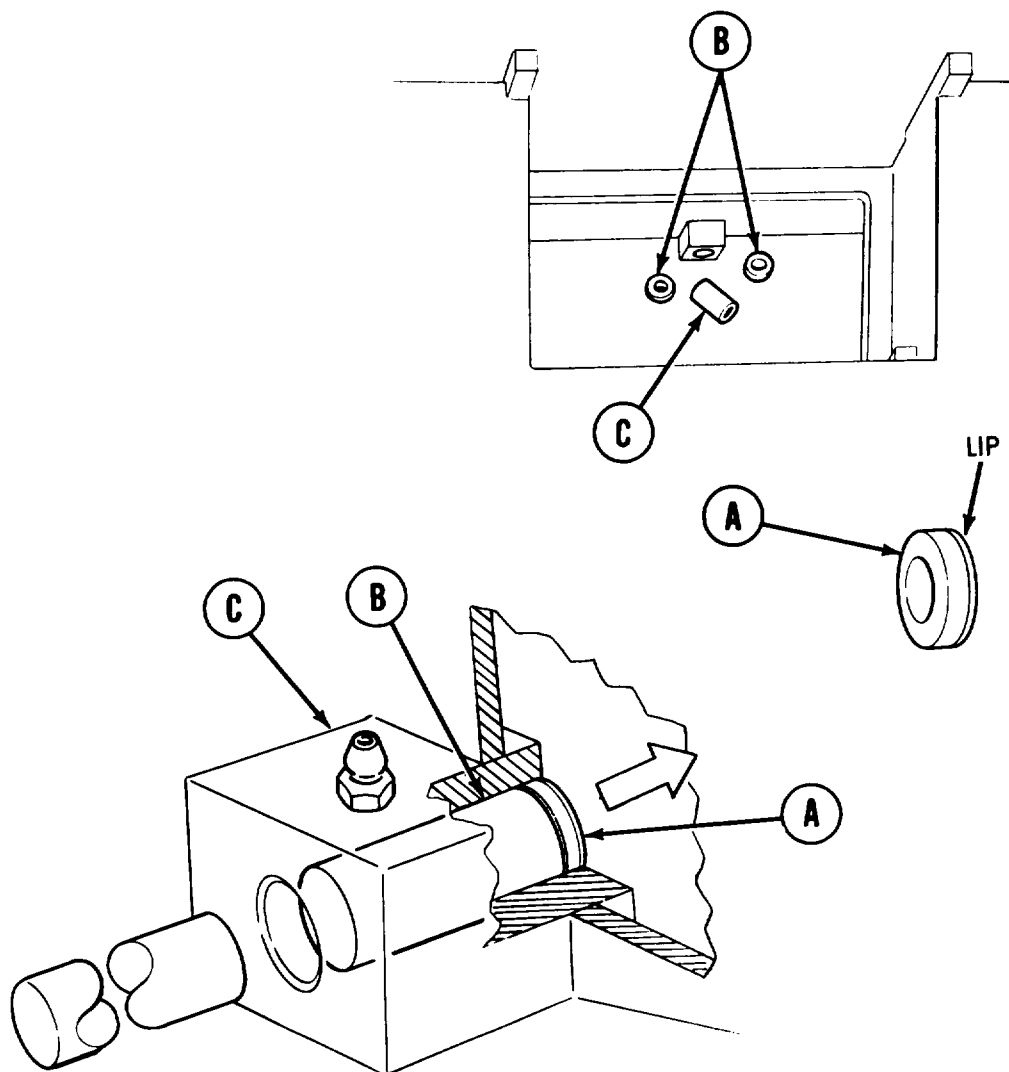
1. Put rod through openings in battery box brackets (A) from front of vehicle.
2. Using hammer and rod, drive seals (B), and bushing (C) out of hole in block (D).

Go on to Sheet 8

TA130819

**REAR DRAIN VALVE CONTROL ROD BUSHING AND SEALS REPLACEMENT (Sheet 2 of 3)**

- Remove seals (B) and bushing (C) from vehicle. Throw seals (B) and bushing (C) away.



**INSTALLATION:**

**NOTE**

**Make sure lip of seal (A) enters hole first.**

- Using hammer and rod, drive one seal (A) and bushing (B) in hole in block (C) until lip of seal (A) is flush with block (C).

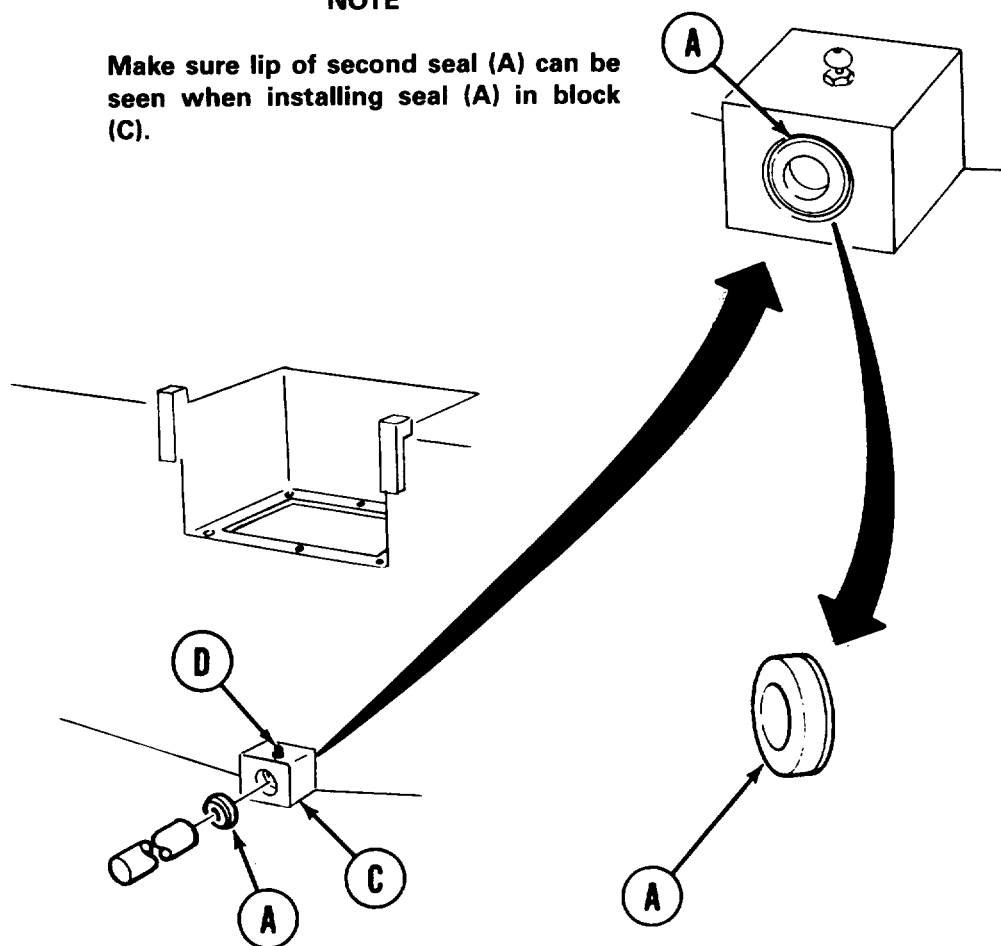
Go on to Sheet 3

TA130820

## REAR DRAIN VALVE CONTROL ROD BUSHING AND SEALS REPLACEMENT (Sheet 3 of 3)

## NOTE

Make sure lip of second seal (A) can be seen when installing seal (A) in block (C).



2. Using hammer and rod, drive second seal (A) in block (C) until lip of second seal (A) is flush with block (C).
3. Remove rod from vehicle.
4. Install front guide (page 11-8, step 2).
5. Install front intermediate rod (page 11-18, steps 1 thru 19).
6. Using grease gun, lubricate bushing through grease fitting (D).
7. Make sure rear drain valve opens and closes smoothly.
8. Install batteries (TM 9-2350-222-20-1).

End of Task

TA130821

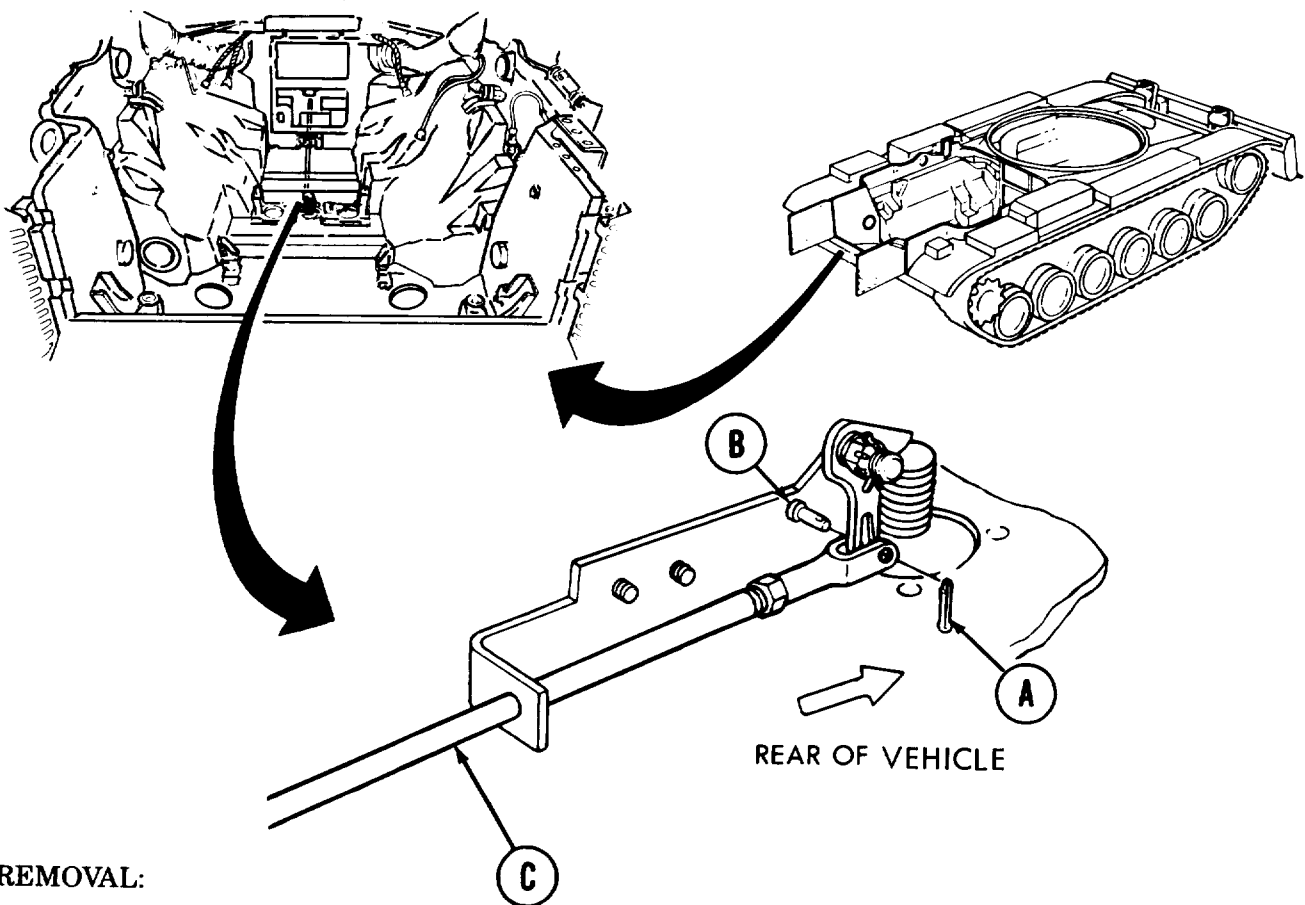
**REAR DRAIN VALVE REAR INTERMEDIATE CONTROL ROD REPLACEMENT (Sheet 1 of 3)**

**TOOLS:** 9/16 in. combination box and open end wrench (2 required)  
6 in. rule  
Slip joint pliers

**SUPPLIES:** Pencil and paper

**REFERENCES:** TM 9-2350-222-20-1  
TM 9-2350-222-34-2

**PRELIMINARY PROCEDURES:** Remove universal joint from rear intermediate rod (page 11-13, steps 1 thru 3 and steps 9 thru 15)  
Remove powerplant (TM 9-2350-222-20-1)  
Remove turret (TM 9-2350-222-34-2)

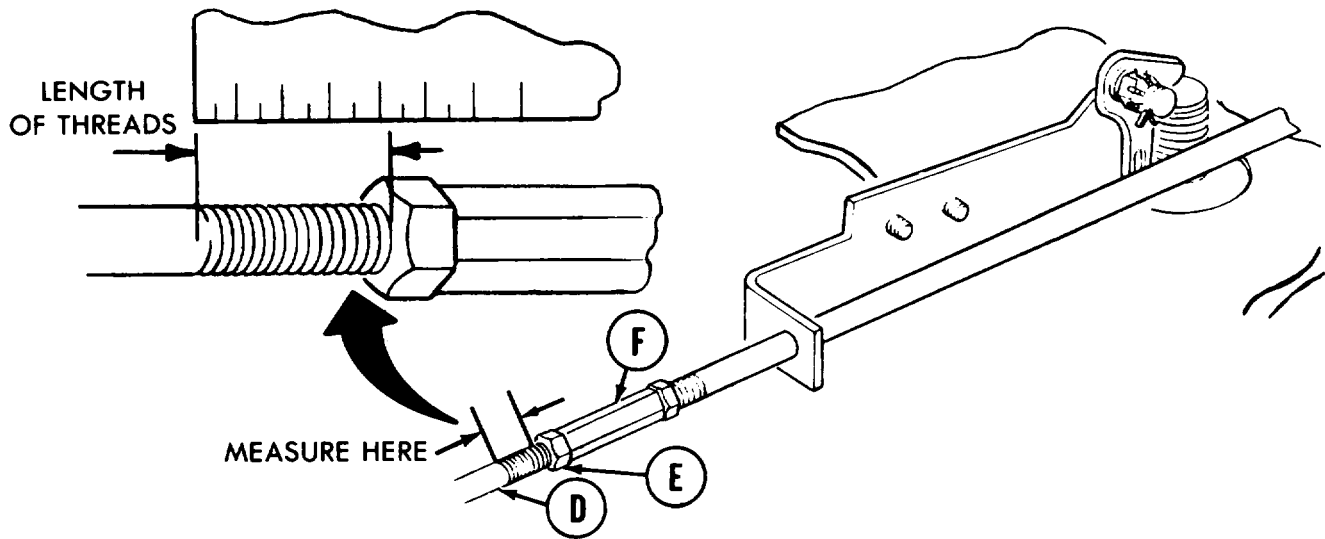
**REMOVAL:**

1. Using pliers, remove cotter pin (A).
2. Remove clevis pin (B).
3. Pull rear rod (C) toward rear of vehicle.

Go on to Sheet 2

TA130822

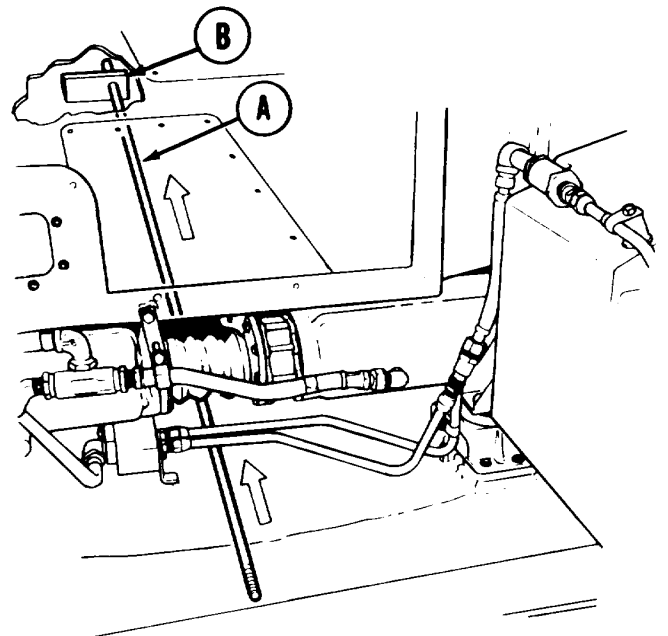
REAR DRAIN VALVE REAR INTERMEDIATE CONTROL ROD REPLACEMENT (Sheet 2 of 3)



4. Measure and record length of threads on rod (D).
5. Using wrench, loosen front coupling jamnut (E) while holding coupling (F) with another wrench.
6. Using pliers, unscrew rear intermediate rod (D) from coupling (F).
7. Remove jamnut (E) from rod (D).
8. Pull rod (D) out of vehicle.

**INSTALLATION:**

1. Push unthreaded end of rear intermediate rod (A) through hole in guide (B).

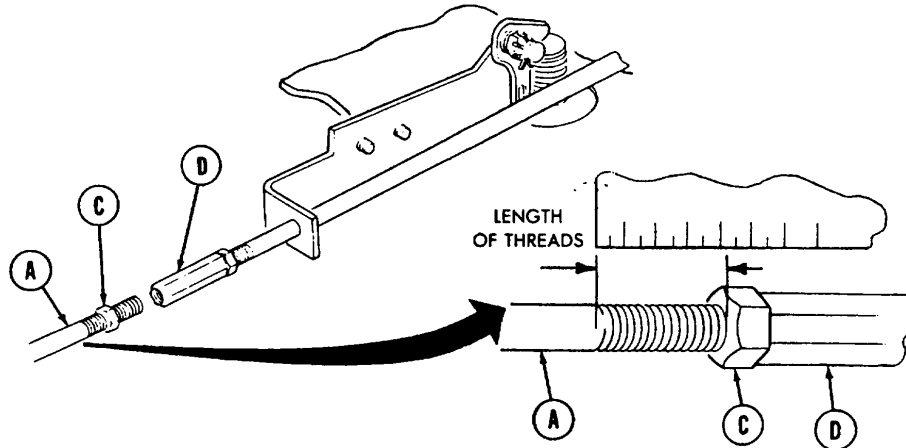


Go on to Sheet 3

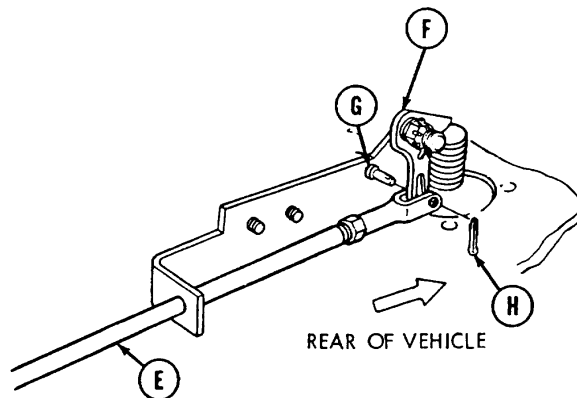
TA130823

REAR DRAIN VALVE REAR INTERMEDIATE CONTROL ROD REPLACEMENT

[Sheet 3 of 3]



2. Screw jamnut (C) on rod (A) so that original length of threads can be seen on rod (A).
3. Using pliers, screw rod (A) in coupling (D).
4. Using wrench, tighten coupling (D) against jam nut (C). Hold jamnut (C) with another wrench while tightening.
5. Push rear rod (E) toward front of vehicle.
6. Position rod (E) clevis to lever (F) and install clevis pin (C).
7. Using pliers, install new cotter pin (H) into clevis pin (C).
8. Connect universal joint to rear intermediate rod (page 11-18).
9. Install powerplant (TM 9-2350-222-20-1).
10. Install turret (TM 9-2350-222-34-2).



Go to Sheet 6

**AMMUNITION RACK (LEFT AND RIGHT) REPLACEMENT (Sheet 1 of 1)**

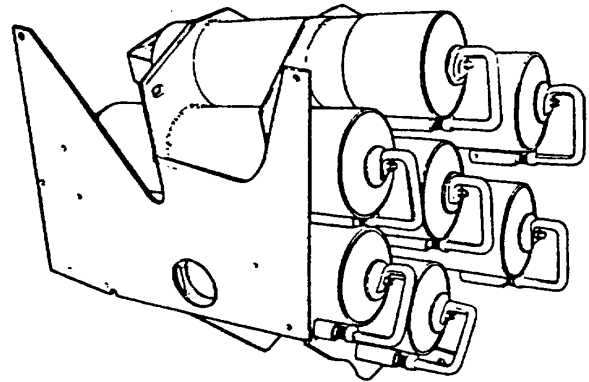
PERSONNEL: Two

REFERENCES: TM 9-2350-222-34-2  
TM 9-2350-222-20-1

PRELIMINARY PROCEDURES: Remove commander's coupla (TM 9-2350- 222-34-2)  
Displace ammo rack (TM 9-2350-222-20-1)

**NOTE**

**Two persons are required to remove ammunition rack.**



**REMOVAL:**

Remove ammunition rack from vehicle.

**INSTALLATION:**

1. Position ammunition rack in vehicle.
2. Install ammunition rack(TM 9-2350-222-20-1).
3. Install commander's coupla (TM 9-2350-222-34-2).

End of Task

**AMMUNITION RACK REPAIR (Sheet 1 of 1)**

TOOLS: Aluminum welding outfit  
1/8 in. twist drill  
Portable electrical drill, 1/4 in.

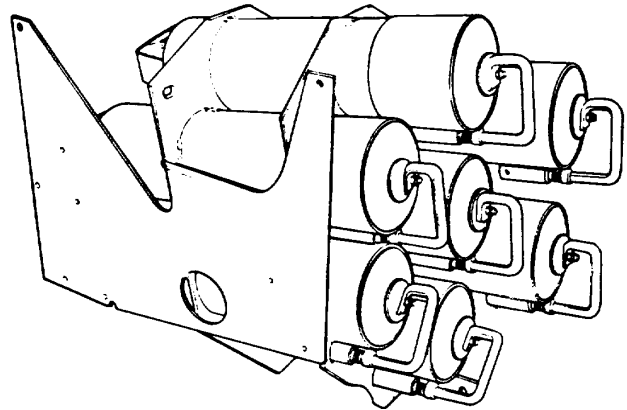
SUPPLIES: 3/32 in. thick aluminum stock

REFERENCES: TM 9-237  
TM 9-247  
TM 9-2350-222-20-1  
TM 9-2350-222-34-2

REPAIR:

**NOTE**

Repair of the ammunition rack consists of welding cracks and broken welds. Welding can be accomplished with the ammunition rack in the turret or removed from vehicle.



1. Using 1/8 inch drill, drill hole through metal at each end of crack.
2. Remove finish from approximately 1-1/2 inches on each side of crack and clean area (TM 9-247 ).
3. Measure length of crack and cut a strip of 3/32 inch aluminum, 2 inches wide and length of crack.
4. Weld broken welds or aluminum strip to cover crack (TM 9-237).
5. Inspect welded area and remove rough or high spots inside and outside ammunition tube.
6. Clean welded area and treat surfaces (TM 9-237).
7. Install ammo rack (TM 9-2350-222-20-1).
8. Install turret if removed (TM 9-2350-222-34-2).

End of Task

TA130826



**CHAPTER 12**

**HYDRAULIC SYSTEM MAINTENANCE INDEX**

Procedure	Page
Hydraulic Reservoir Replacement.....	12-2
Hydraulic Oil Reservoir Repair .....	12-17
Bulldozer Hydraulic Cylinder Ram Repair .....	12-23
Hydraulic Reservoir Suction Line Assembly Replacement.....	12-34
Hydraulic Pump Discharge Tubes Assembly Replacement.....	12-41
Right Angle Drive Power Takeoff Repair.....	12-48
Magnetic Clutch Adjustment.....	12-58
Magnetic Clutch Repair .....	12-60

**NOTE**

**There is a hydraulic schematic located on page 12-64 for your use. Please refer to it anytime you have a question.**

**HYDRAULIC RESERVOIR REPLACEMENT (Sheet 1 of 15)**  
**PROCEDURE INDEX**

PROCEDURE	PAGE
Removal	12-3
Installation	12-9

**TOOLS:**

13/16 in. combination box and open end wrench 11/16 in. combination box and open end wrench 7/16 in. combination box and open end wrench 3/4 in. combination box and open end wrench 1/2 in. combination box and open end wrench 7/16 in. socket with 1/2 in. drive 9/16 in. socket with 1/2 in. drive	3/4 in. socket with 1/2 in. drive 10 in. extension with 1/2 in. drive Ratchet with 1/2 in. drive Lifting device 2 in. open end wrench 1-1/8 in. open end wrench 1-3/8 in. open end wrench 1-5/8 in. open end wrench 1-3/4 in. open end wrench 1-1/4 in. open end wrench 1-1/2 in. open end wrench 8 in. adjustable wrench
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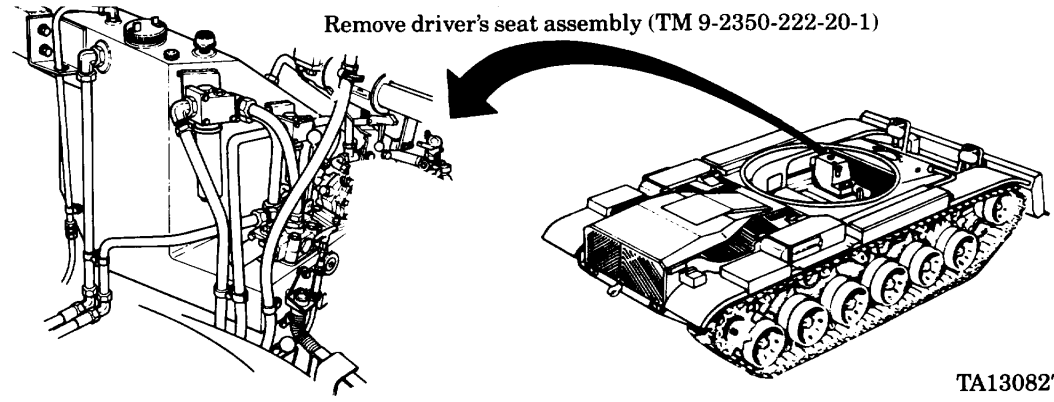
**SUPPLIES:**

Rope (Item 23, Appendix B) Gaskets (10864321) (2 required) Sealing compound (Item 8, Appendix B) Plastic caps and plugs Preformed packing (MS28775-35)	Preformed packing (MS28778-12) Preformed packing (MS28778-228) Preformed packing (MS28778-20) Preformed packing (MS28778-16) Preformed packing (MS28778-6)
--	--

**PERSONNEL:** Two

**REFERENCES:** LO 9-2350-222-12  
 TM 9-2350-222-20-1  
 TM 9-2350-222-34-2

**PRELIMINARY PROCEDURES:** Remove turret (TM 9-2350-222-34-2)  
 Remove first shot fire extinguisher cylinder (TM 9-2350-222-20-1)  
 Drain reservoir (LO 9-2350-222-12)  
 Remove driver's seat assembly (TM 9-2350-222-20-1)



TA130827

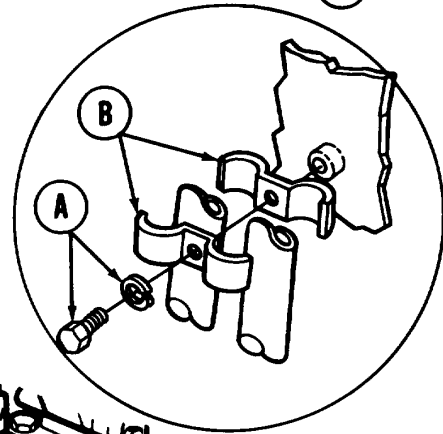
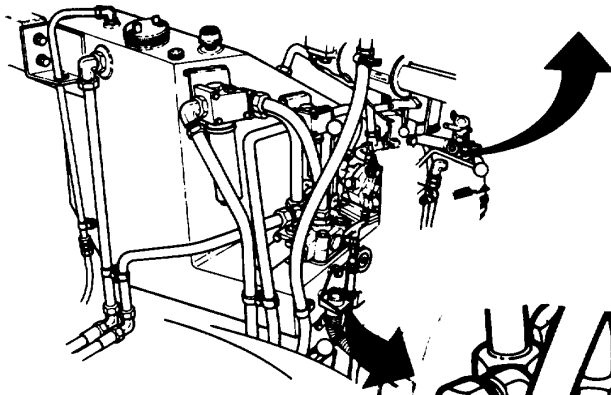
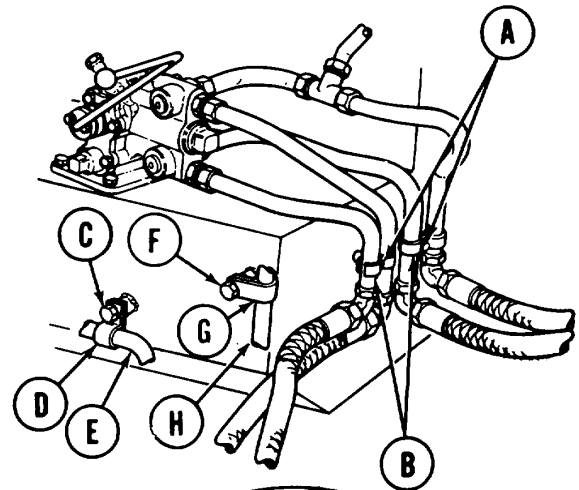
Go on to Sheet 2

TA130827

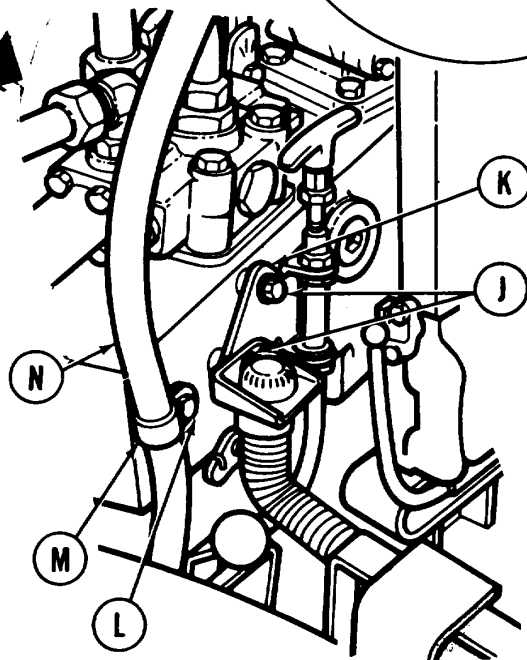
**HYDRAULIC RESERVOIR REPLACEMENT (Sheet 2 of 15)**

**REMOVAL:**

1. Using 9/16 inch socket, remove two screws and lockwashers (A) and four retaining straps (B).
2. Using 7/16 inch socket, remove screw, lockwasher (C), and clamp (D) from hose (E).
3. Using 7/16 inch socket, remove screw, lockwasher (F), and clamp (G) from cable (H).



4. Using 7/16 inch socket, remove two screws and lockwashers (J) to displace bracket (K) with attached parts.
5. Using 7/16 inch socket, remove screw and lockwasher (L) and clamp (M) from hose (N).



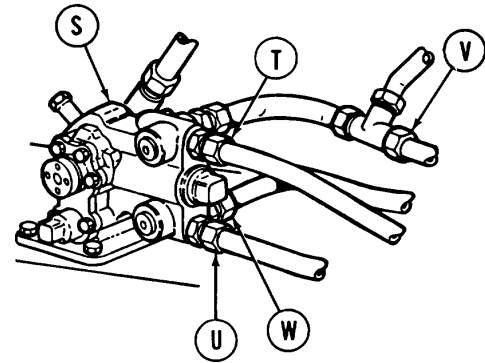
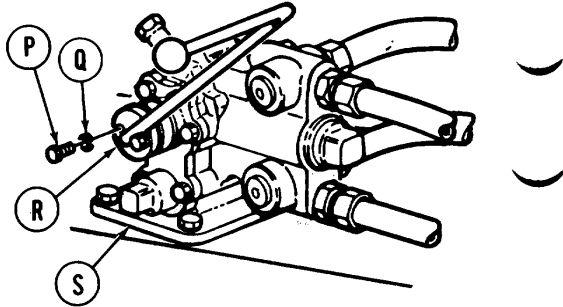
TA130828

Go on to Sheet 3

TA130828

**HYDRAULIC RESERVOIR REPLACEMENT (Sheet 3 of 15)**

6. Using 9/16 inch socket, remove two screws (P), lockwashers (Q), and handle (R) from control valve (S).

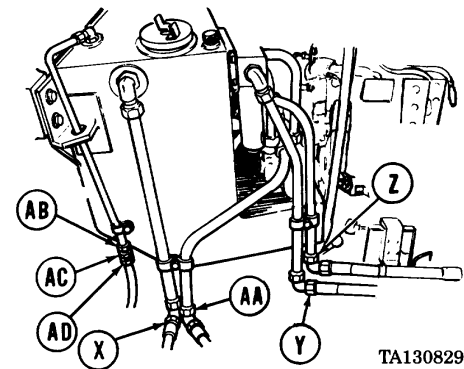


**NOTE**

**Install dust caps to all tube assemblies as they are removed.**

8. Using 1-1/2 inch wrench, disconnect tube assemblies (Z and AA).
9. Using 1-1/2 inch wrench, disconnect and displace hose assemblies (X and Y).
10. Using 11/16 inch wrench on nut of tube assembly (AB) and 13/16 inch wrench to hold union (AC), disconnect nut and displace union and attached hose assembly (AD).

7. Using 1-1/2 inch wrench, disconnect and displace four tube assemblies (T, U, V, and W).

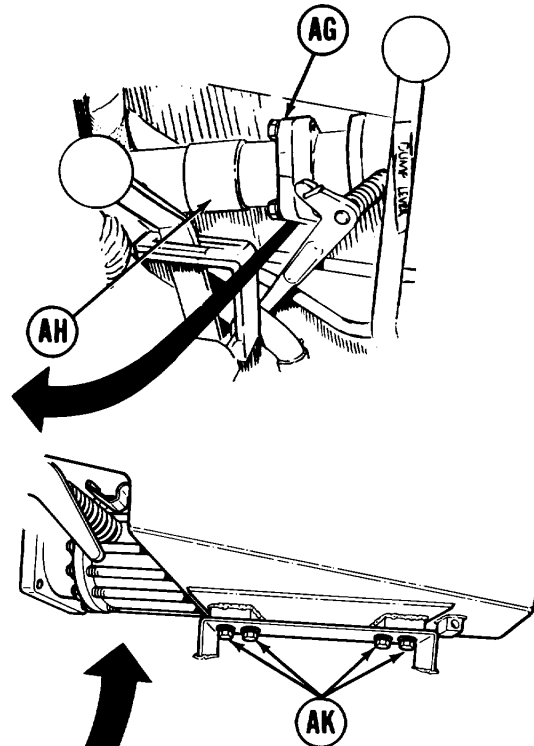
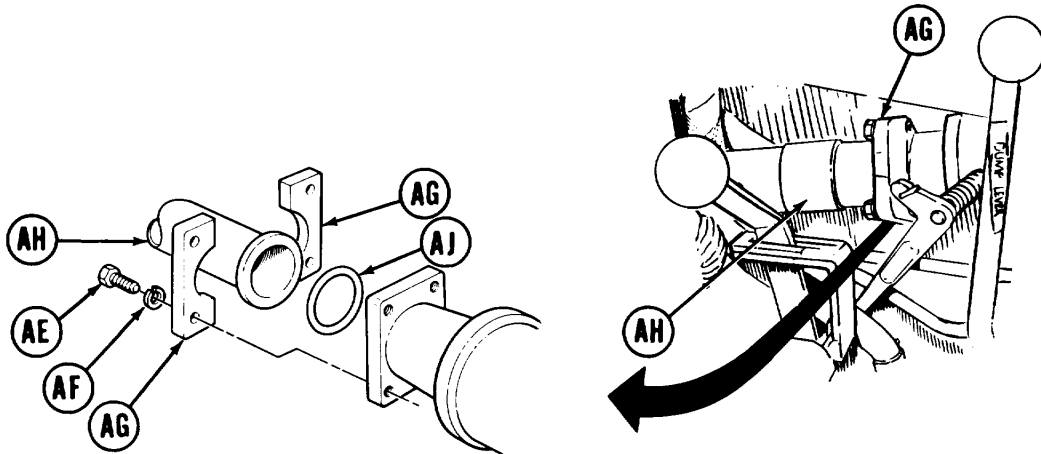


TA130829

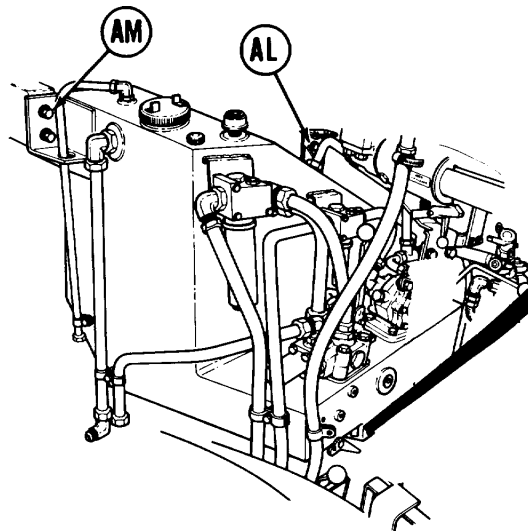
Go on to Sheet 4

**HYDRAULIC RESERVOIR REPLACEMENT (Sheet 4 of 15)**

11. Using 3/4 inch socket with 10 inch extension, remove four screws (AE), lockwashers (AF), two split flanges (AG), hose assembly (AH), and packing (AJ). Throw packing away.



12. Using 3/4 inch wrench, remove four screws, washers, and lockwashers (AK).



13. Using 3/4 inch socket on screw and 3/4 inch wrench on nut, remove two screws, four washers, and two nuts (AL).

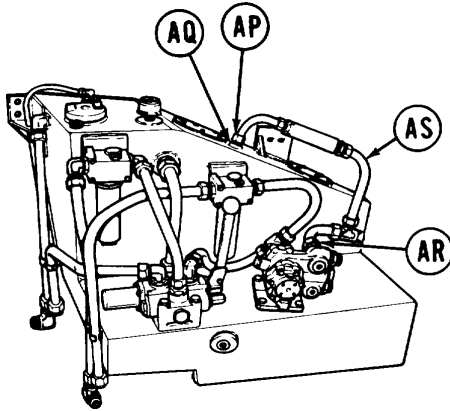
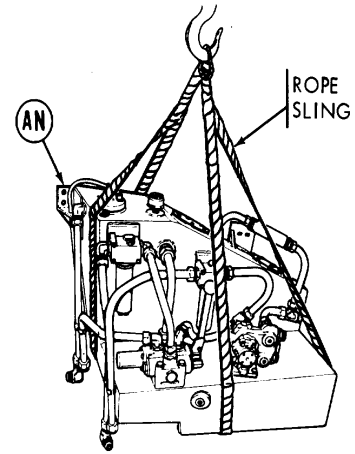
14. Using 3/4 inch socket, remove two screws, lockwashers, and washers (AM).

**CAUTION**

Place pieces of plywood or other suitable material over batteries, cables, tubes, and other components to prevent damage when positioning reservoir for removal.

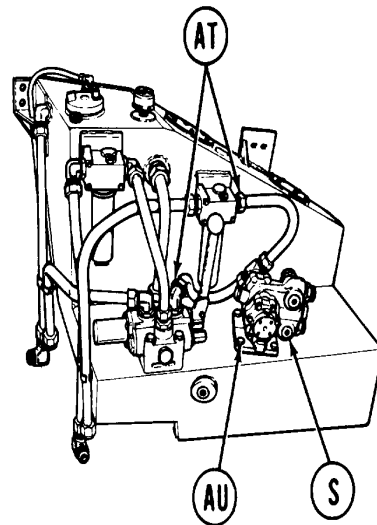
**HYDRAULIC RESERVOIR REPLACEMENT (Sheet 5 of 15)**

15. Move reservoir (AN) to turret opening in hull and attach rope (Item 23, Appendix B), as shown.
16. Using lifting device, remove reservoir (AN) from vehicle and place in suitable work area using care not to damage any components.
17. Remove rope sling.



18. Using 1-1/4 inch wrench on tube assembly nut (AP) and 1-3/8 inch wrench on union (AQ), disconnect nut and remove union and packing (under union). Throw packing away.
19. Using 1-1/2 inch wrench, disconnect nut (AR) and remove assembled parts (AS).

20. Using 1-1/2 inch wrench, disconnect two tube assembly nuts (AT).
21. Using 3/4 inch socket, remove four screws and lockwashers (AU).
22. Lift off control valve (S) with its attached parts. Remove packing from reservoir and throw away.

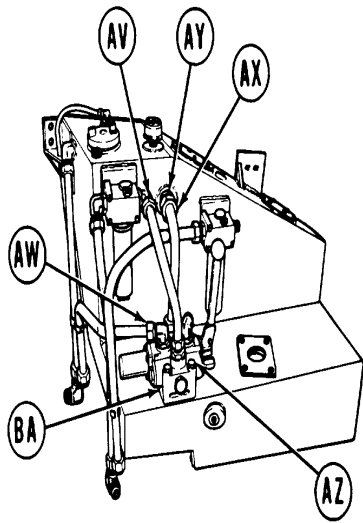


TA130831

Go on to Sheet 6

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HYDRAULIC RESERVOIR REPLACEMENT (Sheet 6 of 15)



23. Using 1-1/2 inch wrench, disconnect tube assembly nuts (AV and AW).

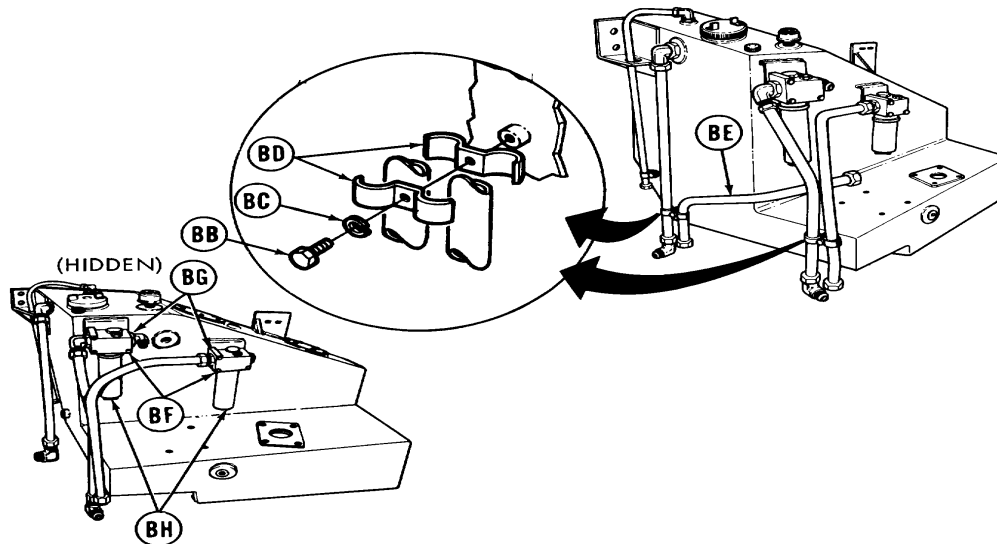
24. Using 2 inch wrench on tube assembly nut (AX) and 1-3/4 inch wrench on union (AY), disconnect nut and remove union and packing (under union). Throw packing away.

25. Using 3/4 inch socket, remove four screws and lockwashers (AZ).

26. Lift off valve assembly (BA) with its attached parts.

27. Using 9/16 inch socket, remove two screws (BB), lockwashers (BC), and four retaining straps (BD).

28. Remove tube assembly (BE)

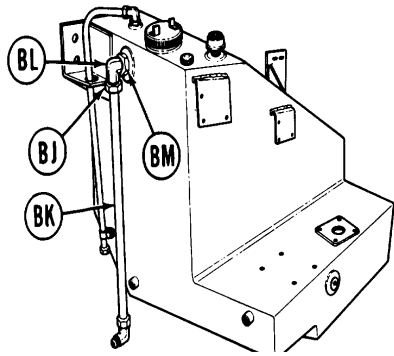


29. Using 7/16 inch socket on screws (BF) and 7/16 inch wrench on locknuts (BG), remove six screws, locknuts, and two filter assemblies (BH) with their attached parts.

Go on to Sheet 7

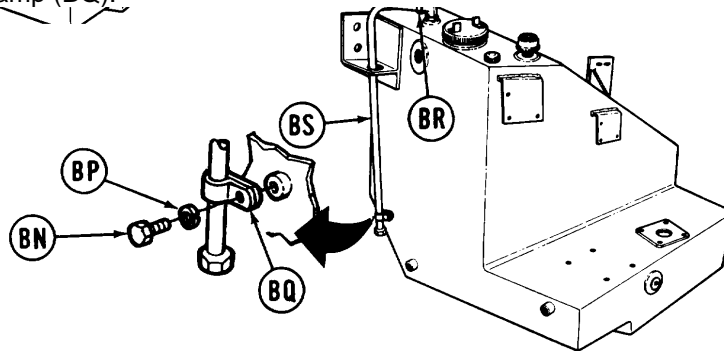
TA130832

HYDRAULIC RESERVOIR REPLACEMENT (Sheet 7 of 15)



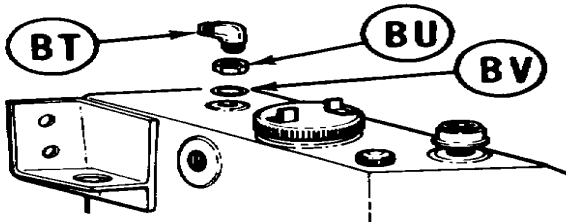
- 30. Using 1-1/2 inch wrench on tube assembly nut (BJ), disconnect and remove tube assembly (BK) with its assembled parts.
- 31. Using adjustable wrench on elbow (BL) and 1-5/8 inch wrench on nut (BM), remove elbow nut and packing (under nut). Throw packing away.

- 32. Using 7/16 inch socket, remove screw (BN), lockwasher (BP), and clamp (BQ).

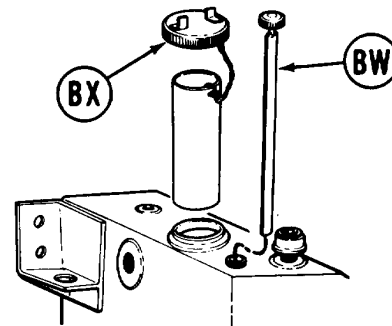


- 33. Using 11/16 inch wrench, disconnect tube assembly nut (BR) and remove tube assembly (BS).

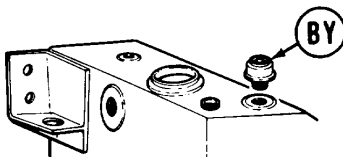
- 34. Using adjustable wrench on elbow (BT) and 13/16 inch wrench on nut (BU), remove elbow, nut, and packing (BV). Throw packing away.



- 35. Turn cap of oil level gage (BW) counterclockwise and remove.
- 36. Turn cap (BX) of filler neck counterclockwise and remove cap and filler neck.



- 37. Using 1-1/8 inch wrench, remove breather filter (BY).



Go on to Sheet 8

TA130833

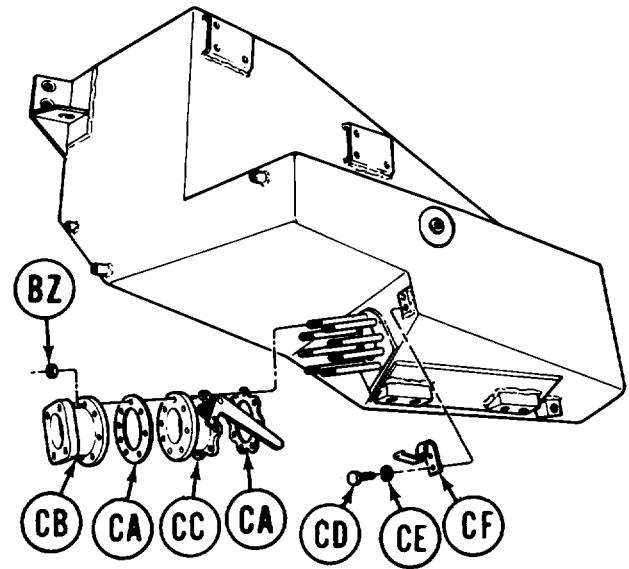
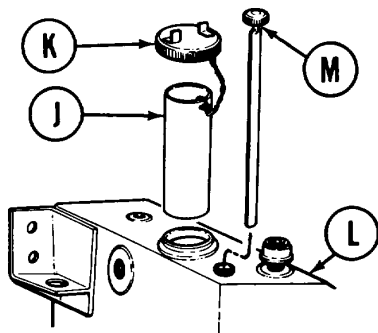
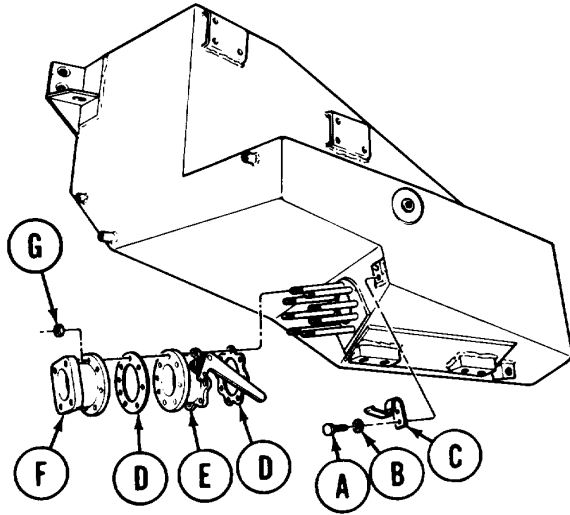


**HYDRAULIC RESERVOIR REPLACEMENT (Sheet 8 of 15)**

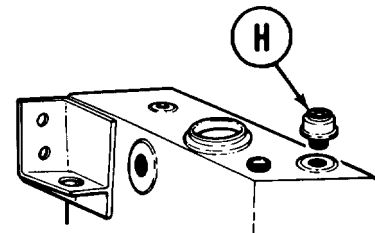
38. Using 1/2 inch wrench, remove eight locknuts (BZ), two gaskets (CA), flange (CB), and shutoff valve (CC). Throw gaskets (CA) away.
39. Using 7/16 inch wrench, remove two screws (CD), washers (CE), and spring clip (CF).

**INSTALLATION:**

1. Using 7/16 inch wrench, install two screws (A), washers (B), and spring clip (C).



2. Position two new gaskets (D), shutoff valve (E), and flange (F) on eight studs.
3. Using 1/2 inch wrench, install eight locknuts (G) on eight studs.
4. Using 1-1/8 inch wrench, install breather filter (H).



5. Position and slip filler neck (J) portion of cap (K) into reservoir (L).
6. Turn cap (K) clockwise to secure.
7. Insert oil level gage (M) and secure it by turning the cap clockwise.

Go on to Sheet 9

TA130834

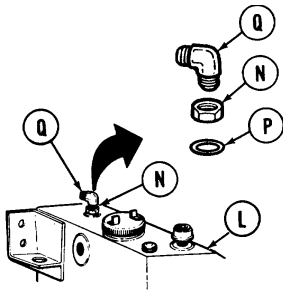
HYDRAULIC RESERVOIR REPLACEMENT (Sheet 9 of 15)

NOTE

Remove all dust caps from tube assemblies as they are installed.

NOTE

Apply sealing tape (Item 8, Appendix B) to all male threads as they are installed.



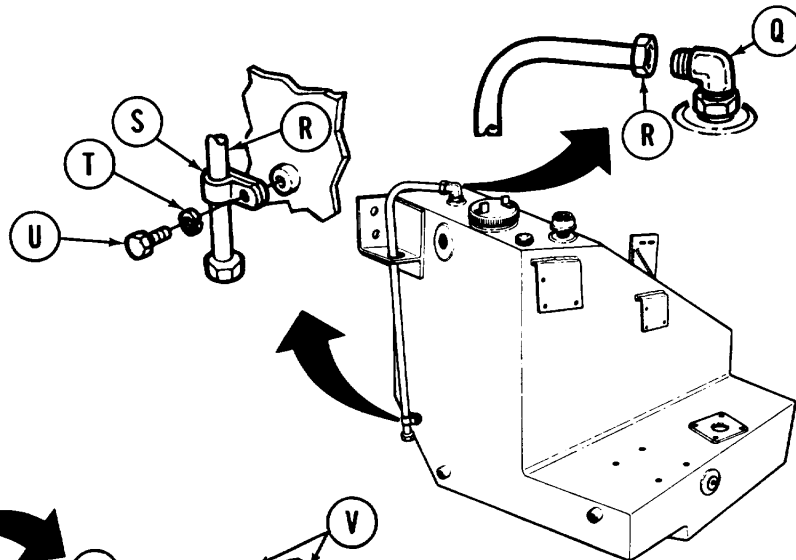
8. Put nut (N) and new packing (P) on elbow (Q) and thread elbow into reservoir (L).
9. Using adjustable wrench on elbow (Q) and 13/16 inch wrench on nut (N), position elbow and tighten nut.

10. Start nut of tube assembly (R) on elbow (Q).

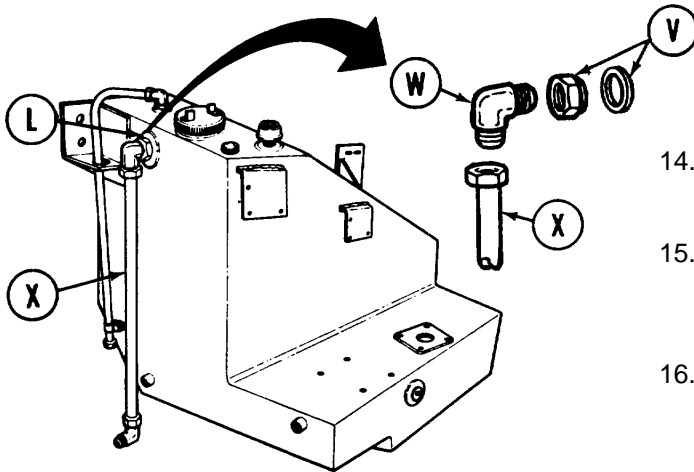
11. Position clamp (S) on tube assembly (R).

12. Using 7/16 inch socket, install lockwasher. (T) and screw (U) through clamp (S).

13. Using 11/16 inch wrench, tighten nut of tube assembly (R).



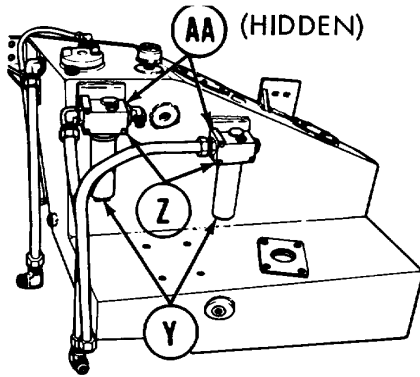
14. Put nut and new packing (V) on elbow (W) and thread elbow into reservoir (L).
15. Using adjustable wrench to hold elbow (W), use 1-5/8 inch wrench and tighten nut (V).
16. Using 1-1/2 inch wrench on nut of tube assembly (X), install tube assembly with its assembled parts to elbow (W).



Go on to Sheet 10

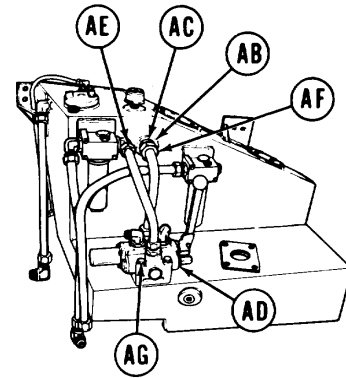
TA130835

HYDRAULIC RESERVOIR REPLACEMENT (Sheet 10 of 15)

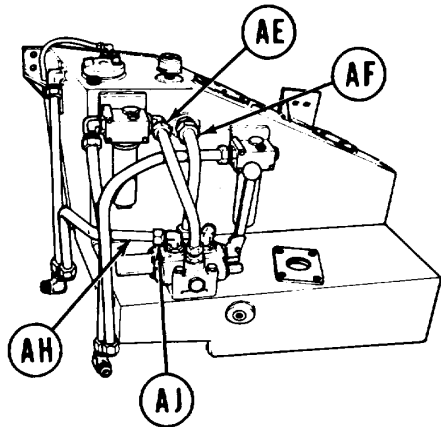


17. Position two filter assemblies (Y). Install three screws (Z) and locknuts (AA) in each filter assembly and bracket.
18. Using 7/16 inch socket on screws (Z) and 7/16 inch wrench on locknuts (AA), tighten screws.

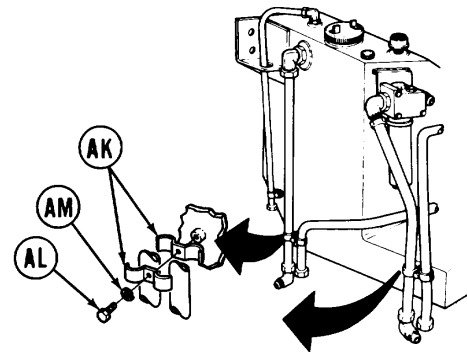
19. Place new packing (AB) on union (AC).
20. Using 1-3/4 inch wrench, install union (AC) and new packing (AB) (hidden).
21. Position valve assembly (AD) with its attached parts and start nuts (AE and AF).
22. Using 3/4 inch socket, install four screws and lockwashers (AG).



23. Using 1-1/2 inch wrench, tighten nut (AE).
24. Using 2 inch wrench, tighten nut (AF).
25. Position tube assembly (AH) and, using 1-1/2 inch wrench, tighten nut (AJ).



26. Position four retaining straps (AK), two on each pair of tube assemblies (one in front and one behind tubes).
27. Using 9/16 inch socket, install screw (AL) and lockwasher (AM) through each retaining strap (AK).



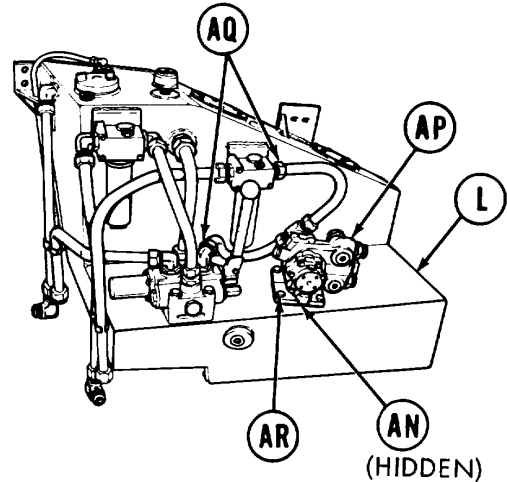
TA130836

Go on to Sheet 11

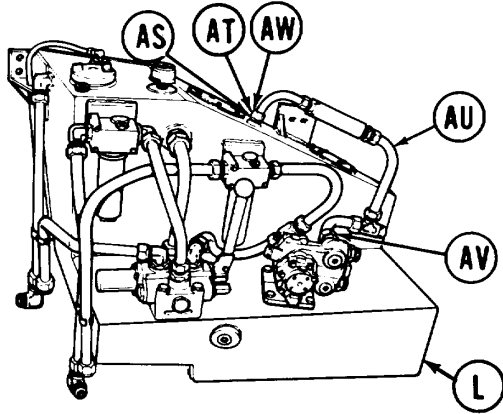
TA130836

**HYDRAULIC RESERVOIR REPLACEMENT (Sheet 11 of 15)**

- 28. Install new packing (AN) onto control valve mount.
- 29. Position control valve (AP) with its attached parts on reservoir (L).
- 30. Start two nuts (AQ) onto filter and selector valve.
- 31. Using 3/4 inch socket, install four screws and lockwashers (AR) into control valve (AP) and reservoir (L).
- 32. Using 1-1/2 inch wrench, tighten two nuts (AQ).



- 33. Place new packing (AS) on union (AT).
- 34. Using 1-3/8 inch wrench, install union (AT) and new packing (AS) into reservoir (L).
- 35. Position tube assembly (AU) onto reservoir (L) and start two nuts (AV and AW).
- 36. Using 1-1/2 inch wrench, tighten nut (AV).
- 37. Using 1-1/4 inch wrench, tighten nut (AW).

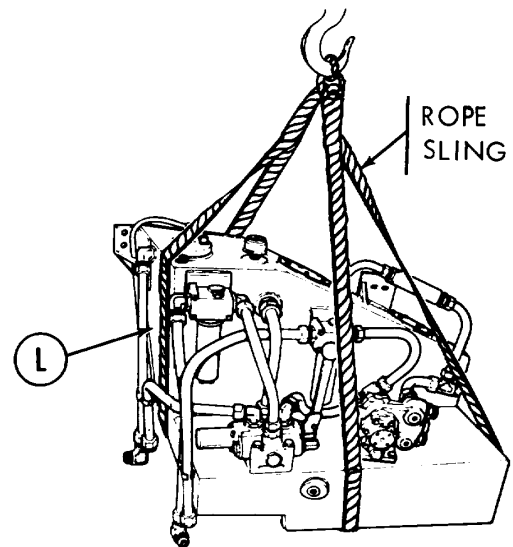


- 38. Attach rope (Item 23, Appendix B) to reservoir (L) as shown.

**CAUTION**

Place pieces of plywood or other suitable material over batteries, cables, tubes, and other components to prevent damage when positioning reservoir in vehicle.

- 39. Using lifting device, place reservoir into vehicle and remove rope sling.

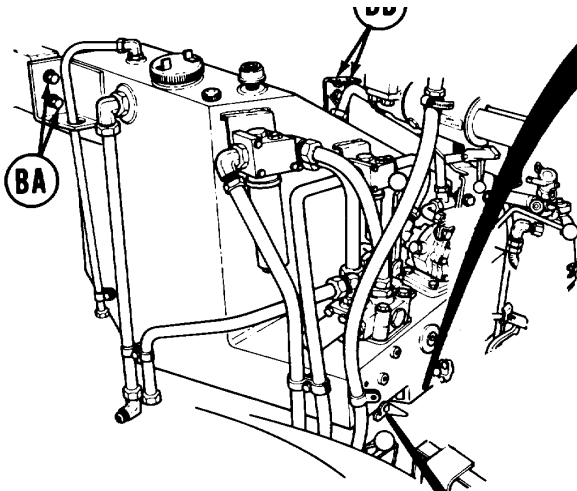
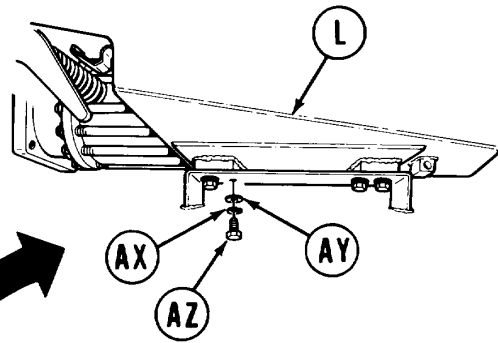


TA130837

Go on to Sheet 12

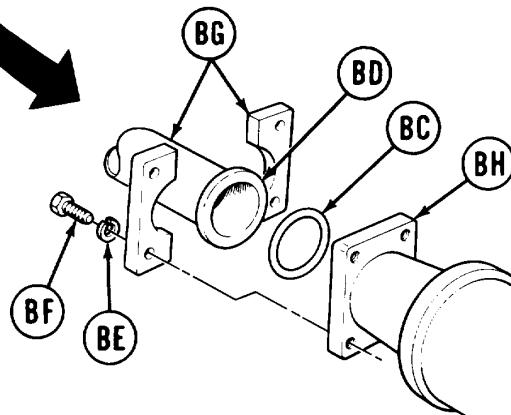
**HYDRAULIC RESERVOIR REPLACEMENT (Sheet 12 of 15)**

- 40. Position reservoir onto mounting bracket in driver's compartment.
- 41. Place lockwashers (AX), then washers (AY), on four screws (AZ).
- 42. Start four screws (AZ) through mounting bracket into reservoir (L).



- 43. By hand, install two screws, lockwashers, and washers (BA).
- 44. By hand, install two screws, four washers, and two nuts (BB).
- 45. Using 3/4 inch socket, tighten four screws (AZ) and two screws, lockwashers, and washers (BA).
- 46. Using 3/4 inch socket and extension on screw and 3/4 inch wrench to hold nut, tighten two screws, four washers, and two nuts (BB).

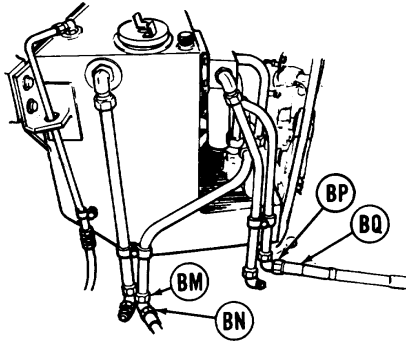
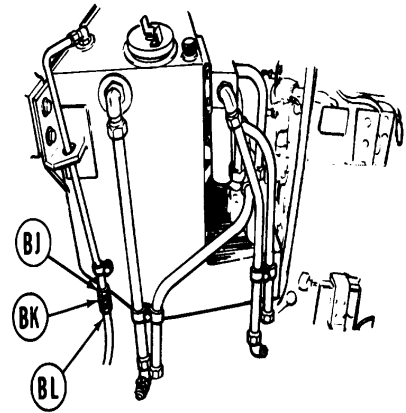
- 47. Place new packing (BC) in groove in end of hose assembly (BD).
- 48. Put lockwashers (BE) on four screws (BF).
- 49. Position hose assembly (BD) and two split flanges (BG) at flange (BH) and install four screws (BF).
- 50. Using 3/4 inch socket with extension, tighten four screws (BF).



Go on to Sheet 13

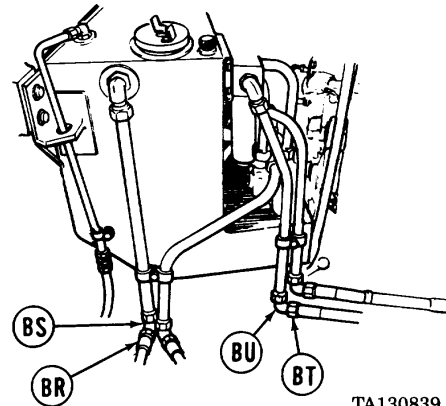
**HYDRAULIC RESERVOIR REPLACEMENT (Sheet 13 of 15)**

- 51. Connect tube assembly nut (BJ) to union (BK) on hose assembly (BL).
- 52. Using 11/16 inch wrench on tube assembly nut (BJ) and 13/16 inch wrench to hold union (BK), tighten tube assembly nut.



- 53. Connect tube assembly nut (BM) to elbow on end of hose assembly (BN).
- 54. Connect tube assembly nut (BP) to elbow on end of hose assembly (BQ).
- 55. Using 1-1/2 inch wrench, tighten two tube assembly nuts (BM and BP).

- 56. Connect hose assembly nut (BR) to elbow on end of tube assembly (BS).
- 57. Connect hose assembly nut (BT) on elbow on end of tube assembly (BU).
- 58. Using 1-1/2 inch wrench, tighten two hose assembly nuts (BR and BT).

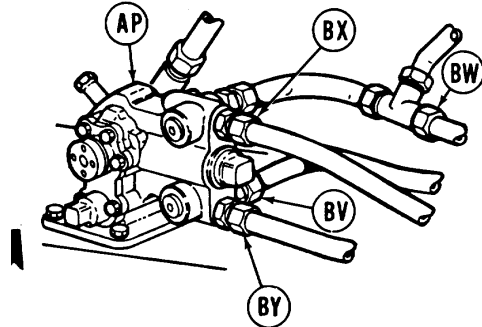
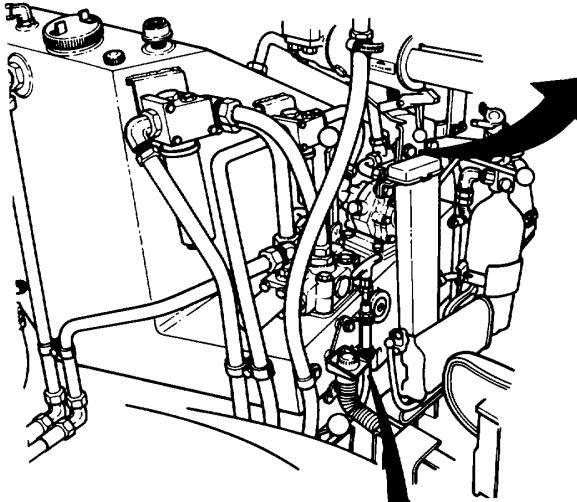


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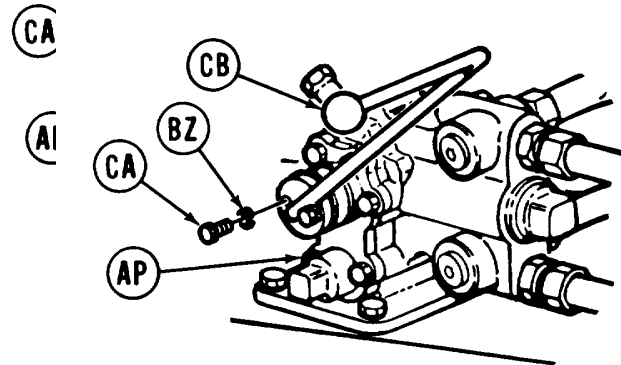
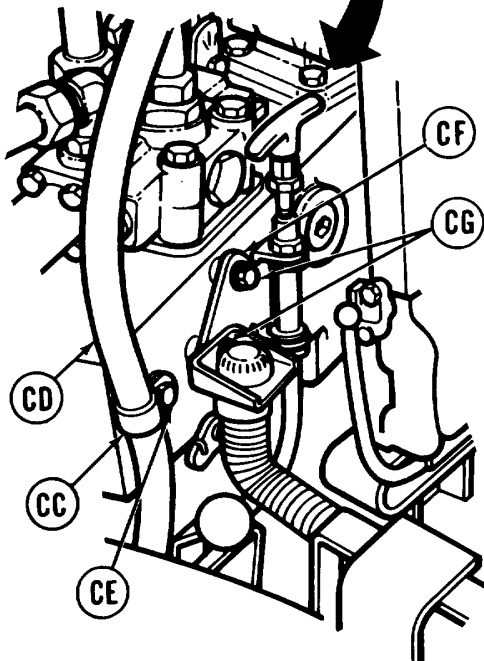
Go on to Sheet 14

**HYDRAULIC RESERVOIR REPLACEMENT (Sheet 14 of 15)**

59. Connect four tube assembly nuts (BV, BW, BX, and BY) to control valve (AP).
60. Using 1-1/2 inch wrench, tighten four tube assembly nuts (BV, BWBX, and BY).



61. Put lockwasher (BZ) on two screws (CA).
62. Position handle (CB) on control valve (AP) and, using 9/16 inch socket, install two screws (CA).

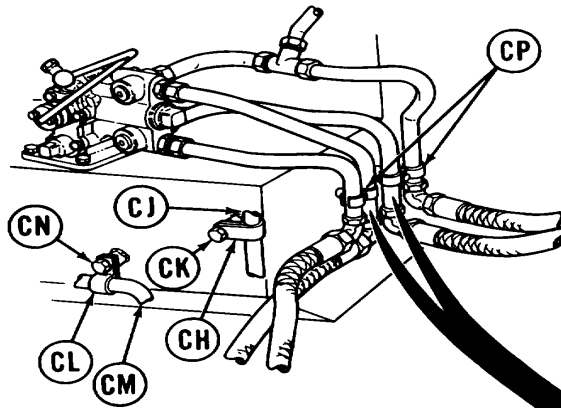


63. Position clamp (CC) on hose (CD).
64. Using 7/16 inch socket, install screw and lockwashers (CE).
65. Position bracket (CF) with attached parts and, using 7/16 inch socket, install two screws and lockwashers (CG).

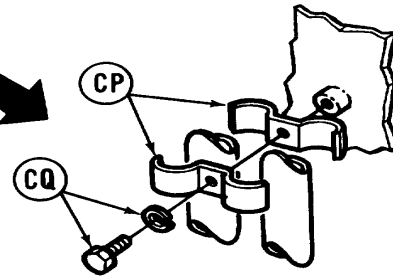
Go on to Sheet 15

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HYDRAULIC RESERVOIR REPLACEMENT (Sheet 15 of 15)



- 66. Position clamp (CH) on cable (CJ).
- 67. Using 7/16 inch socket, install screw and lockwasher (CK).
- 68. Position clamp (CL) on hose (CM).
- 69. Using 7/16 inch socket, install screw and lockwashers (CN).



- 70. Position four retaining straps (CP) on each pair of tube assemblies (one in front and one behind tubes).
- 71. Using 9/16 inch socket, install screw and lockwasher (CQ) through two retaining straps (CP).
- 72. Install first shot fire extinguisher cylinder (TM 9-2350-222-20-1).
- 73. Install turret (TM 9-2350-222-34-2).
- 74. Install driver's seat assembly (TM 9-2350-222-20-1).
- 75. Fill and purge reservoir and hydraulic system and check for leaks (LO 9-2350-222-12).

End of Task

TA130841



HYDRAULIC OIL RESERVOIR REPAIR (Sheet 1 of 6)

PROCEDURE INDEX

PROCEDURE	PAGE
Cleaning	12-18
Inspection	12-18
Repair	12-18
Test	12-19

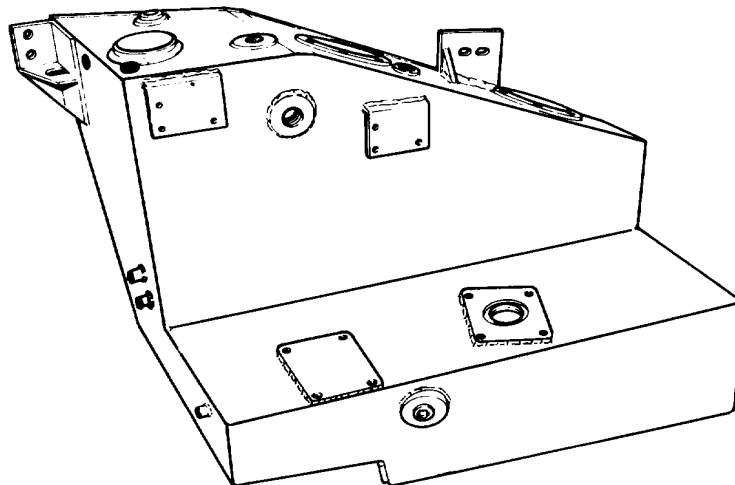
TOOLS: Low-pressure compressed air facility  
 Steam cleaner  
 Radiator repair tool kit  
 Coil thread insert tool kit  
 5/8 in. socket head screw key (alien wrench)  
 1/2 in. combination box and open end wrench  
 3/4 in. combination box and open end wrench

FABRICATED ITEMS: (For oil shutoff valve opening on reservoir)  
 Plate (Fig. 2, Appendix D)  
 Spacers (Fig. 3, Appendix D) (8 required)

SUPPLIES: Primer (Item 21, Appendix B)  
 White enamel paint (Item 20, Appendix B)  
 Liquid detergent (Item 11, Appendix B)  
 Cleaning compound (Item 5, Appendix B)  
 Gasket (1 required) (10864321)

REFERENCES: TM 9-237  
 TM 43-0139

PRELIMINARY PROCEDURE: Remove hydraulic oil reservoir from vehicle (page 12-3)



**HYDRAULIC OIL RESERVOIR REPAIR (Sheet 2 of 6)**

## Cleaning:

1. Using steam cleaner, apply a solution of cleaning compound (Item 5, Appendix B) and water to outside and inside of reservoir.
2. Rinse reservoir thoroughly with hot water after cleaning. Allow to dry.

## INSPECTION:

1. Inspect reservoir to make sure it has no cracks, fractures, or broken or defective welds.
2. Inspect threaded screw holes for worn or damaged threads.
3. Inspect reservoir for flaked or chipped paint.

## REPAIR:

1. Weld cracks, fractures, and broken or damaged welds (TM 9-237).
2. Repair worn or damaged threads by chasing with properly sized tap or by installation of coil insert. Coil insert can be installed using coil thread insert tool kit for particular thread size needed.
3. Repaint painted surfaces which have flaked or chipped with primer (Item 21, Appendix B). After primer coating has thoroughly dried, paint over primed surfaces with white enamel (Item 20, Appendix B). Refer to TM 43-0139.

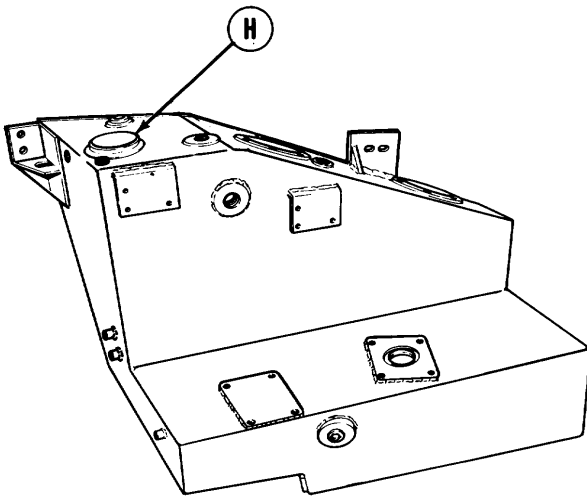
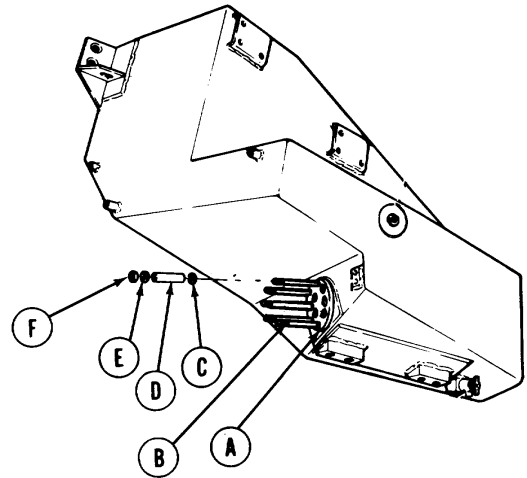
Go on to Sheet 3

TA130843

**HYDRAULIC OIL RESERVOIR REPAIR (Sheet 3 of 6)**

**TEST:**

1. Place fabricated plate (A) (Fig. 2, Appendix D) and gasket (B) onto studs (C) provided for oil reservoir shutoff valve.
2. Place washer (D), fabricated spacer (E) (Fig. 3, Appendix D), washer (F), and 5/16 x 24 nut (G) on each stud (C).
3. Using 1/2 inch wrench, tighten eight nuts (G) on studs (C) to hold fabricated plate (A) and gasket (B) snugly against reservoir.



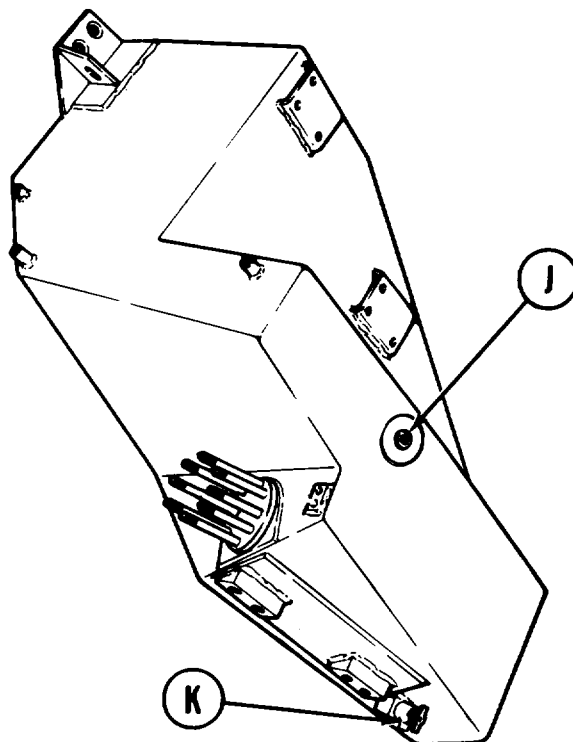
4. Install filler cover onto filler hole (H).

Go on to Sheet 4

TA130844

**HYDRAULIC OIL RESERVOIR REPAIR (Sheet 4 of 6)**

5. Manually start drain plug in drain hole (J).
6. Using allen wrench, install drain plug (J).
7. Manually start drain valve (K) in reservoir.
8. Using 3/4 inch wrench, install drain valve (K).  
Make sure valve nozzle is pointing down and valve is closed.



Go on to Sheet 5

TA130845

**HYDRAULIC OIL RESERVOIR REPAIR (Sheet 5 of 6)**

9. Using plugs from radiator repair tool kit, seal all remaining reservoir openings except one.
10. Install pressurizing fitting from radiator repair tool kit into final opening.
11. Install hose from low-pressure compressed air facility to pressurizing fitting in reservoir.
12. Using compressed air, slowly pressurize reservoir to a pressure of 3 psig.

**NOTE**

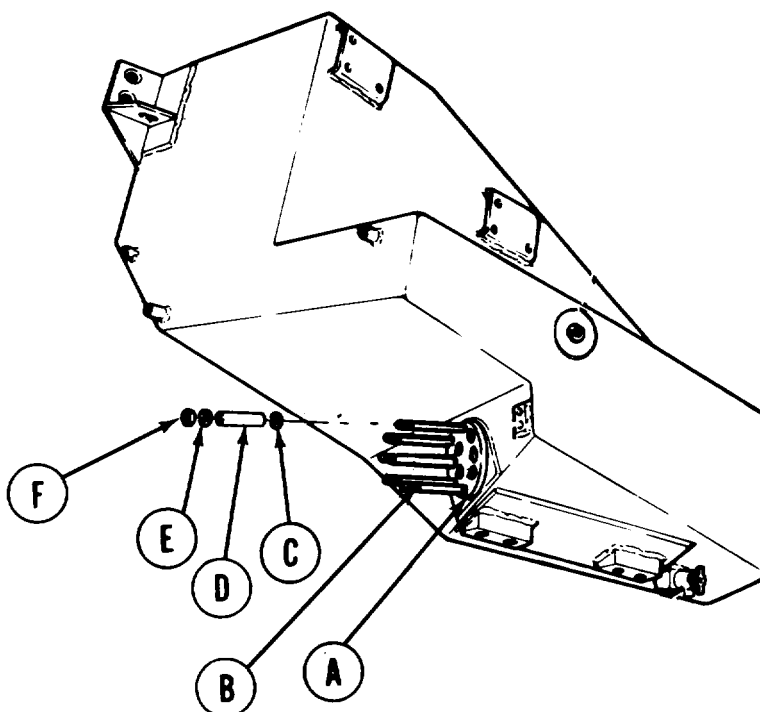
**There shall be no air leakage permissible from the pressurized reservoir. Any leakage will be detected by escaping air causing bubbles to form in a soapy solution applied to each weld and joint, and by loss of air pressure as indicated by the low-pressure compressed air facility pressure gage. If leakage occurs at filler cover, use a piece of 2 or 3 mil polyethylene sheet between cover and reservoir.**

13. Check all welds and joints for air leaks by applying solution of detergent (Item 11, Appendix B) and water on each weld and joint.
14. Check low-pressure compressed air facility pressure gage for any loss in pressure.
15. Relieve pressure in reservoir and disconnect air hose from pressurizing fitting.
16. Using hot water, thoroughly rinse outside of reservoir. Allow to dry.

Go on to Sheet 6

**HYDRAULIC OIL RESERVOIR REPAIR (Sheet 6 of 6)**

17. Using 1/2 inch wrench, remove nuts (F) holding plate and gasket (A) to reservoir.
18. Remove washers (E), spacers (D), washers (C), and plate and gasket (A) from studs (B).



19. Remove all radiator repair tool kit plugs from reservoir.
20. Using tape, cover all openings into reservoir to prevent entry of dirt and other foreign matter.
21. Install hydraulic oil reservoir into vehicle (page 12-9).

End of Task

TA130846

**BULLDOZER HYDRAULIC CYLINDER RAM REPAIR (Sheet 1 of 11)**

**PROCEDURE INDEX**

PROCEDURE	PAGE
Disassembly	12-24
Cleaning and Inspection	12-27
Assembly	12-28
Test	12-31

- TOOLS:**
- |  |  |
|--|--|
| 3/4 in. combination box and open end wrench                | Torque wrench with 1/2 in. drive (0-175 lb-ft) (0-237 N-m) |
| 3/8 in. socket head key wrench (allen wrench)              | Micrometer set, inside, 0-8 in.                            |
| Socket adapter, 1/2 in. drive to 3/4 in. drive             | Micrometer set, outside, 0-8 in.                           |
| Socket adapter, 3/4 in. drive to 1 in. drive               | Flat-tip screwdriver                                       |
| 15/16 in. socket with 3/4 in. drive                        | Slip joint pliers  |
| 2-1/4 in. socket with 1 in. drive                          | Cleaning brush   |
| Ratchet with 3/4 in. drive                                 | Arbor press  |
| Ratchet with 1 in. drive                                   | Pinch bar  |
| Torque wrench with 3/4 in. drive (0-600 lb-ft) (0-713 N-m) | Hammer   |
|  | Vise   |

**PERSONNEL:** Two

**TEST EQUIPMENT:** Hydraulic test support equipment

- SUPPLIES:**
- Cotter pin (MS24665-628)
  - Flat washer (8668478)
  - Seal (63X1807)
  - Piston, rod packing set (7705560)
  - Rags (Item 31, Appendix B)
  - Container
  - Wooden block
  - Dry cleaning solvent (Item 12, Appendix B)
  - Pointed stick
  - Watch
  - Preformed packing (7261644)
  - Piston packing set (7261470)
  - Preformed packing (MS28775-442)
  - Adapters
  - Bushing reducers

**PRELIMINARY PROCEDURE:** Remove right or left cylinder and ram (TM 9-2350-222-20-1)

Go on to Sheet 2 TA130847

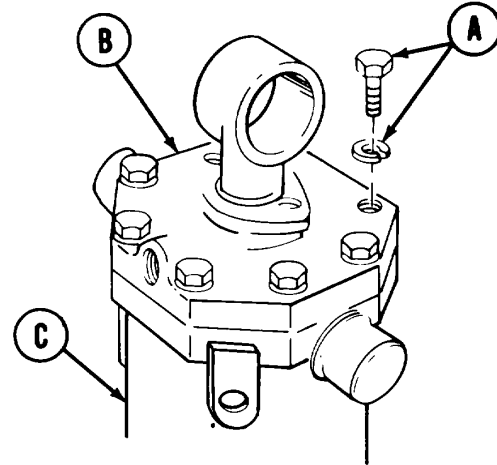
**BULLDOZER HYDRAULIC CYLINDER RAM REPAIR (Sheet 2 of 11)**

**NOTE**

Right and left moldboard cylinder and ram have the same component parts The left moldboard cylinder is shown throughout this procedure.

**DISASSEMBLY:**

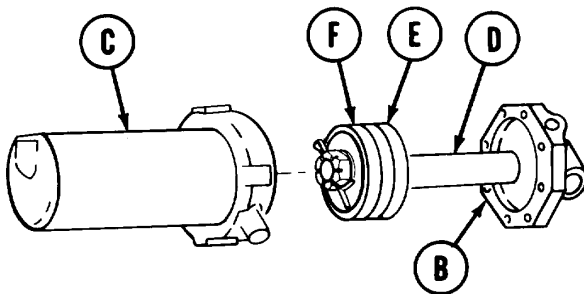
1. Using 15/16 inch socket, remove eight screws and lockwashers (A) holding cylinder head (B) to cylinder (C).



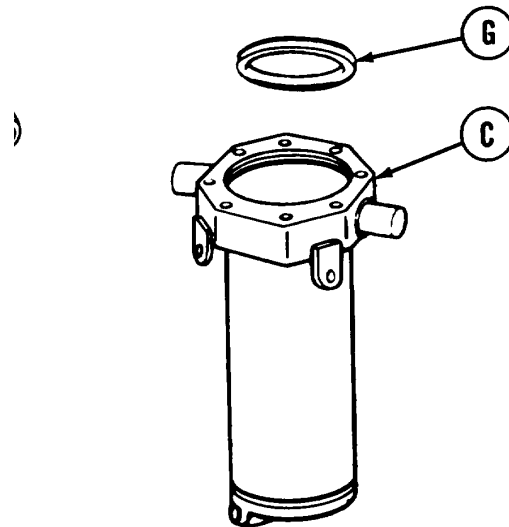
**NOTE**

It may be necessary to tap cylinder head (B) with hammer to loosen it.

2. Remove cylinder head (B), piston rod (D), and pistons (E and F) as assembly from cylinder (C).



3. Remove preformed packing (G) from groove inside cylinder (C). Throw packing away.



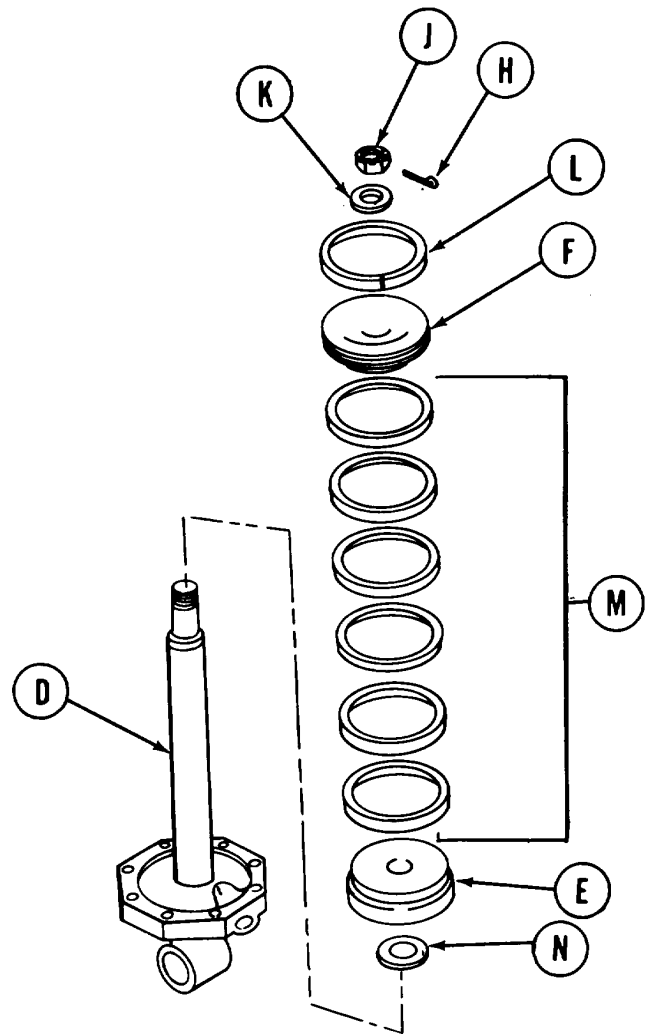
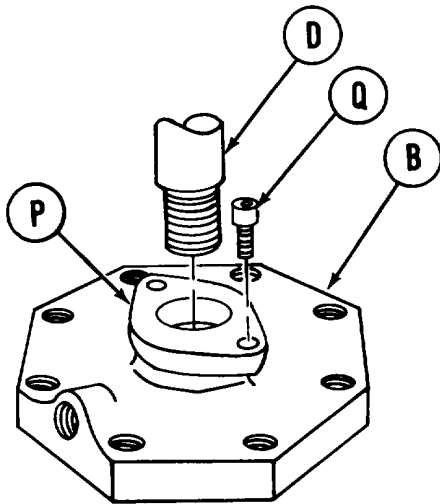
TA130848

Go on to Sheet 3 TA130848



**BULLDOZER HYDRAULIC CYLINDER RAM REPAIR (Sheet 3 of 11)**

4. Using slip joint pliers, remove cotter pin (H) from nut (J). Throw cotter pin away.
5. Using 2-1/4 inch socket, remove nut (J) and washer (K) from rod (D).
6. Remove piston (F) from rod (D).
7. Remove ring (L) from piston (F) groove. Throw ring away.
8. Remove packing set (M) from piston set (E and F). Throw packing set away.
9. Remove piston (E) and washer (N) from rod (D).
10. Slide rod (D) from cylinder head (B) and gland (P). Tap with hammer, if necessary.

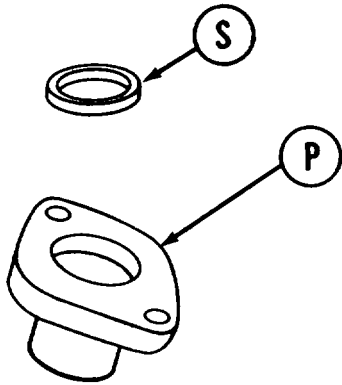


11. Using 3/8 inch allen wrench, remove two screws (Q) securing gland (P) to cylinder head (B).
12. Remove gland (P) from cylinder head (B).

Go on to Sheet 4 TA130849

**BULLDOZER HYDRAULIC CYLINDER RAM REPAIR (Sheet 4 of 11)**

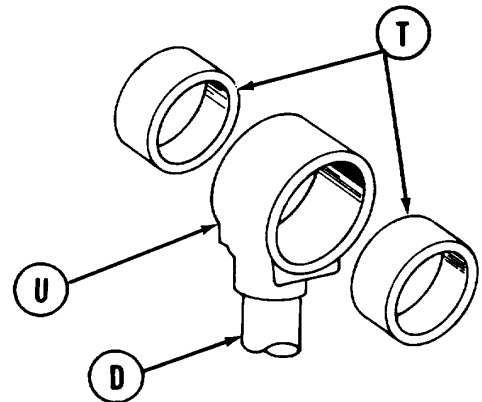
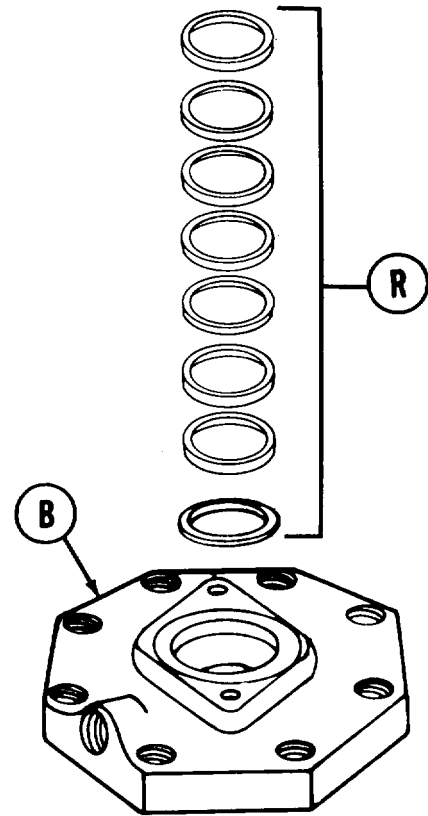
13. Remove rod packing set (R) from cylinder head (B).
14. Using pinch bar, remove seal (S) from gland (P).  
Throw seal away.



**CAUTION**

Do not remove bushings from housing unless bushings are damaged or inside diameter (I.D.) is beyond wear limits (page 12-27).

15. Using arbor press, drive two bushings (T) out of ram head (U).
16. Placing rod (D) in covered vise and, using covered pinch bar in ram head (U), remove ram head from rod.



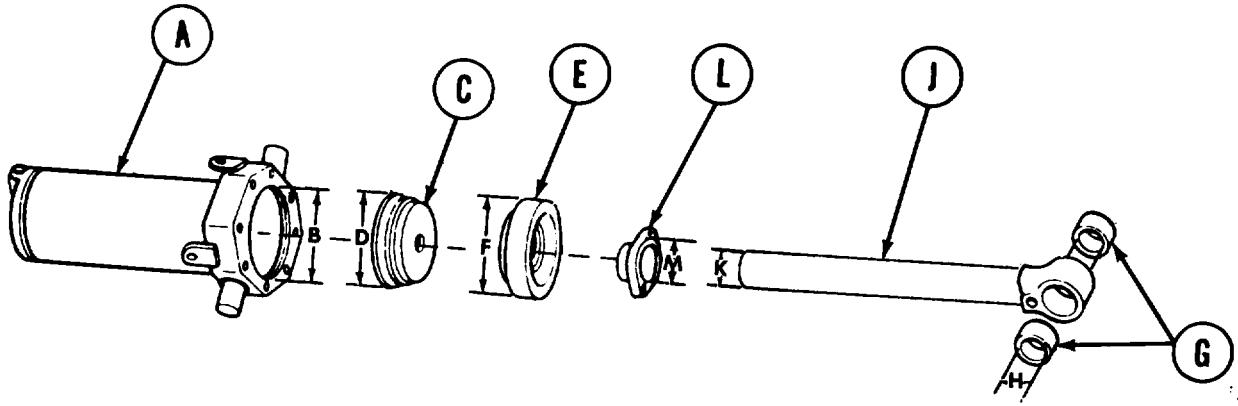
Go on to Sheet 5

TA130850

**BULLDOZER HYDRAULIC CYLINDER RAM REPAIR (Sheet 5 of 11)**

**CLEANING AND INSPECTION:**

1. Using rags and solvent (Item 12, Appendix B), clean metal surfaces. Wipe dry with rags.
2. Using solvent and cleaning brush or a pointed wooden stick, clean recessed areas and wipe dry with rags.
3. Inspect components and parts to wear limits specified in table.



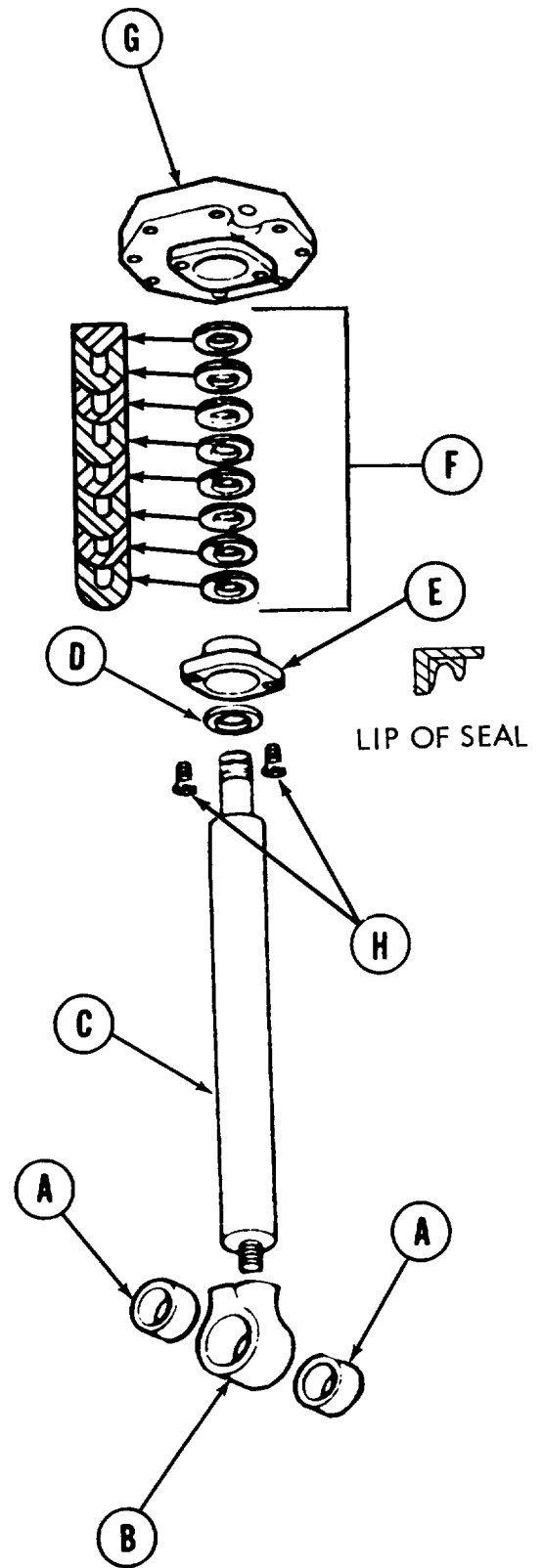
Item and Inspection Area		Surface and Inspection Limits	Micrometer
A - Cylinder	I.D	B - 7.021	Inside 7-8 inch
C - Piston	O.D	D - 6.9740	Outside 7 inch
E - Piston	O.D	F - 6.9740	Outside 7 inch
G - Bushings	I.D	H - 2.006	Inside 2-3 inch
J - Piston Rod	O.D	K - 2.497	Outside 3 inch
L - Gland	I.D	M - 2.507	Inside 2-3 inch

Go on to Sheet 6 TA130851

**BULLDOZER HYDRAULIC CYLINDER RAM REPAIR (Sheet 6 of 11)**

**ASSEMBLY:**

1. Using arbor press, install two bushings (A) into ram head (B) of rod (C).
2. Screw ram head (B) onto rod (C) until head is flush with rod (C).
3. Position new seal (D) in gland (E) with lip of seal facing outward.
4. Place wooden block over seal (D), and using hammer, tap seal (D) into gland (E).
5. Install new packing set (F) into cylinder head (G) with flat surface of packing set into cylinder head (G) and pointed surface of packing set (F) towards gland (E).
6. Install gland (E) against packing set (F) into cylinder head (G) and aline holes.
7. Install two screws (H) securing gland (E) to cylinder head (G) and hand tighten.
8. Slide rod (C) in cylinder head (G).
9. Using 3/8 inch alien wrench, tighten screws (H).



**BULLDOZER HYDRAULIC CYLINDER RAM REPAIR (Sheet 7 of 11)**

10. Install washer (J) on shoulder of rod (C).
11. Position piston (K) on rod (C) (piston (K) has no groove).
12. Install new packing set (L) onto piston (M). (Piston (M) has a groove).

**NOTE**

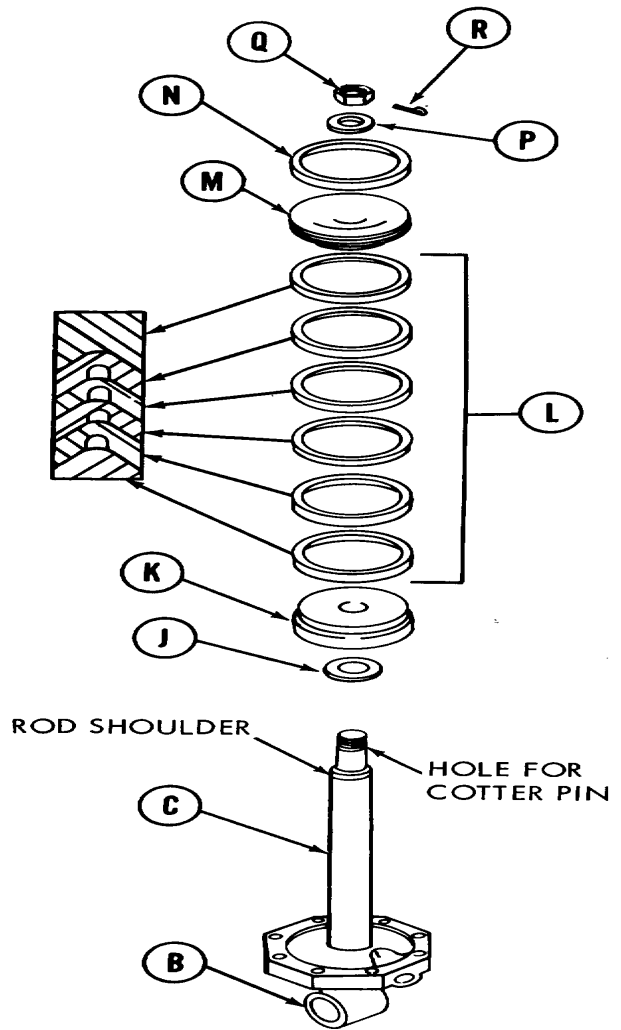
**Six packings must be installed with lips facing toward piston (M) as shown.**

13. Install new ring (N) in groove in piston (M).
14. Install piston (M) and packing set (L) onto rod (C) so that piston (K and M) mates with packing set (L).
15. Install washer (P) on rod (C).
16. Screw nut (Q) on threaded end of rod (C).
17. Holding ram head (B) of piston rod (C) in vise and, using 2-1/4 inch socket with adapter and torque wrench, tighten nut (Q) to 300-330 lb ft (407-447 N-m).

**NOTE**

**Use washer(s) (P) as required to line up cotter pin hole in rod (C) and slot in nut (Q).**

18. Using pliers, install new cotter pin (R) through slot in nut hole (Q) and hole in rod (C).

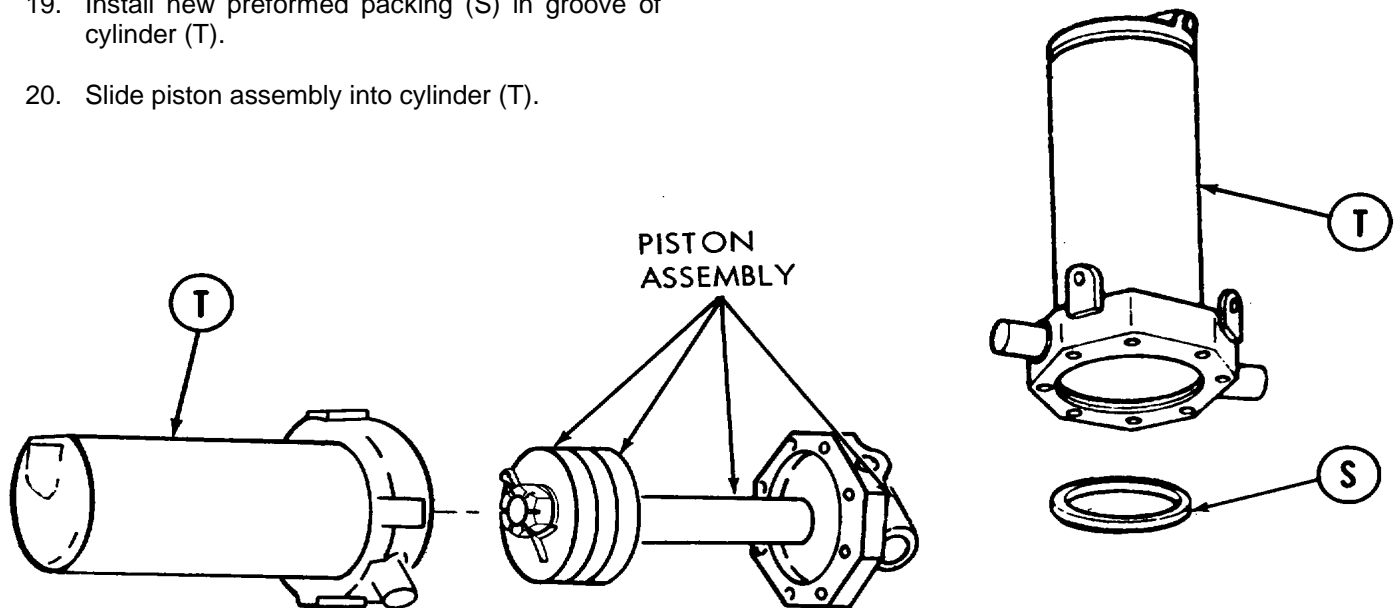


TA130853

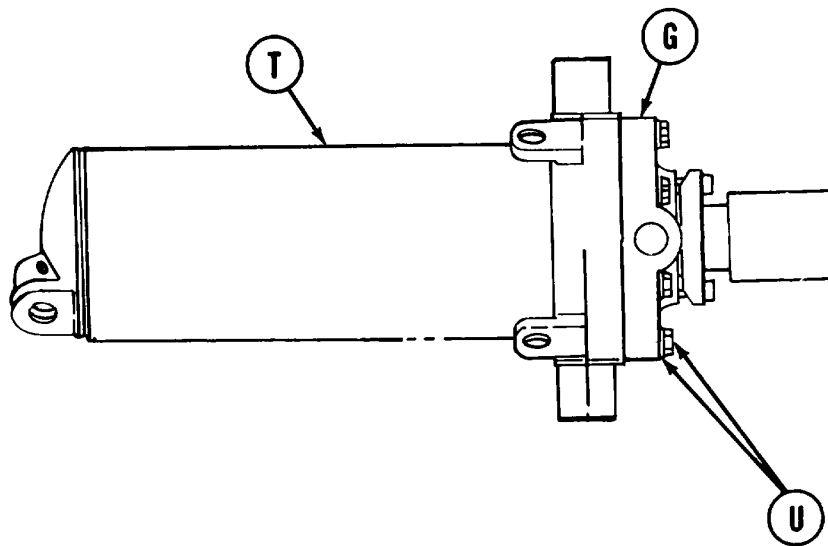
Go on to Sheet 8 TA130853

**BULLDOZER HYDRAULIC CYLINDER RAM REPAIR (Sheet 8 of 11)**

19. Install new preformed packing (S) in groove of cylinder (T).
20. Slide piston assembly into cylinder (T).



21. Install eight lockwashers and eight screws (U) securing cylinder head (G) and cylinder (T) together.



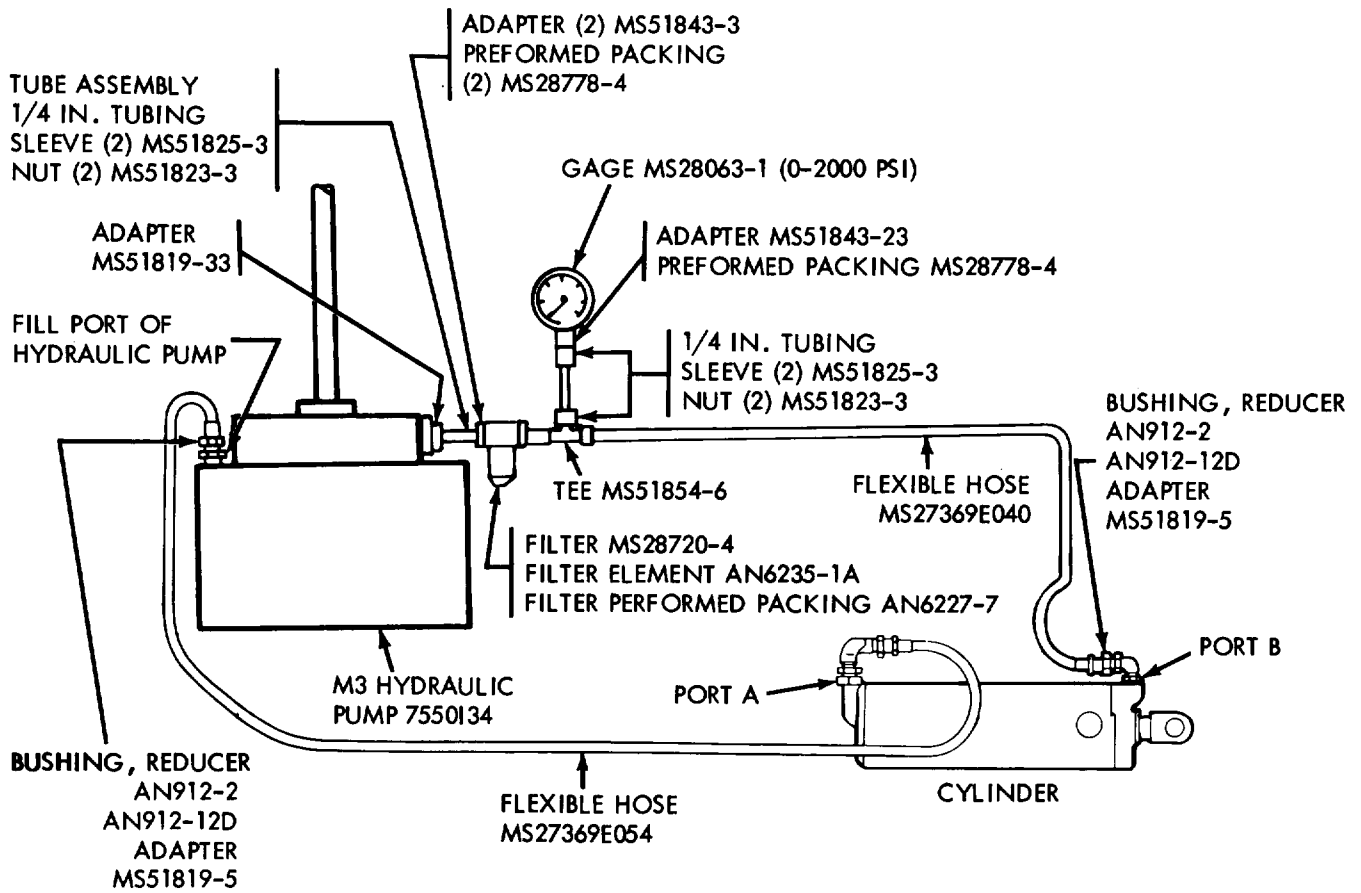
22. Using 15/16 inch socket with adapter and torque wrench, tighten eight screws (U) alternately to 100-110 lb-ft (136-150 N-m).

TA130854

Go on to Sheet 9

BULLDOZER HYDRAULIC CYLINDER RAM REPAIR (Sheet 9 of 11)

TEST:

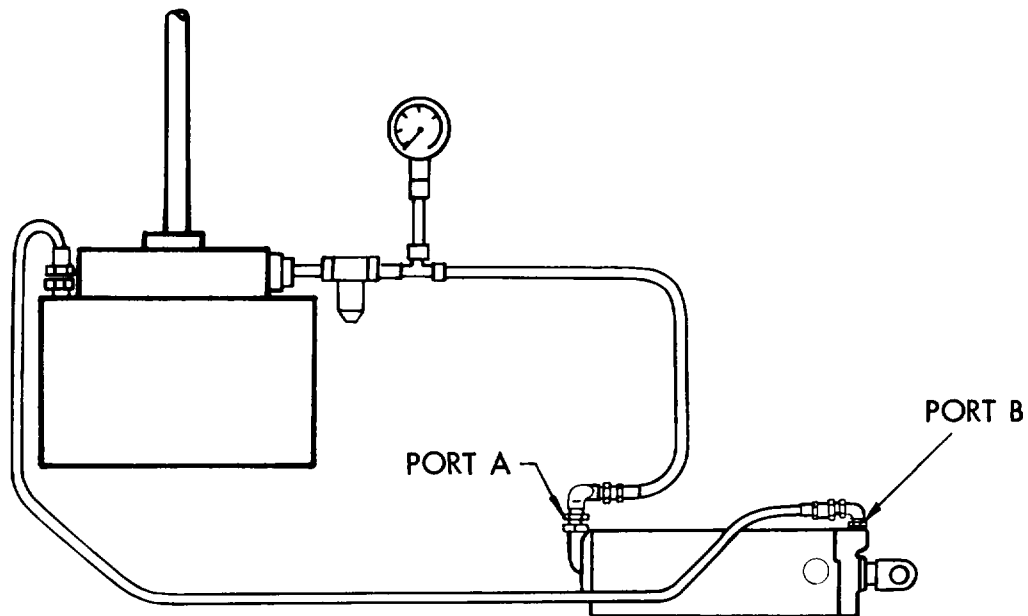


TEST SETUP 1

Go on to Sheet 10 TA130855

**BULLDOZER HYDRAULIC CYLINDER RAM REPAIR (Sheet 10 of 11)**

1. Connect test arrangement to cylinder as shown in test setup 1 (page 12-31).
2. Operate hydraulic pump to completely withdraw piston.
3. Reconnect test arrangement to cylinder as shown in test setup 2 (below).
4. Operate hydraulic pump to completely extend piston.
5. Repeat steps 1 thru 4 five times.
6. There shall be no exterior leakage showing on the outside of the cylinder during cycling.

**TEST SETUP 2**

Go on to Sheet 11

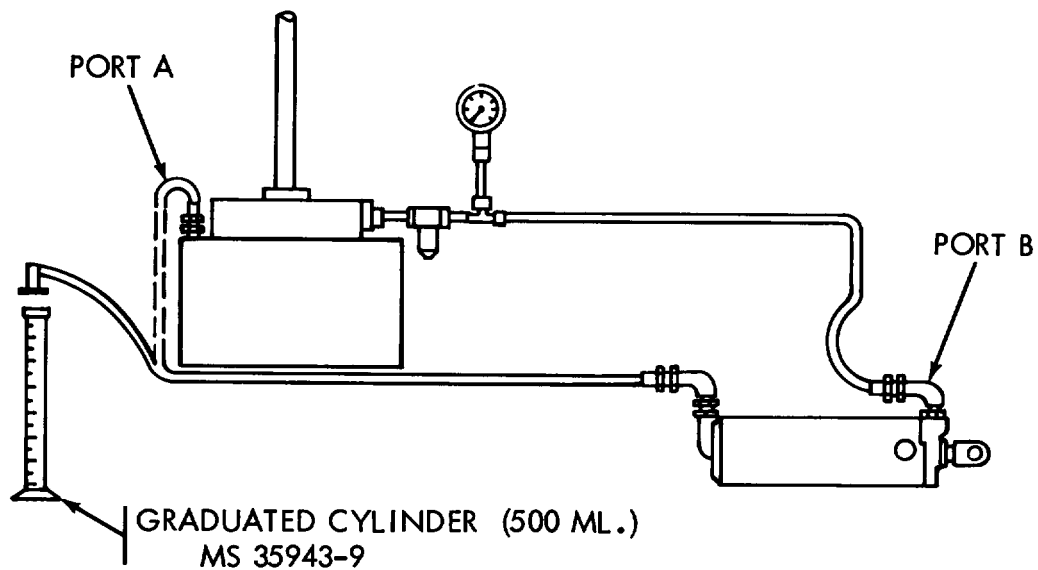
TA130856



**BULLDOZER HYDRAULIC CYLINDER RAM REPAIR (Sheet 11 of 11)**

7. Connect test arrangement to cylinder as shown in test setup 3 (below).
8. Operate hydraulic pump and apply 1000 + 50 psi at port B cylinder must be fully retracted.
9. Maintain a pressure of 1000 + 50 psi for 5 minutes.
10. There shall be no rod seal leakage or exterior leakage.
11. During the last minute of the 5-minute test, check for leakage at port A. Do this by removing flexible hose (A) from hydraulic pump.
12. With flexible hose removed from pump, using graduated cylinder, measure leakage.
13. During the 1-minute check, leakage shall not exceed 3 cubic inches for 1 minute.

NOTE: 3 cubic inches 49.15 ml.



**TEST SETUP 3**

End of Task

TA130857

**HYDRAULIC RESERVOIR SUCTION LINE ASSEMBLY REPLACEMENT (Sheet 1 of 7)**

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	12-35
Inspection	12-37
Installation	12-38

**TOOLS:** 3/4 in. combination box and open end wrench (2 required) Ratchet with 1/2 in. drive  
 Flat-tip screwdriver Flashlight or drop light  
 7/16 in. socket with 1/2 in. drive

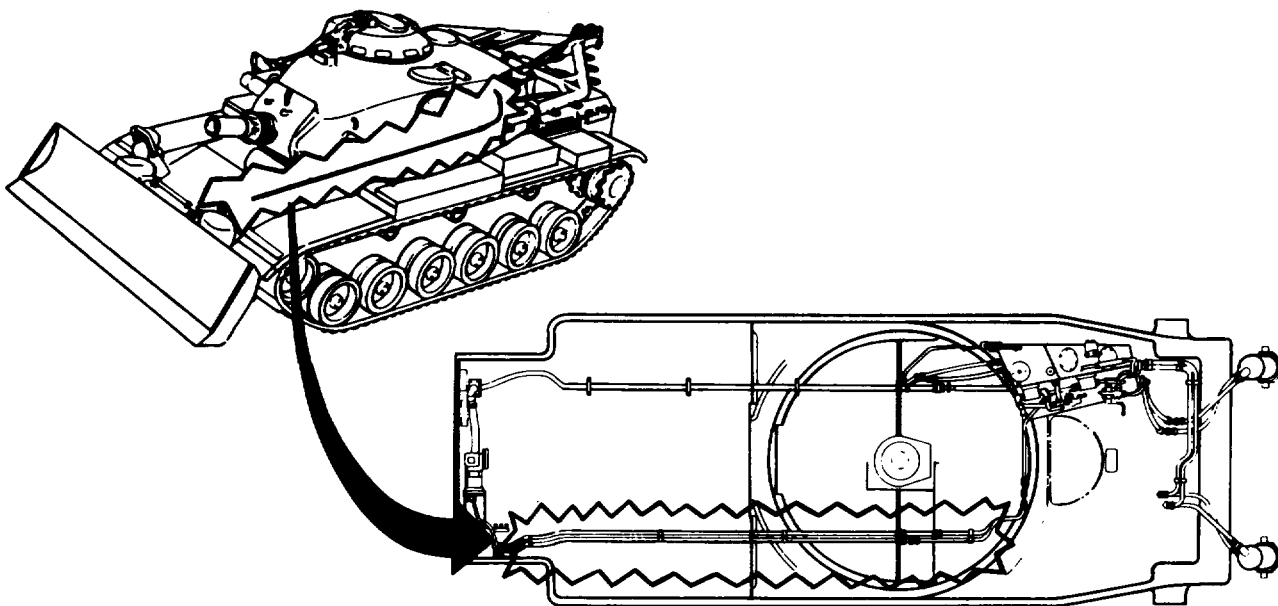
**SPECIAL TOOLS:** Spanner wrench (Item 11, Chapter 2, Section I)

**SUPPLIES:** Rags (Item 31, Appendix B) Seal (10940578)  
 Oil (Item 16, Appendix B) Drip pan  
 Preformed packing (MS28775-232)

**PERSONNEL:** Three

**REFERENCES:** TM 9-2350-222-10  
 TM 9-2350-222-20-1

**PRELIMINARY PROCEDURES:** Remove left fuel tank (page 4-51)  
 Open turret platform access cover (TM 9-2350-222-10)  
 Manually traverse turret to gain access to suction line under turret platform (TM 9-2350-222-10)  
 Remove reservoir-to-bulkhead suction hoses (TM 9-2350-222-20-1)  
 Remove fuel tank crossover line (TM 9-2350-222-20-1)



Go on to Sheet 2

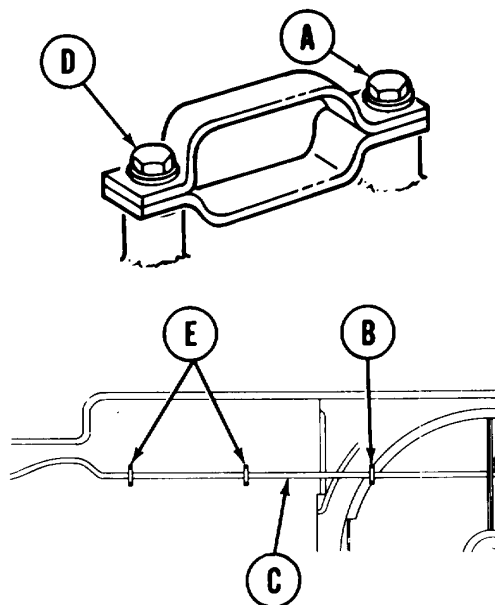
## HYDRAULIC RESERVOIR SUCTION LINE ASSEMBLY REPLACEMENT (Sheet 2 of 7)

## REMOVAL:

## NOTE

Three straps (B) and (E) are identical.

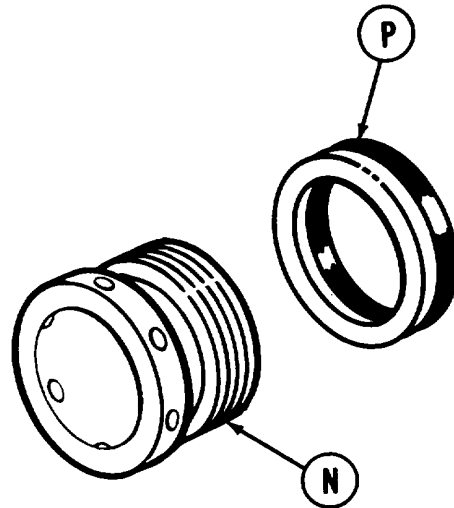
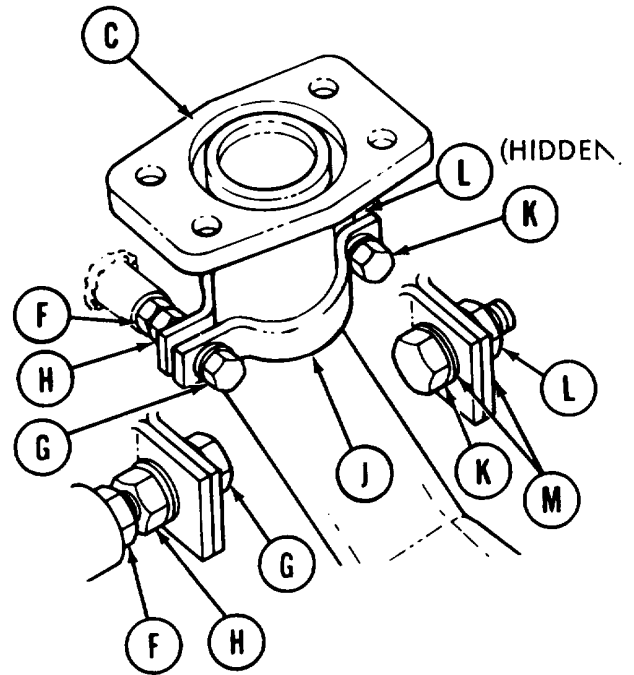
1. Using 7/16 inch socket, remove two screws, lockwashers, and flat washers (A) from strap (B). Remove both halves of strap (B) from suction line (C) and hull mount.
2. Using 7/16 inch socket, remove two screws, lockwashers, and flat washers (D) from two straps (E). Remove both parts of straps (E) from suction line and hull mount.



Go on to Sheet 3 TA130859

**HYDRAULIC RESERVOIR SUCTION LINE ASSEMBLY REPLACEMENT (Sheet 3 of 7)**

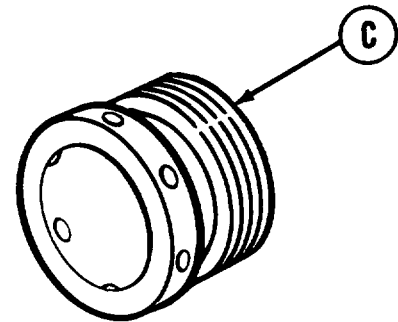
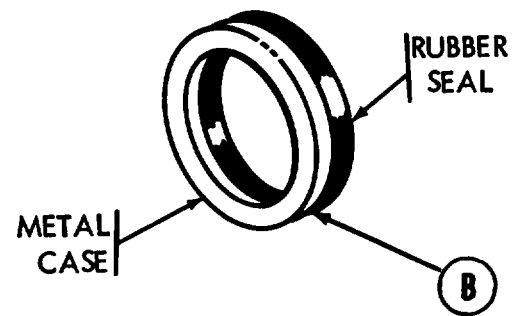
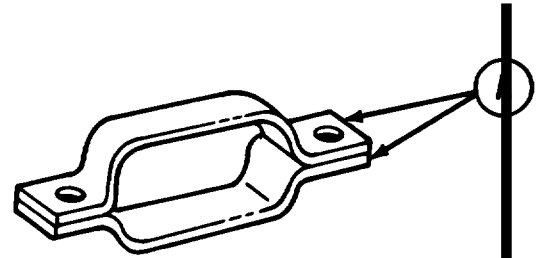
3. Using one 3/4 inch wrench on jamnut (F) and other 3/4 inch wrench to hold screw (G), loosen jamnut (F).
4. Using one 3/4 inch wrench to hold screw (G) and other 3/4 inch wrench on nut (H), loosen nut (H).
5. Lift suction line (C) away from mounting boss and remove nuts (F) and (H) from screw (G). Remove screw and flat washer (G) from clamp (J).
6. Using one 3/4 inch wrench on screw (K) and other 3/4 inch wrench on nut (L), remove screw (K), two flat washers (M), and nut (L) from clamp (J). Remove clamp (J) from suction line (C).
7. Using spanner wrench, remove bushing (N) from bulkhead.
8. Using hands, and with assistance from another person, twist suction line (C) back and forth while pulling from bulkhead toward rear of vehicle.
9. Using screwdriver, pry seal (P) from bushing (N).



Go on to Sheet 4

**HYDRAULIC RESERVOIR SUCTION UNE ASSEMBLY REPLACEMENT (Sheet 4 of 7)****INSPECTION:**

1. Inspect straps (A) for breaks or cracks. Straps must not be broken, cracked, or rusted.
2. Inspect seal (B) for cracked, broken, or dry-rotted rubber seal. Seal (B) must not be cracked, broken, or dry-rotted.
3. Inspect threads of bushing (C) for damage. Threads must not be damaged.
4. Replace broken or cracked clamps (A). Replace seal (B) if cracked, broken, or signs of dry rot show. Repair threads of bushing (C) by chasing threads with file or proper die.
5. Inspect screws for rust or damaged threads. Screws must not be rusted and threads must not be damaged.
6. Replace damaged or rusted parts.



Go on to Sheet 5

**Change 3 12-37**

**HYDRAULIC RESERVOIR SUCTION UNE ASSEMBLY REPLACEMENT (Sheet 5 of 7)**

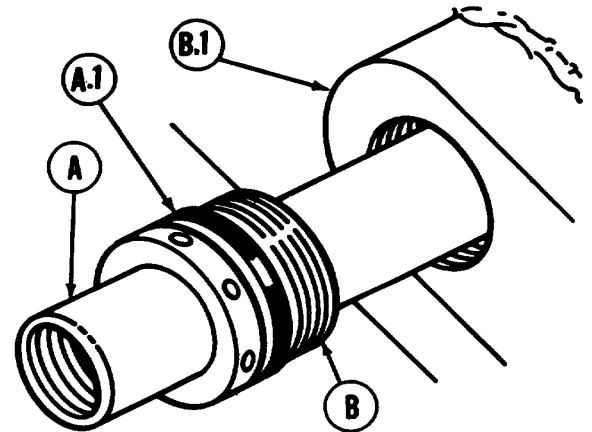
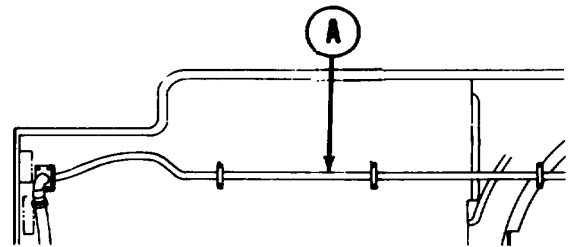
**INSTALLATION:**

1. Using three persons, position new suction line assembly (A) into vehicle. Light up area under turret so hole in bulkhead can be seen.
2. Using screwdriver, install seal (A.1) on bushing (B).
- 2.1. Install seal (A.1) and bushing (B) over end of suction line (A) into bulkhead mounting block. Using spanner wrench, tighten bushing (B) in bulkhead mounting block (B.1).

**NOTE**

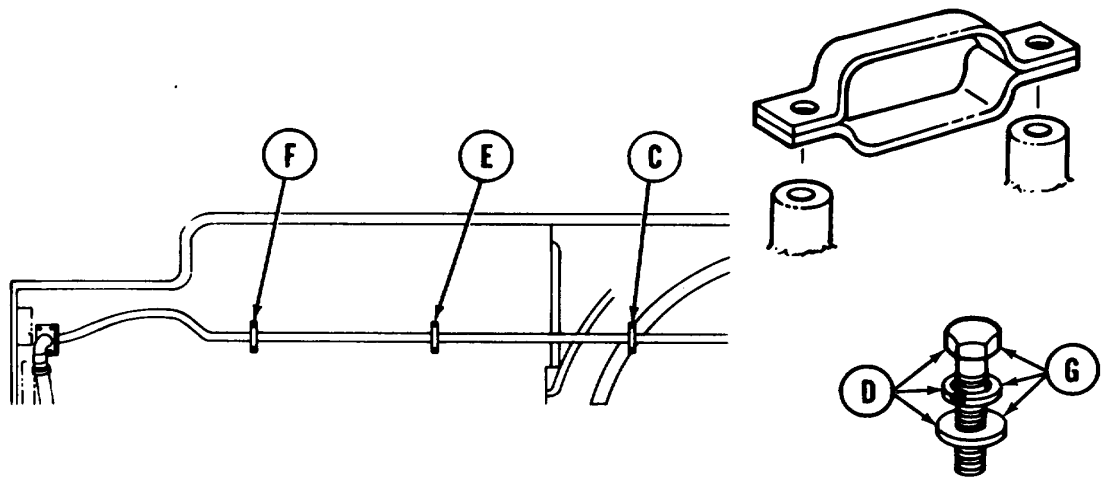
Use one person to raise and lower suction line while installing straps.

3. Using fingers, install strap (C) onto suction line (A) and hull mounts with two screws, lockwashers, and flat washers (D). Install screws loosely.
4. Using fingers, install two straps (E) and (F) onto suction line (A) and hull mounts with two screws, lockwashers, and flat washers (G) in each strap. Install screws loosely.



**NOTE**

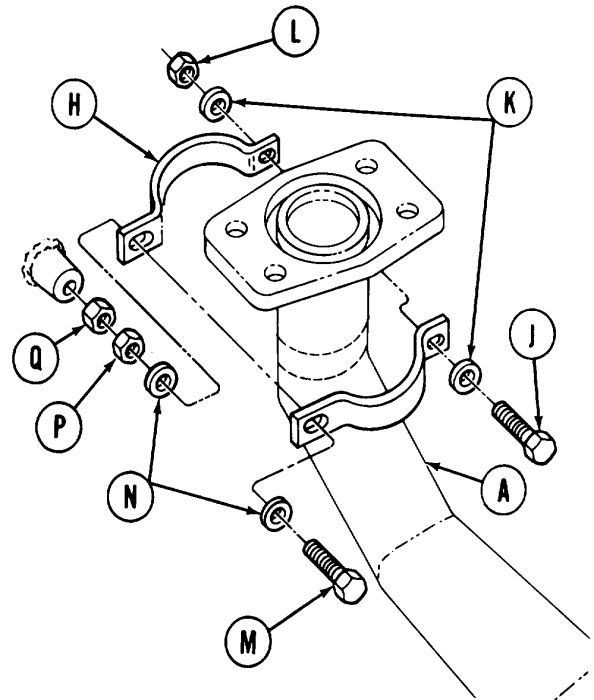
Straps C, E, and F are identical



Go on to Sheet 6

## HYDRAULIC RESERVOIR SUCTION LINE ASSEMBLY REPLACEMENT (Sheet 6 of 7)

5. Position clamp (H) onto upper end of suction line (A).
6. Using fingers, install 1-1/2 inch long screw (J), two flat washers (K), and nut (L) onto clamp (H). Tighten finger tight.
7. Using fingers, install 2-1/4 inch long screw (M), two flat washers (N), nut (P), and jamnut (Q) onto clamp (H). Tighten finger tight.
8. Position clamp (H) onto hull mounting boss and, using 3/4 inch wrench, thread screw (M) about seven or eight complete turns into mounting boss.
9. Using one 3/4 inch wrench to hold screw (M) and other 3/4 inch wrench on jamnut (Q), tighten jamnut against hull mounting boss.
10. Using one 3/4 inch wrench to hold screw (M) and other 3/4 inch wrench on nut (P), tighten nut (P).
11. Using one 3/4 inch wrench on screw (J) and other 3/4 inch wrench on nut (L), tighten screw (J) and nut (L).



Go on to Sheet 7

TA130863

**HYDRAULIC RESERVOIR SUCTION LINE ASSEMBLY REPLACEMENT (Sheet 7 of 7)**

12. Using 7/16 inch socket, tighten screws on clamps (C, E, and F).
13. Install reservoir-to-bulkhead suction hose assembly (TM 9-2350-222-20-1).
14. Install fuel tank crossover line (TM 9-2350222-20-1).
15. Install left fuel tank (page 4-59).
16. Close turret platform access cover (TM 92350-222-10).
17. Fill hydraulic reservoir with oil (Item 16, Appendix B) to replace lost oil.

End of Task



**HYDRAULIC PUMP DISCHARGE TUBES ASSEMBLY REPLACEMENT (Sheet 1 of 7)**

PROCEDURE INDEX

PROCEDURE	PAGE
Removal	12-42
Inspection	12-44
Installation	12-44

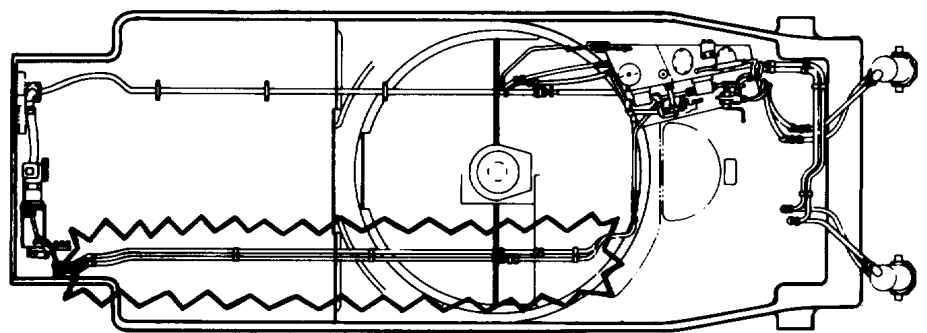
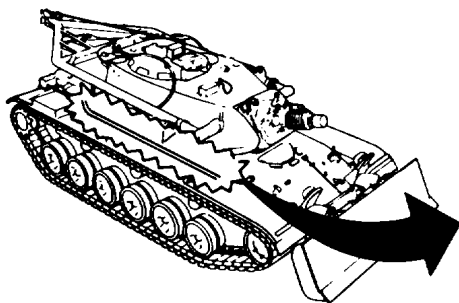
**TOOLS:** 9/16 in. socket with 1/2 in. drive  
 Ratchet with 1/2 in. drive  
 5 in. extension with 1/2 in. drive  
 Hacksaw with blade  
 Flat-tip screwdriver  
 1-1/4 in. open end wrench  
 1-1/2 in. open end wrench  
 1-5/8 in. open end wrench

**SUPPLIES:** Seal (10940575)  
 Rags (Item 31, Appendix B)  
 Drip pan  
 Clinch sleeve (MS21922-16) (2 required)

**PERSONNEL:** Three

**REFERENCES:** TM 9-2350-222-10  
 TM 9-2350-222-20-1

**PRELIMINARY PROCEDURES:** Disconnect cable from master relay (TM 9-2350-222-20-1)  
 Disconnect two cables from regulator (TM 9-2350-222-20-1)  
 Disconnect gas particulate filter hoses from tee near regulator (TM 9-2350-222-20-1)  
 Remove hydraulic pump discharge hoses (TM 9-2350-222-20-1)  
 Remove right fuel tank (page 4-37)



CUTAWAY VIEW SHOWN FOR CLARITY

Go on to Sheet 2 TA130864

**HYDRAULIC PUMP DISCHARGE TUBES ASSEMBLY REPLACEMENT (Sheet 2 of 7)**

**REMOVAL:**

**NOTE**

Removal procedures for cover end tube assembly (A) and shaft end tube assembly (B) are identical. This procedure describes cover end tube assembly.

**NOTE**

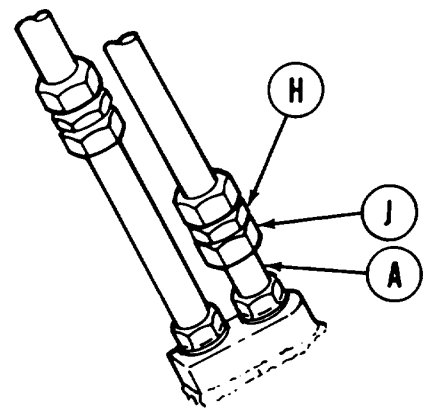
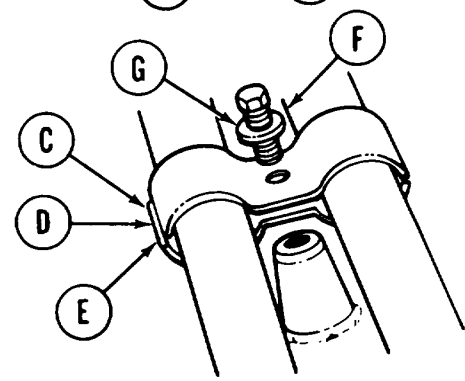
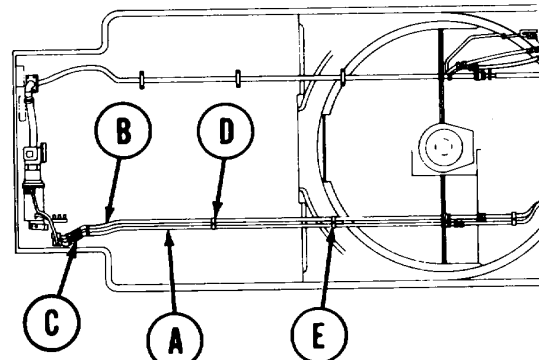
Retaining straps C, D, and E are identical.

1. Using 9/16 inch socket, remove two screws and lockwashers (F) from two retaining straps (C) and (D). Upper half of retaining straps will come off with screw and lockwasher (F). Lift tube to remove lower half.
2. Using 9/16 inch socket, remove screw and lockwasher (G) from retaining strap (E). Lift tube to remove lower half of strap.

**NOTE**

**Steps 3 thru 8 must be performed in crew compartment.**

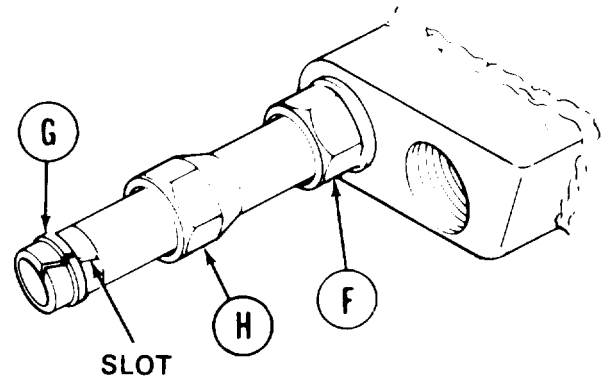
3. Using 1-5/8 inch wrench to hold adapter (H) and 1-1/2 inch wrench on nut (J), remove nut (J) from adapter (H).
4. Have two persons in engine compartment pull discharge tube (A) away from adapter (H).



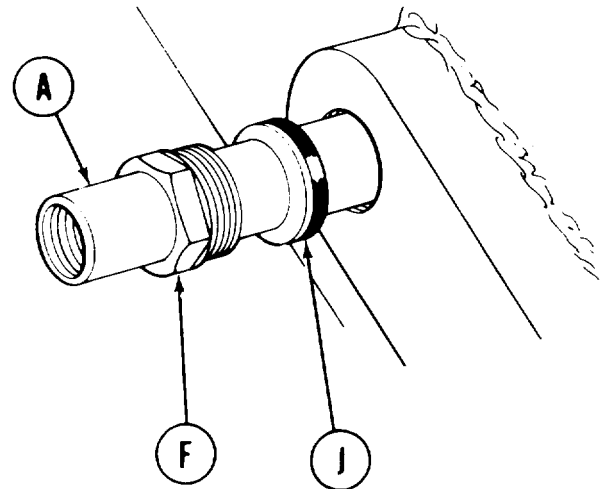
Go on to Sheet 3 TA130865

## HYDRAULIC PUMP DISCHARGE TUBES ASSEMBLY REPLACEMENT (Sheet 3 of 7)

5. Using hacksaw, cut slot in clinch sleeve (G).
6. Using screwdriver, pry clinch sleeve open. I Remove clinch sleeve (G) and coupling nut (Hi. Throw clinch sleeve away.
7. Using 1-1/4 inch wrench, remove packing nut (F) from bulkhead.



8. Remove packing nut (F) from tube (A).
9. Using two persons, pull tube (A) toward rear of vehicle and out of bulkhead. Remove tube from vehicle.
10. Using screwdriver, pry seal (J) out of bulkhead bushing. Throw seal away.



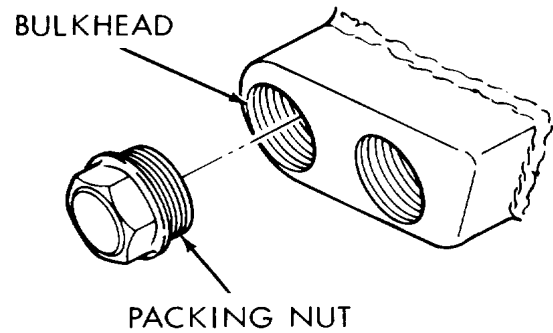
Go on to Sheet 4

TA252655

**HYDRAULIC PUMP DISCHARGE TUBES ASSEMBLY REPLACEMENT (Sheet 4 of 7)**

**INSPECTION:**

1. Inspect threads in bulkhead mount for damage. If damaged, repair.
2. Inspect threads on packing nut for damage. If damaged, restore threads. If damaged beyond repair, replace packing nut.



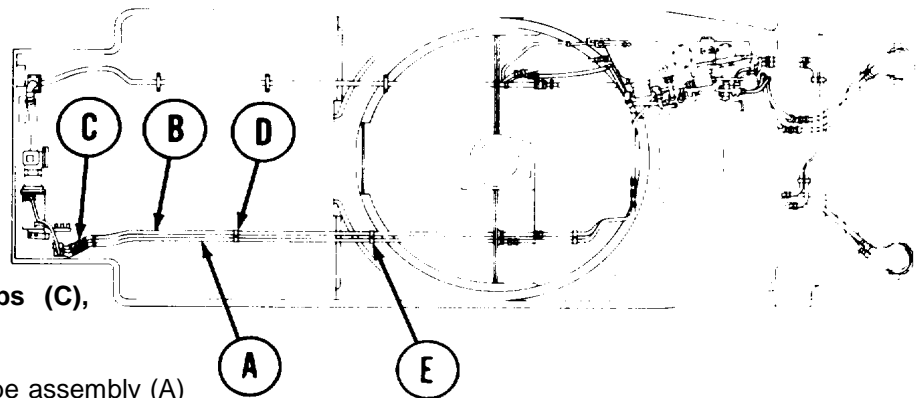
**INSTALLATION:**

**NOTE**

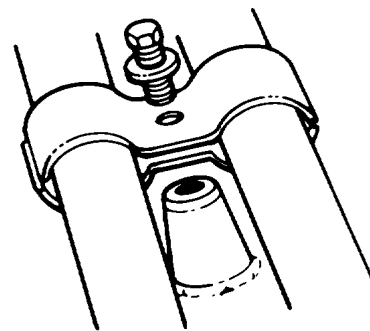
Installation procedures for cover end tube assembly (A) and shaft end tube assembly (B) are identical. This procedure installs cover end tube assembly.

**NOTE**

Installation of retaining straps (C), (D), and (E) is identical.



1. Using three persons, position tube assembly (A) into vehicle and through bulkhead and mounting block.



**RETAINING STRAP  
INSTALLATION**

HYDRAULIC PUMP DISCHARGE TUBES ASSEMBLY REPLACEMENT (Sheet 5 of 7)

**NOTE**

Steps 2 thru 8 are performed in crew compartment.

2. Place new bulkhead seal (F) over tube (A) and into bulkhead mount (G).
3. Install packing nut (H) onto tube (A) and, using fingers, start nut (H) into bulkhead mount (G).
4. Using 1-1/4 inch wrench, tighten packing nut (H) into bulkhead mount (G).
5. Position coupling nut (J) onto tube (A).

**NOTE**

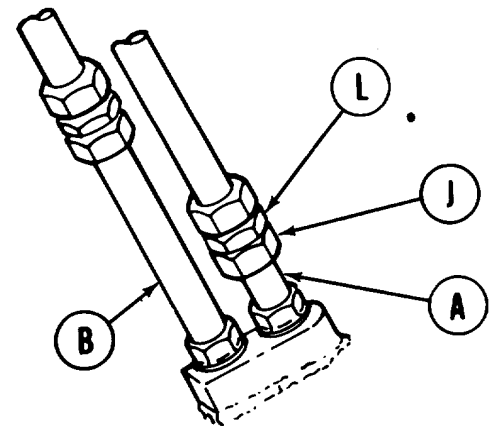
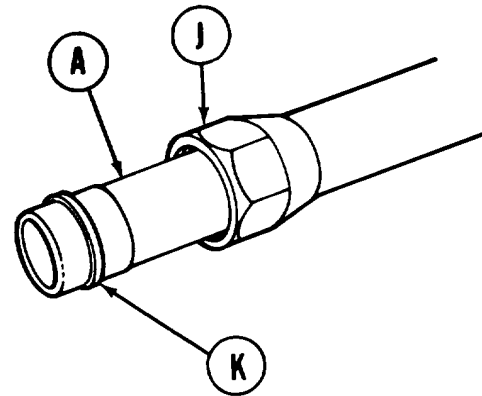
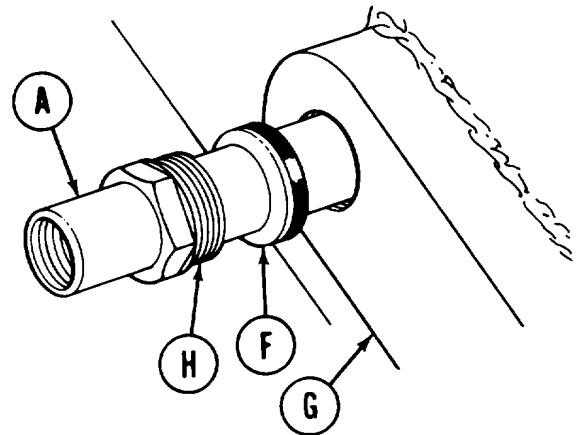
Clinch sleeve fits tightly over tube. It may be necessary to use block of wood and hammer, tapping lightly, to install onto tube.

6. Place clinch sleeve (K) onto tube (A). Bottom tube (A) firmly in seat of clinch sleeve (K).

**NOTE**

Connect tubes (A) or (B) to hydraulic pump discharge tubes only finger tight, to allow for final alinement of tubes (A) or (B) in vehicle.

7. Have two persons in engine compartment push tube (A) forward to connect with adapter (L).
8. Using 1-5/8 inch wrench to hold adapter (L) and 1-1/2 inch wrench on nut (J), connect nut (J) to adapter (L).



Go on to Sheet 6

TA130868

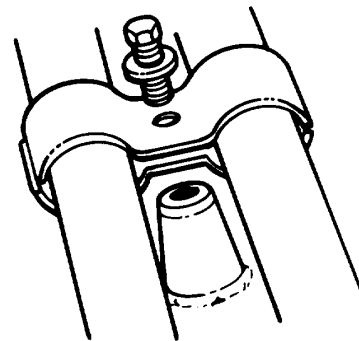
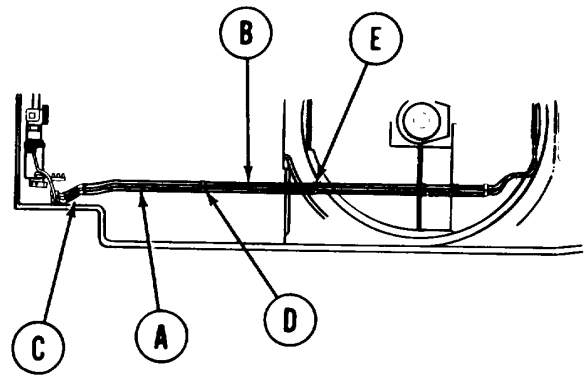
## HYDRAULIC PUMP DISCHARGE TUBES ASSEMBLY REPLACEMENT (Sheet 6 of 7)

9. Using three persons, aline tube (A) with hull mounting blocks, alongside tube (B).

**NOTE**

**Have one person stand by to lift tubes (A) and (B) when installing retaining straps (D) and (E).**

10. Position retaining strap (E) onto tubes (A) and (B).
11. Using 9/16 inch socket, install one screw and lockwasher (shown) into retaining strap (E) and mounting block.
12. Position retaining strap (D) onto tubes (A) and (B).
13. Using 9/16 inch socket, install one screw and lockwasher (shown) into retaining strap (D) and mounting block.
14. Position retaining strap (C) onto tubes (A) and (B).
15. Using 9/16 inch socket, install one screw and lockwasher (shown) into retaining strap (C) and mounting block.



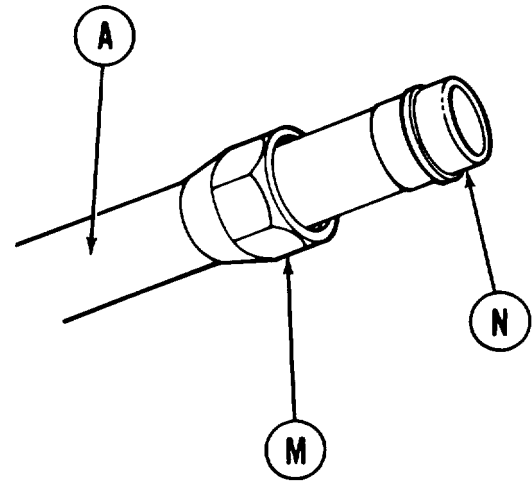
RETAINING STRAP  
INSTALLATION

Go on to Sheet 7

TA130869

**HYDRAULIC PUMP DISCHARGE TUBES ASSEMBLY REPLACEMENT (Sheet 7 of 7)**

16. Go into engine compartment and place coupling nut (M) onto tube (A).
17. Using hands, install clinch sleeve (N) onto end of tube (A).
18. Install hydraulic pump discharge hoses (TM 9-2350-222-20-1).
19. Go back into turret and, using 1-3/4 inch wrench and 1-1/2 inch wrench, tighten coupling nut (J) (TM 9-2350-222-20-1 and step 7).
20. Connect gas particulate hoses (TM 9-2350222-20-1).
21. Connect cable to master relay (TM 9-2350222-20-1).
22. Connect cables to regulator (TM 9-2350-22220-1).
23. Install right fuel tank (page 4-44).



End of Task

**RIGHT ANGLE DRIVE POWER TAKEOFF REPAIR (Sheet 1 of 10)**  
**PROCEDURE INDEX**

PROCEDURE	PAGE
Disassembly	12-48
Cleaning and Inspection	12-52
Assembly	12-53

**TOOLS:**

Micrometer set, inside (0-6 in.)	1/2 in. socket with 1/2 in. drive
Micrometer set, outside (0-6 in.)	Ratchet with 1/2 in. drive
Bearing puller set	1-1/8 in. socket with 1/2 in. drive
Snap ring pliers external	3/8 in. combination box and open end wrench
Snap ring pliers internal	7/16 in. combination box and open end wrench
Slip joint pliers	5/16 in. socket head screw key (allen wrench)
Flat-tip screwdriver	
Dial indicator	
Arbor press	
6 in. steel rule	

**SPECIAL TOOLS:** Spanner wrench (Item 12, Chapter 2, Section I)

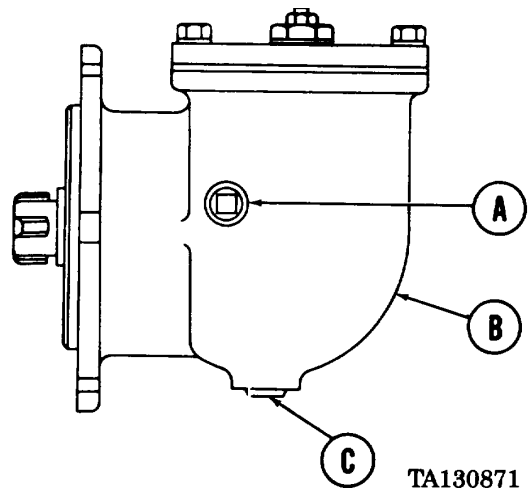
<b>SUPPLIES:</b> Drip pan	Paper
Dry cleaning solvent (Item 12, Appendix B)	Seal (8728125)
Pencil	Gasket (7699891)
	Packing (MS28775-235)

**REFERENCE:** LO 9-2350-222-12  
 TM 9-2350-222-20

**PRELIMINARY PROCEDURE:** Remove right angle drive from hydraulic pump and magnetic clutch (TM 9-2350-222-20-1)

**DISASSEMBLY:**

- Using 3/8 inch wrench, remove plug (A).
- Place drip pan under housing (B) to catch lubricant.
- Using allen wrench, remove plug (C) and allow lubricant to drain.

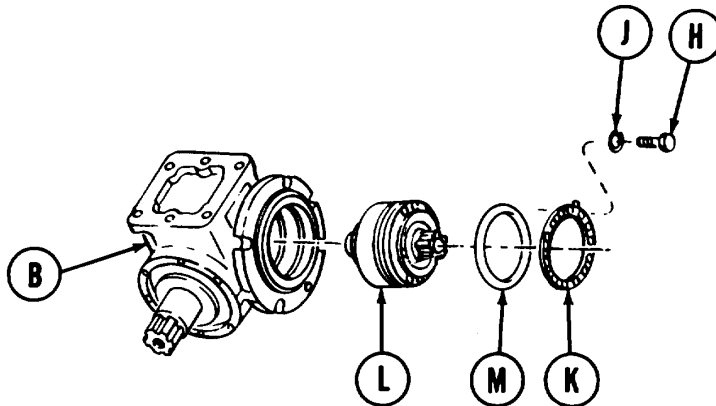
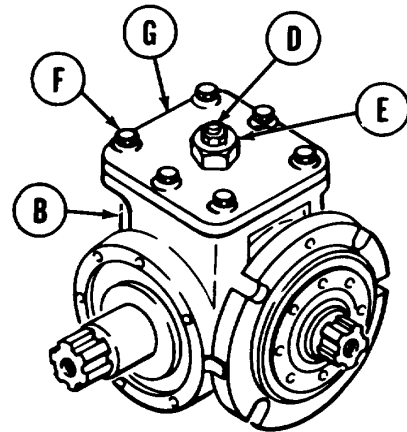


Go on to Sheet 2



**RIGHT ANGLE DRIVE POWER TAKEOFF REPAIR (Sheet 2 of 10)**

4. Using 7/16 inch wrench, remove fitting (D).
5. Using 1-1/8 inch socket, remove plug and gasket (E).
6. Using 1/2 inch socket, remove six screws and lockwashers (F).
7. Lift off cover plate and gasket (G) from housing (B). Throw away gasket.
8. Using screwdriver, remove two screws (H), two lockwashers (J), and ring (K).

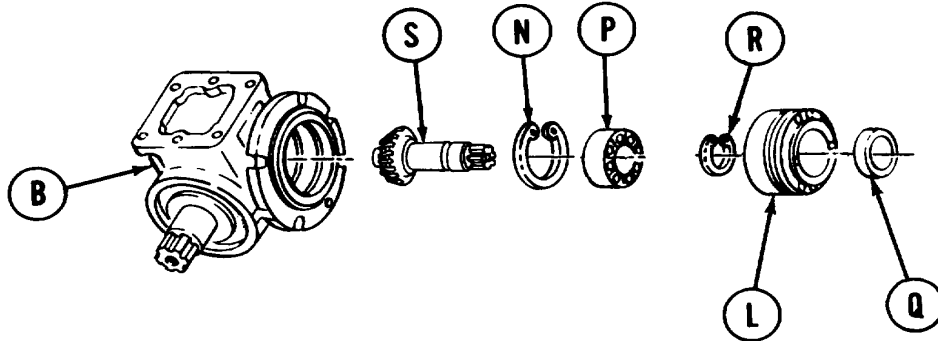


9. Using spanner wrench, remove retainer (L) with its attached parts from housing (B).
10. Remove packing (M) from groove in retainer (L). Throw packing away.

Go on to Sheet 3 TA130872

**RIGHT ANGLE DRIVE POWER TAKEOFF REPAIR (Sheet 3 of 10)**

11. Using snap ring pliers, remove retaining ring (N).
12. Using arbor press, remove retainer (L) from bearing (P).

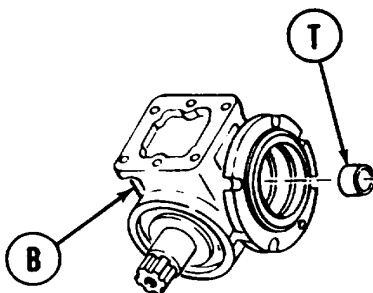


13. Using bearing puller, remove seal (Q).
14. Using snap ring pliers, remove retaining ring (R).
15. Using arbor press, remove bearing (P) from gear shaft (S).

**CAUTION**

**Do not remove bearing from housing unless inside diameter is beyond wear limits (page 12-52)**

16. Using bearing puller, remove bearing (T) from housing (B).

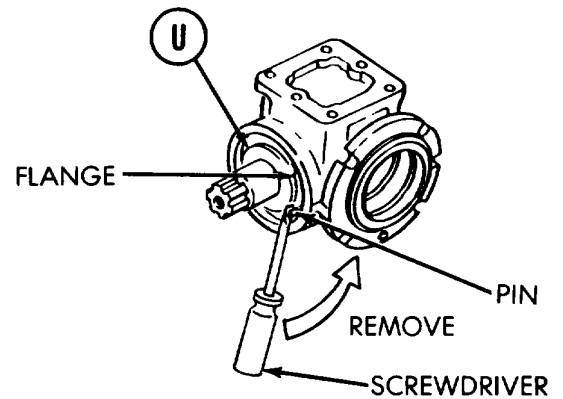


TA130873

Go on to Sheet 4 TA130873

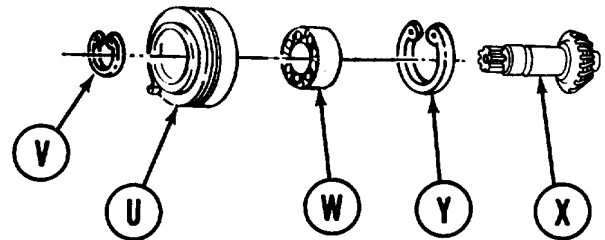
**RIGHT ANGLE DRIVE POWER TAKEOFF REPAIR (Sheet 4 of 10)**

17. Insert screwdriver between flange and pin of retainer assembly (U). Using screwdriver as a lever, unscrew and remove retainer assembly (U) with its attached parts.



18. Using snap ring pliers, remove retaining ring (V).

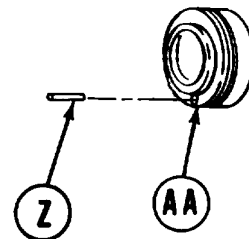
19. Using arbor press and bearing puller, remove retainer assembly (U) and bearing (W) from gear shaft (X).



20. Using snap ring pliers, remove retaining ring (Y) from retainer assembly (U).

21. Using arbor press, remove bearing (W) from retainer assembly (U).

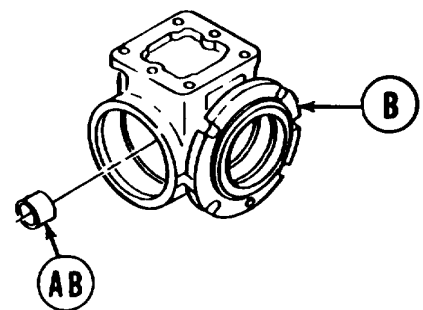
22. Using pliers, remove pin (Z) from retainer (AA).



**CAUTION**

**Do not remove bearing from housing unless inside diameter is beyond wear limits (page 12-52).**

23. Using bearing puller, remove bearing (AB) from housing (B).



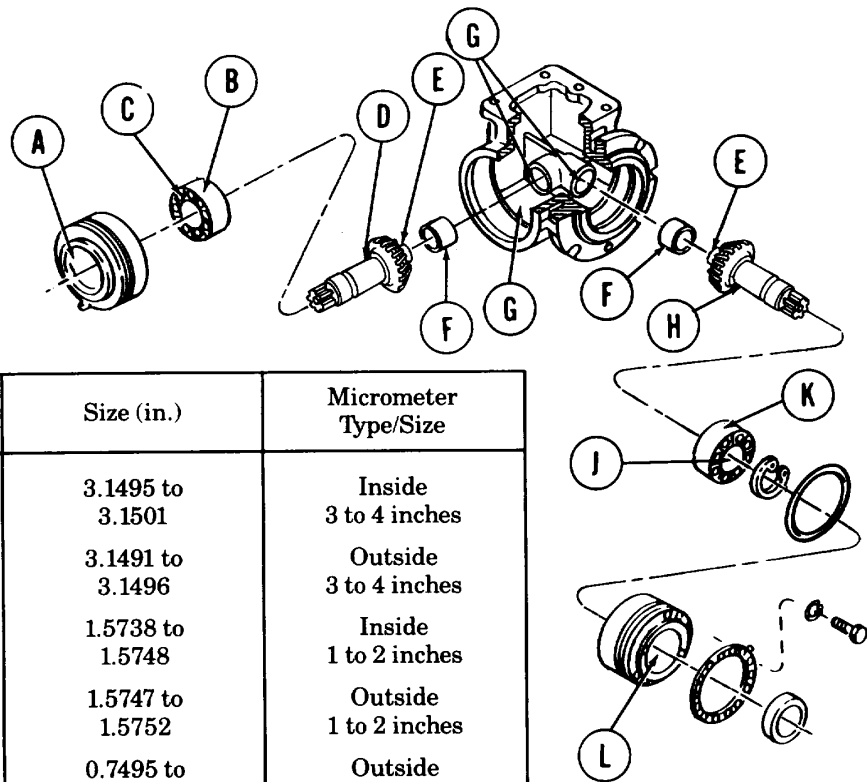
TA130874

Go on to Sheet 5

**RIGHT ANGLE DRIVE POWER TAKEOFF REPAIR (Sheet 5 of 10)**

**CLEANING AND INSPECTION:**

1. Clean all metallic parts in dry cleaning solvent (Item 12, Appendix B).
2. Inspect all parts for damage or wear (Appendix C, TM 9-2350-222-20-1). Replace all unserviceable parts.
3. Measure parts for wear limits indicated.



Item/Surface	Size (in.)	Micrometer Type/Size
A. Retainer bore ID	3.1495 to 3.1501	Inside 3 to 4 inches
B. Bearing OD	3.1491 to 3.1496	Outside 3 to 4 inches
C. Bearing ID	1.5738 to 1.5748	Inside 1 to 2 inches
D. Gearshaft OD	1.5747 to 1.5752	Outside 1 to 2 inches
E. Gearshaft OD	0.7495 to 0.7500	Outside 0 to 1 inch
F. Bearings OD	1.0010 to 1.0015	Outside 1 to 2 inches
G. Housing ID for bearings	0.9995 to 1.0005	Inside 0 to 1 inch
H. Gearshaft OD	1.3779 to 1.3784	Outside 1 to 2 inches
J. Bearing ID	1.3775 to 1.3780	Inside 1 to 2 inches
K. Bearing OD	2.8341 to 2.8346	Outside 2 to 3 inches
L. Retainer bore ID	2.8346 to 2.8352	Inside 2 to 3 inches

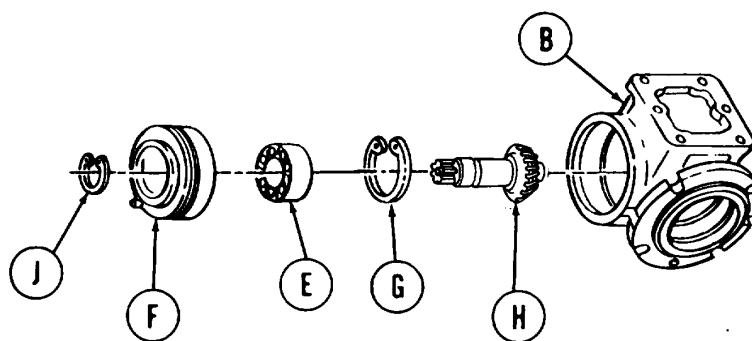
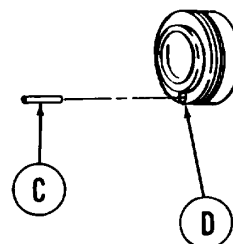
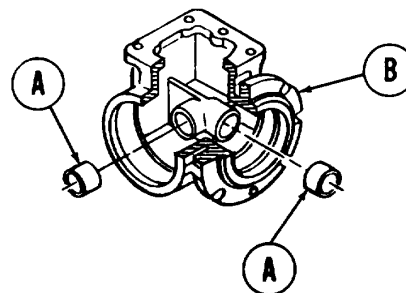
Go on to Sheet 6

TA130875

**RIGHT ANGLE DRIVE POWER TAKEOFF REPAIR (Sheet 6 of 10)**

**ASSEMBLY:**

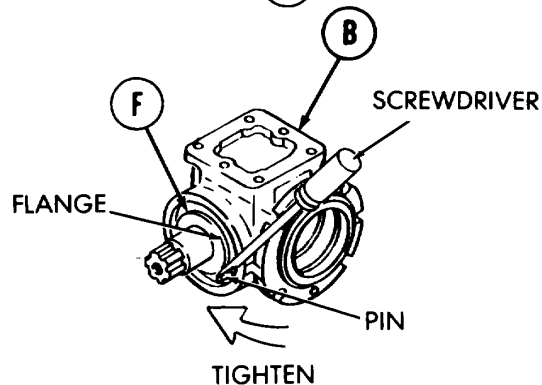
1. Using arbor press, install two bearings (A) (if removed) in housing (B). Bearing must be pressed all the way in flush with face of housing bore.
2. Using pliers, install pin (C) in retainer (D).
3. Using arbor press, install bearing (E) in retainer assembly (F) until it clears retaining ring groove.
4. Using snap ring pliers, install retaining ring (G).
5. Using arbor press, install retainer assembly (F), with its assembled parts, on gear shaft (H) until it clears retaining ring groove on shaft.
6. Using snap ring pliers, install retaining ring (J).



**NOTE**

**Make sure threads of retainer assembly (F) and those in housing are clean.**

7. Thread retainer assembly (F) into housing (B). Insert screwdriver between flange and pin of retainer assembly. Using screwdriver as a lever, tighten retainer assembly until it is flush with face of housing.

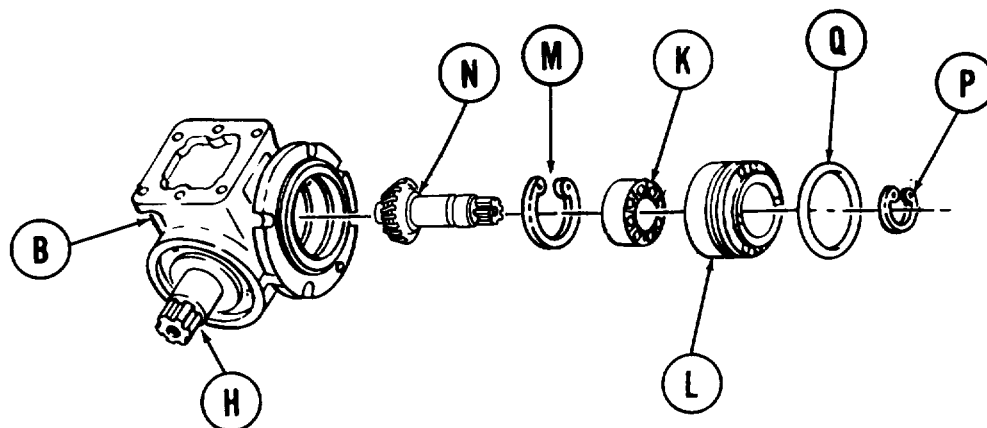


TA130876

Go on to Sheet 7

**RIGHT ANGLE DRIVE POWER TAKEOFF REPAIR (Sheet 7 of 10)**

8. Using arbor press, install bearing (K) in retainer (L) until it clears retaining ring groove.
9. Using snap ring pliers, install retaining ring (M).
10. Using arbor press, install retainer (L), with its assembled parts, on gear shaft (N) until it clears retaining ring groove on shaft.



11. Using snap ring pliers, install retaining ring (P).
12. Place new packing (Q) in groove of retainer (L).

**NOTE**

**Use care when installing retainer (L) and its assembled parts to make sure that gear teeth of gear shafts (H) and (N) mesh properly.**

13. Using spanner wrench, install retainer (L), with its assembled parts, in housing (B).

TA130877

Go on to Sheet 8

**RIGHT ANGLE DRIVE POWER TAKEOFF REPAIR (Sheet 8 of 10)**

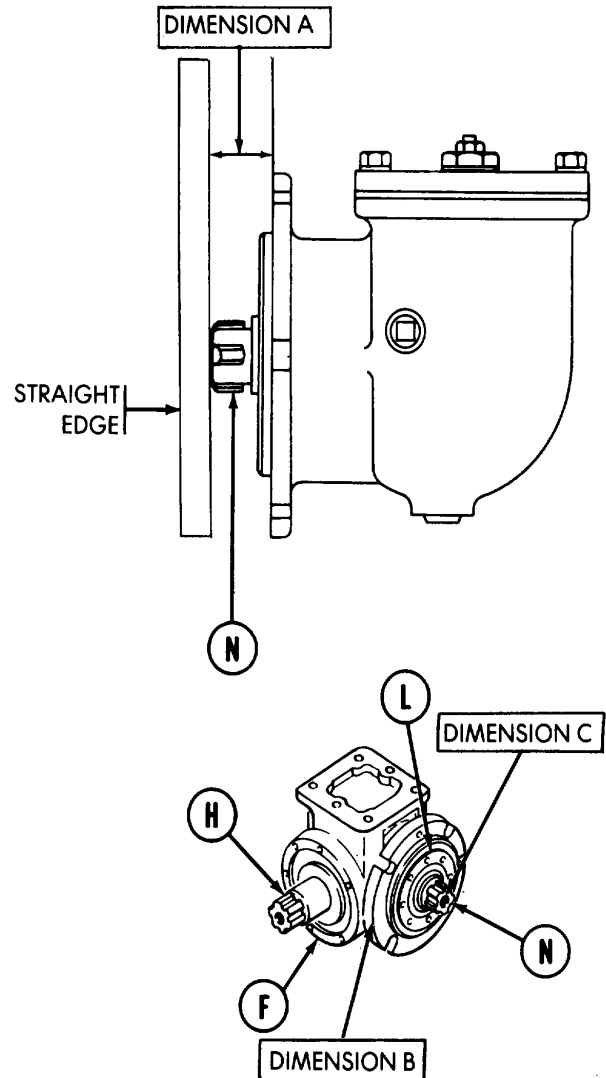
**NOTE**

Before alining gear shafts, it will be necessary to first find out dimension A.

**NOTE**

It may be necessary to remove paint on casting to read dimension B, which is etched on flange of housing.

14. Write down dimension C (etched on the end of gear shaft (N). Subtract dimension B from dimension C (etched on the edge of housing flange). The result is dimension A.
15. Hold gear shaft (H) and housing stationary.
16. Using micrometer and straight edge, measure dimension A. This measurement should be the value calculated in step 14 plus or minus 0.0017 inch.
17. Loosen or tighten one or both retainers (F or L) until dimension A requirement of step 16 is met.
18. Using dial indicator, measure backlash of gear shaft (N).
19. Loosen or tighten retainer (F) until 0.004 to 0.006 inch backlash is obtained.



Go on to Sheet 9

TA130878

**RIGHT ANGLE DRIVE POWER TAKEOFF REPAIR (Sheet 9 of 10)**

20. Position ring (R) on retainer (L).

21. Place lockwashers (S) on two screws (T).

22. Using screwdriver, install two screws (T).

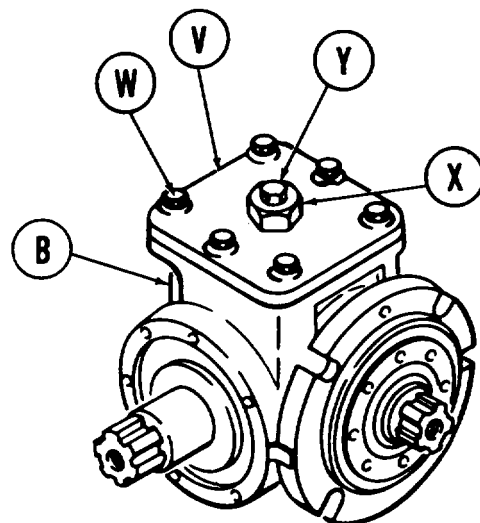
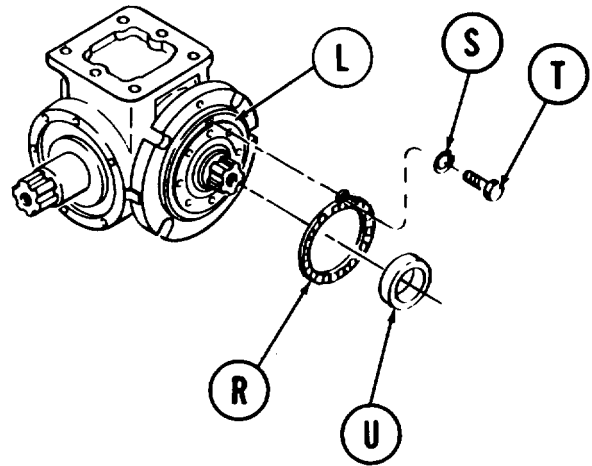
23. Using arbor press, install new seal (U).

24. Position new gasket and plate (V) on housing (B).

25. Using 1/2 inch socket, install six lockwashers and screws (W).

26. Using 1-1/8 inch socket, install new gasket and plug (X).

27. Using 7/16 inch wrench, install fitting (Y).



Go on to Sheet 10

TA130879

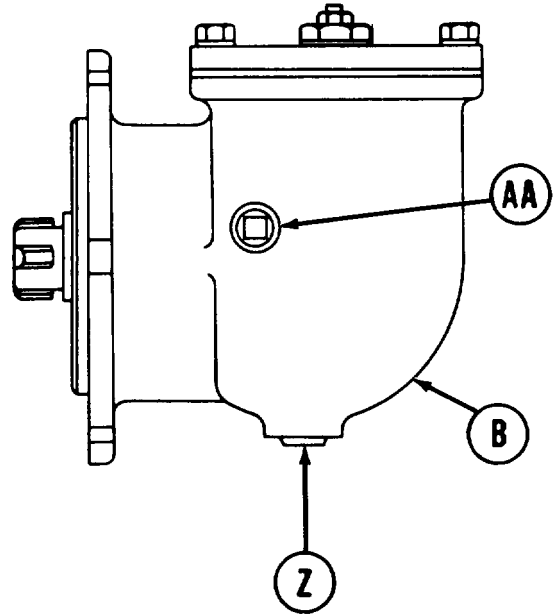


**RIGHT ANGLE DRIVE POWER TAKEOFF REPAIR (Sheet 10 of 10)**

28. Using allen wrench, install plug (Z) in housing (B).

29. Fill with lubricant (LO 9-2350-222-12).

30. Using 3/8 inch wrench, install plug (AA).



End of Task

TA130880

**MAGNETIC CLUTCH ADJUSTMENT (Sheet 1 of 2)**

**TOOLS:** Power supply (28 vdc)  
 9/64 in. socket head screw key (alien wrench)  
 Thickness gage, 0.015 to 0.018 inch (brass)

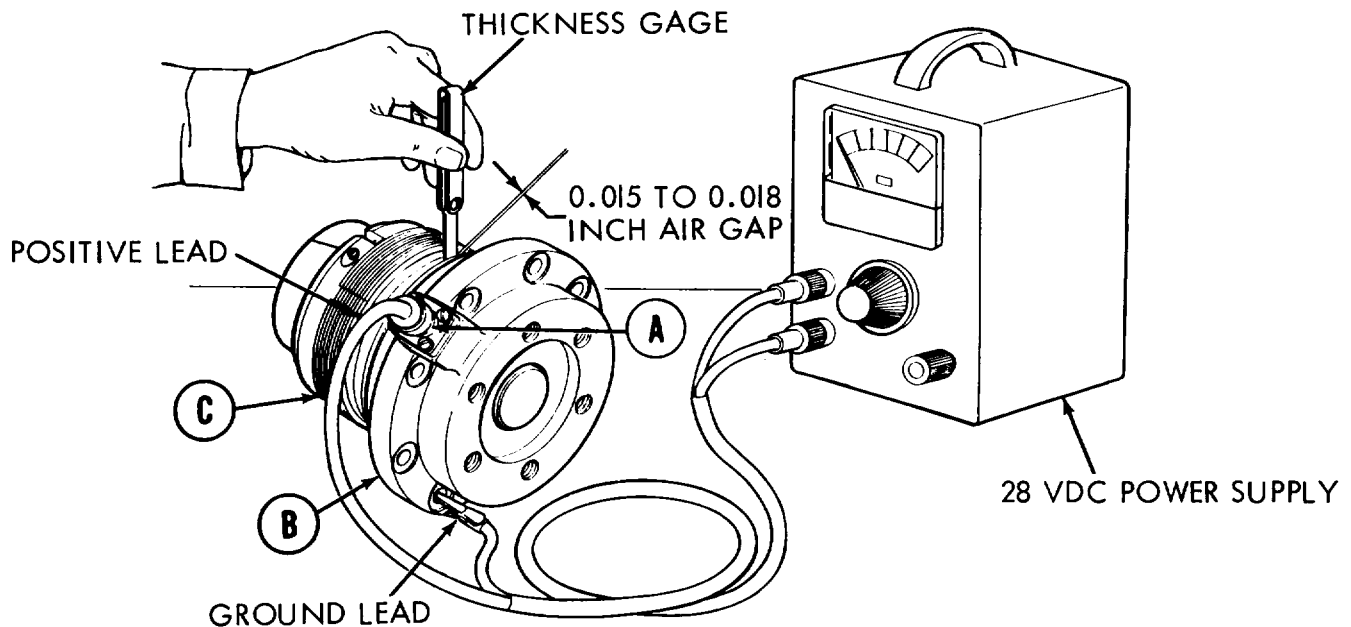
**REFERENCE:** TM 9-2350-222-20-1

**SUPPLIES:** Pencil and paper

**PRELIMINARY PROCEDURE:** Remove magnetic clutch (TM 9-2350-222-20-1)

**ADJUSTMENT:**

1. Connect positive lead of power supply to pin in connector (A) and ground lead to rim of magnet body half (B).
2. Turn on power supply and adjust for 26.5-30 vdc.
3. Using thickness gage, measure and record air gap between magnet body half (B) and clutch body half (C) at four points (top, bottom, and both sides).
4. Add up the four gap measurements, then divide by four to get average. Average should be 0.015 to 0.018 inch for proper adjustment. If not, proceed to step 5.



Go on to Sheet 2

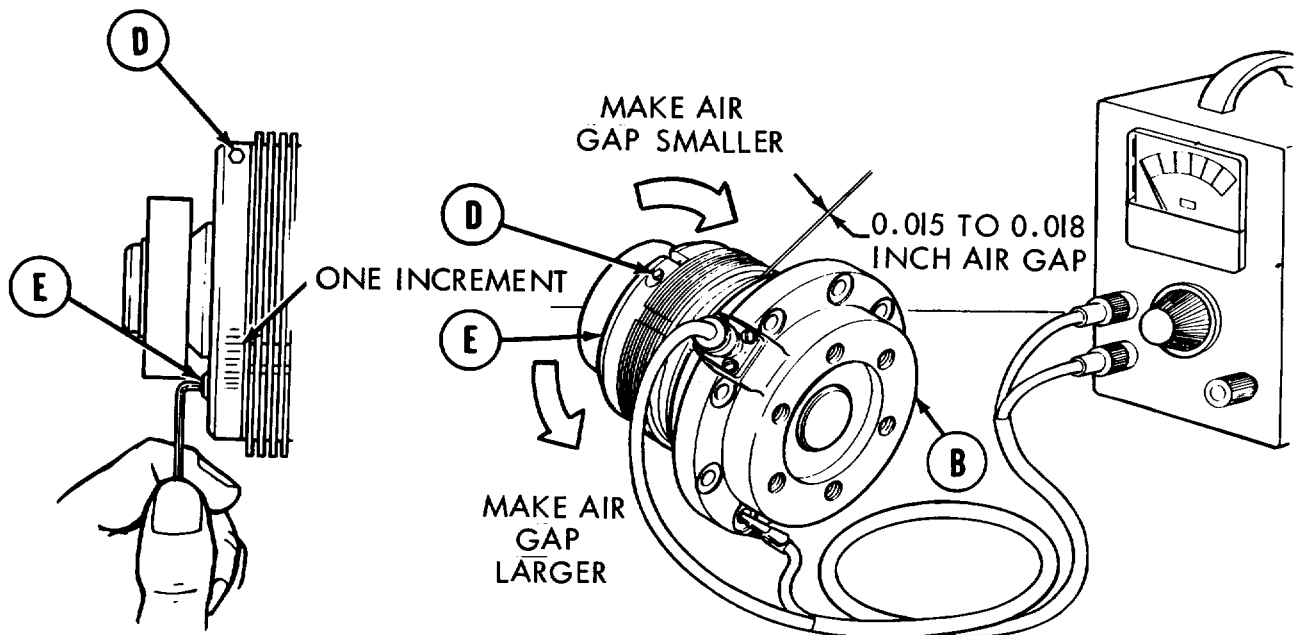
TA130881

**MAGNETIC CLUTCH ADJUSTMENT (Sheet 2 of 2)**

5. Turn off power supply.
6. Using socket head screw key, loosen screw (D).

**NOTE**

**Make a pencil mark as an index mark for ease of counting increments.**



7. Using socket head screw key, turn adjusting nut (E) one increment in direction indicated for each 0.001 inch necessary to provide air gap average of .015 to .018.
8. Using socket head screw key, tighten screw (D).
9. Perform steps 2 through 8 until average of the four thickness gage readings is 0.015 to 0.018 inch.
10. Disconnect power supply from magnet body half (B).
11. Install magnetic clutch (TM 9-2350-222-20-1).

End of Task

TA130882

**MAGNETIC CLUTCH REPAIR (Sheet 1 of 4)**

PROCEDURE INDEX

PROCEDURE	PAGE
Disassembly	12-60
Cleaning and Inspection	12-61
Assembly	12-62

**TOOLS:** 0 to 6 inch outside micrometer  
 0 to 6 inch inside micrometer set  
 Bearing puller  
 Snap ring pliers (external)  
 Flat-tip screwdriver  
 Hammer  
 Punch

**SUPPLIES:** Dry cleaning solvent (Item 12, Appendix B)  
 Wire (Item 26, Appendix B)  
 Solder (Item 30, Appendix B)  
 Gasket (MS52000-3)  
 Woodruff key (MS20066-255)

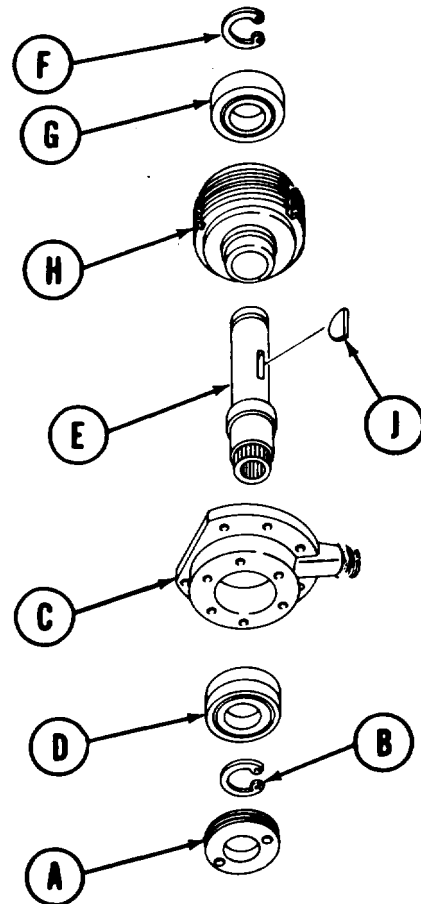
**REFERENCE:** TM 9-2350-222-20-1

**DISASSEMBLY:**

- Using spanner wrench, remove ring (A).
- Using snap ring pliers, remove retaining ring (B).
- Using bearing puller, remove magnet body half (C) with thrust bearing (D) from shaft (E).
- Using bearing puller, remove thrust bearing (D) from magnet body half (C).
- Using snap ring pliers, remove retaining ring (F).
- Using bearing puller, remove bearing (G) from shaft (E).
- Using bearing puller, remove clutch body half (H) from shaft (E).
- Using hammer and punch, remove key (J). Throw key away.

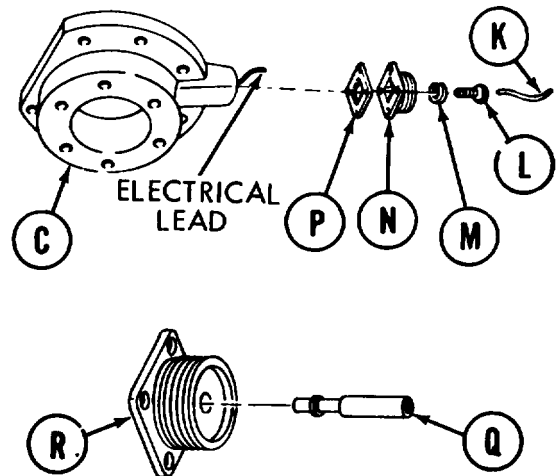
Go on to Sheet 2

Vise  
 Soldering iron  
 Long round nose pliers  
 Diagonal cutting pliers  
 Arbor press  
 Brass drift  
 Spanner wrench  
 (NSN 5120-00-293-0798)  
 Goggles (Item 13.2, Appendix B)  
 Gloves (Item 13.1, Appendix B)



**MAGNETIC CLUTCH REPAIR (Sheet 2 of 4)**

9. Using cutting pliers, remove two lockwires (K) from four screws (L). Throw lockwires away.
10. Using screwdriver, remove four screws (L) and lockwashers (M).
11. Using soldering iron, unsolder electrical lead loose from contact in connector (N).
12. Remove connector (N) and gasket (P). Throw gasket away.
13. Using pliers, remove contact (Q) from shell (R).

**CLEANING AND INSPECTION:****WARNING**

Dry cleaning solvent P-D-680 is toxic and flammable. To prevent personal injury, wear protective goggles and gloves and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flash point for Type #1 Dry Cleaning Solvent is 1000F (380C) and for 1type t2 is 1380F (500C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

1. Clean master cylinder using dry cleaning solvent.
2. Inspect all parts for damage or wear (Appendix C, TM 9-2350-222-20-1). Replace all unserviceable parts.

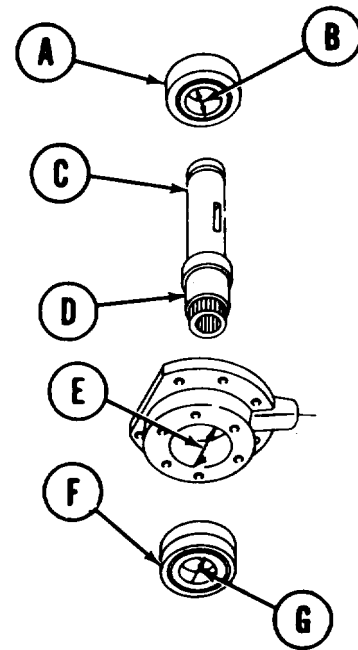
Go on to Sheet 2.1

Change 3 12-60.1/(12-60.2 blank)

**MAGNETIC CLUTCH REPAIR (Sheet 2.1 of 4)**

3. Measure parts for wear limits as indicated in table.

Item/Surface	Size (in.)	Micrometer Type/Size
A. Bearing OD	2.4404 to 2.4409	Outside 2 to 3 inches
B. Bearing ID	1.1807 to 1.1811	Inside 1 to 2 inches
C. Shaft OD	1.1812 to 1.1816	Outside 1 to 2 inches
D. Shaft OD	1.3781 to 1.3785	Outside 1 to 2 inches
E. Magnet Body Half ID	2.4409 to 2.4416	Inside 2 to 3 inches
F. Bearing OD	2.4404 to 2.4409	Outside 2 to 3 inches
G. Bearing ID	1.3775 to 1.3780	Inside 1 to 2 inches



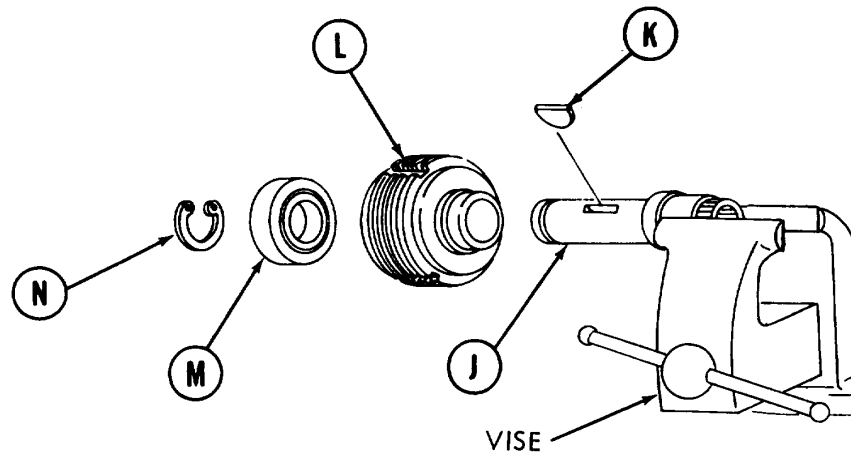
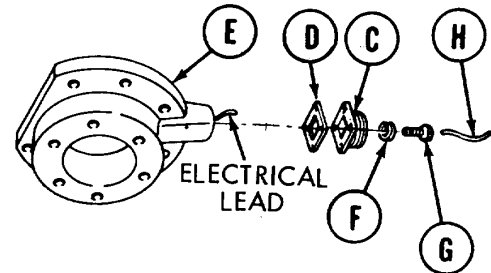
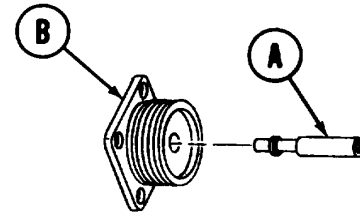
Go on to Sheet 3

**Change 3 12-61**

**MAGNETIC CLUTCH REPAIR (Sheet 3 of 4)**

ASSEMBLY:

1. Using screwdriver, insert contact (A) into shell (B).
2. Position connector (C) and new gasket (D) on magnet body half (E).
3. Using soldering iron, solder electrical lead to contact in connector (C).
4. Place four lockwashers (F) on four screws (G).
5. Using screwdriver, install four screws (G).
6. Using 3/8 inch allen wrench, remove two screws (Q) securing gland (P) to cylinder (B).
7. Place shaft (J) in a vise and, using brass drift and hammer, install new key (K) in slot.
8. With groove of clutch body half (L) lined up with key (K), slide clutch body half on shaft (J).
9. Using arbor press, install bearing (M) on shaft (J) until it clears retaining ring groove in shaft.
10. Using snap ring pliers, install retaining ring (N).

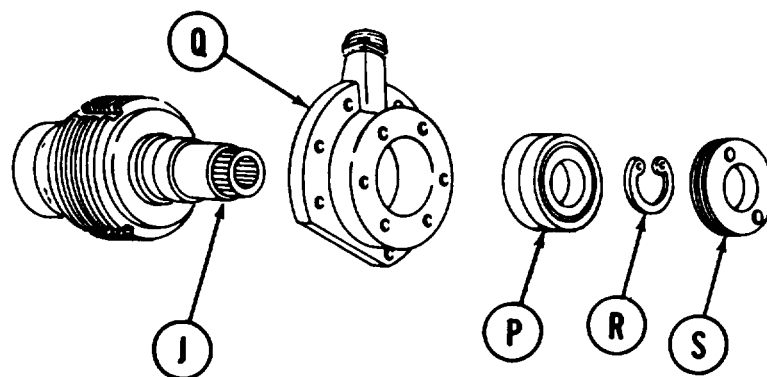


Go on to Sheet 4

TA130885

**MAGNETIC CLUTCH REPAIR (Sheet 4 of 4)**

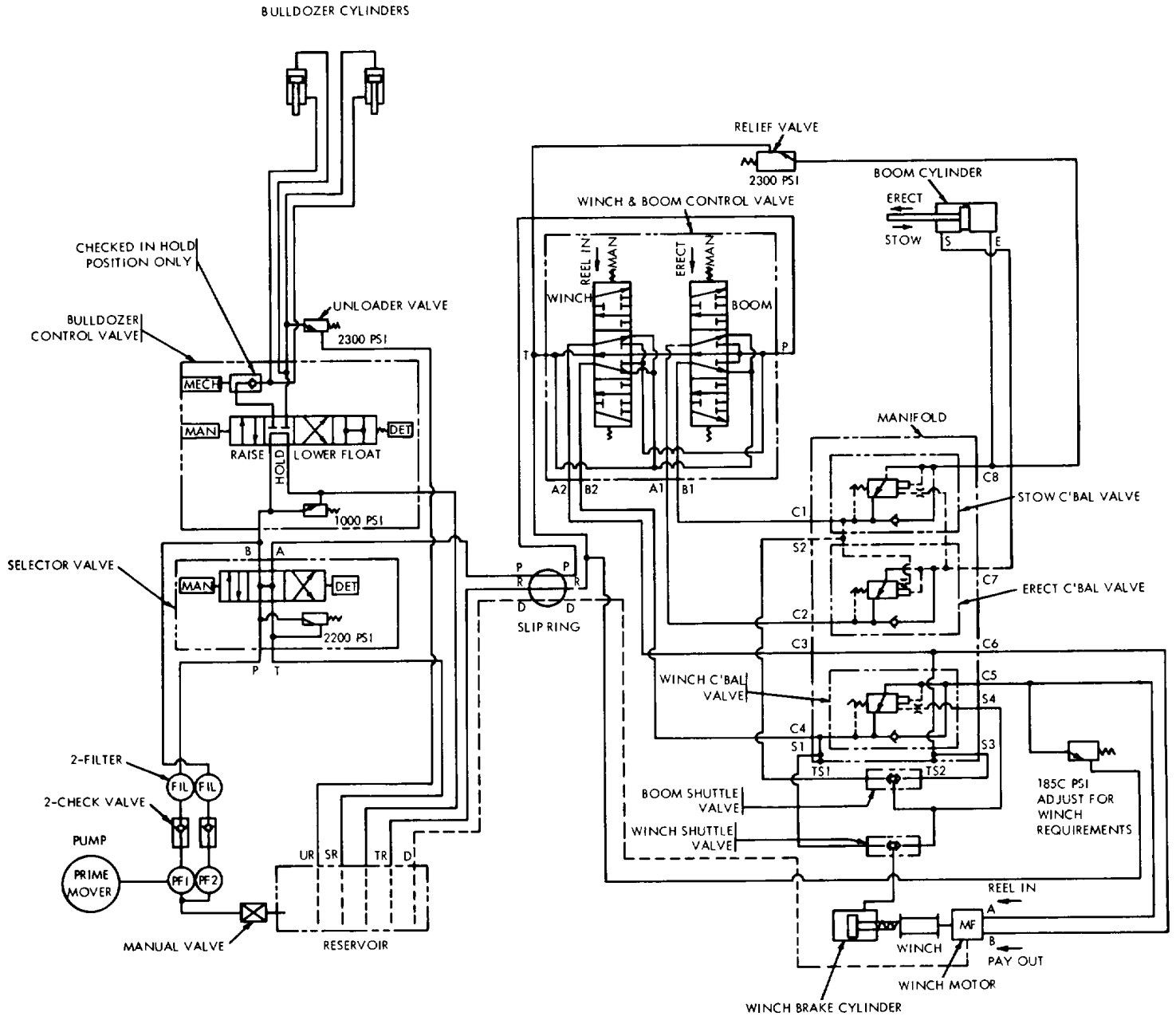
11. Using arbor press, squeeze thrust bearing (P) into magnet body half (Q).
12. Using spanner wrench, install ring (S).
13. Using arbor press, install assembled thrust bearing (P) and magnet body half (Q) on shaft (J) until they clear retaining ring groove in shaft.
14. Using spanner wrench, remove ring (S).
15. Using snap ring pliers, install retaining ring (R).
16. Using spanner wrench, install ring (S).



End of Task

Change 3 12-63





Hydraulic Schematic

TA130385

CHAPTER 13

FIRE FIGHTING SYSTEM MAINTENANCE INDEX

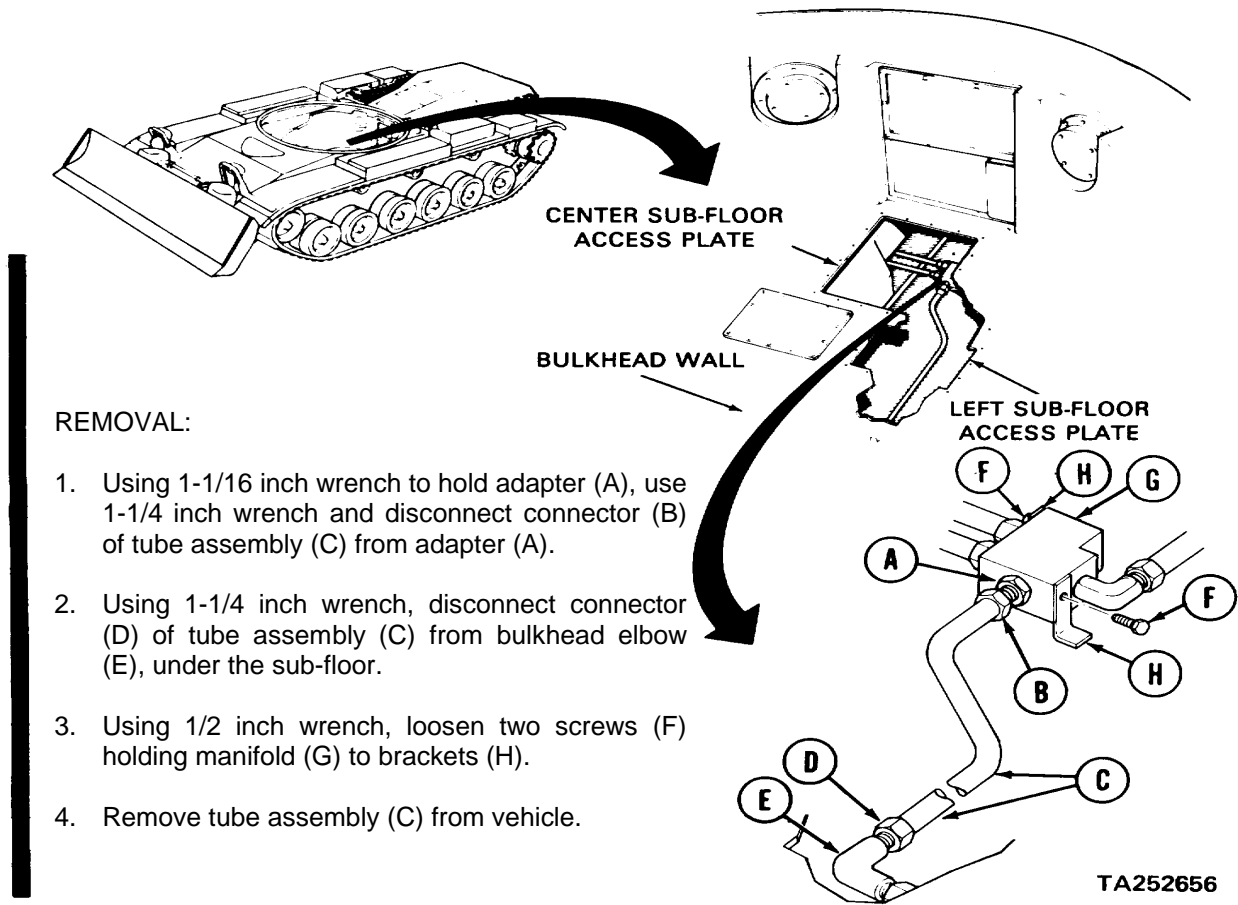
Procedure	Page
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Fixed Fire Extinguisher Cylinder Servicing.....	13-4

**BULKHEAD-WALL-TO-MANIFOLD TUBE ASSEMBLY REPLACEMENT (FIXED FIRE EXTINGUISHER) (Sheet 1 of 2)**

**TOOLS:** 1/2 in. combination box and open end wrench  
 1-1/16 in. open end wrench  
 1-1/4 in. open end wrench  
 1-1/4 in. crowfoot with 1/2 in. Drive  
 Torque wrench with 1/2 in. drive (0-175 lb-ft) (0-237 N.m)

**REFERENCES:** TM 9-2350-222-20-1  
 TM 9-2350-222-34-2

**PRELIMINARY PROCEDURES:** Remove turret (TM 9-2350-222-34-2)  
 Remove left fuel tank (page 4-51)  
 Remove center and left sub-floor access plate (TM 9-2350-222-20-1)



**REMOVAL:**

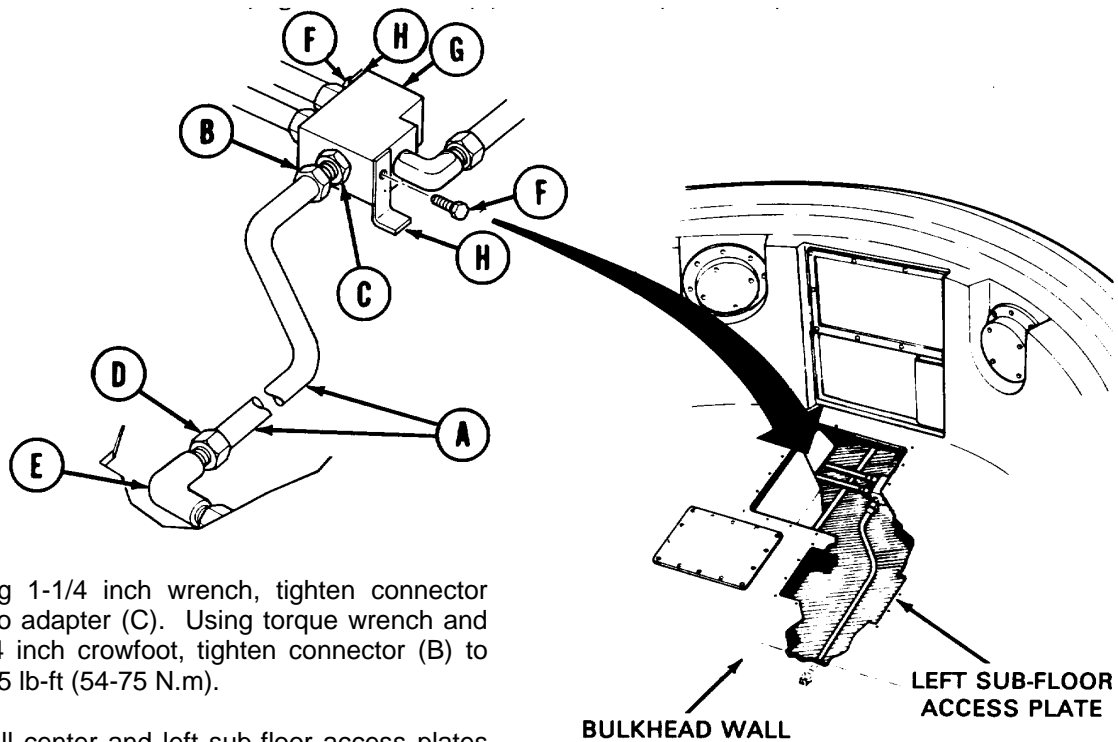
1. Using 1-1/16 inch wrench to hold adapter (A), use 1-1/4 inch wrench and disconnect connector (B) of tube assembly (C) from adapter (A).
2. Using 1-1/4 inch wrench, disconnect connector (D) of tube assembly (C) from bulkhead elbow (E), under the sub-floor.
3. Using 1/2 inch wrench, loosen two screws (F) holding manifold (G) to brackets (H).
4. Remove tube assembly (C) from vehicle.

Go on to Sheet 2

## BULKHEAD-WALL-TO-MANIFOLD TUBE ASSEMBLY REPLACEMENT (FIXED FIRE EXTINGUISHER) (Sheet 2 of 2)

### INSTALLATION:

1. Position tube assembly (A) in vehicle and hand tighten connector (B) to adapter (C) and connector (D) to bulkhead elbow (E).
2. Using 1/2 inch wrench, tighten two screws (F) holding manifold (G) to brackets (H).
3. Using 1-1/4 inch wrench, tighten connector (D) to bulkhead elbow (E). Using torque wrench and 1-1/4 inch crowfoot, tighten connector (D) to 40-55 lb-ft (54-75 N.m).



4. Using 1-1/4 inch wrench, tighten connector (B) to adapter (C). Using torque wrench and 1-1/4 inch crowfoot, tighten connector (B) to 40-55 lb-ft (54-75 N.m).
5. Install center and left sub-floor access plates (TM 9-2350-222-20).
6. Install left fuel tank (page 4-59).
7. Install turret (TM 9-2350-222-34-1).

End of Task

TA252657

**FIXED FIRE EXTINGUISHER CYLINDER SERVICING (Sheet I of 1)**

TOOLS: Beam scale

REFERENCE: 9-2350-222-20-1

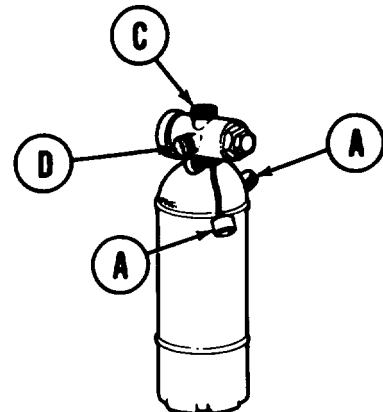
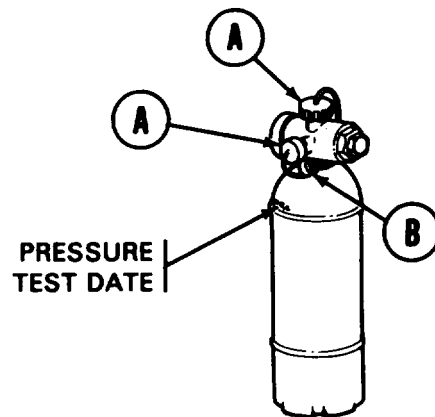
PRELIMINARY PROCEDURE: Remove fixed fire extinguisher cylinders (TM 9-2350- 222-20-1)

**WARNING**

- **Handle charged cylinders with extreme caution. Do not jar or subject cylinders to temperatures above 140°F (60°C).**
- **Do not handle fire extinguisher cylinders unless safety caps (A) are installed. Cylinders without safety caps installed, that are accidentally discharged, can cause injury to personnel and/or damage to the equipment.**

**INSPECTION:**

1. Inspect neck of bottle for pressure test data.
2. If cylinder is full, pressure test data must not be over 12 years old.
3. If cylinder is to be refilled, pressure test data must not be over 5 years old.
4. Inspect for plastic coating on indicator (B) over safety valve outlet. If indicator (B) is missing, cylinder is unserviceable.
5. Remove safety caps (A). Inspect threads of flood valve (C) and discharge port (D). Repair threads if required.
6. Install safety caps (A).
7. Using beam scales, weigh cylinder.
8. Serviceable cylinder must weigh a least 9 pounds more than empty weight. Empty weight is stamped on flood valve (C).
9. If cylinder does not pass inspection steps 2, 3, 4, 5, and 8, cylinder must be sent through supply channels for recharging or replacement.



End of Task

**CHAPTER 14**

**PRE-EMBARKATION INSPECTION**

Refer to TM 55-2350-215-10-15, Transportability Guidance; Tank, Combat, Full-Tracked, M60 Series.

**14-1/(14-2 Blank)**

A-1 Publication Index

The following index should be consulted frequently for latest changes or revisions of references given in this Appendix and for new publications relating to material covered in this Technical Manual:

DA PAM 2530 Consolidated Index of Army Publications and Blank Forms

A-2 Maintenance Forms and Records

DA Form 2028 Recommended Changes to Publications  
 DA Form 2404 Equipment, Inspection, and Maintenance Worksheet  
 DA Form 2407 Maintenance Requests  
 DA PAM 738750 The Army Maintenance Management System (TAMMS)  
 DD Form 1397 Processing and Deprocessing for Shipment, Storage and Issue of  
 Vehicles and Spare Engines

SF 368 Quality Deficiency Report

A-3 Regulations

AR-385-40 Accident Reporting and Records  
 AR-75-1 Malfunctions Involving Ammunition and Explosives

A-4 Lubrication

LO 9-2350-222-12 Combat Engineer Vehicle, Full-Track, M728

A-5 Technical Manuals

FM 9-207 Operation and Maintenance of Ordnance Materiel in Cold Weather (0° to  
 - 65°F) ( - 18° to - 54°C)  
 TM 43-0139 Painting Instructions for Field Use  
 TM 9-214 Inspection, Care, and Maintenance of Antifriction Bearings  
 TM 9-237 Welding Theory and Application  
 TM 9-247 Materials Used for Cleaning, Preserving, Abrading, and Cementing  
 Ordnance Materiel  
 TM 55-2350-215-10-15 Transportability Guidance Tank, Combat, Full-Track, M60 Series

Vehicle Manuals

TM 9-2350-222-10 Operator's Manual for Combat Engineer Vehicle, Full-Track, M728  
 TM 9-2350-222-20-1 Hull Organizational Maintenance Manual for Combat Engineer Vehicle,  
 Full-Track, M728

**Change 5 A-1**

TM 9-2350-222-20-2	Turret Organizational Maintenance Manual for Combat Engineer Vehicle, Full-Tracked, M728
TM 9-2350-222-20P-1	Hull Organizational Maintenance Repair Parts and Special Tools List for Combat Engineer Vehicle, Full-Tracked, M728
TM 9-2350-222-20P-2	Turret Organizational Maintenance Repair Parts and Special Tools List for Combat Engineer Vehicle, Full-Tracked, M728
TM 9-2350-222-34-2	Turret Direct Support and General Support Maintenance Manual for Combat Engineer Vehicle, Full-Tracked, M728
TM 9-2350-222-34P-1	Hull Direct Support and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools for Combat Engineer Vehicle, Full-Tracked, M728
TM 9-2350-222-34P-2	Turret Direct Support and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) for Combat Engineer Vehicle, Full-Tracked, M728

Power Plant

TM 9-2815-220-34	Direct Support and General Support Maintenance Manual for Engine w/Container: Turbosupercharged, Diesel, Fuel Injection, 90 Degree, V-Type, Air Cooled, 12 Cylinder Assembly (Models AVDS-1790-2C) (NSN 2815-00-410-1203), (Model AVDS-1790-2D) (2815-00-410-1204), (Model AVDS-1790-2DR) (2815-00-124-5387), (Model AVDS-1790-2CA) (2815-01-149-1353) and (Model 1790-2DA) (2815-01-166-2051)
TM 9-2815-220-34P	Direct Support and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools): Engine w/Container, Turbosupercharged, Diesel, Fuel Injection, 90-Deg, V-Type, Air-Cooled, 12-Cylinder Assembly (Model AVDS-1790-2C) (NSN 2815-00-410-1203), (Model AVDS-1790-2D) (2815-00-410-1204), (Model AVDS-1790-2DR) (2815-00-124-5387), (Model AVDS 1790-2CA) (2815-01-149-1353) and (Model 1790-2DA) (2815-01-166-2051)
TM 9-2520-223-34&P	Direct Support and General Support Maintenance Manual Including Repair Parts and Special Tools List for Cross Drive Transmission w/Container, Model CD-850-6A (NSN 2520-00-086-7792) and Model CD-850-6A-1 (2520-01-159-6214), Detroit Diesel Allison Div, GMC
TM 9-2910-212-34&P	Direct Support and General Support Maintenance Manual Including Direct Support, General Support and Depot Maintenance Repair Parts and Special Tools List for Pump, Fuel Metering and Distributing (American Bosch Model PSB-12BT) (NSN 2910-01-073-0124)
TM 9-2910-213-34&P	Direct Support and General Support Maintenance Manual (Including Repair Parts List): Pump, Fuel, Engine, Assembly, 8725131, 8725282, 8725283, 10882763 and 10882763-1 (Viking Model FV492)

**Change 2 A-2**



TM 9-2920-232-34&P Direct Support and General Support Maintenance Manual (Including Repair Parts List) for Starter, Engine, Electrical, Assembly (Delco-Remy-GMC Model 1109972) (NSN 2920-00-793-1557) (TO 38X14-2-32)

TM 9-2990-205-34&P Direct Support and General Support Maintenance Manual Including Repair Parts and Special Tools List for Turbosupercharger (Schwitzer Model 5HDR) (NSN 2950-00-397-3384) (11668377-1) and (2950- 01-167-1700) (187727)

TM 9-2920-252-34&P Direct Support and General Support Maintenance Manual (Including Repair Parts and Special Tools List): 650 Ampere Generator Assembly (Bendix Corp., Model 30B95-3-B) (NSN 2920-00-441-8137) and Voltage Regulator Assembly (Bendix Corp., Model 24B30-3-B) (6110-00-467-4000)

TM 9-6140-200-14 Operator's Organizational, Direct Support, and General Support Maintenance Manual for Lead-Acid Storage Batteries: 4HN, 24V (NSN 6140-00-059-35Z8) MS75047-1; 2HN, 1ZV (6140-00-057-2553) MS35000-1, 6TN, IZV (6140-00-057-Z554) MS35000

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APPENDIX B

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

**B-1. Scope**

This appendix lists expendable supplies and materials you will need to operate and maintain the Combat Engineer Vehicle M728 Hull. These items are authorized to you by CTA 50-970, Expendable items (Except Medical, Class V, Repair Parts, and Heraldic Items).

C	Operator or crew
O	Organization maintenance
F	Direct support maintenance
H	General support maintenance

**B-2. Explanation of Columns**

*a. Column 1 - Item Number.* This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material, e.g., Use cleaning compound (Item 6, Appendix B).

*b. Column 2 - Level.* This column identifies the lowest level of maintenance that requires the listed item.

*c. Column 2 - National Stock Number.* This is the National stock number assigned to the item; use it to request or requisition the item.

*d. Column 4 - Description.* Indicates the Federal item name, and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in paren-theses if applicable.

*e. Column 5 - Unit of Measure (U/M).* Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea., in., pr.). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

## Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	O	8040-00-664-4318	Adhesive, Synthetic Rubber (MMM-A-1617, Type II)	PT
1.1	O	7920-00-514-2417	Brush, Acid Swabbing	EA
2	O	1015-00-615-7206	Brush, Channel	EA
3	C	5350-00-221-0872	Cloth, Crocus (P-C-458)	SH
4	C	8305-00-286-5451	Cloth, Lint-Free	LB
5	F	8305-00-256-0157	Compound, Cleaning, High Pressure (P-S-751)	GA
6	O	8030-00-081-2328	Compound, Sealing (MIL-S-22473, Grade E)	OZ
7	F	8030-00-081-7818	Compound, Sealing (MIL-S-22473, Grade CV)	OZ
8	O	8030-00-081-2337	Compound, Sealing (MIL-S-22473, Grade AV)	QT
9	O	8030-00-081-2325	Compound, Sealing (MIL-S-22473, Grade HV)	QT
9.1	O	2030-01-131-9189	Compound, Sealing (MIL-S-46163, Type I, Grade K)	PT
10	C	6850-00-880-7616	Compound, Silicone (MIL-S-8660)	OZ
11	O	7390-00-990-7391	Detergent, Liquid (P-S-598)	DR
12	C	6850-00-281-1985	Dry Cleaning Solvent (P-D-680, Type II)	GA
13	F	6850-00-145-0255	Dye, Penetrating (MIL-I-25135)	
13.1	O	8415-00-641-4601	Gloves, Rubber	PR
13.2	O	4240-00-017-9768	Goggles	PR
14	C	9150-00-935-1017	Grease, GAA, Automotive & Artillery (MIL-G-10924)	OZ
15	C	9150-00-059-2586	Brake Fluid, Silicone, Automotive (MILB-46176)	GA
15.1	F	5510-00-138-0216	Lumber, Softwood, 18 in. x 8 in. x 10 ft.	EA
16	C	9150-00-265-9425	Oil, OE/HDO-10, Engine, Heavy Duty (MIL-L-2104)	QT
17	C	9150-00-265-9426	Oil, OE/HEO-10, Engine, Heavy Duty (MIL-L-2104C)	DR
18	O	9150-00-223-4119	Oil, Penetrating (VV-P-216)	QT
19	O	8030-01-041-1602	Paint, Acid Resistant (MIL-P-20689/22750)	QT
20	F	8010-00-298-2293	Paint, White Enamel (TT-E-489)	QT
21	F	8030-00-963-0930	Primer, Sealing (MIL-S-22473, Grade T)	QT
22	O	8010-00-297-0593	Primer, Zinc Chromate (TT-P-1757)	QT
22.1	O	7920-00-205-1711	Rags, Wiping, Cotton, White (DDR-3068)	LB
23	C	4020-00-689-5658	Rope, Manila, 3/4 in. (TR-605)	FT
24	F		Sandpaper, Number 4/0	SH
25	C	7510-00-973-9513	Tape, Masking, 2" (MIL-T-23397)	RL
Z6	O	9525-00-529-0442	Wire, Corrosion Resistant (QQ-W-390C)	RL
27	O	9525-00-277-4268	Wire, Nickle, Copper Alloy (QQ-W281)	RL
28	O	9505-00-191-3680	Wire, Steel, Carbon (QQ-W-461)	RL
29	O	9505-00-248-9849	Wire, Steel, Carbon (MS-20995-F41)	RL
30	O	3439-00-003-8601	Solder, Lead-Tin Alloy (QQ-S-571)	LB
31	O	7120-00-205-1711	Rag, Wiping, Cotton (DD-R-30)	LB
32	O	9150-00-965-2003	Grease (MIL-G-21164)	OZ
33	O	8040-00-865-8991	Adhesive (MIL-A-46106, Type I)	OZ
34	C	7510-00-189-7881	Pencil, Writing (SS-P-1605)	EA
35	F	8030-00-985-2350	Compound, Sealing (MIL--7916)	TU

Change 5 B-2

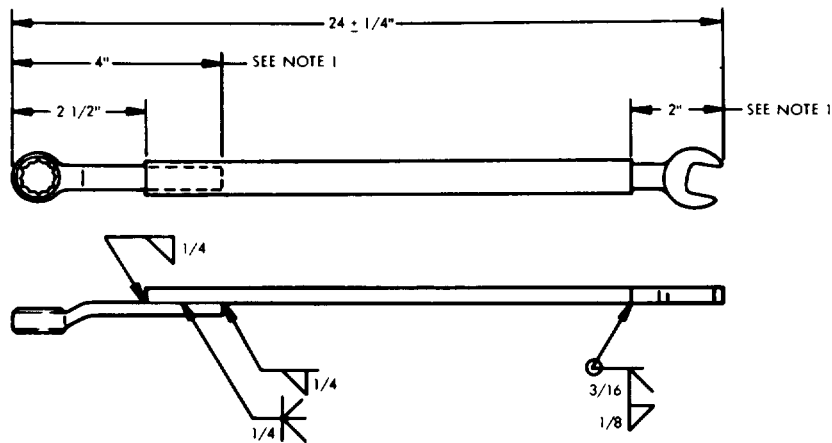
**APPENDIX C**  
**ELECTRICAL SCHEMATICS**

Refer to FO-1 in the back of this manual for the hull electrical system schematic diagram.

**C-1/(C-2 blank)**

**APPENDIX D  
ILLUSTRATED LIST MANUFACTURED ITEMS**

MATERIAL		
STOCK SIZE	DESCRIPTION	WELDING REQUIREMENT
5/8 x 5/16 x 19 1/2	CARBON OR ALLOY STEEL	WELD IN ACCORDANCE WITH MIL-STD-1261 CLASS 3



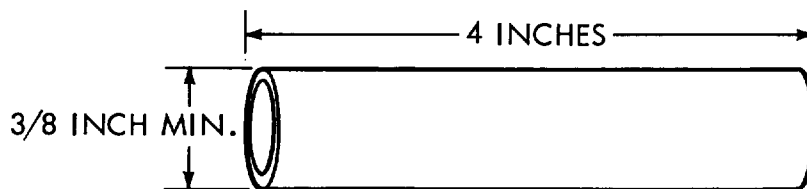
NOTES:

1. USE 5/8" WRENCH NSN 5120-00-228-9508 CUT TO PROVIDE 2 PIECES SHOWN.
2. TOLERANCE: ± 1/8"
3. ALL DIMENSIONS ARE IN INCHES.

*Figure 1. Double-ended wrench.*

MATERIAL	
STOCK SIZE	DESCRIPTION
.675 OD X 423 ID	BLACK PIPE, SCHEDULE 80

SEE NOTE 1



NOTE 1

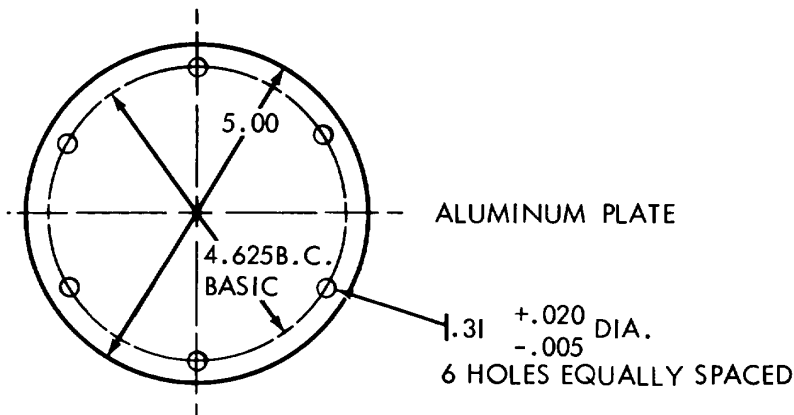
ROUND MECHANICAL TUBING,  
17/32" OD x 16 GA MAY BE  
SUBSTITUTED FOR BLACK PIPE.

*Figure 2. Spacers for hydraulic reservoir repair.*

APPENDIX D

ILLUSTRATED LIST OF MANUFACTURED ITEMS

MATERIAL		
STOCK	DESCRIPTION	FABRICATING REQUIREMENT
1/8 in. Aluminum (QQ-S-698)	5 in. Diameter	1. Cut out aluminum plate and lay out holes. 2. Use a 5/16 inch drill, bore six holes through plate, 60 degrees apart, as shown.



MATERIAL		
STOCK	DESCRIPTION	FABRICATING REQUIREMENT
1/16 Rubber Sheet	Goodyear Style 121 or equivalent	Punch six 5/16 in. Holes, 60 degrees apart, as shown.

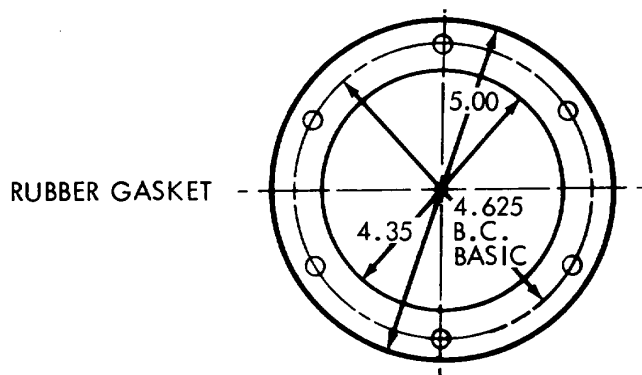


Figure 3. Cover and Gasket

TA130894

**NOTE**

Bearing installer is fabricated from spacers (8689162). Two installers are required for output shaft bearing installation.

Modify spacer (8689162) as follows:

- a. Using hand grinder, or other suitable tool, enlarge openings at each end of spacer enough to allow spacer to slip onto output shaft without binding.
- b. Remove all nicks and burrs.
- c. Mark modified spacer

"UNSERVICABLE-PRESS ONLY."

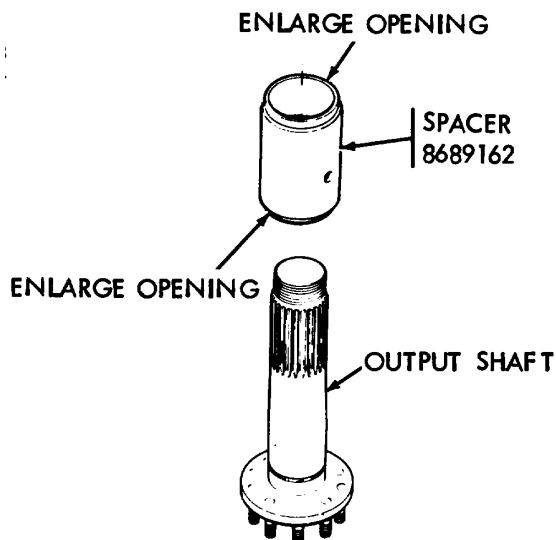


Figure 4. Final drive output shaft and drive bearing installer.

**NOTE**

**Two attachments are required.**

1. Thread two nuts (NSN 5310-00-930-3447) on an unused stud or bolt to maintain thread alignment and weld together per TM 9-237.
2. Obtain eye (NSN 2520-00-840-4560). Cut off and throw away threaded portion.
3. Weld modified eye to welded nut assembly per TM 9-237.

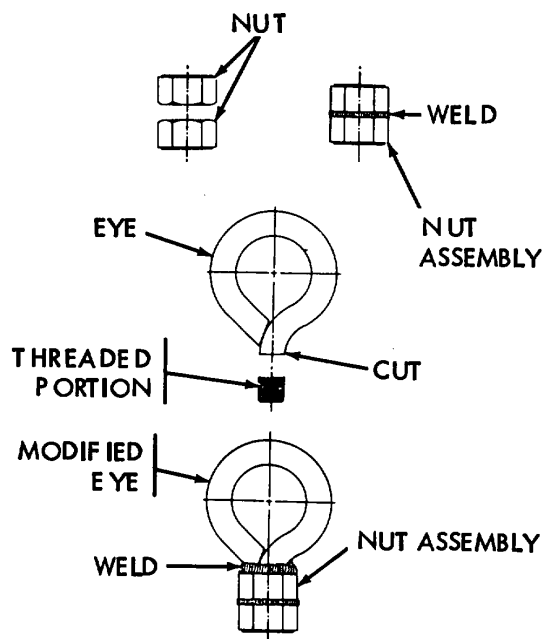


Figure 5. Final drive lifting attachment.

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By Order of the Secretary of the Army:

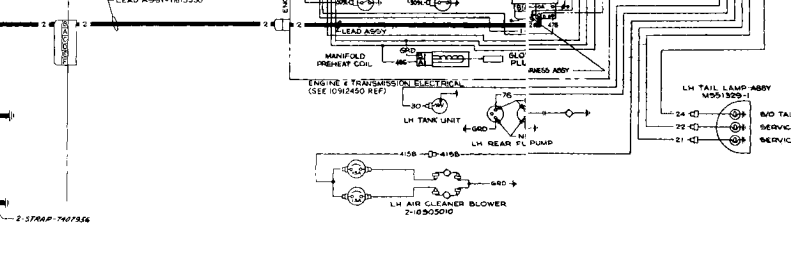
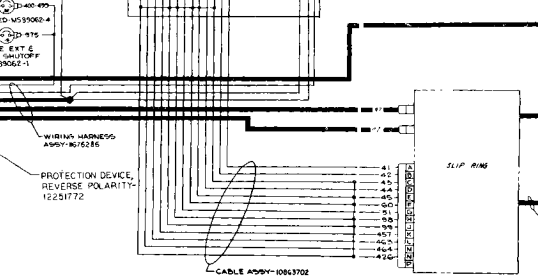
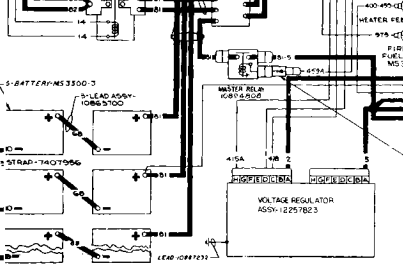
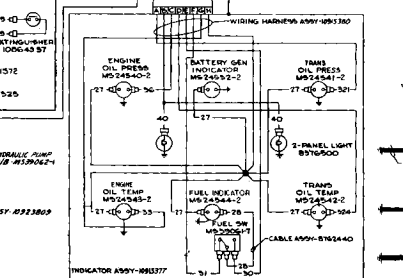
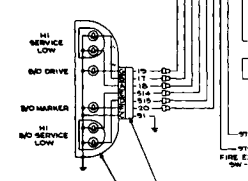
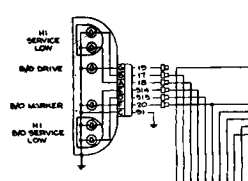
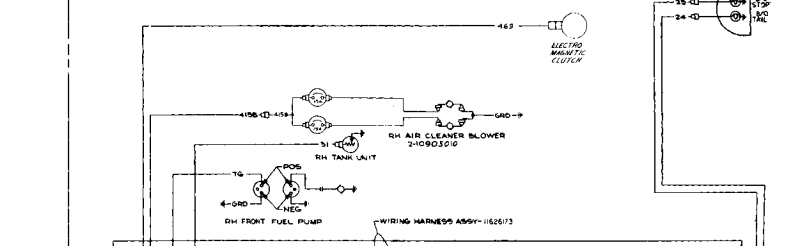
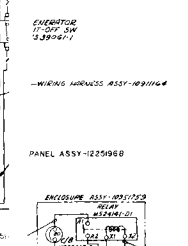
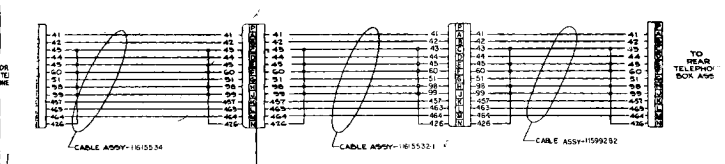
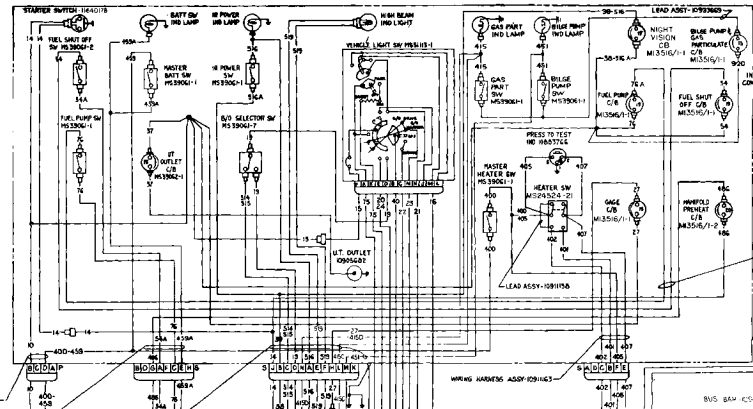
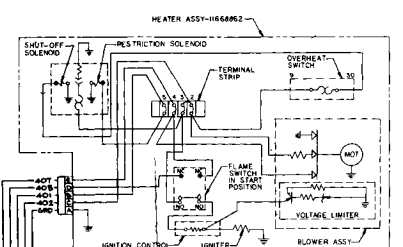
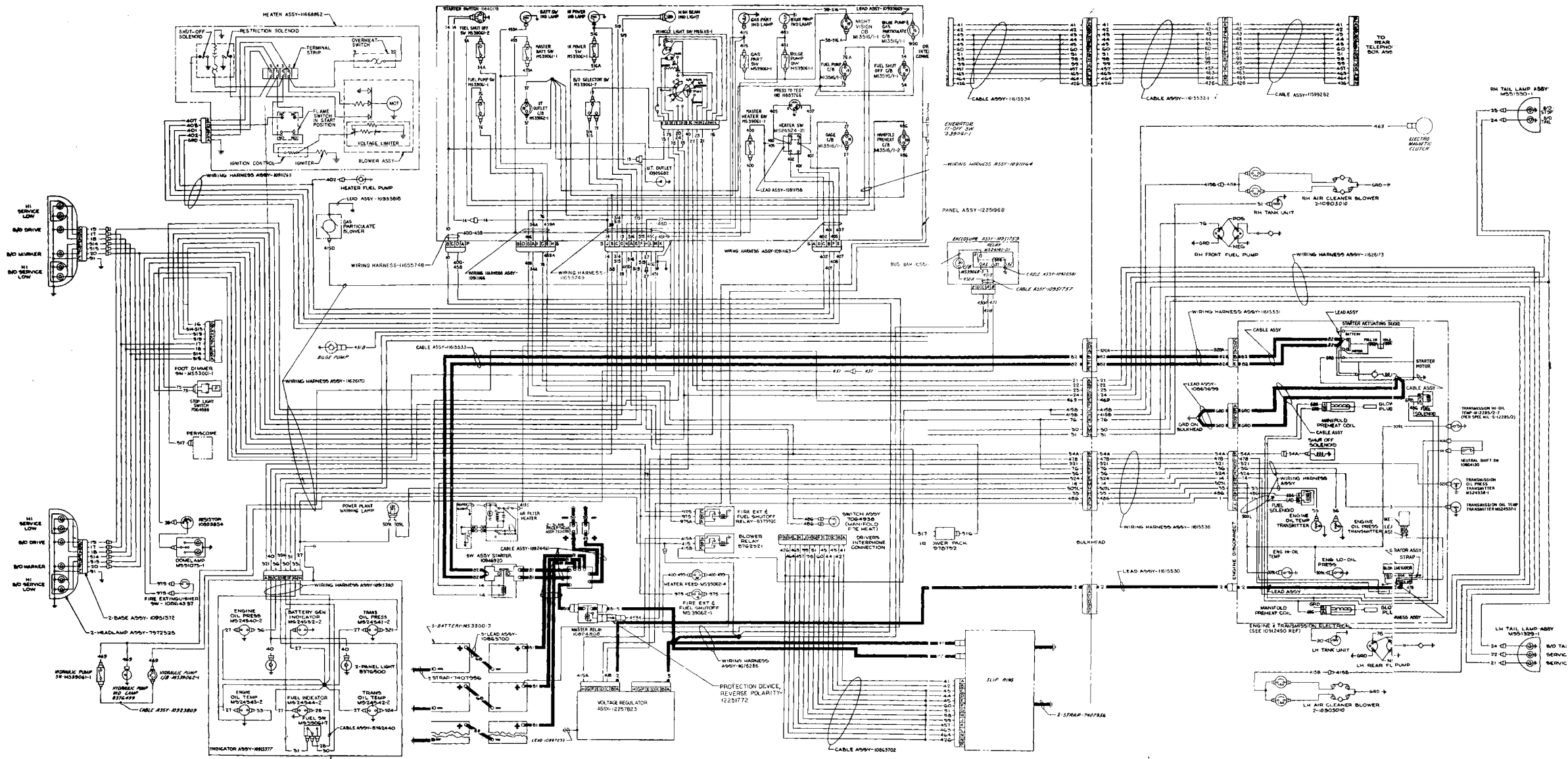
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*Chief of Staff*

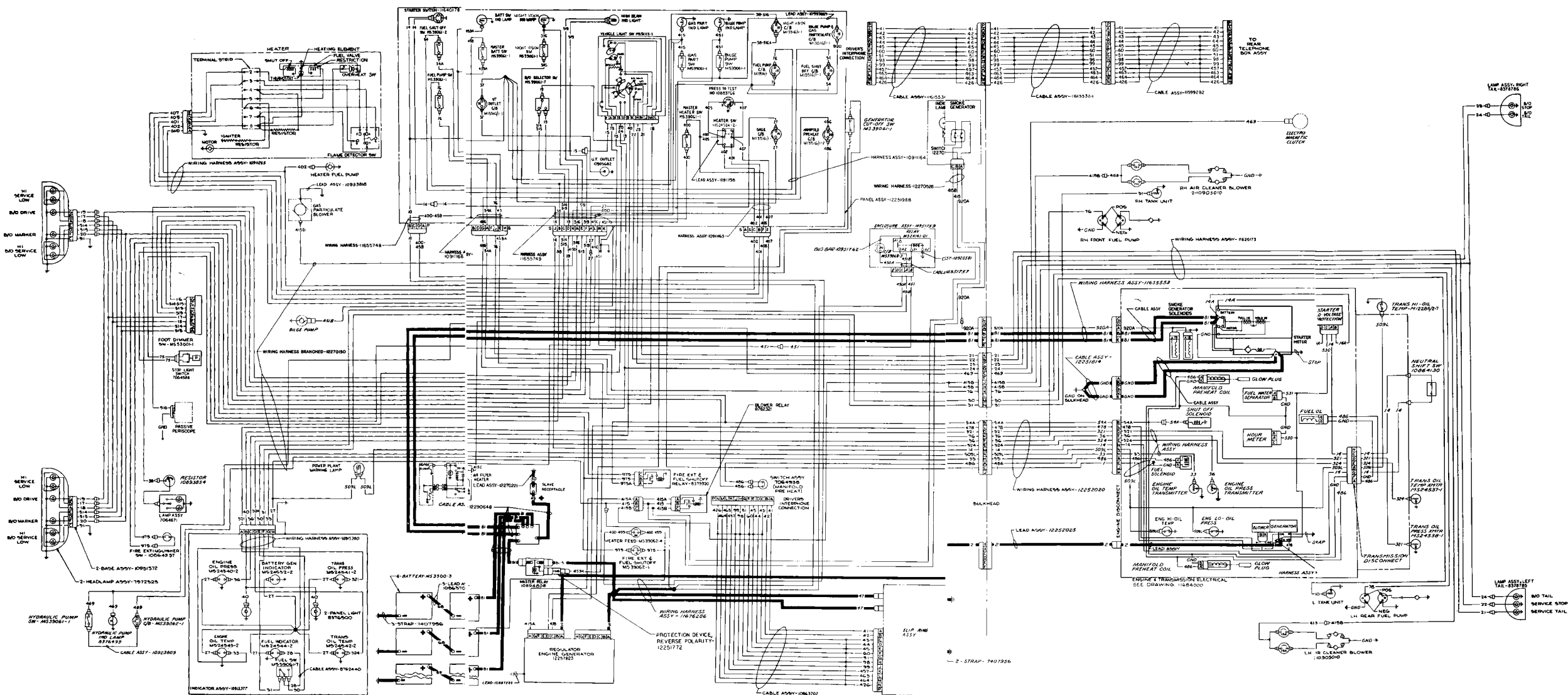
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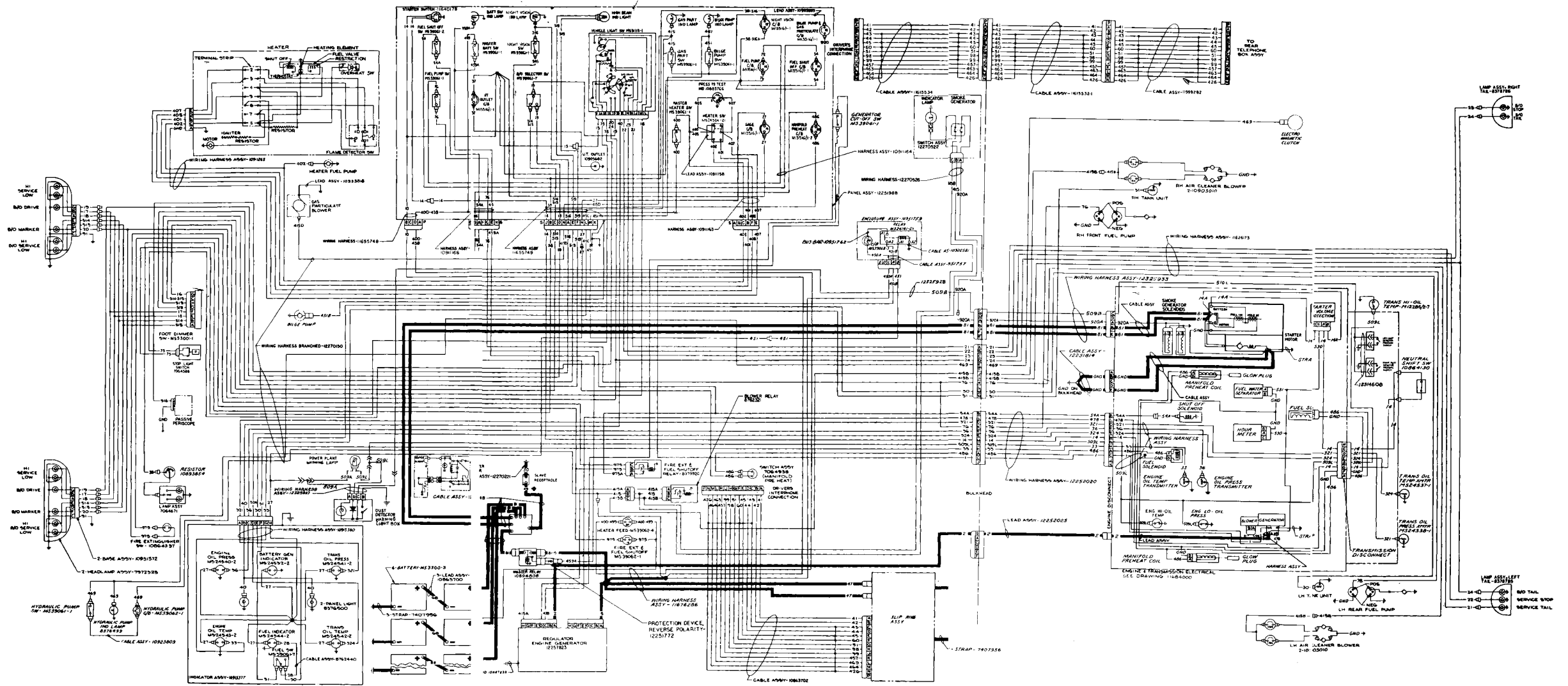
J. C. PENNINGTON  
*Major General, United States Army*  
*The Adjutant General*

To be distributed in accordance with DA Form 12-37, Direct Support and General Support Maintenance requirements for Combat Engineer Vehicle, M728.

U.S. GOVERN PRINTING OFFICE : 1994 - 300-421 (82438)







FO-3 Hull wiring diagram (2DA Engine)  
Change 2

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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 = 1.000 Millimeters =  
39.37 Inches  
1 Kilometer = 1,000 Meters = 0.621 Miles

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

### LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces  
1 Liter = 1,000 Milliliters = 33.82 Fluid Ounces

### TEMPERATURE

$5/9 (^{\circ}\text{F} - 32) = ^{\circ}\text{C}$   
212 $^{\circ}$  Fahrenheit is equivalent to 100 $^{\circ}$  Celsius  
90 $^{\circ}$  Fahrenheit is equivalent to 32.2 $^{\circ}$  Celsius  
32 $^{\circ}$  Fahrenheit is equivalent to 0 $^{\circ}$  Celsius  
 $9/5 \text{ C}^{\circ} + 32 = \text{F}^{\circ}$

### WEIGHTS

1 Gram = 0.001 Kilograms = 1,000 Milligrams =  
0.035 Ounces  
1 Kilogram = 1,000 Grams = 2.2 lb.  
1 Metric Ton = 1,000 Kilograms = 1 Megagram =  
1.1 Short Tons

### 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

