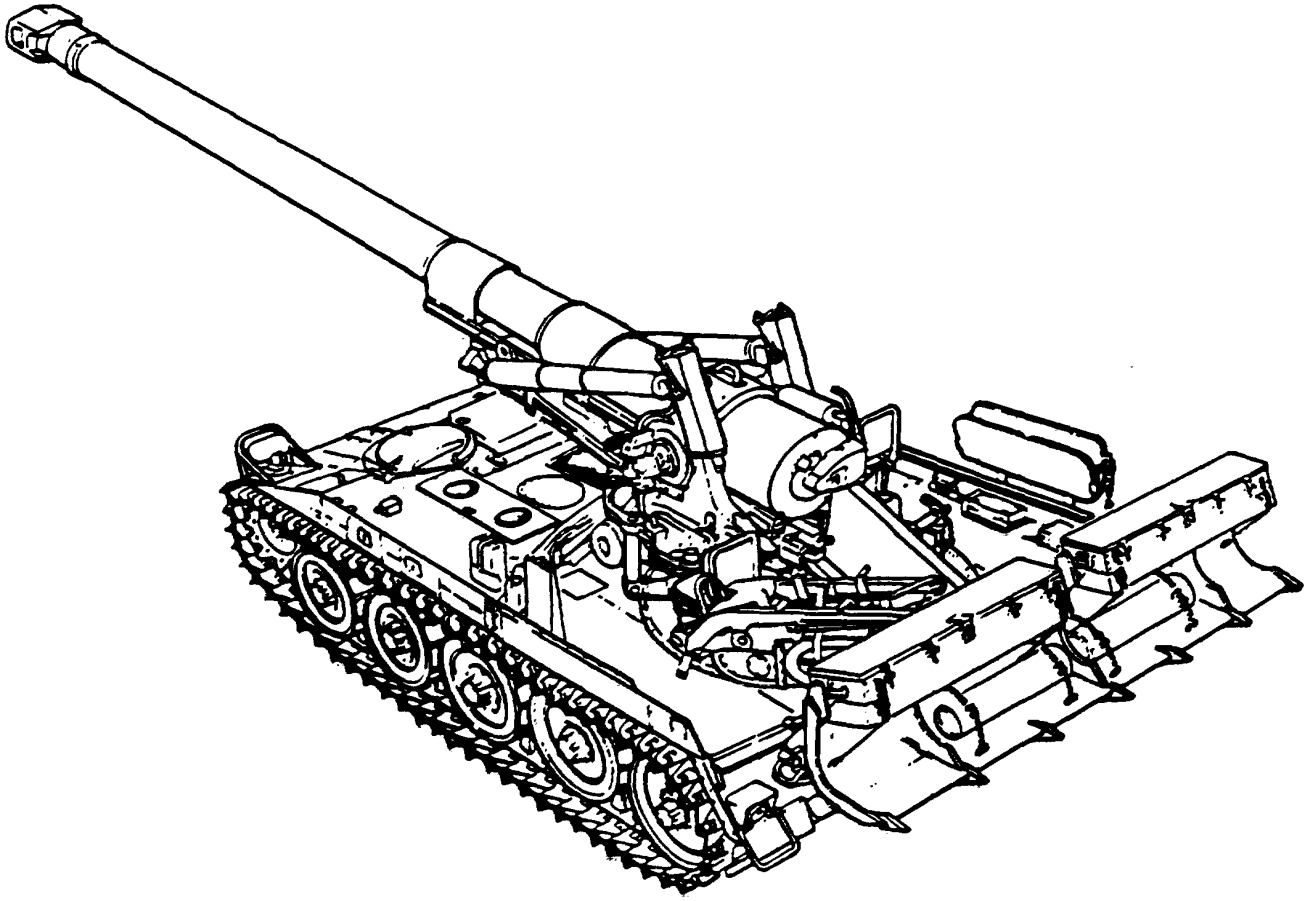
TECHNICAL MANUAL
DIRECT UPPORT AND GENERAL
SUPPORT MAINTENANCE MANUAL

HULL AND
RELATED COMPONENTS
HOWITZER, HEAVY,
SELF-PROPELLED:
8-INCH, M11OA2
(2350-01-041-4590) (EIC:3E3)

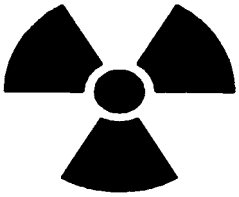


***This manual supersedes TM9-2350-304-34-1 dated 20 June 1980.**

HEADQUARTERS, DEPARTMENT OF THE ARMY **MAY 1994**

WARNING

RADIATION HAZARD



TRITIUM (H_3)

Rules and Regulations

Copies of the following rules and regulations are maintained at HQ, AMCCOM Rock Island, IL 61299-6000. Copies may be requested or information obtained by contacting the AMCCOM Radiological Protection Officer (RPO), AUTOVON 793-2964, Commercial (309) 782-2964.

10CFR Part 19--Notices, Instructions, and Reports to Workers; Inspections.

10CFR Part 20--Standards for Protection Against Radiation.

NRC license, license condition, and license application.

Safety Precautions

The radioactive material used in these instruments is tritium gas (H3) sealed in pyrex tubes. It poses no significant hazard to the repair person when intact. These sources illuminate the instrumentation for night operations. Tampering with or removal of the sources in the field is prohibited by Federal law. In the event there is no illumination, notify the local RPO. Do not attempt to repair or replace the instrument in the field. If skin contact is made with any area contaminated with tritium, immediately wash with nonabrasive soap and water.

Identification

Radioactive self-luminous sources are identified by means of radioactive warning labels (as above). These labels should not be defaced or removed and should be replaced immediately when necessary. Refer to the local RPO or the AMCCOM RPO for instructions on handling, storage, or disposal.

Storage and Shipping

All radioactively illuminated instruments or modules which are defective will be evacuated to a depot maintenance activity. These items must be placed in a plastic bag and packaged in the shipping container from which the replacement was taken before evacuation to a higher echelon is made. Spare equipment must be stored in the shipping container, as received, until installed on the weapon. Storage of these items is recommended to be in an outdoor shed-type storage or unoccupied building.

GENERAL

Dry cleaning solvent (SD2) is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated areas.

Solvent vapors are toxic. Do not use solvent in a confined space. Avoid long periods of breathing solvent vapors and/or contact with skin.

Prolonged breathing of fuel vapors can be fatal. If eyes or skin become irritated by diesel fuel, flush with water.

WARNING (CONT)

Prolonged breathing of fuel vapors can be fatal. Do not enter fuel cells until they have been thoroughly cleaned.

Fuel cells that are not entirely free of fuel or fuel vapors must not be welded or exposed to heat, flame, or sparks. Welding or the use of power sanders, chisels, and chipping hammers shall be preceded by removal of the fabric fuel cell and by thorough cleaning.

Failure to reduce pressure to zero before removing fuel filler cap may cause injury.

Unusable CARC mixtures are considered hazardous waste and will require disposal in accordance with Federal, state, DOD, DA, and local installation waste regulations. Consult the installation environmental office for proper disposal guidance. Mixed CARC is extremely flammable - use only in well ventilated areas, keep from flames, sparks, and other ignition sources.

- For brush roller painting in confined spaces, an airline respirator is required, unless an air sampling shows exposure to be below standards. If the air sampling is below standards, either chemical cartridge or airline respirators are required.
- Spot painter applying CARC paint by brush or roller must wear clothing and gloves affording full coverage.
- Do not use water, alcohol, or amine-based solvents to thin or remove CARC paints. Use of these solvents with CARC paints can produce chemical reactions resulting in nausea, disease, burns, or severe illness to personnel.
- Do not use paint solvents to remove paint coating from your skin.
- Mix paint/coating in a well-ventilated mixing room or spraying area away from open flames. Personnel mixing paint coating should wear eye protection.
- Use paint coating with adequate ventilation.
- Personnel grinding or sanding on painted equipment should use high efficiency air purifying respirators.
- Do not weld or cut CARC-coated metal. Substances causing skin or respiratory irritation may be released. Before applying heat, sand or grind paint down to bare metal on area four inches to either side of the area you plan to weld or cut.

HYDRAULICS

Hydraulic fluid is under high pressure. Relieve pressure and drain system before removing connections or components.

Hydraulic system is under high pressure. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

WARNING (CONT)

ACTUATING CYLINDER

Actuating cylinder contains high pressure nitrogen that can cause severe injury. Relieve all gas pressure before removing bottle.

MANUAL CONTROL LEVER

Manual control lever is under spring tension. Use caution during removal.

VALVE

Closing valve opener more than 3 turns may disengage valve opener from tube assembly, causing injury to personnel.

MASTER SWITCH

Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.

BATTERIES

Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

FIRST AID

Refer to FM 21-11, First Aid for Soldiers.

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TECHNICAL MANUAL

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D.C., 24 May 1994

No. 9-2350-304-34-1

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL

HULL AND RELATED COMPONENTS
HOWITZER, HEAVY, SELF-PROPELLED
8-INCH, M110A2
(2350-01-041-4590) (EIC:3E3)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to Commander, US Army Tank-Automotive Command, Attn: AMSTA-MB, Warren, MI 48597-5000. A reply will be furnished to you.

Table of Contents

***This manual supersedes TM9-2350-304-34-1 dated 20 June 1980.**

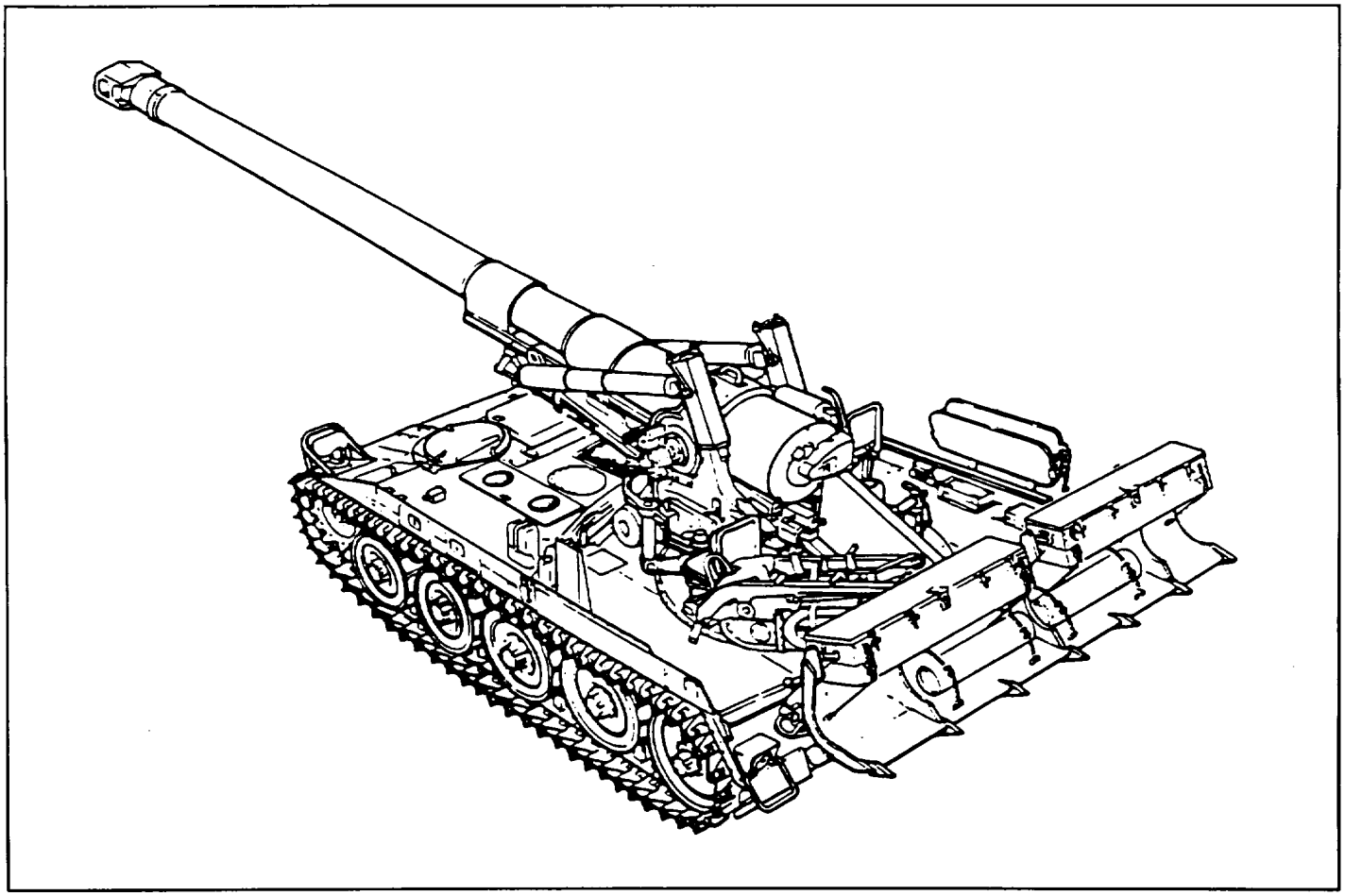
Table of Contents (cont)

HOW TO USE THIS MANUAL

This manual (TM 9-2350-304-34-1) contains direct support and general support maintenance procedures for the hull and related components of the M110 A2 Self-Propelled Howitzer. This manual is to be used in conjunction with TM 9-2350-304-20-1 and TM 9-2340-304-24P-1. Chapter 1 contains general information; information concerning repair parts, special tools, TMDE, and support equipment; and equipment description and data. Chapter 2 contains direct support troubleshooting and direct support maintenance procedures. Chapter 3 contains general support maintenance procedures and information concerning preparation for storage or shipment.

Be sure to read and understand maintenance instructions before beginning any maintenance task. Also, read and understand information in Chapter 1 and general maintenance procedures on page 2-26 before beginning any maintenance task.

M110A2 8-INCH, HEAVY, SELF-PROPELLED HOWITZER



CHAPTER 1
INTRODUCTION

CHAPTER INDEX

Section I. GENERAL INFORMATION

1-1. SCOPE.

a. *Type of Manual*: Direct support and general support maintenance.

b. *Model Number and Equipment Name*: M110A2, 8-inch, heavy, self-propelled howitzer.

c. *Purpose of Equipment*: M1 10A2, 8-inch, heavy, self-propelled howitzer transports a long-barrel howitzer and its crew and travels at convoy speed for artillery support in both offensive and defensive combat operations.

1-2. 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).

1-3. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE.

a. *Tactical Situations*. Situations may arise in which it is necessary to abandon equipment in the combat zone. All abandoned equipment must be destroyed to prevent its use by the enemy. The destruction of equipment subject to capture or abandonment in the combat zone will be undertaken only upon authority delegated by a division or higher commander.

b. *Plans*.

(1) Plans for destruction of equipment must be adequate, uniform, and easily carried out in the field.

1-3. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE (CONT).

(2) Destruction must be as complete as the available time, equipment, and personnel will permit. Since complete destruction requires considerable time, priorities must be established so the more essential parts are destroyed first.

(3) The same essential parts must be destroyed on all like units to prevent the enemy from constructing a complete unit from undamaged parts.

(4) Spare parts and accessories must be given the same priority as parts installed on the equipment.

c. *Methods.* To destroy equipment adequately and uniformly, all personnel of the unit must know the plan and priority of destruction and be trained in the methods of destruction.

d. *References.* Read TM 750-244-6 for information on destruction of mechanical equipment. Read TM 750-244-5-1 for information on destruction of ammunition.

1-4. PREPARATION FOR STORAGE OR SHIPMENT. Administrative storage is restricted to 90 days and must not be extended. Refer to TM 9-2350-304-20-1 for detailed instructions on administrative storage.

1-5. OFFICIAL NOMENCLATURE, NAMES, AND DESIGNATIONS.

Nomenclature Cross-Reference List.

Common Name	*Official Nomenclature*
Air duct clamp	Air regulator hose lamp
Air line	Air regulator hose assembly
Air valve	Nonexpansive rod
Bracket	Heater bracket
Ceramic rod	Headless straight pin
Combustion air blower direct current motor	Air blower motor
Connector	Pipe-to-tube adapter
Connector	Retaining plate
Drain plug	Machine thread plug
Electrical connector	Electrical lead assembly
Final drive puller	Hexagon head capscrew
Fitting	Pipe-to-tube adapter
Fuel line	Fuel tube assembly
Globe angle valve	Accumulator valve
Ground terminal	Terminal lug
Left fuel cell	Left-hand fuel cell
Lockwire	Nonelectrical wire
Nameplate	Identification plate
O-ring	Preformed packing
Resistor	Fixed wire resistor
Right fuel cell	Engine fuel tank
Switch	Thermostatic flame detector switch
Switch	Thermostatic overheat switch
Tachometer cable	Flexible shaft assembly

1-6. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR). If your M110A2 howitzer needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to us at Commander, US Army Tank-Automotive Command, ATTN: AMSTA-Q, Warren, Ml 48397-5000. We will send you a reply.

1-7. CORROSION PREVENTION AND CONTROL (CPC).

a. *General.* Corrosion Prevention and Control (CPC) of Army materiel is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements can be made to prevent the problem in the future.

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

c. *Reporting.* If a corrosion problem is identified, it can be reported using SF 368, Product Quality Deficiency Report. Use of key words such as "corrosion," "rust," "deterioration," or "cracking" will assure that the information is identified as a CPC problem.

d. *Forms.* The form should be submitted to: Commander, US Army Tank-Automotive Command, ATTN: AMSTA-Q/Customer Feedback Center, Warren, Ml 48397-5000.

Section II. EQUIPMENT DESCRIPTION AND DATA

1-8. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

a. *Purpose.* The M11 0A2 Howitzer is a weapon that defends against close-in or long-range ground targets.

b. *Capabilities and Features.*

CAUTION

Do not ford water which exceeds 42.0 in. (106.7 cm) in depth. Check for soft mud or sandy bottoms.

(1) The M110A2 Howitzer is an unarmored, full-tracked, heavy, self-propelled, 8-in. (203-mm) howitzer. This diesel-powered artillery piece is highly mobile, maneuverable, and may be air transported. The vehicle is capable of long-range, high-speed operation on improved roads. It can traverse rough terrain, muddy or marshy ground, sand, and snow or ice. The M11 0A2 Howitzer can ford streams up to 42.0 in. (106.7 cm) deep.

(2) A hydraulic suspension lockout system and spade assembly help provide a stable platform for firing the cannon. The cannon elevating and traversing mechanisms and the projectile loader and rammer are also hydraulically powered. However, they may be manually operated in case of a power failure.

(3) The turret can traverse 30 degrees (533 mils) right or left of vehicle centerline and the cannon can elevate to 65 degrees (1156 mils) above horizontal position.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS. Refer to TM 9-2350-304-20-1

1-10. EQUIPMENT DATA. Necessary equipment data not furnished in this manual can be found in TM 9-2350-304-10 or TM 9-2350-304-20-1.

a. *Engine.*
- **(1)** Type ..... Two-cycle, V-8, turbocharged compression-ignition, diesel, liquid cooled
- **(2)** Model 8V71T
- **(3)** Weight, dry, as installed ..... 2442 lb (1108 kg)
- **(4)** Number of cylinders 8
- **(5)** Displacement ..... 568 cu in. (9308 cm^3)
- **(6)** Bore ..... 4.25 in. (10.80 cm)
- **(7)** Stoke ..... 5.0 in. (12.7 cm)
- **(8)** Compression ratio 17:1
- **(9)** Maximum, gross brake horsepower (at 2300 rpm) ..... 405 (302 kW)
- **(10)** Maximum, net brake horsepower ..... 345 (257 kW)
- **(11)** Maximum, rpm (governed):
  - **(a)** No load ..... 2450 rpm
  - **(b)** Full load ..... 2300 rpm
- **(12)** Idle speed ..... 550 to 600 rpm
- **(13)** Crankshaft rotation (viewed from front of engine) ..... Clockwise
- **(14)** Firing order ..... 1 L-3R-3L-4R-4L-2R-2L-1 R

b. *Power Takeoff.*
- **(1)** Dimensions ..... 19.00 in. lg x 10.75 in. h x 8.50 in. w (48.26 cm lg x 27.30 cm h x 21.59 cm w)
- **(2)** Engine rpm to power takeoff output ratio 1.32:1

c. *Final Drives.*
- **(1)** Type ..... Front drive sprocket
- **(2)** Final drive ratio 5.35:1
- **(3)** Weight, dry:
  - **(a)** Left ..... 718 lb (326 kg)
  - **(b)** Right ..... 633 lb (287 kg)

d. *Transmission.*
- **(1)** Type ..... Crossdrive, torque converter, planetary gear, all-torque shifting
- **(2)** Model XTG-411-2A
- **(3)** Transmission ..... Hydraulic and mechanical
- **(4)** Weight, dry as installed ..... 2390 lb (1084 kg)
- **(5)** Overall length ..... 61.286 in. (155.666 cm)
- **(6)** Overall height ..... 26.07 in. (66.22 cm)
- **(7)** Overall width (between output drive-to-hull mounting faces) ..... 83 in. (211 cm)
- **(8)** Torque converter type ..... Hydraulic, single stage, polyphase, (three element, with automatic lockup clutch)

(9) Clutches ..... Multiplate wet, hydraulically applied
(10) Range selector ..... Four forward speeds, two reverse speeds
(11) Oil screen ..... Reusable screen disk-type or disposable element
(12) Lubrication pressure ..... 18 to 45 psi (124 to 310 kPa) at 1835 to 1900 engine rpm
(**13)** Gear ratios:
(a) 1st 4.69:1
(b) 2nd 3.18:1
(c) 3rd 1.59:1
(d) 4th 0.794:1
(e) R41 ..... 5.60:1
(f) R2 ..... 3.79:1
(14) Maximum rating:
(a) Input torque ..... 880 ft-lb (1193 N-m)
(b) Input power (net) ..... 360 hp (269 kW)
(c) Input speed ..... 2300 rpm
(15) Steering system:
(a) Clutches applied by ..... Oil pressure
(b) Clutches released by ..... Spring pressure
(c) Steering brakes applied by ..... Oil pressure
(d) Brakes (service and parking) ..... Multiplate, wet, mechanically applied, sintered bronze on steel
(e) Oil pumps ..... 5 pumps
(f) Type of pump ..... Gear, positive displacement

e. *Auxiliary Drive Assembly.*

(1) Weight ..... 191 lb (87 kg)
(2) Input to generator output shaft ratio 1:3.48
(3) Input fan sheave output shaft ratio 1:0.69
(4) Magnetic clutch:
(a) Voltage ..... 24 V dc
(b) Ampere at 25 °C (77 °F) 4.76
(c) Resistance at 25 °C (77 °F) ..... 5.04 ohms

f. *Radiators.*

(1) Dimensions ..... 39.25 in. h x 24.00 in. w x 5.00 in. deep (99.70 cm h x 60.96 cm w x 12.70 cm deep)
(2) Coolant flow (each radiator) ..... 70 gpm (265 l/min)
(3) Top tank temperature ..... 210 °F (99 °C)
(4) Weight (each) ..... 73 lb (33 kg)

1-10. EQUIPMENT DATA (CONT).

g. *Coolant Fan.*

(1) Design and construction data:
(a) Outside diameter ..... 27 in. (68.6 cm) .w
(b) Overall length .....(38.1 cm)
(c) Weight .....120 lb (53.4 kg)
(2) Direction of rotation (viewed from pulley end) .....Clockwise
(3) Direction of air flow .....Through fan, into engine compartment
(4) Number of mounting holes.....16
(5) Bolt circle diameter .....25.75 in. (65.41 cm)

h. *Hydraulic Rotary Pump.*

(1) Type .....gear
(2) Rate output pressure .....2000 psi (13,790 kPa)
(3) Rated flow at 2000 psi .....23.5 gpm (88 /min)
(4) Maximum operating rpm .....2500 rpm
(5) Displacement .....3.02 cu In./rev (49.5 cm3/rev)

I. *Lockout Cylinder.*

(1) Length:
(a) Retracted .....25.94 in. (65.89 cm)
(b) Extended .....35.47 in. (90.09 cm)
(2) Outside diameter .....6.00 in. (15.24 cm)
(3) Weight, dry.....82 lb (37 kg)
(4) Operating pressure .....150 psi (1034 kPa)

CHAPTER 2
DIRECT SUPPORT MAINTENANCE INSTRUCTIONS

CHAPTER INDEX

CHAPTER INDEX (CONT)

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

2-1. COMMON TOOLS AND EQUIPMENT. For authorized common tools and equipment, refer to the Modified Table of Organization (MTOE) applicable to your unit.

2-2. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT. Tools, special tools, and test equipment necessary to maintain the M110A2 self-propelled howitzer are listed in TM 9-2350-304-24P-1, TM 9-2815-202-24P, and appendix B of TM 9-2350-304-20-1. For an illustrated list of special tools and equipment, refer to appendix E of this manual.

2-3. REPAIR PARTS. Repair parts are listed in TM 9-2350-304-24P-1 and TM 9-2815-202-24P, covering unit, direct support, general support, and depot maintenance for this equipment.

Section II. DIRECT SUPPORT TROUBLESHOOTING

2-4. TROUBLESHOOTING INFORMATION.

a. The symptom index can be used as a quick guide to troubleshooting. Common malfunctions are listed in alphabetical order under each major assembly, which appear in MAC order, with a page number reference to the troubleshooting table where a test or inspection and corrective action are provided.

b. The direct support troubleshooting table lists the malfunction, the test or inspection indicating the malfunction, and the necessary corrective action.

c. If the malfunction still exists after all listed direct support maintenance corrective actions have been performed, notify general support maintenance.

d. This manual cannot list all malfunctions that may occur, nor all tests or Inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

DIRECT SUPPORT SYMPTOM INDEX

2-4. TROUBLESHOOTING INFORMATION (CONT).

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
ENGINE
1. STARTER FAILS TO CRANK ENGINE WHEN START SWITCH IS PRESSED.
Step 1. Check batteries for low charge. Charge batteries, refer to TM 9-6140-200-14; or replace batteries, refer to TM 9-2350-304-20-1.
Step 2. Check for proper setting of neutral position switch. Adjust neutral position switch. Refer to TM 9-2350-304-20-1.
Step 3. Check if MASTER IND light is operating. Set MASTER and INST switches ON. If MASTER IND light is off, troubleshoot master relay and battery power circuits. Refer to TM 9-2350-304-20-1.
Step 4. Check if starter engages engine. a. If starter does not engage engine, troubleshoot starter circuit and starter. Refer to TM 9-2350-304-20-1. b. If starter does engage engine, but does not crank, troubleshoot engine. Refer to TM 9-2815-202-34.
2. ENGINE CRANKS SLOWLY BUT DOES NOT START.
Step 1. Check for bad connections on battery terminals and grounds. a. Clean and tighten terminal clamps and nuts. b. Tighten ground connections.
Step 2. Check batteries for low charge. Charge batteries, refer to TM 9-6140-200-14; or replace batteries, refer to TM 9-2350-304-20-1.
Step 3. Check for loose connections on starter. Tighten loose connections. Refer to TM 9-2350-304-20-1.

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
3. ENGINE CRANKS BUT DOES NOT START. *Step 1.* Check fuel level indicator for fuel level. Fill fabric fuel cell. Refer to TM 9-2350-304-10. *Step 2.* Check engine shutdown handle. Push engine shutdown handle against hull. *Step 3.* Check for water in primary and secondary fuel filters. Drain water from fuel filters, refer to TM 9-2350-304-10; or replace dirty fuel filters, refer to TM 9-2350-304-20-1. *Step 4.* Check operation of air box heater by feeling air box heater on top of engine. a. If air box heater is not warm, troubleshoot air box heater. Refer to TM 9-2350-304-20-1. b. If air box heater is warm, troubleshoot engine fuel system. Refer to TM 9-2815-202-34. *Step 5.* Check for faulty engine parts. Troubleshoot engine fuel system and check engine compression. Refer to TM 9-2815-202-34.
4. ENGINE LABORS, RUNS UNEVENLY, SMOKES TOO MUCH, LACKS POWER, USES TOO MUCH OIL, HAS LOW OIL PRESSURE, HAS HIGH OIL PRESSURE, USES TOO MUCH FUEL, OR OVERHEATS. Check for faulty engine systems. Troubleshoot engine. Refer to TM 9-2815-202-34.
5. ENGINE IS NOT GETTING ENOUGH AIR. *Step 1.* Check for clogged or dirty air cleaner filter elements. Clean clogged or dirty air cleaner filter elements, refer to TM 9-2350- 304-10; or replace air cleaner filter elements and seal assemblies, refer to TM 9-2350-304-20-1.

2-4. TROUBLESHOOTING INFORMATION (CONT).

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
Step 2. Check forward and aft air cleaner centrifugal fan exhaust ports for air movement. a. If forward or aft air cleaner centrifugal fan is not operating, troubleshoot air cleaner blower circuits. Refer to TM 9-2350-304-20-1. b. Repair damaged air cleaner centrifugal fan, refer to page 2-40; or replace damaged air cleaner centrifugal fan, refer to TM 9-2350-304-20-1.
Step 3. Check for dirt buildup in forward and aft intake air cleaners. Clean and repair dirty intake air cleaners. Refer to TM 9-2350-304-20-1.
Step 4. Check air intake ducts and screen assembly for damaged or clogged parts. Repair or replace damaged parts. Refer to TM 9-2350-304-20-1.
Step 5. Check turbocharger for damaged or clogged parts. Troubleshoot turbocharger. Refer to TM 9-2815-202-34.
NOTE Step 6 applies to engine model 7083-7398.
Step 6. Check turbocharger regulator for damaged bypass valve. Troubleshoot turbocharger regulator. Refer to TM 9-2815-202-34.
FUEL SYSTEM
6. ENGINE DOES NOT GET ENOUGH FUEL.
Step 1. Check fuel filler cap vent. Turn fuel filler cap vent to OPEN.
Step 2. Check fuel level indicator for fuel cell level. Fill fabric fuel cell. Refer to TM 9-2350-304-10.

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
Step 3. Check for dirty fuel filters. Replace filter elements. Refer to TM 9-2350-304-20-1.
Step 4. Check for damaged engine fuel pump or clogged lines. Perform fuel flow test. Refer to TM 9-2350-304-20-1.
Step 5. Check for damaged or dirty fuel injectors. Troubleshoot fuel injectors. Refer to TM 9-2815-202-34.
7. ENGINE LEAKS.
Step 1. Check for leaking or loose fuel drain plugs. Tighten or replace fuel cell drain plugs and preformed packings. Refer to page 2-43.
Step 2. Check fuel supply and return tubes, hoses, and fittings for leaks. a. Tighten loose connections. b. Replace all damaged tubes, hoses, and fittings. Refer to TM 9-2350-304-20-1.
Step 3. Check for fuel leaks around hull fuel compartment. Tighten screws to stop leaks, or replace fabric fuel cells. Refer to page 2-43.
Step 4. Check for internal leaks in fuel pump. Troubleshoot fuel pump. Refer to TM 9-2815-202-34.
EXHAUST
8. BURNED AREAS EXIST AROUND EXHAUST MANIFOLD.
CAUTION Exhaust manifold lugs must be aligned properly to prevent breakage.
Step 1. Check for loose exhaust manifold. Tighten exhaust manifold. Refer to TM 9-2815-202-34.

2-4. TROUBLESHOOTING INFORMATION (CONT).

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
Step 2. Check for cracked exhaust manifold and damaged exhaust manifold gasket. Troubleshoot exhaust manifold and exhaust manifold gasket. Refer to TM 9-2815-202-34.
9. ENGINE SMOKES TOO MUCH.
Step 1. Check for stuck or damaged exhaust valves. Replace stuck or damaged exhaust valves. Refer to TM 9-2815-202-34.
Step 2. Check for clogged engine air intake. Troubleshoot ENGINE. Refer to malfunction 5, page 2-5.
Step 3. Check for engine misfire or low compression if smoke is white. Check for oil bypassing cylinders if smoke is blue. Check for dirty or damaged fuel injectors if smoke is black or gray. Troubleshoot engine. Refer to TM 9-2815-202-34.
RADIATOR COOLING VANEAXIAL FAN
10. RADIATOR COOLING VANEAXIAL FAN DOES NOT OPERATE.
Step 1. Check for broken V-belt. If V-belt is not broken, go to step 3.
Step 2. Check for seized or damaged radiator cooling vaneaxial fan bearings. Check fan housing for scratches or gouges from impeller. Move impeller fore and aft by hand, checking for too much play or looseness. a. If impeller has hit housing, is loose, or will not turn, remove radiator cooling vaneaxial fan. Refer to TM 9-2350-304-20-1. b. Repair radiator cooling vaneaxial fan bearings. Refer to page 2-63. c. Install and adjust new V-belt. Refer to TM 9-2350-304-20-1. d. If fan belt tensioner is damaged, repair fan belt tensioner. Refer to TM 9-2350-304-20-1.

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

Step 3. Remove V-belt, refer to TM 9-2350-304-20-1. Start engine. Check clutch fan sheave for rotation. Stop engine.

If clutch fan sheave did not rotate, refer to malfunction 11, steps 3 and 4.

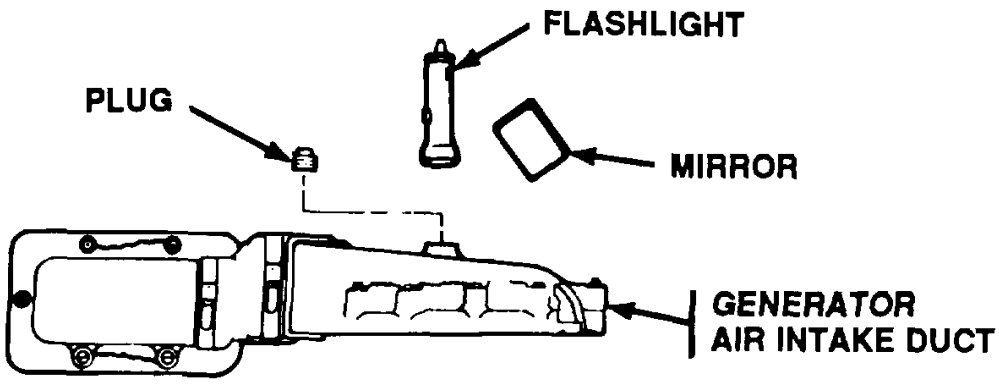
GENERATOR

11. GENERATOR DOES NOT OPERATE.

Step 1. Check for faulty or damaged voltage regulator.

Troubleshoot voltage regulator. Refer to TM 9-2350-304-20-1.

Step 2. Check for faulty or damaged generator. Remove engine deck. Remove plug from generator air intake duct. Start engine. Using mirror and flashlight, look through air duct hole and check if generator is turning. Stop engine.



If generator turned, troubleshoot generator. Refer to TM 9-2350-304-20-1. If generator did not turn, go to step 3.

Step 3. Install plug in generator air intake duct. Check for worn or damaged drive shaft or universal joints. Enter right hull tunnel and turn power takeoff to auxiliary drive shaft back and forth.

If any play is in drive line, repair worn or damaged universal joints. Refer to TM 9-2350-304-20-1.

2-4. TROUBLESHOOTING INFORMATION (CONT).

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
Step 4. Check for damaged or faulty power source. Start engine. Check power takeoff to auxiliary drive shaft for rotation. Stop engine. a. If power takeoff to auxiliary drive shaft rotated, remove auxiliary drive. Refer to TM 9-2350-304-20-1. Repair or replace auxiliary drive. Refer to page 2-70. b. If power takeoff to auxiliary drive shaft did not rotate, remove powerplant. Refer to TM 9-2350-304-20-1. Repair or replace power takeoff. Refer to page 2-128.
TRANSMISSION
12. TRANSMISSION OIL TEMPERATURE IS TOO HIGH. *Step 1.* Check transmission oil level. Add or drain oil to proper level. Refer to TM 9-2350-304-20-1. *Step 2.* Check for dirty or clogged transmission oil filter. Clean transmission oil filter. Refer to TM 9-2350-304-20-1. *Step 3.* Check for damaged or faulty transmission warning light and temperature indicator circuits. Troubleshoot transmission warning light and temperature indicator circuits. Refer to TM 9-2350-304-20-1. *Step 4.* Check for low main oil pressure, damaged oil pump, internal binding, and clutch slippage. Troubleshoot transmission. Refer to TM 9-2520-234-35.
13. TRANSMISSION CONSUMES TOO MUCH OIL, OIL PRESSURE IS TOO LOW, OR OIL PRESSURE IS TOO HIGH. Check for faulty transmission parts. Troubleshoot transmission. Refer to TM 9-2520-234-35.

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
14. VEHICLE DOES NOT BRAKE PROPERLY.
Step 1. Check brake linkage adjustment. Check for damaged or worn linkage. Adjust or replace brake linkage components. Refer to TM 9-2350-304-20-1.
Step 2. Check adjustment of transmission brakes. Adjust transmission brakes. Refer to TM 9-2350-304-20-1.
Step 3. Check hydraulic operating pressure in left and right transmission brakes. Refer to TM 9-2520-234-35. If pressure is wrong, troubleshoot transmission oil pump. Refer to TM 9-2520-234-35.
Step 4. Check transmission for worn or damaged brake plates. Troubleshoot transmission brakes. Refer to TM 9-2520-234-35.
15. VEHICLE DOES NOT STEER PROPERLY.
Step 1. Check steering linkage adjustment. Check for damaged or worn steering linkage. Adjust or replace steering linkage components. Refer to TM 9-2350-304-20-1.
Step 2. Check left and right geared steer clutch and left and right output clutch hydraulic operating pressure. Refer to TM 9-2520-234-35. If pressure is wrong, troubleshoot transmission oil pump. Refer to TM 9-2520-234-35.
Step 3. Check transmission internal steering. Troubleshoot transmission internal steering. Refer to TM 9-2520-234-35.
16. VEHICLE DOES NOT SHIFT PROPERLY.
Step 1. Check shifting linkage adjustment. Check for damaged or worn linkage. Adjust or replace shifting linkage components. Refer to TM 9-2350-304-20-1.

2-4. TROUBLESHOOTING INFORMATION (CONT).

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
Step 2. Check transmission shift hydraulic operating pressure. Refer to TM 9-2520-234-35. If pressure Is wrong, troubleshoot transmission oil pump. Refer to TM 9-2520-234-35. *Step 3.* Check transmission internal shifting components. Troubleshoot transmission. Refer to TM 9-2520-234-35.
17. TRANSMISSION STALLS OR DOES NOT OPERATE IN ALL RANGES. *Step 1.* Check transmission hydraulic operating pressures. Refer to TM 9-2520-234-35. If pressures are wrong, troubleshoot transmission oil pump. Refer to TM 9-2520-234-35. *Step 2.* Check transmission for internal wear or damage. Troubleshoot transmission. Refer to TM 9-2520-234-35.
AUXILIARY DRIVE AND POWER TAKEOFF
18. VEHICULAR DRIVE DOES NOT OPERATE. *Step 1.* Start engine. Set HYD PUMP/PTO CLUTCH switch ON. Check radiator cooling vaneaxial fan and vehicular drive drive shaft for rotation. Set HYD PUMP/PTO CLUTCH switch OFF. Stop engine. a. If radiator cooling vaneaxial fan rotated and vehicular drive did not, troubleshoot HYD PUMP/PTO CLUTCH switch. Refer to TM 9-2350-304-20-1. b. If radiator cooling vaneaxial fan did not rotate, troubleshoot GENERATOR, steps 3 and 4. Refer to page 2-9. *Step 2.* Remove auxiliary drive. Refer to TM 9-2350-304-20-1. Check for damaged drive shaft between auxiliary drive and vehicular drive. If drive shaft is damaged, repair drive shaft. Refer to page 2-83.

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

Step 3. Check vehicular drive for worn or damaged plates.

If vehicular drive plates are wom or damaged, repair vehicular drive. Refer to page 2-75.

19. AUXILIARY DRIVE OR POWER TAKEOFF MAKES TOO MUCH NOISE.

Step 1. Check auxiliary drive oil level.

Add oil to FULL mark on gage. Refer to TM 9-2350-304-10.

Step 2. Check for worn or damaged universal joints in drive shaft. Enter right hull tunnel and turn power takeoff to auxiliary drive shaft back and forth.

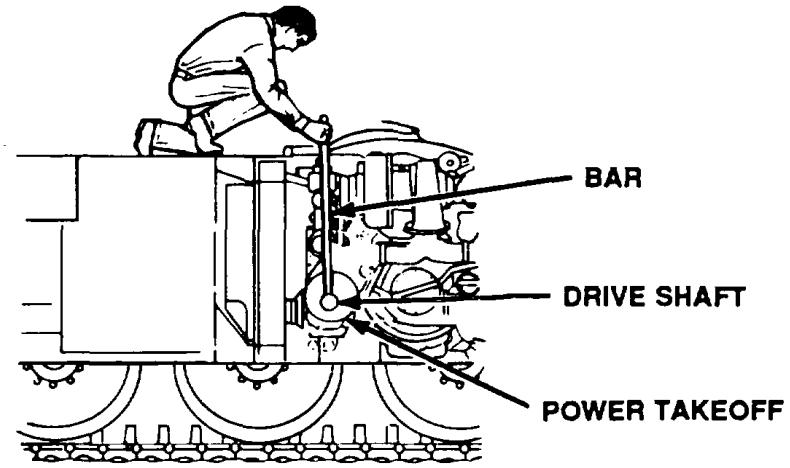
If any play is in drive line, repair worn or damaged universal joints. Refer to TM 9-2350-304-20-1.

Step 3. Isolate noise in auxiliary drive or power takeoff. Refer to TM 9-2350-304-20-

1. Remove exhaust pipes. Disconnect drive shaft at power takeoff. Pull drive shaft coupling from power takeoff and lower drive shaft to hull bottom. Install exhaust pipes. Start engine. Listen for noise. Stop engine.

a. If noise was not present, replace auxiliary drive, refer to TM 9-2350-304-20-1; or repair auxiliary drive, refer to page 2-69.

b. If noise was present, remove power takeoff, refer to TM 9-2350-304-20-1; or repair power takeoff, refer to page 2-132.



2-4. TROUBLESHOOTING INFORMATION (CONT).

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

HYDRAULIC SYSTEM

20. HYDRAULIC SYSTEM HAS NO PRESSURE.

WARNING

Hydraulic system Is under high pressure. Follow safety procedures to prevent injury. Wipe up any spilled hydraulic fluid.

Step 1. Check that hydraulic reservoir and accumulator drain valves are closed.

Close drain valves if open.

Step 2. Check hydraulic reservoir fluid level.

Add hydraulic fluid (item 22, appx B) if low. Refer to TM 9-2350-304-10.

Step 3. Check for leaks and damaged or clogged tubes, hoses, and fittings. Tighten all loose connections.

Repair or replace all leaking or damaged components. Refer to TM 9-2350-304-20-1.

Step 4. Check for damaged or faulty hydraulic oil pressure switch.

Troubleshoot hydraulic oil pressure switch. Refer to TM 9-2350-304-20-1.

Step 5. Check for damaged or faulty safety relief valve.

Troubleshoot safety relief valve. Refer to TM 9-2350-304-20-1.

Step 6. Check for damaged hydraulic pump drive shaft and hydraulic pump. Start engine. Set HYD PUMP/PTO CLUTCH switch ON. Check hydraulic pump drive shaft for rotation. Set HYD PUMP/PTO CLUTCH switch OFF. Stop engine.

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

a. If hydraulic pump drive shaft rotated, repair hydraulic pump. Notify general support maintenance.

b. If hydraulic pump shaft did not rotate, refer to malfunction 18, page 2-12.

21. ROTARY PUMP CYCLES MORE THAN NORMAL.

WARNING

Hydraulic system is under high pressure. Follow safety procedures to prevent injury. Wipe up any spilled hydraulic fluid.

Step 1. Check that accumulator drain (pressure dump) valve Is closed.

Close accumulator drain (pressure dump) valve if open. Refer to TM 9-2350-304-20-2.

Step 2. Check entire vehicle hydraulic system for leaks.

a. Tighten all loose connections.

b. Replace damaged or leaking hydraulic components. Refer to TM 9-2350-304-20-1.

Step 3. Check for faulty or damaged hydraulic oil pressure switch.

Troubleshoot hydraulic oil pressure switch. Refer to TM 9-2350-304-20-1.

Step 4. Check loader-rammer pressure gage during operation. Close accumulator drain (pressure dump) valve. Start engine. Set HYD PUMP/PTO CLUTCH switch ON. Hydraulic pressure reading on loader-rammer gage should jump to 1200 psi (8274 kPa) and climb slowly to 2400 psi (16,548 kPa). Set HYD PUMP/PTO CLUTCH switch OFF. Stop engine.

a. If hydraulic pressure did not jump to 1200 psi (8274 kPa) and climb slowly to 2400 psi (16,548 kPa), check and charge accumulator nitrogen gas bottle. Refer to TM 9-2350-304-20-2.

2-4. TROUBLESHOOTING INFORMATION (CONT).

Table 2-1. DIRECT SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
b. If accumulator nitrogen gas bottle will not hold charge, trouble-shoot for leaks or damaged accumulator. Refer to TM 9-2350- 304-34-2.
SPADE
22. SPADE DOES NOT RAISE OR LOWER.
Step 1. Check that spade shutoff valve is open.
Open spade shutoff valve if closed.
Step 2. Check that spade cylinder lock on both spade cylinders is unlocked.
Unlock spade cylinder locks.
Step 3. Remove rear hydraulic access cover for access to spade hydraulic components. Refer to TM 9-2350-304-20-1. Check for leaks and damaged or clogged hoses and fittings.
a. Tighten all loose connections.
b. Replace all leaking or damaged components. Refer to TM 9-2350-304-20-1.
Step 4. Check that actuating shaft rotates when control lever Is rotated.
Replace actuating shaft or lever if shaft does not rotate. Refer to page 2-141.

SECTION III. MAINTENANCE OF HYDRAULIC LINES AND FITTINGS

2-5. GENERAL.

a. This section contains instructions on repair of hydraulic lines and fittings. Repair of hydraulic lines and fittings consists of replacement of performed packings, tube fitting locknuts, lockwashers, and defective sleeve spacers and washers. Pages 2-17 and 2-18 show exploded views of typical hydraulic lines and fittings used on the vehicle and give procedures for disassembly and reassembly of fittings. For complete inspection procedures, refer to b. and c. below. Refer to TM 9-2350-304- 24P-1 for ordering of authorized parts. Ensure hydraulic pressure is relieved before performing any disassembly of hydraulic lines and fittings.

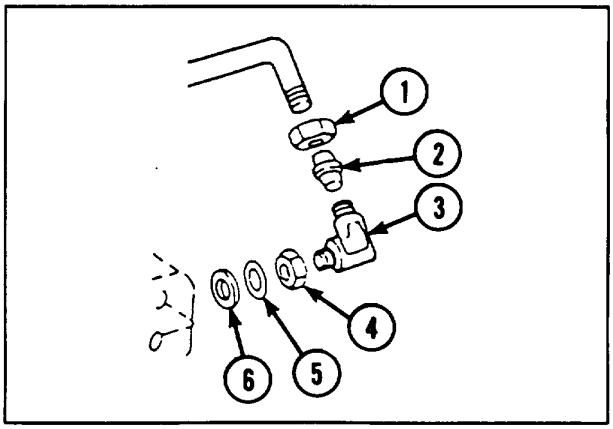
b. Inspect all unions, nipples, tees, reducers, plugs, elbows, and parts on which end fittings are used for thread damage, fractures, corrosion, distortion, slivers, restrictions, sealing surface scratches, and mutilation. Hex corners shall not be rounded.

c. Inspect tube assemblies for kinks, fractures, cracks, thread damage, restrictions, corrosion, and mutilation. Tube ends shall be squared, deburred inside and out, unprimed, and unpainted from sleeve flange to tube end. Tubes, 1/4 to 3/8 in. (6.35 to 9.53 mm) in diameter, shall show no deformation of sleeves as a result of overapplication of torque. Repair is by replacement of

2-6. TUBE ELBOW TO TUBE FITTING.

DISASSEMBLY

Remove tube fitting locknut (1), sleeve spacer (2), tube elbow (3), tube fitting locknut (4), flat washer (5), and performed packing (6).



REASSEMBLY

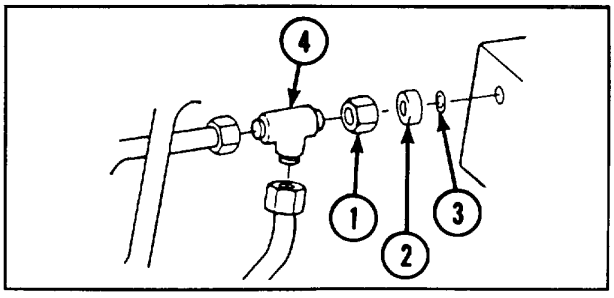
Install new performed packing (6), flat washer (5), new tube fitting locknut (4), tube elbow (3), sleeve spacer (2), and new tube fitting locknut (1).

2-7. TUBE TEE TO TUBE FITTING.

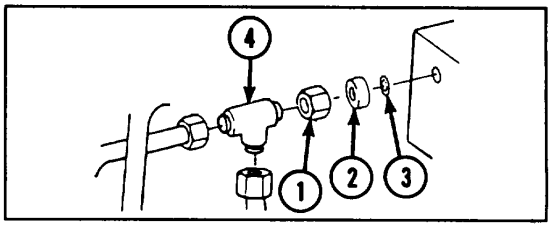
DISASSEMBLY

1 Remove tube fitting locknut (1), flat washer (2), and performed packing (3).

2 Disconnect tube assemblies from tube tee (4) and remove tube tee.



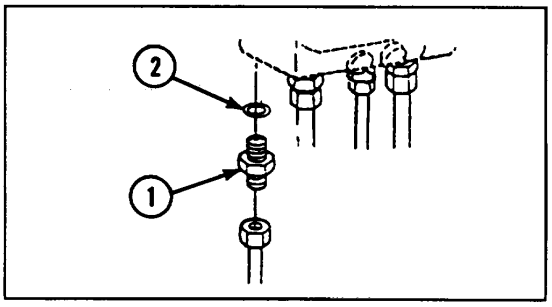
2-7. TUBE TEE TO TUBE FITTING (CONT).



REASSEMBLY

Install tube tee (4), new preformed packing (3), flat washer (2), and new tube fitting locknut (1).

2-8. TUBE REDUCER TO TUBE FITTING.



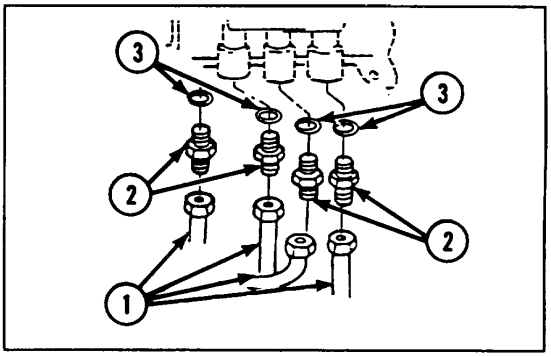
DISASSEMBLY

Disconnect tube assembly, and remove tube reducer (1) and preformed packing (2).

REASSEMBLY

Install new preformed packing (2) and tube reducer (1), and connect tube assembly.

2-9. TUBE NIPPLE TO TUBE FITTING.



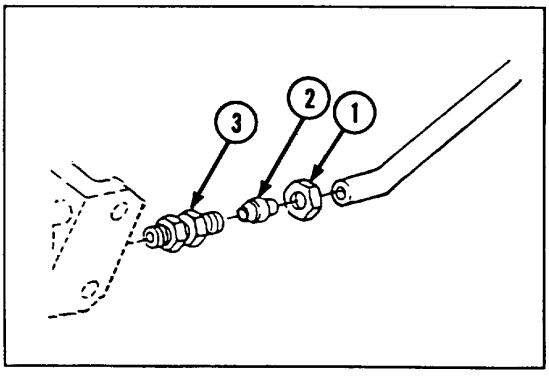
DISASSEMBLY

Disconnect tube fitting (1), and remove tube nipple (2) and preformed packing (3).

REASSEMBLY

Install new preformed packing (3) and tube nipple (2), and connect tube fitting (1).

2-10. STRAIGHT ADAPTER TO TUBE FITTING.



DISASSEMBLY

Remove tube fitting locknut (1), sleeve spacer (2), and straight adapter (3).

REASSEMBLY

Install straight adapter (3), sleeve spacer (2), and new tube fitting locknut (1).

Section IV. WIRING HARNESS AND CABLE REPAIR

2-11. GENERAL. This section contains instructions on repair of wiring harnesses and cables (leads). Repair of wiring harnesses and cables consists of replacement of defective connectors, shells, and terminals, or taping cut or worn insulation and exposed wire conductors. Pages 2-19 thru 2-26 show exploded views of typical harness and cable connectors used on the vehicle and give procedures for disassembly and assembly of connectors. When soldering is required, procedures in TBSIG-222 must be followed.

INITIAL SETUP

Tools and Special Tools

Automotive maintenance and repair

Shop equipment: field maintenance, basic, less power (SC 4910-95-A31)

* Electric soldering iron
* Electrical repair tool kit

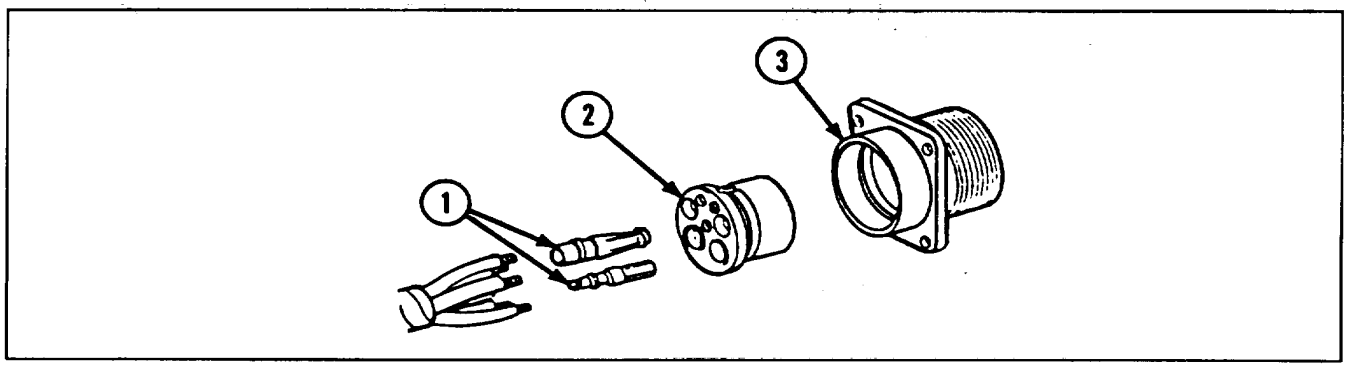
Materials/Parts

Solder (item 37, appx B)

NOTE

Label cables on multiple receptacles during disassembly to ensure proper order during reassembly.

2-12. TYPICAL FEMALE-TYPE PANEL MOUNTING RECEPTACLE CONNECTOR.



DISASSEMBLY

1 Drive socket contacts (1) out through rear of insert (2) with pin extractor.

2 Unsolder cable leads from solder wells on socket contacts (1).

3 Slide insert out through rear of shell assembly (3).

2-12. TYPICAL FEMALE-TYPE PANEL MOUNTING RECEPTACLE CONNECTOR (CONT).

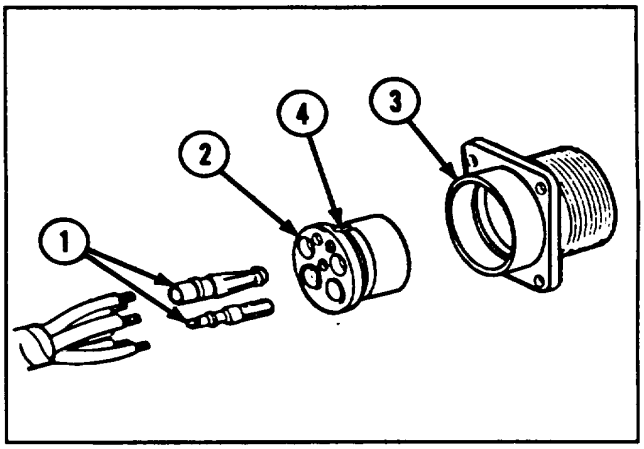
REASSEMBLY

1 Strip cable Insulation equal to depth of solder wells of socket contacts (1).

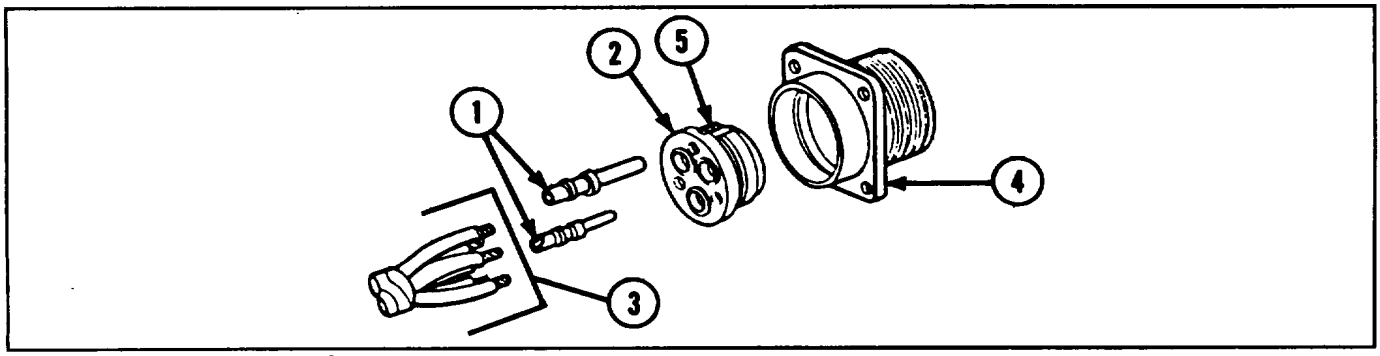
2 Insert cable leads into solder wells of socket contacts (1) and solder.

3 Push Insert (2) into shell assembly (3) from rear until seated. Groove (4) in Insert must be aligned with guide In shell assembly (3) to ensure proper fit.

4 Push socket contacts (1) into Insert (2) from rear until seated.



2-13. TYPICAL MALE-TYPE PANEL MOUNTING RECEPTACLE CONNECTOR.



DISASSEMBLY

1 Drive pin contacts (1) out through rear of Insert (2) with pin extractor.

2 Unsolder cable leads (3) from solder wells on pin contacts (1).

3 Slide Insert (2) out through rear of shell assembly (4).

REASSEMBLY

1 Strip cable Insulation equal to depth of solder wells of pin contacts (1).

2 Insert cable leads (3) into solder wells of pin contacts (1) and solder.

3 Push Insert (2) into shell assembly (4) from rear until seated. Groove (5) In Insert must be aligned with guide in shell assembly (4) to ensure proper fit.

4 Push pin contacts (1) into Insert (2) from rear until seated.

2-14. TYPICAL FEMALE-TYPE PANEL

DISASSEMBLY

1 Unscrew nut (1) from shell assembly (2) and slide back on cable (3).

2 Slide grommet (4) back on cable leads (5).

3 Drive socket contacts (6) out through front of insert (7) with pin extractor.

4 Unsolder lead from socket contacts (6).

5 Push insert (7) out through rear of shell assembly (2).

REASSEMBLY

1 Strip cable Insulation to depth of solder wells of socket contacts (1).

2 Slide nut (2) over cable (3).

3 Slide grommet (4) over cable leads (5).

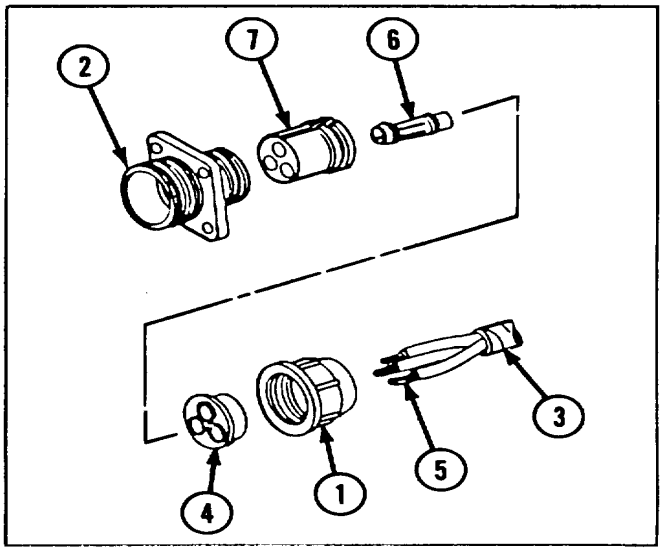
4 Insert cable leads (5) into solder wells of socket contacts (1) and solder.

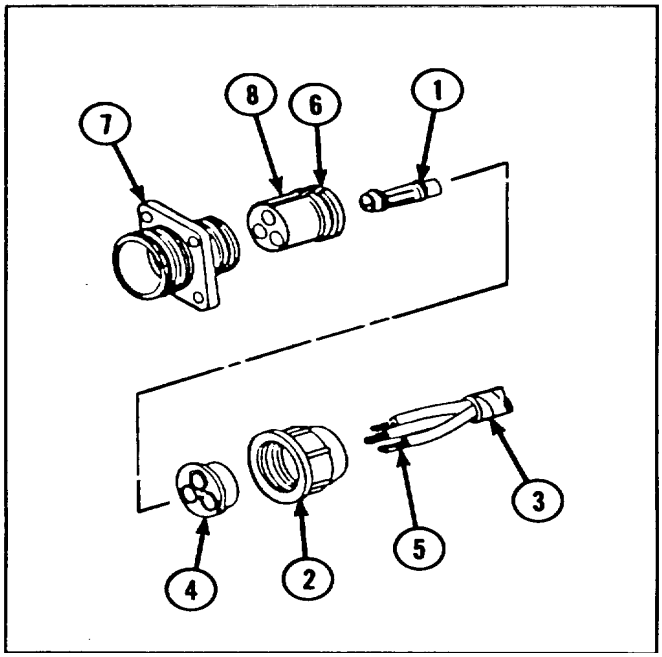
5 Push insert (6) into shell assembly (7) from rear until seated. Groove (8) in insert (6) must be aligned with guide in shell assembly (7) to ensure proper fit.

6 Push socket contacts (1) into Insert (6) from rear until seated.

7 Push grommet (4) down cable leads (5) and over solder wells of socket contacts (1).

8 Screw nut (2) onto shell assembly (7).





2-15. TYPICAL MALE-TYPE PANEL MOUNTING RECEPTACLE CONNECTOR.

DISASSEMBLY

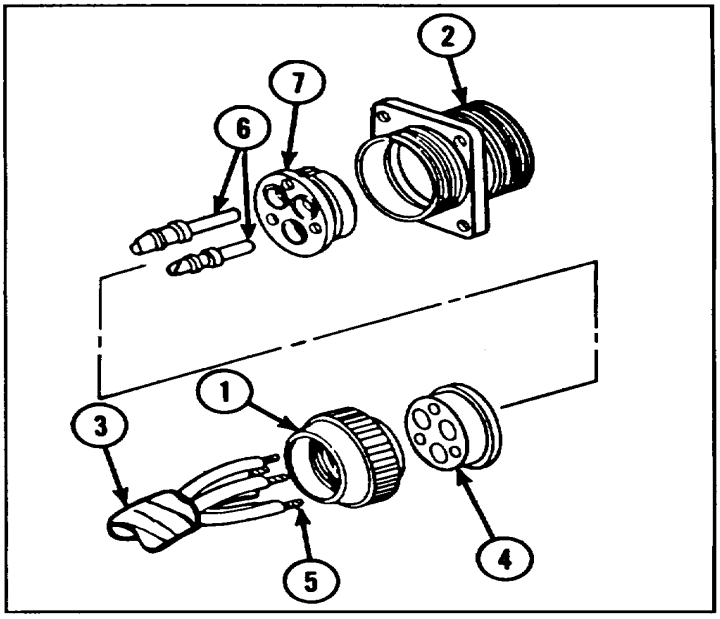
1 Unscrew nut (1) from shell assembly (2) and slide back on cable (3).

2 Push grommet (4) back on cable leads (5).

3 Drive pin contacts (6) out through rear of insert (7) with pin extractor.

4 Push insert (7) out through rear of shell assembly (2).

5 Unsolder cable leads (5) from pin contacts (6).



REASSEMBLY

1 Strip cable insulation equal to depth of solder wells of pin contacts (1).

2 Slide nut (2) onto cable (3).

3 Slide grommet (4) over cable leads (5).

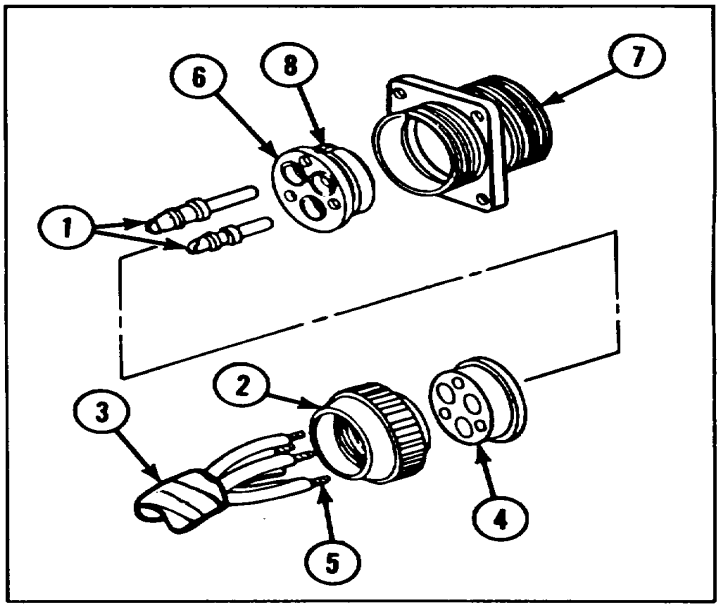
4 Insert cable leads (5) into solder wells of pin contacts (1) and solder.

5 Push insert (6) into shell assembly (7) from rear until seated. Groove (8) in Insert (6) must be aligned with guide in shell assembly (7) to ensure proper fit.

6 Push pin contacts (1) into Insert (6) from rear until seated.

7 Push grommet (4) down cable leads (5) and over solder wells of pin contacts (1).

8 Screw nut (2) onto shell assembly (7).



2-16. TYPICAL FEMALE-TYPE PLUG CONNECTOR

DISASSEMBLY

1 Unscrew nut (1) from shell assembly (2) and slide back on cable (3).

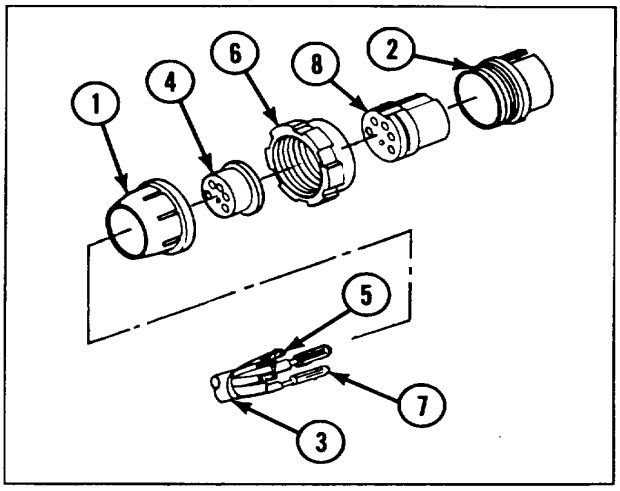
2 Slide grommet (4) back on cable leads (5).

3 Slide coupling (6) off shell assembly (2).

4 Drive socket contacts (7) out through rear of insert (8) with pin extractor.

5 Push insert (8) out through rear of shell assembly (2).

6 Unsolder cable leads (5) from socket contacts (7).



REASSEMBLY

1 Strip cable insulation equal to depth of solder wells of socket contacts (1).

2 Slide nut (2) over cable (3).

3 Slide grommet (4) over cable leads (5).

4 Insert cable leads (5) into solder wells of socket contacts (1) and solder.

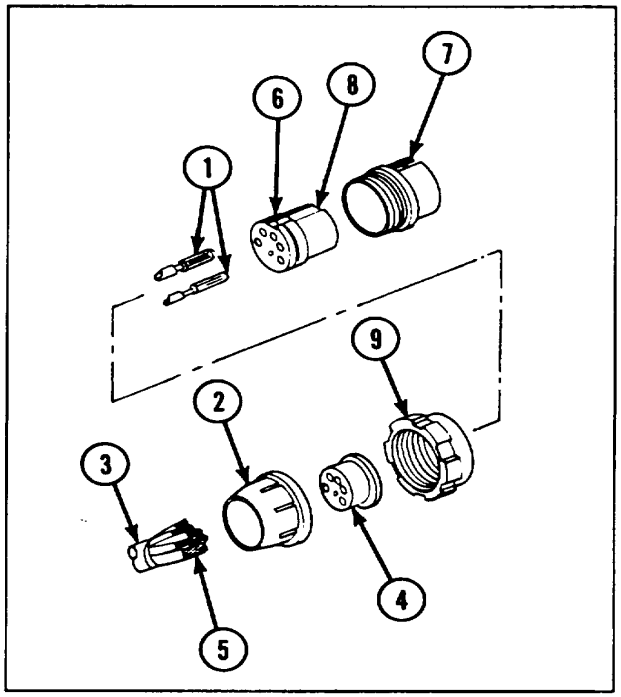
5 Push insert (6) into shell assembly (7) from rear until seated. Groove (8) in insert (6) must be aligned with guide in shell assembly (7) to ensure proper fit.

6 Push socket contacts (1) into insert (6) from rear until seated.

7 Slide coupling (9) onto shell assembly (7).

8 Push grommet (4) down cable leads (5) and over solder wells of socket contacts (1).

9 Screw nut (2) onto shell assembly (7).



2-17. TYPICAL MALE-TYPE PLUG CONNECTOR

DISASSEMBLY

1 Unscrew nut (1) from shell assembly (2) and slide back on cable (3).

2 Slide grommet (4) back on cable leads (5).

3 Slide coupling (6) off shell assembly (2).

4 Drive pin contacts (7) out through rear of insert (8) with pin extractor.

5 Push insert (8) out through rear of shell assembly (2).

6 Unsolder cable leads (5) from pin contacts (7).

REASSEMBLY

1 Strip cable of insulation equal to depth of solder wells of pin contacts (1).

2 Slide nut (2) over cable (3).

3 Slide grommet (4) over cable leads (5).

4 Insert cable leads (5) into solder wells of pin contacts (1) and solder.

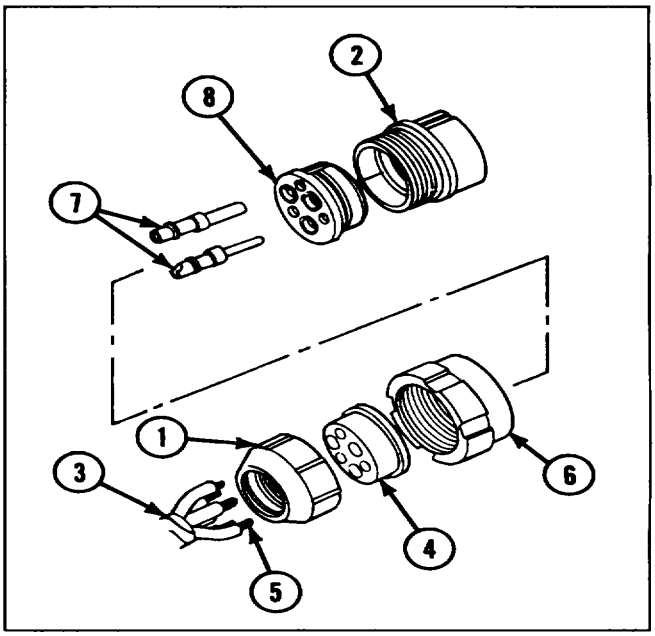
5 Push insert (6) into shell assembly (7) from rear until seated. Groove (8) in insert (6) must be aligned with guide in shell assembly (7) to ensure proper fit.

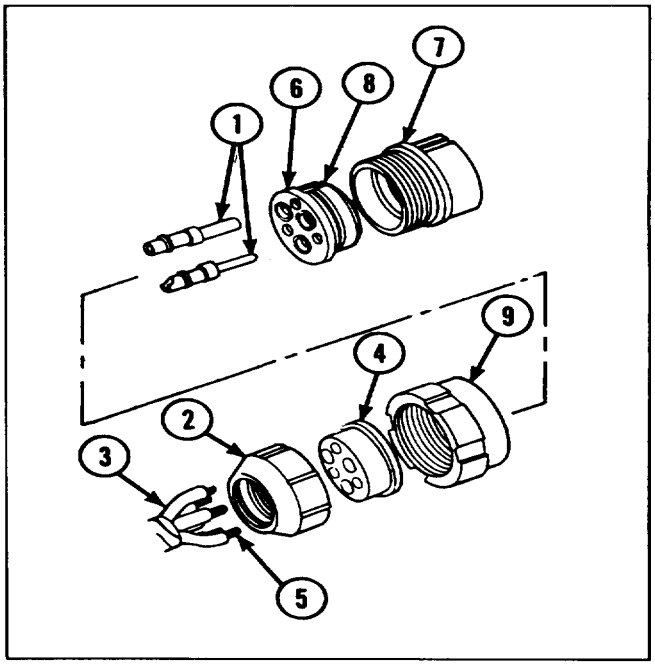
6 Push pin contacts (1) into insert (6) from rear until seated.

7 Slide coupling (9) onto shell assembly (7).

8 Push grommet (4) down cable leads (5) and over solder wells of pin contacts (1).

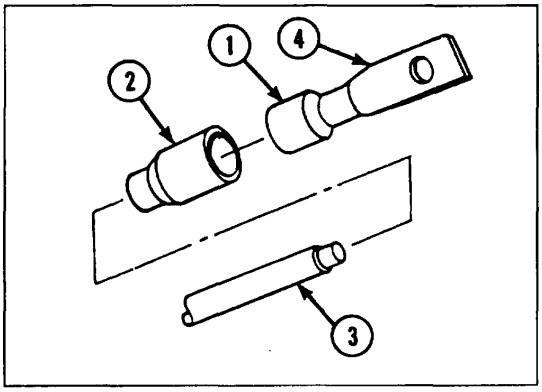
9 Screw nut (2) onto shell assembly (7).





2-18. REPLACING CABLE TERMINALS AND TERMINALS AND SHELL CONNECTORS.

CABLE TERMINAL CONNECTORS



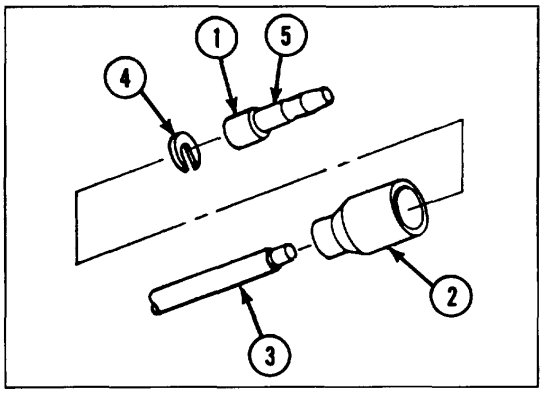
1 Strip cable insulation equal to depth of terminal well (1).

2 Slide insulator (2) over cable (3).

3 Insert cable (3) into terminal well (1) and crimp.

4 Slide insulator (2) over crimped end of terminal (4).

MALE CABLE SHELL CONNECTOR



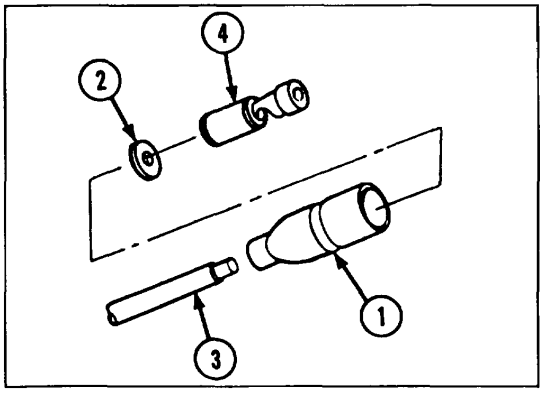
1 Strip cable insulation equal to depth of ferrule well (1).

2 Slide shell assembly (2) over cable (3).

3 Insert cable (3) into ferrule well (1) and crimp.

4 Place C-washer (4) over cable (3) at crimped junction and slide shell assembly (2) over C-washer (4) and ferrule (5).

FEMALE CABLE SHELL CONNECTOR (WITH WASHER)



1 Strip cable insulation approximately 0.125 in. (0.318 cm).

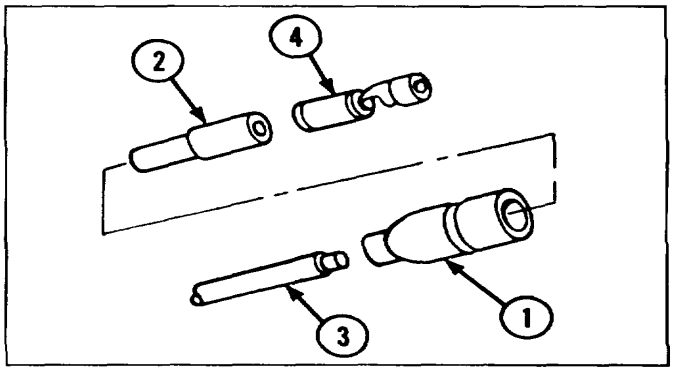
2 Slide shell assembly (1) and washer (2) over cable (3).

3 Place cable (3) in cylindrical end of terminal (4) and crimp.

4 Slide shell assembly (1) and washer (2) over terminal (4).

2-18. REPLACING CABLE TERMINALS AND SHELL CONNECTORS (CONT)

FEMALE CABLE SHELL CONNECTOR (WITH SLEEVE)



1 Strip cable insulation approximately 0.125 in. (0.318 cm).

2 Slide shell assembly (1) and sleeve (2) over cable (3).

3 Place cable (3) in cylindrical end of terminal (4) and crimp.

4 Slide shell assembly (1) and sleeve (2) over terminal (4).

SECTION V. DIRECT SUPPORT GENERAL MAINTENANCE PROCEDURES

2-19. GENERAL. This section contains general repair methods and cleaning procedures. Special repair and cleaning procedures are provided, as required, in the individual maintenance instructions.

2-20. REPAIR METHODS.

1 Complete disassembly is not always necessary to make a repair. Exercise good judgment to keep disassembly and assembly to a minimum.

2 Repair or replace unserviceable parts and hardware. Always replace performed packings, gaskets, seals, and cotter pins with new parts.

3 Remove burrs with a stone or file. Remove burrs on closely fitted mating surfaces by lapping the surfaces with abrasive grade compound (item 20, appx B).

4 Remove corrosion or rust with sandblasting, vapor blast cleaning, or crocus cloth (item 8, appx B). Use the method that will not damage the surface being cleaned. Crocus cloth should be used to remove corrosion and rust from polished surfaces. Make sure that critical dimensions are not changed when using crocus cloth.

5 Repair damaged threads with a thread chaser, or by chasing in a lathe or die.

6 When welding is authorized, procedures in TM 9-237 must be followed. Welds must be inspected for cracks.

7 Bearings should be inspected and maintained per TM 9-214.

8 Some components of the Ml10 vehicle require special repair or disposition. Table 2-2 lists the components needing special handling and the action to be taken:

Table 2-2. ITEMS FOR SPECIAL REPAIR OR HANDLING

COMPONENT NAME	SPECIAL REPAIR/HANDLING
Engine	For repair, refer to TM 9-2815-202-34.
Engine Coolant Radiator	For limited repair, refer to TM 750-254.
Fire Extinguisher	Recharge fire extinguisher.
Generator Cooling Air Tube Fan	For repair, refer to TM 9-2920-224-35.
Left Hand Final Drive Assembly	For repair, refer to TM 9-2520-234-35.
Personnel Vehicular Heater Assembly	For repair, refer to TM 9-2540-205-24&P.
Right Hand Final Drive Assembly	For repair, refer to TM 9-2520-234-35.
Spade and Related Parts	For disposition and repair, notify Depot maintenance.
Storage Battery	For disposition and limited repair, refer to TM 9-6140-200-14.
Transmission	For repair, refer to TM 9-2520-234-35.
Vehicular Drive	For disposition and repair, notify Depot maintenance.

2-21. TORQUE VALUES.

1 Follow torque values given throughout this manual. When no torque value is given, follow the torque limits guide, provided in appendix D of this manual, to prevent damaged parts.

2 The guide is based on using clean, dry threads. Reduce original torque requirements by amount specified under the following conditions:

a. Ten percent when engine oil is used as a lubricant.

b. Twenty percent when new screws are used.

c. Thirty percent when threading screws into aluminum, unless inserts are used.

2-22. CLEANING.

1 Wire brush metal parts to remove rust and corrosion.

WARNING

Solvent vapors are toxic. Do not use solvent in a confined space. Avoid long periods of breathing solvent vapors and/or contact with skin.

2 Clean metal parts with dry cleaning solvent (item 31, appx B). Metal or fiber brushes may be used to apply cleaning solvent and to remove softened or dissolved materials. Hand scraping with metal scrapers may be used to remove soft coatings or deposits.

2-22. CLEANING (CONT).

3 Soak very oily or greasy metal parts in a tank containing dry cleaning solvent (item 31, appx B). The time parts must be in solvent varies with the type and amount of material to be removed.

4 Do not use solvent to clean electrical insulation, wires, cables, or wiring harnesses. Clean these parts by wiping with a damp cloth. Use a mild soap solution if necessary. Dry Immediately with clean, dry cloths. Clean contact points with flint abrasive paper (item 22, appx B) and dust thoroughly after cleaning.

5 Do not use solvent to clean rubber parts. Clean rubber parts by washing with mild solution of soap and water.

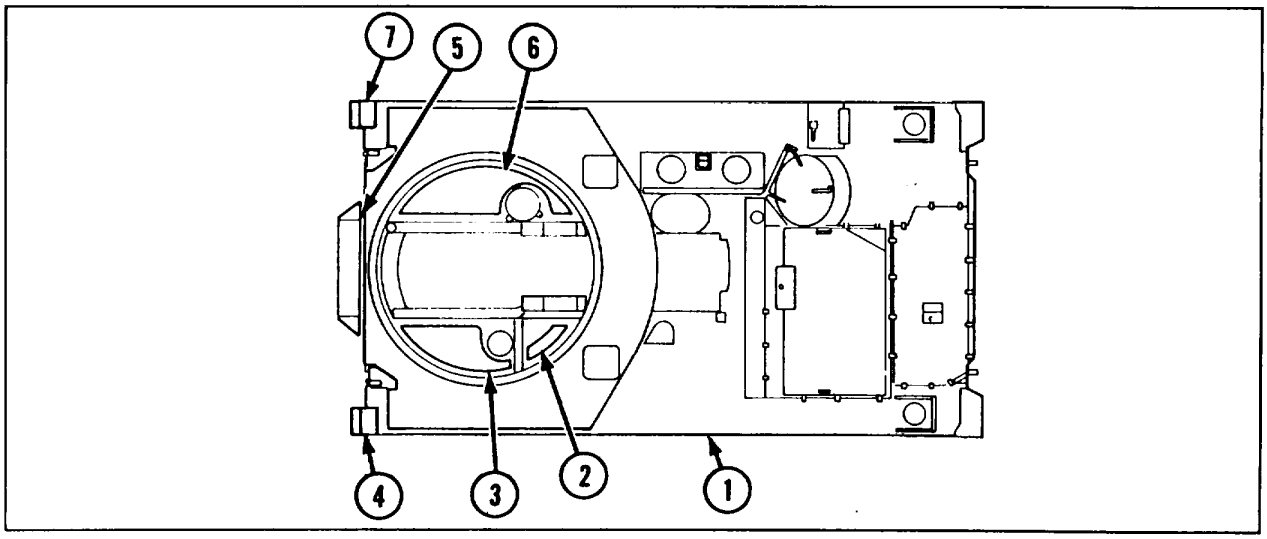
6 Dry parts by blowing with low-pressure compressed air or wiping with clean lint-free cloths (item 9, appx B).

7 Bearings should be cleaned according to procedures in TM 9-214.

8 Paint metal surfaces after repair as required. Sand and paint damaged areas. Apply one coat of rust inhibitor primer (item 23, appx B). Allow primer to dry for 30 minutes minimum before applying enamel. Paint with enamel to match existing color; use white enamel (item 14, appx B) or olive drab enamel (item 13, appx B).

2-23. LUBRICATION. Keep a light coat of lubricating oil (item 21, appx B) on parts during repair procedures to prevent rusting. Lubricate parts during repair and assembly as required by TM 9- 2350-304-20-1.

2-24. PAINTING INSTRUCTIONS. Complete painting is authorized for and done by general support maintenance personnel or higher. Spot painting and restenciling vehicle markings is done by unit maintenance personnel. Instructions for materiel preparation, priming, and finish are given in TM 43-0139.



2-25. NONSKID AREAS. Nonslip coating compound (item 10, appx B) will be used to coat deck areas where personnel walk. The seven areas to be coated with nonslip paint are shown in the illustration above.

2-26. TOUCHUP AND RECOATING.

WARNING

- Usable CARC mixtures are considered hazardous waste and will require disposal in accordance with Federal, state, DoD, DA, and local installation waste regulations. Consult the installation environmental office for proper disposal guidance. Mixed CARC is extremely flammable - use only in well ventilated areas, keep away from open flames, heat, sparks, and other ignition sources.

- For brush/roller painting in confined spaces, an airline respirator is required, unless an air sampling shows exposure to be below standards. If the air sampling is below standards, either chemical cartridge or airline respirators are required.

- Spot painter applying CARC paint by brush or roller must wear clothing and gloves affording full coverage.

- Do not use water, alcohol, or amine-based solvents to thin or remove CARC paints. Use of these solvents with CARC paints can produce chemical reactions resulting in nausea, disease, burns, or severe illness to personnel.

- Do not use paint solvents to remove paint/coating from your skin.

- Mix paint/coating in a well-ventilated mixing room or spraying area away from open flames. Personnel mixing paint/coating should wear eye protection.

- Use paint/coating with adequate ventilation.

- Personnel grinding or sanding on painted equipment should use high efficiency air purifying respirators.

- Do not weld or cut CARC-coated metal. Substances causing skin or respiratory irritation may be released. Before applying heat, sand or grind paint down to bare metal on area four inches to either side of the area you plan to weld or cut.

When touching up damaged areas, the procedure should be as similar to the original method of finishing as possible; a clean surface Is imperative. Where general disintegration of the surface is evident, or the undersurface is corroded, the coating must be stripped clean from the part. Corrosion must be removed or neutralized by mechanical or chemical treatment, or both, and the surface metal must be pretreated, primed, and then topcoated.

2-27. RESTENCILING VEHICLE MARKINGS.

Refer to TM 9-2350-304-20-1.

2-28. PAINTING RETRACT MARK.

Refer to TM 9-2350-304-20-1.

2-29. PAINTING LOAD MARKS.

Refer to TM 9-2350-304-20-1.

Section VI. DIRECT SUPPORT MAINTENANCE PROCEDURES

2-30. MAINTENANCE OF ENGINE AND RELATED PARTS, AND TRANSMISSION ASSEMBLY.

This task covers: a. *Removal* b. *Inspection/Repair* c. *Installation*

INITIAL SETUP

Tools and Special Tools
- Automotive maintenance and repair shop equipment; field maintenance, basic, less power (SC 4910-95-A31)
  - Plier wire twister
- Engine sling (item 26, appx E)
- Hoist
- Transmission lifting bracket (item 2, appx E)
- Transmission sling (item 25, appx E)
- Waste oil drain unit (Figure 86, item 8-TM 9-2815-202-24P)

Materials/Parts
- Cotter pin
- Flywheel housing gasket
- Lockwasher (14)
- Lockwasher (6)
- Lockwasher (4)
- Lockwasher (2)
- Lockwire (item 38, appx B)
- Performed packing
- Self-locking bolt (12)

References
- TM 9-2350-304-20-1
- TM 9-2350-304-24P-1
- TM 9-2520-234-35
- TM 9-2815-202-24P

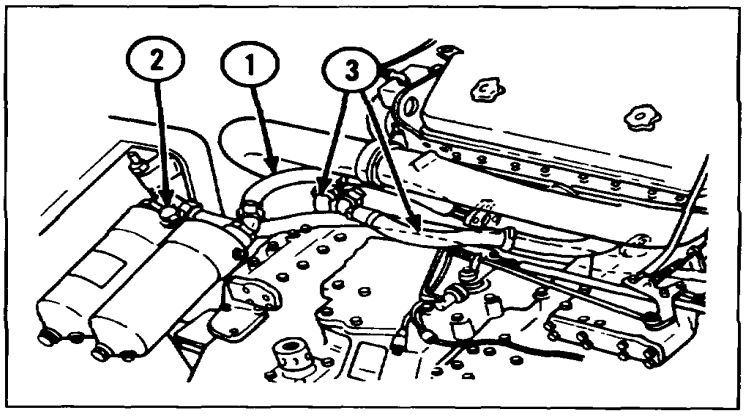
Equipment Conditions
- Powerplant removed (TM 9-2350-304-20-1)

REMOVAL

1 Ensure powerplant is properly supported on blocks.

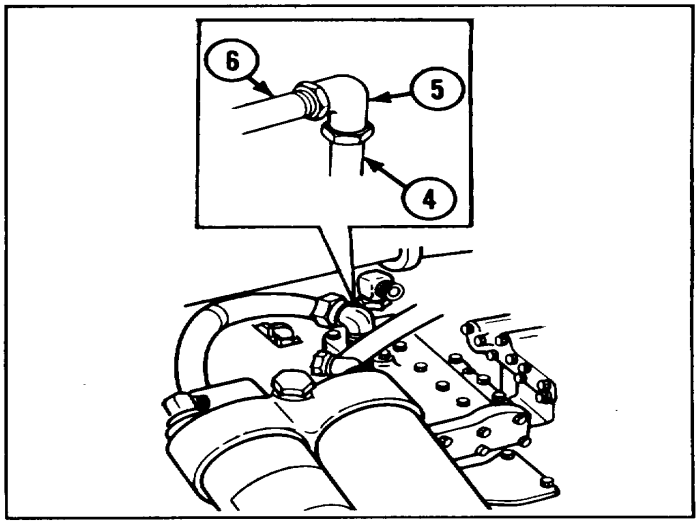
2 Disconnect oil filter cooler hose assembly (1) and engine oil filter hose assembly (2).

3 Disconnect two transmission-to-oil cooler hose assemblies (3).

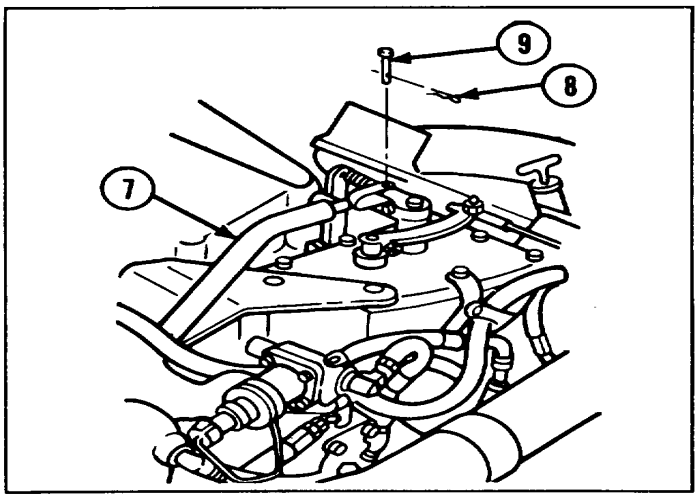


4 Disconnect transfer case drain hose assembly (4).

5 Remove pipe-to-tube elbow (5) and pipe bushing (6).



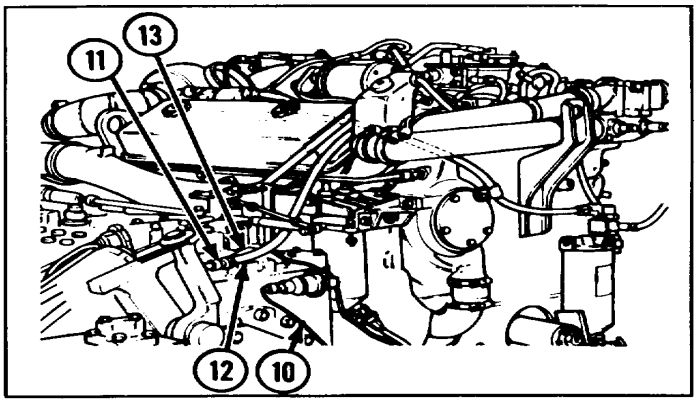
6 Disconnect governor throttle control rod (7) by removing cotter pin (8) and straight pin (9).



7 Disconnect transmission oil pressure electrical lead (10).

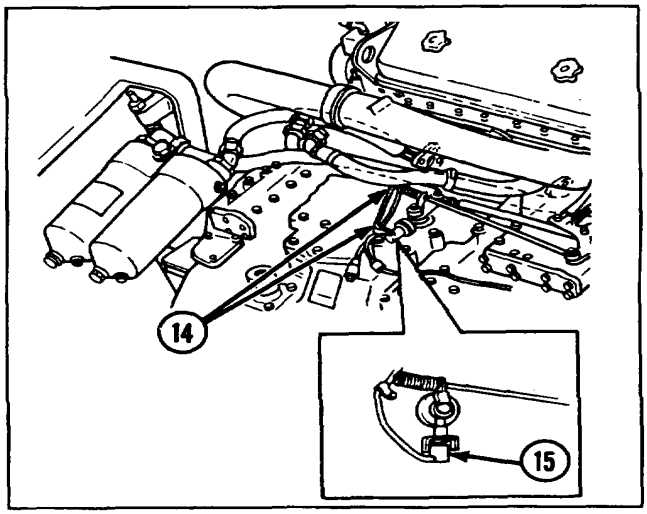
8 Remove two loop damps (11) securing tachometer cable (12) and electrical lead (13).

9 Pull tachometer cable (12) and electrical lead (13) free of transmission and place on diesel engine.

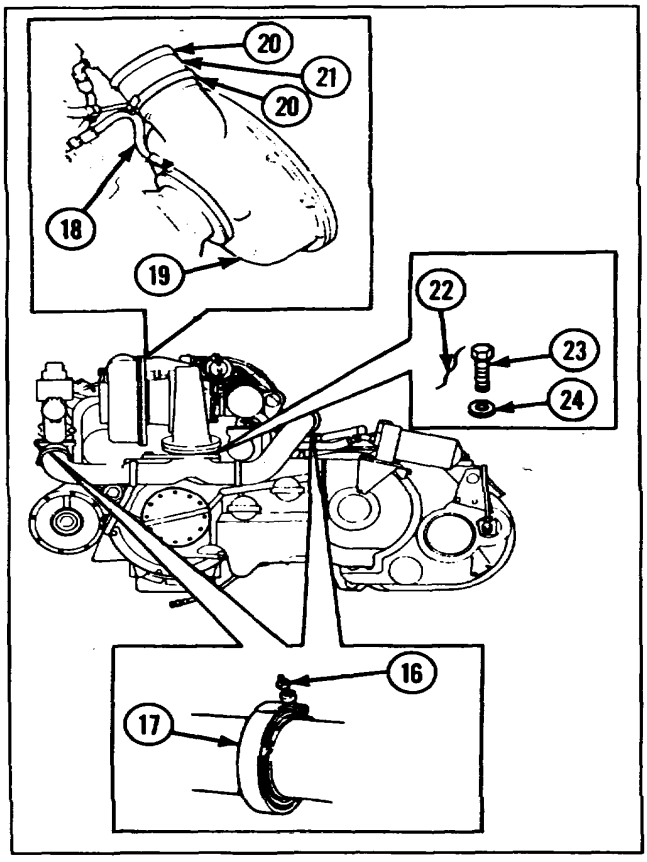


2-30. MAINTENANCE OF ENGINE AND RELATED PARTS, AND TRANSMISSION ASSEMBLY (CONT).

REMOVAL (CONT)



10 Disconnect two electrical leads (14) from neutral position sensitive switch (15).



11 Loosen two nuts (16) and remove two exhaust pipe clamps (17).

NOTE

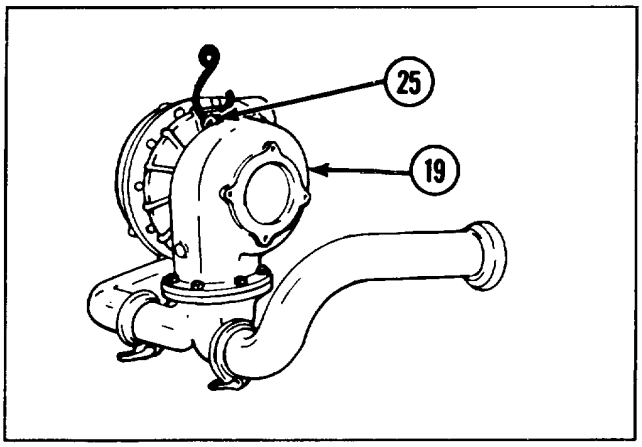
Steps 12 and 13 are written and illustrated for diesel engine model 7083-7398 only.

12 Disconnect air regulator hose assembly (18) from turbocharger (19).

13 Disconnect two air regulator hose clamps (20) from turbocharger (19). Remove two air regulator hose clamps and hose (21).

14 Remove lockwire (22), four screws (23), and four washers (24) securing turbocharger (19) to transfer assembly.

15 Attach hoist to turbocharger lifting eye (25). Lift turbocharger (19) from diesel engine.

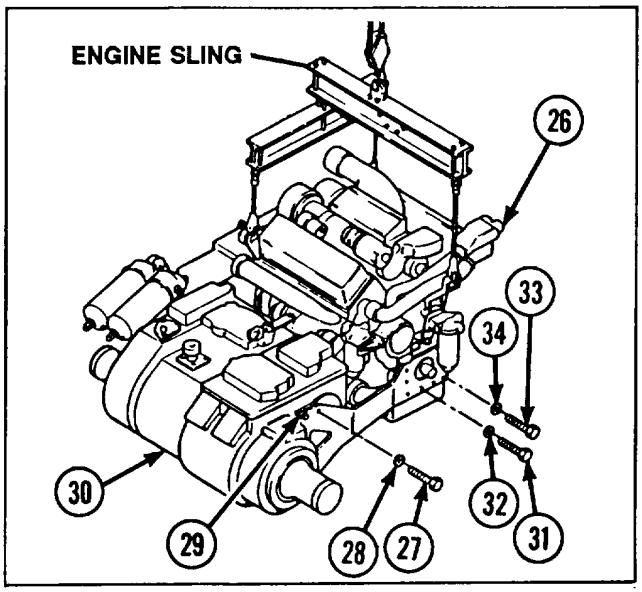


16 Attach engine sling to diesel engine (26). Attach hoist to engine sling. Remove slack from sling cables.

NOTE

If transmission is to be moved, attach transmission lifting bracket. Attach transmission sling to transmission lifting bracket. Attach second hoist to sling and remove slack.

17 Remove six hexagon head capscrews (27) and six lockwashers (28) securing engine-to-transmission support (29) to transmission assembly (30).

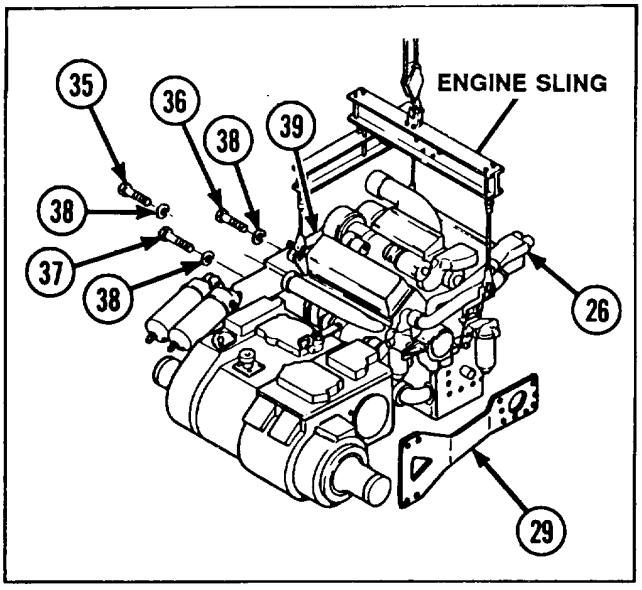


NOTE

Tag all capscrews in steps 18 and 19 to ensure proper installation.

18 Remove two 1-1/8-in. hexagon head capscrews (31), two lockwashers (32), four 4-in. hexagon head capscrews (33), four lockwashers (34), and engine-to-transmission support (29) from diesel engine (26).

19 Remove nine 1-1/2-in. hexagon head capscrews (35), three 2-1/4-in. hexagon head capscrews (36), two 3-1/2-in. capscrews (37), and 14 lockwashers (38) securing transfer assembly (39) to diesel engine (26).

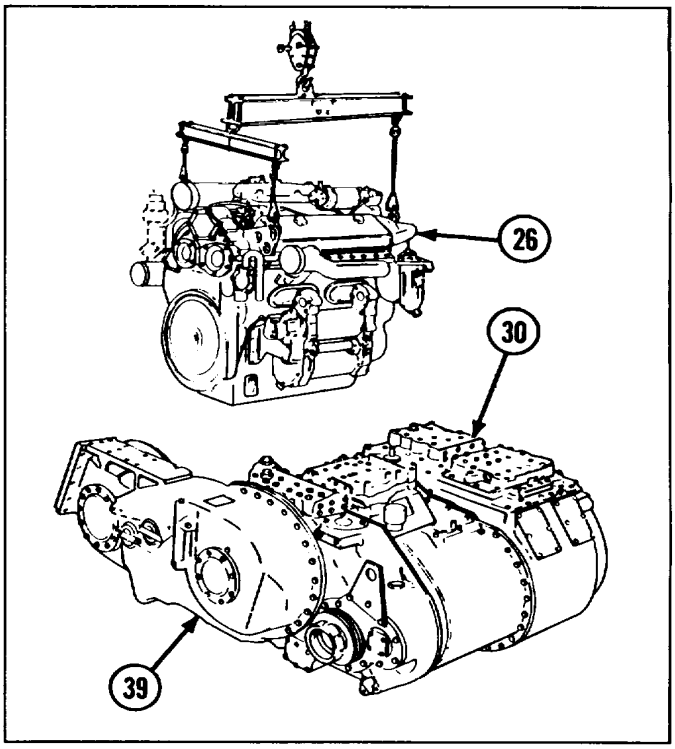


2-30. AINTENANCE OF ENGINE AND RELATED PARTS, AND TRANSMISSION ASSEMBLY (CONT).

REMOVAL (CONT)

20 Carefully swing and lift diesel engine (26) from transmission assembly (30) and transfer assembly (39).

21 Place diesel engine on suitable supports for removal of accessories, using waste oil drain unit per TM 9-2815-202-24P.

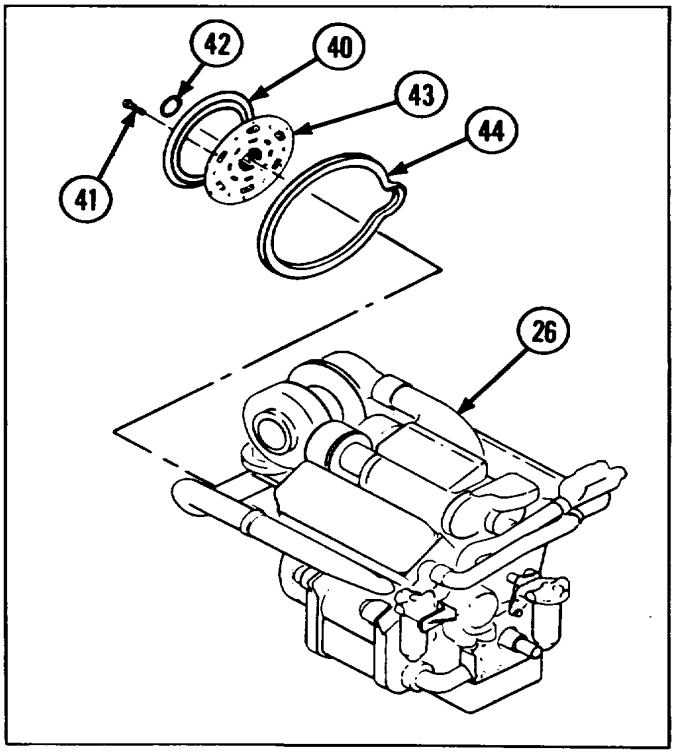


NOTE

Retainer is not an authorized repair part. Use care to ensure retainer is not lost or damaged during maintenance of diesel engine.

22 Remove retainer (40), 12 self-locking bolts (41), preformed packing (42), and flexible shaft coupling (43) from diesel engine (26).

23 Remove flywheel housing gasket (44) from diesel engine (26).



NOTE

If transmission coupling shaft was removed with diesel engine, remove shaft from engine and install in transfer assembly.

24 Remove transfer assembly from transmission assembly, refer to page 2-67.

INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 If diesel engine is damaged, refer to TM 9-2815-202-24P.

3 For repair of transmission, refer to TM 9-2520-234-35.

4 If transmission is damaged beyond repair, replace entire transmission and container.

5 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1) which do not meet inspection criteria.

INSTALLATION

NOTE

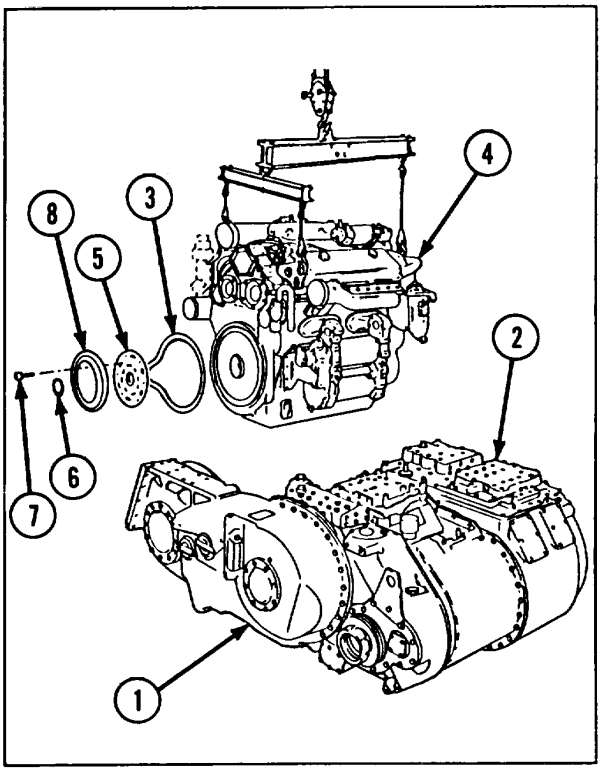
When installing new engine, use exhaust pipes from old engine.

1 Install transfer assembly (1) on transmsion assembly (2), refer to page 2-67.

2 Install new flywheel housing gasket (3) on diesel engine (4).

3 Install flexible shaft coupling (5), new preformed packing (6), 12 new self-locking bolts (7), and retainer (8) on diesel engine (4).

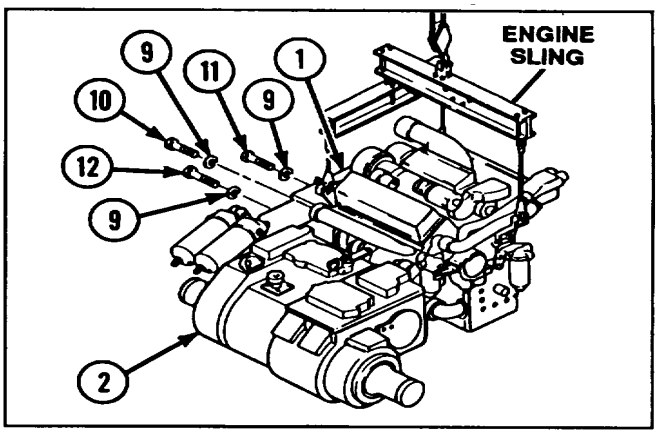
4 Lift and carefully swing engine from support. Install diesel engine (4) to transmission and transfer assemblies (2 and 1).



2-30. MAINTENANCE OF ENGINE AND RELATED PARTS AND TRANSMISSION ASSEMBLY (CONT).

INSTALLATION (CONT)

5 Install 14 new lockwashers (9), nine 1-1/2-in. hexagon head capscrews (10), three 2-1/4-in. hexagon head capscrews (11), and two 3-1/2-in. hexagon head capscrews (12) securing diesel engine (2) to transfer assembly (1).

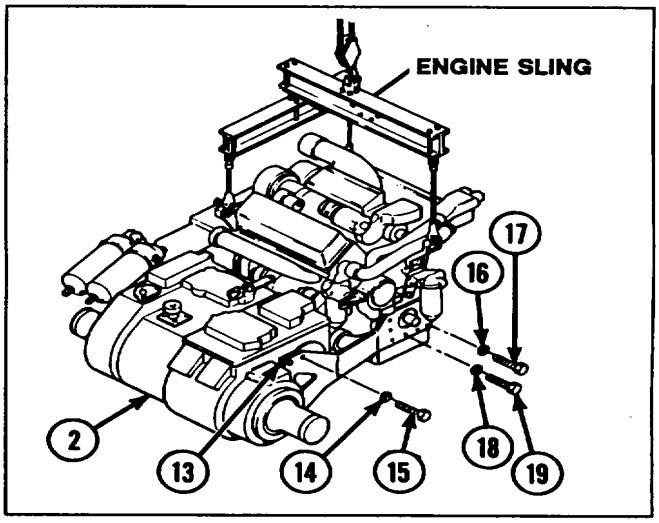


6 Install engine-to-transmission support (13) on transmission assembly (2) and secure with six new lockwashers (14) and six hexagon head capscrews (15).

7 Install four new lockwashers (16), four 4-in. hexagon head capscrews (17), two new lockwashers (18), and two 1-1/8-in. hexagon head capscrews (19) securing engine-to-transmission support (13) to diesel engine (4).

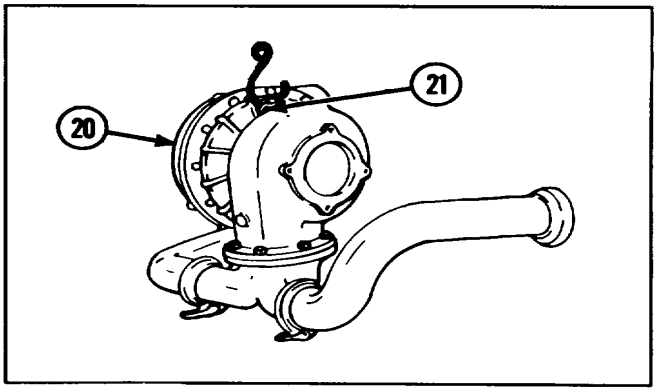
NOTE

If transmission was moved, remove transmission lifting bracket, transmission sling, and hoist.



8 Remove engine sling from diesel engine (2). Remove hoist from engine sling.

9 Using hoist, install turbocharger (20) to diesel engine. Remove hoist from turbocharger lifting eye (21).



10 Install four washers (22), four screws (23), and new lockwire (24) securing turbocharger (20) to transfer assembly.

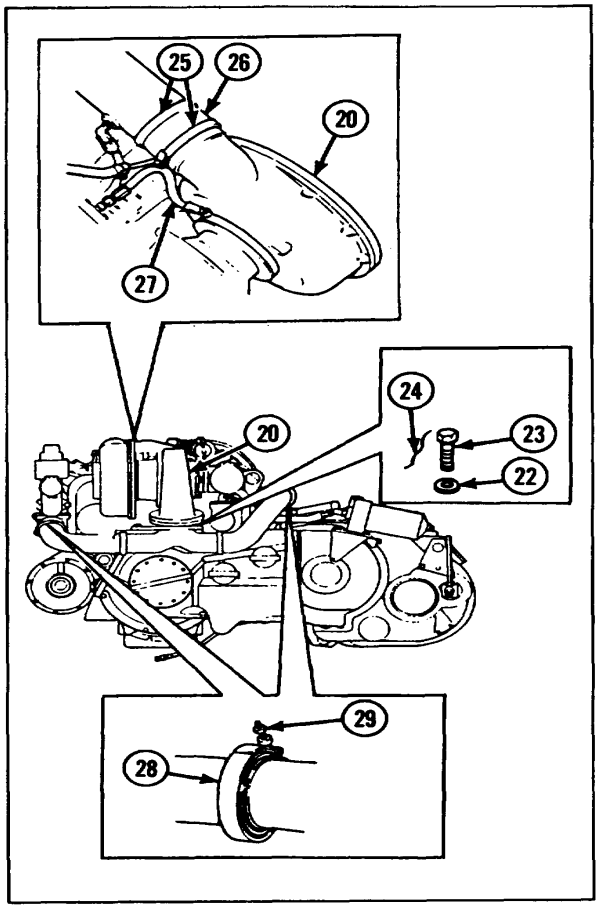
NOTE

Steps 11 and 12 are written for engine model 7083-7398 only.

11 Connect two air regular hose clamps (25) and hose (26) to turbocharger (20).

12 Connect air regular hose assembly (27) to turbocharger (20).

13 Install two exhaust pipe clamps (28) and tighten two nuts (29).

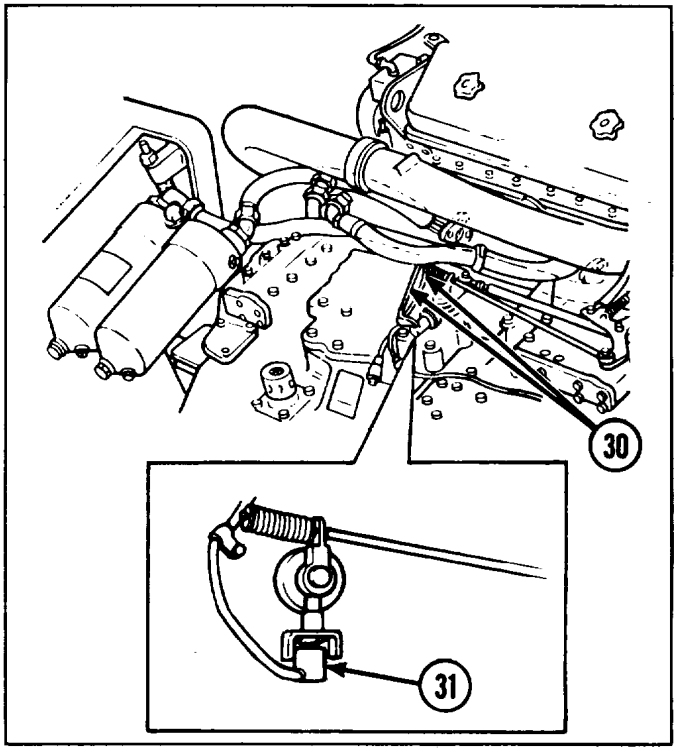


2-37

2-30. MAINTENANCE OF ENGINE AND RELALATED PARTS, AND TRANSMISSION ASSEMBLY (CONT).

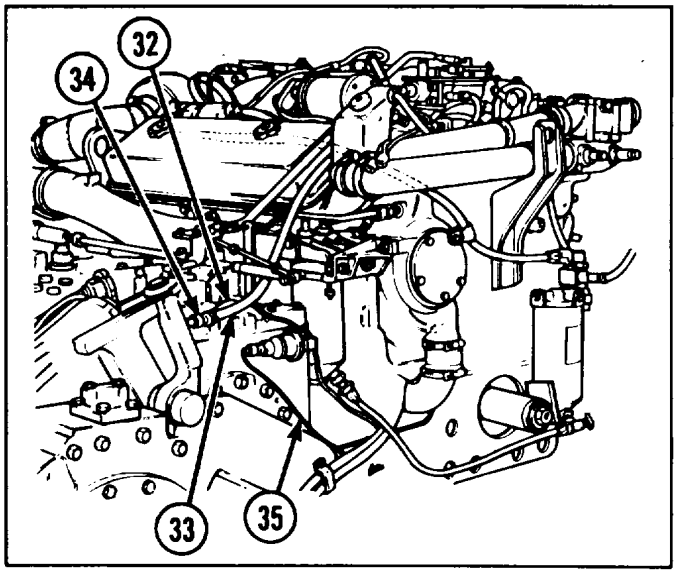
INSTALLATION (CONT)

14 Connect two electrical leads (30) to neutral position sensitive switch (31).

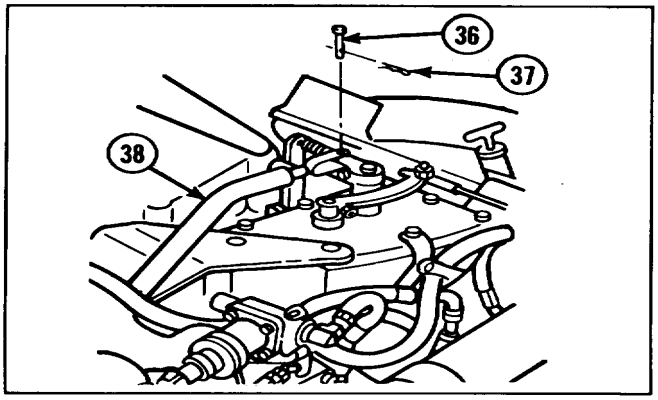


15 Install electrical lead (32) and tachometer cable (33), and secure with two clamps (34).

16 Connect transmission oil pressure transmitter electrical lead (35).

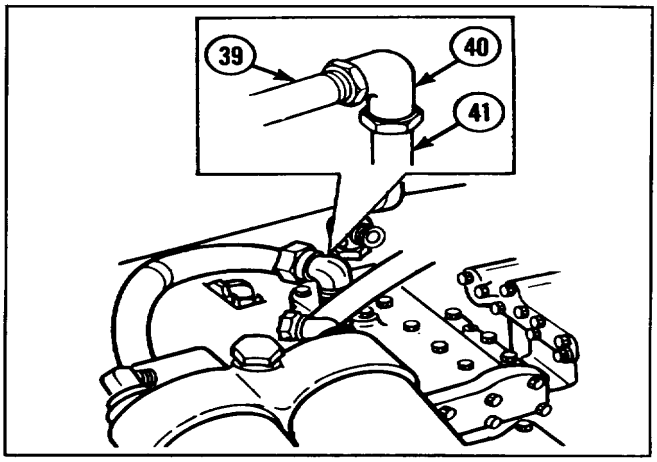


17 Install straight pin (36) and new cotter pin (37) securing governor throttle control rod (38).



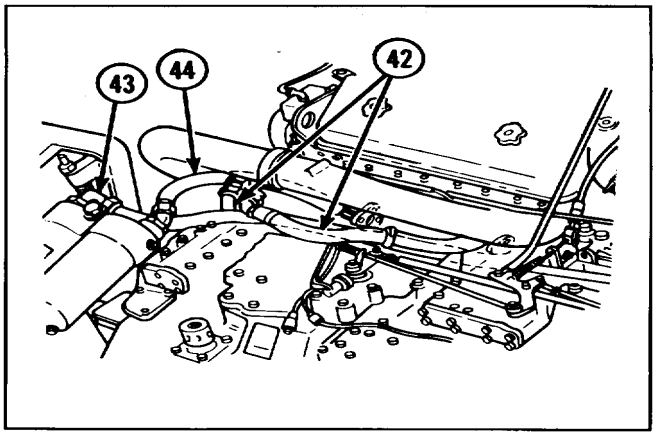
18 Install pipe bushing (39) and pipe-to-tube elbow (40).

19 Connect transfer case drain hose (41).



20 Connect two transmission-to-oil cooler hose assemblies (42).

21 Connect engine oil filter hose assembly (43) and oil filter cooler hose assembly (44).



2-31. MAINTENANCE OF AIR CLEANER CENTRIFUGAL FAN.

This task covers: a. *Disassembly* *b. Inspection/Repair* *c Reassembly*

INITIAL SETUP

Materials/Parts
Air cleaner blower parts kit
Lockwasher (4)
Lockwasher (11)
Lockwasher (1)
Preformed packing
Preformed packing
Self-locking nut
Spring pin

References
TM 9-2350-304-20-1
TM 9-2350-304-24P-1

Equipment Conditions
Air cleaner centrifugal fan removed (TM 9-2350-304-20-1)

DISASSEMBLY

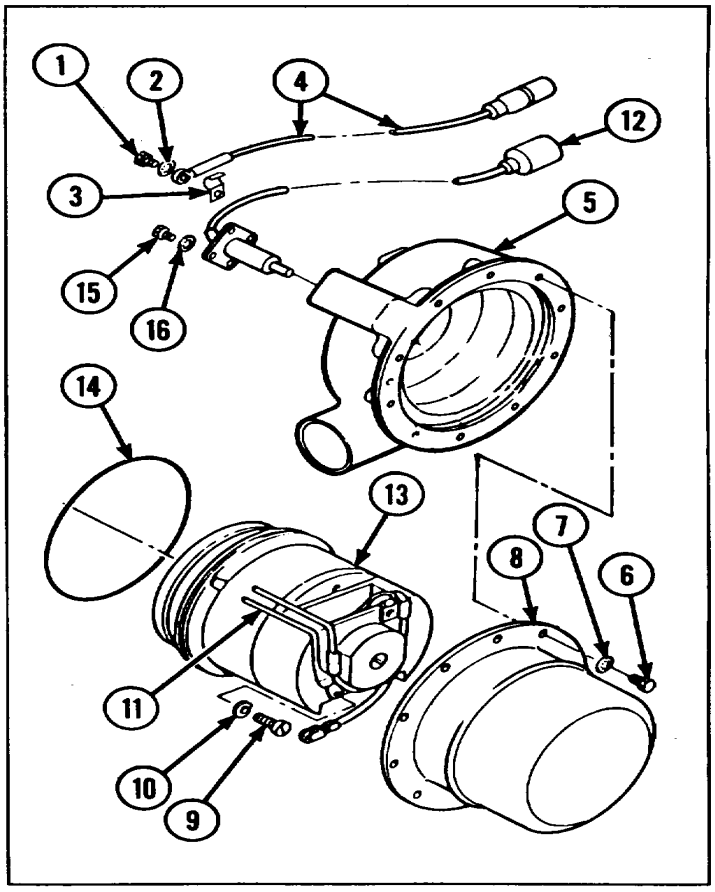
1 Remove machine screw (1), lockwasher (2), retaining strap (3), and electrical lead (4) from centrifugal blower motor housing (5).

2 Remove ten machine screws (6), ten lockwashers (7), and electric motor cover (8) from centrifugal blower motor housing (5).

3 Remove screw (9) and lockwasher (10) securing electrical lead (11) to rear of motor. Disconnect electrical lead and capacitor (12).

4 Pull direct current electric motor (13) from centrifugal blower motor housing (5). Remove preformed packing (14). Pull electrical leads (11 and 12) from groove under motor packing flange.

5 Remove four machine screws (15), four lockwashers (16), and lead and capacitor (12) from centrifugal blower motor housing (5).

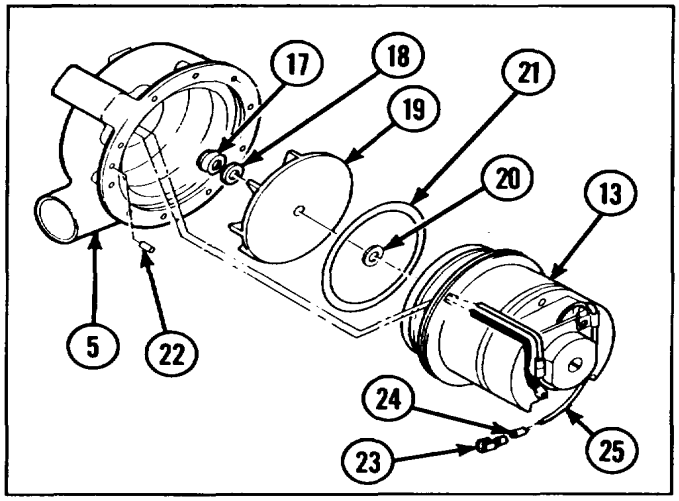


6 Remove self-locking nut (17), flat washer (18), fan impeller (19), and flat washer (20) from direct current electric motor (13).

7 Remove preformed packing (21) from direct current electric motor (13).

8 If damaged, remove spring pin (22) from centrifugal blower motor housing (5).

9 If damaged, remove terminal (23) and insulation sleeving (24) from electrical lead (25).



INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 If any kit component Is damaged, replace entire air cleaner blower parts kit.

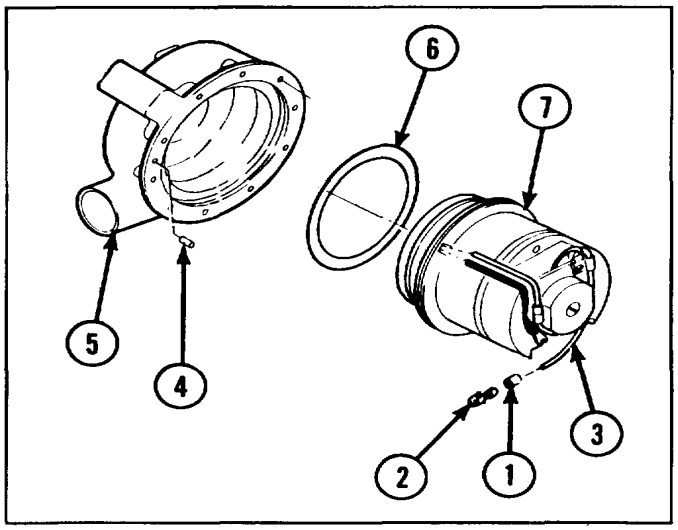
3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1) which do not meet inspection criteria.

REASSEMBLY

1 If removed, install new insulation sleeving (1) and terminal (2) on electrical lead (3).

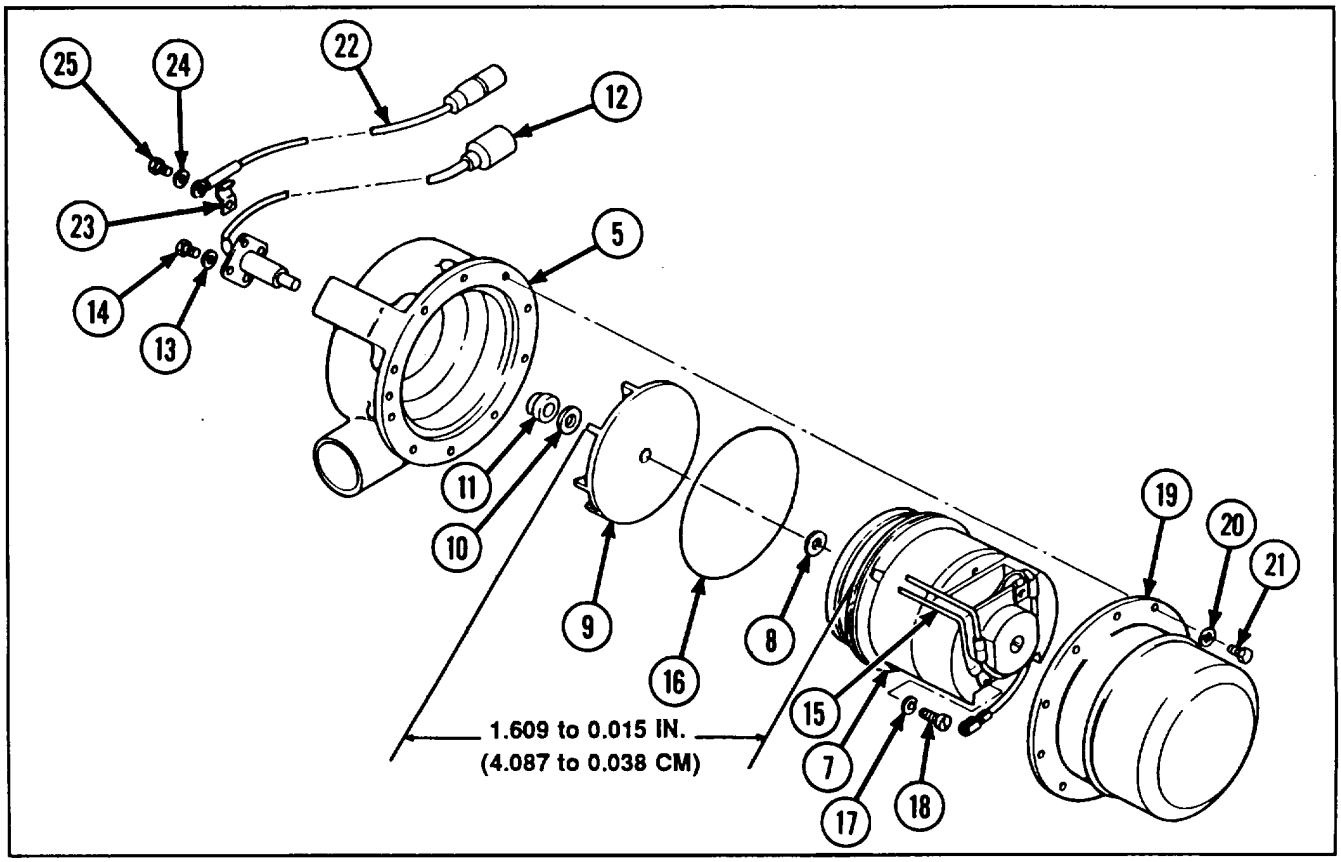
2 If removed, install new spring pin (4) in centrifugal blower motor housing (5).

3 Install new preformed packing (6) in groove on direct current electric motor (7).



2-31. MAINTENANCE OF AIR CLEANER CENTRIFUGAL FAN (CONT).

REASSEMBLY (CONT)



4 Install flat washer (8), fan impeller (9), flat washer (10), and new self-locking nut (11) to direct current electrical motor (7). Measure distance between forward edge of fan Impeller and forward edge of motor packing flange. Add or remove flat washers (8) until measurement is 1.594 to 1.609 in. (4.049 to 4.087 cm).

5 Install lead and capacitor (12) through centrifugal blower motor housing (5) with four new lockwashers (13) and four machine screws (14).

6 Insert leads (12 and 15) through groove under motor packing flange. Install new performed packing (16) to direct current electric motor (7). Install direct current electric motor (7) to centrifugal blower motor housing (5).

7 Secure electrical lead (15) to rear of motor with new lockwasher (17) and screw (18). Connect lead and capacitor (12) at connector.

8 Install electric motor cover (19), ten new lockwashers (20), and ten machine screws (21) to centrifugal blower motor housing (5).

9 Install electrical lead (22), retaining strap (23), new lockwasher (24), and machine screw (25) to centrifugal blower motor housing (5).

2-32. MAINTENANCE OF FABRIC FUEL CELL INSTALLATION AND FABRIC FUEL CELL FILLER BLOCKS.

This task covers:
a. *Fabric Fuel Cell Draining*
b. Removal
c. Cleaning
d. Inspection/Repair
e. Installation
f. Test

INITIAL SETUP

Tools and Special Tools
Automotive maintenance and repair shop equipment: field maintenance, basic, less power (SC 4910-95-A31)
- Hand pump
- Pressure gage, 0 to 10 psi (0 to 69 kPa)
- Sparkproof extension light
- Spray gun
- Torque wrench (0 to 300 in.-lb)

Materials/Parts
Adhesive silicone (item 4, appx B)
Cleaning compound (item 6, appx B)
Compressed air (90 to 100 psi)
Gasket (2)
Grease (item 19, appx B)
Liquid soap (item 30, appx B)
Lockwasher (18)
Lockwasher (40)
Masking tape (item 33, appx B)
Paint thinner (item 34, appx B)
PeRformed packing (2)
Rags (item 25, appx B)
Rubber hose (figure C-5, appx C)
Sealing compound (item 31, appx B)

References
TM 9-2350-304-20-1
TM 9-2350-304-24P-1

Equipment Conditions
Fan well deck removed (TM 9-2350-304-20-1)

General Safety Instructions

WARNING

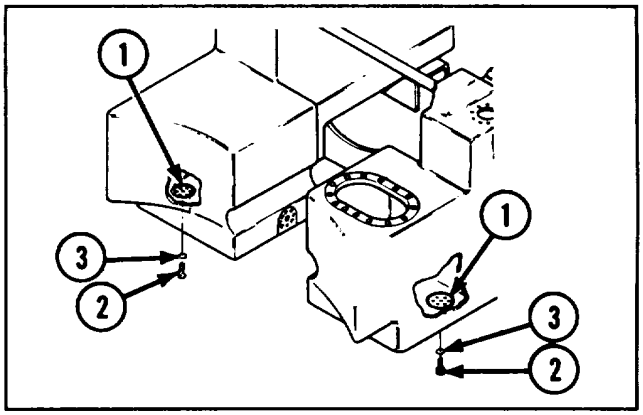
- Prolonged breathing of vapors can be fatal. Do not enter fuel cells until they have been thoroughly cleaned. If eyes or skin become irritated by diesel fuel, flush with water.
- Failure to reduce pressure to zero before removing cap may cause injury.
- Fuel cells that are not entirely free of fuel or fuel vapors must not be welded or exposed to heat, flames, or sparks. Welding or the use of power sanders, chisels, and chipping hammers shall be. preceded by removal of the fabric fuel cell and by thorough cleaning.

2-32. MAINTENANCE OF FABRIC FUEL CELL INSTALLATION AND FABRIC FUEL CELL FILLER BLOCKS (CONT).

FABRIC FUEL CELL DRAINING

1 Use hand pump to remove as much fuel as possible. Place suitable containers for fuel under two fuel cell drains (1) (fuel capacity is 260 gal. (984 l1)).

2 Remove two drain plugs (2) and two preformed packings (3) and drain fuel cell. Allow 24 hours for the fuel cell to drip, if possible.

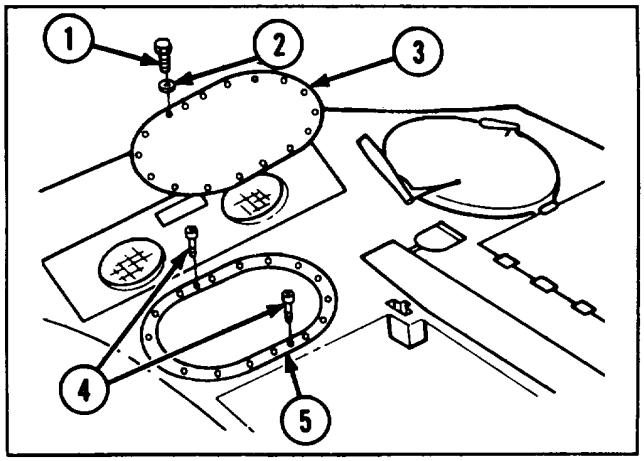


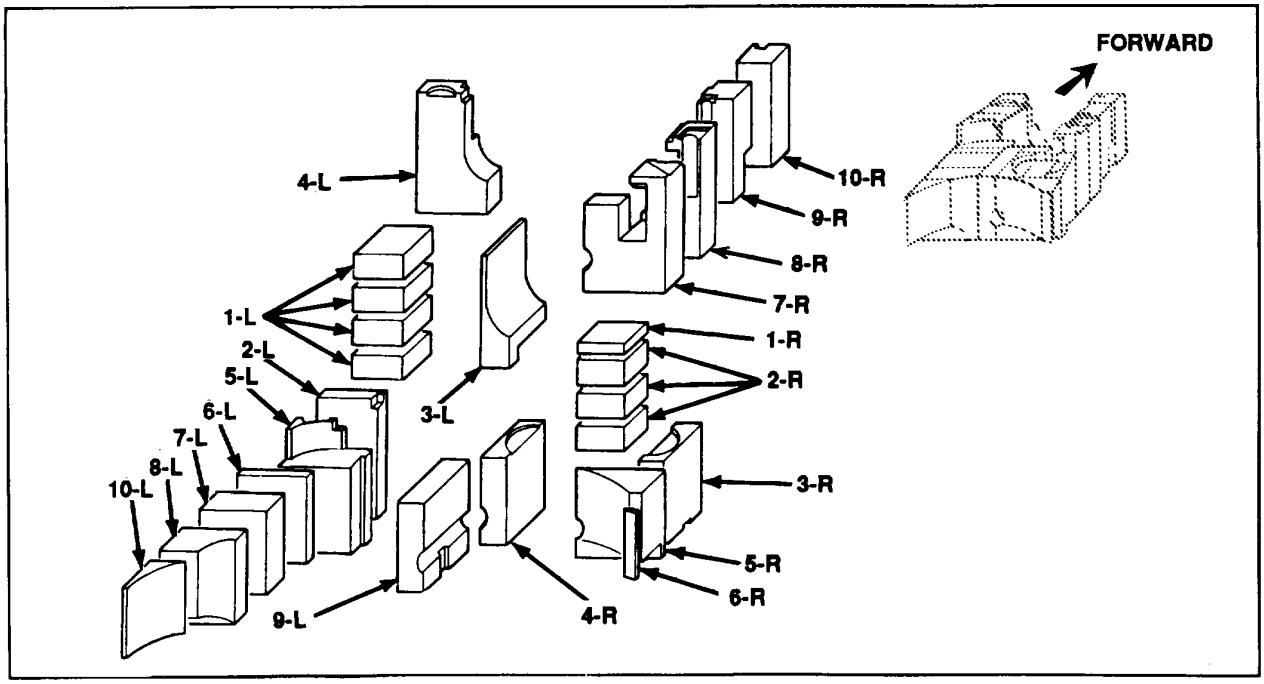
REMOVAL

NOTE
Steps 1 and 2 are written and illustrated for left fuel cell access cover but apply to both the left and right fuel cell access covers.

1 Remove 20 capscrews (1), 20 lockwashers (2), and left fuel cell access cover (3).

2 Remove two capscrews (4) and access cover gasket (5). Reinstall capscrews (4) and hand tighten.





WARNING

Prolonged breathing of fuel vapors can be fatal. If eyes or skin become irritated by diesel fuel, flush with water.

CAUTION

Filler blocks are saturated with diesel fuel. Running water must be available to flush eyes and sensitive skin areas that may be irritated by fuel. If possible, wear coveralls and protective covers on hands and arms.

NOTE

The fabric fuel cells are filled with 25 foam filler blocks shaped to fit one way inside the fuel compartments. The filler blocks may have painted manufacturer's numbers that should be disregarded. Tag and number each filler block as it is removed for easy identification.

3 Ensure fuel level transmitter and fuel filler neck and strainer element have been removed (TM 9-2350-304-20-1).

4 Provide suitable containers to hold filler blocks and catch dripping diesel fuel.

5 Start at right fabric fuel cell access opening. Remove and tag filler blocks in sequence 1-R thru 10-R as shown.

6 Start at left fabric fuel cell access opening. Remove and tag filler blocks in sequence 1-L thru 10-L as shown.

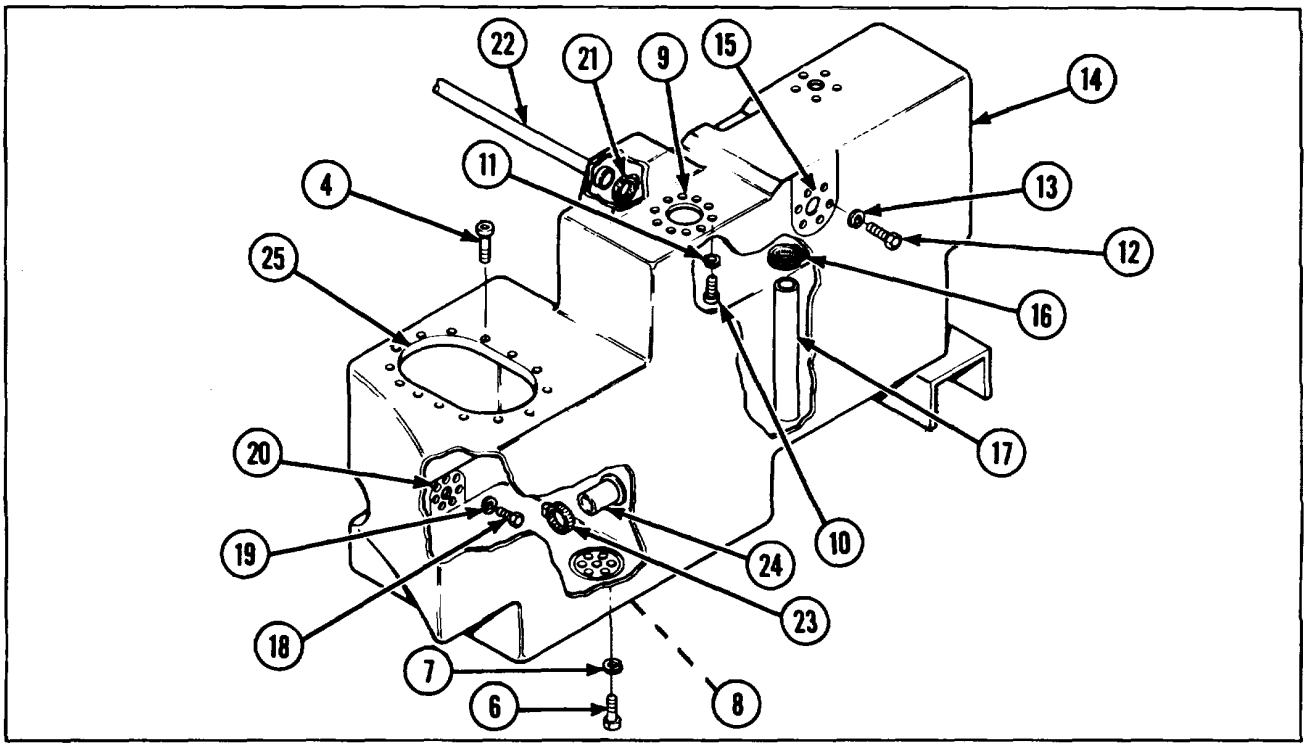
WARNING

- Prolonged breathing of vapors can be fatal. Do not enter fuel compartments until fabric fuel cells have been thoroughly cleaned.
- Fuel compartments that are not entirely free of fuel or fuel vapors must not be welded or exposed to heat, flames, or sparks. Welding or the use of power sanders, chisels, and chipping hammers shall be preceded by removal of the fabric fuel cell and by thorough cleaning.

7 Perform fabric fuel cell cleaning procedures, refer to page 2-49.

2-32. MAINTENANCE OF FABRIC FUEL CELL INSTALLATION AND FABRIC FUEL CELL FILLER BLOCKS (CONT).

REMOVAL (CONT)



8 Remove six capscrews (6) and six lockwashers (7) securing right fuel drain nut ring (8) to hull.

9 Reach through fuel filler neck and strainer element access (9) and remove ten capscrews (10) and ten flat washers (11).

10 Enter right vehicle tunnel and remove six capscrews (12) and six lockwashers (13) securing right fabric fuel cell (14) to coolant heater fuel intake (15).

CAUTION

Do not enter fuel compartment until all sharp objects are removed from clothing and shoes are wrapped with rags to prevent damage to fabric fuel cells.

11 Enter right fabric fuel cell (14) and remove hose clamp (16) and coolant heater fuel rubber hose (17).

12 Remove eight capscrews (18) and eight flat washers (19) at interconnect (20).

13 Remove hose clamp (21) securing nipple to crossover vent tube (22). Pull right fabric fuel cell free of fitting. Plug or cap crossover vent tube (22).

14 Remove hose clamp (23) securing nipple to fuel intake tube (24). Pull right fabric fuel cell free of fitting. Plug or cap fuel intake tube (24).

15 Remove two capscrews (4) securing right fabric fuel cell (14) to right fuel cell access opening (25).

CAUTION

Do not cut or damage fabric fuel cell when separating from hull.

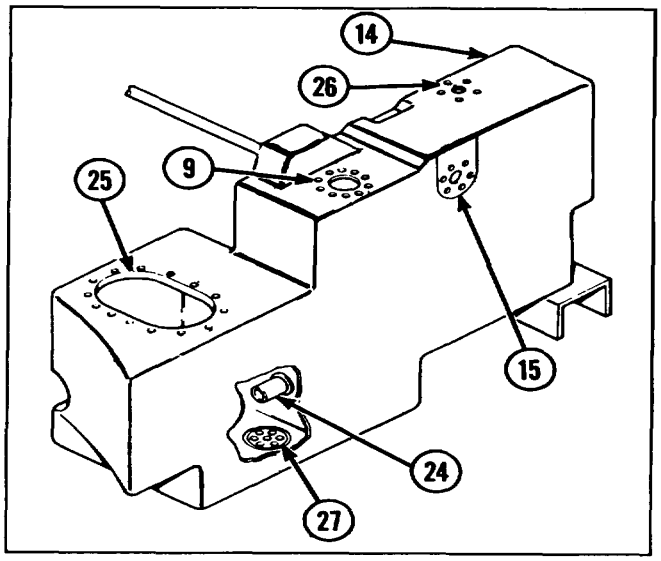
NOTE

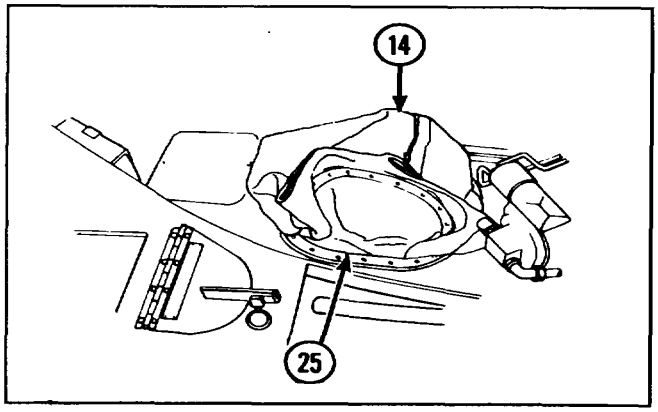
Fabric fuel cells are sealed with sealant at hull attaching points.

16 Use putty knife or dull screwdriver to separate right fabric fuel cell (14) from hull at the following points: right fabric fuel cell access opening (25); fuel level transmitter access (26); fuel filler neck and strainer element access (9); and coolant heater fuel intake (15).

17 Pull right fabric fuel cell (14) down and free of fuel intake tube (24).

18 Fold right fabric fuel cell (14) down and roll back to gain access to fuel drain (27). Separate right fabric fuel cell (14) from hull.





19 Fold and remove right fabric fuel cell (14) from hull through right fabric fuel cell access opening (25).

2-32. MAINTENANCE OF FABRIC FUEL CELL INSTALLATION AND FABRIC FUEL CELL FILLER BLOCKS (CONT).

REMOVAL (CONT)

20 Remove six capscrews (28) and six lockwashers (29) securing left fuel drain nut ring (30) to hull.

21 Remove hose clamp (31) securing nipple to crossover vent tube (22). Pull left fabric fuel cell (32) free of crossover vent tube.

22 Remove hose clamp (33) securing left fabric fuel cell (32) to fuel return adapter (34). Pull left fabric fuel cell (32) free of fuel return adapter (34).

23 Remove two capscrews (4) securing left fabric fuel cell (32) to left fuel cell access opening (35).

24 Use putty knife or dull screwdriver to separate left fabric fuel cell (32) from left fabRico fuel cell access opening (35).

25 Fold left fabric fuel cell (32) down and roll back to gain access to fuel drain (36). Separate left fabric fuel cell (32) from hull.

26 Fold and remove left fabric fuel cell (32) from hull through left fabric fuel cell access opening (35).

27 Remove crossover vent tube (22) through left fabric fuel cell access opening (35).

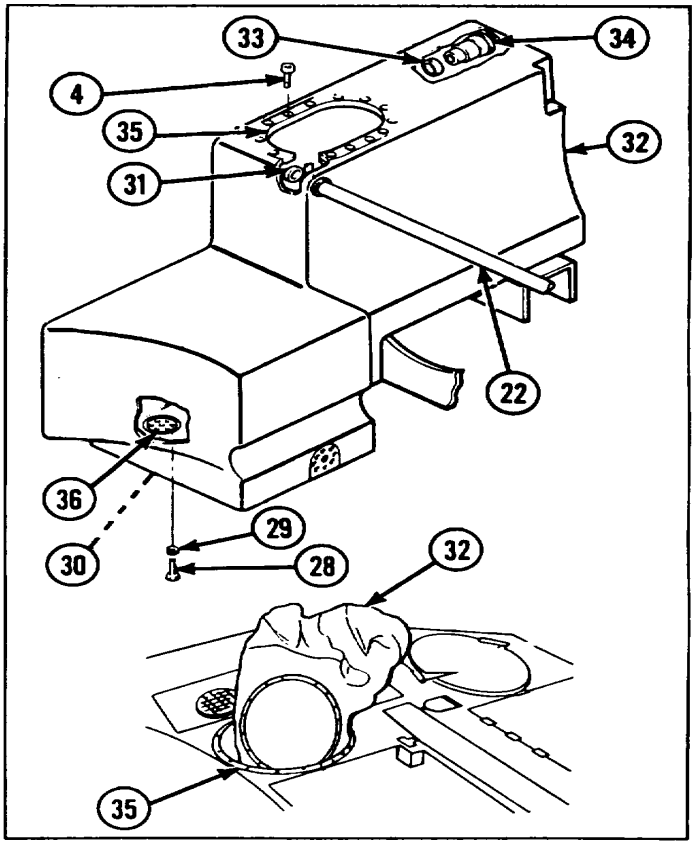
28 Remove left front fuel cell support (37).

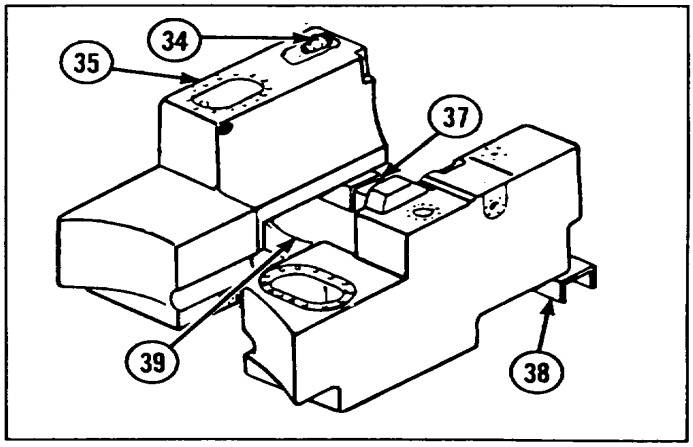
29 Remove right front fuel cell support (38).

30 Remove fuel tank support (39).

31 Remove fuel return adapter (34).

32 Clean right and left fuel compartments. Refer to general cleaning procedures, page 2-27.





CLEANING

1 The following materials are needed to clean the fabric fuel cells:

a. Pressurized hot water at 100 to 160 °F (38 to 71 °C) and a hose long enough to reach vehicle top deck.
b. Cleaning compound.
c. Paint thinner.
d. Liquid soap.
e. Compressed air (90 to 100 psi (621 to 690 kPa)).
f. Sparkproof extension light.
g. Spray gun with nozzle and connections for air and water.

2 Prepare cleaning solution of one part cleaning compound and nine parts paint thinner. Mix solution well. Fill spray gun cup and attach gun to air pressure.

3 Ensure drained fuel has been removed from under vehicle and provision has been made for disposal of cleaning solution.

4 Spray fabric fuel cells with cleaning solution. Cracks will retain residual fuel. Ensure all surfaces are covered.

5 Allow cleaning solution to remain on surfaces for 15 minutes minimum.

6 Fill spray gun cup with liquid soap and attach to pressurized hot water.

7 Rinse fabric fuel cells with soap solution for 5 minutes minimum. Allow rinse to drain holes.

8 Thoroughly rinse fabric fuel cells with clean warm water.

CAUTION

Do not enter fuel compartments until all sharp objects are removed from clothing and shoes are wrapped with rags to prevent damage to fabric fuel cells.

9 Dry fabric fuel cells with clean, dry, absorbent rags.

10 Test cleanliness of fuel cells, using masking tape. If tape sticks to fabric fuel cell, the fabric fuel cell is clean. If tape does not stick, repeat cleaning procedures.

2-32. MAINTENANCE OF FABRIC FUEL CELL INSTALLATION AND FABRIC FUEL CELL FILLER BLOCKS (CONT).

INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.
2 Filler blocks are part of left fuel cell kit or right fuel cell kit. If filler blocks are broken, damaged, or missing, order applicable fuel cell kit for replacement.

3 Inspect fabric fuel cells for tears or holes which will cause leaks. Repair small holes and tears using adhesive silicone.

4 Rubber hose is a manufactured item, refer to appendix C.

5 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1) which do not meet inspection criteria.

INSTALLATION

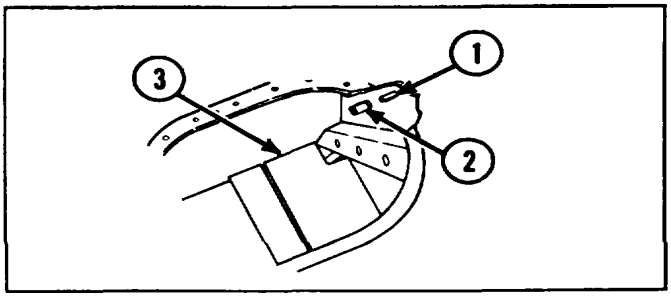
1 Make sure left and right fuel compartments are clean. Refer to general cleaning procedures, page 2-27. Remove all debris and sharp objects.

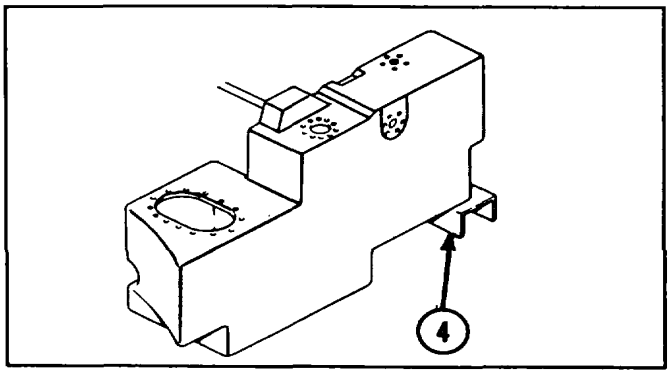
2 Clean fuel return tube threads (1) and apply sealing compound. Install fuel return adapter (2).

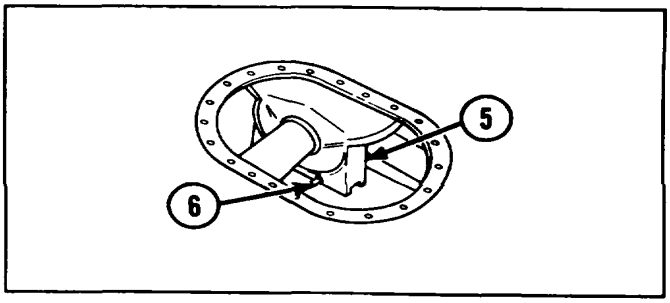
3 Install left front fuel cell support (3). Elevate inboard side of support when inserting to aid positioning.

4 Install right front fuel cell support (4). Elevate inboard side of support when inserting to aid positioning.

5 Install fuel tank support (5). Make sure fuel intake tube (6) extends through fuel tank support.







6 Fold right fabric fuel cell (7). Insert forward part into right fuel cell access opening (8).

7 Turn right fabric fuel cell (7) and install right fabric fuel cell nut ring (9) and remainder of right fabric fuel cell through right fabric fuel cell access opening (8).

8 Unfold right fabric fuel cell (7) inside right fuel compartment.

CAUTION

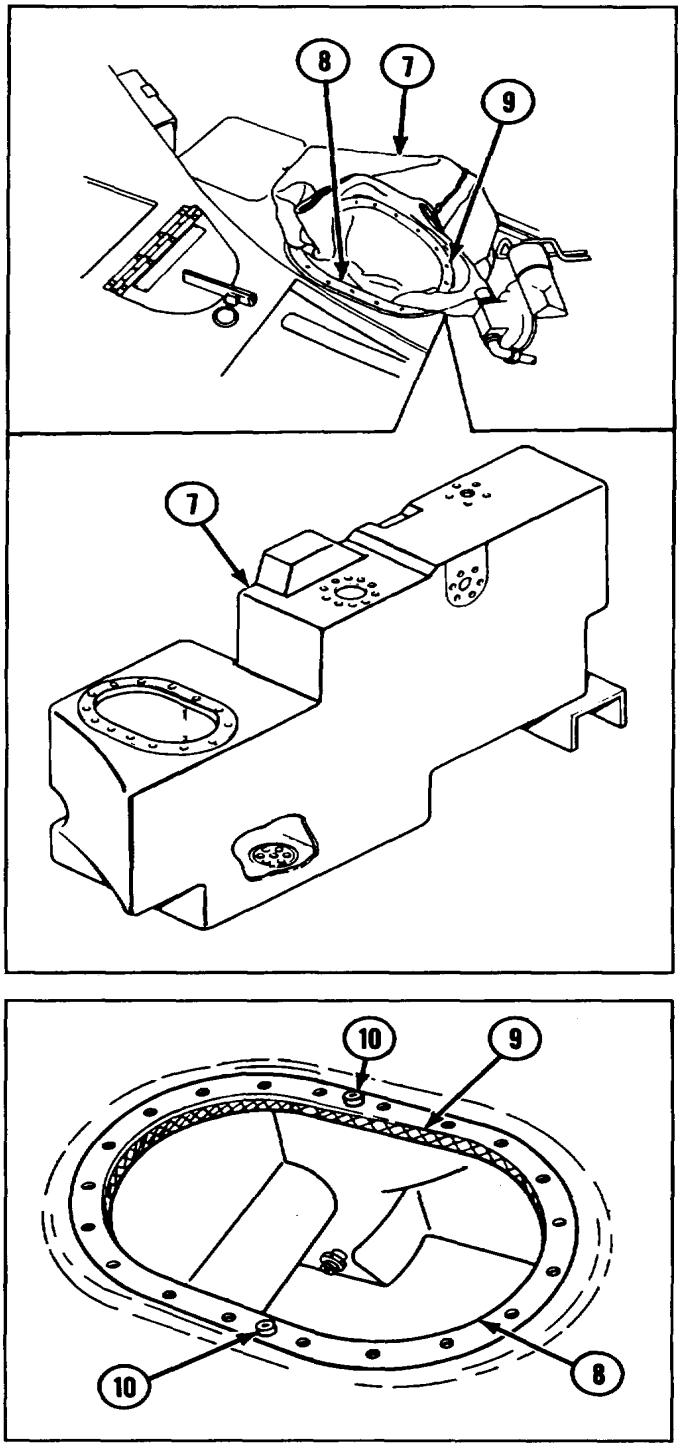
Apply adhesive silicone only in a well-ventilated area. Keep away from heat, sparks, and open flame.

NOTE

• Adhesive silicone should cure until a skin coat is formed before mating surfaces are placed together.

• Hand tighten capscrews during installation. Tighten screws to torque specifications after fabric fuel cell installation is complete. Allow 6 hours minimum drying time before adding fuel. Take care not to apply adhesive silicone to tube connections.

9 Secure right fabric fuel cell nut ring (9) to right fabric fuel cell access opening (8) with two capscrews (10) through odd-spaced holes offset from centerline. Hand tighten two capscrews (10).



2-32. MAINTENANCE OF FABRIC FUEL CELL INSTALLATION AND FABRIC CELL FILLER BLOCKS (CONT).

INSTALLATION (CONT)

CAUTION

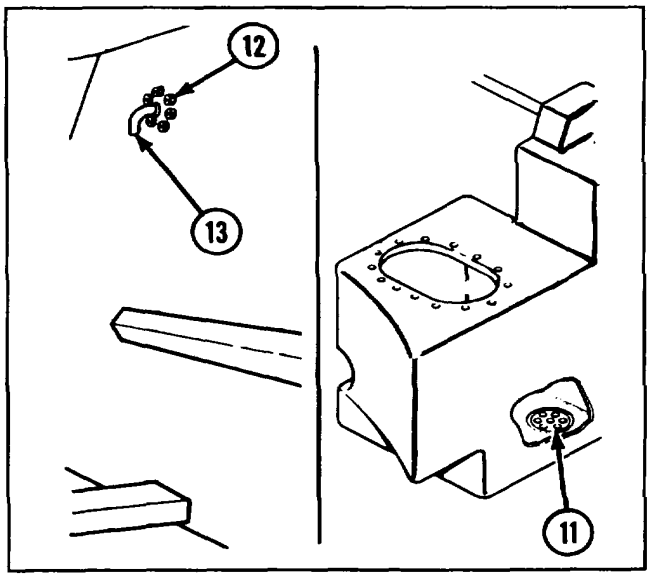
Do not enter fuel compartment until all sharp objects are removed from clothing and shoes are wrapped with rags to prevent damage to fabric fuel cell.

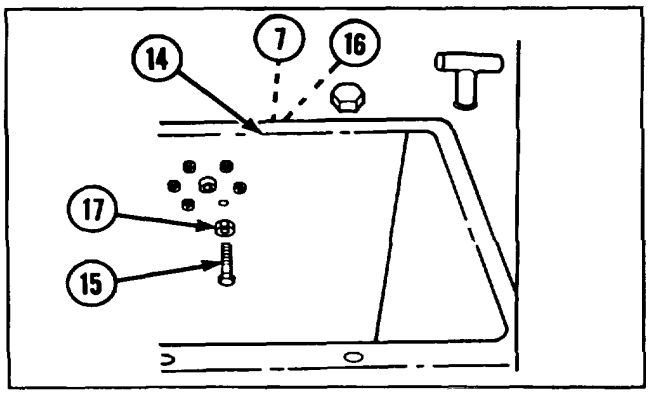
10 Enter right fuel compartment and smooth right fabric fuel cell to contours of right fuel compartment.

11 Fold down forward right side of right fabric fuel cell. Clean mating surfaces and apply a liberal amount of adhesive silicone to drain nut ring (11) and hull, and to coolant heater fuel intake (12). Allow sealant to form a skin coat.

12 Slide right fabric fuel cell over coolant heater fuel intake tube (13) and press against hull.

13 Enter right vehicle tunnel (14). Apply sealing compound to six capscrews (15). Secure right fabric fuel cell (7) to coolant heater fuel intake (16) with six new lock-washers (17) and six capscrews (15). Hand tighten capscrews.





14 Install coolant heater fuel rubber hose (18). Secure coolant heater fuel rubber hose (18) with hose clamp (19). 15 Remove two capscrews (10) securing right fabric fuel cell to right fuel cell access opening (8).

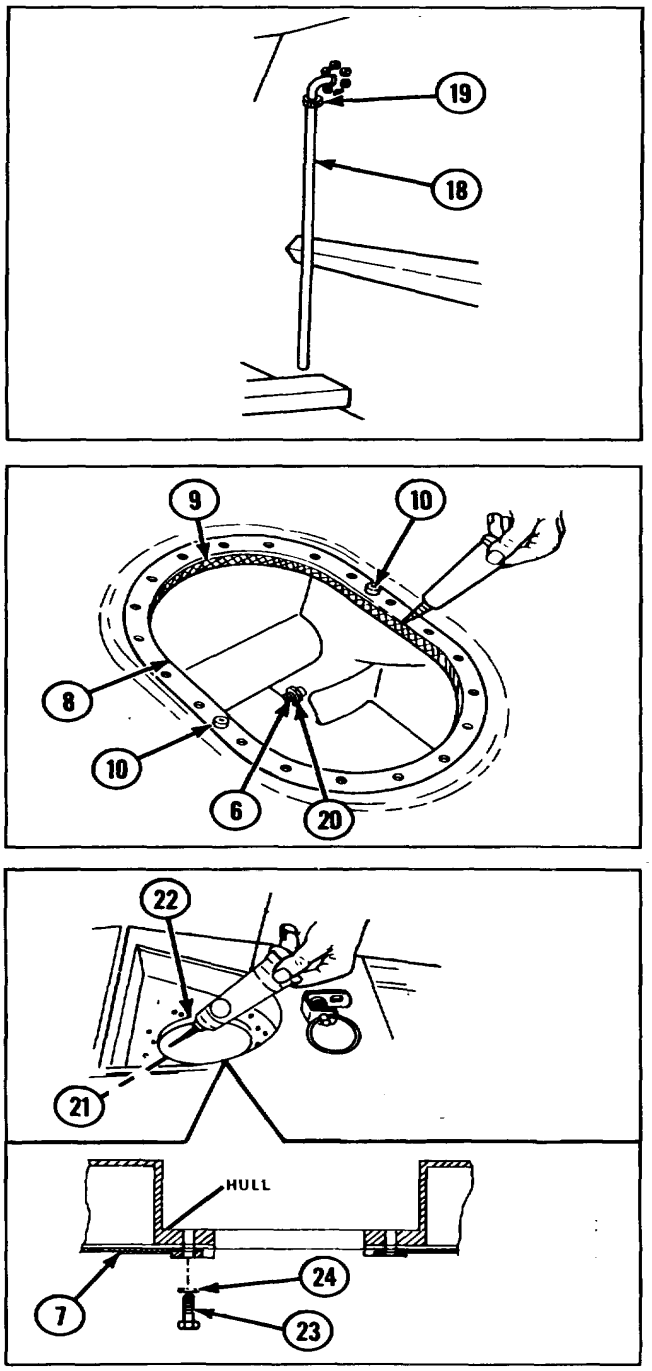
16 Clean mating surfaces and apply a liberal amount of adhesive silicone to right fabric fuel cell access opening (8) and right fabric fuel cell nut ring (9). Allow adhesive to form a skin coat.

17 Secure right fabric fuel cell nut ring (9) to right fabric fuel cell access opening (8) with two capscrews (10) through odd spaced holes offset from centerline. Hand tighten capscrews.

18 Work right fabric fuel cell nipple over fuel intake tube (6) until tube protrudes through nipple. Secure right fabric fuel cell with clamp (20).

19 Clean mating surfaces and apply a liberal amount of adhesive silicone to nut ring (21) and underside of hull at fuel filler neck and strainer element access (22). Allow adhesive to form a skin coat.

20 Apply sealing compound to ten capscrews (23). Secure right fabric fuel cell (7) to hull with ten flat washers (24) and ten capscrews (23) installed through right fabric fuel cell into hull. Hand tighten capscrews.



2.

2-32. MAINTENANCE OF FABRIC FUEL CELL INSTALLATION AND FABRIC FUEL CELL FILLER BLOCKS (CONT).

INSTALLATION (CONT)

21 Align fuel drain nut ring (25) with hull. Hold in place with one capscrew (26) with only one- or two-thread engagements. While right fabric fuel cell (7) is lifted from inside, work from underside of hull and apply a liberal amount of adhesive silicone to mating surfaces of fuel cell drain nut ring (25) and hull. Allow adhesive to form a skin coat.

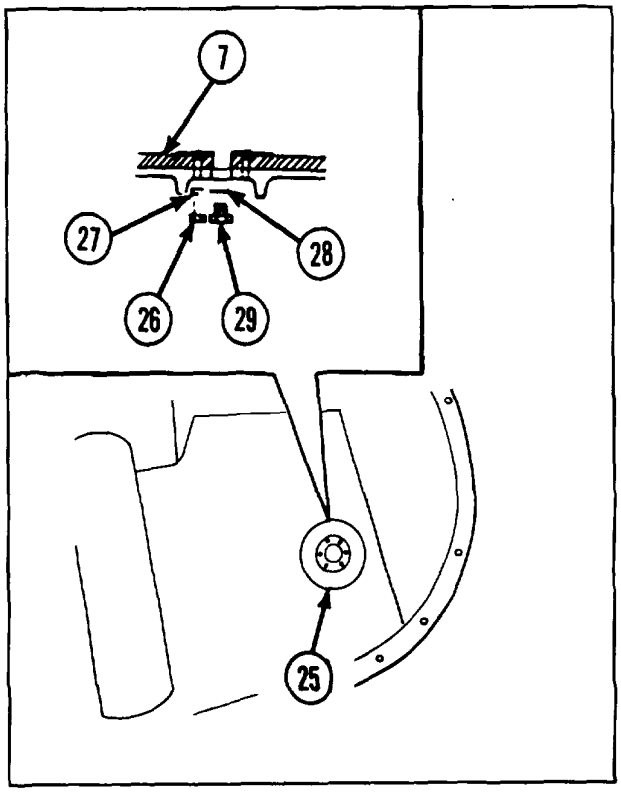
22 Apply sealing compound to six capscrews (26). Secure fuel drain nut ring (25) to hull with six new lockwashers (27) and six capscrews (26). Hand tighten six capscrews.

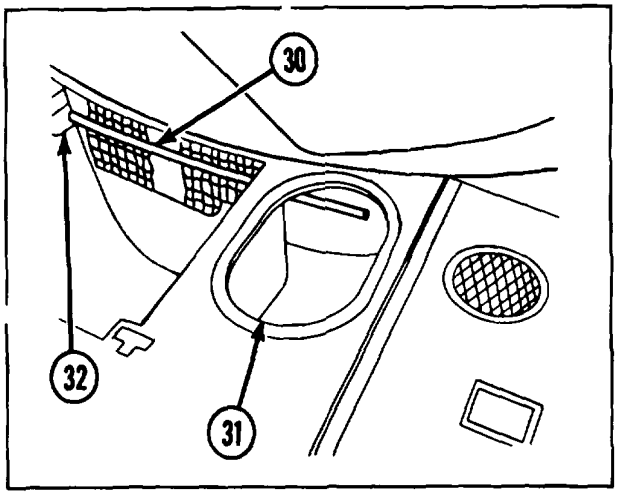
23 Install new performed packing (28) and drain plug (29).

CAUTION

Pushing tube too far may damage right fuel cell.

24 Lightly lubricate crossover vent tube (30) with grease. Install crossover vent tube (30) through left fabric fuel cell access opening (31) into hull vent flange (32). As tube projects into right fabric fuel cell, work right nipple over tube until tube protrudes through nipple. Pull tube through right nipple until end of crossover vent tube is nearly flush with hull vent flange in left fuel compartment.





NOTE

Do not clamp hull vent tube to right nipple at this time.

25 Fold left fabric fuel cell (33). Insert forward part into left fabric fuel cell access opening (31).

26 Turn left fabric fuel cell (33) and install left fuel cell nut ring (34) and remainder of left fabric fuel cell through left fabric fuel cell access opening (31).

27 Unfold left fabric fuel cell (33) Inside left fuel compartment.

28 Secure left fuel cell nut ring (34) to left fabric fuel cell access opening (31) with two capscrews (35) through odd-spaced holes offset from centerline. Hand tighten two capscrews.

CAUTION

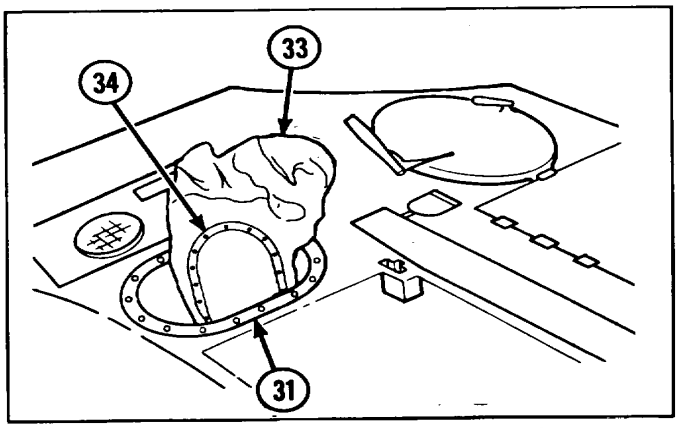
Do not enter fuel compartment until all sharp objects are removed from clothing and shoes are wrapped with rags to prevent damage to fabric fuel cell.

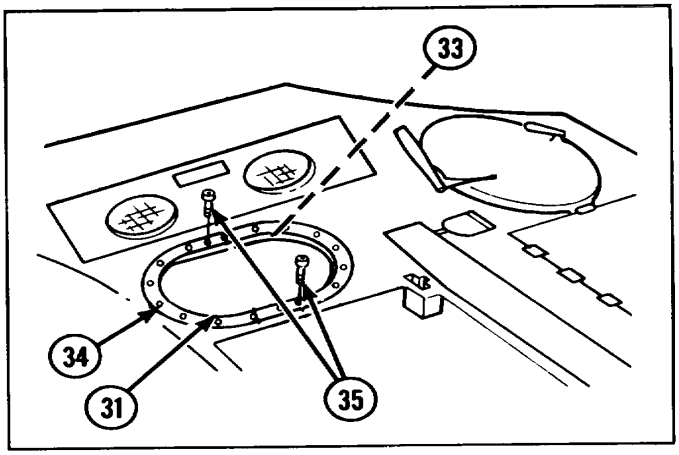
29 Enter left fuel compartment and smooth left fabric fuel cell to contours of left fuel compartment.

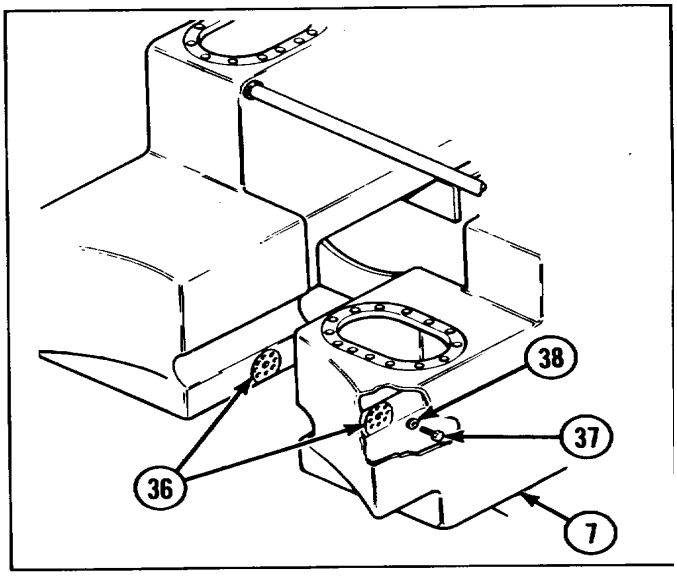
30 Remove two capscrews (35) securing left fabric fuel cell (33) to left fabric fuel cell access opening (31).

31 Pull fabric fuel cell away from hull. Apply a liberal amount of adhesive silicone to mating surfaces of left and right fabric fuel cell interconnects (36). Allow adhesive to form a skin coat.

32 From inside right fabric fuel cell (7), apply sealing compound to eight capscrews (37). Secure interconnects with eight flat washers (38) and eight capscrews (37). Hand tighten eight capscrews.







2-32. MAINTENANCE OF FABRIC FUEL CELL INSTALLATION AND FABRIC FUEL CELL FILLER BLOCKS (CONT).

INSTALLATION (CONT)

33 Clean mating surfaces and apply a liberal amount of adhesive silicone to left fuel cell access opening (31) and left fuel cell nut ring (34). Allow adhesive to form a skin coat.

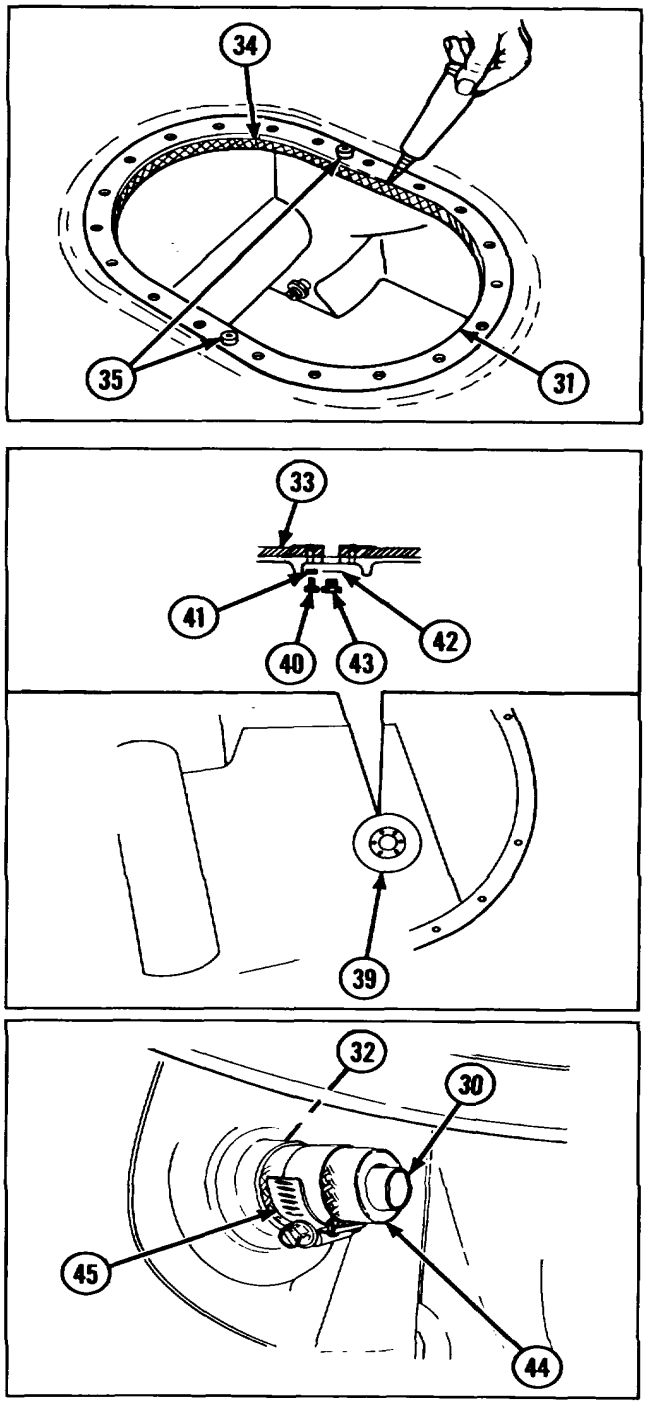
34 Secure left fuel cell nut ring (34) to left fabric fuel cell access opening (31) with two capscrews (35) through odd-spaced holes offset from centerline. Hand tighten two capscrews.

35 Align left fuel drain nut ring (39) with hull. Hold in place with one capscrew (40) with only one- or two-thread engagements. While left fabric fuel cell (33) is lifted from inside, work from underside of hull and apply a liberal amount of adhesive silicone to mating surfaces of left fuel drain nut ring (39) and hull. Allow adhesive to form a skin coat.

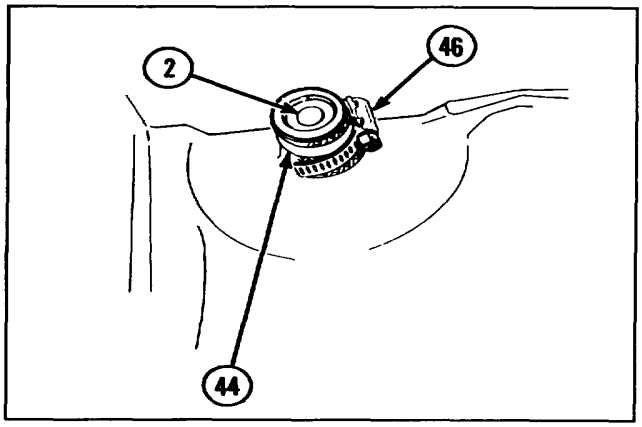
36 Apply sealing compound to six capscrews (40). Secure left fuel drain nut ring (39) to hull with six new lockwashers (41) and six capscrews (40). Hand tighten six capscrews.

37 Install new performed packing (42) and drain plug (43).

38 From inside right fabric fuel cell, push crossover vent tube (30) toward left fabric fuel cell. Work fabric fuel cell nipples (44) over hull vent flange (32) until crossover vent tube is evenly spaced in both right and left fuel cells. Secure crossover vent tube (32) to right and left nipples with hose clamps (45).

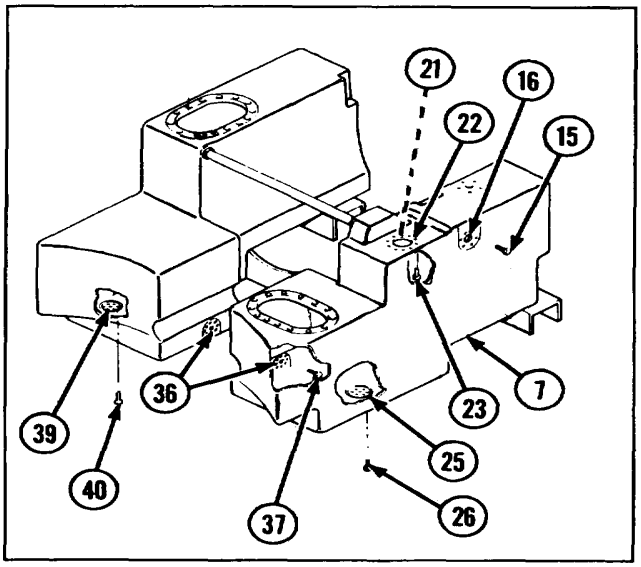


39 Under left fabric fuel cell access opening, work left fabric fuel cell over fuel return tube adapter (2). Extend fuel return adapter through right fabric fuel cell nipple (44). Secure right fabric fuel cell nipple with hose clamp (46).



40 Torque the following capscrews to 108.0 to 120.0 in.-lb (12.2 to 13.6 N-m):

a. six capscrews (15) securing right fabric fuel cell (7) to coolant heater fuel intake (16).
b. ten capscrews (23) securing nut ring (21) to underside of hull at fuel filler neck and strainer element access (22). Fill top of ten capscrew holes with sealing compound.
c. six capscrews (26) securing right fuel drain nut ring (25) to hull.
d. eight capscrews (37) securing right and left fabric fuel cell interconnects (36).
e. six capscrews (40) securing left fuel cell drain nut ring (39) to hull.



2-32. MAINTENANCE OF FABRIC FUEL CELL INSTALLATION AND FABRIC FUEL CELL FILLER BLOCKS (CONT).

INSTALLATION (CONT)

41 Make sure all hose clamps are securely tightened.

NOTE

Filler blocks support the fabric fuel cell in areas where fabric fuel cells are not attached to the hull. Make sure each filler block is in place before Installing the next block. Assembling the blocks in an open area prior to installation will help In identification, location, and installation of the blocks.

42 Install block 10-1- (4i7) into front of right fabric fuel cell.

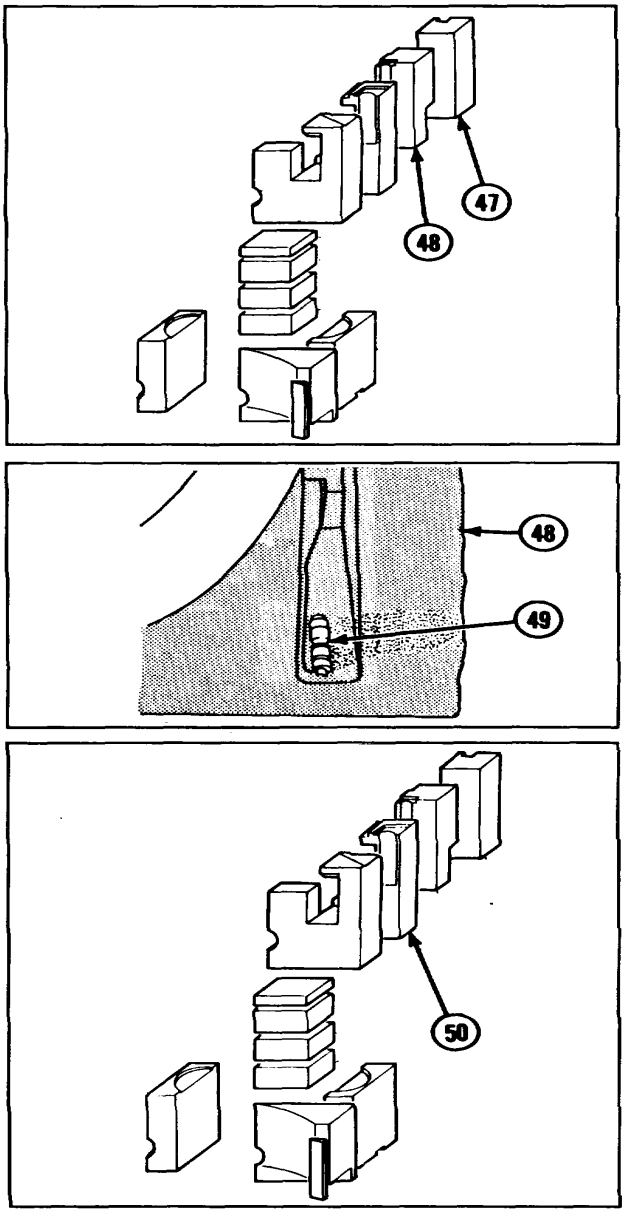
43 Install block 9-R (4,.) into front of right fabric fuel cell. Make sure coolant heater fuel intake hose is in filler block slot.

44 Install liquid quantity transmitter. Refer to TM 9-2350-304-20- 1.

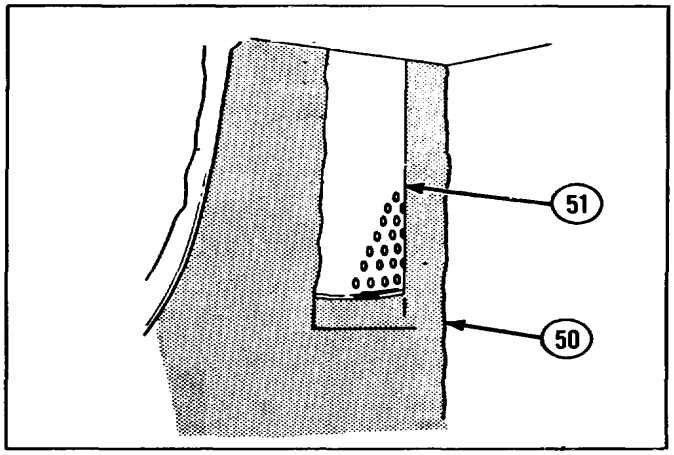
45 Adjust block 9-R (48) until liquid quantity transmitter float (49) has complete freedom of movement.

46 Install block 8-R (50) into forward part of cell. Align cutout with fuel filler hole to allow Installation of fuel filler neck and fuel filler neck strainer element.

47 Install fuel filler neck strainer element and fuel filler neck cap. Refer to TM 9-2350-304-20-1.



48 Adjust block 8-R (50) to fit around fuel filler neck strainer element (51).



49 Install block 7-R (52) into forward part of right fabric fuel cell.

50 Install block 6-R (53) Into right rear comer of right fabric fuel cell.

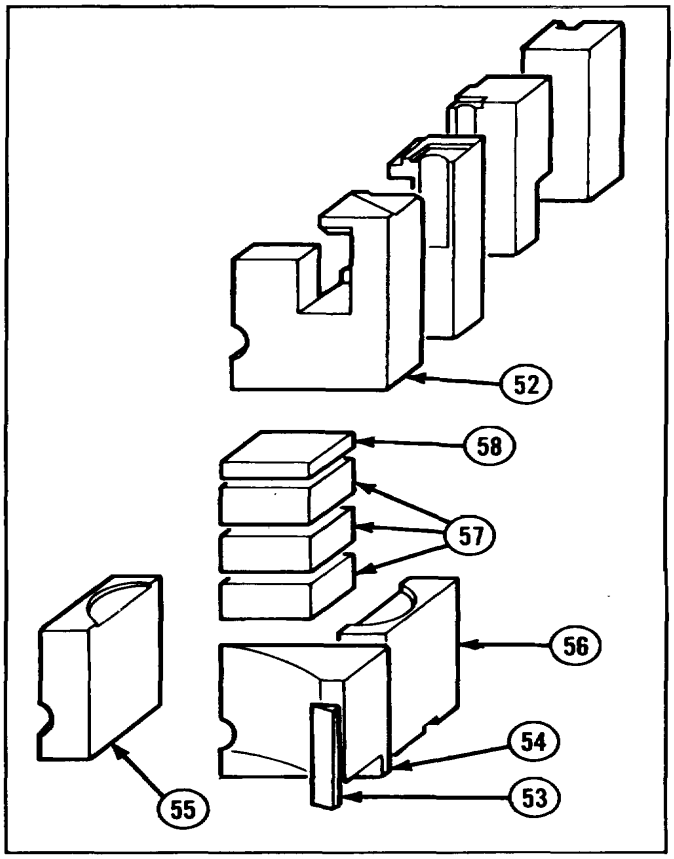
51 Install block 5-R (54) into rear part of right fabric fuel cell.

52 Install block 4-R (55) into inboard side of right fabric fuel cell.

53 Install block 3-R (56) into outboard side of right fabric fuel cell.

54 Install three blocks 2-R (57), one on top of another, Into bottom of right fabric fuel cell.

55 Install block 1-R (58) into right fabric fuel cell on top of block 2-R (57).



2-32. MAINTENANCE OF FABRIC FUEL CELL INSTALLATION AND FABRIC FUEL CELL FILLER BLOCKS (CONT).

INSTALLATION (CONT)

56 Install block 10-L (59) into rear corner of left fabric fuel cell.

57 Install block 9-L (60) into rear Inboard side of left fabric fuel cell.

58 Install block 8-L (61) into rear outboard side of left fuel cell.

59 Install block 7-L (62) into rear outboard side of left fabric fuel cell.

60 Install block 6-L (63) into rear of left fabric fuel cell.

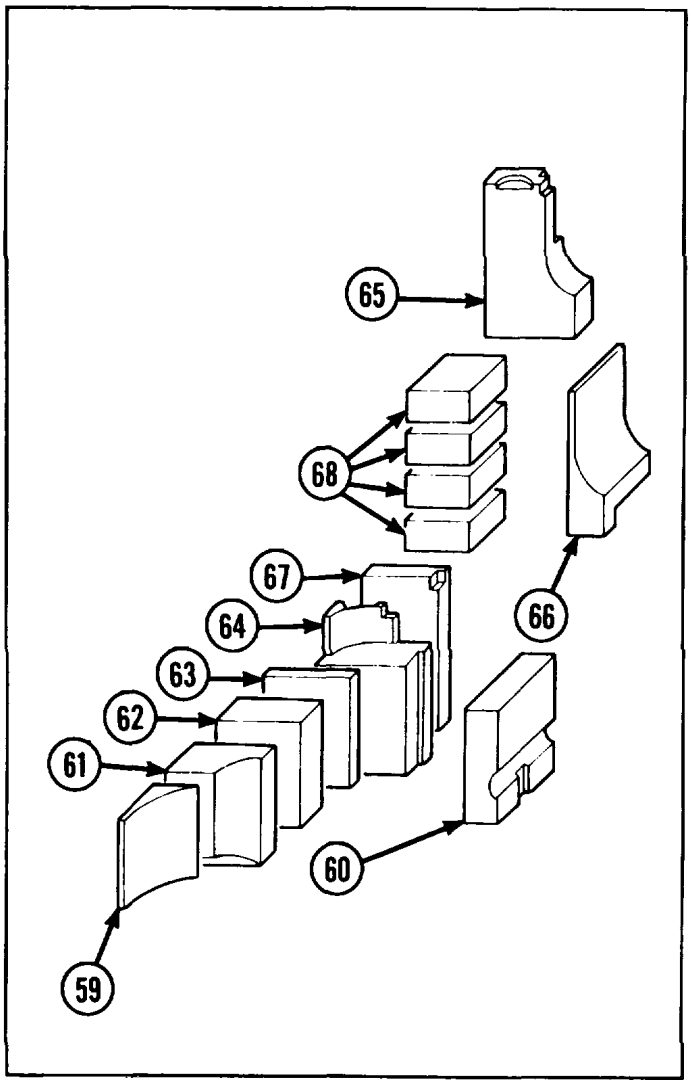
61 Install block 5-L (64) into rear of left fabric fuel cell.

62 Install block 4-L (65) into front of left fabric fuel cell.

63 Install block 3-L (66) into inboard side of left fabric fuel cell.

64 Install block 2-L (67) into rear of left fabric fuel cell.

65 Install four blocks 1-L (68), one on top of another, Into bottom of left cell.



2-60

NOTE

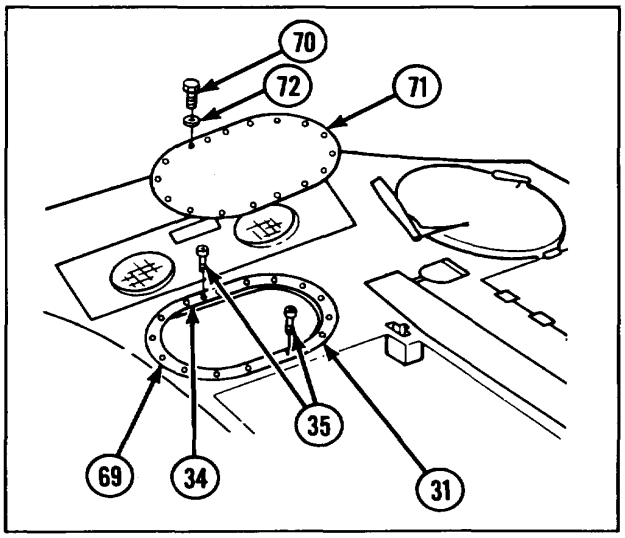
Steps 66 thru 68 are written and illustrated for left fabric fuel cell access cover but apply to both left and right fabric fuel cell access covers.

66 Remove two capscrews (35) securing left fabric fuel cell nut ring (34) to left fabric fuel cell access opening (31).

67 Place access cover gasket (69) on access ring. Apply sealing compound to two capscrews (35). Secure access cover gasket (69) and left fabric fuel cell nut ring (34) to left fabric fuel cell access opening (31) with two capscrews (35). Torque capscrews to 108.0 to 120.0 in.-lb (12.2 to 13.6 N-m).

68 Apply sealing compound to 20 capscrews (70). Secure fuel cell access cover (71) and left fabric fuel cell nut ring (34) to hull with 20 new lockwashers (72) and 20 capscrews (70). Torque all capscrews to 120.0 to 130.0 in.-lb (13.6 to 14.7 N-m).

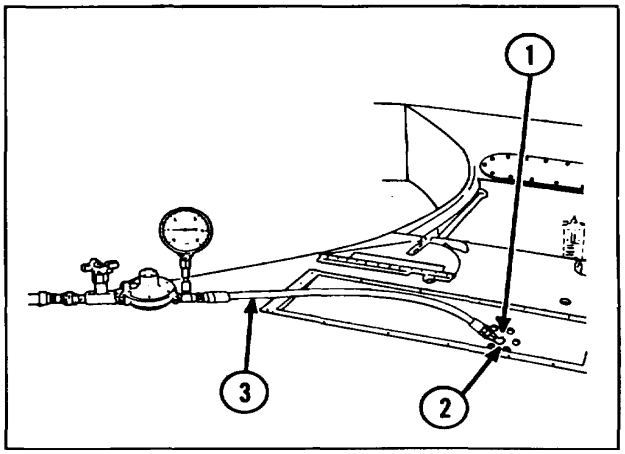
69 Install fan well cover. Refer to TM 9-2350-304-20-1.



FABRIC FUEL CELL TEST

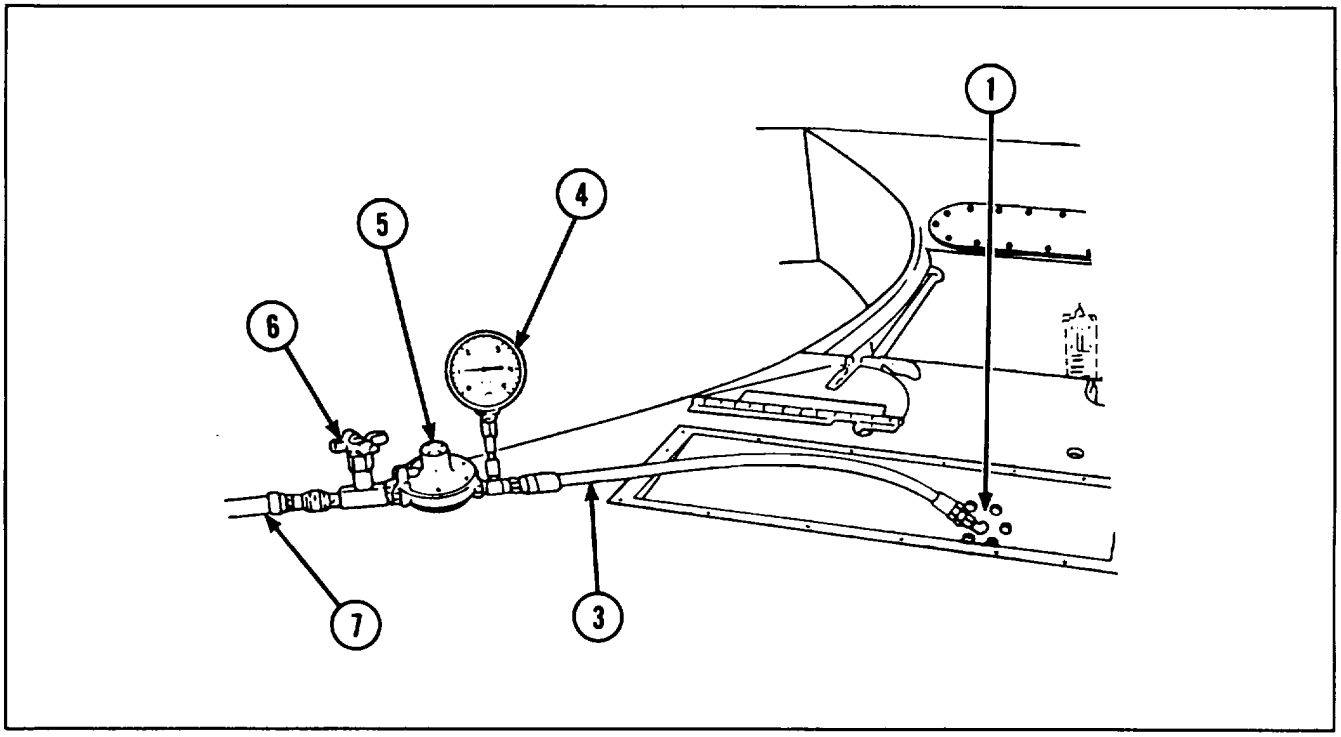
1 Remove fuel filler neck cap. Turn cap vent valve, on underside of cap, to CLOSED position. Install fuel filler neck cap and tighten.

2 Remove plug from coolant heater fuel intake line (1). Install nipple (2) into fuel intake line. Connect hose (3) to nipple (2).



2-32. MAINTENANCE OF FABRIC FUEL CELL INSTALLATION AND FABRIC FUEL CELL FILLER BLOCKS (CONT).

FABRIC FUEL CELL TEST (CONT)



3 Connect 0 to 10 psi (0 to 69 kPa) pressure gage (4), pressure regulator valve (5), and shutoff valve (6) to hose (3). Connect shutoff valve to compressed air source (7).

4 Set pressure regulator valve (5) to 3 psi (21 kPa). Pressurize fuel cell for 5 minute minimum. Observe gage for any pressure drop.

5 Check for air leakage with soap solution at the following places:
- a. access covers.
- b. fuel level transmitter.
- c. fuel filler neck.
- d. fuel cell drain plugs.
- e. coolant heater fuel intake.
- f. fuel supply and return line quick disconnects.

6 Tighten capscrews, if required, to stop leaks. No leakage is permissible. If leakage cannot be stopped by tightening cap- screws, disassemble the fuel cell to the extent necessary to reseal leaking area.

WARNING

Failure to reduce pressure to zero before removing cap may cause injury.

7 Reduce fabric fuel cell pressure to zero and remove test equipment. Install plug in coolant heater fuel intake (1).

8 Remove fuel filler cap and turn cap vent valve to OPEN position. Install fuel filler cap.

9 Install right tunnel access cover.

10 Allow 6 hours minimum drying time for sealants, then fill cell with diesel fuel.

2-33. MAINTENANCE OF RADIATOR COOLING VANEAXIAL FAN.

This task covers:	a. Disassembly	b. Inspection/Repair	c. Reassembly

INITIAL SETUP:

Tools and Special Tools
- Automotive maintenance and repair shop equipment: field maintenance, basic, less power (SC 4910-95-A31)
  - • Arbor press
  - • Bearing puller

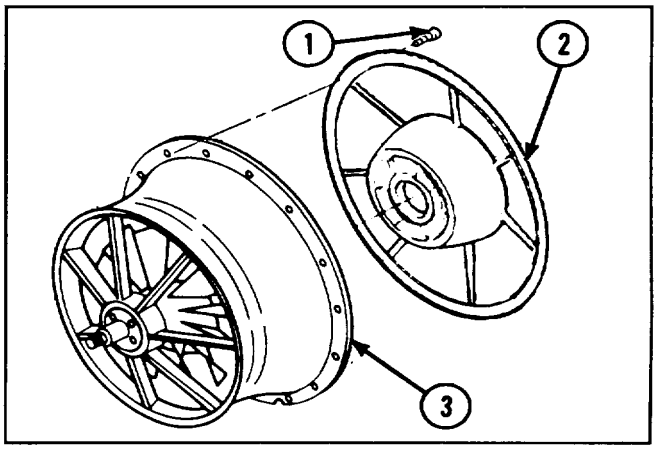
Materials/Parts
- Vaneaxial fan repair parts kit
- Grease (GAA) (item 19, appx B)

References
- TM 9-2350-304-20-1
- TM 9-2350-304-24P-1

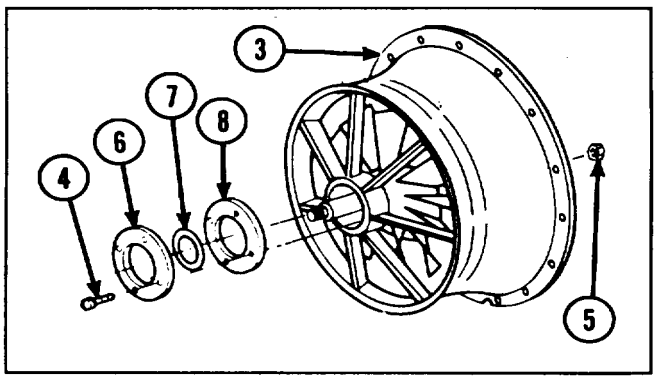
Equipment Conditions
- Radiator cooling vaneaxial fan removed (TM 9-2350-304-20-1)

DISASSEMBLY

1 Remove seven screws (1) and ring as sembly (2) from housing (3).

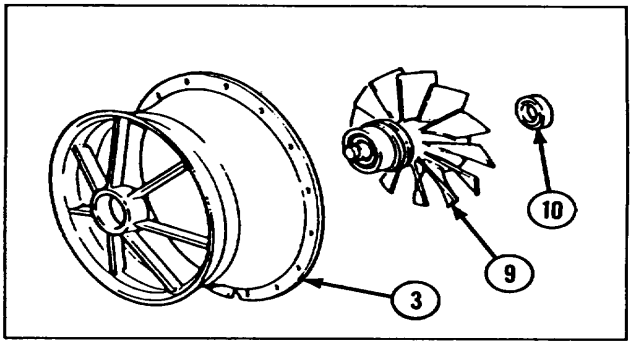


2 Remove four machine screws (4), four nuts (5), plate (6), felt (7), and plate (8 from housing (3).



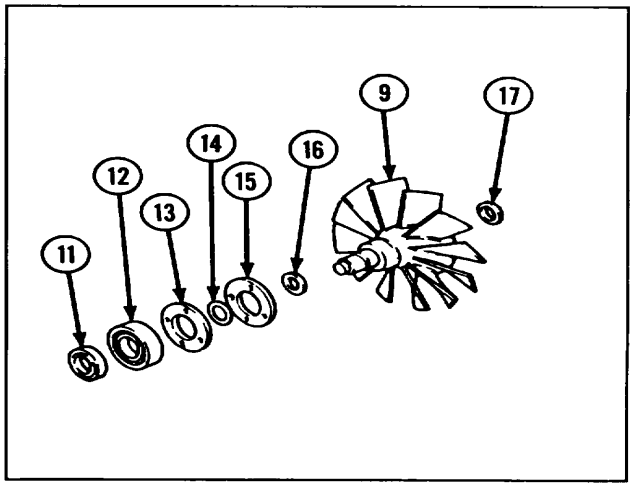
2-33. MAINTENANCE OF RADIATOR COOLING VANEAXIAL FAN (CONT).

DISASSEMBLY (CONT)



3 Remove impeller and shaft assembly (9) from housing (3).

4 Using bearing puller, remove bearing (10) from impeller and shaft assembly (9).



5 Remove spacer (11) from impeller and shaft assembly (9).

6 Using bearing puller, remove bearing (12) from impeller and shaft assembly (9).

7 Remove plate (13), felt (14), and plate assembly (15) from impeller and shaft assembly (9).

8 Remove spacer (16) from impeller and shaft assembly (9).

9 If necessary, remove spacer (17) from impeller and shaft assembly (9).

INSPECTION/REPAIR

CAUTION

Do not attempt repair of impeller and shaft assembly. It s a balanced unit and must be replaced if damaged.

1 Inspect for broken, damaged, or missing parts.

2 If any kit component is damaged, replace entire vaneaxial fan repair parts kit.

3 If impeller and shaft assembly, ring assembly, or housing are damaged, replace entire cooling fan assembly.

4 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1) which do not meet inspection criteria.

REASSEMBLY I

1 If removed, Install spacer (1) to impeller and shaft assembly (2).

2 Install spacer (3) to Impeller and shaft assembly (2).

3 Install plate assembly (4), felt (5), and plate (6) to impeller and shaft assembly (2).

4 Pack new bearing (7) with grease.

5 Using arbor press, install new bearing (7) to impeller and shaft assembly (2).

6 Install spacer (8) to impeller and shaft assembly (2).

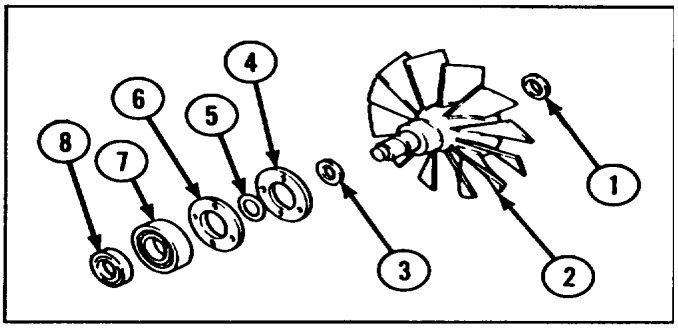
7 Pack new bearing (9) with grease.

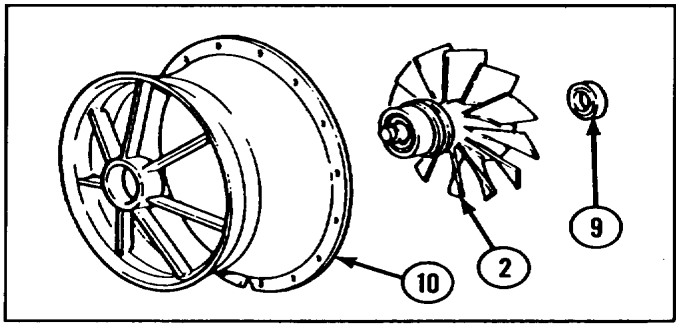
8 Using arbor press, install new bearing (9) to impeller and shaft assembly (2).

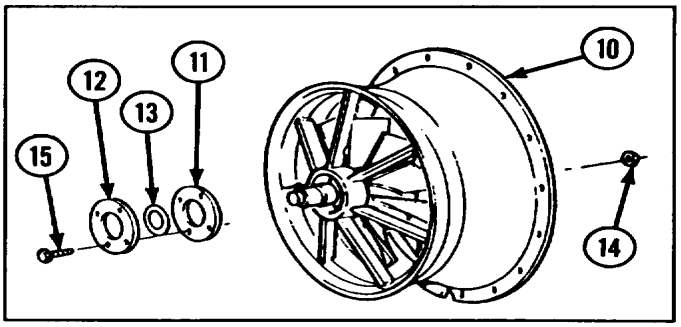
9 Install impeller and shaft assembly (2) to housing (10).

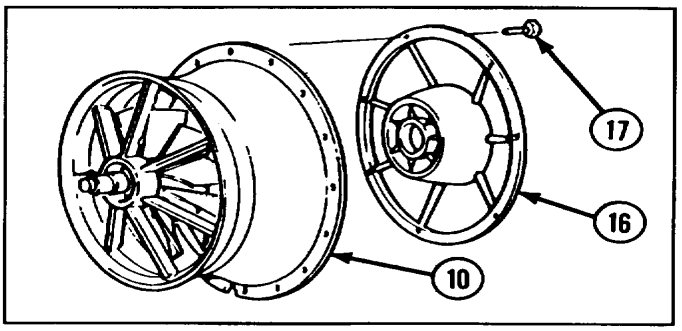
10 Align mounting holes in plates (11 and 12) and housing (10). Install plate (11), felt (13), plate (12), four nuts (14), and four machine screws (15) to housing (10).

11 Align mounting holes in ring assembly (16) and housing (10). Install ring assembly and seven screws (17) to housing.









2-34. MAINTENANCE OF DRIVER'S INSTRUMENT PANEL (GAGE).

This task covers: **a. Disassembly** **b. Inspection/Repair** **c. Reassembly**

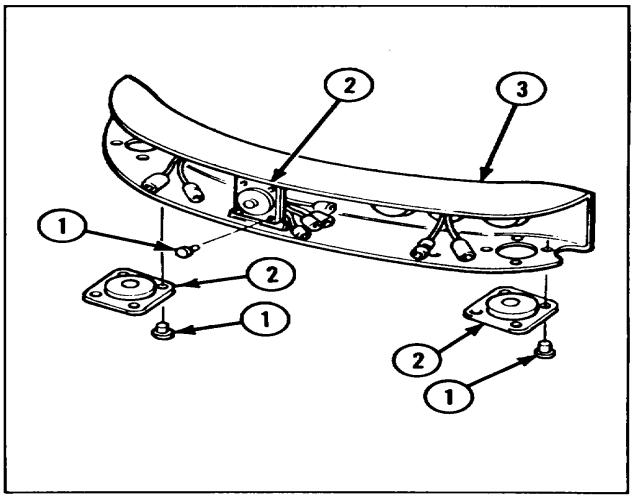
INITIAL SETUP:

References
TM 9-2350-304-20-1
TM 9-2350-304-24P-1

Equipment Conditions
Driver's instrument panel assembly removed and partially disassembled(TM 9-2350-304-20-1)

DISASSEMBLY

If necessary, remove 12 solid rivets (1) and 3 instrument panel mounting cushions (2) from welded instrument panel (3).



INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1).

REASSEMBLY I

If removed, install 3 instrument panel mounting cushions (2), and secure to instrument panel (3) with 12 new solid rivets (1).

This task covers: **a. Removal** **b. Inspection/Repair** **c. Installation**

INITIAL SETUP:

Tools and Special Tools
- Automotive maintenance and repair shop equipment: field maintenance, basic, less power (SC 4910-95-A31)
  - Torque wrench (O to 150 ft-lb)
- Hoist
- Sling

Materials/Parts
- Gasket .
- Self-locking bolt (16)

References
- TM 9-2350-304-20-1
- TM 9-2350-304-24P-1
- TM 9-2520-234-35

Equipment Conditions
- 2-30 Engine removed
- 2-128 Power takeoff removed
- Powerplant removed (TM 9-2350-304-20-1)
- Oil drained from transmission (TM 9-2350-304-20-1)

REMOVAL

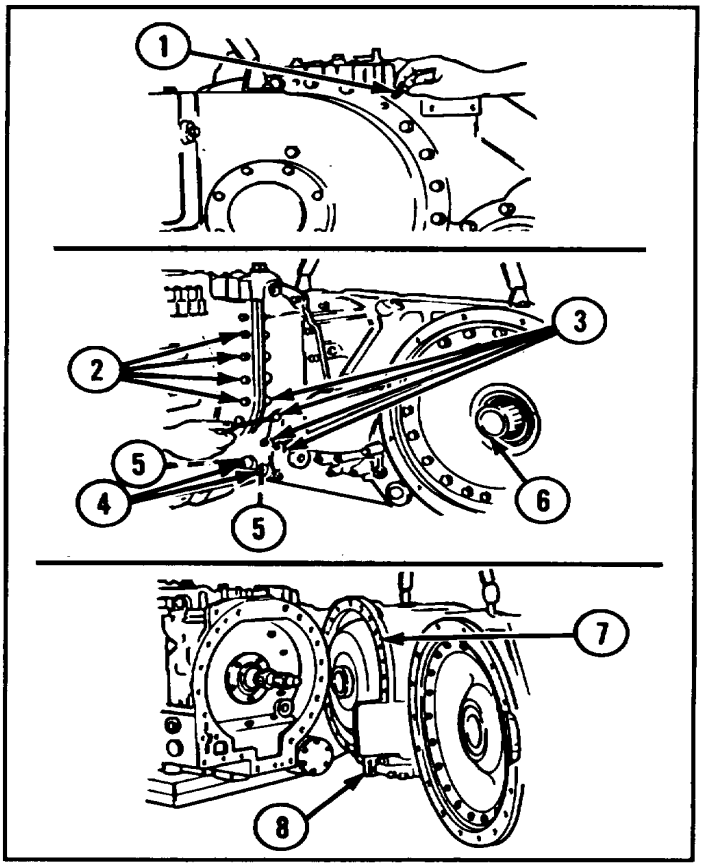
1 Attach sling and hoist to housing.

2 Remove 16 self-locking bolts (1).

3 Remove four 1-1/2-in. bolts (2), four 6-in bolts (3), two 5-1/4-in. bolts (4), and ten washers (5).

4 Remove engine coupling shaft (6).

5 Remove gasket (7) and transfer assembly (8).



2-35. MAINTENANCE OF TRANSFER ASSEMBLY (CONT).

INSPECTION/REPAIR I

1 Inspect for broken, damaged, or missing parts.

2 For complete repair of transfer assembly, refer to TM 9-2520-234-35.

3 For disposition of shipping and storage containers, notify depot maintenance.

4 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1).

INSTALLATION I

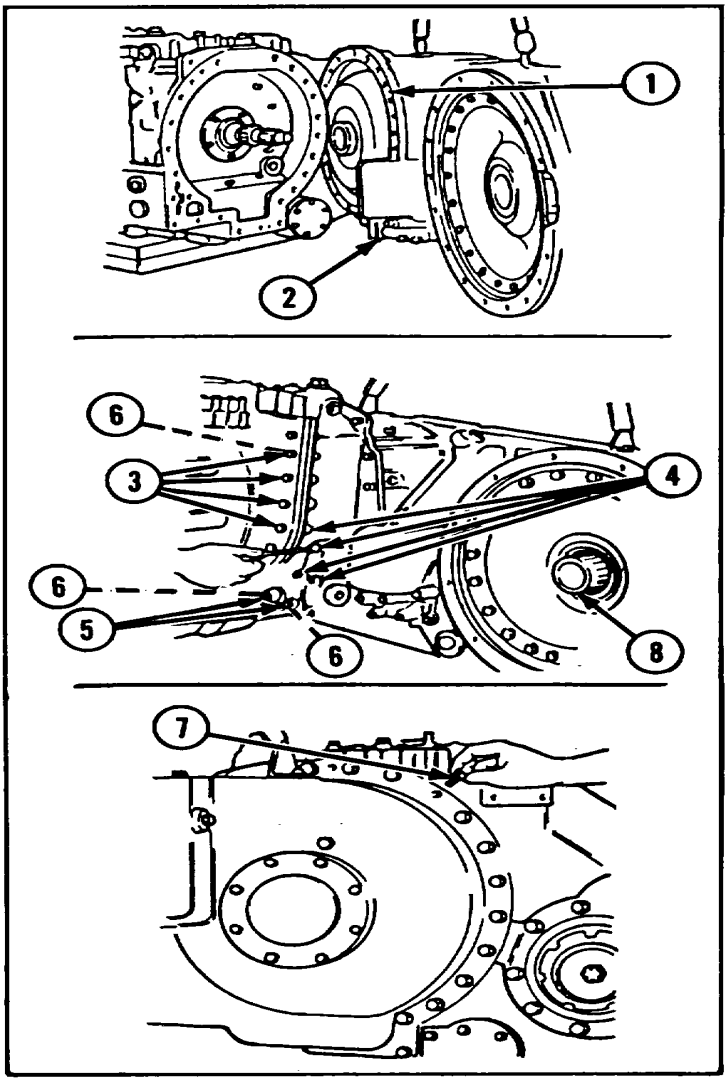
1 Install new gasket (1) and align transfer assembly (2) with transmission.

2 Install four 1-1/2-in. bolts (3), four 6-in. bolts (4), two 5-1/4-in. bolts (5), and ten washers (6). Torque bolts to 42.0 to 50.0 ft-lb (56.9 to 67.8 N-m).

3 Install 16 new self-locking bolts (7). Torque new self-locking bolts to 42.0 to 50.0 ft-lb (56.9 to 67.8 N-m).

4 Install engine coupling shaft (8).

5 Remove sling and hoist from housing.



2-36. MAINTENANCE OF AUXILIARY DRIVE ASSEMBLY.

This task covers: **a. Disassembly** **b. Inspection/Repair** **c. Reassembly**

INITIAL SETUP:

Tools and Special Tools
- Automotive maintenance and repair shop equipment: field maintenance, basic, less power (SC 4910-95-A31)
  - Micrometer
  - Plier wire twister
  - Torque wrench (O to 175 ft-lb)
- Face wrench socket (item 26, appx E)
- Jacking screw (3) (item 22, appx E)

Materials/Parts
- Antiseize compound (item 5, appx B)
- Bearing gage (item 17, appx B)
- Grease (item 19, appx B)
- Lockwire (item 38, appx B)
- Preformed packing
- Preformed packing
- Shim
- Shim (2)
- White enamel (item 15, appx B)

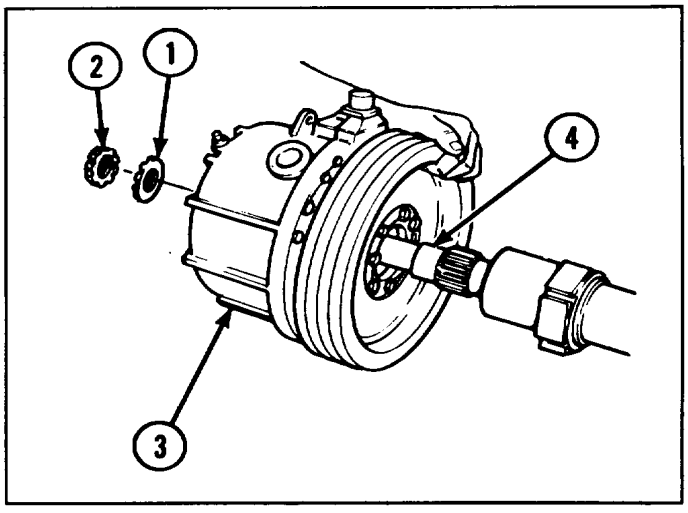
References
- TM 9-2350-304-10
- TM 9-2350-304-20-1
- TM 9-2350-304-24P-1

Equipment Conditions
- Auxiliary drive installation removed (TM 9-2350-304-20-1)

DISASSEMBLY

1 Straighten tangs on key washer (1). Use face wrench socket to remove plain round nut (2) and key washer (1).

2 Grasp vehicular drive (3) and pull from clutch drive shouldered shaft (4).



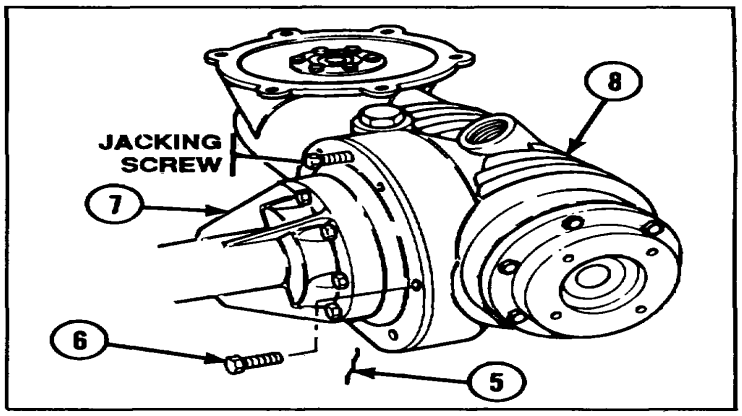
2-69

2-36. MAINTENANCE OF AUXILIARY DRIVE ASSEMBLY (CONT).

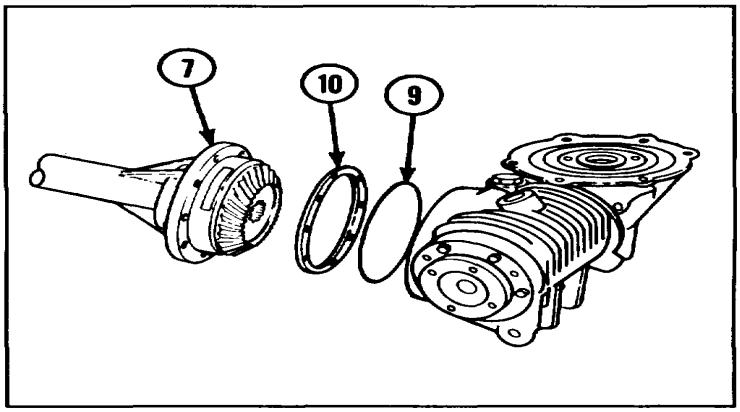
DISASSEMBLY (CONT)

3 Remove lockwire (5) and four hexagon head capscrews (6) securing clutch drive (7) to Input drive (8).

4 Install three jacking screws in threaded holes to separate clutch drive (7) from Input drive (8). Remove jacking screws.

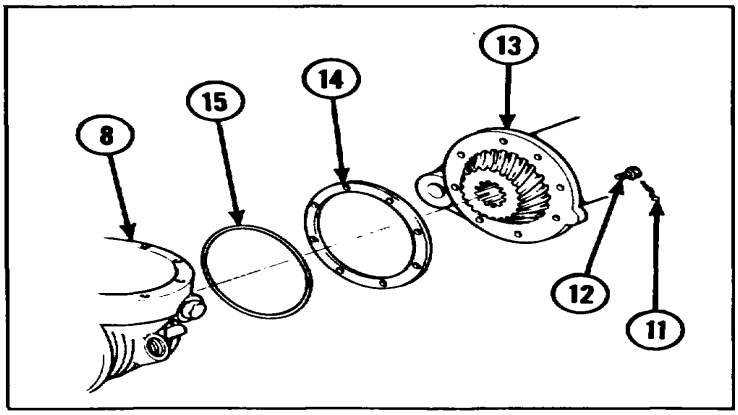


5 Remove preformed packing (9) and two shims (10) from clutch drive (7).



6 Remove lockwire (11) and eight hexagon head capscrews (12).

7 Separate generator drive (13) from input drive (8). Remove two shims (14). Remove preformed packing (15).



INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 Vehicular drive is a repairable assembly. Refer to page 2-75.

3 Clutch drive is a repairable assembly. Refer to page 2-83.

4 Generator drive is a repairable assembly. Refer to page 2-90.

5 Input drive is a repairable assembly. Refer to page 2-105.

6 Repair is by replacement of authorized parts (TM 9-2350-204-24P-1).

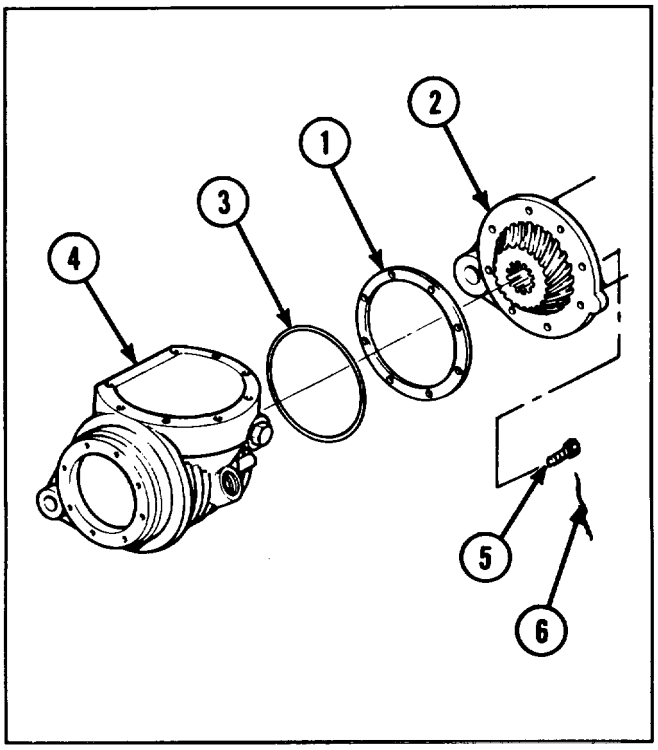
REASSEMBLY

1 Install two new shims (1) on face of generator drive (2).

2 Install new preformed packing (3) in groove of input drive (4).

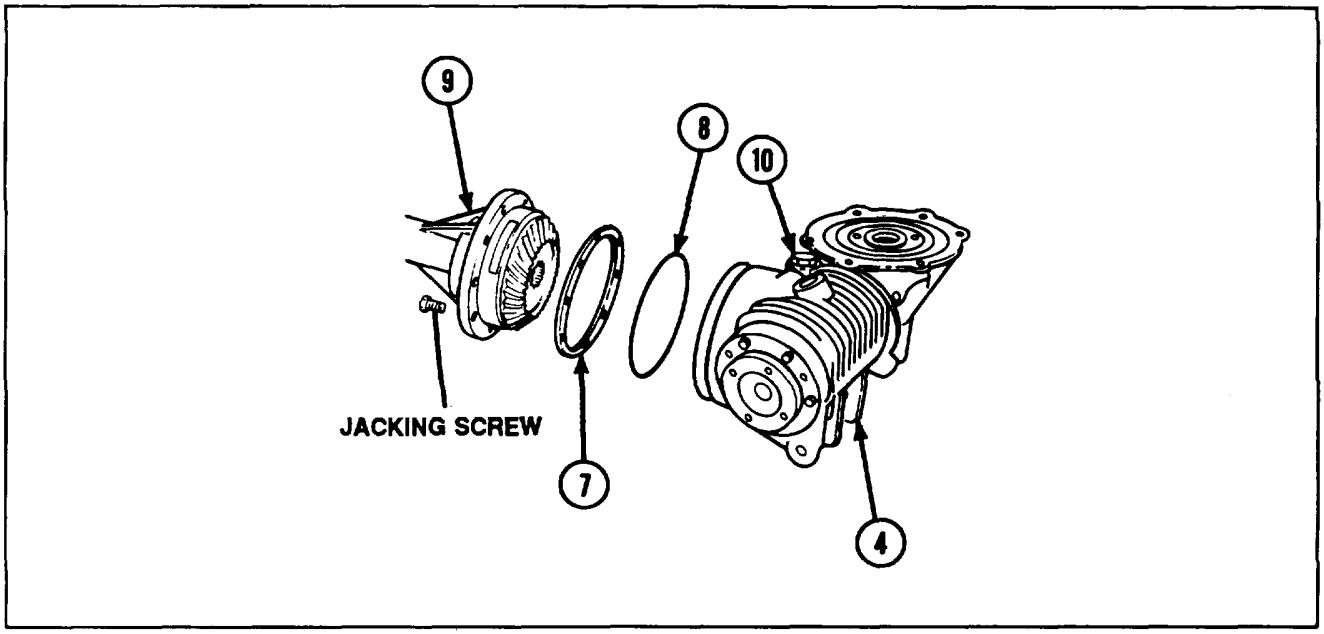
3 Install generator drive (2) on input drive (4) and secure with eight hexagon head capscrews (5). Secure hexagon head capscrews with lockwire (6).

4 Remove input shaft mechanical housing from input drive mechanical housing (p 2-105).



2-36. MAINTENANCE OF AUXILIARY DRIVE ASSEMBLY (CONT).

REASSEMBLY (CONT)



5 Install two new shims (7) and new preformed packing (8) on clutch drive (9).

6 Install clutch drive (9) into input drive (4) and secure with three evenly spaced jacking screws.

7 Remove plug (10). Insert bearing gage through hole and between large end of output gear teeth while rotating gears by hand. Reverse rotation and remove bearing gage after it has traveled through one tooth. Install plug (10).

8 Measure flattened portion of bearing gage to determine backlash measurement. Backlash should measure 0.005 to 0.006 in. (0.013 to 0.015 cm).

9 If backlash is not correct, remove clutch drive (9) and increase or decrease number of shims (7).

NOTE

Approximately 0.001 in. (0.003 cm) backlash change requires 0.0016 in. (0.0041 cm) shim change (one lamination).

10 Repeat steps 6 thru 9 until proper backlash is obtained.

11 Clean any remaining oil from output gear teeth and apply grease or white enamel on four or five teeth. Use Input shaft opening in input drive for access.

12 Turn shaft counterclockwise and rotate output gears at least one complete revolution.

13 Remove three jacking screws and clutch drive (9).

14 Examine output gear matching gear teeth and determine gear tooth wear pattern. If backlash is correct (fig. 2-1), the gear tooth bearing contact area shall be equal in length and centered on tooth face within 10 percent of length and width. The contact area should be 0.3 to 0.7 in. (7.6 to 17.8 cm).

CAUTION

Contact areas extending to either end of the teeth are not acceptable.

15 Repeat steps 4 thru 13 if wear pattern is not correct (fig. 2-2 and 2-3). If wear pattern cannot be reached through proper shimming, repair generator drive (p 2-90).

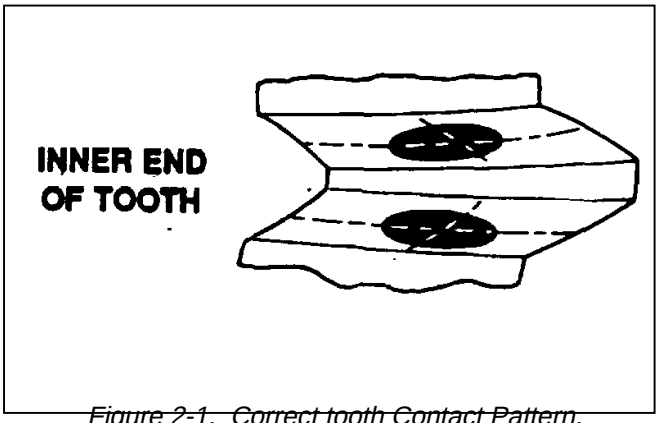


Figure 2-1. Correct tooth Contact Pattern.

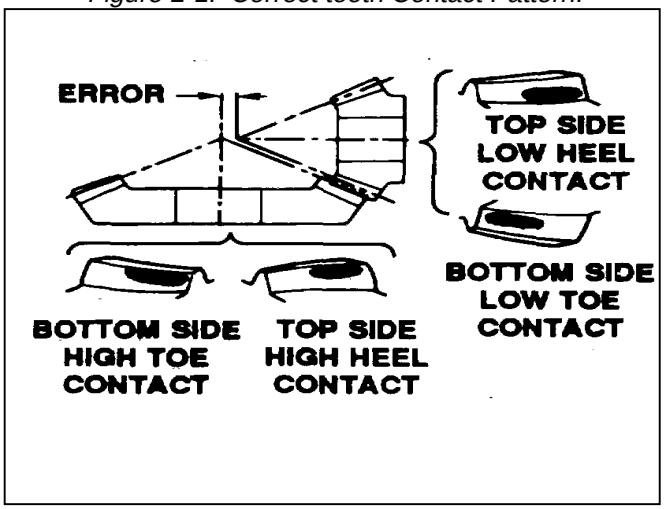


Figure 2-2. Backlash Too Large.

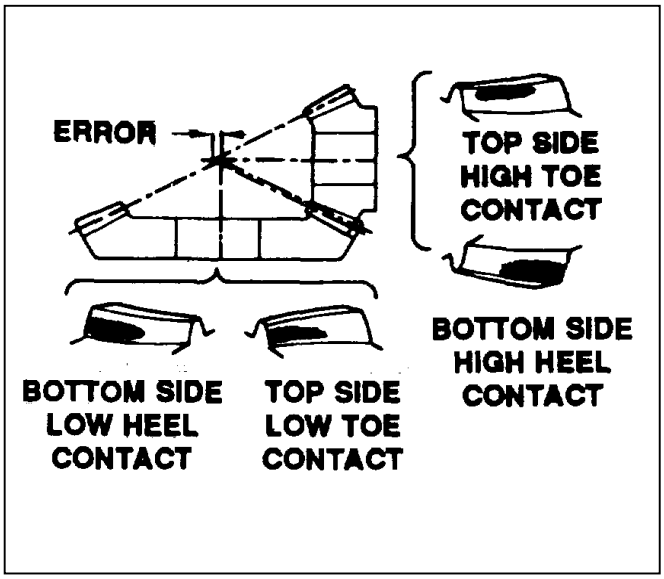


Figure 2-3. Backlash Too Small.

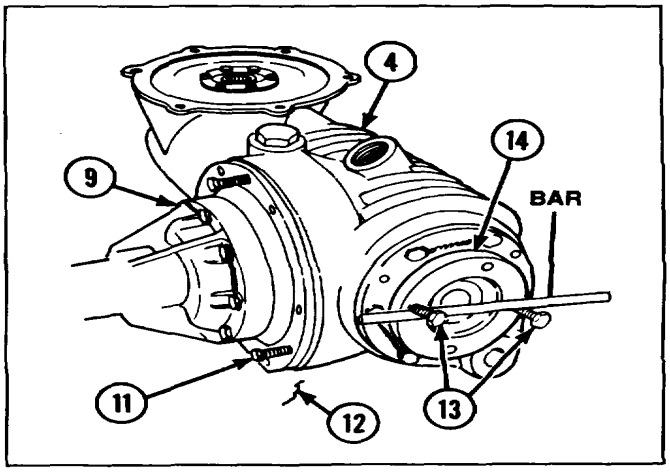
2-36. MAINTENANCE OF AUXILIARY DRIVE ASSEMBLY (CONT).

REASSEMBLY (CONT)

16 Secure clutch drive (9) to input drive (4) with four capscrews (11) in bottom holes. Secure capscrews with new lockwire (12).

17 Install input shaft mechanical housing in input drive mechanical housing (p 2-105).

18 Partially install two screws (13) in input shouldered shaft (14). Prevent clutch drive shouldered shaft from turning by placing a bar between screws.

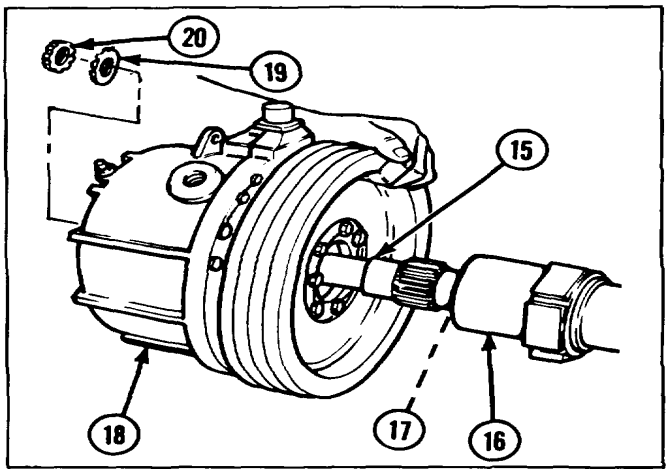


19 Apply antiseize compound to splines and mating surfaces of clutch drive shouldered shaft (15), drive shaft sleeve (16), and inner bearing ring (17).

20 Install vehicular drive (18) on clutch drive shouldered shaft (15). Make sure splines mate properly.

21 Secure vehicular drive (18) to clutch drive shouldered shaft (15) with key washer (19) and plain round nut (20). Using wrench, torque nut to 110 to 150 ft-lb (149 to 203 N-m). Bend tangs of key washer (19) against plain round nut (20).

22 Lubricate auxiliary drive. Refer to TM 9-2350-304-10.



2-37. MAINTENANCE OF AUXILIARY DRIVE ASSEMBLY (VEHICULAR DRIVE).

This task covers: **a. Disassembly** **b. Inspection/Repair** **c. Reassembly**

INITIAL SETUP:

Tools and Special Tools
- Automotive maintenance and repair shop equipment: field maintenance, basic, less power (SC 4910-95-A31)
  - • Arbor press
  - • Plier wire twister
  - • Soldering gun
- Bearing replacer (item 15, appx E)
- Clutch bearing replacer (item 20, appx E)
- Jacking screw (2) (item 23, appx E)
- Remover and replacer (item 13, appx E)
- Seal inserter (item 8, appx E)

Materials/Parts
- Adhesive silicone (item 4, appx B)
- Grease (item 19, appx B)
- Lockwire (item 38, appx B)
- Plain encased seal (2)
- Rubber silicone compound (item 29, appx B)
- Self-locking nut
- Solder (item 31, appx B)

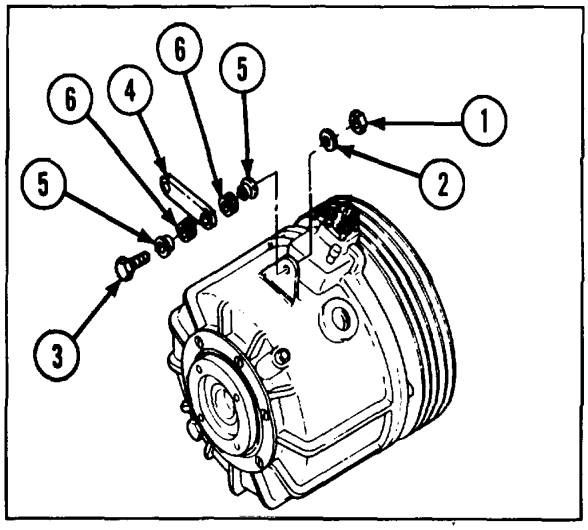
References
- MIL-G-10924
- TB SIG-222
- TM 9-214
- TM 9-2350-304-24P-1

Equipment Conditions
- 2-69 Vehicular drive removed

DISASSEMBLY

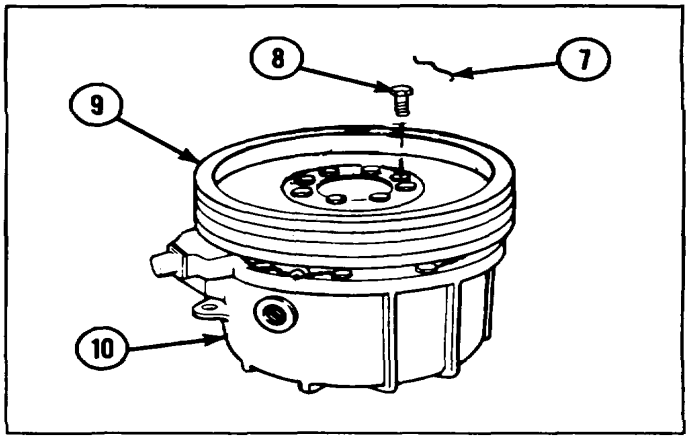
1 Remove self-locking nut (1), flat washer (2), hexagon head capscrew (3), and connecting link (4).

2 Remove two sleeve spacers (5) and two nonmetallic grommets (6) from connecting link (4).

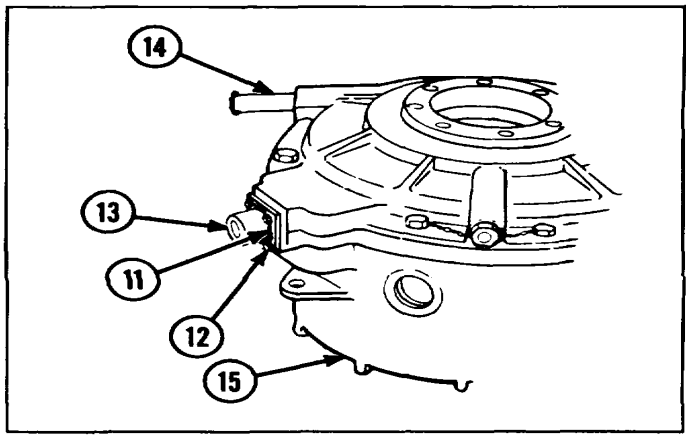


2-37. MAINTENANCE OF AUXILIARY DRIVE ASSEMBLY (VEHICULAR DRIVE) (CONT.)

DISASSEMBLY (CONT)

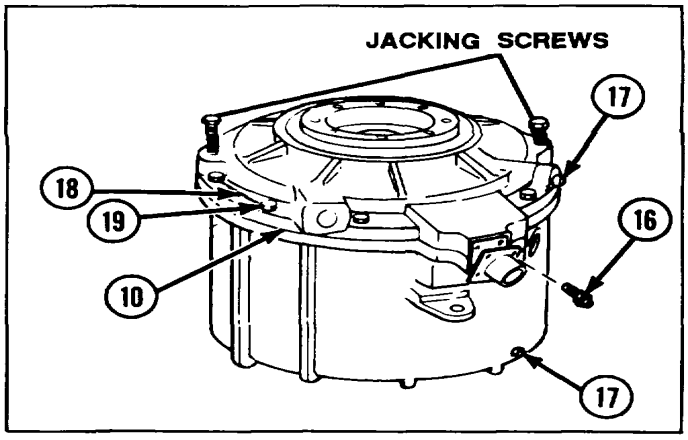


3 Remove lockwire (7), eight hexagon head capscrews (8), and groove pulley (9) from mechanical clutch end housing (10).



4 Remove lockwire (11) and four socket head capscrews (12). Loosen receptacle connector (13).

5 Remove gage rod tube (14) from mechanical clutch housing (15).



6 Remove lubricant fitting (16).

7 Remove two pipe plugs (17).

8 Remove lockwire (18) and ten hexagon head capscrews (19) securing mechanical clutch end housing (10). Use two jacking screws to loosen and remove mechanical clutch end housing (10).

9 Remove top part of magnetic clutch (20) with electrical receptacle attached from bottom part of magnetic clutch (21).

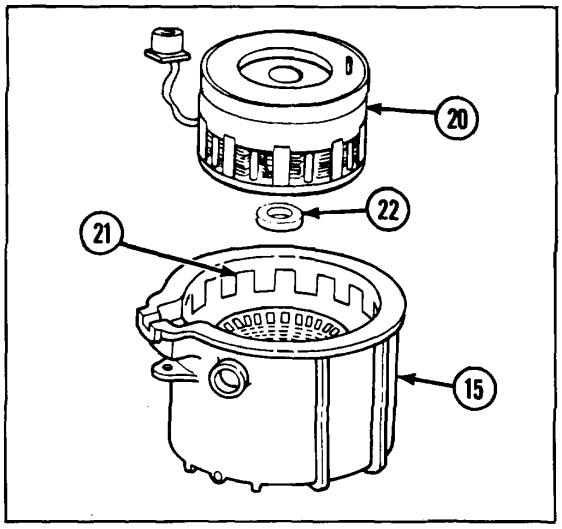
10 Remove ring spacer (22) from bottom part of magnetic clutch (21).

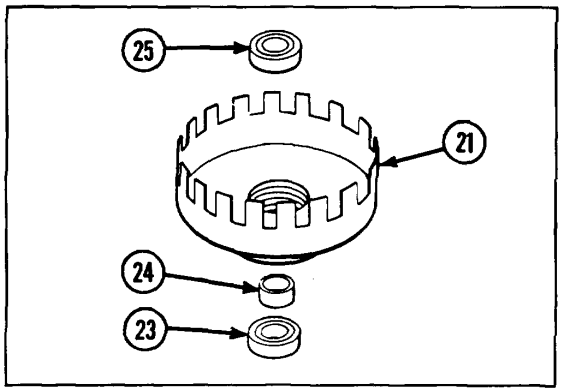
11 Turn mechanical clutch housing (15) over. sing hammer and drift, lightly tap bottom part of magnetic clutch (21) free and remove.

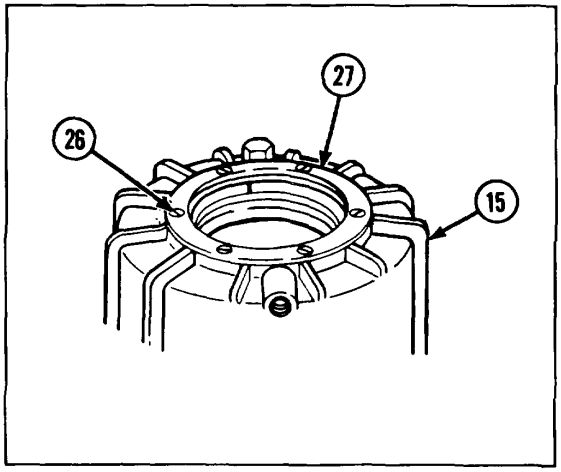
12 Using drift, tap free and remove outer annular ball bearing (23) and sleeve spacer (24) from bottom part of magnetic clutch (21).

13 Turn bottom part of magnetic clutch (21) over and remove inner annular ball bearing (25).

14 Remove six staked machine screws (26) and retaining plate (27) from mechanical clutch housing (15).



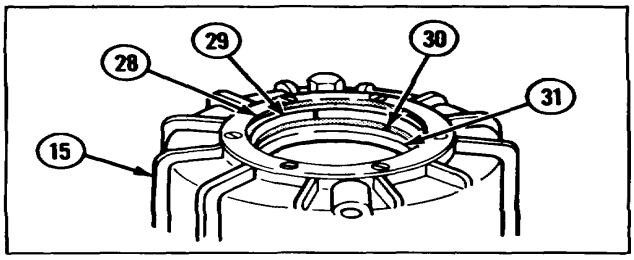




2-37. MAINTENANCE OF AUXILIARY DRIVE ASSEMBLY (VEHICULAR DRIVE) (CONT).

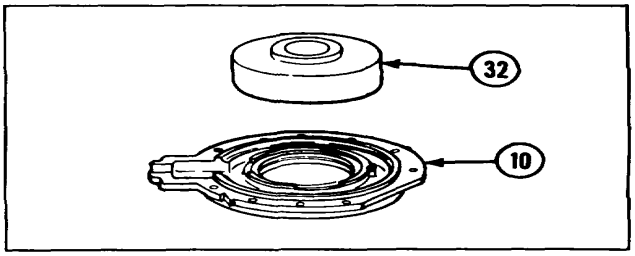
DISASSEMBLY (CONT)

15 Using remover and replacer, remove plain encased seal (28), retaining ring (29), annular ball bearing (30), and clutch shield (31) from mechanical clutch housing (15).

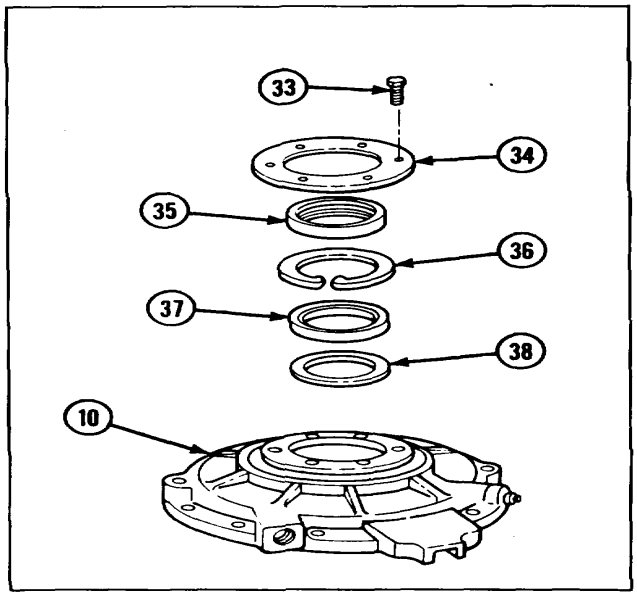


16 Remove fan drive body hub (32) from mechanical clutch end housing (10).

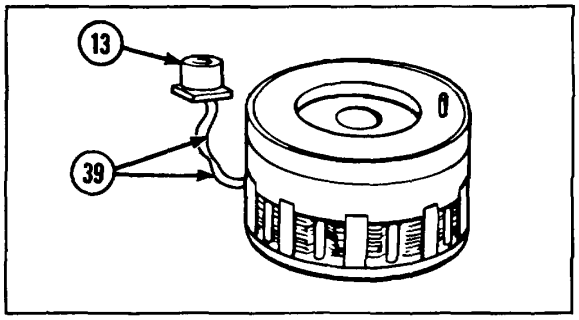
17 Remove six staked machine screws (33) and retaining plate (34) from mechanical clutch end housing (10).



18 Using remover and replacer, remove plain encased seal (35), retaining ring (36), annular ball bearing (37), and clutch shield(38) from mechanical clutch end housing (10).



19 Unsolder electrical leads (39) from receptacle connector contact pins, and remove receptacle connector (13).



INSPECTION /REPAIR

1 Inspect for broken, damaged, or missing parts.

2 Inspect annular ball bearings. Refer to TM 9-214.

3 Inspect magnetic clutch for wear or warp- age of clutch plates and signs of arcing or overheating. Spin rotor by hand and listen for grinding noise. Apply 24 V dc to magnetic coil and check clutch operation. If damaged, notify depot *maintenance.*

4 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1) which do not meet inspection criteria.

REASSEMBLY

1 Pack annular ball bearing (1) with grease. Install clutch shield (2) and annular ball bearing (1) into mechanical clutch housing (3), using clutch bearing replacer and press.

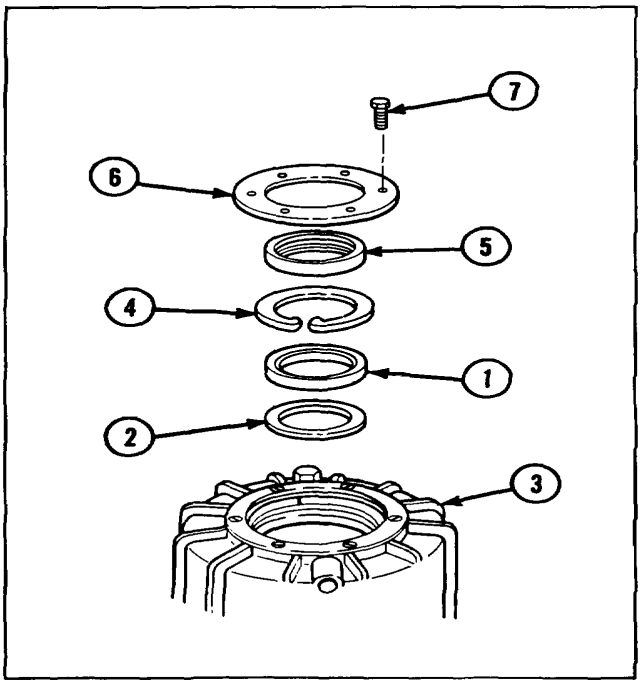
2 Install retaining ring (4).

CAUTION

An improperly installed plain encased seal will leak during operation.

3 Lightly lubricate clutch mechanical housing seal cavity with grease. Install new plain encased seal (5), using remover and re- placer. Ensure lip of seal is toward inside of housing.

4 Install retaining plate (6) and secure with six machine screws (7). Stake each ma- chine screw in place.



2-37. MAINTENANCE OF AUXILIARY DRIVE ASSEMBLY (VEHICULAR DRIVE) CONT).

REASSEMBLY (CONT)

5 Pack annular ball bearing (8) with grease. Install clutch shield (9) and annular ball bearing (8) into mechanical clutch end housing (10), using clutch bearing replacer and press.

6 Install retaining ring (11).

CAUTION

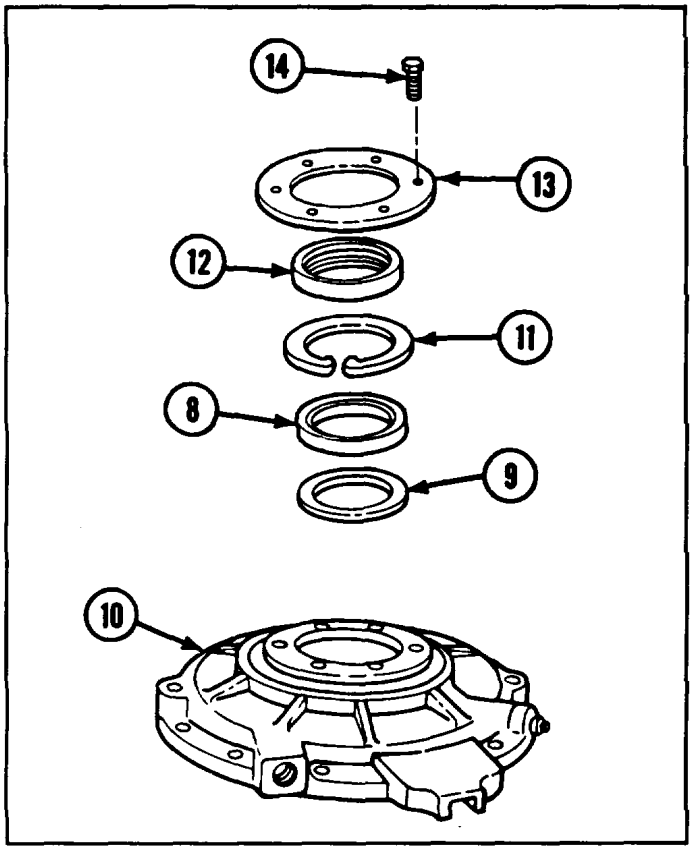
An improperly installed plain encased seal will leak during operation.

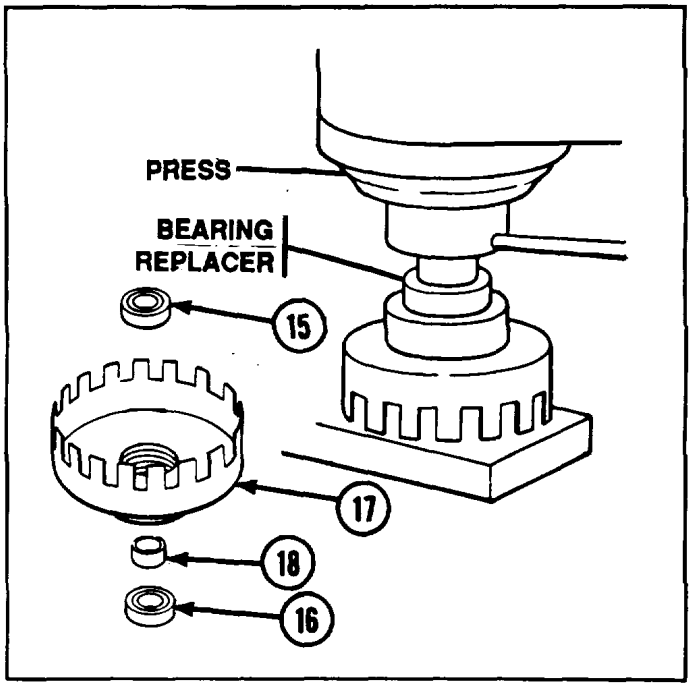
7 Lightly lubricate mechanical clutch end housing seal cavity with grease. Install new plain encased seal (12), using seal inserter. Ensure lip of seal is toward in- side of housing

8 Install retaining plate (13) and secure with six machine screws (14). Stake each machine screw in place.

9 Pack Inner annular ball bearing (15) and annular ball bearing (16) with grease. Place splined end of clutch output flange (17) down and install annular ball bearing (16) using bearing replacer and press.

10 Turn clutch output flange (17) over and install sleeve spacer (18). Pack space between sleeve spacer (18), annular ball bearing (16), and clutch output flange (17) with grease. Install inner annular ball bearing (15) using bearing replacer and press



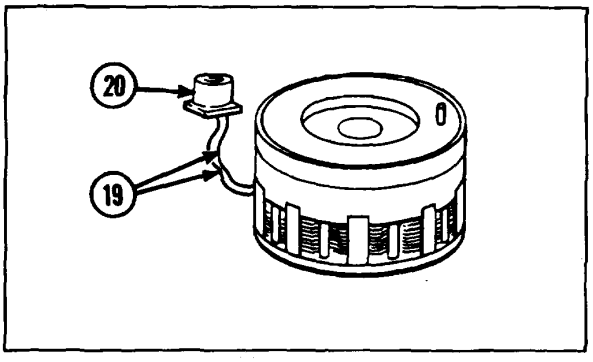


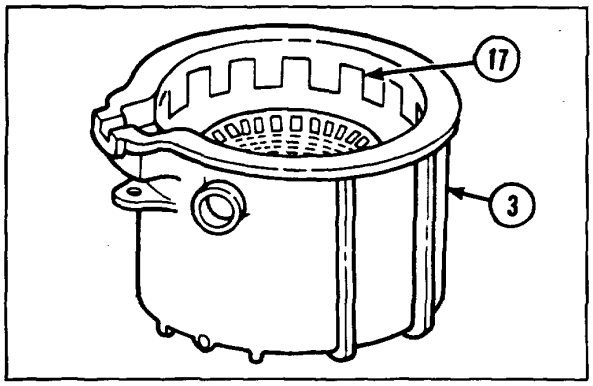
11 Solder electrical leads (19) to receptacle connector (20) contact pins. Refer to TB SIG-222.

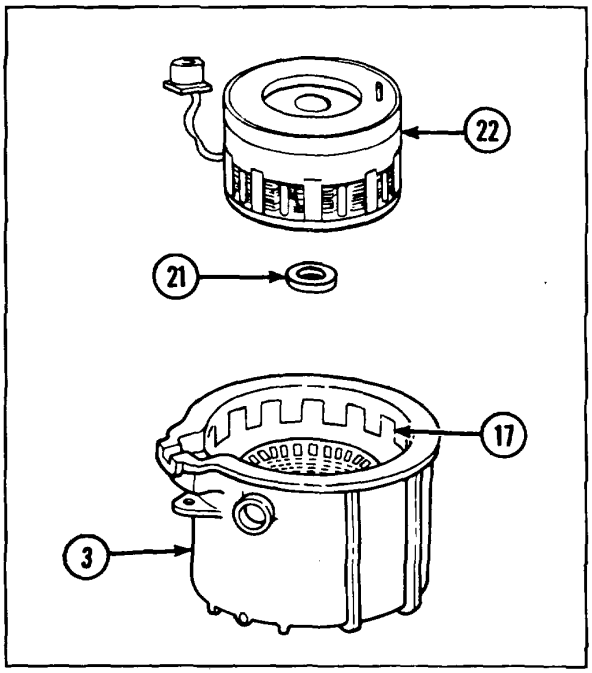
12 Install bottom part of magnetic clutch (17) into mechanical clutch housing (3). Ensure that lip of inner seal is worked up and over edge of magnetic clutch (17) and points Inward evenly around clutch.

13 Place ring spacer (21) in bottom part of magnetic clutch (17) with external chamfer down.

14 Position top part of magnetic clutch (22) directly over mechanical clutch housing (3). Carefully lower top part of magnetic clutch (22) into mechanical clutch housing (3), rotating slightly to aid the alignment of magnetic clutch teeth with clutch plate grooves







2-37. MAINTENANCE OF AUXILIARY DRIVE ASSEMBLY (VEHICULAR DRIVE) CONT).

REASSEMBL Y (CONT)

CAUTION

A nicked, scratched, or cut seal lip will leak during operation.

15 Install fan drive body hub (23) into mechanical clutch end housing (10). Ensure lip of seal is worked up and over edge of output flange and points inward evenly around flange.

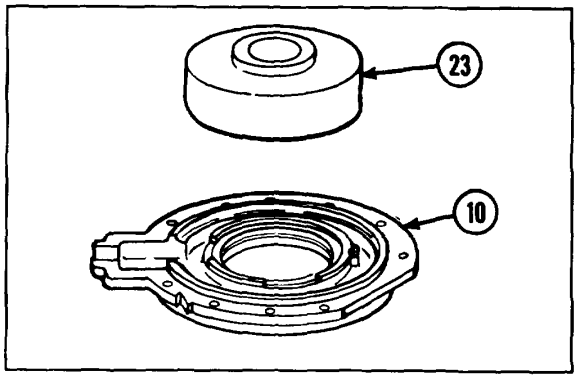
16 Apply a coat of rubber silicone compound or adhesive silicone to mating surfaces of mechanical clutch housing (3) and mechanical clutch end housing (10).

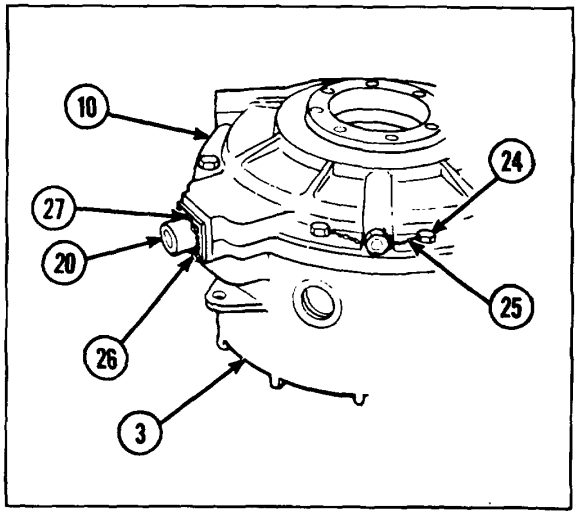
17 Install mechanical clutch end housing (10) on mechanical clutch housing (3) by aligning guide pin on magnetic clutch with hole In mechanical clutch end housing (10). Secure with ten hexagon head capscrews (24) and new lockwire (25).

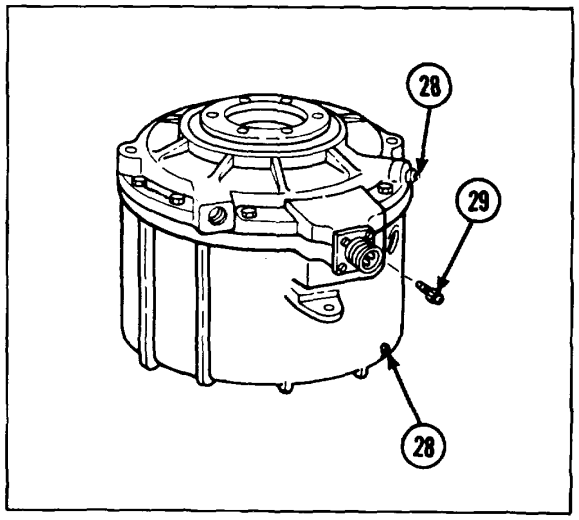
18 Secure receptacle connector (20) with four socket head capscrews (26) and new lockwire (27).

19 Install two 5.0-psi (34.5-kPa) pressure relief grease fittings. Pack two new plain encased seals with grease. Refer to MIL- G-10924. Remove two pressure relief grease fittings and install two pipe plugs (28).

20 Install lubricant fitting (29).





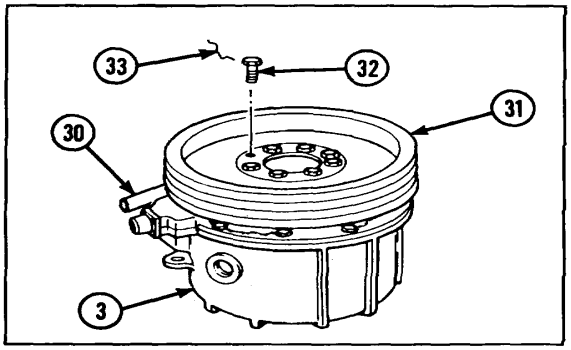


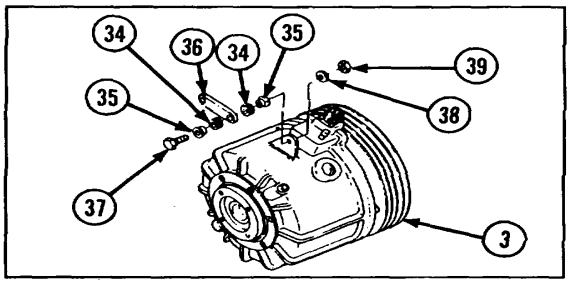
21 Install gage rod tube (30) in mechanical clutch housing (3).

22 Install groove pulley (31) and secure using eight hexagon head capscrews (32). Secure capscrews with new lockwire (33).

23 Install two nonmetallic grommets (34) and two sleeve spacers (35) in connecting link (36).

24 Position connecting link (36) on mechanical clutch housing (3), and secure with hexagon head capscrew (37), flat washer (38), and new self-locking nut (39).





2-38. MAINTENANCE OF AUXILIARY DRIVE ASSEMBLY (CLUTCH DRIVE).

This task covers: a. *Disassembly* *b. Inspection/Repair* *c. Reassembly*

INITIAL SETUP

Tools and Special Tools
- Automotive maintenance and repair shop equipment: field maintenance, basic, less power (SC 4910-95-A31)
  - • Mechanical gear puller **kit**
  - • Pliers wire twister
  - • Puller
  - • Torque wrench (0 to 300 in.-LB)
  - • Vise
- Bearing cup replacer (item 19, appx E)
- Face socket wrench (item 28, appx E)
- Gear replacer (item 21, appx E)
- Remover and replacer (item 13, appx E)
- Replacer (item 14, appx E)
- Wood block

Materials/Parts
- Gasket
- Grease (item 17, appx B)
- Lockwasher
- Lockwire (item 36, appx B)
- Plain encased seal (2)

References
- TM 9-214
- TM 9-2350-304-24P-1

Equipment Conditions
- 2-69 Clutch drive removed

DISASSEMBLY I

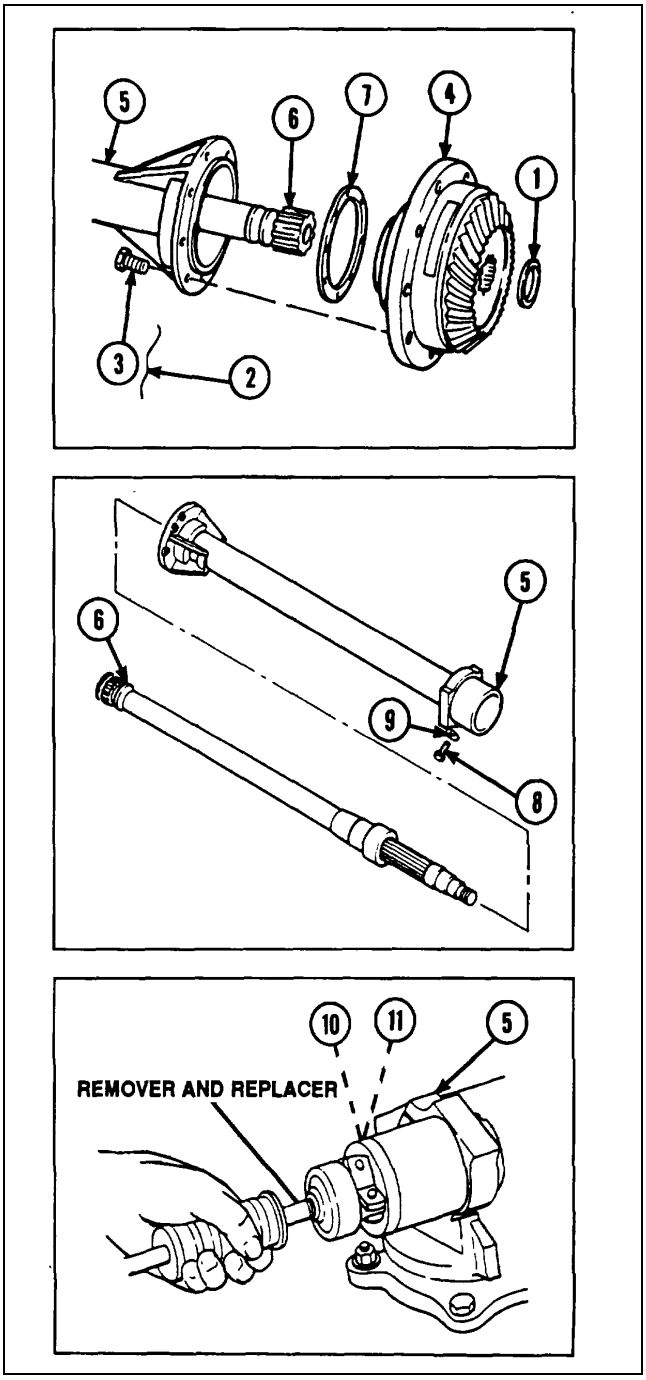
1 Remove retaining ring (1).

2 Remove lockwire (2) and eight capscrews (3).

3 Pull output drive gear mechanical housing (4) with attached parts from drive shaft housing (5) and clutch shouldered shaft (6). Remove gasket (7).

4 Pull clutch shouldered shaft (6) from for- ward end of drive shaft housing (5). 5 Remove socket head capscrew (8) and lockwasher (9).

6 Place drive shaft housing (5) in vise. Using remover and replacer, remove two plain encased seals (10) and needle roller bearing (11) from drive shaft housing (5)



7 Using puller, remove inner bearing ring (12) from clutch shouldered shaft (6).

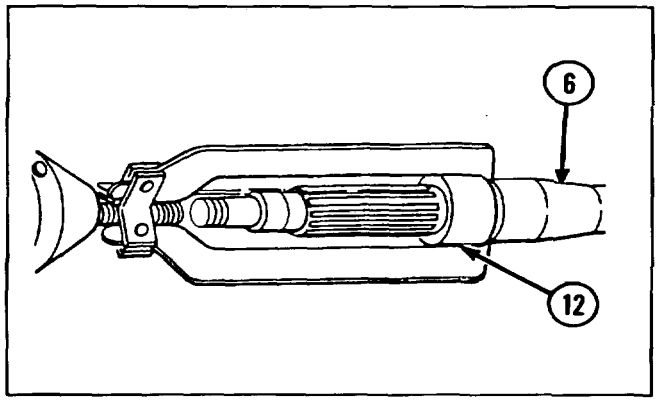
8 Straighten tangs on key washer (13). Re- move plain round nut (14).

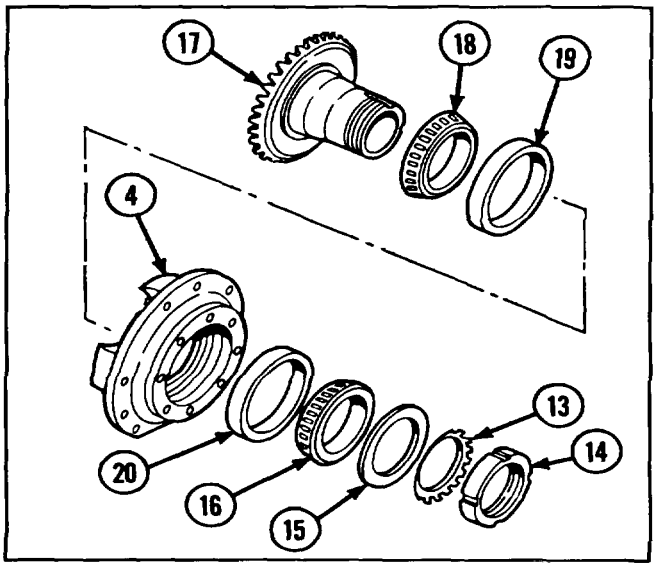
9 Remove key washer (13), bearing retaining key washer (15), and tapered roller bearing (16) from output drive gear mechanical housing (4).

10 Remove spiral drive gear (17) with cone- and-rollers (18) from output drive gear mechanical housing (4).

11 Using bearing puller, remove cone-and- rollers (18) from output drive spiral gear (17).

12 Using bearing puller, remove two tapered roller bearing cups (19 and 20) from output drive gear mechanical housing (4).





2-38. MAINTENANCE OF AUXILIARY DRIVE ASSEMBLY (CLUTCH DRIVE) (CONT).

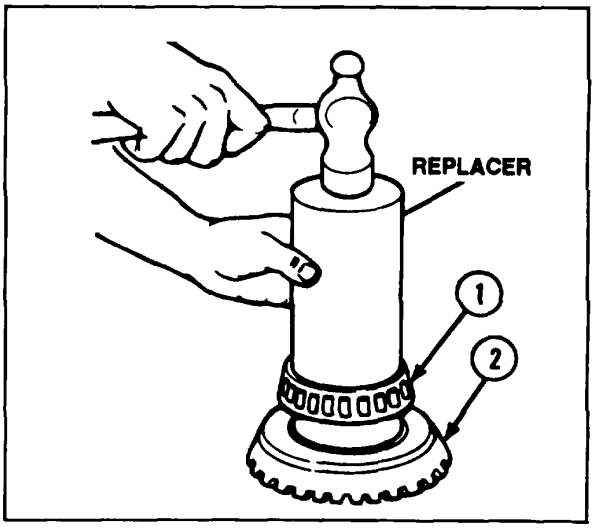
INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 Inspect all bearings and Inner bearing ring. Refer to TM 9-214.

3 If required, replace output drive spiral gear and output drive spiral pinion gear as matched sets. Refer to page 2-69.

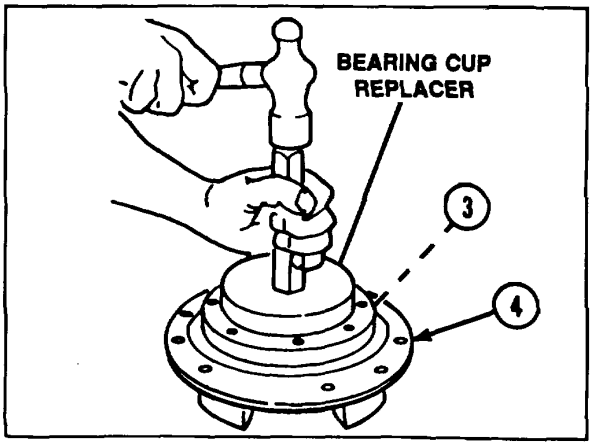
4 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1) which do not meet inspection criteria.



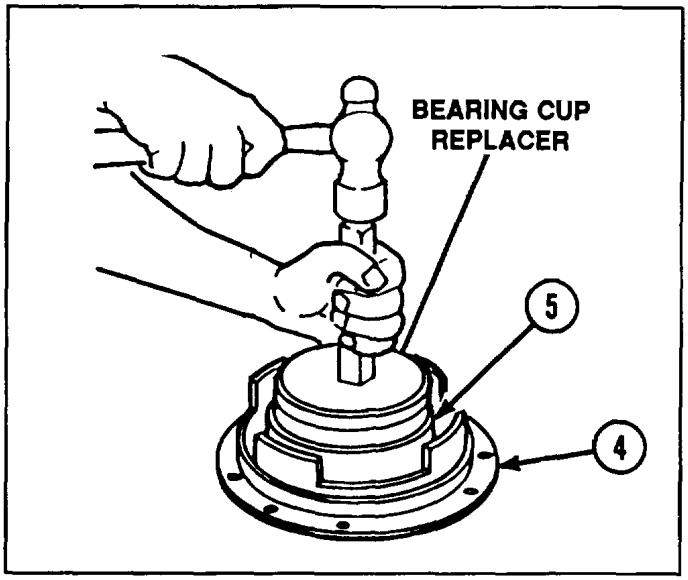
REASSEMBLY

1 Using replacer, install cone-and-rollers (1) on output drive spiral gear (2).

2 Using bearing cup replacer, install tapered roller bearing cup (3) in output drive gear mechanical housing (4).

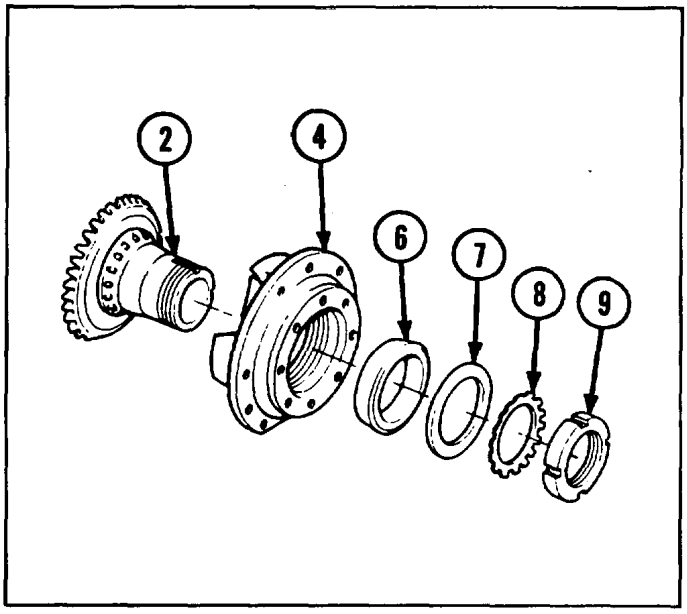


3 Using bearing cup replacer, install tapered roller bearing cup (5) in output drive gear mechanical housing (4).



4 Install output drive spiral gear (2) in output drive gear mechanical housing (4).

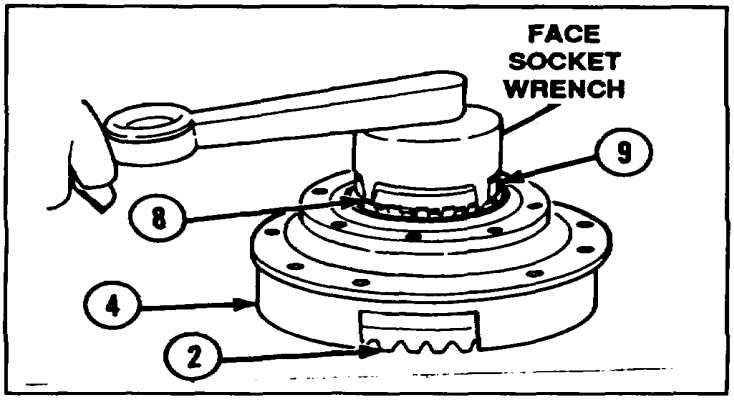
5 Place gear end of output drive gear mechanical housing (4) on flat surface and install tapered roller bearing cone (6), bearing retaining key washer (7), key washer (8), and plain round nut (9) on output drive spiral gear (2).



2-38. MAINTENANCE OF AUXILIARY DRIVE ASSEMBLY (CLUTCH DRIVE) (CONT).

REASSEMBLY (CONT)

6 Using face socket wrench and torque wrench, tighten plain round nut (9) to pre- load bearings until 15.0 to 25.0 in.-LB (1.7 to 2.8 N-m) is required to rotate spiral drive gear (2) in output drive gear mechanical housing (4).

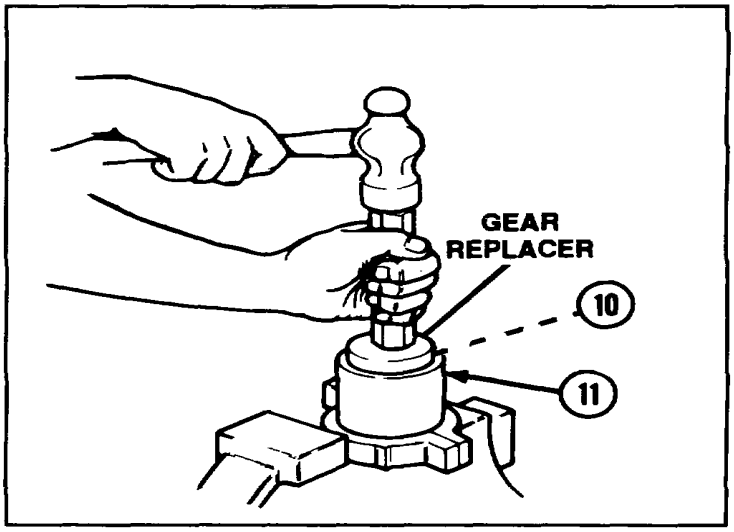


7 Bend tangs of key washer (8) into grooves of plain round nut (9).

8 Lightly lubricate bearing surface with grease. Using gear replacer, install needle roller bearing (10) into drive shaft housing (11).

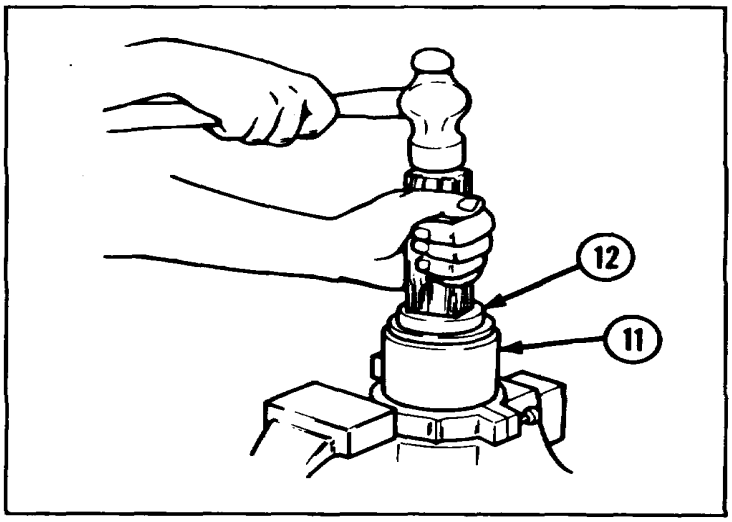
CAUTION

An improperly installed plain encased seal will leak during operation.



9 Using wood block, Install two new plain encased seals (12) in drive shaft housing (11). Install new inner plain encased seal against needle roller bearing with open face of seal facing bearing. Install new outer plain encased seal with open face of seal facing out.

10 Pack seal openings with grease.



11 Using drift, install inner bearing ring (13) on clutch shouldered shaft (14).

12 Install clutch shouldered shaft (14) Into drive shaft housing (11). Ensure that splines do not damage needle roller bearing and that lip of inner seal is worked over edge of clutch shouldered shaft and points inward evenly.

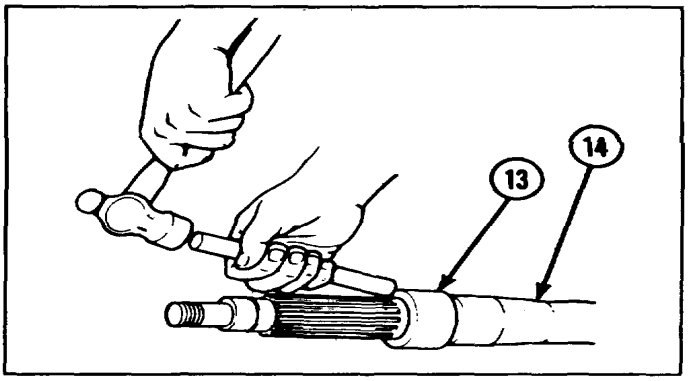
13 Install new lockwasher (15) and socket head capscrew (16) in drive shaft housing(11).

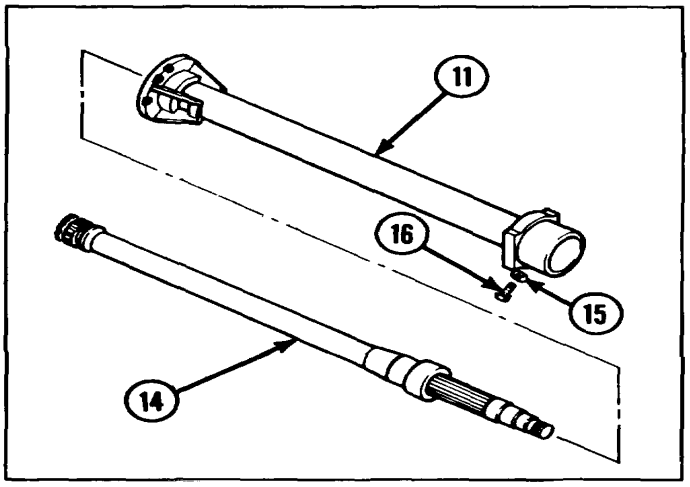
14 Install new gasket .(17) on drive shaft housing (11).

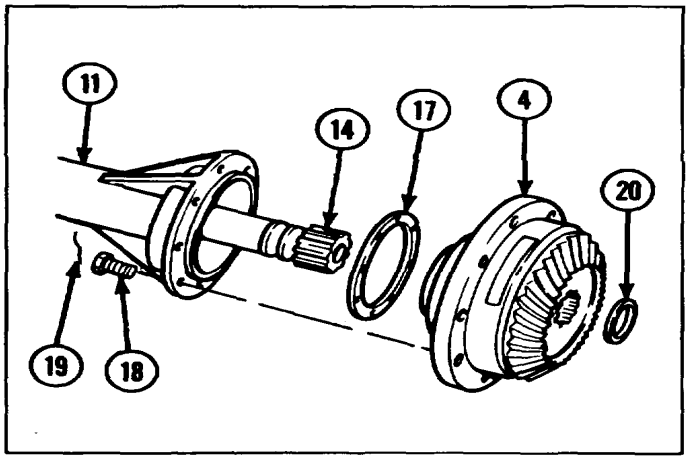
15 Mate splines and insert clutch shouldered shaft (14) through output drive gear mechanical housing (4).

16 Seat output drive gear mechanical housing (4) on drive shaft housing (11) and gasket (17), and secure with eight capscrews (18). Secure capscrews with new lockwire (19).

17 Install new retaining ring (20) on end of clutch shouldered shaft (14).







2-39. MAINTENANCE OF AUXILIARY DRIVE ASSEMBLY (GENERATOR DRIVE).

This task covers: a. *Disassembly* *b. Inspection/Repair* c. *Reassembly*

INITIAL SETUP

Tools and Special Tools
- *Automotive maintenance and repair shop equipment: field maintenance, basic, less power (SC 4910-95-A31)*
  - *Arbor press*
  - *Mechanical gear puller kit*
  - *Pliers wire twister*
  - *Torque wrench (O to 300 in.-LB)*
- *Bearing cup replacer (item 17, appx E)*
- *Bearing cup replacer (item 19, appx E)*
- *Bearing inserter (item 7, appx E)*
- *Bearing remover (item 11, appx E)*
- *Bearing remover (item 12, appx E)*
- *Face socket wrench (item 28, appx E)*
- *Jacking screw (3) (item 23, appx E)*
- *Remover and replacer (item 13, appx E)*
- *Replacer (item 14, appx E)*

Materials/Parts
- *Bearing gage (item 17, appx B)*
- *Lockwire (item 38 , appx B)*
- *Lubricating oil (item 22, appx B)*
- *Plain encased seal*
- *Performed packing*
- *Performed packing (2)*
- *Performed packing*
- *Performed packing*
- *Shim (2)*
- *Shim (4)*
- *White enamel (item 15, appx B)*

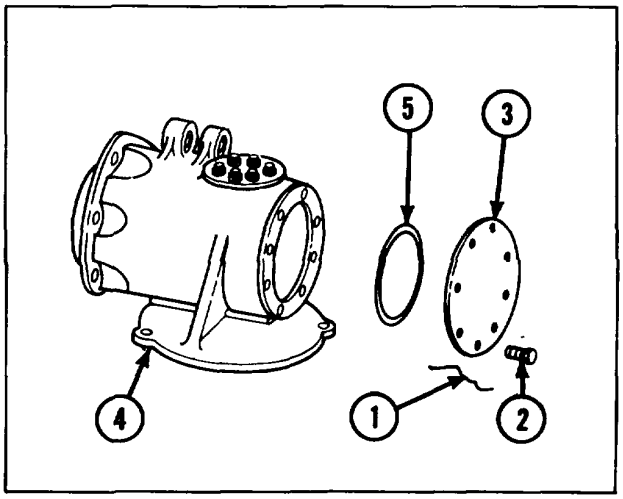
References
- *TM 9-214*
- *TM 9-2350-304-24P-1*

Equipment Conditions
- *2-69 Generator drive removed*

DISASSEMBLY

1 Remove lockwire (1), eight hexagon head capscrews (2), and gear set inspection access cover (3) from generator drive mechanical housing (4).

2 Remove performed packing (5) from gear set inspection access cover (3).

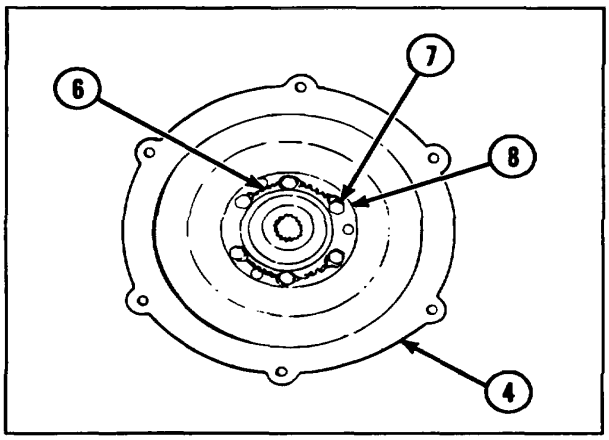


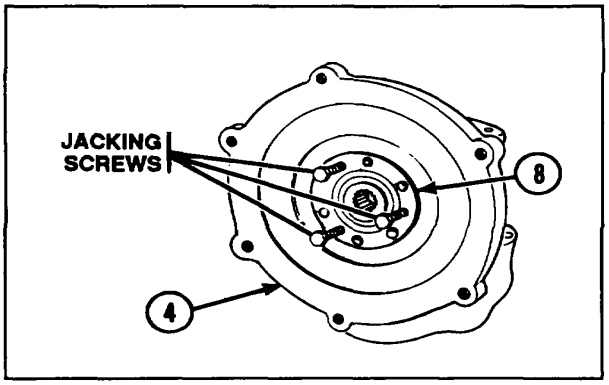
3 Remove lockwire (6) and six hexagon head capscrews (7) securing *drive* gear bearing housing (8) to generator drive mechanical housing (4).

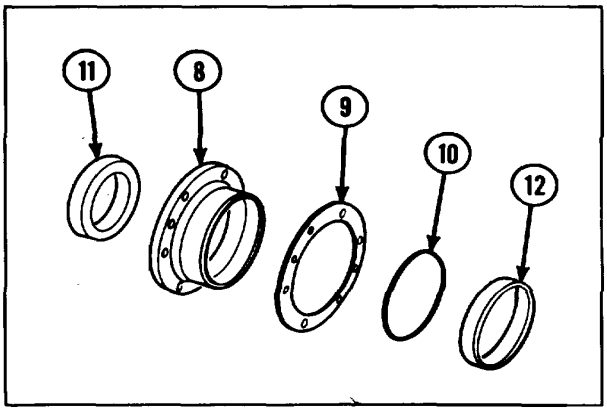
4 Using three jacking screws, remove drive gear bearing housing (8) from generator drive mechanical housing (4).

5 Remove two bearing carrier shims (9) and performed packing (10) from drive gear bearing housing (8).

6 Using bearing remover (item 11, appx E), remove plain encased seal (11) and bearing cup (12) from drive gear bearing housing (8).







2-39. MAINTENANCE OF AUXILIARY DRIVE ASSEMBLY (GENERATOR DRIVE).

DISASSEMBLY (CONT)

7 Remove lockwire (13), six hexagon head capscrews (14), and drive gearcase access cover (15) from generator drive mechanical housing (4).

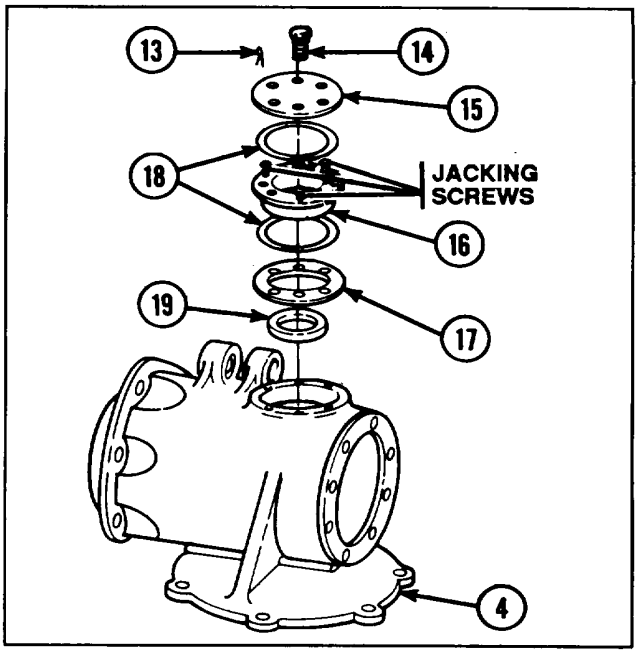
8 Using three jacking screws, remove shaft bearing housing (16).

9 Remove two shims (17) and two pre- formed packing (18) from shaft bearing housing (16).

10 Using remover and replacer, remove bearing cup (19) from shaft bearing housing (16).

11 Remove gear set shouldered shaft (20) with attached roller bearings (21) from generator drive mechanical housing (4).

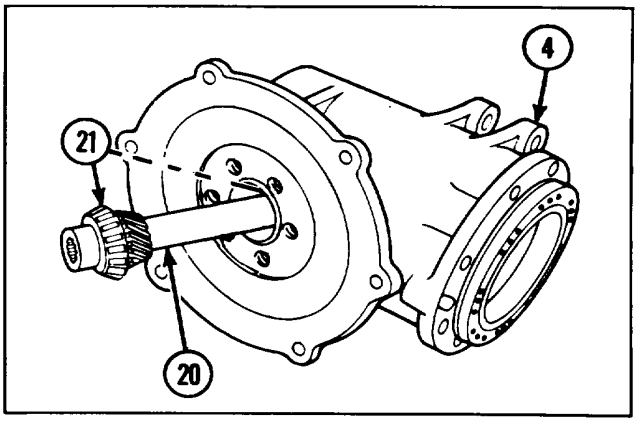
12 Using puller, remove two roller bearings (21) from gear set shouldered shaft (20).

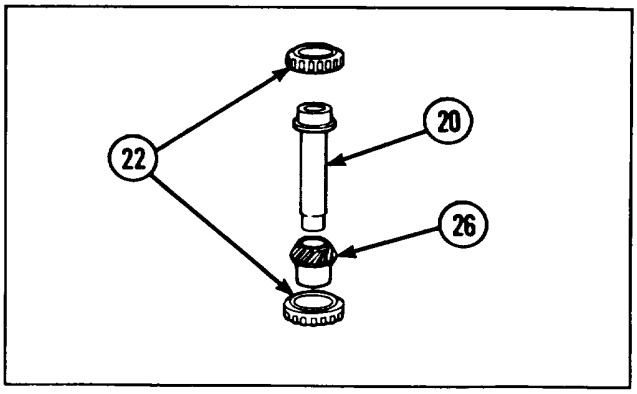


CAUTION

Do not remove bevel gear set spiral gear from gear set shouldered shaft unless gear or shaft is replaced. The bevel gear set spiral gear and bevel gear set spiral pinion gear are a matched set.

13 If required, remove bevel gear set spiral gear (22) from gear set shouldered shaft (20), using puller.

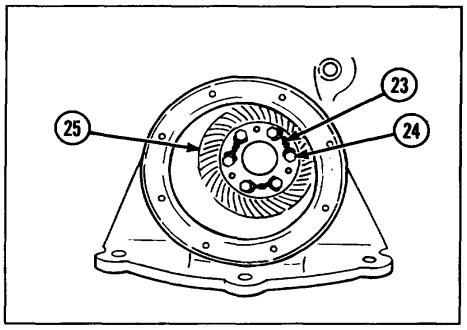


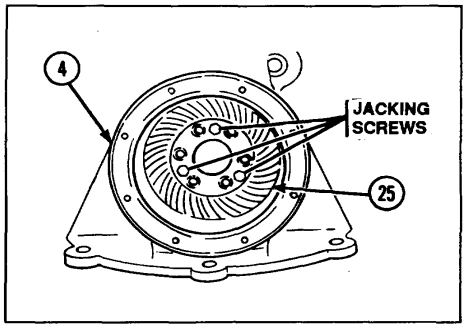


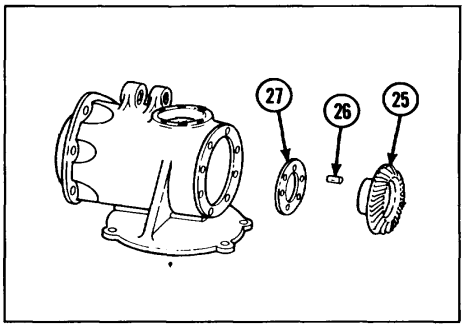
14 Remove lockwire (23) and six hexagon head capscrews (24) from bevel gear set spiral pinion gear (25).

15 Using three jacking screws, remove bevel gear set spiral pinion gear (25) from mechanical generator drive housing (4).

16 Remove machine key (26) and two drive gear shims (27) from bevel gear set spiral pinion gear (25).



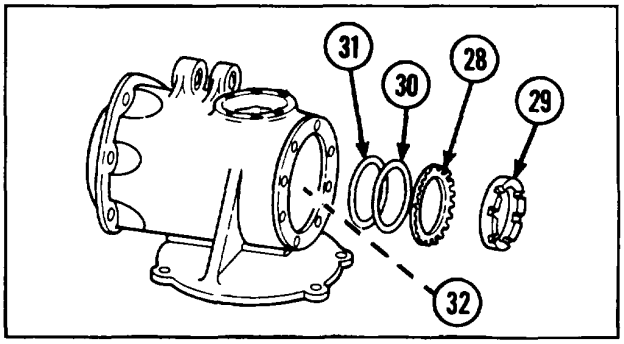




2-39. MAINTENANCE OF AUXILIARY DRIVE ASSEMBLY (GENERATOR DRIVE).

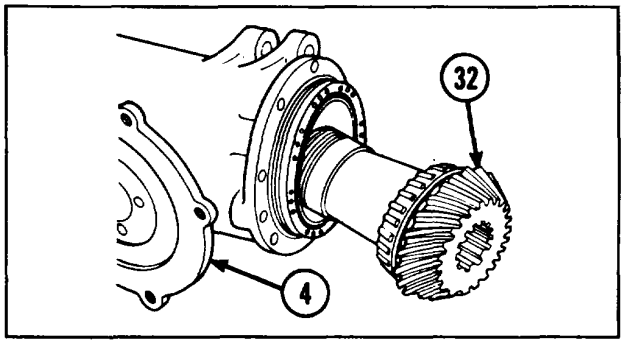
DISASSEMBLY (CONT)

17 Straighten tangs on key washer (28). Using spanner wrench, remove plain round nut (29).



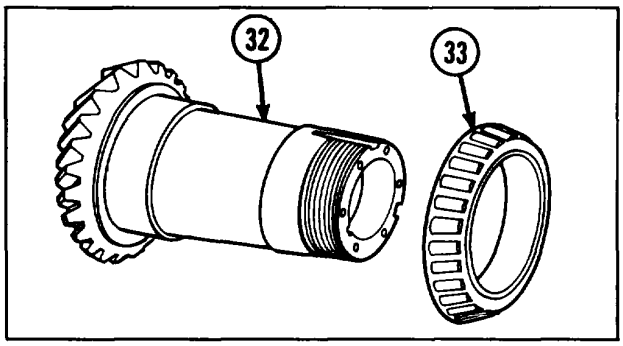
18 Remove key washer (28), flat washer (30), and key washer (31) from main output drive spiral pinion gear (32).

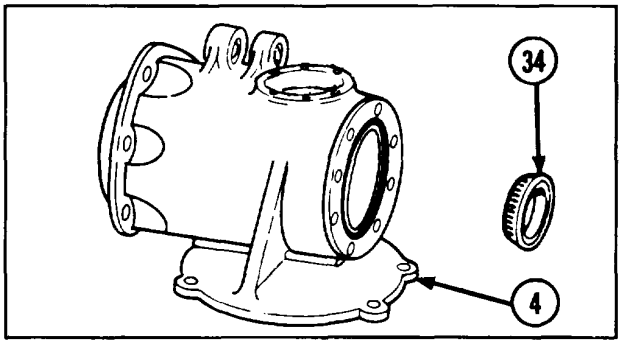
19 Press main output drive spiral pinion gear (32) out of generator drive mechanical housing (4).



20 Using puller, remove cone and rollers (33) from spiral pinion gear (32).

21 Using puller, remove tapered roller bearing (34) from generator drive mechanical housing (4).

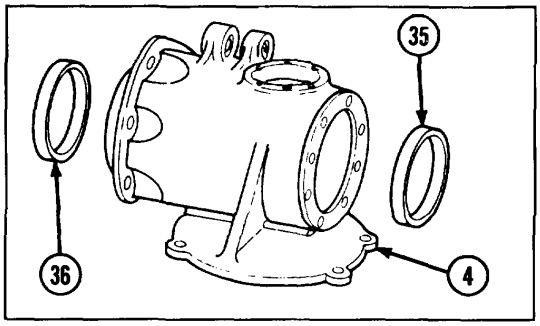




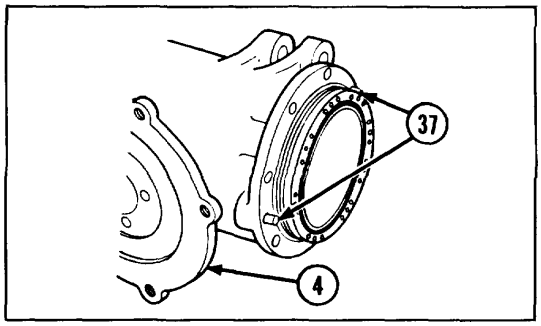
NOTE

Tapered roller bearing cup is supplied with tapered roller bearing. If tapered roller bearing cup is defective, re- place tapered roller bearing.

22 Remove tapered roller bearing cup (35) and tapered roller cup (36) from generator drive mechanical housing (4).



23 If damaged, remove two headless straight pins (37) from generator drive mechanical housing (4).



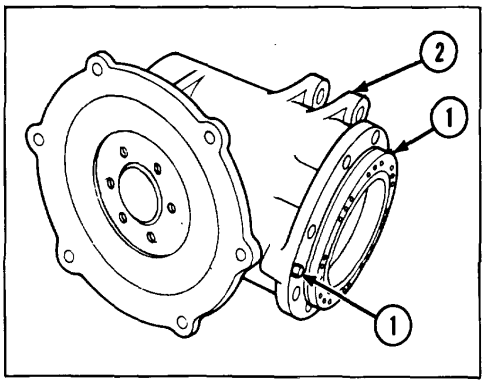
INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing

2 Inspect bearings. Refer to TM 9-214.

3 If required, replace gears as matched se

4 Repair is by replacement of authorized parts (TM 9- 350-04-24P-1) which do not meet inspection criteria.



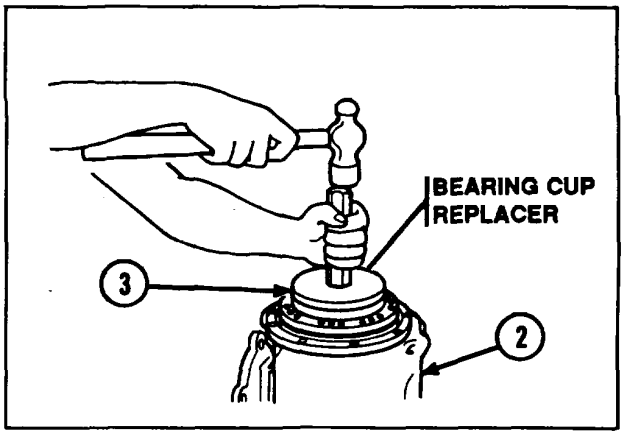
REASSEMBLY I

1 If removed, install two headless straight pins (1) to generator drive mechanical housing (2).

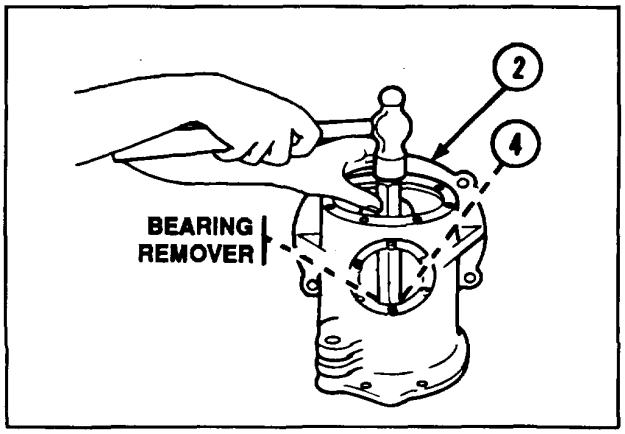
2-39. MAINTENANCE OF AUXILIARY DRIVE ASSEMBLY (GENERATOR DRIVE).

REASSEMBLY (CONT)

2 Using bearing cup replacer (item 19, appx E), Install tapered roller bearing cup (3) into generator drive mechanical housing (2).



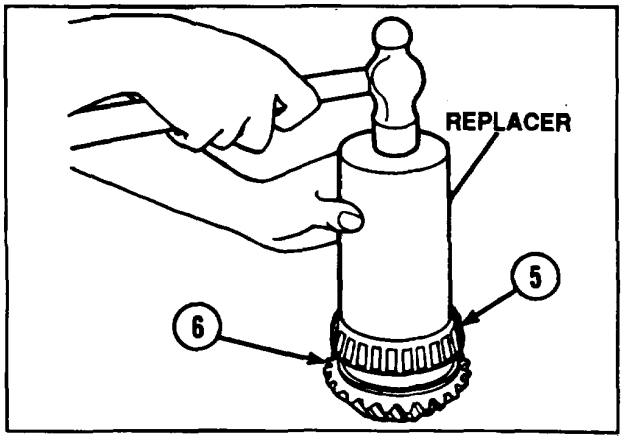
3 Using bearing remover (item 12, appx E), install tapered roller cup (4) into generator drive mechanical housing (2).



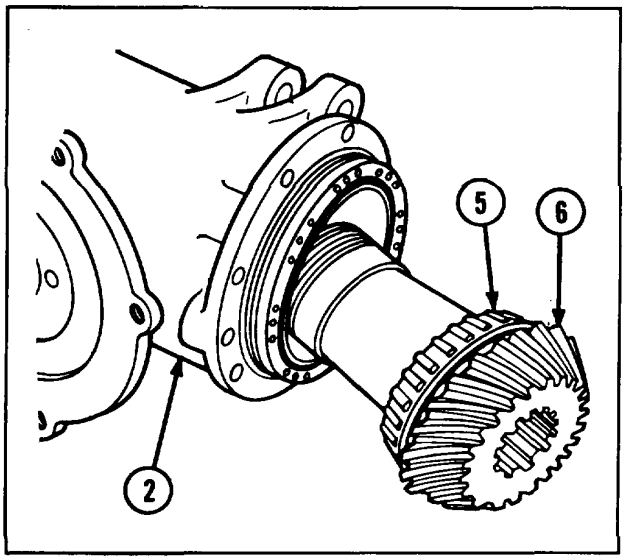
CAUTION

Main output drive spiral pinion gear is one of a matched set. If replaced, refer to page 2-69 for replacement of matching parts.

4 Coat cone and rollers (5) with lubricating oil. Using replacer, install cone and rollers onto main output drive spiral pinion gear (6).



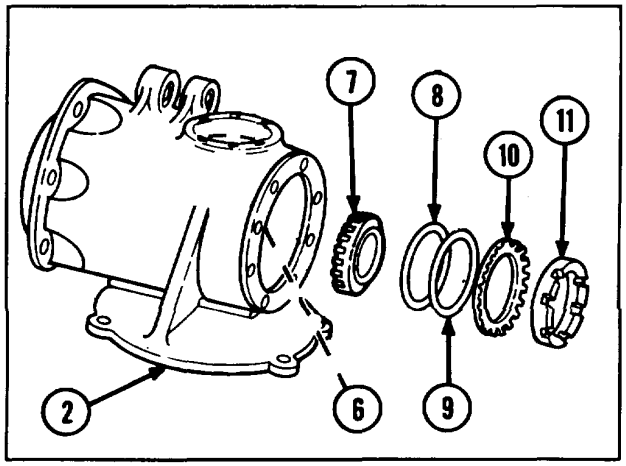
5 Install main output drive spiral pinion gear (6) and attached cone and rollers (5) into generator drive mechanical housing (2). Ensure gear seats properly.

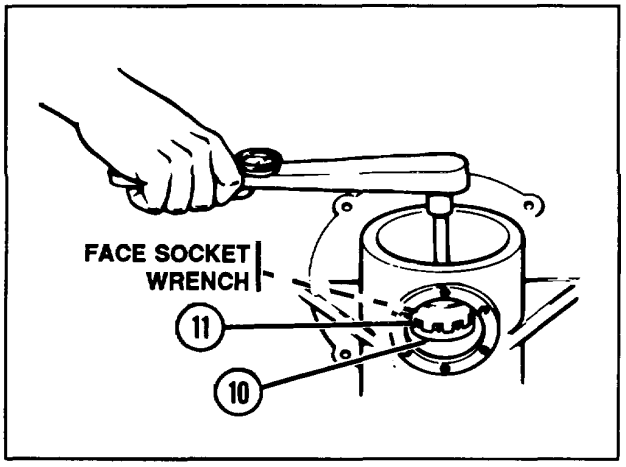


6 Coat tapered roller bearing (7) with lubricating oil and install bearing cone over end of main output drive spiral pinion gear (6) in generator drive mechanical housing (2). Ensure bearing Is completely seated in housing.

7 Hold main output drive spiral pinion gear (6) into generator drive mechanical housing (2) and install key washer (8), flat washer (9), key washer (10), and plain round nut (11) on end of main output drive spiral pinion gear.

8 Using face socket wrench, tighten plain round nut (11) until 15.0 to 25.0 in.-LB (1.7 to 2.8 N-m) is required to turn main output drive spiral pinion gear within its bearings. After adjustment, bend tangs of key washer (10) into grooves of plain round nut.





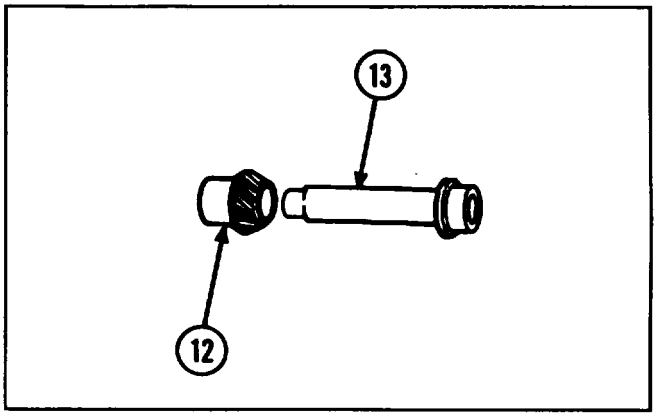
2-39. MAINTENANCE OF AUXILIARY DRIVE ASSEMBLY (GENERATOR DRIVE).

REASSEMBL Y (CONT)

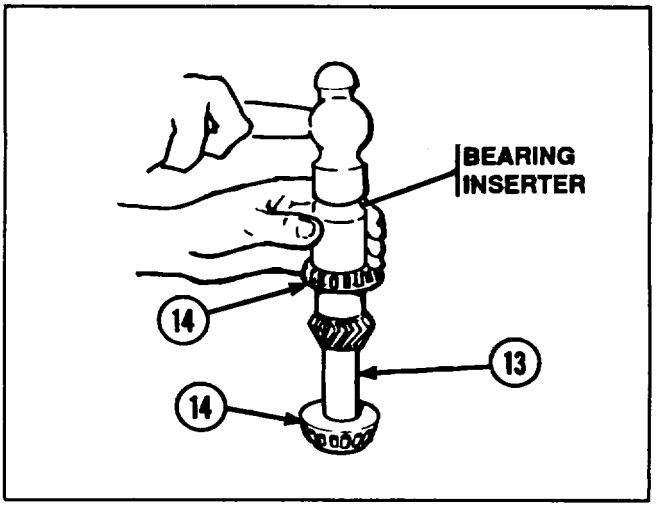
CAUTION

If either bevel gear set spiral pinion gear or bevel gear set spiral gear is replaced, replace both gears as a matched set.

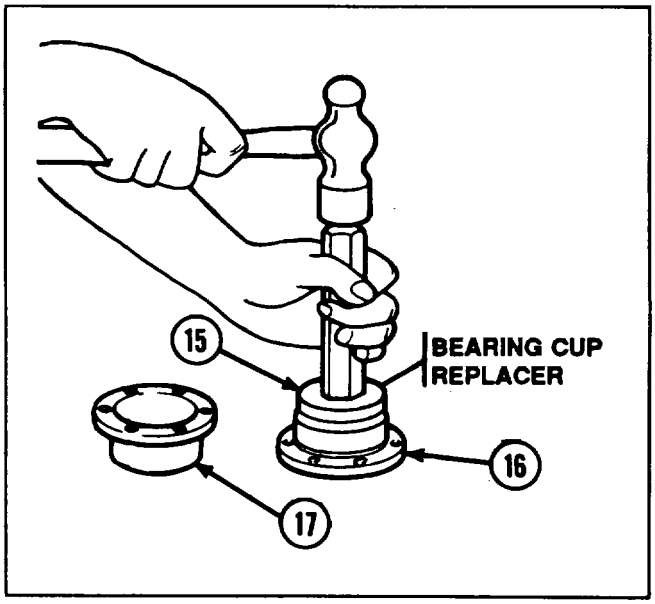
9 If removed, press bevel gear set spiral gear (12) onto gear set shouldered shaft (13) until seated. Do not disassemble after initial reassembly.



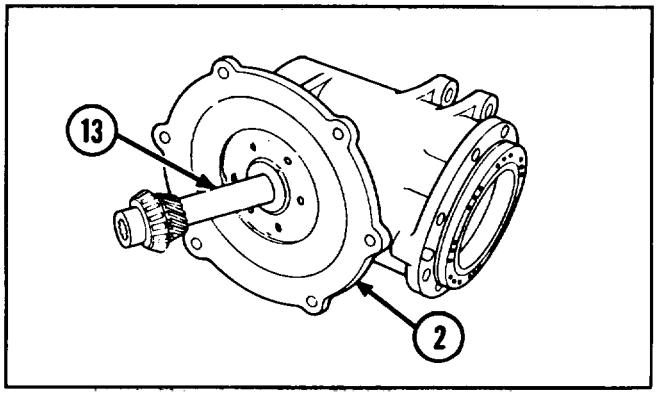
10 Using bearing Inserter, install two roller bearings (14) on gear set shouldered shaft (13).



11 Using bearing cup replacer (item 17, appx E), install two bearing cups (15) into shaft bearing housing (16) and drive gear bearing housing (17).

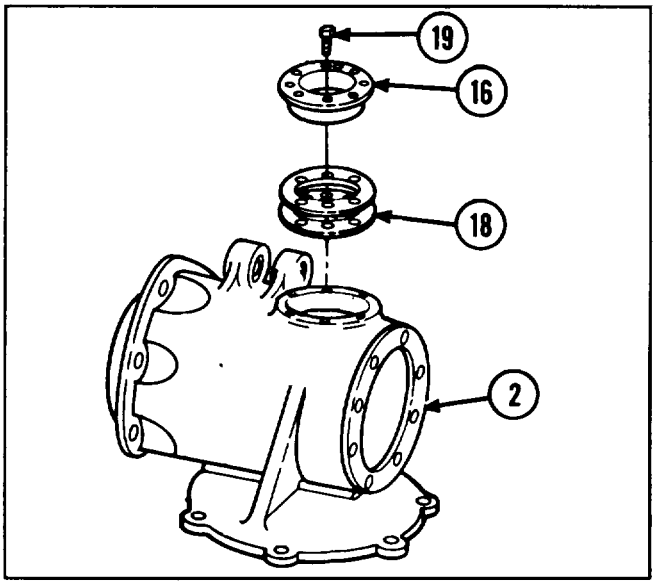


12 Install gear set shouldered shaft (13) with attached bearings into generator drive mechanical housing (2).

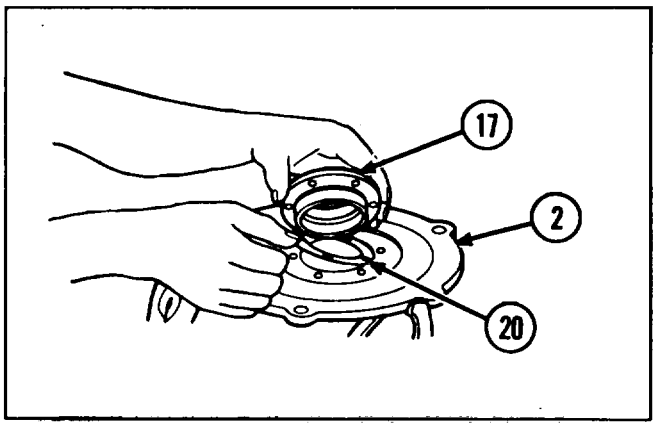


13 Install two new bearing carrier shims (18) on generator drive mechanical housing (2). Install shaft bearing housing (16) on generator drive mechanical housing. En- sure that bearing cup seats properly over roller bearing.

14 Secure shaft bearing housing with three evenly-spaced hexagon head capscrews (19) tightened to ensure shaft bearing housing seats completely.



15 Install two new bearing carrier shims (20) to generator drive mechanical housing (2). Install drive gear bearing housing (17) to generator drive mechanical housing. Ensure bearing cup seats properly over roller bearing.



2-39. MAINTENANCE OF AUXILIARY DRIVE ASSEMBLY (GENERATOR DRIVE).

REASSEMBL Y (CONT)

16 Secure drive gear bearing housing (17) with three evenly-spaced hexagon head capscrews (21) tightened to ensure gear bearing housing seats completely in generator drive mechanical housing (2).

17 Ensure that torque required to rotate gear set shouldered shaft (13) is 5.0 to 15.0 in.-LB (0.6 to 1.7 N-m). Remove shims from either bearing housing to reach required torque.

18 When torque is reached, remove one bearing housing, add 0.002 in. (0.005 cm) shim, and reinstall bearing housing.

NOTE

Jacking screws may be required to remove drive gear bearing housing.

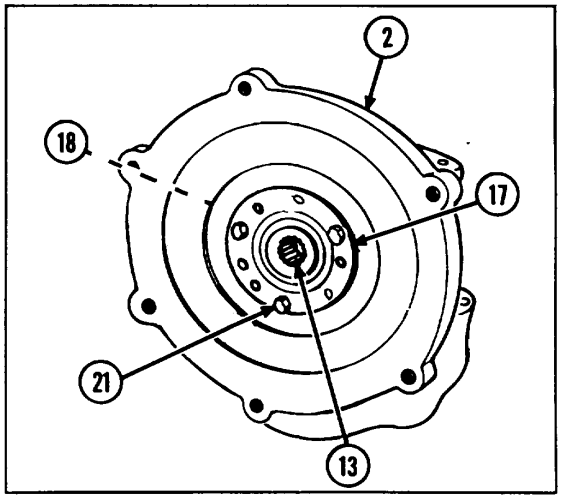
19 Remove three hexagon head capscrews (21), drive gear bearing housing (17), and bearing carrier shims (18). Mark bearing carrier shims for reinstallation.

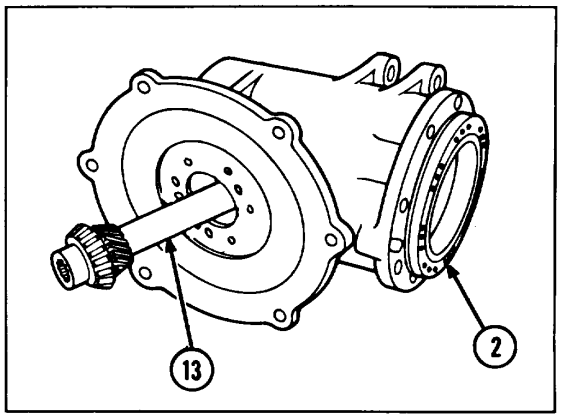
20 Remove gear set shouldered shaft (13) from generator drive mechanical housing (2).

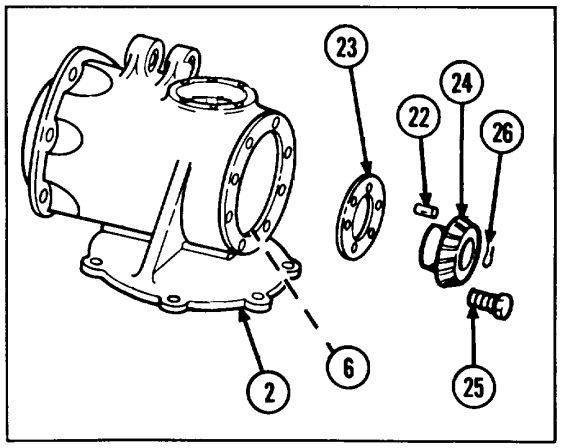
21 Install machine key (22) into main output drive spiral pinion gear (6).

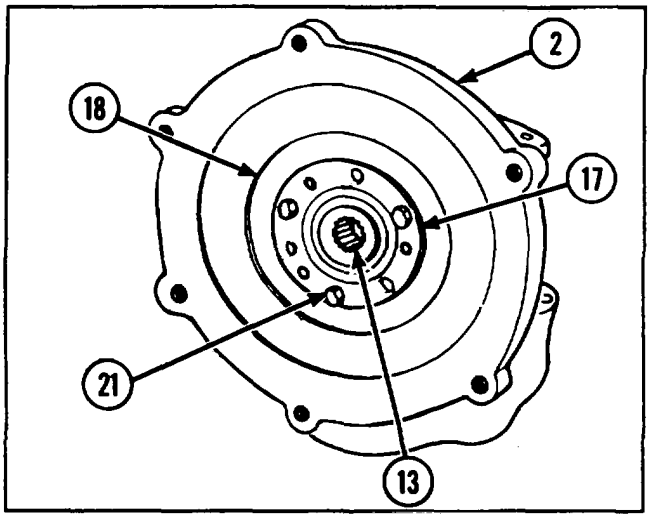
22 Install two new drive gear-to-shaft shims (23) on end of main output drive spiral pinion gear (6).

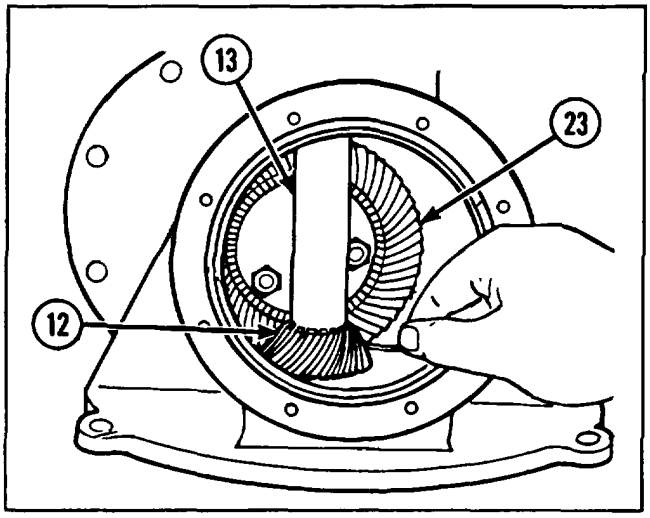
23 Install bevel gear set spiral pinion gear (24) over shim and into end of main output drive spiral pinion gear (6). Secure with six hexagon head capscrews (25). Secure capscrews with new lockwire (26).











24 Reinstall gear set shouldered shaft (13), bearing carrier shim (18), and drive gear bearing housing (17). Secure drive gear bearing housing with three hexagon head capscrews (21) tightened to ensure bearing housing seats completely in generator drive mechanical housing (2).

25 Insert bearing gage between bevel gear set spiral gear (12) and bevel gear set spiral pinion gear (23) teeth at large end of teeth to check gear backlash. Rotate gear set shouldered shaft (13)through one gear tooth and bearing. Reverse rotation and remove bearing.

26 Measure thickness of flattened portion of bearing with micrometer to determine backlash. Back-lash must be 0.002 to 0.003 in. (0.005 to 0.008 cm).

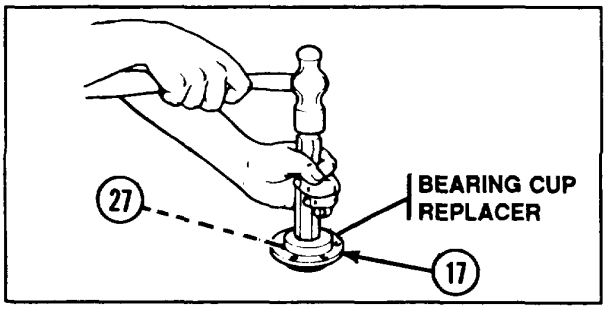
27 If backlash is not correct, transfer shims from one bearing housing to the other.

NOTE

To increase backlash, transfer shims from shaft bearing housing to drive gear bearing housing. To decrease backlash, transfer shims from drive gear bearing housing to shaft bearing housing. Each lamination of shim is 0.002 in. (0.005 cm) thick. About 0.001 in. (0.003 cm) change in backlash requires transfer of two shim laminations.

28 Apply white enamel to four or five teeth of bevel gear set spiral gear (12) and bevel gear set spiral pinion gear (23). Rotate gear set shouldered shaft (13). Examine wear pattern on gear teeth. Wear pattern should be about one-half length and depth of tooth and centered on tooth face (p 2-69). Correct backlash (step 27) if wear pattern is not correct.

29 Remove three capscrews (21) and drive gear bearing housing (17). Using bearing cup replacer (item 17, appx E), install new plain encased seal (27) with open lid facing in drive gear bearing housing (17).



2-39. MAINTENANCE OF AUXILIARY DRIVE ASSEMBLY (GENERATOR DRIVE).

REASSEMBL Y (CONT)

30 Install new performed packing (28) on drive gear bearing housing (17).

31 Ensure bearing carrier shim (18) is properly in place and install drive gear bearing housing (17) to generator drive mechanical housing (2). Secure drive gear bearing housing (17) with six hexagon head capscrews (21). Secure capscrews with new lockwire (29).

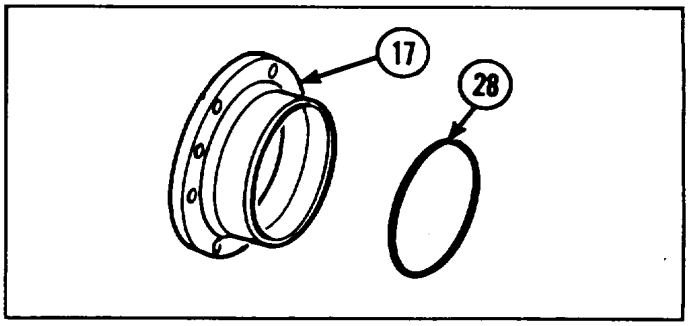
32 Remove three hexagon head capscrews(19) and shaft bearing housing (16).

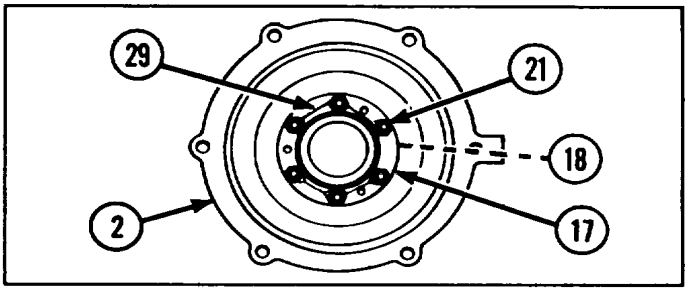
33 Install new performed packing (30) onto shaft bearing housing (16).

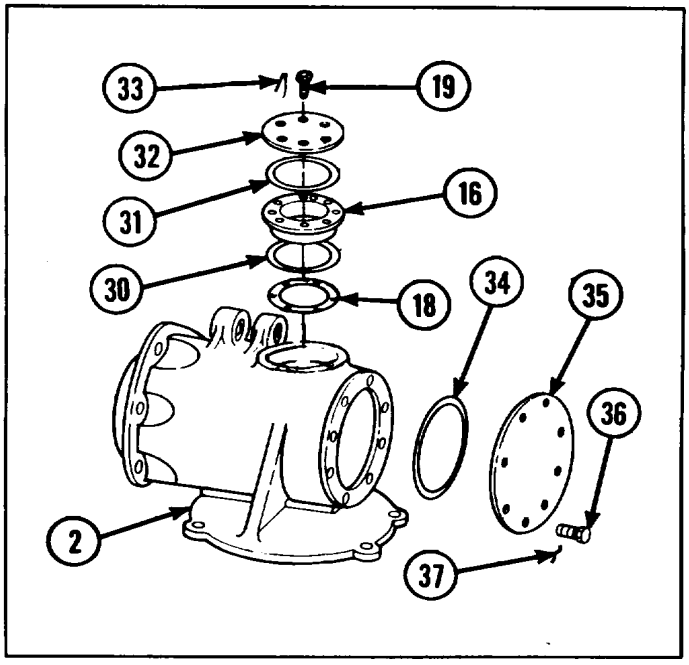
34 Ensure bearing carrier shim (18) is properly in place and install shaft bearing housing (16) in generator drive mechanical housing (2). Install new performed packing (31) in outer face of shaft bearing housing (16).

35 Install drive gearcase access cover (32). Secure drive gearcase access cover and shaft bearing housing (16) with six hexagon head capscrews (19). Secure six hexagon head capscrews with new lock- wire (33).

36 Install new performed packing (34) and gear set inspection access cover (35). Secure access cover with eight hexagon head capscrews (36). Secure hexagon head capscrews with new lockwire (37).







2-40. MAINTENANCE OF AUXILIARY DRIVE ASSEMBLY (INPUT DRIVE).

This task covers:	a. *Disassembly*	*b. Inspection/Repair*	c. *Reassembly*

INITIAL SETUP

Tools and Special Tools
- *Automotive maintenance and repair shop equipment: field maintenance, basic, less power (SC 4910-95-A31)*
  - *Mechanical gear puller kit*
  - *Pliers wire twister*
  - *Press*
  - *Retaining ring pliers*
- *Bearing cup replacer (item 16, appx E)*
- *Bearing cup replacer (item 17, appx E)*

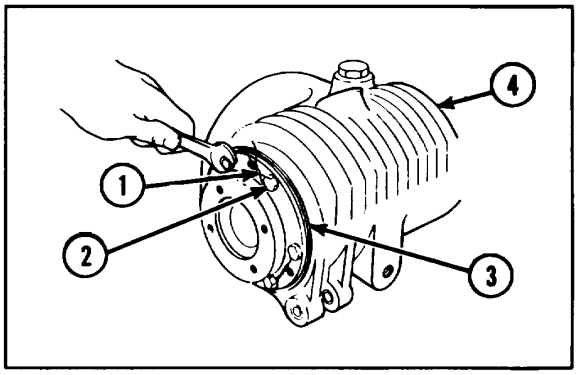
Materials/Parts
- *Lockwire (item 38, appx B)*
- *Lubricating oil (item 22, appx B)*
- *Plain encased seal (2)*
- *Performed packing*
- *Performed packing*

References
- *TM 9-214*
- *TM 9-2350-304-24P-1*

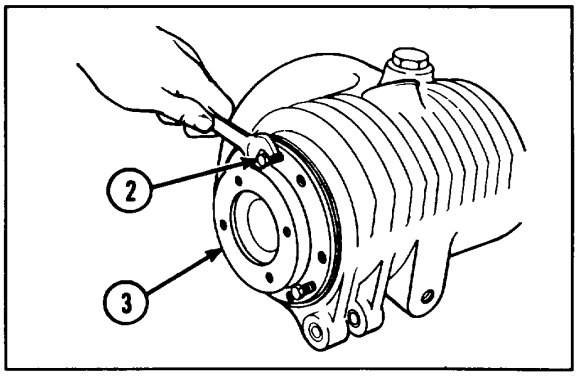
Equipment Conditions
- *2-69 Input drive removed*

DISASSEMBLY I

1 Remove lockwire (1) and six hexagon head capscrews (2) securing Input shaft mechanical housing (3) to input drive mechanical housing (4).



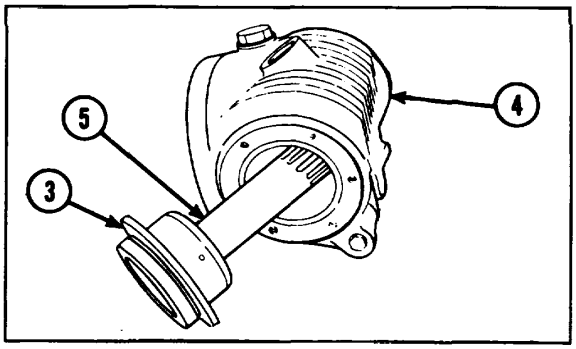
2 Using three of the six removed hexagon head capscrews (2) as jackscrews, loosen input shaft mechanical housing (3).



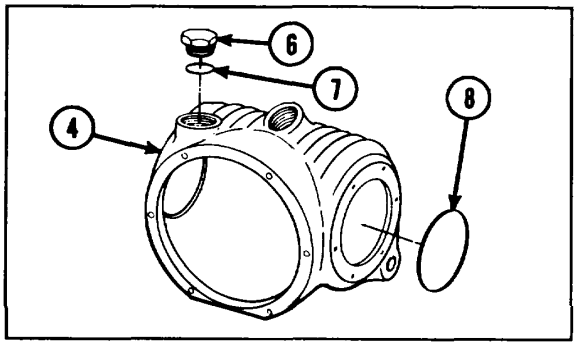
2-40. MAINTENANCE OF AUXILIARY DRIVE ASSEMBLY (INPUT DRIVE).

DISASSEMBLY (CONT)

3 Pull input shaft mechanical housing (3) 'and input shouldered shaft (5) from Input drive mechanical housing (4).

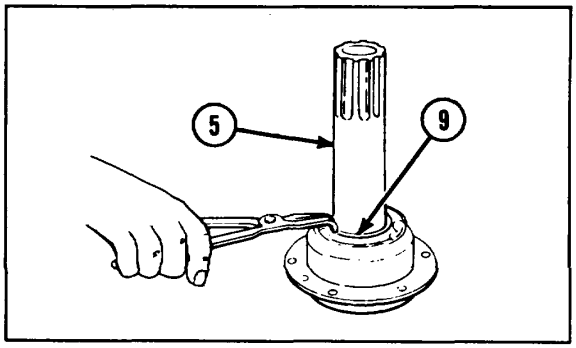


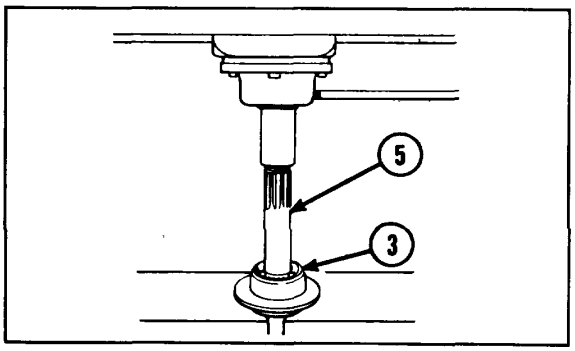
4 Remove machine plug (6) and performed packing (7). Remove performed packing (8) from Input drive mechanical housing (4).



5 Remove retaining ring (9) from Input shouldered shaft (5).

6 sing press, remove input shouldered shaft (5) from Input shaft mechanical housing (3).

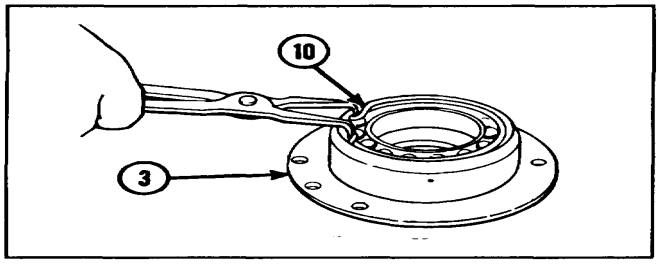


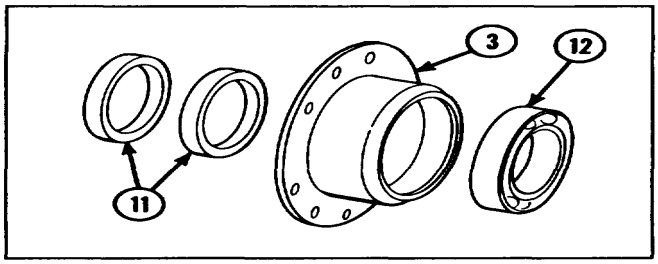


7 Remove retaining ring (10) from Input shaft mechanical housing (3).

8 Pry two plain encased seals (11) from input shaft mechanical housing (3).

9 Using bearing puller, remove annular ball bearing (12) from Input shaft bearing housing (3).





INSPECTION/REPAIR

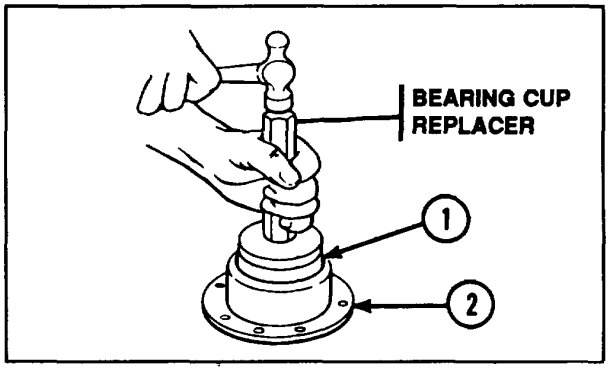
1 Inspect for broken, damaged, or missing parts.

2 Inspect annular ball bearing per TM 9-214.

3. Repair is by replacement of authorized parts (TM 9-2350-304-24P-1) which do not meet inspection criteria.

REASSEMBLY

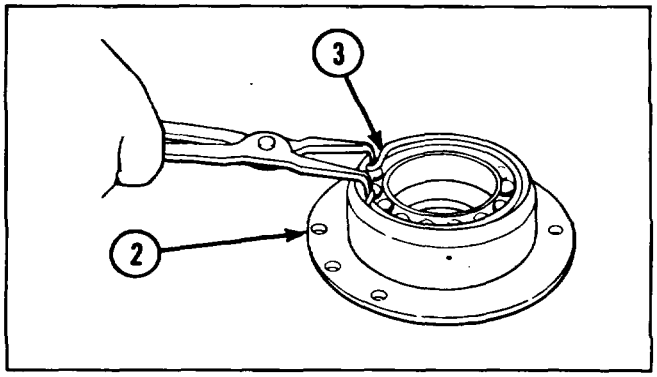
1 Lightly lubricate outer surface of annular ball bearing (1) with lubricating oil. Using bearing cup replacer (item 16, appx E), install annular ball bearing (1) into input shaft mechanical housing (2).



2-40. MAINTENANCE OF AUXILIARY DRIVE ASSEMBLY (INPUT DRIVE).

REASSEMBLY (CONT)

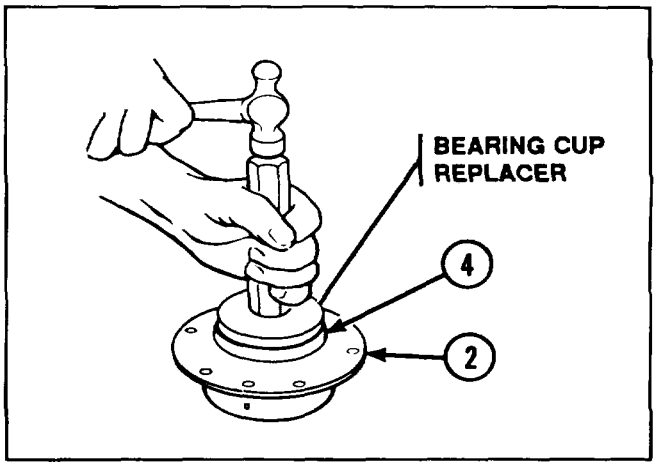
2 Using retaining ring pliers, Install retaining ring (3) in Input shaft mechanical housing (2).



CAUTION

An improperly installed seal will leak during operation.

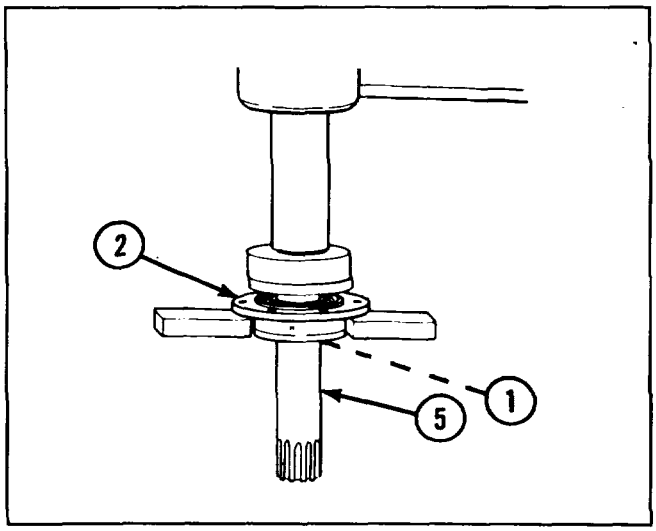
3 Using bearing cup replacer (item 17, appx E), Install two new plain encased seals (4) to input shaft mechanical housing (2). Ensure lip of Inner plain encased seal is toward annular ball bearing and lip of outer plain encased seal is toward outside of input shaft mechanical housing.



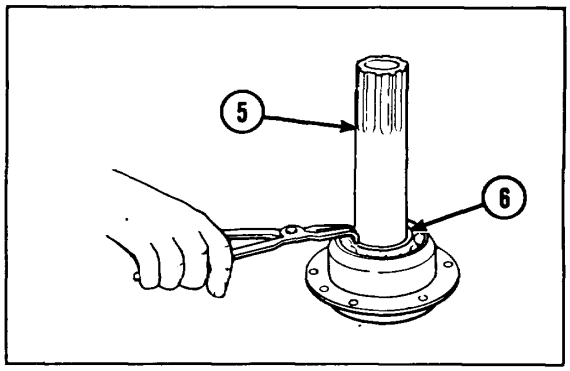
CAUTION

A nicked, scratched, or cut seal lip will leak during operation.

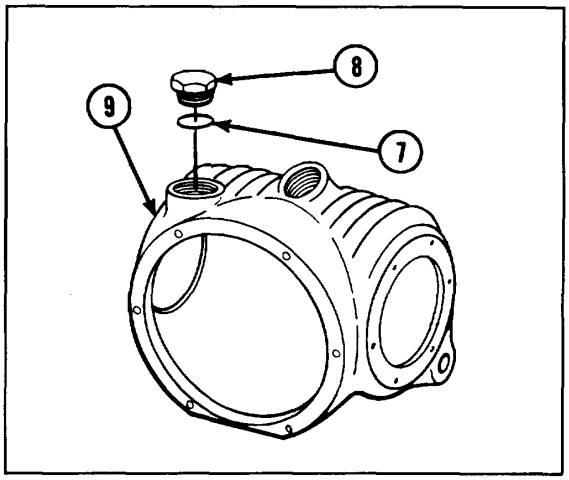
4 Install Input shouldered shaft (5) through input shaft mechanical housing (2). En- sure lip of outer seal is over edge of input shouldered shaft and points outward. Using press, Install input shouldered shaft into annular ball bearing (1) in input shaft mechanical housing (2).



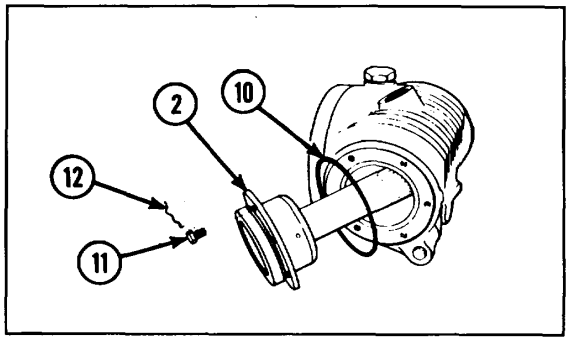
5 Install retaining ring (6) in Input shouldered shaft (5) groove.



6 Install new preformed packing (7) and machine plug (8) in Input drive mechanical housing (9).



7 Install input shaft mechanical housing (2) with attached parts, new preformed packing (10), and six hexagon head capscrews (11) in input drive mechanical housing (9). Secure hexagon head capscrews with new lockwire (12).



2-41. MAINTENANCE OF OIL FILLER NECK.

This task covers:	a. *Disassembly*	*b. Inspection/Repair*	c. *Reassembly*

INITIAL SETUP

Materials/Parts
- Lockwasher (6)
- Preformed packing
- Primer coating (item 16, appx B)
- White enamel (item 15, appx B)

References
- TM 9-2350-304-20-1
- TM 9-2350-304-24P-1

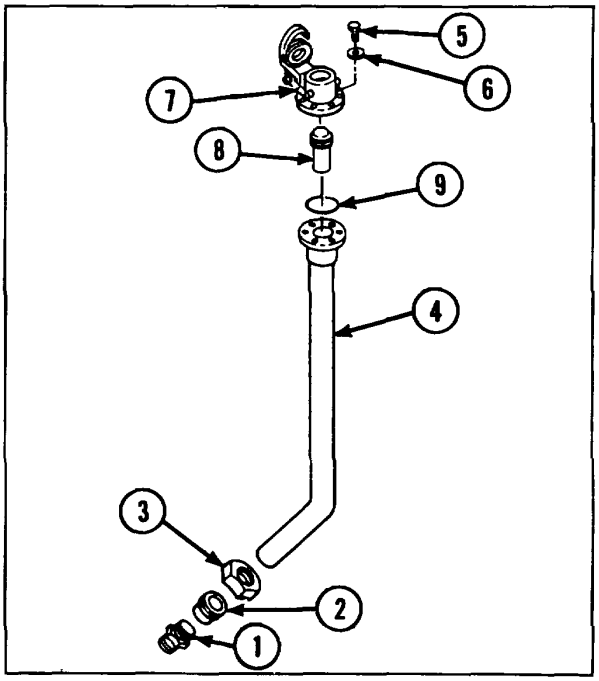
Equipment Conditions
- Oil filler neck removed (TM 9-2350-304-20-1)

DISASSEMBLY

1 Remove tube nipple (1), tube clinch sleeve (2), and tube coupling nut (3) from filler neck (4).

2 Remove six machine screws (5), six lockwashers (6), and gage rod cap assembly (7) with strainer element (8) from filler neck (4).

3 Remove preformed packing (9) and strainer element (8) from gage rod cap assembly (7).



INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 If gage rod cap assembly Is broken, damaged, or missing, repair is by replacement of next higher assembly.

3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1) which do not meet inspection criteria.

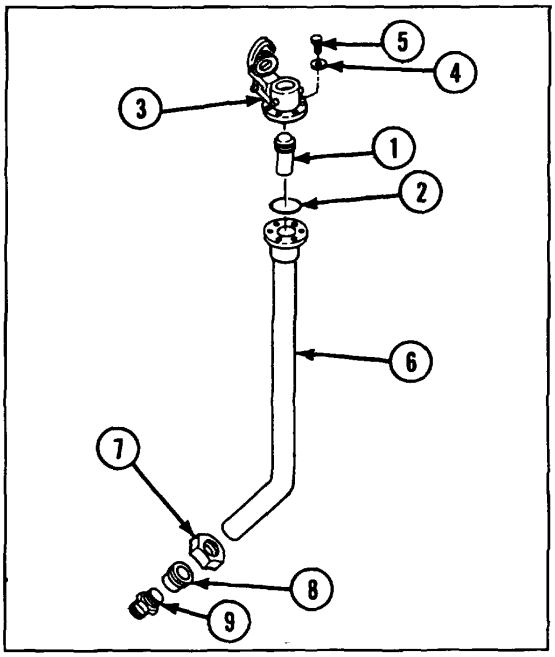
REASSEMBLY

1 Install strainer element (1) and new preformed packing (2) on gage rod cap assembly (3).

2 Install gage rod cap assembly (3), and secure six new lockwashers (4) and six machine screws (5) on filler neck (6).

3 Install tube coupling nut (7), tube clinch sleeve (8), and tube nipple (9) on filler neck (6).

4 If necessary, touch up exterior surfaces with primer coating and white enamel.



2-42. MAINTENANCE OF OIL DRAIN TUBE ASSEMBLY.

This task covers:	a. *Disassembly*	*b. Inspection/Repair*	c. *Reassembly*

INITIAL SETUP

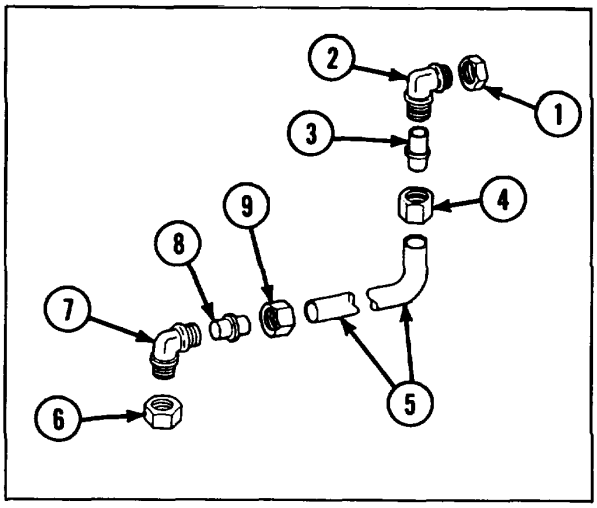
Materials/Parts
Locknut

References
TM 9-2350-304-20-1
TM 9-2350-304-24P-1

Equipment Conditions
Oil drain tube assembly removed (TM 9-2350-304-20-1)

2-42. MAINTENANCE OF OIL DRAIN TUBE A'

DISASSEMBLY



1 Remove tube fitting locknut (1), tube elbow (2), tube clinch sleeve (3), and tube coupling nut (4) from metallic bent tube (5).

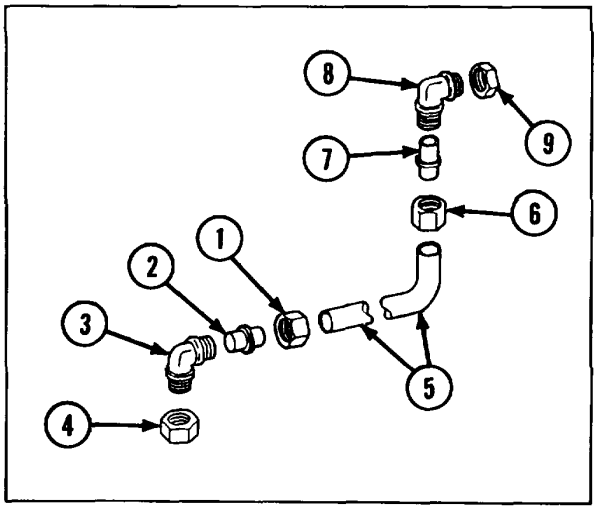
2 Remove tube cap (6), tube elbow (7), tube clinch sleeve (8), and tube coupling nut (9) from metallic bent tube (5).

INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1) which do not meet inspection criteria.

REASSEMBLY



1 Install tube coupling nut (1), tube clinch sleeve (2), tube elbow (3), and tube cap (4) on metallic bent tube (5).

2 Install tube coupling nut (6), tube clinch sleeve (7), tube elbow (8), and new tube fitting locknut (9) on metallic bent tube (5).

2-43. MAINTENANCE OF AUXILIARY DRIVE LINE CARRIER BALL BEARING UNIT.

This task covers: a. *Disassembly* *b. Inspection/Repair* c. *Reassembly*

INITIAL SETUP

Tools and Special Tools
Automotive maintenance and repair shop equipment: field maintenance, basic less power (SC 4910-95-A31)
* Torque wrench (O to 250 ft-lb)
Face wrench socket (item 26, appx E)

Materials/Parts
Grease (item 19, appx B)
Lockwasher

References
TM 9-214
TM 9-2350-304-20-1
TM 9-2350-304-24P-1

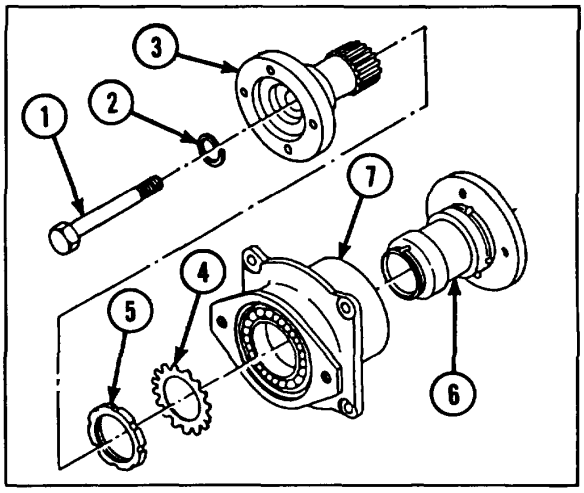
Equipment Conditions
Auxiliary drive line ball bearing unit removed (TM 9-2350-304-20-1)

DISASSEMBLY

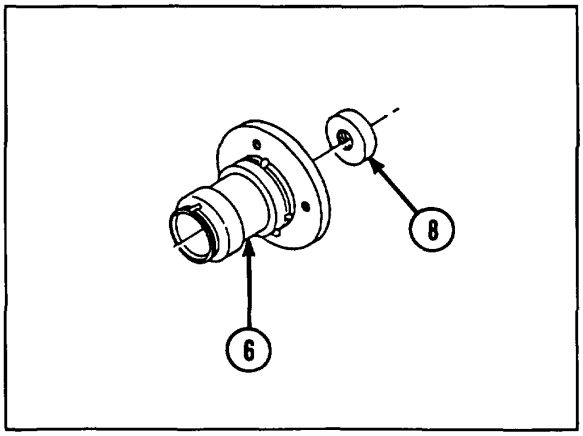
1 Remove machine bolt (1), lockwasher (2), and companion flange (3).

2 Straighten tangs of key washer (4). Using face wrench socket, remove round plain nut (5).

3 Remove key washer (4) and pull pump input flange (6) from bearing unit *housing* (7).



4 Using drift, drive output flange sleeve nut (8) from pump input flange (6).

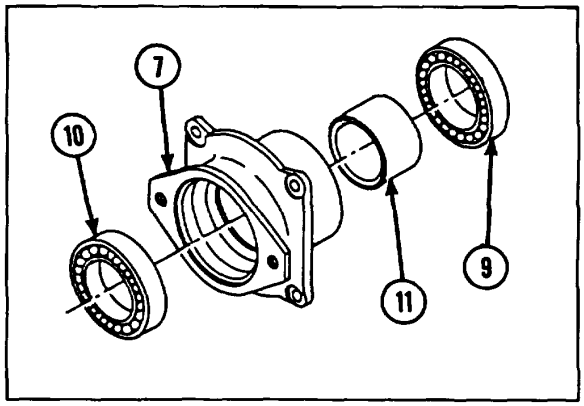


2-43. MAINTENANCE OF AUXILIARY DRIVE LINE CARRIER BALL BEARING UNIT (CONT).

DISASSEMBLY (CONT)

5 Insert drift into bearing unit housing (7) and remove annular ball bearing (9). Turn bearing unit housing over and remove annular ball bearing (10).

6 Remove spacer sleeve bushing (11) from bearing unit housing (7).



INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 Inspect bearings per TM 9-214.

3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1) which do not meet Inspection criteria.

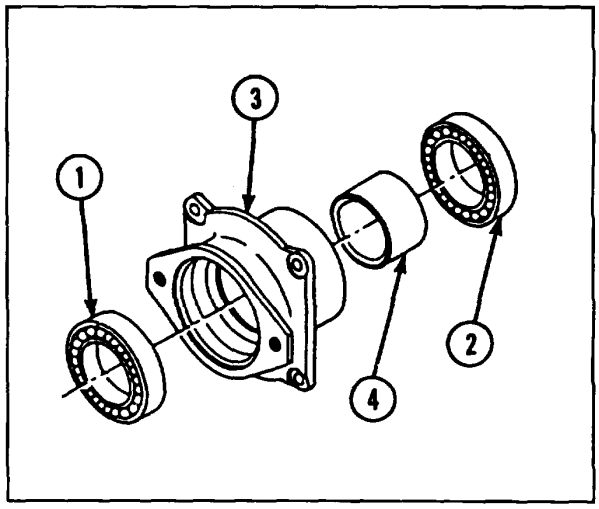
REASSEMBLY

1 Pack annular ball bearings (1 and 2) and bearing unit housing (3) cavity with grease.

2 Press annular ball bearing (1) into bearing unit housing (3) with seal facing out.

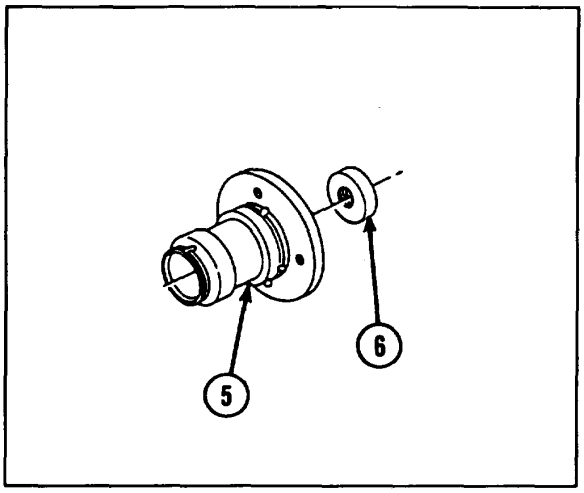
3 Install spacer sleeve bushing (4) into bearing unit housing (3).

4 Press annular ball bearing (2) into bearing unit housing (3) with seal facing out.



5 Apply a thin even coat of grease to pump Input flange (5).

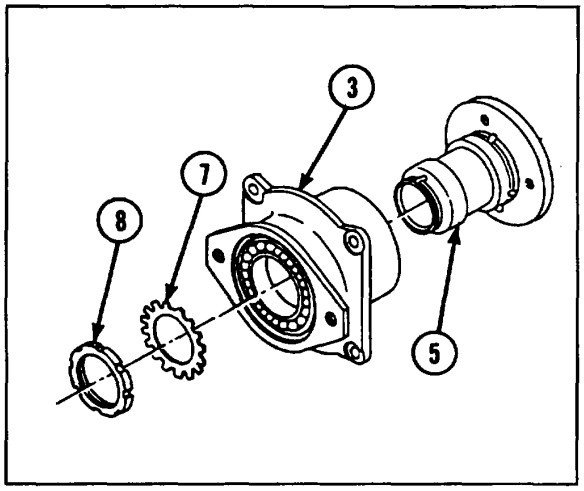
6 Install output flange sleeve nut (6) into pump Input flange (5) and stake In eight places.



7 Install pump Input flange (5) into bearing unit housing (3).

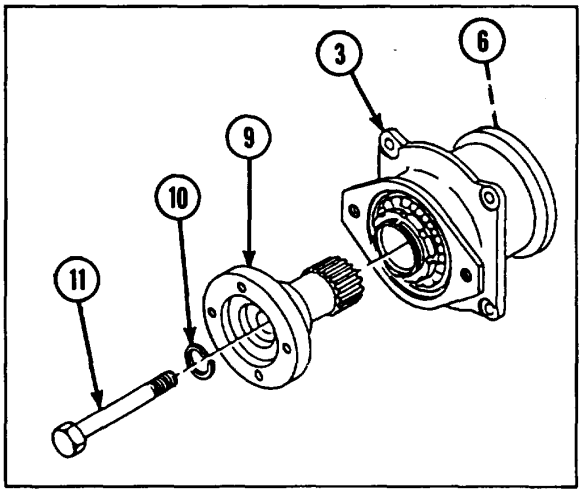
8 Install key washer (7) and round plain nut (8) on pump input flange (5). Tighten round plain nut with face wrench socket.

9 Bend tangs on key washer (7) Into nut grooves.



10 Install companion flange (9) in bearing unit housing (3).

11 Install new lockwasher (10) and machine bolt (11) into companion flange (9). Tighten machine bolt in output flange sleeve nut (6), and torque to 140 to 180 ft-lb (190 to 244 N-m).



2-44. MAINTENANCE OF AIR CLEANER BLOWER ACCESS DOOR ASSEMBLY.

This task covers:	a. *Disassembly*	*b. Inspection/Repair*	c. *Reassembly*

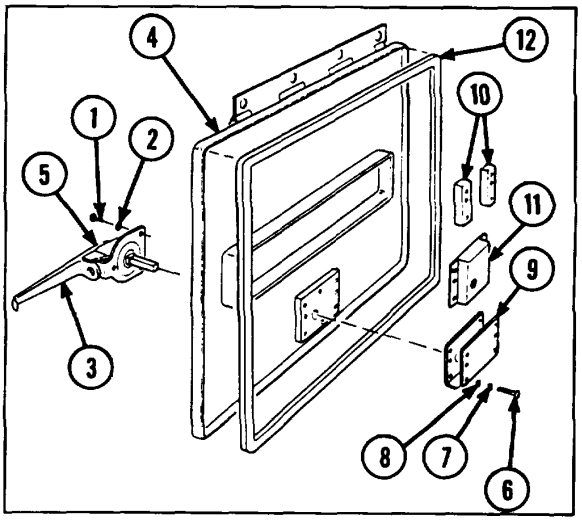
INITIAL SETUP

Materials/Parts
Adhesive (item 1, appx B)
Cleaning compound (item 6, appx B)
Lockwasher (7)

References
MIL-STD-1261
TM 9-2350-304-20-1
TM 9-2350-304-24P-1

Equipment Conditions
Air cleaner blower access door assembly removed (TM 9-2350-304-20-1)

DISASSEMBLY



1 Remove three machine screws (1), three lockwashers (2), and door handle (3) from door (4).

2 If damaged, remove handle stop (5) from door handle (3).

3 Remove four machine screws (6), four lockwashers (7), four flat washers (8), and lock support (9) from door (4).

4 Remove two plate spacers (10) and flush latch (11) from lock support (9).

5 If damaged, remove nonmetallic seal (12) from door (4).

INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 If door is broken, damaged, or missing, repair is by replacement of next higher assembly.

3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1) which do not meet inspection criteria.

REASSEMBLY

1 If nonmetallic seal (1) was removed, clean door (2) with cleaning compound. Coat new nonmetallic seal (1) with adhesive and install new nonmetallic seal on door (2).

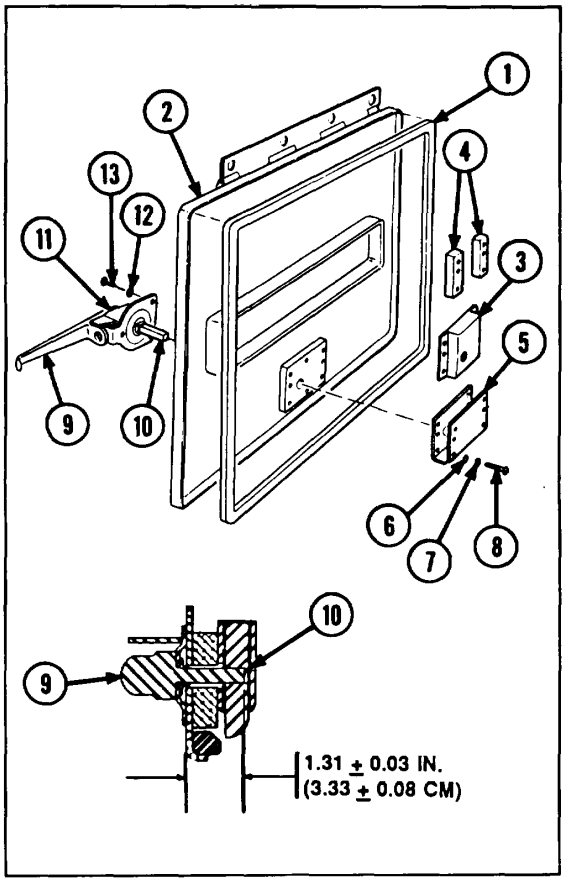
2 Install flush latch (3) and two plate spacers (4) in lock support (5).

3 Install lock support (5) on door (2), and secure with four flat washers (6), four new lockwashers (7), and four machine screws (8).

4 If door handle (9) has been replaced, cut door handle shank (10) to length as shown.

5 If handle stop was removed, or if door handle has been replaced, weld new handle stop (11) to door handle (9) per MILSTD-1 261.

6 Install door handle (9) to door (2), and secure with three new lockwashers (12) and three machine screws (13).



2-45. MAINTENANCE OF BATTERY ACCESS COVER.

This task covers:	a. *Disassembly*	*b. Inspection/Repair*	c. *Reassembly*

INITIAL SETUP

Materials/Parts
- Adhesive (item 1, appx B)
- Cleaning compound (item 6, appx B)
- Handle spring pin (2)
- Lockwasher (8)
- Rubber strip
- Spring pin (2)
- Spring tension washer (2)

References
- TM 9-2350-304-20-1
- TM 9-2350-304-24P-1

Equipment Conditions
- Battery access cover removed (TM 9-2350-304-20-1)

DISASSEMBLY

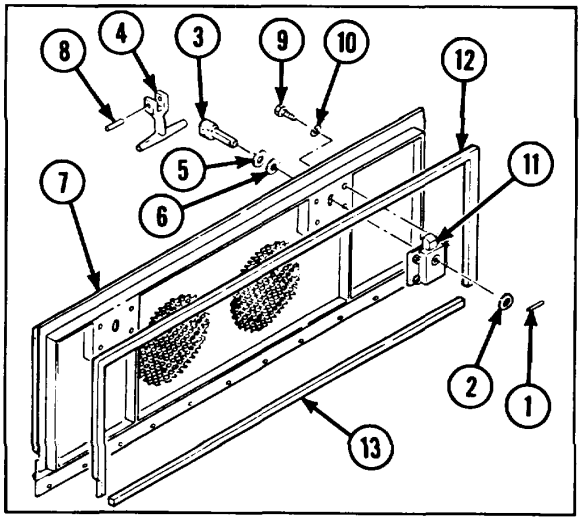
1 Remove two spring pins (1) and two flat washers (2) from two headed straight pins (3).

2 Remove two manual control handles (4) with two headed straight pins (3), two flat washers (5), and two spring tension washers (6) from door (7).

3 Remove two handle spring pins (8) and two manual control handles (4) from two headed straight pins (3).

4 Remove eight machine screws (9), eight lockwashers (10), and two rim latches (11) from door (6).

5 If damaged, remove access door seal (12) and rubber strip (13) from door (6).



INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1).

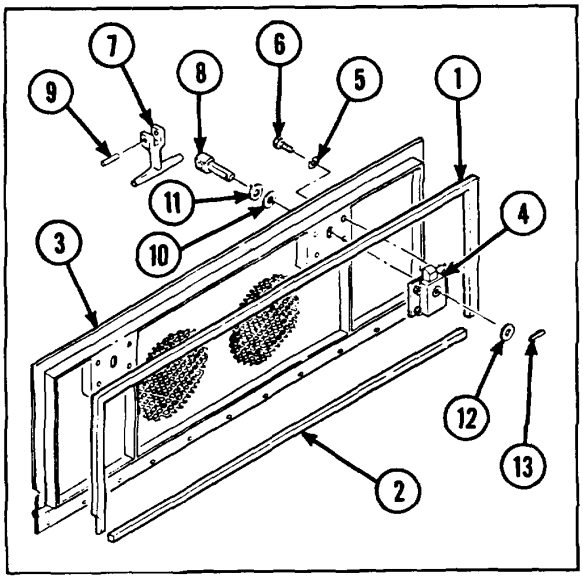
REASSEMBLY

1 If access door seal (1) and rubber strip (2) were removed, clean door (3) with cleaning compound. Coat new access door seal (1) and rubber strip (2) with adhesive, and install on door (3).

2 Install two rim latches (4), eight new lockwashers (5), and eight machine screws (6) to door (3).

3 Install two manual control handles (7) on two headed straight pins (8), and secure with two new handle spring pins (9).

4 Install two new spring tension washers (10), two flat washers (11), and two headed straight pins (8) with two handles (7) to door (3). Secure with two flat washers (12) and two new spring pins (13).



2-46. MAINTENANCE OF AIR CLEANER ACCESS DOOR.

This task covers:	a. *Disassembly*	*b. Inspection/Repair*	c. *Reassembly*

INITIAL SETUP

Materials/Parts
- Adhesive (item 1, appx B)
- Cleaning compound (item 6, appx B)
- Lockwasher (4)
- Spring pin
- Spring pin
- Spring tension washer (2)

References
- TM 9-2350-304-20-1
- TM 9-2350-304-24P-1

Equipment Conditions
- Air cleaner access door removed (TM 9-2350-304-20-1)

DISASSEMBLY

1 Remove spring pin (1), flat washer (2), and spring tension washer (3) from headed straight pin (3).

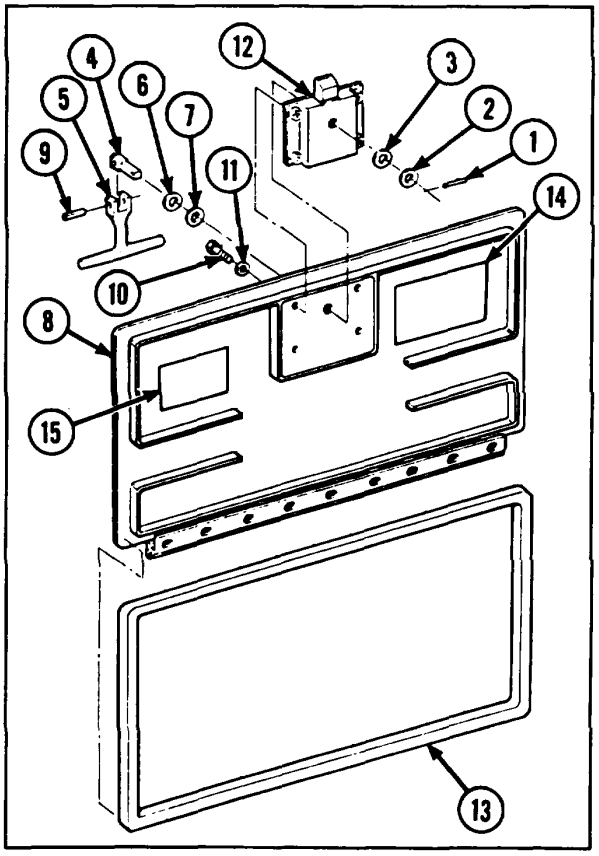
2 Remove handle (5) with headed straight pin (4), flat washer (6), and spring tension washer (7) from air cleaner door (8).

3 Remove spring pin (9) and manual control handle (5) from headed straight pin (4).

4 Remove four machine screws (10), four lockwashers (11), and rim latch (12) from air cleaner door (8).

5 If damaged, remove nonmetallic seal (13) from air cleaner door (8).

6 If damaged, remove decal (14) and caution decal (15) from air cleaner door (8).



INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 If air cleaner door Is broken, damaged, or missing, repair is by replacement of next higher

3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1) which do not meet Inspection criteria.

REASSEMBLY

1 If decal (1) was removed, clean air cleaner door (2) with cleaning compound. Coat new decal (1) with adhesive, and install on air cleaner door (2).

2 If caution decal (3) was removed, clean air cleaner door (2) with cleaning compound. Coat new caution decal (3) with adhesive, and install on air cleaner door (2).

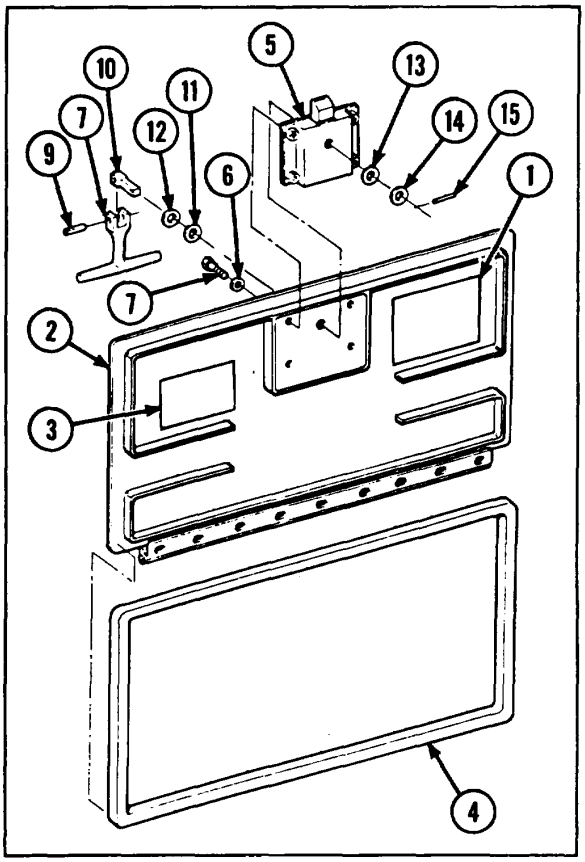
3 If nonmetallic seal (4) was removed, clean air cleaner door (2) with cleaning compound. Coat new nonmetallic seal (4) with adhesive, and install on air cleaner door (2).

4 Install rim latch (5) on air cleaner door (2), and secure with four new lockwashers (6) and four machine screws (7).

5 Install manual control handle (8) and new spring pin (9) on headed straight pin (10).

6 Install new spring tension washer (11), flat washer (12), and headed straight pin (10) with manual control handle (8) on air cleaner door (2).

7 Install new spring tension washer (13), flat washer (14), and new spring pin (15) on headed straight pin (10).



2-47. MAINTENANCE OF ENGINE FUEL FILTER ACCESS DOOR.

This task covers:	a. *Disassembly*	*b. Inspection/Repair*	c. *Reassembly*

INITIAL SETUP

Materials/Parts
- Adhesive (item 1, appx B)
- Antiseize compound (item 5, appx B)
- Cotter pin
- Lockwasher (2)
- Spring tension washer

References
- TM 9-2350-304-20-1
- TM 9-2350-304-24P-1

Equipment Conditions
- Fuel filter access door assembly removed (TM 9-2350-304-20-1)

DISASSEBLY

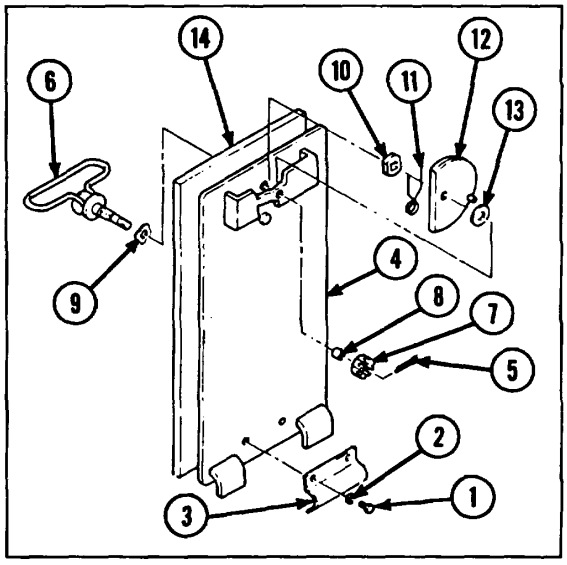
1 Remove two hexagon head capscrews (1), two lockwashers (2), and retaining strap (3) from door plate (4).

2 Remove cotter pin (5) from driver's latch handle (6).

3 Remove slotted plain nut (7) and sleeve spacer (8) from driver's latch handle (6).

4 Remove driver's latch handle (6), spring tension washer (9), access door collar (10), torsion helical spring (11), driver's latch wheel (12), and flat washer (13) from door plate (4).

5 If damaged, remove cushioning pad (14) from door plate (4).



INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 If door plate is broken, damaged, or missing, repair is by replacement of next higher assembly.

3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1) which do not meet inspection criteria.

REASSEMBLY

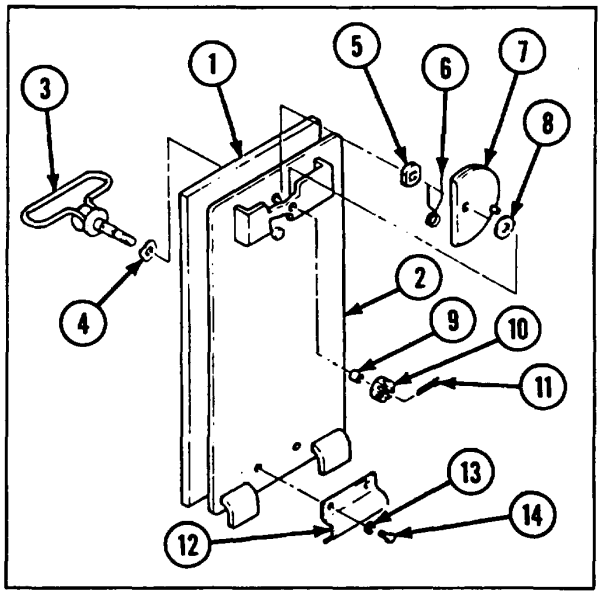
NOTE
Cushioning pad must be centered on plate within 0.03 in. (0.08 cm).

1 If removed, coat new cushioning pad (1) with adhesive and install on door plate (2).

2 Apply antiseize compound to mating surfaces of driver's latch handle (3), new spring tension washer (4), access door collar (5), torsion helical spring (6), driver's latch wheel (7), flat washer (8), and door plate (2).

NOTE
If necessary, toggle of driver's latch handle may be bent slightly to aid In installation.

3 Install driver's latch handle (3), new spring tension washer (4), access door collar (5), torsion helical spring (6), driver's latch wheel (7), and flat washer (8) on door plate (2).



4 Install sleeve spacer (9) and slotted plain nut (10) on driver's latch handle (3).

5 Install new cotter pin (11) on driver's latch handle (3).

6 Install retaining strap (12), two new lock-washers (13), and two hexagon head capscrews (14) on door plate (2).

2-48. MAINTENANCE OF DRIVER'S HATCH COVER.

This task covers:	a. *Disassembly*	*b. Inspection/Repair*	c. *Reassembly*

INITIAL SETUP

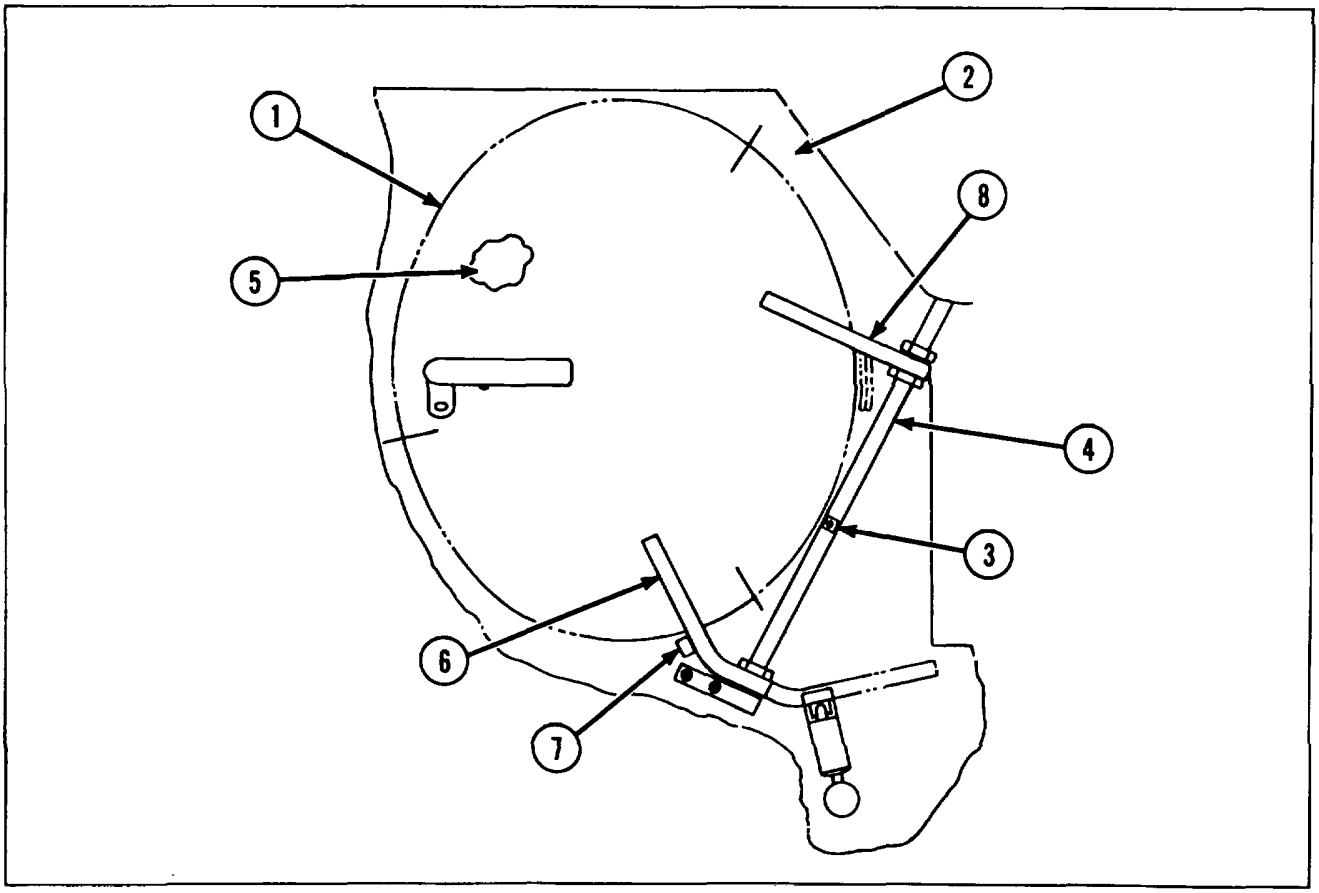
Tools and Special Tools
- Arc welder
- Automotive maintenance and repair shop equipment: field maintenance, basic, less power (SC 4910-95-A31)
- Torque wrench (O to 150 ft-lb)
- Grinder

Materials/Parts
- Adhesive (item 2, appx B)
- Electrode (item 11, appx B)
- Electrode (item 12, appx B)
- Soap (item 30, appx B)

References
- MIL-STD-1941
- TM 9-2350-304-24P-1

Equipment Conditions
- Driver's hatch cover partially disassembled (TM 9-2350-304-20-1)

DISASSEMBLY



1 Scribe vehicle hatch door (1) and hull (2) at three evenly spaced locations.

2 Raise vehicle hatch door (1) to vertical position.

3 If necessary, remove lubrication fitting (3) from cupola hinge torsion bar (4).

4 Remove cupola hinge torsion bar (4) from vehicle hatch door (1).

5 Remove vehicle hatch door (1) from hull (2).

NOTE

Cushioning pad can be reused if not damaged when removed from hatch cover. Pad Is removed to protect it from burning when new inner and outer arms are welded on.

6 Remove cushioning pad (5) from vehicle hatch door (1).

7 Remove outer arm (6) with strike (7) attached and inner arm (8) from vehicle hatch door (1) by grinding or cutting.

INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 Clean cushioning pad with mild soap and water.

3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1).

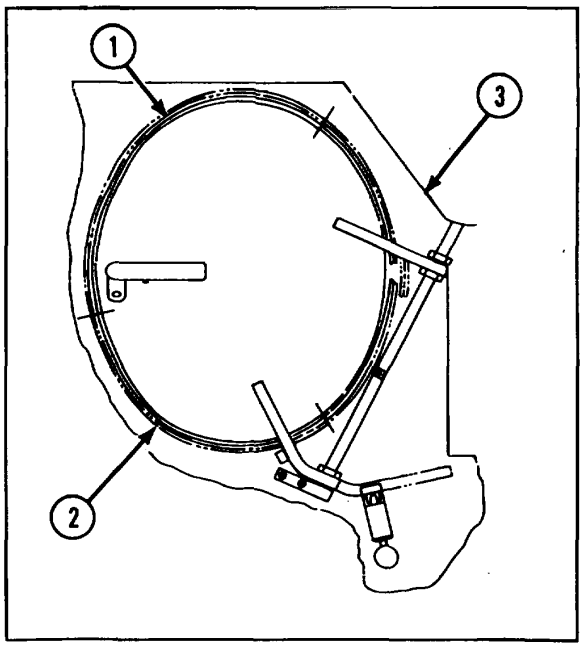
REASSEMBLY

1 Grind excess weld material flush with vehicle hatch door (1).

2 Install new cushioning pad (2).

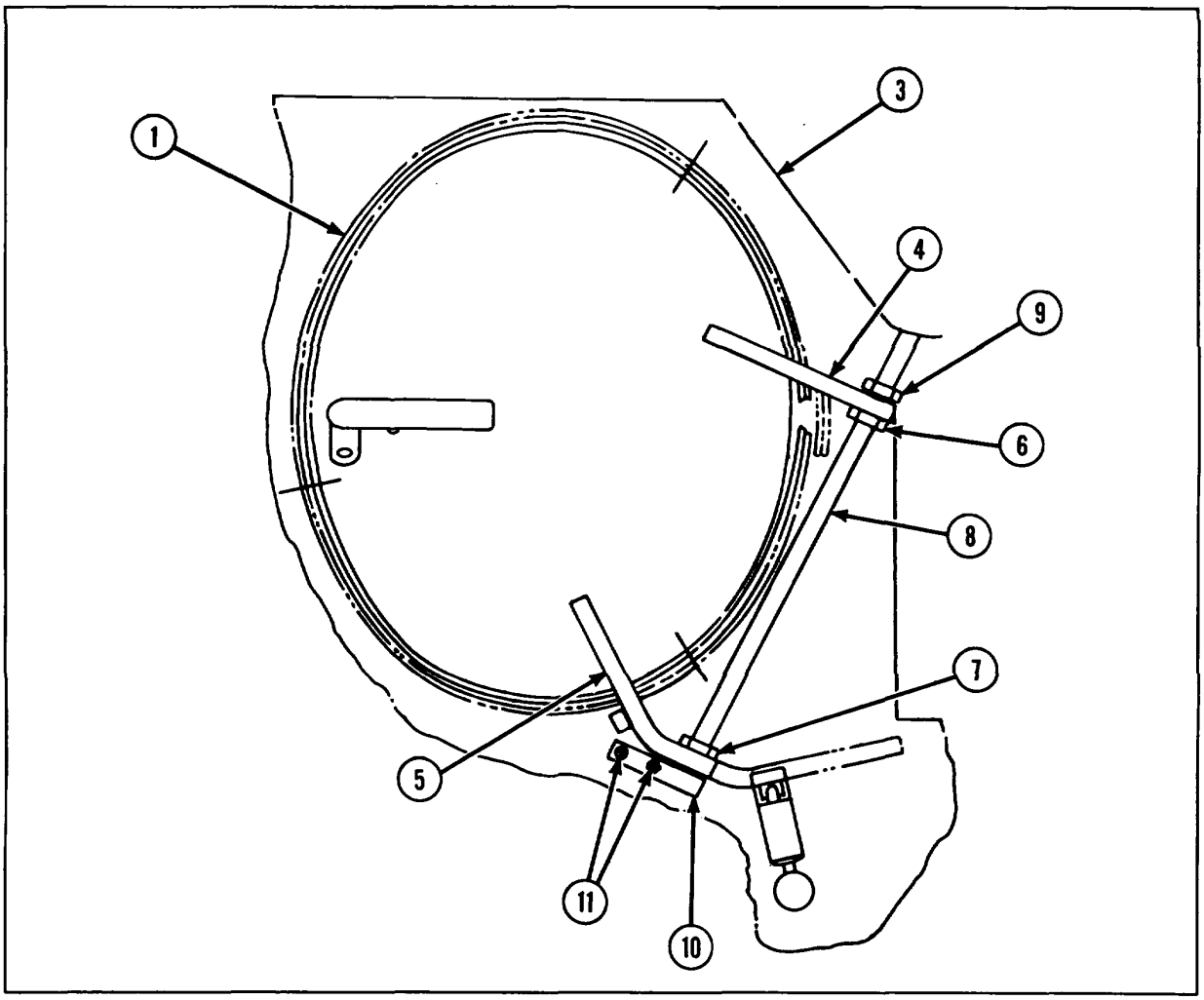
3 Position, align, and center vehicle hatch door (1) on hull (3).

4 Use a 30.0-lb (13.6-kg) weight to compress vehicle hatch door (1) evenly into cushioning pad (2).



2-48. MAINTENANCE OF DRIVER'S HATCH COVER (CONT).

REASSEMBLY (CONT)



5 Position Inner arm (4) and outer arm (5) on vehicle hatch door (1) and align them with two brackets (6 and 7).

6 Install cupola hinge torsion bar (8) through outer arm (5) and outer bracket (7), inner arm (4) and inner bracket (6), and hinge (9).

7 Install anchor (10) and two capscrews (11) on hull (3).

8 Center outer arm (5) between outer bracket (7) and anchor (10).

9 Center inner arm (4) between hinge (9) and inner bracket (6).

NOTE

Steps 10 thru 13 are written for outer arm, but also apply to inner arm.

10 Check clearance between outer arm (5) and vehicle hatch door (1).

11 If clearance between outer arm (5) and vehicle hatch door (1) exceeds 1/16 In. (0.16 cm), Install not more than ¼ in. (0.64 cm) of shims.

12 If necessary, cut enough shims to fit gap between outer arm (5) and vehicle hatch door (1).

13 Tack weld shims and/or outer arm (5) on vehicle hatch door (1).

14 Remove weight from vehicle hatch door (1).

15 Remove two capscrews (11) from anchor (10).

16 Remove anchor (10) and cupola hinge torsion bar (8) from vehicle hatch door (1).

17 Remove vehicle hatch door (1) from vehicle.

18 Weld outer arm (5) and inner arm (4) to vehicle hatch door (1) per MIL-STD-1941, method 2.

CAUTION

Allow hatch cover to air cool slowly to prevent it from warping.

19 Install vehicle hatch door (1) in vertical position on two brackets (6 and 7) and hinge (9).

20 Install cupola hinge torsion bar (8) through outer arm (5) and outer bracket (7), inner arm (4) and inner bracket (6), and hinge (9).

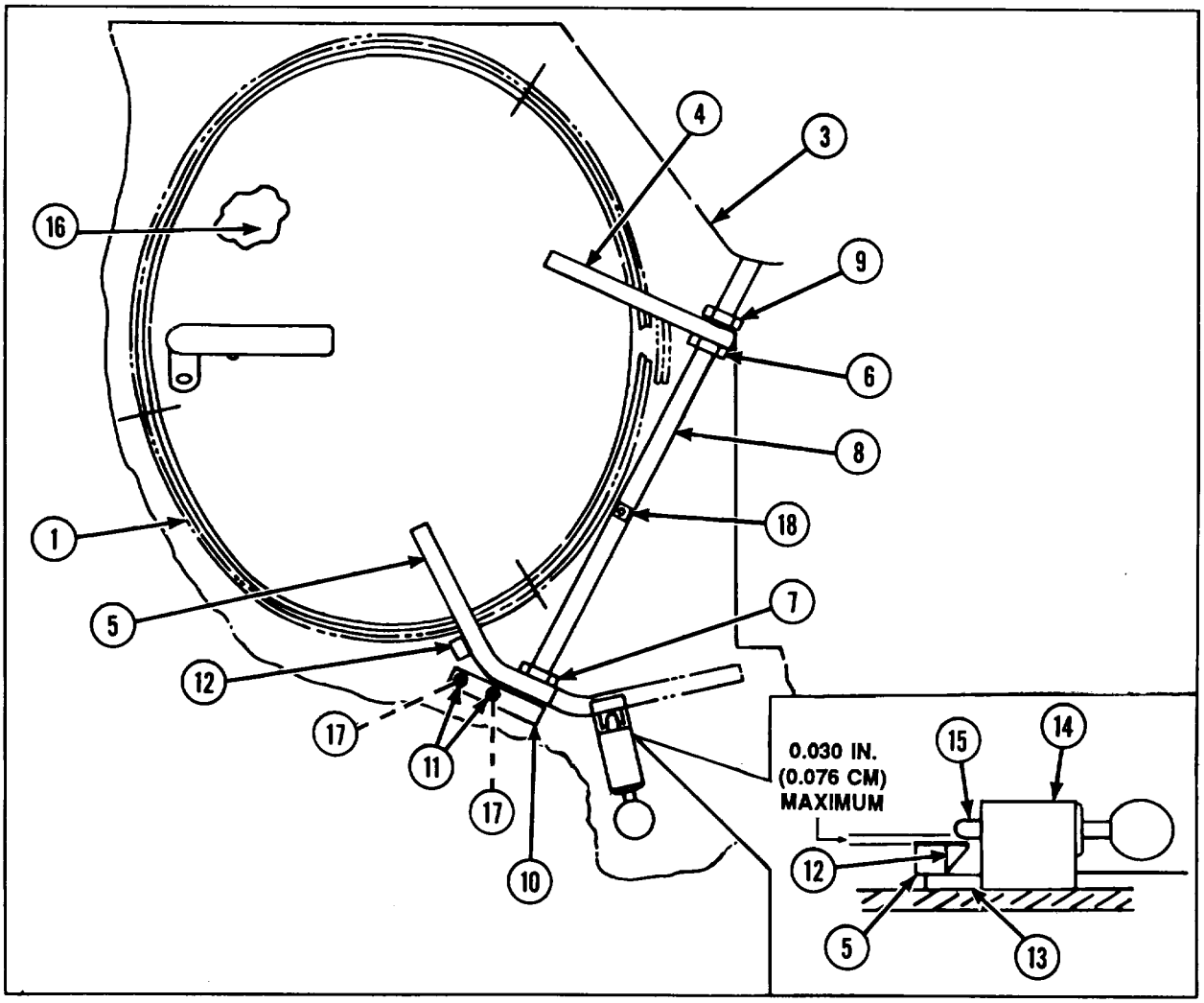
21 Install anchor (10) and two capscrews (11) on hull (3).

22 Swing vehicle hatch door (1) from closed position to open position to check for binding.

23 If necessary, repeat steps 15 thru 22 to prevent vehicle hatch door (1) from binding.

2-48. MAINTENANCE OF DRIVER'S HATCH COVER (CONT).

REASSEMBLY (CONT)



NOTE
The latch pin should contact the strike in the middle.

24 Open vehicle hatch door (1) and position strike (12) on outer arm (5) and center on latch plate (13) to check clearances.

25 If necessary, grind down strike (12) to provide clearance between it and the latch block (14).

26 Position and clamp strike (12) on outer arm (5) so clearance between strike and latch pin (15) is less than 0.030 In. (0.076 cm).

27 Tack weld strike (12) to outer arm (5).

28 Recheck clearance between strike (12) and latch pin (15).

29 Open and latch vehicle hatch door (1) to confirm proper position and operation of strike (12).

30 Weld strike (12) on outer arm (5) per MIL-STD-1941. Allow to air cool.

31 Close vehicle hatch door (1). If necessary, grind strike (12) flush with outer arm (5).

32 Open and latch vehicle hatch door (1) to confirm proper position and operation of strike (12).

33 If necessary, grind down strike (12) to reduce clearance between it and latch pin (15) to less than 0.030 in. (0.076 cm).

34 Raise vehicle hatch door (1) to vertical position.

35 Remove two capscrews (11) from anchor (10).

36 Remove anchor (10) and cupola hinge torsion bar (8) from vehicle hatch door (1).

37 Remove vehicle hatch door (1) from hull (3).

38 Clean and paint rework areas per drawing 12369003.

39 Coat mating surfaces of cushioning pad (16) and inside surface of vehicle hatch door (1) with adhesive.

NOTE

Notched area of cushioning pad goes around vehicle hatch door handle.

40 Install cushioning pad (16) on vehicle hatch door (1). Allow to air dry for one hour at a temperature greater than 65°F (18°C).

41 Install vehicle hatch door (1) in vertical position on two brackets (6 and 7) and hinge (9).

42 Install cupola hinge torsion bar (8) through outer arm (5) and outer bracket (7), inner arm (4) and inner bracket (6), and hinge (9).

43 Install anchor (10), two new lockwashers (17), and two capscrews (11) on hull (3).

44 Torque two capscrews (11) to 85 to 90 ft-lb (115 to 122 N-m) dry or 60 to 65 ft-lb (81 to 88 N-m) lubricated.

45 If removed, reinstall lubrication fitting (18) in cupola hinge torsion bar (8).

2-49. MAINTENANCE OF PROJECTILE CLAMP CHAIN ASSEMBLY.

This task covers: a. *Disassembly* *b. Inspection/Repair* c. *Reassembly*

INITIAL SETUP

Materials/Parts
- Chain (figure C-2, appx C)
- Forest green enamel (item 13, appx B)
- Headless straight pin (2)
- Primer (item 24, appx B)
- Self-locking nut
- Spring pin

References
- TM 9-2350-304-10
- TM 9-2350-304-20-1
- TM 9-2350-304-24P-1

Equipment Conditions
- Projectile clamp chain assembly removed (TM 9-2350-304-20-1)
- Spade In lowered position (TM 9-2350-304-10)

DISASSEMBLY

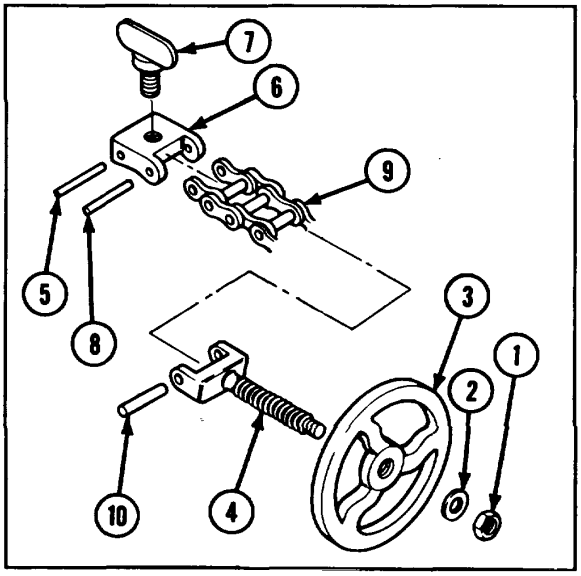
1 Remove self-locking nut (1), flat washer (2), and projectile chain handwheel (3) from projectile chain screw (4).

2 Remove spring pin (5) from rod end clevis (6).

3 Remove thumbscrew (7) from rod end clevis (6).

4 Remove headless straight pin (8) and chain (9) from rod end clevis (6).

5 Remove headless straight pin (10) and chain (9) from projectile chain screw (4).



INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 If projectile chain screw is broken, damaged, or missing, repair is by replacement of next higher assembly.

3 Chain Is a manufactured item, refer to appendix C.

4 Check handwheel and threads to ensure they are free of paint.

5 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1) which do not meet Inspection criteria.

REASSEMBLY

1 Install new chain (1) and new headless straight pin (2) to projectile chain screw (3). Stake or rivet ends of headless straight pin securely into chamfer of hole.

2 Install chain (1) and new headless straight pin (4) to rod end clevis (5). Stake or rivet ends of headless straight pin securely into chamfer of hole.

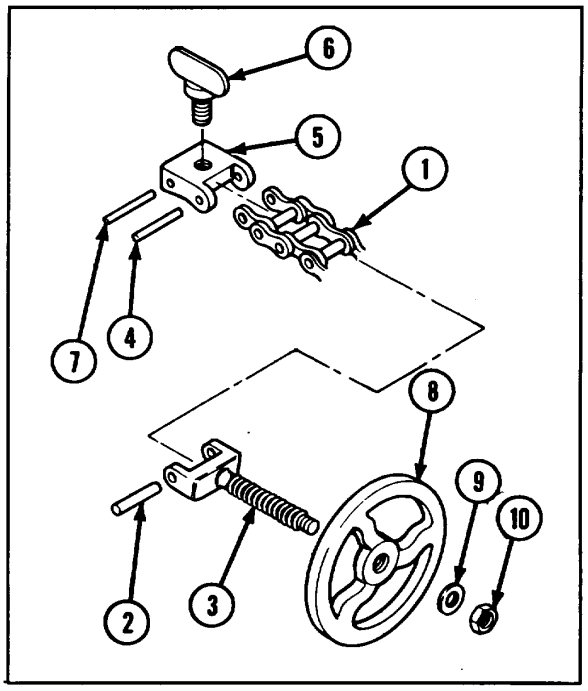
3 Install thumbscrew (6) and new spring pin (7) to rod end clevis (5).

4 Install projectile chain handwheel (8), fiat washer (9), and new self-locking nut (10) to projectile chain screw (3).

NOTE

Do not paint threads or handwheel.

5 If necessary, apply primer and forest green enamel.



2-50. MAINTENANCE OF HAND GRENADE BOX ASSEMBLY.

This task covers:	a. *Disassembly*	*b. Inspection/Repair*	c. *Reassembly*

INITIAL SETUP

Materials/Parts
Adhesive (item 1, appx B)
Cotter pin
Safety chain (figure C-1, appx C)

References
TM 9-2350-304-20-1
TM 9-2350-304-24P-1

Equipment Conditions
Hand grenade box assembly removed (TM 9-2350-304-20-1)

DISASSEMBLY

1 If damaged, raise hand grenade cover (1) and remove mechanical felt (2).

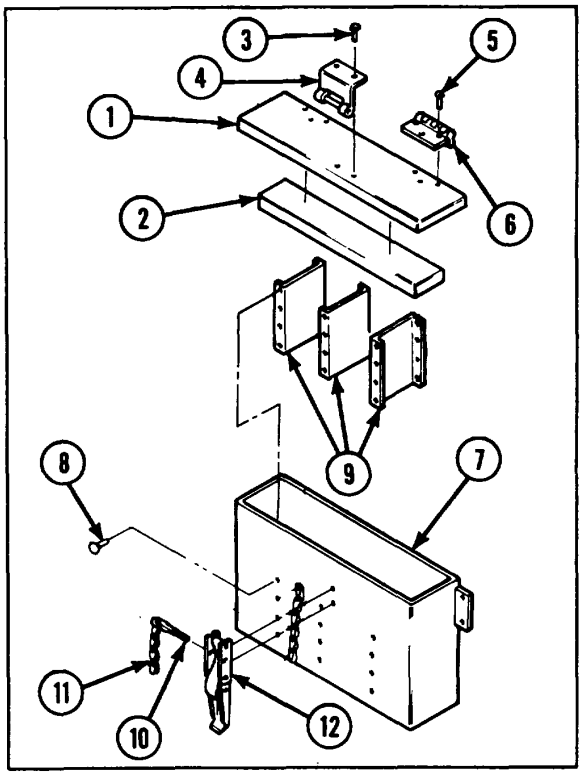
NOTE
Disassemble riveted components only if necessary for repair.

2 Remove two solid rivets (3) and bracket assembly (4) from hand grenade cover (1).

3 Remove 12 solid rivets (5), 2 butt hinges (6), and hand grenade cover (1) from body (7).

4 Remove 24 solid rivets (8) and 3 partitions (9) from body (7).

5 Remove cotter pin (10) with attached safety chain (11) from stowage clamp assembly (12).

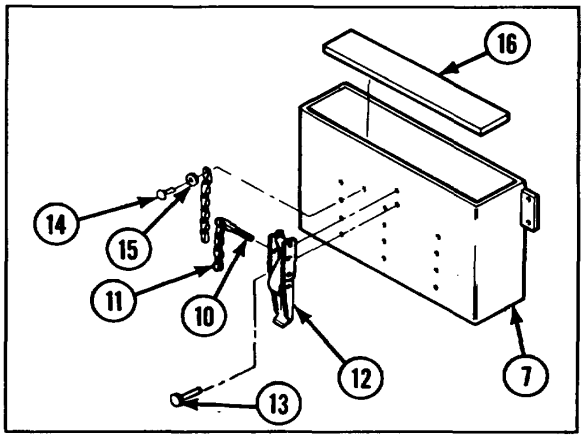


6 Remove two solid rivets (13) and stowage clamp assembly (12) from body (7).

7 Remove cotter pin (10) from safety chain (11).

8 Remove solid rivet (14), flat washer (15), and safety chain (11) from body (7).

9 If damaged, remove mechanical felt (16) from body (7).



INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 If hand grenade cover is broken, damaged, or missing, repair is by replacement of next higher

3 If body is broken, damaged, or missing, repair is by replacement of next higher assembly. assembly.

4 If partition is broken, damaged, or missing, repair is by replacement of next higher assembly.

5 Safety chain is a manufactured item, refer to appendix C.

6 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1) which do not meet inspection criteria.

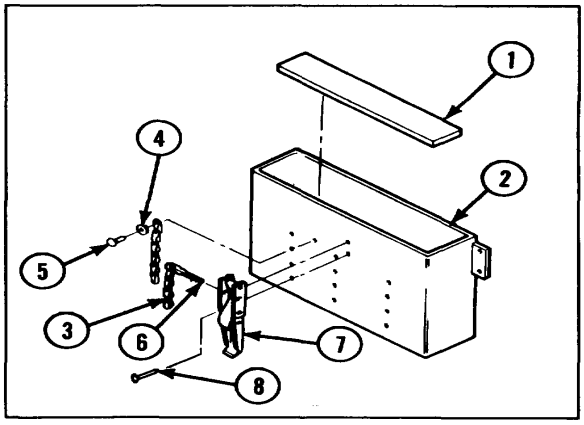
REASSEMBLY

1 If removed, apply adhesive to new mechanical felt (1) and install into body (2).

2 If removed, install new safety chain (3), flat washer (4), and new solid rivet (5) on body (2).

3 Install new cotter pin (6) on safety chain (3).

4 If removed, install stowage clamp assembly (7) and two new solid rivets (8) on body (2).



2-50. MAINTENANCE OF HAND GRENADE BOX ASSEMBLY (CONT.).

REASSEMBLY (CONT.)

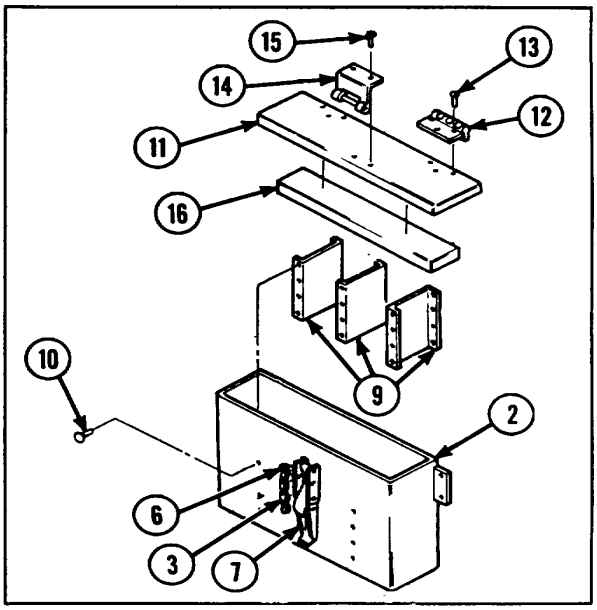
5 Install new cotter pin (6) with safety chain (3) on stowage clamp assembly (7).

6 If removed, install 3 partitions (9) and 24 new solid rivets (10) on body (2).

7 If removed, install hand grenade cover (11), 2 butt hinges (12), and 12 new solid rivets (13) on body (2).

8 If removed, Install bracket assembly (14) and two new solid rivets (15) on hand grenade cover (11).

9 If removed, apply adhesive to new mechanical felt (16). Raise hand grenade cover (11) and install new mechanical felt on hand grenade cover (11).



2-51. MAINTENANCE OF POWER TAKEOFF INSTALLATION.

This task covers:	a. *Disassembly*	*b. Inspection/Repair*	c. *Reassembly*

INITIAL SETUP

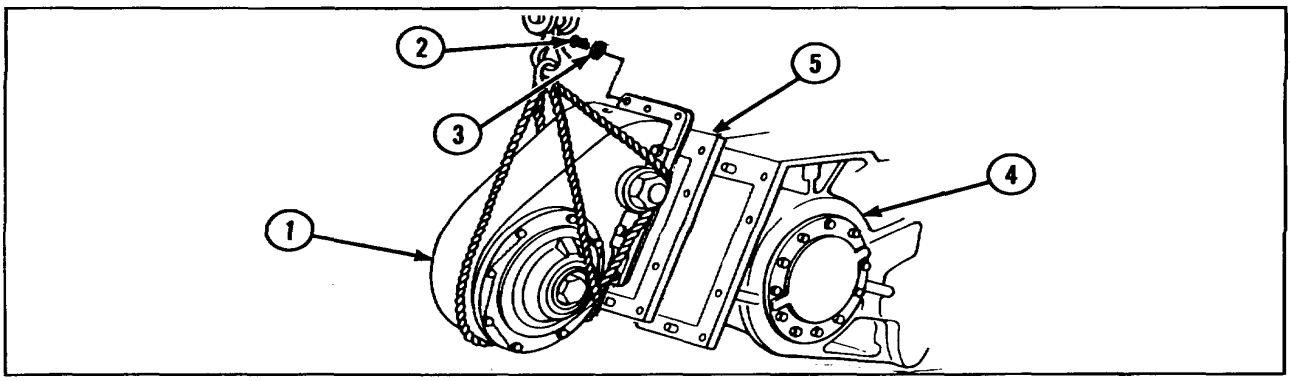
Tools and Special Tools
Automotive maintenance and repair shop equipment: field maintenance, basic, less power (SC 4910-95-A31)
- Soft-faced hammer

Hoist
Sling

Materials/Parts
Lockwasher (8)
Power takeoff gasket

References
TM 9-2350-304-20-1
TM 9-2350-304-24P-1

Equipment Conditions
Powerplant removed (TM 9-2350-304-20-1)



REMOVAL

1 Connect hoist and lifting straps to transmission power takeoff (1).

2 Remove eight hexagon head capscrews (2) and eight lockwashers (3) from transmission power takeoff (1).

3 Lift transmission power takeoff (1) from transfer case (4).

4 Remove power takeoff gasket (5) from transmission power takeoff (1).

5 Cover transfer case power takeoff opening.

INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 Transmission power takeoff is a repairable assembly. Notify general support maintenance.

3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1) which do not meet inspection criteria.

INSTALLATION

1 Remove covering from transfer case power takeoff opening.

CAUTION

Failure to use power takeoff gasket may damage transmission power takeoff.

2 Install new power takeoff gasket (5) on transmission power takeoff (1).

3 Connect hoist and lifting straps on transmission power takeoff (1).

4 Align transmission power takeoff (1) with transfer case (4), and tap with soft-faced hammer to

5 Install eight new lockwashers (3) and eight hexagon head capscrews (2) on transfer case (4). seat dowels.

2-52. MAINTENANCE OF SPADE LIFTING CYLINDER ASSEMBLY.

This task covers:	a. *Disassembly*	c. *Reassembly*
	b. *Inspection/Repair*	d. *Test*

INITIAL SETUP

Tools and Special Tools

Automotive maintenance and repair shop equipment: field maintenance, basic, less power (SC 4910-95-A31)
- Press
- Soft-jawed vise
- Torque wrench (O to 150ft-lb)

Bearing cup replacer (item 18, appx E)
Bearing inserter (item 6, appx E)
Linear actuating cap (item 3, appx E)
Ordnance artillery and turret mechanic's tool kit (SC 5180-95-CL-A12)
- M3 hydraulic pump kit
- Strap wrench

Spanner wrench (item 31, appx E)

Materials/Parts

Forest green enamel (item 13, appx B)
Grease (item 19, appx B)
Hydraulic fluid (item 20, appx B)
Locknut
Lubricating oil (item 22, appx B)
Primer (item 24, appx B)
Sealing compound (item 26, appx B)
Spade lifting cylinder repair kit
10-micron filter

References

TM 9-2350-304-20-1
TM 9-2350-304-24P-1

Equipment Conditions

Spade lifting cylinder assembly removed and partially disassembled (TM 9-2350-304-20-1)

General Safety Instructions

WARNING

Wipe up any spilled hydraulic fluid. Failure to do so may result in injury.

DISASSEMBLY

WARNING

Wipe up any spilled hydraulic fluid. Failure to do so may result in injury.

1 Remove two machine thread plugs (1) and two preformed packings (2) from shell (3). Drain hydraulic oil from spade lifting cylinder assembly.

2 Remove two lubrication fittings (4) from spade cylinder eye (5), and remove lubrication fitting (6) from shell (3).

3 Remove plain hexagon nut (7) and cylinder lock quick-release plunger (8) from spade cylinder lock (9).

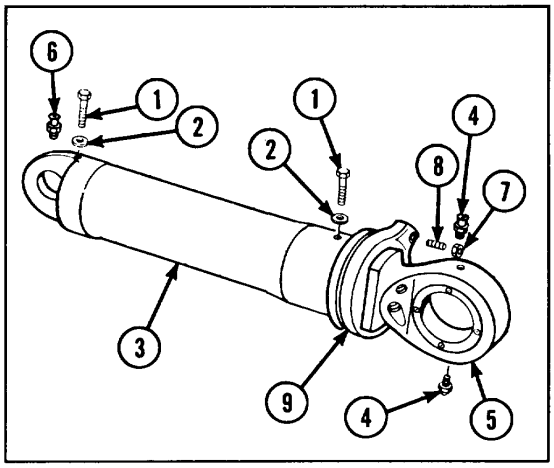
4 Pull spade cylinder eye (5) from shell (3). Unscrew spade cylinder lock (9) and place spade cylinder lock over spade cylinder eye.

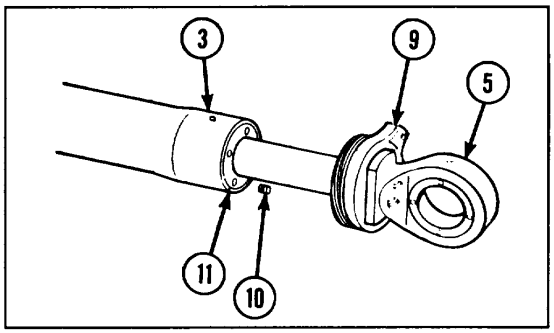
5 Remove setscrew (10) from externally threaded ring (11).

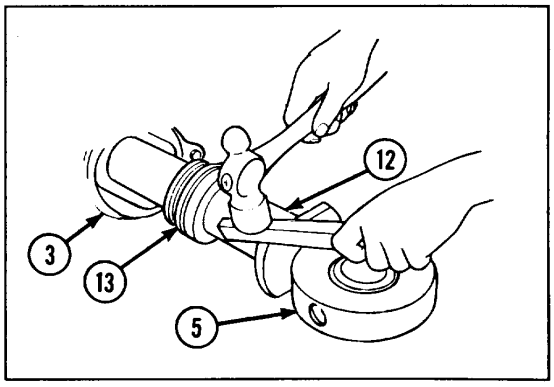
6 Using spanner wrench, remove cylinder head lock externally threaded ring (11) from shell (3).

7 Pull piston rod (12) from shell (3) until it contacts linear actuating head (13).

8 Using drift and hammer, tap on flats of spade cylinder eye (5) to loosen linear actuating head (13). Pull piston rod (12) and linear actuating head from shell (3).







2-52. MAINTENANCE OF SPADE LIFTING CYLINDER ASSEMBLY (CONT.).

DISASSEMBLY (CONT)

CAUTION

Do not scratch or damage surface of piston rod.

9 Slide linear actuating head (13), externally threaded ring (11), and spade cylinder lock (9) away from spade cylinder eye (5). Secure piston rod (12) in a clean, softjawed vise.

10 Remove setscrew (14) from spade cylinder eye (5).

11 Unscrew spade cylinder eye (5) from piston rod (12). Remove spade cylinder eye with lift control tube (15) from piston rod.

12 Loosen tube fitting locknut (16) and remove lift control tube (15) from spade cylinder eye (5). Remove packing retainer (17), preformed packing (18), and tube fitting locknut from lift control tube. Remove preformed packing (19) from spade cylinder eye (5).

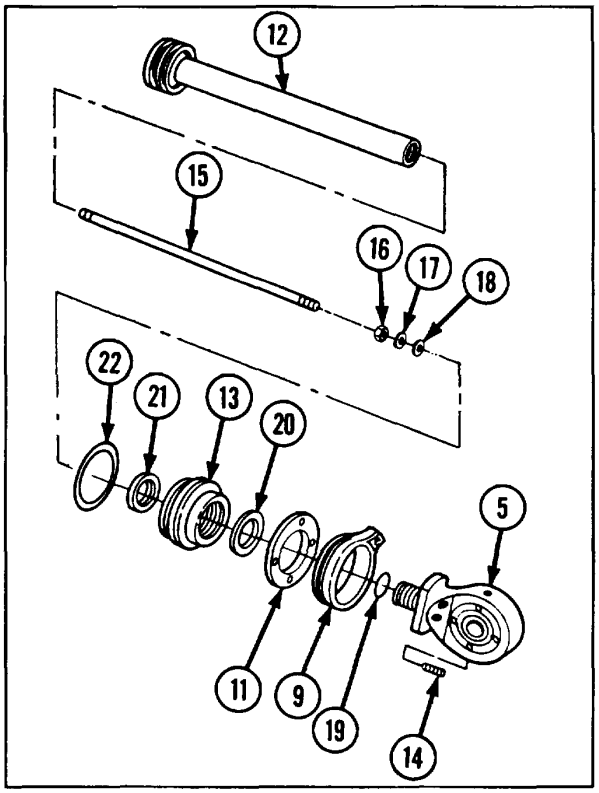
13 Remove spade cylinder lock (9), externally threaded ring (11), and linear actuating head (13) from piston rod (12).

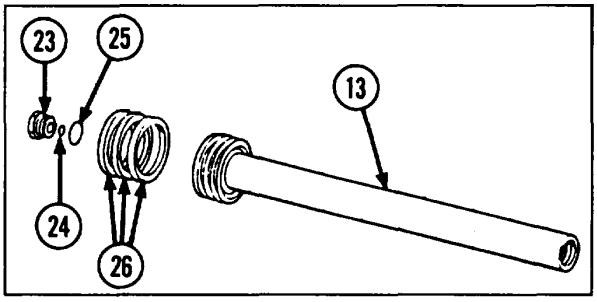
14 Remove plain encased seal (20) and packing assembly (21) from inside linear actuating head (13). Remove preformed packing (22) from outside linear actuating head.

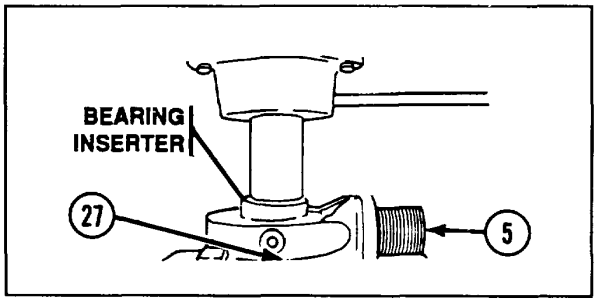
15 Unscrew machine threaded bushing (23) from piston rod (12). Remove preformed packings (24 and 25) from machine threaded bushing.

16 Remove three packing assemblies (26) from piston rod (12).

17 Using bearing inserter and press, remove two cylinder eye plain bearings (27) from spade cylinder eye (5) and shell.







INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 Inspect piston rod for scratches, corrosion, and pitting.

3 Inspect shell for cracks and dents, and inspect inside for corrosion, and pitting.

4 If shell is broken, damaged, or missing, repair is by replacement of next higher assembly.

5 If piston rod is broken, damaged, or missing, repair is by replacement of next higher assembly.

6 If lift control tube is broken, damaged, or missing, repair is by replacement of next higher

7 If any kit component is replaced, replace entire repair kit (5703293).

8 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1) which do not meet inspection criteria.

REASSEMBLY

NOTE

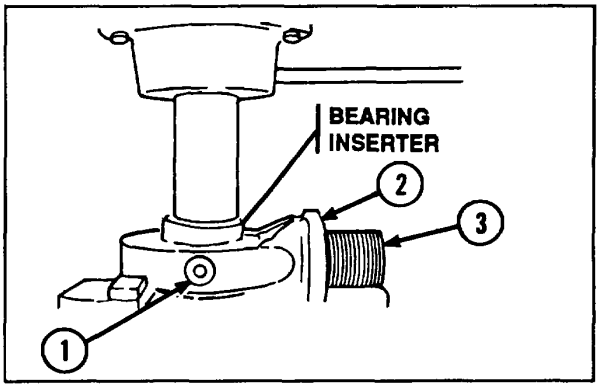
Lubricate all threads with grease before reassembly.

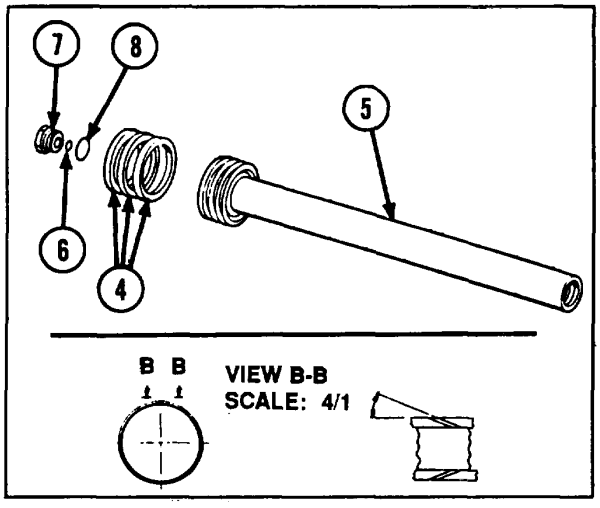
1 Using bearing inserter and press, install cylinder eye plain bearings (1) into spade cylinder eye (2) and shell (3). Stake each cylinder eye plain bearing on both sides.

2 Install three new packing assemblies (4) on piston rod (5). Each back-up ring (part of packing assembly) must be installed with radius oriented against seal and beveled splits aligned as shown.

3 Install new preformed packing (6) inside machine threaded bushing (7), and install new preformed packing (8) outside machine threaded bushing.

4 Install machine threaded bushing (7) in piston rod (5).





2-52. MAINTENANCE OF SPADE LIFTING CYLINDER ASSEMBLY (Cont).

REASSEMBLY (CONT)

5 Install new plain encased seal (9) in linear actuating head (10).

6 Using bearing cup replacer, install new packing assembly (11) in linear actuating head (10).

7 Install new preformed packing (12) on linear actuating head (10).

8 Place protector into piston rod (5). Lightly lubricate protector, piston rod, and inside of linear actuating head (10) with lubricating oil. Install linear actuating head over linear actuating cap onto piston rod. Remove linear actuating cap.

9 Install new tube fitting locknut (13), new packing retainer (14), and new preformed packing (15) on lift control tube (16).

10 Install new preformed packing (17) on spade cylinder eye (2).

11 Install lift control tube (16) to spade cylinder eye (2), and secure by tightening locknut (13).

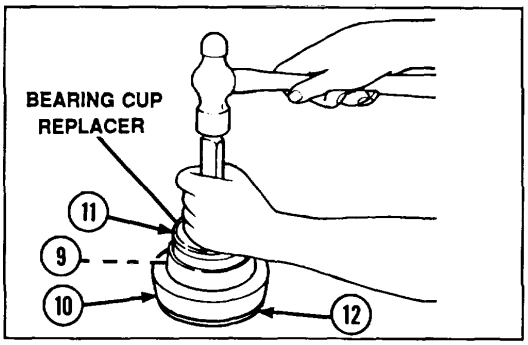
12 Slide externally threaded ring (18) and spade cylinder lock (19) on piston rod (5).

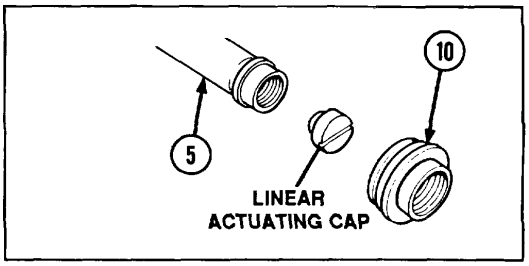
CAUTION

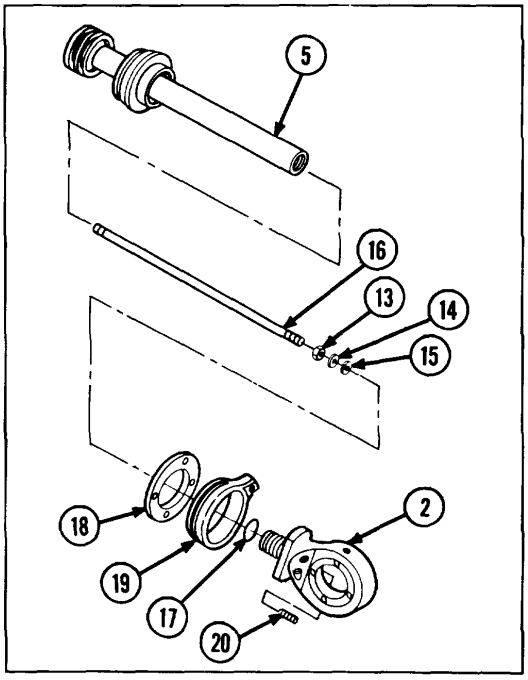
Do not scratch or damage surface of piston rod.

13 Secure piston rod (5) in soft-jawed vise. Install spade cylinder eye (2) with lift control tube (16) in piston rod. Using strap wrench to hold piston rod, tighten spade cylinder eye.

14 Install setscrew (20) in spade cylinder eye (2).







15 Lightly lubricate inside shell (21) with lubricating oil. Install linear actuating head (10) into shell.

16 Using spanner wrench, install externally threaded ring (18) into shell (21). Tighten externally threaded ring. Install setscrew (22) in externally threaded ring.

17 Install spade cylinder lock (19) into shell (21).

18 Install cylinder lock quick-release plunger (23) through spade cylinder lock (19) to extend 0.12 in. (0.31 cm). Install plain hexagon nut (24) and torque to 6 to 8 ft-lb (8 to 11 N-m).

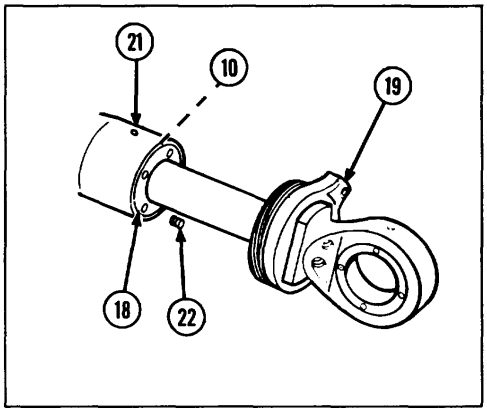
19 Install two lubrication fittings (25) to spade cylinder eye (2) and one lubrication fitting (26) to shell (21).

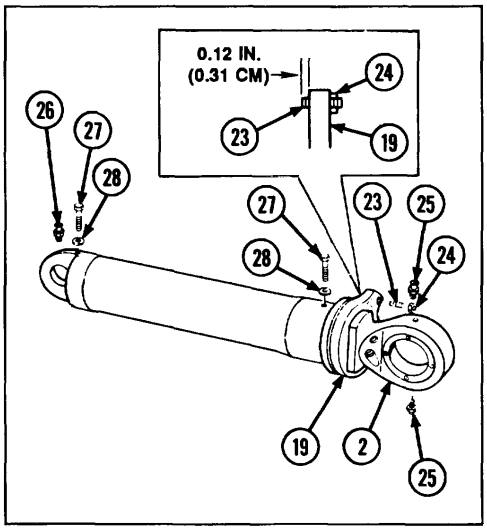
20 Install two machine thread plugs (27) and two new preformed packings (28) to shell (21).

NOTE

Do not paint bearings, fittings, or parts.

21 If necessary, apply primer and forest green enamel.





2-52. MAINTENANCE OF SPADE LIFTING

TEST

WARNING

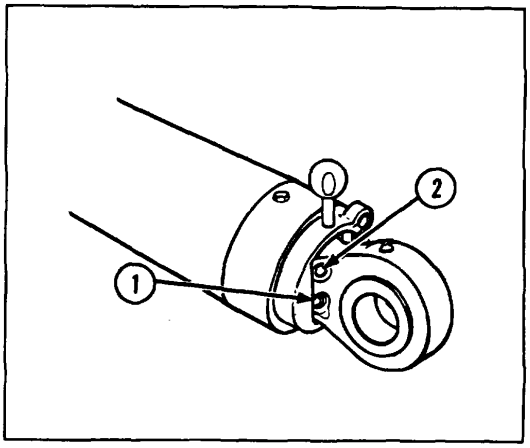
Wipe up any spilled hydraulic fluid. Failure to do so may result in Injury.

1 Fill spade cylinder with hydraulic fluid filtered through a 10-micron filter.

2 Push piston into cylinder shell.

3 Using M3 oil pump, apply 4000 psi (27,580 kPa) hydraulic pressure to both eye ports A and B (1 and 2) for 5 minutes. No leakage is allowed at bleed ports around piston rod, or at cylinder head.

4 Open port A (1) and, using M3 oil pump, apply 4000 psi (27,580 kPa) hydraulic pressure to port B (2). No leakage is allowed at port A (1).



2-53. MAINTENANCE OF SPADE CONTROL LEVER.

This task covers:
a. *Removal/Disassembly*
b. *Inspection/Repair*
c. *Reassembly/Installation*

INITIAL SETUP

Materials/Parts

Locknut
Locknut (2)
Lockwasher (6)
Packing retainer
Preformed packing (4)
Preformed packing
Preformed packing (2)
Preformed packing
Preformed packing (4)
Rags
Self-locking nut
Spring pin

References

TM 9-2350-304-10
TM 9-2350-304-20-1
TM 9-2350-304-24P-1

Equipment Conditions

Spade in lower position (TM 9-2350-304-10)
Rear hydraulic access cover removed (TM 9-2350-304-20-1)

General Safety Instructions

WARNING

• Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will keep the cannon from sliding out of battery.

• Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up any spilled hydraulic fluid.

2-53. MAINTENANCE OF SPADE CONTROL

REMOVAL/DISASSEMBLY

WARNING

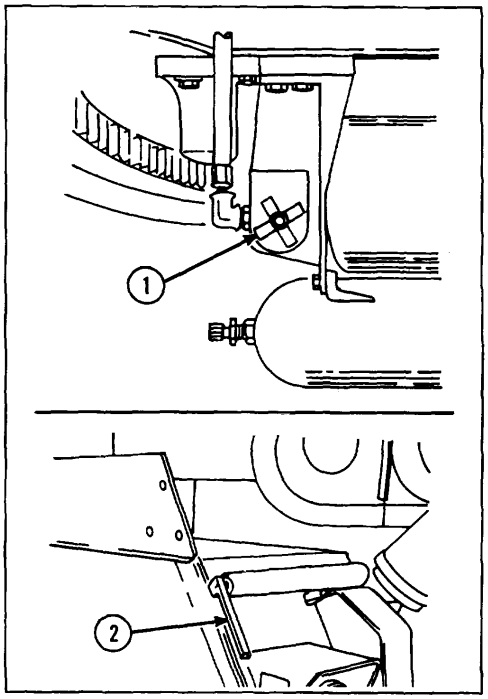
Before relieving hydraulic pressure, be sure travel lock is engaged and vehicle is on as level ground as possible. This will keep the cannon from sliding out of battery.

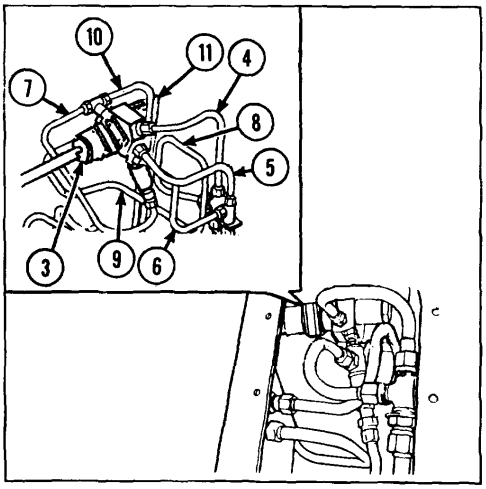
1 To relieve hydraulic pressure, set MASTER switch to OFF. Open globe angle valve (1), and operate manual control lever (2) several times.

WARNING

Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up any spilled hydraulic fluid.

2 To remove hydraulic lines from control valve manifold assembly (3), disconnect spade control manifold to tee return line tube assembly (4), pressure line tee to spade control manifold tube assembly (5), spade control line tee to pressure reduction valve tube assembly (6), spade control valve tee to reducing valve tube assembly (7), spade control cylinder lowering tee to hose tube assembly (8), tube (9), spade control valve tee to nipple tube assembly (10), and spade right cylinder raising tube assembly (11). Cover tube openings with clean rags.





CAUTION

Do not pull manual control lever too far from hull. This could bind retaining ring.

3 Pull back manual control lever (2) and block in place. Disconnect retaining ring (12).

4 Remove spade control lever shaft (13).

5 Remove self-locking nut (14) and spade control sleeve spacer (15) from manual control lever (2).

6 Remove helical compression spring (16) from manual control lever (2).

7 Remove ball bearing (17) and flat washer (18) from spade control lever shaft (13).

NOTE

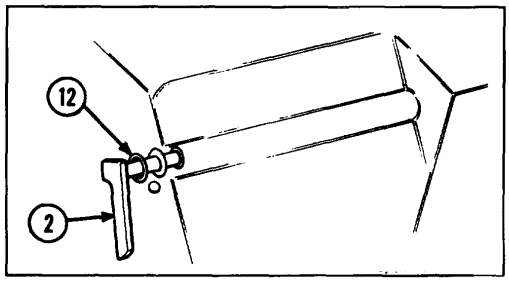
Retain pressure on valve to keep valve from rotating and to prevent damage to lockwire.

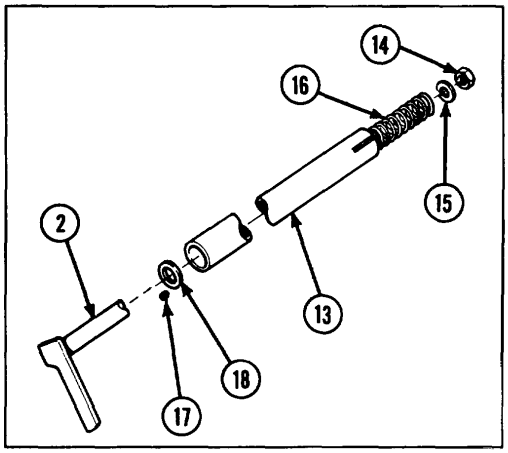
8 Remove spade control pressure reducing valve (19) from control valve manifold assembly (3).

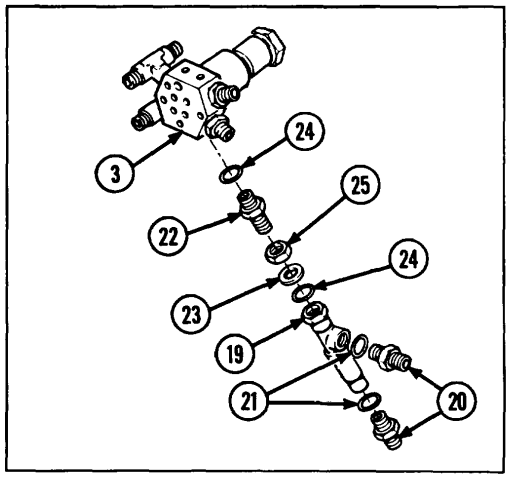
9 Remove two tube reducers (20) and two preformed packings (21) from spade control pressure reducing valve (19).

10 Remove tube nipple (22), packing retainer (23), and two preformed packings (24) from spade control pressure reducing valve (19).

11 Remove locknut (25) from tube nipple (22).







2-53. MAINTENANCE OF SPADE CONTROL LEVER (CONT).

REMOVAL/DISASSEMBLY (CONT)

12 Remove two hexagon head capscrews (26), two lockwashers (27), and control valve manifold assembly (3) from hull deck.

13 Remove socket head capscrew (28), flat washer (29), and spade control lever coupling (30) from hydraulic control valve (31).

14 Remove four hexagon head capscrews (32), four lockwashers (33), and hydraulic control valve (31) from control valve manifold assembly (3).

15 Remove four preformed packings (34) from hydraulic control valve (31).

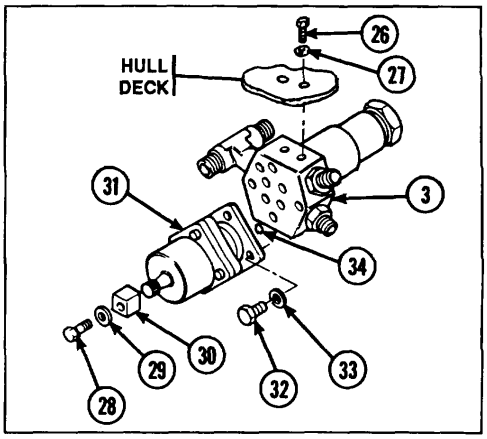
16 Remove machine thread plug (35), preformed packing (36), check valve (37), and preformed packing (38) from control valve manifold assembly (3).

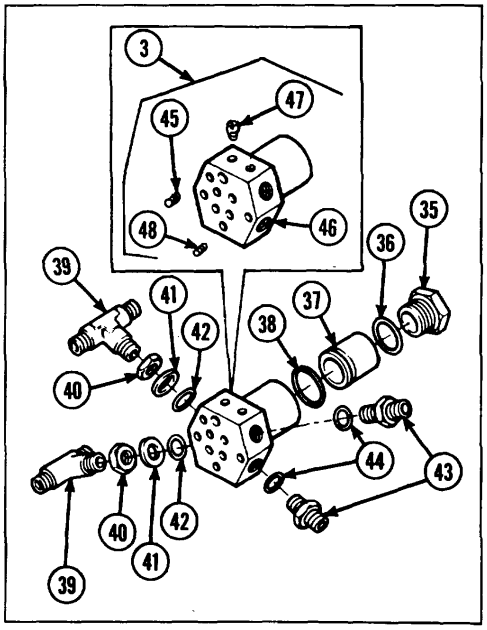
17 Remove two tube tees (39), two locknuts (40), two flat washers (41), and two preformed packings (42) from control valve manifold assembly (3).

18 Remove two tube nipples (43) and two flat washers (44) from control valve manifold assembly (3).

19 If necessary, remove four screw thread Inserts (45) from manifold (46) of control valve manifold assembly (3).

20 If necessary, remove two screw thread Inserts (47) and one spring pin (48) from manifold (46) of control valve manifold assembly (3).





INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 If manifold is damaged, repair is by replacement of next higher assembly.

3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1) which do not

REASSEMBLY/INSTALLATION

1 If removed, install two screw thread inserts (1) and new spring pin (2) on manifold (3) of control valve manifold assembly (4).

2 If removed, Install four screw thread inserts (5) on manifold (3) of control valve manifold assembly (4).

3 Install two flat washers (6) and two tube nipples (7) on control valve manifold assembly (4).

4 Install two new preformed packings (8), two flat washers (9), two new locknuts (10), and two tube tees (11) on control valve manifold assembly (4).

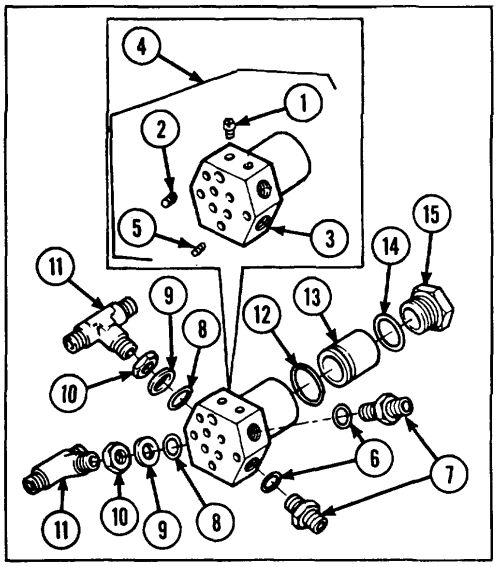
5 Install new preformed packing (12), check valve (13), new preformed packing (14), and machine thread plug (15) on control valve manifold assembly (4).

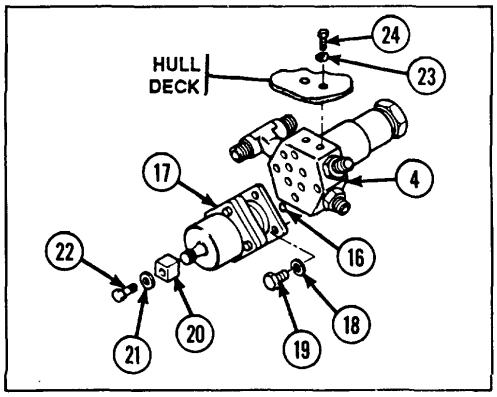
6 Install four new preformed packings (16) into hydraulic control valve (17).

7 Align hydraulic control valve (17) with index pin in control valve manifold assembly (4). Install hydraulic control valve, four new lockwashers (18), and four hexagon head capscrews (19) on control valve manifold assembly.

8 Install spade lever control coupling (20), flat washer (21), and socket head cap- screw (22) on attached hydraulic control valve (17).

9 Install control valve manifold assembly (4), two new lockwashers (23), and two hexagon head capscrews (24) on hull deck.





2-53. MAINTENANCE OF SPADE CONTROL LEVER (CONT).

REASSEMBLY/INSTALLATION (CONT)

10 Install new locknut (25) on tube nipple (26).

11 Install two new preformed packings (27), new packing retainer (28), and tube nipple (26) on spade control pressure reducing valve (29).

12 Install two new preformed packings (30) and two tube reducers (31) on spade control pressure reducing valve (29).

NOTE

Retain spade control pressure reducing valve to keep valve from rotating and to prevent damage to lockwire.

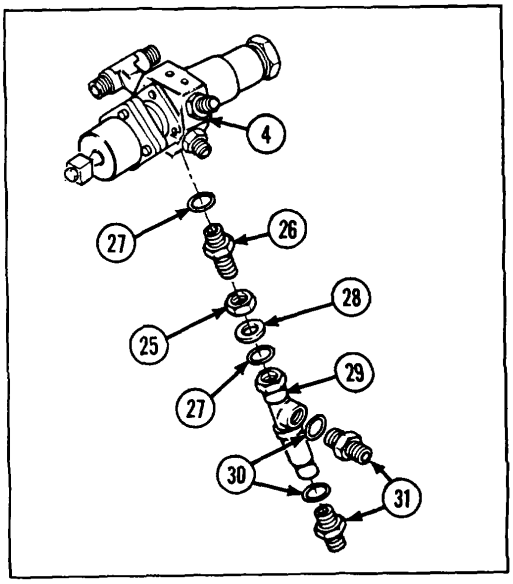
13 Install spade control pressure reducing valve (29) on control valve manifold assembly (4).

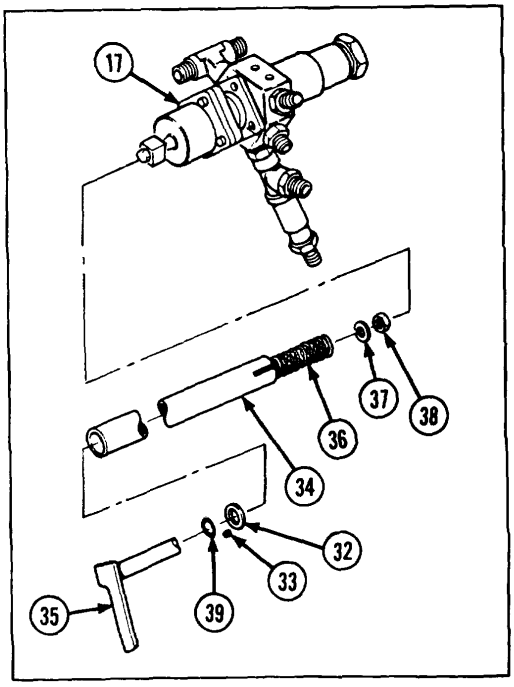
14 Install flat washer (32) and ball bearing (33) on spade control lever shaft (34).

15 Install manual control lever (35) into spade control lever shaft (34).

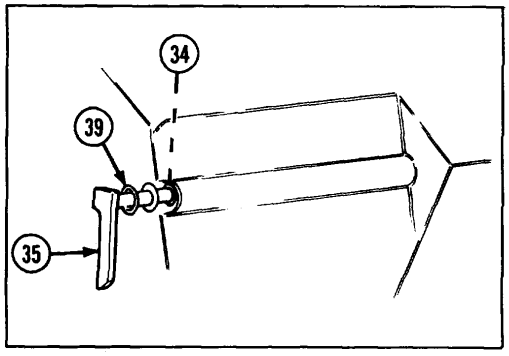
16 Install helical compression spring (36), spade control sleeve spacer (37), and new self-locking nut (38) on manual control lever (35) inside spade control lever shaft (34).

17 Align index notch on hull housing and flat on spade control lever shaft (34). Install spade control lever shaft on attached hydraulic control valve (17).





18 Pull back manual control lever (35). Remove blocking and install new retaining ring (39) to spade control lever shaft (34).



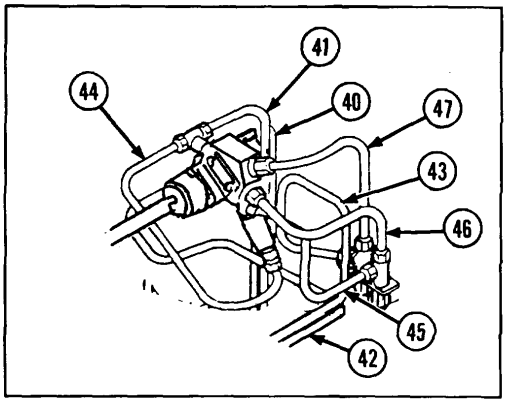
WARNING

Hydraulic system Is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up any spilled hydraulic fluid.

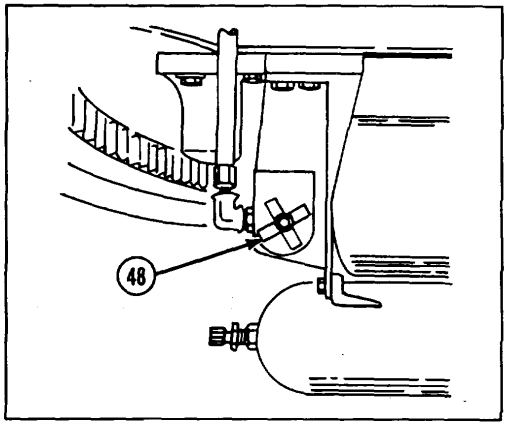
NOTE

Check hydraulic lines for oil leaks.

19 To Install hydraulic lines to control valve manifold assembly (4), uncover tube openings and connect spade right cylinder raising tube assembly (40), spade control valve tee to nipple tube assembly (41), tube (42), spade control lowering tee to hose tube assembly (43), spade control valve tee to reducing valve tube assembly (44), spade control line tee to pressure reducing valve tube assembly (45), pressure line tee to spade control manifold tube assembly (46), and spade control manifold to tee return line tube assembly (47).



20 To establish hydraulic pressure, close globe angle valve (48) and set MASTER switch to ON.



2-54. MAINTENANCE OF ENGINE BLOWER ASSEMBLY (HEATER INSTALLATION KIT).

This task covers: *a. Disassembly* *b. Inspection/Repair* *c. Reassembly*

INITIAL SETUP

Tools and Special Tools
Automotive maintenance and repair shop equipment: field maintenance, basic, less power (SC 4910-95-A31)
• Plier wire twister

Materials/Parts
Lockwasher (15)
Lockwasher (2)
Lockwire (item 38, appx B)
Preformed packing

References
TM 9-1250-304-20-1
TM 9-2350-304-24P-1
TM 9-2920-224-34&P

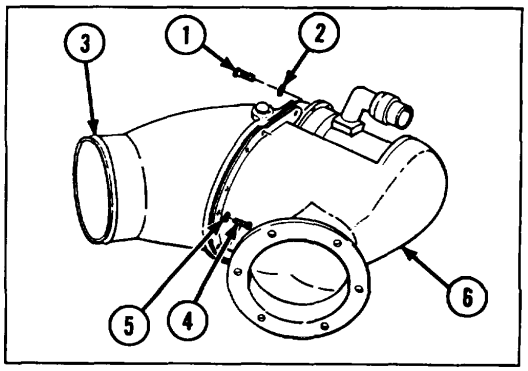
Engine Conditions
Engine blower assembly removed (TM 9-2350-304-20-1)

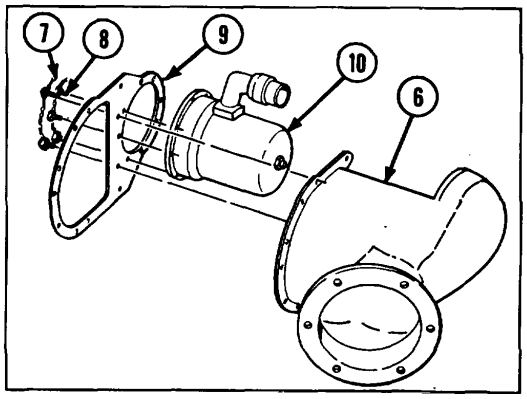
DISASSEMBLY

1 Remove five machine screws (1) and five lockwashers (2) from forward blower housing (3).

2 Remove ten machine screws (4) and ten lockwashers (5) from rear blower housing (6). Separate forward blower housing (3) and rear blower housing (6).

3 Remove lockwire (7), five capscrews (8), heater blower plate (9), and tube axial fan (10) from rear blower housing (6).



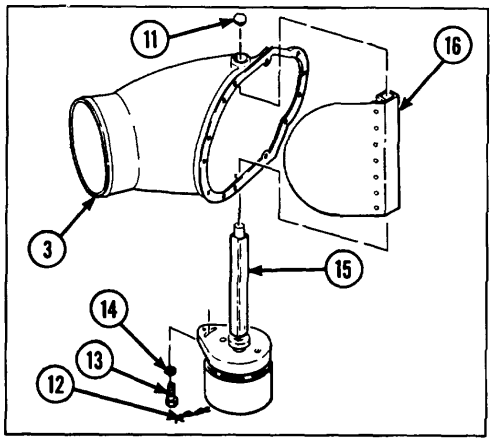


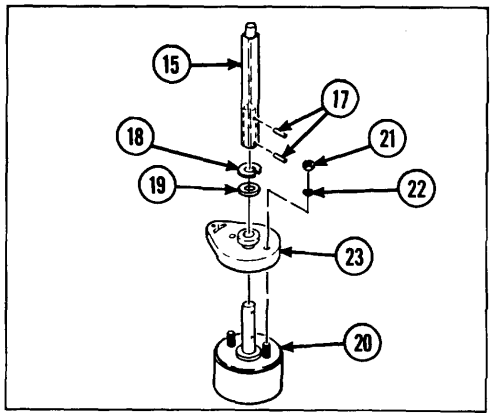
4 Remove expansion plug (11), lockwire (12), capscrew (13), and flat washer (14).

5 Pull solenoid shaft (15) from forward blower housing (3) and remove heater blower flap (16).

6 Remove two spring pins (17), solenoid shaft (15), flat washer (18), and preformed packing (19) from electrical solenoid (20).

7 Remove two plain nuts (21), two lock-washers (22), and blower assembly adapter (23) from electrical solenoid (20).





INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 Tube axial fan is a repairable assembly. Refer to TM 9-2920-224-34&P.

3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1) which do not meet inspection criteria.

2-54. MAINTENANCE OF ENGINE BLOWER ASSEMBLY (HEATER INSTALLATION KIT) (CONT).

REASSEMBLY

1 Coat electrical solenoid (1) with sealing compound and install blower assembly adapter (2), two new lockwashers (3), and two plain nuts (4) on electrical solenoid (1).

2 Install new preformed packing (5), flat washer (6), solenoid shaft (7), and two spring pins (8).

NOTE

With heater blower flap fully open, adjust electrical solenoid to full neutral position.

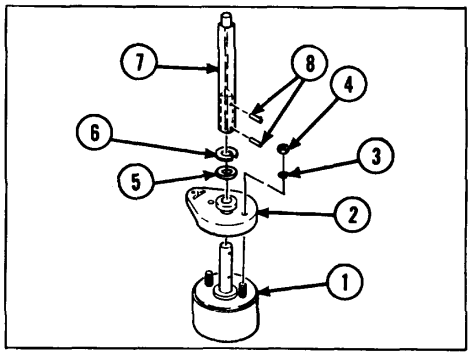
3 Install heater blower flap (9) and solenoid shaft (7) in forward blower housing (10).

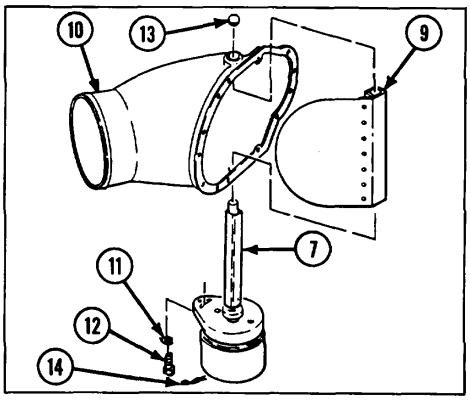
4 Install flat washer (11), capscrew (12), expansion plug (13), and new lockwire (14).

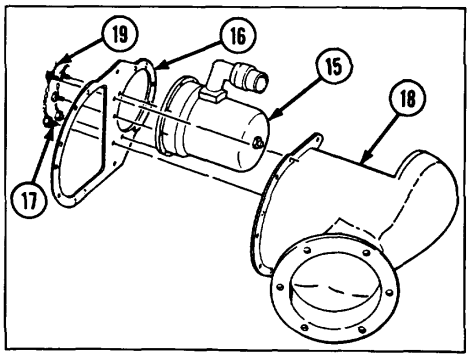
5 Install tube axial fan (15), blower heater plate (16), and five capscrews (17) to rear blower housing (18). Secure with new lockwire (19).

NOTE

Coat forward blower housing and rear blower housing with sealing compound.

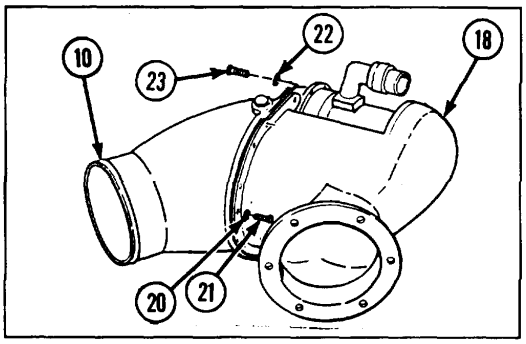






6 Align rear blower housing (18) with forward blower housing (10) and secure with ten new lockwashers (20) and ten machine screws (21).

7 Install five new lockwashers (22) and five machine screws (23).



2-55. MAINTENANCE OF HEATER ELECTRICAL CONTROL BOX (HEATER INSTALLATION KIT).

This task covers: *a. Disassembly* *b. Inspection/Repair* *c. Reassembly*

INITIAL SETUP

Materials/Parts
Lockwasher (7)
Lockwasher (2)
Varnish (item 35, appx B)

References
TM 9-2350-304-20-1
TM 9-2350-304-24P-1

Equipment Conditions
Heater electrical control box removed from driver's heater assembly (TM 9-2350-304-20-1)

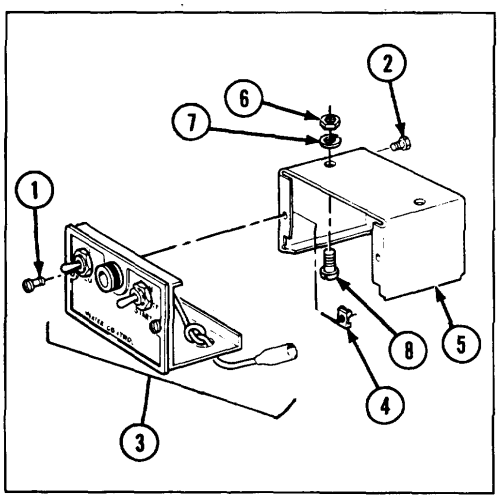
DISASSEMBLY

NOTE

Procedures are written for driver's heater electrical control box assembly, but also apply to coolant heater control box assembly and crew heater control box assembly.

1 Remove two threaded tapping screws (1), two assembled washer screws (2), panel (3) with attached parts, and two sheet spring nuts (4) from control case assembly (5).

2 Remove two plain hexagon nuts (6), two lockwashers (7), and two screws (8) from control case assembly (5).



2-55. MAINTENANCE OF HEATER ELECTRICAL BOX (HEATER INSTALLATION KIT) (CONT).

DISASSEMBLY (CONT)

3 Remove screws at terminals 12 and 13 of HI/LO toggle switch (9), and disconnect two electrical leads (10 and 11).

4 Remove hexagon nut (12), lockwasher (13), HI/LO toggle switch (9), and key washer (14) from panel (3).

5 Remove screw from RUN/OFF/START toggle switch (15) terminals 21 and 18, and remove jumper assembly (16).

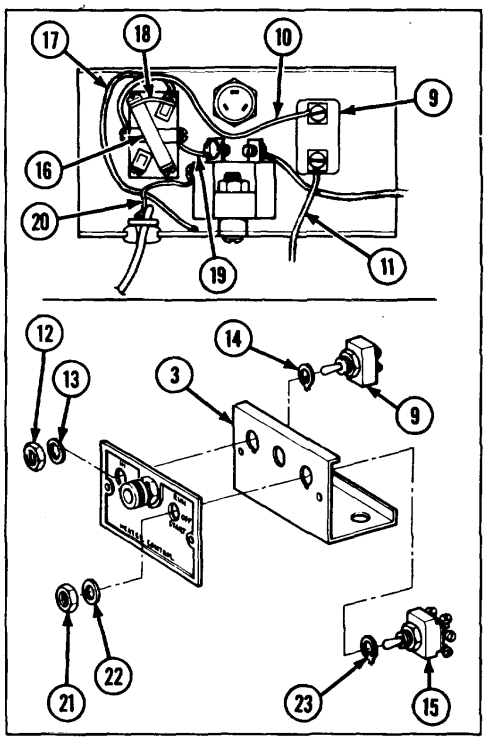
6 Remove screw from RUN/OFF/START toggle switch (15) terminal 14. Disconnect heater control switch electrical lead (17) and remove retaining plate (18) from RUN/OFF/START toggle switch.

7 Remove screw from RUN/OFF/START toggle switch (15) terminal 15 and disconnect lead (19).

8 Remove screw and disconnect lead (19) from RUN/OFF/START toggle switch (15) terminal 20.

9 Remove screw and disconnect three leads (20) from RUN/OFF/START toggle switch (15) terminal 19. Remove RUN/OFF/ START toggle switch-to-HI/LO toggle switch lead (10) from panel (3).

10 Remove plain hexagon nut (21), lock-washer (22), RUN/OFF/START toggle switch (15), and key washer (23) from panel (3).



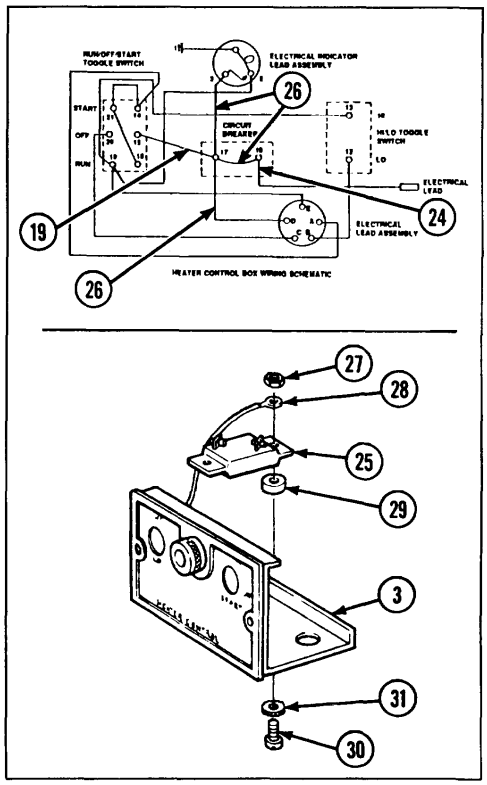
11 Remove screw and disconnect lead (24) from circuit breaker (25) terminal 16.

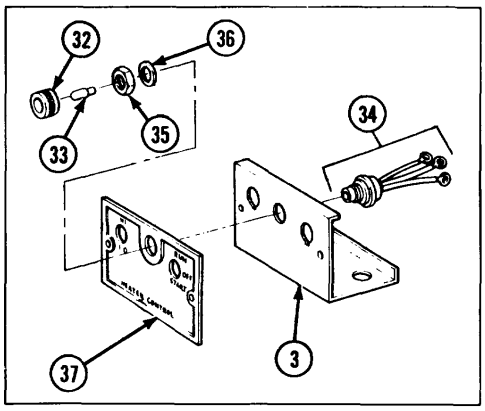
12 Remove screw and disconnect three leads (26) from circuit breaker (25) terminal 17. Remove lead (19) from panel (3).

13 Remove two nuts (27) and disconnect ground lead (28) from circuit breaker (25). Remove circuit breaker (25), two spacers (29), two machine screws (30), and two lockwashers (31) from panel (3).

14 Remove circuit breaker (25) from panel (3).

15 Remove lens cap (32) and incandescent lamp (33) from electrical indicator lead assembly (34). Remove plain hexagon nut (35), lockwasher (36), indicator panel (37), and electrical indicator lead assembly (34) from panel (3).



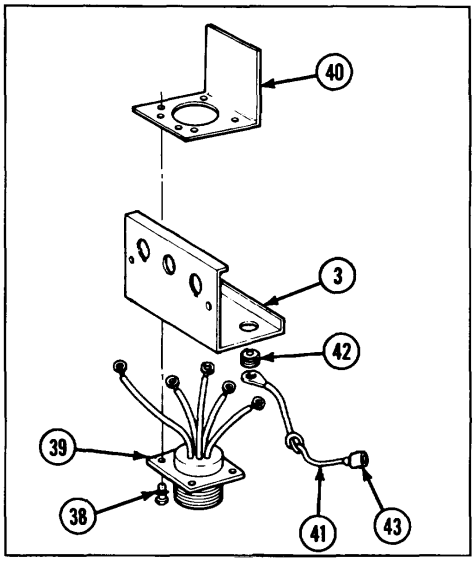


2-55. MAINTENANCE OF HEATER ELECTRICAL BOX (HEATER INSTALLATION KIT) (CONT).

DISASSEMBLY (CONT)

16 Remove four assembled washer screws (38), electrical lead assembly (39), and cable assembly mounting angle bracket (40) from panel (3).

17 Remove electrical lead (41) and nonmetallic grommet (42) from panel (3).



INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 For repair of electrical lead and shell connector, refer to general maintenance, page 2-19.

3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1).

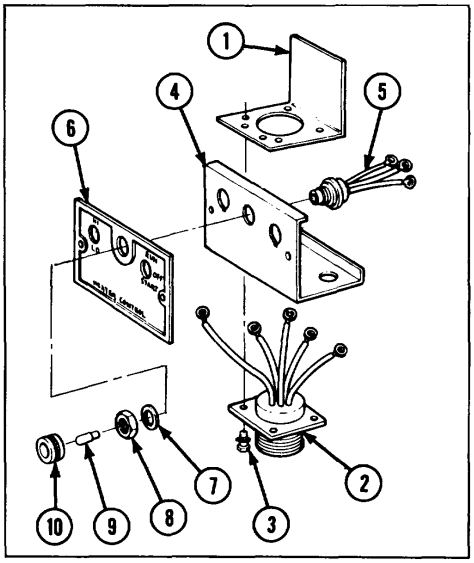
REASSEMBLY

NOTE

Procedures are written for driver's heater assembly, but also apply to coolant heater control box assembly and crew heater control box assembly.

1 Install cable assembly mounting angle bracket (1), electrical lead assembly (2), and four assembled washer screws (3) to panel (4).

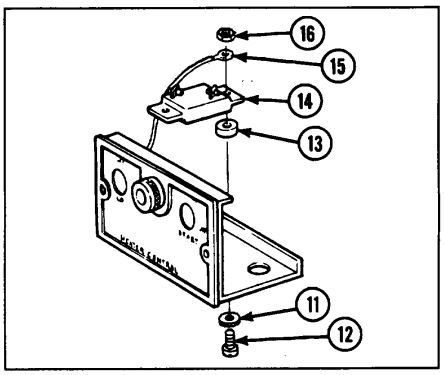
2 Install electrical indicator lead assembly (5), indicator panel (6), lockwasher (7), and plain hexagon nut (8) to panel (4). Install incandescent lamp (9) and lens cap (10) to electrical indicator lead assembly (5).



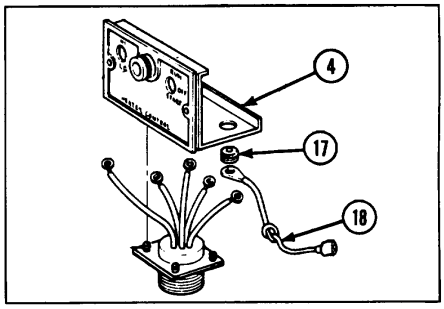
NOTE

Secure indicator ground lead to one of the circuit breaker mounting screws.

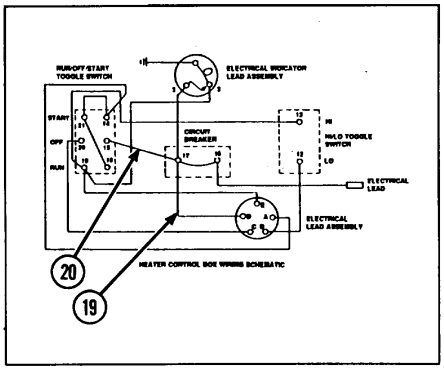
3 Install two new lockwashers (11), two machine screws (12), two spacers (13), circuit breaker (14), ground lead (15) from indicator lamp terminal 1, and two plain hexagon nuts (16).



4 Install grommet (17) to panel (4). Install electrical lead (18) to circuit breaker terminal 16.



5 Connect lead from electrical indicator lead assembly terminal 3, lead (19) from electrical lead assembly pin D, and one end of lead (20) to circuit breaker terminal 17. Secure three leads with screw.



2-55. MAINTENANCE OF HEATER ELECTRICAL CONTROL BOX (HEATER INSTALLATION KIT) (CONT).

REASSEMBLY (CONT)

6 Install key washer (21), RUN/OFF/ START toggle switch (22), lockwasher (23), and plain hexagon nut (24) to panel (4) with attached parts.

7 Connect lead (25) from indicator lamp terminal 2 to terminal 19 of RUN/OFF/ START toggle switch (22).

8 Connect lead (26) from electrical lead assembly pin E to terminal 19 of RUN/OFF/START toggle switch (22).

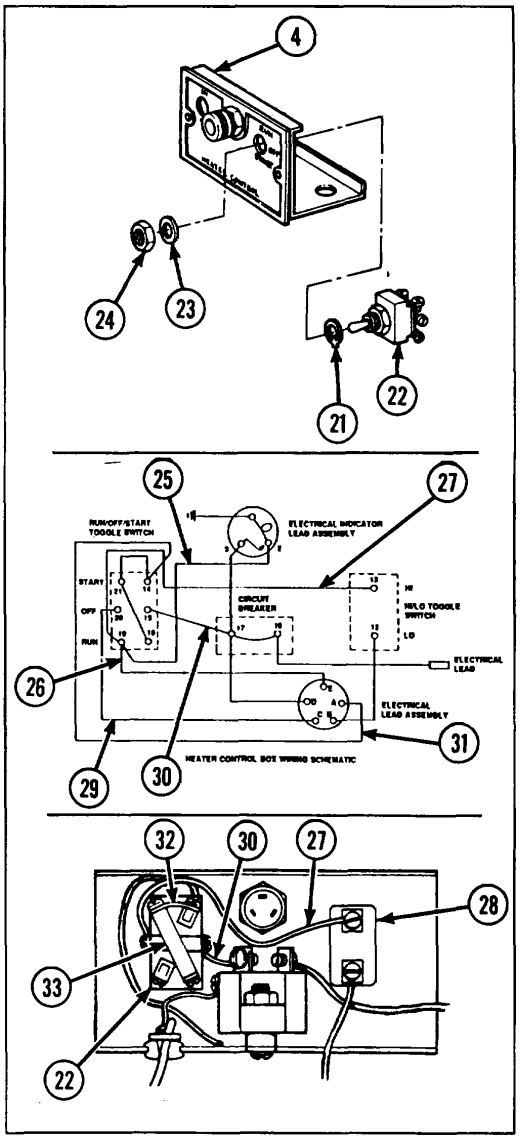
9 Connect electrical lead (27) to HI/LO toggle switch (28) terminal 13 and to RUN/OFF/START toggle switch terminal 20. Secure leads with screw.

10 Connect lead (29) from electrical lead assembly terminal C to RUN/OFF/START toggle switch (22) terminal 20. Secure to RUN/OFF/START toggle switch with screw.

11 Connect lead (30) from circuit breaker terminal 17 to RUN/OFF/START toggle switch (22) terminal 15. Secure to toggle switch with screw.

12 Install heater control switch electrical lead (31) from electrical connector pin A, retaining plate (32), and screw to RUN/OFF/START toggle switch (22) terminal 14.

13 Install retaining plate (32) and one end of jumper (33) to RUN/OFF/START toggle switch (22) terminal 21. Secure to toggle switch with screw.



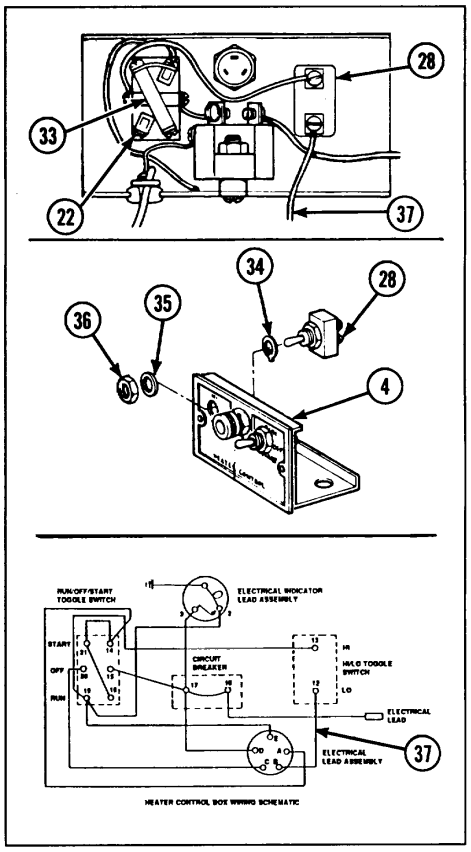
14 Connect other end of jumper (33) to RUN/OFF/START toggle switch (22) terminal 18, and secure to toggle switch with screw.

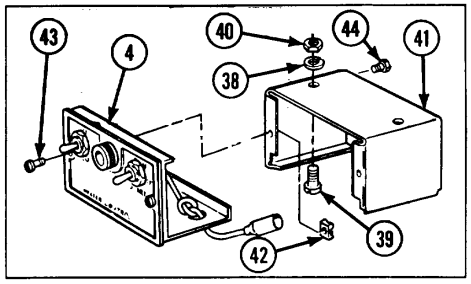
15 Install key washer (34), HI/LO toggle switch (28), lockwasher (35), and plain hexagon nut (36) to panel (4) with attached parts.

16 Connect lead (37) from electrical connector pin B to HI/LO toggle switch (28) terminal 12. Secure lead to HI/LO toggle switch with screw.

17 Apply varnish or equivalent to all exposed metal where wires attach to screw terminals to protect against fungus growth and moisture.

18 Install two new lockwashers (38), two screws (39), and two plain hexagon nuts (40) into control case assembly (41). Install two sheet spring nuts (42), panel (4), two machine screws (43), and two threaded tapping screws (44) to control case assembly (41).





2-56. MAINTENANCE OF ENGINE COOLANT HEATER ASSEMBLY (HEATER INSTALLATION KIT).

This task covers:	*a. Disassembly*	*c. Reassembly*
	b. Inspection/Repair	*d. Test*

INITIAL SETUP

Materials and Parts
- Gasket
- Gasket
- Lockwasher (3)
- Lockwasher
- Preformed packing
- Preformed packing
- Self-locking nut (3)
- Sleeve
- Tapping screw

References
- TM 9-2350-304-20-1
- TM 9-2350-304-24P-1
- TM 9-2990-207-23&P

Equipment Conditions
- Engine coolant heater assembly removed (TM 9-2350-304-20-1)

DISASSEMBLY

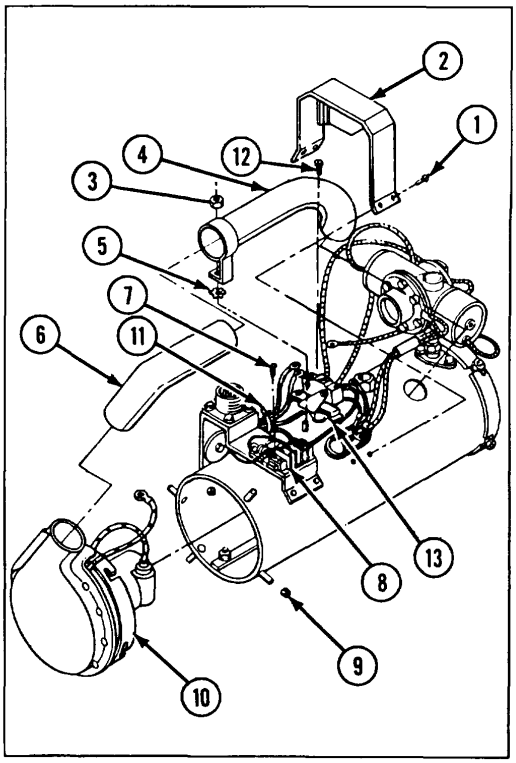
1 Remove four machine screws (1) and heater guard assembly (2).

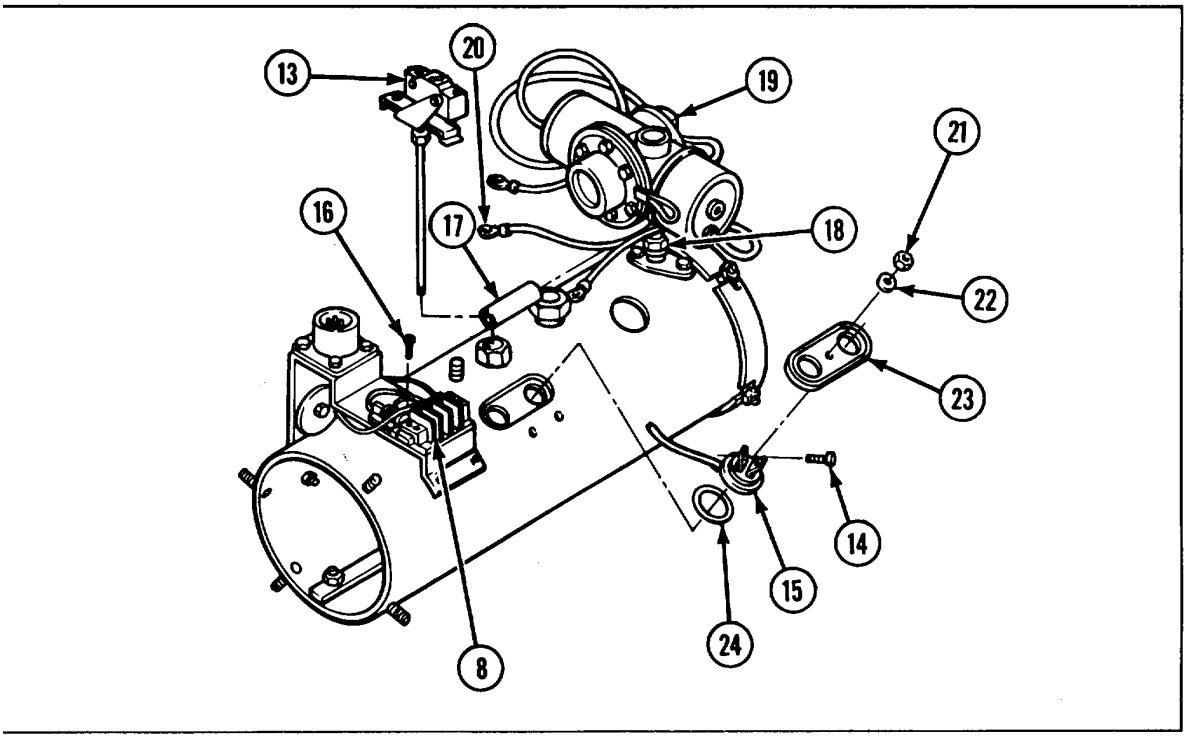
2 Remove plain nut (3), heat exchanger inlet tube (4), lockwasher (5), and blower outlet tube (6).

3 Remove assembled washer screw (7) and disconnect blower lead from terminal 6 of terminal board (8).

4 Loosen four plain nuts (9), and turn coolant heater blower assembly (10) counter-clockwise and remove from housing.

5 Remove three electrical tiedown straps (11) and five assembled washer screws (12), and disconnect five leads from terminals of flame detector thermostatic switch (13).





CAUTION

Do not attempt to remove sleeve fitting from steel tube, since it will normally be sealed against tube.

6 Loosen fitting below flame detector thermostatic switch (13) and pull flame detector thermostatic switch from bushing without bending tube.

7 Remove two screws (14) and disconnect electrical leads from overheat thermostatic switch (15). Replace two screws (14) in overheat thermostatic switch (15).

8 Remove assembled washer screw (16) and disconnect lead from terminal 5 of terminal board (8).

9 Pull leads from sleeve (17).

10 Loosen nut from pipe union (18) and remove fuel control valve (19) from pipe union.

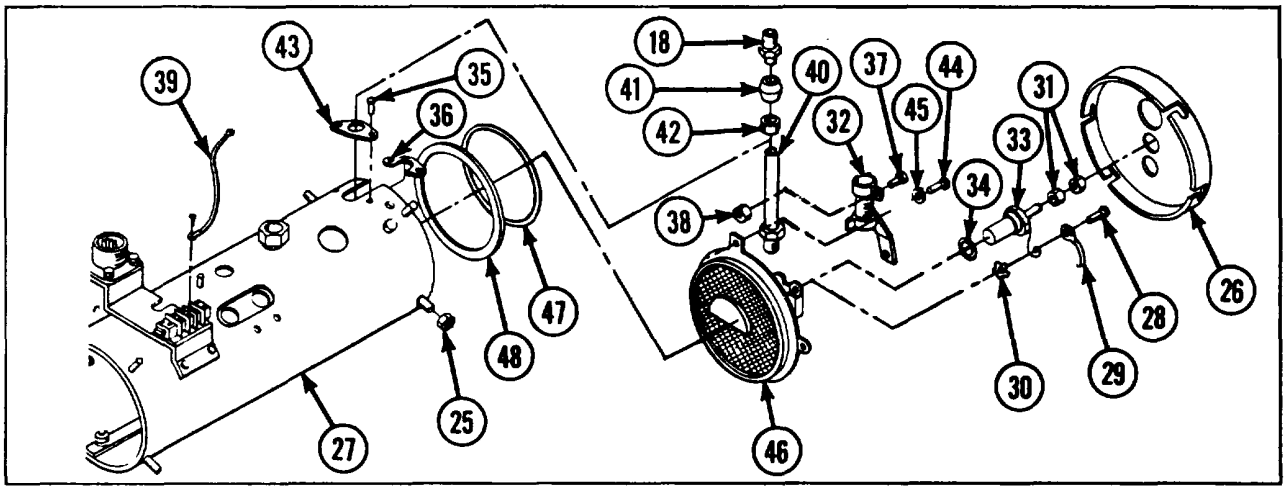
11 Remove cable assembly (20) from fuel control valve (19).

12 Remove plain nut (21), lockwasher (22), and thermostat cover (23).

13 Lift overheat thermostatic switch (15) and preformed packing (24) from heat exchanger.

2-56. MAINTENANCE OF ENGINE COOLANT HEATER ASSEMBLY (HEATER INSTALLATION KIT) (CONT).

DISASSEMBLY (CONT)



14 Loosen four nuts (25), and turn access cover (26) counterclockwise and remove from housing (27).

15 Remove assembled washer screw (28), ground lead (29), and lockwasher (30). Bend fuel spark igniter ground lead so it will fit inside a deep socket.

16 Remove two plain nuts (31) and disconnect copper connecting strap of wire fixed resistor (32). Remove fuel spark igniter (33).

17 Remove gasket (34) from fuel spark igniter (33).

18 Remove two machine screws (35) and tapping plate (36).

19 Remove assembled washer screw (37), self-locking nut (38), and electrical lead (39) from wire fixed resistor (32).

20 Remove metal tube assembly (40).

21 If damaged, remove pipe union (18) and cut or grind tube compression sleeve (41) from metal tube assembly (40). Discard sleeve.

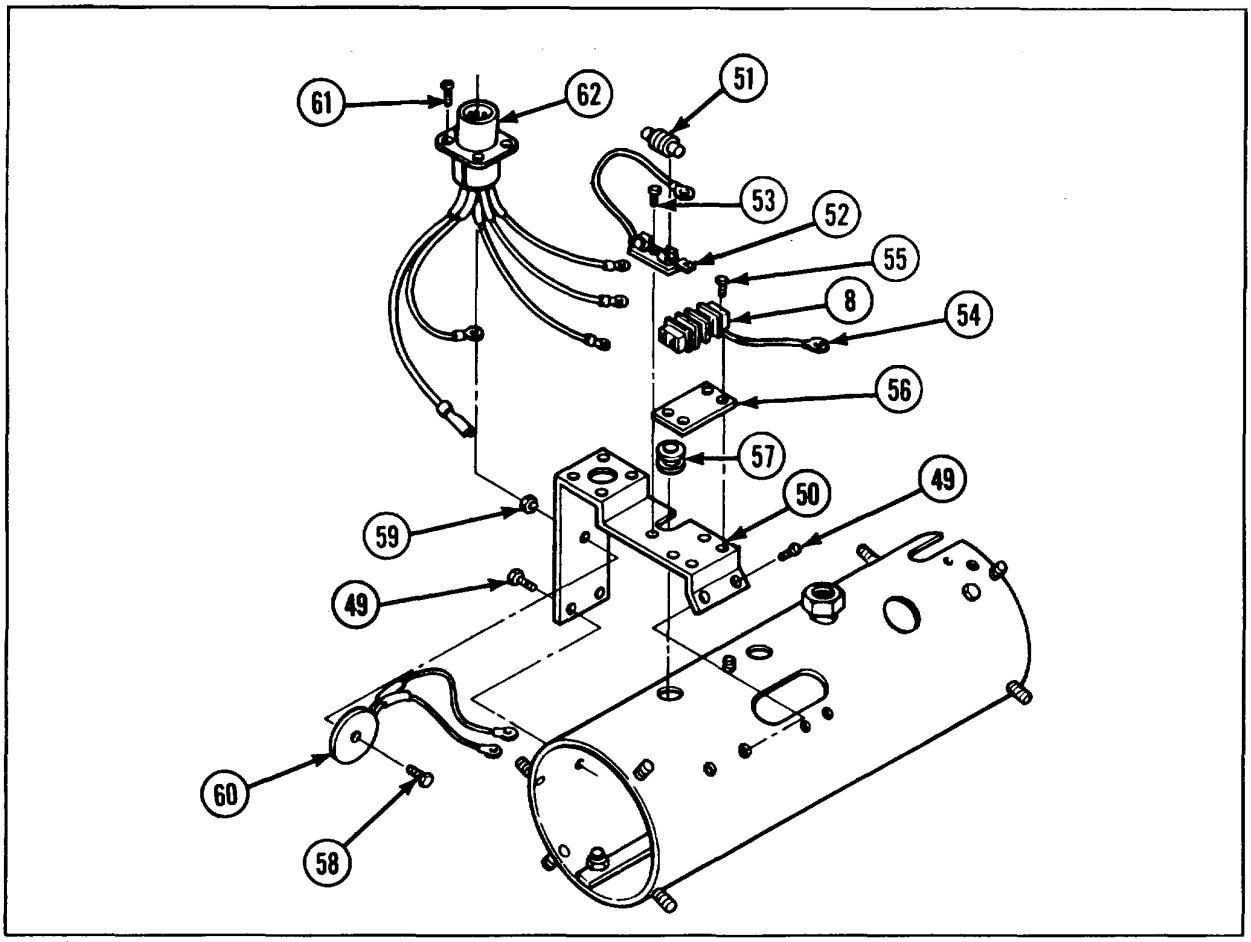
22 Remove tube coupling nut (42), wire fixed resistor (32), and pipe flange (43) from metal tube assembly (40).

CAUTION

The burner assembly is a welded assembly. Do not attempt to remove burner parts for cleaning or repair.

23 Remove three machine screws (44), three flat washers (45), and burner assembly (46).

24 Remove preformed packing (47) and gasket (48) from burner assembly (46).



25 Disconnect receptacle assembly ground lead and thermostat lead. Remove four machine screws (49) and bracket (50).

26 Remove heater coolant diode (51) from semiconductor holder (52).

27 Remove threaded tapping screw (53) and semiconductor holder (52).

28 Disconnect motor resistor leads from terminals 4 and 6 of terminal board (8). Remove cable assembly (54) from terminal 4.

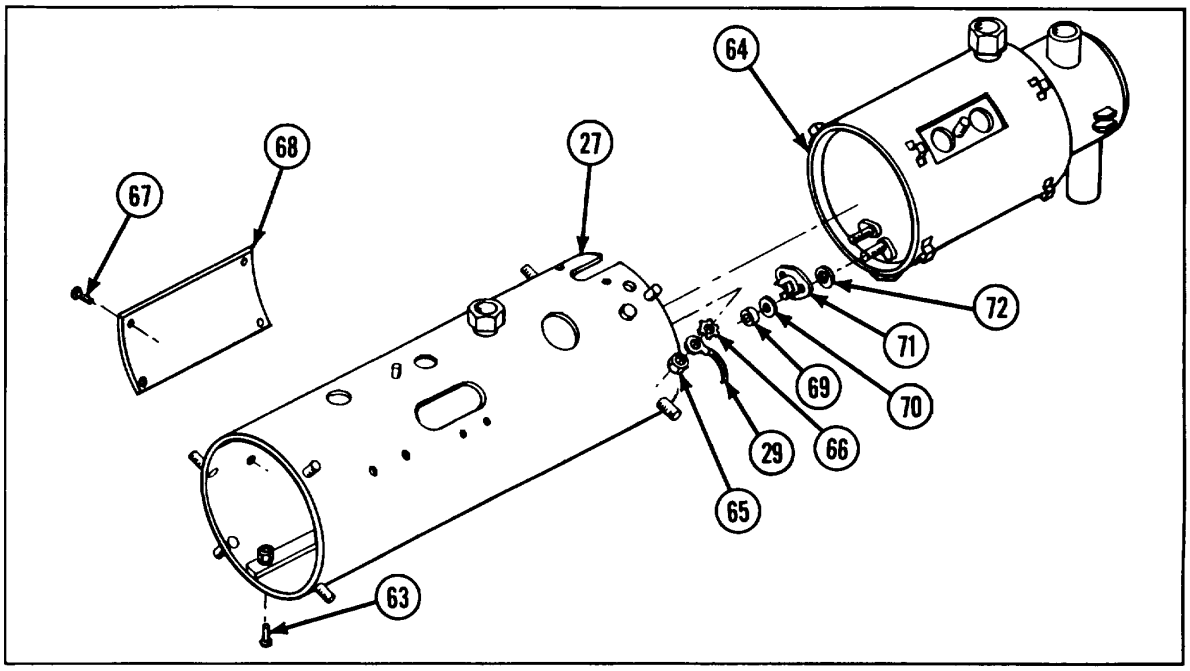
29 Remove four assembled washer screws (55), terminal board (8), marker link (56), and nonmetallic grommet (57).

30 Remove machine screw (58), plain nut (59), and resistor and cables (60). 2-161

31 Remove four assembled washer screws (61) and receptacle and cables connector (62).

2-56. MAINTENANCE OF ENGINE COOLANT HEATER ASSEMBLY (HEATER INSTALLATION KIT) (CONT).

DISASSEMBLY (CONT)



32 Remove three machine screws (63). Loosen heat exchange housing (27) just enough to remove heat exchanger (64).

33 Remove plain nut (65), electrical lead (29), and lockwasher (66) from heat exchange housing (27).

34 If damaged, remove four blind rivets (67) and identification plate (68) from heat exchange housing (27).

35 Remove two self-locking nuts (69), two flat washers (70), heater thermostat (71), and two sleeve spacers (72) from heat exchanger (64).

INSPECTION/REPAIR

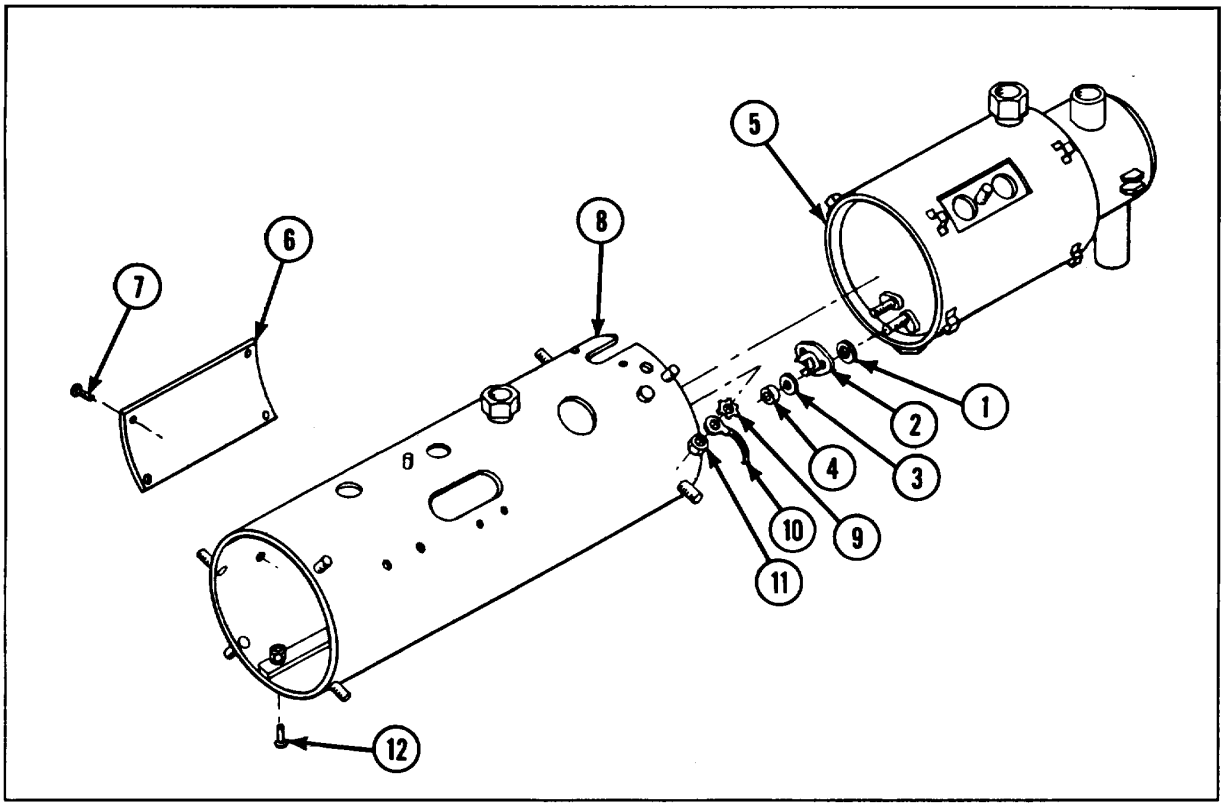
1 Inspect for broken, damaged, or missing parts.

2 Check heater coolant diode with ohmmeter. A. circuit must be indicated in only one direction through diode.

3 Coolant heater blower assembly is a repairable assembly. Refer to page 2-167.

4 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1) which do not meet inspection criteria.

REASSEMBLY



1 Install two sleeve spacers (1), heater thermostat (2), two flat washers (3), and two new self-locking nuts (4) to heat exchanger (5).

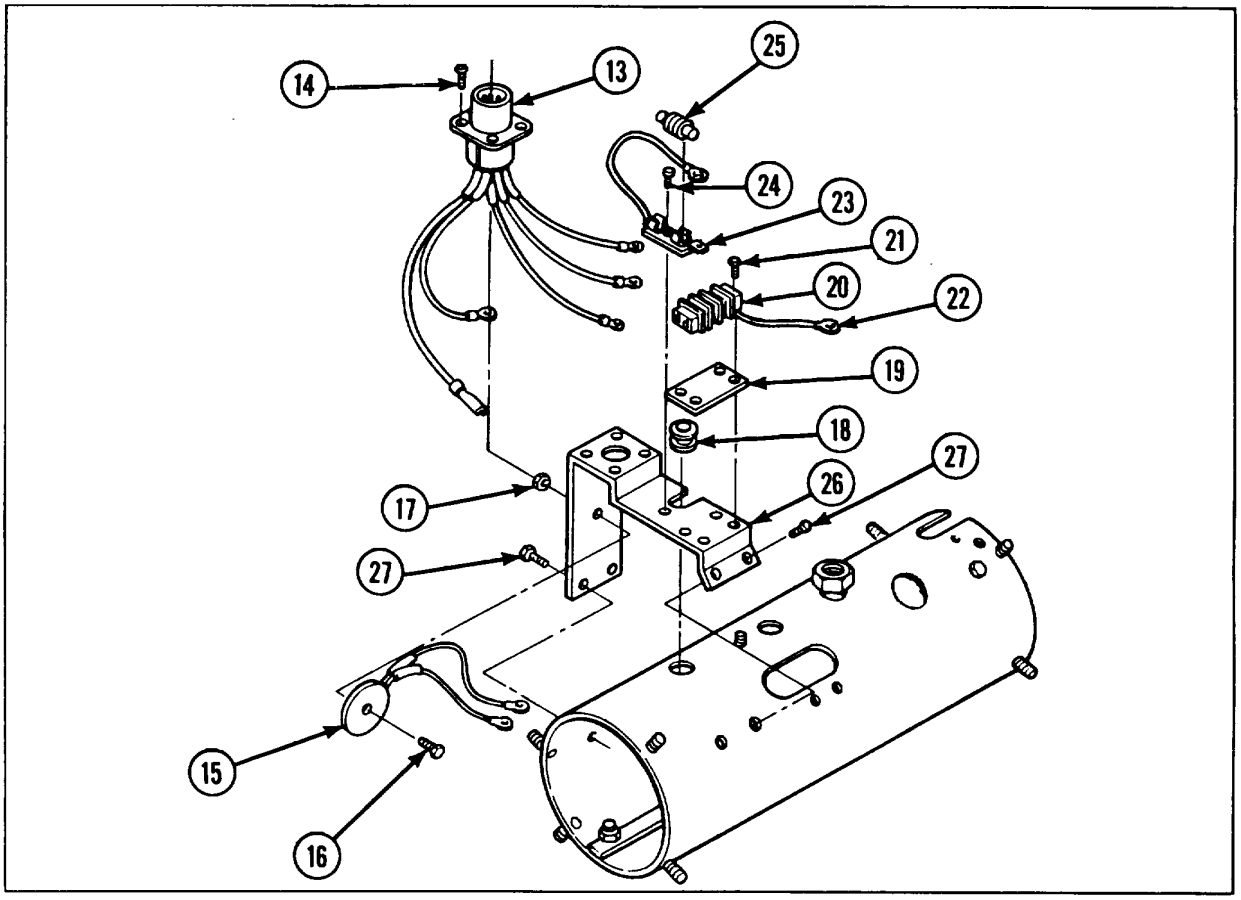
2 If removed, install new identification plate (6) and four blind rivets (7) to heat exchange housing (8).

3 Install two lockwashers (9), electrical lead (10), and plain nut (11) from heat exchange housing (8).

4 Install heat exchanger (5) and three machine screws (12).

2-56. MAINTENANCE OF ENGINE COOLANT HEATER ASSEMBLY (HEATER INSTALLATION KIT) (CONT).

REASSEMBLY (CONT)



6 Install resistor and cables (15), machine screw (16), and plain nut (17).

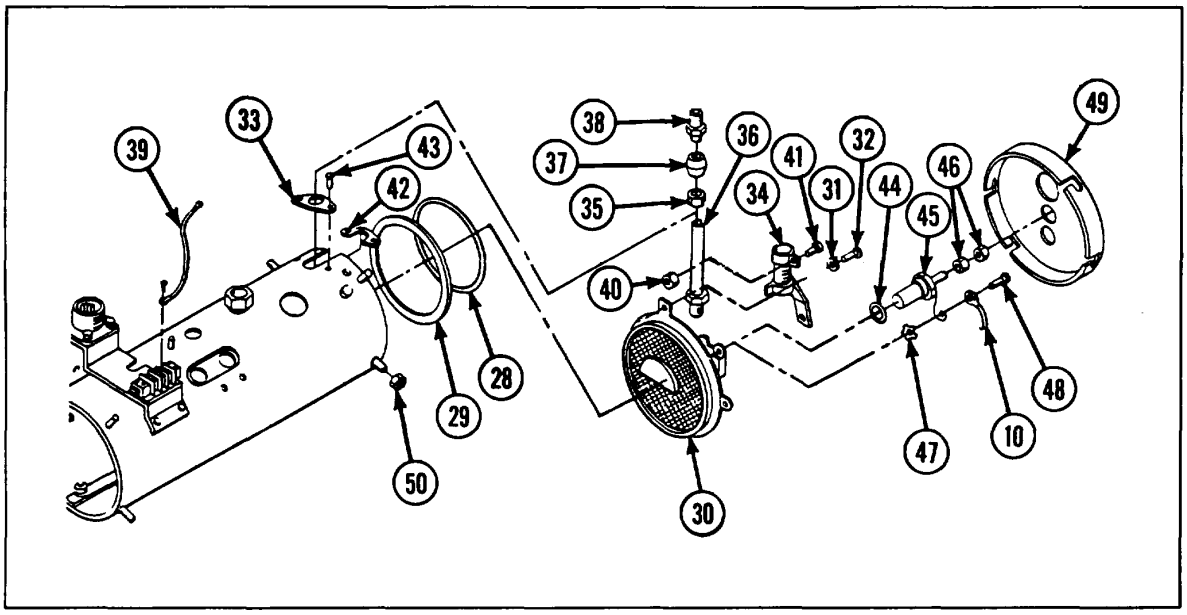
7 Install nonmetallic grommet (18), marker link (19), terminal board (20), and four assembled

8 Connect cable assembly (22) to terminal 4. Connect motor resistor leads to terminals 4 and 6 of terminal board (20).

9 Install semiconductor holder (23) and new threaded tapping screw (24).

10 Install heater coolant diode (25) to semiconductor holder (23).

11 Install bracket (26) and four machine screws (27). Connect receptacle assembly ground lead and thermostat lead.



12 Install new preformed packing (28) and new gasket (29) in burner assembly (30).

13 Install burner assembly (30), three flat washers (31), and three machine screws (32).

14 Install pipe flange (33), wire fixed resistor (34), and tube coupling nut (35) to metal tube assembly (36).

15 If removed, install new tube compression sleeve (37) and pipe union (38) to metal tube assembly (36).

16 Install metal tube assembly (36).

17 Install electrical lead (39), new self-locking nut (40), and assembled washer screw (41).

18 Install tapping plate (42) and two machine screws (43).

19 Install new gasket (44) in fuel spark igniter (45).

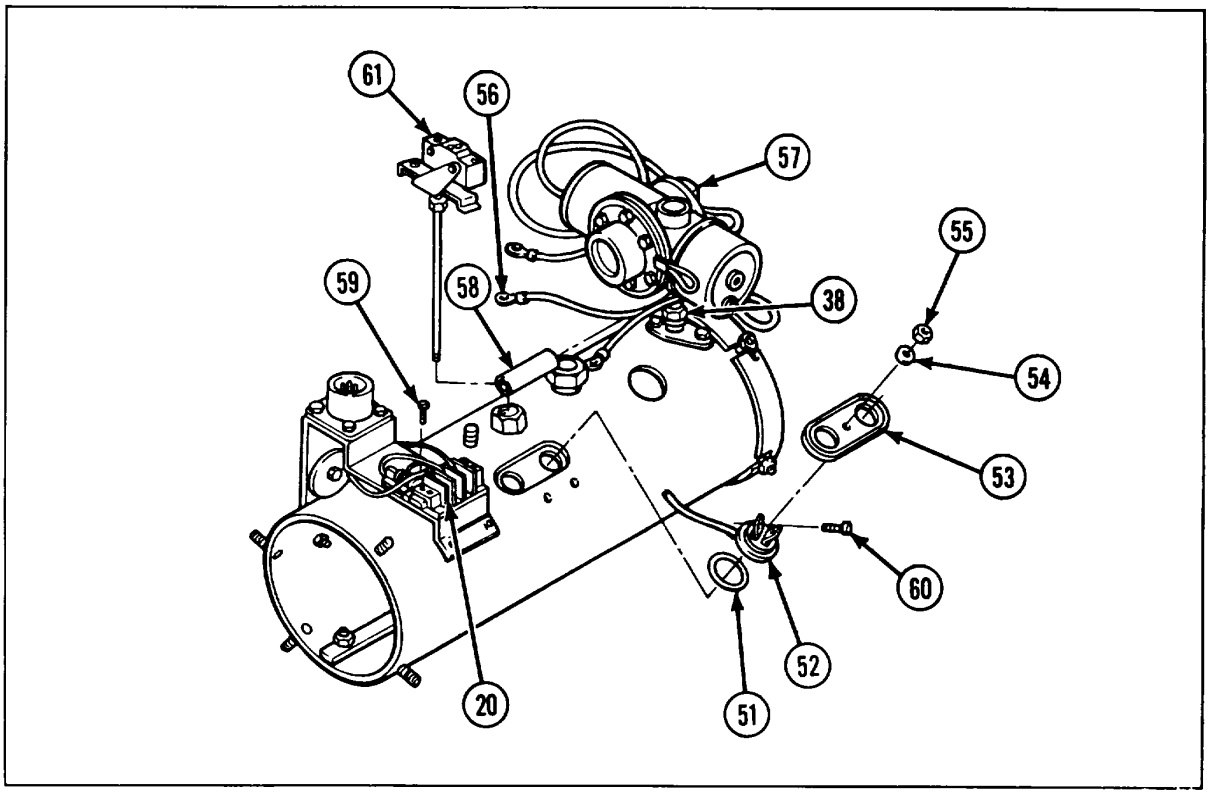
20 Install fuel spark igniter (45). Connect copper connecting strap of wire fixed resistor (34) and secure with two plain nuts (46).

21 Connect ground lead (10) and secure with lockwasher (47) and assembled washer screw (48).

22 Install access cover (49) to housing and tighten four nuts (50).

2-56. MAINTENANCE OF ENGINE COOLANT HEATER ASSEMBLY (HEATER INSTALLATION KIT) (CONT).

REASSEMBLY (CONT)



23 Install new preformed packing (51) and overheat thermostatic switch (52).

24 Install thermostatic cover (53), new lockwasher (54), and plain nut (55).

25 Install cable assembly (56) to fuel control valve (57).

26 Install fuel control valve (57) to pipe union (38) and tighten nut.

27 Install leads in sleeve (58).

28 Connect lead to terminal 5 of terminal board (20) and secure with assembled washer screw (59).

29 Connect leads to overheat thermostatic switch (52) and secure with two screws (60).

30 Install flame detector thermostatic switch (61) and tighten fitting.

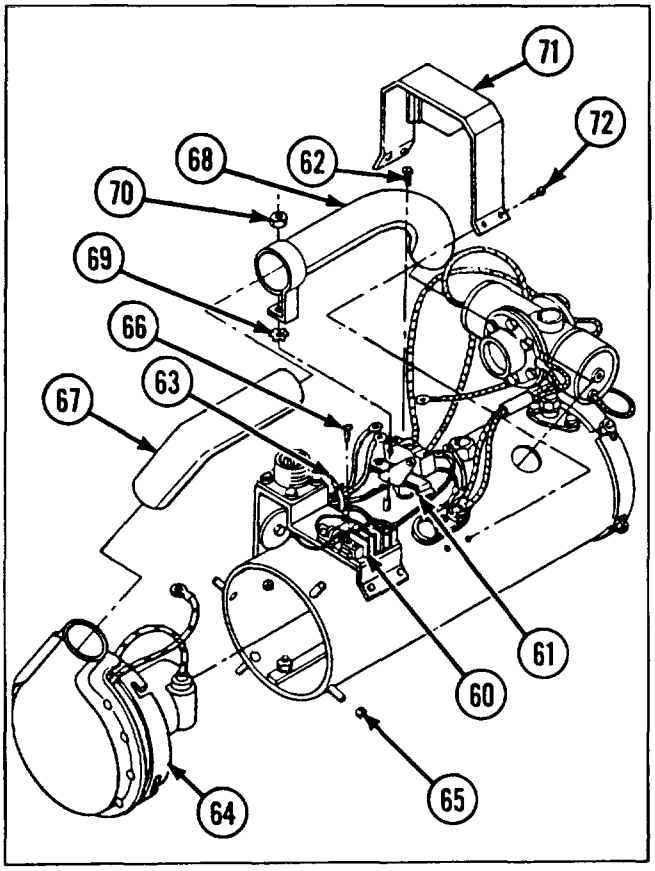
31 Connect five leads to terminals of flame detector thermostatic switch (61), and secure with five assembled washer screws (62) and three electrical tiedown straps (63).

32 Install coolant heater blower assembly (64) to housing and tighten four plain nuts (65).

33 Connect blower lead to terminal 6 of terminal board (20) and secure with assembled washer screw (66).

34 Install blower outlet tube (67), heat exchanger inlet tube (68), new lockwasher (69), and plain nut (70).

35 Install heater guard assembly (71) and four machine screws (72).



TEST

For test procedures for engine coolant heater assembly refer to TM 9-2990-207-23&P.

2-57. MAINTENANCE OF COOLANT HEATER BLOWER ASSEMBLY (HEATER INSTALLATION KIT).

This task covers:	a. *Disassembly*	b. *Inspection/Repair*	c. *Reassembly*

INITIAL SETUP

References
TM 9-2350-304-24P-1

Equipment Conditions
2-154 Coolant heater blower assembly removed

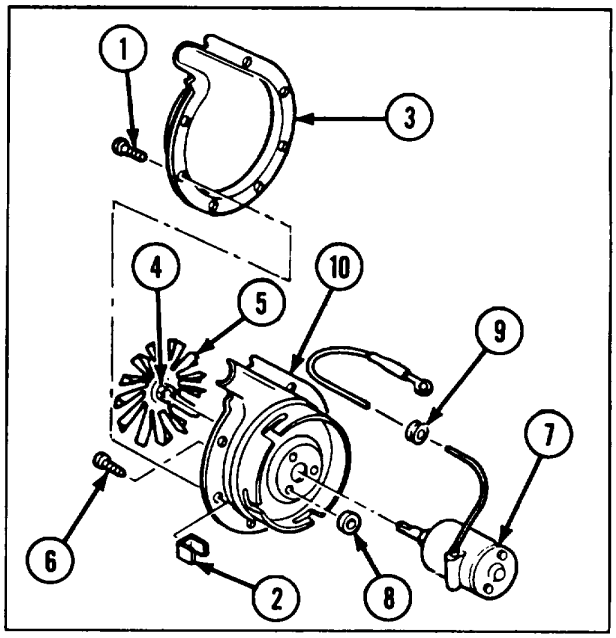
2-57. MAINTENANCE OF COOLANT HEATER BLOWER ASSEMBLY (HEATER INSTALLATION KIT) (CONT).

DISASSEMBLY

1 Remove seven pan head tapping screws (1), seven sheet spring nuts (2), and heater blower cover (3).

2 Loosen setscrew (4) in hub of centrifugal blower fan (5), and remove centrifugal blower fan.

3 Remove three pan head screws (6), air blower motor (7), three sleeve spacers (8), and grommet (9) from combustion air blower plate assembly (10).



INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 If combustion air blower plate assembly is broken, damaged, or missing, repair is by replacement of next higher assembly.

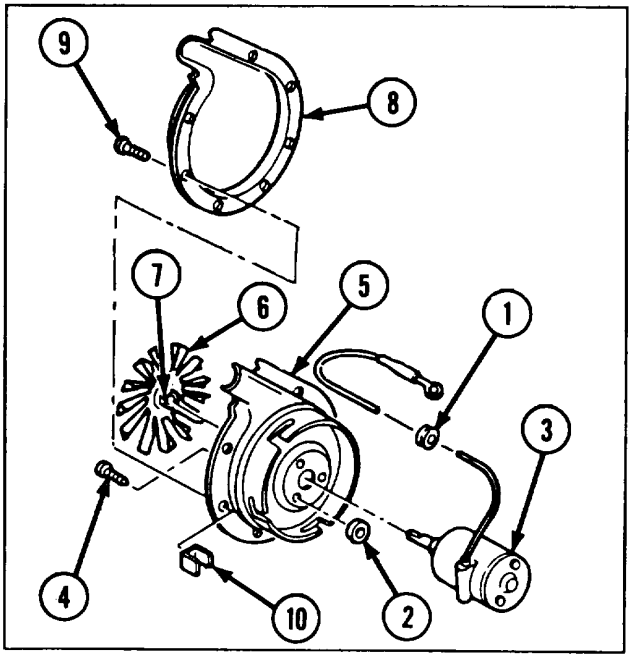
3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1) which do not meet inspection criteria.

REASSEMBLY

1 Install grommet (1), three sleeve spacers (2), air blower motor (3), and three pan head screws (4) to combustion air blower plate assembly (5).

2 Install centrifugal blower fan (6) and tighten setscrew (7) in hub of centrifugal blower fan.

3 Install heater blower cover (8), seven pan head tapping screws (9), and seven sheet spring nuts (10).



2-58. MAINTENANCE OF VEHICULAR HEATER (DRIVER'S COMPARTMENT) (HEATER INSTALLATION KIT).

This task covers:	a. *Disassembly* b. *Inspection/Repair*	c. *Reassembly* d. *Test*

INITIAL SETUP

Materials and Parts
- Gasket
- Lockwasher
- Preformed packing

References
- TM 9-2350-304-20-1
- TM 9-2350-304-24P-1
- TM 9-2990-207-23&P

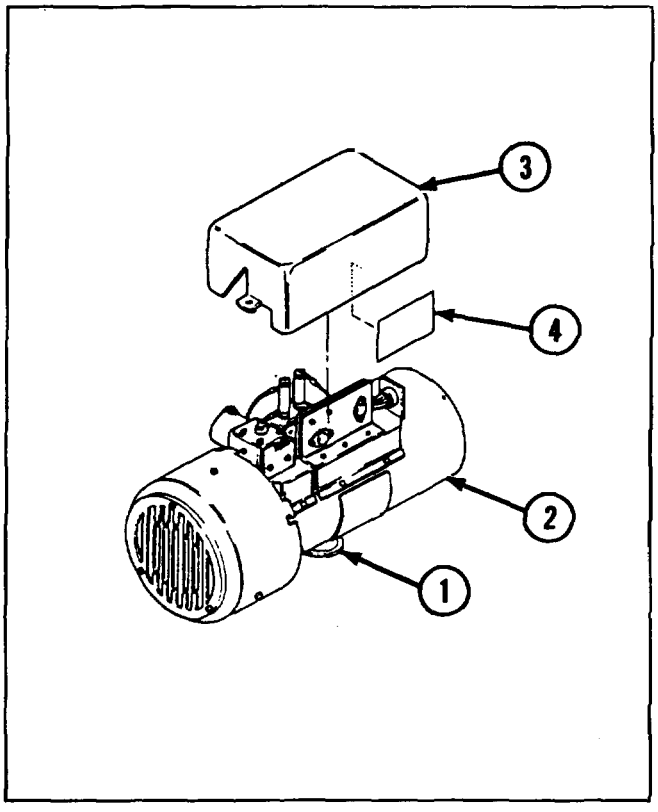
Equipment Conditions
- Vehicular heater (driver's compartment) removed (TM 9-2350-304-20-1)

DISASSEMBLY

1 Remove exhaust flange (1) from vehicular heater (driver's compartment) (2).

2 Loosen two fasteners and remove access cover (3).

3 If damaged, remove wiring diagram (4) from access cover (3).



2-58. MAINTENANCE OF VEHICULAR HEATER (DRIVER'S COMPARTMENT) (HEATER INSTALLATION KIT) (CONT).

DISASSEMBLY (CONT)

4 Remove screw (5), four screws (6), and disconnect cable assemblies from flame detector switch (7).

5 Remove four screws (8) and pull heater blower assembly (9) from heater housing assembly (10).

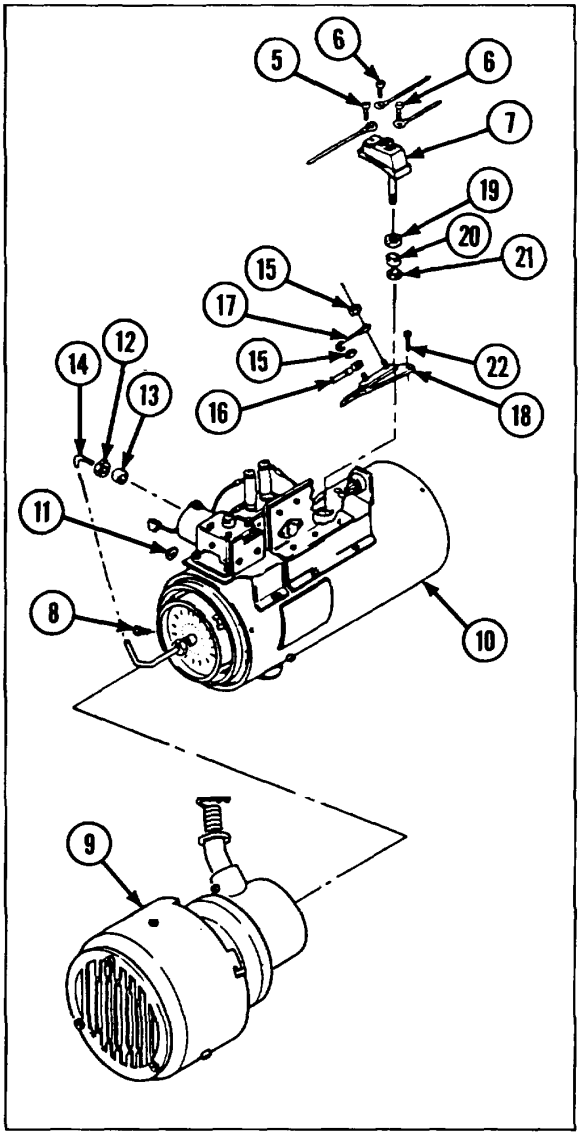
6 Remove grommet (11).

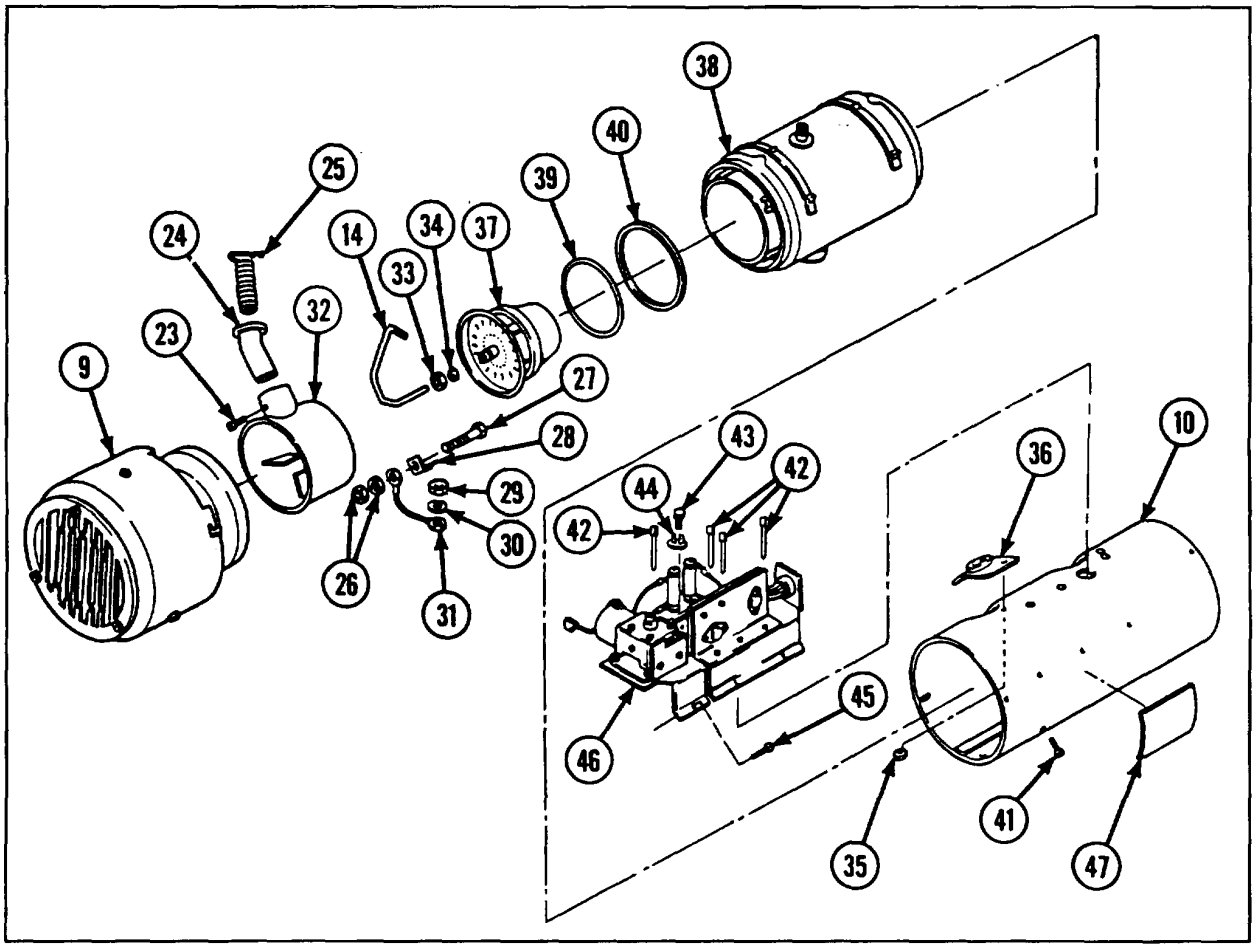
7 Remove coupling nut (12) and sleeve (13) from fuel tube (14).

8 Remove two nuts (15) and disconnect cable assembly (16) and cable assembly (17) from overheat switch (18).

9 Loosen coupling nut (19), and remove flame detector switch (7), sleeve (20), and flame detector washer (21).

10 Remove two screws (22) and overheat switch (18).





11 Remove screw (23), igniter tube and bracket (24), and igniter (25).

12 Remove two nuts (26), bolt hook (27), burner clamp (28), nut (29), lockwasher (30), and ground lead (31).

13 Remove housing and baffle (32) from heater blower assembly (9).

14 Loosen coupling nut (33), and remove fuel tube (14), coupling nut (33), and sleeve (34).

15 Remove two receptacles (35) and hatch cover assembly (36) from heater housing assembly (10).

16 Remove burner assembly (37) from heat exchanger assembly (38).

17 Remove preformed packing (39) and gasket (40) from burner assembly (37).

18 Remove screws (41), and loosen heater housing assembly (10) just enough to remove heat exchanger assembly (38) by sliding out.

19 If damaged, remove four electrical tiedown straps (42). Remove screw (43) and stationary terminal (44).

20 Remove screws (45) and component bracket assembly (46).

21 If damaged, remove nomenclature plate (47).

2-58. MAINTENANCE OF VEHICULAR HEATER (DRIVER'S COMPARTMENT) (HEATER INSTALLATION KIT) (CONT).

INSPECTION/REPAIR

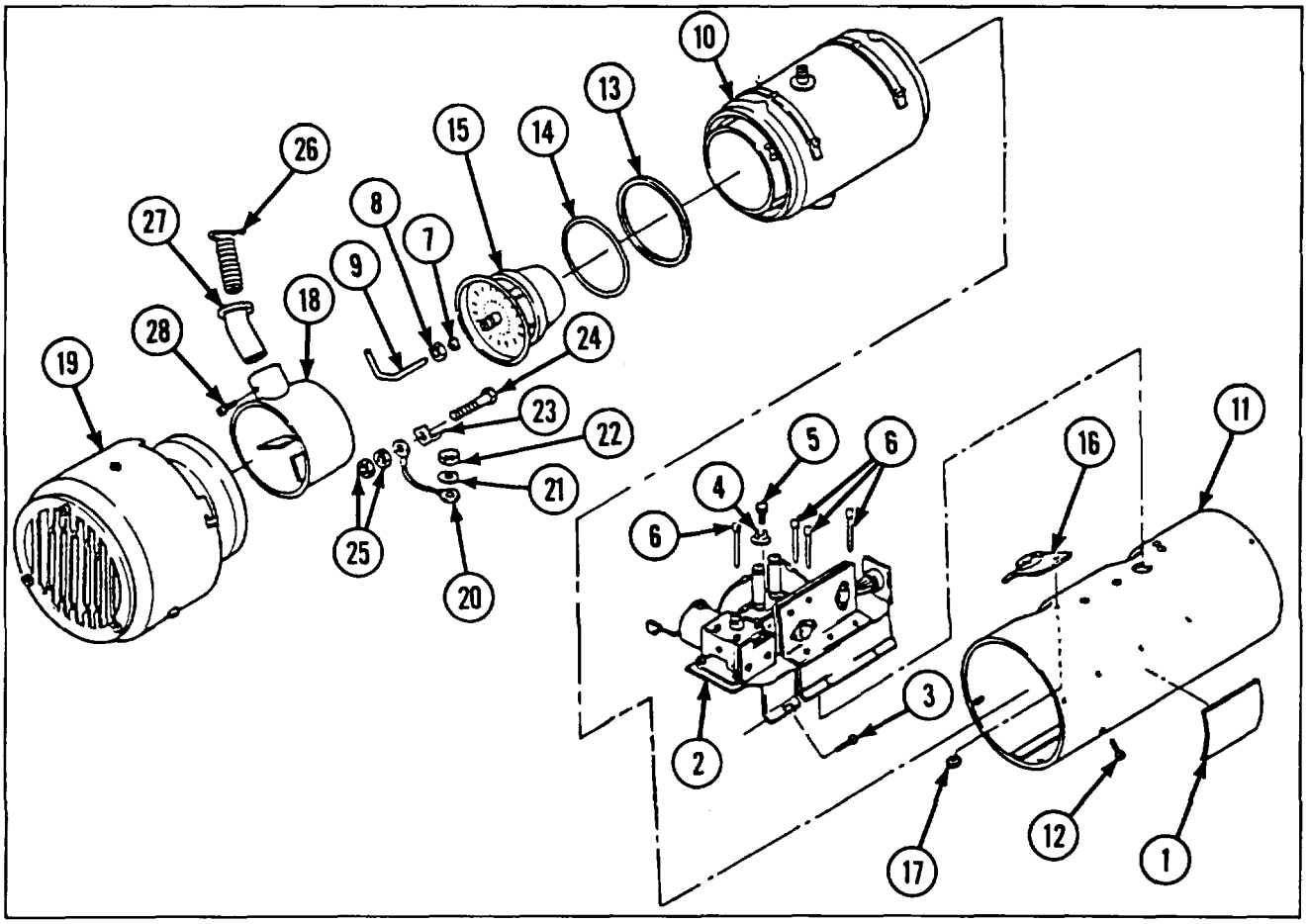
1 Inspect for broken, damaged, or missing parts.

2 Blower assembly is a repairable assembly. Refer to page 2-174.

3 Heater component bracket is a repairable assembly. Refer to page 2-176.

4 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1).

REASSEMBLY



1 If removed, install nomenclature plate.

2 Install component bracket assembly (2), and secure with screws (3).

3 Install stationary terminal (4) and screw (5) on component bracket assembly (2).

4 If removed, install four electrical tiedown straps (6).

5 Install sleeve (7) and coupling nut (8). Connect fuel tube (9) to coupling nut (8).

6 Install heat exchanger assembly (10) in heater housing assembly (11). Secure with screws (12).

7 Install new gasket (13) and new preformed packing (14) on burner assembly (15).

8 Install burner assembly (15) in heat exchanger assembly (10).

9 Install hatch cover assembly (16) and two receptacles (17).

10 Install housing and baffle (18) on heater blower assembly (19).

11 Install ground lead (20), new lockwasher (21), nut (22), burner clamp (23), bolt hook (24), and two nuts (25).

12 Install igniter (26), igniter tube and bracket (27), and screw (28).

13 Install overheat switch (29) and two screws (30).

14 Install flame detector washer (31), sleeve (32), coupling nut (33), and flame detector switch (34). Tighten coupling nut (33).

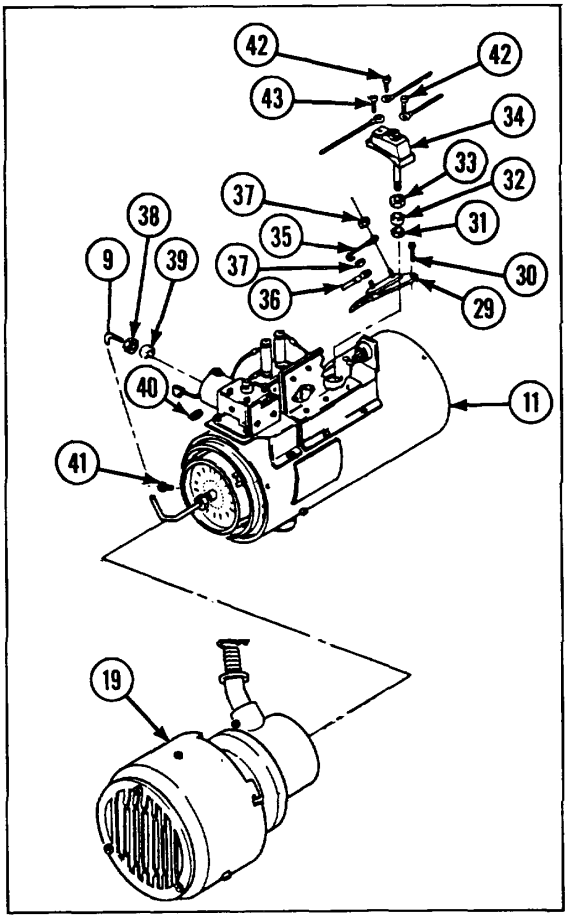
15 Connect cable assembly (35), cable assembly (36), and two nuts (37) to overheat switch (29).

16 Install coupling nut (38) and sleeve (39) to fuel tube (9).

17 Install grommet (40).

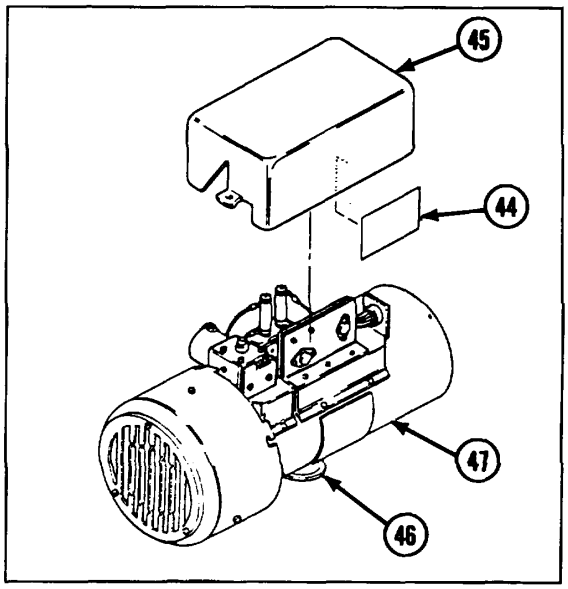
18 Install heater blower assembly (19) in heater housing assembly (11) and secure with four screws (41).

19 Connect cable assemblies to flame detector switch (34), and secure with four screws (42) and screw (43).



2-58. MAINTENANCE OF VEHICULAR HEATER (DRIVER'S COMPARTMENT) (HEATER INSTALLATION KIT) (CONT).

REASSEMBLY (CONT)



20 If removed, install new wiring diagram (44) on access cover (45).

21 Install access cover (45), and tighten two fasteners.

22 Install exhaust flange (46) on vehicular heater (driver's compartment) (47).

TEST

For test procedures for vehicular heater (driver's compartment), refer to TM 9-2990-207-23&P.

2-59. MAINTENANCE OF BLOWER ASSEMBLY (HEATER INSTALLATION KIT).

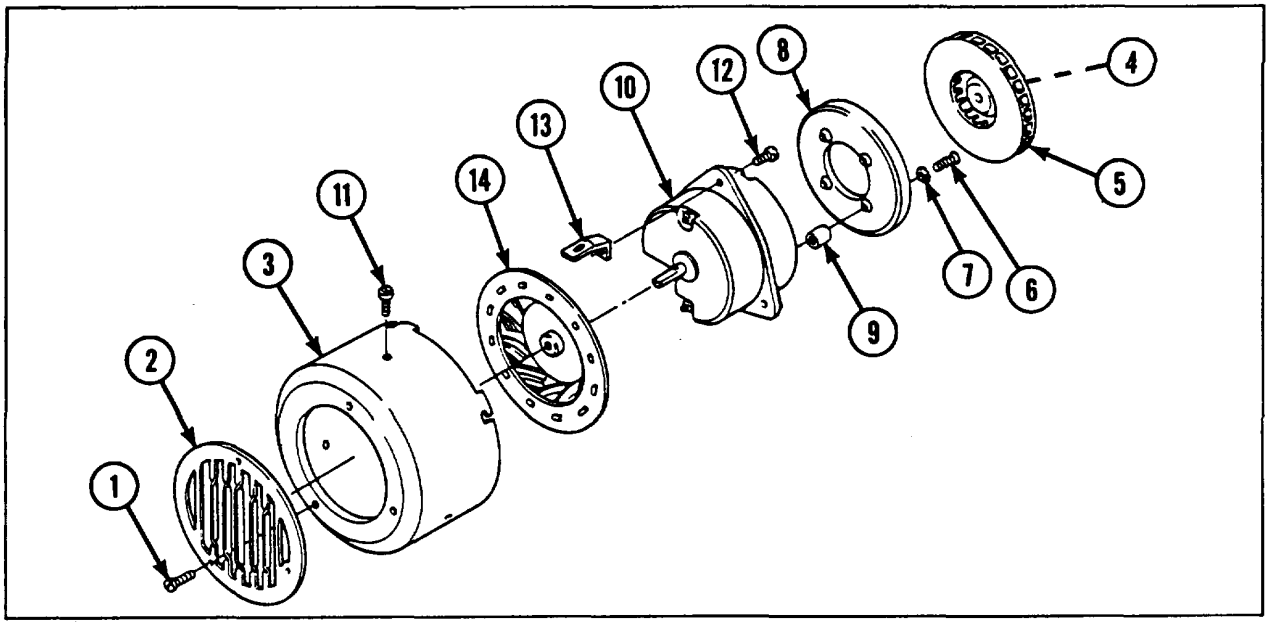
This task covers:	a. *Disassembly*	b. *Inspection/Repair*	c. *Reassembly*

INITIAL SETUP

References
TM 9-2350-304-20-1
TM 9-2350-304-24P-1

Equipment Conditions
2-167 Blower assembly removed

DISASSEMBLY



1 Remove three assembled washer screws (1) and air inlet ventilator (2) from housing assembly (3).

2 Loosen setscrew (4) and remove blower wheel assembly (5).

3 Remove four machine screws (6), four lockwashers (7), secondary blower header (8), and four spacers (9) from motor assembly (10).

4 Remove three screws (11) and motor assembly (10) with attached parts from housing assembly (3).

5 Remove three screws (12), three motor brackets (13), and wheel assembly (14) from motor assembly (10).

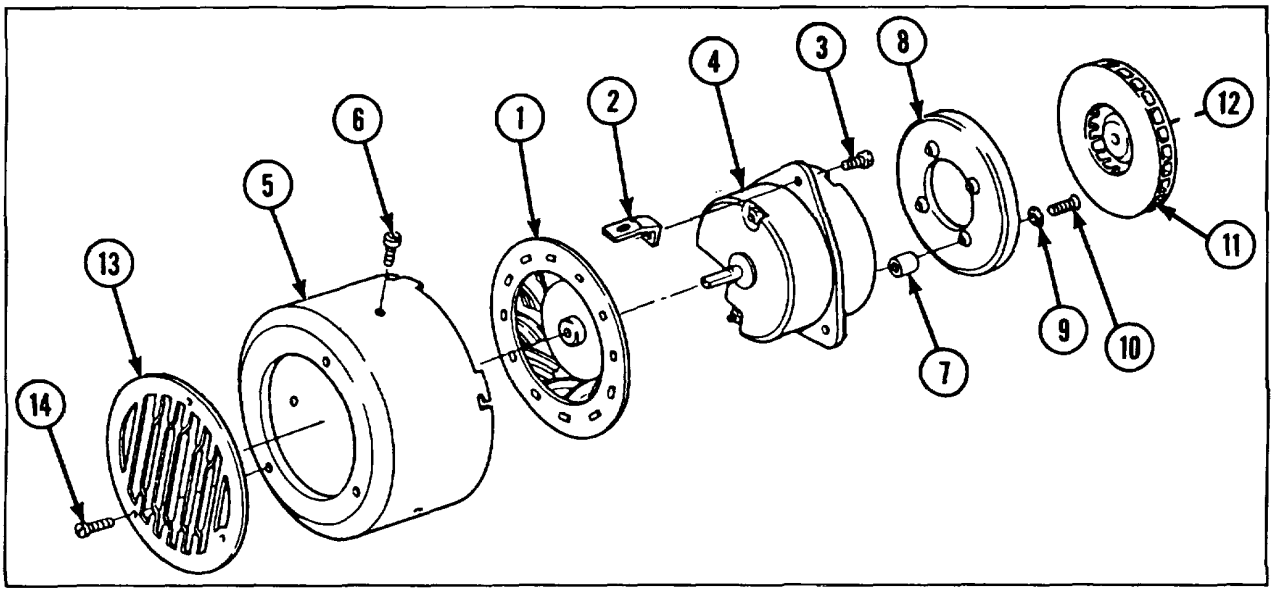
INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1).

2-59. MAINTENANCE OF BLOWER ASSEMBLY (HEATER INSTALLATION KIT) (CONT).

REASSEMBLY



1 Install wheel assembly (1), three motor brackets (2), and three screws (3) on motor assembly (4).

2. Install motor assembly (4) with attached parts in housing assembly (5) and secure with three screws (6).

3 Install four spacers (7), secondary blower header (8), four new lockwashers (9), and four machine screws (10) on motor assembly (4).

4 Install blower wheel assembly (11) and tighten setscrew (12).

5 Install air inlet ventilator (13) and three assembled washer screws (14) on housing assembly (5).

2-60. MAINTENANCE OF HEATER COMPONENT BRACKET (HEATER INSTALLATION KIT).

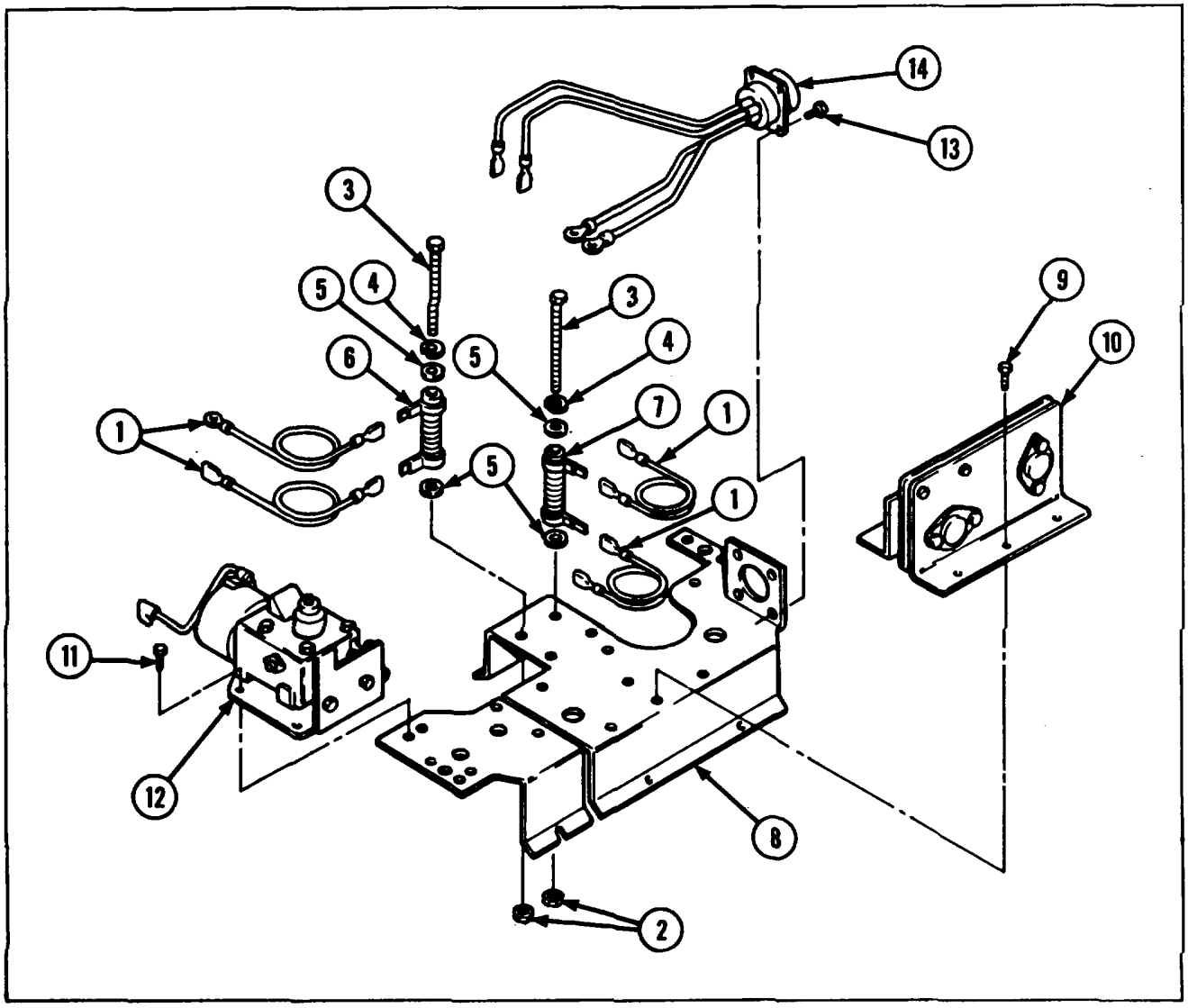
This task covers:	a. *Disassembly*	b. *Inspection/Repair*	c. *Reassembly*

INITIAL SETUP

References
TM 9-2350-304-24P-1

Equipment Conditions
2-167 Heater component bracket removed

DISASSEMBLY



1 Disconnect cable assemblies (1).

2. Remove two nuts (2), two screws (3), two star washers (4), four centering washers (5), two resistors (6 and 7), and cable assemblies (1) from component bracket (8).

3 Remove screws (9) and voltage regulator (10) from component bracket (8).

4 Remove screws (11) and valve assembly (12) from component bracket (8).

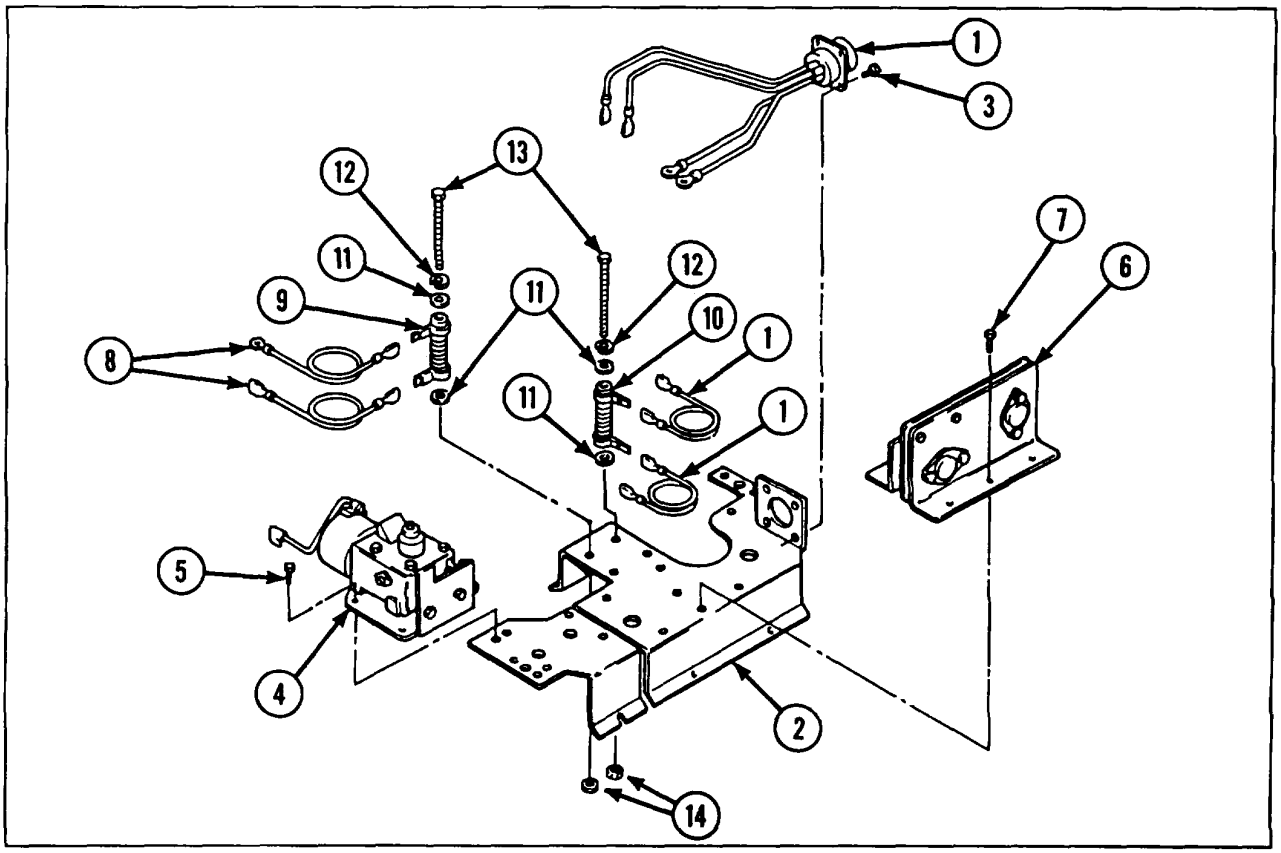
5 Remove four screws (13) and receptacle and cable assembly (14) from component bracket (8).

2-60. MAINTENANCE OF HEATER COMPONENT BRACKET (HEATER INSTALLATION KIT) (CONT).

1 Inspect for broken, damaged, or missing parts.

2 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1).

REASSEMBLY



1 Install receptacle and cable assembly (1) on component bracket (2) and secure with four screws (3).

2 Install valve assembly (4) on component bracket (2) and secure with screws (5).

3 Install voltage regulator (6) on component bracket (2) and secure with screws (7).

4 Install cable assemblies (8), resistors (9 and 10), four centering washers (11), two star washers (12), two screws (13), and two nuts (14) on component bracket (2).

5 Connect cable assemblies (8).

2-61. MAINTENANCE OF VEHICULAR WINDOW--WINDSHIELD (DRIVER'S WINDSHIELD ENCLOSURE KIT).

This task covers:	a. *Disassembly*	b. *Inspection/Repair*	c. *Reassembly*

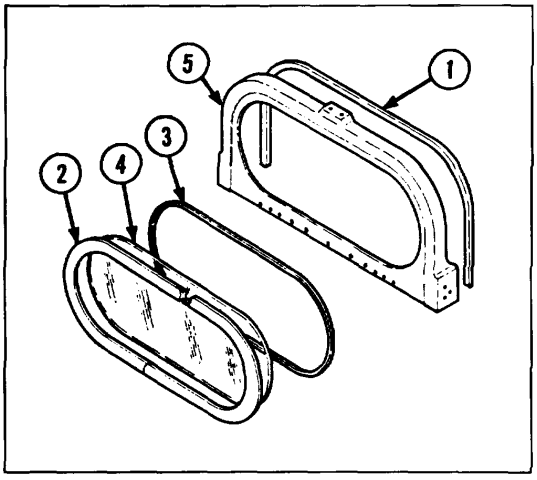
INITIAL SETUP

Materials/Parts
Epoxy adhesive (item 3, appx B)
Nonmetallic seal (figure C-5, appx C)
Rubber section (figure C-2, appx C)
Rubber strip (figure C-4, appx C)

References
TM 9-2350-304-20-1
TM 9-2350-304-24P-1

Equipment Conditions
Vehicular window removed and partially disassembled (TM 9-2350-304-20-1)

DISASSEMBLY



1 Remove rubber section (1).

2 Remove nonmetallic seal (2).

3 Remove rubber strip (3) and windshield (4) from windshield frame (5).

INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 If windshield frame is broken, damaged, or missing, repair is by replacement of next higher assembly.

3 Rubber section, rubber strip, and nonmetallic seal are manufactured items, refer to appendix C.

4 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1) which do not meet inspection criteria.

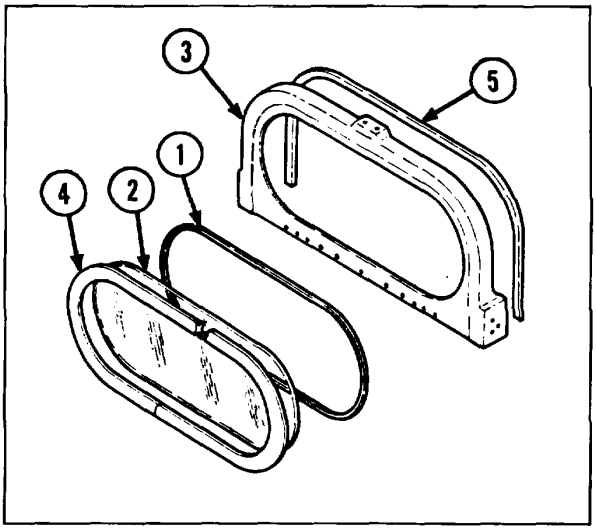
2-61. MAINTENANCE OF VEHICULAR WINDOW—WINDSHIELD (DRIVER'S WINDSHIELD ENCLOSURE KIT) (CONT).

REASSEMBLY

1 Install new rubber strip (1) and windshield (2) in windshield frame (3).

2 Install nonmetallic seal (4).

3 Apply epoxy adhesive to rubber section (5), and install to wind-shield frame (3).



2-61. MAINTENANCE OF VEHICULAR WINDOW (DRIVER'S WINDSHIELD ENCLOSURE KIT).

This task covers:	a. *Disassembly*	b. *Inspection/Repair*	c. *Reassembly*

INITIAL SETUP

Materials/Parts
- Epoxy adhesive (item 3, appx B)
- Self-locking nut (28)
- Window-to-frame rubber channel seal

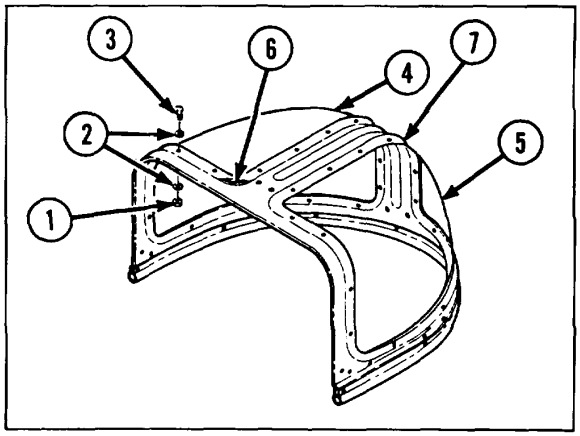
References
- TM 9-2350-304-20-1
- TM 9-2350-304-24P-1

Equipment Conditions
- Vehicular window removed and partially disassembled (TM 9-2350-304-20-1)

DISASSEMBLY

1 Remove 28 self-locking nuts (1), 56 flat washers (2), 28 machine screws (3), and right and left window panels (4 and 5).

2 Remove window-to-frame rubber channel seal (6) from frame (7).



INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 Inspect window for chips, cracks, breaks, bubbles, and change of color.

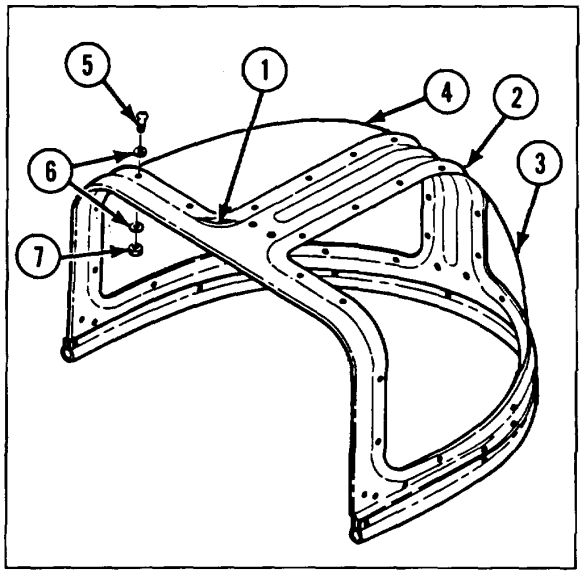
3 If frame is broken, damaged, or missing, repair is by replacement of next higher assembly.

4 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1) which do not meet inspection criteria.

REASSEMBLY

1 Apply adhesive to new window-to-frame rubber channel seal (1), and install seal in frame (2).

2 Install left and right window panels (3 and 4) in frame (2), and secure with 56 flat washers (5), 28 machine screws (6), and 28 new self-locking nuts (7).



2-63. MAINTENANCE OF WINDSHIELD WIPER MOTOR ASSEMBLY (DRIVER'S WINDSHIELD ENCLOSURE KIT).

This task covers:	a. *Disassembly*	b. *Inspection/Repair*	c. *Reassembly*

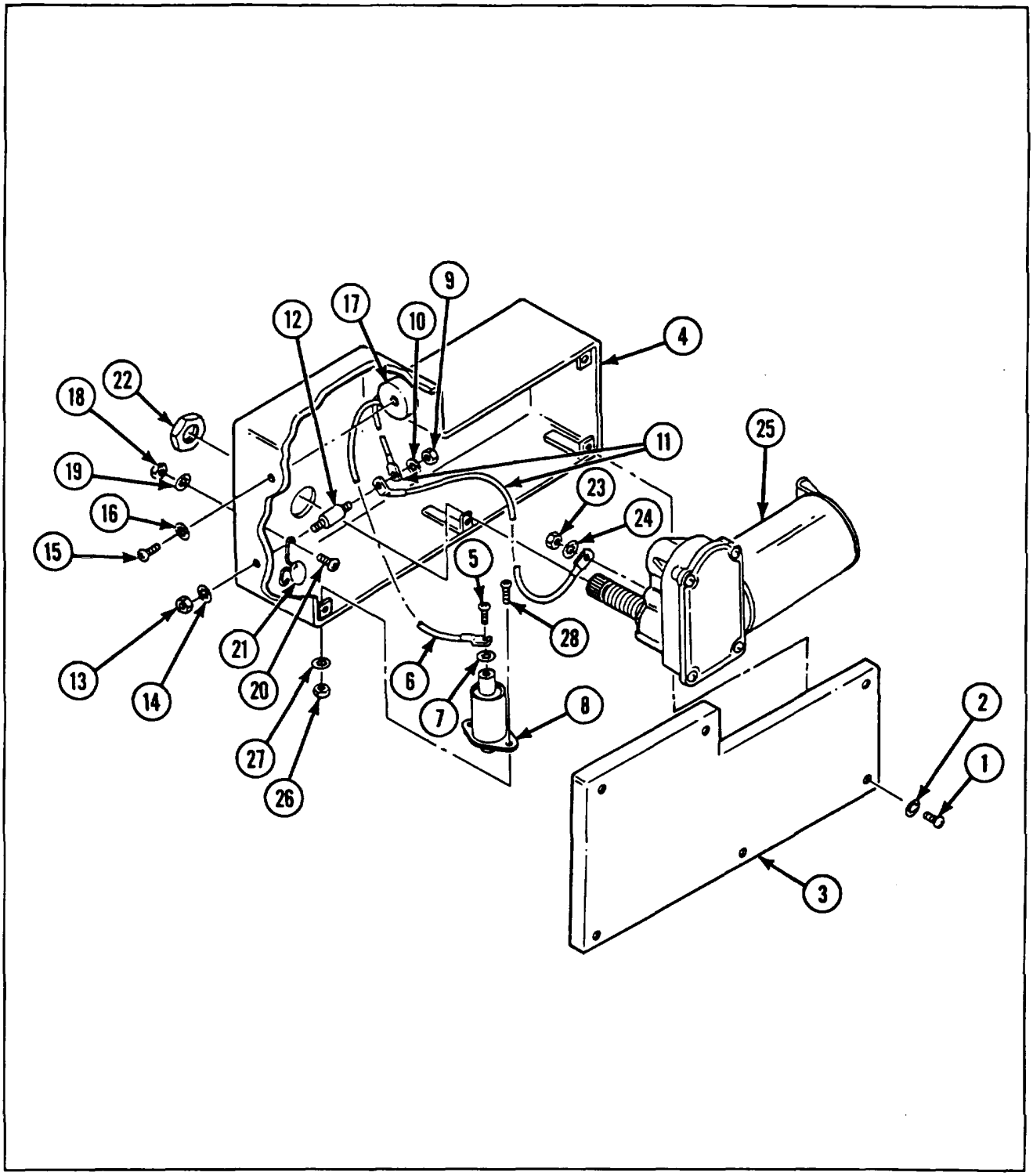
INITIAL SETUP

Materials/Parts
- Lockwasher (5)
- Lockwasher (7)
- Lockwasher (2)

References
- TM 9-2350-304-20-1
- TM 9-2350-304-24P-1

Equipment Conditions
- Windshield wiper motor assembly removed (TM 9-2350-304-20-1)

2-63. MAINTENANCE OF WINDSHIELD WIPER MOTOR ASSEMBLY (DRIVER'S WINDSHIELD ENCLOSURE KIT) (CONT).



DISASSEMBLY

1 Remove six machine screws (1), six lockwashers (2), and cover (3) from shield assembly (4).

2 Remove machine screw (5), electrical lead (6), and lockwasher (7) from fixed capacitor (8).

3 Remove plain hexagon nut (9), lockwasher (10), two electrical leads (11), standoff insulator (12), plain hexagon nut (13), and lockwasher (14).

4 Remove machine screw (15), lockwasher (16), and induction motor coil (17).

5 Remove plain hexagon nut (18), lockwasher (19), machine screw (20), and capacitor (21).

6 Remove nut (22), plain hexagon nut (23), lockwasher (24), electrical lead (11), and windshield wiper motor (25) from shield assembly (4).

7 Remove two plain hexagon nuts (26), two lockwashers (27), two machine screws (28), and fixed capacitor (8).

INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1).

REASSEMBLY

1 Install fixed capacitor (8), two machine screws (28), two new lockwashers (27), and two plain hexagon nuts (26) in shield assembly (4).

2 Install windshield wiper motor (25).

3 Install electrical lead (11), new lockwashers (24), plain hexagon nut (23), and nut (22) to windshield wiper motor (25).

4 Install capacitor (21), machine screw (20), new lockwasher (19), and plain hexagon nut (18).

5 Install induction motor coil (17), new lockwasher (16), and machine screw (15).

6 Install standoff insulator (12), new lockwasher (14), and plain hexagon nut (13). Install two electrical leads (11), new lockwasher (10), and plain hexagon nut (9) on standoff insulator (12).

7 Install new lockwasher (7), electrical lead (6), and machine screw (5) to fixed capacitor (8).

8 Install cover (3), six new lockwashers (2), and six machine screws (1) to shield assembly (4).

CHAPTER 3
GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

CHAPTER INDEX

Section I. GENERAL SUPPORT GENERAL MAINTENANCE PROCEDURES

3-1. GENERAL. This section contains general repair methods and painting procedures. Special repair methods and cleaning procedures are provided, as required, in the individual maintenance instructions. For repair methods and cleaning procedures not found in this section, refer to pages 2-26 and 2-27 of this manual.

3-2. PAINTING PROCEDURES.

WARNING

Unusable CARC mixtures may be considered hazardous waste and may require disposal in accordance with Federal, state, DOD, and DA hazardous waste regulations. Consult the Installation environmental office for proper disposal guidance. Mixed CARC has a flashpoint of approximately 38 °F (3 °C) due to the incorporation of solvents and is highly flammable.

Complete painting is authorized for and done by general support maintenance personnel or higher. CARC paint that has been opened must be used within 8 hours or it will deteriorate beyond use. Mix only what is needed for immediate use. Instructions for materiel preparation, priming, and finish are given in TM 43-0139.

Section II. GENERAL SUPPORT TROUBLESHOOTING

3-3. TROUBLESHOOTING INFORMATION.

a. The symptom index can be used as a quick guide to troubleshooting. Common malfunctions are listed in alphabetical order under each major assembly, which appear in MAC order, with a page number reference to the troubleshooting table where a test or inspection and corrective action are provided.

b. The general support troubleshooting table lists the malfunction, the test or inspection indicating the malfunction, and the necessary corrective action.

c. If the malfunction still exists after all listed general support maintenance corrections have been performed, notify depot maintenance.

3-3. TROUBLESHOOTING INFORMATION (CONT).

d. This manual cannot list all malfunctions that may occur, nor all tests or Inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

GENERAL SUPPORT SYMPTOM INDEX

Table 3-1. GENERAL SUPPORT TROUBLESHOOTING

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
ROTARY PUMP
1. ROTARY PUMP CYCLES MORE THAN NORMAL. **WARNING** Hydraulic system is under high pressure. Follow safety procedures to prevent injury. Wipe up any spilled hydraulic fluid. *Step 1.* Check that accumulator drain (pressure dump) valve is closed. Close accumulator drain (pressure dump) valve if open. Refer to TM 9-2350-304-20-2. *Step 2.* Check entire vehicle hydraulic system for leaks. a. Tighten all loose connections. b. Replace damaged or leaking hydraulic components. Refer to TM 9-2350-304-20-1. *Step 3.* Check for faulty or damaged hydraulic oil pressure switch. Troubleshoot hydraulic oil pressure switch. Refer to TM 9-2350-304-20-1.

Table 3-1. GENERAL SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

Step 4. Check loader-rammer pressure gage during operation. Close accumulator drain (pressure dump) valve. Start engine. Set HYD PUMP/PTO CLUTCH switch ON. Hydraulic pressure reading on loader-rammer gage should jump to 1200 psi (8274 kPa) and climb slowly to 2400 psi (16,548 kPa). Set HYD PUMP/PTO CLUTCH switch OFF. Stop engine.

a. If hydraulic pressure did not jump to 1200 psi (8274 kPa) and climb slowly to 2400 psi (16, 548 kPa), check and charge accumulator nitrogen gas bottle. Refer to TM 9-2350-304-20-2.

b. If accumulator nitrogen gas bottle will not hold charge, troubleshoot for leaks or damaged accumulator. Refer to TM 9-2350-304-34-2.

LOCKOUT CYLINDERS

2. LOCKOUT CYLINDER DOES NOT LOCK.

Step 1. Check for leaks and damaged or clogged tubes, hoses, and fittings.

a. Tighten all loose connections.

b. Replace leaking or damaged components. Refer to TM 9-2350-304-20-1.

Step 2. Check for damaged or faulty lockout system pressure switch or suspension locked indicator lights.

Troubleshoot lockout system pressure switch or suspension locked indicator lights. Refer to TM 9-2350-304-20-1.

POWER TAKEOFF

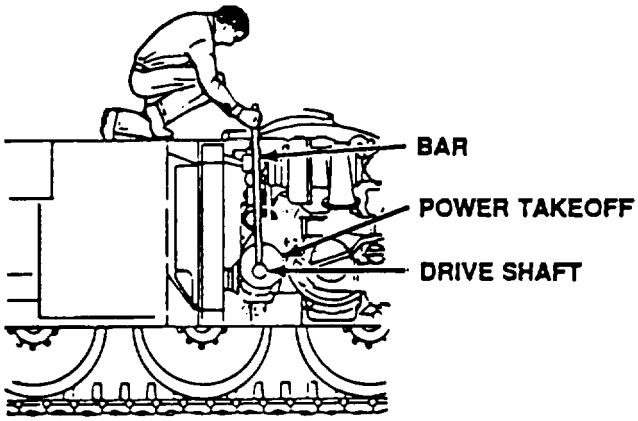
3. POWER TAKEOFF MAKES TOO MUCH NOISE.

Step 1. Check for worn or damaged universal joints in drive shaft. Enter right hull tunnel and turn power takeoff to auxiliary drive shaft back and forth.

If any play is in drive line, repair worn or damaged universal joints. Refer to TM 9-2350-304-20-1.

3-3. TROUBLESHOOTING INFORMATION (CONT).

Table 3-1. GENERAL SUPPORT TROUBLESHOOTING (CONT)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
Step 2. Isolate noise In power takeoff. Refer to TM 9-2350-304-20-1. Remove exhaust pipes. Disconnect drive shaft at power takeoff. Pull drive shaft coupling from power takeoff and lower drive shaft to hull bottom. Install exhaust pipes. Start engine. Listen for noise. Stop engine. If noise was present, replace power takeoff, refer to TM 9-2350-304-20-1; or repair power takeoff, refer to page 3-20.   

Section III. GENERAL SUPPORT MAINTENANCE PROCEDURES

3-4. MAINTENANCE OF ROTARY PUMP.

This task covers: a. *Disassembly* b. *Inspection/Repair* c. *Reassembly*

INITIAL SETUP

Tools and Special Tools
Automotive maintenance and repair shop equipment: field maintenance, basic, less power (SC 4910-95-A31)
- Soft face hammer
- Vise

Materials/Parts
Gasket (2)
Gear pump repair parts kit
Lubricating oil (item 22, appx B)
Preformed packing (2)

References
TM 9-2350-304-20-1
TM 9-2350-304-24P-1

Equipment Conditions
Rotary pump removed (TM 9-2350-304-20-1)

DISASSEMBLY

1 Clean outside of rotary pump.

2 Scribe a line on top of rotary pump across front plate (1), body (2), and back plate (3).

3 Clamp rotary pump in vise, with drive gear shaft facing down (4), and remove eight tie bolts (5).

4 Remove rotary pump from vise. Bump drive gear shaft (4) against wooden block to remove front plate (1) from body (2) and back plate (3). Body will remain with back plate.

5 Remove drive gear (6) and idler gear (7) assemblies from body (2).

6 Place drive gear shaft (4) into bearing in body (2). Tap end of drive gear shaft with soft face hammer to separate body (2) from back plate (3) and thrust plate (8).

7 Remove thrust plate (8) from back plate (3).

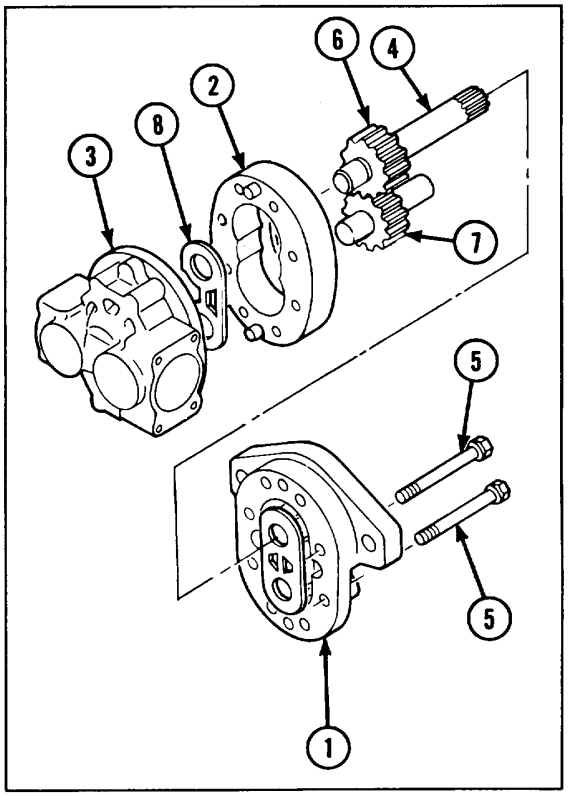
8 Remove two preformed packings (9) from body (2).

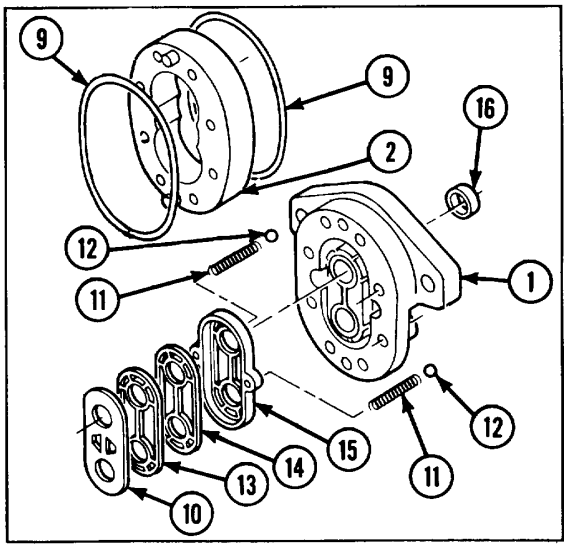
9 Pry diaphragm (10) from front plate (1).

10 Lift two springs (11) and two ball bearings (12) from front plate (1).

11 Lift gaskets (13 and 14) from front plate (1).

12 Remove plain seal (15) and plain encased seal (16) from front plate (1).





3-4. MAINTENANCE OF ROTARY PUMP (CONT).

INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 If any kit component is damaged, replace entire gear pump repair kit.

3 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1) which do not meet Inspection criteria.

REASSEMBLY

CAUTION

Make sure scribe line on top of pump across front plate, body, and back plate is aligned.

1 Lubricate new plain encased seal and new plain seal with lubricating oil. Install new plain encased seal (1) and new plain seal (2) to front plate (3).

2 Lubricate two new gaskets with lubricating oil. Install two new gaskets (4 and 5) to front plate (3).

3 Install two new bail bearings (6) and two new springs (7) into front plate (3).

4 Install new diaphragm (8) to front plate (3).

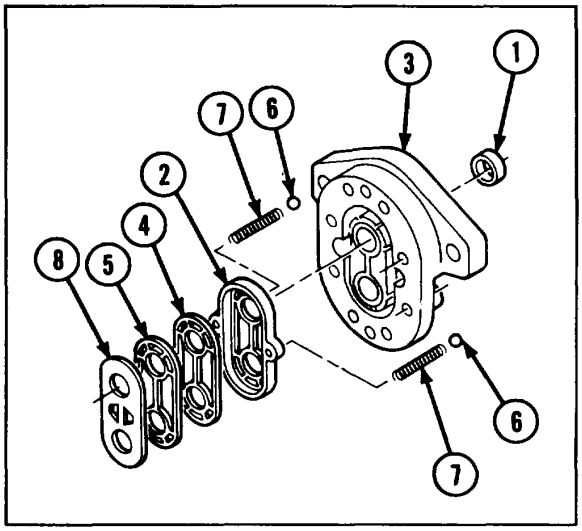
5 Lubricate two new preformed packings with lubricating oil. Install two new preformed packings (9) to body (10).

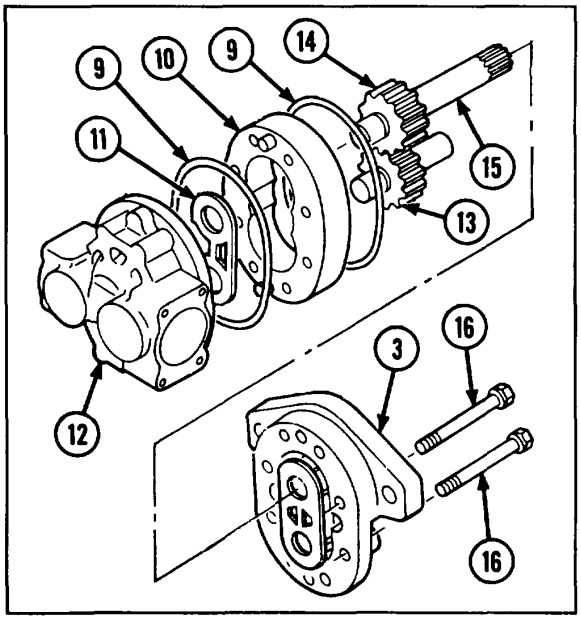
6 Install new thrust plate (11) to back plate (12). Tap in place, using soft face hammer.

7 Install idler gear (13) and drive gear (14) assemblies to body (10).

8 Install front plate (3) and back plate (12) to body (10).

9 Clamp rotary pump into vise, with drive gear shaft (15) facing down, and install eight tie bolts (16).





3-5. MAINTENANCE OF HYDRAULIC SUSPENSION LOCKOUT CYLINDER ASSEMBLY.

This task covers:	a. *Disassembly* b. *Inspection/Repair*	c. *Reassembly* d. *Test*

INITIAL SETUP

Tools and Special Tools

Automotive maintenance and repair shop equipment: field maintenance, basic, less power (SC 4910-95-A31)
- Breaker bar, 3/4 In. drive
- Plier wire twister
- Press and block
- Socket wrench
- Torque wrench (O to 150 ft-lb)
- Torque wrench (O to 600 ft-lb)
- V-block

Bearing replacer (item 15, appx E)
M3 hydraulic pump kit
Rope sling
Seal inserter (item 8, appx E)
Slide puller (item 10, appx E)
Spanner wrench (item 30, appx E)
Wrench adapter (item 1, appx E)

Materials/Parts 4
Hydraulic oil (item 20, appx B)
Lockout parts kit
Lockwasher (2)
Lockwire (item 36, appx B)
Preformed packing (2)
Sealing compound (item 26, appx B)
Self-aligning shell bearing (2)
10-micron filter

References
TM 9-214
TM 9-237
TM 9-2350-304-20-1
TM 9-2350-304-24P-1

Equipment Conditions
Hydraulic suspension lockout cylinder assembly removed (TM 9-2350-304-20-1)

General Safety Instructions

WARNING

- Wipe up any spilled hydraulic fluid. Failure to do so may result in injury to personnel.
- Spring pressure exists behind eye. To avoid injury to personnel, use caution when removing eye.

3-5. MAINTENANCE OF HYDRAULIC SUSPENSION LOCKOUT CYLINDER ASSEMBLY (CONT).

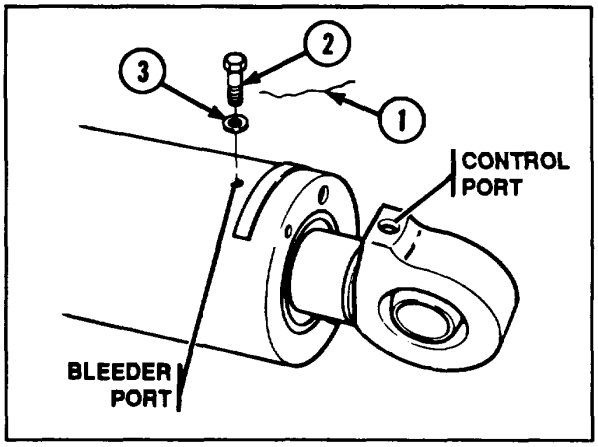
DISASSEMBLY

WARNING

Wipe up any spilled hydraulic fluid. Failure to do so may result in injury to personnel.

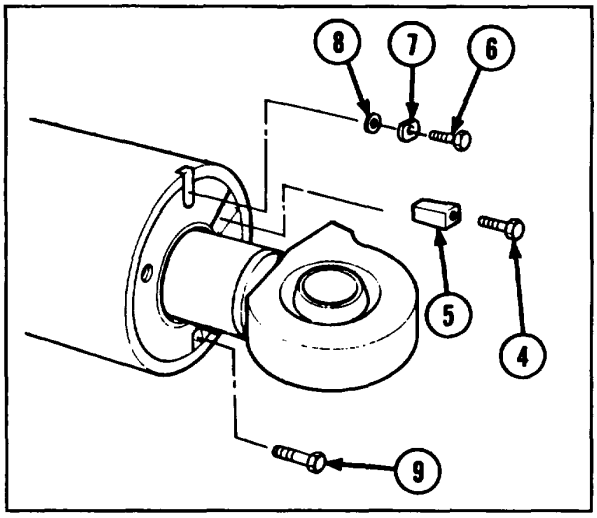
1 Remove lockwire (1), two tube fitting plugs (2), and two preformed packings (3).

2 Drain hydraulic fluid from bleeder ports and control port in rod eye.

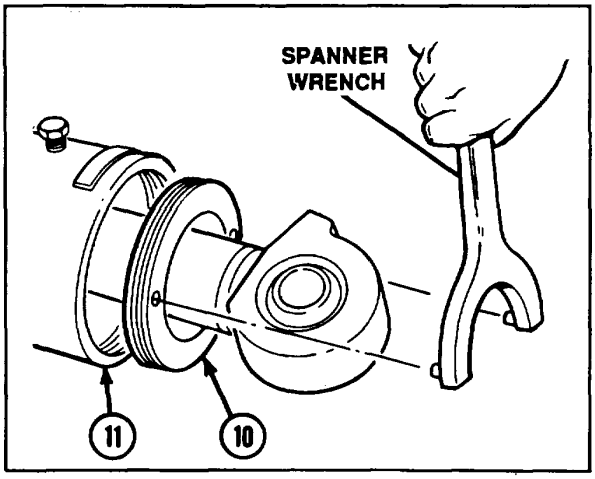


3 Remove internal wrench bolt (4), cylinder end wedge (5), internal wrench bolt (6), lockout cylinder key (7), and lockwasher (8).

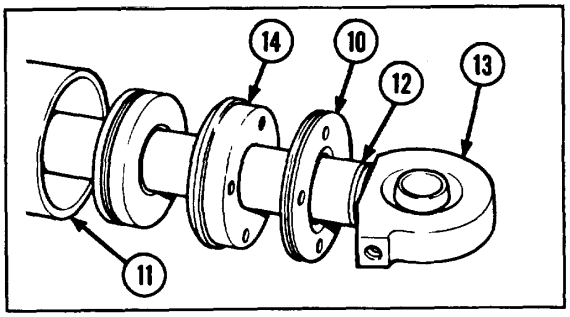
4 Remove three internal wrench bolts (9).



5 Using spanner wrench, loosen externally threaded ring (10) from actuating cylinder (11).

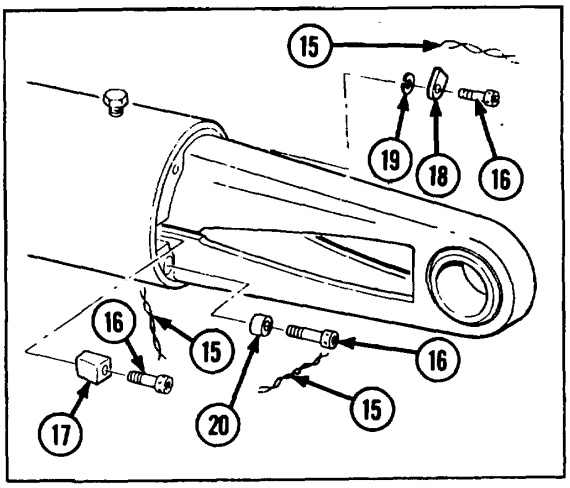


6 Remove cylinder rod (12) with eye (13), externally threaded ring (10), and cylinder head (14) from actuating cylinder (11).



7 Remove lockwire (15) from six socket head capscrews (16).

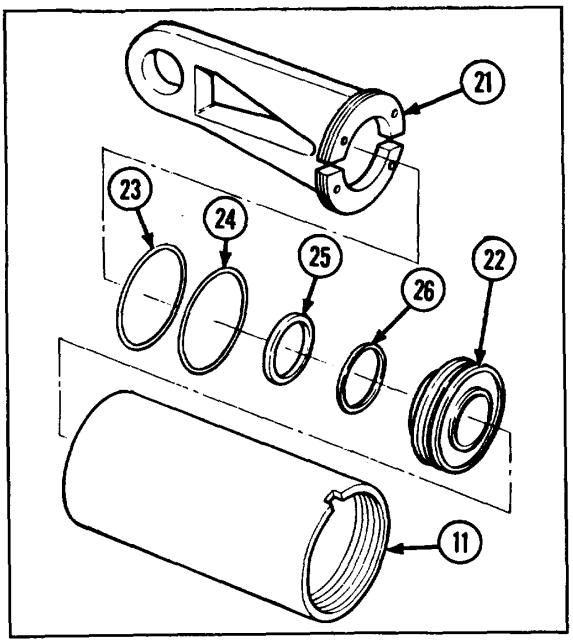
8 Remove six socket head capscrews (16), two cylinder plate wedges (17), lockout cylinder key (18), lockwasher (19), and sleeve spacer (20).



9 Remove adapter (21).

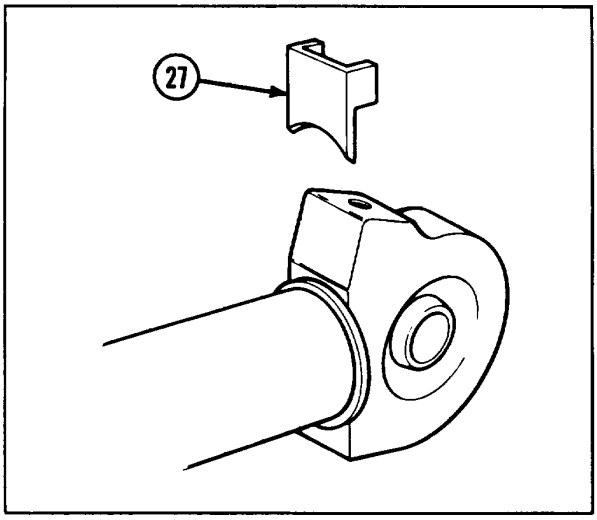
10 Remove cylinder head (22) from actuating cylinder (11).

11 Remove packing retainer (23), preformed packing (24), plain encased seal (25), and packing assembly (26).



3-5. MAINTENANCE OF HYDRAULIC SUSPENSION LOCKOUT CYLINDER ASSEMBLY (CONT).

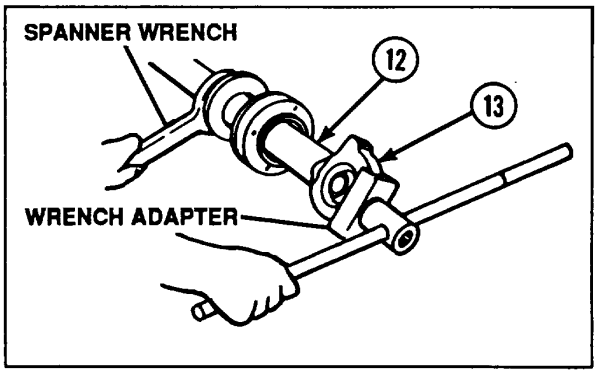
DISASSEMBLY (CONT)



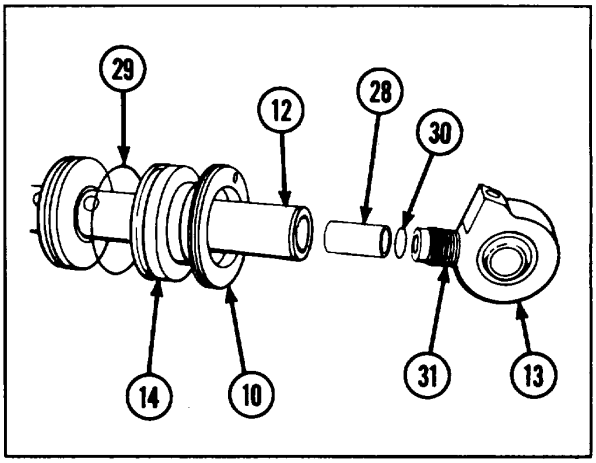
12 Using chisel, remove eye cylinder clip (27).

WARNING

Spring pressure exists behind eye. To avoid injury to personnel, use caution when removing eye.



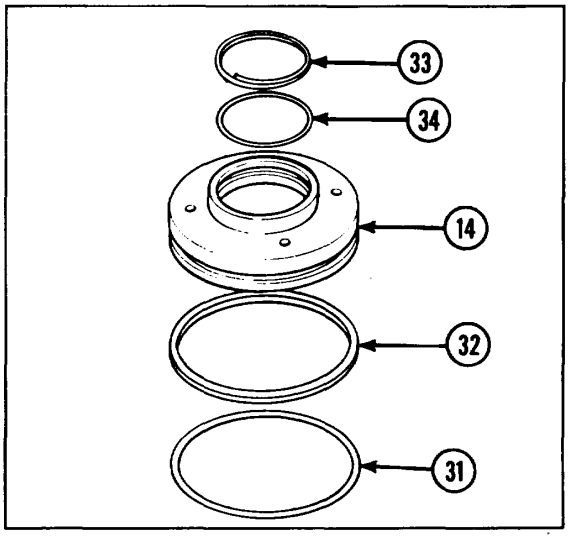
13 Using spanner wrench, wrench adapter, and breaker bar, remove eye (13) from cylinder rod (12).



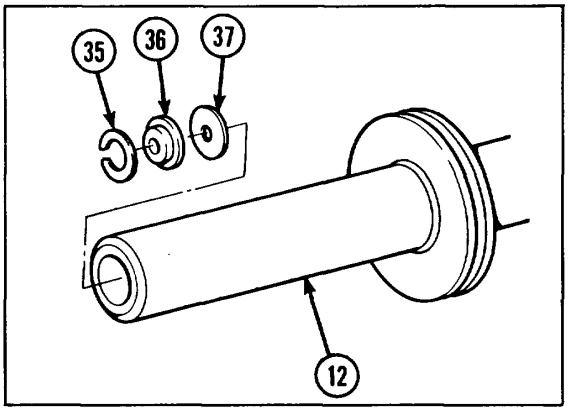
14 Remove sleeve spacer (28), externally threaded ring (10), cylinder head (14), and packing assembly (29) from cylinder rod (12).

15 Remove preformed packing (30) and key washer (31) from eye (13).

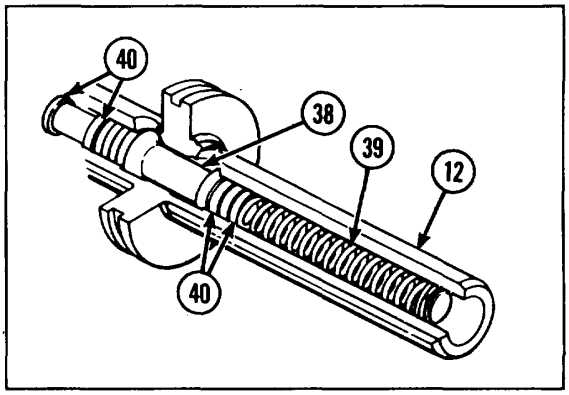
16 Remove packing retainer (31), preformed packing (32), plain encased seal (33), and packing assembly (34) from cylinder head (14).



17 Remove retaining ring (35), piston vent (36), and piston spring washer (37) from cylinder rod (12).

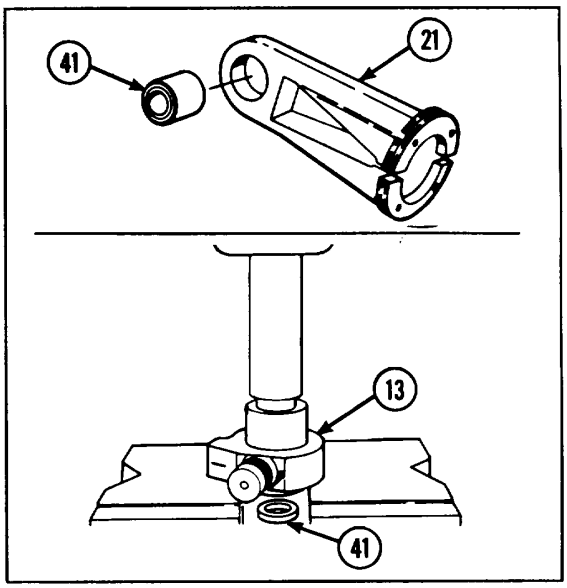


18 Pull shock absorber piston (38) and piston spring (39) through threaded end of cylinder rod (12). Remove four preformed packings (40).



3-5. MAINTENANCE OF HYDRAULIC SUSPENSION LOCKOUT CYLINDER ASSEMBLY (CONT).

DISASSEMBLY (CONT)

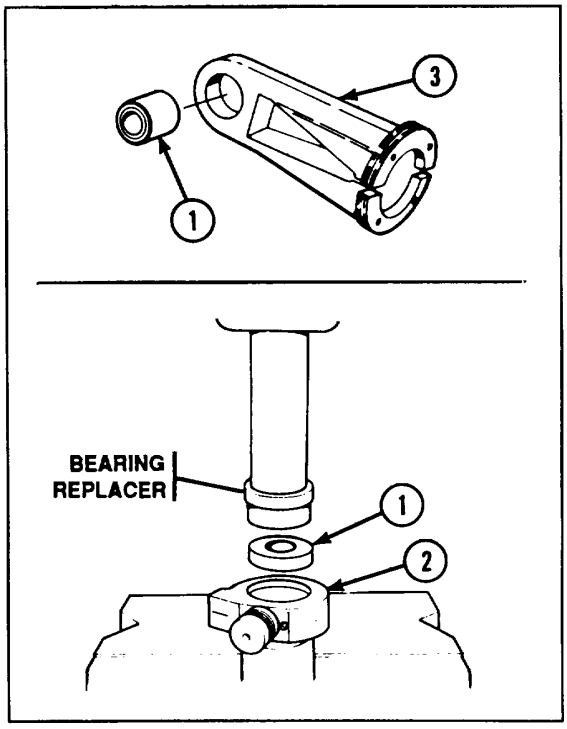


NOTE

Step 19 is illustrated for eye, but also applies to adapter.

19 Using press and block, force one self-aligning shell bearing (41) from eye (13) and one from adapter (21).

INSPECTION/REPAIR



1 Inspect for broken, damaged, or missing parts.

2 Inspect bearings IAW TM 9-214.

3 If any kit component is damaged, replace entire lockout cylinder parts kit.

4 Repair is by replacement of authorized parts (TM 9-2350-230-24P-1) which do not meet inspection criteria.

REASSEMBLY

NOTE

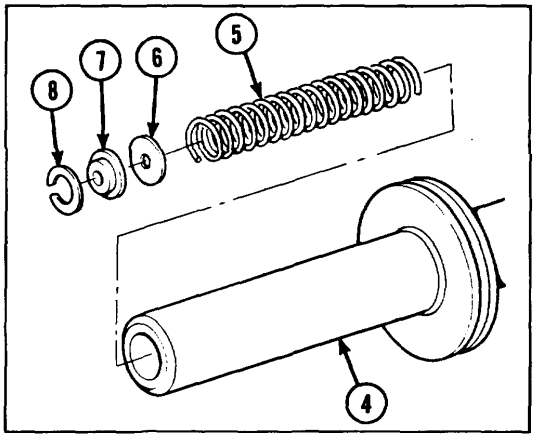
Step 1 is illustrated for eye, but also applies to adapter.

1 Using press and bearing replacer, press one new self-aligning shell bearing (1) into eye (2) and one into adapter (3).

2 Using center punch, stake two self-aligning shell bearings (1) in four places on each side. Metal must extend to bearing race.

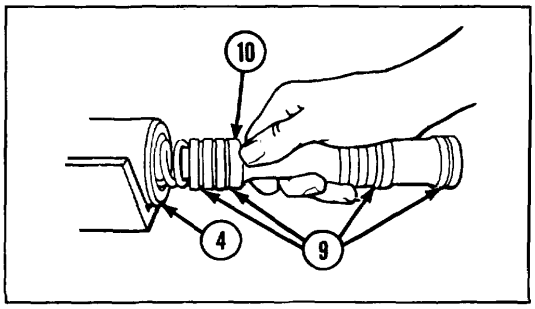
3 Place cylinder rod (4) on level, wooden V-block stand.

4 Slide piston spring (5) through retaining ring end of cylinder rod (4) until it is past ring groove. Install piston spring washer (6). Install piston vent (7) with large end toward piston spring washer. Install retaining ring (8).



5 Install four new preformed packings (9) in grooves on shock absorber piston (10).

6 Install shock absorber piston (10), small diameter first, into threaded end of cylinder rod (4).

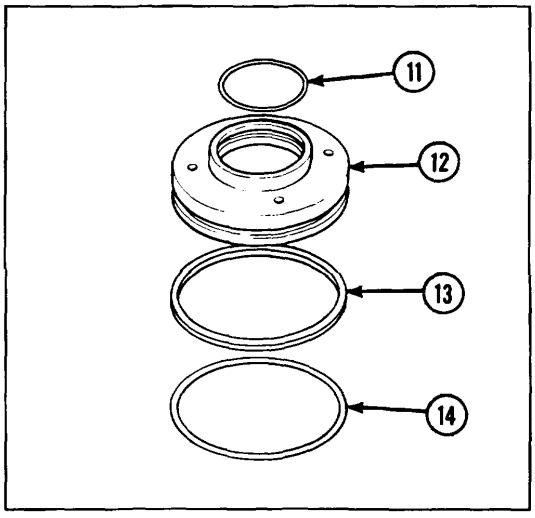


NOTE

Steps 7 thru 9 are written and illustrated for one cylinder head, but apply to both cylinder heads.

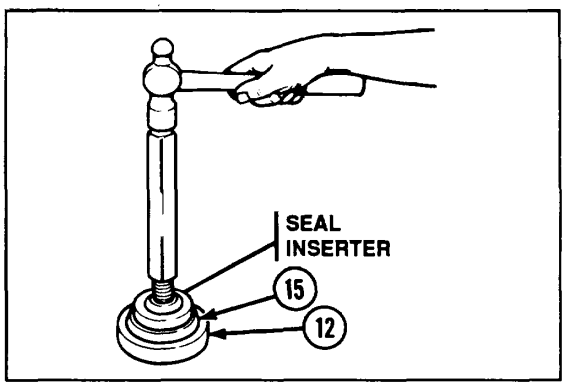
7 Install new packing assembly (11) in cylinder head (12).

8 Install new preformed packing (13) and packing retainer (14) with concave side of packing retainer facing preformed packing.



3-5. MAINTENANCE OF HYDRAULIC SUSPENSION LOCKOUT CYLINDER ASSEMBLY (CONT).

REASSEMBLY (CONT)



9 Using seal inserter, install new plain encased seal (15) in cylinder head (12) with lip facing out.

10 Install new packing assembly (16) and cylinder head (12) on eye end of cylinder rod (4) with threaded holes facing out.

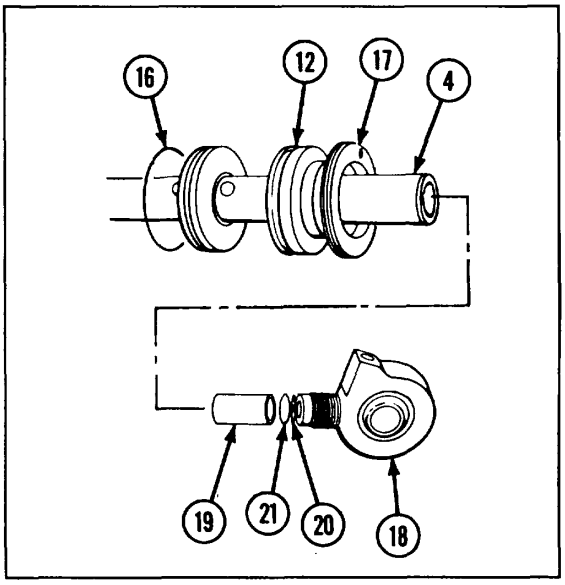
11 Install externally threaded ring (17) on eye end of cylinder rod (4) with large diameter of four holes facing out.

12 Apply sealing compound to threaded area of eye (18).

13 Install sleeve spacer (19) into threaded end of cylinder rod (4).

14 Install new key washer (20) and new preformed packing (21) on eye (18).

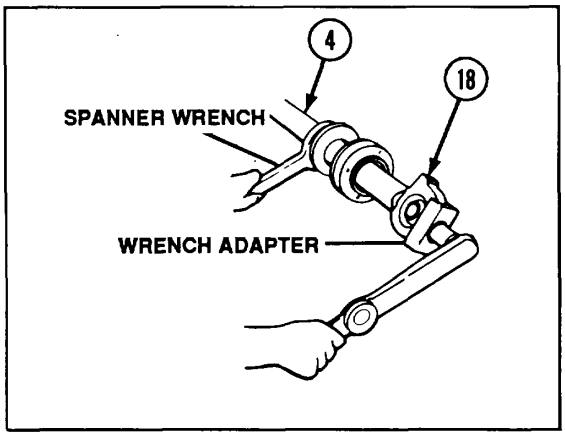
15 Place end of eye (18) against sleeve spacer (19). Press against sleeve spacer to compress piston spring and engage eye threads.



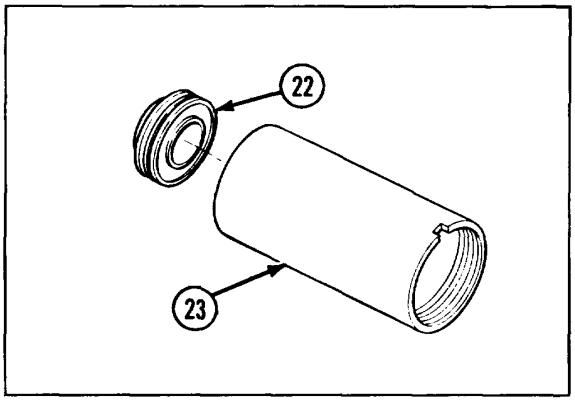
NOTE

Align notch with tab in washer and shaft.

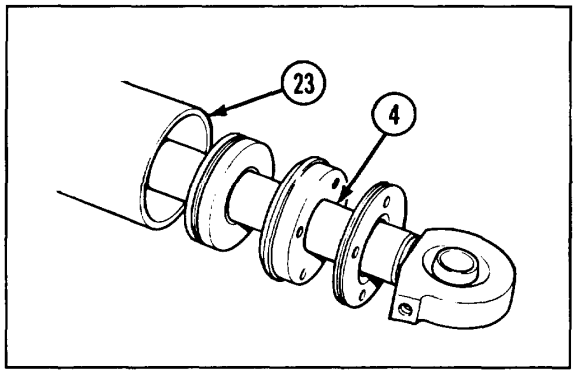
16 Using spanner wrench, wrench adapter, and torque wrench, secure eye (18) to cylinder rod (4). Torque to 300 to 400 ft-lb (407 to 542 N-m).



17 Insert cylinder head (22) into adapter end of actuating cylinder (23) so that threaded holes in cylinder head are facing out and are 45 degrees left and right of bleeder port centerline.



18 Insert assembled cylinder rod (4) into actuating cylinder (23). Ensure that cylinder rod is centered in actuating cylinder.

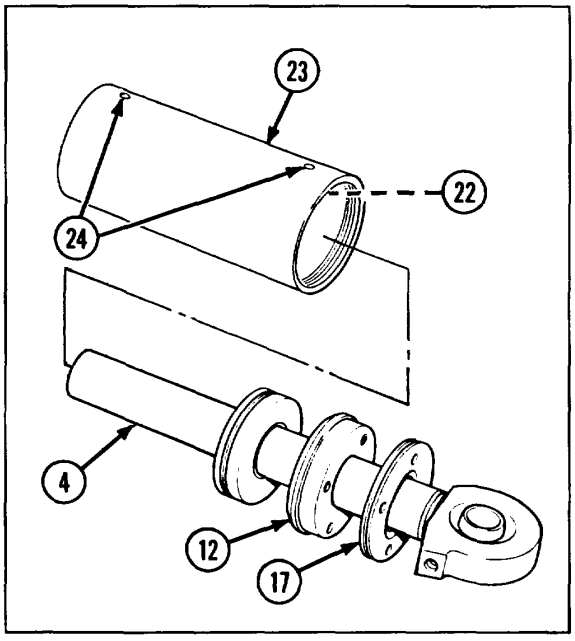


19 Work cylinder rod (4) through cylinder head (22).

20 Install two tube fitting plugs (24) without new preformed packings into actuating cylinder (23). Tighten tube fitting plugs finger tight.

21 Screw externally threaded ring (17) into actuating cylinder (23) until cylinder head (12) contacts tube fitting plug (24).

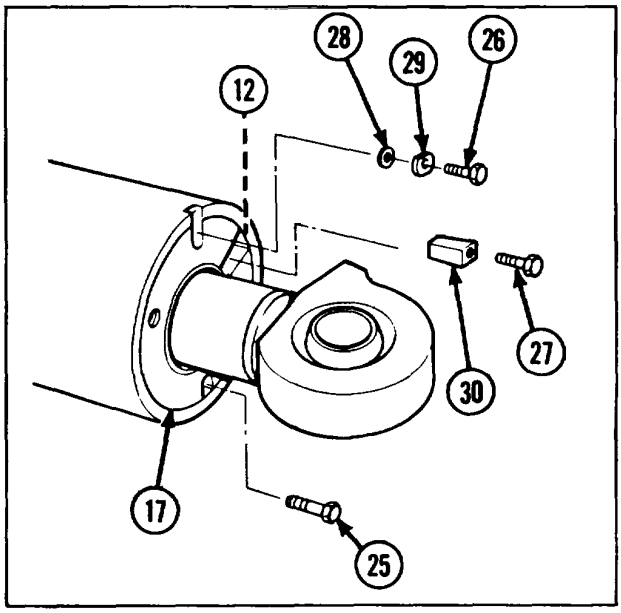
22 Back off externally threaded ring (17) until slots in externally threaded ring and cylinder head (12) are aligned. Do not exceed 180 degrees.



3-5. MAINTENANCE OF HYDRAULIC SUSPENSION LOCKOUT CYLINDER ASSEMBLY (CONT).

REASSEMBLY (CONT)

23 Apply sealing compound to the three internal wrench bolts (25), Internal wrench bolt (26), and internal wrench bolt (27).



NOTE

Key prevents relative rotation between externally threaded ring and actuating cylinder.

24 Install new lockwasher (28), lockout cylinder key (29), and internal wrench bolt (26) in externally threaded ring (17).

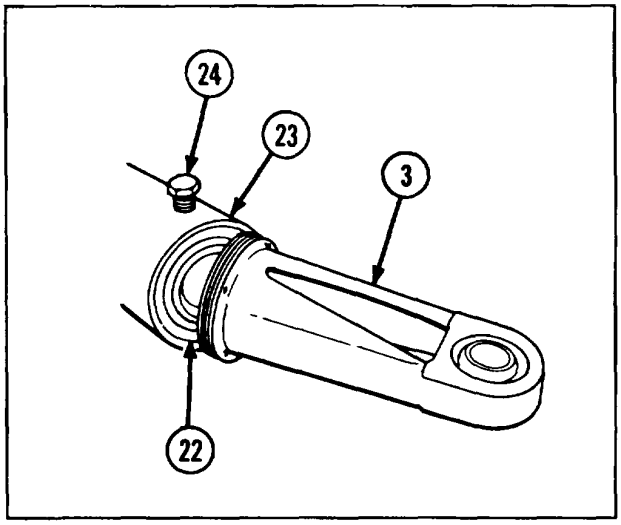
25 Install cylinder end wedge (30), internal wrench bolt (27), and three internal wrench bolts (25). Do not tighten internal wrench bolts.

26 Spread externally threaded ring (17) by tightening Internal wrench bolt (27) that secures wedge (30) to cylinder head (12). Torque internal wrench bolt (27) to 5.2 to 6.2 ft-lb (7.1 to 8.4 N-m).

27 Torque internal wrench bolt (26) and three internal wrench bolts (25) to 5.2 to 6.2 ft-lb (7.1 to 8.4 N-m).

28 Apply sealing compound to threads of adapter (3).

29 Screw adapter (3) into actuating cylinder (23) until cylinder head (22) contacts tube fitting plug (24).



CAUTION

Backing off adapter more than 90 degrees will result in Incorrect adjustment.

30 Back off adapter (3) until four screw holes are aligned with cylinder head holes.

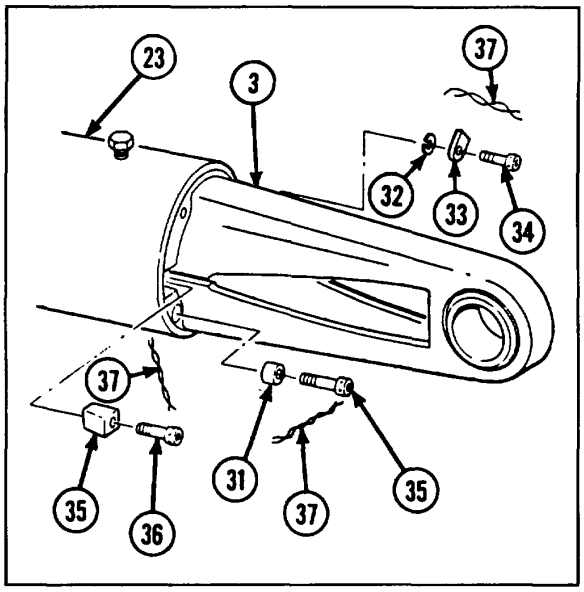
31 Install sleeve spacer (31), new lockwasher (32), lockout cylinder key (33), and four socket head capscrews (34). Tighten socket head capscrews finger tight.

32 Install two cylinder plate wedges (35) and two socket head capscrews (36).

33 Spread adapter (3) into actuating cylinder (23) by torquing two socket head capscrews (36) to 5.2 to 6.2 ft-lb (7.1 to 8.4 N-m).

34 Torque four socket head capscrews (34) to 5.2 to 6.2 ft-lb (7.1 to 8.4 N-m).

35 Secure six socket head capscrews (34 and 36) with new lockwire (37).

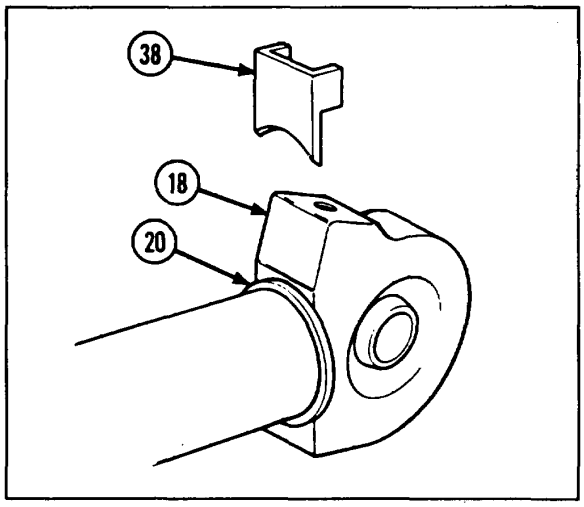


36 Insert new eye cylinder clip (38) into gap between eye (18) and key washer (20).

CAUTION

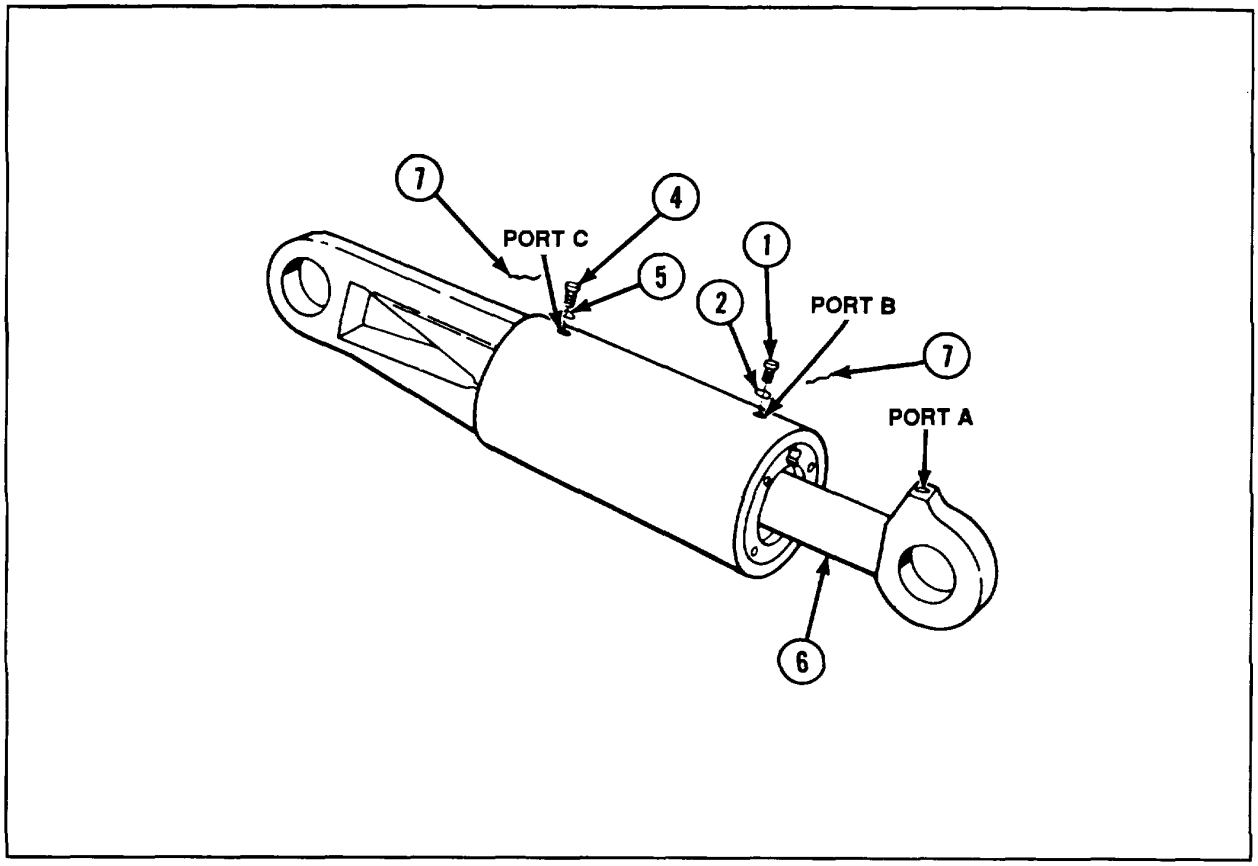
Protect cylinder rod from spatter of welding slag.

37 Weld eye cylinder clip (38) to key washer per TM 9-237.



3-5. MAINTENANCE OF HYDRAULIC SUSPENSION LOCKOUT CYLINDER ASSEMBLY (CONT).

TEST



1 If necessary, remove plug from eye control port (port A).

2 If necessary, remove tube fitting plug (1) and preformed packing (2) from port B at eye end of actuating cylinder (3).

3 If necessary, remove tube fitting plug (4) and preformed packing (5) from port C at adapter end of actuating cylinder (3).

4 Retract cylinder rod (6) to minimum length. Place lockout cylinder assembly on bench with ports on top. Using M3 oil pump, fill cylinder with hydraulic oil. Apply oil at 2 to 3 psi (14 to 21 kPa) through port A. Assist by filling through ports B and C. Fill slowly to make sure all air is removed from lockout cylinder assembly.

5 To test oil flow through shock absorber piston, apply 2 to 3 psi (14 to 21 kPa) hydraulic pressure at port A.

NOTE

Oil should flow freely from ports B and C.

6 To test shock absorber piston operation, install two new preformed packings (2 and 5) and two tube fitting plugs (1 and 4) in ports B and C.

7 Apply 150 psi (1034 kPa) hydraulic pressure at port A to compress piston spring.

NOTE

No leakage is allowed at port B, port C, or adapter end of cylinder. Relieve pressure.

8 Maintain pressure at port A, and remove two tube fitting plugs (1 and 4) and two preformed packings (2 and 5) from ports B and C.

9 To test cylinder head seals and rod seals, retract cylinder rod (6) to minimum length.

10 Install two new preformed packings (2 and 5) and tube fitting plugs (1 and 4) in ports B and C.

11 Apply 150 psi (1034 kPa) hydraulic pressure at port A to compress piston spring.

12 Maintain pressure at port A, and remove two tube fitting plugs (1 and 4) and two preformed packings (2 and 5) from ports B and C.

NOTE

No leakage is allowed at port C or around cylinder rod and cylinder head at eye end of cylinder.

13 Apply 3000 psi (20,685 kPa) hydraulic pressure at port B for 2 minutes.

14 Relieve pressure at port A and B.

15 Install new preformed packing (5) and tube fitting plug (4) in port C and port A.

NOTE

No leakage or permanent distortion is allowed.

16 Apply 3000 psi (20,685 kPa) hydraulic pressure at port B for 5 minutes.

17 Remove tube fitting plug (4) and preformed packing (5) from port C. Install one new preformed packing (2 and 5) on each tube fitting plug (1 and 4). Retract cylinder rod (6) to minimum length and install two tube fitting plugs. Tighten two tube fitting plugs finger tight.

18 Tighten two tube fitting plugs (1 and 4). Secure tube fitting plugs with new lockwire (7).

3-6. MAINTENANCE OF POWER TAKEOFF INSTALLATION AND TRANSMISSION POWER TAKEOFF.

This task covers: a. *Disassembly* b. *Inspection/Repair* c. *Reassembly*

INITIAL SETUP:

Tools and Special Tools
Automotive maintenance and repair shop equipment: field maintenance, basic, less power (SC 4910-95-A31)
- Arbor press
- Mechanical gear puller kit
- Plier wire twister
- Retaining ring pliers
- Rubber hammer

Bearing cup replacer (item 18, appx E)
Bearing remover (item 11, appx E)
Oil replacer handle (item 5, appx E)
Replacer (item 14, appx E)
Replacer assembly (item 22, appx E)
Wood block

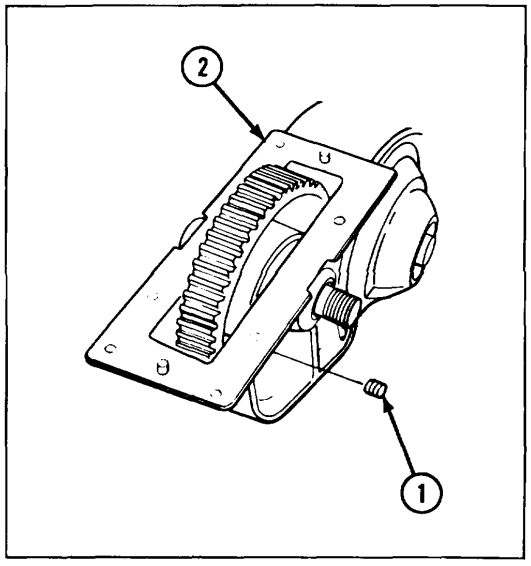
Materials/Parts
Lockwasher
Lockwasher
Lockwire (item 38, appx B)
Lubricating oil (item 22, appx B)
Plain encased seal (2)
Plain encased seal (2)
Preformed packing
Preformed packing
Preformed packing (2)
Primer (item 24, appx B)
Sealing compound (item 26, appx B)
Sealing compound (item 27, appx B)
White enamel (item 15, appx B)

References
TM 9-214
TM 9-2350-304-24P-1

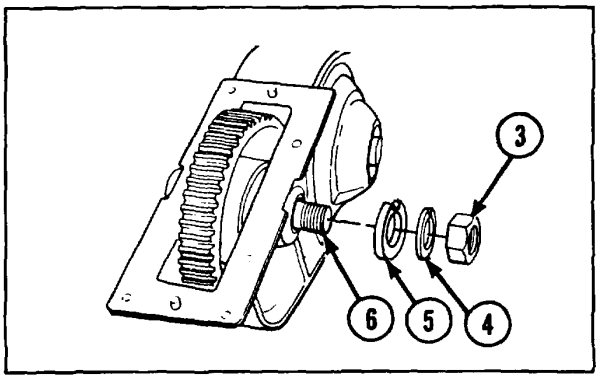
Equipment Conditions
2-128 Transmission power takeoff removed

DISASSEMBLY

1 If necessary, remove pipe plug (1) from transmission power takeoff assembly (2).

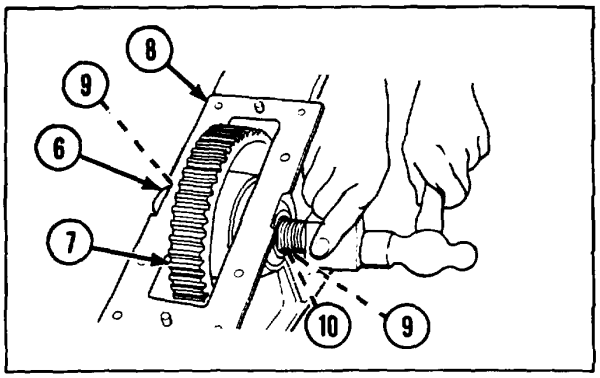


2 Remove plain hexagon nut (3), lockwasher (4), and shaft collar (5) from shoulder bolt (6).

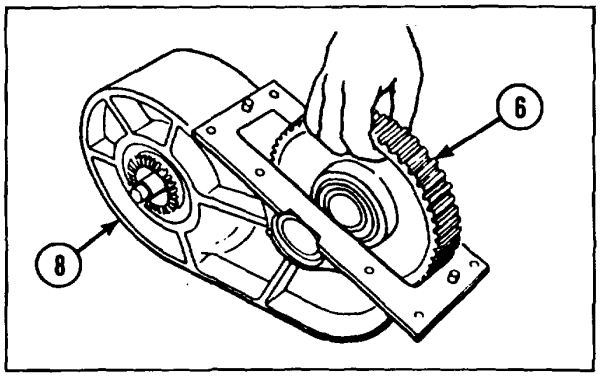


3 Using wood block, drive shoulder bolt (6) from spur gear (7) and gearcase (8).

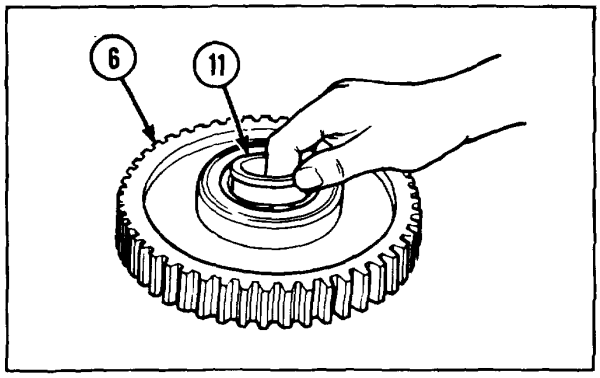
4 Remove two preformed packings (9) from gear case (8), and preformed packing (10) from shoulder bolt (6).



5 Lift spur gear (6) out of gearcase (8).



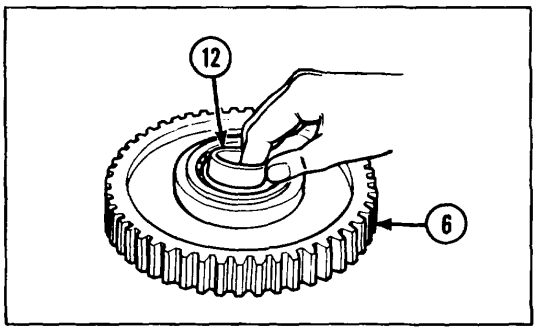
6 Remove two roller bearings (11) from each side of spur gear (6).



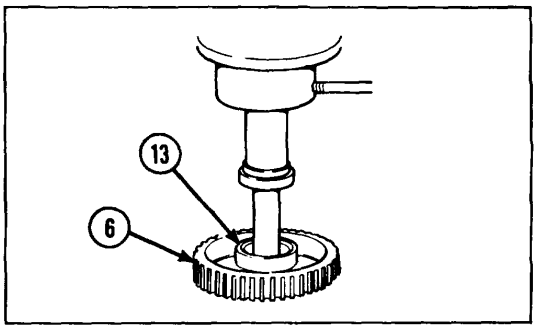
3-6. MAINTENANCE OF POWER TAKEOFF INSTALLATION AND TRANSMISSION POWER TAKEOFF (CONT).

DISASSEMBLY (CONT)

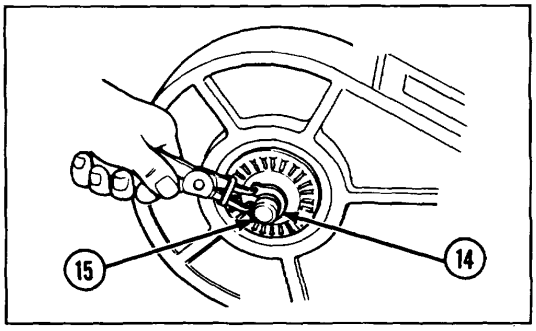
7 Remove sleeve spacer (12) from spur gear (6).



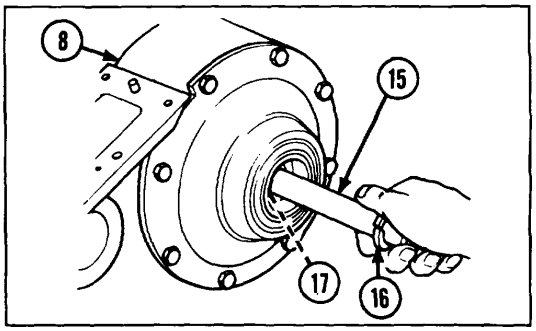
8 Using drift and press, remove bearing cones (13) from spur gear (6).



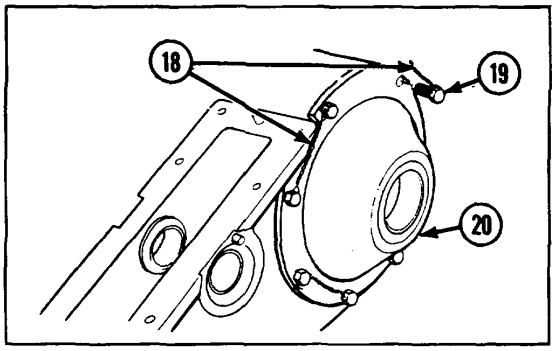
9 Using retaining ring pliers, remove external retaining ring (14) from externally released bolt (15).



10 Pull externally released bolt (15) and lockwasher (16) from output gear cluster (17) and gearcase (8).



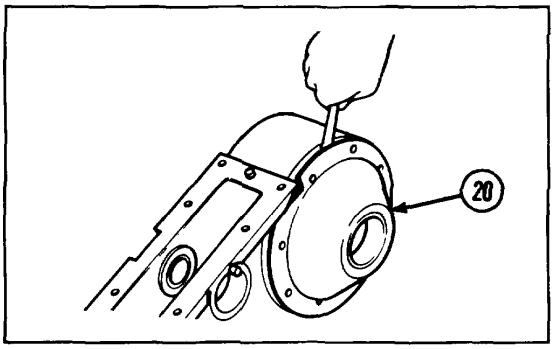
11 Remove lockwire (18) and eight hexagon head capscrews (19) securing gearcase cover (20).



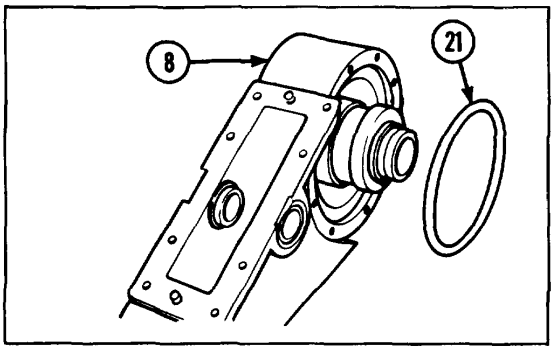
CAUTION

Do not damage mating surfaces of cover and gearcase.

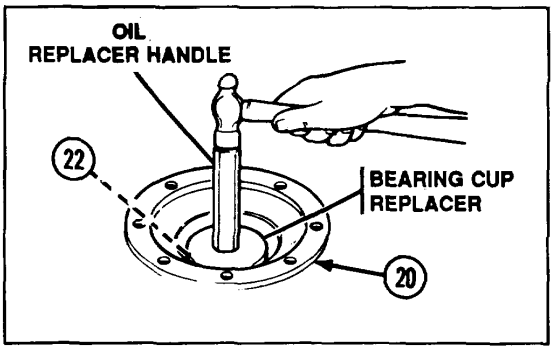
12 Using rubber hammer, loosen gearcase cover (20). Pry carefully around edge and remove gearcase cover.



13 Remove preformed packing (21) from gearcase (8).



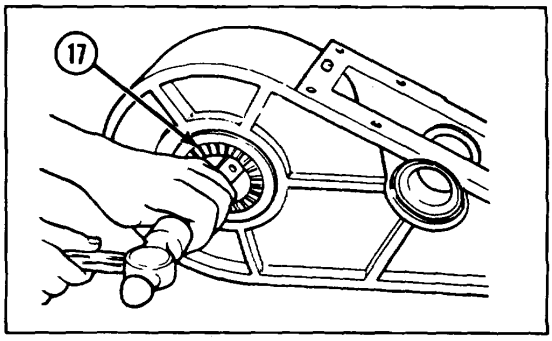
14 Remove two plain encased seals (22) from gearcase cover (20), using bearing cup replacer and oil replacer handle.



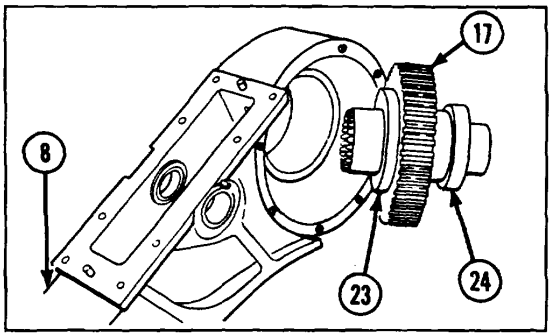
3-6. MAINTENANCE OF POWER TAKEOFF INSTALLATION AND TRANSMISSION POWER TAKEOFF (CONT).

DISASSEMBLY (CONT)

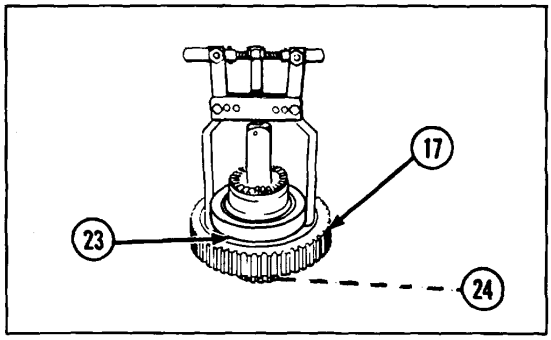
15 Using drift, tap output gear cluster (17) lightly to loosen two gearcase ball bearings.



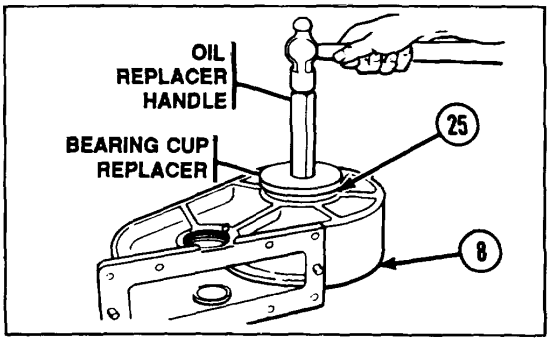
16 Remove output gear cluster (17) with two ball bearings (23 and 24) from gearcase (8).



17 Using bearing puller, remove two ball bearings (23 and 24) from output gear cluster (17).

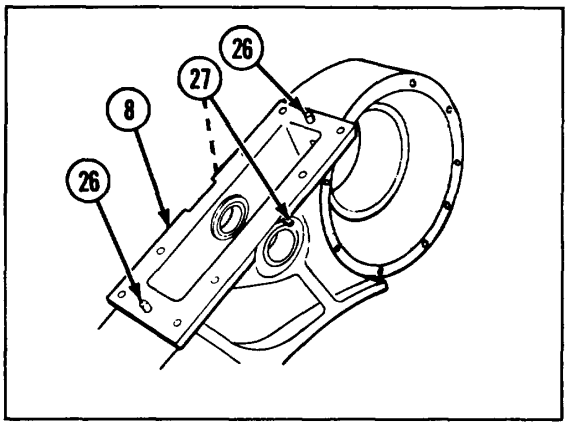


18 Remove two plain encased seals (25) from gearcase (8), using bearing cup replacer and oil replacer handle.



19 If damaged, remove two headless straight pins (26) from gearcase (8).

20 If damaged, remove two headless straight pins (27) from gearcase (8).



INSPECTION/REPAIR

1 Inspect for broken, damaged, or missing parts.

2 Inspect bearings per TM 9-214.

3 Inspect externally released bolt for damaged threads. Discard if threads are damaged.

4 If gearcase cover is damaged, repair is by replacement of next higher assembly.

5 If gearcase is damaged, repair is by replacement of next higher assembly.

6 Repair is by replacement of authorized parts (TM 9-2350-304-24P-1) which do not meet inspection criteria.

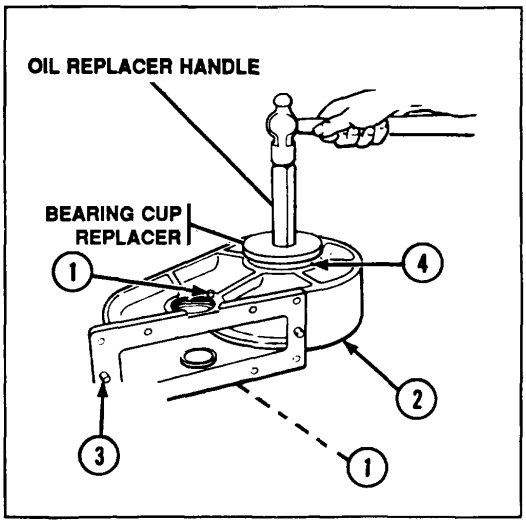
REASSEMBLY

1 If removed, install two headless straight pins (1) to gearcase (2).

2 If removed, install two headless straight pins (3) to gearcase (2).

3 Apply sealing compound (item 27, appx B) to outside diameter of two new plain encased seals (4).

4 Install two new plain encased seals (4) in gearcase (2) with seal lips back to back, using bearing cup replacer and oil replacer handle.

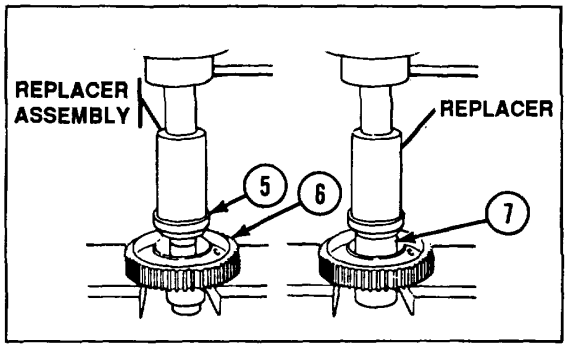


3-6. MAINTENANCE OF POWER TAKEOFF INSTALLATION AND TRANSMISSION POWER TAKEOFF (CONT).

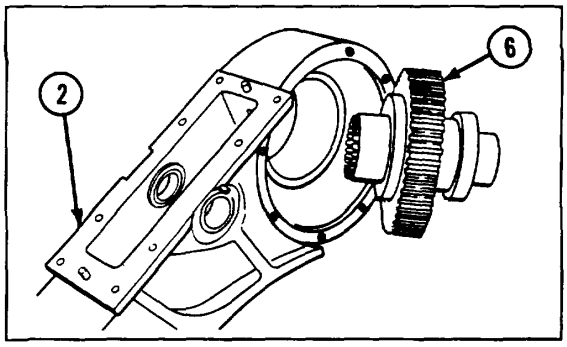
REASSEMBLY (CONT)

5 Using replacer assembly and press, install ball bearing (5) onto output gear cluster (6).

6 Using replacer and press, install ball bearing (7) onto output gear cluster (6).

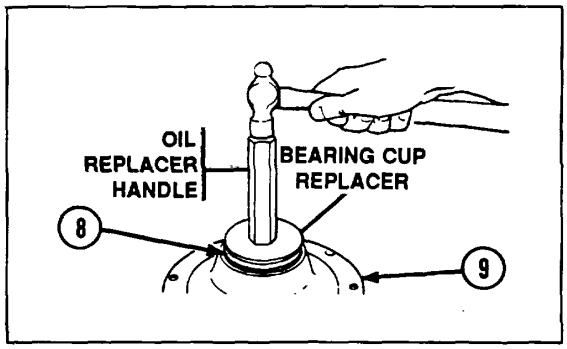


7 Lightly lubricate shafts of output gear cluster with oil. Install output gear cluster (6) in gearcase (2). Ensure wiper lip of inner seal is properly seated on gear with lip toward gear teeth. Using rubber hammer, tap gear Into gearcase until ball bearing is seated.

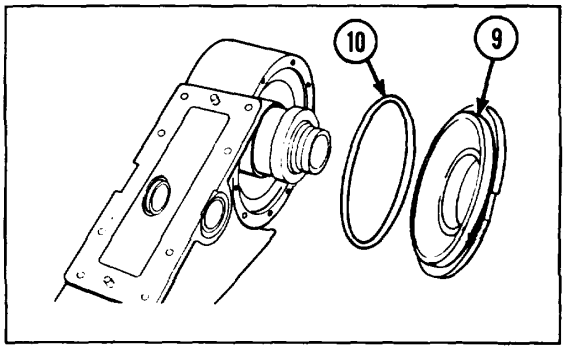


8 Apply sealing compound (item 26, appx B) to outside diameter of two new plain encased seals (8).

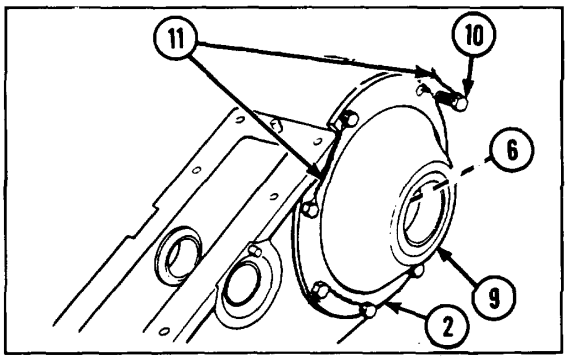
9 Install two new plain encased seals (8) in gearcase cover (9) with seal lips back to back, using bearing cup replacer and oil replacer handle.



10 Install new preformed packing (10) in gearcase cover (9) opening.



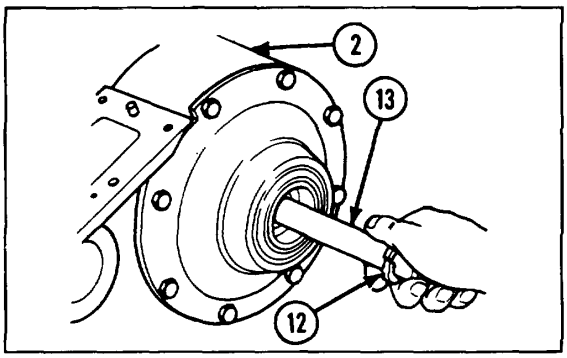
11 Lightly lubricate gear shaft with oil. Position gearcase cover (9) over installed output gear cluster (6). Ensure wiper lip of inner seal is properly seated on gear with lip toward gear teeth. Using drift, tap gearcase cover (9) onto gear until gearcase cover is seated over ball bearing.



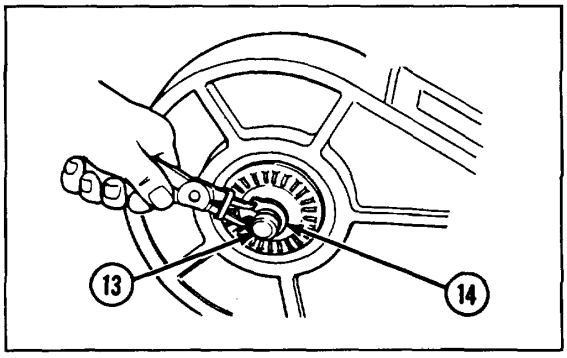
12 Apply sealing compound (item 27, appx B) to threads of eight hexagon head capscrews (10). Install eight hexagon head capscrews through gearcase cover (9) to gearcase (2).

13 Secure eight hexagon head capscrews (10) with new lockwire (11).

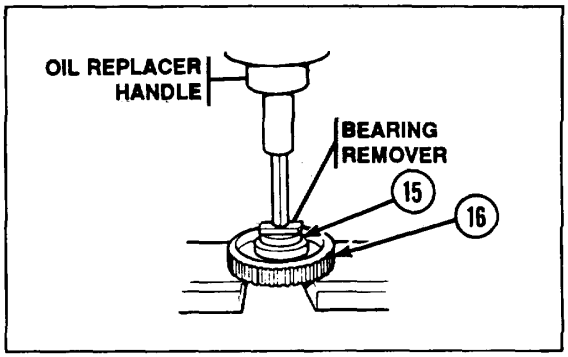
14 Install new lockwasher (12) and externally released bolt (13) through output gear cluster in gearcase (2).



15 Using retaining ring pliers, install external retaining ring (14) to externally released bolt (13).



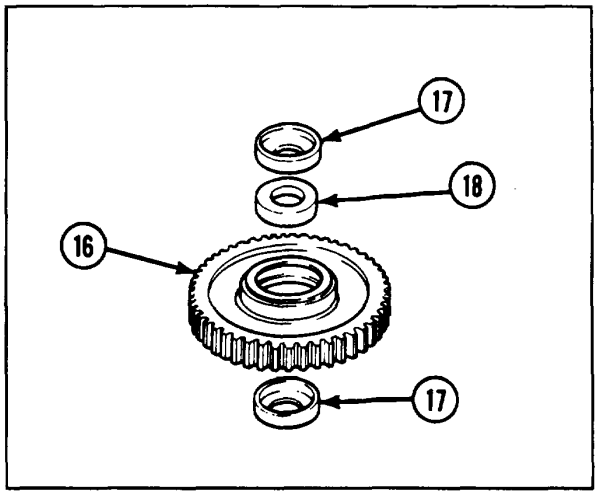
16 Install two bearing cones (15) on spur gear (16), using press, bearing remover, and oil replacer handle. Ensure bearing cones (15) are seated.



3-6. MAINTENANCE OF POWER TAKEOFF INSTALLATION AND TRANSMISSION POWER TAKEOFF (CONT).

REASSEMBLY (CONT)

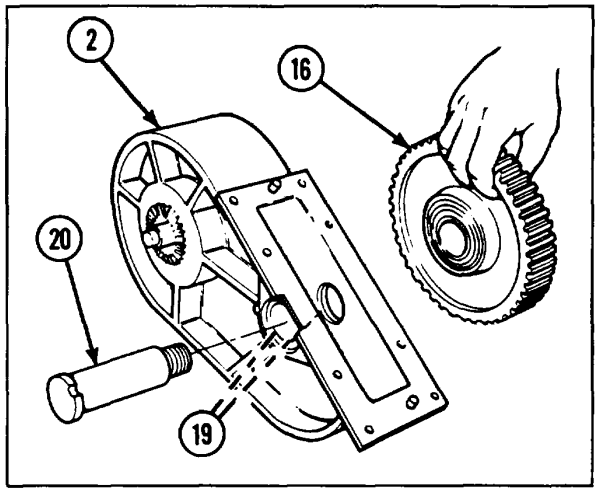
17 Install two roller bearings (17), with sleeve spacer (18) between them, to spur gear (16).



18 Install two new preformed packings (19) In gearcase (2).

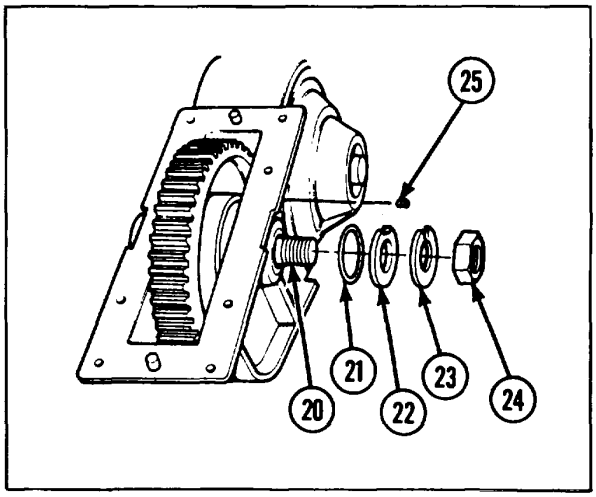
19 Place spur gear (16) into gearcase (2).

20 Install shoulder bolt (20) to gearcase (2). If necessary, reach through gearcase and lift sleeve spacer (18) onto shoulder bolt. Align and start shoulder bolt through second bearing. Turn shoulder bolt so notch in head fits over headless straight pin. If necessary, tap shoulder bolt through gearcase, using rubber hammer.



21 Install new preformed packing (21) into collar recess. Install shaft collar (22) over shoulder bolt (20) and align with headless straight pin. Secure shoulder bolt with new lockwasher (23) and plain hexagon nut (24).

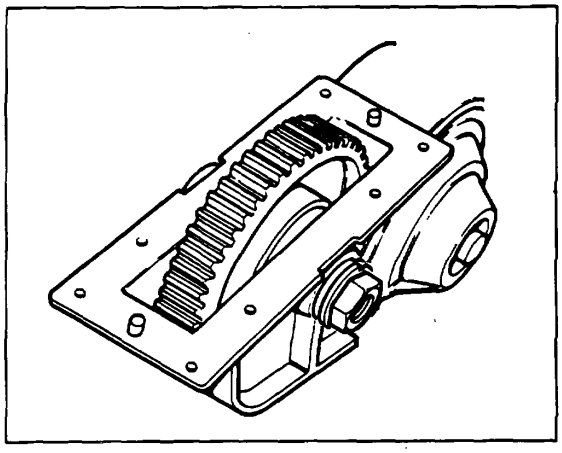
22 If removed, install pipe plug (25) in transmission power takeoff assembly (26).



CAUTION

Do not paint areas specified in figure 3-1.

23 If necessary, apply primer and white enamel paint.



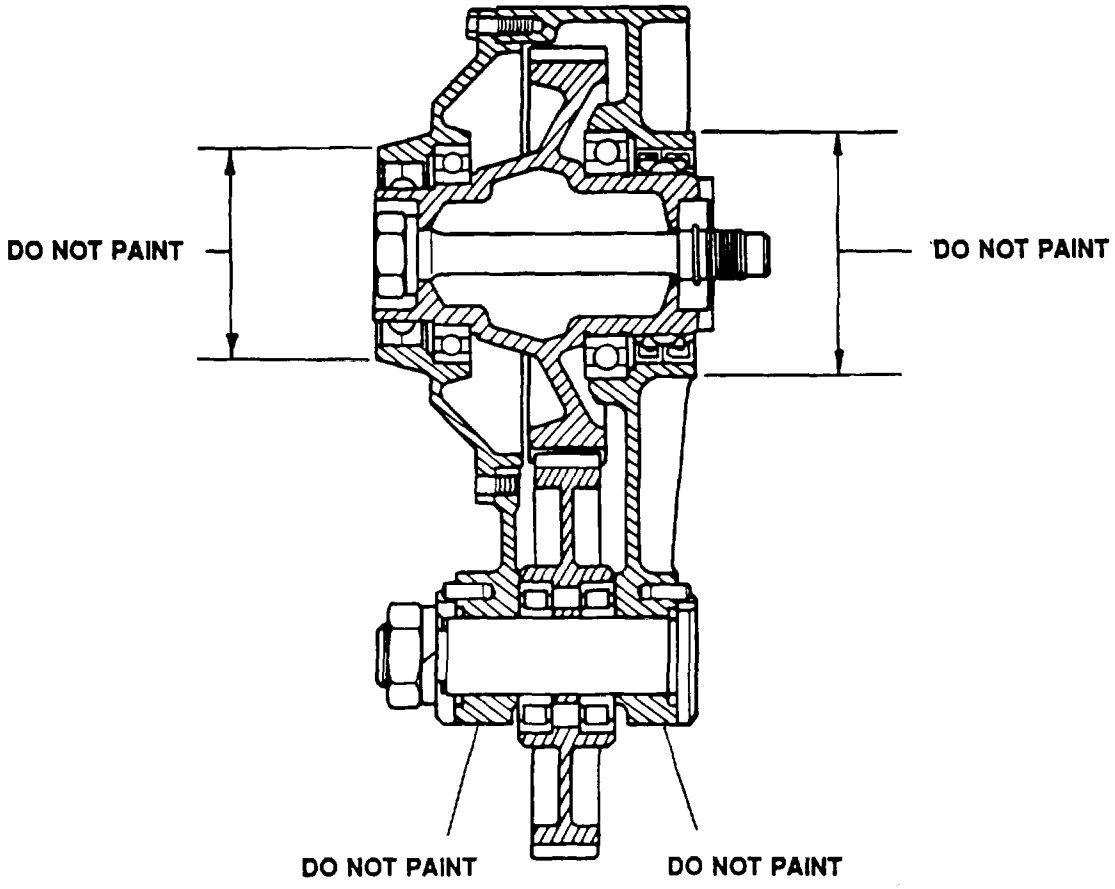


Figure 3-1. Painting Specifications for Transmission Power Takeoff.

Section IV. PREPARATION FOR STORAGE OR SHIPMENT

Refer to TM 9-2350-304-20-1 for detailed preparation for storage or shipment.

APPENDIX A

REFERENCES

A-1. SCOPE.

This appendix lists all forms, field manuals, technical bulletins, technical manuals, and miscellaneous publications referenced in this manual.

A-2. FORMS.

DA Form 2404 ..... Equipment Inspection and Maintenance Worksheet

DD Form 6 ..... Packaging Improvement Report

DD Form 314 ..... Preventive Maintenance Schedule and Record

SF 368 ..... Product Quality Deficiency Report

A-3. FIELD MANUALS.

FM 21-11 ..... First Aid for Soldiers

A-4. TECHNICAL BULLETINS.

TB SIG-222 ..... Solder and Soldering

TB 746-95-1 ..... Color, Marking, and Camouflage Pattern Painting for Armament Command Equipment

A-5. TECHNICAL MANUALS.

TM 9-214 ..... Inspection, Care, and Maintenance of Antifriction Bearings

TM 9-237 ..... Operator's Manual for Welding Theory and Application

TM 9-2350-304-10 ..... Operator's Manual for Howitzer, Heavy, Self-Propelled: 8-inch, M110A2

TM 9-2350-304-20-1 ..... Unit Maintenance Manual for Howitzer, Heavy, Self-Propelled: 8-inch, M110A2 Hull and Related Components

TM 9-2350-304-24P-1 ..... Unit, Direct Support, and General Support Repair Parts and Special Tools List for Howitzer, Heavy, Self-Propelled: 8-inch, M110A2 (Hull Components)

A-5. TECHNICAL MANUALS (CONT).

TM 9-2350-304-34-2 ..... Direct and General Support Maintenance Manual for Armament and Turret Components, Howitzer, Heavy, Self-Propelled, 8-inch, M110A2

TM 9-2520-234-34P ..... Direct Support and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) for Power Train Assembly (8351100) (Allison Model XTG-411-2A) Composed of Transfer Assembly, Transmission Input (NSN 2520-00-894- 9535), Transmission Assembly (NSN 2520-00-894- 9533), Drive Assembly, Transmisison Output Vehicle, Left (NSN 2520-00-894-9534), and Drive Assembly, Transmission Output Vehicle, Right (NSN 2520-00-894-9532)

TM 9-2520-234-35..... Field and Depot Maintenance Manual for Power Train Assembly (8351100) (Allison Model XTG-411-2A) Composed of Transfer Assembly, Transmission Input (NSN 2520-00-894-9535), Transmission Assembly (NSN 2520-00-894-9533), Drive Assembly, Transmission Output Vehicle, Left (NSN 2520-00-894-9534), and Drive Assembly, Transmission Output Vehicle, Right (NSN 2520-00-894-9532)

TM 9-2540-205-24&P..... Organizational, Direct Support, and General Support Maintenance Manual (Including Repair Parts and Special Tools) for Heaters, Vehicular Compartment (60,000 BTU)

TM 9-2815-202-24P ..... Direct and General Support Maintenance Repair Parts and Special Tools List for Engine, Diesel: Turbocharged, Fuel-Injected, Liquid-Cooled, "V" Type, 8 Cylinder, w/Container Assembly, Detroit Diesel-GMC Series 8V71T, Model 7083-7398 (NSN 2815-00-762-4500 and 2815-00-936-7659), Model 7083-7395 (NSN 2815-01-043-7091 and 2815-01-043-7092), Model 7083-7399 (NSN 2815-00-134-4845), and Model 7083-7396 (NSN 2815-00-040-3120)

TM 9-2815-202-34 ..... Direct and General Support Maintenance for Engine, Diesel: Turbocharged, Fuel-Injected, Liquid-Cooled, "V" Type, 8 Cylinder, w/Container Assembly, Detroit Diesel-GMC Series 8V71T, Model 7083-7398 (NSN 2815-00-762-4500 and 2815-00-436-7654), Model 7083-7395 (NSN 2815-01-043-7091 and 2815-01-043-7092), Model 7083-7399 (NSN 2815-00-134-4845), and Model 7083-7396 (NSN 2815-00-040-3120)

TM 9-2920-224-34&P ..... Direct Support and General Support Maintenance Manual Including Repair Parts and Special Tools List for Generator Assembly, Engine (300 AMP) 8717421 (NSN 2920-00-735-6827); 10908713 (NSN 2920-00-030-6880); and 11642008 (NSN 2920-00-189-5715)

TM 9-2990-207-23&P ..... Organizational, Direct Support, and General Support Maintenance Manual (Including Repair Parts and Special Tools) for Heaters, Vehicular Compartment (30,000 BTU)

TM 9-6140-200-14 ..... Lead-Acid Storage Batteries, 12V, 24V

TM 43-0139 ..... Painting Instructions for Field Use

TM 750-244-6 ..... Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use

TM 750-254 ..... Cooling Systems: Tactical Vehicles

TM 750-244-5-1 ..... Procedures for Destruction of Equipment to Prevent Enemy Use

A-6. MISCELLANEOUS PUBLICATIONS

AR 190-13 ..... The Army Physical Security Program

AR 750-1 ..... Army Materiel Maintenance Policies

CTA 8-100 ..... Army Medical Department Expendable/Durable Items

CTA 50-970 ..... Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items)

DA PAM 738-750 ..... The Army Maintenance Management Systems (TAMMS)

A-6. MISCELLANEOUS PUBLICATIONS (CONT).

SC 4910-95-A31 ..... Automotive Maintenance and Repair Shop Equipment: Field Maintenance, Basic, Less Power

SC 5180-95-A12 ..... Ordnance Artillery and Turret Mechanic's Tool Kit

APPENDIX B
EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

B-1. SCOPE. This appendix lists expendable/durable supplies and materials you will need to operate and maintain the M110A2 Heavy, Self-propelled Howitzer. This listing is for informational purposes only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (Except Medical, Class V, Repair Parts, and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

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 referenced the material (e.g. “cleaning compound (item 7, appx B”).

b. *Column (2) - Level*. This column identifies the lowest level of maintenance that requires the listed item.

O-Unit Maintenance
F-Direct Support Maintenance

c. *Column (3) - National Stock Number*
This is the National stock number assigned to the item; use it to request or requisition the item.

d. *Column (4) - Description*. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the Contractor and Government Entity Code (CAGEC) In parentheses followed by the part number.

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/DURABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	0	8040-00-262-9011	ADHESIVE: reclaimed rubber, liquid, general purpose, type II (81349) MIL-A-5092 1-pint can	PT
2	0	8040-00-262-9026	ADHESIVE (81348) MMM-A-1617 0.5-pint can	PT
3	F	8040-00-849-5195	ADHESIVE EPOXY (81349) MIL-A-81236	KT
4	F	8040-00-118-2695	ADHESIVE SILICONE: RTV, type I (81349) MIL-A-46146	KT
5	0		ANTISEIZE COMPOUND (81349) MIL-T-83483	
		8030-00-087-8630	1-lb can	LB
		9150-00-168-2000	12-oz can	OZ
6	0	6850-00-597-9765	CLEANING COMPOUND: liquid form (solvent) (81348) O-C-1889 1-gal. container	GL
7	0	’6850-00-224-6665	CLEANING COMPOUND, SOLVENT: degreasing self-emulsifying, 5-gal. can (81349) MIL-C-11090	GL
8	0	5350-00-221-0872	CLOTH, ABRASIVE: 9 x 11 in. Sheets (81348) P-C-458 50-sheet pg.	SH
9	0	8305-01-152-3587	CLOTH, BATISTE: lint-free (81349) MIL-C-40129 45-in. wide 1 yard	EA

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
10	O	8010-00-641-0426	COATING COMPOUND, NONSLIP, type II, OD (80244) MIL-W-5044 TY2 1-gal. container	GL
11	F	3439-00-165-4167	ELECTRODE, WELDING (36232) MIL-E-22200/1 1/8 in. 10-lb can	LB
12	F	3439-00-165-4165	ELECTRODE, WELDING (36232) MIL-E-22200/1 3/32 in. 10-lb can	LB
13	O	8010-00-111-7938	ENAMEL, FOREST GREEN (81349) MIL-E-52798 1-gal. can	GL
14	O	8010-01-229-9561	EPOXY COATING: enamel, olive drab (OD, Class opt) (81349) MIL-C-22750 1-gal. container	GL
15	O	8010-01-154-2334	EPOXY COATING KIT: enamel, white (81348) MIL-C-22750	KT
16	F	8010-00-142-9279	EPOXY PRIMER COATING: primer, rust inhibitor (81349) MIL-P-23377	KT
17	F	5210-00-640-6177	GAGE, BEARING: clearance 0.0 (77220) PLASTIGAGE PG-1 12 ea. box	EA
18	F	5210-00-640-6178	GAGE, BEARING: clearance 0.0 (77220) PLASTIGAGE PR-1 12 ea. box	EA

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (CONT)

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
19	0		GREASE, AUTOMOTIVE AND ARTIL-LERY: (GM) (81349) MIL-G-10924	
		9150-00-065-0029	2.25-oz tube	OZ
		9150-00-190-0904	1.75-lb can	LB
		9150-00-190-0905	6.5-lb can	LB
20	0		HYDRAULIC FLUID, PETROLEUM BASE: (OHT) (81349) MIL-H-6083	
		9150-00-935-9807	1 qt container	QT
		9150-00-935-9808	1 gal. container	GL
21	0	5350-00-193-7227	LAPPING AND GRINDING COMPOUND: abrasive grade (58536) A-A-1203 1-lb container	EA
22	0	9150-00-231-2356	LUBRICATING OIL: (OE/HDO) (81349) MIL-L-3150 5-gal. can	GL
23	0	5350-00-598-5537	PAPER, ABRASIVE (53536) A-A-1202 1-hd count	EA
24	F	8010-00-899-0931	PRIMER COATING (81348) TT-P-1757 1-qt container	QT
25	0	7920-00-205-1711	RAG, WIPING (81348) DDD-R-30 50-lb bale	LB
26	0		SEALING COMPOUND: blue, liquid, C or CV (81349) MIL-S-22473	
		8030-00-081-2330	50-cc bottle	CC
		8030-00-900-4412	250-cc bottle	CC

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
27	O	8030-00-291-1787	SEALING COMPOUND: type II (81349) MIL-S-45180 1-pt container	PT
28	O	8030-00-291-1789	SEALING COMPOUND: type III (81349) MIL-S-45180 1-gal. container	GL
29	F	6850-00-295-7685	SILICONE COMPOUND 10: Rubber, RTV w/corrosion inhibitor (81349) MIL-S-8650 10-lb can	LB
30	F	8520-00-228-0598	SOAP, TOILET LIQUID (81348) P-S-624 1-gal. container	GL
31	F	3439-00-824-9856	SOLDER, TIN ALLOY (81348) QQ-S-571 16-oz spool	OZ
32	O	6850-00-281-1985	SOLVENT, DRY CLEANING (58536) A-A-71 1 1-gal. can	GL
33	O	7510-00-266-6712	TAPE, PRESSURE SENSITIVE: masking (58536) A-A-883 60-yd roll	YD
34	O	8010-00-290-4079	THINNER, PAINT: Type 1 (80244) TT-T-291 I -qt container	QT
35	O	8110-00-180-6343	VARNISH, OIL (81349) MIL-V-173 1-qt container	QT

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (CONT)

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
36	H	9505-00-331-3275	WIRE, NONELECTRICAL (96906) MS20995-C41	LB
37	F	9505-00-087-3956	WIRE, NONELECTRICAL (96906) MS20995F20AR	LB
38	0	9505-00-684-4843	WIRE, NONELECTRICAL (96906) MS20995F41 96.0 in. long 1 lb	LB

APPENDIX C

ILLUSTRATED LIST OF MANUFACTURED ITEMS

C-1. INTRODUCTION. This appendix includes complete instructions for making items authorized to be manufactured or fabricated at direct support and general support maintenance.

a. A part number index in alphanumeric order is provided for cross-referencing the part number of the item to be manufactured to the figure which covers fabrication criteria.

b. All bulk materials needed for manufacture of an item are listed by part number or specification number in a tabular list on the illustration.

c. Figures C-7 and C-8 do not have part numbers.

C-2. MANUFACTURED ITEMS PART NUMBER INDEX.

C-3. MANUFACTURED ITEMS ILLUSTRATIONS

Fabricate safety chain from:

NSN 4010-01-K60-9239
CAGEC 81348 PN RRC271AR

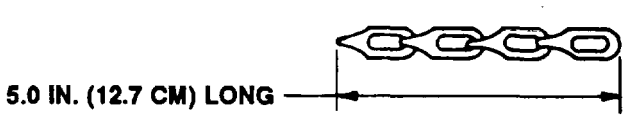


Figure C-1. Brass Safety Chain.

C-3. MANUFACTURED ITEMS ILLUSTRATIONS (CONT).

Fabricate chain from:

NSN 3020-00-K60-9541
CAGEC 19207 PN 10892063NOTE3

CHAIN LENGTH = 27 PITCHES

Figure C-2. Chain.

Fabricate nonmetallic seal from:

NSN 9390-00-839-4830
CAGEC (19207) PN 10900479-1

Figure C-3. Nonmetallic Seal.

Fabricate rubber section from:

NSN 5330-00-947-5716
CAGEC 19207 PN 10946632AR

Figure C-4. Rubber Section.

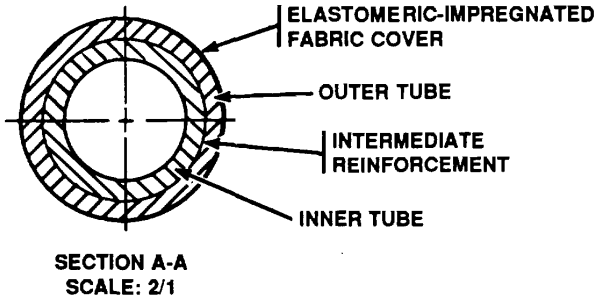
NOTES:

1. RUBBER GRADE SA610 TO 620 $A^1B^1C^1E^3F^2$
   OR
   GRADE SB610 TO 620 $A^1B^1C^1E^3E^5F^2$.

2. REINFORCEMENT: HOSE SHALL BE REINFORCED WITH 2 PLY OF CLOTH, OSNABURG, COTTON, CLASS OPTIONAL, SPEC CCC-C-429.

3. CONSTRUCTION OF HOSE SHALL CONSIST OF AN INNER SEAMLESS TUBE, AND INTERMEDIATE FABRIC REINFORCEMENT, AND AN OUTER TUBE WITH AN ELASTOMERIC MATERIAL-IMPREGNATED FABRIC COVER.

4. APPLY PART NO. PER MIL-STD-130



Fabricate hose from:

NSN 4720-01-101-8470
CAGEC 19207 PN 11643363-2

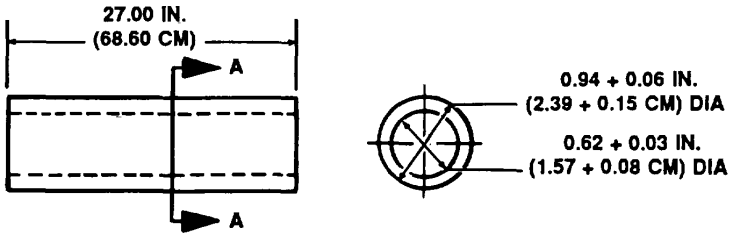


Figure C-5. Rubber Hose

Fabricate rubber strip from:

NSN 9390-00-505-6594
CAGEC 19207 PN 8323272AR

Figure C-6. Rubber Strip.

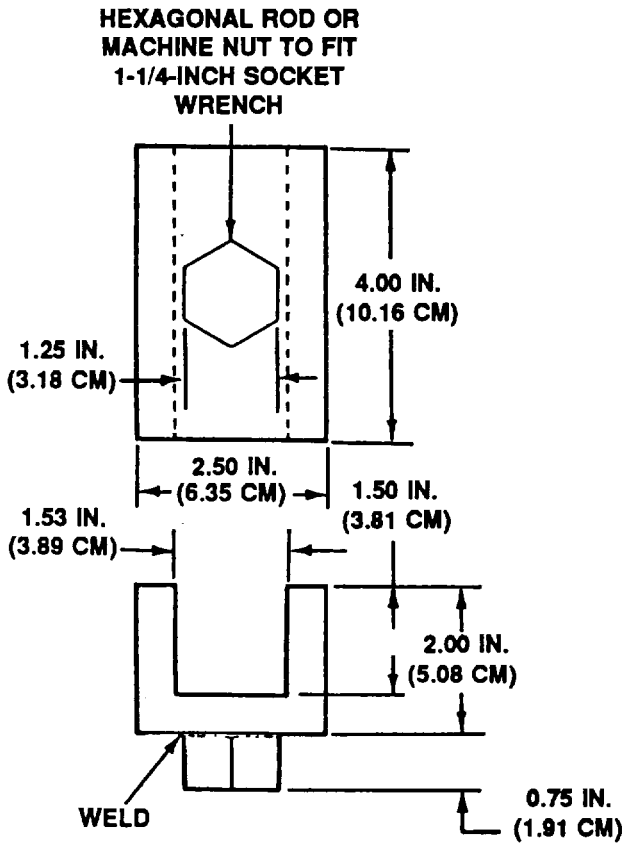
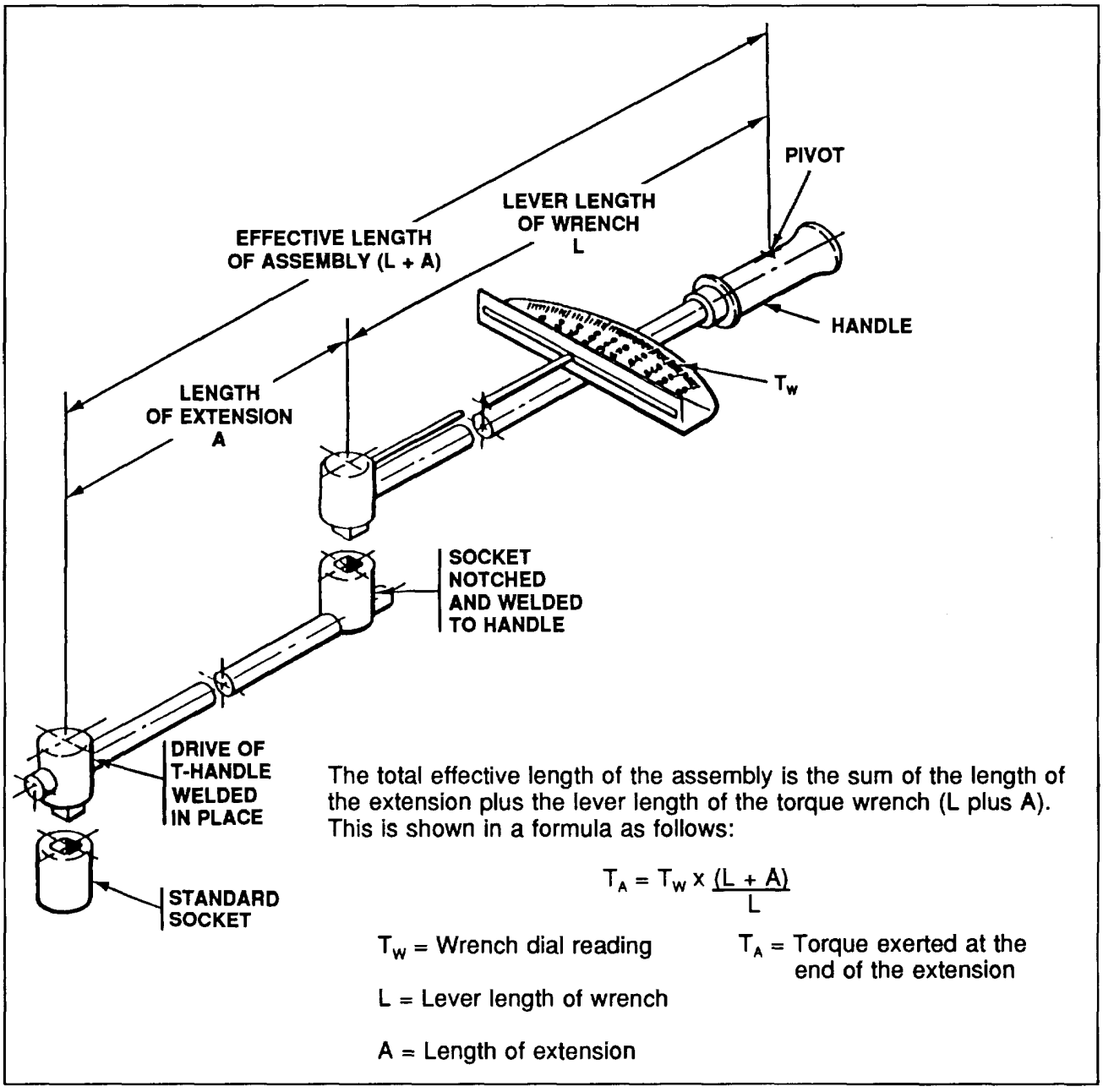


Figure C-7. Wrench Adapter.



The total effective length of the assembly is the sum of the length of the extension plus the lever length of the torque wrench (L plus A). This is shown in a formula as follows:

$$T_A = T_W \times \frac{(L + A)}{L}$$

T_W = Wrench dial reading

T_A = Torque exerted at the end of the extension

L = Lever length of wrench

A = Length of extension

Figure C-8. Torque Wrench Extension.

APPENDIX D
TORQUE VALUES

D-1. Follow torque values given throughout this manual. When no torque value is given, follow the guide to prevent damaging parts.

D-2. The guide is based on using clean, dry threads.

TORQUE VALUE GUIDE

SCREW DIAMETER	TORQUE NO DASHES (SAE GRADE 2)	TORQUE 3 DASHES (SAE GRADE 5)	TORQUE 6 DASHES (SAE GRADE 8)	SOCKET SIZE
1/4 - 20 UNC	3 - 5 ft-lb	6 - 8 ft-lb	10 - 12 ft-lb	7/16
(4 - 7 N-m)	(8 -11 N-m)	(14 - 16 N-m)		
1/4 - 28 UNF	4 - 6 ft-lb	8 - 10 ft-lb	9 - 14 ft-lb	7/16
(5 - 8 N-m)	(I -	14 N-m)	(12 -19 N-m)	
5/16 - 18 UNC	7 -11 ft-lb	13 - 17 ft-lb	19 - 24 ft-lb	1/2
(9 - 15 N-m)	(18 - 23 N-m)	(261- 33 N-m)		
5/16 - 24 UNF	7 - 11 ft-lb	14 - 19 ft-lb	23 - 28 ft-lb	1/2
(9 - 15 N-m)	(19 - 26 N-m)	(31 - 38 N-m)		
3/8 - 16 UNC	14 - 18 ft-lb	26 - 31 ft-lb	39 - 44 ft-lb	9/16
(19 - 24 N-m)	(35 - 42 N-m)	(53 - 60 N-m)		
3/8 - 24 UNF	15 - 19 ft-lb	30 - 35 ft-lb	46 - 51 ft-lb	9/16
(20 - 26 N-m)	(41 - 47 N-m)	(62 - 69 N-m)		
7/16 - 14 UNC	23 - 28 ft-lb	44 - 49 ft-lb	65 - 70 ft-lb	5/8
(31 - 38 N-m)	(60 - 66 N-m)	(88 - 95 N-m)		
7/16 - 20 UNF	23 - 28 ft-lb	44 - 54 ft-lb	69 - 79 ft-lb	5/8
(31 - 38 N-r)	(60 - 73 N-m)	(94 - 107 N-m)		
1/2 - 13 UNC	32 - 37 ft-lb	65 - 75 ft-lb	95 - 105 ft-lb	3/4
(43 - 50 N-m)	(88 - 102 N-m)	(129 - 142 N-m)		
1/2 - 20 UNF	34 - 41 ft-lb	73 - 83 ft-lb	113 - 123 ft-lb	3/4
(46 - 56 N-m)	(99 - 113 N-m)	(153 - 167 N-m)		
9/16 - 12 UNC	46 - 56 ft-lb	100 - 110 ft-lb	145 - 155 ft-lb	13/16
(62 - 76 N-r)	(136 - 149 N-m)	(197 - 210 N-m)		
9/16 - 18 UNF	47 - 57 ft-lb	107 - 117 ft-lb	165 - 175 ft-lb	13/16
(64 - 77 N-m)	(145 - 159 N-m)	(224 - 237 N-m)		
5/8 - 11 UNC	62 - 72 ft-lb	140 - 150 ft-lb	200 - 210 ft-lb	15/16
(84 - 98 N-m)	(190 - 203 N-m)	(271 - 285 N-m)		
5/8 - 18 UNF	67 - 77 ft-lb	153 - 163 ft-lb	235 - 245 ft-lb	15/16
(91 -104 N-m)	(207 - 221 N-m)	(319 - 332 N-m)		
3/4 - 10 UNC	106 - 116 ft-lb	260 - 270 ft-lb	365 - 375 ft-lb	1-1/4
(144 - 157 N-m)	(353 - 366 N-m)	(495 - 508 N-m)		
3/4 - 16 UNF	115 - 125 ft-lb	268 - 278 ft-lb	417 - 427 ft-lb	1-1/4
(156 - 169 N-m)	(363 - 377 N-m)	(565 - 579 N-m)		
7/8 - 9 UNC	165 - 175 ft-lb	385 - 395 ft-lb	595 - 605 ft-lb	1-5/16
(224 -237 N-r)	(522 -536 N-m)	(807 - 820 N-m)		

D-2. (CONT).

TORQUE VALUE GUIDE (CONT)

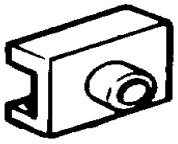
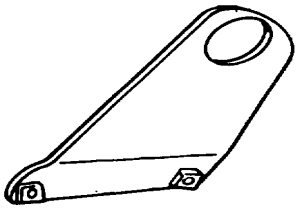
TORQUE SCREW DIAMETER	TORQUE NO DASHES (SAE GRADE 2)	TORQUE 3DASHES (SAE GRADE 5)	6DASHES (SAE GRADE 8)	SOCKET SIZE
7/8 - 14 UNF	178 - 188 ft-lb (241 - 255 N-m)	424 - 434 ft-lb (575- 588 N-m)	663 - 673 ft-lb (899 -912 N-m)	1-5/16
1 - 8 UNC	251 - 261 ft-lb (340 -354 N-m)	580 - 590 ft-lb (786 -800 N-m)	900 - 910 ft-lb (1220 - 1234 N-m)	1-1/2
1 - 14 UNF	255 - 265 ft-lb (346 - 359 N-m)	585 - 634 ft-lb (793 - 860 N-m)	943 - 993 ft-lb (1279 - 1346 N-m)	1-1/2
1-1/4 - 7 UNC	451 - 461 ft-lb (611 - 625 N-r)	1070 - 1120 ft-lb (1451-1518 N-r)	1767 - 1817 ft-lb (2396-2463 N-m)	1-7/8
1-1/4 -12 UNF	488 - 498 ft-lb (662 - 675 N-r)	1211 - 1261 ft-lb (1642 - 1710 N-m)	1963 - 2013 ft-lb (2661 - 2729 N-m)	1-7/8
1-1/2 - 6 UNC	727 - 737 ft-lb (986 - 999 N-m)	1899 - 1949 ft-lb (2575 - 2642 N-m)	3111 - 3161 ft-lb (4218 - 4286 N-m)	2-1/4
1-1/2 - 12 UNF	816 - 826 ft-lb (1106 - 1120 N-m)	2144 - 2194 ft-lb (2907 - 2975 N-m)	3506 - 3556 ft-lb (4753 - 4821 N-m)	2-1/4

APPENDIX E
SPECIAL TOOLS AND EQUIPMENT

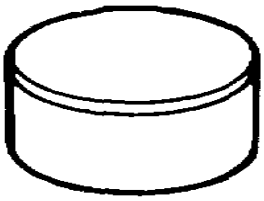
E-1. GENERAL. Repair parts, special tools, and support equipment are issued for maintaining the vehicle. Tools and equipment should not be used for purposes other than those prescribed. When not in use, they should be properly stowed.

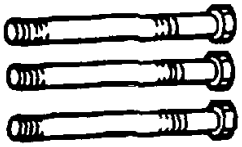
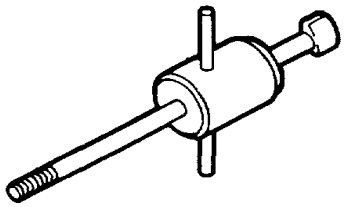
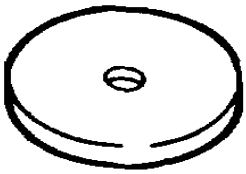
E-2. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT. Special tools and equipment necessary to perform the maintenance described in this manual are listed for your information. Special tools and support equipment are listed in TM 9-2350-304-24P-1 which is the authority for requisitioning replacement.

E-3. REPAIR PARTS. Repair parts are issued for the replacement of parts that have become worn, broken, or otherwise unserviceable. Repair parts are listed in TM 9-2350-304-24P-1, which is the authority for requisitioning replacement.

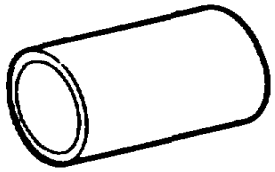
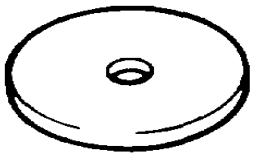
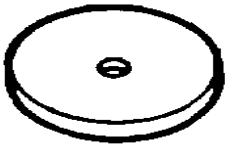
ITEM 1  **ADAPTER, WRENCH**	No NSN No NSN (No PN)	For fabrication instructions, refer to fig. C-8, appx C. Used to remove cylinder eye from lockout cylinder (p 3-7).
ITEM 2  **BRACKET, TRANSMISSION LIFTING**	5340-00-977-5580 (8355697)	Used with lifting sling to lift transmission (p 2-30).
ITEM,3 	2590-01-063-5653 (11675660)	Used on spade cylinder piston to protect cylinder head packing (p 2-134).

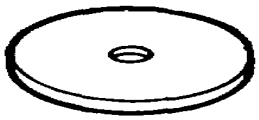
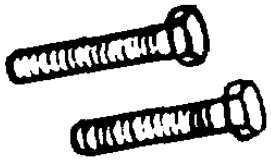
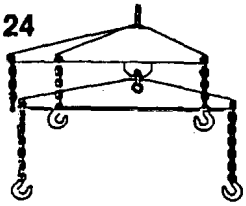
E-3. REPAIR PARTS (CONT).

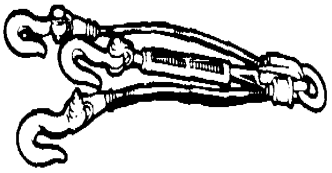
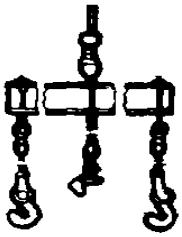
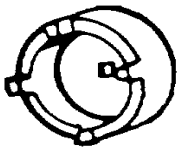
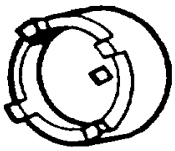
ITEM 4  **HANDLE, REMOVER AND REPLACER**	5340-00-708-3883 (7083883)	Used with seal inserter in lockout cylinder (p 3-7).
ITEM 5  **HANDLE, REPLACER, OIL**	5340-00-316-9182 (7950864) (7950864)	Used with bearing cup replacer to remove power takeoff cover seals (p 3-20).
ITEM 6  **INSERTER, BEARING**	5120-00-733-8979 (10904217)	Used to replace spade cylinder eye bearings (p 2-134).
ITEM 7  **INSERTER, BEARING**	5120-00-057-0302 (10934814)	Used to replace auxiliary drive shaft bearing cones (p 2-90).
ITEM 8  **INSERTER, SEAL**	5120-00-733-8929 (10904174)	Used to replace lockout cylinder head seal (p 2-75).

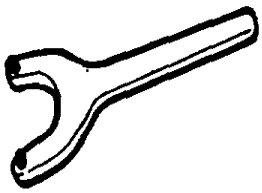
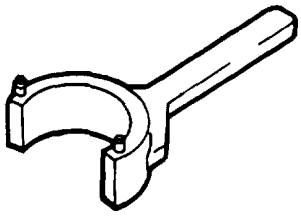
ITEM 9  **PULLER, FINAL DRIVE**	5305-00-084-0796 (10914934)	Used to remove final drive (TM 9-2350-304-20-1).
ITEM 10  **PULLER, SLIDE**	5120-00-557-3615 5120-00-557-3615	Used with two adapters to remove road wheel arm or torsion bar (TM 9-(5573615) 2350-304-20-1).
ITEM 11  **REMOVER, BEARER**	5120-00-722-4063 (10902750)	Used to remove and replace auxiliary drive shaft housing seals and power takeoff idler gear bearings (p 2-90 and 3-25).
ITEM 12  **REMOVER, BEARING**	5120-00-722-4067 (10902751)	Used to replace auxiliary drive gear housing outer bearing cap (p 2-90). Used with oil replacer handle (5340-00-316-9182).
ITEM 13  **REMOVER AND REPLACER**	5120-00-383-3672 (8375175)	Used to remove and replace plain encased seals and bearings in auxiliary drive assembly (p 2-75, 2-83, and 2-90).Used with oil replacer handle (5340-00-316-9182).

E-3. REPAIR PARTS (CONT)

ITEM 14  **REPLACER**	5120-00-860-9579 (10908787)	Used to replace auxiliary drive gear inner bearing cones and transmission power takeoff output gear bearing (p 2-83, 2-90, and 3-20).
ITEM 15  **REPLACER, BEARING**	5120-00-733-8948 (10904179)	Used to replace auxiliary drive clutch housing inner bearing and lockout cylinder bearing (p 2-75).
ITEM 16  **REPLACER, BEARING CUP**	5120-00-722-4071 (10902752)	Used to remove and replace auxiliary drive shaft carrier housing bearing and seals (p 2-105). Used with oil replacer handle (5340-00-316-9182).
ITEM 17  **REPLACER, BEARING CUP**	5120-00-722-4083 (10902751)	Used to replace auxiliary drive shaft carrier bearing cups and outer carrier seal (p 2-90). Used with oil replacer handle (5340-00-316-9182).
ITEM 18  **REPLACER. BEARING CUP**	5120-00-722-4089 (10902757)	Used to replace spade cylinder head seals, and replace power takeoff cover seals and spade cylinder head seal (p 2-134 and 3-20). Used with oil replacement handle (5340-00-316-9182)

ITEM 19  **REPLACER, BEARING CUP**	5120-00-860-9579 (10908787)	Used to replace auxiliary drive gear inner bearing cones and transmission power takeoff output gear bearing (p 2-83, 2-90, and 3-20).
ITEM 20  **REPLACER, CLUTCH BEARING**	5120-00-733-8948 '10904179' 8	Used to replace auxiliary drive clutch housing inner bearing and lockout (10904179) cylinder bearings (p 2-75).
ITEM 21  **REPLACER, GEAR**	5120-00-722-4071 (10902752)	Used to remove and replace auxiliary drive shaft carrier housing bearing and seals (p 2-105). Used with oil replacer handle (5340-00-316-9182).
ITEM 22  **REPLACER ASSEMBLY**	5120-00-722-4083 (10902756)	Used to replace auxiliary drive shaft carrier bearing cups and outer carrier seal (p 2-90). Used with oil replacer handle (5340-00-316-9182).
ITEM 23  **SCREW, JACKING**	5120-00-722-4089 (10902757)	Used to replace spade cylinder head seals, and replace power takeoff cover seals and spade cylinder head seal (p 2-134 and 3-20). Used with oil replacer handle (5340-00-316-9182).
ITEM 24  **SLING, BEAM TYPE**	3940-01-280-0872 (12355173)	Used to lift powerplant (TM 9-2350-304-20-1)

ITEM 25  **SLING, TRANSMISSION**	4910-00-473-7556 (7081593)	Used to lift transmission (p 2-30).
ITEM 26  **SLING, ENGINE**	4910-00-001-3993 (11643469)	Used to lift engine (p 2-30).
ITEM 27  **SOCKET, WRENCH,FACE**	5120-00-860-9576 (10908791)	Used to turn auxiliary drive line carrier ball bearing unit locknut (p 2-113).
ITEM 28  **SOCKET, WRENCH,FACE**	5120-00-860-9575 (10908794)	Used to turn auxiliary drive gear bearing locknut (p 2-83 and 2-90).
ITEM 29  **WRENCH, SPANNER**	5120-01-310-1996 (10518265)	Used to turn vehicular drive retaining nut (p 2-69).

ITEM 30  **WRENCH, SPANNER CYLINDER LOCKNUT**	5120-00-733-8982 (10904219)	Used to hold lockout cylinder locknut (p 3-7).
ITEM 31  **WRENCH, SPANNER**	5120-00-860-9578 (10904737)	Used to turn spade cylinder head locknut (p 2-134).

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By Order of the Secretary of the Army:

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

Official:

MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
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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 (°F -32) = °C
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5 C° +32 = F°

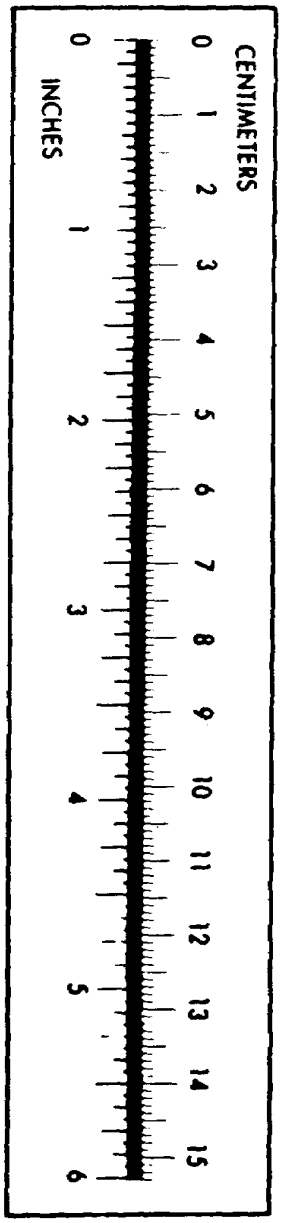
WEIGHTS

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



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