

**UNIT
MAINTENANCE MANUAL**

**RECOVERY VEHICLE,
FULL-TRACKED:
MEDIUM, M88A1**

(NSN 2350-00-122-6826)

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CHANGE
NO. 1

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DEPARTMENT OF THE ARMY
Washington, D.C., 18 AUGUST 1998

**Unit Maintenance Manual
For
RECOVERY VEHICLE,
FULL-TRACKED:
MEDIUM, M88A1
(NSN 2350-00-1 22-6826)**

TM 9-2350-256-20, September 1995, is changed as follows:

1. Remove old pages and insert new pages as indicated below.
2. New or changed material is indicated by a vertical bar in the margin of the page.
3. Added or revised illustrations are indicated by a vertical bar adjacent to the illustration identification number.

<i>REMOVE PAGES</i>	<i>INSERT PAGES</i>	<i>REMOVE PAGES</i>	<i>INSERT PAGES</i>
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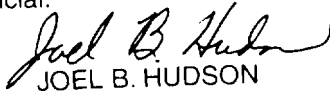
4. File this change sheet in front of the publication for reference purposes.

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By Order of the Secretary of the Army:

DENNIS J. REIMER
General, United States Army
Chief of Staff

Official:


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Administrative Assistant to the
Secretary of the Army
04951

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CARBON MONOXIDE**WARNING**

Carbon Monoxide (exhaust gas) can kill

CARBON MONOXIDE GAS. Carbon monoxide is a colorless, odorless, deadly poisonous gas. Breathing air with carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, and drowsiness. Brain damage or death can result from severe exposure.

EXHAUST FUMES. The exhaust fumes of fuel-burning heaters and internal combustion engines produce carbon monoxide gas. Carbon monoxide can become dangerously concentrated without adequate ventilation.

PRECAUTIONS. To ensure crew safety when the personnel heater or main or auxiliary engine of any vehicle is operated for any purpose:

- Do not operate personnel heater or engine of vehicle in a closed area unless it is adequately ventilated.
- Do not idle engine for long periods without ventilation blower operation. If tactical situation permits, open hatches.
- Do not drive any vehicle with inspection plates, cover plates, or engine compartment doors removed unless necessary for maintenance purposes.

BE ALERT. During vehicle operation be aware of exhaust odors and exposure symptoms. If either is present, immediately ventilate personnel compartments. If symptoms persist, remove affected personnel and:

- Expose to fresh air
- Keep warm
- Do not permit physical exercise
- Give artificial respiration (if necessary)
- Get immediate medical attention

BE AWARE. Neither the gas/particulate filter unit nor the field protection mask for Nuclear, Biological, and Chemical (NBC) protection will protect you from carbon monoxide poisoning.

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS GOOD VENTILATION.

NBC EXPOSURE AND VEHICLE AIR FILTERS**WARNING**

EXPOSURE. Vehicles exposed to NBC must have all air filters replaced with extreme caution by experienced and trained personnel. Unprotected personnel may experience injury or death if residual toxic agents or radioactive materials are present.

PRECAUTIONS. Servicing personnel must wear:

- Protective mask
- Hood
- Protective overgarments
- Chemical-protective gloves and boots

NBC EXPOSURE AND VEHICLE AIR FILTERS-Continued

DISPOSAL. Damaged or unusable filters are considered hazardous waste. Do not dispose of them like common trash.

- Filters must be placed into double-lined plastic bags.
- Filters must be moved to a temporary segregation area away from the work site.
- Final disposal of contaminated air filters must be in accordance with local Standard Operating Procedures (SOP).
-

NUCLEAR EXPOSURE. The same procedure applies for radioactive dust contamination; however, the company NBC team should measure the radiation prior to filter removal to determine the extent of safety procedures required per the NBC Annex to the unit SOP. The segregation area in which the contaminated air filters are temporarily stored must be marked with appropriate NBC placards.

HIGH VOLTAGE**WARNING**

PRECAUTIONS. High voltage is used in the operation of some equipment. Serious injury or death may result if personnel fail to observe safety precautions.

- Learn the areas containing high voltage in each piece of equipment.
- Do not contact high voltage connections when installing or operating this equipment.
- Before working on electrical equipment turn MASTER switch to the OFF position.
- Disconnect battery cables.
- Keep one hand away from the equipment to reduce the chances of current flowing through your body.

FUEL HANDLING**WARNING**

PRECAUTIONS. Fuel is very flammable and can explode easily. To avoid serious injury or death:

- Keep fuel away from open fire
- Keep fire extinguisher within easy reach
- Do not work on fuel system when engine is hot (fuel can be ignited by a hot engine)
- Post signs that read "NO SMOKING WITHIN 50 FEET OF VEHICLE"

FUEL AND OIL SPILLS**WARNING**

Fuel and oil are slippery and can cause falls. To avoid injury, wipe up spilled fuel or oil with rags.

ADHESIVES, SOLVENTS, AND SEALING COMPOUNDS**WARNING**

PRECAUTIONS. Adhesives, solvents, and sealing compounds can burn easily, give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on your skin or clothing, wash immediately with soap and water.

ENGINE DECK AND POWER PLANT REMOVAL**WARNING**

REMOVAL. Do not use a 5-ton wrecker to remove engine deck and powerplant. Use only an M578 Light Recovery Vehicle or another M88A1 Medium Recovery Vehicle to remove the engine deck and powerplant.

WEIGHTS. The engine deck weighs approximately 1700 lb (771kg), and the powerplant weighs approximately 12,000 lb (5443kg). Use a lifting device with a capacity of at least 15,000 lb (6804kg) to remove engine deck and powerplant.

WARNING

Do not stand on engine deck while operating the boom.

PAINT HAZARD**WARNING**

REACTIONS. Chemical Agent Resistant Coating (CARC) paint contains isocyanate, a constituent that can cause the following allergic reactions during and after the application of the material:

- Coughing
- Shortness of breath
- Pain on respiration
- Increased sputum
- Chest tightness
- Itching and reddening of the skin
- A burning sensation of the throat and nose
- Watering of the eyes

PRECAUTIONS. An allergic reaction may occur after initial exposure (ranging from a few days to a few months later) producing asthmatic symptoms including coughing, wheezing, tightness in the chest, or shortness of breath. The following precautions must be observed to ensure the safety of personnel when CARC paint is applied:

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

PAINT HAZARD-Continued

- Spot painters applying CARC paint by brush or roller must wear clothing and gloves affording full coverage. Personnel using touchup spray kits should wear an air line respirator and protective clothing.
- Do not use water, alcohol, or amine-based solvents to thin or remove CARC paint. Use of these solvents with CARC paint can produce chemical reactions resulting in nausea, disease, burns, or severe illness.
- 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, cut, or apply any form of heat to CARC-coated metal until the paint has been removed from a 4-in. (102-mm) area surrounding the rework site. Substances may be released that cause skin or respiratory irritation if this is not done. Sand or grind the paint down to the base metal in the surrounding area and also remove any paint from the other side of the metal.
- When sanding any paint, use the wet sanding method. Older paints may contain lead, chromates, or other toxic material. Using wet or dry sandpaper, wet down the area before starting. Keep the sandpaper wet as you sand to keep down paint dust.

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REPORTING OF 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 and Armaments Command, ATTN: AMSTA-IM-OPIT, Warren, MI 48397-5000. A reply will be furnished to you. You may also provide DA Form 2028-2 information to TACOM via datafax or e-mail. TACOM's datafax number for AMSTA-IM-MMAA is (810) 574- 6323 and the e-mail address is: tacom-tech-pubs@cc.army.mil

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THIS MANUAL SUPERSEDES TM9-2350-256-20 DATED 1 MAY 1986 AND ALL CHANGES.

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HOW TO USE THIS MANUAL

GENERAL

This manual contains unit maintenance instructions for the M88A1 Medium Full-Track Recovery Vehicle.

The front matter in this manual consists of a cover index, general warnings, and table of contents.

This manual is divided into 17 chapters and 9 appendixes. Each chapter and appendix starts on a right-hand page with the page number of 1. Pages are numbered after the chapter number or appendix letter. For example, I-14 means Chapter 1, page 14, and .A-2 means Appendix A, page 2.

At the end of this manual are an alphabetical index, schematic, DA Form 20287 and metric conversion chart

a. FRONT MATTER

The front cover has an index for the major divisions in this manual. The first page of the associated major division has a black edge that lines up with the applicable cover boxed-in area.

There are general warnings that start on the first right-hand page immediately after the cover that should be read before performing any maintenance on the M88A1.

The table of contents has the page where each chapter, appendix, and section starts

b. CHAPTERS

- Chapter 1 provides general information, equipment description, and principles of operation of the M88A1
- Chapter 2 covers troubleshooting the vehicle.
- Chapter 3 provides unit maintenance instructions for the powerplant.
- Chapter 4 provides unit maintenance instructions for the fuel, air intake, and exhaust systems.
- Chapter 5 provides unit maintenance instructions for the engine cooling system.
- Chapter 6 provides unit maintenance instructions for the electrical systems and circuits.
- Chapter 7 provides unit maintenance instructions for the transmission and output reduction drives.
- Chapter 8 provides unit maintenance instructions for the suspension system.
- Chapter 9 provides unit maintenance instructions for the hull- and cab-related components.
- Chapter 10 provides unit maintenance instructions for the personnel heater and connection components, and fixed fire extinguisher system.
- Chapter 11 provides unit maintenance instructions for main winch, hoist winch, and related components.
- Chapter 12 provides unit maintenance instructions for the main hydraulic system.
- Chapter 13 provides unit maintenance instructions for the APU.
- Chapter 14 provides unit maintenance instructions for the M8AA13 gas/particulate filter unit.
- Chapter 15 provides unit maintenance instructions for the M239 smoke grenade launcher system.
- Chapter 16 provides unit maintenance instructions for the exhaust smoke generating system.
- Chapter 17 covers preparation for storage and shipment.

c. APPENDIXES

- Appendix A provides titles of documents and publications referenced in this manual
- Appendix B provides the MAC and special tools list.
- APPENDIX C provides a tool ID list.
- Appendix D provides an expendable and durable items list.
- Appendix E provides an illustrated list of the manufactured item.
- Appendix F provides torque limits.

- Appendix G provides a list of the mandatory replacement parts necessary to perform the unit maintenance procedures.
- Appendix H provides unit maintenance instructions for the USAREUR safety lighting modification kit.
- Appendix I provides unit maintenance instructions for the deep water fording kit.
- Appendix J provides unit maintenance lubrication instructions.

d. ALPHABETICAL INDEX

The alphabetical index is located after the last appendix and provides an alphabetical listing of information contained in this manual.

e. SCHEMATIC

There are three schematics in the form of foldouts located at the end of this manual. One schematic for the hydraulic system and two for the electrical system (one schematic for the dual voltage system and one schematic for the single voltage system).

f. DA FORM 2028-2

DA Form 2028-3 is used to report errors and to recommend improvements for the tasks in this manual.

g. METRIC CONVERSION CHART

The metric conversion chart converts English measurements to metric equivalents. Measurements in this manual are provided in both English and metric units.

WARNINGS, CAUTIONS, AND NOTES

Warnings, cautions, and notes are provided throughout this manual: A warning is provided where injury may occur to personnel on or near the vehicle. A caution is provided where equipment may be damaged, but no injuries to personnel should result. A note provides information, but no personnel injury or equipment damage should result.

INITIAL SET-UPS

Before starting a task, you must obtain all the tools, supplies, and personnel listed in the initial set-up. Be sure to read the task before performing the maintenance. If any other tasks are referenced, you must go to the initial set-up page for each of those tasks to find out what tools, supplies, and personnel will be needed.

REFERENCING

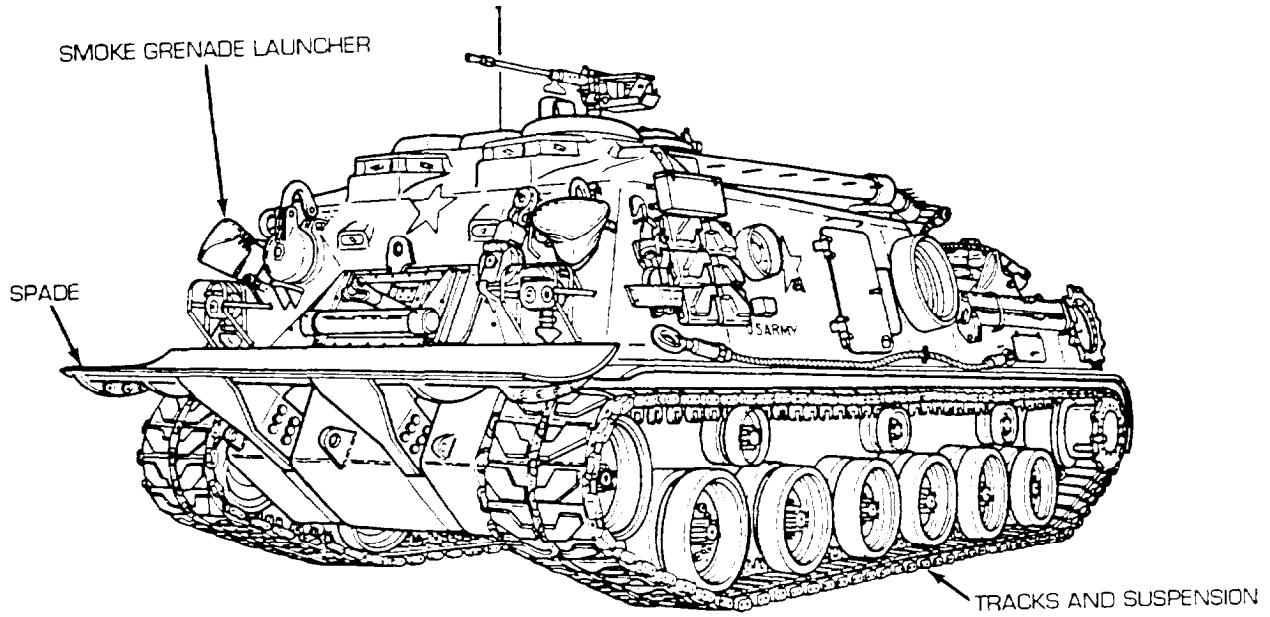
In this manual, internal referencing is done by chapter, appendix, paragraph, section, or task. For example, (see paragraph 8-15) refers you to Chapter 6, paragraph 15.

Referencing outside this manual is done by the military document or publication number. For example, (refer to TM 9-256-311-10) refers you to that manual.

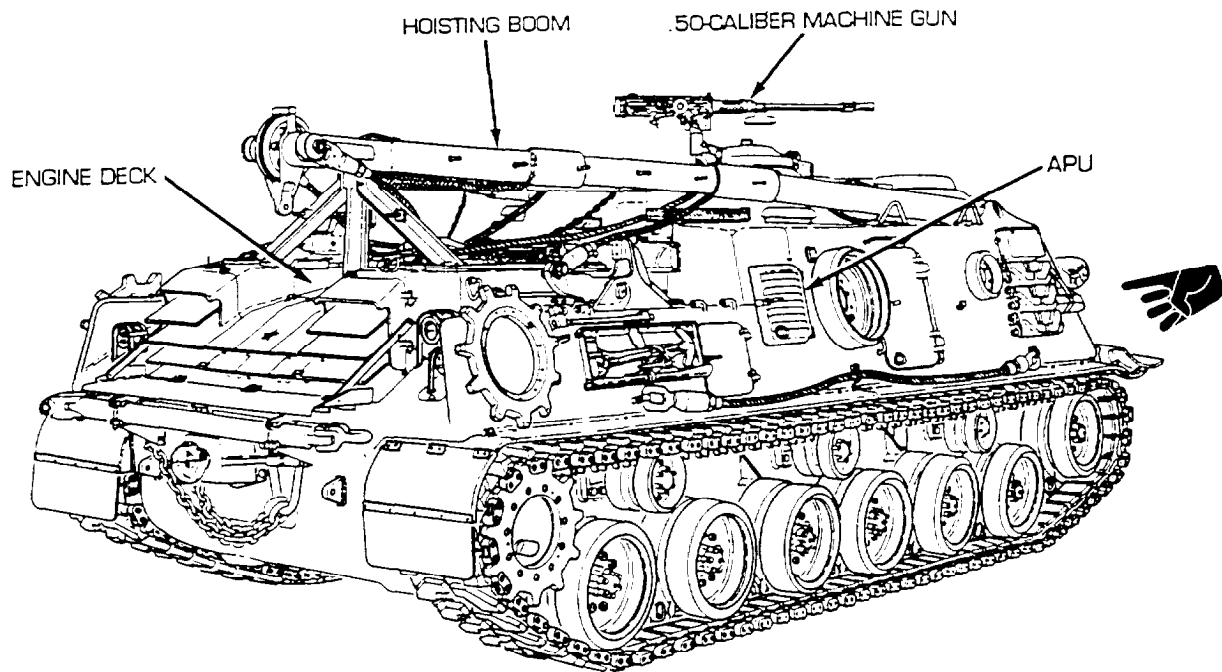
LOCATING INFORMATION

This manual provides six ways by which you can locate information quickly:

- The cover index lists most frequently used major division by name and starting page number.
- The table of contents.
- The chapter and appendix indexes list the paragraphs (if only one section in that chapter) or sections (if more than one section in that chapter) that are in those chapters/appendices.
- The section indexes list the paragraphs that are in those sections.
- The malfunction index (Chapter 3) provides a quick guide to troubleshooting malfunctions.
- The alphabetical index provides an alphabetical listing of information contained in this manual.



LEFT-FRONT VIEW



RIGHT-REAR VIEW

CHAPTER 1

INTRODUCTION

CHAPTER OVERVIEW

The purpose of this chapter is to familiarize the technician with the M88A1 hull, powerplant, tracks, suspension, drive controls, and other related components. The familiarization is provided through a physical description of major components that the technician is required to inspect, service, replace, or repair at unit level.

This chapter consists of the following sections

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SECTION I: GENERAL INFORMATION

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1-1 SCOPE

This Unit Maintenance manual is for your use in maintaining the M88A1, Full-Track, Medium, Recovery Vehicle. The M88A1 is designed for towing, hoisting, and winching; its purpose is to provide for battlefield recovery of medium and light combat vehicles.

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

For information and conditions under which destruction of the M88A1 should be undertaken to prevent enemy use and for other methods of destruction, refer to TM 9-2350-256-10 and TM 750-244-6.

1-4 PREPARATION FOR STORAGE OR SHIPMENT

The requirements for storage and shipment are covered in Chapter 17.

1-5 OFFICIAL NOMENCLATURE, NAMES, AND DESIGNATIONS

Throughout this manual, parts and component assemblies are referred to by their official nomenclature. In the following list, parts and component assemblies are identified by their official nomenclature followed by their common names.

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

<u>OFFICIAL NOMENCLATURE</u>	<u>COMMON NAME</u>
Hexagonal nut	Jamnut
Incandescent lamp	Bulb
Liquid level gage rod	Dipstick
Nonelectrical wire	Lockwire
Parking brake handle	Hand brake
Pipe plug	Drain plug
Quick-coupling half	Quick disconnect
Self-locking nut	Locknut
Self-locking washer	Lockwasher
Socket head screw key	Hex key
Spacer	Shim

1-6 REPORTING EIRs

If your M88A1 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 Form 368, Product Quality Deficiency Report. Mail it to Commander, U.S. Army Tank-automotive and Armaments Command, Attn: AMSTA-QRT, Warren, MI 48397-5000. We will send you a reply.

1-7 CPC

CPC of Army materiel is a continuing concern. It is important that any corrosion problem with this item be reported so that the problem can be corrected and improvements can be made to prevent the problem in future items.

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

If a corrosion problem is identified, it can be reported using SF Form 368, Product Quality Deficiency Report. Use of key words such as "corrosion," "rust," "deterioration," or "cracking" will ensure that the information is identified as a CPC problem. The form should be submitted to Commander, U.S. Army Tank-automotive and Armaments Command, Attn: AMSTA-QRT, Warren, MI 48397-5000.

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1-10	Differences Between Models	1-12
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1-8 EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

The M88A1 is an armored vehicle used to perform battlefield recovery of medium and light combat vehicles. The vehicle is powered by a Continental, V-type, air-cooled, 12-cylinder, fuel-injected, turbosupercharged, diesel engine, model AVDS-1790-2DR, through an Allison cross-drive transmission, model XT-1410-4. The vehicle is designed for towing, hoisting, and winching. An armored, turret-type cupola with a caliber .50 machine gun is mounted on top of the vehicle cab. The vehicle is equipped with a hydraulically powered and controlled spade, hoisting boom, main winch, and hoist winch.

Racks, boxes, brackets, hangers, and straps are installed and conveniently located in and on the hull and cab. They provide stowage and supply facilities for various vehicular equipment such as water cans, tools, parts, wheels, sprockets, tarpaulins, track-connecting tools, and tow cables.

1-9 LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

The components of the M88A1 that are essential to the operation and maintenance of the vehicle are shown in Figures 1-1 through 1-4

a. EXTERNAL COMPONENTS

- | | |
|--|--|
| <ol style="list-style-type: none"> 1 Hoisting boom—a pivot-mounted, tubular A-frame which is raised or lowered by two hydraulically operated cylinders and supported by a stayline cable 2 Stowage doors—provide right- and left-side access 3 Auxiliary Power Unit (APU) door—provides exterior access to AUP 4 Rigger's door—provides access from cab top; vision prisms located below door on hull rear 5 Personnel doors—provide right- and left-side access to cab 6 Commander's vision cupola—provides access and vision from cab top 7 Caliber 50 machine gun—an automatic, recoil-operated, linkbelt-fed, air-cooled, heavy-barrel type for Commander's use | <ol style="list-style-type: none"> 8 Mechanic's door—provides access from right side of cab top; vision prisms located below door 9 Driver's door—provides access from left side of cab top; vision prisms located below door 10 M239 smoke grenade launcher—includes two smoke grenade discharges, covers, and push button firing switch box 11 Spade-mounted to vehicle nosepiece by two trunnion-mounted arms; hydraulically activated 12 Tracks and suspension—includes transverse torsion-bar type suspension which, by means of individually suspended roadwheels that are supported by support arms splined to torsion bars, gives optimum riding characteristics over all types of terrain 13 Engine deck—rear top cover for engine/transmission |
|--|--|

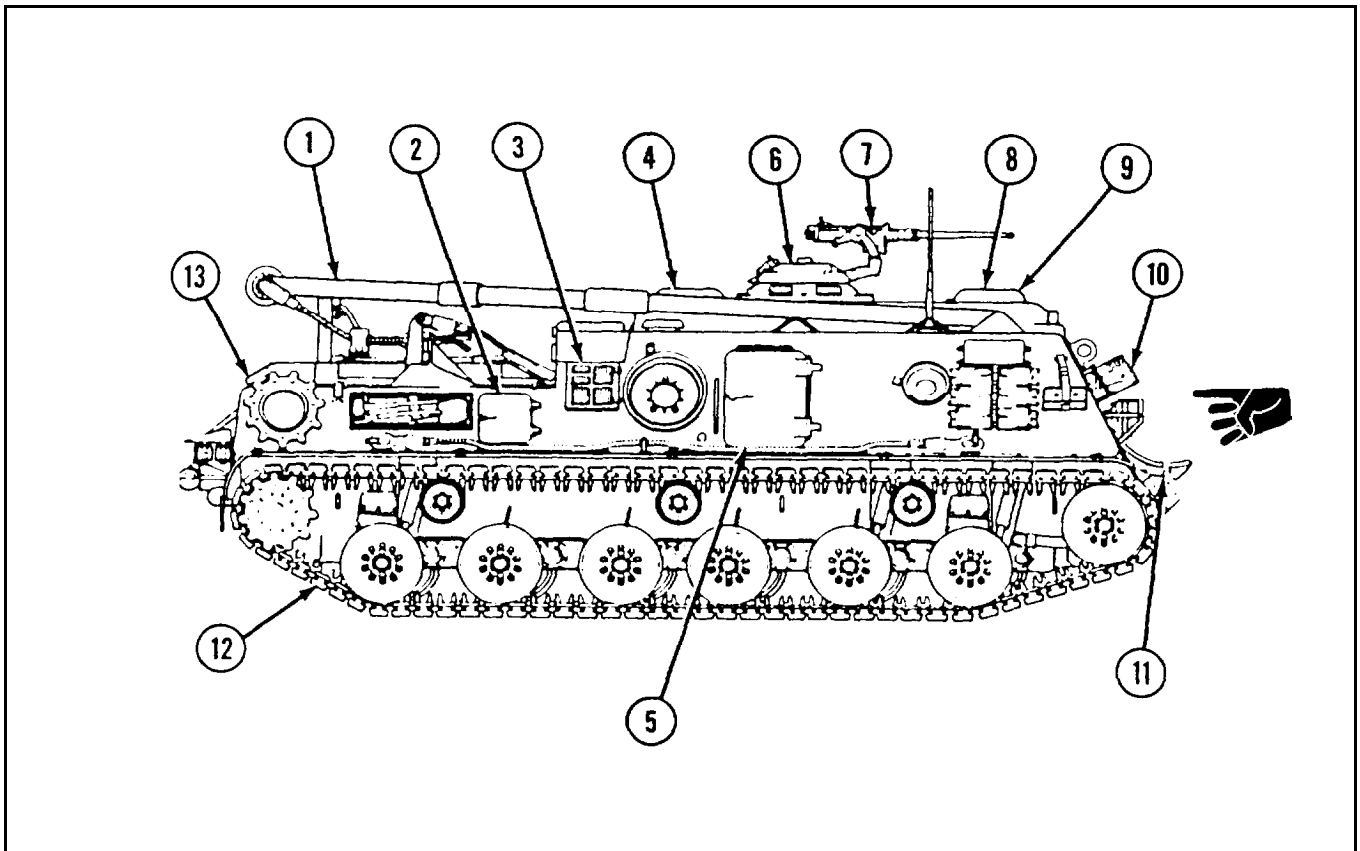


Figure 1-1. External Components.

1-9 LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-Continued

b. INTERNAL COMPONENTS

- | | |
|---|---|
| <p>1 Hydraulic control panel--contains controls for hoisting boom, spade, main winch, hoist winch, hydraulic power, and auxiliary and main hydraulic systems</p> <p>2 Driver's and mechanic' s seats</p> <p>3 Commander' s seat</p> <p>4 Rigger' s seat</p> <p>5 Personnel heater-electrically controlled, multifuel, combustion heater for heating cab interior</p> <p>6 APU-provides power to charge batteries and operate hydraulic system when main hydraulic system pump does not operate</p> <p>7 Engine-provides power to vehicle</p> <p>8 Cross-drive transmission-transmits power directly from engine to track drive components</p> | <p>9 Fuel tank installationion-consists of three fuel tanks. one under crew subfloor and one on, each side of engine,which supply fuel to engine, APU, and refuel system</p> <p>10 Mechanical transmission and hydraulic pump assembly-transmission is driven by engine through a power takeoff (PTO) coupling; transmission drives main hydraulic system pump</p> <p>11 Hoist winch-capable of holding a maximum load of 50,000 pounds (lb) (22,680 kilogram [kg]) with a 4-part line; used with hoisting boom</p> <p>12 Fixed fire extinguisher system-used for smothering fires in engine and winch compartments</p> <p>13 Main winch-used for heavy-duty recovery operations; wound with 200 feet (ft) (61.0 meters [m]) of 1-1/ 4-inch(in.) (31.8-millimeter [mm]) steel cable</p> |
|---|---|

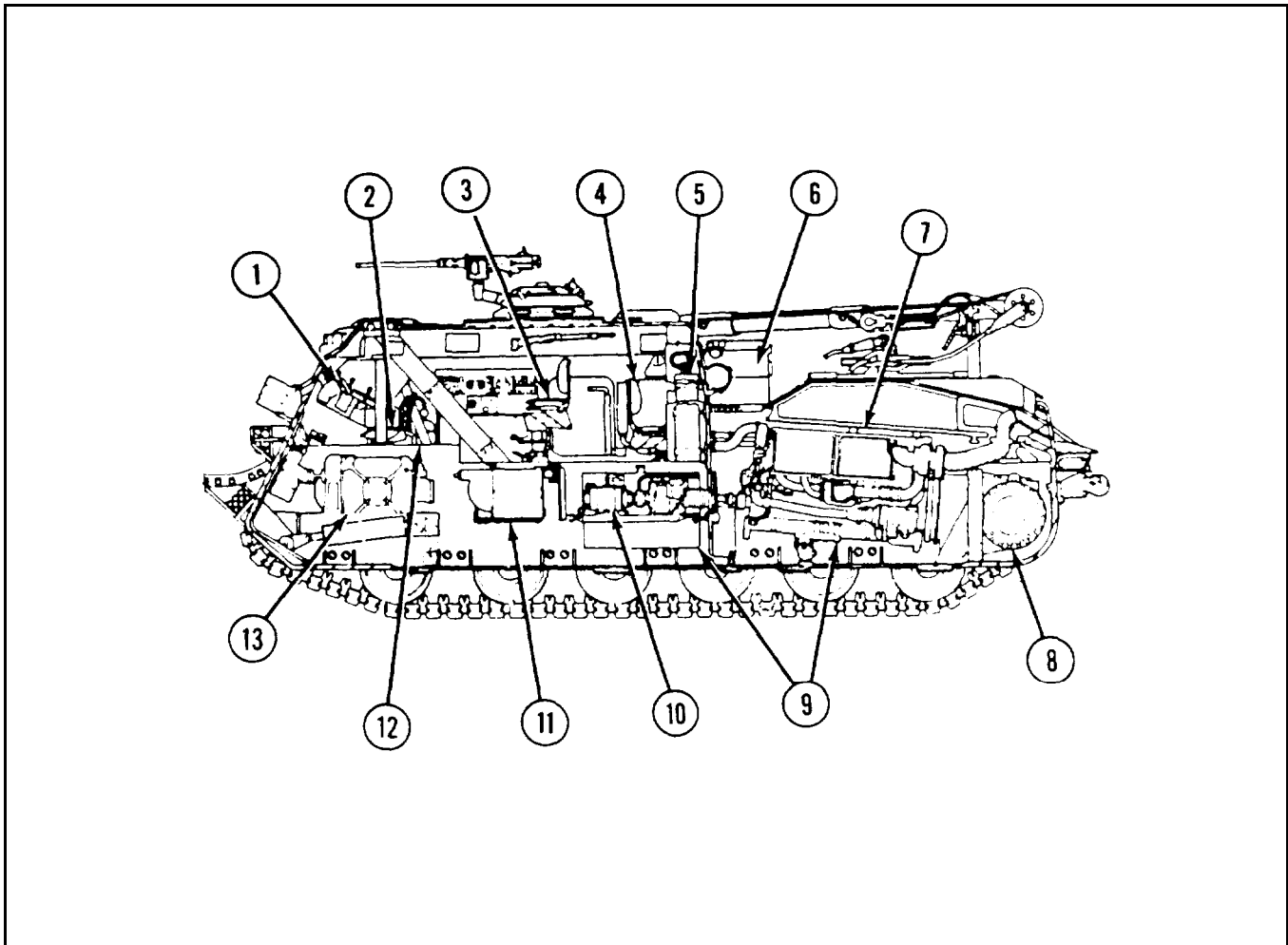


Figure 1-2. Internal Components.

c. IDENTIFICATION (ID) PLATES

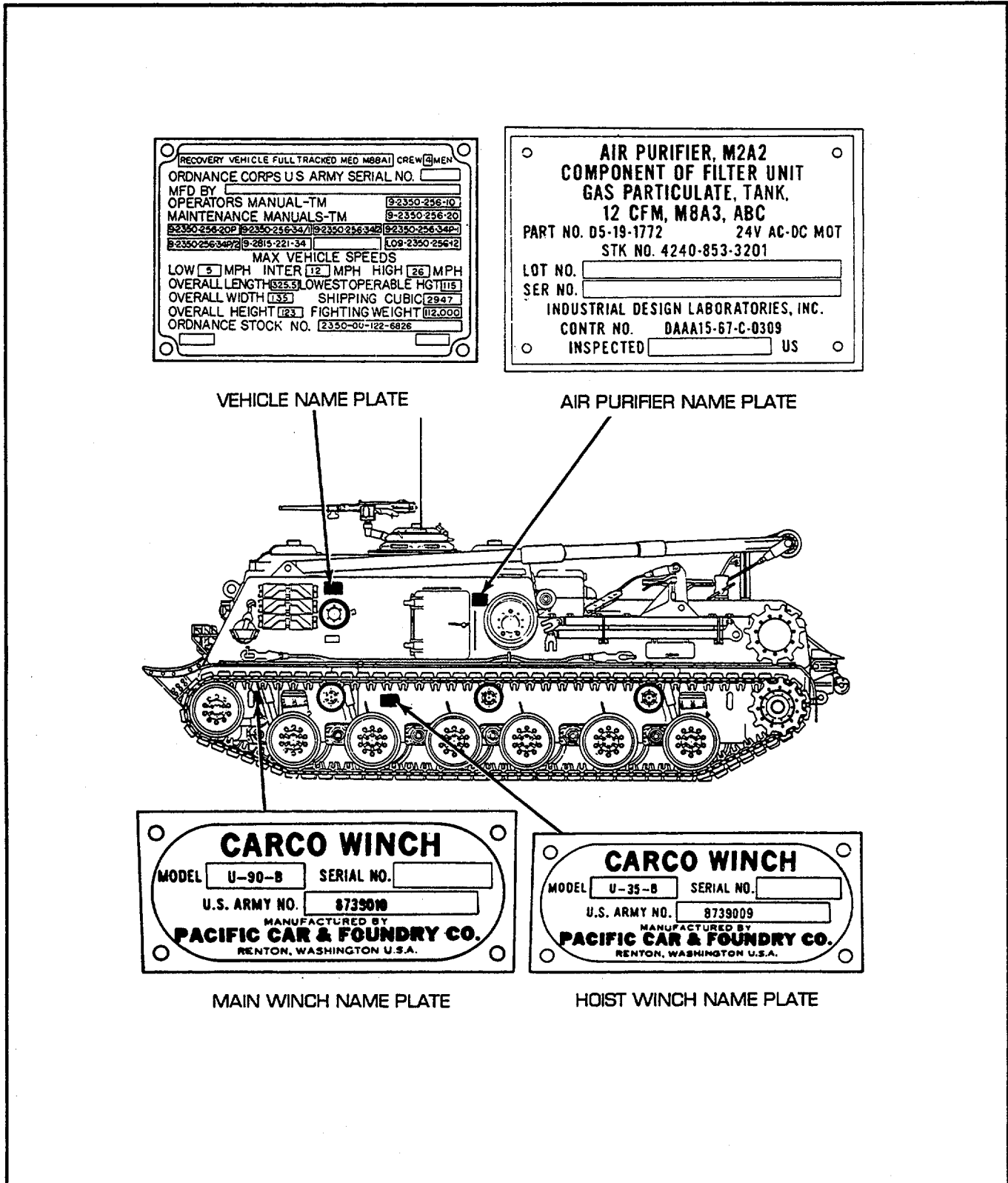


Figure 1-3. ID Plates (1 of 2).

1-9 LOCATION AND DESCRIPTION OF MAJOR COMPONENT' Continued

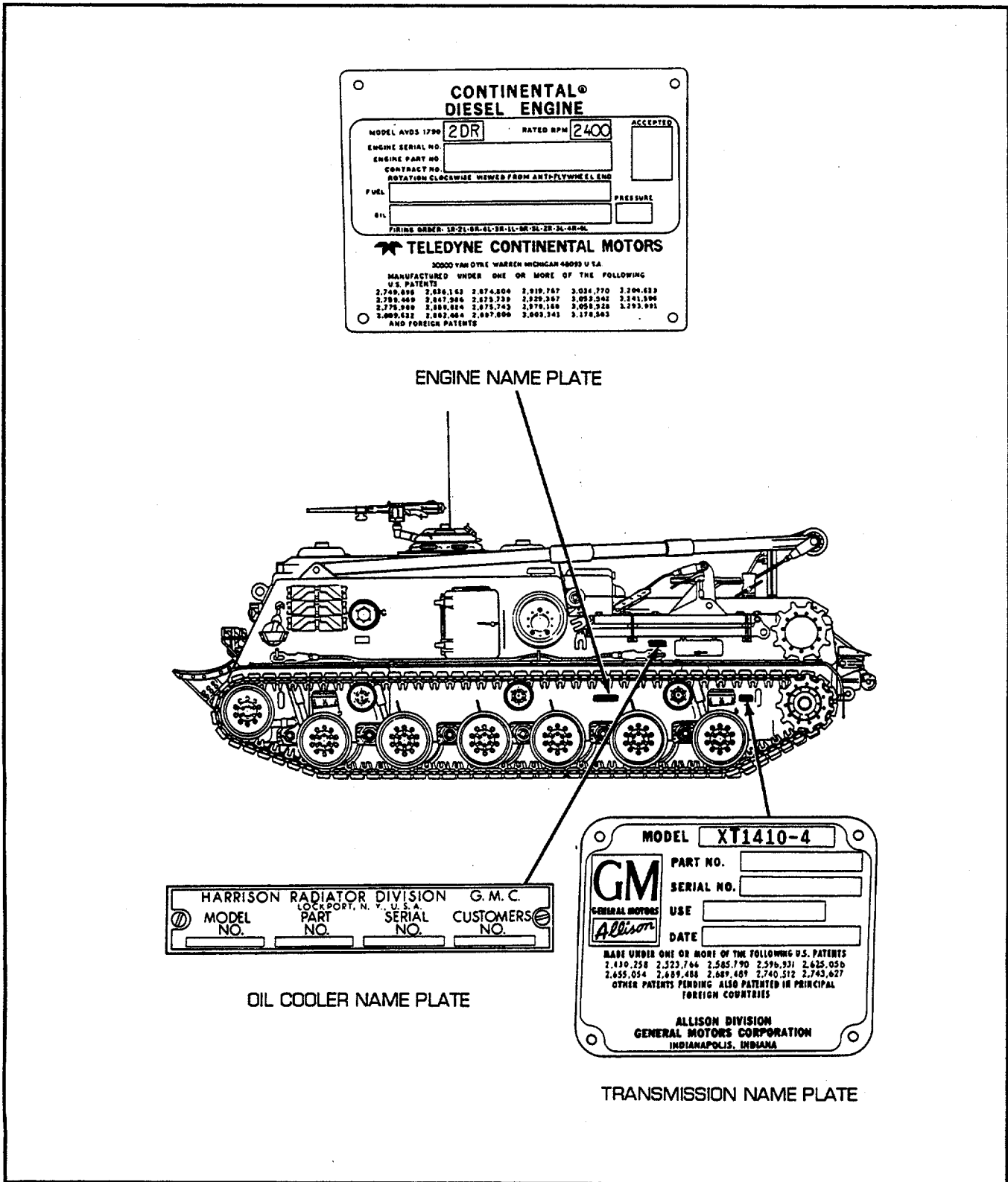


Figure 1-3. ID Plates (2 of 2)

d. PAINTING AND RESTENCILING MARKINGS

Stenciled markings must be renewed periodically because of weathering or repainting. To restencil markings, paint lusterless black on forest green background. U.S. Army and vehicular registration markings are approximately 3 in. (76 mm) high in block, Gothic, capital letters. Locational marking letters (such as: Tow Bar, Tie Down, etc.) are 1/2 in. (13 mm) high (within 1.16 in. [29.5 mm]), 3/32 in. (2.4 mm) wide (within 1/32 in. [0.8 mm]), and spaced 1/4 in. (6.4 mm) between lines. Refer to the locator view (Figure 1-4) for required stenciled markings and location of lettering positions.

Instructions for the preparation of the materiel for painting, methods of painting, and materials to be used are contained in TM 43-0139 and AR 746-1. Instructions for camouflage painting are contained in FM 5-20. See Chapter 2 for instructions on painting fender walkways.

1-9 LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-Continued

f. STENCILED MARKINGS

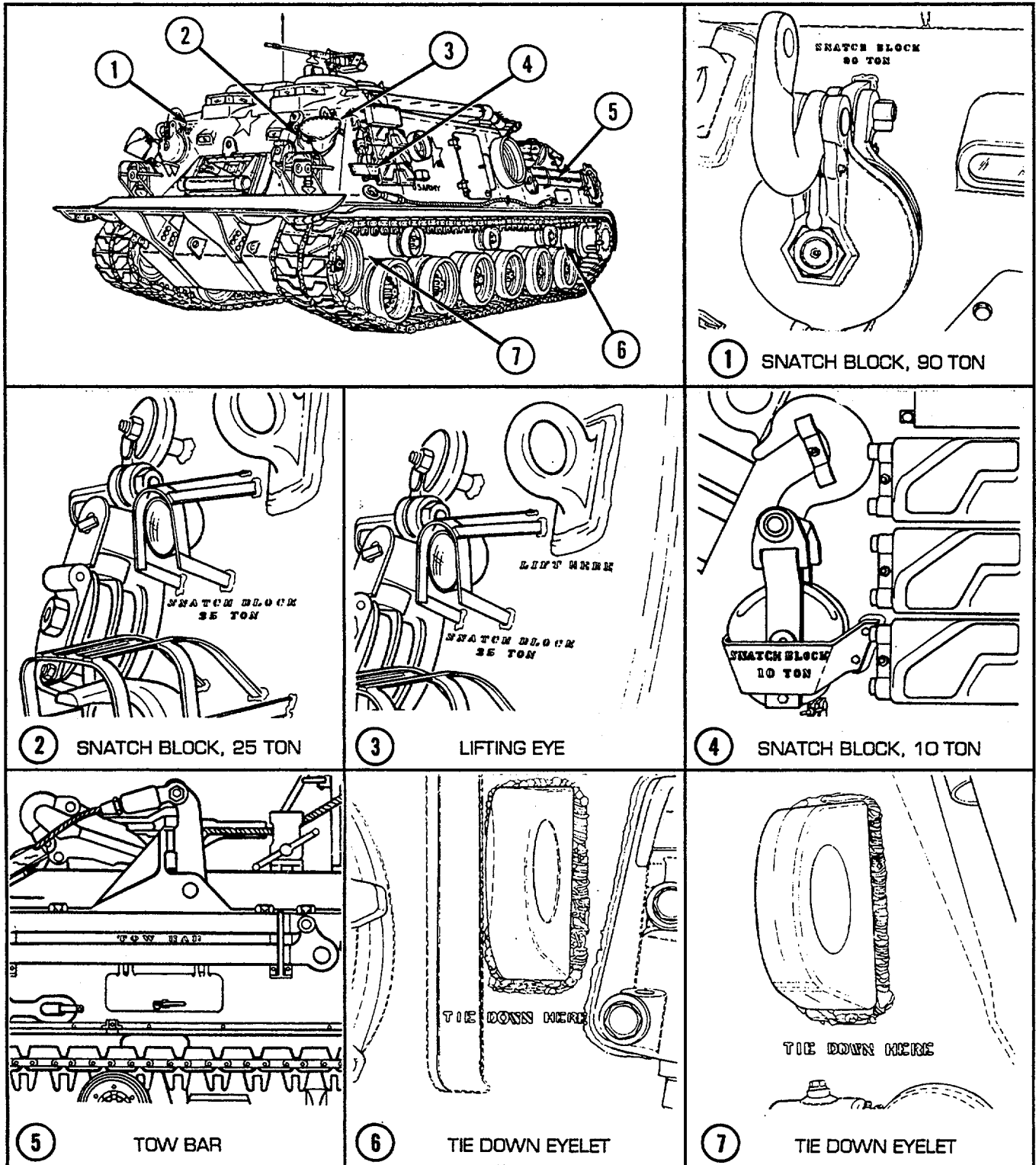


Figure 1-4. Stenciled Markings (1 of 4).

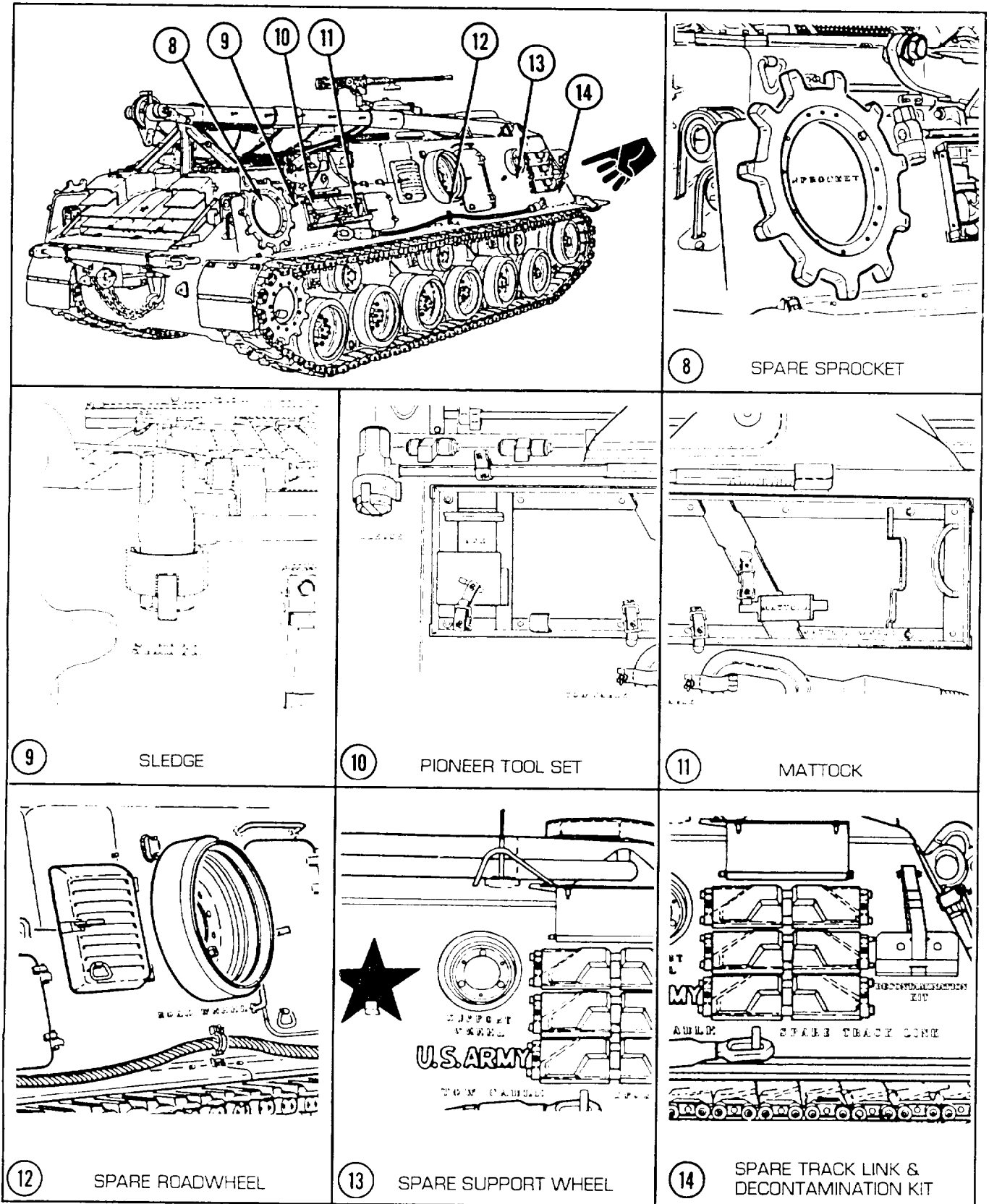


Figure 1-4. Stenciled Markings (2 of 4).

1-9 LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-Continued

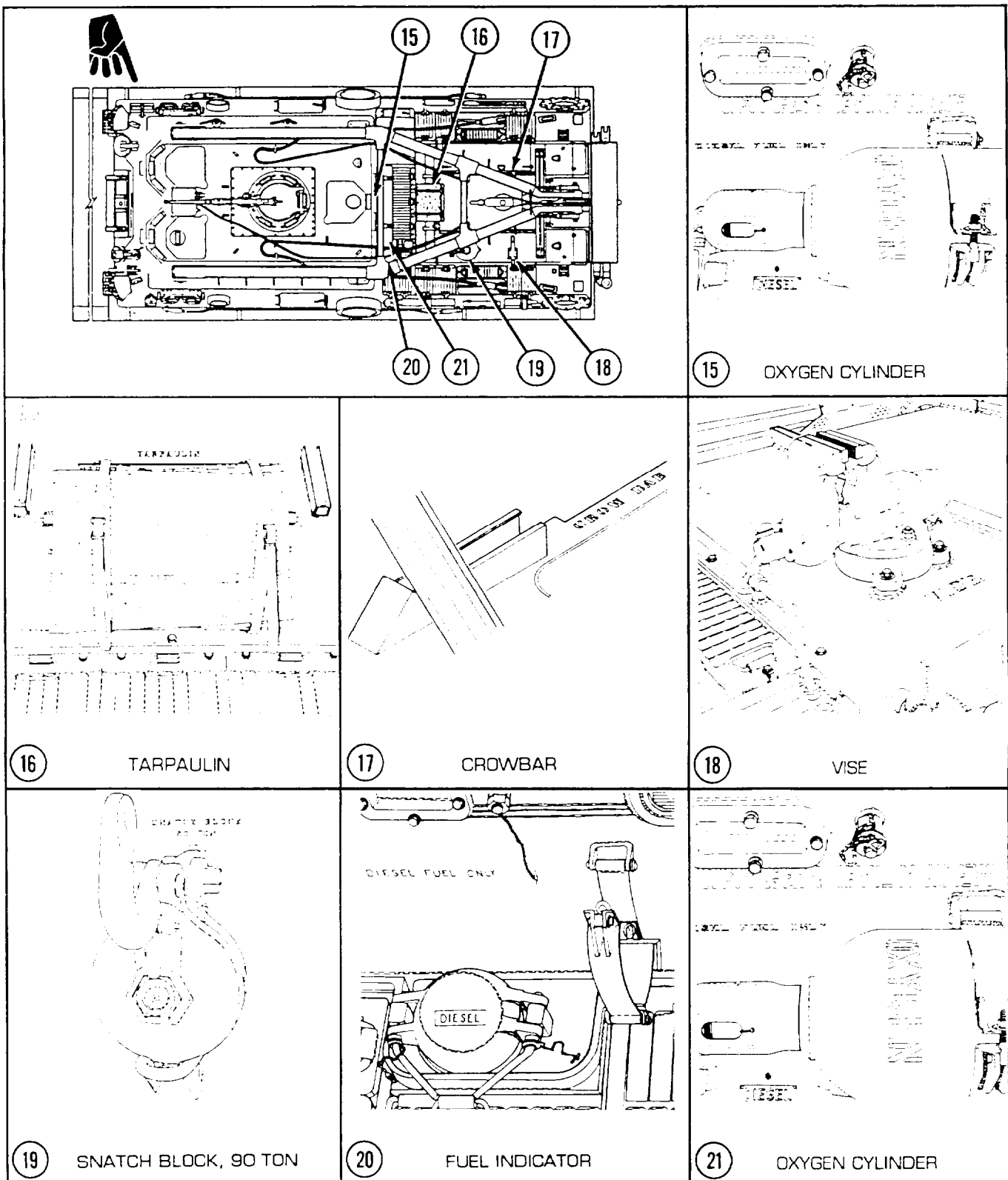


Figure 1-4. Stenciled Markings (3 of 4).

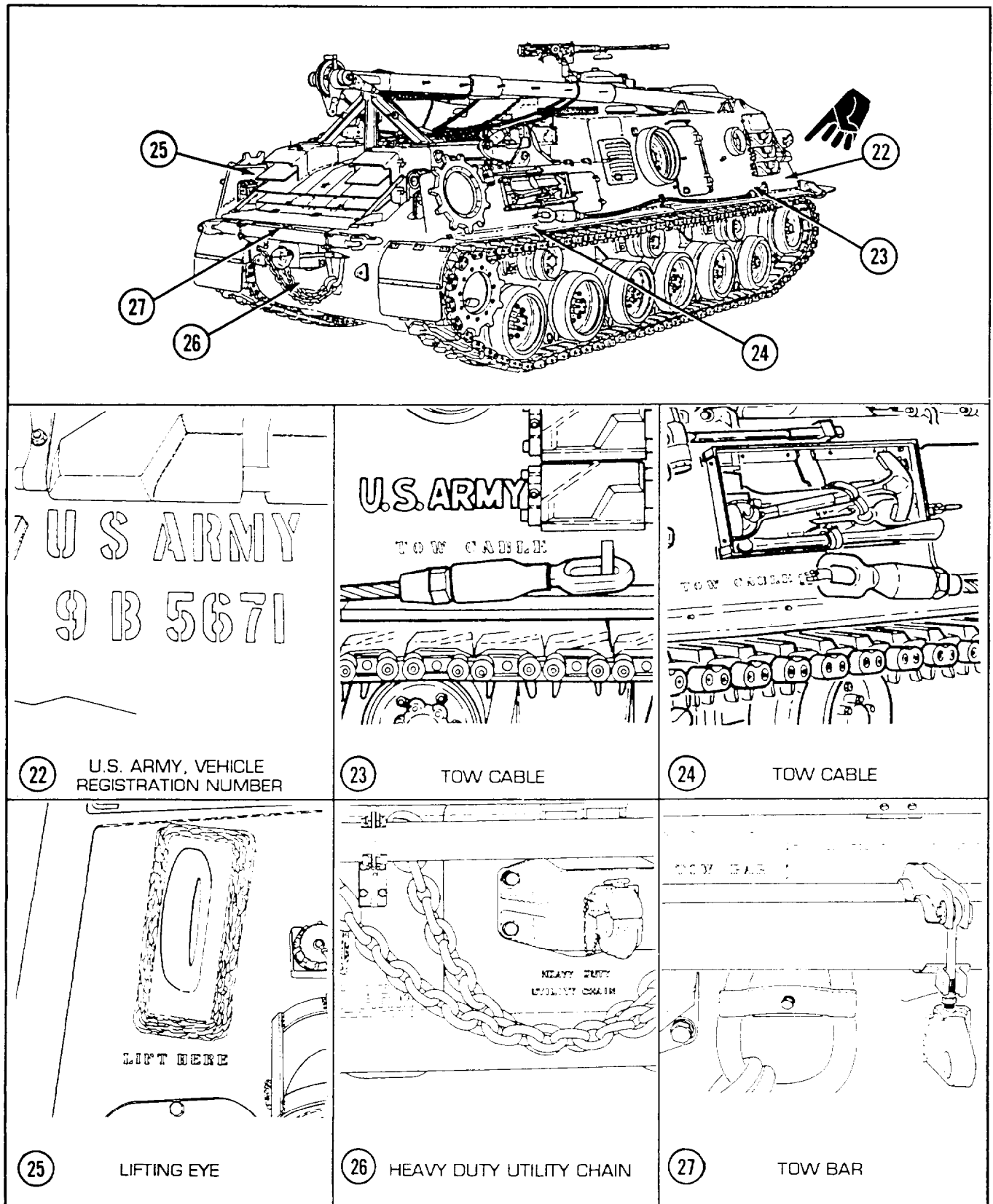


Figure 1-4. Stenciled Markings (4 of 4).

1-10 DIFFERENCES BETWEEN MODELS

There are several optional configurations for the M88A1. The major differences between models are as follows:

a. ENGINE DECK

Earlier versions of the M88A1 have the original engine deck with integral hinges that connect the engine deck and the right-side door. Later models have the new, optional engine deck with hinges that are connected by screws to the deck and then welded.

b. VOLTAGE REGULATOR

Earlier versions of the M88A1 have a single voltage regulator. Later versions of the vehicle have dual voltage regulators. See foldouts 3, 5, 7, and 9 for configuration differences.

c. SPADE RELEASE

Earlier versions of the M88 have a mechanically operated spade which is released through the use of cables and linkages. Later versions have a hydraulically operated spade.

d. PASSIVE NIGHT VIEWER DEVICE

Earlier versions use an infrared (IR) light device that allows for night viewing, while current vehicles use the passive night viewer device.

1-11 EQUIPMENT DATA

Tracks and Suspension	
Shoes in each track section	84.....
Track support rollers (pairs)	3
Roadwheel and arm assemblies (pairs)	6
Suspension	Torsion-bar type
Fuel Capacities	
All tanks (total)	400.gallons (gal) (1514 liters [L])
Forward tank	252.gal (954 L)
Left rear tank	74.gal.(280 L)
Right rear tank	74.gal.(280 L)
Performance	
Fuel consumption	0.7 mile per gallon (0.30 kilometer per liter)
Engine oil consumption (maximum [max] allowable)	0.2 gal in 1 hour (hr) (0.8 L in 1 hr)
Engine	
Make and type.....	Continental, 12-cylinder, air-cooled, 90-degree, V-type, compression-ignition
Model	AVDS-1790-2DR
Dimensions:	
Length (transmission adapter to fuel pump drive housing)	72.50 in. (1841.5 mm)
Width (including turbosuperchargers)	70.25 in. (1784.4 mm)
Height	45.30 in. (1150.6 mm)
Displacement	1790 cubic inches (29,333 cubic centimeters)
Weight, dry, (with accessories)	5050 lb (2290.7 kg)

Speed, governed:

Full load..... 2400 to 2450 revolutions per minute (rpm) max, at rated load
 No load 2640 rpm max
 Idle 675 to 725 rpm
 Winching 1800 ± 25 rpm

Horsepower (hp):

Gross 750 brake horsepower (bhp) at 2400 rpm
 Net 642 bhp at 2400 rpm

Cooling system Engine-driven fans for cylinders, transmission, and engine coolers

Induction system..... Supercharged by two exhaust-driven turbosuperchargers

Oil temperature:

Normal..... 140 to 240°F (60 to 116°C)
 Max (out of cooler)..... 250°F (121°C)

Fuel:

Type Diesel
 Grade..... DF-2
 Specification W-F-800
 Rating 40 cetane minimum (min)
 Consumption.. 29.8 gallons per hour (113 liters per hour) at 2400 rpm and 750 hp

Torque:

Gross 1720 pound-feet (lb-ft) (2332.0 newton-meters [N•m]) at 1800 rpm
 Net..... 1585 lb-ft (2148.9 N•m) at 1800 rpm

Firing order..... 1R, 2L, 5R, 4L, 3R, 1L, 6R, 5L, 2R, 3L, 4R, 6L

Bore..... 5.750 in. (146.05 mm)

Stroke..... 5.750 in. (146.05 mm)

Compression ratio..... 16:1

Crankshaft rotation..... Clockwise as viewed from front

Injector pump ratio 1:1

Valves..... Overhead-type, two per cylinder, actuated by a single, overhead camshaft per each bank

Drive..... Integral flywheel ring gears

Lubricating oil:

Type - Refer to TM 9-2350-256-10 and Appendix J

Capacity:

Dry engine.. 78 quarts (qt) (73.8 L)

Oil change (approximate) 63 qt (59.6 L)

Oil pressure (crankcase main oil gallery):

At 675 to 725 rpm (idle)..... 20 pounds per square inch (psi) (138 kilopascals [kPa])
 (OE 30) at 180°F (82°C)

At 2400 to 2450 rpm (full load) 40 to 70 psi (276 to 483 kPa) (OE 30) at 180°F (82°C)

Engine-Related Components

Generator..... Teledyne Continental Motors

Voltage regulator, solid-state (dual)..... 11672403-1

Voltage regulator, solid-state (single)..... 11659111-1

Starter..... Delco-Remy

Batteries..... Type 6TN: 12 volts (V), 100 ampere-hours (A-hr)

Transmission and Output Reduction Drives

Type (transmission)..... Cross-drive

Model (transmission) XT-1410-4

Dimensions:

Length, overall (approximate)..... 42 in. (1067 mm)

Height..... 31.75 in. (806.5 mm)

1-11 EQUIPMENT DATA-Continued

Width (between sides of hull)	73 in. (1880 mm)
Weight, dry (approximate)	6611 lb (2998.7 kg)
Suspension	Three-point (engine and two supports)
Drive ranges	Low, intermediate, high, reverse
Shift and steering control (external)	Mechanical
Shift and steering control (internal)	Hydraulic
Drive ranges control	Multiple-disk clutch
Clutches engaged by	Oil pressure
Clutches released by	Spring pressure
Brakes:	
Type	Multiple-plate, wet
Duty	Servicing and parking
Application and release	Mechanical
Cooled by	Circulating oil
Oil capacity:	
Initial fill	27 gal. (102 L)
Refill	17 gal. (64 L)
Oil cooled by	External radiators
Oil filter type	Four-element convolute

Personnel Heater Refer to TM 9-2540-205-24&P for heater description and data

Hoist Winch	
Part Number (PN)	8739009
Make	Pacific Car and Foundry CO.
Model	U35B.....
Cable size	0.625 in. (15.88 mm) diameter (dia)
Cable length	300 ft. (61.0 m)

Main Winch

PN	873901C
Make	Pacific Car and Foundry Co.
Model	U90B.....
Cable size	1.25 in. (31.8 mm) dia 6 x 31 IWRC
Cable length	200 ft. (61.0 m)

Auxiliary Engine

PN	11671652
Make	ONAN.
Type	Two-cylinder, four-cycle diesel
Model	DJBMA.
Cooling system	Air-cooled by direct drive centrifugal blower
Bore and stroke	3.250 x 2.625 in. (82.55 x 66.68 mm)
Hp (full load)	10.8 at 2000 ± 100 rpm
Auxiliary generator:	
PN	MS51001-1
Auxiliary hydraulic pump:	
PN	11671411
Auxiliary engine fuel filter assembly:	
PN	11671506
Make	ONAN.

SECTION II: EQUIPMENT DESCRIPTION AND DATA TM 9-2350-256-20

Auxiliary engine oil filter:
 PN 122-0185
 Make ONAN
 Type Replaceable

Auxiliary engine fuel transfer pump:
 PN 149-0429
 Make ONAN

Deep Water Fording Kit

Bilge pump:
 PN 10894565
 Make Piqua Machine and Manufacturing Co.
 Model S-100
 Hp 1
 V direct current (dc) 27.5
 Amperes (A) 47

Solenoid relay:
 Type Single-pole, single-throw, normally open, 28 V dc, 50 A

Coil:
 PN 8762321
 Continuous voltage 29 V dc max
 Voltage pickup and seal 13 V dc max, 13 V dc min
 Voltage dropout 7 V dc max, 1.5 V dc min

Circuit breaker:
 Type Thermal, automatic reset, nonwaterproof
 Capacity 50 A max

Additional Tabulated Data Refer to TM 9-2350-25&10.

SECTION III: PRINCIPLES OF OPERATION

Para.	Task	Page
1-12	Powerplant	1-16
1-13	Lubrication System	1-19
1-14	Fuel Supply, Air Intake, and Exhaust Systems	1-20
1-15	Manifold Air Induction Heater System	1-23
1-16	Cooling System	1-24
1-17	Electrical Systems and Circuits.....	1-24
1-18	Transmission and Output Reduction Drives	1-27
1-19	Tracks and Suspension Systems	1-28
1-20	Fixed Fire Extinguisher System	1-29
1-21	Winches, Spade Assembly, and Hoisting Boom.....	1-29
1-22	Mechanical Transmission and Main Hydraulic System Pump.....	1-31
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1-24	APU	1-31
1-25	M8A3 Gas/Particulate Filter Unit (GPFU)	1-32
1-26	M239 Smoke Grenade Launcher System	1-33
1-27	Exhaust Smoke Generating System	1-34
1-28	Deep Water Fording Kit.....	1-34
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1-12 POWERPLANT

a. GENERAL

The powerplant consists of the engine and cross-drive transmission with a right and left output reduction gear drive. The powerplant is removed from the vehicle as one complete unit.

Throughout this manual, the front of the engine is referred to as the damper end or front, and the rear of the $\frac{3}{4}$ engine is referred to as the flywheel end or rear.

As viewed from the front (damper end) toward the rear (flywheel end), the side to the right is called the right side and the side to the left is called the left side. Beginning at the front, the right bank of cylinders is numbered 1R through 6R, and the left bank of cylinders is numbered 1L through 6L (see Figure 1-5).

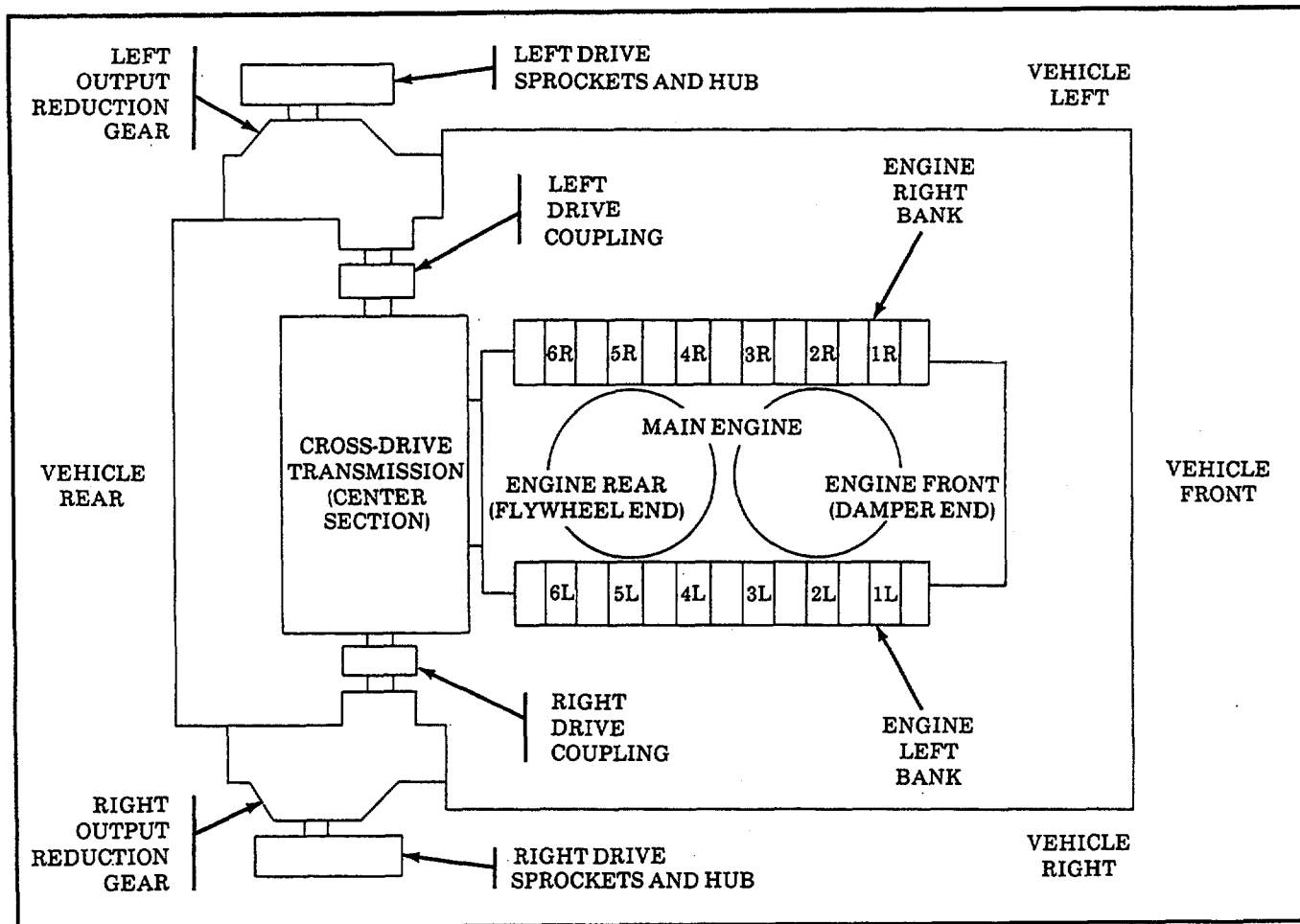


Figure 1-5. Powerplant Diagram.

b. ENGINE

The Continental model AVDS-1790-2DR engine is a 12-cylinder, 90-degree, V-type, 4-cycle, air-cooled, turbosupercharged, diesel engine. The cylinder assemblies are individually replaceable units with overhead valves and valve rocker assemblies in the head. The cylinders are arranged in two banks of six cylinders each. Each bank of cylinders has an overhead camshaft arrangement to actuate the valves of each cylinder.

NOTE

The following callouts are found in Figure 16.

The engine features a fuel injection system and a turbosupercharged, air induction system. The fuel injection system utilizes a fuel injection metering pump which supplies metered fuel to individual cylinders through fuel injector nozzles. The fuel pump assembly (22), located at the front of the engine, delivers fuel to the injector pump. A turbosupercharger (7 and 29) is located on each side of the engine at the rear. The turbosuperchargers are exhaust-gas driven and increase the airflow pressure entering the air intake manifolds. The engine is equipped with a 28V, 300-A, dc generator (9) and a 24-V, solenoid-operated starter (34).

The engine is lubricated by a forced-feed system. The system consists of three circuits: the scavenge circuit, the main or pressure oil circuit, and the piston cooling circuit. These circuits are operated independently by one oil pump, which consists of four separate pump sections.

The engine is equipped with two intake manifold heaters (15 and 33) which are installed in the air intake system between the intake manifold elbows and the turbosuperchargers (7 and 29). The heaters, when operated, preheat the air entering the cylinders to facilitate cold-weather starting and cold-weather idle operation.

The engine crankcase is vented by the crankcase breather system which exhausts through the crankcase breather tube at the left turbosupercharger exhaust outlet.

The engine primary fuel filter (2) and fuel/water separator-type secondary fuel filter (26) both have top-mounted bleeder valves to assist in the removal of air from the fuel system. Water is removed automatically by a constant-bleed orifice in the primary fuel filter and an automatic water drain in the fuel/water separator fuel filter.

- | | | | | | |
|---|-------------------------|---|---|---|------------------------------|
| 1 | Oil filter bypass valve | 3 | Engine oil cooler thermostatic bypass valve | 5 | Oil pressure warning switch |
| 2 | Primary fuel filter | 4 | Oil pressure gage transmitter | 6 | Oil pressure regulator valve |

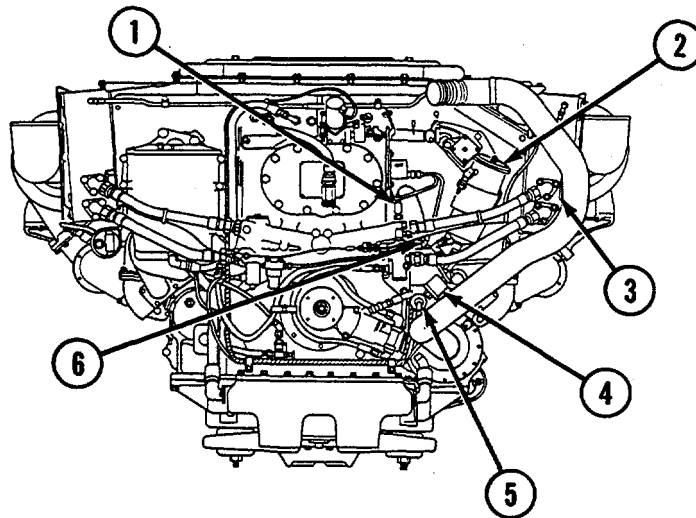


Figure 1-6. Engine (1 of 4)

1-12 POWERPLANT-Continued

- | | | | | | |
|---|-------------------------|----|--|----|--|
| 7 | Right turbosupercharger | 10 | Manifold heater ignition unit | 13 | Transmission oil cooler (right- and left-side) |
| 8 | Transmission | 11 | Primary fuel filter | 14 | Generator boot |
| 9 | Engine generator | 12 | Engine oil cooler (right- and left-side) | 15 | Intake manifold heater |
| | | | | 16 | Cylinder head drain tube |

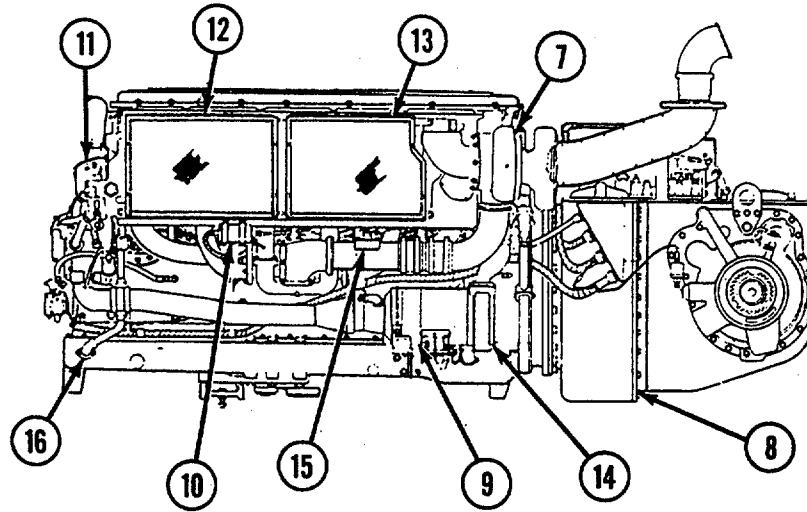


Figure 14-6. Engine (2 of 4).

- | | | | | | |
|----|-------------------------|----|--------------------------|----|-------------------------------------|
| 17 | Oil cooler bypass valve | 20 | Tachometer drive adapter | 23 | PTO coupling |
| 18 | Oil filter | 21 | Fuel check valve | 24 | Manifold heater fuel filter |
| 19 | Fire extinguisher tube | 22 | Fuel pump assembly | 25 | Manifold heater fuel solenoid valve |
| | | | | 26 | Fuel/water separator fuel filter |

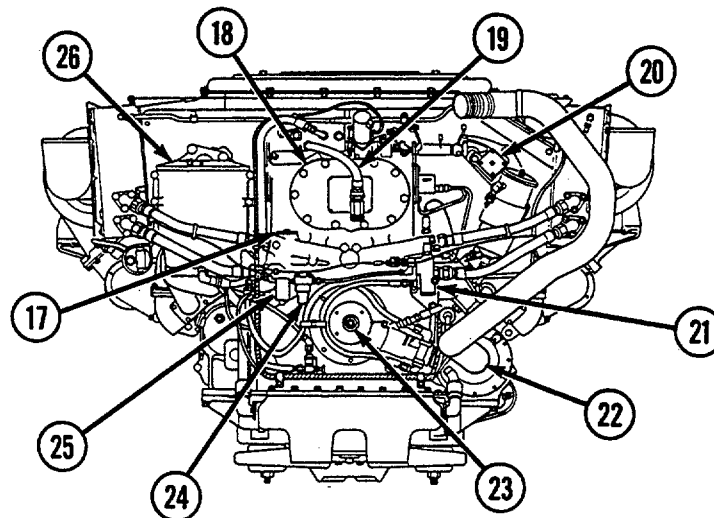


Figure 1-6. Engine (3 of 4)

1-12 POWERPLANT-Continued

- | | | |
|-------------------------------|---------------------------------------|---------------------------|
| 27 Oil level indicator tube | 30 Manifold heater ignition unit | 33 Intake manifold heater |
| 28 Starter low-voltage module | 31 Fuel/water automatic drain control | 34 Engine starter |
| 29 Left turbosupercharger | 32 Air intake manifold | 35 Oil filler tube |

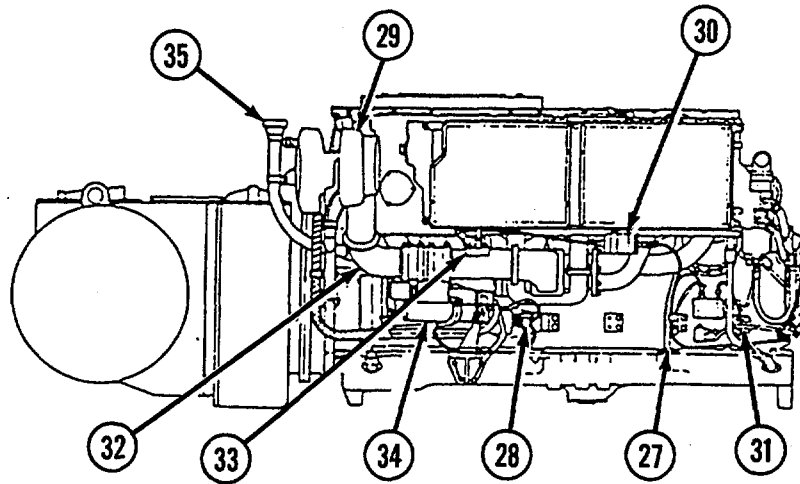


Figure 1-6. Engine (4 of 4)

1-13 LUBRICATION SYSTEM

a. GENERAL

The main pressure oil pump draws oil from the pressure oil pump compartment in the oil pan. This compartment is fed by the scavenge oil pump which picks up oil from the front end of the oil pan and by oil which drains into the pressure compartment from the cover of the pressure pump compartment and the reserve compartment. The pressurized oil is forced through the engine oil coolers and oil filter to the engine oil galleries, bearings, turbosuperchargers, fuel injection pump, and piston oil sprayer nozzles. These nozzles are located in the crankcase below each cylinder and provide a continuous oil spray to the pistons and cylinder walls. A pressure regulator valve, located on the right side of the crankshaft damper and oil filter housing, is influenced by the pressure in the main bearing oil gallery and returns the incoming, excess, unfiltered oil to the oil pan.

b. OIL PAN

The oil pan is a one-piece, aluminum-alloy casting divided into a pressure oil pump compartment, oil reserve compartment, and sump compartment (at the front of the pan). Cored passages from each of the compartments terminate at a central outlet and permit draining of all of the compartments from a single drainage point. A cored passage also permits draining the oil coolers and oil filter compartment directly without permitting any sludge to enter the oil pan. The oil pan is designed to maintain a constant oil level above the main pressure oil pump pickup tube in the pressure oil pump compartment during vehicle operation, regardless of the angle at which the engine may be inclined.

1-13 LUBRICATION SYSTEM-Continued**c. OIL PUMP**

The oil pump assembly consists of four sections combined as a single unit. The twin scavenge oil pump section of the unit picks up oil from the front end compartment of the oil pan and delivers it to the main pressure oil pump compartment. The main pressure oil pump section picks up oil from its respective compartment and supplies oil to the engine oil galleries and bearings, and to the piston oil sprayer nozzles. The level in the pressure pump compartment is maintained by a dual-inlet leveling pump which returns any excess oil to the reserve compartment. Oil is pumped from the reserve compartment by two makeup pumps in a single section. These pumps pick up oil from opposite corners of the reserve compartment and discharge it into the pressure pump compartment. The dual pump design ensures return of oil from the reserve compartment under all operating conditions (cold oil, slope operation, etc.).

d. OIL FILTERS AND CONTROL VALVES

The engine oil filters and the bypass valve are located in the crankshaft damper and oil filter housing at the front of the engine. All engine oil passes through the oil filters. The oil filter bypass valve opens at the differential pressure of 35.6 psi (245 kPa). The bypass valve permits oil to bypass the filters in the event that they become clogged.

e. CRANKCASE BREATHER SYSTEM

The engine crankcase breather system is completely enclosed, which allows the engine to be submerged without the entrance of water and permits the crankcase to be vented. The breather system is vented through the left turbocharger exhaust outlet into the vehicle exhaust system.

f. ENGINE AND TRANSMISSION OIL COOLERS

All transmission and engine oil cooling is accomplished by external oil coolers. The oil coolers are located on the sides of the engine, above the cylinders. Air is drawn through the oil coolers by the cooling fans. A thermostatic bypass valve in each oil cooler controls the temperature of the oil from the cooler by permitting cold oil to bypass the coolers. This valve also permits oil to bypass the cooler in the event the cooler becomes clogged.

1-14 FUEL SUPPLY, AIR INTAKE, AND EXHAUST SYSTEMS

a. FUEL SUPPLY SYSTEM

Three fuel tanks supply fuel to the engine, the APU, and the refuel system. Two tanks are adjacent to the engine, one on either side, and the third tank is forward of the bulkhead in the winch compartment.

A system of four manually operated control valves maintains fuel flow through the check valve and directs fuel to the engine and refueling systems. These valves are also used to drain the fuel tanks.

NOTE

The following callouts are found in Figure 1-7.

The fuel from the vehicle fuel tanks is supplied at a minimum pressure of 5 psi (34 kPa) to the primary fuel filter (3), which is mounted on the engine right front. Fuel flows through the main fuel check valve (5) to the fuel pump assembly (7) mounted on the front center of the engine. This is an engine-driven, gear-type pump; it boosts fuel pressure to the fuel injector pump. A relief valve is incorporated in the pump as a pressure-limiting safety valve.

Fuel from the fuel pump assembly (7) is filtered through the fuel/water separator fuel filter (9) and passes into the fuel injector pump (23). This pump is located in the engine V between the cooling fans. The fuel injector pump delivers accurately metered quantities of fuel under high pressure to each cylinder. An integral governor, of the mechanical centrifugal type, is used to control fuel delivery as a function of engine speed. Engine shutoff is accomplished by a normally open solenoid control unit in the fuel injector pump. The engine fuel shutoff switch on the master control panel actuates the circuit to close the solenoid. Closing of the solenoid cuts off fuel delivery from the injector pump and stops the engine. The engine is equipped with a manual fuel shutoff control to stop the engine if the electric fuel shutoff should fail. A bleeder pressure-relief valve in the pump outlet maintains a constant fuel pressure by allowing any accumulated air and excess fuel to return to the fuel tanks through the engine and fuel tank fuel return lines, check valve, hose, and selector valve. Excess fuel is used to lubricate and cool the fuel injector pump. The check valve prevents a backflow of fuel into the injector from the fuel return line and prevents continued engine operation after the fuel shutoff valve is closed.

Twelve stainless steel fuel lines (13) carry fuel under high pressure from the fuel injector pump (23) to the 12 fuel injector nozzles (15) on the left and right banks of the engine. The nozzles inject a fine spray of metered fuel under pressure into each cylinder. Excess fuel is carried from the nozzles through fuel return hose assemblies (2) on each cylinder bank to the fuel return system.

A hand-operated purge pump, next to the driver's seat, provides a means of purging the fuel injector pump (23), fuel filters (3 and 9), and engine fuel lines of air. The air is forced by the fuel pressure from the purge pump through the engine fuel lines and back to the fuel tanks through the injector pump fuel return line.

b. AIR INTAKE SYSTEM

Two dry-type air cleaners, mounted in the right and left rear of the crew compartment, filter intake air for the engine. A damper control, mounted on each air cleaner, is used to select air intake from either the crew compartment or from outside the vehicle.

c. EXHAUST SYSTEM

Exhaust pipes connect each exhaust manifold to a turbosupercharger. Exhaust gases are ejected from the engine, via exhaust pipes, through deflector-type louvers at the rear of the vehicle.

1-14 FUEL SUPPLY, AIR INTAKE, AND EXHAUST SYSTEMS -Continued

- | | | | |
|----|--|----|---|
| 1 | Fuel return tube to injection fuel return hose tee (right bank) | 12 | Fuel return to fuel tank hose |
| 2 | Fuel return hose assembly | 13 | Fuel injection pump to injector nozzle tube assembly |
| 3 | Primary fuel filter | 14 | Fuel injection pump to injector nozzle tube assembly support, damp plate, and insulator |
| 4 | Primary fuel filter outlet to check valve, fuel flow back | 15 | Fuel injector nozzle |
| 5 | Main fuel check valve | 16 | Fuel return tube to injection fuel return hose tee (left bank) |
| 6 | Primary fuel filter outlet to fuel pump inlet hose assembly | 17 | Fuel return tube cross |
| 7 | Fuel pump assembly | 18 | Fuel injector line bracket, plate, and insulator |
| 8 | Fuel pump outlet to fuel/water separator fuel filter inlet hose assembly | 19 | Fuel injection pump inlet hose |
| 9 | Fuel/water separator fuel filter | 20 | Pressure regulator valve |
| 10 | Fuel/water separator manual drain | 21 | Fuel return check valve |
| 11 | Fuel/water separator outlet hose assembly | 22 | Fuel injector pump fuel return hose |
| | | 23 | Fuel injector pump |

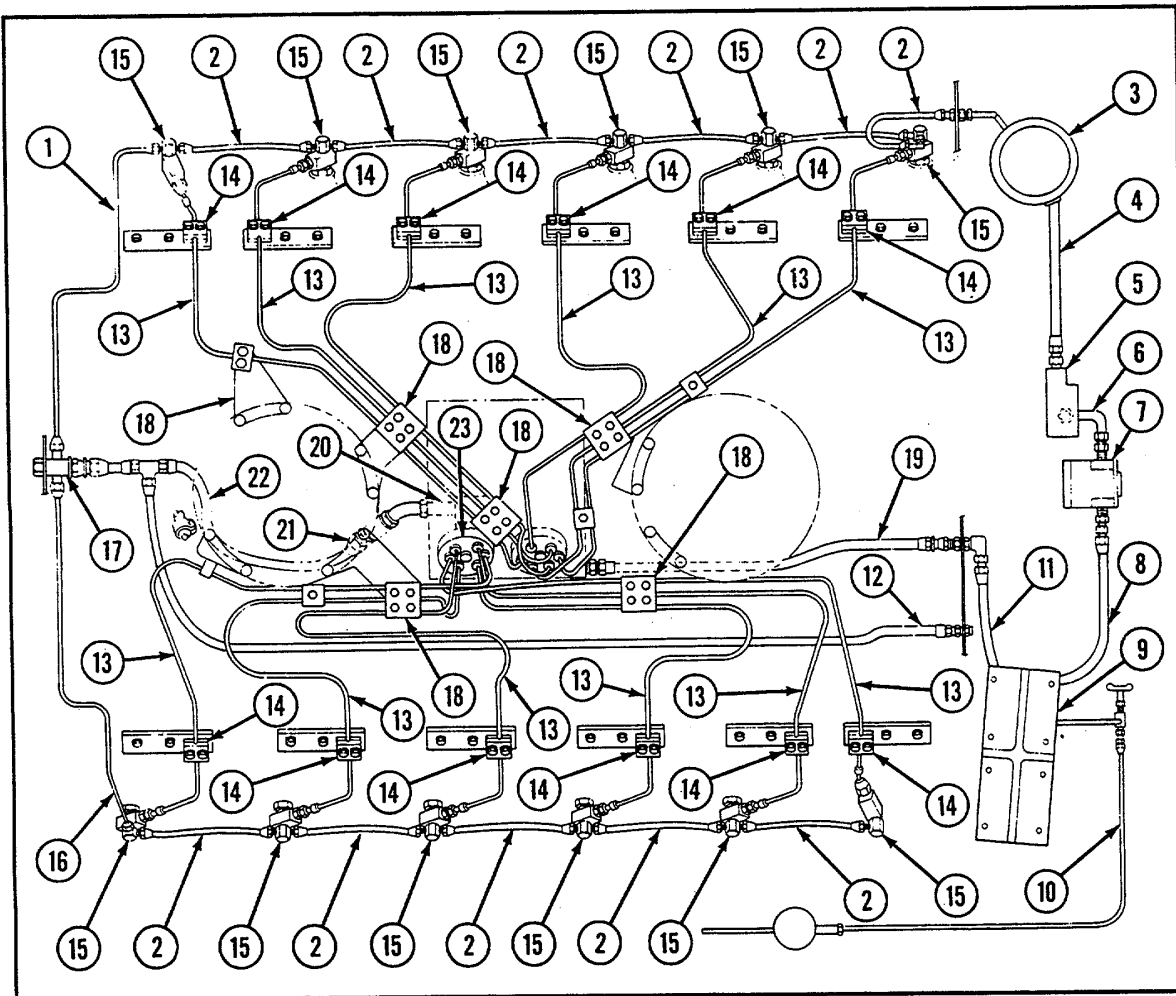


Figure 1-7. Fuel Supply System.

1-15 MANIFOLD AIR INDUCTION HEATER SYSTEM

NOTE

Unless otherwise indicated, the following callouts are found in Figure 1-8.

The left and right intake manifolds (6 and 9), which distribute supercharged air into each bank of cylinders, are equipped with electrically ignited intake manifold air heaters (2 and 8). The heaters are provided to facilitate engine starting during cold weather.

The purge pump is operated to obtain 90 psi (621 kPa) in the manifold heater fuel lines. Operation of the heater switch on the purge pump handle energizes the manifold heater fuel inlet solenoid valve to allow fuel flow to the heater nozzle. The heater switch also energizes the high-tension coil creating an electrical spark in the manifold, thereby igniting the sprayed fuel. Continued operation of the purge pump is required to maintain fuel pressure and an effective spray pattern into the manifold.

A leakoff line is provided to prevent nozzle fouling and is routed into the injector fuel return line. The fuel is burned in the intake manifold by the ignition of the heater spark plug, which flame-heats the incoming air. This flame-heated air and the products of combustion are fed directly into the cylinders.

The purge pump line connects to a fuel check and pressure relief valve (14) and pressure regulator valve (see item 20, Figure 1-7) in the engine. The fuel check and pressure relief valve prevents purged fuel from returning to the tank or to the purge inlet line.

The fuel check and pressure relief valve (14) ensures the necessary fuel pressure to operate the flame heater spray nozzles (5 and 10). A manifold heater fuel supply solenoid valve (7) and fuel return solenoid valve (16) close the flame heater fuel lines when the flame heater switch is off.

The manifold heater fuel return solenoid valve (16) is located at the rear of the engine. The valve is energized at the same time the ignition unit and heater spark plugs are energized and acts as a check valve to prevent fuel returning from the injector pump and nozzles from entering the heater fuel tubes.

- 1 Left manifold heater ignition unit
- 2 Left manifold air heater
- 3 Spark plug
- 4 Ignition unit electrical lead
- 5 Manifold heater nozzle
- 6 Left intake manifold
- 7 Manifold heater fuel supply solenoid valve
- 8 Right manifold air heater
- 9 Right intake manifold
- 10 Manifold heater nozzle
- 11 Spark plug
- 12 Ignition unit electrical lead
- 13 Right manifold heater ignition unit
- 14 Fuel check and pressure relief valve
- 15 Manifold heater fuel filter
- 16 Manifold heater fuel return solenoid valve

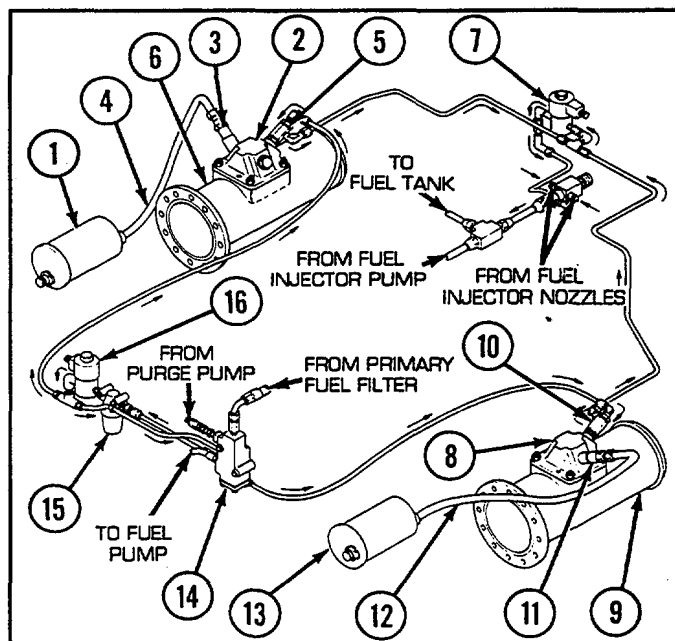


Figure 1-8. Manifold Air Induction Heater System

1-16 COOLING SYSTEM**a. AIR COOLING****NOTE**

The following callouts are found in Figure 1-9.

Air for cooling enters the engine compartment through the grille doors. The top of the engine is shrouded and encloses two gear-driven, axial-flow cooling fans (1) which draw the air through the cylinder fins and oil coolers and discharge the hot air vertically from the shroud. Sheet metal baffles and deflectors direct the flow of cooling air across the cylinders.

The cooling fans (1) are attached to hubs and are mounted on shafts which are driven by the engine-driven fan drive clutch assembly.

The fan drive shaft and gear shift are driven by a horizontal drive shaft.

The fan clutch is oil cooled. The fan clutch drive and driven disks are loaded by the centrifugal action of clutch balls and springs housed in the clutch assembly. The balls and springs are in the driven member and apply upward force to the clutch disks. The clutch oil enters the fan drive vertical shaft from the fan drive housing through an annular groove in the shaft. The depth of the groove controls the amount of oil flow. The oil flows through a central hole in the shaft to a distributor where it is dispersed to the two ball bearings and the clutch disks. The oil moves between the clutch disks by centrifugal action and drains back through the fan drive housing into the engine oil pan. The fan clutch is designed to slip under deep water fording conditions where the resistance of the water exceeds the friction of the clutch.

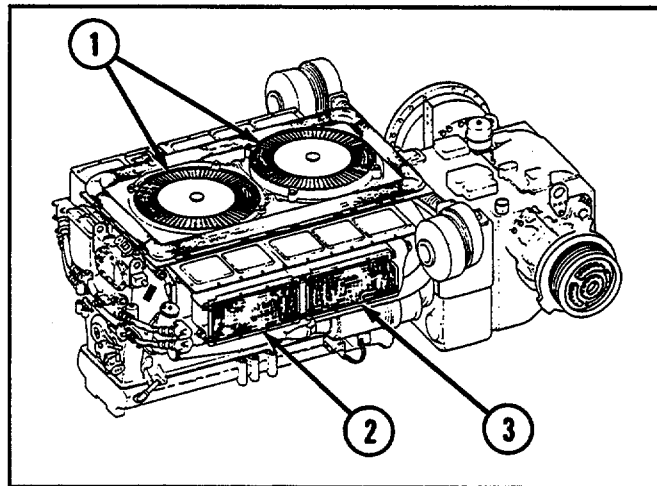


Figure 1-9. Cooling System

b. OIL COOLING

Two engine oil coolers (2) and two transmission oil coolers (3) are mounted on the sides of the engine above the cylinders. The cooling fans (1) draw air through the oil cooler cores to cool the oil being circulated within the coolers.

1-17 ELECTRICAL SYSTEMS AND CIRCUITS**a. CHARGING/STARTING SYSTEM AND VEHICLE BATTERIES**

- 1 Engine generator. The generator is an air-cooled, 28V, dc-rated, 300-A, field-regulated unit. It is mounted on the right side of the engine near the flywheel end, and is gear driven by the engine. An integral blower, an air intake duct, and an outer boot and duct provide a means of cooling the generator. The electrically operated blower draws air from the crew compartment, forces it through the generator, and exhausts it upward through an outlet near the right camshaft gear housing.

- 2 Generator voltage regulators. The M88A1 has either a single or dual voltage system. In the dual system -there are two solid-state generator voltage regulators which maintain generator output voltage at a constant $28 + 0.7$ V dc. One controls the generator voltage output of the engine and the other the generator voltage output of the APU. In the single system, a single voltage regulator controls both the engine and APU generator voltage output. The voltage regulators are mounted at the left rear of the engine compartment.
- 3 Starter assembly. The 24-V, waterproof starter assembly is mounted on the lower left side of the engine toward the rear. It is a heavy-duty, solenoid-operated, enclosed, shift-lever-type engine starter. The motor utilizes 12 brushes retained in 6 brush holders which are accessible through inspection plugs in the motor frame. The drive clutch is a heavy-duty, over-running type with adjustable pinion clearance.
- 4 Neutral safety switch. The neutral safety switch, mounted on the brake assembly, functions as a safety switch to prevent starting the engine while the transmission shift control is in any shift position other than P (park).
- 5 Master relay. The master relay is located in the left rear of the engine compartment. It controls primary power to all electrical systems and components with the exceptions of the personnel heater system, the MASTER switch, and the slave receptacle.
- 6 Batteries. Six 12-V batteries are connected in a series-parallel circuit to give the vehicle a 300-A-hr source of 24-V dc power. The batteries are located in the left side of the engine compartment.

b. GAGE AND SWITCH PANELS

- 1 Gage panel (located to the left of the steering control at the driver's position). The gage panel mounts the following:
 - Fuel level gage
 - Engine and transmission temperature and pressure gages
 - Battery generator indicator
 - Speedometer and tachometer
 - Mechanical transmission oil pressure warning light
 - Master warning light
 - Three instrument panel lights
 - Fuel selector switch
- 2 Switch panel (located to the right of the driver's steering control). The switch panel mounts the following:
 - Main light switch
 - Auxiliary light switch
 - Fuel cutoff switch
 - Fuel pump switch
 - Five circuit breakers
 - Master relay indicator light
 - MASTER switch
 - Blackout (B.O.) selector switch

c. SENDING UNITS AND WARNING INDICATORS

- 1 Sending units. Sending units for the gage panel are mounted on the engine, transmission, and forward and right rear fuel tanks to indicate the engine and transmission oil temperatures, pressures, and fuel levels.

1-17 ELECTRICAL SYSTEMS AND CIRCUITS -Continued

- 2 Warning switches. Switches mounted on the engine, transmission, and mechanical transmission indicate, through gage panel lights, the occurrence of engine oil low pressure and high temperature, transmission oil high temperature, and mechanical transmission low oil pressure.
- 3 Warning indicator lights, gage, and flasher system panel. The panel contains the following components and is located next to the transmission shift lever bracket, adjacent to the driver's seat:
 - Fire extinguisher engine shutoff light indicates when the fire extinguisher engine shutoff switch is activated.
 - PTO engaged light indicates when the PTO is engaged.
 - Flasher system components include an indicator light, switch, flasher unit, and circuit breaker.
- 4 Hydraulic oil temperature gage and indicator light. These components allow the operator to monitor the temperature of the hydraulic oil during operation of the hydraulic system and warn if a heating problem occurs.

d. LIGHTING SYSTEM

- 1 Headlight clusters. The right and left headlight clusters each consist of a service headlight, a B.O. service IR headlight, a B.O. drive light, and a B.O. marker light. The headlight assemblies are completely interchangeable; however, the right B.O. drive light is not powered in the B.O. drive condition.
- 2 Flasher warning light. A flasher warning light with colored lens is controlled through the flasher unit and switch-mounted on the shifting lever mounting bracket in the crew compartment.
- 3 Dome lights. The dome lights are installed in the crew compartment for interior illumination. The dome light switches provide for either white or colored light as the tactical situation requires.
- 4 High beam indicator light. A high beam indicator light glows red when the vehicle service drive headlights or IR headlights are changed to high beam through the driver's dimmer switch.
- 5 Winch compartment light. The winch compartment light is operated by a switch on the accessories panel and illuminates the hoist winch, main winch, and surrounding areas in the winch compartment.
- 6 Rigger's fixed spotlight. The rigger's fixed spotlight is controlled by a handle that extends through the roof into the rigger's area in the crew compartment.
- 7 Rigger's service light assembly. The rigger's service light assembly, controlled by the rigger's light selector switch, projects a high beam.
- 8 Rigger's B.O. light. The rigger's B.O. light is controlled by the rigger's light selector switch and projects a high beam.
- 9 Taillight assemblies. The right taillight assembly consists of the B.O. marker taillight. The left taillight assembly consists of the service taillight, service stoplight, and B.O. marker light.
- 10 Troublelight assembly. The troublelight assembly is a portable, hand-held light with a reeled, 25-ft (7.6-m) extension cord.
- 11 Driver's passive night viewer switch and light. The driver's passive night viewer is controlled by the switch, and the light indicates when the night viewer is activated.

e. MISCELLANEOUS ELECTRICAL COMPONENTS

- 1 Rigger' s light selector switch. The rigger' s light selector switch contains a three-position toggle switch that controls the operation of the rigger' s service and IR light.
- 3 Accessories panel. The accessories panel contains the accessory outlet socket, a two-position winch light toggle switch, a two-position ventilating blower toggle switch, a two-position bilge pump toggle switch, a two-position generator toggle switch, a bilge pump lamp, and a generator lamp.
- 3 Ventilating blower. An electric motor driven ventilating blower draws fresh air from outside the vehical into the crew compartment for ventilation.

f. CONDUITS, CABLES, AND CONNECTORS

- 1 Conduits. Flexible, metallic conduits are used on high-voltage cables to prevent electrical radiation which might interfere with communications equipment.
- 2 Cables. Electrical cables are rubber covered. The ends of all cables terminate in a pin or socket on a connector, plug, or receptacle, or at a cable terminal. The cables are crimped or soldered to the pins sockets, terminals, or ferrules.
- 3 Plug and receptacle-type connectors. The plug has four main components: the shell assembly coupling nut, grommet, and retaining nut. The receptacle has three components: the receptacle assembly grommets and retaining nut. The receptacle is secured to a box or panel with four screw. The plug is secured to the receptacle with the coupling nut. A waterproof connection is made with the retaining nut by compressing the grommet to the ends of the plug or shell assemblies. The shell and receptacle assemblies have either pins or sockets for one or many electrical connections.
- 4 Waterproof rubber connectors. Each connector has a male and female component. The female portion consists of a rubber shell, sleeve, and ferrule. The male part consists of a rubber shell, C-washer, and terminal. The friction-fit union of the two halves forms a waterproof connection.

1-18 TRANSMISSION AND OUTPUT REDUCTION DRIVES

NOTE

The following callouts are found in Figure 1-10.

a. GENERAL

The cross-drive transmission (3) is a combined transmission with steering unit and two output reduction drives (1 and 2). It transmits power directly from the engine to the track drive sprockets. The transmission is controlled by the vehicle operator by means of the shifting and steering controls and linkages, and the brake control pedala1 linkage.

The cross-drive transmission (3) includes a hydraulic torque converter, a split torque drive, variable steering, and disk-type brakes. The transmission delivers engine power to the track sprockets at an output torque which varies automatically according to the driven-load conditions when not in linkup.

There are three forward speed ranges and one reverse

Steering is possible in all drive ranges and N (neutral). Steering in N (neutral) causes the vehical to pivot in place, with the tracks turning in opposite directions.

1-18 TRANSMISSION AND OUTPUT REDUCTION DRIVES-Continued

b. HYDRAULIC AND LUBRICATION SYSTEM

Functions:

- Applies force for clutch ranges
- Power transmitting medium in torque converter
- Lubricant For entire transmission
- Cooling medium for entire transmission

- 1 Right output reduction drive
- 2 Left output reduction drive
- 3 Cross-drive transmission

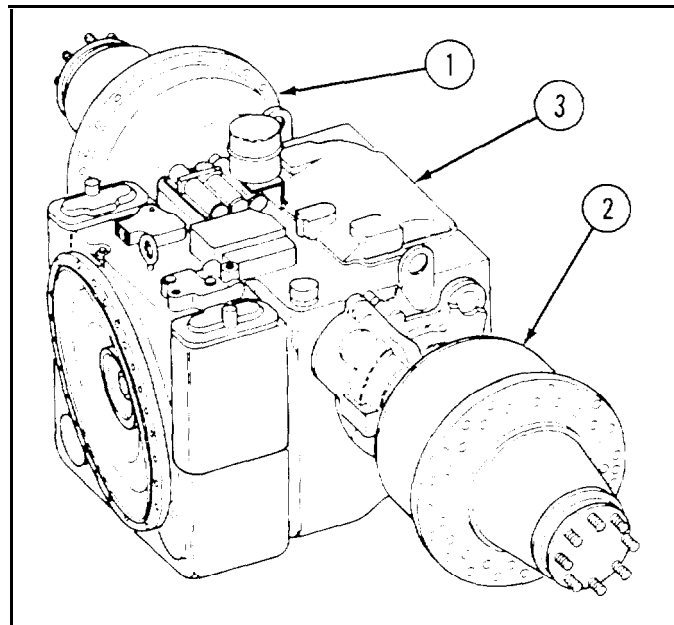


Figure 1-10. Transmission and Output Reduction Drives.

1-19 TRACKS AND SUSPENSION SYSTEMS

NOTE

The following callouts are found in Figure 1-11.

The suspension system on each side of the vehicle consists of six pairs of individually sprung roadwheels (1), three track support rollers (2), a compensating idler wheel (3), a compensating idler link (4), a track drive hub and sprocket (5) and a track (6).

Primary springing is accomplished by individual torsion-bars for each roadwheel. Secondary springing is accomplished by dual volute bumper springs on numbers 1 and 6 roadwheels. Bump stop brackets are welded to the hull over roadwheel numbers 2 through 5 to limit torsion bar windup beyond allowable limits.

Shock absorbers are attached between the first, second, and sixth roadwheel arms and the hull on each side of the vehicle. Each track consists of 84 rubber shoe assemblies. The individual links are held together by

- 1 Roadwheels
- 2 Track support rollers
- 3 Compensating idler wheel
- 4 Compensating idler link
- 5 Track drive hub and sprocket
- 6 Track

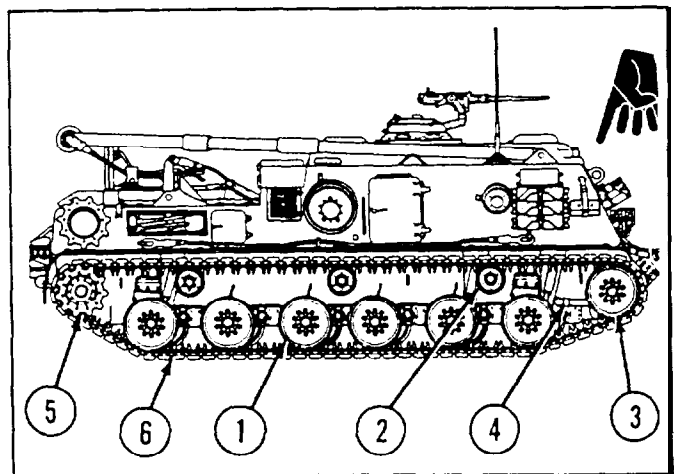


Figure I-11. Tracks and Suspension Systems.

end connectors and wedges, guides, and guide caps. The guides ride between the dual wheels and through a trough in the track drive sprocket hub to maintain track alinement.

1-20 FIXED FIRE EXTINGUISHER SYSTEM

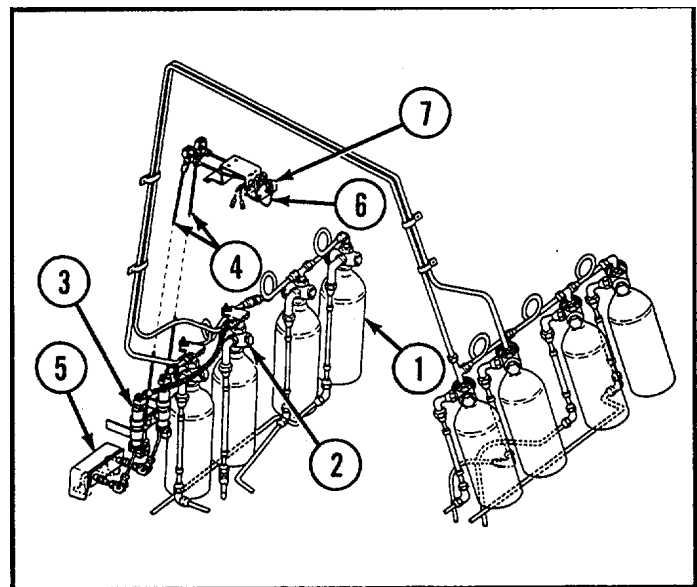
NOTE

The following callouts are found in Figure 1-12.

The M88A1 is equipped with a fixed, carbon dioxide, fire extinguisher system for smothering fires in the engine and winch compartments. The system consists of eight 10-lb (4.5-kg) cylinders (1), a cylinder control valve (2), remote control connectors (3), two dual-pull mechanisms (4), extinguisher lines, seven nozzles, two exterior

remote control pull handles (5) with cables, two interior remote control pull handles (6) with cables, and an engine shutoff switch (7) (to ensure the engine is turned off before the fixed fire extinguishers are discharged). Each cylinder is equipped with a safety valve that automatically discharges when pressure becomes excessive due to heat. The cylinders are mounted in banks of four on each side of the cab interior.

The engine shutoff switch (7) consists of a push button switch assembly (electrically connected in series with the engine fuel shutoff solenoid and the vehicle batteries), which is depressed (open circuit) during vehicle operation by an adjustable screw mounted on a hinged metal shield held in position by a quick-release pin. When it is necessary to discharge the fire extinguisher system, the push button on the quick-release pin is depressed, allowing the shield to pivot downward, which releases the adjustable screw from the push button on the switch assembly and activates the fuel shutoff solenoid, shutting off the engine.



1-21 WINCHES, SPADE ASSEMBLY, AND HOISTING BOOM

NOTE

The following callouts are found in Figure 1-13.

a. MAIN WINCH

The main winch (1) is mounted to the nosepiece of the vehicle beneath the crew compartment. It is gear-driven by a hydraulic motor and is used for heavy-duty recovery operations. The winch is wound with 200 ft (61.0 m) of 1-1/4-in. (31.8-mm) steel cable. The cable is equipped with a clevis on the free end for securing it to loads.

1-21 WINCHES, SPADE ASSEMBLY, AND HOISTING BOOM--Continued

b. SPADE ASSEMBLY

The spade (2) is mounted to the vehicle nosepiece by two trunnion-mounted arms. The arms are operated by hydraulic cylinders (3) from within the winch compartment. When not in use, the spade is secured in a raised position by a hydraulically activated, spring-loaded spade lock.

- 1 Main winch
- 2 Spade
- 3 Hydraulic cylinders

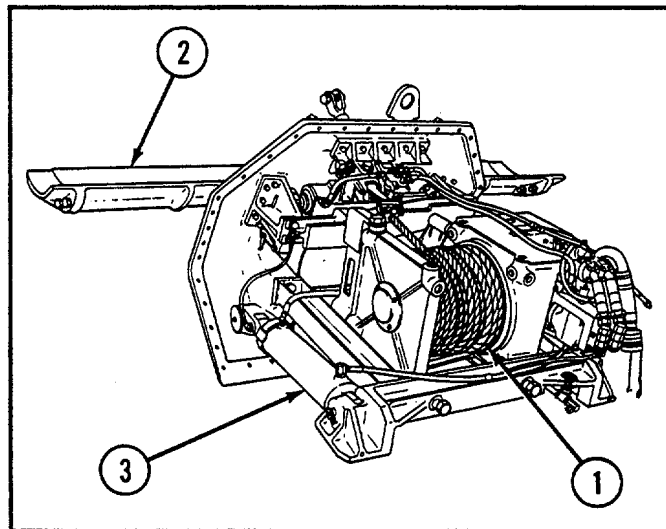


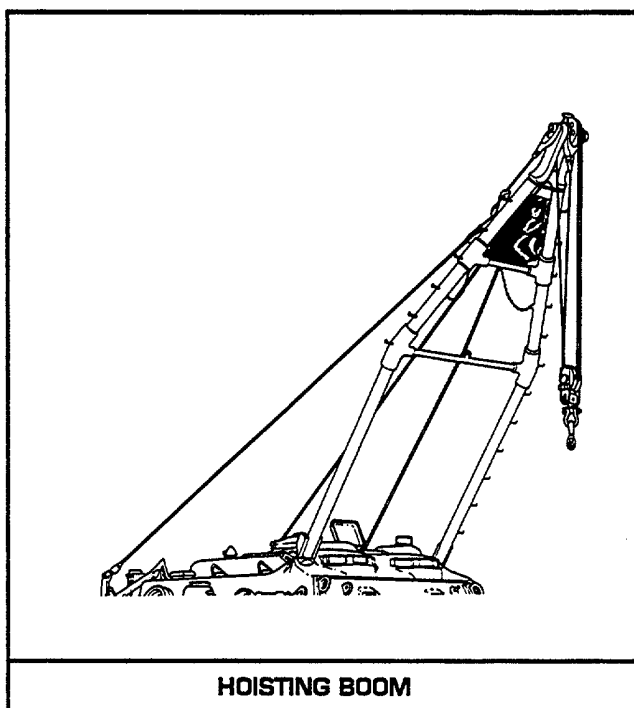
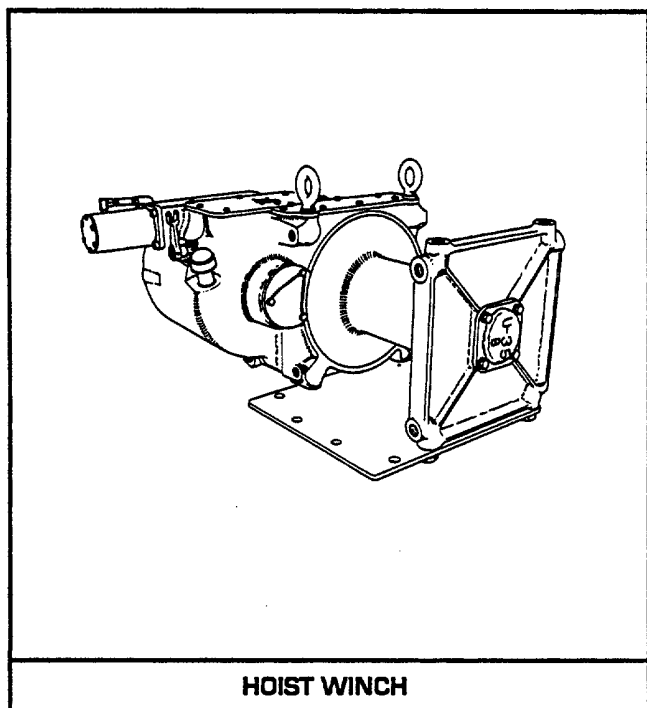
Figure 1-13. Main Winch and Spade Assembly.

c. HOIST WINCH

The hoist winch is mounted in the winch compartment and is gear-driven by a hydraulic motor. The winch is capable of hoisting a maximum load of 50,000 lb (22,680 kg) with a four-part line, using a 5/8-in. (15.88-mm) steel cable. The hoist winch is wound with 200 ft (61.0 m) of this steel cable.

d. HOISTING BOOM

The hoisting boom is a tubular, modified A-frame, and is pivot-mounted to the top front of the vehicle. The boom is raised or lowered by two hydraulically operated boom cylinders. In operating position, the boom is supported by a stayline cable secured to crankarms located at the rear of the hull. The crankarms control the live-boom movement by means of hydraulically operated stayline cylinders. In lowered position, the boom is secured on the boom support assembly by a boom travel lock. The hoisting boom is used in conjunction with the hoist winch.



1-22 MECHANICAL TRANSMISSION AND MAIN HYDRAULIC SYSTEM PUMP**NOTE**

The following callouts are found in Figure 1-14.

The mechanical transmission and hydraulic pump assembly is mounted in the rear of the hydraulics compartment, under the crew compartment subfloor plates. The engine drives the mechanical transmission (1) through the PTO drive shaft coupled to the PTO coupling at the accessory end of the engine. The mechanical transmission drives the main hydraulic system pump (2). The pump provides hydraulic system pressure.

- 1 Mechanical transmission
- 2 Main hydraulic system pump

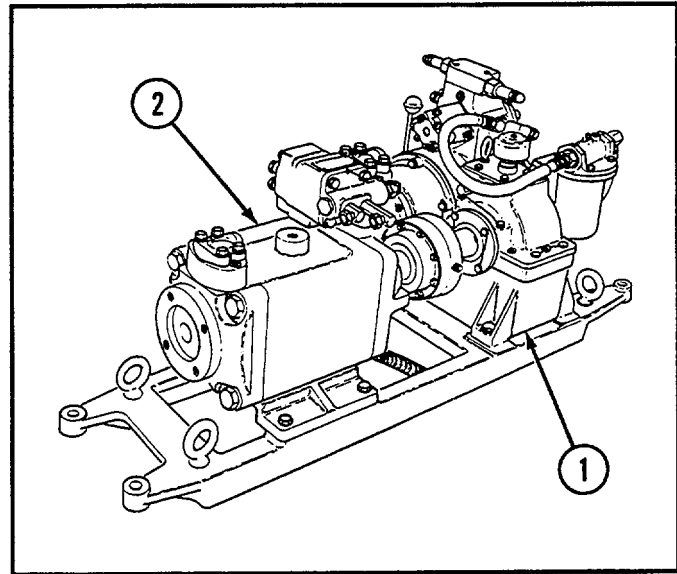


Figure 1-14. Mechanical Transmission and Main Hydraulic System Pump.

1-23 MAIN HYDRAULIC SYSTEM

The main hydraulic system supplies power for the control and operation of the spade, hoisting boom, hoist winch, and main winch, and for releasing the mechanically applied main and hoist winch brakes. System power is obtained from the main hydraulic pump driven by the mechanical transmission.

1-24 APU**a. GENERAL**

The APU consists of an overhead-valve, two-cylinder, four-cycle, air-cooled, diesel engine connected directly to a 300-A, 28-V, shunt-wound, dc generator (which is also used as a starter), and an auxiliary hydraulic system pump. The APU provides electrical power to charge the vehicle batteries, and hydraulic power to raise and lower the spade, stow and raise the boom, and retrieve the main and hoist winch cables.

b. STARTING AND GENERATING SYSTEMS

The 300-A, 28-V generator mentioned above is also used as a starter motor. This is accomplished by first feeding 24 V dc to the field coil of the generator from the preheat relay when the preheat switch is activated, and then by applying 24 V dc to the generator armature through a starting relay when the start switch is activated. This motorizes the generator, which is directly coupled to the engine by a drive chain. When the engine starts, the current in the generator armature reverses direction, and the system automatically changes from a motorizing mode to a generating mode. After the engine starts, the start and preheat switches must be released to prevent loading down the engine since the voltage regulator is bypassed during this start cycle, and full voltage is being applied to the field. After the engine has started, and the preheat and start switches are released, the generator output is controlled by a solid-state voltage regulator and a current-limiting device.

1-24 APU-Continued**c. LUBRICATION**

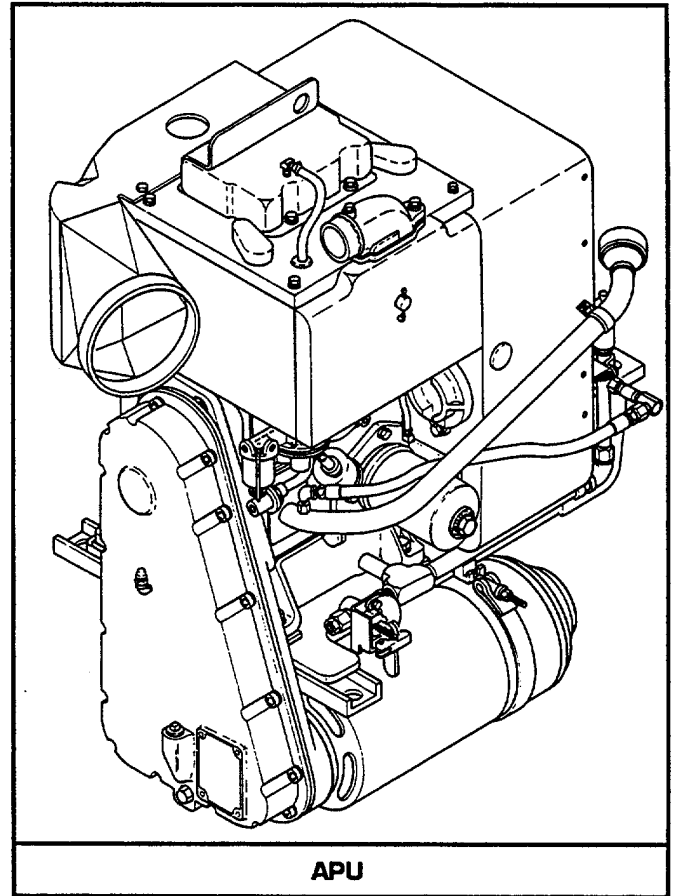
A gear-type pump draws oil from the crankcase and delivers it through a replaceable oil filter to the engine. Normal oil pressure should be 25 psi (172 kPa) or higher under normal operating conditions. A crankcase oil drain valve with operating handle is provided to drain the lubricating oil without removing the unit from the vehicle.

d. GOVERNOR

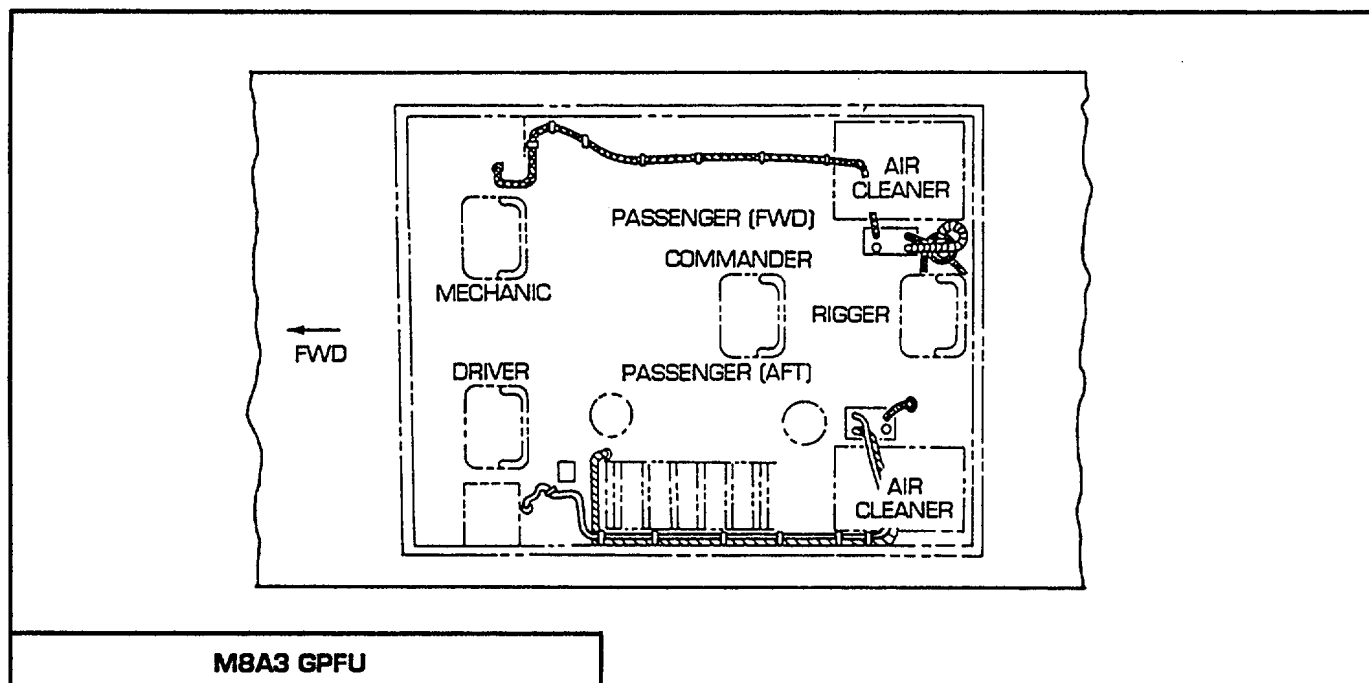
Constant speed is set to maintain engine speed at 2000 ± 100 rpm. The governor uses a ball-and-cup mechanism on the camshaft gear as the sensing device. A yoke resting on the cup connects to an arm-and-spring mechanism controlling the throttle lever. Any change in engine speed is transmitted from the cup to the yoke and to the throttle. The speed may be adjusted by changing the spring tension.

e. FUEL SYSTEM

The fuel system consists basically of a primary and secondary fuel filter, fuel transfer pump, injection pump, and injection nozzle. The transfer pump, operating off the camshaft, draws fuel from the supply tank and delivers it through the two filters to the injection pump. The injection pump meters and delivers the fuel at high pressure to the nozzle.

**1-25 M8A3 GPFU**

The GPFU installation in the M88A1 vehicle is made up of two separate M8A3 systems. One M8A3 GPFU serves the personnel on the left side of the vehicle and is operated by the driver. The other M8A3 GPFU serves the commander, mechanic, and rigger with the control switch located at the mechanic's station. Electrical power for operation of the purifier units is obtained by tapping into convenient dome light power leads.



1-26 M239 SMOKE GRENADE LAUNCHER SYSTEM

NOTE

The following callout is found in Figure 1-15.

The M239 smoke grenade launcher system consists of two smoke grenade dischargers (1), canvas covers, a push button firing switch at the commander's station, two smoke grenade stowage boxes, and an electrical installation kit composed of a power (arming) switch box, mounting bracket, electrical wiring harnesses, and connectors.

The power (arming) switch box is mounted on a bracket attached to the cab top near the commander's cupola. Electrical wiring harnesses connect the power switch box to the push button firing switch, dischargers, and vehicle current source. The power switch box consists of an on/off switch to control the power supply to the firing switch, and an indicator lamp to show the presence of electrical power.

1 Smoke grenade dischargers

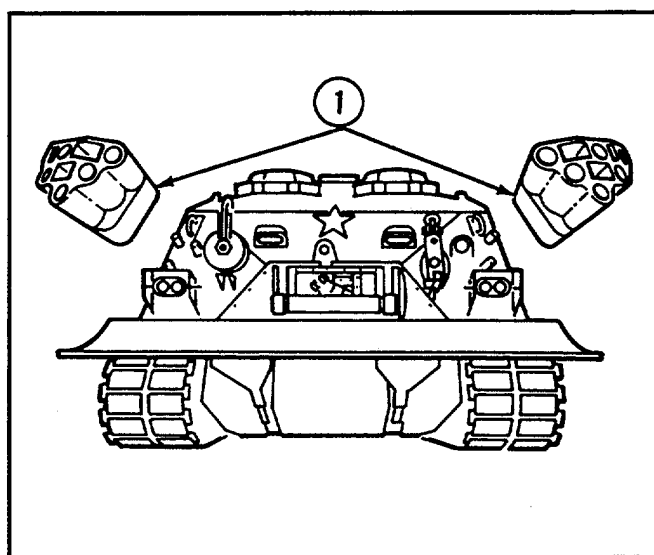


Figure 1-15. M239 Smoke Grenade Launcher System.

1-27 EXHAUST SMOKE GENERATING SYSTEM**NOTE**

The following callout is found in Figure 1-16.

The exhaust smoke generating system consists of solenoid valves, switch assemblies, shutoff valve, indicator light, mounting brackets, fuel hose assemblies, electrical leads, and attaching parts.

The solenoid valves and fuel tube assemblies are attached to the rear of the engine. Fuel to operate the smoke generating system is taken from the main fuel supply at the front of the engine.

The switch (1) to operate the smoke generating system is installed in the driver's compartment and the commander's station, and is connected to the main wiring harness using electrical leads provided in the smoke generating system kits.

The smoke generating system uses the engine fuel pump to supply diesel fuel, from the vehicle fuel tanks, to two solenoid valves mounted at the rear of the engine. When the solenoid valves are energized (opened), they allow diesel fuel to be sprayed into the exhaust system. The fuel vaporizes and exits together with the engine exhaust gases. The fuel vapor cools on contact with the moving exhaust air and condenses to form a dense smoke screen. The electrical power to energize the solenoid valves is supplied by the warning indicator and warning horn systems. The warning horn will not sound unless the engine is running, and connection to this system prevents accidental activation of the smoke generating system when the engine is not running.

The manual fuel shutoff valve can be used to determine if the smoke produced is from a malfunctioning engine, or from the smoke generating system.

1 Switch

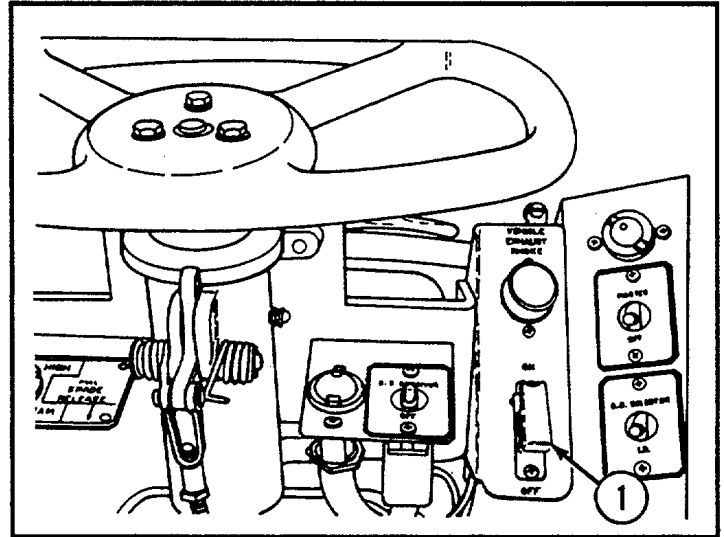


Figure 1-16. Exhaust Smoke Generating System.

1-28 DEEP WATER FORDING KIT**a. GENERAL**

The deep water fording kit as installed on the M88A1 permits fording to a maximum depth of 8 ft, 6 in. (2.59 m). The design of the deep water fording equipment permits the vehicle to be completely operable on land or in water, providing maximum depth is not exceeded.

b. ENGINE EXHAUST

The engine exhaust system for deep water fording consists of a series of pipes to provide the proper venting of the exhaust for the right and left banks of the engine. A flexible, bellowed-type pipe is clamped to the engine exhaust outlet. Utilizing a slip joint, each pipe is attached to the main engine exhaust pipe, which ducts the exhaust gases through the rear engine deck. To each engine exhaust pipe, a 4-1/2-in.- (114-mm-) diameter pipe, which extends above the specified depth, is clamped and sealed. Two clamps, bolted to the engine deck, are used to hold the system in proper position.

c. ENGINE AIR INLET

The engine air inlet system provides for the use of outside air for the engine while the vehicle is in the water. The system consists of two pipes and two rubber seals, which cover and seal each of the air intake vents on the top of the vehicle cab.

d. ENGINE GENERATOR COOLING EXHAUST

The engine generator electrical output is switched off and the valve assembly closed by the driver from the crew compartment to prevent water from entering the generator.

e. APU

Preparations and precautions are taken before and after submersion of the APU to prevent corrosion and separation of hot leads due to electrolysis by exposure to salt water, and the destruction of the brushes, brush holders, and armature by sand.

f. PERSONNEL HEATER

The personnel heater is not operable during fording operations. The air inlet and exhaust outlets are plugged during fording operations and unplugged after fording operations.

g. ACETYLENE COMPARTMENT VENT

A vent assembly consisting of tubing, fittings, adapter plate, and gasket is attached to a boss which surrounds the four vent holes in the left rear of the cab, to provide ventilation of the compartment during the deep water fording operation. Two clips mounted onto the left engine air intake pipe support the vent system.

h. FUEL TANK VENT

Two 90-degree elbows, a rubber hose, two hose clamps, a seal, and a clip are the components used to vent the fuel tanks. The rubber hose is clamped to an elbow in the left engine air intake pipe and to an elbow in the fuel tank's filler cover. The seal is installed between the bottom of the fuel tank filler cover and the top of the fuel tank filler cap to prevent entry of water. The clip, attached to the acetylene vent cover, keeps the hose from hanging free and being torn.

i. BILGE PUMP, MOTOR, AND SUPPORT ASSEMBLY

A centrifugal-type bilge pump with motor and support assembly is installed on the hull floor in the winch compartment. The pump is used to remove any water which may enter the compartment during fording. The discharge of the pump is directed through the bilge pump hose to an outlet adapter, mounted onto the right side of the personnel compartment. A multiple purpose (wash vehicle, etc.), dacron rubber-lined hose with nozzle can be attached to the outlet adapter. A toggle switch and indicator lamp for operating the pump are located at the right of the driver's seat on the accessories panel. A relay, which is activated by the toggle switch, controls the pump motor. A circuit breaker mounted under the floor plates and on the same plate as the relay provides overload protection for the pump circuit. The switch and relay coil circuit is protected by a circuit breaker in the accessories panel.

j. CREW FAN AIR DUCT HOUSING AND BOOM BOOT DRAINS

A rubber seal between two metal plates fits into and seals the crew fan air duct housing. Shutoff hose clamps are used to control water flow from the crew fan air duct housing and boom boot drains.

1-28 DEEP WATER FORDING KIT-Continued**k. FIRE EXTINGUISHER SYSTEM**

Seven rubber fire extinguisher nozzle caps protect the extinguisher system from the entrance of water and contaminants. These caps are not sealed and would be blown off from the nozzles upon release of the system.

I. SEALING AND MISCELLANEOUS MATERIALS'

Nonhygroscopic tape is applied around the transmission oil filler neck, and to excessively large open areas if required.

Fording sealer is used as a sealing compound around exterior stowage compartment doors, main winch cable opening, removable hull front cover, and all mounting surfaces of the vehicle and deep water fording components.

Electrical insulating and sealing compound is used to seal all exposed electrical connections except battery terminals.

Asbestos sealing compound is used to seal battery terminals.

Wiping cloths are supplied to be used in cleaning and drying the vehicle preparatory to sealing.

Spanner wrenches are provided for installing multipurpose hose.

1-29 RADIO INTERFERENCE SUPPRESSION

Radio interference suppression is the elimination or minimizing of electrical disturbances which interfere with radio reception or disclose the location of the vehicle to sensitive electronic detectors. It is important, therefore, that all vehicles be suppressed properly to prevent interference with radio reception by the same vehicle, neighboring vehicles, or installations. Essentially, suppression is attained by providing a low-resistance path to ground for stray currents. The methods used include shielding the ignition and high-frequency wires, grounding the frame with bonding straps, and using capacitors and resistors.

a. INTERFERENCE SUPPRESSION COMPONENTS

1 Preheat system.

- High-tension cable. The high-tension cable to the spark plug preheater consists of an inner conductor which carries the high voltage to the spark plug, and an outer braided conductor which serves as a shield and also grounds the metal exciter housing to the spark plug housing. The exciter housing is also grounded to the vehicle engine through one of the leads (connected to terminal B) in the exciter power input cable.
- Spark plug. The spark plug is integrally shielded and contains an integral resistor-suppressor.

2 Generating systems. The engine generator and auxiliary engine generator are radio interference suppressed in an identical manner by use of feedthrough capacitors. These feedthrough capacitors are mounted on and extend through the side of the junction box mounted on the generators. The mounting frames of the capacitors are grounded to the box by means of tooth-type lockwashers. The armature circuit capacitor valve is 1.75 microfarads (mfd), and rated at 100 V dc at 300 A. The field and interpole circuit capacitors are both 0.25 mfd, and rated at 100 V dc at 10 A. The blower attached to the engine generator also has a 0.25-mfd, 100 V dc, 20-A, feedthrough capacitor in series with each power lead.

- 3 Personnel heater. The personnel heater fuel pump is integrally suppressed by means of a feedthrough capacitor. A 0.25-mfd, 100-V dc, 20-A, feedthrough capacitor mounted on the motor housing is in series with the blower motor positive power input lead.
- 4 Ventilating blower. A 0.1-mfd, feedthrough capacitor mounted in the motor housing is inserted in series with the power input lead of the blower. The power input lead between the blower and input power connector is also shielded with braided cable.
- 5 Roadwheels, track support rollers, and idler wheels. Static grounding springs are included in the roadwheels and track support rollers. These coil steel springs function as grounding devices for static electricity developed by the wheels and rollers when the vehicle is in motion.

b. OTHER MEANS

Feedthrough capacitors require good bonding or grounding to provide adequate radio noise suppression. Tinned copperbraid bond straps, terminated in appropriate copper lugs and bonded by means of plated tooth-type lockwashers, are used for this purpose when good contact between the component to be suppressed and ground is required. Where clearance is not a problem and the component is mounted with bolts or other fasteners, plated tooth-type lockwashers are used to provide the grounding.

CHAPTER 2 VEHICLE MAINTENANCE INSTRUCTIONS

CHAPTER OVERVIEW

The purpose of this chapter is to present detailed instructions and additional information needed to keep the equipment and components in good repair. These detailed instructions provide a step-by-step illustrated text describing M88A1 service and maintenance for equipment and components.

The maintenance functions described in this chapter are limited to those functions authorized by the MAC for Unit Maintenance level activities. If maintenance is needed on any equipment or components that are not discussed in this chapter, notify Direct Support Maintenance for assistance.

This chapter consists of the following sections:	Page
Section I: Repair Parts, Special Tools, TMDE, and Support Equipment.....	2-1
Section II: Service Upon Receipt.....	2-2
Section III: Preventive Maintenance Checks and Service (PMCS)	2-4
Section IV: General Maintenance	2-34
Section V: Troubleshooting	2-34

SECTION I: REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

Para.	Task	Page
2-1	General	2-1
2-2	Common Tools and Equipment.....	2-1
2-3	Special Tools, TMDE, and Support Equipment	2-1
2-4	Repair Parts	2-1

2-1 GENERAL

Tools, equipment, and repair parts are issued to Unit Maintenance personnel for maintaining the M88A1. Tools and equipment should not be used for purposes other than those prescribed. When not in use, these tools should be properly stowed in the spaces provided on the vehicle.

2-2 COMMON TOOLS AND EQUIPMENT

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

2-3 SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

Certain tools and equipment, specially designed for Unit Maintenance, repair, and general use, are listed in Appendix B for information only. This list is not to be used for requisitioning parts.

2-4 REPAIR PARTS

Repair parts are listed and illustrated in the repair parts list (refer to TM 9-2350-256-24P) covering Unit Maintenance for this equipment.

SECTION II. SERVICE UPON RECEIPT

Para	Task	Page
2-5	General	2-2
2-6	Checking Unpacked Equipment.....	2-2
2-7	Deprocessing Unpacked Equipment	2-2
2-8	Assembly and Installation Instructions	24

2-5 GENERAL

If the vehicle has been shipped by rail, unblock and unload the shipment observing existing regulations. Perform a run-in test of at least 5 miles (8 kilometers [km]) on all new, rebuilt, or overhauled vehicles, and a sufficient number of miles on used vehicles to completely check their operation.

WARNING

- Do not use mineral spirits or paint thinner to clean the M88A1. Mineral spirits and paint thinners are highly toxic and combustible. Prolonged breathing can cause dizziness, nausea, and even death. Do not use these materials.
- Dry-cleaning solvent used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flashpoint of solvent is 138 degrees Fahrenheit (OF) (59 degrees Celsius [°C]).

If any exterior surfaces are coated with rust preventive compound, remove it with dry-cleaning solvent (Appendix D, item 9). Whenever possible, the vehicle crew will help perform these services.

2-6 CHECKING UNPACKED EQUIPMENT

Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on SF Form 364 (Record of Discrepancy).

Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with instructions on DA-PAM 73&750.

2-7 DEPROCESSING UNPACKED EQUIPMENT

a. Assembly of Miscellaneous Vehicle Components

- 1 Attach the left and right fenders to the fender brackets with the hardware contained in the package stowed in the crew compartment.
- 2 Remove bolt from entry door on left side of vehicle and open all hatches and doors.
- 3 Remove components and support item boxes from interior of vehicle.
- 4 Remove tape and protective paper form seats and backrests.
- 5 Remove tape from all lamp lenses and vision blocks.
- 6 Remove screens and replace covers on all access openings on underside of hull.

- 7 Open components and support item boxes and inventory contents with packing list furnished with each container. Record missing items.
- 8 Install radio, periscopes, night viewer, and machine gun mount as required.
- 9 Remove sealing from battery vent plugs, add electrolyte, charge (refer to TM 9-6140-200-14).

b. Pre-Operational Checkout

- 1 Drain power takeoff lubricant to operating level.
- 2 Perform before-operation preventive maintenance checks and services (refer to TM 9-2350-256-10).
- 3 Check lubricant level in engine, transmission, and auxiliary power unit. Check DA Form 2258 (Depreservation Guide for Vehicles and Equipment) to assure proper lubricant.
- 4 Perform complete lubrication in accordance with TM 9-2350-256-10 and Appendix J.
- 5 Check operation of all controls.
- 6 Start engine and check immediately for generator blower operation and for fuel and oil leaks.

NOTE

Due to internal processing, engine may start hard, smoke excessively, and run erratically. However, conditions should greatly improve after five minutes running time. Failure to obtain full engine power will necessitate performing troubleshooting procedures to isolate and correct problem.

- 7 Repeat above step for the Auxiliary Power Unit (APU).
- 8 Perform complete TM 9-2350-256-20 PMCS and road test as outlined in this manual. Record all equipment faults on DA Form 2404 (Equipment Inspection and Maintenance Worksheet).

c. Vehicle Road Test

Refer to TM 9-2350-256-10 for vehicle operating instructions. Road test long enough to make sufficient observations that operation is normal (5 to 10 miles [8 to 16 km]) for new, rebuilt, or overhauled vehicles. Observe instrument panel gages and warning lights during road test. Do not travel at excessive speeds, accelerate rapidly, or in any way load the engine or power train to capacity during break-in period. Stop at least every mile and observe external parts of vehicle. Check for loose parts, lubricant leaks, and overheated hubs on roadwheels, support rollers, and compensating idler wheels.

d. After Road Test

Upon completion of road test, perform TM 9-2350-256-10 PMCS

NOTE

Main engine, transmission, auxiliary power unit engine, power takeoff, winch gearcases, and hydraulic reservoir will not be drained unless expected temperatures require drain and fill with different viscosity oil. Refer to TM 9-2350-256-10 and Appendix J for detailed instructions. The preservative oil in the transmission is good for 100 miles (102 km) and should not be drained during vehicle deprocessing.

2-7 DEPROCESSING UNPACKED EQUIPMENT-Continued

e. Correction of Deficiencies

Equipment faults found during deprocessing or during break-in period will be corrected. Service equipment faults which appear to involve unsatisfactory design or material will be reported on DA Form 5504 (Maintenance Request), as prescribed in DA-PAM 738-750.

2-8 SERVICING OF EQUIPMENT

a. General

Complete lubricating instructions are contained in TM 9-2350-256-10 and Appendix J which prescribe cleaning and lubricating procedures including locations, intervals, and the proper materials. Lubrication will be performed in accordance with TM 9-2350-256-10, Appendix J, and the Maintenance Allocation Chart (Appendix B). Whenever necessary, the driver and crew will assist Unit Maintenance personnel.

b. Special Instructions

Any special lubricating instructions for specific mechanisms or parts are covered in TM 9-2350-256-10.

c. Service Intervals

Service intervals specified in TM 9-2350-256-10 and Appendix J are for normal operation and where moderate temperature, humidity, and atmospheric conditions prevail. For lubrication procedures and instructions under unusual conditions refer to TM 9-2350-256-10.

d. Oil Analysis

Oil sampling of engine and transmission will be conducted as prescribed in TB 43-0210 (Army Oil Analysis Program). Sampling will be done every 25 hours of engine and transmission or every 30 days, whichever comes first, or as directed by the servicing oil analysis laboratory.

e. Reports and Records

- 1 Report unsatisfactory performance of prescribed petroleum fuels, lubricants, or preserving materials, using Da Form 5504 (Maintenance Request).
- 2 Maintain a record of lubrication of the vehicle on DA Form 2408-1 (Equipment Daily or Monthly Log).

SECTION III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES
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Para.	Task	Page
2-9	General.....	2-4.....
2-10	Preventive Maintenance Checks and Services.....	2-5.....
2-11	Special Intervals.....	2-7.....
2-12	General Procedures.....	2-7.....
2-13	Procedures for Special Interval Preventive Maintenance Checks and Services.....	2-7.....

2-9 GENERAL

To ensure that the M88A1 Recovery Vehicle is ready for operation at all times it must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or failure. Table 2-1 contains a tabulated listing of preventive maintenance checks and services to be performed by Unit Maintenance

personnel. All deficiencies and shortcomings will be recorded as well as corrective action taken of DA Form 2404 at the earliest possible opportunity.

2-10 PREVENTIVE MAINTENANCE CHECKS AND SERVICES

The item number of Table 2-1 indicate the sequence of the PMCS. Perform at the intervals shown below:

- Do your (Q) preventive maintenance once each 3 months.
- Do your (S) preventive maintenance twice a year, or each 6 month.
- Do your (A) preventive maintenance once each two years.
- Do your (B) preventive maintenance once each two years.
- Do your (H) preventive maintenance at the hour interval listed.
- Do your (MI) preventive maintenance when the mileage/kilometers of the vehicle reaches the amount listed

If something doesn't work, troubleshoot it with the instructions in the manual and notify your supervisor.

Always do your preventive maintenance in the same order, so it gets to be a habit. Once you've had some practice, you'll spot anything wrong in a hurry.

If anything looks wrong and you can't fix it, write it down on your DA Form 2404. If you find something seriously wrong, report it to Direct Support Maintenance as soon as possible.

WARNING

Dry-cleaning solvent (P-D-680), used to clean parts, is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flashpoint of solvent is 138° F(59° C)

Keep it clean: Dirt, grease, oil and debris only get in the way and may cover up a serious problem. Clean as work and as needed. Use dry-cleaning solvent (Appendix D, item 9) to clean metal surfaces. Use soap and water to clean rubber or plastic material. Keep all air ducts clear of foreign matter. Special cleaning instructions are given, when necessary, in the pertinent sections.

Bolts, nuts, and screws. Check that they are not loose, missing bent, or broken. You can't try them all with a tool, of course. but looking for chipped paint, bare metal, or rust around bolt heads. Tighten any that you find loose.

Welds: Looks for loose or chipped paint, rust, or gaps when parts are welded together. If you find a bad weld, report it to Direct Support Maintenance.

Electric wires and connectors: Look for cracked or broken insulation, bare wires, and loose or broken connectors. Tighten loose connections and make sure the wires are in good condition.

Hoses and fluid lines: Look for wear, damage, leaks. make sure clamps and fittings are tight. Wet spots show leaks, of course, but a stain around a fitting or connector and also mean a leak. If a leak comes from a loose fitting or connector, tighten it. If something is broken or worn out, either correct it or report it to Direct Support Maintenance (see MAC chart).

It is necessary for you to know how fluid leaks affect the status of you equipment. The following are definitions of the types/classes of leakage you need to know to be able to determine the status of your equipment. Learn and be familiar with them and remember-When in doubt, notify you supervisor.

2-10 PREVENTIVE MAINTENANCE CHECKS AND SERVICES-Continued**CAUTION**

- Equipment operation is allowable with minor leakage (Class I or II) with exception of fuel leaks. Consideration must be given to fluid capacity in item/system being checked/inspected. When in doubt, notify your supervisor.
- When operating with Class I or II leaks, continue to check fluid levels as required in your PMCS. Class III leaks require corrective action and should be reported to your supervisor.

Leakage definitions for Unit PMCS:

- CLASS I-Seepage of fluid (as indicated by wetness or discoloration). Not great enough to form drops.
- CLASS II-Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being checked/inspected.
- CLASS III-Leakage of fluid great enough to form drops that fall from the item being checked/inspected.

CAUTION

Water may enter the engine exhaust system when washing the vehicle. To prevent this occurrence, tape the exhaust outlets before washing the vehicle, or operate the engine while washing. Care must also be taken to prevent water from entering the personnel heater exhaust tube or auxiliary engine exhaust exhaust by covering the exhaust outlets with tape or cap. Do not use high pressure hoses inside the hull.

Unwashed Vehicle. The driver or crew should present the vehicle for scheduled preventive maintenance services in a reasonably clean condition. That is, it should be dry and not caked with mud to such an extent as to seriously hamper inspection and service. However, washing of the vehicle should be avoided immediately prior to an inspection, since certain types of defects such as loose parts and oil leaks may not be noticeable immediately after washing.

Plates. Nameplates, caution plates, and instruction plates found dirty or corroded should be thoroughly cleaned and heavily coated with clear lacquer. Refer to TM 43-0139.

Services. Unit Maintenance services are defined by, and restricted to, the following general procedures:

- Adjust. Make all necessary adjustments in accordance with instructions contained herein.
- Special lubrication. Special lubrication applies either to lubrication operations that do not appear in TM 9-2350-256-10, or to items that do appear, but which should be performed in connection with the maintenance operations.
- Service. Servicing usually consists of performing special operations, such as replenishing battery water, draining and refilling units with oil, and changing the oil filters, fuel filters, and air cleaner filters.
- Tighten. Tighten all units to torque specified herein or, if not specified, tighten to accepted practices Use a torque wrench where specified. Do not over tighten, as this may strip threads or

cause distortion. Tightening includes the correct installation of lockwashers, nuts lockwire, or cotter pins to secure the tightened nut or bolt in place.

Special Conditions. When conditions make it difficult to perform the complete preventive maintenance procedure on the vehicle at one time, the procedure can be handled in sections. Plan to complete all operations within the week, if possible. All available time must be utilized, if necessary, to assure that maintenance operations are completed.

2-11 SPECIAL INTERVALS

Operation under adverse conditions, such as extreme temperatures, dust, or mud may require more frequent services. Commanders are authorized to reduce the intervals between preventive maintenance services whenever conditions warrant.

When mileage is accumulated rapidly, the appropriate preventive maintenance services will be performed at the commander's discretion.

After operation in water, mud, or loose sand, the vehicle should be cleaned of any foreign matter as soon as possible and lubricated.

2-12 GENERAL PROCEDURES

Automatically Applied. The general listed procedures in TM 9-2350-256-10 will be followed. Unit Maintenance mechanics must be so thoroughly trained in these procedures that they apply them automatically at all times in the performance of their duties.

Driver/Crew Participation. The driver or crew usually accompanies the vehicle and assists the Unit Maintenance mechanics in performance of these services.

2-13 PROCEDURES FOR SPECIAL INTERVAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES

DA Form 2404 (Equipment Inspection and Maintenance Worksheet) is utilized by the Unit Maintenance mechanic to record periodic inspections and maintenance services performed, faults corrected and faults beyond the organizational category to correct. The item numbers recorded on DA Form 2404 must correspond to the item numbers on the Unit Preventive Maintenance Checks and Services Table 2-1.

Table 2-1 reflects the work required to accomplish inspections, tests, services, and minor repairs such as replacement of cotter pins, screws, nuts, washers, and locking wire. Work to remove or disassemble components or assemblies necessary to accomplish preventive maintenance checks and services is also included. The repair or replacement of defective components, assemblies, or repair parts is not included in this table. See the Maintenance Allocation Chart, Appendix B.

During accomplishment of preventive maintenance checks and services, certain components and assemblies must be removed or disassembled. Pertinent items of Table 2-1 refer to paragraphs in the manual containing instructions for removal or disassembly. Removal and disassembly is limited to that authorized by the Maintenance Allocation Chart, Appendix B.

The driver is often unaware of defects that have developed gradually in the vehicle. Unit Maintenance personnel shall road test the vehicle as part of the preventive maintenance checks and services. During and after road test, any repairs or adjustments necessary to assure safe operation should be made. Any defect that does not require

**2-13 PROCEDURES FOR SPECIAL INTERVAL PREVENTIVE MAINTENANCE
CHECKS AND SERVICES-Continued**

immediate correction should be noted on DA Form 2404. This defect should be corrected later during the after-road-test services. The road test should be approximately five, but not more than 10 miles (16 km). Perform the before-operation services listed in TM 9-2350-256-10.

After all services and inspections on the vehicle have been completed, take the vehicle out on a short road test (approximately 5 miles [8 km]) to assure that equipment faults have been corrected. Pay particular attention to those items which were found defective initially. Correct any remaining problems noted during this test run.

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE MSBA1

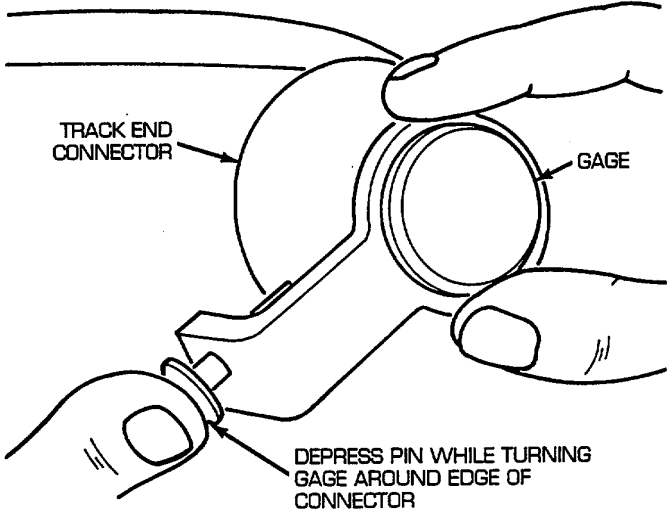
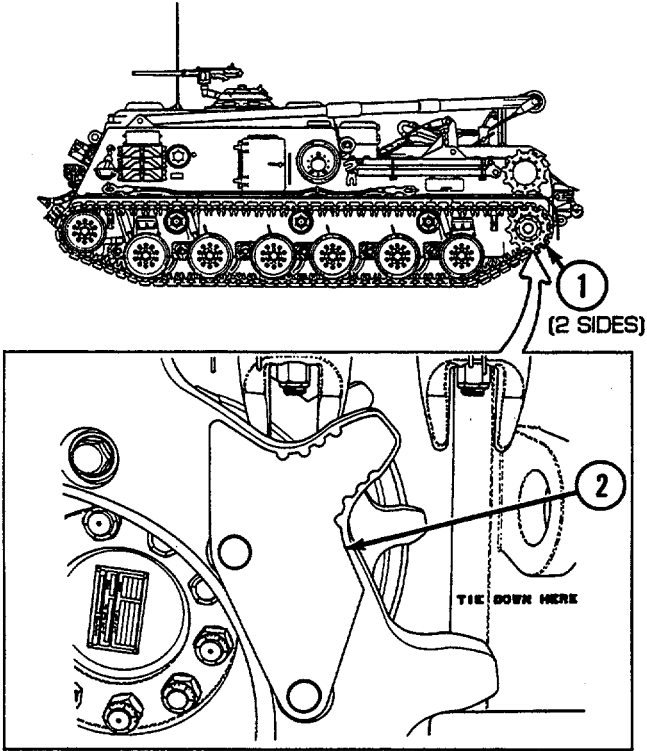
Item No.	Interval	Location Item To Check/ Service	Procedure	Not Fully Mission Capable If:
1	S	Fenders	Inspect for dents, cracks, breaks, or other damage.	
2	S S	Tracks	<p>a. Check track adjustment and adjust as necessary.</p> <p>b. Check end connectors for wear using end connector wear gage. Proceed as follows:</p> <ol style="list-style-type: none"> (1) Place locator of end connector wear gage (Appendix C, item 15) over protruding end of track link pin. (2) Depress pin of gage and observe whether pin touches end connector. (3) Rotate gage around end surface of connector and measure wear in various locations. (4) If end of gage pin fails to touch surface of connector at any point when gage is fully depressed, end connector is excessively worn and must be replaced. 	End connector unserviceable

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M88A1-Continued

Item No.	Interval	Location Item To Check/ Service	Procedure	Not Fully Mission Capable If:
3	<p>S</p> <p>S</p> <p>S</p>	Sprockets	<p style="text-align: center;">NOTE</p> <p>Refer to paragraph 8-10 for removal and installation instructions.</p> <p>a. Inspect sprockets (1) for cracks and breaks and replace where needed.</p> <p>b. Check sprocket teeth for wear. If only forward side of sprocket tooth is worn to limit, reverse inner and outer sprockets.</p> <p>c. Tighten loose mounting bolts to 225-250 pound-feet (lb-ft) (305-339 newton-meters [N•m]).</p> <div style="text-align: center;">  <p>The diagram shows a side view of the M88A1 vehicle's track system. A circled '1' with an arrow points to the sprockets on both sides, labeled '(2 SIDES)'. Below this is a detailed view of a sprocket hub with a circled '2' pointing to a specific location on the hub, labeled 'TIE DOWN HERE'.</p> </div>	Both sides of teeth are worn
4		Wheel Arms and Hubs	<p style="text-align: center;">WARNING</p> <p>Be careful when feeling wheel hubs. They can heat up enough to cause burns.</p>	

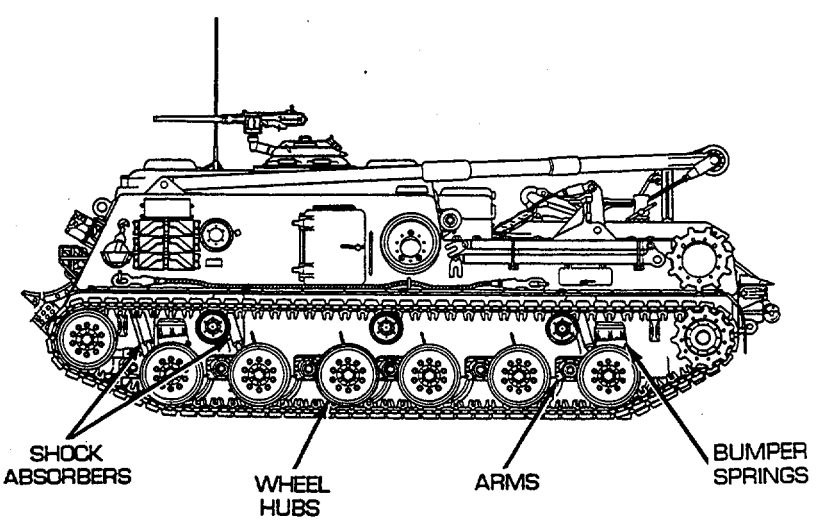
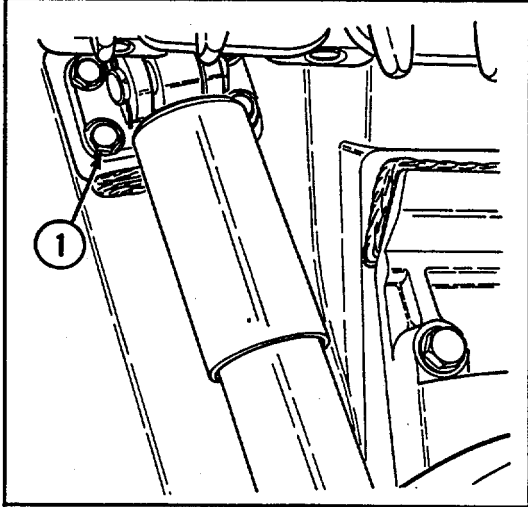
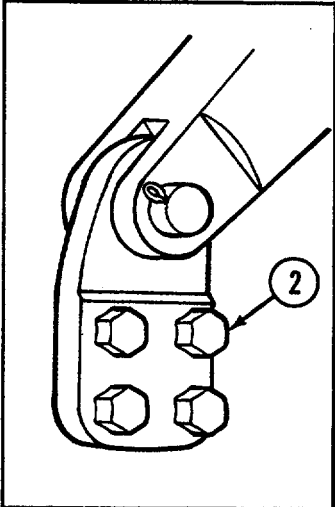
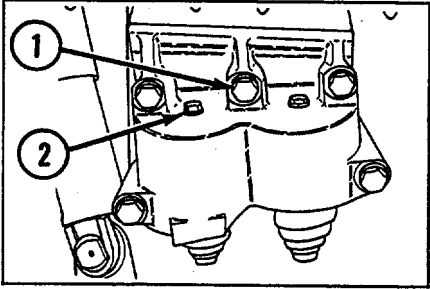
Item No.	Interval	Location Item To Check/ Service	Not Fully Mission Procedure	Capable If:
5	S		<p align="center">NOTE</p> <p>Prior to performing this check, the vehicle must be operated for 5-10 minutes.</p> <p>a. Visually inspect arms and hubs for lubricant leaks.</p> 	Two or more hub seal leaks are found
	S	Shock Absorbers	<p>b. Replace seals and/or gaskets where leaks are evident. Refer to paragraphs 8-3 and 8-4 for detailed removal and installation instructions.</p> <div style="border: 1px solid black; padding: 5px; text-align: center; width: fit-content; margin: 10px auto;">WARNING</div> <p>Be careful when feeling shock absorbers. They can heat up enough to cause burns.</p> <p align="center">NOTE</p> <p>Prior to performing this check, the vehicle must be operated for 5-10 minutes.</p>	
	S		<p>a. Attempt to move shock absorbers from side to side. If movement is present, shock absorber bearing or pin is defective. Refer to paragraph 8-12 for removal and installation.</p>	

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M88A1 ---Continued

Item No.	Interval	Location Item To Check/ Service	Procedure	Not Fully Mission Capable If:
5-Cont.	S	Shock Absorbers-Cont.	<p>b. Tighten loose mounting bolts. Torque upper bracket bolts (1) to 145-175 lb-ft (197-237 Nom) and lower bracket bolts (2) to 300-340 lb-ft (407-461 Nom).</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div>	
6	S S	Bumper Springs	<p>a. Visually inspect for broken, cracked, or compressed bumper springs. Refer to paragraph 811 for removal and installation instructions.</p> <p>b. Tighten loose mounting bolts. Torque bolts (1) to 350-400 lb-ft (475-542 N-m) and bolts (2) to 150-170 lb-ft (203-231 N-m).</p> <div style="text-align: center; margin-top: 20px;">  </div>	

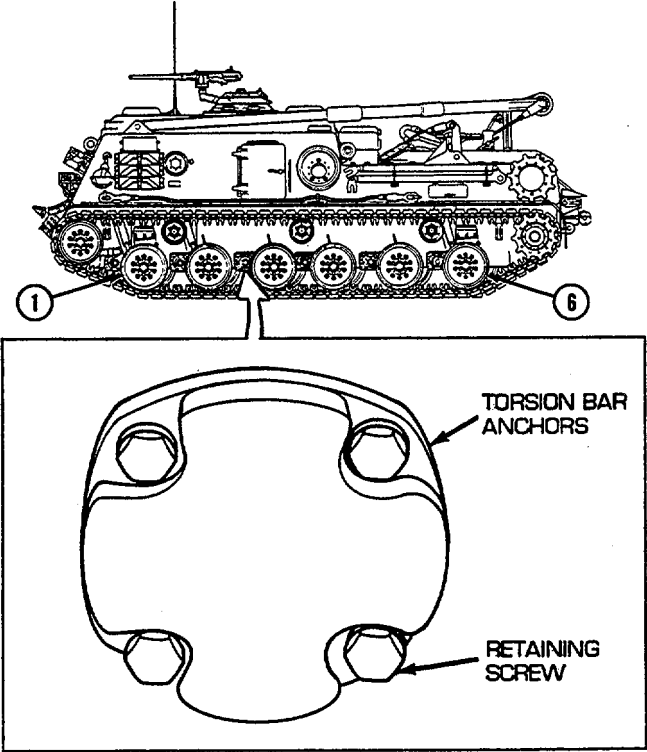
Item No.	Interval	Location Item To Check/ Service	Procedure	Not Fully Mission Capable If:
7	S	Torsion Bar Anchors	<p>Visually inspect torsion bar anchors to ensure that they are fully seated and retaining screws are in place and secure. Torque screws to 40-50 lb-ft (54-68 N-m).</p>  <p>The diagram consists of two parts. The upper part is a side view of a tank chassis with callouts 1 and 6 pointing to the front and rear torsion bar anchors respectively. The lower part is a top-down view of the chassis, showing four circular torsion bar anchors and four retaining screws. Labels 'TORSION BAR ANCHORS' and 'RETAINING SCREW' point to the respective parts.</p>	Two or more torsion bar anchors unserviceable on any one side
8	S	Drain Valves and Drain Valve Seals	<p>a. Operate drain valve lever to assure free operation of two drain valves (located at front and rear of underside of hull). The drain valves should seal openings completely when closed.</p>	
	S		<p>b. Inspect drain valve bearing surfaces for nicks, dents, scored bearing surface, and out-of-roundness.</p>	
9	S	Decals, Name Plates, Stencils, Markings and Paint	<p>a. Replace decals and name plates that are not legible.</p> <p style="text-align: center;">NOTE</p> <p>Refer to TM 9-213 for painting information and procedures.</p>	
	S		<p>b. Restencil markings that are not legible.</p>	

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M88A1-Continued

Item No.	Interval	Location Item To Check/ Service	Procedure	Not Fully Mission Capable If:
9-Cont.	S	Decals, Name Plates, Stencils, Markings and Paint-Cont.	<p>c. Clean and paint bare spots on painted surfaces that might permit reflections, rust or corrosion.</p> <p style="text-align: center;">CAUTION</p> <p style="text-align: center;">High intensity noise hearing protection required (4).</p> <div style="text-align: center;"> </div> <p style="text-align: center;">DECAL LOCATION — CREW COMPARTMENT</p> <div style="text-align: center;"> </div>	

Item No.	Interval	Location Item To Check/ Service	Procedure	Not Fully Mission Capable If:
10	S	Access Covers,	a. Check for loose or missing access covers.	I
	S	Seals, Racks, Straps, and Clamps	b. Replace defective door seals.	
	S		c. Replace defective straps and retaining dampers.	
	S			
11	S	Commander's Cupola	a. Rotate cupola to ensure that ring does not bind.	Will not lock open or closed
	S		b. Operate cupola door latches and locks in open and closed positions to assure ease of operation.	
	S		c. Check seals and crash pads for tears and deterioration.	
	S		d. Check that vision blocks are free of fungus growth, chips, fractures, and separation that would interfere with vision.	
12	S	Machine Gun Mount .50-caliber	a. With machine gun installed, elevate and depress mount to full range (93° elevation and 21° depression).	
	S		b. Check for weak or faulty equilibrator action.	

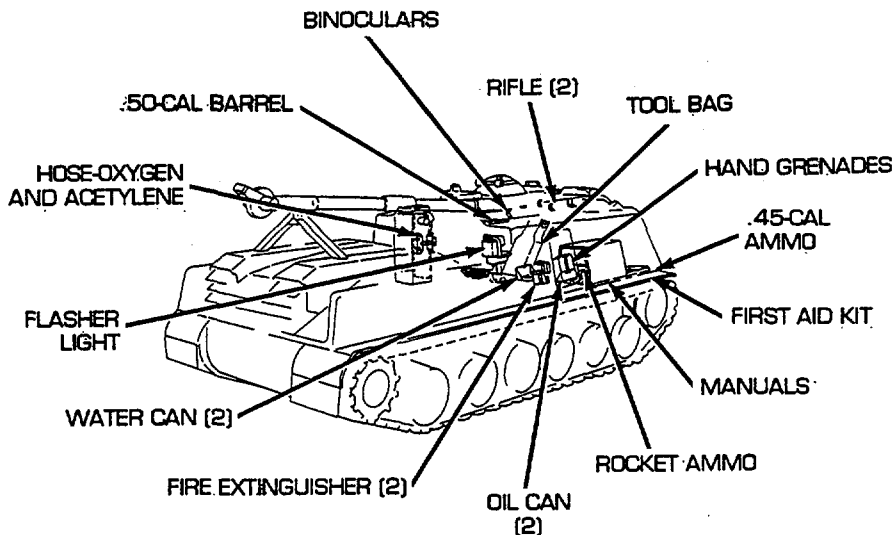
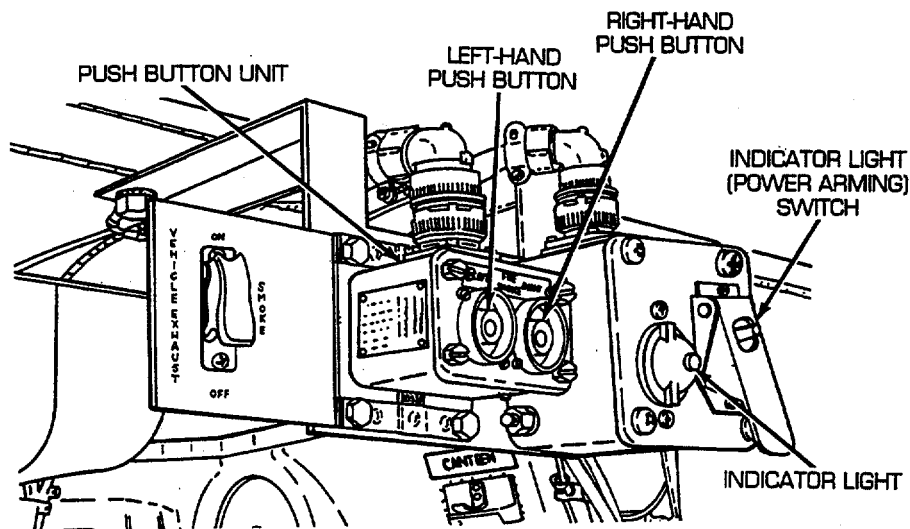


TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M88A1 -Continued

Item No.	Interval	Location Item To Check/ Service	Procedure	Not Fully Mission Capable If:
12-Cont.		Machine Gun Mount .50-caliber-Cont.	<p style="text-align: center;">WARNING</p> <p>Dry-cleaning solvent used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flashpoint of solvent is 138°F (590C).</p> <p>c. Clean mount with dry-cleaning solvent (Appendix D, item 9).</p>	
13	S S S S S	Smoke Grenade Launcher System, M239	<p>d. Lubricate all moving parts with lubricating oil (Appendix D, item 18). Refer to TM 3-1040-266-20&P for additional PMCS instructions.</p> <p>a. Inspect condition of cables for fraying, or broken wires, and for tightness of fit in connectors.</p> <p>b. Check spring return action of push button firing switches, and switching action of toggle switch.</p> <p>c. Check light bulb in power (arming) switch assembly.</p>	



Item No.	Interval	Location Item To Check/ Service	Procedure	Not Fully Mission Capable If:
	S		<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px; text-align: center;">WARNING</div> <p>Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.</p> <p>d. Perform continuity checks on system as follows:</p> <ol style="list-style-type: none"> (1) Place MASTER switch in ON position. (2) Place power (arming) switch in ON position. (3) Depress and hold L hand push button. (4) Check to see if approximately 24 volts exists on plug pins in tubes (5, 2, and 1) on left discharger, and (3, 6, and 4) on right discharger. No voltage should exist on any other plug pins. (5) Release L hand push button and depress and hold R hand push button. (6) Check to see if approximately 24 volts exists on plug pins in tubes (3, 6, and 4) on left discharger and (5, 2, and 1) on right discharger. No voltage should exist on any other plug pins. 	

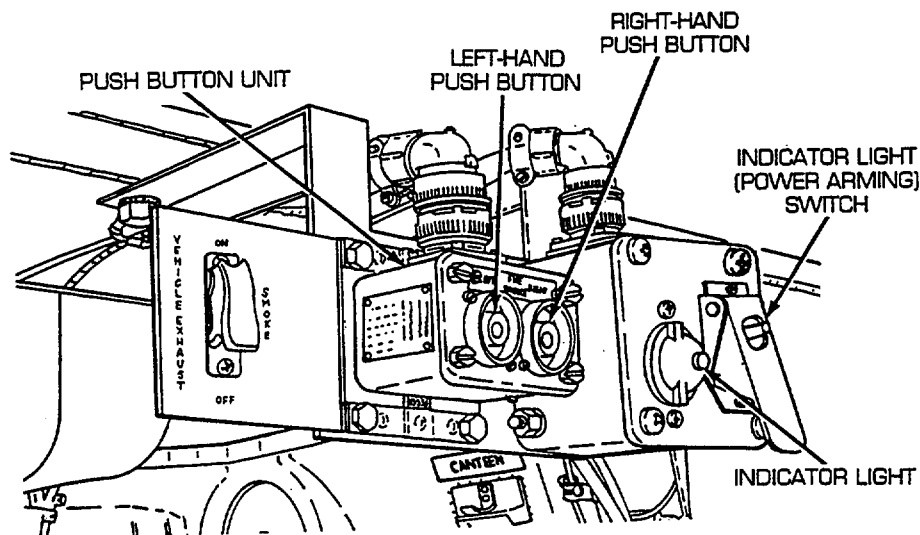
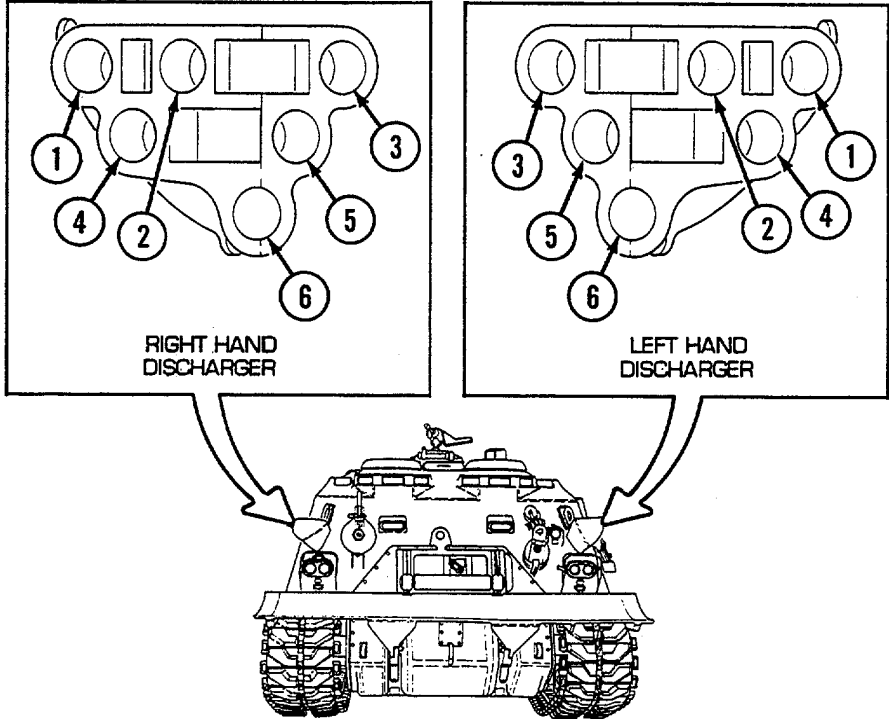


TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M88A1-Continued

Item To Item No.	Interval	Location	Check/ Service	Procedure	Not Fully Mission Capable If:
13-- Cont.		Smoke Grenade Launcher System, M239- Cont.			
14	S S S S S	APU	<ol style="list-style-type: none"> a. Start engine. Listen for unusual noises in engine and generator which might indicate improper operation. b. Observe warning lights and oil pressure gage to see if unit is functioning properly. Oil pressure gage should indicate approximately between 30-45 pounds per square inch (psi) (207-310 kilopascal [kPa]). c. Service primary fuel filter. Replace filter semiannually. d. Service primary fuel filter. Replace filter semiannually. e. Tighten fuel, oil, and air connections that leak. 	APU not serviceable	

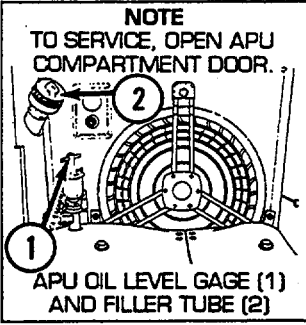
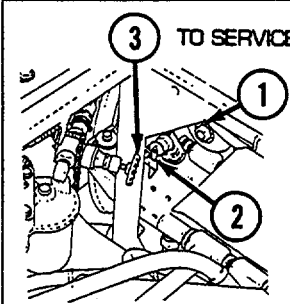
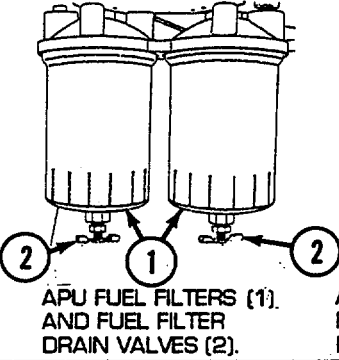
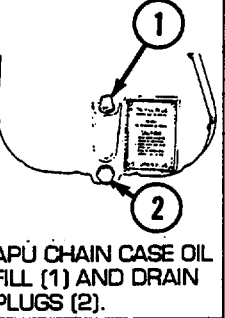
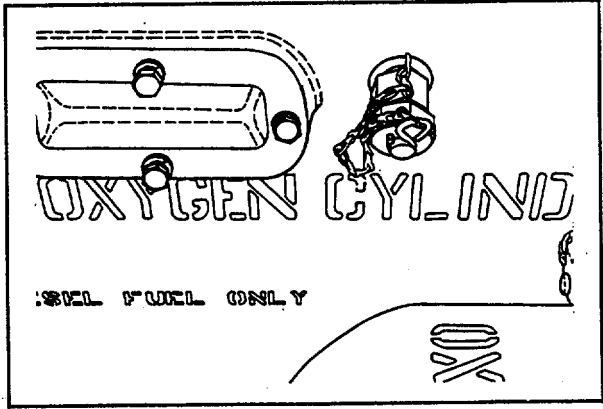
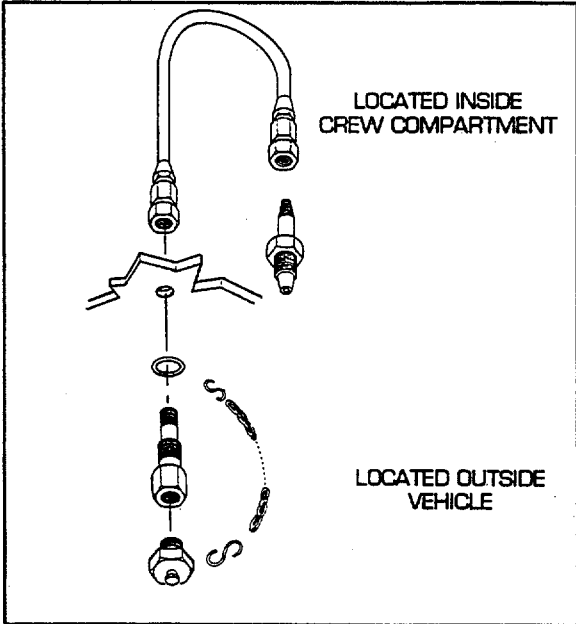
Item No.	interval	Location Item To Check/ Service	Procedure	Not Fully Mission Capable If:
			<p>f. Inspect air system components and replace if damaged or deteriorated.</p> <div style="border: 1px solid black; padding: 5px;"> <p>NOTE TO SERVICE, OPEN APU COMPARTMENT DOOR.</p>  <p>APU OIL LEVEL GAGE (1) AND FILLER TUBE (2)</p> <p>NOTE TO SERVICE, OPEN RIGHT FRONT ENGINE DECK AIR INLET DOOR.</p>  <p>APU OIL FILTER (1), APU CRANKCASE OIL DRAIN VALVE (2), AND APU EMERGENCY FUEL SHUTOFF VALVE (3).</p>  <p>APU FUEL FILTERS (1) AND FUEL FILTER DRAIN VALVES (2).</p>  <p>APU CHAIN CASE OIL FILL (1) AND DRAIN PLUGS (2).</p> </div>	
15	S	Acetylene Hose and Adapter	<p>Inspect acetylene hose, adapter, and related parts for leaks and damage. Replace defective parts in accordance with paragraph 947.</p> <div style="border: 1px solid black; padding: 5px;">  <p>OXYGEN CYLINDERS</p> <p>USE FUEL ONLY</p> </div>	

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M88A1-Continued

Item No.	Interval	Location Item To Check/ Service	Procedure	Not Fully Mission Capable If:
15-Cont.	S	Acetylene Hose and Adapter-Cont.		
16	S	Stowage Boxes	a. Inspect and repair locks and hinges.	
	S		b. Tighten loose mounting bolts.	
17	S	Seats	a. Inspect seats for torn cushions and backrests.	
	S		b. Check adjusting mechanisms and trip levers for smooth operation.	
18		Fire Extinguishers (Fixed)	<p style="text-align: center;">NOTE</p> <p>A cylinder must be recharged or replaced if its weight loss exceeds 10 percent of difference between full and empty weight marked on cylinder.</p>	
	S		a. Remove and weigh each cylinder. Refer to paragraph 10-4 for removing, weighing, and installing instructions.	

Item No.	Interval	Location Item To Check/ Service	Procedure	Not Fully Mission Capable If:
			<p style="text-align: center;">NOTE</p> <p>A cylinder must be recharged or replaced if its weight loss exceeds 10 percent of difference between full and empty weight marked on cylinder.</p> <p>b. Inspect the fire extinguisher data plate to insure that hydrostatic tests have been performed on each cylinder in the past five years.</p> <p>c. Clean cylinder discharge nozzles of foreign matter.</p> <p>d. Before replacing fixed fire extinguisher cylinders, operate remote control discharge handles to make sure that cables do not bind, and that they control discharge function properly.</p> <p>e. Seal remote control handles before checking system.</p> <p>f. Ensure fire extinguisher interlock switch assembly is operating properly by pulling out safety pin and letting cover plate swing down. A clicking sound should be heard.</p>	<p>Cable binds, or will not operate smoothly</p>
	S			
	S			
	S			
	S			
	S			

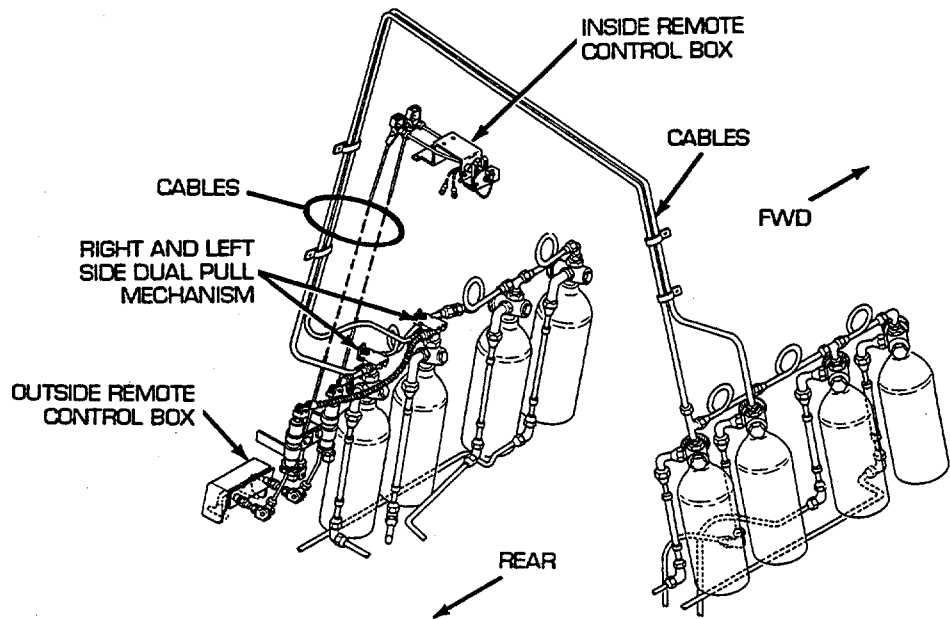


TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE MSSA1--Continued

Item No.	Interval	Location Item To Check/ Service	Procedure	Not Fully Mission Capable If:
19	S	Steering	With vehicle operating in moderate speed and steering control centered, check for any tendency to wander or pull to one side. If either of these conditions exist, check steering controls and linkage adjustment in accordance with paragraph 9-72.	
20	S	Brakes	<p>a. Accelerate vehicle to 15 miles per hour (mph) (24 kilometers per hour [kph]) and do the following:</p> <p>(1) Release accelerator and apply brakes.</p> <p>(2) Observe if vehicle stops effectively without pulling to one side. Vehicle must stop within 4 feet (ft) (1.2 meters [m]), when stopping at 15 mph (24 kph).</p> <p>b. With vehicle on an incline, do the following:</p> <p>(1) Depress brake pedal and move transmission shift lever to P (park) position.</p> <p>(2) Observe if brakes lock securely and vehicle is held in place.</p>	Brakes do not operate properly
21	S	Transmission	Shift through all forward and reverse speed ranges and notice if transmission shifts smoothly, without excessive vibration or unusual noises, and that response is satisfactory.	
22	S	Accelerator Controls and Linkages	<p style="text-align: center;"><u>CAUTION</u></p> <p>If governor malfunctions, engine speed must not exceed 2640 rpm for more than 2 or 3 seconds.</p> <p>a. Move the accelerator through its entire range and observe if engine rpm response is satisfactory.</p> <p>b. With the transmission lever in neutral position, the engine should idle smoothly between 675 and 725 rpm.</p> <p>c. Adjust accelerator controls and linkages in accordance with paragraph 9-79.</p>	Idle is not between 675 and 725 rpm

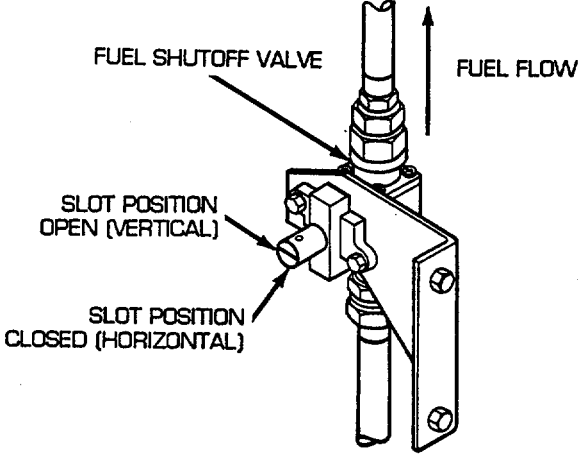
Item No.	Interval	Location Item To Check/ Service	Procedure	Not Fully Mission Capable If:
23	S S S	Exhaust Smoke Generating System	<p style="text-align: center;">WARNING</p> <p>Never activate smoke generator system in a building or closed area, or with personnel at rear of vehicle.</p> <p>a. Check that fuel shutoff valve is open.</p> <p>b. Check tightness of all electrical connectors.</p> <p>c. Inspect for evidence of leakage and tighten fuel connections as necessary</p> 	Any fuel leak is present
24	S	Fuel Filter	<p style="text-align: center;">NOTE</p> <p>Remove powerplant (see paragraph 3-1).</p> <p>Replace primary fuel filter (see paragraph 4-14).</p>	
25	S	Fuel Water Separator	Replace fuel/water separator filters (see paragraph 4-15).	
26	S	Oil Coolers	<p>a. Inspect oil coolers for leaks or dirty fins. Repair any leaks authorized for Unit Maintenance.</p> <p style="text-align: center;">WARNING</p> <p>Wear eye protection when working with pressurized air to prevent debris from causing injury.</p>	Cooler damaged, clogged, or leaks are present

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M88A1--Continued

Item No.	Interval	Location Item To Check/ Service	Procedure	Not Fully Mission Capable If:
26-Cont.	S	Oil Coolers-Cont.	b. Clean dirty fins with low pressure air. Inspect oil cooler lines for holes, rips, and tears. Replace oil cooler lines as necessary in accordance with paragraph 5-7.	
	S		c. Inspect oil cooler screens for clogs or holes.	
27	S	Cooling Fans	Check engine cooling fans for proper alignment and damage (see paragraph 5-2).	Fan damaged or improperly aligned
28	S	Manifold Heater	a. Replace manifold heater fuel filter (see paragraph 4-18).	
	S		b. Inspect and service manifold heater spark plug. (1) Clean electrodes. (2) Wipe insulator clean of accumulated grease and dirt.	
	S		c. Shut off engine before it reaches operating temperature and do the following: <div style="border: 1px solid black; padding: 5px; text-align: center;">WARNING</div> Be careful when feeling engine. Engine parts can be hot enough to cause burns. (1) Using extreme caution, run hand along each intake manifold to check for heat generated by manifold heaters. (2) If heaters are operative, heat will be felt.	
29	S	Main Engine Oil Filters	Replace main engine oil filters (see paragraph 3-5).	
30	S	Main Engine Air Cleaner	Clean main engine air cleaner (refer to TM 9-2350-256-10). (1) Be sure that all joints, seals, and connections are tight and not leaking. (2) Inspect air intake hoses for tears and deterioration.	Hoses are damaged

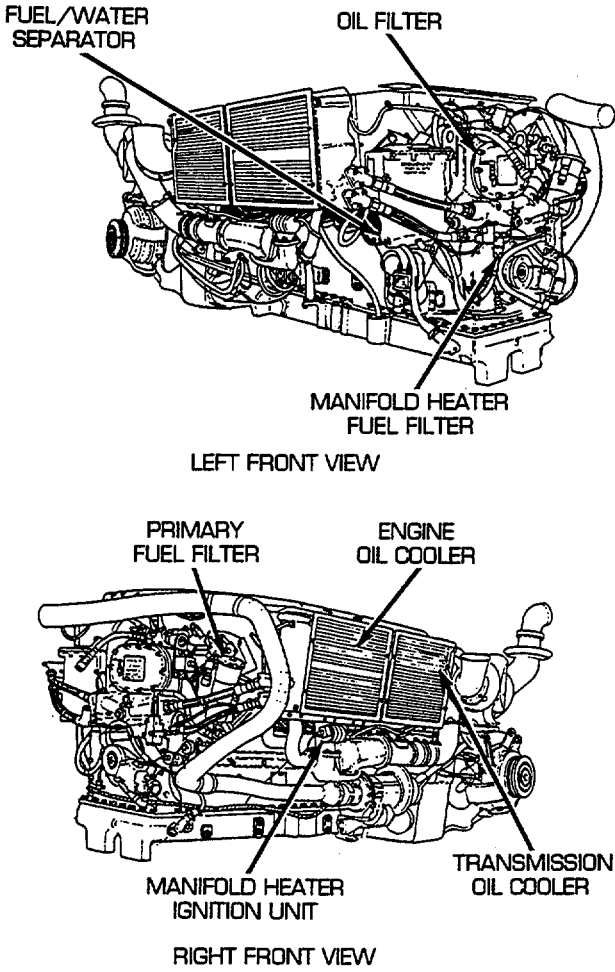
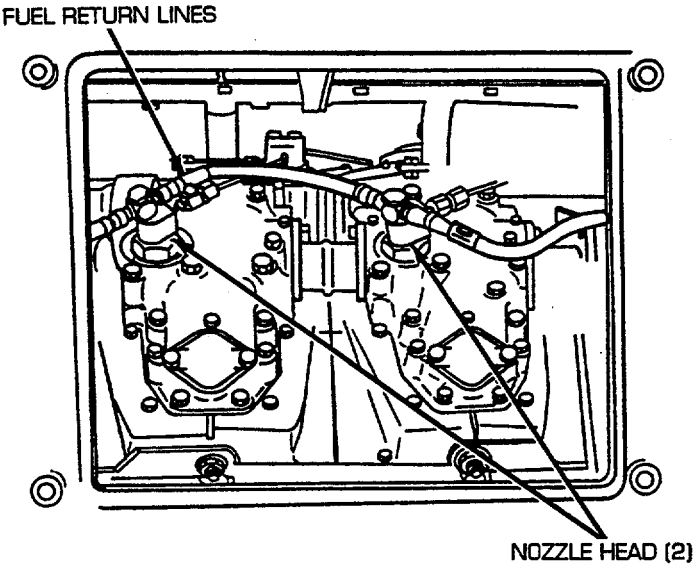
Item No.	Interval	Location Item To Check/ Service	Procedure	Not Fully Mission Capable If:
31	S S	Engine Rear Mount and Oil Pan Plug	<p>a. Check engine rear mount and base assembly for damage.</p> <p>b. Check oil pan plug and gasket for leaks.</p> 	Class HI leak present
32		Fuel Tanks	Check for class III leaks.	Class III leak present
33		Fuel Manifold	Check for class III leaks.	Class III leak present
34	S	Fuel Injector Lines	Check all fuel injector lines and coupling nuts to insure they are properly tightened. The proper tightening is 1/10 turn (minimum) to 1/3 turn (maximum) after the sleeve is seated.	

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE MS88A1-Continued

Item No.	Interval	Location Item To Check/ Service	Procedure	Not Fully Mission Capable If:
35	S S	Fuel Injector Lines, Fuel Return Lines, and Related Parts	<p>a. Immediately inspect fuel injector lines, fuel return lines, fuel control valves, and fuel injector and holder assemblies for leakage.</p> <div style="border: 1px solid black; padding: 5px; text-align: center; width: fit-content; margin: 10px auto;"> WARNING </div> <p>Be careful when feeling engine. Engine parts can be hot enough to cause burns.</p> <p>b. Check to be sure there is no movement of nozzle head inside outer fuel injector assembly. This inspection can be accomplished by placing hand between the nozzle head and top of the holder before engine temperature rises. If movement of the nozzle is felt, stop engine and notify Direct Support Maintenance.</p> <div style="text-align: center; margin-top: 20px;">  <p style="margin-top: 0;">FUEL RETURN LINES</p> <p style="margin-top: 100px; margin-left: 200px;">NOZZLE HEAD (2)</p> </div>	
36	S S	Purge Pump	<p>a. Check operation of purge pump.</p> <p>b. Check connections (1 and 2) for evidence of leakage.</p>	Class m leak present

SECTION III: PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

TM 9-2350-256-20

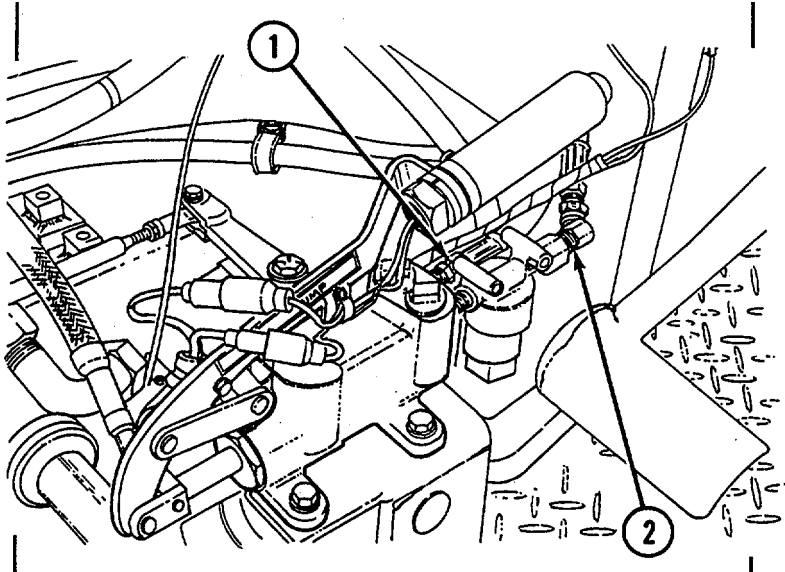
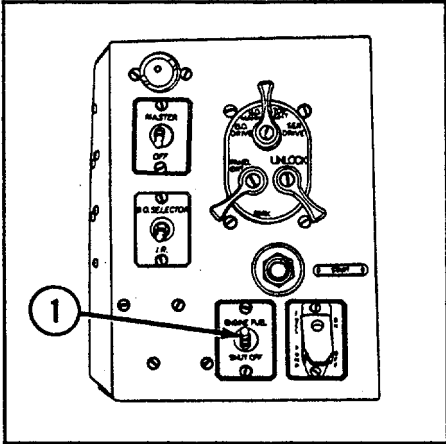
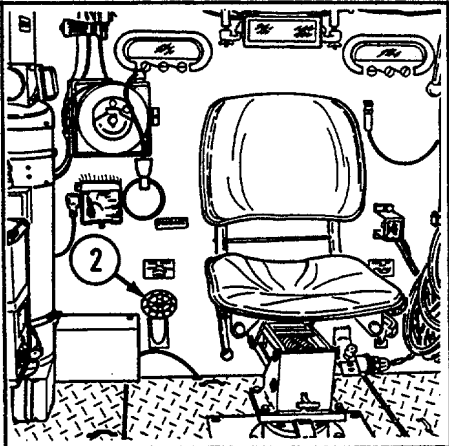
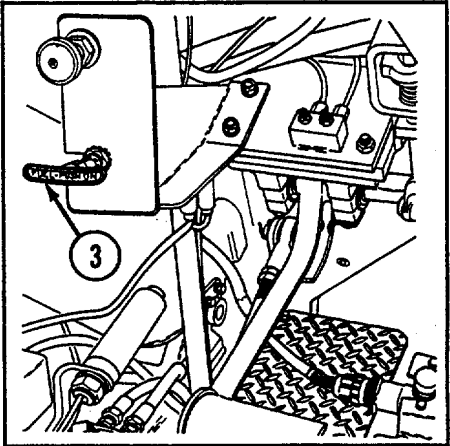
Item No.	Interval	Location Item To Check/ Service	Procedure	Not Fully Mission Capable If:
37	S	Starter	 <p>While starting engine, listen for unusual noises and difficult cranking at starter</p>	Unusual noises present
38	S	Generator	<p>Listen for unusual noises in engine and generator which might indicate improper operation.</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Checks below are performed with powerpack installed (see paragraph 3-1).</p>	Unusual noises present
39	S	Exhaust System	<p>Inspect exhaust system for damaged or deteriorated components. Tighten loose clamps and mounting bolts.</p>	
40	S	Engine Fuel Shutoff and Accelerator Controls	<p>Start the engine again and perform the following:</p> <ol style="list-style-type: none"> 1 Listen for unusual noises, hesitations, and varying idle speed. 2 Check throttle and accelerator controls for smooth operation. 3 Check operation of fuel shutoff switch (1), manual fuel shutoff valve (2), and fuel shutoff handle (3). 	One switch/valve is inoperable

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M88A1-Continued

Item No.	Interval	Location Item To Check/ Service	Procedure	Not Fully Mission Capable If:
40-Cont	S	Engine Fuel Shutoff and Accelerator Controls-Cont.	  	
41	S	Governor No-Load Test	<p style="text-align: center;">CAUTION</p> <p style="text-align: center;">If governor malfunctions, engine speed must not exceed 2640 rpm for more than 2 or 3 seconds.</p> <p>Perform governor no-load test as follows:</p> <p>(1) Run engine until normal operating temperatures (engine oil at 1400F [60°C] to 2400F [116°C], transmission oil at 160°F [720C] to 2800F [1380C]) are reached.</p>	

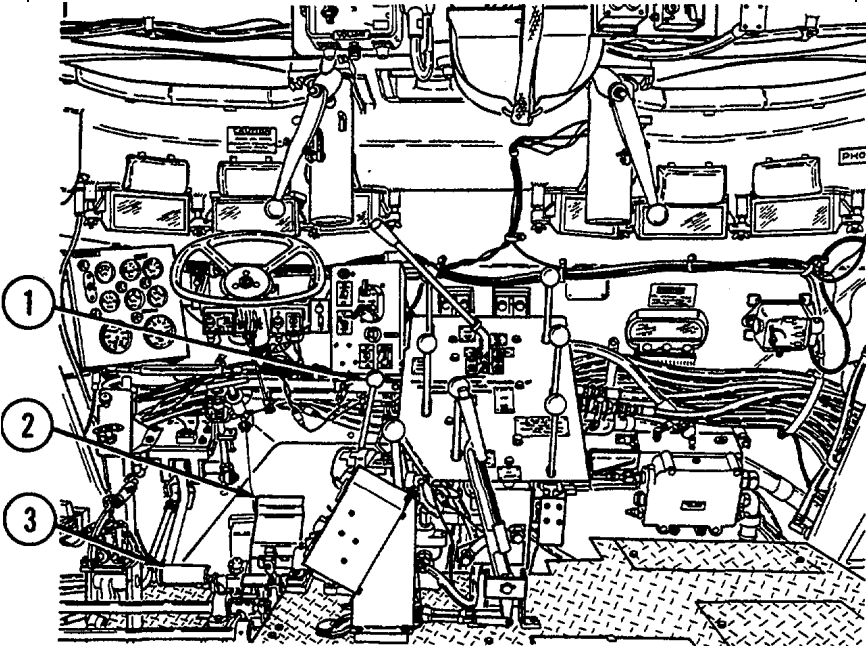
Item No.	Interval	Location Item To Check/ Service	Procedure	Not Fully Mission Capable If:
42	S	Stall Test	<p>(2) With transmission (1) in neutral, gradually open the throttle until the accelerator pedal (2) is fully depressed. Engine speed will generally exceed 2640 rpm momentarily; when speed will stabilize between 2400 and 2640 rpm. If the governor repeatedly cuts in and out or surges, notify Direct Support Maintenance.</p>  <p style="text-align: center;">WARNING Vehicle may move even with brakes in the locked position</p> <p style="text-align: center;">CAUTION Do not stall test engine for more than 30 seconds, or converter will overheat.</p> <p>Perform stall test.</p> <p>(1) Run engine until normal operating temperature is reached.</p> <p>(2) Depress brake (3) to lock it in position; place transmission (1) in high range and run the engine at full throttle for 30 seconds.</p>	<p>Rpm exceeds 2640 or governor cuts in or out, or surges</p> <p>Rpm below 1800 or above 1950</p>

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M88A1-Continued

Item No.	Interval	Location Item To Check/ Service	Procedure	Not Fully Mission Capable If:
42-Cont.		Stall Test-Cont.	(4) If the engine speed exceeds 1950 rpm, there is a clutch slippage in the transmission. Check the shifting control linkage adjustment (see paragraph 9-76).	
43	S	Acceleration and Pulling Power Test	<p>Test for normal acceleration and pulling power in each transmission range.</p> <p>While testing in low range, accelerate with wide-open throttle from low speed to top speed. Governed speed under load should reach 1875 rpm, but not exceed 2640 rpm. If below 1875 rpm or over 2640, notify Direct Support Maintenance.</p>	Under 1875 rpm or over 2640
44	S S S	Main Hydraulic System	<div style="border: 1px solid black; padding: 2px; text-align: center; margin-bottom: 10px;">WARNING</div> <ul style="list-style-type: none"> • Do not attempt to loosen or tighten hydraulic fittings or lines when system is pressurized. Be sure that boom and spade are in stored positions before doing any maintenance on hydraulic system. • Dry-cleaning solvent used to clean parts is potentially dangerous to personnel and property. do not use near open flame or excessive heat. Flashpoint of solvent is 138°F (590C). • Particles blown by compressed air can be dangerous. Be certain to direct airstream away form user and other personnel in the area. Compressed air used for cleaning will not exceed 30 psi (207 kPa). Use only with effective chip-guarding and personnel protective equipment (goggles/shield and gloves). <p>a. Service hydraulic reservoir oil filter (see paragraph12-5).</p> <p>b. Inspect hydraulic lines and fittings for leaks, damage and deterioration.</p> <p>c. Operate system and check for unusual noises or other defects.</p>	Class III leak present

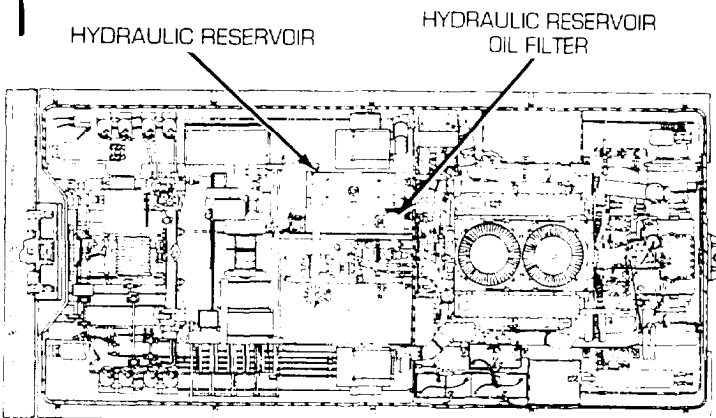
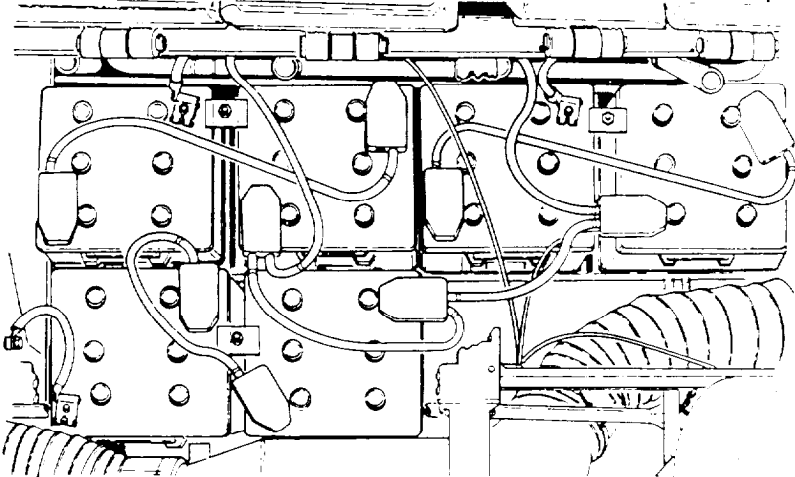
Item No.	Interval	Location Item To Check/ Service	Procedure	Not Fully Mission Capable If:
				
45		Main Winch	Clean and lubricate cable (refer to TM 9-2350-256-10).	
46		Hoist Winch	Clean and lubricate cable (see Appendix J).	
47		Hoisting Boom and Deck Attachments	<ul style="list-style-type: none"> a. Clean and lubricate stayline cable in accordance with Appendix J. b. Inspect boom yoke/pulley cotter pins. Replace if damaged or missing (see paragraph 11-11). 	Cotter pins missing or damaged
48		Gas/ Particulate Filter Unit	<p style="text-align: center;">WARNING</p> <p>The unit commander or senior officer in charge of maintenance personnel assigned to remove and dispose of contaminated gas filters must prescribe necessary protective clothing to be worn during this operation. They must also prescribe necessary safety measures to be followed including the decontamination operation that must be performed before new gas filters are installed in housing assembly (refer to TM 3-220).</p> <p>Check that air flow is 3.0 to 4.5 standard cubic feet/minute (scf/m) or 2.1 to -1.5 inch water gage (IWG) at each station using the M39 Tester (Appendis B, item 160).</p>	

TABLE 2-1 PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M88A1-Continued

Item NO.	Interval	Location Item To Check/ Service	Procedure	Not Fully Mission Capable If:												
49		Batteries	<p>a. Clean batteries, trays, supports, and retainers (see paragraph 6-4).</p> <p>b. If supports, trays, and/or retainers are corroded, paint with acid-resistant paint.</p> <p style="text-align: center;">NOTE</p> <p>Batteries are in good condition and serviceable when the following conditions are met:</p> <ul style="list-style-type: none"> • The specific gravity readings are between 1.250 and 1.300 corrected to 80° F (27° C) (1.200 to 1.225 for batteries used in tropical climates). • The specific gravity between individual cells does not vary by more than 0.040. <p>c. Test specific gravity of battery electrolyte. Specific gravity shall be a minimum of 1.225 under normal operating conditions and 1.180 under tropical conditions (refer to TM 9-6140-200-14). If specific gravity is unsatisfactory, charge or replace batteries (see paragraph 64).</p> <p style="text-align: center;">Specific Gravity-Cold Climate</p> <table border="0" style="width: 100%;"> <tr> <td style="text-align: center;">Specific Gravity (corrected to 80° F [27C°])</td> <td style="text-align: center;">Electrolyte Freezing Temperature</td> </tr> <tr> <td style="text-align: center;">1.100</td> <td style="text-align: center;">+19° F (-7° C)</td> </tr> <tr> <td style="text-align: center;">1.150</td> <td style="text-align: center;">+5° F (-15° C)</td> </tr> <tr> <td style="text-align: center;">1.200</td> <td style="text-align: center;">-16° F (-27° C)</td> </tr> <tr> <td style="text-align: center;">1.250</td> <td style="text-align: center;">-62° F (-52° C)</td> </tr> <tr> <td style="text-align: center;">1.280</td> <td style="text-align: center;">-90° F (-68° C)</td> </tr> </table>	Specific Gravity (corrected to 80° F [27C°])	Electrolyte Freezing Temperature	1.100	+19° F (-7° C)	1.150	+5° F (-15° C)	1.200	-16° F (-27° C)	1.250	-62° F (-52° C)	1.280	-90° F (-68° C)	
Specific Gravity (corrected to 80° F [27C°])	Electrolyte Freezing Temperature															
1.100	+19° F (-7° C)															
1.150	+5° F (-15° C)															
1.200	-16° F (-27° C)															
1.250	-62° F (-52° C)															
1.280	-90° F (-68° C)															

Item No.	Interval	Location Item To Check/Service	Procedure	Not Fully Mission Capable If:
50	S	Wiring Harnesses and Cable	 <p>a. Inspect for visible damage.</p> <p>b. Replace missing chassis grommets.</p>	
51	S	Lubrication	<p>Lubrication should be performed in sequence and in conjunction with the following checks and services.</p>	
52	S	Final Road Test	<p>Lubricate the vehicle in accordance with Appendix J.</p> <p>After all services, inspections and repairs have been completed, take vehicle on a short road test (approximately 5 miles [8 km]) to be sure that equipment faults have been</p>	

SECTION IV: GENERAL MAINTENANCE

Para.	Task	Page
2-14	Replacement of Decal Markings	2-34

2-14 REPLACEMENT OF DECAL MARKINGS

Many of the markings within the vehicle are decals. If these decals become damaged and are no longer legible, they should be replaced. TM 9-2350-256-10 illustrates the various decals and their locations.

WARNING

Dry-cleaning solvent used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flashpoint of solvent is 138° F (59° C).

Before removing a damaged decal, note its position. Then remove it by scraping, and cleaning scraped area with dry-cleaning solvent. Apply new decal over scraped area.

- Spot paint area if required.
- Remove carrier sheet (backing sheet) from back of new decal by dipping decal in water for approximately 20 seconds.
- Place new decal in same position as old decal and roll down firmly

SECTION V: TROUBLESHOOTING

Para.	Task	Page
2-15	General Instructions	2-34
2-16	Quick Guide To Troubleshooting	2-35
2-16.1	Mechanical Troubleshooting	2-40
2-17	Hydraulic Troubleshooting	2-40.16
2-18	Vehicle Troubleshooting with Simplified Test Equipment/Internal Combustion Engine-Reprogrammable (STE/ICE-R)	2-56
2-19	Electrical Troubleshooting	2-57

2-15 GENERAL INSTRUCTIONS

a. GENERAL

This chapter contains a Quick Guide to Troubleshooting index and a Troubleshooting Chart. The Quick Guide to Troubleshooting is the master reference table for locating troubleshooting information. The Quick Guide to Troubleshooting index contains a list of various malfunctions which may occur during operation or inspection of the M88AI and provides a reference to the troubleshooting information in the troubleshooting chart or a solution. The troubleshooting chart provides step-by-step instructions for isolating and correcting malfunctions.

b. STE/ICE-R TROUBLESHOOTING

When a malfunction is recognized on the engine, transmission or hydraulic systems of the M88AI the Quick Guide to Troubleshooting may reference STE-ICE-R method for analyzing the malfunction. The STE/ICE-R method will be the primary troubleshooting procedure when referenced; the backup procedure should be used only when STE/ICE-R is unavailable.

c. ELECTRICAL TROUBLESHOOTING

Electrical troubleshooting in this chapter includes schematic diagrams to give insight to the harnesses involved.

When troubleshooting any electrical system or component, exercise care to prevent electrical shock.

WARNING

Ensure MASTER switch is OFF between every step unless otherwise directed throughout troubleshooting of the electrical stem or electrical components. Remove all jewelry and metal objects when working on electrical systems to prevent injury due to electrical shock.

The multimeter is used throughout electrical troubleshooting. STE/ICE-R can also perform as a multimeter and instruction on its use is in TM 9-4910-571-12&P.

2-16 QUICK GUIDE TO TROUBLESHOOTING**a. MECHANICAL**

Item	Problem	Solution or Reference
Engine	1 Engine fails to crank when start switch is pressed.	See page 2-30
	2 Engine cranks at normal speed but will not start after two attempts to start.	See page 2-30
	3 Engine cranks at normal speed but will not start during extreme cold weather.	See page 2-40
	4 Engine cranks slowly and will not start.	See page 2-40
Fuel, Air Intake, and Exhaust Systems	1 Engine start running but fails to stay running.	See page 2-40.4
	2 Engine fails to shut off when the engine fuel shutoff switch is activated.	See page 2-40.4
	3 Engine fails to stop when fuel shutoff handle is pulled.	See page 2-40.4
	4 Engine stalls at low rpm, does not develop full power, and has excessive smoke from one or both banks of cylinders.	See page 2-40.3
	5 Engine stalls at low rpm and does not develop full power, but exhaust smoke is normal.	See page 2-40.4
	6 Engine runs rough or misfires, knocks, and/or fuel consumption is excessive.	See page 2-40.4
Oil Cooling System	1 Low engine oil pressure, engine oil temperature normal.	See page 2-40.7
	2 High engine oil pressure, engine oil temperature normal.	See page 2-40.7
	3 Engine oil consumption excessive.	See page 2-40.7
	4 High engine oil temperature.	See page 2-40.7
Ventilation Blower Assembly	1 Blower motor does not run	See page 2-40.9
	2 Blower rum but does not come up to speed.	See page 2-40.9
	3 Blower unusually noisy.	See page 2-40.9

2-16 QUICK GUIDE TO TROUBLESHOOTING-Continued

a. MECHANICAL-Continued

Item	Problem	Solution or Reference
Transmission Center Section and Output Reduction Sears	1 High transmission oil temperature.	See page 2-40.10
	2 Vehicle will steer or pivot but will not drive in any range.	See page 2-40.10
	3 Vehicle will not drive in low range.	See page 2-40.10
	4 Vehicle will not drive in intermediate range.	See page 2-40.10
	5 Vehicle will not drive in high range.	See page 2-40.10
	6 Vehicle will drive but creeps in neutral.	See page 2-40.10
	7 Transmission cannot be down-shifted.	See page 2-40.10
Driver' s Controls	1 Vehicle will not steer in either direction.	See page 2-40.12
	2 Vehicle will steer in only one direction.	See page 2-40.12
	3 Depressing brake pedal will not stop vehicle effectively.	See page 2-40.12
	4 Brakes dragging at one or both sides of vehicle.	See page 2-40.12
	5 Engine does not respond properly to throttle controls.	See page 2-40.12
	6 No back pressure, or insufficient pressure, when operating purge pump.	See page 2-40.12
	7 Excessive back pressure when operating purge pump.	See page 2-40.12
Tracks and Suspension	1 Vehicle pulls to one side.	See page 2-40.14
	2 Vehicle throws track.	See page 2-40.14
	3 Vehicle sags to one side.	See page 2-40.14
	4 Vehicle rides excessively hard.	See page 2-40.14
	5 Thumping noises heard during vehicle operation.	See page 2-40.14
	6 Excessive noise in track or suspension during vehicle operation.	See page 2-40.14
Mechanical Transmission	Mechanical transmission fails to operate, slips, or chatters.	See page 2-40.15

b. HYDRAULIC

Item	Problem	Solution or Reference
Main Winch	1 Main winch fails to operate.	See page 2-40.16
	2 Main winch operates with difficulty.	See page 2-40.16
	3 Main winch creeps with control in neutral or winch brake fails to hold load.	See page 2-40.16
	4 Main winch level winder fails to traverse.	See page 2-40.16
Hoist Winch	1 Hoist winch fails to operate.	See page 2-43
	2 Hoist winch operates with difficulty.	See page 2-43
	3 Hoist winch creeps or fails to hold load.	See page 2-43
Hoisting Boom	1 Hoisting boom does not operate.	See page 2-45
	2 Hoisting boom operates with difficult	See page 2-45

Item	Problem	Solution or Reference
Hoisting Boom-cont.	3 Hoisting boom creeps.	See Page 2-45
	4 Boom stayline cables become slack during 1ive boom operation.	See page 2-45
Spade	1 Spade fails to operate.	See page 2-48
	2 Spade operates with difficulty.	See page 2-48
	3 Spade creeps.	See page 2-48
Main Hydraulic System	1 Insufficient or no main system oil pressure.	See page 2-49
	2 Loss of main hydraulic pressure during operation	See page 2-49
Auxiliary Hydraulic System	1 Insufficient or no auxiliary system oil pressure.	See page 2-51
	2 Loss of auxiliary hydraulic pressure during operation	See page 2-51
	3 Main and hoist winches fail to operate.	see page 2-51
APU	1 Engine fails to crank when starting switch is operated.	See page 2-52
	2 Engine cranks but fails to start.	See page 2-52
	3 Engine hard to start.	See page 3-52
	4 Engine hard to start in cold weather.	See page 2-52
	5 Engine starts but fails to keep running, misfires, or lacks power.	See page 2-52
	6 Engine overheating.	See page 2-52
	7 Engine discharges black smoke.	See page 2-52
	8 Engine knocks.	See page 2-52
	9 Engine uses excessive oil and discharges light blue smoky exhaust.	See page 2-52
Main Hydraulic Pump	1 Main hydraulic pump fails to operate.	See page 2-53
	2 Main hydraulic pump fails to develop sufficient pressure.	See page 2-53
	3 Main hydraulic pump is noisy during operation.	See page 2-53
Auxiliary Hydraulic Pump	Auxiliary hydraulic pump does not operate	See page 2-55
Mechanical Transmission-Hydraulic	Mechanical transmission fails to operate, slips, or chatters.	See page 2-56

c. ELECTRICAL

Item	Problem	Solution or Reference
Battery Power Circuit	Battery-Generator gage indicates low battery charge	See page 2-58
Master Relay System and Slave Receptacle	1 Master relay fails to operate.	See page 2-60
	2 No power to slave receptacle.	See page 2-60

2-16 QUICK GUIDE TO TROUBLESHOOTING-Continued

c. ELECTRICAL-Continued

Item	Problem	Solution or Reference
Engine Starting System	Engine fails to crank.	See page 2-65
Engine Manifold Preheater System	Manifold preheater fails to operate.	See page 2-72
Engine Fuel Shutoff Solenoid	Engine cranks but fails to start.	See page 2-80
Fire Extinguisher Engine Shutoff Light	Fire extinguisher engine shutoff light fails to operate while fuel shutoff switch operates normally.	See page 2-86
Electric In-Tank Fuel Pump	Electric in-tank fuel pump fails to operate.	See page 2-89
Fuel Gage	Fuel gage does not operate in either FRONT or REAR position.	See page 2-95

Item	Problem	Solution or Reference
Engine Oil Temperature Gage	Engine oil temperature gage does not operate.	See page 2-100
Engine Oil Pressure Gage	Engine oil pressure gage does not operate.	See page 2-105
Power Control Lever Switch	Engine exceeds 1800 rpm when hydraulic POWER lever is ON.	SEE page 2-109
Transmission Oil Temperature Gage	Transmission oil temperature gage does not operate.	See page 2-114
Transmission Oil Pressure Gage	Transmission oil pressure gage does not operate.	See page 2-119
Engine Generator (Dual Voltage System)	1 Generator indicator reads in yellow or lower red region with engine running and generator cutout switch closed.	SEE page 2-124
	2 Generator cutout switch does not operate.	See page 2-124
Engine Generator (Single Voltage) System	1 Generator indicator reads in yellow or lower red region with engine running and generator cutout witch closed.	SEE page 2-130
	2 Generator cutout switch does not operator	See page 2-130
APU Generator System (Dual Voltage)	Generator indicator reads in yellow or lower red region with APU engine running and APU generator switch on.	See page 2-138
APU Generator System (Single Voltage,!)	Generator indicator reads in yellow or lower red region with APU engine running and APU generator switch on.	See page 2-147
Generator Indicator Gage	Generator indicator gage fails to operator when MASTER switch is on.	See page 2-157
APU Starting System	APU stater fails to crank or is hard to start in cold weather.	See page 2-162
APU Fuel Solenoid System	APU fuel solenoid fails to operate.	SEE page 2-168
APU Low Oil Pressure System	APU LOW OIL PRESS lamp fails to light running	See page 2-174
APU High Air Temperature System	APU HIGH AIR TEMP lamp does not light when air temperature is high.	See page 2-182

2-16 QUICK GUIDE TO TROUBLESHOOTING-Continued

c. ELECTRICAL-Continued

Item	Problem	Solution or Reference
APU Engine Oil Pressure Gage Circuit	APU ENGINE OIL PRESSURE gage fails to operate.	See page 2-190
Mechanical Transmission Oil Pressure Light	<ol style="list-style-type: none"> 1 Mechanical transmission oil pressure warning light does not go out with mechanical transmission operating. 2 Mechanical transmission oil pressure warning light fails to operate with mechanical transmission stopped. 	<p>See page 2-197</p> <p>See page 2-197</p>
Master Warning Light	<ol style="list-style-type: none"> 1 MASTER WARNING light fails to operate with engine off. 2 MASTER WARNING light does not go out after starting engine. 3 MASTER WARNING light does not light with high transmission oil temp, but lights with engine off. 4 MASTER WARNING light does not light with high engine oil temp, but lights with engine off. 	<p>See page 2-204</p> <p>See page 2-204</p> <p>See page 2-204</p> <p>See page 2-204</p>
Powerplant Warning Horn	Powerplant warning horn fails to operate.	See page 2-213
External Vehicle Warning Horn	External External warning horn fails to operate.	See page 2-219
Bilge Pump System and Electrical Accessories Panel Power Outlet	<ol style="list-style-type: none"> 1 Bilge pump fails to operate. 2 Bilge pump indicator lamp fails to light and bilge pump operates. 3 Electrical accessories panel power outlet has no power, and bilge pump operates. 	<p>See page 2-224</p> <p>See page 2-224</p> <p>See page 2-224</p>
Personnel Heater Control System	Personnel heater fails to operate.	See page 2-232
Communication System	One radio fails to operate.	See page 2-238
Dome Lights	<ol style="list-style-type: none"> 1 Both left front and left rear dome lights fail to operate. 2 Both center and right front dome lights fail to operate. 3 Only one dome light fails to operate. 	<p>See page 2-240</p> <p>See page 2-240</p> <p>See page 2-240</p>
Passive Night Viewer	<ol style="list-style-type: none"> 1 Passive night viewer lamp fails to light but passive night viewer operates. 2 Passive night viewer fails to operate. 3 Both lamp and passive night viewer fail to operate. 	<p>See page 2-246</p> <p>See page 2-246</p> <p>See page 2-246</p>
Driver's Periscope	<ol style="list-style-type: none"> 1 B.O. receiver lamp fails to light but driver' s periscope operates. 2 Driver' s periscope fails to operate. 3 Both lamp and driver' s periscope fail to operate. 	<p>See page 2-249</p> <p>See page 2-249</p> <p>See page 2-249</p>

Item	Problem	Solution or Reference
Fixed Spotlight	Fixed spotlight fails to operate.	See page 2-253
Troublelight Assembly	Troublelight assemble, fails to operate.	See page 2-257
Winch	Winch light fails to operate.	See page 2-262
Gage Panel Lights	One or all gage panel lamps fail to light.	See page 2-267
Service Headlights	Service headlights fail to operate.	See page 2-273
High Beam Indicator	High beam indicator fails to light with high beams on, in Infrared (IR) or SER DRIVE condition.	See page 2-280
Service Stoplight	Service stoplight fails to operate.	See page 2-282
B.O. Service Condition (IR Headlights)	IR headlights fail to operate.	See page 2-289
B.O. Service Condition (B.O. Stoplight)	B.O. stoplight fails to operate in any B.O. mode.	See page 2-298
B.O. Marker Condition	Front B.O. marker fails to operate. Rear B.O. marker fails to operate.	See page 2-305 See page 2-305
B.O. Drive Condition	B.O. drive lights fail to operate.	See page 2-313
Rigger's Light and Front Signal Light	One or both rigger's service lamps fail to operate. Front signal light and/or indicator light fails to operate, but indicator lamp operates.	See page 2-319 See page 2-319
Ventilation Blower System	Ventilation blower fails to operate.	See page 2-328
Engine Generator Blower Motor	Engine generator blower motor fails to operate when engine is running.	See page 2-333
M8A3 Filter Unit System	M2A2 air purifier fails to operate.	See page 2-335
M239 Smoke Grenade Launcher System	One or more of the launcher tubes fails to operate.	See page 2-338

2-16 QUICK GUIDE TO TROUBLESHOOTING-Continued

c. ELECTRICAL-Continued

Item	Problem	Solution or Reference
Hydraulic Reservoir Monitoring System Switches and Lights	1 Hydraulic oil high temperature lamp fails to operate when temperature limit is exceeded.	See page 2-343
	2 Hydraulic oil high temperature light fails to go out when temperature is normal.	See page 2-343
Hydraulic Reservoir Monitoring System Gage and Transmitter	Hydraulic oil temperature gage fails to operate.	See page 2-346
Exhaust Smoke Generating System	1 Vehicle generates smoke but indicator light fails to operate.	See page 2-350
	2 Vehicle does not generate smoke.	See page 2-350
	3 Commander' s switch fails to operate.	See page 2-350
Fuel/Water Separator Control Module System	Automatic water dram system fails to operate.	See page 2-360

2-16.1 MECHANICAL TROUBLESHOOTING

ENGINE

SYMPTOMS

Engine fails to crank when starter switch is pressed. Do steps A and B.	Engine cranks at normal speed but will not start during extreme cold weather. Do steps K through O.
Engine cranks at normal speed but will not start after two attempts to start. Do steps C through J.	Engine cranks slowly and will not start. Do steps P through S.

A Turn MASTER switch on and test batteries in accordance with serviceability test in Table 2-1 PMCS.

B While moving transmission shift lever into park position, observe neutral safety switch activating lever. If lever fails to move, check linkage connecting transmission shift assembly to neutral safety switch lever cross shaft (see paragraph 9-77). Reconnect linkage if disconnected. If linkage is bent, straighten or replace damaged parts. If lever does not depress neutral safety switch, make adjustments (see paragraph 9-77).

- C Check fire extinguisher engine shutoff switch for proper adjustment (see paragraph 10-6). Ensure fire extinguisher engine shutoff activated lamp is lit.
- D Turn MASTER switch on. Turn FUEL SHUTOFF switch ON. Listen for a click from engine. If no click can be heard, troubleshoot fuel shutoff solenoid circuit (see paragraph 2-19).
- E Place manual fuel shutoff handle in ON (in) position. Remove cotter pin. Place engine fuel shutoff lever in ON (up) position. Check connector link for a free pm fit. If a free pm fit cannot be made, make adjustments in accordance with paragraph 4-11.
- F Turn MASTER switch and in-tank fuel pump switch ON. The electric fuel pump will make noise. If there is no noise, troubleshoot fuel shutoff solenoid circuit (see paragraph 2-19). If there is a noise, perform the following fuel flow test. Disconnect fuel tank supply hose at engine primary fuel filter. Remove quick disconnect. Place a 5-gallon (gal) (19-liters [L]) container in a suitable position to collect fuel from hose. Turn MASTER and m-tank fuel pump switches to ON position. Time fuel flow into container. If there is no fuel flow or fuel flow is less than 3 gallons per minute (gpm) (11 liters per minute [Lpm]), inspect fuel lines for restrictions. If there are no restrictions, troubleshoot electric fuel pump (see paragraph 2-19).
- G Disconnect fuel line connecting primary fuel filter and main fuel check valve at main fuel check valve (check valve fuel inlet hose). Place fuel line in a suitable container. Place MASTER and fuel pump switches in ON position. If there is no fuel flow, replace primary fuel filter element (see paragraph 4-14).

NOTE

If the cause of filter restriction is excessive algae contamination, notify Direct Support Maintenance to clean and drain fuel tanks and fill with uncontaminated fuel.

- H Disconnect fuel line connecting mechanical fuel pump assembly and fuel/water separator at fuel/water separator. Position a container to catch fuel. With MASTER and fuel pump switches in ON position, crank engine. If there is no fuel flow from disconnected fuel line, replace mechanical (gear type) fuel pump assembly (see paragraph 4-5). If there is fuel flow, reconnect fuel line and go to step I.

2-16.1 MECHANICAL TROUBLESHOOTING-Continued

ENGINE-Continued

- I Loosen air bleeder valve on top of fuel/water separator. With MASTER and fuel pump switches in ON position, crank engine. If there is no fuel flow from air bleeder valve, replace outer fuel/water separator elements (see paragraph 4-15). If there is fuel flow, go to step L.
- J Disconnect fuel line connecting fuel/water separator and engine at elbow, on left front engine shroud. Position suitable container to catch fuel from fuel line. With MASTER and fuel pump switches in ON position, crank engine. If no fuel flows from line, replace final filter in fuel/water separator element (see paragraph 4-15). If engine fails to start, notify Direct Support Maintenance.
- K Check fire extinguisher engine shutoff switch for proper adjustment (see paragraph 10-6 for removing manual interlock systems). Verify that fire extinguisher engine shutoff activated light is lit.
- L Place transmission shift lever in neutral position. Open rear grill doors and position yourself by exhaust pipe outlet. Have assistant place MASTER switch in on position and press manifold heater switch. If electrical portion of manifold heater is working, a sparking sound will be heard at each exhaust pipe outlet. If no sound is heard, troubleshoot engine starter circuit (see paragraph 2-19).
- M Turn MASTER and fuel pump switches to ON position. Operate purge pump. If little or no resistance is felt or excessive force is required during operation or purge pump cannot be operated, perform the following procedures. Turn MASTER switch to OFF position. Remove fuel line connected to in port on purge pump. Place fuel line in a suitable container and turn MASTER switch to on position. If no fuel flows from line, perform fuel flow test (see step F). If fuel flows into the container, place MASTER switch in OFF position and connect fuel line. Disconnect fuel line from out side of purge pump. Place a suitable container under purge pump. Place MASTER switch in on position and operate purge pump. If fuel flows from out port, connect fuel line. If no fuel flows from purge pump or handle still will not move, repair/replace purge pump (see paragraph 4-9). Disconnect fuel filler inlet

tube between main fuel check valve and manifold fuel filter. Turn MASTER and fuel pump switches to ON position. Press starter button and operate purge pump. If handle was excessively hard to operate or could not be operated previously and can now be operated, replace main fuel check value (see paragraph 4-13). Disconnect left intake manifold tube at tee on manifold heater fuel inlet solenoid valve. With MASTER and fuel pump switches in ON position, press preheat and starter buttons while operating purge pump. If no fuel flows from tee, install new manifold preheater fuel filter (see paragraph 4-18).

- N Operate pump with MASTER and fuel pump in ON position. Press preheat and starter buttons. If fuel fails to flow, troubleshoot manifold preheater circuit (see paragraph 2-19).
- O Remove engine deck (see paragraph 9-51) and both plastic tubes at manifold heater nozzles. With an assistant to watch both tube ends, turn MASTER and fuel pump switches to ON position. Press starter and preheater buttons while operating purge pump. If no fuel flows from one or both tubes, replace defective tubes (see paragraph 4-23). If fuel flows from both tubes, disconnect manifold heater return tube (see paragraph 4-23). Inspect manifold heater for damaged threads or plugged orifice. Replace manifold heater if threads are damaged (see paragraph 4-21).

WARNING

Dry-cleaning solvent used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 138° F (59° C).

If orifice is plugged, soak nozzle in dry-cleaning solvent (Appendix D, item 9). Using a fine wire, clean orifice opening. Inspect filters for contamination or damage. Clean or replace filters (see paragraph 4-18). Assemble in reverse order of disassembly. Install manifold heater nozzle assembly and tighten jamnut. Connect manifold heater fuel inlet hose and fuel return tube.

- P Perform battery serviceability test (see paragraph 2-19). Recharge or replace low batteries (see paragraph 63).

2-16.1 MECHANICAL TROUBLESHOOTING-Continued

ENGINE-Continued

- Q If during battery test battery voltage was below 12 volts and starter still tried to turn over engine, starter protection module may be defective, troubleshoot engine starter circuit (see paragraph 2-19). Replace starter module if defective (see paragraph 6-3).

 - R Check engine for proper grade of oil. If wrong grade of oil for prevailing temperature is in engine do the following: Use external means to heat engine compartment. After engine starts, run it until engine reaches operating temperature. Drain engine and/or transmission and fill with proper grade of oil for prevailing temperatures as specified in TM 9-2350-256-10.

 - S While assistant engages starter, listen at vehicle right rear cooling air inlet grilles for a spinning noise. If spinning noise is present, replace starter assembly (see paragraph 6-3).
-

FUEL, AIR INTAKE, AND EXHAUST SYSTEMS

SYMPTOMS

<p>Engine starts running but fails to stay running. Do steps A through E.</p>	<p>Engine fails to stop when fuel shutoff handle is pulled. Do step G.</p>	<p>Engine stalls at low rpm and does not develop full power, but exhaust smoke is normal. Do steps J through M.</p>
<p>Engine fails to shut off when engine fuel shutoff switch is activated. Do step F.</p>	<p>Engine stalls at low rpm, does not develop full power, and has excessive smoke from one or both banks of cylinders. Do steps H and I.</p>	<p>Engine runs rough or misfires, knocks, and/or fuel consumption is excessive. Do step N.</p>

- A With MASTER switch and in-tank fuel pump switch in ON position, electric fuel pump will make a noise. If there is no noise, troubleshoot electric fuel pump circuit (see paragraph 2-19). If there is noise go to step L and perform fuel flow test.

- B Disconnect fuel line connecting primary fuel filter and main fuel check valve at main fuel check valve. Place fuel line in a suitable container. Place MASTER and fuel pump switches in ON position. If there is no fuel flow, clean filter and/or replace the primary fuel filter element (see paragraph 4-14).

NOTE

If cause of filter restriction is excessive algae contamination, notify Direct Support Maintenance to drain and clean fuel tanks and fill with uncontaminated fuel.

- C Disconnect fuel line connecting mechanical fuel pump assembly and fuel/water separator at fuel/water separator. Position a container to catch fuel. With MASTER and fuel pump switches in ON position, crank the engine. If there is no fuel flow from disconnected fuel line, replace mechanical (gear type) fuel pump assembly (see paragraph 4-5). If there is fuel flow, reconnect fuel line and go to step D.

CAUTION

Do not remove or disturb the center (final) filter element. If the center (final) filter element is removed, the element must be replaced.

- D Loosen air bleeder valve on top of fuel/water separator. With MASTER and fuel pump switches in ON position, crank the engine. If there is no fuel flow from air bleeder valve, replace outer fuel/water separator elements (see paragraph 4-15).
- E Disconnect fuel line connecting fuel/water separator and engine at elbow on left front engine shroud. Position a suitable container to catch fuel from fuel line. With MASTER and fuel pump switches in ON position, crank the engine. If no fuel flows from line, replace final filter in fuel/water separator (see paragraph 4-15). If problem is not corrected after above checks, notify Direct Support Maintenance.

NOTE

If engine does not shutoff using fuel shutoff switch, use manual fuel shutoff handle to stop engine.

- F With MASTER switch in on position, have an assistant operate FUEL SHUTOFF switch several times. Listen for a click from engine. If no click can be heard, troubleshoot fuel shutoff solenoid (see paragraph 2-19). If click can be heard, notify Direct Support Maintenance.

2-16.1 MECHANICAL TROUBLESHOOTING-Continued

FUEL, AIR INTAKE, AND EXHAUST SYSTEMS-Continued

- G Remove left- and center-front air inlet grilles (see paragraph 9-57). Have an assistant move manual fuel shutoff handle in and out. If manual fuel shutoff linkage on front of engine does not move, replace fuel shutoff control cable assembly (see paragraph 4-11). If manual fuel shutoff linkage on front of engine moves, do the following: Remove engine deck (see paragraph 9-51). Remove forward engine cooling fan (see paragraph 5-2). While assistant moves manual fuel shutoff handle in and out, observe manual fuel shutoff lever on side of fuel injector pump for movement. If manual fuel shutoff lever does not move, replace manual fuel shutoff lever (see paragraph 4-11).
- H Open exhaust deflector doors and inside deck doors. Check exhaust outlets and exhaust pipes for damage and restrictions. Remove any restrictions. Repair or replace damaged parts.
- I Inspect air intake hoses and tubes for damage and restrictions. Remove any restrictions. Repair or replace damaged parts.
- J Remove left- and center-front air inlet grilles (see paragraph 9-57). Have assistant move accelerator pedal to full throttle position. Observe throttle linkage on front of engine. If throttle linkage does not have full travel, adjust throttle linkage (see paragraph 9-79).
- K Check fuel return line (see paragraph 4-6) on front of engine for proper connection.
- L With MASTER switch and m-tank fuel pump switch in ON position, electric fuel pump will make a noise. If there is no noise, troubleshoot electric fuel pump circuit (see paragraph 2-19). If there is a noise, perform the following fuel flow test. Disconnect fuel tank supply hose at engine primary fuel filter. Remove quick-disconnect. Place a 5-gal (19-L) container in a suitable position to collect fuel from hose. Turn MASTER and m-tank fuel pump switches to ON position. Time fuel flow into container. If there is no fuel flow or fuel flow is less than 3 gpm (11 Lpm), inspect fuel lines for restrictions. If there is no fuel line restriction, replace electric fuel pump (see paragraph 4-3).

- M Remove fuel/water separator filter bleeder valve. Install a pressure gage (minimum of 100 psi) in fuel/water separator filter cover bleeder valve opening. Turn MASTER and in-tank fuel pump switches to ON position. Start engine and operate at high-idle speed (1800-2400 rpm). Pressure should read 55-60 psi (379313 kPa). If fuel pressure is less than 55 psi (379 kPa), clean filter and replace primary fuel filter element (see paragraph 4-15).

Turn MASTER and in-tank fuel pump switches to ON position. Start engine and operate at high-idle speed (1800-2400 rpm). If fuel pressure is less than 55 psi (379 kPa), replace mechanical (gear type) fuel pump (see paragraph 4-5).

If fuel pressure is less than 55 psi (379 kPa), replace all three fuel/water separator elements (see paragraph 4-15).

- N With engine not running, open rear exhaust doors and observe engine deck liner for wet spots. If wet spots can be seen on engine deck liner, remove engine deck (see paragraph 9-51). Remove front and rear cooling fan (see paragraph 5-2). Loosen and tighten fuel line fittings that show evidence of leaking. If leakage persists, notify Direct Support Maintenance. If no wet spots are found on engine deck liner, remove left- and center-front air inlet grilles (see paragraph 9-57) and check for fuel leaks. Tighten, repair, or replace fuel lines or components leaking fuel. Check for proper operation of fuel/water separator automatic drain system (see paragraph 4-17). If leaking and/or excessive fuel consumption persists, notify Direct Support Maintenance.

OIL COOLING SYSTEM

SYMPTOMS

Low engine oil pressure, engine oil temperature normal. Do steps A through D.	Engine oil consumption excessive. Do step F.
High engine oil pressure, engine oil temperature normal. Do steps A through E.	High engine oil temperature. Do steps G through K.

- A Check to see that proper grade of oil for prevailing temperature is used in engine. If improper grade was used, refill with proper grade of oil (refer to TM 9-2350-256-10).

2-16.1 MECHANICAL TROUBLESHOOTING-Continued

OIL COOLING SYSTEM-Continued

- B Check main engine crank case for proper oil level. Refer to TM 9-2350-256-10 instructions on checking engine oil level. Check that oil is not diluted. Drain and refill if oil is diluted (refer to TM 9-2350-256-10).
- C Remove left- and center-front air inlet grilles (see paragraph 9-57) and open side air inlet grille doors. Inspect oil lines for evidence of leaking. Tighten or replace any lines or connections that are leaking. Check oil drain valve plug (see paragraph 3-6). If valve plug is loose, tighten plug and recheck oil pressure. If oil pressure is low, go to step D. If oil pressure is high, go to step E.

CAUTION

Be sure to use the proper pressure gage for the pressure range to be tested.

- D Remove left- and center-front air inlet grilles (see paragraph 9-57) if they have not already been removed. Remove main engine oil pressure switch (see paragraph 6-22) and install pressure gage (Appendix B, item 153). If pressure gage reads 40-70 psi (276-483 kPa) at 2400 rpm and ENGINE OIL PRESSURE gage reads lower, troubleshoot ENGINE OIL PRESSURE gage circuit (see paragraph 2-19). If pressure gage reads less than 40 psi (276 kPa) at 2400 rpm, notify Direct Support Maintenance.
- E Remove left- and center-front air inlet grilles (see paragraph 9-57). Remove main engine oil pressure switch (see paragraph 6-22) and install pressure gage (Appendix B, item 153). If pressure gage reads 40-70 psi (276-483 kPa) at 2400 rpm and ENGINE OIL PRESSURE gage reads higher, troubleshoot ENGINE OIL PRESSURE gage circuit (see paragraph 2-19). If pressure gage reads higher than 70 psi (483 kPa), notify Direct Support Maintenance.
- F While an assistant operates vehicle, look at engine exhaust. If there is excessive exhaust smoke from one or both banks of cylinders or exhaust is oily, remove crankcase breather tube (see paragraph 3-10). Check to see if engine breather tube is clogged. Service or replace clogged breather tube. If there is no evidence of excessive exhaust smoke and exhaust is not oily, remove left- and center-front air inlet

grilles (see paragraph 9-57) and open side air inlet grille doors. Check engine externally for evidence of oil leaks. Tighten all loose fittings and connections.

- G Check engine cooling grille openings for restrictions. Remove all material that blocks air flow to engine.
- H Remove left and right deck air inlet doors (see paragraph 9-60). Check engine oil cooler screens for restrictions (see paragraph 5-6). Remove all restrictions from oil cooler screens.
- I Visually inspect engine oil cooler air passages. If engine oil cooler air passages are restricted, clean passages using oil cooler cleaning tool (Appendix B, item 137).
- J Remove left- and center-front air inlet grilles (see paragraph 9-57) and inspect oil cooler lines for kinks and/or twists. Repair or replace any damaged oil cooler lines (see paragraph 5-7).
- K With engine operating at approximately 200° F (93° C), cautiously feel oil cooler lines and oil cooler. If oil cooler lines are hot and oil cooler is only warm, notify Direct Support Maintenance.

VENTILATION BLOWER ASSEMBLY

SYMPTOMS

Blower motor does not run.
Do step A.

Blower runs but does not come
up to speed.
Do steps B through D.

Blower unusually noisy.
Do steps E and F.

- A Check for defective blower switch and/or circuit breaker. Troubleshoot vehicle blower circuit (see paragraph 2-19).

WARNING

Do not operate or perform maintenance on hydraulic system while doing maintenance work in the vicinity of the boom actuating cylinder.

- B Check for obstructed air passage. To access intake opening, hoist boom and remove rubber covering of the boom, actuating cylinder and hoisting boom connection inside the vehicle. Remove any obstructions. If blower still does not come up to speed, go to step C.

2-16.1 MECHANICAL TROUBLESHOOTING-Continued

VENTILATION BLOWER ASSEMBLY-Continued

- C Check for low input due to low voltage batteries while engine is not running. Perform battery serviceability test (see Table 2-1). Recharge or replace low voltage batteries. If blower still does not come up to speed, go to step D.
 - D Check generator for proper output while engine is running. Troubleshoot APU generator output circuit (see paragraph 2-19) and generator output circuit (see paragraph 2-19).
 - E Check for defective blower assembly. Troubleshoot ventilating blower circuit (see paragraph 3-19).
 - F Check for loose blower assembly. Tighten mounting screw (see paragraph 6-101).
-

TRANSMISSION CENTER SECTION AND OUTPUT REDUCTION GEARS

SYMPTOMS

- | | |
|--|---|
| <p>High transmission oil temperature.
Do steps A through E.</p> | <p>Vehicle will not drive in high range.
Do step F.</p> |
| <p>Vehicle will steer or pivot but will not drive in any range.
Do step F.</p> | <p>Vehicle will drive but creeps in neutral.
Do step F.</p> |
| <p>Vehicle will not drive in low range.
Do step F.</p> | <p>Transmission cannot be down-shifted.
Do step G.</p> |
| <p>Vehicle will not drive in intermediate range.
Do step F.</p> | |
-

- A Check transmission for proper oil level. Add oil if low or drain to proper level if over full (refer to TM 9-2350-256-10).
- B Open side air inlet grille doors. Check transmission oil cooler screens for restrictions. Remove all restrictions from oil cooler screens.
- C Visually inspect transmission oil cooler air passages. If transmission oil cooler air passages are restricted, clean air passages using oil cooler cleaning tool (Appendix B, item 137).

- D Inspect four transmission oil cooler tubes for damage/leaks. Replace damaged tubes.

CAUTION

Care should be taken when feeling tubes.
They can be hot enough to burn.

- E With engine operating and transmission temperature at approximately 200° F (93° C), feel the oil cooler tubes and the oil cooler. If oil cooler tubes are hot and oil cooler is only warm, notify Direct Support Maintenance. Turn off engine.
- F Open left rear exhaust deflector grille door and inside deck doors. While an assistant moves shifting control lever through each position, observe transmission shift lever for movement. If transmission shift lever does not move, check linkages and repair or replace broken or missing parts (see paragraph 9-76). Check the shift linkages adjustments (see paragraph 9-77). If transmission shift lever still cannot be moved, notify Direct Support Maintenance.
- G Open left rear exhaust deflector grille door and open inside deck doors. Remove screw, securing rear shifting rod to transmission shift lever. While an assistant moves transmission shift control through each range position, observe rear shifting rod for movement. If rear shifting rod does not move, check linkage and repair or replace broken or missing parts (see paragraph 9-76). Check the shift linkages adjustments (see paragraph 9-77). If transmission shift lever on transmission cannot be moved, notify Direct Support Maintenance.

2-16.1 MECHANICAL TROUBLESHOOTING-Continued

DRIVER' S CONTROLS

SYMPTOMS

Vehicle will not steer in either direction.

Do step A.

Engine does not respond properly to throttle controls.

Do step E.

Vehicle will steer in only one direction.

Do step A.

No back pressure, or insufficient pressure, when operating purge pump.

Do steps F through I.

Depressing brake pedal will not stop vehicle effectively.

Do step B.

Excessive back pressure when operating purge Pump.

Do steps J through M.

Brakes dragging at one or both sides of vehicle.

Do steps C and D.

NOTE

Check vehicle maintenance record for proper lubrication of steering, brake, and throttle linkages. If proper lubrication maintenance has been performed (refer to TM 9-2350-256-10), perform the following procedures.

- A Open left rear exhaust deflector door and transmission access door. While an assistant moves steering wheel from full-right to full-left turn, observe movement of transmission steer lever on steer valve body of transmission. If transmission steer arm does not move, check linkage and repair/replace broken or missing parts. If transmission steer linkage does not move, check steer linkage adjustment (see paragraph 9-73). If all mechanical linkages are properly adjusted and move freely, notify Direct Support Maintenance.
- B Open rear exhaust deflector grille doors and transmission access doors. Observe brake adjustment gage and alignment mark on brake rod (see paragraph 9-80). If brake adjustment gage and alignment mark on brake rod do not line up, adjust brake. Check adjustment on brake air valve linkage (see paragraph 7-1) and adjust if required.
- C Open rear exhaust deflector grille doors and transmission access doors. With brakes released, check to see that each brake-supply-and-slack-adjustment lever (right and left) is touching the respective stops. If brake-apply-and-slack-adjustment levers do not touch their respective stops, adjust brake linkage (see paragraph 9-80).

- D With brakes properly adjusted, have assistant apply and release brakes several times. Observe each time that both right and left brake-apply-and-slack-adjustment levers return to their respective stops. If brakes do not fully release each time, check linkages and repair or replace any binding, bent, or broken parts.
- E Remove left- and center-front air inlet grilles (see paragraph 9-57). Disconnect one end of throttle rod (see paragraph 9-78). Have an assistant depress accelerator pedal to its maximum. Depress accelerator linkage on front of engine to its maximum. If a free pm cannot be made, check linkage and repair or replace any binding, bent, or broken parts. Check throttle linkage adjustment (see paragraph 9-78). If a free pm fit can be made, notify Direct Support Maintenance.
- F Check purge pump fuel lines between purge pump and main engine for leaks.
- G Turn MASTER switch to OFF position. Remove fuel line connected to in port on purge pump. Place fuel line in a container and turn MASTER switch to on position. If no fuel flows from disconnected fuel lines, troubleshoot electric fuel pump (see paragraph 2-19).
- H If fuel flows into container, turn MASTER switch to OFF position and connect fuel line. Disconnect fuel line from out side of purge pump. Place a container under purge pump, turn MASTER switch to on position and operate purge pump. If no fuel flows from purge pump, turn MASTER switch to OFF position. Replace purge pump (see paragraph 4-9).

Remove front air inlet grilles (see paragraph 9-57). Unscrew fuel outlet hose at main engine fuel check valve (see paragraph 4-13). Disconnect main engine fuel hose at primary fuel filter (see paragraph 4-14). Operate purge pump with MASTER and fuel pump switches in ON position. If no back pressure or only light back pressure can be felt during operation, replace main engine fuel check valve (see paragraph 4-13).
- J Remove front air inlet grilles (see paragraph 9-57). Check primer hose and fuel return hose for proper connection at quick-disconnects (see paragraph 3-1).
- K Check purge pump fuel lines between purge pump and main engine for kinks or restrictions. Replace or repair kinks or restricted fuel lines (see paragraph 4-10).

2-16.1 MECHANICAL TROUBLESHOOTING-Continued

DRIVER'S CONTROLS-Continued

- L Disconnect fuel line from OUT side of purge pump. Place a container under purge pump. Turn MASTER switch to on position and operate purge pump. If purge pump cannot be operated or excessive pressure is required to operate purge pump, replace purge pump (see paragraph 4-9).

WARNING

To prevent injury to personnel or damage to equipment, chock vehicle (see paragraph 17-9).

- M Place transmission shift lever in neutral position. Turn MASTER switch and fuel pump switches to ON position, press starter button and preheat button located on purge pump handle. If purge pump operates with no excessive pressure, replace main engine fuel check valve (see paragraph 4-13).
-

TRACKS AND SUSPENSION

SYMPTOMS

Vehicle pulls to one side. (This condition is normal on a crowned road. The vehicle will pull to the low side of the road.) Do steps B through E.	Vehicle sags to one side. Do steps B, C, and E. Vehicle rides excessively hard. Do steps E and G.	Thumping noises heard during vehicle operation. Do steps H and I. Excessive noise in track or suspension during vehicle operation. Do steps A through C and F.
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vehicle throws track.
 Do steps A through C.

- A Inspect tracks for foreign material lodged in track or between roadwheels and support rollers. Remove foreign material from tracks, roadwheels, and support rollers.
- B Inspect tracks for damaged end connectors and center guides. Inspect track shoes for separation of rubber from metal tubes, inspect track for dead track shoes and for shoes with chunked rubber or rubber worn down to metal tubes. Replace worn, missing, or damaged parts (refer to TM 9-2350-256-10).
- C Check track tension and adjust if necessary (refer to TM 9-2350-256-10).

- D Open grille doors. Have assistant apply brakes. Check that black mark on brake rod is in alignment with brake adjustment gage. Adjust brakes if required (see paragraph 7-1).
- E Attempt to lift each roadwheel of vehicle with a crowbar. If wheel can be lifted, torsion bar is broken. Replace broken torsion bar (see paragraph 8-2).

WARNING

Care should be taken when feeling wheel hubs, they can be hot enough to burn.

- F Immediately after vehicle operation, feel all roadwheel hubs for noticeable temperature difference. An overheated hub indicates an unadjusted, inadequately lubricated, or damaged bearing. Replace defective roadwheel bearings (see paragraph 8-4).

WARNING

Care should be taken when feeling shocks, they can be hot enough to burn.

- G Immediately after vehicle operation, feel all shock absorbers. If heat is not felt, shock absorber is malfunctioning. Replace shock absorber (see paragraph 8-12).
- H Inspect track shoes for serviceability (refer to TM 9-2350-200-24). Replace unserviceable track shoes (refer to TM 9-2350-256-10).
- I Inspect roadwheels and track support rollers for serviceability (refer to TM 9-2350-200-2-2). Replace unserviceable roadwheels (see paragraph 8-1) and support rollers (see paragraphs 8-6 and 8-7).

MECHANICAL TRANSMISSION**SYMPTOM**

Mechanical transmission fails to operate, slips, or chatters.
Do steps A through D.

- A Remove front air inlet grilles (see paragraph 9-57). Inspect power takeoff coupling to see that drive shaft is firmly attached to power takeoff coupling. Tighten bolts and/or replace missing bolts and lockwashers.

2-16.1 MECHANICAL TROUBLESHOOTING-Continued

MECHANICAL TRANSMISSION-Continued

- B Have assistant start engine. Observe power takeoff coupling and drive shaft. If the power takeoff coupling and drive shaft are not turning, turn off engine and remove powerplant (see paragraph 3-1). Install holding bar and pulley (Appendix B, item 21) and tighten power takeoff retaining nut. Torque nut to 240-250) lb-ft (325-339 N•m). Reinstall powerplant (see paragraph 3-1).
- C Remove rear center subfloor plate (see paragraph 9-17). Remove pipe plug in mechanical transmission (see paragraph 2-15) and perform STE-ICE-R test 50 (pressure gage optional) (Appendix B, items 153 and 160). Lubricating oil pressure should be 10-19 psi (69-131 kPa). If lubricating oil pressure is not 10-19 Psi (69-131 kPa), notify Direct Support Maintenance.
- D Disconnect hydraulic line (see paragraph 12-2). Install tee and perform STE/ICE-R test 50 (pressure gage optional) (Appendix B, items 153 and 160). Connect hydraulic line. Operate engine at 1600 rpm. Mechanical transmission clutch operating pressure should be 140-225 psi (965-1551 kPa). If clutch pressure is not 140-225 psi (965-1551 kPa), notify Direct Support Maintenance.

2-17 HYDRAULIC TROUBLESHOOTING

MAIN WINCH

SYMPTOMS

Main winch fails to operate.
Do steps A through J.

Main winch creeps with control in neutral or winch brake falls to hold load.
Do steps K and L.

Main winch operates with difficulty.
Do steps B through J.

Main winch level winder fails to traverse.
Do steps M and N.

NOTE

The main winch troubleshooting procedures are performed using the main hydraulic system as a fluid power source. If main winch operates using the main hydraulic but not the auxiliary hydraulic, troubleshoot auxiliary hydraulic system. If main winch operate; using the auxiliary hydraulic but not the main hydraulic, troubleshoot main hydraulic system.

- A Attempt operation of the hoisting boom, hoist winch, and spade. If the hoisting boom, hoist winch, and spade do not operate, troubleshoot main hydraulic system and/or auxiliary hydraulic system. If the hoisting boom, hoist winch, and spade operate go to step B.
- B Visually inspect for signs of main winch mechanical failure. If signs of mechanical failure exist, notify Direct Support Maintenance. If no signs of mechanical failure exist, go to step C.

WARNING

Do not attempt to loosen or tighten hydraulic fittings or lines when system is pressurized. Severe injury or death to personnel may result.

- C Inspect for any damaged or restricted hoses. Replace hoses as necessary (see paragraph 11-14). If no damaged or restricted hoses exist, go to step D.
- D Test for hydraulic motor failure. Remove hose No. 47 from rear of hydraulic motor (see paragraph 12-1). A large volume of oil discharged from port when main winch control valve is engaged indicates a faulty motor. If a faulty hydraulic motor exists, notify Direct Support Maintenance. If hydraulic motor is not faulty, go to step E.
- E Inspect manual control and linkage (see paragraph 11-4) for disconnected, damaged, or missing parts. Connect linkage and replace or repair missing or damaged parts (see paragraph 11-3). If main winch cable is not damaged and is properly attached to drum, go to step F.
- F Ensure main winch cable is not damaged and is properly attached to drum. Replace main winch cable if required (see paragraph 11-5). If main winch cable is not damaged and is properly attached to drum, go to step G.

WARNING

Do not attempt to loosen or tighten hydraulic fittings or lines when system is pressurized. Severe injury or death to personnel may result.

- G Inspect hydraulic lines and fittings for leaks. Replace leaking hydraulic lines and tighten leaking connections (see paragraph 12-1). If leaks persist,

2-17 HYDRAULIC TROUBLESHOOTING-Continued

MAIN WINCH-Continued

notify Direct Support Maintenance. If no leaks exist go to step H.

- H Test main winch combination control valve by performing STE/ICE-R test No. 51 with 0-10,000 psig pressure transducer (Appendix C, item 51) installed in test gage port No. 50 at main winch level cylinder. Remove hose No. 21A from valve, and plug outlet of valve (see paragraph 12-2). If no pressure is indicated on gage when operating hydraulic system, it indicates a faulty combination control valve. If combination control valve is faulty, notify Direct Support Maintenance. If combination control valve is not faulty go to step I.
- I Test the main winch control valve by performing STE/ICE-R test No. 51 with 0-10,000 psig pressure transducer (Appendix C, item 51) installed in combination control valve port No. 7. If no pressure is established when actuating control valve, but pressure is established when removing hose No. 21A from control valve and plugging outlet, a faulty main winch control valve is indicated. If main winch control valve is faulty, notify Direct Support maintenance. If main winch control valve is not faulty, go to step J.
- J If main winch still does not operate or operates with difficulty, troubleshoot main hydraulic system and/or auxiliary hydraulic system (see paragraph 2-19). If main winch operates properly, but creeps or fails to hold load, go to step K.

NOTE

Ensure hydraulic system is at operating temperature.

- K If main winch creeps or fails to hold load, adjust brake. Open door of hydraulic valve forward right floor plate (see paragraph 9-3). Loosen locknut (see paragraph 11-2) and tighten main winch adjusting screw clockwise as far as it will go. Back off adjusting screw one full turn. Hold adjusting screw in position and tighten locknut. If brake fails to hold load or creeps, go to step L.
- L Remove hydraulic brake cylinder hose No. 29 and inspect for restriction (see paragraph 12-1). Replace

restricted or damaged hose (see paragraph 12-1). If no hose restriction or damage exists and brake still fails to hold load or creep, notify Direct Support Maintenance. If level winder fails to traverse, go to step M.

WARNING

Do not attempt to loosen or tighten hydraulic fittings or lines when system is pressurized. Severe injury or death to personnel may result.

- M Inspect for any damaged or restricted hoses. Replace hoses as necessary (see paragraph 12-1). If no damaged or restricted hoses exist, go to step N.
- N Adjust main winch level winder cylinders (see paragraph 11-1). If level winder fails to traverse after cylinder adjustment, notify Direct Support Maintenance.

HOIST WINCH

SYMPTOMS

Hoist winch fails to operate.
Do steps A through G.

Hoist winch operates with difficulty.
Do steps B through G.

Hoist winch creeps or fails to hold load.
Do steps H through J.

NOTE

The hoist winch troubleshooting procedures are performed using the main hydraulic system as a fluid power source. If hoist winch operates using the main hydraulic but not the auxiliary hydraulic, troubleshoot auxiliary hydraulic system. If hoist winch operates using the auxiliary hydraulic but not the main hydraulic, troubleshoot main hydraulic system.

- A Attempt operation of the hoisting boom, main winch, and spade. If the hoisting boom, main winch, and spade do not operate, troubleshoot main hydraulic system and/or auxiliary hydraulic system. If the hoisting boom, main winch, and spade operate go to step B.
- B Visually inspect for signs of main winch mechanical failure. If signs of mechanical failure exist, notify Direct Support Maintenance. If no signs of mechanical failure exist, go to step C.

2-17 HYDRAULIC TROUBLESHOOTING-Continued

HOIST WINCH-Continued

WARNING

Do not attempt to loosen or tighten hydraulic fittings or lines when system is pressurized. Severe injury or death to personnel may result.

- C Inspect for any damaged or restricted hoses. Replace hoses as necessary (see paragraph 12-1). If no damaged or restricted hoses exist, go to step D.
- D Test for hydraulic motor failure. Remove hose No. 48 from rear of hydraulic motor (see paragraph 12-1). A large volume of oil discharged from port when hoist winch control valve is engaged indicates a faulty motor. If a faulty hydraulic motor exists, notify Direct Support maintenance. If hydraulic motor is not faulty, go to step E.
- E Inspect manual control and linkage (see paragraph 11-8) for disconnected, damaged, or missing parts. Connect linkage and replace or repair missing or damaged parts (see paragraph 11-8). If no control and linkage defects exist, go to step F.
- F Ensure hoist winch cable is not damaged and is properly attached to drum. Replace hoist winch cable if required (see paragraph 11-6). If hoist winch cable is not damaged and is properly attached to drum, go to step G.

WARNING

Do not attempt to loosen or tighten hydraulic fittings or lines when system is pressurized. Severe injury or death to personnel may result.

- G Inspect hydraulic lines and connections for leaks. Replace leaking hydraulic lines and tighten leaking connections (see paragraph 12-1). If leaks persist, notify Direct Support Maintenance. If no leaks exist go to step H.

NOTE

Ensure hydraulic system is at operating temperature.

- H If hoist winch creeps or fails to hold load, adjust brake. Open door of U-35 winch center right floor plate (see paragraph 9-4). Loosen locknut (see paragraph 11-7) and tighten hoist winch adjusting screw clockwise as far as it will go. Back off adjusting screw one full turn. Hold adjusting screw in position and tighten locknut. If brake fails to hold load, go to step I. If brake holds load but continues to creep, notify Direct Support maintenance.
- I Remove hydraulic brake cylinder hose No. 28 and inspect for restriction (see paragraph 12-1). Replace restricted or damaged hose (see paragraph 12-1). If no hose restriction or damage exists and brake still fails to hold load, go to step J.

WARNING

Do not attempt to loosen or tighten hydraulic fittings or lines when system is pressurized. Severe injury or death to personnel may result.

- J If quick disconnect between hydraulic line, hose number 22, and hydraulic line hose number 22A is dirty or damaged, clean or replace quick disconnect as necessary (see paragraph 12-1). If no quick disconnect damage is present and hoist winch still creeps or fails to hold load, notify Direct Support Maintenance.

HOISTING BOOM

SYMPTOMS

Hoisting boom does not operate.
Do steps A through F.

Hoisting boom creeps.
Do steps J and K.

Hoisting boom operates with difficulty.
Do steps C through J.

Boom stayline cables become slack during live boom operation.
Do step L.

NOTE

The hoisting boom troubleshooting procedures are performed using the main hydraulic system as a fluid power source. If hoisting boom operates using main hydraulic but not auxiliary hydraulic, troubleshoot auxiliary hydraulic system. If hoisting boom operates using auxiliary hydraulic but not main hydraulic, troubleshoot main hydraulic system.

2-17 HYDRAULIC TROUBLESHOOTING-Continued

HOISTING BOOM-Continued

- A Attempt operation of the hoist winch, main winch, and spade. If hoist winch, main winch, and spade do not operate, troubleshoot main hydraulic system and/or auxiliary hydraulic system. If hoist winch, main winch, and spade operate go to step B.
- B Visually inspect for damage. If damage exists and boom cannot be repaired, replace hoisting boom (see paragraph 11-11). If signs of damage exist and can be repaired, notify Direct Support Maintenance. If no signs of damage exist, go to step C.
- C Visually inspect for any indication of class III oil leak at stayline cylinder and actuating cylinder hydraulic connections. If class III oil leaks are present, tighten fittings (see paragraph 12-1). If no leaks are present, go to step D.

WARNING

Do not attempt to loosen or tighten hydraulic fittings or lines when system is pressurized. Severe injury or death to personnel may result.

- D Inspect for any damaged or restricted hoses. Replace hoses as necessary (see paragraph 12-1). If no damaged or restricted hoses exist, go to step E.
- E Visually inspect for failed or missing boom or hydraulic cylinder attaching pins. If any failed or missing pins exist, notify Direct Support maintenance. If no failed or missing pins exist, go to step F.

WARNING

Test equipment must be able to withstand 1950-2050 psi (13,445-14,135 kPa), Improper test equipment could burst during testing and cause personnel injury or death.

- F Test for boom combination control valve failure. Perform STE/ICE-R Test No. 51 with 0-10,000 psig pressure transducer (Appendix C, item 51) installed in pilot-operated relief and unloading valve gage port. With the main hydraulic system operating, actuate boom combination control valve lever. If

pressure is 1950-2050 psi (13,445-14,135 kPa), go to step G. If 1950-2050 psi (13,445-14,135 kPa) is not read, notify Direct Support Maintenance.

- G Visually inspect stayline cables to ensure cable connections are intact. If stayline cables are disconnected, reconnect cables as required (see paragraph 11-11). If stayline cables are connected, go to step H.
- H Inspect boom limit valve actuating shaft for binding. Move boom limit valve actuating arm by hand and lubricate shafts (refer to TM 9-2350-256-10). If binding cannot be corrected, notify Direct Support Maintenance. If no binding exists or binding was corrected, go to step J.
- I Inspect boom limit valve for defective or broken actuating arm linkage. If any defects exist, notify Direct Support Maintenance. If no boom limit valve actuating arm linkage defects exist, go to step K.
- J Inspect boom limit valves for proper adjustment. Adjust boom limit valves (see paragraph 11-12). If any defects exist, notify Direct Support Maintenance. If boom still operates with difficulty, notify Support Maintenance. If boom operates properly but creeps (fails to maintain position), go to step K.

WARNING

Do not attempt to loosen or tighten hydraulic fittings or lines when system is pressurized. Severe injury or death to personnel may result.

- K Inspect hydraulic lines and connections for leaks. Replace leaking hydraulic lines and tighten leaking connections (see paragraph 12-1). If leaks persist or boom continues to creep, notify Direct Support Maintenance.
- L Visually inspect stayline cables to ensure cable connections are intact. Adjust stayline cylinder limit valves (see paragraph 11-12). If cables still become slack after adjustment, notify Direct Support Maintenance.

2-17 HYDRAULIC TROUBLESHOOTING-Continued

SPADE

SYMPTOMS

Spade fails to operate.
Do steps A through F.

Spade operates with difficulty.
Do steps A through H.

Spade creeps.
Do steps G and H.

NOTE

The spade troubleshooting procedures are performed using the main hydraulic system as a fluid power source. If spade operates using main hydraulic but not auxiliary hydraulic, troubleshoot auxiliary hydraulic system. If spade operates using auxiliary hydraulic but not main hydraulic, troubleshoot main hydraulic system.

- A Attempt operation of the hoisting boom, hoist winch, and main winch. If hoisting boom, hoist winch, and main winch do not operate, troubleshoot main hydraulic system and/or auxiliary hydraulic system. If hoisting boom, hoist winch, and main winch operate go to step B.

WARNING

Do not attempt to loosen or tighten hydraulic fittings or lines when system is pressurized. Severe injury or death to personnel may result.

- B Inspect hydraulic lines and connections for leaks. Replace leaking hydraulic lines and tighten leaking connections (see paragraph 12-1). If leaks persist, notify Direct Support Maintenance. If no leaks persist go to step C.

WARNING

Do not attempt to loosen or tighten hydraulic fittings or lines when system is pressurized. Severe injury or death to personnel may result.

- C Visually inspect for any indication of oil leakage at spade cylinders, spade release cylinder, and cylinder hydraulic connections. If oil leaks cannot be stopped by tightening fittings, notify Direct Support Maintenance. If oil leaks are not present, go to step D.

- D Visually inspect for signs of mechanical failure of spade. If signs of mechanical failure exist, notify, Direct Support maintenance. If no signs of mechanical failure exist, go to step E.
- E Visually inspect for failed or missing spade cylinder attaching pins. If any failed or missing pins exist, notify Direct Support maintenance. If no failed or missing pins exist, go to step G.

WARNING

Test equipment must be able to withstand 1950-2050 psi (13,445-14,135 kPa). Improper test equipment could burst during testing and cause personnel injury or death.

- F If spade still does not operate, troubleshoot main hydraulic system and/or auxiliary hydraulic system (see paragraph 2-19). If spade operates, hut with difficulty, go to step G.
- G Inspect for galled spade pivot pins. If any damaged pins exist, notify Direct Support Maintenance. If no damaged pivot pins exist, go to step H.
- H Inspect hydraulic lines and connections for leaks. Replace leaking hydraulic lines and tighten leaking connections (see paragraph 12-1). If leaks persist or spade continues to operate with difficulty, notify, Direct Support Maintenance. If no leaks exist and spade still creeps, notify Direct Support Maintenance.

MAIN HYDRAULIC SYSTEM

SYMPTOMS

Insufficient or no main system oil pressure.
Do steps A through E.

Loss of main hydraulic pressure during operation
Do steps A through G.

- A Remove hydraulic line intermediate rear right center floor plate (see paragraph 9-11). Remove eight socket head screws. Remove hydraulic oil filter cover and oil filter element (see paragraph 12-3).

WARNING

Dry-cleaning solvent used to clean parts is potentially, dangerous to personnel and property. Do not use near open flame or excessive heat. Flashpoint of solvent is 138° F (59° C).

2-17 HYDRAULIC TROUBLESHOOTING-Continued

MAIN HYDRAULIC SYSTEM-Continued

WARNING

Particles blown by compressed air can be dangerous. Be certain to direct airstream away from user and other personnel in the area. Compressed air used for cleaning purposes will not exceed 30 psi. Use only with effective chip-guarding and personnel protective equipment (goggles/shield and gloves).

Clean hydraulic oil filter element in dry-cleaning solvent (Appendix D, item 9) and dry with compressed air. Install filter element and cover and go to step B.

- B Remove left- and center-front air inlet grilles (see paragraph 9-57). Inspect power takeoff coupling to see that drive shaft is firmly attached to power takeoff coupling. Tighten bolts and/or replace missing bolts and lockwashers and go to step C.

WARNING

Keep hands and arms away from fan blade and drive while engine is running, or serious injury to personnel will result.

- C Have assistant start engine. Observe power takeoff coupling and drive shaft. If they are not turning, remove powerplant (see paragraph 3-1). Install holding bar and pulley (Appendix C, item 14) and tighten power takeoff retaining nut. Torque nut to 240-250 lb-ft (1655-1724 N•m) and go to step D.
- D Remove hydraulic line intermediate rear right center floor plate (see paragraph 9-11). Remove pipe plug from mechanical transmission and install pressure gage (Appendix C, item 25). Operate engine at 1600 rpm. Lubricating oil pressure should be 10-19 psi (69-131 kPa). If lubricating oil pressure is 10-19 psi (69-131 kPa), go to step E. If lubricating oil pressure is not 10-19 psi (69-131 kPa), notify Direct Support Maintenance.
- E Disconnect hydraulic line. Install tee and pressure gage (Appendix C, item 25). Connect hydraulic line. Operate engine at 1600 rpm. Mechanical

transmission clutch operating pressure should be 140-225 psi (965-1551 kPa). If clutch pressure is 140-225 psi (965-1551 kPa), go to step F. If clutch pressure is not 140-325 psi (965-1551 kPa), notify Direct Support Maintenance.

- F Inspect hydraulic lines and connections for damage and leaks. Replace hydraulic lines and connections that show signs of damage. Tighten connections that leak. If leaks persist, notify Direct Support Maintenance.
- G Inspect hydraulic components (valves, pumps, cylinders, etc.) for leaks at gaskets and/or seals. Tighten loose covers, plates, and housings. If leaks persist, notify Direct Support Maintenance.

AUXILIARY HYDRAULIC SYSTEM

SYMPTOMS

Main and hoist winches fail to operate. Do step A.	Insufficient or no auxiliary system oil pressure. Do step A.	Loss of auxiliary hydraulic pressure during operation. Do steps B and C.
---	---	---

- A Check auxiliary power unit emergency winch control valve to see if it is in AUXILIARY POWER UNIT OPERATION (open) position. If valve is not in correct position, place in open position.

WARNING

Do not attempt to loosen or tighten hydraulic fittings or lines when system is pressurized. Severe injury or death to personnel may result.

- B Inspect hydraulic lines and connections for damage and leaks. Tighten connections that leak. If leaks persist, notify Direct Support Maintenance.
- C Inspect hydraulic components valves, pumps, cylinders, etc.) for leaks at gaskets and/or seals. Tighten loose covers, plates, or housings. If leaks persist, notify Direct Support Maintenance.

2-17 HYDRAULIC TROUBLESHOOTING-Continued

APU

SYMPTOMS

Engine fails to crank when starting switch is operated. Do steps A and B.	Engine starts but fails to keep running, misfires, or lacks power. Do steps H and K through M.	Engine discharges black smoke. Do steps I' and Q.
Engine cranks but fails to start. Do steps C and G.	Engine overheating. Do steps M and N.	Engine knocks. Do step A.
Engine hard to start. Do steps D, E, F, H, and J.		Engine uses excessive oil and discharges light blue smoky exhaust. Do step R.
Engine hard to start in cold weather. Do steps H, I, and J.		

- A Remove APU access cover (see paragraph 9-49). Check for loose electrical connections. Clean and tighten connections if loose.
- B Troubleshoot APU engine starter circuit (see paragraph 2-19, APU starter circuit fails to operate).
- C Remove APU access cover (see paragraph 9-49). Check vehicle tank and APU engine fuel supply line for restrictions or damage. Clean fuel line or replace if necessary (see paragraph 13-5).
- D Remove APU access cover (see paragraph 9-49). Check fuel system for water. Bleed water at filters (see paragraph 13-5).
- E Check for leaking APU fuel lines or fittings. Tighten or replace defective lines or fittings.
- F Check for dirty fuel filters. Replace fuel filter elements (see paragraph 13-5).
- G Remove access cover (see paragraph 9-49). Troubleshoot fuel solenoid circuit (see paragraph 2-19, APU starter circuit fails to operate). If fuel solenoid is defective, notify Direct Support Maintenance.
- H Remove APU access cover (see paragraph 9-49). Check for dirty air cleaner filter element. Clean or replace filter element (see paragraph 13-2).
- I Check air preheater and glow plugs for malfunction by troubleshooting APU starter circuit.

- J Check PREHEAT switch on APU control box for malfunction by troubleshooting APU starter circuit,
- K Check for clogged fuel lines. Clean or replace lines (see paragraph 13-5).
- L Check for dirty fuel filters. Clean or replace filters as necessary (see paragraph 13-5).
- M Remove APU access cover (see paragraph 9-49). Check that all air intake tubes and passages are free of obstructions. Remove obstructions from air intake tubes and passages.
- N Check high engine temperature sending unit. Troubleshoot APU high air temperature circuit (see paragraph 2-19, APU HIGH AIR TEMP lamp does not light when air temperature is high). If defective, notify Direct Support Maintenance.
- O Check for air in fuel supply system. Bleed fuel lines at fuel filters (see paragraph 13-5).
- P Remove APU access cover (see paragraph 9-39). Check fuel for contamination. If contaminated fuel is found, drain fuel tanks and fill with uncontaminated fuel (refer to TM 9-2350-256-10).
- Q Check air intake tubes for restrictions. If restrictions are found, clean or replace tubes (see paragraph 13-2).
- R Notify Direct Support Maintenance.

MAIN HYDRAULIC PUMP

SYMPTOMS

Main hydraulic pump fails to operate.

Do steps A through E.

Main hydraulic pump fails to develop sufficient pressure.

Do steps C through F.

Main hydraulic pump is noisy during operation.

Do steps C through F.

- A Ensure system selector control lever is in the MAIN position. If problem persists, go to step B.
- B Test for defective power control valve or restricted hose. Remove hose No. 66 from mechanical transmission (see paragraph 12-1). With mechanical transmission drive shaft rotating, and power control valve lever placed in ON position, oil should flow from hose.

2-17 HYDRAULIC TROUBLESHOOTING-Continued

MAIN HYDRAULIC PUMP-Continued

- 1 If no oil flows from hose, check hose for damage or restriction and replace as necessary (see paragraph 12-1). If oil flow cannot be restored, go to step D. If oil flows, go to step C. If mechanical transmission drive shaft does not rotate, notify Direct Support Maintenance.
 - 2 If no oil flows from hose after checking hoses and replacing as necessary, this indicates a defective power control valve. Notify Direct Support Maintenance.
- C Inspect main hydraulic pump drive shaft. If shaft is rotating, go to step D. If shaft is not rotating, go to step E.

WARNING

Do not attempt to loosen or tighten hydraulic fittings or lines when system is pressurized. Severe injury or death to personnel may result.

- D Inspect all hydraulic hoses and connections for visible indication of leaks or damage. Replace hydraulic hoses and tighten fittings as necessary (see paragraph 12-1). If problem persists, go to step E.
- E Inspect main hydraulic pump for broken or damaged shaft coupling. Tighten bolts and/or replace missing bolts and lockwashers (see paragraph 12-1). If additional damage is present or main hydraulic pump still does not operate, notify Direct Support Maintenance. If main hydraulic pump operates but is noisy or fails to develop sufficient pressure and no additional shaft coupling damage is present, go to step F.

WARNING

- Dry-cleaning solvent used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 138° F (59° C).
- Particles blown by compressed air can be dangerous. Be certain to direct air stream

away from user and other personnel in the area. compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip-guarding and personal protective equipment (goggle/shield and gloves).

- F Remove center rear floor plate (see paragraph 9-18). Remove eight socket head screws and remove hydraulic oil filter cover and oil filter element (see paragraph 12-3). clean hydraulic oil filter element in dry-cleaning solvent and dry with compressed air. Replace filter element and cover. If problem persists notify Direct Support Maintenance.

AUXILIARY HYDRAULIC PUMP

SYMPTOM

Auxiliary hydraulic pump does not operate.
Do steps A through D.

- A Ensure SYSTEM SELECTOR CONTROL lever is in the AUXILIARY or REFUEL position (not MAIN position) as appropriate. If problem persists, go to step B.
- B Ensure APU emergency winch control valve lever is in the AUXILIARY POWER UNIT OPERATION (open) position. If problem persists, go to step C.
- C Ensure power control lever is in the OFF position. If problem persists, go to step D.

WARNING

Do not attempt to loosen or tighten hydraulic fittings or lines when system is pressurized. Severe injury or death to personnel may result.

- D Inspect all hydraulic hoses and connections for visible indication of leaks or damage. Replace hydraulic hoses and tighten fittings as necessary (see paragraph 12-1). If problem persists, notify Direct Support Maintenance.

2-17 HYDRAULIC TROUBLESHOOTING-Continued

MECHANICAL TRANSMISSION-HYDRAULIC

SYMPTOM

Mechanical transmission fails to operate, slips, or chatters.

WARNING

Do not attempt to loosen or tighten hydraulic fittings or lines when system is pressurized. Severe injury or death to personnel may result.

Inspect all hydraulic hoses and connections for visible indication of leaks or damage. Replace hydraulic hoses and tighten fittings as necessary (see paragraph 12-1). If problem persists, notify Direct Support Maintenance.

2-18 VEHICLE TROUBLESHOOTING WITH SIMPLIFIED TEST EQUIPMENT/ INTERNAL COMBUSTION ENGINE-REPROGRAMMABLE (STE/ICE-R)

The STE/ICE-R kit provides an evaluation for troubleshooting various engine failure symptoms.

The STE/ICE-R Vehicle Test Meter (VTM) provides a digital readout for displaying measurement results of the engine, transmission, and battery/generator. This section contains the following:

- 1 How to use STE/ICE-R set (refer to TM 9-4910-571-12&P).
- 2 M8841 Test Procedures Table (an index of the STE/ICE-R tests and TEST LIMITS).
- 3 VTM General Setup, Confidence, and Identification tests, 66/60 (refer to TM 9-4910-571-12&P).

M88A1 Test Procedures Table			
Test No.	Title	Limits	
		Min.	Max.
10	Engine Rpm Test	2550	2640
13	C1 Governor Check and Power Test	75	
14	Compression Unbalance Test	0	15
49	Pressure Test, 0-25 Psig	1	
50	Pressure 0-1000 Psig Test	42	
66/60	VTM General Setup Confidence, and Identification Test	04	04
67	Charging Circuit and Battery Voltage Test	27	30
72	Starter Current First Peak Test	695	1185
74	Starter Circuit Resistance Test	10	60
89	DC Voltage Test*		
90	DC Current Test*		
91/92	Resistance and Continuity Check Test*		

*Limits will vary per vehicle.

2-19 ELECTRICAL TROUBLESHOOTING

TROUBLESHOOTING PROCEDURES**WARNING**

Certain precautions must be observed before beginning any tests on the 24-V system. Do not permit a hot wire to touch metal parts of the vehicle at any time. Flash testing by striking a hot wire against a vehicle ground will cause an arc that will completely destroy the connector on the lead. Accidental contact of metal tools between battery or starter cables and frame of vehicle causes a direct circuit resulting in arcing of tools. This can cause serious damage to tools, vehicle components, and batteries. Overloaded batteries may explode, spraying hot acid and sharp fragments over surrounding area. The correct procedure when removing electrical equipment, harnesses, battery cables, or starting cables is to turn off the MASTER switch and disconnect battery ground cable. Protect ground cable from accidental contact with battery terminal. When work has been completed, connect battery ground cable last.

See Hull Wiring Diagram (see fold-out illustration at back of this manual) for complete wiring of the entire vehicle.

NOTE

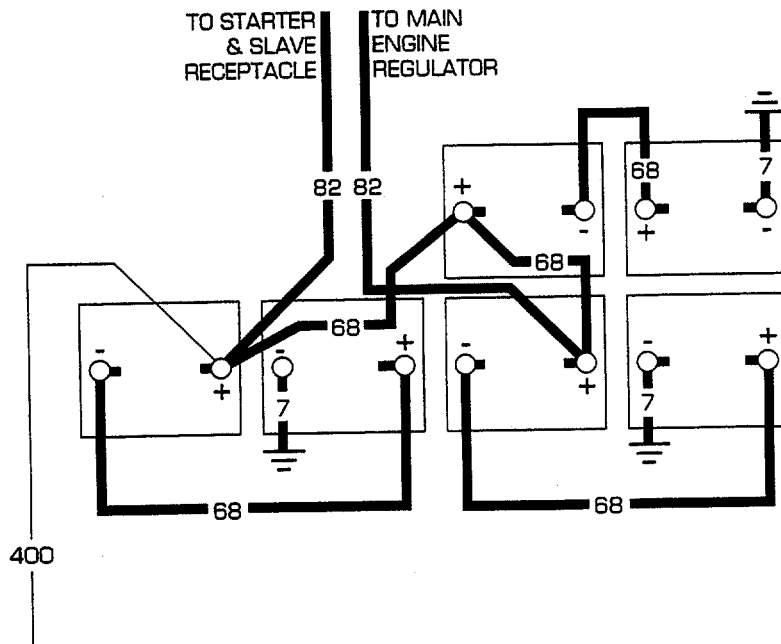
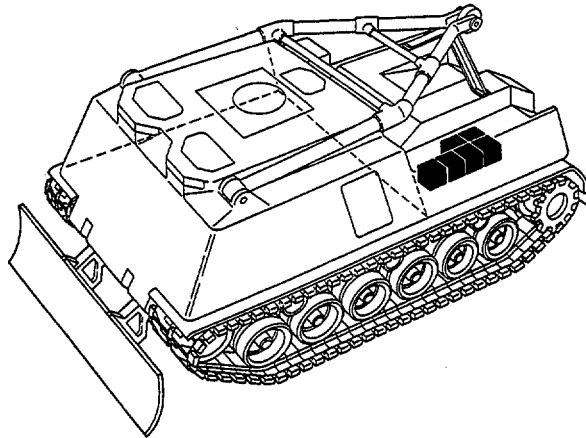
While performing electrical troubleshooting, the black lead of multimeter must have metal to metal contact with ground point to receive accurate reading.

2-19 ELECTRICAL TROUBLESHOOTING- Continued

BATTERY POWER CIRCUIT

SYMPTOMS

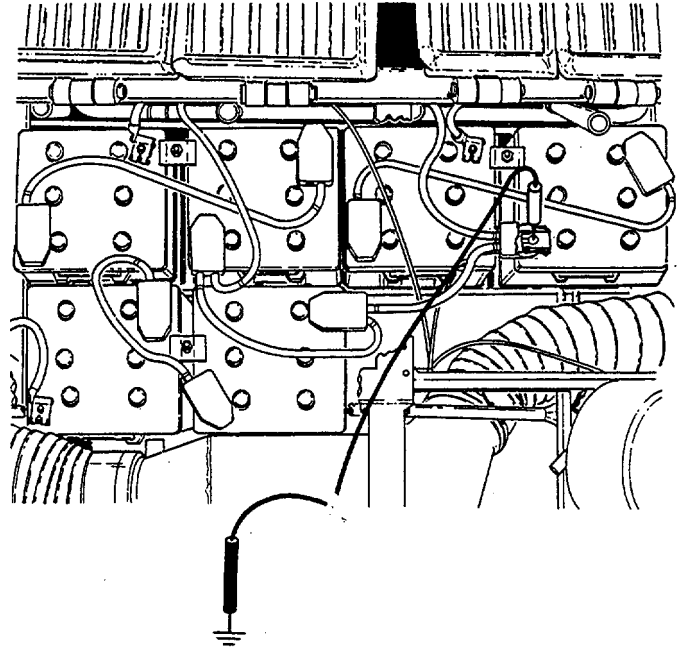
Generator gage indicates low battery charge.
Do steps A and B.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Open air inlet doors (TM 9-2350-256-10). Place red multimeter lead on positive post and black lead to ground. Check for voltage. If voltage is below 18 Vdc, clean, tighten, repair, or replace necessary cables. Crank engine and check voltage. If voltage is still below 18 Vdc, go to step B.
- B Place red multimeter lead on positive post and black lead on negative post of battery 1. Voltage reading should not be below 9 Vdc. Repeat on batteries 2, 3, 4, 5, and 6. If any battery voltage is below 9 Vdc replace battery (see paragraph 6-4).



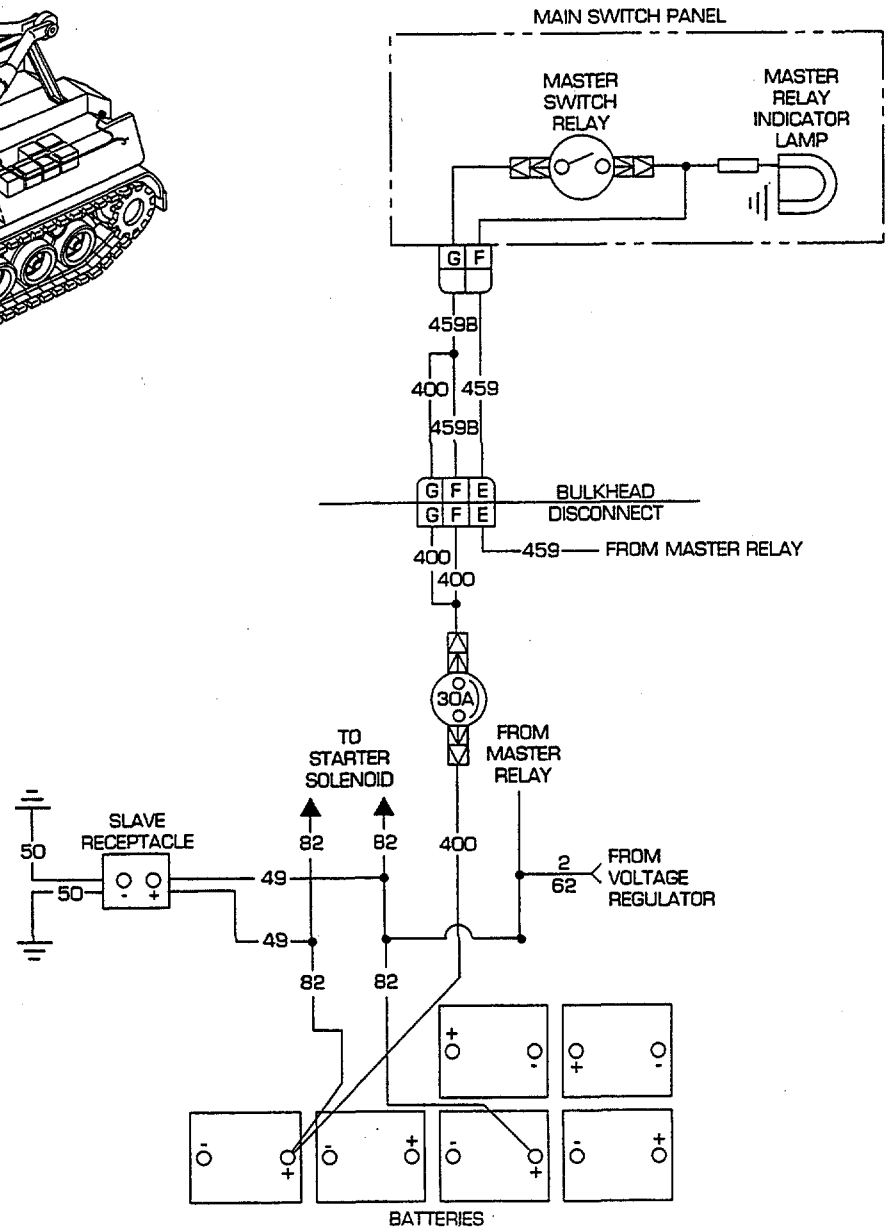
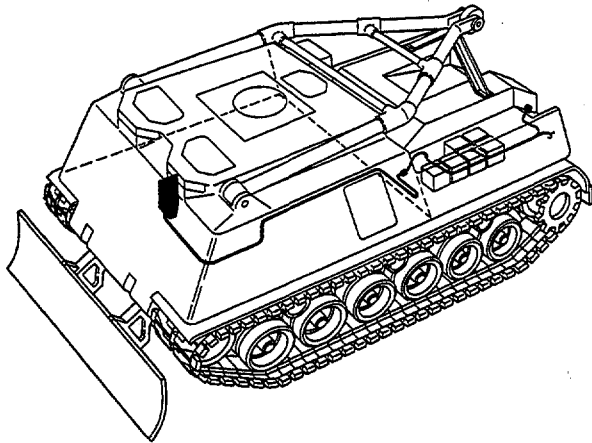
2-19 ELECTRICAL TROUBLESHOOTING-Continued

MASTER RELAY SYSTEM AND SLAVE RECEPTACLE

SYMPTOMS

Master relay fails to operate.
Do steps A through G.

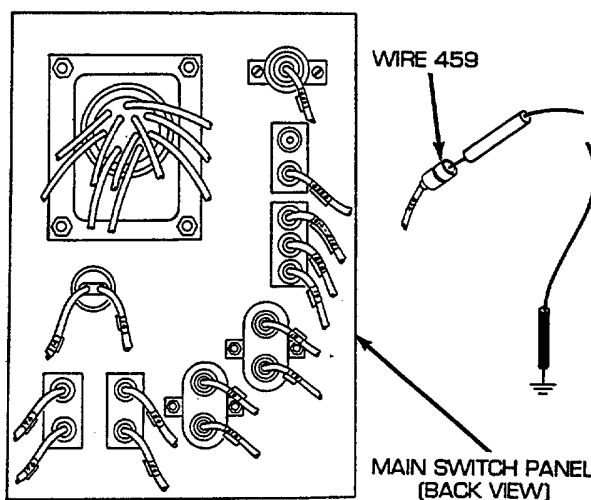
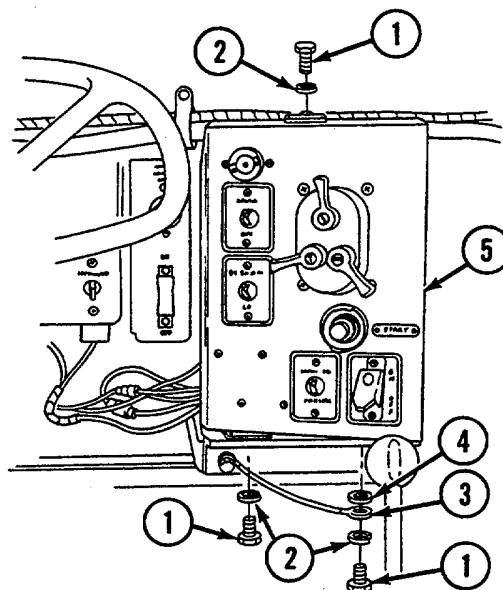
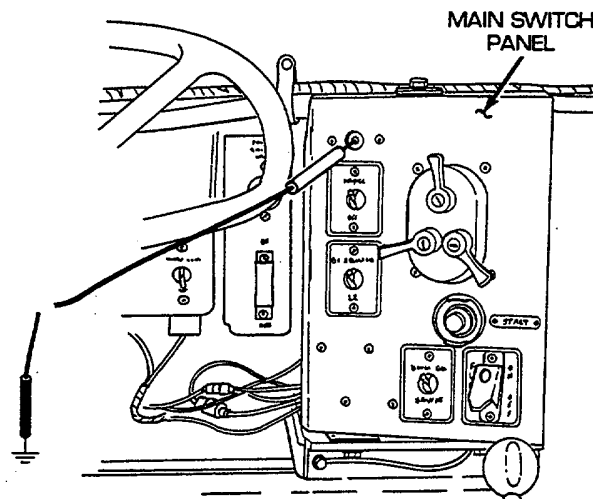
No power to slave receptacle.
Do steps H and I.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Remove master relay lamp from socket. Place red lead of multimeter in socket and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace lamp (see paragraph 6-10). If voltage is not present, go to step B.
- B Remove three screws (1), three lockwashers (2), ground lead (3), flat washer (4), and release main switch panel (5) from mounting brackets. Ground panel housing. Disconnect wire 459 from MASTER switch. Place red lead of multimeter on switch terminal and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 459 from MASTER switch to lamp connector (see paragraph 6-70). If voltage is not present, go to step C.



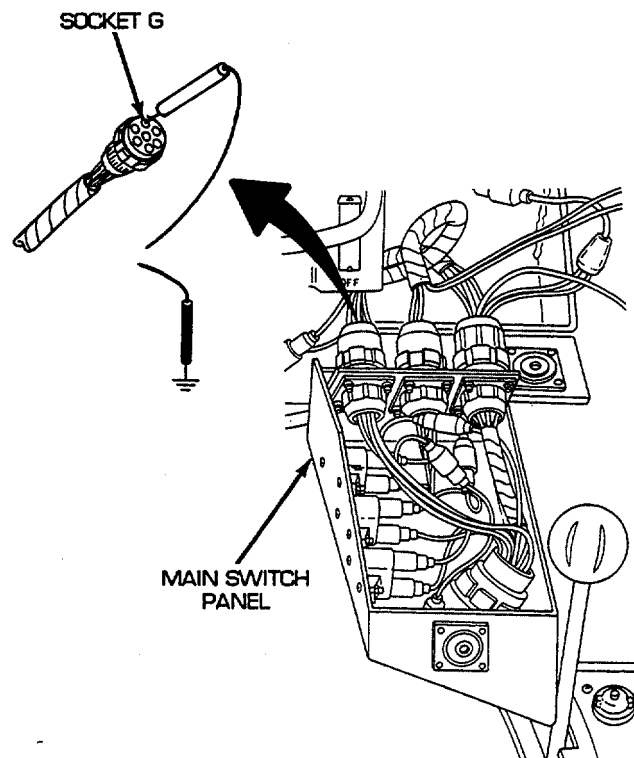
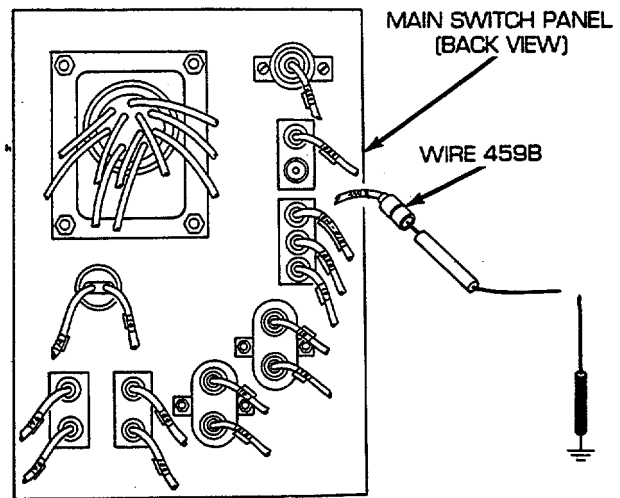
2-19 ELECTRICAL TROUBLESHOOTING-Continued

MASTER RELAY SYSTEM AND SLAVE RECEPTACLE

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- C Reconnect wire 459 MASTER switch. Disconnect wire 459B from MASTER switch. Place red lead of multimeter in wire 459B and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace master switch (see paragraph 6-10). If voltage is not present, go to step D.
- D Reconnect wire 459B to MASTER switch. Disconnect switch panel to head lamps and bulkhead wiring harness from main switch panel. Place red lead of multimeter in socket G of wire 459B and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace/repair wire 459B of switch panel. If voltage is not present, go to step E.

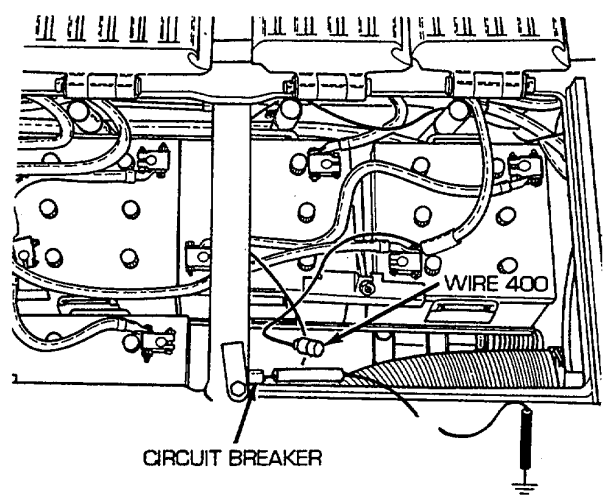
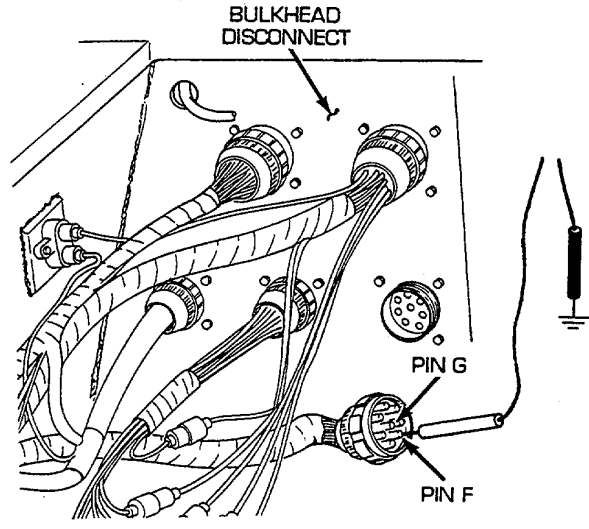
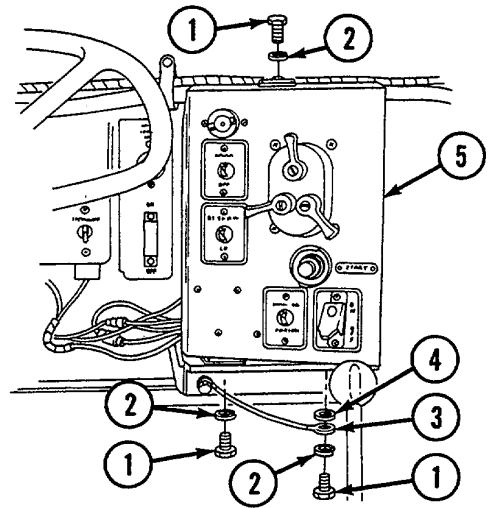


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

E Reconnect switch panel to head lamps and bulkhead wiring harness to main switch panel. Install main switch panel (5), flat washer (4), ground lead (3), three lockwashers (2), and three screws (1) to mounting brackets. Open air inlet doors (TM 9-2350-256-10). Disconnect bulkhead to master relay and left and right taillight wiring harness from bulkhead disconnect. Place red lead of multimeter on pin F of wire 400 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. Place red lead of multimeter on pin G of wire 400 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch off. If voltage is present replace/repair wire 459B of switch panel to head lamps and bulkhead wiring harness (see paragraph 6-52). If voltage is not present, go to step F.

F Reconnect bulkhead to master relay and left and right taillight wiring harness to bulkhead disconnect. Disconnect wire 400 from bulkhead side of 30 ampere (A) circuit breaker. Place red lead of multimeter on terminal of circuit breaker and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch off. If voltage is present, replace/repair wire 400 of bulkhead to master relay and left and right taillight wiring harness from 30 A circuit breaker to bulkhead (see paragraph 6-71). If voltage is not present, go to step G



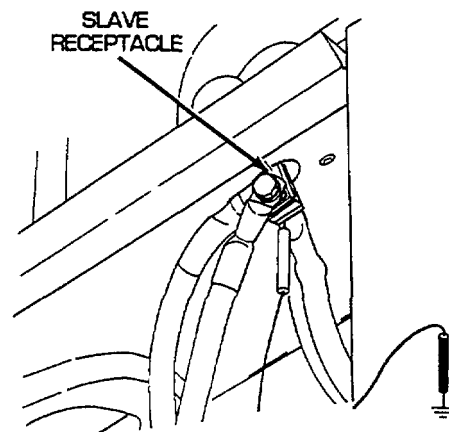
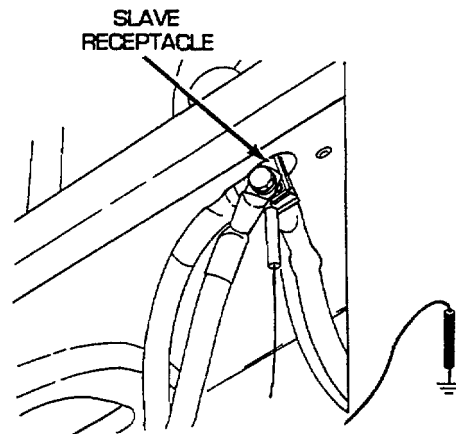
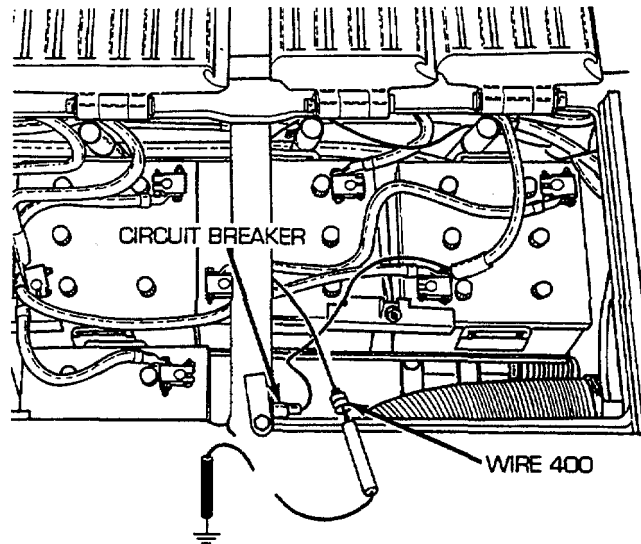
2-19 ELECTRICAL TROUBLESHOOTING-Continued

MASTER RELAY SYSTEM AND SLAVE RECEPTACLE-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

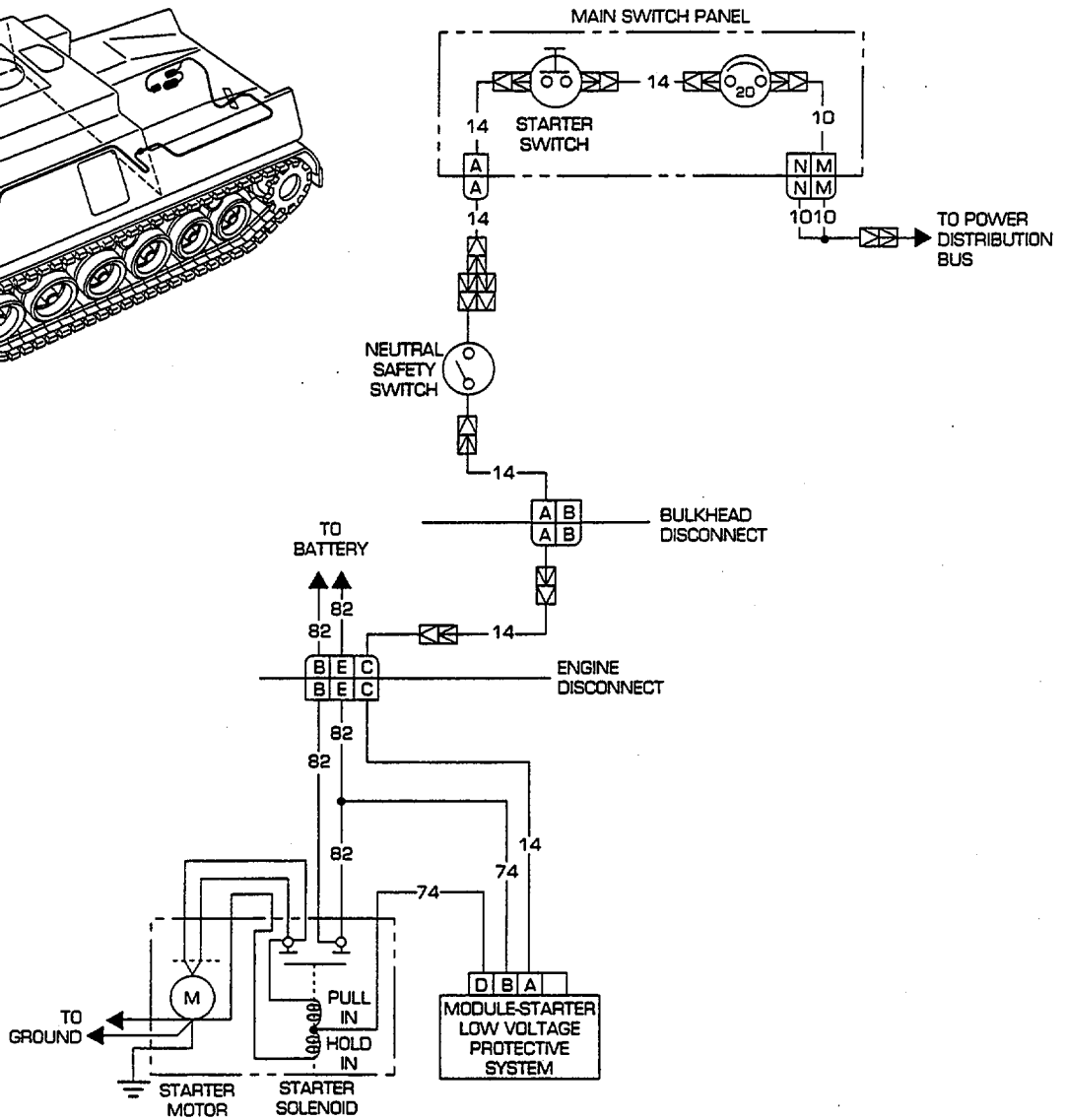
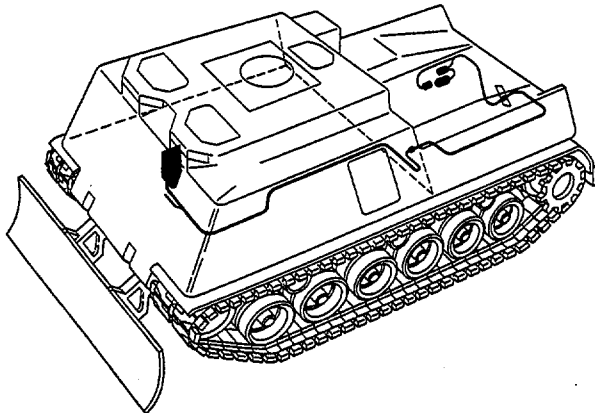
- G Reconnect wire 400 to bulkhead side of 30 A circuit breaker. Disconnect wire 400 from battery side of 30 A circuit breaker. Place red lead of multimeter in wire 400 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch off. If voltage is present, replace 30 A circuit breaker. If voltage is not present, troubleshoot battery circuit.
- H Close air inlet doors (TM 9-2350-256-10). Raise boom (TM 9-2350-256-10). Open air inlet doors. Place red lead of multimeter on wire 49 at positive terminal and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step I. If voltage is not present, replace/repair wire 49 of batteries to master relay, voltage regulators, slave receptacle, and engine disconnect wiring harness (see paragraph 6-41 for dual voltage; 6-42 for single voltage).
- I Place red lead of multimeter on wire 50 at negative terminal and black lead to ground. Check for continuity. If continuity is present, replace rear slave receptacle (see paragraph 6-77). If continuity is not present, replace/repair bulkhead rear slave receptacle wiring harness (see paragraph 6-77).



ENGINE STARTING SYSTEM

SYMPTOMS

Engine fails to crank
Do steps A through N.



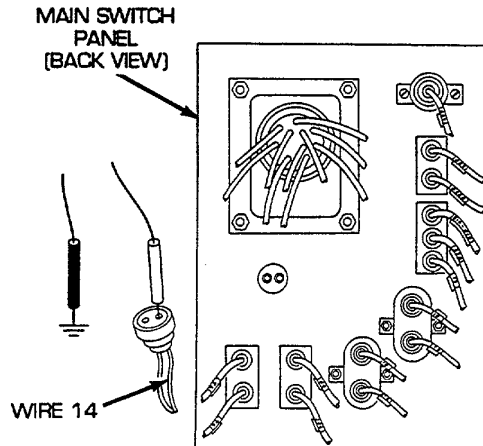
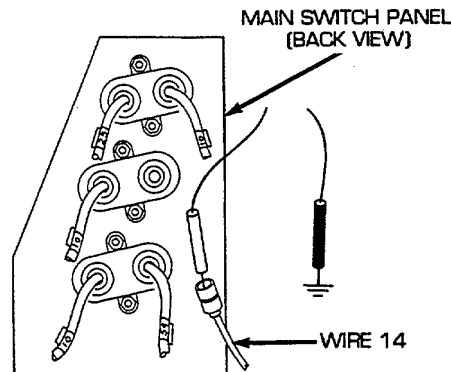
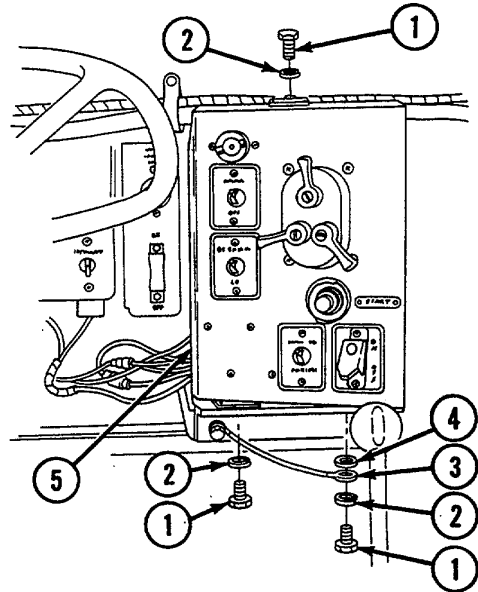
2-19 ELECTRICAL TROUBLESHOOTING-Continued

ENGINE STARTING SYSTEM-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Remove three screws (1), three lockwashers (2), ground lead (3), and flat washer (4) and release main switch panel (5) from mounting brackets. Disconnect wire 14 from START switch side of circuit breaker. Place red lead of multimeter on terminal of circuit breaker and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step B. If voltage is not present, go to step L.
- B Reconnect wire 14 to circuit breaker side of START switch. Disconnect wire 14 from panel side of START switch. Place red lead of multimeter on START switch terminal and black lead to ground. Turn MASTER switch on, push START switch, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step C. If voltage is not present, replace START switch (see paragraph 6-10).



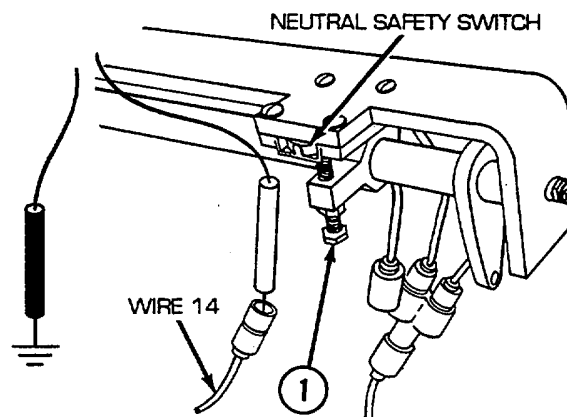
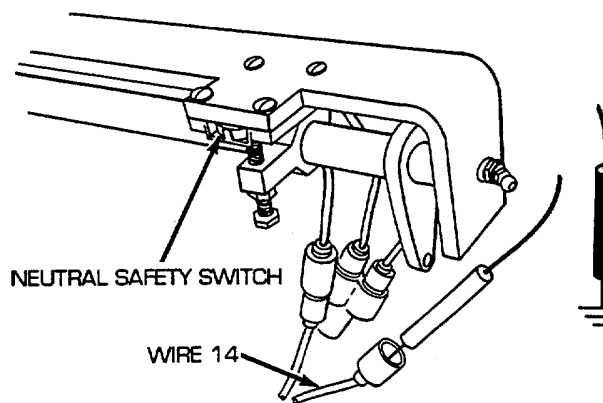
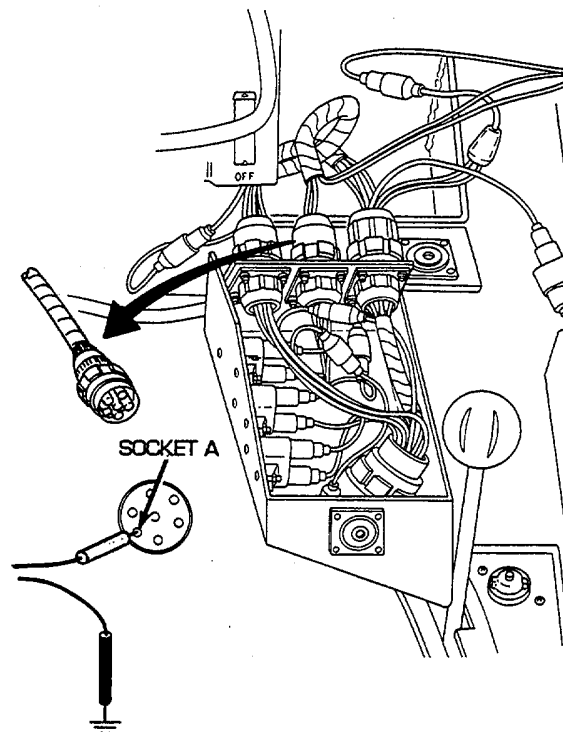
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

C Disconnect switch panel to neutral safety to bulkhead wiring harness from main switch panel. Place red lead of multimeter in socket A, of wire 14 and black lead to ground. Turn MASTER switch on, push START switch, and check for voltage. Turn MASTER switch OFF. If voltage is not present, replace/repair wire 14 of circuit breaker-to-main switch panel wiring harness. If voltage is present, go to step D.

D Reconnect switch panel to neutral safety to bulkhead wiring harness to main switch panel. Disconnect wire 14 at Y-connector on switch panel side. Place red lead of multimeter in wire 14 and black lead to ground. Turn MASTER switch on, push START switch, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step E. If voltage is not present, replace/repair wire 14 of switch panel to neutral safety to bulkhead wiring harness (see paragraph 6-54).

E Reconnect wire 14 to Y-connector on switch panel side. Disconnect wire 14 from bulkhead side of neutral safety switch. Place red lead of multimeter in male connector of neutral safety switch and black lead to ground. Turn MASTER switch on, push START switch and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step F. If voltage is not present, ensure bolt (1) is making contact with neutral safety switch. If no contact is present adjust neutral safety switch (see paragraph 6-14). If contact is present replace neutral safety switch (see paragraph 6-14).



2-19 ELECTRICAL TROUBLESHOOTING-Continued

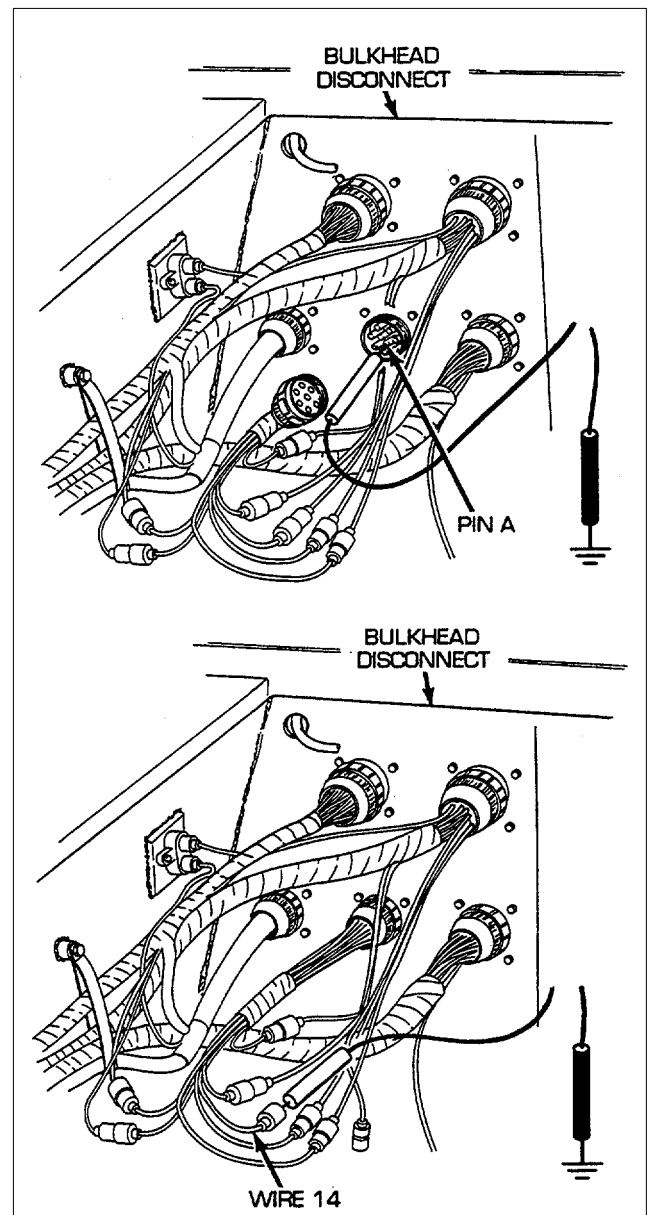
ENGINE STARTING SYSTEM-Continued

WARNING

- Place transmission selector in P (park).
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

F Reconnect wire 14 to connector on bulkhead side of neutral safety switch. Open air inlet doors (TM 9- 2350-256-10). Disconnect bulkhead to engine wiring harness and starter relay wiring harness from bulkhead disconnect. Place red lead of multimeter on pin A of wire 14 and black lead to ground. Turn MASTER switch on, push START switch, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step G. If voltage is not present, replace/repair wire 14 of switch panel to neutral safety to bulkhead wiring harness (see paragraph 6-54).

G Reconnect switch panel to neutral safety to bulkhead wiring harness at bulkhead disconnect. Disconnect wire 14 of bulkhead to engine wiring harness and starter relay wiring harness from connector near bulkhead disconnect. Place red lead of multimeter on male connector and black lead to ground. Turn MASTER switch on, push START switch, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step H. If voltage is not present, replace/repair wire 14 of bulkhead to engine wiring harness and starter relay wiring harness (see paragraph 6-72).



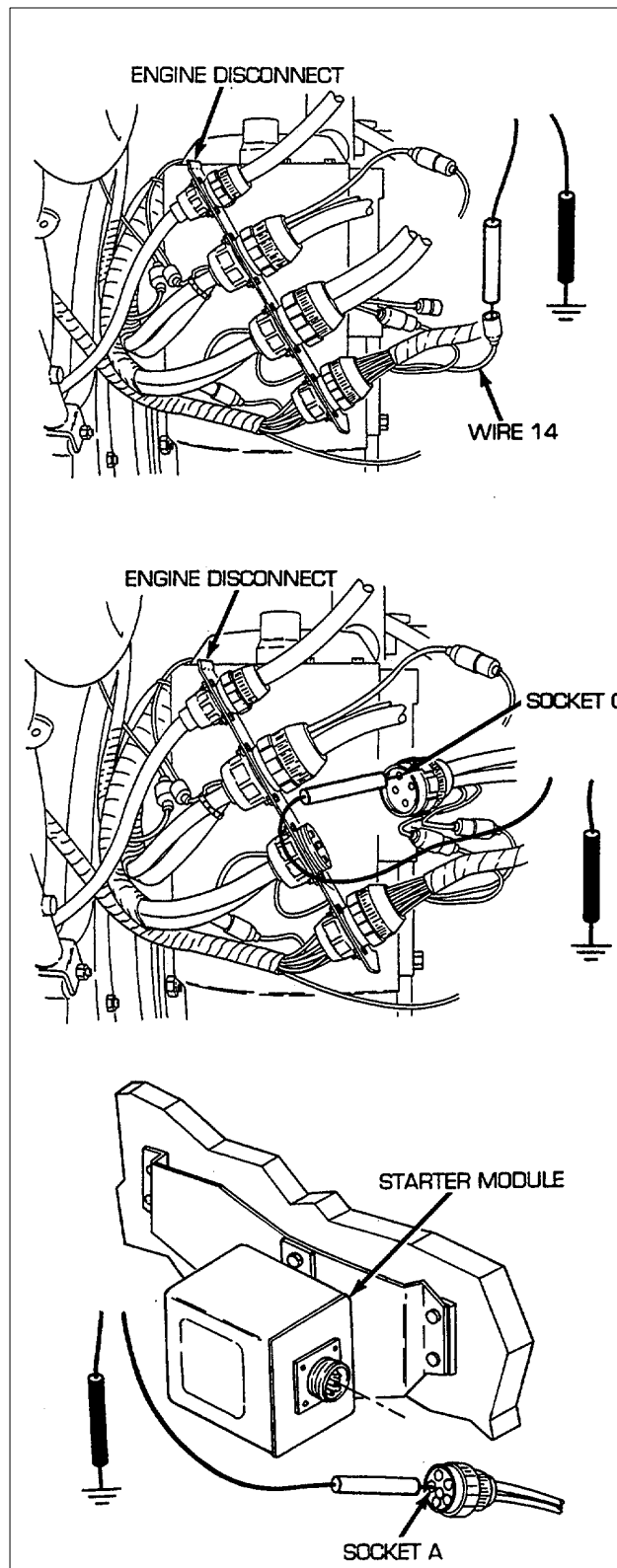
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

H Reconnect wire 14 of bulkhead to engine wiring harness and starter relay wiring harness to connector near bulkhead disconnect. Remove engine deck (see paragraph 9-51). Disconnect wire 14 of batteries to master relay, voltage regulators, slave receptacle, and engine disconnect wiring harness from connector near engine disconnect. Place red lead of multimeter on male connector of wire 14 and black lead to ground. Turn MASTER switch on, push START switch and check for voltage. Turn MASTER switch OFF. If voltage is not present, replace/repair wire 14 of bulkhead to engine disconnect wiring harness (see paragraph 6-73 for dual voltage; 6-74 for single voltage). If voltage is present, go to step I.

I Reconnect wire 14 of engine disconnect wiring harness to connector near engine disconnect. Remove engine deck (see paragraph 9-51). Disconnect batteries to master relay, voltage regulators, slave receptacle, and engine disconnect wiring harness from engine disconnect. Place red lead of multimeter in socket C of wire 14 and black lead to ground. Turn MASTER switch on, push START switch, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step J. If voltage is not present, replace/repair wire 14 of batteries to master relay, voltage regulators, slave receptacle, and engine disconnect wiring harness (see paragraph 6-41 for dual voltage; 6-42 for single voltage).

J Remove powerplant and connect ground-hop kit (see paragraph 3-1). Reconnect battery to master relay, voltage regulators, slave receptacle, and engine disconnect wiring harness to engine disconnect. Disconnect module starter wiring harness from low voltage protection module. Place red lead of multimeter in socket A of wire 14 and black lead to ground. Turn MASTER switch on, push START switch, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step K. If voltage is not present, replace/repair wire 14 of module starter wiring harness (see paragraph 6-40).



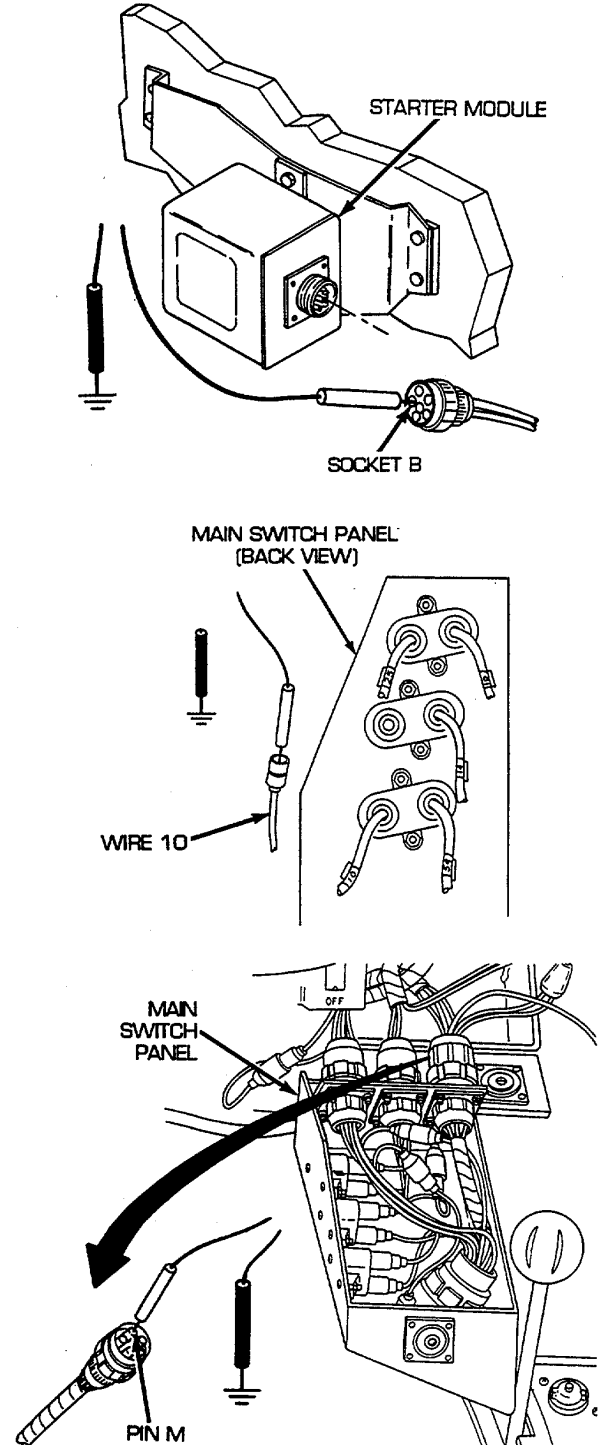
2-19 ELECTRICAL TROUBLESHOOTING-Continued

ENGINE STARTING SYSTEM-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

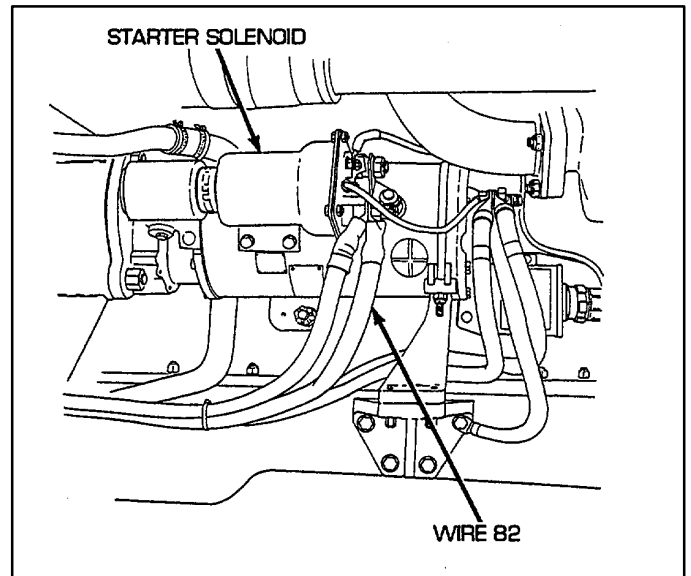
- K Place red lead of multimeter in socket B of wire 74 and black lead to ground. Turn MASTER switch on, push START switch and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step N. If voltage is not present, replace/repair wire 82/74 of module starter wiring harness (see paragraph 6-40).
- L Reconnect wire 14 to START switch side of circuit breaker. Disconnect wire 10 from circuit breaker. Place red lead of multimeter in wire 10 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace circuit breaker (see paragraph 6-10). If voltage is not present, go to step M.
- M Disconnect switch panel to gage panel and miscellaneous switches wiring harness from main switch panel. Place red lead of multimeter on pin M of wire 10 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 10 of circuit breaker-to-main present, troubleshoot battery power circuit.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- N Check for voltage at wire 82 of starter solenoid. If voltage is present, replace starter motor (see paragraph 6-3). If voltage is not present replace starter module (see paragraph 6-40).



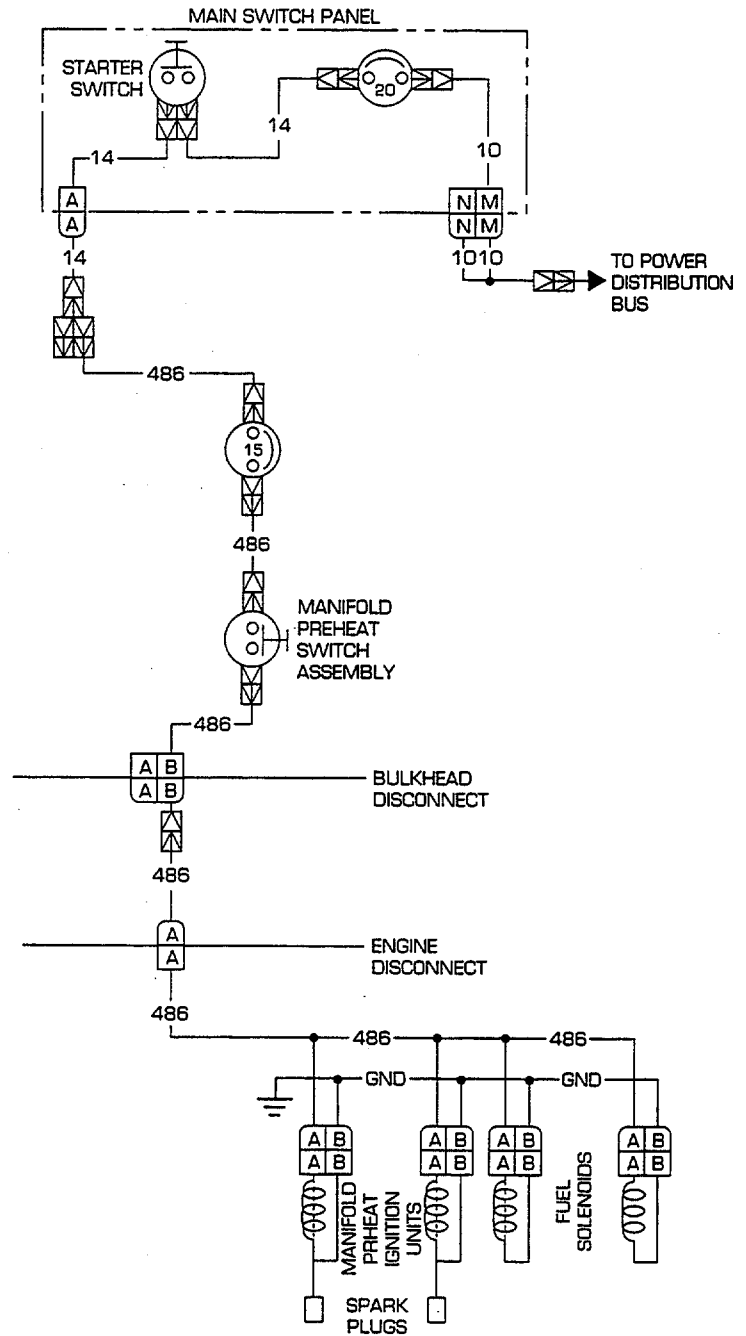
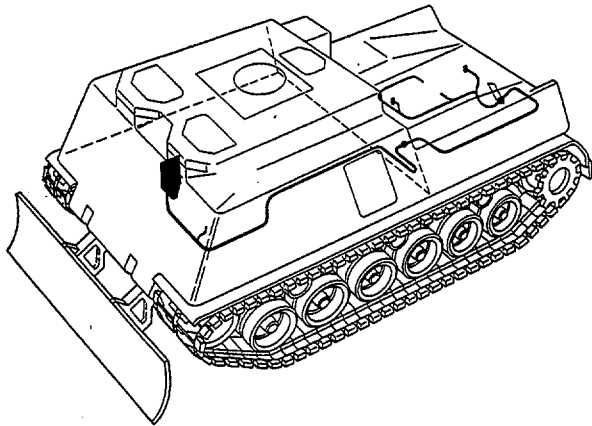
2-19 ELECTRICAL TROUBLESHOOTING-Continued

ENGINE MANIFOLD PREHEATER SYSTEM

SYMPTOM

Manifold preheater fails to operate.

Do steps A through S.

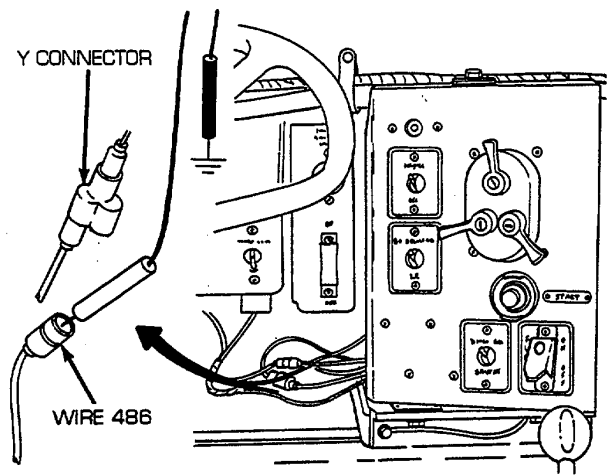
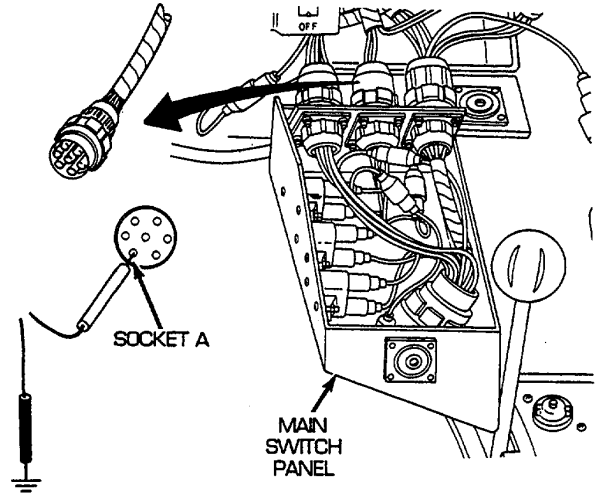
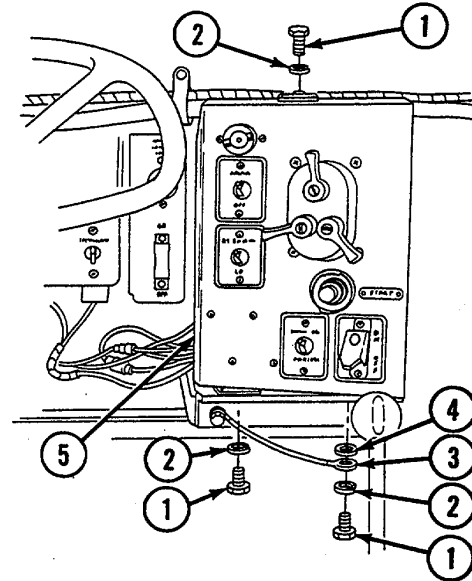


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

A Remove three screws (1), three lockwashers (2), ground lead (3), flat washer (4), and release main switch panel (5) from mounting brackets. Disconnect switch panel to neutral safety to bulkhead wiring harness from main switch panel. Place red lead of multimeter in socket A of wire 14 and black lead to ground. Turn MASTER switch on, push START switch, and check for voltage. Turn MASTER switch OFF. If voltage is not present, go to step 0. If voltage is present, go to step B.

B Reconnect switch panel to neutral safety to bulkhead wiring harness to main switch panel. Install main switch panel (5), flat washer (4), ground lead (3), three lockwashers (2), and three screws (1) to mounting bracket. Disconnect wire 486 at Y-connector rear main switch panel on manifold preheat switch side. Place red lead of multimeter on male connector of wire 486 and black lead to ground. Turn MASTER switch on, push START switch, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step C. If voltage is not present, repair/replace wire 14 of switch panel to neutral safety to bulkhead wiring harness (see paragraph 6-54).



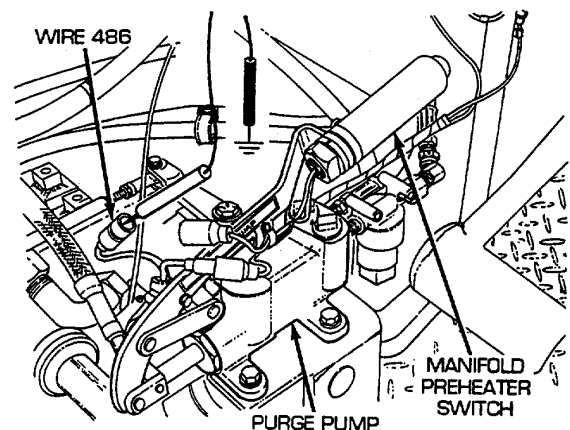
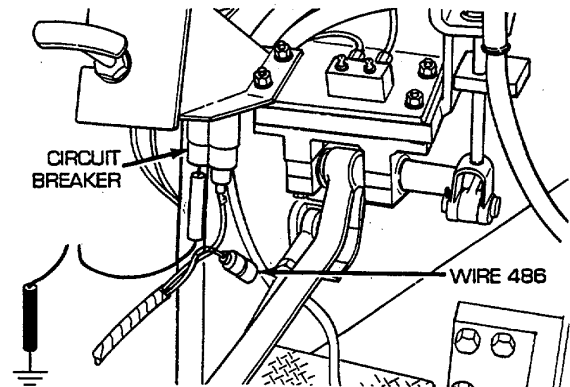
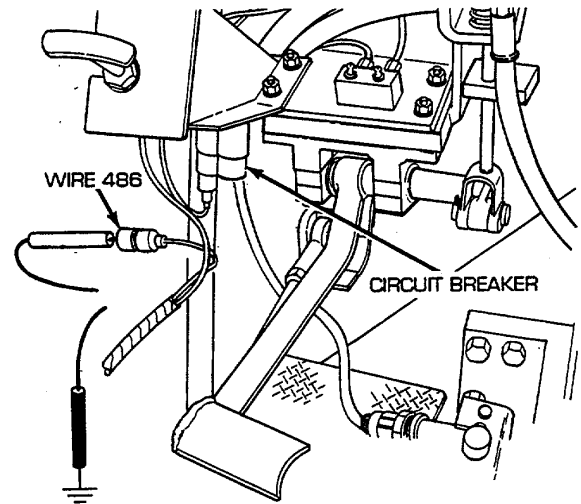
2-19 ELECTRICAL TROUBLESHOOTING-Continued

ENGINE MANIFOLD PREHEATER SYSTEM-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

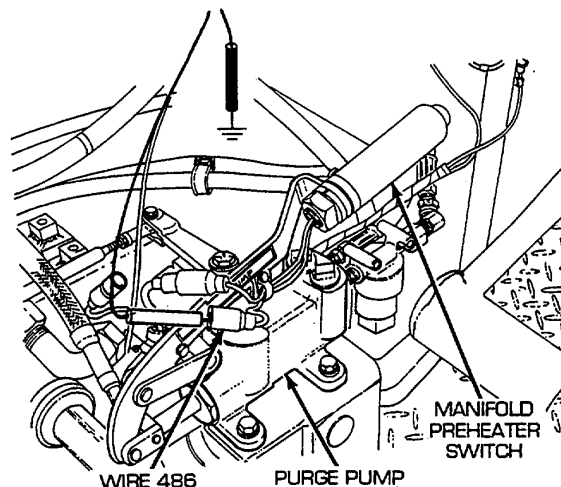
- C Reconnect wire 486 to Y-connector on manifold preheat switch side. Disconnect wire 486 from switch panel side of 15 A circuit breaker. Place red lead of multimeter on female connector of wire 486 and black lead to ground. Turn MASTER switch on, push START switch, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step D. If voltage is not present, repair/replace wire 486 or air cleaner circuit breaker lead assembly (see paragraph 6-82).
- D Reconnect wire 486 to switch panel side of 15 A circuit breaker. Disconnect wire 486 from manifold preheater switch side of 15 A circuit breaker. Place red lead of multimeter on circuit breaker terminal and black lead to ground. Turn MASTER switch on, push START switch, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step E. If voltage is not present, replace 15 A circuit breaker.
- E Reconnect wire 486 to manifold preheater switch side of 15 A circuit breaker. Disconnect wire 486 from circuit breaker side of manifold preheater switch. Place red lead of multimeter in wire 486 and black lead to ground. Turn MASTER switch on, push START switch, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step F. If voltage is not present, repair/replace wire 486 of switch panel to neutral safety to bulkhead wiring harness from circuit breaker to manifold preheat switch assembly (see paragraph 6-54).



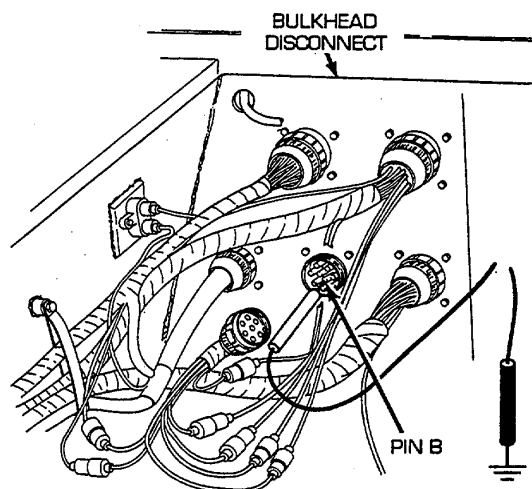
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

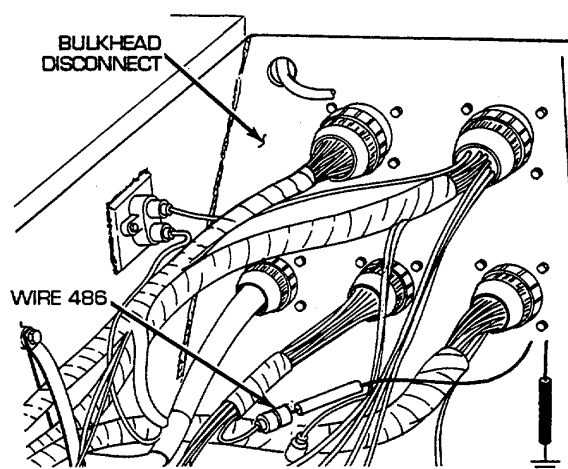
F Reconnect wire 486 to circuit breaker side of manifold preheat switch. Disconnect wire 486 from bulkhead side of manifold preheat switch. Place red lead of multimeter on switch terminal and black lead to ground. Turn MASTER switch on, push START and manifold preheat switches, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step G. If voltage is not present, replace manifold preheat switch assembly (see paragraph 4-9).



G Reconnect switch panel to neutral safety switch to bulkhead wiring harness to main switch panel. Open air inlet doors (TM 9-2350-256-10). Disconnect bulkhead to engine harness and starter relay wiring harness from bulkhead disconnect. Place red lead of multimeter on pin B of wire 486 and black lead to ground. Turn MASTER switch on, push START and manifold preheat switches, and check for voltage. Turn MASTER and manifold preheat switches OFF. If voltage is present, go to step H. If voltage is not present, replace/repair wire 486 of switch panel to neutral safety to bulkhead wiring harness.



H Reconnect bulkhead to engine wiring harness and starter relay wiring harness to bulkhead disconnect. Disconnect wire 486 from connector near bulkhead disconnect. Place red lead of multimeter in female connector and black lead to ground. Turn MASTER switch on, push START and manifold preheat switches, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step I. If voltage is not present, repair/replace wire 486 of bulkhead to engine wiring harness and starter relay wiring harness from female connector to bulkhead disconnect (see paragraph 6-72).



2-19 ELECTRICAL TROUBLESHOOTING-Continued

ENGINE MANIFOLD PREHEATER SYSTEM-Continued

WARNING

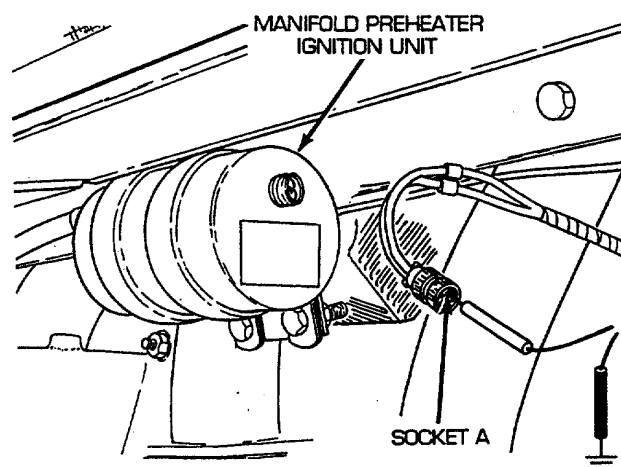
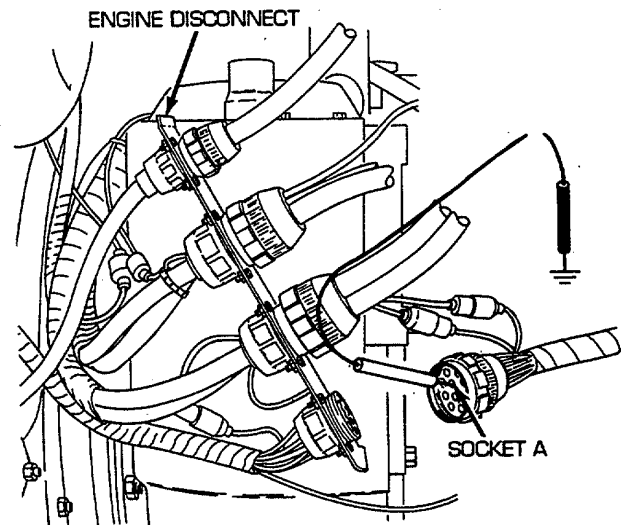
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- I Remove engine deck (see paragraph 9-51). Reconnect wire 486 at connector near bulkhead disconnect. Disconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness from engine disconnect. Place red lead of multimeter in socket A of wire 486 and black lead to ground. Turn MASTER switch ON, push START and manifold preheat switches, and check for voltage. Turn MASTER, START and manifold preheat switches OFF. If voltage is present, go to step J. If voltage is not present repair/replace wire 486 of bulkhead to engine bracket and rear fuel tank transmitter wiring harness (see paragraph 6-73 for dual voltage; 6-74 for single voltage).

NOTE

Steps J through N are the same for both left and right preheaters and fuel solenoids. Perform J through N as necessary for each side.

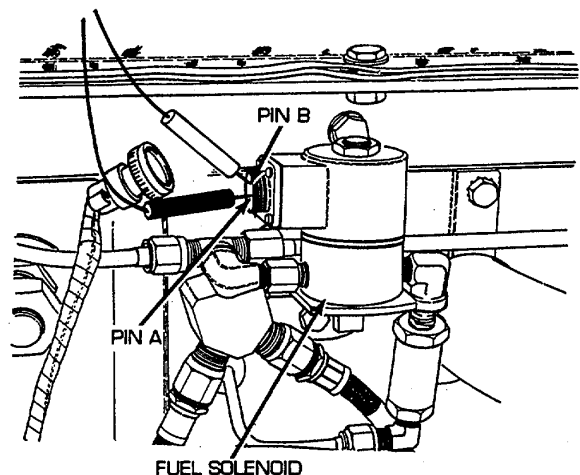
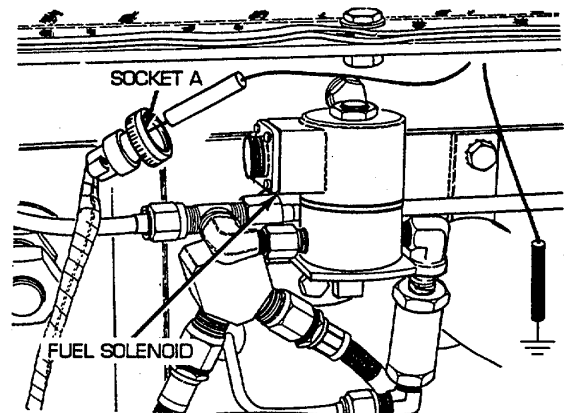
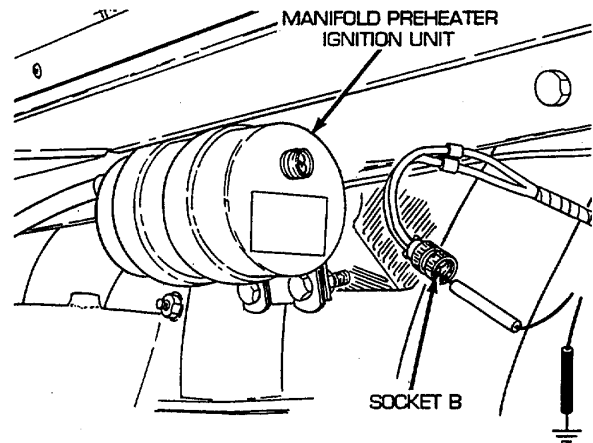
- J Remove powerplant (see paragraph 3-1). Reconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness to engine disconnect. Disconnect engine wiring harness from manifold preheater ignition unit. Place red lead of multimeter in socket A of wire 486 and black lead to ground. Turn MASTER switch on, push START and manifold preheat switches, and check for voltage. Turn MASTER, START, and manifold preheat switches OFF. If voltage is present, go to step K. If voltage is not present, repair/replace wire 486 of engine wiring (see paragraph 6-58 for dual voltage; 6-59 for single voltage).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- K Place red lead of multimeter in socket B of ground wire and black lead to ground. Check for continuity. If continuity is present, go to step L. If continuity is not present, repair/replace ground wire of engine wiring harness (see paragraph 6-58 for dual voltage; 6-59 for single voltage).
- L Reconnect engine wiring harness to manifold preheater ignition unit. Disconnect engine wiring harness from fuel solenoid. Place red lead of multimeter in socket A of wire 486 and black lead to ground. Turn MASTER switch on, push START and manifold preheat switches, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step M. If voltage is not present, repair/replace wire 486 of engine wiring harness (see paragraph 6-58 for dual voltage; 6-59 for single voltage).
- M Place red lead of multimeter on pin B of fuel solenoid and black lead to pin A. Check for continuity. If continuity is present, go to step N. If continuity is not present, replace fuel solenoid (see paragraph 4-20).



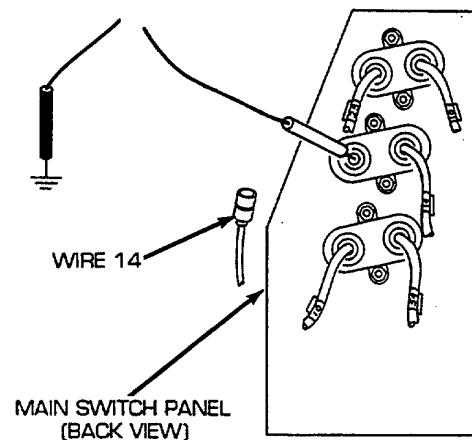
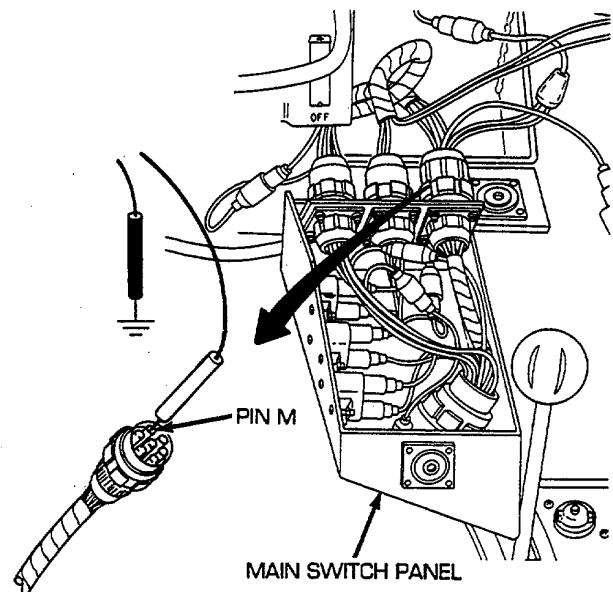
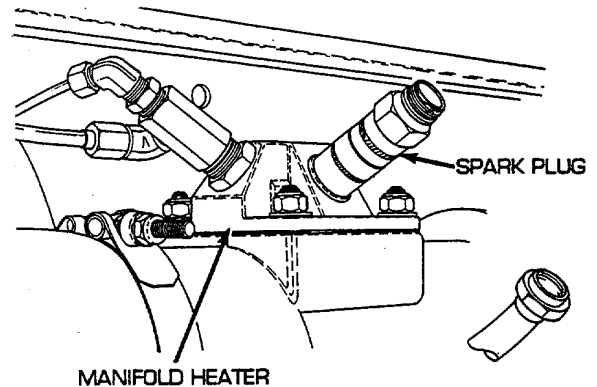
2-19 ELECTRICAL TROUBLESHOOTING- Continued

ENGINE MANIFOLD PREHEATER SYSTEM-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

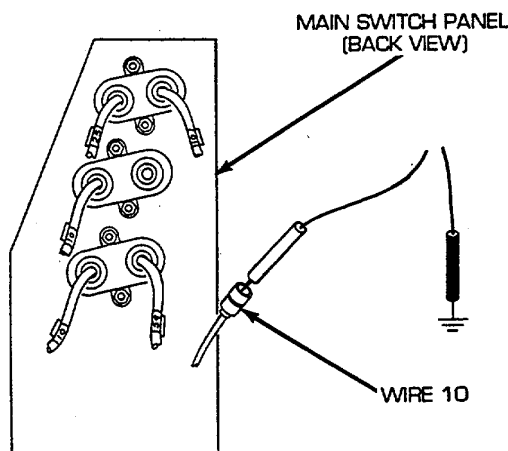
- N Reconnect engine wiring harness to fuel solenoid. Disconnect lead from spark plug. Hold lead close to engine and turn MASTER switch on, push START and manifold preheat switches, and check for spark. Turn MASTER switch OFF. If spark is present, replace spark plug (see paragraph 4-21). If spark is not present, replace manifold preheater ignition unit (see paragraph 4-19).
- O Reconnect switch panel to neutral safety switch to bulkhead harness to main switch panel. Disconnect switch panel to gage panel and miscellaneous switches wiring harness from main switch panel. Place red lead of multimeter on pin M of wire 10 and black lead to ground. Turn MASTER switch on push START switch, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step P. If voltage is not present, troubleshoot battery circuit.
- P Place a jumper wire from bracket to hull to ground the panel. Reconnect switch panel and miscellaneous switches wiring harness to main switch panel. Disconnect wire 14 from START switch side of 20 A circuit breaker. Place red lead of multimeter on terminal of 20 A circuit breaker and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step R. If voltage is not present, go to step Q.



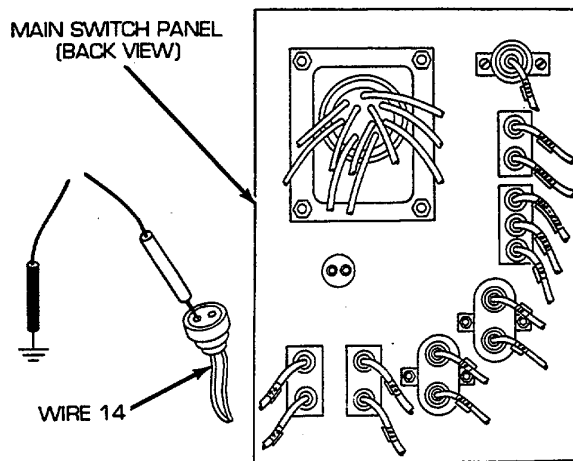
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

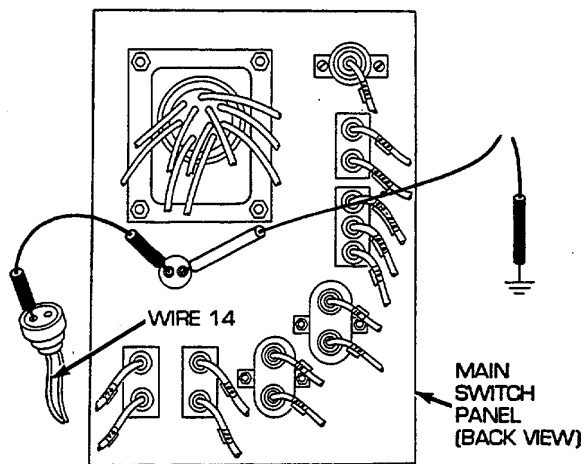
Q Reconnect wire 14 to START switch side of 20 A circuit breaker. Disconnect wire 10 from 20 A circuit breaker. Place red lead of multimeter in wire 10 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace circuit breaker (see paragraph 6-10). If voltage is not present, repair/replace wire 10 of main lighting and B.O. selector switch wiring harness (see paragraph 6- 69).



R Reconnect wire 14 to 20 A circuit breaker. Disconnect connector from START switch. Place red lead of multimeter in wire 14 from circuit breaker and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step S. If voltage is not present, repair/replace wire 14 of main lighting and B.O. selector switch wiring harness (see paragraph 6-69).



S Place jumper in wire 14 from circuit breaker to START switch input terminal. Place red lead of multimeter on START switch output terminal and black lead to ground. Turn MASTER switch on, push START switch, and check for voltage. Turn MASTER and START switches OFF. If voltage is present, repair/replace wire 14 of starter switch wiring harness (see paragraph 6-57). If voltage is not present, replace START switch (see paragraph 6-10).



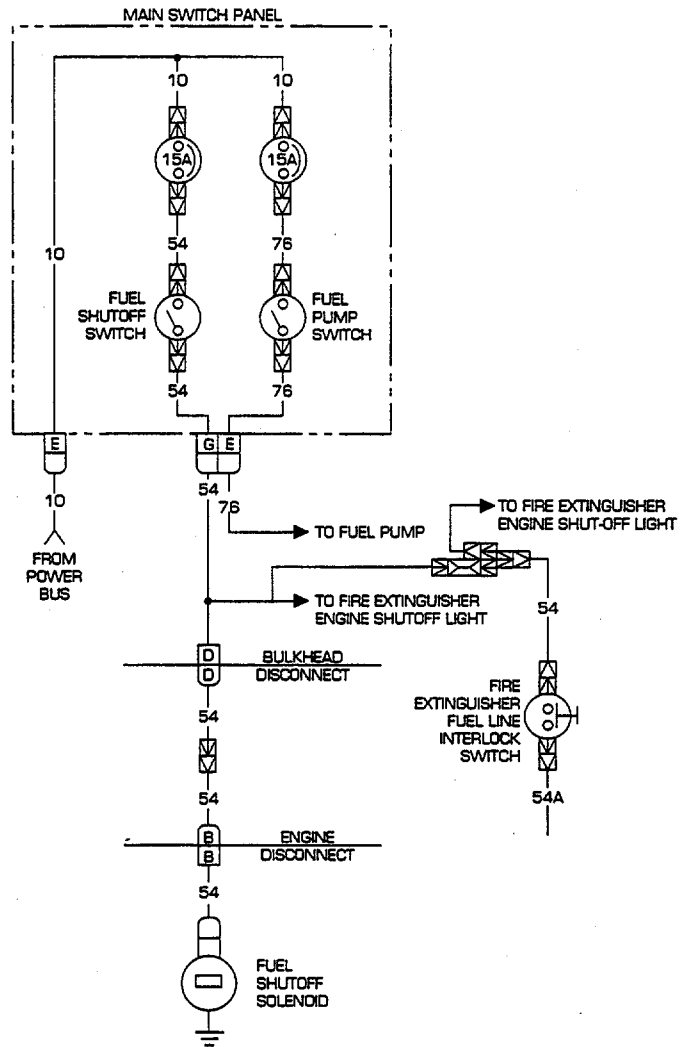
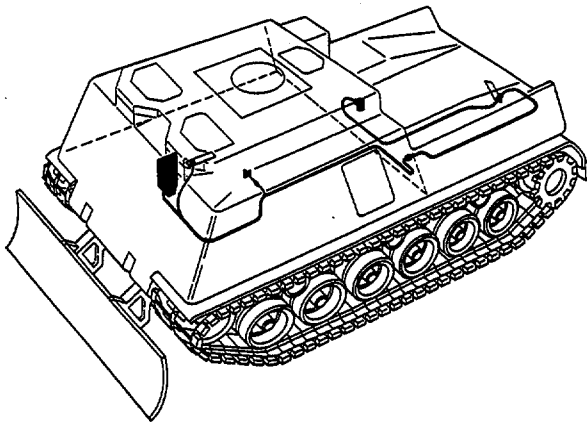
2-19 ELECTRICAL TROUBLESHOOTING--Continued

ENGINE FUEL SHUTOFF SOLENOID

SYMPTOMS

Engine cranks but fails to start.

Do steps A through K.

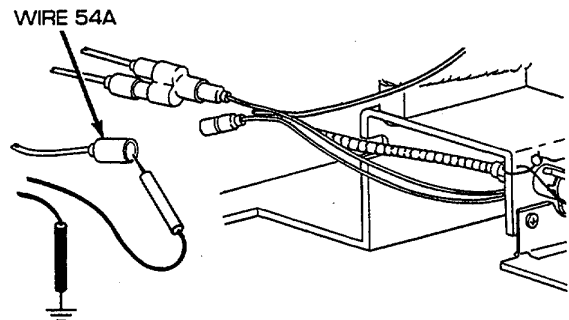
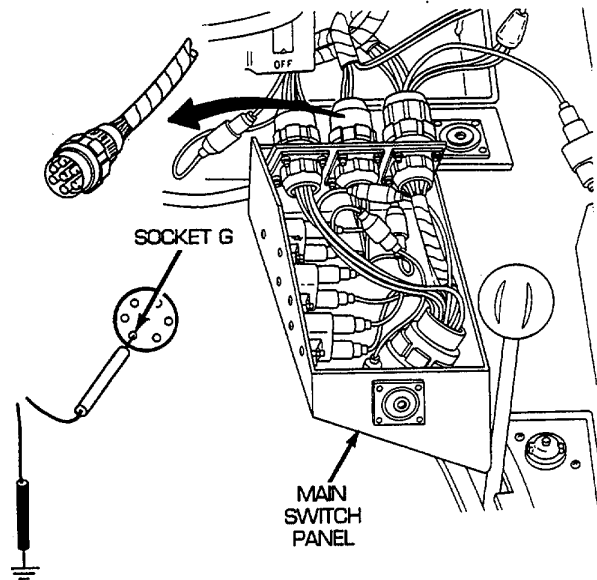
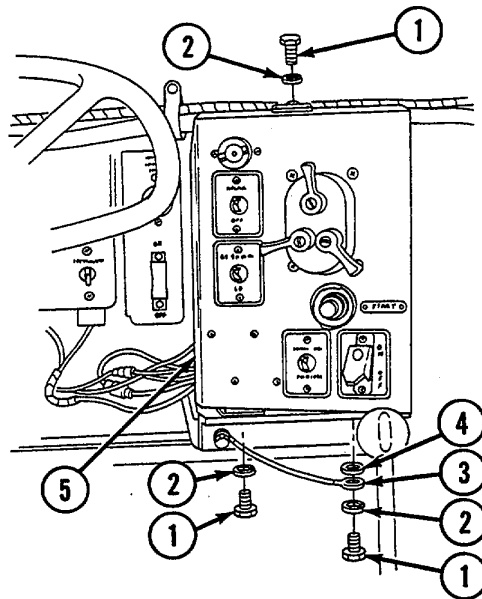


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

A Remove three screws (1), three lockwashers (2), ground lead (3), flat washer (4), and release main switch panel (5) from mounting brackets. Disconnect switch panel to neutral safety to bulkhead wiring harness from main switch panel. Place red lead of multimeter in socket G of wire 54 and black lead to ground. Turn MASTER and ENGINE FUEL SHUTOFF switches on and check for voltage. Place red lead in socket E of wire 54 and black lead to ground and check for voltage. Turn MASTER and ENGINE FUEL SHUTOFF switches off. If voltage is present at pins G and E, go to step B. If voltage is not present at pin G, go to step H. If voltage is not present at pin E, go to step K.

B Disconnect wire 54A of switch panel to head lamps and bulkhead wiring harness from fire extinguisher interlock switch. Place red lead of multimeter on wire 54A and black lead to ground. Turn MASTER switch on, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step C. If voltage is not present, replace/repair wire 54 of switch panel to headlamps and bulkhead wiring harness.



2-19 ELECTRICAL TROUBLESHOOTING-Continued

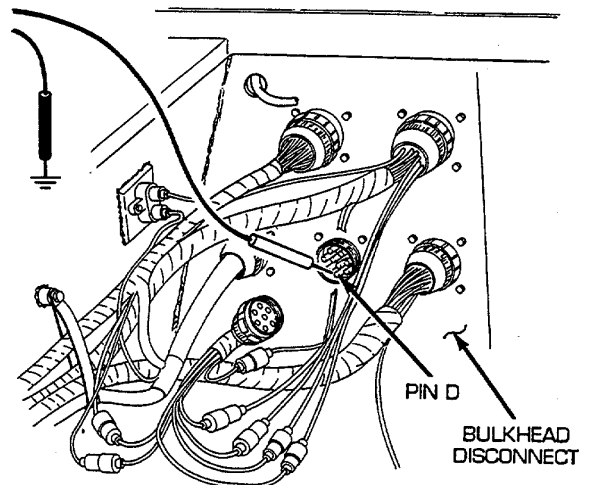
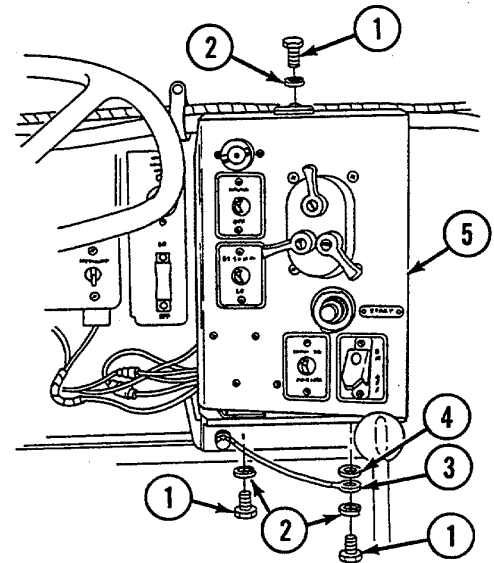
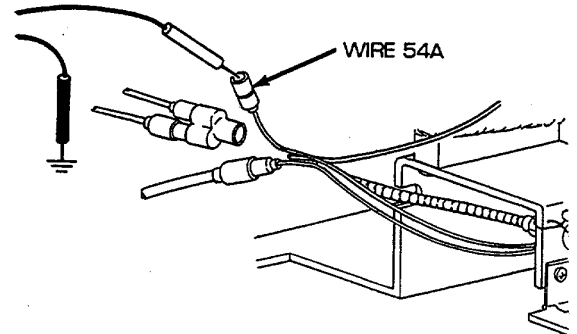
ENGINE FUEL SHUTOFF SOLENOID- -Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

C Reconnect wire 54A of switch panel to head lamps and bulkhead wiring harness to fire extinguisher interlock switch. Disconnect wire 54A on output side of fire extinguisher interlock switch from connector. Place red lead of multimeter in wire 54A and black lead to ground. Turn MASTER switch on, release fire extinguisher interlock switch, and check for voltage. Turn MASTER and fire extinguisher interlock switches OFF. If voltage is present, reconnect wire 54A on output side of fire extinguisher interlock switch to connector and, go to step D. If voltage is not present, repair/replace fire extinguisher interlock switch assembly (see paragraph 6-16).

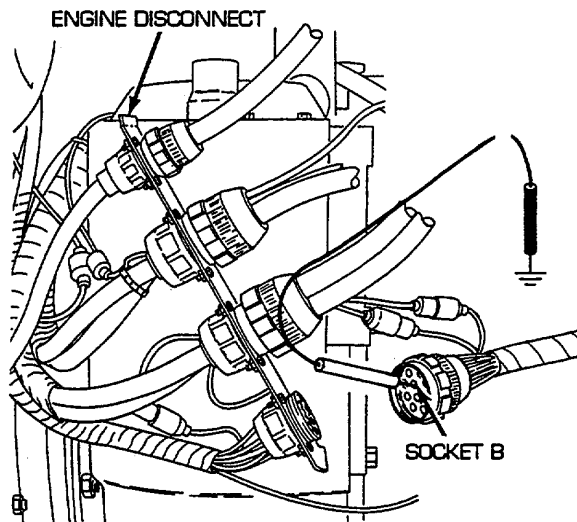
D Reconnect switch panel to neutral safety to bulkhead wiring harness to main switch panel. Install main switch panel (5), flat washer (4), ground lead (3), three lockwashers (2), and three screws (1) to mounting brackets. Open air inlet doors (TM 9-2350-256-10). Disconnect bulkhead to engine wiring harness and starter relay wiring harness from bulkhead. Place red lead of multimeter on pin D of wire 54 and black lead to ground. Turn MASTER and ENGINE FUEL SHUTOFF switches on, and check for voltage. Turn MASTER and ENGINE FUEL SHUTOFF switches OFF. If voltage is present, go to step E. If voltage is not present, repair/replace wire 54 of switch panel to neutral safety to bulkhead wiring harness (see paragraph 6-54).



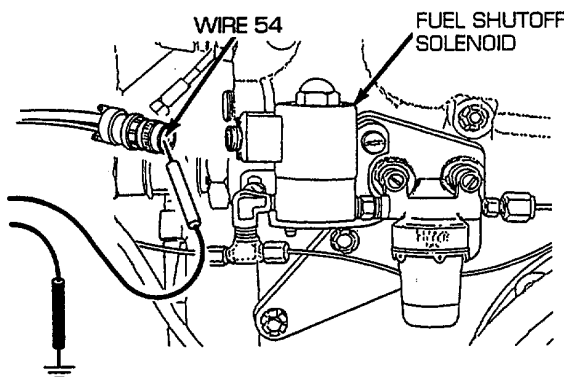
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

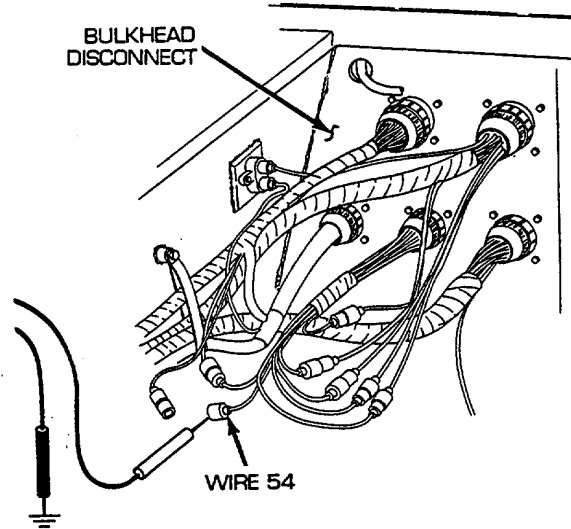
E Reconnect bulkhead to engine wiring harness and starter relay wiring harness to bulkhead. Remove engine deck (see paragraph 9-51). Disconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness from engine disconnect. Place red lead of multimeter in socket B of wire 54 and black lead to ground. Turn MASTER and ENGINE FUEL SHUTOFF switches on and check for voltage. Turn MASTER and ENGINE FUEL SHUTOFF switches OFF. If voltage is present, repair/replace wire 54 of engine wiring harness (see paragraph 6-58 for dual voltage; 6-59 for single voltage). If voltage is not present, go to step G.



F Disconnect wire 54 from fuel shutoff solenoid. Place red lead of multimeter in wire 54 and black lead to ground. Turn MASTER and ENGINE FUEL SHUTOFF switches on and check for voltage. Turn MASTER and ENGINE FUEL SHUTOFF switches OFF. If voltage is present, replace fuel shutoff solenoid (see paragraph 4-16). If voltage is not present, go to step G.



G Reconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness to engine disconnect. Disconnect wire 54 of bulkhead to engine wiring harness and starter relay wiring harness from bulkhead to engine bracket and rear fuel tank transmitter wiring harness. Place red lead of multimeter on male connector of wire 54 and black lead to ground. Turn MASTER and ENGINE FUEL SHUTOFF switches on and check for voltage. Turn MASTER and ENGINE FUEL SHUTOFF switches OFF. If voltage is present, repair/replace wire 54 of bulkhead to engine bracket and rear fuel tank transmitter wiring harness (see paragraph 6-73 for dual voltage; 6-74 for single voltage). If voltage is not present, repair/replace wire 54 of bulkhead to engine wiring harness and starter relay wiring harness (see paragraph 6-72).



2-19 ELECTRICAL TROUBLESHOOTING--Continued

ENGINE FUEL SHUTOFF SOLENOID-Continued

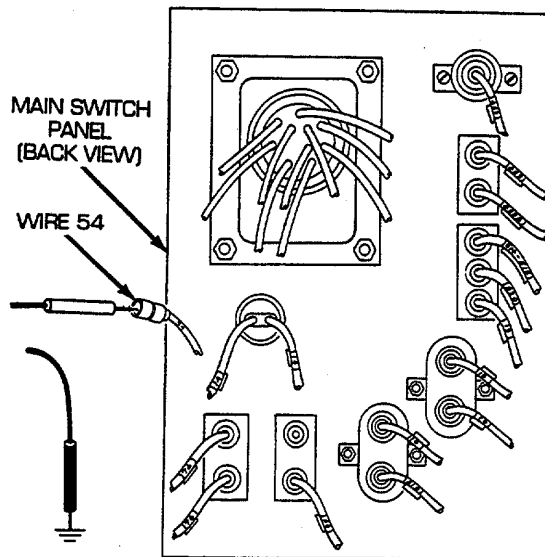
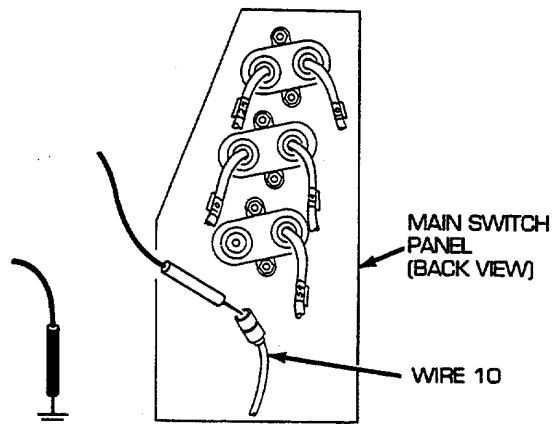
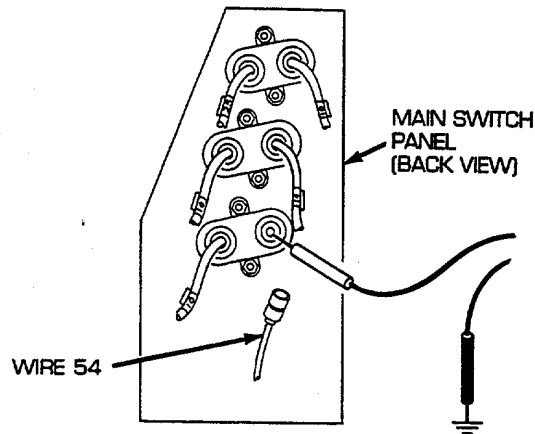
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

H Reconnect switch panel to neutral safety to bulkhead wiring harness to main switch panel. Disconnect wire 54 from ENGINE FUEL SHUTOFF switch side of circuit breaker. Place red lead of multimeter on terminal of circuit breaker and black lead to ground. Turn MASTER switch on, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step J. If voltage is not present, go to step I.

I Reconnect wire 54 to ENGINE FUEL SHUTOFF switch side of 15 A circuit breaker. Disconnect wire 10 from 15 A circuit breaker. Place red lead of multimeter in wire 10 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace circuit breaker (see paragraph 6-10). If voltage is not present, repair/replace wire 10 of main lighting and B.O. selector switch wiring harness (see paragraph 6-69).

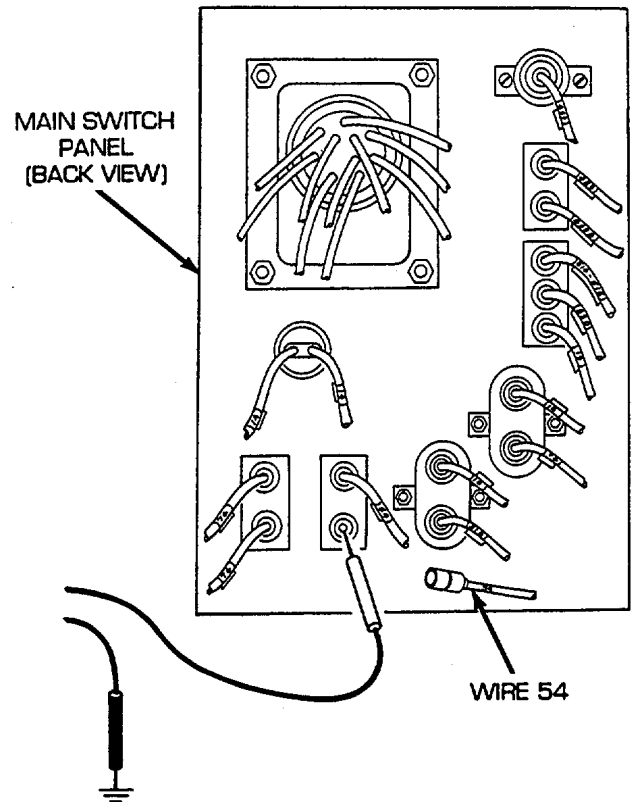
J Reconnect wire 54 to ENGINE FUEL SHUTOFF switch side of 15 A circuit breaker. Disconnect wire 54 from circuit breaker side of ENGINE FUEL SHUTOFF switch. Place red lead of multimeter on wire 54 and black lead to ground. Turn MASTER switch on, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step K. If voltage is not present, repair/replace fuel shutoff switch panel lead assembly (see paragraph 6-49).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- K Reconnect wire 54 to circuit breaker side of ENGINE FUEL SHUTOFF switch. Disconnect wire 54 from panel side of ENGINE FUEL SHUTOFF switch. Place red lead of multimeter on terminal of ENGINE FUEL SHUTOFF switch and black lead to ground. Turn MASTER and ENGINE FUEL SHUTOFF switches on and check for voltage. Turn MASTER and ENGINE FUEL SHUTOFF switches OFF. If voltage is present, repair/replace wire 54 of starter switch wiring harness (see paragraph 6- 57). If voltage is not present, replace ENGINE FUEL SHUTOFF switch (see paragraph 6-10).



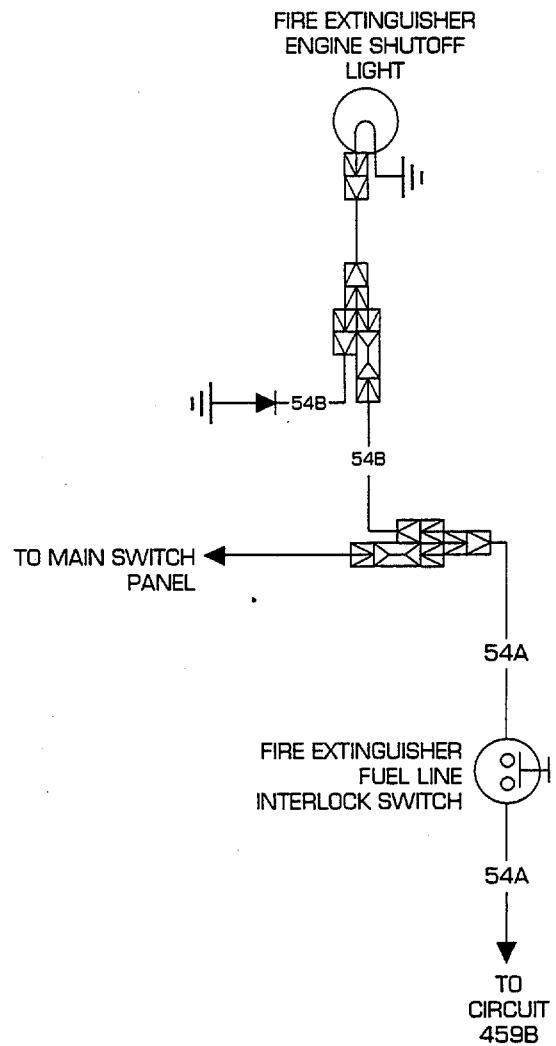
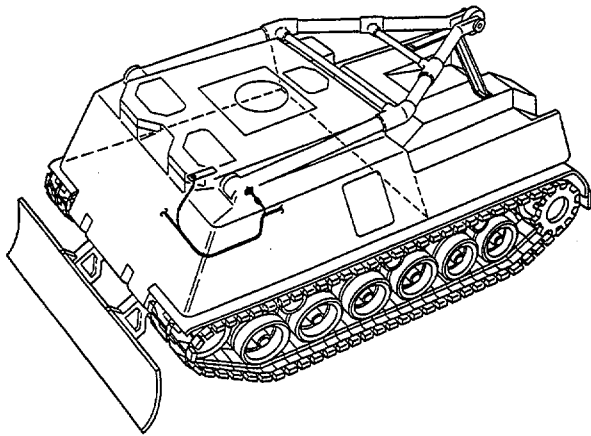
2-19 ELECTRICAL TROUBLESHOOTING-Continued

FIRE EXTINGUISHER ENGINE SHUTOFF LIGHT

SYMPTOM

Fire extinguisher engine shutoff light fails to operate while fuel shutoff switch operates normally.

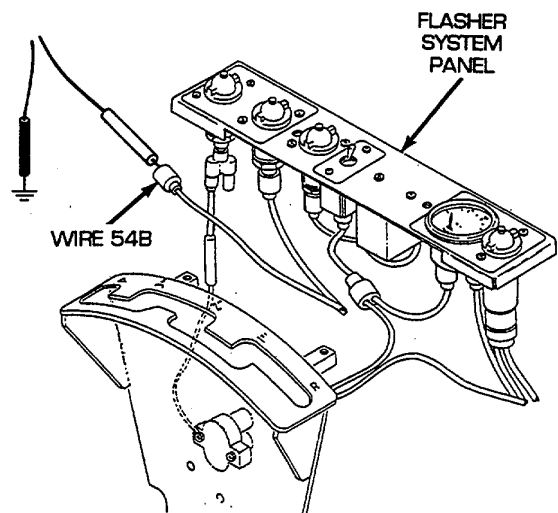
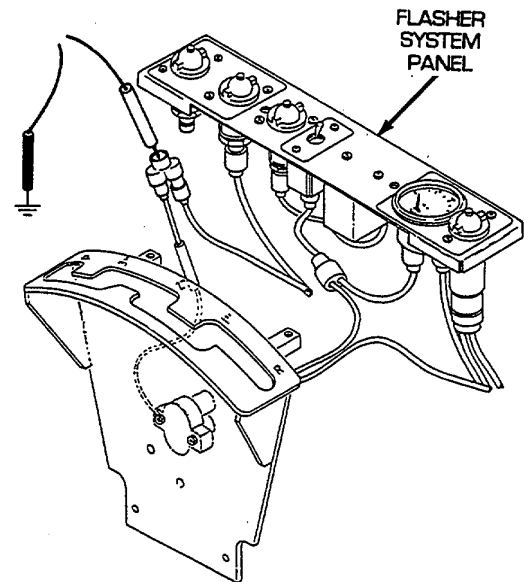
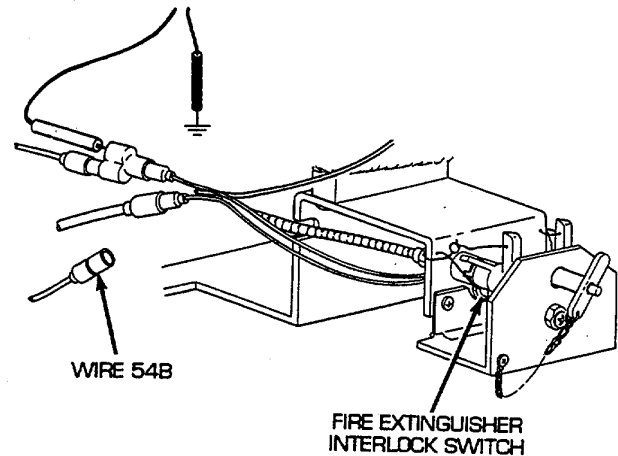
Do steps A through E.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Disconnect wire 54B of flasher system panel wiring harness from connector at fire extinguisher interlock switch. Place red lead of multimeter on pin of connector and black lead to ground. Turn MASTER and FUEL SHUTOFF switches on and check for voltage. Turn MASTER and FUEL SHUTOFF switches OFF. If voltage is present, go to step B. If voltage is not present, go to step E.
- B Reconnect wire 54B of flasher system panel wiring harness to connector at fire extinguisher interlock switch. Disconnect diode lead assembly connector from fire extinguisher engine shutoff light. Place red lead of multimeter in connector of fire extinguisher engine shutoff light and black lead to ground. Turn MASTER and FUEL SHUTOFF switches ON and check for voltage. Turn MASTER and FUEL SHUTOFF switches OFF. If voltage is present, replace fire extinguisher engine shutoff light (see paragraph 6-11). If voltage is not present, go to step C.
- C Reconnect diode lead assembly connector to fire extinguisher engine shutoff light. Disconnect wire 54B of flasher system panel wiring harness from diode lead assembly connector. Place red lead of multimeter on wire 54B and black lead to ground. Turn MASTER and FUEL SHUTOFF switches ON and check for voltage. Turn MASTER and FUEL SHUTOFF switches OFF. If voltage is present, go to step D. If voltage is not present, replace/repair wire 54B of flasher system panel wiring harness.



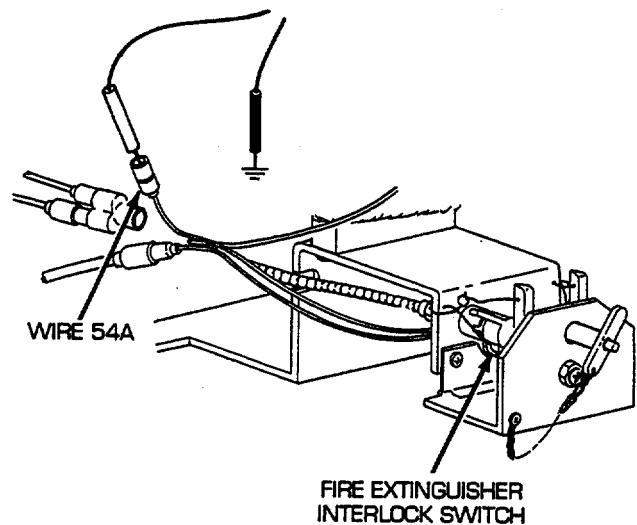
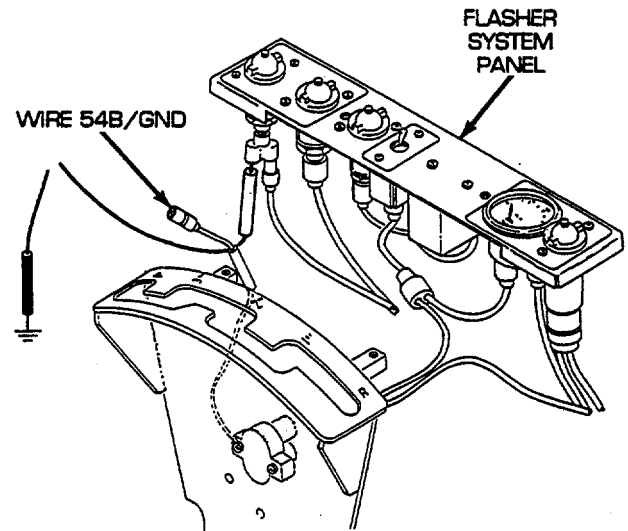
2-19 ELECTRICAL TROUBLESHOOTING-Continued

FIRE EXTINGUISHER ENGINE SHUTOFF LIGHT--Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

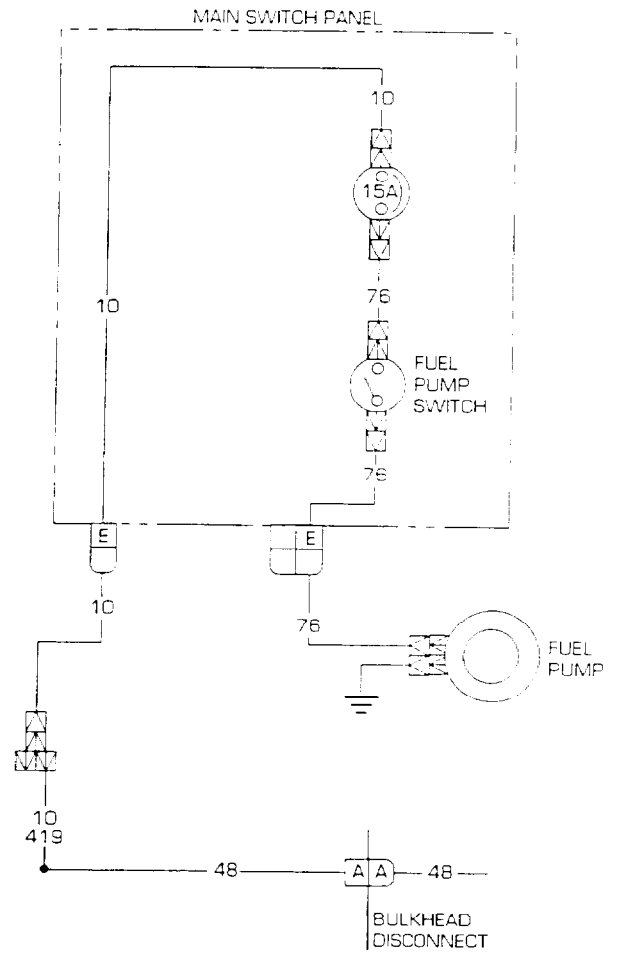
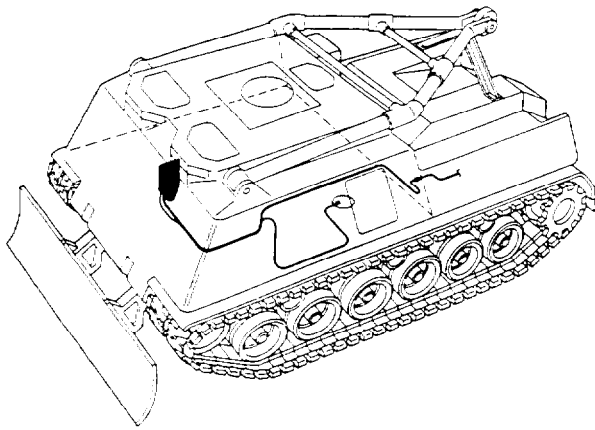
- D Reconnect wire 54B of flasher system panel wiring harness to diode lead assembly connector. Disconnect wire 54B/GND of diode assembly from connector. Place red lead of multimeter on pin of connector and black lead to ground. Turn MASTER and FUEL SHUTOFF switches OFF. If voltage is present, repair/replace wire 54B/GND of diode lead assembly from connector to GND (see paragraph 6-89). If voltage is not present, repair/replace connector of diode lead assembly (see paragraph 6-89).
- E Reconnect wire 54B of flasher system panel wiring harness to connector at fire extinguisher interlock switch. Disconnect flasher system panel wiring harness Y-connector from wire 54A of fire extinguisher interlock switch assembly. Place red lead of multimeter in wire 54A and black lead to ground. Turn MASTER and FUEL SHUTOFF switches ON, release fire extinguisher interlock switch and check for voltage. Turn MASTER, FUEL SHUTOFF, and fire extinguisher interlock switches OFF. If voltage is present, replace connector of flasher system panel wiring harness (see paragraph 6-48). If voltage is not present, troubleshoot fuel shutoff solenoid circuit.



ELECTRIC IN-TANK FUEL PUMP

SYMPTOM

Electric in-tank fuel pump fails to operate.
Do steps A through K.



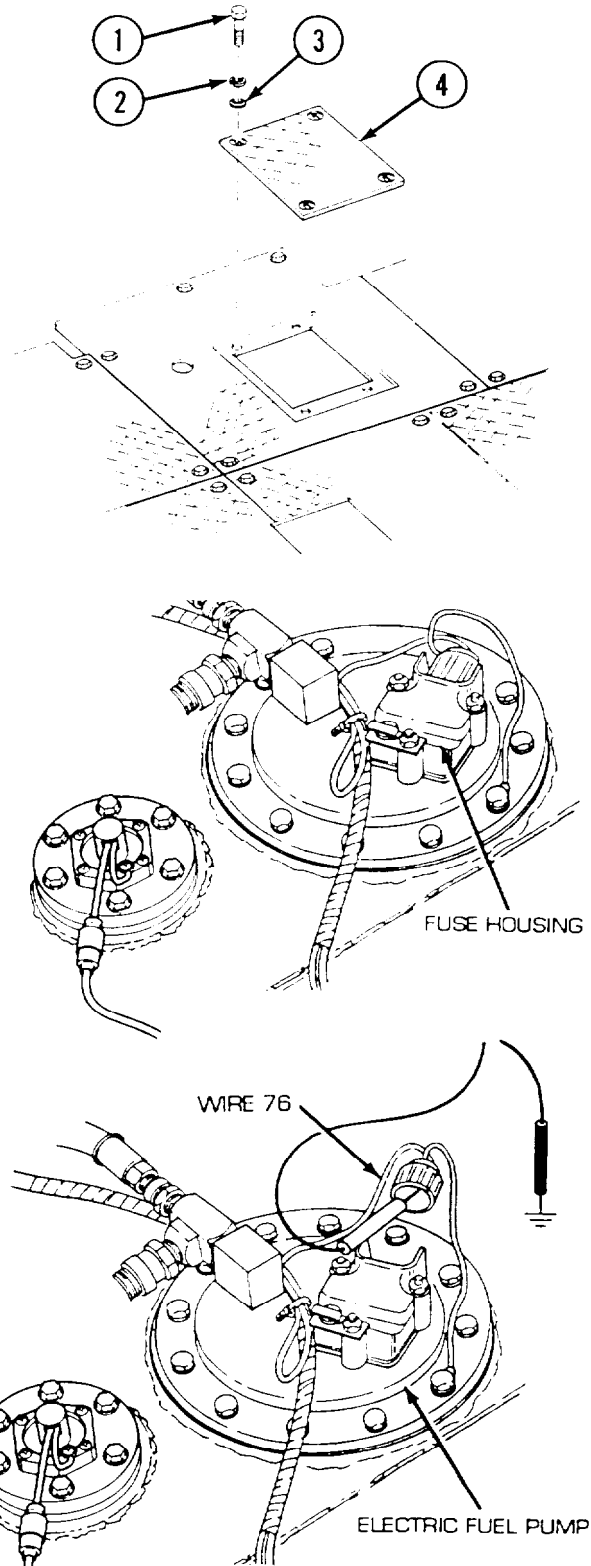
2-19 ELECTRICAL TROUBLESHOOTING-Continued

ELECTRIC IN-TANK FUEL PUMP-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

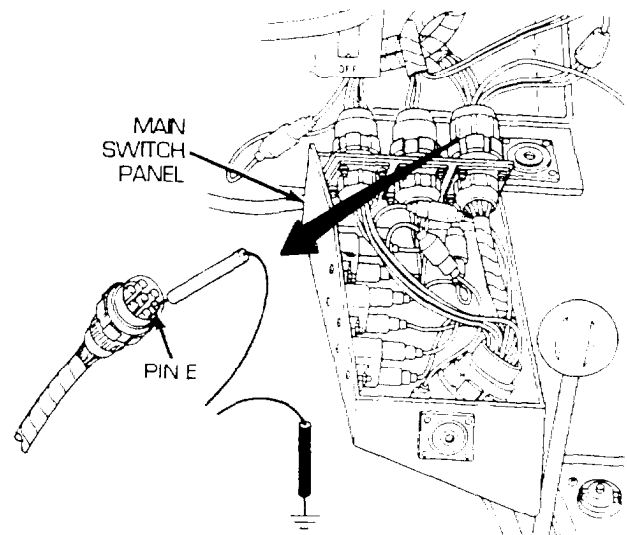
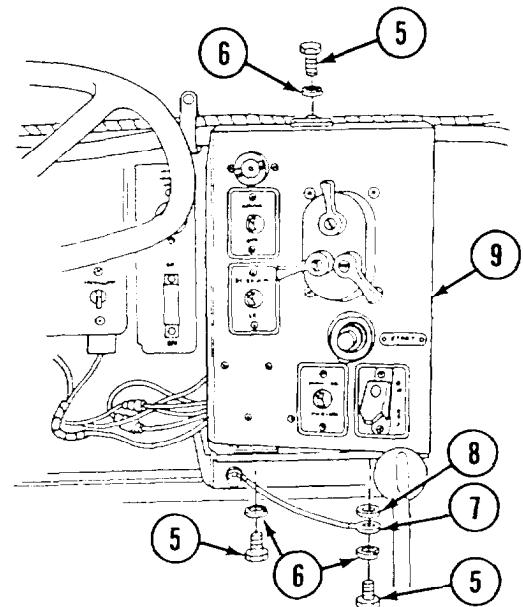
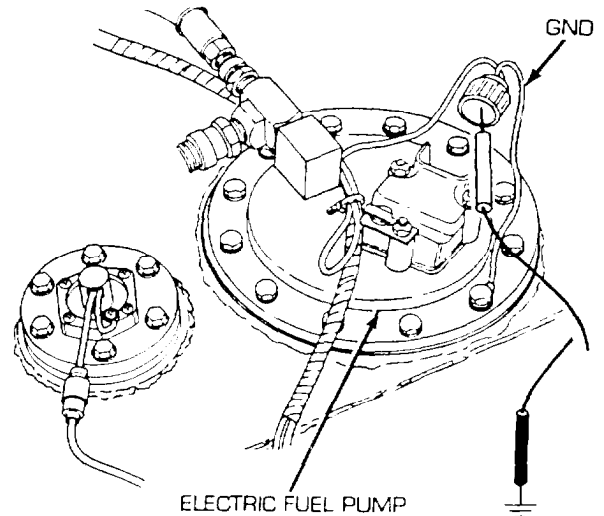
- A Remove four screws (1), four lockwashers (2), four flat washers (3), and fuel transmitter center left floor access plate (4). Remove fuse housing and inspect fuse. If fuse is unserviceable, replace fuse (see paragraph 4-3). If fuse is serviceable and electric in-tank pump still fails to operate, go to step B.
- B Disconnect switch panel to neutral safety to bulkhead wiring harness connector from fuel pump. Place red lead of multimeter in wire 76 of connector and black lead to ground. Turn MASTER and FUEL PUMP switches ON and check for voltage. Turn MASTER and FUEL PUMP switches OFF. If voltage is present, go to step C. If voltage is not present, go to step D.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- C Place red lead of multimeter in wire GND of connector and black lead to ground. Check for continuity. If continuity is present, replace electric fuel pump (see paragraph 4-3). If continuity is not present, repair/replace wire GND of switch panel to neutral safety to bulkhead wiring harness (see paragraph 6-54).
- D Reconnect switch panel to neutral safety to bulkhead wiring harness connector to fuel pump. Remove three screws (5), three lockwashers (6), ground lead (7), flat washer (8), and release main switch panel (9) from mounting brackets. Disconnect switch panel to gage panel and miscellaneous switches wiring harness from main switch panel. Place red lead of multimeter on pin E of wire 10 and black lead to ground. Turn MASTER switch on, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step E. If voltage is not present, go to step I.



2-19 ELECTRICAL TROUBLESHOOTING-Continued

ELECTRIC IN-TANK FUEL PUMP-Continued

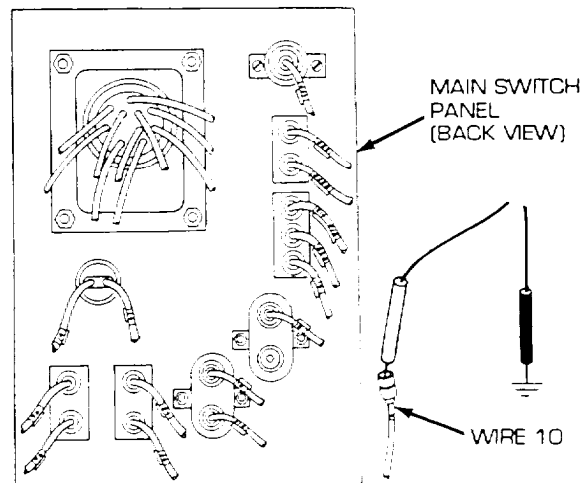
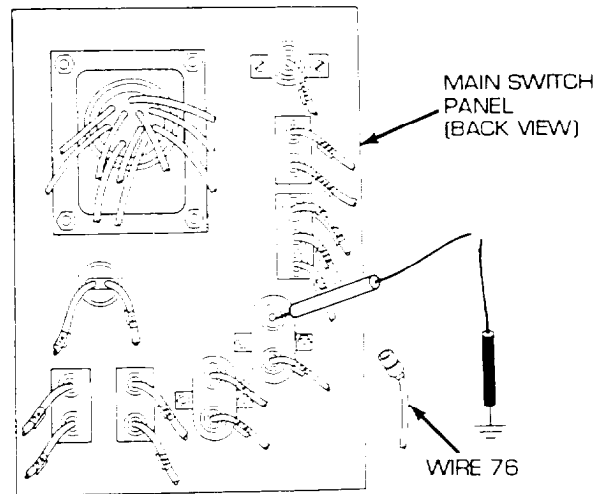
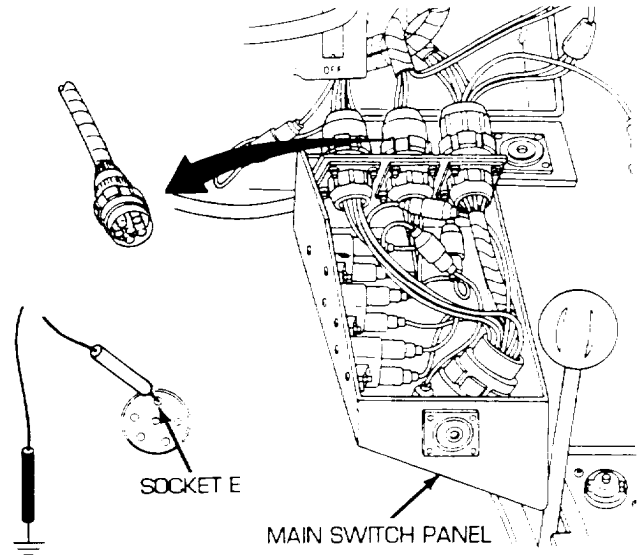
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

E Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Disconnect switch panel to neutral safety to bulkhead wiring harness from main switch panel. Place red lead of multimeter in socket E of wire 76 and black lead to ground. Turn MASTER and FUEL PUMP switches ON and check for voltage. Turn MASTER and FUEL PUMP switches OFF. If voltage is present, repair/replace wire 76 of switch panel to neutral safety to bulkhead wiring harness (see paragraph 6-54). If voltage is not present, go to step F.

F Reconnect switch panel to neutral safety to bulkhead wiring harness to main switch panel. Disconnect wire 76 from FUEL PUMP switch side of 15 A circuit breaker. Place red lead of multimeter on terminal of 15 A circuit breaker and black lead to ground. Turn MASTER switch on, and check for voltage. Turn MASTER switch OFF. If voltage, is present, go to step H. If voltage is not present, go to step G.

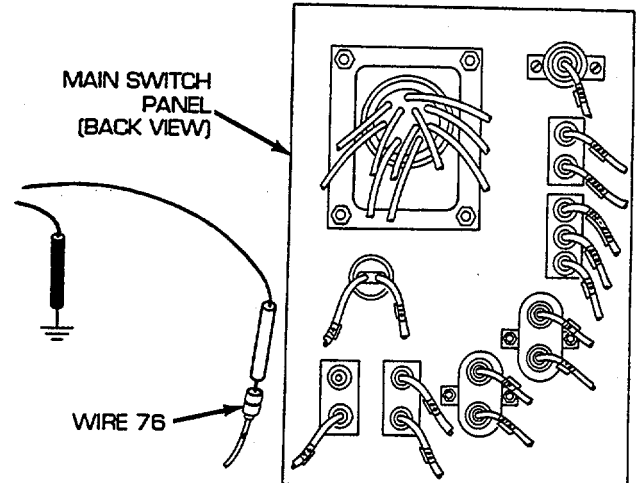
G Reconnect wire 76 to FUEL PUMP switch side of 15 A circuit breaker. Disconnect wire 10 from 15 A circuit breaker. Place red lead of multimeter in wire 10 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace circuit breaker (see paragraph 6-10). If voltage is not present, repair replace wire 10 of main lighting and B.O. selector switch wiring harness (see paragraph 6-69).



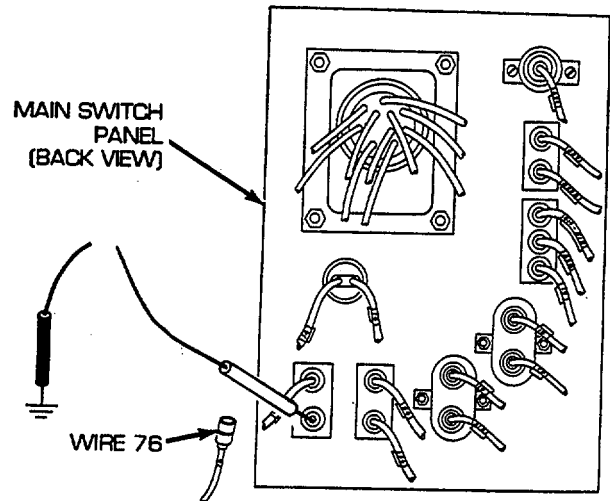
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

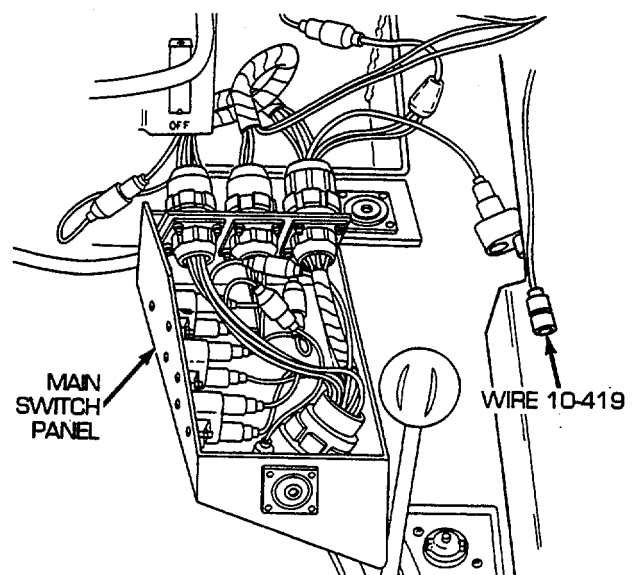
- H Reconnect wire 10 to 15 A circuit breaker. Disconnect wire 76 from circuit breaker side of FUEL PUMP switch. Place red lead of multimeter in wire 76 and black lead to ground. Turn MASTER switch on, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to switch I. If voltage is not present, repair/replace wire 76 of fuel pump switch panel lead assembly (see paragraph 6-50).



- I Reconnect wire 76 to circuit breaker side of FUEL PUMP switch. Disconnect wire 76 from panel side of FUEL PUMP switch. Place red lead of multimeter on terminal of FUEL PUMP switch and black lead to ground. Turn MASTER and FUEL PUMP switches ON and check for voltage. Turn MASTER and FUEL PUMP switches OFF. If voltage is present, repair/replace wire 76 of starter switch wiring harness (see paragraph 6-57). If voltage is not present, replace FUEL PUMP switch (see paragraph 6-10).



- J Disconnect wire 10-419 from Y-connector of switch panel, radio, and bilge pump to bulkhead wiring harness at main switch panel. Turn MASTER switch on, and check for voltage. If voltage is present, repair wire 419 from Y-connector at main switch panel to APU control box bulkhead wiring harness. If voltage is not present, go to step K.



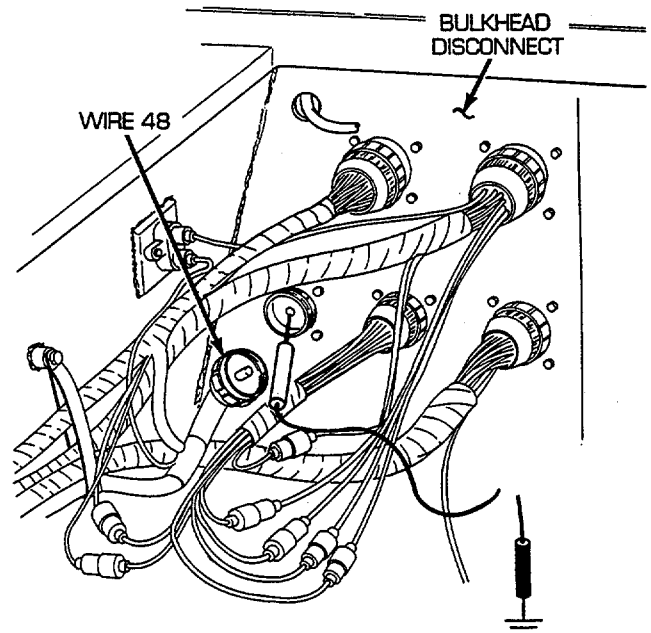
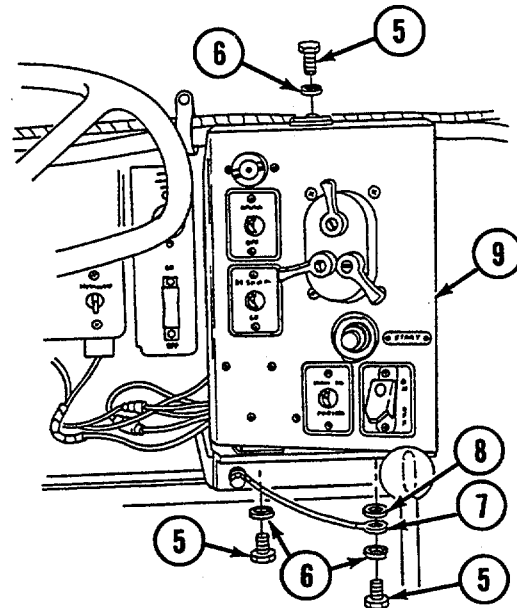
2-19 ELECTRICAL TROUBLESHOOTING-Continued

ELECTRIC IN-TANK FUEL PUMP-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

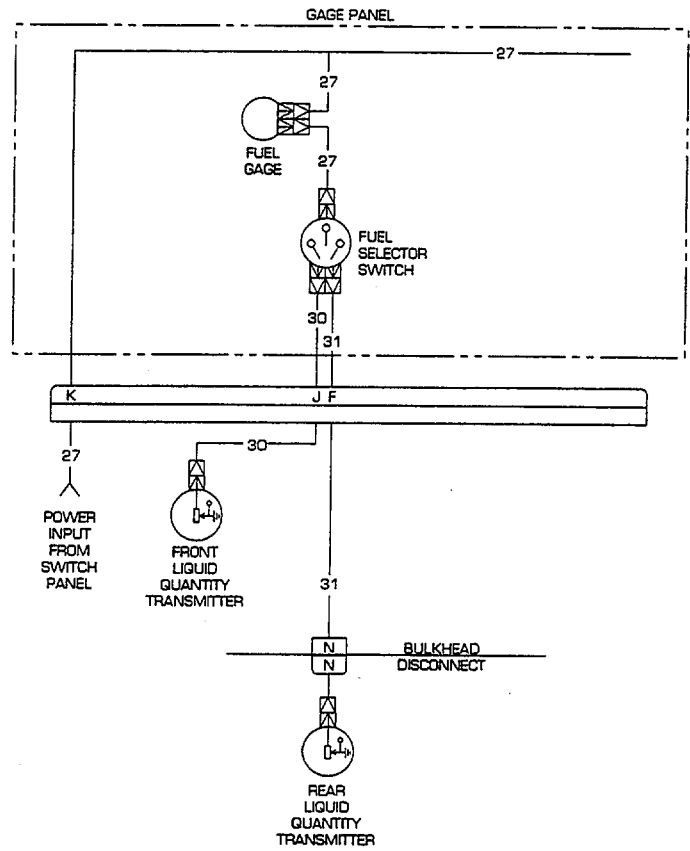
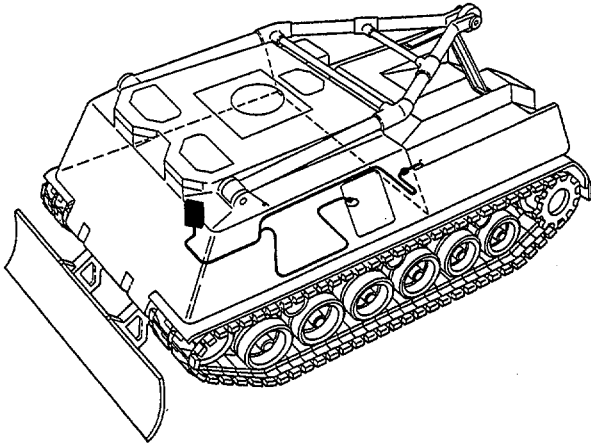
- K Reconnect wire 10-419 to Y-connector of switch panel, radio, and bilge pump to bulkhead wiring harness to main switch panel. Install main switch panel (9), flat washer (8), ground lead (7), three lockwashers (6), and three screws (5) to mounting bracket. Open air inlet doors (TM 9-2350-256-10). Disconnect wire 48 pin A from bulkhead to master relay wiring harness. Place red multimeter lead in socket and black lead to ground. Turn MASTER switch on and check for voltage. If voltage is present, repair or replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay circuit (see paragraph 2-19, master relay fails to operate).



FUEL GAGE

SYMPTOMS

Fuel gage does not operate in either FRONT or REAR position.
Do steps A through H.



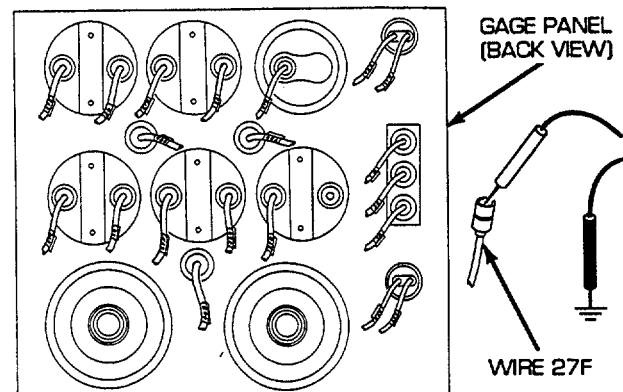
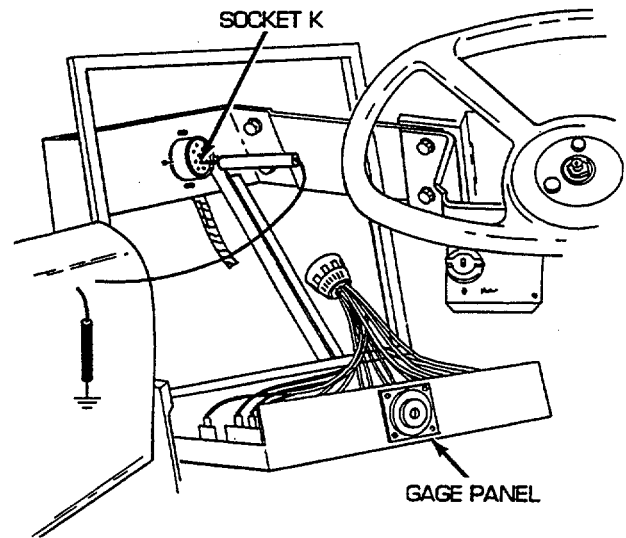
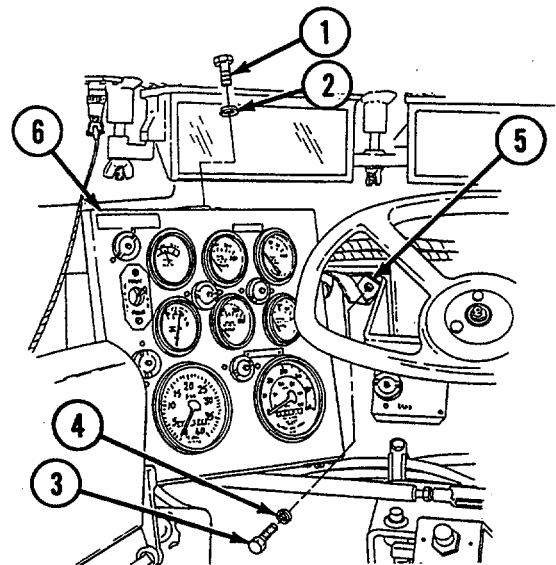
2-19 ELECTRICAL TROUBLESHOOTING-Continued

FUEL GAGE-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

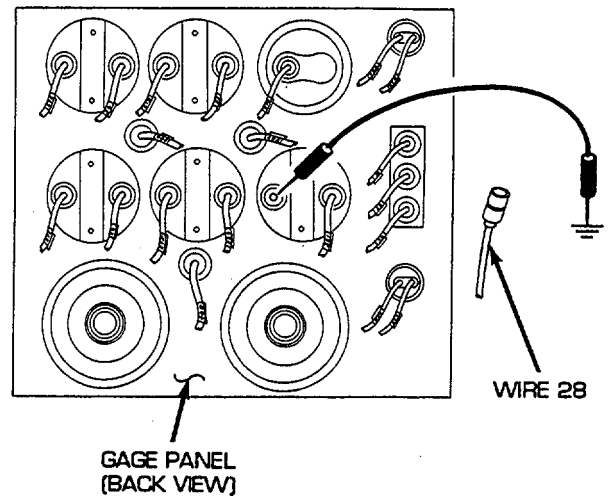
- A Remove three screws (1), three lockwashers (2), two screws (3), two lockwashers (4), and ground strap (5) and release gage panel (6) from mounting brackets. Remove gage panel to bulkhead wiring harness from gage panel. Place red lead of multimeter in socket K of wire 27 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step B. If voltage is not present, troubleshoot power control lever circuit.
- B Reconnect gage panel to bulkhead wiring harness to gage panel. Disconnect wire 27F from fuel gage. Place red lead of multimeter on wire 27F and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step C. If voltage is not present, repair/replace wire 27F of gage panel wiring harness (see paragraph 6-44).



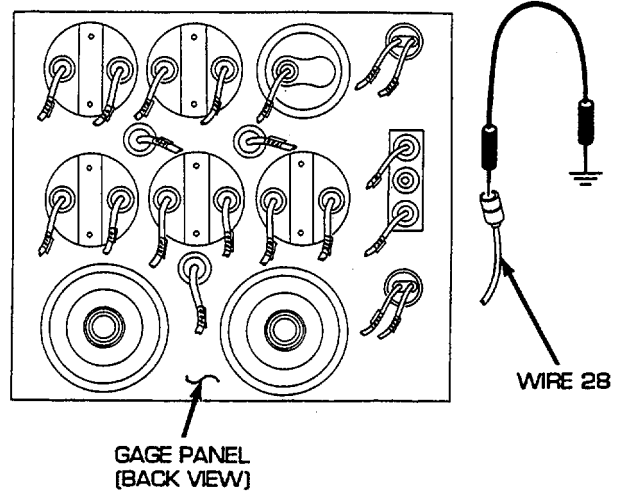
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

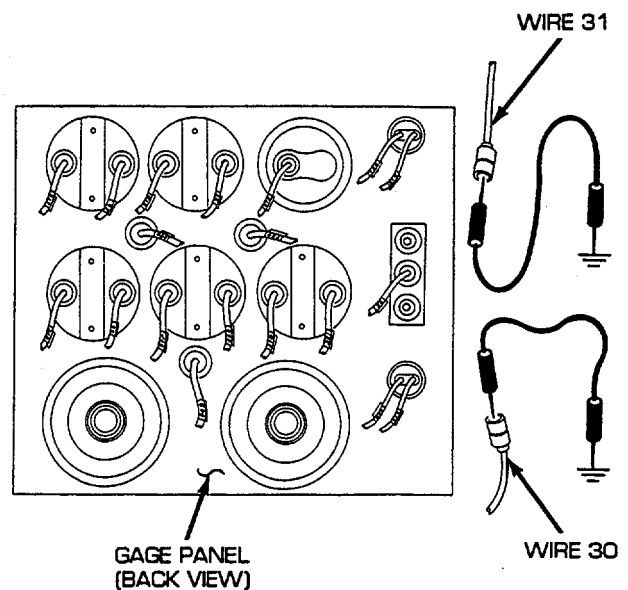
C Reconnect wire 27F to fuel gage. Disconnect wire 28 from fuel gage. Place one end of jumper wire on receptacle on fuel gage and other end to ground. Turn MASTER switch on and check for fuel gage to read full scale. Turn MASTER switch OFF. If fuel gage operates, go to step D. If fuel gage fails to operate, replace fuel gage (see paragraph 6-8).



D Reconnect wire 28 to fuel gage. Disconnect wire 28 from fuel selector switch. Turn MASTER switch on and check fuel gage. Fuel gage should read full. Ground wire 28 at fuel selector switch end. Fuel gage should read empty. Turn MASTER switch OFF. If fuel gage reads correctly, go to step E. If fuel gage reads incorrectly, repair/replace wire 28 of fuel gage panel lead assembly (see paragraph 6-51).



E Reconnect wire 28 to fuel selector switch. Remove wires 30 and 31 from fuel selector switch. Turn MASTER switch on and check fuel gage for operation in both FRONT and REAR positions. Fuel gage should read full for both tanks. Place one end of jumper wires in both switch positions and other ends to ground. Check fuel gage for operation in both FRONT and REAR positions. Fuel gage should read empty. Turn MASTER switch OFF. If fuel gage reads correctly, go to step F. If fuel gage reads incorrectly, replace fuel selector switch (see paragraph 6-8).



2-19 ELECTRICAL TROUBLESHOOTING-Continued

FUEL GAGE-Continued

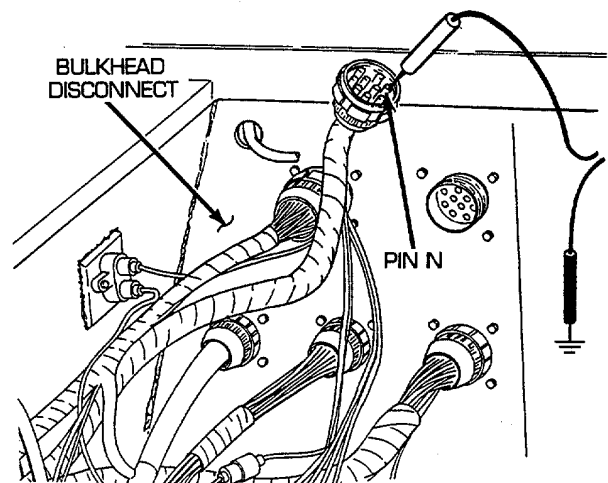
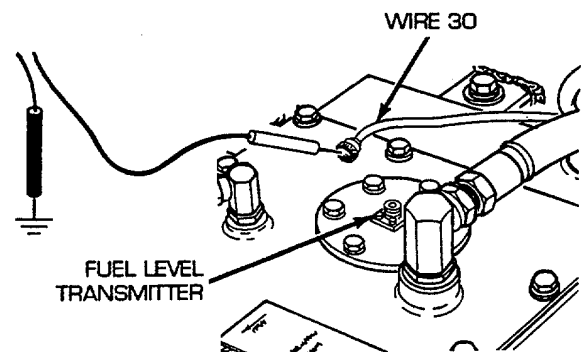
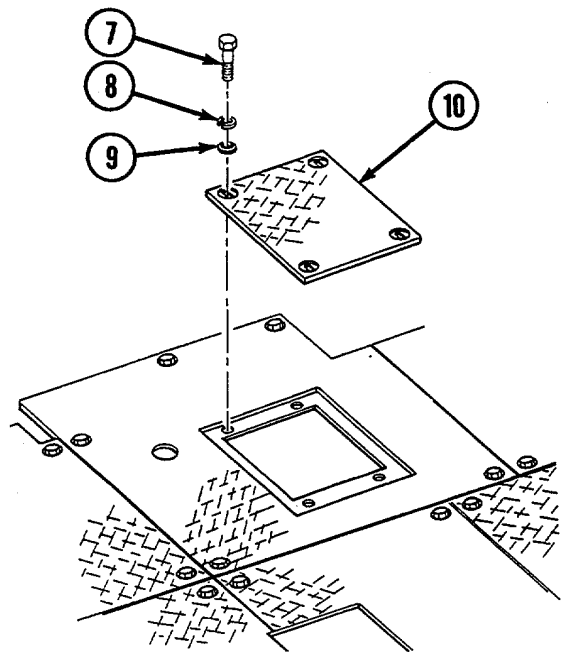
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

NOTE

Do step F for front fuel lever transmitter, do step G for rear fuel level transmitter.

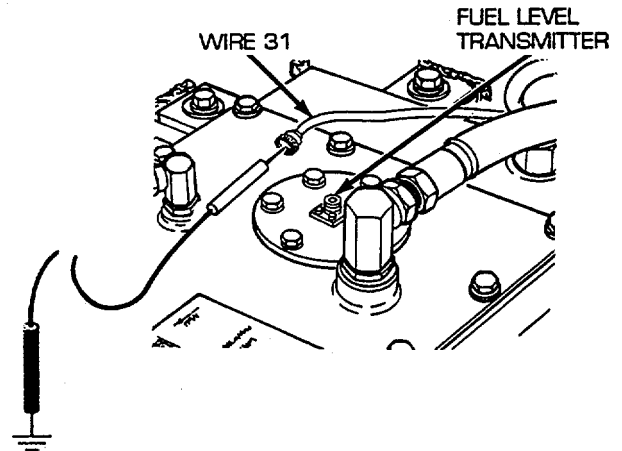
- F Reconnect wires 30 and 31 to fuel selector switch. Remove four screws (7), four lockwashers (8), four flat washers (9), and fuel transmitter center left floor access plate (10). Disconnect wire 30 from fuel level transmitter on front fuel tank. Place red lead of multimeter in wire 30 at fuel level transmitter and black lead to ground. If voltage is present, replace fuel level transmitter (see paragraph 4-8). If voltage is not present, repair/replace wire 30 of gage panel to bulkhead wiring harness (see paragraph 6-45 for dual voltage; 6-46 for single voltage).
- G Open air inlet doors (TM 9-2350-256-10). Disconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness from bulkhead disconnect. Place red lead of multimeter in pin N of wire 31 and black lead to ground and check for voltage. If voltage is present, go to step H. If voltage is not present, repair/replace wire 31 of gage panel to bulkhead wiring harness (see paragraph 6-45 for dual voltage; 6-46 for single voltage).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- H Reconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness to bulkhead. Disconnect wire 31 from rear fuel tank transmitter. Place red lead of multimeter in wire 31 and black lead to ground and check for voltage. If voltage is present, replace rear fuel tank transmitter (see paragraph 4-8). If voltage is not present, repair/replace bulkhead to engine bracket and rear fuel tank transmitter wiring harness (see paragraph 6-73 for dual voltage; 6-74 for single voltage).

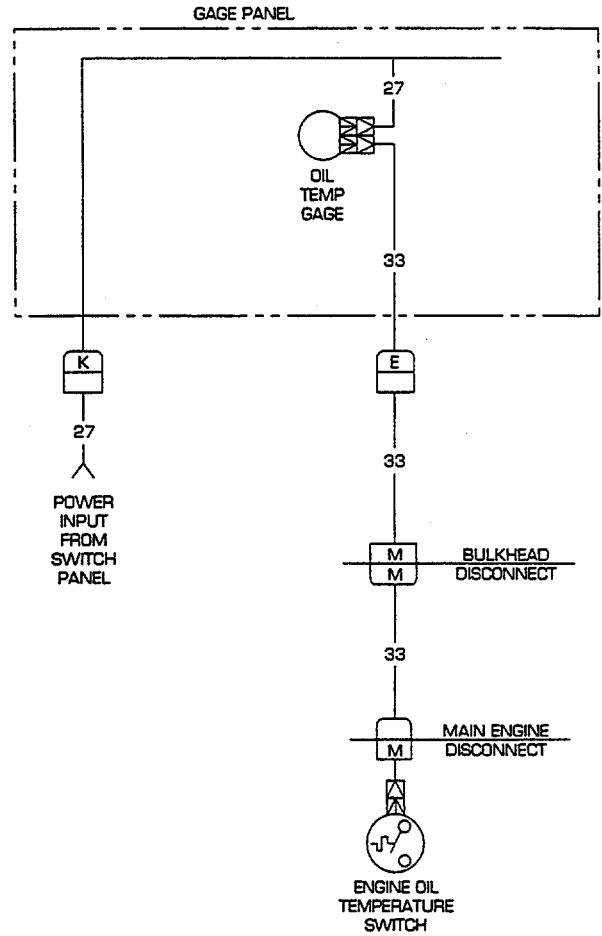
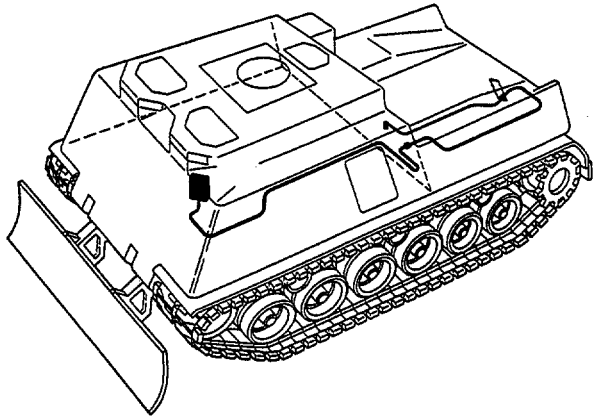


2-19 ELECTRICAL TROUBLESHOOTING-Continued

ENGINE OIL TEMPERATURE GAGE

SYMPTOM

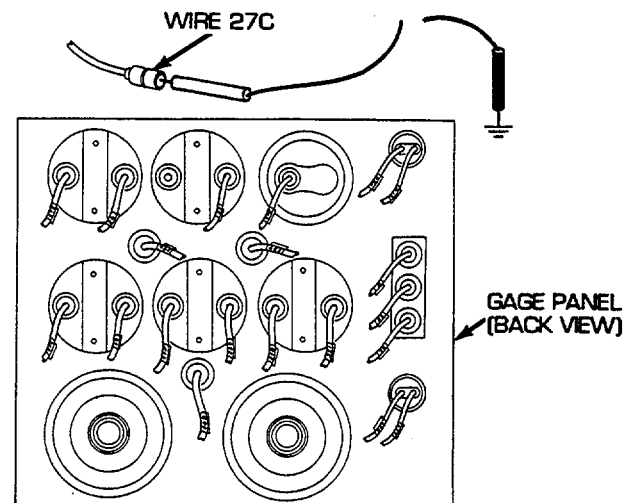
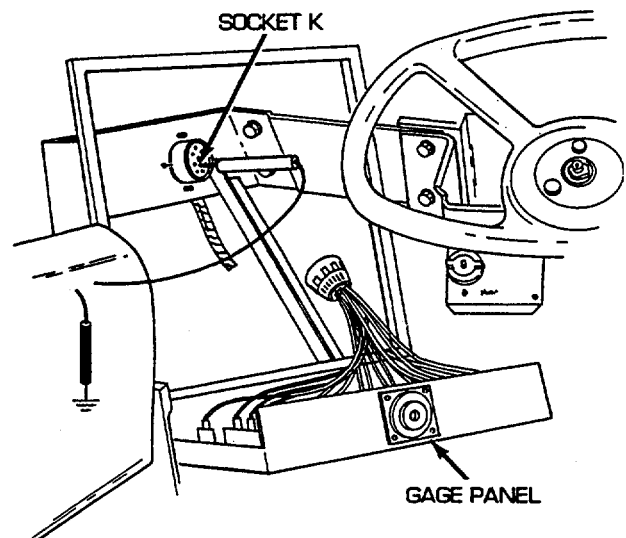
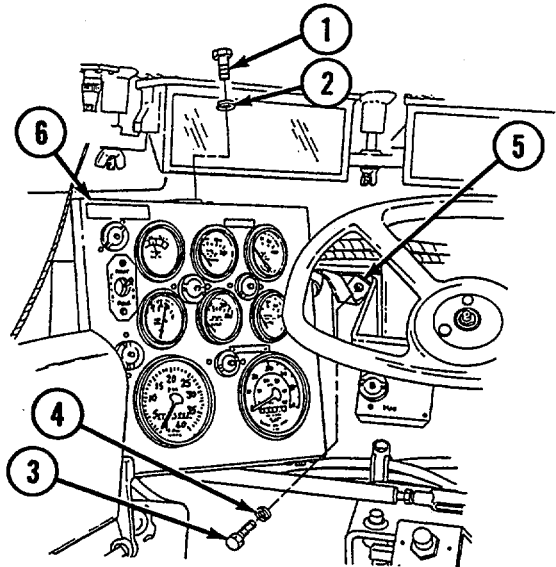
Engine oil temperature gage does not operate.
Do steps A through G.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Remove three screws (1), three lockwashers (2), two screws (3), two lockwashers (4), and ground strap (5) and release gage panel (6) from mounting brackets. Remove gage panel to bulkhead wiring harness from gage panel. Place red lead of multimeter on socket K of wire 27 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step B. If voltage is not present, troubleshoot power control lever circuit.
- B Reconnect gage panel to bulkhead wiring harness to gage panel. Disconnect wire 27C from engine oil temperature gage. Place red lead of multimeter in wire 27C and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step C. If voltage is not present, repair/replace wire 27C of gage panel wiring harness (see paragraph 6-44).



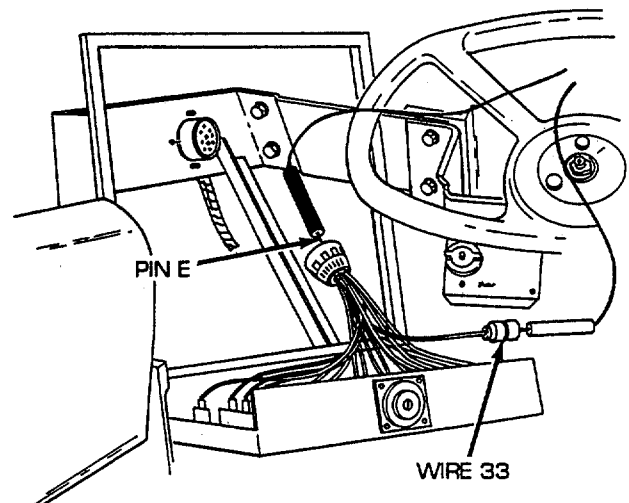
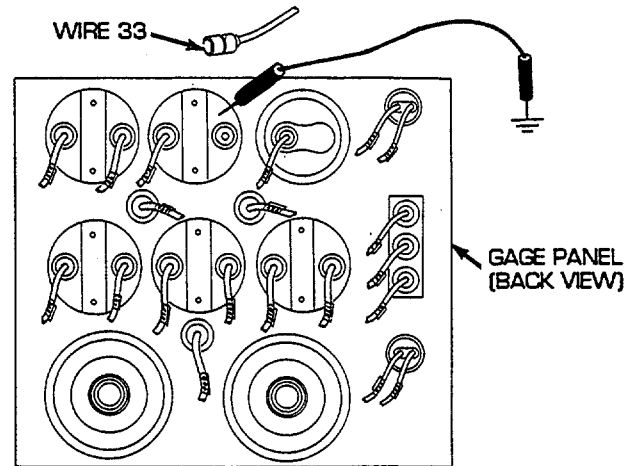
2-19 ELECTRICAL TROUBLESHOOTING--Continued

ENGINE OIL TEMPERATURE GAGE--Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

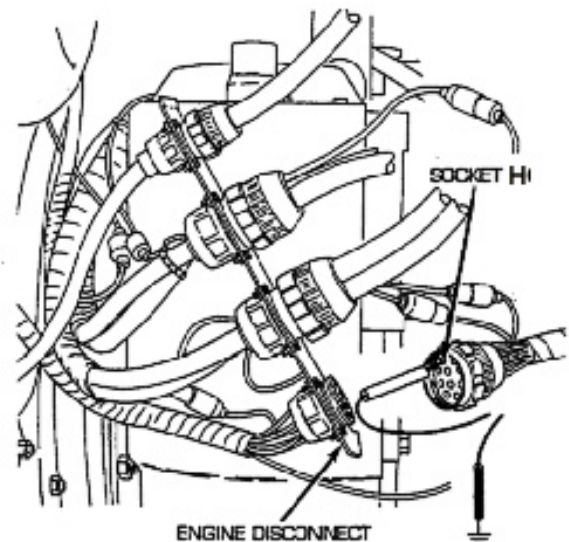
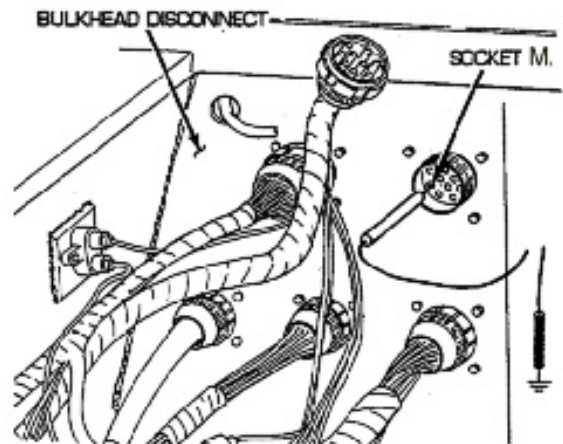
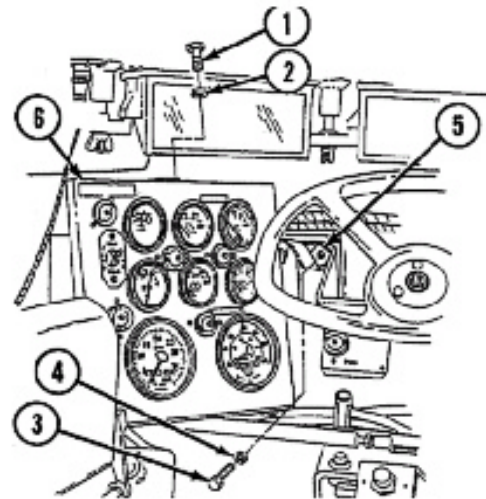
- C Reconnect wire 27C to engine oil temperature gage. Disconnect wire 33 from engine oil temperature gage. Turn MASTER switch on and check engine oil temperature gage for operation. Engine oil temperature gage should read full scale. Ground case of engine oil temperature gage and check gage for operation. Gage should read "0." Turn MASTER switch OFF. If engine oil temperature gage reads correctly, go to step D. If engine oil temperature gage fails to read correctly, replace engine oil temperature gauge (see paragraph 6-8).
- D Disconnect gage panel to bulkhead wiring harness from gage panel. Check wire 33 in gauge panel harness for continuity by placing red lead of multimeter on wire 33 and black lead on pin E. If continuity is present, go to step E. If continuity is not present, repair/replace wire 33 of gage panel wiring harness (see paragraph 6-44).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- E Reconnect wire 33 to engine oil temperature gage and gage panel to bulkhead wiring harness to gage panel. Install ground strap (5), two lockwashers (4), two screws (3), gage panel (6), three lockwashers (2), and three screws (1). Open air inlet doors (TM 9-2350-256-10). Disconnect bulkhead to engine bracket and rear fuel tank wiring harness from bulkhead disconnect. Place red lead of multimeter in socket M of wire 33 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step F. If voltage is not present, repair/replace wire 33 of gage panel to bulkhead wiring harness (see paragraph 6-45 for dual voltage; 6-46 for single voltage).
- F Reconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness to bulkhead. Remove engine deck (see paragraph 9-51). Disconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness from engine disconnect. Place red lead of multimeter in socket H of wire 33 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step G. If voltage is not present, repair/replace wire 33 of bulkhead to engine bracket and rear fuel tank transmitter wiring harness (see paragraph 6-73 for dual voltage; 6-74 for single voltage).



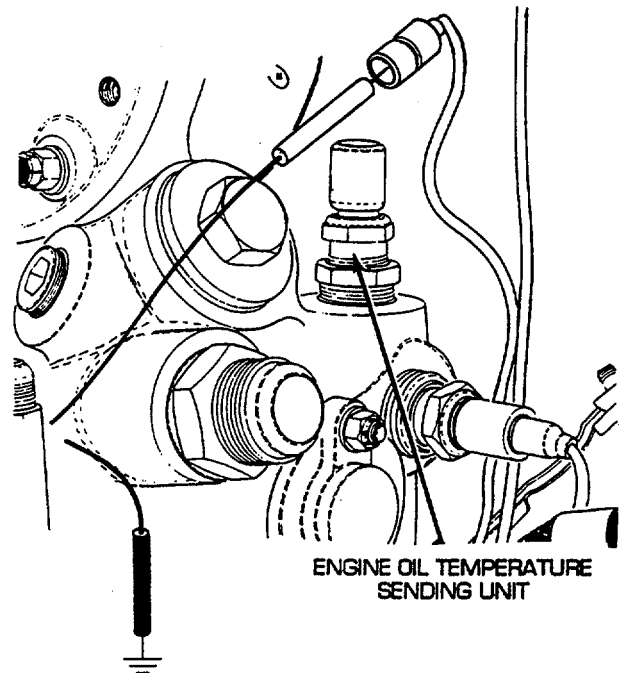
2-19 ELECTRICAL TROUBLESHOOTING-Continued

ENGINE OIL TEMPERATURE GAGE-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

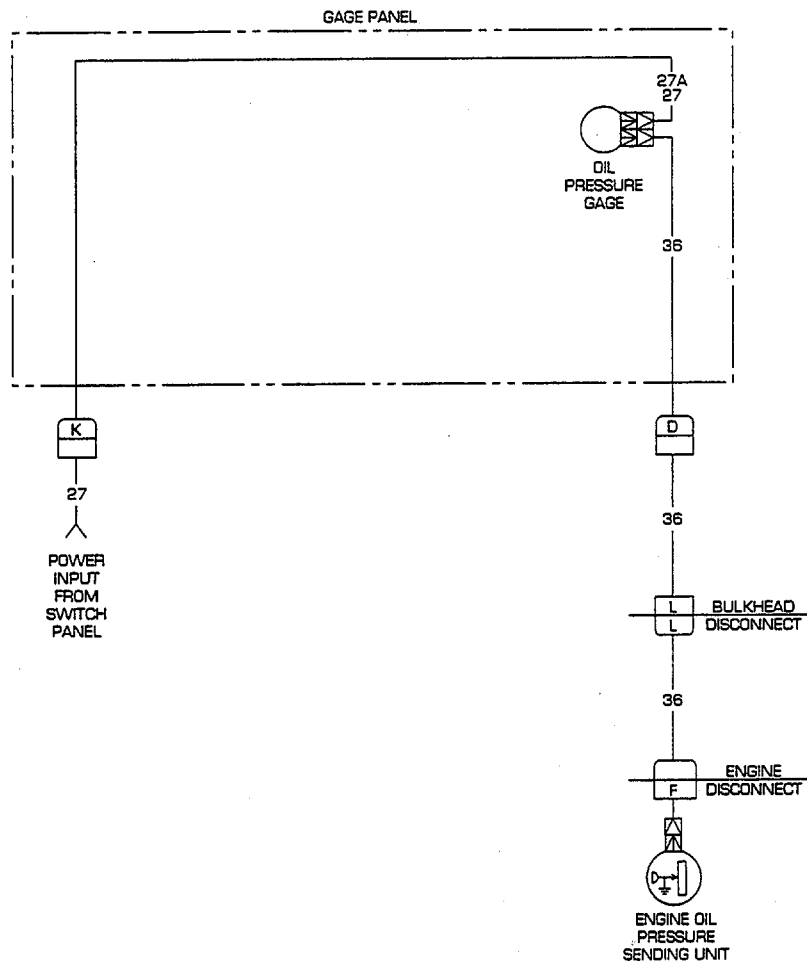
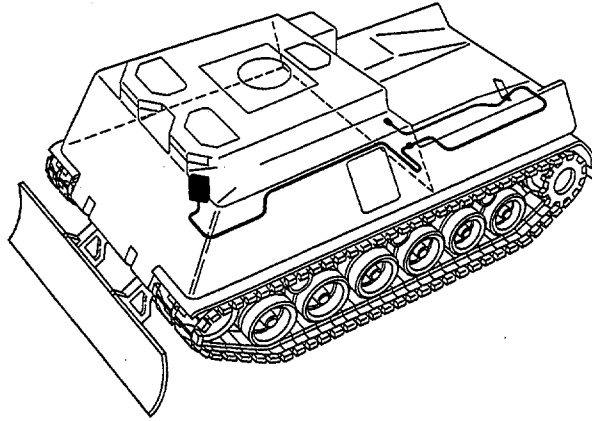
- G Reconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness to engine disconnect. Remove powerplant (see paragraph 3-1). Disconnect wire 33 from engine oil temperature sending unit. Place red lead of multimeter on wire 33 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace engine oil temperature sending unit (see paragraph 6-22). If voltage is not present, repair/replace wire 33 of engine wiring harness (see paragraph 6-58 for dual voltage; 6-59 for single voltage).



ENGINE OIL PRESSURE GAGE

SYMPTOM

Engine oil pressure gage does not operate.
Do steps A through G.



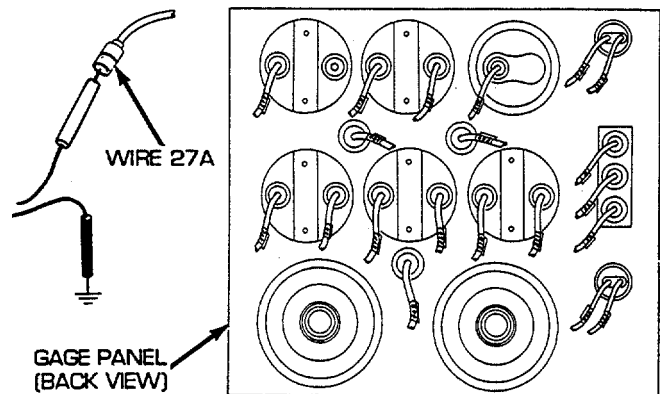
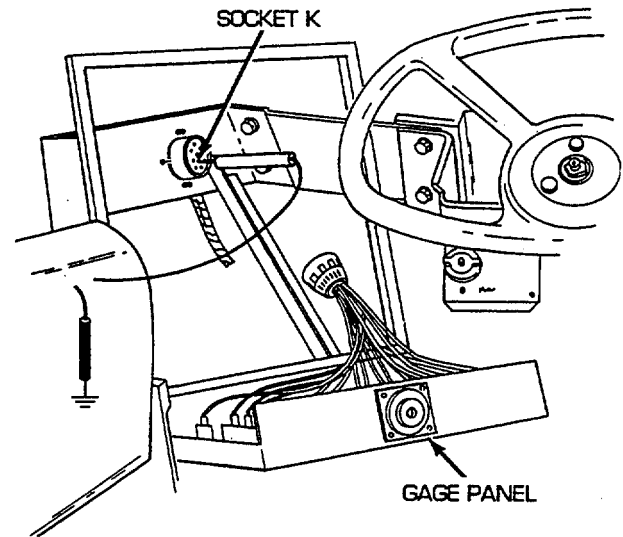
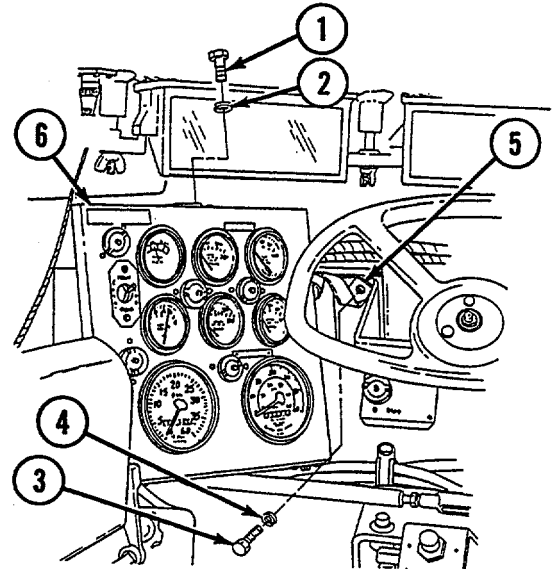
2-19 ELECTRICAL TROUBLESHOOTING--Continued

ENGINE OIL PRESSURE GAGE--Continued .

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

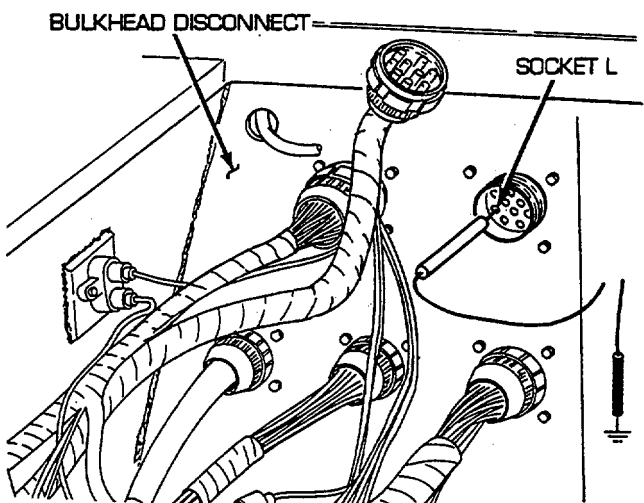
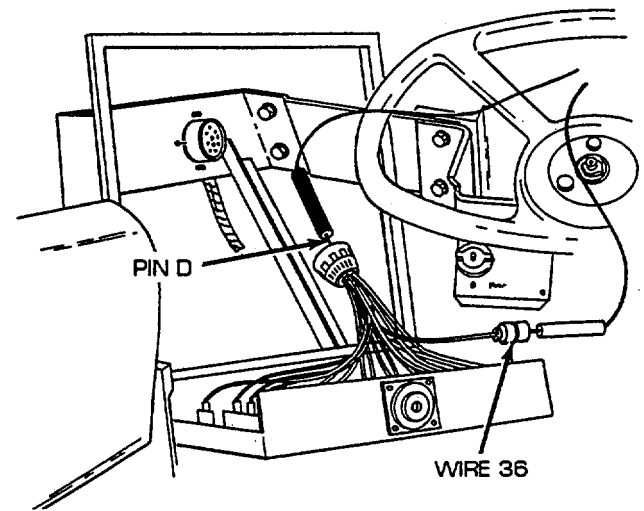
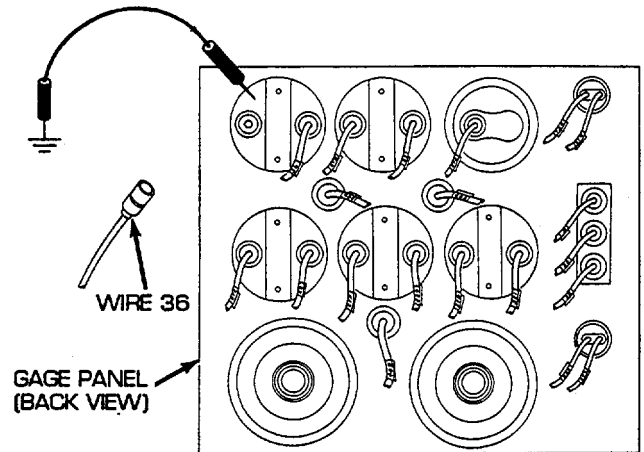
- A Remove three screws (1), three lockwashers (2), two screws (3), two lockwashers (4), and ground strap (5) and release gage panel (6) from mounting brackets. Remove gage panel to bulkhead wiring harness from gage panel. Place red lead of multimeter in socket K of wire 27 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step B. If voltage is not present, troubleshoot power control lever circuit.
- B Reconnect gage panel to bulkhead wiring harness to gage panel. Disconnect wire 27A from engine oil pressure gage. Place red lead of multimeter in wire 27A and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step C. If voltage is not present, repair/replace wire 27A of gage panel wiring harness (see paragraph 6-44).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- C Reconnect wire 27A to engine oil pressure gage. Disconnect wire 36 from engine oil pressure gage. Turn MASTER switch on and check engine oil pressure gage for operation. Engine oil pressure gage should read "0." Ground case of engine oil pressure gage and check gage for operation. Gage should read full scale. Turn MASTER switch OFF. If engine oil pressure gage reads correctly, go to step D. If engine oil pressure gage fails to read correctly, replace engine oil pressure gage (see paragraph 6-8).
- D Disconnect gage panel to bulkhead wiring harness from gage panel. Check wire 36 in gage panel harness for continuity by placing red lead of multimeter on wire 36 and black lead on pin D. If continuity is present, go to step E. If continuity is not present, repair/replace wire 36 of gage panel wiring harness (see paragraph 644).
- E Reconnect wire 36 to engine oil pressure gage and gage panel to bulkhead wiring harness to gage panel. Install ground strap (5), two lockwashers (4), two screws (3), gage panel (6), three lockwashers (2), and three screws (1) to mounting brackets. Open air inlet doors (TM 9-2350-256-10). Disconnect bulkhead to engine bracket and rear fuel tank wiring harness from bulkhead disconnect. Place red lead of multimeter in socket L of wire 36 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step F. If voltage is not present, repair/replace wire 36 of gage panel to bulkhead wiring harness (see paragraph 6-45 for dual voltage; 6-46 for single voltage).



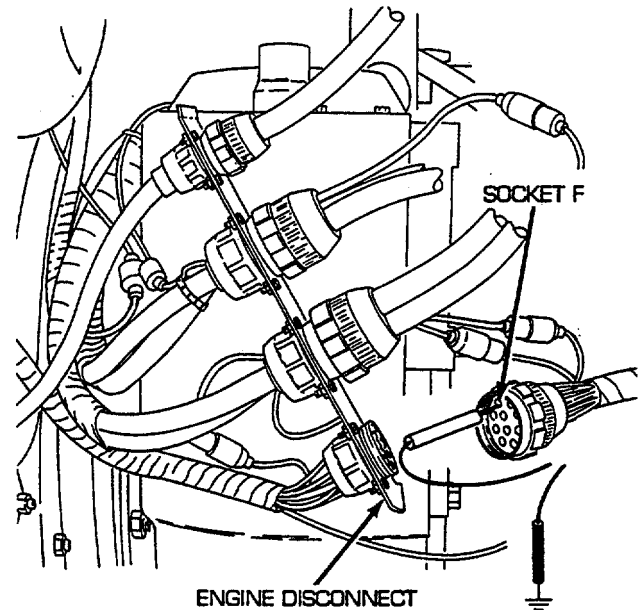
2-19 ELECTRICAL TROUBLESHOOTING-Continued

ENGINE OIL PRESSURE GAGE-Continued'

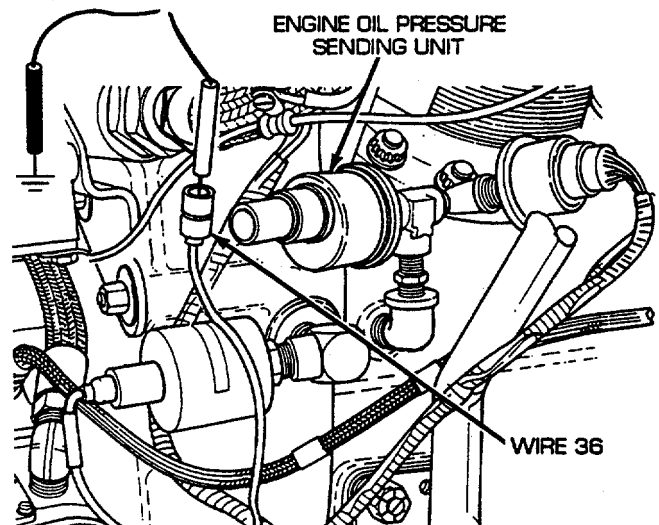
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

F Reconnect bulkhead to engine bracket and rear fuel tank wiring harness to bulkhead. Remove engine deck (see paragraph 9-51). Disconnect bulkhead to engine bracket and rear fuel tank wiring harness to engine disconnect. Place red lead of multimeter in socket F of wire 36 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step G. If voltage is not present, repair/replace wire 36 of bulkhead to engine bracket and rear fuel tank transmitter wiring harness (see paragraph 6-73 for dual voltage; 6-74 for single voltage).



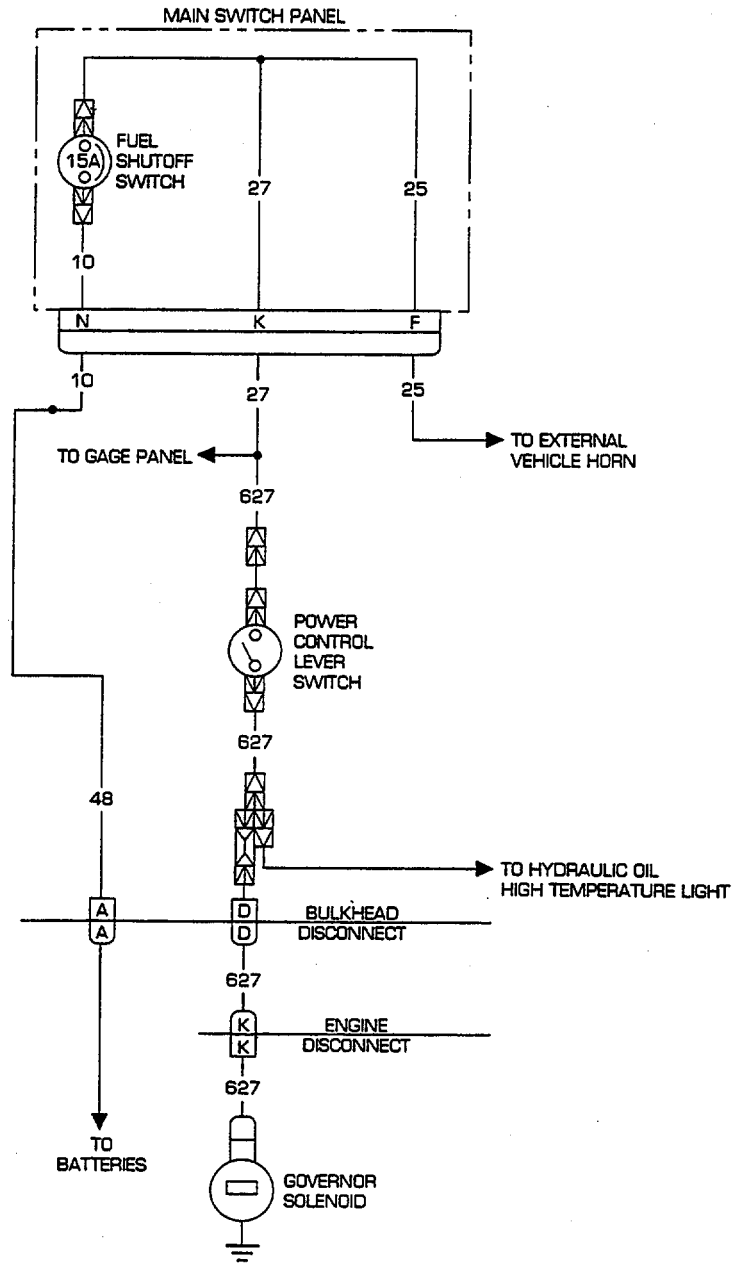
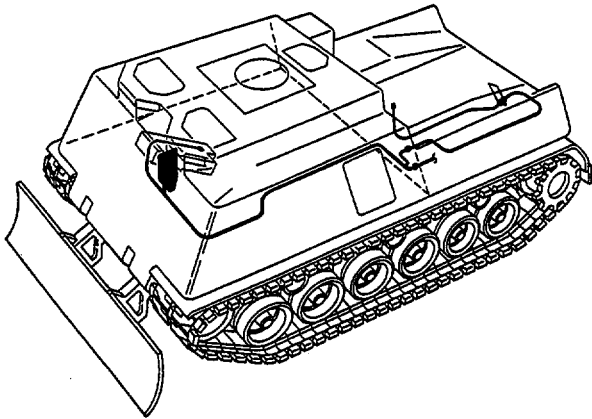
G Reconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness to engine disconnect. Remove powerplant (see paragraph 3-1). Disconnect wire 36 from engine oil pressure sending unit. Place red lead of multimeter in wire 36 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace engine oil pressure sending unit (see paragraph 6-22). If voltage is not present, repair/replace wire 36 of engine wiring harness (see paragraph 6-58 for dual voltage; 6-59 for single voltage).



POWER CONTROL LEVER SWITCH

SYMPTOM

Engine exceeds 1800 rpm when hydraulic POWER lever is ON.
Do steps A through I.



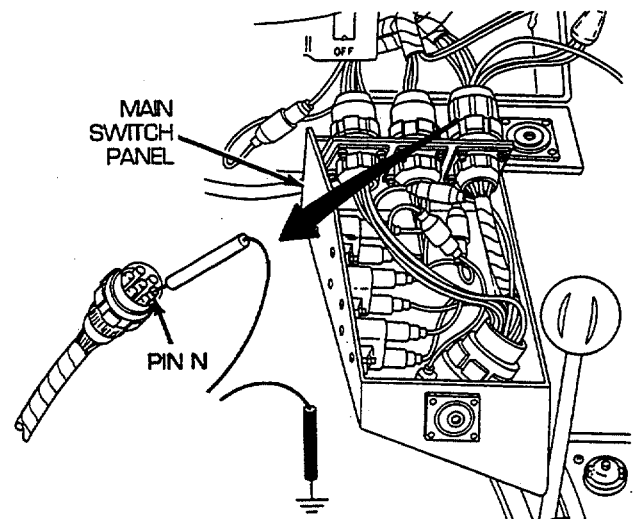
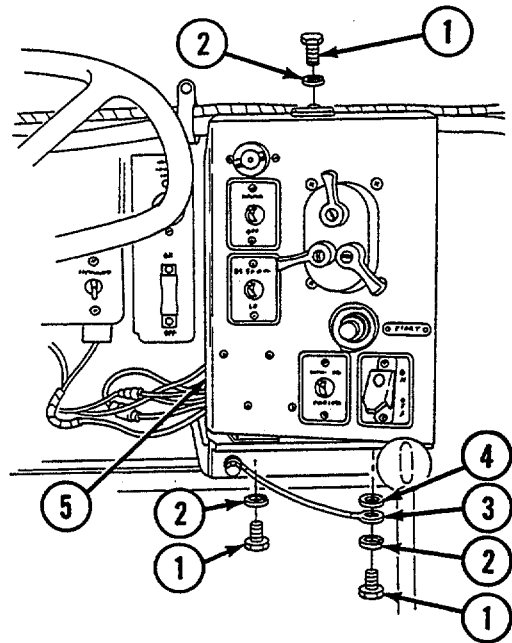
2-19 ELECTRICAL TROUBLESHOOTING-Continued

POWER CONTROL LEVER SWITCH--Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Remove three screws (1), three lockwashers (2), ground lead (3), flat washer (4), and release main switch panel (5) from mounting brackets. Disconnect switch panel to gage panel and miscellaneous switches wiring harness from switch panel. Place red lead of multimeter on pin N of wire 10 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step C. If voltage is not present, go to step B.



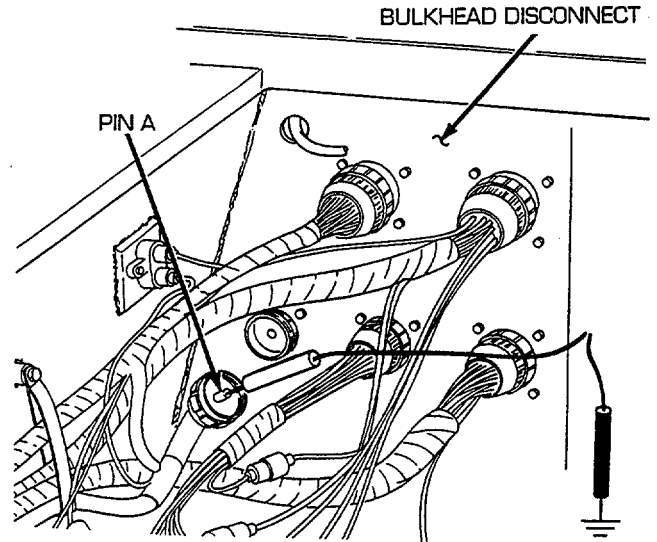
SECTION V: TROUBLESHOOTING

TM 9-2350-256-20

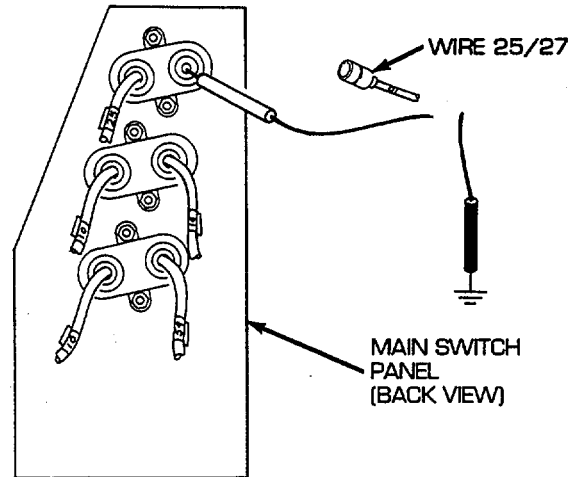
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

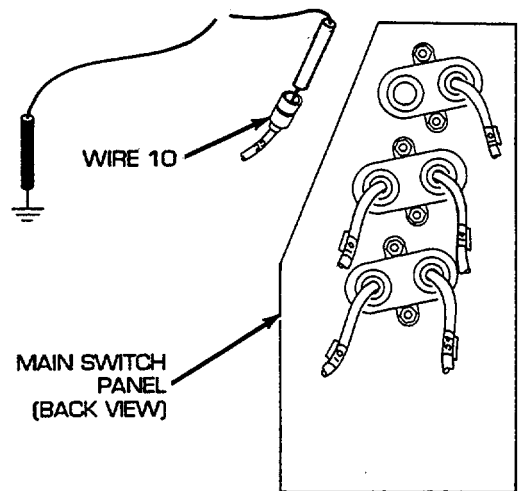
B Reconnect switch panel to gage panel and miscellaneous switches wiring harness. Disconnect switch panel, radio, and bilge pump to bulkhead wiring harness. Place red lead on pin A and black lead to ground and check for voltage. If voltage is present repair/replace switch panel, radio, and bilge pump to bulkhead wiring harness. If voltage is not present, troubleshoot master relay circuit (see paragraph 2-19, master relay fails to operate).



C Reconnect switch panel to gage panel and miscellaneous switches wiring harness. Disconnect wire 25/27 from 15 A circuit breaker. Place red lead of multimeter on terminal of 15 A circuit breaker and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step E. If voltage is not present, go to step D.



D Reconnect wire 25/27 to 15 A circuit breaker. Disconnect wire 10 from 15 A circuit breaker. Place red lead of multimeter in wire 10 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace circuit breaker (see paragraph 6-10). If voltage is not present, repair/replace wire 10 of main lighting and B.O. selector switch wiring harness (see paragraph 6-69).



2-19 ELECTRICAL TROUBLESHOOTING-Continued

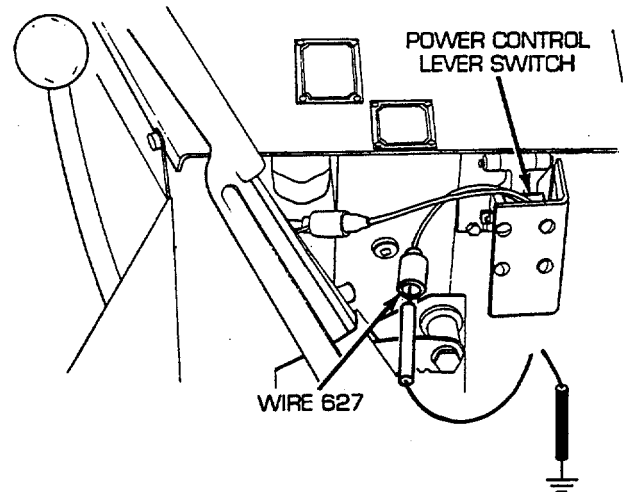
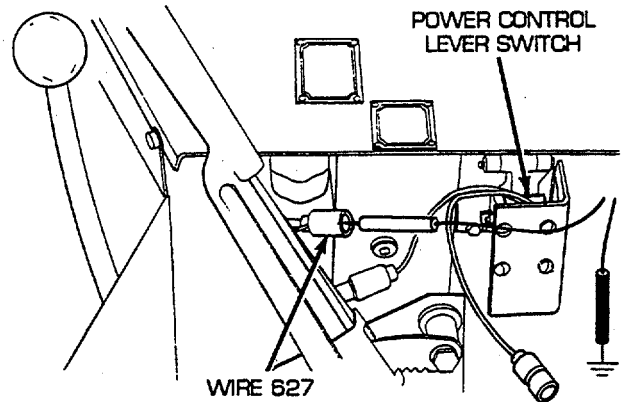
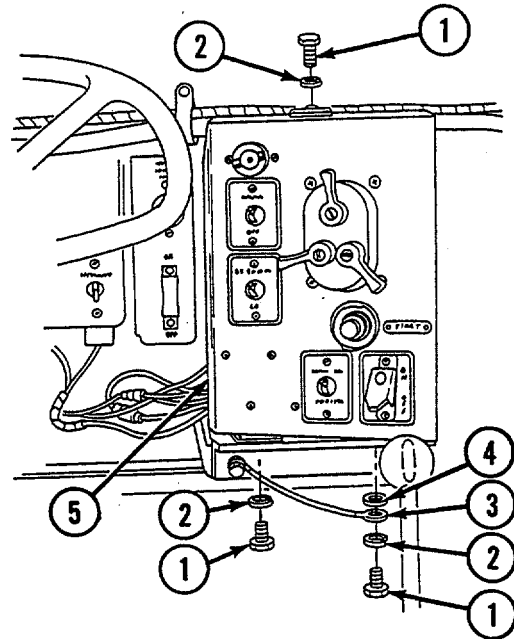
POWER CONTROL LEVER SWITCH--Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

E Reconnect switch panel to gage panel and miscellaneous switches wiring harness from switch panel. Install main switch panel (5), flat washer (4), ground lead (3), three lockwashers (2) and three screws (1). Disconnect wire 627 of switch panel to gage panel and miscellaneous switches wiring harness from switch panel side of power control lever switch. Place red lead of multimeter in wire 627 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step F. If voltage is not present, repair/replace wire 627 of switch panel to gage panel and miscellaneous switches wiring harness (see paragraph 6-55 for dual voltage; 6-56 for single voltage).

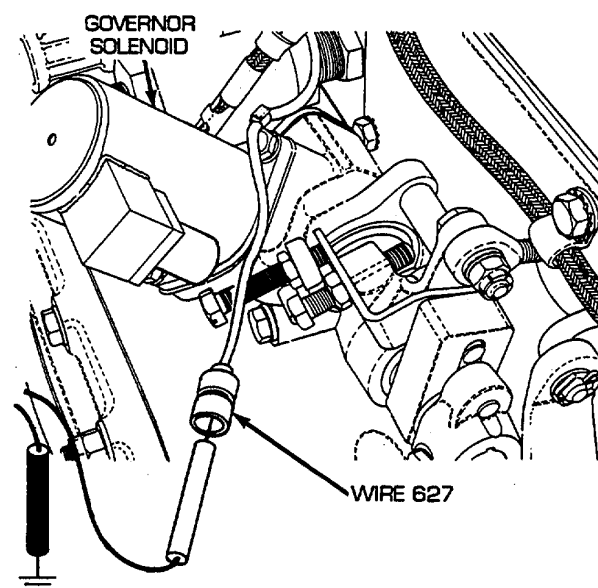
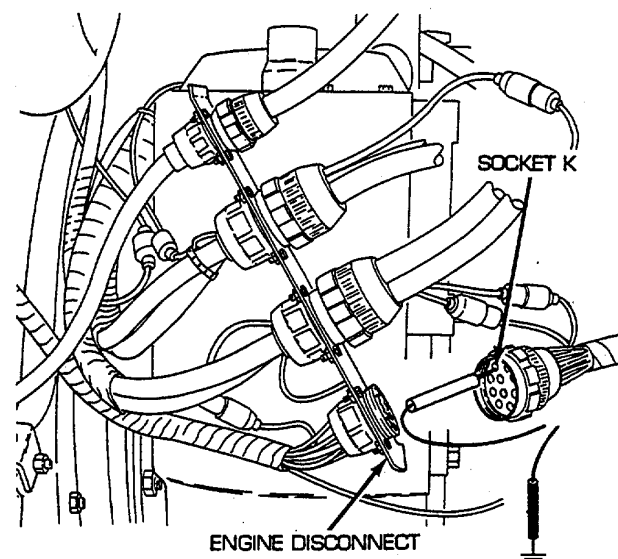
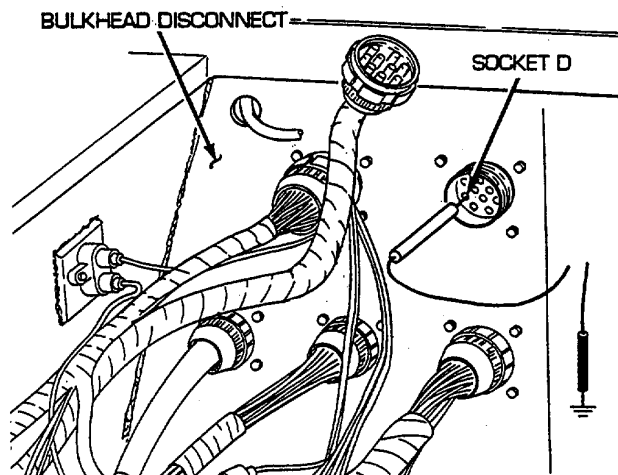
F Reconnect wire 627 of switch panel to gage panel and miscellaneous switches wiring harness to switch panel side of power control switch. Disconnect wire 627 of gage panel to bulkhead wiring harness from power control lever switch. Place red lead of multimeter on terminal of power control lever switch and black lead to ground. Turn MASTER switch on, place POWER lever in the ON position, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step G. If voltage is not present, replace power control lever switch (see paragraph 6-17).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- G Reconnect gage panel to bulkhead wiring harness to power control lever switch. Open air inlet doors (TM 9-2350-256-10). Disconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness from bulkhead disconnect. Place red lead of multimeter in socket D of wire 627 and black lead to ground. Turn MASTER switch on, place POWER lever in the ON position, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step H. If voltage is not present, repair/replace gage panel to bulkhead wiring harness (see paragraph 6-45 for dual voltage; 6-46 for single voltage).
- H Reconnect gage panel to bulkhead wiring harness to bulkhead disconnect. Remove engine deck (see paragraph 9-51). Disconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness from engine disconnect. Place red lead of multimeter in socket K of wire 627 and black lead to ground. Turn MASTER switch on, place POWER lever in the ON position, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step I. If voltage is not present, repair/replace wire 627 of bulkhead to engine bracket and rear fuel tank transmitter wiring harness (see paragraph 6-73 for dual voltage; 6-74 for single voltage).
- I Reconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness to engine disconnect. Disconnect wire 627 from governor solenoid. Place red lead of multimeter on wire 627 and black lead to ground. Turn MASTER switch on, place POWER lever in the ON position, and check for voltage. Turn MASTER switch and POWER lever OFF. If voltage is present, notify Direct Support Maintenance. If voltage is not present, repair/replace wire 627 of engine wiring harness (see paragraph 6-58 for dual voltage; 6-59 for single voltage).

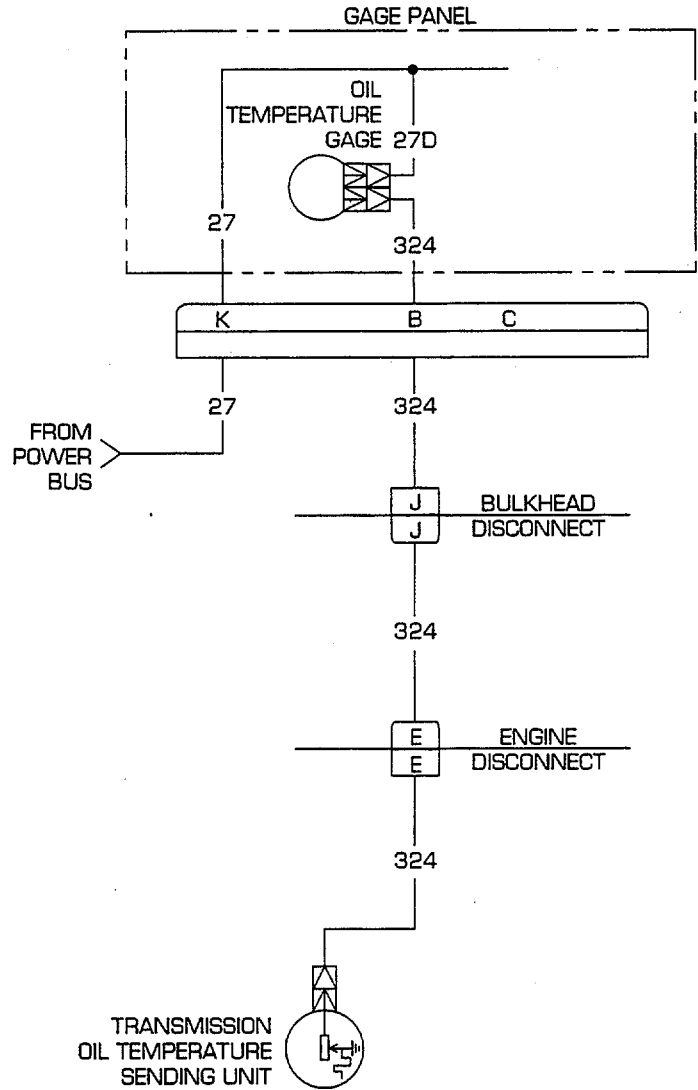
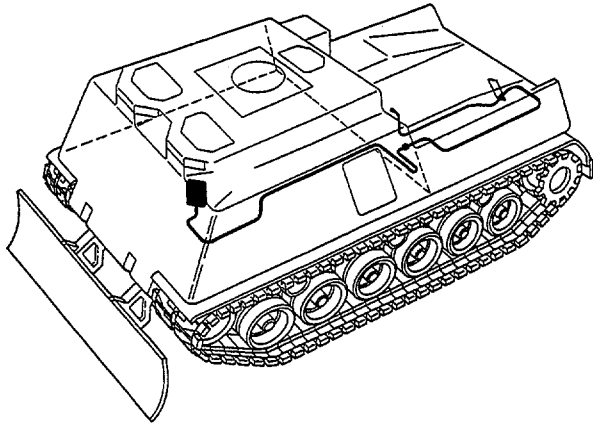


2-19 ELECTRICAL TROUBLESHOOTING-Continued

TRANSMISSION OIL TEMPERATURE GAGE

SYMPTOM

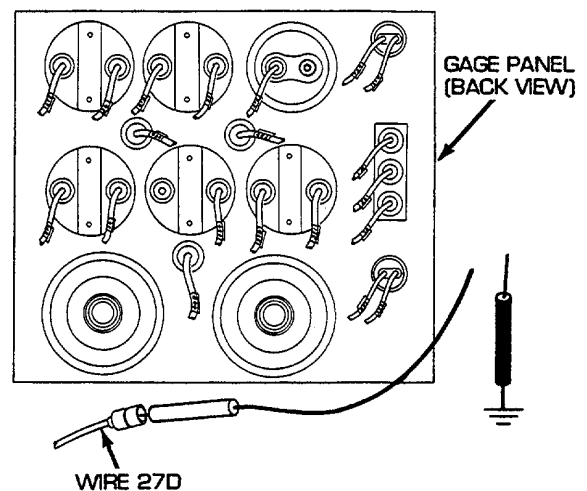
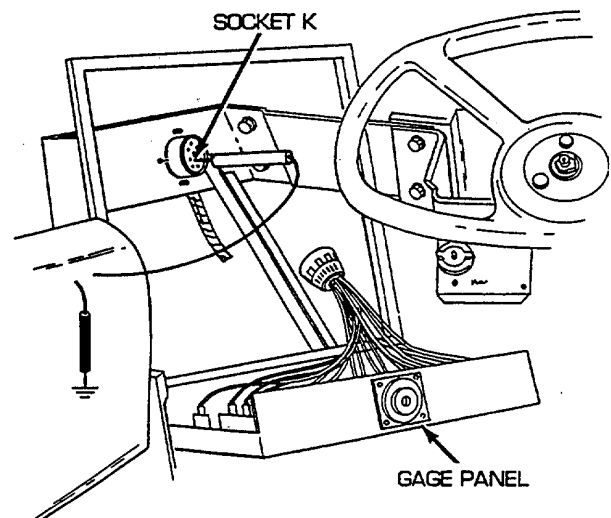
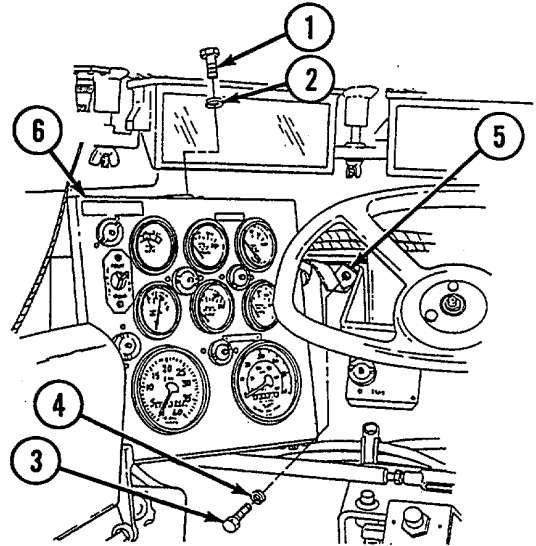
Transmission oil temperature gage does not operate.
Do steps A through G.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Remove three screws (1), three lockwashers (2), two screws (3), two lockwashers (4), and ground strap (5) and release gage panel (6). Disconnect gage panel to bulkhead wiring harness from gage panel. Place red lead of multimeter in socket K of wire 27 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step B. If voltage is not present, troubleshoot power control lever circuit.
- B Reconnect gage panel to bulkhead wiring harness to gage panel. Disconnect wire 27D from transmission oil temperature gage. Place red lead of multimeter in wire 27D and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step C. If voltage is not present, repair/replace wire 27D of gage panel wiring harness (see paragraph 6-44).



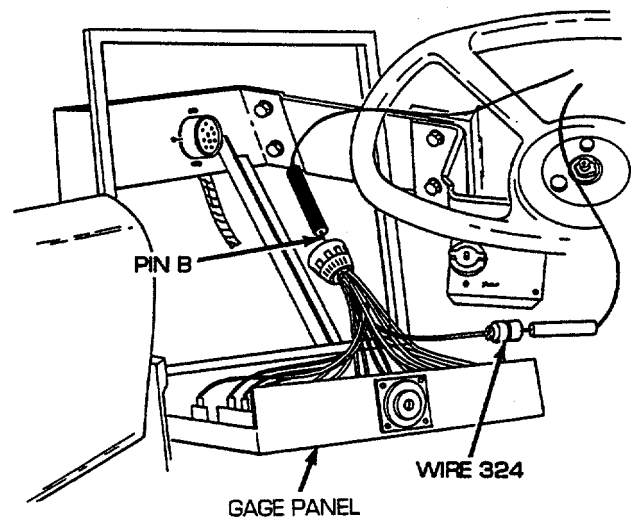
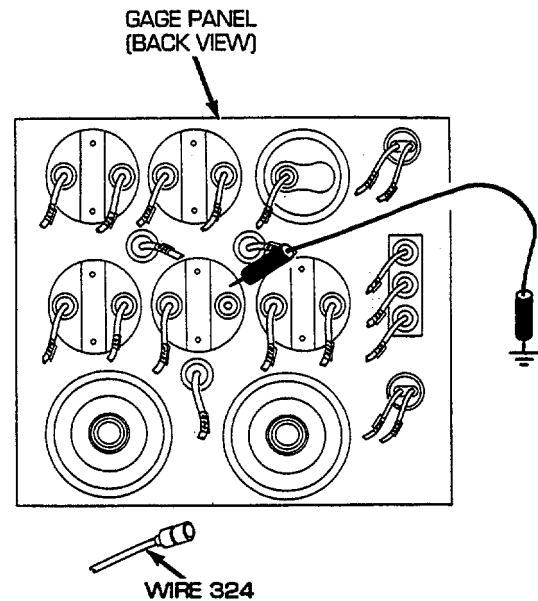
2-19 ELECTRICAL TROUBLESHOOTING--Continued

TRANSMISSION OIL TEMPERATURE GAGE--Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- C Reconnect wire 27D to transmission oil temperature gage. Disconnect wire 324 from transmission oil temperature gage. Turn MASTER switch on and check transmission oil temperature gage for operation. Transmission oil temperature gage should read "O." Ground case of transmission oil temperature gage and check gage for operation. Gage should read full scale. Turn MASTER switch OFF. If transmission oil temperature gage reads correctly, go to step D. If transmission oil temperature gage fails to read correctly, replace transmission oil temperature gage (see paragraph 6-8).
- D Disconnect gage panel to bulkhead wiring harness from gage panel. Check wire 324 in gage panel harness for continuity by placing red lead of multimeter on wire 324 and black lead on pin B of wire 324. If continuity is present, go to step E. If continuity is not present, repair/replace wire 324 of gage panel wiring harness (see paragraph 6-44).

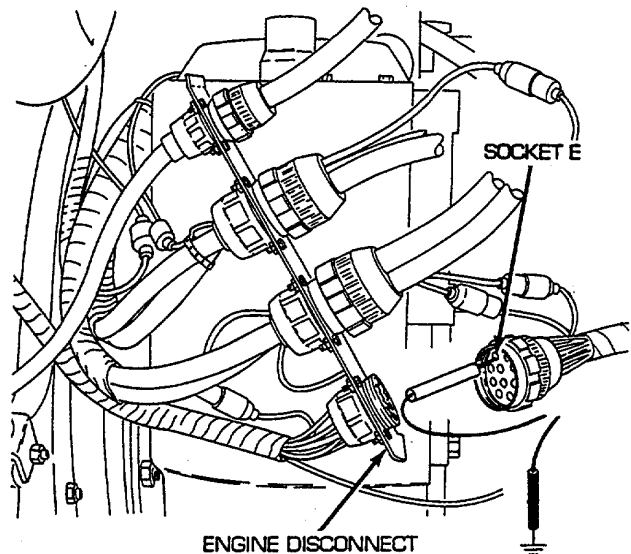
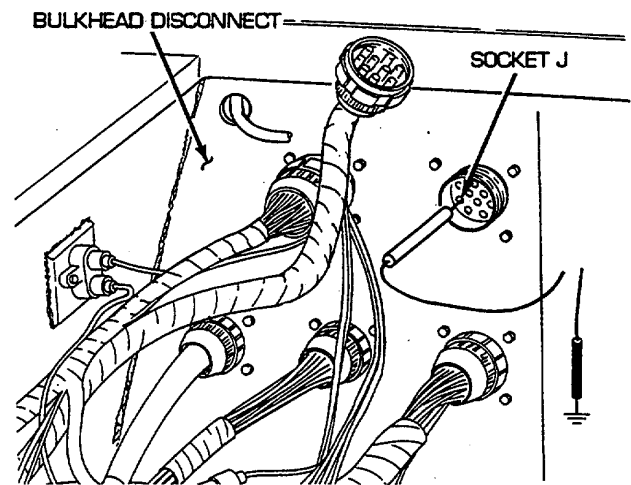
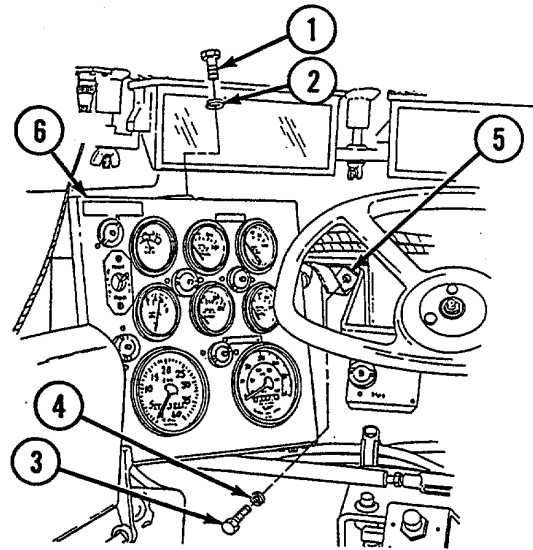


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- E Reconnect wire 324 to transmission oil temperature gage and gage panel to bulkhead wiring harness to gage panel. Install ground strap (5), two lockwashers (4), two screws (3), gage panel (6), three lockwashers (2), and three screws (1) to mounting brackets. Open air inlet doors (TM 9-2350- 256-10). Disconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness from bulkhead disconnect. Place red lead of multimeter in socket J of wire 324 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step F. If voltage is not present, repair/replace wire 324 of gage panel to bulkhead wiring harness (see paragraph 6-45 for dual voltage; 6-46 for single voltage).

- F Reconnect bulkhead to engine bracket and rear fuel tank wiring harness to bulkhead. Remove engine deck (see paragraph 9-51). Disconnect bulkhead to engine bracket and rear fuel tank wiring harness from engine disconnect. Place red lead of multimeter in socket E of wire 324 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step G. If voltage is not present, repair/replace wire 324 of bulkhead to engine bracket and rear fuel tank wiring harness (see paragraph 6-73 for dual voltage; 6-74 for single voltage).



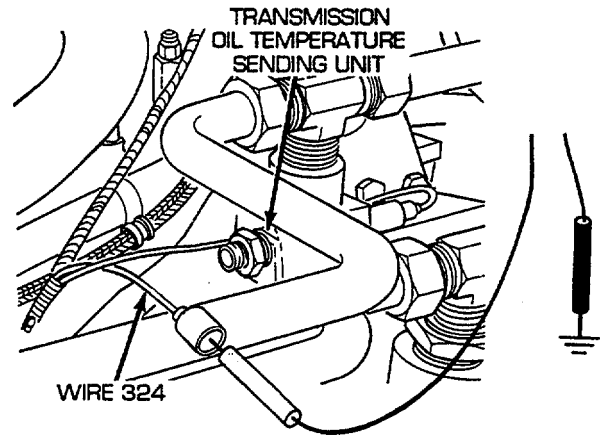
2-19 ELECTRICAL TROUBLESHOOTING-Continued

TRANSMISSION OIL TEMPERATURE GAGE--Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

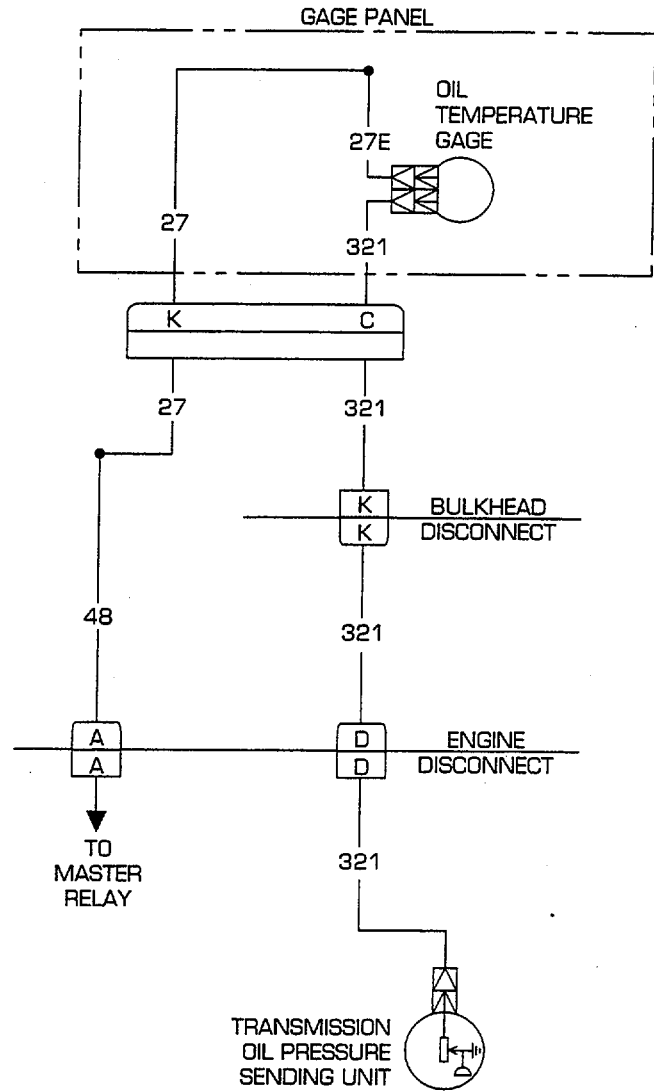
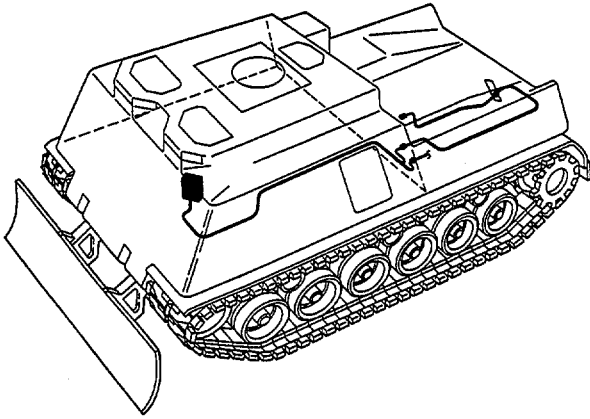
- G Reconnect bulkhead to engine bracket and rear fuel tank wiring harness to engine disconnect. Disconnect wire 324 from transmission oil temperature sending unit. Place red lead of multimeter in wire 324 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace transmission oil temperature sending unit (see paragraph 6-19). If voltage is not present, repair/replace wire 324 of engine wiring harness (see paragraph 6-58 for dual voltage; 6-59 for single voltage).



TRANSMISSION OIL PRESSURE GAGE

SYMPTOM

Transmission oil pressure gage does not operate.
Do steps A through H.



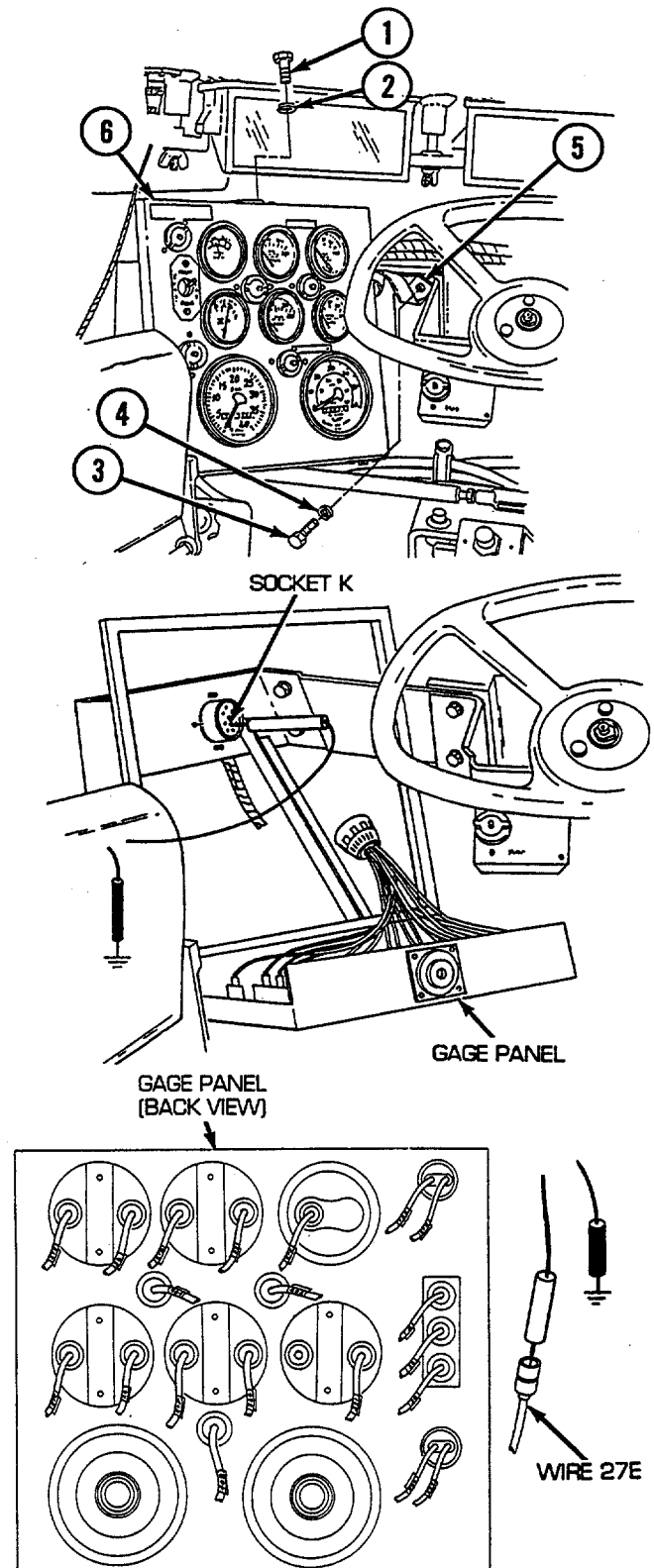
2-19 ELECTRICAL TROUBLESHOOTING-Continued

TRANSMISSION OIL PRESSURE GAGE-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

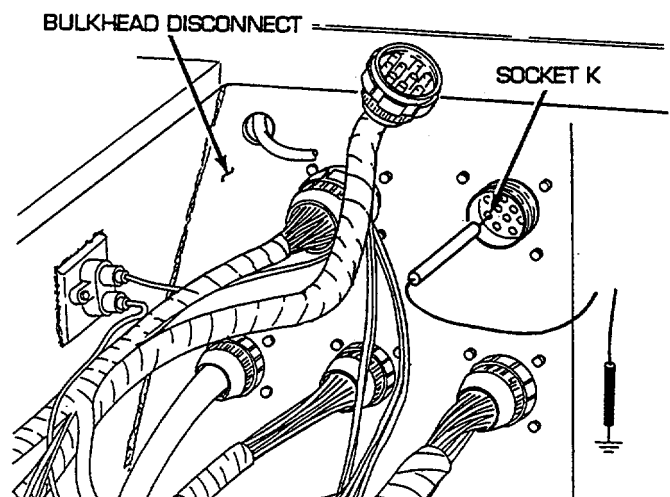
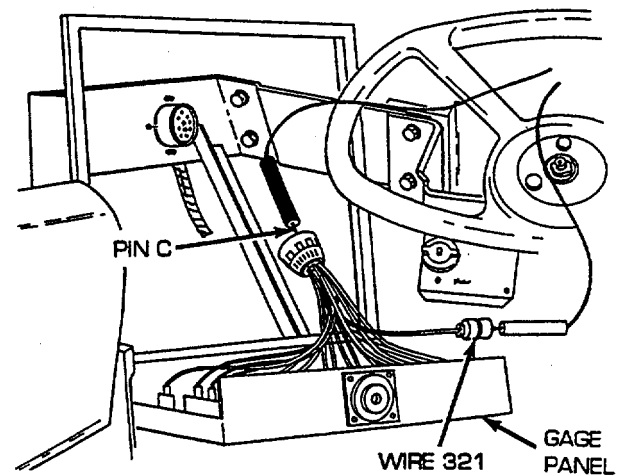
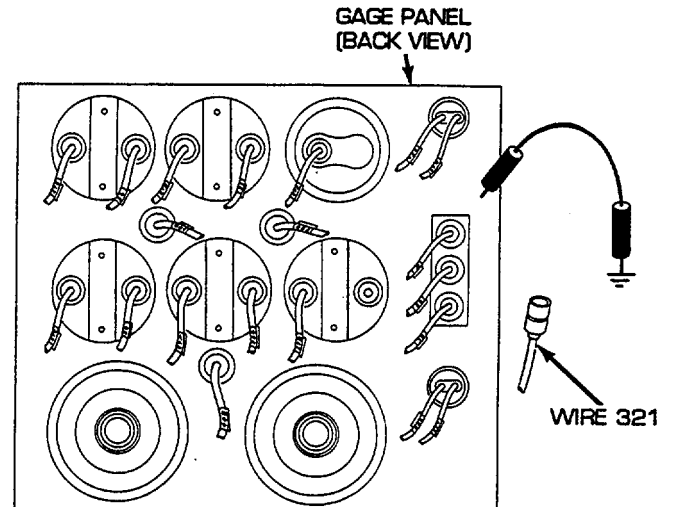
- A Remove three screws (1), three lockwashers (2), two screws (3), two lockwashers (4), ground strap (5), and release gage panel (6). Remove gage panel to bulkhead wiring harness from gage panel. Place red lead of multimeter in socket K of wire 27 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step B. If voltage is not present, go to step H.
- B Reconnect gage panel to bulkhead wiring harness to gage panel. Disconnect wire 27E from transmission oil pressure gage. Place red lead of multimeter on wire 27E and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step C. If voltage is not present, repair/replace wire 27E of gage panel wiring harness (see paragraph 6-44).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- C Reconnect wire 27E to transmission oil pressure gage. Disconnect wire 321 from transmission oil pressure gage. Turn MASTER switch on and check transmission oil pressure gauge for operation. Transmission oil pressure gauge should read full scale. Ground case of transmission oil pressure gage and check gage for operation. Gage should read "O." Turn MASTER switch OFF. If transmission oil pressure gauge reads correctly, go to step D. If transmission oil pressure gauge fails to read correctly, replace transmission oil pressure gage (see paragraph 6-8).
- D Disconnect gage panel to bulkhead wiring harness from gage panel. Check wire 321 in gage panel harness for continuity by placing red lead of multimeter on wire 321 and black lead on pin C. If continuity is present, go to step E. If continuity is not present, repair/replace wire 321 of gage panel wiring harness (see paragraph 6-44).
- E Reconnect wire 321 to transmission oil pressure gage and bulkhead wiring harness to gage panel. Install ground strap (5), two lockwashers (4), two screws (3), gage panel (6), three lockwashers (2), and three screws (1). Open air inlet doors (TM 9-2350-256-10). Disconnect bulkhead to engine bracket and rear fuel tank wiring harness from bulkhead disconnect. Place red lead of multimeter in socket K of wire 321 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step F. If voltage is not present, repair/replace wire 321 of gage panel to bulkhead wiring harness (see paragraph 6-45 for dual voltage; 6-46 for single voltage).



2-19 ELECTRICAL TROUBLESHOOTING-Continued

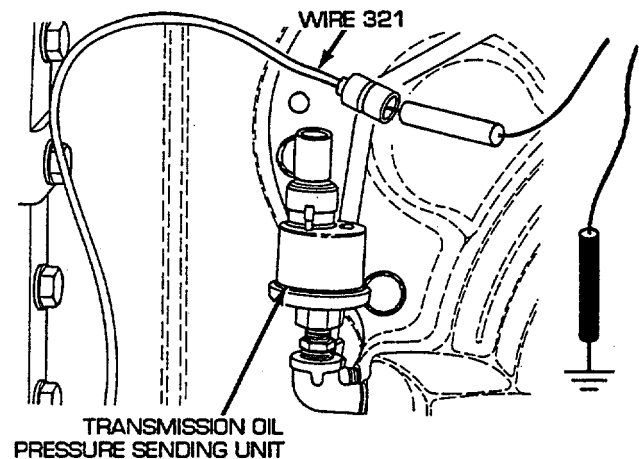
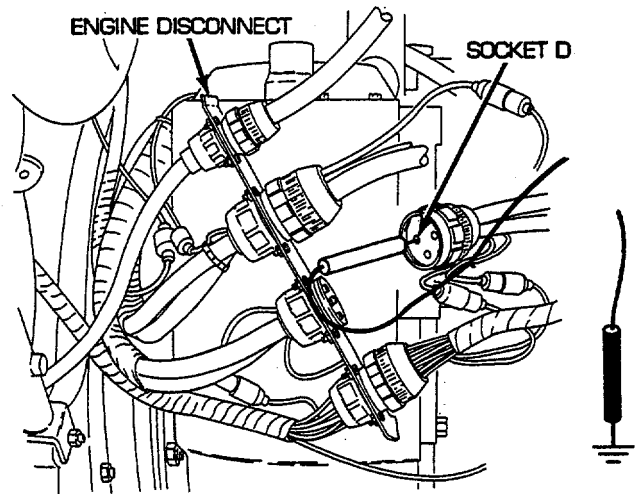
TRANSMISSION OIL PRESSURE GAGE-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

F Reconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness to bulkhead and disconnect from engine disconnect. Place red lead of multimeter in socket D of wire 321 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step G. If voltage is not present, repair/replace wire 321 of bulkhead to engine bracket and rear fuel tank wiring harness (see paragraph 6-73 for dual voltage; 6-74 for single voltage).

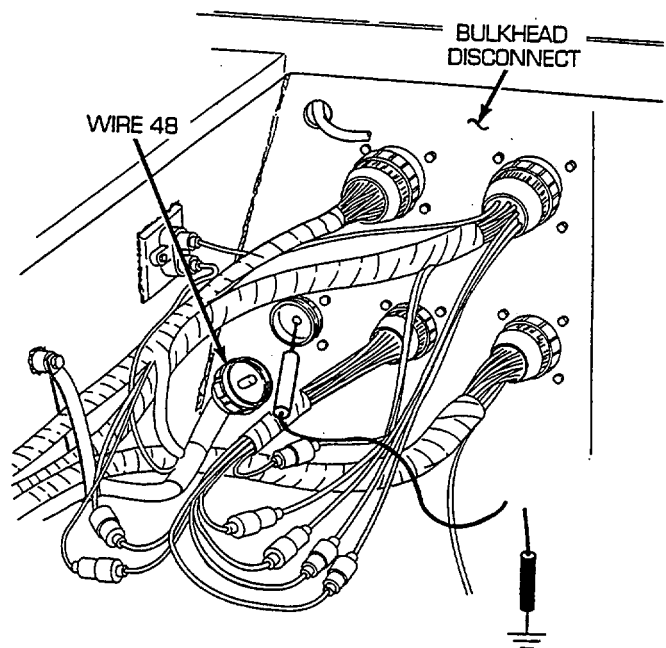
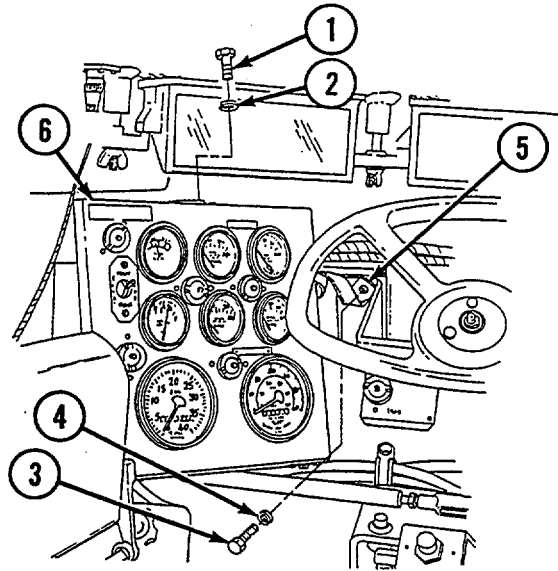
G Reconnect bulkhead to engine bracket and rear fuel tank wiring harness to engine disconnect. Disconnect wire 321 from transmission oil pressure sending unit. Place red lead of multimeter on wire 321 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace transmission oil pressure sending unit (see paragraph 6-19). If voltage is not present, repair/replace wire 321 of engine wiring harness (see paragraph 6-58 for dual voltage; 6-59 for single voltage).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- H Install ground strap (5), two lockwashers (4), two screws (3), gage panel (6), three lockwashers (2), and three screws (1). Open air inlet doors (TM 9-2350-256-10). Disconnect wire 48 pin A from bulkhead to master relay wiring harness. Place red multimeter lead in socket and black lead to ground. Turn MASTER switch on and check for voltage. If voltage is present repair or replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay circuit (see paragraph 2-19, master relay fails to operate).



2-19 ELECTRICAL TROUBLESHOOTING-Continued

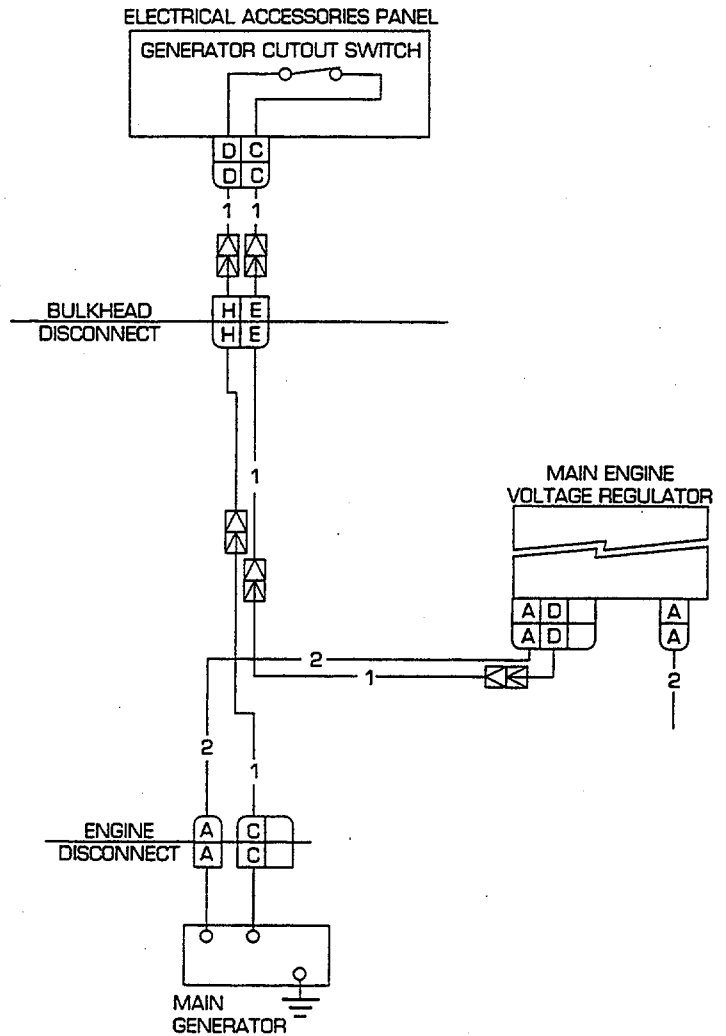
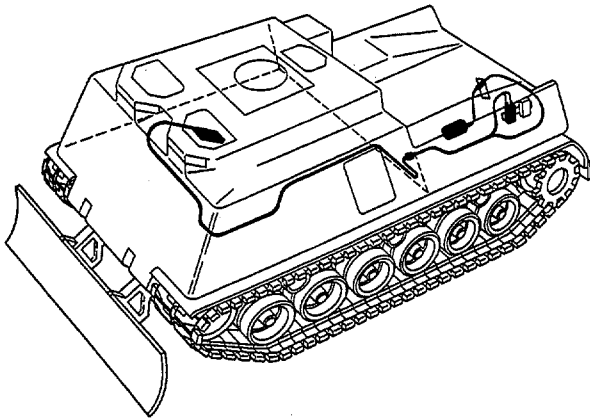
ENGINE GENERATOR (DUAL VOLTAGE SYSTEM)

SYMPTOM

Generator indicator reads in yellow or lower red region with engine running and generator cutout switch closed.

Generator cutout switch does not operate.
Do steps D through K.

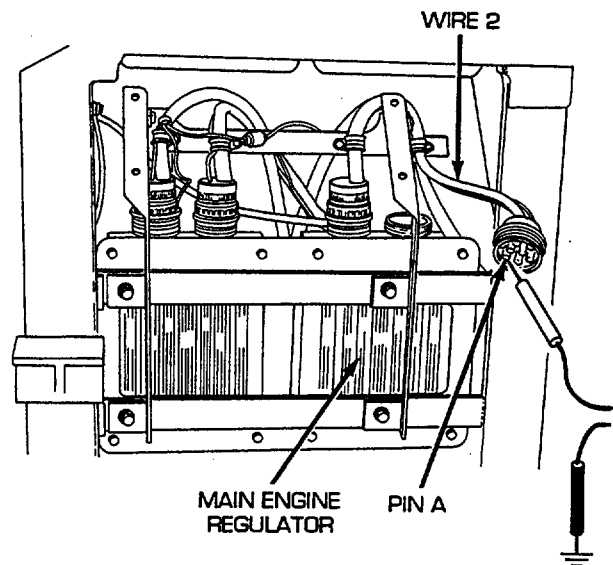
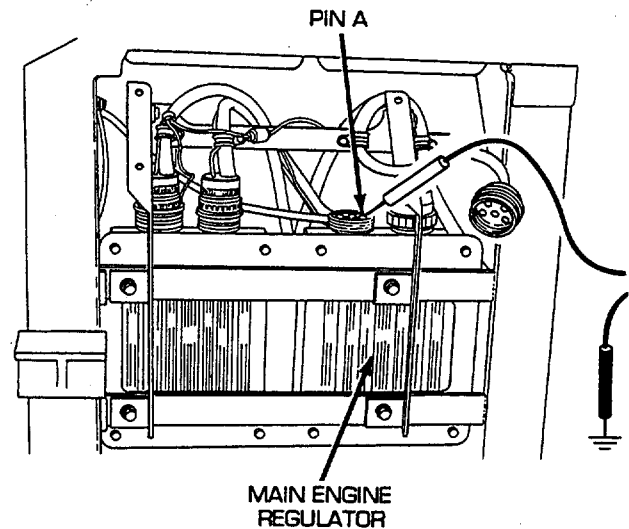
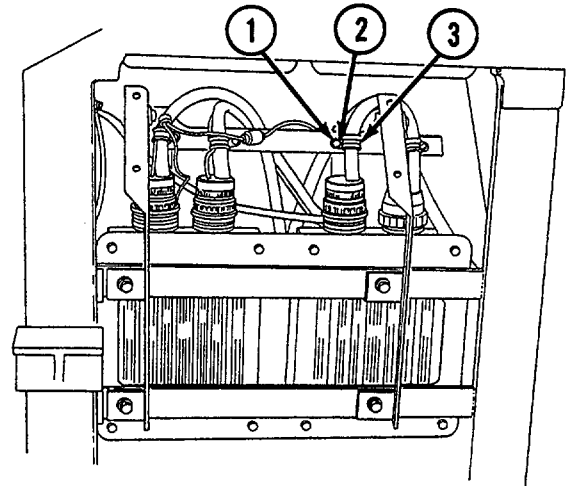
Do steps A, B, J, and K.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Extend boom all the way out (TM 9-2350-256-10). Open air inlet door (TM 9-2350-256-10). Remove screw (1), nut (2), and bracket (3). Disconnect batteries to master relay, voltage regulators, slave receptacle, and engine disconnect wiring harness from engine regulator. Place red lead of multimeter on pin A of wire 2 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is not present, troubleshoot battery circuit. If voltage is present, go to step B.
- B Place red lead of multimeter on pin A of wire 2 and black lead to ground. Turn MASTER switch on, start engine, open generator cutout switch and check for voltage. Turn engine and MASTER switch OFF, and close generator cutout switch. If voltage is present, go to step G. If voltage is not present, replace main engine regulator (see paragraph 6-5).



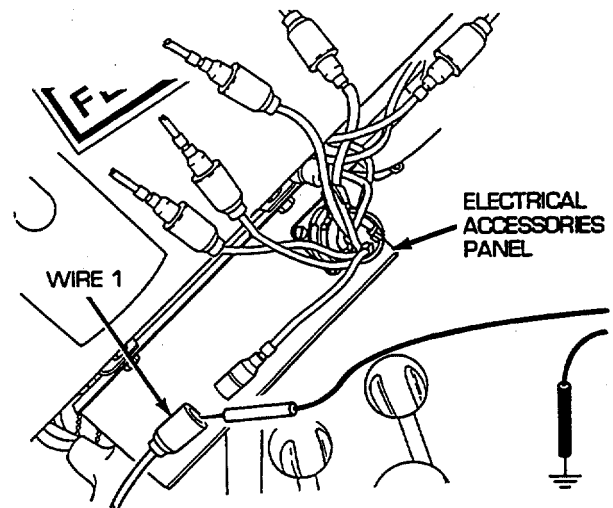
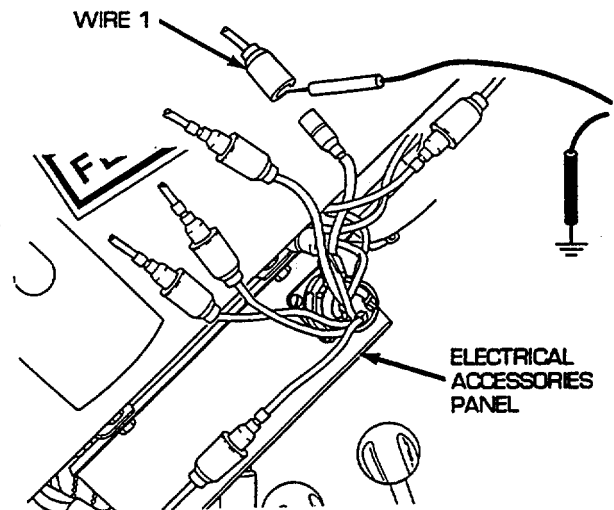
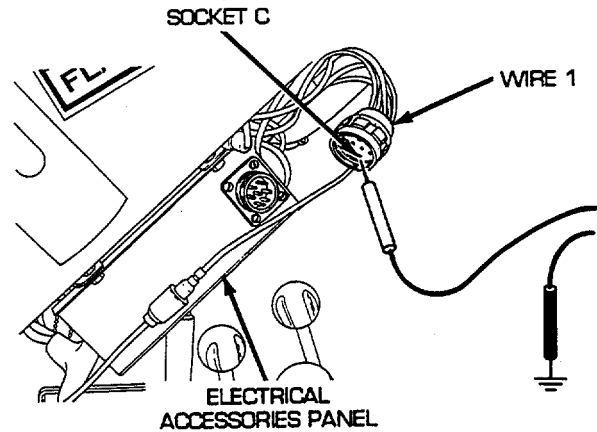
2-19 ELECTRICAL TROUBLESHOOTING--Continued

ENGINE GENERATOR (DUAL VOLTAGE SYSTEM)--Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- C Disconnect electrical accessories panel wiring harness from electrical accessories panel. Place red lead of multimeter in socket C of wire 1 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step D. If voltage is not present, go to step E.
- D Disconnect wire 1 (from socket C) of electrical accessories panel wiring harness from switch panel to bulkhead wiring harness. Place red lead of multimeter on male connector of wire 1 and black lead to ground. Turn MASTER switch on, start engine, open generator cutout switch and check for voltage. Turn engine and MASTER switch OFF, and close generator cutout switch. If voltage is present, repair/replace wire 1 of electrical accessories panel wiring harness (see paragraph 6-47). If voltage is not present, go to step F.
- E Reconnect bulkhead to engine wiring harness and starter relay wiring harness to bulkhead disconnect. Disconnect wire 1 of bulkhead to engine bracket and rear fuel tank transmitter wiring harness (from engine voltage regulator) from bulkhead to engine wiring harness and starter relay wiring harness. Place red lead of multimeter on male connector of wire 1 and black lead to ground. Turn MASTER switch on, start engine, open generator cutout switch and check for voltage. Turn engine and MASTER switch OFF and close generator cutout switch. If voltage is present, repair/replace wire 1 of bulkhead to engine wiring harness and starter relay wiring harness (see paragraph 6-72). If voltage is not present, go to step F.



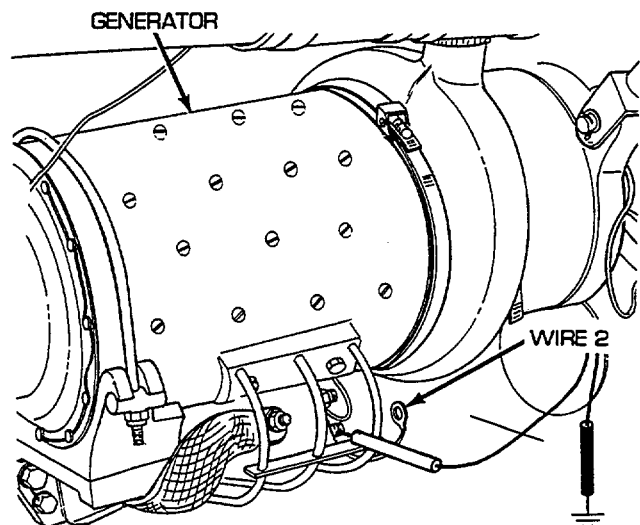
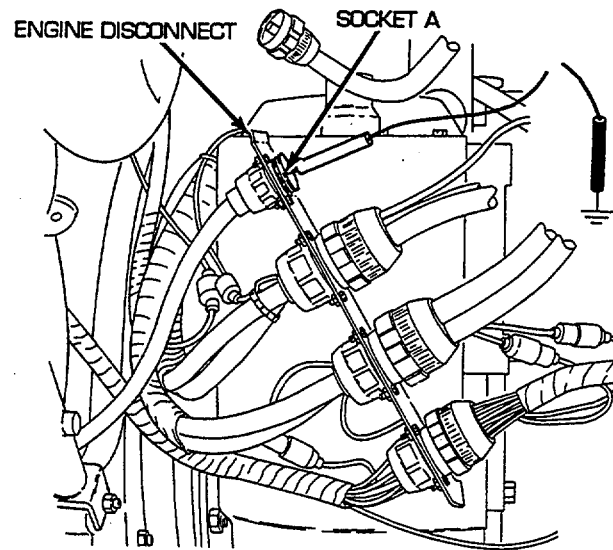
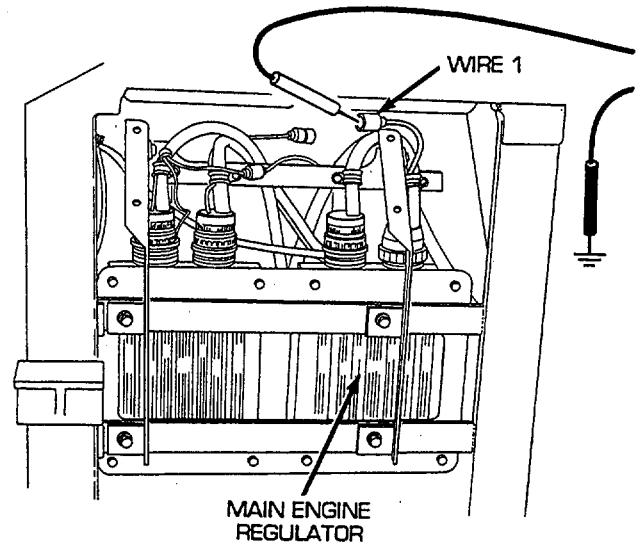
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- F Reconnect wire 1 of bulkhead to engine bracket and rear fuel tank transmitter wiring harness to the bulkhead to engine wiring harness and starter relay wiring harness. Disconnect wire 1 of bulkhead to engine bracket and rear fuel tank transmitter wiring harness from bulkhead to APU, master relay, and rigger's lights wiring harness. Place red lead of multimeter on male connector of wire 1 and black lead to ground. Turn MASTER switch on, start engine, open generator cutout switch and check for voltage. Turn engine and MASTER switch OFF, and close generator cutout switch. If voltage is present, repair/replace wire 1 of bulkhead to APU, master relay, and rigger's lights wiring harness (see paragraph 6-75). If voltage is not present, go to step I.

- G Remove engine deck (see paragraph 9-51). Reconnect engine voltage regulator to engine disconnect wiring harness to engine voltage regulator. Disconnect generator power lead assembly from engine disconnect. Place red lead of multimeter in socket A of wire 2 and black lead to ground. Turn MASTER switch on, start engine, open generator cutout switch and check for voltage. Turn engine and MASTER switch OFF, and close generator cutout switch. If voltage is not present, repair/replace wire 2 of engine voltage regulator to engine disconnect wiring harness (see paragraph 6-43). If voltage is present, go to step H.

- H Remove powerplant (see paragraph 3-1). Place red lead of multimeter on terminal of generator and black lead to ground. Turn MASTER switch on, start engine, open generator cutout switch and check for voltage. Turn engine and MASTER switch OFF, and close generator cutout switch. If voltage is not present, repair/replace wire 2 of generator power lead assembly (see paragraph 6-36). If voltage is present, replace engine generator (see paragraph 6-1).



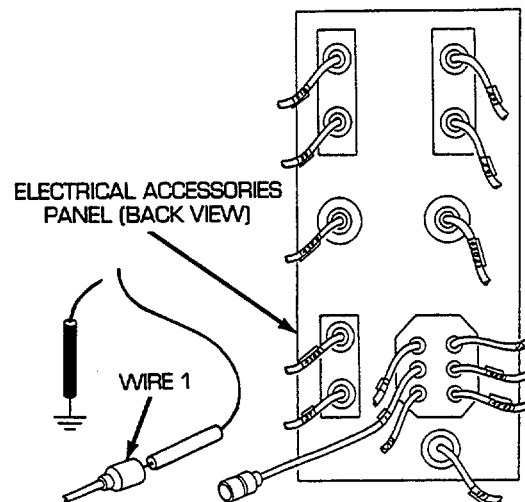
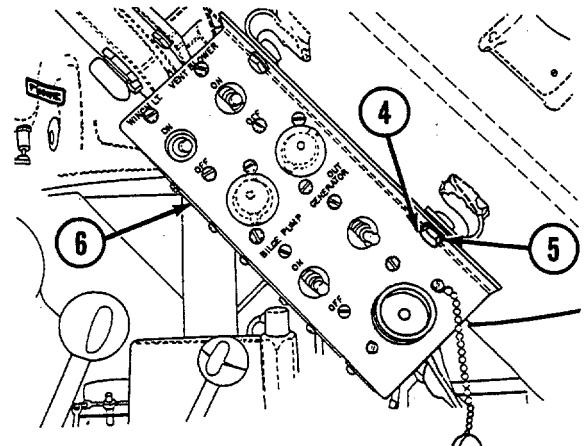
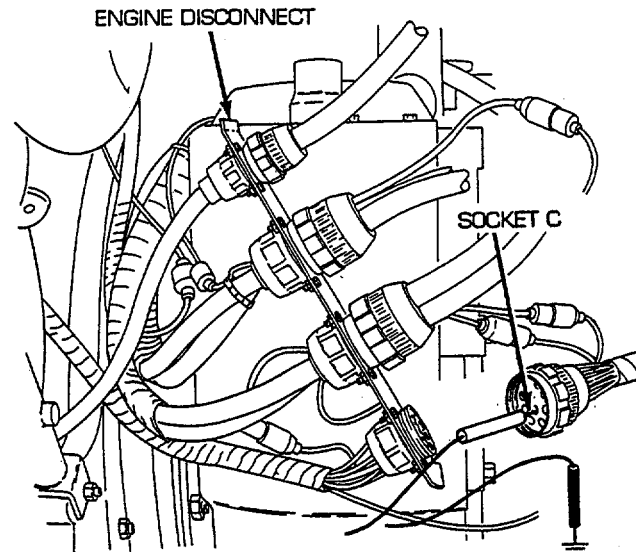
2-19 ELECTRICAL TROUBLESHOOTING-Continued

ENGINE GENERATOR (DUAL VOLTAGE SYSTEM a--Continued)

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

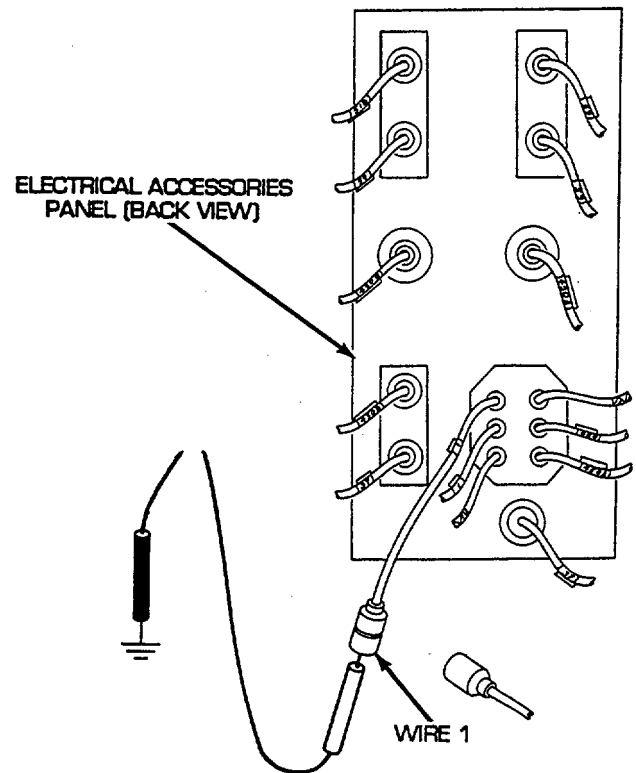
- I Reconnect bulkhead to engine wiring harness and starter relay wiring harness to bulkhead disconnect. Remove engine deck (see paragraph 9-51). Disconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness from engine disconnect. Place red lead of multimeter in socket C of wire 1 and black lead to ground. Turn MASTER switch on, start engine, open generator cutout switch and check for voltage. Turn engine and MASTER switch OFF and close generator cutout switch. If voltage is present, repair/replace wire 1 of bulkhead to engine bracket and rear fuel tank transmitter wiring harness (see paragraph 6-73). If voltage is not present, go to step J.
- J Remove four screws (4), four lockwashers (5), and release accessories panel (6). Disconnect wire 1 (from socket D) from generator cutout switch. Place red lead of multimeter in wire 1 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step K. If voltage is not present repair/replace wire 1 of bilge pump main power wiring harness from socket D (see paragraph 6-84).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- K Reconnect wire 1 (from socket D) to generator cutout switch. Disconnect wire 1 (from socket C) from generator cutout switch. Place red lead of multimeter on generator cutout switch and black lead to ground. Turn MASTER switch on, open generator cutout switch and check for voltage. Turn MASTER switch OFF, close generator cutout switch. If voltage is present, repair/replace wire 1 of bilge pump main power wiring harness (see paragraph 6-84). If voltage is not present, replace generator cutout switch (see paragraph 6-9).



2-19 ELECTRICAL TROUBLESHOOTING-Continued

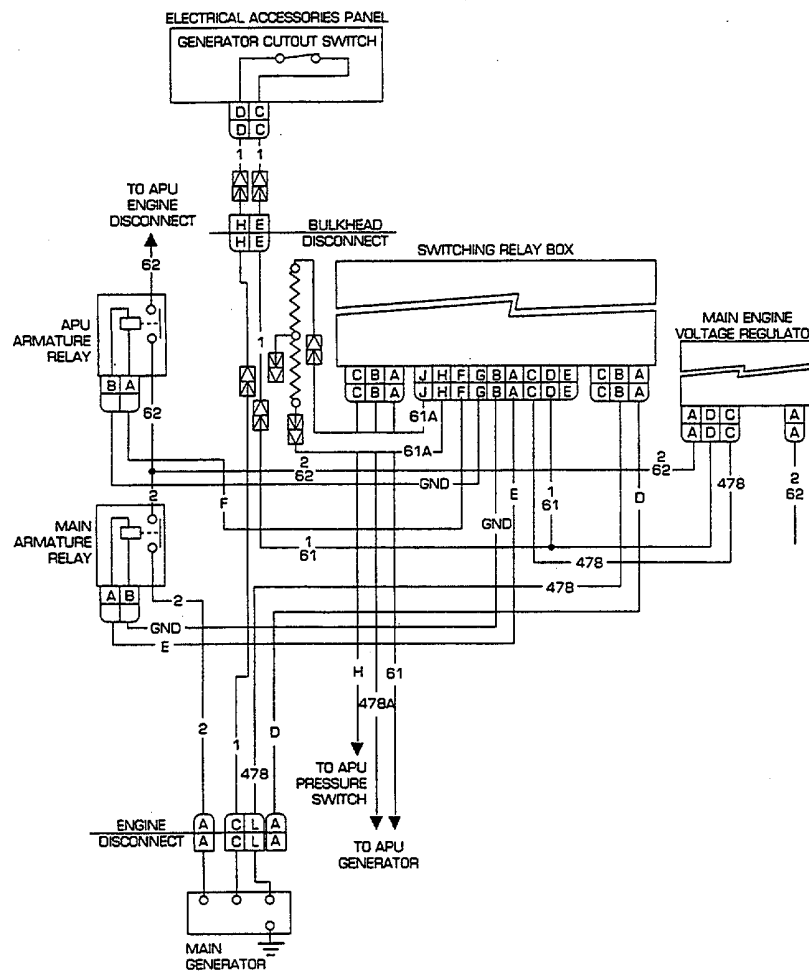
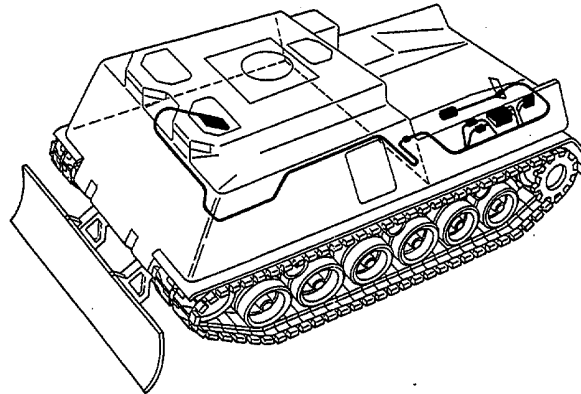
ENGINE GENERATOR (SINGLE VOLTAGE SYSTEM)

SYMPTOM

Generator indicator reads in yellow or lower red region with engine running and generator cutout switch closed.

Generator cutout switch does not operate.
Do steps I through S.

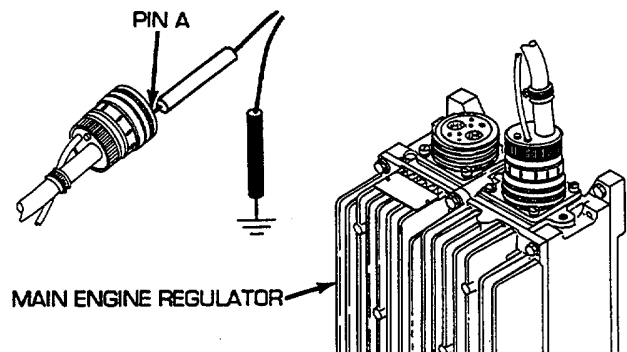
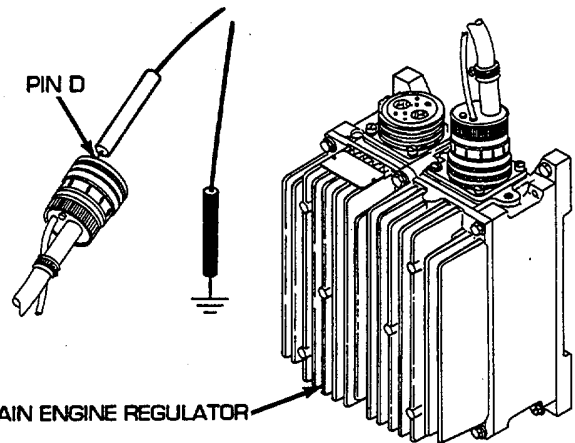
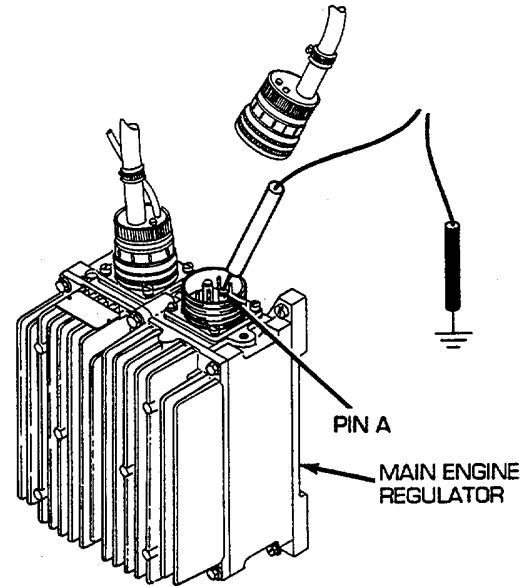
Do steps A through S.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Open air inlet doors (TM 9-2350-256-10). Disconnect batteries to master relay, voltage regulator, slave receptacle, and engine disconnect wiring harness from engine regulator. Place red lead of multimeter on pin A of wire 2/62 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step B. If voltage is not present, troubleshoot battery circuit.
- B Reconnect batteries to master relay, voltage regulator, slave receptacle, and engine disconnect wiring harness to engine regulator. Disconnect APU and engine armature relays to voltage regulator wiring harness from engine regulator. Place red lead of multimeter on pin D of wire 1/61 and black lead to ground. Turn MASTER switch on, start engine and close generator output switch and check for voltage. Turn engine and MASTER switch OFF, and open generator output switch. If voltage is present, go to step I. If voltage is not present, go to step C.
- C Place red lead of multimeter on pin A of wire 2/62 and black lead to ground. Turn MASTER switch on, start engine, open generator cutout switch and check for voltage. Turn engine and MASTER switch OFF, and close generator cutout switch. If voltage is not present, replace engine regulator (see paragraph 6-6). If voltage is present, go to step D.



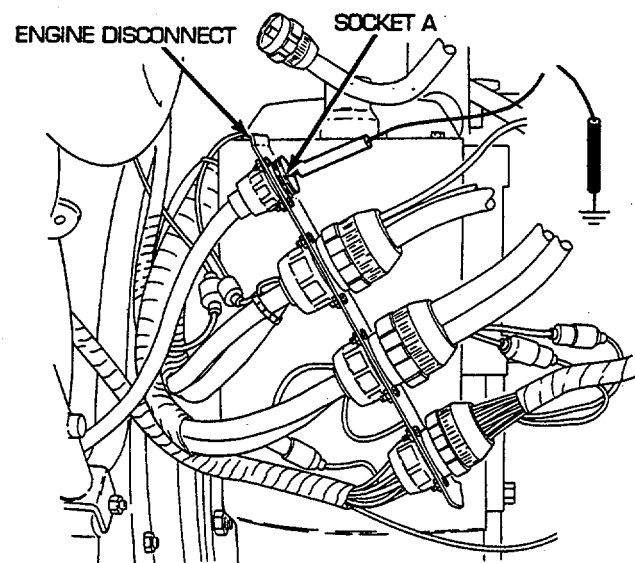
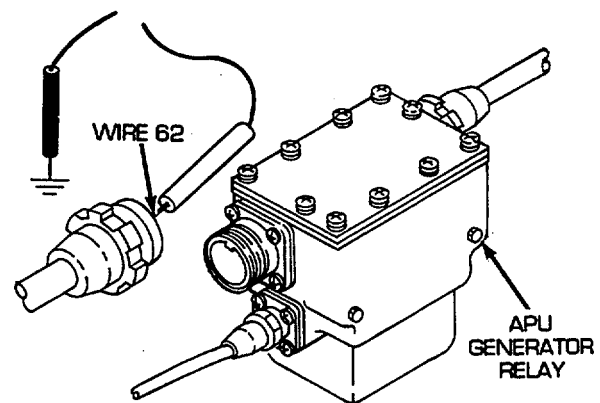
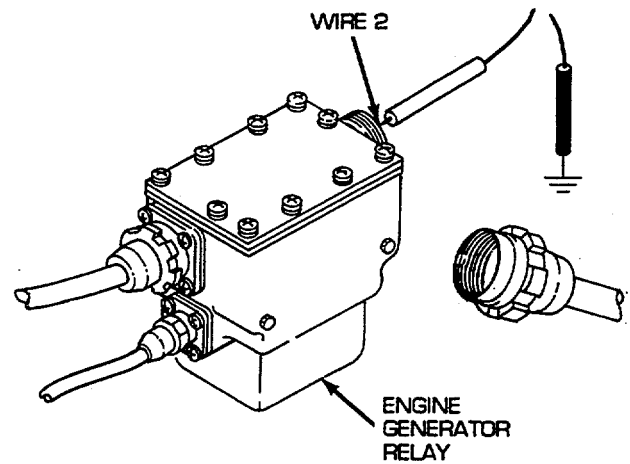
2-19 ELECTRICAL TROUBLESHOOTING-Continued

ENGINE GENERATOR (SINGLE VOLTAGE SYSTEM)-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

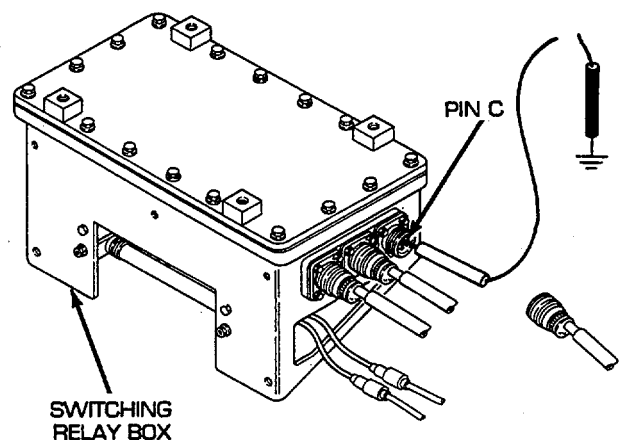
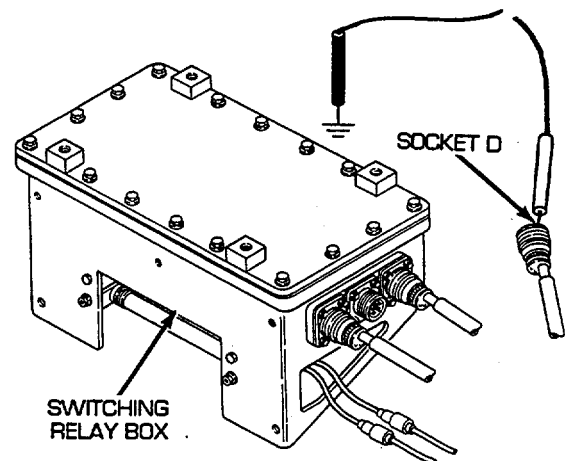
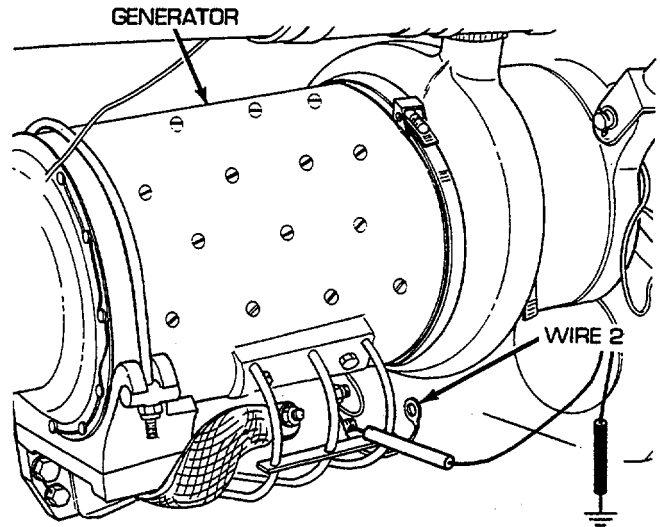
- D Reconnect APU and engine generator relays to voltage regulator wiring harness to engine regulator. Disconnect wire 2 of APU and engine generator relays to voltage regulator wiring harness from engine generator relay. Place red lead of multimeter on terminal of engine generator relay and black lead to ground. Turn MASTER switch on, start engine, open generator cutout switch and check for voltage. Turn engine and MASTER switch OFF, and close generator cutout switch. If voltage is present, go to step F. If voltage is not present, go to step E.
- E Reconnect wire 2 of APU and engine generator relays to voltage regulator wiring harness to engine generator relay. Disconnect wire 62/2 of APU and engine generator relays to voltage regulator wiring harness from APU generator relay. Place red lead of multimeter on wire 62/2 and black lead to ground. Turn MASTER and APU generator switches on, and check for voltage. Turn APU generator and MASTER switches OFF. If voltage is not present, repair/replace wire 62/2 of APU and engine generator relays to voltage regulator wiring harness. If voltage is present, replace master relay (see paragraph 6-2).
- F Reconnect wire 2 of engine disconnect to engine generator relay lead to engine generator relay. Remove engine deck (see paragraph 9-51). Disconnect generator power lead assembly from engine disconnect. Place red lead of multimeter in socket A of wire 2 and black lead to ground. Turn MASTER switch on, start engine, open generator cutout switch and check for voltage. Turn engine and MASTER switch OFF, and close generator cutout switch. If voltage is present, repair/replace wire 2 of engine disconnect to engine generator relay lead (see paragraph 6-62). If voltage is not present, go to step G.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- G Reconnect generator power lead assembly to engine disconnect. Remove powerplant (see paragraph 3-1). Disconnect wire 2 of generator power lead assembly from generator. Place red lead of multimeter on terminal of generator and black lead to ground. Turn MASTER switch on, start engine, open generator cutout switch and check for voltage. Turn engine and MASTER switch OFF, and close generator cutout switch. If voltage is present, repair/replace generator power lead assembly (see paragraph 6-36). If voltage is not present, replace engine generator (see paragraph 6-1).
- H Reconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness to switching relay box. Disconnect APU and engine generator relays to voltage regulator wiring harness from switching relay box. Place red lead of multimeter in socket D of wire 1-61 and black lead to ground. Turn MASTER switch on, start engine, open generator cutout switch and check for voltage. Turn engine and MASTER switch OFF and close generator cutout switch. If voltage is present, go to step I. If voltage is not present, repair/replace wire 1-61 of APU and engine generator relays to voltage regulator wiring harness (see paragraph 6-81).
- I Reconnect APU and engine generator relays to voltage regulator wiring harness to engine regulator. Disconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness from switching relay box. Place red lead of multimeter on pin C of wire 1 and black lead to ground. Turn MASTER switch on, start engine, close generator cutout switch and check for voltage. Turn engine and MASTER switch OFF and open generator cutout switch. If voltage is present, go to step J. If voltage is not present, replace switching relay box (see paragraph 6-13).



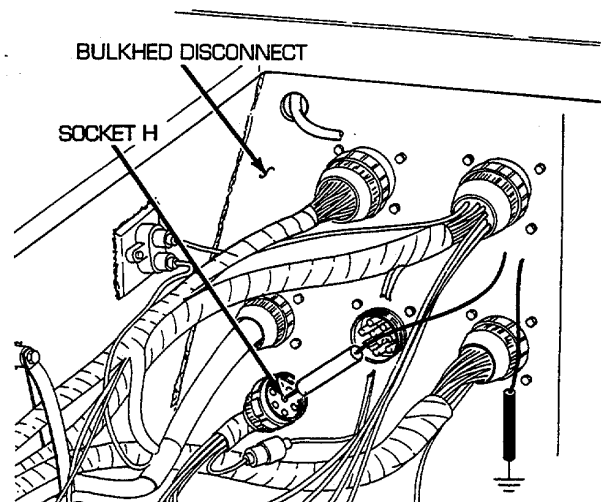
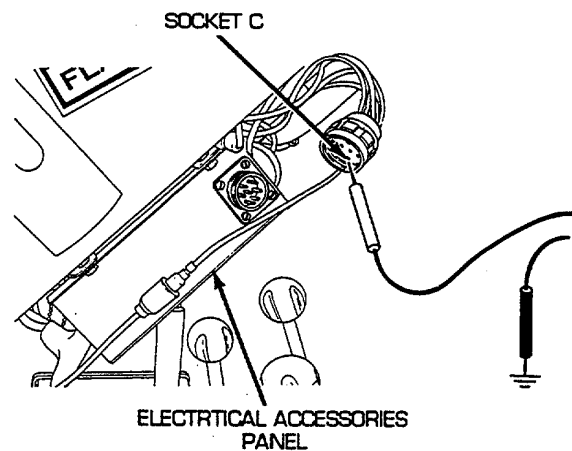
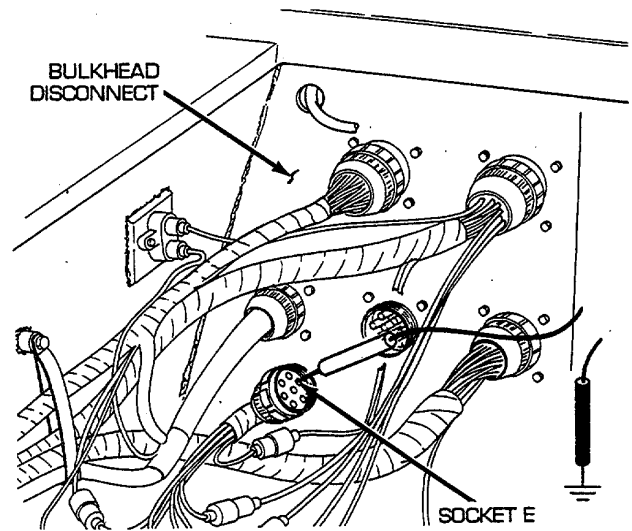
2-19 ELECTRICAL TROUBLESHOOTING-Continued

ENGINE GENERATOR (SINGLE VOLTAGE SYSTEM)-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

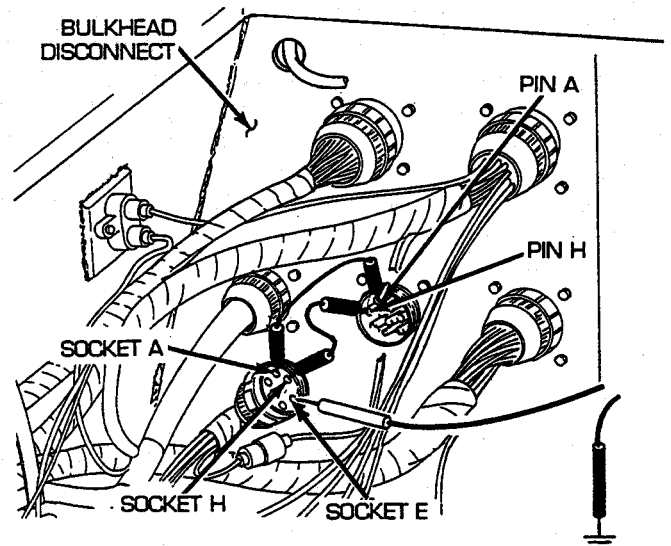
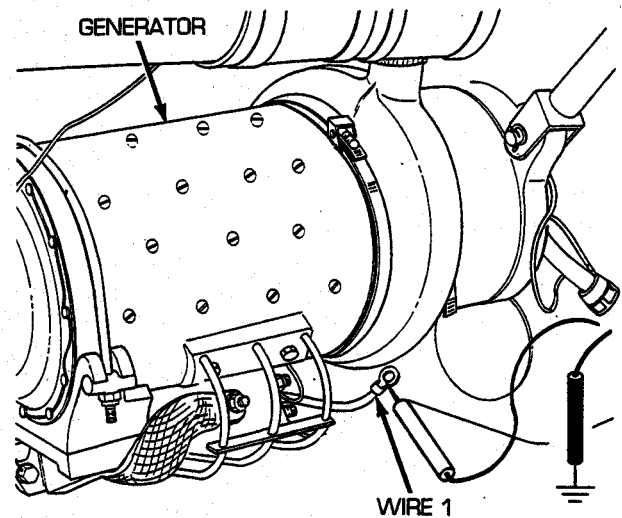
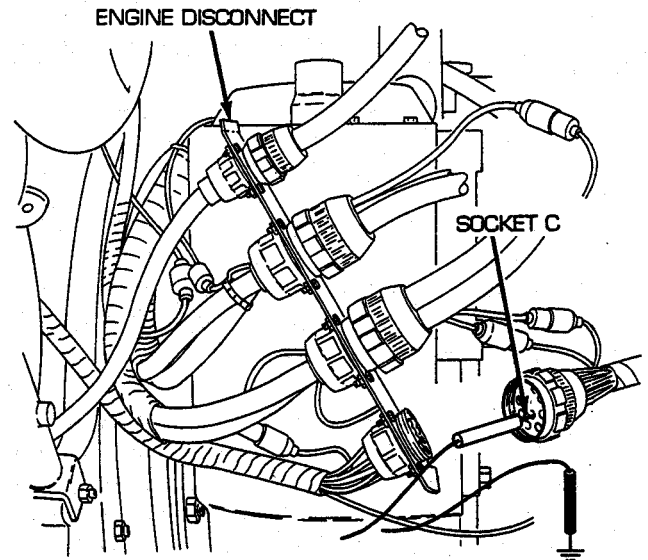
- J Reconnect bulkhead to engine bracket and rear fuel tank transmitter to switching relay box. Disconnect bulkhead to engine wiring harness and starter relay wiring harness from bulkhead. Place red lead of multimeter in socket E of wire 1 and black lead to ground. Turn MASTER switch on, start engine, close generator cutout switch and check for voltage. If voltage is present, go to step K. If voltage is not present, go to step O.
- K Reconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness to switching relay box. Disconnect electrical accessories panel wiring harness from electrical accessories panel. Place red lead of multimeter in socket C of wire 1 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step L. If voltage is not present, repair/replace wire 1 of electrical accessories panel wiring harness.
- L Place red lead of multimeter in socket H of wire 1 and black lead to ground. Turn MASTER switch on, start engine, close generator cutout switch, and check for voltage. If voltage is present, go to step M. If voltage is not present, go to step R.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- M** Reconnect bulkhead to engine wiring harness and starter relay wiring harness to bulkhead disconnect. Remove engine deck (see paragraph 9-51). Disconnect engine wiring harness from engine disconnect. Place red lead of multimeter on socket C of wire 1 and black lead to ground. Turn MASTER switch on, start engine, open generator cutout switch and check for voltage. Turn engine and MASTER switch OFF and close generator cutout switch. If voltage is present, repair/replace engine wiring harness. If voltage is not present, go to step N.
- N** Reconnect engine wiring harness to engine disconnect. Disconnect wire 1 of engine wiring harness from field terminal A of generator. Place red lead of multimeter on wire 1 and black lead to ground. Turn MASTER switch on, start engine, open generator cutout switch, and check for voltage. If voltage is present, replace generator assembly. If voltage is not present, repair/replace wire 1 of engine wiring harness.
- O** Reconnect electrical accessories panel wiring harness to electrical accessories panel. Disconnect bulkhead to engine harness and starter relay wiring harness from bulkhead disconnect. Place jumper wires from pin H to socket H and pin A to socket A. Place red lead of multimeter in socket E of wire 1 and black lead to ground. Turn MASTER switch on, start engine, open generator cutout switch and check for voltage. Turn engine and MASTER switch OFF and close generator cutout switch. If voltage is present, go to step P. If voltage is not present, go to step Q.



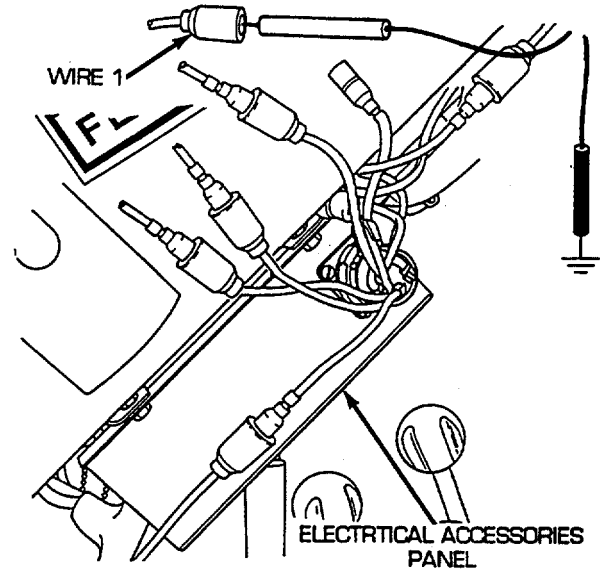
2-19 ELECTRICAL TROUBLESHOOTING-Continued

ENGINE GENERATOR (SINGLE VOLTAGE SYSTEM)-Continued

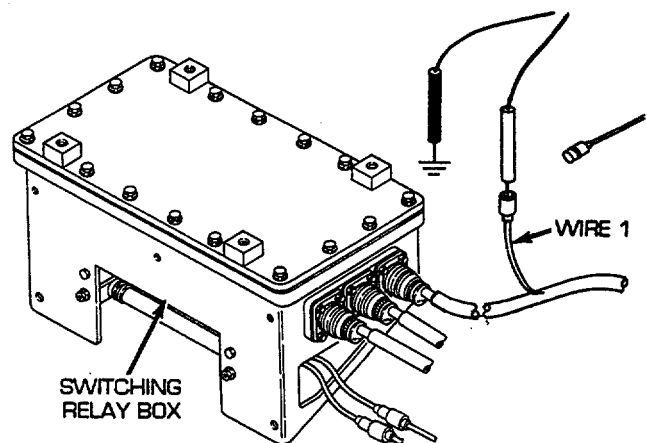
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

P Reconnect bulkhead to engine wiring harness and starter relay harness to bulkhead disconnect. Disconnect wire 1 (from socket C) of electrical accessories panel wiring harness from switch panel to neutral safety to bulkhead wiring harness. Place red lead of multimeter on male connector of wire 1 and black lead to ground. Turn MASTER switch on, start engine, and check for voltage. Turn engine and MASTER switch OFF. If voltage is present, repair/replace wire 1 of electrical accessories panel wiring harness (see paragraph 6-47). If voltage is not present, repair/replace wire 1 of switch panel to neutral safety to bulkhead wiring harness (see paragraph 6-54).



Q Reconnect bulkhead to engine wiring harness and starter relay wiring harness to bulkhead disconnect. Disconnect wire 1 of bulkhead to engine bracket and rear fuel tank transmitter wiring harness (from switching relay box) from bulkhead to engine wiring harness and starter relay wiring harness. Place red lead of multimeter on male connector of wire 1. Turn MASTER switch on, start engine, open generator cutout switch and check for voltage. Turn engine and MASTER switch OFF and close generator cutout switch. If voltage is present, repair/replace wire 1 of bulkhead to engine wiring harness and starter relay wiring harness (see paragraph 6-72). If voltage is not present, repair/replace wire 1 of bulkhead to engine bracket and rear fuel tank transmitter wiring harness (see paragraph 6-74).

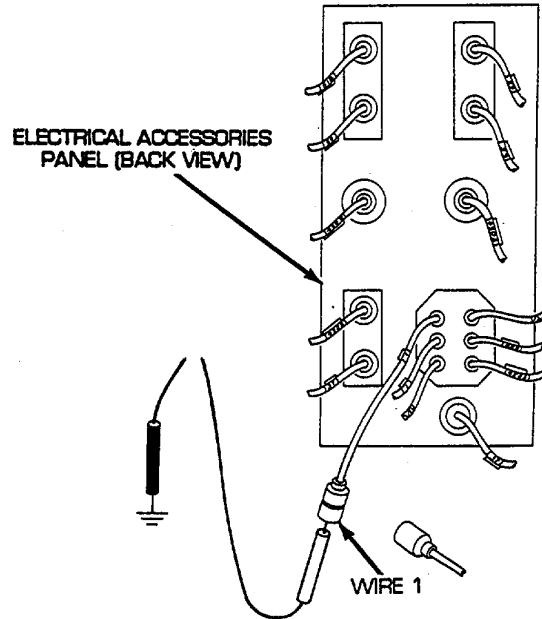
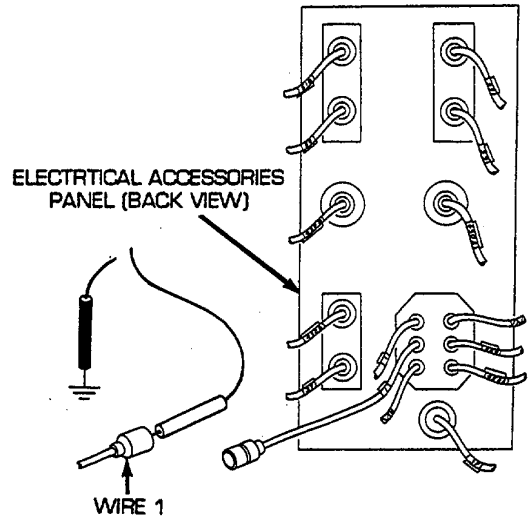
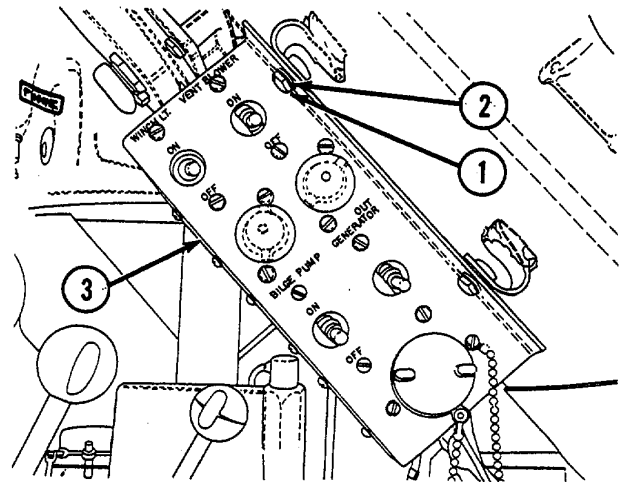


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

R Remove four screws (1) and four lockwashers (2), and release electrical accessories panel (3). Ground panel. Reconnect electrical accessories panel wiring harness to electrical accessories panel. Disconnect wire 1 (from socket D) from generator cutout switch. Place red lead of multimeter in wire 1 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step S. If voltage is not present repair/replace wire 1 of bilge pump main power wiring harness from socket D (see paragraph 6-84).

S Reconnect wire 1 (from socket D) to generator cutout switch. Disconnect wire 1 (from socket C) from generator cutout switch. Place red lead of multimeter on generator cutout switch and black lead to ground. Turn MASTER switch on, open generator cutout switch and check for voltage. Turn MASTER switch OFF, close generator cutout switch. If voltage is present, repair/replace wire 1 of bilge pump main power wiring harness (see paragraph 6-84). If voltage is not present, replace generator cutout switch (see paragraph 6-9).

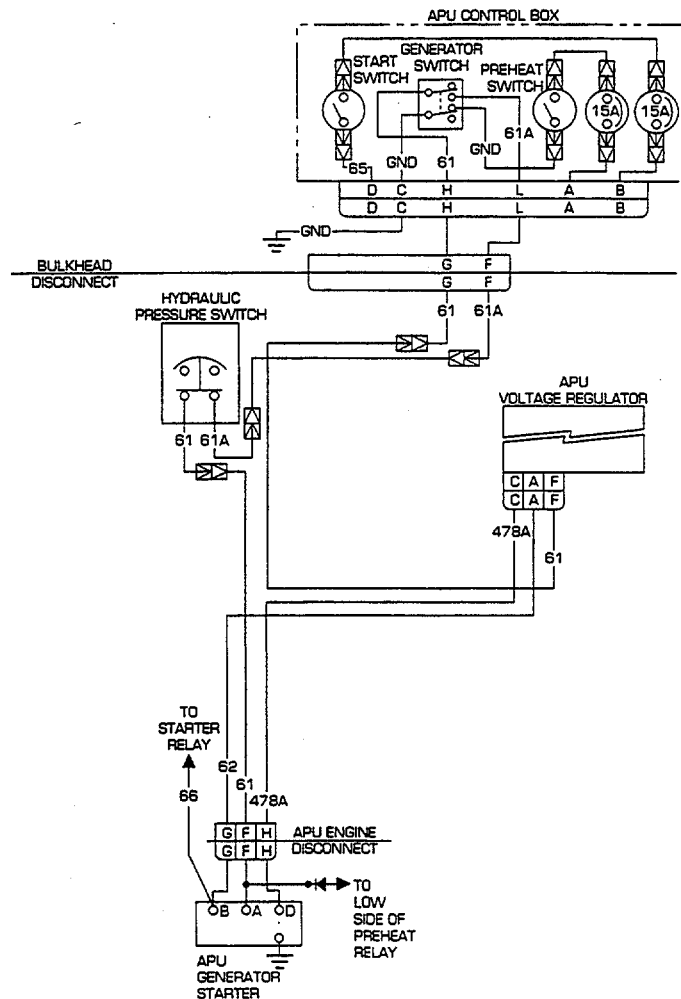
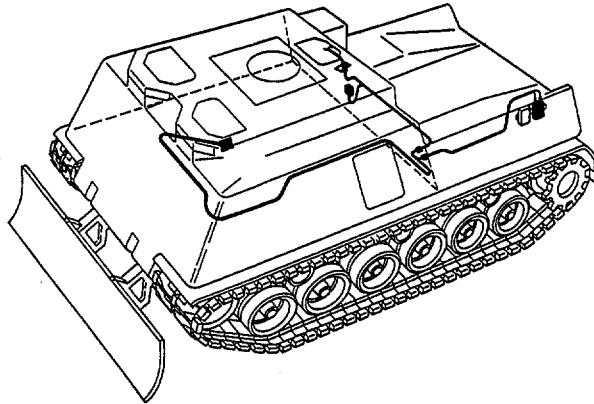


2-19 ELECTRICAL TROUBLESHOOTING-Continued

APU GENERATOR SYSTEM (DUAL VOLTAGE)

SYMPTOM

Generator indicator reads in yellow or lower red region with APU engine running and APU generator switch on. Do steps A through S.



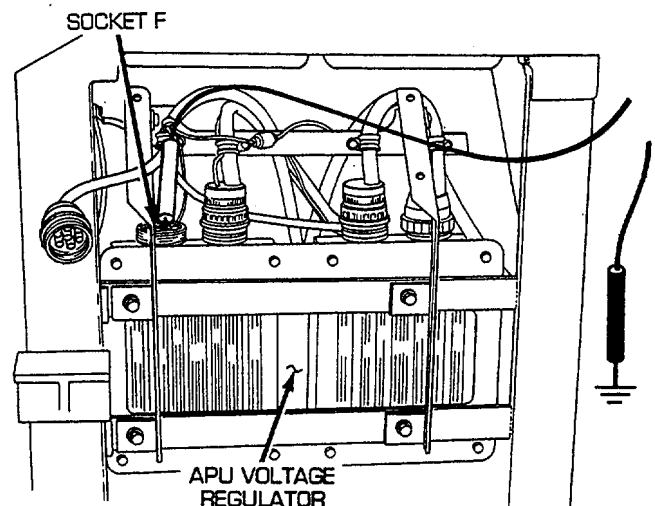
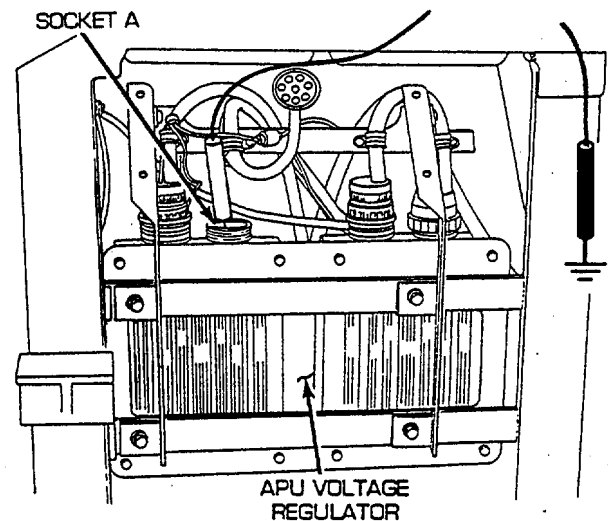
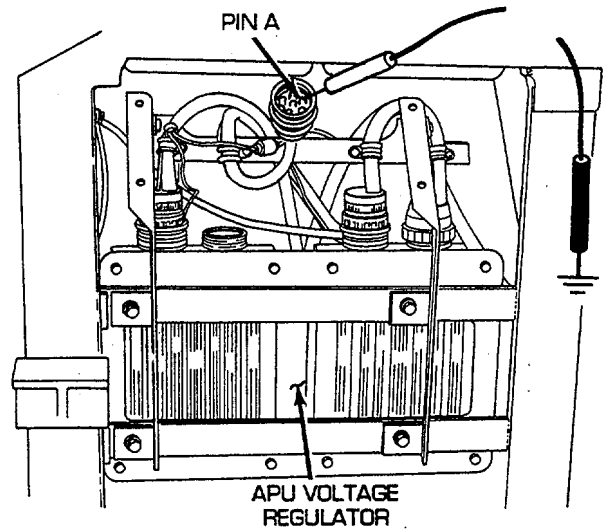
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

A Open air inlet doors (TM 9-2350-256-10). Disconnect batteries to master relay voltage regulator and slave receptacle wiring harness from APU regulator. Place red lead of multimeter on pin A of wire 62 and black lead to ground. Turn MASTER and APU GEN switches on and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is not present, troubleshoot battery circuit. If voltage is present, go to step B.

B Place red lead of multimeter in socket A of wire 62 and black lead to ground. Turn MASTER and APU GEN switches ON, start APU, and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is present, go to step C. If voltage is not present, replace APU voltage regulator (see paragraph 6-5).

C Reconnect batteries to master relay, voltage regulator, and slave receptacle wiring harness to APU regulator. Disconnect bulkhead to APU to master relay and rigger's lights wiring harness from APU regulator. Place red lead of multimeter in socket F of wire 61 and black lead to ground. Turn MASTER and APU GEN switches ON, start APU, and check for voltage. Turn APU and MASTER and APU GEN switches OFF. If voltage is present, go to step D. If voltage is not present, replace APU voltage regulator (see paragraph 6-5).



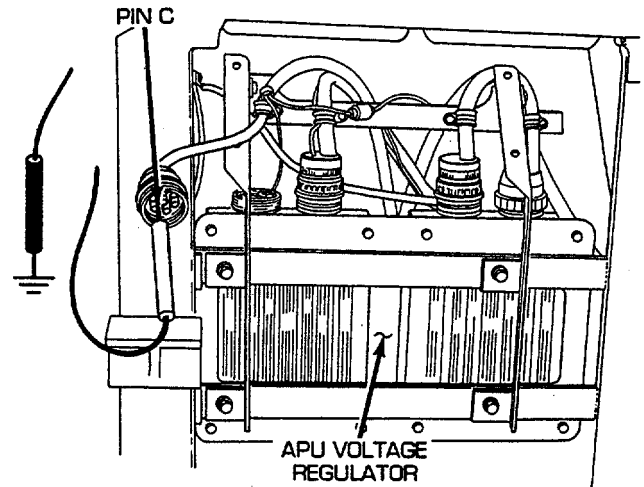
2-19 ELECTRICAL TROUBLESHOOTING--Continued

APU GENERATOR SYSTEM (DUAL VOLTAGE)--Continued

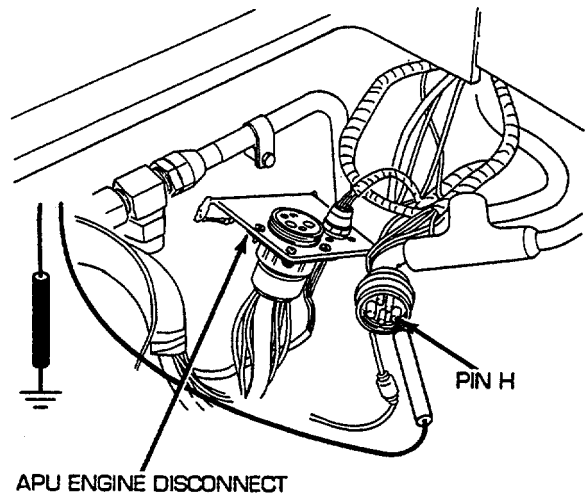
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

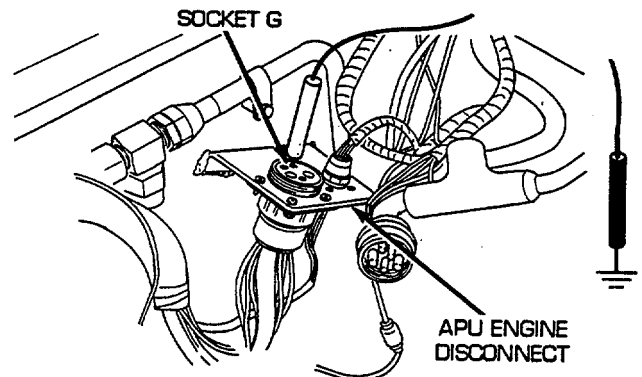
D Place red lead of multimeter on pin C of wire 478A and black lead to ground. Turn MASTER and APU GEN switches ON, start APU, and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is not present, replace APU regulator (see paragraph 6-5). If voltage is present, go to step E.



E Reconnect bulkhead to APU, master relay, and rigger's lights wiring harness to APU regulator. Open center-front air inlet doors (TM 9-2350-256-10). Disconnect bulkhead to APU, master relay, and rigger's lights wiring harness from APU engine disconnect. Place red lead of multimeter on pin H of wire 478A. Turn MASTER and APU GEN switches ON and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is not present, repair/replace wire 478A of bulkhead to APU, master relay, and rigger's lights wiring harness (see paragraph 6-75). If voltage is present, go to step F.



F Reconnect bulkhead to APU, master relay, and rigger's lights wiring harness to APU regulator. Disconnect bulkhead to APU, master relay, and rigger's lights wiring harness from APU engine disconnect. Place red lead of multimeter in socket G of wire 62 and black lead to ground. Turn MASTER and APU GEN switches ON and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is present, go to step G. If voltage is not present, repair/replace wire 62 of bulkhead to APU, master relay, and rigger's lights wiring harness (see paragraph 6-75).

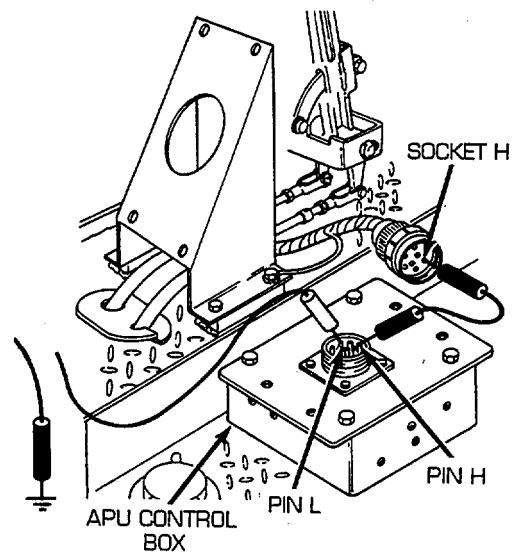
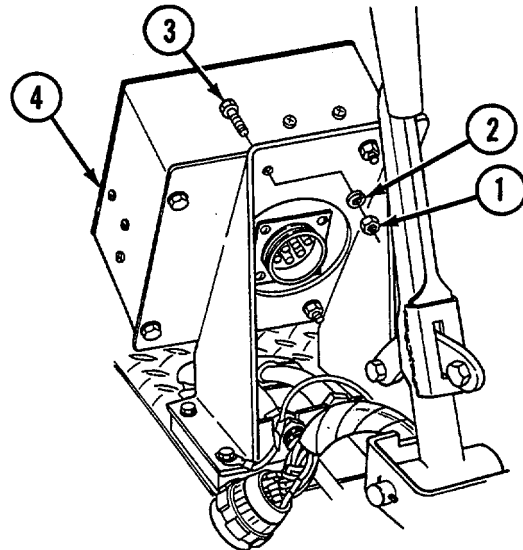
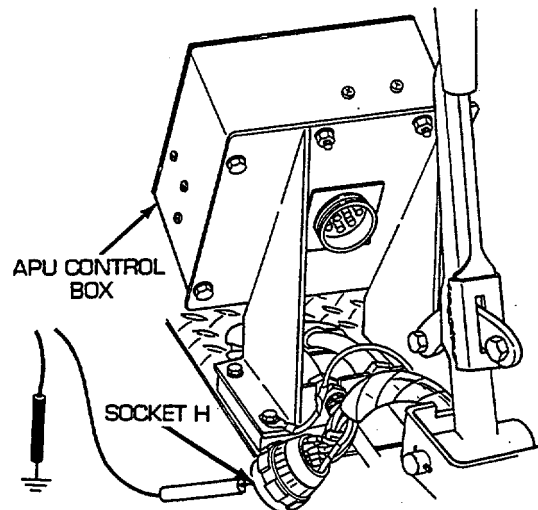


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

G Reconnect bulkhead to APU to master relay and rigger's lights wiring harness to APU regulator. Disconnect APU control box to foot dimmer switch and bulkhead wiring harness from APU control box. Place red lead of multimeter in socket H of wire 61 and black lead to ground. Turn MASTER and APU GEN switches ON and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is present, go to step H. If voltage is not present, go to step M.

H Remove four nuts (1), four lockwashers (2), four screws (3), and release APU control box (4) from mounting brackets. Place a jumper from pin H to socket H. Place red lead of multimeter on pin L of wire 61A and black lead to ground. Turn MASTER and APU GEN switches on and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is present, go to step K. If voltage is not present, go to step I.



2-19 ELECTRICAL TROUBLESHOOTING--Continued

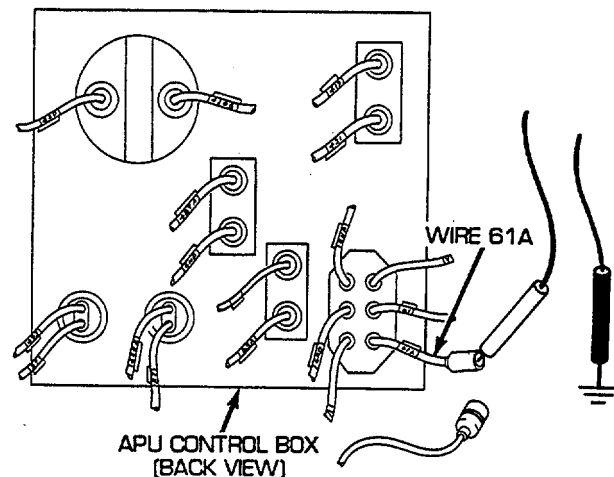
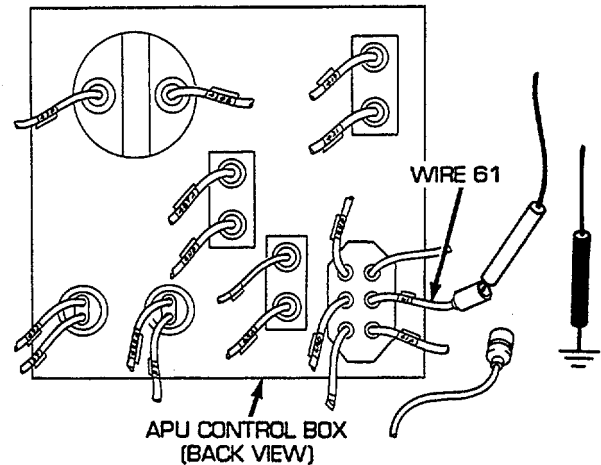
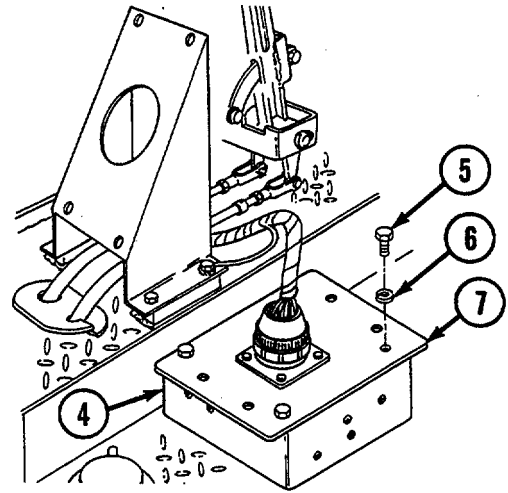
APU GENERATOR SYSTEM (DUAL VOLTAGE)--Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

I Reconnect APU control box to foot dimmer switch and bulkhead wiring harness to APU control box. Remove four screws (5) and four lockwashers (6), and release rear panel (7) from APU control box (4). Disconnect wire 61 of APU control box wiring harness from APU GEN switch. Place red lead of multimeter in wire 61 and black lead to ground. Turn MASTER and APU GEN switch ON and check for voltage. If voltage is present, go to step J. If voltage is not present, repair/replace APU control box wiring harness (see paragraph 13-7).

J Reconnect wire 61 to APU GEN switch. Disconnect wire 61A from APU GEN switch. Place red lead of multimeter on APU GEN switch terminal and black lead to ground. Turn MASTER and APU GEN switches ON, and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is present, repair/replace wire 61A of APU control box wiring harness (see paragraph 13-7). If voltage is not present, replace APU GEN switch (see paragraph 13-7).

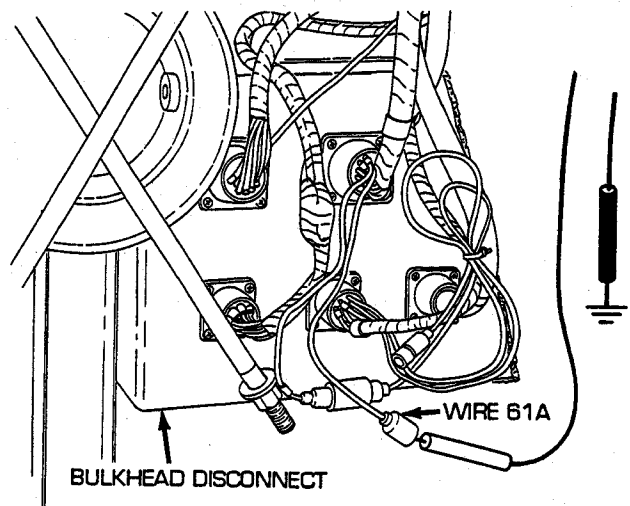
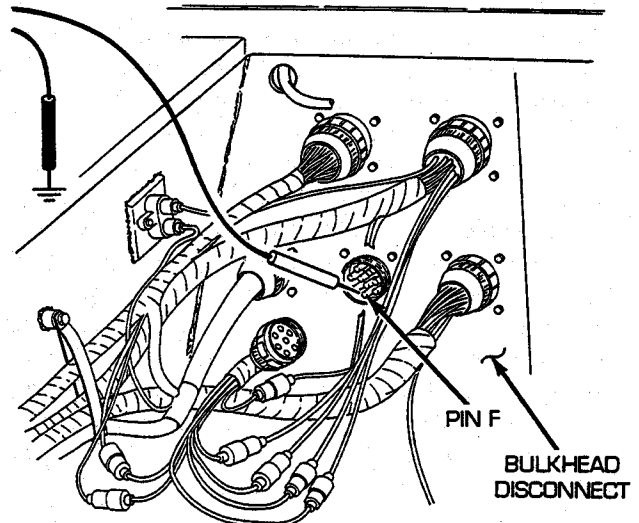
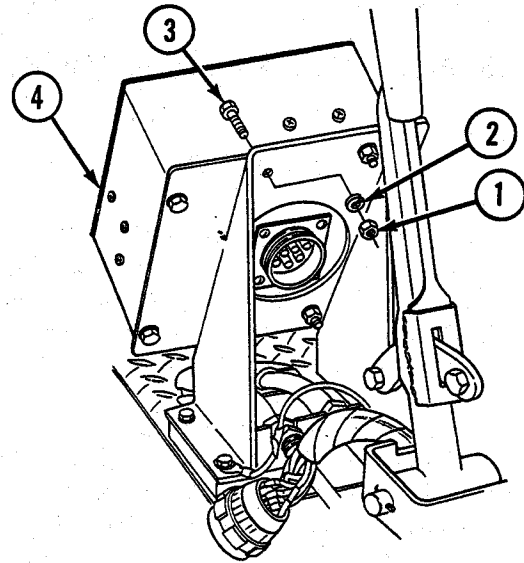


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

K Reconnect wire 61A to APU GEN switch. Install APU control box (4), four screws (3), four lockwashers (2), and four nuts (1) to mounting bracket. Install APU control box to foot dimmer switch and bulkhead wiring harness to APU control box. Open air inlet doors. Disconnect bulkhead to engine wiring harness and starter relay wiring harness from bulkhead disconnect. Place red lead of multimeter on pin F of wire 61A and black lead to ground. Turn MASTER and APU GEN switches ON and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is present, go to step P. If voltage is not present, go to step L.

L Reconnect bulkhead to engine wiring harness and starter relay wiring harness to bulkhead. Disconnect wire 61A of switch panel to neutral safety switch to bulkhead wiring harness from APU control box to foot dimmer switch and bulkhead wiring harness. Place red lead of multimeter in female connector wire 61A and black lead to ground. Turn MASTER and APU GEN switches ON and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is present, replace wire 61A of switch panel to neutral safety switch to bulkhead wiring harness (see paragraph 6-54). If voltage is not present, repair/replace wire 61A of APU control box to foot dimmer switch and bulkhead wiring harness (see paragraph 6-79).



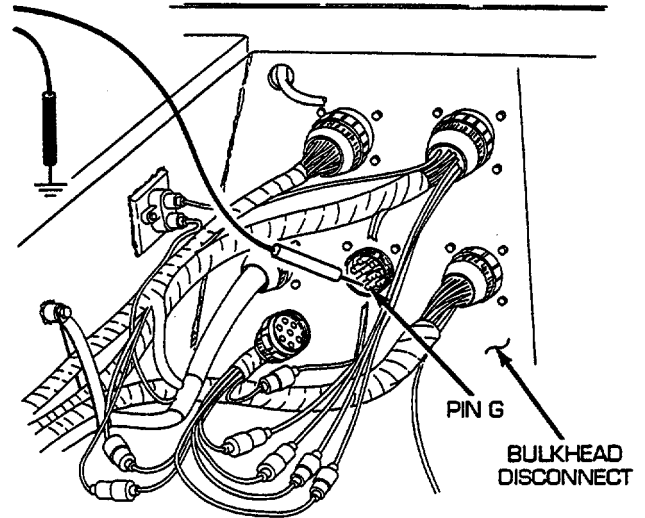
2-19 ELECTRICAL TROUBLESHOOTING--Continued

APU GENERATOR SYSTEM (DUAL VOLTAGE)--Continued

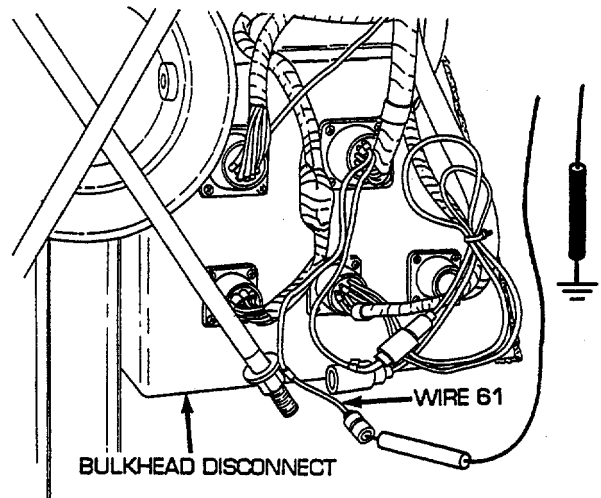
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

M Reconnect APU control box to foot dimmer switch and bulkhead wiring harness to APU control box. Disconnect bulkhead to engine harness and starter relay wiring harness from bulkhead disconnect. Place red lead of multimeter in socket G of wire 61 and black lead to ground. Turn MASTER and APU GEN switches ON and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is present, go to step N. If voltage is not present, go step O.



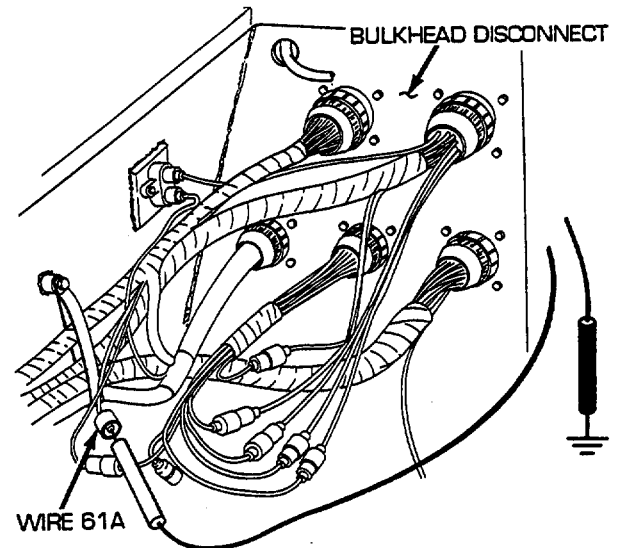
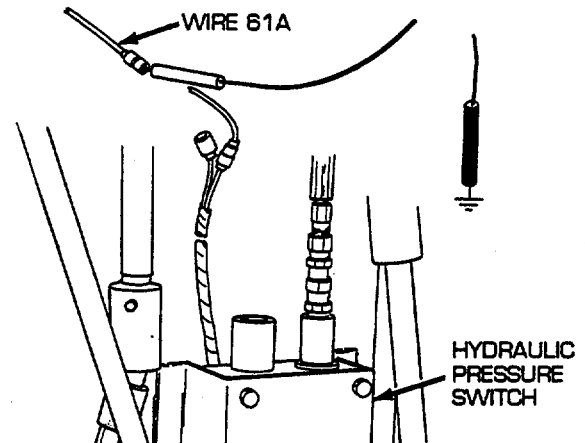
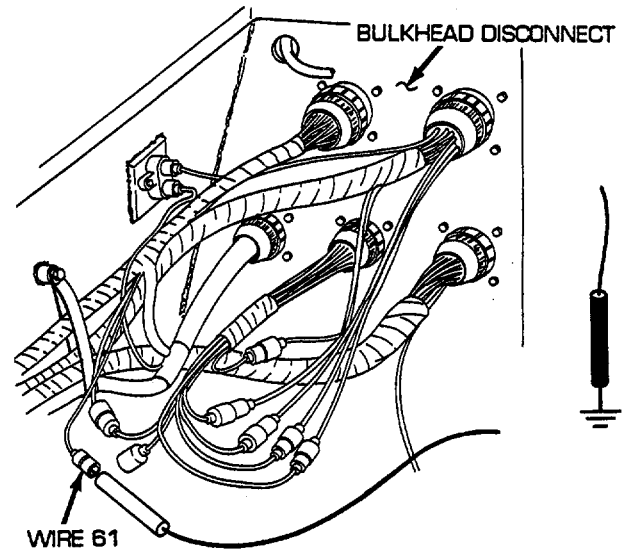
N Reconnect bulkhead to engine wiring harness and starter relay wiring harness to bulkhead. Disconnect wire 61 of switch panel to neutral safety to bulkhead wiring harness from APU control box to foot dimmer switch and bulkhead wiring harness. Place red lead of multimeter in female connector of wire 61 and black lead to ground. Turn MASTER and APU GEN switches ON and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is present, repair/replace wire 61 of APU control box to foot dimmer switch and bulkhead wiring harness (see paragraph 6-79). If voltage is not present, repair/replace wire 61 of switch panel to neutral safety to bulkhead wiring harness (see paragraph 6-54).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- O Reconnect bulkhead to engine wiring harness and starter relay wiring harness to bulkhead disconnect. Disconnect wire 61 of bulkhead to engine wiring harness and starter relay wiring harness from wire 61 of bulkhead to APU, master relay, and rigger's lights wiring harness. Place red lead of multimeter on male connector wire 61 and black lead to ground. Turn MASTER and APU GEN switches ON and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is present, repair/replace wire 61 of bulkhead to engine wiring harness and starter relay wiring harness to bulkhead disconnect (see paragraph 6-72). If voltage is not present, repair/replace wire 61 of bulkhead to APU, master relay, and rigger's lights wiring harness (see paragraph 6-75).
- P Reconnect bulkhead to engine wiring harness and starter relay wiring harness to bulkhead disconnect. Disconnect wire 61A from hydraulic pressure switch. Place red lead of multimeter in wire 61A and black lead to ground. Turn MASTER, APU pressure and APU GEN switches ON and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is present, go to step R. If voltage is not present, go to step Q.
- Q Reconnect wire 61A to hydraulic pressure switch. Disconnect wire 61A of bulkhead to engine wiring harness and starter relay wiring harness from bulkhead to APU, master relay, and rigger's lights wiring harness. Place red lead of multimeter on male connector of wire 61A and black lead to ground. Turn MASTER and APU GEN switches ON and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is present, repair/replace wire 61A of bulkhead to APU, master relay, and rigger's lights wiring harness (see paragraph 6-75). If voltage is not present, notify Direct Support Maintenance.



2-19 ELECTRICAL TROUBLESHOOTING-Continued

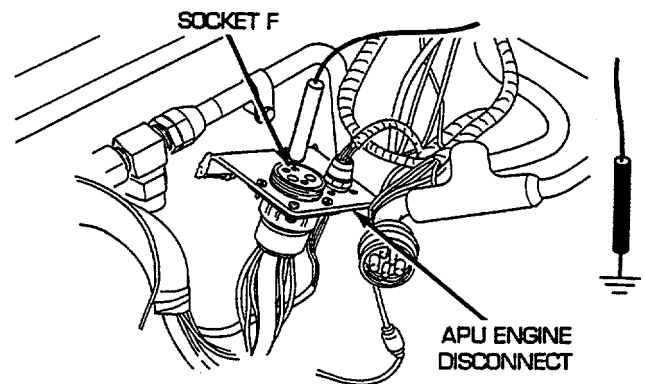
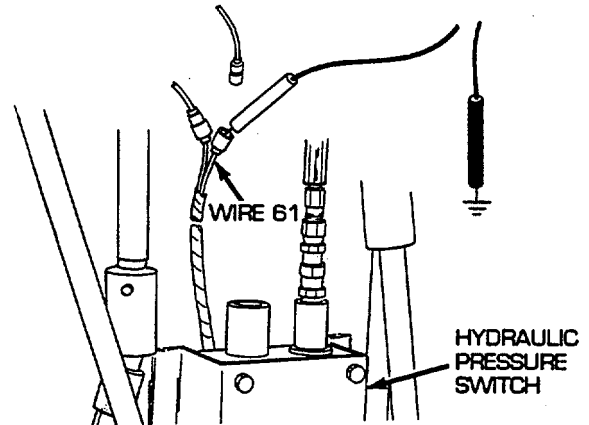
APU GENERATOR SYSTEM (DUAL VOLTAGE)--Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- R Reconnect wire 61A to hydraulic pressure switch. Disconnect wire 61 from hydraulic pressure switch. Place red lead of multimeter on wire 61 and black lead to ground. Turn MASTER and APU GEN switches ON and check for voltage. If voltage is present, go to step S. If voltage is not present, replace hydraulic pressure switch (see paragraph 13-1).

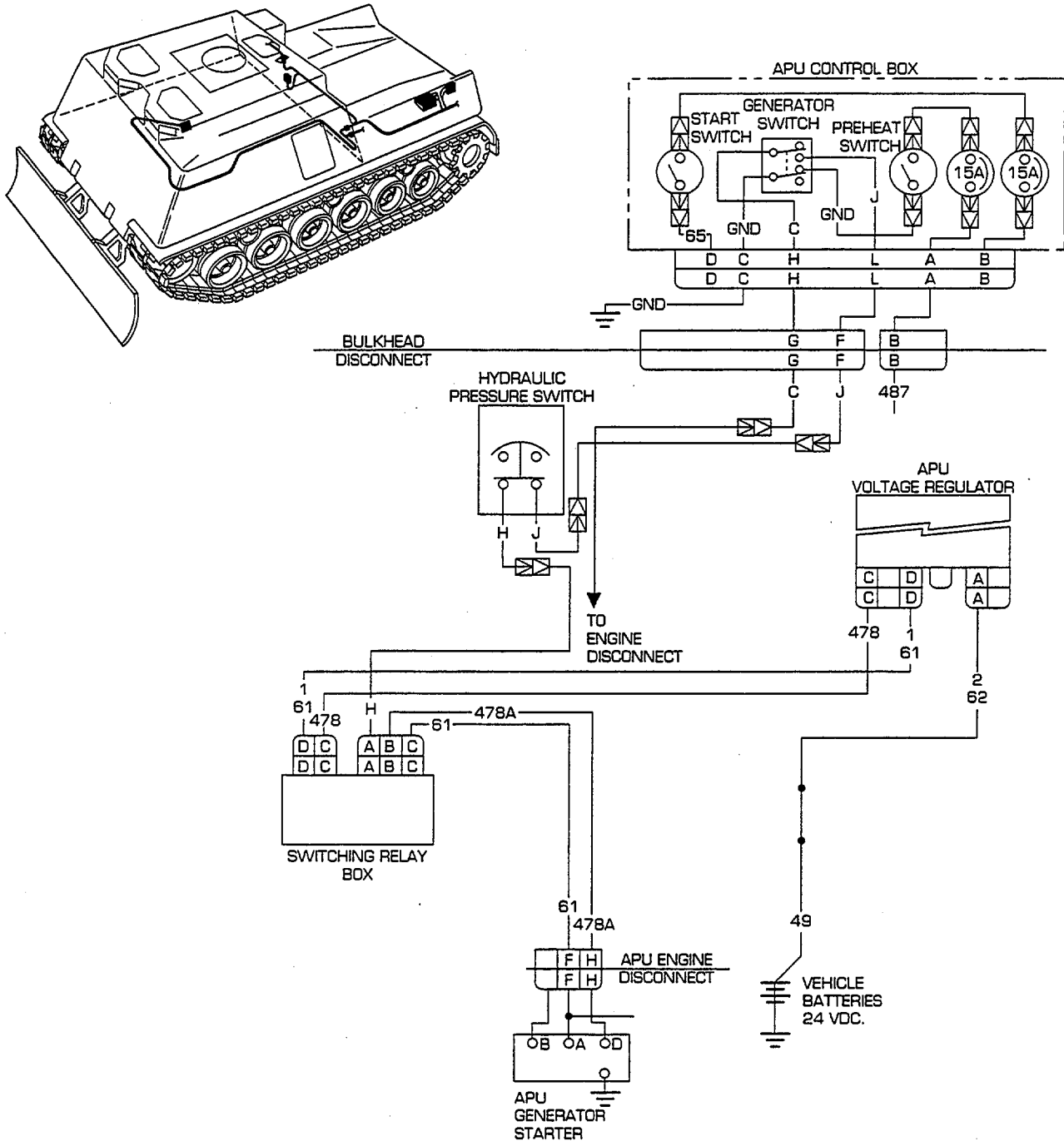
- S Disconnect bulkhead to APU, master relay, and rigger's lights wiring harness from APU engine disconnect. Place red lead of multimeter in socket F of wire 61 and black lead to ground. Turn MASTER, APU pressure and APU GEN switches ON and check for voltage. Turn MASTER, APU pressure and APU GEN switches OFF. If voltage is present, notify Direct Support Maintenance. If voltage is not present, repair/replace wire 61 of bulkhead to APU, master relay, and rigger's lights wiring harness (see paragraph 6-75).



APU GENERATOR SYSTEM (SINGLE VOLTAGE)

SYMPTOM

Generator indicator reads in yellow or lower red region with APU engine running and APU generator switch on. Do steps A through W.



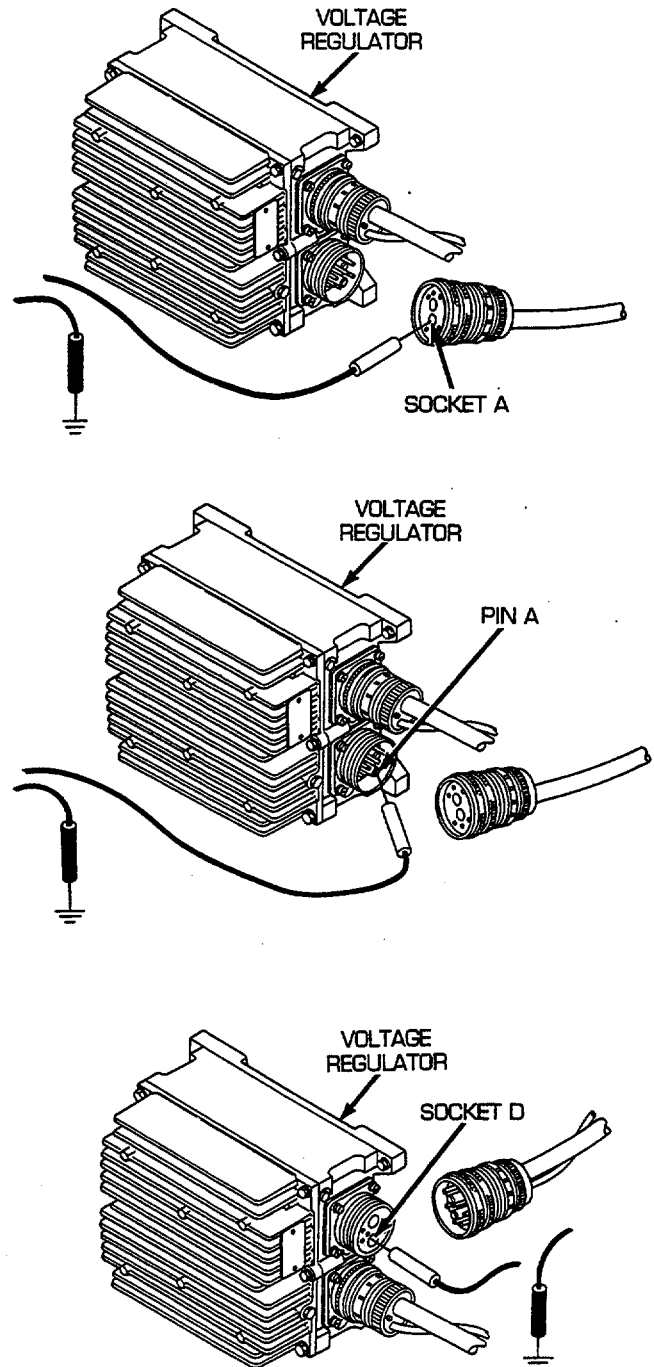
2-19 ELECTRICAL TROUBLESHOOTING-Continued

APU GENERATOR SYSTEM (SINGLE VOLTAGE)-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Open air inlet doors (TM 9-2350-25610). Disconnect batteries to master relay, voltage regulator, and slave receptacle wiring harness from regulator. Place red lead of multimeter on socket A of wire 62/2 and black lead to ground. Turn MASTER and APU GEN switches on and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is not present, troubleshoot battery circuit. If voltage is present, go to step B.
- B Place red lead of multimeter in pin A of wire 62/2 and black lead to ground. Turn MASTER and APU GEN switches ON, start APU, and check for voltage. Turn APU and MASTER and APU GEN switches OFF. If voltage is present, go to step C. If voltage is not present, replace voltage regulator (see paragraph 6-5).
- C Reconnect batteries to master relay, voltage regulator, and slave receptacle wiring harness to regulator. Disconnect bulkhead to APU, master relay, and rigger's lights wiring harness from regulator. Place red lead of multimeter in socket D of wire 61/1 and black lead to ground. Turn MASTER and APU GEN switches ON, start APU, and check for voltage. Turn APU and MASTER and APU GEN switches OFF. If voltage is present, go to step D. If voltage is not present, replace voltage regulator (see paragraph 6-5).



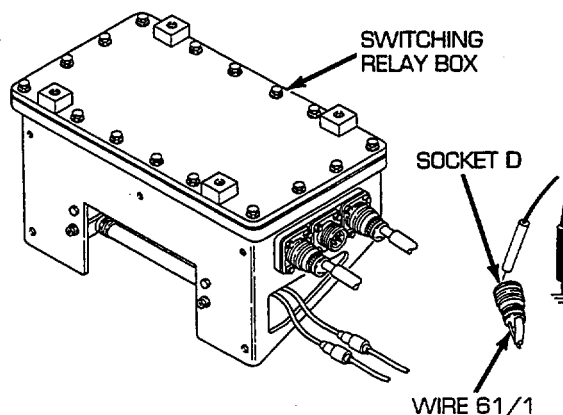
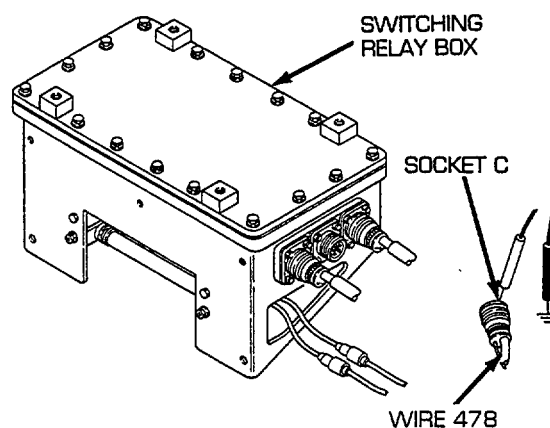
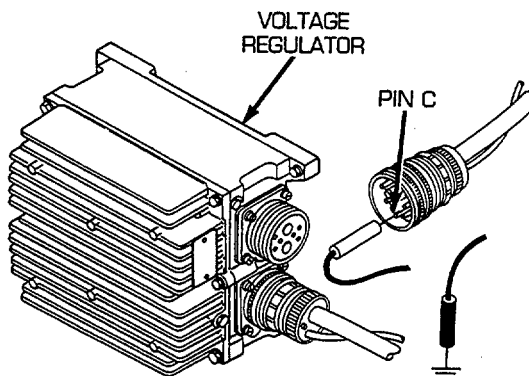
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

D Place red lead of multimeter on pin C of wire 478 and black lead to ground. Turn MASTER and APU GEN switches ON, start APU, and check for voltage. Turn APU and MASTER and APU GEN switches OFF. If voltage is not present, replace regulator (see paragraph 6-5). If voltage is present, go to step E.

E Reconnect bulkhead to APU, master relay, and rigger's lights wiring harness to regulator. Disconnect engine generator relays to voltage regulator wiring harness at switching relay box. Place red lead of multimeter in socket C of wire 478. Turn MASTER and APU GEN switches ON, start APU, and check for voltage. Turn APU and MASTER and APU GEN switches OFF. If voltage is not present, repair/replace wire 478 of engine generator relays to voltage regulator wiring harness (see paragraph 6-81). If voltage is present, go to step F.

F Place red lead of multimeter in socket D of wire 61/1. Turn MASTER and APU GEN switches ON, start APU, and check for voltage. Turn APU and MASTER and APU GEN switches OFF. If voltage is not present, repair/replace wire 61/1 of engine generator relays to voltage regulator wiring harness (see paragraph 6-81). If voltage is present, go to step G.



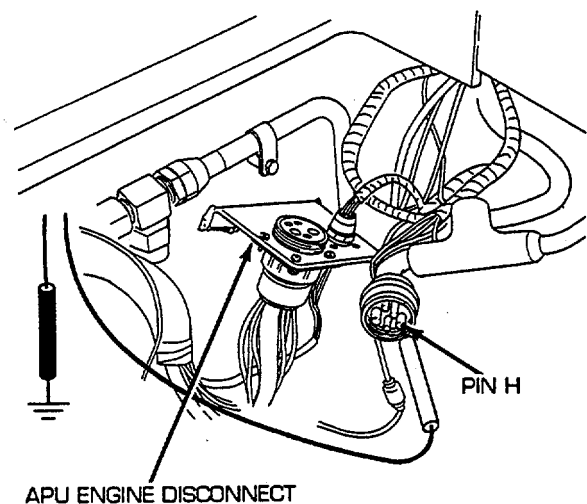
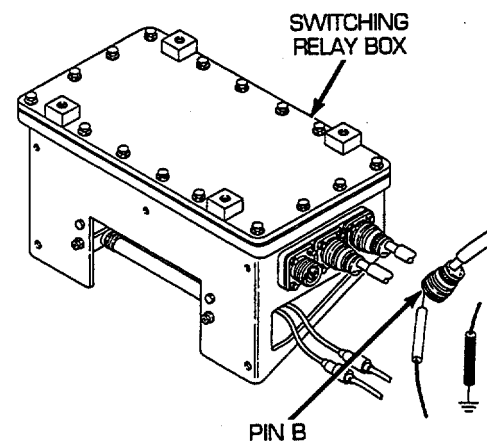
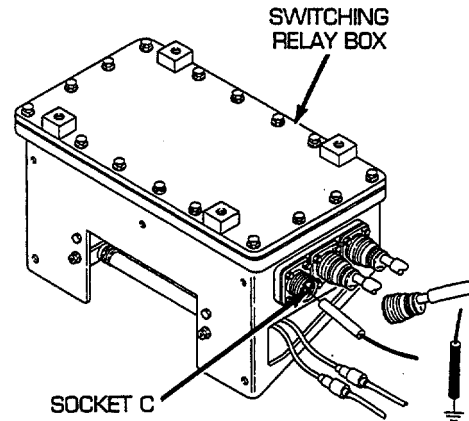
2-19 ELECTRICAL TROUBLESHOOTING--Continued

APU GENERATOR SYSTEM (SINGLE VOLTAGE)-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- G Reconnect engine generator relays to voltage regulator wiring harness to switching box relay. Disconnect bulkhead to APU, master relay, and rigger's lights wiring harness at switching box relay. Place red lead of multimeter in socket C of wire 61. Turn MASTER and APU GEN switches ON, start APU, and check for voltage. Turn APU and MASTER and APU GEN switches OFF. If voltage is not present, replace switching relay box (see paragraph 6-13). If voltage is present, go to step H.
- H Place red lead on pin B of wire 478A. Turn MASTER and APU GEN switches ON, start APU, and check for voltage. Turn APU and MASTER and APU GEN switches OFF. If voltage is not present, replace switching relay box (see paragraph 6-13). If voltage is present, go to step I.
- I Reconnect bulkhead to APU, master relay, and rigger's lights wiring harness to switching box relay. Open front grille doors (TM 9-2350-256-10). Disconnect bulkhead to APU, master relay, and rigger's lights wiring harness from APU engine disconnect. Place red lead of multimeter on pin H of wire 478A. Turn MASTER and APU GEN switches ON and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is not present, repair/replace wire 478A of bulkhead to APU, master relay, and rigger's lights wiring harness (see paragraph 6-76). If voltage is present, go to step J.

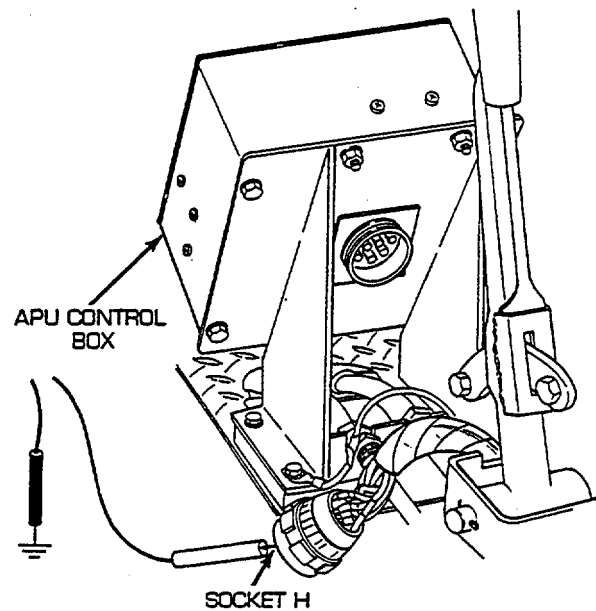
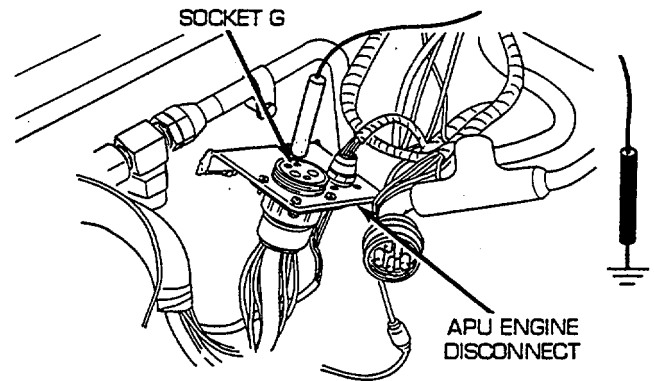


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

J Place red lead of multimeter in socket G of wire 62 and black lead to ground. Turn MASTER and APU GEN switches ON and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is present, go to step K. If voltage is not present, repair/replace wire 62 of bulkhead to APU, master relay, and rigger's lights wiring harness (see paragraph 6-76).

K Reconnect bulkhead to APU, master relay, and rigger's lights wiring harness to APU engine disconnect. Disconnect APU control box to foot dimmer switch and bulkhead wiring harness from APU control box. Place red lead of multimeter in socket H of wire C and black lead to ground. Turn MASTER and APU GEN switches ON and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is present, go to step L. If voltage is not present, go to step Q.



2-19 ELECTRICAL TROUBLESHOOTING--Continued

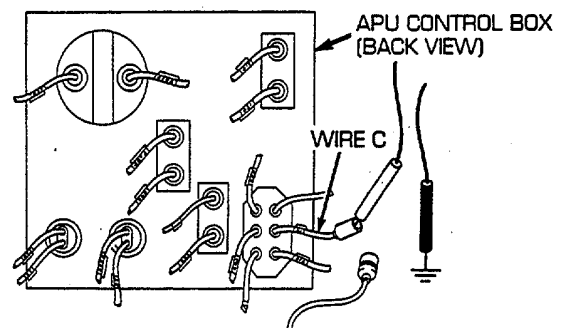
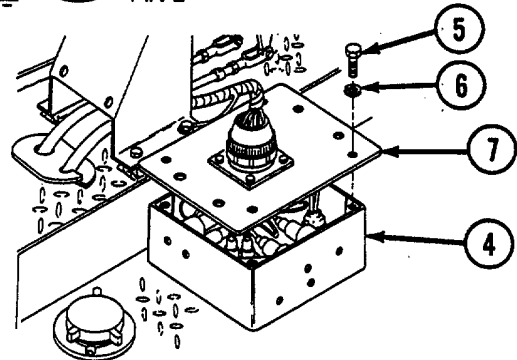
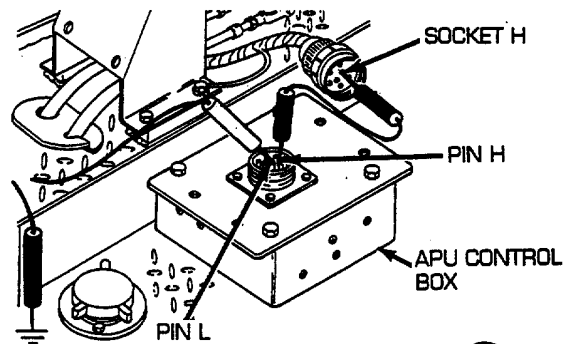
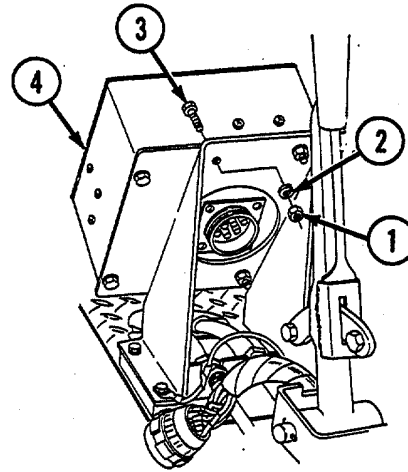
APU GENERATOR SYSTEM (SINGLE VOLTAGE)--Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

L Remove four nuts (1), four lockwashers (2), four screws (3), and APU control box (4) from mounting brackets. Place a jumper from pin H to socket H. Place red lead of multimeter on pin L of wire J and black lead to ground. Turn MASTER and APU GEN switches on and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is present, go to step O. If voltage is not present, go to step P.

M Reconnect APU control box to foot dimmer switch and bulkhead wiring harness to APU control box. Remove four screws (5), four lockwashers (6), and rear panel (7) from APU control box (4). Disconnect wire C of APU control box wiring harness from APU GEN switch. Place red lead of multimeter in wire C and black lead to ground. Turn MASTER and APU GEN switches on and check for voltage. If voltage is present, go to step N. If voltage is not present, repair/replace wire C of APU control box wiring harness (see paragraph 13-7).

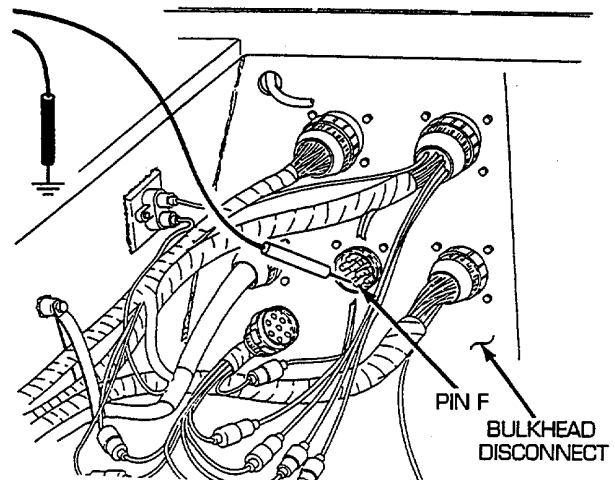
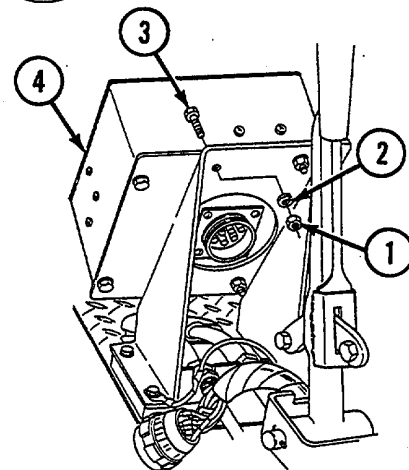
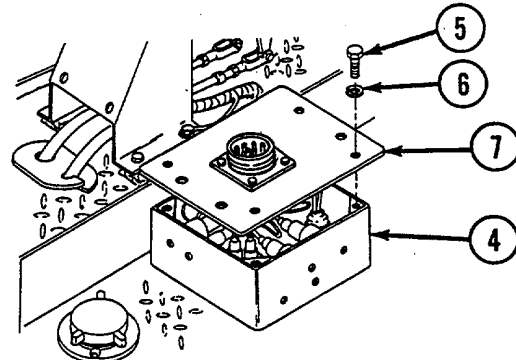
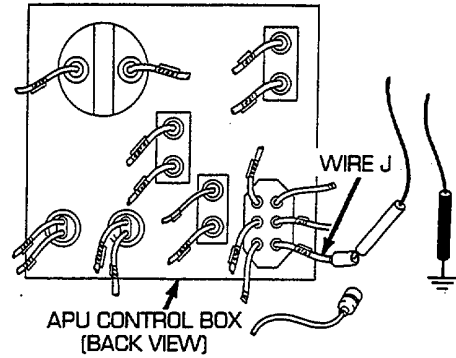


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

N Reconnect wire C to APU GEN switch. Disconnect wire J from APU GEN switch. Place red lead of multimeter on APU GEN switch terminal and black lead to ground. Turn MASTER and APU GEN switches ON, and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is present, repair/replace wire J of APU control box wiring harness (see paragraph 13-7). If voltage is not present, replace APU GEN switch (see paragraph 13-7). Reconnect wire J to APU GEN switch. Install rear panel (7), four lockwashers (6), and four screws (5) to APU control box (4). Disconnect APU control box to foot dimmer switch and bulkhead wiring harness at APU control box.

O Install APU control box (4), four screws (3), four lockwashers (2), and four nuts (1). Reconnect APU control box to foot dimmer switch and bulkhead wiring harness to APU control box. Disconnect bulkhead to engine wiring harness and starter relay wiring harness from bulkhead disconnect. Place red lead of multimeter on pin F of wire J and black lead to ground. Turn MASTER and APU GEN switches ON and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is present, go to step U. If voltage is not present, go to step P.



2-19 ELECTRICAL TROUBLESHOOTING-Continued

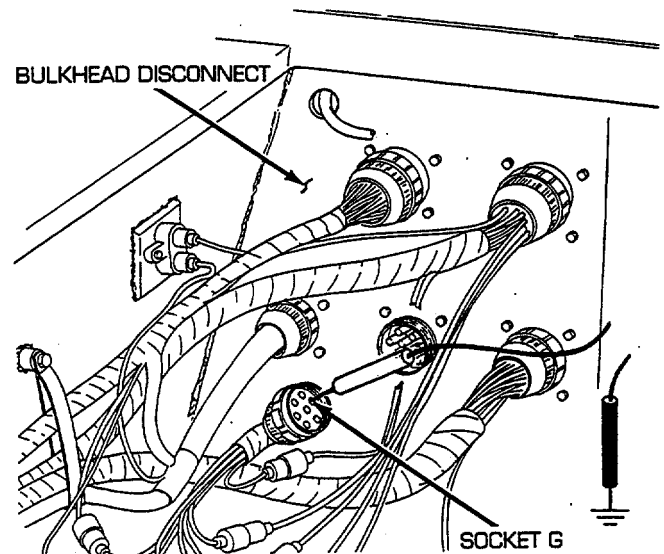
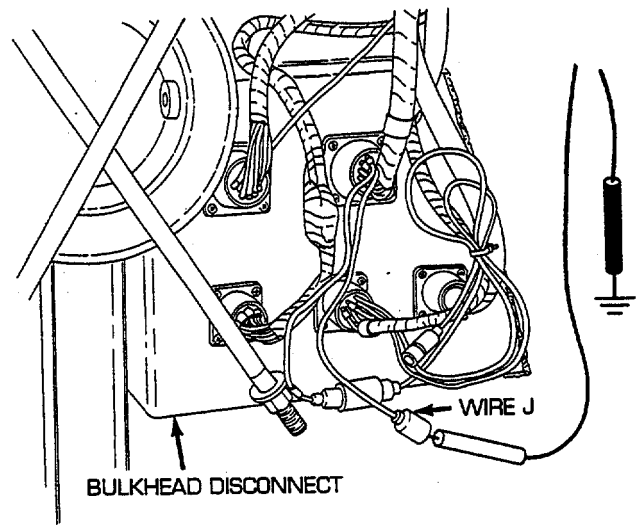
APU GENERATOR SYSTEM (SINGLE VOLTAGE)-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

P Reconnect bulkhead to engine wiring harness and starter relay wiring harness to bulkhead. Disconnect wire J of switch panel to neutral safety switch to bulkhead wiring harness from APU control box to foot dimmer switch and bulkhead wiring harness. Place red lead of multimeter in female connector wire J and black lead to ground. Turn MASTER and APU GEN switches ON and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is present, replace wire J of switch panel to neutral safety to bulkhead wiring harness (see paragraph 6-54). If voltage is not present, repair/replace wire J of APU control box to foot dimmer switch and bulkhead wiring harness (see paragraph 6-80).

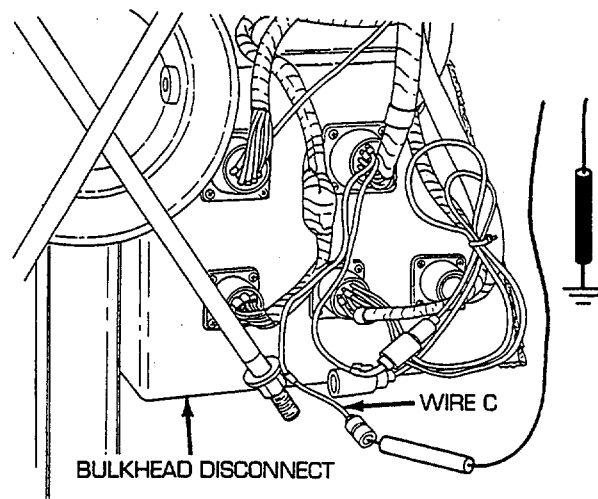
Q Reconnect APU control box to foot dimmer switch and bulkhead wiring harness to APU control box. Disconnect bulkhead to engine harness and starter relay wiring harness from bulkhead disconnect. Place red lead of multimeter in socket G of wire C and black lead to ground. Turn MASTER and APU GEN switches ON and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is present, go to step R. If voltage is not present, go step S.



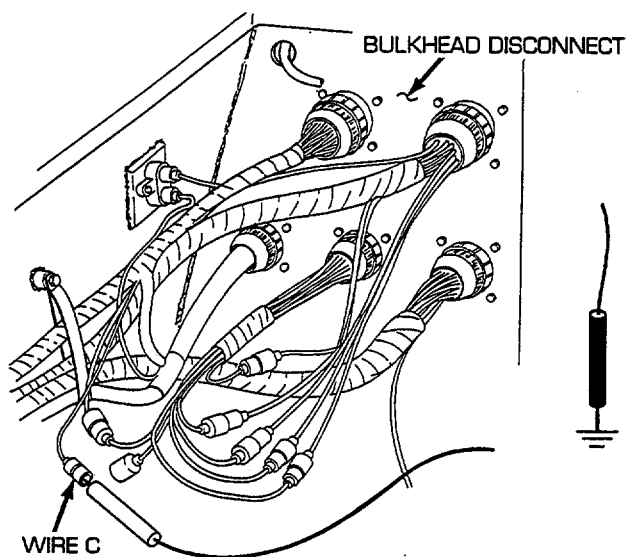
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

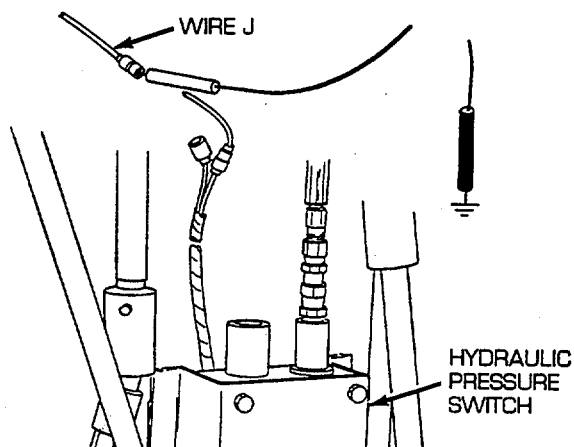
- R Reconnect bulkhead to engine wiring harness and starter relay wiring harness to bulkhead. Disconnect wire C of switch panel to neutral safety to bulkhead wiring harness from APU control box to foot dimmer switch and bulkhead wiring harness. Place red lead of multimeter in female connector of wire C and black lead to ground. Turn MASTER and APU GEN switches ON and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is present, repair/replace wire C of APU control box to foot dimmer switch and bulkhead wiring harness (see paragraph 6-80). If voltage is not present, repair/replace wire C of switch panel to neutral safety to bulkhead wiring harness (see paragraph 6-54).



- S Reconnect bulkhead to engine wiring harness and starter relay wiring harness to bulkhead disconnect. Disconnect wire C of bulkhead to engine wiring harness and starter relay wiring harness from wire C of bulkhead to APU, master relay, and rigger's lights wiring harness. Place red lead of multimeter on male connector wire C and black lead to ground. Turn MASTER and APU GEN switches ON and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is present, repair/replace wire C of bulkhead to engine wiring harness and starter relay wiring harness to bulkhead disconnect (see paragraph 6-72). If voltage is not present, repair/replace wire C of bulkhead to APU, master relay, and rigger's lights wiring harness (see paragraph 6-76).



- T Reconnect bulkhead to engine wiring harness and starter relay wiring harness to bulkhead disconnect. Disconnect wire J from hydraulic pressure switch. Place red lead of multimeter in wire J and black lead to ground. Turn MASTER, APU pressure and APU GEN switches ON and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is present, go to step V. If voltage is not present, go to step U.



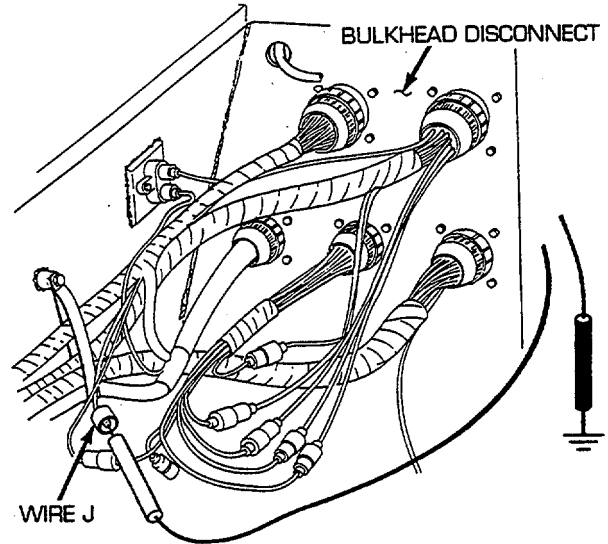
2-19 ELECTRICAL TROUBLESHOOTING-Continued

APU GENERATOR SYSTEM (SINGLE VOLTAGE)-Continued

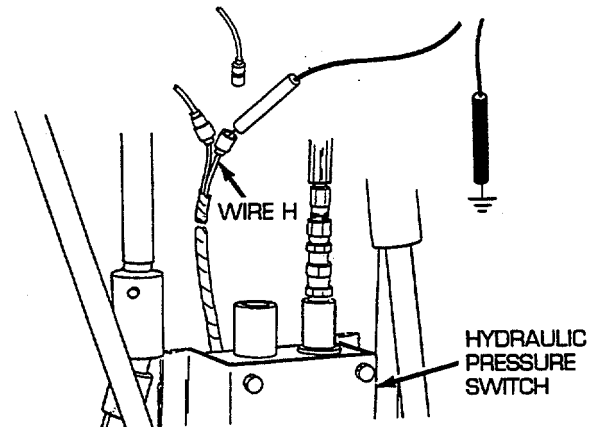
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

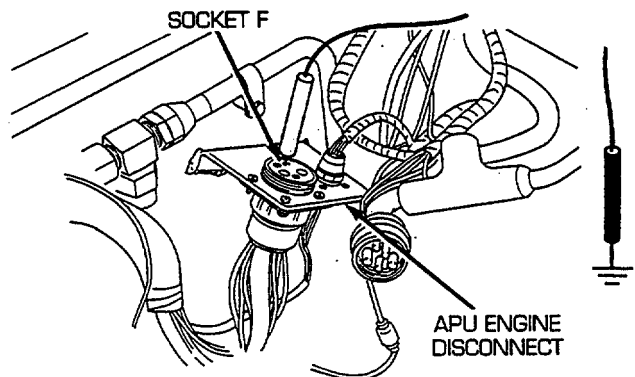
U Reconnect wire J to hydraulic pressure switch. Disconnect wire J of bulkhead to engine wiring harness and starter relay wiring harness from bulkhead to APU, master relay, and rigger's lights wiring harness. Place red lead of multimeter on male connector of wire J and black lead to ground. Turn MASTER and APU GEN switches ON and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is present, repair/replace wire J of bulkhead to APU, master relay, and rigger's lights wiring harness (see paragraph 6-76). If voltage is not present, repair/replace wire J of bulkhead to engine wiring harness and starter relay wiring harness to bulkhead disconnect (see paragraph 6-72).



V Reconnect wire J to hydraulic pressure switch. Disconnect wire H from hydraulic pressure switch. Place red lead of multimeter on wire H and black lead to ground. Turn MASTER and APU GEN switches ON and check for voltage. If voltage is present, go to step W. If voltage is not present, replace hydraulic pressure switch (see paragraph 13-1).



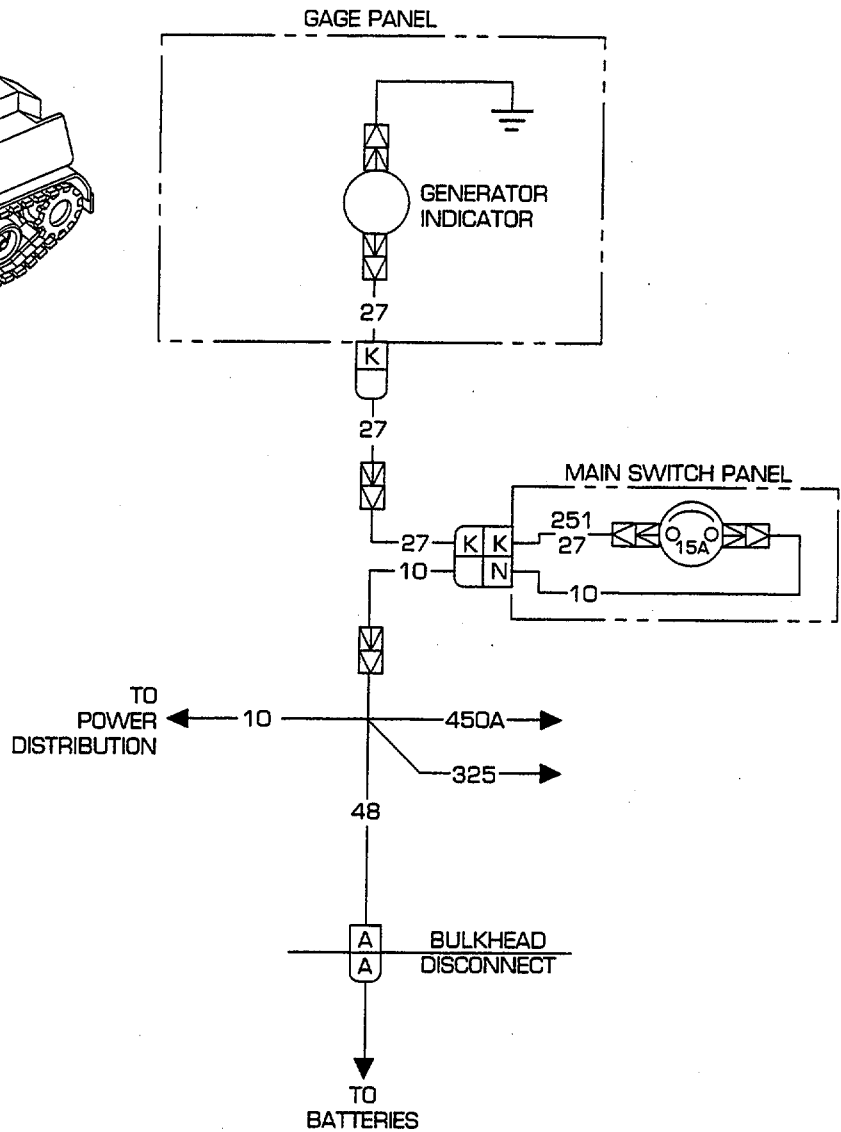
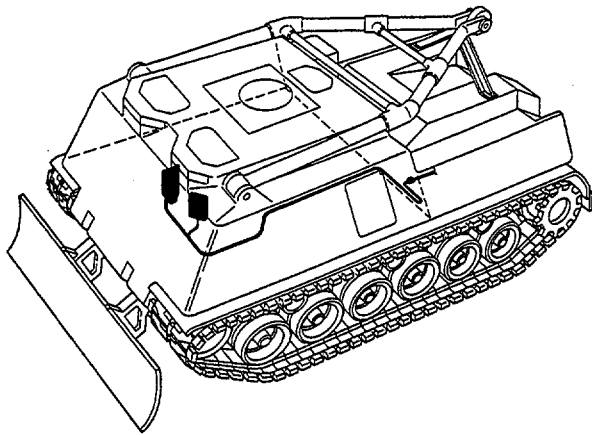
W Reconnect wire H to hydraulic pressure switch. Disconnect bulkhead to APU, master relay, and rigger's lights wiring harness from APU engine disconnect. Place red lead of multimeter in socket F of wire 61 and black lead to ground. Turn MASTER, APU pressure, and APU GEN switches ON and check for voltage. Turn MASTER, APU pressure, and APU GEN switches OFF. If voltage is present, notify Direct Support Maintenance. If voltage is not present, repair/replace wire 61 of bulkhead to APU, master relay, and rigger's lights wiring harness (see paragraph 6-76).



GENERATOR INDICATOR GAGE

SYMPTOM

Generator indicator gage fails to operate when MASTER switch is on. Do steps A through H.



2-19 ELECTRICAL TROUBLESHOOTING-Continued

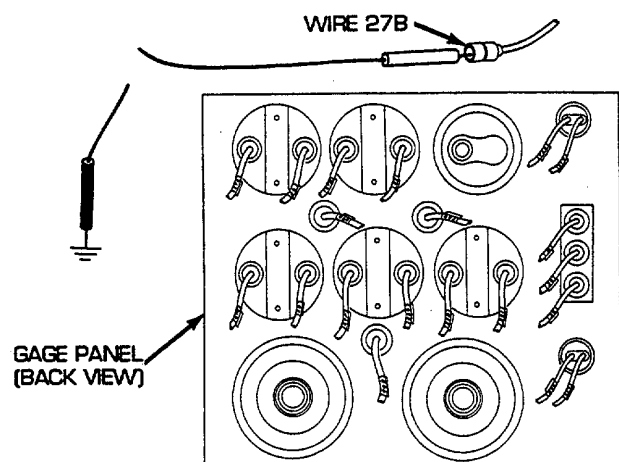
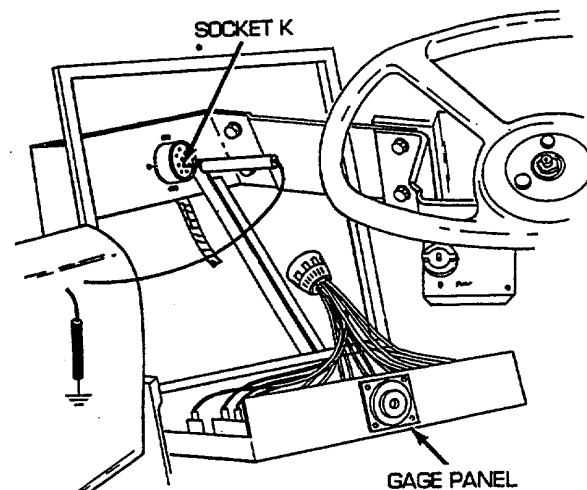
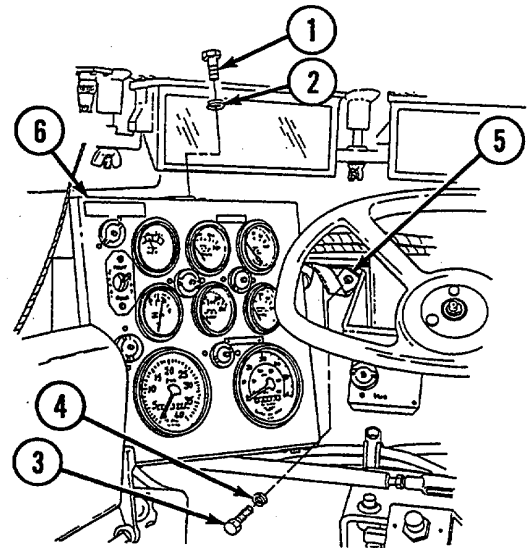
GENERATOR INDICATOR GAGE—Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

A Remove three screws (1), three lockwashers (2), two screws (3), two lockwashers (4), and ground strap (5) and release gage panel (6) from mounting brackets. Disconnect gage panel to bulkhead wiring harness from gage panel. Place red lead of multimeter in pin K of wire 27 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step B. If voltage is not present, go to step C.

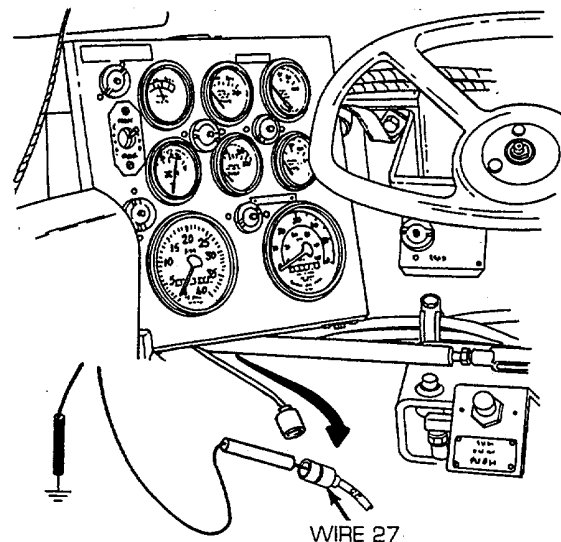
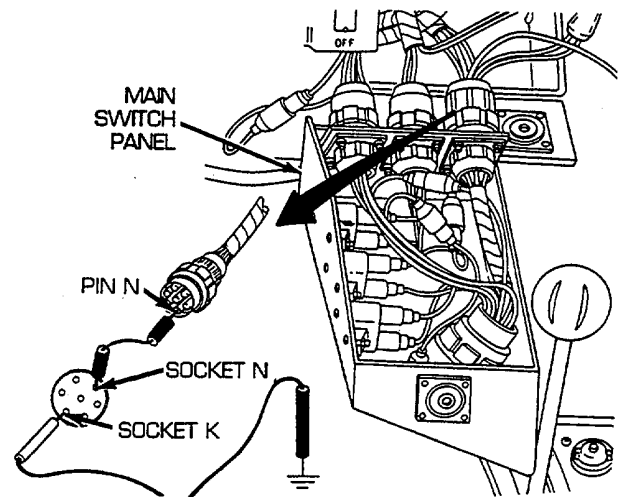
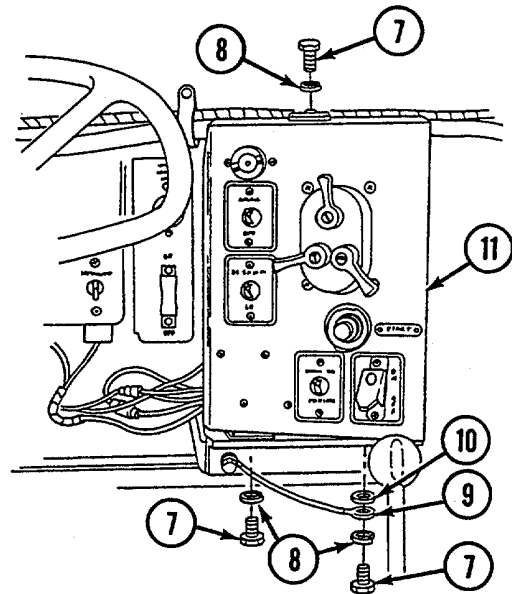
B Reconnect gage panel to bulkhead wiring harness to gage panel. Disconnect wire 27B from generator indicator gauge. Place red lead of multimeter in wire 27B and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace generator indicator gage (see paragraph 6-8). If voltage is not present, repair/replace wire 27B from connector to generator indicator gage of gage panel wiring harness (see paragraph 6-44).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- C Reconnect gage panel to bulkhead wiring harness to gage panel. Install ground strap (5), two lockwashers (4), two screws (3), gage panel (6), three lockwashers (2), and three screws (1) to mounting brackets. Remove three screws (7), three lockwashers (8), ground wire (9), flat washer (10), and release main switch panel (11) from mounting brackets. Disconnect switch panel to gage panel and miscellaneous switches wiring harness from main switch panel. Place a jumper wire from pin N to socket N. Place red lead of multimeter in socket K of wire 27 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step D. If voltage is not present, go to step E.
- D Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Disconnect wire 27 at connector near gage panel. Place red lead of multimeter in female connector of wire 27 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 27 of gage panel to bulkhead wiring harness (see paragraph 6-45 for dual voltage; 6-46 for single voltage). If voltage is not present, repair/replace wire 27 to switch panel to gage panel and miscellaneous switches wiring harness (see paragraph 6-55 for dual voltage; 6-56 for single voltage).



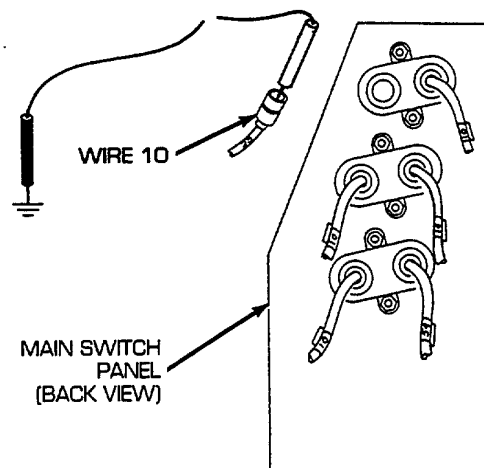
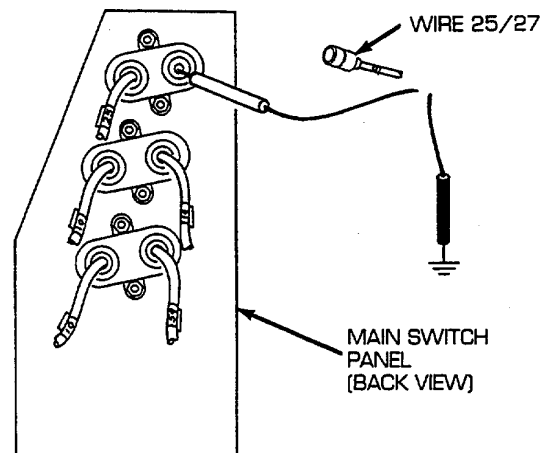
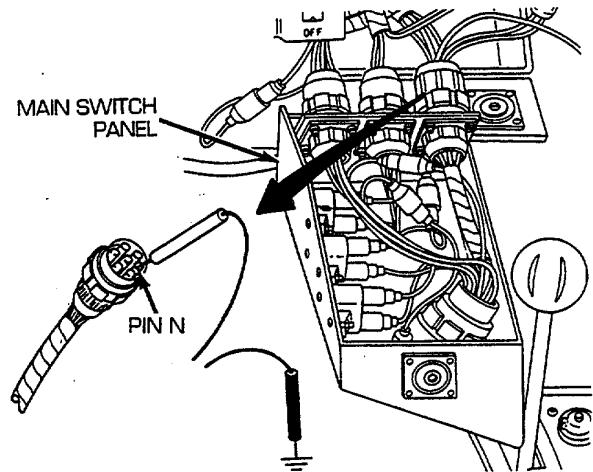
2-19 ELECTRICAL TROUBLESHOOTING--Continued

GENERATOR INDICATOR GAGE--Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

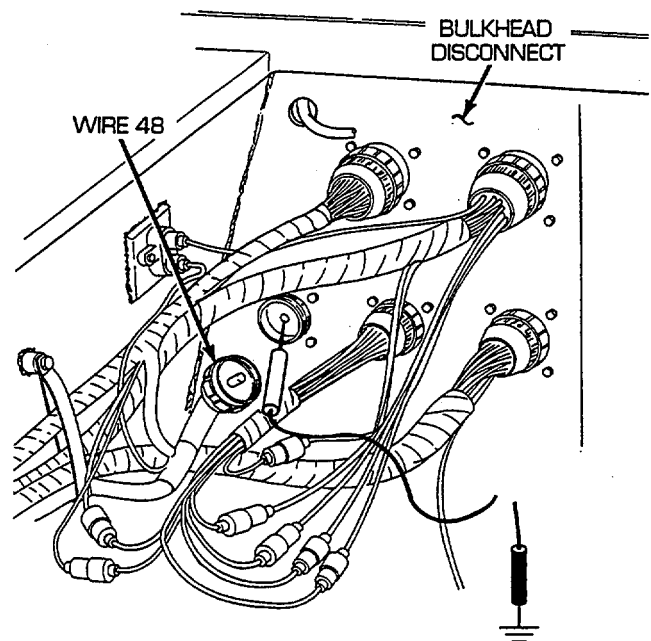
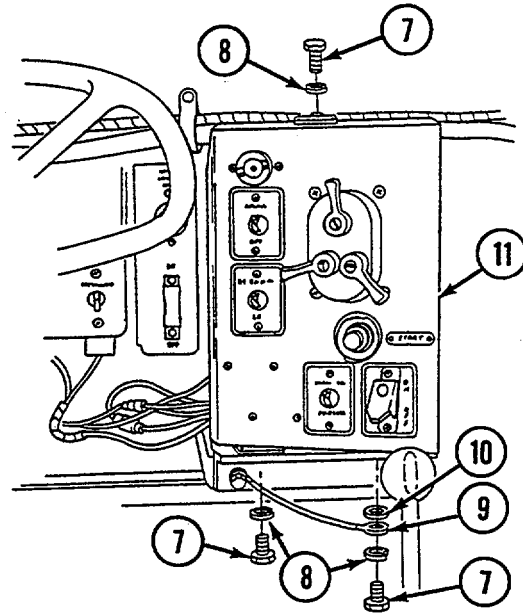
- E Place red lead of multimeter on pin N of wire 10/15 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step F. If voltage is not present, go to step H.
- F Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Disconnect wire 25/27 from 15 A circuit breaker. Place red lead of multimeter on circuit breaker terminal and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 27 of main lighting and B. O. selector switch wiring harness (see paragraph 6-69). If voltage is not present, go to step G.
- G Reconnect wire 25/27 to 15 A circuit breaker. Disconnect wire 10 from 15 A circuit breaker. Place red lead of multimeter in wire 10 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace 15 A circuit breaker (see paragraph 6-10). If voltage is not present, repair/replace wire 10 of main lighting and B. O. selector switch wiring harness (see paragraph 6-69).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- H Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Install main switch panel (11), flat washer (10), ground wire (9), three lockwashers (8), and three screws (7) to mounting brackets. Disconnect wire 48 pin A from bulkhead to master relay wiring harness. Place red multimeter lead in socket and black lead to ground. Turn MASTER switch on and check for voltage. If voltage is present, repair/replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay circuit (see paragraph 2-19, master relay fails to operate).

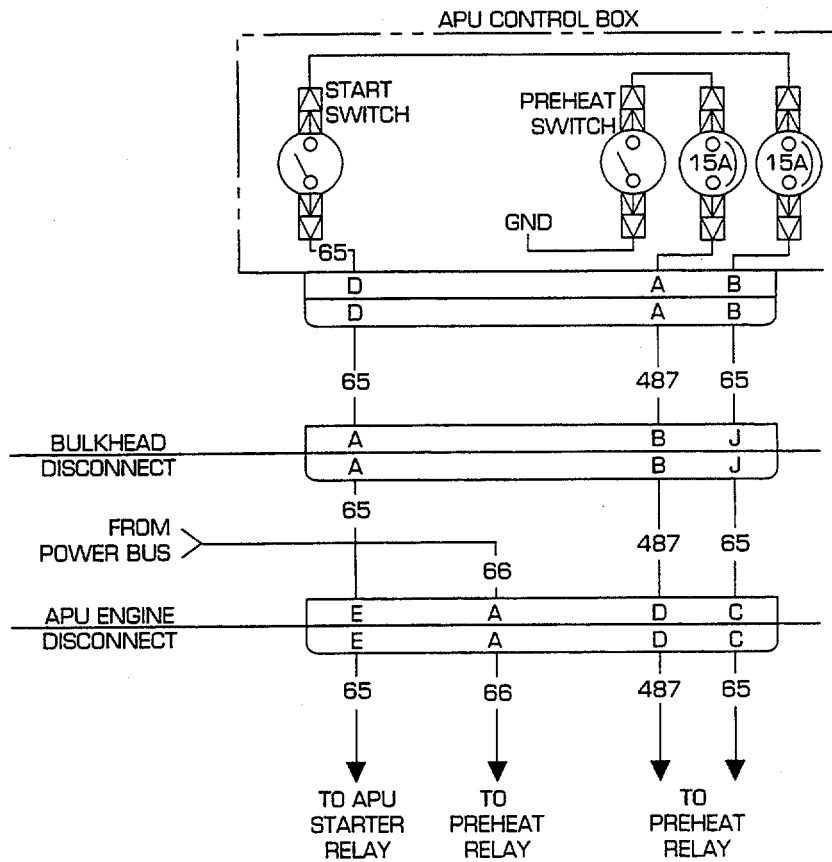
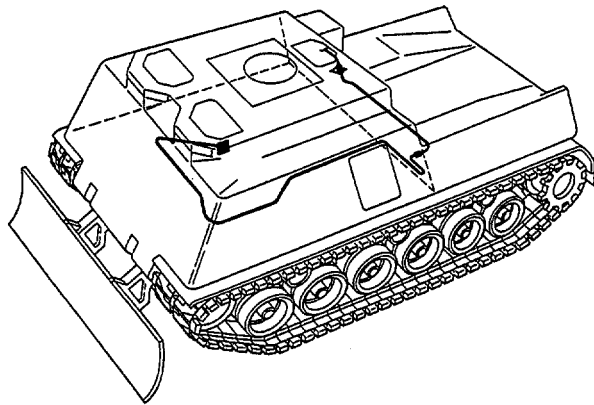


2-19 ELECTRICAL TROUBLESHOOTING-Continued

APU STARTING SYSTEM

SYMPTOMS

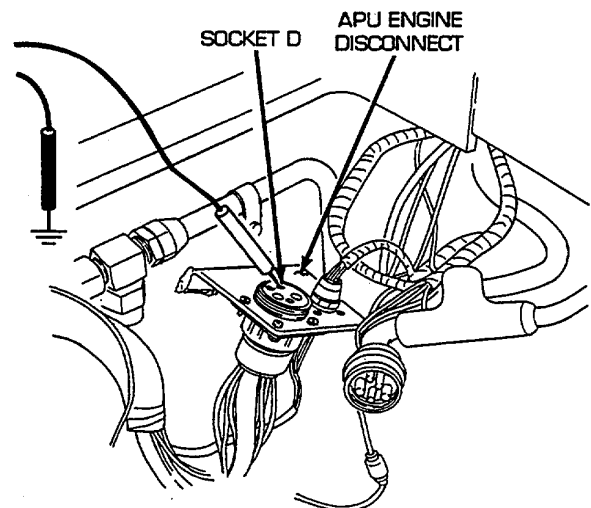
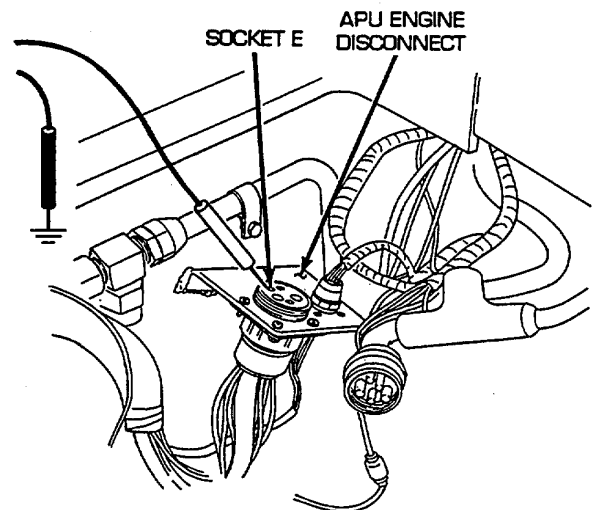
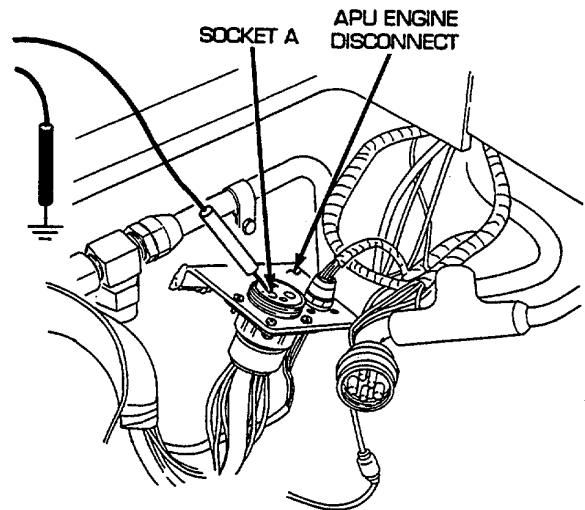
APU starter fails to crank or is hard to start in cold weather.
 Do steps A through M.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Open center-front air inlet doors (TM 9-2350-256-10). Disconnect bulkhead to APU, master relay, and rigger's lights wiring harness from APU engine disconnect. Place red lead of multimeter in socket A of wire 66 and black lead to ground. Turn MASTER, and PREHEAT switches on and check for voltage. Turn MASTER and PREHEAT switches OFF. If voltage is present, go to step B. If voltage is not present, troubleshoot battery circuit.
- B Place red lead of multimeter in socket E of wire 65 and black lead to ground. Turn MASTER, PREHEAT, and APU START switches on and check for voltage. Turn MASTER, PREHEAT, and APU START switches OFF. If voltage is present, go to step C. If voltage is not present, go to step D.
- C Place red lead of multimeter in socket D of wire 487 and black lead to ground. Turn MASTER and PREHEAT switches ON and check for voltage. Turn MASTER and PREHEAT switches OFF. If voltage is present, notify Direct Support Maintenance. If voltage is not present, go to step E.



2-19 ELECTRICAL TROUBLESHOOTING-Continued

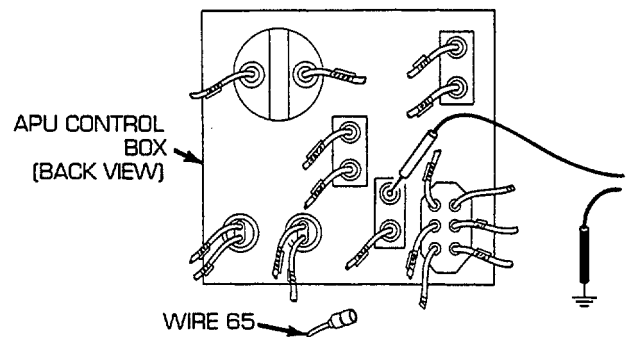
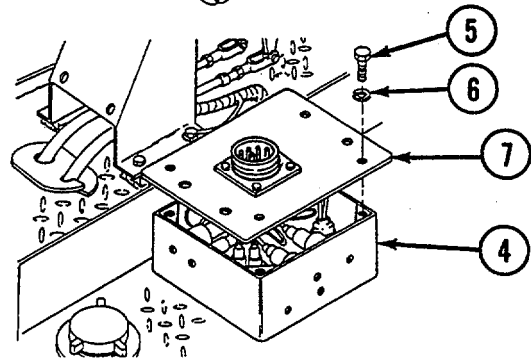
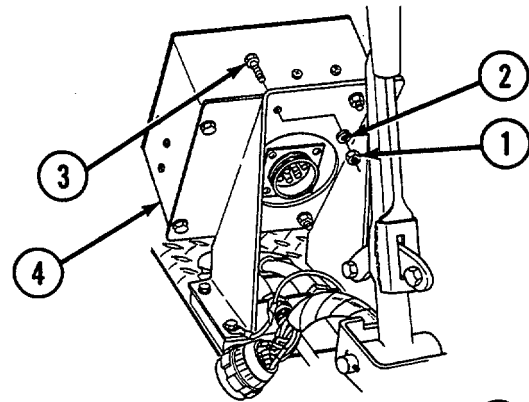
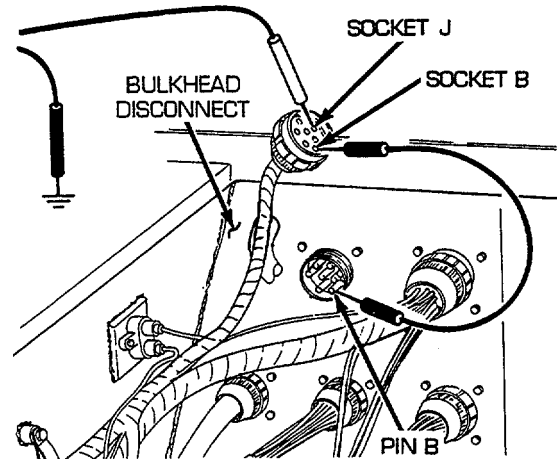
APU STARTING SYSTEM-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

D Reconnect bulkhead to APU, master relay, and rigger's lights wiring harness to APU engine disconnect. Open air inlet doors (see TM 9-2350-256-10). Disconnect bulkhead to APU, master relay, and rigger's lights wiring harness from bulkhead disconnect. Place a jumper wire from pin B to socket B. Place red lead of multimeter in socket J of wire 65 and black lead to ground. Turn MASTER and PREHEAT switches ON and check for voltage. Turn MASTER and PREHEAT switches OFF. If voltage is present, repair/replace wire 65 of APU control box to foot dimmer switch and bulkhead wiring harness (see paragraph 6-79 for dual voltage; 6-80 for single voltage). If voltage is not present, reconnect bulkhead to APU, master relay, and rigger's lights wiring harness to bulkhead disconnect and go to step E.

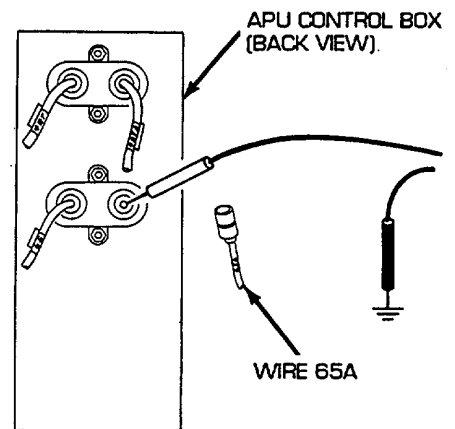
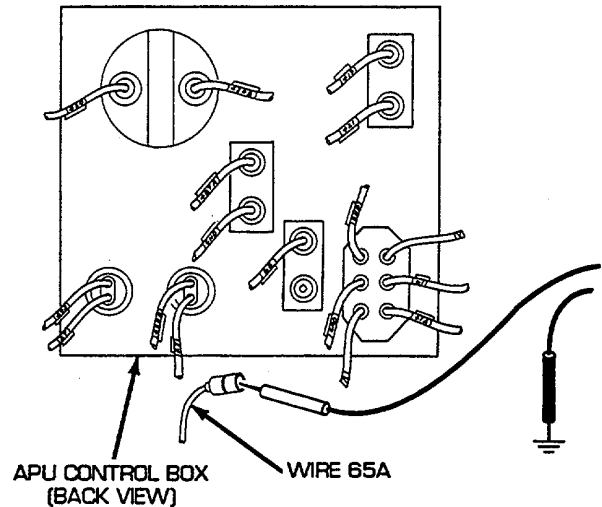
E Disconnect APU control box to foot dimmer switch and bulkhead wiring harness from APU control box. Remove four nuts (1), four lockwashers (2), and four screws (3), and release APU control box (4) from mounting bracket. Remove four screws (5) and four lockwashers (6), and release rear panel (7) from APU control box. Reconnect APU control box to foot dimmer switch and bulkhead wiring harness to APU control box. Disconnect wire 65 from START switch. Place red lead of multimeter on terminal of START switch and black lead to ground. Turn MASTER, PREHEAT and APU START switches ON and check for voltage. Turn MASTER, PREHEAT and APU START switches OFF. If voltage is not present, go to step F. If voltage is present, repair/replace wire 65 of APU control box wiring harness (see paragraph 13-7).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel

- F Reconnect wire 65 to APU START switch. Disconnect wire 65A from APU START switch. Place red lead of multimeter in wire 65A and black lead to ground. Turn MASTER and PREHEAT switches ON, and check for voltage. Turn MASTER and PREHEAT switches OFF. If voltage is not present, go to step G. If voltage is present, replace START switch (see paragraph 13-7).
- G Reconnect wire 65A to APU START switch. Disconnect wire 65A from APU START switch side of 15 A circuit breaker. Place red lead of multimeter on terminal of 15 A circuit breaker and black lead to ground. Turn MASTER, and PREHEAT switches ON and check for voltage. Turn MASTER, and PREHEAT switches OFF. If voltage is not present, go to step H. If voltage is present, repair/replace wire 65A of APU control box wiring harness (see paragraph 13-7).



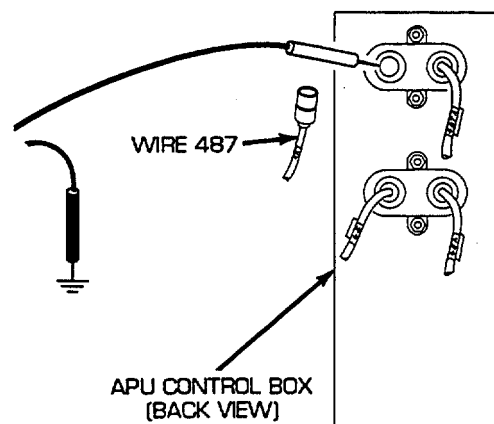
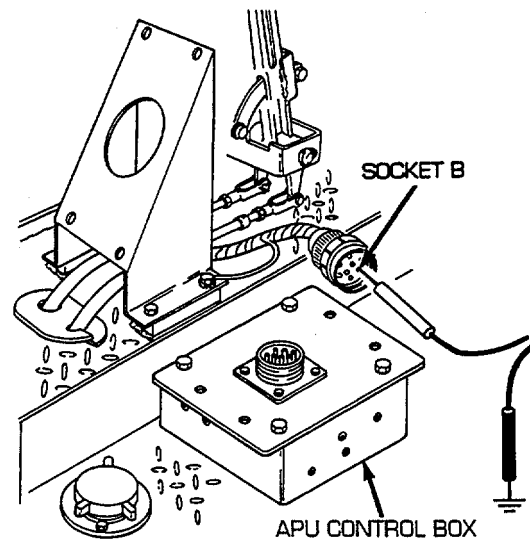
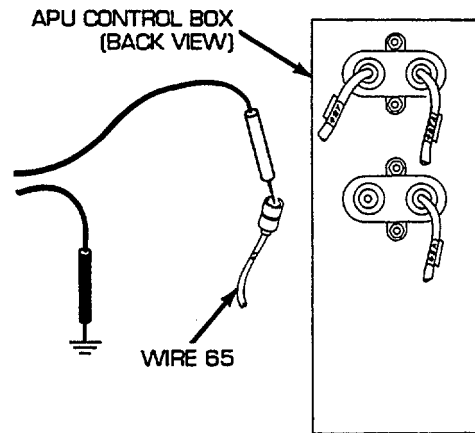
2-19 ELECTRICAL TROUBLESHOOTING-Continued

APU STARTING SYSTEM-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

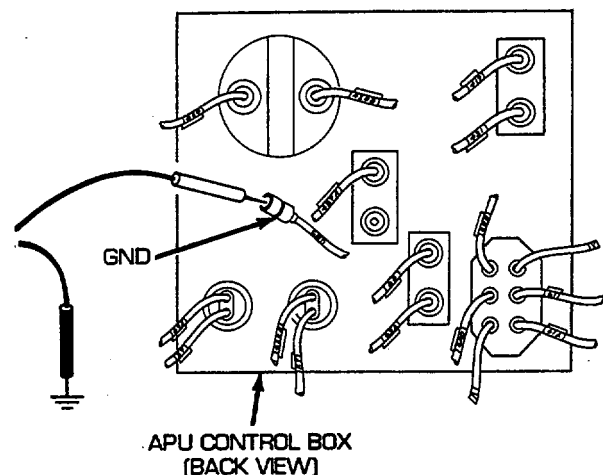
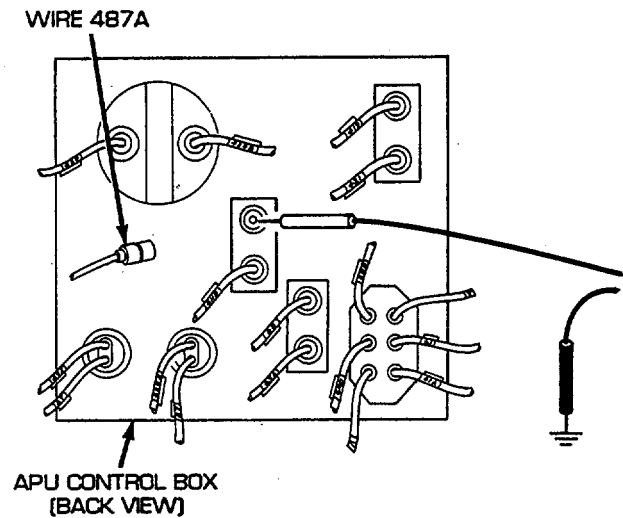
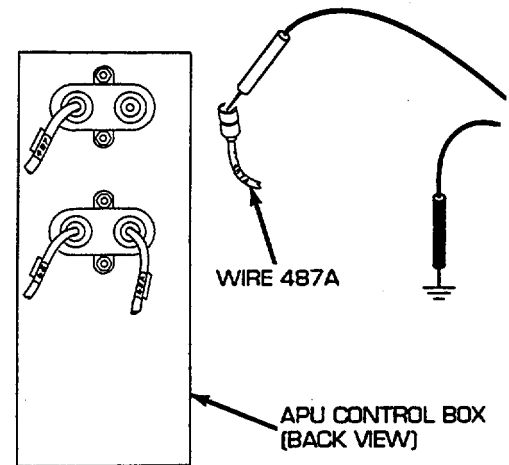
- H Reconnect wire 65A to APU START switch side of circuit breaker. Disconnect wire 65 from panel connector side of 15 A circuit breaker. Place red lead of multimeter in wire 65 and black lead to ground. Turn MASTER and PREHEAT switches ON, and check for voltage. Turn MASTER and PREHEAT switches OFF. If voltage is not present, go to step I. If voltage is present, replace 15 A circuit breaker (see paragraph 13-7).
- I Disconnect APU control box to foot dimmer switch and bulkhead wiring harness from APU control box. Place red lead of multimeter in socket B of wire 65 and black lead to ground. Turn MASTER and PREHEAT switches on, and check for voltage. Turn MASTER and PREHEAT switches OFF. If voltage is present, repair/replace wire 65 of APU control box. If voltage is not present, go to step J.
- J Reconnect APU control box to foot dimmer switch and bulkhead wiring harness to APU control box. Disconnect wire 487 from 15 A circuit breaker. Place red lead of multimeter on terminal of 15 A circuit breaker and black lead to ground. Turn MASTER and PREHEAT switches ON, and check for voltage. Turn MASTER and PREHEAT switches OFF. If voltage is present, repair/replace wire 487 of APU control box wiring harness (see paragraph 13-7). If voltage is not present, go to step K.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- K Reconnect wire 487 to 15 A circuit. Disconnect wire 487A from PREHEAT switch side of 15 A circuit breaker. Place red lead of multimeter in wire 487A and black lead to ground. Turn MASTER and PREHEAT switches ON, and check for voltage. Turn MASTER and PREHEAT switches OFF. If voltage is present, replace circuit breaker (see paragraph 13-7). If voltage is not present, go to step L.
- L Reconnect wire 487A to PREHEAT switch side of circuit breaker. Disconnect wire 487A from PREHEAT switch. Place red lead of multimeter on terminal of preheat switch and black lead to ground. Turn MASTER and PREHEAT switches ON, and check for voltage. Turn MASTER and PREHEAT switches OFF. If voltage is present, repair/replace wire 487A of APU control box wiring harness (see paragraph 13-7). If voltage is not present, go to step M.
- M Reconnect wire 487A to PREHEAT switch. Disconnect GND wire from PREHEAT switch. Place red lead of multimeter in GND wire and black lead to ground. Turn MASTER and APU GEN switches ON and check for voltage. Turn MASTER and APU GEN switches OFF. If voltage is present, replace PREHEAT switch (see paragraph 13-7). If voltage is not present, replace GND wire of APU control box wiring harness (see paragraph 13-7).

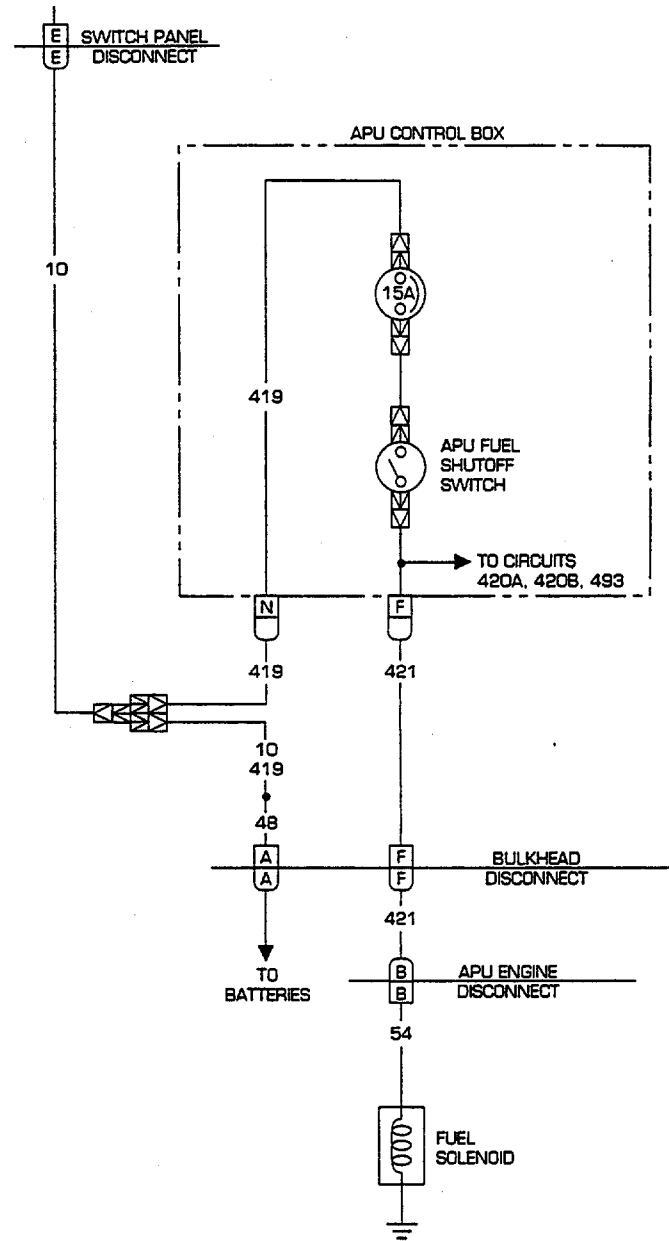
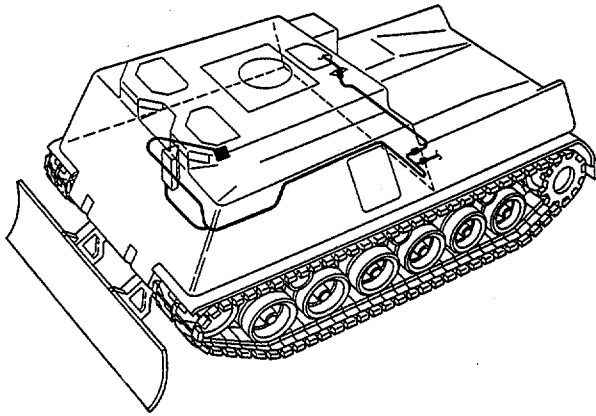


2-19 ELECTRICAL TROUBLESHOOTING--Continued

APU FUEL SOLENOID SYSTEM

SYMPTOM

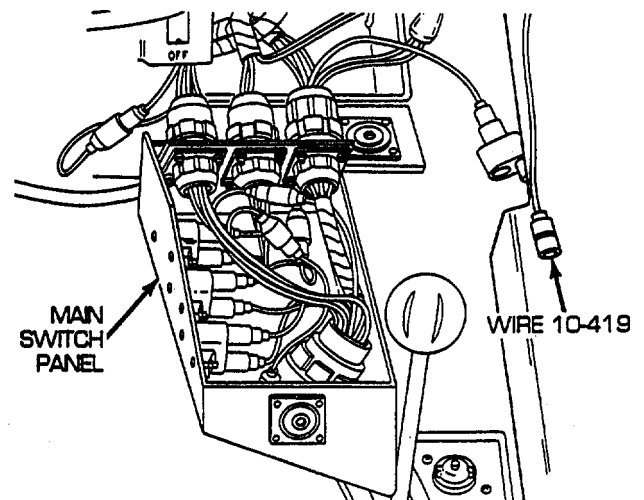
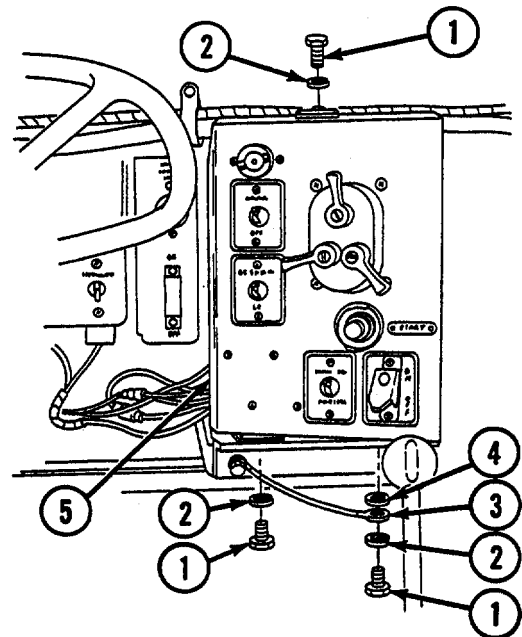
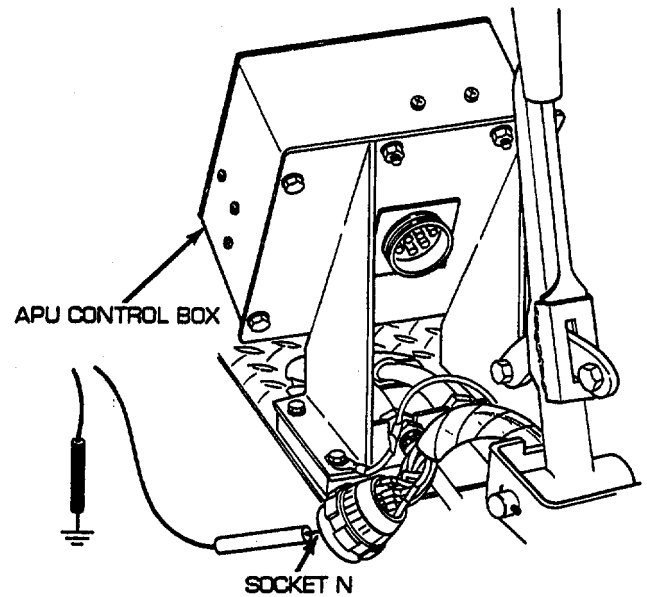
APU fuel solenoid fails to operate.
Do steps A through J.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Disconnect APU control box to foot dimmer switch and bulkhead wiring harness from APU control box. Place red lead of multimeter in socket N of wire 419 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step D. If voltage is not present, go to step B.
- B Connect APU control box to foot dimmer switch and bulkhead wiring harness to APU control box. Remove three screws (1), three lockwashers (2), ground wire (3), and flat washer (4), and release main switch panel (5) from mounting bracket. Disconnect wire 10419 from Y-connector of switch panel, radio, and bilge pump to bulkhead wiring harness at main switch panel. Turn MASTER switch on, and check for voltage. If voltage is present, repair wire 419 from Y-connector at main switch panel to APU control box bulkhead wiring harness. If voltage is not present, go to step C.



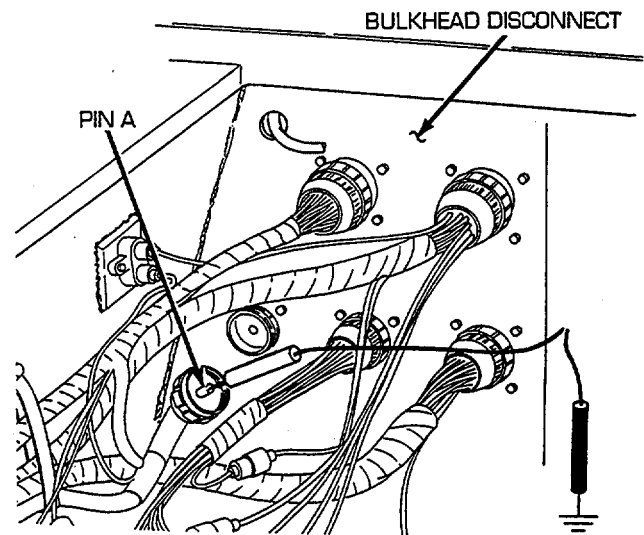
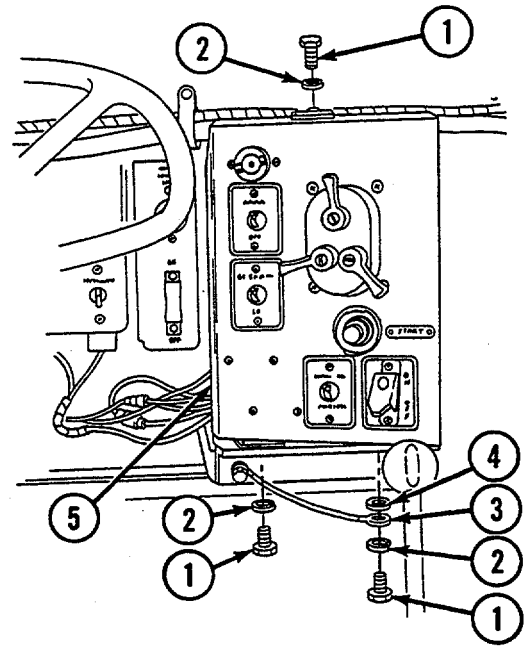
2-19 ELECTRICAL TROUBLESHOOTING-Continued

APU FUEL SOLENOID SYSTEM-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- C Reconnect wire 10-419 to Y-connector of switch panel, radio, and bilge pump to bulkhead wiring harness to main switch panel. Install main switch panel (5), flat washer (4), ground wire (3), three lockwashers (2), and three screws (1) to mounting bracket. Open air inlet doors (TM 9-2350-256-10). Disconnect wire 48 pin A from bulkhead to master relay wiring harness. Place red multimeter lead in socket and black lead to ground. Turn MASTER switch on and check for voltage. If voltage is present, repair/replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay circuit (see paragraph 2-19, master relay fails to operate).

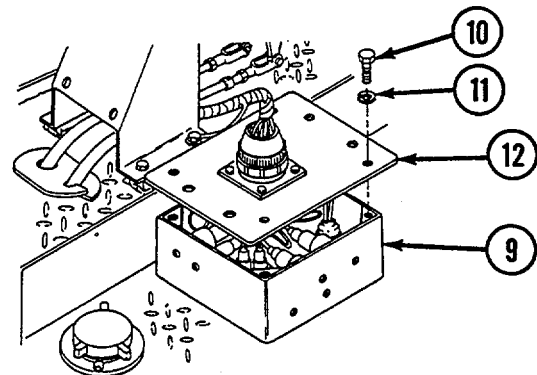
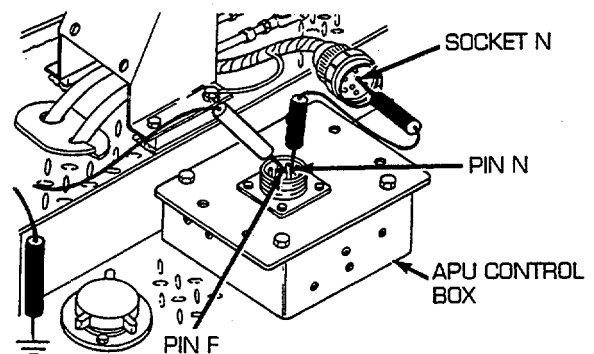
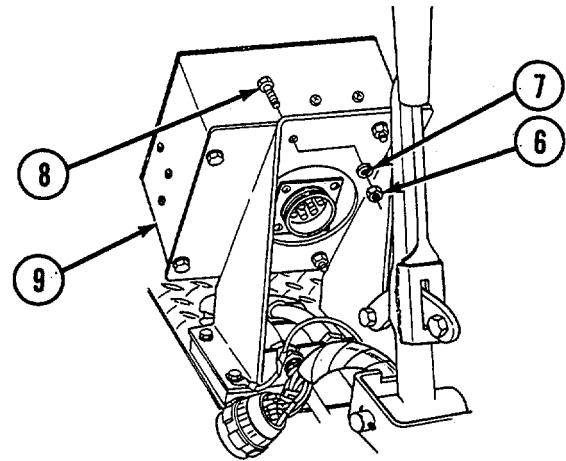


WARNING

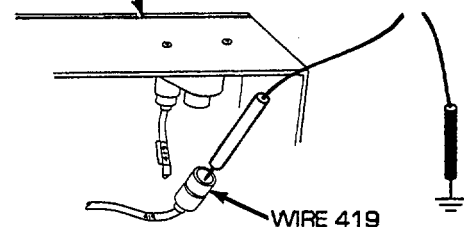
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

D Remove four nuts (6), four lockwashers (7), four screws (8), and release APU control box (9) from mounting bracket. Place a jumper wire from pin N to socket N. Place red lead of multimeter on pin F of wire 421 and black lead to ground. Turn MASTER and APU FUEL SHUTOFF switches ON, and check for voltage. Turn MASTER and APU FUEL SHUTOFF switches OFF. If voltage is present, go to step I. If voltage is not present, go to step E.

E Remove four screws (10), four lockwashers (11), and release rear panel (12) from APU control box (9). Reconnect APU control box to foot dimmer switch and bulkhead wiring harness to APU control box. Disconnect wire 419 from 15 A circuit breaker. Place red lead of multimeter in wire 419 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step F. If voltage is not present, repair/replace wire 419 of APU control box wiring harness from connector to circuit breaker (see paragraph 13-7).



APU CONTROL BOX
(BACK VIEW)



2-19 ELECTRICAL TROUBLESHOOTING-Continued

APU FUEL SOLENOID SYSTEM-Continued

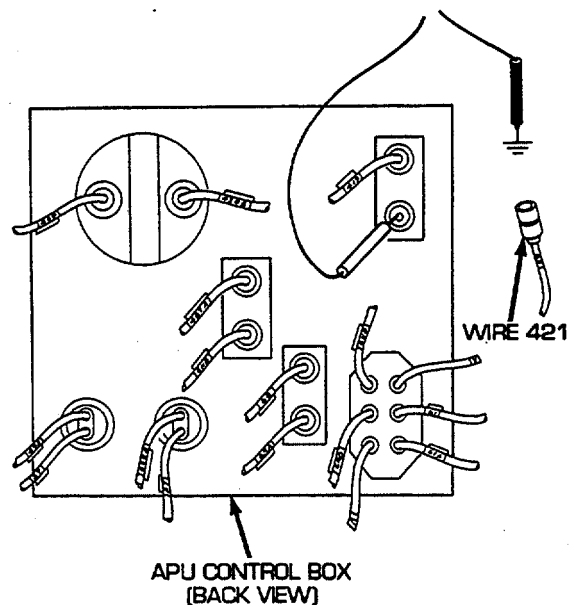
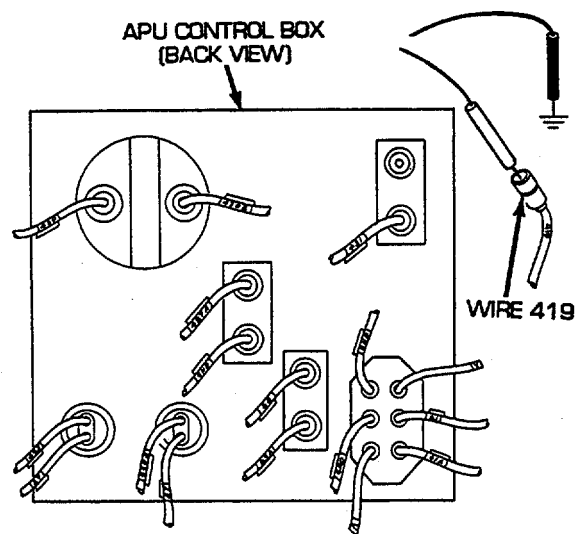
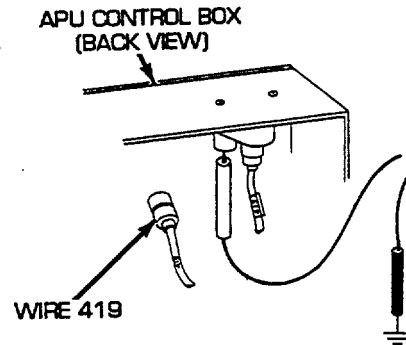
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

F Reconnect wire 419 to circuit breaker. Disconnect wire 419 from APU FUEL SHUTOFF switch side of 15 A circuit breaker. Place red lead of multimeter on terminal of circuit breaker and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step G. If voltage is not present, replace 15 A circuit breaker (see paragraph 13-7).

G Reconnect wire 419 to APU fuel shutoff switch side of 15 A circuit breaker. Disconnect wire 419 from circuit breaker side of APU FUEL SHUTOFF switch. Place red lead of multimeter in wire 419 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step H. If voltage is not present, repair/replace wire 419 of APU fuel shutoff switch lead assembly from circuit breaker to shutoff switch (see paragraph 13-7).

H Reconnect wire 419 to circuit breaker side of APU FUEL SHUTOFF switch. Disconnect wire 421 from APU FUEL SHUTOFF switch. Place red lead of multimeter on terminal of APU FUEL SHUTOFF switch and black lead to ground. Turn MASTER and APU FUEL SHUTOFF switches ON and check for voltage. Turn MASTER and APU FUEL SHUTOFF switches OFF. If voltage is present, repair/replace wire 421 of APU control box wiring harness (see paragraph 13-7). If voltage is not present, replace APU FUEL SHUTOFF switch (see paragraph 13-7).

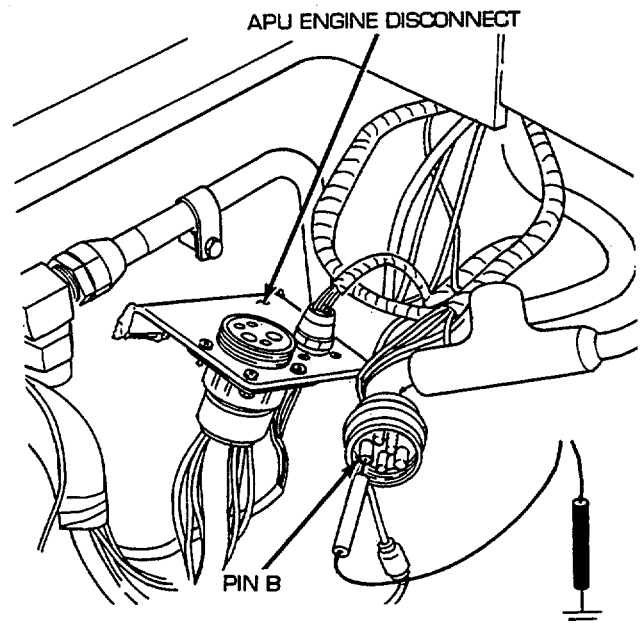
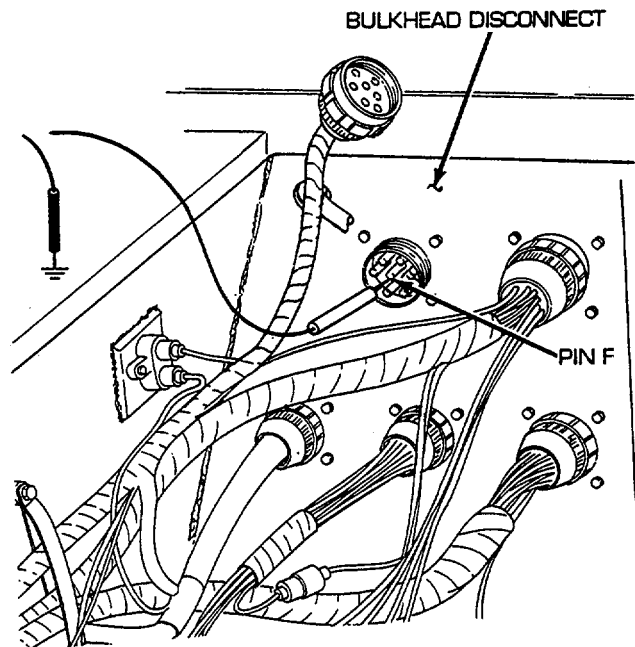
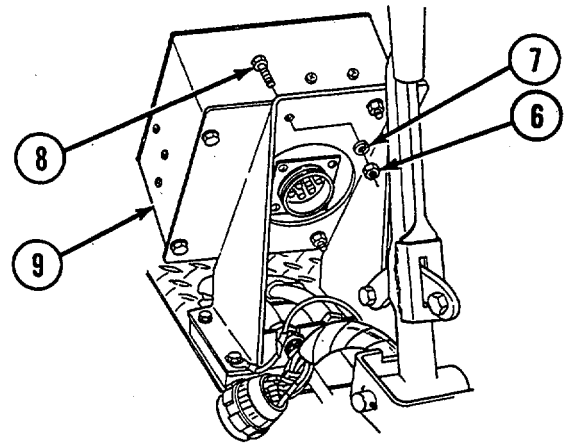


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

I Reconnect APU control box to foot dimmer switch and bulkhead wiring harness to APU control box. Install APU control box (9), four screws (8), four lockwashers (7), and four nuts (6) to mounting bracket. Open air inlet doors. Disconnect bulkhead to APU, master relay, and rigger's lights wiring harness from bulkhead disconnect. Place red lead of multimeter on pin F of wire 421 and black lead to ground. Turn MASTER and APU fuel shut-off switches ON and check for voltage. Turn MASTER and APU fuel shut-off switches OFF. If voltage is present, go to step J. If voltage is not present, repair/replace wire 421 of APU control box to foot dimmer switch and bulkhead wiring harness (see paragraph 6-79 for dual voltage; 6-80 for single voltage).

J Reconnect bulkhead to APU, master relay, and rigger's lights wiring harness to bulkhead disconnect. Open center-front air inlet doors (TM 9-2350-256-10). Disconnect bulkhead to APU, master relay, and rigger's lights wiring harness from APU engine disconnect. Place red lead of multimeter on pin B of wire 421 and black lead to ground. Turn MASTER and APU fuel shut-off switches ON and check for voltage. Turn MASTER and APU fuel shut-off switches OFF. If voltage is present, notify Direct Support Maintenance. If voltage is not present, repair/replace wire 421 of bulkhead to APU, master relay, and rigger's lights wiring harness (see paragraph 6-75 for dual voltage; 6-76 for single voltage).



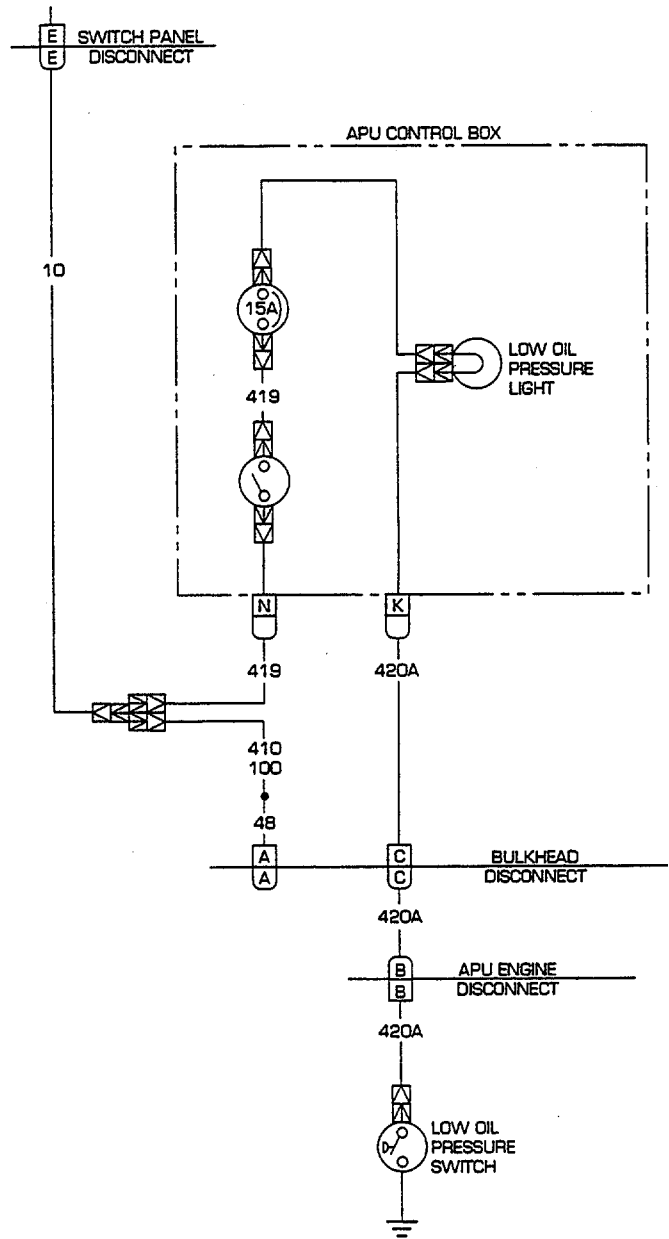
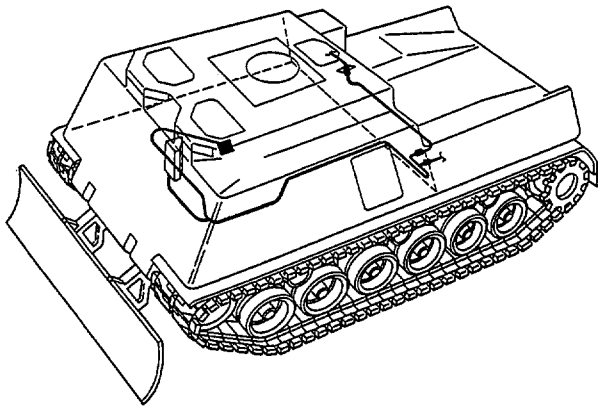
2-19 ELECTRICAL TROUBLESHOOTING-Continued

APU LOW OIL PRESSURE SYSTEM

SYMPTOM

APU LOW OIL PRESS lamp fails to light when APU is not running.

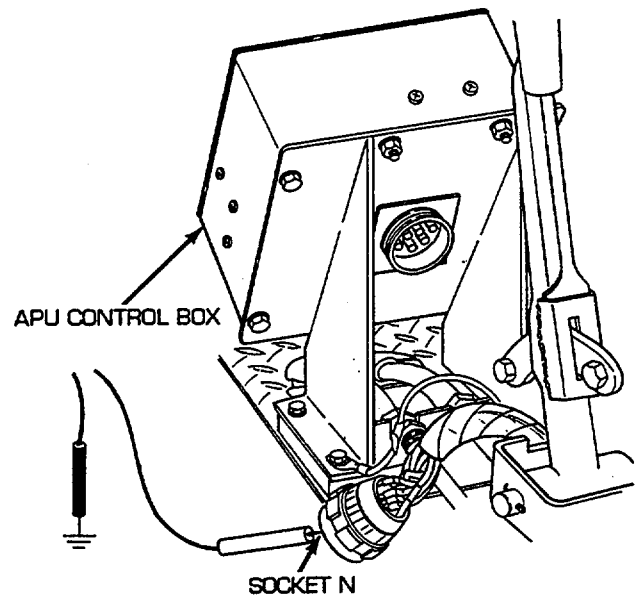
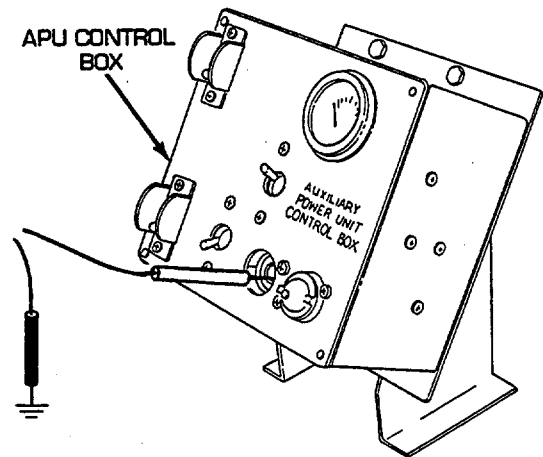
Do steps A through K.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Remove lamp from socket. Place red lead of multimeter in socket and black lead to ground. Turn MASTER and APU FUEL SHUTOFF switches ON, and check for voltage. Turn MASTER and APU FUEL SHUTOFF switches OFF. If voltage is present, replace lamp (see paragraph 13-7). If voltage is not present, go to step B.
- B Disconnect APU control box to foot dimmer switch and bulkhead wiring harness from APU control box. Place red lead of multimeter in socket N of wire 419 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step E. If voltage is not present, go to step C.



2-19 ELECTRICAL TROUBLESHOOTING-Continued

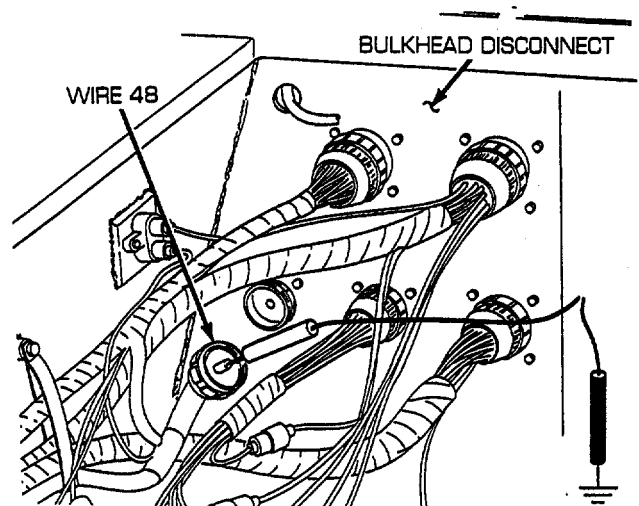
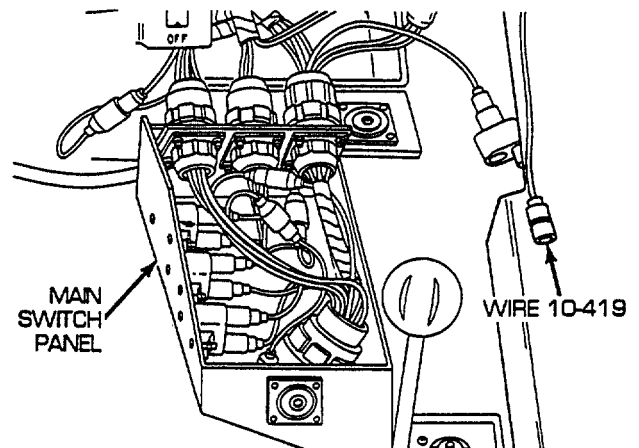
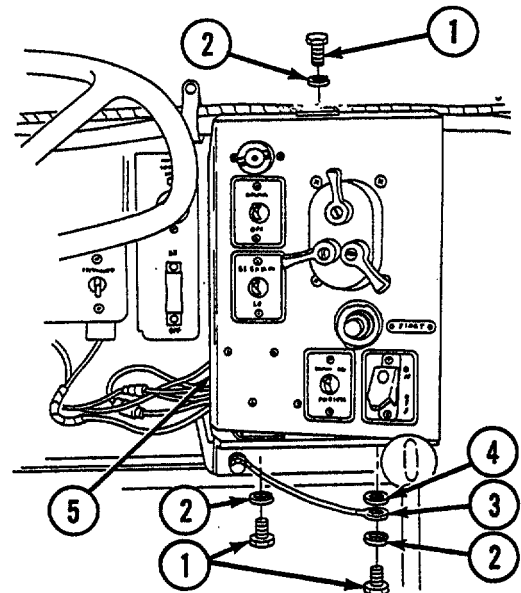
APU LOW OIL PRESSURE SYSTEM-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

C Reconnect APU control box to dimmer switch and bulkhead wiring harness to APU control box. Remove three screws (1), three lockwashers (2), ground wire (3), and flat washer (4), and release main switch panel (5) from mounting bracket. Disconnect wire 10-419 from Y-connector of switch panel, radio, and bilge pump to bulkhead wiring harness at main switch panel. Turn MASTER switch on, and check for voltage. If voltage is present, repair wire 419 from Y-connector at main switch panel to APU control box bulkhead wiring harness. If voltage is not present, go to step D.

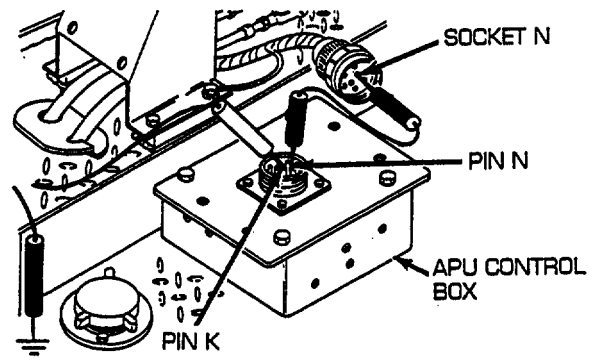
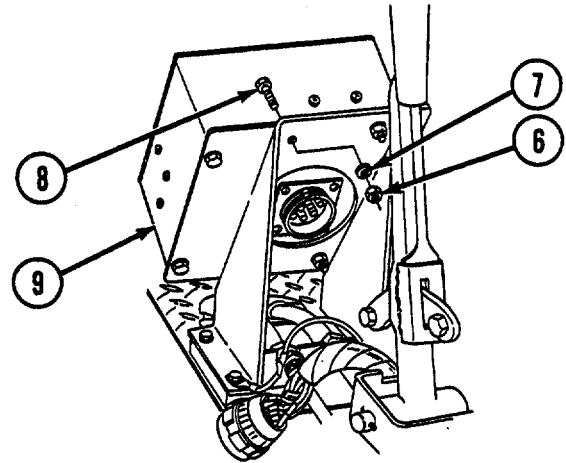
D Reconnect wire 10-419 to Y-connector of switch panel, radio, and bilge pump to bulkhead wiring harness to main switch panel. Install main switch panel (5), flat washer (4), ground wire (3), three lockwashers (2), and three screws (1) to mounting bracket. Open air inlet doors (TM 9-2350-256-10). Disconnect wire 48 pin A from bulkhead to master relay wiring harness. Place red multimeter lead in socket and black lead to ground. Turn MASTER switch on and check for voltage. If voltage is present, repair/replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay circuit (see paragraph 2-19, master relay fails to operate).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- E Remove four nuts (6), four lockwashers (7), and four screws (8) and release APU control box (9) from mounting bracket. Place a jumper wire from pin N to socket N. Place red lead of multimeter on pin K of wire 420A and black lead to ground. Turn MASTER and APU FUEL SHUTOFF switches ON, and check for voltage. Turn MASTER and APU FUEL SHUTOFF switches OFF. If voltage is present, go to step L. If voltage is not present, go to step F.



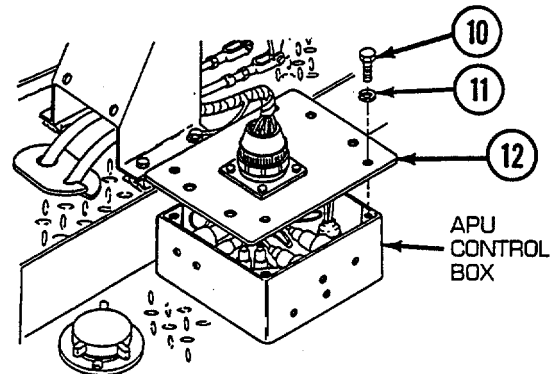
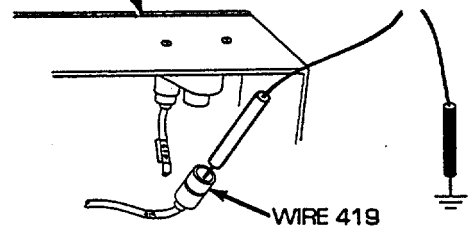
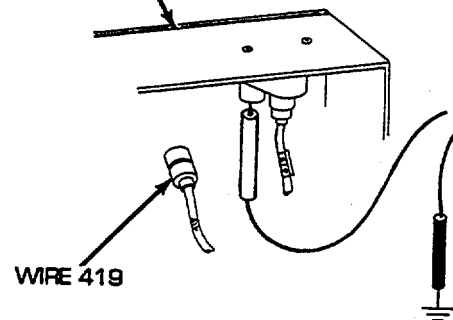
2-19 ELECTRICAL TROUBLESHOOTING--Continued

APU LOW OIL PRESSURE SYSTEM-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- F Reconnect APU control box to foot dimmer switch and bulkhead wiring harness to APU control box. Remove four screws (10), four lockwashers (11), and release rear panel (12) from APU control box. Disconnect wire 419 from panel connector side of 15 A circuit breaker. Place red lead of multimeter in wire 419 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step G. If voltage is not present, repair/replace wire 419 of APU control box wiring harness (see paragraph 13-7).
- G Reconnect wire 419 to panel connector side of 15 A circuit breaker. Disconnect wire 419 from APU FUEL SHUTOFF switch side of 15 A circuit breaker. Place red lead of multimeter on terminal of circuit breaker and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step H. If voltage is not present, replace 15 A circuit breaker (see paragraph 13-7).

APU CONTROL BOX
(BACK VIEW)APU CONTROL BOX
(BACK VIEW)

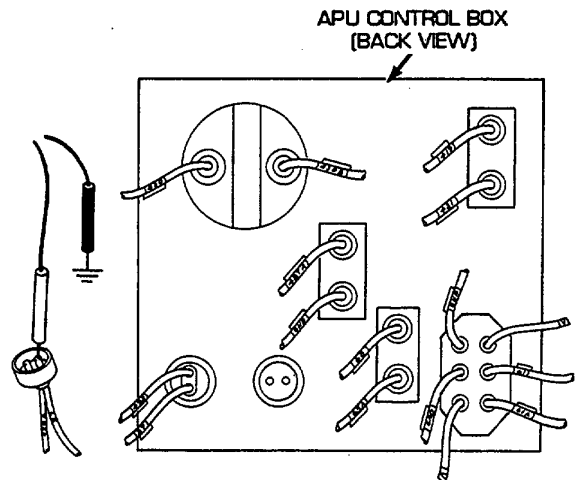
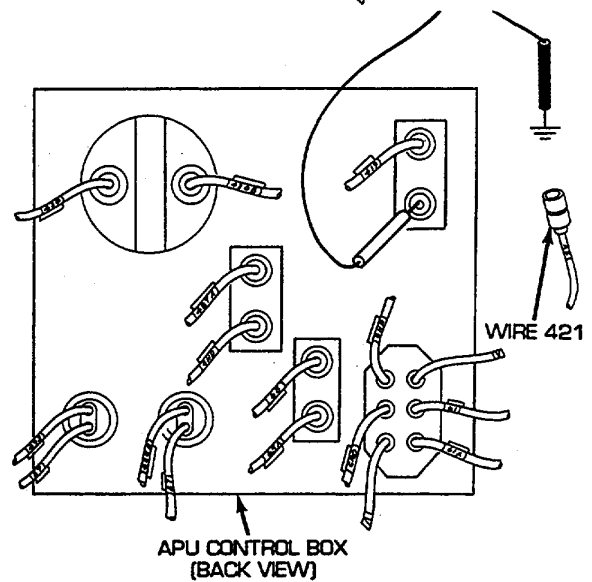
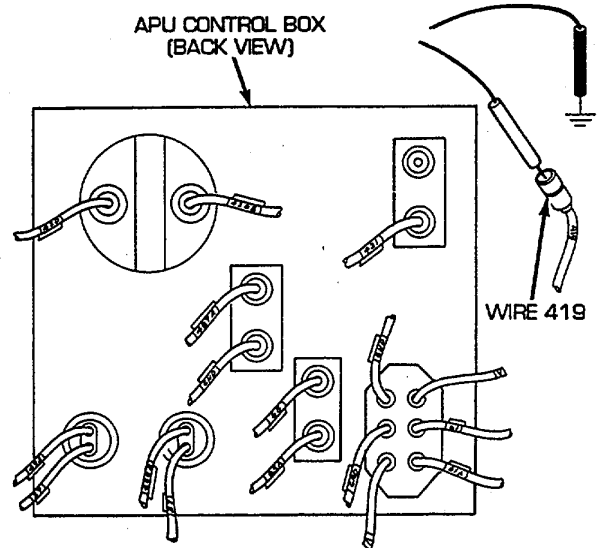
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

H Reconnect wire 419 to APU FUEL SHUTOFF switch side of 15 A circuit breaker. Disconnect wire 419 from circuit breaker side of APU FUEL SHUTOFF switch. Place red lead of multimeter in wire 419 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step I. If voltage is not present, repair/replace wire 419 of APU fuel shutoff lead assembly (see paragraph 13-7).

I Reconnect wire 419 to circuit breaker side of APU FUEL SHUTOFF switch. Disconnect wire 421 from APU FUEL SHUTOFF switch. Place red lead of multimeter on terminal of APU FUEL SHUTOFF switch and black lead to ground. Turn MASTER and APU FUEL SHUTOFF switches ON and check for voltage. Turn MASTER and APU FUEL SHUTOFF switches OFF. If voltage is present, go to step J. If voltage is not present, replace APU FUEL SHUTOFF switch (see paragraph 13-7).

J Reconnect wire 421 to APU FUEL SHUTOFF switch. Disconnect connector from LOW OIL PRESS lamp. Place red lead of multimeter in wire 27 and black lead to ground. Turn MASTER and APU FUEL SHUTOFF switches ON and check for voltage. Turn MASTER and APU FUEL SHUTOFF switches OFF. If voltage is present, go to step K. If voltage is not present, repair/replace wire 421/27 of APU control box wiring harness (see paragraph 13-7).



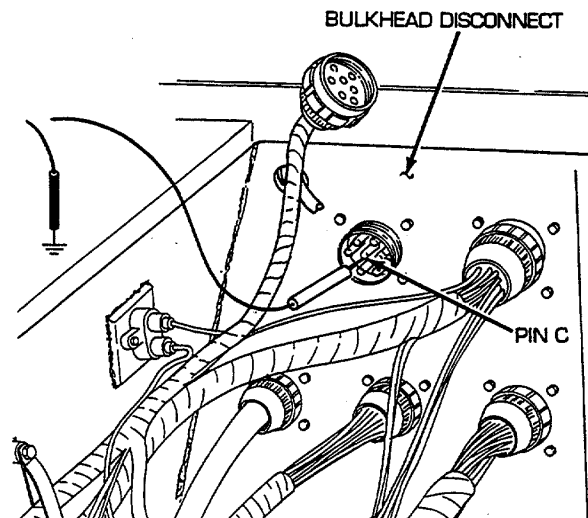
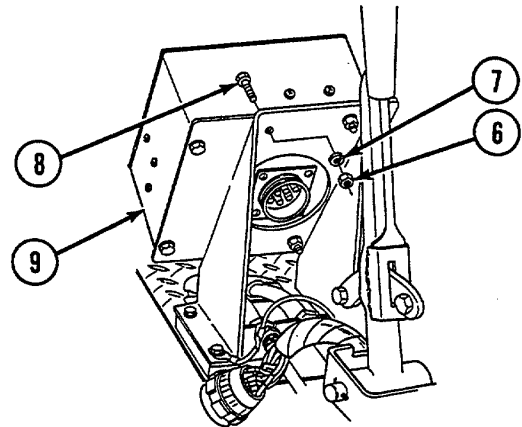
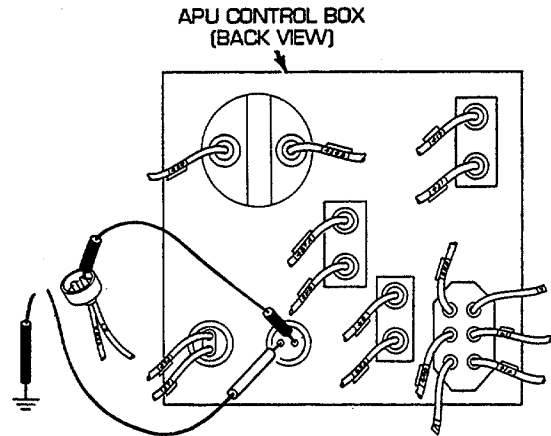
2-19 ELECTRICAL TROUBLESHOOTING-Continued

APU LOW OIL PRESSURE SYSTEM-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

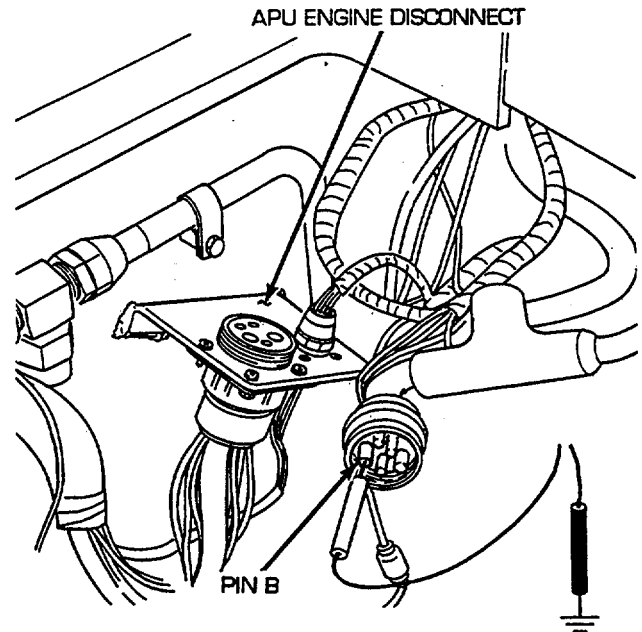
- K Place a jumper wire from wire 27 to terminal of LOW OIL PRESS lamp. Place red lead of multimeter on terminal of lamp and black lead to ground. Turn MASTER and APU FUEL SHUTOFF switches on and check for voltage. Turn MASTER and APU FUEL SHUTOFF switches OFF. If voltage is present, repair/replace wire 420A of APU control box wiring harness (see paragraph 13-7). If voltage is not present, replace lamp socket (see paragraph 13-7).
- L Install APU control box (9), four screws (8), four lockwashers (7), and four nuts (6) to mounting bracket. Reconnect APU control box to foot dimmer switch and bulkhead wiring harness to APU control box. Disconnect bulkhead to APU, master relay, and rigger's lights wiring harness from bulkhead disconnect. Place red lead of multimeter on pin C of wire 420A and black lead to ground. Turn MASTER and APU FUEL SHUTOFF switches ON and check for voltage. Turn MASTER and APU FUEL SHUTOFF switches OFF. If voltage is present, go to step M. If voltage is not present, repair/replace wire 420A of APU control box to foot dimmer switch and bulkhead wiring harness (see paragraph 6-79 for dual voltage; 6-80 for single voltage).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- M Reconnect bulkhead to APU, master relay, and rigger's lights wiring harness to bulkhead disconnect. Open center-front air inlet doors (TM 9-2350-256-10). Disconnect bulkhead to APU, master relay, and rigger's lights wiring harness from APU engine disconnect. Place red lead of multimeter on pin B of wire 420A and black lead to ground. Turn MASTER and APU FUEL SHUTOFF switches ON and check for voltage. Turn MASTER and APU FUEL SHUTOFF switches OFF. If voltage is present, notify Direct Support Maintenance. If voltage is not present, repair/replace wire 420A of bulkhead to APU, master relay, and rigger's lights wiring harness (see paragraph 6-75 for dual voltage; 6-76 for single voltage).



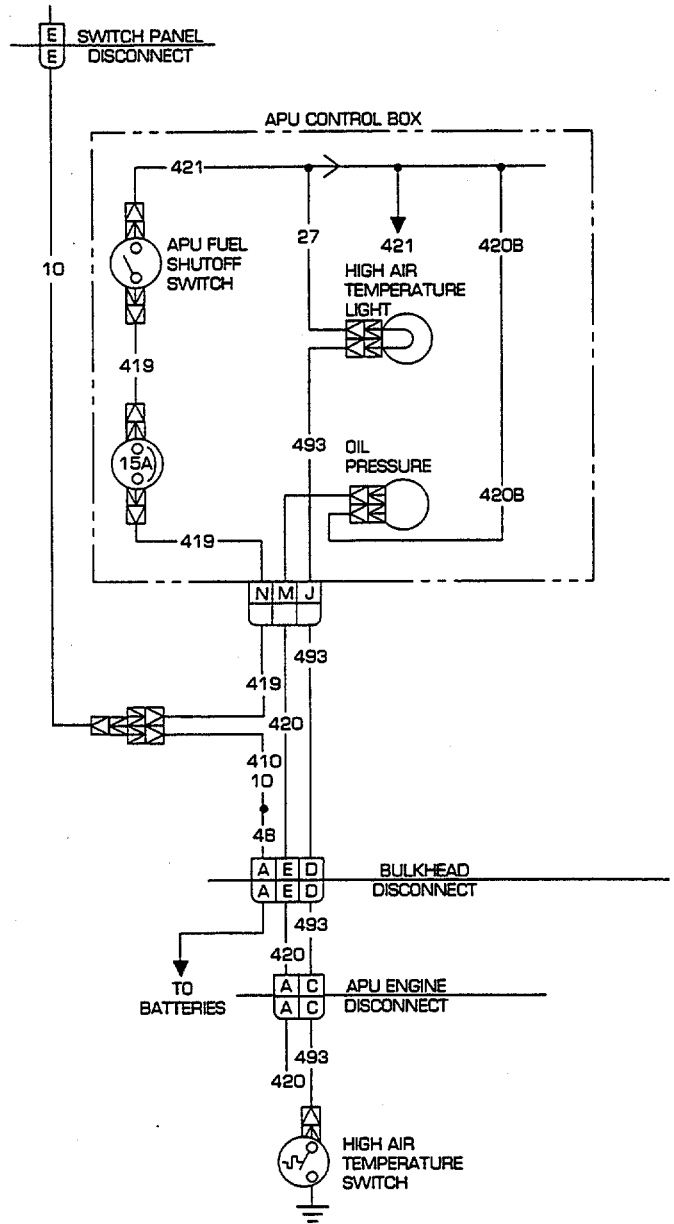
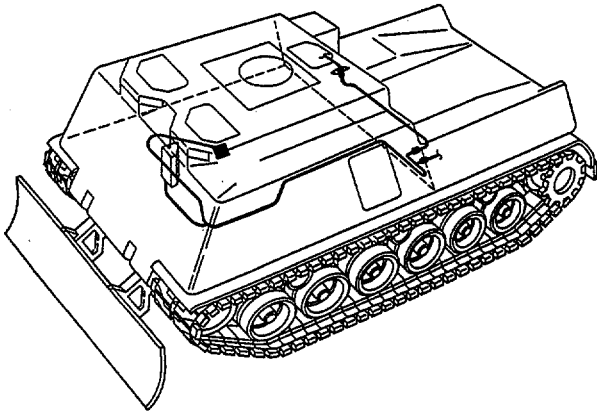
2-19 ELECTRICAL TROUBLESHOOTING-Continued

APU HIGH AIR TEMPERATURE SYSTEM

SYMPTOMS

APU HIGH AIR TEMP lamp does not light when air temperature is high.

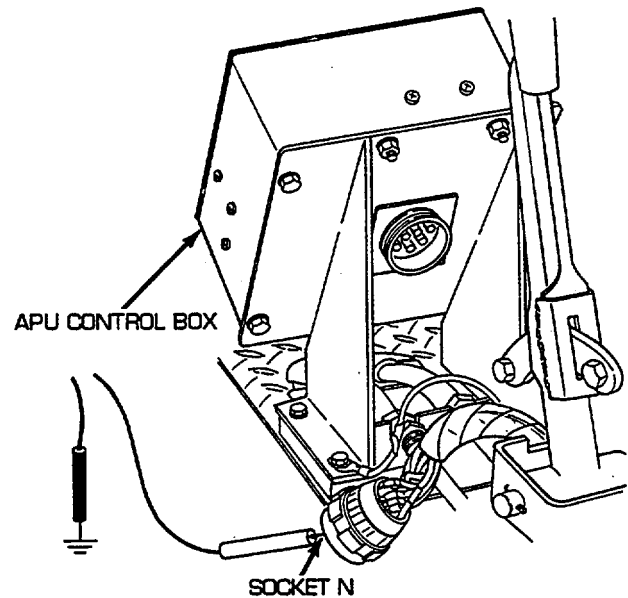
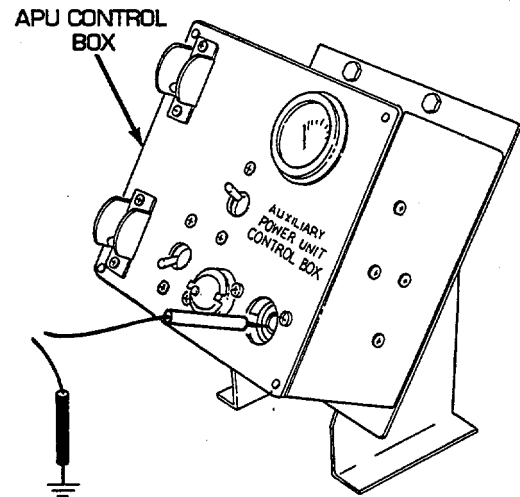
Do steps A through M.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Remove lamp from socket. Place red lead of multimeter in socket and black lead to ground. Turn MASTER and APU FUEL SHUTOFF switches ON, and check for voltage. Turn MASTER and APU FUEL SHUTOFF switches OFF. If voltage is present, replace lamp (see paragraph 13-7). If voltage is not present, go to step B.
- B Disconnect APU control box to foot dimmer switch and bulkhead wiring harness from APU control box. Place red lead of multimeter in socket N of wire 419 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step E. If voltage is not present, go to step C.



2-19 ELECTRICAL TROUBLESHOOTING-Continued

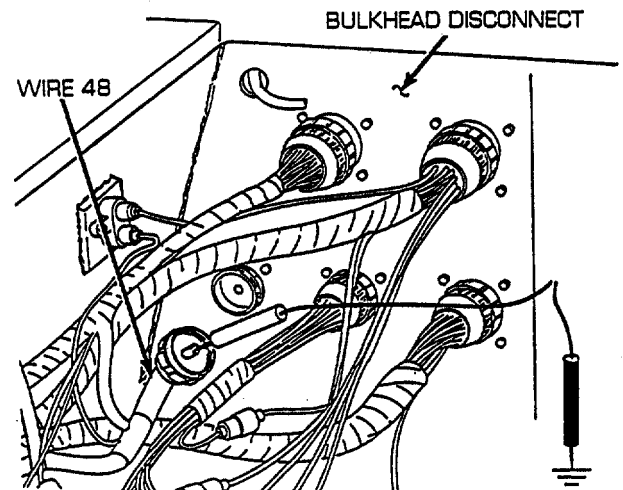
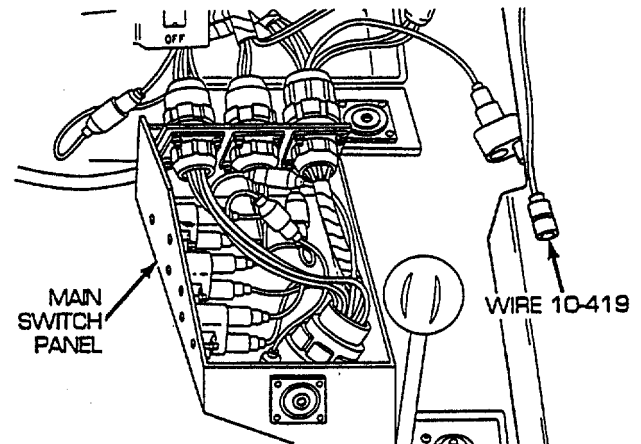
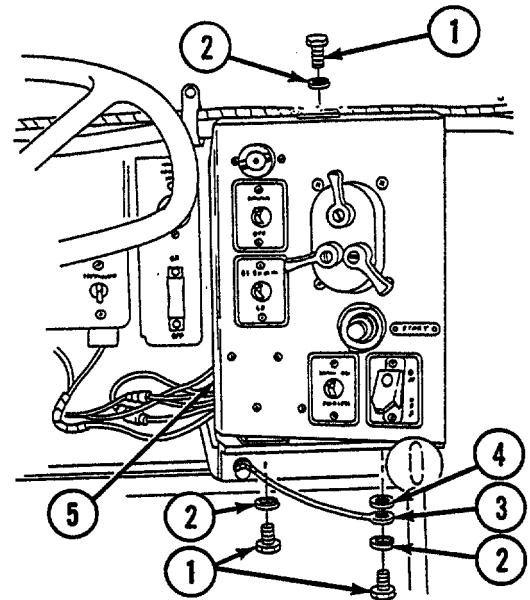
APU HIGH AIR TEMPERATURE SYSTEM-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

C Reconnect APU control box to foot dimmer switch and bulkhead wiring harness to APU control box. Remove three screws (1), three lockwashers (2), ground wire (3), and flat washer (4) and release main switch panel (5) from mounting bracket. Disconnect wire 10-419 from Y-connector of switch panel, radio, and bilge pump to bulkhead wiring harness at main switch panel. Turn MASTER switch on, and check for voltage. If voltage is present, repair wire 419 from Y-connector at main switch panel to APU control box bulkhead wiring harness. If voltage is not present, go to step D.

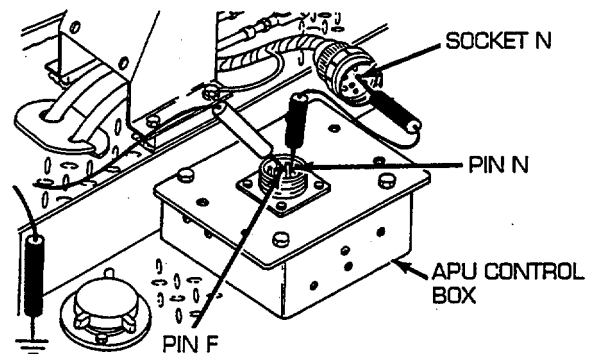
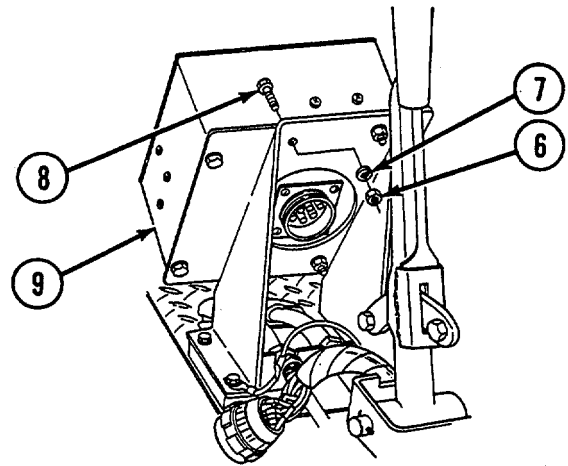
D Reconnect wire 10-419 to Y-connector of switch panel, radio, and bilge pump to bulkhead wiring harness to main switch panel. Install main switch panel (5), flat washer (4), ground wire (3), three lockwashers (2), and three screws (1) to mounting bracket. Open air inlet doors (TM 9-2350-256-10). Disconnect wire 48 pin A from bulkhead to master relay wiring harness. Place red multimeter lead in socket and black lead to ground. Turn MASTER switch on and check for voltage. If voltage is present, repair/replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay circuit (see paragraph 2-19, master relay fails to operate).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- E Remove four nuts (6), four lockwashers (7), and four screws (8), and release APU control box (9) from mounting bracket. Place a jumper wire from pin N to socket N. Place red lead of multimeter on pin J of wire 493 and black lead to ground. Turn MASTER APU FUEL SHUTOFF switches ON, and check for voltage. Turn MASTER and APU FUEL SHUTOFF switches OFF. If voltage is present, go to step L. If voltage is not present, go to step F.



2-19 ELECTRICAL TROUBLESHOOTING-Continued

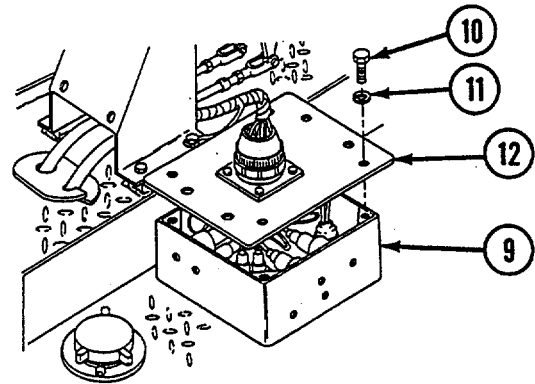
APU HIGH AIR TEMPERATURE SYSTEM-Continued

WARNING

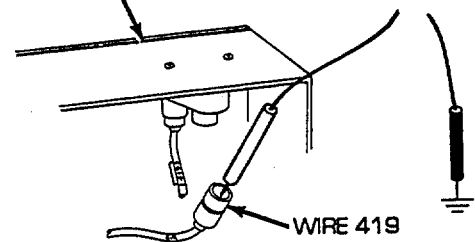
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

F Reconnect APU control box to foot dimmer switch and bulkhead wiring harness to APU control box. Remove four screws (10), four lockwashers (11), and pull rear panel (12) from APU control box (9). Disconnect wire 419 from panel connector side of 15 A circuit breaker. Place red lead of multimeter in wire 419 and black lead to ground. Turn MASTER switch on, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step G. If voltage is not present, repair/replace wire 419 of APU control box wiring harness (see paragraph 13-7).

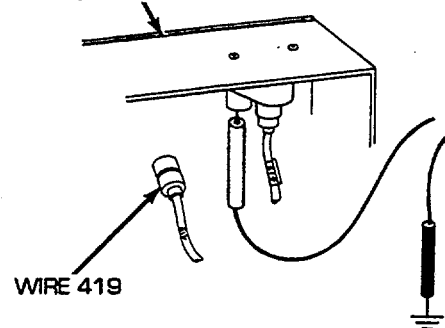
G Reconnect wire 419 to panel connector side of 15 A circuit breaker. Disconnect wire 419 from APU FUEL SHUTOFF switch side of 15 A circuit breaker. Place red lead of multimeter on terminal of circuit breaker and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step H. If voltage is not present, replace 15 A circuit breaker (see paragraph 13-7).



APU CONTROL BOX
(BACK VIEW)



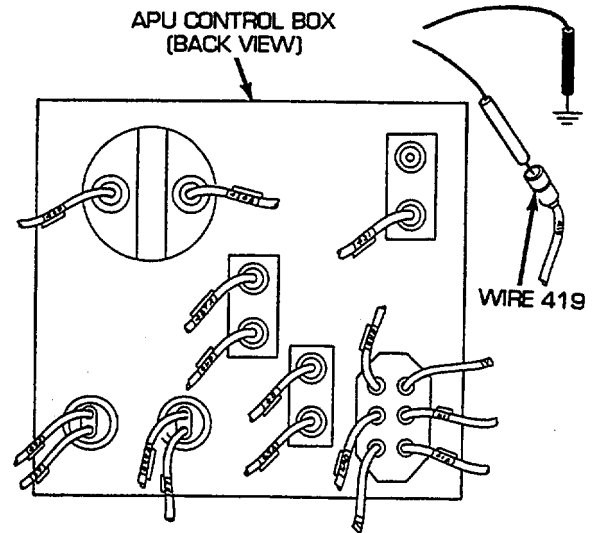
APU CONTROL BOX
(BACK VIEW)



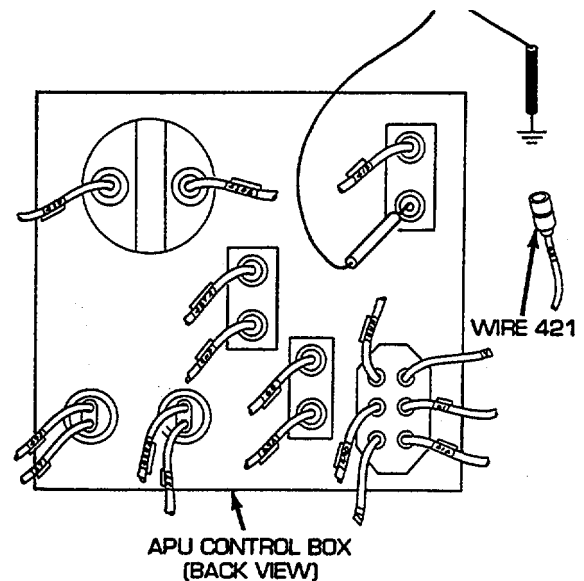
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

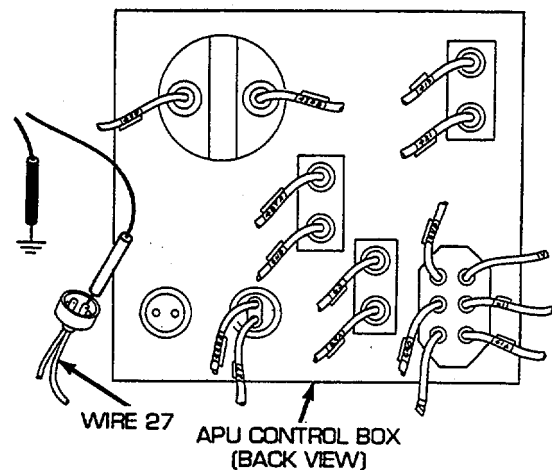
H Reconnect wire 419 to APU FUEL SHUTOFF switch side of 15 A circuit breaker. Disconnect wire 419 from circuit breaker side of APU FUEL SHUTOFF switch. Place red lead of multimeter in wire 419 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step I. If voltage is not present, repair/replace wire 419 of APU control box wiring harness (see paragraph 13-7).



I Reconnect wire 419 to circuit breaker side of APU FUEL SHUTOFF switch. Disconnect wire 421 from APU FUEL SHUTOFF switch. Place red lead of multimeter in terminal of APU FUEL SHUTOFF switch and black lead to ground. Turn MASTER and APU FUEL SHUTOFF switches ON and check for voltage. Turn MASTER and APU FUEL SHUTOFF switches OFF. If voltage is present, go to step J. If voltage is not present, replace APU FUEL SHUTOFF switch (see paragraph 13-7).



J Reconnect wire 421 to APU FUEL SHUTOFF switch. Disconnect connector from HIGH AIR TEMP lamp. Place red lead of multimeter on wire 27 and black lead to ground. Turn MASTER and APU FUEL SHUTOFF switches ON and check for voltage. Turn MASTER and APU FUEL SHUTOFF switches OFF. If voltage is present, go to step K. If voltage is not present, repair/replace wire 421/27 of APU control box wiring harness (see paragraph 13-7).



2-19 ELECTRICAL TROUBLESHOOTING-Continued

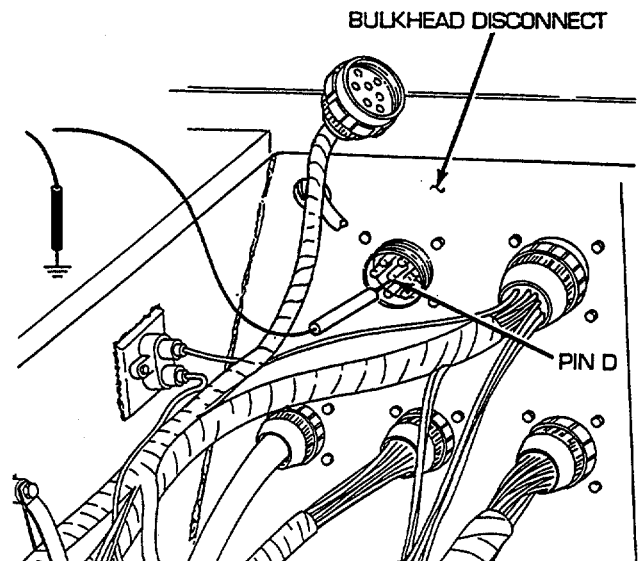
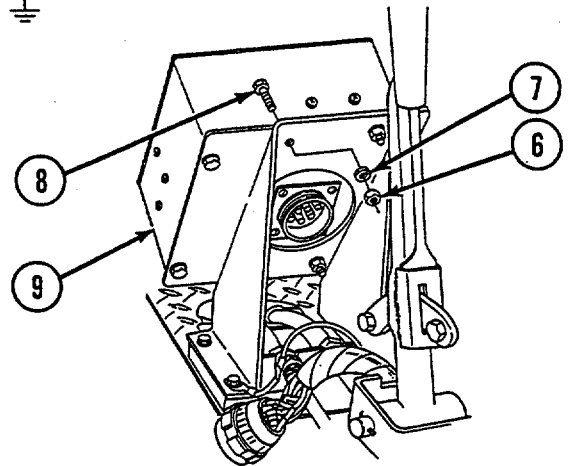
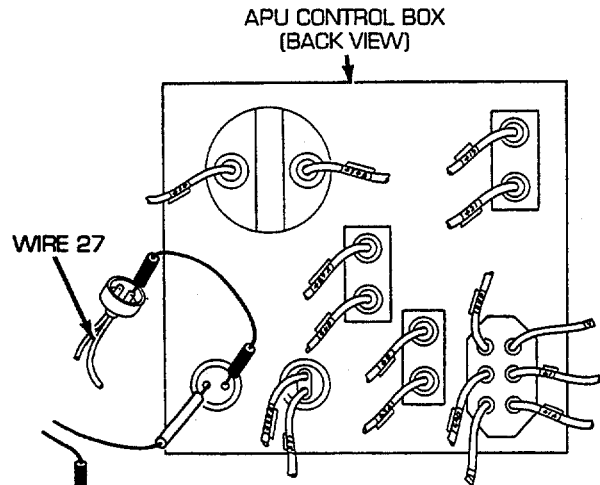
APU HIGH AIR TEMPERATURE SYSTEM-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- K Place a jumper wire from wire 27 to terminal of HIGH AIR TEMP lamp. Place red lead of multimeter on terminal of lamp and black lead to ground. Turn MASTER and APU FUEL SHUTOFF switches ON and check for voltage. Turn MASTER and APU FUEL SHUTOFF switches OFF. If voltage is present, repair/replace wire 493 of APU control box wiring harness (see paragraph 13-7). If voltage is not present, replace HIGH AIR TEMP lamp (see paragraph 13-7).

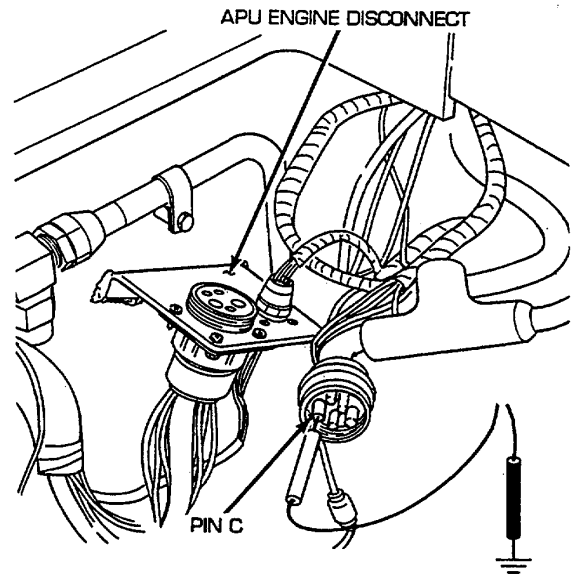
- L Reconnect APU control box to foot dimmer switch and bulkhead wiring harness APU control box. Install APU control box (9), four screws (8), four lockwashers (7), and four nuts (6) to mounting bracket. Open air inlet doors. Disconnect bulkhead to APU, master relay, and rigger's lights wiring harness from bulkhead disconnect. Place red lead of multimeter on pin D of wire 493 and black lead to ground. Turn MASTER and APU FUEL SHUTOFF switches ON and check for voltage. Turn MASTER and APU FUEL SHUTOFF switches OFF. If voltage is present, go to step M. If voltage is not present, repair/replace wire 493 of APU control box to foot dimmer switch and bulkhead wiring harness (see paragraph 6-79 for dual voltage; 6-80 for single voltage).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

M Reconnect bulkhead to APU, master relay, and rigger's lights wiring harness to bulkhead disconnect. Open center-front air inlet doors (TM 9- 2350-256-10). Disconnect bulkhead to APU, master relay, and rigger's lights wiring harness from APU engine disconnect. Place red lead of multimeter on pin C of wire 493 and black lead to ground. Turn MASTER and APU FUEL SHUTOFF switches ON and check for voltage. Turn MASTER and APU FUEL SHUTOFF switches OFF. If voltage is present, notify Direct Support Maintenance. If voltage is not present, repair/replace wire 493 of bulkhead to APU, master relay, and rigger's lights wiring harness (see paragraph 6-75 for dual voltage; 6-76 for single voltage).



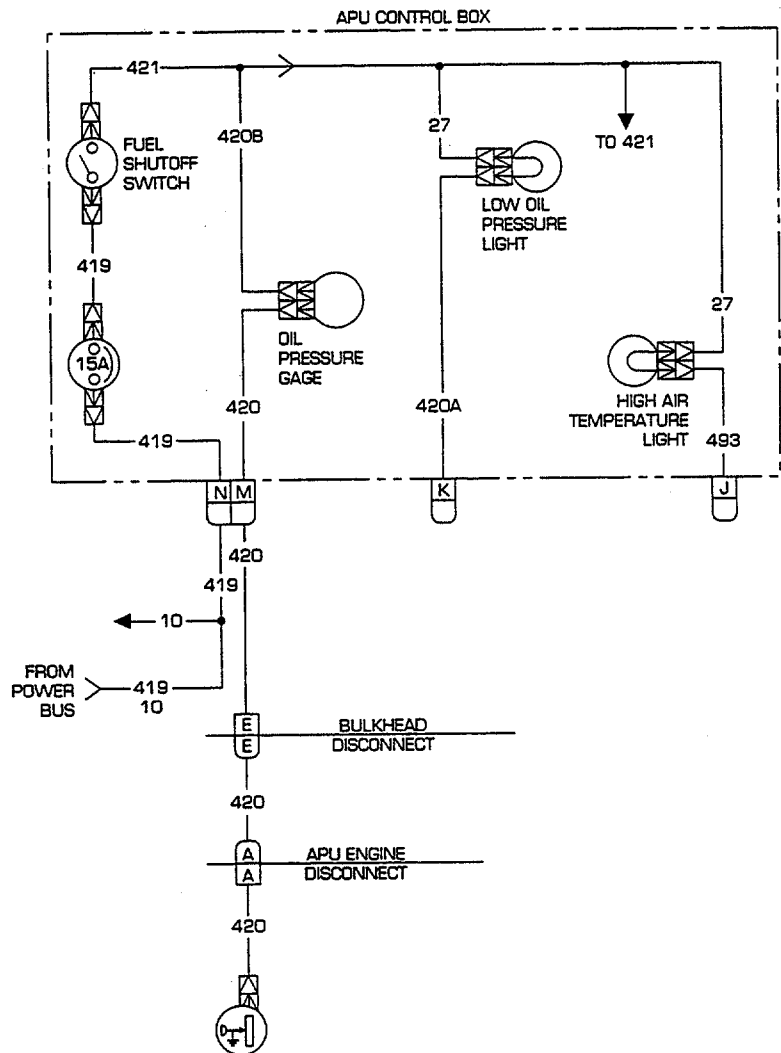
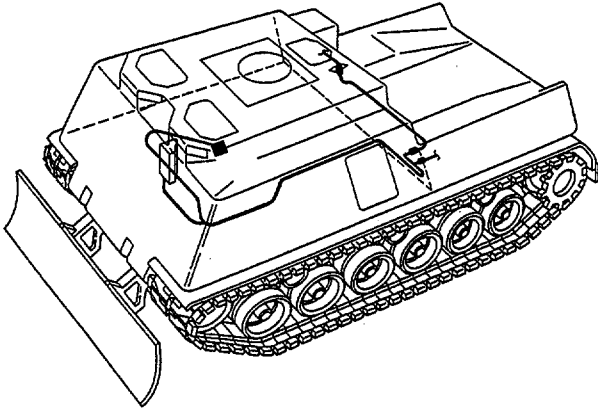
2-19 ELECTRICAL TROUBLESHOOTING-Continued

APU ENGINE OIL PRESSURE GAGE CIRCUIT

SYMPTOM

APU ENGINE OIL PRESSURE gage fails to operate.

Do steps A through L.

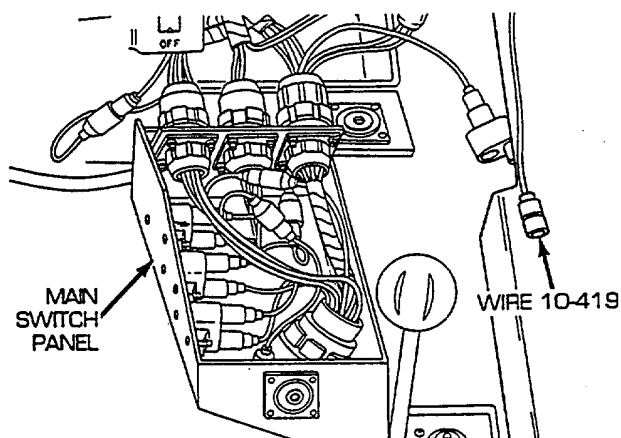
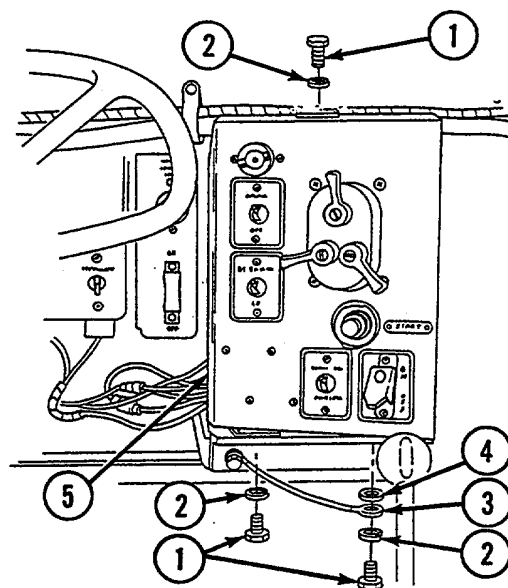
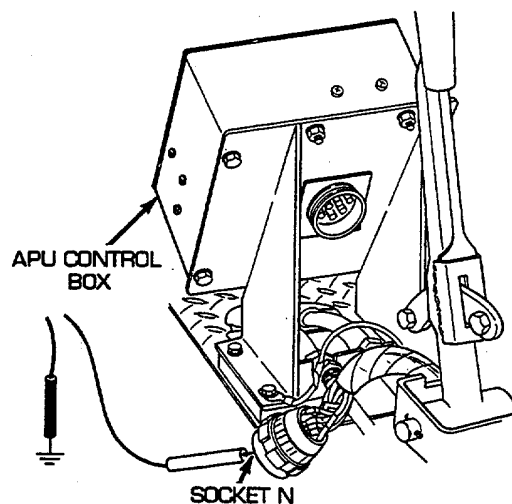


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

A Disconnect APU control box to foot dimmer switch and bulkhead wiring harness from APU control box. Place red lead of multimeter in socket N, wire 419 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step D. If voltage is not present, go to step B.

B Reconnect APU control box to foot dimmer switch and bulkhead wiring harness to APU control box. Remove three screws (1), three lockwashers (2), ground wire (3), and flat washer (4) and release main switch panel (5) from mounting bracket. Disconnect wire 10-419 from Y-connector of switch panel, radio, and bilge pump to bulkhead wiring harness at main switch panel. Turn MASTER switch on, and check for voltage. If voltage is present, repair wire 419 from Y-connector at main switch panel to APU control box bulkhead wiring harness. If voltage is not present, go to step C.



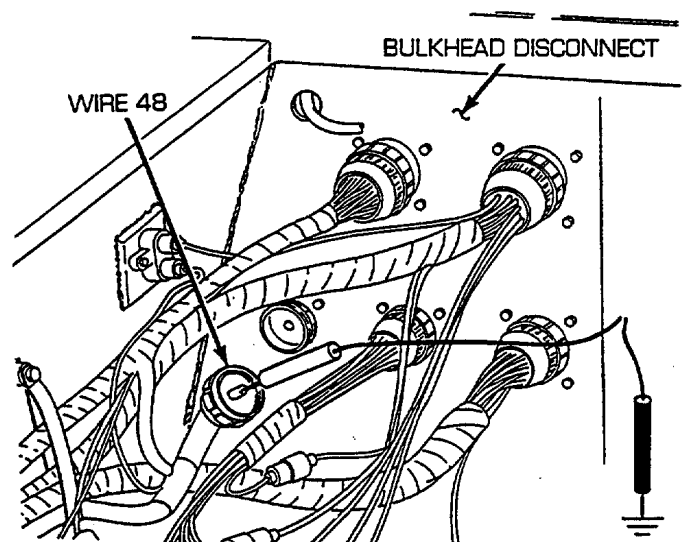
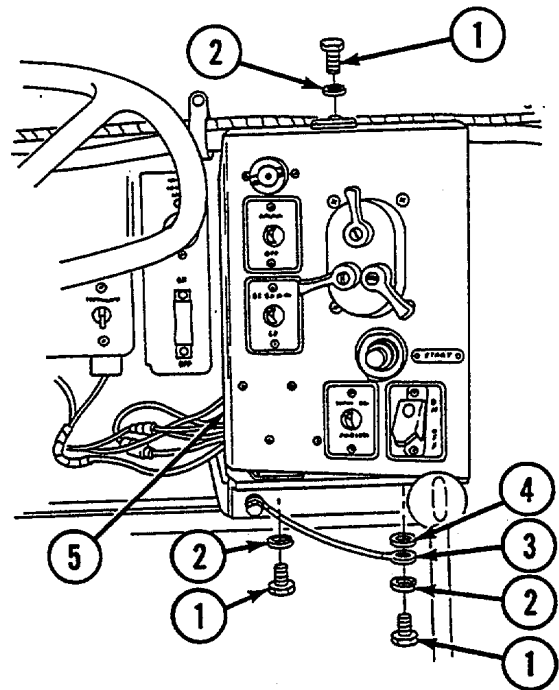
2-19 ELECTRICAL TROUBLESHOOTING-Continued

APU ENGINE OIL PRESSURE GAGE CIRCUIT-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

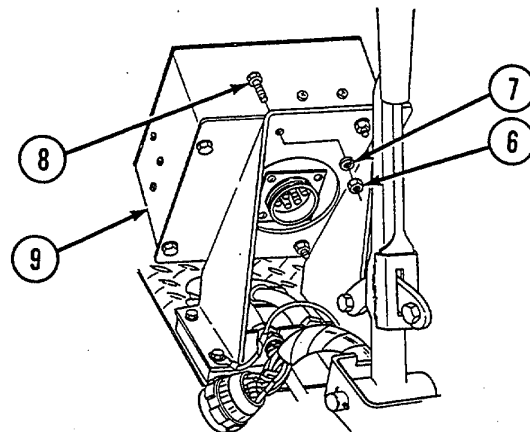
- C Reconnect wire 10-419 to Y-connector of switch panel, radio, and bilge pump to bulkhead wiring harness to main switch panel. Install main switch panel (5), flat washer (4), ground wire (3), three lockwashers (2), and three screws (1) to mounting bracket. Disconnect wire 48 pin A from bulkhead to master relay wiring harness. Place red multimeter lead in socket and black lead to ground. Turn MASTER switch on and check for voltage. If voltage is present, repair/replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay circuit (see paragraph 2-19, master relay fails to operate).



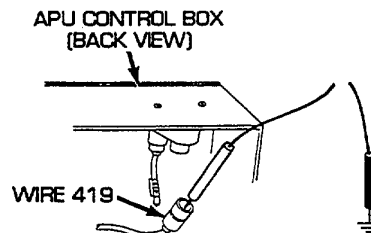
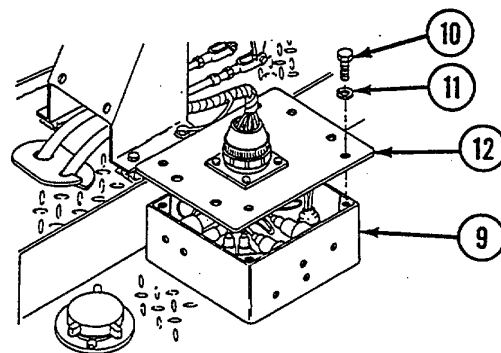
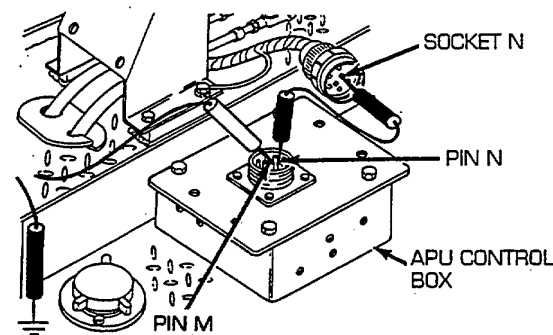
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

D Remove four nuts (6), four lockwashers (7), and four screws (8), and release APU control box (9) from mounting bracket. Place a jumper wire from pin N to socket N. Place red lead of multimeter on pin M of wire 420 and black lead to ground. Turn MASTER and APU FUEL SHUTOFF switches ON, and check for voltage. Turn MASTER and APU FUEL SHUTOFF switches OFF. If voltage is present, go to step K. If voltage is not present, go to step E.



E Reconnect APU control box to foot dimmer switch and bulkhead wiring harness to APU control box. Remove four nuts (10) and four lockwashers (11), and pull rear panel (12) from APU control box (9). Disconnect wire 419 from panel connector side 15 A circuit breaker. Place red lead of multimeter in wire 419 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step F. If voltage is not present, repair/replace wire 419 of APU control box wiring harness (see paragraph 13-7).



2-19 ELECTRICAL TROUBLESHOOTING-Continued

APU ENGINE OIL PRESSURE GAGE CIRCUIT--Continued

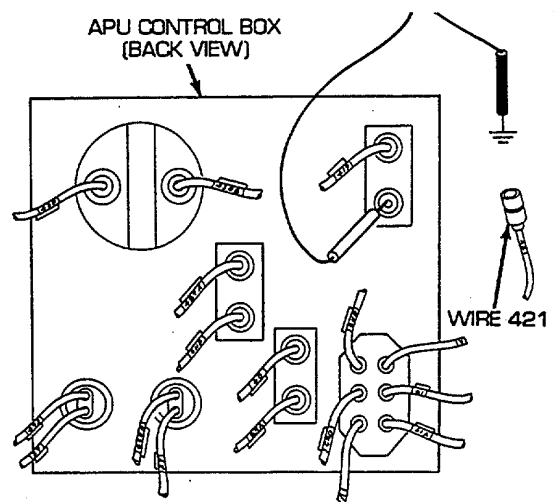
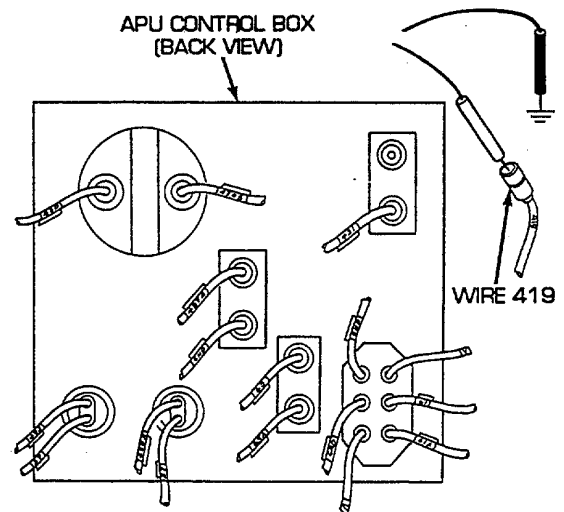
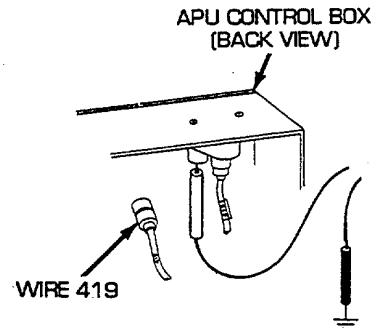
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

F Reconnect wire 419 to panel connector side of 15 A circuit breaker. Disconnect wire 419 from APU FUEL SHUTOFF switch side of 15 A circuit breaker. Place red lead of multimeter on terminal of circuit breaker and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step G. If voltage is not present, replace 15 A circuit breaker (see paragraph 13-7).

G Reconnect wire 419 to 15 A circuit breaker. Disconnect wire 419 from circuit breaker side of APU FUEL SHUTOFF switch. Place red lead of multimeter in wire 419 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step H. If voltage is not present, repair/replace wire 419 of APU fuel shutoff lead assembly (see paragraph 13-7).

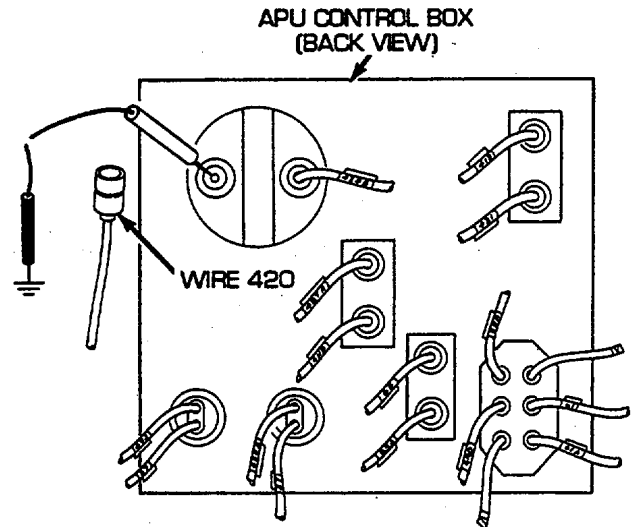
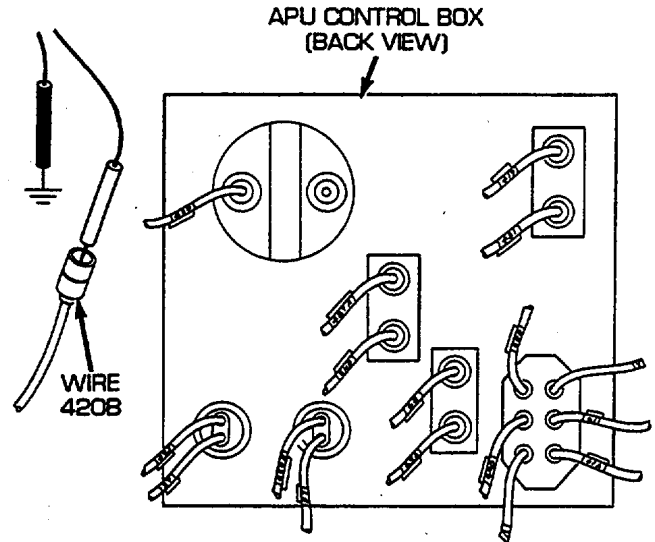
H Reconnect wire 419 to circuit breaker side of APU FUEL SHUTOFF switch. Disconnect wire 421 from APU FUEL SHUTOFF switch. Place red lead of multimeter on terminal of APU FUEL SHUTOFF switch and black lead to ground. Turn MASTER and APU FUEL SHUTOFF switches ON and check for voltage. Turn MASTER and APU FUEL SHUTOFF switches OFF. If voltage is present, go to step I. If voltage is not present, replace APU FUEL SHUTOFF switch (see paragraph 13-7).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- I Reconnect wire 421 to APU FUEL SHUTOFF switch. Disconnect wire 420B from ENGINE OIL PRESSURE gage. Place red lead of multimeter in wire 420B and black lead to ground. Turn MASTER and APU FUEL SHUTOFF switches ON and check for voltage. Turn MASTER and APU FUEL SHUTOFF switches OFF. If voltage is present, go to step J. If voltage is not present, repair/replace wire 421/420B of APU control box wiring harness (see paragraph 13-7).
- J Reconnect wire 420B to ENGINE OIL PRESSURE gage. Disconnect wire 420 from ENGINE OIL PRESSURE gage. Place red lead of multimeter on terminal of gage and black lead to ground. Turn MASTER and APU FUEL SHUTOFF switches ON and check for voltage. Turn MASTER and APU FUEL SHUTOFF switches OFF. If voltage is present, repair/replace wire 420 of APU control box wiring harness (see paragraph 13-7). If voltage is not present, replace ENGINE OIL PRESSURE gage (see paragraph 13-7).



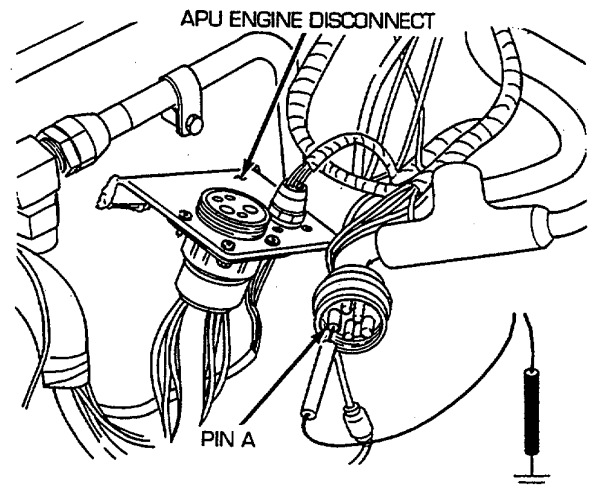
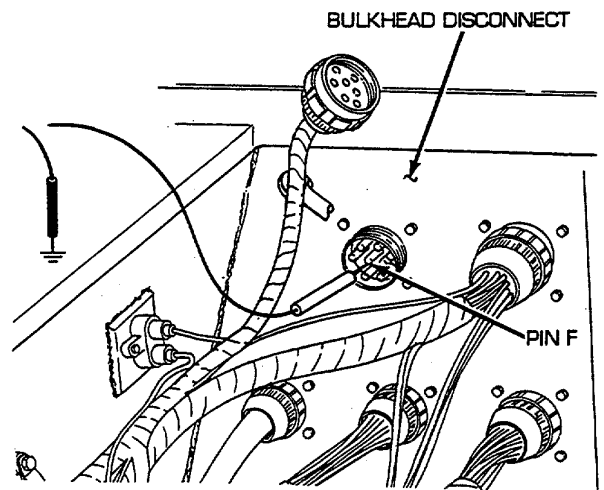
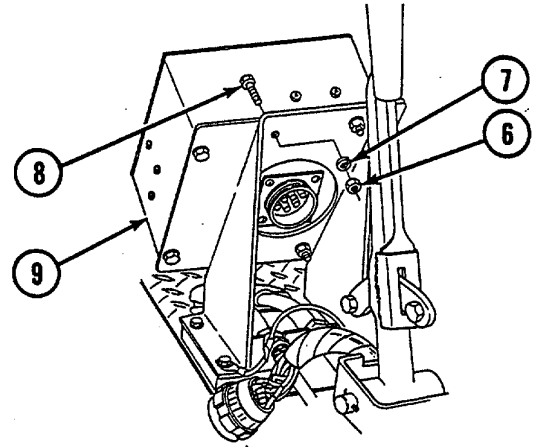
2-19 ELECTRICAL TROUBLESHOOTING-Continued

APU ENGINE OIL PRESSURE GAGE CIRCUIT-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- K Install APU control box (9), four screws (8), four lockwashers (7), and four nuts (6) to mounting bracket. Open air inlet doors (TM 9-2350-256-10). Reconnect APU control box to foot dimmer switch and bulkhead wiring harness to APU control box. Disconnect bulkhead to APU, master relay, and rigger's lights wiring harness from bulkhead disconnect. Place red lead of multimeter on pin E and black lead to ground. Turn MASTER and APU FUEL SHUTOFF switches ON and check for voltage. Turn MASTER and APU FUEL SHUTOFF switches OFF. If voltage is present, go to step L. If voltage is not present, repair/replace wire 420 of APU control box to foot dimmer switch and bulkhead wiring harness (see paragraph 6-79 for dual voltage; 6-80 for single voltage).
- L Reconnect bulkhead to APU, master relay, and rigger's lights wiring harness to bulkhead disconnect. Open center-front air inlet doors (TM 9-2350-256-10). Disconnect bulkhead to APU, master relay, and rigger's lights wiring harness from APU engine disconnect. Place red lead of multimeter on pin A of wire 420 and black lead to ground. Turn MASTER and APU FUEL SHUTOFF switches ON and check for voltage. Turn MASTER and APU FUEL SHUTOFF switches OFF. If voltage is present, notify Direct Support Maintenance. If voltage is not present, repair/replace wire 420 of bulkhead to APU, master relay, and rigger's lights wiring harness (see paragraph 6-75 for dual voltage; 6-76 for single voltage).



MECHANICAL TRANSMISSION OIL PRESSURE LIGHT

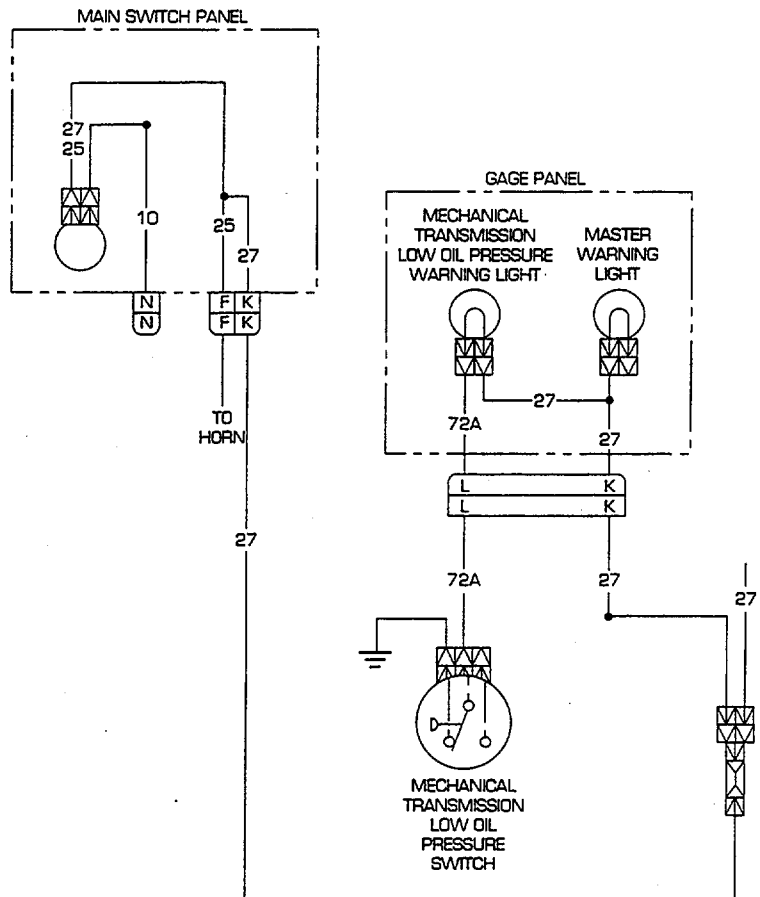
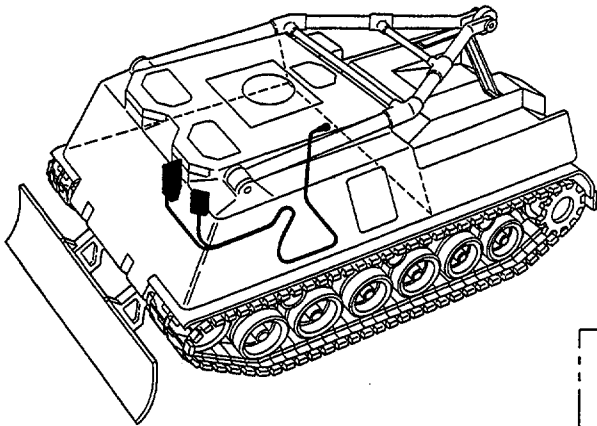
SYMPTOMS

Mechanical transmission oil pressure warning light does not go out with mechanical transmission operating.

Do steps A through M.

Mechanical transmission oil pressure warning light fails to operate with mechanical transmission stopped.

Do steps D through M.



2-19 ELECTRICAL TROUBLESHOOTING-Continued

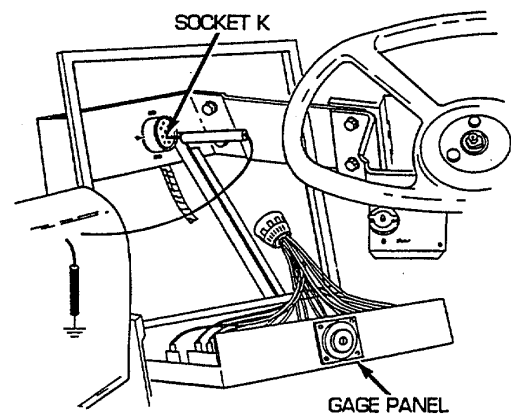
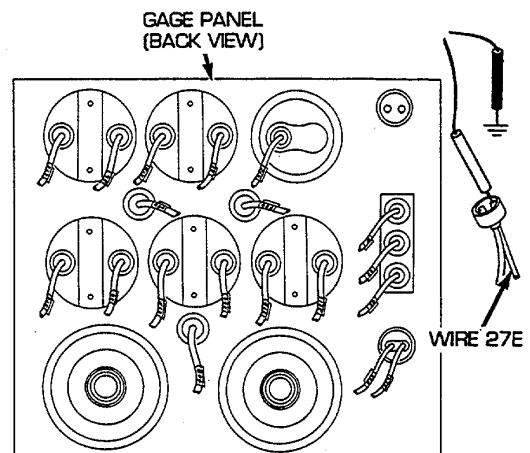
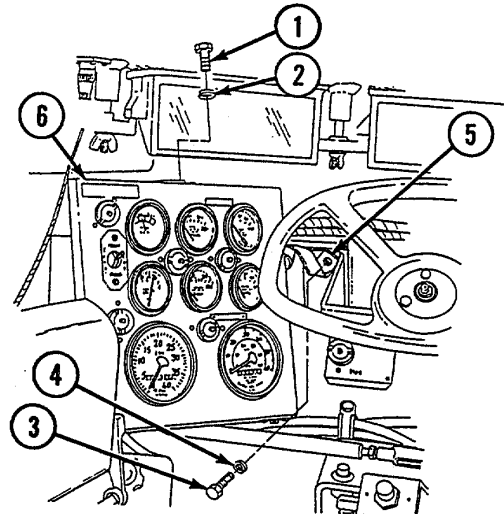
MECHANICAL TRANSMISSION OIL PRESSURE LIGHT-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

A Remove three screws (1), three lockwashers (2), two screws (3), two lockwashers (4), and ground strap (5), and release gage panel (6) from mounting brackets. Disconnect connector from MECH TRANSMISSION OIL PRESSURE light. Place red lead of multimeter in wire 27E and black lead to ground. Turn MASTER switch on, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step K. If voltage is not present, go to step B.

B Reconnect connector to MECH TRANSMISSION OIL PRESSURE light. Disconnect gage panel to bulkhead wiring harness from gage panel. Place red lead of multimeter in socket K of wire 27 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 27/27K of gage panel wiring harness (see paragraph 6-44). If voltage is not present, go to step C.

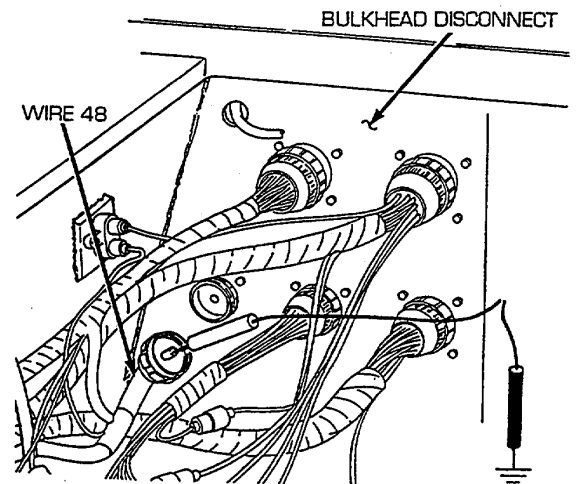
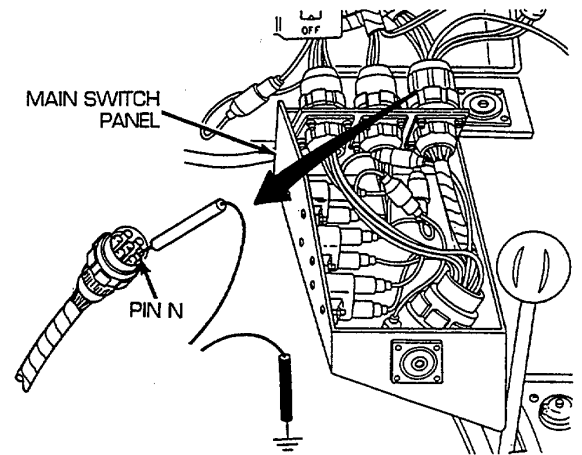
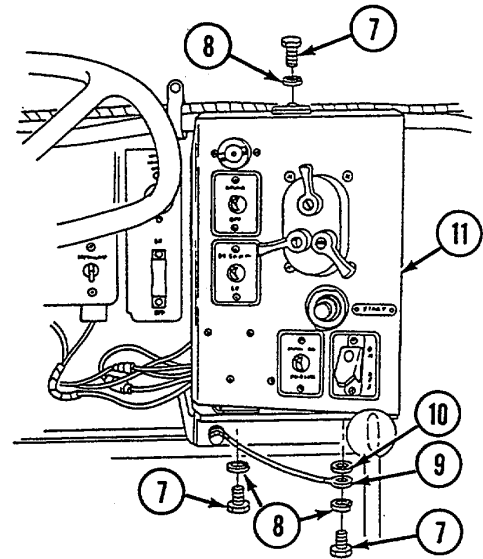


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

C Reconnect gage panel to bulkhead wiring harness to gage panel. Install ground strap (5), two lockwashers (4), two screws (3), gage panel (6), three lockwashers (2), and three screws (1) to mounting brackets. Remove three screws (7), three lockwashers (8), ground lead (9), and flat washer (10), and release main switch panel (11) from mounting brackets. Disconnect switch panel to gage panel and miscellaneous switches wiring harness from switch panel. Place red lead of multimeter in pin N and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step E. If voltage is not present, go to step D.

D Reconnect switch panel to gage panel and miscellaneous switches wiring harness to switch panel. Install main switch panel (11), flat washer (10), ground lead (9), three lockwashers (8), and three screws (7) to mounting brackets. Open air inlet doors (TM 9-2350-256-10). Disconnect switch panel, radio, and bilge pump to bulkhead wiring harness from bulkhead disconnect. Place red lead of multimeter in socket A wire 48 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay (see paragraph 2-19, master relay fails to operate).



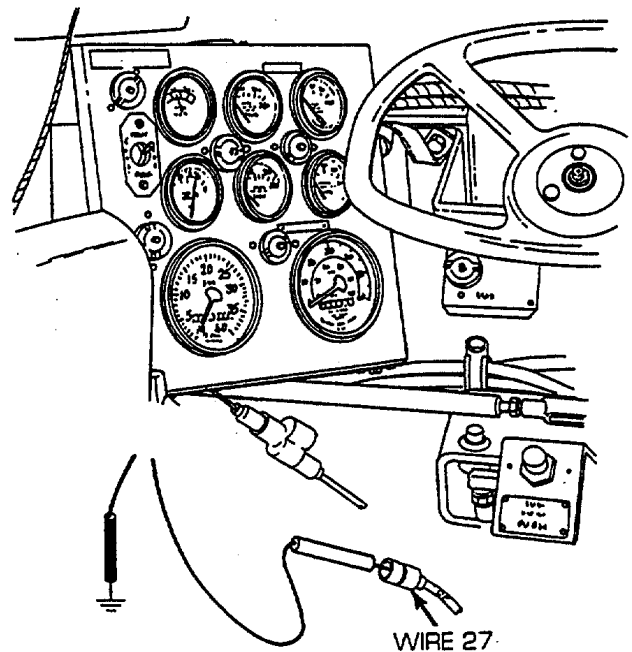
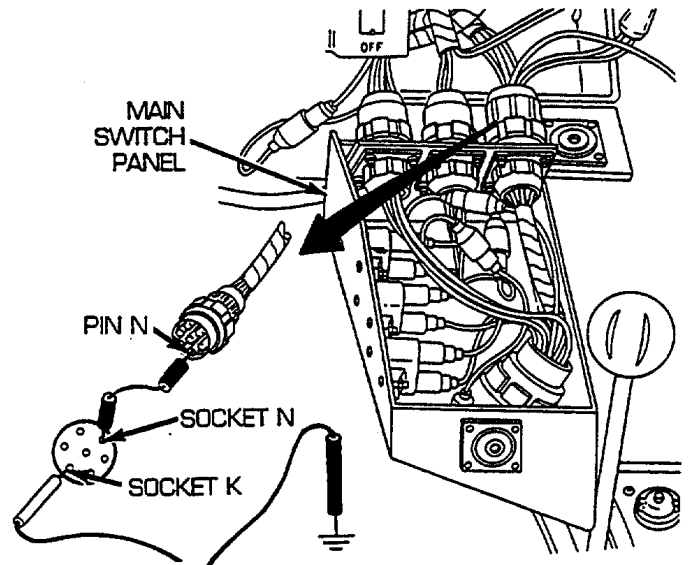
2-19 ELECTRICAL TROUBLESHOOTING-Continued

MECHANICAL TRANSMISSION OIL PRESSURE LIGHT-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

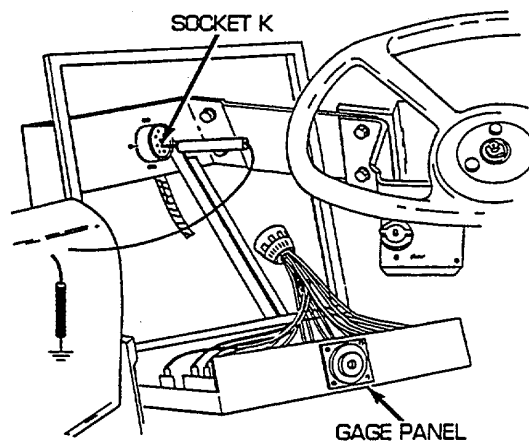
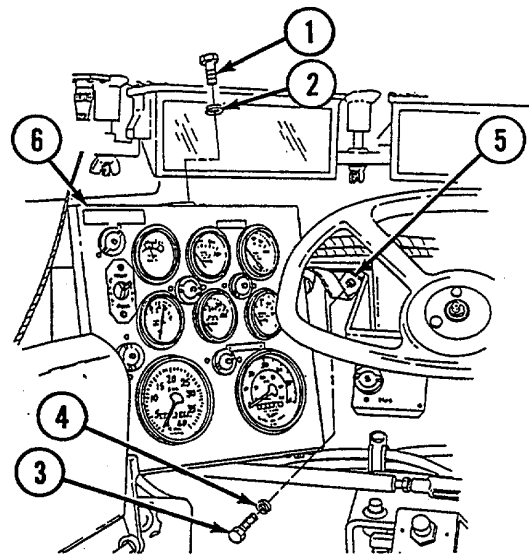
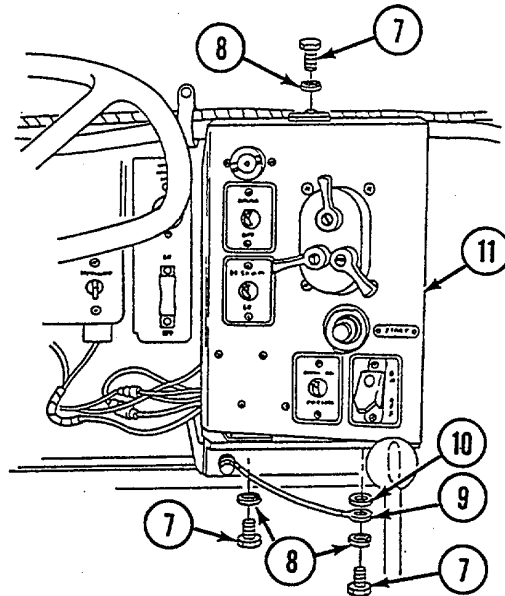
- E Place jumper wire from socket N to pin N. Place red lead of multimeter in socket K of switch panel and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step F. If voltage is not present, go to step H.
- F Reconnect switch panel to gage panel and miscellaneous switches wiring harness to switch panel. Disconnect wire 27 from Y-connector. Place red multimeter lead on wire 27 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step G. If voltage is not present, repair/replace wire 27 of switch panel to gage panel and miscellaneous switches wiring harness (see paragraph 6-55 for dual voltage; 6-56 for single voltage).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- G Reconnect wire 27 at Y-connector. Install main switch panel (11), flat washer (10), ground lead (9), three lockwashers (8), and three screws (7) to mounting brackets. Remove three screws (1), three lockwashers (2), two screws (3), two lockwashers (4), and ground strap (5) and release gage panel (6) from mounting brackets. Disconnect switch panel to gage panel and miscellaneous switches wiring harness from gage panel. Place red multimeter on socket K and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step L. If voltage is not present, repair/replace wire 27 of switch panel to gage panel and miscellaneous switches wiring harness (see paragraph 6-55 for dual voltage; 6-56 for single voltage).



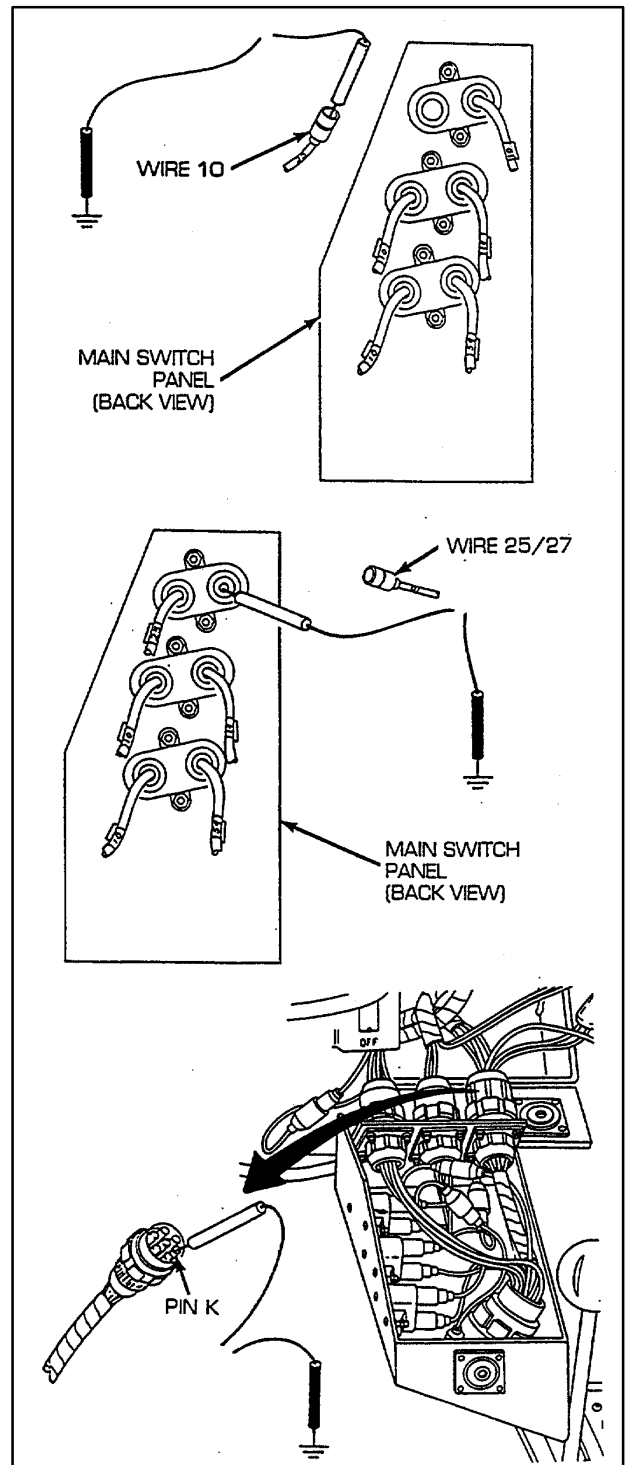
2-19 ELECTRICAL TROUBLESHOOTING-Continued

MECHANICAL TRANSMISSION OIL PRESSURE LIGHT--Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- H Reconnect switch panel to gage panel and miscellaneous switches wiring harness to switch panel. Disconnect wire 10 from 15 A circuit breaker. Place red lead of multimeter on wire 10 and black lead to ground. Turn MASTER switch ON and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step I. If voltage is not present, repair/replace wire 10 of switch panel to gage panel and miscellaneous switches wiring harness (see paragraph 6-55 for dual voltage; 6-56 for single voltage).
- I Reconnect wire 10 to 15 A circuit breaker. Disconnect wire 25-27 from 15 A circuit breaker. Place red lead of multimeter on terminal of circuit breaker and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is not present, replace 15 A circuit breaker (see paragraph 6-10). If voltage is present, go to step J.
- J Reconnect wire 25-27 to 15 A circuit breaker. Disconnect main lighting and B.O. selector switch wiring harness. Place red lead of multimeter on pin K of wire 25-27 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is not present, repair/replace wire 25-27 of main lighting and B.O. selector switch wiring harness (see paragraph 6-69). If voltage is present, go to step K.



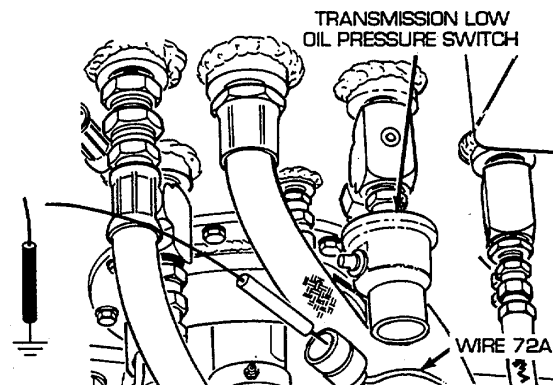
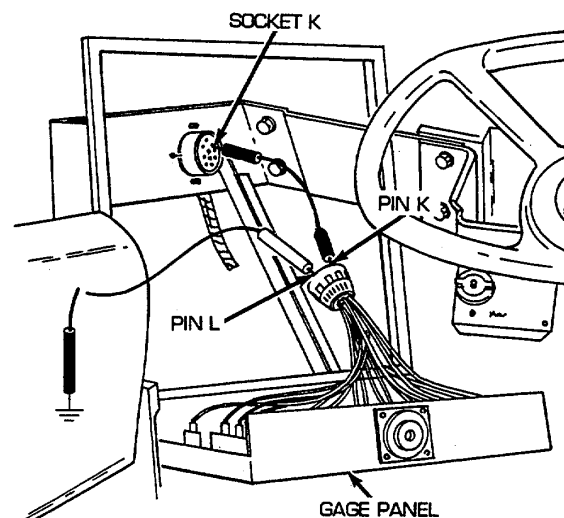
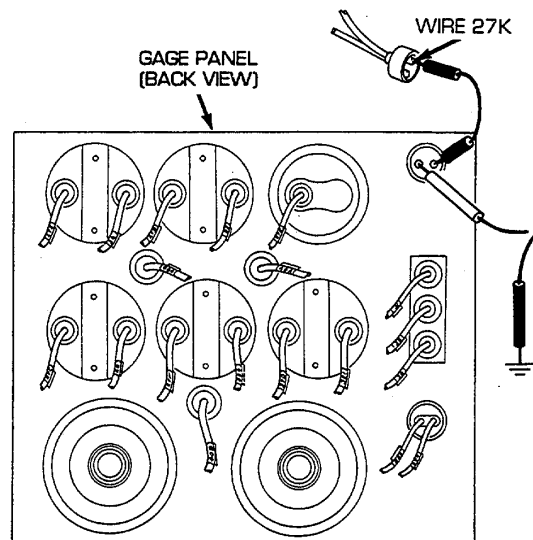
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

K Place jumper wire from wire 27K to terminal of MECH TRANSMISSION OIL PRESSURE light. Place red lead of multimeter on terminal of light and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step L. If voltage is not present, replace MECH TRANSMISSION OIL PRESSURE light (see paragraph 6-8).

L Reconnect connector to MECH TRANSMISSION OIL PRESSURE light. Disconnect gage panel to bulkhead wiring harness from gage panel. Place a jumper wire from pin K to socket K. Place red lead of multimeter on pin L of wire 72A and black lead to ground. Turn MASTER switch on, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step M. If voltage is not present, repair/replace wire 72A of gage panel wiring harness (see paragraph 6-44).

M Reconnect gage panel to bulkhead wiring harness to gage panel. Disconnect gage panel to bulkhead wiring harness from mechanical transmission low oil pressure switch. Place red lead of multimeter in wire 72A and black lead to ground. Turn MASTER switch on, and check for voltage. Turn MASTER switch OFF. If voltage is present, replace mechanical transmission low oil pressure switch (see paragraph 6-18). If light continues to remain lit, with the mechanical transmission operating, the mechanical transmission has low oil pressure. If voltage is not present, repair/replace wire 72A of gage panel to bulkhead wiring harness (see paragraph 6-45 for dual voltage; 6-46 for single voltage).



2-19 ELECTRICAL TROUBLESHOOTING-Continued

MASTER WARNING LIGHT

SYMPTOMS

Master warning light fails to operate with engine off.

Do steps A through L.

Master warning light does not go out after starting engine.

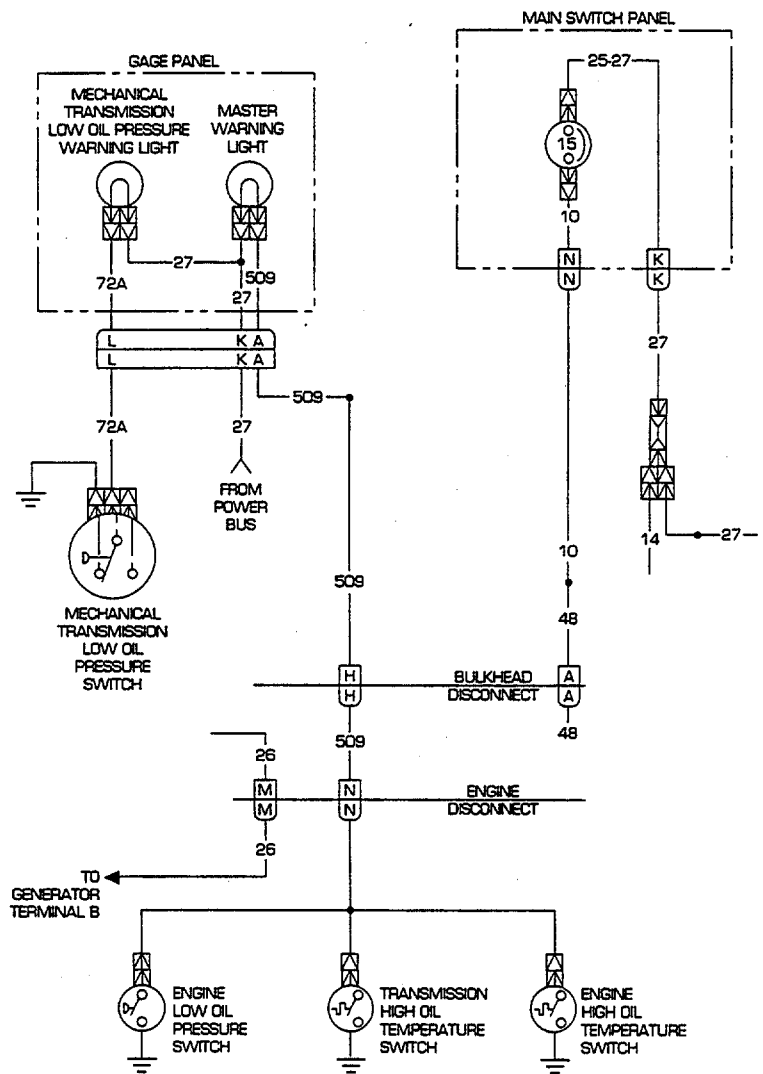
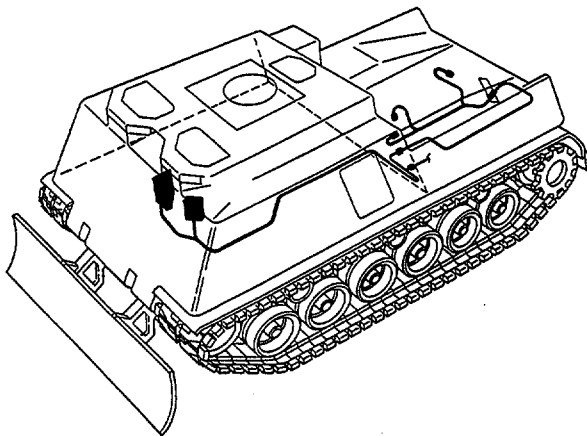
Do step H through L.

Master warning light does not light with high transmission oil temp, but lights with engine off.

Do step P.

Master warning light does not light with high engine oil temp, but lights with engine off.

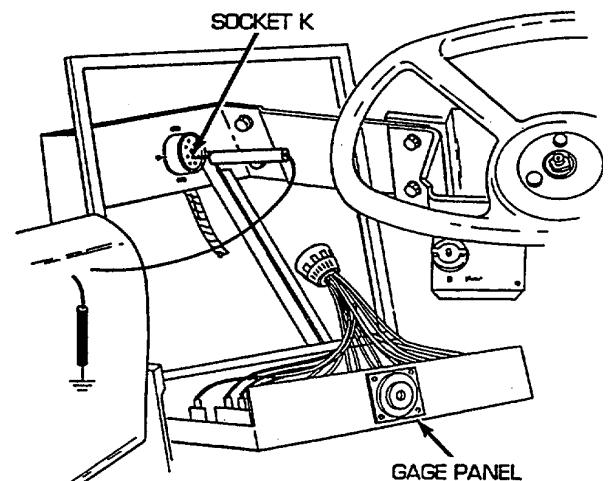
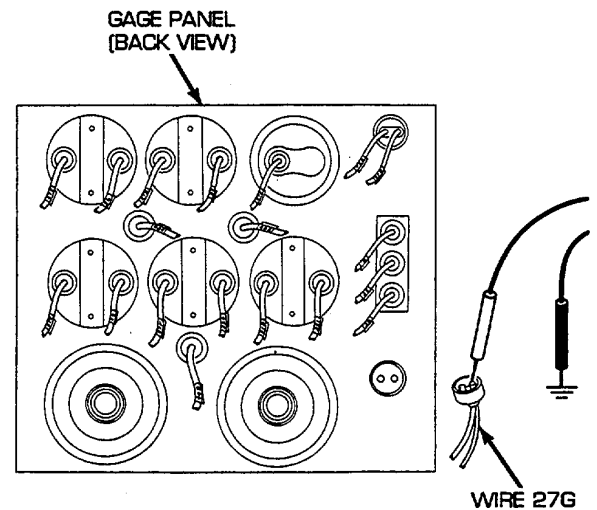
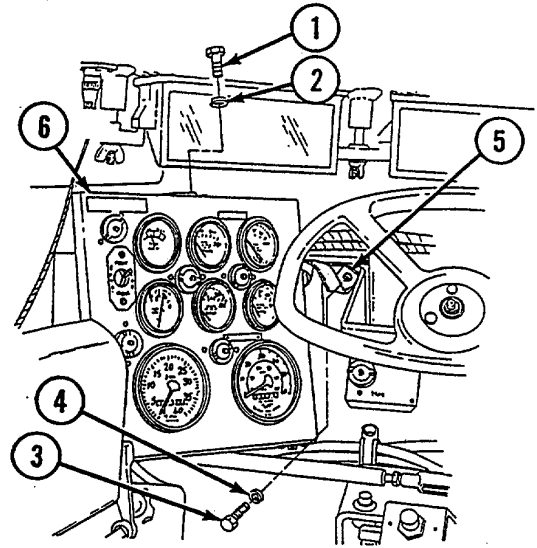
Do step Q.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Remove three screws (1), three lockwashers (2), two screws (3), two lockwashers (4), and ground strap (5) and release gage panel (6) from mounting bracket. Disconnect connector from master warning light. Place red lead of multimeter in wire 27G and black lead to ground. Turn MASTER switch on, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step I. If voltage is not present, go to step B.
- B Reconnect connector to master warning light. Disconnect gage panel to bulkhead wiring harness from gage panel. Place red lead of multimeter in socket K of wire 27 and black lead to ground. Turn MASTER switch on, and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 27/27G of gage panel wiring harness (see paragraph 6-44). If voltage is not present, go to step C.



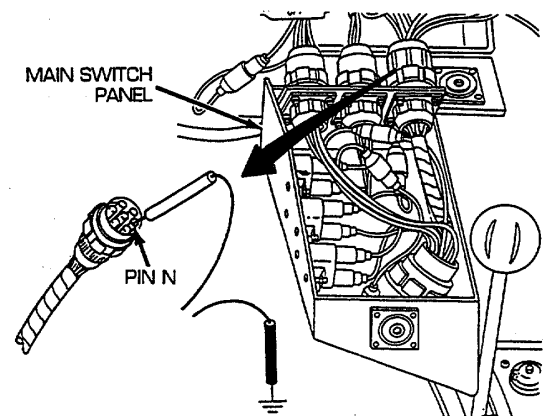
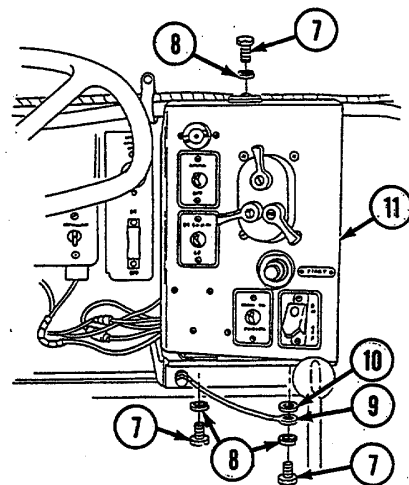
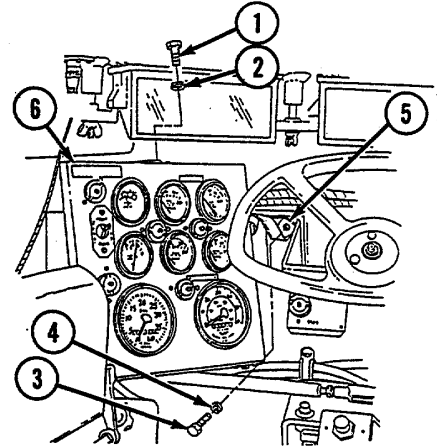
2-19 ELECTRICAL TROUBLESHOOTING--Continued

MASTER WARNING LIGHT--Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- C Install ground strap (5), two lockwashers (4), two screws (3), gage panel (6), three lockwashers (2), and three screws (1) to mounting brackets. Remove three screws (7), three lockwashers (8), ground lead (9), and flat washer (10), and release switch panel (11) from mounting brackets. Disconnect switch panel to gage panel and miscellaneous switches wiring harness from switch panel. Place red lead of multimeter on pin N and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step E. If voltage is not present, go to step D.



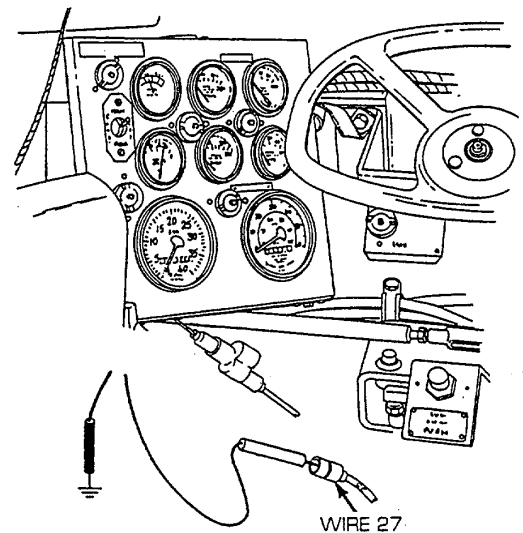
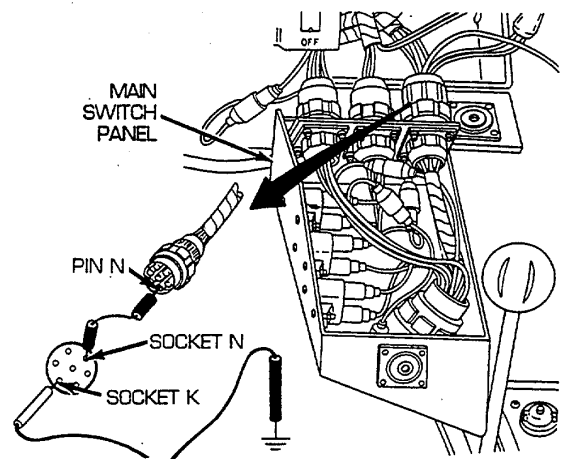
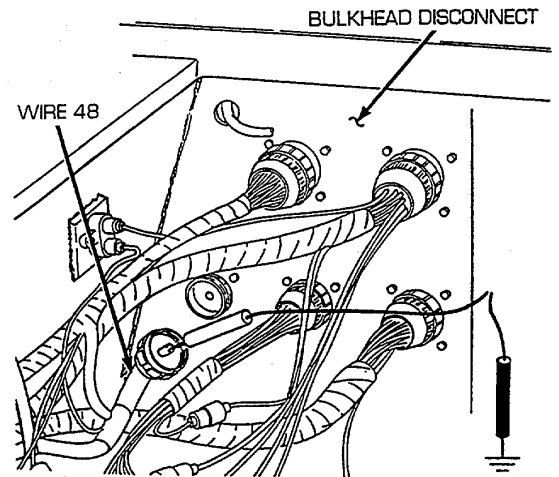
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

D Reconnect switch panel to gage panel and miscellaneous switches wiring harness to switch panel. Install main switch panel (11), flat washer (10), ground lead (9), three lockwashers (8), and three screws (7) to mounting brackets. Open air inlet doors (TM 9-2350-256-10). Disconnect switch panel, radio, and bilge pump to bulkhead wiring harness from bulkhead disconnect. Place red lead of multimeter on pin A of wire 48 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay (see paragraph 2-19, master relay fails to operate).

E Place jumper wire from socket N to pin N. Place red lead of multimeter in socket K of switch panel and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step F. If voltage is not present, go to step H.

F Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Disconnect wire 27 from Y-connector. Place red multimeter lead on wire 27 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step G. If voltage is not present, repair/replace wire 27 of switch panel to gage panel and miscellaneous switches wiring harness (see paragraph 6-55 for dual voltage; 6-56 for single voltage).



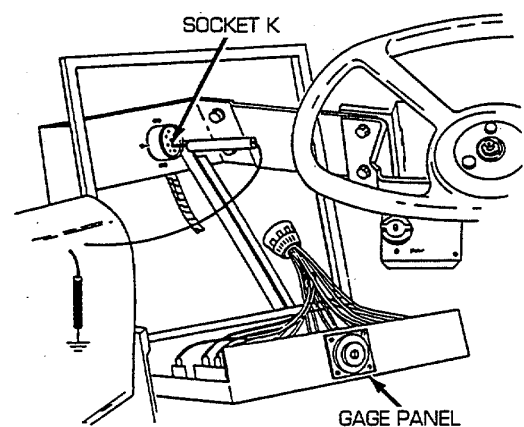
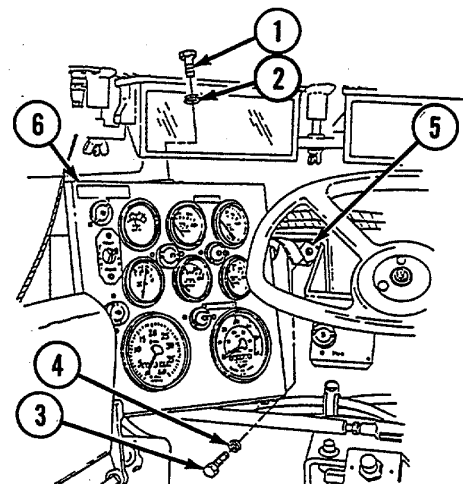
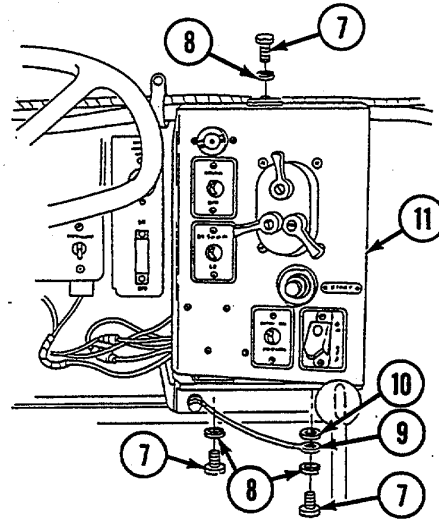
2-19 ELECTRICAL TROUBLESHOOTING--Continued

MASTER WARNING LIGHT--Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- G Reconnect wire 27 at Y-connector. Install main switch panel (11), flat washer (10), ground lead (9), three lockwashers (8), and three screws (7) to mounting brackets. Remove three screws (1), three lockwashers (2), two screws (3), two lockwashers (4), and ground strap, and release gage panel (6) from mounting bracket. Disconnect switch panel to gage panel and miscellaneous switches wiring harness from gage panel. Place red multimeter lead in socket K and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step L. If voltage is not present, repair/replace wire 27 of switch panel to gage panel and miscellaneous switches wiring harness (see paragraph 6-55 for dual voltage; 6-56 for single voltage).



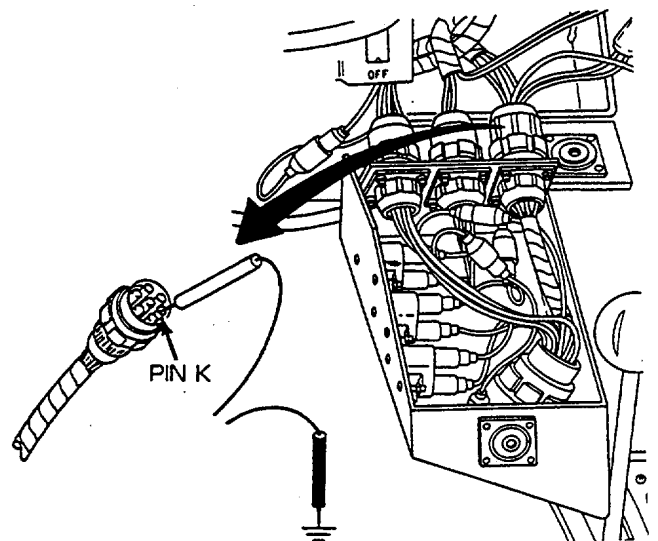
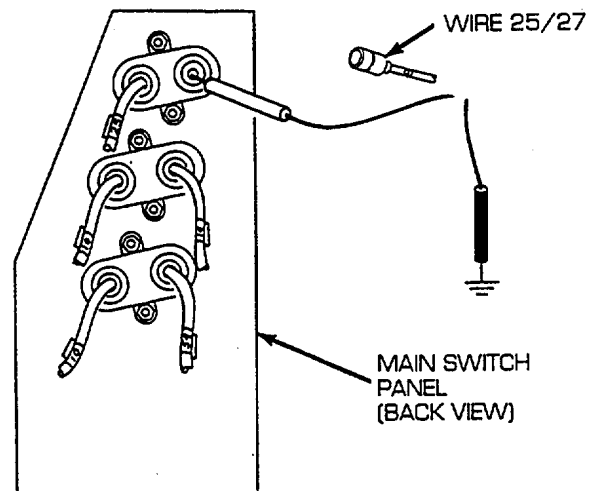
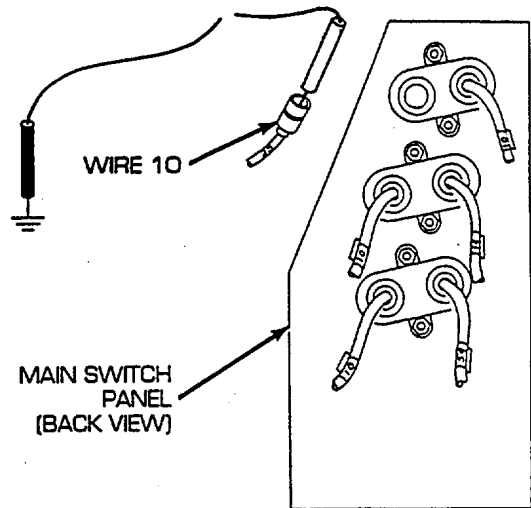
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

H Reconnect switch panel to gage panel and miscellaneous switches wiring harness to switch panel. Disconnect wire 10 from 15 A circuit breaker. Place red lead of multimeter on wire 10 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step I. If voltage is not present, repair/replace wire 10 of switch panel to gage panel and miscellaneous switches wiring harness (see paragraph 6-55 for dual voltage; 6-56 for single voltage).

I Reconnect wire 10 to 15 A circuit breaker. Disconnect wire 25-27 from 15 A circuit breaker. Place red lead of multimeter on terminal of circuit breaker and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is not present, replace 15 A circuit breaker (see paragraph 6-10). If voltage is present, go to step J.

J Reconnect wire 25-27 to 15 A circuit breaker. Disconnect main lighting and B.O. selector switch wiring harness from main switch panel. Place red lead of multimeter on pin K of wires 25-27 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step K. If voltage is not present, repair/replace wire 25-27 of main lighting and B.O. selector switch wiring harness (see paragraph 6-69).



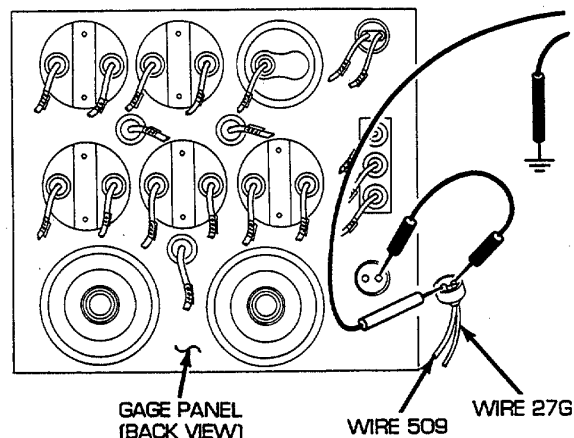
2-19 ELECTRICAL TROUBLESHOOTING--Continued

MASTER WARNING LIGHT--Continued

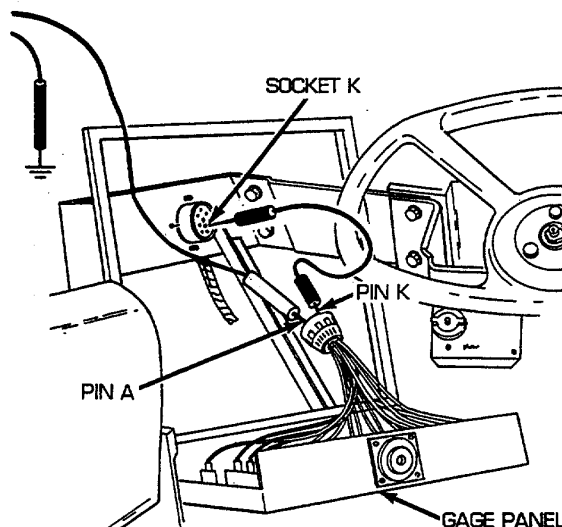
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

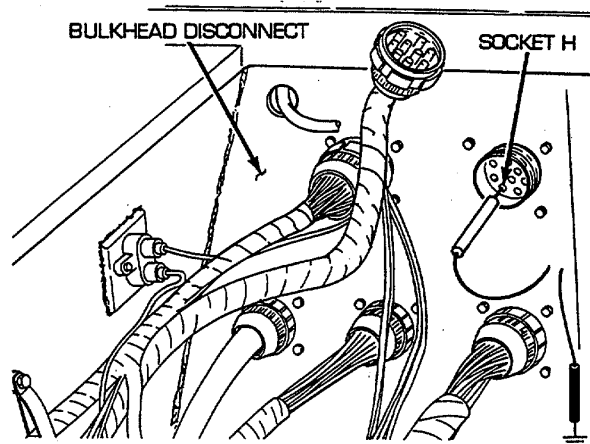
K Place a jumper wire from wire 27G to terminal of master warning light. Place red lead of multimeter in wire 509 and black lead to ground. Turn MASTER switch on, start engine, set to idle, and check for voltage. Turn engine and MASTER switch OFF. If voltage is present, replace lamp (see paragraph 6- 8). If voltage is not present, go to step L.



L Reconnect connector to master warning light. Disconnect gage panel to bulkhead wiring harness from gage panel. Place a jumper wire from pin K to socket K. Place red lead of multimeter in pin A of wire 509 and black lead to ground. Turn MASTER switch on, start engine, set to idle, and check for voltage. Turn engine and MASTER switch OFF. If voltage is present, repair/replace wire 509 of gage panel wiring harness (see paragraph 6-44). If voltage is not present, reconnect gage panel to bulkhead wiring harness and go to step M.



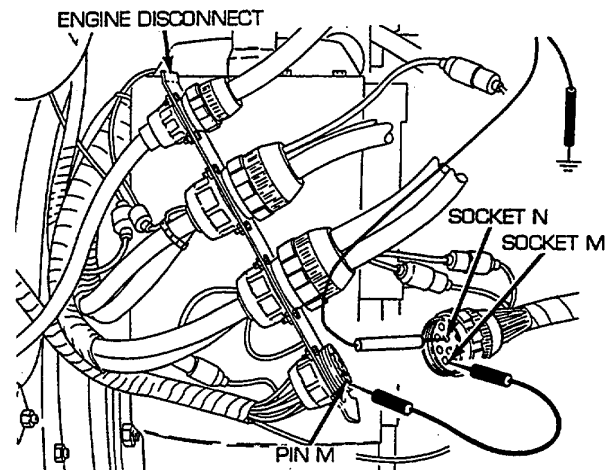
M Open air inlet doors. Disconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness from bulkhead disconnect. Place red lead of multimeter in socket H of wire 509 and black lead to ground. Turn MASTER switch on, start engine, set to idle, and check for voltage. Turn engine and MASTER switch OFF. If voltage is present, go to step N. If voltage is not present, repair/replace wire 509 of gage panel to bulkhead wiring harness from gage panel to bulkhead (see paragraph 645 for dual voltage; 6-46 for single voltage).



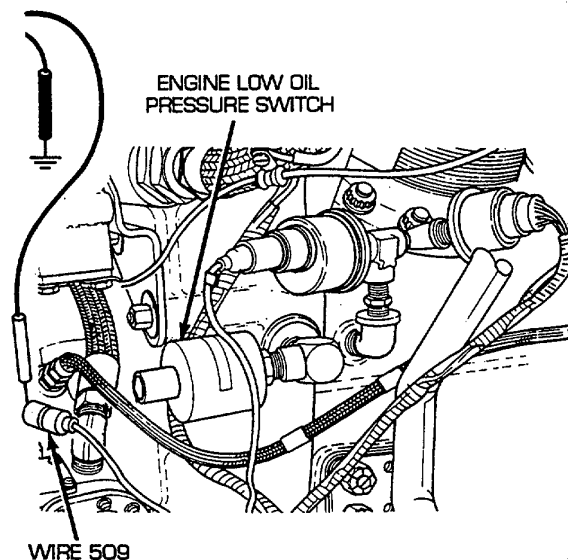
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

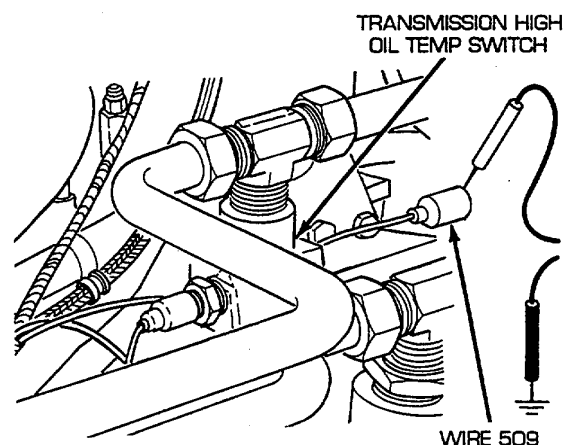
N Reconnect gage panel to bulkhead wiring harness to bulkhead disconnect. Remove engine deck (see paragraph 9-51). Disconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness from engine disconnect. Place a jumper wire from pin M to socket M. Place red lead of multimeter in socket N of wire 509 and black lead to ground. Turn MASTER switch on, start engine, set to idle, and check for voltage. Turn engine and MASTER switch OFF. If voltage is present, go to step O. If voltage is not present, repair/replace wire 509 of bulkhead to engine bracket and rear fuel tank transmitter wiring harness (see paragraph 6- 73 for dual voltage; 6-74 for single voltage).



O Reconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness to engine disconnect. Remove powerplant (see paragraph 3-1). Disconnect wire 509 from engine low oil pressure switch. Place red lead of multimeter in wire 509 and black lead to ground. Turn MASTER switch on, start engine, set to idle, and check for voltage. Turn engine and MASTER switch OFF. If voltage is present, replace engine low oil pressure switch (see paragraph 6-22). If voltage is not present, repair/replace wire 509 of engine wiring harness from engine low oil pressure switch to engine disconnect (see paragraph 6-58 for dual voltage; 6-59 for single voltage).



P Disconnect wire 509 from transmission high oil temperature switch. Place red lead of multimeter in wire 509 and black lead to ground. Turn MASTER switch on, start engine, set to idle, and check for voltage. Turn engine and MASTER switch OFF. If voltage is present, replace transmission high oil temperature switch (see paragraph 6-19). If voltage is not present, repair/replace wire 509 of engine wiring harness from transmission high oil temperature switch to engine disconnect (see paragraph 6-58 for dual voltage; 6-59 for single voltage).



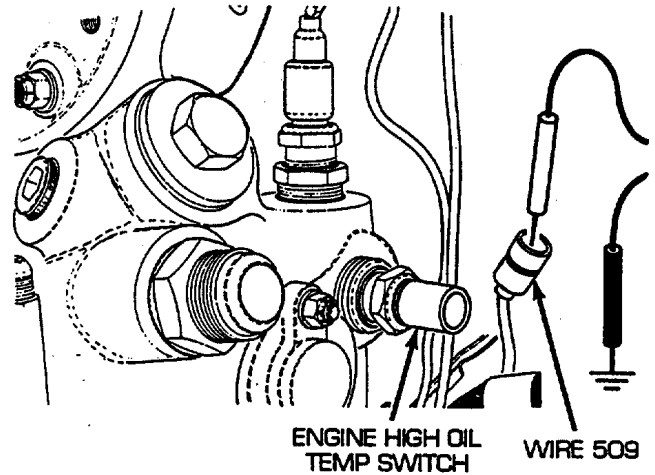
2-19 ELECTRICAL TROUBLESHOOTING--Continued

MASTER WARNING LIGHT--Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

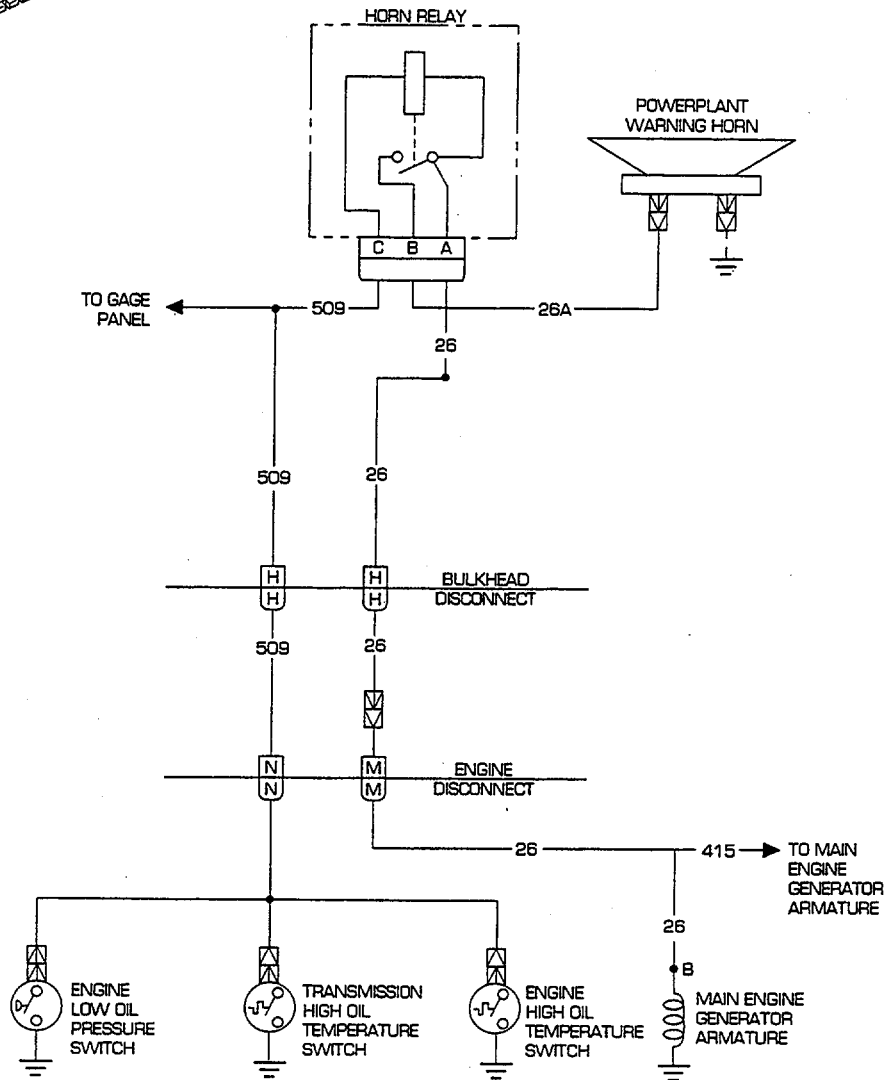
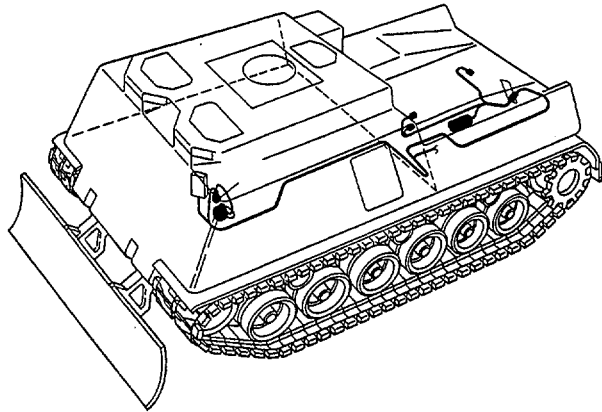
- Q Remove powerplant and groundhop (see paragraphs 3-1 and 3-2). Disconnect wire 509 from engine high oil temperature switch. Place red lead of multimeter in wire 509 and black lead to ground. Turn MASTER switch on, start engine, and check for voltage. Turn engine and MASTER switch OFF. If voltage is present, replace engine high oil temp switch. If voltage is not present, repair/replace wire 509 of engine wiring harness from engine high oil temperature switch to engine disconnect (see paragraph 6-58 for dual voltage; 6-59 for single voltage).



POWERPLANT WARNING HORN

SYMPTOM

Powerplant warning horn fails to operate.
Do steps A through O.



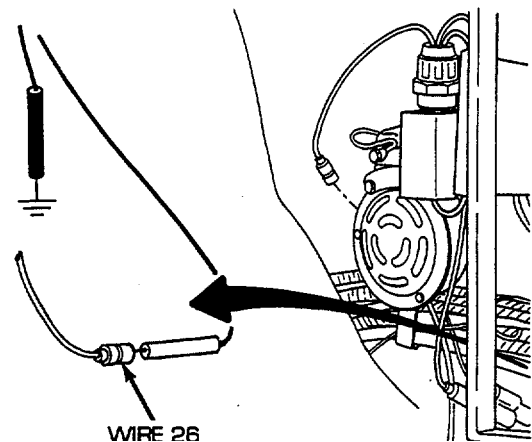
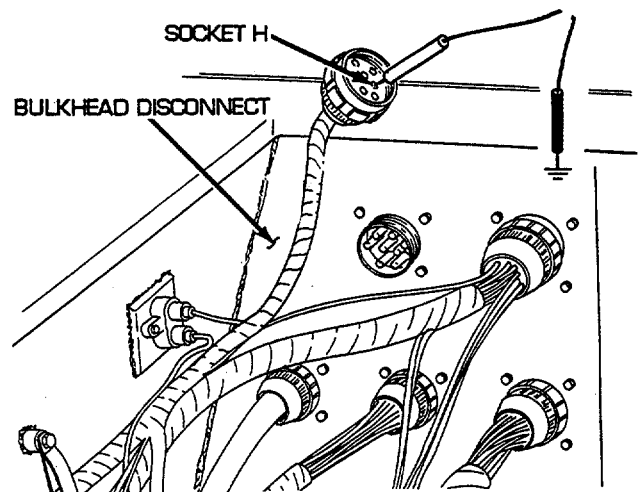
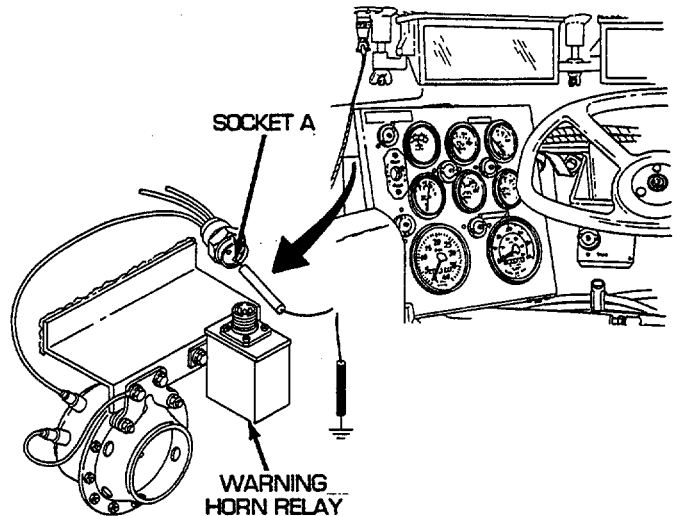
2-19 ELECTRICAL TROUBLESHOOTING-Continued

POWERPLANT WARNING HORN-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

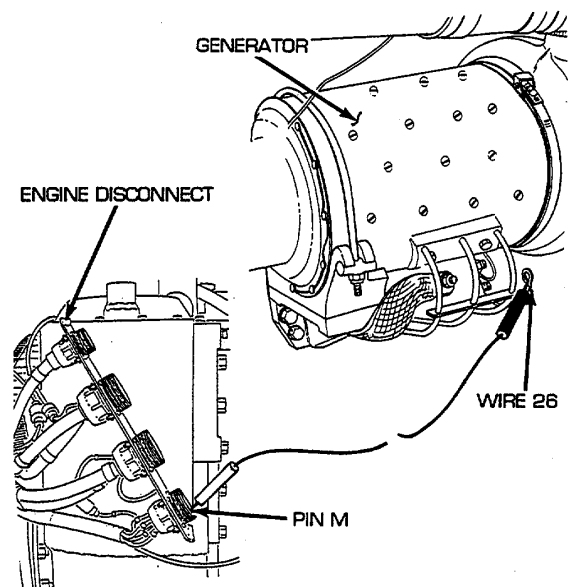
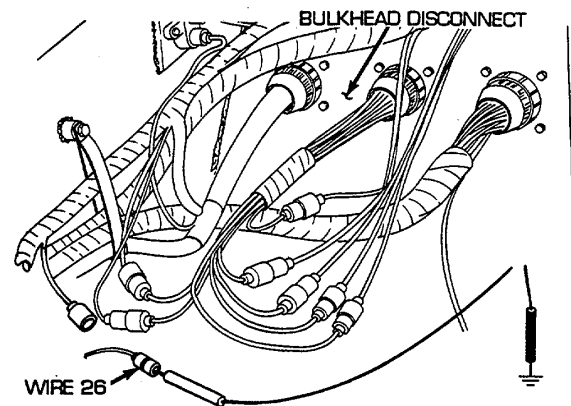
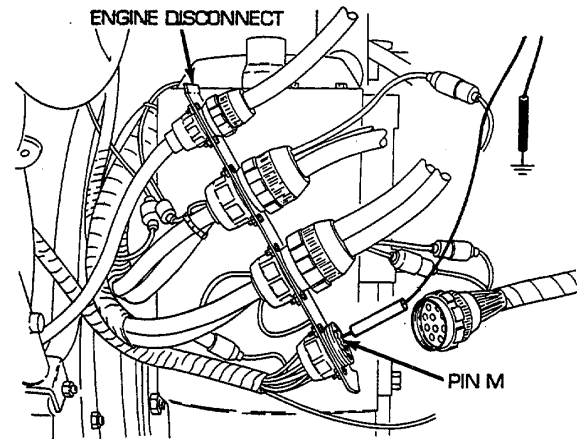
- A Disconnect gage panel to bulkhead wiring harness from warning horn relay. Place red lead of multimeter in socket A of wire 26 and black lead to ground. Turn MASTER switch on, start engine, set to idle, and check for voltage. Turn engine and MASTER switch OFF. If voltage is present, go to step G. If voltage is not present, go to step B.
- B Reconnect gage panel to bulkhead wiring harness to warning horn relay. Open air inlet doors (TM 9- 2350-256-10). Disconnect bulkhead to APU, master relay, and rigger's lights wiring harness from bulkhead. Place red lead of multimeter in socket H of wire 26 and black lead to ground. Turn MASTER switch on, start engine, set to idle, and check for voltage. Turn engine and MASTER switch OFF. If voltage is present, go to step C. If voltage is not present, go to step D.
- C Reconnect APU control box to foot dimmer switch and bulkhead wiring harness to bulkhead. Disconnect wire 26 of gage panel to bulkhead wiring harness from APU control box to foot dimmer switch and bulkhead wiring harness. Place red lead of multimeter in female connector of wire 26 and black lead to ground. Turn MASTER switch on, start engine, set to idle, and check for voltage. Turn engine and MASTER switch OFF. If voltage is present, repair/replace wire 26 of gage panel to bulkhead wiring harness (see paragraph 6-45 for dual voltage; 6-46 for single voltage). If voltage is not present, repair/replace wire 26 of APU control box to foot dimmer switch and bulkhead wiring harness (see paragraph 6-79 for dual voltage; 6-80 for single voltage).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- D Reconnect APU control box to foot dimmer switch and bulkhead wiring harness to bulkhead. Remove engine deck (see paragraph 9-51). Disconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness from engine disconnect. Place red lead of multimeter on pin M of wire 26 and black lead to ground. Turn MASTER switch on, start engine, set to idle, and check for voltage. Turn engine and MASTER switch OFF. If voltage is present, go to step E. If voltage is not present, go to step F.
- E Reconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness to engine disconnect. Disconnect wire 26 of bulkhead to APU, master relay, and rigger's lights wiring harness from bulkhead to engine bracket and rear fuel tank transmitter wiring harness. Place red lead of multimeter in female connector of wire 26 and black lead to ground. Turn MASTER switch on, start engine, set to idle, and check for voltage. Turn engine and MASTER switch OFF. If voltage is present, repair/replace wire 26 of bulkhead to APU, master relay, and rigger's lights wiring harness (see paragraph 6-75 for dual voltage; 6-76 for single voltage). If voltage is not present, repair/replace wire 26 of bulkhead to engine bracket and rear fuel tank transmitter wiring harness (see paragraph 6-73 for dual voltage; 6-74 for single voltage).
- F Remove powerplant (see paragraph 3-1). Place red lead of multimeter on pin M of wire 26 and black lead of multimeter on wire 26. Check for continuity. If continuity is present, replace generator (see paragraph 6-1). If continuity is not present, repair/replace wire 26 of engine wiring harness (see paragraph 6-58 for dual voltage; 6-59 for single voltage).



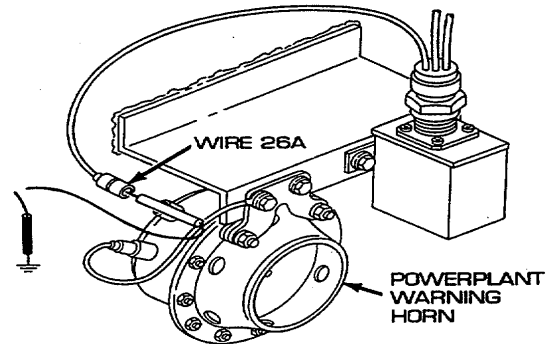
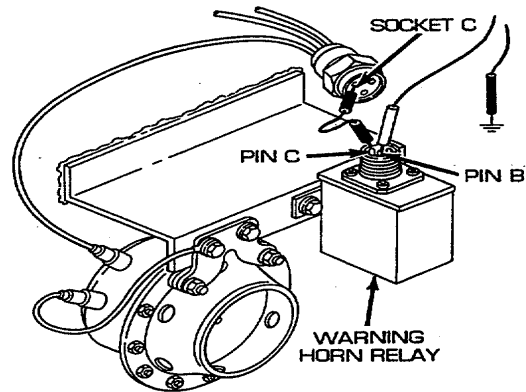
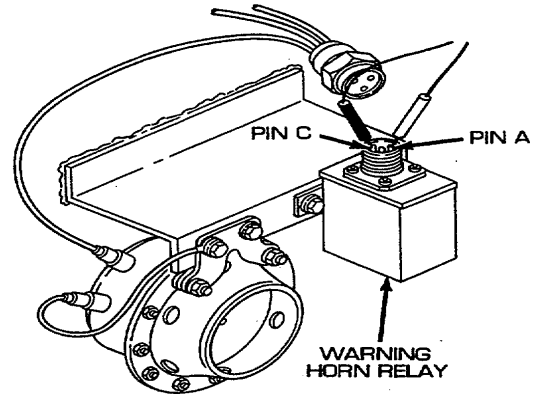
2-19 ELECTRICAL TROUBLESHOOTING-Continued

POWERPLANT WARNING HORN-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel

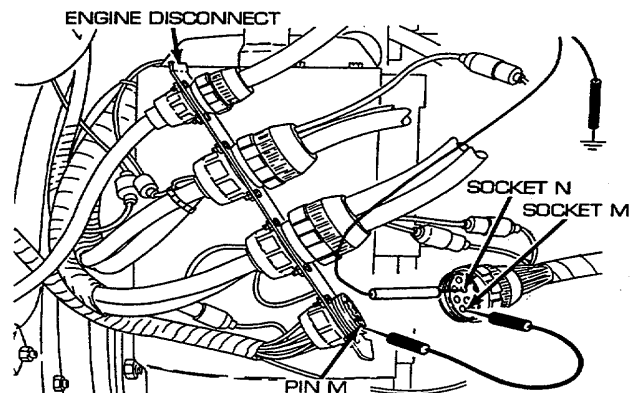
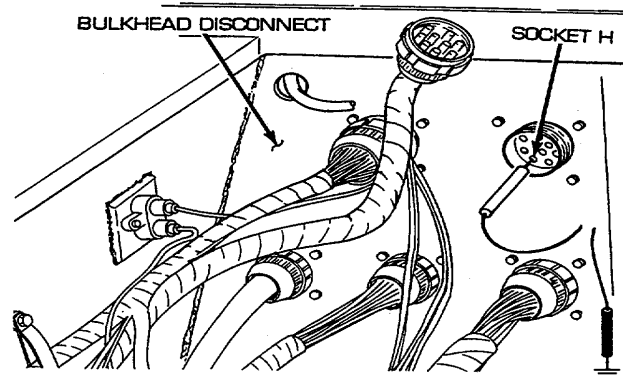
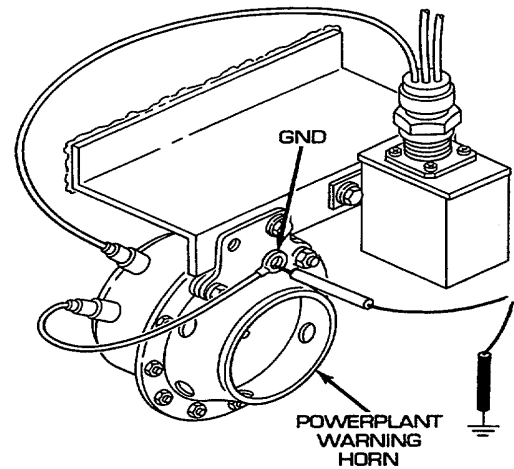
- G Place red lead of multimeter on pin A and black lead on pin C of horn relay. Check for continuity. If continuity is present, go to step H. If continuity is not present, go to step K.
- H Place a jumper wire from pin C to socket C. Place red lead of multimeter on pin B of warning horn relay and black lead to ground. Turn MASTER switch on, start engine, set to idle, and check for voltage. Turn engine and MASTER switch OFF. If voltage is present, go to step I. If voltage is not present, replace warning horn relay (see paragraph 6-21).
- I Reconnect gage panel to bulkhead wiring harness to warning horn relay. Disconnect wire 26A from warning horn. Place red lead of multimeter in wire 26A and black lead to ground. Turn MASTER switch on, start engine, set to idle, and check for voltage. Turn engine and MASTER switch OFF. If voltage is present, go to step J. If voltage is not present, replace/ repair wire 26A of gage panel to bulkhead wiring harness (see paragraph 6-45 for dual voltage; 6-46 for single voltage).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

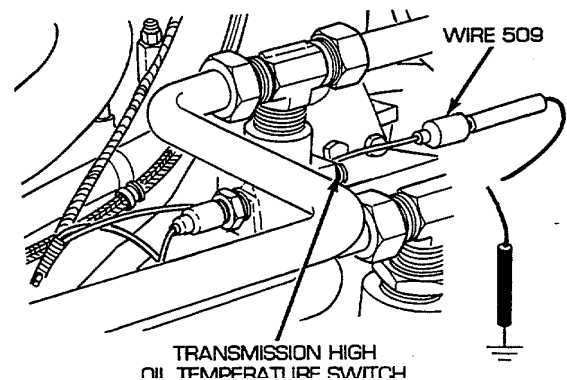
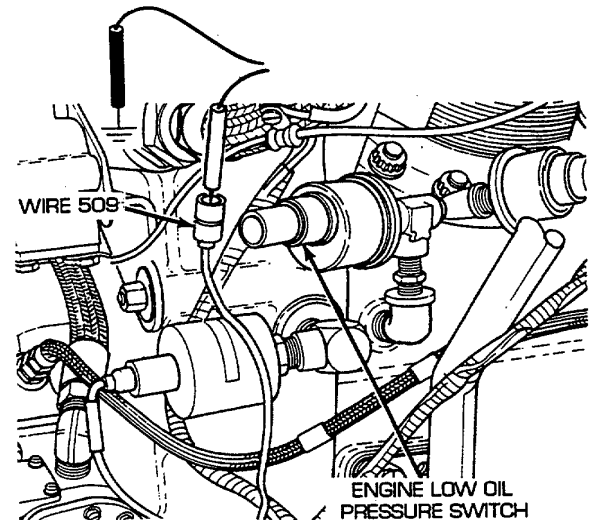
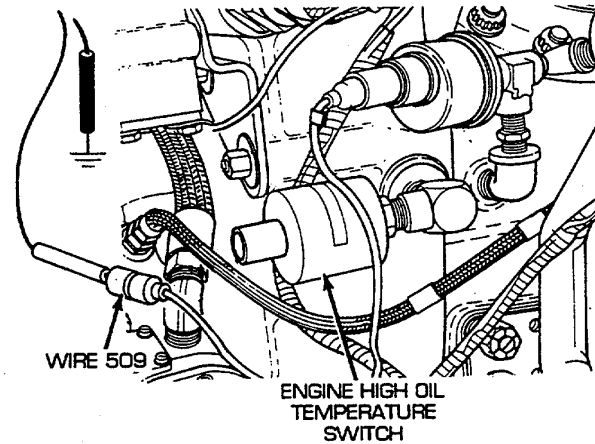
- J Disconnect GND lead from warning horn assembly. Place red lead of multimeter in GND lead and black lead to ground. Check for continuity. If continuity is not present, replace warning horn assembly (see paragraph 6-21). If continuity is present, repair/replace warning horn ground lead (see paragraph 6-21).
- K Reconnect gage panel to bulkhead wiring harness to warning horn relay. Open air inlet doors. Disconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness from bulkhead disconnect. Place red lead of multimeter in socket H of wire 509 and black lead to ground. Turn MASTER switch on, start engine, set to idle, and check for voltage. Turn engine and MASTER switch OFF. If voltage is present, go to step L. If voltage is not present, repair/replace wire 509 of gage panel to bulkhead wiring harness (see paragraph 6-45 for dual voltage; 6-46 for single voltage).
- L Reconnect gage panel to bulkhead wiring harness to bulkhead disconnect. Remove engine deck (see paragraph 9-51). Disconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness from engine disconnect. Place a jumper wire from pin M to socket M. Place red lead of multimeter in socket N of wire 509 and black lead to ground. Turn MASTER switch on, start engine, set to idle, and check for voltage. Turn engine and MASTER switch OFF. If voltage is present, go to step M. If voltage is not present, repair/replace wire 509 of bulkhead to engine bracket and rear fuel tank transmitter wiring harness (see paragraph 6-73 for dual voltage; 6-74 for single voltage).



2-19 ELECTRICAL TROUBLESHOOTING-Continued**POWERPLANT WARNING HORN-Continued****WARNING**

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

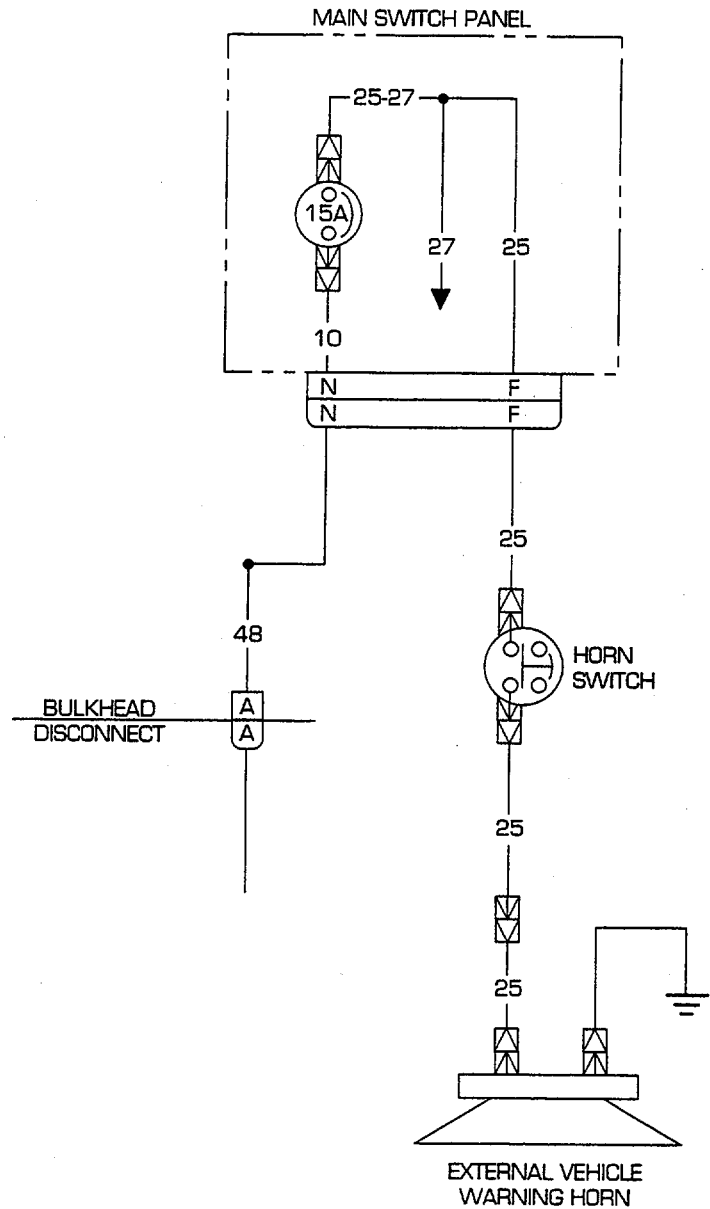
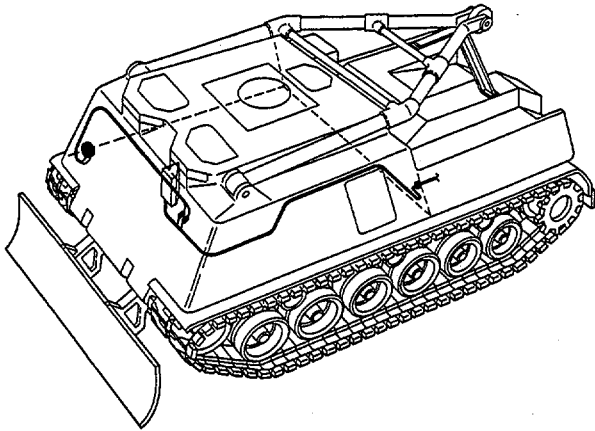
- M Reconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness to engine disconnect. Remove powerplant (see paragraph 3-1). Disconnect wire 509 from engine high oil temperature switch. Place red lead of multimeter in wire 509 and black lead to ground. Turn MASTER switch on, start engine, set to idle, and check for voltage. Turn engine and MASTER switch OFF. If voltage is present, replace engine high oil temperature switch (see paragraph 6-22). If voltage is not present, go to step N.
- N Disconnect wire 509 from engine low oil pressure switch. Place red lead of multimeter in wire 509 and black lead to ground. Turn MASTER switch on, start engine, set to idle, and check for voltage. Turn engine and MASTER switch OFF. If voltage is present, replace engine low oil pressure switch (see paragraph 6-22). If voltage is not present, go to step O.
- O Disconnect wire 509 from transmission high oil temperature switch. Place red lead of multimeter in wire 509 and black lead to ground. Turn MASTER switch on, start engine, set to idle, and check for voltage. Turn engine and MASTER switch OFF. If voltage is present, replace transmission high oil temperature switch (see paragraph 6-19). If voltage is not present at any of the switches, repair/replace wire 509 of engine wiring harness (see paragraph 6-58 for dual voltage; 6-59 for single voltage).



EXTERNAL VEHICLE WARNING HORN

SYMPTOM

External vehicle warning horn fails to operate.
Do steps A through I.



2-19 ELECTRICAL TROUBLESHOOTING-Continued

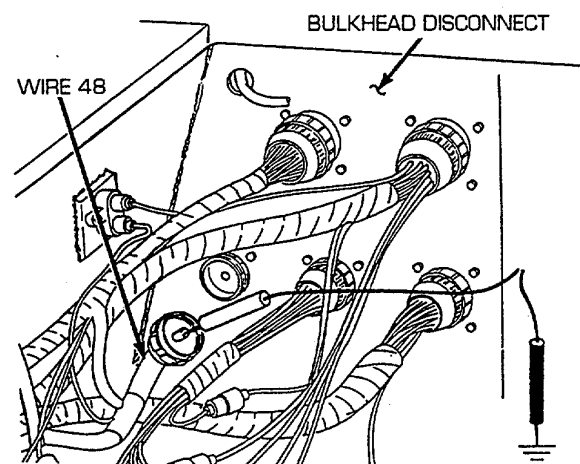
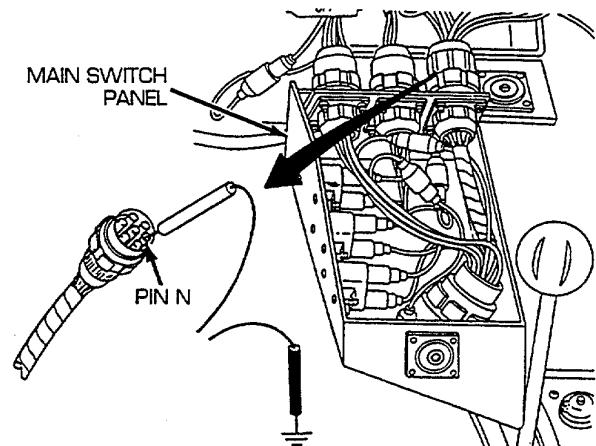
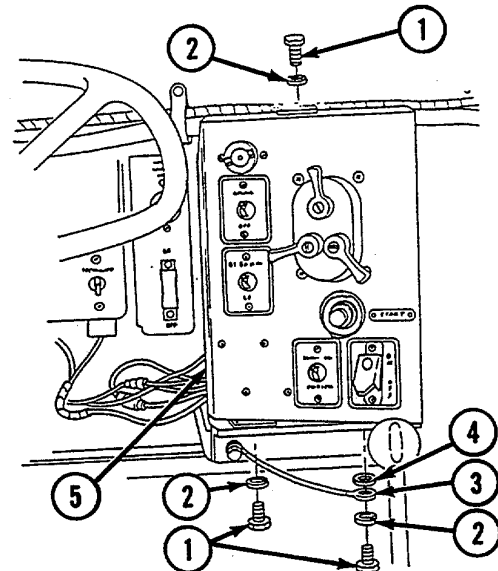
EXTERNAL VEHICLE WARNING HORN-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

A Remove three screws (1), three lockwashers (2), ground lead (3), and flat washer (4), and release main switch panel (5) from mounting brackets. Disconnect switch panel to gage panel and miscellaneous switches wiring harness from main switch panel. Place red lead of multimeter on pin N of wire 10 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step C. If voltage is not present, go to step B.

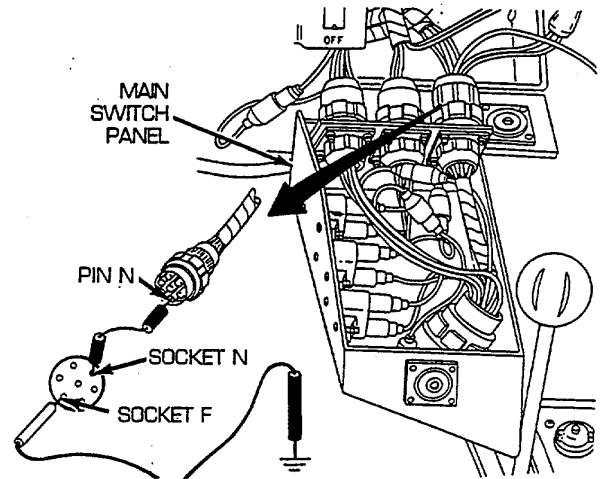
B Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Install main switch panel (5), flat washer (4), ground lead (3), three lockwashers (2), and three screws (1) to mounting brackets. Open air inlet doors (TM 9-2350-256-10). Disconnect wire 48 pin A from bulkhead to master relay wiring harness. Place red multimeter lead on pin A and black lead to ground. Turn MASTER switch on and check for voltage. If voltage is present, repair/replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay circuit (see paragraph 2-19, master relay fails to operate).



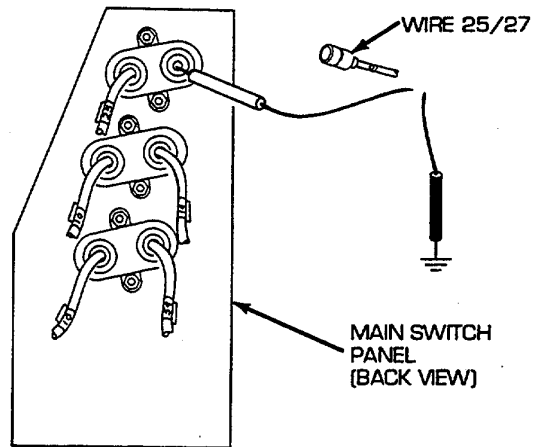
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

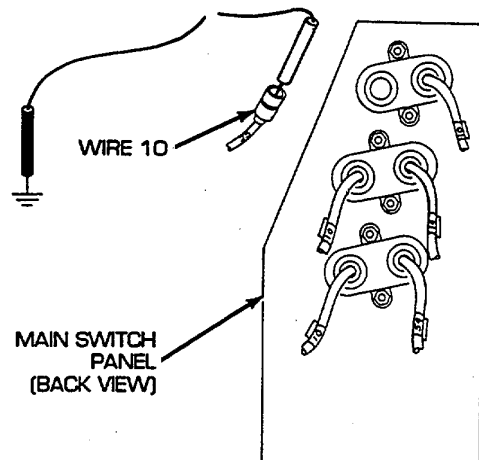
C Place a jumper wire from pin N to socket N. Place red lead of multimeter in socket F of wire 25 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step F. If voltage is not present, go to step D.



D Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Disconnect wire 25/27 from 15 A circuit breaker. Place red lead of multimeter on terminal of 15 A circuit breaker and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage repair/replace wire 25/27 of main lighting and B.O. selector switch wiring harness (see paragraph 6-69). If voltage is not present, go to step E.



E Reconnect wire 25/27 to 15 A circuit breaker. Disconnect wire 10 from 15 A circuit breaker. Place red lead of multimeter in wire 10 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace circuit breaker (see paragraph 6-10). If voltage is not present, repair/replace wire 10 of main lighting and B.O. selector switch wiring harness (see paragraph 6-69).



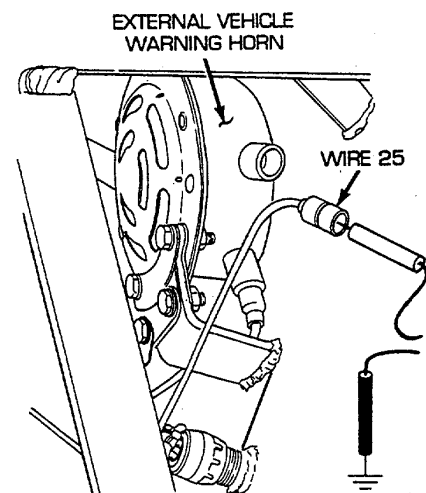
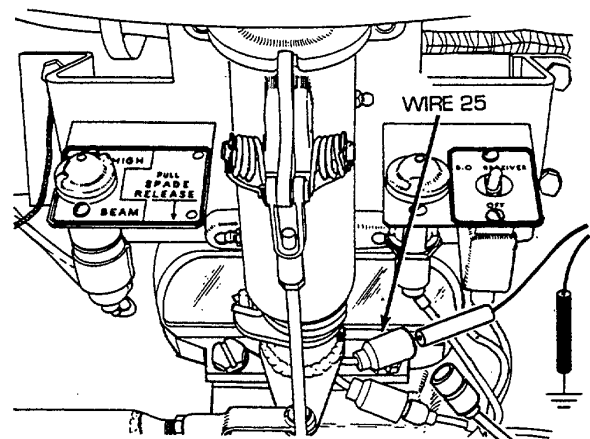
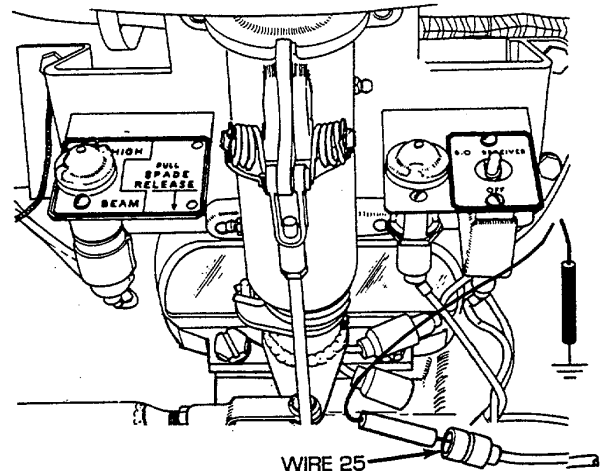
2-19 ELECTRICAL TROUBLESHOOTING-Continued

EXTERNAL VEHICLE WARNING HORN-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

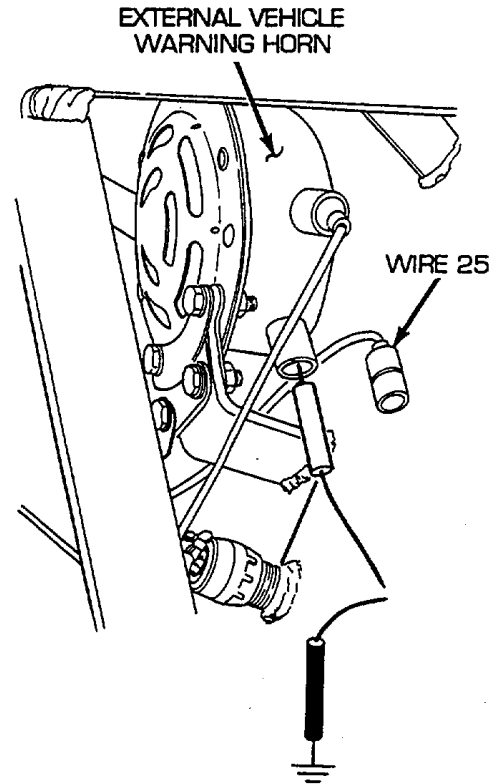
- F Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Disconnect wire 25 from main switch panel side of horn switch. Place red lead of multimeter in wire 25 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step G. If voltage is not present, repair/replace wire 25 of switch panel to gage panel and miscellaneous switches wiring harness (see paragraph 6-55 for dual voltage; 6-56 for single voltage).
- G Reconnect wire 25 to main switch panel side of horn switch. Disconnect wire 25 from horn side of horn switch. Place red lead of multimeter on terminal of horn switch and black lead to ground. Turn MASTER switch on, push horn switch, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step H. If voltage is not present, replace horn switch (see paragraph 6-20).
- H Reconnect wire 25 to horn side of horn switch. Disconnect wire 25 from external vehicle horn. Place red lead of multimeter in wire 25 and black lead to ground. Turn MASTER switch on, push horn switch, and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step I. If voltage is not present, repair/replace wire 25 of horn switch to horn lead assembly (see paragraph 6-20).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- I Reconnect wire 25 to external vehicle horn. Disconnect ground wire from external vehicle horn. Place red lead of multimeter on terminal of horn and black lead to ground. Turn MASTER switch on, push horn switch, and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace ground wire (see paragraph 6-20). If voltage is not present, replace external vehicle horn (see paragraph 6-20).



2-19 ELECTRICAL TROUBLESHOOTING-Continued

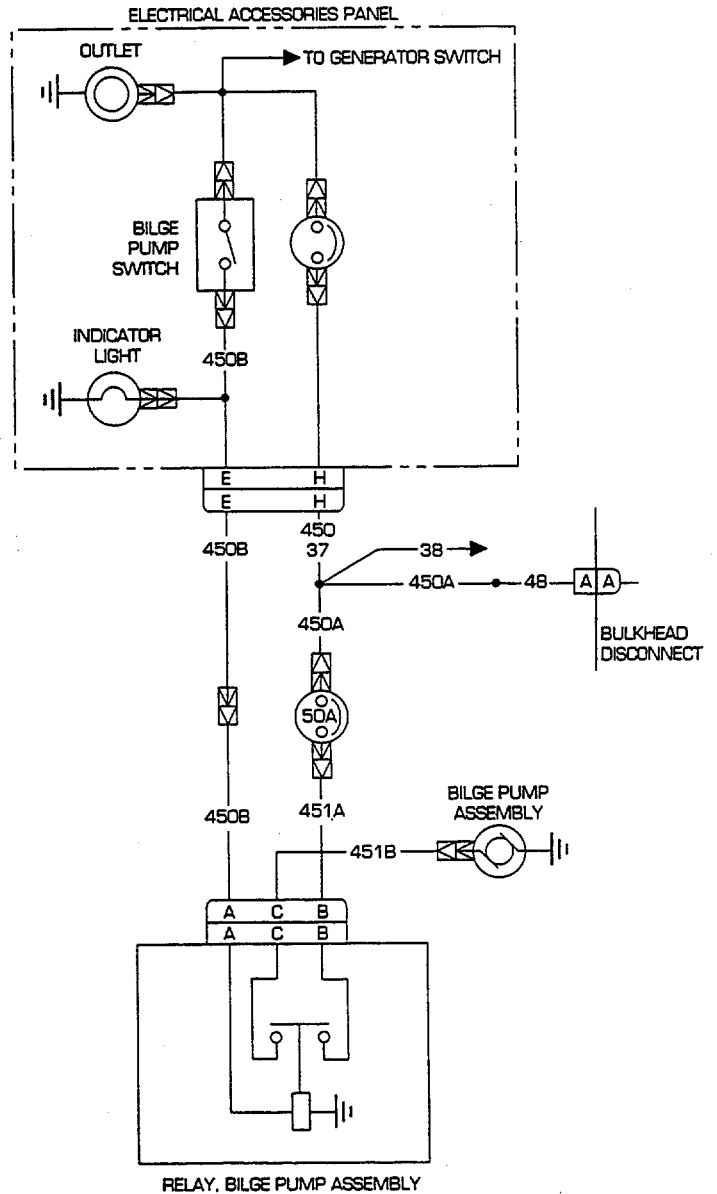
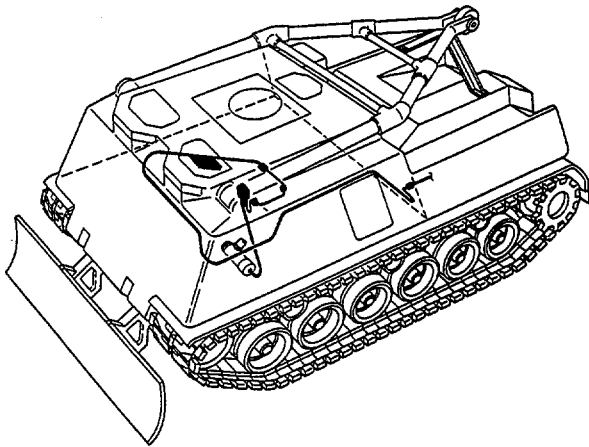
BILGE PUMP SYSTEM AND ELECTRICAL ACCESSORIES PANEL POWER OUTLET

SYMPTOMS

Bilge pump fails to operate.
Do steps A through P.

Bilge pump indicator lamp fails to light and bilge pump operates.
Do steps A through B.

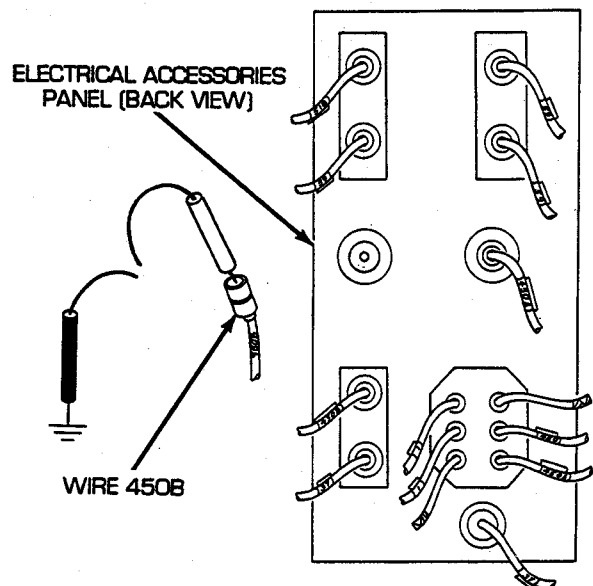
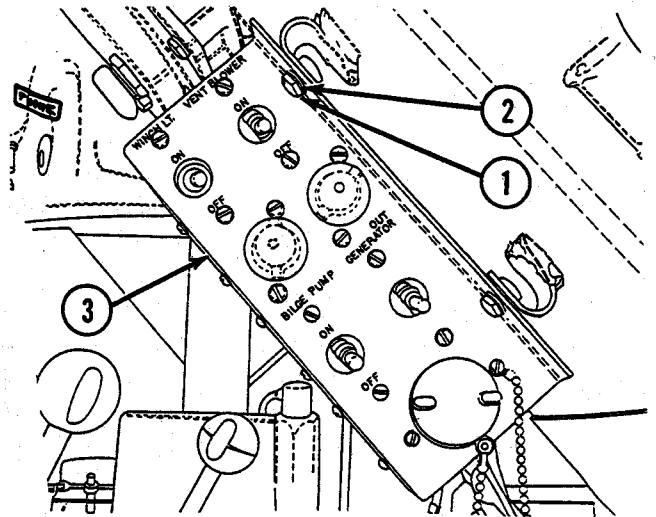
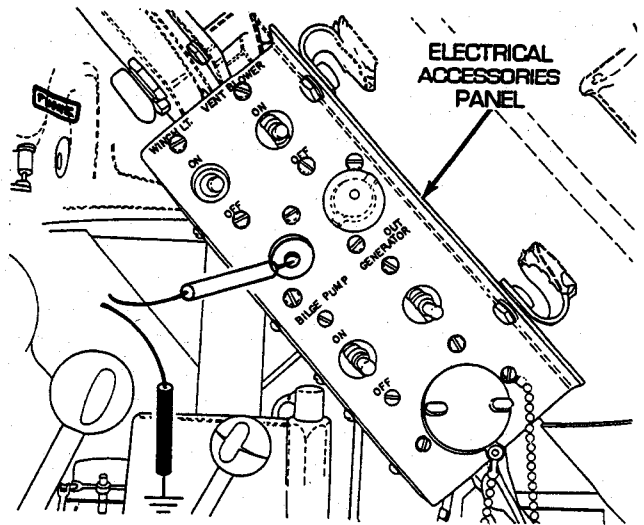
Electrical accessories panel power outlet has no power and bilge pump operates.
Do step Q.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Remove BILGE PUMP indicator lamp. Place red lead of multimeter in socket and black lead to ground. Turn MASTER and BILGE PUMP switches ON and check for voltage. Turn MASTER and BILGE PUMP switches OFF. If voltage is present, replace lamp (see paragraph 6-9). If voltage is not present, go to step B.
- B Remove four screws (1) and four lockwashers (2) and release electrical accessories panel (3). Disconnect wire 450B from BILGE PUMP indicator light. Place red lead of multimeter on wire 450B and black lead to ground. Turn MASTER and BILGE PUMP switches ON and check for voltage. Turn MASTER and BILGE PUMP switches OFF. If voltage is present, replace lamp socket (see paragraph 6-9). If voltage is not present, go to step C.



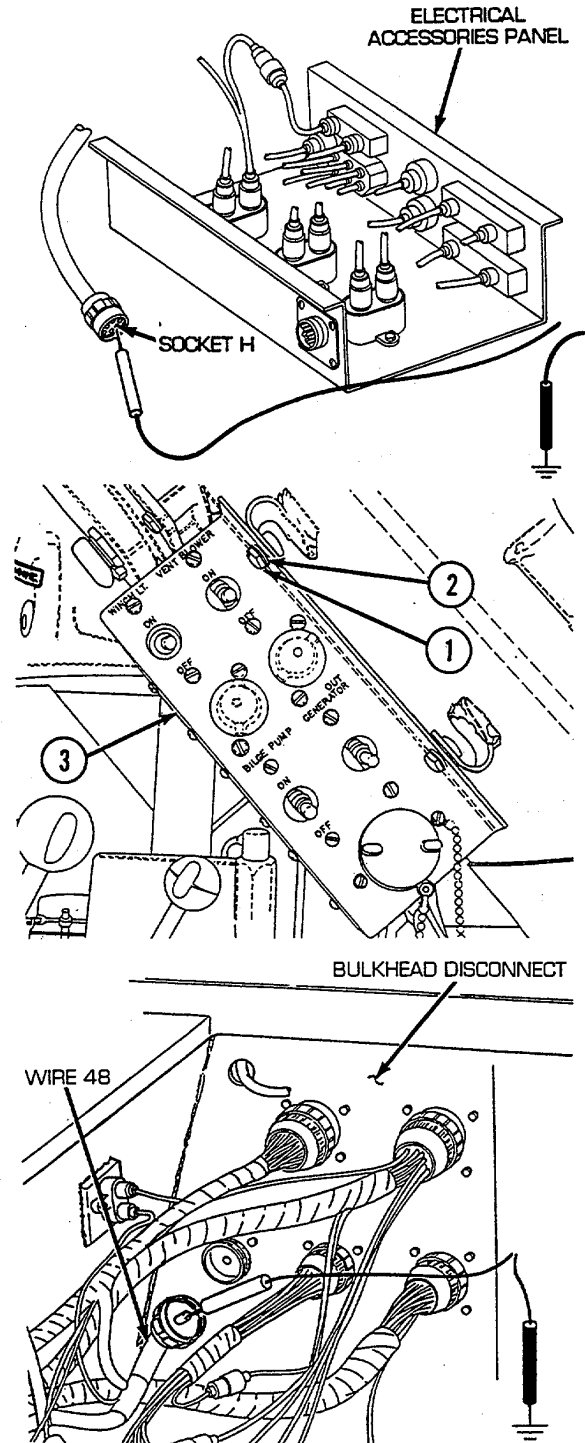
2-19 ELECTRICAL TROUBLESHOOTING-Continued

BILGE PUMP SYSTEM AND ELECTRICAL ACCESSORIES PANEL POWER OUTLET-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

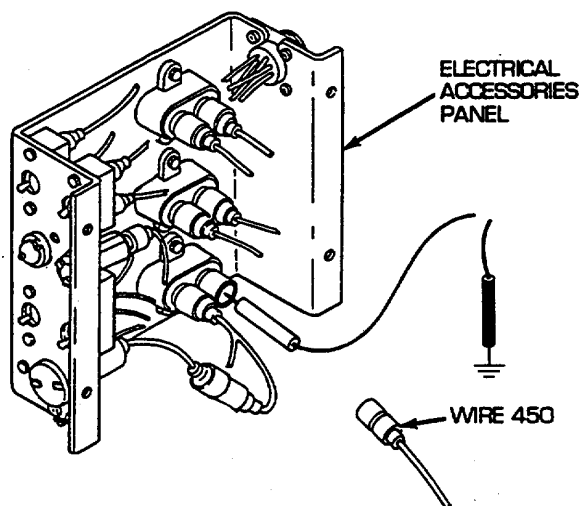
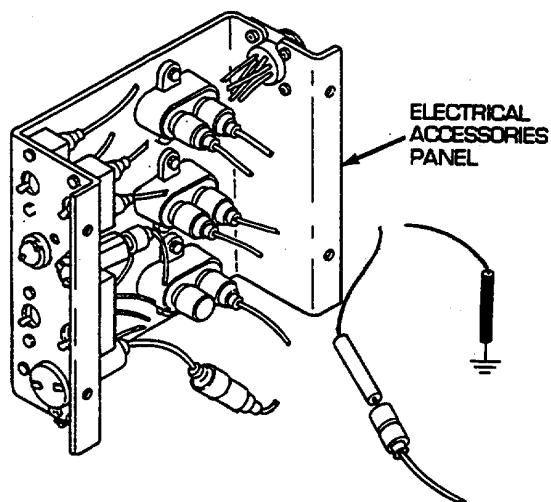
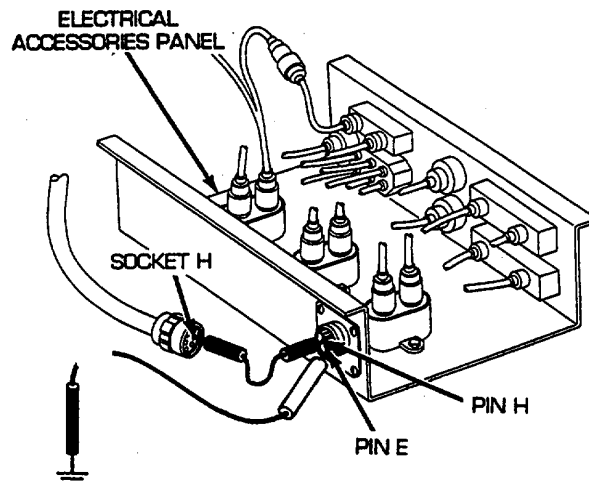
- C Disconnect electrical accessories panel wiring harness from electrical accessories panel. Place red lead of multimeter in socket H of wire 450 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step E. If voltage is not present, go to step D.
- D Reconnect electrical accessories panel wiring harness to electrical accessories panel. Install electrical accessories panel (3), four lockwashers (2), and four screws (1) to mounting bracket. Open air inlet doors (TM 9-2350-256-10). Disconnect wire 48 pin A from bulkhead to master relay wiring harness. Place red multimeter lead in socket and black lead to ground. Turn MASTER switch on and check for voltage. If voltage is present, repair/replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay circuit (see paragraph 2-19, master relay fails to operate).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- E Place a jumper wire from pin H to socket H. Place red lead of multimeter on pin E wire 450B of and black lead to ground. Turn MASTER and BILGE PUMP switches ON and check for voltage. Turn MASTER and BILGE PUMP switches OFF. If voltage is present, go to step J. If voltage is not present, go to step F.
- F Disconnect wire 37/450 from panel connector side of circuit breaker. Place red lead of multimeter in wire 37/450 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step G. If voltage is not present, repair/replace wire 37/450 of bilge pump main power wiring harness from circuit breaker to connector (see paragraph 6-84).
- G Reconnect wire 37/450 to panel connector side of circuit breaker. Disconnect wire 450 from BILGE PUMP switch side of circuit breaker. Place red lead of multimeter on circuit breaker terminal and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step H. If voltage is not present, replace circuit breaker (see paragraph 6-9).

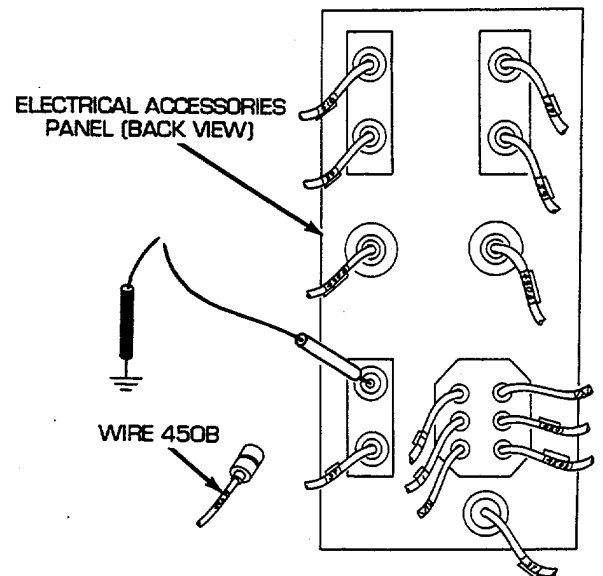
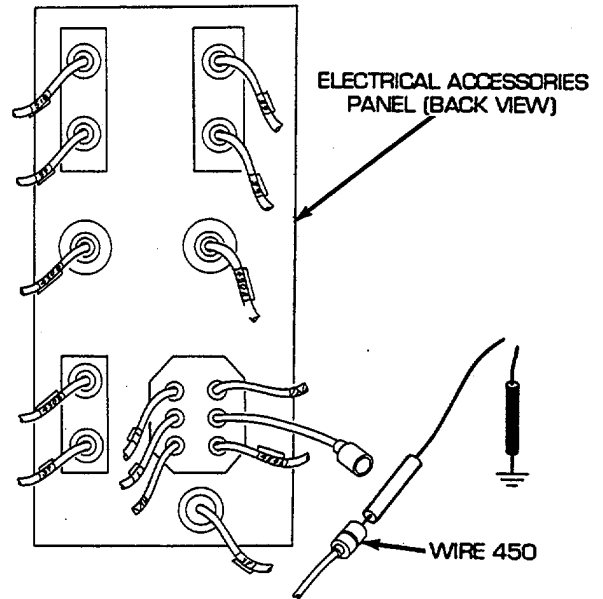


2-19 ELECTRICAL TROUBLESHOOTING-Continued**BILGE PUMP SYSTEM AND ELECTRICAL ACCESSORIES PANEL POWER OUTLET-Continued****WARNING**

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

H Reconnect wire 450 to BILGE PUMP switch side of circuit breaker. Disconnect wire 450 from circuit breaker side of BILGE PUMP switch. Place red lead of multimeter in wire 450 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step I. If voltage is not present, repair/replace wire 450 from circuit breaker to bilge pump switch (see paragraph 6-84).

I Reconnect wire 450 to circuit breaker side of BILGE PUMP switch. Disconnect wire 450B from panel connector side of BILGE PUMP switch. Place red lead of multimeter on BILGE PUMP switches terminal and black lead to ground. Turn MASTER and BILGE PUMP switches ON and check for voltage. Turn MASTER and BILGE PUMP switches OFF. If voltage is present, repair/replace wire 450B of bilge pump main power harness (see paragraph 6-84). If voltage is not present, replace BILGE PUMP switch (see paragraph 6-9).



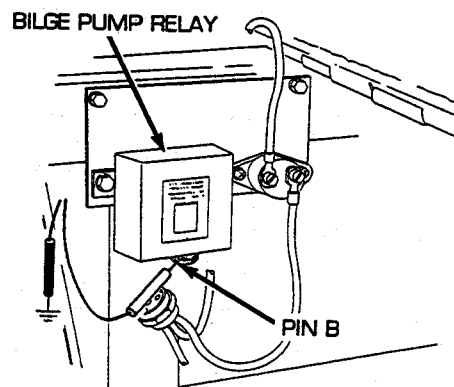
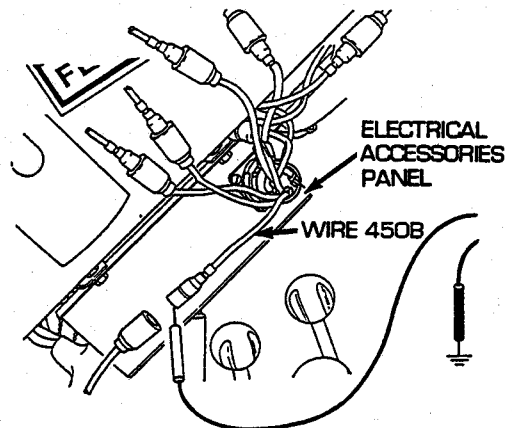
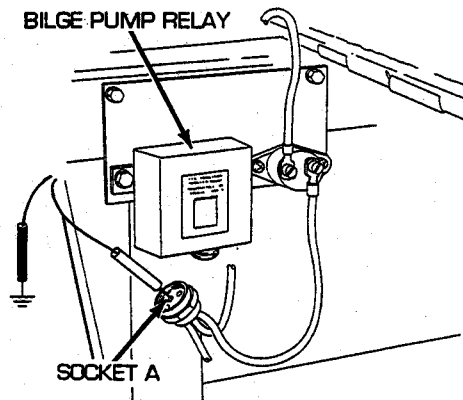
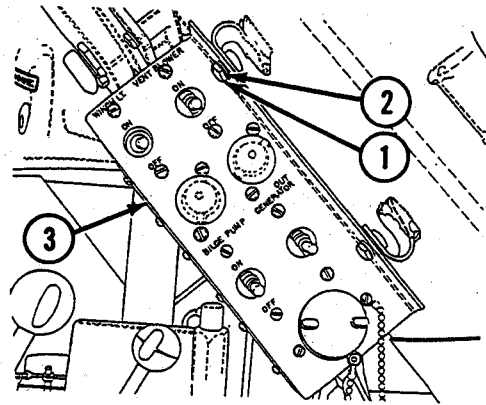
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

J Reconnect electrical accessories panel wiring harness to electrical accessories panel. Install electrical accessories panel (3), three lockwashers (2), and three screws (1). Open stowage basket forward intermediate left floor plate. Disconnect bilge pump circuit breaker to switch panel lead assembly from bilge pump relay. Place red lead of multimeter in socket A of wire 450B and black lead to ground. Turn MASTER and BILGE PUMP switches ON and check for voltage. Turn MASTER and BILGE PUMP switches OFF. If voltage is present, go to step L. If voltage is not present, go to step K.

K Reconnect bilge pump circuit breaker to switch panel lead assembly. Disconnect wire 450B of electrical accessories panel wiring harness from wire 450B of bilge pump lead relay wiring harness. Place red lead of multimeter in female connector of wire 450B and black lead to ground. Turn MASTER and BILGE PUMP switches ON, and check for voltage. Turn MASTER and BILGE PUMP switches OFF. If voltage is not present, repair/replace wire 450B of electrical accessories panel wiring harness (see paragraph 6-47). If voltage is present, repair/replace 450B of bilge pump lead relay wiring harness (see paragraph 6-86).

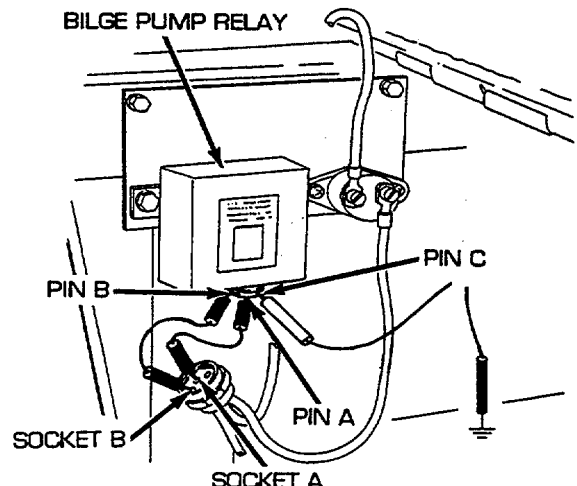
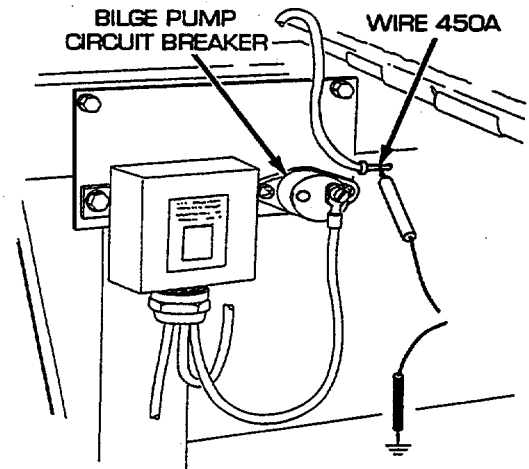
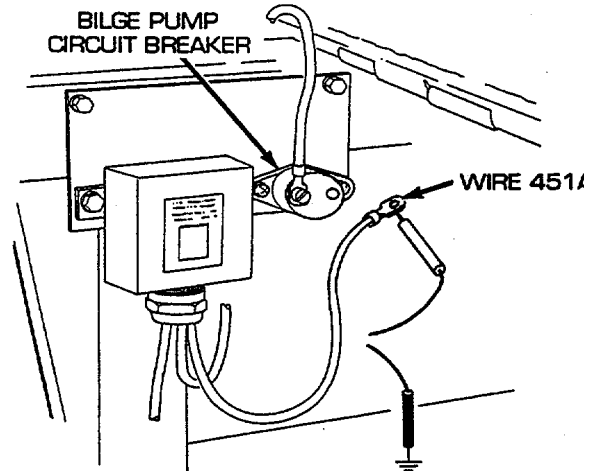
L Place red lead of multimeter in pin B of wire 451A and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step O. If voltage is not present, go to step M.



2-19 ELECTRICAL TROUBLESHOOTING-Continued**BILGE PUMP SYSTEM AND ELECTRICAL ACCESSORIES PANEL POWER OUTLET-Continued****WARNING**

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

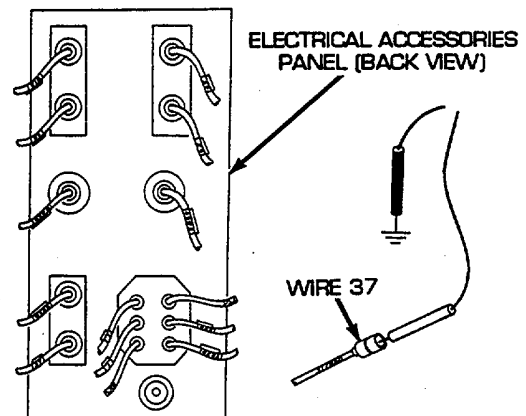
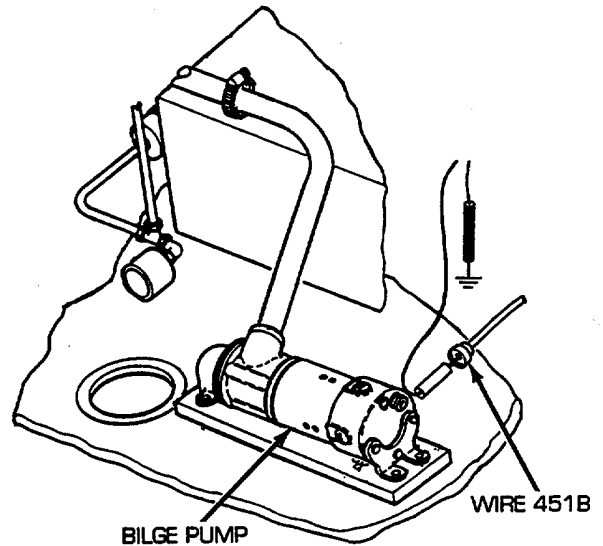
- M Disconnect wire 451A from bilge pump relay side of 50 A circuit breaker. Place red lead of multimeter on 50 A circuit breaker terminal and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 451A of bilge pump lead relay wiring harness (see paragraph 6-86). If voltage is not present, go to step N.
- N Reconnect wire 451A to bilge pump relay side of 50 A circuit breaker. Disconnect wire 450A from electrical accessories panel side of 50 A circuit breaker. Place red lead of multimeter in wire 450A and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace 50 A circuit breaker (see paragraph 6-85). If voltage is not present, repair/replace bilge pump circuit breaker to switch panel lead wire 450A (see paragraph 6-85).
- O Place jumper wires from pin A to socket A and pin B to socket B. Place red lead of multimeter on pin C of wire 451B of bilge pump relay and black lead to ground. Turn MASTER and BILGE PUMP switches ON and check for voltage. Turn MASTER and BILGE PUMP switches OFF. If voltage is present, go to step P. If voltage is not present, repair/replace bilge pump relay (see paragraph 6-101).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- P Reconnect bilge pump circuit breaker to switch panel lead assembly to bilge pump relay. Disconnect wire 451B from bilge pump. Place red lead of multimeter in wire 451B and black lead to ground. Turn MASTER and BILGE PUMP switches ON and check for voltage. Turn MASTER and BILGE PUMP switches OFF. If voltage is present, replace bilge pump assembly (see paragraph I-12). If voltage is not present, repair/replace wire 451B of bilge pump circuit breaker to switch panel lead assembly (see paragraph 6-85).
- Q Remove four screws (1) and four lockwashers (2) and release electrical accessories panel (3). Disconnect wire 37 from electrical accessories panel power outlet. Place red lead of multimeter on wire 37 and black lead to ground. Turn MASTER and BILGE PUMP switches ON and check for voltage. Turn MASTER and BILGE PUMP switches OFF. If voltage is present, replace electrical accessories panel power outlet (see paragraph 6-9). If voltage is not present, repair/replace wire 37 of bilge pump and generator cutout switch lead assembly (see paragraph 6-83).



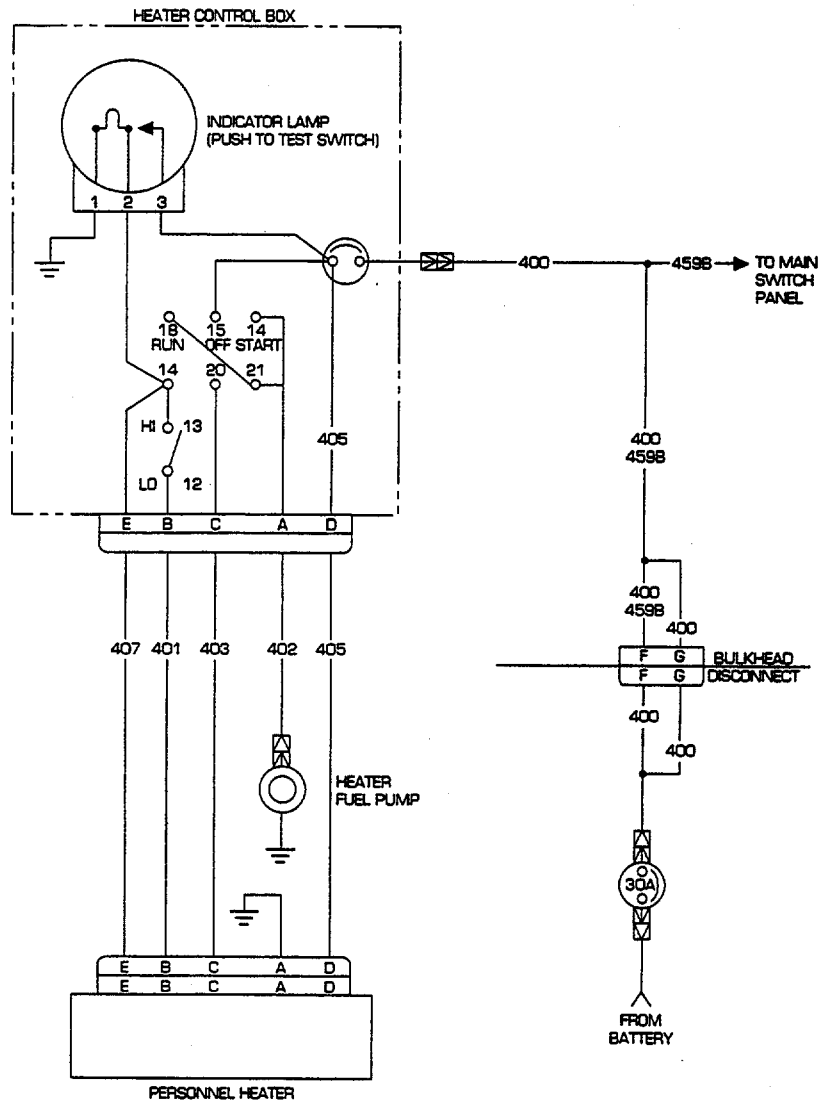
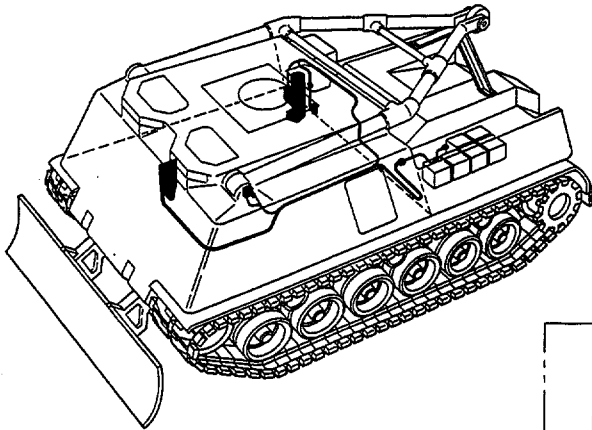
2-19 ELECTRICAL TROUBLESHOOTING- Continued

PERSONNEL HEATER CONTROL SYSTEM

SYMPTOM

Personnel heater fails to operate.

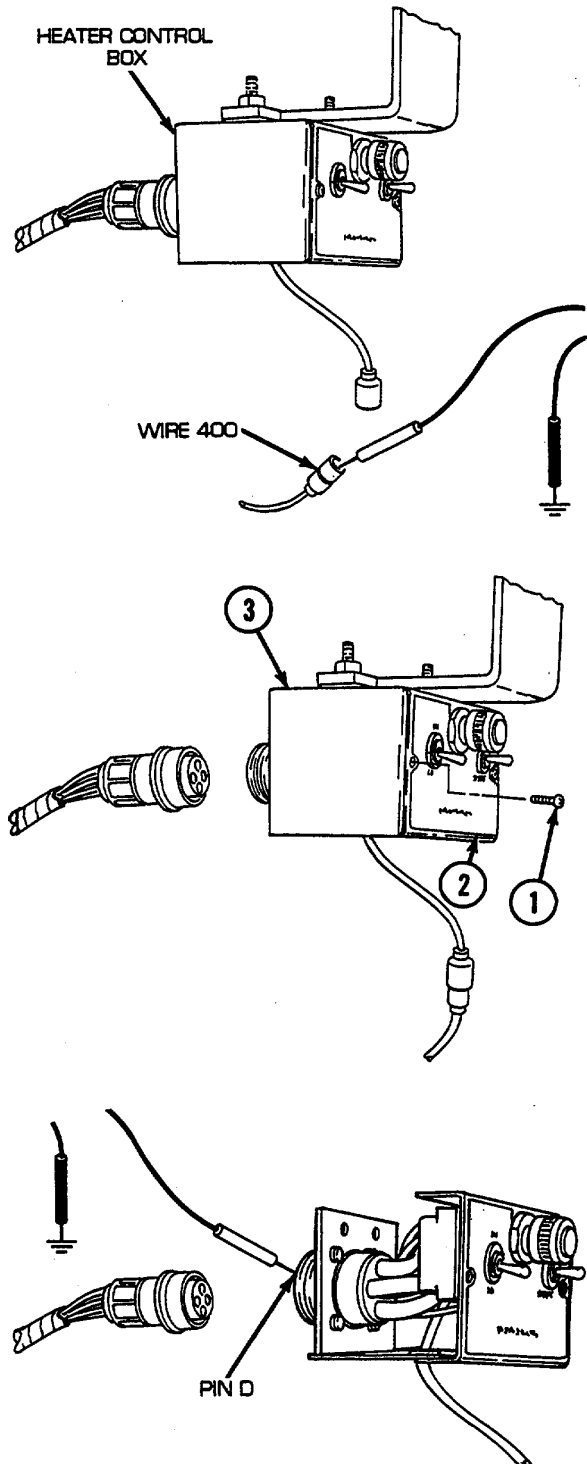
Do steps A through O.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

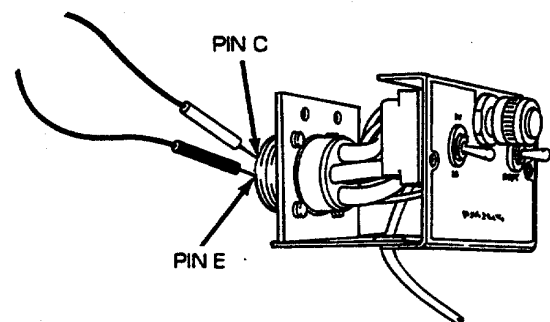
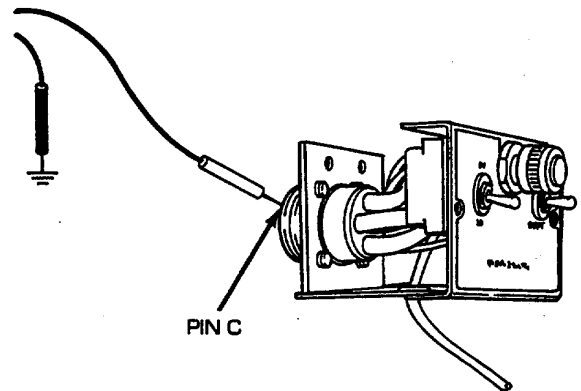
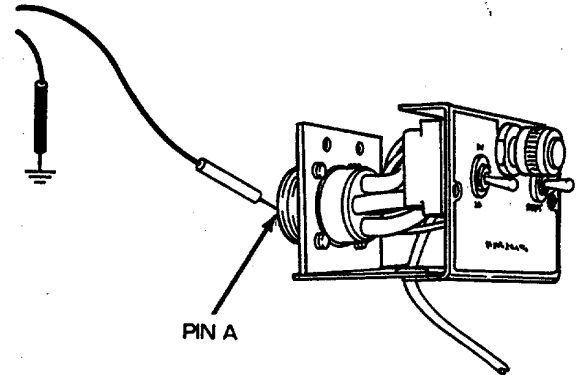
- A Disconnect wire 400 of switch panel to head lamps and bulkhead wiring harness from connector at HEATER CONTROL box. Place red lead of multimeter in wire 400 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step B. If voltage is not present, go to step L.
- B Reconnect wire 400 of switch panel to head lamps and bulkhead wiring harness to HEATER CONTROL box connector. Remove two screws (1) and release personnel heater control box front panel (2) from personnel heater control box (3). Disconnect heater control box to heater wiring harness from HEATER CONTROL box. Place red lead of multimeter on pin D of wire 405 and black lead to ground. Turn MASTER switch on, HEATER CONTROL switch to START, and check for voltage. Turn MASTER and HEATER CONTROL switches OFF. If voltage is present, go to step C. If voltage is not present, replace HEATER CONTROL box (see paragraph 6-12).



2-19 ELECTRICAL TROUBLESHOOTING-Continued**PERSONNEL HEATER CONTROL SYSTEM-Continued****WARNING**

Remove all jewelry such as rings, dog tags , bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- C Place red lead of multimeter on pin A of wire 402 and black lead to ground. Turn MASTER switch on, HEATER CONTROL switch to START, and check for voltage. Place HEATER CONTROL switch in RUN position and check for voltage. Turn MASTER and HEATER CONTROL switches OFF. If voltage is present, go to step D. If voltage is not present, replace HEATER CONTROL box (see paragraph 6-12).
- D Place red lead of multimeter on pin C of wire 403 and black lead to ground. Turn MASTER switch on, HEATER CONTROL switch to START, and check for voltage. Place heater controls switch in RUN position and check for voltage. Turn MASTER and HEATER CONTROL switches OFF. If voltage is present, go to step E. If voltage is not present, replace HEATER CONTROL box (see paragraph 6-12).
- E Place red lead of multimeter on pin C of wire 403 and black lead on pin E of wire 407. Check for continuity. If continuity is present, go to step F. If continuity is not present, replace HEATER CONTROL box (see paragraph 6-12).



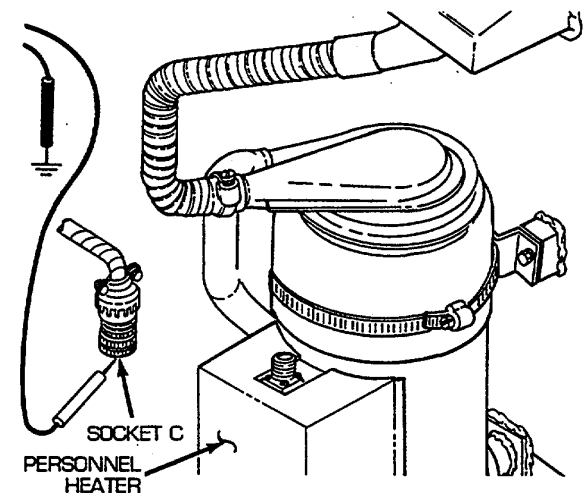
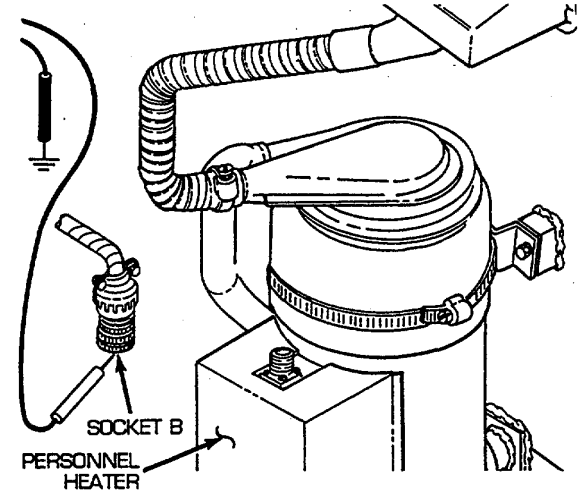
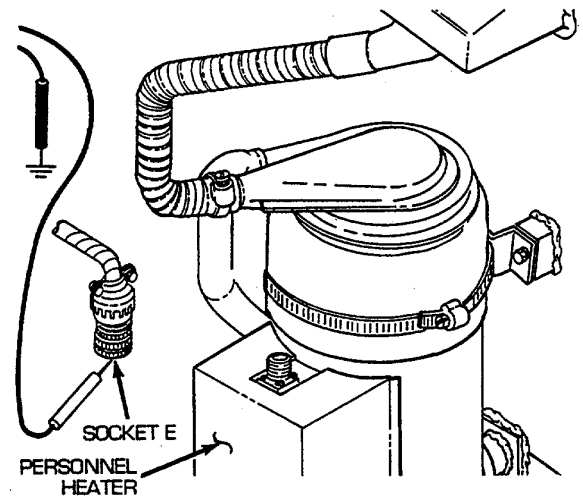
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

F Reconnect heater control box to heater wiring harness to HEATER CONTROL box. Disconnect HEATER CONTROL box to heater wiring harness from the personnel heater. Place red lead of multimeter in socket E of wire 407 and black lead to ground. Turn MASTER switch on, HEATER CONTROL switch to START, and check for voltage. Turn MASTER and HEATER CONTROL switches OFF. If voltage is present, go to step G. If voltage is not present, repair/replace wire 407 of heater control box to heater wiring harness (see paragraph 6-87).

G Place red lead of multimeter in socket B of wire 401 and black lead to ground. Turn MASTER switch on, HEATER CONTROL switch to START, and check for voltage. Turn MASTER and HEATER CONTROL switches OFF. If voltage is present, go to step H. If voltage is not present, repair/replace wire 401 of heater control box to heater wiring harness (see paragraph 6-87).

H Place red lead of multimeter in socket C of wire 403 and black lead to ground. Turn MASTER switch on, and HEATER CONTROL switch to START, and check for voltage. Turn MASTER and HEATER CONTROL switches OFF. If voltage is present, go to step I. If voltage is not present, repair/replace wire 403 of heater control box to heater wiring harness (see paragraph 6-87).



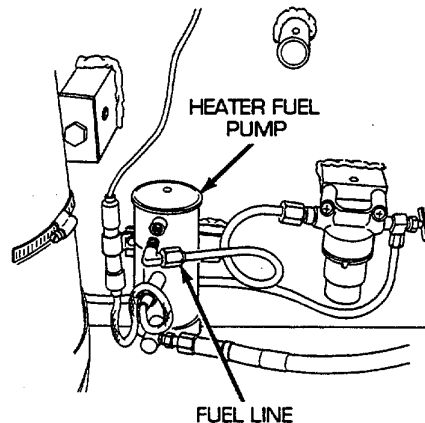
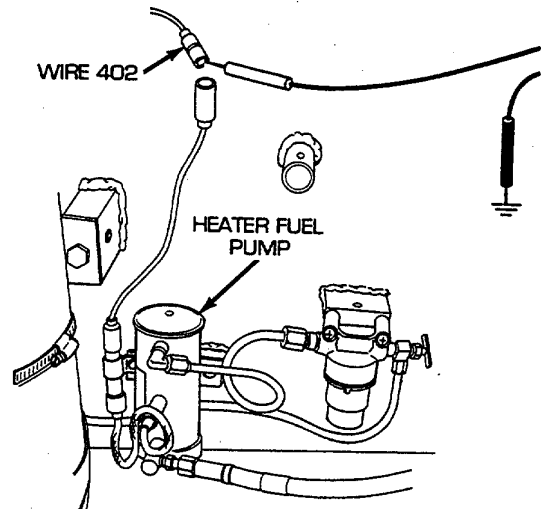
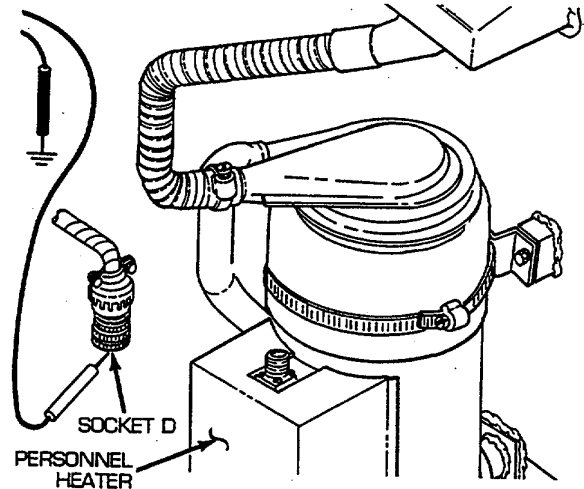
2-19 ELECTRICAL TROUBLESHOOTING-Continued**PERSONNEL HEATER CONTROL SYSTEM-Continued****WARNING**

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

I Place red lead of multimeter in socket D of wire 405 and black lead to ground. Turn MASTER switch on, HEATER CONTROL switch to START, and check for voltage. Turn MASTER and HEATER CONTROL switches OFF. If voltage is present, go to step J. If voltage is not present, repair/replace wire 405 of heater control box to heater wiring harness (see paragraph 6-87).

J Reconnect heater control box to heater wiring harness to personnel heater. Disconnect wire 402 from heater fuel pump. Place red lead of multimeter in wire 402 and black lead to ground. Turn MASTER switch on, HEATER CONTROL switch to START, and check for voltage. Turn MASTER and HEATER CONTROL switches OFF. If voltage is present, go to step K. If voltage is not present, repair/replace wire 402 of heater control box to heater wiring harness (see paragraph 6-87).

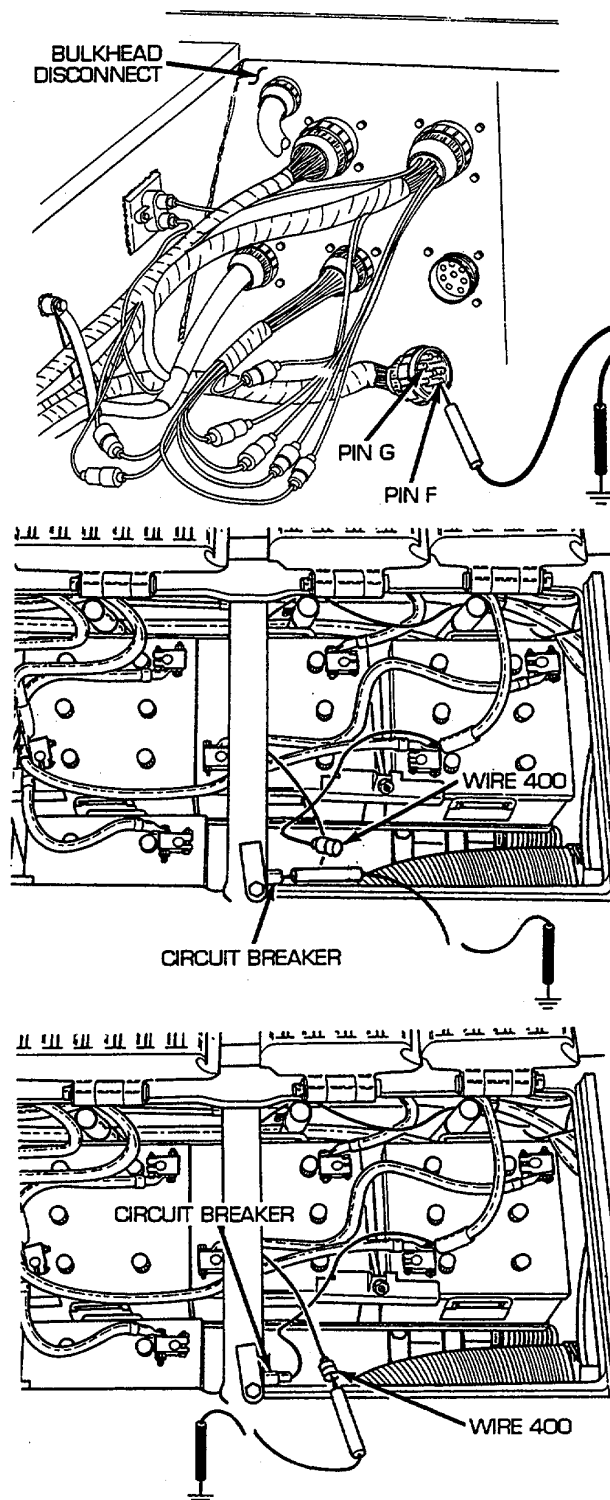
K Reconnect wire 402 to heater fuel pump. Disconnect fuel line from fuel pump. Turn MASTER switch on, HEATER CONTROL switch to START, and check for fuel flow. Turn MASTER and HEATER CONTROL switches OFF. If fuel flow is present, troubleshoot personnel heater (TM 9-2540-205-24&P). If fuel flow is not present, replace heater fuel pump (see paragraph 10-2).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- L Reconnect wire 400 of switch panel to head lamps and bulkhead wiring harness to connector at HEATER CONTROL box. Disconnect bulkhead to master relay and left and right taillights wiring harness from bulkhead disconnect. Place red lead of multimeter on pin F of wire 400 and black lead to ground. Turn MASTER switch on and check for voltage. Place red lead of multimeter on pin G of wire 400 and black lead to ground. Check for voltage. Turn MASTER switch OFF. If voltage is not present at either location, repair/replace wire 400 of bulkhead to MASTER relay and left and right taillights wiring harness from bulkhead to battery (see paragraph 6-71). If voltage is not present in either location, go to step M.
- M Reconnect bulkhead to master relay and left and right taillights wiring harness to bulkhead disconnect. Disconnect wire 400 from bulkhead side of 30 A circuit breaker. Place red lead of multimeter on terminal of circuit breaker and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 400 of bulkhead to master relay and left and right taillight wiring harness. (see paragraph 6-71). If voltage is not present, go to step N.
- N Reconnect wire 400 to bulkhead side of 30 A circuit breaker. Disconnect wire 400 from battery side of 30 A circuit breaker. Place red lead of multimeter in wire 400 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace 30 A circuit breaker. If voltage is not present, repair/replace wire 400 of battery to circuit breaker lead assembly (see paragraph 6-38).

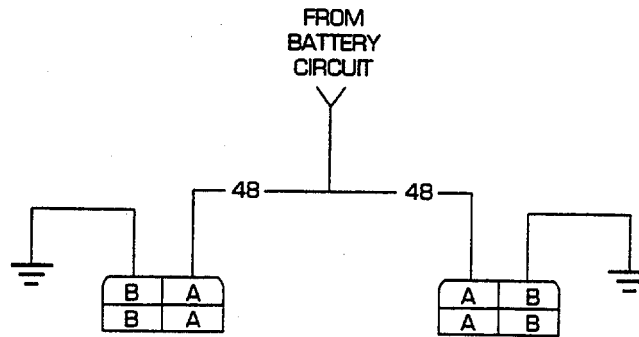
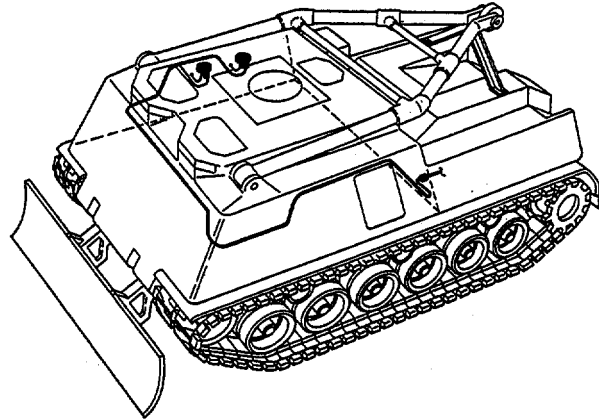


2-19 ELECTRICAL TROUBLESHOOTING-Continued

COMMUNICATION SYSTEM

SYMPTOMS

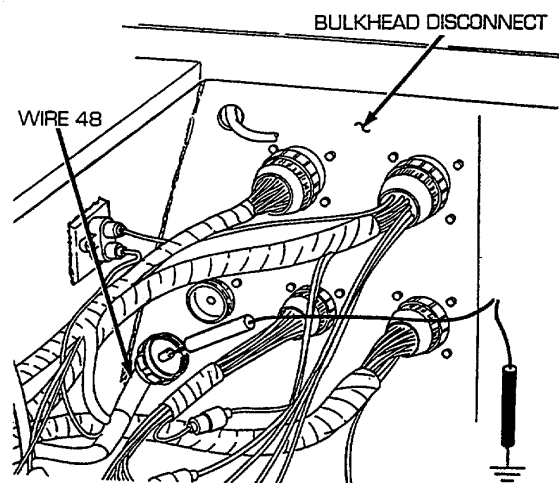
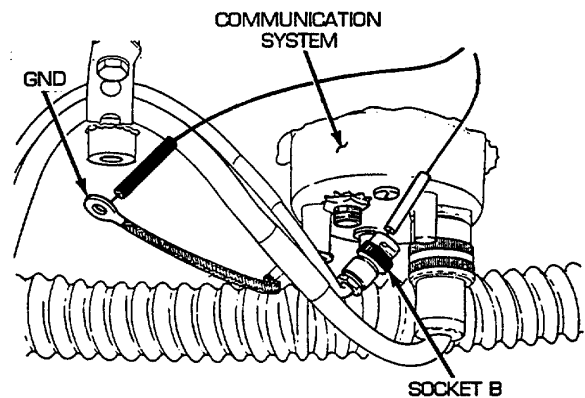
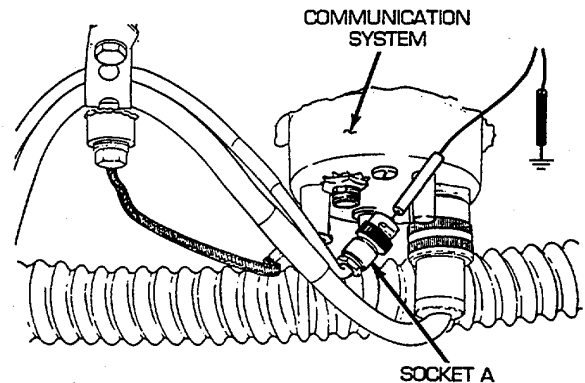
One radio fails to operate.
Do steps A through C.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Disconnect switch panel, radio, and bilge pump to bulkhead wiring harness from both communications systems. Place red lead of multimeter in one socket A of wire 48 and black lead to ground. Turn MASTER switch on and check for voltage. Then place red lead of multimeter in other socket A of wire 48 and black lead to ground and check for voltage. Turn MASTER switch OFF. If voltage is present in both sockets, go to step B. If voltage is present in one or not present in either, go to step C.
- B Disconnect one ground wire from bulkhead. Place red lead of multimeter in socket B of ground wire and black lead on other end of ground wire. Check for continuity. Disconnect other ground wire from bulkhead. Place red lead of multimeter in socket B of ground wire and black lead on other end of ground wire. If continuity is present, troubleshoot master relay (see paragraph 2-19, master relay fails to operate). If continuity is not present, repair/replace ground wire of switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53).
- C Reconnect ground wires to hull and switch panel, radio, and bilge pump to bulkhead wiring harness to both communications systems. Disconnect wire 48 pin A from bulkhead to master relay wiring harness. Place red multimeter lead in socket and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair or replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay circuit (see paragraph 2-19, master relay fails to operate).



2-19 ELECTRICAL TROUBLESHOOTING-Continued

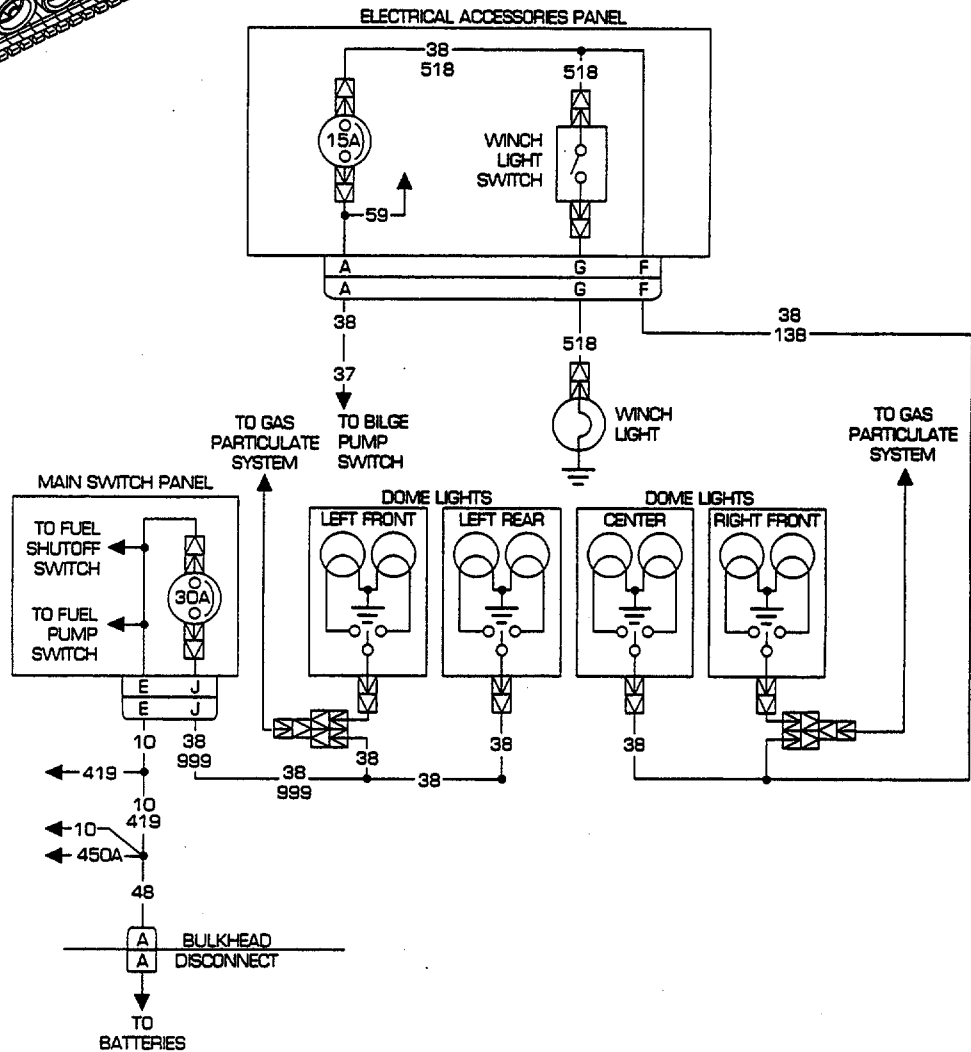
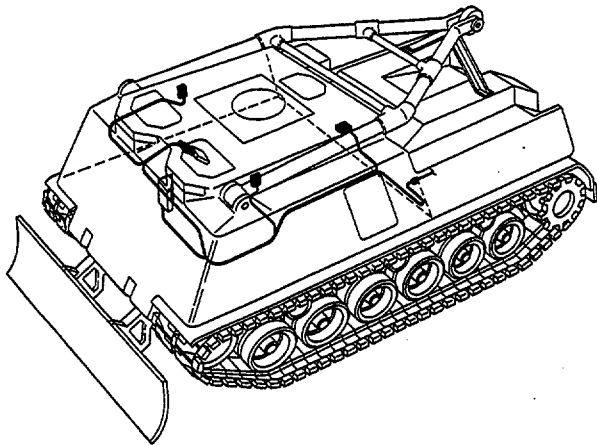
DOME LIGHTS

SYMPTOMS

Both left front and left rear dome lights fail to operate.
Do steps A through F.

Both center and right front dome lights fail to operate.
Do steps A through J.

Only one dome light fails to Operate.
Do steps A and B.



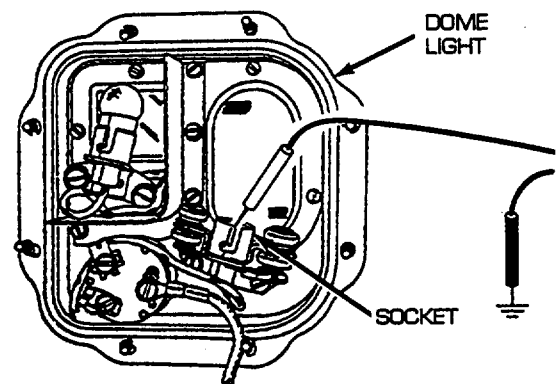
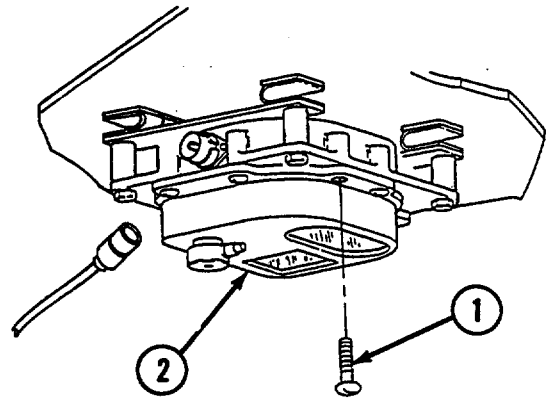
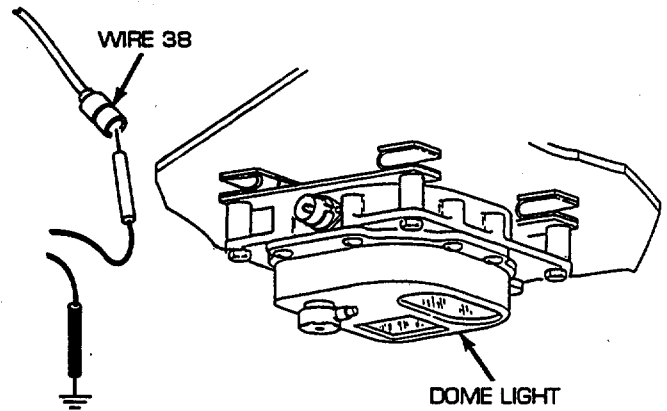
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

NOTE

Do steps A and B for all symptoms.

- A Disconnect wire 38 from dome light. Place red lead of multimeter in wire 38 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step B. If voltage is not present, go to step C for left front and left rear dome lights and go to step G for center and right front dome lights.
- B Remove eight screws (1) and door assembly (2). Remove lamp from socket assembly. Turn MASTER switch on. Place red lead of multimeter on contact in center of socket and black lead to ground. Check for voltage. Turn MASTER switch OFF. If voltage is not present, replace dome light assembly (see paragraph 6-34). If voltage is present, replace lamp (see paragraph 6-34).



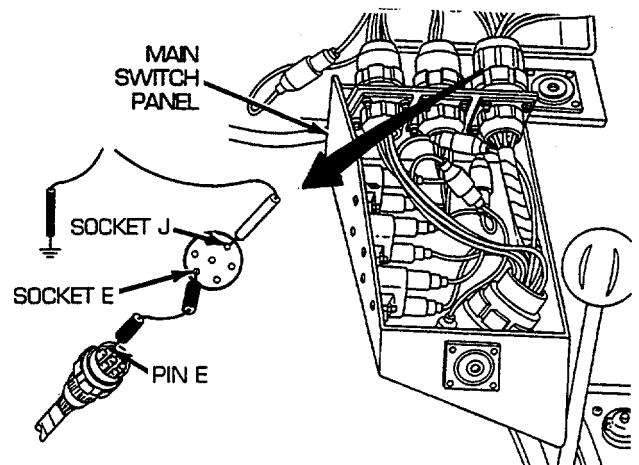
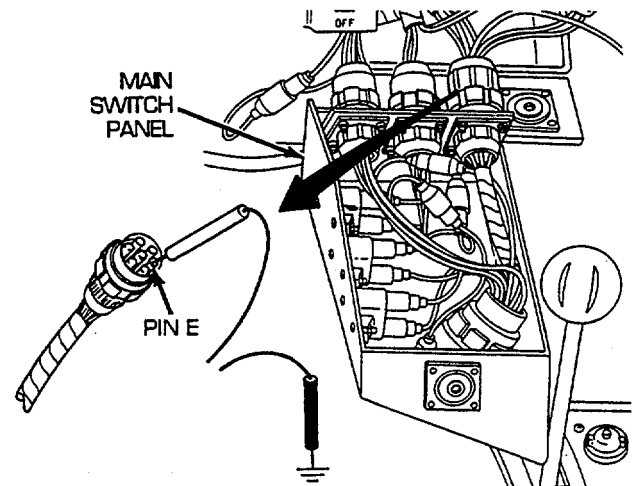
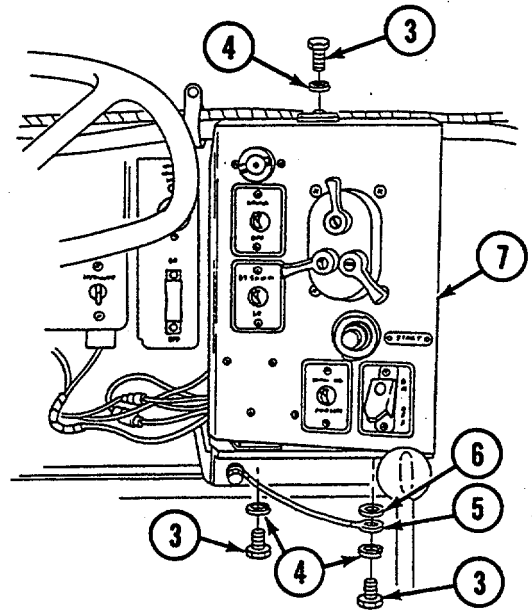
2-19 ELECTRICAL TROUBLESHOOTING-Continued

DOME LIGHTS-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

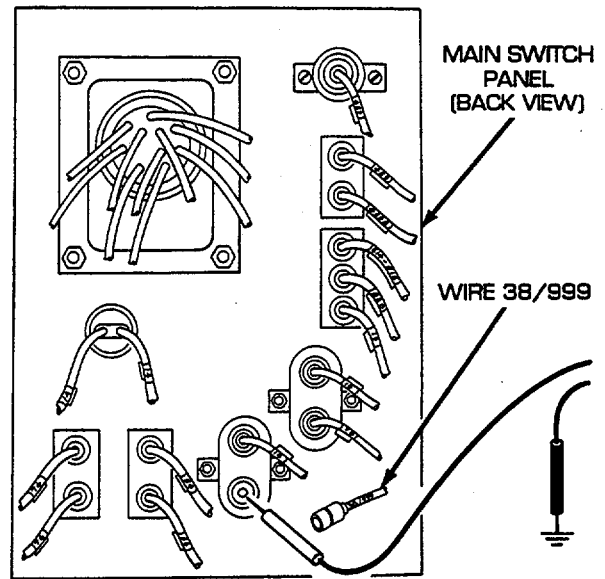
- C Remove three screws (3), three lockwashers (4), ground lead (5), and flat washer (6) and release main switch panel (7) from mounting brackets. Disconnect switch panel to gage panel and miscellaneous switches wiring harness from main switch panel. Place red lead of multimeter on pin E of wire 10 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step F. If voltage is not present, reinstall main switch panel and go to step I.
- D Place a jumper wire from pin E to socket E of wire 10. Place red lead of multimeter in socket J of wire 38/999 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 38/999 of switch panel to gage panel and miscellaneous switches wiring harness (see paragraph 6-55 for dual voltage; 6-56 for single voltage). If voltage is not present, go to step E.



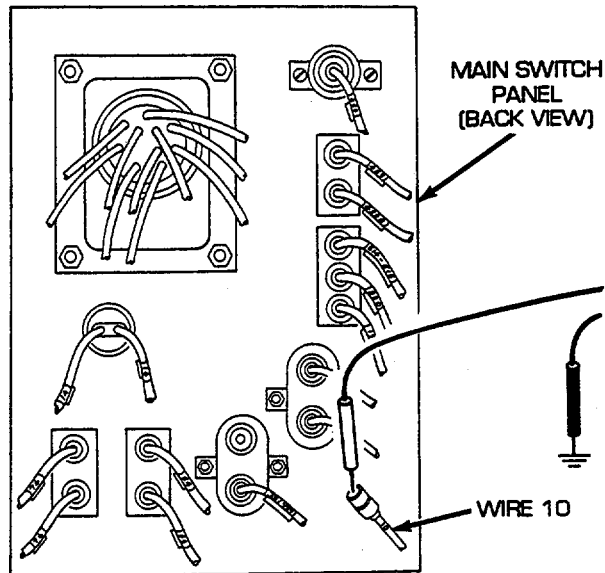
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

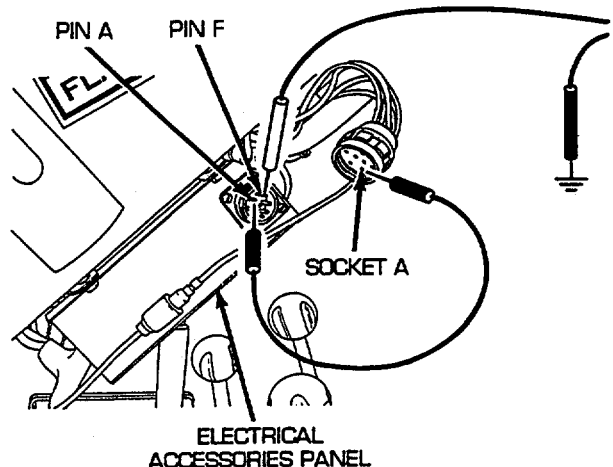
E Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Remove main switch panel (see paragraph 6-10). Place jumper wire from bracket to hull to ground the panel. Disconnect wire 38/999 from 15 A circuit breaker. Place red lead of multimeter on terminal of 15 A circuit breaker and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 38/999 of main lighting and B.O. selector switch wiring harness (see paragraph 6-69). If voltage is not present, go to step F.



F Reconnect wire 38/999 to 15 A circuit breaker. Disconnect wire 10 from 15 A circuit breaker. Place red lead of multimeter in wire 10 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace 15 A circuit breaker (see paragraph 6-10). If voltage is not present, repair/replace wire 10 of main lighting and B.O. selector switch wiring harness (see paragraph 6-69).



G Disconnect electrical accessories panel wiring harness from electrical accessories panel. Place a jumper wire from pin A to socket A of wire 38/59. Place red lead of multimeter on pin F of wire 38 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 38 of electrical accessories panel wiring harness (see paragraph 6-47). If voltage is not present, go to step H.



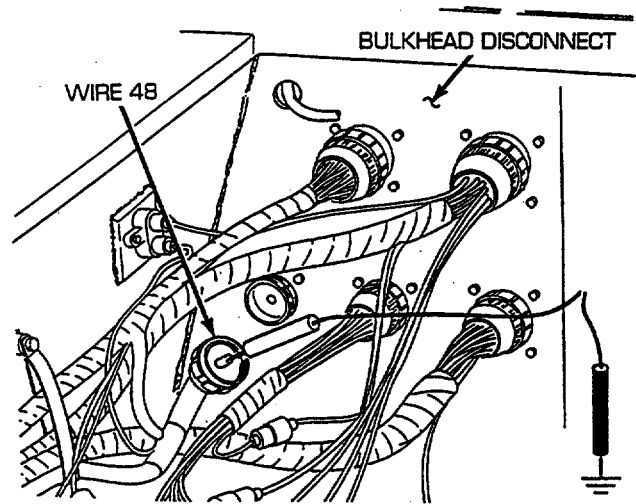
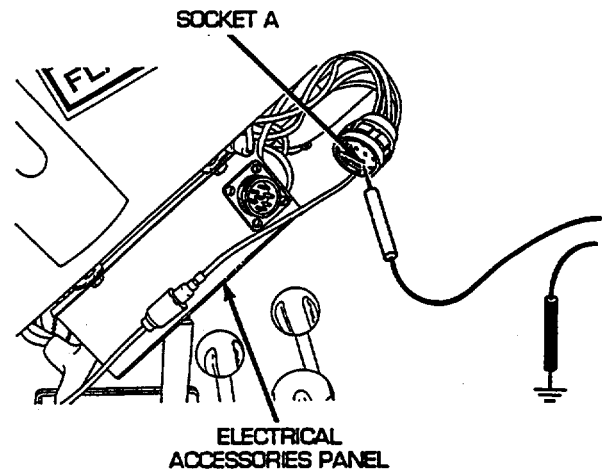
2-19 ELECTRICAL TROUBLESHOOTING-Continued

DOME LIGHTS-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

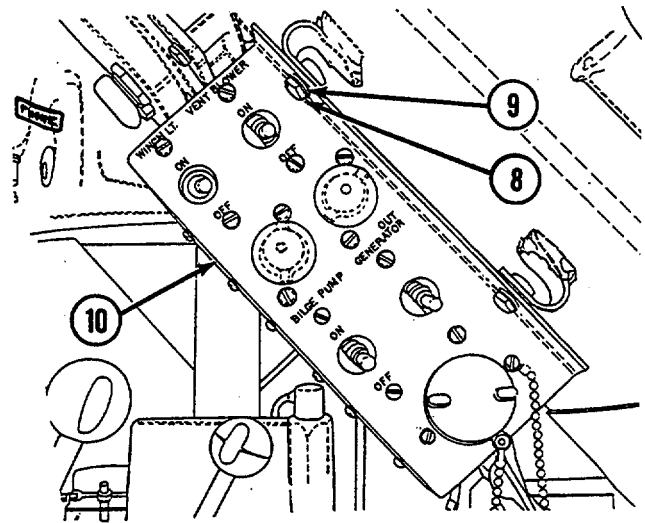
- H Place red lead of multimeter in socket A of wire 38/59 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step J. If voltage is not present, reconnect electrical accessories panel wiring harness to electrical accessories panel and go to step I.
- I Open air inlet doors (TM 9-2350-256-10). Disconnect wire 48 pin A from bulkhead to master relay wiring harness. Place red multimeter lead in socket and black lead to ground. Turn MASTER switch on and check for voltage. If voltage is present, repair/replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay circuit (see paragraph 2-19, master relay fails to operate).



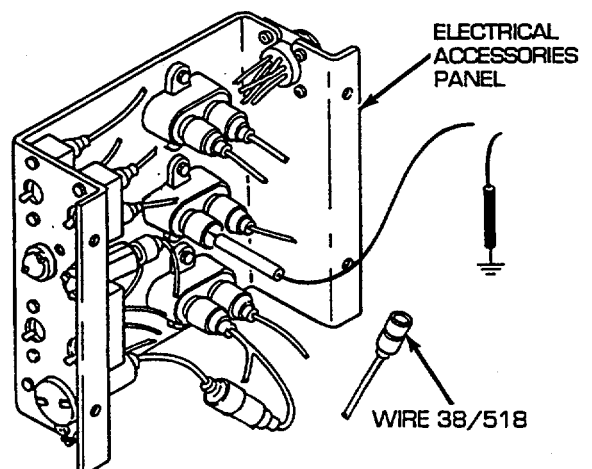
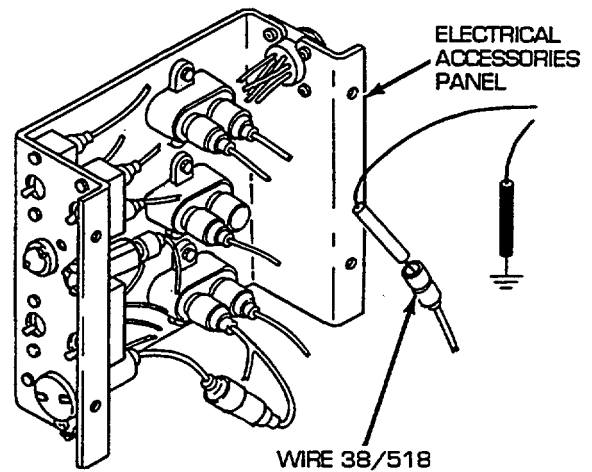
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- J Remove four screws (8) and four lockwashers (9) and release electrical accessories panel (10). Reconnect electrical accessories panel wiring harness to electrical accessories panel. Disconnect wire 38/518 from winch light switch side of 15 A circuit breaker. Place red lead of multimeter on terminal of 15 A circuit breaker and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 38/518 of bilge pump main power wiring harness from 15 A circuit breaker to electrical accessories panel wiring harness connector (see paragraph 6-84). If voltage is not present, go to step K.



- K Reconnect wire 38/518 to winch light switch side of 15 A circuit breaker. Disconnect wire 38/518 from panel connector side of 15 A circuit breaker. Place red lead of multimeter in wire 38/518 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace 15 A circuit breaker (see paragraph 6-9). If voltage is not present, repair/replace wire 38 from pin A to 15 A circuit breaker (see paragraph 6-9).



2-19 ELECTRICAL TROUBLESHOOTING-Continued

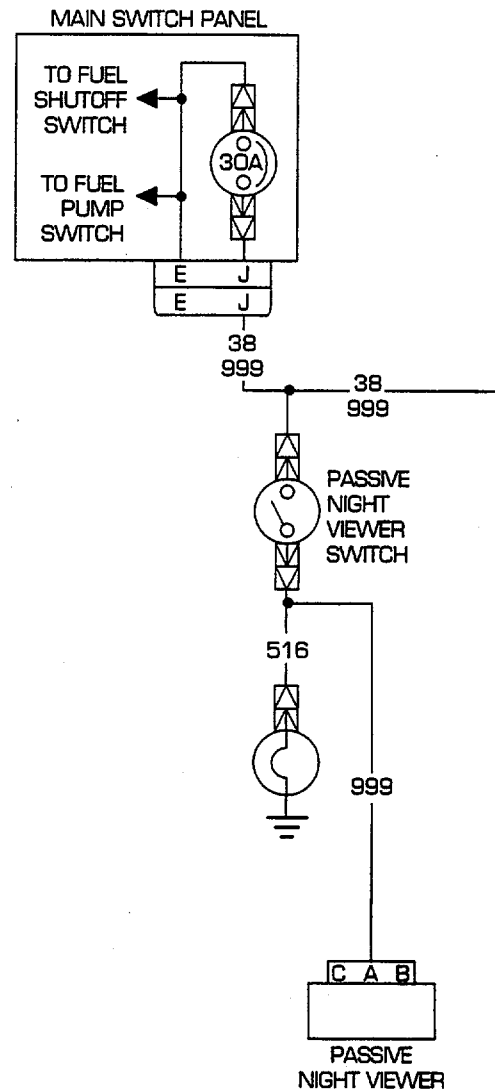
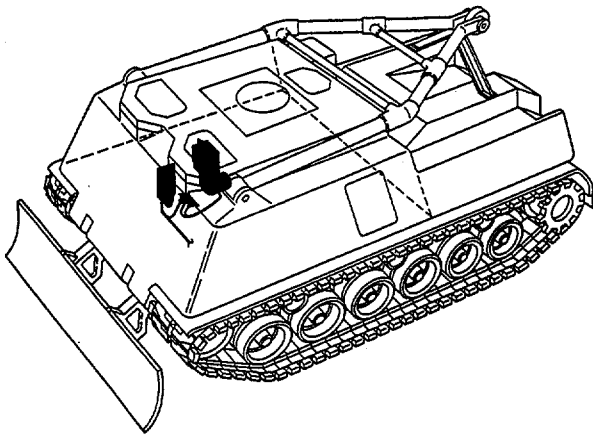
PASSIVE NIGHT VIEWER

SYMPTOMS

Passive night viewer lamp fails to light but passive night viewer operates.
Do step A.

Passive night viewer fails to operate.
Do steps C through F.

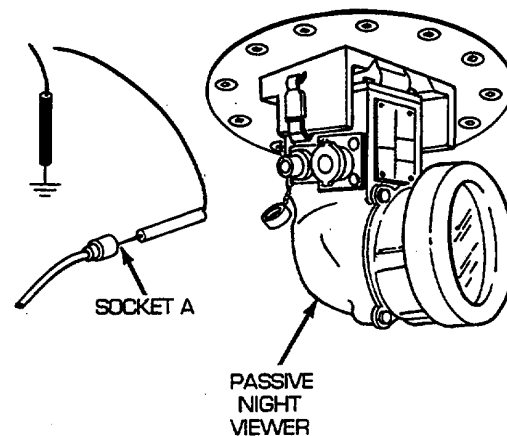
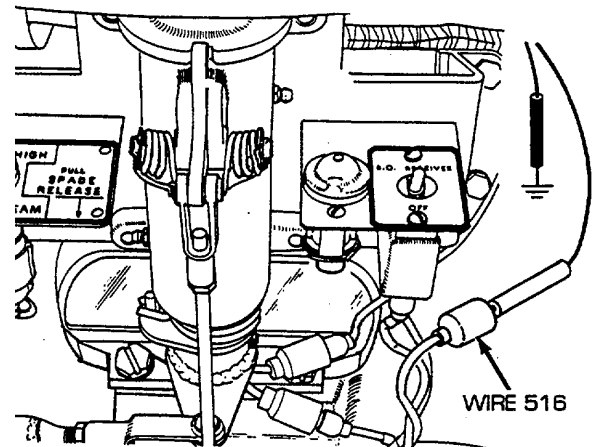
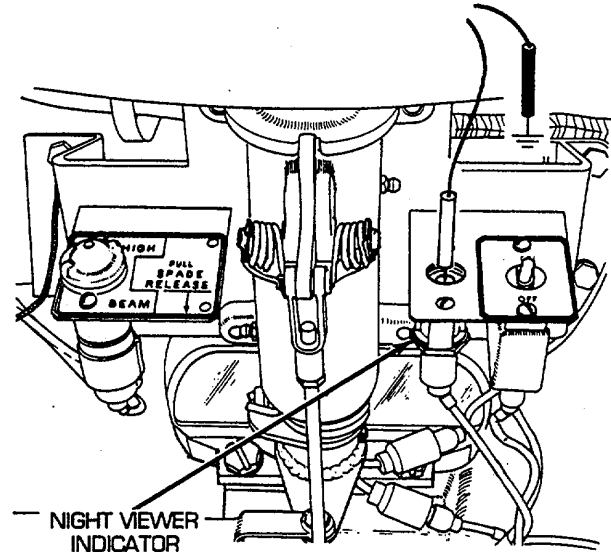
Both lamp and passive night viewer fail to operate.
Do steps E through F.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Remove night viewer indicator lamp from socket. Place red lead of multimeter in socket and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace lamp (see paragraph 6-15). If voltage is not present, go to step B.
- B Disconnect wire 516 from night viewer indicator lamp. Place red lead of multimeter in wire 516 and check for voltage. If voltage is present replace lamp socket (see paragraph 6-29). If voltage is not present, repair/replace wire 999 of switch panel to age panel and miscellaneous switches wiring harness (see paragraph 6-55).
- C Remove switch panel to gage panel and miscellaneous switches wiring harness from passive night viewer. Place red lead of multimeter in socket A of wire 999 and black lead to ground. Turn MASTER and passive NIGHT VIEWER switches on and check for voltage. Turn MASTER and passive NIGHT VIEWER switches OFF. If voltage is present, go to step D. If voltage is not present, go to step E.



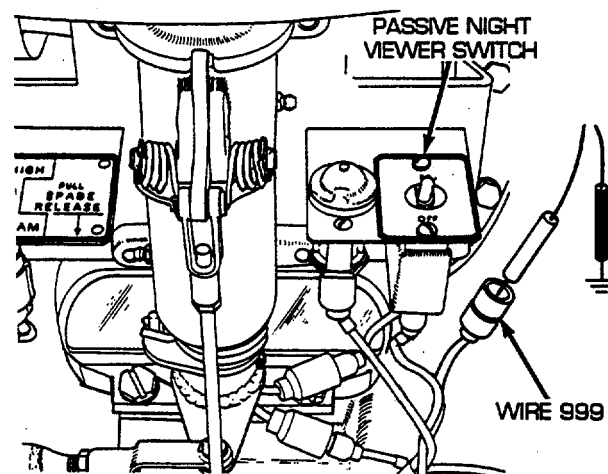
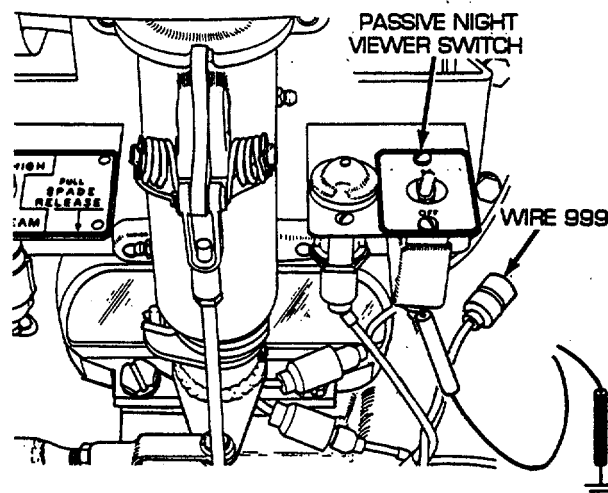
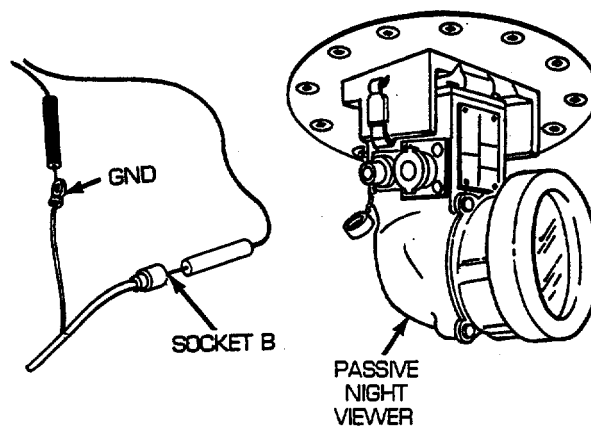
2-19 ELECTRICAL TROUBLESHOOTING-Continued

PASSIVE NIGHT VIEWER-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- D Disconnect ground wire from vehicle. Place red lead of multimeter in socket B and black lead on other end of ground wire. Check for continuity. If continuity is not present, repair/replace ground wire of switch panel to gage panel and miscellaneous switches wiring harness (see paragraph 6-55). If continuity is present, notify Direct Support Maintenance.
- E Disconnect wire 999 from passive night viewer side of passive NIGHT VIEWER switch. Place red lead of multimeter on switch terminal and black lead to ground. Turn MASTER and passive NIGHT VIEWER switches on and check for voltage. Turn MASTER and passive NIGHT VIEWER switches OFF. If voltage is present, repair/replace wire 999 of switch panel to gage panel and miscellaneous switches wiring harness from passive night viewer to passive night viewer switch (see paragraph 6-55). If voltage is not present, go to step F.
- F Reconnect wire 999 to passive NIGHT VIEWER switch. Disconnect wire 999 from main switch panel side of passive NIGHT VIEWER switch. Place red lead of multimeter in wire 999 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace passive NIGHT VIEWER switch (see paragraph 6-15). If voltage is not present, troubleshoot dome light circuit.



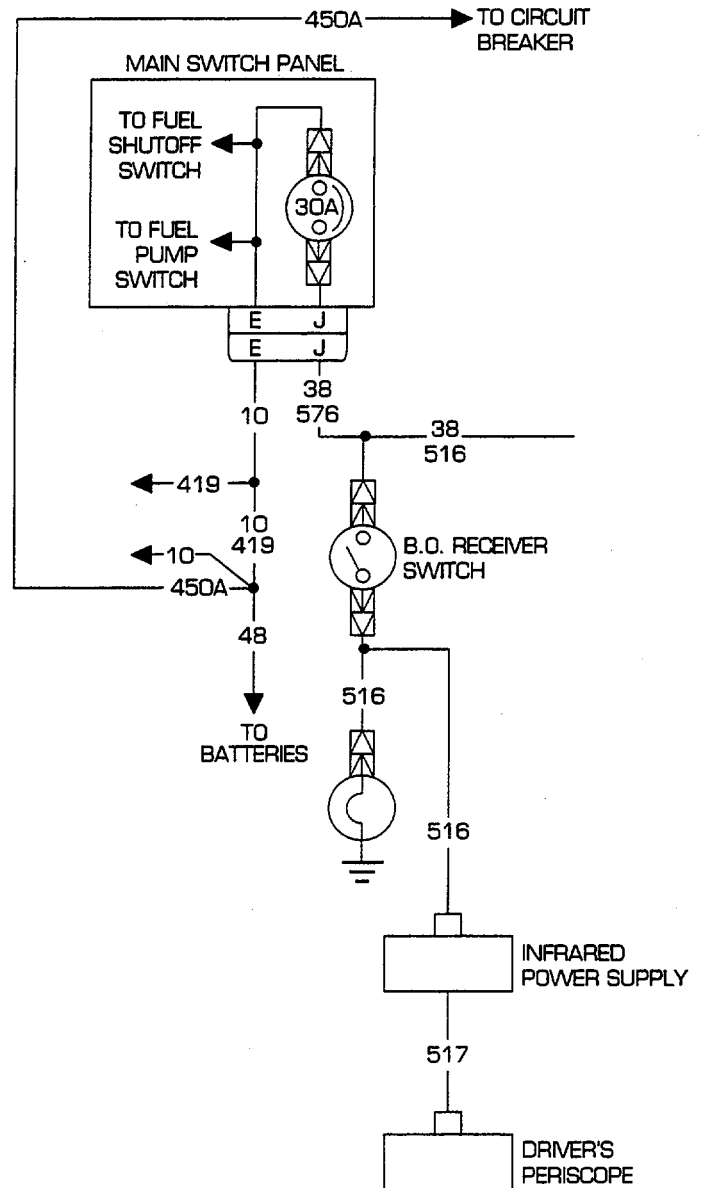
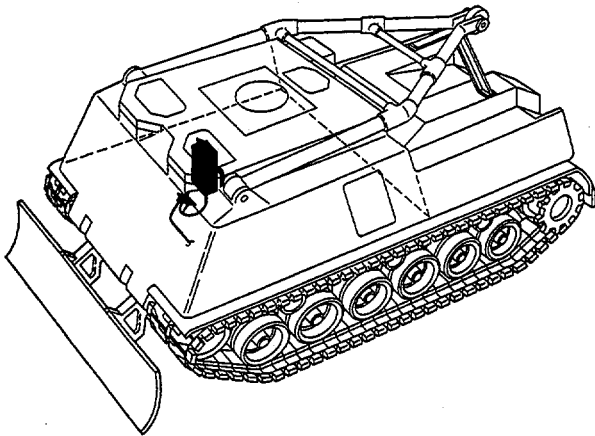
DRIVER'S PERISCOPE

SYMPTOMS

B.O. receiver lamp fails to light but driver's periscope operates.
Do step A.

Driver's periscope fails to operate.
Do steps C through G.

Both lamp and driver's periscope fail to operate.
Do steps F through G.



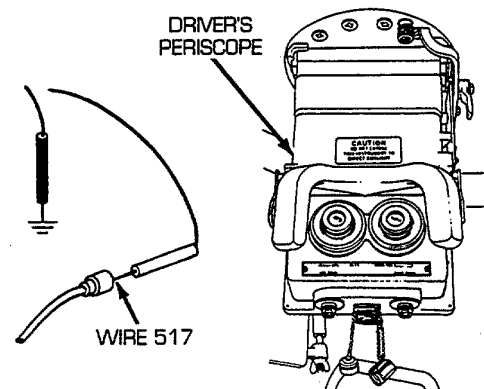
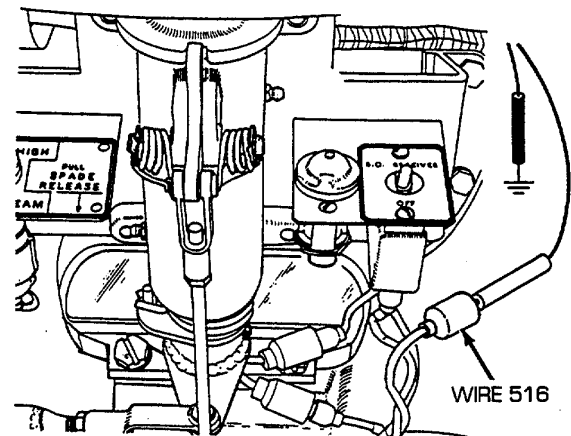
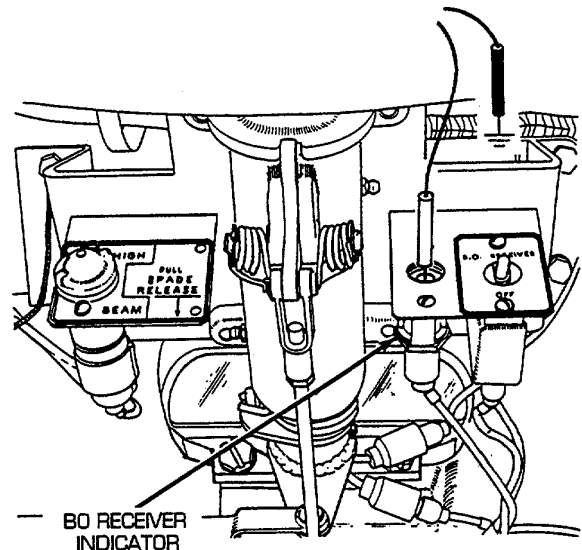
2-19 ELECTRICAL TROUBLESHOOTING-Continued

DRIVER'S PERISCOPE-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

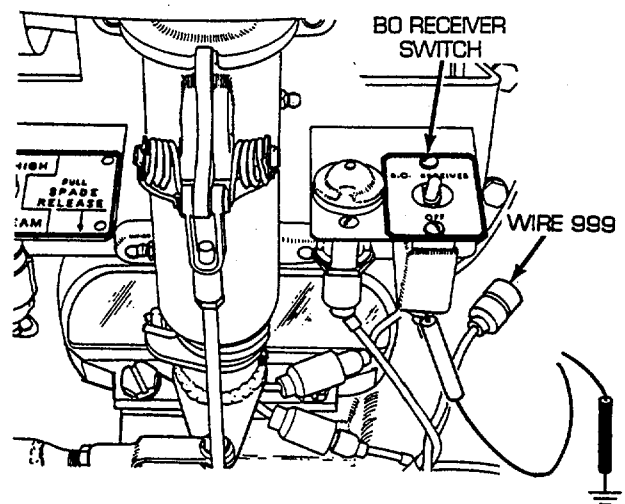
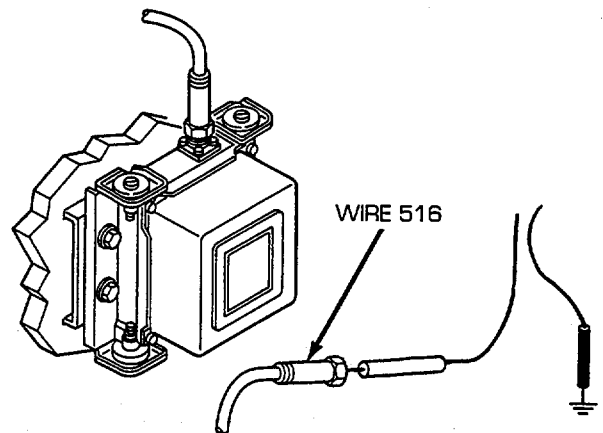
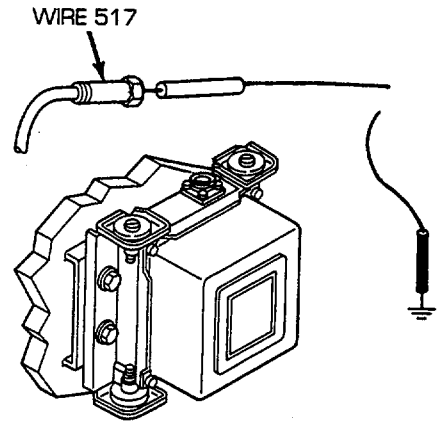
- A Remove B.O. receiver indicator lamp from socket. Place red lead of multimeter in socket and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace lamp (see paragraph 6-15). If voltage is not present, go to step B.
- B Disconnect wire 516 from B.O. receiver lamp. Place red lead of multimeter in wire 516 and check for voltage. If voltage is present, replace lamp socket (see paragraph 6-29). If voltage is not present, repair/replace wire 516 of switch panel to gage panel and miscellaneous switches wiring harness (see paragraph 6-56).
- C Remove infrared power supply to driver's periscope lead assembly from driver's periscope. Place red lead of multimeter in wire 517 and black lead to ground. Turn MASTER and B.O. RECEIVER switches on and check for voltage. Turn MASTER and B.O. RECEIVER switches OFF. If voltage is present, notify Direct Support Maintenance. If voltage is not present, go to step D.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- D Disconnect infrared power supply to driver's periscope lead assembly from infrared power supply. Place red lead of multimeter in socket of wire 517 and black lead to ground. Turn MASTER and B.O. RECEIVER switches on and check for voltage. Turn MASTER and B.O. RECEIVER switches OFF. If voltage is present, replace/repair infrared power supply to driver's periscope lead assembly (see paragraph 6-100). If voltage is not present, go to step E.
- E Disconnect switch panel to gage panel and miscellaneous switches wiring harness from infrared power supply. Place red lead of multimeter in wire 516 and black lead to ground. Turn MASTER and B.O. RECEIVER switches on and check for voltage. Turn MASTER and B.O. RECEIVER switches OFF. If voltage is present, replace/repair infrared power supply (see paragraph 9-39). If voltage is not present, go to step F.
- F Disconnect wire 999 from infrared power supply side of B.O. RECEIVER switch. Place red lead of multimeter on switch terminal and black lead to ground. Turn MASTER and B.O. RECEIVER switches on and check for voltage. Turn MASTER and B.O. RECEIVER switches OFF. If voltage is present, repair/replace infrared power supply to B.O. RECEIVER switch wire 999 of switch panel to gage panel and miscellaneous switches wiring harness (see paragraph 6-56). If voltage is not present, go to step G.



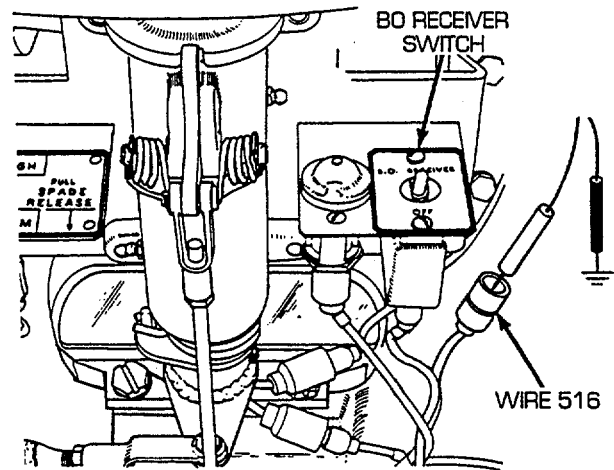
2-19 ELECTRICAL TROUBLESHOOTING-Continued

DRIVER'S PERISCOPE-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

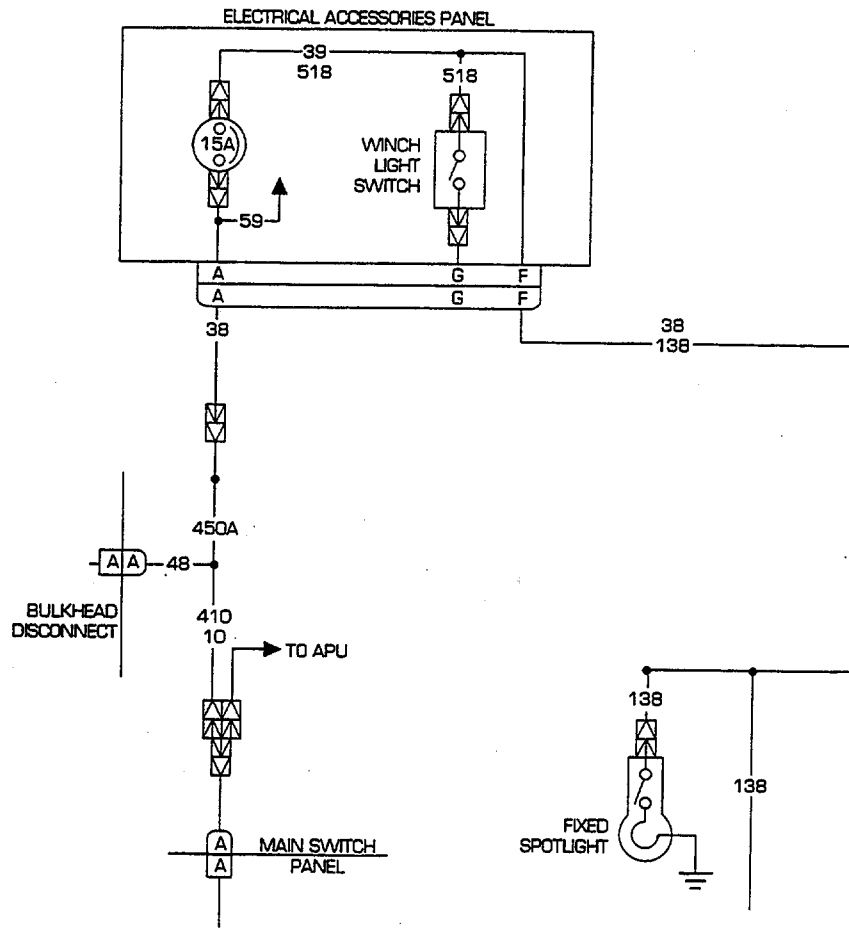
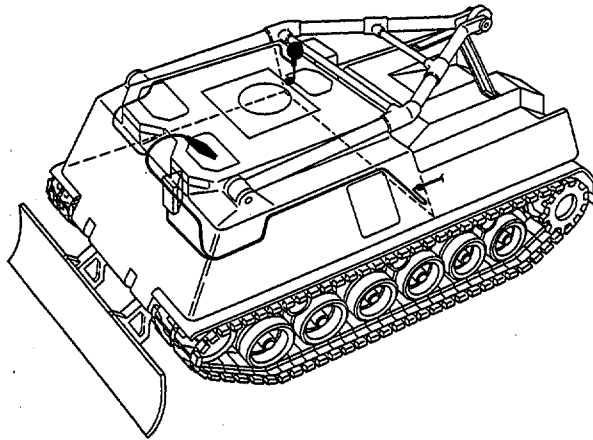
- G Reconnect wire 999 to B.O. RECEIVER switch. Disconnect wire 516 from main switch panel side of B.O. RECEIVER switch. Place red lead of multimeter in wire 516 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace B.O. RECEIVER switch (see paragraph 6-15). If voltage is not present, troubleshoot dome light circuit.



FIXED SPOTLIGHT

SYMPTOM

Fixed spotlight fails to operate
Do steps A through G.



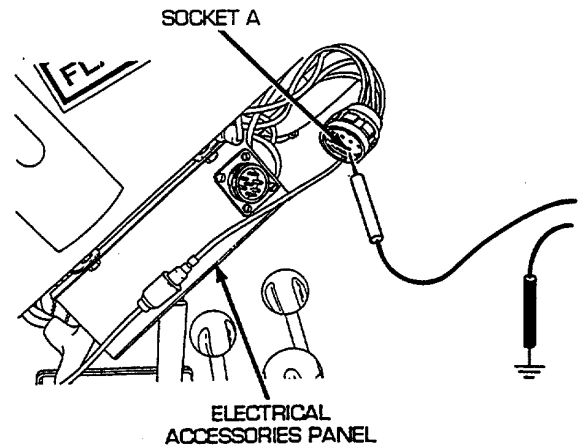
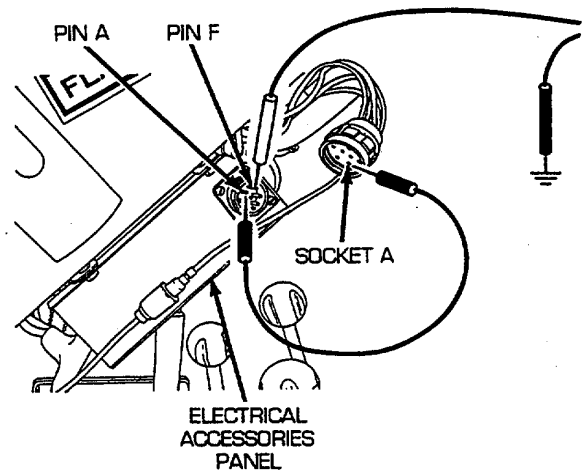
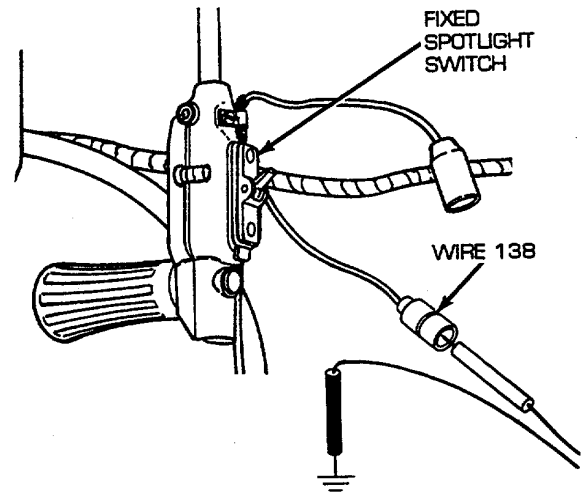
2-19 ELECTRICAL TROUBLESHOOTING-Continued

FIXED SPOTLIGHT-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

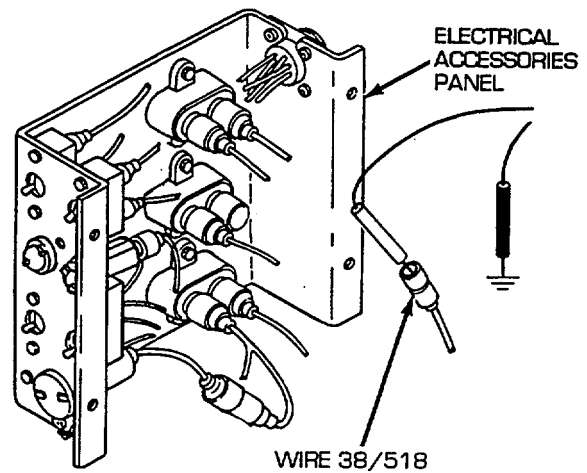
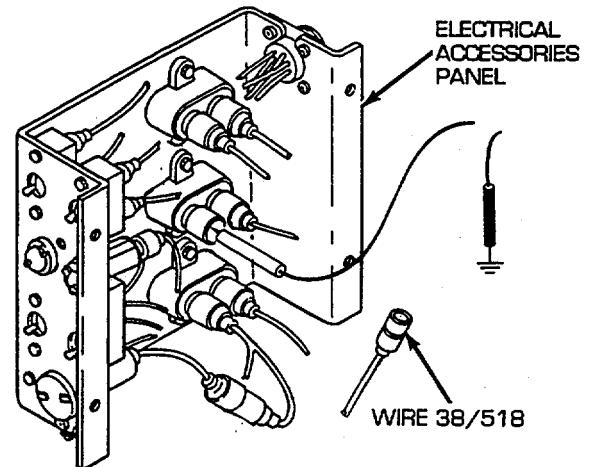
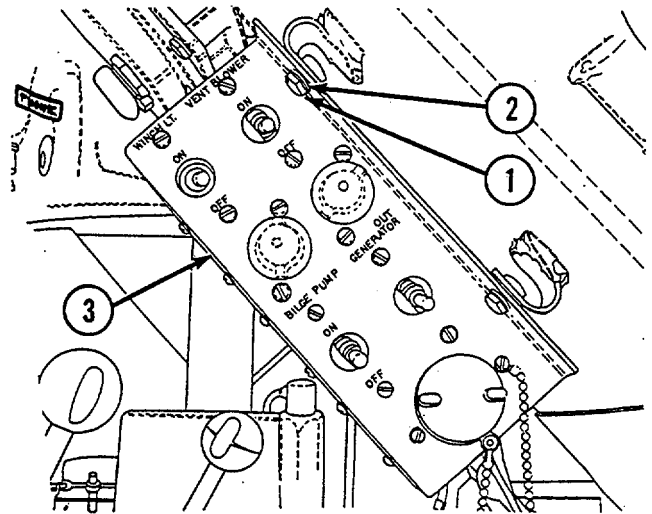
- A Disconnect wire 138 from fixed spotlight. Place red lead of multimeter on wire 138 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace spotlight (see paragraph 6-32). If voltage is not present, go to step B.
- B Reconnect wire 138 to fixed spotlight. Disconnect electrical accessories panel wiring harness from electrical accessories panel. Place a jumper wire from pin A to socket A of wire 38/59. Place red lead of multimeter on pin F of wire 38 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 38/138 of electrical accessories panel wiring harness (see paragraph 6-47). If voltage is not present, go to step C.
- C Place red lead of multimeter in socket A of wire 38/59 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step D. If voltage is not present, go to step F.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- D Remove four screws (1) and four lockwashers (2) and release electrical accessories panel (3). Reconnect electrical accessories panel wiring harness to electrical accessories panel. Disconnect wire 38/518 from winch light switch side of 15 A circuit breaker. Place red lead of multimeter on terminal of 15 A circuit breaker and black lead to ground. Turn MASTER switch on, and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 38/518 of bilge pump main power wiring harness from 15 A circuit breaker to electrical accessories panel wiring harness (see paragraph 6-84). If voltage is not present, go to step E.
- E Reconnect wire 38/518 to winch light switch side of 15 A circuit breaker. Disconnect wire 38/518 from panel connector side of 15 A circuit breaker. Place red lead of multimeter in wire 38/518 and black lead to ground. Turn MASTER switch on, and check for voltage. Turn MASTER switch OFF. If voltage is present, replace 15 A circuit breaker (see paragraph 6-9). If voltage is not present, repair/replace wire 38/518 from pin A to 15 A circuit breaker (see paragraph 6-9).



2-19 ELECTRICAL TROUBLESHOOTING-Continued

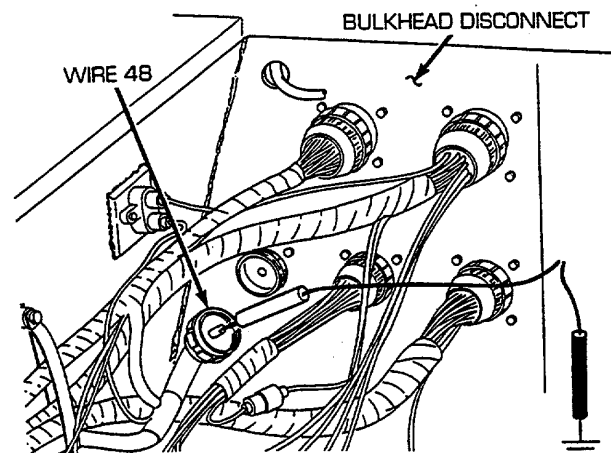
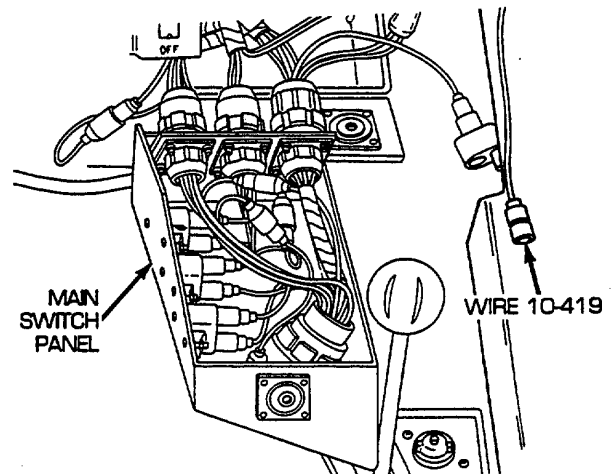
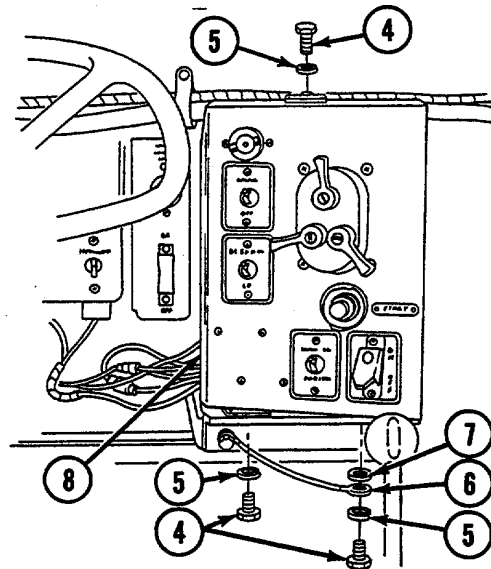
FIXED SPOTLIGHT-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

F Remove three screws (4), three lockwashers (5), ground wire (6), and flat washer (7) and release main switch panel (8) from mounting bracket. Disconnect wire 10-419 from Y-connector of switch panel, radio, and bilge pump to bulkhead wiring harness at main switch panel. Turn MASTER switch on, and check for voltage. If voltage is present, repair wire 419 from Y-connector at main switch panel to APU control box bulkhead wiring harness. If voltage is not present, go to step G.

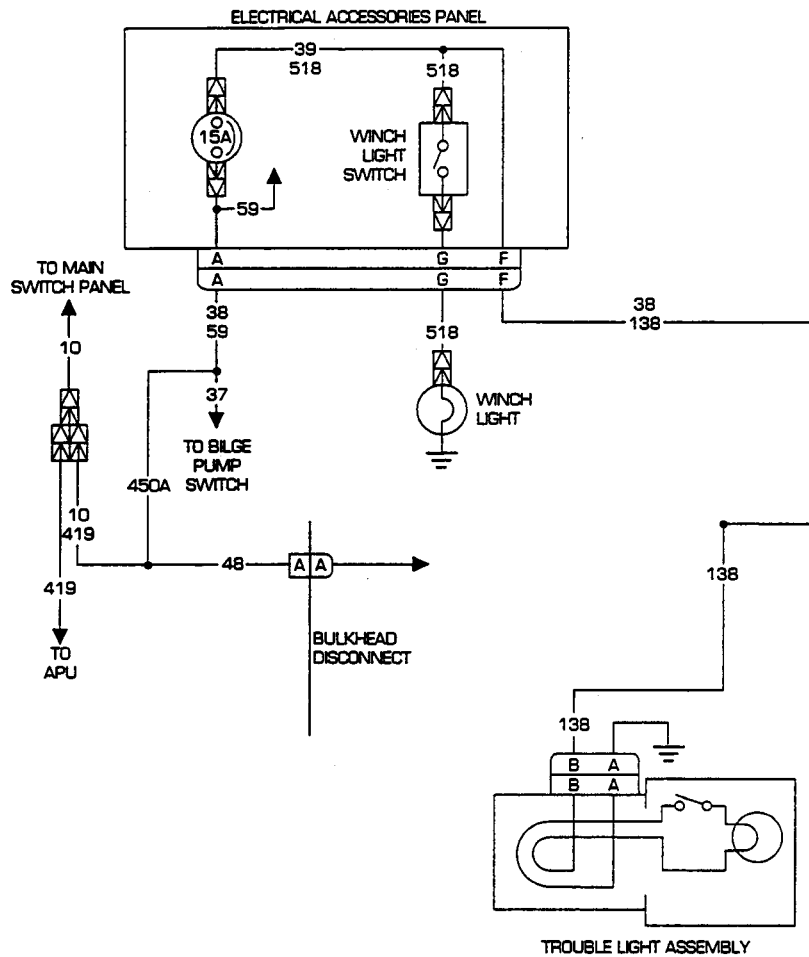
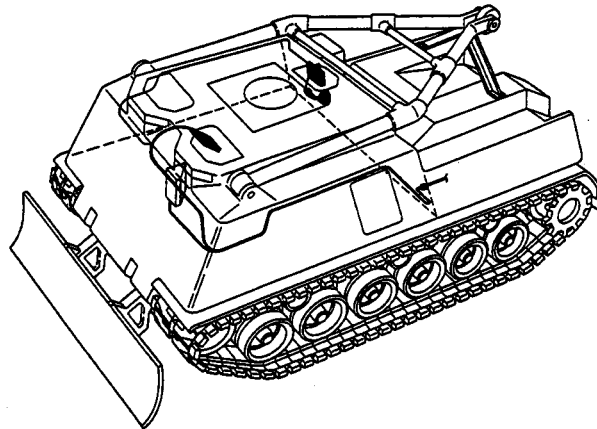
G Reconnect wire 10-419 to Y-connector of switch panel, radio, and bilge pump to bulkhead wiring harness to main switch panel. Install main switch panel (8), flat washer (7), ground wire (6), three lockwashers (5), and three screws (4) to mounting bracket. Open air inlet doors (TM 9-2350-256-10). Disconnect wire 48 pin A from bulkhead to master-relay wiring harness. Place red multimeter lead in socket and black lead to ground. Turn MASTER switch on and check for voltage. If voltage is present, repair/replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay circuit (see paragraph 2-19, master relay fails to operate).



TRUBLELIGHT ASSEMBLY

SYMPTOM

Troublelight assembly fails to operate
Do steps A through H.



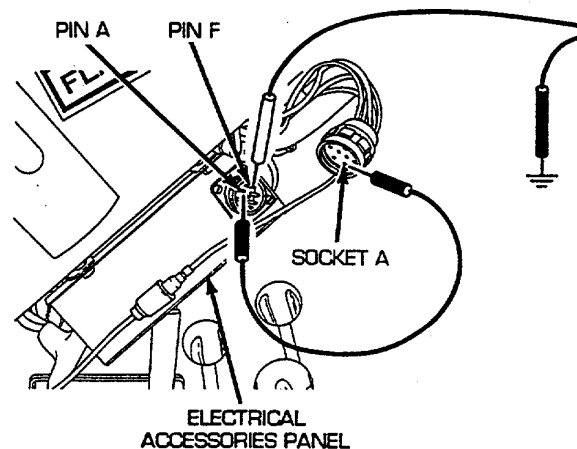
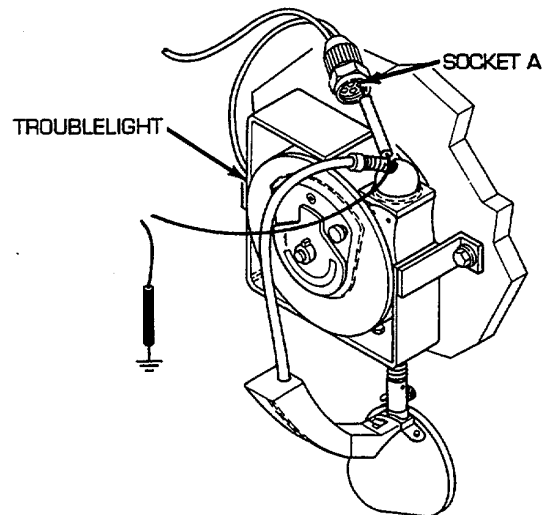
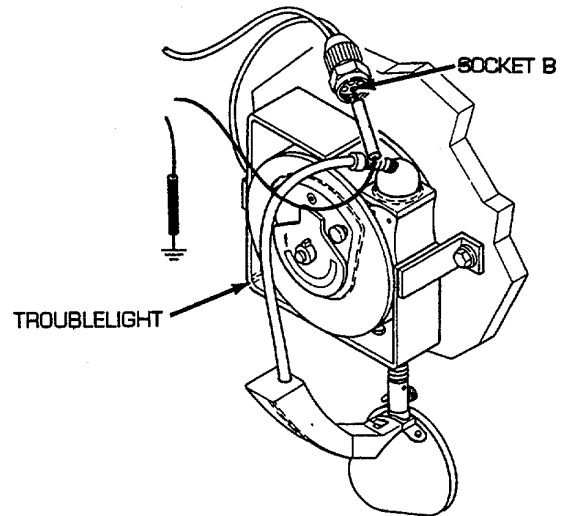
2-19 ELECTRICAL TROUBLESHOOTING-Continued

TROUBLELIGHT ASSEMBLY-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

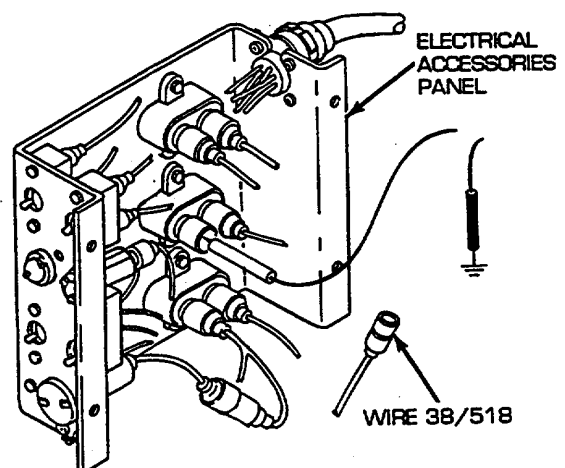
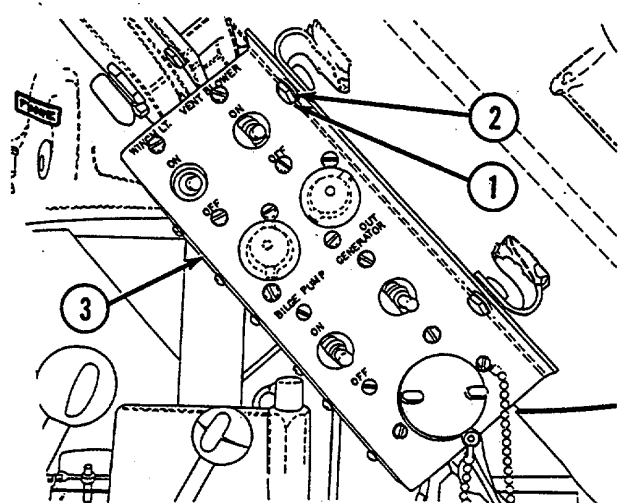
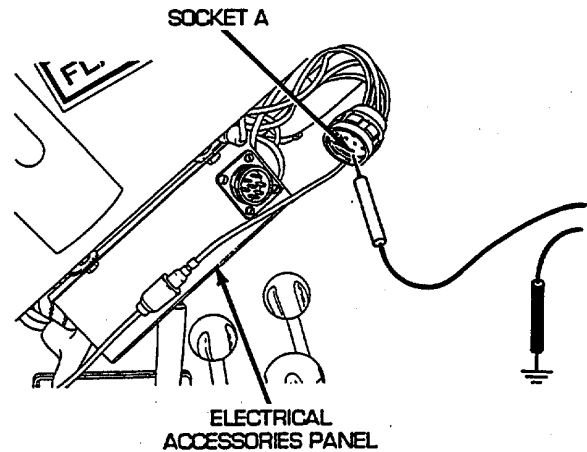
- A Disconnect electrical accessories panel wiring harness from troublelight assembly. Place red lead of multimeter in socket B of wire 138 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step B. If voltage is not present, go to step C.
- B Place red lead of multimeter in socket A of GND and black lead to ground. Check for continuity. If continuity is present, replace troublelight (see paragraph 6-31). If continuity is not present, repair/replace GND wire of electrical accessories panel wiring harness (see paragraph 6-47).
- C Disconnect electrical accessories panel wiring harness from electrical accessories panel. Place a jumper wire from pin A to socket A of wire 38/59. Place red lead of multimeter on pin F of wire 38 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 38/138 of electrical accessories panel wiring harness (see paragraph 6-47). If voltage is not present, go to step D.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- D Place red lead of multimeter in socket A of wire 38/59 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step E. If voltage is not present, go to step G.
- E Reconnect electrical accessories panel wiring harness to electrical accessories panel. Remove four screws (1) and four lockwashers (2) and release electrical accessories panel (3). Disconnect wire 38/518 from winch light switch side of 15 A circuit breaker. Place red lead of multimeter on terminal of 15 A circuit breaker and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 38/518 of bilge pump main power wiring harness from 15 A circuit breaker to electrical accessories panel wiring harness (see paragraph 6-84). If voltage is not present, go to step F.



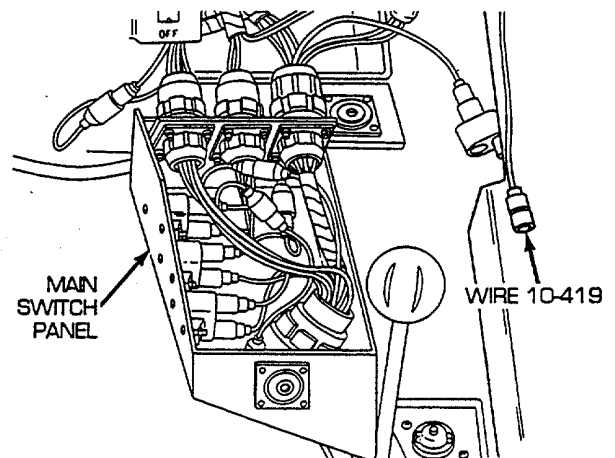
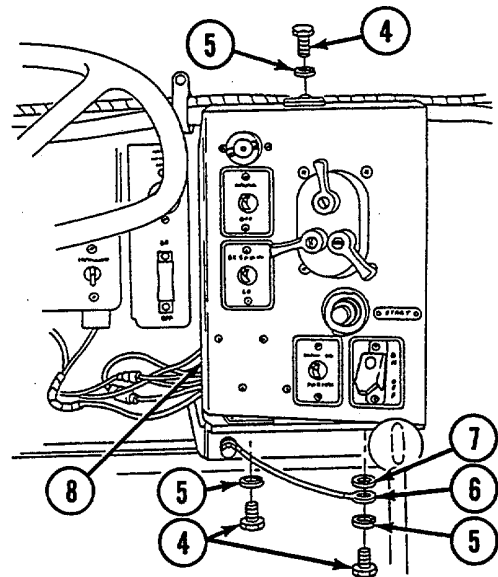
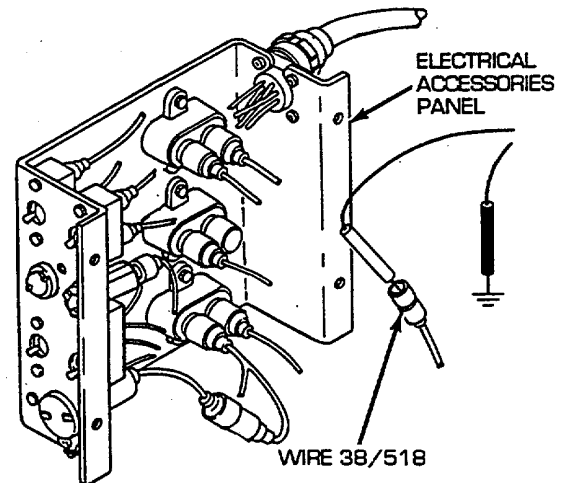
2-19 ELECTRICAL TROUBLESHOOTING-Continued

TROUBLELIGHT ASSEMBLY-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

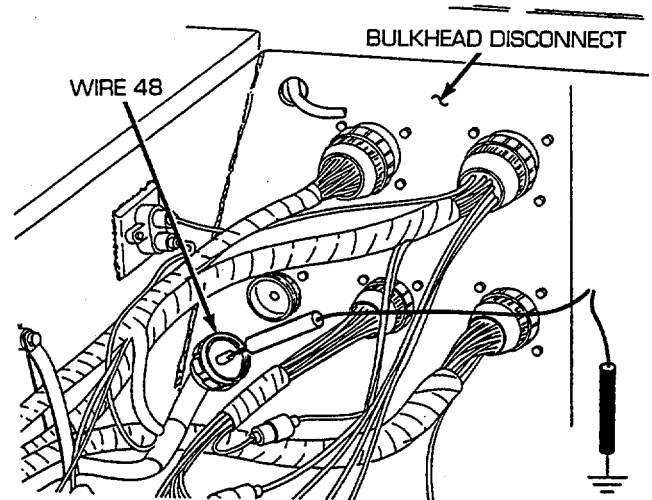
- F Reconnect wire 38/518 to winch light switch side of 15 A circuit breaker. Disconnect wire 38/518 from panel connector side of 15 A circuit breaker. Place red lead of multimeter in wire 38/518 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace 15 A circuit breaker (see paragraph 6-9). If voltage is not present, repair/replace wire 38 from pin A to 15 A circuit breaker (see paragraph 6-9).
- G Remove three screws (4), three lockwashers (5), ground wire (6), and flat washer (7) and release main switch panel (8) from mounting bracket. Disconnect wire 10-419 from Y-connector of switch panel, radio, and bilge pump to bulkhead wiring harness at main switch panel. Turn MASTER switch on, and check for voltage. If voltage is present, repair wire 419 from Y-connector at main switch panel to APU control box bulkhead wiring harness. If voltage is not present, go to step H.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- H Reconnect wire 10-419 to Y-connector of switch panel, radio, and bilge pump to bulkhead wiring harness to main switch panel. Install main switch panel (8), flat washer (7), ground wire (6), three lockwashers (5), and three screws (4) to mounting bracket. Open air inlet doors (TM 9-2350-256-10). Disconnect wire 48 pin A from bulkhead to master relay wiring harness. Place red multimeter lead in socket and black lead to ground. Turn MASTER switch on and check for voltage. If voltage is present, repair/replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay circuit (see 2-19, master relay fails to operate).

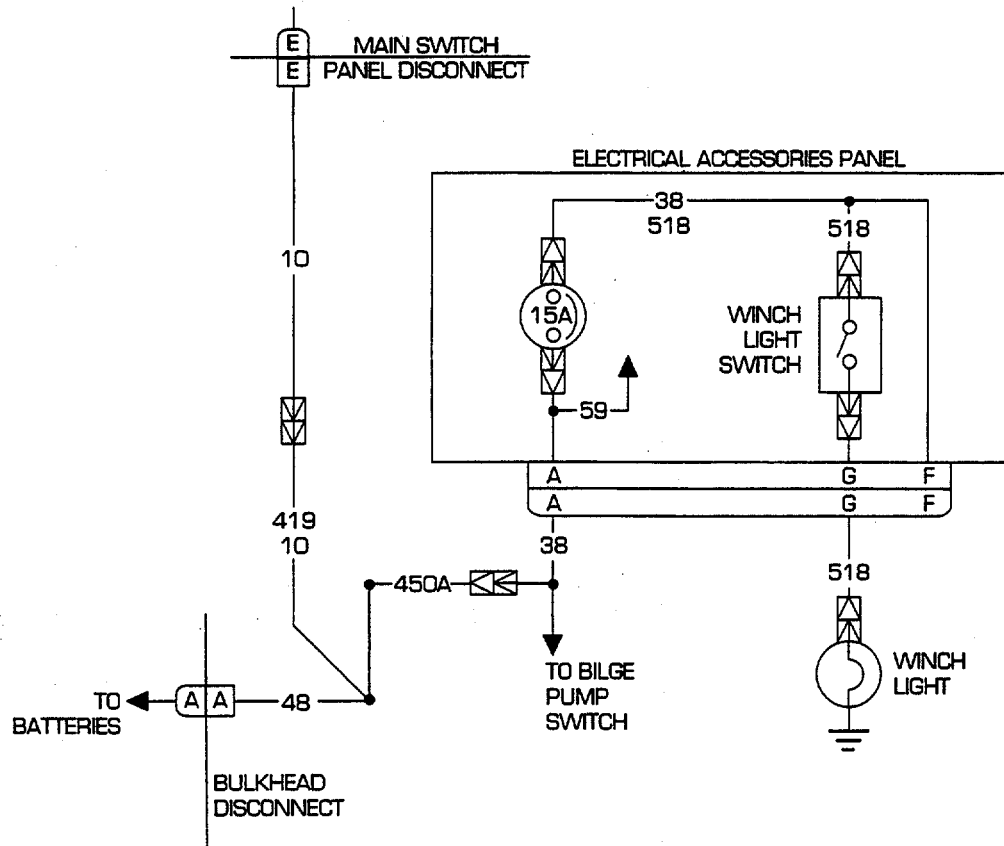
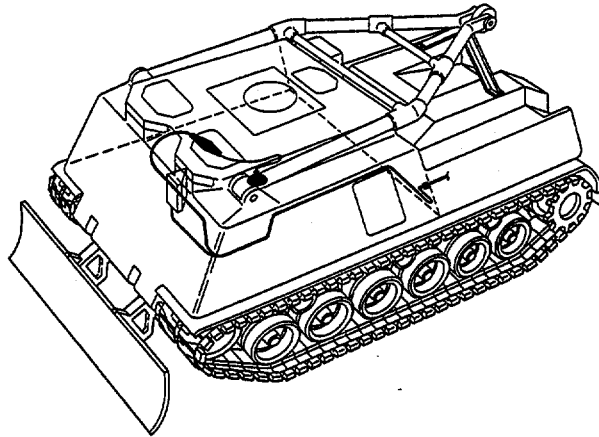


2-19 ELECTRICAL TROUBLESHOOTING-Continued

WINCH LIGHT

SYMPTOM

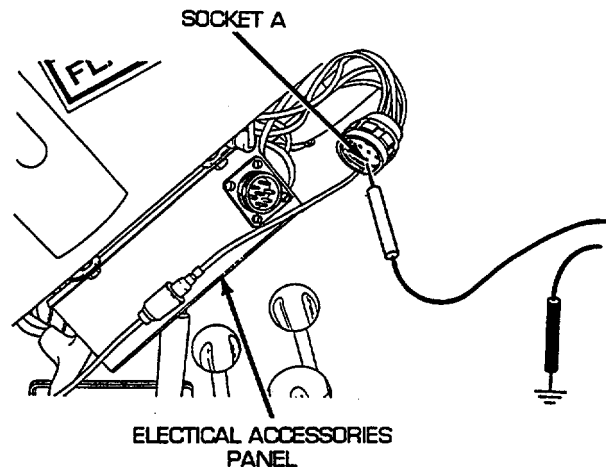
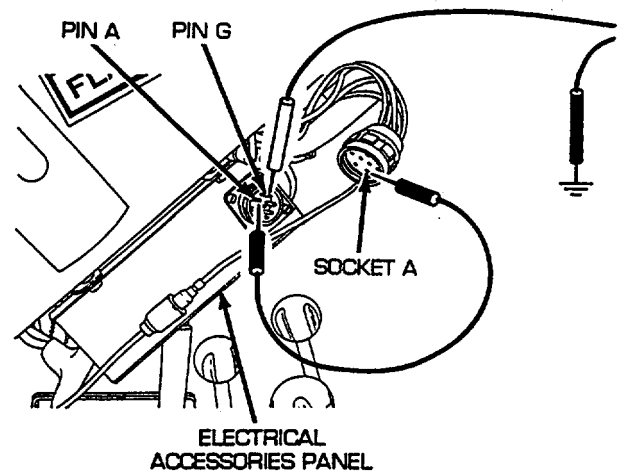
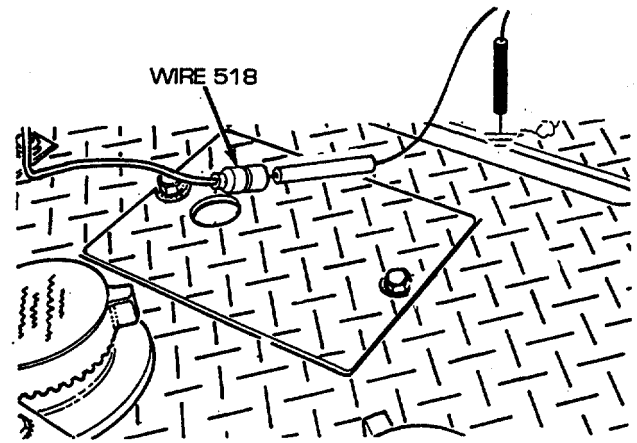
Winch light fails to operate.
Do steps A through I.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Disconnect wire 518 from winch light. Place red lead of multimeter on wire 518 and black lead to ground. Turn MASTER and WINCH LT switches ON and check for voltage. Turn MASTER and WINCH LT switches OFF. If voltage is present, replace lamp (see paragraph 6-35). If voltage is not present, go to step B.
- B Reconnect wire 518 to winch light. Disconnect electrical accessories panel wiring harness from electrical accessories panel. Place a jumper wire from socket A to pin A of wire 38/59. Place red lead of multimeter on pin G of wire 518 and black lead to ground. Turn MASTER and WINCH LT switches ON, and check for voltage. Turn MASTER and WINCH LT switches OFF. If voltage is present, repair/replace wire 518 of electrical accessories panel wiring harness (see paragraph 6-47). If voltage is not present, go to step C.
- C Place red lead of multimeter in socket A of wire 38/59 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step D. If voltage is not present, go to step H.



2-19 ELECTRICAL TROUBLESHOOTING-Continued

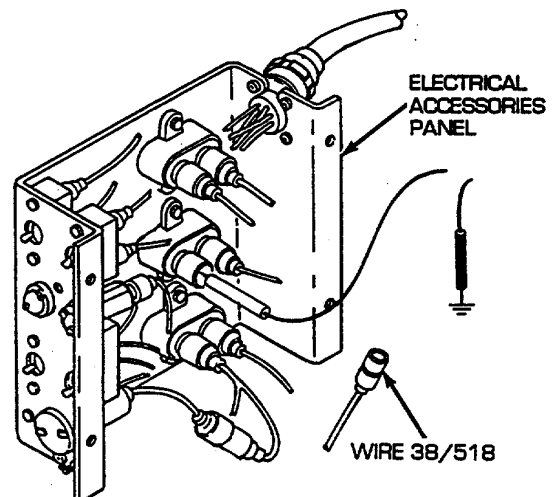
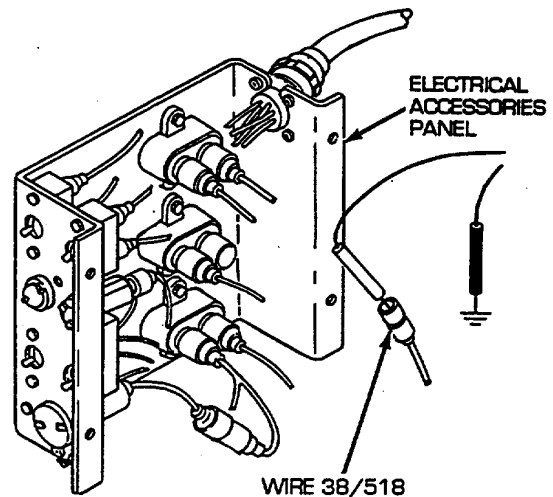
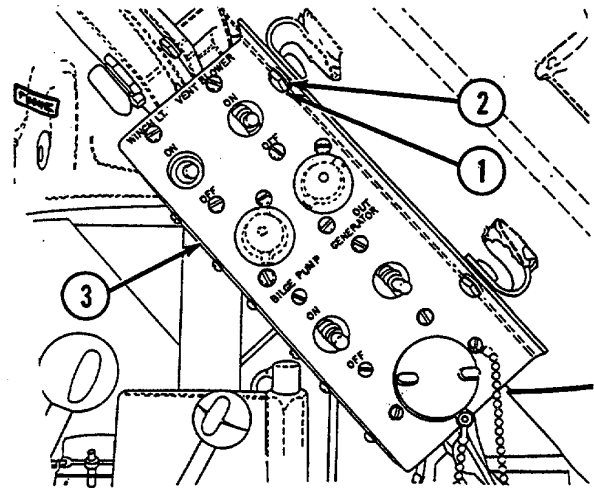
WINCH LIGHT--Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

D Reconnect electrical accessories panel wiring harness to electrical accessories panel. Remove four screws (1) and four lockwashers (2) and release electrical accessories panel (3) from mounting brackets. Disconnect wire 38/518 from panel connector side of 15 A circuit breaker. Place red lead of multimeter in wire 38/518 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step E. If voltage is not present, repair/replace wire 38/518 of bilge pump main power wiring harness from panel connector to circuit breaker (see paragraph 6-84).

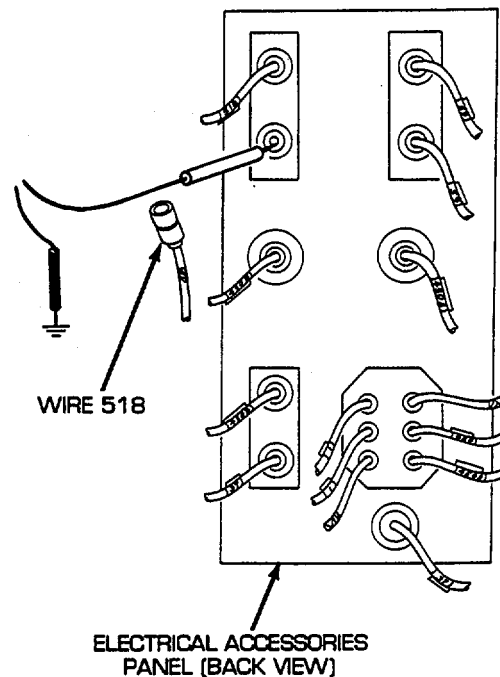
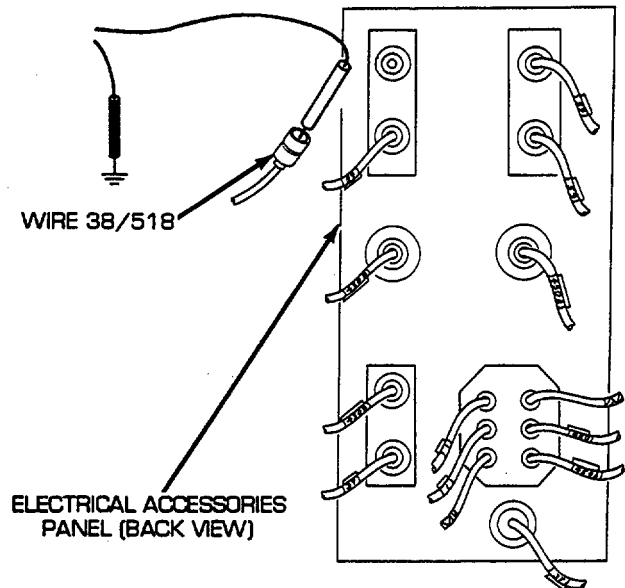
E Reconnect wire 38/518 to panel connector side of 15 A circuit breaker. Disconnect wire 38/518 from winch light switch side of 15 A circuit breaker. Place red lead of multimeter on terminal of 15 A circuit breaker and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step F. If voltage is not present, replace 15 A circuit breaker (see paragraph 6-9).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- F Reconnect wire 38/518 to 15 A circuit breaker. Disconnect wire 518 from circuit breaker side of winch light switch. Place red lead of multimeter in wire 518 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step G. If voltage is not present, repair/replace wire 38/518 of bilge pump main power wiring harness from 15 A circuit breaker to winch light switch (see paragraph 6-84).
- G Reconnect wire 518 to circuit breaker side of winch light switch. Disconnect wire 518 from panel connector side of winch light switch. Place red lead of multimeter on terminal of winch light switch and black lead to ground. Turn MASTER and WINCH LT switches ON and check for voltage. Turn MASTER and WINCH LT switches OFF. If voltage is present, repair/replace wire 518 of bilge pump main power wiring harness from winch light switch to panel connector (see paragraph 6-84). If voltage is not present, replace winch light switch (see paragraph 6-9).



2-19 ELECTRICAL TROUBLESHOOTING-Continued

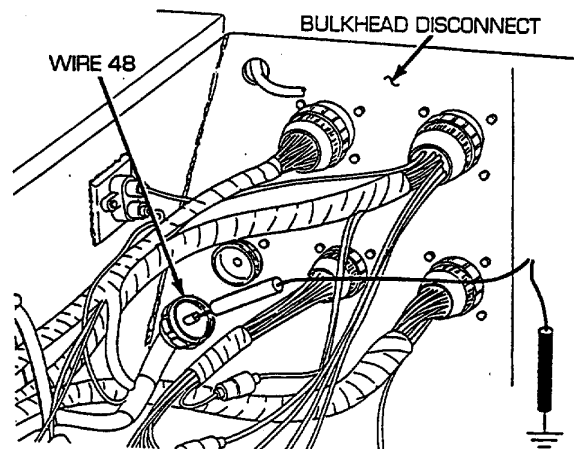
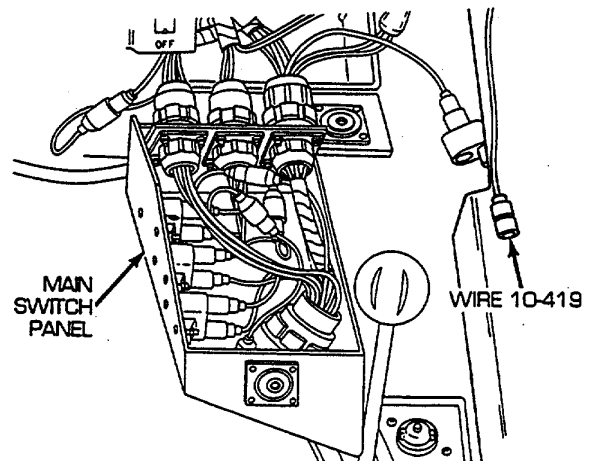
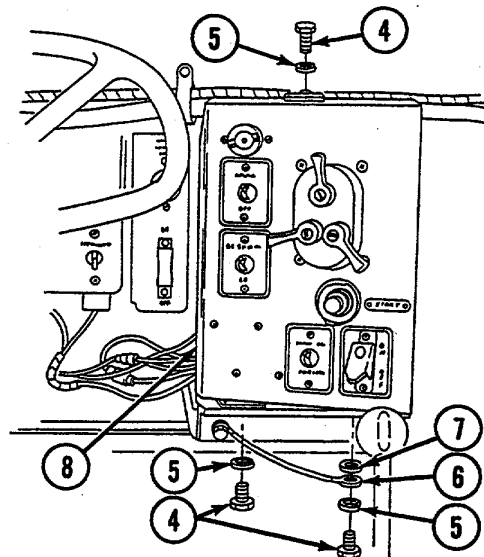
WINCH LIGHT--Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

H Reconnect electrical accessories panel wiring harness to electrical accessories panel. Remove three screws (4), three lockwashers (5), ground wire (6), and flat washer (7) and release main switch panel (8) from mounting bracket. Disconnect wire 10-419 from Y-connector of switch panel, radio, and bilge pump to bulkhead wiring harness at main switch panel. Turn MASTER switch on and check for voltage. If voltage is present, repair wire 419 from Y-connector at main switch panel to APU control box bulkhead wiring harness. If voltage is not present, go to step I.

I Reconnect wire 10-419 to Y-connector of switch panel, radio, and bilge pump to bulkhead wiring harness to main switch panel. Install main switch panel (8), flat washer (7), ground wire (6), three lockwashers (5), and three screws (4) to mounting bracket. Open air inlet doors (TM 9-2350-256-10). Disconnect wire 48 pin A from bulkhead to master relay wiring harness. Place red multimeter lead in socket and black lead to ground. Turn MASTER switch on and check for voltage. If voltage is present, repair/replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay circuit (see paragraph 2-19, master relay fails to operate).

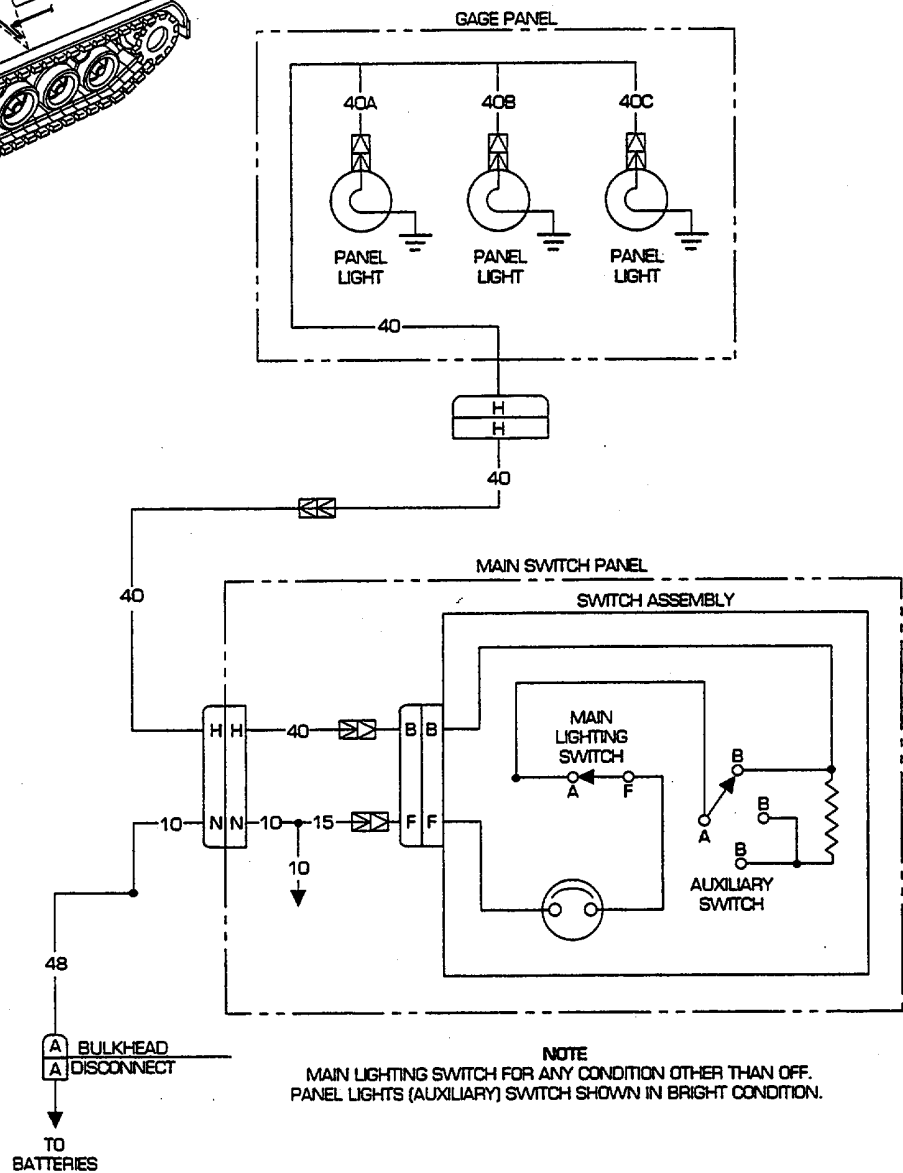
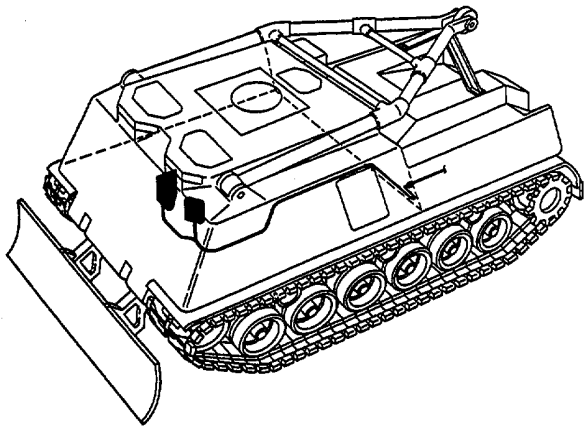


GAGE PANEL LIGHTS

SYMPTOMS

One or all three gage panel lamps fail to light.
Do steps A through K.

One gage panel lamp fails to light.
Do steps A through K.



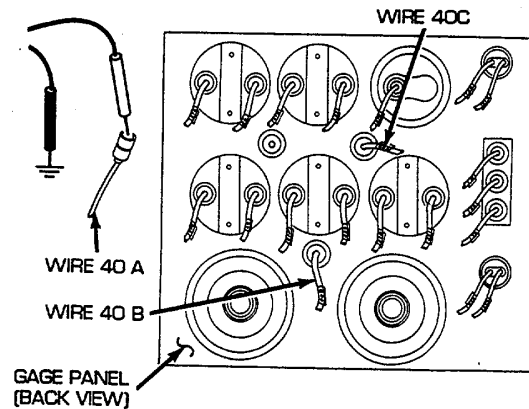
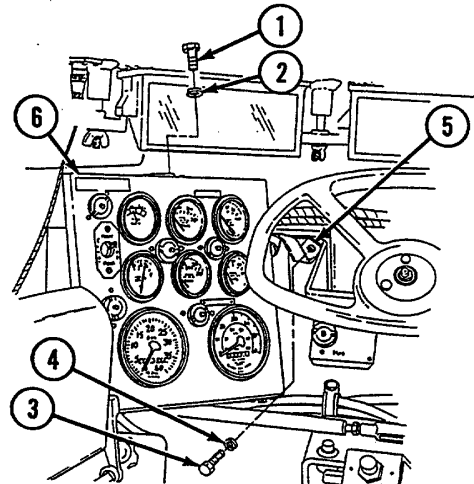
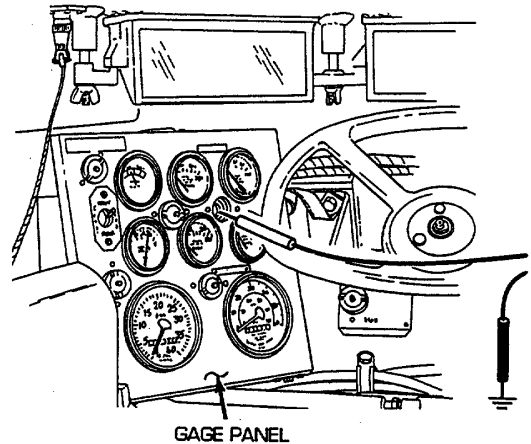
2-19 ELECTRICAL TROUBLESHOOTING-Continued

GAGE PANEL LIGHTS-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and a injury or death to personnel.

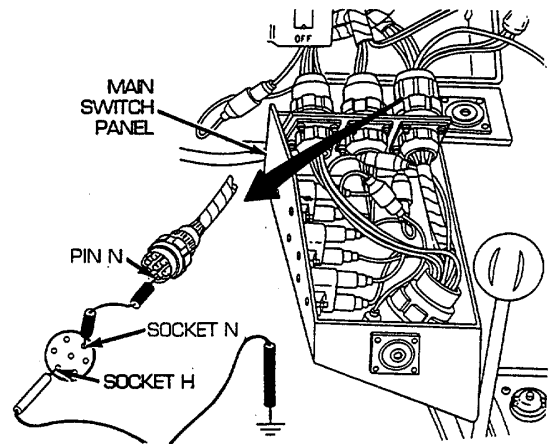
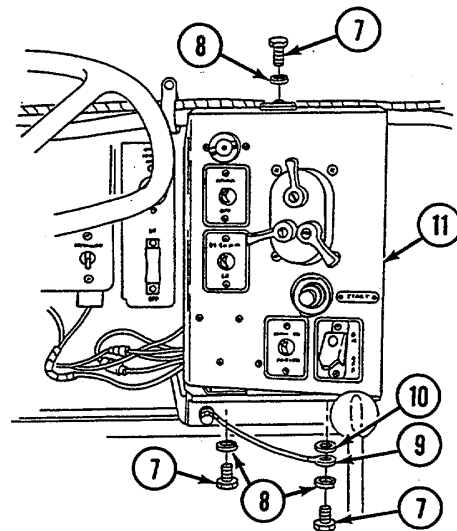
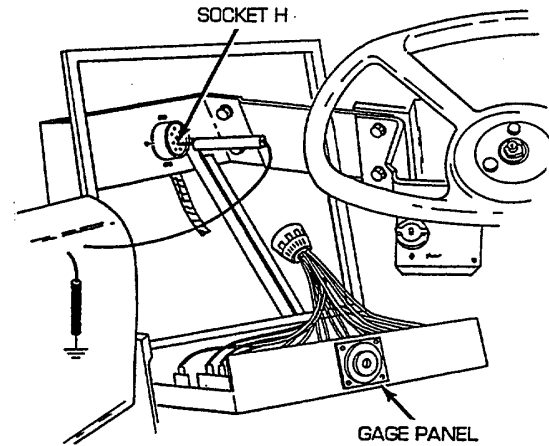
- A Remove lamp from socket. Place red lead c multimeter in socket and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace lamp (see paragraph 6-8). If voltage is not present go to step B.
- B Remove three screws (1), three lockwashers (2), two screws (3), two lockwashers (4), and ground strap (5) and release gage panel (6) from mounting brackets. Disconnect wire 40A, 40B, and/or 40C on gage panel wiring harness from gage panel light(s) Place red lead of multimeter in wire 40A, 40E and/or 40C and black lead to ground. Turn MASTER switch on and check for voltage in each wire. Turn MASTER switch OFF. If voltage is present, replace socket (see paragraph 6-8). If voltage is no present, go to step C.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- C Disconnect gage panel to bulkhead wiring harness from gage panel. Place red lead of multimeter in socket H of wire 40 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 40A, 40B, and/or 40C of gage panel wiring harness (see paragraph 6-44). If voltage is not present, go to step D.
- D Reconnect gage panel to bulkhead wiring harness to gage panel. Install ground strap (5), two lockwashers (4), two screws (3), gage panel (6), three lockwashers (2), and three screws (1) to mounting brackets. Remove three screws (7), three lockwashers (8), ground lead (9), and flat washer (10) and release main switch panel (11) from mounting brackets. Disconnect switch panel to gage panel and miscellaneous switches wiring harness from main switch panel. Place jumper wire from socket N to pin N. Place red lead of multimeter in socket H of wire 40 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step E. If voltage is not present, go to step F.



2-19 ELECTRICAL TROUBLESHOOTING-Continued

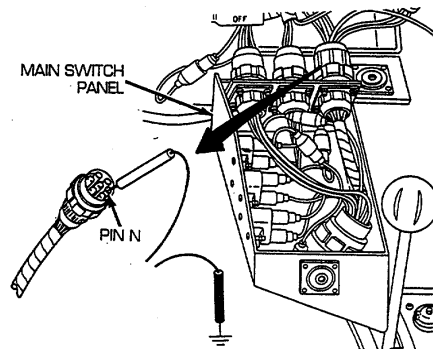
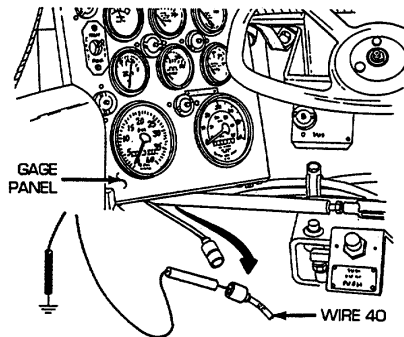
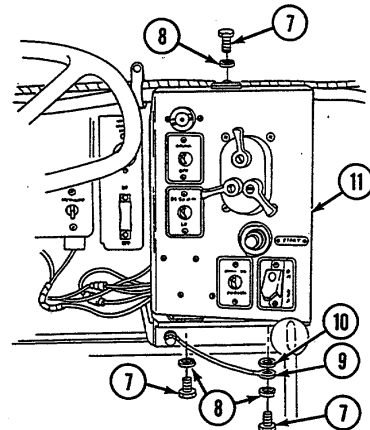
GAGE PANEL LIGHTS-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

E. Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Install main switch panel (11), flat washer (10), ground lead (9), three lockwashers (8) and three screws (7). Disconnect wire 40 of gage panel to bulkhead wiring harness from switch panel to gage panel and miscellaneous switch wiring harness. Place red lead of multimeter on male connector of wire 40 and black lead to ground Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present repair/replace wire 40 of gage panel to bulkhead wiring harness (see paragraph 6-45 for dual voltage; 6-46 for single voltage). If voltage is not present, repair/replace wire 40 of switch panel gage panel and miscellaneous switches wiring harness (see paragraph 6-55 for dual voltage; 6-56 for single voltage).

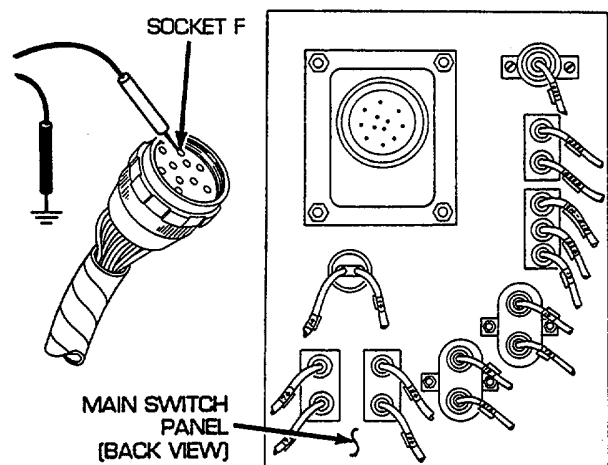
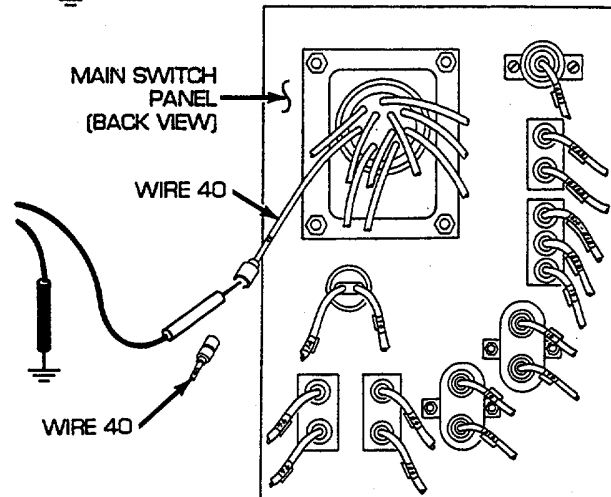
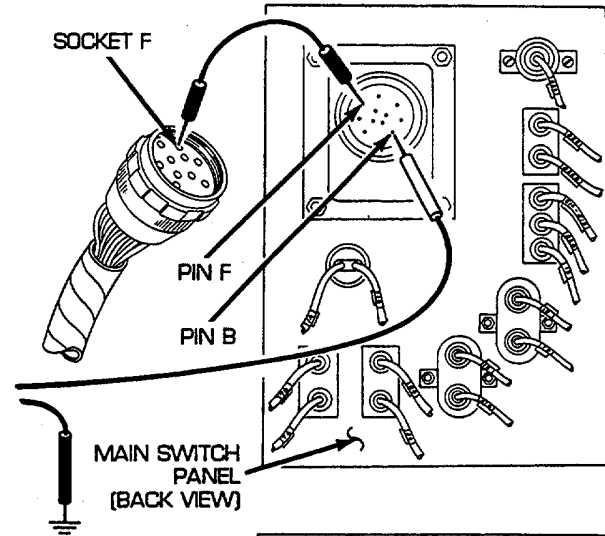
F Place red lead of multimeter on pin N of wire 10/15 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step G. If voltage is not present, go to step K.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- G Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Disconnect main lighting and master relay wiring harness from main lighting switch. Place a jumper wire from pin F to socket F. Place red multimeter lead on pin B of wire 40 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step H. If voltage is not present, go to step I.
- H Reconnect main lighting and master relay wiring harness to main lighting switch. Disconnect wire 40 from main lighting and master relay wiring harness connector in switch panel. Place red lead of multimeter on male connector of wire 40 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 40 of main lighting and B.O. selector switch wiring harness (see paragraph 6-69). If no voltage is present, repair/replace wire 40 of main lighting and master relay wiring harness (see paragraph 6-70).
- I Place red lead of multimeter in socket F of wire 10/15 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present repair main lighting switch (see paragraph 6-10). If no voltage is present, go to step J.



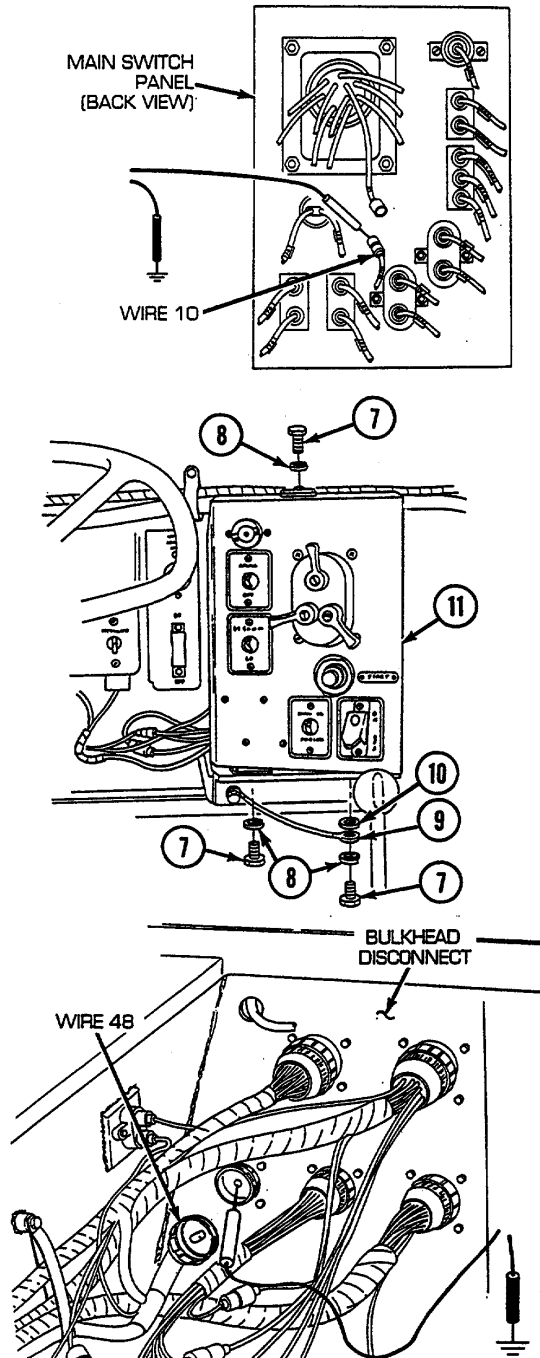
2-19 ELECTRICAL TROUBLESHOOTING--Continued

GAGE PANEL LIGHTS-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- J Reconnect main lighting and master relay wiring harness to main lighting switch. Disconnect wire 10 of main lighting and B.O. selector switch wiring harness from wire 15 of main lighting and master relay wiring harness. Place red lead of multimeter in wire 10 and black to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 15 of main lighting and master relay wiring harness (see paragraph 6-70). If voltage is not present, repair/replace wire 10 of main lighting and B.O. selector switch wiring harness (see paragraph 6-69).
- K Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Install main switch panel (11), flat washer (10), ground lead (9), three lockwashers (8), and three screws (7) to mounting brackets. Open air inlet doors (TM 9-2350-256-10). Disconnect wire 48 pin A from bulkhead to master relay wiring harness. Place red multimeter lead in socket and black lead to ground. Turn MASTER switch on and check for voltage. If voltage is present, repair/replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay circuit (see paragraph 2-19, master relay fails to operate).

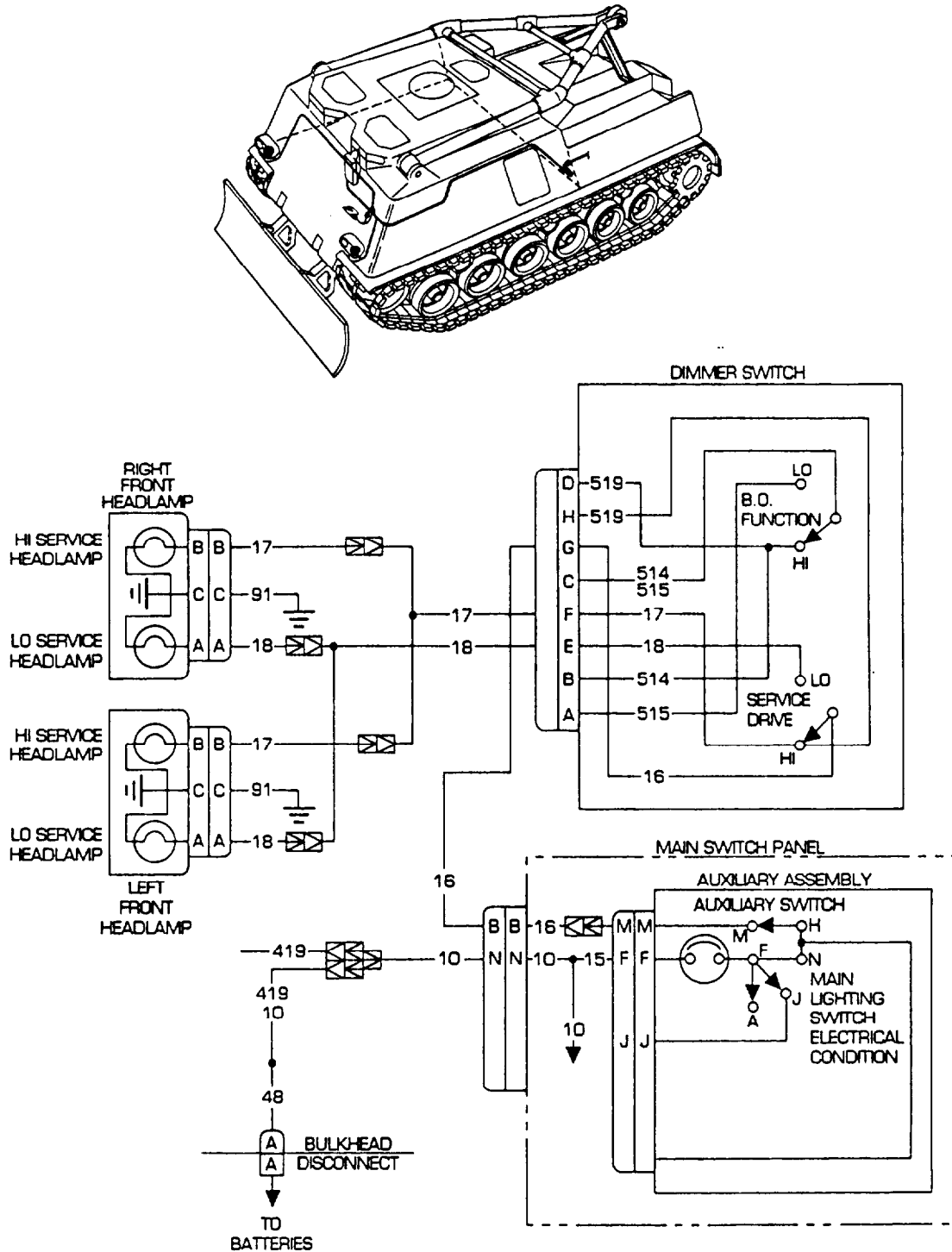


SERVICE HEADLIGHTS

SYMPTOM

Service headlights fail to operate.

Do steps A through O.



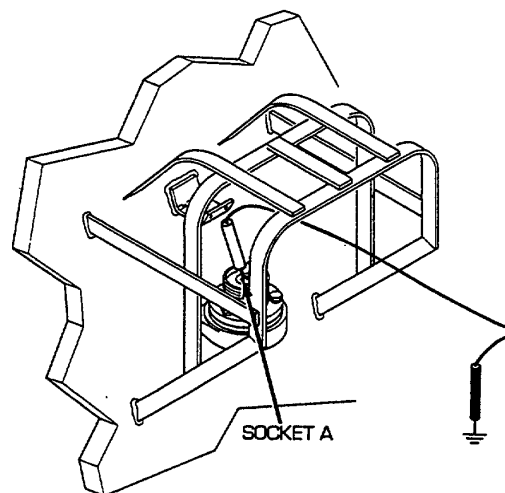
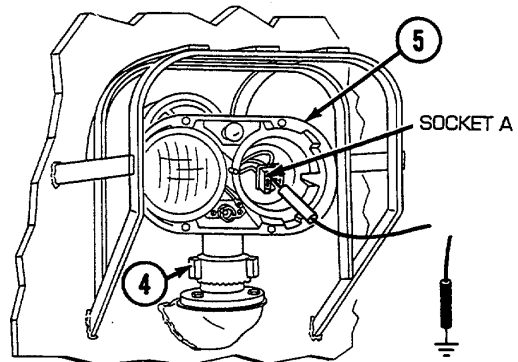
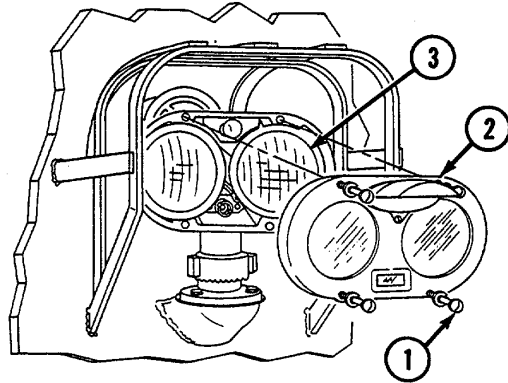
2-19 ELECTRICAL TROUBLESHOOTING-Continued

SERVICE HEADLIGHTS-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

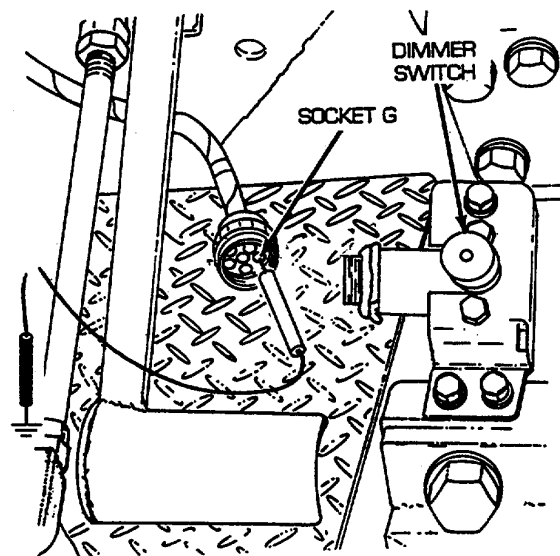
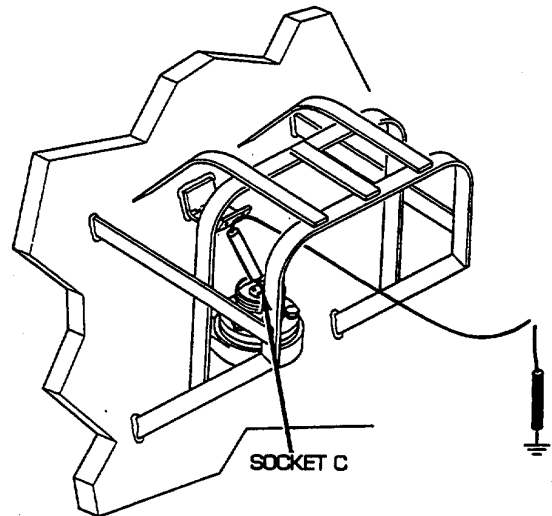
- A Loosen four screws (1) and remove headlight cover (2). Remove lamp (3) and disconnect connector. Place red lead of multimeter in socket A of wire 18. Turn MASTER switch on, unlock and place main lighting switch in SER. DRIVE position and auxiliary switch in any position other than PARK, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, replace lamp. If voltage is not present, go to step B.
- B Install lamp (3), headlight cover (2), and tighten four screws (1). Loosen adjustment nut (4) and remove headlight assembly (5). Place red lead of multimeter in socket A of wire 18 and black lead to ground. Turn MASTER switch on, UNLOCK and place main lighting switch in SER. DRIVE position, and auxiliary switch in any position other than PARK, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, replace headlight assembly (see paragraph 6-26). If voltage is not present, go to step C.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- C Place red lead of multimeter in socket C of wire 91 (ground) and black lead to ground. Check for continuity. If continuity is present, go to step D. If continuity is not present, repair/replace wire 91 (ground) of headlight and dimmer switch wiring harness (see paragraph 6-65).
- D Place red lead of multimeter in socket G of wire 16 and black lead to ground. Turn MASTER switch on, UNLOCK and place main lighting switch in SER. DRIVE position, auxiliary switch in any position other than PARK, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, go to step E. If voltage is not present, go to step F.



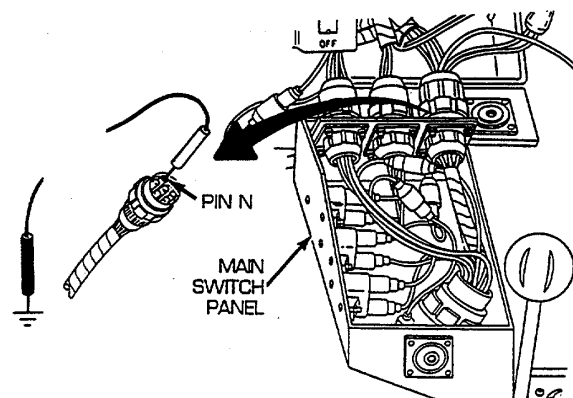
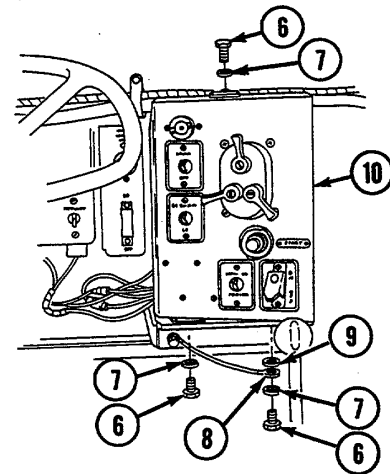
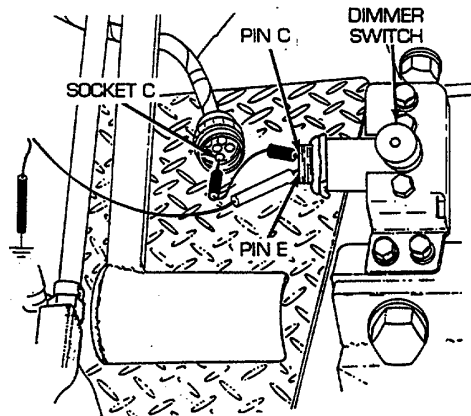
2-19 ELECTRICAL TROUBLESHOOTING-Continued

SERVICE HEADLIGHTS-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

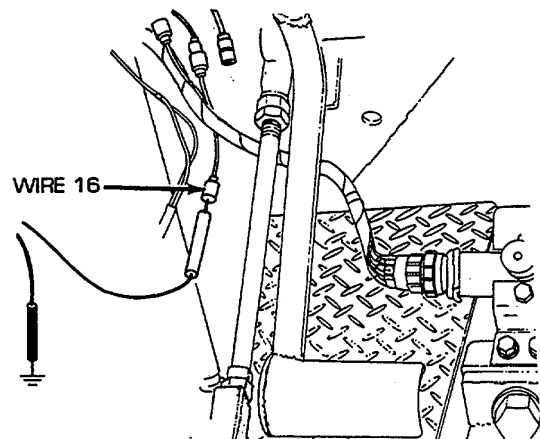
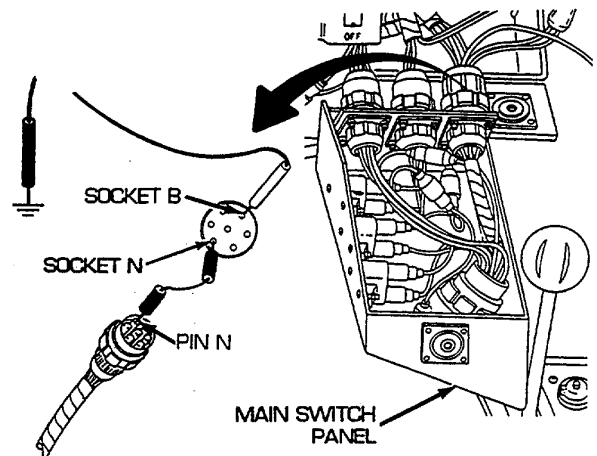
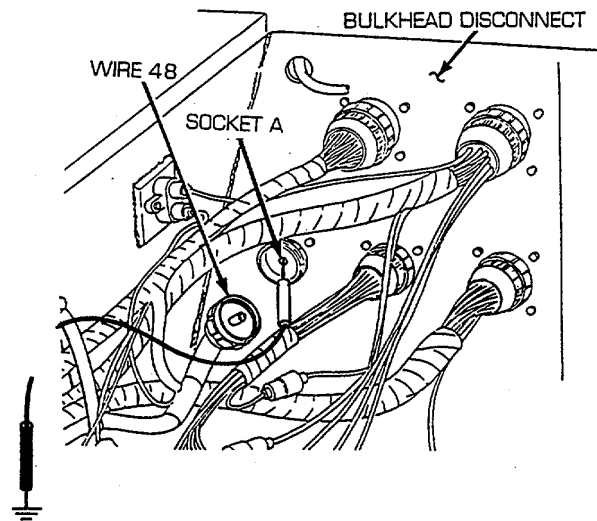
- E Reconnect headlight base assembly to headlight assembly. Disconnect headlight and dimmer switch wiring harness from dimmer switch. Place a jumper wire from socket C to pin C. Place red lead of multimeter on pin E of wire 18 and black lead to ground. Turn MASTER switch on, UNLOCK and place main lighting switch in SER. DRIVE position, and auxiliary switch in any position other than PARK, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, replace dimmer switch (see paragraph 6-25).
- F Reconnect headlight and dimmer switch wiring harness to dimmer switch. Remove three screws (6), three lockwashers (7), ground wire (8), and flat washer (9) and release main switch panel (10) from mounting bracket. Disconnect switch panel to gage panel and miscellaneous switches wiring harness from main switch panel. Place red lead of multimeter on pin N of wire 10 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step H. If voltage is not present, go to step G.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- G Open air inlet doors (TM 9-2350-256-10). Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Disconnect wire 48 pin A from bulkhead to master relay wiring harness. Place red multimeter lead in socket A and black lead to ground. Turn MASTER switch on and check for voltage. If voltage is present, repair/replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay circuit (see paragraph 2-19, master relay fails to operate).
- H Place a jumper wire from pin N to socket N. Place red lead of multimeter in socket B of wire 16 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch in SER. DRIVE position, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, go to step I. If voltage is not present, go to step J.
- I Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Disconnect wire 16 of switch panel to gage panel and miscellaneous switches wiring harness from headlight and dimmer switch wiring harness. Place red lead of multimeter on male connector of wire 16 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch in SER. DRIVE position, and auxiliary switch in any position other than PARK and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, repair/replace wire 16 of headlight and dimmer switch wiring harness (see paragraph 6-65). If voltage is not present, repair/replace wire 16 of switch panel to gage panel and miscellaneous switches wiring harness (see paragraph 6-55 for dual voltage; 6-56 for single voltage).



2-19 ELECTRICAL TROUBLESHOOTING-Continued

SERVICE HEADLIGHTS-Continued

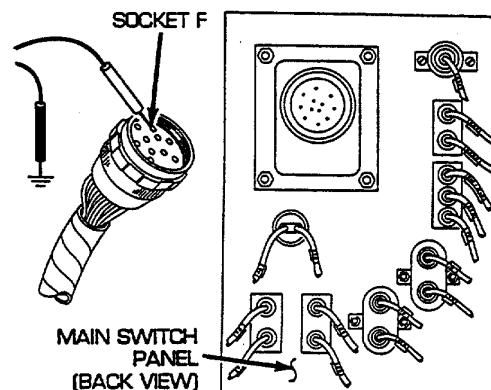
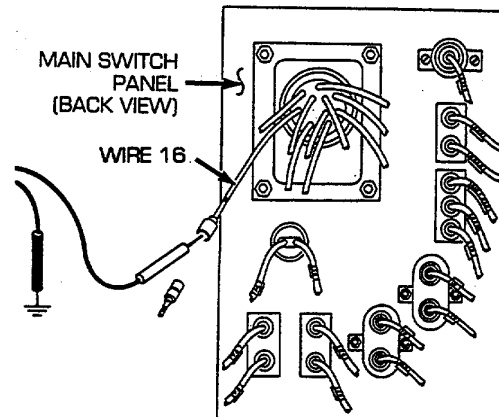
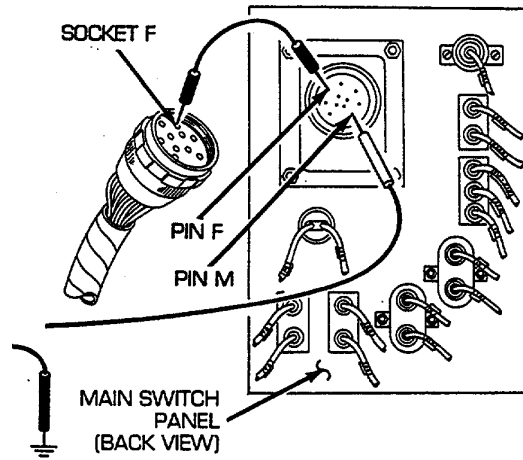
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

J Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Disconnect main lighting and master relay wiring harness from main lighting switch. Place a jumper wire from pin F to socket F. Place red lead of multimeter on pin M of wire 16 and black lead to ground. Turn MASTER switch on, UNLOCK and place main lighting switch in SER. DRIVE position, and auxiliary switch in any position other than PARK, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, go to step M. If voltage is not present, go to step N.

K Reconnect main lighting and master relay wiring harness to main lighting switch. Disconnect wire 16 of main lighting and master relay wiring harness at connector. Place red lead of multimeter on male connector of wire 16 and black lead to ground. Turn MASTER switch on, UNLOCK and place main lighting switch in SER. DRIVE position, and auxiliary switch in any position other than PARK, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, repair/replace wire 16 of main lighting and B.O. selector switch wiring harness (see paragraph 6-69). If voltage is not present, repair/replace wire 16 of main lighting and master relay wiring harness (see paragraph 6-70).

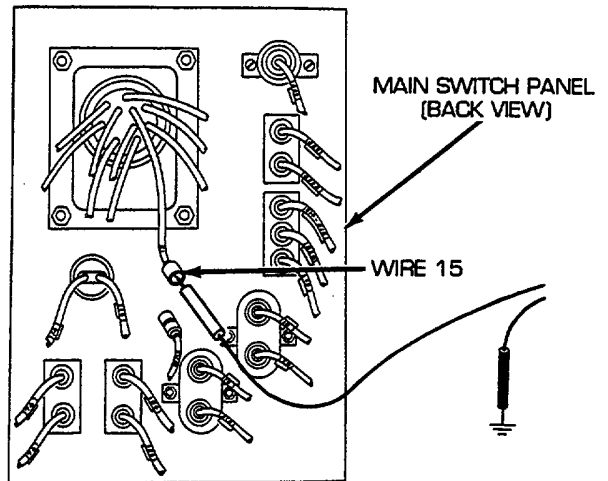
L Place red lead of multimeter in socket F of wire 15 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace main lighting switch (see paragraph 6-10). If voltage is not present, go to step M.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- M Reconnect main lighting and master relay wiring harness to main lighting switch. Disconnect wire 15 of main lighting and master relay wiring harness at connector. Place red lead of multimeter in female connector of wire 15 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 15 of main lighting and master relay wiring harness (see paragraph 6-70). If voltage is not present, repair/replace wire 10 of main lighting and B.O. selector switch wiring harness (see paragraph 6-69).

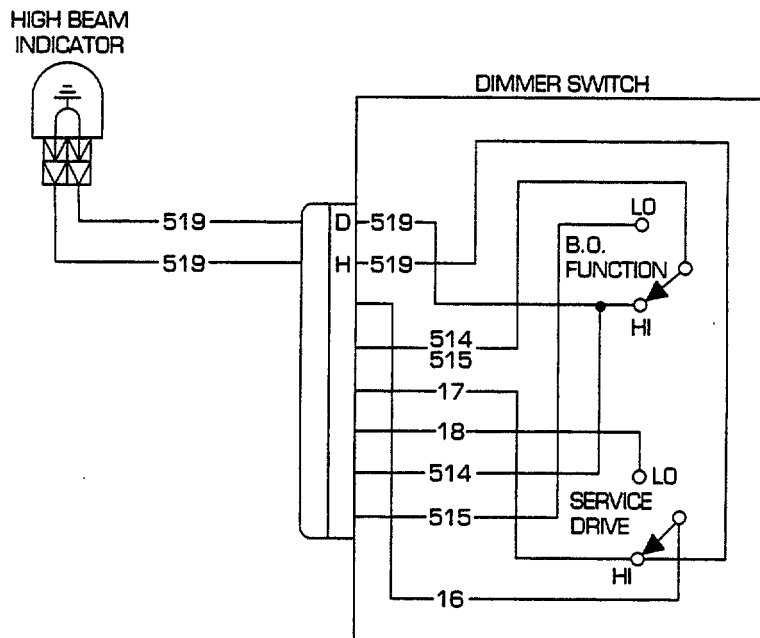
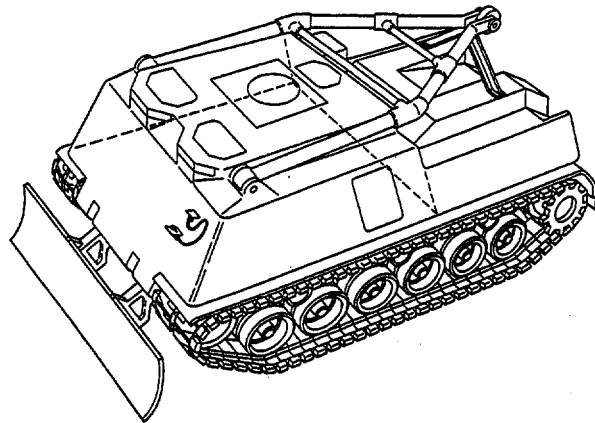


2-19 ELECTRICAL TROUBLESHOOTING-Continued

HIGH BEAM INDICATOR

SYMPTOMS

High beam indicator fails to light with high beams on, in IR or SER. DRIVE condition.
Do step A.

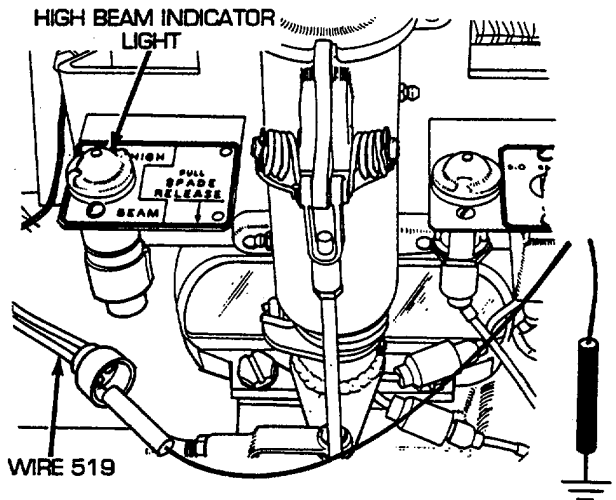
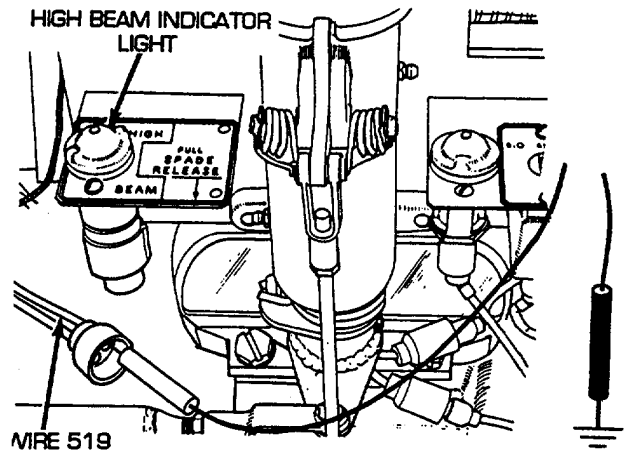


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

A Disconnect headlight and dimmer switch wiring harness from HIGH BEAM indicator light. Place red lead of multimeter in wire 519 (from pin D of dimmer switch) and black lead to ground. Turn MASTER switch on, UNLOCK and place main lighting switch in B.O. DRIVE position, and B.O. SELECTOR switch in B.O. position, press dimmer switch, and check for voltage. Turn MASTER, main lighting, B.O. SELECTOR and dimmer switches OFF. If voltage is present, replace HIGH BEAM indicator light bulb (see paragraph 6-33). If voltage is not present, go to step B.

B Place red lead of multimeter in wire 519 (from pin H of dimmer switch) and black lead to ground. Turn MASTER switch on, UNLOCK and place main lighting switch in SER. DRIVE position, and auxiliary switch any position other than park, press dimmer switch, and check for voltage. Turn MASTER and main lighting and dimmer switches OFF. If voltage is present, replace HIGH BEAM indicator light bulb (see paragraph 6-33). If voltage is not present, repair/replace wire 519 from pin H of headlight and dimmer switch wiring harness (see paragraph 6-65).



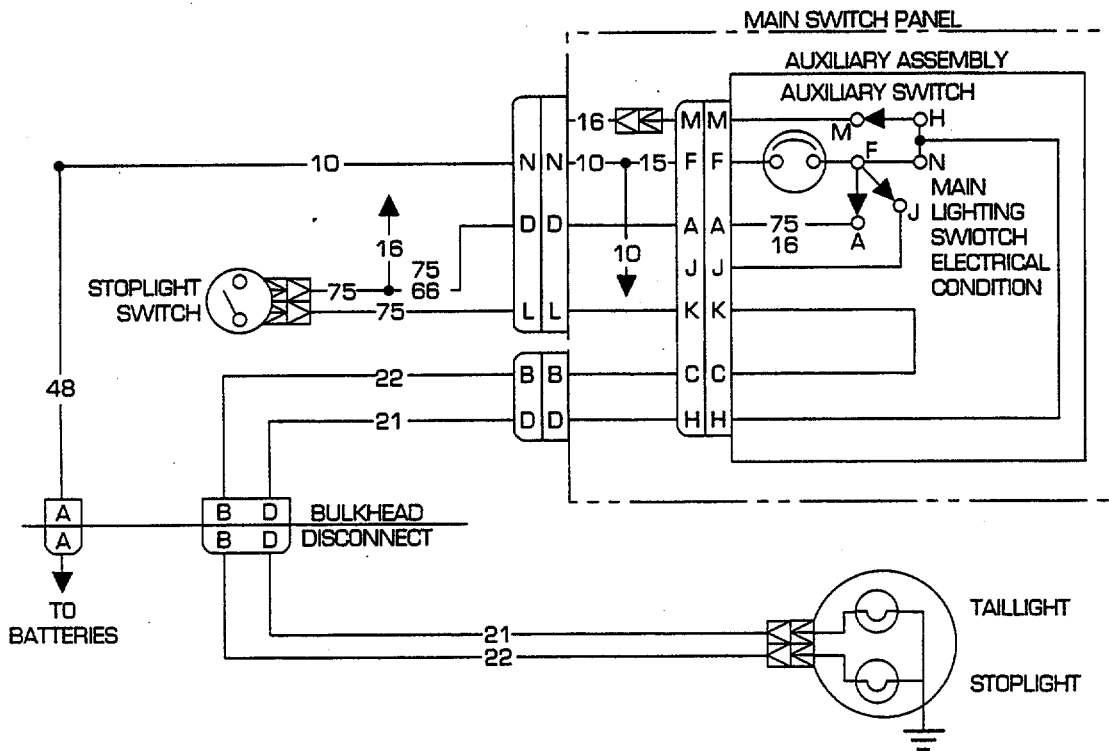
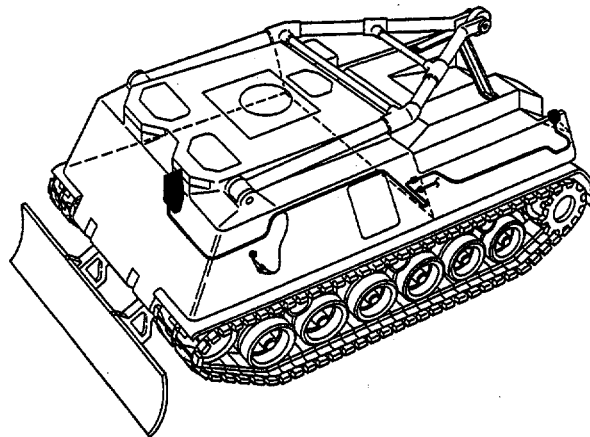
2-19 ELECTRICAL TROUBLESHOOTING--Continued

SERVICE STOPLIGHT

SYMPTOM

Service stoplight fails to operate.

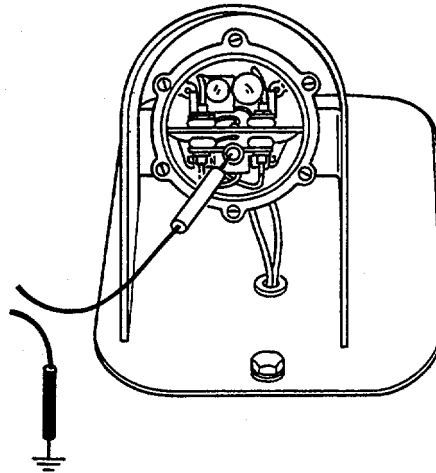
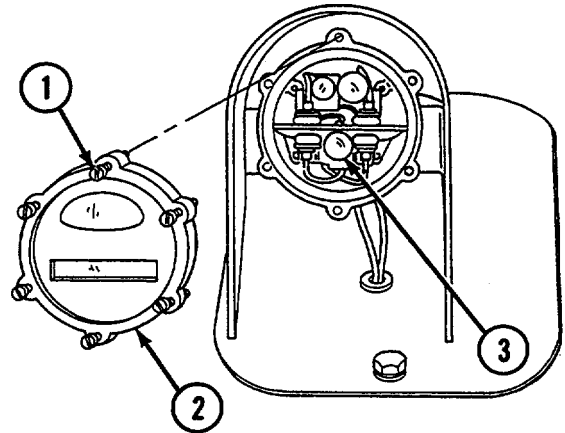
Do steps A through K.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Loosen six screws (1) and remove stoplight cover (2). Remove stoplight lamp (3). Place red lead of multimeter in socket and black lead to ground. Turn MASTER switch on, UNLOCK and place main lighting switch in SER. DRIVE position. Depress stoplight switch (vehicle brake) and check for voltage. Turn MASTER, main lighting, and stoplight switches OFF. If voltage is present, replace lamp (see paragraph 6-30). If voltage is not present, go to step B.



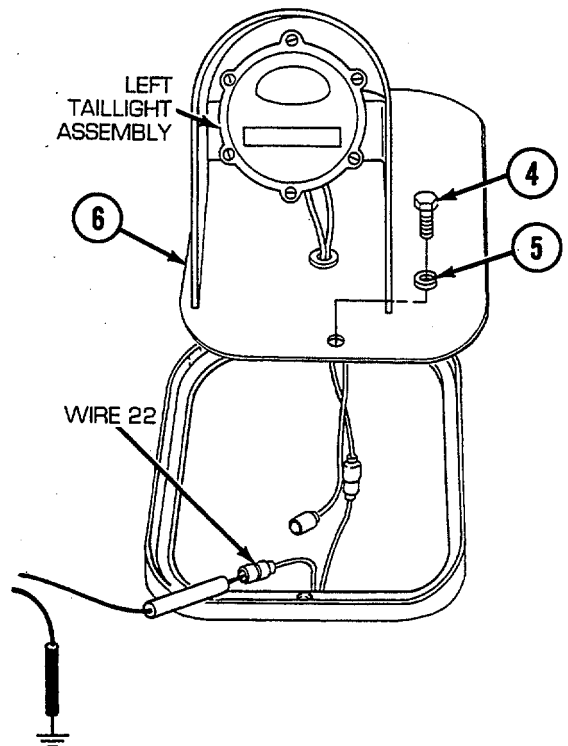
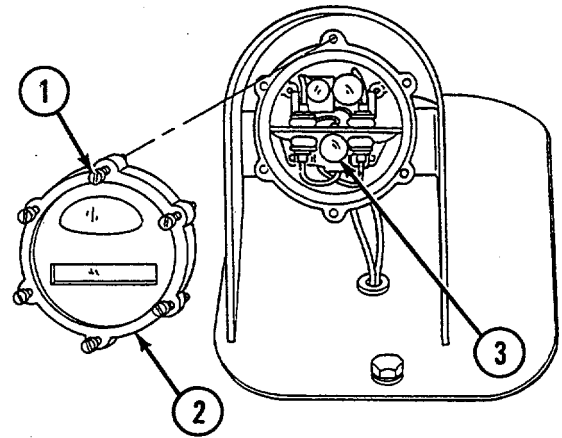
2-19 ELECTRICAL TROUBLESHOOTING-Continued

SERVICE STOPLIGHT-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

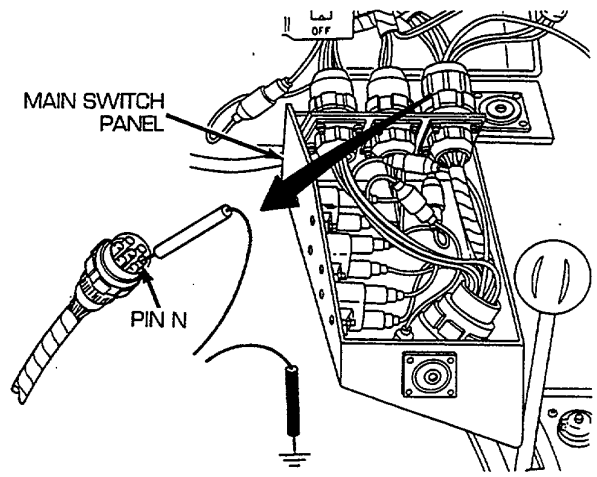
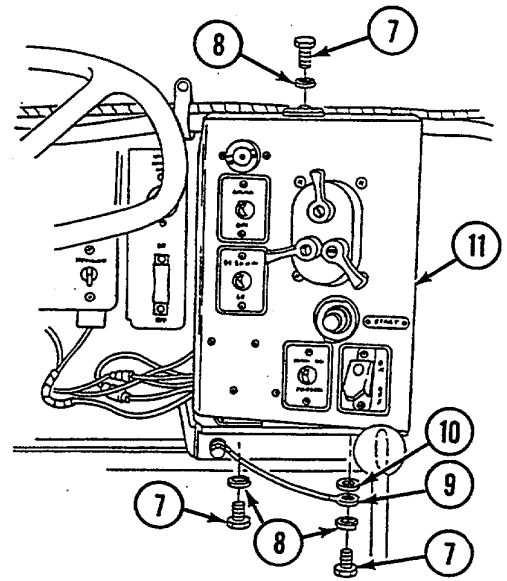
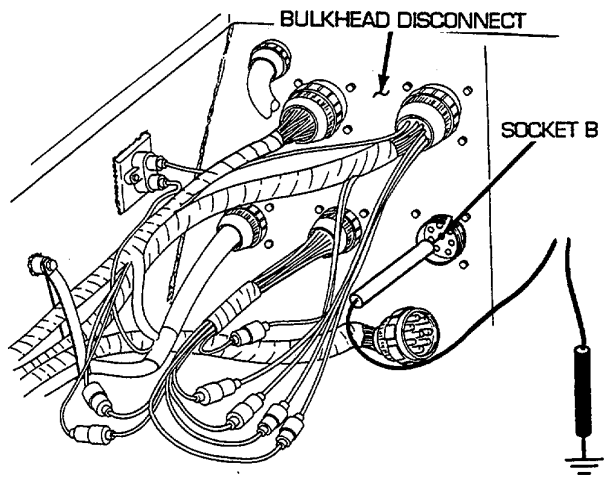
- B Install stoplight lamp (3), stoplight cover (2), and tighten six screws (1). Remove two screws (4), two lockwashers (5), and hydraulic access plate (6). Disconnect wire 22 of bulkhead to master relay and left and right taillight wiring harness from left taillight assembly. Place red lead of multimeter in wire 22 and black lead to ground. Turn MASTER switch on, UNLOCK and place main lighting switch in SER. DRIVE position, depress stoplight switch (vehicle brake) and check for voltage. Turn MASTER, main lighting, and stoplight switches OFF. If voltage is present, replace taillight lamp (see paragraph 6-30). If voltage is not present, go to step C.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- C Open air inlet doors (TM 9-2350-256-10). Reconnect wire 22 at bulkhead to master relay and left and right taillight wiring harness to left taillight assembly. Install hydraulic access plate (6), two lockwashers (5), and two screws (4). Disconnect bulkhead to master relay and left and right taillight wiring harness from bulkhead disconnect. Place red lead of multimeter in socket B of wire 22 and black lead to ground. Turn MASTER switch on, UNLOCK and place main lighting switch in SER DRIVE position, and depress stoplight switch, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, repair/replace wire 22 of bulkhead to master relay and left and right taillight wiring harness (see paragraph 6-71). If voltage is not present, go to step D.
- D Remove three screws (7), three lockwashers (8), ground lead (9), and flat washer (10) and release main switch panel (11) from mounting brackets. Reconnect bulkhead to master relay and left and right taillight wiring harness to bulkhead disconnect. Disconnect switch panel to gage panel and miscellaneous switches wiring harness from main switch panel. Place red lead of multimeter on pin N of wire 10 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step E. If voltage is not present, go to step K.



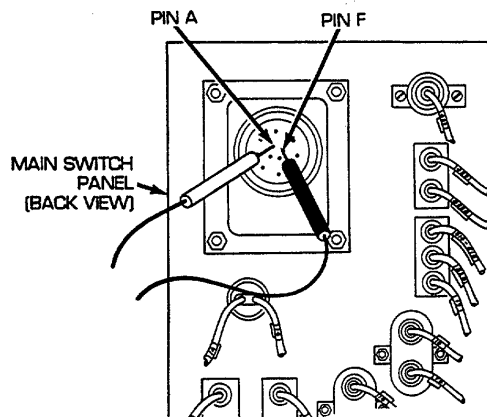
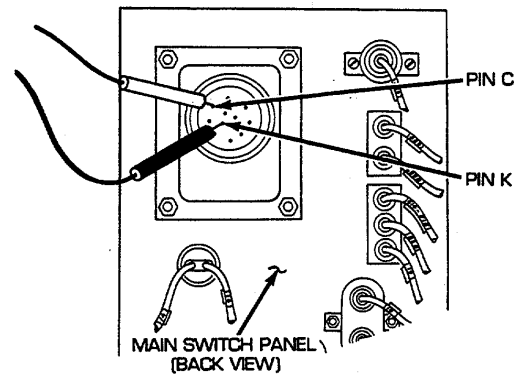
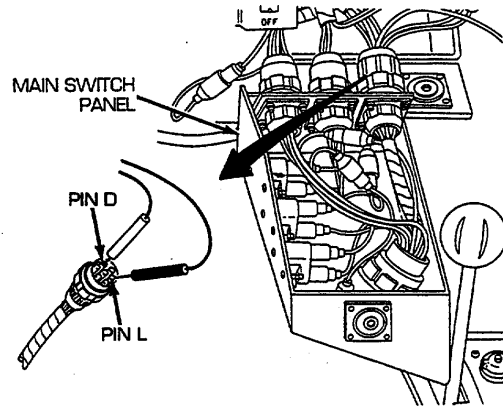
2-19 ELECTRICAL TROUBLESHOOTING-Continued

SERVICE STOPLIGHT-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

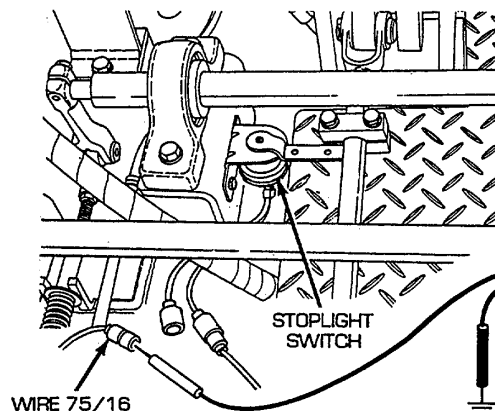
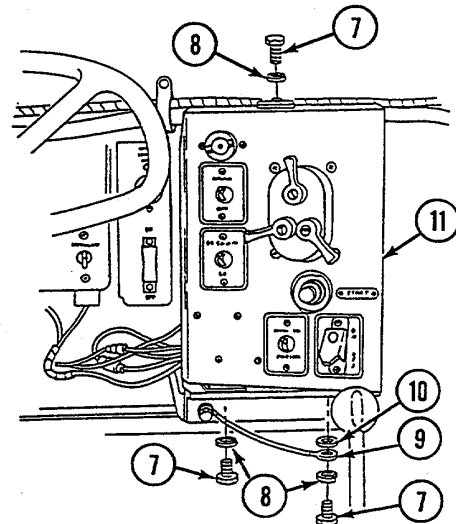
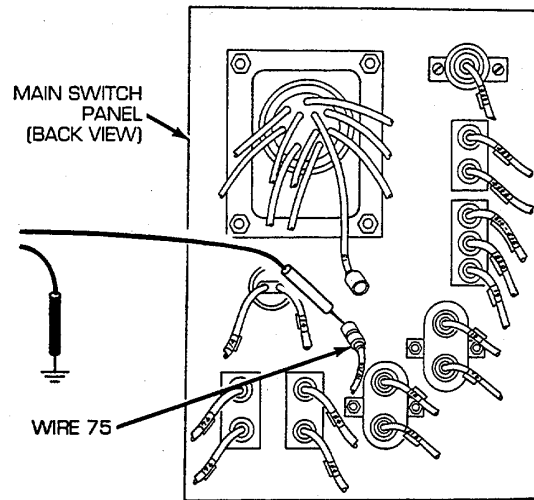
- E Place red lead of multimeter on pin D of wire 75/16 and black lead on pin L of wire 75. Check for continuity. If continuity is present, go to step F. If continuity is not present, go to step I.
- F Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Disconnect main lighting and master relay wiring harness from main lighting switch. Place red lead of multimeter on pin C and black lead on pin K. Check for continuity. If continuity is present, go to step G. If continuity is not present, replace main lighting switch (see paragraph 6-10).
- G Place red lead of multimeter on pin A and black lead on pin F. Check for continuity. If continuity is present, go to step H. If continuity is not present, replace main lighting switch (see paragraph 6-10).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- H Reconnect main lighting and master relay wiring harness to main lighting switch. Disconnect wire 75 of main lighting and B.O. selector switch wiring harness at connector. Place red lead of multimeter in female connector of wire 75 and black lead to ground. Turn MASTER switch on, UNLOCK and place main lighting switch in SER. DRIVE, depress stoplight switch, and check for voltage. Turn MASTER, stoplight, and main lighting switches OFF. If voltage is present, repair/replace wire 75 of main lighting and B.O. selector switch wiring harness (see paragraph 6-69). If voltage is not present, repair/replace wire 75 of main lighting and master relay wiring harness (see paragraph 6-70).
- I Install main switch panel (11), flat washer (10), ground lead (9), three lockwashers (8), and three screws (7). Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Disconnect wire 75/16 at stoplight switch. Place red lead of multimeter in wire 75/16 and black lead to ground. Turn MASTER switch on, UNLOCK and place main lighting switch in SER. DRIVE position, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, go to step J. If voltage is not present, repair/replace wire 75/16 of switch panel to gage panel and miscellaneous switches wiring harness (see paragraph 6-55 for dual voltage; 6-56 for single voltage).



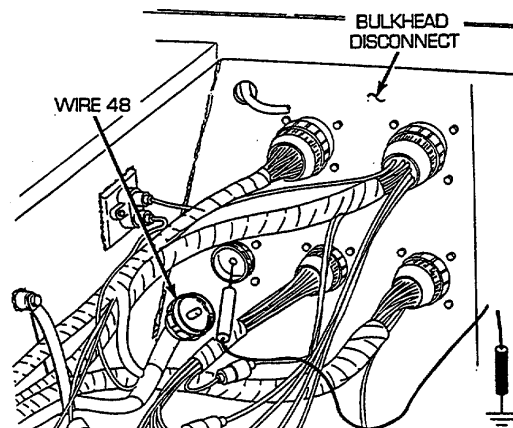
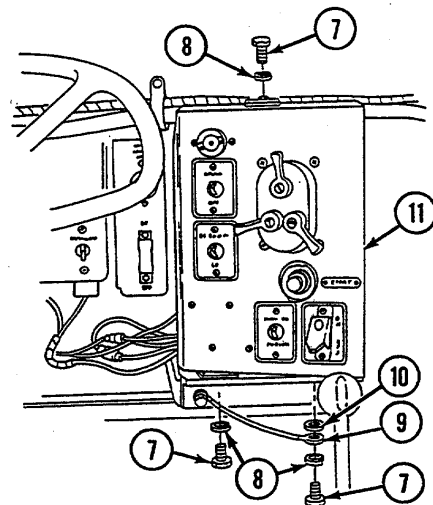
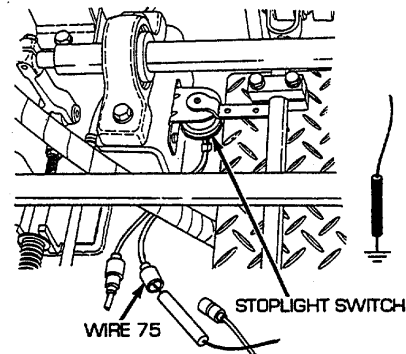
2-19 ELECTRICAL TROUBLESHOOTING-Continued

SERVICE STOPLIGHT-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

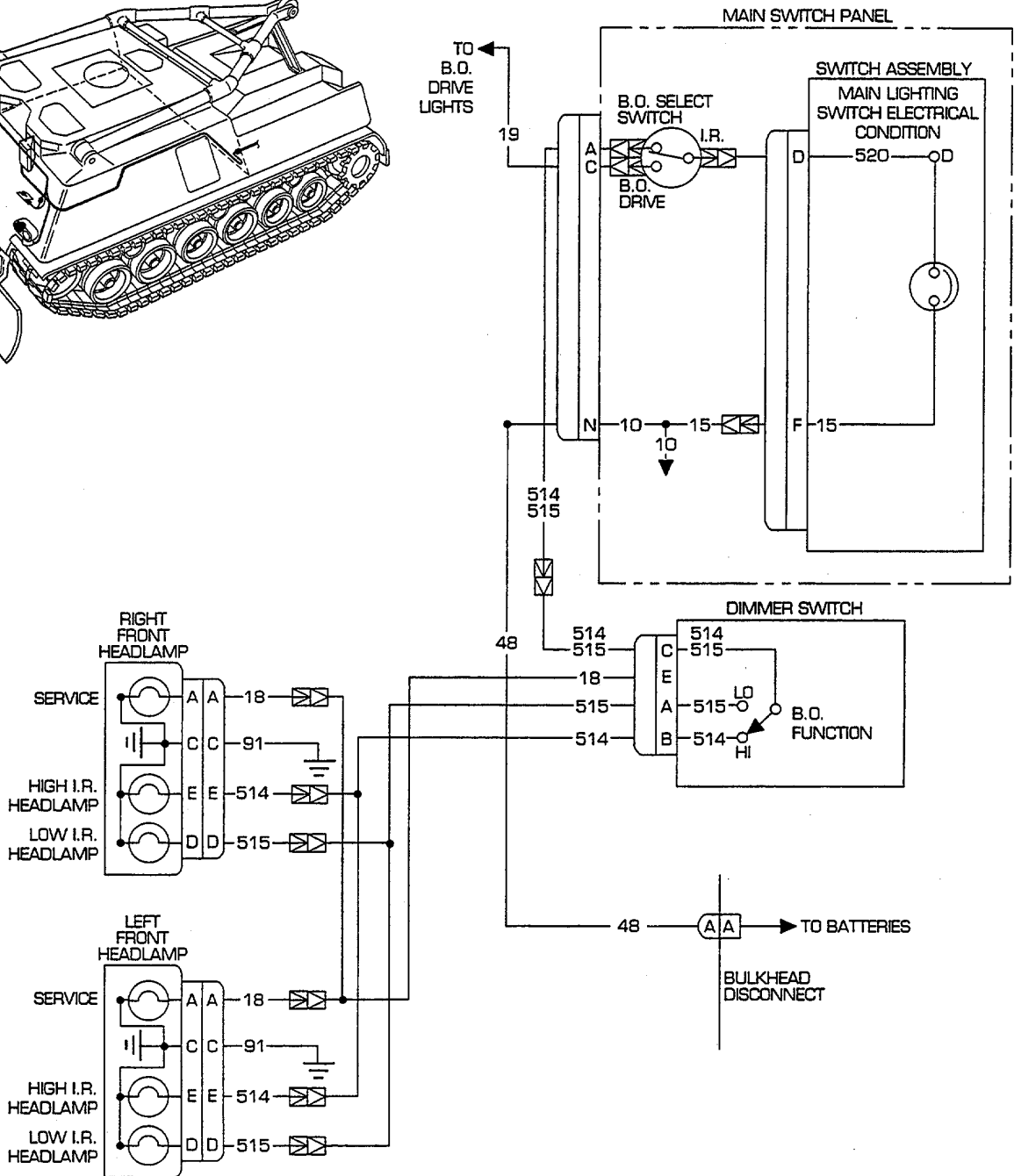
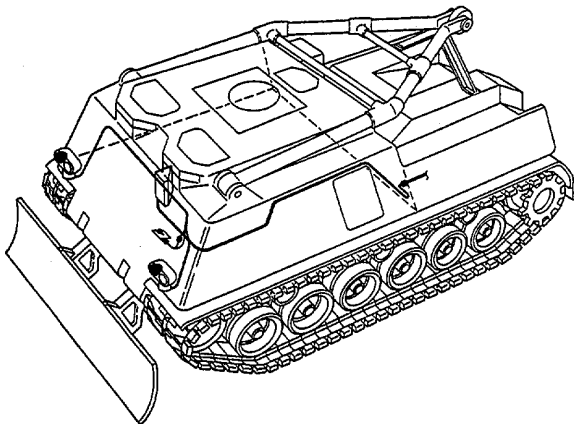
- J Reconnect wire 75/16 to stoplight switch. Disconnect wire 75 from stoplight switch. Place red lead of multimeter on wire 75 of stoplight switch and black lead to ground. Turn MASTER switch on, UNLOCK and place main lighting switch in SER. DRIVE position, depress stoplight switch, and check for voltage. Turn MASTER, main lighting, and stoplight switches OFF. If voltage is present, repair/replace wire 75 of switch panel to gage panel and miscellaneous switches wiring harness (see paragraph 6-55 for dual voltage; 6-56 for single voltage). If voltage is not present, replace stoplight switch (see paragraph 6-23).
- K Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Install main switch panel (11), flat washer (10), ground lead (9), three lockwashers (8), and three screws (7). Open air inlet doors. Disconnect wire 48 pin A from bulkhead to master relay wiring harness. Place red multimeter lead in socket and black lead to ground. Turn MASTER switch on and check for voltage. If voltage is present, repair/replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay circuit (see paragraph 2-19, master relay fails to operate).



B.O. SERVICE CONDITION (IR HEADLIGHTS)

SYMPTOM

IR headlights fail to operate.
Do steps A through S.



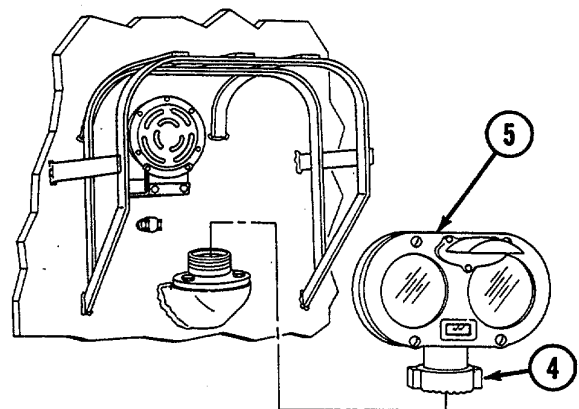
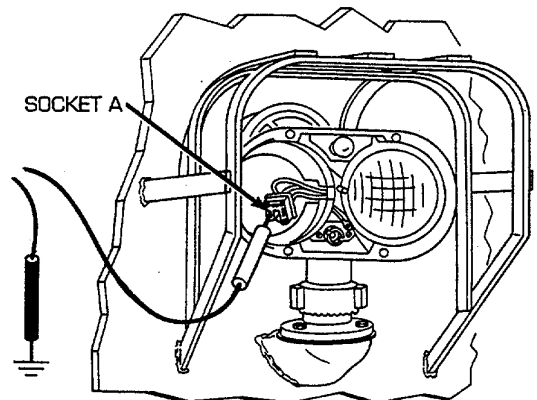
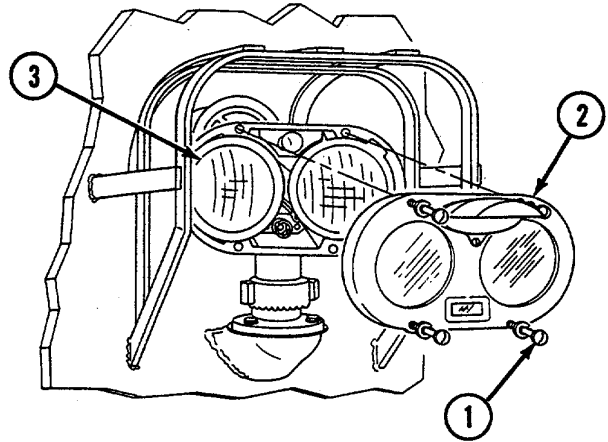
2-19 ELECTRICAL TROUBLESHOOTING-Continued

B.O. SERVICE CONDITION [IR HEADLIGHTS]-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

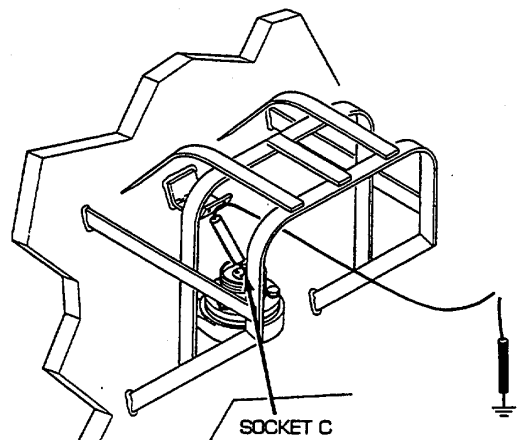
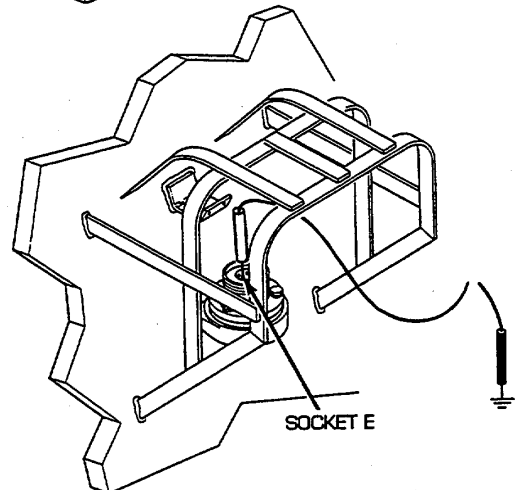
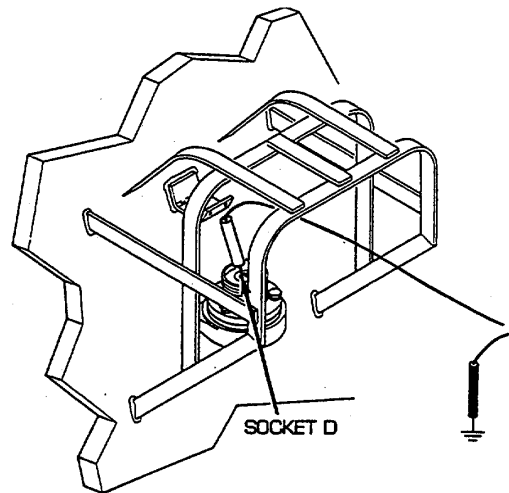
- A Loosen four screws (1) and remove headlight cover (2). Remove lamp (3) and disconnect connector. Place red lead of multimeter in socket A of wire 18. Turn MASTER switch on, UNLOCK and place main lighting switch in B.O. DRIVE position and B.O. selector switch to IR, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, replace lamp. If voltage is not present, go to step B.
- B Install lamp (3), headlight cover (2), and tighten four screws (1). Loosen adjustment nut (4) and remove headlight assembly (5). Place red lead of multimeter in socket D of wire 515 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. DRIVE position, B.O. SELECTOR switch to IR, and check for voltage. Turn MASTER, main lighting, and B.O. SELECTOR switches off. If voltage is present, go to step C. If voltage is not present, go to step E.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- C Place red lead of multimeter in socket E of wire 514 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. DRIVE position, B.O. SELECTOR switch to IR, press dimmer switch, and check for voltage. Turn MASTER, main lighting, B.O. SELECTOR, and dimmer switches OFF. If voltage is present, go to step D. If voltage is not present, go to step E.
- D Place red lead of multimeter in socket C of wire 91 (ground) and black lead to ground. Check for continuity. If continuity is present, replace head lamp (see paragraph 6-26). If continuity is not present, repair/replace wire 91 (ground) of headlight and dimmer switch wiring harness (see paragraph 6-65).



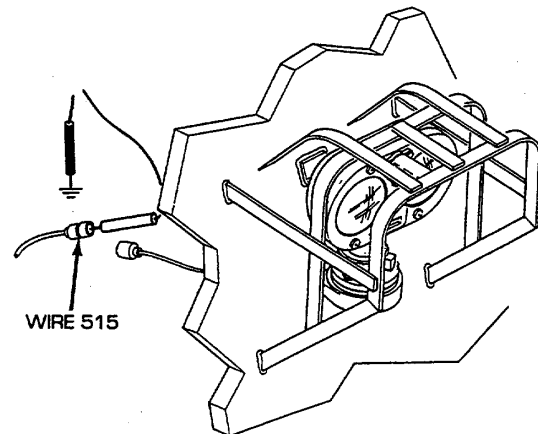
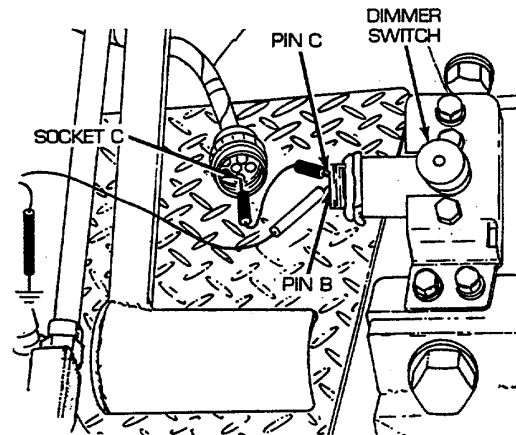
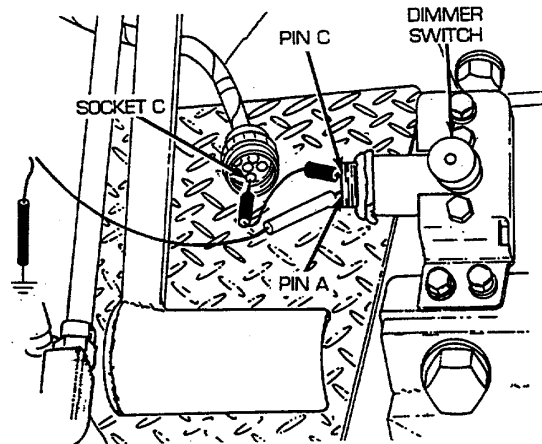
2-19 ELECTRICAL TROUBLESHOOTING-Continued

B.O. SERVICE CONDITION (IR HEADLIGHTS)-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

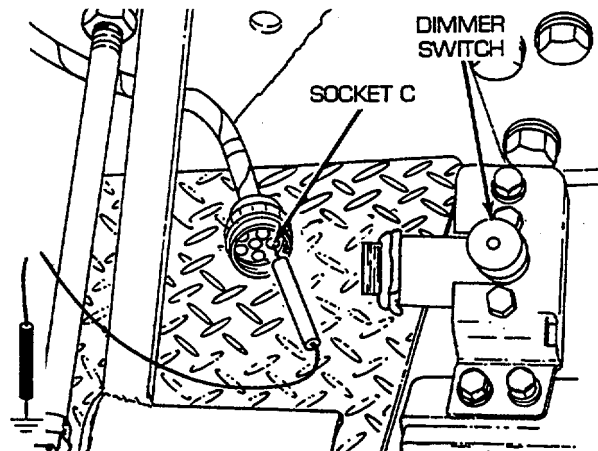
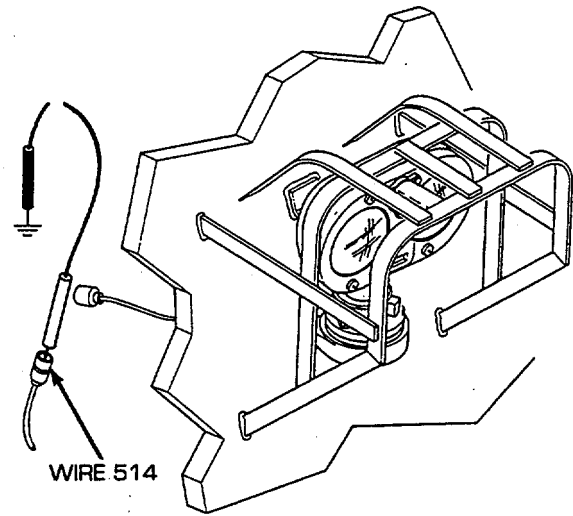
- E Reconnect headlight base assembly to headlight assembly. Disconnect headlight and dimmer switch wiring harness from dimmer switch. Place a jumper wire from socket C to pin C of wire 514/515. Place red lead of multimeter on pin A of wire 515 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. DRIVE position, B.O. SELECTOR switch to IR, and check voltage. Turn MASTER, main lighting, and B.O. SELECTOR switches off. If voltage is present, go to step G. If voltage is not present, go to step F.
- F Place a jumper wire from socket C to pin C of wire 514/515. Place red lead of multimeter on pin B of wire 514 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. DRIVE position, B.O. SELECTOR switch to IR, press dimmer switch, and check for voltage. Turn MASTER, main lighting, B.O. SELECTOR, and dimmer switches off. If voltage is present, go to step H. If voltage is not present, go to step I.
- G Reconnect headlight and dimmer switch wiring harness to dimmer switch. Disconnect wire 515 of headlight base assembly at connector. Place red lead of multimeter in wire 515 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. DRIVE position, B.O. SELECTOR switch to IR, and check for voltage. Turn MASTER, main lighting, and B.O. SELECTOR switches off. If voltage is present, repair/replace wire 515 of headlight base wiring harness (see paragraph 6-64). If voltage is not present, repair/replace wire 515 of headlight and dimmer switch wiring harness (see paragraph 6-65).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- H Reconnect headlight and dimmer switch wiring harness to dimmer switch. Disconnect wire 514 of headlight base assembly at connector. Place red lead of multimeter in wire 514 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. DRIVE position, B.O. SELECTOR switch to IR, press dimmer switch, and check voltage. Turn MASTER, main lighting, B.O. SELECTOR, and dimmer switches off. If voltage is present, repair/replace wire 514 of headlight base wiring harness (see paragraph 6-64). If voltage is not present, repair/replace wire 514 of headlight and dimmer switch wiring harness (see paragraph 6-65).
- I Place red lead multimeter in socket C of wire 514/515 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. DRIVE position, B.O. SELECTOR switch to IR, and check for voltage. Turn MASTER, main lighting, and B.O. SELECTOR switches off. If voltage is present, replace dimmer switch (see paragraph 6-25). If voltage is not present, go to step J.



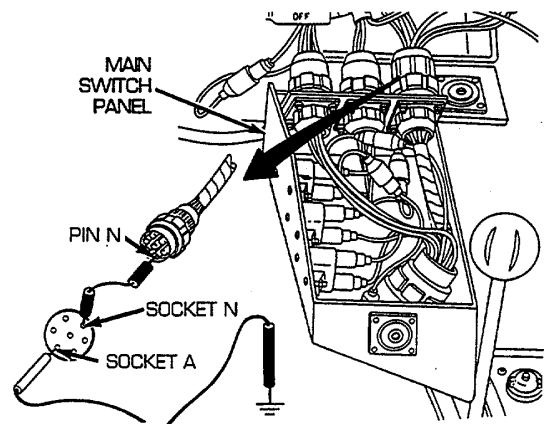
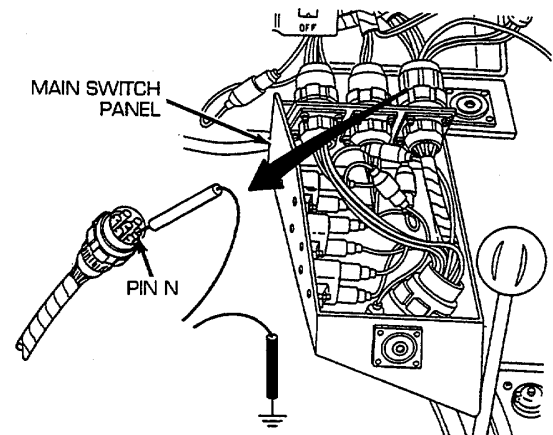
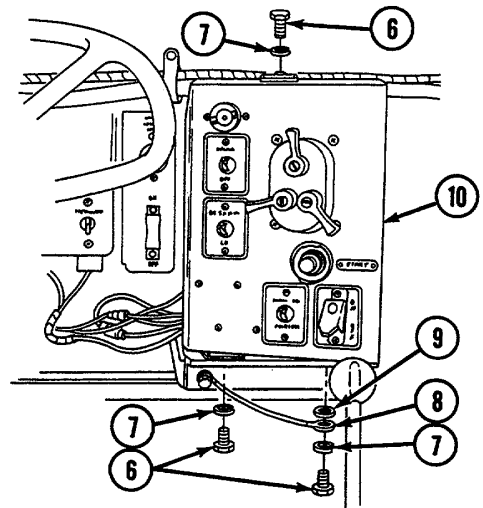
2-19 ELECTRICAL TROUBLESHOOTING-Continued

B.O. SERVICE CONDITION (IR HEADLIGHTS-Continued)

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

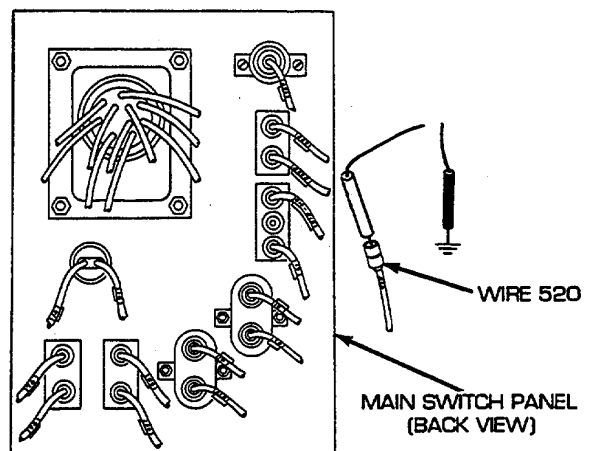
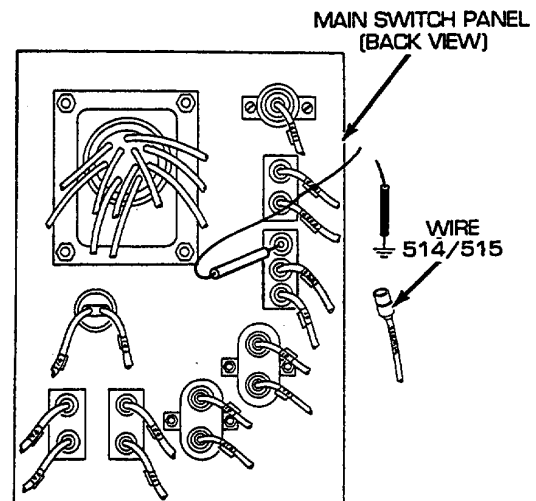
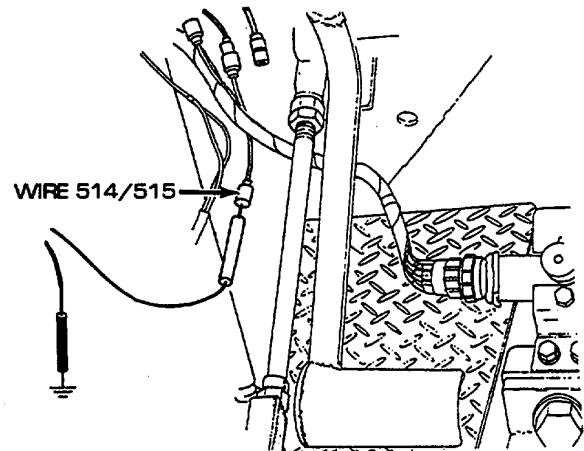
- J Reconnect headlight and dimmer switch wiring harness to dimmer switch. Remove three screws (6), three lockwashers (7), ground lead (8), and flat washer (9) and release main switch panel (10) from mounting brackets. Disconnect switch panel to gage panel and miscellaneous switches wiring harness from main switch panel. Place red lead of multimeter on pin N of wire 10 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step K. If voltage is not present, go to step S.
- K Place a jumper wire from pin N to socket N of wire 10. Place red lead of multimeter in socket A of wire 514/515 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. DRIVE position, B.O. SELECTOR switch to IR, and check for voltage. Turn MASTER main lighting, and B.O. SELECTOR switches off. If voltage is present, go to step L. If voltage is not present, go to step M



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- L Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Install main switch panel (10), flat washer (9), ground lead (8), three lockwashers (7), and three screws (6) to mounting bracket. Disconnect wire 514/515 of switch panel to gage panel and miscellaneous switches wiring harness from headlight and dimmer switch wiring harness. Place red lead of multimeter on male connector of wire 514/515 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. DRIVE position, B.O. SELECTOR switch to IR, and check for voltage. Turn MASTER, main lighting, and B.O. SELECTOR switches off. If voltage is present, repair/replace wire 514/515 of headlight and dimmer switch wiring harness (see paragraph 6-65). If voltage is not present, repair/replace wire 514/515 of switch panel to gage panel and miscellaneous switches wiring harness (see paragraph 6-55 for dual voltage; 6-56 for single voltage).
- M Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Disconnect wire 514/515 from B.O. SELECTOR switch. Place red lead of multimeter on terminal of switch and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. DRIVE position, B.O. SELECTOR switch to IR, and check for voltage. If voltage is present, repair/replace wire 514/515 of main lighting and B.O. selector switch' wiring harness (see paragraph 6-69). If voltage is not present, go to step N.
- N Reconnect wire 514/515 to B.O. SELECTOR switch. Disconnect wire 520 from B.O. SELECTOR switch. Place red lead of multimeter in wire 520 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. DRIVE position, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, replace B.O. SELECTOR switch (see paragraph 6-10). If voltage is not present, go to step 0.



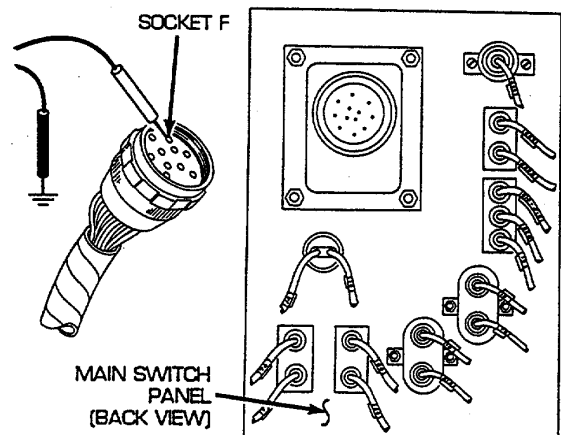
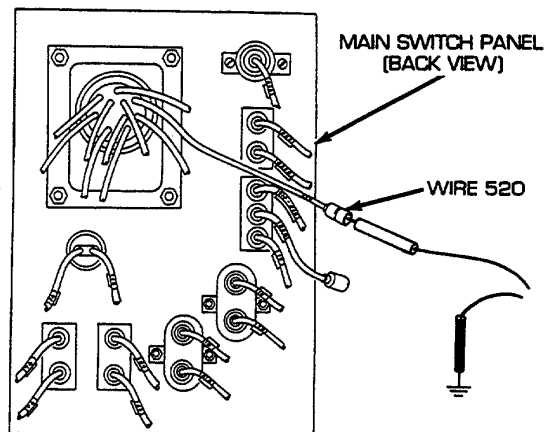
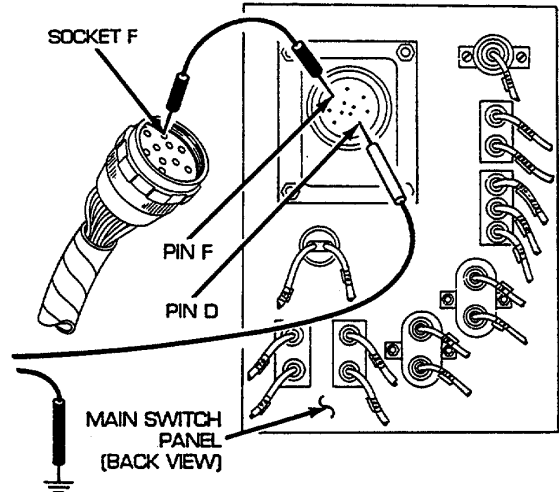
2-19 ELECTRICAL TROUBLESHOOTING-Continued

B.O. SERVICE CONDITION (IR HEADLIGHTS)-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

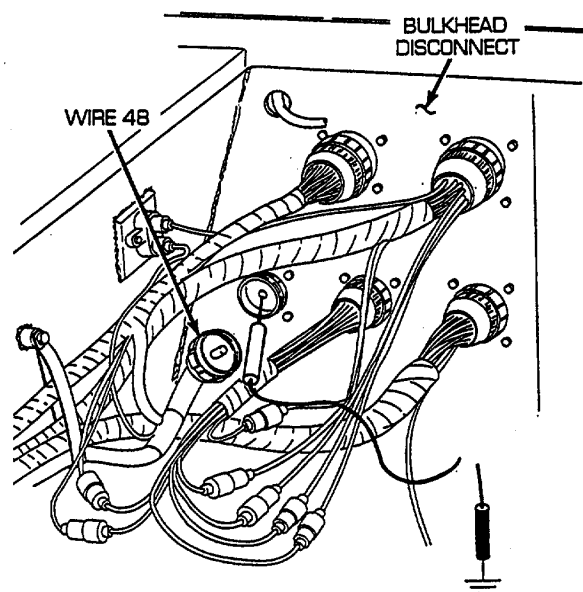
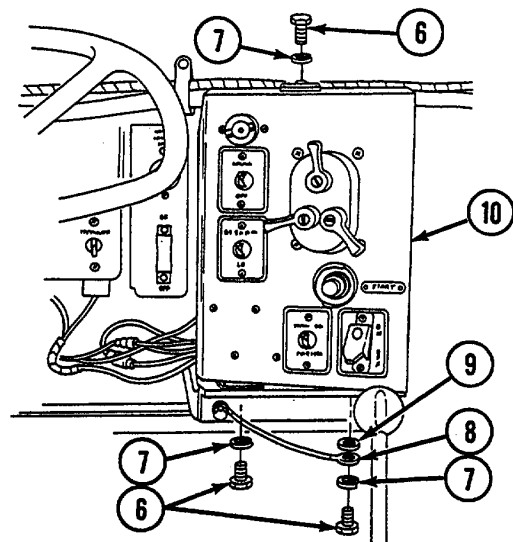
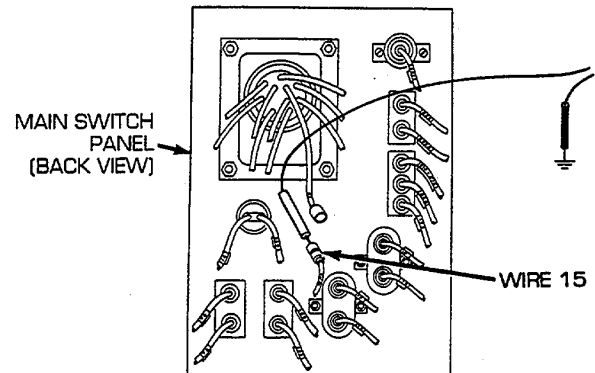
- O Reconnect wire 520 to B.O. SELECTOR switch. Disconnect main lighting and master relay wiring harness from main lighting switch. Place a jumper wire from pin F to socket F. Place red lead of multimeter on pin D of wire 520 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting to B.O. DRIVE position, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, go to step P. If voltage is not present, go to step Q.
- P Reconnect main lighting and master relay wiring harness to main lighting switch. Disconnect wire 520 at female connector, near main lighting switch. Place red lead of multimeter in female connector of wire 520 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. DRIVE position, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, repair/replace wire 520 of B.O. selector lead assembly (see paragraph 6-68). If voltage is not present, repair/replace wire 520 of main lighting and master relay wiring harness (see paragraph 6-70).
- Q Place red lead of multimeter in socket F of wire 15 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace main lighting switch (see paragraph 6-10). If voltage is not present, go to step R.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- R Reconnect main lighting and master relay wiring harness to main lighting switch. Disconnect wire 15 of main lighting and master relay wiring harness at connector. Place red lead of multimeter in female connector of wire 15 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 15 of main lighting and master relay wiring harness (see paragraph 6-70). If voltage is not present, repair/replace wire 10 of main lighting and B.O. selector switch wiring harness (see paragraph 6-69).
- S Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Install main switch panel (10), flat washer (9), ground lead (8), three lockwashers (7), and three screws (6). Open air inlet doors (TM 9-2350-256-10). Disconnect wire 48 pin A from bulkhead to master relay wiring harness. Place red multimeter lead in socket and black lead to ground. Turn MASTER switch on and check for voltage. If voltage is present, repair/replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay circuit (see paragraph 2-19, master relay fails to operate).

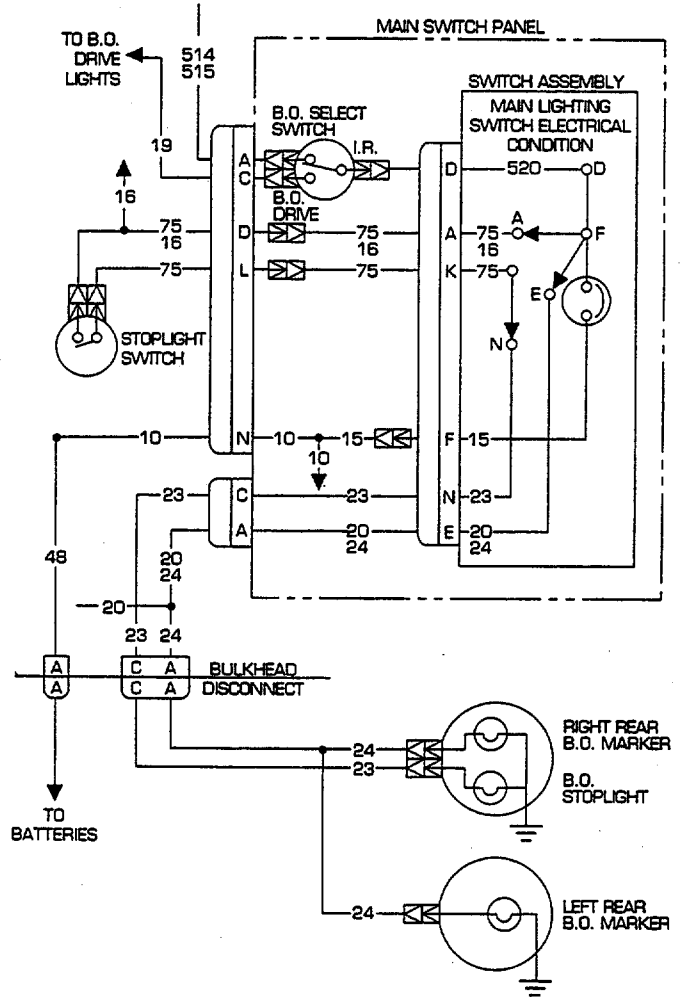
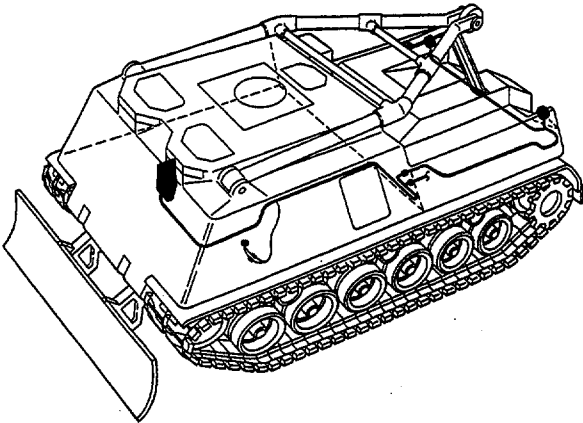


2-19 ELECTRICAL TROUBLESHOOTING-Continued

B.O. SERVICE CONDITION (B.O. STOPLIGHT)

SYMPTOM

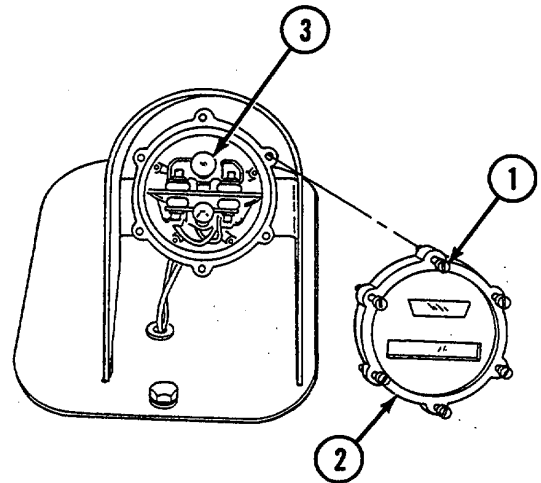
B.O. stoplight fails to operate in any B.O. mode.
Do steps A through K.



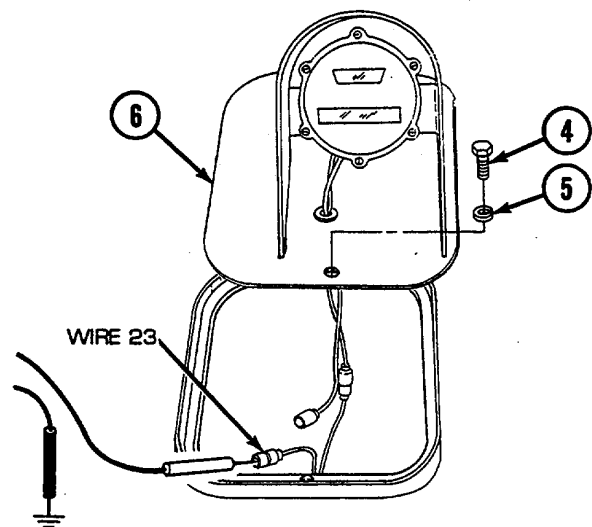
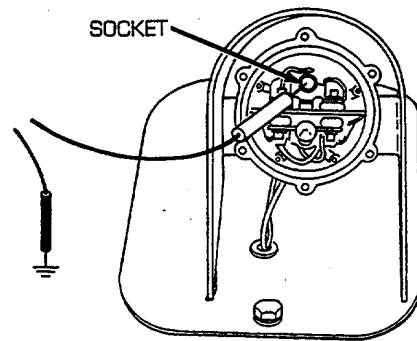
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Loosen six screws (1) and remove stoplight cover (2). Remove B.O. stoplight lamp (3). Place red lead of multimeter in socket and black lead to ground. Turn MASTER switch on, UNLOCK and place main lighting switch in B.O. MASTER position. Depress stoplight switch (vehicle brake) and check for voltage. Turn MASTER, main lighting and stoplight switches OFF. If voltage is present, replace lamp (see paragraph 6-30). If voltage is not present, go to step B.



- B Install B.O. stoplight lamp (3), stoplight cover (2), and tighten six screws (1). Remove two screws (4) and two lockwashers (5) and remove hydraulic access cover (6). Disconnect wire 23 of bulkhead to master relay and left and right taillight wiring harness from right taillight assembly. Place red lead of multimeter in wire 23 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. MASTER position, apply brakes, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, replace taillight assembly (see paragraph 6-30). If voltage is not present, go to step C.



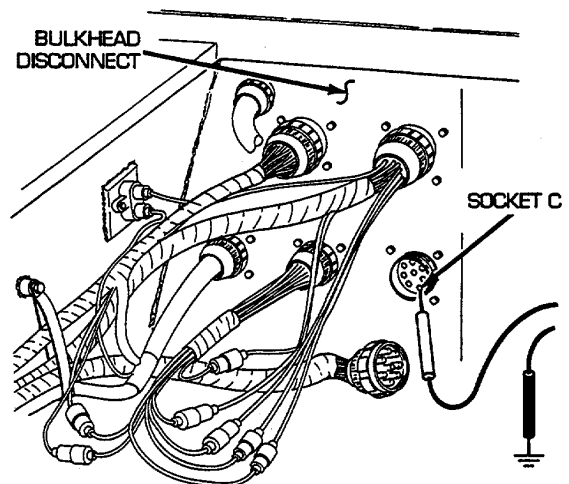
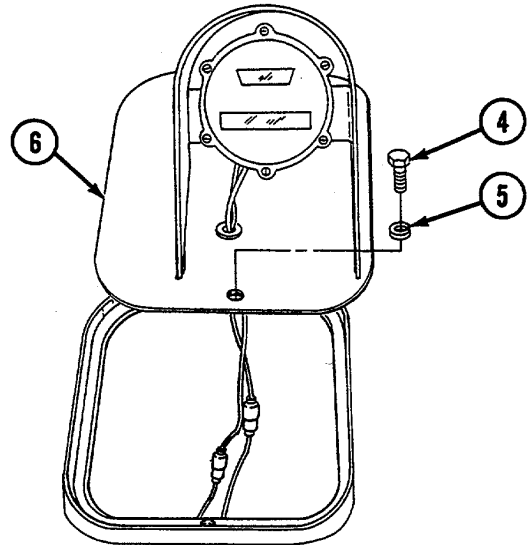
2-19 ELECTRICAL TROUBLESHOOTING-Continued

B.O. SERVICE CONDITION (B.O. STOPLIGHT)-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

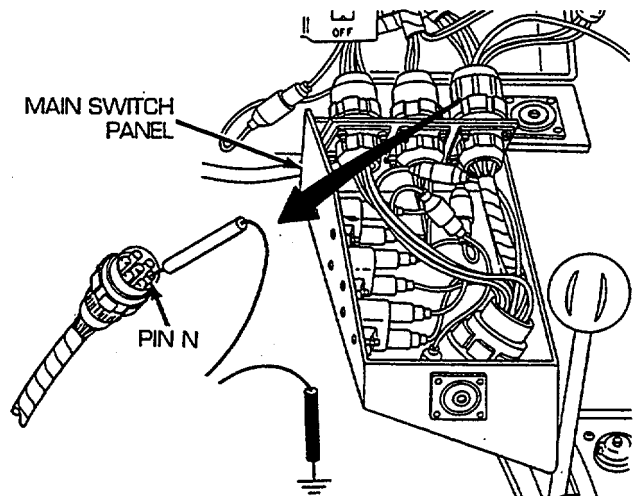
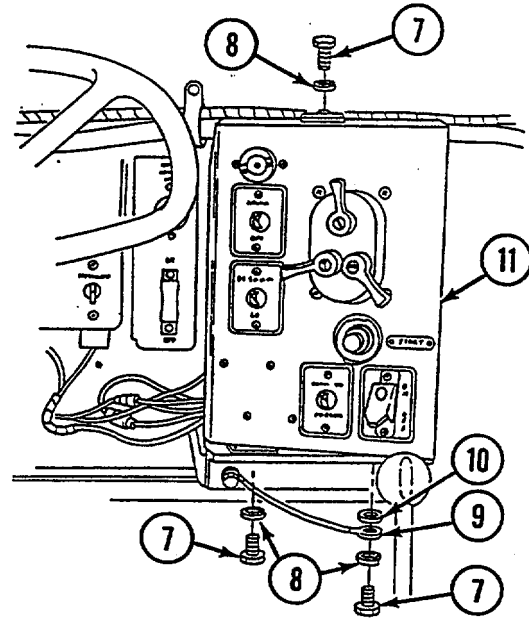
- C Install hydraulic access cover (6), two lockwashers (5), and two screws (4). Open air inlet doors (TM 9-2350-256-10). Disconnect bulkhead to master relay and left and right taillight wiring harness from bulkhead. Place red lead of multimeter in socket C of wire 23 and black lead to ground. Turn MASTER switch on, UNLOCK and place main lighting switch to B.O. MARKER position, apply brakes, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, repair/replace wire 23 of bulkhead to master relay and left and right taillight wiring harness (see paragraph 6-71). If voltage is not present, go to step D.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- D Remove three screws (7), three lockwashers (8), ground wire (9), flat washer (10), and release main switch panel (11) from mounting brackets. Disconnect switch panel to gage panel and miscellaneous switches wiring harness from main switch panel. Place red lead of multimeter on pin N of wire 10 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step E. If voltage is not present, go to step K.



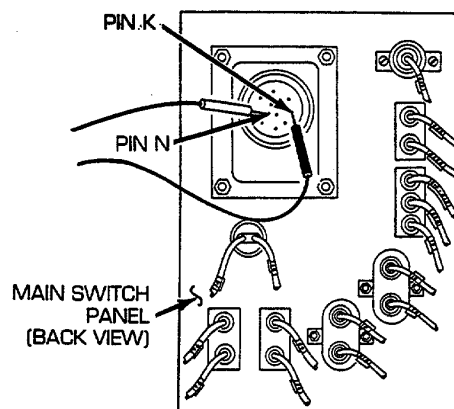
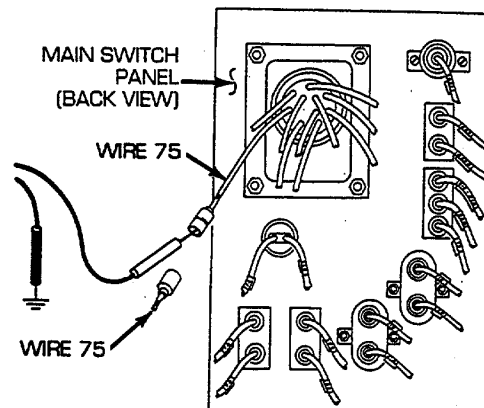
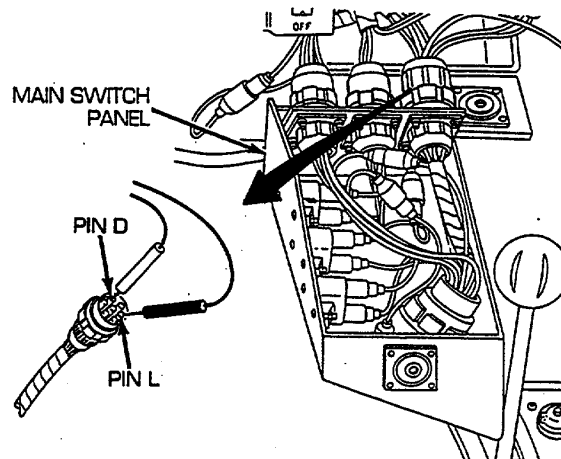
2-19 ELECTRICAL TROUBLESHOOTING-Continued

B.O. SERVICE CONDITION (B.O. STOPLIGHT)-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- E Place red lead of multimeter on pin D of wire 75/16 and black lead on pin L of wire 75. Check for continuity. If continuity is present, go to step F. If continuity is not present, go to step I.
- F Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Disconnect wire 75 of main lighting and B.O. selector switch wiring harness at connector. Place red lead of multimeter in female connector of wire 75 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. MARKER position, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, repair/replace wire 75 of main lighting and B.O. selector switch wiring harness (see paragraph 6-69). If voltage is not present, go to step G.
- G Reconnect wire 75 of main lighting and B.O. selector switch wiring harness at connector. Disconnect main lighting and master relay wiring harness from main lighting switch. Place red lead of multimeter on pin N of and black lead on pin K of main switch. Check for continuity. If continuity is present, go to step H. If continuity is not present, replace main lighting switch (see paragraph 6-10).

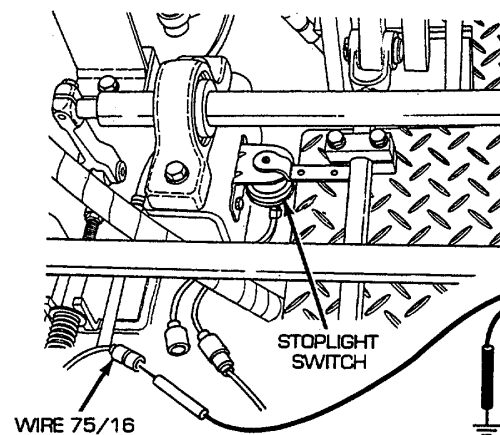
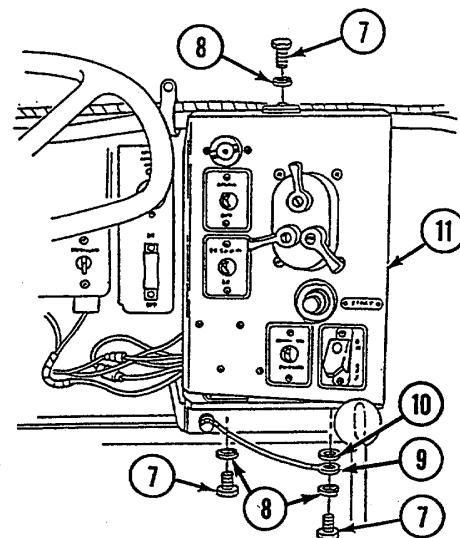
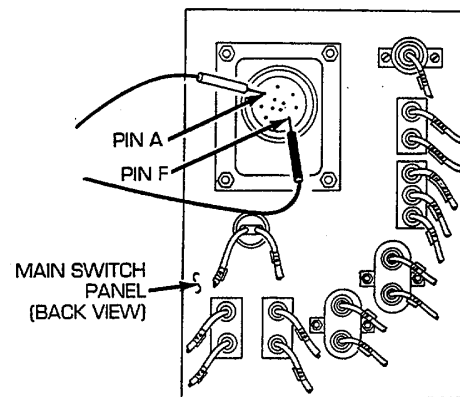


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- H Place red lead of multimeter on pin A of main switch and black lead on pin F of main switch. Check for continuity. If continuity is present, repair/replace wire 75 of main lighting and master relay wiring harness (see paragraph 6-70). If continuity is not present, replace main lighting switch (see paragraph 6-10).

- I Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Install main switch panel (11), flat washer (10), ground wire (9), three lockwashers (8), and three screws (7). Disconnect wire 75/16 at stoplight switch. Place red lead of multimeter in wire 75/16 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. MARKER position, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, go to step J. If voltage is not present, repair/replace wire 75/16 of switch panel to gage panel and miscellaneous switches wiring harness (see paragraph 6-55 for dual voltage; 6-56 for single voltage).



2-19 ELECTRICAL TROUBLESHOOTING-Continued

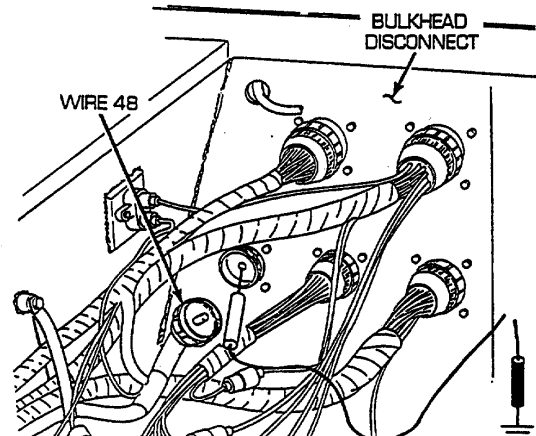
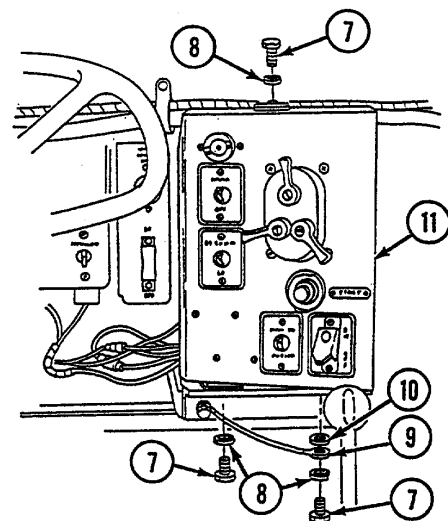
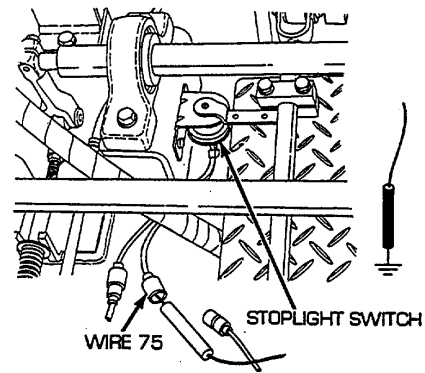
B.O. SERVICE CONDITION (B.O. STOPLIGHT)-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- J Reconnect wire 75/16 to stoplight switch. Disconnect wire 75 from stoplight switch. Place red lead of multimeter on wire 75 of stoplight switch and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. MARKER position, press stoplight switch, and check for voltage. If voltage is present, repair/replace wire 75 of switch panel to gage panel and miscellaneous switches wiring harness (see paragraph 6-55 for dual voltage; 6-56 for single voltage). If voltage is not present, replace stoplight switch (see paragraph 6-23).

- K Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Install main switch panel (11), flat washer (10), ground lead (9), three lockwashers (8), and three screws (7). Open air inlet doors. Disconnect wire 48 pin A from bulkhead to master relay wiring harness. Place red multimeter lead in socket and black lead to ground. Turn MASTER switch on and check for voltage. If voltage is present, repair/replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay circuit (see paragraph 2-19, master relay fails to operate).

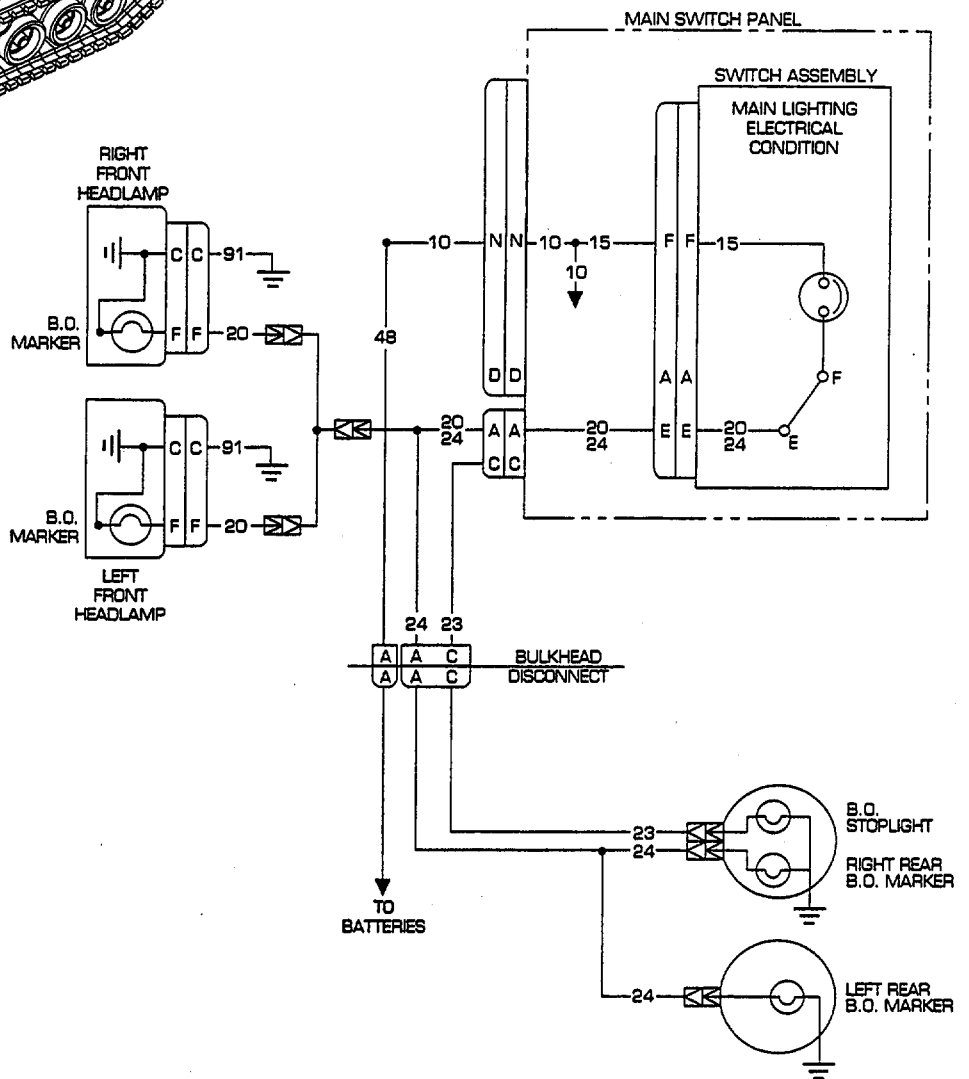
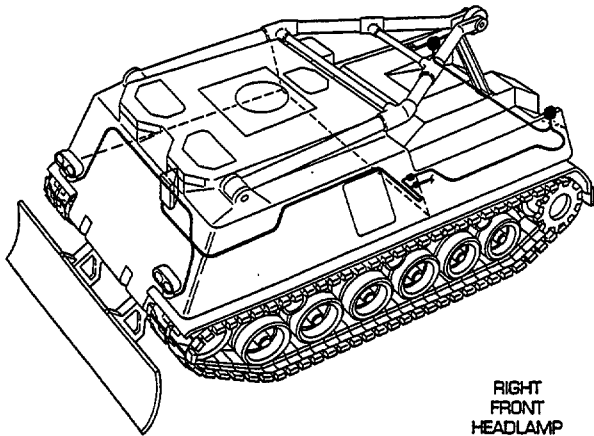


B.O. MARKER CONDITION

SYMPTOMS

Front B.O. marker fails to operate.
Do steps A through K.

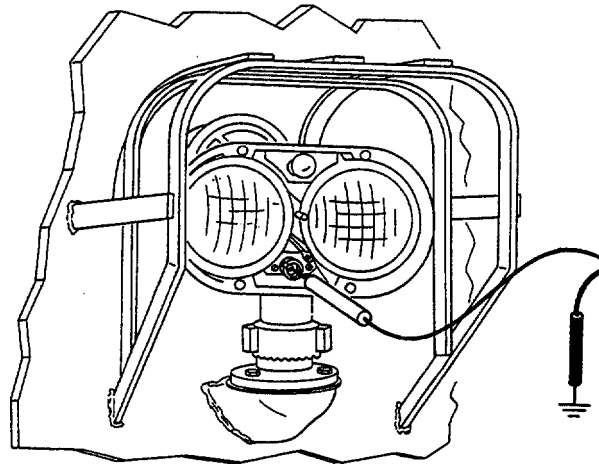
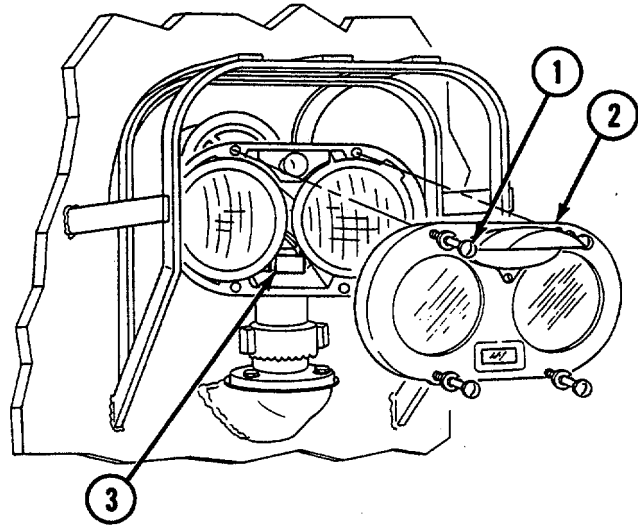
Rear B.O. marker fails to operate.
Do steps D through K.



2-19 ELECTRICAL TROUBLESHOOTING-Continued**B.O. MARKER CONDITION-Continued****WARNING**

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

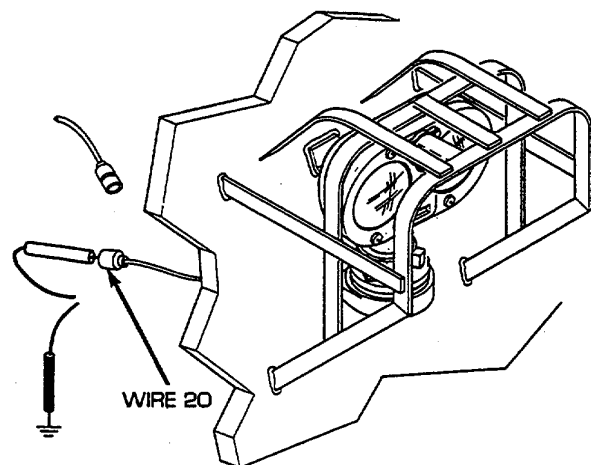
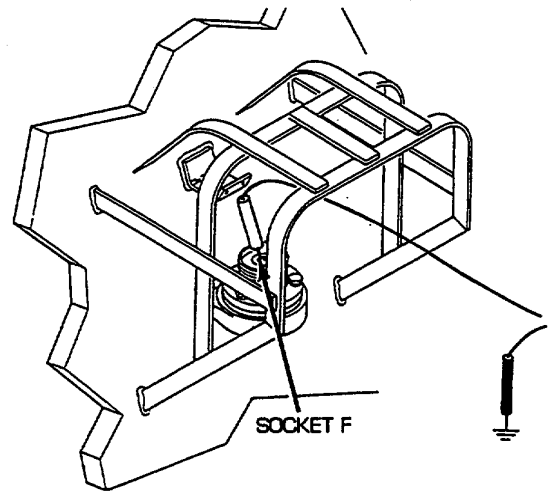
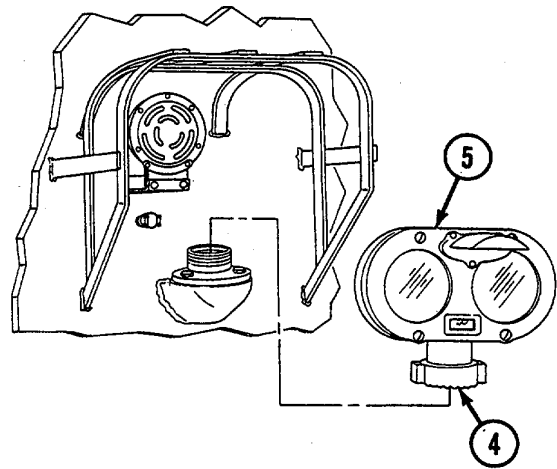
- A Loosen four screws (1) and remove cover (2) and B.O. marker light (3). Place red lead of multimeter in socket and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. MARKER position and check for voltage. If voltage is present, replace marker light (see paragraph 6-26). If voltage is not present, go to step B.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- B Install marker light (3) and cover (2) and tighten four screws (1). Loosen adjustment nut (4) and remove headlight assembly (5). Place red lead of multimeter in socket F of wire 20 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. MARKER position, and check for voltage. Turn MASTER and main light switches OFF. If voltage is present, replace lamp (see paragraph 6-26). If voltage is not present, go to step C.
- C Reconnect headlight base assembly to headlight assembly. Disconnect wire 20 of headlight base assembly from switch panel to head lamps and bulkhead wiring harness. Place red lead of multimeter on male connector of wire 20 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. MARKER position, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, repair/replace wire 20 of headlight and dimmer switch wiring harness (see paragraph 6-65). If voltage is not present, go to step G.



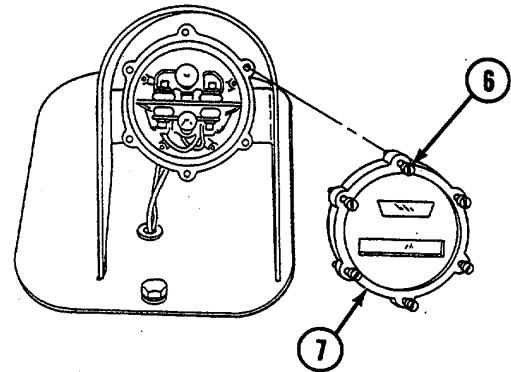
2-19 ELECTRICAL TROUBLESHOOTING-Continued

B.O. MARKER CONDITION-Continued

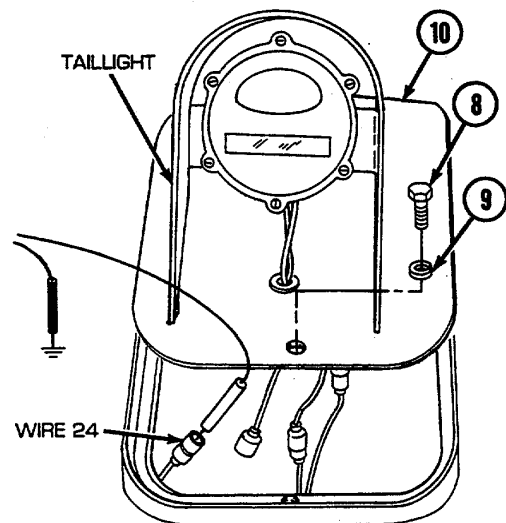
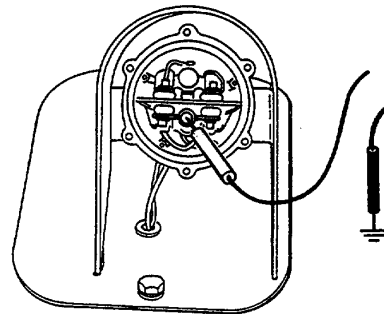
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- D Loosen six screws (6) and remove cover (7) and lamp. Place red lead of multimeter in socket and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. MARKER position, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, replace lamp (see paragraph 6-30). If voltage is not present, go to step E.



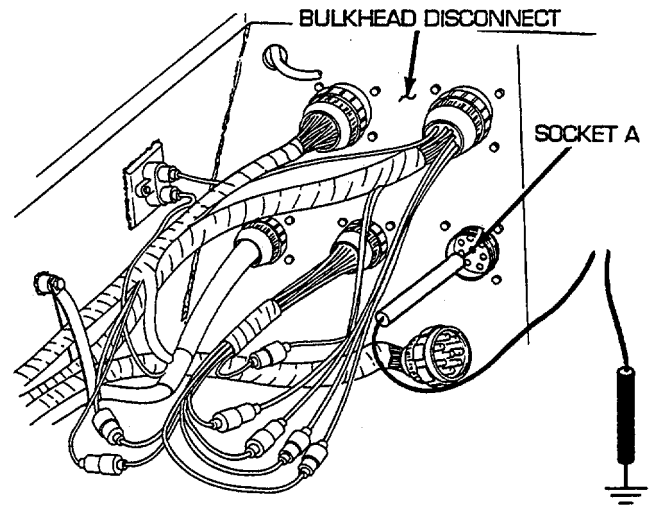
- E Remove two screws (8), two lockwashers (9), and hydraulic access plate (10). Disconnect wire 24 of bulkhead to master relay and left and right taillight wiring harness from taillight. Place red lead of multimeter in wire 24 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. MARKER position, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, replace lamp (see paragraph 6-26). If voltage is not present, go to step F.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- F Reconnect wire 24 of bulkhead to master relay and left and right taillight wiring harness to taillight. Open air inlet doors (TM 9-2350-256-10). Disconnect bulkhead to master relay and left and right taillight wiring harness from bulkhead. Place red lead of multimeter in socket A of wire 20/24 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. MARKER position, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, repair/replace wire 24 of bulkhead to master relay and left and right taillight wiring harness (see paragraph 6-65). If voltage is not present, go to step G.



2-19 ELECTRICAL TROUBLESHOOTING-Continued

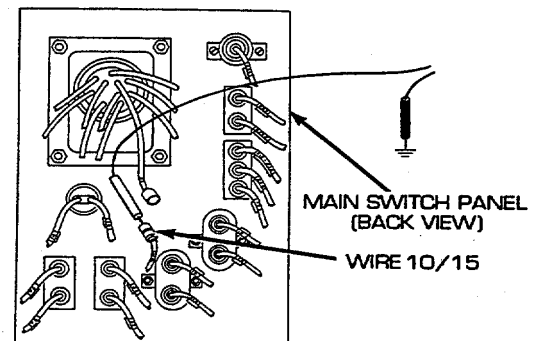
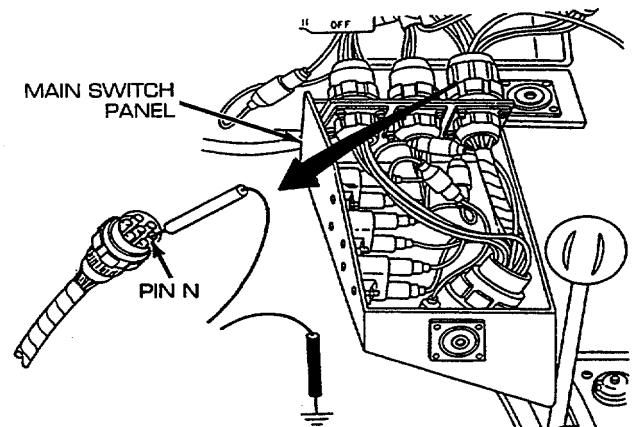
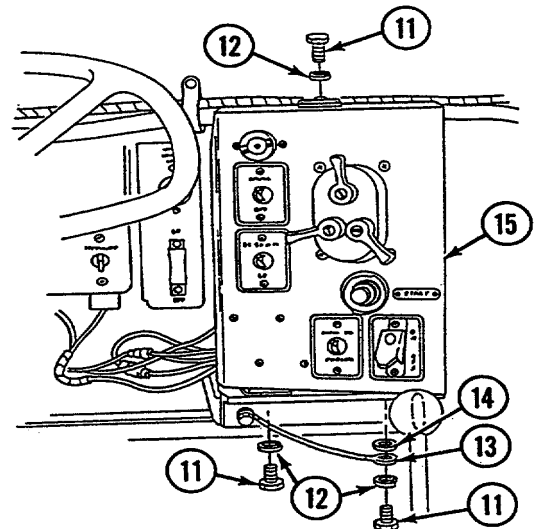
B.O. MARKER CONDITION--Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

G Reconnect switch panel to head lamps and bulkhead wiring harness to main switch panel. Remove three screws (11), three lockwashers (12), ground lead (13), and flat washer (14) and release main switch panel (15) from mounting brackets. Disconnect switch panel to gage panel and miscellaneous switches wiring harness from main switch panel. Place red lead of multimeter on pin N of wire 10 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step H. If voltage is not present, go to step K.

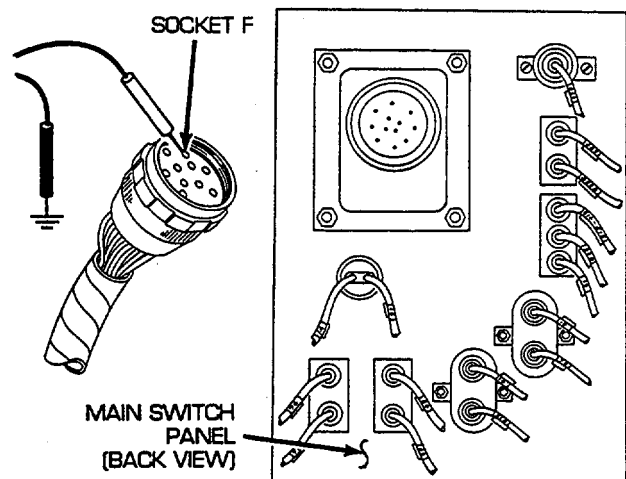
H Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Ground main switch panel. Disconnect wire 10/15 at connector. Place red lead of multimeter in wire 10/15 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step I. If voltage is not present, repair/replace wire 10/15 of main lighting and B.O. selector switch wiring harness (see paragraph 6-69).



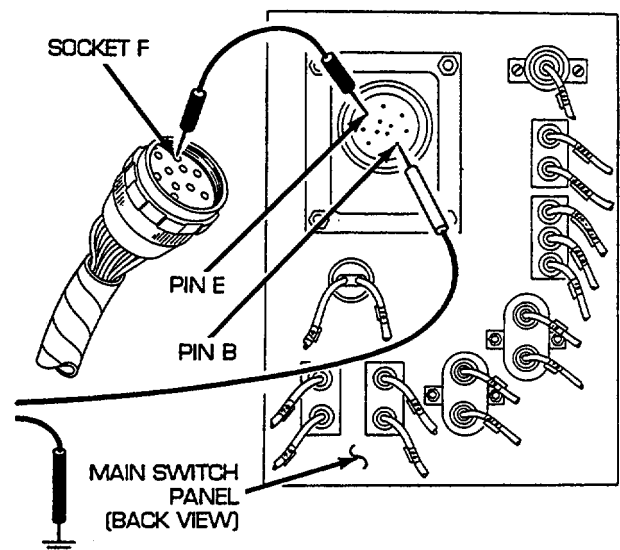
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- I Reconnect wire 10/15 at connector. Disconnect main lighting and master relay wiring harness from main lighting switch. Place red lead of multimeter in socket F of wire 15 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step J. If voltage is not present, repair/replace wire 15 of main lighting and master relay wiring harness (see paragraph 6-70).



- J Place a jumper wire from socket F to pin F. Place red lead of multimeter on pin E of wire 20/24 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. MARKER position, and check for voltage. Turn MASTER and main lighting switches to OFF. If voltage is present, repair/replace wire 20/24 of main lighting and master relay wiring harness assembly (see paragraph 6-70). If voltage is not present, replace main lighting switch (see paragraph 6-10).



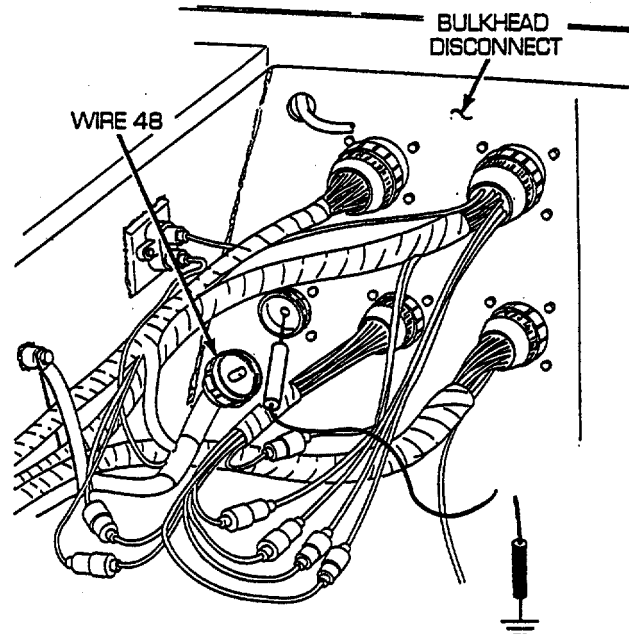
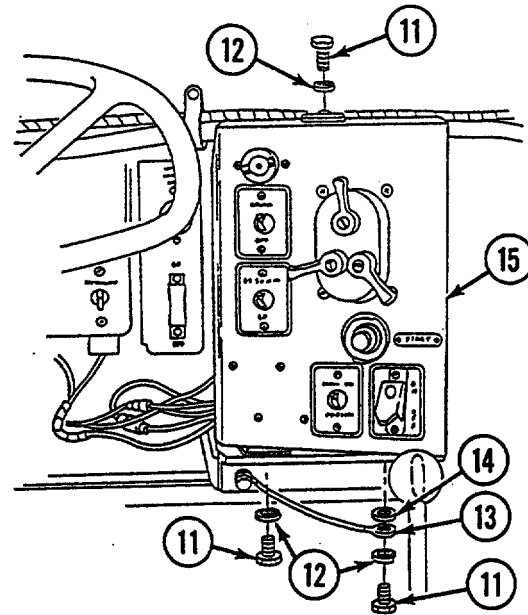
2-19 ELECTRICAL TROUBLESHOOTING-Continued

B.O. MARKER CONDITION--Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- K Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Install main switch panel (15), flat washer (14), ground lead (13), three lockwashers (12), and three screws (11). Open air inlet doors (TM 9-2350-256-10). Disconnect wire 48 pin A from bulkhead to master relay wiring harness. Place red multimeter lead in socket and black lead to ground. Turn MASTER switch on and check for voltage. If voltage is present, repair/replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay circuit (see paragraph 2-19, master relay fails to operate).

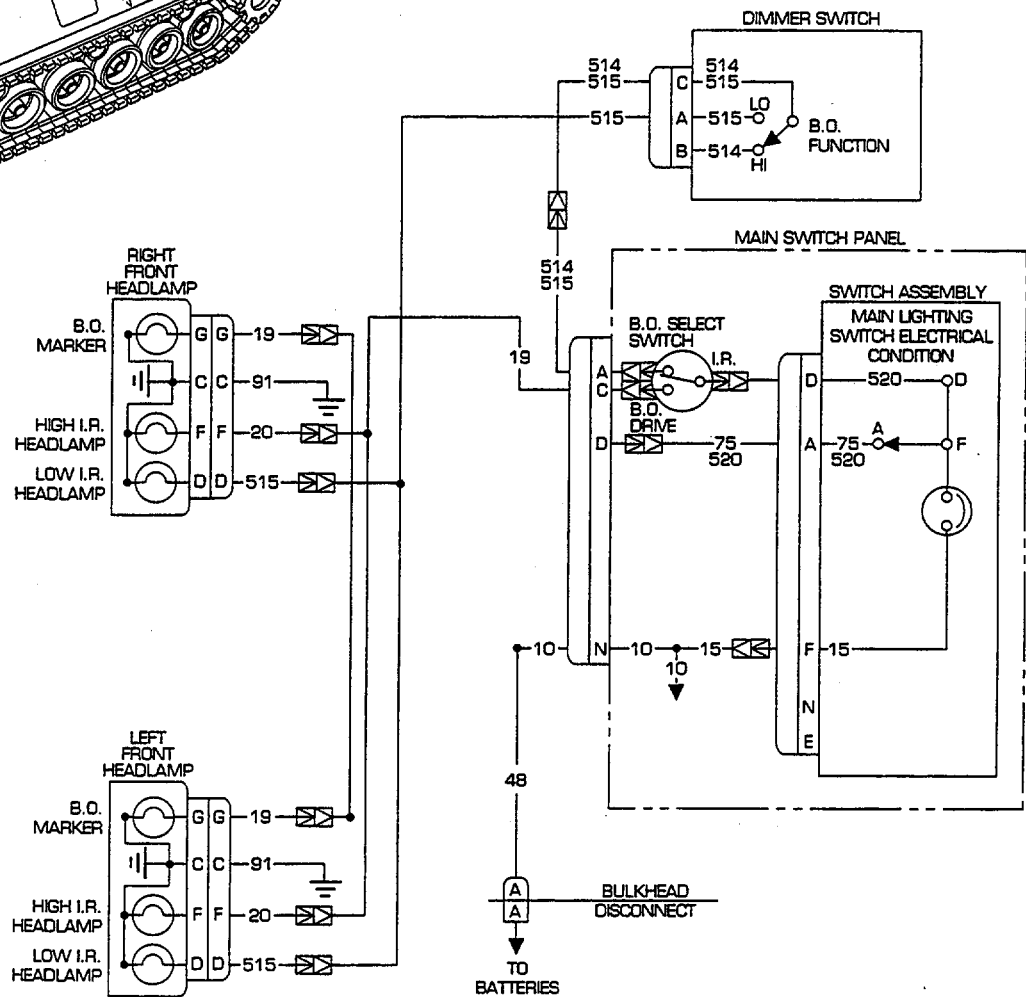
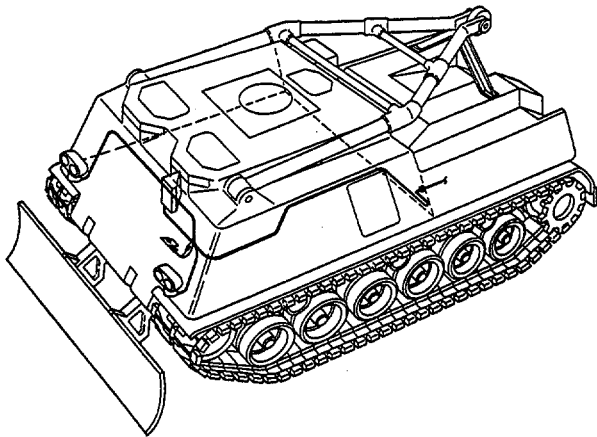


B.O. DRIVE CONDITION

SYMPTOMS

B.O. drive lights fail to operate.

Do steps A through K.



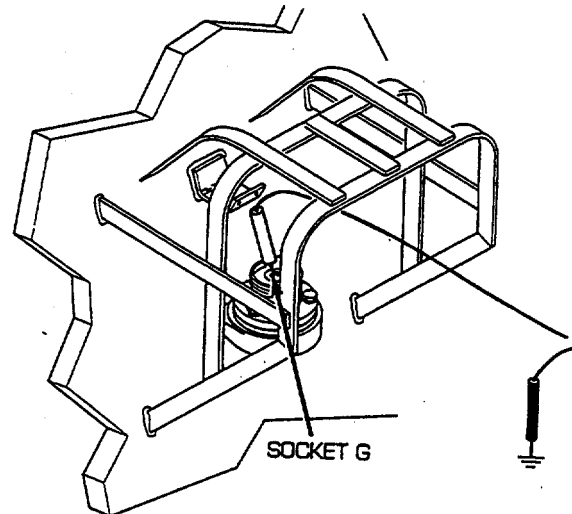
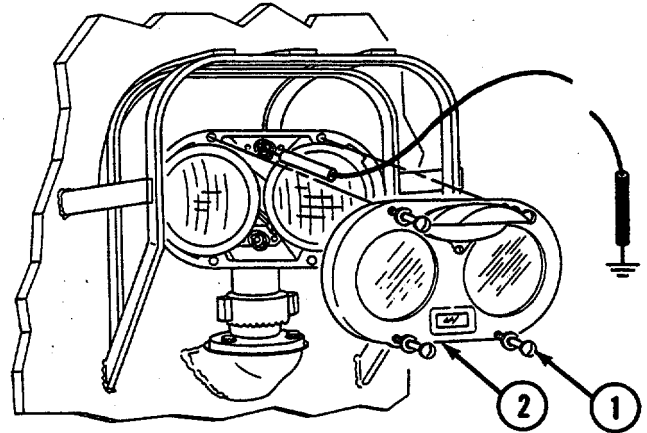
2-19 ELECTRICAL TROUBLESHOOTING-Continued

B.O. DRIVE CONDITION--Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Loosen four screws (1) and remove cover (2) of left hand headlight assembly. Remove lamp and place red lead of multimeter in socket and black lead to ground. Turn MASTER switch on, UNLOCK and place main lighting switch in B.O. DRIVE position, B.O. SELECTOR switch to B.O. position, and check for voltage. Turn MASTER and B.O. SELECTOR switches OFF. If voltage is present, replace bulb (see paragraph 9-26). If voltage is not present, go to step B.
- B Disconnect headlight base assembly from left hand headlight assembly. Place red lead of multimeter in socket G of wire 19 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. DRIVE position, B.O. SELECTOR switch to B.O. position, and check for voltage. Turn MASTER, main lighting, and B.O. SELECTOR switches OFF. If voltage is present, replace headlight assembly (see paragraph 6-26). If voltage is not present, go to step C.

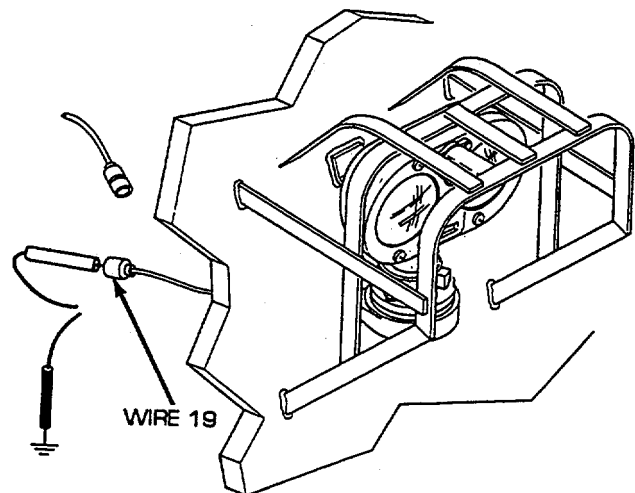
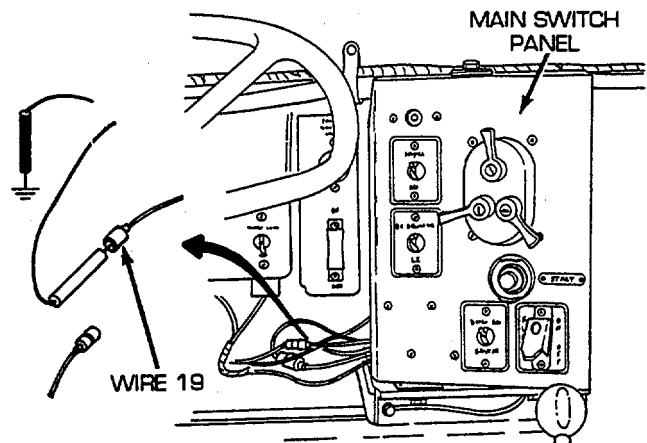


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- C Reconnect headlight base assembly to left hand headlight assembly. Disconnect wire 19 of headlight and dimmer switch wiring harness from switch panel to gage panel and miscellaneous switches wiring harness. Place red lead of multimeter on male connector of wire 19 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. DRIVE position, B.O. SELECTOR switch to B.O. position, and check for voltage. Turn MASTER, main lighting, and B.O. SELECTOR switches OFF. If voltage is present, go to step D. If voltage is not present, go to step E.

- D Reconnect wire 19 of headlight and dimmer switch wiring harness to switch panel to gage panel and miscellaneous switches wiring harness. Disconnect wire 19 of headlight base assembly from headlight and dimmer switch wiring harness. Place red lead of multimeter in wire 19 and black to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. DRIVE position, B.O. SELECTOR switch to B.O. position, and check for voltage. Turn MASTER, main lighting, and B.O. SELECTOR switches OFF. If voltage is not present, repair/replace wire 19 of headlight and dimmer switch wiring harness (see paragraph 6-65). If voltage is present, repair/replace wire 19 of headlight base wiring harness (see paragraph 6-64).



2-19 ELECTRICAL TROUBLESHOOTING-Continued

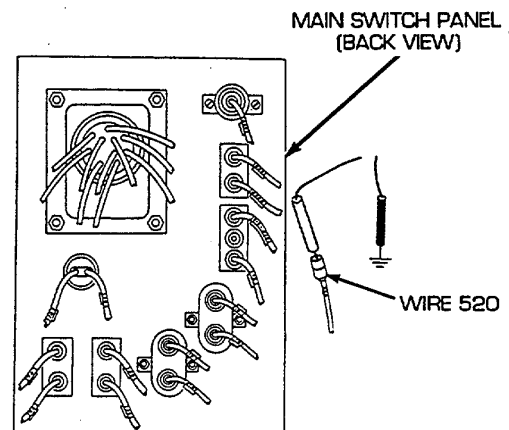
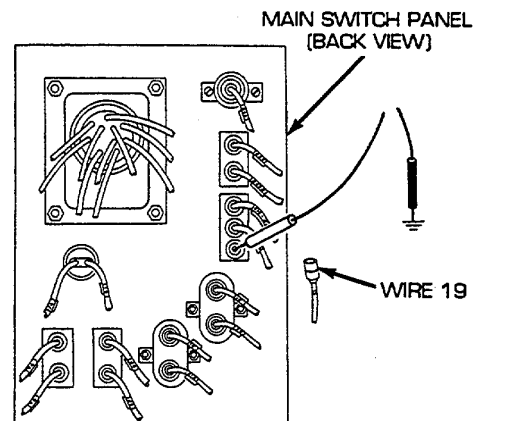
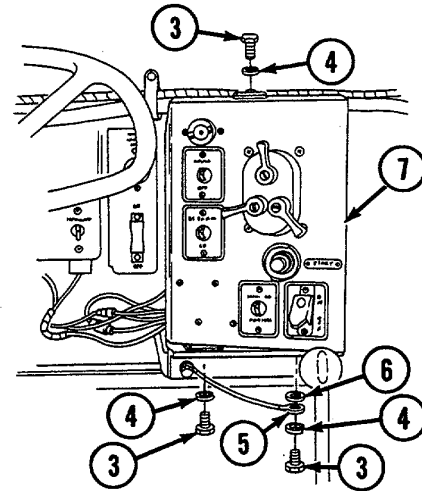
B.O. DRIVE CONDITION-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- E Remove three screws (3), three lockwashers (4), ground lead (5), flat washer (6), and release main switch panel (7) from mounting bracket. Reconnect wire 19 of headlight and dimmer switch panel to gage panel and miscellaneous switches wiring harness. Disconnect wire 19 from B.O. SELECTOR switch. Place red lead of multimeter on terminal of switch and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. DRIVE position, and B.O. SELECTOR switch to B.O. position, and check for voltage. Turn MASTER, main lighting, and B.O. SELECTOR switches OFF. If voltage is present, repair/replace wire 19 of main lighting and B.O. selector switch wiring harness (see paragraph 6-69). If voltage is not present, go to step F.

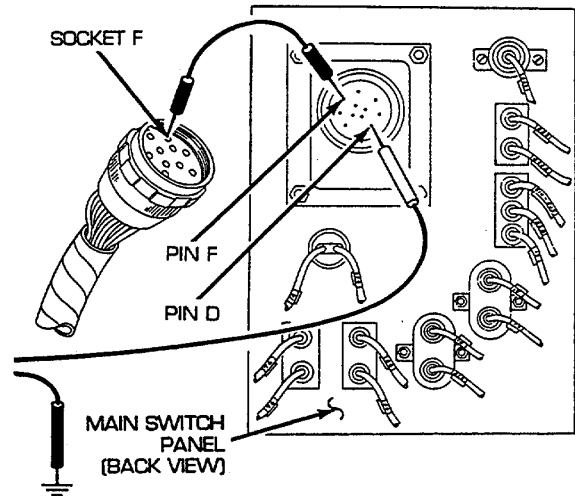
- F Reconnect wire 19 to B.O. SELECTOR switch. Disconnect wire 520 from B.O. SELECTOR switch. Place red lead of multimeter in wire 520 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. DRIVE position, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, replace switch (see paragraph 6-10). If voltage is not present, go to step G.



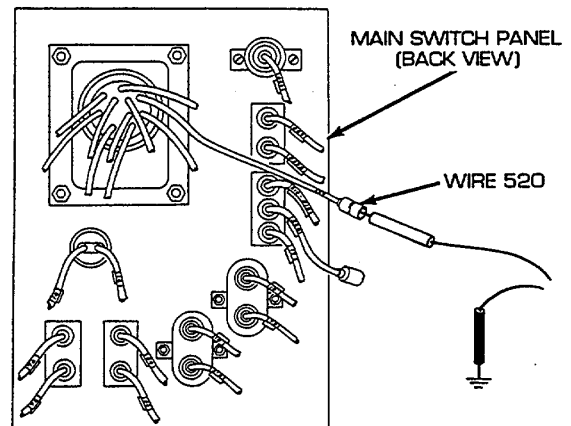
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

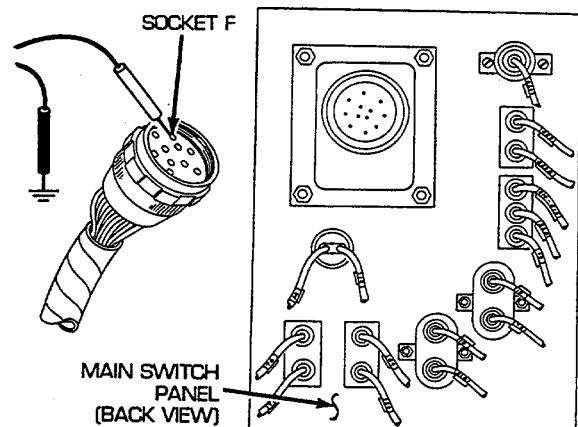
- G Reconnect wire 520 to B.O. SELECTOR switch. Disconnect main lighting and master relay wiring harness from main lighting switch. Place a jumper wire from pin F to socket F. Place red lead of multimeter on pin D of wire 520 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. DRIVE position, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, go to step H. If voltage is not present, go to step I.



- H Reconnect main lighting and master relay wiring harness to main lighting switch. Disconnect wire 520 at female connector, near main lighting switch. Place red lead of multimeter in female connector of wire 520 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to B.O. DRIVE position, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, repair/replace wire 520 of B.O. selector lead assembly (see paragraph 6-68). If voltage is not present, repair/replace wire 520 of main lighting and master relay wiring harness (see paragraph 6-70).



- I Place red lead of multimeter in socket F of wire 15 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace main lighting switch (see paragraph 6-10). If voltage is not present, go to step J.



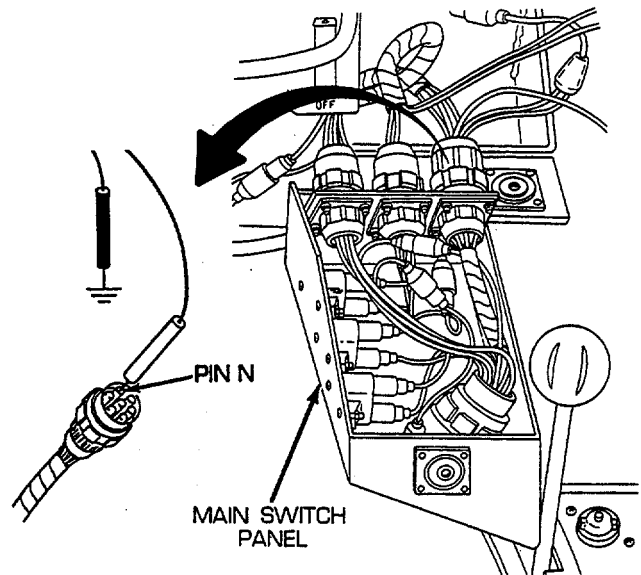
2-19 ELECTRICAL TROUBLESHOOTING-Continued

B.O. DRIVE CONDITION--Continued

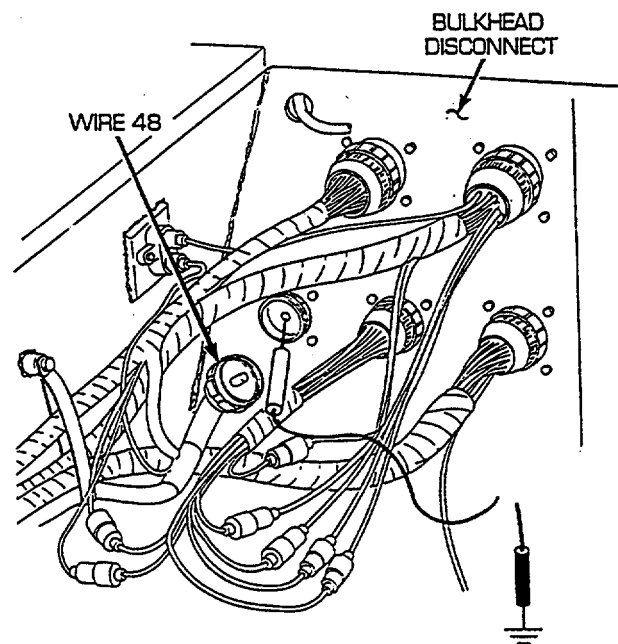
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- J Reconnect main lighting and master relay wiring harness to main lighting switch. Disconnect switch panel to gage panel and miscellaneous switches wiring harness from main switch panel. Place red lead of multimeter on pin N of wire 10 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 10 of main lighting and B.O. selector switch wiring harness (see paragraph 6-69). If voltage is not present, go to step K.



- K Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Open air inlet doors (TM 9-2350-256-10). Disconnect wire 48 pin A from bulkhead to master relay wiring harness. Place red multimeter lead in socket and black lead to ground. Turn MASTER switch on and check for voltage. If voltage is present, repair/replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay circuit (see paragraph 2-19, master relay fails to operate).

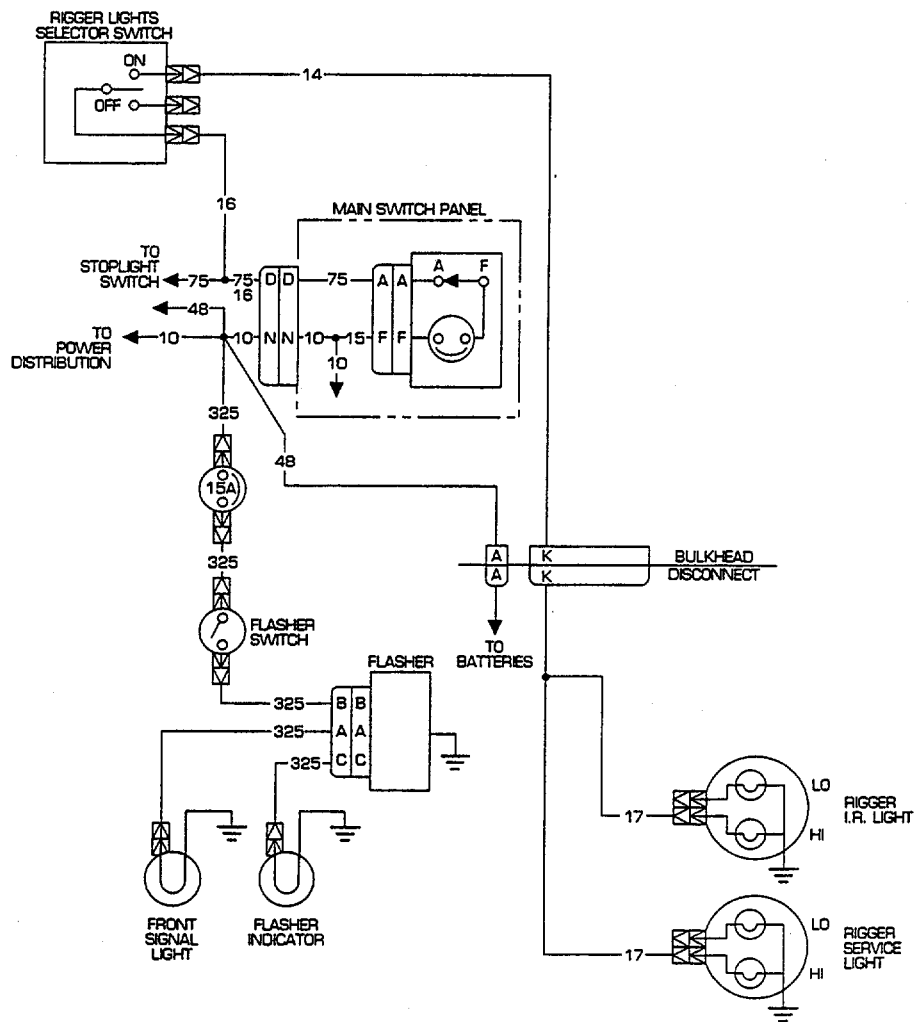
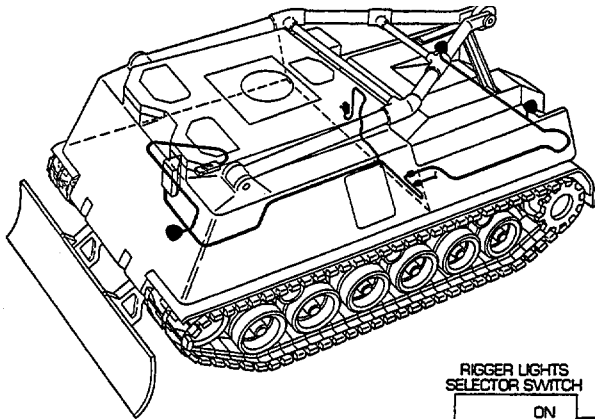


RIGGER'S LIGHTS AND FRONT SIGNAL LIGHT

SYMPTOMS

One or both rigger's service lamp fails to operate.
Do steps A through J.

Front signal light and/or indicator light fails to operate, but indicator lamp operates.
Do steps K through S.



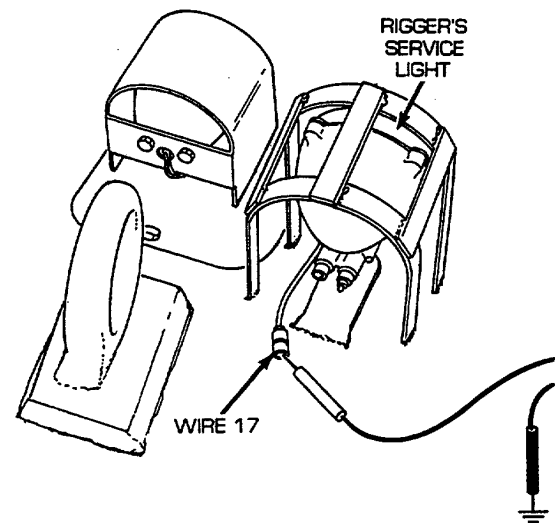
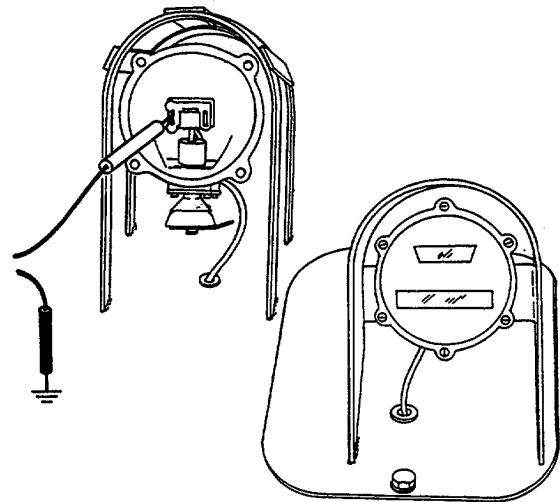
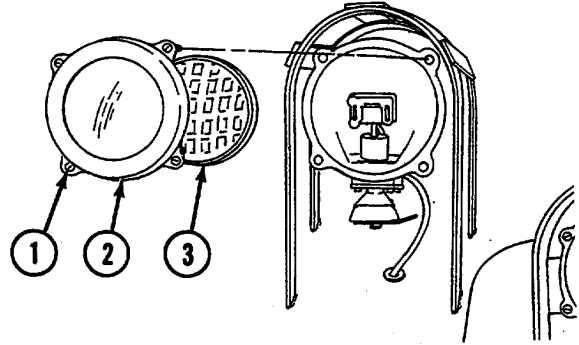
2-19 ELECTRICAL TROUBLESHOOTING-Continued

RIGGER'S LIGHTS AND FRONT SIGNAL LIGHT--Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

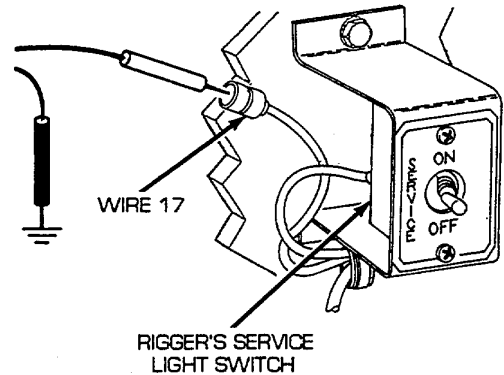
- A Loosen four screws (1) and remove cover (2). Remove bulb (3). Place red lead of multimeter in socket and black lead to ground. Turn MASTER switch on, UNLOCK and turn main lighting switch to STOPLIGHT position, rigger's B.O. SELECTOR to SERVICE position, and check for voltage. Turn MASTER and B.O. SELECTOR switches OFF. If voltage is present, replace lamp (see paragraph 6- 27). If voltage is not present, go to step B.
- B Install bulb (3), cover (2), and tighten four screws (1). Disconnect wire 17 from failed rigger's service light. Place red lead of multimeter in wire 17 and black lead to ground. Turn MASTER switch on, UNLOCK and turn main lighting switch to STOP LIGHT position, rigger's B.O. SELECTOR to SERVICE position, and check for voltage. Turn MASTER, main lighting, and rigger's B.O. SELECTOR switches OFF. If voltage is present, replace rigger's service light assembly (see paragraph 6-27). If voltage is not present, go to step C.



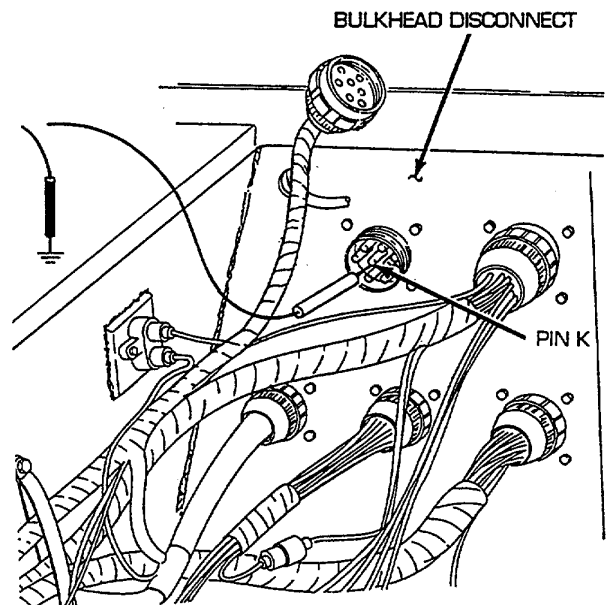
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

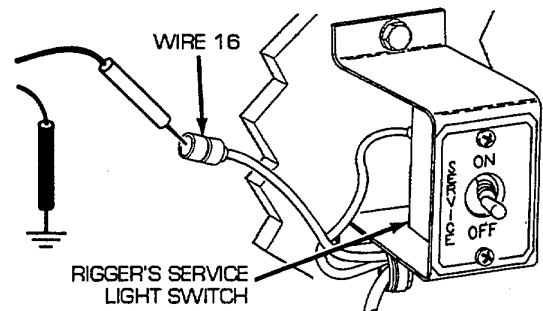
- C Reconnect wire 17 to light. Disconnect wire 17 from rigger's SERVICE switch. Place red lead of multimeter on switch terminal and black lead to ground. Turn MASTER switch on, UNLOCK and turn main lighting switch to STOP LIGHT position, rigger's B.O. SELECTOR to SERVICE position, and check for voltage. Turn MASTER, main lighting, and rigger's B.O. SELECTOR switches OFF. If voltage is present, go to step D. If voltage is not present, go to step E.



- D Reconnect wire 17 to rigger's SERVICE switch. Open air inlet doors (TM 9-2350-256-10). Disconnect bulkhead to APU, master relay, and rigger's lights wiring harness from bulkhead disconnect. Place red lead of multimeter on pin K of wire 17 and black lead to ground. Turn MASTER switch on, UNLOCK and turn main lighting switch to STOP LIGHT position, rigger's B.O. SELECTOR to SERVICE position, and check for voltage. Turn MASTER, main lighting, and rigger's B.O. SELECTOR switches OFF. If voltage is not present, repair/replace wire 17 of APU control box to foot dimmer switch and bulkhead wiring harness (see paragraph 6-79 for dual voltage; 6-80 for single voltage) If voltage is present, repair/replace wire 17 of bulkhead to APU, master relay, and rigger's lights wiring harness (see paragraph 6-75 for dual voltage; 6-76 for single voltage).



- E Reconnect wire 17 to rigger's SERVICE switch. Disconnect wire 16 from rigger's SERVICE light switch. Place red lead of multimeter in wire 16 and black lead to ground. Turn MASTER switch on, main lighting switch to STOP LIGHT, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, replace rigger's service lights switch (see paragraph 6-24). If voltage is not present, go to step F.



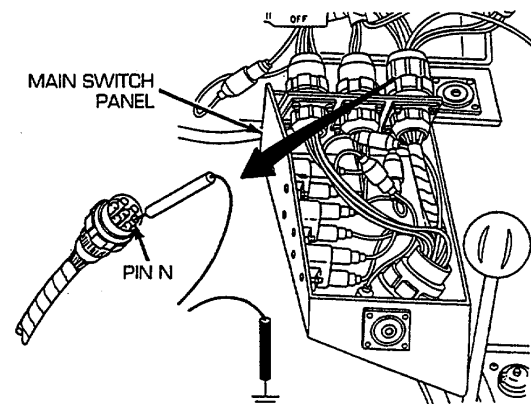
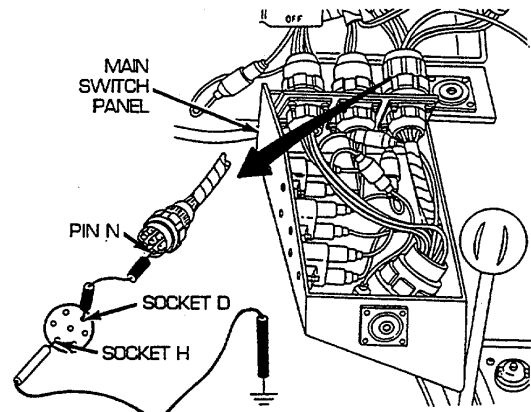
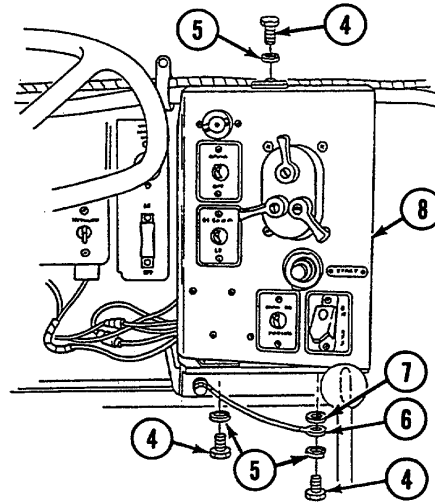
2-19 ELECTRICAL TROUBLESHOOTING-Continued

RIGGER'S LIGHTS AND FRONT SIGNAL LIGHT-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

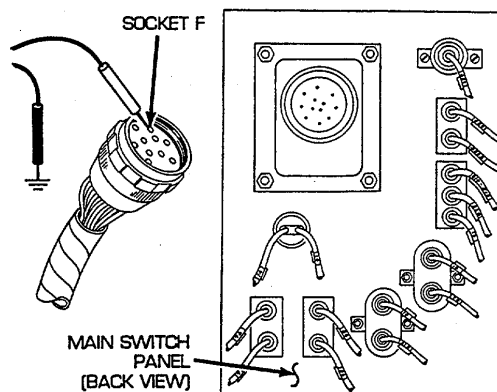
- F Reconnect wire 16 from rigger's SERVICE light switch. Remove three screws (4), three lockwashers (5), ground lead (6), and flat washer (7) and release main switch panel (8) from mounting brackets. Disconnect switch panel to gage panel and miscellaneous switches wiring harness from main switch panel. Place a jumper wire from pin N to socket N. Place red lead of multimeter in socket D of wire 75/16 and black lead to ground. Turn MASTER switch on, main lighting switch to STOP LIGHT, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, repair/replace wire 16/75 of switch panel to gage panel and miscellaneous switches wiring harness (see paragraph 6-55 for dual voltage; 6-56 for single voltage. If voltage is not present, go to step G.
- G Place red lead of multimeter on pin N of wire 10 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step H. If voltage is not present, reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel and go to step S.



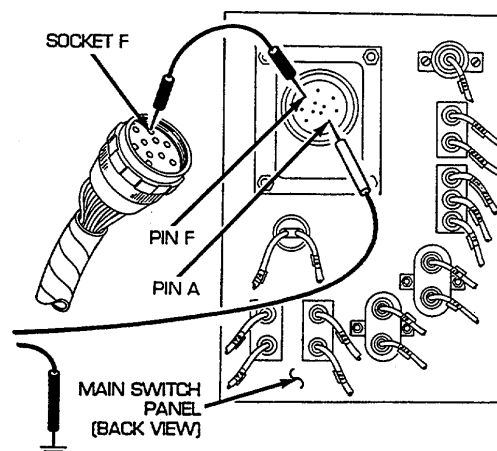
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

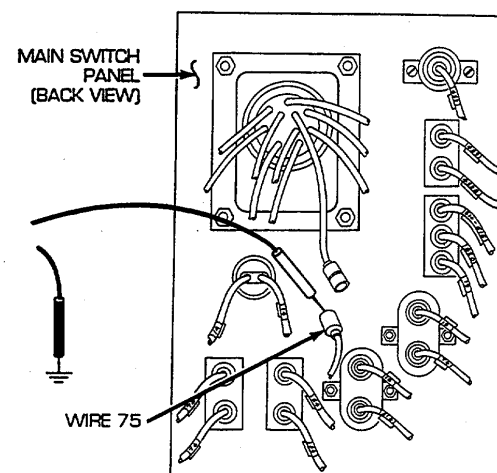
H Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Disconnect main lighting and master relay wiring harness from main lighting switch. Place red lead of multimeter in socket F of wire 10/15 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step I. If voltage is not present, repair/replace wire 10/15 of main lighting and B.O. selector switch wiring harness (see paragraph 6-69).



I UNLOCK and turn main lighting switch to SER. DRIVE. Place a jumper wire from pin F to socket F. Place red lead of multimeter on pin A of wire 75 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step J. If voltage is not present, replace main lighting switch (see paragraph 6-10).



J Reconnect main lighting and master relay wiring harness to main lighting switch. Disconnect wire 75 of main lighting and B.O. selector switch wiring harness from connector. Place red lead of multimeter on male connector of wire 75 and black lead to ground. Turn MASTER switch on, UNLOCK and move main lighting switch to SER. DRIVE, and check for voltage. Turn MASTER and main lighting switches OFF. If voltage is present, repair/replace wire 75 of main lighting and master relay wiring harness (see paragraph 6-70). If voltage is not present, repair/replace wire 75 of main lighting and B.O. selector switch wiring harness (see paragraph 6-69).



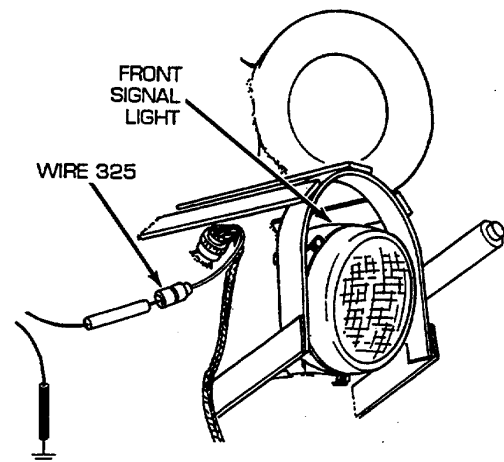
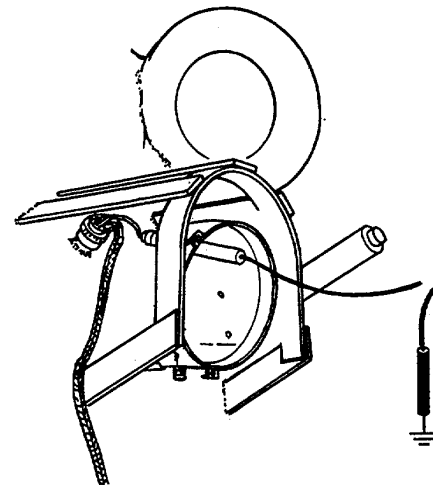
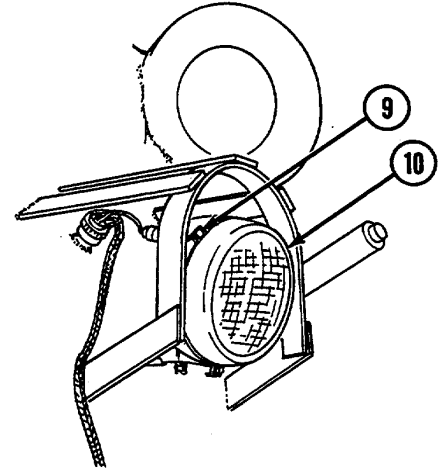
2-19 ELECTRICAL TROUBLESHOOTING-Continued

RIGGER'S LIGHTS AND FRONT SIGNAL LIGHT-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

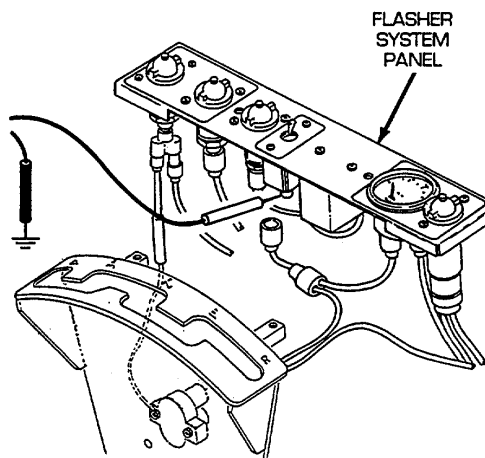
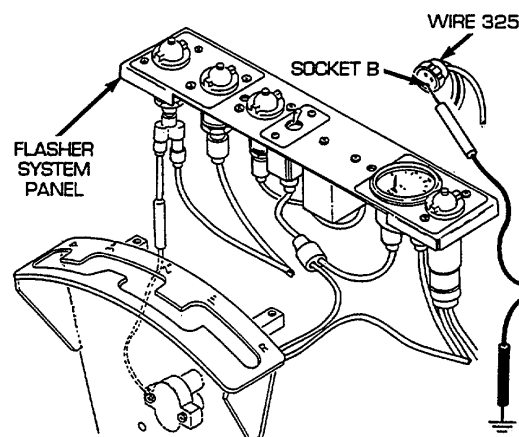
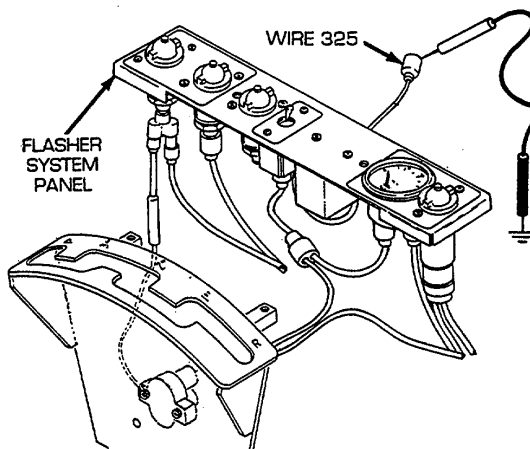
- K Loosen three screws (9) and remove light door with lamp (10). Place red lead of multimeter in connector and black lead to ground. Turn MASTER and FLASHER switches on and check for voltage. Turn MASTER and FLASHER switches OFF. If voltage is present, replace lamp (see paragraph 6-28). If voltage is not present, go to step L.
- L Install light door with lamp (10) and tighten three screws (9). Disconnect wire 325 from front signal light. Place red lead of multimeter in wire 325 and black lead to ground. Turn MASTER and FLASHER switches ON and check for voltage. Turn MASTER and FLASHER switches OFF. If voltage is present, replace front signal light assembly (see paragraph 6-28). If voltage is not present, go to step M.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- M Disconnect wire 325 from indicator light. Place red lead of multimeter in wire 325 and black lead to ground. Turn MASTER and FLASHER switches ON and check for voltage. Turn MASTER and FLASHER switches OFF. If voltage is present, replace indicator lamp (see paragraph 6-11). If voltage is not present, go to step N.
- N Disconnect turn signal flasher wiring harness from flasher unit. Place red lead of multimeter in socket B of wire 325 and black lead to ground. Turn MASTER and FLASHER switches ON and check for voltage. Turn MASTER and FLASHER switches OFF. If voltage is present, replace flasher unit (see paragraph 6-11). If voltage is not present, go to step O.
- O Reconnect turn signal flasher wiring harness to flasher unit. Disconnect wire 325 from flasher side of FLASHER switch. Place red lead of multimeter on terminal of switch and black lead to ground. Turn MASTER and FLASHER switches ON and check for voltage. Turn MASTER and FLASHER switches OFF. If voltage is not present, go to step P. If voltage is present, repair/replace wire 325 of turn signal flasher wiring harness from FLASHER switch to the flasher (see paragraph 6-67).



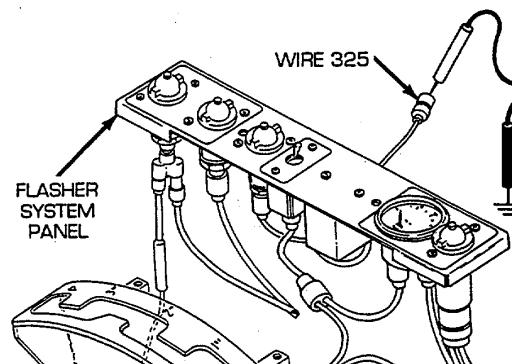
2-19 ELECTRICAL TROUBLESHOOTING-Continued

RIGGER'S LIGHTS AND FRONT SIGNAL LIGHT-Continued

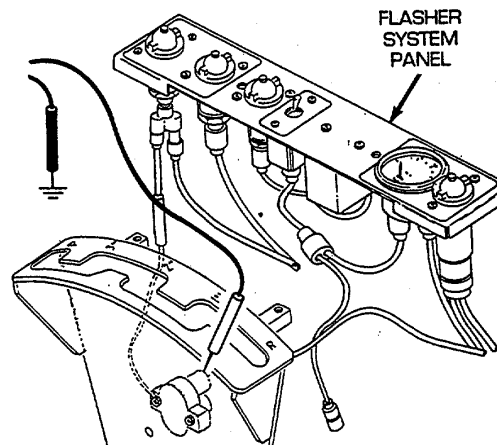
WARNING

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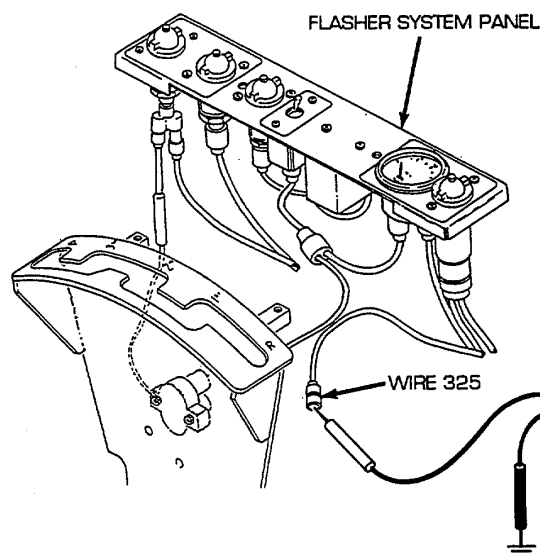
P Reconnect wire 325 to flasher side of FLASHER switch. Disconnect wire 325 of red flasher breaker to switch wiring harness from circuit breaker side of FLASHER switch. Place red lead of multimeter in of wire 325 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace FLASHER switch (see paragraph 6-11). If voltage is not present, go to step Q.



Q Reconnect wire 325 of red flasher breaker to switch cable to circuit breaker side FLASHER switch. Disconnect wire 325 from FLASHER switch side of 15 A circuit breaker. Place red lead of multimeter on circuit breaker terminal and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 325 of red flasher breaker to switch wiring harness from 15 A circuit breaker to FLASHER switch (see paragraph 6-66). If voltage is not present, go to step R.



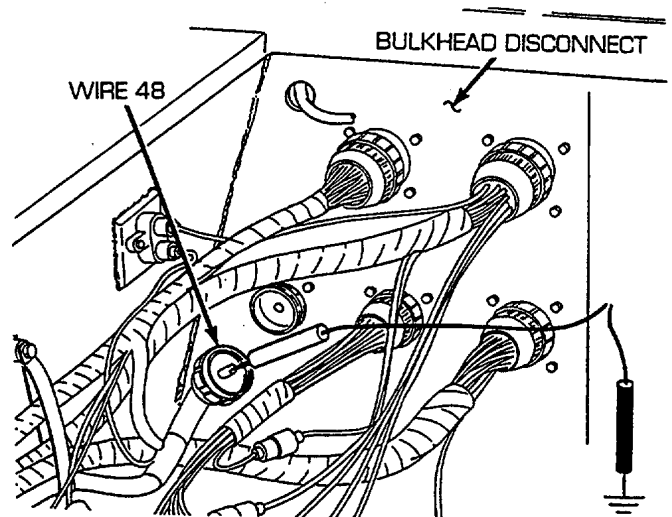
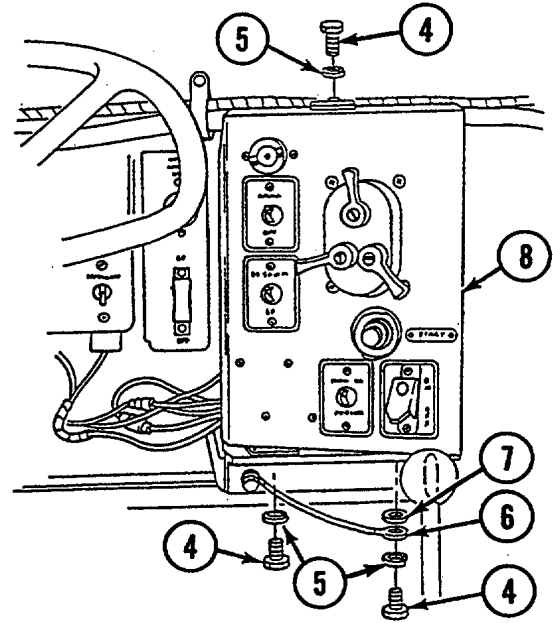
R Reconnect wire 325 of red flasher breaker to switch wiring harness to switch side of 15 A circuit breaker. Disconnect wire 325 of switch panel, radio and bilge pump to bulkhead wiring harness from main switch panel side of 15 A circuit breaker. Place red lead of multimeter in wire 325 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace 15 A circuit breaker (see paragraph 6-11). If voltage is not present, reconnect wire 325 of switch panel, radio, and bilge pump to bulkhead wiring harness to main switch panel side of 15 A circuit breaker.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- S Install main switch panel (8), flat washer (7) ground lead (6), three lockwashers (5), and three screws (4). Open air inlet doors (TM 9-2350-256-10) Disconnect wire 48 pin A from bulkhead to master relay wiring harness. Place red multimeter lead in socket and black lead to ground. Turn MASTER switch on and check for voltage. If voltage is present, repair/replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay circuit (see paragraph 2-19, master relay fails to operate).



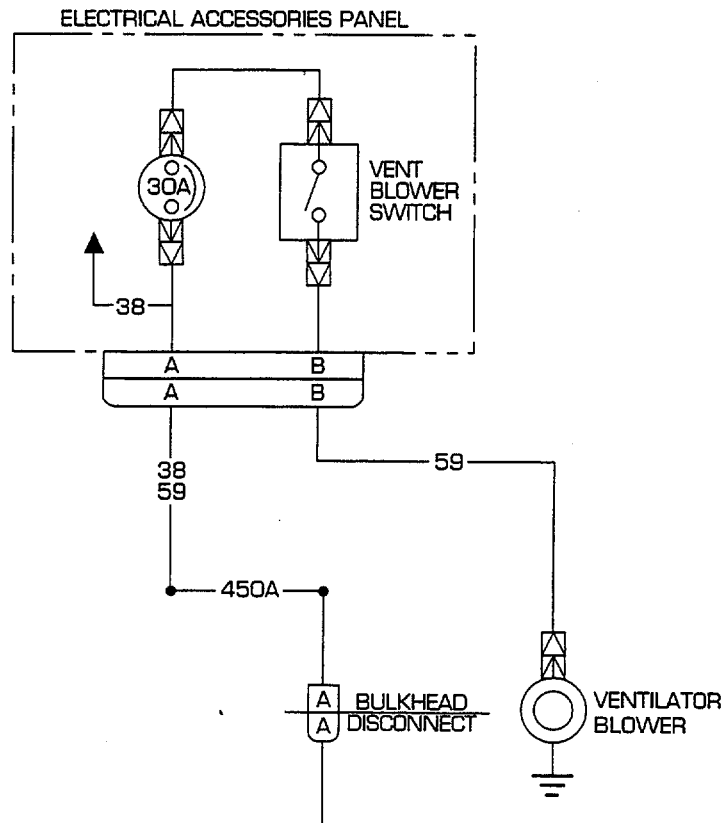
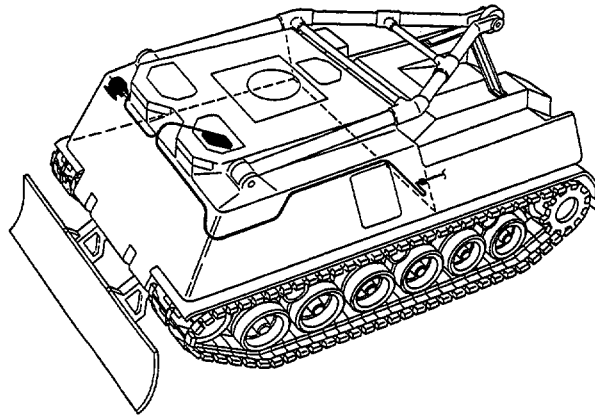
2-19 ELECTRICAL TROUBLESHOOTING-Continued

VENTILATION BLOWER SYSTEM

SYMPTOM

Ventilation blower fails to operate.

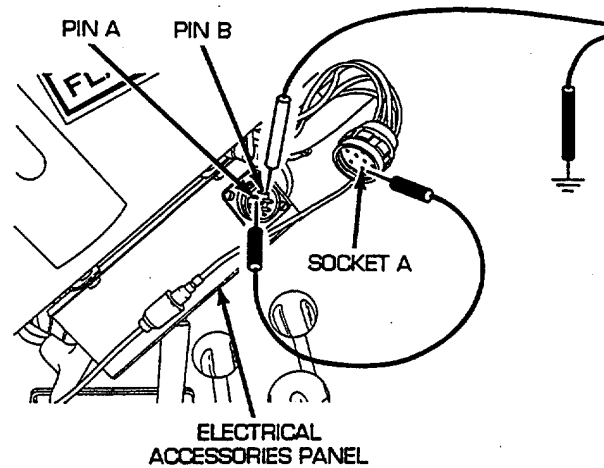
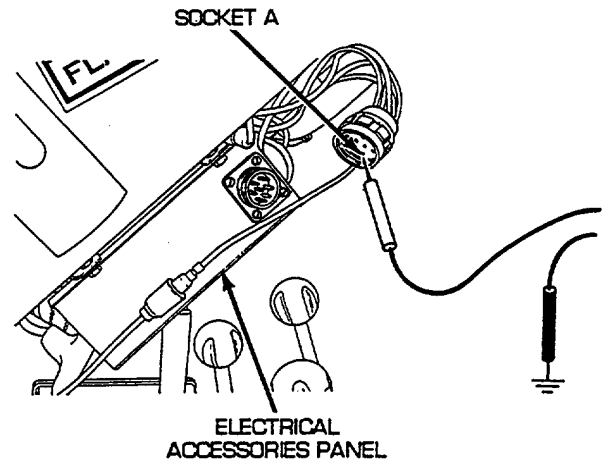
Do steps A through H.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Disconnect electrical accessories panel wiring harness from electrical accessories panel. Place red lead of multimeter in socket A of wire 38/59 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step B. If voltage is not present, go to step H.
- B Place a jumper wire from socket A to pin A. Place red lead of multimeter on pin B of wire 59 and black lead to ground. Turn MASTER and VENT BLOWER switches ON and check for voltage. Turn MASTER and VENT BLOWER switches OFF. If voltage is present, go to step G. If voltage is not present, go to step C.



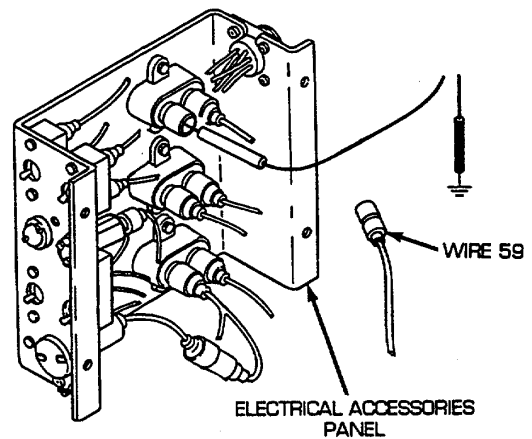
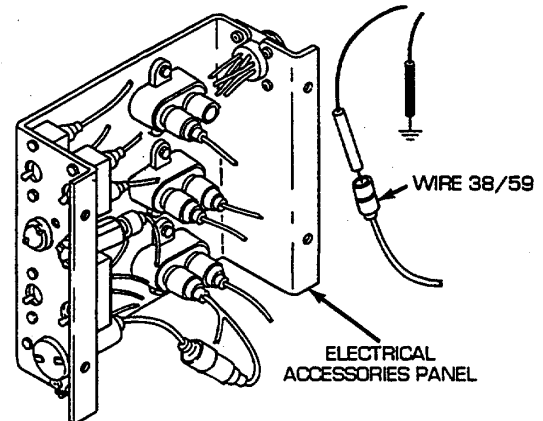
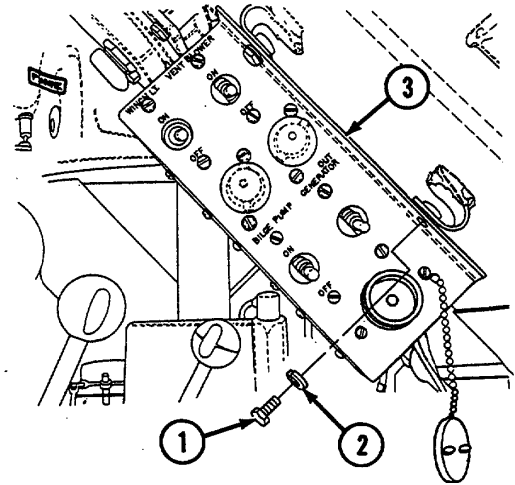
2-19 ELECTRICAL TROUBLESHOOTING-Continued

VENTILATION BLOWER SYSTEM--Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

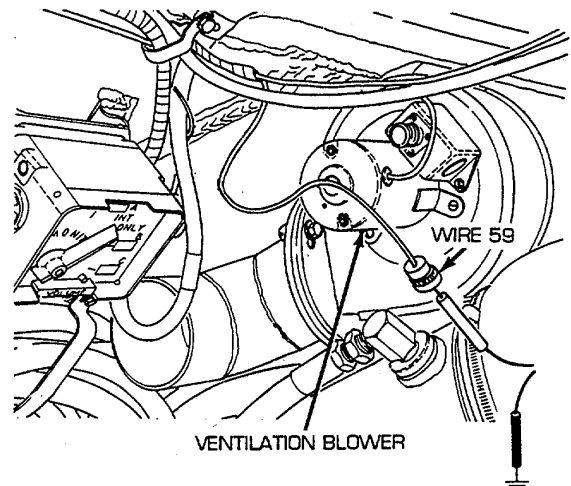
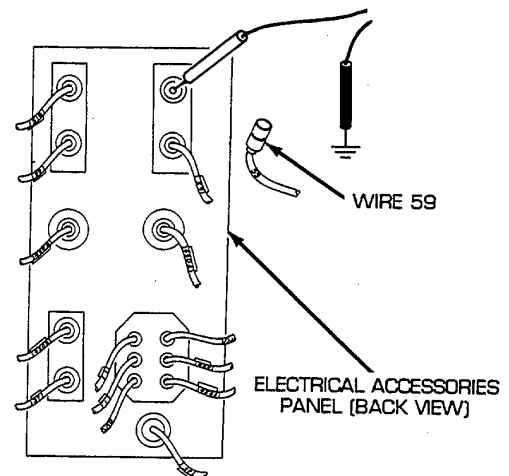
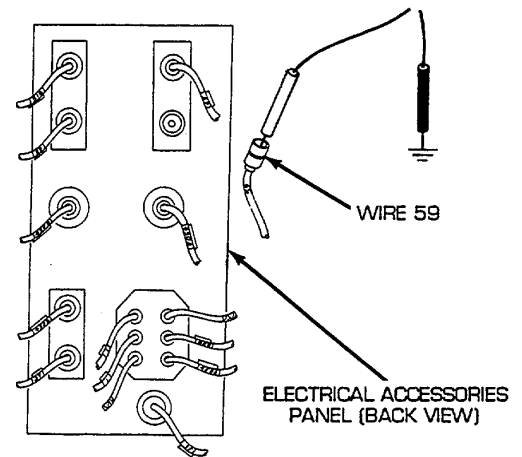
- C Remove four screws (1) and four lockwashers (2) and release electrical accessories panel (3) from mounting brackets. Ground panel. Reconnect electrical accessories panel wiring harness to electrical accessories panel. Disconnect wire 38/59 from 15 A circuit breaker. Place red lead of multimeter in wire 38/59 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step D. If voltage is not present, repair/replace wire 38/59 of bilge pump main power wiring harness (see paragraph 6-84).
- D Reconnect wire 38/59 to 15 A circuit breaker. Disconnect wire 59 from blower switch side of 15 A circuit breaker. Place red lead of multimeter on terminal of 15 A circuit breaker and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step E. If voltage is not present, replace 15 A circuit breaker (see paragraph 6-9).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- E Reconnect wire 59 to blower switch side of 15 A circuit breaker. Disconnect wire 59 from circuit breaker side of blower switch. Place red lead of multimeter in wire 59 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step F. If voltage is not present, repair/replace wire 59 of ventilation blower switch lead assembly (see paragraph 6-9).
- F Reconnect wire 59 to 15 A circuit breaker side of blower switch. Disconnect wire 59 from panel connector side of blower switch. Place red lead of multimeter on terminal of blower switch and black lead to ground. Turn MASTER and VENT BLOWER switches ON and check for voltage. Turn MASTER and VENT BLOWER switches OFF. If voltage is present, repair/replace wire 59 of bilge pump main power wiring harness (see paragraph 6-84). If voltage is not present, replace ventilator blower switch (see paragraph 6-9).
- G Reconnect electrical accessories panel wiring harness to electrical accessories panel. Disconnect wire 59 from ventilation blower. Place red lead of multimeter in wire 59 and black lead to ground. Turn MASTER and VENT BLOWER switches ON and check for voltage. Turn MASTER and VENT BLOWER switches OFF. If voltage is present, repair/replace ventilation blower (see paragraph 6-100). If voltage is not present, repair/replace wire 59 of electrical accessories panel wiring harness (see paragraph 6-47)



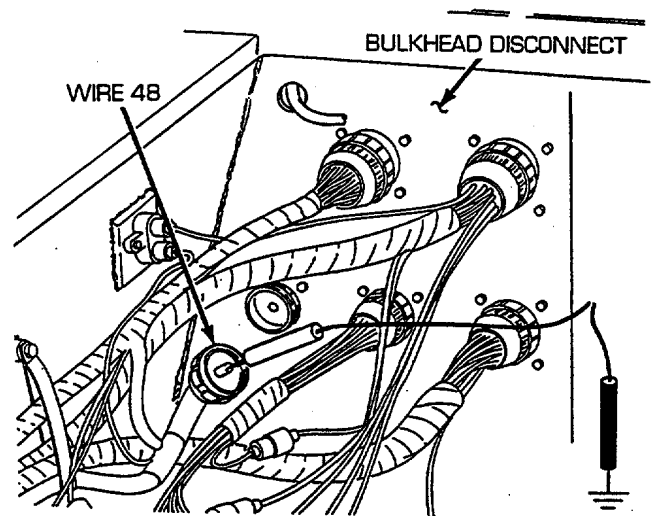
2-19 ELECTRICAL TROUBLESHOOTING-Continued

VENTILATION BLOWER SYSTEM-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- H Reconnect electrical accessories panel wiring harness to electrical accessories panel. Open air inlet doors (TM 9-2350-256-10). Disconnect wire 48 pin A from bulkhead to master relay wiring harness. Place red multimeter lead in socket and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay circuit (see paragraph 2-19, master relay fails to operate).

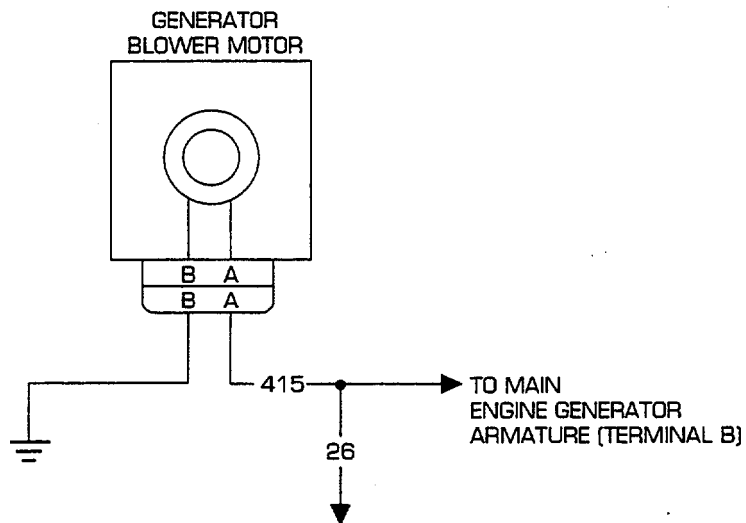
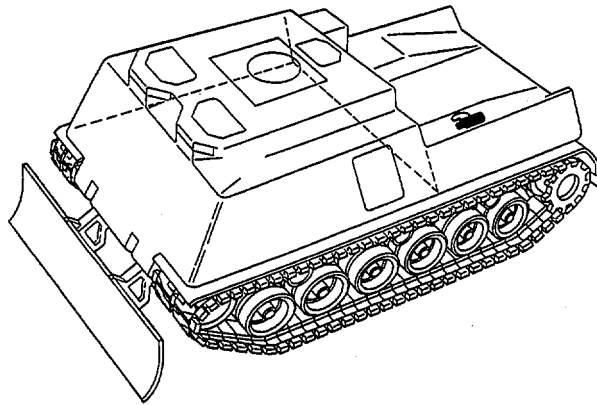


ENGINE GENERATOR BLOWER MOTOR

SYMPTOM

Engine generator blower motor fails to operate when engine is running.

Do steps A and B.



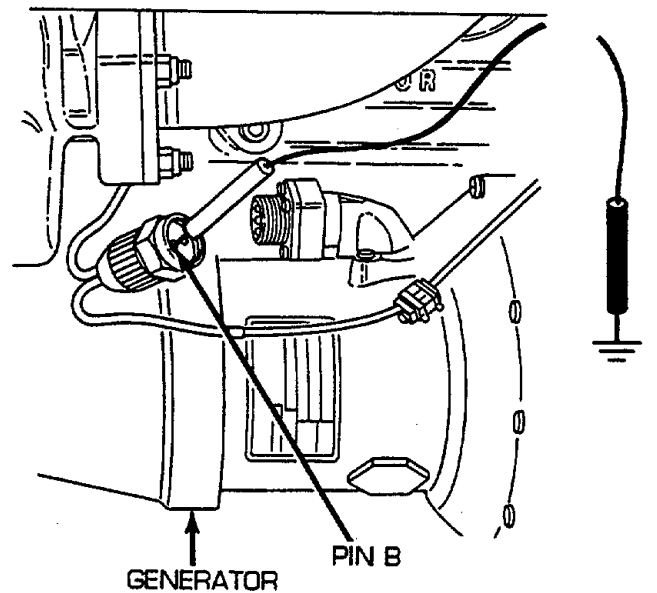
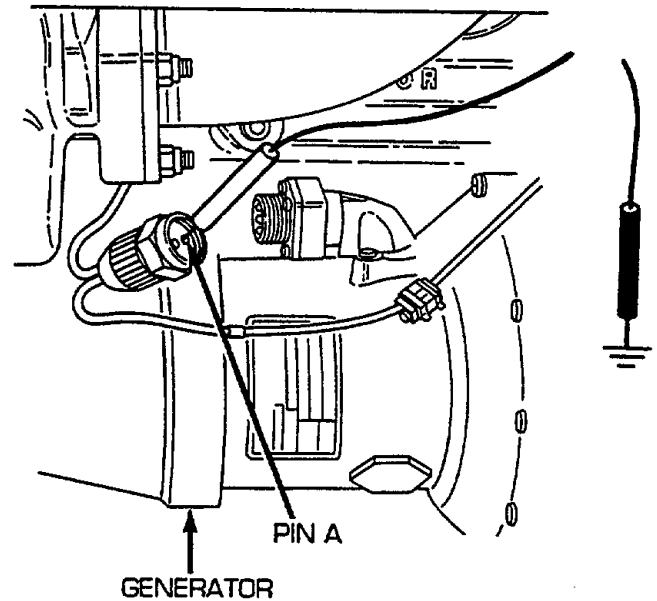
2-19 ELECTRICAL TROUBLESHOOTING-Continued

ENGINE GENERATOR BLOWER MOTOR-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

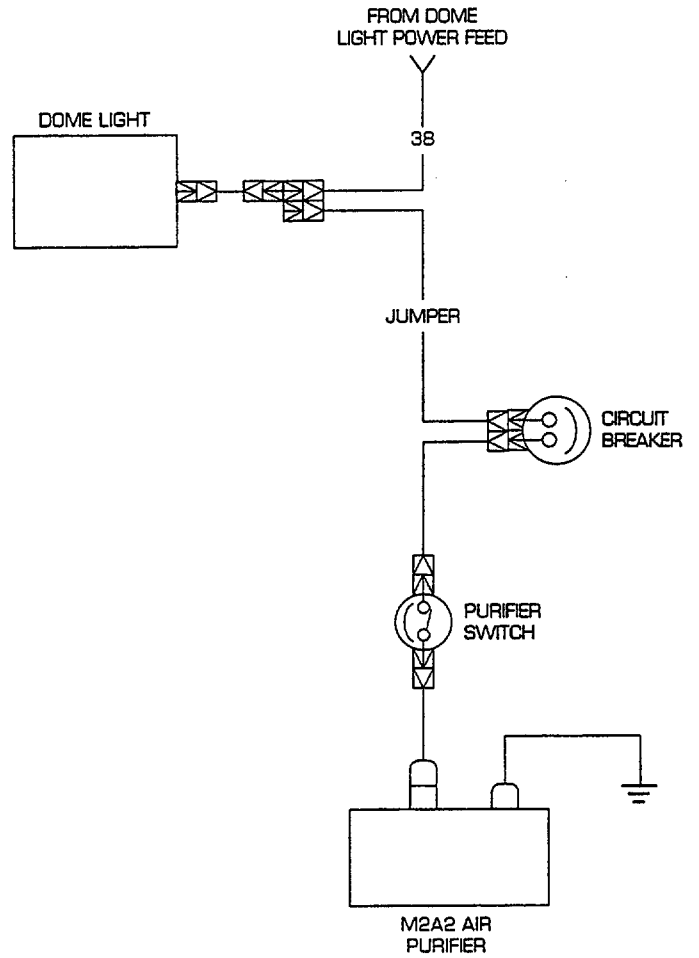
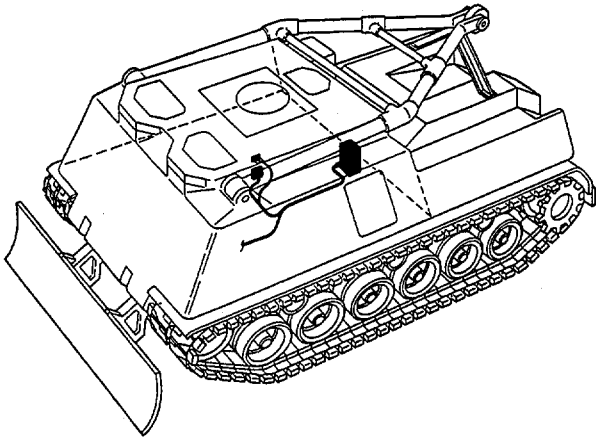
- A Remove powerplant and connect ground-hop kit (see paragraph 3-1). Disconnect engine wiring harness from engine blower motor. Place red lead of multimeter in socket A of wire 415 and black lead to ground. Turn MASTER switch on start engine and check for voltage. Turn engine and MASTER switch OFF. If voltage is present, go to step B. If voltage is not present, repair/replace wire 415 of engine wiring harness from blower plug to generator armature terminal (see paragraph 6-58 for dual voltage; 6-59 for single voltage).
- B Place red lead of multimeter in socket B of GND wire and black lead to GND. Check for continuity. If continuity is present, repair/replace engine generator blower motor (see paragraph 6-1). If continuity is not present, repair/replace ground wire of engine wiring harness (see paragraph 6-58 for dual voltage; 6-59 for single voltage).



M8A3 FILTER UNIT SYSTEM

SYMPTOM

M2A2 air purifier fails to operate.
Do steps A through F.



2-19 ELECTRICAL TROUBLESHOOTING-Continued

M8A3 FILTER UNIT SYSTEM-Continued

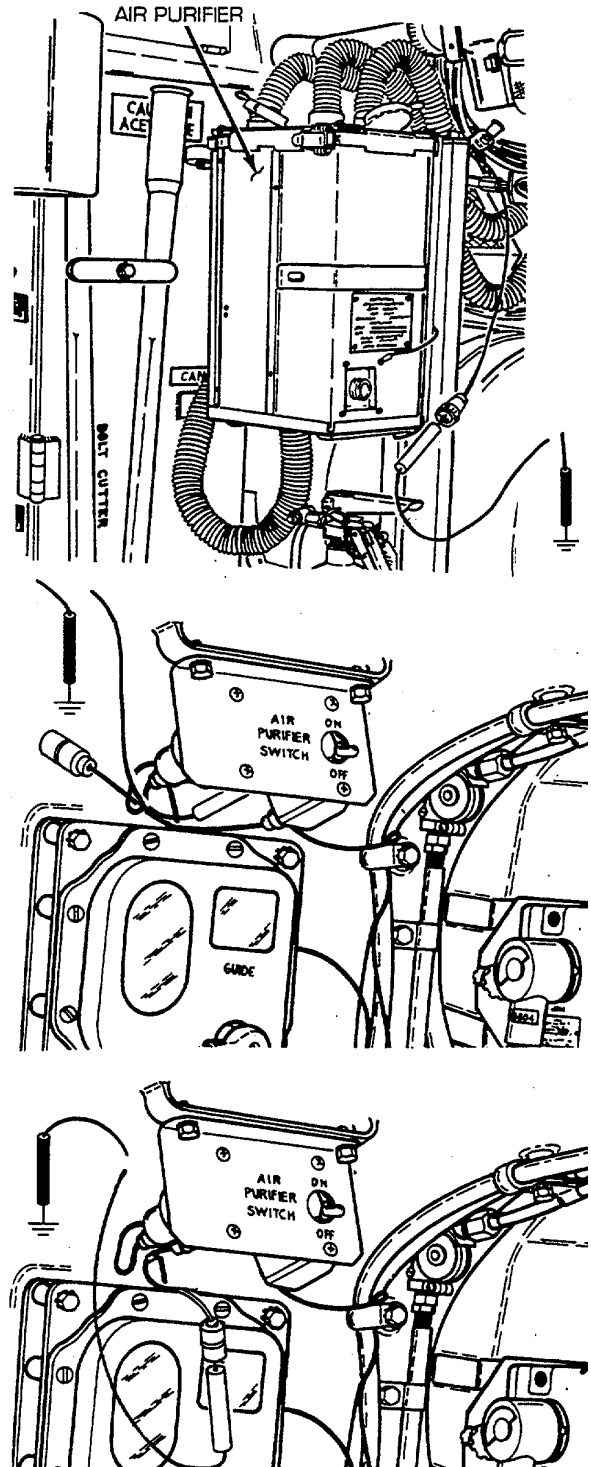
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

NOTE

There are two air purifiers in the M88A1. Troubleshooting is the same for each.

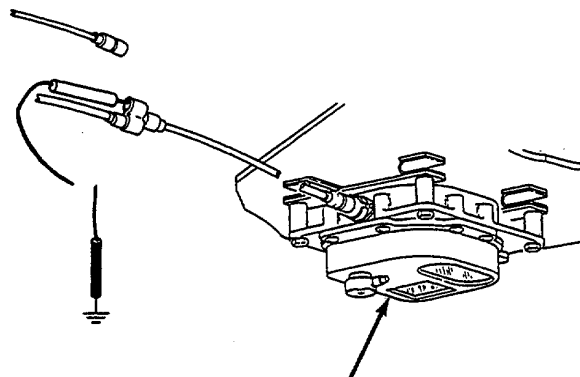
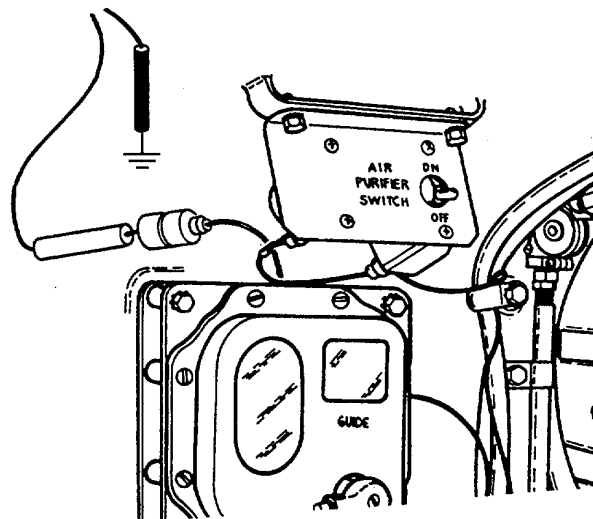
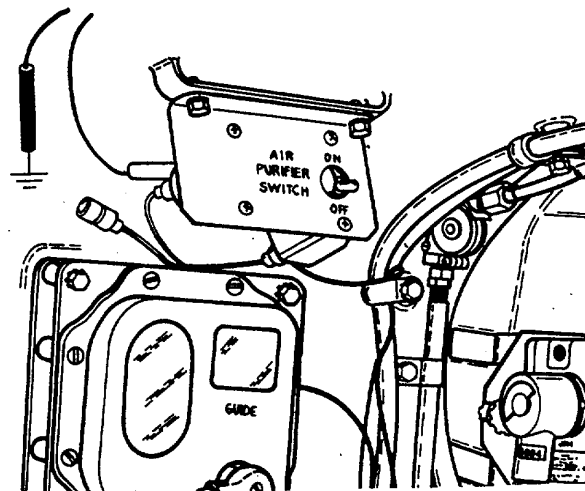
- A Disconnect wire from M2A2 air purifier. Place red lead of multimeter in wire and black lead to ground. Turn MASTER and purifier switches on and check for voltage. Turn MASTER and purifier switches OFF. If voltage is present, repair/replace M2A2 air purifier (see paragraph 14-1). If voltage is not present, go to step B.
- B Reconnect wire to M2A2 air purifier. Disconnect wire from purifier side of purifier switch. Place red lead of multimeter on switch terminal and black lead to ground. Turn MASTER and purifier switches on and check for voltage. Turn MASTER and purifier switches OFF. If voltage is present, repair/replace wire (see paragraph 14-1). If voltage is not present, go to step C.
- C Reconnect wire to purifier switch. Disconnect wire from circuit breaker side of purifier switch. Place red lead of multimeter in wire and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace purifier switch (see paragraph 14-5). If voltage is not present, go to step D.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- D Reconnect wire to purifier switch. Disconnect wire from switch side of circuit breaker. Place red lead of multimeter on circuit breaker terminal and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire from purifier switch to circuit breaker (see paragraph 14-1). If voltage is not present, go to step E.
- E Reconnect wire to switch side of circuit breaker. Disconnect wire from dome light side of circuit breaker. Place red lead of multimeter in wire and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace circuit breaker (see paragraph 14-5). If voltage is not present, go to step F.
- F Reconnect wire to dome light side of circuit breaker. Disconnect wire from Y-connector. Place red lead of multimeter in Y-connector and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace Y-connector (see paragraph 14-1). If voltage is not present, troubleshoot dome light circuit.

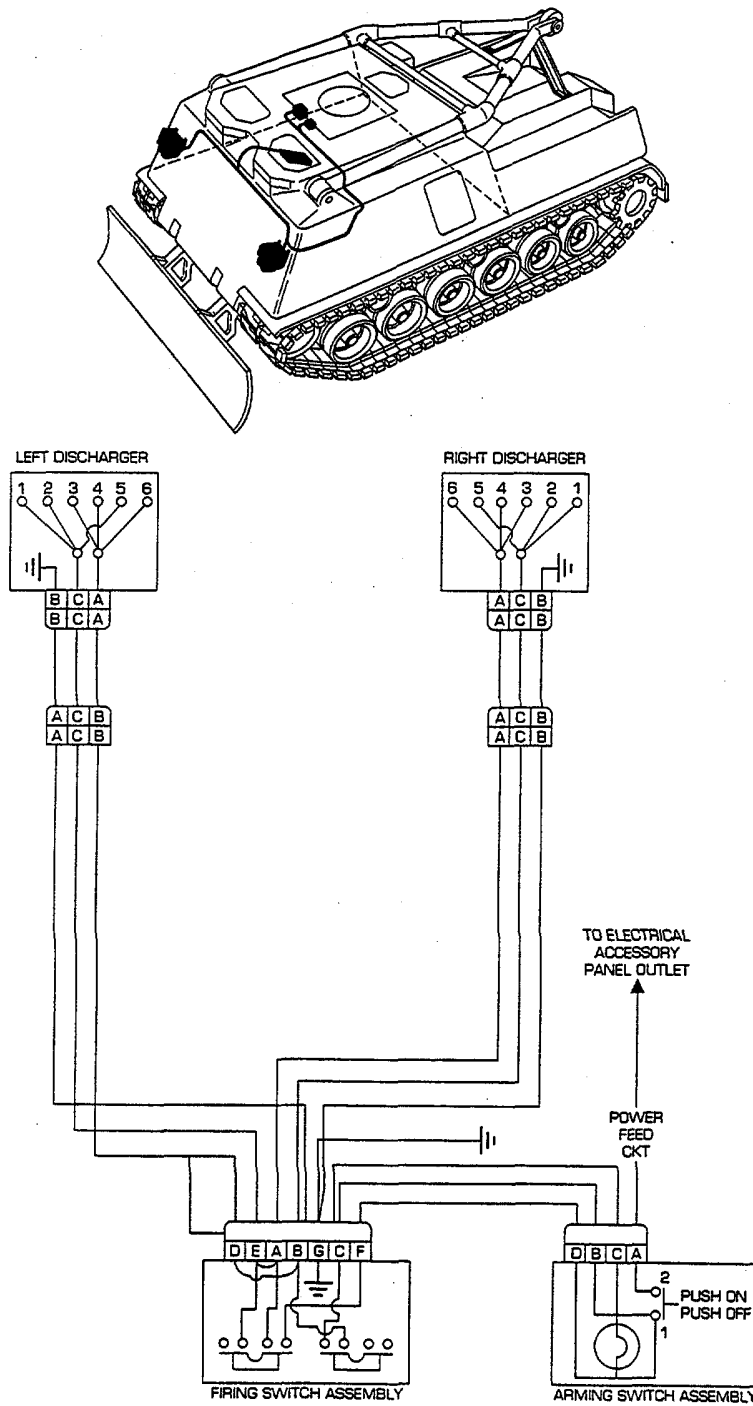


2-19 ELECTRICAL TROUBLESHOOTING-Continued

M239 SMOKE GRENADE LAUNCHER SYSTEM

SYMPTOMS

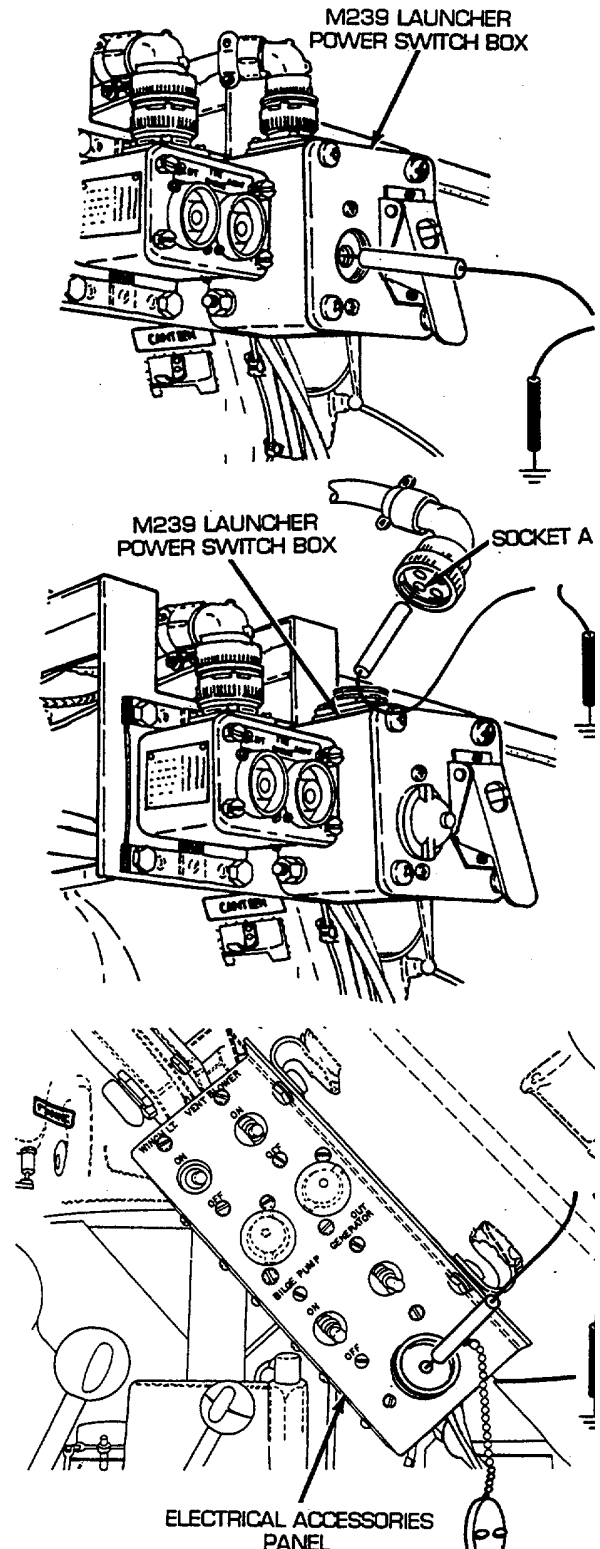
One or more of the launcher tubes fails to operate.
Do steps A through J.



WARNING

- Ensure all launcher tubes are empty before performing maintenance on launcher system. Serious injury or death may result if tubes launch accidentally.
- Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Remove lens from lamp on M239 launcher power switch box assembly. Remove lamp. Place red lead of multimeter in lamp socket and black lead to ground. Turn MASTER and ARM SMOKE switches ON and check for voltage. Turn MASTER and ARM SMOKE switches OFF. If voltage is present, replace lamp (see paragraph 15-1). If voltage is not present, go to step B.
- B Disconnect smoke grenade launcher system wiring harness from M239 launcher power switch box. Place red lead of multimeter in socket A of harness and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step D. If voltage is not present, go to step C.
- C Place red lead of multimeter in accessory panel outlet and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire from accessory outlet to arming switch assembly of smoke grenade launcher system wiring (see paragraph 6-91). If voltage is not present, troubleshoot bilge pump system and electrical accessories panel power outlet.



2-19 ELECTRICAL TROUBLESHOOTING-Continued

M239 SMOKE GRENADE LAUNCHER SYSTEM-Continued

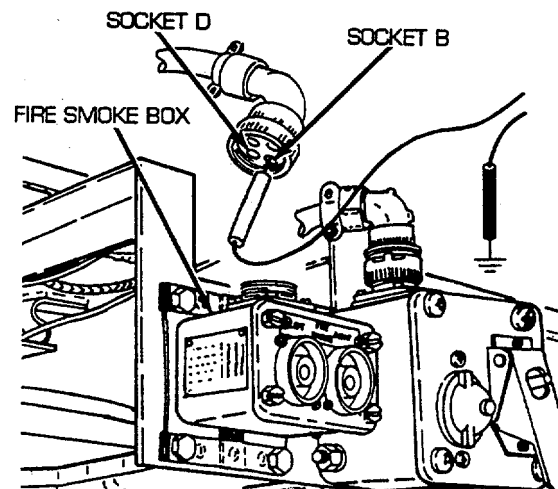
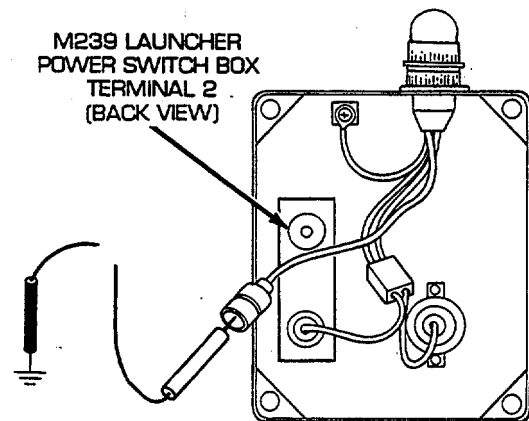
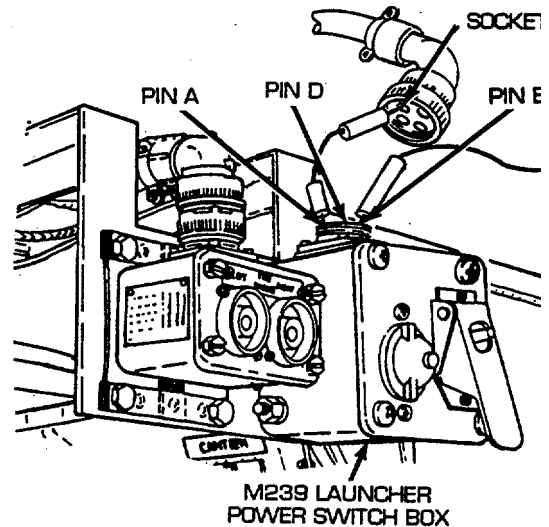
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- D Place a jumper wire from pin A to socket A. Place red lead of multimeter on pin B of M239 launcher power switch box and black lead to ground. Turn MASTER and ARM SMOKE switches ON and check for voltage. Place red lead of multimeter on pin D of ARM SMOKE box assembly and black lead to ground and check for voltage. Turn MASTER and ARM SMOKE switches OFF. If voltage is present on both pins, go to step F. If voltage is not present on either pin, go to step E.

- E Reconnect smoke grenade launcher system wiring harness to M239 launcher power switch box. Remove M239 launcher power switch box from mounting bracket (see paragraph 15-1). Disconnect connector from terminal 2 of ARM SMOKE switch. Place red lead of multimeter on wiring harness and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is not present, repair/replace wire in power switch box assembly for M239 smoke grenade launcher assembly (see paragraph 6-92). If voltage is present, replace ARM SMOKE switch (see paragraph 15-1).

- F Reconnect smoke grenade launcher system wiring harness to M239 launcher power switch box. Disconnect smoke grenade launcher system wiring harness from FIRE SMOKE box assembly. Place red lead of multimeter in socket B and black lead to ground. Turn MASTER and ARM SMOKE switches ON and check for voltage. Place red lead of multimeter in socket D and black lead to ground and check for voltage. Turn MASTER and ARM SMOKE switches OFF. If voltage is present in both sockets, go to step G. If voltage is not present in either socket, repair/replace smoke grenade launcher system wiring harness (see paragraph 6-91).



WARNING

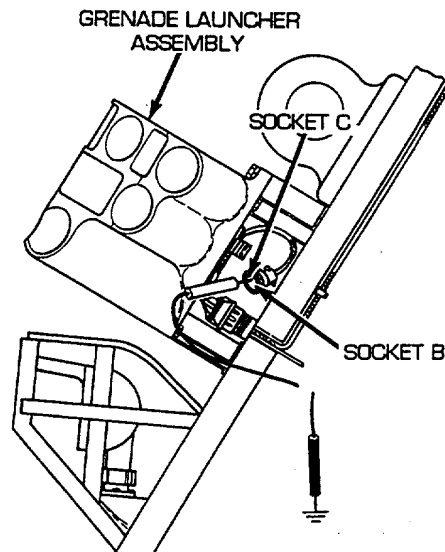
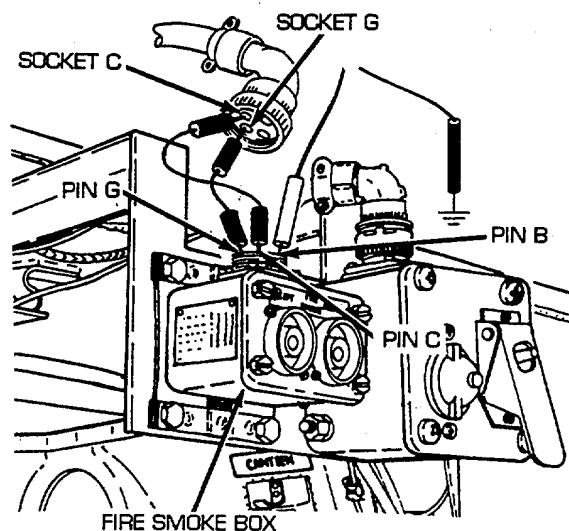
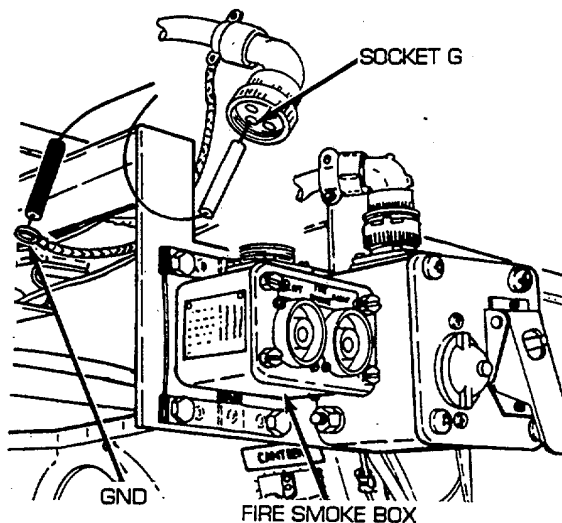
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- G Remove screw securing ground wire. Check ground wire for continuity by placing red lead of multimeter in socket G and black lead on ground wire terminal. If continuity is present, go to step H. If continuity is not present, repair/replace ground wire of smoke grenade launcher system wiring harness (see paragraph 6-91).
- H Reconnect ground wire. Place jumper wires from pin G to socket G and from pin C to socket C. Place red lead of multimeter on pin B and black lead to ground. Turn MASTER and ARM SMOKE switches ON, push RIGHT switch, and check for voltage. Turn MASTER and ARM SMOKE switches OFF. If voltage is present, go to step I for right dischargers, and step K for left dischargers. If voltage is not present, replace FIRE SMOKE box assembly (refer to TM 3-1040-266-20&P).

CAUTION

The following steps apply to both the LEFT and RIGHT dischargers. The LEFT and RIGHT firing buttons fire three grenades from each side at the same time. Failure to do all the steps could leave inoperative firing on some tubes.

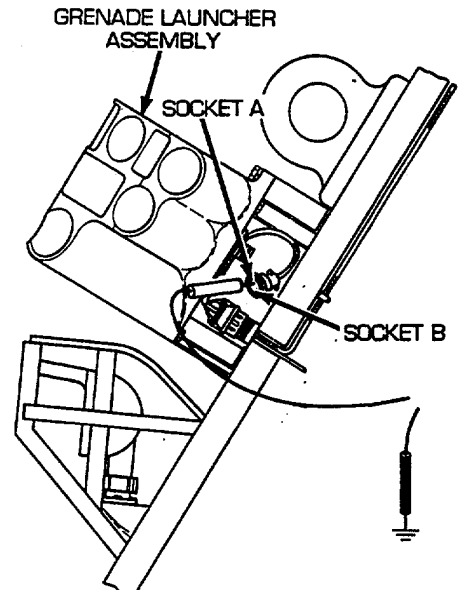
- I Reconnect smoke grenade launcher system wiring harness to FIRE SMOKE box assembly. Disconnect cable assembly for M239 smoke grenade launcher, right hand side discharger feed through from grenade launcher assembly. Place red lead of multimeter in socket C and black lead to ground. Turn MASTER and ARM SMOKE switches ON push RIGHT switch, and check for voltage. Turn MASTER and ARM SMOKE switches OFF. Check ground circuit for continuity by placing red lead of multimeter in socket B and black lead to ground. If voltage and continuity are present in all circuits, notify Direct Support Maintenance. If voltage or continuity is not present in any circuit, repair/replace harness cable assembly for M239 smoke grenade launcher right hand side discharger feed through, (see paragraph 6-104).



2-19 ELECTRICAL TROUBLESHOOTING-Continued**M239 SMOKE GRENADE LAUNCHER SYSTEM-Continued****WARNING**

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- J Reconnect smoke grenade launcher system wiring harness to FIRE SMOKE box assembly. Disconnect cable assembly for M239 smoke grenade launcher, left hand side discharger feed through from launcher assembly. Place red lead of multimeter in socket A and black lead to ground. Turn MASTER and ARM SMOKE switches ON, push LEFT switch, and check for voltage. Turn MASTER and ARM SMOKE switches OFF. Check ground circuit for continuity by placing red lead of multimeter in socket B and black lead to ground. If voltage and continuity are present in all circuits, refer to TM 9-1330-200-12. If voltage or continuity is not present in any circuit, repair/replace cable assembly for M239 smoke grenade launcher, right hand side discharger feed through (see paragraph 6-104).

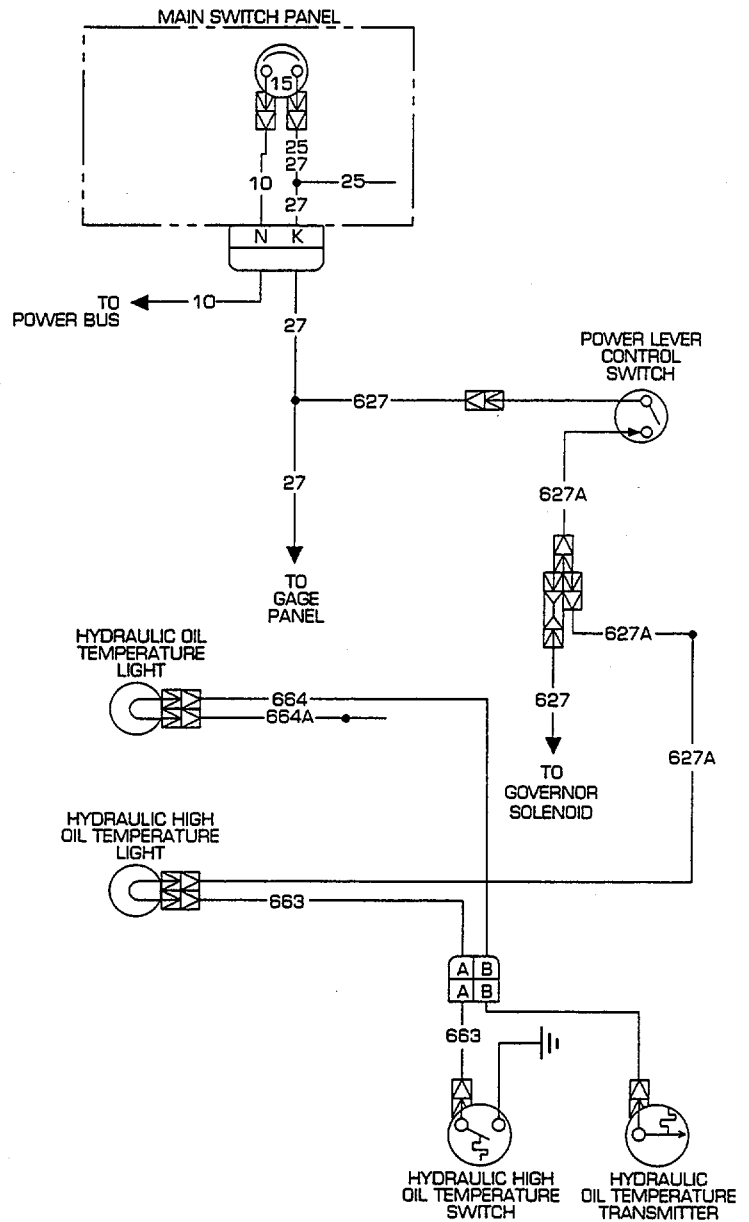
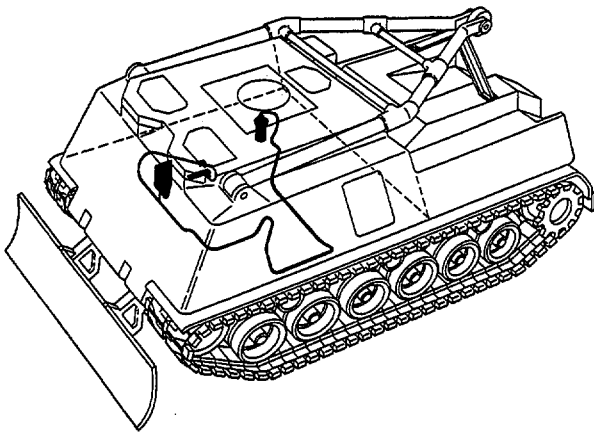


HYDRAULIC RESERVOIR MONITORING SYSTEM SWITCHES AND LIGHTS

SYMPTOMS

Hydraulic oil high temperature lamp fails to operate when temperature limit is exceeded.
Do steps A through E.

Hydraulic oil high temperature light fails to go out when temperature is normal.
Do steps C through E.



2-19 ELECTRICAL TROUBLESHOOTING-Continued

HYDRAULIC RESERVOIR MONITORING SYSTEM SWITCHES AND LIGHTS-Continued

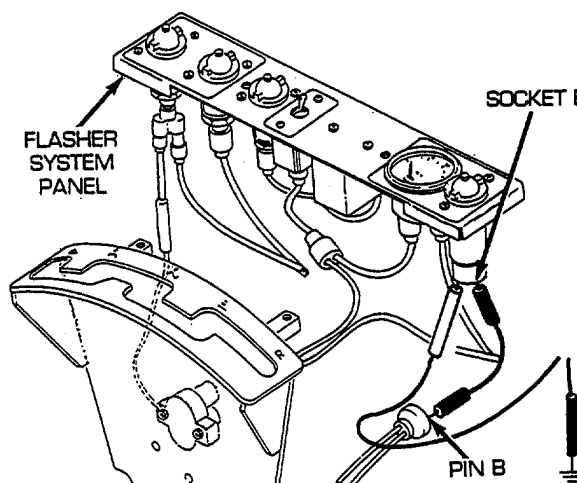
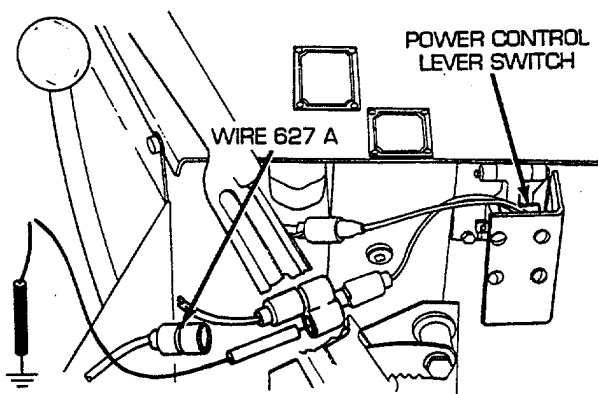
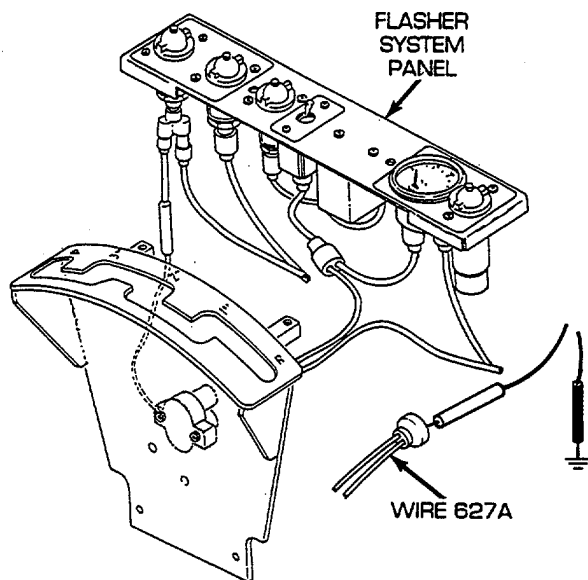
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Disconnect flasher system panel wiring harness from hydraulic oil high temperature light. Place red lead of multimeter in socket B of wire 627A and black lead to ground. Turn MASTER switch on, place power control lever switch in ON position, and check for voltage. Turn MASTER switch and power control lever switch OFF. If voltage is present, go to step C. If voltage is not present, go to step B.

- B Reconnect flasher system panel wiring harness to hydraulic oil high temperature light. Disconnect wire 627A of flasher system panel wiring harness from Y-connector at power control lever switch. Place red lead of multimeter on Y-connector terminal and black lead to ground. Turn MASTER switch on, place power control lever switch in ON position, and check for voltage. Turn MASTER switch and power control lever switch OFF. If voltage is present, repair/replace wire 627A of flasher system panel wiring harness from Y-connector to hydraulic high temperature lamp (see paragraph 6-48). If voltage is not present, troubleshoot power control lever switch circuit.

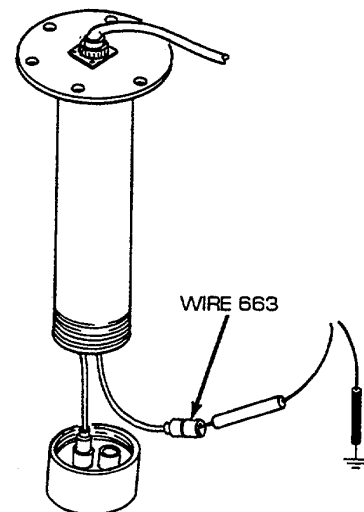
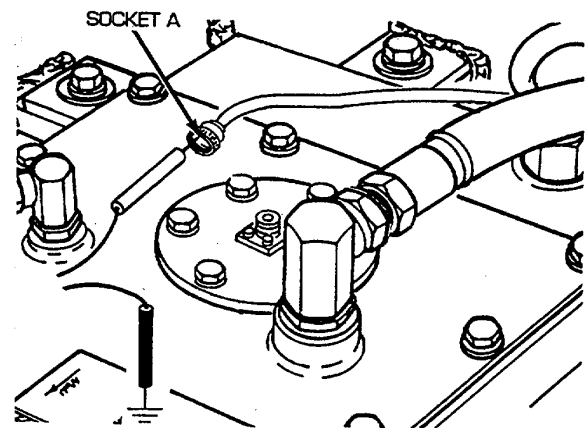
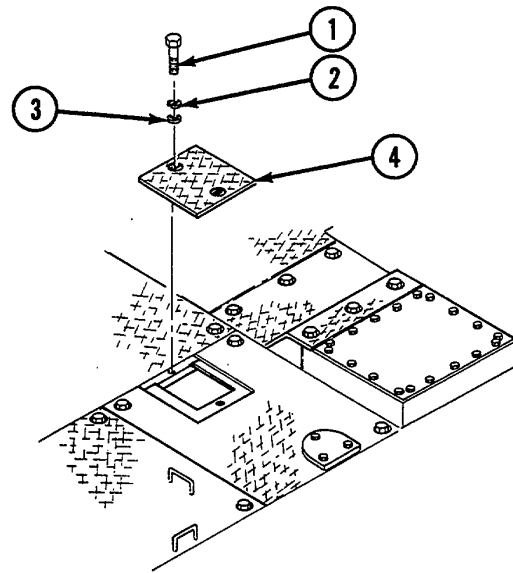
- C Place a jumper wire from socket B to pin B. Place red lead of multimeter on terminal of hydraulic oil high temperature light and black lead to ground. Turn MASTER switch on, place power control lever switch in ON position, and check for voltage. Turn MASTER switch and power control lever switch OFF. If voltage is present, go to step D. If voltage is not present, replace hydraulic oil high temperature lamp (see paragraph 6-11).



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- D Reconnect flasher system panel wiring harness to lamp socket. Remove two screws (1), two lockwashers (2), two flat washers (3), and rear intermediate right access floor plate (4). Disconnect flasher system panel wiring harness at hydraulic reservoir disconnect. Place red lead of multimeter in socket A of wire 663 and black lead to ground. Turn MASTER switch on, place power control lever switch in ON position, and check for voltage. Turn MASTER switch and power control lever switch OFF. If voltage is present, go to step E. If voltage is not present, repair/replace wire 663 of flasher system panel wiring harness from hydraulic oil high temperature lamp to hydraulic reservoir disconnect (see paragraph 6-48).
- E Reconnect flasher system panel wiring harness to hydraulic reservoir disconnect. Disconnect wire 663 from high temperature switch on hydraulic reservoir. Place red lead of multimeter in wire 663 and black lead to ground, turn MASTER switch on, place power control lever switch in ON position, and check for voltage. Turn MASTER switch and power control lever switch OFF. If voltage is present, replace high temperature switch (see paragraph 12-8). If voltage is not present, repair/replace wire 663 of hydraulic oil temperature transmitter wiring harness (see paragraph 6-88).

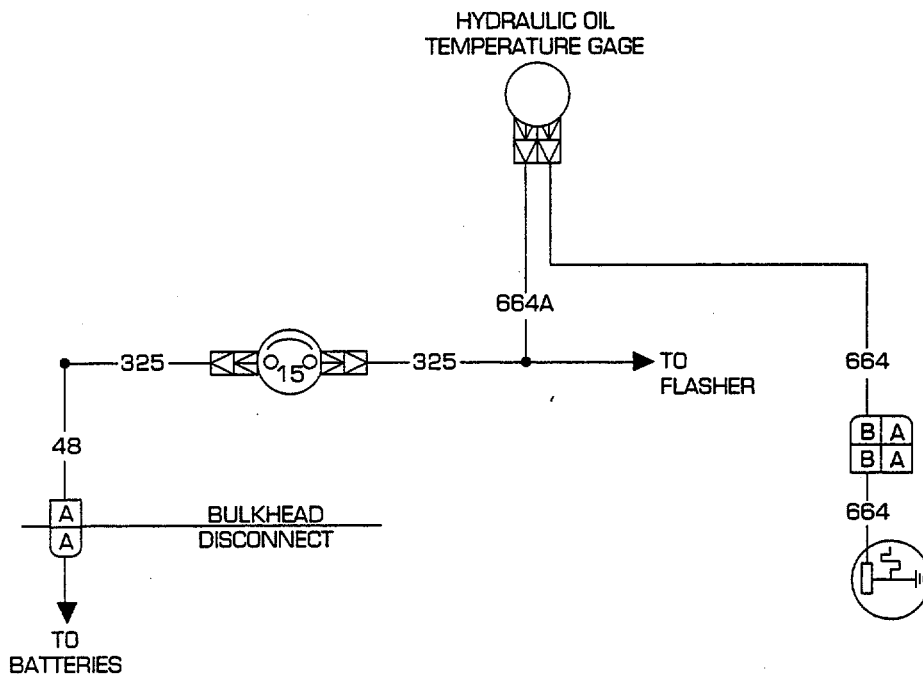
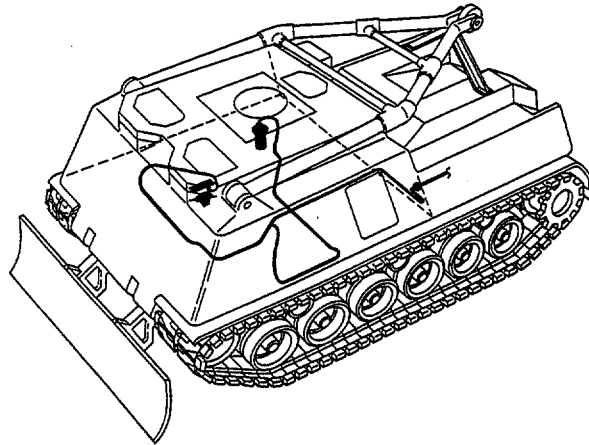


2-19 ELECTRICAL TROUBLESHOOTING-Continued

HYDRAULIC RESERVOIR MONITORING SYSTEM GAGE AND TRANSMITTER

SYMPTOM

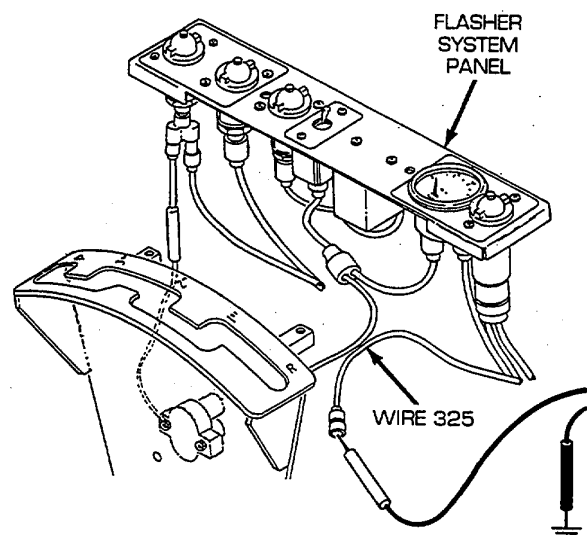
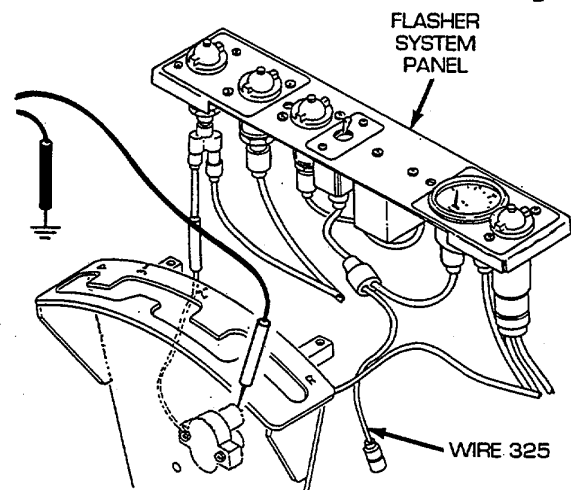
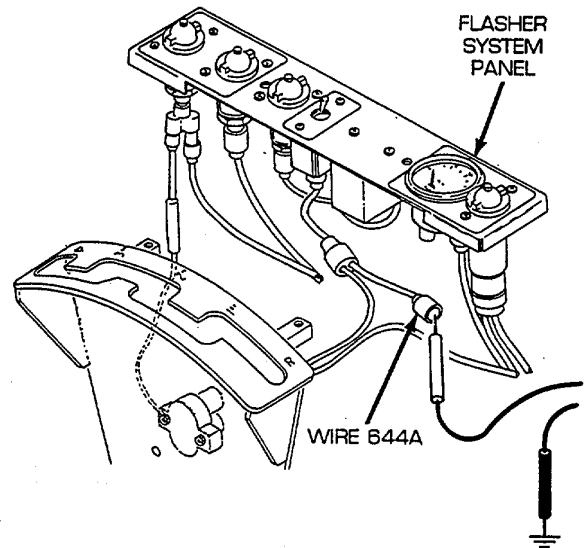
Hydraulic oil temperature gage fails to operate.
Do steps A through G.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Disconnect wire 664A from hydraulic oil temperature gage. Place red lead of multimeter in wire 664A and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step D. If voltage is not present, go to step B.
- B Reconnect wire 664A to hydraulic oil temperature gage. Disconnect wire 325 from hydraulic oil temperature gage side of 15 A circuit breaker. Place red lead of multimeter on terminal of 15 A circuit breaker and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 664A of red flasher breaker to switch wiring harness (see paragraph 6-66). If voltage is not present, go to step C.
- C Reconnect wire 325 to hydraulic oil temperature gage side of 15 A circuit breaker. Disconnect wire 325 of switch panel, radio, and bilge pump to bulkhead wiring harness from 15 A circuit breaker. Place red lead of multimeter in wire 325 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace 15 A circuit breaker (see paragraph 6-11). If voltage is not present, go to step G.



2-19 ELECTRICAL TROUBLESHOOTING-Continued

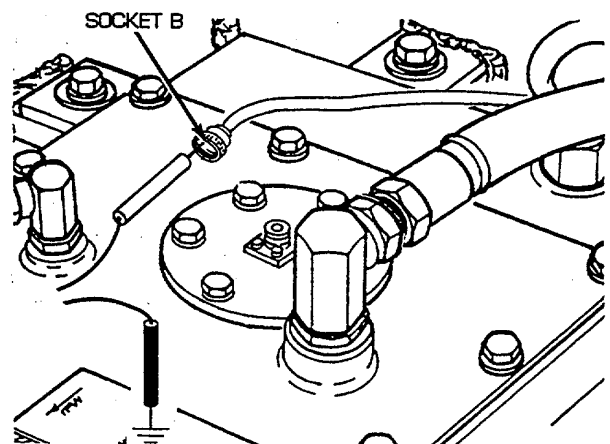
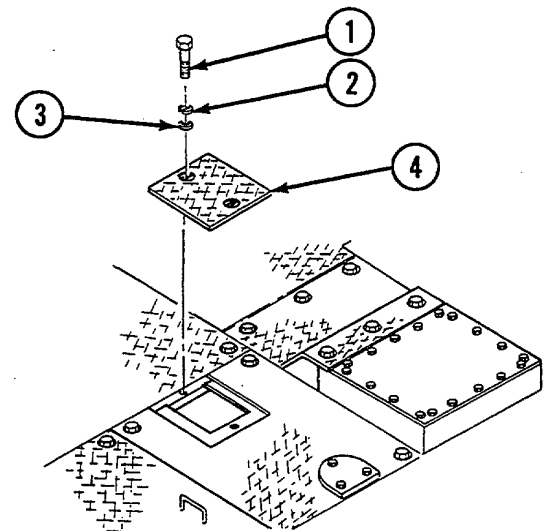
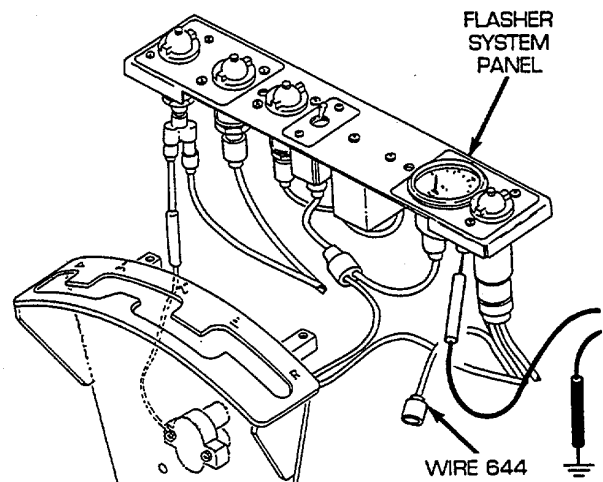
HYDRAULIC RESERVOIR MONITORING SYSTEM GAGE AND TRANSMITTER-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

D Reconnect wire 664A to hydraulic oil temperature gage. Disconnect wire 664 from hydraulic oil temperature gage. Place red lead of multimeter on terminal of hydraulic oil temperature gage and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step E. If voltage is not present, replace hydraulic oil temperature gage (see paragraph 6-11).

E Reconnect wire 664 to hydraulic oil temperature gage. Remove two screws (1), two lockwashers (2), two flat washers (3), and rear intermediate right access floor plate (4). Disconnect flasher system panel wiring harness at hydraulic reservoir disconnect. Place red lead of multimeter in socket B of wire 664 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step F. If voltage is not present, repair/replace wire 664 of flasher system panel wiring harness (see paragraph 6-48).

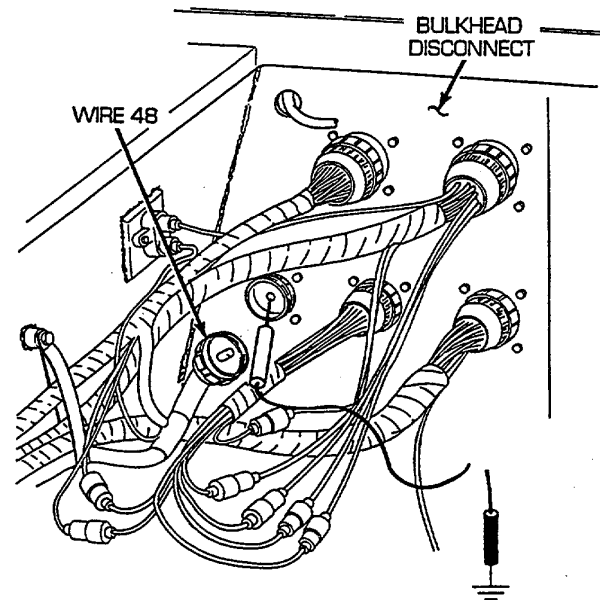
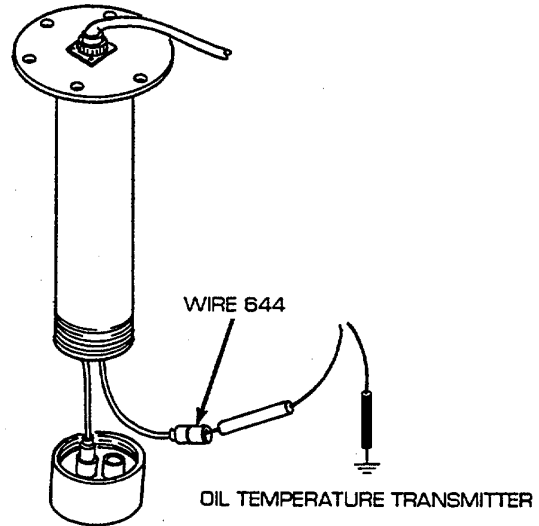


WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- F Reconnect flasher system panel wiring harness to hydraulic reservoir disconnect. Disconnect wire 664 from hydraulic oil temperature transmitter (see paragraph 12-8). Place red lead of multimeter in wire 664 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace hydraulic oil temperature transmitter (see paragraph 12-8). If voltage is not present, repair/replace wire 664 from hydraulic reservoir disconnect to hydraulic oil temperature transmitter (see paragraph 6-88).

- G Reconnect wire 325 of switch panel, radio, and bilge pump to bulkhead wiring harness from 15 A circuit breaker. Open air inlet doors (TM 9-2350-256-10). Disconnect wire 48 pin A from bulkhead to master relay wiring harness. Place red multimeter lead in socket and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay circuit (see paragraph 2-19, master relay fails to operate).



2-19 ELECTRICAL TROUBLESHOOTING-Continued

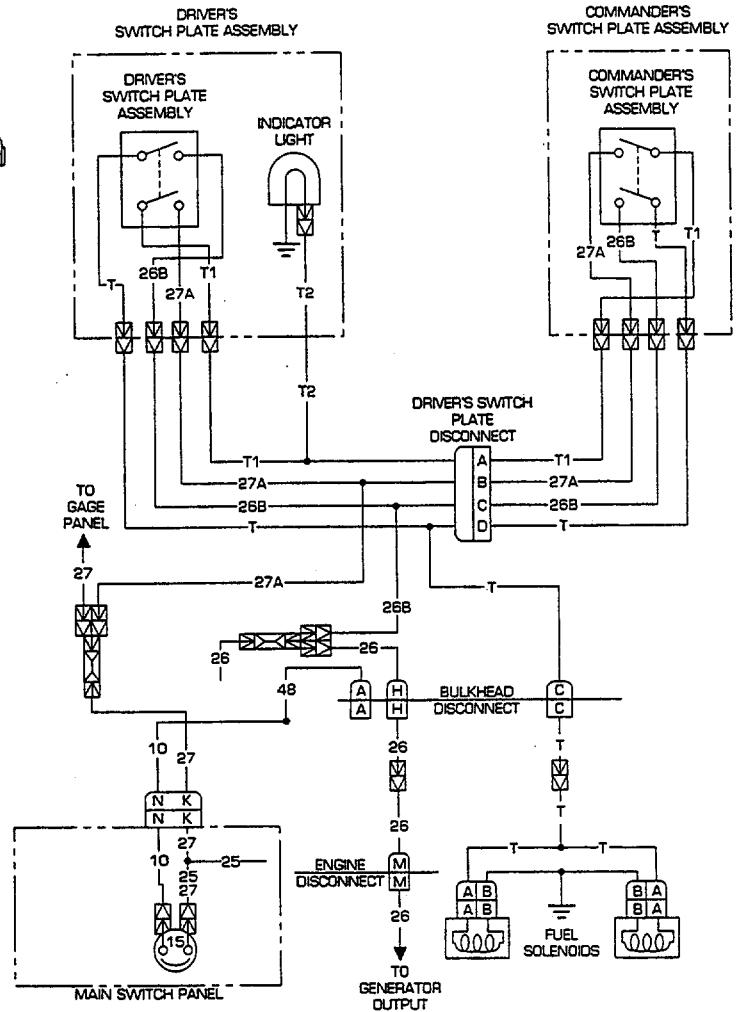
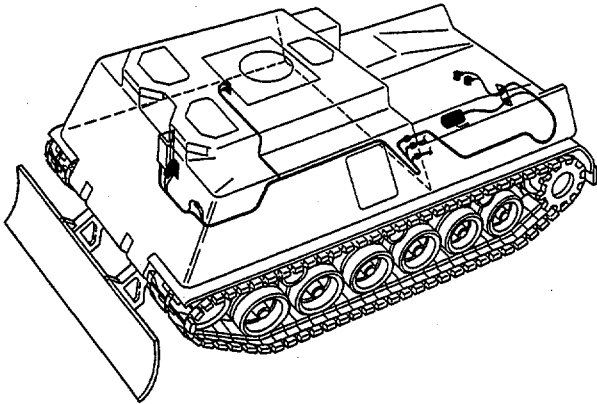
EXHAUST SMOKE GENERATING SYSTEM

SYMPTOMS

Vehicle generates smoke but indicator light fails to operate.
Do steps A through D.

Vehicle does not generate smoke.
Do steps A through Y.

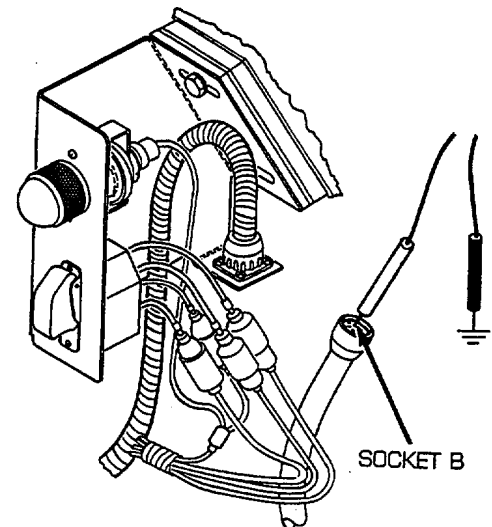
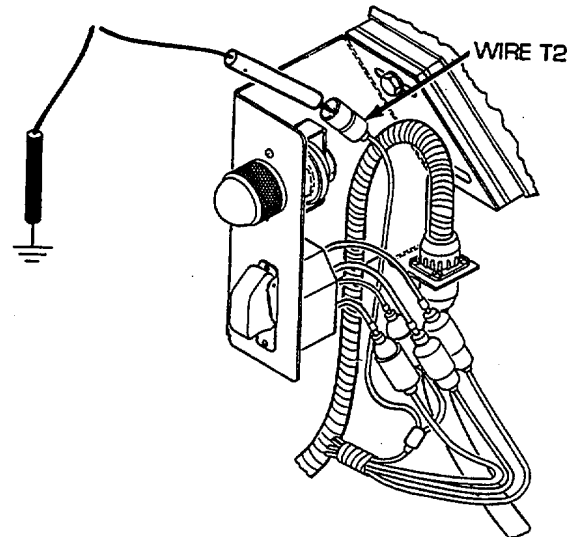
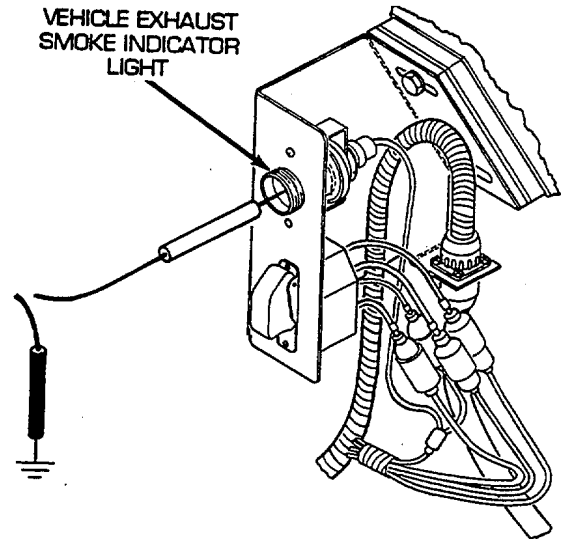
Commander's switch fails to operate.
Do steps V through X.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Remove lamp from socket. Place red lead of multimeter in socket and black lead to ground. Turn MASTER and driver's VEHICLE EXHAUST SMOKE switches ON and check for voltage. Turn MASTER and driver's VEHICLE EXHAUST SMOKE switches OFF. If voltage is present, replace lamp (see paragraph 16-4). If voltage is not present, go to step B.
- B Reinstall lamp to socket. Disconnect wire T2 from indicator light. Place red lead of multimeter on wire T2 and black lead to ground. Turn MASTER and driver's VEHICLE EXHAUST SMOKE switches ON and check for voltage. Turn MASTER and driver's VEHICLE EXHAUST SMOKE switches OFF. If voltage is present, replace lamp socket (see paragraph 16-4). If voltage is not present, go to step C.
- C Reconnect wire T2 to indicator light. Disconnect driver's vehicle exhaust smoke bracket to bulkhead connection wiring harness from driver's switch plate disconnect behind switch panel. Place red lead of multimeter in socket B of wire 27A and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step J. If voltage is not present, go to step D.



2-19 ELECTRICAL TROUBLESHOOTING-Continued

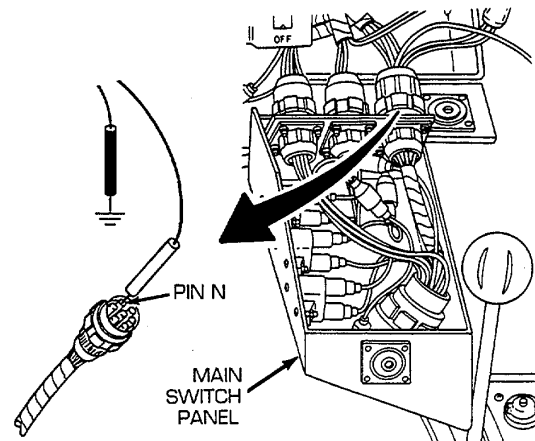
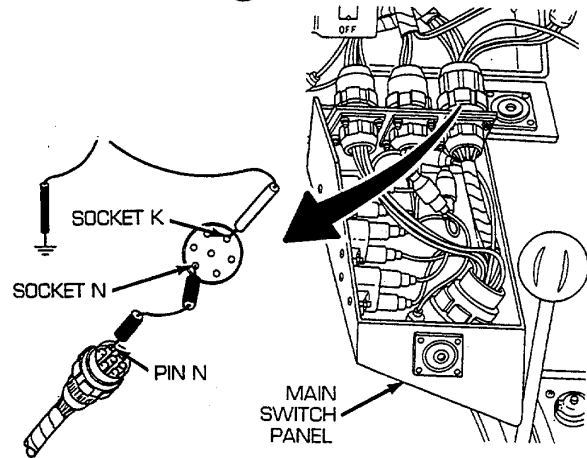
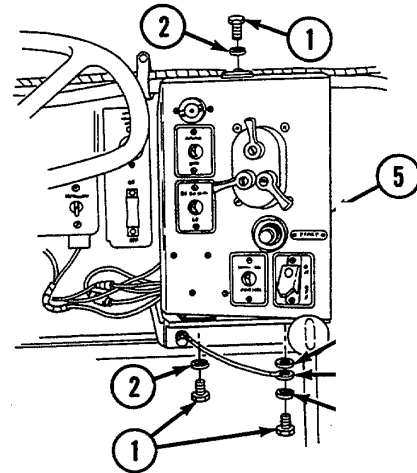
EXHAUST SMOKE GENERATING SYSTEM-Continued

WARNING

Remove all jewelry such as rings, dog tags , bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

D Reconnect driver's vehicle exhaust smoke bracket to bulkhead connection wiring harness to driver's switch plate disconnect. Remove three screws (1), three lockwashers (2), ground lead (3), and flat washer (4) and release main switch panel (5) from mounting brackets. Disconnect switch panel to gage panel and miscellaneous switches wiring harness from main switch panel. Place a jumper wire from pin N to socket N. Place red lead of multimeter in socket K of wire 27 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step H. If voltage is not present, go to step E.

E Place red lead of multimeter in pin N of wire 10 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step F. If voltage is not present, go to step Y.



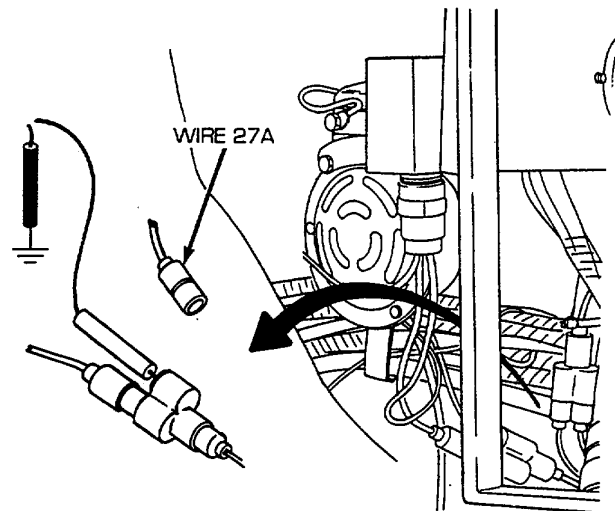
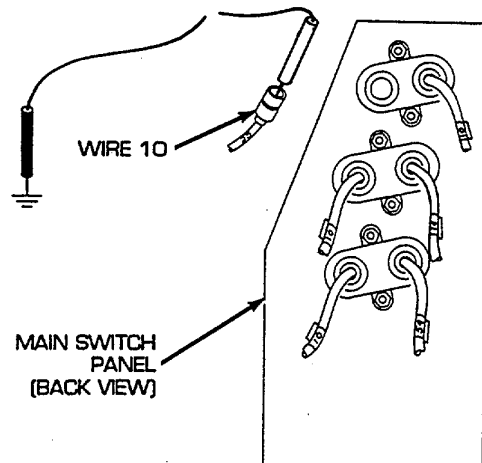
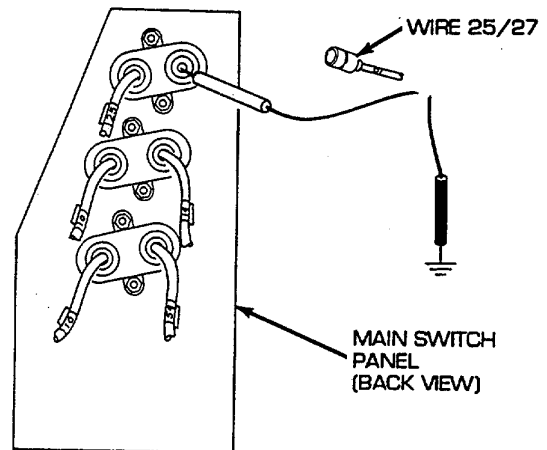
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- F Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Place a jumper wire from switch panel to hull to ground panel. Disconnect wire 25/27 from 15 A circuit breaker. Place red lead of multimeter on circuit breaker terminal and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 25/27 of main lighting and B.O. selector switch wiring harness (see paragraph 6-69). If voltage is not present, go to step G.

- G Reconnect wire 25/27 to 15 A circuit breaker. Disconnect wire 10 from 15 A circuit breaker. Place red lead of multimeter on wire 10 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace 15 A circuit breaker (see paragraph 6-10). If voltage is not present, repair/replace wire 10 of main lighting and B.O. selector switch wiring harness (see paragraph 6-69).

- H Reconnect wire 27A to driver's VEHICLE EXHAUST SMOKE switch. Disconnect wire 27A of driver's vehicle exhaust smoke bracket to bulkhead connection wiring harness at Y-connector. Place red lead of multimeter on male connector and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 27A of driver's vehicle exhaust smoke bracket to bulkhead connection wiring harness from driver's switch to Y-connector (see paragraph 6-93). If voltage is not present, go to step I.



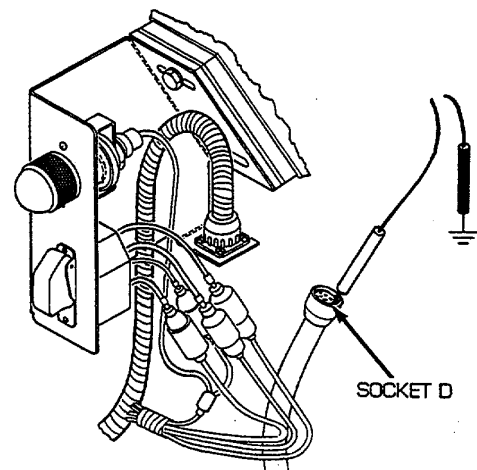
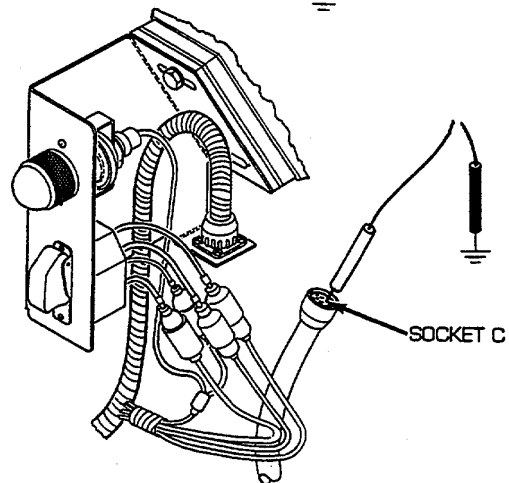
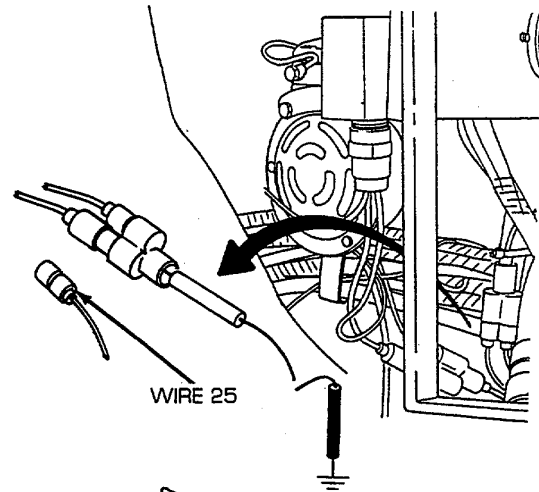
2-19 ELECTRICAL TROUBLESHOOTING--Continued

EXHAUST SMOKE GENERATING SYSTEM--Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

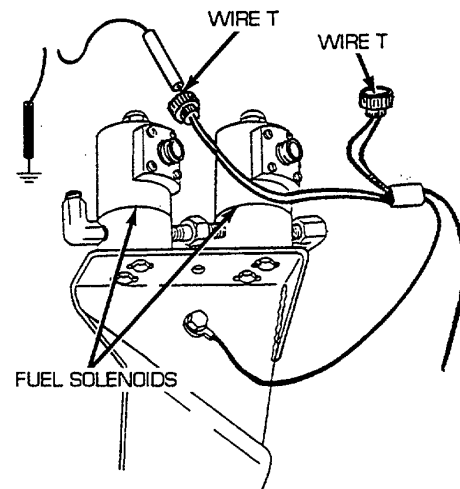
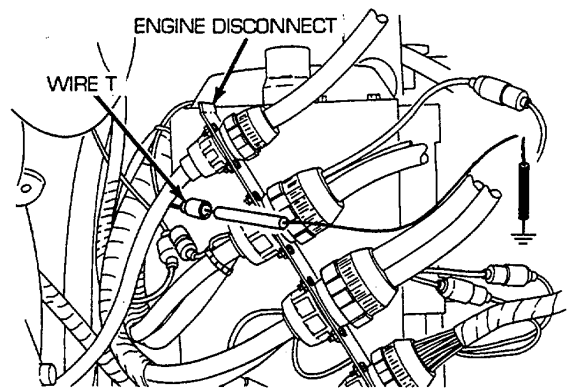
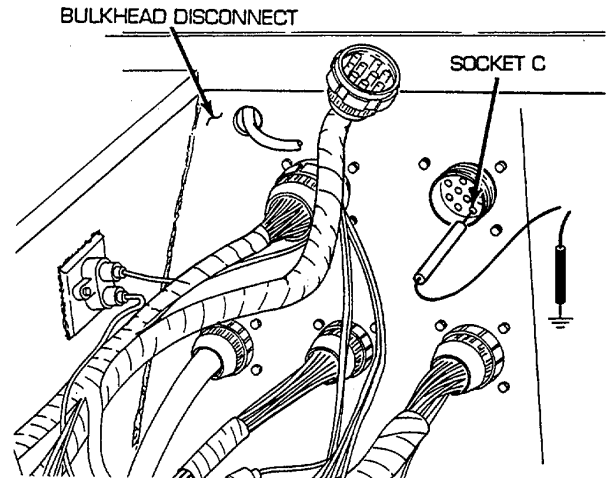
- I Reconnect wire 27A of driver's vehicle exhaust smoke bracket to bulkhead connection wiring harness to Y-connector. Disconnect wire 27 of switch panel to gage panel and miscellaneous switches wiring harness from Y-connector. Place red lead of multimeter on wire 27 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace Y-connector (see paragraph 6-93). If voltage is not present, repair/replace wire 27 of switch panel to gage panel and miscellaneous switches wiring harness (see paragraph 6-55 for dual voltage; 6-56 for single voltage).
- J Place red lead of multimeter in socket C of wire 26B and black to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is not present, go to step Q. If voltage is present, go to step K.
- K Place red lead of multimeter in socket D of wire T and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step L. If voltage is not present, go to step O.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- L Reconnect driver's vehicle exhaust smoke bracket to bulkhead connection wiring harness to driver's switch plate disconnect. Open air inlet doors (TM 9-2350-256-10). Disconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness from bulkhead disconnect. Place red lead of multimeter in socket C of wire T and black lead to ground. Turn MASTER and driver's VEHICLE EXHAUST SMOKE switches ON and check for voltage. Turn MASTER and driver's VEHICLE EXHAUST SMOKE switches OFF. If voltage is present, go to step M. If voltage is not present, repair/replace wire T of driver's vehicle exhaust smoke bracket to bulkhead connection wiring harness (see paragraph 6-93).
- M Reconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness to bulkhead. Remove engine deck (see paragraph 9-51). Disconnect smoke generating system lead assembly from engine connector. Place red lead of multimeter on wire T and black lead to ground. Turn MASTER and driver's VEHICLE EXHAUST SMOKE switches ON and check for voltage. Turn MASTER and VEHICLE EXHAUST SMOKE switches OFF. If voltage is present, got to step N. If voltage is not present, repair/replace wire T of exhaust smoke generating system lead assembly (see paragraphs 6-97).
- N Reconnect smoke generating system lead assembly to engine connector. Disconnect fuel solenoid wiring harness from two fuel solenoids. Place red lead of multimeter in wire T of first fuel solenoid and black lead to ground. Turn MASTER and driver's VEHICLE EXHAUST SMOKE switches ON and check for voltage. Place red lead of multimeter in wire T of second fuel solenoid and check for voltage. If voltage is present, replace fuel solenoid (see paragraph 16-1. If voltage is not present, repair/replace wire T of fuel solenoid wiring harness (see paragraph 6-95).



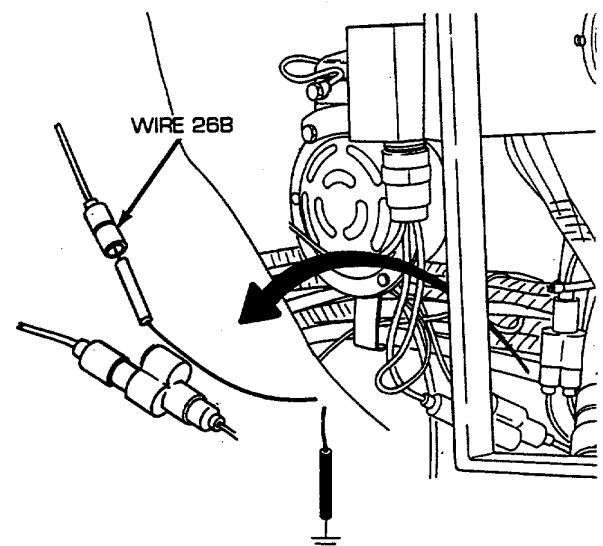
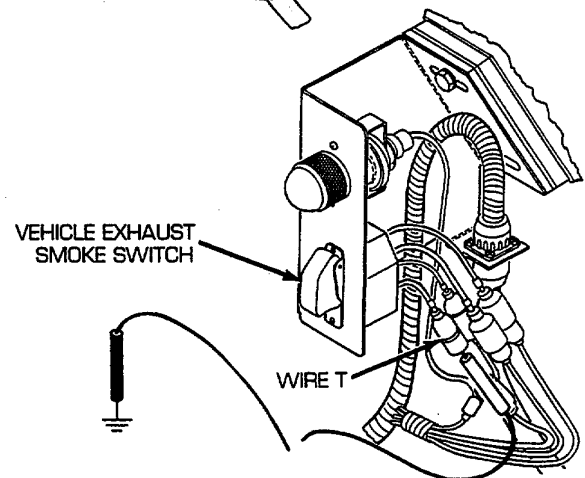
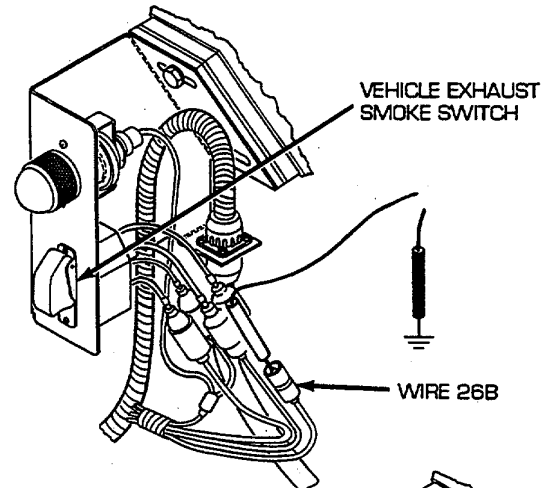
2-19 ELECTRICAL TROUBLESHOOTING-Continued

EXHAUST SMOKE GENERATING SYSTEM-Continued

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

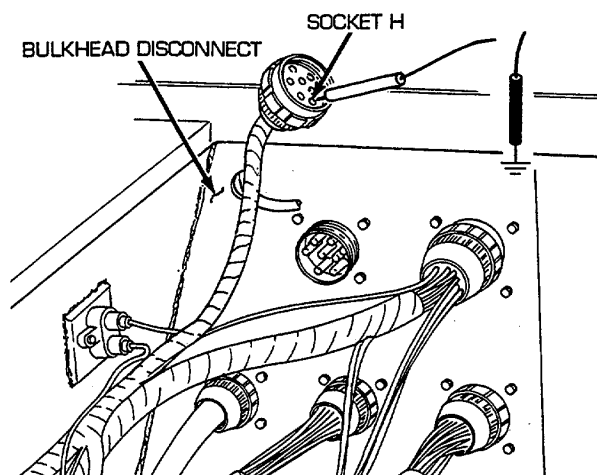
- O Reconnect driver's vehicle exhaust smoke bracket to bulkhead connection wiring harness to driver's switch plate disconnect. Disconnect wire 26B from driver's VEHICLE EXHAUST SMOKE switch. Place red lead of multimeter on wire 26B and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step P. If voltage is not present, repair/replace wire 26B of driver's exhaust smoke bracket to bulkhead connection wiring harness (see paragraph 6-93).
- P Reconnect wire 26B to driver's VEHICLE EXHAUST SMOKE switch. Disconnect wire T from driver's VEHICLE EXHAUST SMOKE switch. Place red lead of multimeter on wire T and black lead to ground. Turn MASTER and driver's VEHICLE EXHAUST SMOKE switches ON and check for voltage. Turn MASTER and driver's VEHICLE EXHAUST SMOKE switches OFF. If voltage is present, repair/replace wire T of driver's vehicle exhaust smoke bracket to bulkhead connection wiring harness (see paragraph 6-93). If voltage is not present, replace driver's VEHICLE EXHAUST SMOKE switch (see paragraph 16-4).
- Q Reconnect driver's vehicle exhaust smoke bracket to bulkhead connection wiring harness to driver's switch plate disconnect. Disconnect wire 26B from Y-connector behind gage panel. Place red lead of multimeter on connector and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 26B of driver's vehicle exhaust smoke bracket to bulkhead connection wiring harness (see paragraph 6-93). If voltage is not present, go to step R.



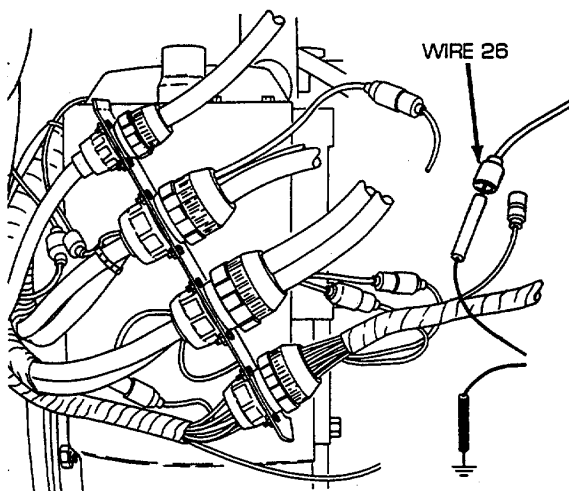
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

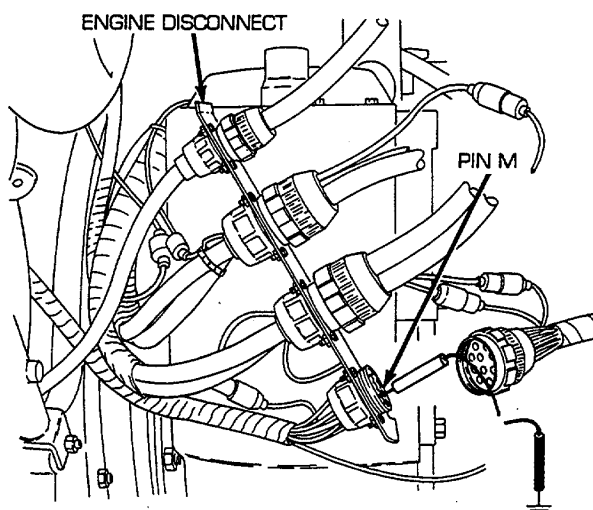
R Reconnect wire 26B to Y-connector behind gage panel. Open air inlet doors. Disconnect bulkhead to APU, master relay and rigger's lights wiring harness from bulkhead disconnect. Place red lead of multimeter in socket H of wire 26 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 26 of APU control box to foot dimmer switch and bulkhead wiring harness (see paragraph 6-79 for dual voltage; 6-80 for single voltage). If voltage is not present, go to step S.



S Reconnect bulkhead to APU, master relay, and rigger's lights wiring harness to bulkhead. Remove engine deck (see paragraph 9-51). Disconnect wire 26 of bulkhead to APU, master relay and rigger's lights wiring harness from connector. Place red lead of multimeter in wire 26 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire 26 of bulkhead to APU, master relay, and rigger's lights wiring harness (see paragraph 6-75 for dual voltage; 6-76 for single voltage). If voltage is not present, go to step T.



T Reconnect wire 26 of bulkhead to APU, master relay, and rigger's lights wiring harness to connector. Disconnect bulkhead to engine bracket and rear fuel tank transmitter wiring harness from engine disconnect. Place red lead of multimeter on pin M of wire 26 and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present repair/replace wire 26 of bulkhead to engine bracket and rear fuel tank transmitter wiring harness (see paragraph 6-73 for dual voltage; 6-74 for single voltage). If voltage is not present, go to step U.



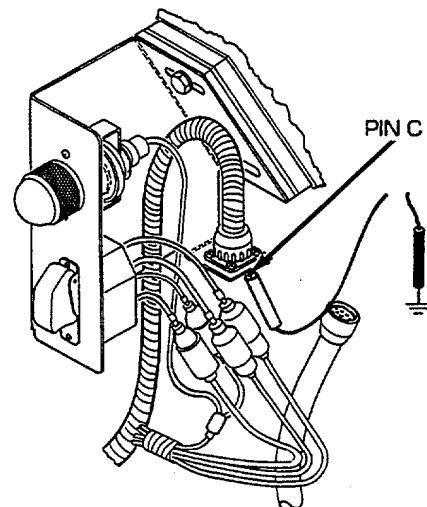
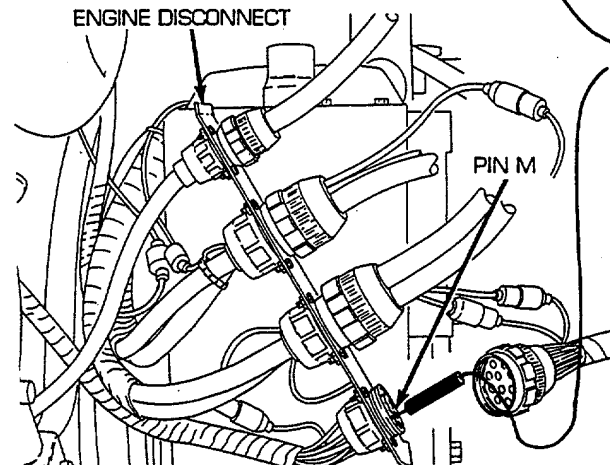
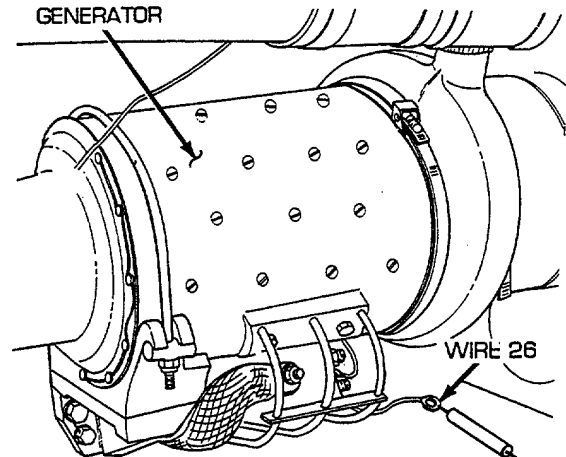
2-19 ELECTRICAL TROUBLESHOOTING-Continued

EXHAUST SMOKE GENERATING SYSTEM-Continued

WARNING

Remove all jewelry such as rings, dog tags , bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- U Remove powerplant (see paragraph 3-1). Disconnect wire 26 at generator terminal. Place red lead of multimeter on wire 26 and black lead on pin M of wire 26. Check for continuity. If continuity is present, replace main generator (see paragraph 6-1). If continuity is not present, repair/replace wire 26 of engine wiring harness (see paragraph 6-58 for dual voltage; 6-59 for single voltage).
- V Disconnect driver's vehicle exhaust smoke bracket to bulkhead wiring harness from driver's switch plate disconnect. Place red lead of multimeter on pin C of wire 26B and black lead on pin D of wire T. Turn commander's VEHICLE EXHAUST SMOKE switch ON and check for continuity. Turn commander's VEHICLE EXHAUST SMOKE switch OFF. If continuity is present, go to step P. If continuity is not present, go to step W.



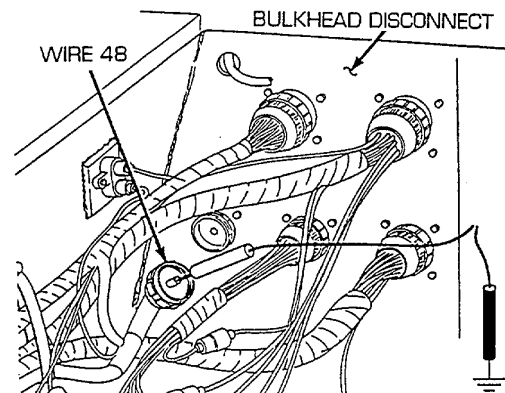
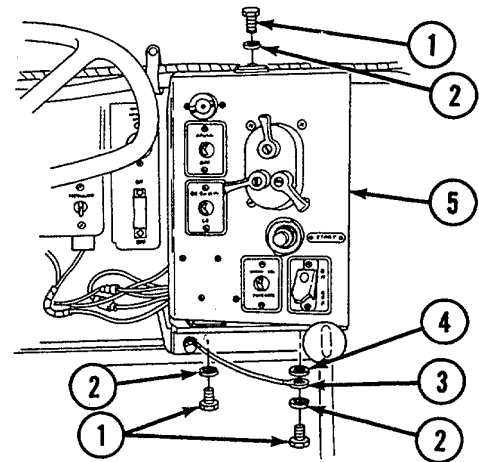
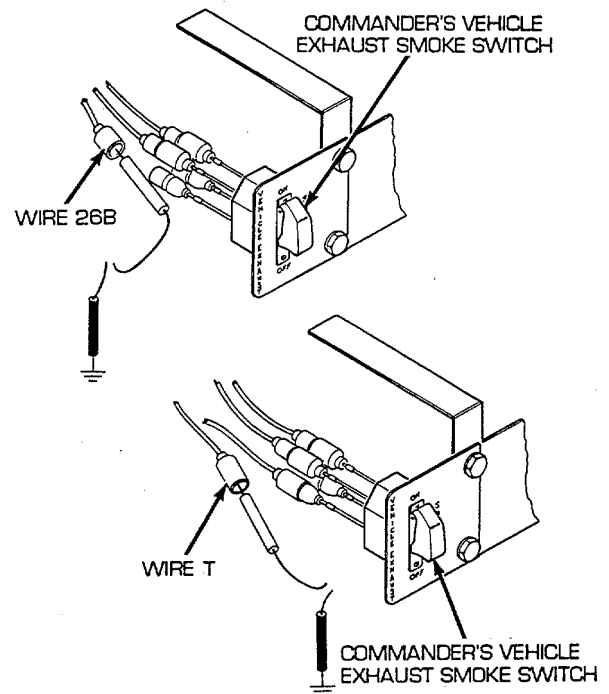
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

W Reconnect driver's vehicle exhaust smoke bracket to bulkhead connect wiring harness to driver's switch plate disconnect. Disconnect wire 26B at commander's VEHICLE EXHAUST SMOKE switch. Place red lead of multimeter on wire 26B and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step X. If voltage is not present repair/replace wire 26B of commander's switch plate to driver's vehicle exhaust smoke bracket wiring harness (see paragraph 6-94).

X Reconnect wire 26B to commander's VEHICLE EXHAUST SMOKE switch. Disconnect wire T from commander's VEHICLE EXHAUST SMOKE switch. Place red lead of multimeter on wire T and black lead to ground. Turn MASTER and commander's VEHICLE EXHAUST SMOKE switches ON and check for voltage. Turn MASTER and commander's VEHICLE EXHAUST SMOKE switches OFF. If voltage is present, repair/replace wire T of commander's switch plate to driver's vehicle exhaust smoke bracket wiring harness (see paragraph 6-94). If voltage is not present, replace commander's VEHICLE EXHAUST SMOKE switch (see paragraph 16-5).

Y Reconnect switch panel to gage panel and miscellaneous switches wiring harness to main switch panel. Install main switch panel (5), flat washer (4), ground lead (3), three lockwashers (2), and three screws (1) to mounting bracket. Open air inlet door. Disconnect wire 48 pin A from bulkhead to master relay wiring harness. Place red multimeter lead in socket and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace switch panel, radio, and bilge pump to bulkhead wiring harness (see paragraph 6-53). If voltage is not present, troubleshoot master relay circuit (see paragraph 2-19, master relay fails to operate).

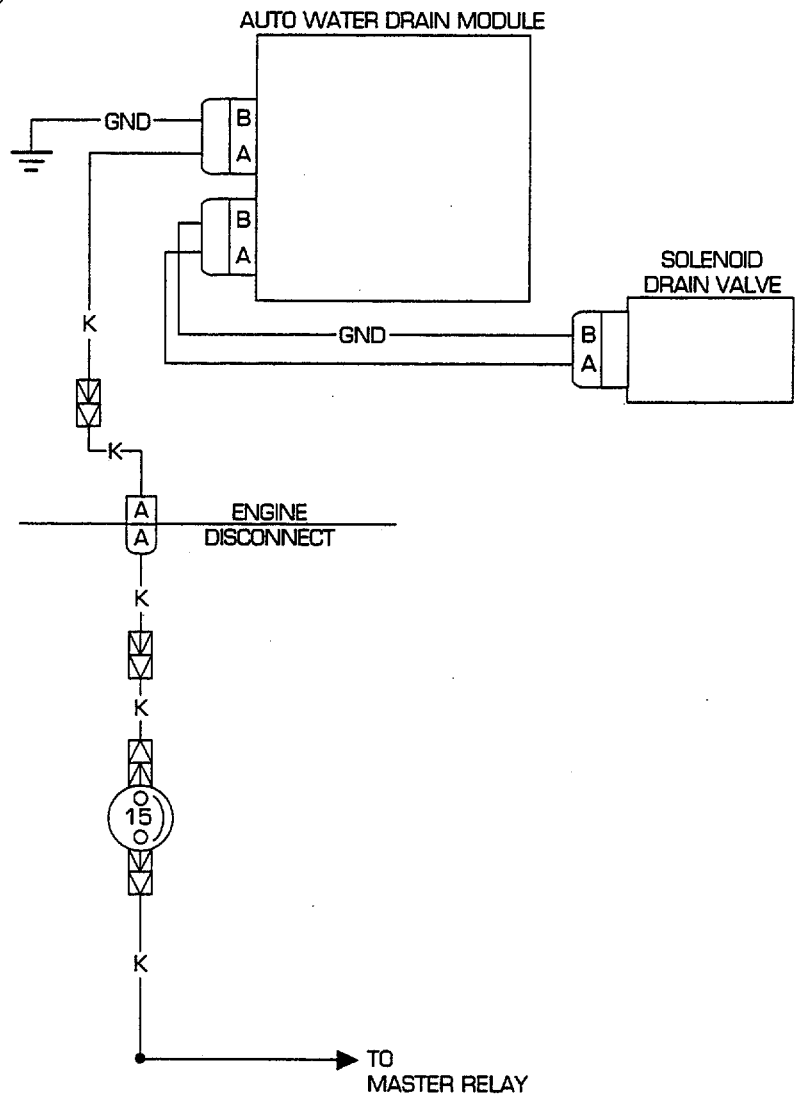
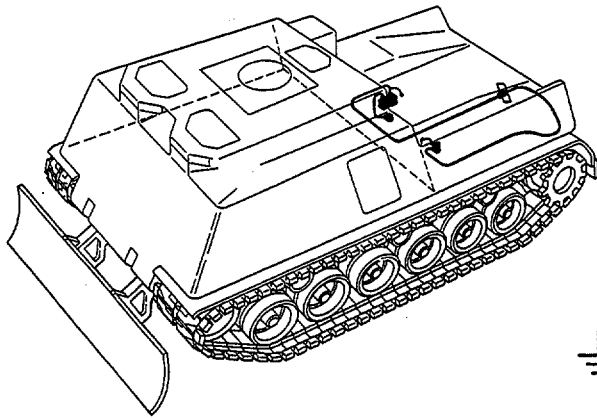


2-19 ELECTRICAL TROUBLESHOOTING-Continued

FUEL/WATER SEPARATOR CONTROL MODULE SYSTEM

SYMPTOM

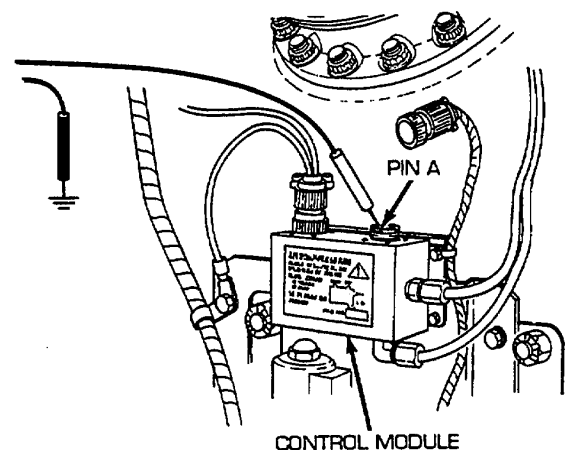
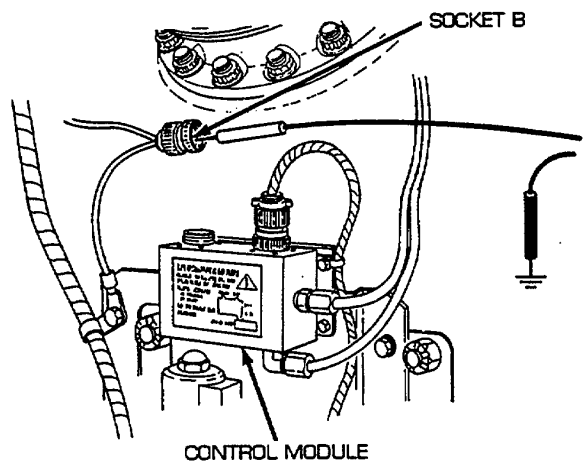
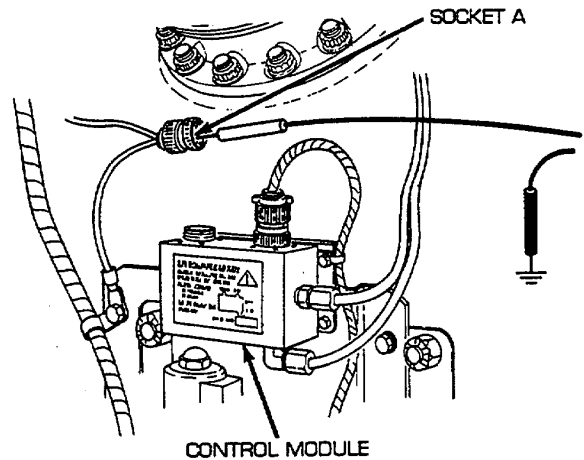
Automatic water drain system fails to operate.
Do steps A through I.



WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

- A Remove powerplant and groundhop (see paragraphs 3-1 and 3-2). Disconnect engine wiring harness connector from control module. Place red lead of multimeter in socket A of wire K and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step B. If voltage is not present, go to step E.
- B Place red lead of multimeter in socket B and black lead to ground. If continuity is present, go to step C. If continuity is not present, repair/replace GND wire of engine wiring harness (see paragraph 6-58 for dual voltage; 6-59 for single voltage).
- C Reconnect engine wiring harness connector to control module. Disconnect fuel/water separator control module to solenoid drain valve wiring harness from control module. Place red lead of multimeter on pin A of control module and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step D. If voltage is not present, replace fuel/water separator control module (see paragraph 4-17).



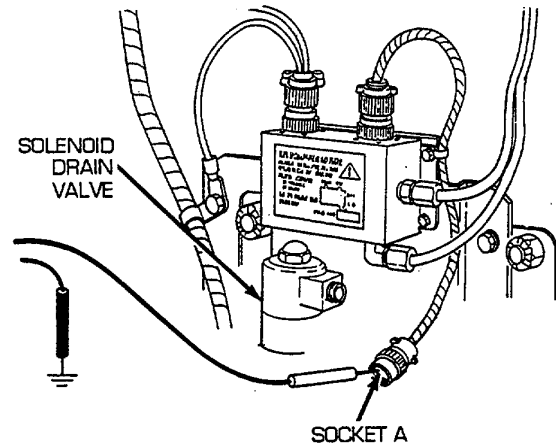
2-19 ELECTRICAL TROUBLESHOOTING-Continued

FUEL/WATER SEPARATOR CONTROL MODULE SYSTEM-Continued

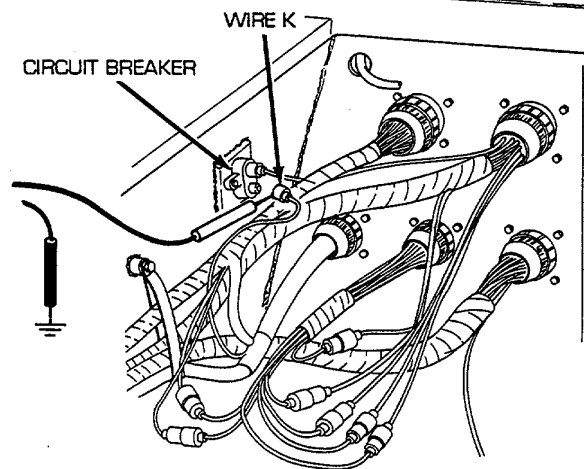
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

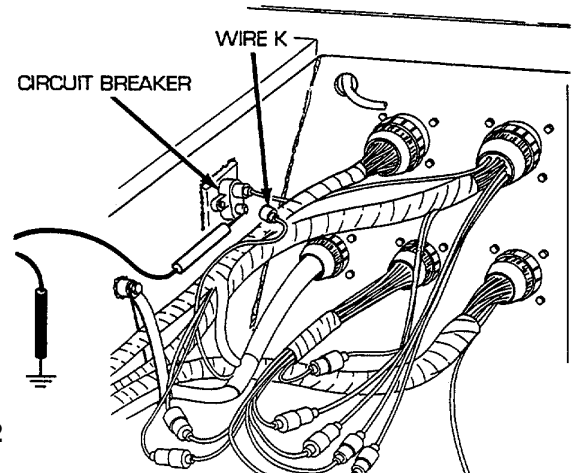
D Reconnect fuel/water separator control module to solenoid drain valve wiring harness to control module and disconnect from solenoid drain valve. Place red lead of multimeter in socket A of wiring harness and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, replace solenoid drain valve (see paragraph 4-17). If voltage is not present, repair/replace fuel/water separator control module to solenoid drain valve wiring harness (see paragraph 6-96).



E Reconnect engine wiring harness connector to auto water drain module. Open air inlet doors (TM 9-2350-256-10). Disconnect wire K of bulkhead to APU master relay and rigger's lights wiring harness from bulkhead side of 15 A circuit breaker in battery compartment. Place red lead of multimeter in female connector of wire K and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step F. If voltage is not present, troubleshoot battery circuit.



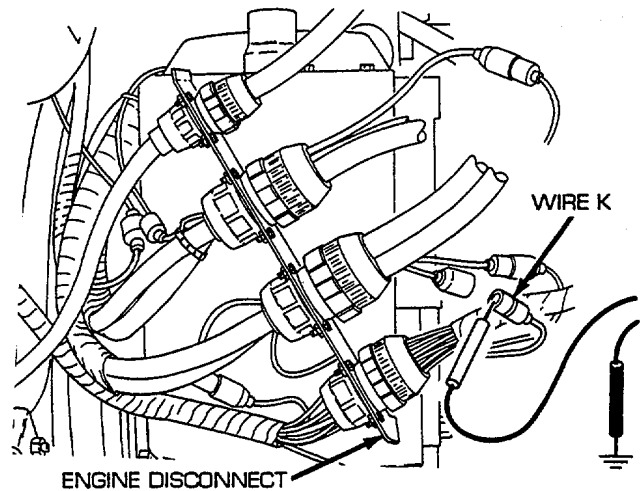
F Reconnect wire K of bulkhead to APU master relay and rigger's lights wiring harness to bulkhead connector side of 15 A circuit breaker. Disconnect wire K of bulkhead to engine bracket and rear fuel tank transmitter wiring harness from other side of 15 A circuit breaker. Place red lead of multimeter on circuit breaker terminal and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step G. If voltage is not present, replace 15 A circuit breaker.



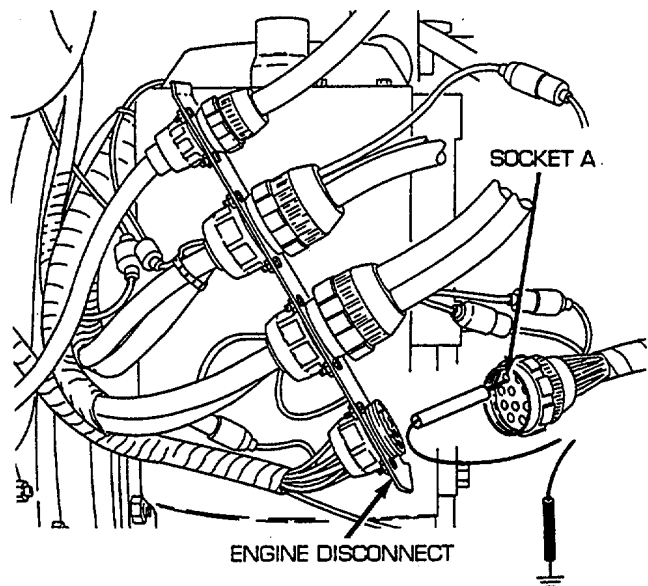
WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

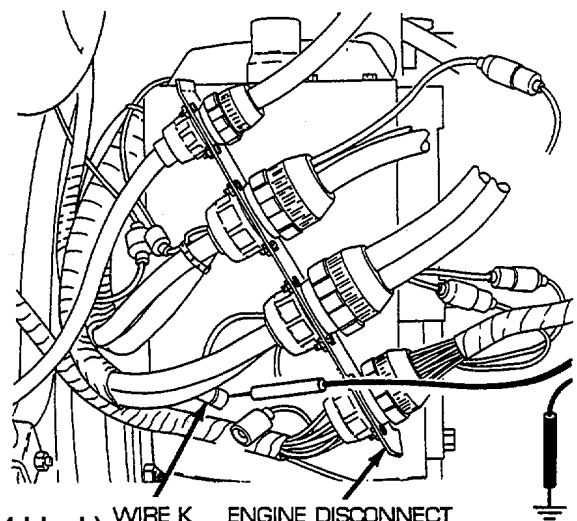
- G Reconnect wire K of bulkhead to engine bracket and rear fuel tank transmitter wiring harness to 15 A circuit breaker. Remove engine deck (see paragraph 9-51). Disconnect wire K of batteries to master relay voltage regulator and slave receptacle wiring harness at connector near engine disconnect bracket. Place red lead of multimeter in female connector of wire K and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step H. If voltage is not present, repair/replace wire K of bulkhead to engine bracket and rear fuel tank transmitter wiring harness from 15 A circuit breaker to connector (see paragraph 6-73 for dual voltage; 6-74 for single voltage).



- H Reconnect wire K of batteries to master relay, voltage regulators, slave receptacle, and engine disconnect wiring harness at connector. Disconnect batteries to master relay, voltage regulators, slave receptacle, and engine disconnect wiring harness from engine disconnect bracket. Place red lead of multimeter in socket A of wire K and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, go to step I. If voltage is not present, repair/replace wire K of batteries to master relay, voltage regulators, slave receptacle, and engine disconnect wiring harness (see paragraph 6-41 for dual voltage; 6-42 for single voltage).



- I Reconnect batteries to master relay, voltage regulators, slave receptacle, and engine disconnect wiring harness to engine disconnect. Disconnect wire K of starter module wiring harness from engine wiring harness near engine disconnect. Place red lead of multimeter in female connector of wire K and black lead to ground. Turn MASTER switch on and check for voltage. Turn MASTER switch OFF. If voltage is present, repair/replace wire K of engine wiring harness (see paragraph 6-58 for dual voltage; 6-59 for single voltage). If voltage is not present, repair/replace wire K of module starter wiring harness (see paragraph 6-40).



CHAPTER 3 MAINTENANCE OF ENGINE

CHAPTER OVERVIEW

This chapter describes how to remove, ground-hop, clean, adjust, inspect, and install the powerplant and engine related parts.

This chapter consists of the following paragraphs:

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3-1 REPLACE POWERPLANT

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic' s (Appendix C, item 53)
- Parts kit, steering clutch housing output shaft (Appendix C, item 28)
- Sling, beam-type, powerplant or engine (Appendix C, item 47)
- Stop, fabricated (Appendix E, item 1)
- Wrench, torque (Appendix C, item 61)

Material/Parts:

- Adhesive, sealant, silicone (Appendix D, item 5)
- Gasket (Appendix G, item 66)
- Gasket (Appendix G, item 73)
- Lockwashers (4) (Appendix G, item 110)
- Lockwashers (3) (Appendix G, item 118)
- Lockwashers (12) (Appendix G, item 132)

Material/Parts--Continued:

- Lockwashers (17) (Appendix G, item 134)
- Lockwashers (6) (Appendix G, item 138)
- Lockwire (Appendix G, item 155)
- Packing, preformed (Appendix G, item 187)
- Pin, cotter (Appendix G, item 206)
- Pins, cotter (2) (Appendix G, item 212)

Personnel Required:

Three

References:

- Deleted
- TM 9-2350-256-10

Equipment Condition:

Engine deck removed (see paragraph 9-51)
Vehicle track blocked (refer to TM 9-2350-256-10)

3-1 REPLACE POWERPLANT-Continued

NOTE

For removal and installation instructions, engine and transmission will be referred to as the powerplant.

a. REMOVAL

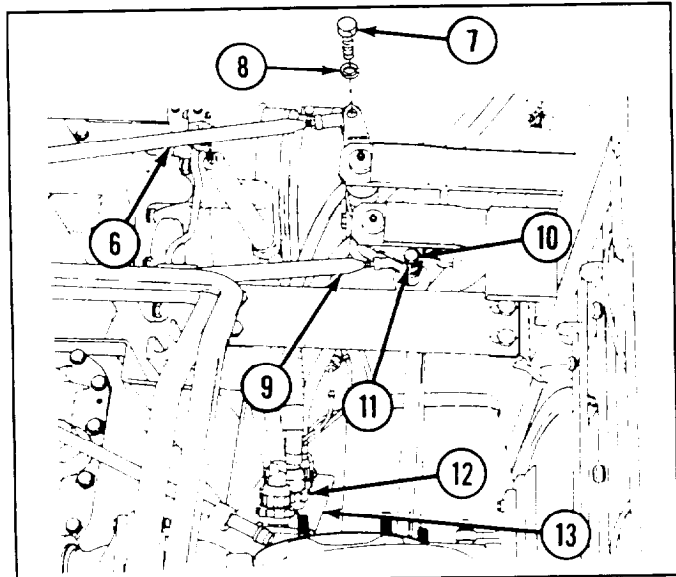
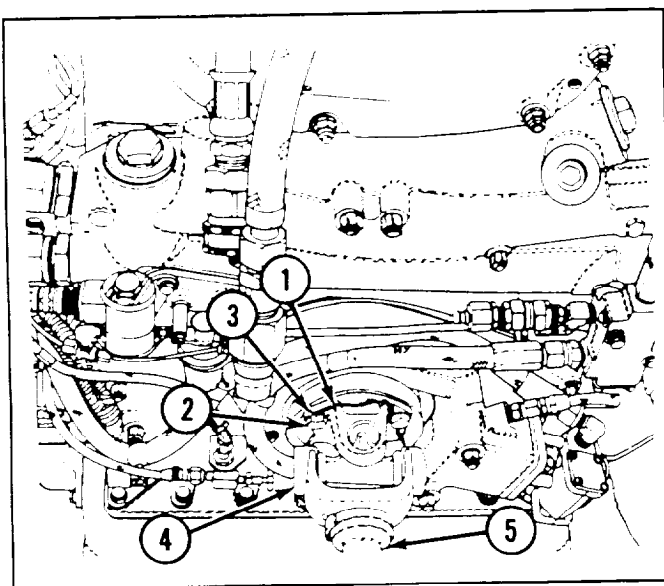
WARNING

Keep hands and arms away from propeller shaft while bumping engine or serious injury to personnel will result.

NOTE

If necessary to turn propeller shaft to reach screws, turn MASTER switch to ON position. Hold FUEL SHUTOFF switch in OFF position and touch STARTER switch. When screws are in position for removal, turn MASTER switch to OFF position.

- 1 Cut lockwire (1) and remove from screws (2).
- 2 Remove four screws (2) and four lockwashers (3) from power takeoff coupling (4).
- 3 Slide propeller shaft (5) toward bulkhead.
- 4 Disconnect transmission steering rod (6) by removing screw (7) and lockwasher (8).
- 5 Disconnect transmission shifting rod (9) by removing screws (10) and lockwasher (11).
- 6 Disconnect four electrical cables (12) to engine wiring harness bracket (13).



NOTE

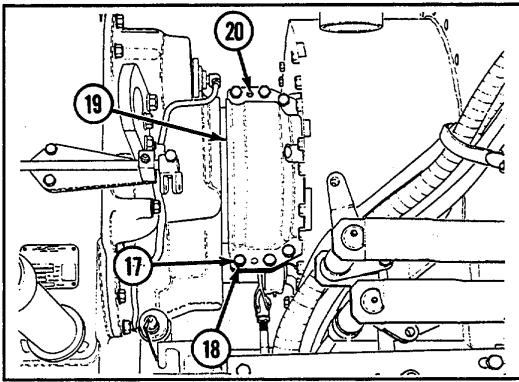
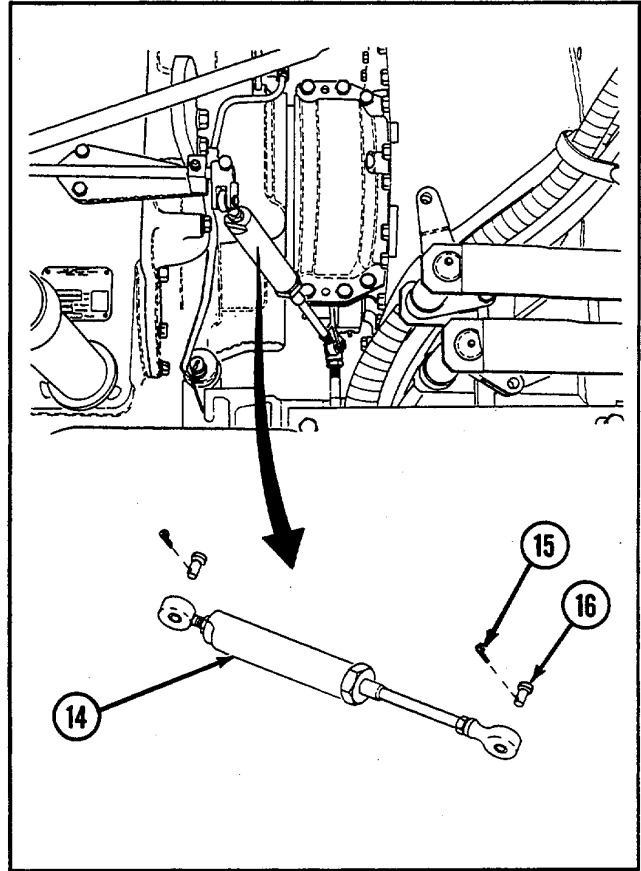
Engine exhaust pipe shown removed for clarity.

- Remove brake air valve linkage (14) by removing two cotter pins (15) and two straight pins (16).

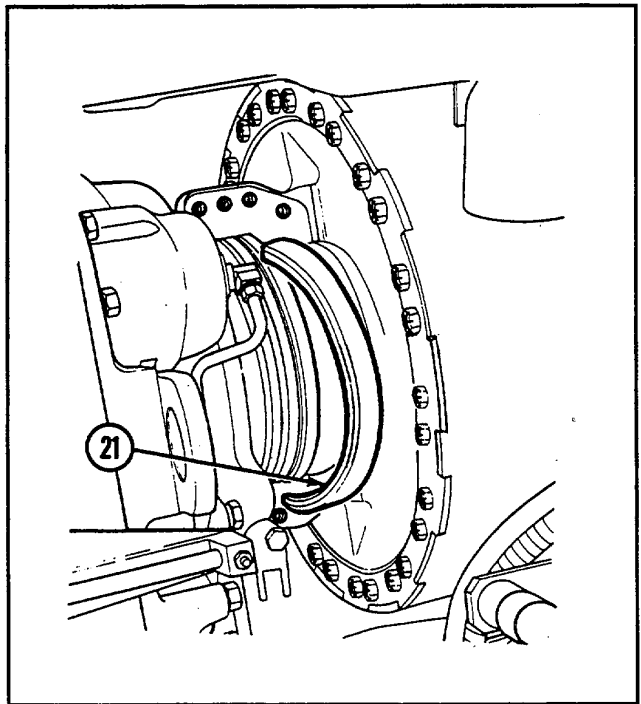
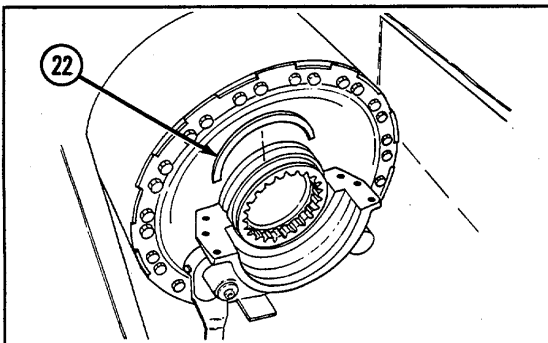
CAUTION

Do not scratch or damage saddle caps. A defective cap may cause oil leaks after installation. Remove nicks and burrs prior to installation.

- Remove six screws (17) and six lockwashers (18) each from left and right transmission mounting saddle caps (19).
- Remove left and right transmission mounting saddle caps (19) by using one of previously removed screws (17) as jacking screw in tapped hole (20).
- Remove left and right coupling retainers (21).

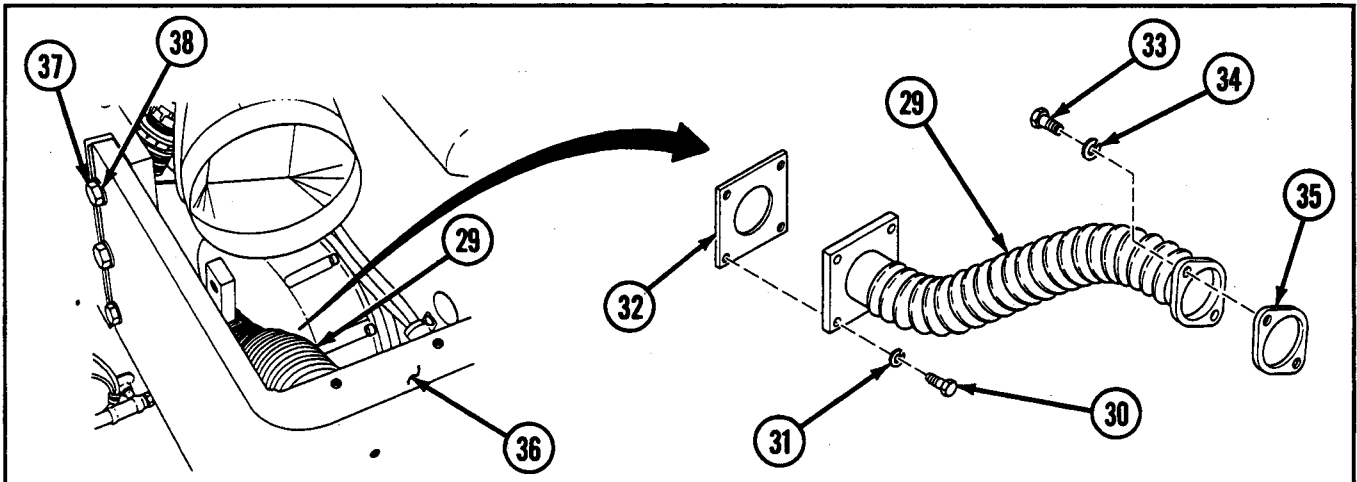
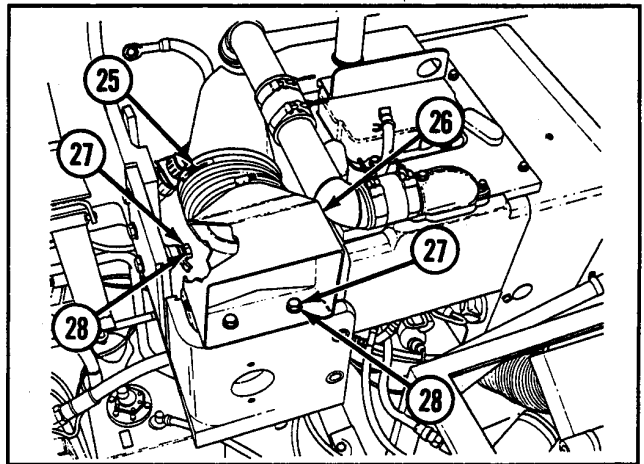
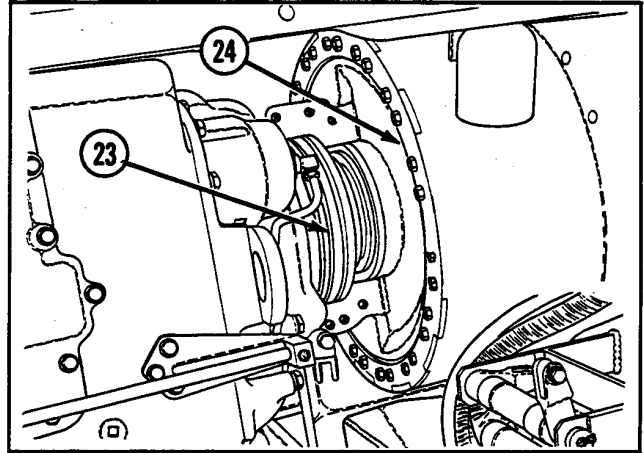


- Place each fabricated stop (22) between left and right output reduction unit and flanges.



3-1 REPLACE POWERPLANT-Continued

- 12 Pry couplings (23) out of left and right output reduction drive units (24).
- 13 Remove Auxiliary Power Unit (APU) access cover (see paragraph 9-49).
- 14 Loosen clamp (25).
- 15 Remove APU cooling air duct (26) by removing three screws (27) and three lockwashers (28).
- 16 Remove personnel heater exhaust hose assembly (29) by removing four screws (30), four lockwashers (31), gasket (32), two screws (33), two lockwashers (34), and gasket (35).
- 17 Remove APU housing (36) by removing three screws (37) and three lockwashers (38).



18 Loosen clamp (39) and disconnect generator air intake hose (40).

19 Disconnect throttle linkage (41) by removing screw (42) and nut (43) and pulling hand throttle at driver's control all the way out.

20 Disconnect tachometer cable (44).

21 Disconnect emergency fuel shutoff linkage (45) by removing flat washer (46) and cotter pin (47) from link (48).

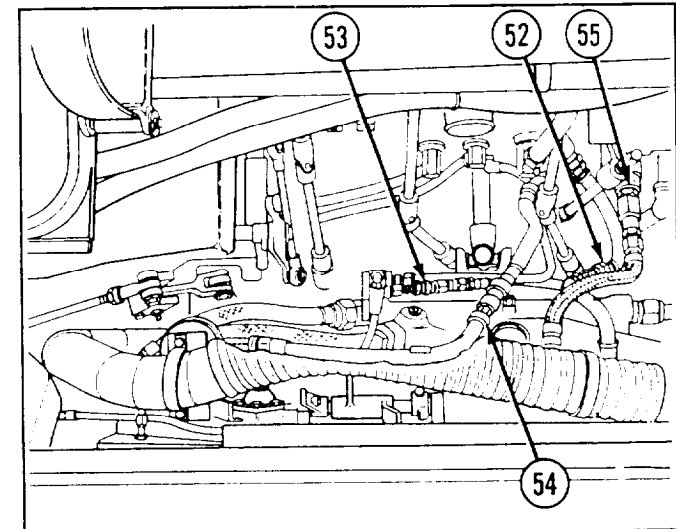
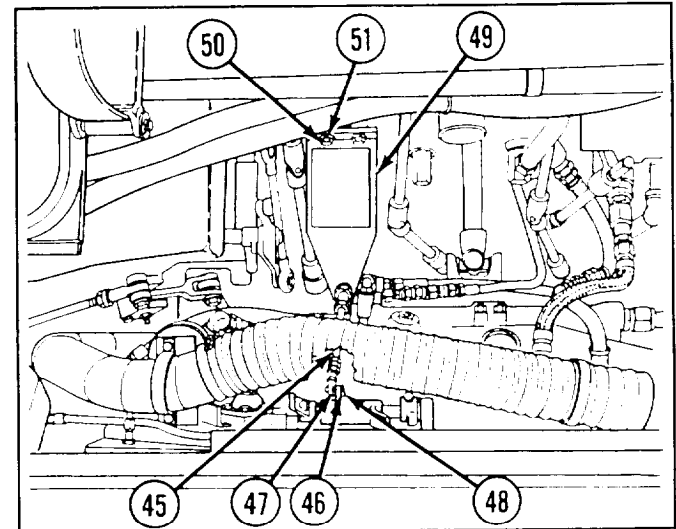
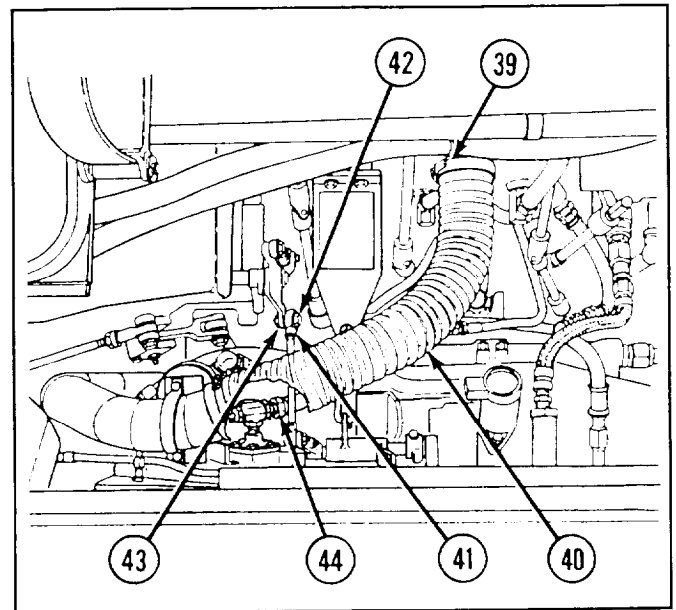
23 Remove emergency fuel shutoff linkage bracket (39) by removing two screws (50) and two lockwashers (51).

23 Disconnect fuel return hose (53) at quick disconnect.

24 Disconnect primer hose (52) at quick disconnect.

25 Disconnect main fuel hose (54) at quick disconnect.

26 Disconnect fire extinguisher line (55) at quick disconnect.



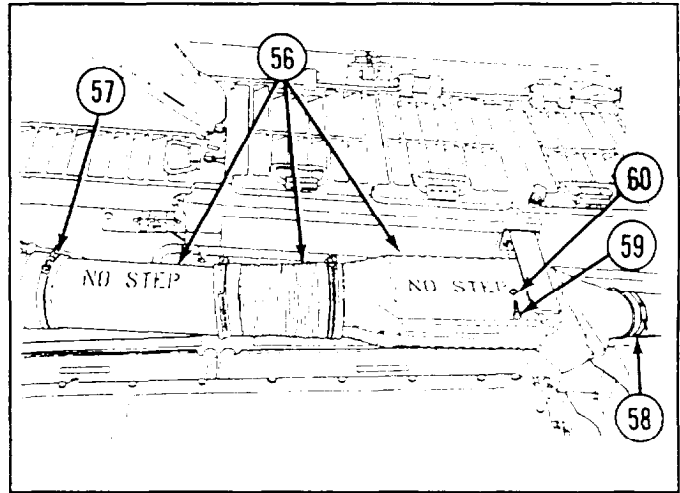
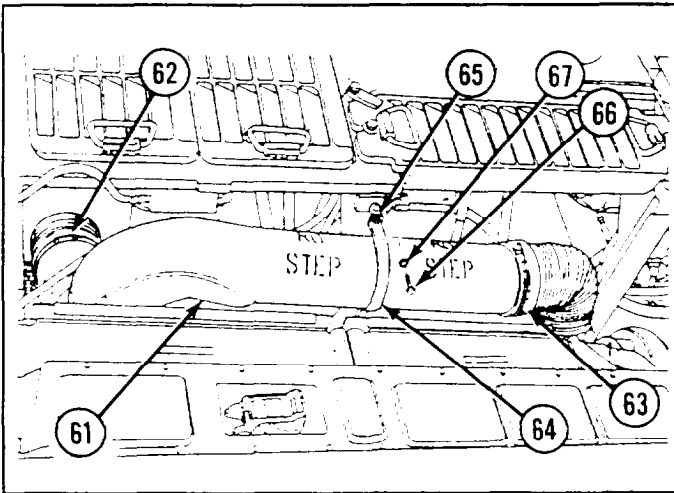
3-1 REPLACE POWERPLANT-Continued

NOTE

Cover turbosupercharger openings with tape or caps after removal of air ducts.

27 Remove vehicle left-side air ducts (56) by loosening hose clamps (57 and 58) and removing two screws (59) and two lockwashers (60).

28 Remove vehicle right-side air ducts (61) by loosening hose clamps (62 and 63). Then remove strap (64) and bar (65) by removing two screws (66) and two lockwashers (67).

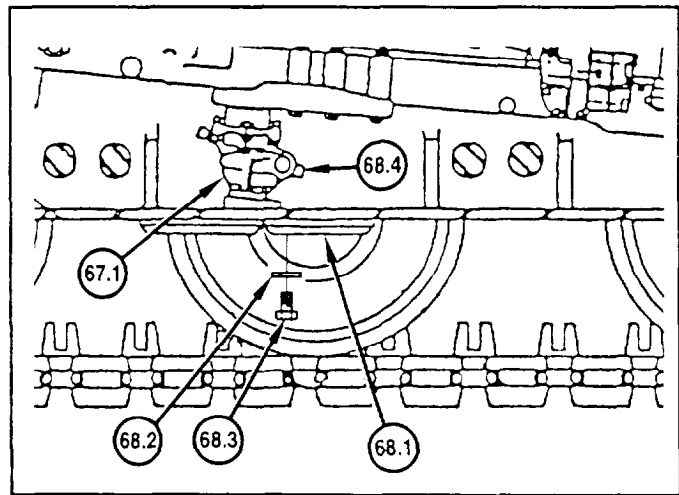
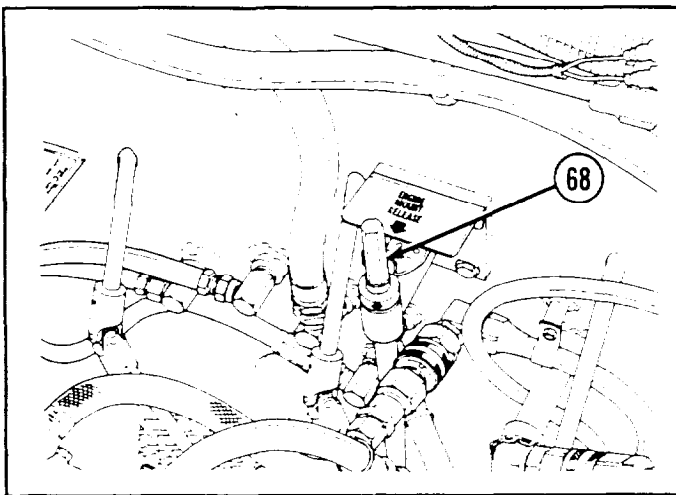


NOTE

Perform step 29a for normal conditions. Perform step 29b if engine mount release rod is inoperable from engine opening.

29 Release engine mount (67.1).

- a Turn engine mount release rod (68) counterclockwise.
- b Remove access cover (68.1) by removing six screws (68.2) and six lockwashers (68.3). Turn bolt (68.4) counterclockwise to release engine mount (67.1).



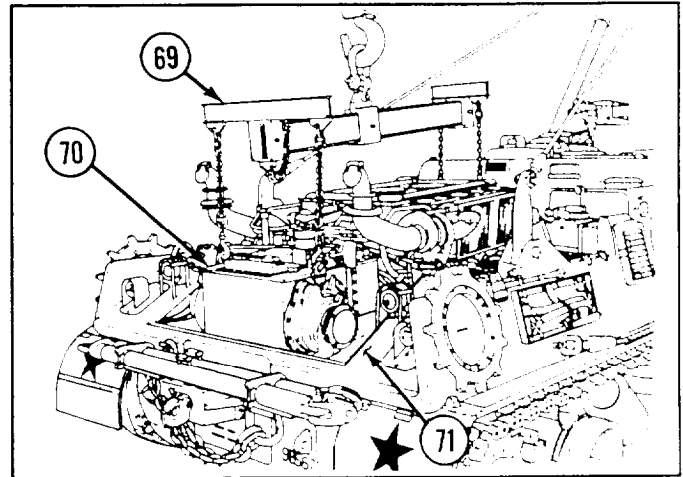
WARNING

All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury or death to personnel.

NOTE

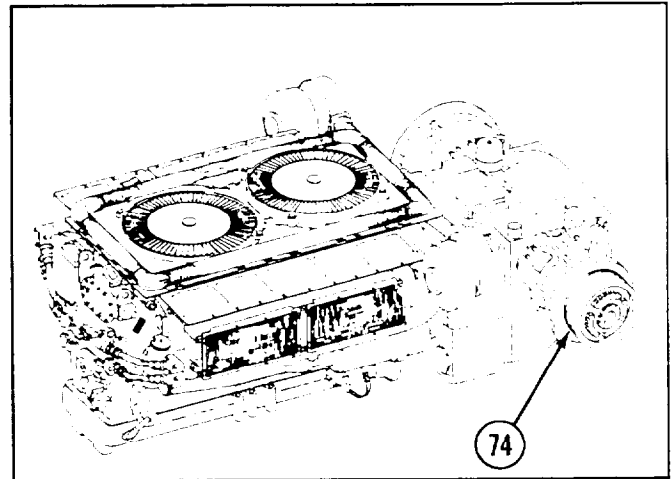
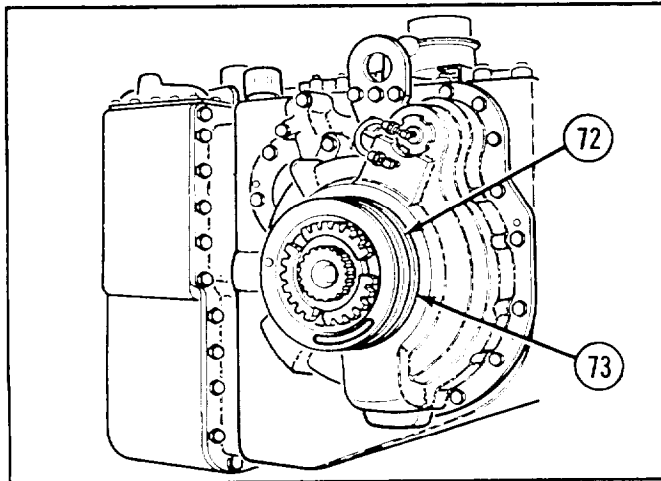
Sling (69) is premarked to ensure proper rigging for powerplant (70) removal.

- 30 Remove power-plant (70) from vehicle hull (71) using sling (69).
- 31 Remove two preformed packings (72) from each side of transmission saddle (73).

**CAUTION**

Do not step on shifting, steering, or brake linkages after removing powerplant. Damage to linkages could result.

- 32 Install steering clutch housing output shaft parts kit (74). Cover ends of left and right output reduction assemblies in hull with tape or other suitable item after removal of powerplant.

**b. INSTALLATION****NOTE**

- Prior to installation, inspect and adjust fire extinguisher nozzles in engine compartment and check that all powerplant lines, cables, accessories, and other components are properly installed, tightened, and adjusted. Inspect transmission output reduction drives and engine mountings and connections in engine compartment to determine if items are serviceable and positioned to receive powerplant.
- Clean (flush) engine compartment prior to installation of powerplant.
- Prior to installation of powerplant, perform necessary engine compartment lubricating procedures (refer to TM 9-2350-256-10).

3-1 REPLACE POWERPLANT-Continued

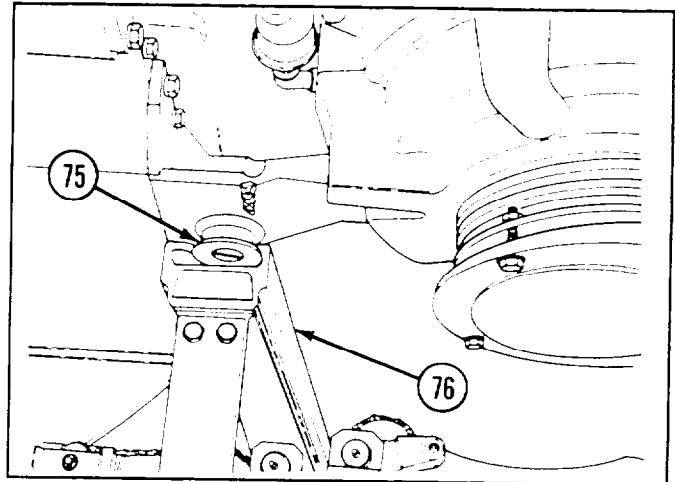
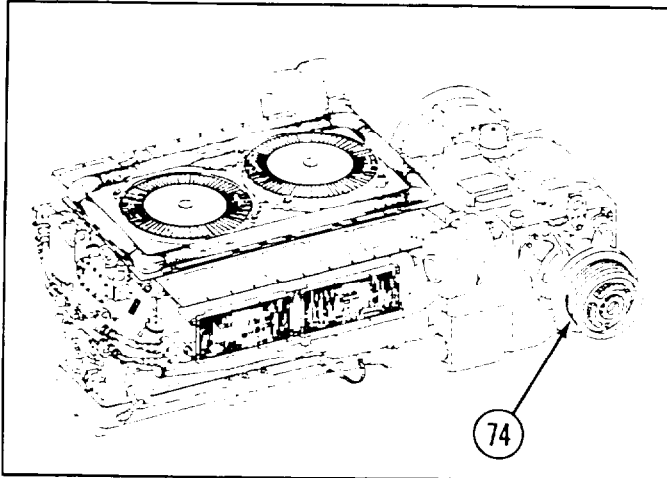
- 1 Remove steering clutch housing output shaft parts kit (74). Uncover left and right output reduction assemblies in hull.

CAUTION

When installing powerplant, be sure transmission guide rollers (75) are inserted into transmission guide rails (76).

NOTE

Be sure that all tape, caps, and other protective closure items have been removed before installation.

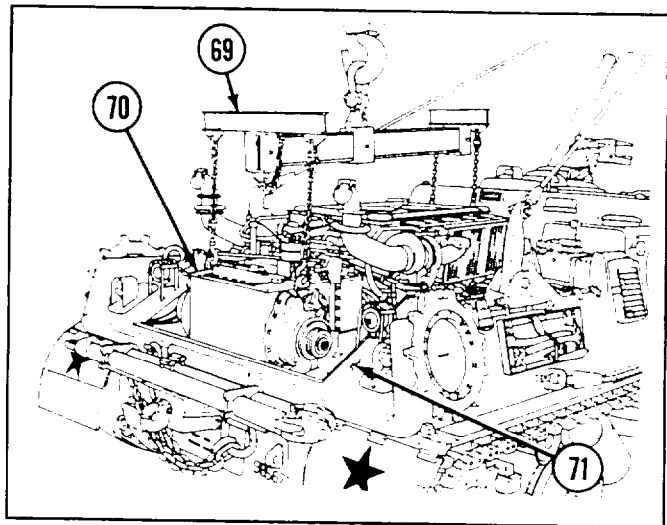
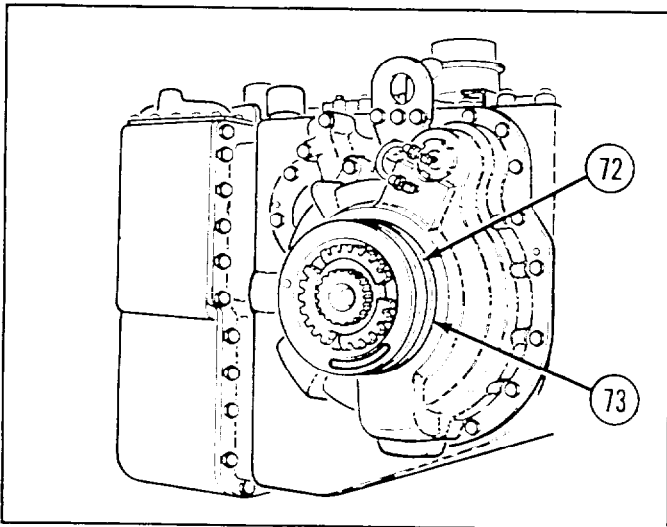


- 2 Install two new preformed packings (72) on each side of transmission saddle (73).

WARNING

All personnel must stand clear during lifting operation. A swinging or shifting load may cause injury or death to personnel.

- 3 Install powerplant (70) in vehicle hull (71) using sling (69)

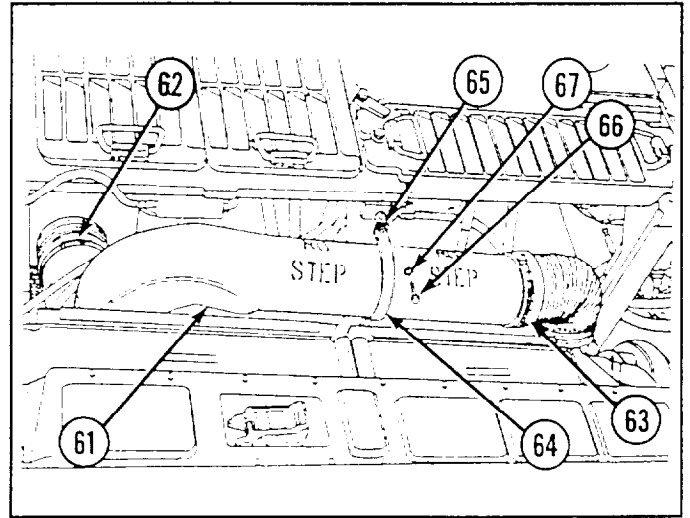
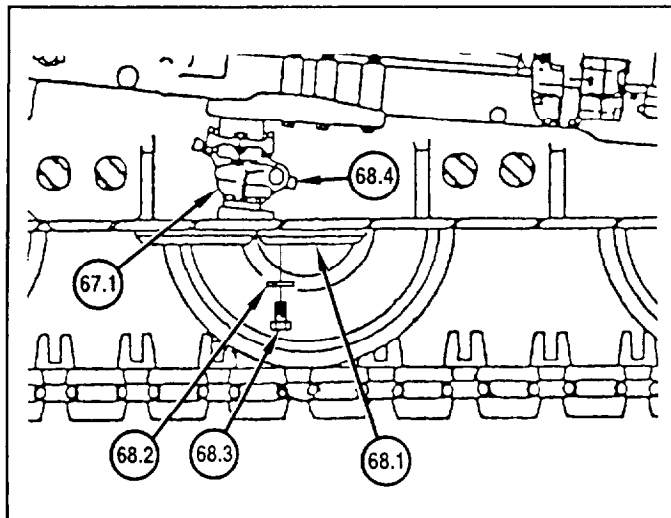
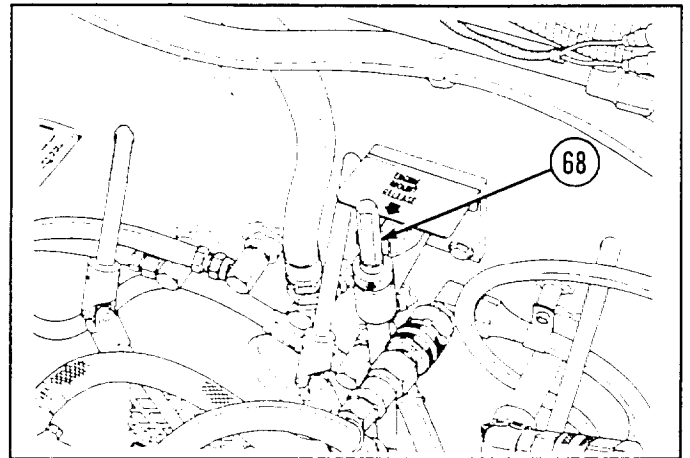


- 4 Torque engine mount release rod (68) to 42-48 pound-feet (lb-ft) (57-65 newton-meters [N•m]) to secure engine to hull.

NOTE

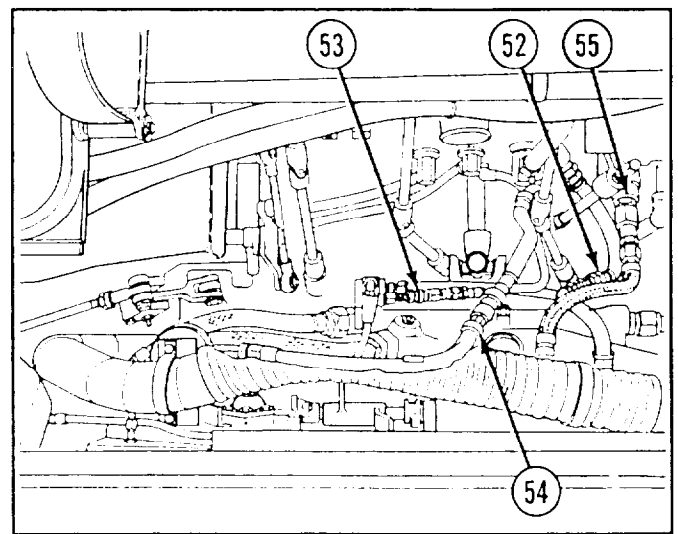
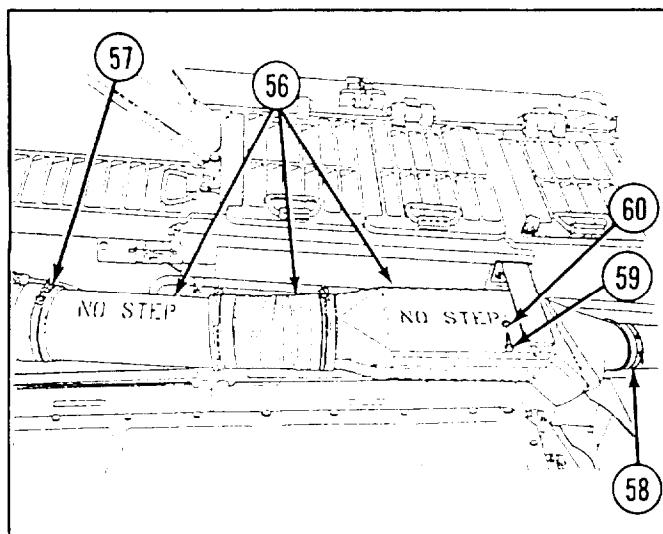
Perform step 4.1 if engine mount (67.1) was accessed and released from underneath hull.

- 4.1 Install access cover (68.1) with six new lockwashers (68.3) and six screws (68.2).
- 5 Install vehicle right-side air ducts (61). Secure with strap (64) and bar (65) using two screws (66) and two new lockwashers (67). Place ends of duct into hose clamps (62 and 63). Tighten clamps



- 6 Install vehicle left-side air ducts (56). Secure with two screws (59) and two new lockwashers (60). Place ends of duct into hose clamps (57 and 58). Tighten clamps.

- 7 Connect fire extinguisher line (55), main fuel hose (54), primer hose (53), and fuel return hose (52)



3-1 REPLACE POWERPLANT-Continued

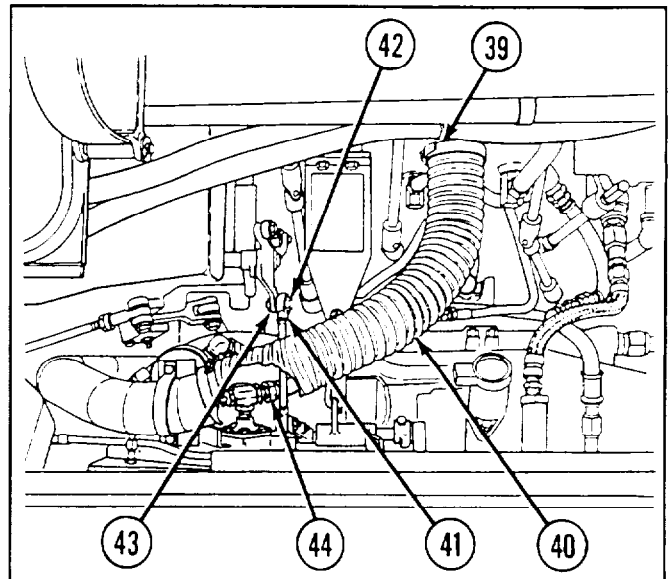
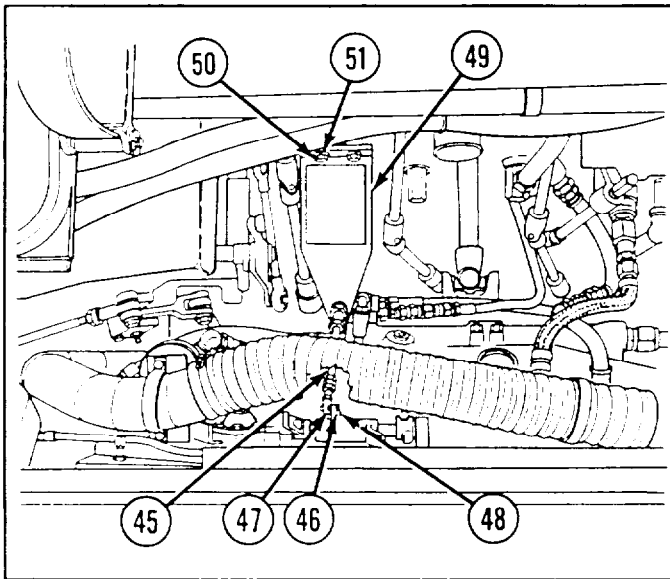
8 Install emergency fuel shutoff linkage bracket (49) with two screws (50) and two new lockwashers (51).

9 Connect emergency fuel shutoff linkage (45) to link (48) with flat washer (46) and new cotter pin (47).

10 Connect tachometer cable (44).

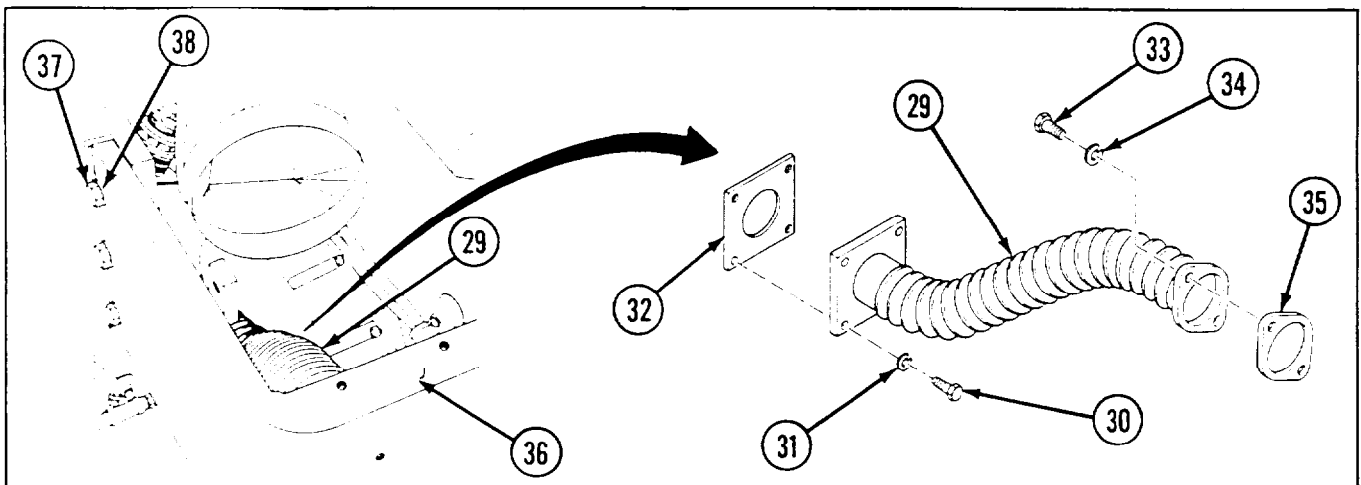
11 Push hand throttle at driver's control all the way in and connect throttle linkage (41) by installing screw (42) and nut (43).

12 Connect generator air intake hose (40) by tightening clamp (39).

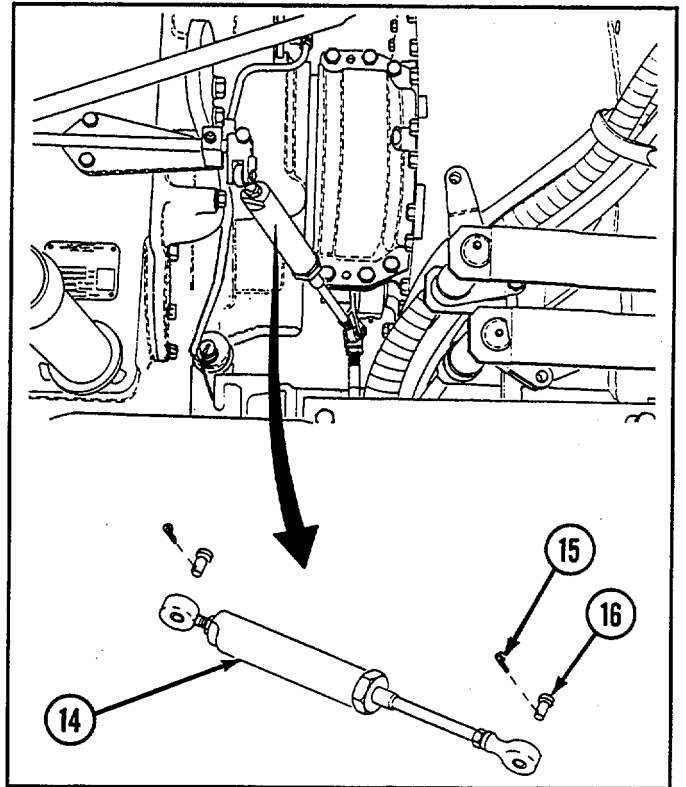
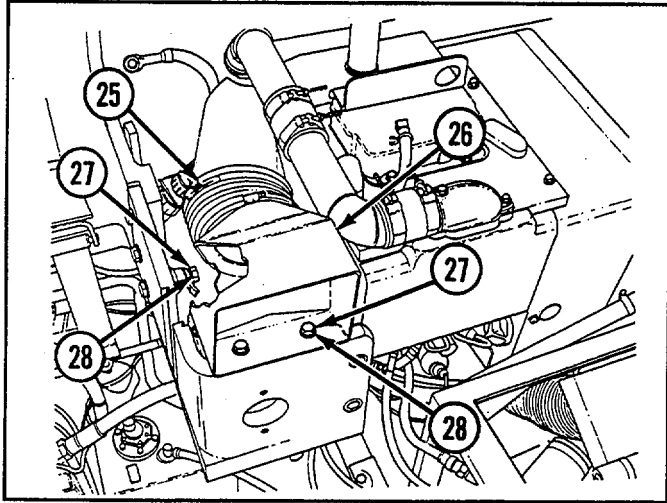


13 Install APU housing (36) with three screws (37) and three new lockwashers (38).

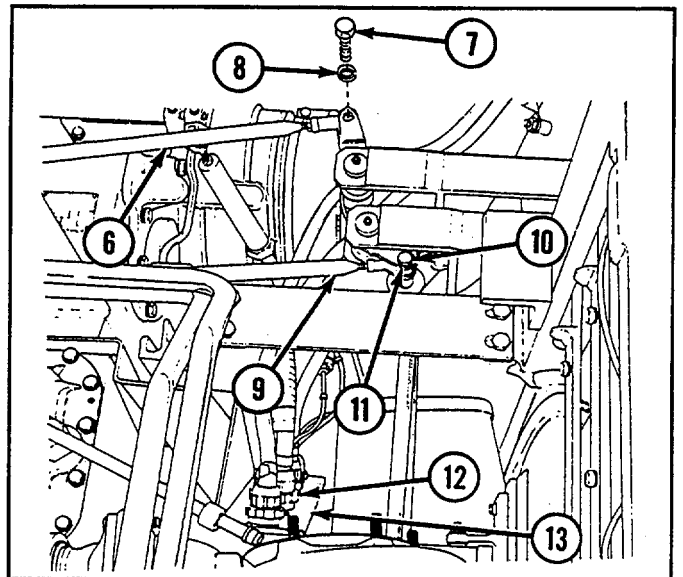
14 Install personnel heater exhaust hose assembly (29) with four screws (30), four new lockwashers (31), new gasket (33), two screws (33), two new lockwashers (34), and new gasket (35).



- 15 Install APU cooling air duct (26) with three screws (27) and three new lockwashers (28). Tighten clamp (25).
- 16 Install APU access cover (see paragraph 9-49).
- 17 Install brake air valve linkage (14) with two straight pins (16) and two new cotter pins (15).



- 18 Connect four electrical cables (12) to engine wiring harness bracket (13).
- 19 Connect transmission shifting rod (9) with screw (10) and new lockwasher (11).
- 20 Connect transmission steering rod (6) with screw (7) and new lockwasher (8).



3-1 REPLACE POWERPLANT-Continued

WARNING

Keep hands and arms away from propeller shaft while engine is running, or serious injury to personnel will result.

NOTE

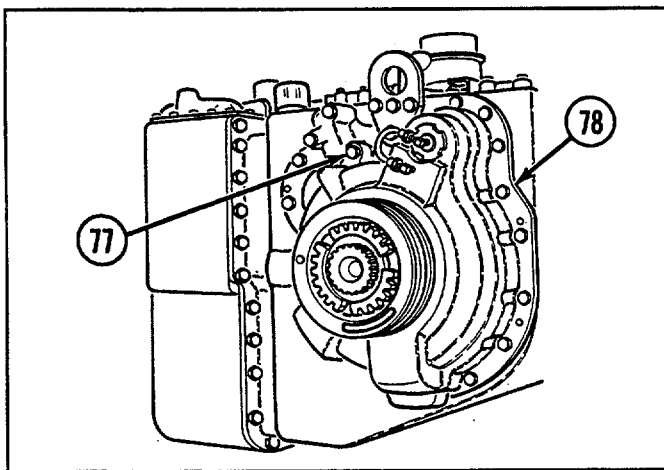
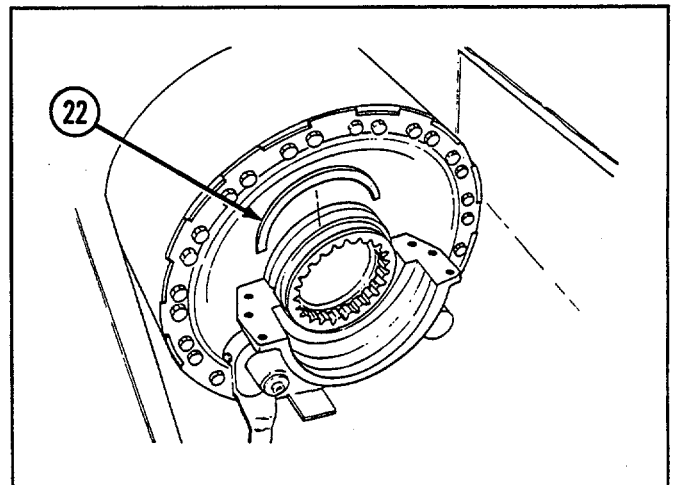
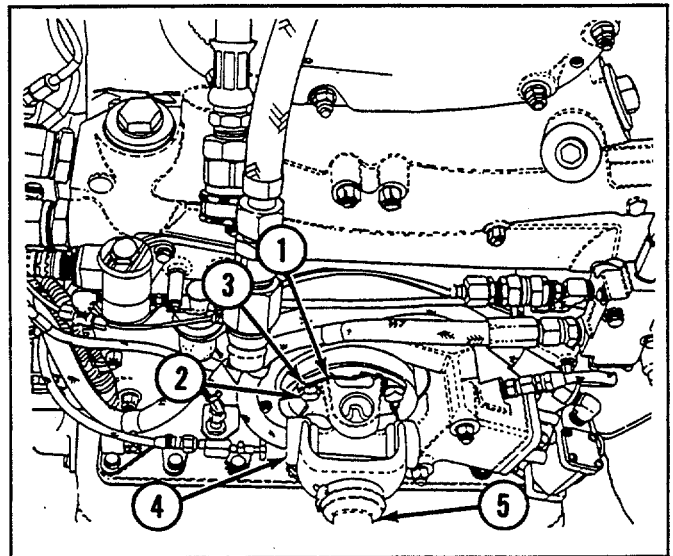
If necessary to turn propeller shaft to align screw holes, turn MASTER switch to ON position. Hold FUEL SHUTOFF switch in OFF position and touch STARTER switch. When holes are in position for installation, turn MASTER switch to OFF position.

- 21 Slide propeller shaft (5) into position on power takeoff coupling (4) and secure with four screws (2) and four new lockwashers (3). Secure four screws with new lockwire (1).
- 22 Remove both fabricated stops (22).
- 23 Remove access plug (77) from left steer clutch housing (78).

NOTE

Ensure that vehicle is in N (neutral) with brakes released and tracks blocked before attempting to rotate steering tie shaft.

- 24 Insert screwdriver in hole and engage slot in steering tie shaft.
- 25 Using a second screwdriver, apply pressure on right coupling (23) flange toward steer clutch housing and simultaneously turn steering tie shaft until gear teeth mesh. It may be necessary to use a 12-in. (305-mm) adjustable, open-end wrench on screwdriver to turn steering tie shaft. Minimum vertical movement of coupling may require a piece of wire for support while engaging gear teeth.



- 26 Repeat steps 24 and 25 for opposite side.
- 27 Install left and right coupling retainers (21).

CAUTION

Scratched or damaged saddle caps can cause oil leaks. Remove nicks and burrs prior to installation.

- 28 Install left and right transmission mounting saddle caps (19) each with six screws (17) and six new lockwashers (18).

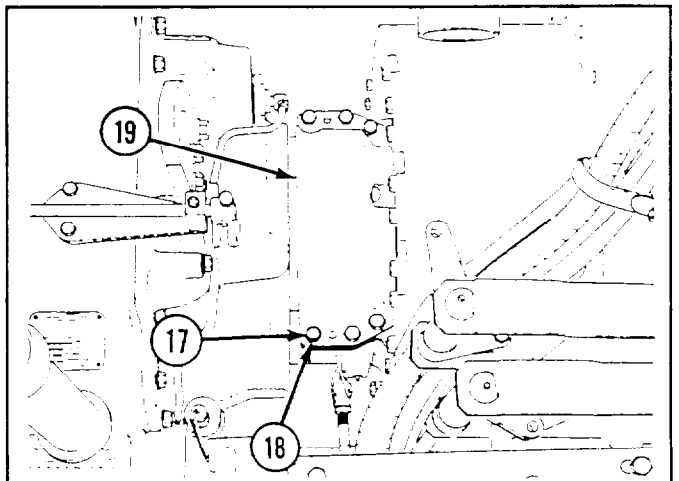
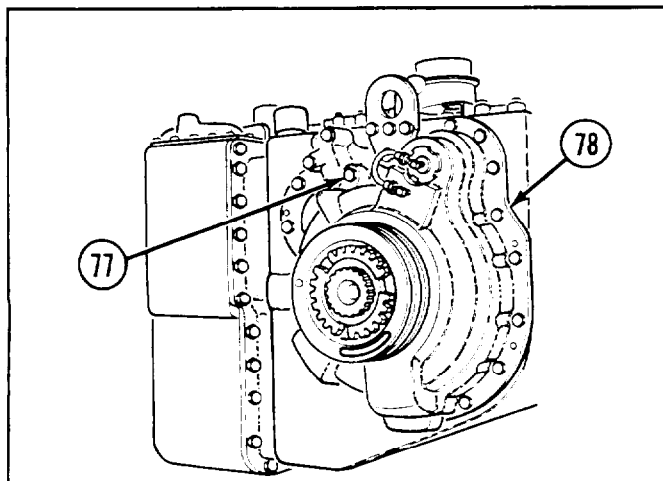
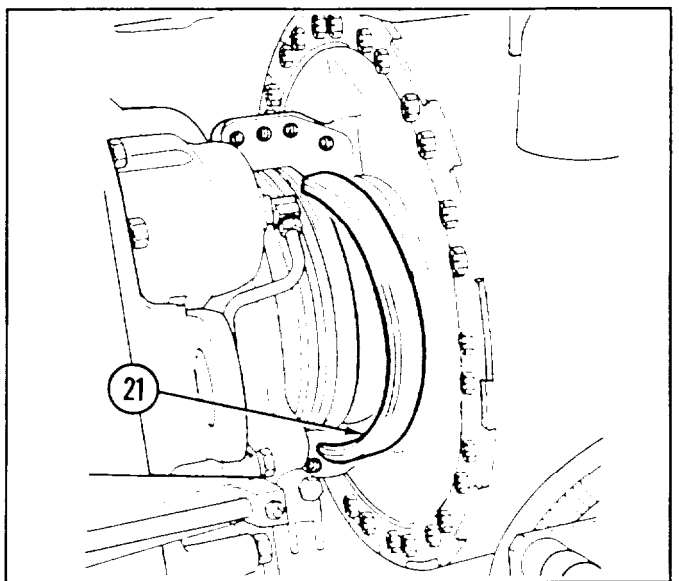
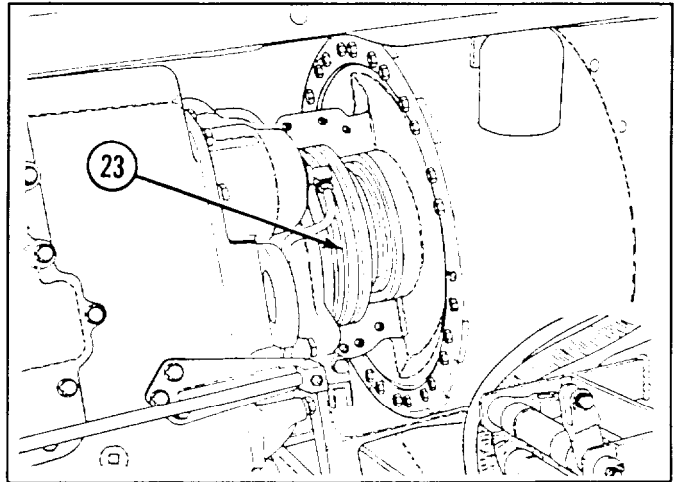
NOTE

Apply silicone sealant adhesive uniformly on saddle cap split line on both sides of transmission.

- 29 Install access plug (77) in left steer clutch housing (78).
- 30 Start engine and listen for unusual noises or abnormal conditions (refer to TM 9-2350-256-10).

NOTE

Follow-on maintenance: Install engine deck (see paragraph 9-51)



3-2 REPLACE/SERVICE GROUNDHOP

THIS TASK COVERS

- | | | |
|-----------------|---------|------------|
| a. Installation | b. Test | c. Removal |
|-----------------|---------|------------|

INITIAL SET-UP

Tools:

- Tool kit, general mechanic' s (Appendix C, item 53)
- Cable assembly, accessories (Appendix C, item 5)
- Cable assembly, generator armature (Appendix C, item 6)
- Cable assembly, ground (Appendix C, item 8)

Tools-Continued:

- Cable assembly, starter (Appendix C, item 7)
- Clamp (Appendix C, item 9.1)
- Filter assembly (Appendix C, item 13.1)
- Hose (Appendix C, item 18.1)
- Hose assembly, engine primer (Appendix C, item 19)
- Hose assembly, main fuel line and fuel injector return line (Appendix C, item 20)

Personnel Required:

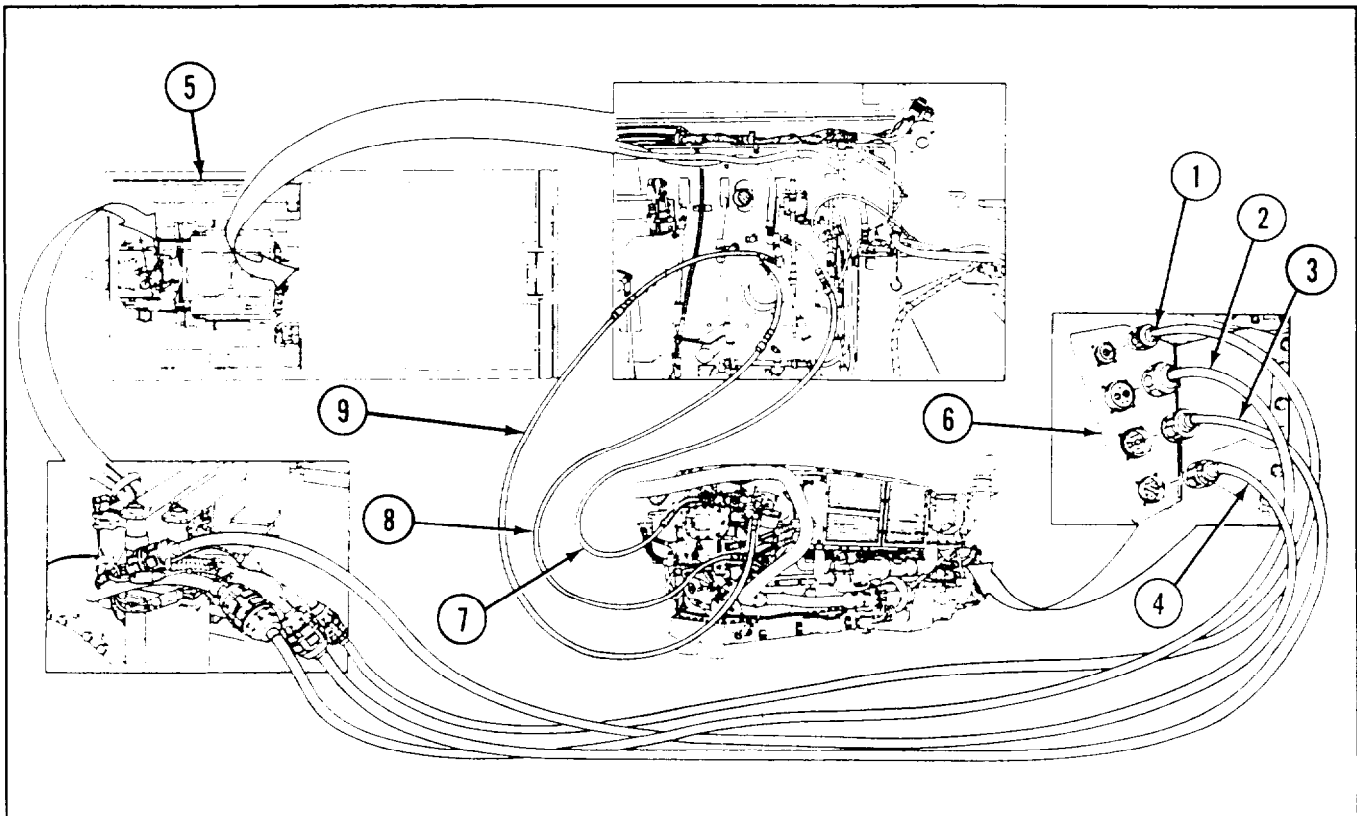
Two

Equipment Condition:

Power-plant removed (see paragraph 3-1)

a. INSTALLATION

- 1 Connect generator armature cable assembly (1), ground cable assembly (2), starter cable assembly (3), and accessories cable assembly (4) between vehicle (5) and engine wiring harness bracket (6).
- 2 Connect fuel return hose (7) at quick disconnects in vehicle and on engine.
- 3 Connect primer fuel hose (8) at quick disconnects in vehicle and on engine.
- 4 Connect main fuel hose (9) at quick disconnects in vehicle and on engine.

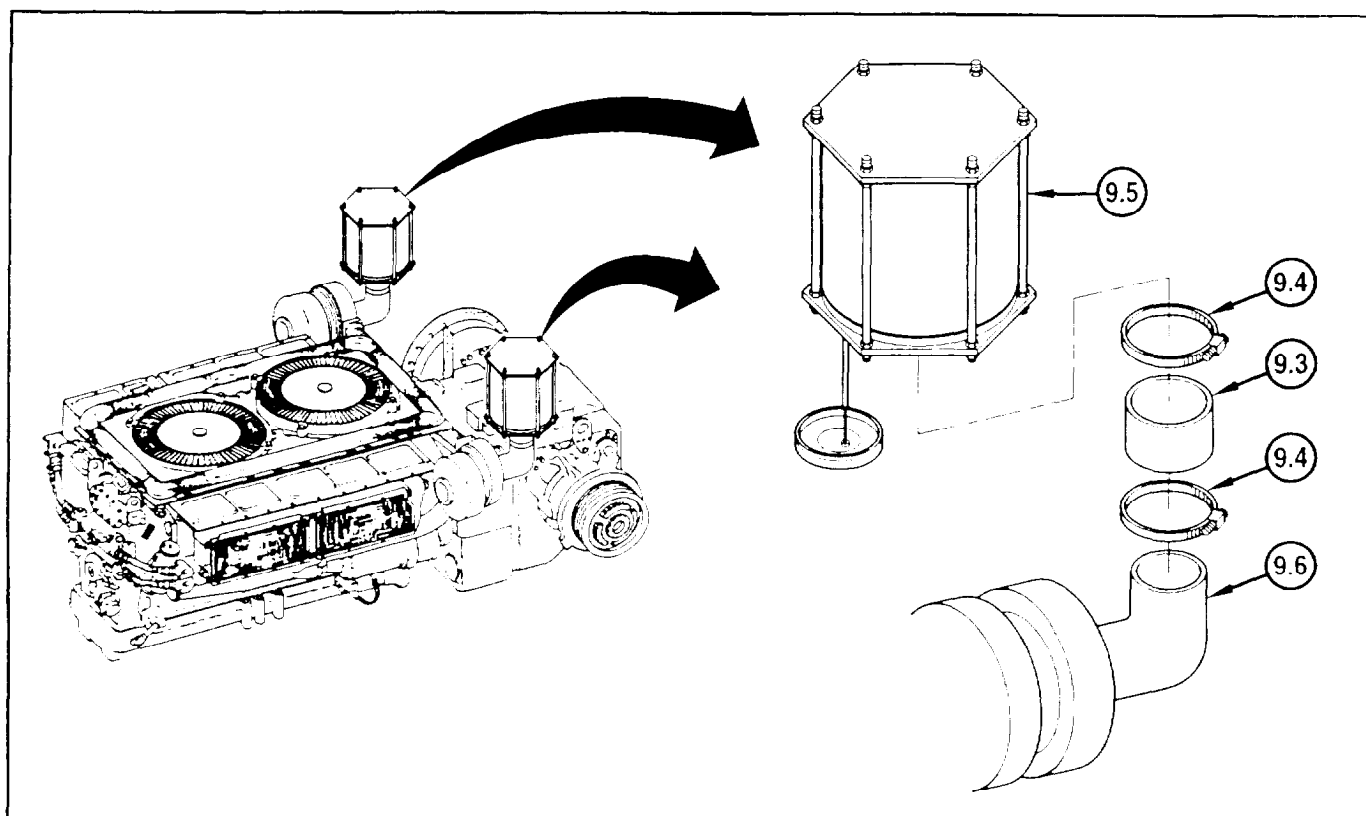
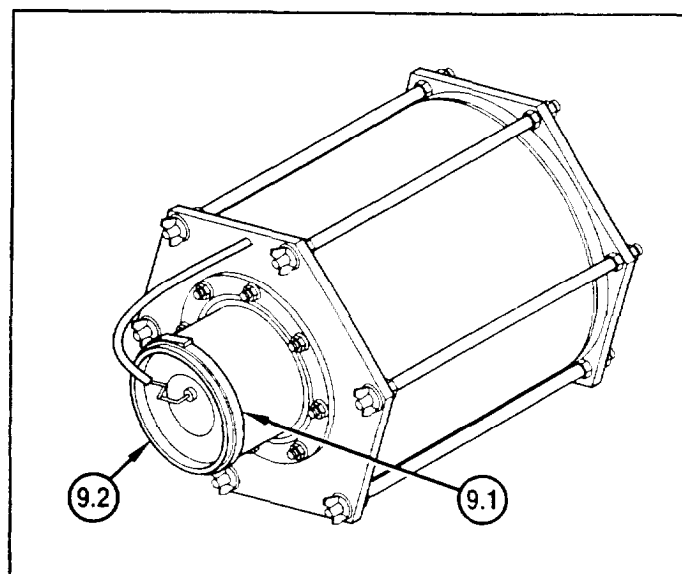


NOTE

Right and left filter assemblies are installed in the same manner.

5 Remove clamp (9.1) and cover (9.2).

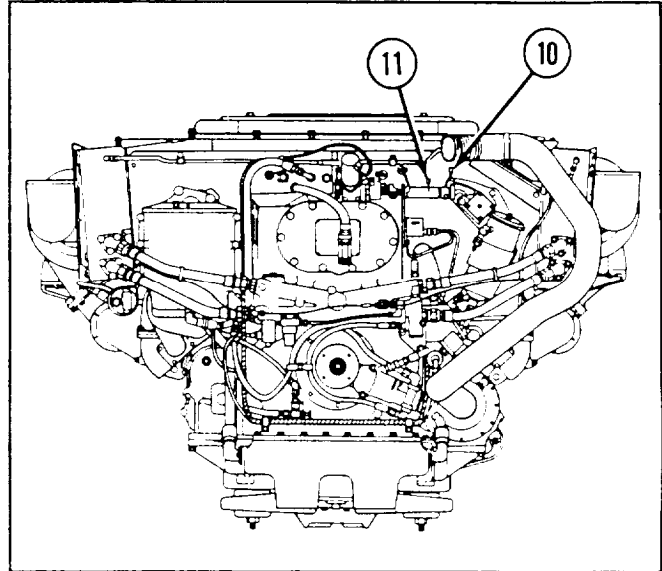
6 Install hose (9.3), two clamps (9.4), and filter assembly (9.5) to turbocharger (9.6).



3-2 REPLACE/SERVICE GROUNDHOP-Continued

b. TEST

- 1 Place throttle control lever (10) and fuel shutoff control lever (11) in open position.
- 2 Start engine and observe gages, warning lights, and powerplant for proper operation with the aid of assistant.
- 3 Place throttle control lever (10) at fast idle for 5 seconds. Release and allow powerplant to warm up to 140-240 degrees (°) Fahrenheit (F) (60-116° Celsius [C]). Observe gages and warning lights.
- 4 Place fuel shutoff control lever (11) in closed position to stop engine.

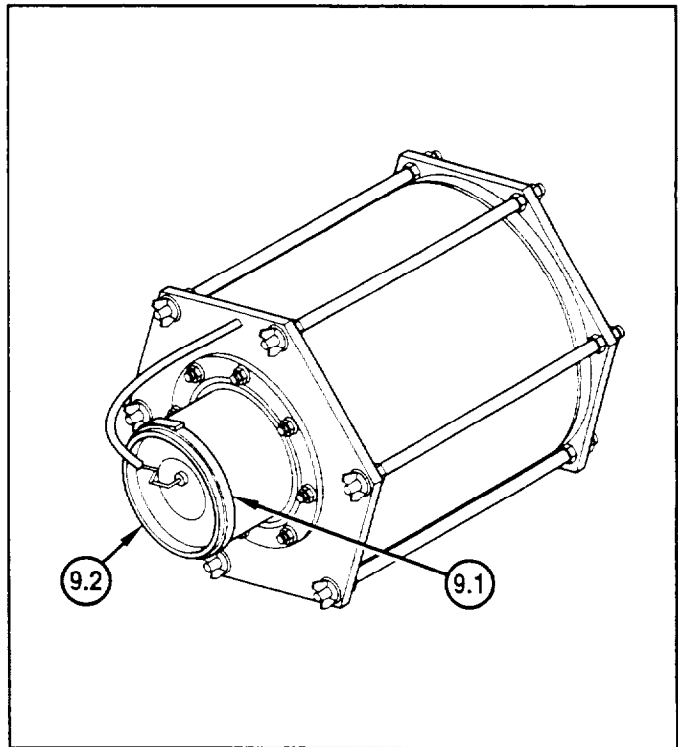
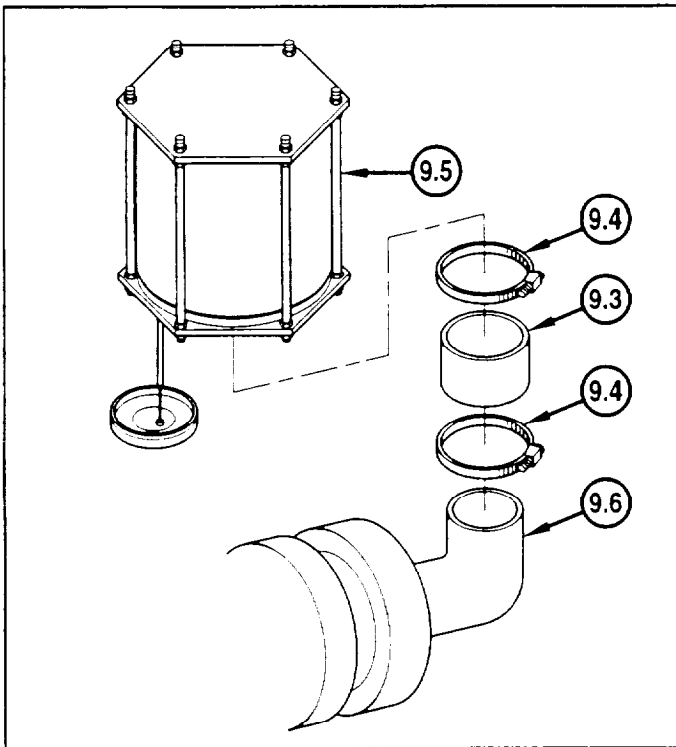


c. REMOVAL

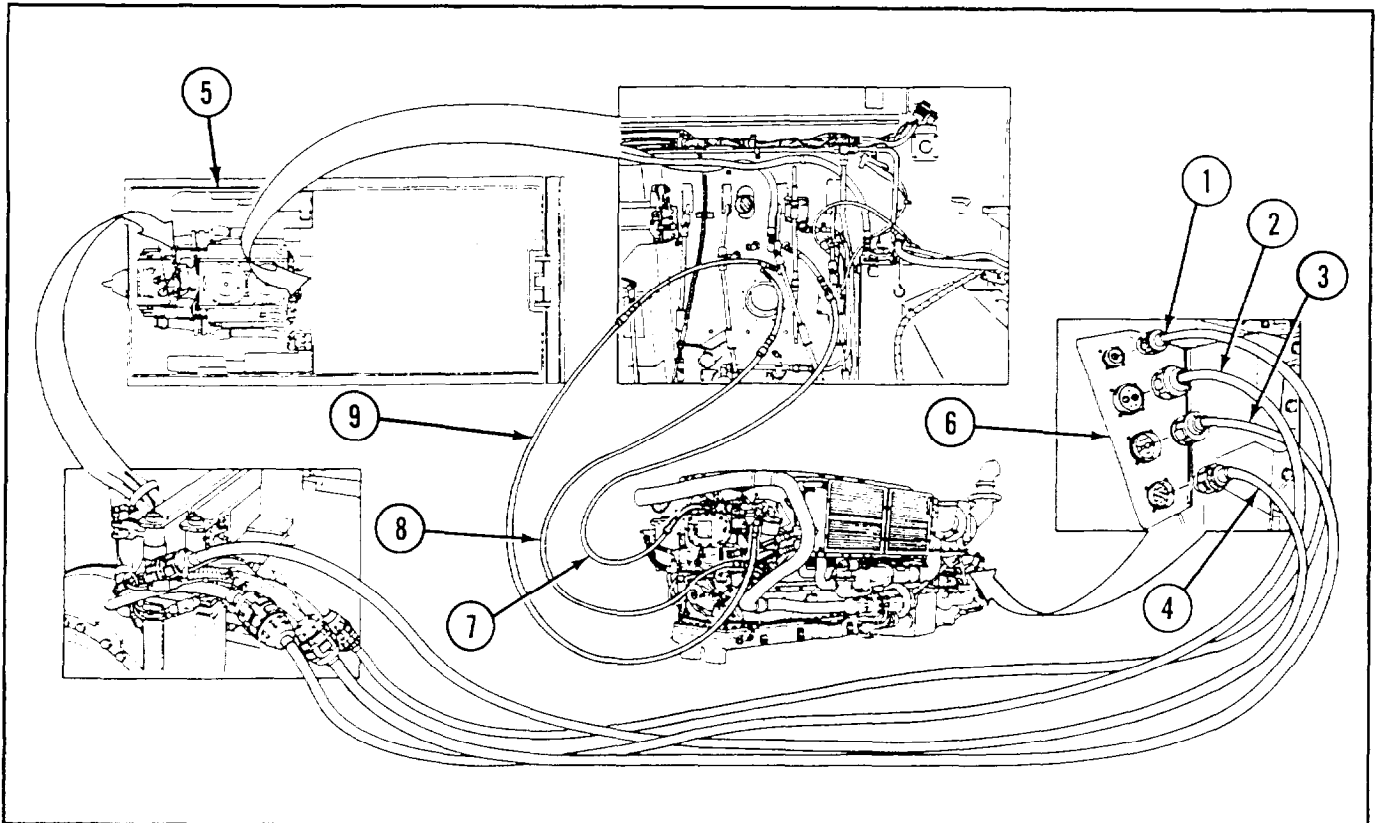
NOTE

Right and left filter assemblies are removed in the same manner

- 1 Remove filter assembly (9.5), two clamps (9.4), and hose (9.3).
- 1.1 Install cover (9.2) and clamp (9.1)



- 1.2 Disconnect main fuel hose (9) from quick disconnects in vehicle and on engine.
- 2 Disconnect primer fuel hose (8) from quick disconnects in vehicle and on engine.
- 3 Disconnect fuel return hose (7) from quick disconnects in vehicle and on engine.
- 4 Disconnect accessories cable assembly (4), starter cable assembly (3), ground cable assembly (2), and generator armature cable assembly (1) from vehicle (5) and engine wiring harness bracket (6).



NOTE

Follow-on maintenance: Install power-plant (see paragraph 3-1)

3-2.1 EMERGENCY BOOM OPERATION

THIS TASK COVERS

- a. General b. Preparation for Operation c. Operation d. After Operation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic' s (Appendix C, item 53)

Material / Parts:

- Hose (Appendix C, item 18.2)
- Hose (Appendix C, item 18.3)
- Hose (Appendix C, item 18.4)
- Sealant tape (Appendix D, item 29)

Equipment Condition:

- Air inlet grilles removed (see paragraph 9-57)
- Hydraulic connections access cover removed (see paragraph 9-7)
- Air cleaner removed (see paragraph 4-25)

a. GENERAL

- 1 In the event of a power loss to both main engine and auxiliary, power unit, the hoisting boom assembly has no RAISE/STOW capabilities. If the boom is in the STOWED position, it is impossible to perform engine deck removal/powerpack maintenance.

WARNING

The hoisting boom assembly should NEVER be lifted to the raised position by means of winching the boom with another vehicle. Boom could free-fall resulting in possible death or injury to personnel.

- 2 It should be stressed that removal of the hoisting boom assembly takes about two hours and requires a crane for lifting off, but removal is the best method for performing maintenance from a safety aspect.
- 3 Should operation of the boom be considered necessary, the following emergency operation procedure could be applied using an M88A1 Recovery vehicle as the slaving vehicle.

b. PREPARATION FOR OPERATION

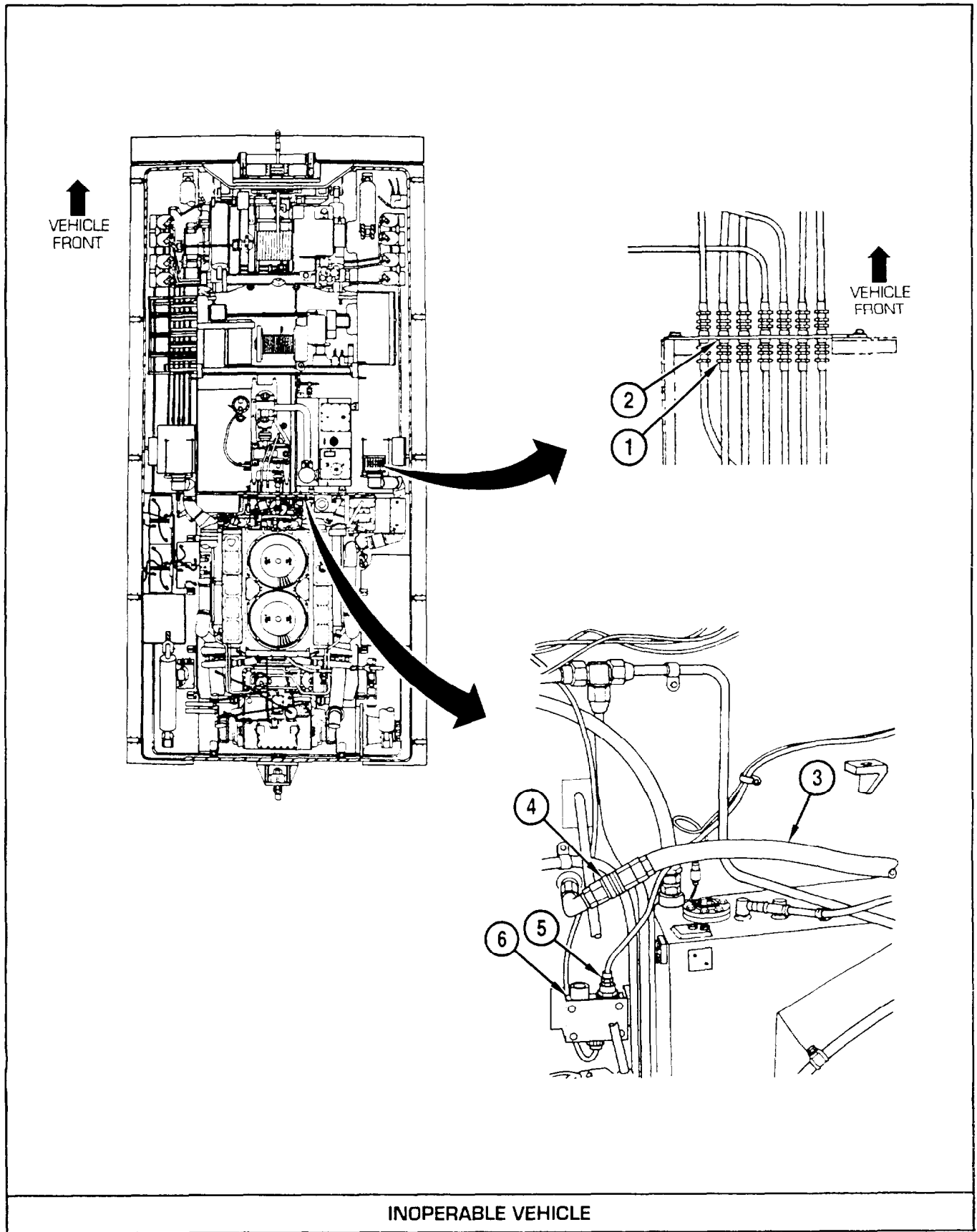
CAUTION

Ensure that both vehicles have the same type of hydraulic fluid.

NOTE

Steps 1 thru 3 apply to the inoperable vehicle.

- 1 Disconnect hose (1) from hydraulic connections panel port 85 (2).
- 2 Disconnect hose (3) from quick disconnect (4).
- 3 Disconnect hose (5) from APU pressure switch (6).



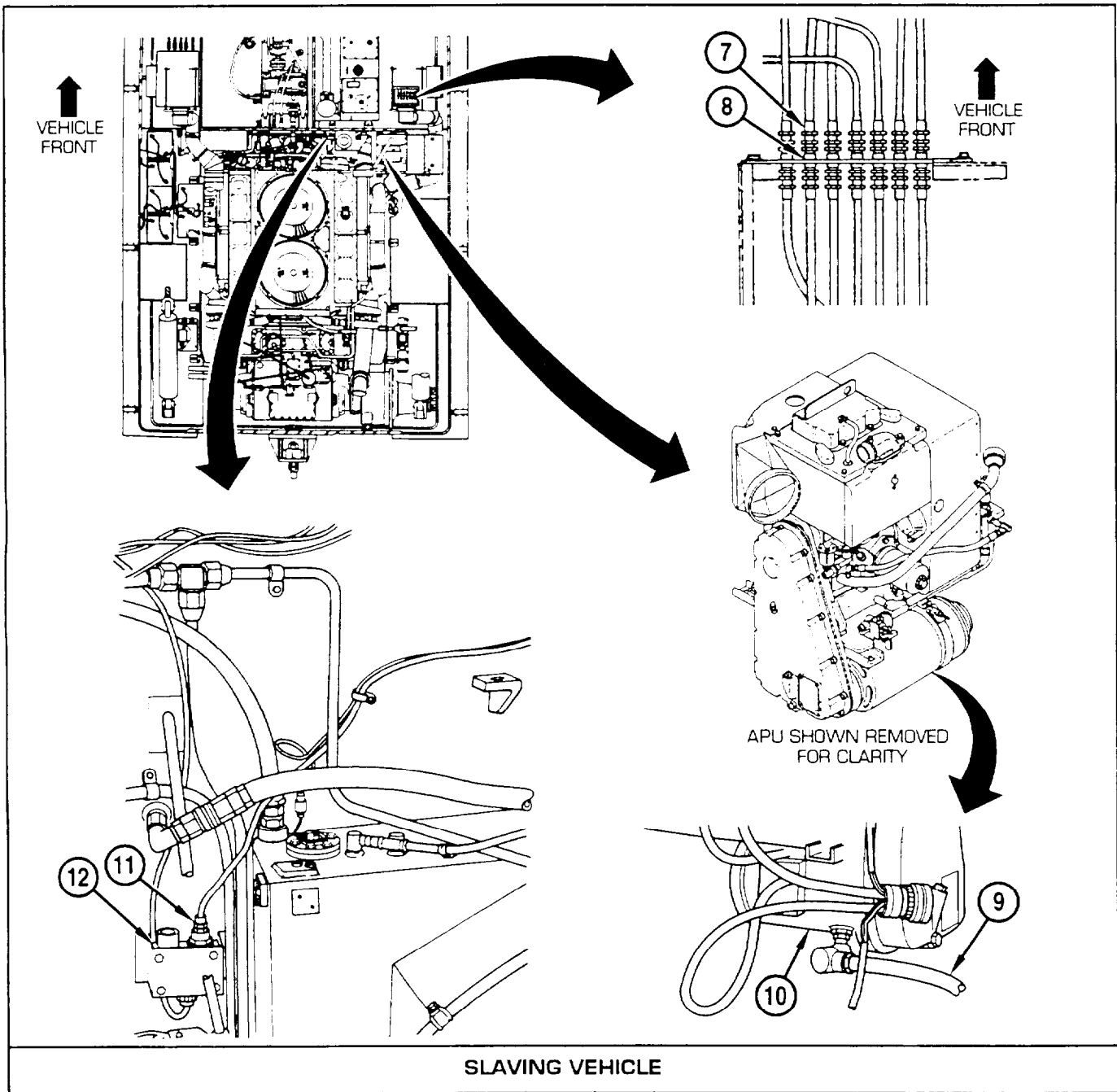
INOPERABLE VEHICLE

3-2.1 EMERGENCY BOOM OPERATION-Continued

NOTE

Steps 4 thru 6 apply to the slaving vehicle.

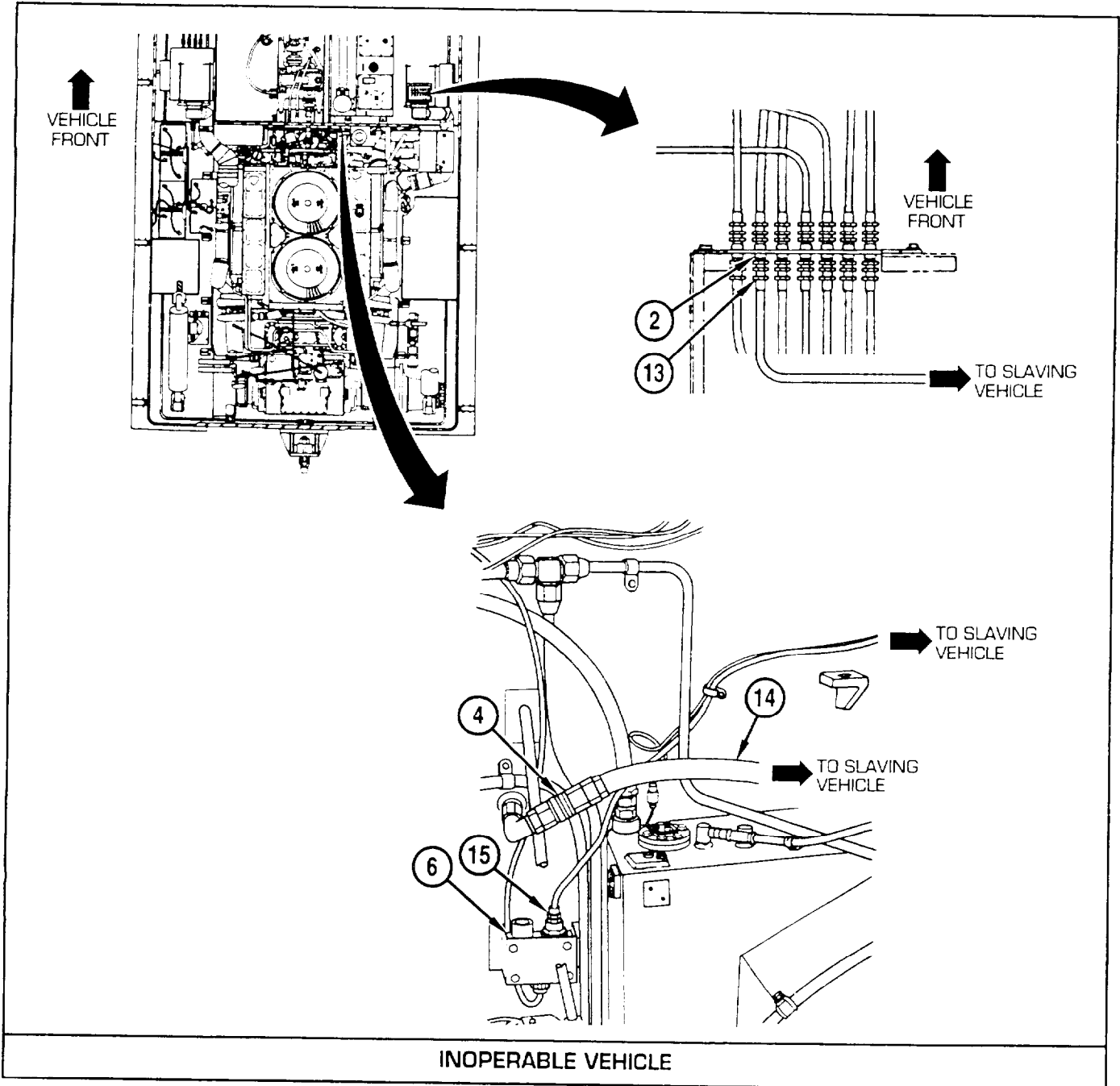
- 4 Disconnect hose (7) from hydraulic connections panel port 85 (8).
- 5 Disconnect hose (9) from hydraulic pump (10).
- 6 Disconnect hose (11) from APU pressure switch (12).



NOTE

Steps 7 thru 9 apply to the inoperable vehicle.

- 7 Connect hose (13) to port 85 (2) at hydraulic connections panel.
- 8 Connect hose (14) to quick disconnect (4).
- 9 Connect hose (15) to APU pressure switch (6).

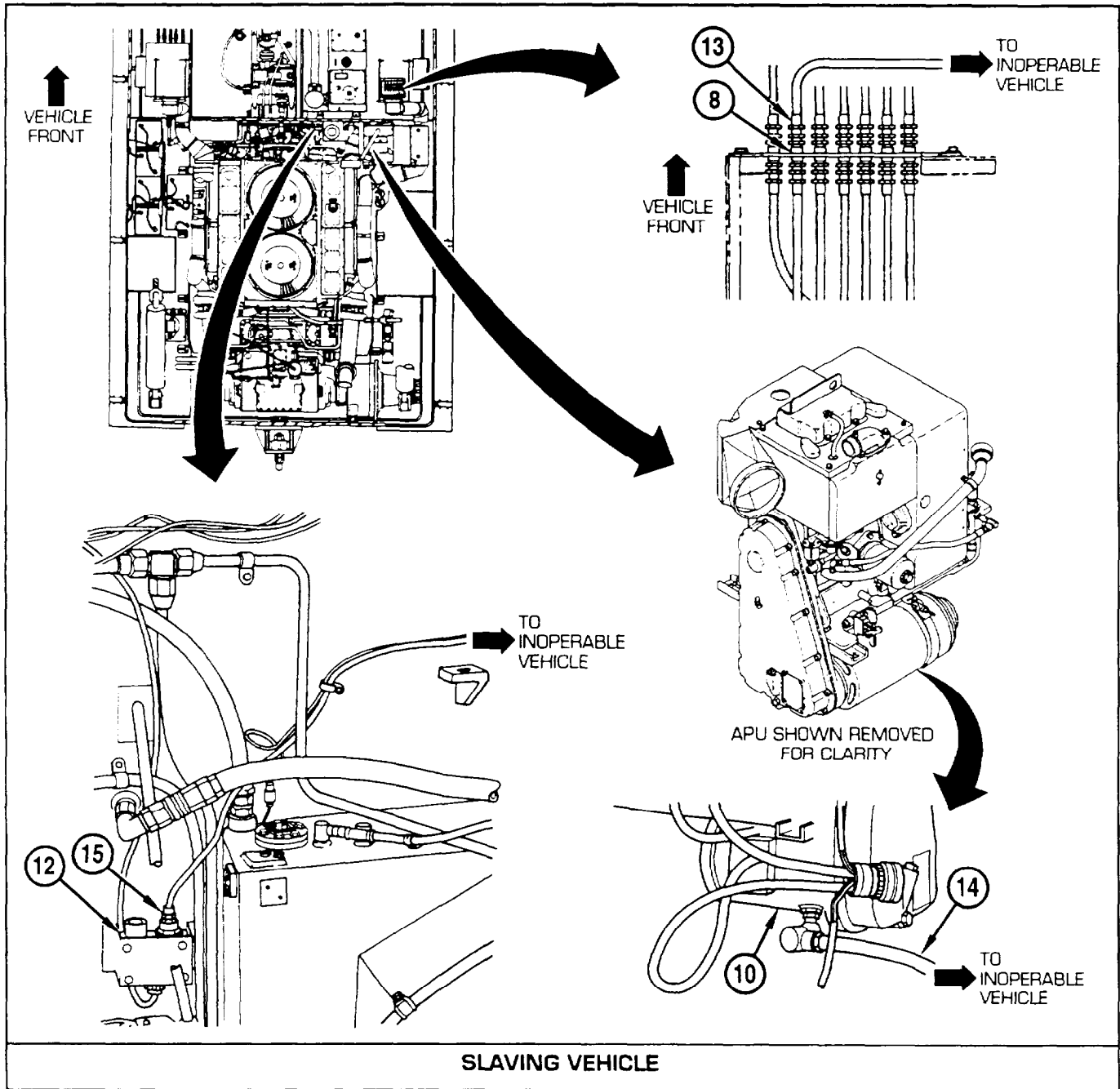


3-2.1 EMERGENCY BOOM OPERATION-Continued

NOTE

Steps 10 thru 12 apply to the slaving vehicle.

- 10 Connect hose (13) to port 85 (8) at hydraulic connections panel.
- 11 Connect hose (14) to hydraulic pump (10).
- 12 Connect hose (15) to APU pressure switch (12).



c. OPERATION**WARNING**

- Clear all personnel from top and rear areas of vehicle before raising or lowering the boom.
- Under no circumstances should any hydraulic hoses/lines be disconnected for maintenance purposes unless the boom is in the fully forward position or blocked by boom safety stands.
- To avoid possibility of injury to personnel, if the hoisting boom cannot be fully raised (roof of building too low, etc.), the use of safety boom stands is mandatory. After maintenance is performed and the boom is to be lowered to the stowed position, clear all personnel from the top and rear area of the vehicle.

CAUTION

- Always raise the hoisting boom assembly to the fully forward position unless it is not permissible due to an obstruction.
- Be sure AUXILIARY GENERATOR switch on slaving vehicle is in the OFF position.
- Ensure APU emergency winch operation valve is in the normal operation mode on the inoperable vehicle.

NOTE

The operation (RAISE/LOWER) of the hoisting boom assembly will be completed by using only the controls in the inoperable vehicle, which is being hydraulically driven by the APU of the slaving vehicle.

- 1 Start APU on slaving vehicle (refer to TM 9-2350-256-10).
- 2 Shift SYSTEM SELECTOR control lever to auxiliary position and operate hoisting boom controls in inoperable vehicle (refer to TM 9-2350-256-10).

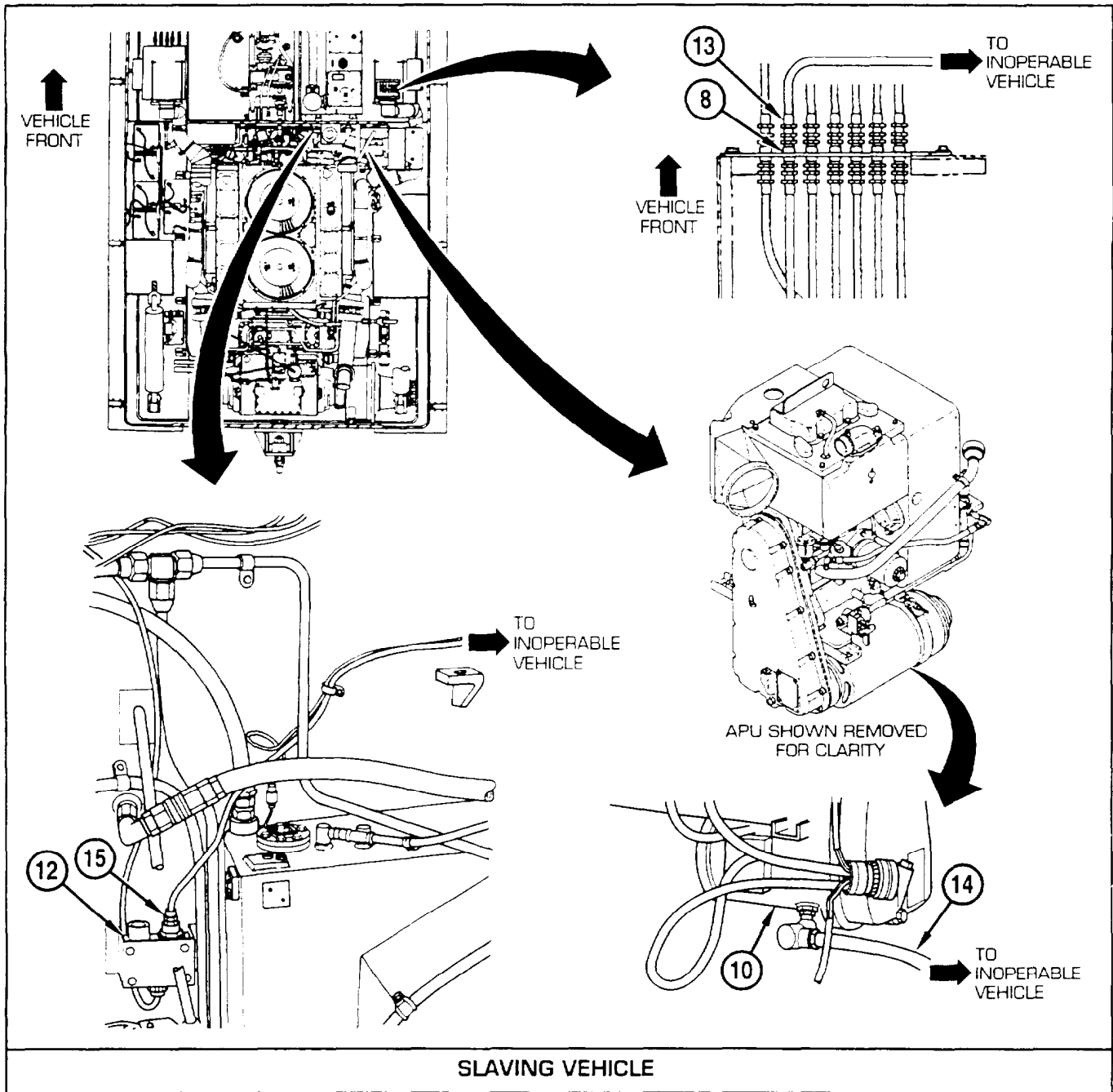
3-2.1 EMERGENCY BOOM OPERATION-Continued

d. AFTER OPERATION

NOTE

Steps 1 thru 3 apply to the slaving vehicle.

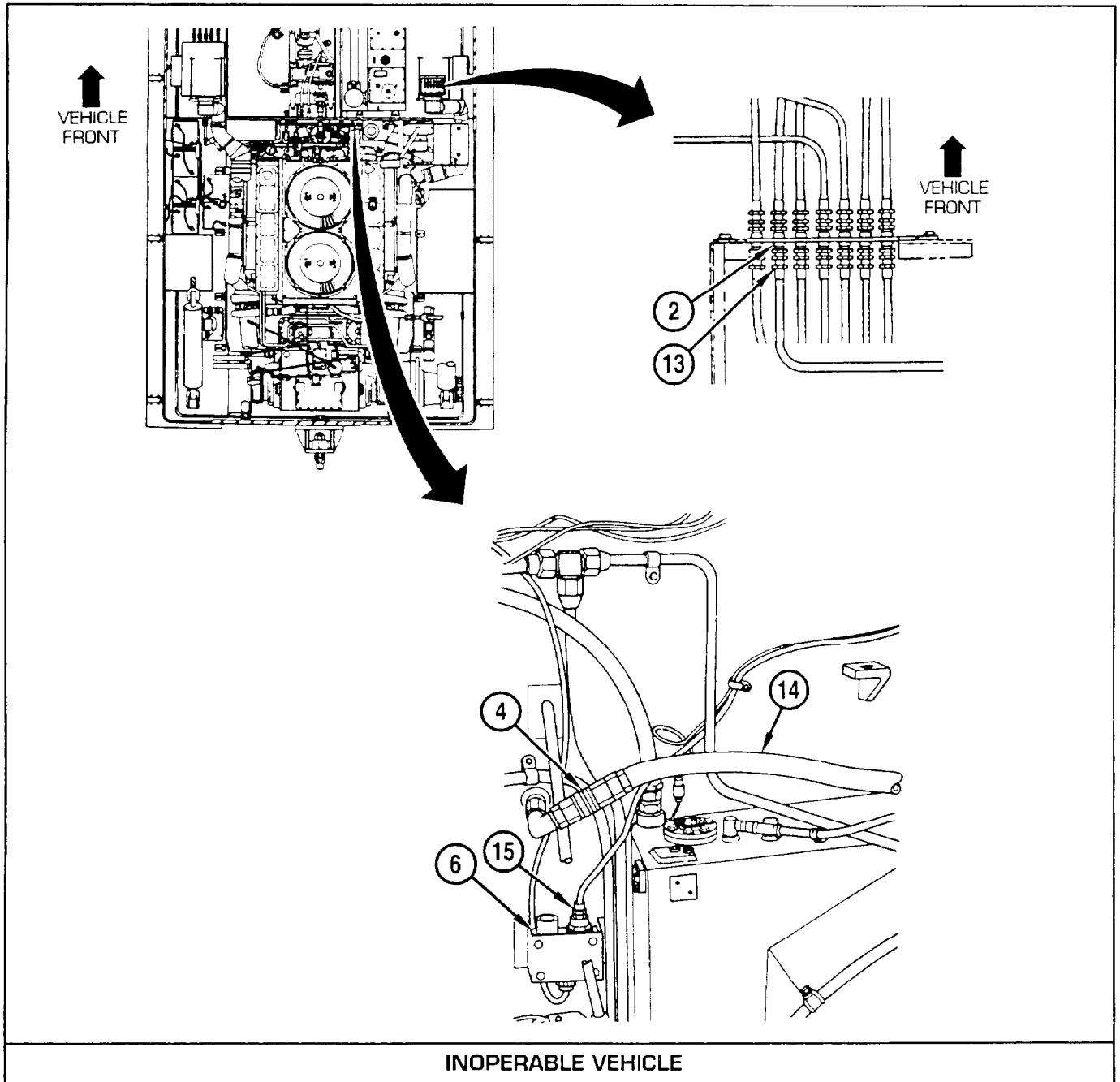
- 1 Disconnect hose (15) from APU pressure switch (12).
- 2 Disconnect hose (14) from hydraulic pump (10).
- 3 Disconnect hose (13) from port 85 (8) at hydraulic connections panel.



NOTE

Steps 4 thru 6 apply to the inoperable vehicle.

- 4 Disconnect hose (15) to APU pressure switch (6).
- 5 Disconnect hose (14) from quick disconnect (4).
- 6 Disconnect hose (13) from port 85 (2) at hydraulic connections panel.

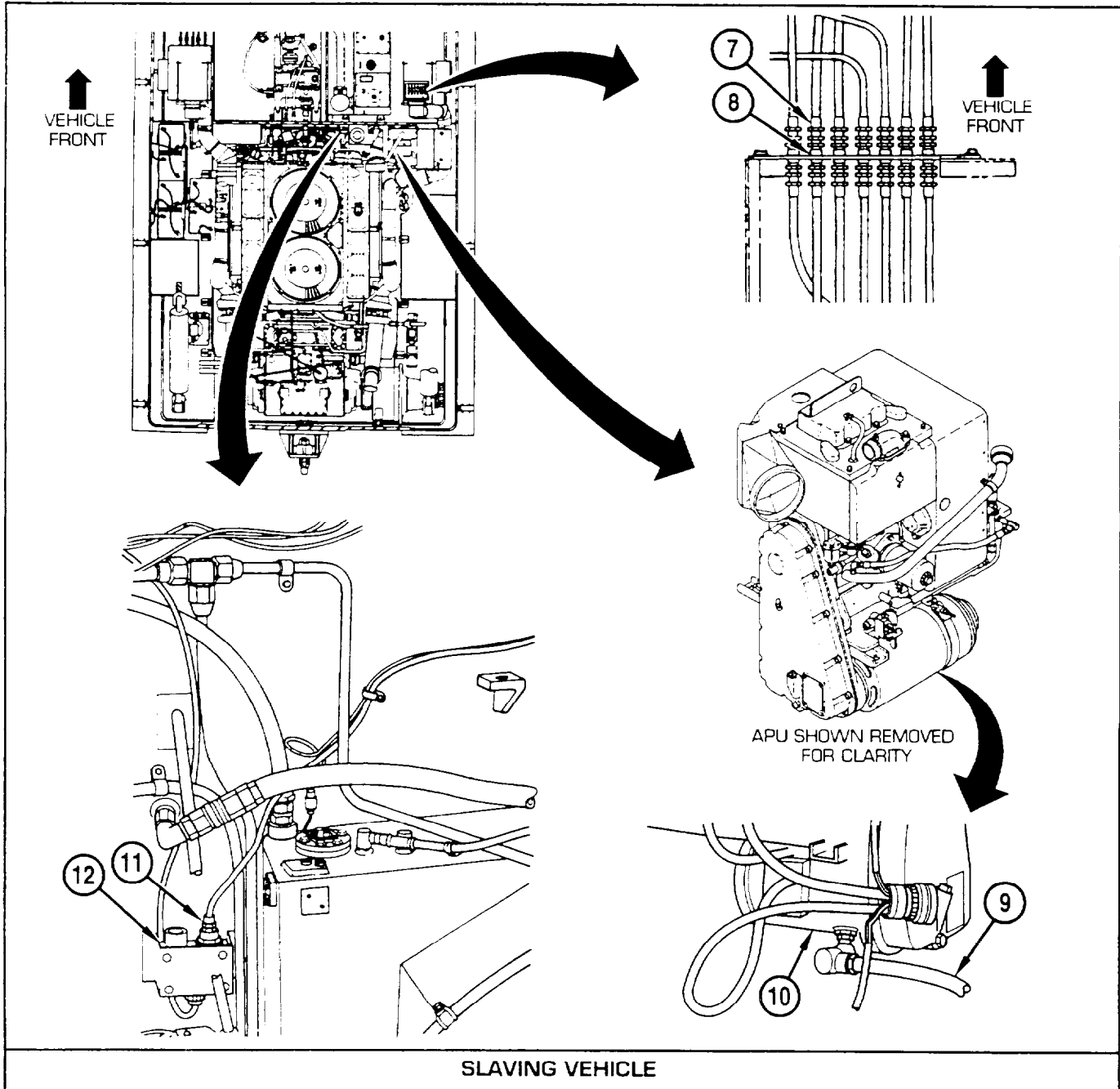


3-2.1 EMERGENCY BOOM OPERATION-Continued

NOTE

Steps 7 thru 9 apply to the slaving vehicle.

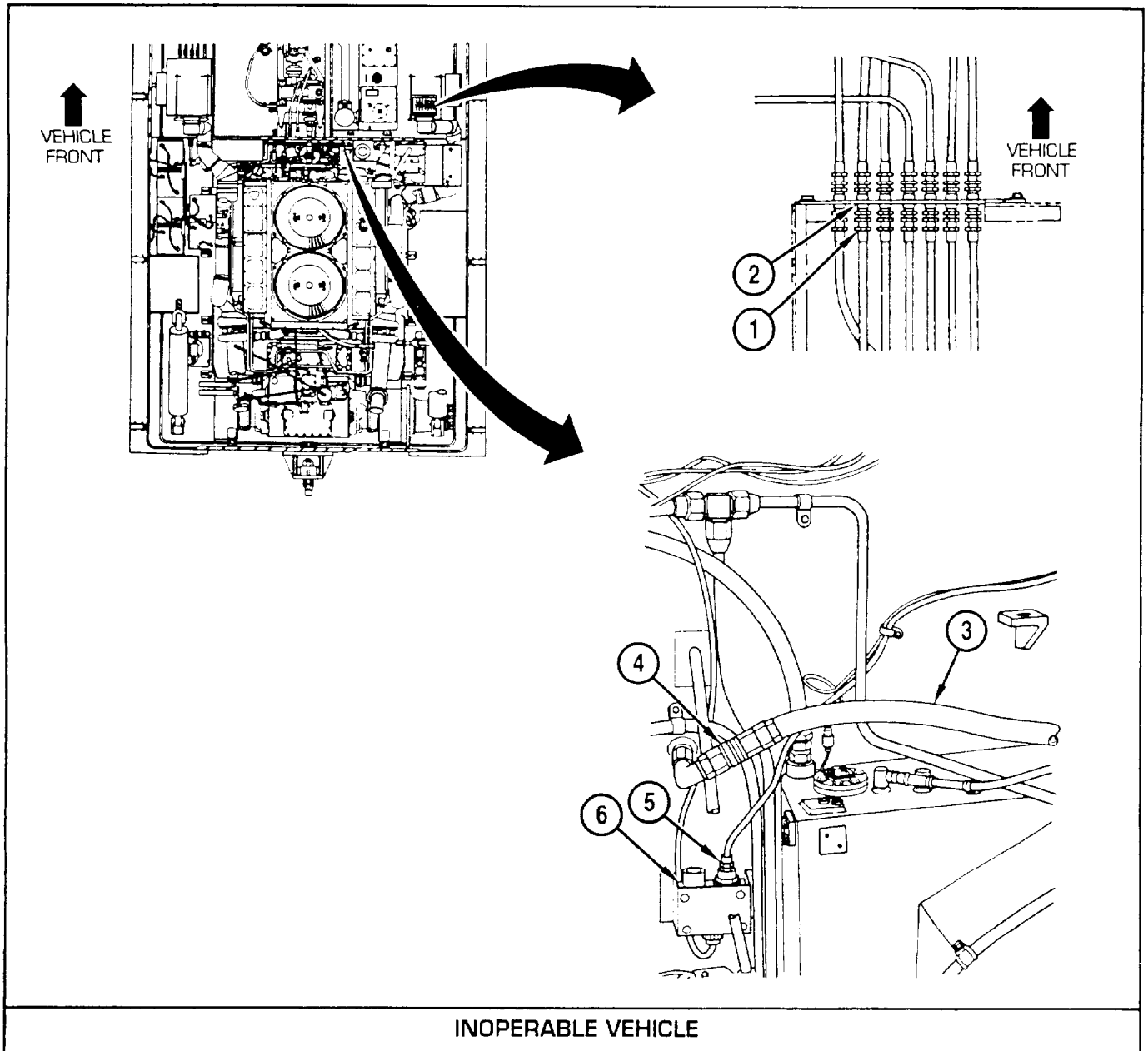
- 7 Connect hose (11) to APU pressure switch (12).
- 8 Connect hose (9) to hydraulic pump (10).
- 9 Connect hose (7) to hydraulic connections panel port 85 (8).



NOTE

Steps 10 thru 12 apply to the inoperable vehicle

- 10 Connect hose (5) to APU pressure switch (6).
- 11 Connect hose (3) to quick disconnect (4).
- 12 Connect hose (1) from hydraulic connections panel port 85 (2).



NOTE

Follow-on maintenance:

- Install air cleaner (see paragraph 4-25)
- Install hydraulic connections access cover (see paragraph 9-7)
- Install air inlet grilles (see paragraph 9-57)

3-3 REPAIR ENGINE MOUNTING BRACKET

THIS TASK COVERS

- | | | | |
|------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
|------------|----------------|-------------|-----------------|

INITIAL SET-UP

Tools:

- Tool kit, general mechanic' s (Appendix C, item 53)
- Multiplier, torque (Appendix C, item 27)
- Socket set (Appendix C, item 48)
- Wrench, torque (Appendix C, item 63)

Personnel Required:
Two

Equipment Condition:
Power-plant removed (see paragraph 3-1)

Parts:

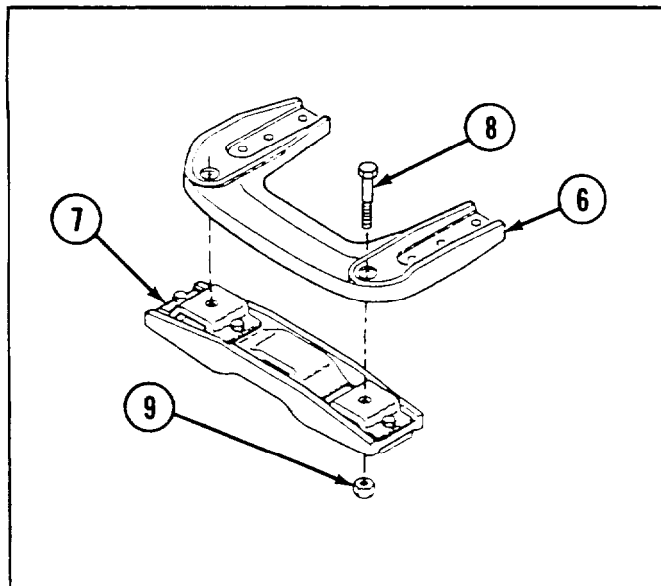
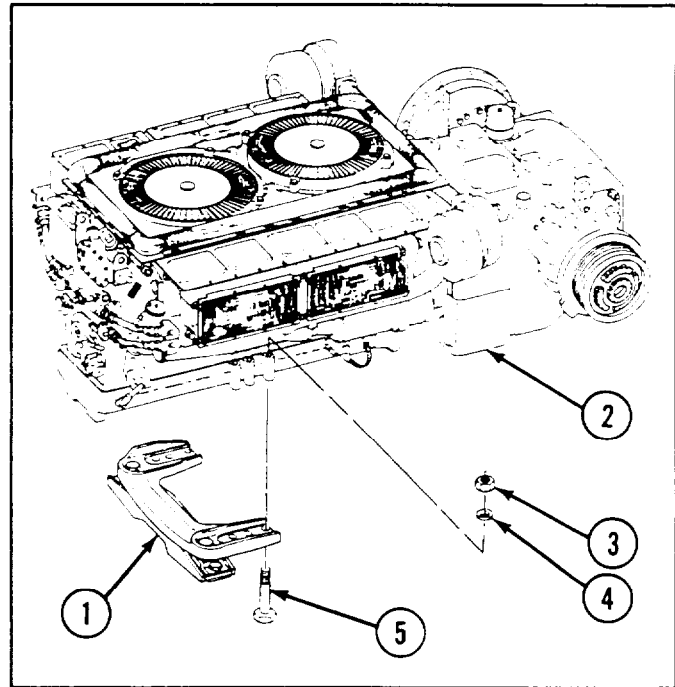
- Nuts, self-locking (4) (Appendix G, item 174)
- Nuts, self-locking (8) (Appendix G, item 175)

a. REMOVAL

- 1 Remove engine mount assembly (1) from engine (2) by removing six self-locking nuts (3), six flat washers (4), and six screws (5).
- 2 Remove saddle assembly (6) from engine mount (7) by removing two screws (8) and two self-locking nuts (9).

b. DISASSEMBLY

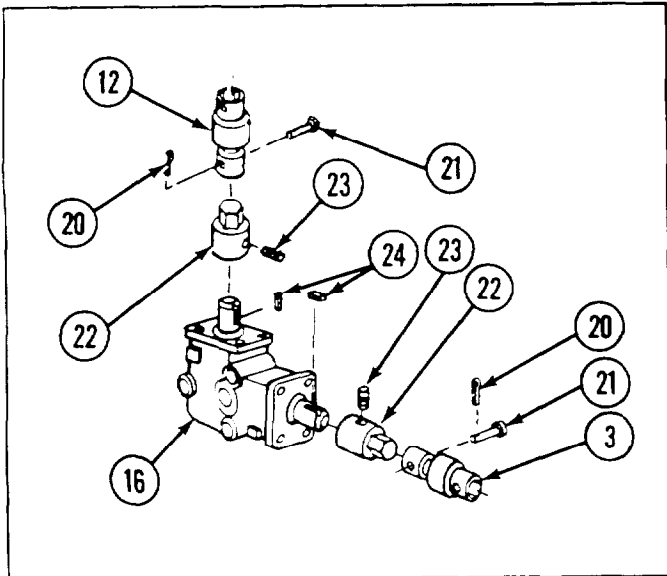
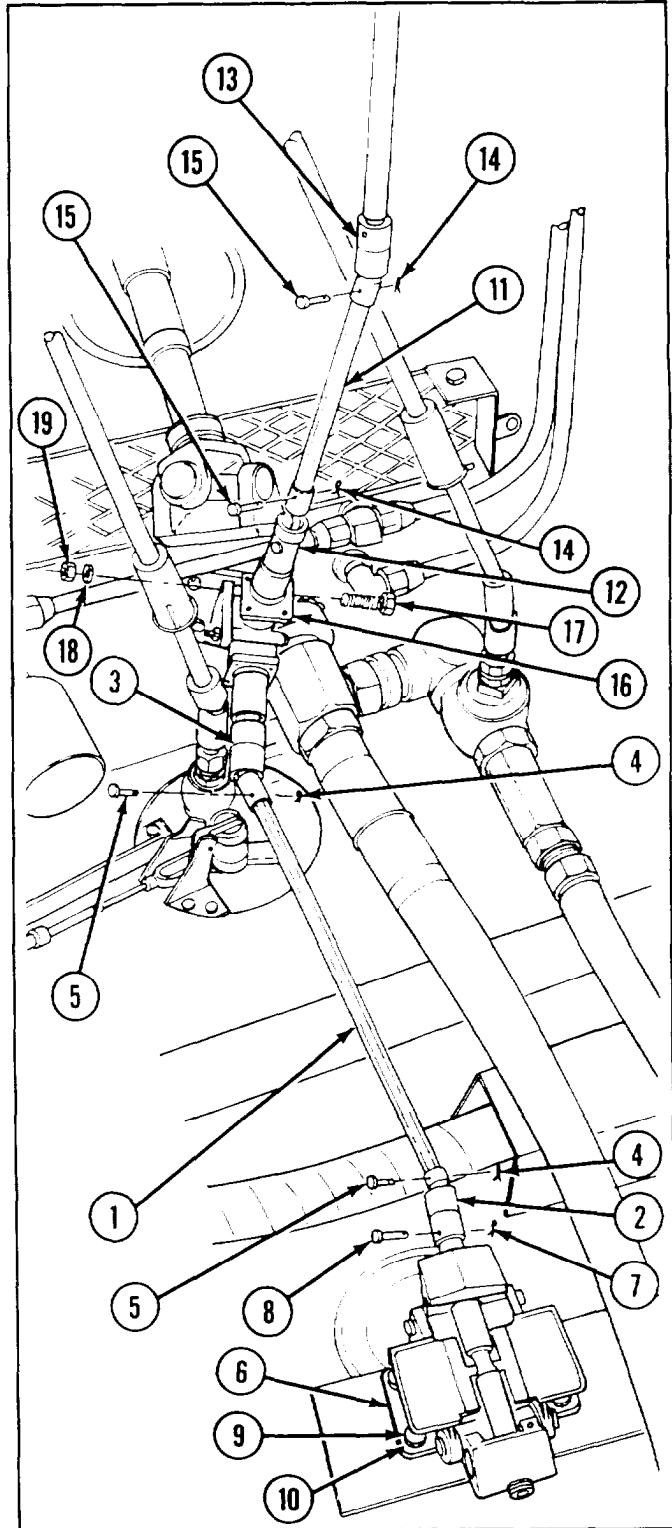
- 1 Remove four self-locking nuts (10), four screws (11), and four mounts (12).
- 2 Remove two shims (13) and two spacers (14) from saddle (15).



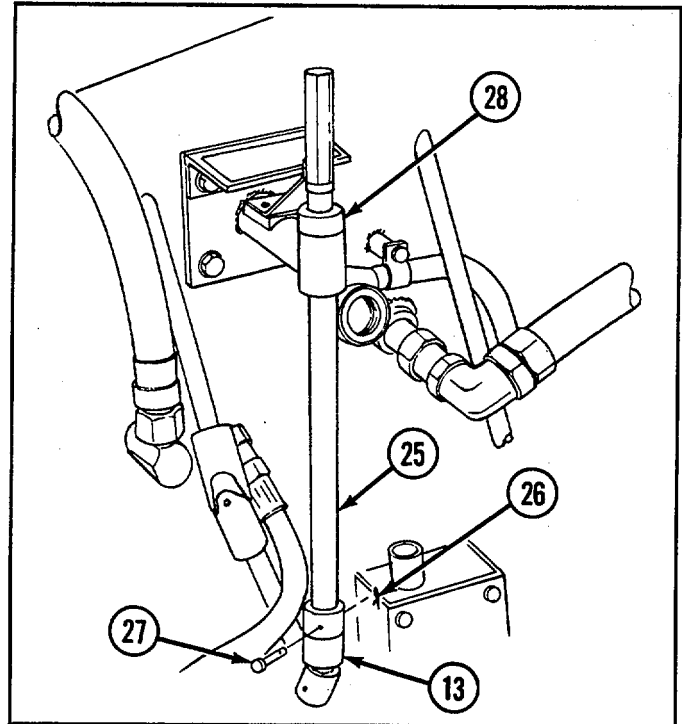
3-4 REPLACE ENGINE REAR MOUNT AND BASE ASSEMBLY-Continued

a. REMOVAL

- 1 Remove horizontal shaft (1) from universal joints (2 and 3) at each end of shaft by removing two cotter pins (4) and two straight pins (5).
- 2 Remove universal joint (2) from base assembly (6) by removing cotter pin (7) and straight pin (8).
- 3 Remove base assembly (6) by removing four screws (9) and four lockwashers (10).
- 4 Remove shaft (11) from universal joints (12 and 13) at each end of shaft by removing two cotter pins (14) and two straight pins (15).
- 5 Remove drive assembly (16) by removing three screws (17), three lockwashers (18), and three nuts (19).
- 6 Remove two universal joints (3 and 12) from drive assembly (16) by removing two cotter pins (20) and two straight pins (21).
- 7 Remove two couplings (22) from drive assembly (16) by removing two setscrews (23).
- 8 Remove two keys (24) from drive assembly (16)

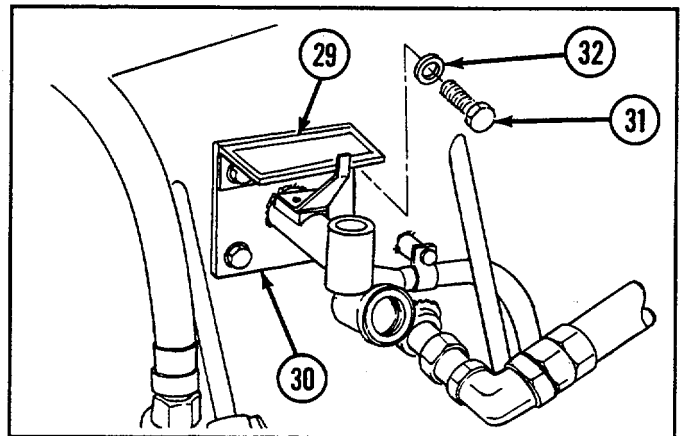


- 9 Remove universal joint (13) from vertical shaft (25) by removing cotter pin (26) and straight pin (27).
- 10 Loosen collar (28) and remove vertical shaft (25).
- 11 Remove identification (ID) plate (29) and bracket (30) by removing four screws (31) and four lockwashers (32).
- 12 Remove drive assembly bracket (33) by removing four screws (34) and four lockwashers (35).



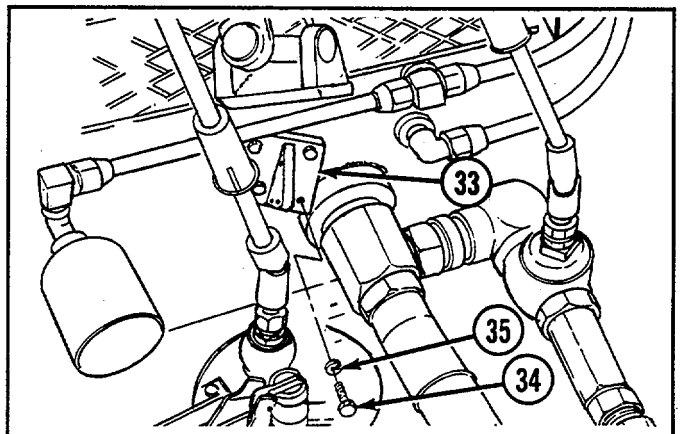
b. INSTALLATION

- 1 Install drive assembly bracket (33) with four screws (34) and four new lockwashers (35).
- 2 Install ID plate (29) and bracket (30) with four screws (31) and four new lockwashers (32).
- 3 Install vertical shaft (25) and tighten collar (28).
- 4 Install universal joint (13) on vertical shaft (25) with straight pin (27) and new cotter pin (26).
- 5 Install two keys (24) to drive assembly (16).
- 6 Install two couplings (22) to drive assembly (16) with two setscrews (23).
- 7 Install two universal joints (3 and 12) to drive assembly (16) with two straight pins (21) and two new cotter pins (20).
- 8 Install drive assembly (16) with three screws (17), three new lockwashers (18), and three nuts (19).
- 9 Install shaft (11) to two universal joints (12 and 13) with two straight pins (15) and two new cotter pins (14).
- 10 Install base assembly (6) with four new lockwashers (10) and four screws (9).
- 11 Install universal joint (2) to base assembly (6) with straight pin (8) and new cotter pin (7).
- 12 Install horizontal shaft (1) to universal joints (2 and 3) with two straight pins (5) and two new cotter pins (4).



NOTE

Follow-on maintenance: Install powerplant (see paragraph 3-1)



3-5 REPLACE ENGINE OIL FILTER SERVICING INSTRUCTION PLATE

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Drivescrews (4) (Appendix G, item 12)

Equipment Condition:

Grille doors removed (see paragraph 9-57)

a. REMOVAL

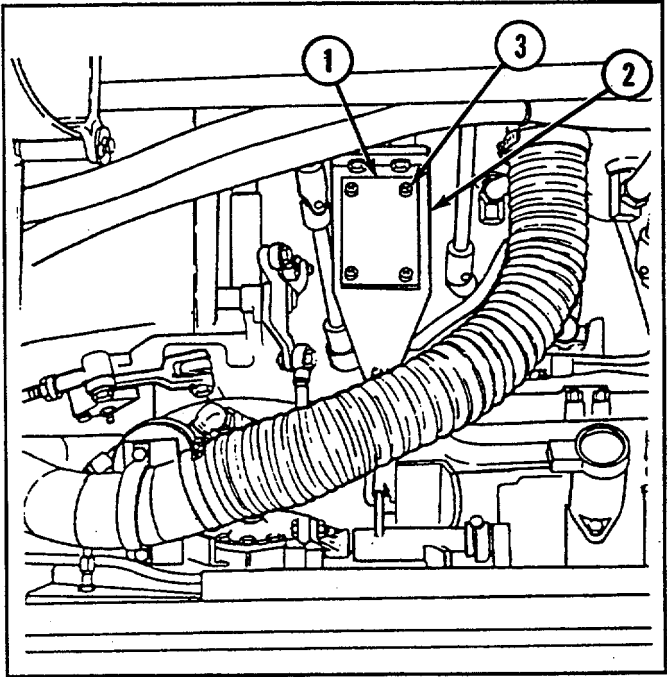
Remove instruction plate (1) from bracket (2) by removing four drivescrews (3).

b. INSTALLATION

Install instruction plate (1) to bracket (2) with four new drivescrews (3).

NOTE

Follow-on maintenance: Install grille doors (see paragraph 9-57)



3-6 REPLACE/SERVICE ENGINE DAMPER HOUSING, OIL FILTER, AND RELATED PARTS

THIS TASK COVERS

- a. Removal
- b. Cleaning
- c. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Bolts, machine (2) (jackscrews) (Appendix C, item 4)
- Pliers, retaining ring, external (Appendix C, item 31)

Parts:

- Nuts, self-locking (10) (Appendix G, item 170)
- Packing, preformed (Appendix G, item 191)
- Packings (2) (Appendix G, item 181)
- Parts kit (Appendix G, item 202)

Equipment Condition:

Grille doors removed (see paragraph 9-57)

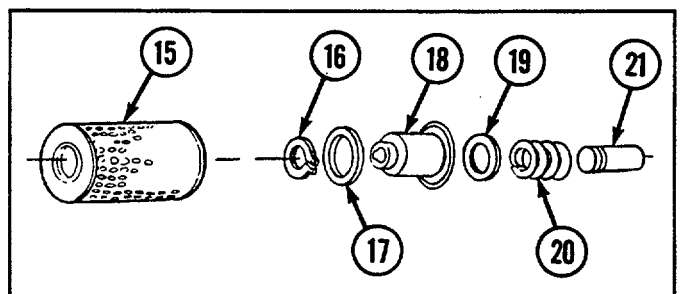
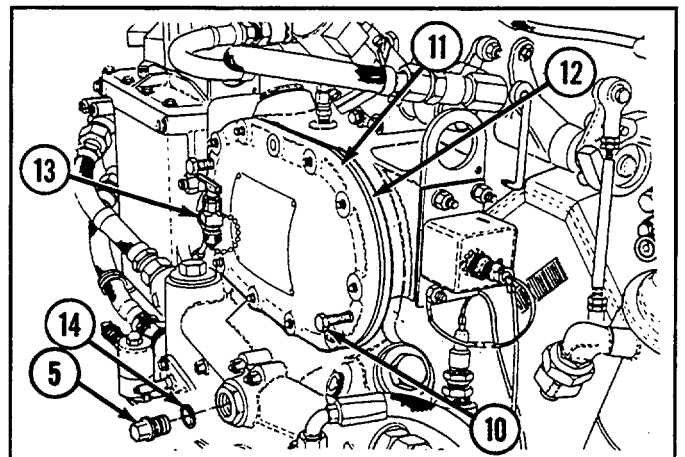
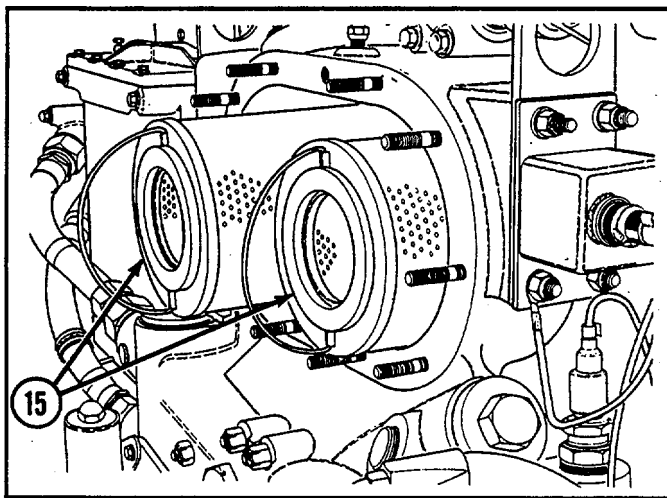
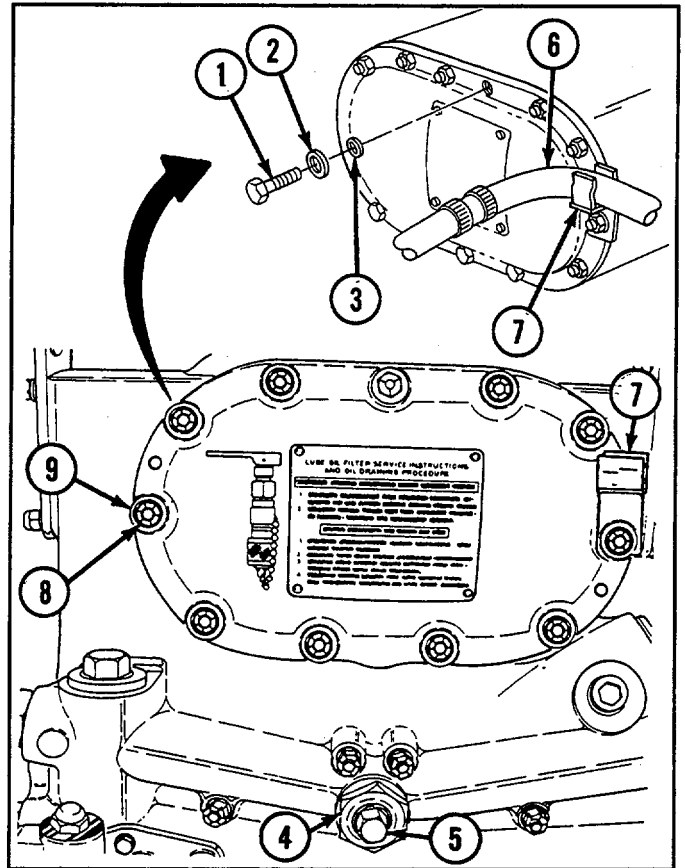
a. REMOVAL

- 1 Remove oil vent screw (1), flat washer (2), and packing (3).

NOTE

Do not loosen oil drain valve adapter (4).

- 2 Loosen oil drain valve plug (5) by turning 6 complete revolutions.
- 3 Remove main fuel hose (6) from clamp (7).
- 4 Remove 10 self-locking nuts (8), 10 flat washers (9), and clamp (7).
- 5 Install two jackscrews (10) in oil filter cover (11).
- 6 Remove oil filter cover (11) using two jackscrews (10) for support.
- 7 Remove gasket (12).
- 8 Remove oil drain valve (13), oil drain valve plug (5), or preformed packing (14) if necessary.
- 9 Remove and discard two oil filter elements (15).
- 10 Remove two retaining rings (16), two packings (17), and two filter bodies (18).
- 11 Remove two washers (19), two springs (20), and two oil filter supports (21).



3-6 REPLACE/REPAIR ENGINE DAMPER HOUSING, OIL FILTER, AND RELATED PARTS-Continued

b. CLEANING

Clean filter bodies (18) with clean, lint-free cloth. Be careful not to drop foreign particles into drain holes.

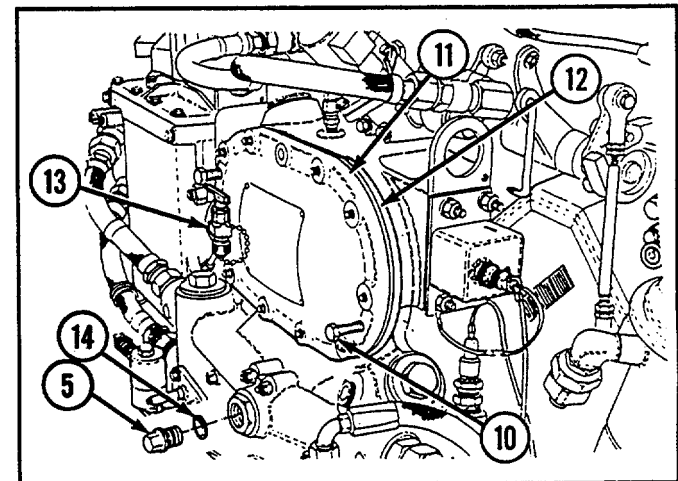
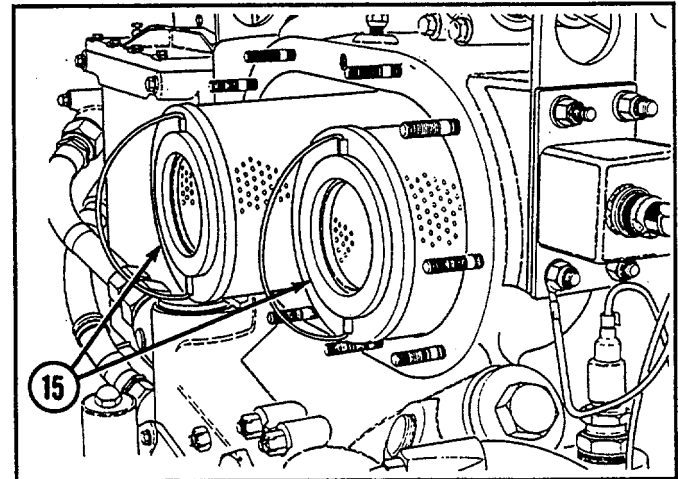
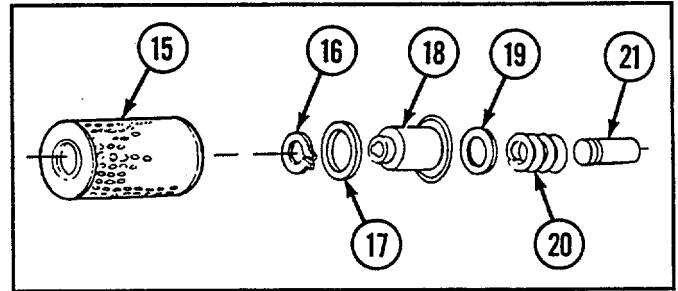
c. INSTALLATION

- 1 Install two oil filter supports (21), two springs (20), and two washers (19).
- 2 Install two filter bodies (18), two new packings (17), and two retaining rings (16).
- 3 Install two new oil filter elements (15).
- 4 Install new gasket (12) under oil filter cover (11).
- 5 Secure oil filter cover (11) with 10 new self-locking nuts (8), 10 flat washers (9), and clamp (7).
- 6 Install main fuel hose (6) to clamp (7).
- 7 Install new preformed packing (14) and oil drain valve plug (5) if removed.
- 8 Install oil drain valve (13) if removed.

CAUTION

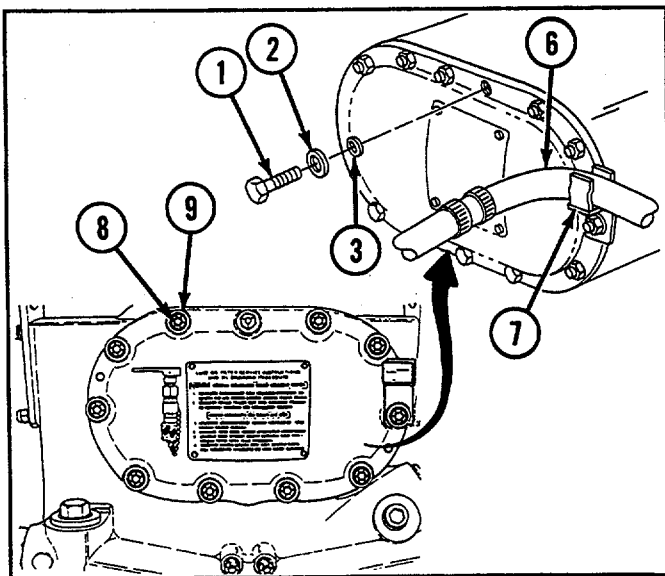
Failure to tighten oil drain valve plug until it bottoms will result in loss of engine oil pressure.

- 9 Tighten oil drain valve plug (5) until it bottoms.
- 10 Install oil vent screw (1), flat washer (2), and new packing (3).



NOTE

Follow-on maintenance: Install grille doors (see paragraph 9-57)



3-7 REPLACE OIL LEVEL INDICATOR AND RELATED PARTS

THIS TASK COVERS

- a. Removal b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic' s (Appendix C, item 53)

Parts:

- Drivescrews (2) (Appendix G, item 15)
- Gasket (Appendix G, item 26)
- Gasket (Appendix G, item 69)
- Lockwashers (2) (Appendix G, item 100)
- Nuts, self-locking (3) (Appendix G, item 166)

Parts-Continued:

- Packings, preformed (2) (Appendix G, item 200)

Reference:

TM 9-2350-256-10

Equipment Conditions:

- Power-plant removed (see paragraph 3-1)
- Engine oil drained

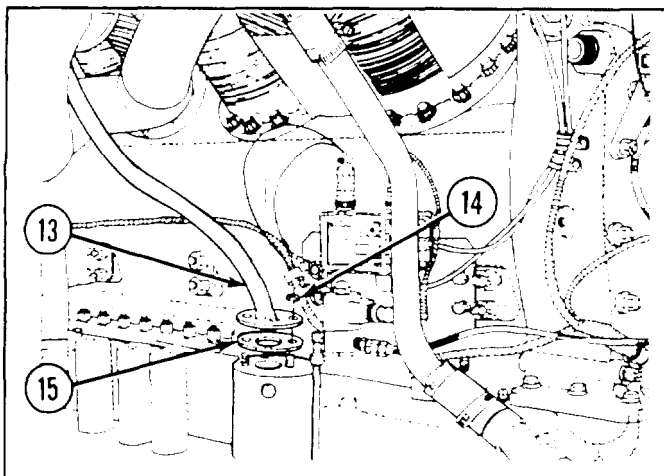
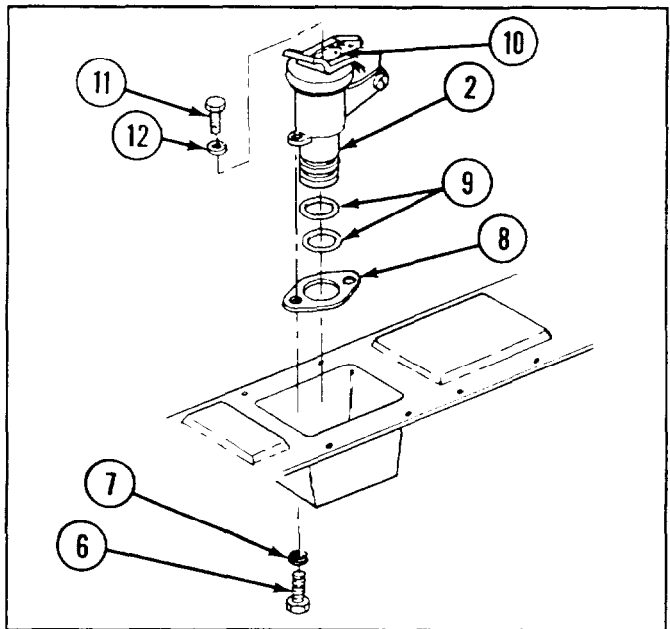
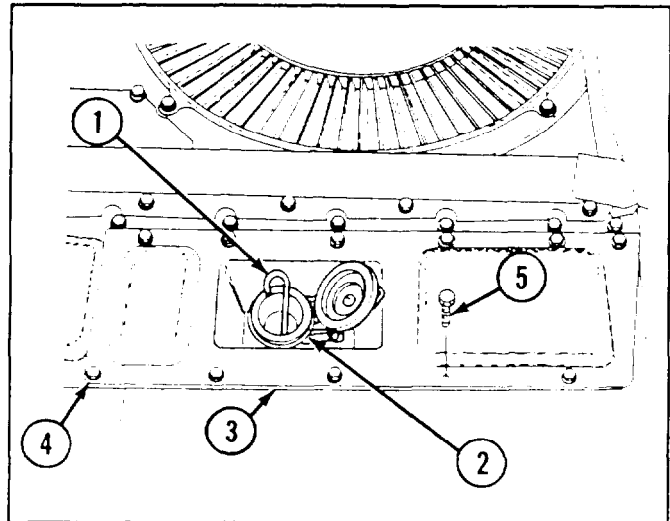
a. REMOVAL

- 1 Remove oil level gage rod (1).

NOTE

Oil level indicator tube cap assembly (2) is removed with right front upper cover (3).

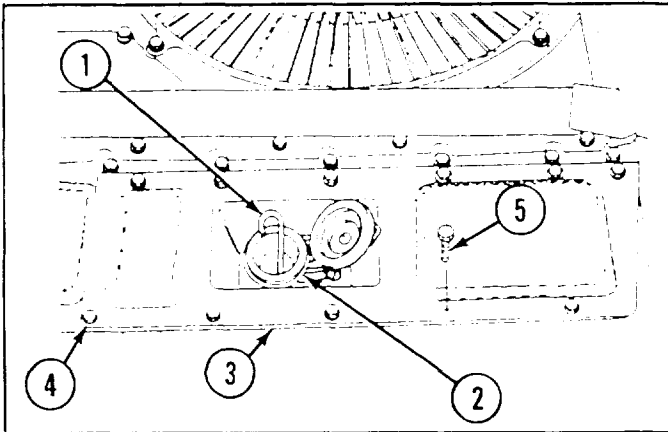
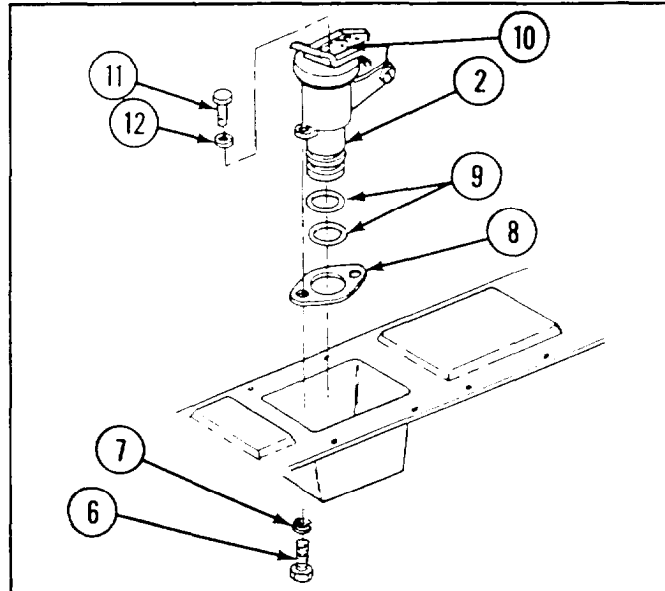
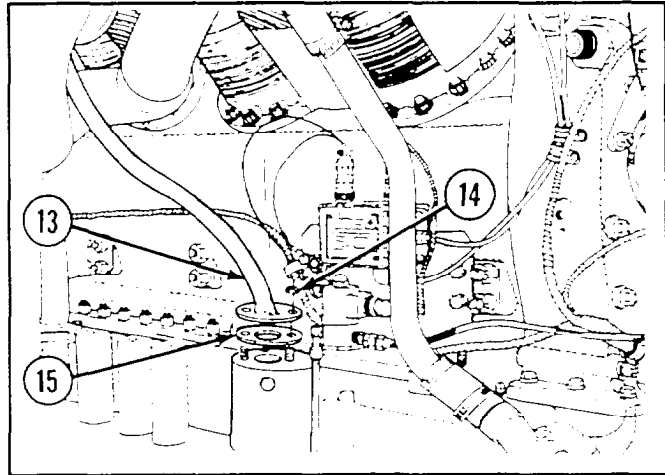
- 2 Remove right front upper cover (3) and strap (4) by removing 12 screws (5).
- 3 Remove oil level indicator tube cap assembly (2) from right front upper cover (3) by removing two screws (6) and two lockwashers (7).
- 4 Remove gasket (8) and two preformed packings (9) from oil level indicator tube cap assembly (2).
- 5 Remove ID plate (10) by removing two drivescrews (11) and two flat washers (12).
- 6 Remove oil level indicator tube (13) by removing three self-locking nuts (11) and gasket (15).



3-7 REPLACE OIL LEVEL INDICATOR AND RELATED PARTS-Continued

b. INSTALLATION

- 1 Install oil level indicator tube (13) with three new self-locking nuts (14) and new gasket (15).
- 3 Install ID plate (10) with two new drivescrews (11) and two flat washers (12) to oil level indicator tube cap assembly (2).
- 3 Install new gasket (8) with two new preformed packings (9) onto oil level indicator tube cap assembly (2).
- 4 Install oil level indicator tube cap assembly (2) on right front upper cover (3) with two screws (6) and two new lockwashers (7).
- 5 Install right front upper cover (3) and strap (4) with 12 screws (5).
- 6 Install oil level gage rod (1).
- 7 Replace engine oil (refer to TM 9-2350-256-10).



3-8 REPLACE OIL FILLER TUBE AND RELATED PARTS

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic' s (Appendix C, item 53)

Parts:

- Drivescrews (2) (Appendix G, item 15)
- Gasket (Appendix G, item 26)
- Lockwashers (2) (Appendix G, item 100)
- Nuts, self-locking (2) (Appendix G, item 167)
- Nuts, self-locking (2) (Appendix G, item 177)

Parts-Continued:

- Packings (3) (Appendix G, item 179)

Reference:

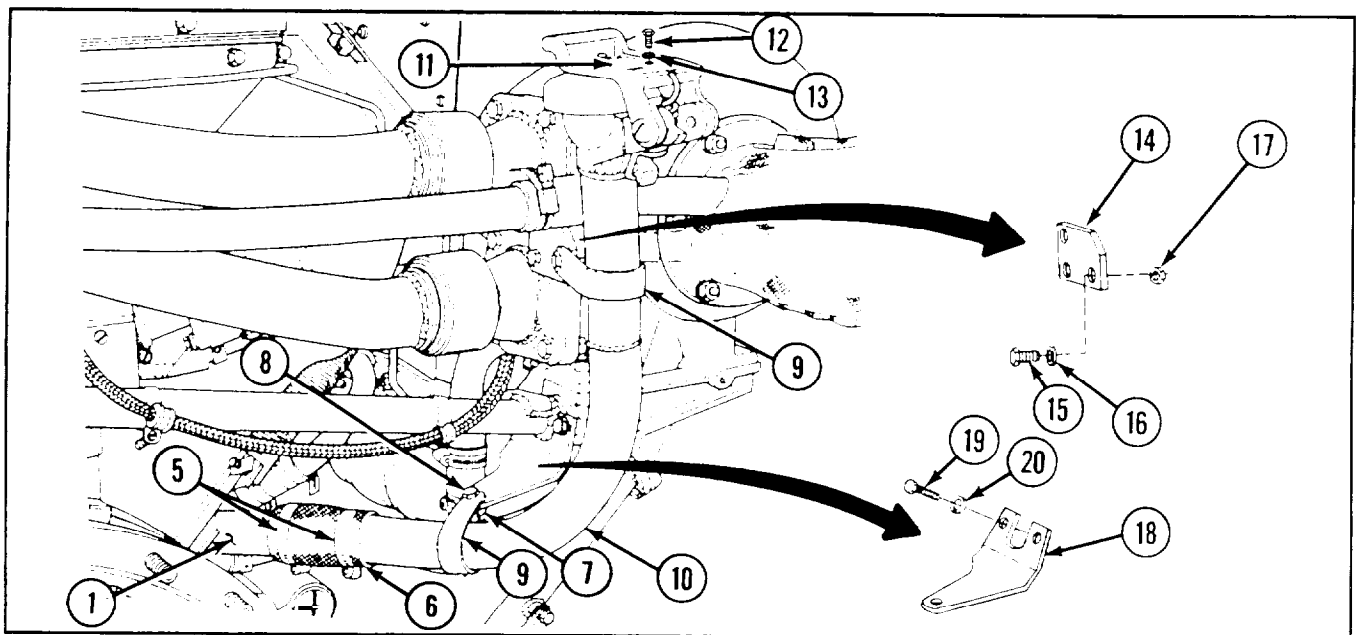
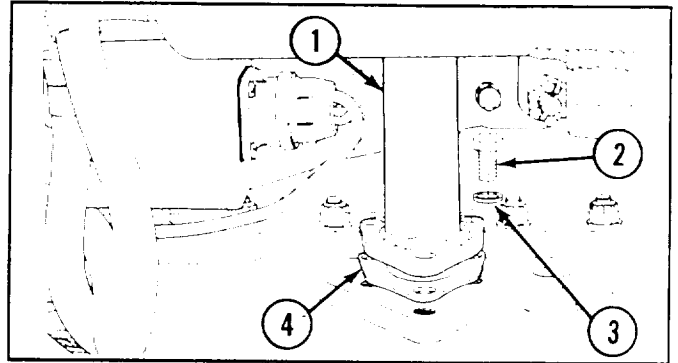
TM 9-2350-256-10

Equipment Conditions:

- Powerplant removed (see paragraph 3-1)
- Engine oil drained

a. REMOVAL

- 1 Remove lower oil fill tube (1) by removing three screws (2), three packings (3), and gasket (4).
- 2 Remove two clamps (5) and rubber hose (6) from lower oil fill tube (1).
- 3 Remove two self-locking nuts (7) and two screws (8) from clamps (9), and remove upper oil fill tube assembly (10).
- 4 Remove ID plate (11) by removing two drivescrews (12) and two flat washers (13).
- 5 Remove bracket (14) by removing two screws (15), two washers (16), and two self-locking nuts (17).
- 6 Remove bracket (18) by removing two screws (19) and two lockwashers (20).



b. INSTALLATION

- 1 Install bracket (18) with two screws (19) and two new lockwashers (20).
- 2 install bracket (14) with two screws (15), two flat washers (16), and two new self-locking nuts (17).
- 3 Install ID plate (11) with two flat washers (13) and two new drivescrews (12).
- 4 Install upper oil fill tube assembly (10) with two clamps (9), two new self-locking nuts (7), and two screws (9).
- 5 Connect rubber hose (6) between lower oil fill tube (1) and upper oil fill tube assembly (10). Secure with two clamps (5).
- 6 Install lower oil fill tube (1) and new gasket (4) with three screws (2) and three new packings (3)
- 7 Replace engine oil (refer to TM 9-2350-256-10).

NOTE

Follow-on maintenance: Install powerplant (see paragraph 3-1)

3-9 REPLACE OIL PAN RELATED PARTS

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools

Tool kit, general mechanic' s (Appendix C, item 53)

Part:

Gasket (Appendix G, item 77)

Equipment Condition:

Powerplant removed (see paragraph 3-1)

NOTE

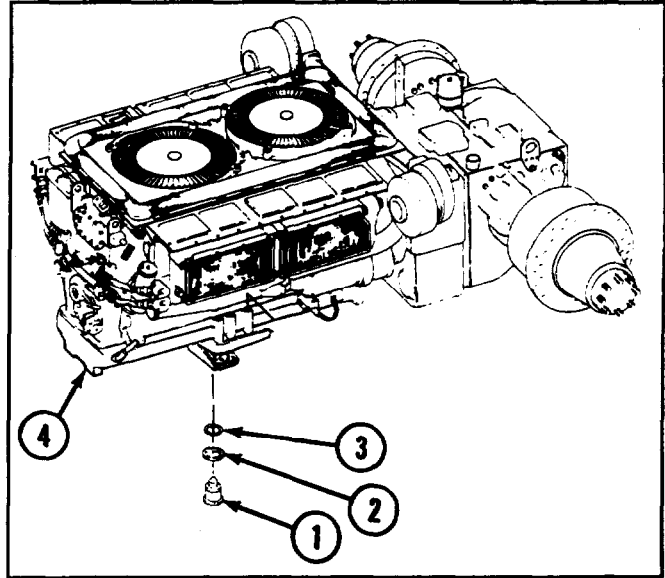
Place container with minimum capacity of 25 gallons (95 liters) under oil pan before beginning procedure.

a. REMOVAL

Remove plug (1), gasket (2), and ring (3) from oil pan (4).

b. INSTALLATION

Install ring (3), gasket (2), and plug (1) to oil pan (4).



NOTE

Follow-on maintenance: Install power-plant (see paragraph 3-1)

3-10 REPLACE CRANKCASE BREATHER TUBE

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic' s (Appendix C, item 53)

Parts-Continued:

- Lockwashers (2) (Appendix G, item 100)
- Nuts, self-locking (3) (Appendix G, item 166)

Equipment Conditions:

- Powerplant removed (see paragraph 3-1)
- Exhaust doors opened (see paragraph 9-61)
- Transmission access door opened (see paragraph 9-55)

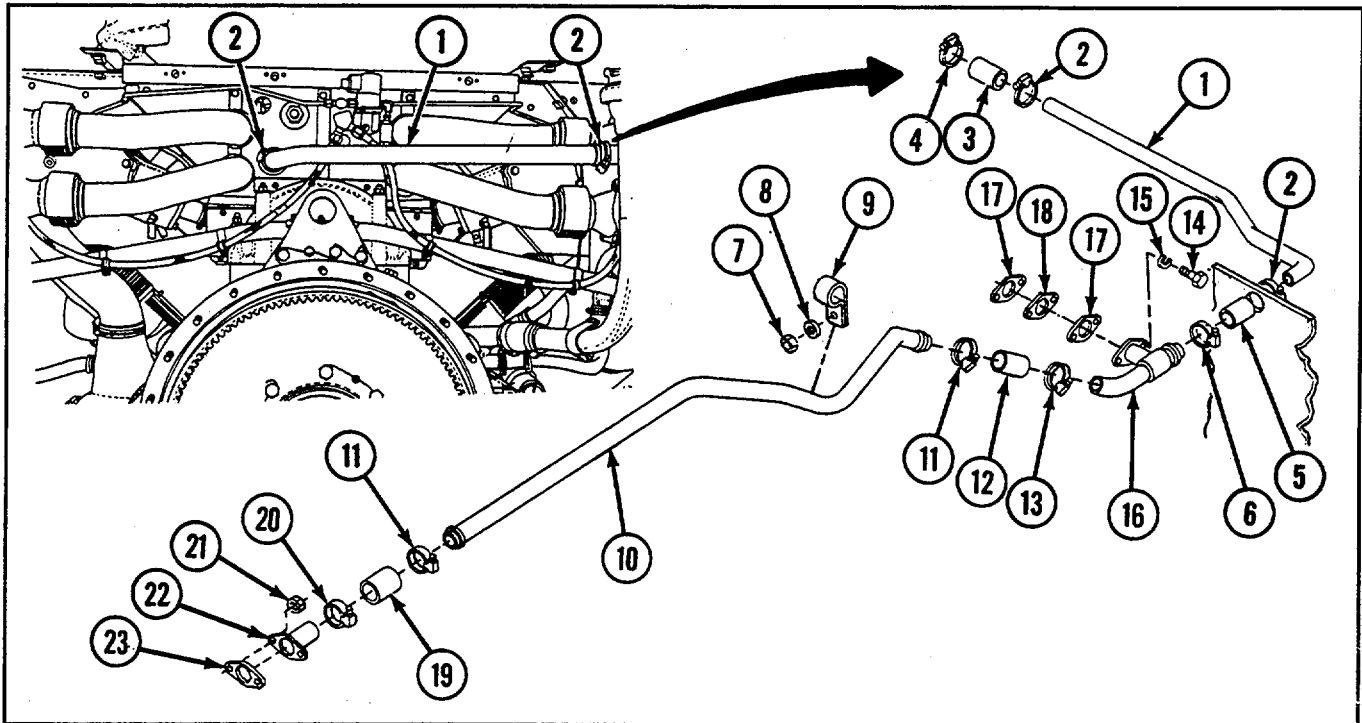
Parts:

- Gasket (Appendix G, item 53)
- Gaskets (2) (Appendix G, item 54)

a. REMOVAL

- 1 Remove tube (1) by removing hose clamps (2) from each end.
- 2 Remove air duct hose (3) by removing hose clamp (4).
- 3 Remove air duct hose (5) by removing hose clamp (6).
- 4 Remove self-locking nut (7), washer (8), and loop clamp (9).
- 5 Remove tube (10) by removing hose clamps (11) from each end.
- 6 Remove air duct hose (12) by removing hose clamp (13).

- 7 Remove two screws (14), two lockwashers (15), breather (16), two gaskets (17), and spacer plate (18).
- 8 Remove air duct hose (19) by removing hose clamp (20).
- 9 Remove two self-locking nuts (21), flange adapter (22), and gasket (23).



b. INSTALLATION

- 1 Install breather (16), two new lockwashers (15), two new gaskets (17), spacer plate (18), and two screws (14). Tighten screws.
- 2 Install new gasket (23), flange adapter (22), and two new self-locking nuts (21).
- 3 Install air duct hose (19) by installing hose clamp (20). Tighten hose clamp.
- 4 Install air duct hose (12) by installing hose clamp (13). Tighten hose clamp.
- 5 Install tube (10) by installing hose clamps (11) at each end. Tighten hose clamps.
- 6 Install loop clamp (9) and washer (8) with new self-locking nut (7).
- 7 Install air duct hose (5) by installing hose clamp (6). Tighten hose clamp.
- 8 Install air duct hose (3) by installing hose clamp (4). Tighten hose clamp.
- 9 Install tube (1) by installing hose clamps (2) at each end. Tighten hose clamps.

NOTE

Follow-on maintenance:

- Install powerplant (see paragraph 3-1)
- Close exhaust doors (see paragraph 9-61)
- Close transmission access door (see paragraph 9-55)

3-11 REPLACE CYLINDER HEAD OIL PAN DRAIN TUBES AND RELATED PARTS**THIS TASK COVERS**

a. Removal

b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts--Continued:

•Lockwire (Appendix G, item 158)

Parts:

•Gaskets (2) (Appendix G, item 55)

•Lockwashers (6) (Appendix G, item 100)

Equipment Condition:

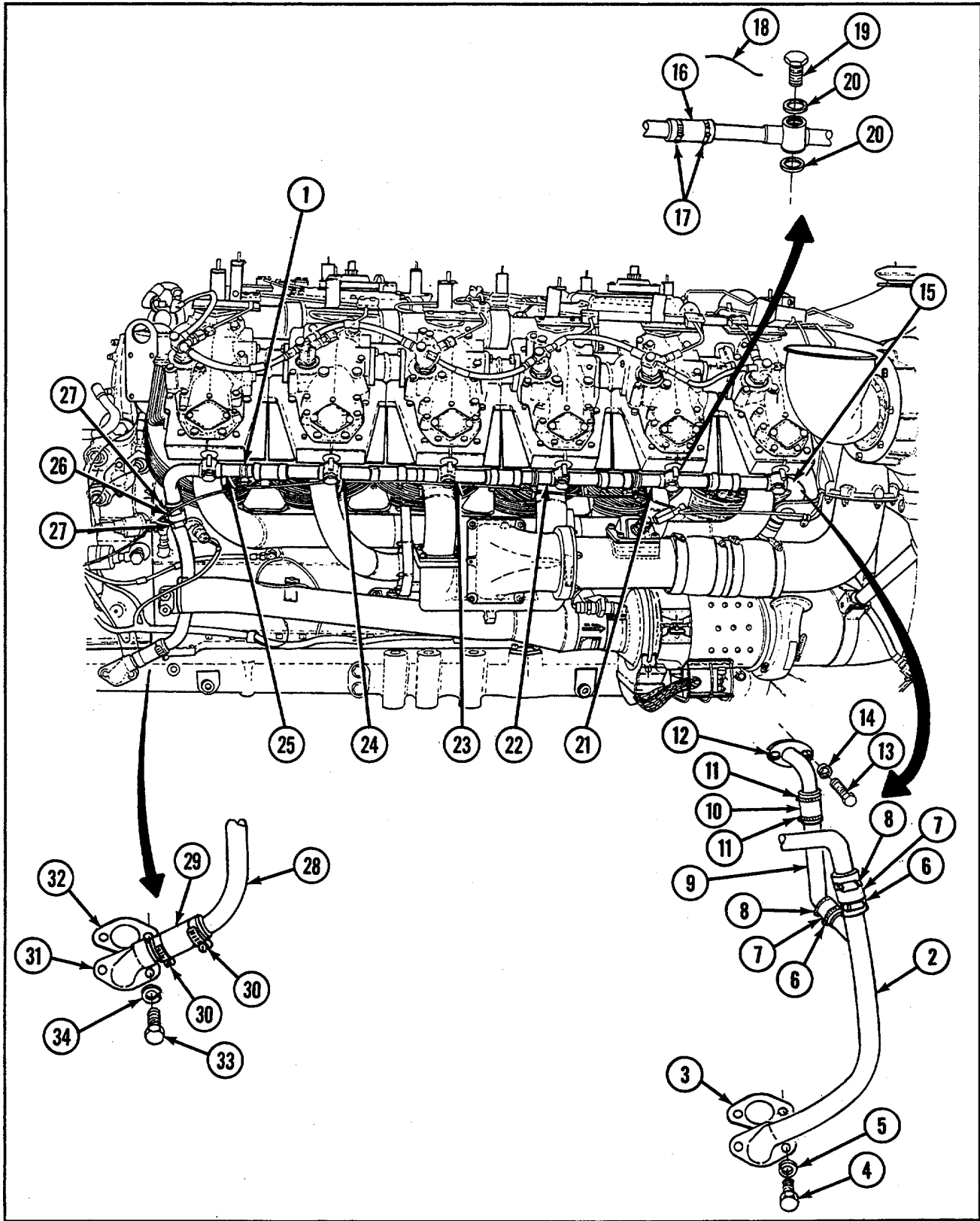
Powerplant removed (see paragraph 3-1)

NOTE

- Removal and installation procedures are the same for both the left- and right-side cylinder head oil pan drain tubes.
- Remove clamps (1) as necessary.

a. REMOVAL

- 1 Remove cylinder head oil pan drain tube (2) and gasket (3) by removing two screws (4), two lockwashers (5), and two hose clamps (6).
- 2 Remove two hoses (7) by removing two hose clamps (8).
- 3 Remove drain tube (9) and hose (10) by removing two hose clamps (11).
- 4 Remove tube (12) by removing two screws (13) and two lockwashers (14).
- 5 Remove drain tube assembly (15) and hose (16) by removing two hose clamps (17), lockwire (18), screw (19), and two flat washers (20).
- 6 Remove tube assembly (21) and hose (16) by removing two hose clamps (17), lockwire (18), screw (19), and two flat washers (20).
- 7 Remove tube assembly (22) and hose (16) by removing two hose clamps (17), lockwire (18), screw (19), and two flat washers (20).
- 8 Remove tube assembly (23) and hose (16) by removing two hose clamps (17), lockwire (18), screw (19), and two flat washers (20).
- 9 Remove tube assembly (24) and hose (16) by removing two hose clamps (17), lockwire (18), screw (19), and two flat washers (20).
- 10 Remove tube assembly (25) and hose (26) by removing two hose clamps (27), lockwire (18), screw (19), and two flat washers (20).
- 11 Remove tube (28) and hose (29) by removing two hose clamps (30).
- 12 Remove elbow (31) and gasket (32) by removing two screws (33) and two lockwashers (34).

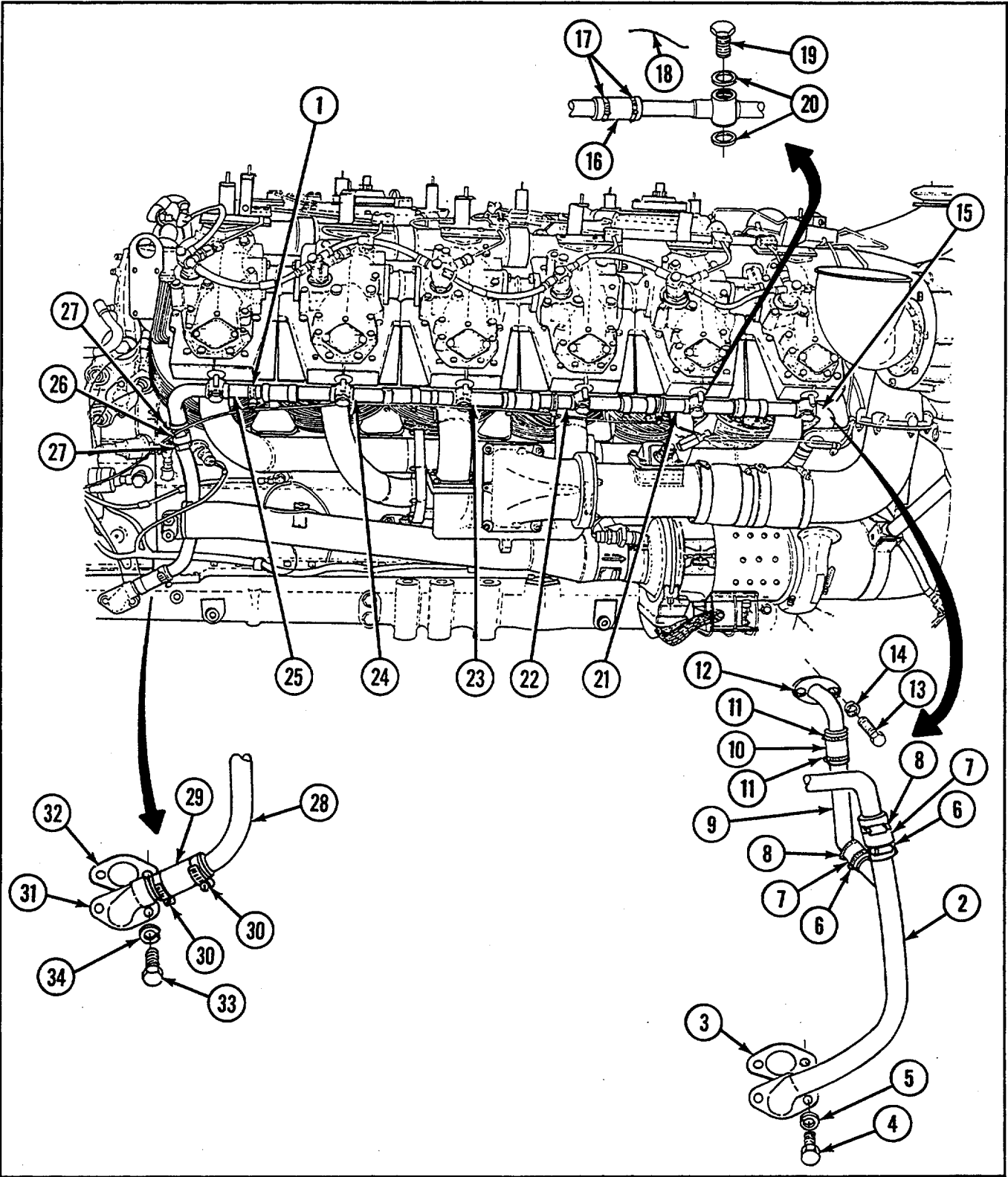


3-11 REPLACE CYLINDER HEAD OIL PAN DRAIN TUBES AND RELATED PARTS--Continued**b. INSTALLATION**

- 1 Install elbow (31) and new gasket (32) with two screws (33) and two new lockwashers (34).
- 2 Install tube (28) and hose (29) with two hose clamps (30).
- 3 Install tube assembly (25) and hose (26) with two hose clamps (27), new lockwire (18), screw (19), and two flat washers (20).
- 4 Install tube assembly (24) and hose (16) with two hose clamps (17), new lockwire (18), screw (19), and two flat washers (20).
- 5 Install tube assembly (23) and hose (16) with two hose clamps (17), new lockwire (18), screw (19), and two flat washers (20).
- 6 Install tube assembly (22) and hose (16) with two hose clamps (17), new lockwire (18), screw (19), and two flat washers (20).
- 7 Install tube assembly (21) and hose (16) with two hose clamps (17), new lockwire (18), screw (19), and two flat washers (20).
- 8 Install drain tube assembly (15) and hose (16) with two hose clamps (17), new lockwire (18), screw (19), and two flat washers (20).
- 9 Install tube (12) with two screws (13) and two new lockwashers (14).
- 10 Install drain tube (9) and hose (10) with two hose clamps (11).
- 11 Install two hoses (7) with two hose clamps (8).
- 12 Install cylinder head oil pan drain tube (2) and new gasket (3) with two screws (4), two new lockwashers (5), and two hose clamps (6).

NOTE

Install clamps (1) if removed.



NOTE

Follow-on maintenance:

Install powerplant (see paragraph 3-1)

3-12 REPLACE OIL COOLER PRESSURE-ACTUATED BYPASS VALVE

THIS TASK COVERS

- a. Removal b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's
(Appendix C, item 53)

Part:

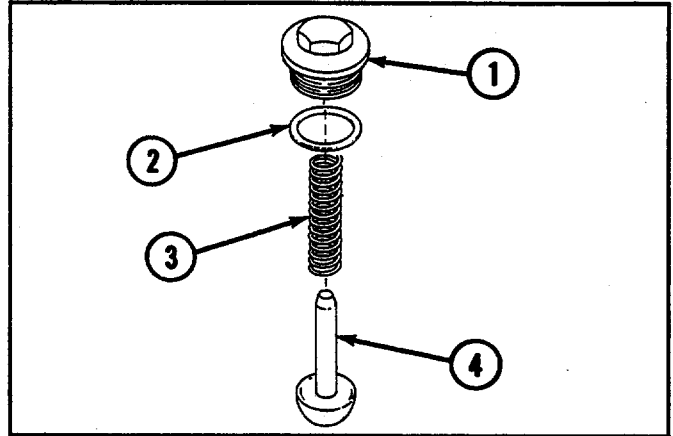
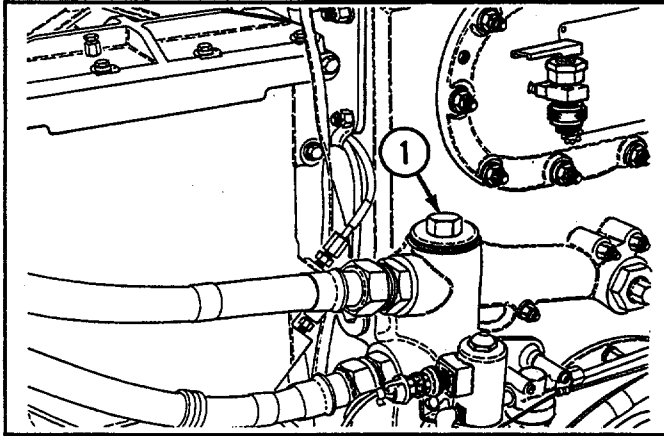
Gasket (Appendix G, item 84)

Equipment Condition:

Grille doors removed (see
paragraph 9-57)

a. REMOVAL

Remove oil cooler bypass valve plug (1), gasket (2), spring (3), and plunger (4).



b. INSTALLATION

Install plunger (4), spring (3), new gasket (2), and oil cooler bypass valve plug (1).

NOTE

Follow-on maintenance: Install grille doors (see paragraph 9-57)

3-13 REPLACE GENERATOR AIR INTAKE TUBE

THIS TASK COVERS

- a. Removal b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

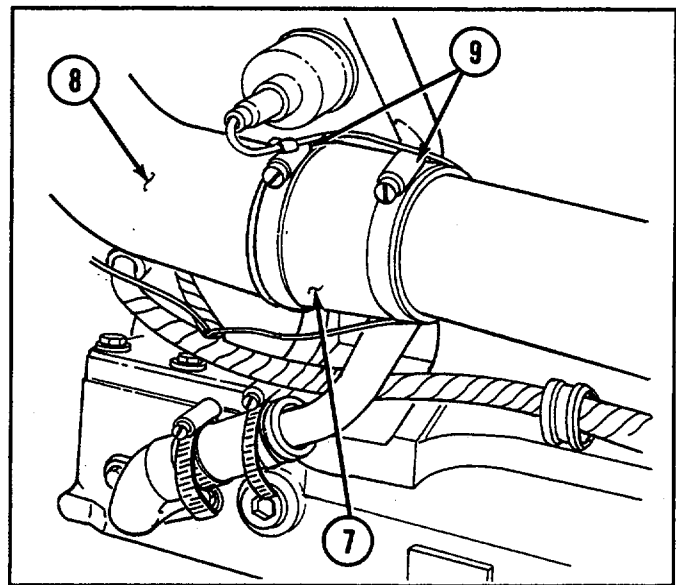
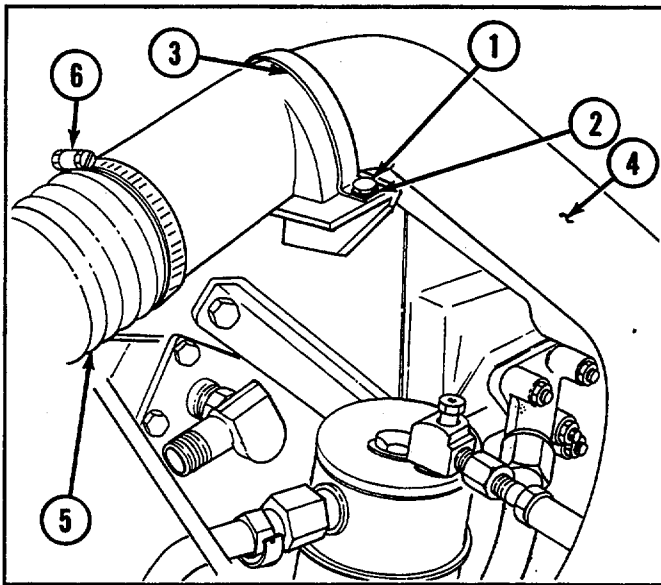
- Lockwashers (2) (Appendix G, item 130)
- Lockwashers (2) (Appendix G, item 131)

Equipment Condition:

Grille doors removed (see
paragraph P57)

a. Removal

- 1 Remove two screws (1), two lockwashers (2), and clamp (3) from air intake tube (4).
- 2 Remove air intake tube (4) from hose (5) by removing clamp (6).
- 3 Remove hose (7) from hose (8) by removing two clamps (9).
- 4 Remove mounting bracket (10) by removing two screws (11) and two lockwashers (12).

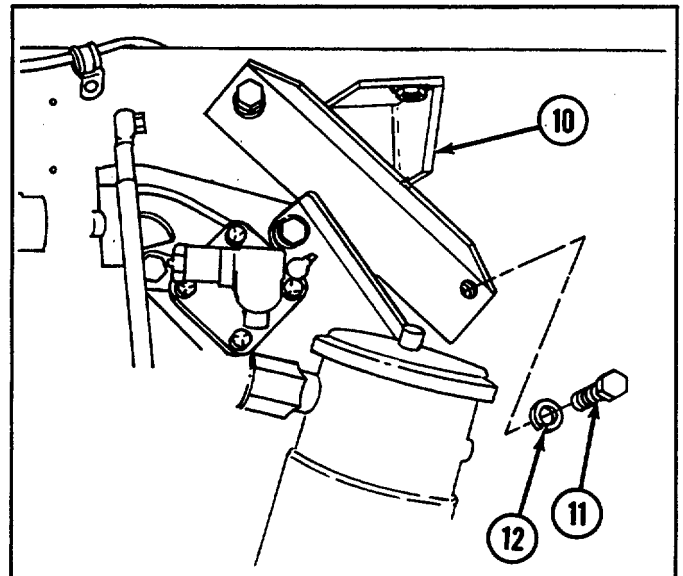


b. INSTALLATION

- 1 Install mounting bracket (10) with two screws (11) and two new lockwashers (12).
- 2 Install hose (7) to hose (8) with two clamps (9).
- 3 Install air intake tube (4) to hose (5) with clamp (6).
- 4 Install clamp (3) to air intake tube (4) with two screws (1) and two new lockwashers (2).

NOTE

Follow-on maintenance: Install grille doors (see paragraph 9-57)



3-14 ADJUST ENGINE IDLE SPEED

THIS TASK COVERS

Adjustment

INITIAL SET-UP

Tools:

Tool kit, general mechanic's
(Appendix C, item 53)

Reference:

TM 9-2350-256-10

Equipment Condition:

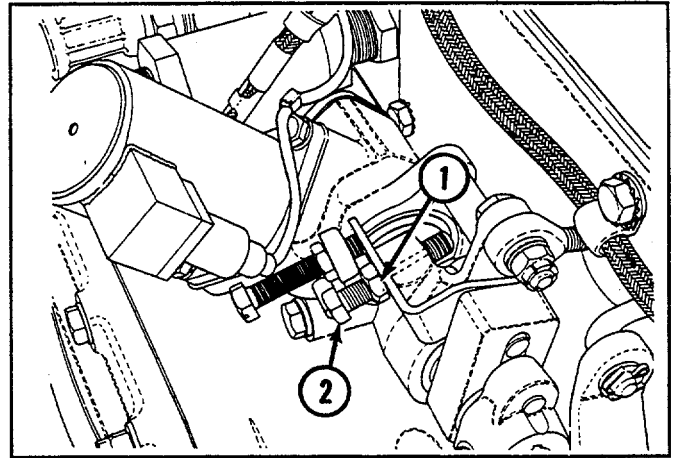
Grille doors removed (see
paragraph 9-57)

3-14 ADJUST ENGINE IDLE SPEED Continued**ADJUSTMENT'**

- 1 With engine running and operating temperature normal (refer to TM 9-2350-256-10), loosen locknut (1) on idle speed adjusting screw (2).
- 2 Turn idle speed adjusting screw (2) clockwise to increase speed or counterclockwise to decrease speed.
- 3 Tighten locknut (1) after 675-725 revolutions per minute (rpm) is obtained.

NOTE

Follow-on maintenance: Install grille doors (see paragraph 9-57)

**3-15 ADJUST ENGINE SOLENOID SPEED****THIS TASK COVERS**

Adjustment

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Reference:

TM 9-2350-256-10

Personnel Required:

2

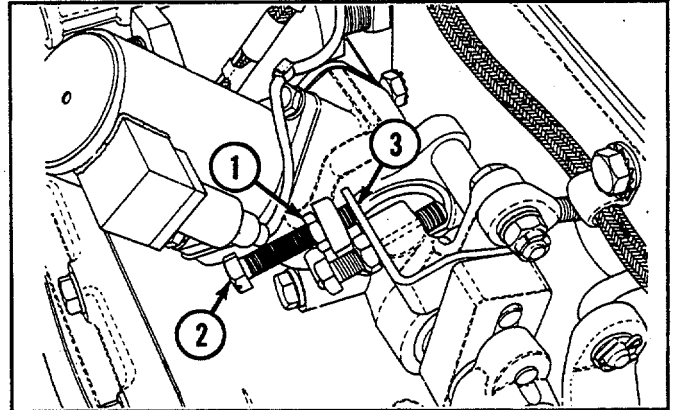
Equipment Condition:

Grille doors removed (see paragraph 9-57)

ADJUSTMENT**CAUTION**

Do not allow engine to exceed 1800 rpm with power takeoff engaged.

- 1 With engine running and operating temperature normal (refer to TM 9-2350-256-10), loosen locknut (1) on solenoid speed control adjusting screw (2). Activate power takeoff and have assistant increase engine speed to 1800 rpm.
- 2 If 1800 rpm cannot be obtained when solenoid speed control adjusting screw (2) engages stop (3), turn adjusting screw counterclockwise to increase rpm. If adjusting screw has not engaged stop when 1800 rpm is obtained, turn adjusting screw clockwise until it engages stop.
- 3 Allow engine to return to idle speed, increase engine speed to 1800 rpm, and recheck adjustment. If adjustment is not correct, repeat step 2.
- 4 Tighten locknut (1) after correct rpm (1800 rpm at no load) is obtained.

**NOTE**

Follow-on maintenance: Install grille doors (see paragraph 9-57)

**CHAPTER 4
MAINTENANCE OF MAIN ENGINE FUEL, AIR INTAKE,
AND EXHAUST SYSTEMS**

CHAPTER OVERVIEW

This chapter describes how to remove, disassemble, test, repair, service, clean, assemble, and install the M88A1 engine fuel, air intake, and exhaust systems.

This chapter consists of the following sections:		Page
Section I:	Fuel System	4-1
Section II:	Primary, Fuel/Water Separator, and Manifold Heater Fuel Filters and Related Parts	4-31
Section III:	Air Intake System	4-50
Section IV:	Exhaust System	4-59

SECTION I: FUEL SYSTEM

Para.	Task	Page
4-1	Replace Fuel Injector Tubes, Brackets, and Related Parts.....	4-2
4-2	Replace Engine Right and Left Upper Covers.....	4-6
4-3	Replace/Repair Electric Fuel Pump	4-8
4-4	Replace Fuel Transfer Pump Hoses and Related Parts	4-10
4-5	Replace Fuel Pump (Gear Type), Lines, and Related Equipment	4-12
4-6	Replace Fuel Injector Fuel Return Hose	4-14
4-7	Replace/Repair Fuel Filler Tube and Filler Strainer	4-18
4-8	Replace Fuel Lever Transmitter	4-19
4-9	Replace/Repair Purge Pump/Handle/Lever	4-20
4-10	Replace/Repair Fuel Valve Lines and Fittings.....	4-22
4-11	Replace/Adjust Engine Fuel Manual Shutoff Control.....	4-24
4-12	Replace Fuel Control Valves and ID Plates	4-27
4-13	Replace Fuel Check Valve	4-29

4-1 REPLACE FUEL INJECTOR TUBES, BRACKETS, AND RELATED PARTS

THIS TASK COVERS

a. Removal

b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Equipment Conditions:

•Engine right and left upper covers removed (see paragraph 4-2)

Parts:

Nuts, self-locking (69) (Appendix G, item 169)

•Engine cooling fan shroud and related parts removed (see paragraph 5-4)

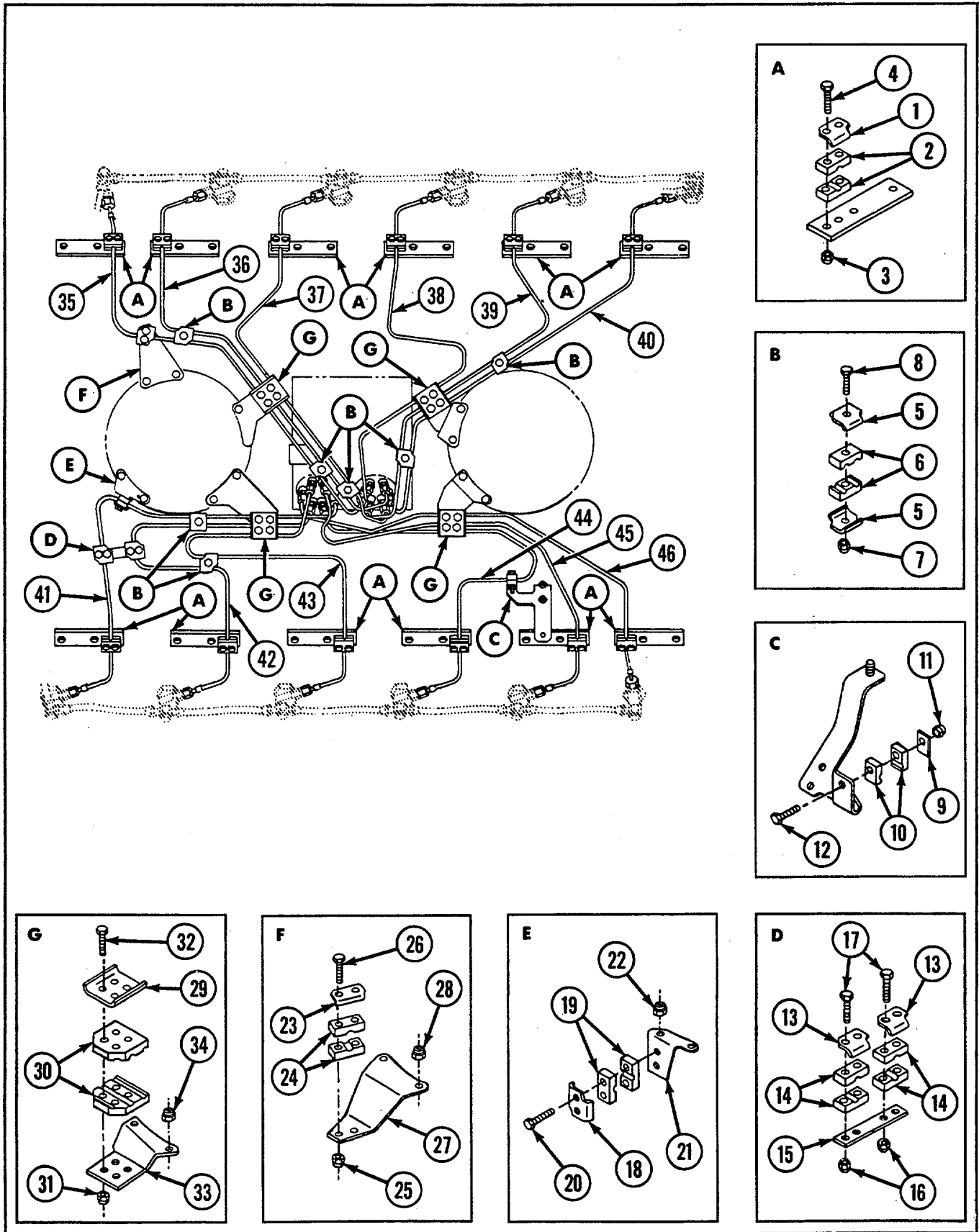
a. REMOVAL

- 1 Remove 12 retaining straps (1) and 24 fairlead halves (2) by removing 24 self-locking nuts (3) and 24 screws (4).
- 2 Remove 14 retaining straps (5) and 14 fairlead halves (6) by removing self-locking nut (7) and screw (8) from each.
- 3 Remove spacer plate (9) and two retaining straps (10) by removing self-locking nut (11) and screw (12).
- 4 Remove two retaining straps (13), four fairlead halves (14), and spacer plate (15) by removing two nuts (16) and two screws (17).
- 5 Remove retaining strap (18) and two fairlead halves (19) by removing two screws (20).
- 6 Remove bracket (21) by removing two self-locking nuts (22).
- 7 Remove retaining strap (23) and two fairlead halves (24) by removing two self-locking nuts (25) and two screws (26).
- 8 Remove bracket (27) by removing two self-locking nuts (28).
- 9 Remove 4 retaining straps (29) and 8 fairlead halves (30) by removing 16 self-locking nuts (31) and 16 screws (32).
- 10 Remove four brackets (33) by removing eight self-locking nuts (34).

NOTE

To aid in installation, tag all tube assemblies before removal.

- 11 Remove 12 tube assemblies (35-46) by loosening coupling nuts at each end of tube assembly.



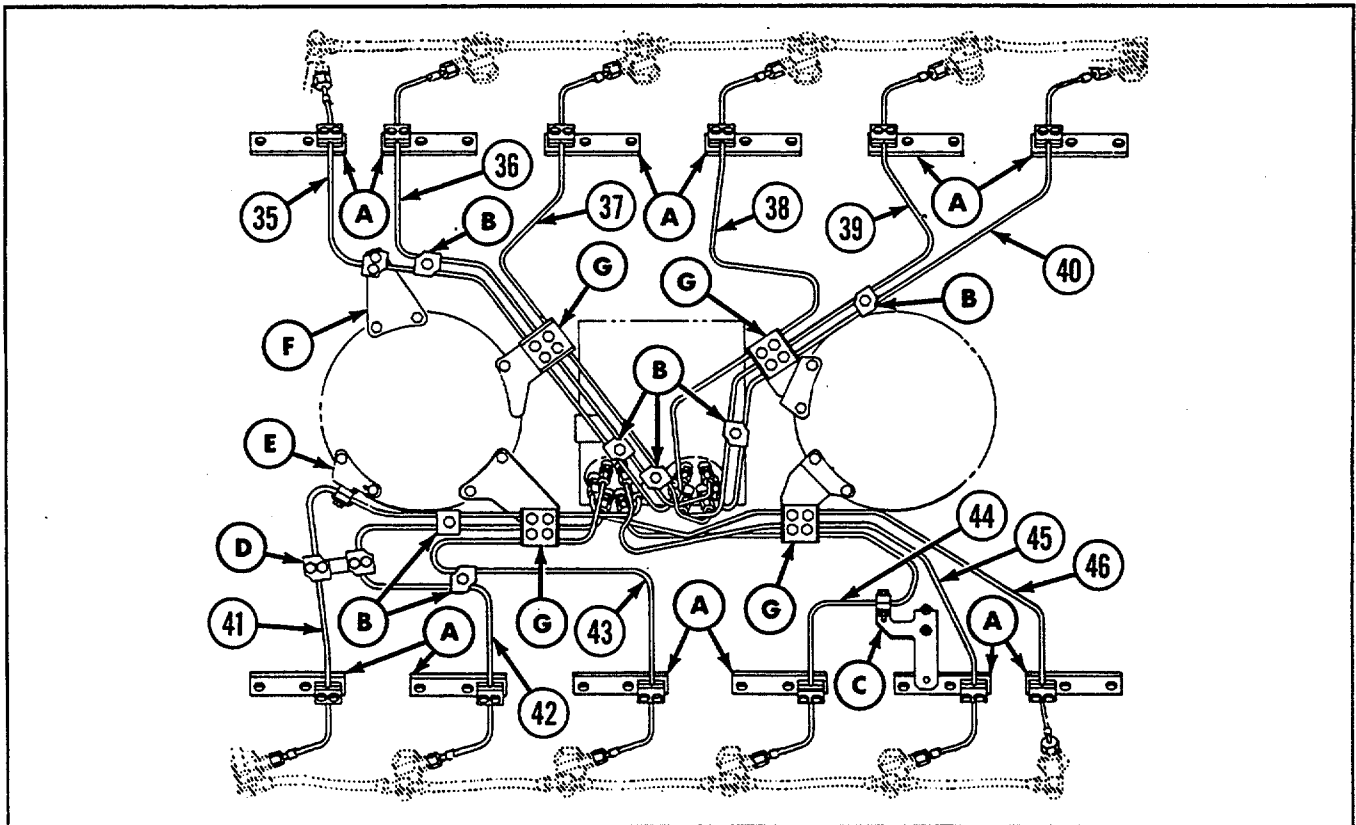
4-1 REPLACE FUEL INJECTOR TUBES, BRACKETS, AND RELATED PARTS-Continued

b. INSTALLATION

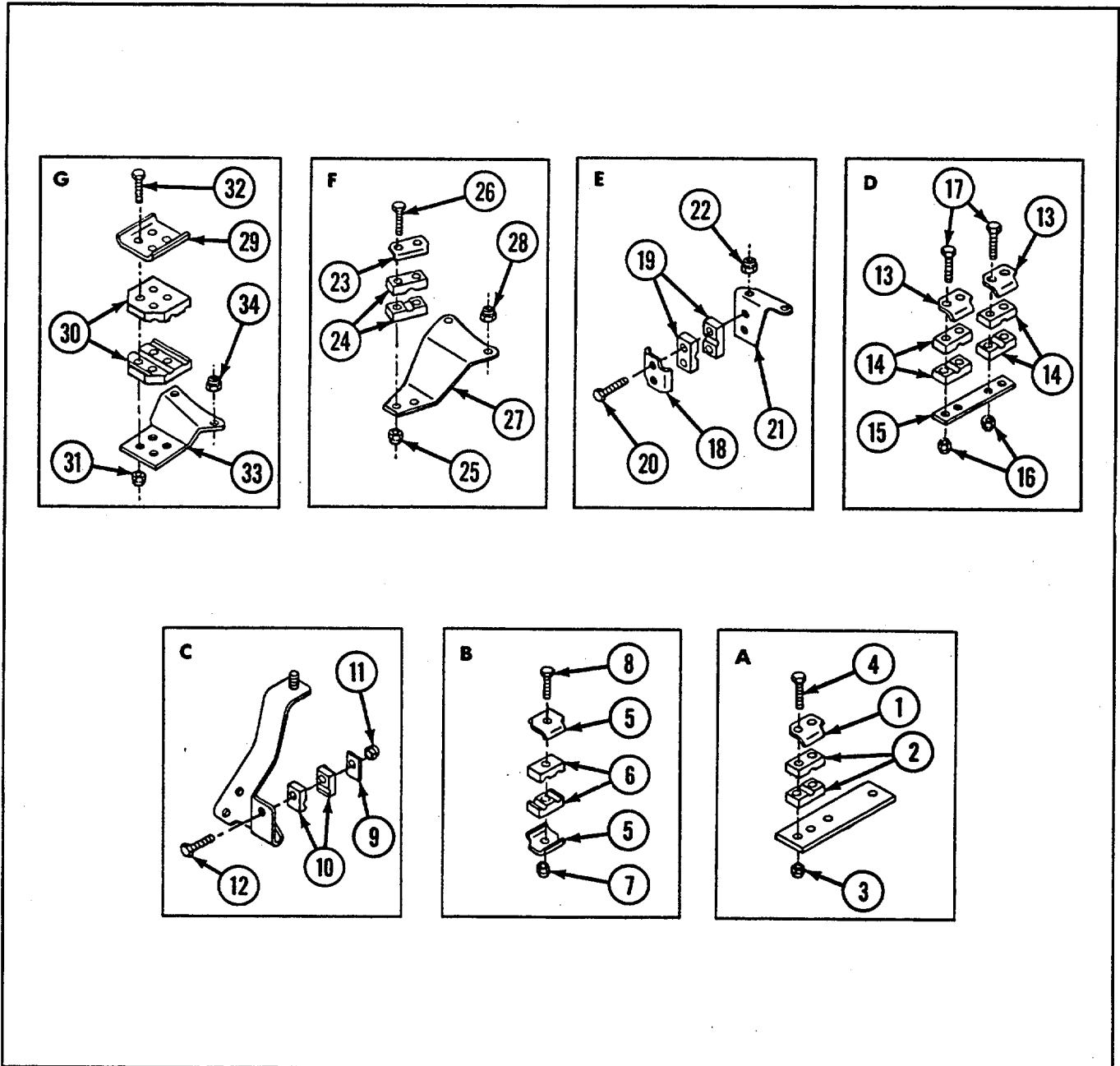
NOTE

When tightening coupling nuts, first tighten coupling nut snugly to seat sleeve and then tighten an additional 1/16 (minimum) to 1/3 (maximum) of a turn to complete operation.

- 1 Install 12 tube assemblies (35-46) by tightening coupling nuts at each end of tube assembly. Remove tags.
- 2 Install four brackets (33) with eight new self-locking nuts (34).
- 3 Install 4 retaining straps (29) and 8 fairlead halves (30) with 16 new self-locking nuts (31) and 16 screws (32).
- 4 Install bracket (27) with two new self-locking nuts (28).
- 5 Install retaining strap (23) and two fairlead halves (24) with two new self-locking nuts (25) and two screws (26).
- 6 Install bracket (21) with two new self-locking nuts (22).
- 7 Install retaining strap (18) and two fairlead halves (19) with two screws (20).
- 8 Install two retaining straps (13), four fairlead halves (14), and spacer plate (15) with two screws (17) and two nuts (16).



- 9 Install spacer plate (9) and two retaining straps (10) with new self-locking nut (11) and screw (12).
- 10 Install 14 retaining straps (5) and 14 fairlead halves (6) each with screw (8) and new self-locking nut (7).
- 11 Install 12 retaining straps (1) and 24 fairlead halves (2) with 24 new self-locking nuts (3) and 24 screws (4).



NOTE

- Follow-on maintenance:
- Install engine cooling fan shroud and related parts (see paragraph 5-4)
 - Install engine right and left upper covers (see paragraph 4-2)

4—2 REPLACE ENGINE RIGHT AND LEFT UPPER COVERS

THIS TASK COVERS

- a. Removal b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Equipment Condition:

Engine deck removed (see paragraph 9-51) for access to engine covers

Parts:

- Gasket (Appendix G, item 69)
- Lockwashers (2) (Appendix G, item 100)
- Packings, preformed (2) (Appendix GC, item 192)

NOTE

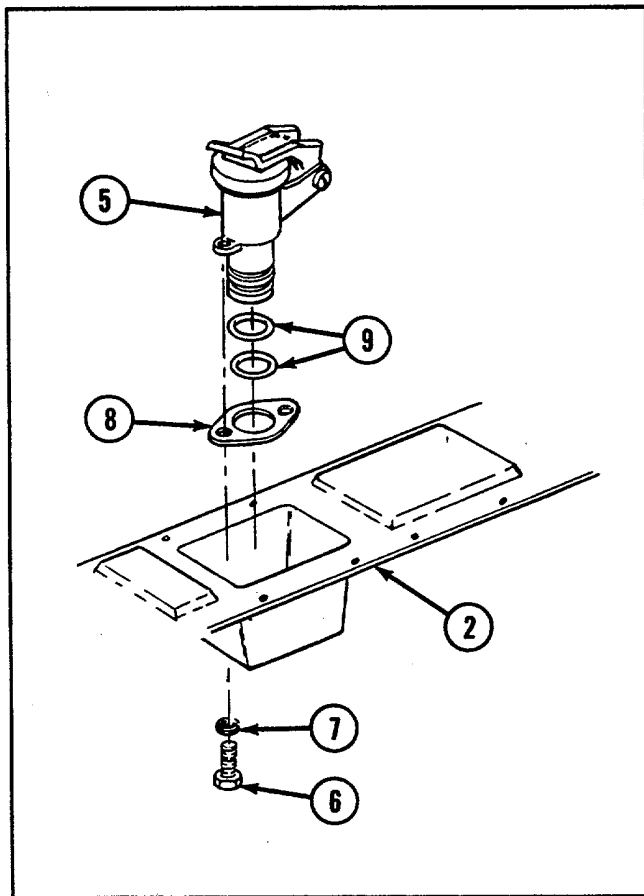
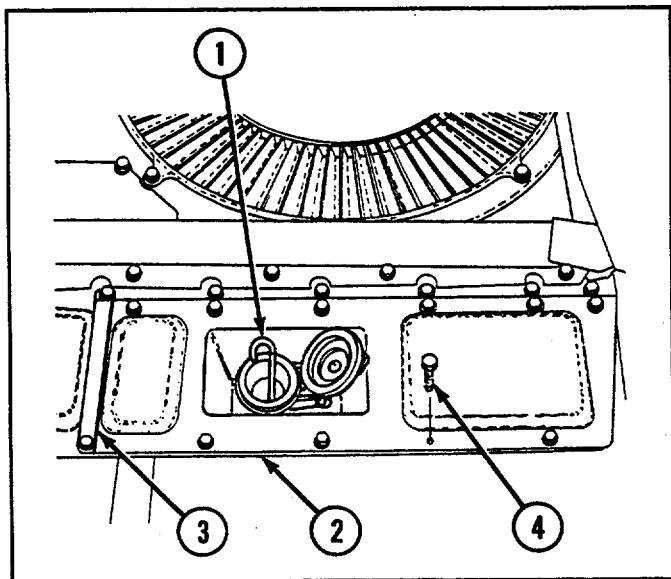
In illustration powerplant shown removed for clarity only.

WARNING

Do not smoke or use open flame when working on fuel system: explosion may occur, causing severe injury or death.

a. REMOVAL

- 1 Remove oil level gage rod (1).
- 2 Remove right front upper cover (2) and strap (3) by removing 12 screws (4).
- 3 Remove oil level indicator tube cap assembly (5) from right front upper cover (2) by removing two screws (6) and two lockwashers (7). Remove gasket (8) and two preformed packings (9) from oil level indicator tube cap assembly.



SECTION: FUEL SYSTEM

TM 9-2350-256-20

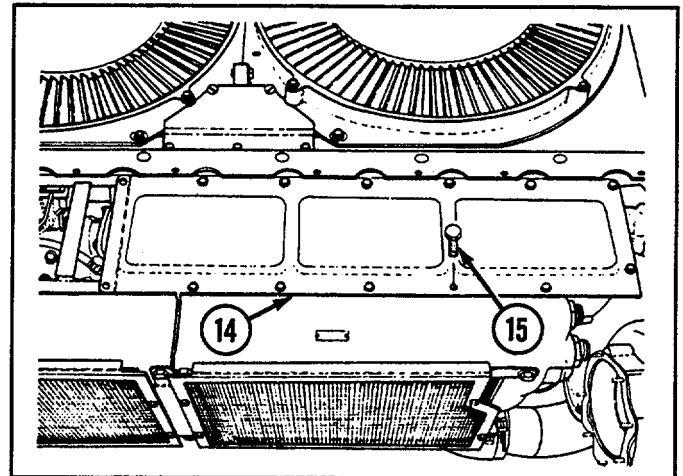
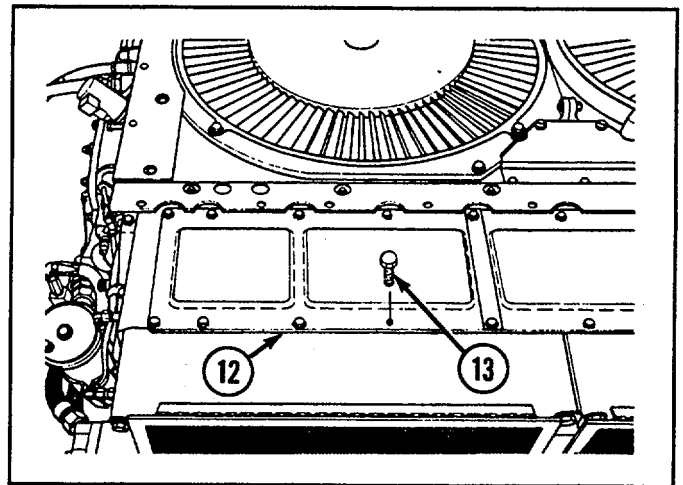
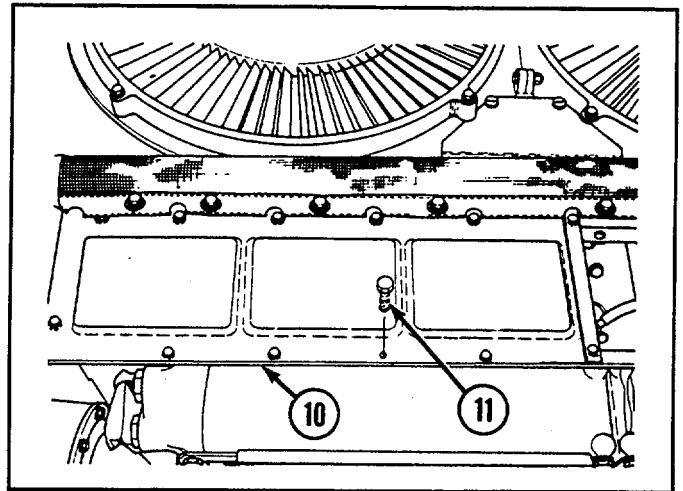
- 4 Remove right rear upper cover (10) by removing 10 screws (11).
- 5 Remove left front upper cover (12) by removing 10 screws (13).
- 6 Remove left rear upper cover (14) by removing 12 screws (15).

b. INSTALLATION

- 1 Install left rear upper cover (14) with 12 screws (15).
- 2 Install left front upper cover (12) with 10 screws (13).
- 3 Install right rear upper cover (10) with 10 screws (11).
- 4 Assemble oil level indicator tube cap assembly (5) to right front upper cover (2) with new gasket (8), two new preformed packings (9), two screws (6), and two new lockwashers (7).
- 5 Install right front upper cover (2) and strap (3) with 12 screws (4).
- 6 Install oil level gage rod (1).

NOTE

Follow-on maintenance: Install engine deck (see paragraph 9-51)



4—3 REPLACE/REPAIR ELECTRIC FUEL PUMP

THIS TASK COVERS

a. Removal b. Disassembly c. Assembly d. Installation e. Test

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Suitable container

Material/Parts-Continued:

- Lockwashers (2) (Appendix G, item 113)
- Lockwashers (12) (Appendix G, item 131)
- Packing (Appendix G, item 183)
- Seal (Appendix G, item 261)

Material/Parts:

- Tape, sealant (Appendix D, item 30)
- Gasket (Appendix G, item 25)
- Gasket (Appendix G, item 46)
- Gasket (Appendix G, item 68)
- Lockwashers (3) (Appendix G, item 95)
- Lockwasher (Appendix G, item 111)

Reference:

TM 9-2350-256-10

Equipment Condition:

Intermediate rear left-center floor plate removed (see paragraph 9-17)

a. REMOVAL

WARNING

Do not smoke or use open flame when working on fuel system: explosion may occur, causing severe injury or death.

CAUTION

Do not allow gasket particles, dirt, rags, or other foreign material to enter fuel tank while electric fuel pump is removed. If electric fuel pump is not immediately replaced, cover opening with sealant tape or other suitable material.

- 1 Disconnect fuel lines with reducers (1) and tee (2) from electric fuel pump (3).
- 2 Disconnect cable connector (4).
- 3 Remove 12 screws (5), 12 lockwashers (6), and ground cable (7).

- 4 Remove electric fuel pump (3) and gasket (8).
- 5 Remove seal (9).
- 6 Remove three nuts (10) and three lockwashers (11).
- 7 Remove retainer (12).
- 8 Remove terminal assembly (13) and gasket (14).
- 9 Remove discharge fitting (15) and packing (16).

b. DISASSEMBLY

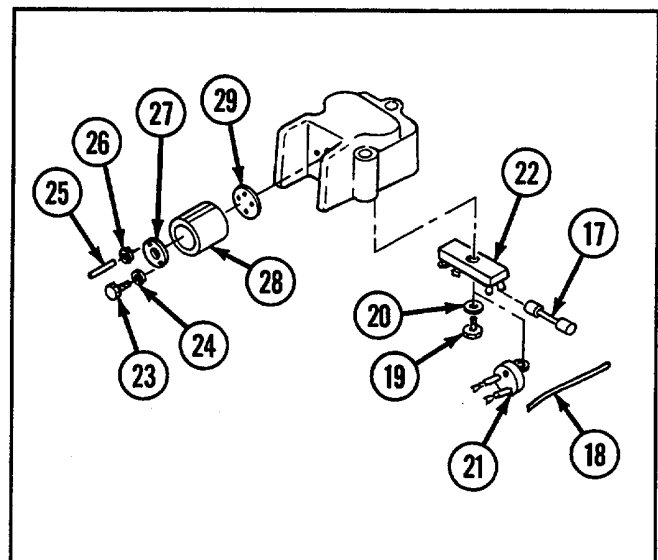
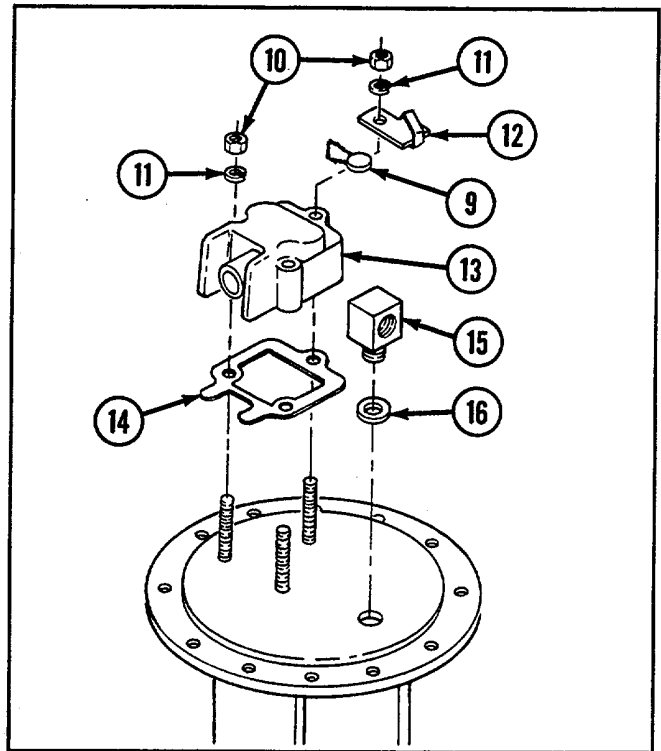
- 1 Remove cartridge fuse (17).
- 2 Disconnect electric cable (18).
- 3 Remove screw (19), lockwasher (20), pin assembly (21), and fuseholder (22).
- 4 Remove screw (23) and lockwasher (24).
- 5 Remove shoulder pin (25) and lockwasher (26).
- 6 Remove fuel plate retainer (27), shell receptacle (28), and gasket (29).

c. ASSEMBLY

- 1 Install new gasket (29), shell receptacle (28), and fuel plate retainer (27).
- 2 Install new lockwasher (26) and shoulder pin (25).
- 3 Install new lockwasher (24) and screw (23).
- 4 Install fuseholder (22), pin assembly (21), new lockwasher (20), and screw (19).
- 5 Connect electric cable (18).
- 6 Install cartridge fuse (17).

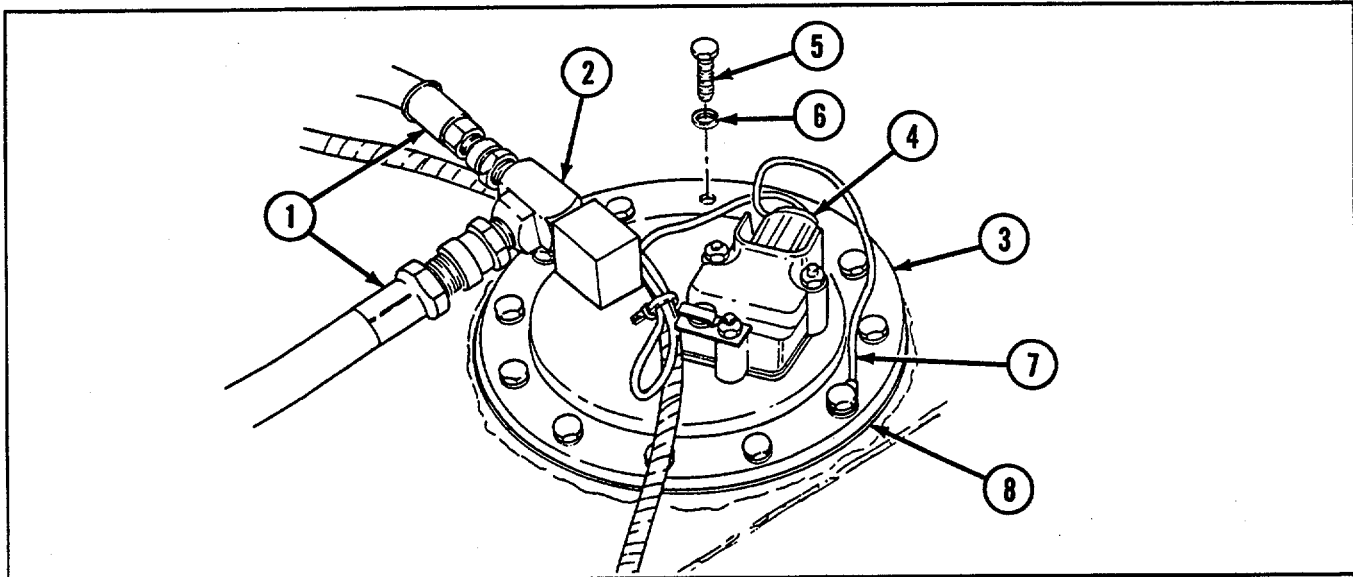
d. INSTALLATION

- 1 Install new packing (16) and discharge fitting (15).
- 2 Install new gasket (14) and terminal assembly (13).
- 3 Install retainer (12).
- 4 Install three new lockwashers (11) and three nuts (10).
- 5 Install new seal (9).



4—3 REPLACE/REPAIR ELECTRIC FUEL PUMP-Continued

- 6 Install new gasket (8), electric fuel pump (3), and ground cable (7) with 12 screws (5) and 12 new lockwashers (6).
- 7 Connect cable connector (4).
- 8 Connect fuel lines with reducers (1) and tee (2) to electric fuel pump (3) using sealant tape.



e. TEST

- 1 Disconnect fuel tank supply hose quick disconnect (see paragraph 4-10). Open coupling valve to collect fuel in suitable, 5-gallon (19-liter) container.
- 2 Turn MASTER switch and in-tank fuel pump switch to ON position (refer to TM 9-2350-256-10).
- 3 Time fuel flow into measured container.
- 4 Flow rate of 3 gallons per minute (11 liters per minute) is satisfactory. Replace electric fuel pump if rate of flow is less than 3 gallons per minute (11 liters per minute).

NOTE

Follow-on maintenance: Install intermediate rear left center floor plate (see paragraph 9-18)

4—4 REPLACE FUEL TRANSFER PUMP HOSES AND RELATED PARTS

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's
(Appendix C, item 53)

Material/Parts:

- Tape, sealant (Appendix D, item 30)
- Lockwashers (4) (Appendix G, item 130)

Equipment Condition:

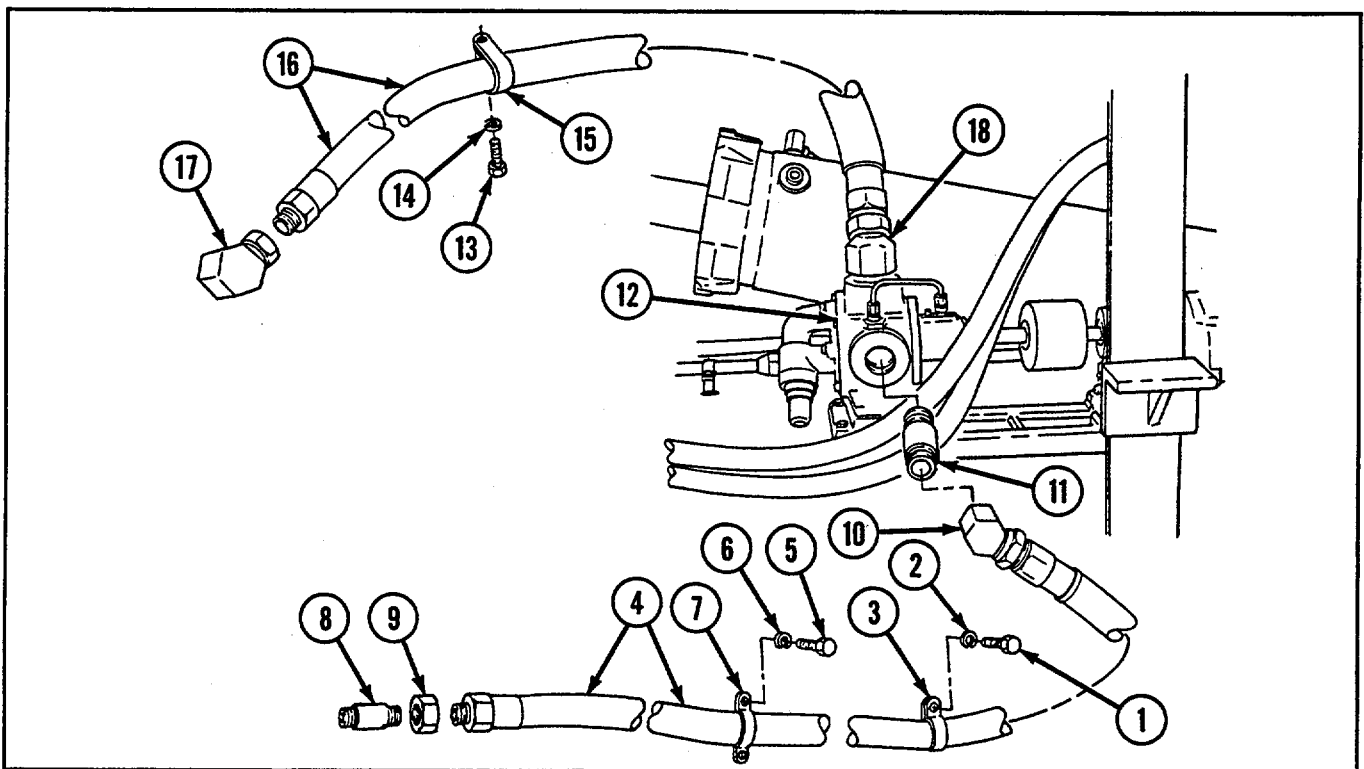
Right rear air inlet door opened
(see paragraph 9-56)

WARNING

Do not smoke or use open flame when working on fuel system: explosion may occur, causing severe injury or death.

a. REMOVAL

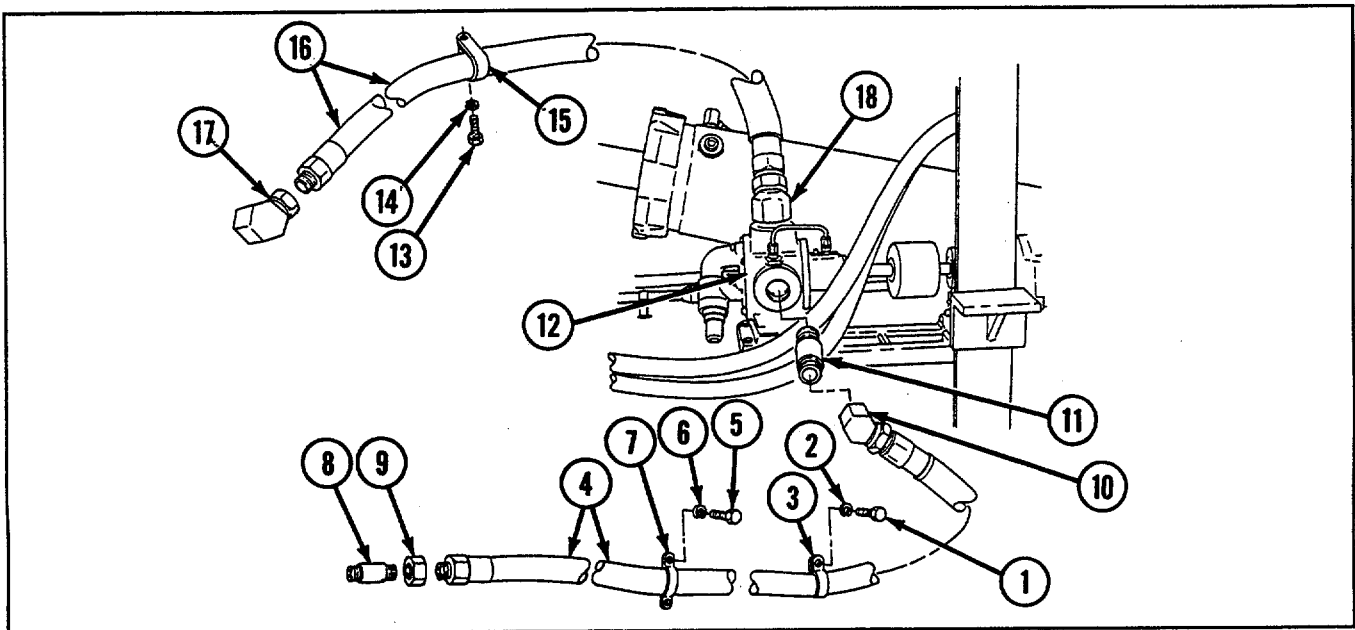
- 1 Remove screw (1), lockwasher (2), and clamp (3) from hose (4).
- 2 Remove two screws (5), two lockwashers (6), and strap (7).
- 3 Remove nipple (8) and nut (9) from hose (4).
- 4 Remove hose (4) with elbow (10) and nipple (11) from pump assembly (12).
- 5 Remove elbow (10) and nipple (11) from hose (4).
- 6 Remove screw (13), lockwasher (14), and clamp (15) from hose (16).
- 7 Remove elbow (17) from hose (16).
- 8 Remove hose (16) with elbow (18) from pump assembly (12).
- 9 Remove elbow (18) from hose (16).

**b. INSTALLATION**

- 1 Install elbow (18) to hose (16).

4—4 REPLACE/REPAIR FUEL TRANSFER PUMP HOSES AND RELATED PARTS-Continued

- 2 Install hose (16) with elbow (18) to pump assembly (12) using adhesive tape.
- 3 Install elbow (17) to hose (16).
- 4 Install elbow (10) and nipple (11) to hose (4).
- 5 Install clamp (15) with new lockwasher (14) and screw (13) to hose (16).
- 6 Install hose (4) with elbow (10) and nipple (11) to pump assembly (12) using adhesive tape.
- 7 Install nut (9) and nipple (8) to hose (4) using adhesive tape.
- 8 Install strap (7) with two new lockwashers (6) and two screws (5).
- 9 Install clamp (3), new lockwasher (2), and screw (1) to hose (4).



NOTE

Follow-on maintenance:

Close right rear air inlet door (see paragraph 9-56)

4—5 REPLACE FUEL PUMP (GEAR TYPE), LINES, AND RELATED EQUIPMENT

THIS TASK COVERS

- | | | |
|------------|-----------------|---------|
| a. Removal | b. Installation | c. Test |
|------------|-----------------|---------|

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- STE/ICE-R (Appendix C, item 51)

Parts:

Gasket (Appendix G, item 36)

Equipment Condition:

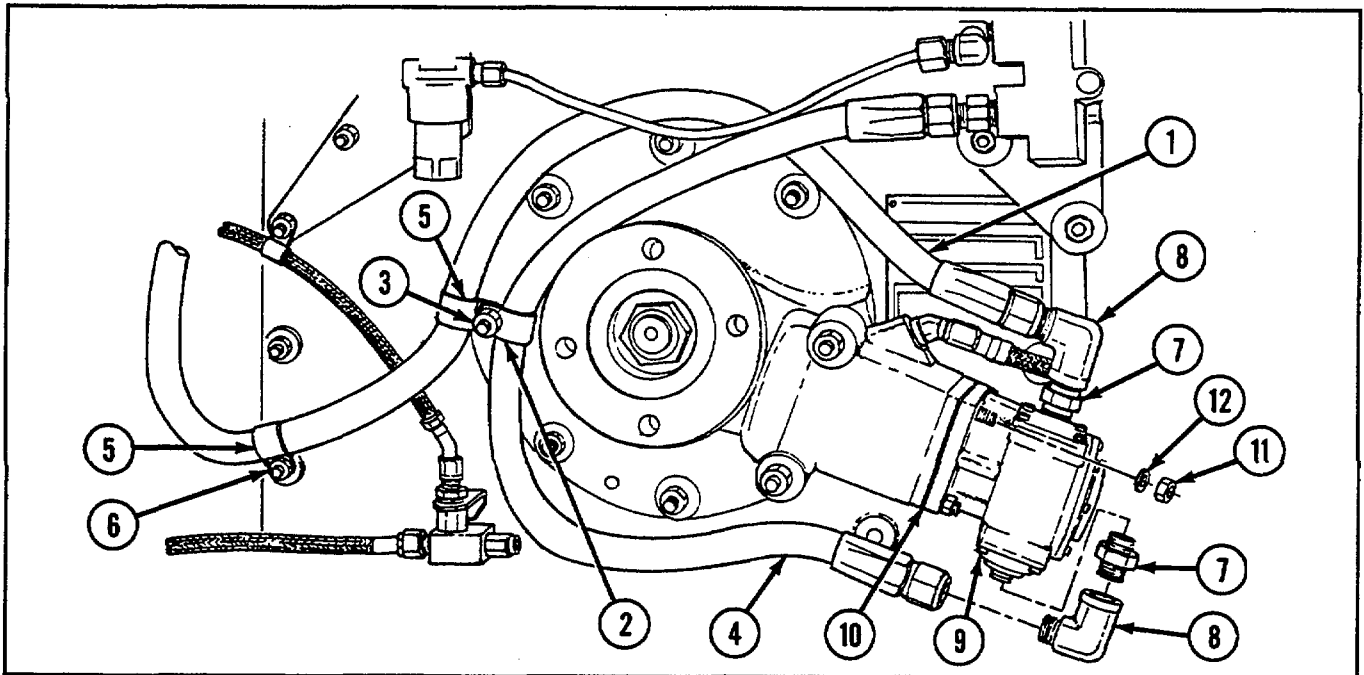
Powerplant removed (see paragraph 3-1) for access to fuel pump

WARNING

Do not smoke or use open flame when working on fuel system: explosion may occur, causing severe injury or death.

a. REMOVAL

- 1 Remove fuel inlet hose (1) by loosening union nuts at each end and removing clamp (2) and nut (3).
- 2 Remove fuel outlet hose (4) by loosening union nuts at each end and removing two clamps (5) and nut (6).
- 3 Remove two nipples (7) and two elbows (8) from fuel pump (9).
- 4 Remove fuel pump (9) and gasket (10) by removing four nuts (11) and four flat washers (12).

**b. INSTALLATION**

- 1 Install fuel pump (9) and new gasket (10) with four nuts (11) and four flat washers (12).
- 2 Install two nipples (7) and two elbows (8) to fuel pump (9).
- 3 Install fuel outlet hose (4) by tightening union nuts at each end and installing two clamps (5) and nut (6).
- 4 Install fuel inlet hose (1) by tightening union nuts at each end and installing clamp (2) and nut (3).

c. TEST

Check fuel/water separator filter cover bleeder valve and primary fuel filter cover bleeder valve for fuel pressure by performing Simplified Test Equipment for Internal Combustion Engines-Reprogrammable test 50 (see paragraph 2-18) with pressure transducer.

NOTE

Follow-on maintenance:

Install powerplant (see paragraph 3-1)

4—6 REPLACE FUEL INJECTOR FUEL RETURN HOSE

THIS TASK COVERS

a. Removal

b. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Pliers, retaining ring, external (Appendix C, item 32)

Parts:

- Lockwasher (Appendix G, item 122)
- Nuts, self-locking (3) (Appendix G, item 165)

Equipment Conditions:

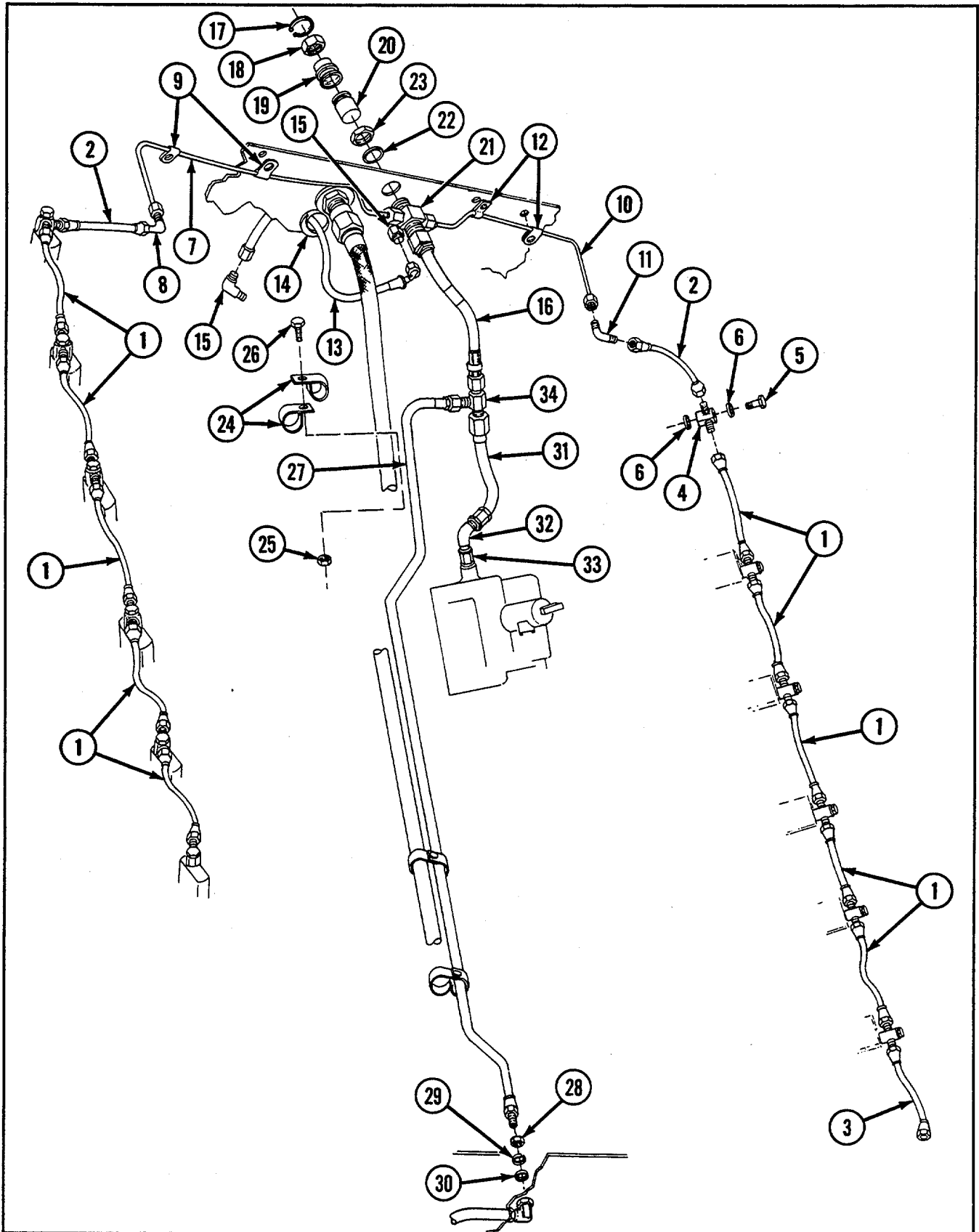
- Engine right and left upper covers removed (see paragraph 4-2)
- Engine cooling fan shroud and related parts removed (see paragraph 5-4)

WARNING

Do not smoke or use open flame when working on fuel system: explosion may occur, causing severe injury or death.

a. REMOVAL

- 1 Remove 10 hose assemblies (1) by loosening coupling nut at each end of hose assembly.
- 2 Remove two hose assemblies (2) by loosening coupling nut at each end of hose assembly.
- 3 Remove hose assembly (3) by loosening coupling nut at each end of hose assembly.
- 4 Remove 12 multiple connectors (4) by removing 12 fluid passage bolts (5) and 24 flat washers (6).
- 5 Remove tube assembly (7) and tube elbow (8) by loosening coupling nut at each end of tube assembly and removing two clamps (9).
- 6 Remove tube assembly (10) and tube elbow (11) by loosening coupling nut at each end of tube assembly and removing two clamps (12).
- 7 Remove hose assembly (13) by loosening coupling nut at each end of hose assembly.
- 8 Remove grommet (14) and two elbows (15).
- 9 Remove hose assembly (16) by loosening coupling nut at each end of hose assembly.
- 10 Remove retaining ring (17), nut (18), clinch sleeve (19), and sealing plug (20).
- 11 Remove tube cross (21), flat washer (22), and nut (23).
- 12 Remove three loop clamps (24) by removing three self-locking nuts (25) and three screws (26).
- 13 Remove hose assembly (27) by loosening coupling nut at each end and removing nut (28), lockwasher (29), and flat washer (30).
- 14 Remove hose assembly (31) by loosening coupling nut at each end and removing elbow (32) and check valve (33) from one end, and tee (34) from other end.



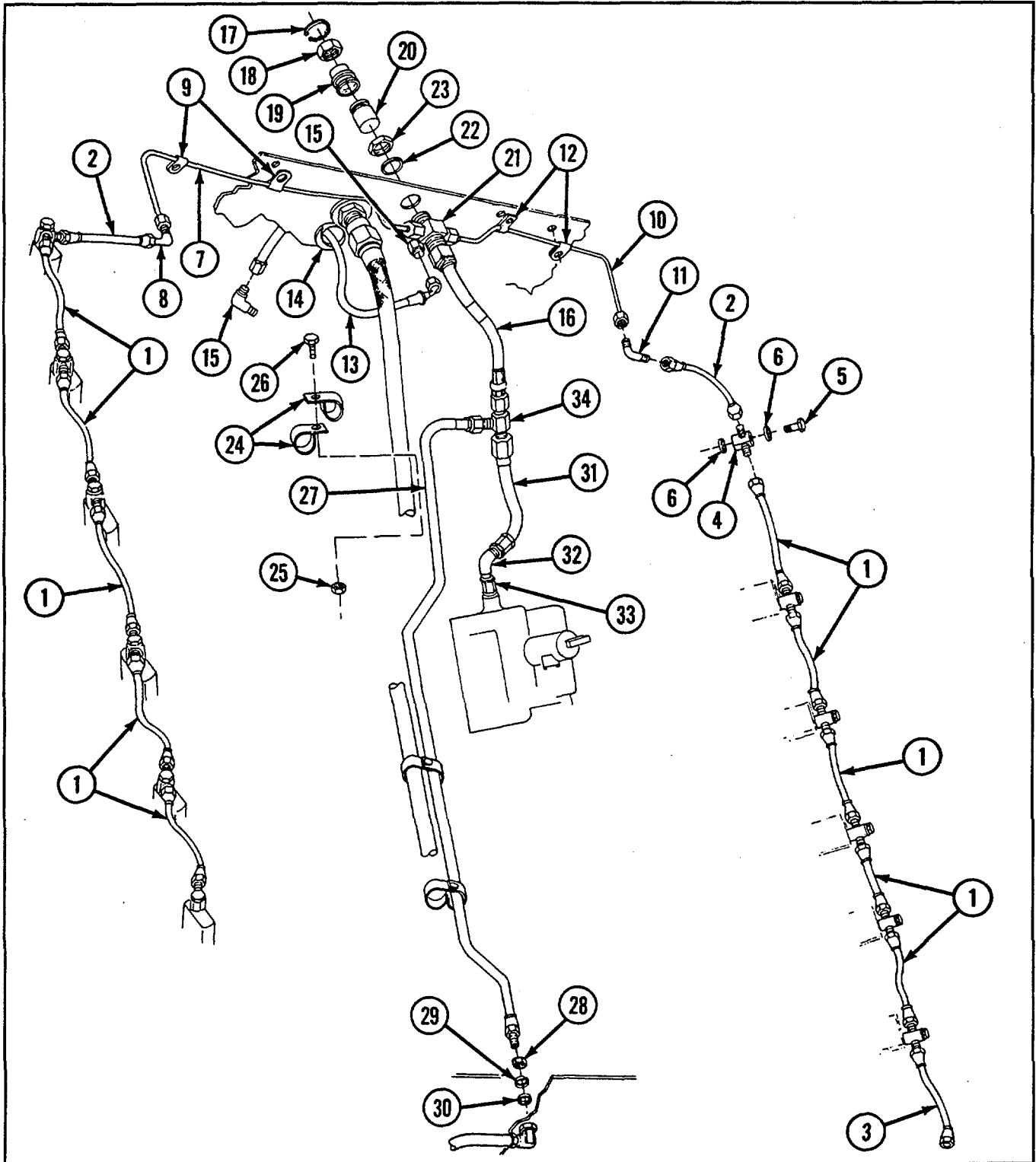
4-6 REPLACE FUEL INJECTOR FUEL RETURN HOSE-Continued

b. INSTALLATION

NOTE

When tightening fuel line fittings, draw nut up 1/16 (minimum) to 1/3 (maximum) of a turn after seating sleeve.

- 1 Install hose assembly (31) by tightening coupling nut at each end and installing elbow (32) and check valve (33) on one end, and tee (34) on other end.
- 2 Install hose assembly (27) by tightening coupling nut at each end and installing nut (28), new lockwasher (29), and flat washer (30).
- 3 Install three loop clamps (24) with three new self-locking nuts (25) and three screws (26).
- 4 Install tube cross (21) with flat washer (22) and nut (23).
- 5 Install sealing plug (20) with retaining ring (17), nut (18), and clinch sleeve (19).
- 6 Install hose assembly (16) by tightening coupling nut at each end of hose assembly.
- 7 Install two elbows (15) and grommet (14).
- 8 Install hose assembly (13) by tightening coupling nut at each end of hose assembly.
- 9 Install tube elbow (11) and tube assembly (10) by tightening coupling nut at each end of tube assembly and installing two clamps (12).
- 10 Install tube elbow (8) and tube assembly (7) by tightening coupling nut at each end of tube assembly and installing two clamps (9).
- 11 Install 12 multiple connectors (4) with 24 flat washers (6) and 12 fluid passage bolts (5).
- 12 Install hose assembly (3) by tightening coupling nut at each end of hose assembly.
- 13 Install two hose assemblies (2) by tightening coupling nut at each end of hose assembly.
- 14 Install 10 hose assemblies (1) by tightening coupling nut at each end of hose assembly.



NOTE

Follow-on maintenance:

- Install engine cooling fan shroud and related parts (see paragraph 5-4)
- Install engine right and left upper covers (see paragraph 4-2)

4—7 REPLACE/REPAIR FUEL FILLER TUBE AND FILLER STRAINER

THIS TASK COVERS

- a. Removal b. Cleaning c. Disassembly d. Assembly e. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Material/Parts-Continued:

- Gaskets (2) (Appendix G, item 34)
- Lockwashers (12) (Appendix G, item 130)

Material/Parts:

- Solvent, dry-cleaning (Appendix D, item 9)
- Gasket (Appendix G, item 33)

Equipment Condition:

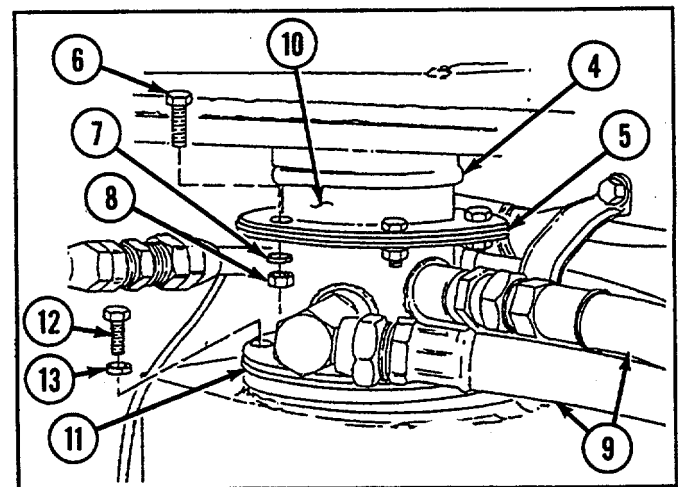
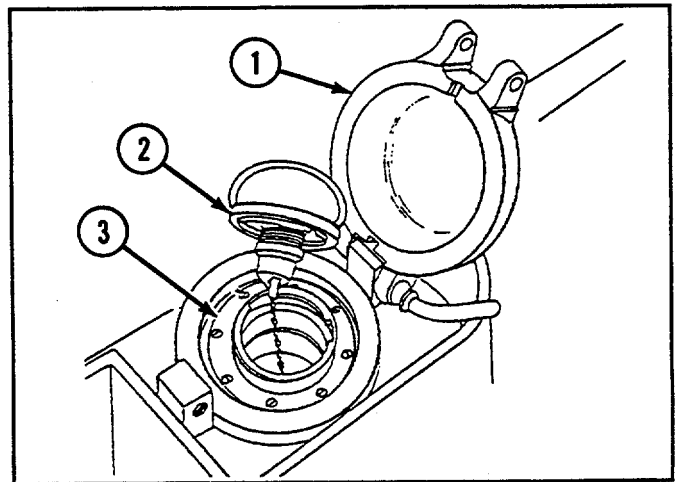
Grille doors removed (see paragraph 9-57)

WARNING

Do not smoke or use open flame when working on fuel system: explosion may occur, causing severe injury or death.

a. REMOVAL

- 1 Open fuel fill cover (1).
- 2 Remove fuel filler tube cap assembly (2).
- 3 Remove filler tube grommet assembly (3).
- 4 Remove upper filler tube (4) and gasket (5) by removing six screws (6), six lockwashers (7), and six nuts (8).
- 5 Disconnect two air vent lines (9).
- 6 Remove lower filler tube (10) and gasket (11) by removing six screws (12) and six lockwashers (13).
- 7 Remove spacer (14) and gasket (15).
- 8 Remove fuel filler strainer element (16) from fuel tank.



b. CLEANING

WARNING

Dry-cleaning solvent used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flashpoint of solvent is 138 degrees Fahrenheit (°F) (59 degrees Celsius [°C]).

Clean fuel filler strainer element (16) with dry-cleaning solvent.

c. DISASSEMBLY

Disassemble filler tube grommet assembly (3) by removing eight screws (17), spacer plate (18), gaskets (19 and 20), and spacer plate (21).

d. ASSEMBLY

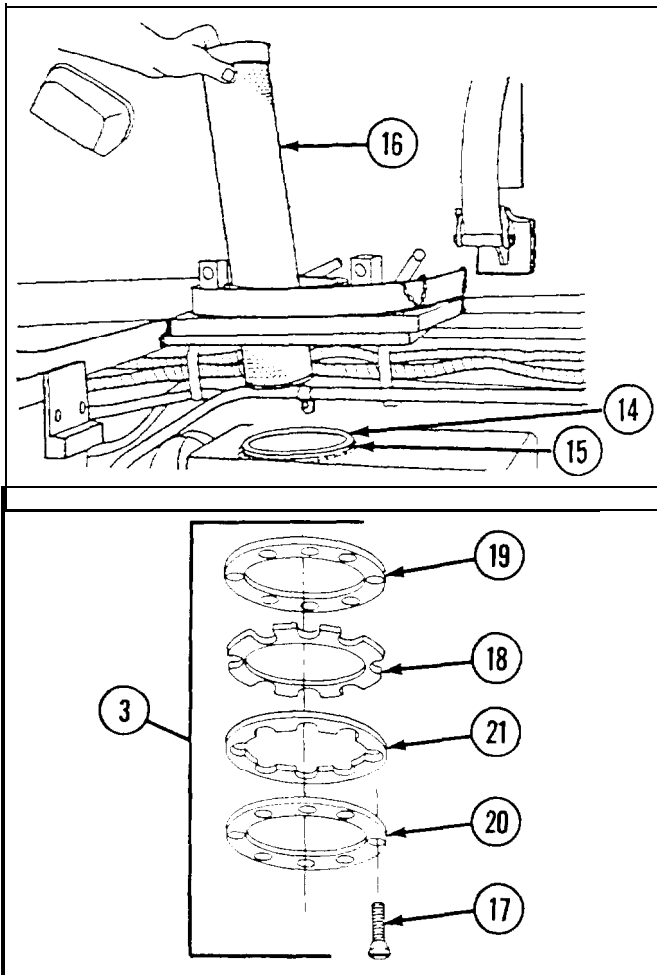
NOTE

If replacing gasket (19), cut an approximate 2-inch (in.) (51-millimeter [mm]) length from new gasket using old gasket as guide.

Assemble filler tube grommet assembly (3) by installing spacer plate (18), two gaskets (19 and 20), spacer plate (21), and eight screws (17).

e. INSTALLATION

- 1 Install fuel filler strainer element (16) into fuel tank.
- 2 Install new gasket (15) and spacer (11).
- 3 Install lower filler tube (10) with new gasket (11) by installing six new lockwashers (13) and six screws (13).
- 4 Connect two air vent lines (9).
- 5 Install upper filler tube (4) with new gasket (5) by installing six nuts (8), six new lockwashers (7), and six screws (6).
- 6 Install filler tube grommet assembly (3).
- 7 Install fuel filler tube cap assembly (2).
- 8 Close fuel fill cover (1).



NOTE

Follow-on maintenance: Install grille doors (see paragraph 9-57)

4-8 REPLACE FUEL LEVEL TRANSMITTER

THIS TASK COVERS

- a. Removal b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic' s (Appendix C, item 53)

Parts:

- Gaskets (2) (Appendix G, item 60)
- Lockwashers (12) (Appendix G, item 130)

Equipment Conditions:

- Stowage basket center left floor plate removed (see paragraph 9-14)
- Engine deck removed (see paragraph 9-51)

WARNING

Do not smoke or use open flame when working on fuel system: explosion may occur, causing severe injury or death.

NOTE

- Removal and installation procedures are the same for both the engine compartment and cab

4-8 REPLACE FUEL LEVEL TRANSMITTER-CONTINUED

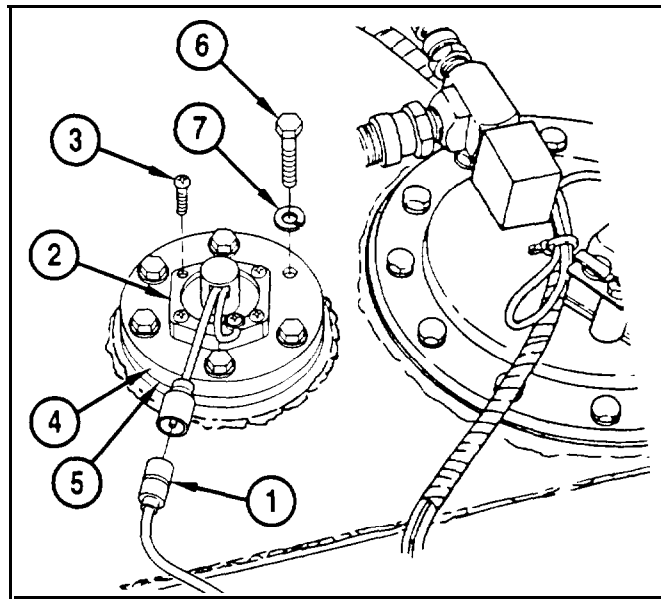
- Transmitter removal pertains to the eight rear and forward fuel tanks only.

a. REMOVAL

- 1 Remove connector (1).
- 2 Remove transmitter (2) by removing four screws (3).
- 3 Remove adapter (4) and gasket (5) by removing six screws (6) and six lockwashers (7).

b. INSTALLATION

- 1 Install adapter (4) with new gasket (5) by installing six new lockwashers (7) and six screws (6) onto fuel tank.
- 2 Install transmitter (2) with four screws (3) and connect connector (1).



NOTE

- Follow-on maintenance:
- Install engine deck (see paragraph 9-51)
 - Install stowage basket center left floor plate (see paragraph 9-14)

4-9 REPLACE/REPAIR PURGE PUMP/HANDLE/LEVER

THIS TASK COVERS

- | | | | |
|------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
|------------|----------------|-------------|-----------------|

INITIAL SET-UP

Tools:

Tool kit, general mechanic' s (Appendix C, item 53)

Parts:

- Bushing (Appendix G, item 8)
- Lockwasher (Appendix G, item 116)
- Lockwasher (Appendix G, item 129)

Parts-Continued:

- Lockwashers (4) (Appendix G, item 132)
- Lockwasher (Appendix G, item 137)
- *Pins, cotter (3) (Appendix G, item 209)

Reference:

TM 9-2350-256-10

WARNING

Do not smoke or use open flame when working on fuel system: explosion may occur, causing severe injury or death.

NOTE

- Push in manual fuel shutoff and turn fuel pump switch to OFF position to shut off fuel to purge pump.
- Push in fuel shutoff handle, start engine (refer to TM 9-2350-256-10), and check for leaks.
- Handle can be repaired without removing purge pump

a. REMOVAL

- 1 Disconnect two electrical connectors (1).
- 2 Disconnect fuel line at coupling (2) and fuel line at nipple (3) from purge pump assembly (4)

- 3 Remove purge pump assembly (4) from mounting bracket (5) by removing four screws (6), four lockwashers (7), and clamp (8).
- 4 Remove clamp (9) by removing screw (10) and lockwasher (11).

b. DISASSEMBLY

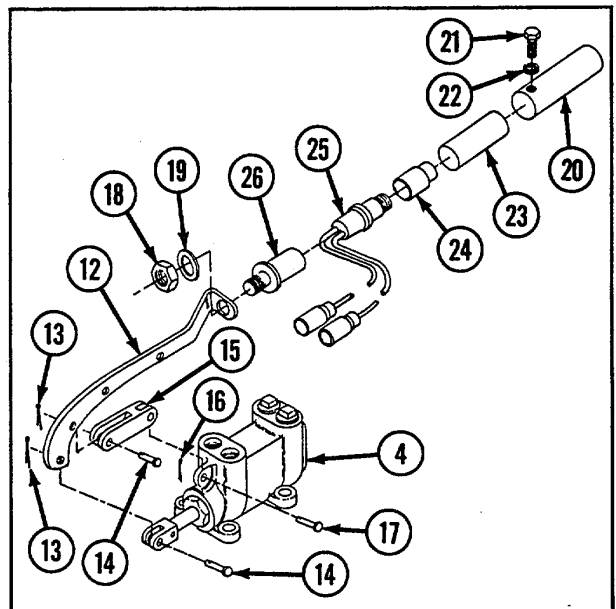
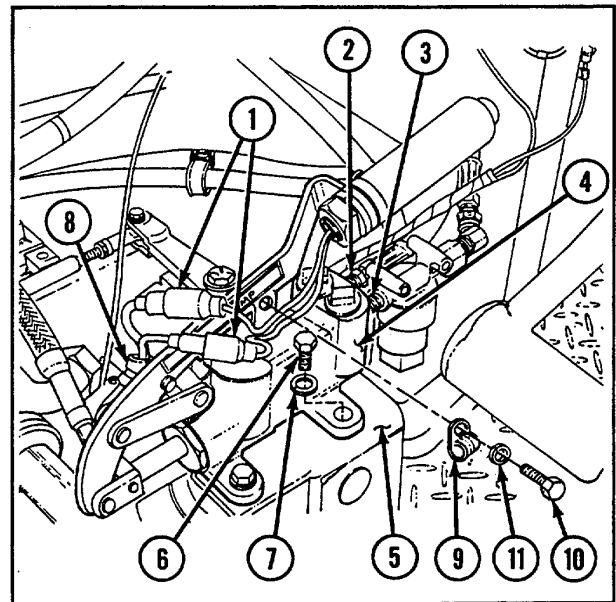
- 1 Remove lever (12) from purge pump assembly (4) by removing two cotter pins (13) and two straight pins (14).
- 2 Remove lever bracket (15) by removing cotter pin (16) and straight pin (17).
- 3 Remove nut (18), lockwasher (19), and handle assembly (20).
- 4 Remove screw (21) and lockwasher (22) from handle assembly (20).
- 5 Remove bushing (23) and push button (24) from handle assembly (20).
- 6 Remove switch (25) from connector (26).

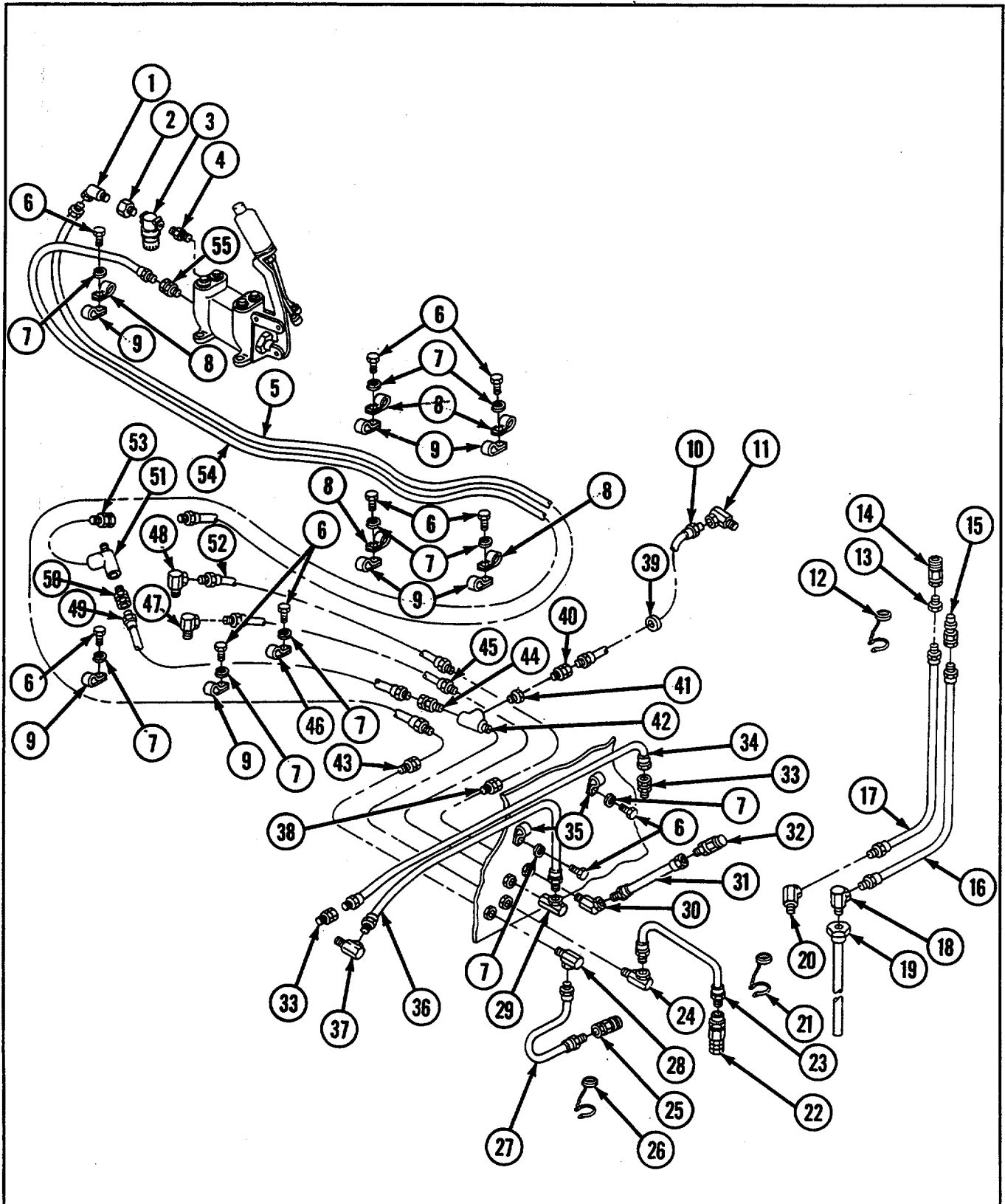
c. ASSEMBLY

- 1 Slide switch (25) into connector (26).
- 2 Install push button (24) and new bushing (23) into handle assembly (20).
- 3 Install handle assembly (20) onto connector (26) with new lockwasher (22) and screw (21).
- 4 Install handle assembly (20) with new lockwasher (19) and nut (18).
- 5 Install lever (12) to purge pump assembly (4) with two straight pins (14) and two new cotter pins (13).
- 6 Install lever bracket (15) with straight pin (17) and new cotter pin (16).

d. INSTALLATION

- 1 Install purge pump assembly (4) to mounting bracket (5) with clamp (8), four new lockwashers (7), and four screws (6).
- 2 Install clamp (9) with screw (10) and new lockwasher (11).
- 3 Connect fuel line at coupling (2) and fuel line at nipple (3) to purge pump assembly (4).
- 4 Connect two electrical connectors (1).





4—10 REPLACE/REPAIR FUEL VALVE LINES AND FITTINGS-Continued

b. REPAIR

- 1 Clean and dry all lines and fittings.
- 2 Inspect fuel lines for cracks, bends, twists, or flattened areas.
- 3 Straighten slightly bent rigid fuel lines. Replace broken or badly bent fuel lines.
- 4 Replace broken or badly bent flexible fuel lines. Replace frayed, cracked, or defective flexible lines. Replace damaged fittings.

c. INSTALLATION

Install lines and fittings in reverse order using illustration as guide.

NOTE

Follow-on maintenance:

- Install toolbox rack (see paragraph 9-47)
- Install rear left-side intermediate floor plate (see paragraph 9-16)
- Install stowage basket center left floor plate (see paragraph 9-14)
- Install intermediate rear left-side floor plate (see paragraph 9-13)
- Install rear center floor plate (see paragraph 9-12)
- Close fuel tank drain valves and fill fuel tanks or turn ON fuel shutoff valves (refer to TM 9-2350-256-10)

4-11 REPLACE/ADJUST ENGINE FUEL MANUAL SHUTOFF CONTROL

THIS TASK COVERS

- a. Removal b. Installation c. Adjustment

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)

Material/Parts:

- Tape, sealant (Appendix D, item 30)
- Lockwashers (10) (Appendix G, item 116)
- Lockwashers (4) (Appendix G, item 121)
- Lockwashers (2) (Appendix G, item 132)

Material/Parts-Continued:

- Packing, preformed (Appendix G, item 195)
- Pins, cotter (2) (Appendix G, item 208)

Equipment Conditions:

- Fuel tank drain valves opened and fuel tank drained, or fuel shutoff valves turned to OFF (refer to TM 9-2350-256-10)

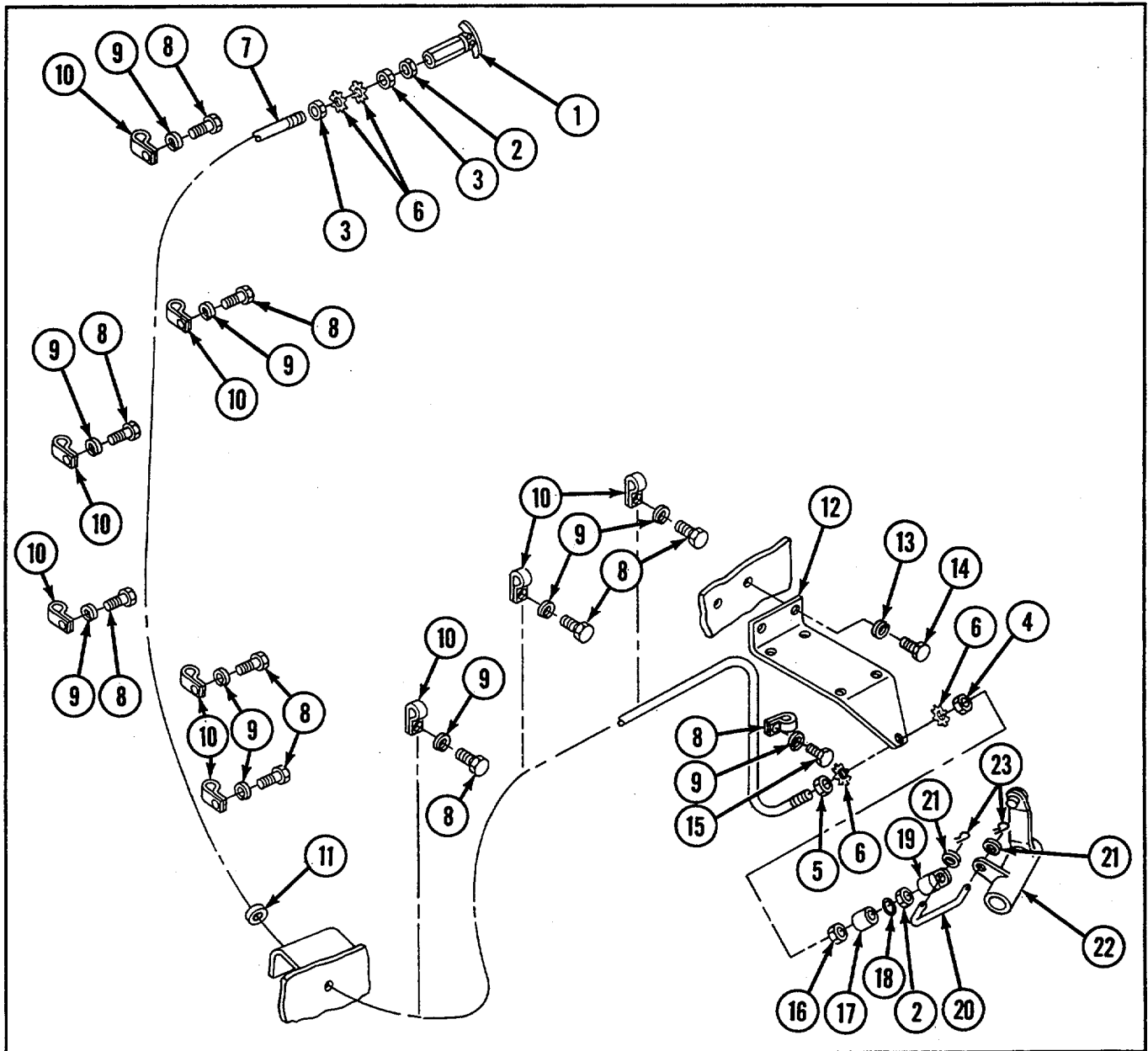
NOTE

For installation purposes, parts indicated with an asterisk (*) need sealant tape.

a. REMOVAL

Remove lines and fittings as required using illustration as guide.

- | | |
|--|-------------------------|
| 1 Fuel shutoff control handle assembly | 13 Lockwasher (2) |
| 2 Nut (2) | 14 Screw (2) |
| 3 Nut (3) | 15 Screw |
| 4 Nut | 16 Nut* |
| 5 Nut | 17 Flat washer |
| 6 Lockwasher (4) | 18 Preformed packing |
| 7 Fuel shutoff control assembly | 19 Connector |
| 8 Screw (9) | 20 Connecting link |
| 9 Lockwasher (10) | 21 Flat washer (2) |
| 10 Loop clamp (10) | 22 Fuel shutoff control |
| 11 Grommet | 23 Cotterpin(2) |
| 12 Mounting bracket | |



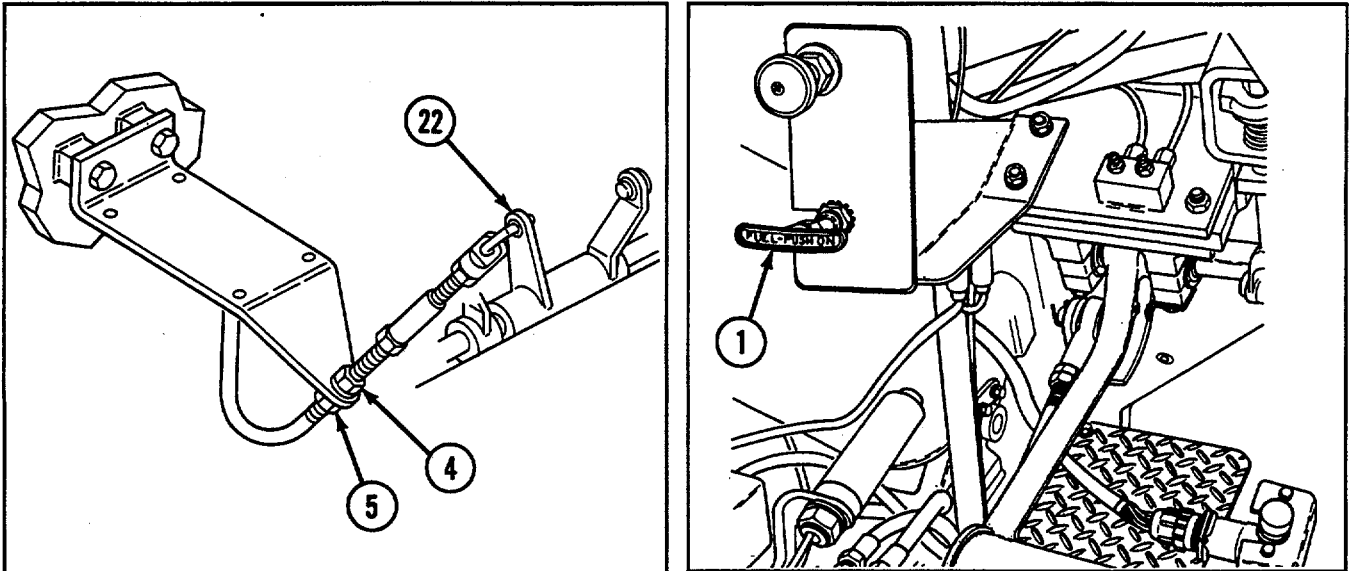
4-11 REPLACE/ADJUST ENGINE FUEL MANUAL SHUTOFF CONTROL-Continued

b. INSTALLATION

Install controls in reverse order using illustration as guide.

c. ADJUSTMENT

- 1 Loosen nuts (4 and 5).
- 2 Pull fuel shutoff handle (1). Check that fuel shutoff control (22) turns to complete "OFF" position. Tighten nut (5).
- 3 Push fuel shutoff handle (1). Check that fuel shutoff control (22) turns to "ON" position. Tighten nut (4).
- 4 Start engine (refer to TM 9-2350-256-10).
- 5 Check operation of engine fuel manual shutoff control. If control does not shut engine off when operated, repeat adjustment.

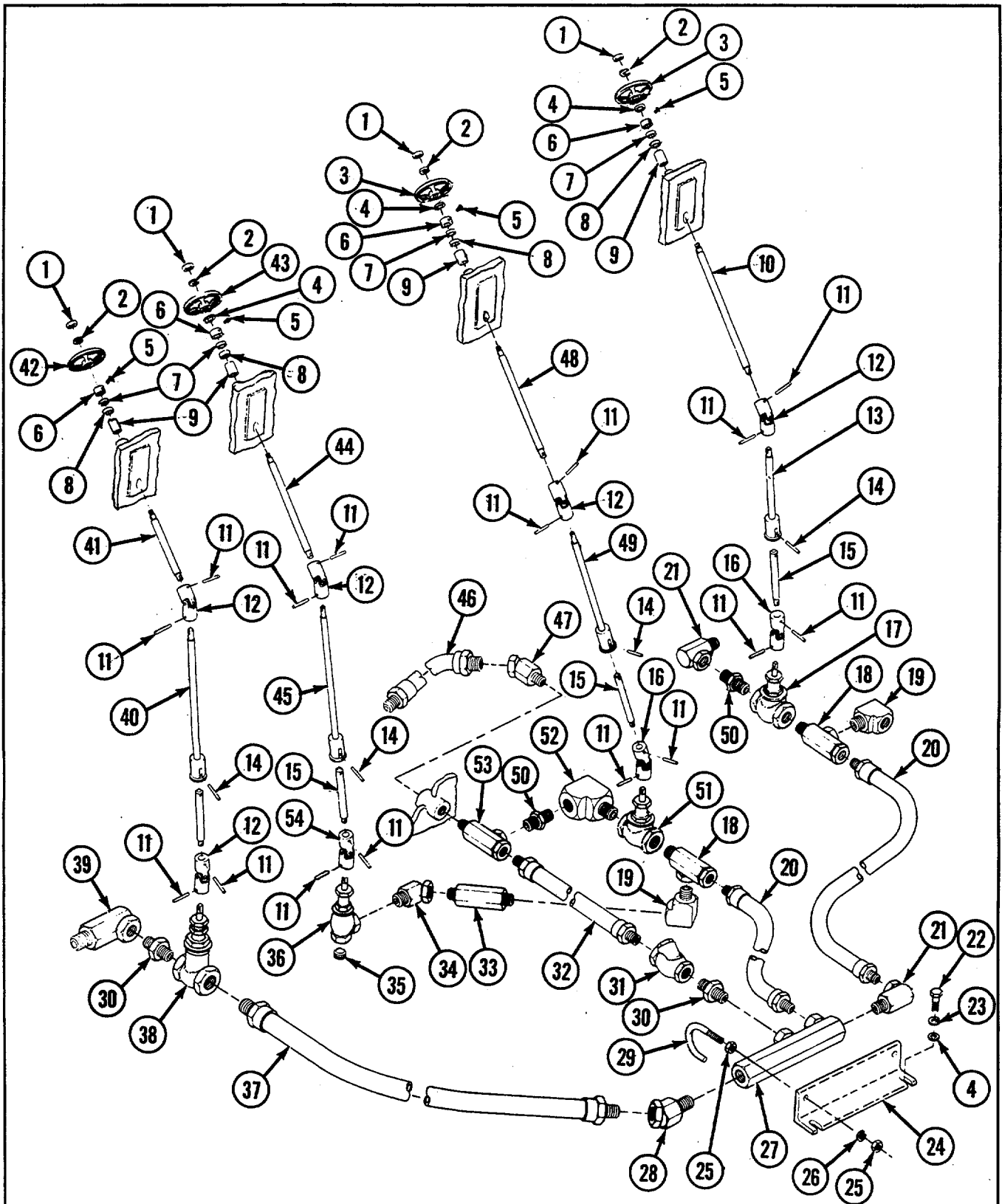


NOTE

Follow-on maintenance:

Close fuel tank drain valves and fill fuel tank or turn on fuel shutoff valves (refer to TM 9-2350-25610)

4-12 REPLACE FUEL CONTROL VALVES AND ID PLATES-Continued



4-13 REPLACE FUEL CHECK VALVE- Continued

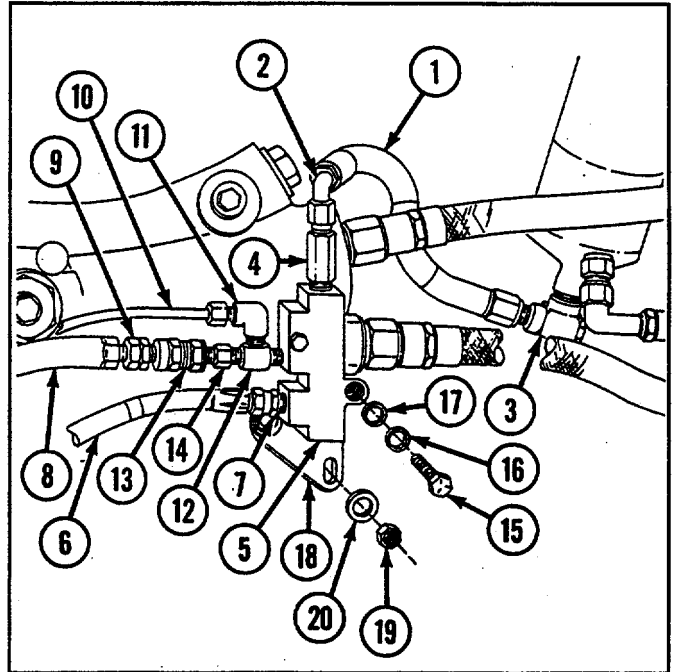
- 5 Disconnect fuel filter inlet tube (10) and elbow (11) from tee (12).
- 6 Remove coupling (9), filter (13), bushing (14), and tee (12) from fuel check valve (5).
- 7 Remove fuel check valve (5) by removing two screws (15), two lockwashers (16), and two flat washers (17).
- 8 Remove bracket (18) with two nuts (19) and two flat washers (20).

b. INSTALLATION

- 1 Install bracket (18) with two flat washers (20) and two nuts (19).
- 2 Install fuel check valve (5) with two screws (15), two new lockwashers (16), and two flat washers (17).
- 3 Install tee (12), new bushing (14), filter (13), and coupling (9) to fuel check valve (5).
- 4 Connect elbow (11) and fuel filter inlet tube (10) to tee (12).
- 5 Connect manifold heater purge fuel line (8) to coupling (9).
- 6 Connect fuel pump outlet hose (6) and adapter (7) to fuel check valve (5).
- 7 Connect adapter (4) and elbow (2) to fuel check valve (5).
- 8 Connect fuel inlet hose (1) to elbows (2 and 3).

c. TEST

- 1 Turn MASTER switch and fuel pump switch to ON position.
- 2 Purge fuel system (refer to TM 9-2350-256-10).
- 3 Operate engine (refer to TM 9-2350-256-10). Inspect fuel check valve (5) and connections for leaks.
- 4 Shut down engine. Turn MASTER switch and fuel pump switch to OFF position.



NOTE

Follow-on maintenance:

Install engine deck (see paragraph 9-51)

**SECTION II: PRIMARY, FUEL/WATER SEPARATOR, AND MANIFOLD
HEATER FUEL FILTERS AND RELATED PARTS**

Para.	Task	Page
4-14	Replace/Repair/Service Primary Fuel Filter	4-31
4-15	Replace Fuel/Water Separator Filter Elements.....	4-35
4-16	Replace Fuel/Water Separator Filter Unit	4-37
4-17	Replace Fuel/Water Separator Automatic Drain System and Solenoid Valve	4-39
4-18	Replace Manifold Heater Fuel Supply Solenoid Valve and Fuel Filter	4-41
4-19	Replace Manifold Heater Ignition Unit	4-42
4-20	Replace Manifold Heater Fuel Return Solenoid Valve.....	4-43
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4-22	Manifold Heater Operation Check.....	4-47
4-23	Replace Manifold Heater Fuel Lines and Fittings.....	4-47

4-14 REPLACE/REPAIR/SERVICE PRIMARY FUEL FILTER

THIS TASK COVERS

- a. Servicing b. Removal c. Disassembly d. Cleaning e. Assembly f. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Suitable container

Material/Parts-Continued:

- Nuts, self-locking (2) (Appendix G, item 168)
- Parts kit, primary fuel filter (Appendix G, item 203)

Material/Parts:

- Solvent, dry-cleaning (Appendix D, item 9)
- Locknut (Appendix G, item 93)
- Lockwashers (3) (Appendix G, item 133)

Equipment Condition:

Left front and center front air inlet grilles removed (see paragraph 9-57)

a. SERVICING

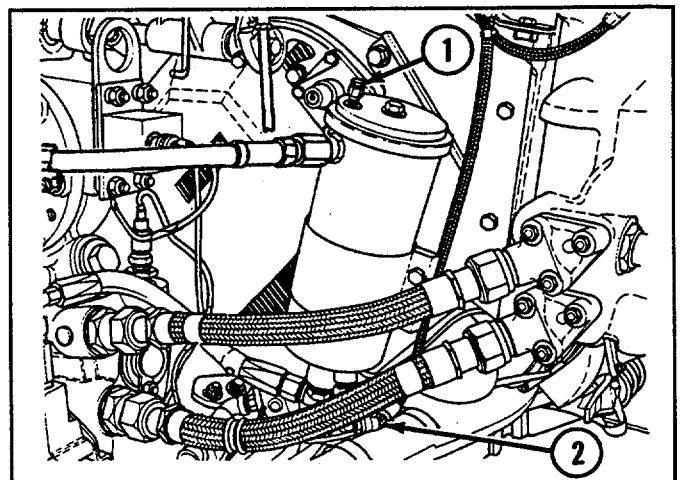
WARNING

Do not smoke or use open flame when working on fuel system: explosion may occur, causing severe injury or death.

NOTE

- Semiannually, or after 750 miles (1207 kilometers [km]) of vehicle operation, replace primary fuel filter element.
- When servicing and assembling primary fuel filter, use parts kit.
- Powerplant and oil cooler lines removed for clarity only.

- 1 Loosen bleeder valve (1).
- 2 Remove constant bleed line (2) and drain fuel from fuel filter into suitable container.



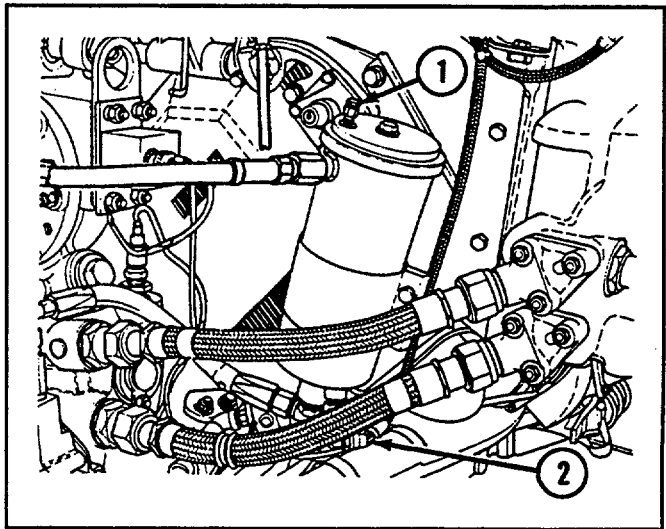
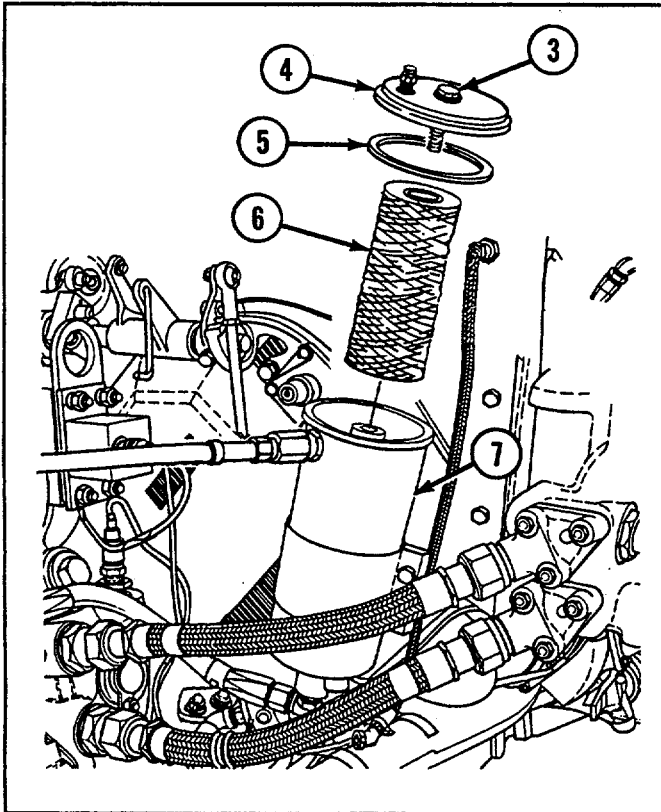
4-14 REPLACE/REPAIR/SERVICE PRIMARY FUEL FILTER-Continued

- 3 Loosen retaining screw (3) and remove fuel filter head (4). Remove and discard filter head gasket (5).
- 4 Remove fuel filter element (6) from filter body (7). Discard fuel filter element.

WARNING

Dry-cleaning solvent used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flashpoint of solvent is 1380F (590C).

- 5 Clean inside of filter body (7) with dry-cleaning solvent and stiff brush. Scrape off sludge or gum, if necessary.
- 6 Attach constant bleed line (2) and install new fuel filter element (6).
- 7 Install fuel filter head (4) using new filter head gasket (5), and tighten retaining screw (3).
- 8 Bleed air from primary fuel filter. Activate electric fuel pump until fuel runs from bleeder valve (1), then tighten bleeder valve.



b. REMOVAL

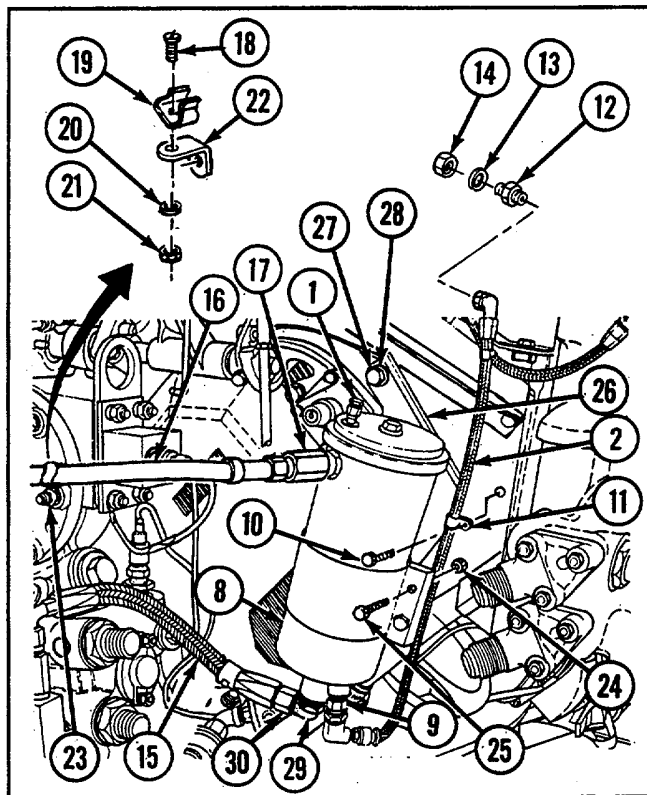
WARNING

Do not smoke or use open flame when working on fuel system: explosion may occur, causing severe injury or death.

NOTE

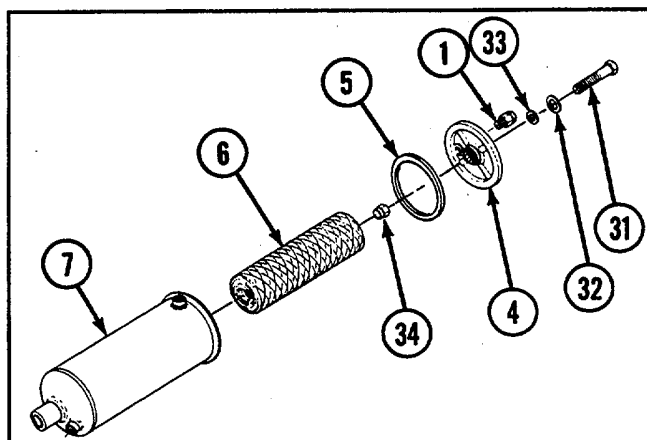
Oil cooler lines removed for clarity.

- 1 Loosen bleeder valve (1).
- 2 Disconnect constant bleed line (2) and drain fuel into suitable container.
- 3 Remove constant bleed line (2), filter (9), screw (10), clamp (11), nipple (12), lockwasher (13), and locknut (14).
- 4 Disconnect fuel filter outlet hose (15) and fuel filter inlet hose (16) from primary fuel filter (8).
- 5 Remove fuel filter inlet hose (16) with coupling (17) by removing screw (18), clamp (19), flat washer (20), and nut (21) from bracket (22).
- 6 Remove bracket (22) by removing nut (23).
- 7 Remove two self-locking nuts (24), two screws (25), and primary fuel filter (8) from filter bracket (26).
- 8 Remove filter bracket (26) by removing two screws (27) and two lockwashers (28). 9 Remove elbow (29) and adapter (30).



c. DISASSEMBLY

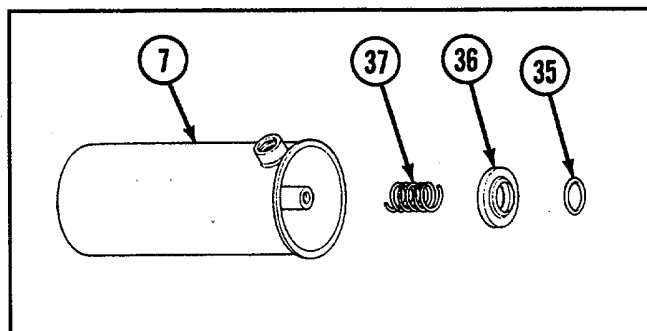
- 1 Loosen retaining screw (31) and lift off fuel filter head (4). Remove and discard filter head gasket (5).
- 2 Remove retaining screw (31), flat washer (32), gasket (33), and nut (34) from fuel filter head (4). Discard gasket.
- 3 Remove bleeder valve (1) from fuel filter head (4).
- 4 Remove and discard fuel filter element (6).
- 5 Remove preformed packing (35), retainer assembly (36), and helical compression spring (37) from filter body (7).



d. CLEANING

WARNING

Dry-cleaning solvent used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flashpoint of solvent is 138°F (590C).



4—14 REPLACE/REPAIR/SERVICE PRIMARY FUEL FILTER-Continued

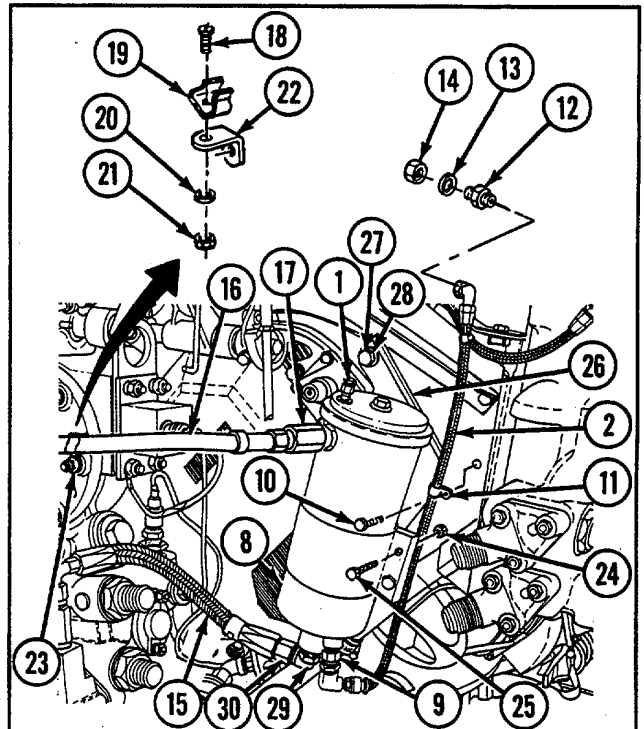
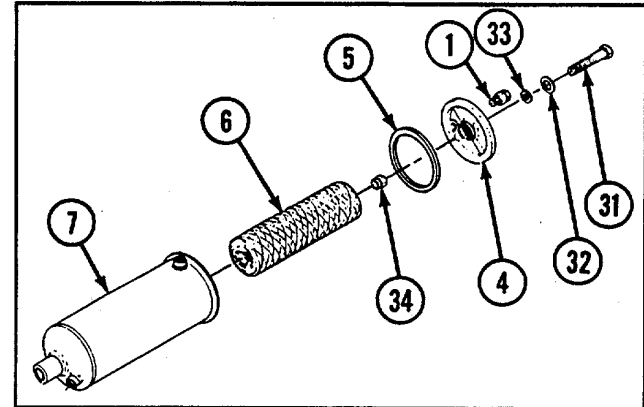
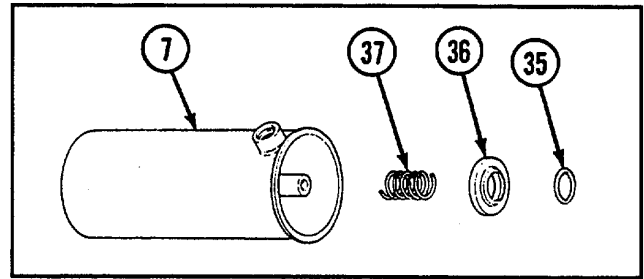
- 1 Clean all parts with dry-cleaning solvent. Scrape off any accumulated sludge or gum. If necessary, dry parts.
- 2 Check filter (9) for blockage. Filter orifice must be open.
- 3 Replace discarded and defective parts.

e. ASSEMBLY

- 1 Install helical compression spring (37) in filter body (7).
- 2 Install new preformed packing (35) on retainer assembly (36) and place both in filter body (7).
- 3 Install new fuel filter element (6).
- 4 Install bleeder valve (1) in fuel filter head (4).
- 5 Install flat washer (32), new gasket (33), nut (34), and retaining screw (31) on fuel filter head (4). Install new fuel filter head gasket (5) in fuel filter head.

f. INSTALLATION

- 1 Install adapter (30) on elbow (29).
- 2 Install filter bracket (26) with two new lockwashers (28) and two screws (27).
- 3 Install primary fuel filter (8) in filter bracket (26) with two screws (25) and two new self-locking nuts (24).
- 4 Install bracket (22) with nut (23).
- 5 Install fuel filter inlet hose (16) with coupling (17) on bracket (22) with screw (18), clamp (19), flat washer (20), and nut (21).
- 6 Connect fuel filter outlet hose (15) and fuel filter inlet hose (16) to primary fuel filter (8).
- 7 Install constant bleed line (2), filter (9), screw (10), clamp (11), nipple (12), new lockwasher (13), and new locknut (14).
- 8 Bleed air from primary fuel filter (8) and fuel lines by loosening bleeder valve (1). Activate electric fuel pump until fuel runs from bleeder valve. Tighten bleeder valve.



NOTE

Follow-on maintenance: Install left front and center front air inlet grilles (see paragraph 9-57)

4-15 REPLACE FUEL/WATER SEPARATOR FILTER ELEMENTS

THIS TASK COVERS

- a. Removal b. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Suitable container

Parts:

- Filter element, center (final) (Appendix G, item 23)
- Filter elements, outer (2) (Appendix G, item 24)
- Gasket (Appendix G, item 70)
- Lockwashers (8) (Appendix G, item 130)

Equipment Conditions:

Grille doors removed (see paragraph 9-57)

NOTE

In illustrations powerplant shown removed for clarity only.

WARNING

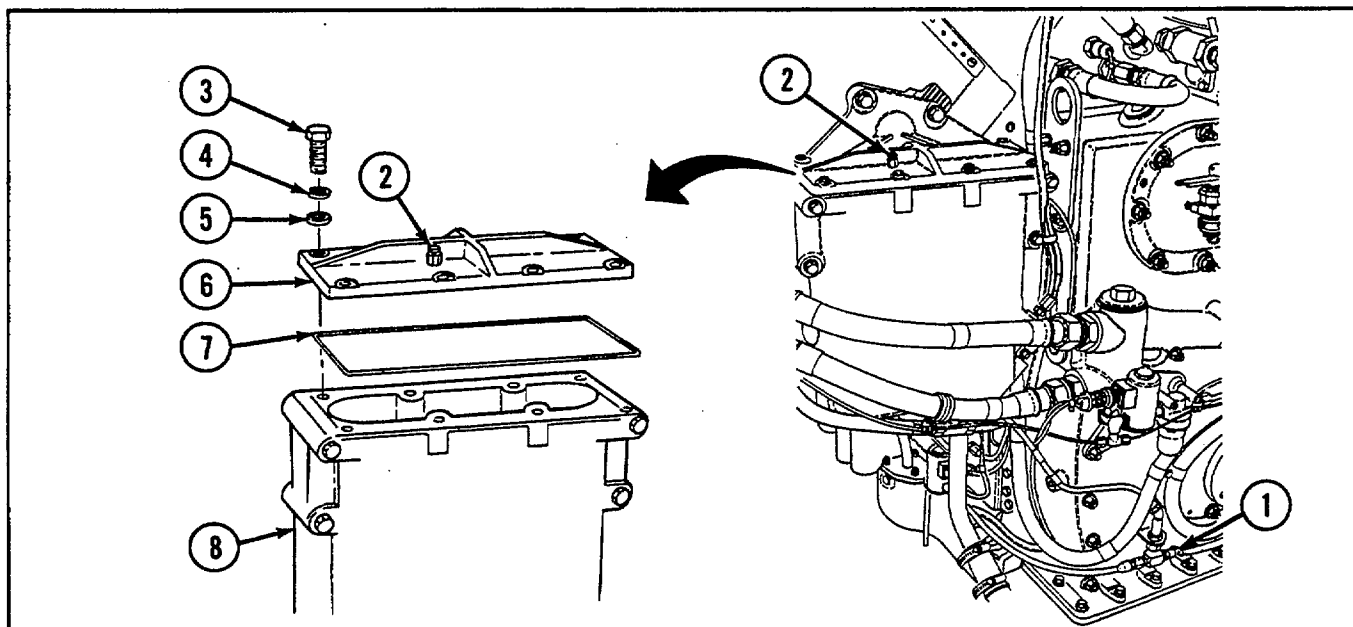
Do not smoke or use open flame when working on fuel system: explosion may occur, causing severe injury or death.

NOTE

- Wipe clean fuel/water separator unit and surrounding area.
- Semiannually, or after 750 miles (1207 km) of operation, replace two outer fuel/water separator filter elements. Center (final) filter element is normally replaced at engine overhaul only.

a. REMOVAL

- 1 Open drain cock (1) and loosen bleeder valve (2). Drain fuel into suitable container.
- 2 Remove eight screws (3), eight lockwashers (4), and eight flat washers (5). Remove cover (6) and gasket (7) from fuel/water separator unit (8). Discard gasket.



4-15 REPLACE FUEL/WATER SEPARATOR FILTER ELEMENTS--Continued

CAUTION

Do not remove or otherwise disturb center (final) filter element during semiannual outer filter element replacement. If center (final) filter element is removed, it must be replaced.

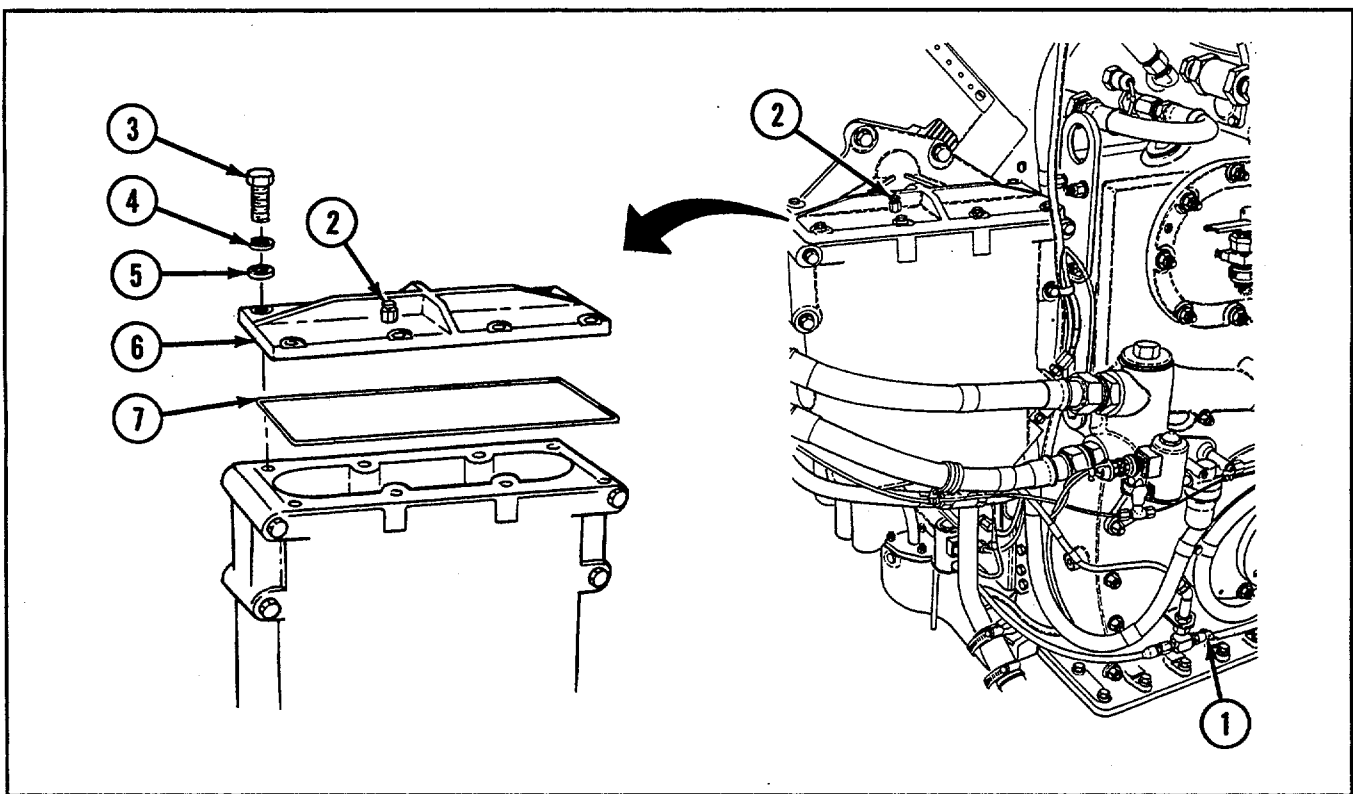
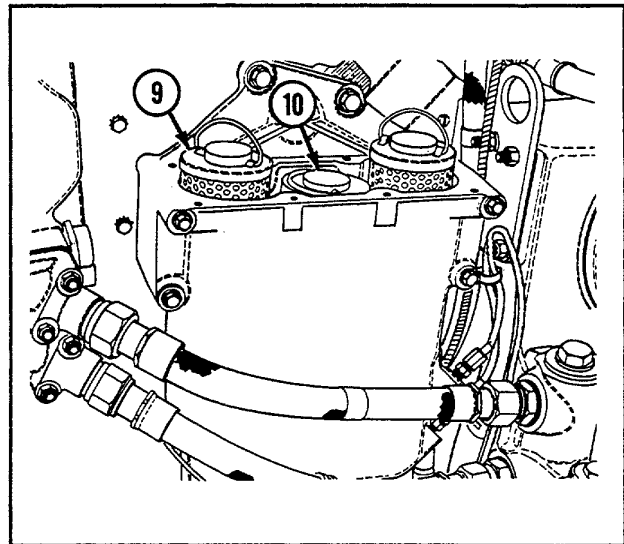
3 Remove and discard two outer filter elements (9) (or if necessary, center [final] filter element [10]). Rotate elements to facilitate removal.

b. INSTALLATION

1 Install two new outer filter elements (9).

2 Install new gasket (7) and cover (6) with eight screws (3), eight new lockwashers (4), and eight flat washers (5).

3 Close drain cock (1). Operate electric fuel pump until fuel flows from bleeder valve (2). Tighten bleeder valve. Check for leaks.



NOTE

Follow-on maintenance: Install grille doors (see paragraph 9-57)

4-16 REPLACE FUEL/WATER SEPARATOR FILTER UNIT

THIS TASK COVERS

a. Removal

b. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Suitable container

Parts:

- Lockwashers (4) (Appendix G, item 100)

Equipment Condition:

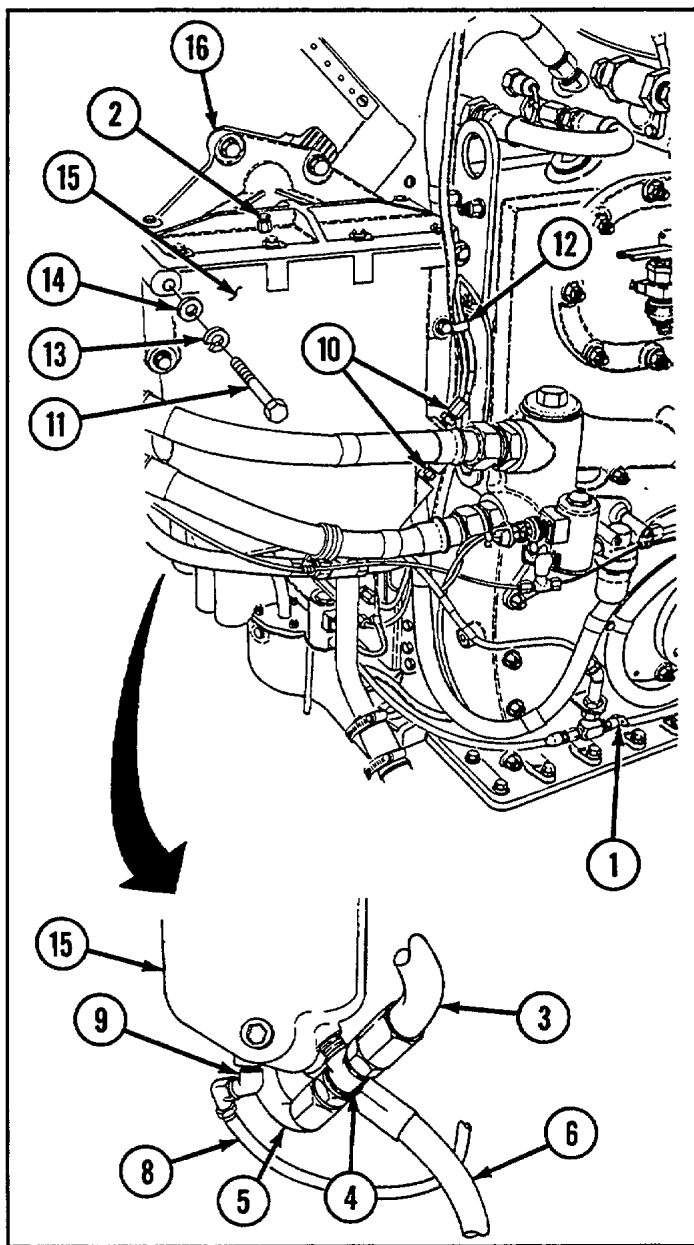
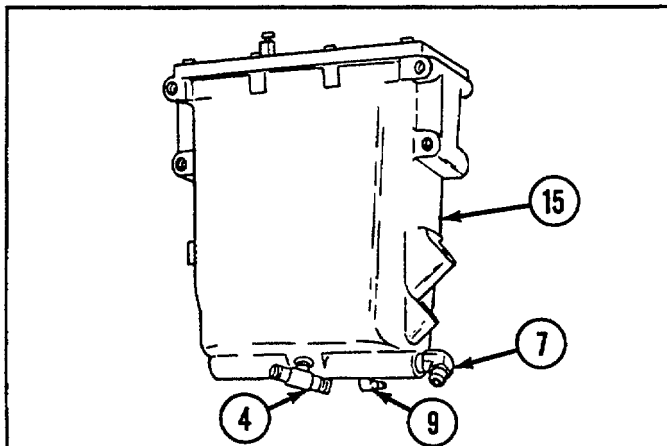
- Powerplant removed (see paragraph 3-1)

WARNING

Do not smoke or use open flame when working on fuel system: explosion may occur, causing severe injury or death.

a. REMOVAL

- 1 Open drain cock (1), loosen bleeder valve (2), and drain fuel into suitable container. Remove bleeder valve.
- 2 Disconnect fuel outlet hose (3) from tee fitting (4).
- 3 Disconnect fuel outlet hose (5) from tee fitting (4).
- 4 Disconnect fuel inlet hose (6) from fuel outlet elbow (7).
- 5 Disconnect fuel drain hose (8) from fuel drain elbow (9).
- 6 Disconnect two water level probes (10).
- 7 Remove four screws (11), clamp (12), four lockwashers (13), and four flat washers (14). Remove fuel/water separator filter unit (15) from mounting bracket (16).
- 8 Remove tee fitting (4), fuel outlet elbow (7), and fuel drain elbow (9).



4-16 REPLACE FUEL/WATER SEPARATOR FILTER UNIT--Continued

9 Remove three screws (17), three flat washers (18), and mounting bracket (16).

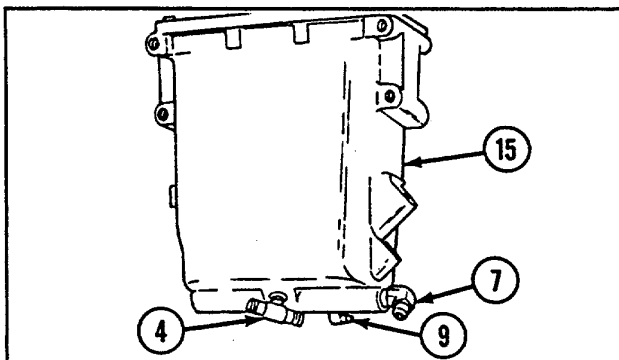
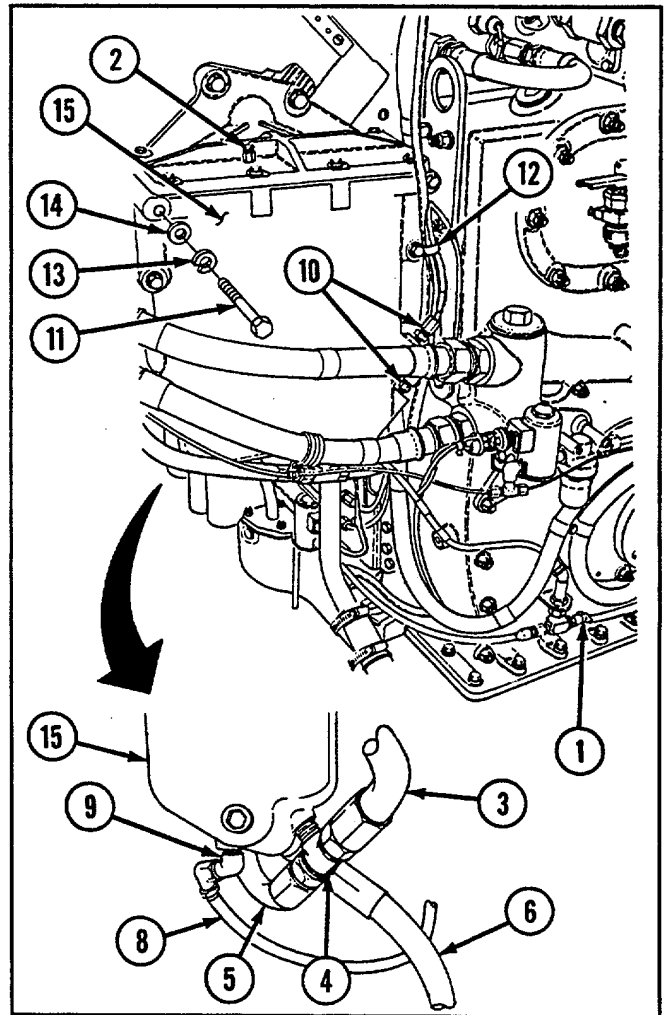
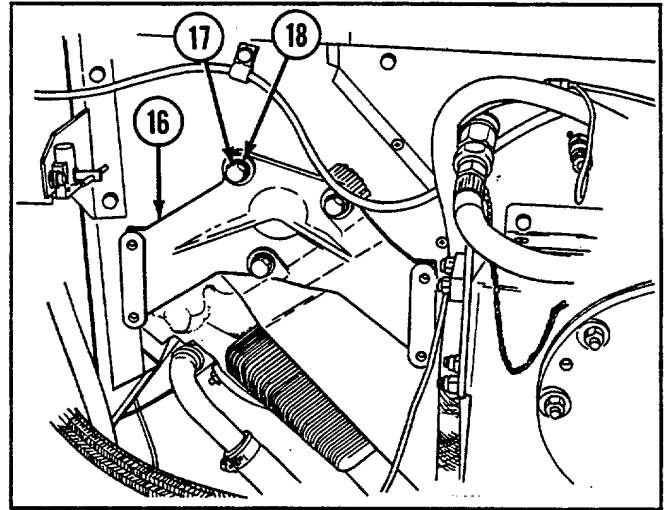
b. INSTALLATION

1 Install mounting bracket (16) with three flat washers (18) and three screws (17).

NOTE

The water level probe that is connected to the lead from the control unit must be installed in the upper location of the fuel/water separator filter.

- 2 Install two water level probes (10).
- 3 Install fuel/water separator filter unit (15) onto mounting bracket (16) and secure with four screws (11), clamp (12), four new lockwashers (13), and four flat washers (14).
- 4 If installing new fuel/water filter unit (15), remove shipping plug from fuel/water separator cover and install bleeder valve (2) in open position.
- 5 Install fuel drain elbow (9) and connect fuel drain hose (8).
- 6 Install tee fitting (4) and connect fuel outlet hoses (5 and 3).
- 7 Install fuel outlet elbow (7) and connect fuel inlet hose (6).
- 8 Close drain cock (1) and activate electric fuel pump until fuel flows from bleeder valve (2). Tighten bleeder valve.



NOTE

Follow-on maintenance: Install powerplant (see paragraph 3-1)

4-17 REPLACE FUEL/WATER SEPARATOR AUTOMATIC DRAIN SYSTEM AND SOLENOID VALVE

THIS TASK COVERS

a. Removal

b. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Suitable container

Parts:

- Lockwashers (4) (Appendix G, item 117)

Equipment Condition:

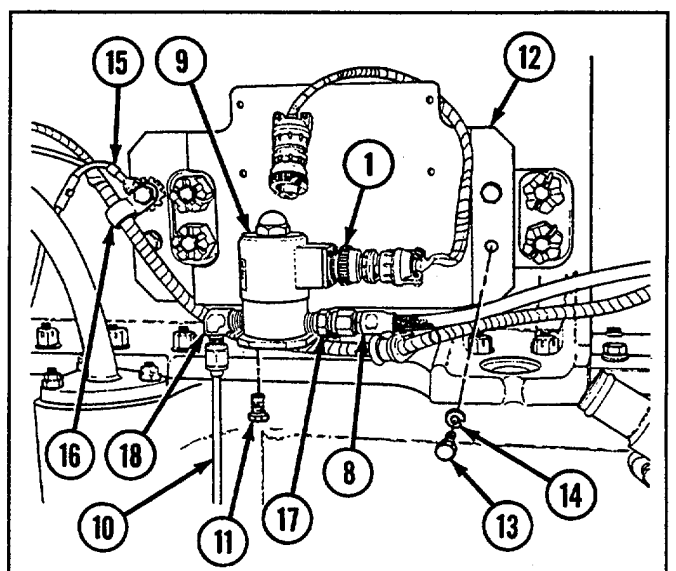
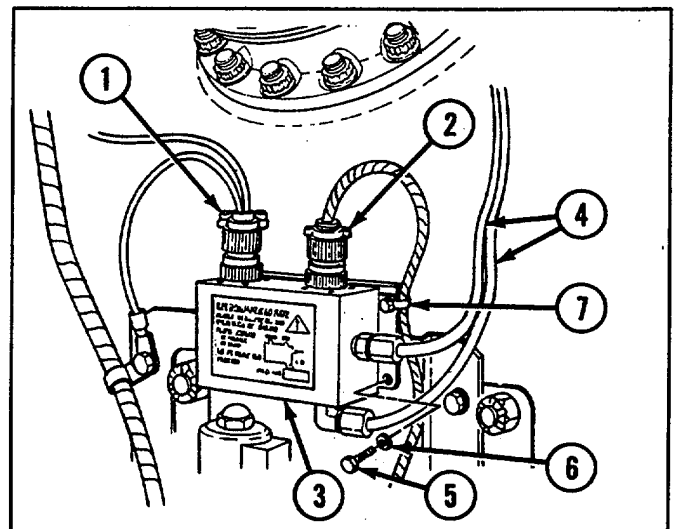
- Powerplant removed (see paragraph 3-1)

WARNING

Do not smoke or use open flame when working on fuel system: explosion may occur, causing severe injury or death.

a. REMOVAL

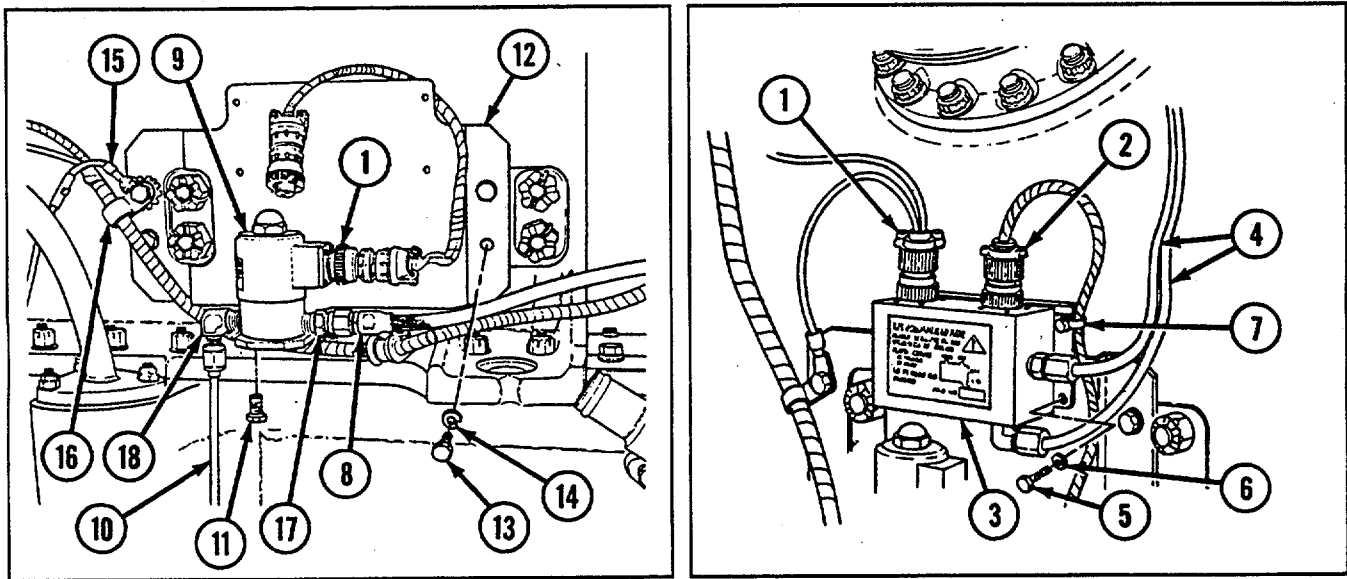
- 1 Open drain cock and bleeder valve on fuel/water separator (see paragraph 4-14) and drain fuel into suitable container.
- 2 Disconnect two wiring harness connectors (1 and 2) from control module (3).
- 3 Disconnect water level probes (4) and clamp (see paragraph 4-14).
- 4 Remove control module (3) with two attached water level probes (4) by removing four screws (5), four flat washers (6), and clamp (7).
- 5 Disconnect fuel/water separator filter drain hose (8) from solenoid valve (9).
- 6 Disconnect wiring harness connector (1) from solenoid valve (9).
- 7 Disconnect solenoid valve drain tube (10) from solenoid valve (9).
- 8 Remove two assembled washer screws (11) and remove solenoid valve (9) from mounting bracket (12).
- 9 Remove mounting bracket (12) by removing four screws (13), four lockwashers (14), ground (15), and clamp (16).
- 10 Remove nipple (17) from solenoid valve (9) IN opening and elbow (18) from solenoid valve OUT opening.



4-17 REPLACE FUEL/WATER SEPARATOR AUTOMATIC DRAIN SYSTEM AND SOLENOID VALVE-Continued

b. INSTALLATION

- 1 Install mounting bracket (12), ground (15), and clamp (16) with four screws (13) and four new lockwashers (14).
- 2 Install control module (3) and clamp (7) with four screws (5) and four flat washers (6).
- 3 Connect water level probes (4) and clamp (see paragraph 4-16).
- 4 Connect two wiring harness connectors (1 and 2) to control module (3).
- 5 Install nipple (17) in solenoid valve (9) IN opening and elbow (18) in solenoid valve OUT opening.
- 6 Install solenoid valve (9) on mounting bracket (12) and secure with two assembled washer screws (11).
- 7 Install solenoid valve drain tube (10), wiring harness connector (1), and fuel/water separator filter drain hose (8) to solenoid valve (9).
- 8 Close drain cock on fuel/water separator (see paragraph 4-16). Activate electric fuel pump until fuel flows from bleeder valve (see paragraph 4-16). Tighten bleeder valve.



NOTE

Follow-on maintenance: Install powerplant (see paragraph 3-1)

**4-18 REPLACE MANIFOLD HEATER FUEL SUPPLY SOLENOID VALVE AND FUEL
FILTER**

THIS TASK COVERS

- a. Removal b. Installation

INITIAL SET-UP

Tools:

Tool kit general mechanic's (Appendix C, item 53)

Equipment Conditions:

- Air inlet grilles removed (see paragraph 9-57)
- MASTER switch turned to OFF position

Parts:

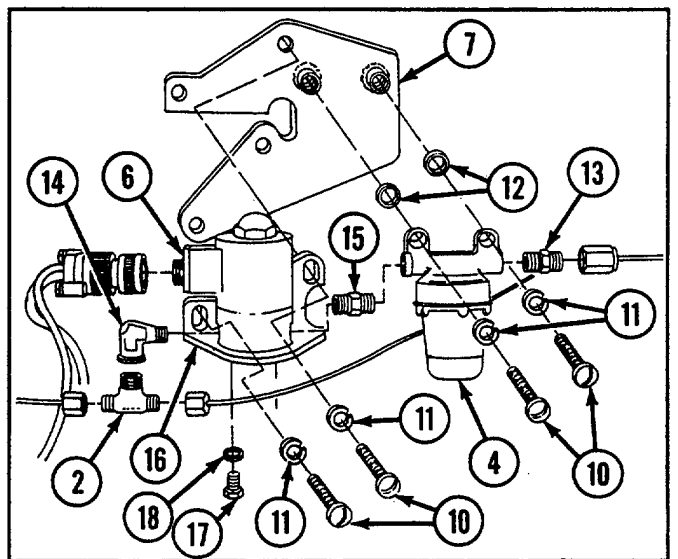
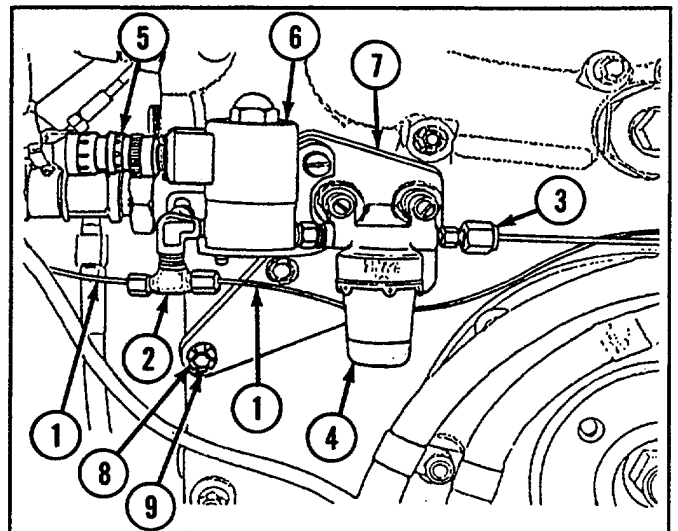
Lockwashers (6) (Appendix G, item 129)

WARNING

Do not smoke or use open flame when working on fuel system: explosion may occur, causing severe injury or death.

a. REMOVAL

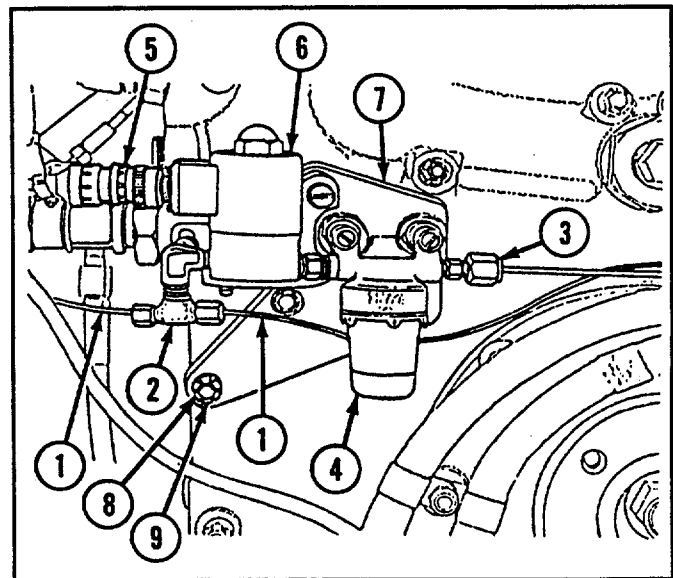
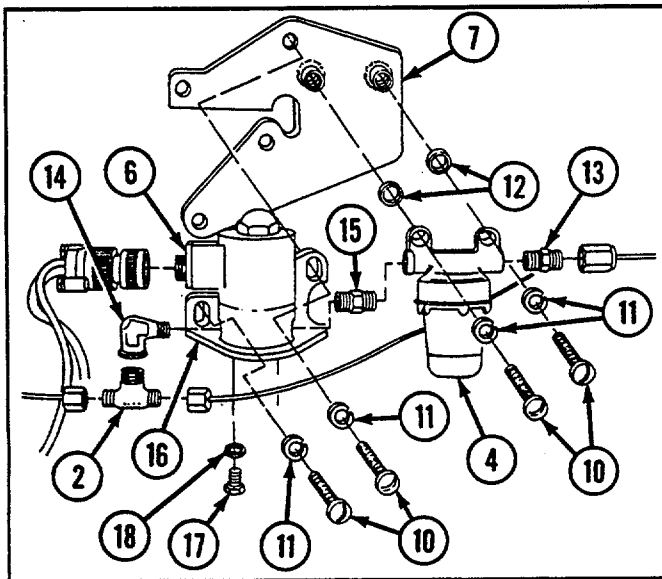
- 1 Disconnect two manifold heater fuel tubes (1) from fuel outlet tee (2).
- 2 Disconnect fuel filter inlet tube (3) from fuel filter (4).
- 3 Disconnect electrical harness plug (5).
- 4 Remove manifold heater fuel supply solenoid valve (6) with fuel filter (4) and bracket (7) as an assembly by removing two nuts (8) and two flat washers (9).
- 5 Remove manifold heater fuel supply solenoid valve (6) with fuel filter (4) from bracket (7) by removing four slotted-head screws (10), four lockwashers (11), and two flat washers (12).
- 6 Remove nipple (13) from fuel filter (4), then remove fuel outlet tee (2) and elbow (14) from manifold heater fuel supply solenoid valve (6).
- 7 Separate manifold heater fuel supply solenoid valve (6) from fuel filter (4) by removing nipple (15).
- 8 Remove manifold heater fuel supply solenoid valve (6) from bracket (16) by removing two screws (17) and two lockwashers (18).



4-18 REPLACE MANIFOLD HEATER FUEL SUPPLY SOLENOID VALVE AND FUEL FILTER-Continued

b. INSTALLATION

- 1 Install manifold heater fuel supply solenoid valve (6) to bracket (16) with two screws (17) and two new lockwashers (18).
- 2 Install manifold heater fuel supply solenoid valve (6) to fuel filter (4) with nipple (15).
- 3 Install nipple (13) to fuel filter (4), then install fuel outlet tee (2) and elbow (14) to manifold heater fuel supply solenoid valve (6).
- 4 Install four slotted-head screws (10), four new lockwashers (11), and two flat washers (12) to bracket (7).
- 5 Install manifold heater fuel supply solenoid valve (6) with fuel filter (4) and bracket (7) as an assembly with two nuts (8) and two flat washers (9).
- 6 Connect electrical harness plug (5) and fuel filter inlet tube (3) to fuel filter (4).
- 7 Connect two manifold heater fuel tubes (1) to fuel outlet tee (2).



NOTE

- Follow-on maintenance:
- Turn MASTER switch to ON position
 - Install air inlet grille (see paragraph 9-57)

4-19 REPLACE MANIFOLD HEATER IGNITION UNIT

THIS TASK COVERS

a. Removal

b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

Nuts, self-locking (4)
(Appendix G, item 161)

Equipment Condition:

Powerplant removed (see
paragraph 3-1)

WARNING

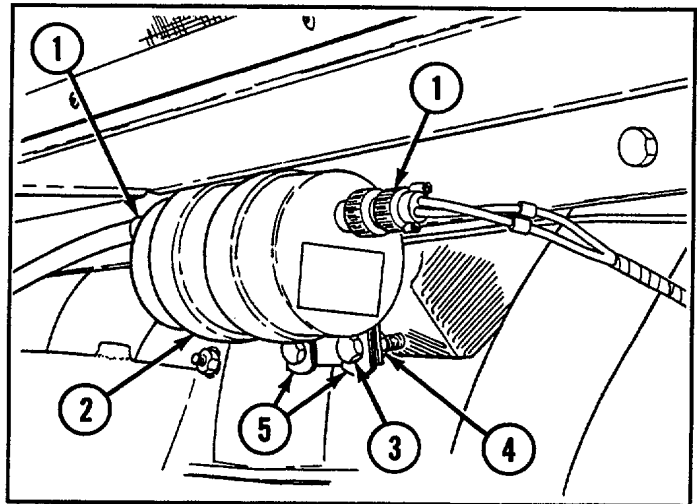
- Ignition units on this engine are capable of producing extremely high voltage. The output is sufficient to cause a dangerous electrical shock. Never touch uncovered or live connections. Ensure MASTER switch is in OFF position prior to removal or maintenance.
- Do not smoke or use open flame when working on fuel system: explosion may occur, causing severe injury or death.

NOTE

Removal and installation procedures are the same for the ignition unit on each side of the engine.

a. REMOVAL

- 1 Disconnect two electrical wiring harness connectors (1) from manifold heater ignition unit (2).
- 2 Remove two screws (3) and two self-locking nuts (4). Remove two clamps (5) and manifold heater ignition unit (2).



b. INSTALLATION

- 1 Install manifold heater ignition unit (2) into two clamps (5) and secure with two screws (3) and two new self-locking nuts (4).
- 2 Connect two electrical wiring harness connectors (1) on manifold heater ignition unit (2).

NOTE

Follow-on maintenance: Install powerplant (see paragraph 3-1)

4-20 REPLACE MANIFOLD HEATER FUEL RETURN SOLENOID VALVE

THIS TASK COVERS

a. Removal

b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Equipment Conditions:

- Engine deck removed (see paragraph 9-51)
- MASTER switch turned to OFF position

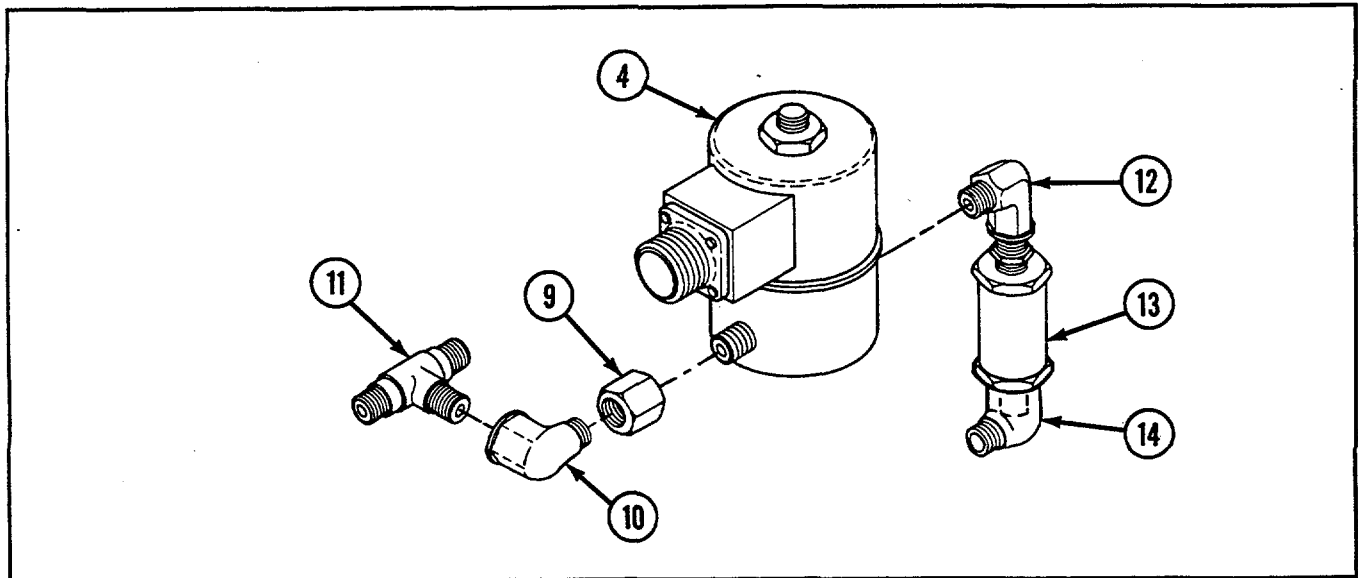
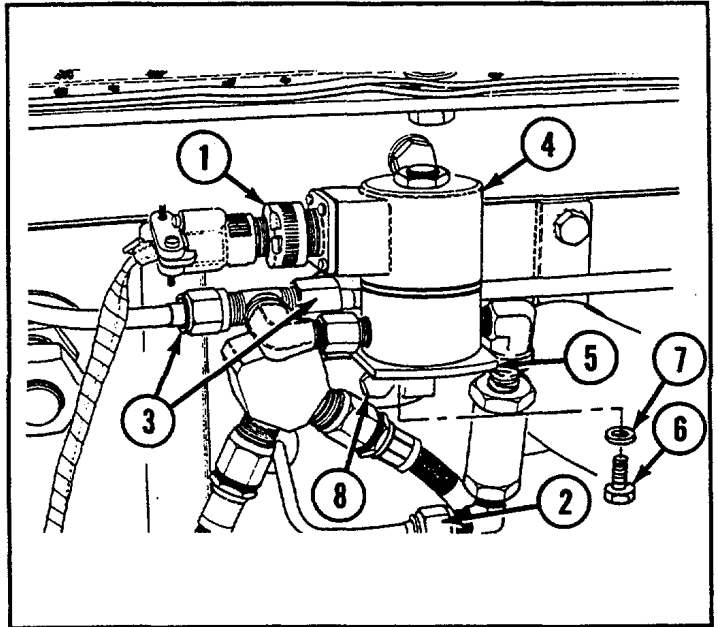
WARNING

Do not smoke or use open flame when working on fuel system: explosion may occur, causing severe injury or death.

4-20 REPLACE MANIFOLD HEATER FUEL RETURN SOLENOID VALVE-Continued

a. REMOVAL

- 1 Disconnect electrical harness connector (1).
- 2 Disconnect fuel solenoid outlet tube (2) and two fuel solenoid inlet tubes (3) from solenoid valve (4).
- 3 Remove solenoid valve (4) with related fittings from mounting bracket (5) by removing two assembled washer bolts (6) and two flat washers (7).
- 4 Remove mounting bracket (5) by removing three assembled washer bolts (8).
- 5 Remove fuel solenoid inlet coupling (9), elbow (10), and tee (11) from solenoid valve (4).
- 6 Remove outlet elbow (12), fuel return check valve (13), and elbow (14) from solenoid valve (4).



b. INSTALLATION

NOTE

If fuel return check valve (13) is removed, it must be installed with arrow pointing down.

- 1 Install outlet elbow (12), fuel return check valve (13), and elbow (14) on solenoid valve (4).
- 2 Install tee (11), elbow (10), and fuel solenoid inlet coupling (9) on solenoid valve (4).
- 3 Install mounting bracket (5) with three assembled washer bolts (8).

**SECTION II: PRIMARY, FUEL/WATER SEPARATOR, AND MANIFOLD
HEATER FUEL FILTERS AND RELATED PARTS**

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- 4 Install solenoid valve (4) with related fittings on mounting bracket (5) with two flat washers (7) and two assembled washer bolts (6).
- 5 Connect fuel solenoid outlet tube (2) and two fuel solenoid inlet tubes (3).
- 6 Connect electrical wiring harness connector (1).

NOTE

- Follow-on maintenance:
- Turn MASTER switch to ON position
 - Install engine deck (see paragraph 9-51)

4-21 REPLACE/REPAIR MANIFOLD HEATER NOZZLE ASSEMBLY

THIS TASK COVERS

- | | | | |
|------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
|------------|----------------|-------------|-----------------|

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Bushing (Appendix G, item 9)

Parts-Continued:

- Gaskets (2) (Appendix G, item 50)
- Nuts, self-locking (8) (Appendix G, item 166)
- Spark plugs (with gasket) (2) (Appendix G, item 267)

WARNING

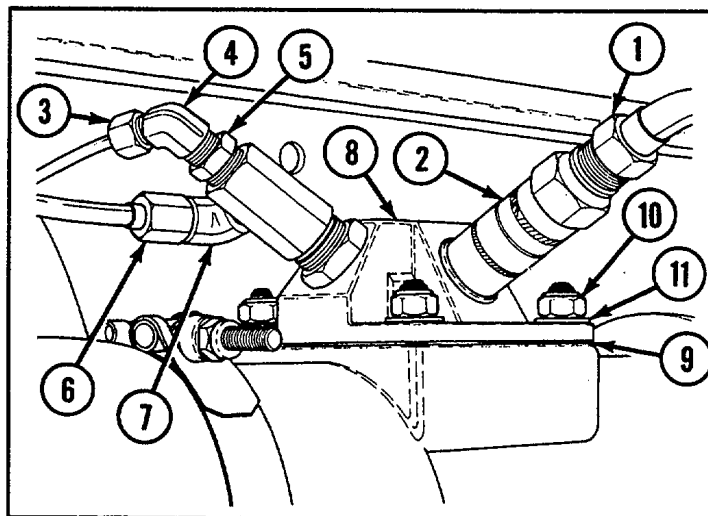
Do not smoke or use open flame when working on fuel system: explosion may occur, causing severe injury or death.

a. REMOVAL

NOTE

Removal and installation procedures are the same for both the left and right bank. Right bank shown.

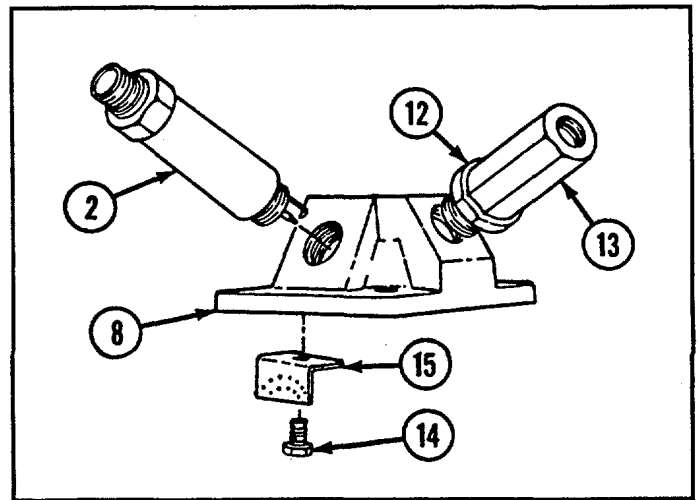
- 1 Disconnect electrical lead (1) from spark plug (with gasket) (2).
- 2 Disconnect fuel inlet hose (3) from fuel inlet elbow (4). Remove fuel inlet elbow and bushing (5).
- 3 Disconnect fuel return tube (6) from fuel return elbow (7). Remove fuel return elbow.
- 4 Remove manifold heater (8) and gasket (9) by removing four self-locking nuts (10) and four flat washers (11). Discard gasket.



4-21 REPLACE/REPAIR MANIFOLD HEATER NOZZLE ASSEMBLY-Continued

b. DISASSEMBLY

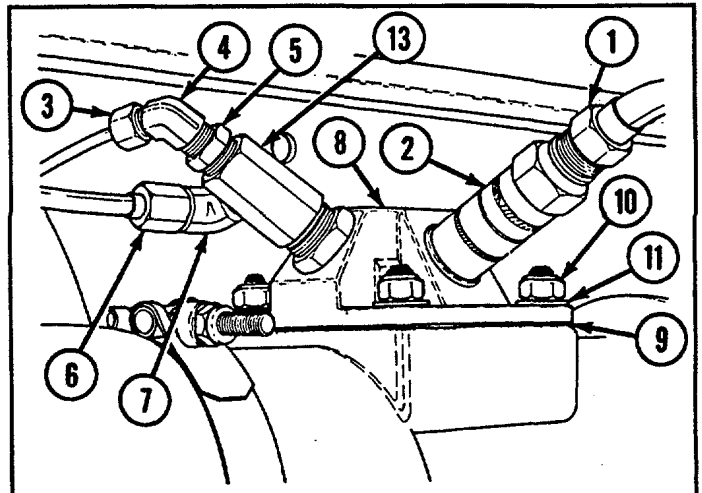
- 1 Remove spark plug (with gasket) (2) from manifold heater (8).
- 2 Loosen locknut (12) and remove manifold heater nozzle assembly (13).
- 3 Remove screw (14) and baffle (15).

**c. ASSEMBLY**

- 1 Install screw (14) and baffle (15) to manifold heater (8).
- 2 Install manifold heater nozzle assembly (13) and tighten locknut (12).
- 3 Inspect spark plug (with gasket) (2), electrodes, and insulator condition. Replace spark plug (with gasket) if unserviceable.
- 4 Set spark plug (with gasket) (2) gap at 0.094 to 0.114 in. (2.39 to 2.90 mm).
- 5 Install new spark plug (with gasket) (2).

d. INSTALLATION

- 1 Install manifold heater (8) and new gasket (9) with four new self-locking nuts (10) and four flat washers (11).
- 2 Connect fuel return elbow (7) and fuel return tube (6) to manifold heater nozzle assembly (13).
- 3 Connect new bushing (5), fuel inlet elbow (4), and fuel inlet hose (3) to manifold heater nozzle assembly (13).
- 4 Connect electrical lead (1) to spark plug (with gasket) (2).



**SECTION II: PRIMARY, FUEL/WATER SEPARATOR, AND MANIFOLD
HEATER FUEL FILTERS AND RELATED PARTS**

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4-22 MANIFOLD HEATER OPERATION CHECK

INITIAL SET-UP

Reference:
TM 9-2350-256-10

Equipment Condition:
Powerplant removed (see paragraph 3-1)

WARNING

Do not smoke or use open flame when working on fuel system: explosion may occur, causing severe injury or death.

MANIFOLD HEATER OPERATION CHECK

After maintenance has been performed on either the intake manifold heater or on the manifold heater fuel system, operation of the heater should be checked before installing the powerplant. To check manifold heater operation, proceed as follows:

- Prepare the powerplant for operation outside the vehicle (see paragraph 3-1).
- The main fuel line shutoff solenoid should be closed and the engine cranked to obtain an air supply to the manifold heaters.
- Operate purge pump and simultaneously press heater button in pump handle.
- If heater is operative, heat will be felt at intake manifold turbosupercharger tube.
- If there is no heat, first check manifold heater accessory on which maintenance was performed. Check wiring harness and heater spark plug lead for faulty connections. Check installation of spark plug, nozzle, and fuel line fittings, and check operation of heater fuel supply and return solenoids.

NOTE

- Manifold heater operation can be checked with the powerplant in the vehicle by removing the engine deck (see paragraph 9-51) and placing a hand on the intake manifold downstream from the heater.
- Follow-on maintenance: Install powerplant (see paragraph 3-1)

4-23 REPLACE MANIFOLD HEATER FUEL LINES AND FITTINGS

THIS TASK COVERS

a. Removal

b. Installation

INITIAL SET-UP

Tools:
Tool kit, general mechanic's
(Appendix C, item 53)

Parts:
• Nuts, self-locking (10)
(Appendix G, item 172)
• Nut, self-locking (Appendix
G, item 162)

Equipment Condition:
Powerplant removed (see
paragraph 3-1)

WARNING

Do not smoke or use open flame when working on fuel system: explosion may occur, causing severe injury or death.

4-23 REPLACE MANIFOLD HEATER FUEL LINES AND FITTINGS-Continued

NOTE

Removal and installation procedures are the same for both the left and right banks. Right bank shown.

a. REMOVAL

- 1 Remove tube assembly (1) by loosening union at each end of tube assembly.
- 2 Remove five clamps (2) by removing self-locking nut (3) and screw (4) from each.

NOTE

Left bank does not have self-locking nut (5) and clamp (6).

- 3 Remove self-locking nut (5) and clamp (6).
- 4 Remove tube assembly (7) by loosening union at each end of tube assembly.
- 5 Remove elbow (8) and bushing (9) from nozzle assembly (10).
- 6 Remove two clamps (11) by removing two screws (12).
- 7 Remove tube assembly (13) by loosening union at each end of tube assembly.
- 8 Remove elbow (14) from nozzle assembly (10).

b. INSTALLATION

- 1 Install elbow (14) onto nozzle assembly (10).
- 2 Install tube assembly (13) by tightening union at each end of tube assembly.
- 3 Install two clamps (11) with two screws (12).
- 4 Install bushing (9) and elbow (8) onto nozzle assembly (10).
- 5 Install tube assembly (7) by tightening union at each end of tube assembly.
- 6 Install clamp (6) with new self-locking nut (5).
- 7 Install five clamps (2) each with new self-locking nut (3) and screw (4).
- 8 Install tube assembly (1) by tightening union at each end of tube assembly.

SECTION III: AIR INTAKE SYSTEM

Para.	Task	Page
4-24	Replace/Repair Air Cleaner	4-50
4-25	Replace Air Cleaner Restriction Gage Assembly	4-54
4-26	Replace Air Intake Hoses	4-55
4-27	Replace Engine Seal, Air Inlet	4-58

4-24 REPLACE/REPAIR AIR CLEANER

THIS TASK COVERS

- | | | | | |
|------------|----------------|------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Service | d. Assembly | e. Installation |
|------------|----------------|------------|-------------|-----------------|

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Material/Parts-Continued:

- Lockwashers (6) (Appendix G, item 134)
- Packing, preformed (Appendix G, item 184)
- Seals (2) (Appendix G, item 258)

Material/Parts:

- Adhesive, rubber-base (Appendix D, item 3)
- Lockwashers (4) (Appendix G, item 130)
- Lockwashers (10) (Appendix G, item 132)

Reference:

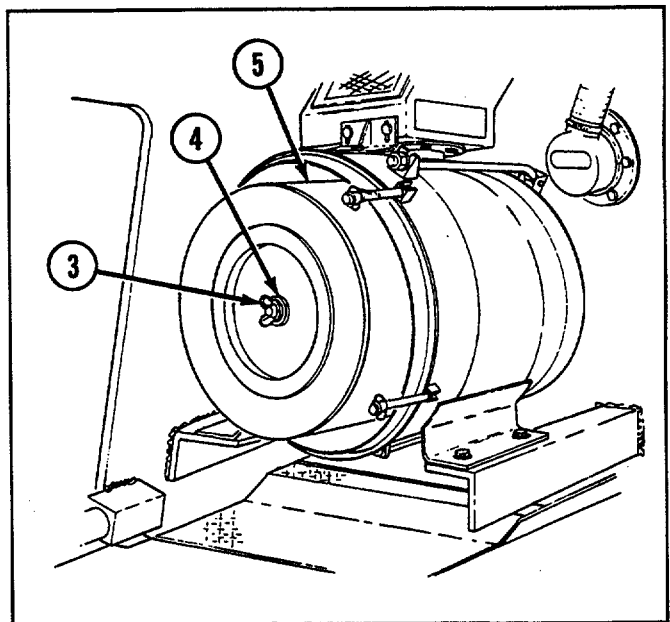
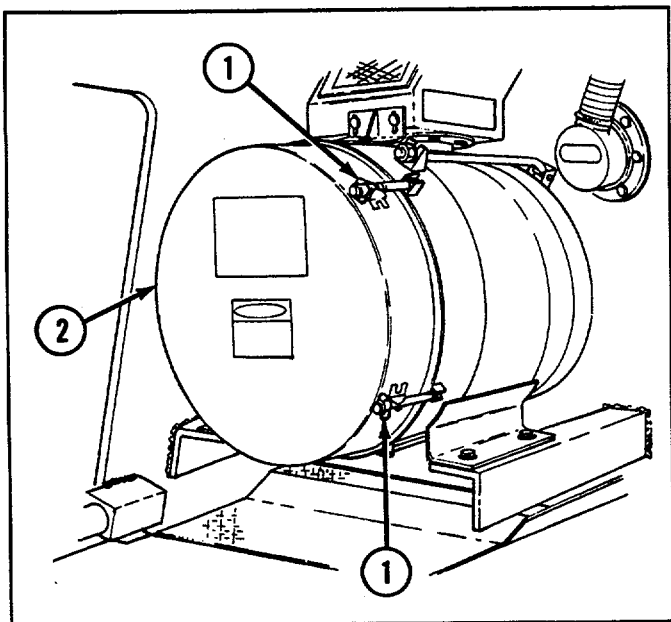
TM 9-2350-256-10

a. REMOVAL

NOTE

- Removal and installation procedures are the same for both the left- and right-side air cleaners.
- In illustration personnel heater, fire extinguishers, and air purifier shown removed for clarity only.

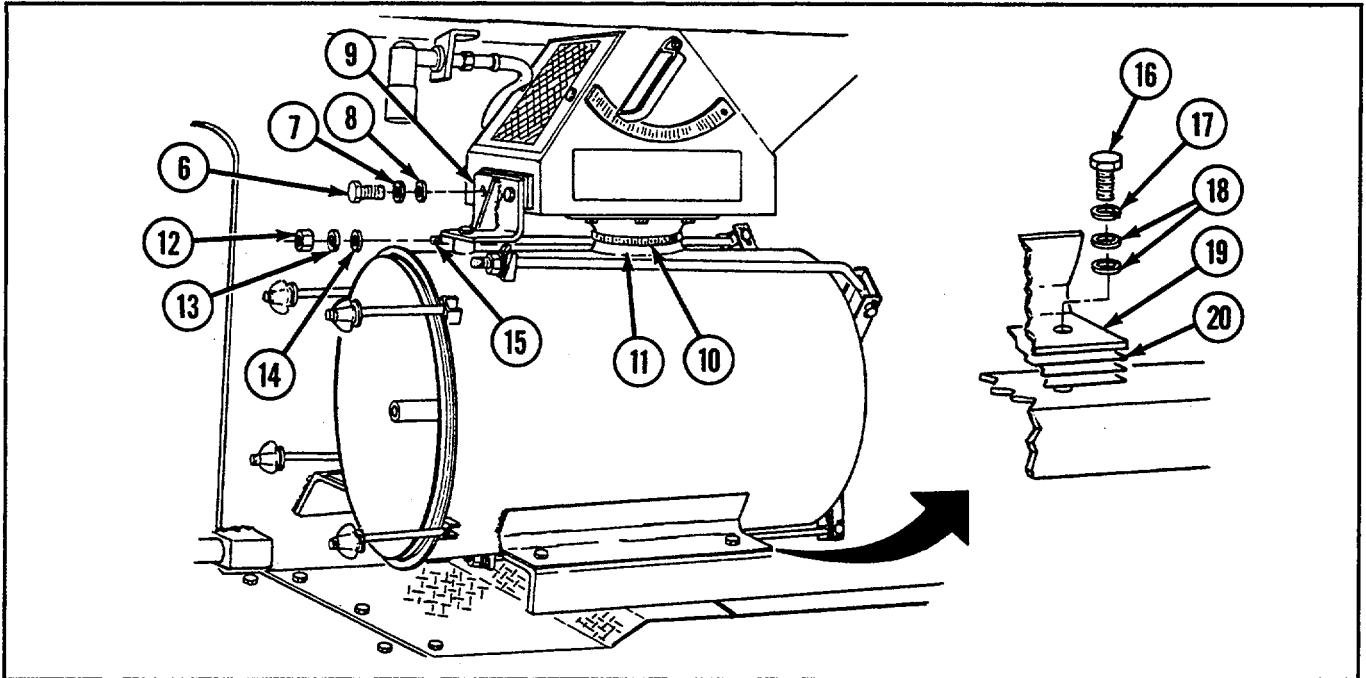
- 1 Loosen four wingnuts (1) and remove air cleaner cover assembly (2).
- 2 Remove wingbolt (3), washer (4), and filter element (5).



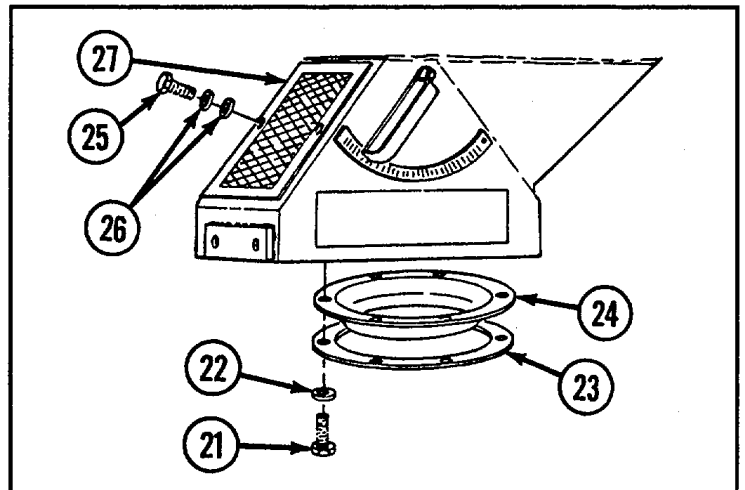
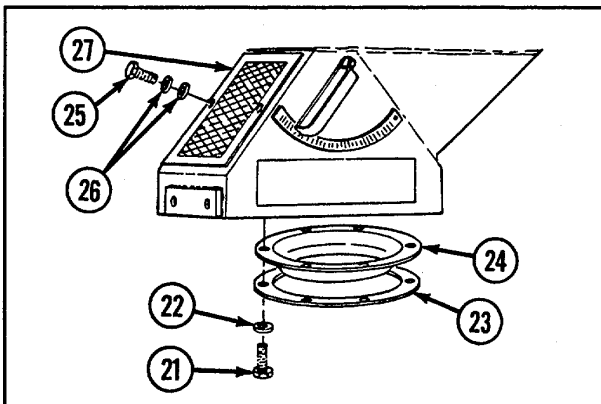
SECTION III: AIR INTAKE SYSTEM

TM 9-2350-256-20

- 3 Remove three screws (6), three lockwashers (7), three flat washers (8), and bracket (9).
- 4 Remove clamp (10) from air inlet opening (11).
- 5 Remove three nuts (12), three lockwashers (13), and three flat washers (14) from three retaining bolts (15).
- 6 Remove four screws (16), four lockwashers (17), eight flat washers (18), air cleaner housing (19), and six spacer plates (20).



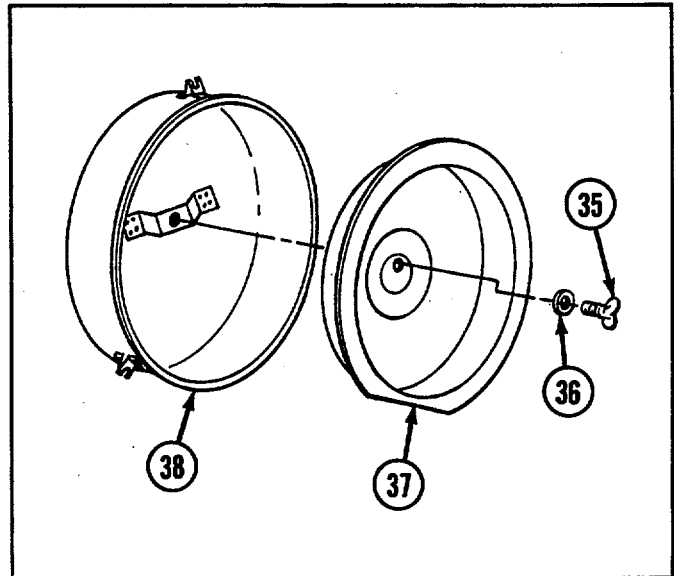
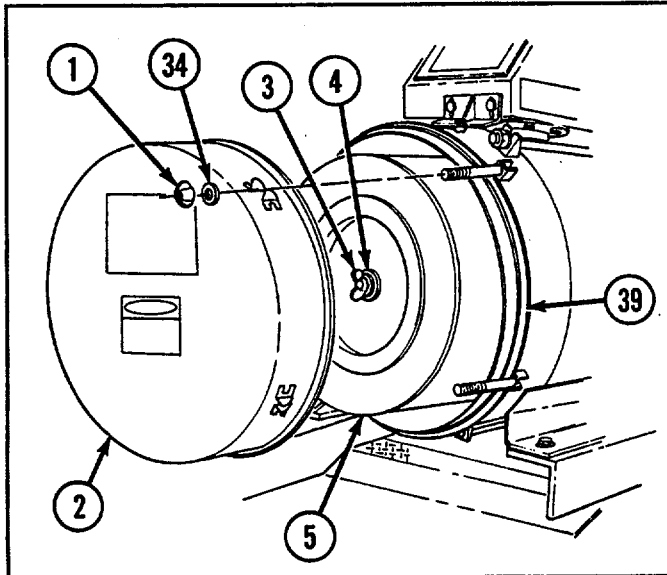
- 7 Remove six screws (21), six flat washers (22), coll (23), and flange (24).
- 8 Remove two screws (25), two flat washers (26), and guard (27).
- 9 Remove screw (28), handle (29), spring (30), two bearings (31), damper (32), and two seals (33).



4-24 REPLACE/REPAIR AIR CLEANER-Continued

b. DISASSEMBLY

- 1 Remove four wingnuts (1), four flat washers (34), and air cleaner cover assembly (2).
- 2 Remove wingbolt (3), washer (4), and filter element (5).
- 3 Remove wingbolt (35), washer (36), and baffle (37) from air cleaner cover (38).
- 4 Remove preformed packing (39) if necessary.



c. SERVICE

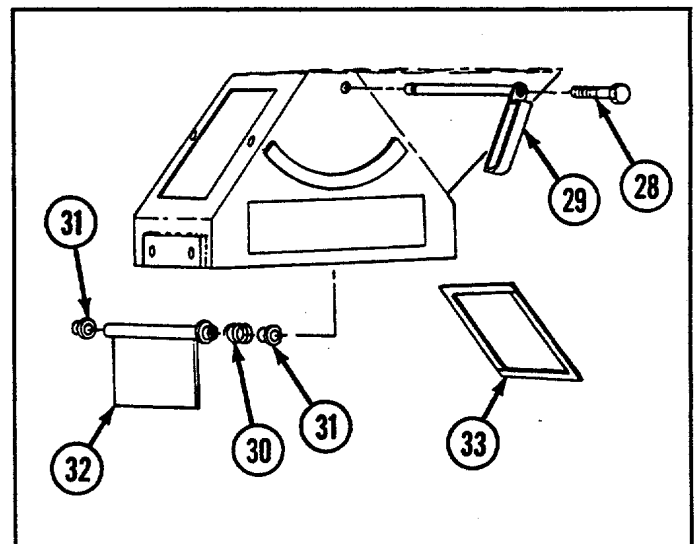
Refer to TM 9-2350-256-10 for service instructions for air cleaners.

d. ASSEMBLY

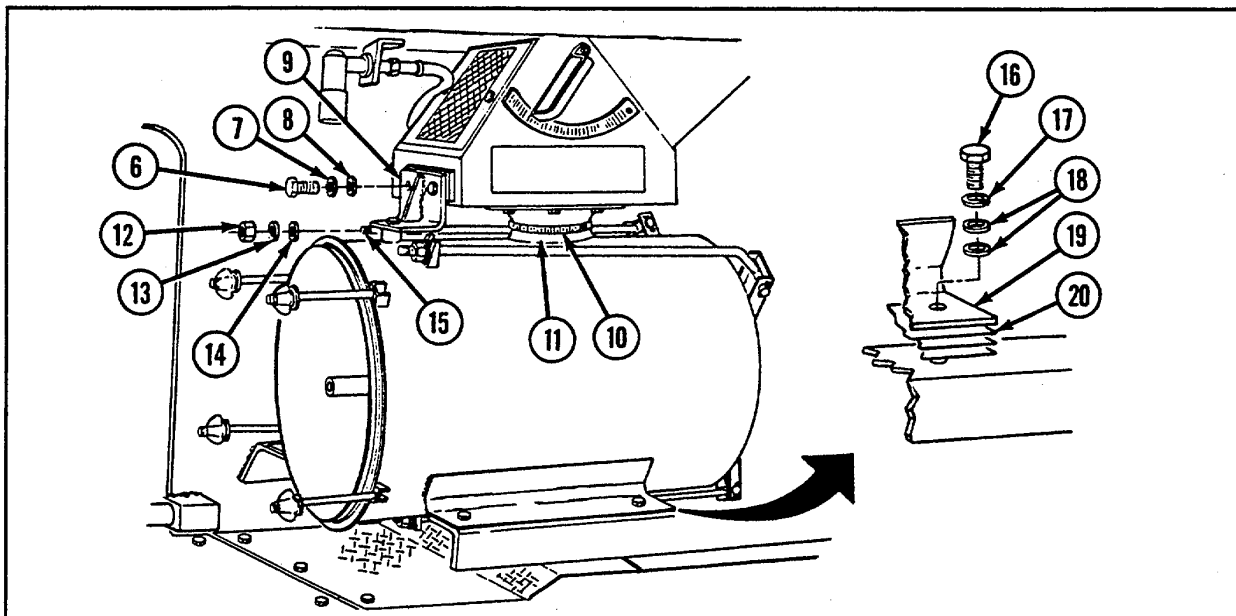
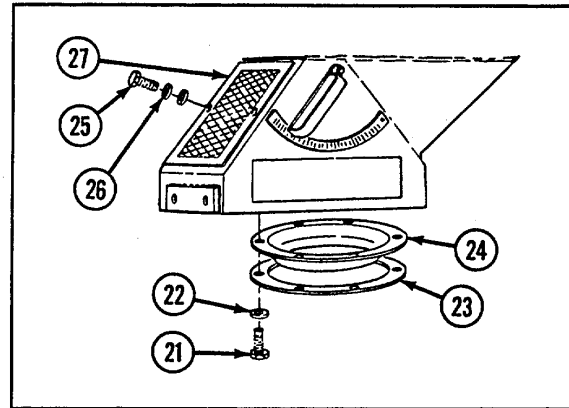
- 1 Install new preformed packing (39) if removed.
- 2 Install baffle (37), washer (36), and wingbolt (35) in air cleaner cover (38).
- 3 Install filter element (5), washer (4), and wingbolt (3).
- 4 Install air cleaner cover assembly (2) with four flat washers (34) and four wingnuts (1).

e. INSTALLATION

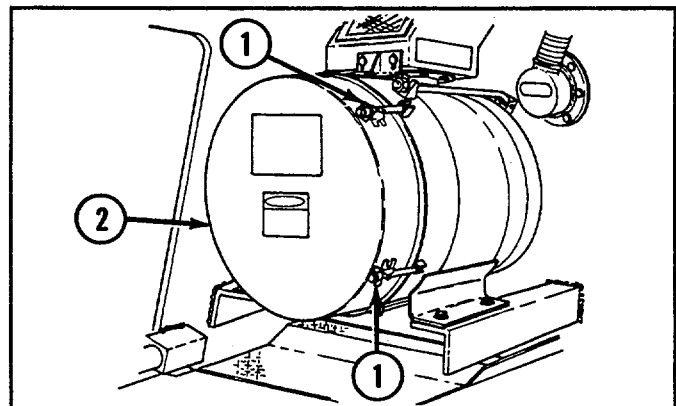
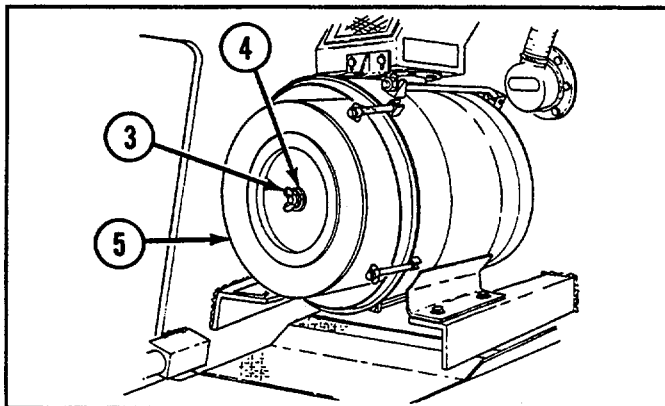
- 1 Install two new seals (33) with adhesive.
- 2 Install damper (32), two bearings (31), spring (30), handle (29), and screw (28).
- 3 Install guard (27) with two flat washers (26) and two screws (25).



- 4 Install flange (24) and collar (23) with six flat washers (22) and six screws (21).
- 5 Install air cleaner housing (19), six spacer plates (20), eight flat washers (18), four new lockwashers (17), and four screws (16).
- 6 Install three retaining bolts (15) with three flat washers (14), three new lockwashers (13), and three nuts (12).
- 7 Install clamp (10) to air inlet opening (11).
- 8 Install bracket (9) with three flat washers (8), three new lockwashers (7), and three screws (6).



- 9 Install filter element (5) with washer (4) and wingbolt (3).
- 10 Install air cleaner cover assembly (2) by tightening four wingnuts (1).



4-25 REPLACE AIR CLEANER RESTRICTION GAGE ASSEMBLY

THIS TASK COVERS

- a. Removal b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

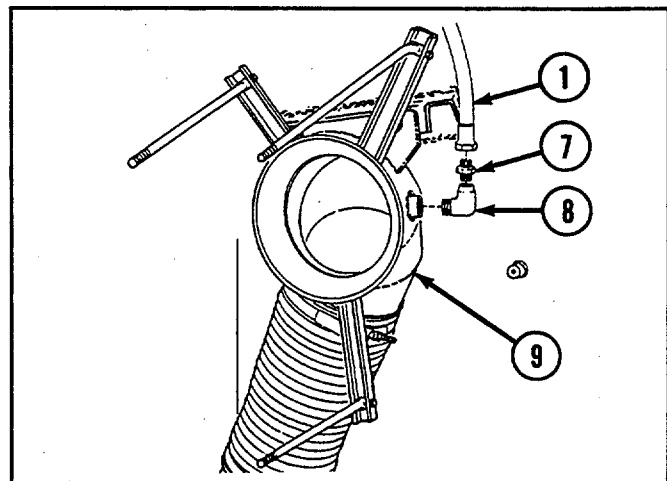
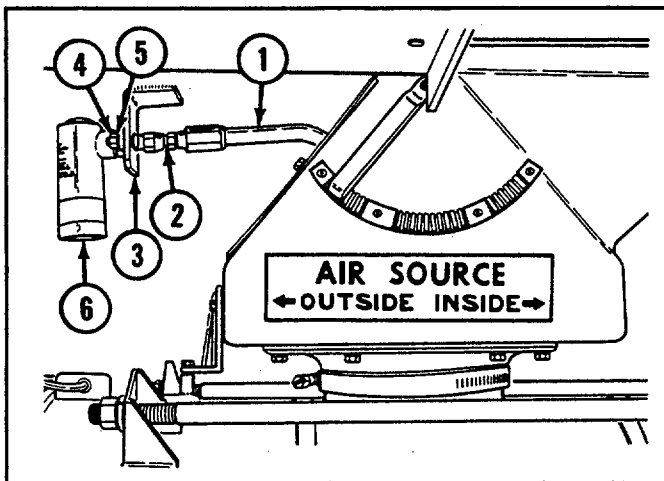
Lockwashers (4) (Appendix G, item 130)

NOTE

Removal and installation procedures are the same for both the left- and right-side air cleaner restriction gages.

a. REMOVAL

- 1 Remove hose (1) and adapter (2) from mounting bracket (3).
- 2 Remove two nuts (4), two lockwashers (5), and air cleaner restriction gage (6).
- 3 Remove hose (1), adapter (7), and elbow (8) from air intake elbow assembly (9).



b. INSTALLATION

- 1 Install elbow (8), adapter (7), and hose (1) to air intake elbow assembly (9).
- 2 Install air cleaner restriction gage (6), two new lockwashers (5), and two nuts (4).
- 3 Install adapter (2) and hose (1) at mounting bracket (3).

4-26 REPLACE AIR INTAKE HOSES**THIS TASK COVERS**

a. Removal b. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Lockwashers (8) (Appendix G, item 132)
- Lockwashers (2) (Appendix G, item 134)
- Packing, preformed (Appendix G, item 189)
- Pins, cotter (3) (Appendix G, item 207)

Equipment Conditions:

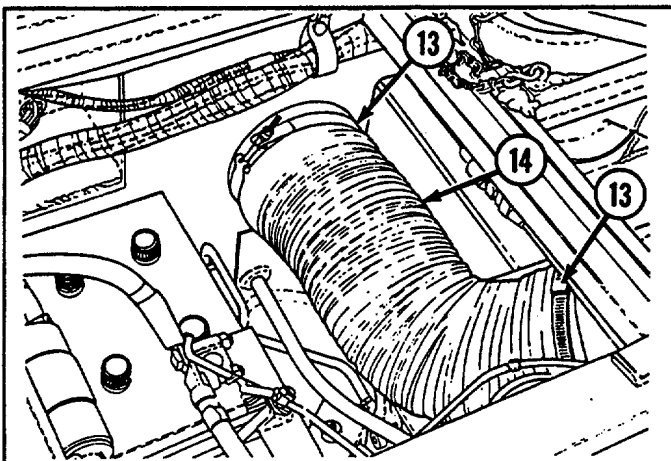
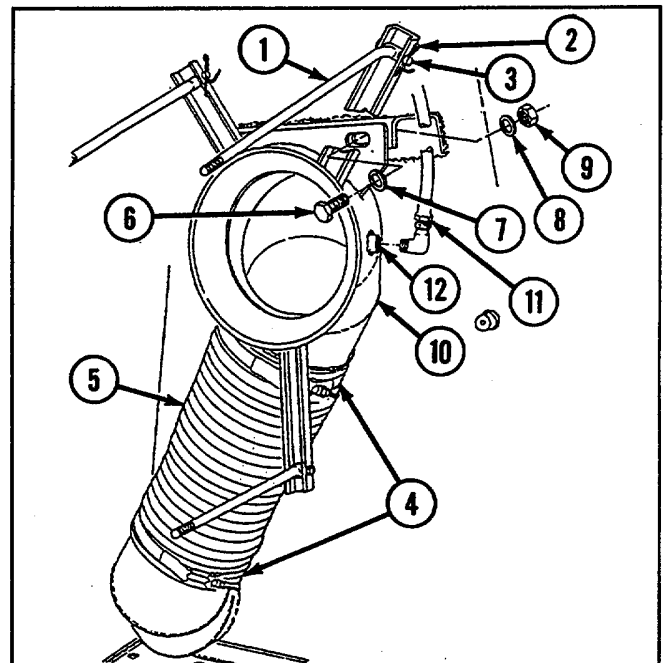
- Air cleaner removed (see paragraph 4-24)
- Engine deck removed (see paragraph 9-51)
- APU access cover removed (see paragraph 9-49)
- Left and center-front air inlet grilles removed (see paragraph 9-57)
- Air inlet doors opened (see paragraph 9-56)

a. REMOVAL**Both Sides**

- 1 Remove three retaining rods (1) by removing cotter pin (2) and straight pin (3) from each.
- 2 Remove two clamps (4) and air intake hose (5).
- 3 Remove two screws (6), two lockwashers (7), two flat washers (8), and two nuts (9) from right and left side of elbow assembly (10).
- 4 Disconnect air cleaner restriction indicator hose (11) from air intake hose (5).
- 5 Remove preformed packing (12).

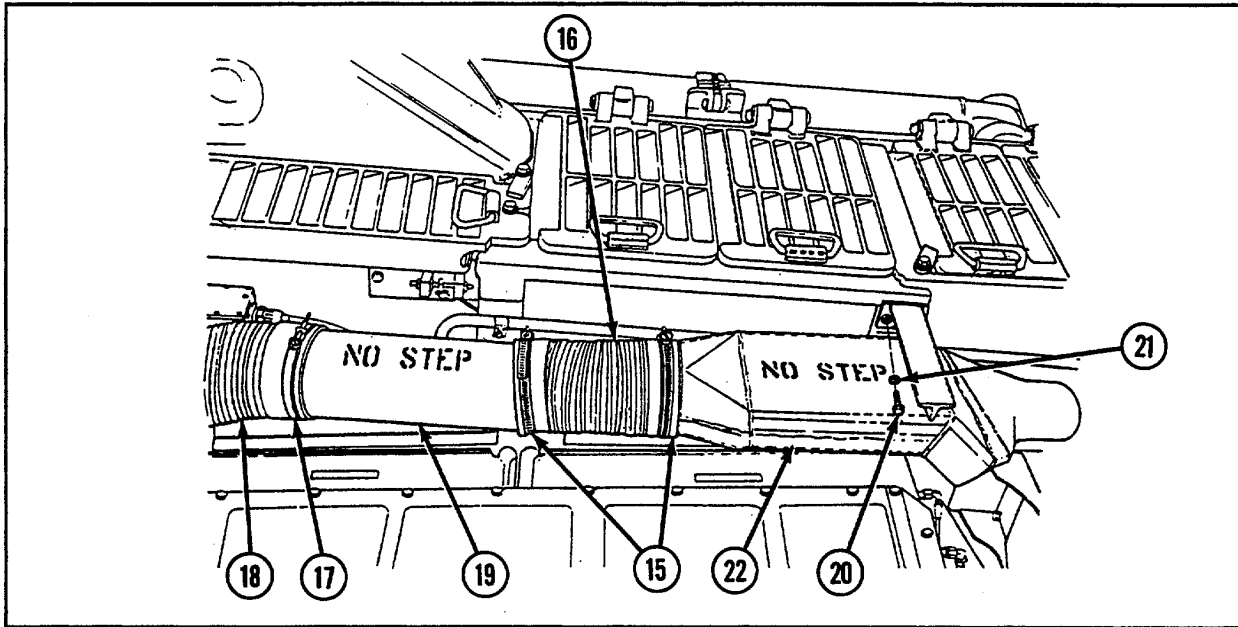
Left Side

- 6 Loosen two clamps (13) and remove air intake hose (14).



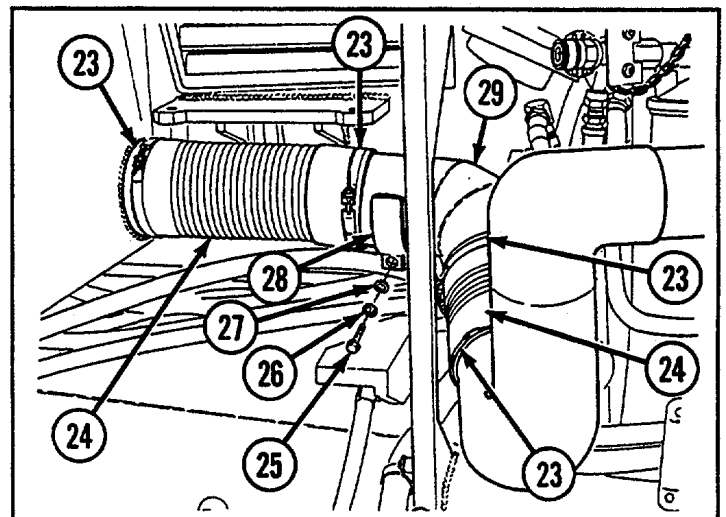
4.26 REPLACE AIR INTAKE HOSES-Continued

- 7 Remove two clamps (15) and air hose (16).
- 8 Remove two clamps (17), air hose (18), and air duct (19).
- 9 Remove two screws (20), two lockwashers (21), and tube assembly (22).



Right Side

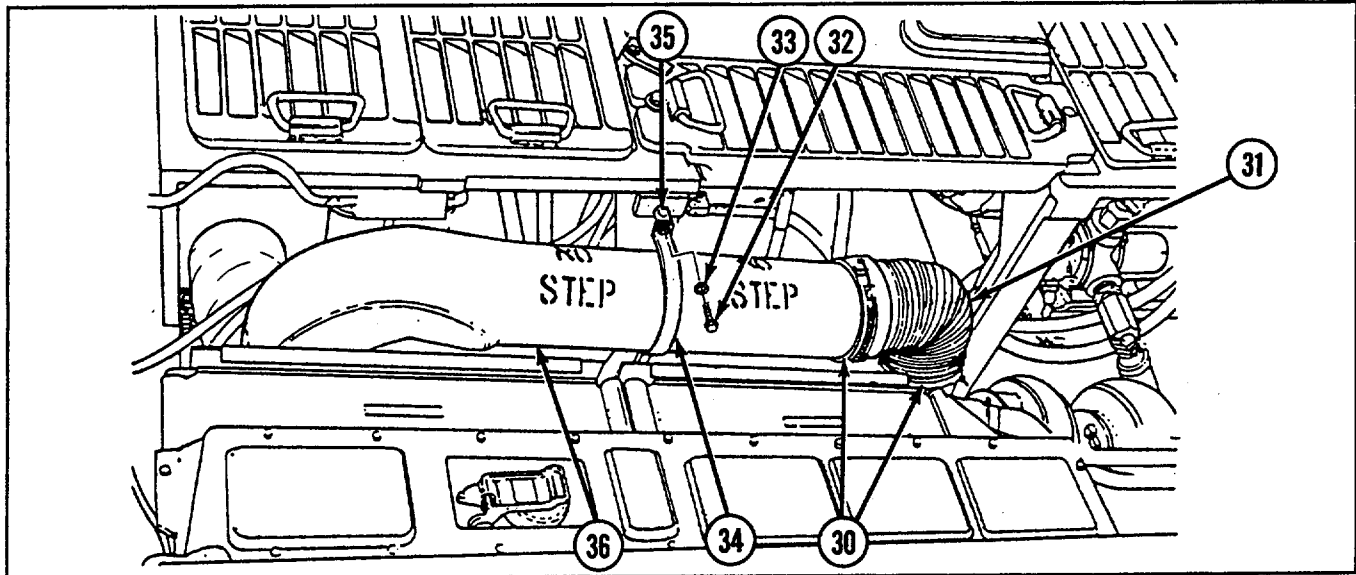
- 10 Remove four clamps (23) and two air intake hoses (24).
- 11 Remove two screws (25), two lockwashers (26), two flat washers (27), clip (28), and air duct (29).
- 12 Remove two clamps (30) and air hose (31).
- 13 Remove two screws (32), two lockwashers (33), clamp (34), spacer (35), and tube assembly (36).



b. INSTALLATION

Right Side

- 1 Install tube assembly (36), spacer (35), clamp (34), two new lockwashers (33), and two screws (32).
- 2 Install air hose (31) and two clamps (30).
- 3 Install air duct (29), clip (28), two flat washers (27), two new lockwashers (26), and two screws (25).
- 4 Install two air intake hoses (24) and four clamps (23).

**Left Side**

- 5 Install tube assembly (22) with two new lockwashers (21) and two screws (20).
- 6 Install air hose (18) and two clamps (17).
- 7 Install air duct (19), air hose (16), and clamps (15).
- 8 Install air intake hose (14) and tighten clamps (13).

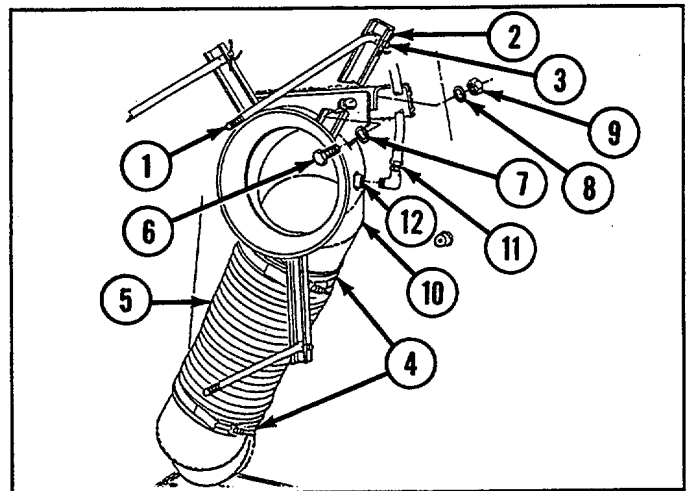
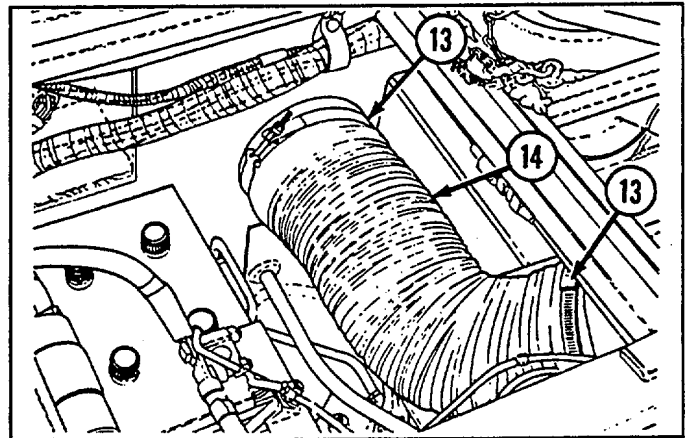
Both Sides

- 9 Install air intake hose (5) and two clamps (4).
- 10 Install new preformed packing (12) and connect air cleaner restriction indicator hose (11).
- 11 Install right and left side of elbow assembly (10) with two nuts (9), two flat washers (8), two new lockwashers (7), and two screws (6).
- 12 Install three retaining rods (1), three new cotter pins (2), and three straight pins (3).

NOTE

Follow-on maintenance:

- Close air inlet doors (see paragraph 9-56)
- Install left and center-front air inlet grilles (see paragraph 9-57)
- Install APU access cover (see paragraph 949)
- Install engine deck (see paragraph 9-51)
- Install air cleaner (see paragraph 4-24)



4-27 REPLACE ENGINE SEAL, AIR INLET

THIS TASK COVERS

- a. Removal b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Equipment Condition:

Engine deck removed (see paragraph 9-51)

Parts:

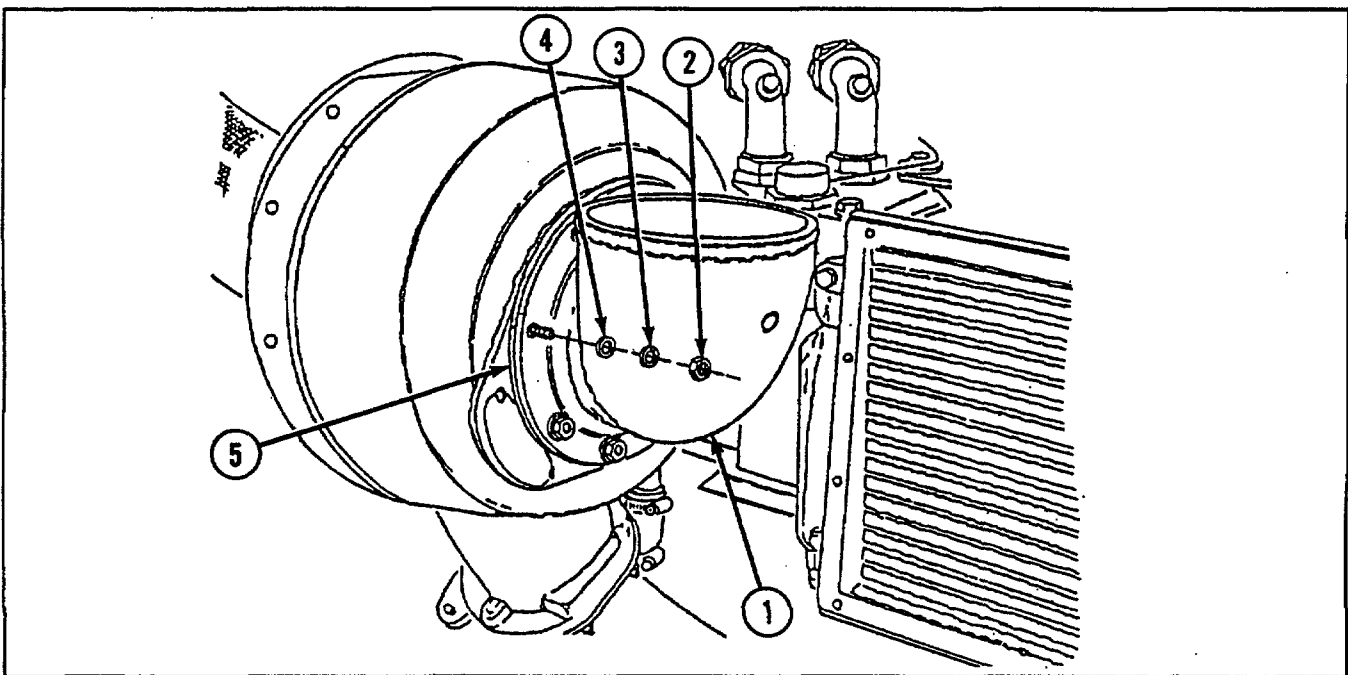
- Lockwashers (16) (Appendix G, item 131)
- Sleeveings, insulation (2) (Appendix G, item 90)

NOTE

Removal and installation procedures are the same for both the left- and right-side air inlet elbows.

a. REMOVAL

- 1 Remove air inlet elbow (1) by removing eight nuts (2), eight lockwashers (3), and eight flat washers (4) from studs.
- 2 Remove insulation sleeving (5).



b. INSTALLATION

- 1 Install new insulation sleeving (5).
- 2 Install air inlet elbow (1) by installing eight flat washers (4), eight new lockwashers (3), and eight nuts (2) on studs.

NOTE

Follow-on maintenance: Install engine deck (see paragraph 9-51)

SECTION IV: EXHAUST SYSTEM

Para.	Task	Page
4-28	Replace Exhaust Pipes	4-59
4-29	Replace Exhaust Manifold Clamps	4-61

4-28 REPLACE EXHAUST PIPES**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

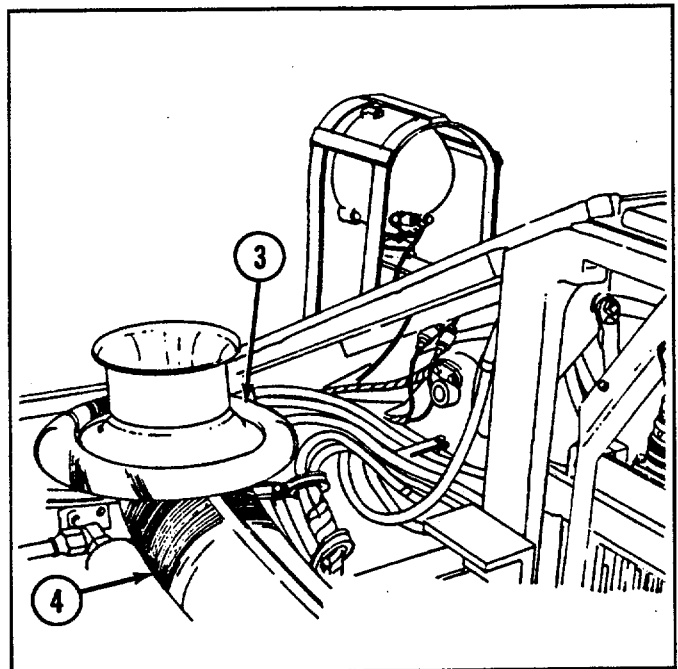
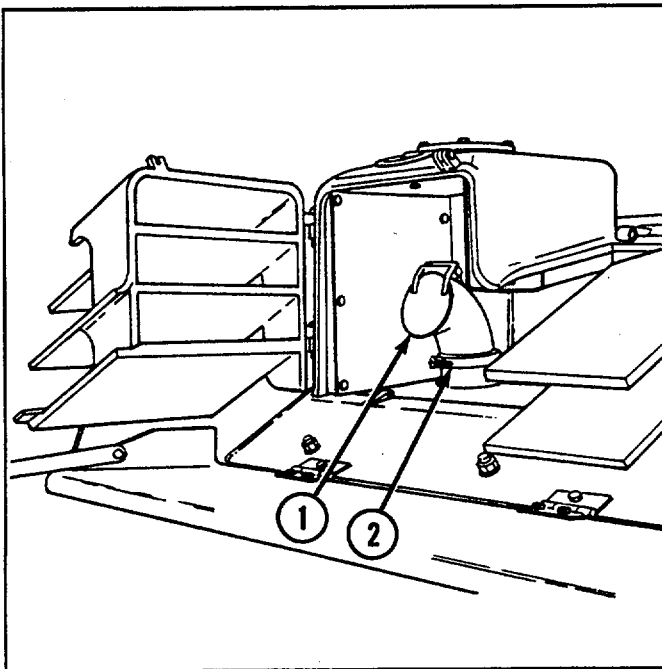
- Gaskets (2) (Appendix G, item 27)
- Lockwashers (34) (Appendix G, item 123)
- Nuts, self-locking (12) (Appendix G, item 177)
- Packing (Appendix G, item 190)

NOTE

Removal and installation procedures are the same for both exhaust pipes.

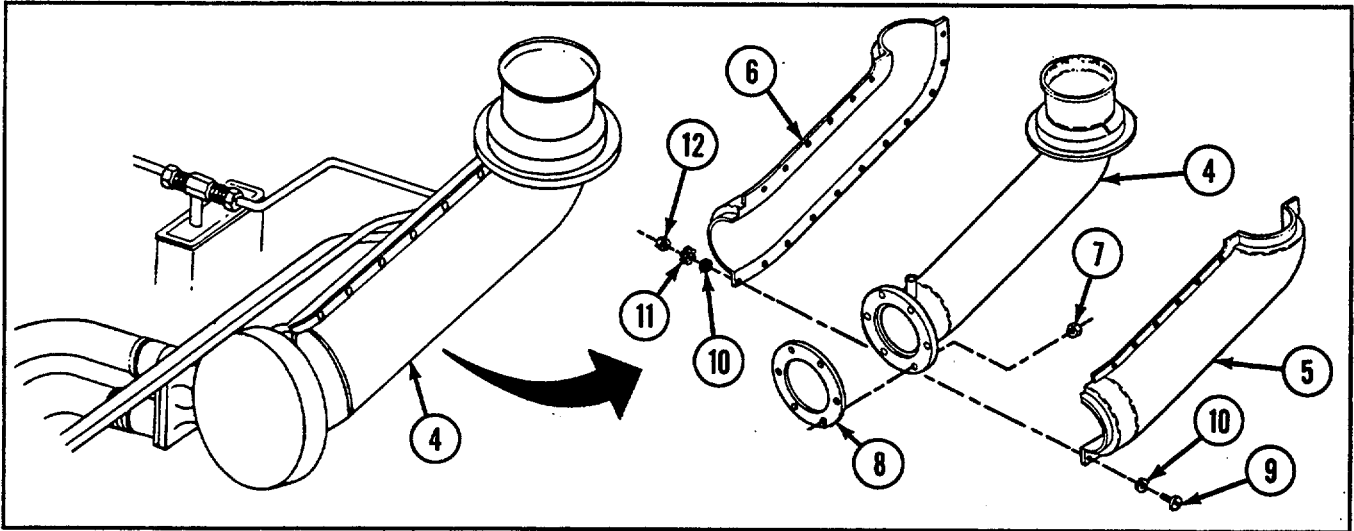
a. REMOVAL

- 1 Remove cap (1) by removing clamp (2).
- 2 Remove engine deck (see paragraph 9-51).
- 3 Remove packing (3) from engine exhaust pipe (4).



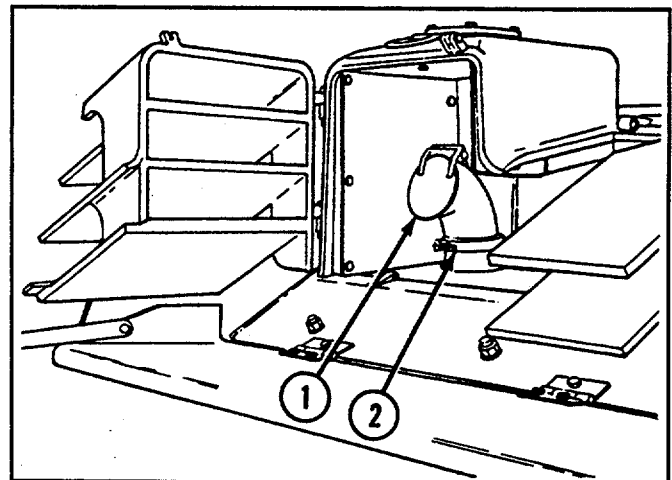
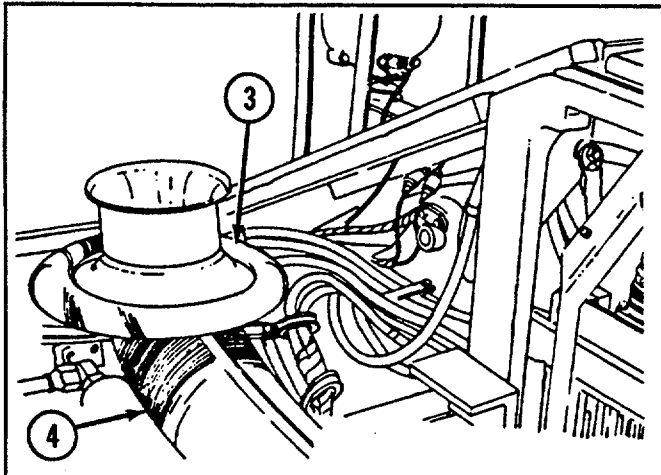
4-28 REPLACE EXHAUST PIPES-Continued

- 4 Remove engine exhaust pipe (4) with covers (5 and 6) by removing six self-locking nuts (7).
- 5 Remove gasket (8).
- 6 Remove covers (5 and 6) by removing 17 screws (9), 34 flat washers (10), 17 lockwashers (11), and 17 nuts (12).



b. INSTALLATION

- 1 Install two covers (5 and 6) by installing 17 nuts (12), 17 new lockwashers (11), 34 flat washers (10), and 17 screws (9).
- 2 Install new gasket (8).
- 3 Install engine exhaust pipe (4) by installing six new self-locking nuts (7).
- 4 Install new packing (3) on engine exhaust pipe (4).
- 5 Install engine deck (see paragraph 9-51).
- 6 Install cap (1) by installing clamp (2).



4-29 REPLACE EXHAUST MANIFOLD CLAMPS**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts-Continued:

Nuts, self-locking (82) (Appendix G, item 177)

Parts:

- Gaskets (4) (Appendix G, item 51)
- Gaskets (16) (Appendix G, item 58)

Equipment Conditions:

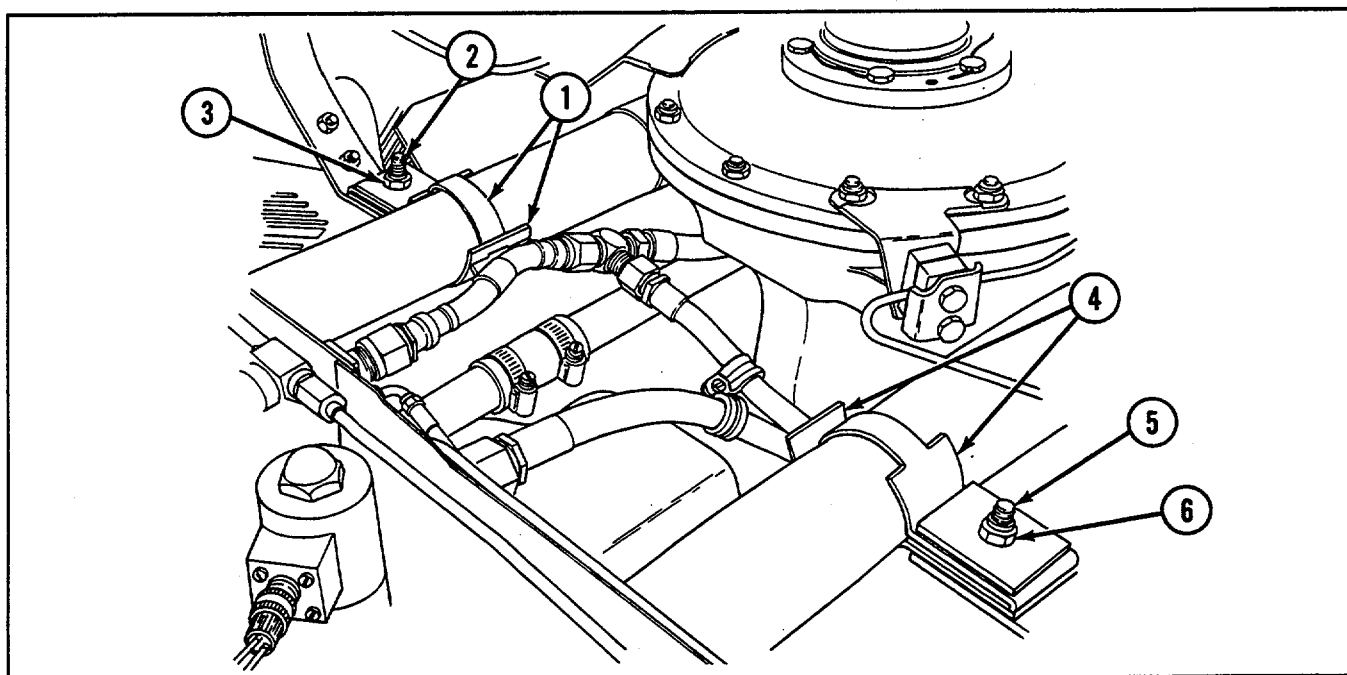
Engine deck removed (see paragraph 9-51)

a. REMOVAL**Left Side**

- 1 Remove two restraining strap halves (1) by removing screw (2) and self-locking nut (3).

Right Side

- 2 Remove two restraining strap halves (4) by removing screw (5) and self-locking nut (6).

**b. INSTALLATION****Right Side**

- 1 Install two restraining strap halves (4) with screw (5) and new self-locking nut (6).

Left Side

- 2 Install two restraining strap halves (1) with screw (2) and new self-locking nut (3).

NOTE

Follow-on maintenance: Install engine deck (see paragraph 9-51)

5-3 REPLACE/REPAIR ENGINE COOLING FAN HOUSINGS-Continued

- 3 Remove two cooling fan housings (6) by removing four screws (7), four lockwashers (8), and four flat washers (9).

b. DISASSEMBLY

NOTE

Remove inserts only if loose or damaged.

Remove eight inserts (10) from two cooling fan housings (6).

c. ASSEMBLY

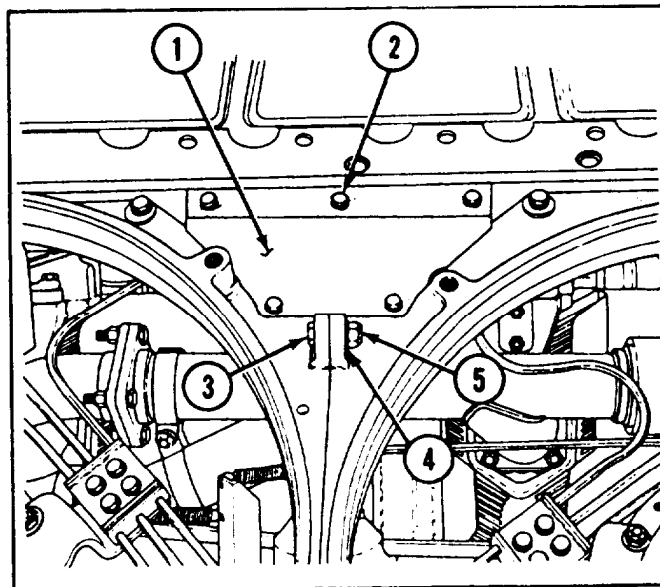
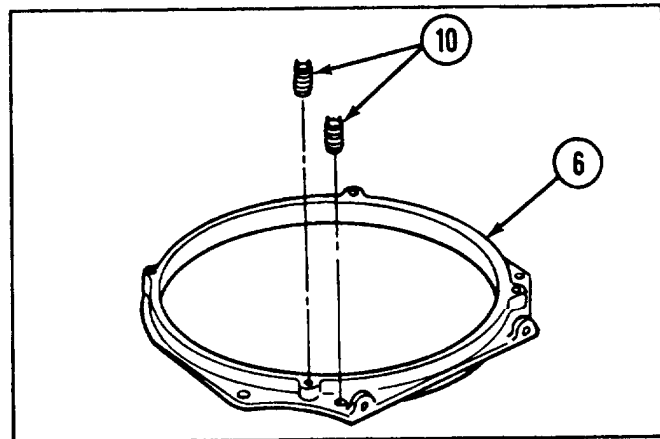
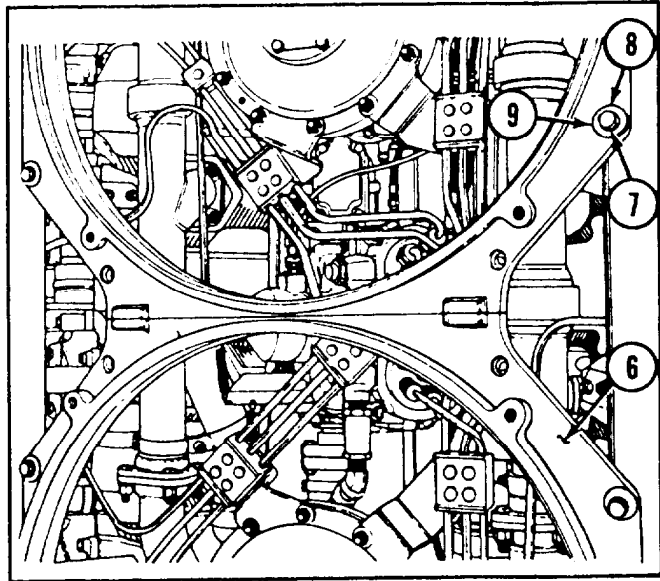
Install eight new inserts (10) in two cooling fan housings (6).

d. INSTALLATION

- 1 Install two cooling fan housings (6) by installing four flat washers (9), four new lo&washers (8), and four screws (7).
- 2 Install two flat washers (4), two screws (3), and two new self-locking nuts (5).
- 3 Install 2 access covers (1) by installing 10 screws (2).

NOTE

Follow-on maintenance: Install cooling fans (see paragraph 5-2)



5—4 REPLACE ENGINE COOLING FAN SHROUD AND RELATED PARTS**THIS TASK COVERS**

a. Removal b. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's
(Appendix C, item 53)

Parts-Continued:

- Lockwashers (4) (Appendix G, item 132)
- Lockwashers (4) (Appendix G, item 96)
- Nuts, self-locking (12) (Appendix G, item 166)

Equipment Condition:

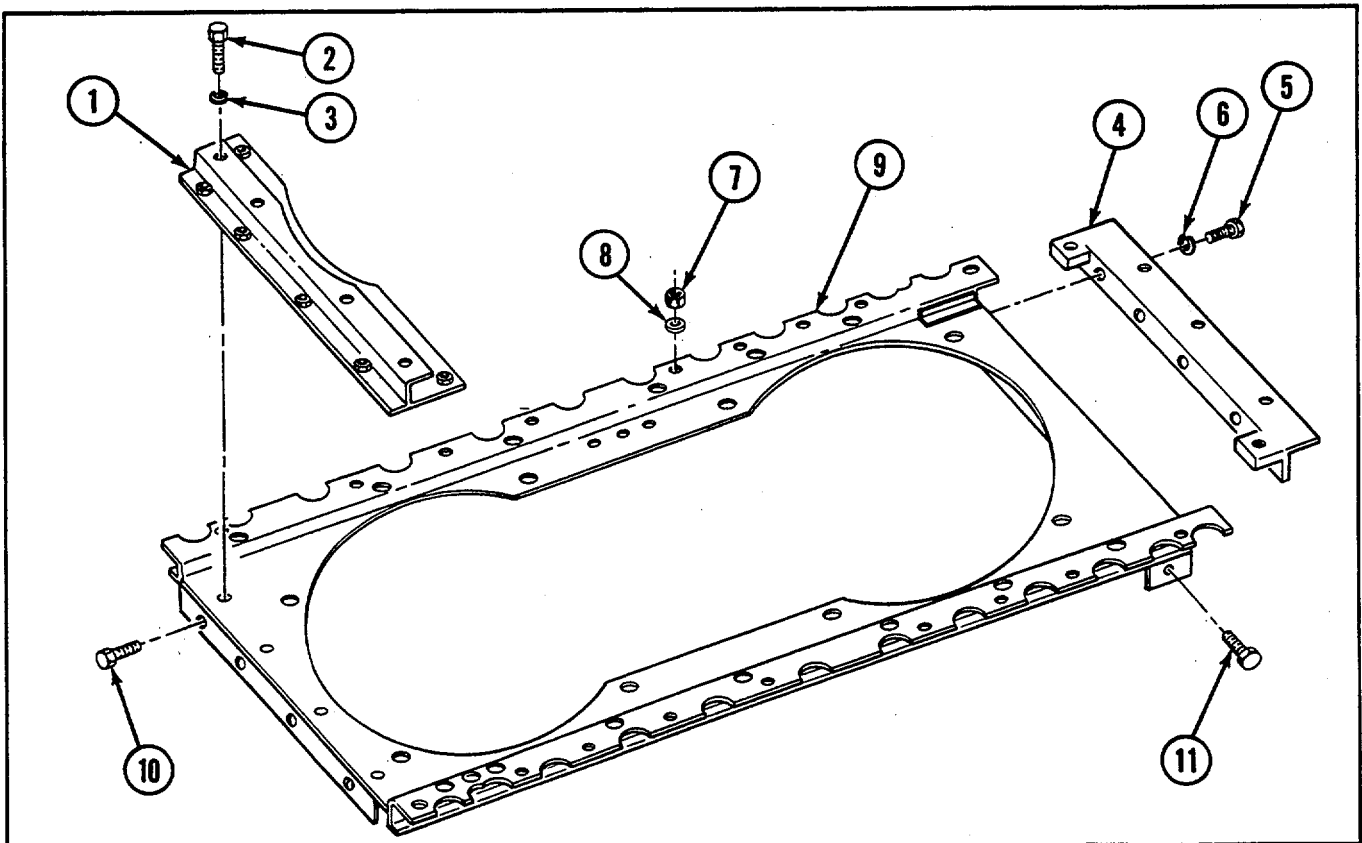
Cooling fan housings removed
(see paragraph 5-3)

Parts:

- Lockwashers (4) (Appendix G, item 132)

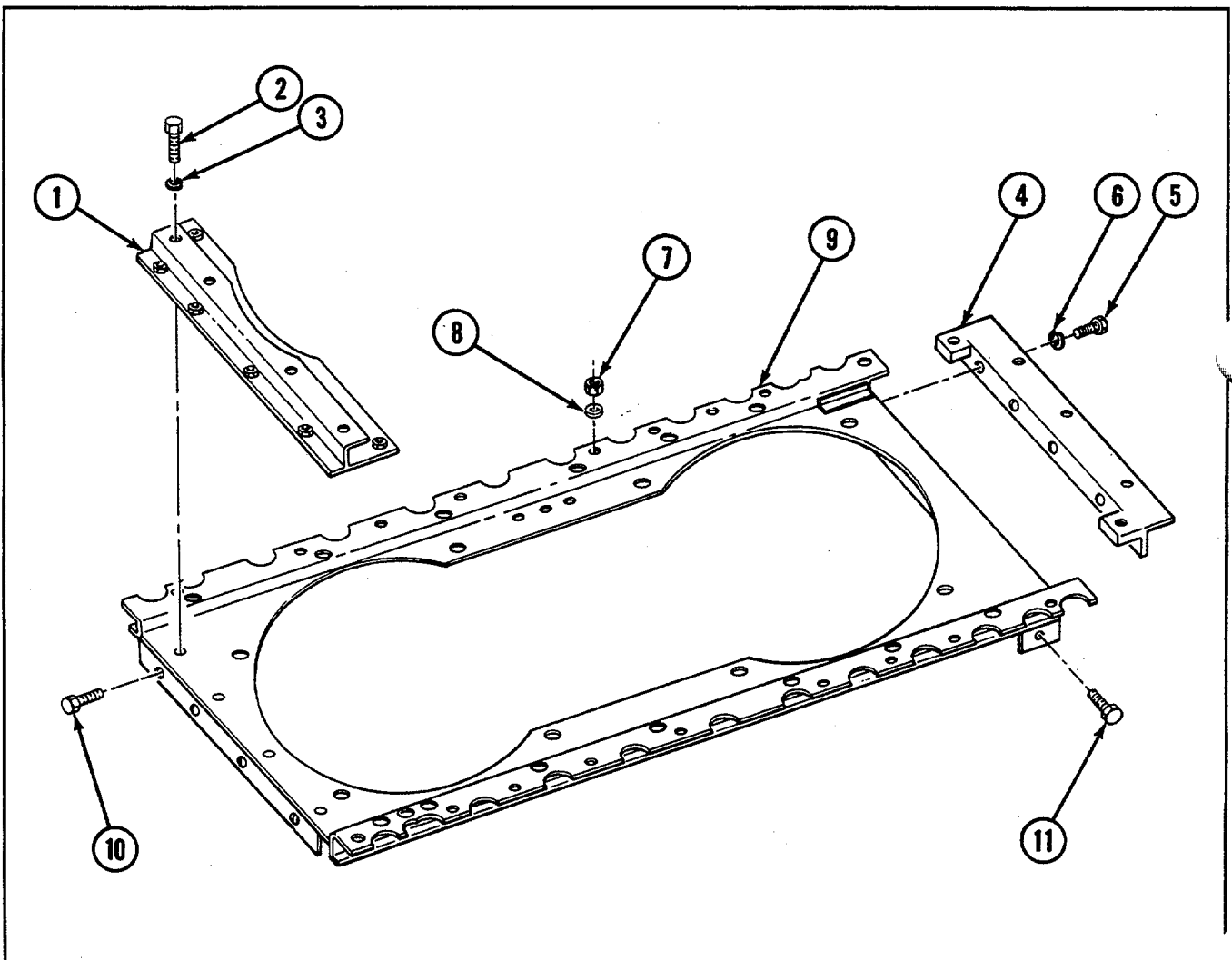
a. REMOVAL

- 1 Remove shroud mounting (1) by removing four screws (2) and four lockwashers (3).
- 2 Remove support assembly (4) by removing four screws (5) and four lockwashers (6).
- 3 Remove six self-locking nuts (7) and six flat washers (8) from each side of shroud (9).
- 4 Remove four screws (10) from end of shroud (9).
- 5 Remove two screws (11) from rear side of shroud (9).
- 6 Remove shroud (9) from engine.



5—4 REPLACE ENGINE COOLING FAN SHROUD AND RELATED PARTS-
Continued**b. INSTALLATION**

- 1 Install shroud (9) on engine with four screws (10) at end of shroud.
- 2 Install two screws (11) to rear side of shroud (9).
- 3 Install six new self-locking nuts (7) and six flat washers (8) to each side of shroud (9).
- 4 Install support assembly (4) with four screws (5) and four new lockwashers (6).
- 5 Install shroud mounting (1) with four screws (2) and four new lockwashers (3).

**NOTE**

Follow-on maintenance: Install cooling fan housings (see paragraph 5-3)

5—5 REPLACE/REPAIR ENGINE COOLING FAN VERTICAL SHAFT OIL SEALS**THIS TASK COVERS**

a. Removal

b. Disassembly

c. Assembly

d. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Screws, cap (jackscrews) (2) (Appendix C, item 44)

Material/Parts:

- Compound, sealing (Appendix D, item 25)
- Gaskets (2) (Appendix G, item 78)
- Lockwires (2) (Appendix G, item 156)
- Seals, oil (2) (Appendix G, item 264)

Reference:

TM 9-2350-256-10

Equipment Condition:

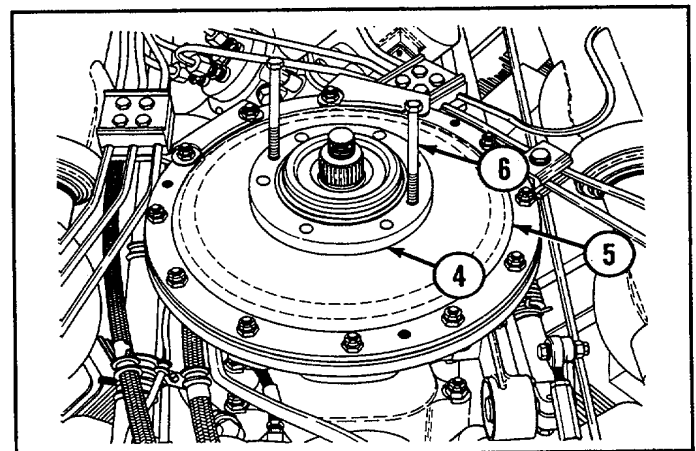
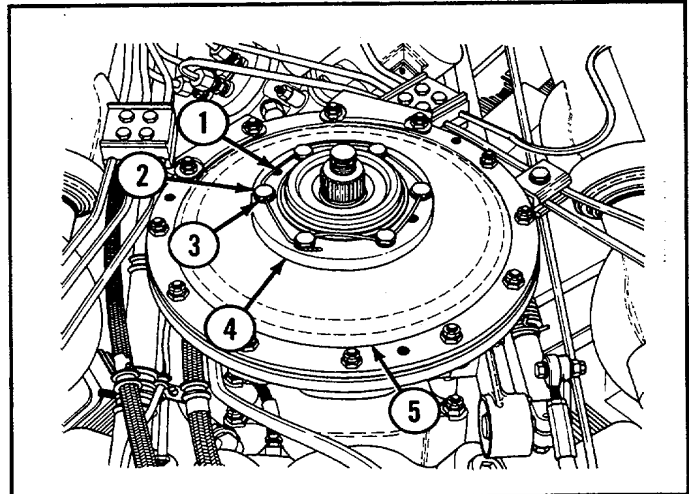
Cooling fans removed (see paragraph 5-2)

NOTE

Removal and installation are the same for both the front and rear cooling fan oil seals.

a. REMOVAL

- 1 Cut and remove lockwire (1).
- 2 Remove six screws (2) and six flat washers (3) securing vertical drive shaft oil seal housing assembly (4) to fan drive housing cover (5).
- 3 Install two 5/16-18 by 4-in.- (101.6-mm-) long jackscrews (6) in screw holes provided in oil seal housing assembly (4).
- 4 Alternately tighten the two jackscrews (6) until oil seal housing assembly (4) separates from fan drive housing cover (5).



5—5 REPLACE/REPAIR ENGINE COOLING FAN VERTICAL SHAFT OIL SEALS-Continued

- 5 Remove gasket (7) from fan drive housing cover (5).
- 6 Clean fan drive housing cover (5), removing dried adhesive.

b. DISASSEMBLY

Drive or press oil seal (8) from oil seal housing (9).

c. ASSEMBLY**CAUTION**

Use care to prevent sealing compound from contacting felt.

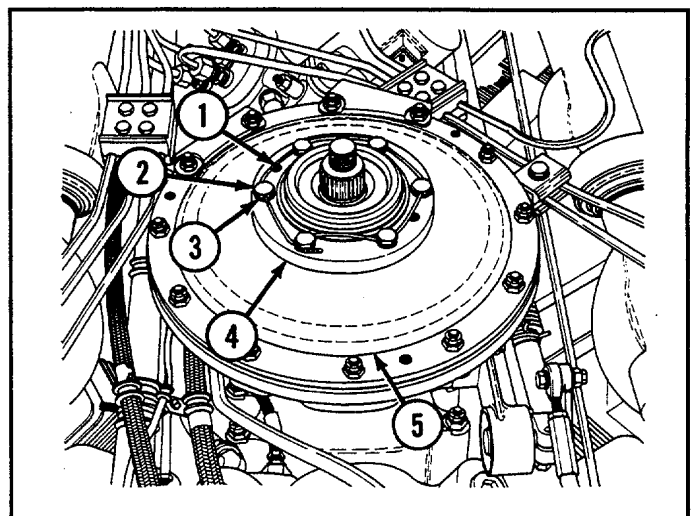
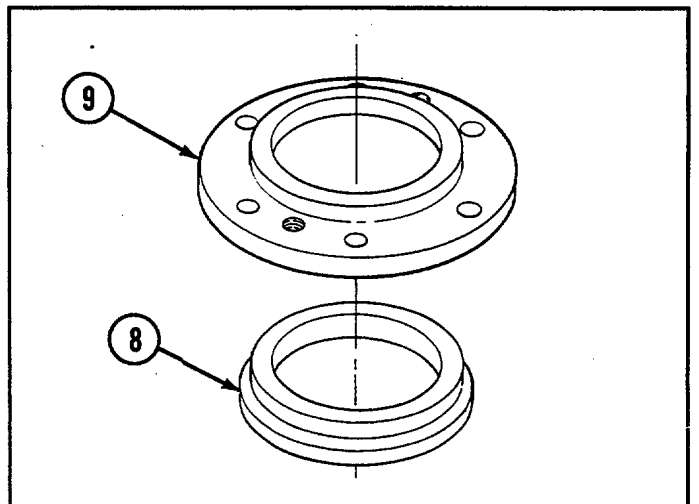
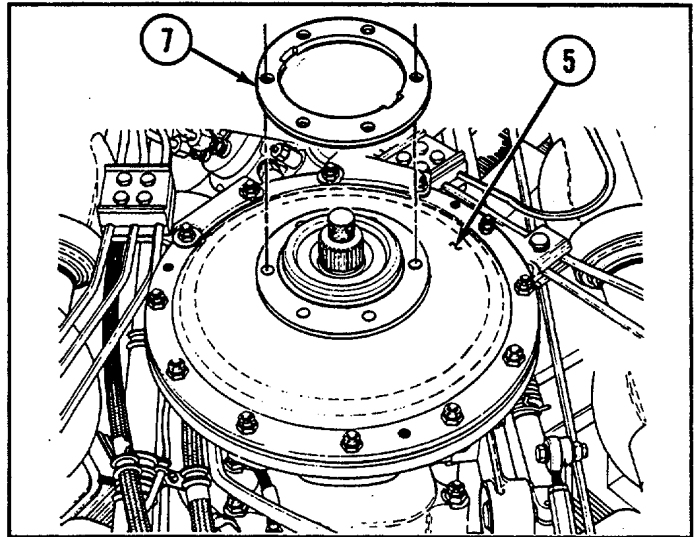
- 1 Coat flange face of new oil seal (8) with sealing compound.
- 2 Position new oil seal (8) in oil seal housing (9) with lip of seal toward flange surface of housing.
- 3 Press new oil seal (8) in oil seal housing (9) until seal seats against housing flange.
- 4 Remove excess sealing compound.

d. INSTALLATION

- 1 Install new gasket (7) in fan drive housing cover (5).
- 2 Install oil seal housing assembly (4) in fan drive housing cover (5) using six flat washers (3) and six screws (2).
- 3 Install cooling fan (see paragraph 5-2) and operate engine (refer to TM 9-2350-256-10) for a short period. Stop engine, remove cooling fan, and check for oil leaks around seal.
- 4 Install new lockwire (1) through screws (2).

NOTE

Follow-on maintenance: Install cooling fans (see paragraph 5-2)



SECTION II: ENGINE OIL COOLERS

Para.	Task	Page
5-6	Replace/Service Engine Oil Coolers and Screens	5-9
5-7	Replace/Repair Engine Oil Cooler Lines.....	5-13

5—6 REPLACE/SERVICE ENGINE OIL COOLERS AND SCREENS

THIS TASK COVERS

- | | | | |
|------------|---------------|-------------|-----------------|
| a. Removal | b. Inspection | c. Cleaning | d. Installation |
|------------|---------------|-------------|-----------------|

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Cleaning tool, oil cooler (Appendix C, item 10)

Parts:

- Gaskets (4) (Appendix G, item 35)
- Gaskets (4) (Appendix G, item 52)
- Nuts, self-locking (12) (Appendix G, item 166)

Equipment Conditions:

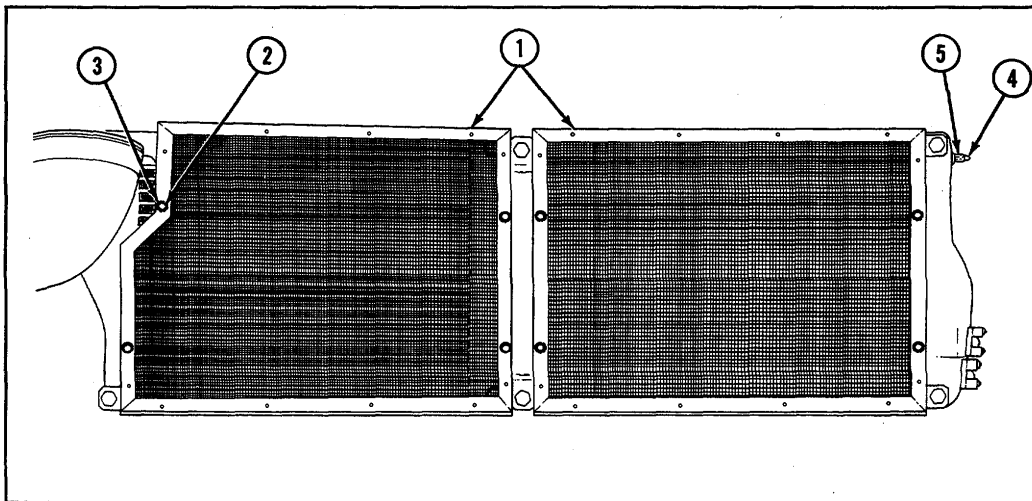
- Powerplant removed (see paragraph 3-1)
- Engine oil cooler lines disconnected from oil cooler (see paragraph 5-7)
- Transmission oil cooler lines disconnected from oil cooler (see paragraph 7-9)

NOTE

- The engine and transmission oil coolers can be removed and installed individually. The following procedure applies to both the engine and transmission oil coolers. If only one of the oil coolers is to be replaced, the procedures which apply to the other oil cooler should be skipped.
- The following procedure applies to both the left- and right-hand oil coolers.

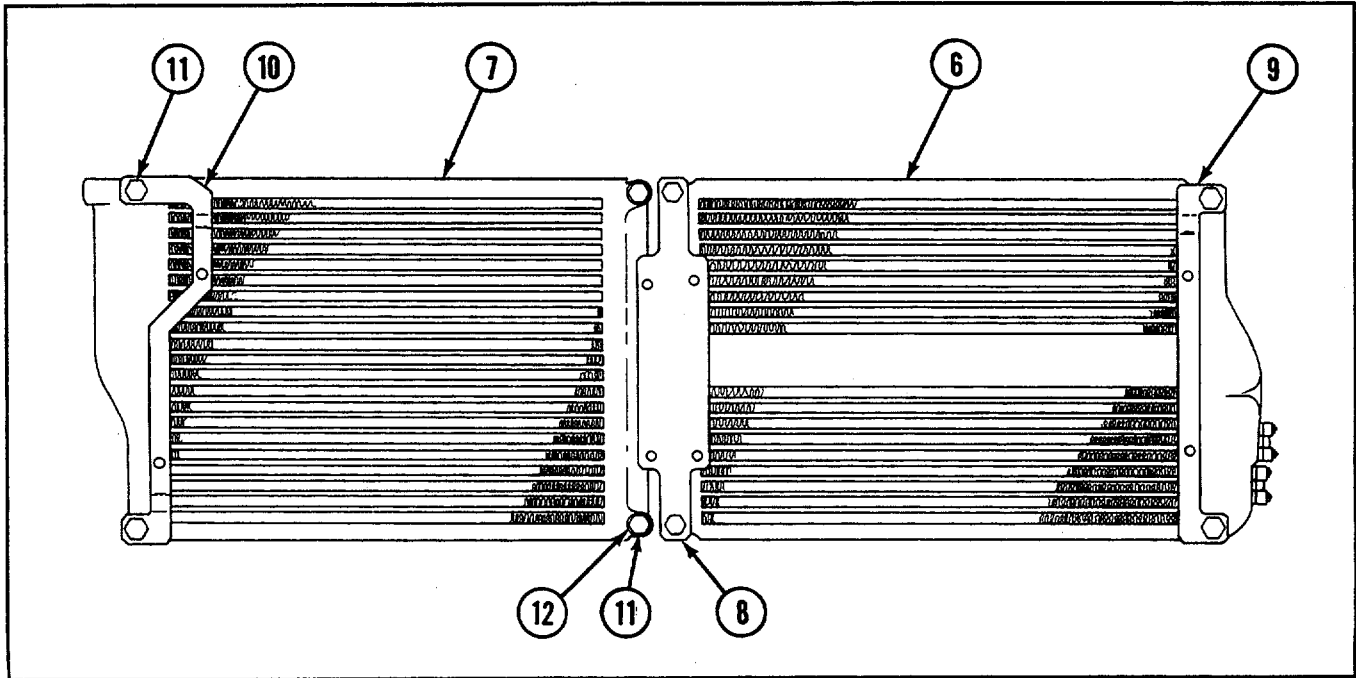
a. REMOVAL

- 1 Remove two oil cooler screens (1) by removing eight screws (2) and eight flat washers (3).
- 2 Disconnect oil cooler vent hose (4) by loosening union nut (5).



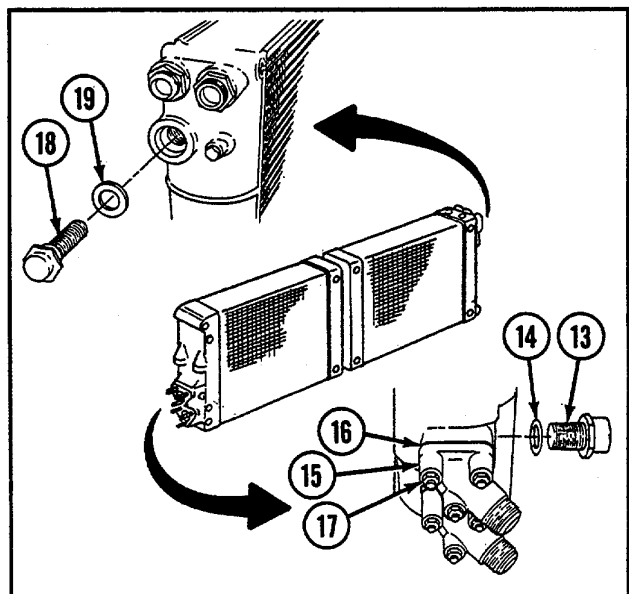
5—6 REPLACE/SERVICE ENGINE OIL COOLERS AND SCREEN--Continued

- 3 Remove two oil coolers (6 and 7) and three oil cooler screen support brackets (8, 9, and 10) by removing eight screws (11) and two flat washers (12).
- 4 Remove engine thermostat (13) and gasket (14).
- 5 Remove two elbows (15) and two gaskets (16) by removing six self-locking nuts (17).
- 6 Remove transmission thermostat (18) and gasket (19).



b. INSPECTION

The coolers must be inspected to ensure that the core and oil cooler screens are clean. Check for cleanliness of the cooler core by shining a flashlight or other visible light through the core.



c. CLEANING**WARNING**

Proper eye, skin, and clothing protection must be worn while operating the cleaning tool or serious injury may occur.

CAUTION

Do not exceed 90 pounds per square inch (psi) (621 kilopascals [kPa]) when cleaning, or damage to the cooler may occur.

NOTE

- Oil cooler and screens must be removed in order to use the cleaning tool.
- The cleaning tool is designed to remove deposits of sand, oil, clay, and other debris from the oil cooler cooling fins while installed in the vehicle. It consists of two tubes connected to a mixing head which produces two high-pressure jets of liquid/air mixture. The air supply tube has a push button valve with a 1/4-in. (6.4-mm) female pipe thread to connect to a 5-cubic-foot (142-liter [L]), 50- to 90-psi (345- to 621-kPa) air supply. The liquid supply tube is attached to a 3/8-in. (9.5-mm) inside diameter (i.d.) by 6-foot (1.83-meter) rubber hose for siphoning from a suitable clean container. The cleaning agent can be a solution of detergent and water, or nontoxic, nonflammable solvent and water. Mix one part of detergent or solvent to approximately five parts of water. A solution of detergent or solvent and water is recommended.
- Use a standard military 5-gallon (19 L) water can to hold the soap solution or cleaning solvent.
- With the cleaning solution container raised to the approximate level of the surface to be cleaned and the siphon hose extended into the container, press the air supply push button and aim the spray at the surface to be cleaned.
- When the surface is clean, replace the cleaning solution with water and flush any cleaning solution remaining on the surface.

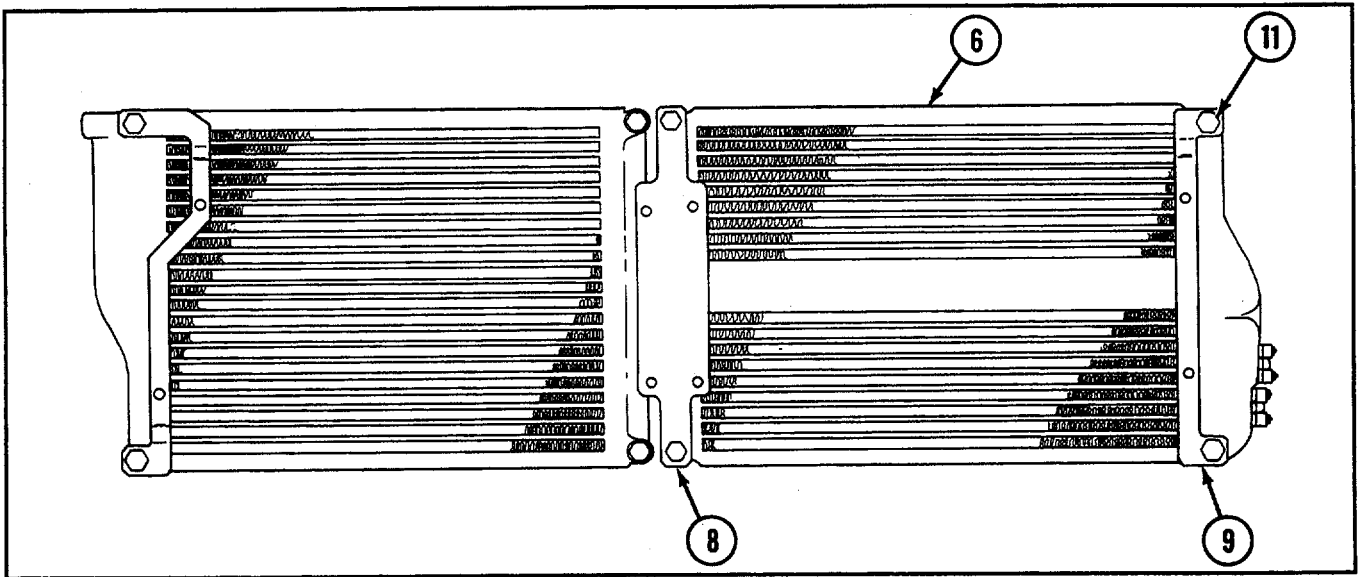
Cleaning may be accomplished with the oil cooler cleaning tool under low pressure. Care must be exercised to ensure that no water or foreign matter enters the oil cooler opening.

d. INSTALLATION

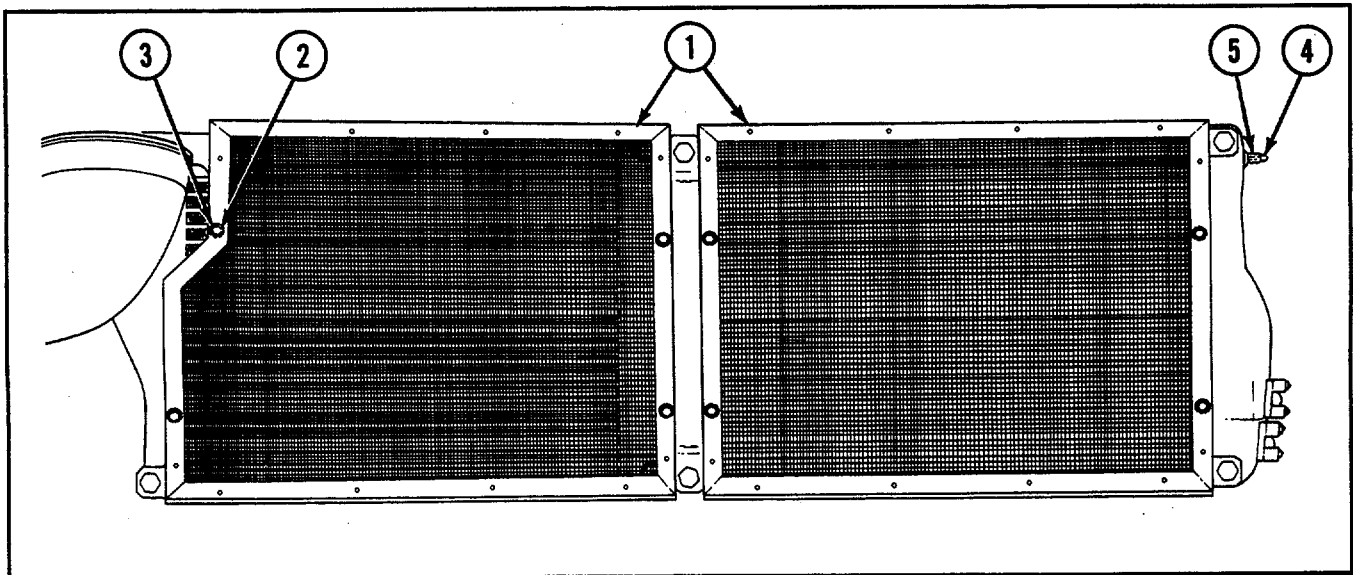
- 1 Install transmission thermostat (18) and new gasket (19).
- 2 Install two new gaskets (16) and two elbows (15) by installing six new self-locking nuts (17).
- 3 Install engine thermostat (13) and new gasket (14).
- 4 Install transmission oil cooler (7) and oil cooler screen support bracket (10) by installing two flat washers (12) and four screws (11).

5—6 REPLACE/SERVICE ENGINE OIL COOLERS AND SCREENS--Continued

- 5 Install oil cooler (6) and two oil cooler screen support brackets (8 and 9) by installing four screws (11).



- 6 Connect oil cooler vent hose (4) by tightening union nut (5).
- 7 Install two oil cooler screens (1) by installing eight flat washers (3) and eight screws (2).



NOTE

Follow-on maintenance:

- Connect transmission oil cooler lines to transmission oil cooler (see paragraph 7-9)
- Connect engine oil cooler lines to engine oil cooler (see paragraph 5-7)
- Install powerplant (see paragraph 3-1)

5—7 REPLACE/REPAIR ENGINE OIL COOLER LINES**THIS TASK COVERS**

- a. Removal b. Cleaning c. Inspection d. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's (Appendix C, item 53)

Material/Parts-Continued:

- Nuts, self-locking (12) (Appendix G, item 166)

Material/Parts:

- Dry-cleaning, solvent (Appendix D, item 9)
- Gaskets (4) (Appendix G, item 52)

Equipment Conditions:

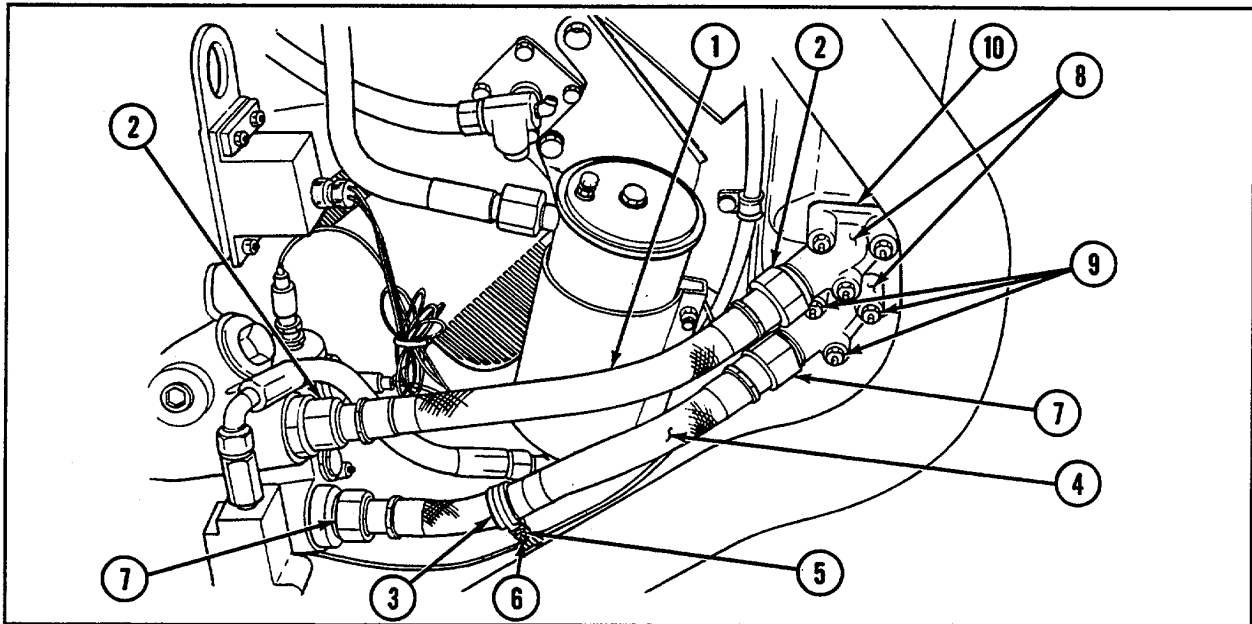
- Engine deck removed (see paragraph 9-51)
- Oil drained to crankcase (see paragraph 3-7)

NOTE

The following procedure applies to either the left- or right-hand oil cooler lines.

a. REMOVAL

- 1 Remove engine oil cooler inlet line (1) by loosening union nut (2) at each end.
- 2 Remove loop clamp (3) from engine oil cooler outlet line (4) by removing nut (5) and screw (6).
- 3 Remove engine oil cooler outlet line (4) by loosening union nut (7) at each end.
- 4 Remove two elbows (8) by removing three self-locking nuts (9) and gasket (10) from each.

**b. CLEANING****WARNING**

Dry-cleaning solvent used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flashpoint of solvent is 138 degrees (°) Fahrenheit (F) (590 Celsius [C]).

Clean two engine oil cooler lines (1 and 4) and two elbows (8) thoroughly with dry-cleaning solvent.

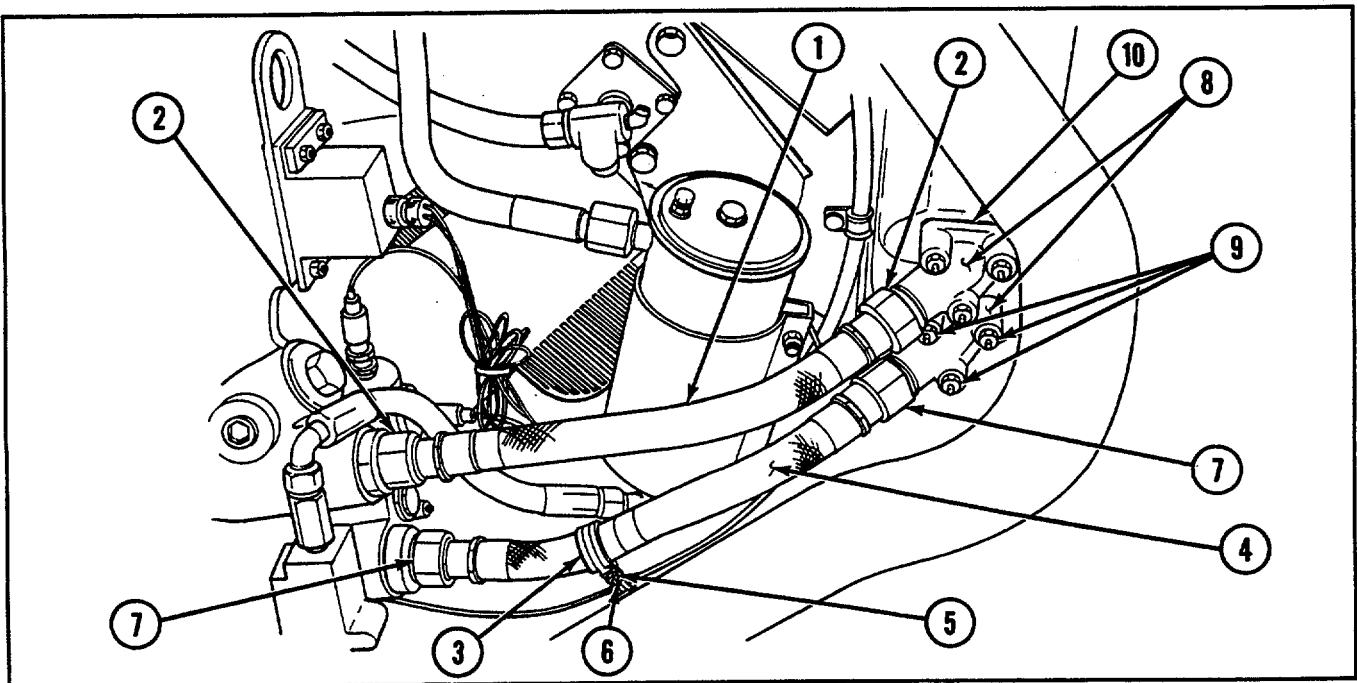
5—7 REPLACE/REPAIR ENGINE OIL COOLER LINES-Continued

c. INSPECTION

- 1 Replace two elbows (8) if cracked or broken, threads stripped, or otherwise damaged.
- 2 Remove slight burrs or raised metal from sealing surface with a fine-tooth file, and polish with crocus cloth dipped in dry-cleaning solvent.
- 3 Replace two engine oil cooler lines (1 and 4) if woven shielding is broken or abraded, union nuts (2 and 7) are cracked, or threads are stripped or damaged.

d. INSTALLATION

- 1 Install two elbows (8) each with new gasket (10) and three new self-locking nuts (9).
- 2 Install engine oil cooler outlet line (4) by tightening union nut (7) at each end.
- 3 Install loop clamp (3) to engine oil cooler outlet line (4) with nut (5) and screw (6).
- 4 Install engine oil cooler inlet line (1) by tightening union nut (2) at each end.



NOTE

- Ensure oil drain valve is tightened to allow for proper system oil flow.
- Follow-on maintenance:
 - Fill oil (see paragraph 3-6)
 - Install powerplant (see paragraph 3-1)

CHAPTER 6 MAINTENANCE OF ELECTRICAL SYSTEMS AND CIRCUITS

CHAPTER OVERVIEW

This chapter describes how to remove, disassemble, adjust, assemble, and install electrical systems and circuits.

This chapter consists of the following sections:

		Page
Section I:	Charging/Starting System and Vehicle Batteries.....	6-1
Section II:	Gages and Switch Panels	6-18
Section III:	Sending Units, Warning Light Switches, and Warning Horns.....	6-43
Section IV:	Lighting System.....	6-56
Section V:	Vehicle Wiring	6-74
Section VI:	Miscellaneous Electrical Components.....	6-258
Section VII:	Terminal Connector Procedures	6-264

SECTION I: CHARGING/STARTING SYSTEM AND VEHICLE BATTERIES

Para.	Task	Page
6—1	Replace/Repair Engine Generator, Cradle, Support, and Related Parts.....	6-1
6—2	Replace Master Relay Housing (Dual and Single Voltage)	6-8
6—3	Replace Engine Starter, Solenoid Relay, and Bracket.....	6-9
6—4	Replace Batteries, Battery Trays, and Terminal.....	6-12
6—5	Replace Voltage Regulator and Related Parts (Dual Voltage) (11672403).....	6-14
6—6	Replace Voltage Regulator (Single Voltage) (11659111-1)	6-17
6—7	Replace Engine and Auxiliary Power Unit (APU) Armature Relay (Single Voltage)	6-18

6—1 REPLACE/REPAIR ENGINE GENERATOR, CRADLE, SUPPORT, AND RELATED PARTS

THIS TASK COVERS

- | | | | |
|------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
|------------|----------------|-------------|-----------------|

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Wrench, box and open-end combination (Appendix C, item 55)

Parts:

- Lockwashers (8) (Appendix G, item 130)
- Lockwashers (6) (Appendix G, item 100)
- Lockwire (Appendix G, item 58)
- Nuts, self-locking (4) (Appendix G, item 167)

Equipment Condition:

Powerplant removed (see paragraph 3-1)

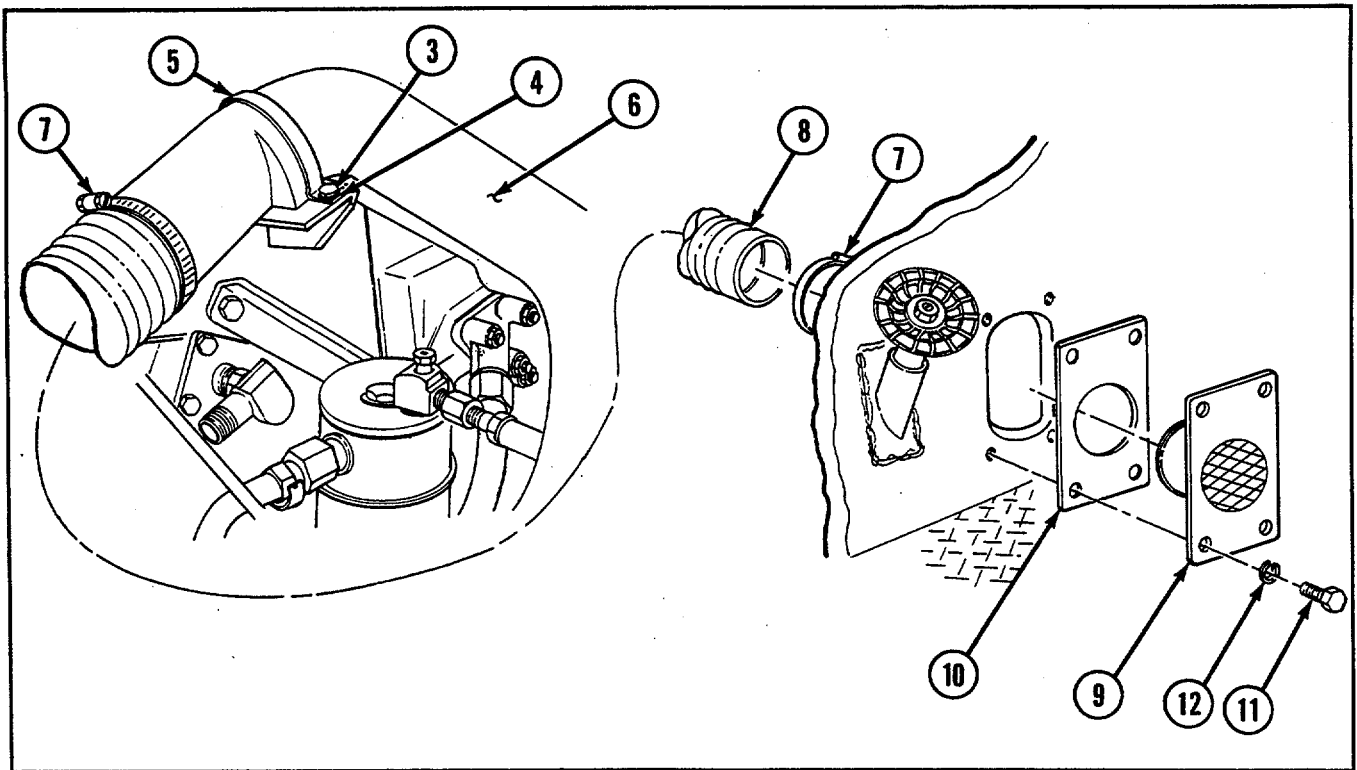
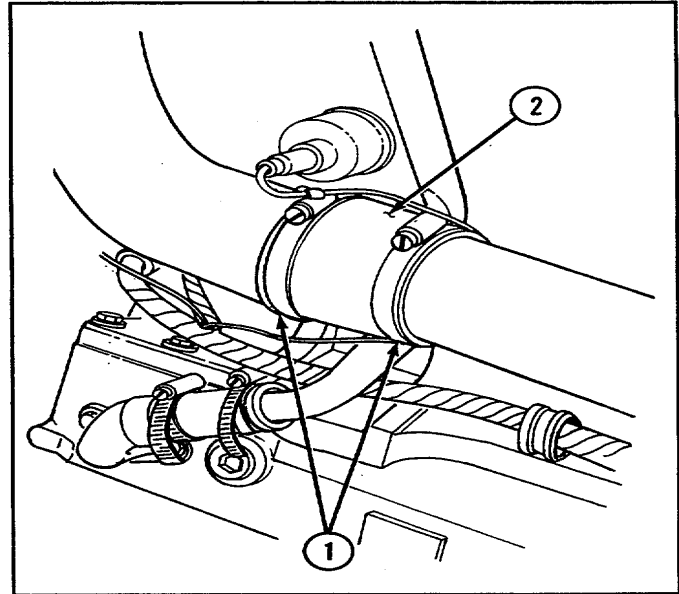
WARNING

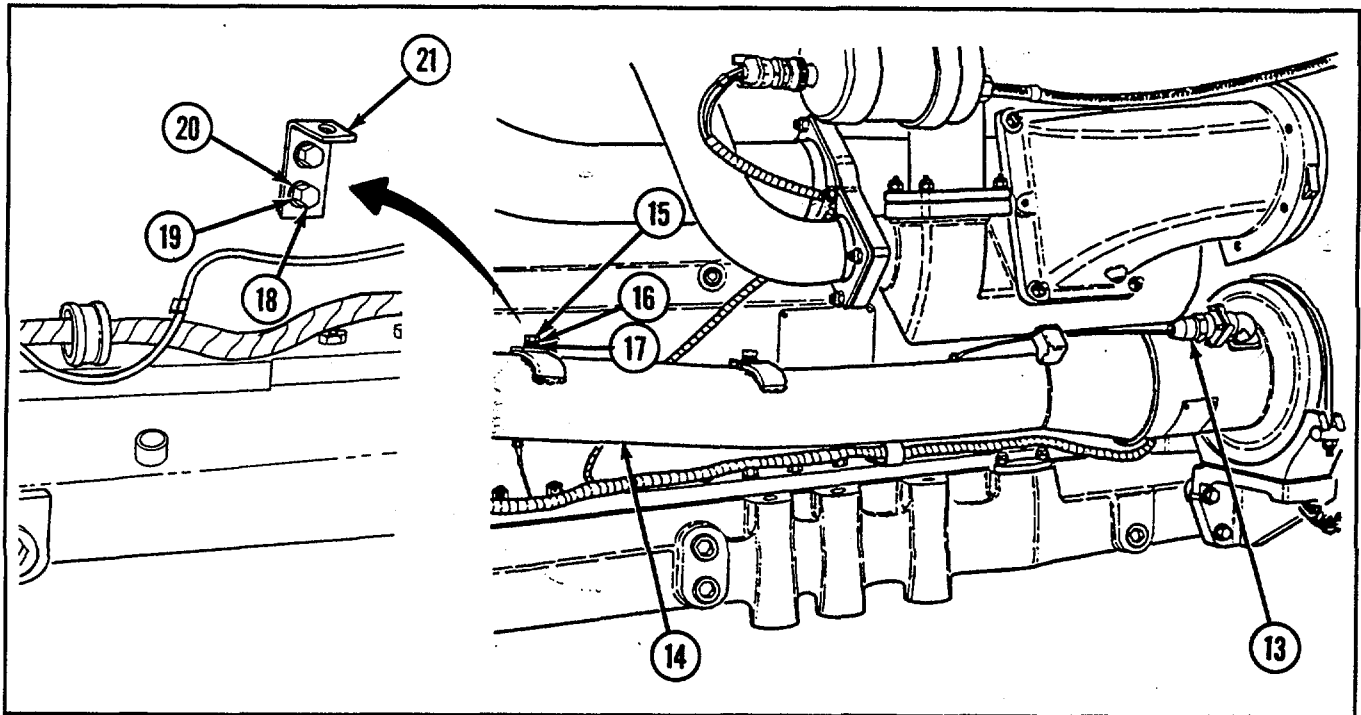
Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

6-1 REPLACE/REPAIR ENGINE GENERATOR, CRADLE, SUPPORT, AND RELATED PARTS—Continued

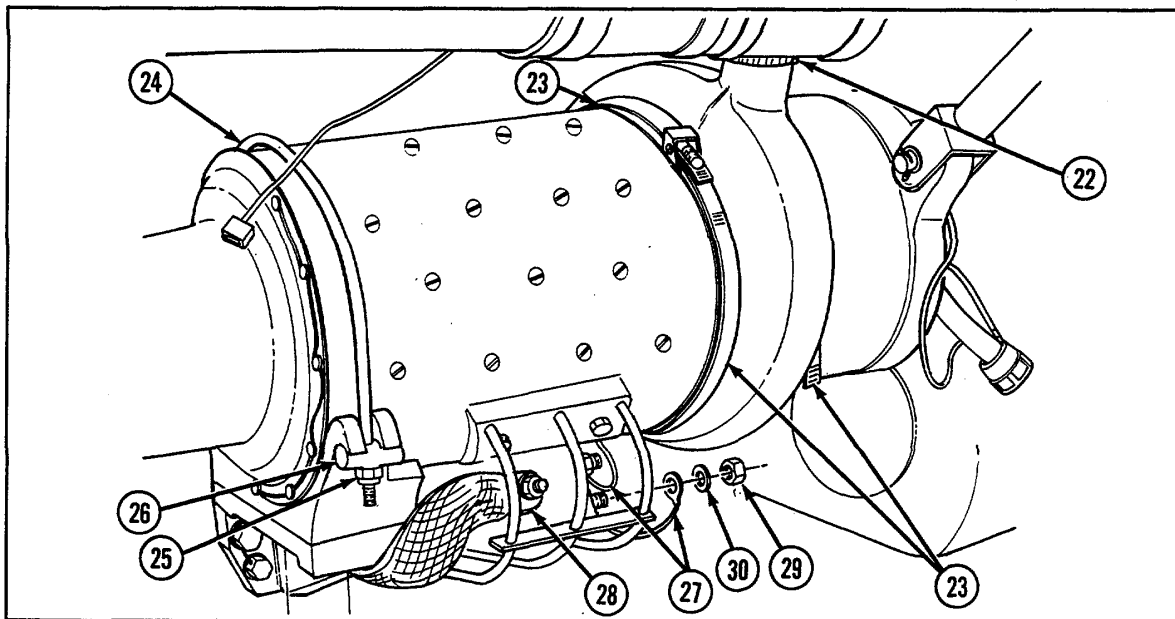
a. REMOVAL

- 1 Remove two clamps (1) and hose (2).
- 2 Remove two screws (3), two lockwashers (4), and bracket (5) securing tube (6) to engine.
- 3 Remove two clamps (7) and hose (8) from tube (6).
- 4 Remove tube (6).
- 5 Remove grille (9) and gasket (10) by removing four screws (11) and four lockwashers (12).
- 6 Disconnect connector (13).
- 7 Remove air intake tube (14) by removing two screws (15), two lockwashers (16), and two flat washers (17).
- 8 Remove four bolts (18), four lockwashers (19), four flat washers (20), and two brackets (21).





- 9 Remove clamp (22).
- 10 Remove four clamps (23).
- 11 Remove U-bolt (24) by removing two self-locking nuts (25) and two clamping bars (26).
- 12 Disconnect two leads (27) and ground strap (28) by removing nut (29) and flat washer (30) from each.



6—1 REPLACE/REPAIR ENGINE GENERATOR, CRADLE, SUPPORT, AND RELATED PARTS -Continued

NOTE

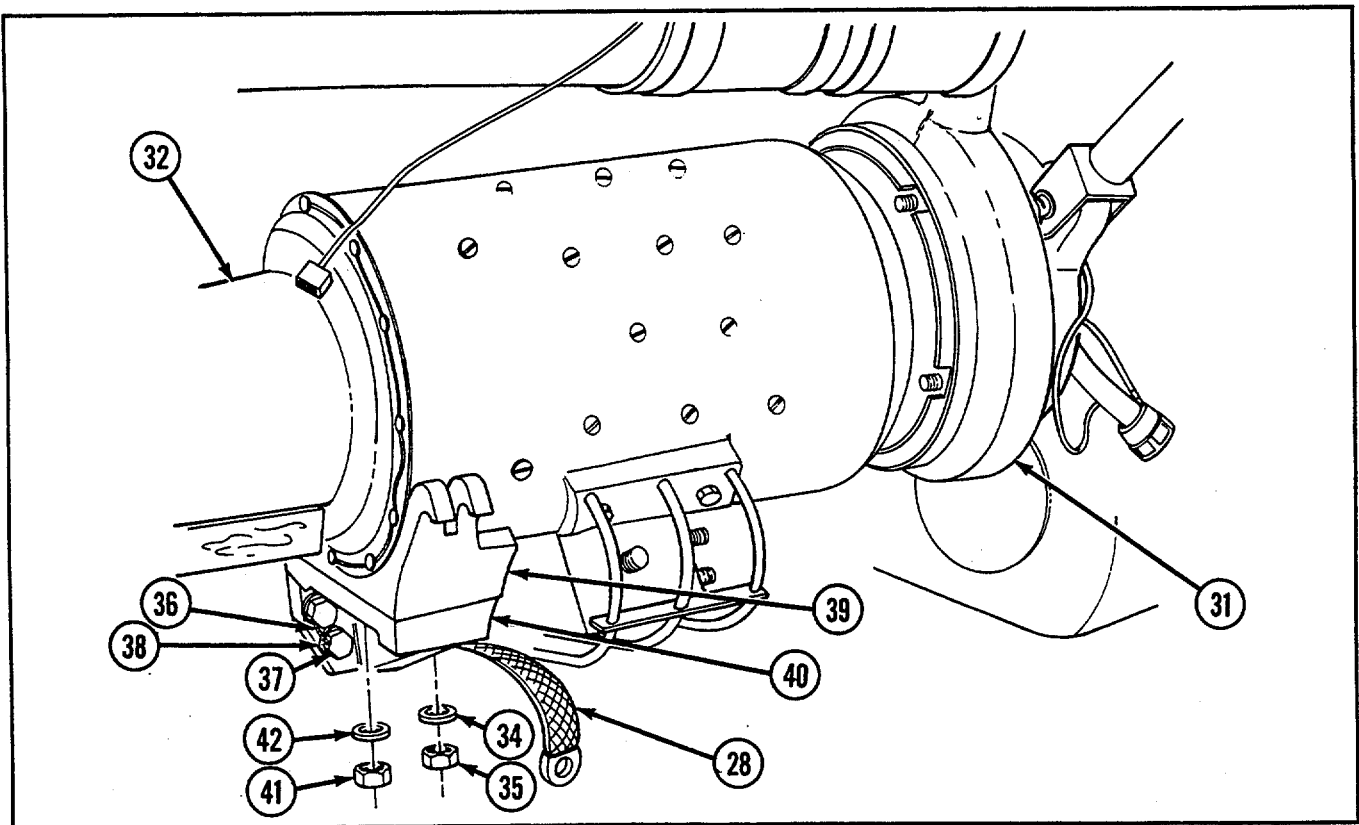
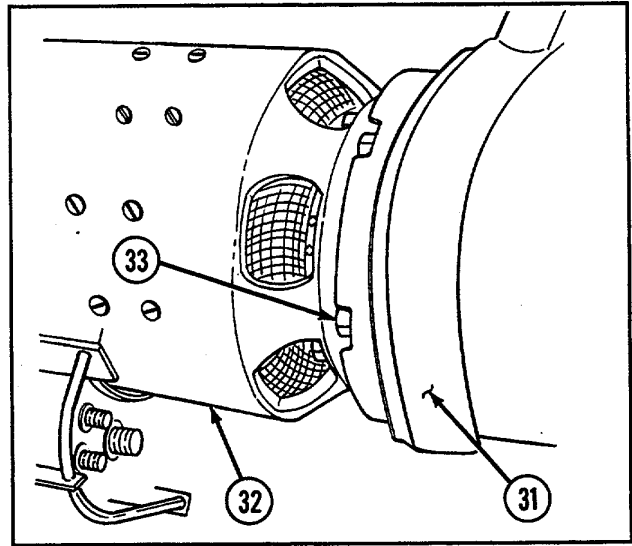
Generator exhaust boot (31) is removed after removal of generator (32).

- 13 Slide generator exhaust boot (31) and remove six nuts (33) using wrench.
- 14 Disconnect ground strap (28) by removing self-locking nut (34) and flat washer (35).

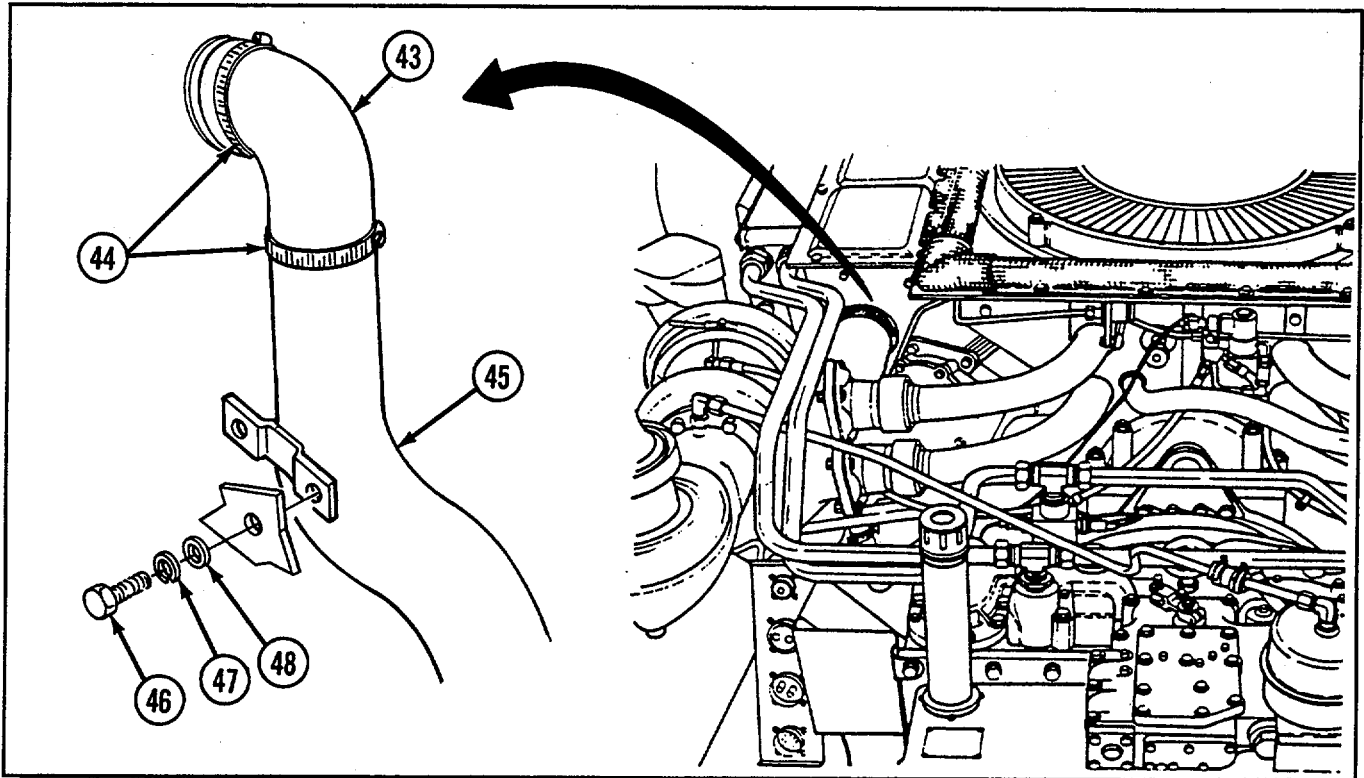
CAUTION

Place board under end of generator (32) for support.

- 15 Cut lockwire (36) and remove four screws (37), four flat washers (38), and generator cradle (39).
- 16 Separate bracket (40) from generator cradle (39) by removing self-locking nut (41) and flat washer (42).
- 17 Remove generator (32) by turning counterclockwise.
- 18 Remove generator exhaust boot (31).



- 19 Remove generator air exhaust hose (43) by loosening two clamps (44).
- 20 Remove generator air exhaust pipe (45) by removing two screws (46), two lockwashers (47), and two flat washers (48).



b. DISASSEMBLY

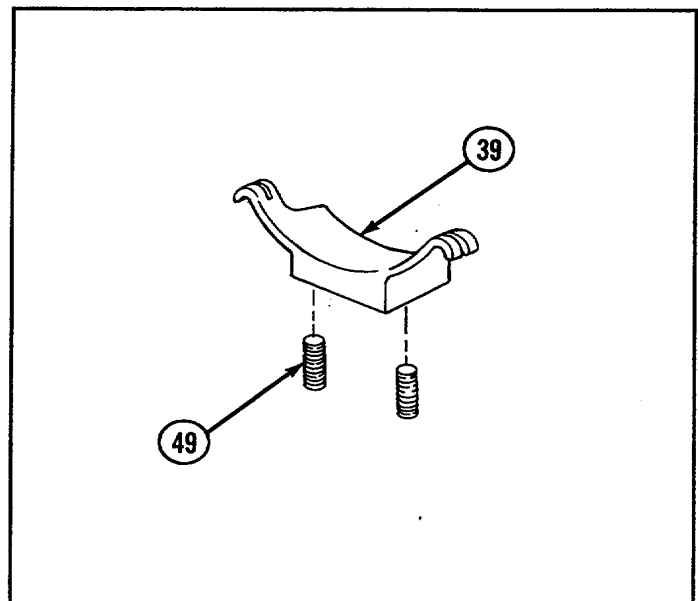
Remove two inserts (49) from generator cradle (39).

c. ASSEMBLY

Install two inserts (49) to generator cradle (39).

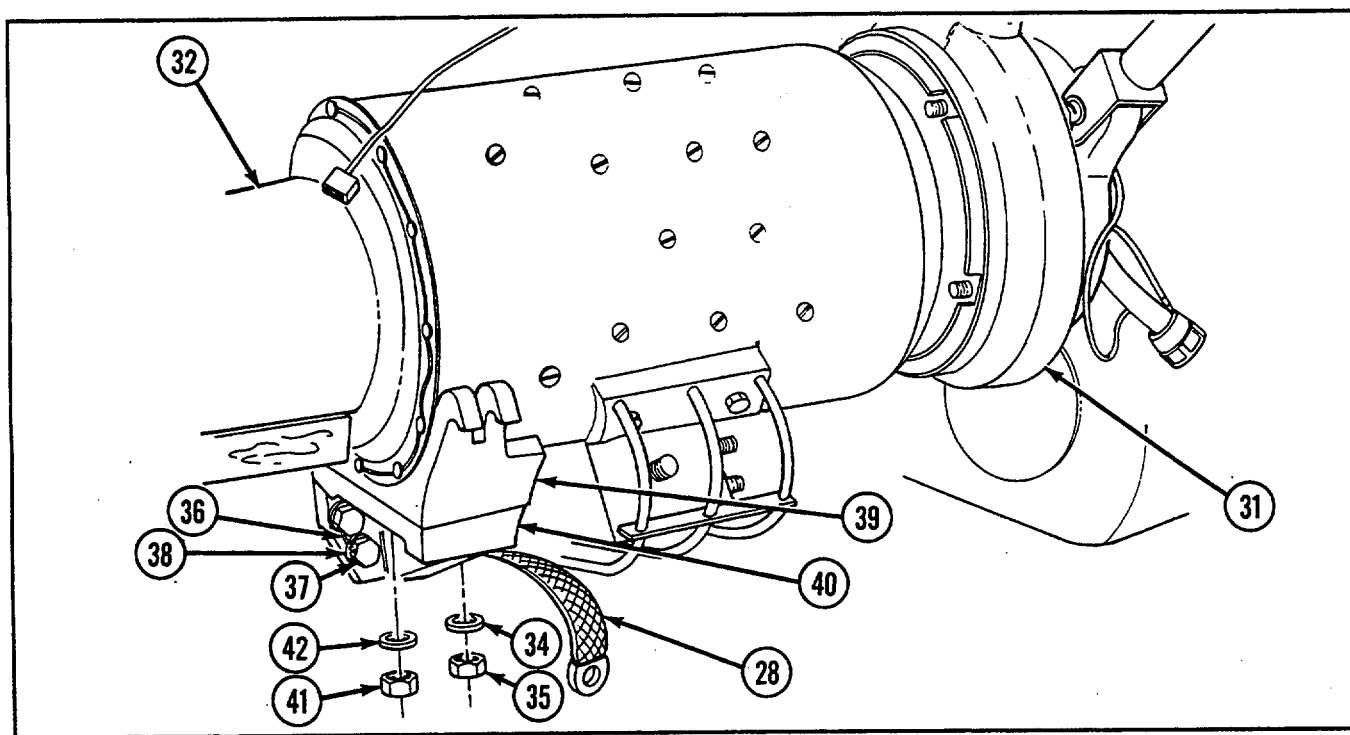
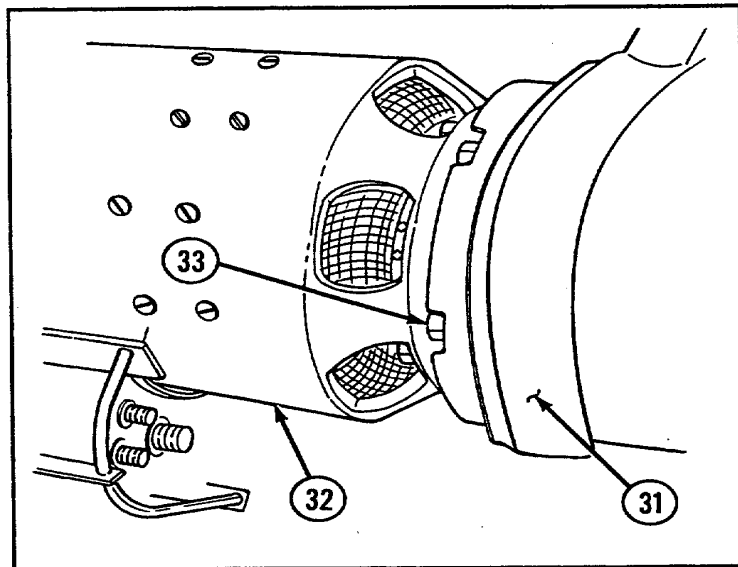
d. INSTALLATION

- 1 Install generator air exhaust pipe (45) using two screws (46), two new lockwashers (47), and two flat washers (48).
- 2 Install generator air exhaust hose (43) by tightening two clamps (44).

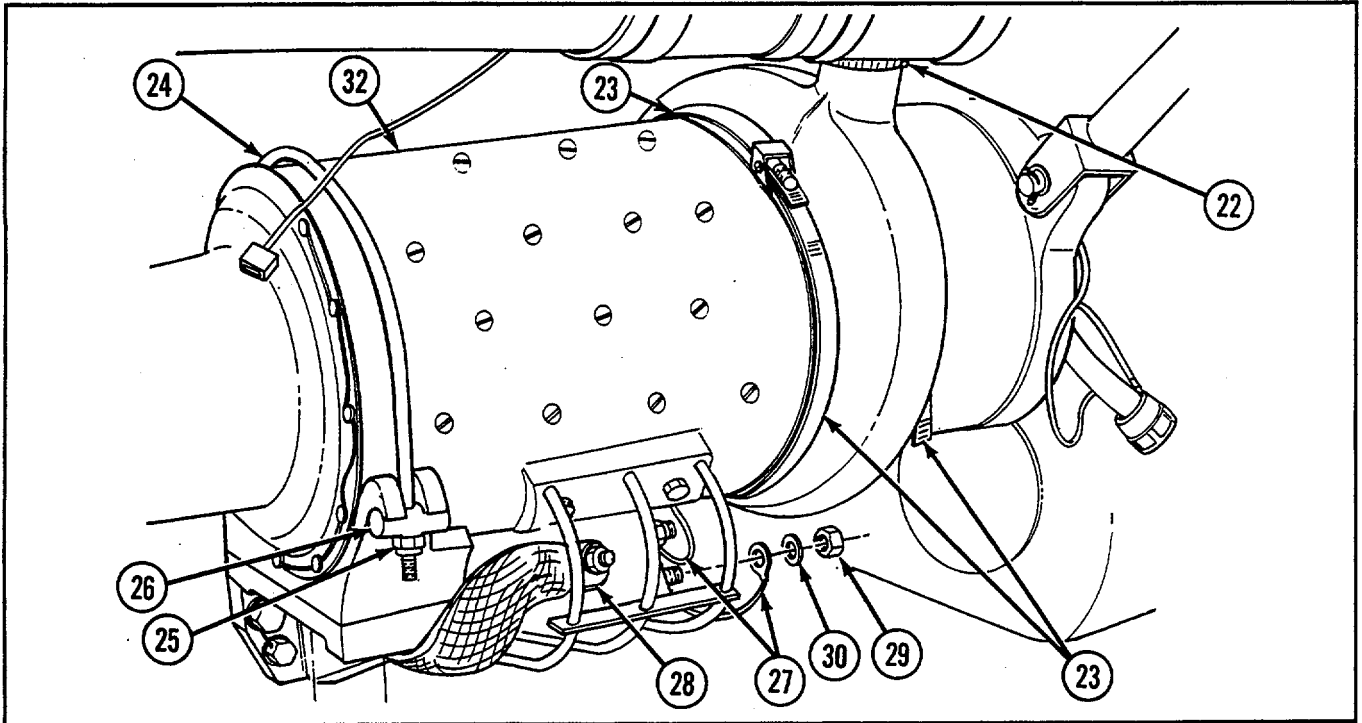


6—1 REPLACE/REPAIR ENGINE GENERATOR, CRADLE, SUPPORT, AND RELATED PART S--Continued

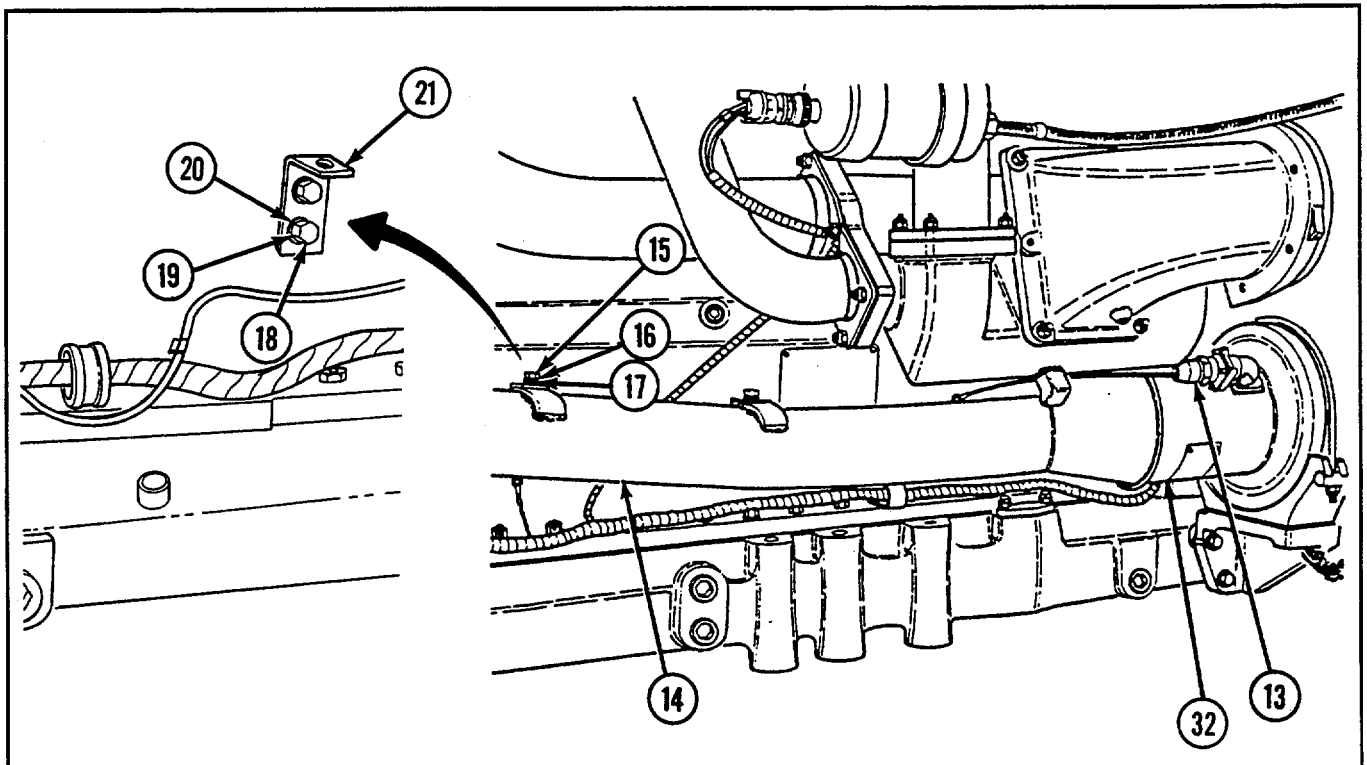
- 3 Install generator exhaust boot (31).
- 4 Place generator (32) into generator exhaust boot (31) and turn clockwise until generator is locked in place.
- 5 Assemble bracket (40) to generator cradle (39) using new self-locking nut (41) and flat washer (42).
- 6 Install generator cradle (39) using four screws (37) and four flat washers (38). Secure screws using new lockwire (36).
- 7 Install ground strap (28) using new self-locking nut (34) and flat washer (35).
- 8 Install six nuts (33) using wrench and slide generator exhaust boot (31) into place.



- 9 Connect two leads (27) and ground strap (28) on generator (32) using nut (29) and flat washer (30) for each.
- 10 Install U-bolt (24) using two new self-locking nuts (25) and two clamping bars (26).
- 11 Install four clamps (23).
- 12 Install clamp (22).



- 13 Install two brackets (21) using four new lockwashers (19), four flat washers (20), and four bolts (18).
- 14 Install air intake tube (14) using two screws (15), two new lockwashers (16), and two flat washers (17).
- 15 Connect connector (13) on generator (32).

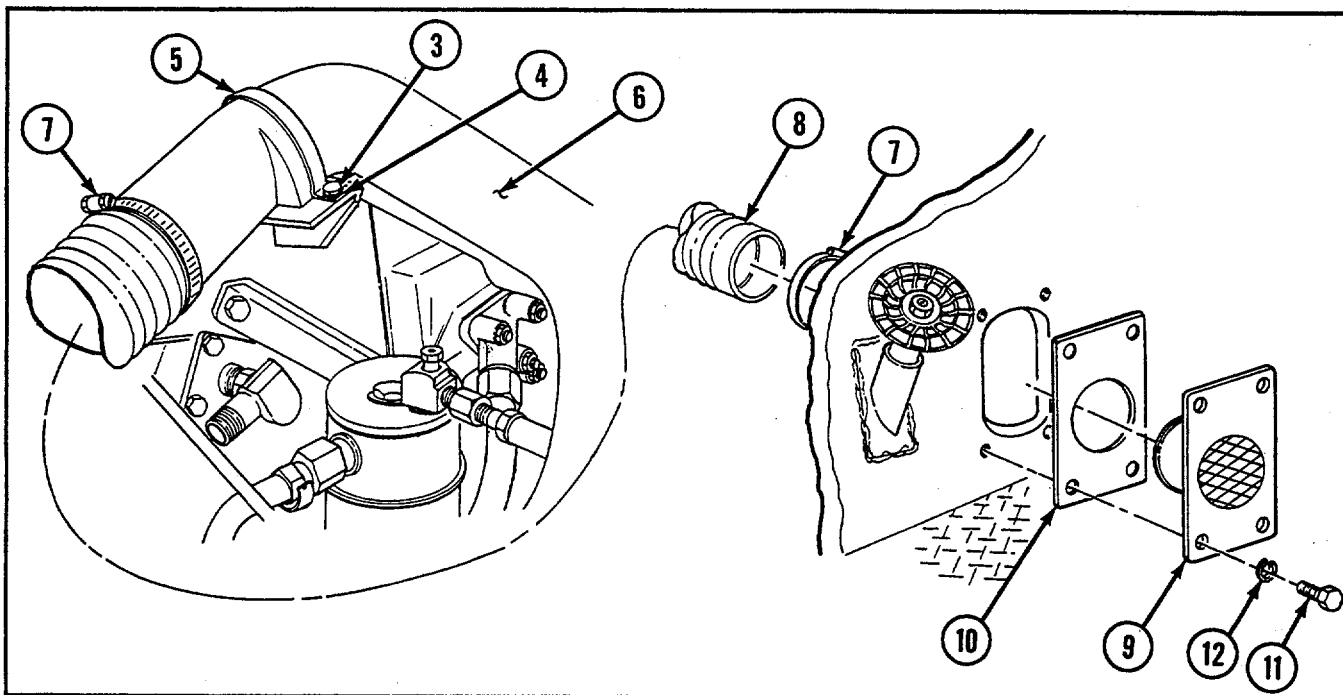
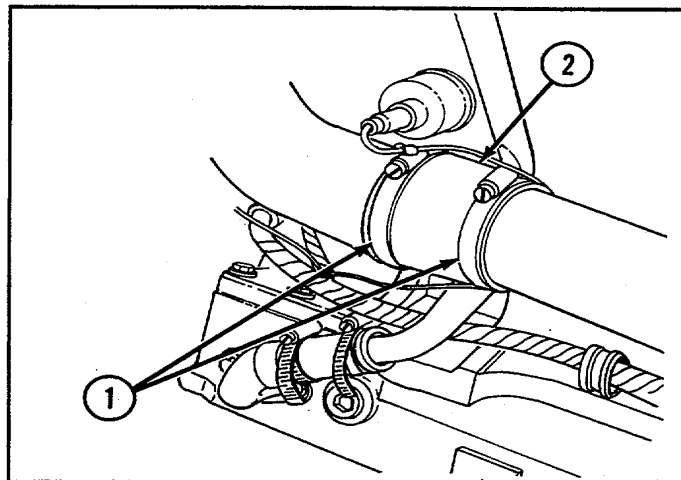


6—1 REPLACE/REPAIR ENGINE GENERATOR, CRADLE, SUPPORT, AND RELATED PARTS--Continued

- 16 Install gasket (10) and grille (9) using four new lockwashers (12) and four screws (11).
- 17 Install hose (8) using two clamps (7).
- 18 Install tube (6) using two screws (3), two new lockwashers (4), and bracket (5).
- 19 Install hose (2) using two clamps (1).
- 20 Install test cables and hoses. Test run engine prior to installation. Check for proper generator output.

NOTE

Follow-on maintenance: Install powerplant (see paragraph 3-1)



6—2 REPLACE MASTER RELAY HOUSING (DUAL AND SINGLE VOLTAGE)

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Drivescrews (2) (Appendix G, item 11)
- Lockwashers (4) (Appendix G, item 107)

Equipment Conditions:

- Grille removed (see paragraph 9-15)
- Battery ground cables disconnected (see paragraph 6-4)

WARNING

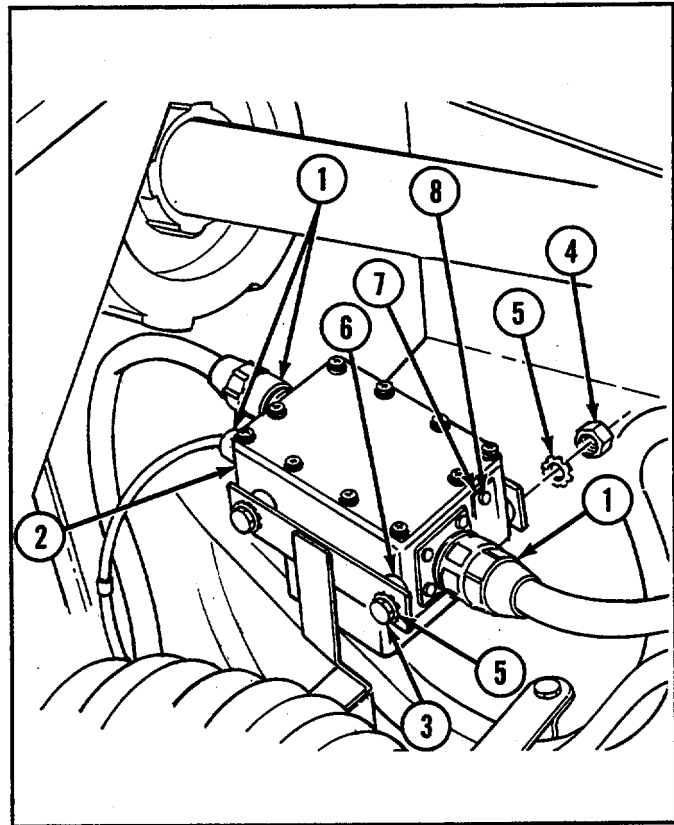
Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

a. REMOVAL

- 1 Disconnect three connectors (1).
- 2 Remove master relay (2) by removing two bolts (3), two nuts (4), four lockwashers (5), and two sleeve spacers (6).
- 3 Remove identification (ID) plate (7) by removing two drivescrews (8).

b. INSTALLATION

- 1 Install ID plate (7) using two new drivescrews (8).
- 2 Install master relay (2) using two bolts (3), four new lockwashers (5), two sleeve spacers (6), and two nuts (4).
- 3 Connect three connectors (1) to master relay (2).

**NOTE**

- Follow-on maintenance:
- Install grille (see paragraph 9-15)
 - Connect battery ground cables (see paragraph 6-4)

6—3 REPLACE ENGINE STARTER, SOLENOID RELAY, AND BRACKET**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Gasket (Appendix G, item 32)
- Lockwashers (4) (Appendix G, item 106)
- Lockwashers (4) (Appendix G, item 117)

Parts-Continued:

- Lockwire (Appendix G, item 155)
- Nuts, self-locking (2) (Appendix G, item 166)
- Nuts, self-locking (3) (Appendix GC, item 164)
- Nuts, self-locking (2) (Appendix G, item 168)

Equipment Condition:

Powerplant removed (see paragraph 3-1)

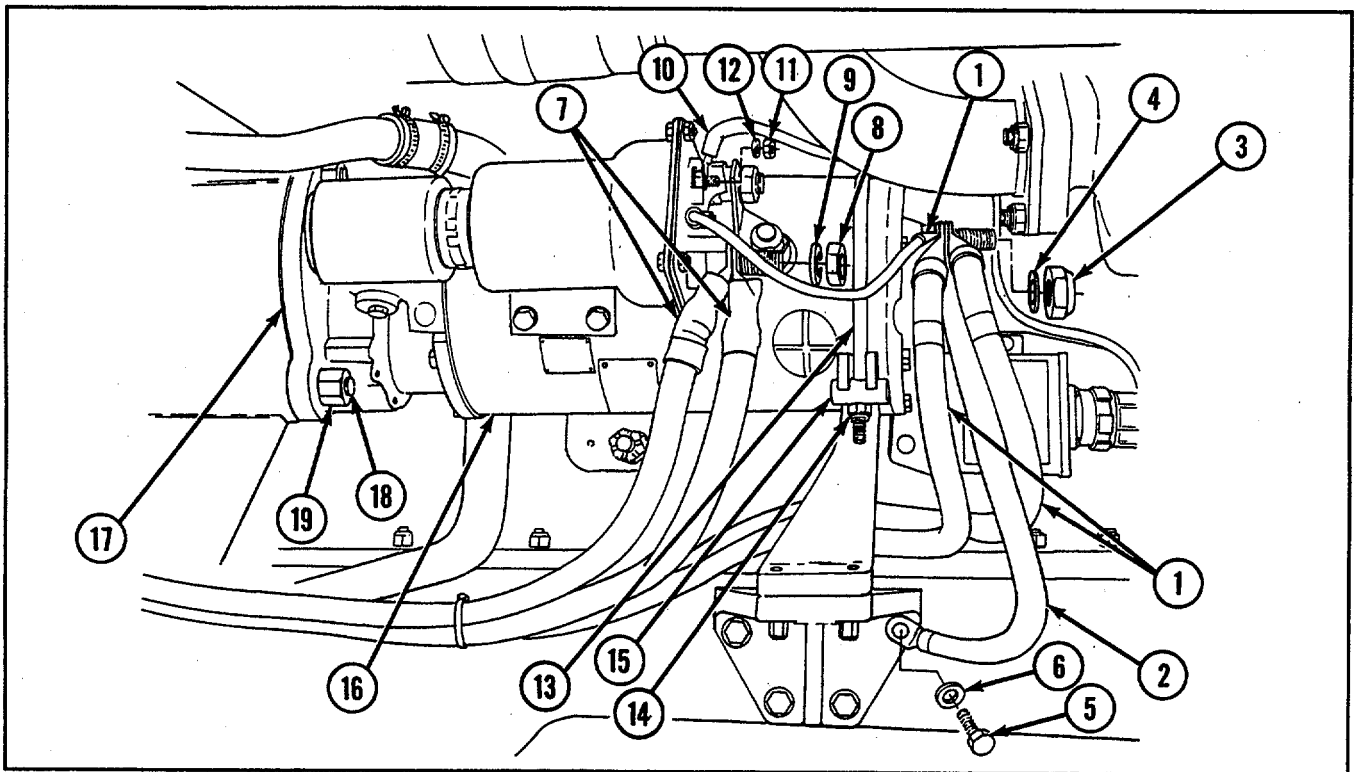
6—3 REPLACE ENGINE STARTER, SOLENOID RELAY, AND BRACKET—Continued

WARNING

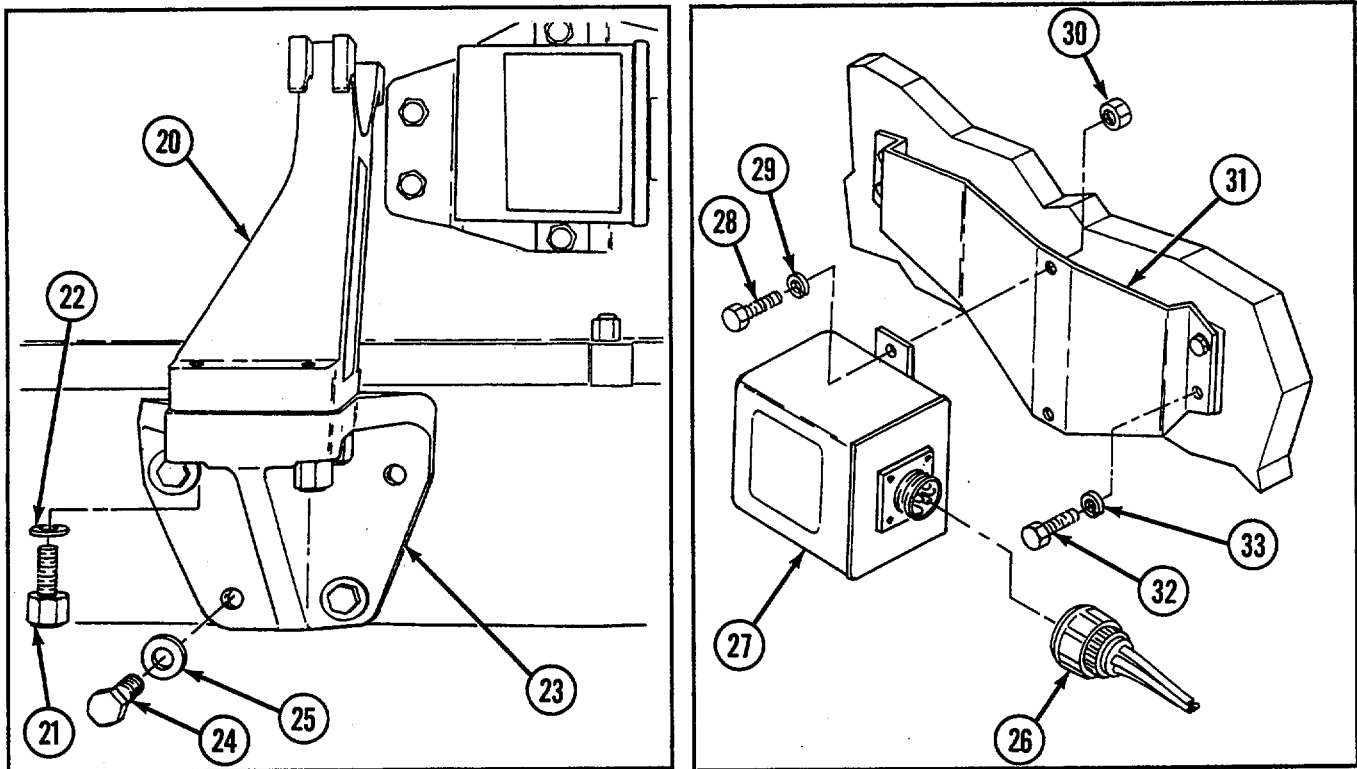
Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

a. REMOVAL

- 1 Disconnect three cables (1) and ground lead (2) by removing nut (3) and lockwasher (4).
- 2 Remove ground lead (2) by removing machine bolt (5) and flat washer (6).
- 3 Disconnect two cables (7) by removing nut (8) and lockwasher (9).
- 4 Disconnect lead (10) by removing nut (11) and lockwasher (12).
- 5 Remove U-bolt (13) by removing two self-locking nuts (14) and two clamping bars (15).
- 6 Remove starter (16) and gasket (17) by removing three bolts (18) and three self-locking nuts (19).



- 7 Remove starter cradle (20) by removing four screws (21) and four flat washers (22).
- 8 Remove starter support (23) by removing three machine bolts (24) and three flat washers (25).
- 9 Disconnect connector (26) from starter module (27).
- 10 Remove starter module (27) by removing two screws (28), four lockwashers (29), and two self-locking nuts (30).
- 11 Remove bracket (31) by removing four screws (32) and four lockwashers (33).



b. INSTALLATION

- 1 Install bracket (31) using four screws (32) and four new lockwashers (33).
- 2 Install starter module (27) using two screws (28), four new lockwashers (29), and two new self-locking nuts (30).
- 3 Connect connector (26) to starter module (27).
- 4 Install starter support (23) using three machine bolts (24) and three flat washers (25).
- 5 Install starter cradle (20) using four screws (21) and four flat washers (22).
- 6 Install starter (16) and new gasket (17) using three bolts (18) and three new self-locking nuts (19).
- 7 Secure starter (16) to starter cradle (20) using U-bolt (13), two new self-locking nuts (14), and two clamping bars (15).
- 8 Connect lead (10) using nut (11) and new lockwasher (12).
- 9 Connect two cables (7) using nut (8) and new lockwasher (9).
- 10 Connect ground lead (2) using machine bolt (5) and flat washer (6).
- 11 Connect three cables (1) and ground lead (2) using nut (3) and new lockwasher (4).
- 12 Install test cables and hoses. Test run engine prior to installation and check for proper starter operation.

NOTE

Follow-on maintenance: Install powerplant (see paragraph 3-1)

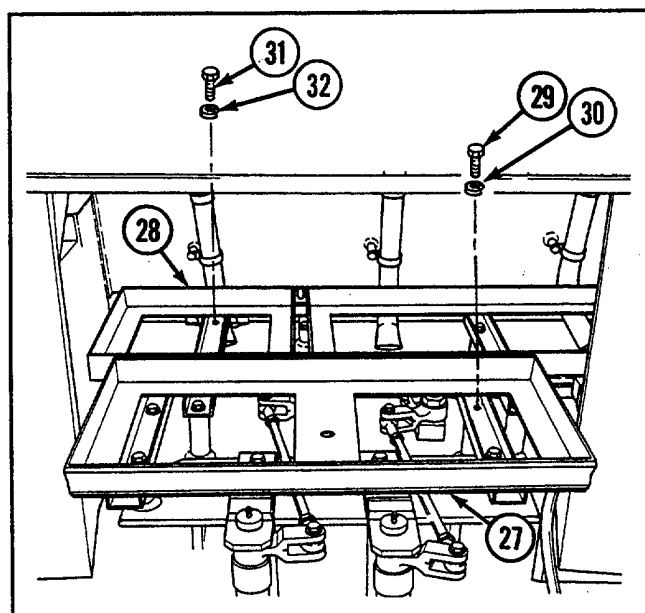
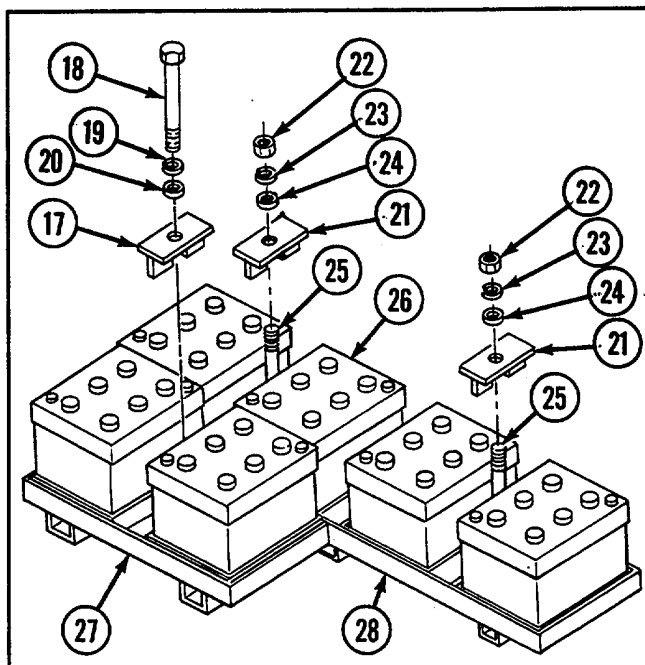
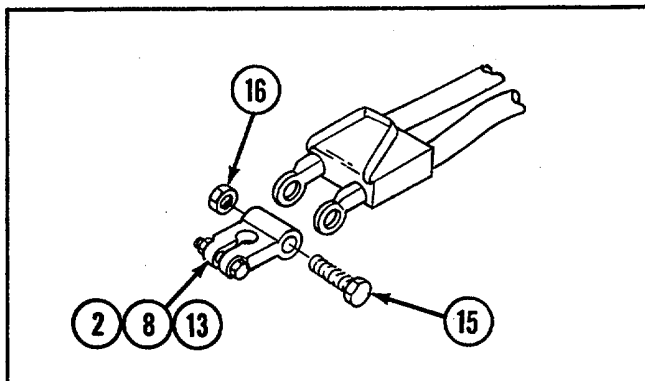
- 4 Remove 12 terminal adapters (2, 8, and 13) from battery cables by removing bolts (15) and nuts (16).
- 5 Remove battery (holddown) clamp (17) by removing bolt (18), lockwasher (19), and flat washer (20).
- 6 Remove two battery (holddown) clamps (21) by removing nut (22), lockwasher (23), flat washer (24), and bolt (25) from each.
- 7 Remove six batteries (26) from vehicle supports (27 and 28).
- 8 Remove forward support (27) by removing four screws (29) and four lockwashers (30).
- 9 Remove rear support (28) by removing six screws (31) and six lockwashers (32).

b. INSTALLATION

NOTE

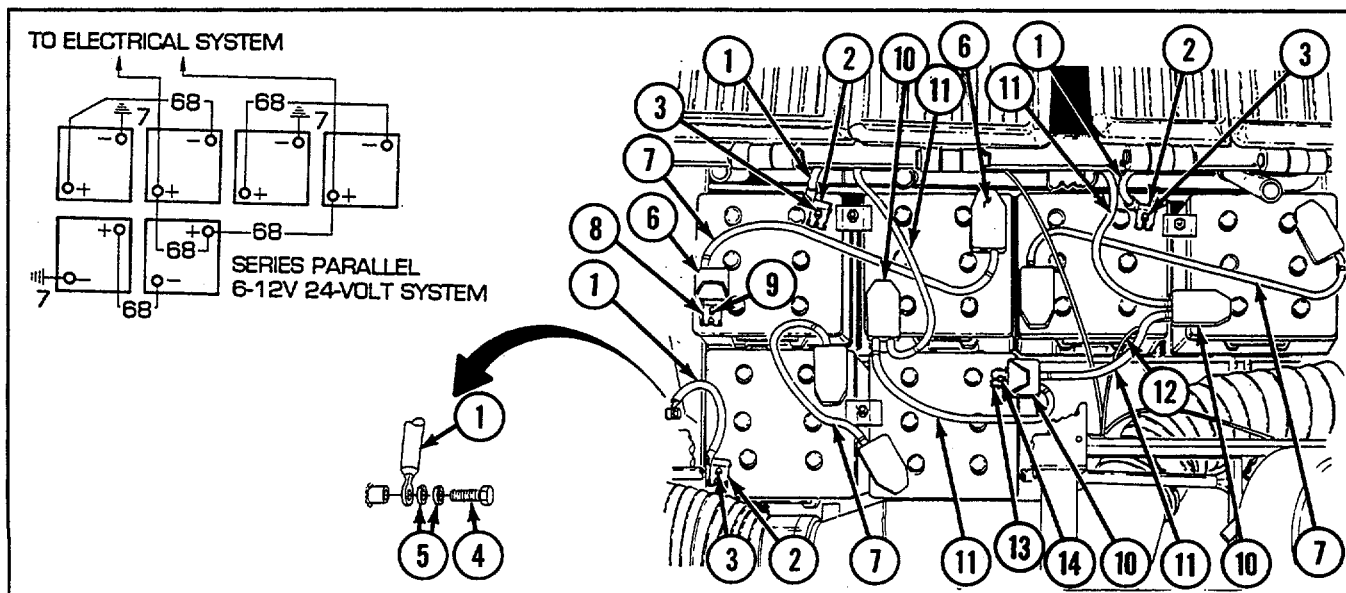
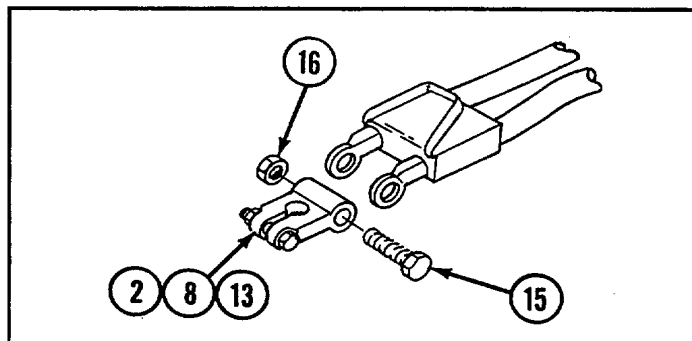
- Before installing batteries, perform serviceability check (see paragraph 2-16).
- If supports (27 and 28) are corroded, clean using stiff brush and alkaline solution (bicarbonate of soda in water).
- Straighten or repair supports (27 and 28) as necessary.
- Coat supports (27 and 28) using acid-resistant paint.

- 1 Install rear support (28) using six screws (31) and six new lockwashers (32).
- 2 Install forward support (27) using four screws (29) and four new lockwashers (30).
- 3 Install six batteries (26) on vehicle supports (27 and 28).
- 4 Install two battery (holddown) clamps (21) using bolt (25), flat washer (24), new lockwasher (23), and nut (22) for each.
- 5 Install battery (holddown) clamp (17) using flat washer (20), new lockwasher (19), and bolt (18).



6—4 REPLACE BATTERIES, BATTERY TRAYS, AND TERMINAL-Continued

- 6 Install 12 terminal adapters (2, 8, and 13) on battery cables using bolts (15) and nuts (16).
- 7 Connect three (parallel) cables (11) and lead (12) with terminal adapters (13) to battery terminals (14). Then push three rubber insulators (10) over battery terminals.
- 8 Connect three (series) cables (7) with terminal adapters (8) to battery terminals (9). Then push six rubber insulators (6) over battery terminals.
- 9 Install three ground cables (1) on vehicle using screw (4) and two new lockwashers (5) for each. Then connect three ground cables with terminal adapters (2) to battery terminals (3).



NOTE

Follow-on maintenance: Close left-side grille doors (see paragraph 9-60)

6—5 REPLACE VOLTAGE REGULATOR AND RELATED PARTS (DUAL VOLTAGE) (11672403)

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Drivescrews (2) (Appendix G, item 13)
- Lockwashers (4) (Appendix G, item 105)
- Lockwashers (4) (Appendix G, item 106)

Parts-Continued:

- Lockwashers (8) (Appendix G, item 130)
- Lockwashers (4) (Appendix G, item 132)

Equipment Condition:

Air inlet doors removed (see paragraph 9-56)

WARNING

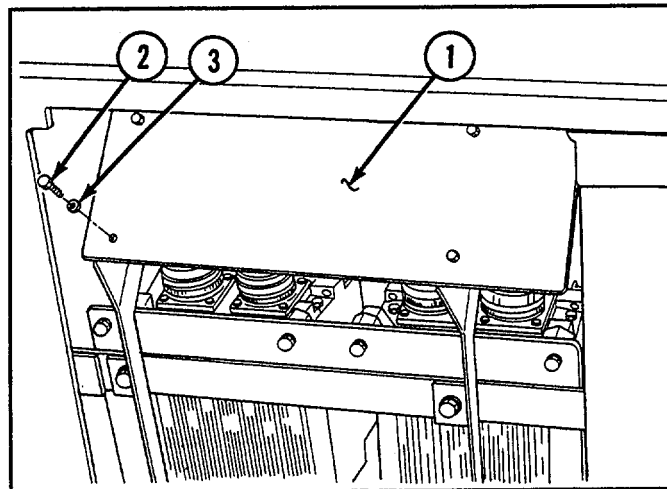
Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

NOTE

A single voltage regulator may be used as a replacement for the main engine regulator position only.

a. REMOVAL

- 1 Open access door (see paragraph 9-51).
- 2 Remove access cover (1) by removing four screws (2) and four lockwashers (3).
- 3 Remove ground strap (4) by removing screw (5) from one end of ground strap and screw (6) and lockwasher (7) from other end of ground strap.
- 4 Disconnect two wiring harnesses (8) and two wiring harnesses (9) from mounting bracket (10) by removing four clamps (11), four screws (12), four lockwashers (13), and four nuts (14).
- 5 Remove screw (15) and ground wire (16).
- 6 Remove two wiring harnesses (8) from Auxiliary



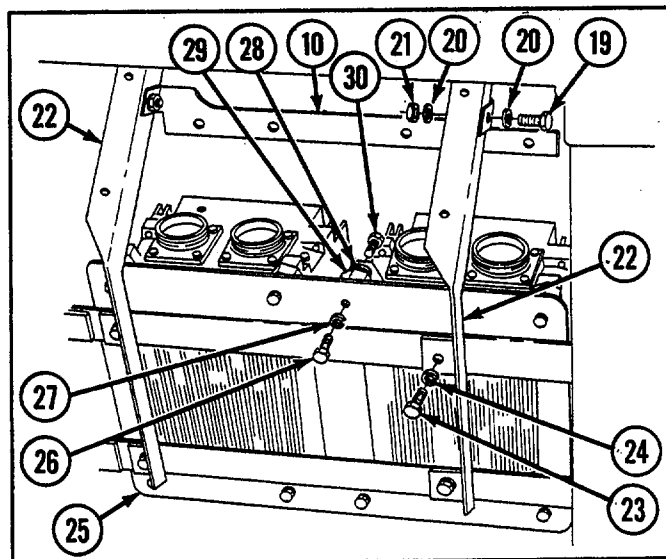
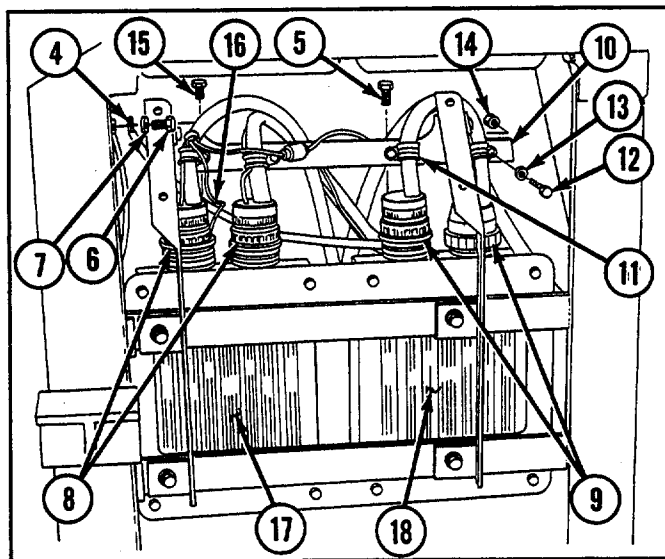
Power Unit (APU) voltage regulator (17) and two wiring harnesses (9) from main engine voltage regulator (18).

- 7 Remove mounting bracket (10) by removing two screws (19), four flat washers (20), and two nuts (21).
- 8 Remove two mounting brackets (22) by removing four screws (23) and four lockwashers (24).
- 9 Remove mounting plate (25) by removing eight screws (26) and eight lockwashers (27).

NOTE

Flat washers (28) are used in single voltage regulator configurations only.

- 10 Remove eight insulators (29) by removing eight screws (30) and flat washers (28) if required.



6-5 REPLACE VOLTAGE REGULATOR AND RELATED PARTS (DUAL VOLTAGE) (11672403-Continued)

- 11 Remove instruction plate (31) from mounting plate (25) by removing two drivescrews (32).

b. INSTALLATION

- 1 Install instruction plate (31) to mounting plate (25) using two new drivescrews (32).

NOTE

- Shim single voltage regulators using flat washers (28) to provide solid mounting.
- Flat washers (28) are used for single voltage regulator configurations only.

- 2 Install eight insulators (29) to voltage regulators (17 and 18) using eight screws (30) and flat washers (28) if required.

- 3 Install mounting plate (25) using eight screws (26) and eight new lockwashers (27).

- 4 Install two mounting brackets (22) using four screws (23) and four new lockwashers (24) each.

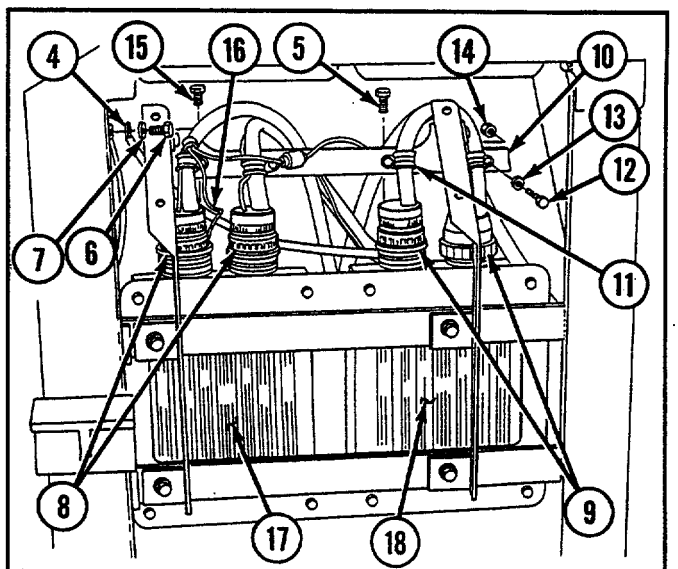
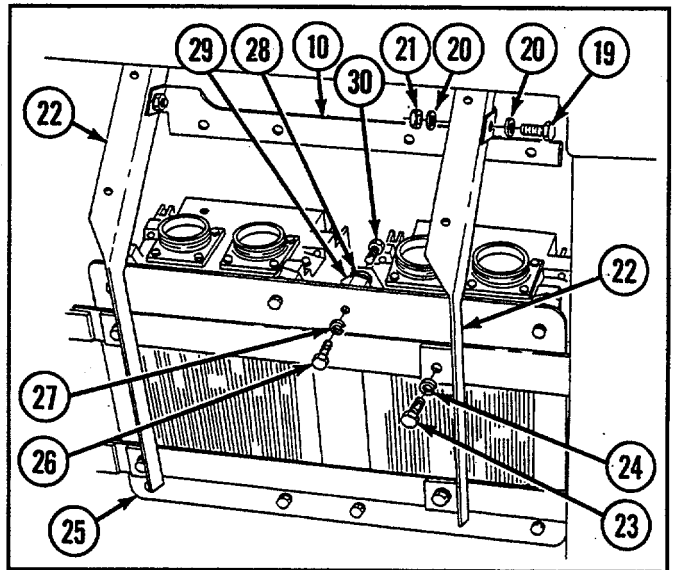
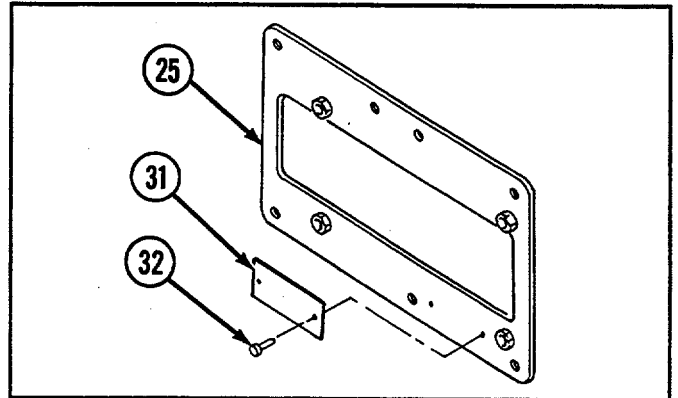
- 5 Install mounting bracket (10) using two screws (19), four flat washers (20), and two nuts (21).

- 6 Install two wiring harnesses (9) to main engine voltage regulator (18) and two wiring harnesses (8) to APU voltage regulator (17).

- 7 Install screw (15) and ground wire (16).

- 8 Connect two wiring harnesses (9) and two wiring harnesses (8) to mounting bracket (10) using four damps (11), four screws (12), four new lockwashers (13), and four nuts (14).

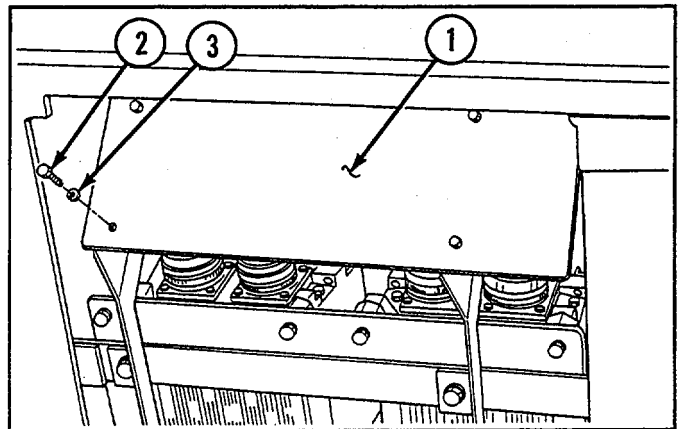
- 9 Install ground strap (4) using screw (5) at one end of ground strap and screw (6) and new lockwasher (7) at other end of ground strap.



- 10 Install access cover (1) using four screws (2) and four new lockwashers (3).
- 11 Close access door (see paragraph 9-51).

NOTE

Follow-on maintenance: Install air inlet doors
(see paragraph 9-56)

**6-6 REPLACE VOLTAGE REGULATOR (SINGLE VOLTAGE) (11659111-1)****THIS TASK COVERS**

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:	Parts:	Equipment Condition:
Tool kit, general mechanic's (Appendix C, item 53)	Lockwasher (Appendix G, item 115)	Air inlet doors removed (see paragraph 9-56)

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

NOTE

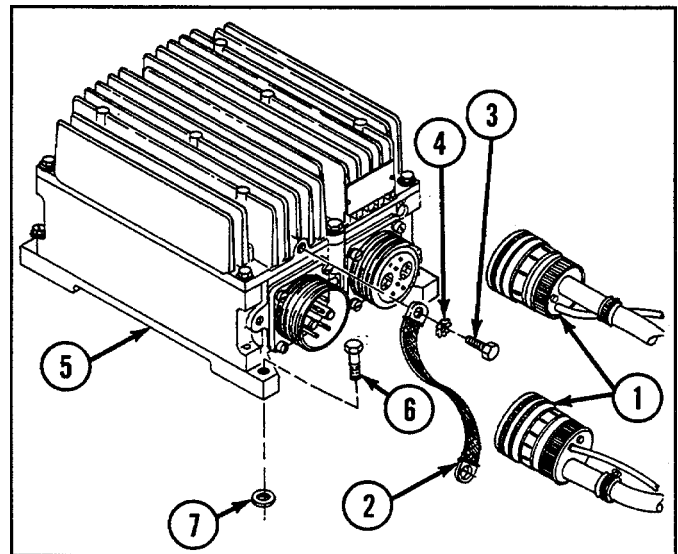
A single voltage regulator may be used in dual voltage regulators as a replacement for the main engine regulator only.

a. REMOVAL

- 1 Disconnect two connectors (1).
- 2 Disconnect ground strap (2) by removing screw (3) and lockwasher (4).
- 3 Remove voltage regulator (5) by removing four screws (6) and four flat washers (7).

b. INSTALLATION

- 1 Install voltage regulator (5) using four flat washers (7) and four screws (6).
- 2 Connect ground strap (2) using new lockwasher (4) and screw (3).
- 3 Connect two connectors (1).

**NOTE**

Follow-on maintenance: Install air inlet doors
(see paragraph 9-56)

6-7 REPLACE ENGINE AND APU ARMATURE RELAY (SINGLE VOLTAGE)

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Lockwashers (2) (Appendix G, item 131)

Equipment Condition:

Air inlet doors removed (see paragraph 9-56)

WARNING

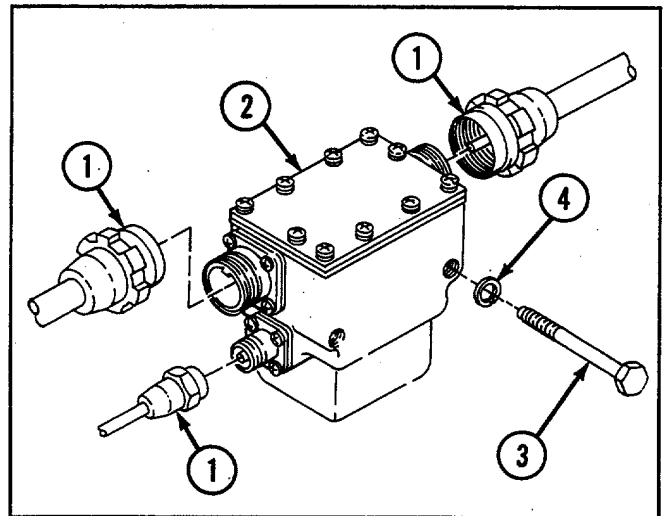
Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

a REMOVAL

- 1 Disconnect three connectors (1).
- 2 Remove engine generator relay and housing (2) by removing two screws (3) and two lockwashers (4).

b. INSTALLATION

- 1 Install engine generator relay and housing (2) using two screws (3) and two new lockwashers (4).
- 2 Connect three connectors (1).



NOTE

Follow-on maintenance: Close air inlet doors (see paragraph 9-56)

SECTION II: GAGES AND SWITCH PANELS

Para.	Task	Page
6-8	Replace/Repair Gage Panel Assembly	6-18
6-9	Replace/Repair Electrical Accessories Panel	6-26
6-10	Replace/Repair Main Switch Panel Assembly.....	6-31
6-11	Replace/Repair Flasher System Panel and Related Parts	6-36
6-12	Replace Heater Control Box	642

6-8 REPLACE/REPAIR GAGE PANEL ASSEMBLY

THIS TASK COVERS

- a. Removal
- b. Disassembly
- c. Assembly
- d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Drivescrews (6) (Appendix G, item 12)
- Lockwashers (12) (Appendix G, item 104)
- Lockwashers (2) (Appendix G, item 106)
- Lockwashers (3) (Appendix G, item 130)
- Lockwashers (2) (Appendix G, item 132)

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

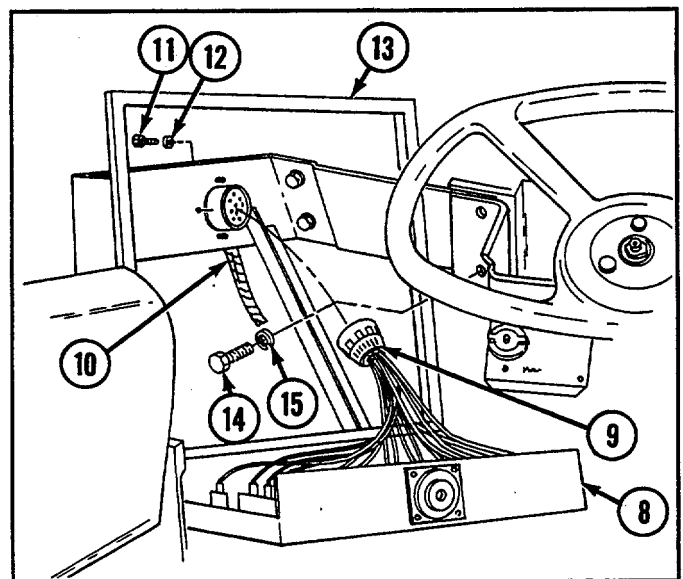
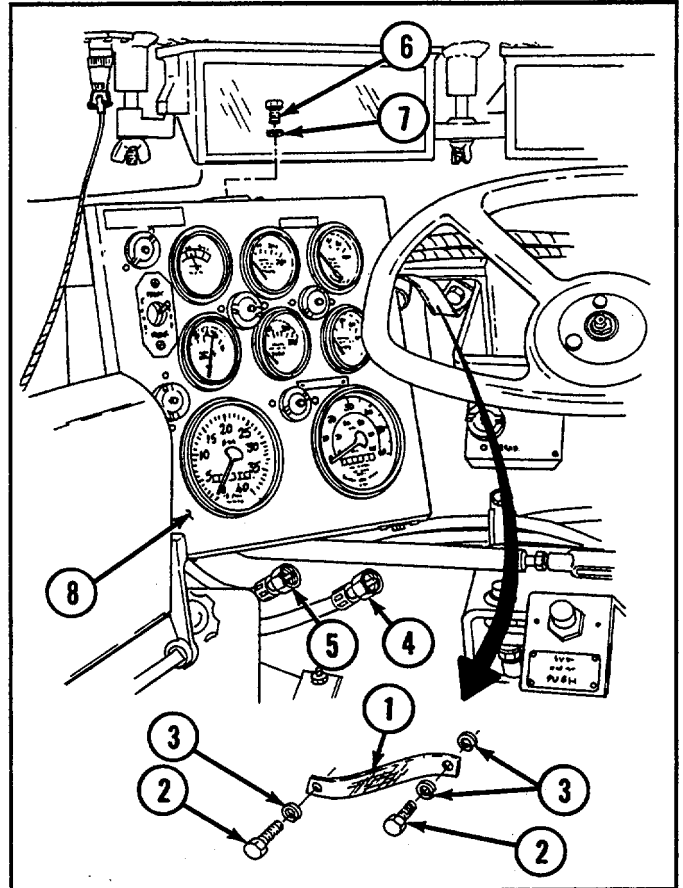
a. REMOVAL

- 1 Remove ground strap (1) by removing two screws (2) and three lockwashers (3).
- 2 Disconnect tachometer connector (4) and speedometer connector (5).
- 3 Remove three screws (6) and three lockwashers (7).
- 4 Pull gage panel (8) forward and disconnect wiring harness (9).
- 5 Remove wiring harness (10) by removing four screws (11) and four lockwashers (12).
- 6 Remove gage panel (8).

NOTE

Screw (2) and lockwasher (3) were removed with ground strap (1).

- 7 Remove mounting bracket (13) by removing three screws (14) and three lockwashers (15)



6-8 REPLACE/REPAIR GAGE PANEL ASSEMBLY-Continued

b. DISASSEMBLY

- 1 Unscrew and remove five light lenses (16) with five preformed packings (17).
- 2 Remove five lamps (18) from indicator lights (19) by depressing and turning counterclockwise.

NOTE

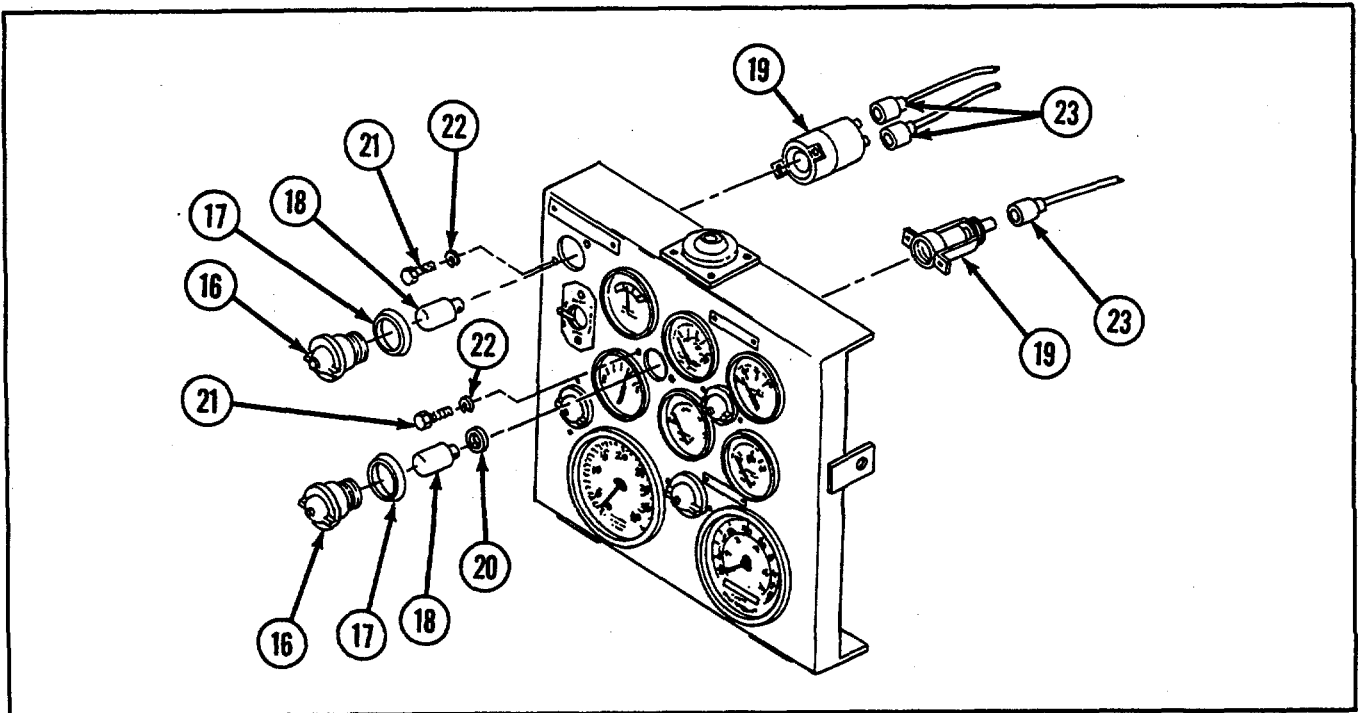
Gaskets (20) are present on three of the lamps (18).

- 3 Remove three gaskets (20).
- 4 Remove five indicator lights (19) by removing two screws (21) and two lockwashers (22) from each.

NOTE

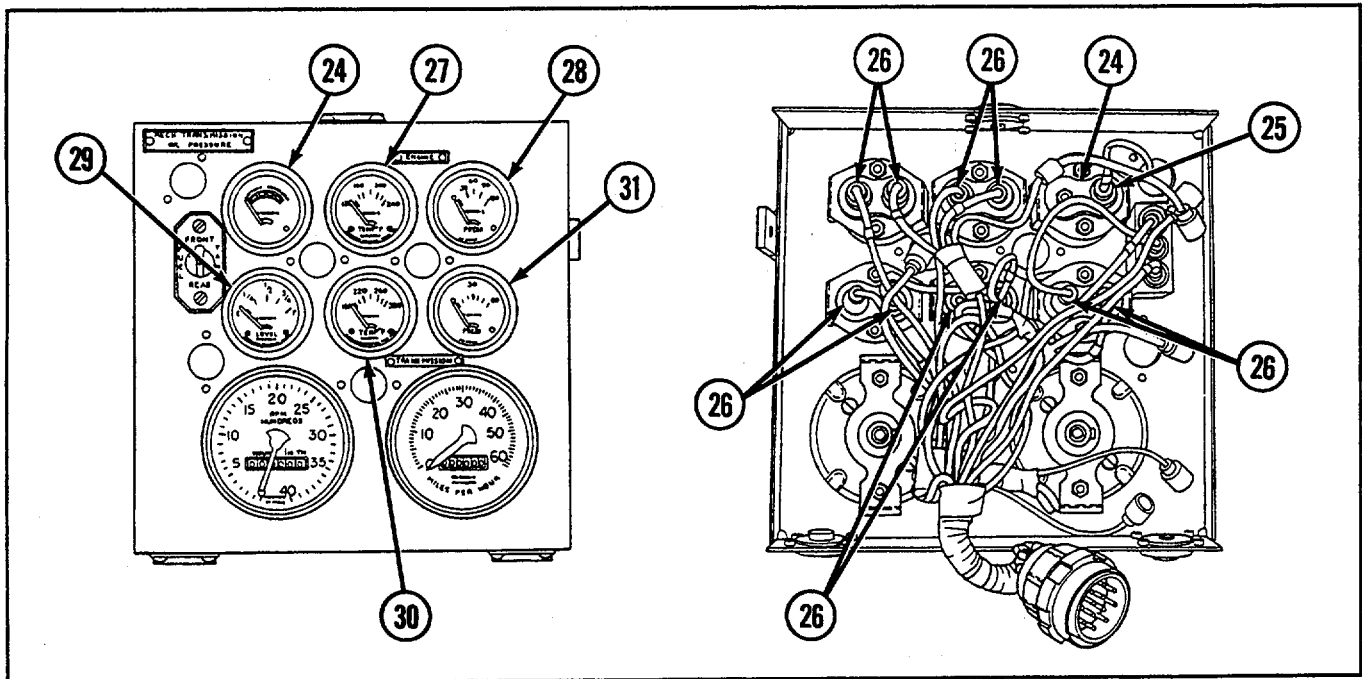
Identify connectors upon removal to ensure proper installation.

- 5 Disconnect connectors (23) from five indicator lights (19).

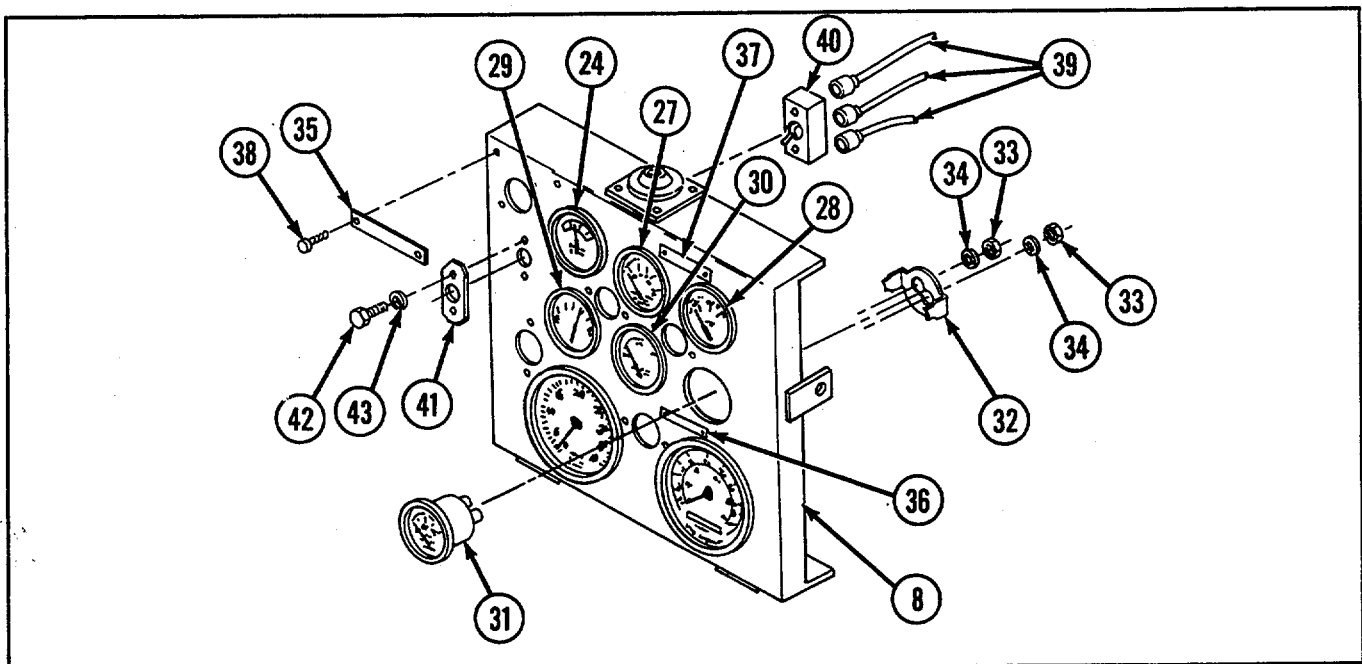
**NOTE**

Battery generator indicator meter (24) has only one connector.

- 6 Disconnect connector (25) from battery generator indicator meter (24) and two connectors (26) from engine oil temperature gage (27), engine oil pressure gage (28), fuel tank level gage (29), transmission oil temperature gage (30), and transmission oil pressure gage (31).



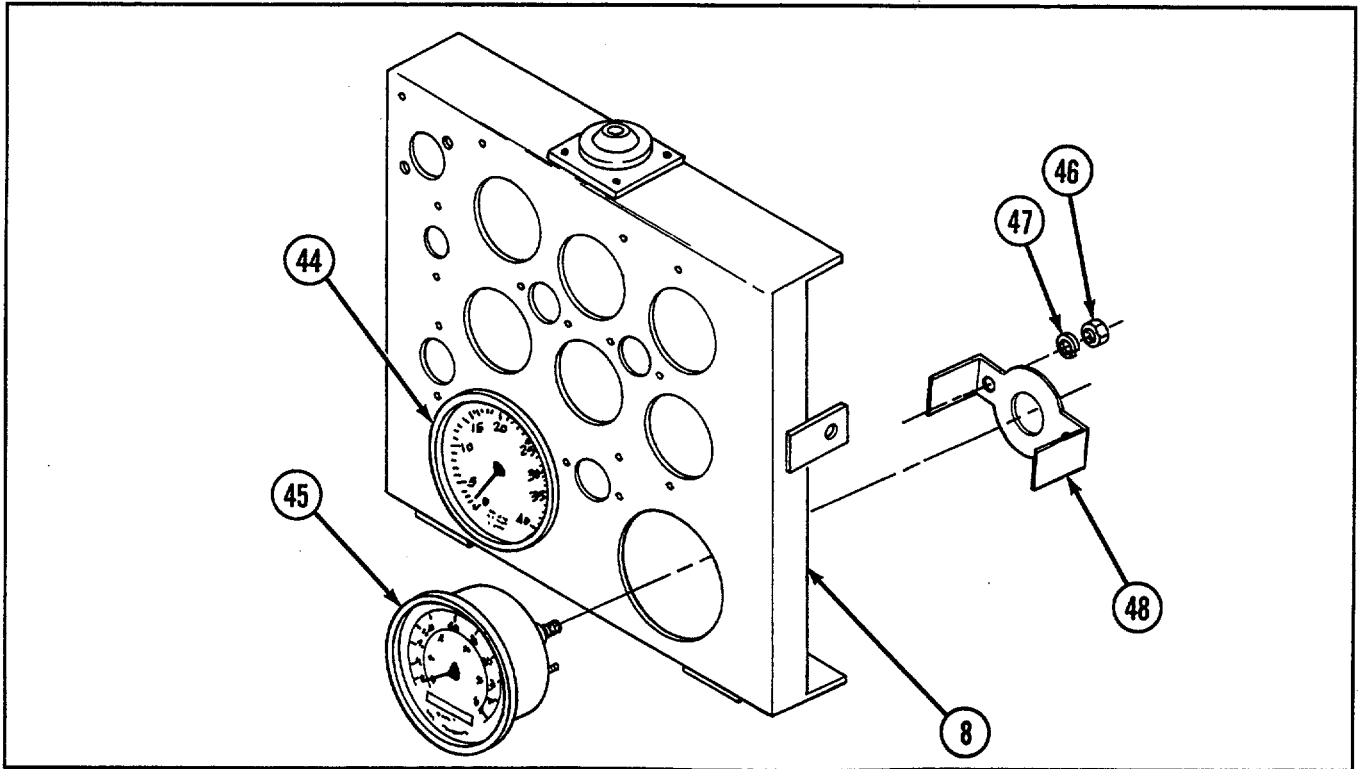
- 7 Remove six clamps (32) by removing two nuts (33) and two lockwashers (34) from each.
- 8 Remove each indicating meter (24 and 27 through 31) from front of gage panel (8).
- 9 Remove ID plates (35, 36, and 37) by removing two drivescrews (38) from each.
- 10 Disconnect three connectors (39) from fuel selector switch (40).
- 11 Remove fuel selector switch instruction plate (41) and fuel selector switch (40) from gage panel (8) by removing two screws (42) and two lockwashers (43).



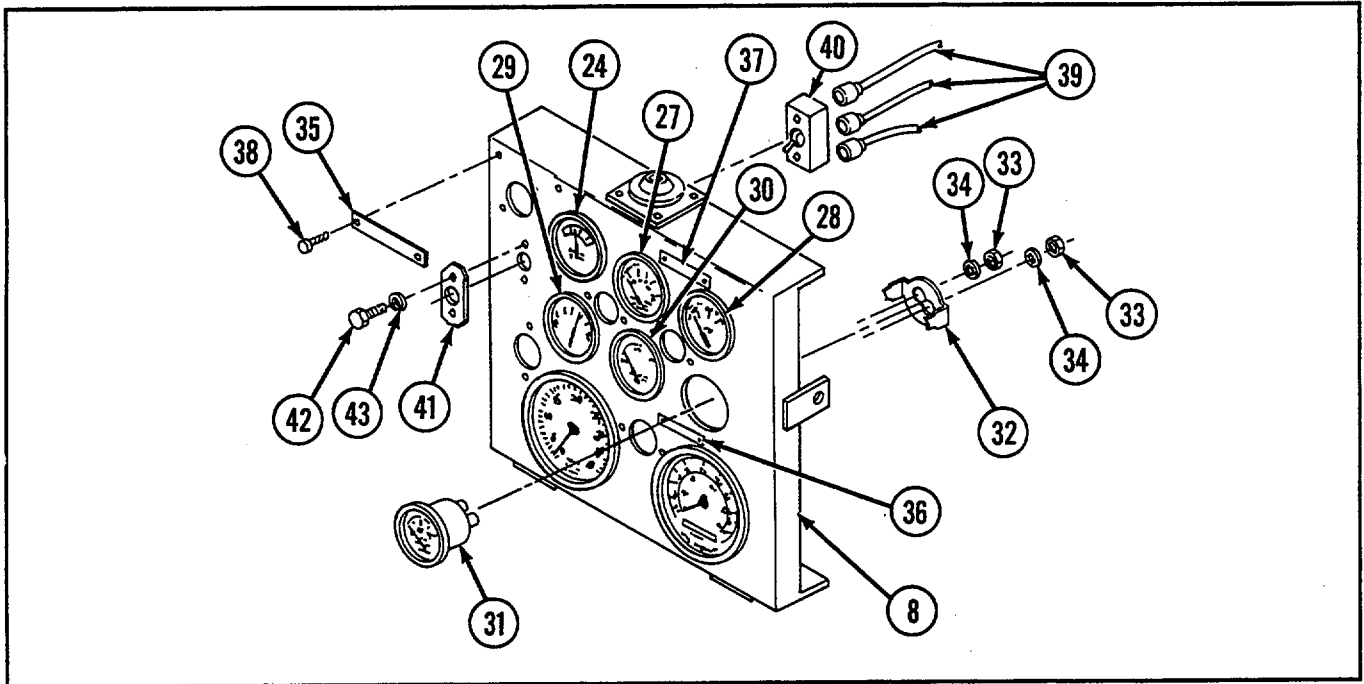
6-8 REPLACE/REPAIR GAGE PANEL ASSEMBLY-Continued

12 Disassemble wiring harness (see Chapter 6, Section VII).

13 Remove speedometer (44) and tachometer (45) by removing two nuts (46), two lockwashers (47), and bracket (48). Pull speedometer and tachometer from front of gage panel (8).

**c. ASSEMBLY**

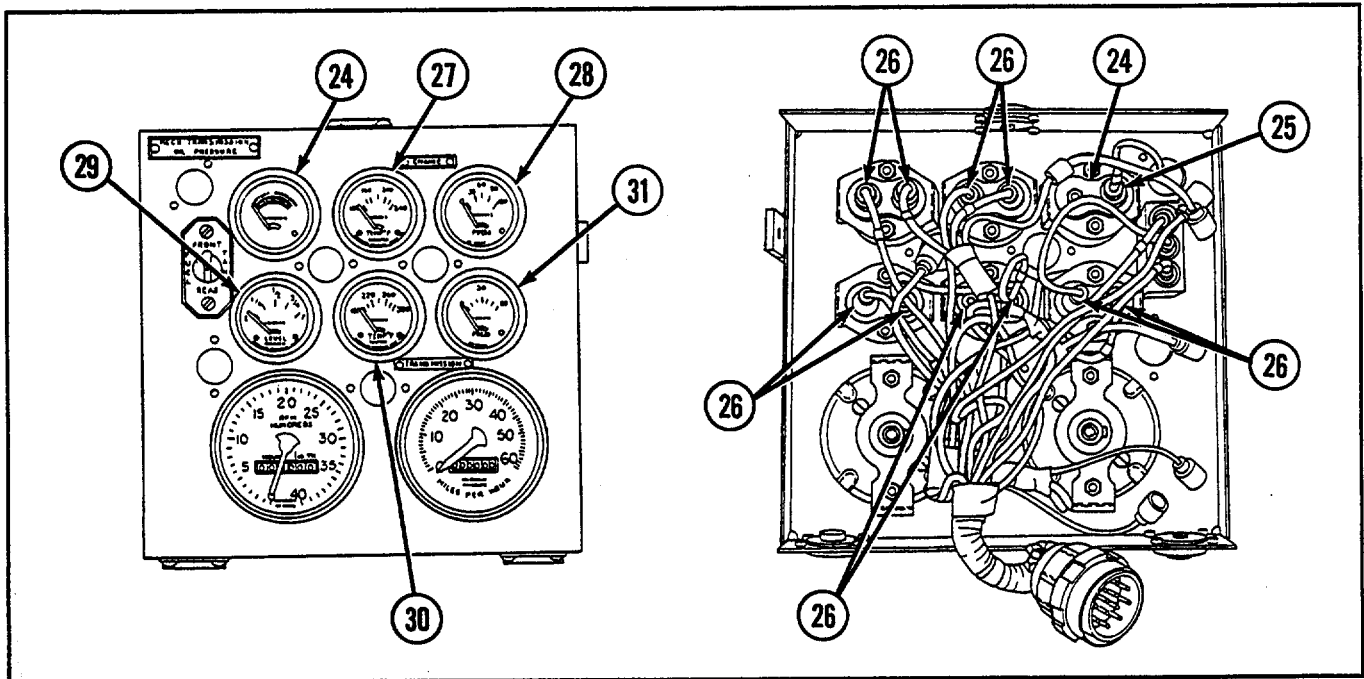
- 1 Insert speedometer (44) and tachometer (45) through front of gage panel (8). Install speedometer and tachometer using bracket (48), two nuts (46), and two new lockwashers (47) for each.
- 2 Assemble wiring harness (see Chapter 6, Section VII).
- 3 Install fuel selector switch (40) and fuel selector switch instruction plate (41) to gage panel (8) using two screws (42) and two new lockwashers (43). Connect three connectors (39) to fuel selector switch.
- 4 Install ID plates (35, 36, and 37) using two new drivescrews (38) for each.
- 5 Install battery generator indicator meter (24), engine oil temperature gage (27), engine oil pressure gage (28), fuel tank level gage (29), transmission oil temperature gage (30), and transmission oil pressure gage (31) through front of gage panel (8).
- 6 Install six clamps (32) using two new lockwashers (34) and two nuts (33) for each.



NOTE

Battery generator indicator meter (24) has only one connector.

- 7 Connect connector (25) to battery generator indicator meter (24) and two connectors (26) to each indicating meter (27 through 31).



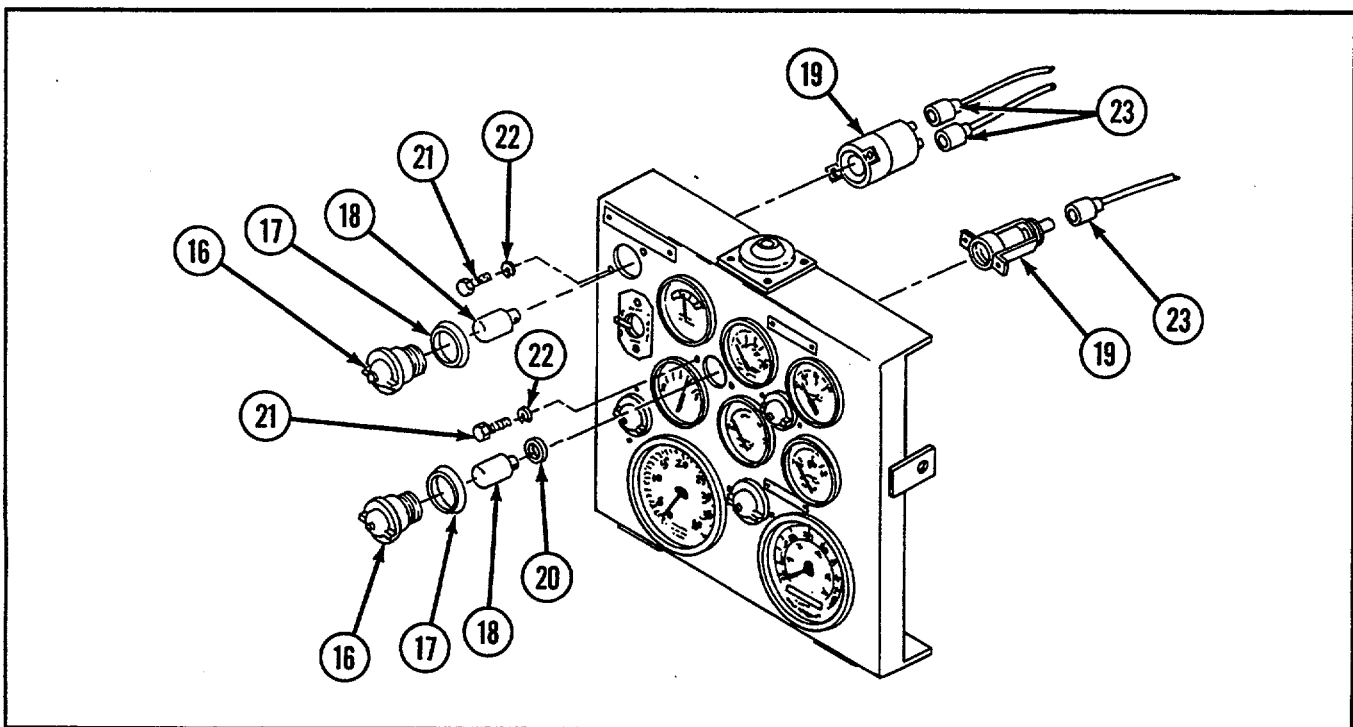
6-8 REPLACE/REPAIR GAGE PANEL ASSEMBLY-Continued

- 8 Install five indicator lights (19) using two screws (21) and two new lockwashers (22) for each.'
- 9 Connect connectors (23) to each of five indicator lights (19).

NOTE

Gaskets (20) are present on three of the lamps (18).

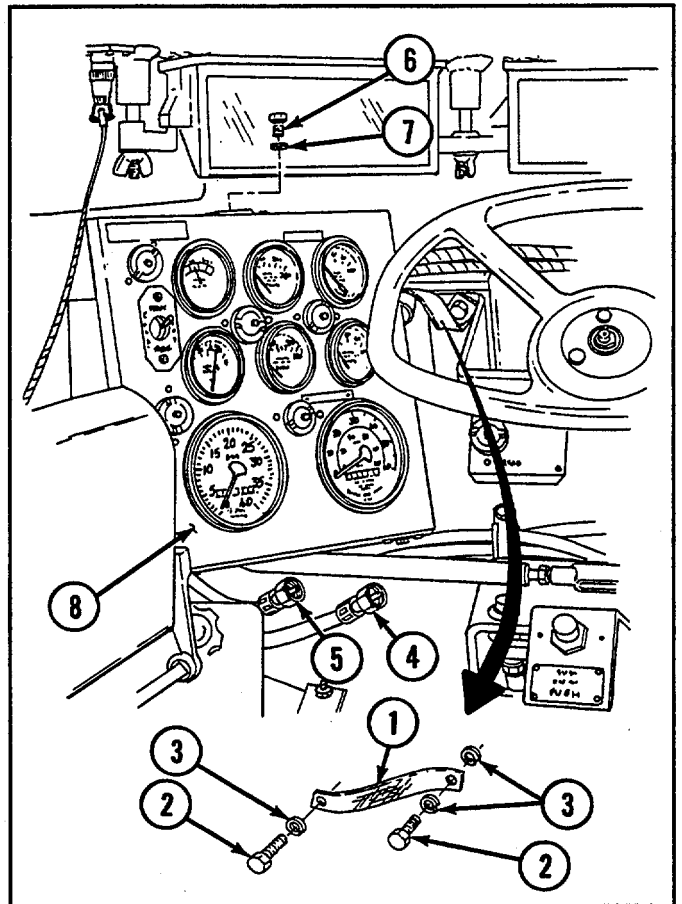
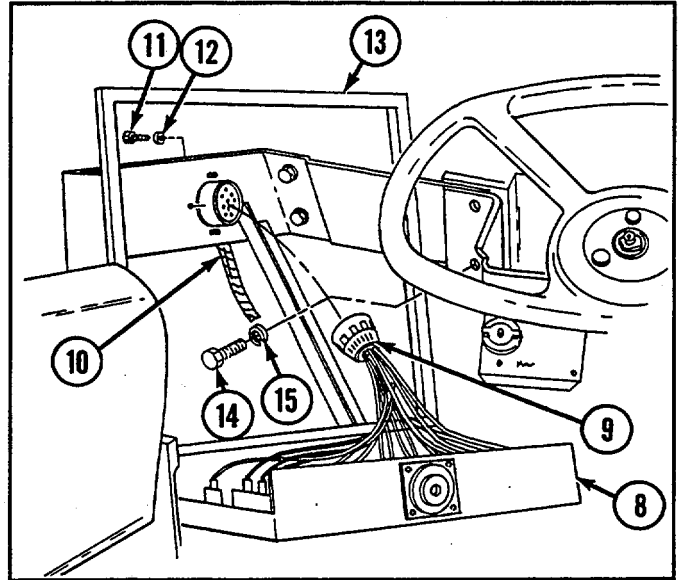
- 10 Install three gaskets (20).
- 11 Install five lamps (18) to indicator lights (19) by depressing and turning clockwise.
- 12 Install five preformed packings (17) and five light lenses (16).

**d. INSTALLATION****NOTE**

Screw (2) and new lockwasher (3) are installed with ground strap (1).

- 1 Install mounting bracket (13) using three screws (14) and three new lockwashers (15).
- 2 Install wiring harness (10) using four screws (11) and four new lockwashers (12).
- 3 Connect wiring harness (9).

- 4 Place gage panel (8) into position and secure using three screws (6) and three new lockwashers (7).
- 5 Connect tachometer connector (4) and speedometer connector (5).
- 6 Install ground strap (1) using screw (2) and three new lockwashers (3).



6-9 REPLACE/REPAIR ELECTRICAL ACCESSORIES PANEL**THIS TASK COVERS**

- | | | | |
|------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
|------------|----------------|-------------|-----------------|

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Lockwashers (2) (Appendix G, item 113)
- Lockwashers (22) (Appendix G, item 114)
- Lockwashers (4) (Appendix G, item 116)

WARNING

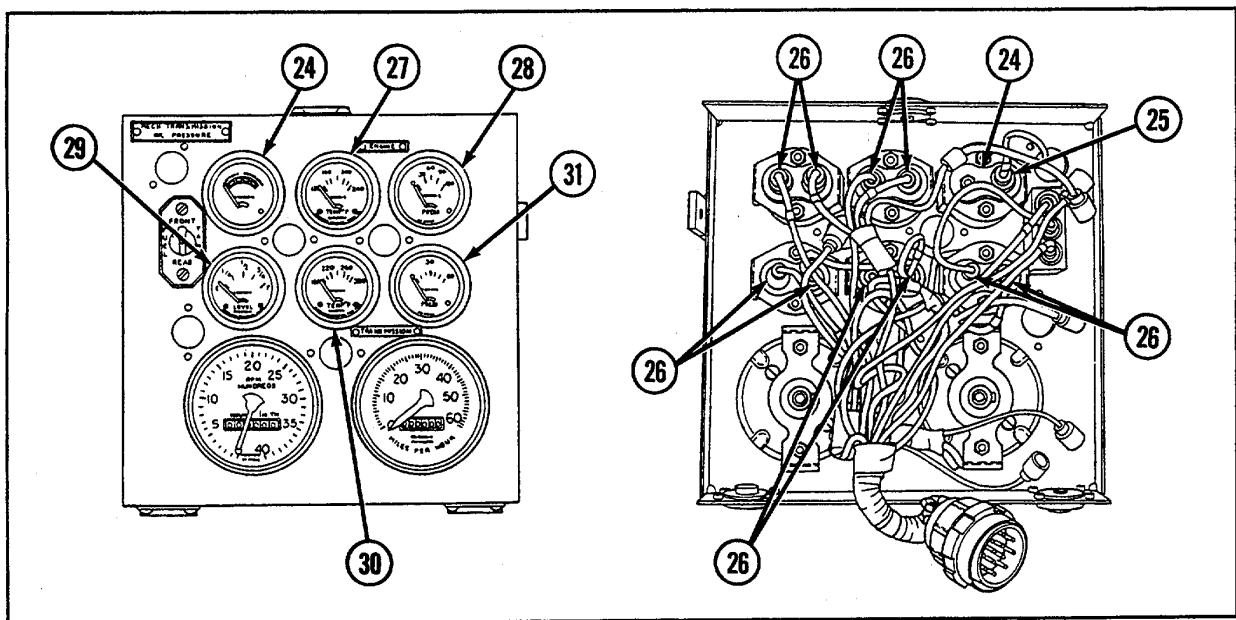
Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

NOTE

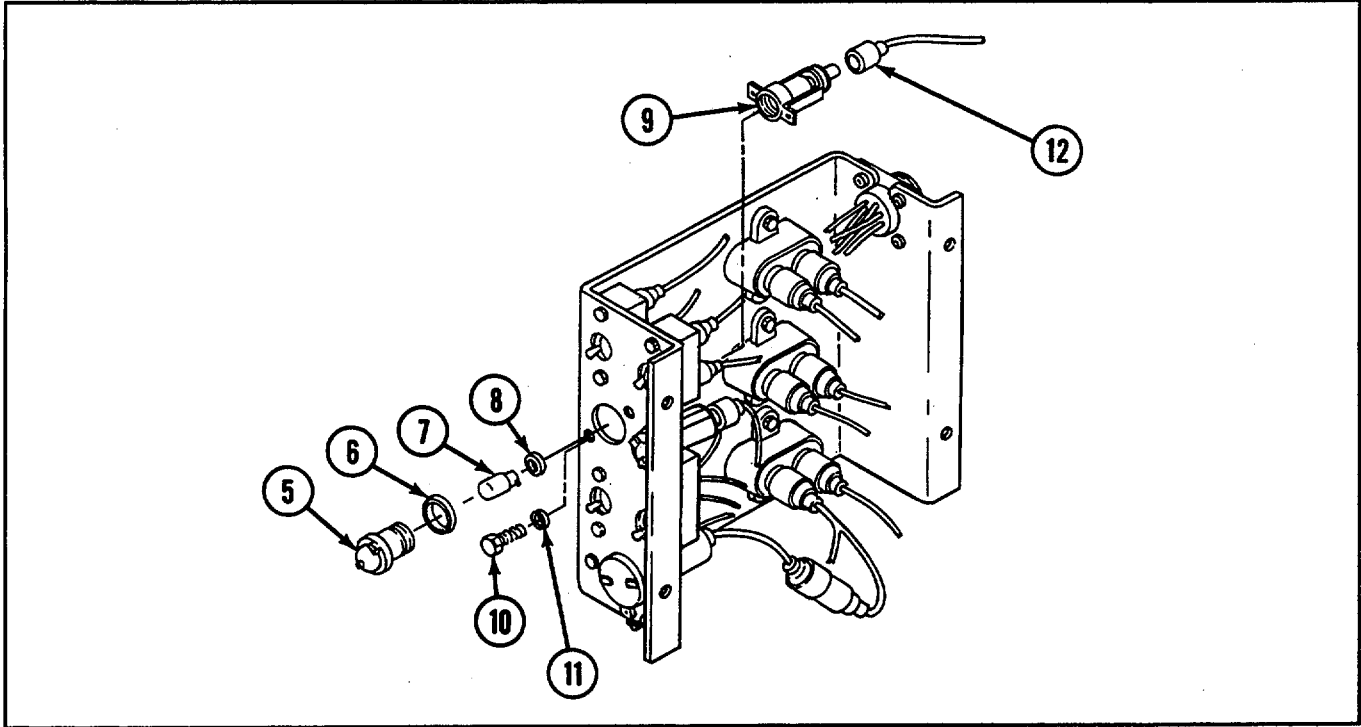
Identify connectors upon removal to ensure proper installation.

a. REMOVAL

- 1 Disconnect connector (1).
- 2 Remove four screws (2), four lockwashers (3), and accessories panel (4).

**b. DISASSEMBLY**

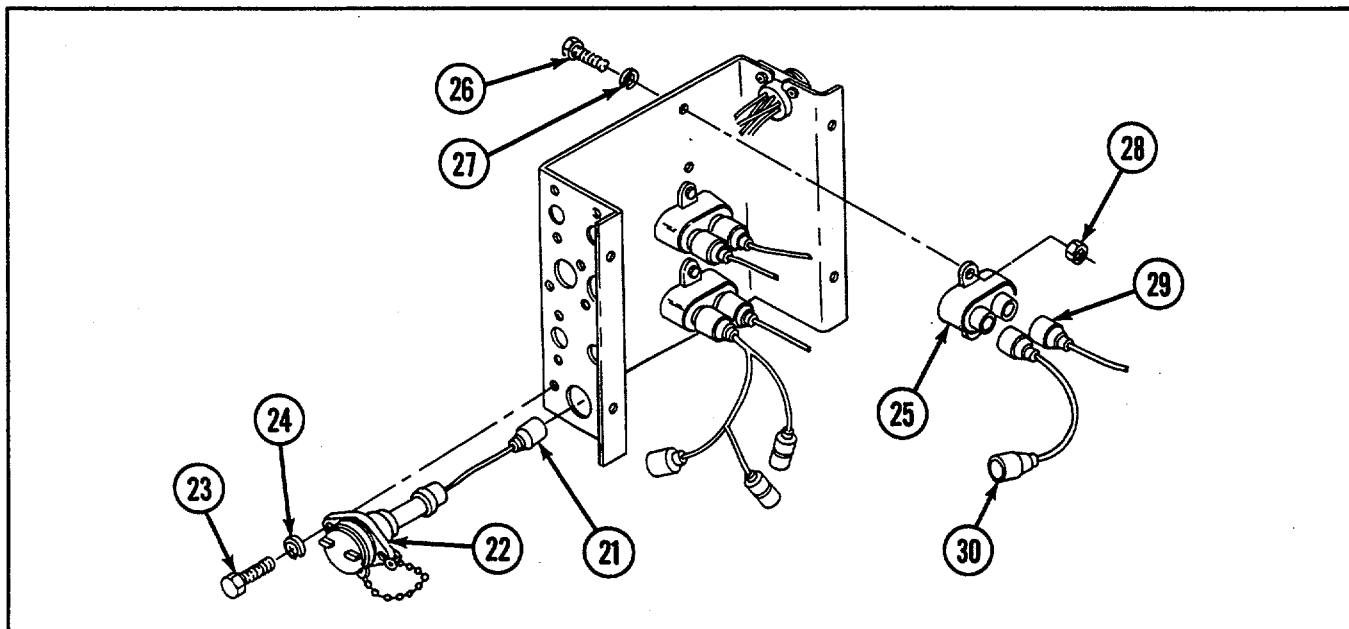
- 1 Unscrew and remove two light lenses (5) and two preformed packings (6).
- 2 Remove two lamps (7) by depressing and turning counterclockwise.
- 3 Remove two gaskets (8).
- 4 Remove two indicator lights (9) by removing two screws (10) and two lockwashers (11) from each.
- 5 Disconnect connector (12) from each indicator light (9).



- 6 Disconnect two connectors (13) from three switches (14).
- 7 Remove three switches (14) by removing two screws (15) and two lockwashers (16) from each.
- 8 Disconnect four connectors (17) from switch (18).
- 9 Remove switch (18) by removing two screws (19) and two lockwashers (20).

6-9 REPLACE/REPAIR ELECTRICAL ACCESSORIES PANEL-Continued

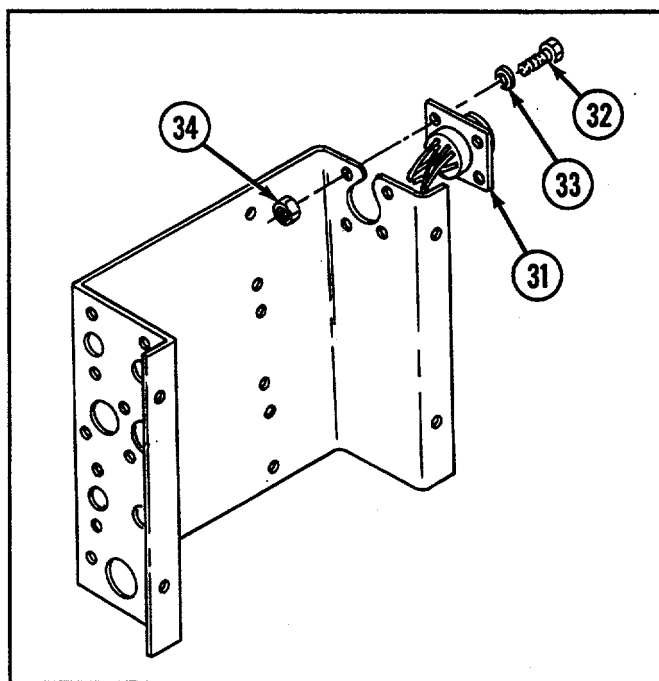
- 10 Disconnect connector (21) and remove lamp holder (22) by removing two screws (23) and two lockwashers (24).
- 11 Remove three circuit breakers (25) by removing two screws (26), two lockwashers (27), and two nuts (28) from each.
- 12 Disconnect six connectors (29) and remove two lead assemblies (30).



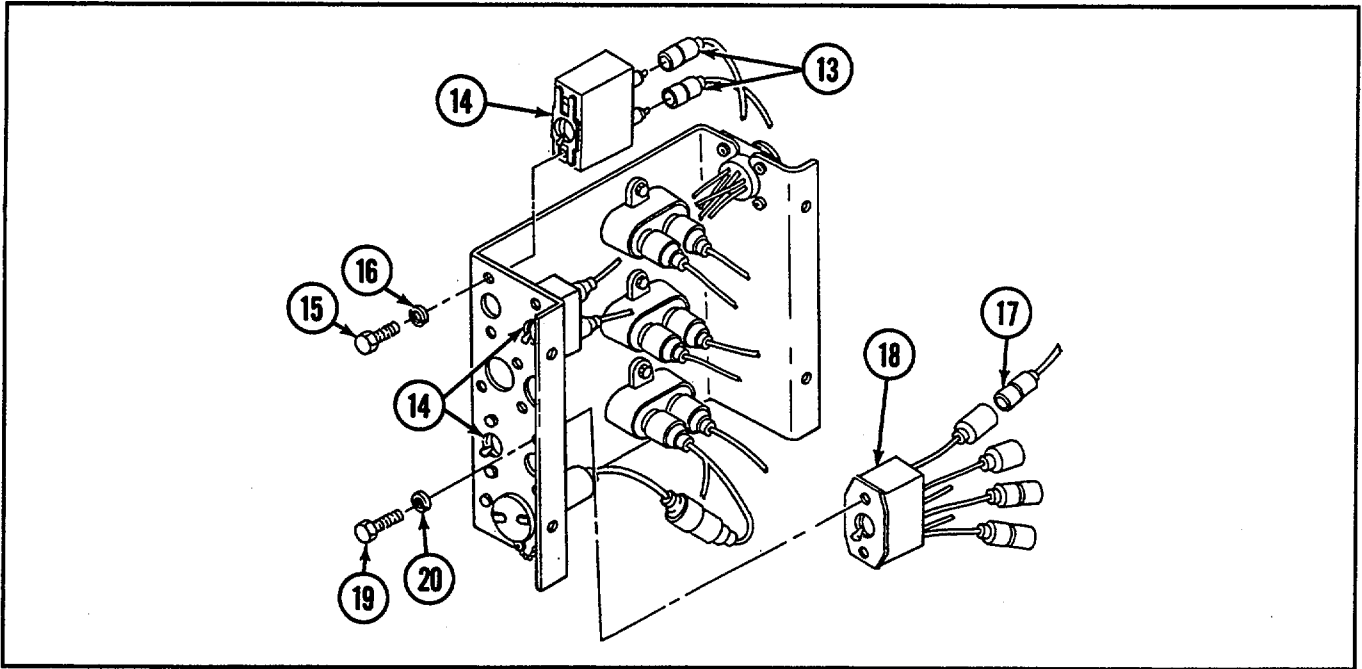
- 13 Remove wiring harness (31) by removing four screws (32), four lockwashers (33), and four nuts (34).
- 14 Disassemble connectors (see Chapter 6, Section VII).

c. ASSEMBLY

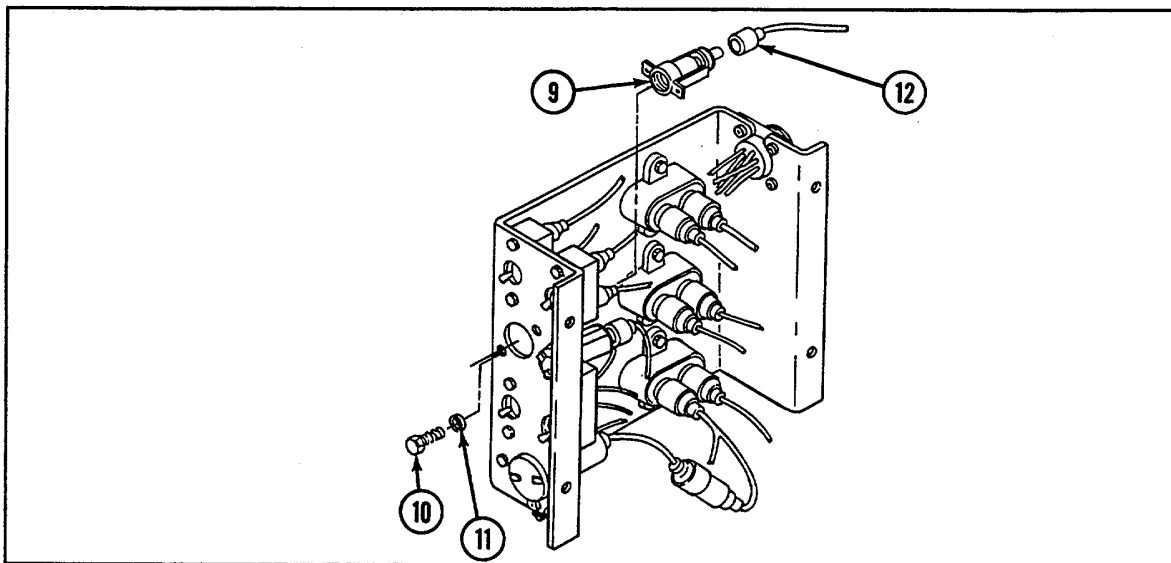
- 1 Assemble connectors (see Chapter 6, Section VII).
- 2 Install wiring harness (31) using four screws (32), four new lockwashers (33), and four nuts (34).
- 3 Connect six connectors (29) and install two lead assemblies (30).
- 4 Install three circuit breakers (25) using two screws (26), two new lockwashers (27), and two nuts (28) for each.
- 5 Install lamp holder (22) using two screws (23) and two new lockwashers (24), and connect connector (21).



- 6 Install switch (18) using two screws (19) and two new lockwashers (20).
- 7 Connect four connectors (17) to switch (18).
- 8 Install three switches (14) using two screws (15) and two new lockwashers (16) for each.
- 9 Connect two connectors (13) to three switches (14).

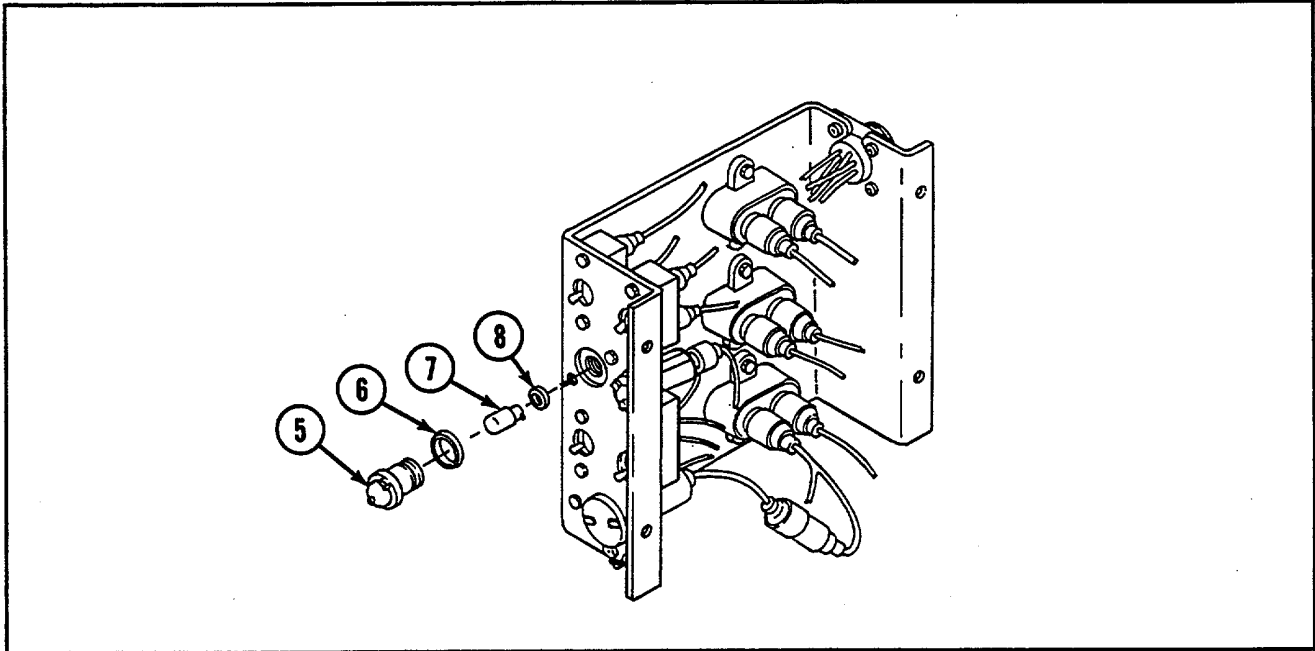


- 10 Connect connector (12) to each indicator light (9).
- 11 Install two indicator lights (9) using two screws (10) and two new lockwashers (11) for each.



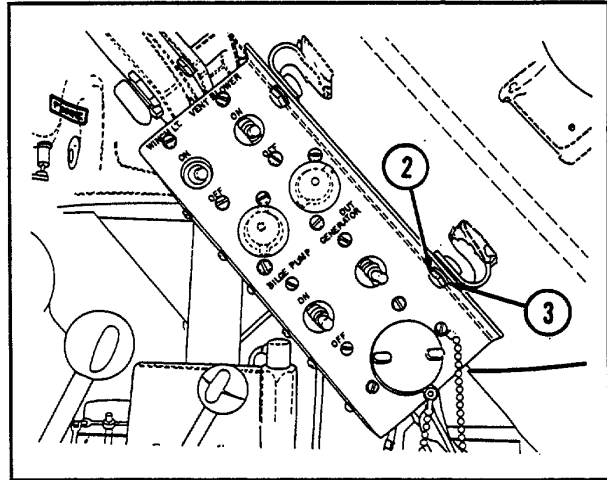
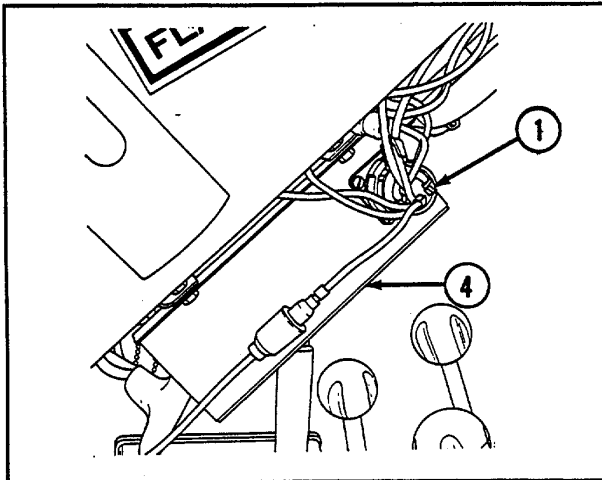
6-9 REPLACE/REPAIR ELECTRICAL ACCESSORIES PANEL-Continued

- 12 Install two gaskets (8).
- 13 Install two lamps (7) by depressing and turning clockwise.
- 14 Install two preformed packings (6) and two light lenses (5).



d. INSTALLATION

- 1 Install accessories panel (4) using four screws (2) and four new lockwashers (3).
- 2 Connect connector (1).



6-10 REPLACE/REPAIR MAIN SWITCH PANEL ASSEMBLY**THIS TASK COVERS**

a. Removal

b. Disassembly

c. Assembly

d. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Riveter, blind (Appendix C, item 42)

Parts:

- Drivescrews (2) (Appendix G, item 19)
- Lockwashers (12) (Appendix G, item 104)
- Lockwashers (2) (Appendix G, item 107)
- Lockwashers (2) (Appendix G, item 150)
- Rivets, blind (4) (Appendix G, item 235)

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

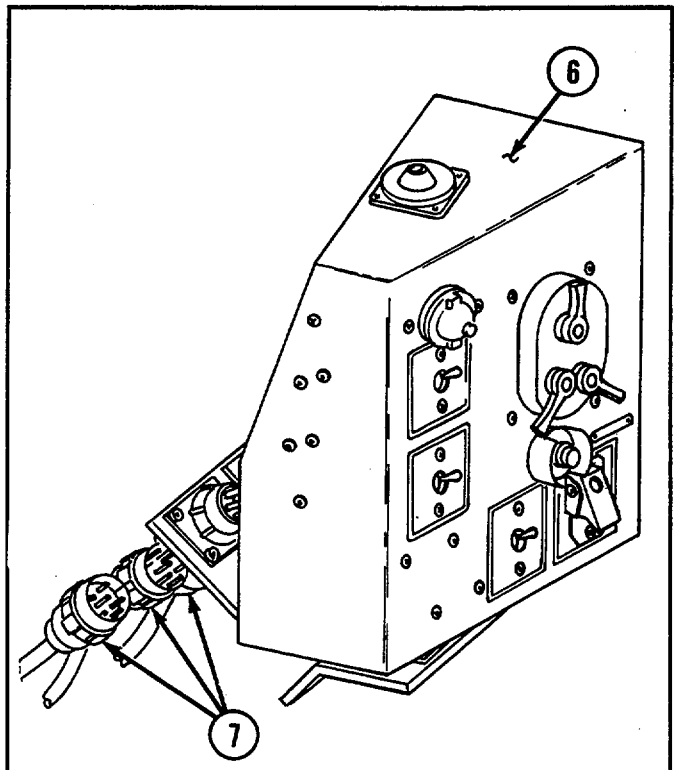
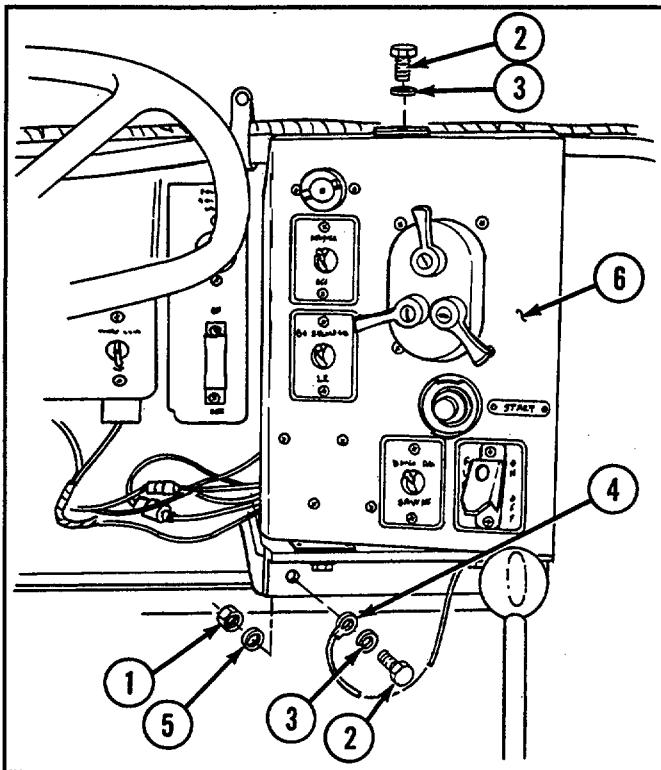
a. REMOVAL

- 1 Remove two nuts (1), three screws (2), three lockwashers (3), end of ground lead (4), and flat washer (5) from main switch panel (6).

NOTE

Identify connectors upon removal to ensure proper installation.

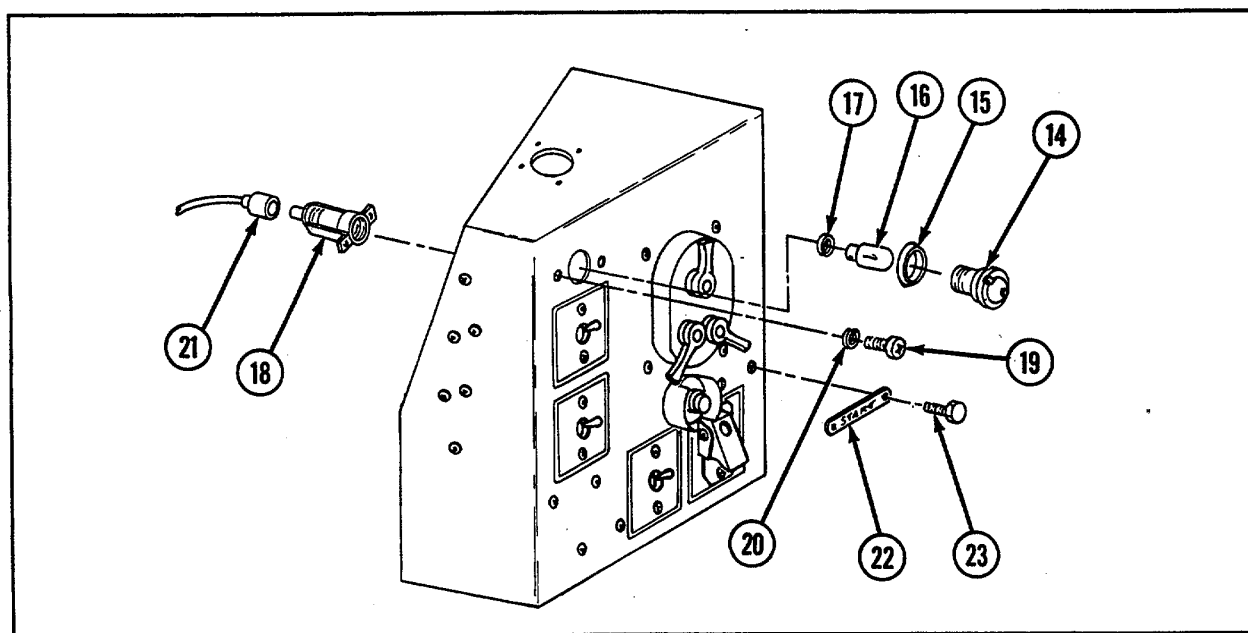
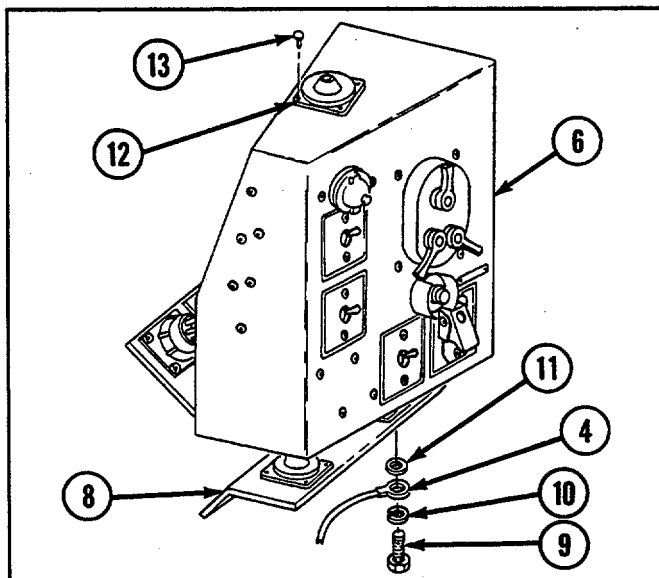
- 2 Pull main switch panel (6) forward and disconnect three connectors (7).



6-10 REPLACE/REPAIR MAIN SWITCH PANEL ASSEMBLY-Continued

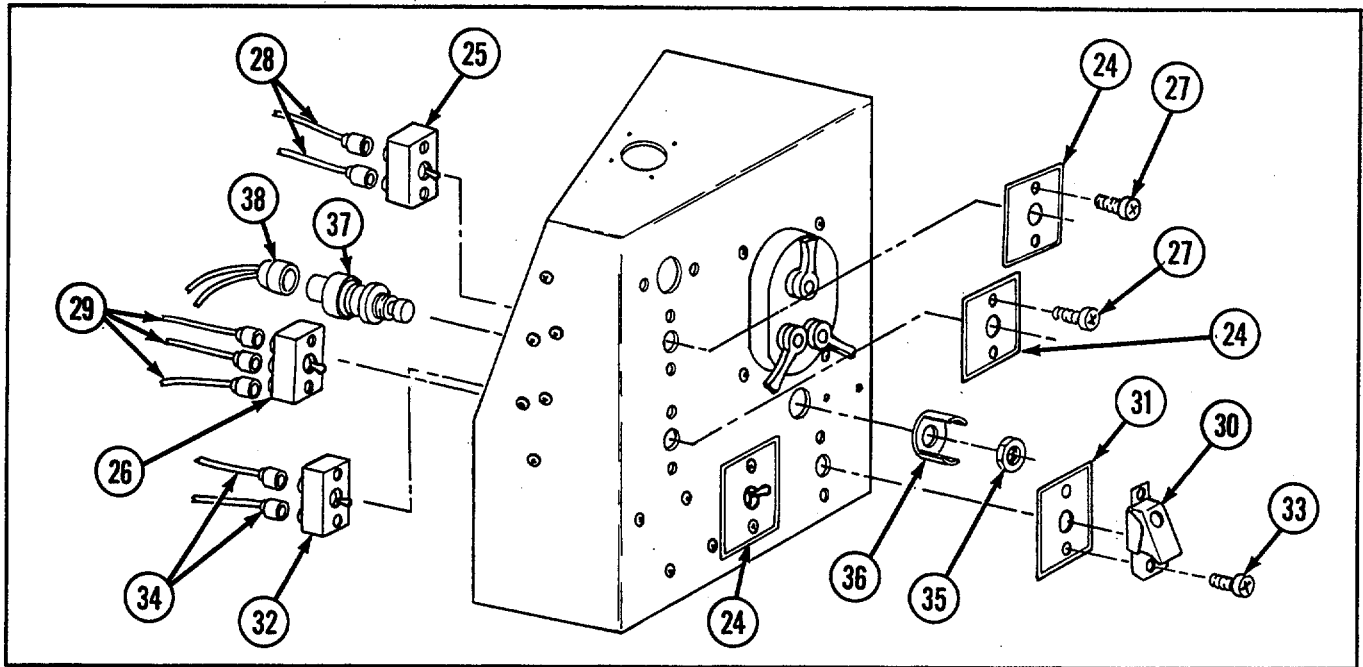
b. DISASSEMBLY

- 1 Remove ground strap (4) and retainer (8) by removing two screws (9), lockwasher (10), and two flat washers (11) from main switch panel (6).
- 2 Remove mount (12) by removing four rivets (13).
- 3 Unscrew and remove light lens (14) and preformed packing (15).
- 4 Remove lamp (16) by depressing and turning counterclockwise.
- 5 Remove gasket (17).
- 6 Remove indicator light (18) by removing two screws (19) and two lockwashers (20).
- 7 Disconnect connector (21) from indicator light (18).
- 8 Remove ID plate (22) by removing two drivescrews (23).



- 9 Remove three ID plates (24), two switches (25), and switch (26) by removing two screws (27) from each.
- 10 Disconnect two connectors (28) from two switches (25) and three connectors (29) from switch (26).
- 11 Remove switch guard (30), ID plate (31), and switch (32) by removing two screws (33).
- 12 Disconnect two connectors (34) from switch (32).

- 13 Remove nut (35), switch guard (36), pull switch (37), and disconnect connector (38).



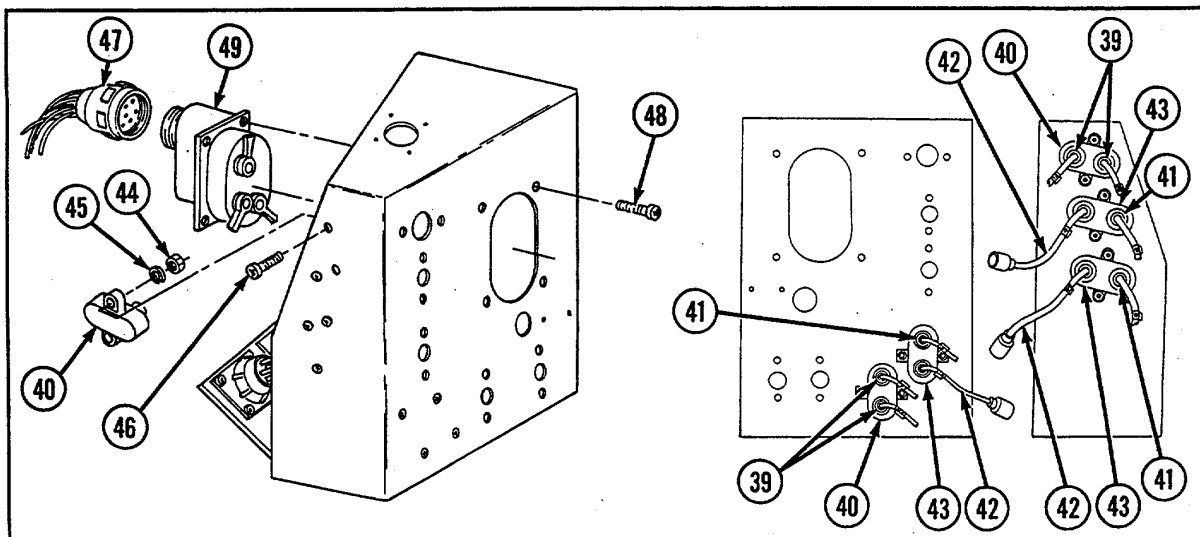
- 14 Disconnect two connectors (39) from two circuit breakers (40).
- 15 Disconnect connector (41) and remove lead assembly (42) from three circuit breakers (43).
- 16 Remove five circuit breakers (40 and 43) by removing two nuts (44), two lockwashers (45), and two screws (46) from each.
- 17 Disconnect connector (47) and remove four screws (48) and switch (49).

6-10 REPLACE/REPAIR MAIN SWITCH PANEL ASSEMBLY-Continued

- 18 Remove three connectors (50) by removing four screws (51) and four nuts (52) from each.
- 19 Remove panel (53) by removing two screws (54).
- 20 Disassemble wiring harnesses and lead assembly (see Chapter 6, Section VII).

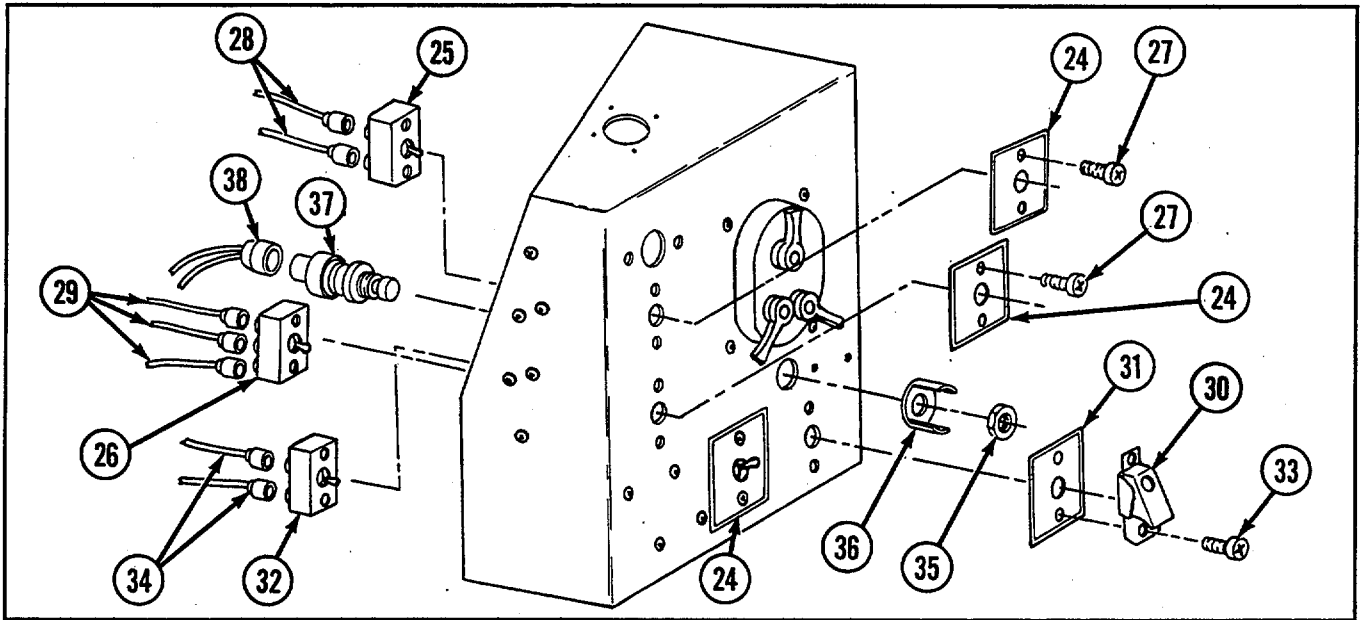
c. ASSEMBLY

- 1 Assemble wiring harnesses and lead assembly (see Chapter 6, Section VII).
- 2 Install panel (53) using two screws (54).
- 3 Install three connectors (50) using four screws (51) and four nuts (52) for each.
- 4 Install switch (49) using four screws (48), and connect connector (47).
- 5 Install five circuit breakers (40 and 43) using two screws (46), two new lockwashers (45), and two nuts (44) for each.
- 6 Install lead assembly (42) to three circuit breakers (43), and connect connector (41).
- 7 Connect two connectors (39) to two circuit breakers (40).



- 8 Install switch guard (36), pull switch (37), nut (35), and connect connector (38).
- 9 Connect two connectors (34) to switch (32).
- 10 Install switch (32), ID plate (31), and switch guard (30) using two screws (33).

- 11 Connect three connectors (29) to switch (26) and two connectors (28) to two switches (25).
- 12 Install two switches (25), switch (26), and three ID plates (24) using two screws (27) for each.



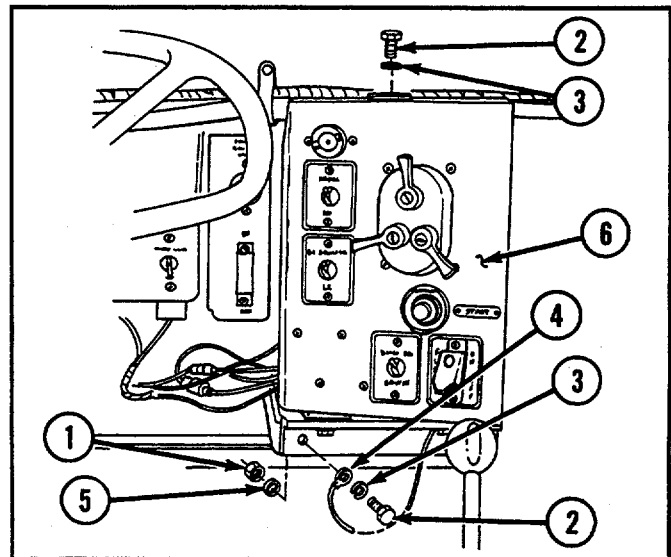
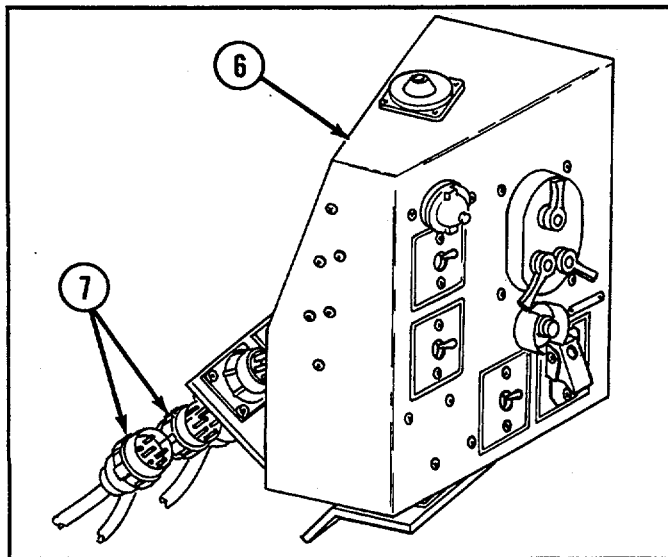
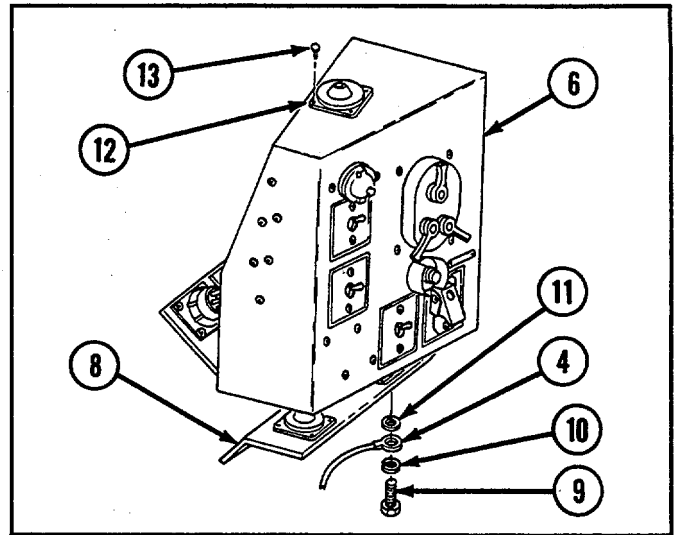
- 13 Install ID plate (22) using two new drivescrews (23).
- 14 Connect connector (21) to indicator light (18).
- 15 Install indicator light (18) using two screws (19) and two new lockwashers (20).
- 16 Install gasket (17).
- 17 Install lamp (16) by depressing and turning clockwise.
- 18 Install preformed packing (15) and light lens (14).

6-10 REPLACE/REPAIR MAIN SWITCH PANEL ASSEMBLY-Continued

- 19 Install mount (12) using four new rivets (13).
- 20 Install ground strap (4) and retainer (8) to main switch panel (6) using two screws (9), two flat washers (11), and new lockwasher (10).

d. INSTALLATION

- 1 Place main switch panel (6) in position and connect three connectors (7).
- 2 Install end of ground lead (4), three new lockwashers (3), flat washer (5), three screws (2), and two nuts (1) to main switch panel (6).



6-11 REPLACE/REPAIR FLASHER SYSTEM PANEL AND RELATED PARTS

THIS TASK COVERS

a. Removal/Disassembly

b. Installation/Assembly

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Lockwashers (10) (Appendix G, item 104)
- Lockwashers (3) (Appendix G, item 114)
- Lockwashers (2) (Appendix G, item 116)
- Lockwashers (2) (Appendix G, item 129)

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

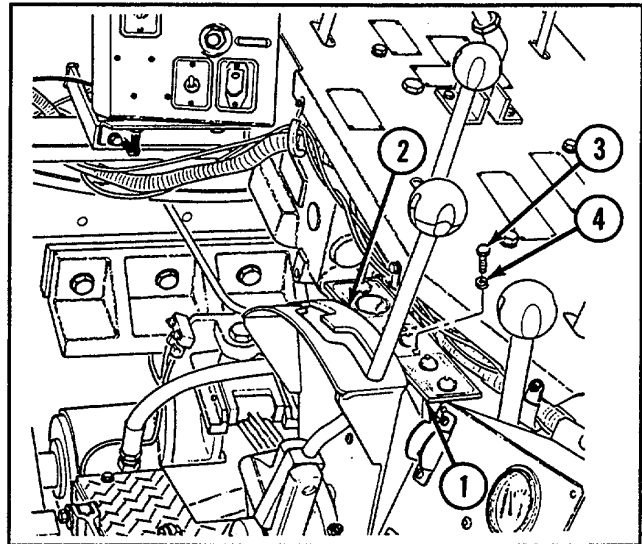
a. REMOVAL/DISASSEMBLY

- 1 Remove flasher system panel (1) from transmission shift lever bracket (2) by removing two screws (3) and two lockwashers (4).

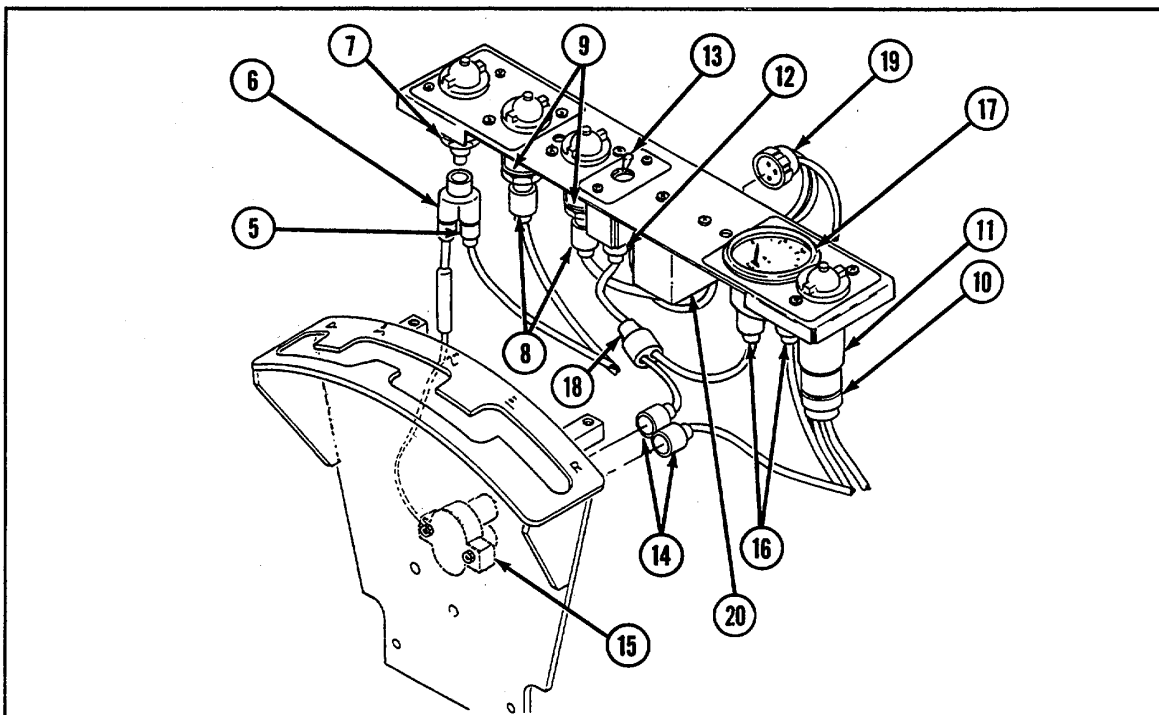
NOTE

Identify connectors upon removal to ensure proper installation.

- 2 Disconnect connector (5) from Y-connector (6) and Y-connector from indicator light (7).
- 3 Disconnect two connectors (8) from two indicator lights (9).
- 4 Disconnect connector (10) from indicator light (11).
- 5 Disconnect two connectors (12) from switch (13).

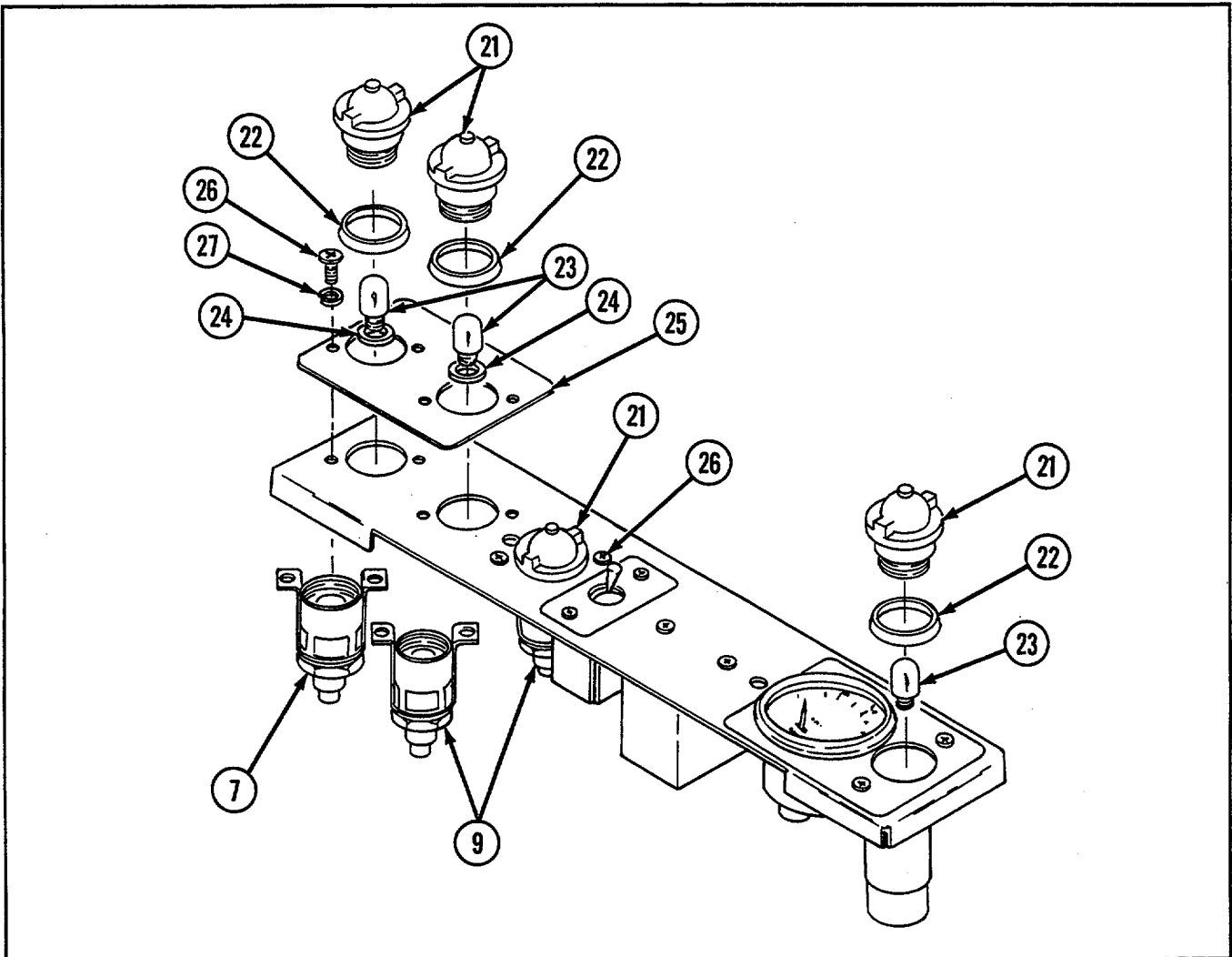


- 6 Disconnect two connectors (14) from circuit breaker (15).
- 7 Disconnect two connectors (16) from gage (17), and remove lead assembly (18).
- 8 Disconnect connector (19) from thermal flasher (20).

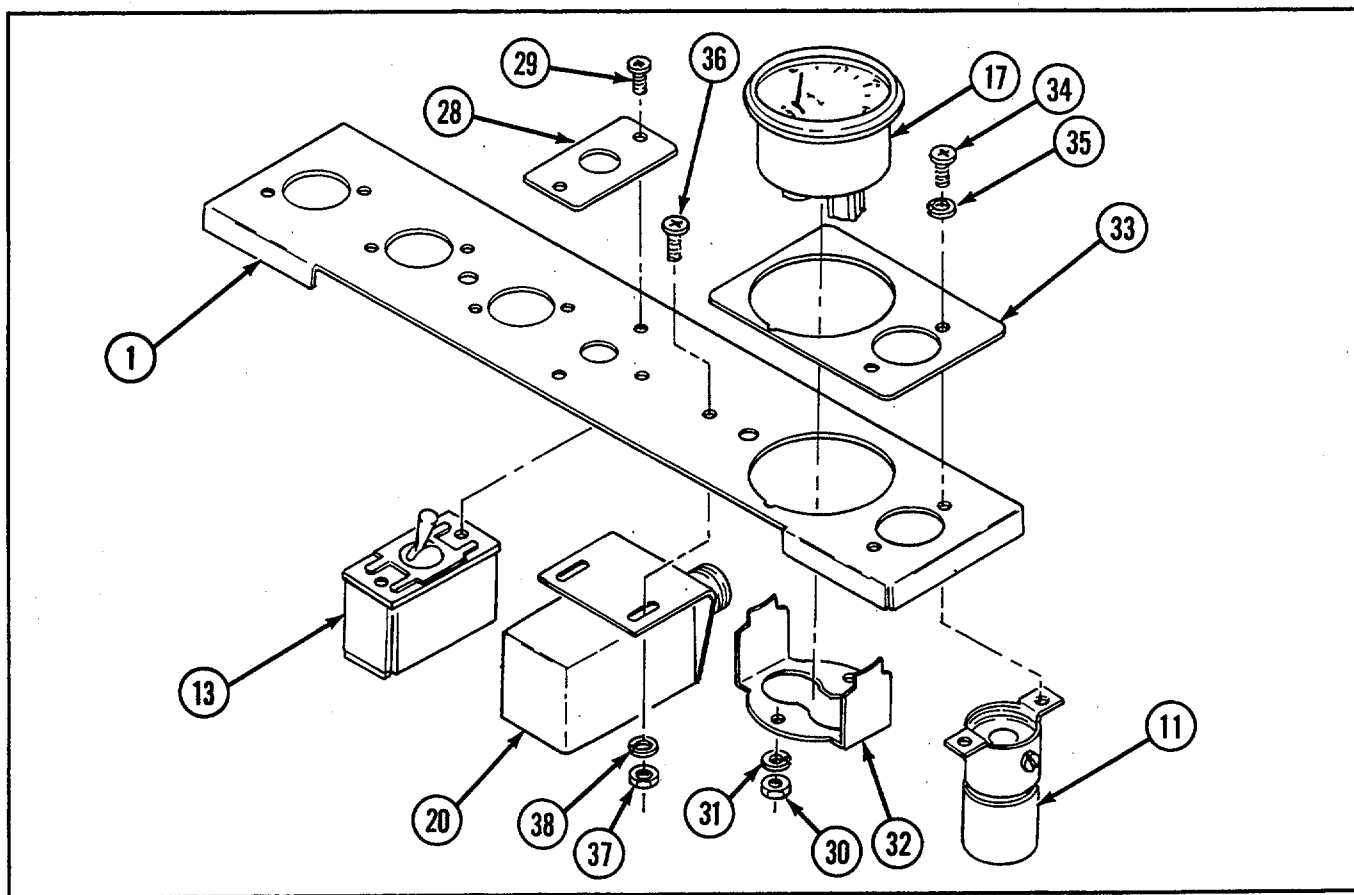


6-11 REPLACE/REPAIR FLASHER SYSTEM PANEL AND RELATED PARTS-Continued

- 9 Unscrew and remove four light lenses (21) and four preformed packings (22).
- 10 Remove four lamps (23) by depressing and turning counterclockwise.
- 11 Remove three gaskets (24).
- 12 Remove ID plate (25) and three indicator lights (7 and 9) by removing two screws (26) and two lockwashers (27) from each indicator light.



- 13 Remove switch (13) and ID plate (28) by removing two screws (29).
- 14 Remove gage (17) from front of flasher system panel (1) by removing two nuts (30), two lockwashers (31), and bracket (32).
- 15 Remove ID plate (33) and indicator light (11) by removing two screws (34), and two lockwashers (35).
- 16 Remove thermal flasher (20) by removing two screws (36), two nuts (37), and two lockwashers (38).



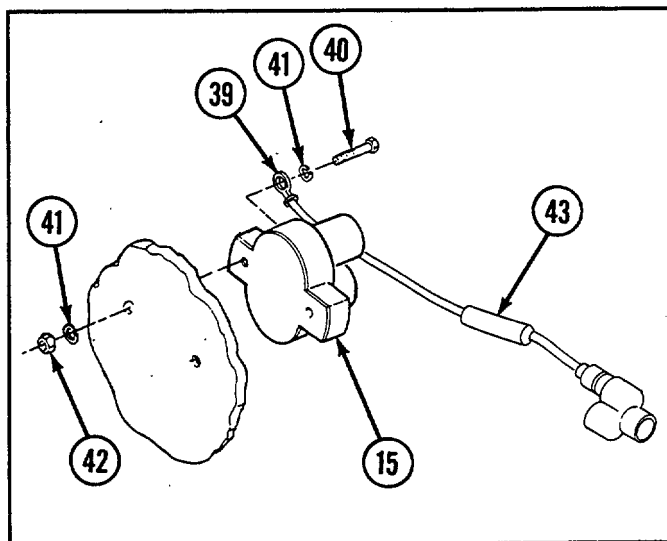
17 Remove circuit breaker (15) and disconnect ground lead (39) by removing two screws (40), three lockwashers (41), and two nuts (42). Remove diode assembly (43).

18 Disassemble wiring harnesses and lead assembly (see Chapter 6, Section VII).

b. INSTALLATION/ASSEMBLY

1 Install diode assembly (43). Install circuit breaker (15) and connect ground lead (39) using two screws (40), three new lockwashers (41), and two nuts (42).

2 Install thermal flasher (20) using two screws (36), two nuts (37), and two new lockwashers (38).



3 Install ID plate (33) and indicator light (11) using two screws (34) and two new lockwashers (35).

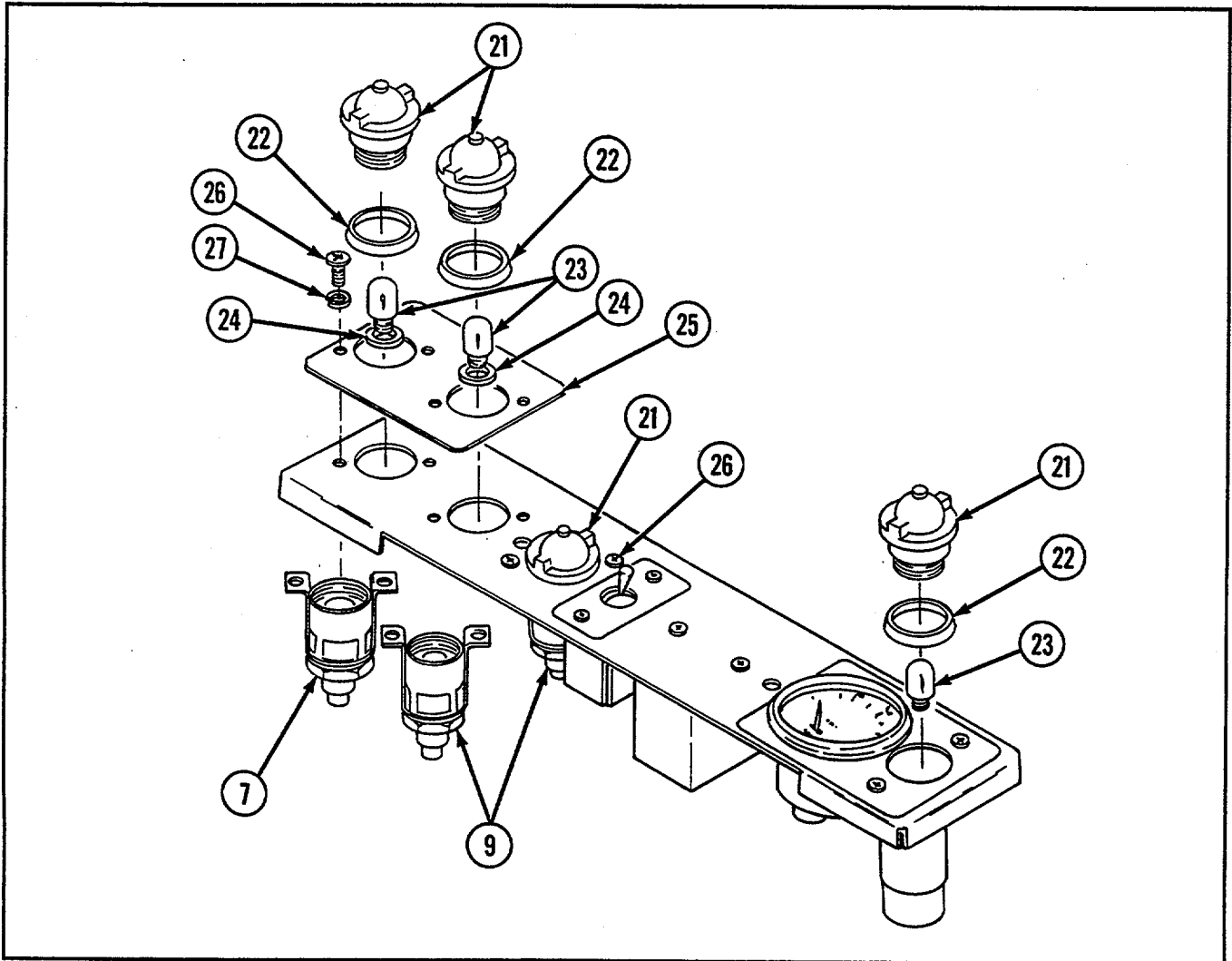
4 Install gage (17) to front of flasher system panel (1) using two nuts (30), two new lockwashers (31), and bracket (32).

5 Install switch (13) and ID plate (28) using two screws (29).

6 Install ID plate (25) and three indicator lights (7 and 9) using two screws (26) and two new lockwashers (27).

6-11 REPLACE/REPAIR FLASHER SYSTEM PANEL AND RELATED PARTS-Continued

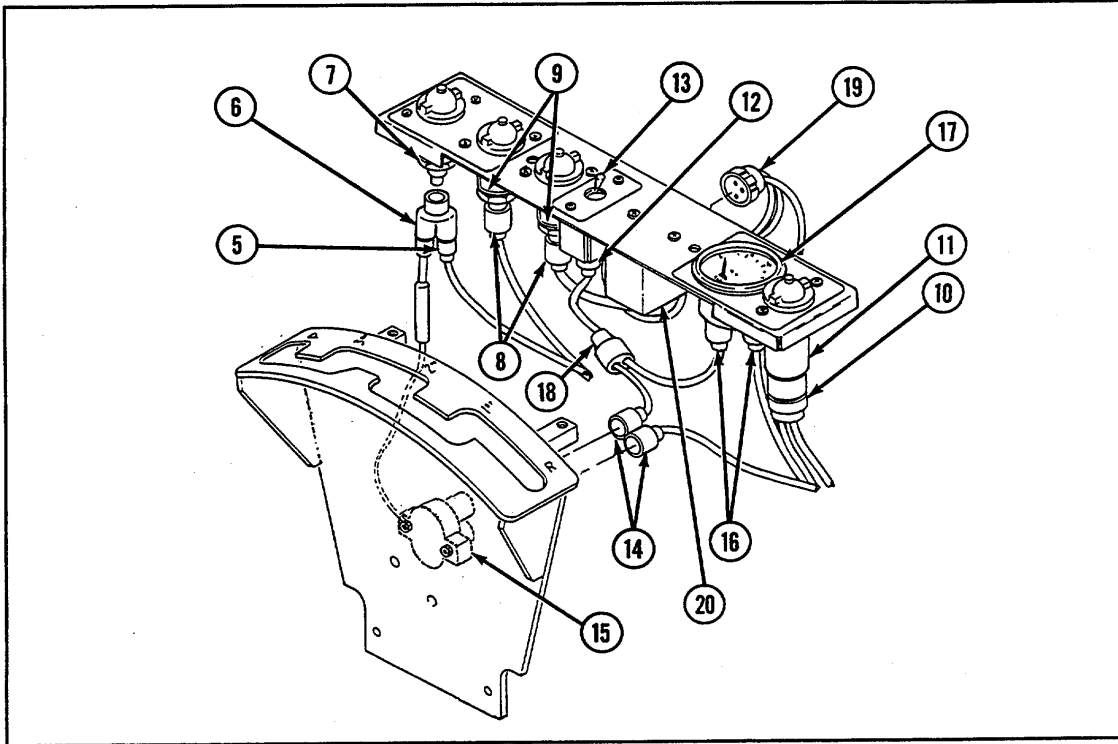
- 7 Install three gaskets (24).
- 8 Install four lamps (23) by depressing and turning clockwise.
- 9 Install four performed packings (22) and four light lenses (21).
- 10 Assemble wiring harnesses and lead assembly (see Chapter 6, Section VII).



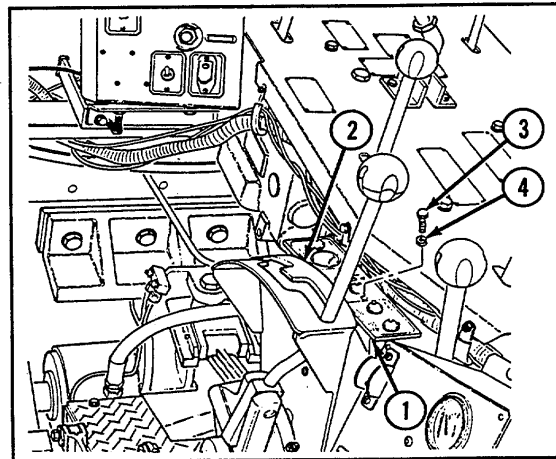
- 11 Connect connector (19) to thermal flasher (20).
- 12 Connect two connectors (16) to gage (17), and install lead assembly (18).
- 13 Connect two connectors (14) to circuit breaker (15).
- 14 Connect two connectors (12) to switch (13).
- 15 Connect connector (10) to indicator light (11).

16 Connect two connectors (8) to two indicator lights (9).

17 Connect connector (5) to Y-connector (6) and Y-connector to indicator light (7).



18 Install flasher system panel (1) to transmission shift lever bracket (2) using two screws (3) and two new lockwashers (4).



**SECTION III: SENDING UNITS, WARNING LIGHT SWITCHES, AND
WARNING HORNS**

Para.	Task	Page
6-13	Replace/Repair Switching Relay Box Assembly (Single Voltage Regulator)	6-43
6-14	Replace/Repair/Service Neutral Safety Switch.	6-46
6-15	Replace/Repair Driver' s Passive Night Viewer Switch and Light and B.O. Receiver Switch and Light	6-47
6-16	Replace/Repair Fire Extinguisher Interlock Switch Assembly	6-49
6-17	Replace/Repair Power Control Lever Switch	6-49
6-18	Replace Mechanical Transmission Lubrication Oil Low Pressure Switch	6-51
6-19	Replace Transmission Oil Pressure Sending Unit, Oil Temperature Sending Unit and Switch.....	6-51
6-20	Replace/Repair External Vehicle Warning Horn.....	6-52
6-21	Replace/ Repair Power-plant Warning Horn.....	6-51
6-23	Replace Engine Oil Temperature Sending Unit, Engine Oil Pressure Sending Unit, and Switches	6-55

6-13 REPLACE/REPAIR SWITCHING RELAY BOX ASSEMBLY (SINGLE VOLTAGE REGULATOR)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Calibration e. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic' s (Appendix C, item 53)

Parts:

- Gaskets (2) (Appendix G, item 66)
- Gasket (Appendix G, Item 87)
- Gasket (Appendix G, item 72)
- Lockwashers (2) (Appendix G, item 103)
- lockwashcrs (4) (Appendix G, item 106)
- Lockwashers (5) (Appendix G, item 108)

Parts-Continued:

- Lockwashers (12) (Appendix G, item 126)
- Lockwasher (Appendix G, item 127)
- Lockwashers (8) (Appendix G, item 128)
- Lockwashers (30) (Appendix G, item 130)

Equipment Condition:

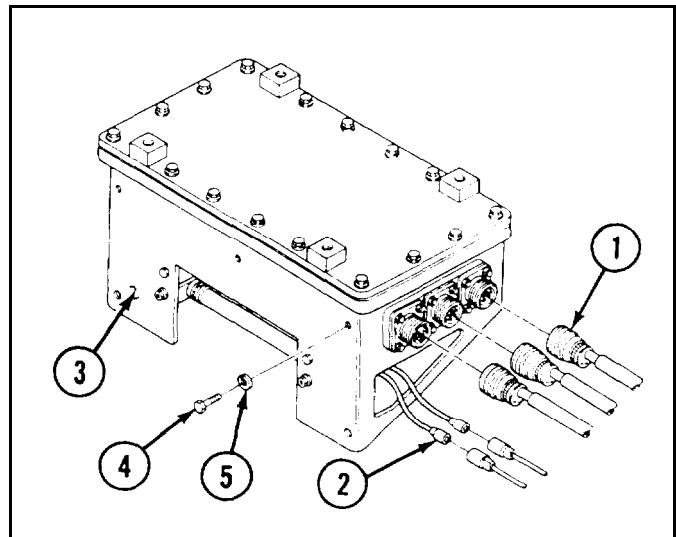
Left-rear air inlet doors removed (see paragraph 9-56)

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

a. REMOVAL

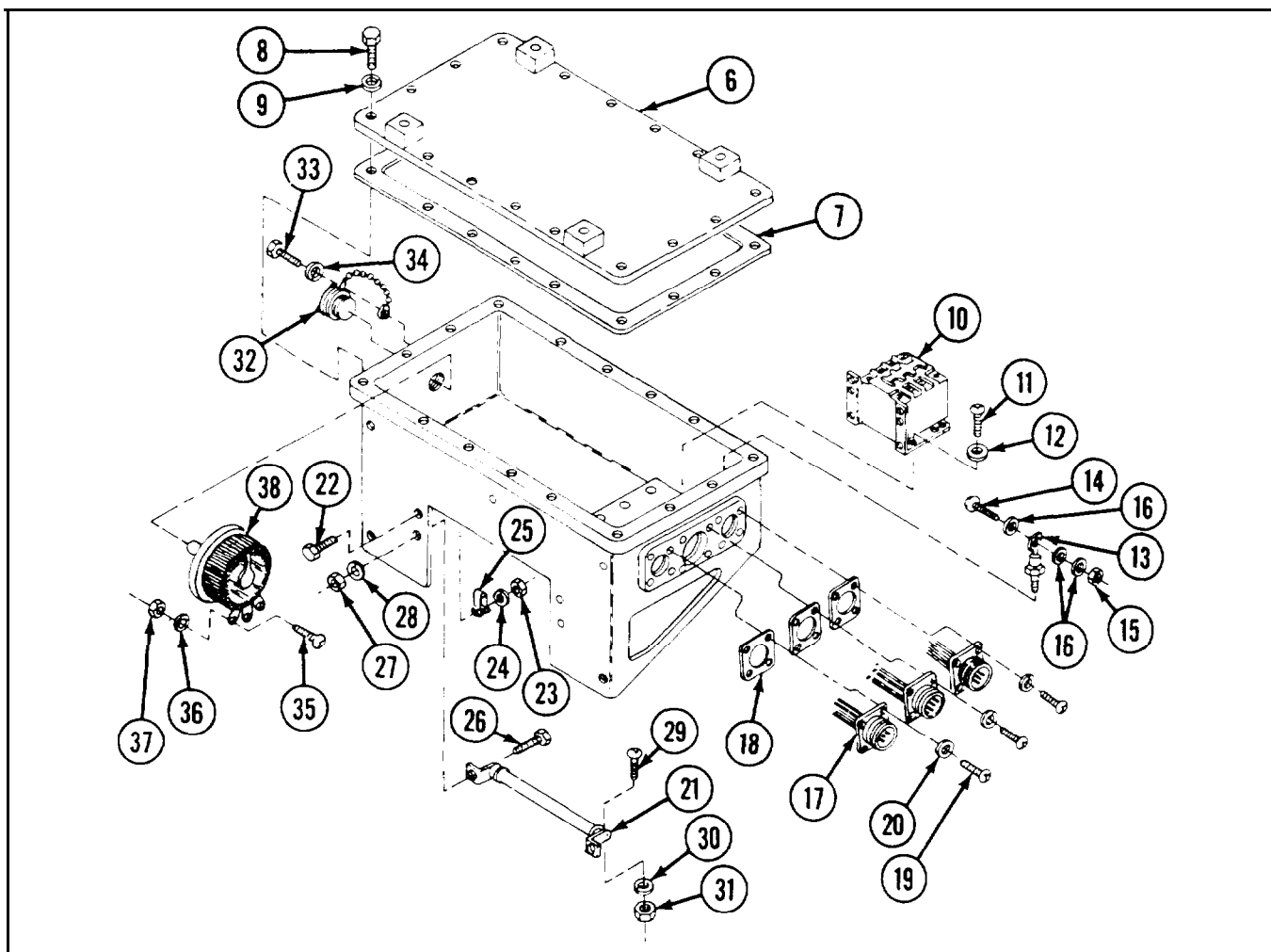
- 1 Disconnect three connectors (1).
- 2 Disconnect two leads (2).
- 3 Remove switching relay box (3) by removing five screws (4) and five lockwashers (5).



6-13 REPLACE/REPAIR SWITCHING RELAY BOX ASSEMBLY (SINGLE VOLTAGE REGULATOR)-Continued

b. DISASSEMBLY

- 1 Remove relay switch cover (6) and gasket (7) by removing 16 screws (8) and 16 lockwashers (9)
- 2 Remove relay (10) by removing eight screws (11) and eight lockwashers (12).
- 3 Remove two diodes (13) by removing two screws (14), two nuts (15), and six lockwashers (16)
- 4 Remove 3 connectors (17) and 3 gaskets (18) by removing 12 screws (19) and 12 lockwashers (30).
- 5 Remove bracket assembly (21) by removing two screws (22), two nuts (23), two lockwashers (24), two loop clamps (25), two screws (26), two nuts (27), and two lockwashers (28).
- 6 Remove screw (29), lockwasher (30), and nut (31).
- 7 Remove cap assembly (32), screw (33), and lockwasher (34).
- 6 Remove three screws (35), three nuts (36), three lockwashers (37), and rheostat (38).



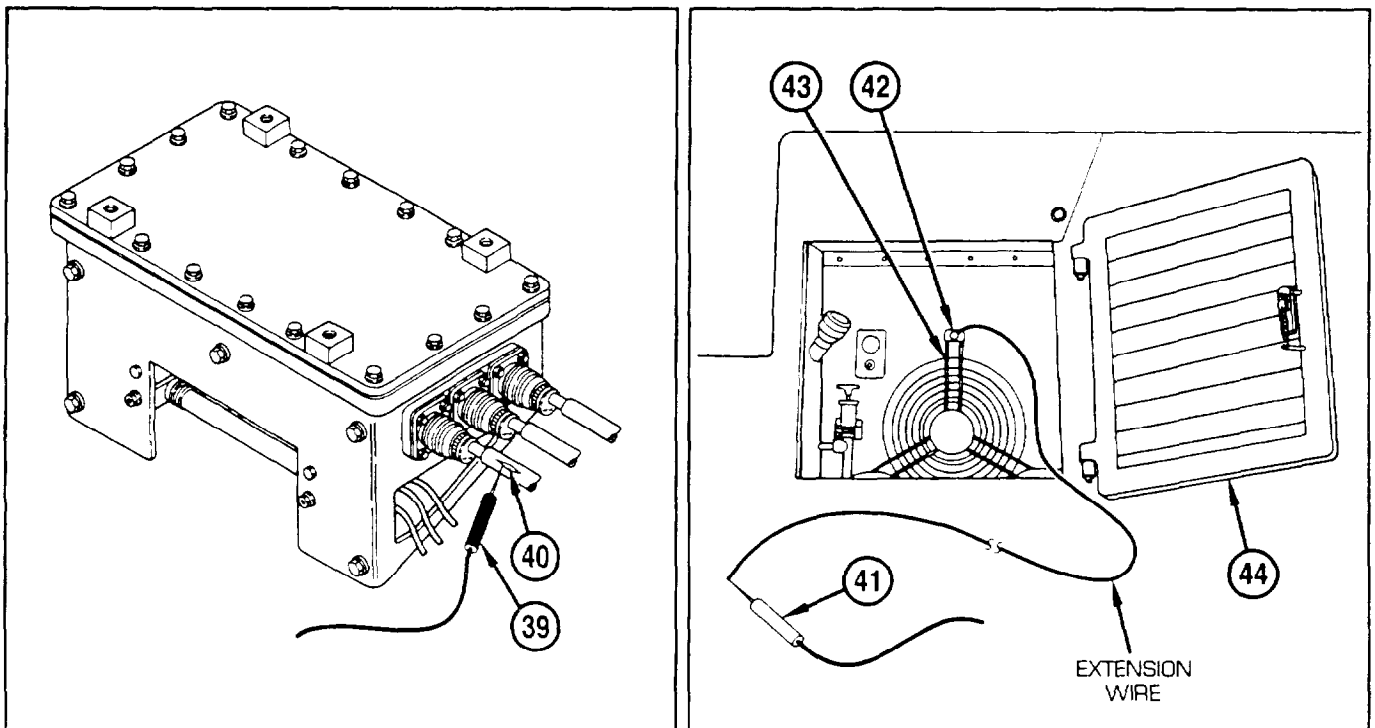
c. ASSEMBLY

- 1 Install rheostat (38), using three screws (35), three new lockwashers (37), and three nuts (36).
- 2 Install cap (32), new lockwasher (34), and screw (33).
- 3 Install screw (29), new lockwasher (30), and nut (31).
- 4 Install bracket assembly (21) using two screws (26), two new lockwashers (28), two nuts (27), two loop clamps (25), two screws (22), two new lockwashers (24), and two nuts (23).
- 5 Install 3 new gaskets (18) and 3 connectors (17), using 12 screws (19) and 12 new lockwashers (20).
- 6 Install two diodes (13) using two screws (14), six new lockwashers (16), and two nuts (15).
- 7 Install relay (10) using eight screws (11) and eight new lockwashers (12).
- 8 Install new gasket (7) and relay switch cover (6) using 16 new lockwashers (9) and 16 screws (S).

d. CALIBRATION

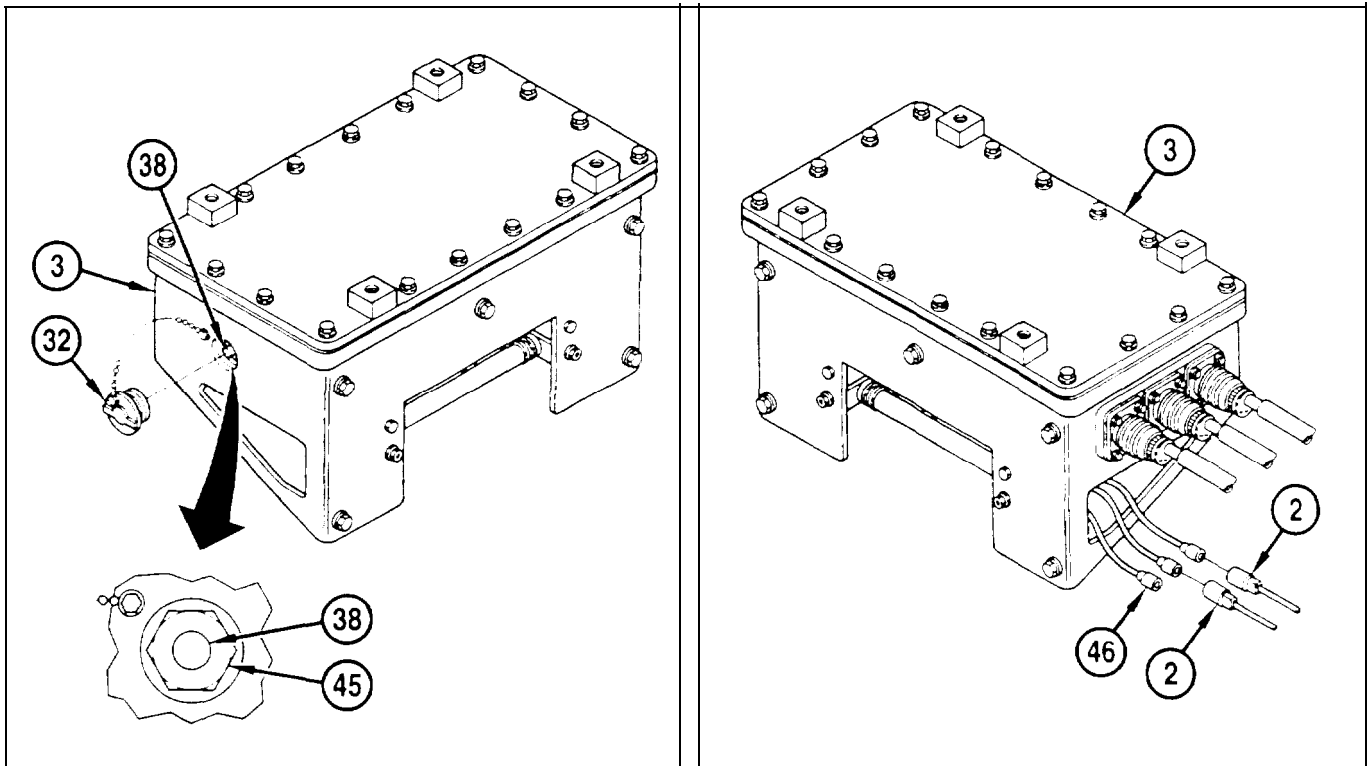
NOTE

- No calibration is required if the auxiliary power unit or switching relay box is removed and reinstalled with no change being affected.
 - System must not be operated four hours prior to performing this calibration procedure.
- 1 Place multimeter on one volt scale, and connect black lead (39) to wire of circuit 478A (40) at switching relay box (3) (ie., sharpen tip with file, and puncture circuit 478A insulation).
 - 2 Connect red lead (41) of multimeter onto a piece of extension wire, and connect other end of wire to mounting screw (42) of APU flywheel guard (43) inside AFU access door (44).



6-13 REPLACE/REPAIR SWITCHING RELAY BOX ASSEMBLY (SINGLE VOLTAGE REGULATOR)-Continued

- 3 Remove cap assembly (32) from end of switching relay box (3), loosen rheostat locknut (45) with screwdriver, and turn rheostat (38) fully counterclockwise.
- 4 Connect only, the 61A leads (3) of resistor beneath switching relay box (3), leaving 61AC (46) open



- 5 Start main engine, operate at approximately 1000 rpm and charge batteries for 30 minutes, then turn off engine.
- 6 Leave main engine fuel turned off, and crank its starter for three cycles of 15 seconds on and 3 minutes off
- 7 Start APU, and warm up, unloaded for one minute
- 8 Turn on generator switch and quickly (within 15 seconds) adjust rheostat for .50 volts on meter before movement of rheostat no longer produces a voltage change, or voltage begins to decrease. Then turn off APU generator and engine.

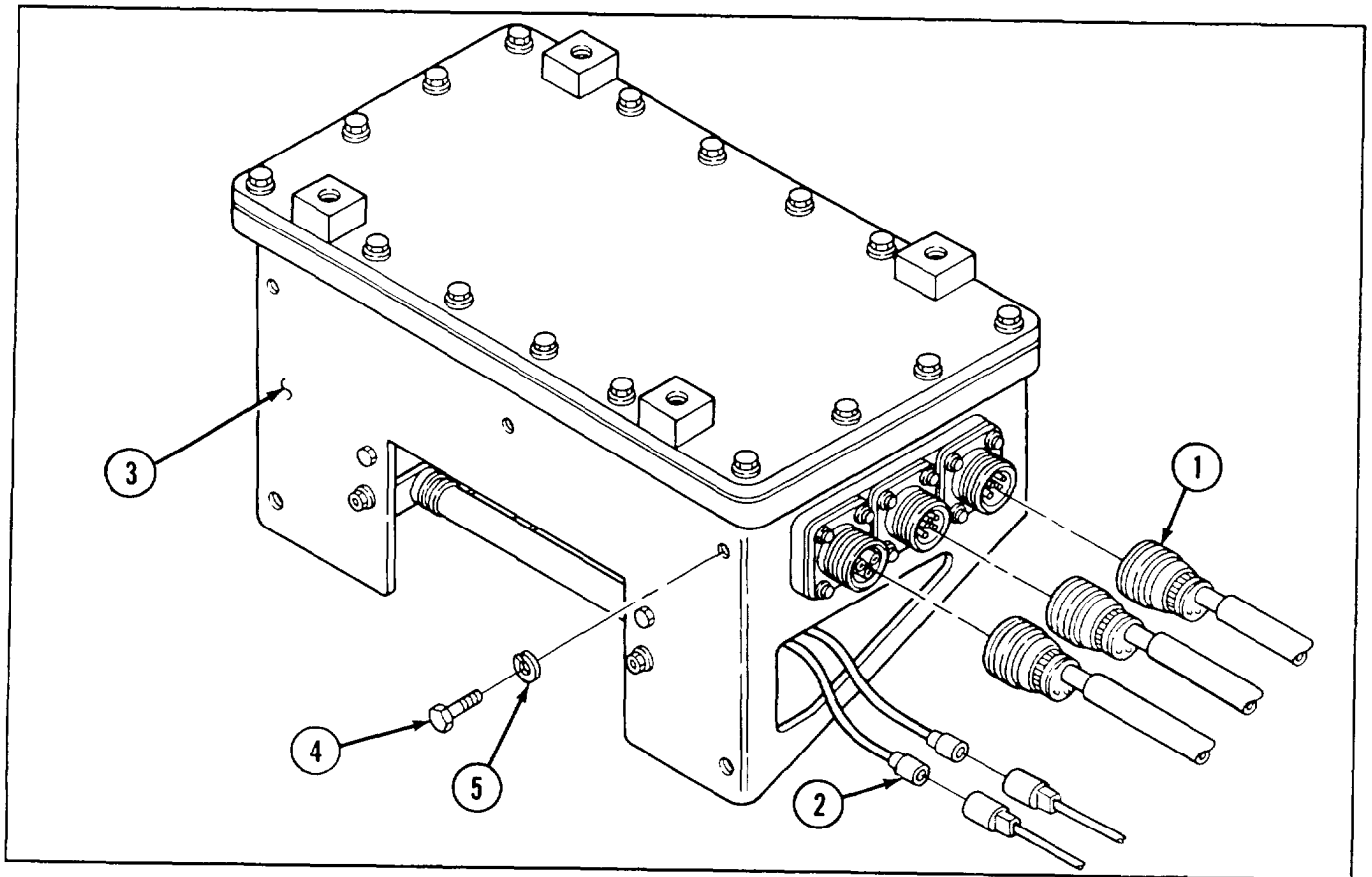
NOTE

If adjustment of rheostat cannot be made to obtain .50 volts, turn off generator and engine, return rheostat fully counterclockwise, replace a 61A lead on resistor with 61AC lead, then continue with step 9.

- 9 Repeat steps 6, 7, and 8 to make final adjustment of rheostat so as to obtain .50 volts on multimeter
10. Tighten rheostat locknut (45), replace cap assembly (32) on switching relay box (3). Disconnect leads (2). Remove multimeter. System is calibrated.

e. INSTALLATION

- 1 Install switching relay box (3) using five new lockwashers (5) and five screws (4).
- 2 Connect two leads (2).
- 3 Connect three connectors (1).



NOTE

Follow-on maintenance: Install left-rear air inlet doors (see paragraph 9-56)

6-14 REPLACE/REPAIR/SERVICE NEUTRAL SAFETY SWITCH

THIS TASK COVERS

- a. Removal b. Disassembly. c. Assembly d. Installation e. Adjustment

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Lockwashers (4) (Appendix G, item 153)

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

a. REMOVAL

NOTE

Switch and mounting removed to show switch, normally located beneath switch panel bracket assembly.

1. Disconnect two connectors (1).
2. Remove neutral safety switch (2) by removing four screws (3) and four lockwashers

b. DISASSEMBLY

Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

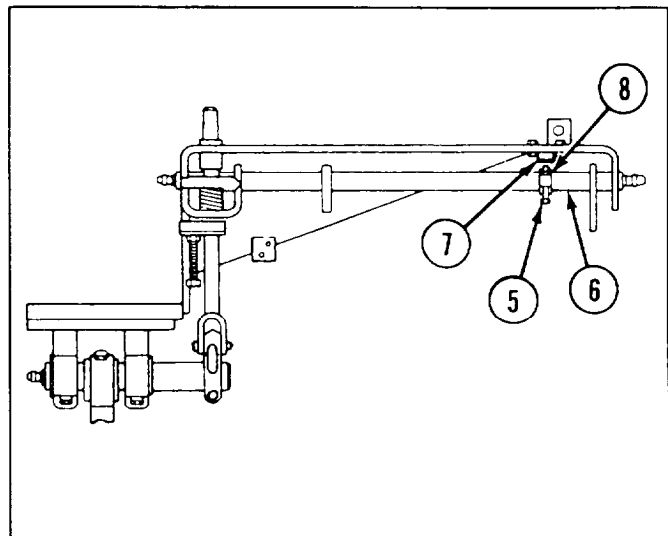
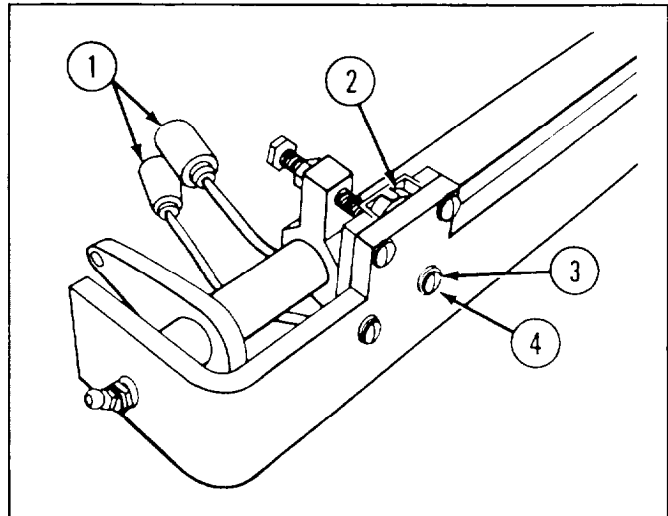
Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Install neutral safety switch (2) using four screws (3) and four new lockwashers (4).
- 2 Connect two connectors (1)

e. ADJUSTMENT

Check adjustment screw (5) on neutral safety switch level cross shaft (6) for contact with neutral safety switch (7). If the adjustment screw is not in contact with neural safety switch, loosen locknut (8) on adjustment screw. adjust length of screw until neutral safety switch is engaged. Tighten locknut.



6-15 REPLACE/REPAIR DRIVER'S PASSIVE NIGHT VIEWER SWITCH AND LIGHT AND B.O. RECEIVER SWITCH AND LIGHT

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Lockwashers (4) (Appendix G, item 104)

WARNING

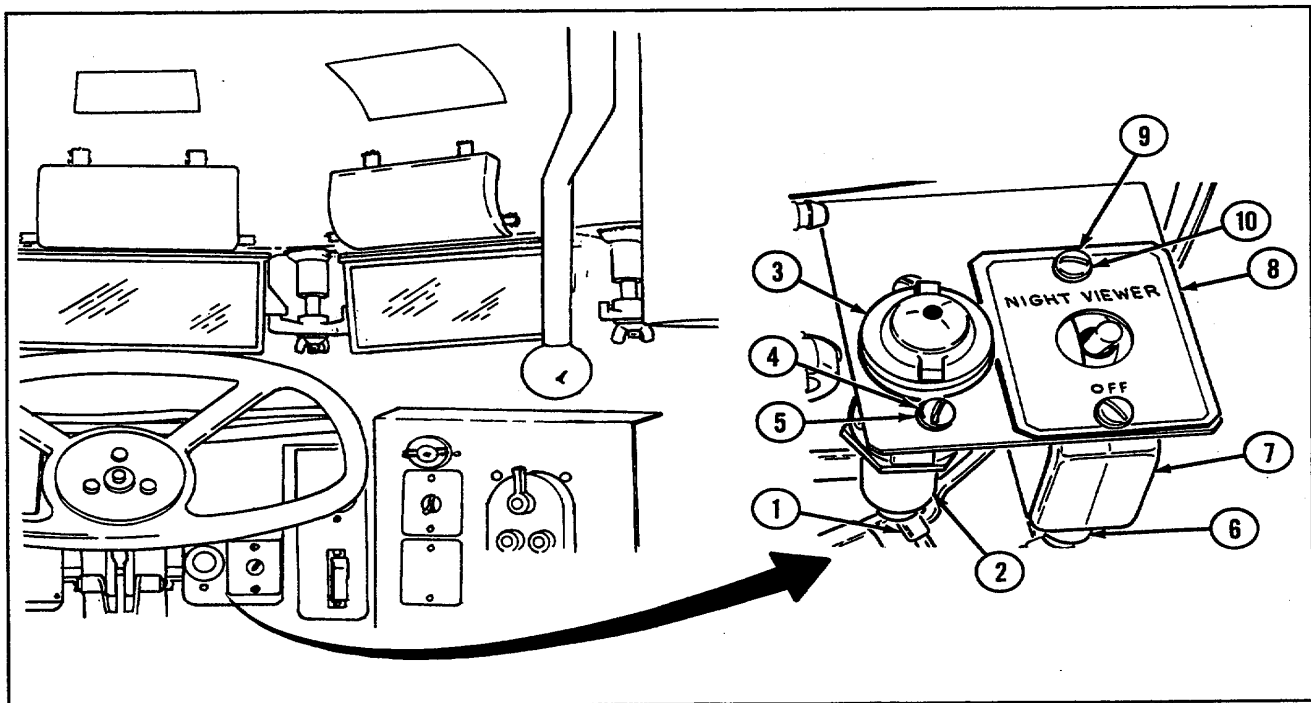
Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

NOTE

Driver's passive night viewer switch and light and B.O. receiver switch and light are removed and installed in the same manner.

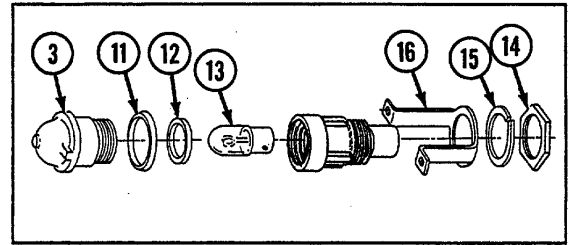
a. REMOVAL

- 1 Disconnect connector (1) from driver's night viewer light (2).
- 2 Remove light cover (3) by turning counterclockwise.
- 3 Remove driver's night viewer light (2) by removing two screws (4) and two lockwashers (5).
- 4 Disconnect two connectors (6) from driver's night viewer switch (7).
- 5 Remove driver's night viewer switch (7) and identification (ID) plate (8) by removing two screws (9) and two lockwashers (10).



6-15 REPLACE/REPAIR DRIVER'S PASSIVE NIGHT VIEWER SWITCH AND LIGHT AND B.O. RECEIVER SWITCH AND LIGHT--Continued**b. DISASSEMBLY**

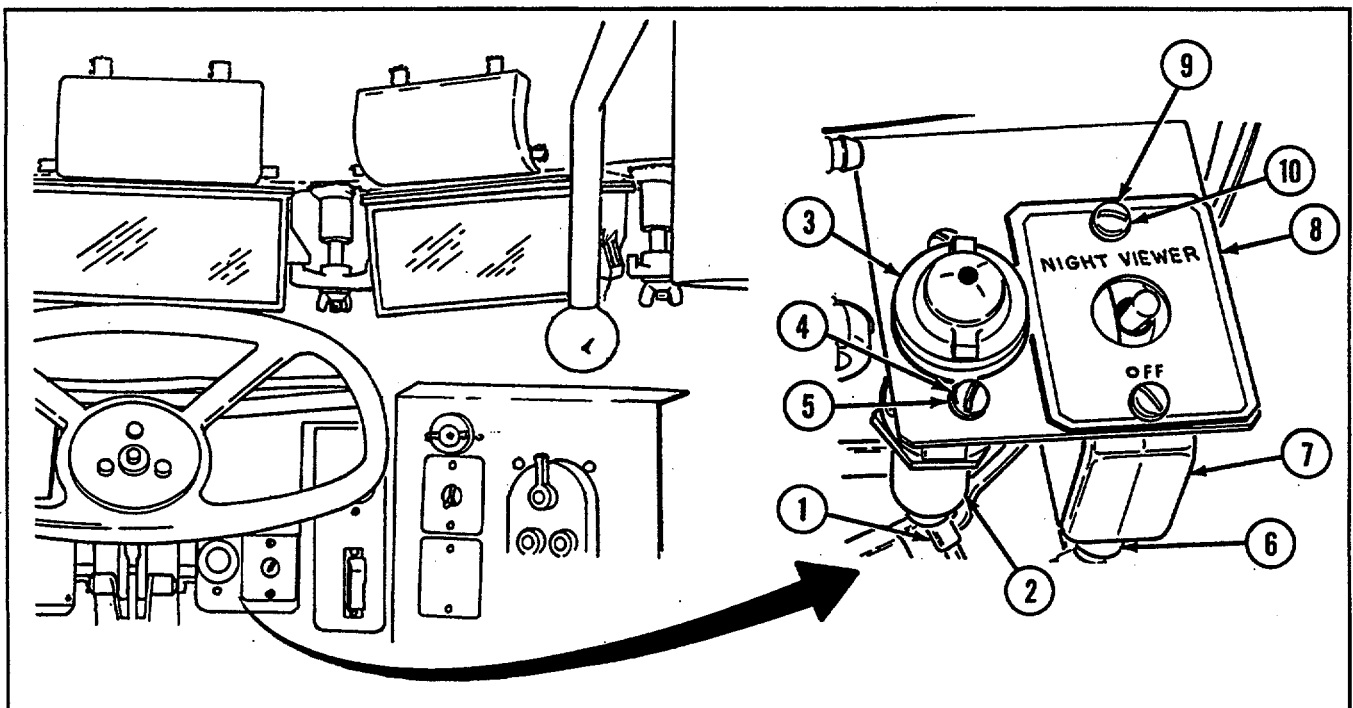
- 1 Remove preformed packing (11) from light cover (3).
- 2 Remove gasket (12) and lamp (13).
- 3 Remove bondnut (14), lockwasher (15), and retaining bracket (16).

**c. ASSEMBLY**

- 1 Install retaining bracket (16), lockwasher (15), and bondnut (14).
- 2 Install lamp (13) and gasket (12).
- 3 Install preformed packing (11) on light cover (3).

d. INSTALLATION

- 1 Install driver's night viewer switch (7) and ID plate (8) using two screws (9) and two new lockwashers (10).
- 2 Connect two connectors (6) to driver's night viewer switch (7).
- 3 Install driver's night viewer light (2) using two screws (4) and two new lockwashers (5).
- 4 Install light cover (3) by turning clockwise.
- 5 Connect connector (1) to driver's night viewer light (2).



6-16 REPLACE/REPAIR FIRE EXTINGUISHER INTERLOCK SWITCH ASSEMBLY

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

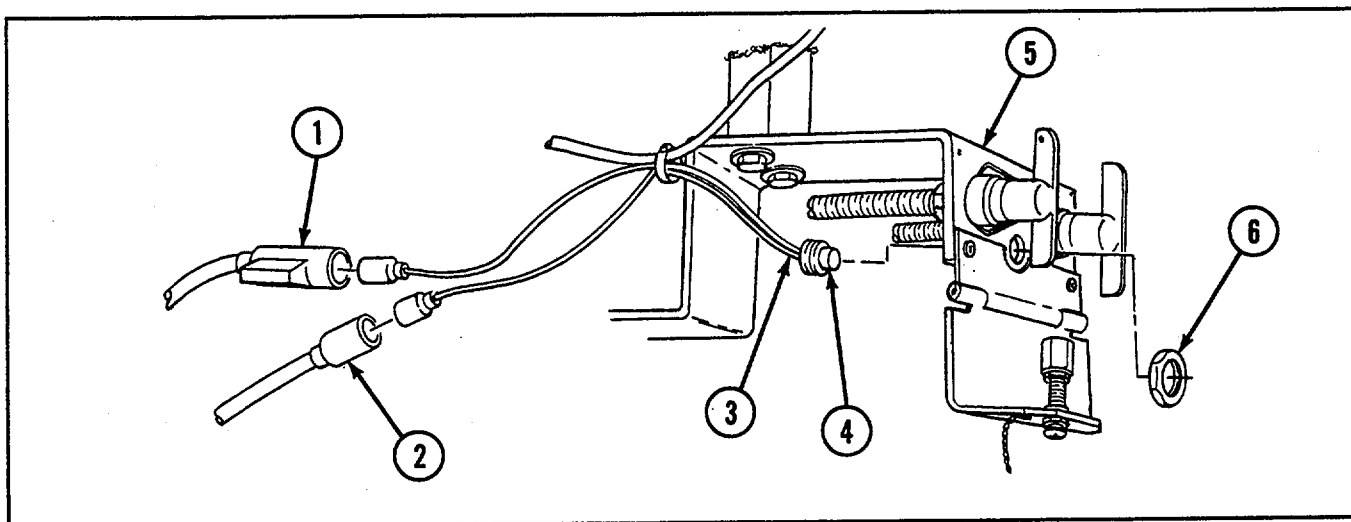
Tool kit, general mechanic's (Appendix C, item 53)

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

a. REMOVAL

- 1 Disconnect two connectors (1 and 2) from fire extinguisher interlock (3).
- 2 Remove push switch (4) from bracket (5) by loosening locknut (6).



b. DISASSEMBLY

Disassemble switch assembly (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble switch assembly (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect push switch (4) to bracket (5) by tightening locknut (6).
- 2 Connect two connectors (1 and 2) to fire extinguisher interlock (3).

6-17 REPLACE/REPAIR POWER CONTROL LEVER SWITCH

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tool:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Lockwashers (4) (Appendix G, item 129)

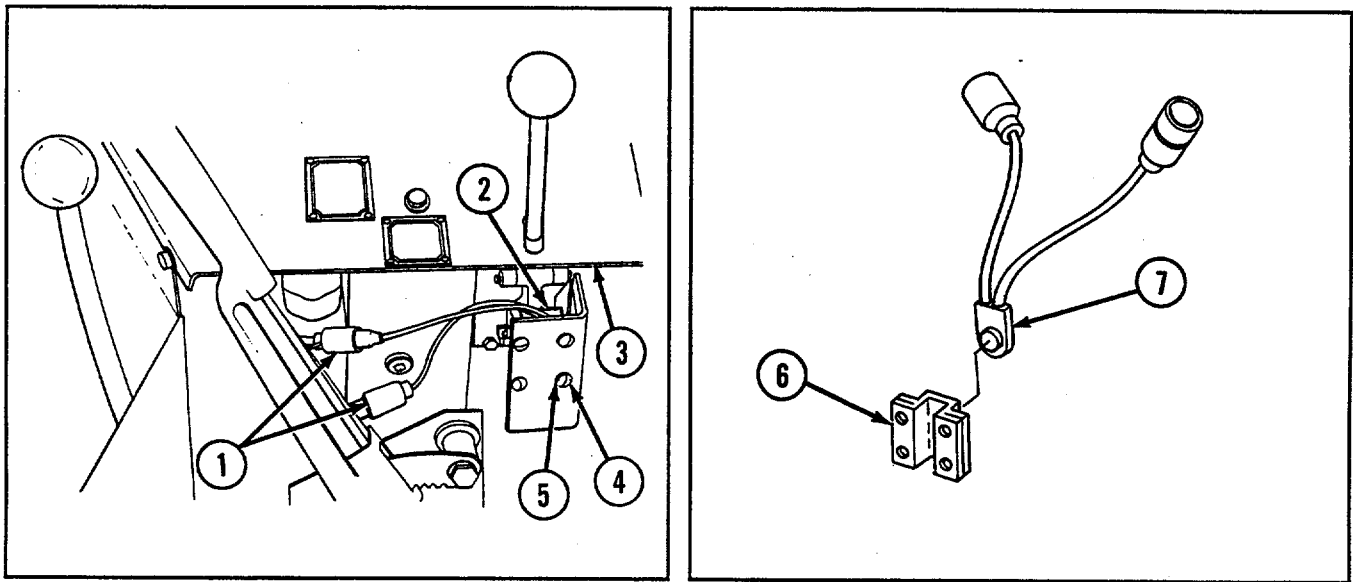
6-17 REPLACE/REPAIR POWER CONTROL LEVER SWITCH--Continued

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

a. REMOVAL

- 1 Disconnect two connectors (1).
- 2 Remove power control lever switch (2) from hydraulic system control panel (3) by removing four screws (4) and four lockwashers (5).
- 3 Disconnect contact assembly (6) from sensitive switch (7).

**b. DISASSEMBLY**

Disassemble two lead assemblies (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble two lead assemblies (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect contact assembly (6) to sensitive switch (7).
- 2 Install power control lever switch (2) to hydraulic system control panel (3) using four screws (4) and four new lockwashers (5).
- 3 Connect two connectors (1).

6-18 REPLACE MECHANICAL TRANSMISSION LUBRICATION OIL LOW PRESSURE SWITCH

THIS TASK COVERS

- a. Removal b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's
(Appendix C, item 53)

Material:

Compound, sealing (Appendix
D, item 25)

Equipment Condition:

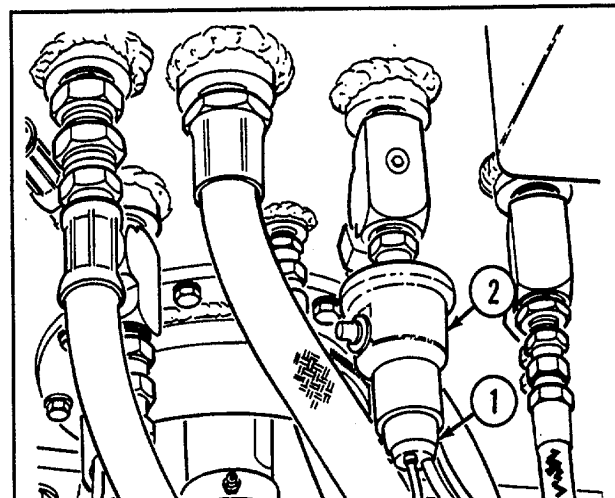
Subfloor plates removed as
required (see Chapter 9,
Section I)

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

a. REMOVAL

- 1 Disconnect connector (1) from mechanical transmission lubrication oil low pressure switch (2).
- 2 Unscrew and remove mechanical transmission lubrication oil low pressure switch (2).



b. INSTALLATION

Coat threads of mechanical transmission lubrication oil low pressure switch with sealing compound during installation.

- 1 Install mechanical transmission lubrication oil low pressure switch (2).
- 2 Connect connector (1) to mechanical transmission lubrication oil low pressure switch (2).

NOTE

Follow-on maintenance: Install subfloor plates if removed (see Chapter 9, Section I)

6-19 REPLACE TRANSMISSION OIL PRESSURE SENDING UNIT, OIL TEMPERATURE SENDING UNIT AND SWITCH

THIS TASK COVERS

- a. Removal b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Equipment Condition:

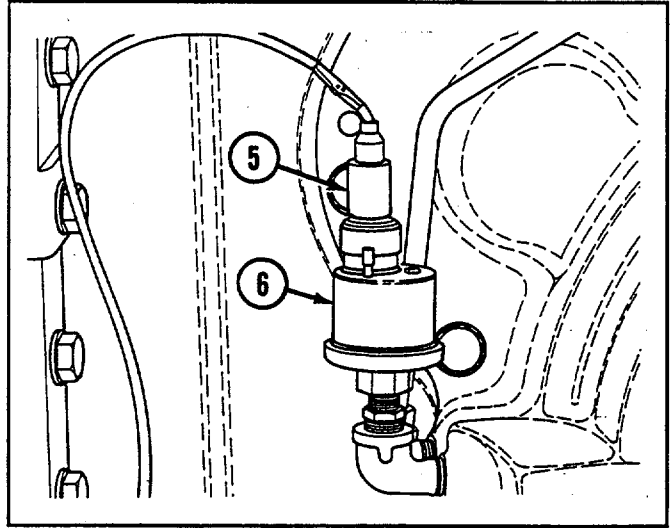
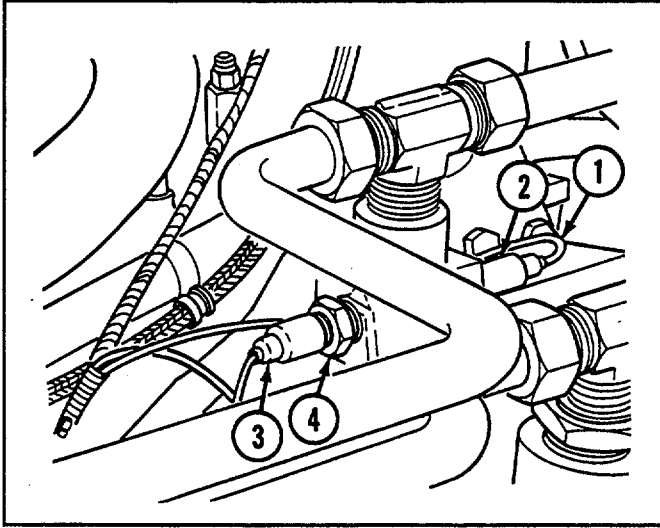
Powerplant removed (see paragraph 3-1)

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

6-19 REPLACE TRANSMISSION OIL PRESSURE SENDING UNIT, OIL TEMPERATURE SENDING UNIT AND SWITCH-Continued**a. REMOVAL**

- 1 Disconnect connector (1) from thermostatic switch (2). Unscrew and remove thermostatic switch.
- 2 Disconnect connector (3) from temperature transmitter (4). Unscrew and remove temperature transmitter.
- 3 Disconnect connector (5) from pressure transmitter (6). Unscrew and remove pressure transmitter.

**b. INSTALLATION**

- 1 Install pressure transmitter (6) and connect connector (5).
- 2 Install temperature transmitter (4) and connect connector (3).
- 3 Install thermostatic switch (2) and connect connector (1).

NOTE

Follow-on maintenance: Install powerplant (see paragraph 3-1)

**6-20 REPLACE/REPAIR EXTERNAL VEHICLE WARNING HORN
THIS TASK COVERS**

- | a. Removal | b. Disassembly | c. Assembly | d. Installation |
|------------|----------------|-------------|-----------------|
|------------|----------------|-------------|-----------------|

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Lockwashers (2) (Appendix G, item 105)
- Lockwashers (3) (Appendix G, item 130)

WARNING

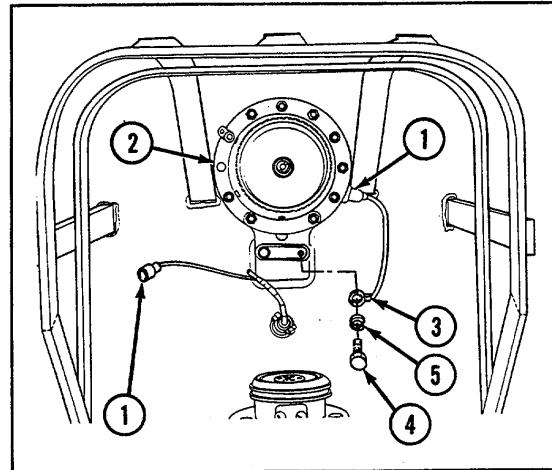
Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

a. REMOVAL

NOTE

Headlight removed for clarity only .

- 1 Disconnect two connectors (1) from external vehicle warning horn (2).
- 2 Remove external vehicle warning horn (2) and ground lead (3) by removing two screws (4) and two lockwashers (5).
- 3 Disconnect connectors (6).
- 5 Remove wheel (7) with horn switch (8) by removing three screws (9) and three lockwashers (10).
- 6 Remove horn switch (8) from wheel (7).



b. DISASSEMBLY

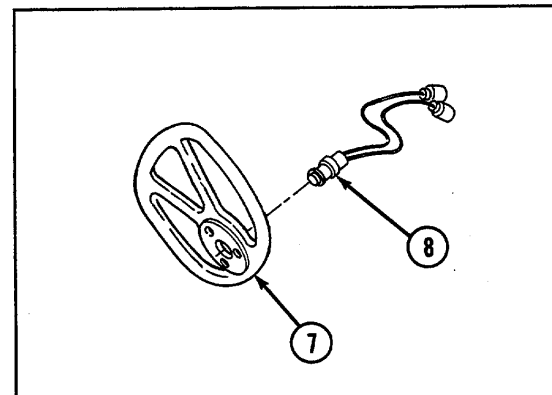
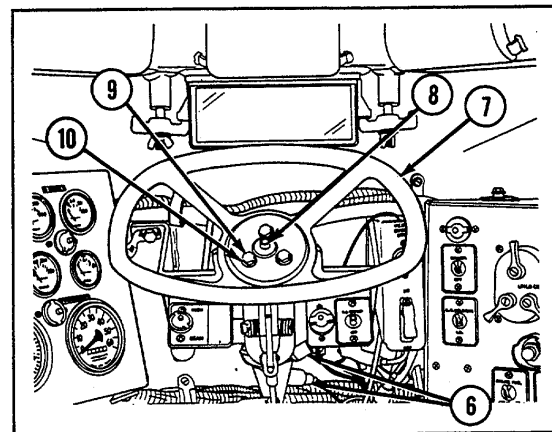
Disassemble leads (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble leads (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Install wheel (7) to horn switch (8).
- 2 Install wheel (7) with horn switch (8) using three screws (9) and three new lockwashers (10).
- 3 Connect connectors (6).
- 4 Install external vehicle warning horn (2) and ground lead (3) using two screws (4) and two new lockwashers (5).
- 5 Connect two connectors (1) to external vehicle warning horn (2).



6-21 REPLACE/REPAIR POWERPLANT WARNING HORN**THIS TASK COVERS**

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Lockwashers (2) (Appendix G, item 105)
- Lockwashers (2) (Appendix G, item 116)

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

a. REMOVAL

- 1 Disconnect two connectors (1) from powerplant warning horn (2).
- 2 Remove powerplant warning horn (2) and ground lead (3) by removing two screws (4) and two lockwashers (5).
- 3 Disconnect connector (6) from warning horn relay (7).
- 4 Remove warning horn relay (7) by removing two screws (8) and two lockwashers (9).

b. DISASSEMBLY

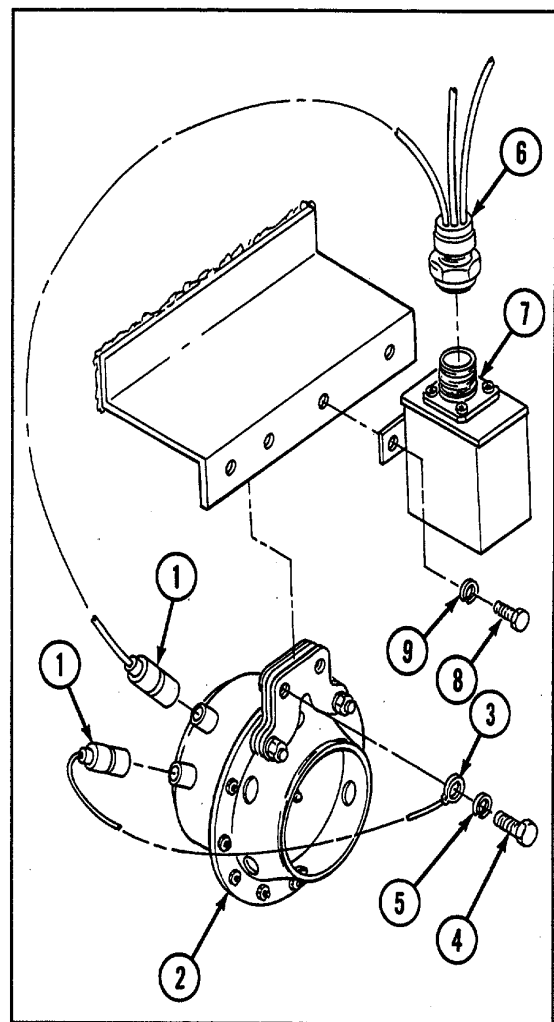
Disassemble lead (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble lead (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Install warning horn relay (7) using two screws (8) and two new lockwashers (9).
- 2 Connect connector (6) to warning horn relay (7).
- 3 Install powerplant warning horn (2) and ground lead (3) using two screws (4) and two new lockwashers (5).
- 4 Connect two connectors (1) to powerplant warning horn (2).



6-22 REPLACE ENGINE OIL TEMPERATURE SENDING UNIT, ENGINE OIL PRESSURE SENDING UNIT, AND
SWITCHES

THIS TASK COVERS

a. Removal

b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's
(Appendix C, item 53)

Material:

Compound, sealing (Appendix
D, item 25)

Equipment Condition:

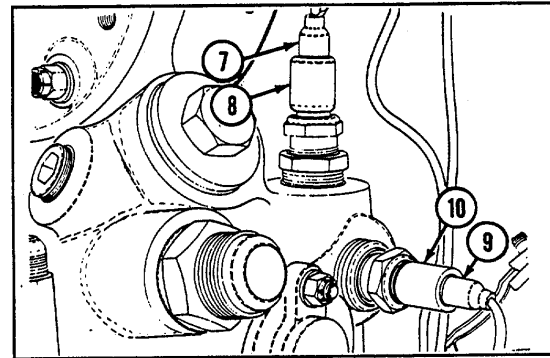
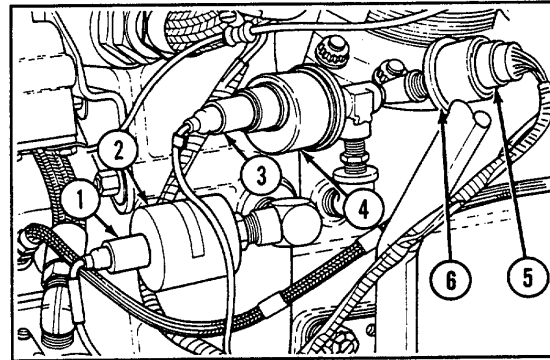
Powerplant removed (see
paragraph 3-1)

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

a. REMOVAL

- 1 Disconnect connector (1) from switch (2). Remove switch.
- 2 Disconnect connector (3) from engine oil pressure sending unit (4). Remove engine oil pressure sending unit.
- 3 Disconnect connector (5). Remove main engine oil pressure switch (6).
- 4 Disconnect connector (7) from engine oil temperature sending unit (8).
- 5 Disconnect connector (9) from switch (10). Remove engine oil temperature sending unit (8).
- 6 Remove switch (10).



b. INSTALLATION

NOTE

Apply sealing compound to threads of all
sending units (4 and 8) and switches (2 and 10).

- 1 Install switch (10).
- 2 Install engine oil temperature sending unit (8) and connect connector (9) to switch (10).
- 3 Connect connector (7) to engine oil temperature sending unit (8).
- 4 Install main engine oil pressure switch (6) and connect connector (5).
- 5 Install engine oil pressure sending unit (4) and connect connector (3).
- 6 Install switch (2) and connect connector (1).
- 7 Install test cables and hoses. Test run engine prior to installation. Observe for leaks.

NOTE

Follow-on maintenance: Install powerplant (see paragraph 3-1).

SECTION IV: LIGHTING SYSTEM

Para.	Task	Page
6-23	Replace Stoplight Switch	6-56
6-24	Replace Rigger's Service Light.....	6-57
6-25	Replace Driver's Headlight Dimmer Switch and Mounting Bracket.....	6-58
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6-23 REPLACE STOPLIGHT SWITCH

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

- | | |
|--|--|
| Tools: | Parts: |
| Tool kit, general mechanic's (Appendix C, item 53) | Lockwashers (2) (Appendix G, item 116) |

WARNING

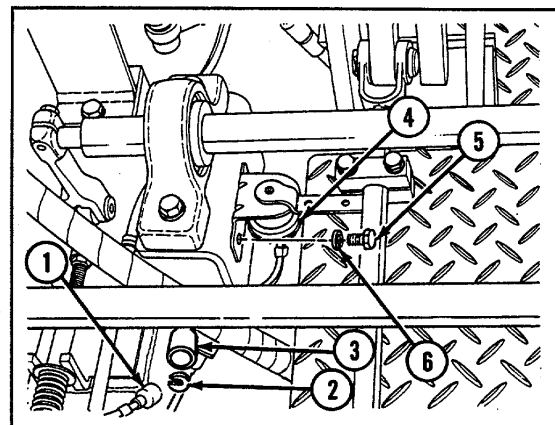
Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

a. REMOVAL

- 1 Disconnect two connectors (1) and remove two slotted washers (2) and two connector shells (3).
- 2 Remove stoplight switch (4) by removing two screws (5) and two lockwashers (6).

b. INSTALLATION

- 1 Install stoplight switch (4) using two new lockwashers (6) and two screws (5).
- 2 Assemble two connector shells (3) and two slotted washers (2) to two connectors (1) and connect connectors.



6-24 REPLACE RIGGER'S SERVICE LIGHT SWITCH**THIS TASK COVERS**

a. Removal

b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

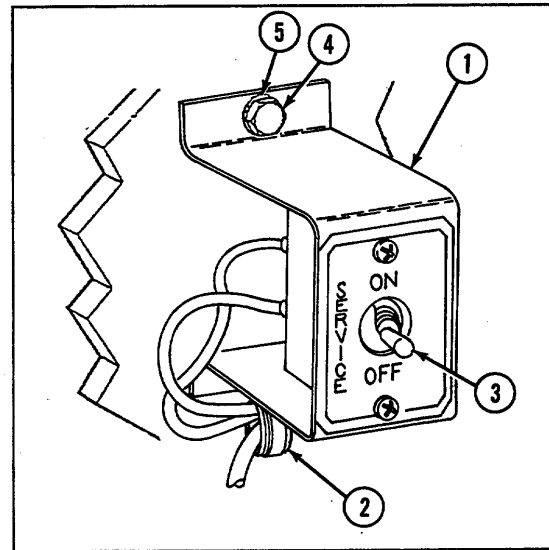
Lockwashers (2) (Appendix G, item 116)

WARNING

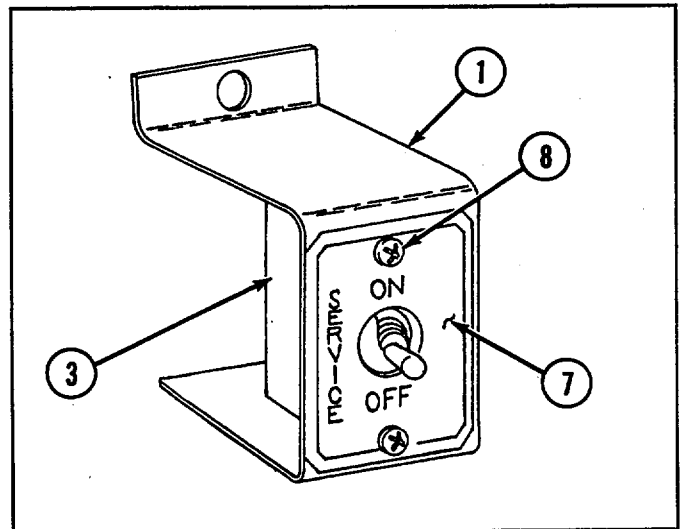
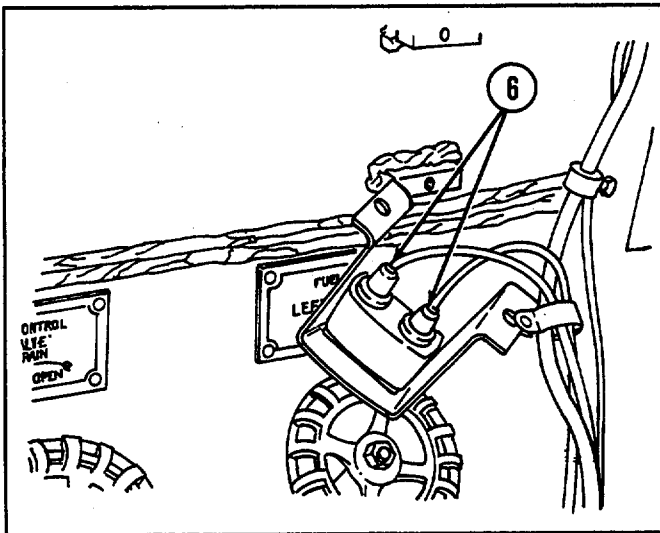
Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

a. REMOVAL

- 1 Remove switch mount (1) and clamp (2) with rigger's light selector switch (3) from hull wall by removing two screws (4) and two lockwashers (5).
- 2 Disconnect two connectors (6) from rigger's light selector switch (3).
- 3 Remove rigger's light selector switch (3) and identification (ID) plate (7) from switch mount (1) by removing two screws (8).

**b. INSTALLATION**

- 1 Install rigger's light selector switch (3) and ID plate (7) on switch mount (1) using two screws (8).
- 2 Connect two connectors (6) to rigger's light selector switch (3).
- 3 Install switch mount (1) and clamp (2) on hull wall using two screws (4) and two new lockwashers (5).



6-25 REPLACE DRIVER'S HEADLIGHT DIMMER SWITCH AND MOUNTING BRACKET**THIS TASK COVERS**

a. Removal

b. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's (Appendix C, item 54)

Parts:

● Lockwashers (3) (Appendix G, item 106)

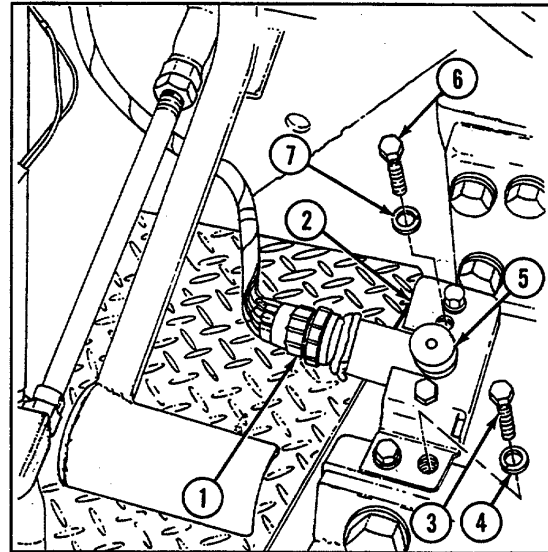
● Lockwashers (2) (Appendix G, item 118)

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

a. REMOVAL

- 1 Disconnect connector (1).
- 2 Remove mounting bracket (2) by removing three screws (3) and three lockwashers (4).
- 3 Remove dimmer switch (5) by removing two screws (6) and two lockwashers (7).

**b. INSTALLATION**

- 1 Assemble dimmer switch (5) to mounting bracket (2) using three screws (6) and three new lockwashers (7).
- 2 Install mounting bracket (2) using two screws (3) and two new lockwashers (4).
- 3 Connect connector (1).

6-26 REPLACE/REPAIR FRONT HEADLIGHT ASSEMBLY**THIS TASK COVERS**

a. Removal

b. Disassembly

c. Assembly

d. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's (Appendix C, item 53)

Materials/Parts:

- Adhesive (Appendix D, item 5)
- Silicone Compound (Appendix D, item 28)
- Grease, aircraft (Appendix D, item 14)
- Gasket (Appendix G, item 40)
- Gasket (Appendix G, item 42)

Materials/Parts-Continued:

- Gaskets (2) (Appendix G, item 43)
- Gaskets (2) (Appendix G, item 44)
- Gasket (Appendix G, item 45)
- Gaskets (2) (Appendix G, item 79)
- Lockwashers (2) (Appendix G, item 103)
- Lockwashers (6) (Appendix G, item 104)
- Lockwashers (3) (Appendix G, item 114)
- Lockwashers (4) (Appendix G, item 97)

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

NOTE

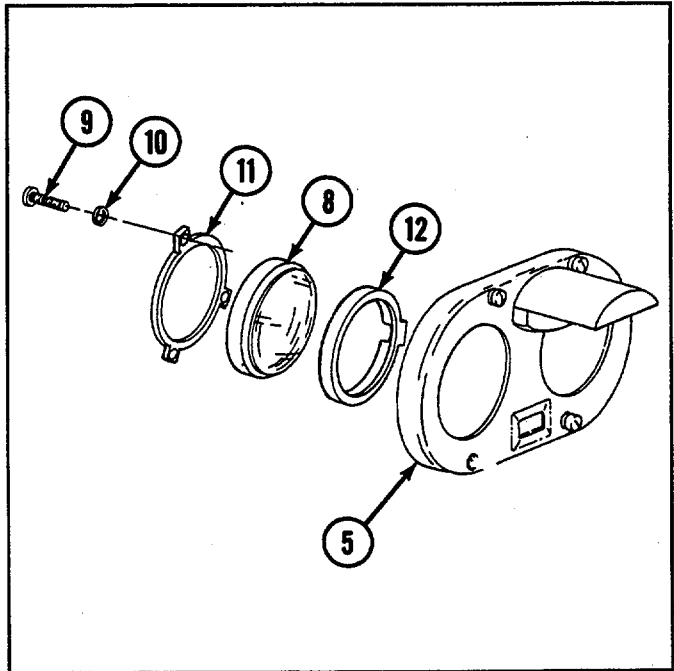
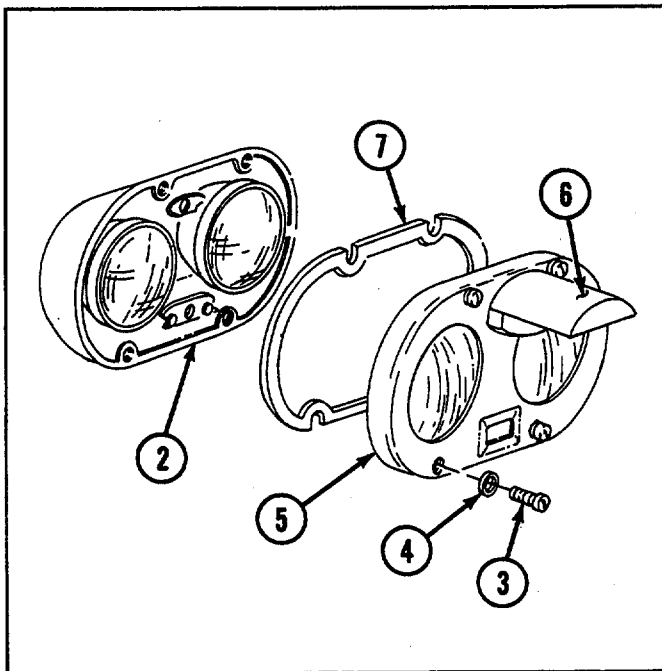
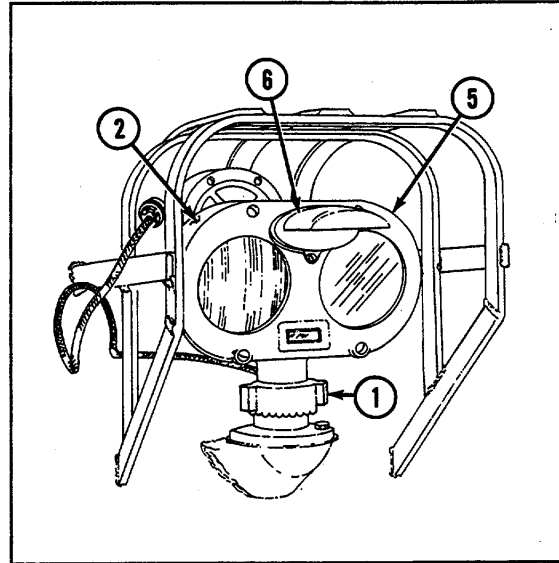
Removal and installation procedures are the same for both left and right headlights.

a. REMOVAL

Loosen adjustment nut (1) and remove headlight assembly (2).

b. DISASSEMBLY

- 1 Remove four screws (3), four lockwashers (4), and cover (5) with shield (6) from headlight assembly (2).
- 2 Remove and discard gasket (7).
- 3 Remove two lenses (8) by removing six screws (9), six lockwashers (10), and two retainers (11) from cover (5).
- 4 Remove two gaskets (12) from two lenses (8).



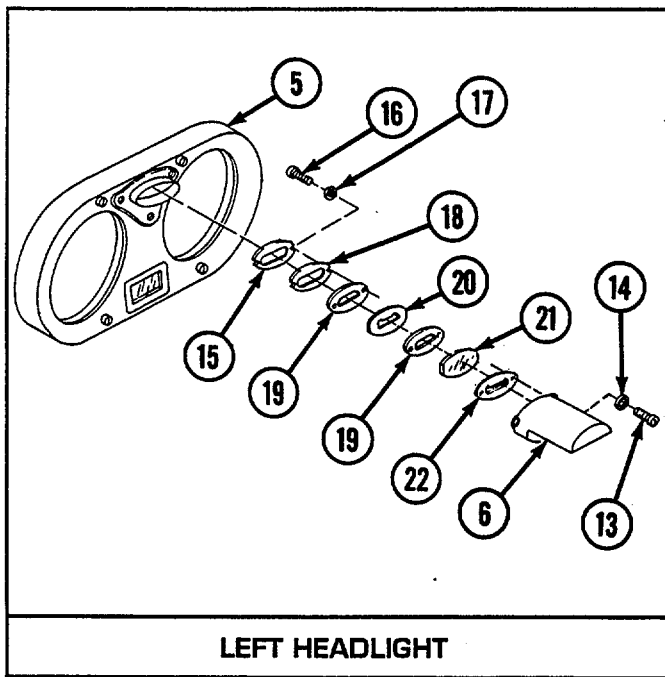
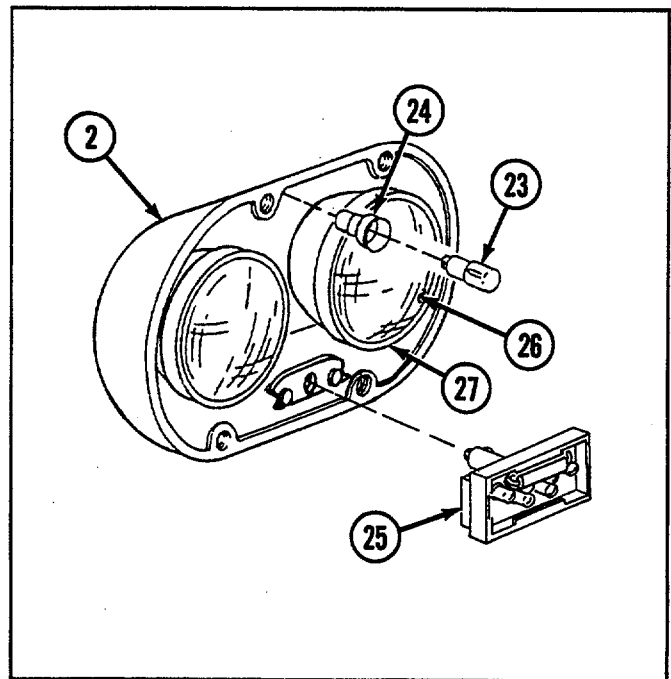
6-26 REPLACE/REPAIR FRONT HEADLIGHT ASSEMBLY--Continued

- 5 Remove shield (6) from cover (5) by removing three screws (13) and three lockwashers (14).
- 6 Remove and discard gasket (15).
- 7 Remove two screws (16), two lockwashers (17), retainer (18), two gaskets (19), filter (20), lens (21), and gasket (22) from shield (6). Discard gasket (22).
- 8 Remove B.O. lamp (23) from headlight assembly (2) by depressing and turning counterclockwise.

NOTE

Reflector (24) is located on left headlight assembly (2) only.

- 9 Remove reflector (24) and marker light (25).
- 10 Remove two lamps (26) and two gaskets (27) from headlight assembly (2). Discard two gaskets (27).

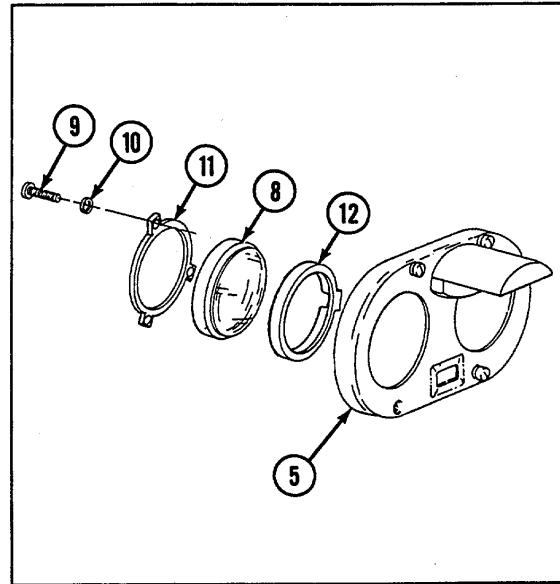
**LEFT HEADLIGHT****c. ASSEMBLY**

- 1 Install two new gaskets (27) and two lamps (26) to headlight assembly (2).

NOTE

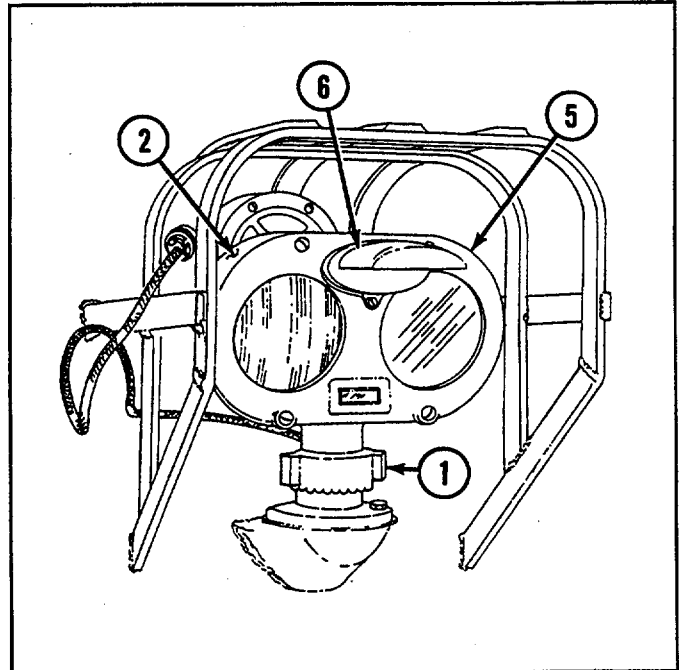
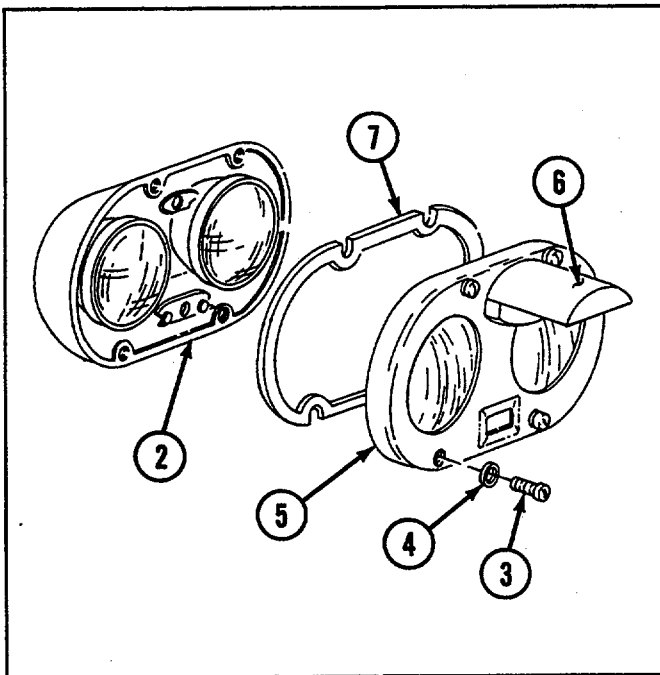
Reflector (24) is located on left headlight assembly (2) only.

- 2 Install reflector (24) and marker light (25) .
- 3 Apply light coating of silicone compound to socket and install B.O. lamp (23) by depressing and turning clockwise.
- 4 Apply light coating of adhesive then grease to mating sealing surface and install new gasket (22), lens (21), filter (20), two gaskets (19), retainer (18), two new lockwashers (17), and two screws (16) to shield (6).
- 5 Install new gasket (15).
- 6 Install shield (6) to cover (5) using three new lockwashers (14) and three screws (13).
- 7 Install two gaskets (12) to two lenses (8).
- 8 Install two lenses (8) to cover (5) using two retainers (11), six new lockwashers (10), and six screws (9).
- 9 Install new gasket (7).
- 10 Apply light coating of grease to mating surface and install cover (5) using four new lockwashers (4) and four screws (3) to headlight assembly (2).



d. INSTALLATION

Install headlight assembly (2) by tightening adjustment nut (1).



6-27 REPLACE/REPAIR RIGGER'S SERVICE LIGHT**THIS TASK COVERS**

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

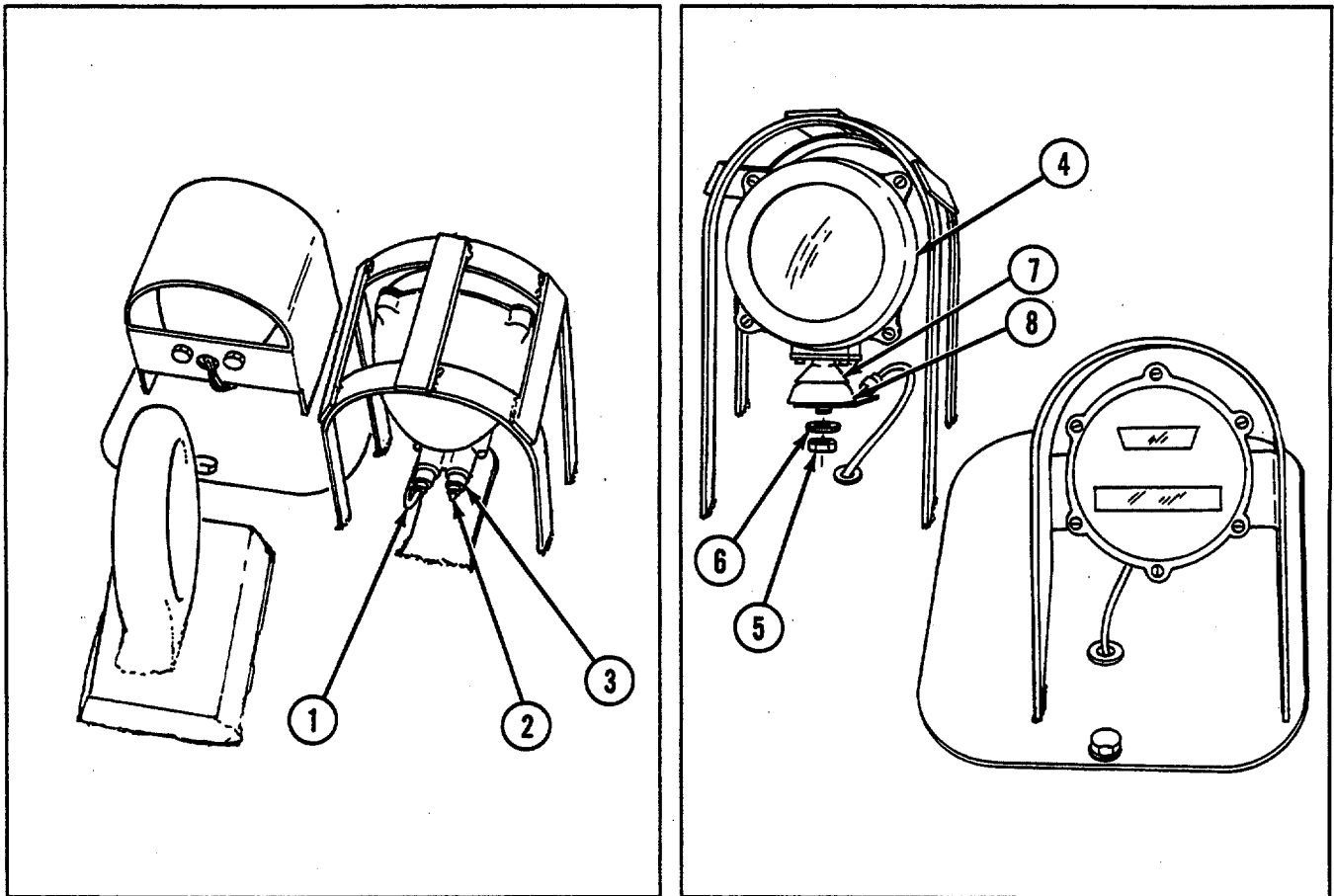
- Gasket (Appendix G, item 39)
- Lockwasher (Appendix G, item 133)
- Packing, preformed (Appendix G, item 87)

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

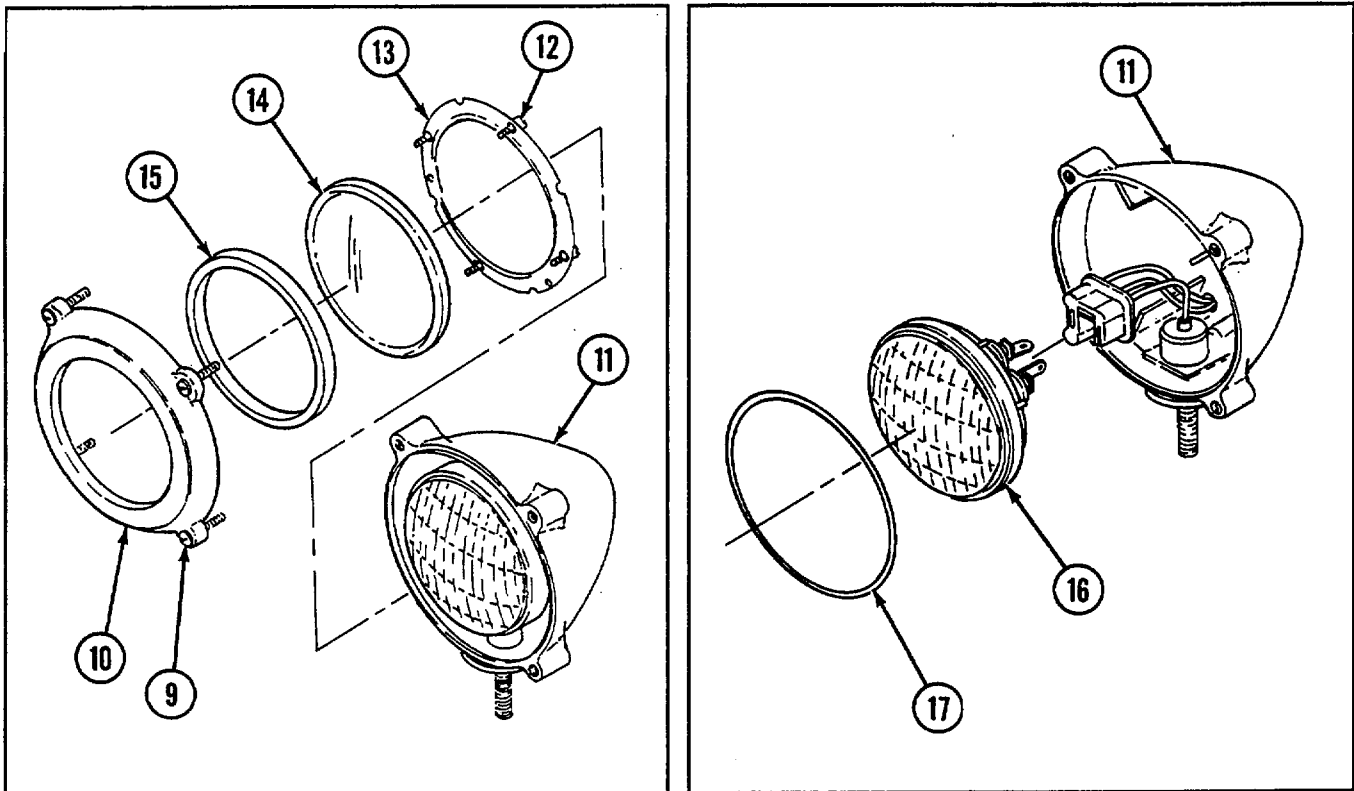
a. REMOVAL

- 1 Disconnect connector (1).
- 2 Remove dummy plug (2) and connector (3).
- 3 Remove rigger's service headlight (4) by removing nut (5), lockwasher (6), finishing washer (7), and recessed washer (8).



b. DISASSEMBLY

- 1 Loosen four screws (9) and remove door (10) from body (11).
- 2 Loosen four screws (12) and remove lens retainer (13), light lens (14), and gasket (15). Discard gasket.
- 3 Remove lamp (16) from body (11).
- 4 Remove and discard preformed packing (17).



c. ASSEMBLY

- 1 Install new preformed packing (17) to body (11).
- 2 Install lamp (15) to body (11).
- 3 Install new gasket (15), light lens (14), and lens retainer (13) to door (10). Tighten four screws (12).
- 4 Install door (10) to body (11) tighten four screws (9).

d. INSTALLATION

- 1 Install rigger's service headlight (4) using nut (5), new lockwasher (6), finishing washer (7), and recessed washer (8).
- 2 Install connector (3) and dummy plug (2).
- 3 Connect connector (1).

6-28 REPLACE/REPAIR FRONT SIGNAL LIGHT ASSEMBLY**THIS TASK COVERS**

a. Removal

b. Disassembly

c. Assembly

d. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

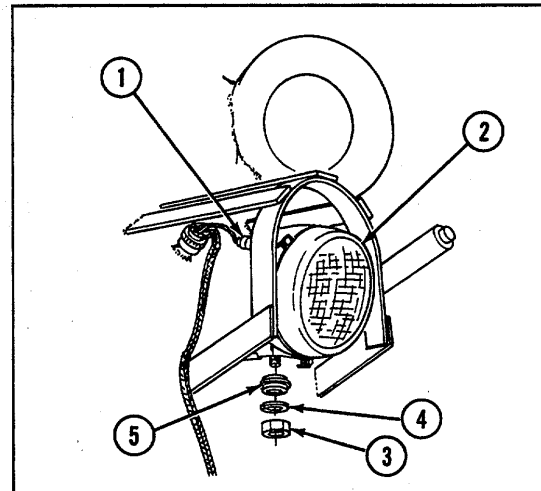
Lockwasher (Appendix G, item 132)

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

a. REMOVAL

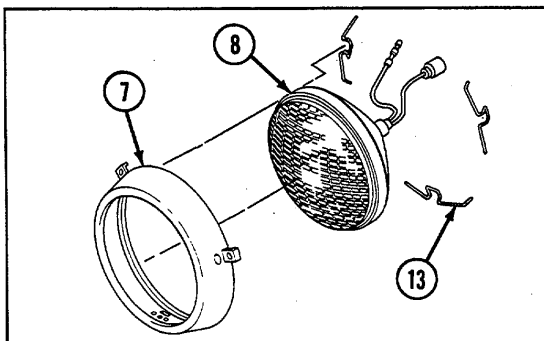
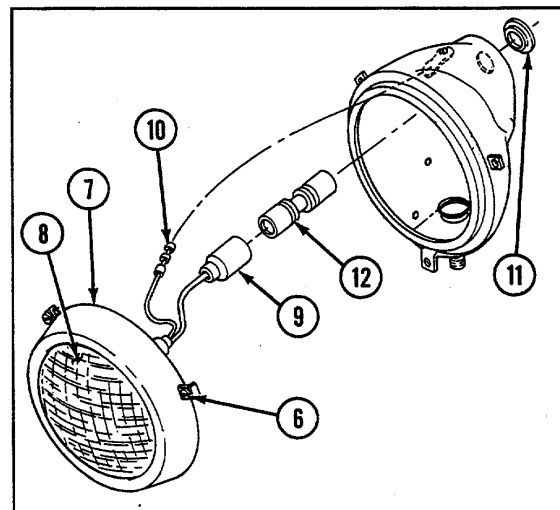
- 1 Disconnect connector (1) .
- 2 Remove front signal light (2) by removing nut (3), lockwasher (4), and finishing washer (5).
- 3 Loosen three captive screws (6) and pull forward light door (7) with lamp (8).
- 4 Disconnect connector (9) and electrical cable (10) and remove light door (7) with lamp (8).
- 5 Remove grommet (11) and connector (12).
- 6 Remove three retaining springs (13) from light door (7).
- 7 Remove lamp (8) from light door (7).

**b. DISASSEMBLY**

Disassemble connectors (see Chapter 6, Section VII) .

c. ASSEMBLY

Assemble connectors (see Chapter 6, Section VII).



d. INSTALLATION

- 1 Install lamp (8) in light door (7).
- 2 Install three retaining springs (13) in lamp body (7).
- 3 Install grommet (11) and connector (12)
- 4 Connect connector (9) and electrical cable (10).
- 5 Install light door (7) with lamp (8) and tighten three captive screws (6).
- 6 Install front signal light (2) using nut (3), new lockwasher (4), and finishing washer (5).
- 7 Connect connector (1).

6-29 REPLACE SPARE HEADLIGHT MOUNT BASE ASSEMBLY**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Lockwashers (4) (Appendix G, item 113)
- Lockwashers (6) (Appendix G, item 116)

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

NOTE

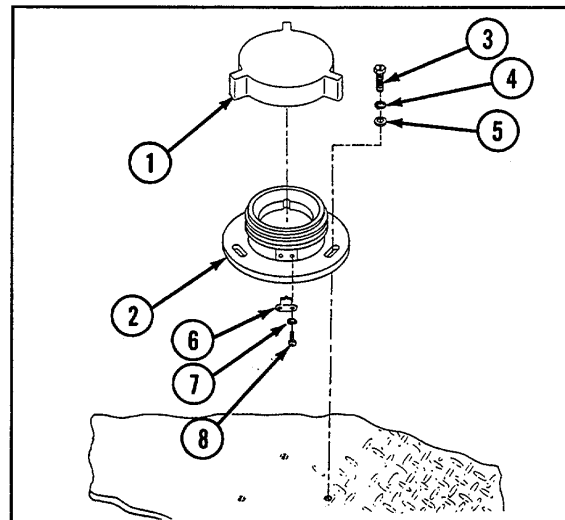
Removal and installation procedures are the same for both spare headlight mount base assemblies.

a. REMOVAL

- 1 Remove protective cap (1).
- 2 Remove base (2) by removing three screws (3), three lockwashers (4), and three flat washers (5).
- 3 Remove clip (6) by removing two screws (7) and two lockwashers (8).

b. INSTALLATION

- 1 Install clip (6) using two new lockwashers (8) and two screws (7).
- 2 Install base (2) using three flat washers (5), three new lockwashers (4), and three screws (3).
- 3 Install protective cap (1).



NOTE

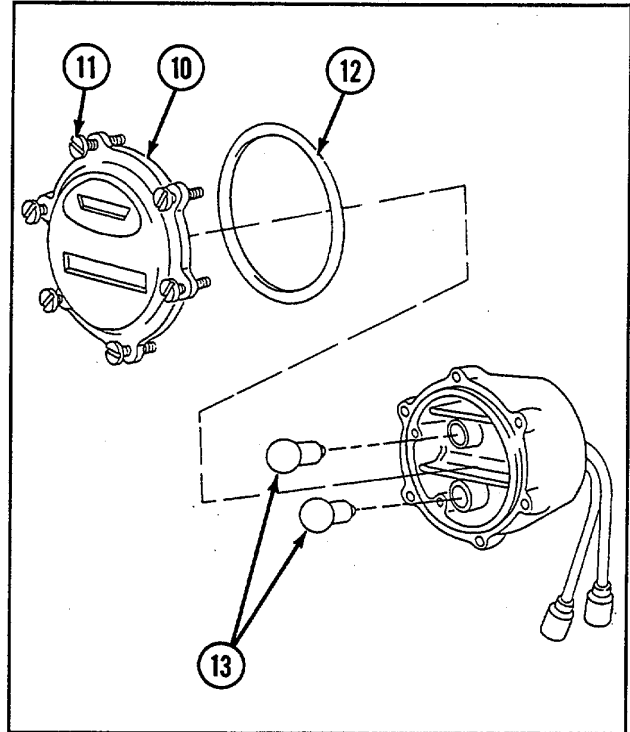
Clean and dry all parts, paying particular attention to contacts.

b. DISASSEMBLY

- 1 Remove door light assembly (10) by loosening six captive screws (11).
- 2 Remove and discard preformed packing (12).
- 3 Remove two lamps (13) by depressing and turning counterclockwise.
- 4 Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

- 1 Assemble wiring harness (see Chapter 6, Section VI).
- 2 Install two lamps (13) by depressing and turning clockwise.
- 3 Install new preformed packing (12).
- 4 Install door light assembly (10) by tightening six captive screws (11).

**d. INSTALLATION**

- 1 Install taillight (6) on support bracket (7) using two screws (8) and two new lockwashers (9).
- 2 Install grommet (5) over two connectors (4) and then place grommet into hole on hydraulic access plate (1).
Connect connectors.
- 3 Install hydraulic access plate (1) using two screws (2) and two lockwashers (3).

6-31 REPLACE TROUBLELIGHT ASSEMBLY**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

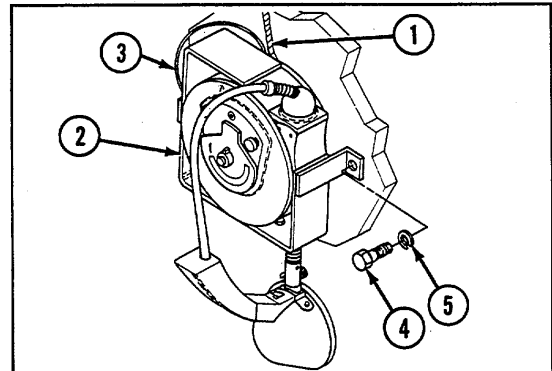
Lockwashers (2) (Appendix G, item 108)

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

6-31 REPLACE TROUBLELIGHT ASSEMBLY--Continued**a. REMOVAL**

- 1 Disconnect connector (1).
- 2 Remove troublelight assembly (2) and ground lead (3) by removing two screws (4) and two lockwashers (5).

**b. INSTALLATION**

- 1 Install troublelight assembly (2) and ground lead (3) using two screws (4) and two new lockwashers (5).
- 2 Connect connector (1).

6-32 REPLACE/REPAIR RIGGER'S FIXED SPOTLIGHT AND RELATED PARTS**THIS TASK COVERS**

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

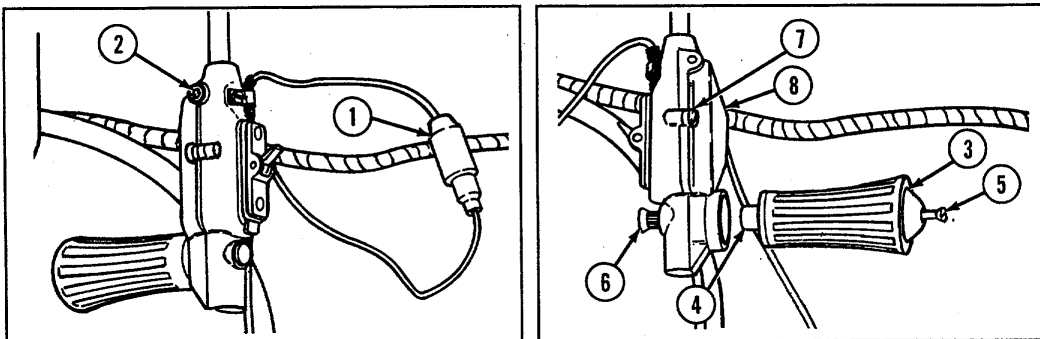
Tool kit, general mechanic's (Appendix C, item 53)

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

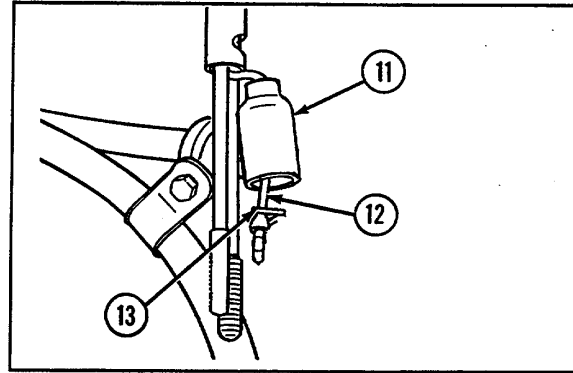
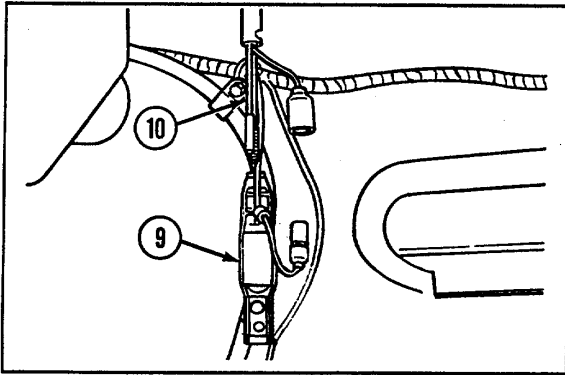
a. REMOVAL

- 1 Disconnect connector (1) and remove socket head screw (2).
- 2 Remove handle (3) and spacer (4) by loosening screw (5).
- 3 Remove gear bolt (6) and two screws (7) from body (8).



- 4 Pull switch assembly (9) off shaft (10).

- 5 Remove connector shell (11) from wire (12) by removing C-washer (13).



- 6 Pull rigger's fixed spotlight (14) out of cab opening by removing nut (15), collet (16), and nut (17).

b. DISASSEMBLY

- 1 Remove lens retainer (18) by removing screw (19).
- 2 Disconnect and remove lamp (20) from rigger's fixed spotlight (14).

c. ASSEMBLY

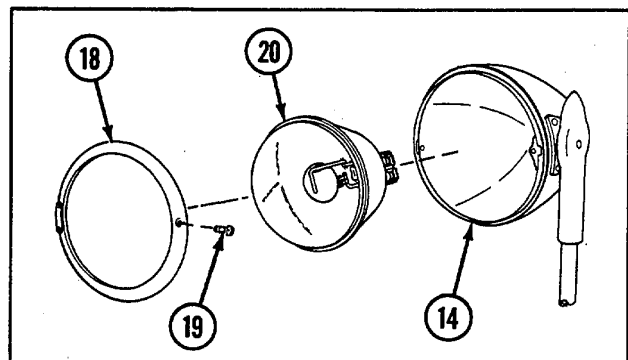
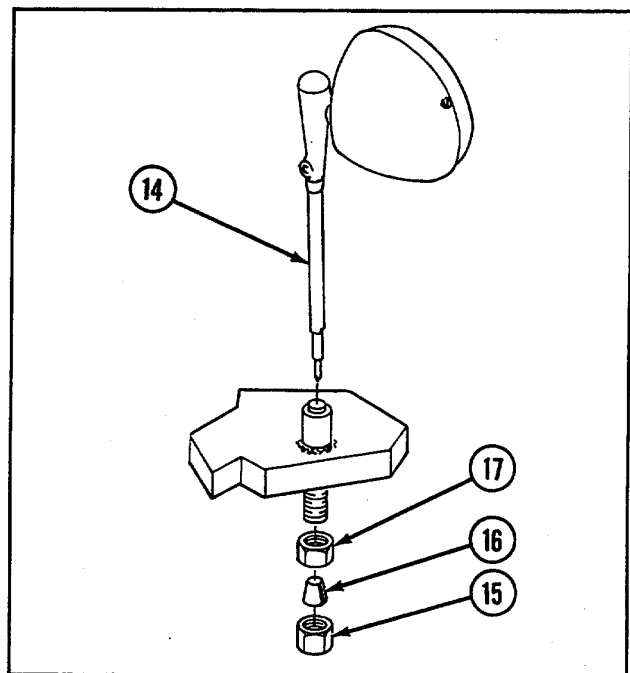
- 1 Install and connect lamp (20) to rigger's fixed spotlight (14).
- 2 Install lens retainer (18) using screw (19).

d. INSTALLATION

NOTE

Clean and dry all parts.

- 1 Install rigger's fixed spotlight (14) in cab opening using nut (15), collet (16), and nut (17).
- 2 Install connector shell (11) over wire (12) and secure using C-washer (13).
- 3 Install switch assembly (9) on shaft (10).
- 4 Install body (8) using two screws (7).
- 5 Install gear bolt (6).
- 6 Install handle (3) and spacer (4) by tightening screw (5).
- 7 Install socket head screw (2) and connect connector (1).



6-33 REPLACE/REPAIR HIGH BEAM INDICATOR LIGHT ASSEMBLY**THIS TASK COVERS**

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Drivescrews (2) (Appendix G, item 13)
- Lockwashers (2) (Appendix G, item 109)
- Packing, preformed (Appendix G, item 186)

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

a. REMOVAL

- 1 Disconnect connector (1).
- 2 Remove light lens (2) from indicator light (3) by turning counterclockwise.
- 3 Remove indicator light (3) by removing two screws (4) and two lockwashers (5).
- 4 Remove ID plate (6) by removing two drive screws (7).

b. DISASSEMBLY

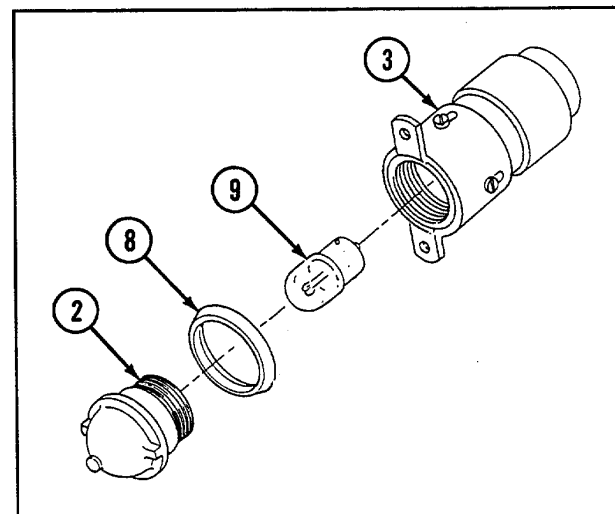
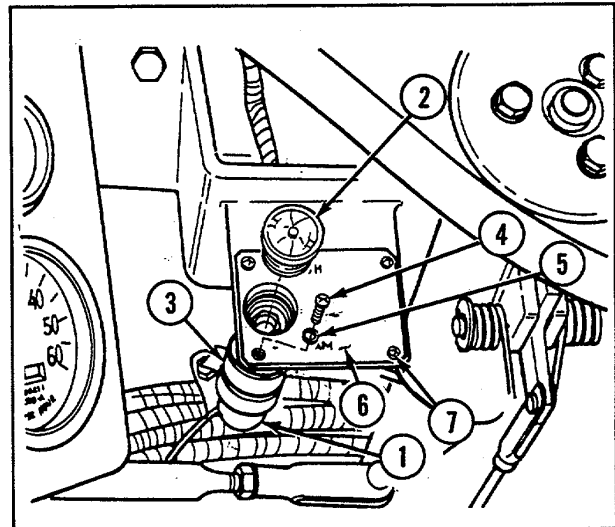
- 1 Remove preformed packing (8) from light lens (2).
- 2 Remove lamp (9) from indicator light (3) by depressing and turning counterclockwise.

c. ASSEMBLY

- 1 Install lamp (9) to indicator light (3) by depressing and turning clockwise.
- 2 Install new preformed packing (8) to light lens (2).

d. INSTALLATION

- 1 Install ID plate (6) using two new drive screws (7).
- 2 Install indicator light (3) using two screws (4) and two new lockwashers (5).
- 3 Install light lens (2) to indicator light (3).
- 4 Connect connector (1).



6-34 REPLACE/REPAIR DOME LIGHT**THIS TASK COVERS**

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Lockwashers (16) (Appendix G, item 126)
- Seal, rubber (Appendix G, item 265)

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

NOTE

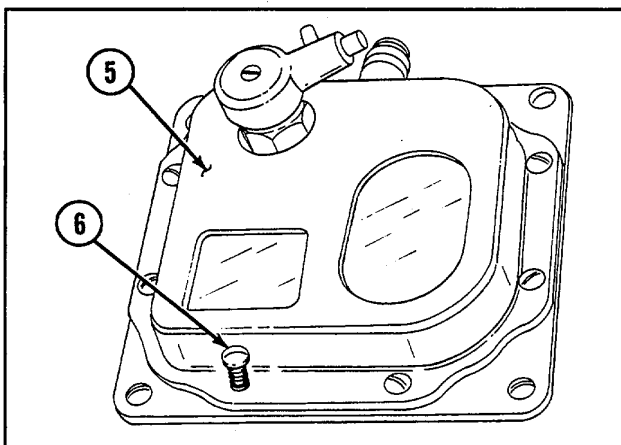
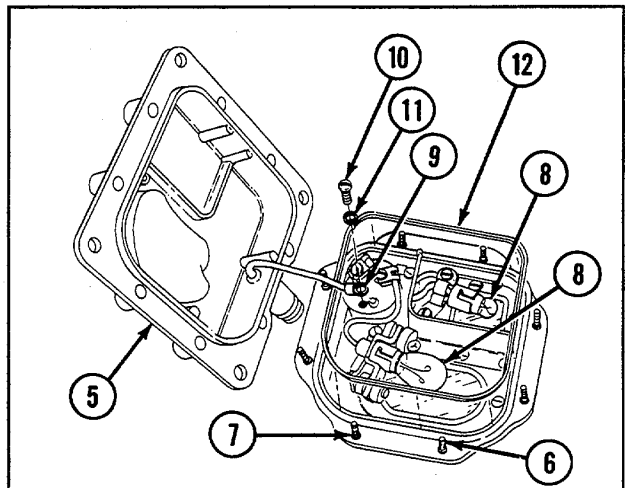
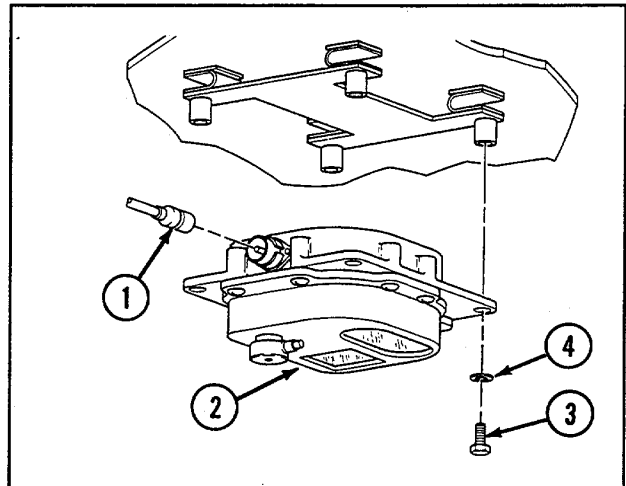
The following procedures are the same for all four dome lights.

a. REMOVAL

- 1 Disconnect connector (1).
- 2 Remove dome light (2) by removing four screws (3) and four lockwashers (4).

b. DISASSEMBLY

- 1 Remove door assembly (5) by loosening eight screws (6) with retaining rings (7).
- 2 Remove two lamps (8) by depressing and turning counterclockwise.
- 3 Disconnect lead (9) by removing screw (10) and lockwasher (11).
- 4 Remove and discard rubber seal (12) from door assembly (5).



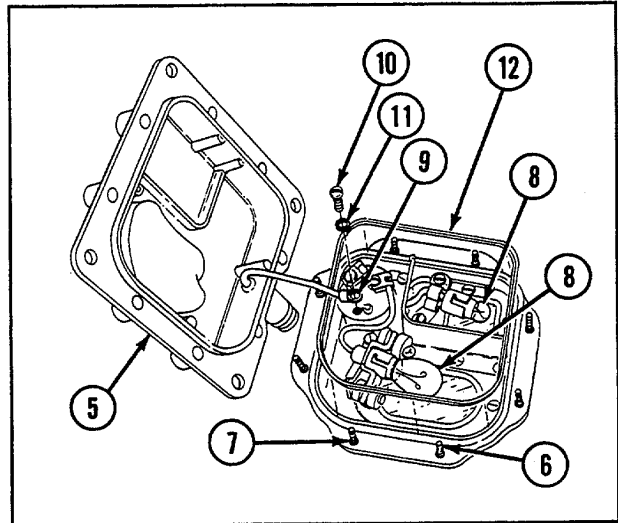
6-34 REPLACE/REPAIR DOME LIGHT--Continued

c. ASSEMBLY

NOTE

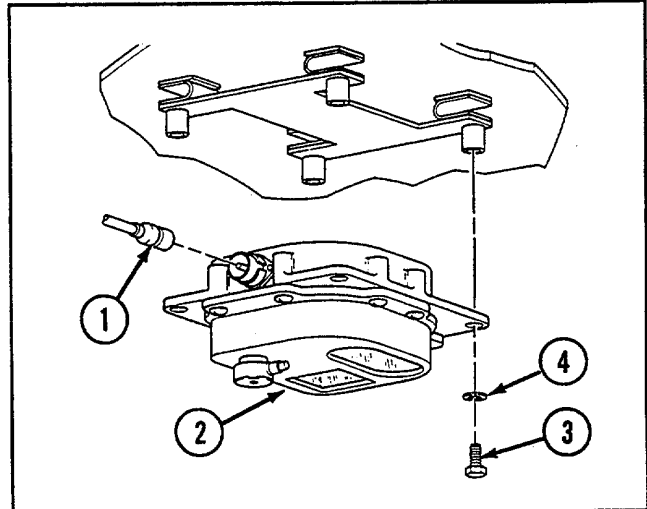
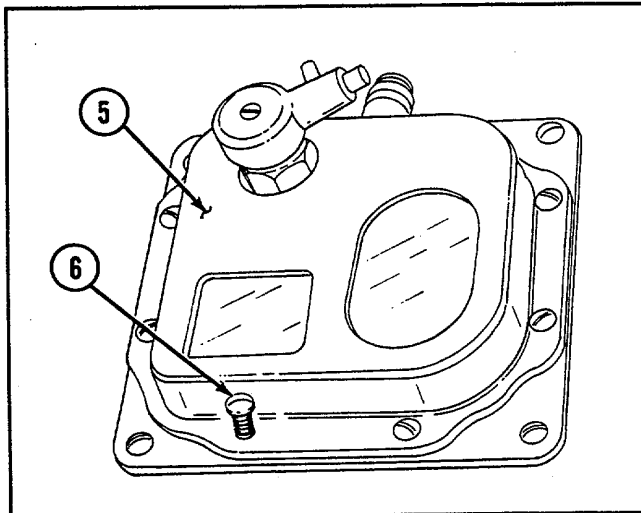
Clean and dry all parts, paying particular attention to contacts.

- 1 Install new rubber seal (12) in door assembly (5).
- 2 Connect lead (9) using screw (10) and new lockwasher (11).
- 3 Install two lamps (8) by depressing and turning clockwise.
- 4 Install door assembly (5) using eight screws (6) and retaining rings (7).



d. INSTALLATION

- 1 Install dome light (2) on vehicle using four screws (3) and four new lockwashers (4).
- 2 Connect connector (1).



6-35 REPLACE/REPAIR WINCH ILLUMINATION LAMP ASSEMBLY

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:
Tool kit, general mechanic's
(Appendix C, item 53)
(see paragraph 9-21)

Parts:
Lockwasher (Appendix G,
item 132)

Equipment Condition:
Stowage basket intermediate
forward floor plate removed

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock or burns.

a. REMOVAL

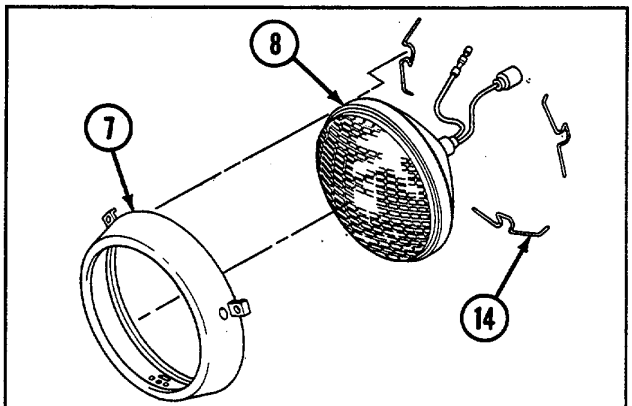
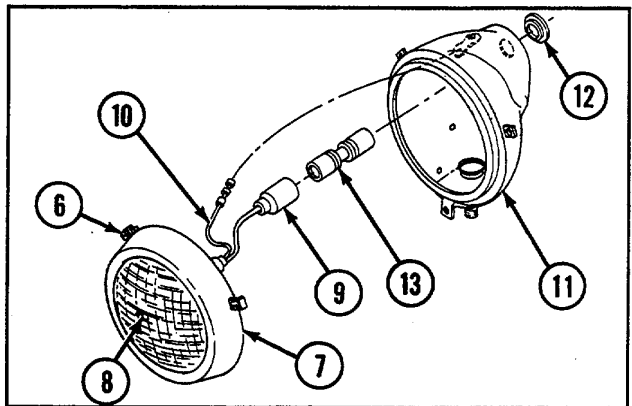
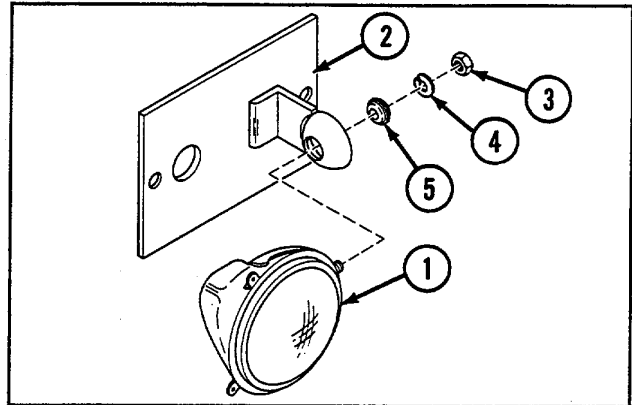
Remove winch compartment light (1) from floor plate (2), by removing nut (3), lockwasher (4), and spacer (5).

b. DISASSEMBLY

- 1 Loosen three captive screws (6) and pull forward light door (7) with lamp (8).
- 2 Disconnect connector (9) and electrical cable (10) and remove light door (7) with lamp (8) from body (11).
- 3 Remove grommet (12) and connector (13) from body (11).
- 4 Remove three retaining springs (14) from light door (7).
- 5 Remove lamp (8) from light door (7).
- 6 Disassemble two connectors (see Chapter 6, Section VII).

c. ASSEMBLY

- 1 Assemble two connectors (see Chapter 6, Section VII).
- 2 Install lamp (8) to light door (7).
- 3 Install three retaining springs (14) to light door (7).
- 4 Install grommet (12) and connector (13) to body (11).
- 5 Connect connector (9) and electrical cable (10) to body (11).
- 6 Install light door (7) with lamp (8) and tighten three captive screws (6).

**d. INSTALLATION**

Install winch compartment light (1) to floor plate (2) using spacer (5), new lockwasher (4), and nut (3).

NOTE

Follow-on maintenance:

Install stowage basket intermediate forward floor plate (see paragraph 9-21)

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6-36 REPLACE/REPAIR GENERATOR POWER LEAD ASSEMBLY (11671357)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Material/Parts:

- Lockwashers (4) (Appendix G, item 128)
- Wire, electrical (Appendix D, item 33)

Equipment Condition:

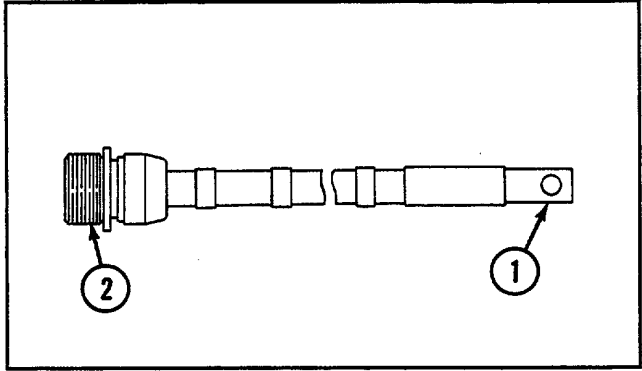
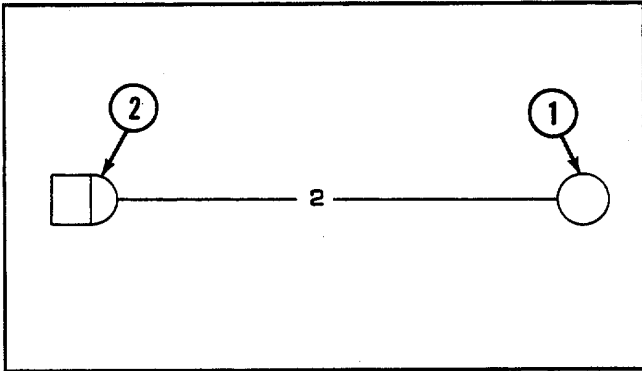
Powerplant removed (see paragraph 3-1)

6-36 REPLACE/REPAIR GENERATOR POWER LEAD ASSEMBLY (116713571-
Continued

WARNING

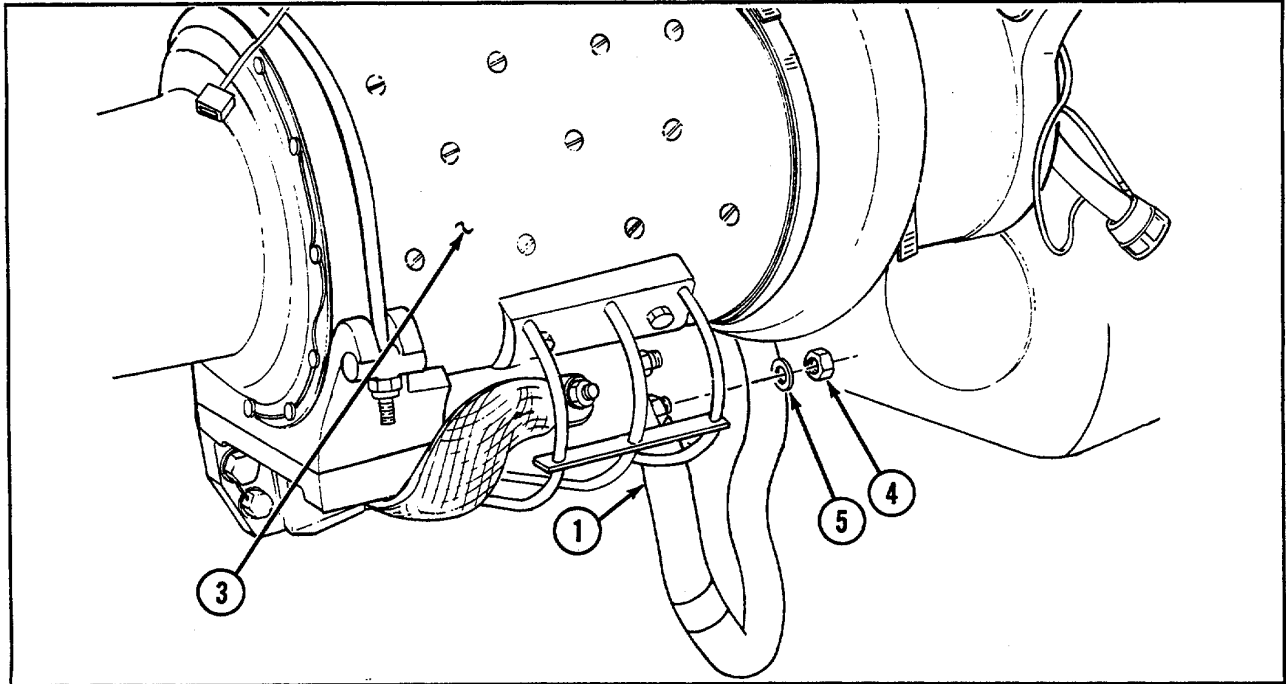
Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Generator	2
2	Engine disconnect	2



a. REMOVAL

- 1 Remove lead (1) from generator (3) by removing nut (4) and flat washer (5).



- 2 Remove connector (2) from engine disconnect (6) by removing four nuts (7), four lockwashers (8), four screws (9), and lead assembly (10).

b. DISASSEMBLY

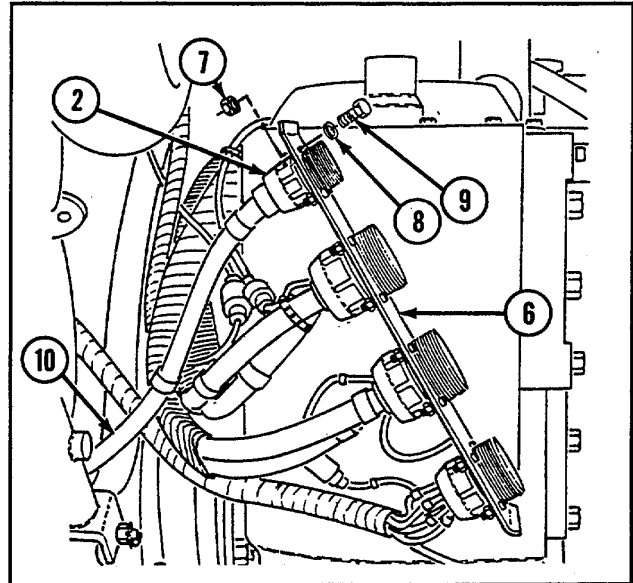
Disassemble lead assembly (10) (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble lead assembly (10) (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Install connector (2) at engine disconnect (6) using four screws (9), four new lockwashers (8), and four nuts (7).
- 2 Install lead (1) on generator (3) using flat washer (5) and nut (4).

**NOTE**

Follow-on maintenance: Install powerplant (see paragraph 3-1)

6-37 REPLACE/REPAIR MASTER RELAY TO RECTIFIER LEAD ASSEMBLY (SINGLE VOLTAGE) (10866904)

THIS TASK COVERS

- | | | | |
|------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
|------------|----------------|-------------|-----------------|

WARNING

Be certain MASTER switch is OFF and negative battery leads are disconnected to avoid electrical shock and burns.

a. REMOVAL

Remove lead assembly (1).

b. DISASSEMBLY

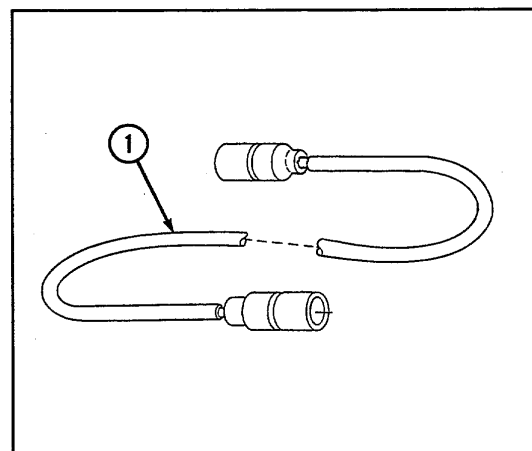
Disassemble lead assembly (1) (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble lead assembly (1) (see Chapter 6, Section VII).

d. INSTALLATION

Install lead assembly (1).



6-38 REPLACE/REPAIR BATTERY TO CIRCUIT BREAKER LEAD ASSEMBLY (11671811)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

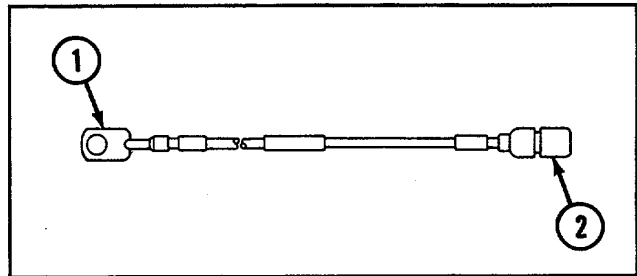
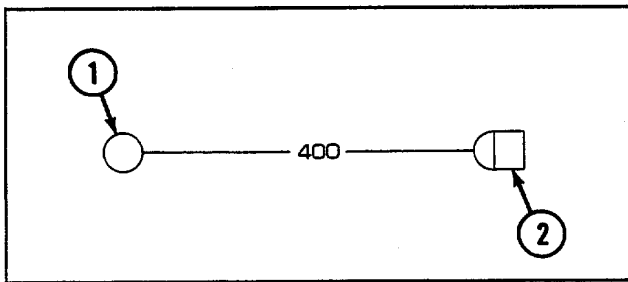
Equipment Condition:

Air inlet doors opened (see paragraph 9-56)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Battery terminal	400
2	Circuit breaker	400



a. REMOVAL

CAUTION

Ground cables must be disconnected prior to disconnecting positive leads to prevent damage to batteries.

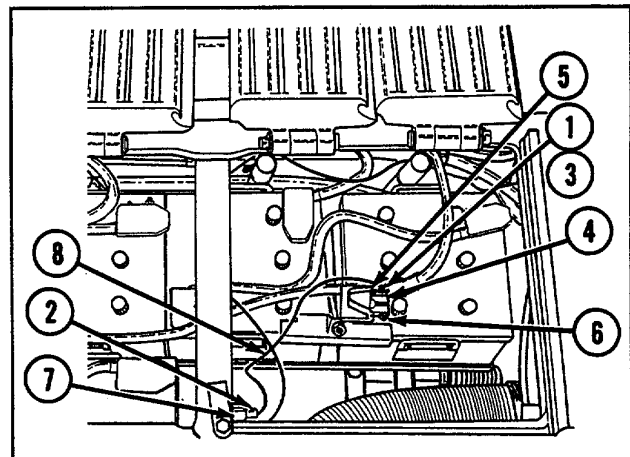
- 1 Pull back rubber insulator (3).
- 2 Remove lead (1) from battery terminal (4) (see paragraph 6-4) by removing bolt (5) and nut (6).
- 3 Disconnect connector (2) from circuit breaker (7). Remove lead assembly (8).

b. DISASSEMBLY

Disassemble lead assembly (8) (see Chapter 6, Section VII).

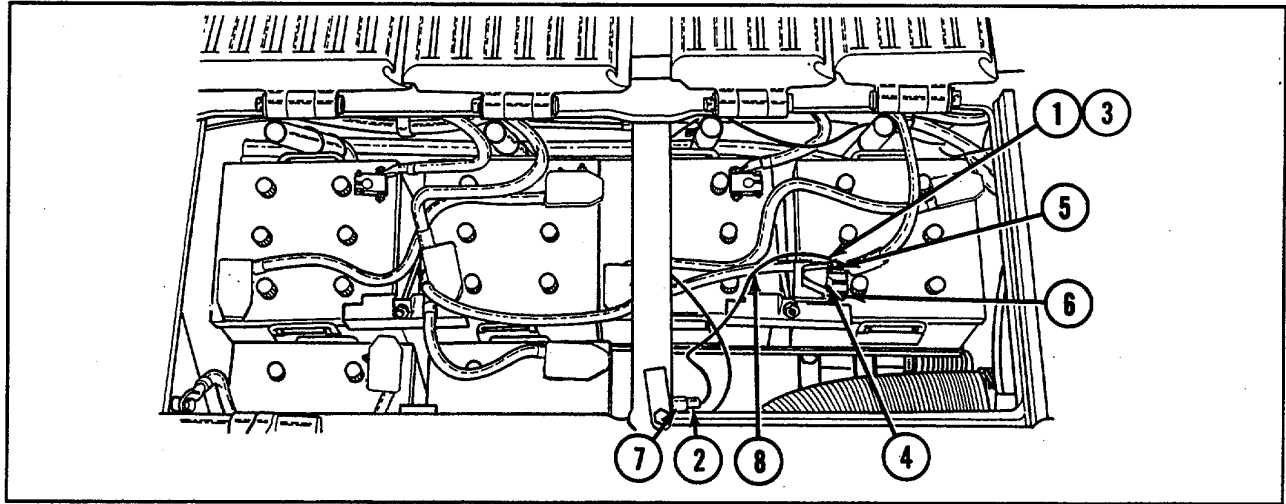
c. ASSEMBLY

Assemble lead assembly (8) (see Chapter 6, Section VII).



d. INSTALLATION

- 1 Install lead (1) at battery terminal (4) (see paragraph 6-4) using bolt (5) and nut (6).
- 2 Push rubber insulator (3) over battery terminal (4).
- 3 Connect connector (2) to circuit breaker (7).



NOTE

Follow-on maintenance Close air inlet doors (see paragraph 9-56)

6-39 REPLACE/REPAIR STARTER LEAD ASSEMBLY (10887570)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:
Tool kit, general mechanic's
(Appendix C, item 53)

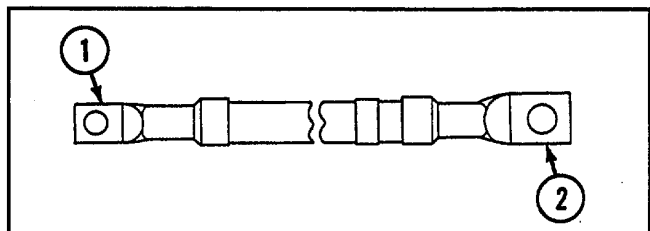
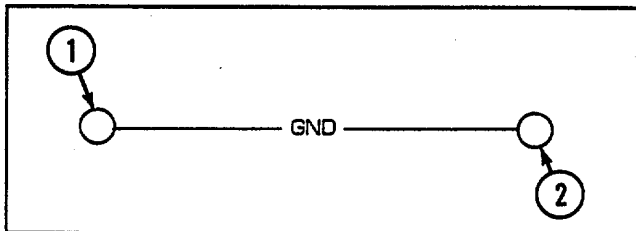
Parts:
Lockwasher (Appendix G,
item 114)

Equipment Condition:
Powerplant removed (see
paragraph 3-1)

WARNING

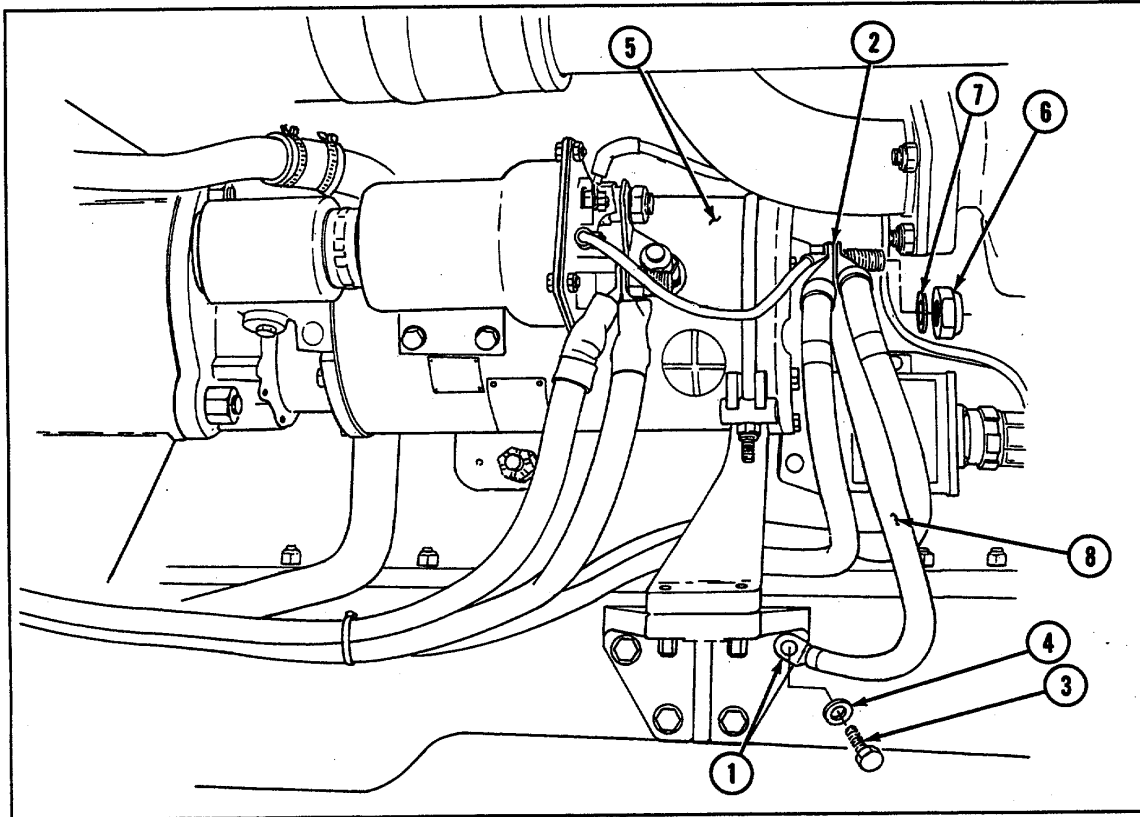
Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Starter support bracket	GND
2	Starter	GND



6-39 REPLACE/REPAIR STARTER LEAD ASSEMBLY (10887570)-Continued**a. REMOVAL**

- 1 Remove lead (1) from starter support bracket by removing machine bolt (3) and flat washer (4).
- 2 Remove lead (2) from starter (5) by removing nut (6) and lockwasher (7). Remove lead assembly (8).

**b. DISASSEMBLY.**

Disassemble lead assembly (8) (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble lead assembly (8) (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Install lead (2) to starter (5) using nut (6) and lockwasher (7).
- 2 Install lead (1) to starter support bracket using machine bolt (3) and flat washer (4).

NOTE

Follow-on maintenance:

Install powerplant (see paragraph 3-1)

6-40 REPLACE/REPAIR MODULE STARTER WIRING HARNESS (116717923)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

- Lockwasher (Appendix G, item 131)
- Lockwashers (4) (Appendix G, item 129)

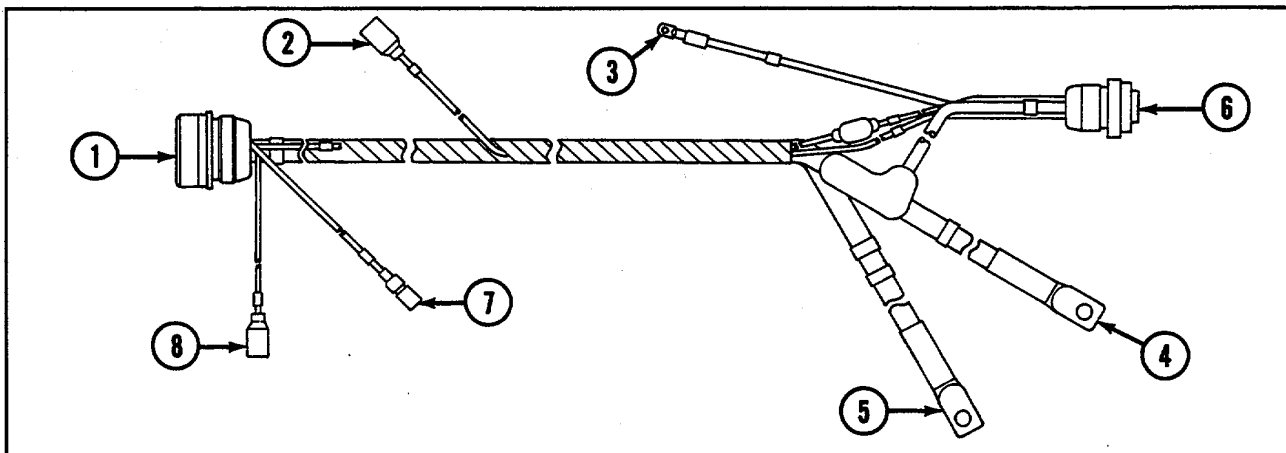
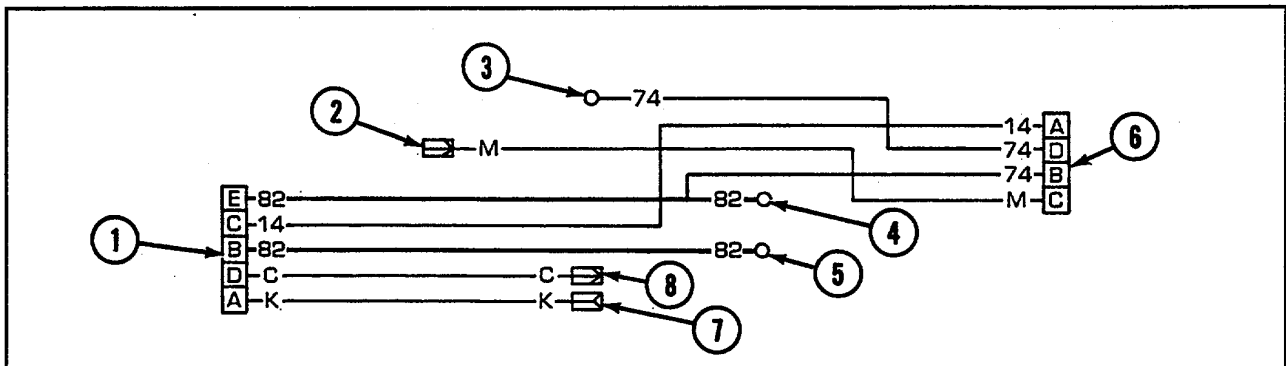
Equipment Condition:

Powerplant removed (see paragraph 3-1)

I WARNING I

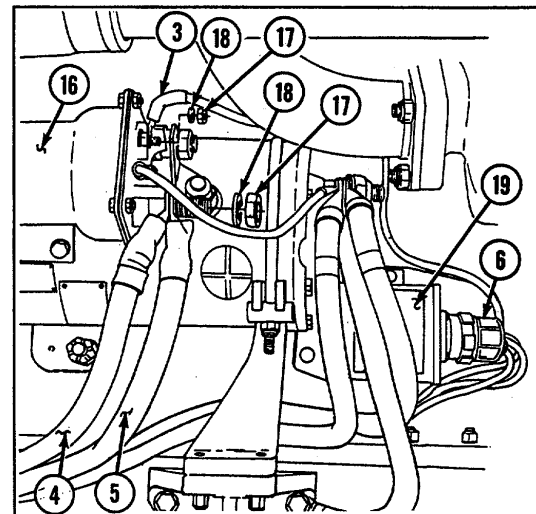
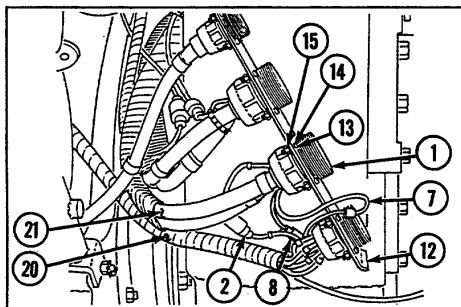
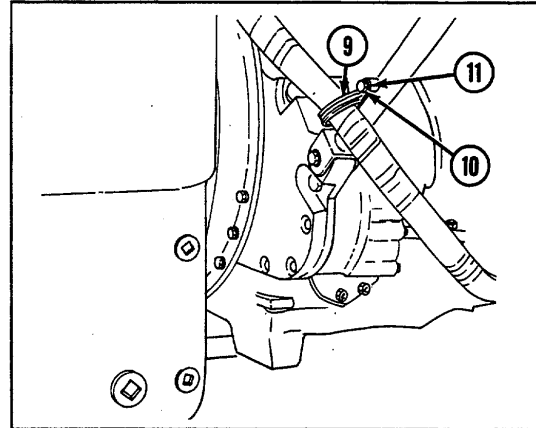
Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Engine disconnect	82, 14, C, K
2	Main engine wiring harness	M
3	Starter solenoid	74
4	Starter solenoid	82
5	Starter solenoid	82
6	Module starter low voltage protective system	14, 74, M
7	Main engine wiring harness	K
8	Main engine wiring harness	C



6-40 REPLACE/REPAIR MODULE STARTER WIRING HARNESS (11671792)-Continued**a. REMOVAL**

- 1 Remove clamp (9) by removing screw (10) and lockwasher (11).
- 2 Remove wiring harness connector (1) from engine disconnect (12) by removing four screws (13), four lockwashers (14), and four nuts (15).
- 3 Remove three leads (3, 4, and 5) from starter solenoid (16) by removing two nuts (17) and two lockwashers (18).
- 4 Disconnect connector (6) from starter module low voltage protective system (19).
- 5 Disconnect three connectors (2, 7, and 8) from main engine wiring harness (20). Remove wiring harness (21).

**b. DISASSEMBLY**

Disassemble wiring harness (21) (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness (21) (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect three connectors (2, 7, and 8) to main engine wiring harness (20).
- 2 Connect connector (6) to starter module low voltage protective system (19).
- 3 Install three leads (3, 4, and 5) to starter solenoid (17) using new lockwasher (18) and nut (19).
- 4 Install wiring harness connector (1) to engine disconnect (12) using four nuts (15), four new lockwashers (14), and four screws (13).
- 5 Install clamp (9) using new lockwasher (11) and screw (10).

NOTE

Follow-on maintenance Install powerplant (see paragraph 3-1)

6-41 REPLACE/REPAIR BATTERIES TO MASTER RELAY, VOLTAGE REGULATORS, SLAVE RECEPTACLE, AND ENGINE DISCONNECT WIRING HARNESS (DUAL VOLTAGE) (11672413)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

- Lockwasher (Appendix G, item 108)
- Lockwashers (8) (Appendix G, item 116)

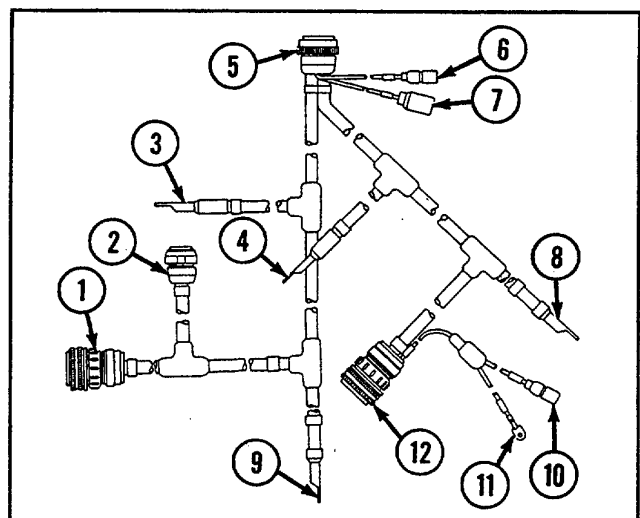
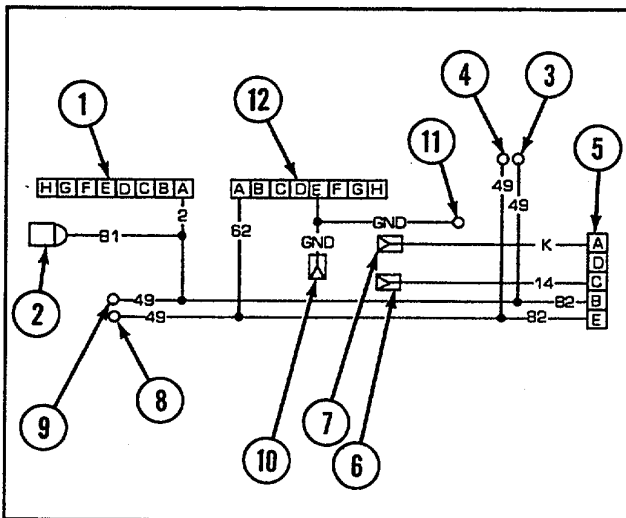
Equipment Condition:

Air inlet doors removed as necessary (see paragraph 9-56)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

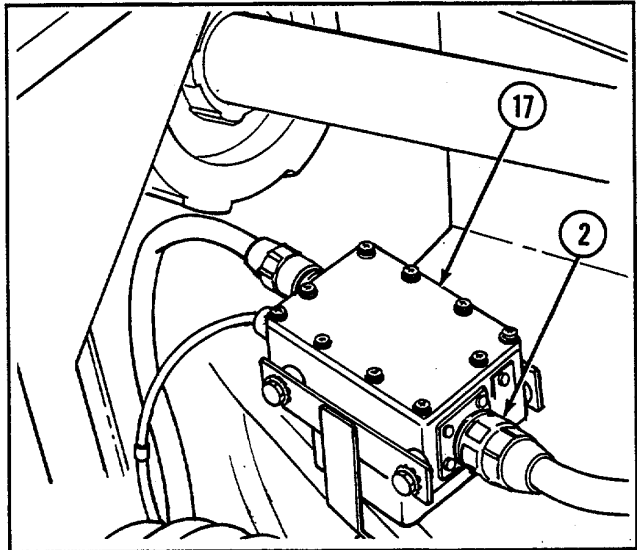
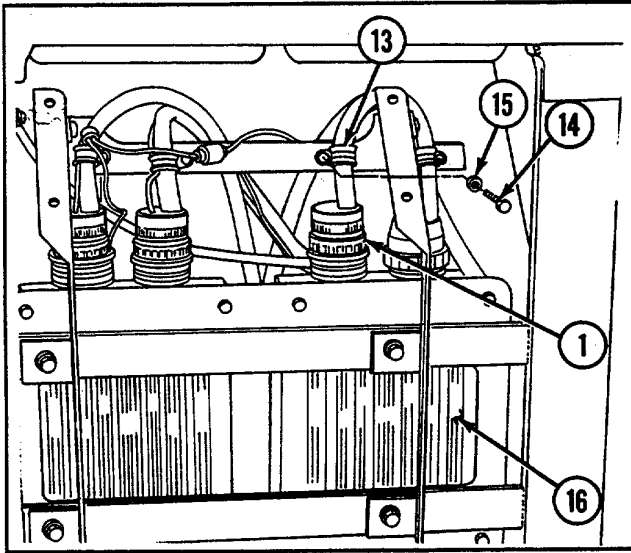
Connector No.	Electrical Lead To:	Wire No.
1	Main engine voltage regulator	2
2	Master relay	81
3	Slave receptacle	49
4	Slave receptacle	49
5	Main engine disconnect	82, 14, K
6	Bulkhead to main engine bracket and rear fuel tank transmitter wiring harness	14
7	Bulkhead to main engine bracket and rear fuel tank transmitter wiring harness	K
8	Battery	49
9	Battery	49
10	Bulkhead to APU, master relay, and rigger's lights wiring harness (dual voltage) (11672412)	GND
11	APU voltage regulator	GND, 62
12	APU voltage regulator	62



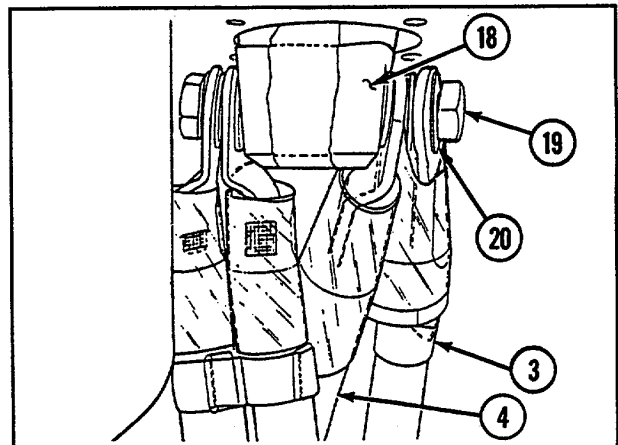
6-41 REPLACE/REPAIR BATTERIES TO MASTER RELAY, VOLTAGE REGULATORS, SLAVE RECEPTACLE, AND ENGINE DISCONNECT WIRING HARNESS (DUAL VOLTAGE) (11672413)- Continued

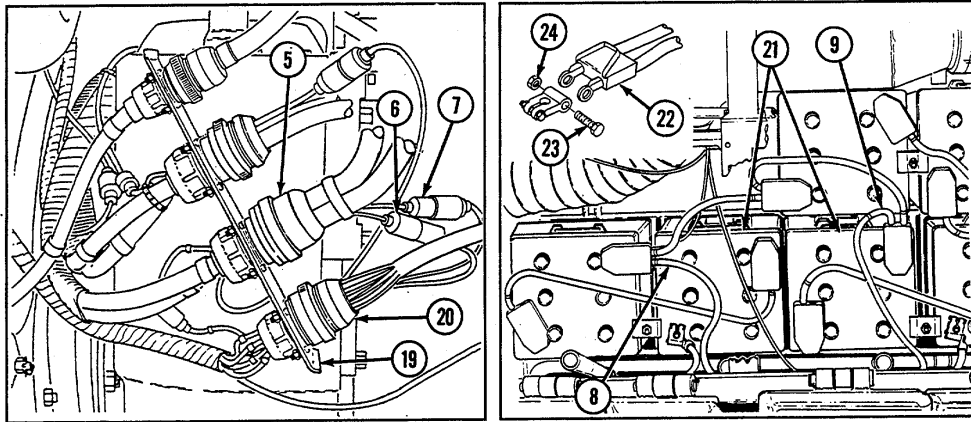
a. REMOVAL

- 1 Remove eight clamps (13) by removing screw (14) and lockwasher (15) from each.
- 2 Disconnect connector (1) from main engine voltage regulator (16).
- 3 Disconnect connector (2) from master relay (17).



- 4 Disconnect two leads (3 and 4) from slave receptacle (18) by removing screw (19) and lockwasher (20).
- 5 Disconnect connector (5) from main engine disconnect (19).
- 6 Disconnect two connectors (6 and 7) from bulkhead to main engine bracket and rear fuel tank transmitter wiring harness (20).
- 7 Disconnect two connectors (8 and 9) from batteries (21) by pulling back rubber insulator (22) and removing bolt (23) and nut (24).
- 8 Disconnect connector (10) from bulkhead to APU, master relay, and rigger's lights wiring harness (25).





- 9 Disconnect connector (11) and lead (12) by removing screw (26) from APU voltage regulator (27).

b. DISASSEMBLY

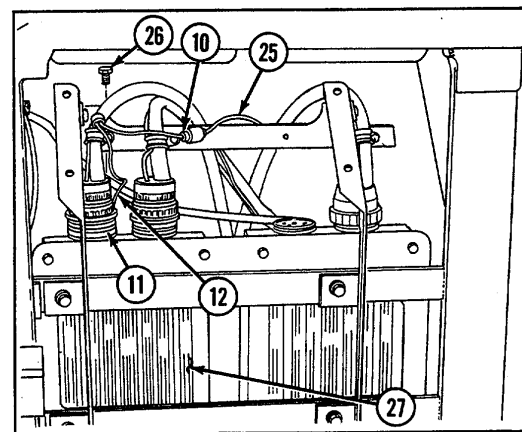
Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect connector (11) and lead (12) with screw (26) to APU voltage regulator (27).
- 2 Connect connector (10) to bulkhead to APU, master relay, and rigger's lights wiring harness (25).
- 3 Connect two connectors (8 and 9) to batteries (21) using bolt (23) and nut (24). Push insulator (22) back on battery terminal.
- 4 Connect two connectors (6 and 7) to bulkhead to main engine bracket and rear fuel tank transmitter wiring harness (20).
- 5 Connect connector (5) to main engine disconnect (19).
- 6 Connect two leads (3 and 4) to slave receptacle (18) using new lockwasher (21) and screw (19).
- 7 Connect connector (2) to master relay (17).
- 8 Connect connector (1) to main engine voltage regulator (16).
- 9 Install eight clamps (13) using new lockwasher (15) and screw (14) for each.



NOTE

Follow-on maintenance: Install air inlet doors if removed (see paragraph 9-56)

6-42 REPLACE/REPAIR BATTERIES TO MASTER RELAY, VOLTAGE REGULATOR, SLAVE RECEPTACLE, AND ENGINE DISCONNECT WIRING HARNESS (SINGLE VOLTAGE) (11671791)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:
Tool kit, general mechanic's
(Appendix C, item 53)

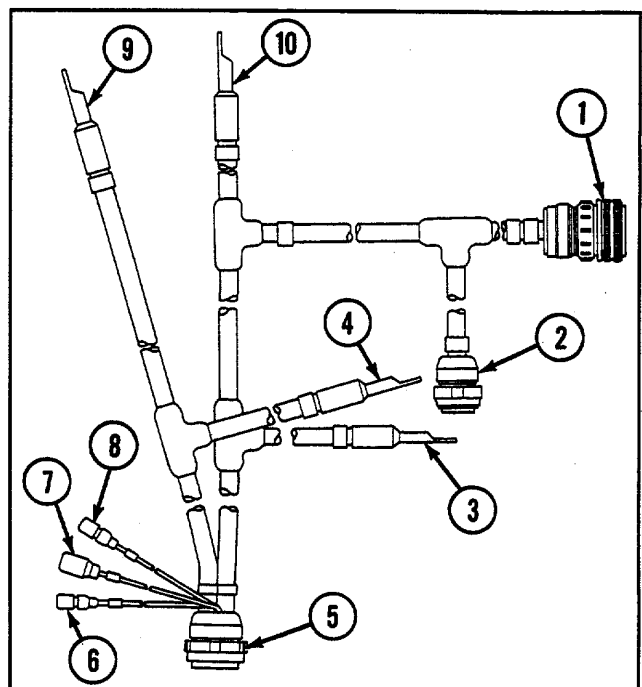
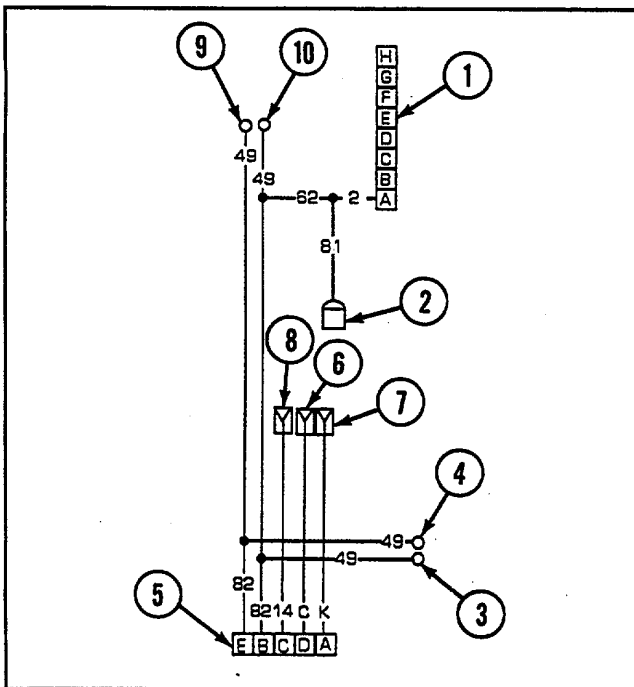
Parts:
Lockwasher (Appendix G,
item 108)
Lockwashers (8) (Appendix G,
item 116)

Equipment Condition:
Air inlet doors removed as
necessary (see paragraph 9-56)

WARNING

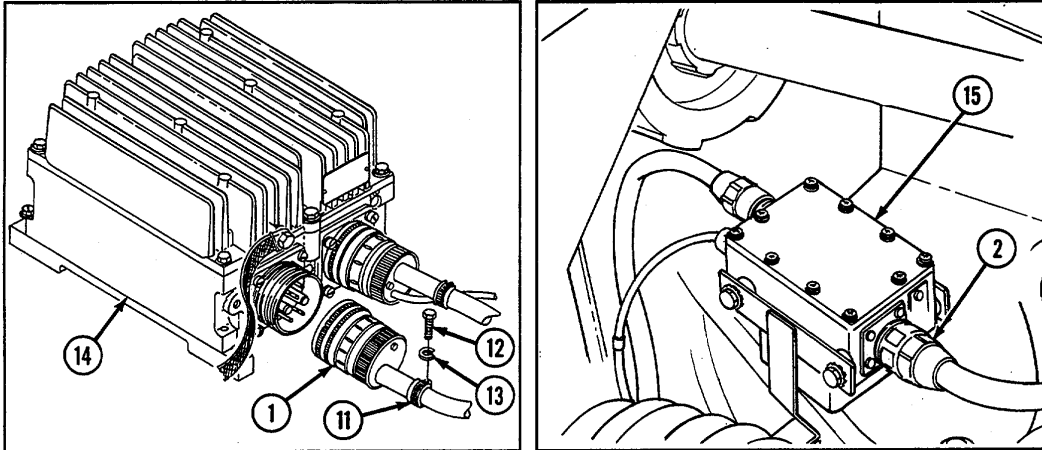
Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Voltage regulator	2/62
2	Master relay	81
3	Slave receptacle	49
4	Slave receptacle	49
5	Engine disconnect	82, 14, C, K, 82
6	Bulkhead to main engine bracket and rear fuel tank transmitter wiring harness (single voltage) (11671789)	C
7	Bulkhead to main engine bracket and rear fuel tank transmitter wiring harness (single voltage) (11671789)	K
8	Bulkhead to main engine bracket and rear fuel tank transmitter wiring harness (single voltage) (11671789)	14
9	Battery	49
10	Battery	49

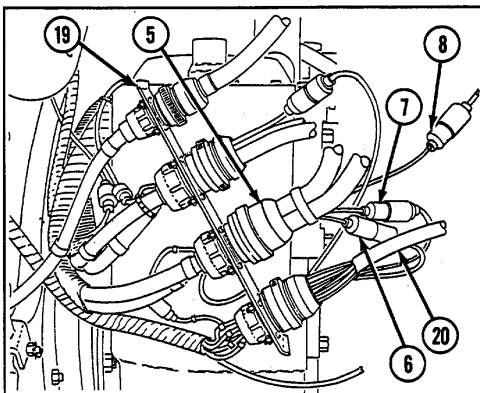
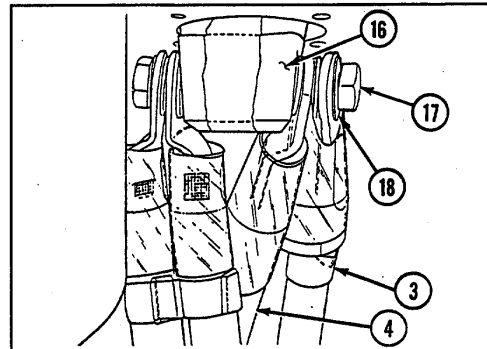


a. REMOVAL

- 1 Remove eight clamps (11) by removing screw (12) and lockwasher (13) from each.
- 2 Disconnect connector (1) from voltage regulator (14).
- 3 Disconnect connector (2) from master relay (15).



- 4 Disconnect two leads (3 and 4) from slave receptacle (16) by removing screw (17) and lockwasher (18).
- 5 Disconnect connector (5) from engine disconnect (19).
- 6 Disconnect three connectors (6, 7, and 8) from bulkhead to main engine bracket and rear fuel tank transmitter wiring harness (20).



6-42 REPLACE/REPAIR BATTERIES TO MASTER RELAY, VOLTAGE REGULATOR, SLAVE RECEPTACLE, AND ENGINE DISCONNECT WIRING HARNESS (SINGLE VOLTAGE) (11671791) -- Continued

7 Disconnect two connectors (9 and 10) from battery (21) by pulling back rubber insulators (22) and removing bolt (23) and nut (24).

b. DISASSEMBLY

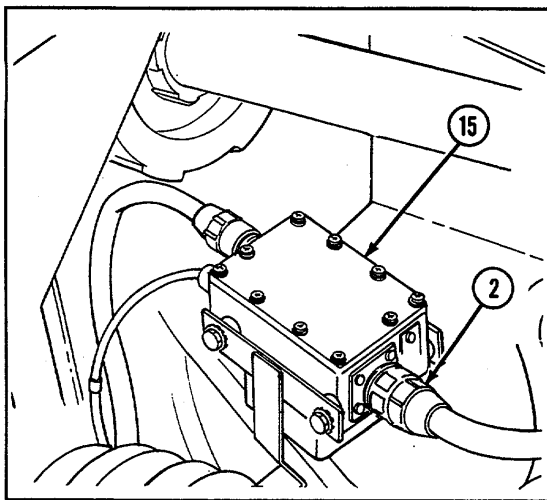
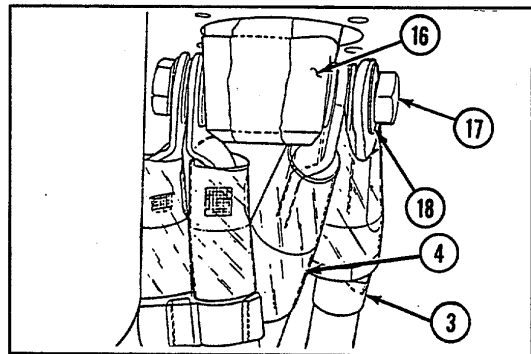
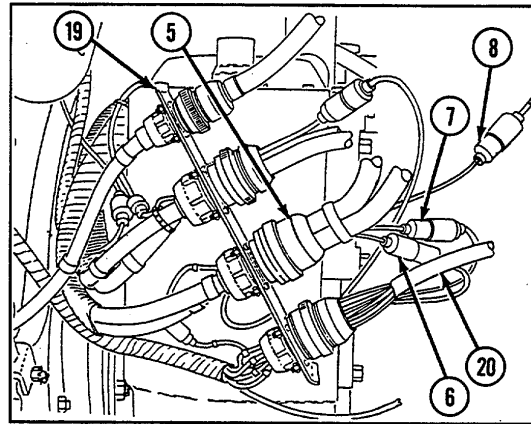
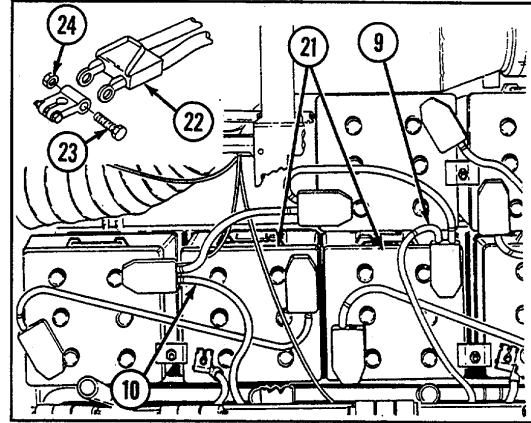
Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

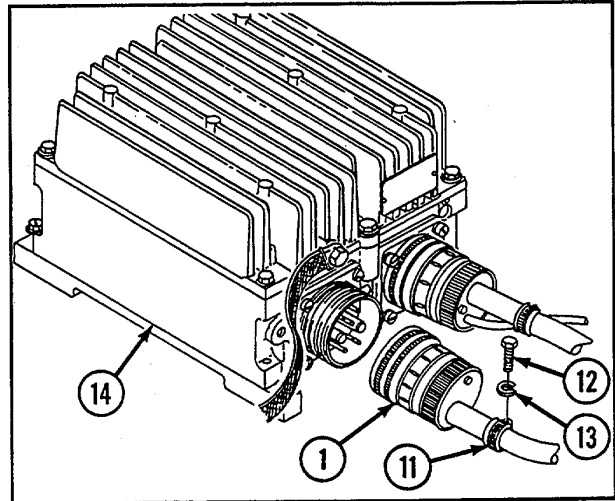
- 1 Connect two connectors (9 and 10) to batteries (19) using bolt (23) and nut (24). Push rubber insulators (22) back on battery terminal.
- 2 Connect three connectors (6, 7, and 8) to bulkhead to main engine bracket and rear fuel tank transmitter wiring harness (20).
- 3 Connect connector (5) to engine disconnect (19).
- 4 Connect two leads (3 and 4) to slave receptacle (16) using new lockwasher (18) and screw (17).
- 5 Connect connector (2) to master relay (15).



- 6 Connect connector (1) to voltage regulator (14).
- 7 Install eight clamps (11) using new lockwasher (13) and screw (12) for each.

NOTE

Follow-on maintenance: Install air inlet doors if removed (see paragraph 9-56)



6-43 REPLACE ENGINE VOLTAGE REGULATOR TO ENGINE DISCONNECT WIRING HARNESS (DUAL VOLTAGE) (116724151)

THIS TASK COVERS

- a. Removal b. Assembly c. Disassembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Equipment Conditions:

- Engine deck removed (see paragraph 9-51)
- Voltage regulator access cover removed (see paragraph 65)

Parts:

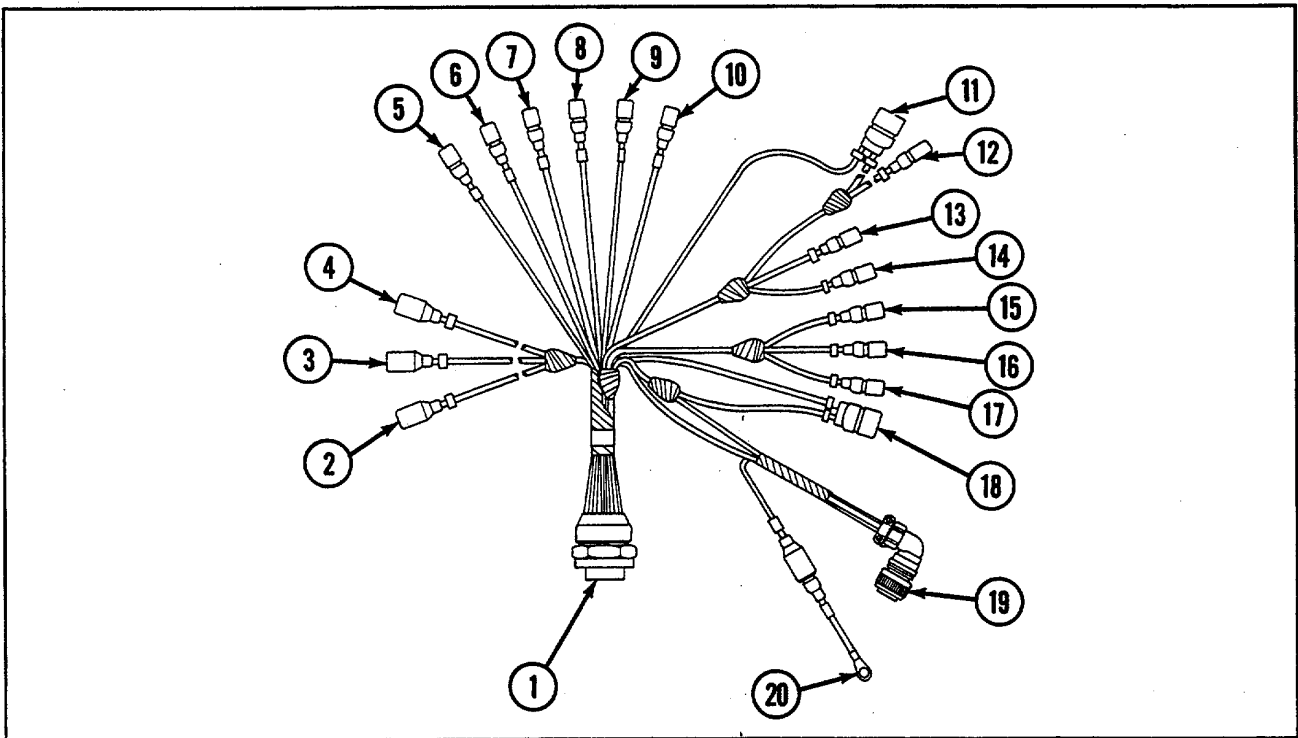
Lockwashers (2) (Appendix G, item 116)

WARNING

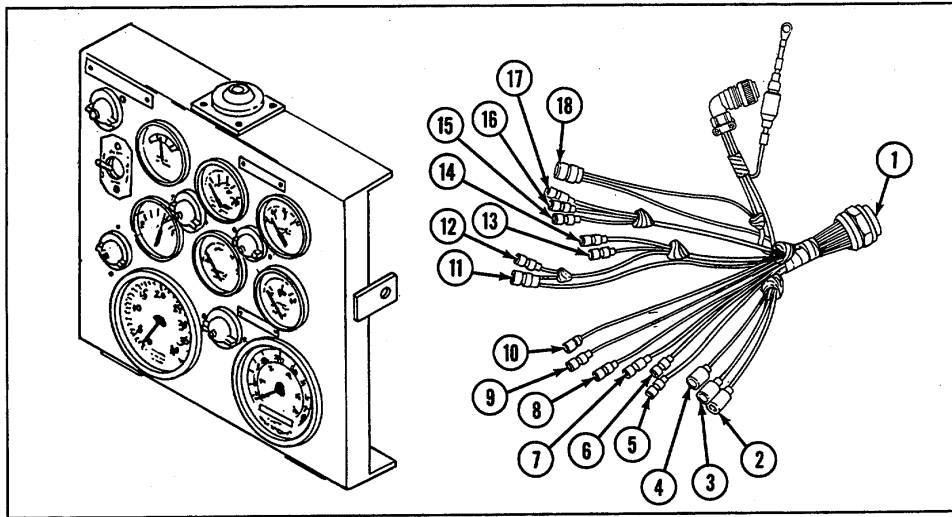
Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Engine disconnect	2
2	Main engine voltage regulator	2, 478, 1
3	Bulkhead to main engine bracket and rear fuel tank transmitter wiring harness (dual voltage) (12322588)	1
4	Bulkhead to main engine bracket and rear fuel tank transmitter wiring harness (dual voltage) (12322588)	478

6-44 REPLACE/REPAIR GAGE PANEL WIRING HARNESS (12322586)--Continued

**a. REMOVAL**

- 1 Remove gage panel from mounting bracket (see paragraph 6-8).
- 2 Disconnect three connectors (2, 3, and 4) from panel lights (21).
- 3 Disconnect two connectors (5 and 6) from fuel selector switch (22).
- 4 Disconnect two connectors (7 and 8) from engine oil temperature gage (23).
- 5 Disconnect two connectors (9 and 10) from engine oil pressure gage (24).
- 6 Disconnect two connectors (11 and 12) from transmission oil pressure gage (25).
- 7 Disconnect two connectors (13 and 14) from transmission oil temperature gage (26).
- 8 Disconnect connector (15) from mechanical transmission oil pressure indicator light (27).
- 9 Disconnect connector (16) from generator indicator (28).
- 10 Disconnect connector (17) from fuel level gage (29).
- 11 Disconnect connector (18) from master warning light (30).

**b. DISASSEMBLY**

Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect connector (18) to master warning light (30).
- 2 Connect connector (17) to fuel level gage (29).
- 3 Connect connector (16) to generator indicator (28).
- 4 Connect connector (15) to mechanical transmission oil pressure indicator light (27).
- 5 Connect two connectors (13 and 14) to transmission oil temperature gage (26).
- 6 Connect two connectors (11 and 12) to transmission oil pressure gage (25).
- 7 Connect two connectors (9 and 10) to engine oil pressure gage (24).
- 8 Connect two connectors (7 and 8) to engine oil temperature gage (23).
- 9 Connect two connectors (5 and 6) to fuel selector switch (22).
- 10 Connect three connectors (2, 3, and 4) to panel lights (21).
- 11 Install gage panel to mounting bracket (see paragraph 6-8).

NOTE

Follow-on maintenance:

Install gage panel if removed (see paragraph 6-8)

6-45 REPLACE/REPAIR GAGE PANEL TO BULKHEAD WIRING HARNESS (DUAL VOLTAGE) (123225873)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts-Continued:

- Lockwashers (19) (Appendix G, item 116)
- Lockwashers (4) (Appendix G, item 120)

Parts:

- Gasket (Appendix G, item 80)
- Lockwashers (4) (Appendix G, item 104)

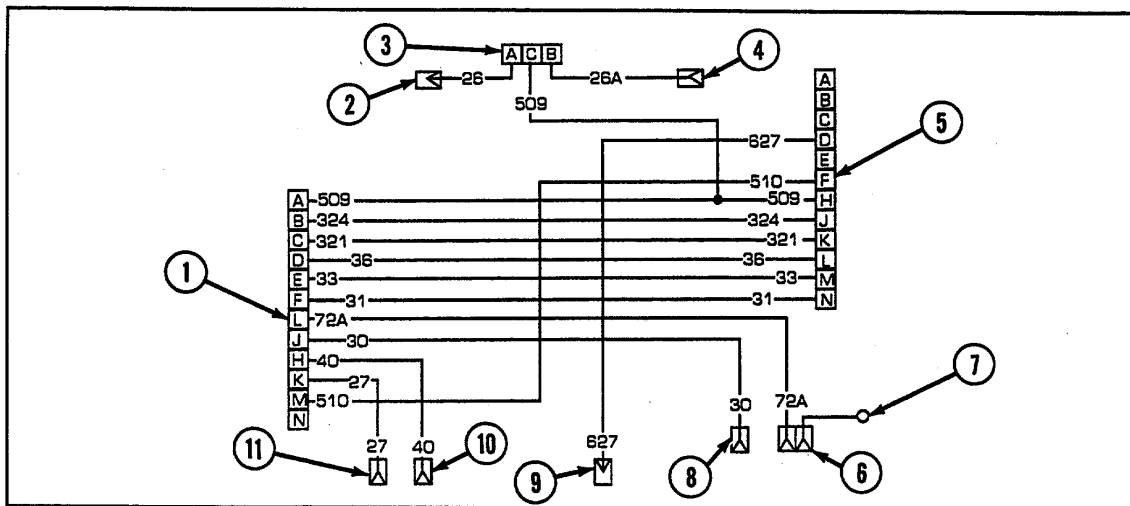
Equipment Condition:

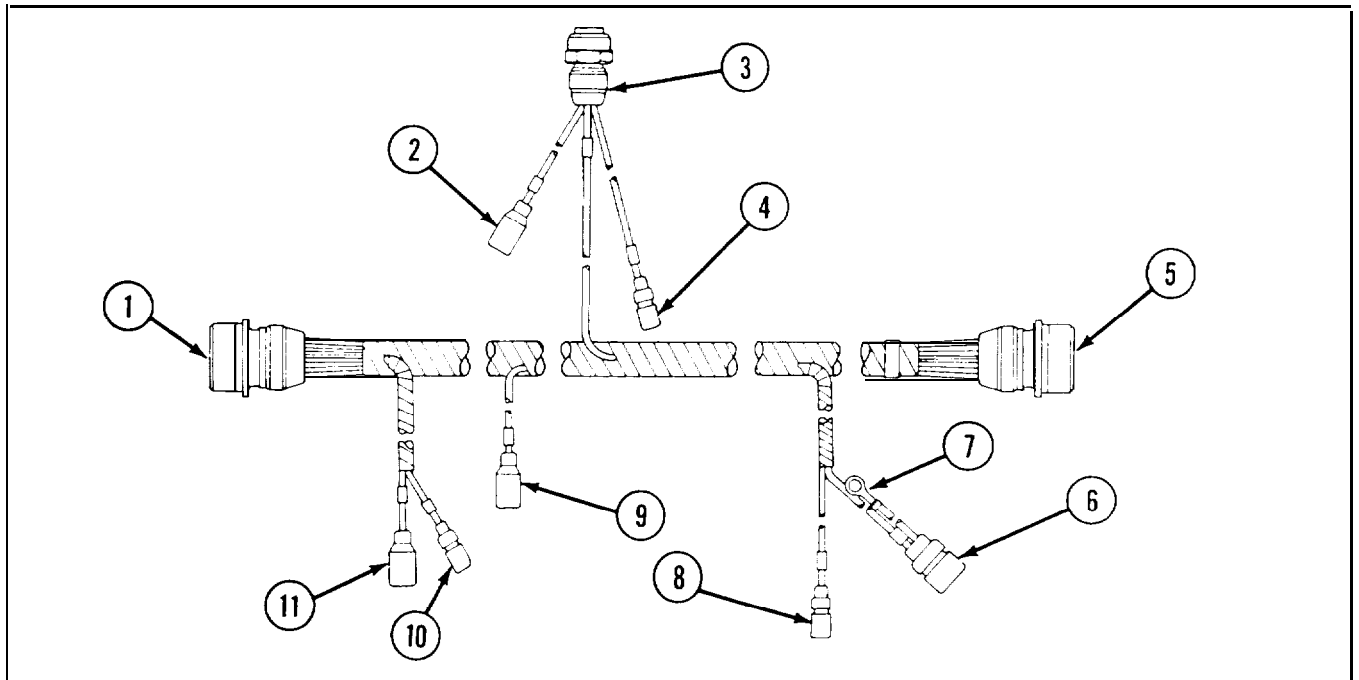
Air cleaner removed (see paragraph 4-24)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Gage panel	509, 324, 321, 36, 33, 31, 72A, 30, 40, 27, 510
2	APU control box to foot dimmer switch and bulkhead wiring harness (dual voltage) (11672466)	26
3	Powerpack warning horn relay	509, 26, 26A
4	Powerpack warning horn assembly	26A
5	Bulkhead disconnect	627, 510, 509, 324, 321, 36, 33, 31
6	Mechanical transmission low oil pressure switch	72A, GND
7	Ground	GND
8	Fuel tank transmitter	30
9	Power control switch	627
10	Switch panel to gage panel and miscellaneous switches wiring harness (12322547)	40
11	Switch panel to gage panel and miscellaneous switches wiring harness (12322547)	27



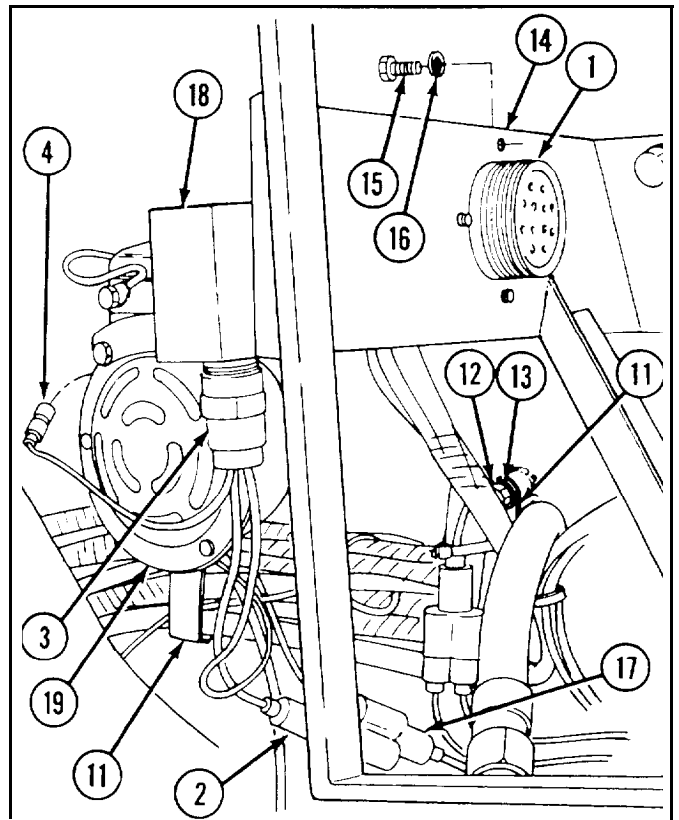


a. REMOVAL

NOTE

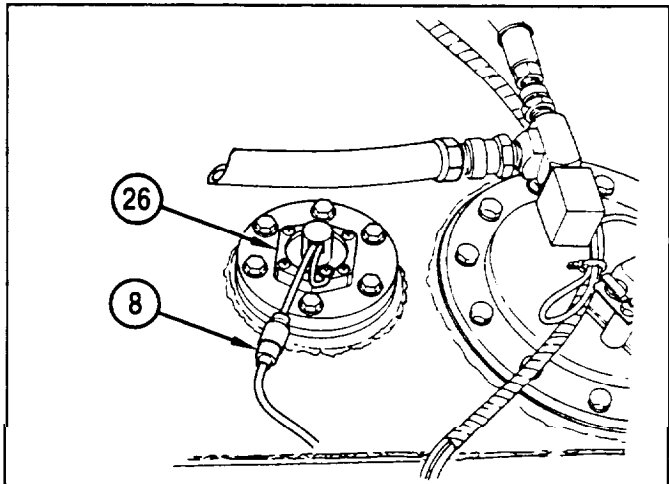
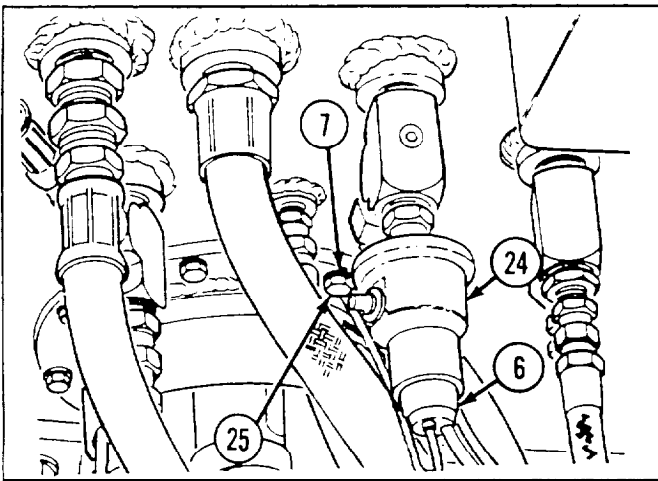
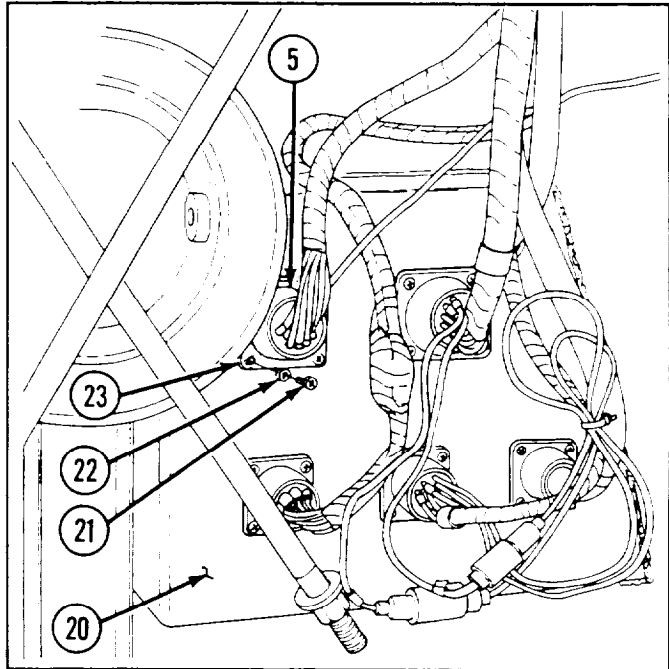
Gage panel shown removed for clarity

- 1 Remove 19 clamps (11) by removing screw (12) and lockwasher (13) from each.
- 2 Remove connector (1) from gage panel bracket (14) by removing four screws (15) and four lockwashers (16).
- 3 Disconnect connector (2) from APU control box to foot dimmer switch and bulkhead wiring harness (17).
- 4 Disconnect connector (3) from powerpack warning horn relay (18).
- 5 Disconnect connector (4) from powerpack warning horn assembly (19).

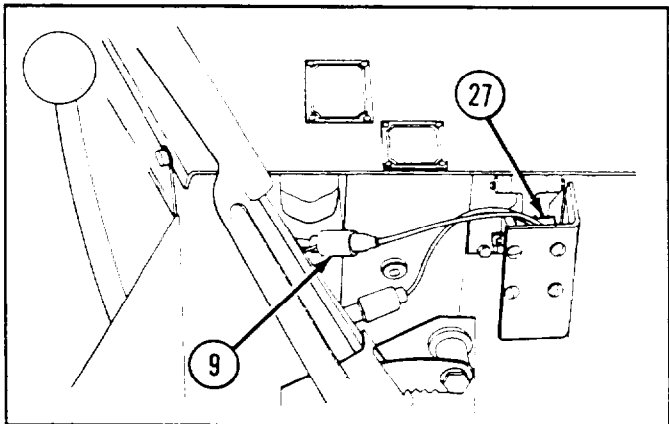
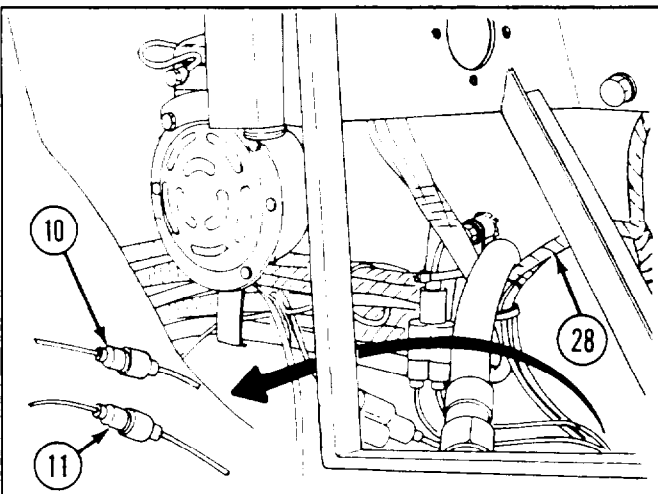


6-45 REPLACE/REPAIR GAGE PANEL TO BULKHEAD WIRING HARNESS (DUAL VOLTAGE) (12322587)-Continued

- 6 Remove connector (5) from bulkhead disconnect (20) by removing four screws (21), four lockwashers (22), and gasket (23).
- 7 Disconnect connector (6) from mechanical transmission low oil pressure switch (24).
- 8 Remove ground lead (7) by removing bolt (25).
- 9 Disconnect connector (S) from fuel tank transmitter (26)



- 10 Disconnect connector (9) from power control switch (27).
- 11 Disconnect two connectors (10 and 11) from switch panel to gage panel and miscellaneous switches wiring harness (28).



b. DISASSEMBLY

Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

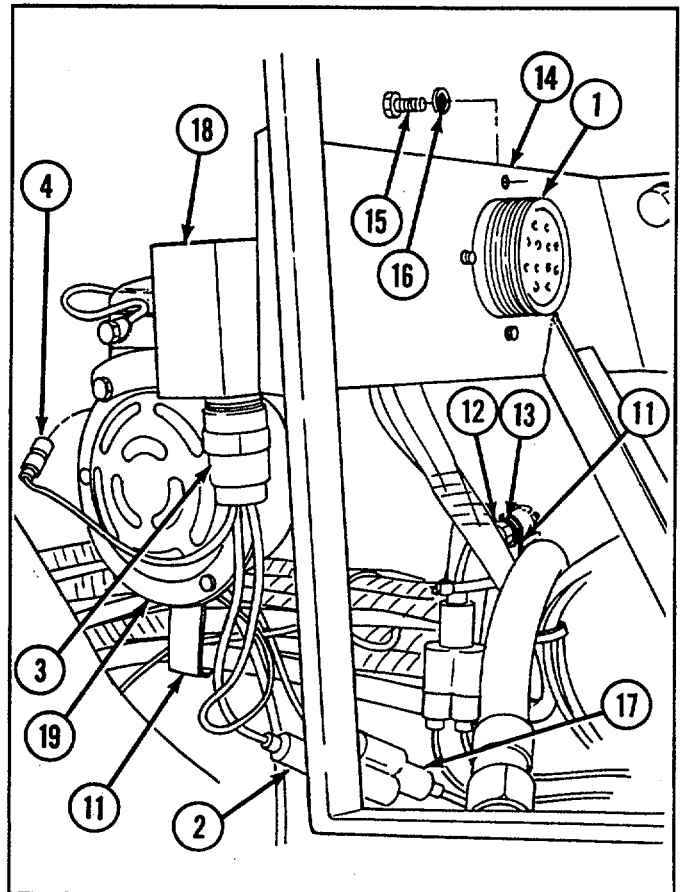
Assemble wiring harness (see Chapter 6, Section VII).

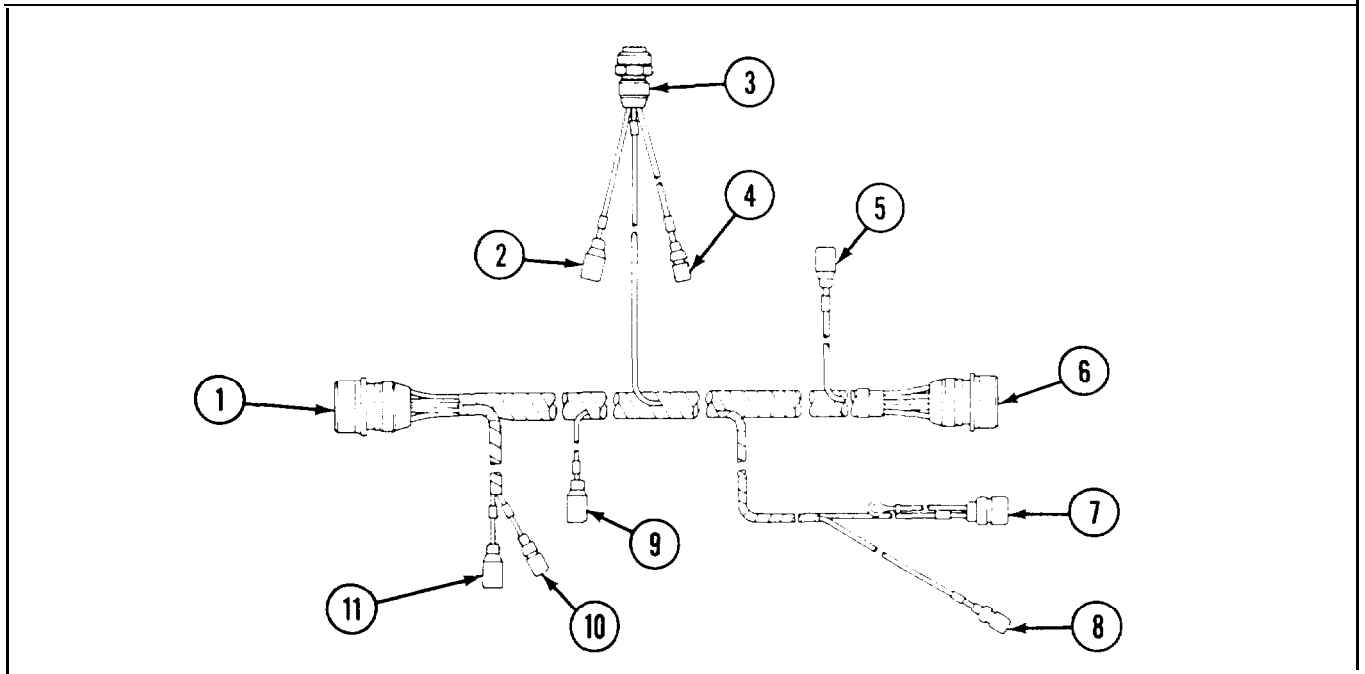
d. INSTALLATION

- 1 Connect two connectors (10 and 11) to switch panel to gage panel and miscellaneous switches wiring harness (28).
- 2 Connect connector (9) to power control switch (27).
- 3 Connect connectors (8) to fuel tank transmitter (26).
- 4 Install ground lead (7) using bolt (25).
- 5 Connect connector (6) to mechanical transmission low oil pressure switch (24).
- 6 Install connector (5) and new gasket (23) to bulkhead disconnect (20) using four screws (21) and four new lockwashers (22).
- 7 Connect connector (4) to powerpack warning horn assembly (19).
- 8 Connect connector (3) to powerpack warning horn (18).
- 9 Connect connector (2) to APU control box to foot dimmer switch and bulkhead wiring harness (17).
- 10 Install connector (1) to gage panel bracket (14) using four new lockwashers (16) and four screws (15).
- 11 Install 19 clamps (11) using new lockwasher (13) and screw (12) for each.

NOTE

Follow-on maintenance: Install air cleaner (see paragraph 4-24)



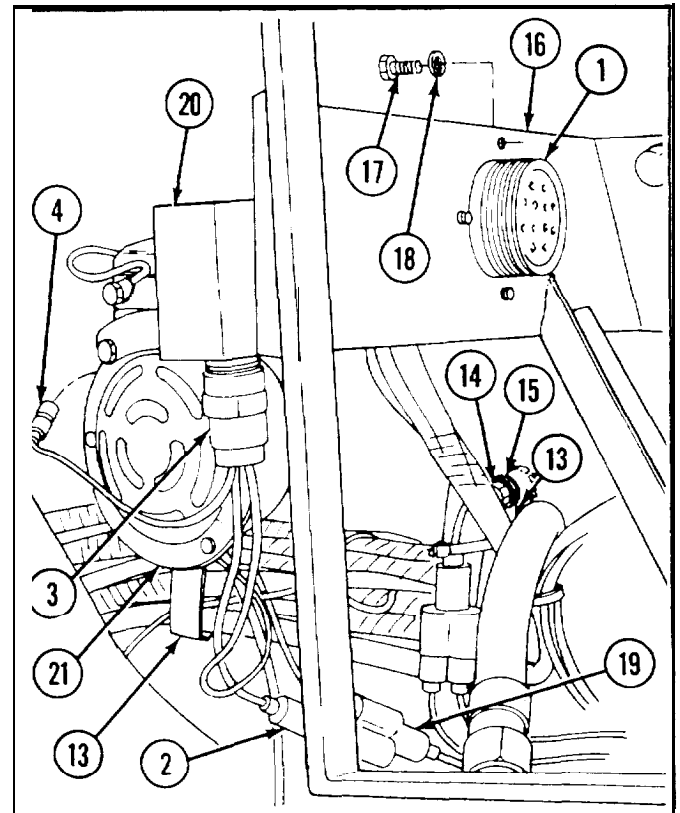


a. REMOVAL

NOTE

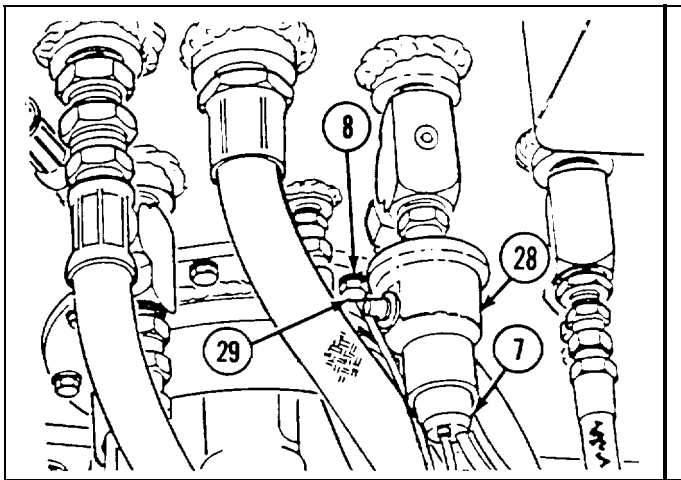
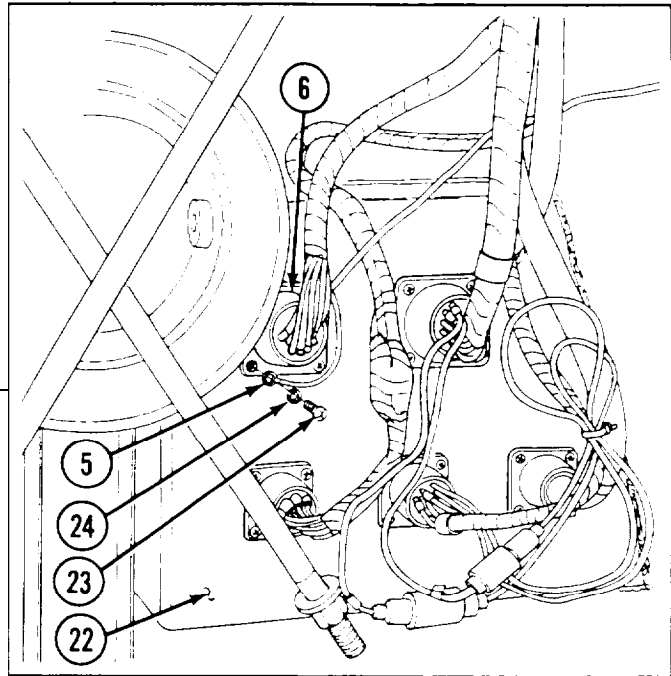
Gage panel shown removed for clarity.

- 1 Remove 19 clamps (13) by removing screw (14) and lockwasher (15).
- 2 Remove connector (1) from gage panel bracket (16) by removing four screws (17) and four lockwashers (18).
- 3 Disconnect connector (2) from APU control box to foot dimmer switch and bulkhead wiring harness (19).
- 4 Disconnect connector (3) from powerpack warning horn relay (20).
- 5 Disconnect connector (4) from powerpack warning horn assembly (21).

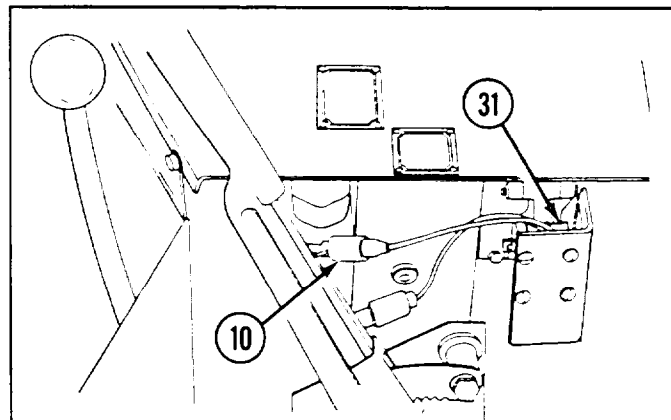
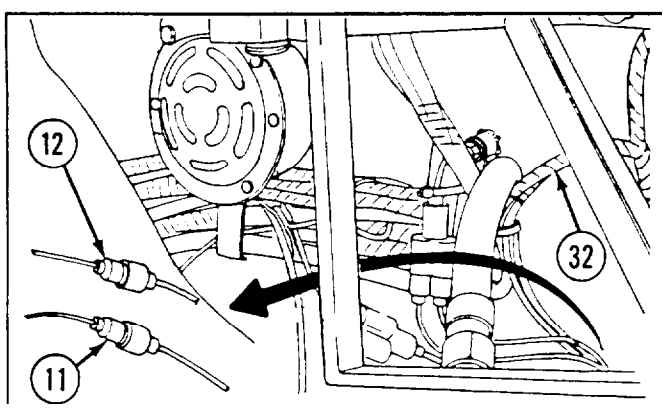
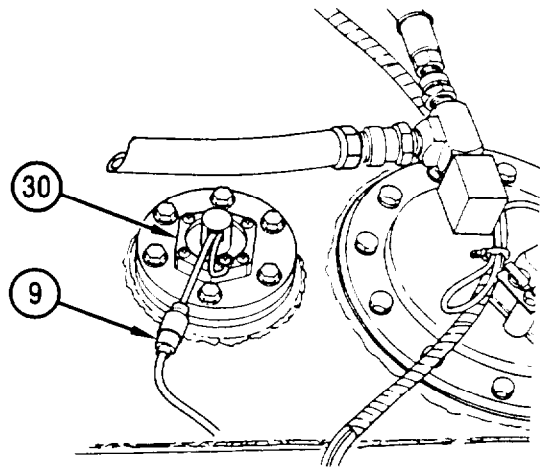


6-46 REPLACE/REPAIR GAGE PANEL TO BULKHEAD WIRING HARNESS (SINGLE VOLTAGE) (11671807)-Continued

- 6 Remove ground lead (5) from bulkhead (22) by removing screw (23) and lockwasher (21).
- 7 Remove connector (6) from bulkhead disconnect (22) by removing three screws (25), three lockwashers (26), and gasket (27).
- 8 Disconnect connector (7) from mechanical transmission low oil pressure switch (28).
- 9 Remove ground lead (8) by removing bolt (29).



- 10 Disconnect connector (9) from fuel tank transmitter (30).
- 11 Disconnect connector (10) from power control switch (31).
- 12 Disconnect two connectors (11 and 12) from switch panel to gage panel and miscellaneous switches wiring harness (32).



b. DISASSEMBLY

Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

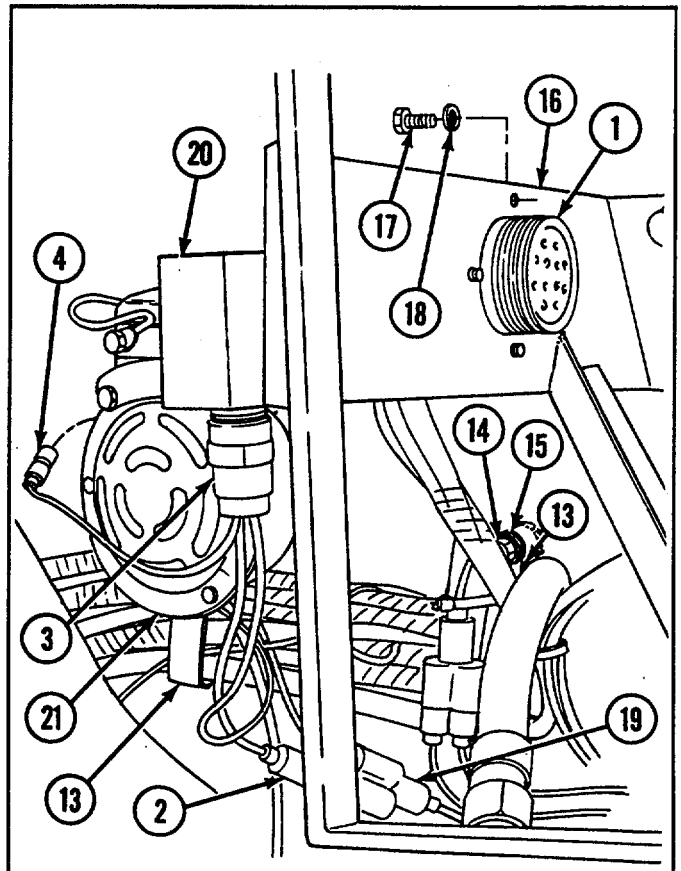
Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect two connectors (11 and 12) to switch panel to gage panel and miscellaneous switches wiring harness (32).
- 2 Connect connectors (10) to power control switch (31).
- 3 Connect connector (9) to fuel tank transmitter (30).
- 4 Install ground lead (8) using bolt (29).
- 5 Connect connector (7) to mechanical transmission low oil pressure switch (28).
- 6 Install connector (6) and new gasket (27) to bulkhead disconnect (22) using three screws (25) and three new lockwashers (26).
- 7 Install ground lead (5) to bulkhead disconnect (22) using screw (23) and new lockwasher (24).
- 8 Connect connector (4) to powerpack warning horn assembly (21).
- 9 Connect connector (3) to powerpack warning horn (20).
- 10 Connect connector (2) to APU control box to foot dimmer switch and bulkhead wiring harness (19).
- 11 Install connector (1) to gage panel bracket (16) using four new lockwashers (18) and four screws (17).
- 12 Install 19 clamps (13) using new lockwasher (15) and screw (14) for each.

NOTE

Follow-on maintenance: Install air cleaner (see paragraph 4-24)



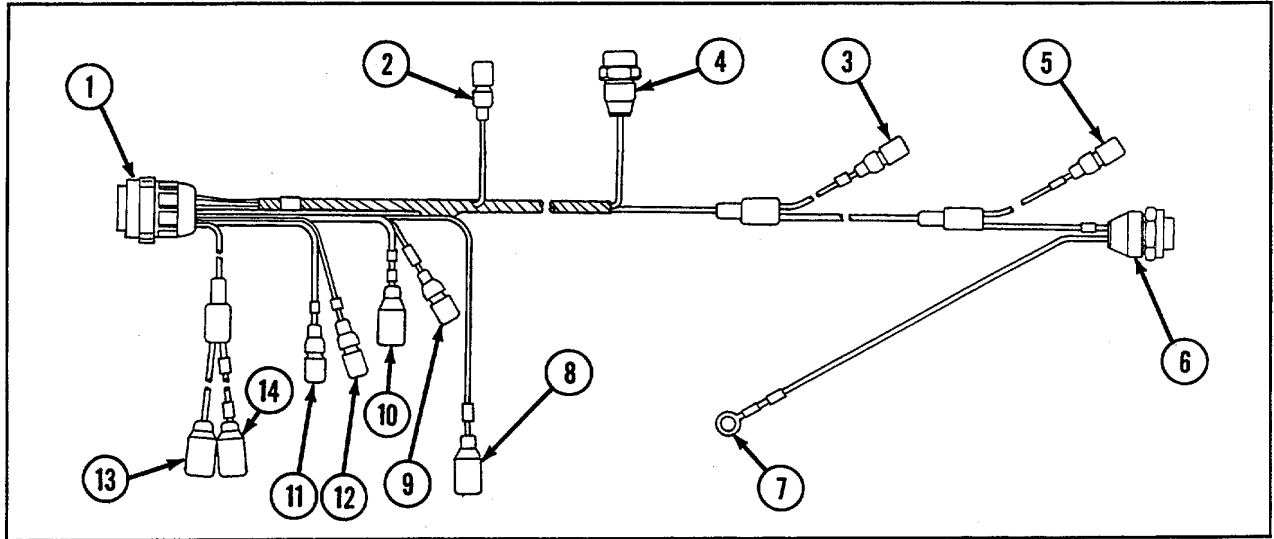
**6-47 REPLACE/REPAIR ELECTRICAL ACCESSORIES PANEL WIRING HARNESS
(10944744)****THIS TASK COVERS**

a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP**Tools:**Tool kit, general mechanic's
(Appendix C, item 53)**Parts:**Lockwashers (21) (Appendix G,
item 116)**Equipment Condition:**Stowage basket intermediate
forward floor plate removed
(see paragraph 9-21)**WARNING**

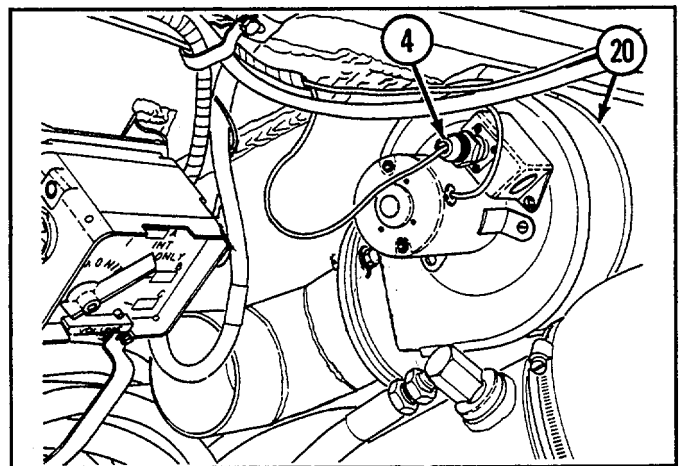
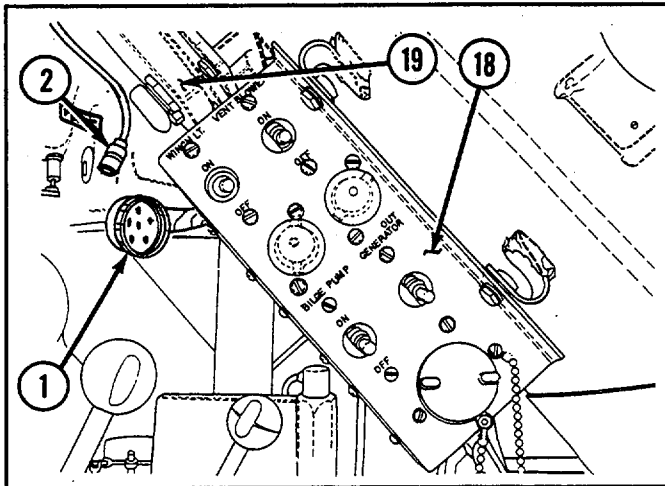
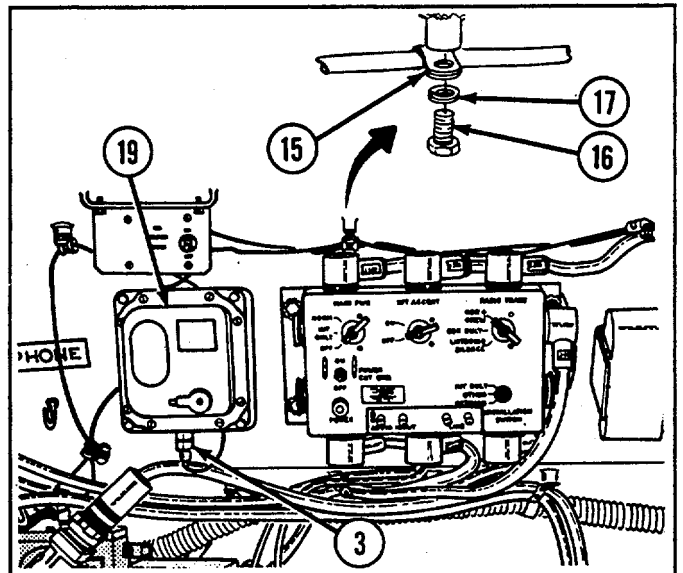
Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Electrical accessories panel	38, 138, 59, 518, 1, 1, 450B, 38/59, 450/37
2	Dome light	38
3	Dome light	38
4	Ventilator blower	59
5	Rigger's fixed spotlight	138
6	Troublelight assembly	138, 496
7	Ground	496
8	Winch illumination lamp assembly	518
9	Bilge pump lead relay wiring harness (10894548)	450B
10	Switch panel, radio, and bilge pump to bulkhead wiring harness	38, 59
11	Switch panel to neutral safety switch to bulkhead wiring harness (11671420)	1
12	Switch panel to neutral safety switch to bulkhead wiring harness (11671420)	1
13	Switch panel, radio, and bilge pump to bulkhead wiring harness	37,450
14	Switch panel, radio, and bilge pump to bulkhead wiring harness	37,450



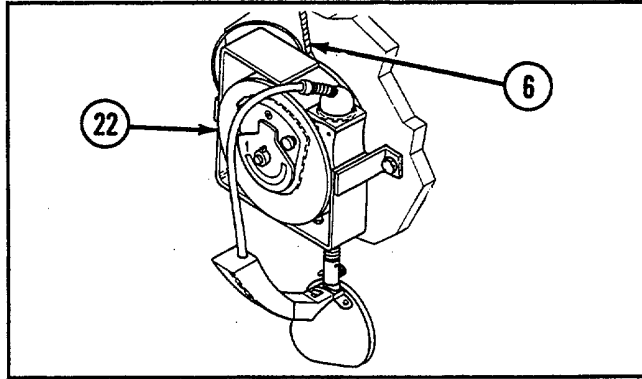
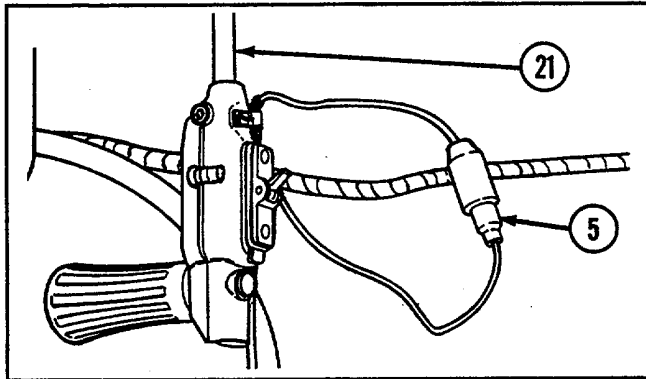
a. REMOVAL

- 1 Remove 20 clamps (15) by removing screws (16) and lockwasher (17) from each.
- 2 Disconnect connector (1) from electrical accessories panel (18).
- 3 Disconnect connectors (2 and 3) from two dome lights (19).
- 4 Disconnect connector (4) from ventilator blower (20).

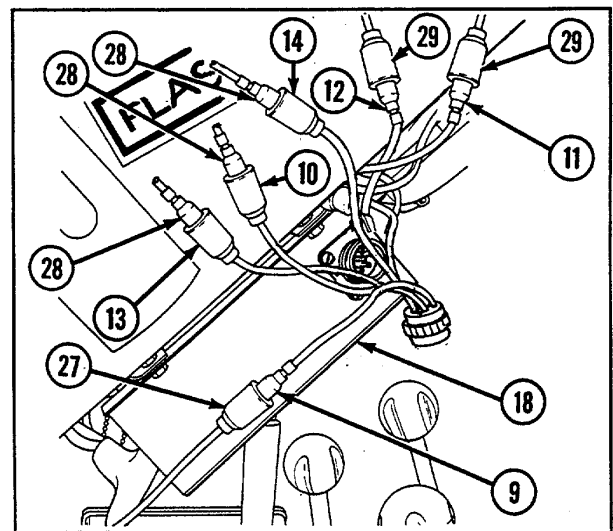
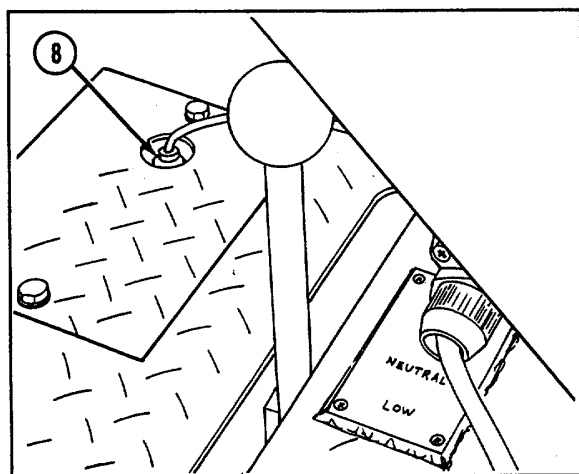
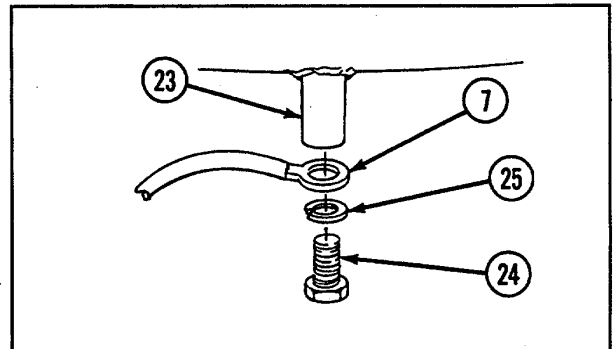


6-47 REPLACE/REPAIR ELECTRICAL ACCESSORIES PANEL WIRING HARNESS (10944744)-Continued

- 5 Disconnect connector (5) from rigger's fixed spotlight (21).
- 6 Disconnect connector (6) from troublelight assembly (22).
- 7 Remove ground lead (7) from hull (23) by removing screw (24) and lockwasher (25).



- 8 Disconnect connector (8) from winch illumination lamp assembly (26).
- 9 Disconnect connector (9) from bilge pump lead relay wiring harness (27).
- 10 Disconnect connector (10) from switch panel, radio, and bilge pump to bulkhead wiring harness (28).
- 11 Disconnect connectors (11 and 12) from switch panel to neutral safety switch to bulkhead wiring harness (29).
- 12 Disconnect connectors (13 and 14) from switch panel, radio, and bilge pump to bulkhead wiring harness (28).



b. DISASSEMBLY

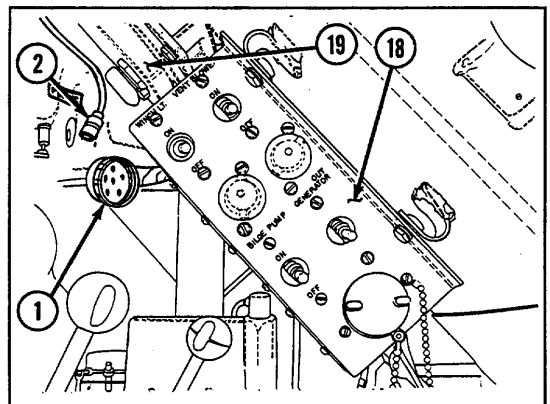
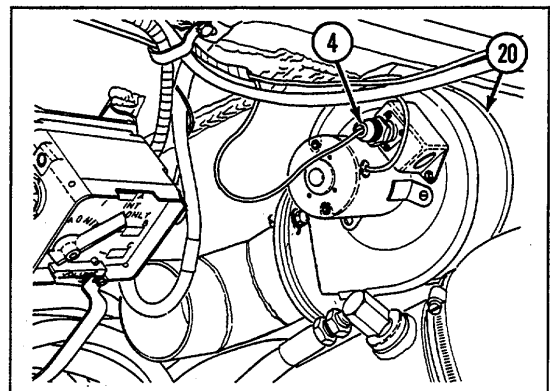
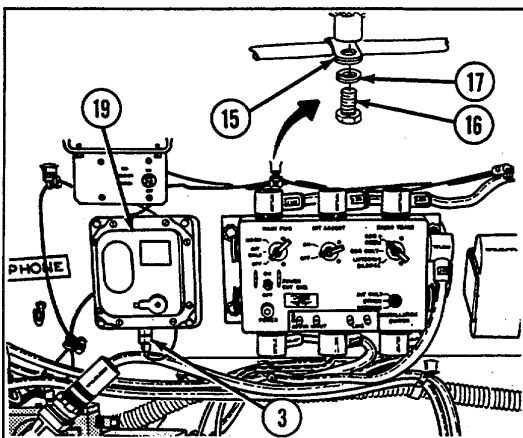
Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect connectors (13 and 14) to switch panel, radio, and bilge pump to bulkhead wiring harness (28).
- 2 Connect connectors (11 and 12) to switch panel to neutral safety switch to bulkhead wiring harness (29).
- 3 Connect connectors (10) to switch panel, radio, and bilge pump to bulkhead wiring harness (28).
- 4 Connect connector (9) to bilge pump lead relay wiring harness (27).
- 5 Connect connectors (8) to winch illumination lamp assembly (26).
- 6 Install ground lead (7) to hull (23) using new lockwasher (25) and screw (24).
- 7 Connect connector (6) to troublelight assembly (22).
- 8 Connect connector (5) to rigger's fixed spotlight (21).
- 9 Connect connector (4) to ventilator blower (20).
- 10 Connect connectors (2 and 3) to two dome lights (19).
- 11 Connect connector (1) to electrical accessories panel (18).
- 12 Install 20 clamps (15) each with new lockwasher (17) and screw (16).

**NOTE**

Follow-on maintenance: Install storage basket intermediate forward floor plate (see paragraph 9-21)

**6-48 REPLACE/REPAIR FLASHER SYSTEM PANEL WIRING HARNESS
(11672373)**

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

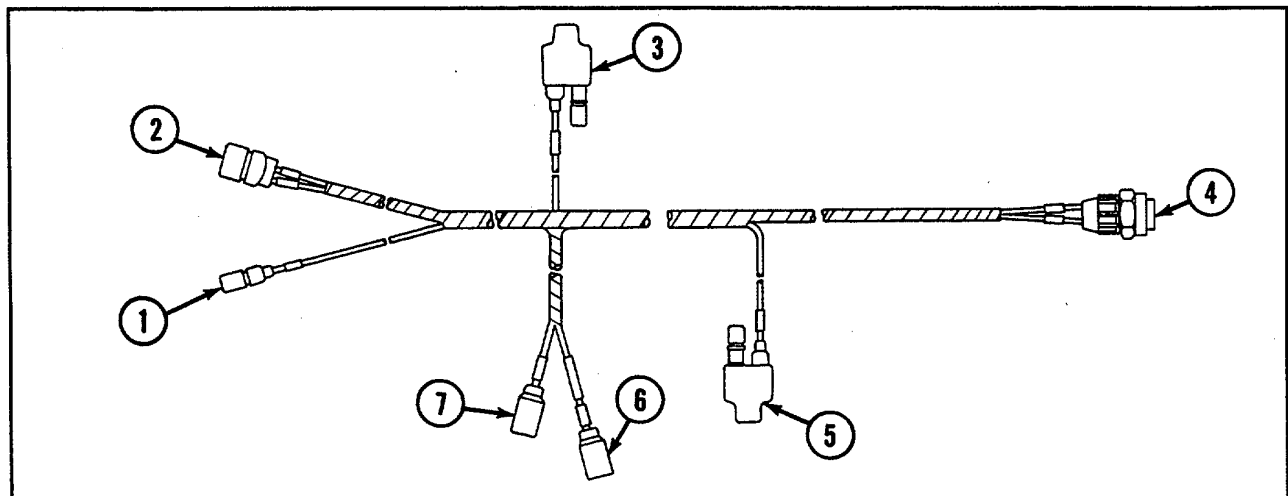
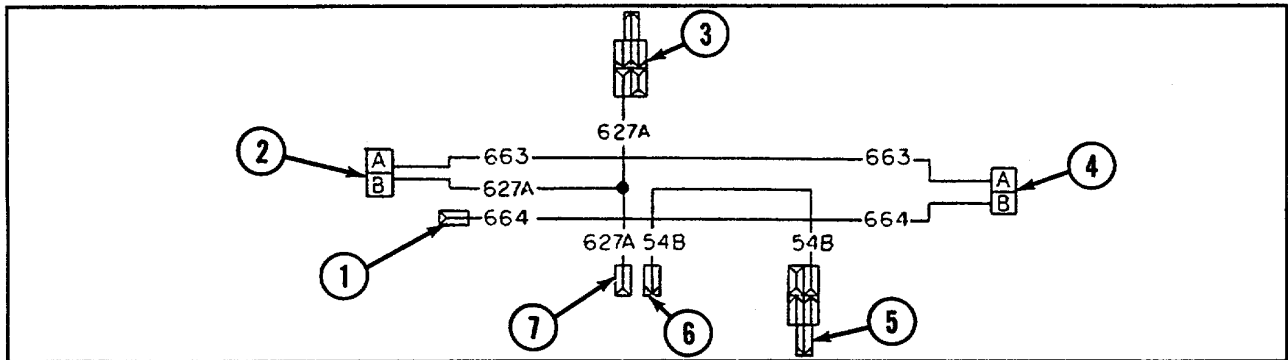
Equipment Conditions:

- Subfloor plates removed as necessary (see Chapter 9, Section I)
- Rear intermediate right access floor plate removed (see paragraph 9-11)

WARNING

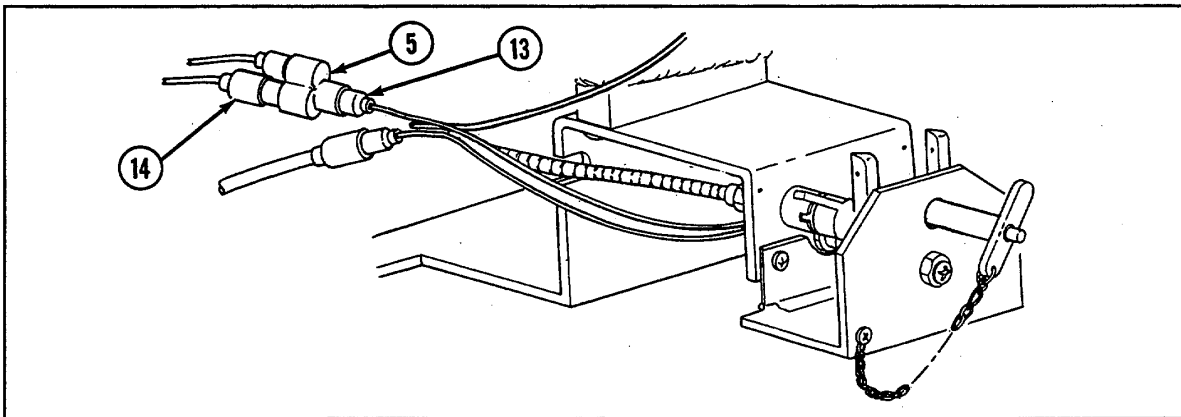
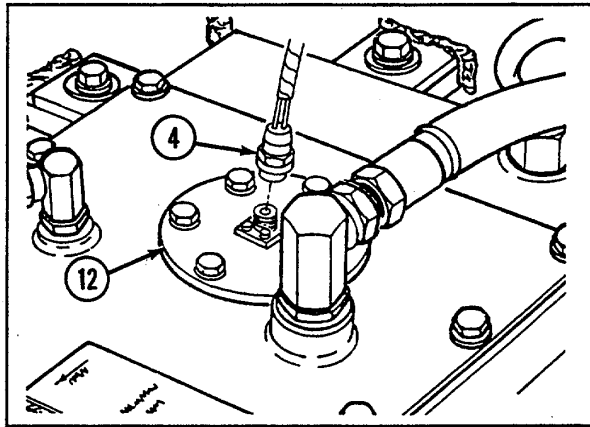
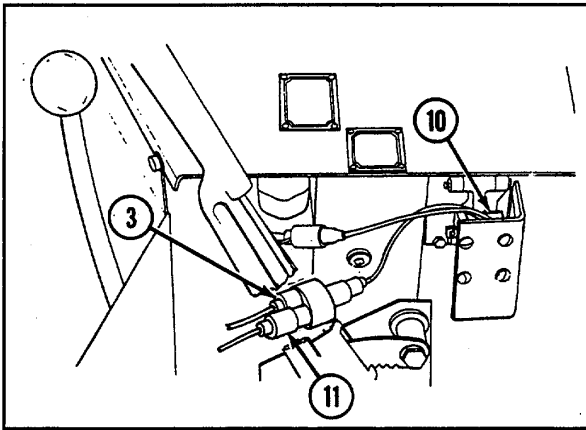
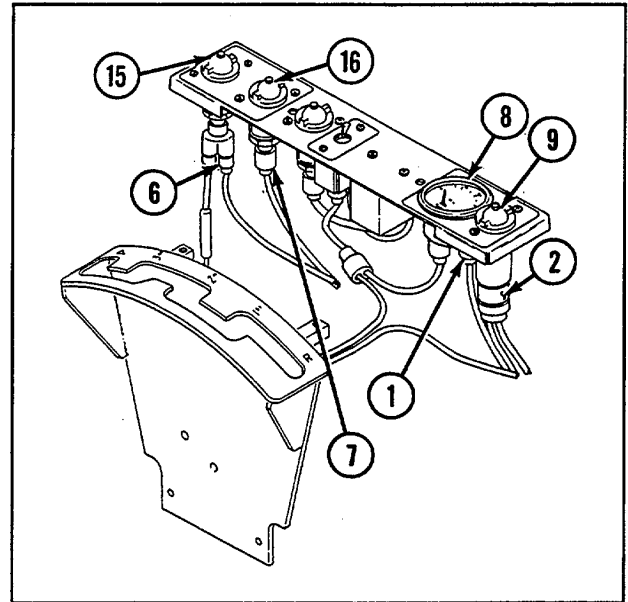
Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Hydraulic oil temperature gage	664
2	Hydraulic oil temperature light	663, 627A
3	Governor control switch	627A
4	Hydraulic oil temperature transmitter housing assembly wiring harness at hydraulic reservoir disconnect	663, 664
5	Fire extinguisher engine shutoff switch	54B
6	Fire extinguisher engine shutoff light	54B
7	PTO engage light	627A



a. REMOVAL

- 1 Disconnect connector (1) from hydraulic oil temperature gage (8).
- 2 Disconnect connector (2) from hydraulic oil temperature light (9).
- 3 Disconnect Y-connector (3) from governor control switch (10) and connector (11).
- 4 Disconnect connector (4) from hydraulic reservoir disconnect (12).
- 5 Disconnect Y-connector (5) from fire extinguisher engine shutoff switch (13) and connector (14).
- 6 Disconnect connector (6) from fire extinguisher engine shutoff light (15).
- 7 Disconnect connector (7) from PTO engage light (16).



6B48 REPLACE/REPAIR FLASHER SYSTEM PANEL WIRING HARNESS (11672373)-Continued

b. DISASSEMBLY

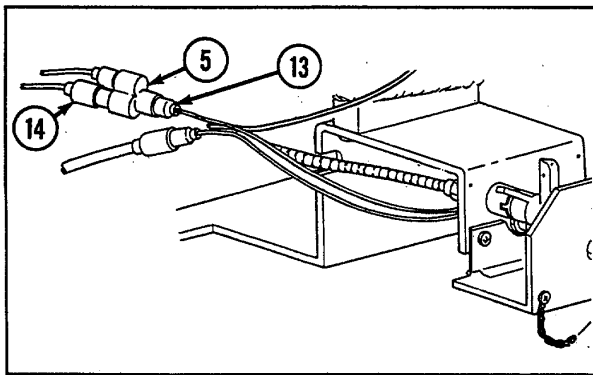
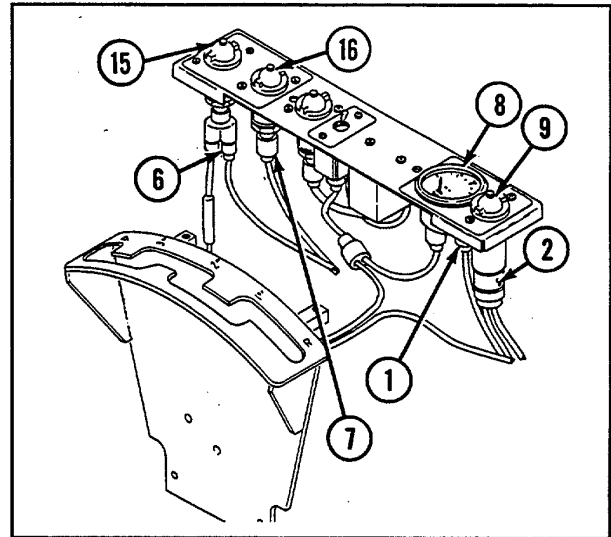
Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

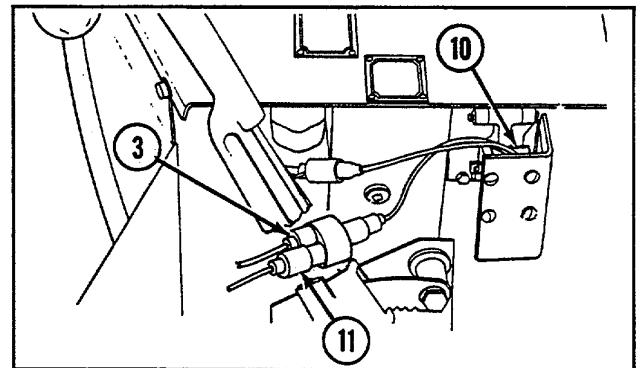
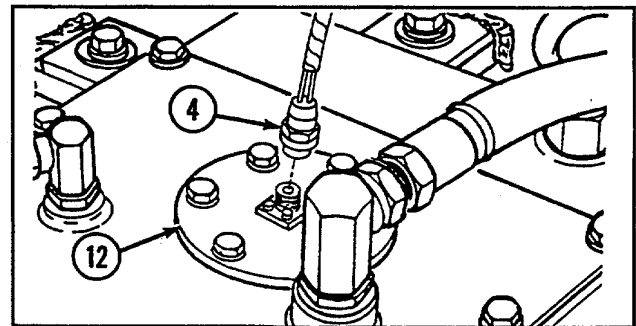
d. INSTALLATION

- 1 Connect connector (7) to PTO engage light (16).
- 2 Connect connector (6) to fire extinguisher engine shutoff light (15).
- 3 Connect Y-connector (5) to fire extinguisher engine shutoff switch (13) and connector (14).
- 4 Connect connector (4) to hydraulic reservoir disconnect (12).
- 5 Connect Y-connector (3) to governor control switch (10) and connector (11).
- 6 Connect connector (2) to hydraulic oil temperature light (9).
- 7 Connect connector (1) to hydraulic oil temperature gage (8).



NOTE

- Follow-on maintenance:
- Install rear intermediate right access floor plate (see paragraph 9-11)
 - Install subfloor plates if removed (see Chapter 9, Section I)



6-49 REPLACE/REPAIR FUEL SHUTOFF SWITCH PANEL LEAD ASSEMBLY (11 67'1 227-a)

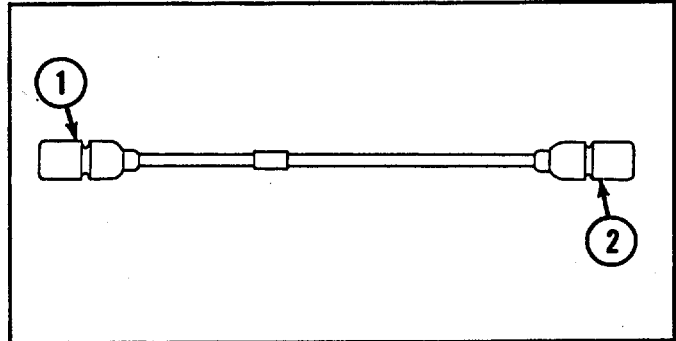
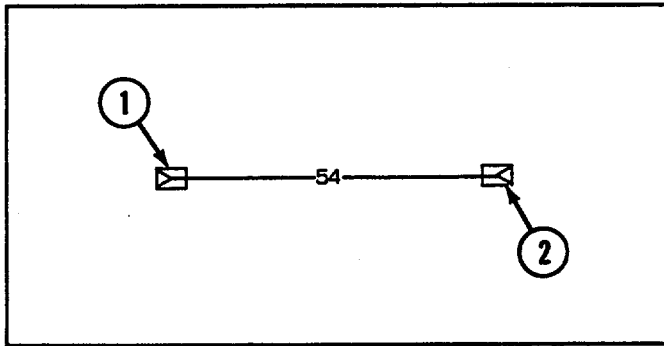
THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Fuel shutoff switch	54
2	Circuit breaker	54



a. REMOVAL

- 1 Disconnect connector (1) from fuel shutoff switch (3).
- 2 Disconnect connector (2) from circuit breaker (4).

b. DISASSEMBLY

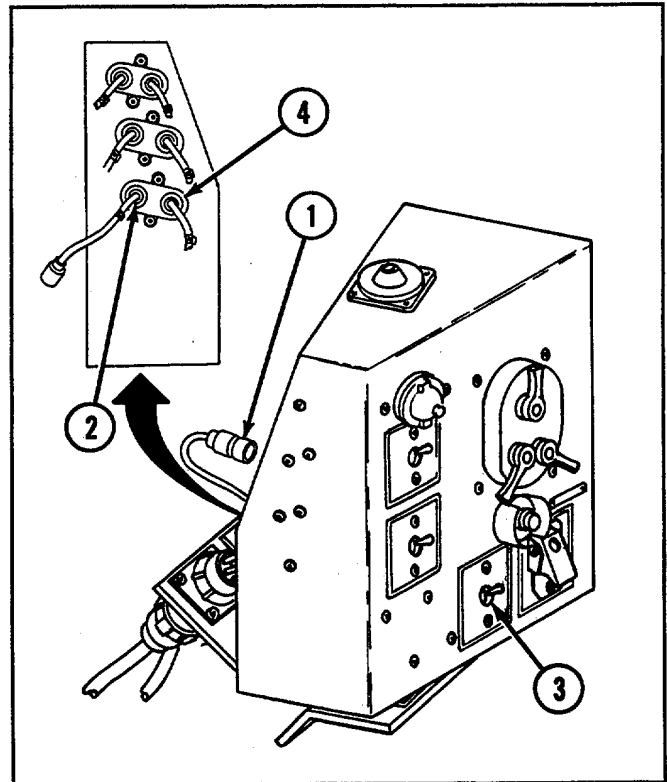
Disassemble lead assembly (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble lead assembly (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect connector (2) to circuit breaker (4).
- 2 Connect connector (1) to fuel shutoff switch (3).



6-51 REPLACE/REPAIR FUEL GAGE PANEL LEAD ASSEMBLY (10866881]**THIS TASK COVERS**

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

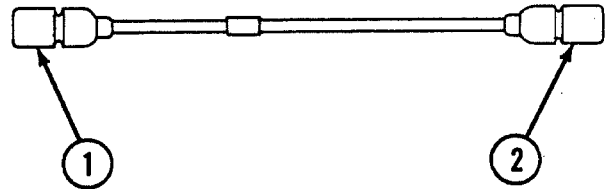
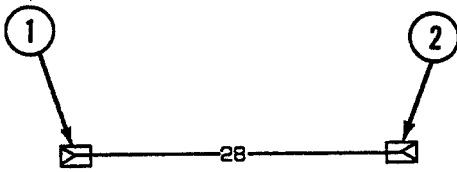
Equipment Conditions:

Gage panel assembly removed (see paragraph 6-8)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Fuel selector switch	28
2	Fuel gage	28

**a. REMOVAL**

- 1 Disconnect connector switch (1) from fuel selector switch (3).
- 2 Disconnect connector switch (2) from fuel gage (4).

b. DISASSEMBLY

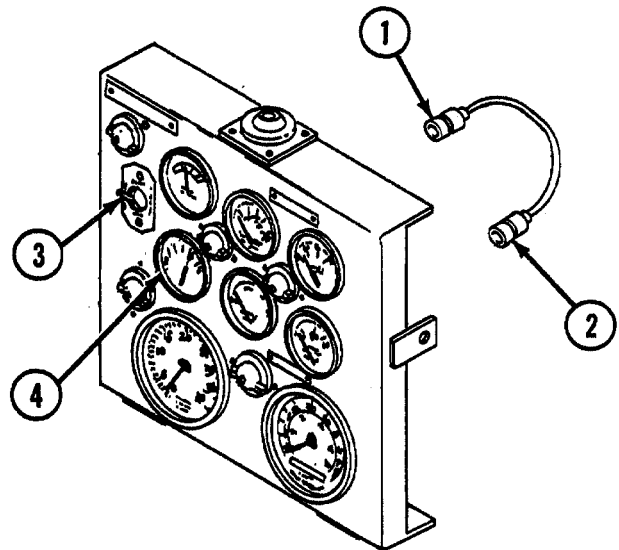
Disassemble lead assembly (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble lead assembly (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect connector (2) to fuel gage (4).
- 2 Connect connector (1) to fuel selector switch (3).

**NOTE**

Follow-on maintenance: Install gage panel assembly (see paragraph 6-8)

6-52 REPLACE/REPAIR SWITCH PANEL TO HEAD LAMPS AND BULKHEAD WIRING HARNESS (11671568)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Gasket (Appendix G, item 81)
- Lockwashers (4) (Appendix G, item 104)
- Lockwashers (24) (Appendix G, item 116)

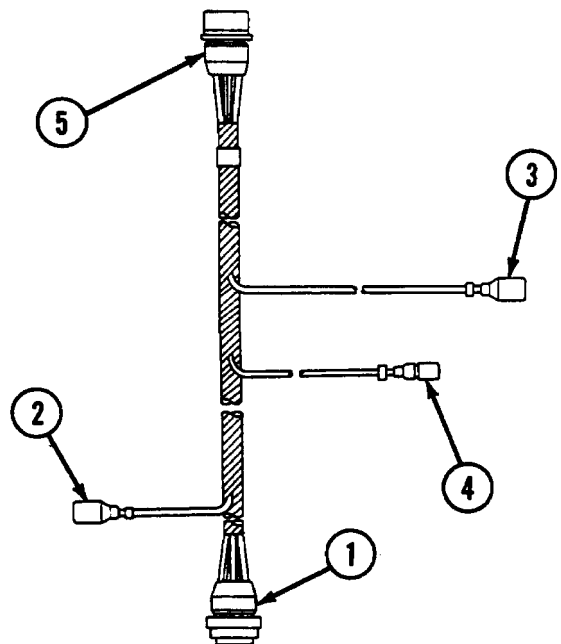
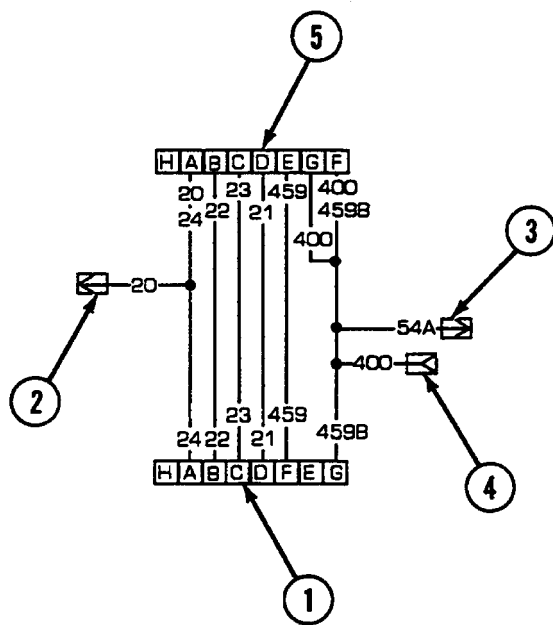
Equipment Conditions:

Air cleaner assembly removed (see paragraph 4-24)

WARNING

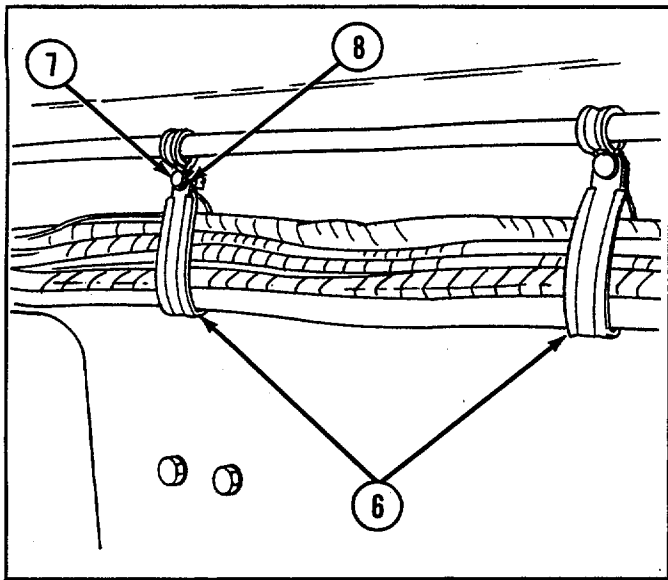
Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Main switch panel assembly	24, 22; 23, 21, 459, 459B
2	Headlight and dimmer switch wiring harness	20
3	Fire extinguisher interlock switch	54A
4	Heater control box	400
5	Bulkhead disconnect	20, 24, 22, 23, 21, 459, 400, 459B

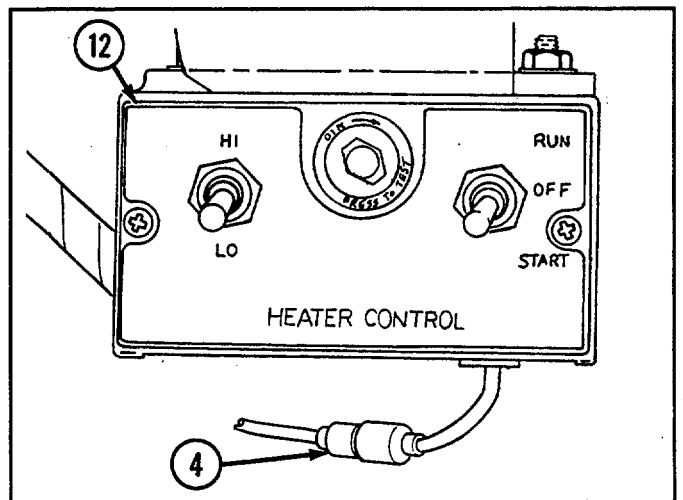
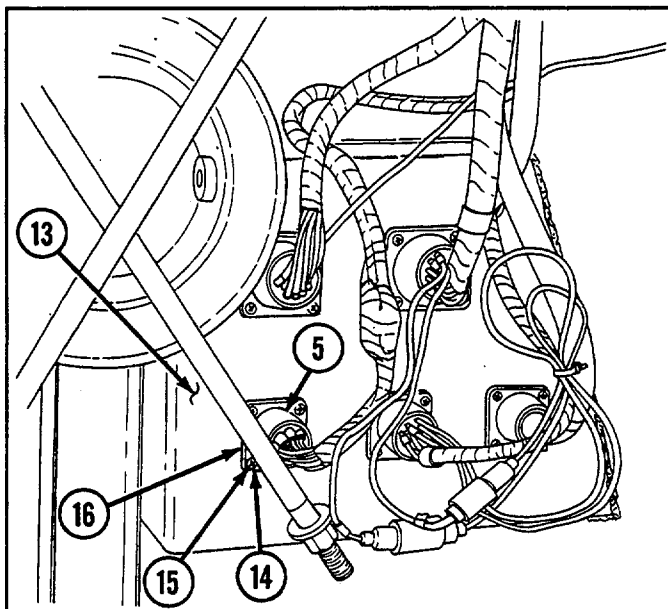
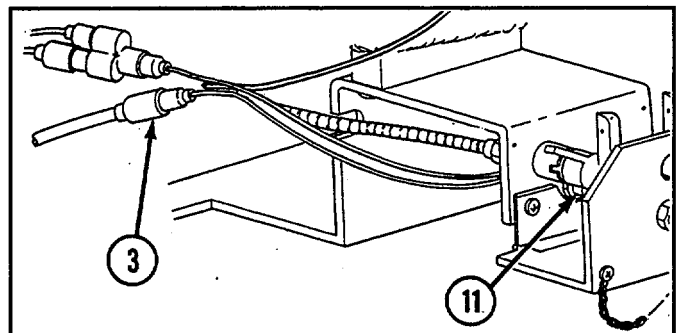
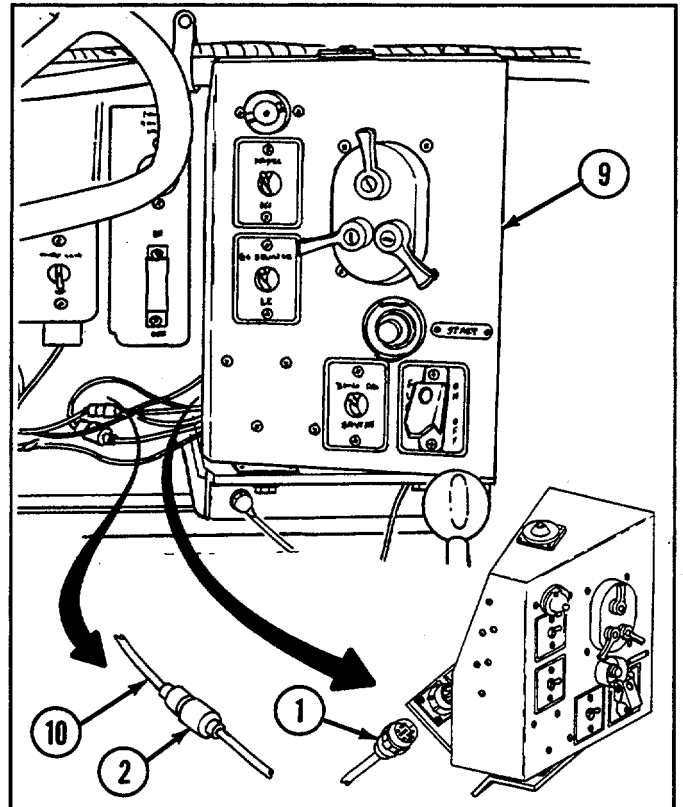


a. REMOVAL

- 1 Remove 24 clamps (6) by removing screw (7) and lockwasher (8) from each.
- 2 Disconnect connector (1) from main switch panel (9).
- 3 Disconnect connector (2) from headlight and dimmer switch wiring harness (10).



- 4 Disconnect connector (3) from fire extinguisher interlock switch (11).
- 5 Disconnect connector (4) from heater control box (12).
- 6 Remove connector (5) from bulkhead disconnect (13) by removing four screws (14), four lockwashers (15), and gasket (16).



b. DISASSEMBLY

Disassemble wiring harness (see Chapter 6, Section VI).

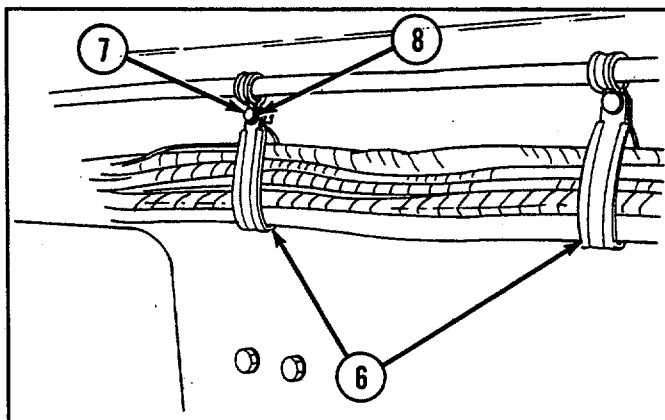
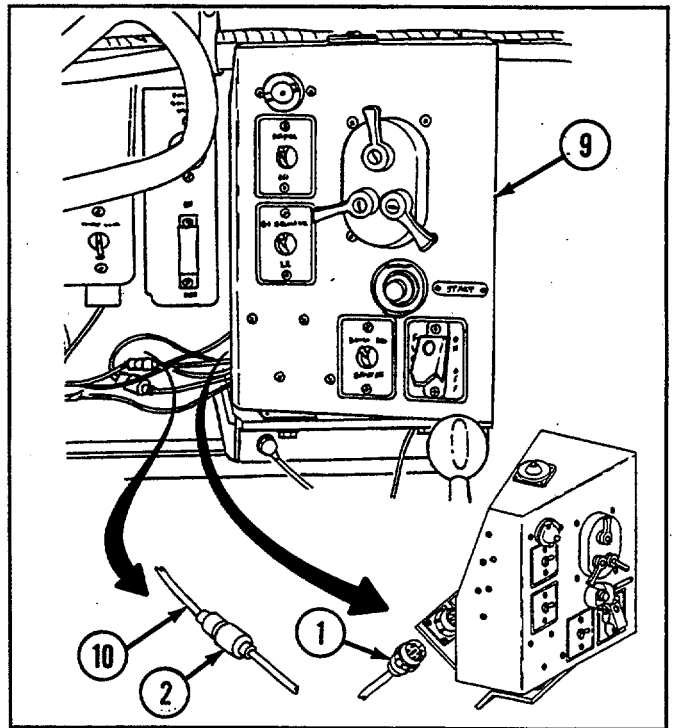
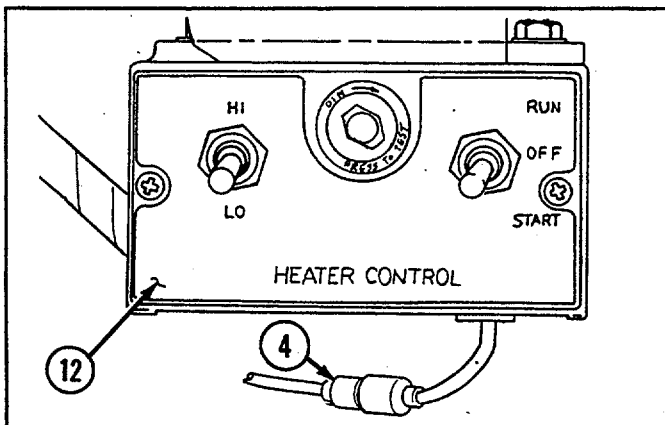
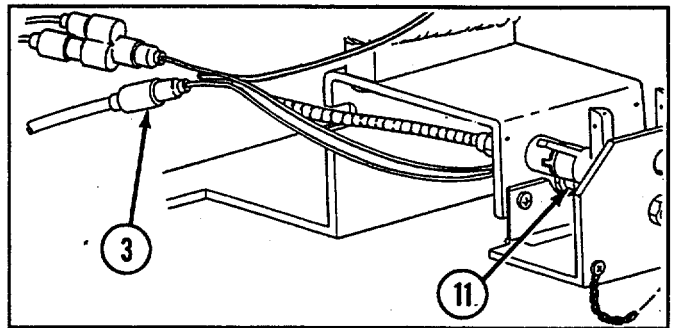
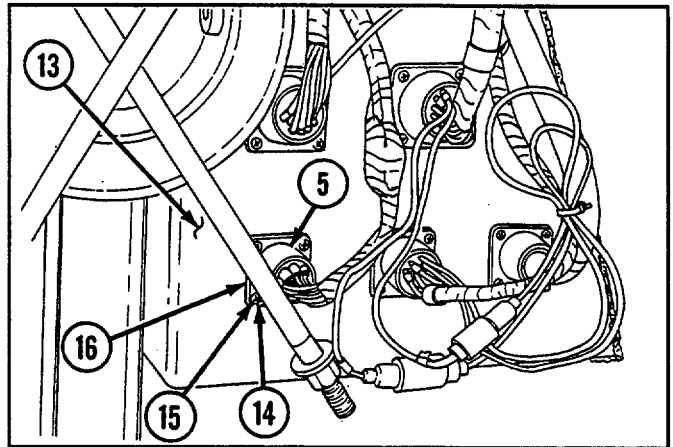
6-52 REPLACE/REPAIR SWITCH PANEL TO HEADLAMPS AND BULKHEAD WIRING HARNESS (116715681--Continued)

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Install connector (5) and new gasket (16) to bulkhead disconnect (13) using four screws (14) and four new lockwashers (15).
- 2 Connect connector (4) to heater control box (12).
- 3 Connect connector (3) to fire extinguisher interlock switch (11).
- 4 Connect connector (2) to headlight and dimmer switch wiring harness (10).
- 5 Connect connector (1) to main switch panel (9).
- 6 Install 24 clamps (6) using new lockwasher (8) and screw (7) for each.



NOTE

Follow-on maintenance: Install air cleaner assembly (see paragraph 4-24)

6—53 REPLACE/REPAIR SWITCH PANEL, RADIO, AND BILGE PUMP TO BULKHEAD WIRING HARNESS (11671798)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Gasket (Appendix GC, item 81)
- Lockwashers (4) (Appendix G, item 104)
- Lockwashers (24) (Appendix G, item 116)

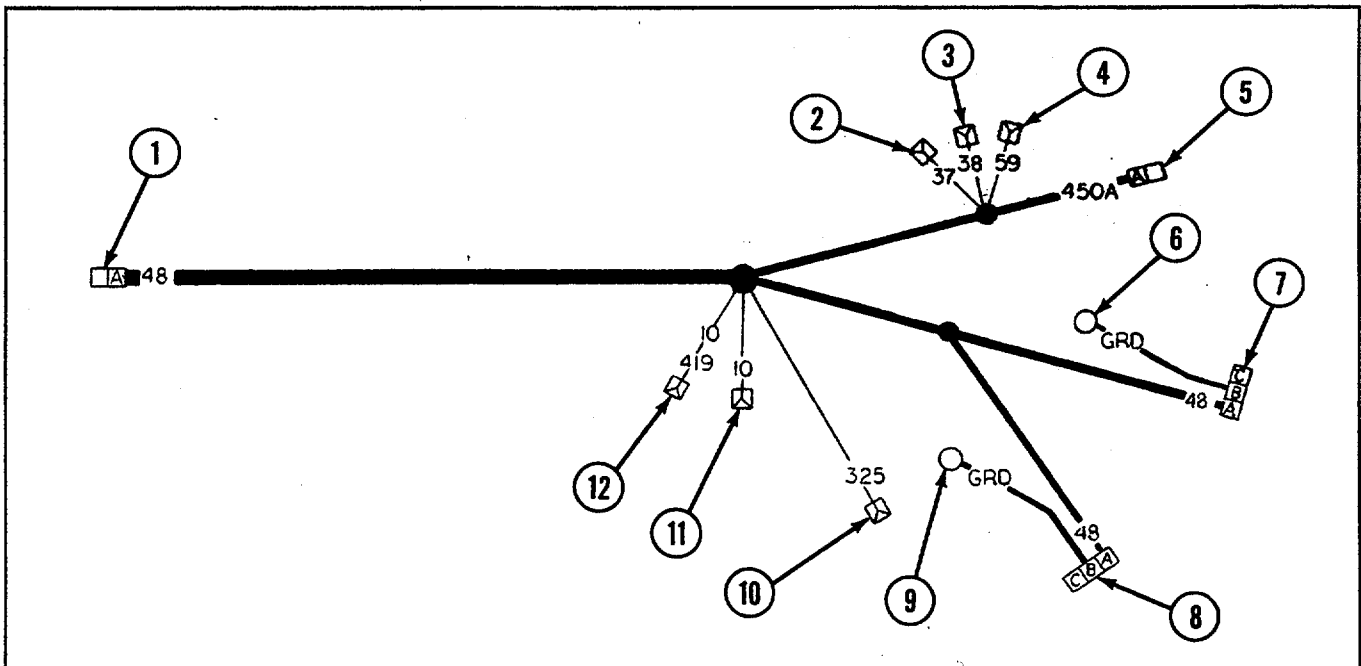
Equipment Conditions:

Air cleaner assembly removed (see paragraph 4-24)

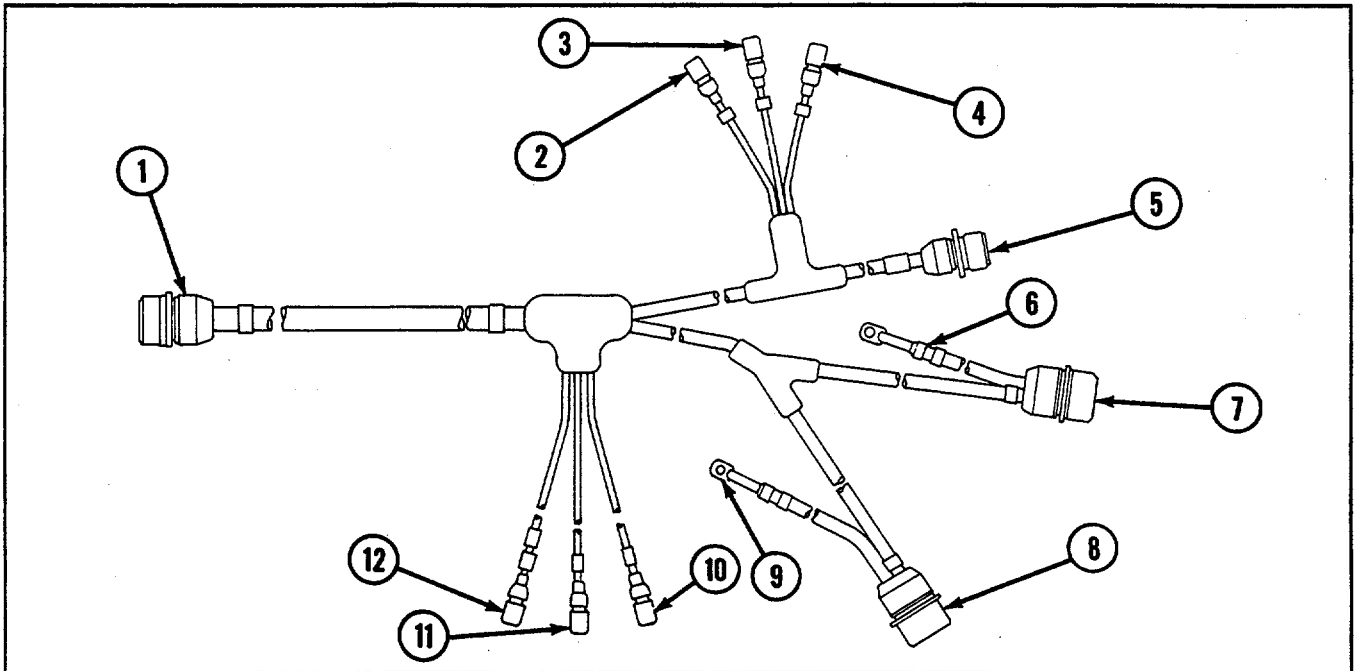
WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Bulkhead disconnect	48
2	Electrical accessories panel wiring harness	37
3	Electrical accessories panel wiring harness	38
4	Electrical accessories panel wiring harness	59
5	Bilge pump circuit breaker to switch panel lead assembly	450A
6	Ground	GND
7	Communication system	48
8	Communication system	48
9	Ground	GND
10	Red flasher circuit breaker	325
11	Switch panel to gage panel and miscellaneous switches wiring harness	10
12	Switch panel to gage panel and miscellaneous switches wiring harness	419, 10

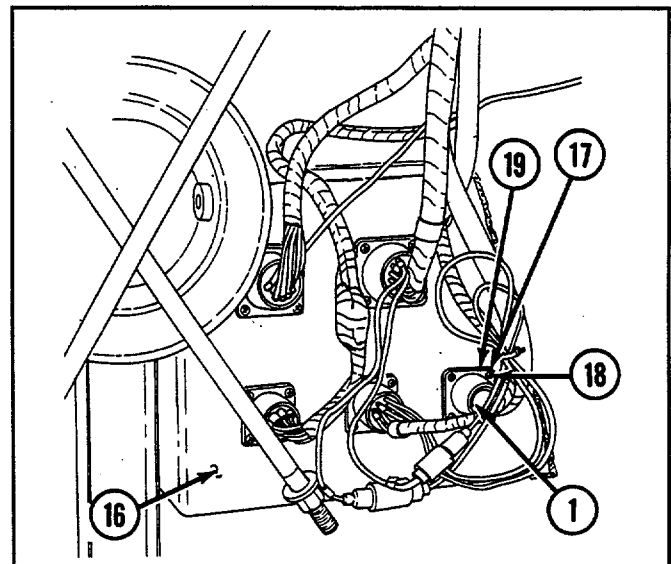
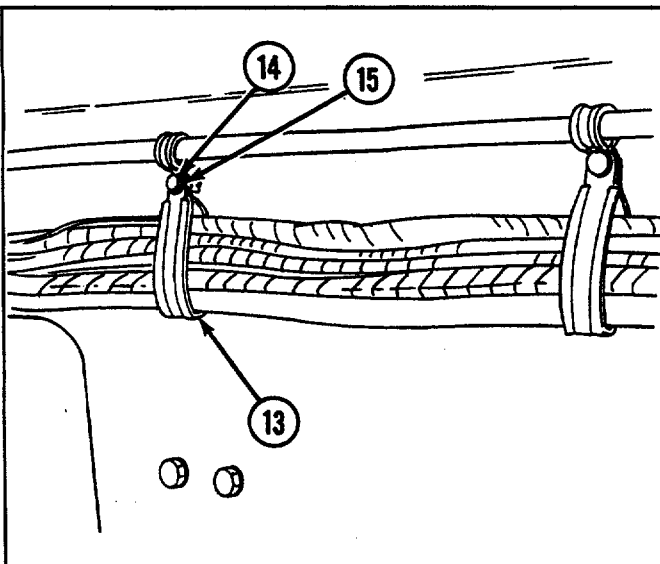


6—53 REPLACE/REPAIR SWITCH PANEL, RADIO, AND BILGE PUMP TO
BULKHEAD WIRING HARNESS (11671798)-Continued

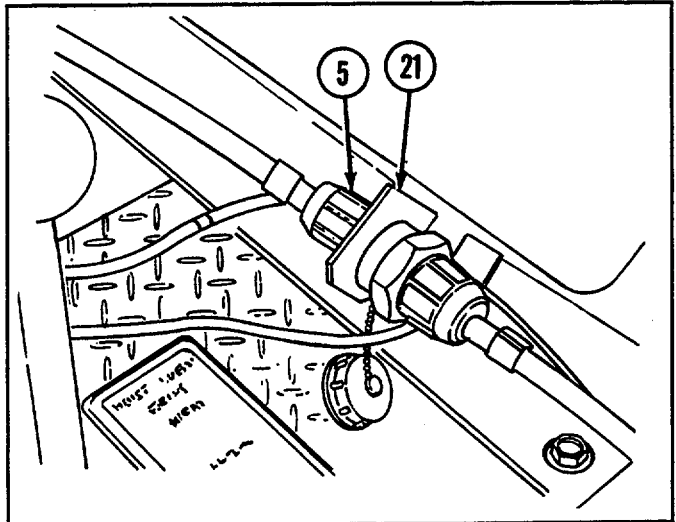
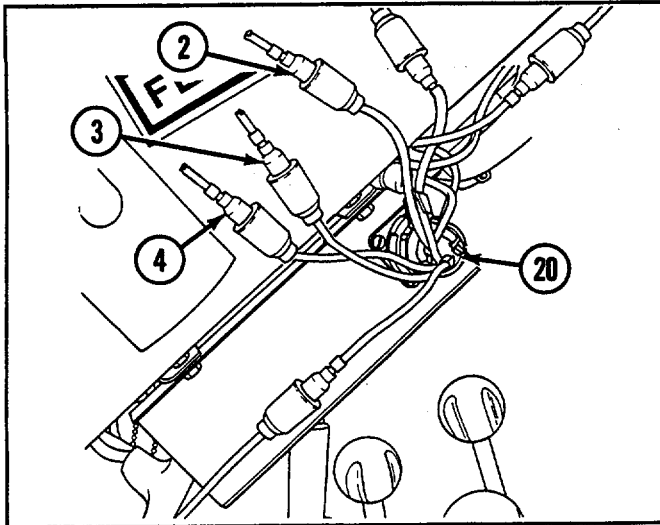


a. REMOVAL

- 1 Remove 30 clamps (13) by removing screw (14) and lockwasher (15) from each.
- 2 Remove connector (1) from bulkhead disconnect (16) by removing four screws (17), four lockwashers (18), and gasket (19).



- 3 Disconnect connectors (2, 3, and 4) from accessories panel wiring harness (20).
- 4 Disconnect connector (5) from bilge pump circuit breaker to switch panel lead assembly (21).

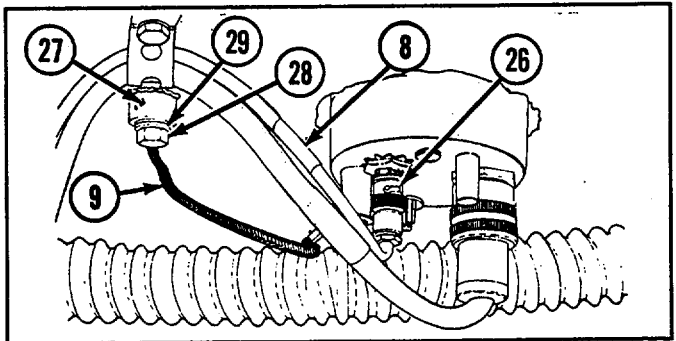
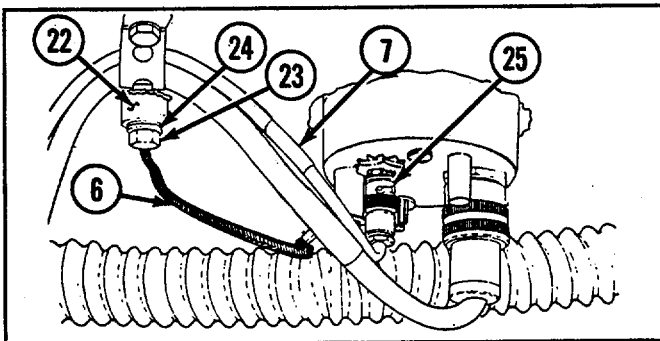


5 Remove ground lead (6) from hull (22) by removing screw (23) and lockwasher (24).

6 Disconnect connector (7) from communication system (25).

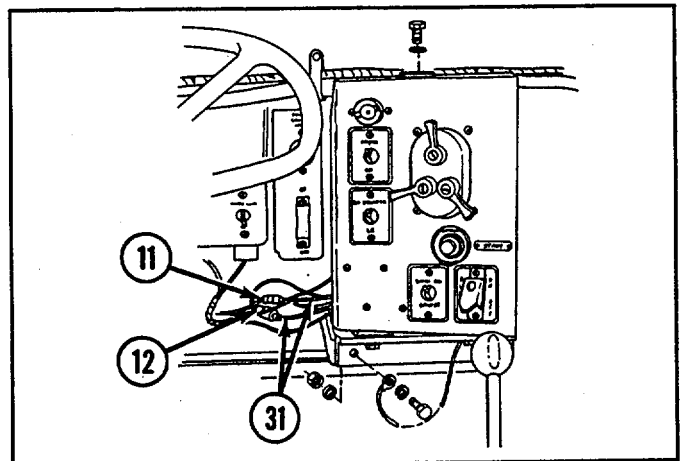
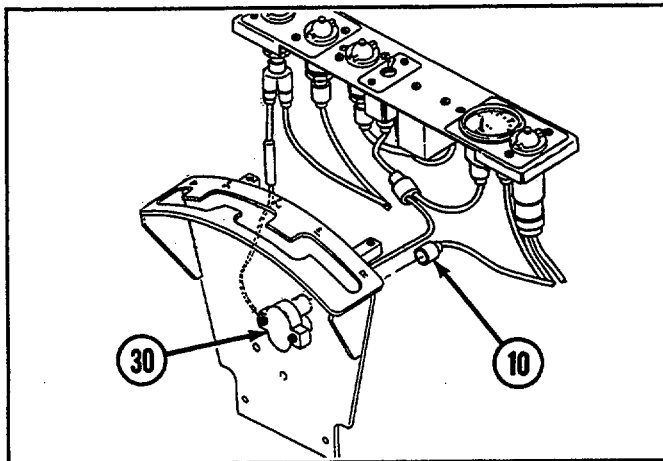
7 Disconnect connector (8) from communication system (26).

8 Remove ground lead (9) from hull (27) by removing screw (28) and lockwasher (29).



9 Disconnect connector (10) from red flasher circuit breaker (30).

10 Disconnect connectors (11 and 12) from switch panel to gage panel and miscellaneous switches wiring harness (31).



6-53 REPLACE/REPAIR SWITCH PANEL, RADIO, AND BILGE PUMP TO BULKHEAD WIRING HARNESS (11671798)-Continued

b. DISASSEMBLY

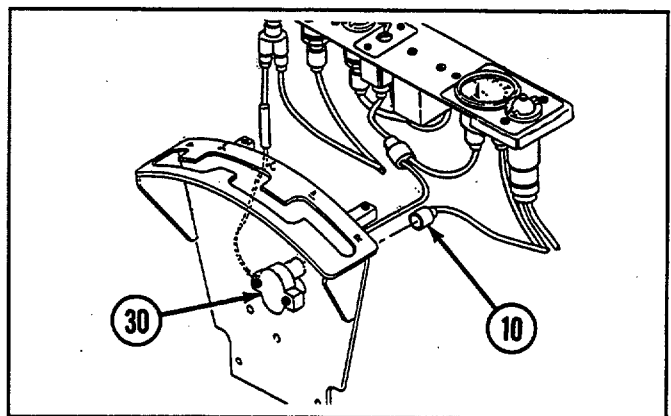
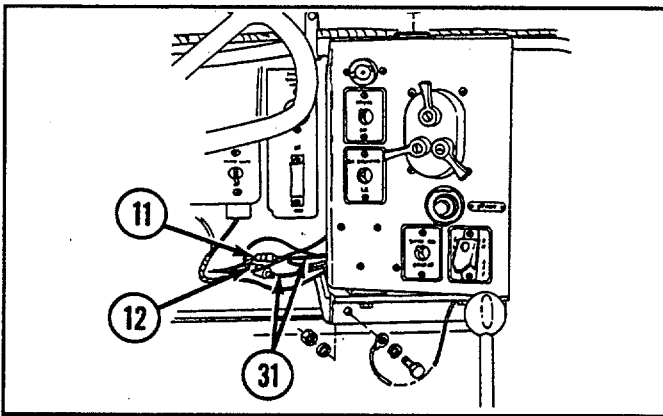
Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

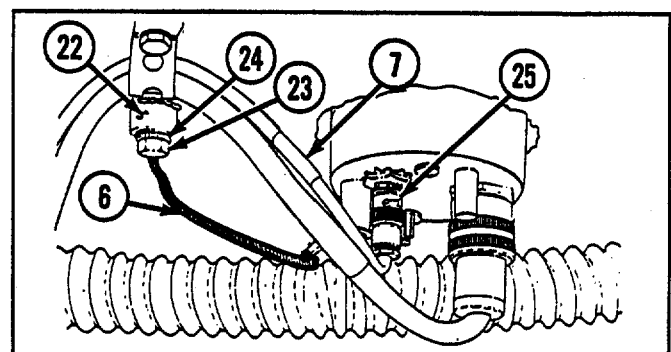
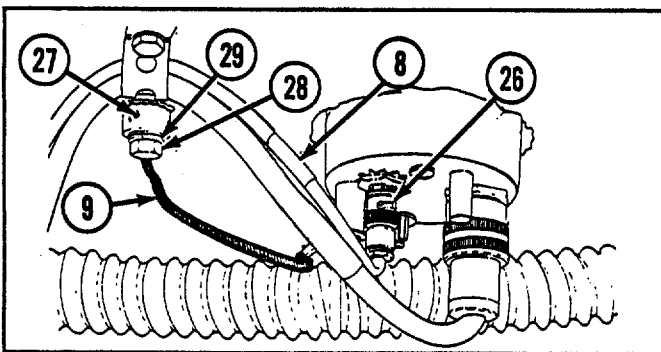
Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

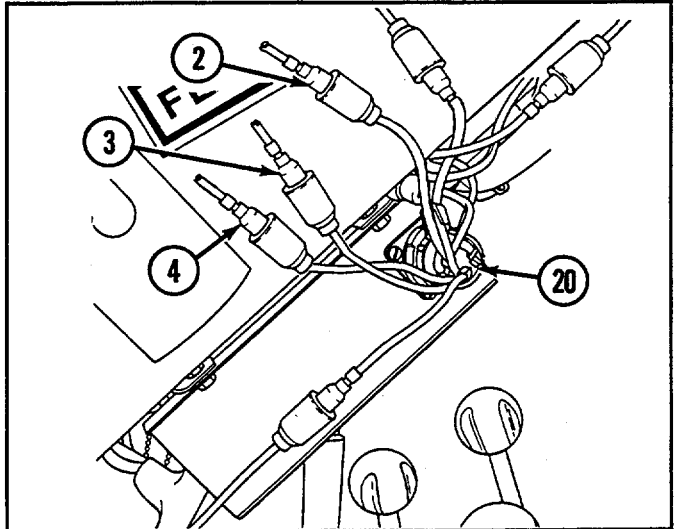
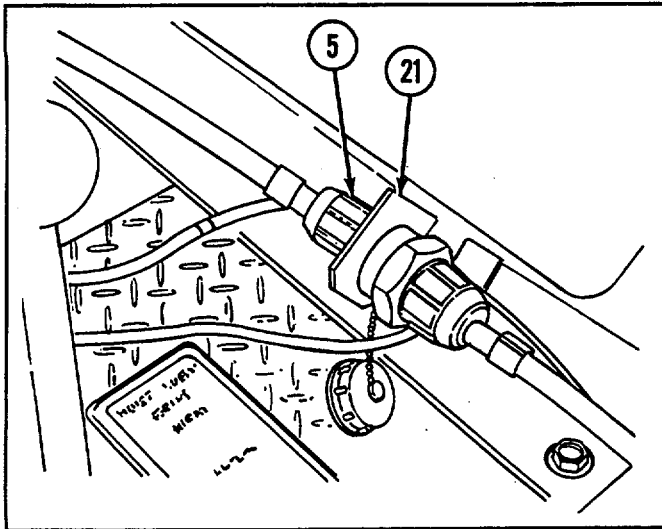
- 1 Connect connectors (11 and 12) to switch panel to gage panel and miscellaneous switches wiring harness (31).
- 2 Connect connector (10) to red flasher circuit breaker (30).



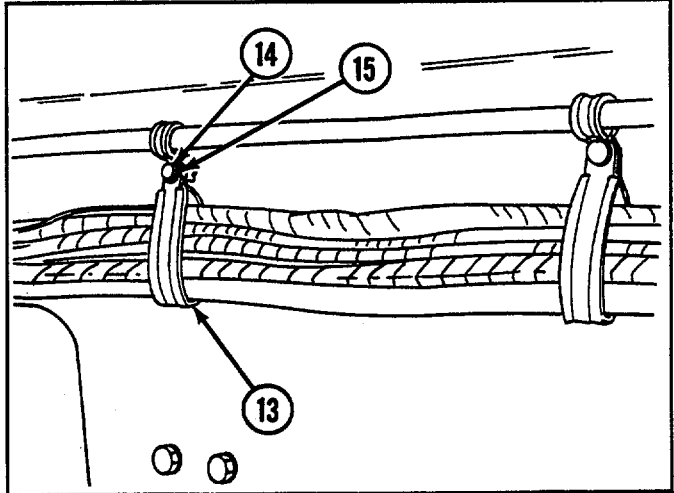
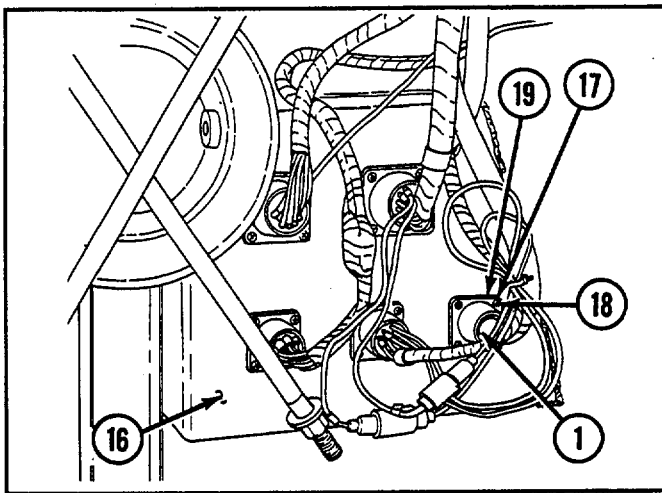
- 3 Install ground lead (9) to hull (27) using new lockwasher (29) and screw (28).
- 4 Connect connector (8) to communication system (26).
- 5 Connect connector (7) to communication system (25).
- 6 Install ground lead (6) to hull (22) using new lockwasher (24) and screw (23).



- 7 Connect connector (5) to bilge pump circuit breaker to switch panel lead assembly (21).
- 8 Connect connectors (2, 3, and 4) to accessories panel wiring harness (20).



- 9 Install connector (1) with new gasket (19) to bulkhead (16) using four new lockwashers (18) and four screws (17).
- 10 Install 30 clamps (13) using new lockwasher (15) and screw (14) for each.



NOTE

Follow-on maintenance:

Install air cleaner assembly (see paragraph 4-24)

6-54 REPLACE/REPAIR SWITCH PANEL TO NEUTRAL SAFETY TO BULKHEAD WIRING HARNESS (116714201)

THIS TASK COVERS

- a. Removal
- b. Disassembly
- c. Assembly
- d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Gasket (Appendix G, item 81)
- Lockwasher (4) (Appendix G, item 104)

Parts-Continued:

- Lockwashers (19) (Appendix GC, item 116)
- Lockwashers (1) (Appendix G, item 131)

Equipment Condition:

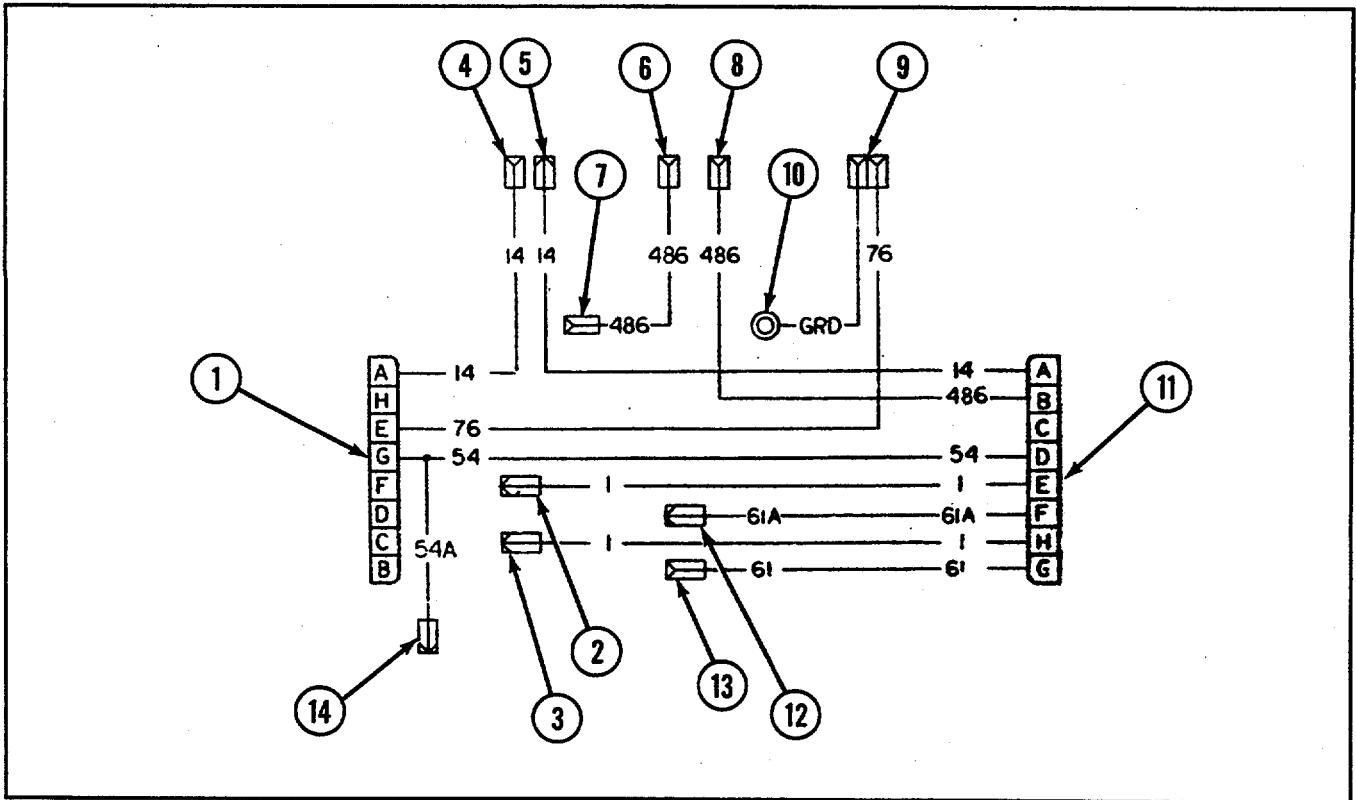
Air cleaner assembly removed (see paragraph 4-24)

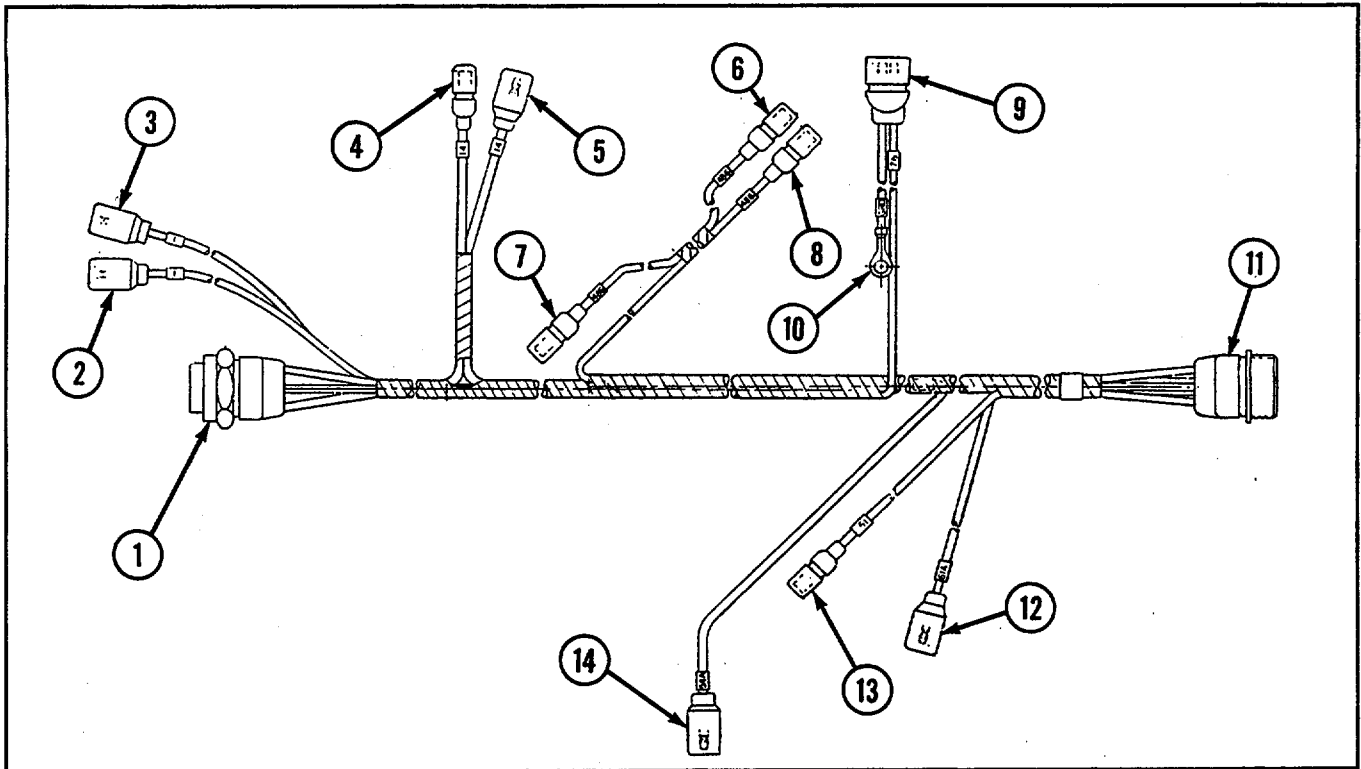
6-54 REPLACE/REPAIR SWITCH PANEL TO NEUTRAL SAFETY TO BULKHEAD WIRING HARNESS (11671420)--Continued

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

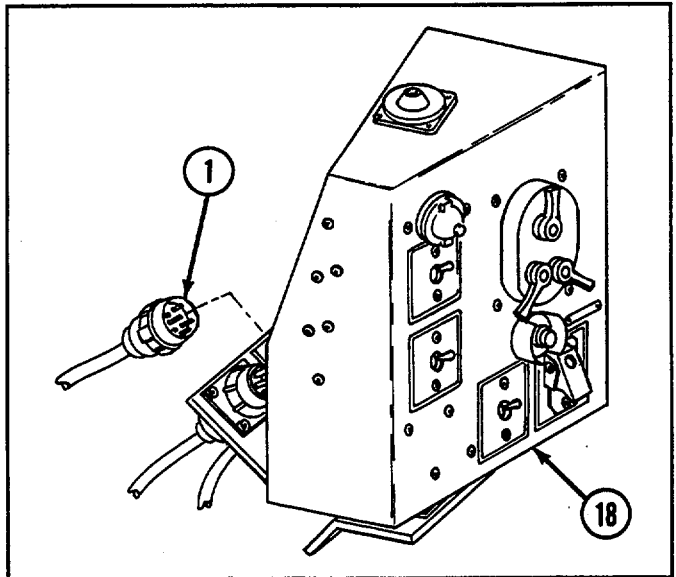
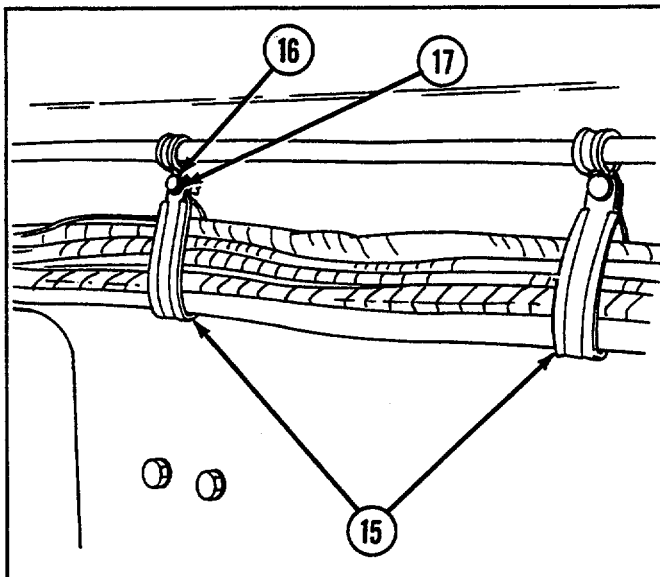
Connector No.	Electrical Lead To:	Wire No.
1	Main switch panel	14, 76, 54
2	Electrical accessories panel wiring harness	1
3	Electrical accessories panel wiring harness	1
4	Neutral safety switch	14
5	Neutral safety switch	14
6	Manifold preheat switch assembly	486
7	Circuit breaker	486
8	Manifold preheat switch assembly	486
9	Electrical fuel pump	GND, 76
10	Ground	GND
11	Bulkhead disconnect	14, 486, 54, 1, 61A, 1, 61
12	APU control box to foot dimmer switch and bulkhead wiring harness	61A
13	APU control box to foot dimmer switch and bulkhead wiring harness	61
14	Fire extinguisher engine shutoff switch	54A





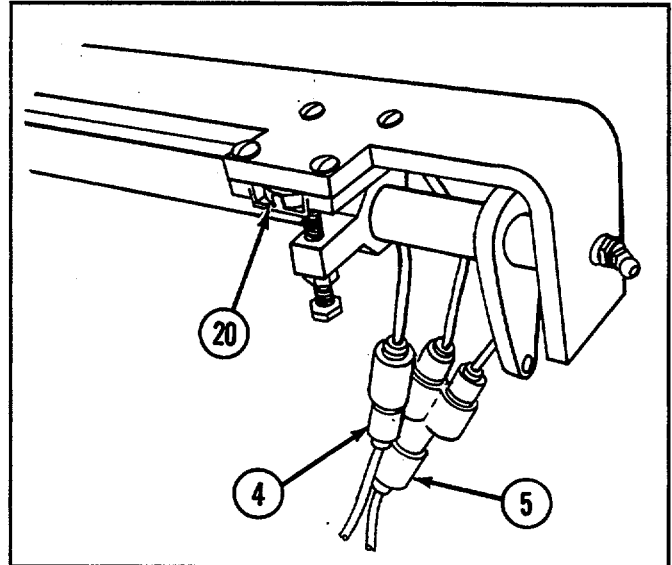
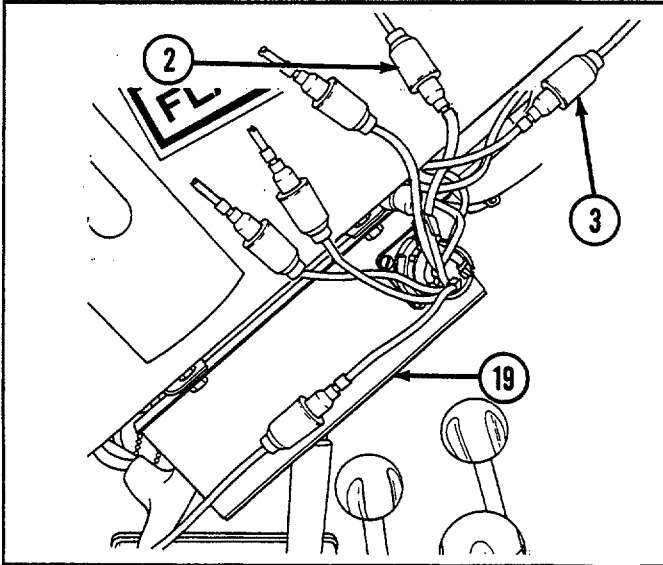
a. REMOVAL

- 1 Remove 19 clamps (15) by removing screw (16) and lockwasher (17) from each.
- 2 Disconnect connector (1) from main switch panel (18).

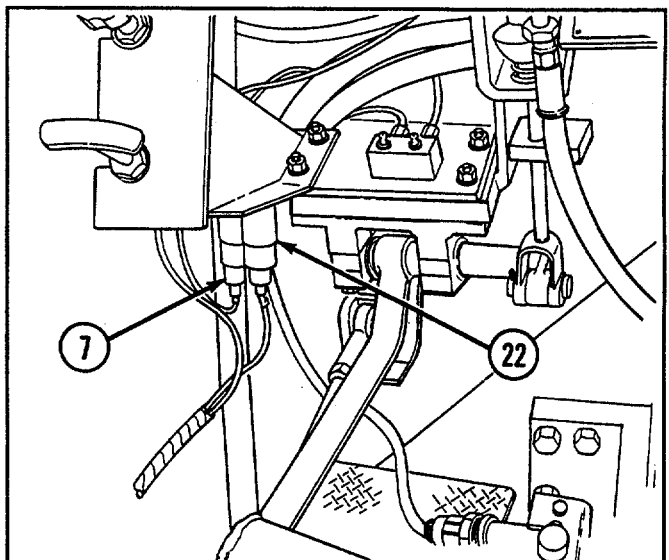
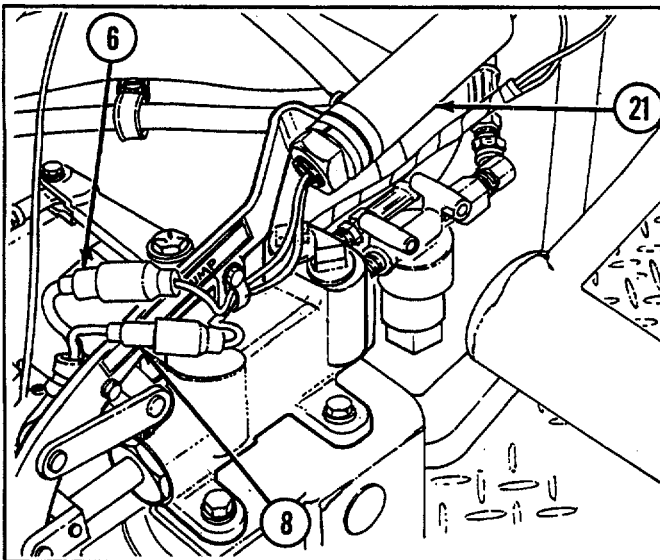


6—54 REPLACE/REPAIR SWITCH PANEL TO NEUTRAL SAFETY TO BULKHEAD WIRING HARNESS (11671420)—Continued

- 3 Disconnect two connectors (2 and 3) from electrical accessories panel wiring harness (19).
- 4 Disconnect two connectors (4 and 5) from neutral safety switch (20).

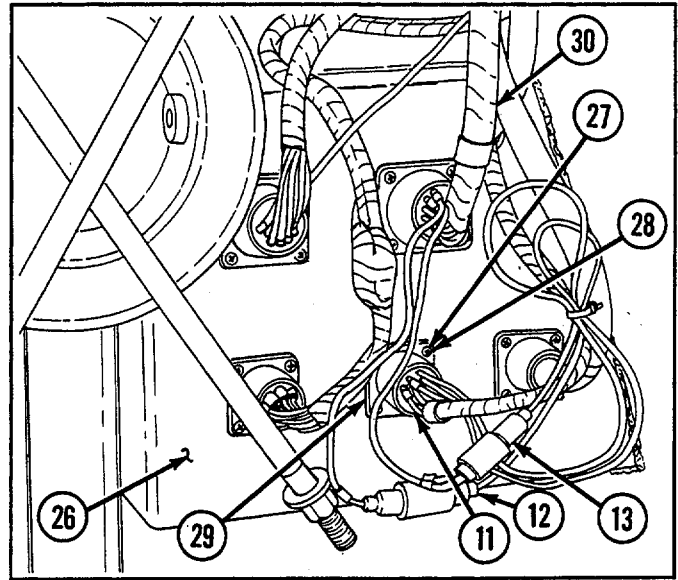
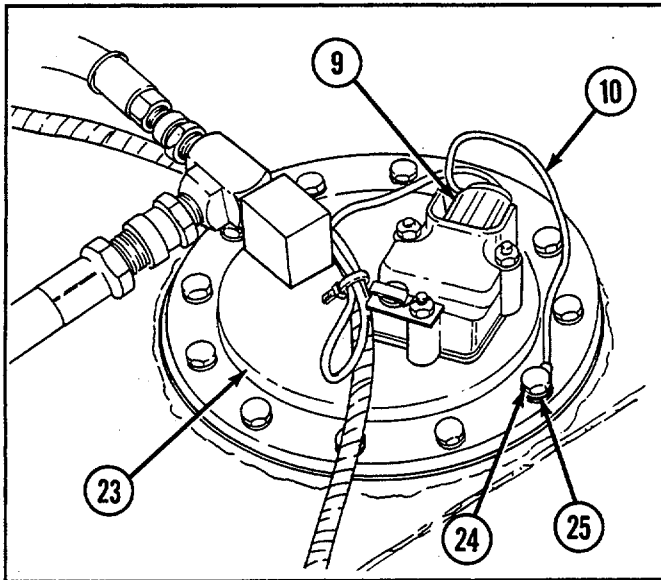


- 5 Disconnect two connectors (6 and 8) from manifold preheat switch (21).
- 6 Disconnect connector (7) from circuit breaker (22).



- 7 Disconnect connector (9) from electrical fuel pump (23).
- 8 Remove ground lead (10) by removing screw (24) and lockwasher (25).
- 9 Remove connector (11) from bulkhead disconnect (26) by removing four screws (27), four lockwashers (28), and gasket (29).

- 10 Disconnect connector (12 and 13) from APU control box to foot dimmer switch and bulkhead wiring harness (30).



- 11 Disconnect connector (14) from fire extinguisher engine shutoff switch (31).

b. DISASSEMBLY

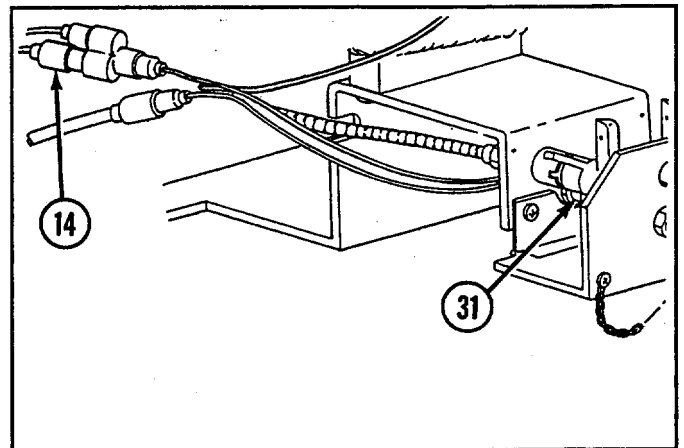
Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

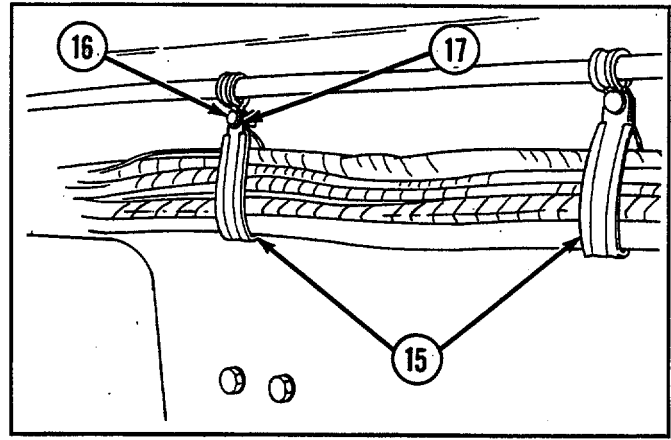
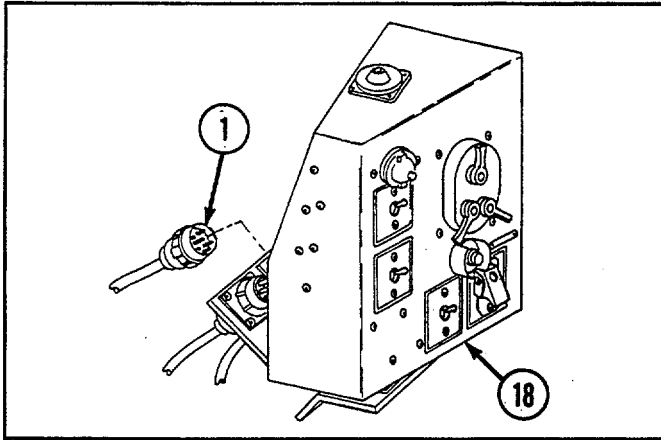
- 1 Connect connector (14) to fire extinguisher engine shutoff switch (31).
- 2 Connect two connectors (12 and 13) to APU control box to foot dimmer switch and bulkhead wiring harness (30).
- 3 Install connector (11) to bulkhead disconnect (26) using four new lockwashers (28) and four screws (27).
- 4 Install ground lead (10) using screw (24) and new lockwasher (25).
- 5 Connect connector (9) to electrical fuel pump (23).
- 6 Connect connector (7) to circuit breaker (22).
- 7 Connect two connectors (6 and 8) to manifold preheat switch (21).
- 8 Connect two connectors (4 and 5) to neutral safety switch (20).
- 9 Connect two connectors (2 and 3) to electrical accessories panel wiring harness (19).



6-54 REPLACE/REPAIR SWITCH PANEL TO NEUTRAL SAFETY TO BULKHEAD WIRING HARNESS (11671420)---Continued

10 Connect connector (1) to main switch panel (18).

11 Install 19 clamps (15) using new lockwasher (17) and screw (16) for each.



NOTE

Follow-on maintenance: Install air cleaner assembly (see paragraph 4-24)

6-55 REPLACE/REPAIR SWITCH PANEL TO GAGE PANEL AND MISCELLANEOUS SWITCHES WIRING HARNESS (PASSIVE NIGHT VIEWER) (DUAL VOLTAGE) (12322547)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Equipment Conditions:

- Gage panel removed (see paragraph 6-8)
- Switch panel removed (see paragraph 6-10)

Parts:

Lockwashers (11) (Appendix G, item 116)

WARNING

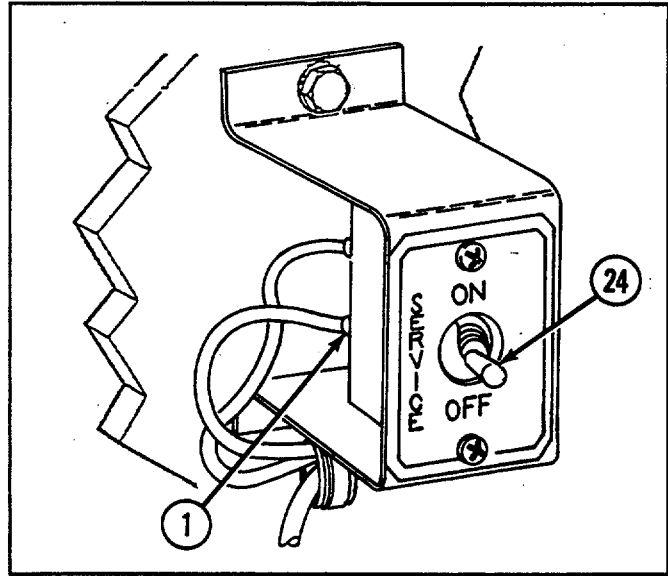
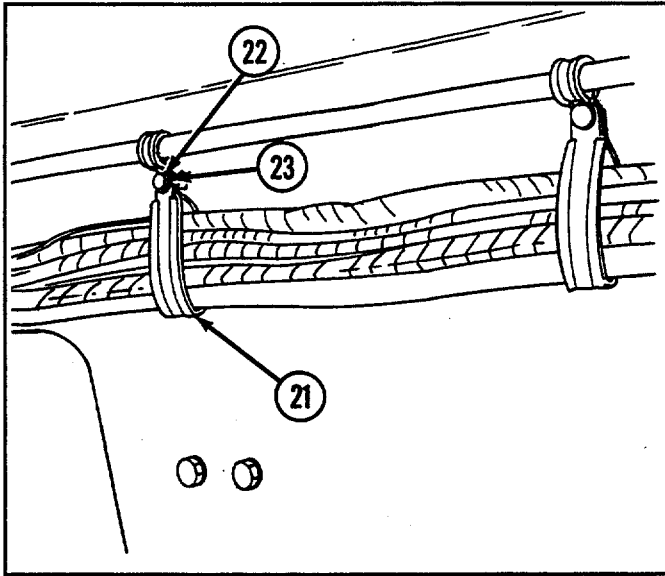
Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Rigger's service light switch	16
2	Dome light	38
3	Dome light	38
4	Ground	GND
5	Passive night viewer	999
6	Gage panel to bulkhead wiring harness	40
7	Driver's vehicle exhaust smoke bracket to bulkhead connection wiring harness	27
8	Switch panel, radio, and bilge pump to bulkhead wiring harness	10
9	Switch panel, radio, and bilge pump to bulkhead wiring harness	10

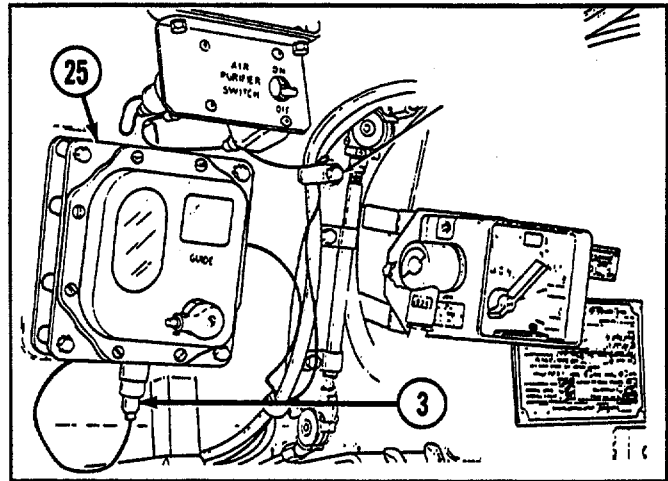
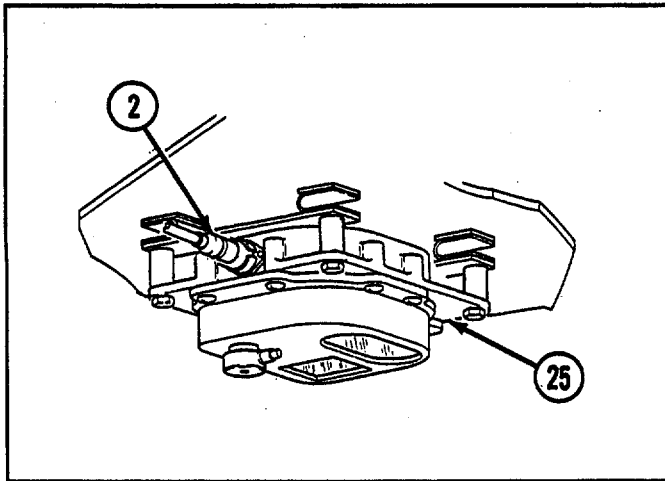
6-55 REPLACE/REPAIR SWITCH PANEL TO GAGE PANEL AND MISCELLANEOUS SWITCHES WIRING HARNESS (PASSIVE NIGHT VIEWER) (DUAL VOLTAGE) (12322547)--Continued

a. REMOVAL

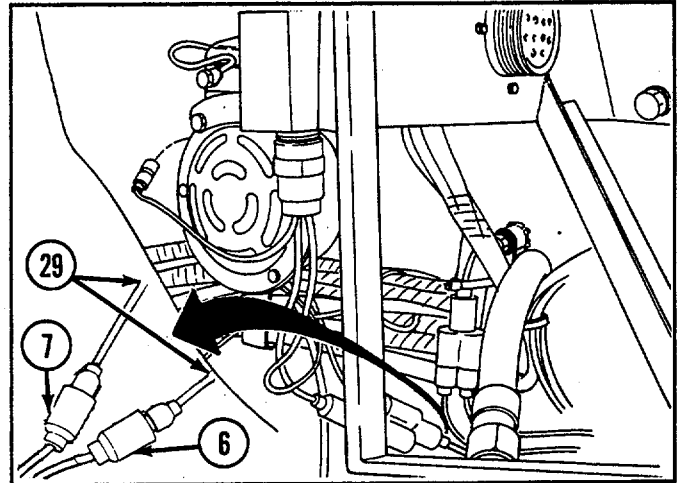
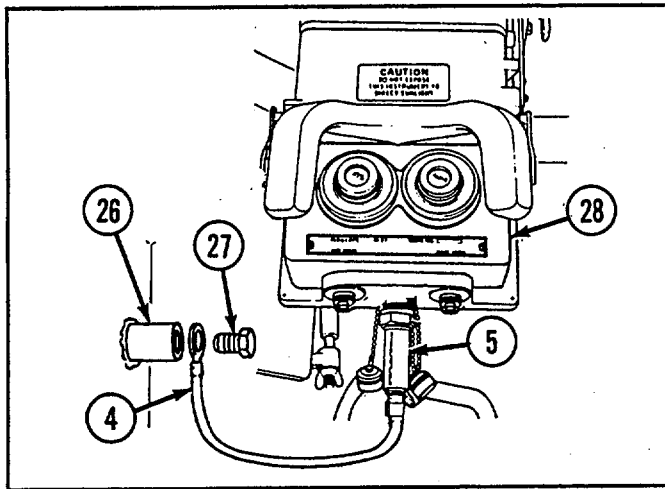
- 1 Remove 11 clamps (21) by removing screw (22) and lockwasher (23) from each.
- 2 Disconnect connector (1) from riggers service light switch (24).



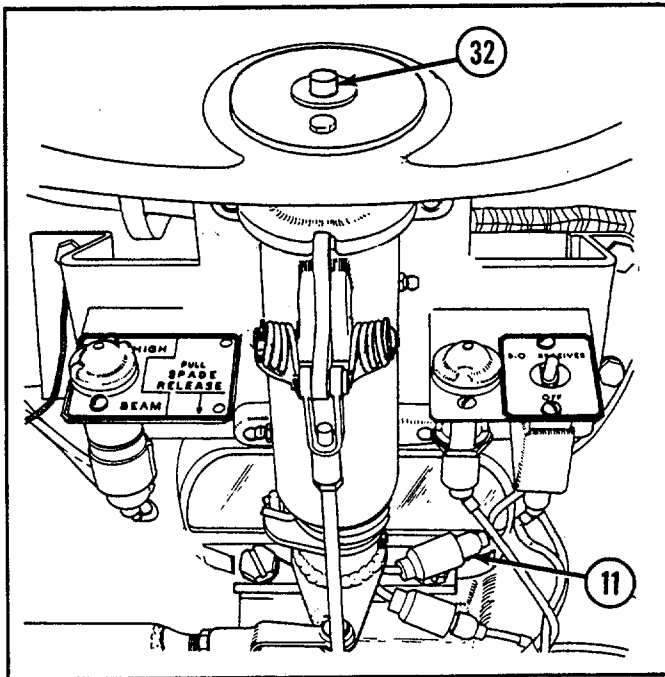
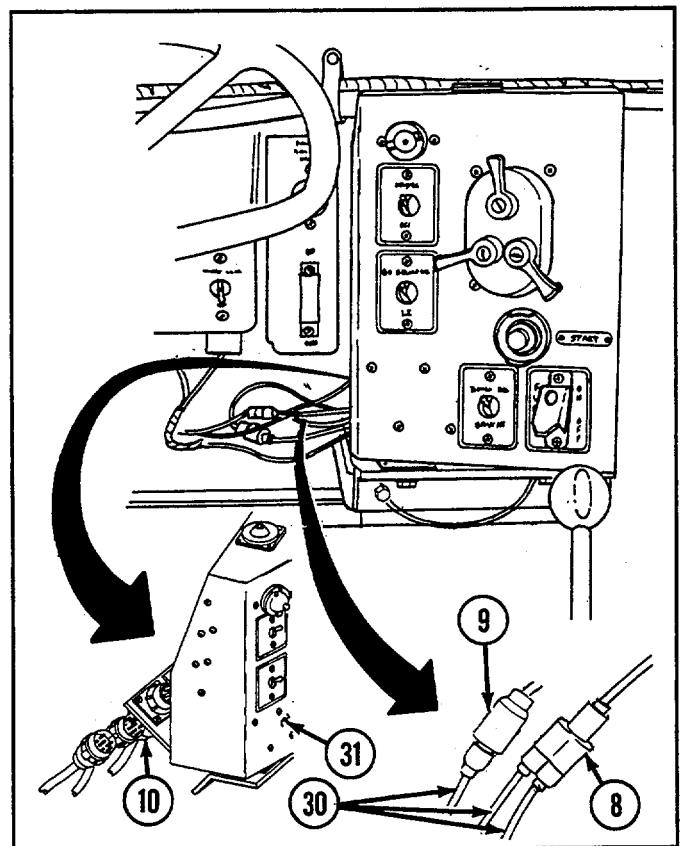
- 3 Disconnect two connectors (2 and 3) from dome light (25).



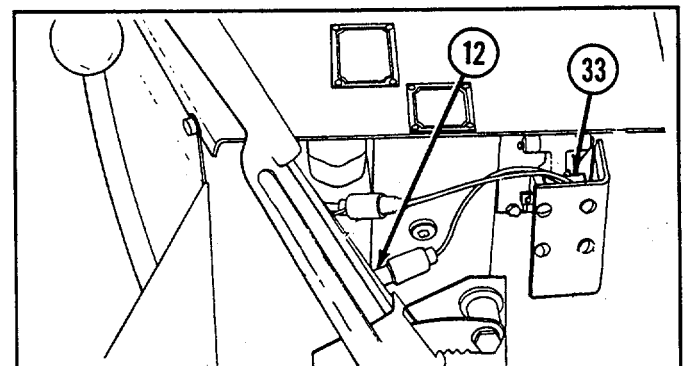
- 4 Disconnect ground (4) from hull (26) by removing screw (27).
- 5 Disconnect connector (5) from passive night viewer (28).
- 6 Disconnect two connectors (6 and 7) from gage panel to bulkhead wiring harness (29).



- 7 Disconnect two connectors (8 and 9) from switch panel, radio, and bilge pump to bulkhead wiring harness (30).
- 8 Disconnect connector (10) from main switch panel (31).
- 9 Disconnect connector (11) from horn switch (32).

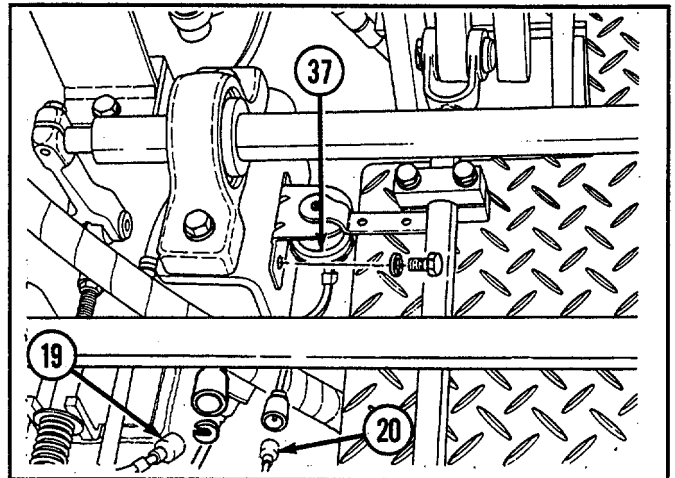
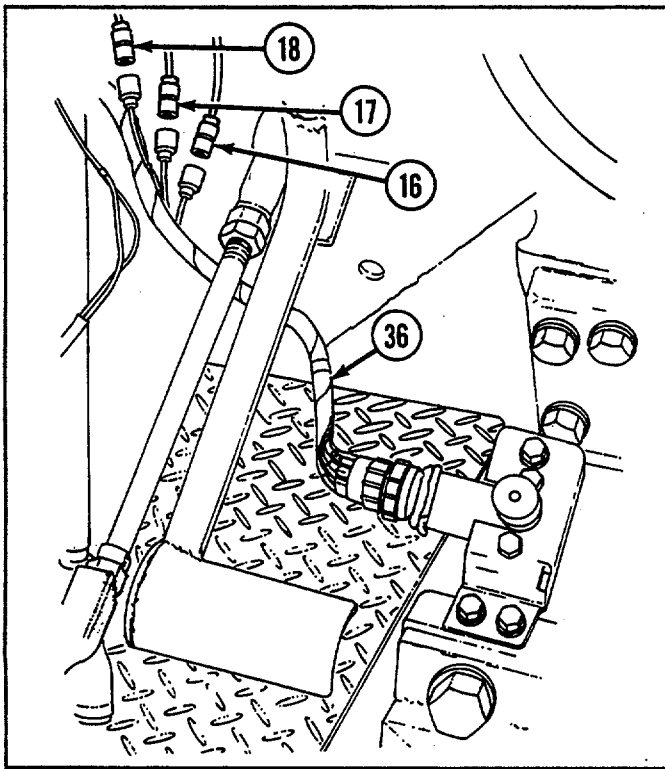
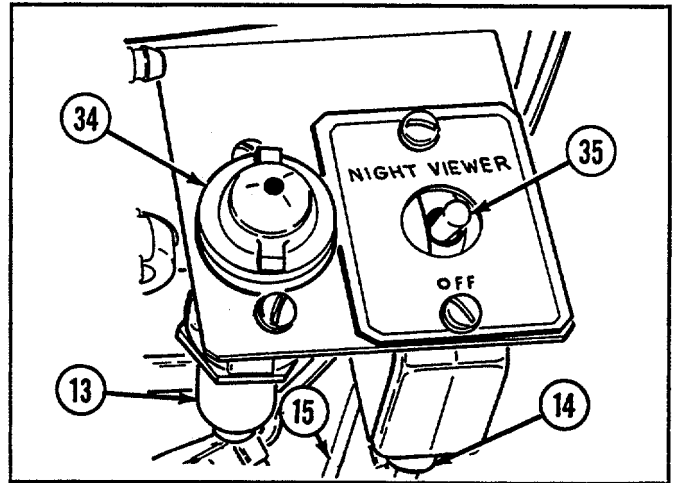


- 10 Disconnect connector (12) from power control switch (33).



6-55 REPLACE/REPAIR SWITCH PANEL TO GAGE PANEL AND MISCELLANEOUS SWITCHES WIRING HARNESS (PASSIVE NIGHT VIEWER) (DUAL VOLTAGE) (1 2322547)--Continued

- 11 Disconnect connector (13) from passive night viewer indicator light (34).
- 12 Disconnect two connectors (14 and 15) from passive night viewer switch (35).
- 13 Disconnect three connectors (16, 17, and 18) from headlight dimmer switch and wiring harness (36).
- 14 Disconnect two connectors (19 and 20) from stoplight switch (37).



b. DISASSEMBLY

Disassemble wiring harness (see Chapter 6, Section VII).

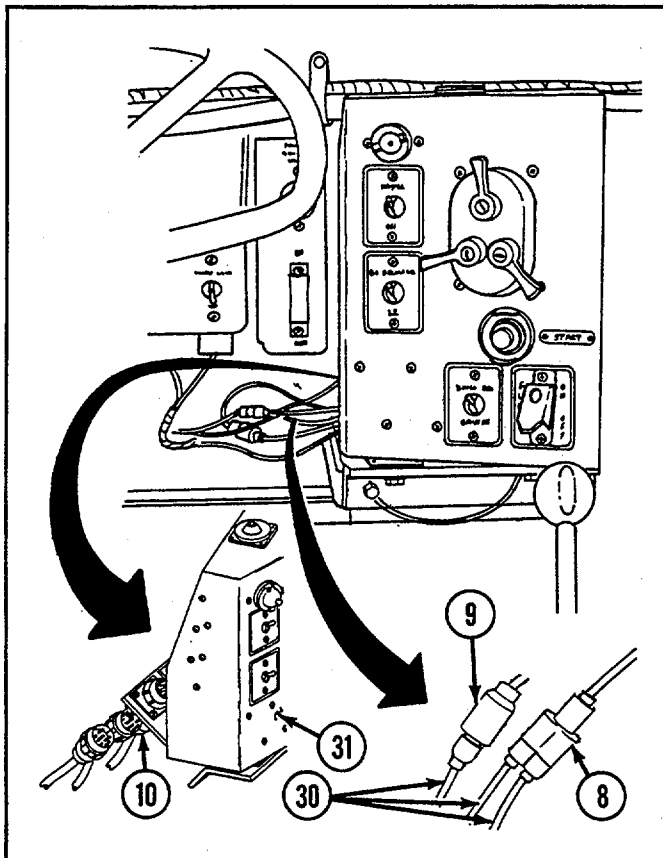
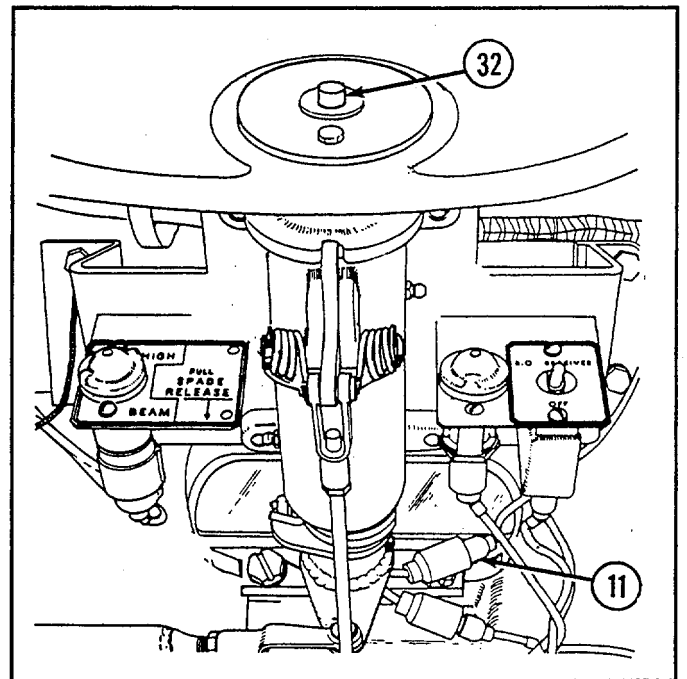
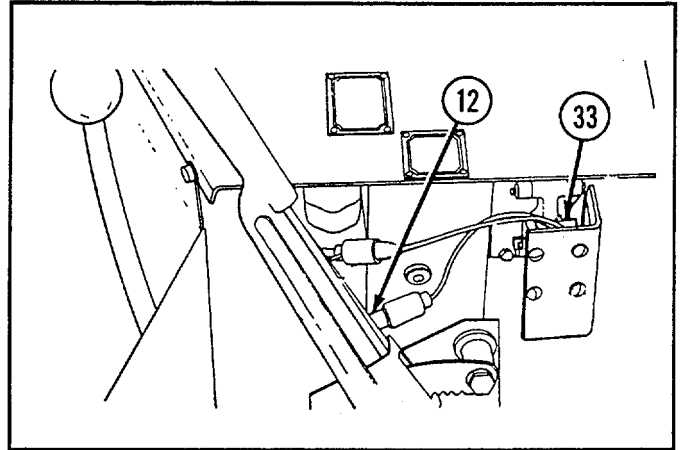
c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

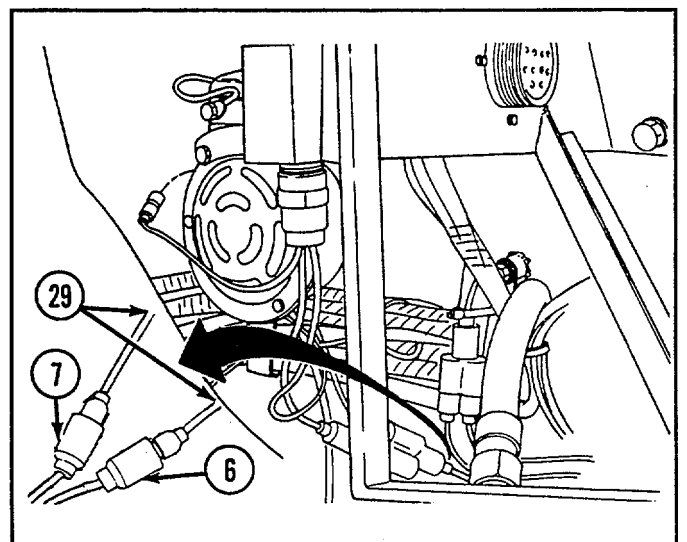
d. INSTALLATION

- 1 Connect connectors (19 and 20) to stoplight switch (37).
- 2 Connect three connectors (16, 17, and 18) to headlight dimmer switch wiring harness (36).

- 3 Connect two connectors (14 and 15) to passive night viewer switch (35).
- 4 Connect connector (13) to passive night viewer indicator light (34).
- 5 Connect connector (12) to power control switch (33).
- 6 Connect connector (11) to horn switch (32).
- 7 Connect connector (10) to main switch panel (31).
- 8 Connect two connectors (8 and 9) to switch panel, radio, and bilge pump to bulkhead wiring harness (30).

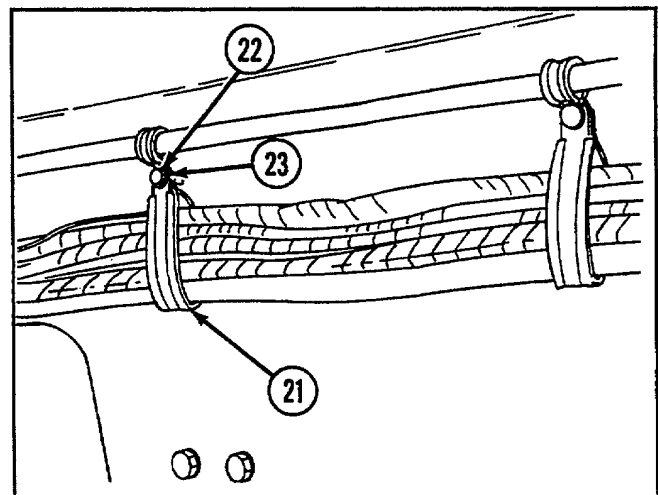
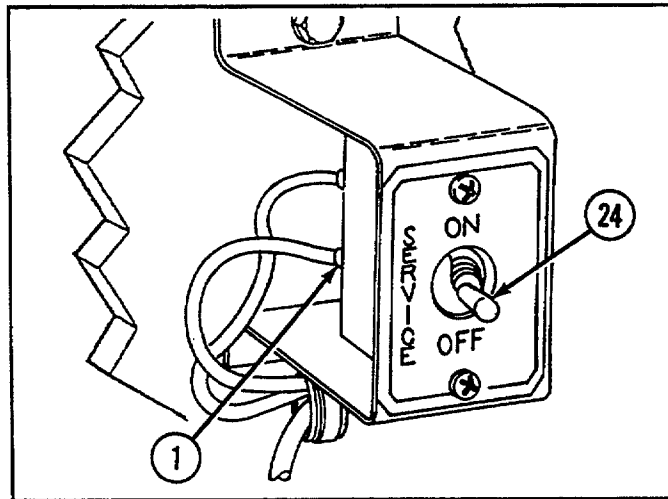
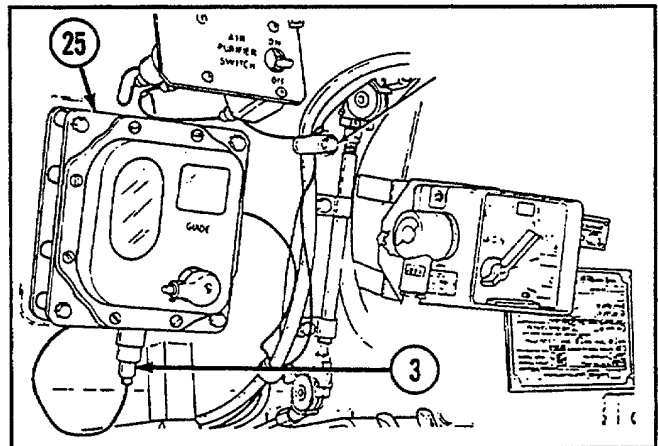
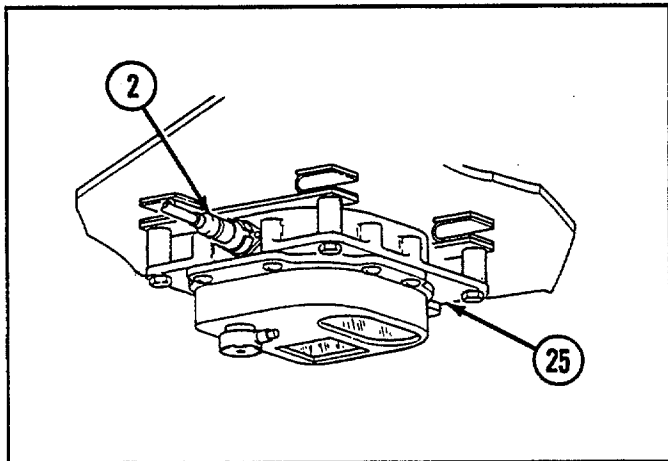
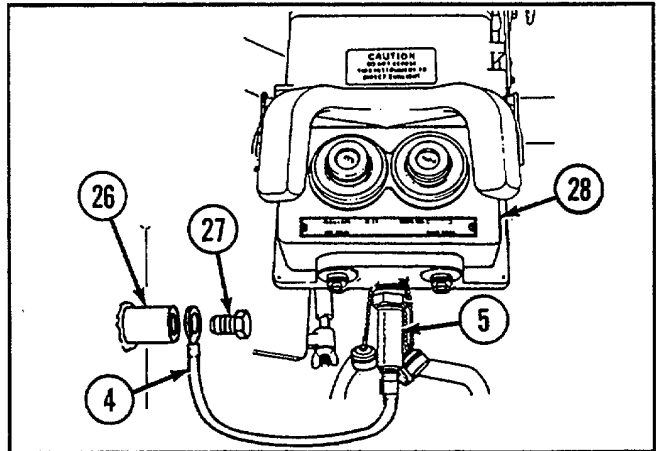


- 9 Connect two connectors (6 and 7) to gage panel to bulkhead wiring harness (29).



6-55 REPLACE/REPAIR SWITCH PANEL TO GAGE PANEL AND MISCELLANEOUS SWITCHES WIRING HARNESS (PASSIVE NIGHT VIEWER) (DUAL VOLTAGE) (12322547--Continued)

- 10 Connect connector (5) to passive night viewer (28).
- 11 Connect ground (4) to hull (26) using screw (27).
- 12 Connect two connectors (2 and 3) to two dome lights (25).
- 13 Connect connector (1) to rigger's service light switch (24).
- 14 Install 11 clamps (21) using screw (22) and new lockwasher (23) for each.



Follow-on maintenance:

NOTE

- Install switch panel (see paragraph 6-10)
- Install gage panel (see paragraph 6-8)

6-56 REPLACE/REPAIR SWITCH PANEL TO GAGE PANEL AND MISCELLANEOUS SWITCHES WIRING HARNESS (INFRARED NIGHT VIEWER) (SINGLE VOLTAGE) (11671795)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Lockwasher (11) (Appendix G, item 116)

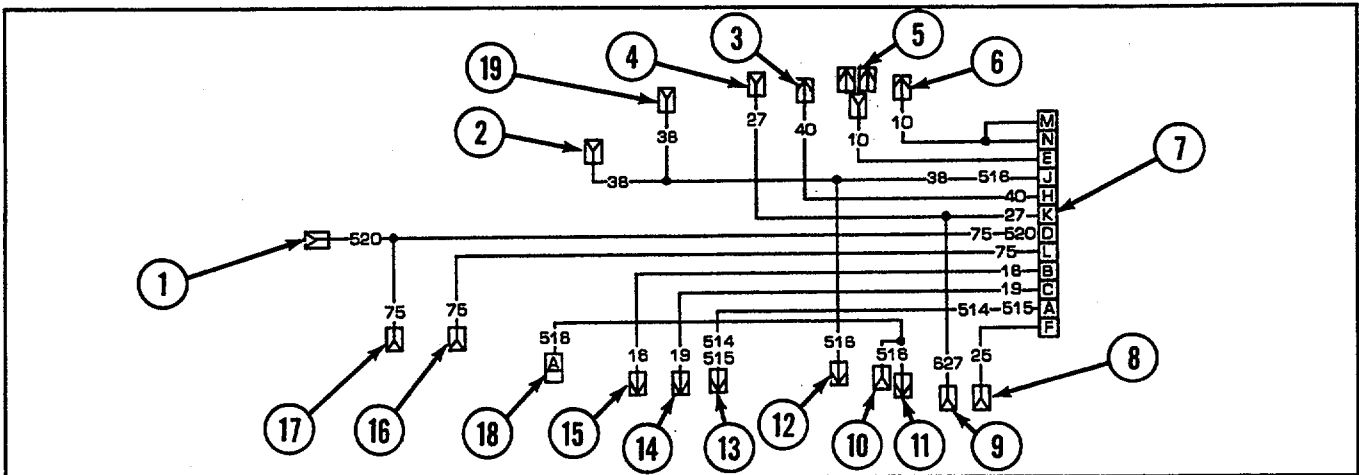
Equipment Conditions:

Air inlet grilles removed as necessary (see paragraph 9-57)

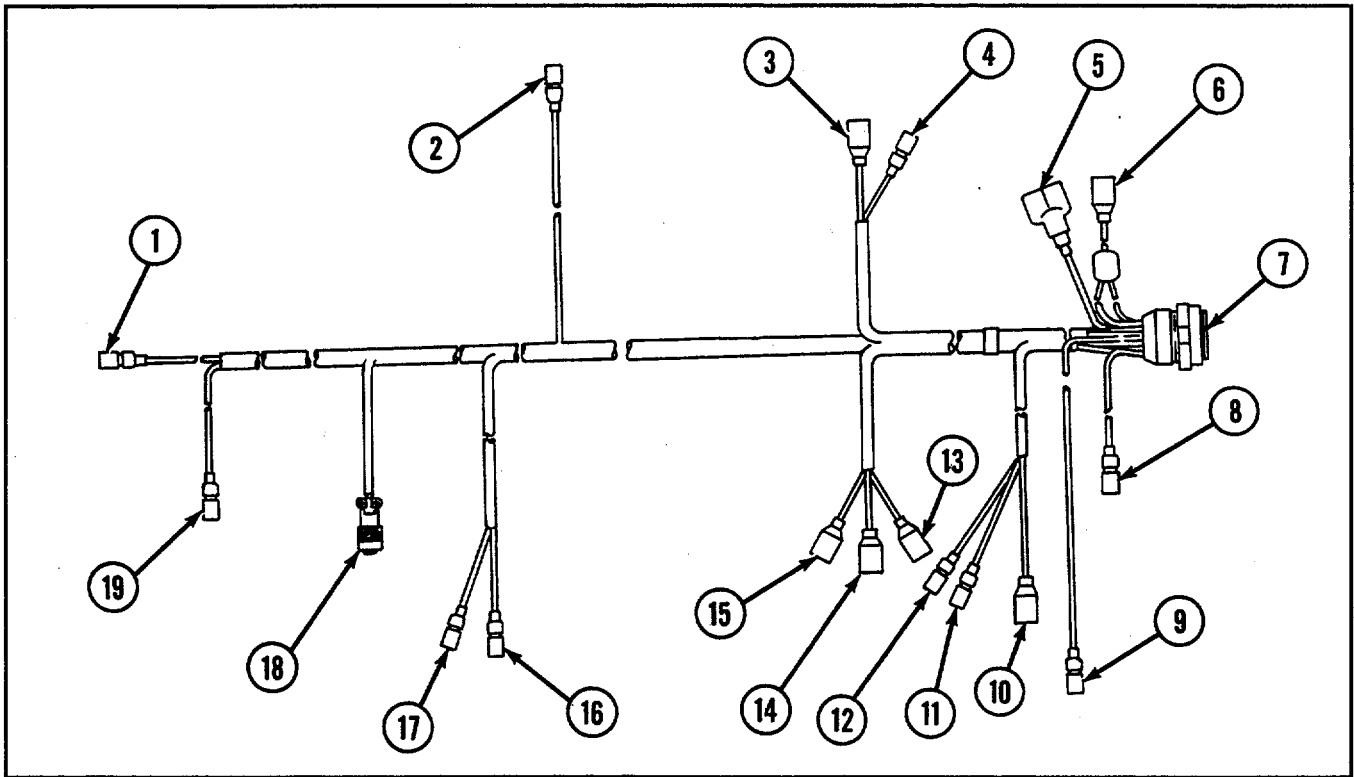
WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Rigger's service light switch	520
2	Dome light	38
3	Gage panel to bulkhead wiring harness	40
4	Driver's vehicle exhaust smoke bracket to bulkhead connection wiring harness	27
5	Switch panel, radio, and bilge pump to bulkhead wiring harness	10
6	Switch panel, radio, and bilge pump to bulkhead wiring harness	10
7	Switch panel	10, 10, 38/516, 40, 27, 75/520, 16, 19, 514/515, 25
8	Horn switch	25
9	Power control switch	627
10	Driver's B.O. receiver indicator light	516
11	Driver's B.O. receiver switch	516
12	Driver's B.O. receiver switch	516
13	Headlight and dimmer switch wiring harness	514/515
14	Headlight and dimmer switch wiring harness	19
15	Headlight and dimmer switch wiring harness	16
16	Stoplight switch	75
17	Stoplight switch	75
18	Infrared periscope	516
19	Dome light	38

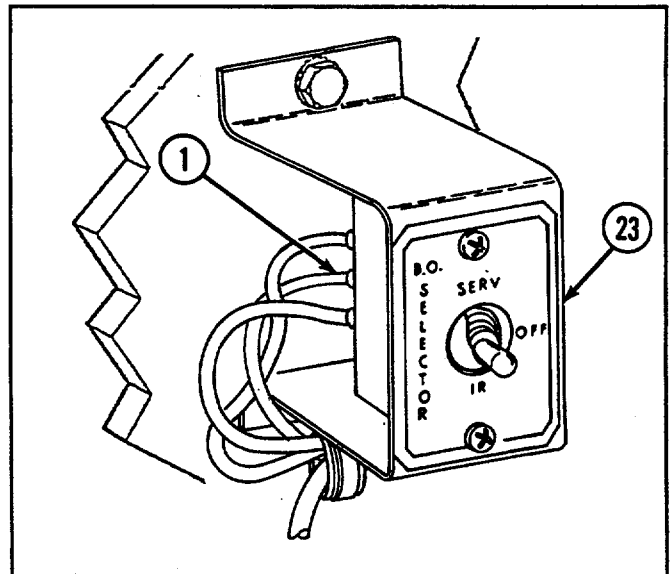
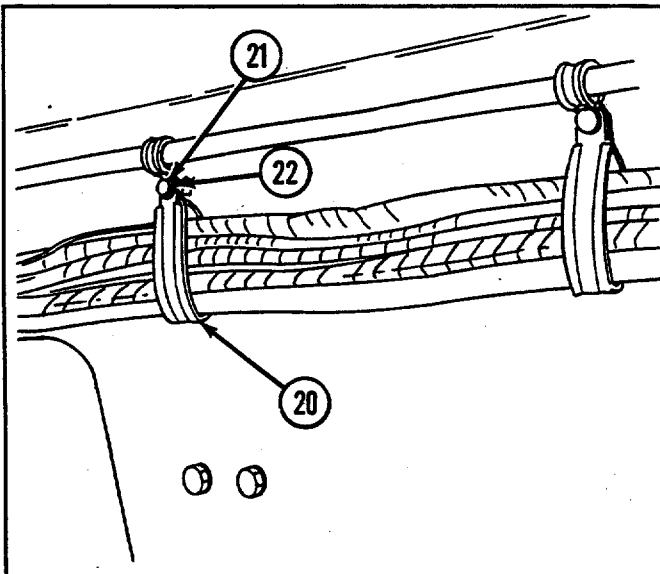


6-56 REPLACE/REPAIR SWITCH PANEL TO GAGE PANEL AND MISCELLANEOUS SWITCHES WIRING HARNESS (INFRARED NIGHT VIEWER) (SINGLE VOLTAGE) (11671 795)-Continued

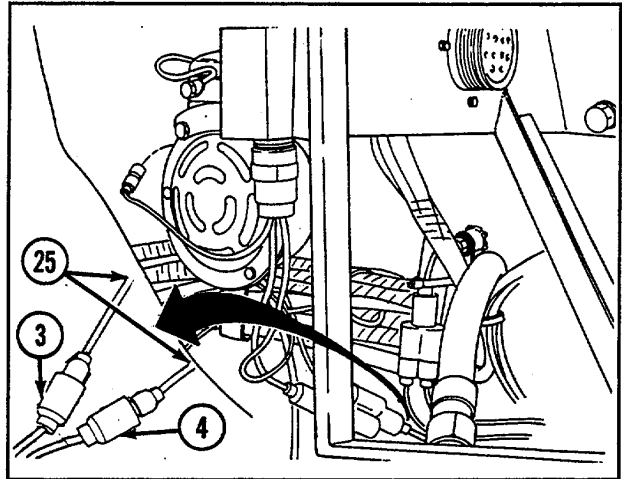
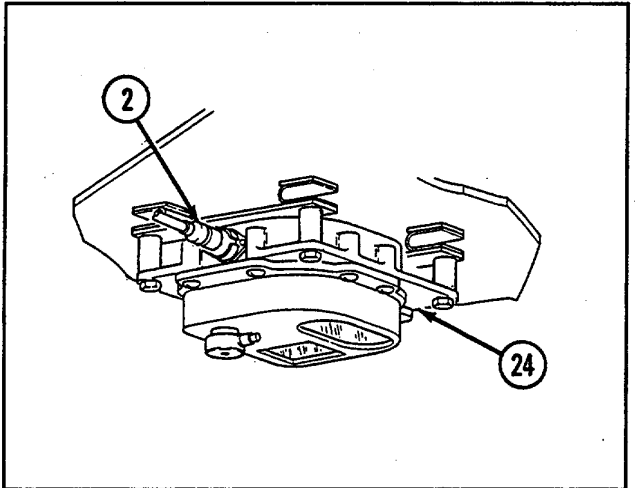


a. REMOVAL

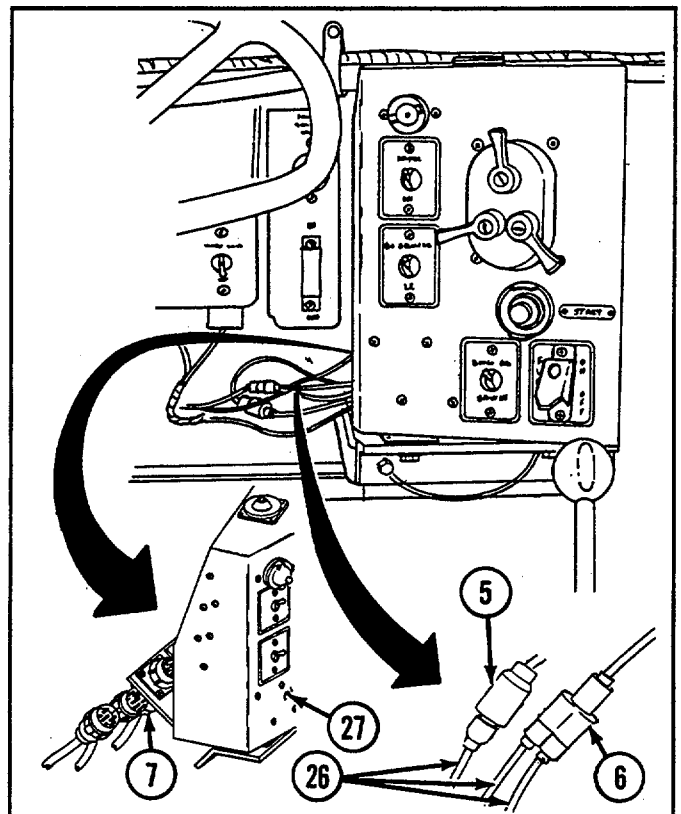
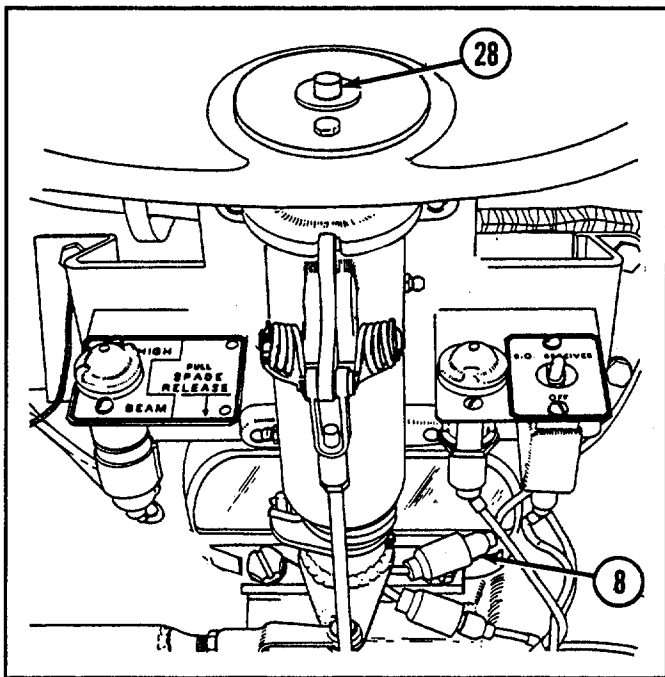
- 1 Remove 11 clamps (20) by removing screw (21) and lockwasher (22) from each.
- 2 Disconnect connector (1) from rigger's service light switch (23).



- 3 Disconnect connector (2) from dome light (24).
- 4 Disconnect two connectors (3 and 4) from gage panel to bulkhead wiring harness (25).

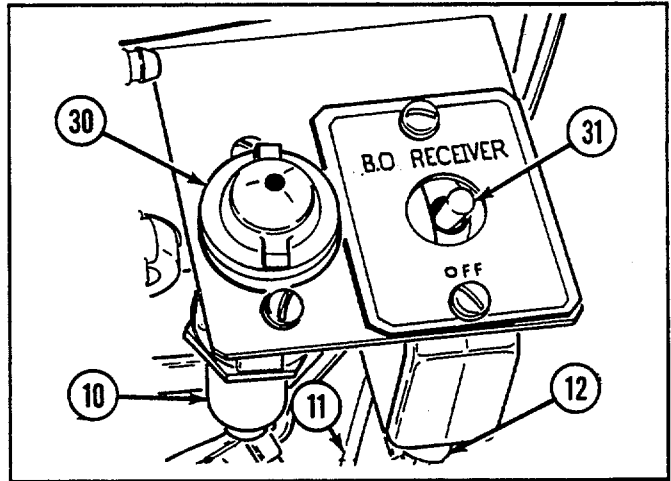
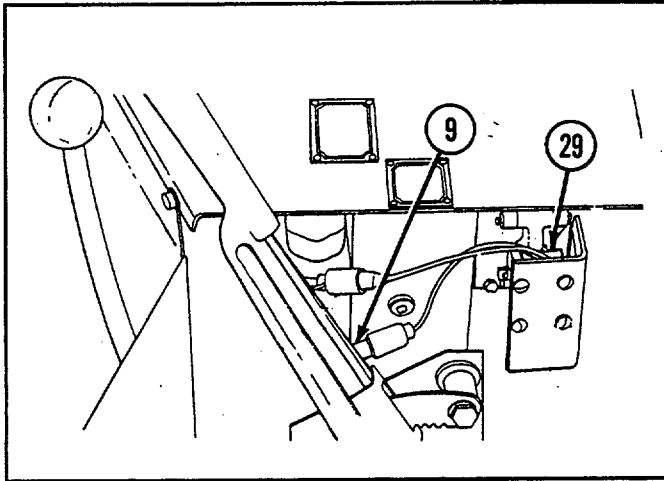


- 5 Disconnect two connectors (5 and 6) from switch panel, radio, and bilge pump to bulkhead wiring harness (26).
- 6 Disconnect connector (7) from main switch panel (27).
- 7 Disconnect connector (8) from horn switch (28).

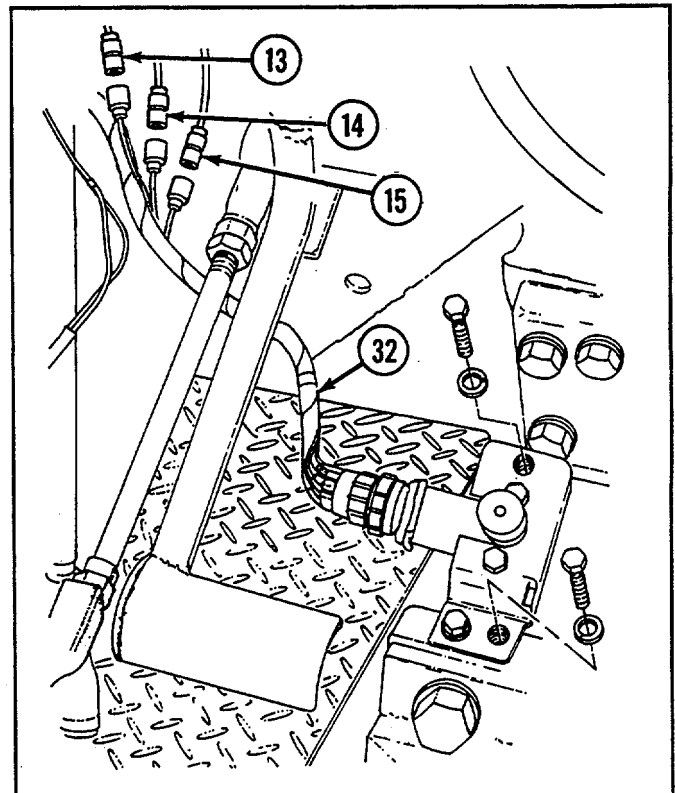
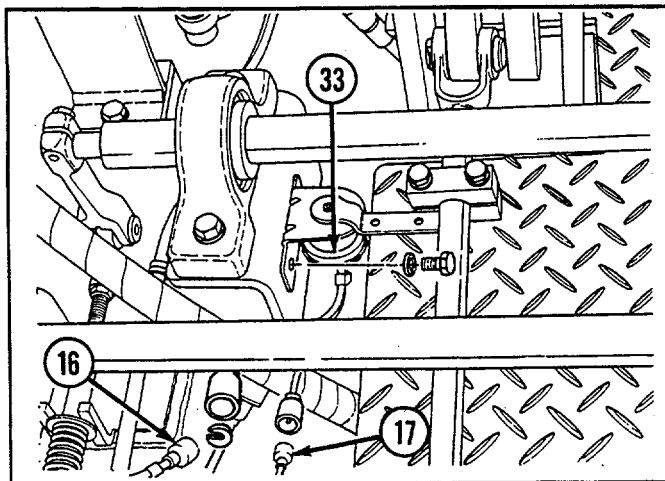


6-56 REPLACE/REPAIR SWITCH PANEL TO GAGE PANEL AND MISCELLANEOUS SWITCHES WIRING HARNESS (INFRARED NIGHT VIEWER) (SINGLE VOLTAGE) (11671795)--Continued

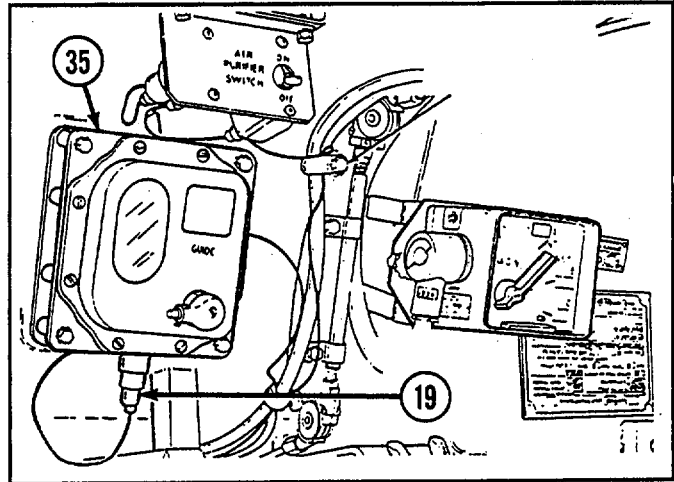
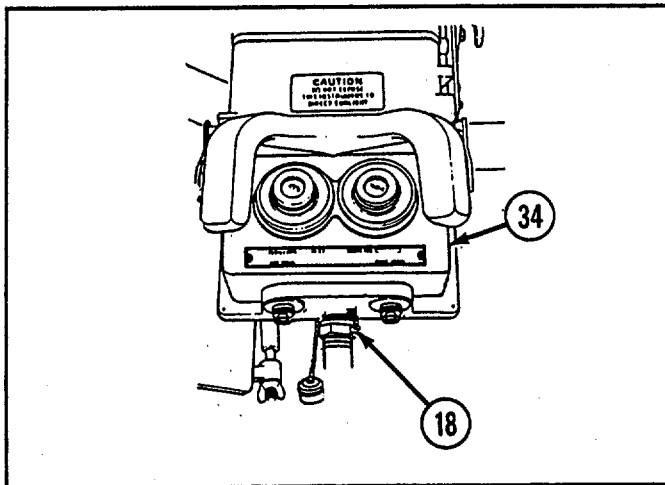
- 8 Disconnect connector (9) from power control switch (29).
- 9 Disconnect connector (10) from driver's B.O. receiver indicator light (30).
- 10 Disconnect two connectors (11 and 12) from driver's B.O. receiver switch (31).



- 11 Disconnect three connectors (13, 14, and 15) from headlight and dimmer switch wiring harness (32).
- 12 Disconnect connectors (16 and 17) from stoplight switch (33).



- 13 Disconnect connector (18) from infrared periscope (34).
- 14 Disconnect connector (19) from dome light (35).



b. DISASSEMBLY

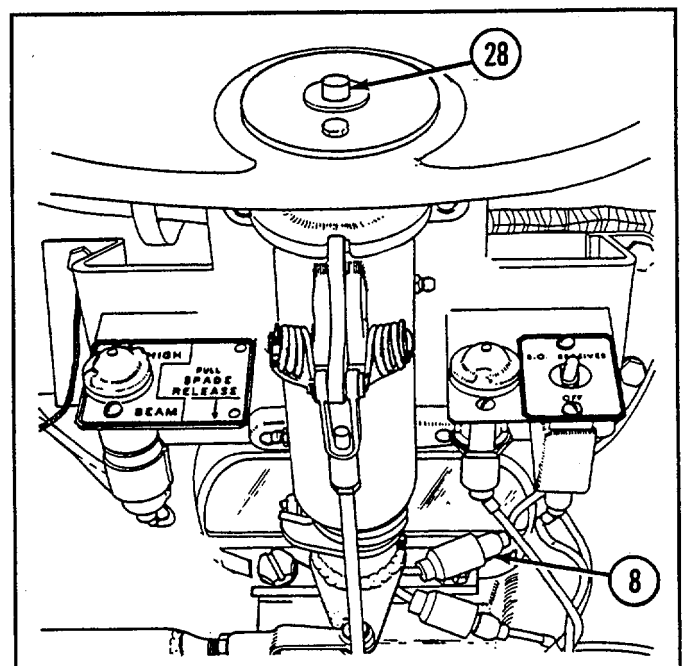
Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

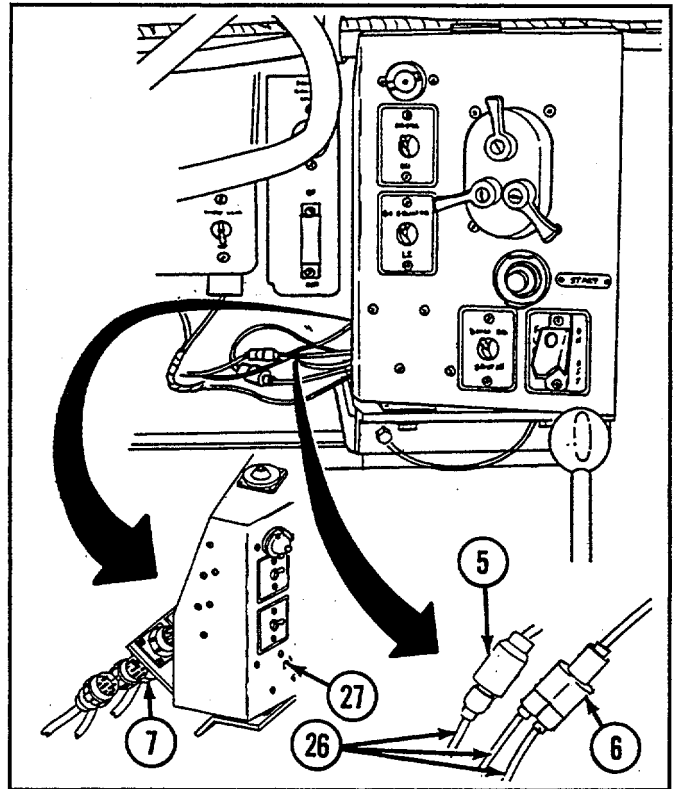
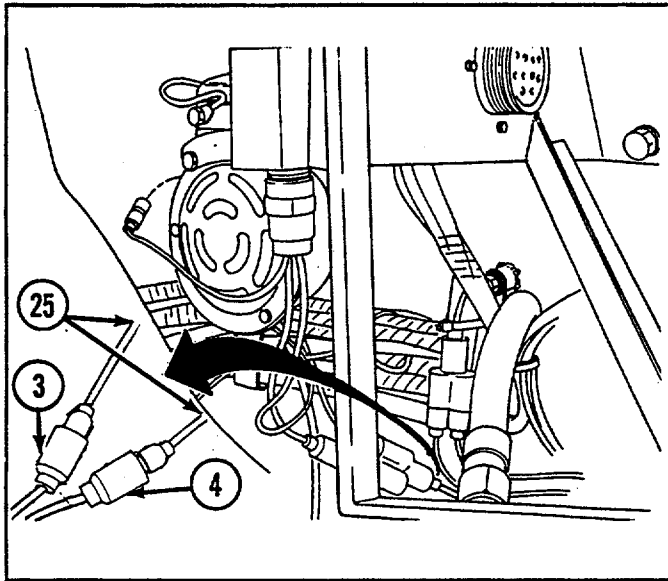
d. INSTALLATION

- 1 Connect connector (19) to dome light (35).
- 2 Connect connector (18) to infrared periscope (34).
- 3 Connect two connectors (16 and 17) to stoplight switch (33).
- 4 Connect three connectors (13, 14, and 15) to headlight and dimmer switch wiring harness (32).
- 5 Connect two connectors (11 and 12) to driver's B.O. receiver switch (31).
- 6 Connect connector (10) to driver's B.O. receiver indicator light (30).
- 7 Connect connector (9) to power control switch (29).
- 8 Connect connector (8) to horn switch (28).

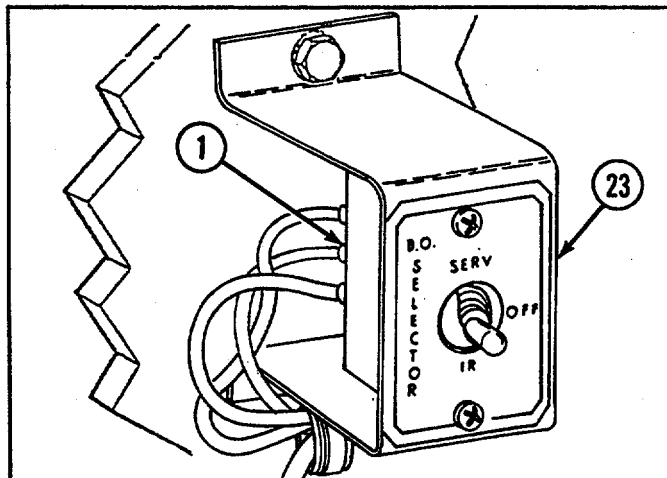
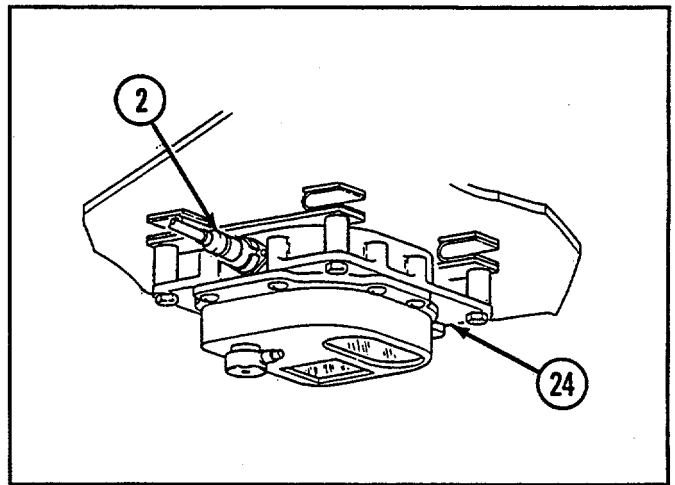


6-56 REPLACE/REPAIR SWITCH PANEL TO GAGE PANEL AND MISCELLANEOUS SWITCHES WIRING HARNESS (INFRARED NIGHT VIEWER) (SINGLE VOLTAGE) (11671 795)--Continued

- 9 Connect connector (7) to main switch panel (27).
- 10 Connect two connectors (5 and 6) to switch panel, radio, and bilge pump to bulkhead wiring harness(26).
- 11 Connect two connectors (3 and 4) to gage panel to bulkhead wiring harness (25).



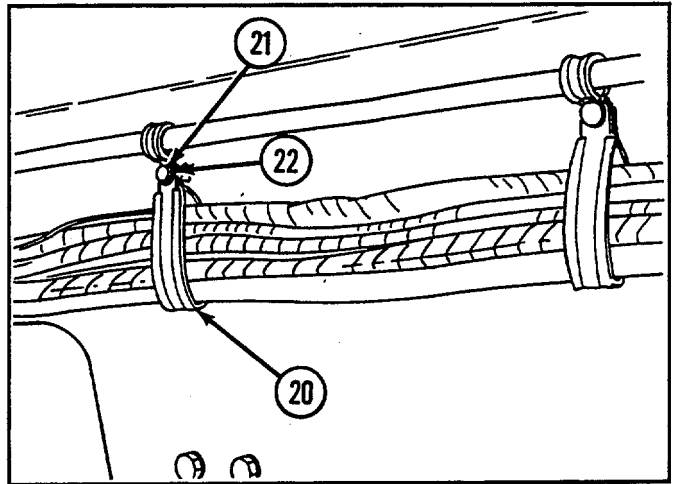
- 12 Connect connector (2) to dome light (24).
- 13 Connect connector (1) to rigger's service light switch (23).



- 14 Install 11 clamps (20) using screw (21) and new lockwasher (22) for each.

NOTE

Follow-on maintenance: Install air inlet grille if removed (see paragraph 9-57)



6-57 REPLACE/REPAIR STARTER SWITCH WIRING HARNESS (116712261)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

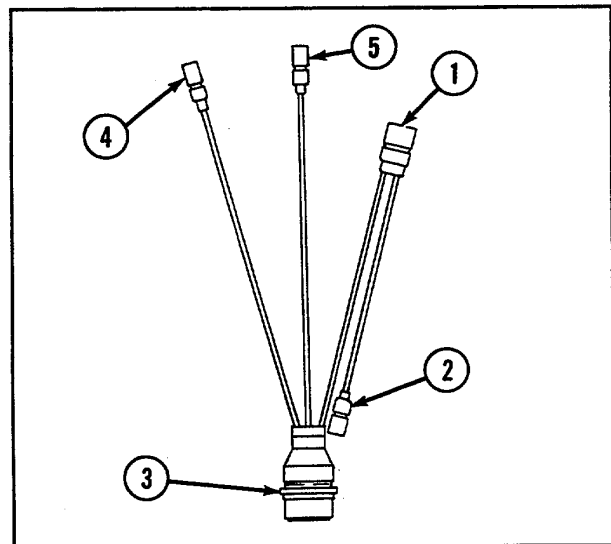
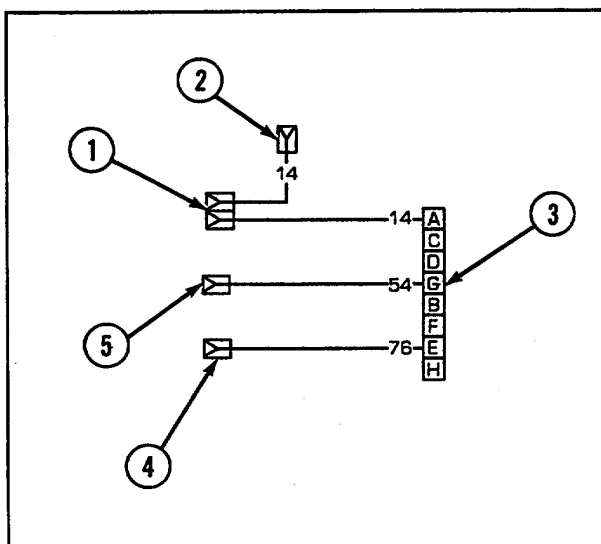
Equipment Conditions:

Main switch panel removed (see paragraph 6-10)

WARNING

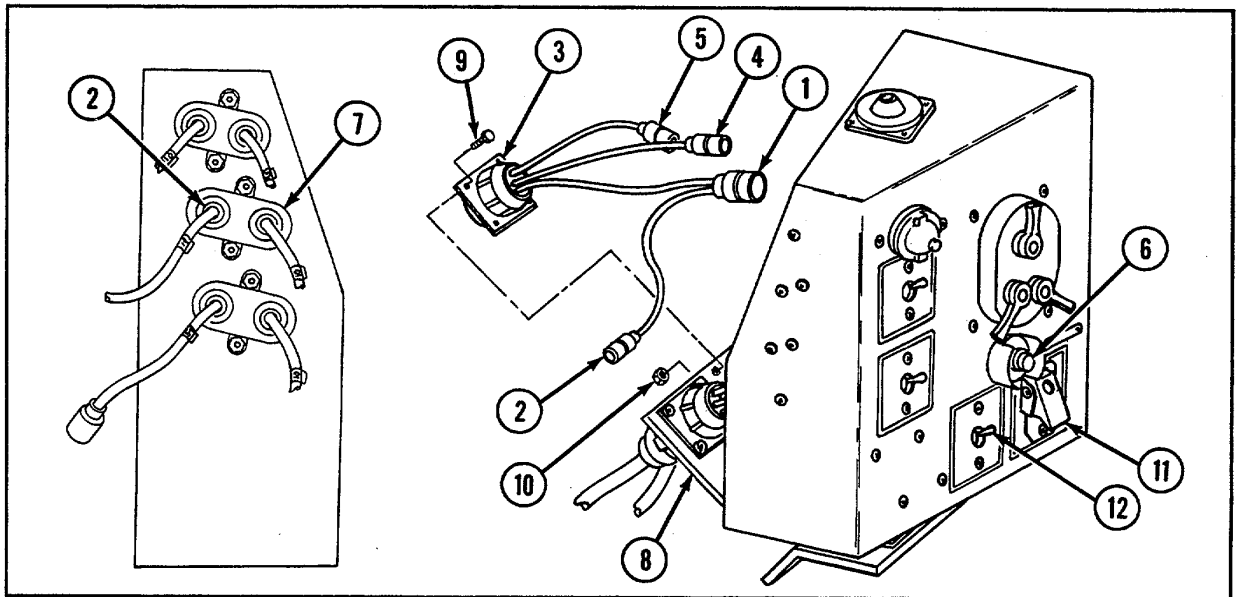
Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Starter switch	14
2	Circuit breaker	14
3	Main switch panel outlet	54, 14, 76
4	Fuel pump switch	76
5	Fuel shutoff switch	54



6-57 REPLACE/REPAIR STARTER SWITCH WIRING HARNESS (116712263-**Continued****a. REMOVAL**

- 1 Disconnect connector (1) from starter switch (6).
- 2 Disconnect connector (2) from circuit breaker (7).
- 3 Remove connector (3) from main switch panel outlet (8) by removing four screws (9) and four nuts (10).
- 4 Disconnect connector (4) from fuel pump switch (11).
- 5 Disconnect connector (5) from fuel shutoff switch (12).

**b. DISASSEMBLY**

Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect connector (5) to fuel shutoff switch (12).
- 2 Connect connector (4) to fuel pump switch (11).
- 3 Install connector (3) to main switch panel outlet (8) using four nuts (10) and four screws (9).
- 4 Connect connector (2) to circuit breaker (7).
- 5 Connect connector (1) to starter switch (6).

NOTE

Follow-on maintenance: Install main switch panel (see paragraph 6-10)

6-58 REPLACE/REPAIR ENGINE WIRING HARNESS (DUAL VOLTAGE) (11672416)

THIS TASK COVERS

a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

- Lockwashers (4) (Appendix G, item 107)
- Lockwashers (4) (Appendix G, item 42)
- Strap (Appendix G, item 268)

Equipment Condition:

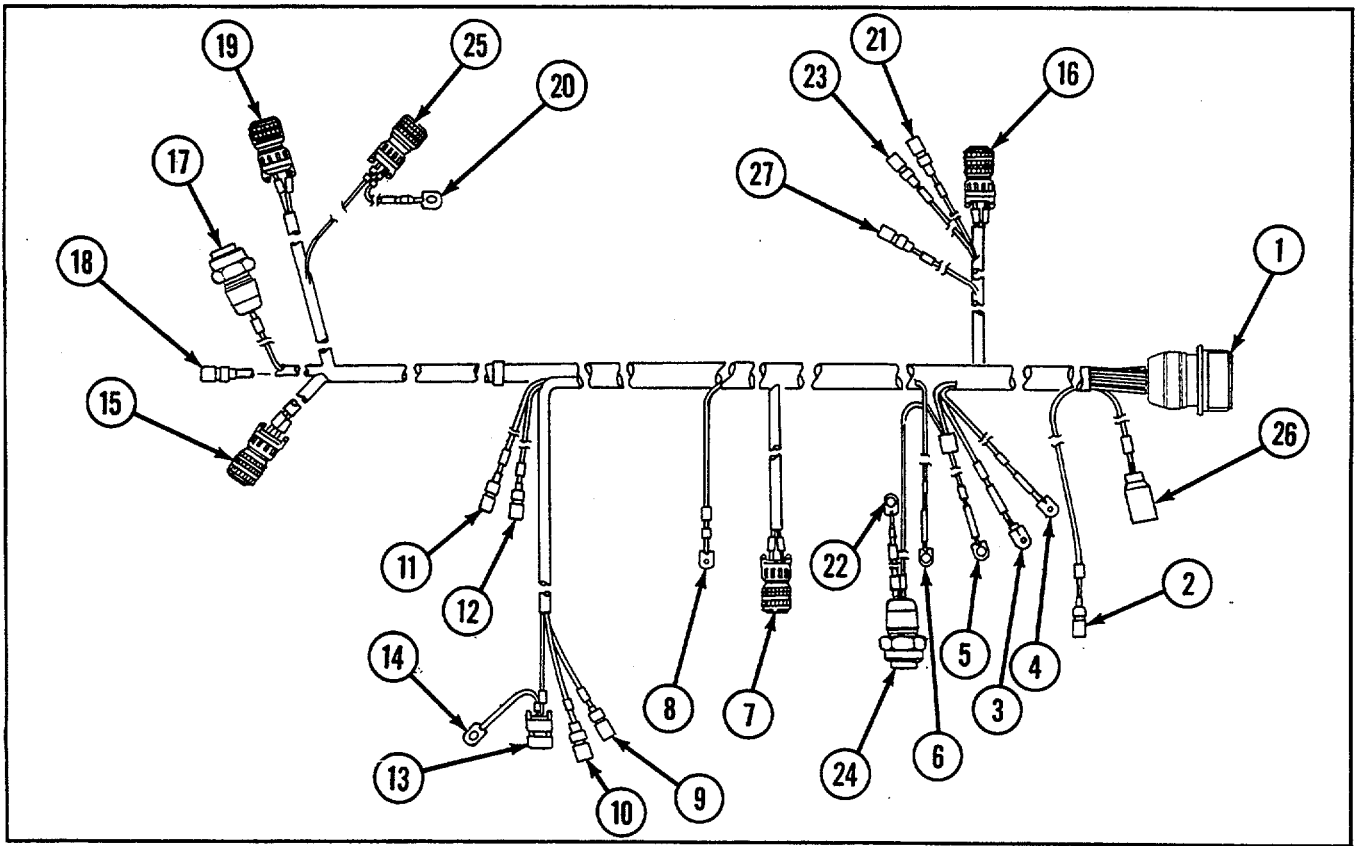
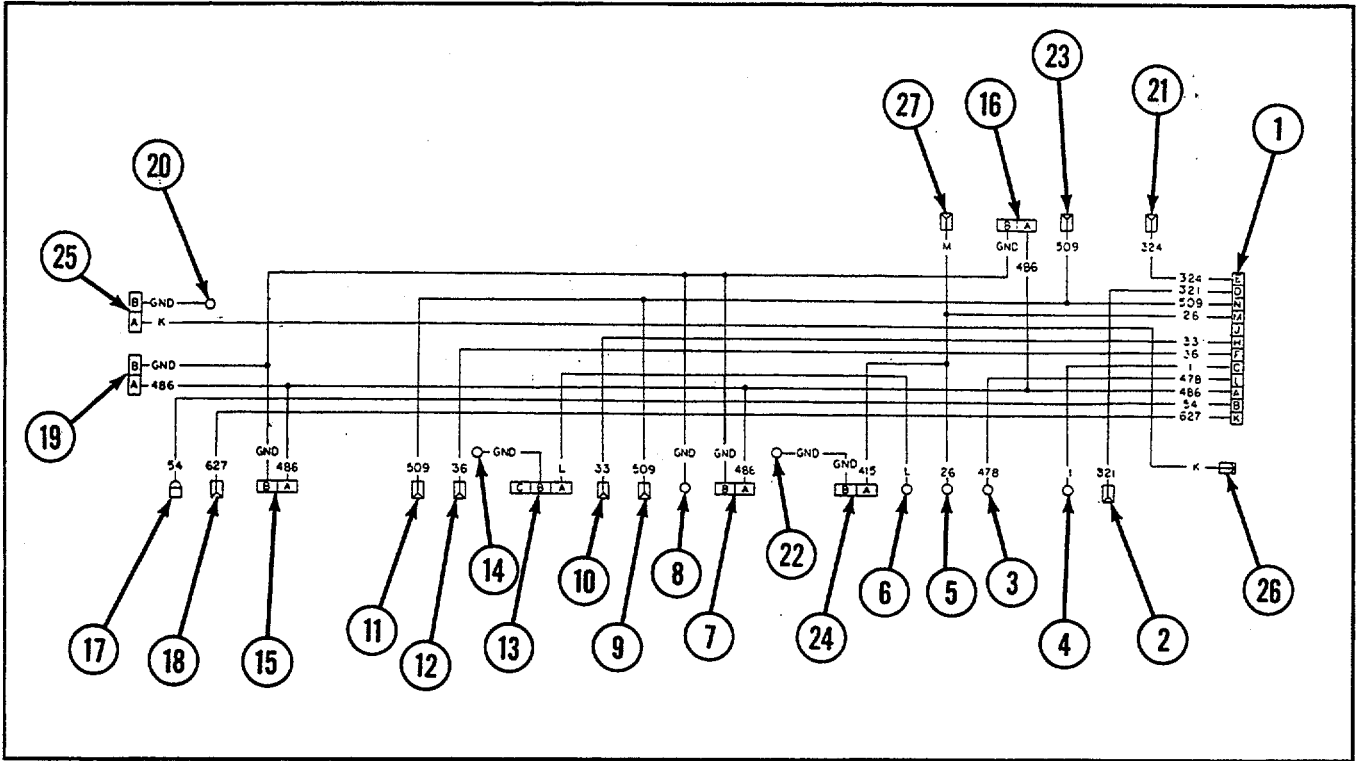
Powerplant removed (see paragraph 3-1)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

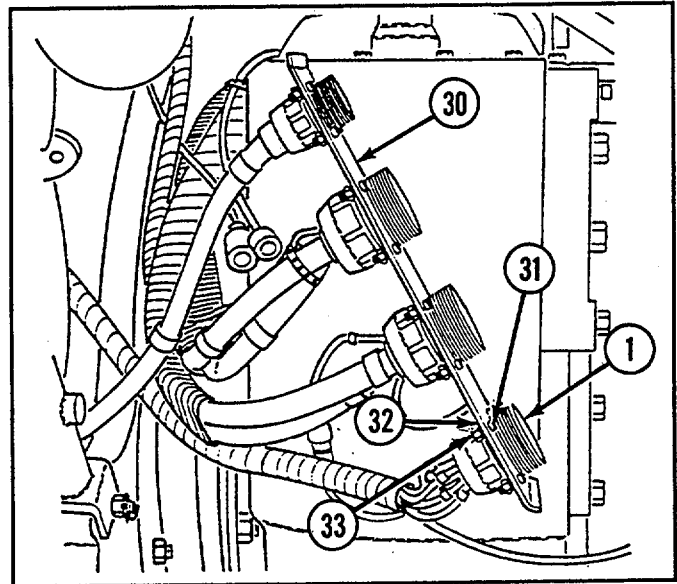
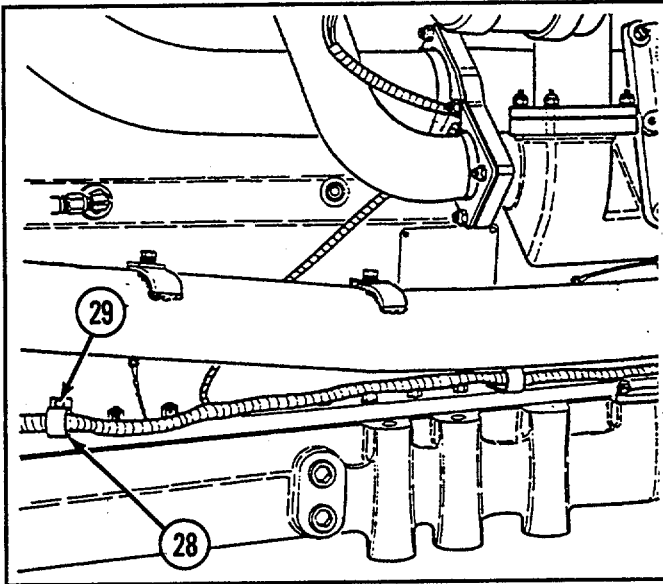
Connector No.	Electrical Lead To:	Wire No.
1	Engine disconnect	324, 321, 509, 26, 33, 36, 1, 478, 486, 54, 627
2	Transmission oil pressure sending unit	321
3, 4, 5, 6	Generator	478, 1, 26, L
7	Manifold preheat coil-left side	486, GND
8	Ground	GND
9	Engine high oil temperature switch	509
10	Engine oil temperature sending unit	33
11	Engine low oil pressure switch	509
12	Engine oil pressure sending unit	36
13	Time totalizing meter	L, GND
14	Ground	GND
15	Fuel solenoid-left side	486, GND
16	Fuel solenoid-right side	486, GND
17	Fuel shutoff solenoid	54
18	Governor solenoid	627
19	Manifold preheat coil-right side	486, GND
20	Ground	GND
21	Transmission oil temperature sending unit	324
22	Ground	GND
23	Transmission high oil temperature switch	509
24	Generator blower	415, GND
25	Module auto water drain	GND, K
26	Module starter wiring harness	K
27	Module starter wiring harness	M

6-58 REPLACE/REPAIR ENGINE WIRING HARNESS (DUAL VDLTAGE)
(1167241 6diContinued)

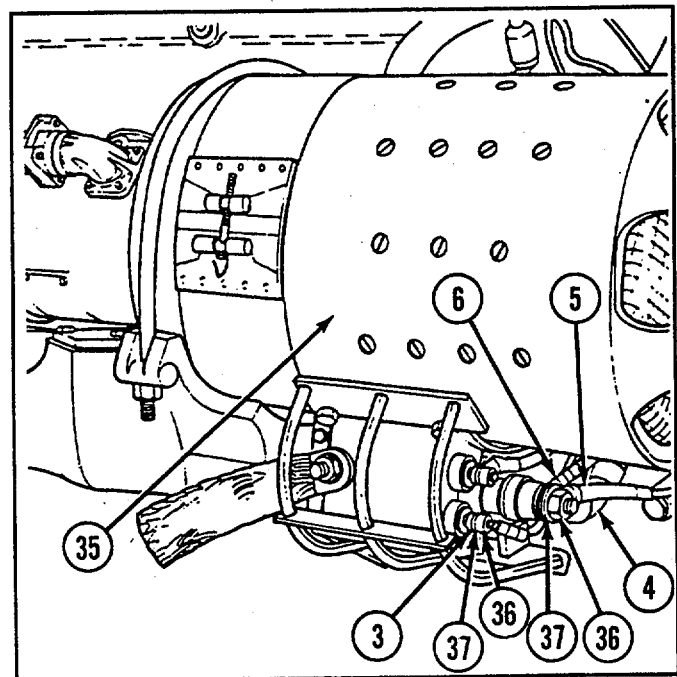
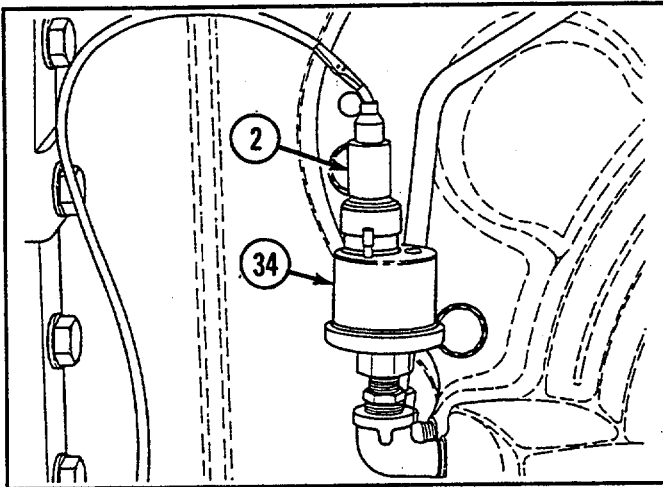


a. REMOVAL

- 1 Remove seven clamps (28) by removing screw (29) from each.
- 2 Disconnect connector (1) from engine disconnect (30) by removing four screws (31), four lockwashers (32), and four nuts (33).

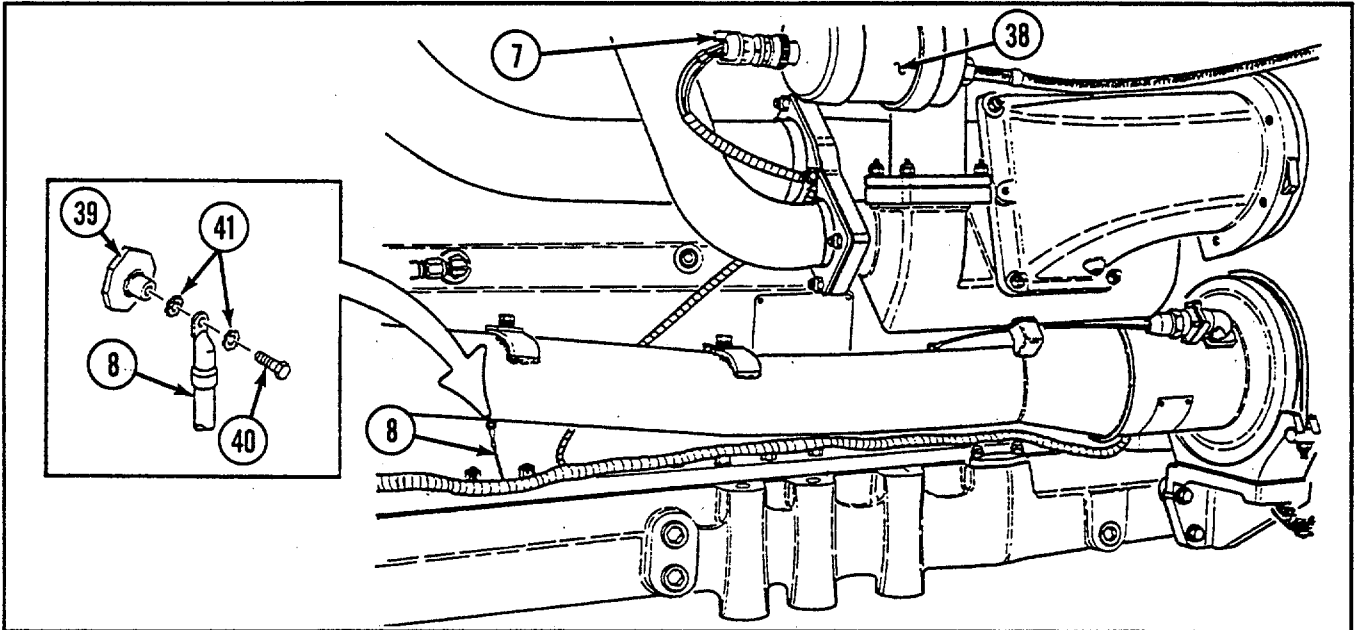


- 3 Disconnect connector (2) from transmission oil pressure sending unit (34).
- 4 Remove four connectors (3, 4, 5, and 6) from generator (35) by removing two nuts (36) and two flat washers (37).

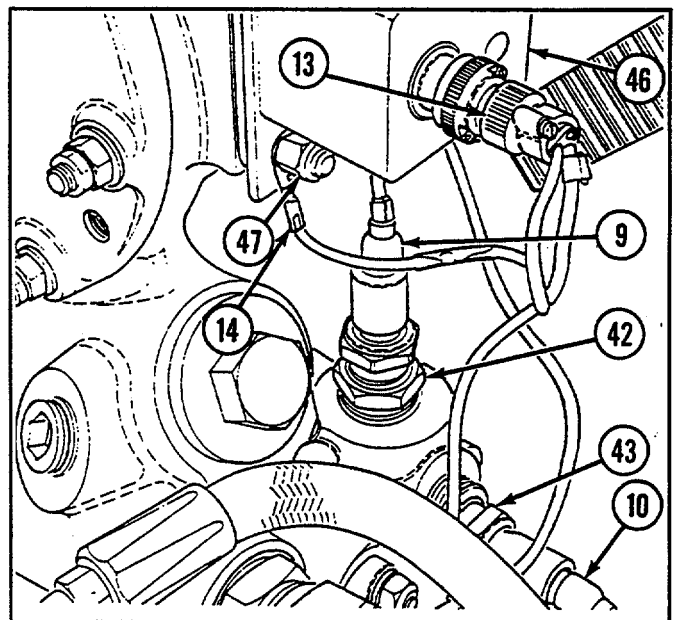
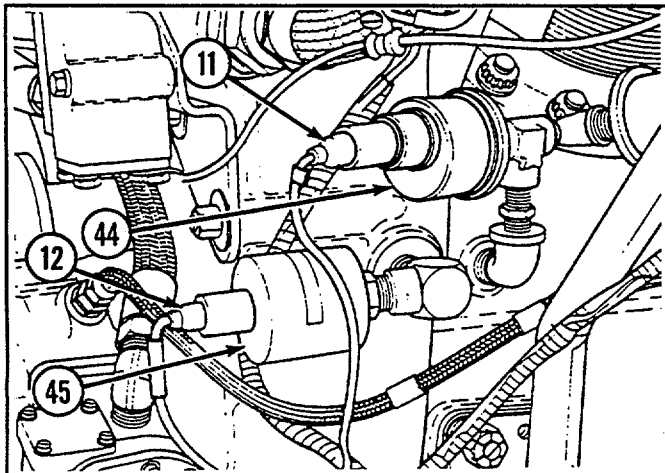


**6-58 REPLACE/REPAIR ENGINE WIRING HARNESS (DUAL VOLTAGE)
(11672416)--Continued**

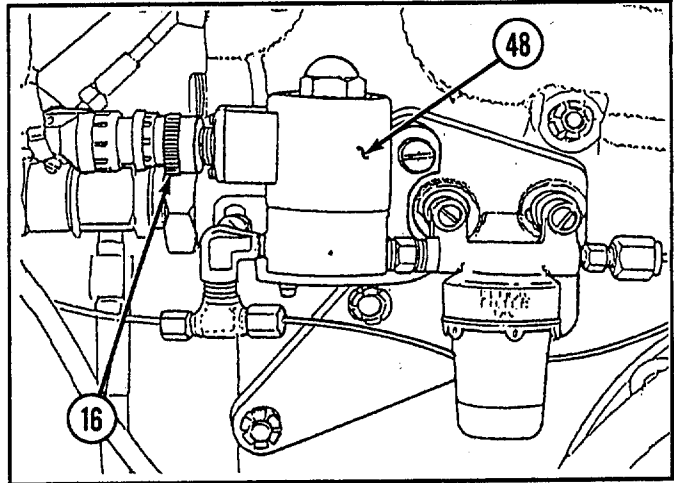
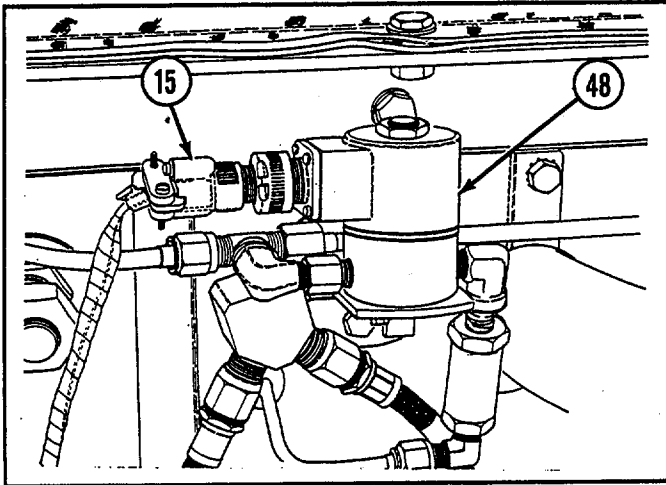
- 5 Disconnect connector (7) from left manifold heater ignition unit (38).
- 6 Remove ground lead (8) from engine (39) by removing bolt (40) and two washers (41).



- 7 Disconnect connector (9) from engine high oil temperature switch (42).
- 8 Disconnect connector (10) from engine oil temperature sending unit (43).
- 9 Disconnect connector (10) from engine low oil pressure switch (44).
- 10 Disconnect connector (12) from engine oil pressure sending unit (45).
- 11 Disconnect connector (13) from time totalizing meter (46).
- 12 Remove ground lead (14) by removing nut (47).

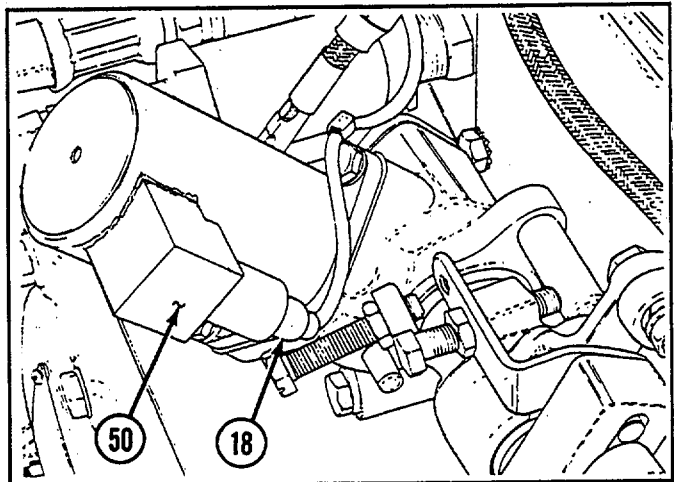
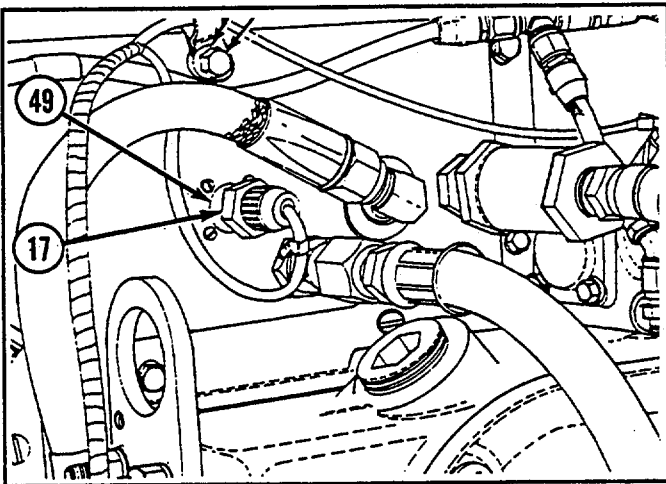


13 Disconnect two connectors (15 and 16) from left and right fuel solenoids (48).

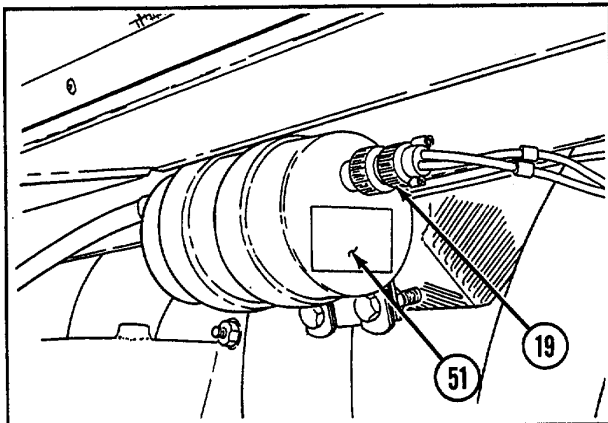


14 Disconnect connector (17) from fuel shutoff solenoid (49).

15 Disconnect connector (18) from governor solenoid (50).

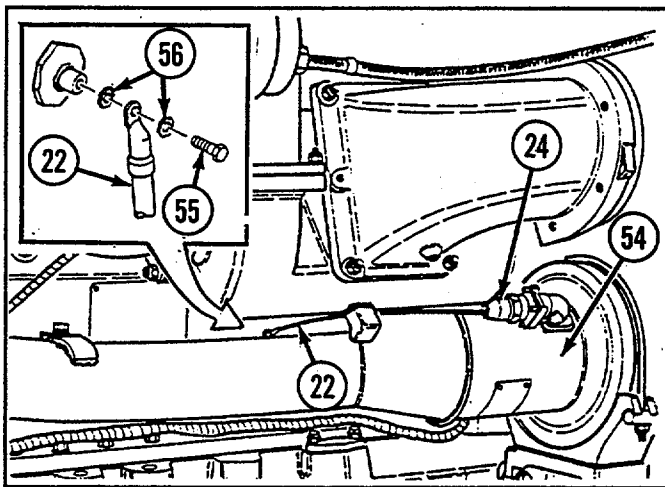
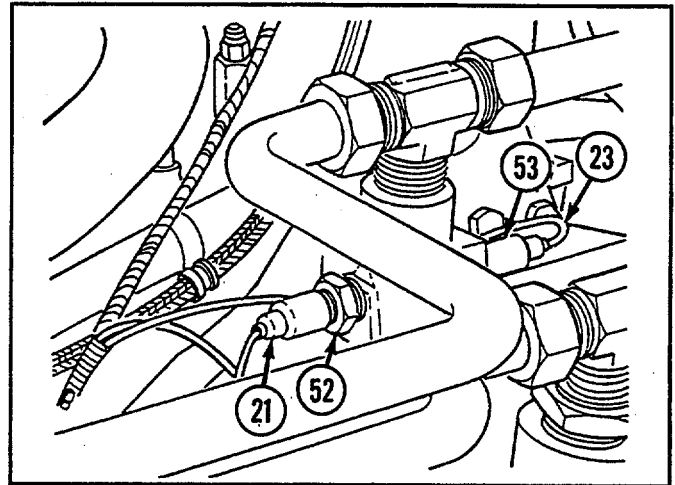


16 Disconnect connector (19) from right manifold heater ignition unit (51).

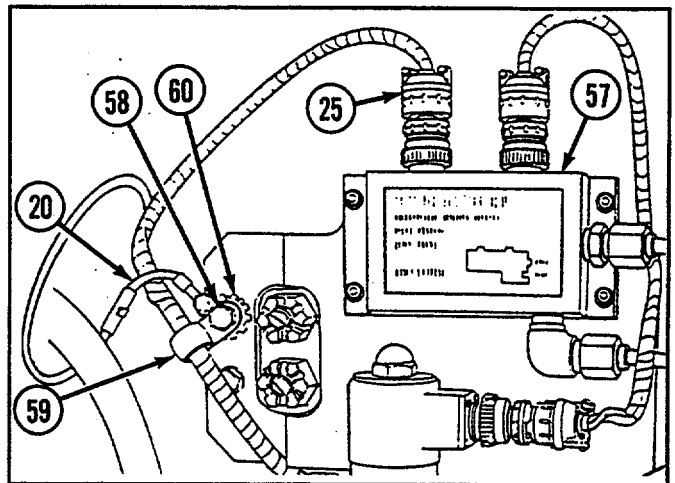


6-58 REPLACE/REPAIR ENGINE WIRING HARNESS (DUAL VOLTAGE)
 (1167241 6Continued

- 17 Disconnect connector (21) from transmission high oil temperature sending unit (52).
- 18 Disconnect connector (23) from transmission high oil temperature switch (53).
- 19 Disconnect connector (24) from generator blower motor (54).
- 20 Remove ground lead (22) by removing screw (55) and two lockwashers (56).



- 21 Disconnect connector (25) from module auto water drain (57).
- 22 Remove ground lead (20) by removing screw (58), clamp (59), and two lockwashers (60).
- 23 Disconnect two connectors (26 and 27) from module starter wiring harness (61).



b. DISASSEMBLY

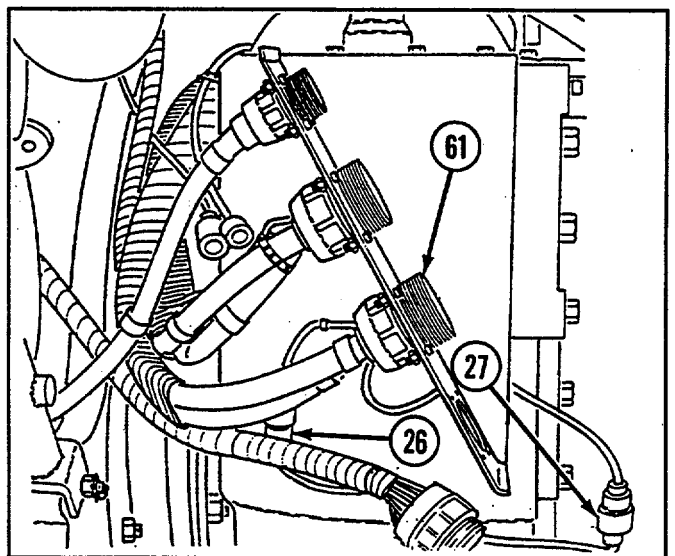
Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

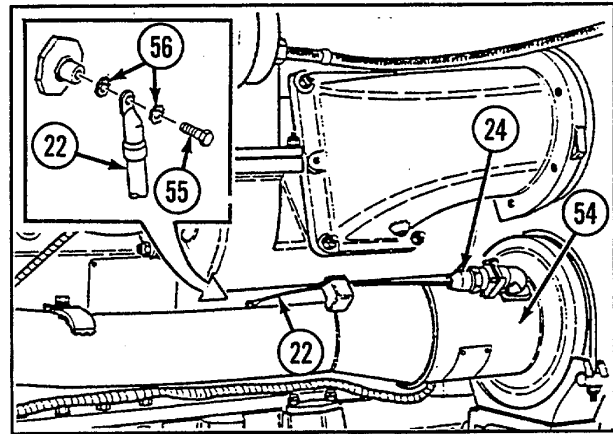
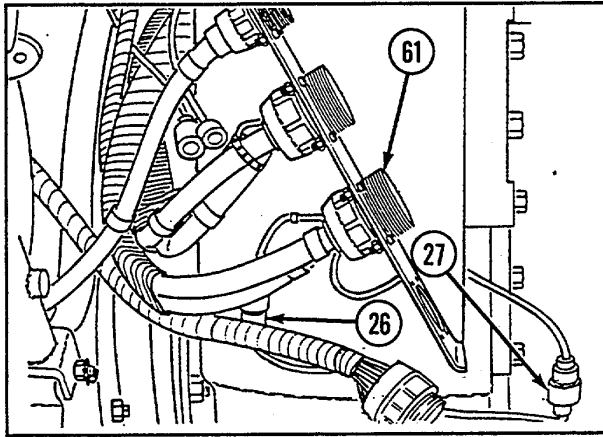
Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

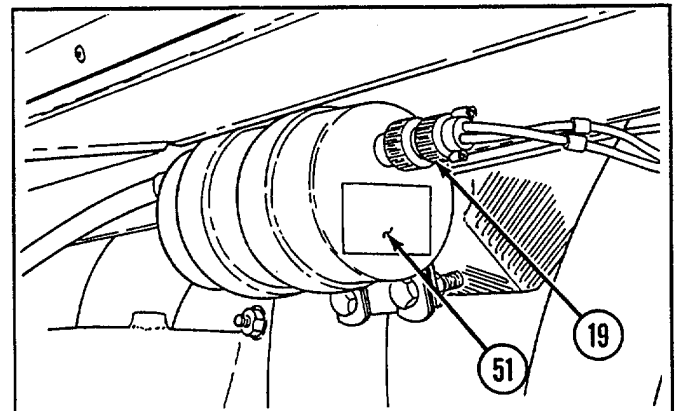
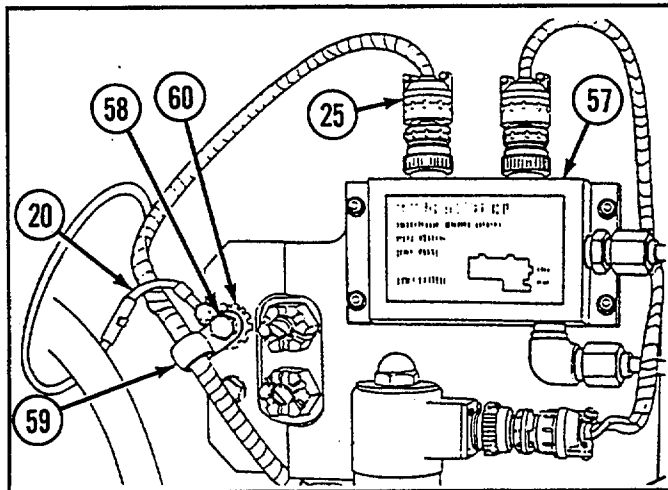
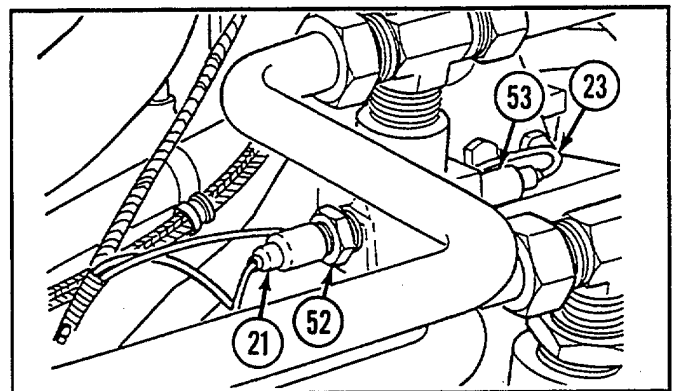
- 1 Connect two connectors (26 and 27) to module starter wiring harness (61).
- 2 Connect connector (25) to module auto water drain (57).



- 3 Install ground lead (20) using two new lockwashers (60), clamp (59), and screw (58).
- 4 Install ground lead (22) using two new lockwashers (56) and screw (55).
- 5 Connect connector (24) to generator blower motor (54).
- 6 Connect connector (23) to transmission high oil temperature switch (53).
- 7 Connect connector (21) to transmission high oil temperature sending unit (52).
- 8 Connect connector (19) to right manifold preheat coil (51).
- 9 Connect connector (18) to governor solenoid (50).

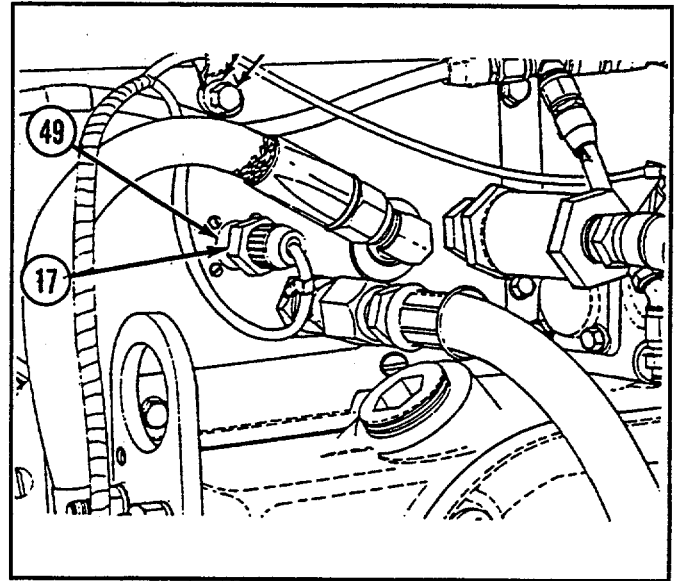
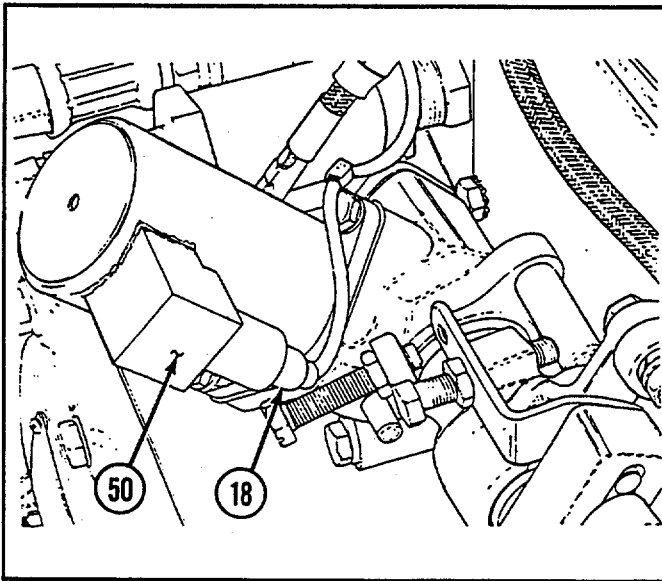


- 10 Connect connector (17) to fuel shutoff solenoid (49).
- 11 Connect two connectors (15 and 16) to left and right fuel solenoid (48).

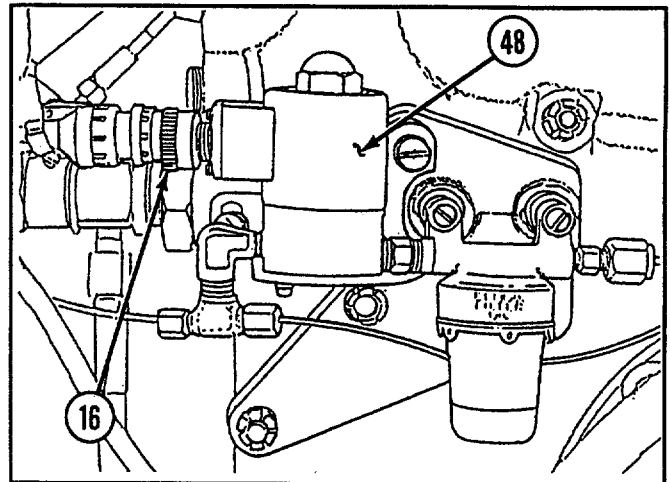
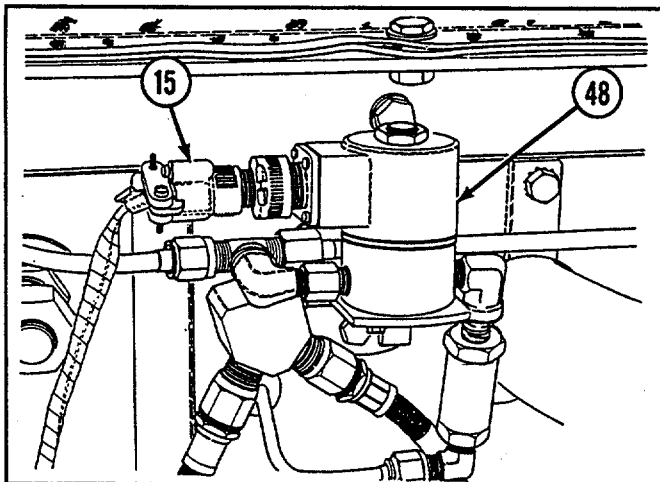


**6-58 REPLACE/REPAIR ENGINE WIRING HARNESS (DUAL VOLTAGE)
(1167241 6)–Continued**

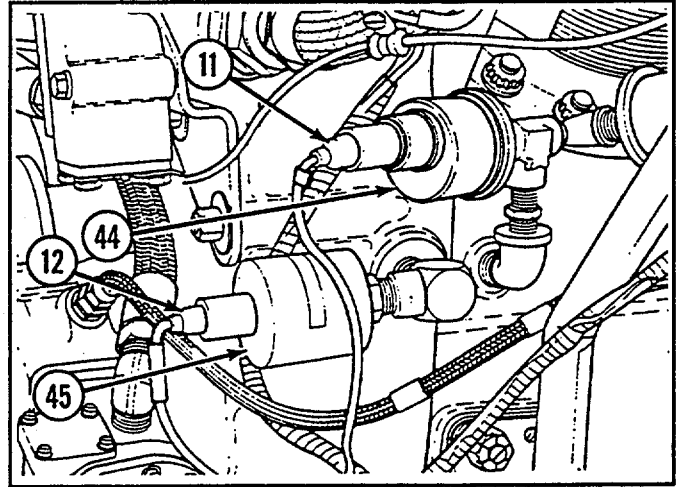
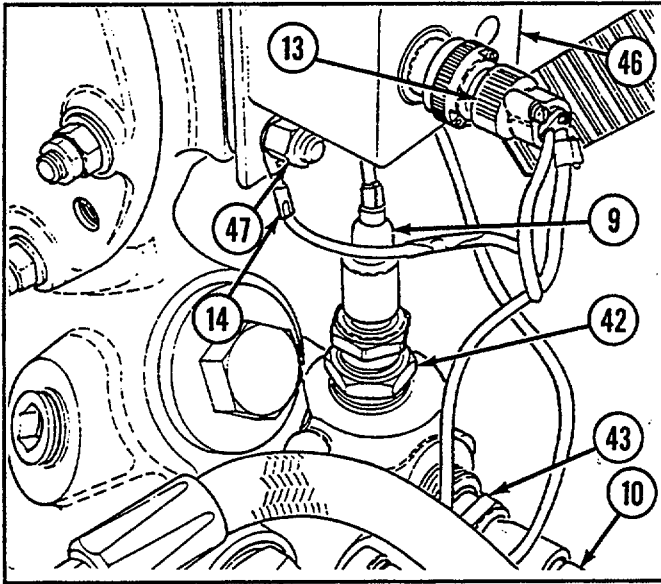
- 12 Install ground lead (14) using nut (47).
- 13 Connect connector (13) to time totalizing meter (46).
- 14 Connect connector (12) to engine oil pressure sending unit (45).
- 15 Connect connector (11) to engine low oil pressure switch (44).
- 16 Connect connector (10) to engine oil temperature sending unit (43).
- 17 Connect connector (9) to engine high oil temperature switch (42).



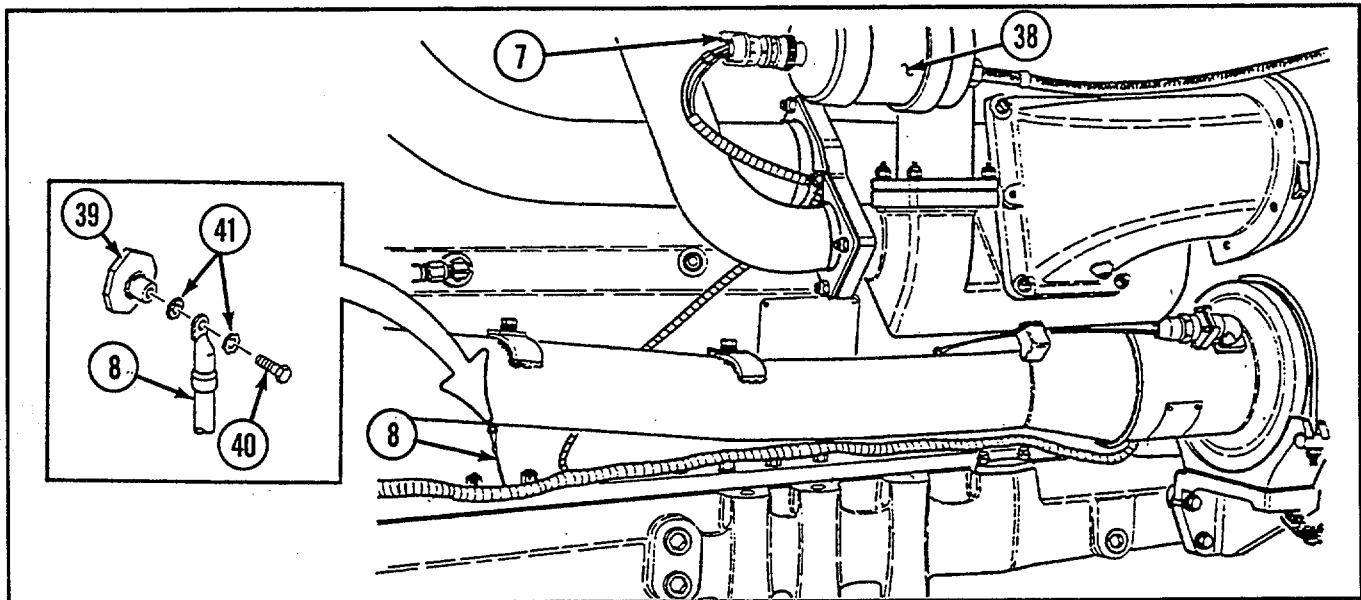
- 18 Install ground lead (8) to engine (39) using two washers (41) and bolt (40).
- 19 Connect connector (7) to left manifold preheat coil (38).



- 20 Install four connectors (3,4, 5, and 6) to generator (35) using two flat washers (37) and two nuts (36).
- 21 Connect connector (2) to transmission oil pressure sending unit (34).



- 22 Connect connector (1) to engine disconnect (30) using four screws (31), four new lockwashers (32), and four nuts (33).
- 23 Install seven clamps (28) using screw (29) for each.

**NOTE**

Follow-on maintenance: Install powerplant (see paragraph 3-1)

**6-59 REPLACE/REPAIR ENGINE WIRING HARNESS (SINGLE VOLTAGE)
111671816)****THIS TASK COVERS**

a. Removal b. Disassembly c. Assembly d. Installation

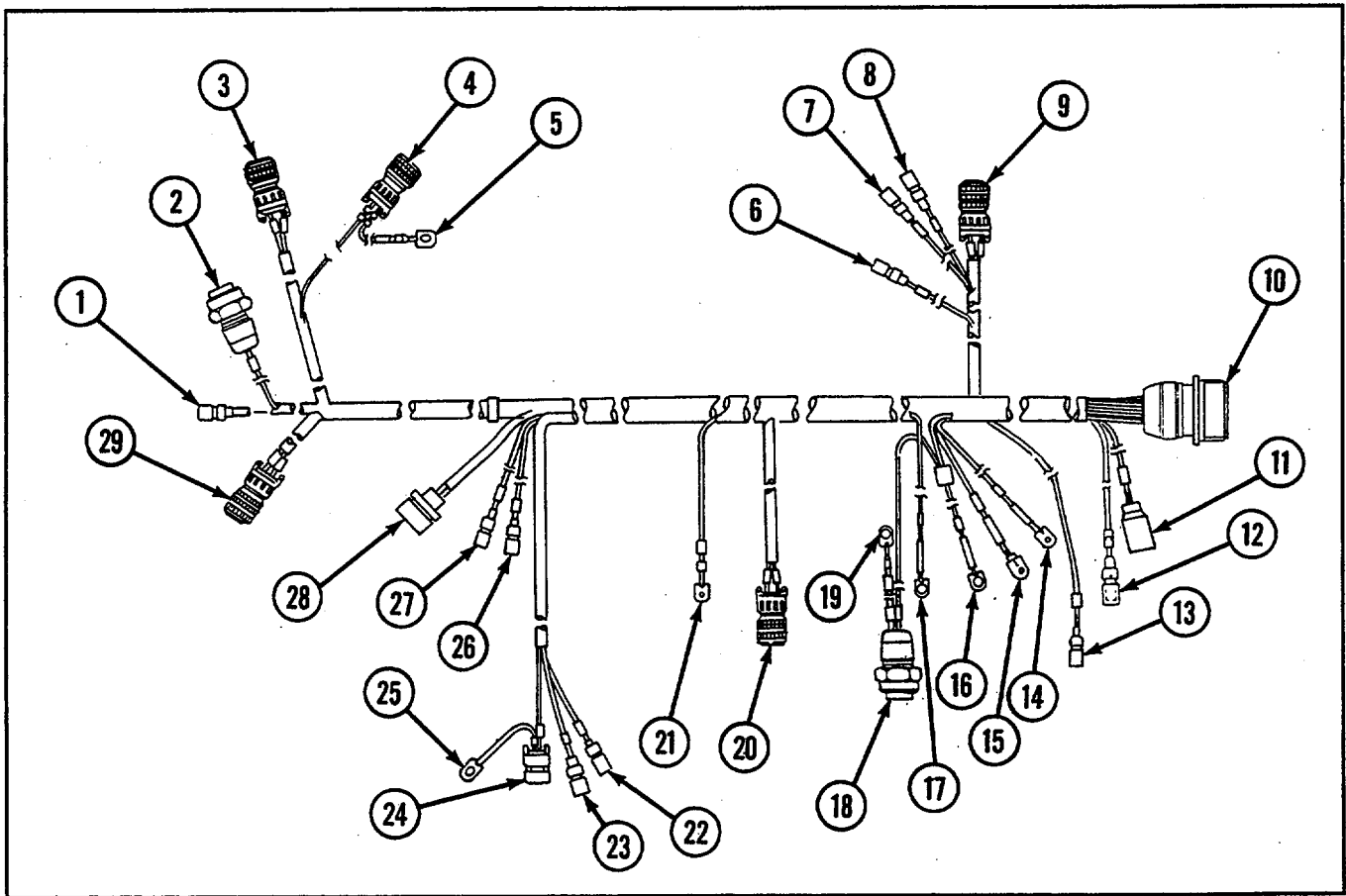
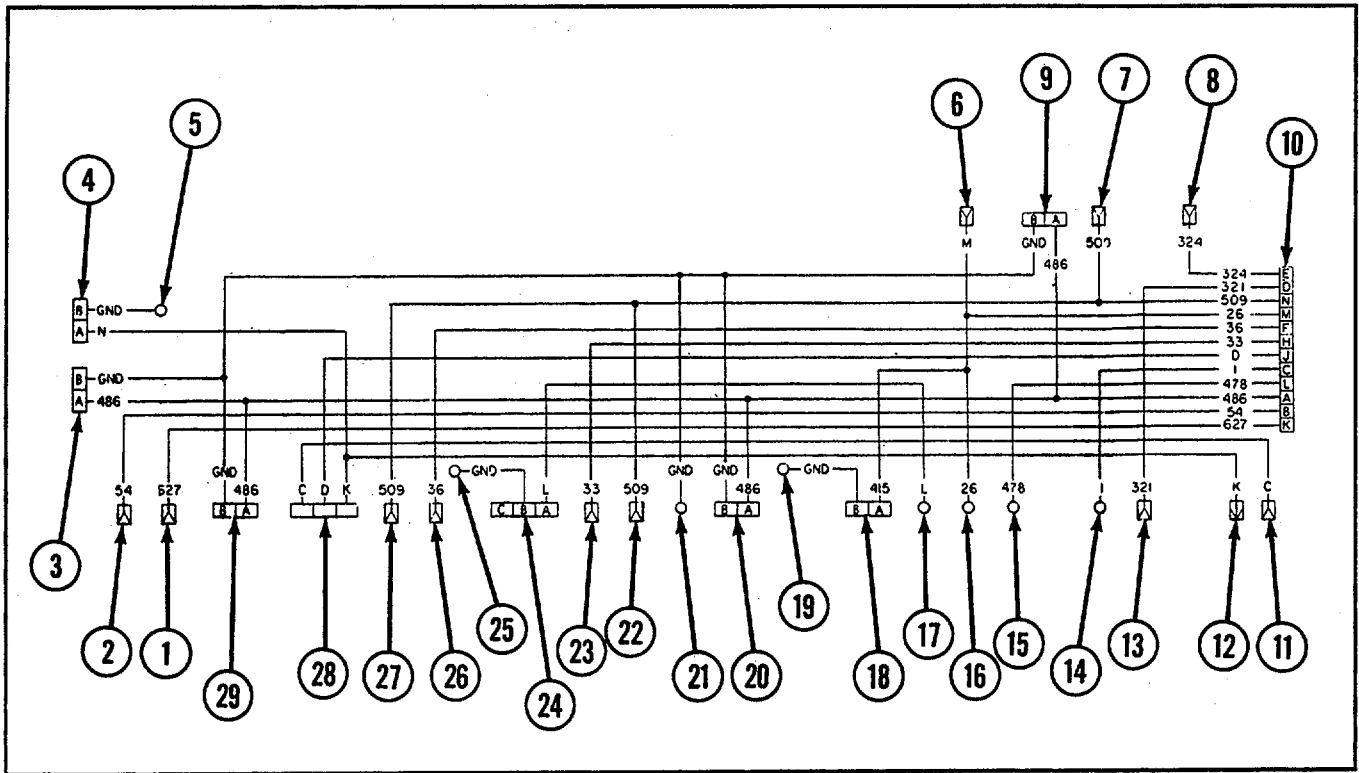
INITIAL SET-UP**Tools:**Tool kit, general mechanic's
(Appendix C, item 53)**Parts:**

- Lockwashers (4) (Appendix G, item 107)
- Lockwashers (4) (Appendix G, item 128)
- Strap (Appendix G, item 270)

Equipment Condition:Powerplant removed (see
paragraph 3-1)**WARNING**

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

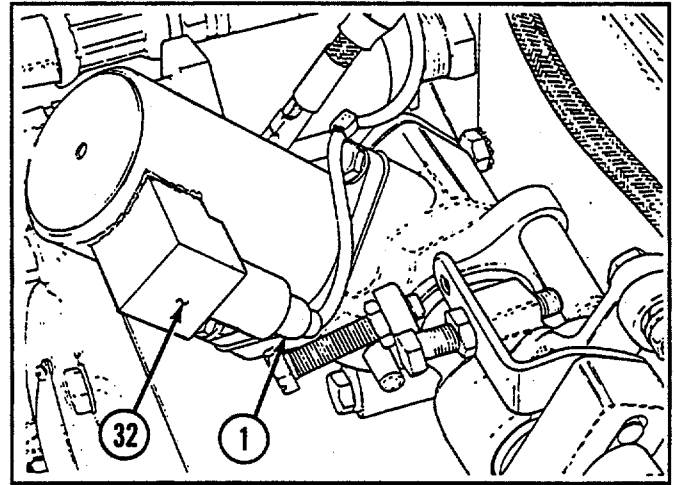
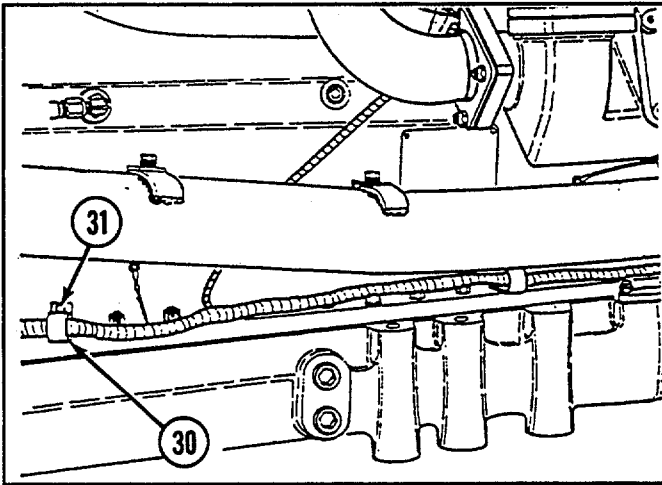
Connector No.	Electrical Lead To:	Wire No.
1	Governor solenoid	627
2	Fuel shut off	54
3	Manifold preheat coil-right side	486, GND
4	Module auto water drain	GND, N
5	Ground	GND
6	Module starter wiring harness	M
7	Transmission high oil temperature switch	509
8	Transmission oil temperature sending unit	324
9	Fuel solenoid-left side	GND, 486
10	Engine disconnect	324, 321, 509, 26, 36, 33, D, 1, 478, 486, 54, 627
11	Module starter wiring harness	C
12	Module starter wiring harness	K
13	Transmission oil pressure sending unit	321
14	Generator	1
15	Generator	478
16	Generator	26
17	Generator	L
18	Generator blower motor	415, GND
19	Ground	GND
20	Manifold preheat coil-left side	486, GND
21	Ground	GND
22	Engine high oil temperature switch	509
23	Engine oil temperature sending unit	33
24	Time totalizing meter	L, GND
25	Ground	GND
26	Engine oil pressure sending unit	36
27	Engine low oil pressure switch	509
28	Main engine oil pressure switch	C, D, K
29	Fuel solenoid-right side	486, GND



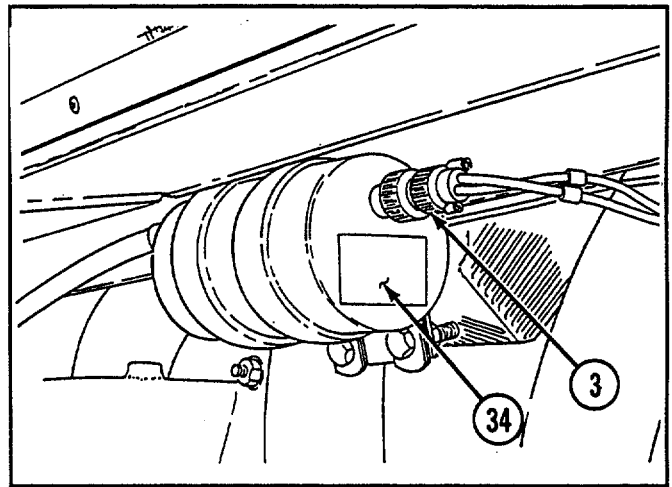
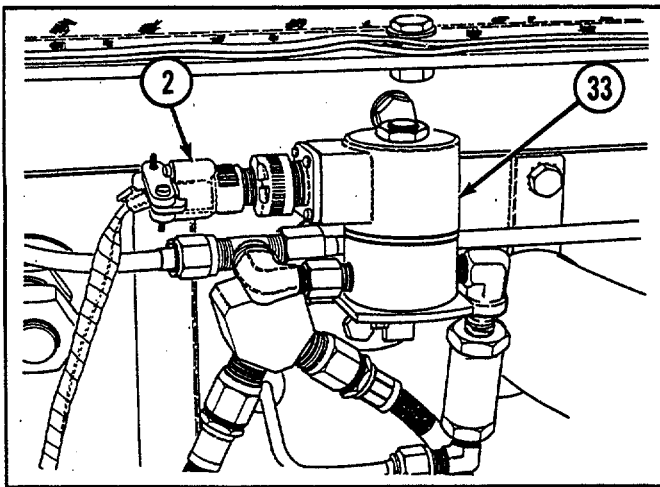
6-59 REPLACE/REPAIR ENGINE WIRING HARNESS (SINGLE VOLTAGE) (11671816)--Continued

a. REMOVAL

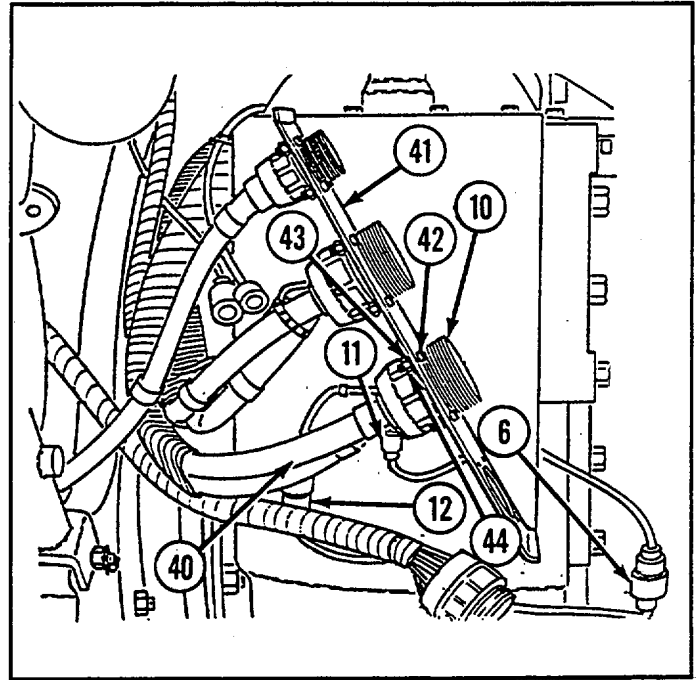
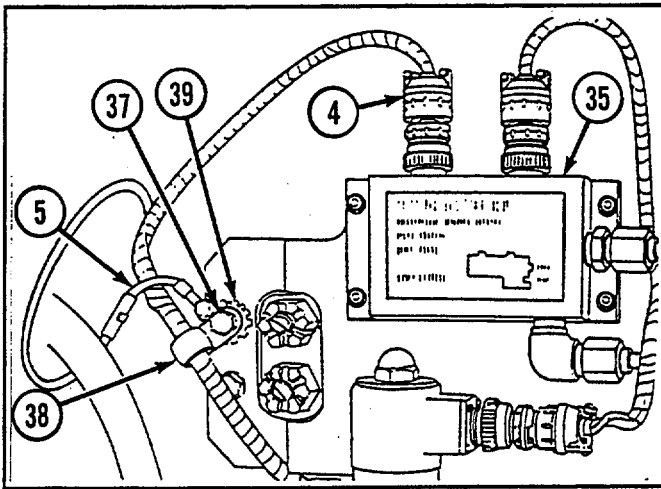
- 1 Remove seven clamps (30) by removing screw (31) from each.
- 2 Disconnect connector (1) from governor solenoid (32).



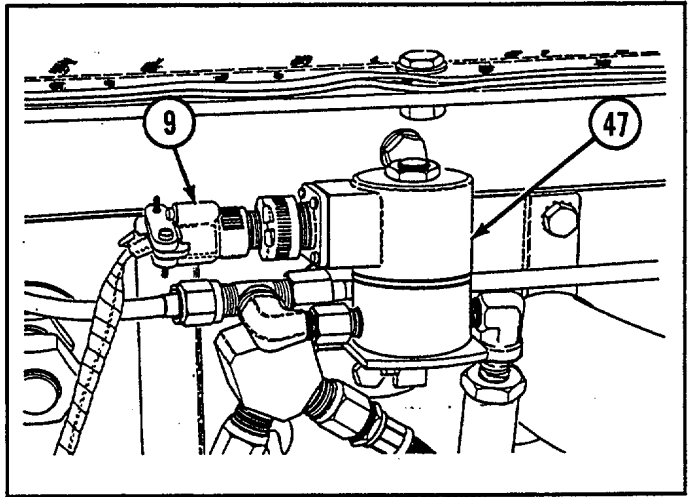
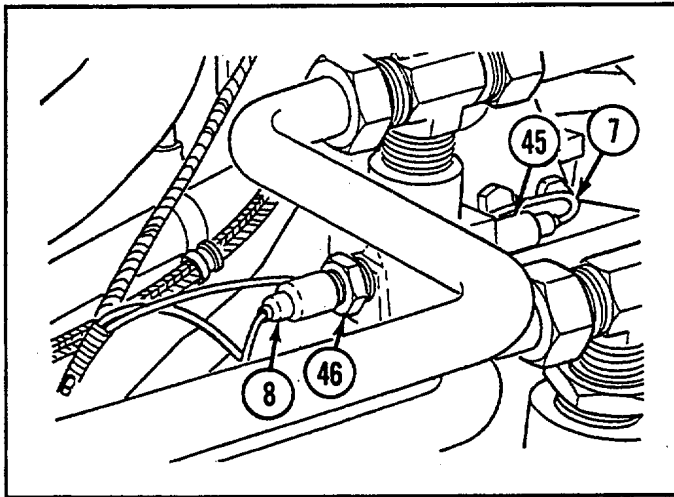
- 3 Disconnect connector (2) from fuel shutoff (33).
- 4 Disconnect connector (3) from right side manifold preheat coil (34).



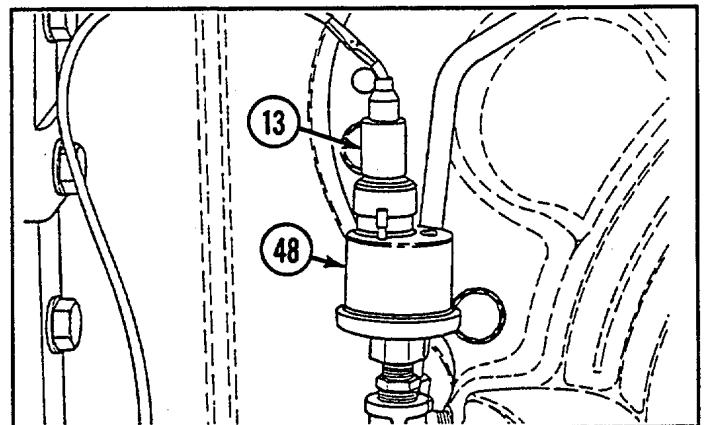
- 5 Disconnect connector (4) from module auto water drain (35).
- 6 Remove ground lead (5) from engine (36) by removing screw (37), clamp (38), and two lockwashers (39).
- 7 Disconnect connectors (6, 11, and 12) from module starter wiring harness (40).
- 8 Disconnect connector (10) from engine disconnect (41) by removing four screws (42), four lockwashers (43) and four nuts (44).



- 9 Disconnect connector (7) from transmission high oil temperature switch (45).
- 10 Disconnect connector (8) from transmission oil temperature sending unit (46).
- 11 Disconnect connector (9) from left side fuel solenoid (47).

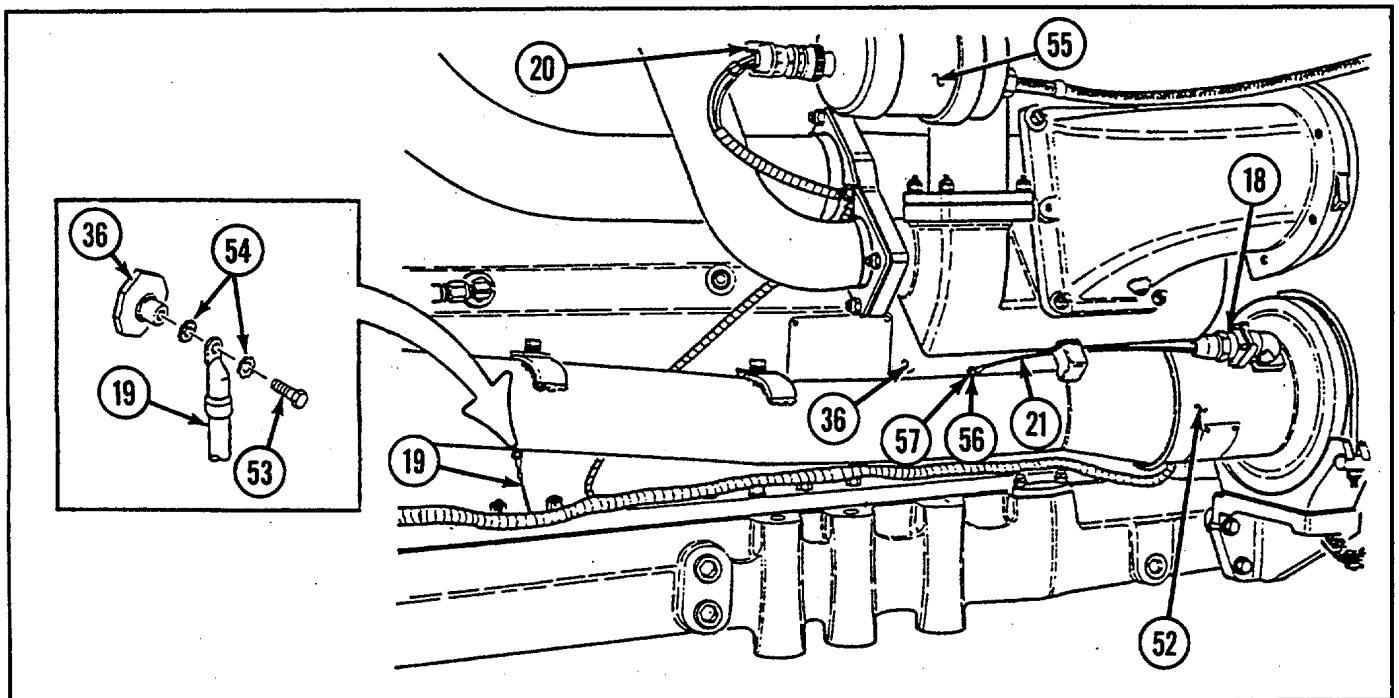
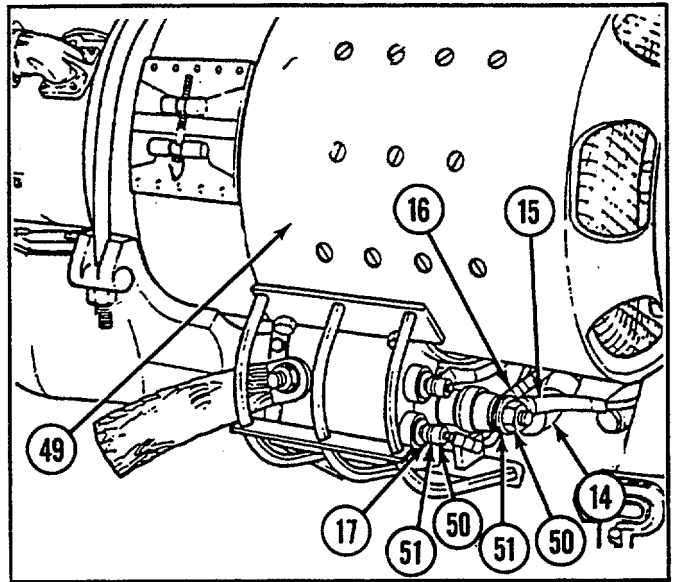


- 12 Disconnect connector (13) from transmission oil pressure sending unit (48).



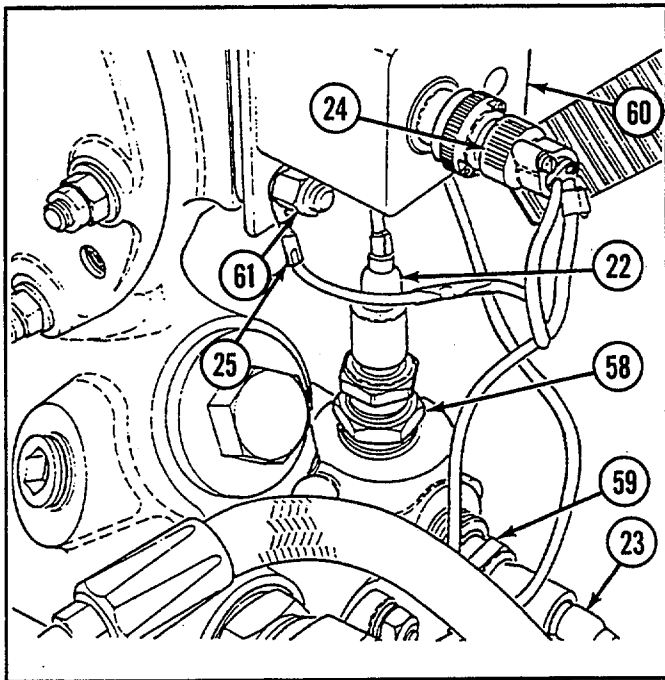
6-59 REPLACE/REPAIR ENGINE WIRING HARNESS (SINGLE VOLTAGE) (11671816)--Continued

- 13 Disconnect four connectors (14 through 17) from generator (49) by removing two nuts (50) and two flat washers (51).
- 14 Disconnect connector (18) from generator blower (52).
- 15 Remove ground lead (19) from engine (36) by removing screw (53) and two lockwashers (54).
- 16 Disconnect connector (20) from left side manifold preheat coil (55).
- 17 Remove ground lead (21) from engine (36) by removing bolt (56) and two washers (57).



- 18 Disconnect connector (22) from engine high oil temperature switch (58).
- 19 Disconnect connector (23) from engine oil temperature sending unit (59).
- 20 Disconnect connector (24) from time totalizing meter (60).
- 21 Remove ground lead (25) by removing nut (61).
- 22 Disconnect connector (26) from engine oil pressure sending unit (62).
- 23 Disconnect connector (27) from engine low oil pressure switch (63).

24 Disconnect connector (28) from main engine oil pressure switch (64).



25 Disconnect connector (29) from right side fuel solenoid (65).

b. DISASSEMBLY

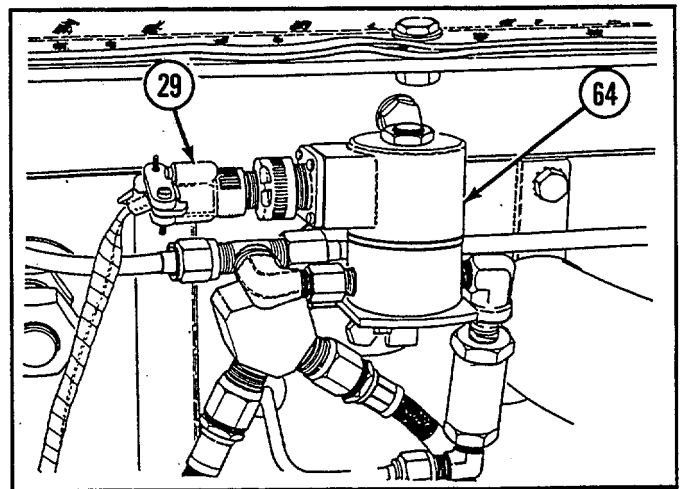
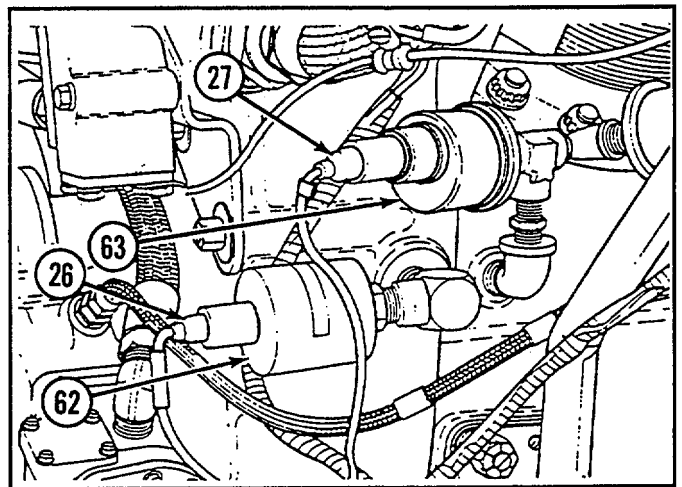
Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

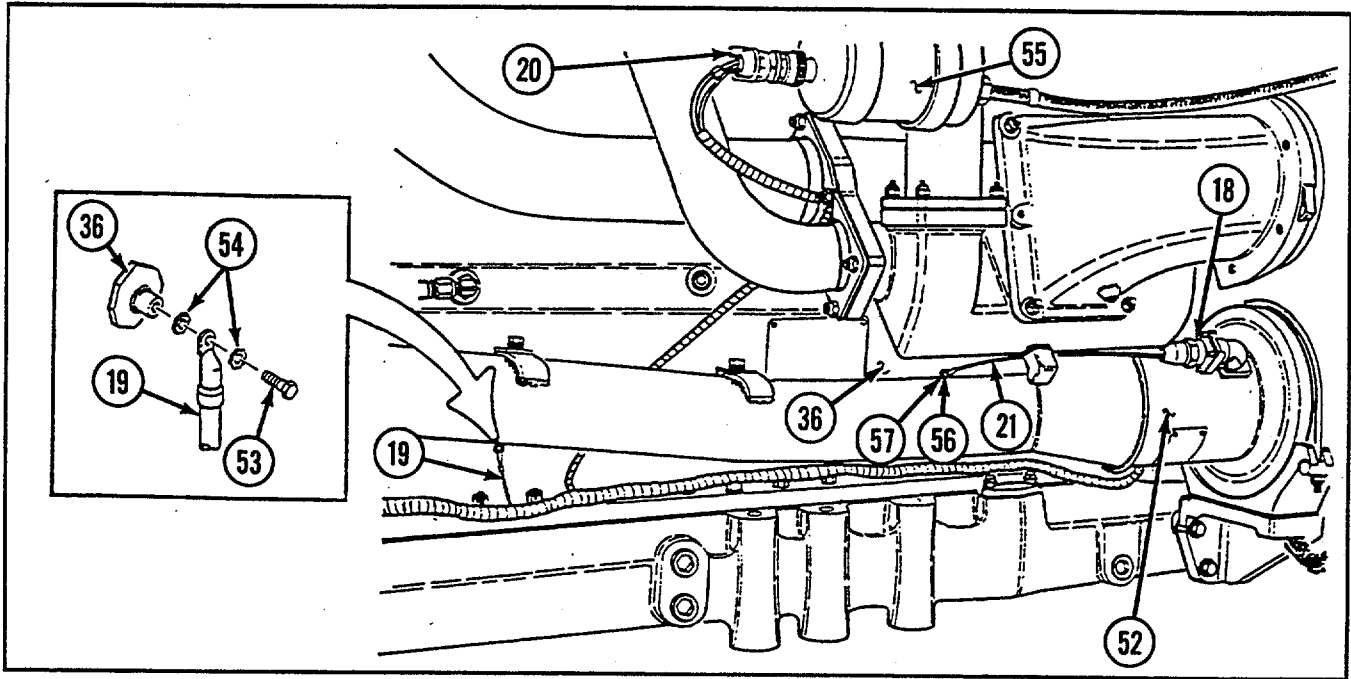
d. INSTALLATION

- 1 Connect connector (29) to right side fuel solenoid (65).
- 2 Connect connector (28) to main engine oil pressure switch (64).
- 3 Connect connector (27) to engine low oil pressure (63).
- 4 Connect connector (26) to engine oil pressure sending unit (62).
- 5 Install ground lead (25) using nut (61).
- 6 Connect connector (24) to time totalizing meter (60).
- 7 Connect connector (23) to engine oil temperature sending unit (59).
- 8 Connect connector (22) to engine high oil temperature switch (58).

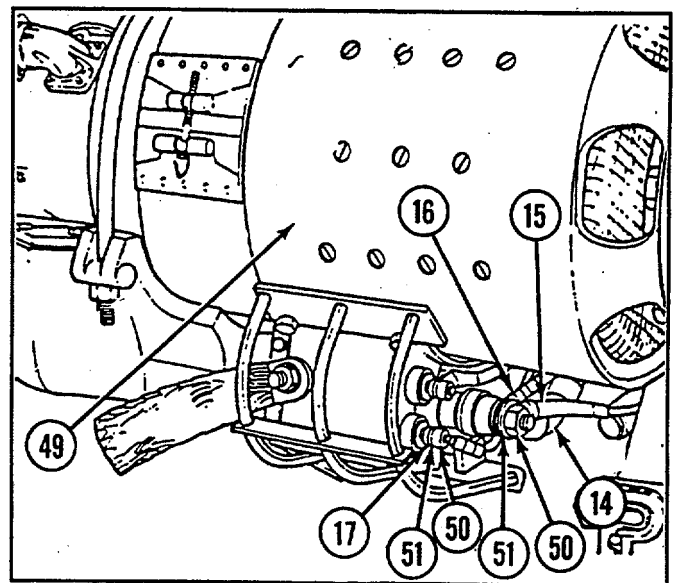
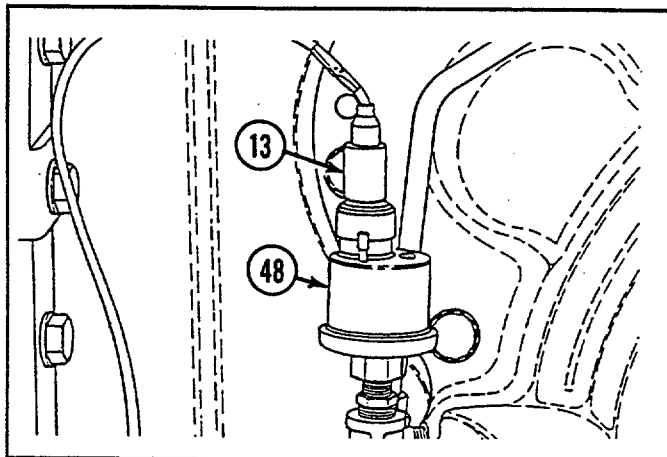


6-59 REPLACE/REPAIR ENGINE WIRING HARNESS (SINGLE VOLTAGE) (11671816)--Continued

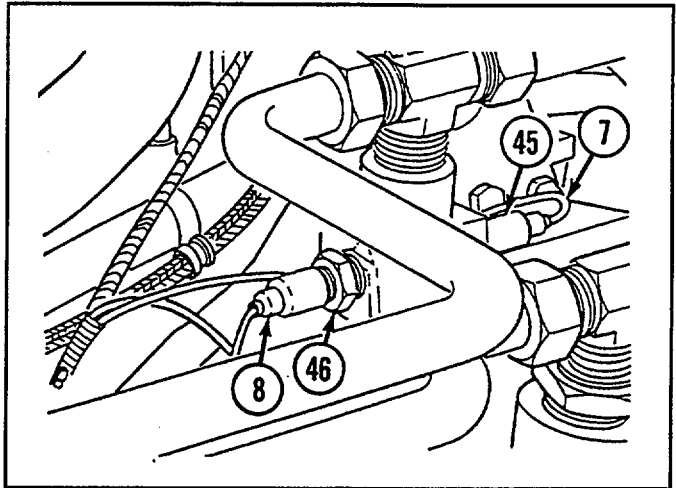
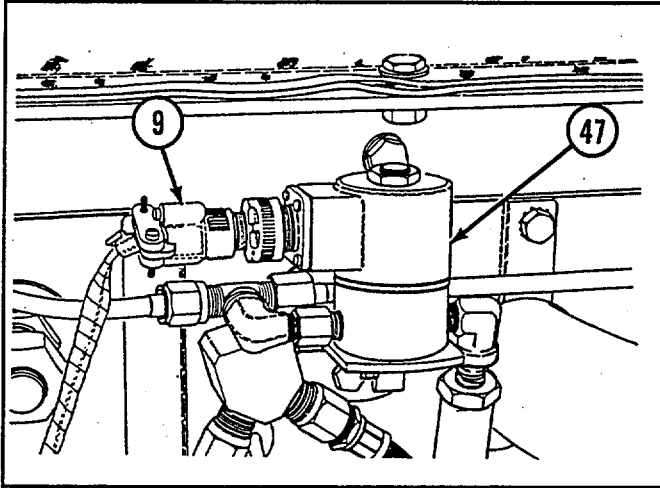
- 9 Install ground lead (21) to engine (36) using two washers (57) and bolt (56).
- 10 Connect connector (20) to left side manifold preheat coil (55).
- 11 Install ground lead (19) to engine (36) using screw (53) and two new lockwashers (54).
- 12 Connect connector (18) to generator blower motor (52).



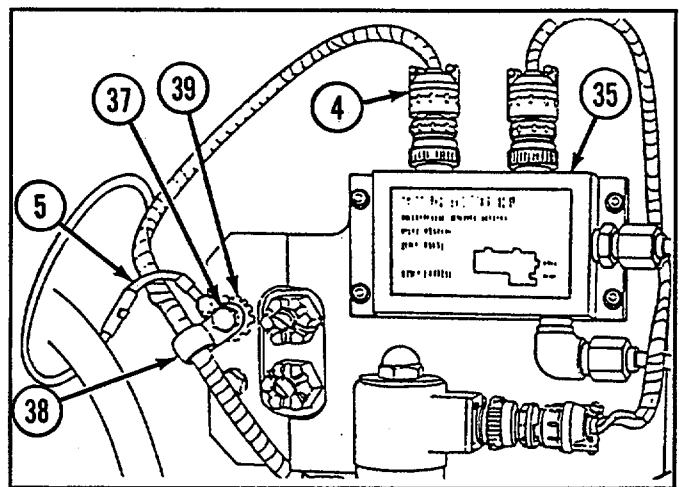
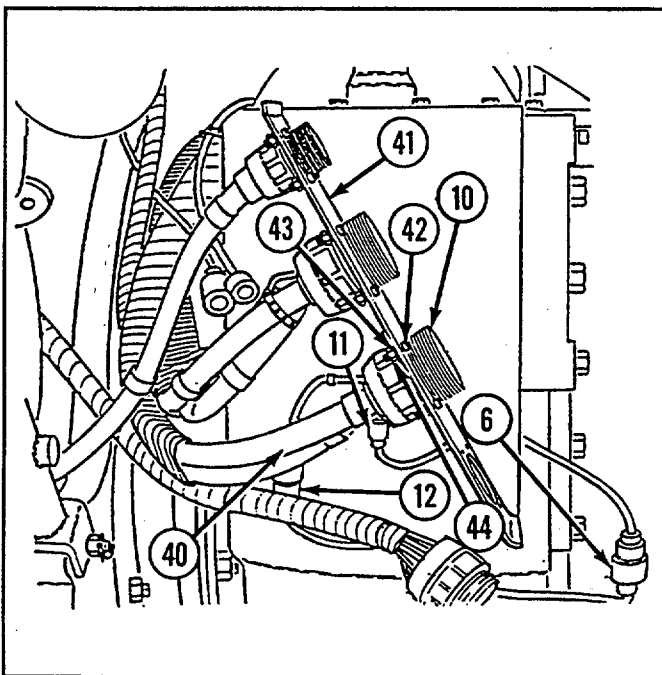
- 13 Connect four connectors (14 through 17) to generator (49) using two flat washers (51) and two nuts (50).
- 14 Connect connector (13) to transmission oil pressure sending unit (48).



- 15 Connect connector (9) to left side fuel solenoid (47).
- 16 Connect connector (8) to transmission oil temperature sending unit (46).
- 17 Connect connector (7) to transmission high oil temperature switch (45).



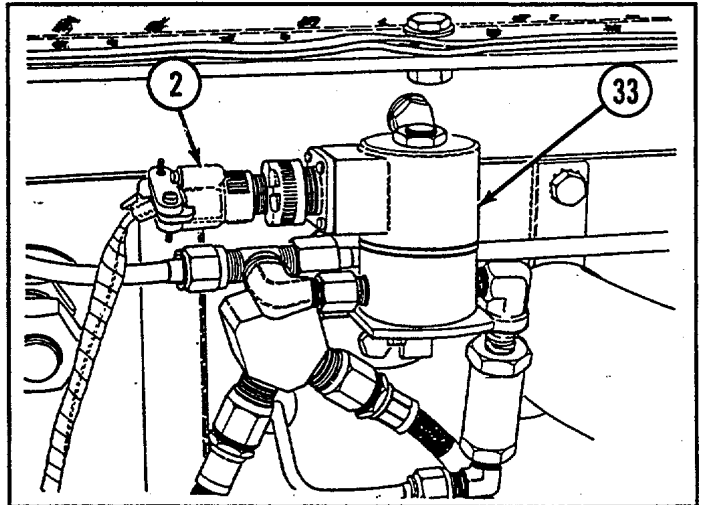
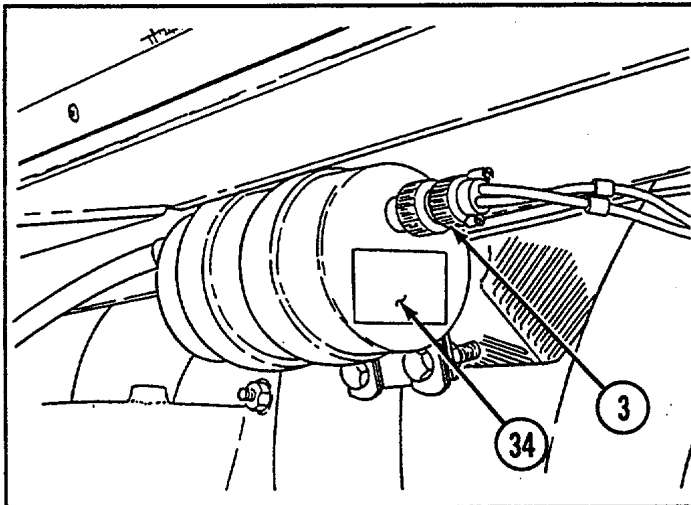
- 18 Connect connector (10) to engine disconnect (41) using four screws (42), four new lockwashers (43), and four nuts (44).
- 19 Connect connectors (6, 11, and 12) to module starter wiring harness (40).
- 20 Install ground lead (5) to engine (36) using screw (37), two new lockwashers (39), and clamp (38).
- 21 Connect connector (4) to module auto water drain (35).



6-59 REPLACE/REPAIR ENGINE WIRING HARNESS (SINGLE VOLTAGE) (11671816)--Continued

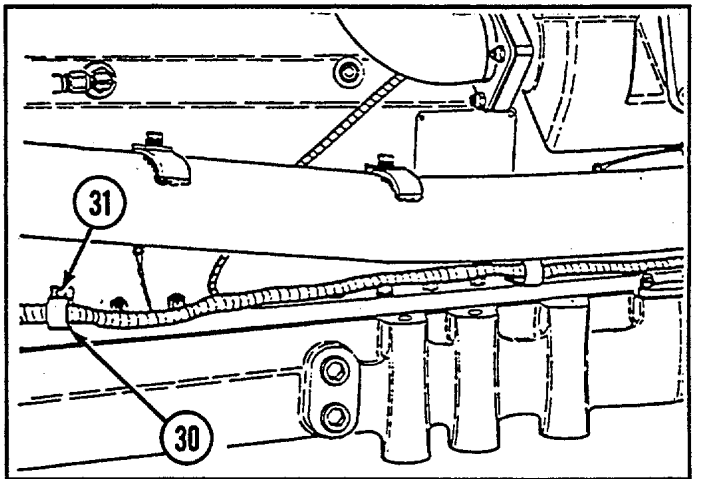
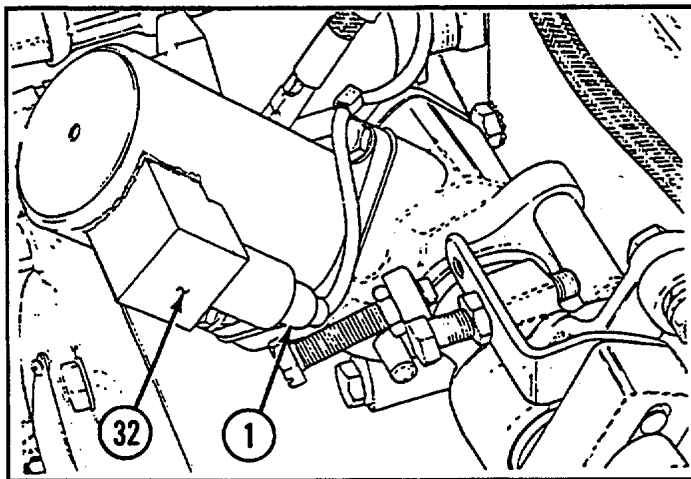
22 Connect connector (3) to right side manifold preheat coil (34).

23 Connect connector (2) to fuel shutoff (33).



24 Connect connector (1) to governor solenoid (32).

25 Install seven clamps (30) using screw (31) for each.



NOTE

Follow-on maintenance: Install powerplant (see paragraph 3-1)

6-60 REPLACE/REPAIR ENGINE DISCONNECT TO PRESSURE SWITCH WIRING HARNESS (12314651)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

Straps (5) (Appendix G, item
267)

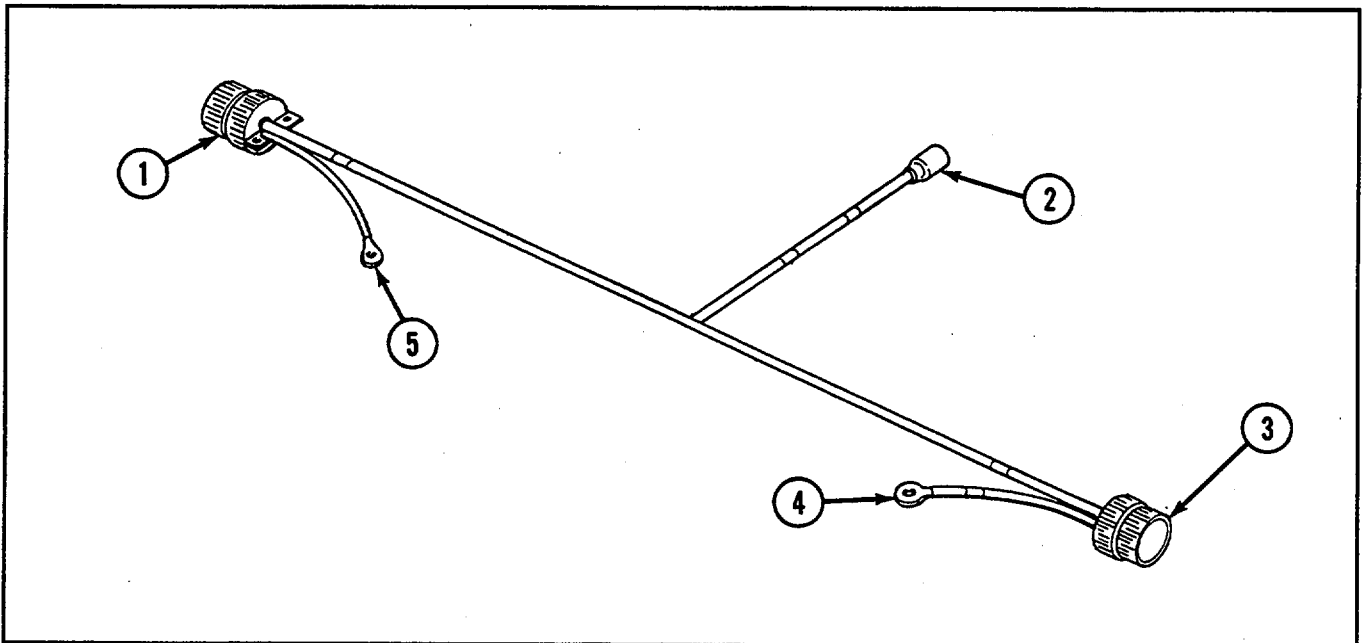
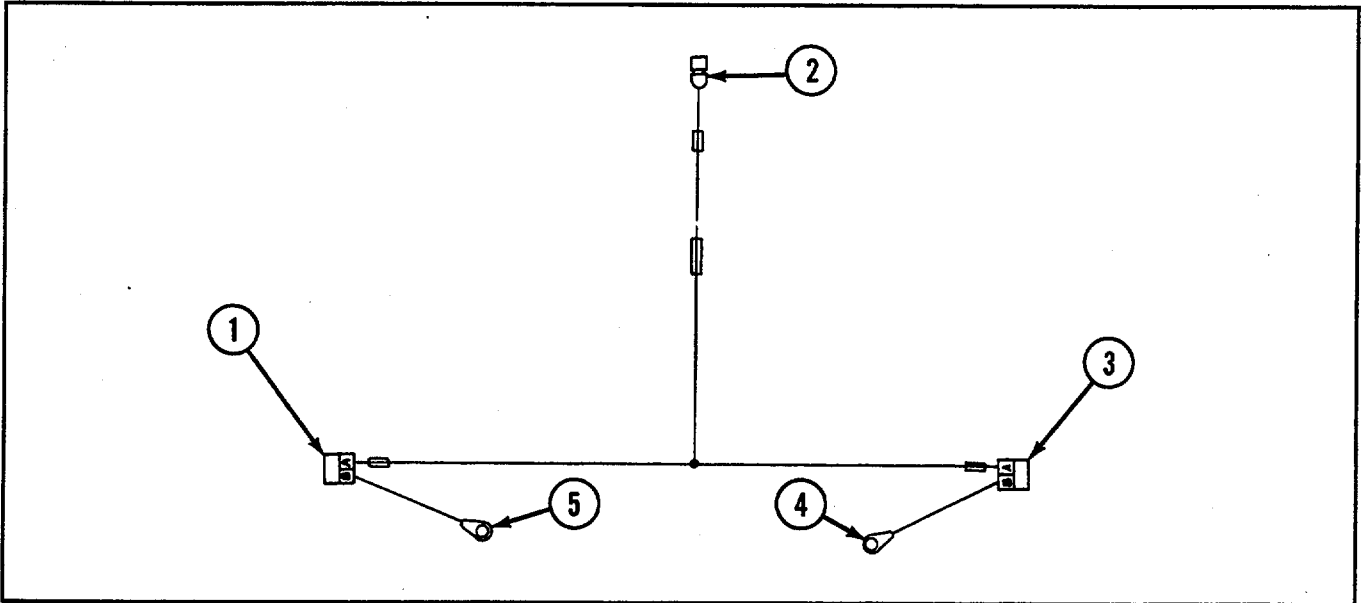
Equipment Condition:

Powerplant removed (see
paragraph 3-1)

WARNING

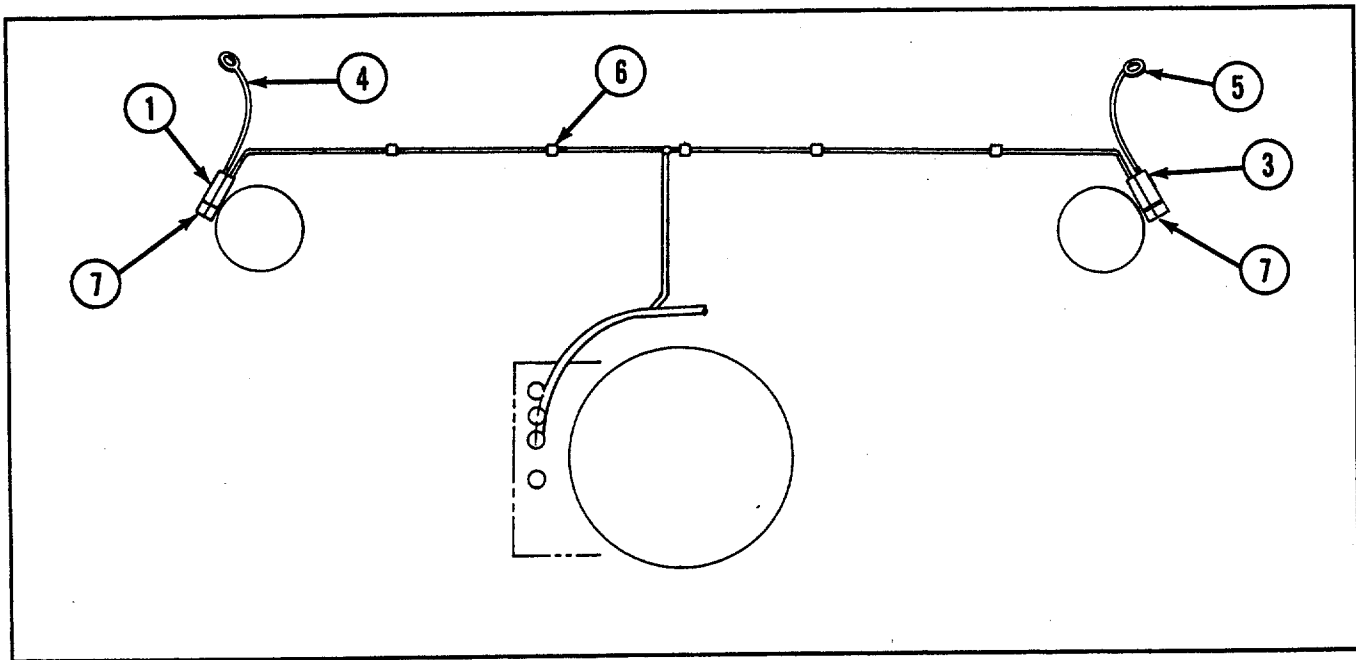
Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Pressure switch	510R, GND
2	Engine disconnect to starter wiring harness	510
3	Pressure switch	510L, GND
4	Ground	GND
5	Ground	GND



6-60 REPLACE/REPAIR ENGINE DISCONNECT TO PRESSURE SWITCH WIRING HARNESS (12314651)-**Continued****a. REMOVAL**

- 1 Remove five straps (6).
- 2 Disconnect two connectors (1 and 3) from two pressure switches (7).
- 3 Disconnect connector (2) from engine disconnect to starter wiring harness (8).
- 4 Disconnect two ground leads (4 and 5).

**b. DISASSEMBLY**

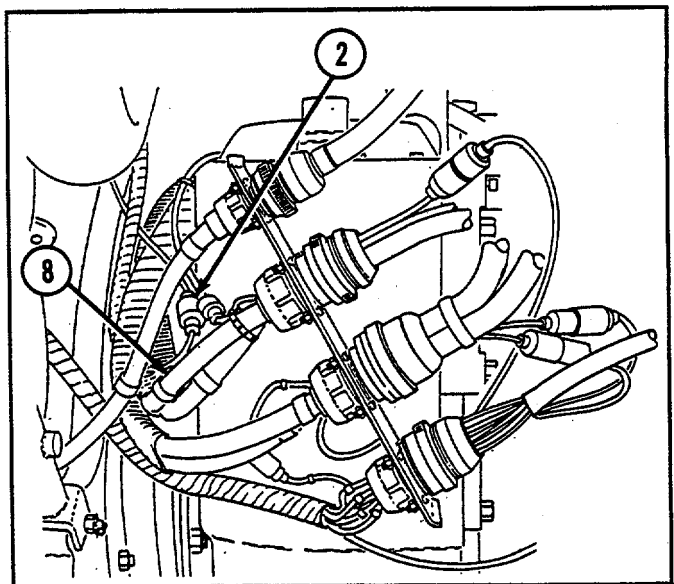
Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect two ground leads (4 and 5).
- 2 Connect connector (2) to engine disconnect to starter wiring harness (8).
- 3 Connect two connectors (1 and 2) to two pressure switches (7).
- 4 Install five new straps (6).

**NOTE**

Follow-on maintenance: Install powerplant (see paragraph 3-1)

6-61 REPLACE/REPAIR ENGINE DISCONNECT TO STARTER WIRING HARNESS (DUAL VOLTAGE) (12314745)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Lockwasher (Appendix G, item 131)
- Lockwashers (4) (Appendix G, item 129)

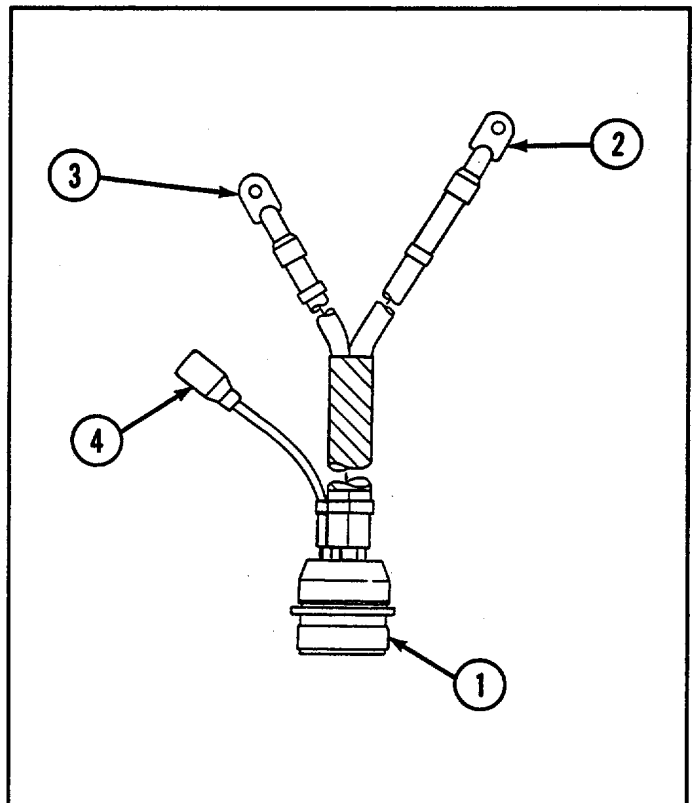
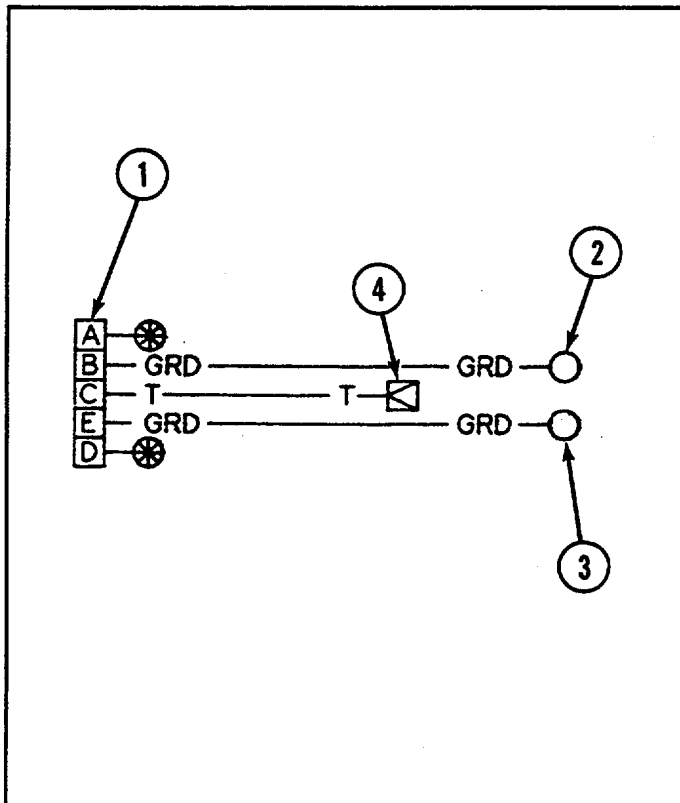
Equipment Condition:

Powerplant removed (see paragraph 3-1)

WARNING

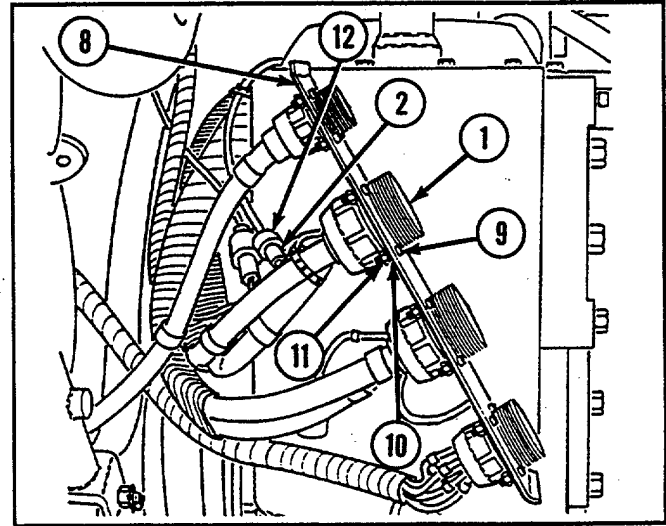
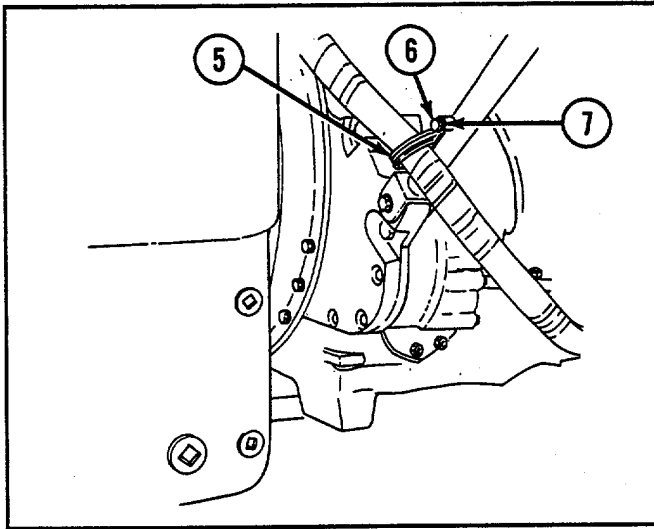
Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Engine disconnect	GND, GND, T
2	Fuel solenoid wiring harness	T
3	Starter	GND
4	Starter	GND

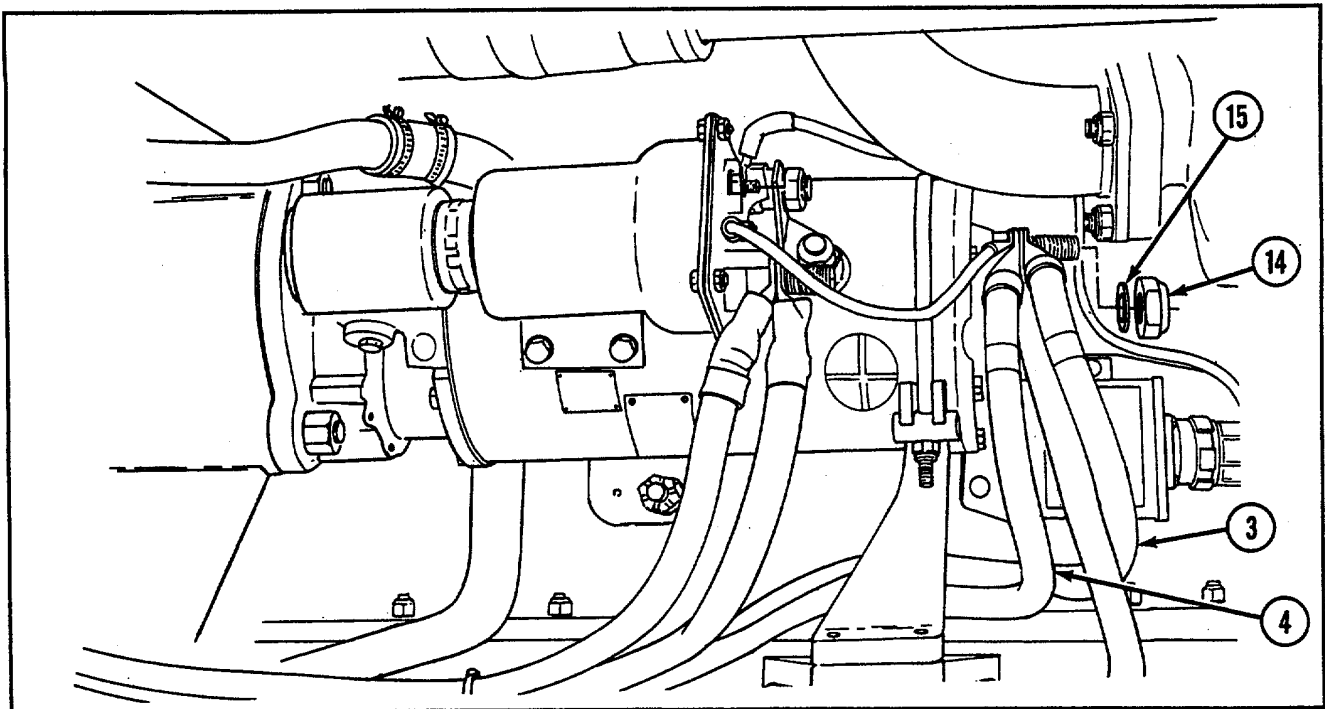


6-61 REPLACE/REPAIR ENGINE DISCONNECT TO STARTER WIRING HARNESS (DUAL VOLTAGE) (12314745)-Continued**a. REMOVAL**

- 1 Remove clamp (5) by removing screw (6) and lockwasher (7).
- 2 Disconnect connector (1) from engine disconnect (8) by removing four screws (9), four lockwashers (10), and four nuts (11).
- 3 Disconnect connector (2) from fuel solenoid wiring harness (12).



- 4 Remove two connectors (3 and 4) from starter (13) by removing nut (14) and lockwasher (15).



b. DISASSEMBLY

Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Install two connectors (3 and 4) to starter (13) using new lockwasher (15) and nut (14).
- 2 Connect connector (2) to fuel solenoid wiring harness (12).
- 3 Connect connector (1) to engine disconnect (8) using four nuts (11), four new lockwashers (10), and four screws (9).
- 4 Install clamp (5) using new lockwasher (7) and screw (6).

NOTE

Follow-on maintenance: Install powerplant (see paragraph 3-1)

6-62 REPLACE/REPAIR ENGINE DISCONNECT TO ENGINE GENERATOR RELAY LEAD (SINGLE VOLTAGE) (11671362)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's (Appendix C, item 53)

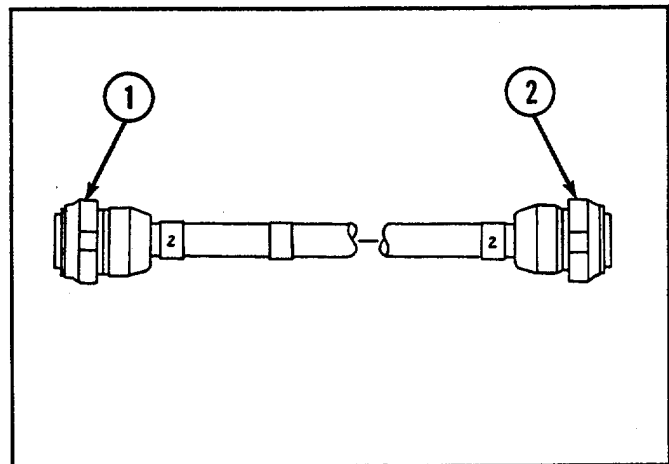
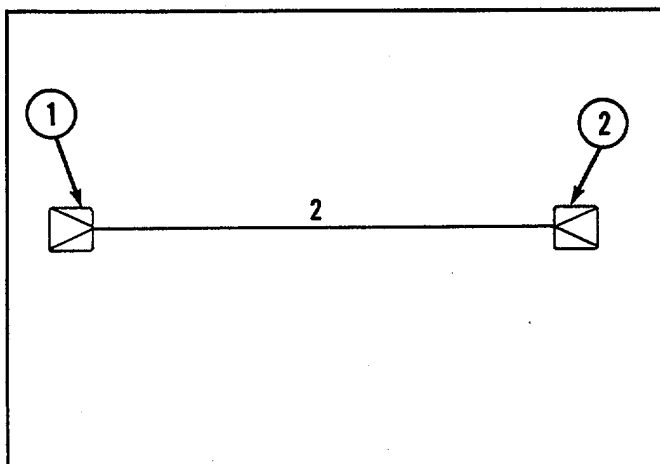
Equipment Condition:

Engine deck removed (see paragraph 9-51)

WARNING

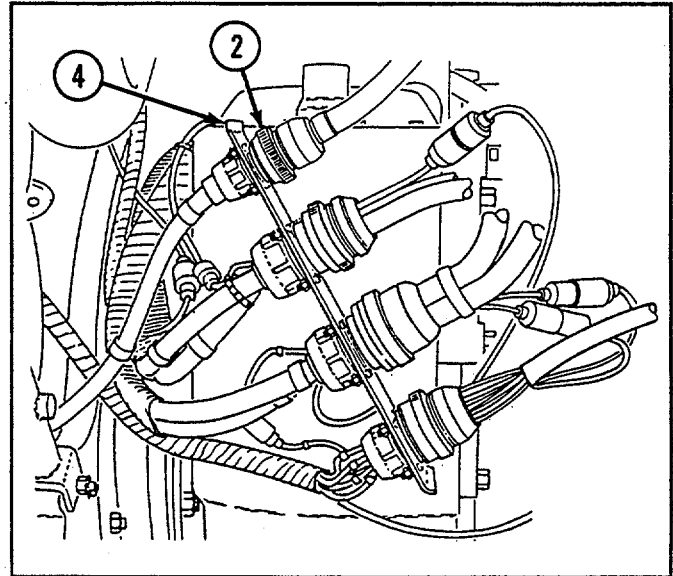
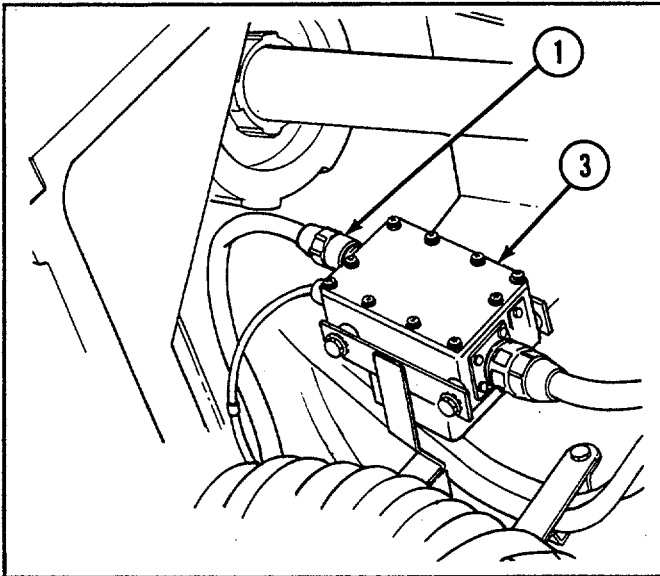
Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Main engine generator relay	2
2	Engine disconnect	2



6-62 REPLACE/REPAIR ENGINE DISCONNECT TO ENGINE GENERATOR RELAY LEAD (SINGLE VOLTAGE) (11671362)--Continued**a. REMOVAL**

- 1 Disconnect connector (1) from main engine generator relay (3).
- 2 Disconnect connector (2) from engine disconnect (4).

**b. DISASSEMBLY**

Disassemble lead assembly (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble lead assembly (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect connector (2) to engine disconnect (4).
- 2 Connect connector (1) to main engine generator relay (3).

NOTE

Follow-on maintenance: Install engine deck (see paragraph 9-51)

6-63 REPLACE/REPAIR ENGINE DISCONNECT GROUND LEAD ASSEMBLY (12322589)**THIS TASK COVERS**

- | | | | |
|------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
|------------|----------------|-------------|-----------------|

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

Lockwashers (4) (Appendix G,
item 116)

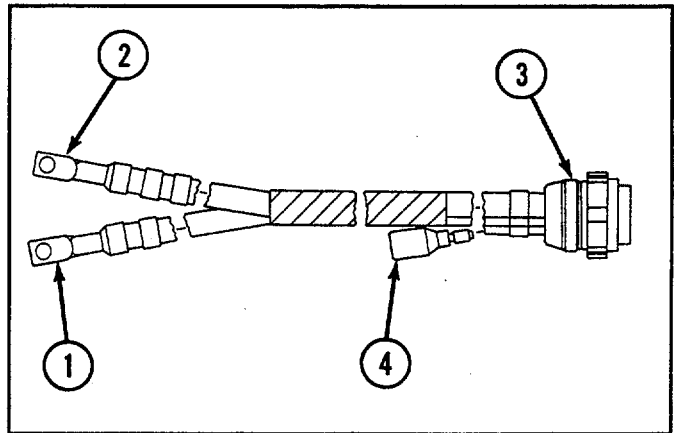
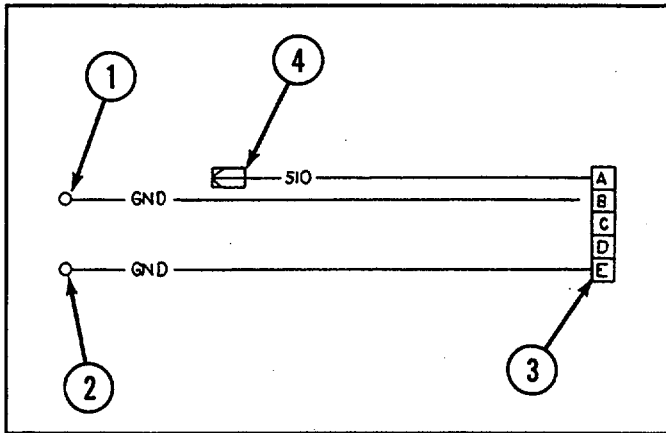
Equipment Condition:

Engine deck removed (see
paragraph 9-51)

WARNING

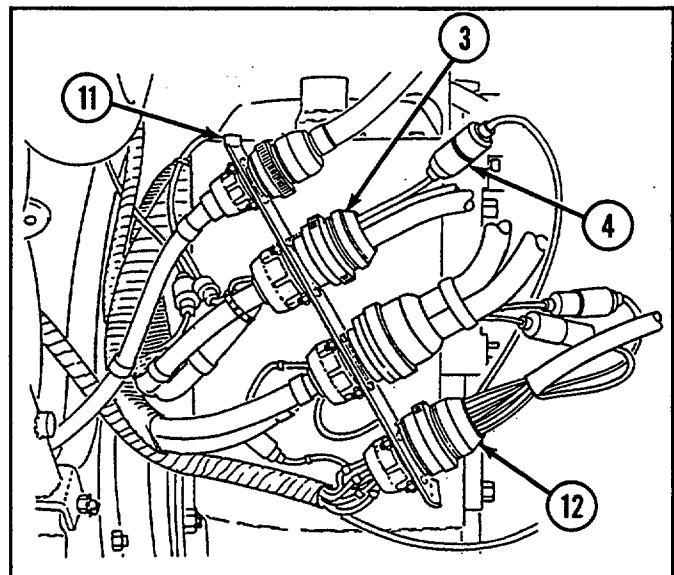
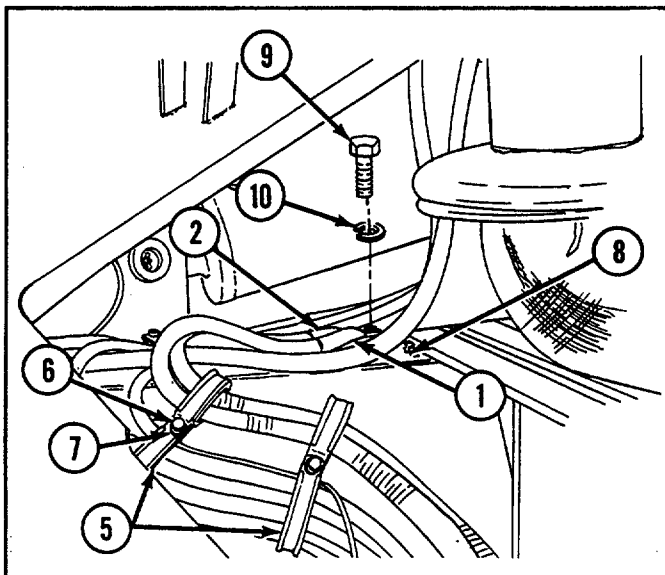
Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Ground	GND
2	Ground	GND
3	Engine disconnect	510, GND, GND
4	Bulkhead to main engine bracket and rear fuel tank transmitter wiring harness	510



a. REMOVAL

- 1 Remove two clamps (5) by removing screw (6) and lockwasher (7) from each.
- 2 Remove two ground leads (1 and 2) from hull (8) by removing screw (9) and two lockwashers (10).
- 3 Disconnect connector (3) from engine disconnect (11).
- 4 Disconnect connector (4) from bulkhead to main engine bracket and rear fuel tank transmitter wiring harness (12).



6-63 REPLACE/REPAIR ENGINE DISCONNECT GROUND LEAD ASSEMBLY (12322589)--Continued

b. DISASSEMBLY

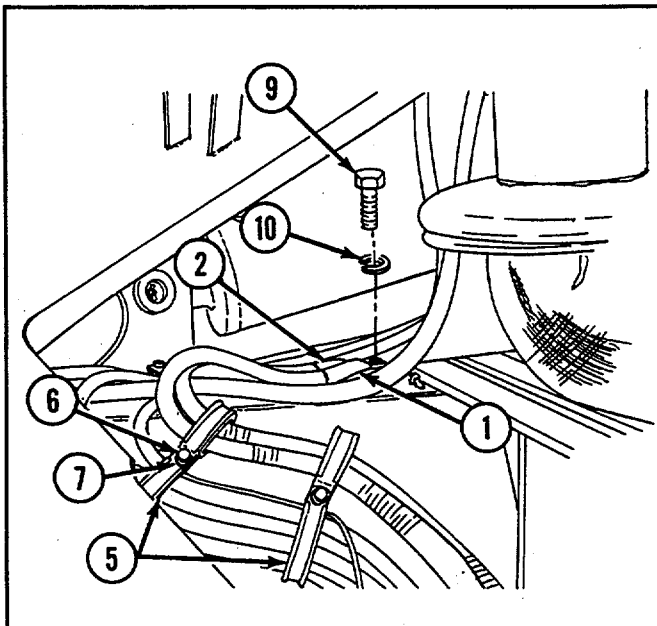
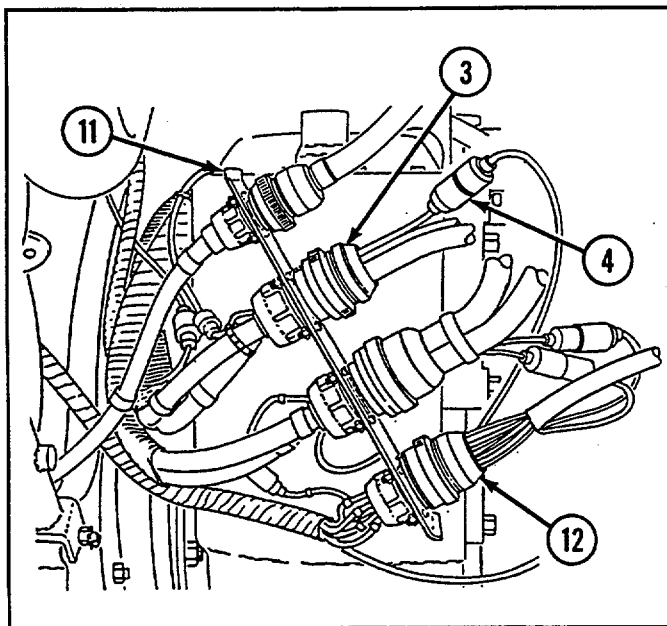
Disassemble lead assembly (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble lead assembly (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect connector (4) to bulkhead to main engine bracket and rear fuel tank transmitter wiring harness (12).
- 2 Connect connector (3) to engine disconnect (11).
- 3 Install two ground leads (1 and 2) to hull (8) with two new lockwashers (10) and screw (9).
- 4 Install two clamps (5) with new lockwasher (7) and screw (6) to each.



NOTE

Follow-on maintenance: Install engine deck (see paragraph 9-51)

6-64 REPLACE/REPAIR HEADLIGHT BASE WIRING HARNESS AND RELATED PARTS (7972352)

THIS TASK COVERS

- | | | | |
|------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
|------------|----------------|-------------|-----------------|

INITIAL SET-UP

Tools:
Tool kit, general mechanic's (Appendix C, item 53)

Parts:

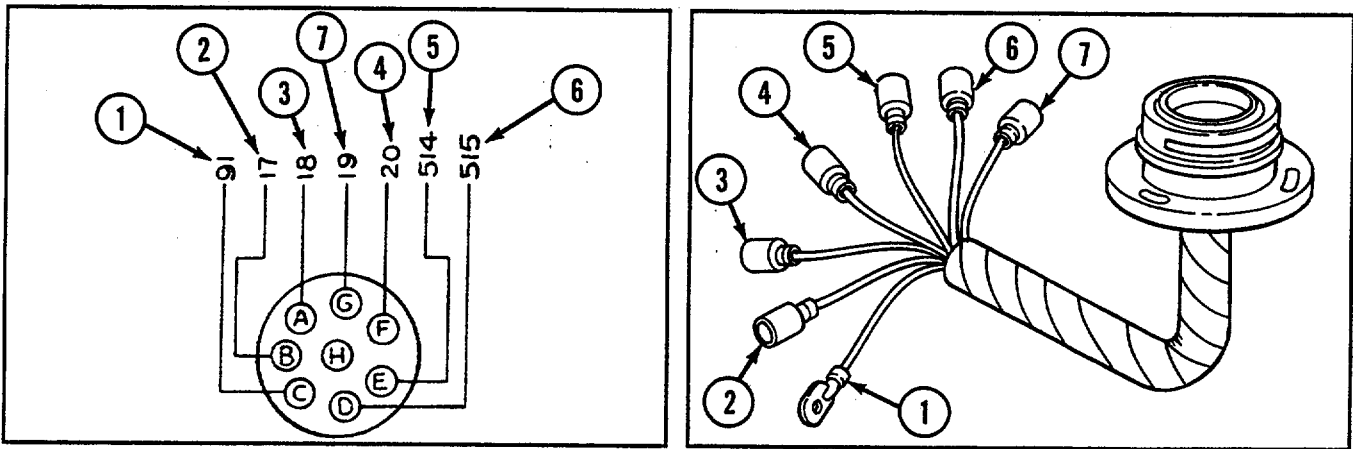
- Lockwashers (2) (Appendix G, item 113)
- Lockwashers (3) (Appendix G, item 130)

Equipment Condition:
Headlight removed (see paragraph 6-26)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

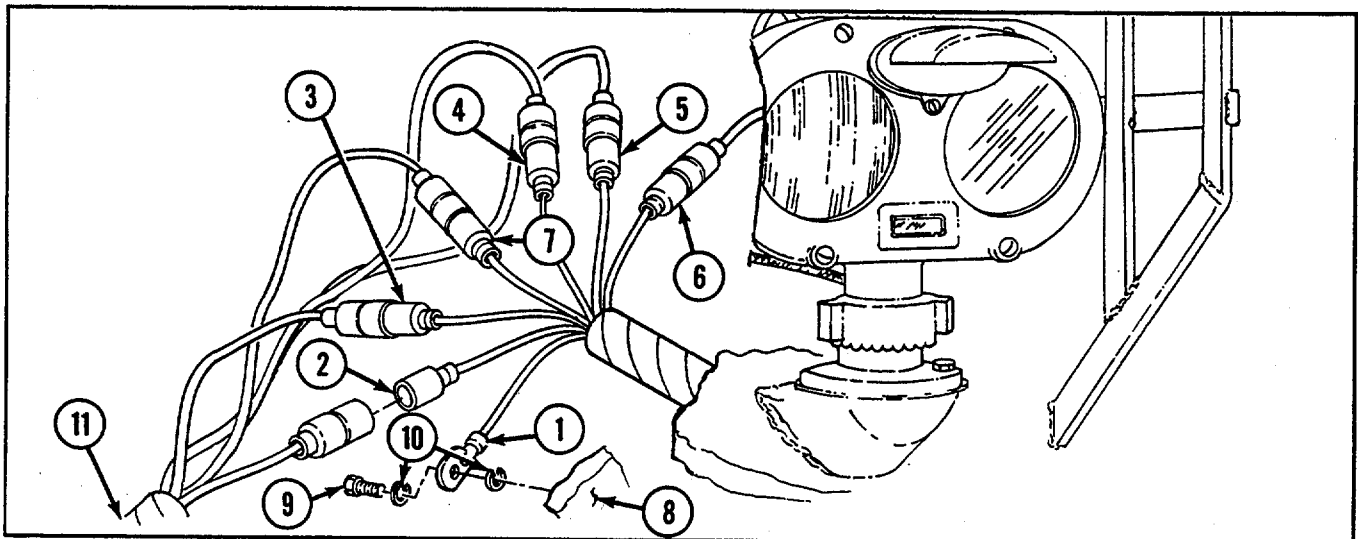
Connector No.	Electrical Lead To:	Wire No.
1	Ground	91
2	Headlight and dimmer switch wiring harness	17
3	Headlight and dimmer switch wiring harness	18
4	Headlight and dimmer switch wiring harness	20
5	Headlight and dimmer switch wiring harness	514
6	Headlight and dimmer switch wiring harness	515
7	Dimmer switch wiring harness	19

**NOTE**

Removal and installation procedures are the same for both left and right headlight assemblies. Left side shown.

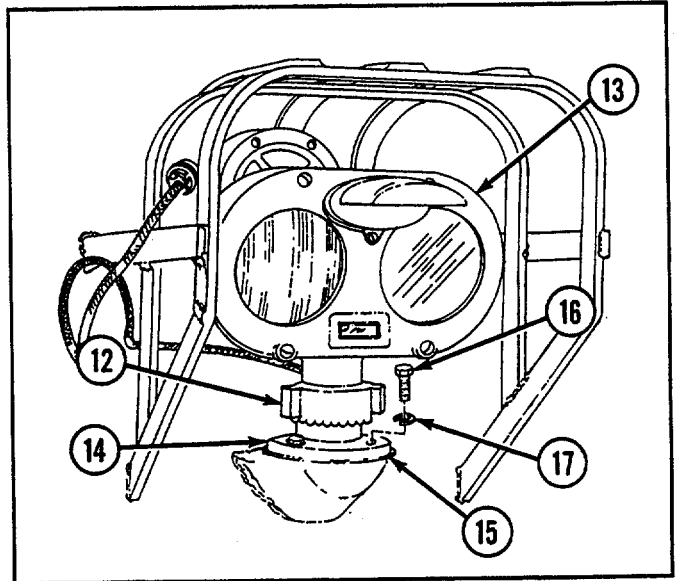
a. REMOVAL

- 1 Remove ground lead (1) from hull (8) by removing screw (9) and two lockwashers (10).
- 2 Disconnect connectors (2 through 7) from headlight and dimmer switch wiring harness (11).



6-64 REPLACE/REPAIR HEADLIGHT BASE WIRING HARNESS AND RELATED PARTS (7972352)-Continued

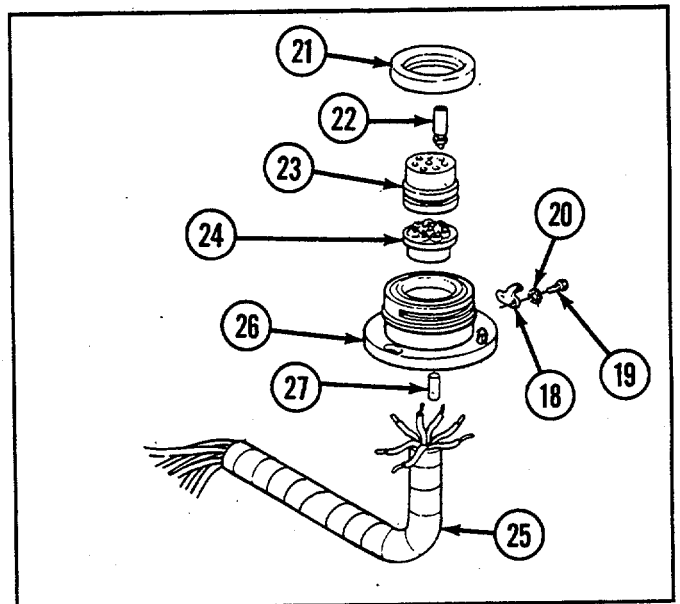
- 3 Loosen adjustment nut (12) and remove headlight assembly (13).
- 4 Remove headlight base assembly (14) and gasket (15) by removing three screws (16) and three lockwashers (17).

**b. DISASSEMBLY**

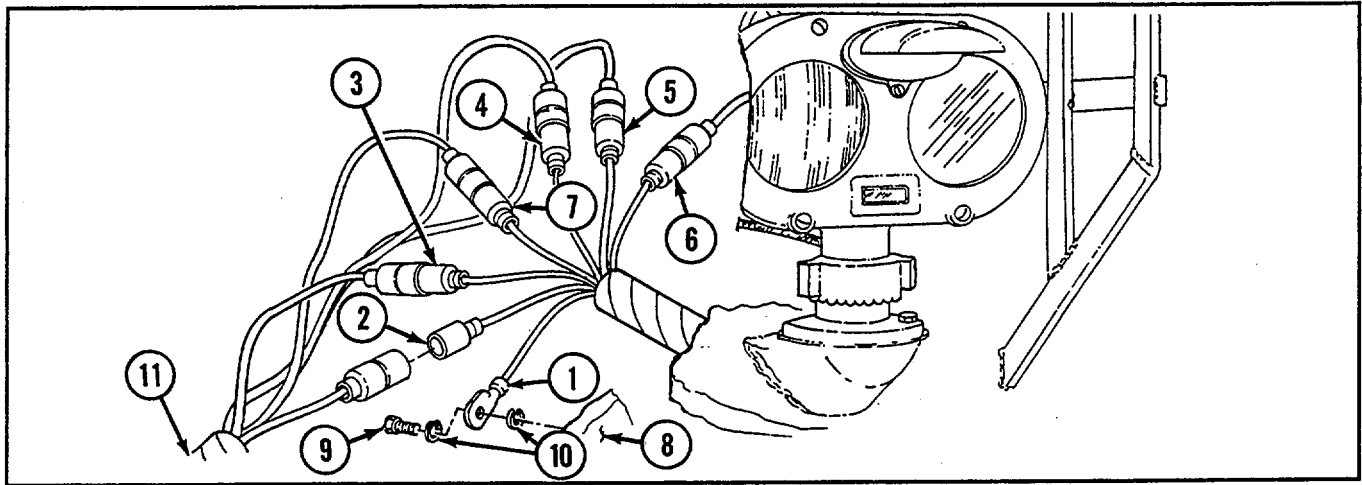
- 1 Remove clip (18) by removing two screws (19) and two lockwashers (20).
- 2 Remove seal (21), seven electrical contacts (22), electrical insert (23), bushing (24), and lead assembly (25) from base (26).
- 3 Remove rod (27) from bushing (24).
- 4 Disassemble lead assembly (see Chapter 6, Section VII).

c. ASSEMBLY

- 1 Assemble lead assembly (see Chapter 6, Section VII).
- 2 Install rod (27) to bushing (24).
- 3 Install lead assembly (25), bushing (24), electrical insert (23), seven electrical contacts (22), and seal (21) to base (26).
- 4 Install clip (18) using two new lockwashers (20) and two screws (19).

**d. INSTALLATION**

- 1 Install headlight base assembly (14) and gasket (15) using three new lockwashers (17) and three screws (16).
- 2 Install headlight assembly (13) by tightening adjustment nut (12).
- 3 Connect connectors (2 through 7) to headlight and dimmer switch wiring harness (11).
- 4 Install ground lead (1) to hull (8) using two new lockwashers (10) and screw (9).

**NOTE**

Follow-on maintenance: Install headlight (see paragraph 6-26)

6-65 REPLACE/REPAIR HEADLIGHT AND DIMMER SWITCH WIRING HARNESS (10866950)**THIS TASK COVERS**

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

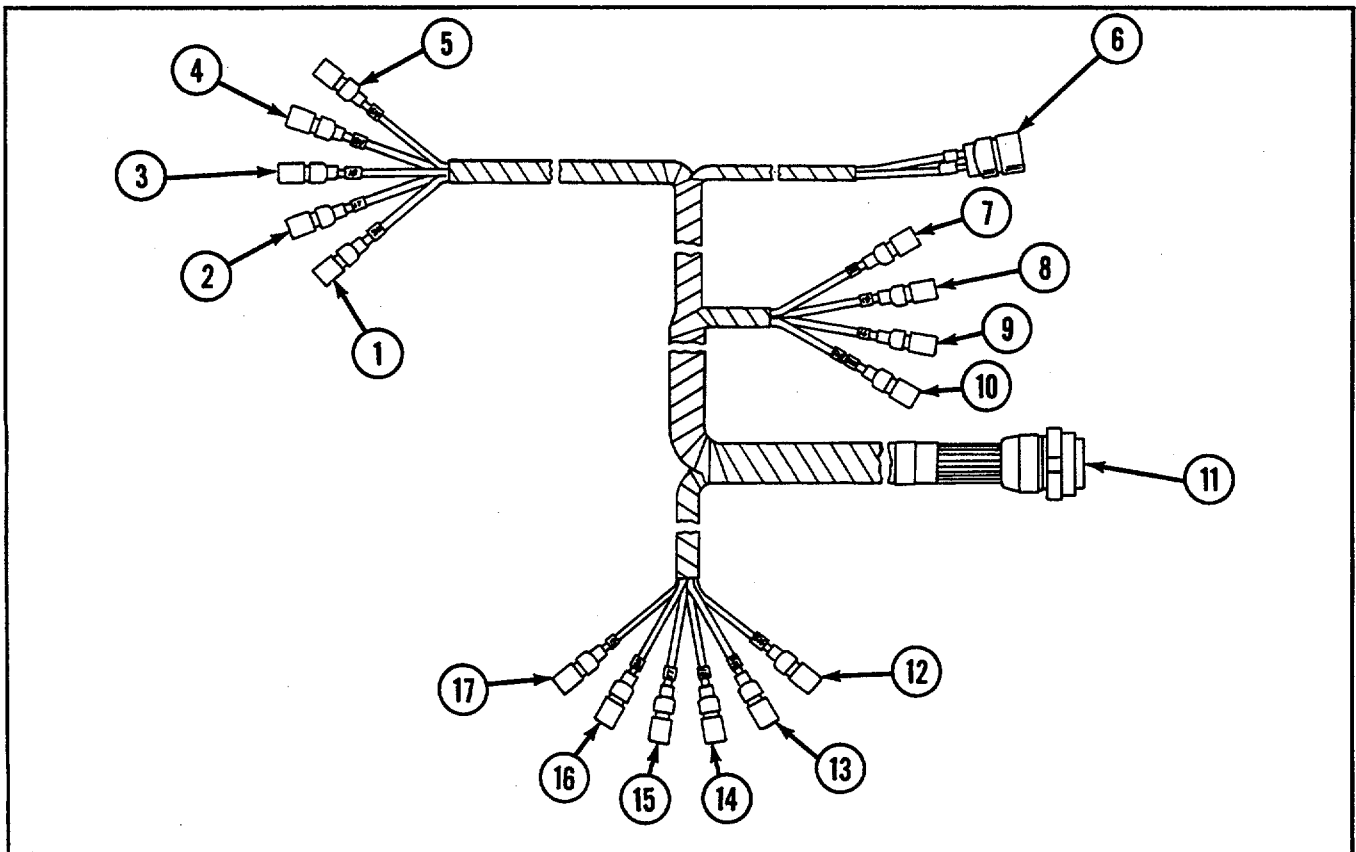
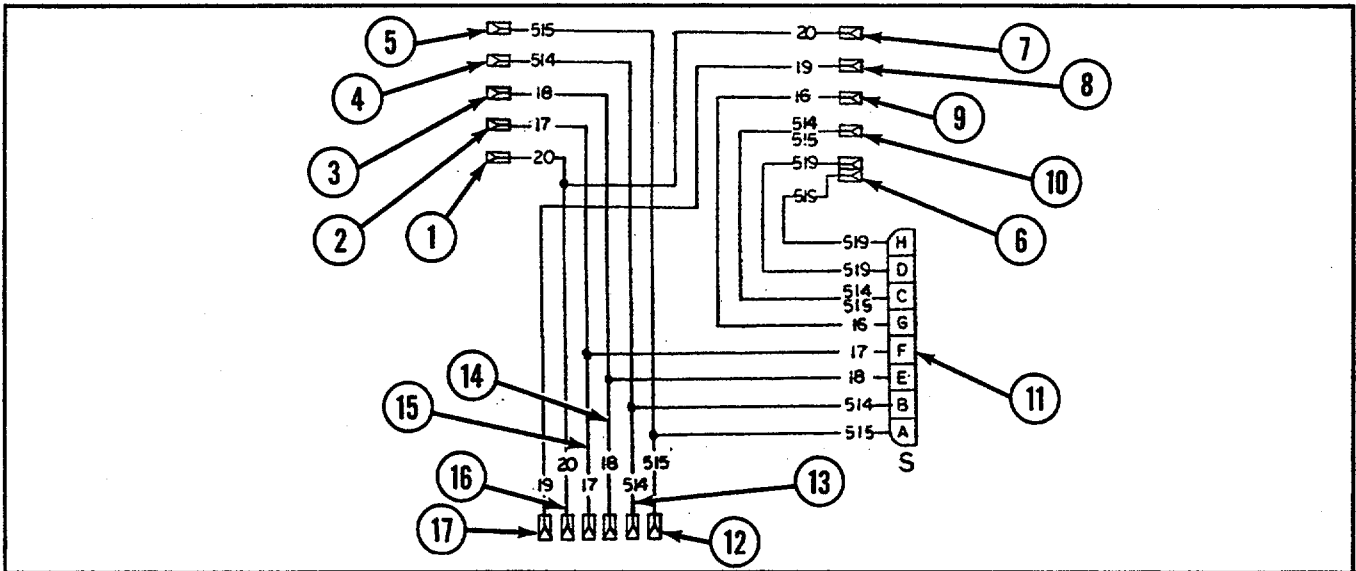
Lockwashers (7) (Appendix G, item 116)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

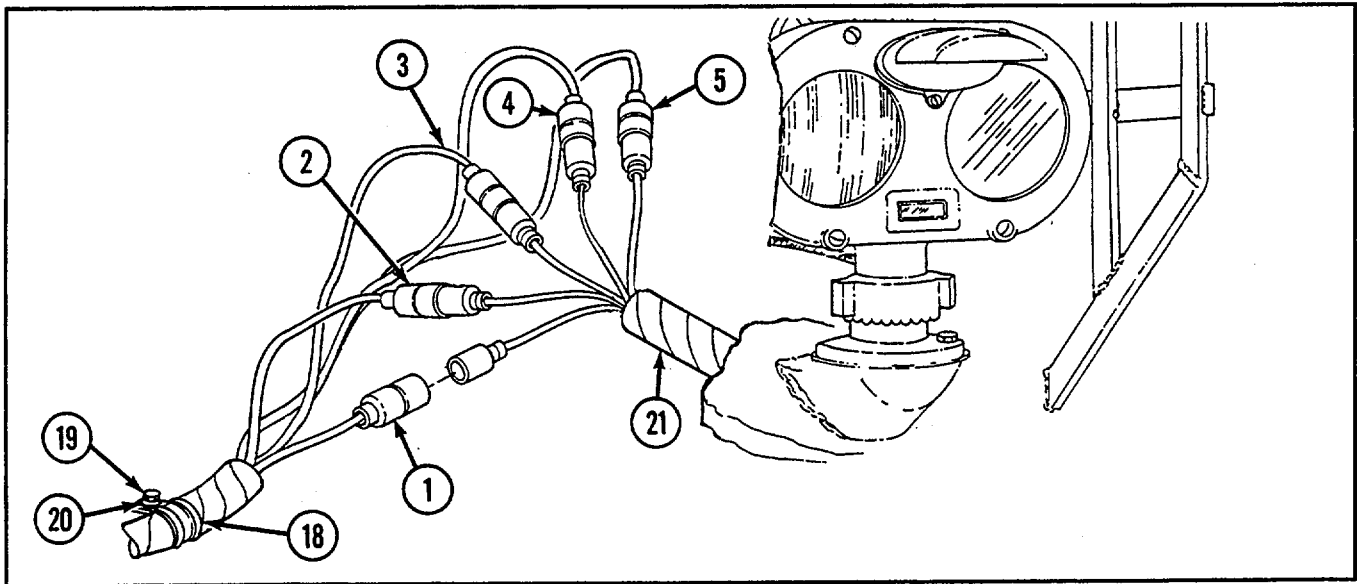
Connector No.	Electrical Lead To:	Wire No.
1	Right hand headlight base wiring harness	20
2	Right hand headlight base wiring harness	17
3	Right hand headlight base wiring harness	18
4	Right hand headlight base wiring harness	514
5	Right hand headlight base wiring harness	515
6	High beam indicator lamp	519, 519
7	Switch panel to head lamps and bulkhead wiring harness	20
8	Switch panel to gage panel and miscellaneous switches wiring harness (11671795)	19
9	Switch panel to gage panel and miscellaneous switches wiring harness (11671795)	16
10	Switch panel to gage panel and miscellaneous switches wiring harness (11671795)	514/515
11	Dimmer switch	519, 519, 514/515, 16, 17, 18, 514, 515
12	Left hand headlight base wiring harness	515
13	Left hand headlight base wiring harness	514
14	Left hand headlight base wiring harness	18
15	Left hand headlight base wiring harness	17
16	Left hand headlight base wiring harness	20
17	Left hand headlight base wiring harness	19

6-65 REPLACE/REPAIR HEADLIGHT AND DIMMER SWITCH WIRING HARNESS (10866950)--Continued

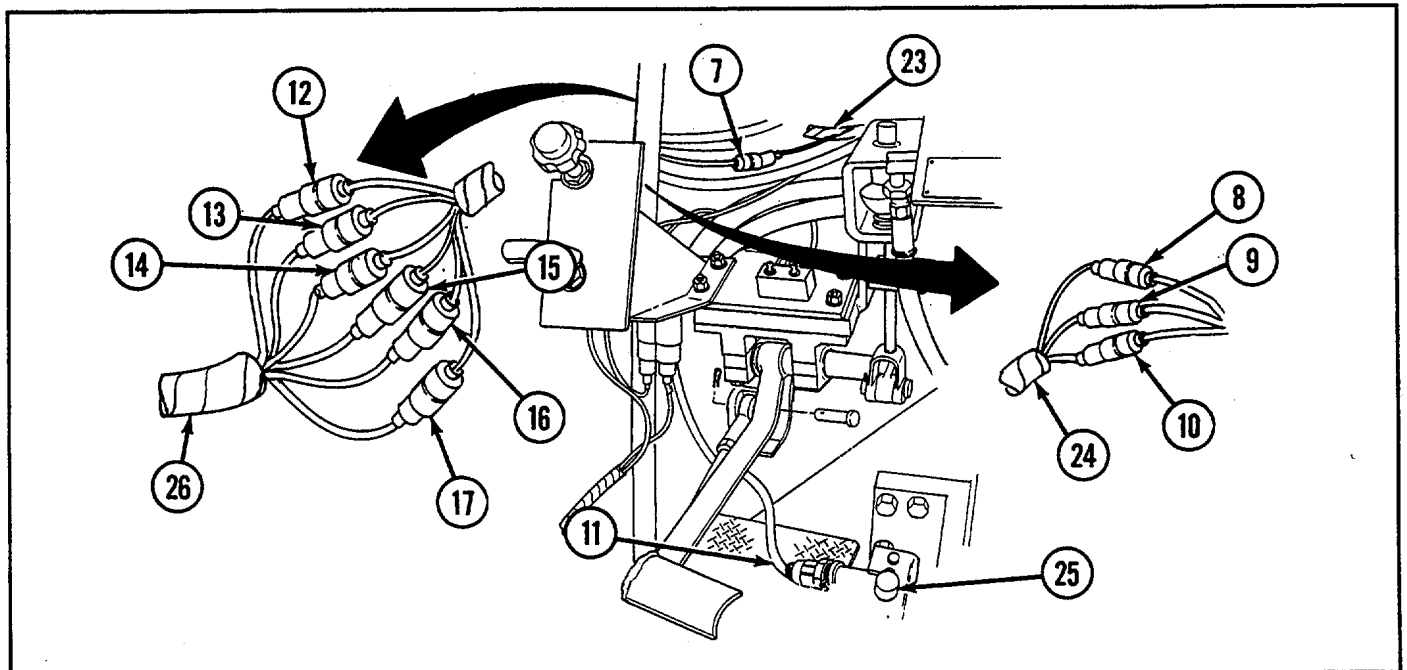
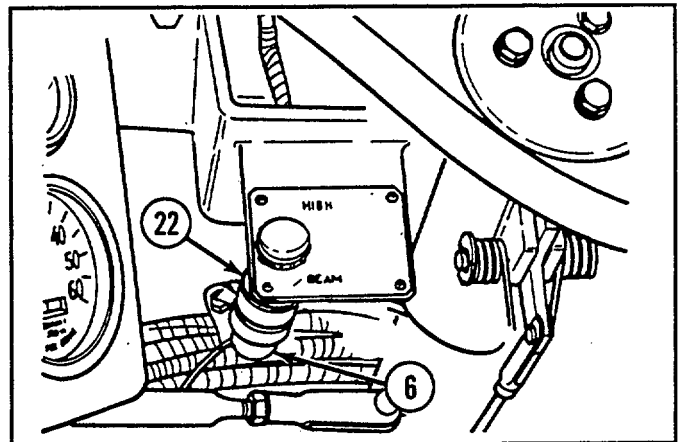


a. REMOVAL

- 1 Remove seven clamps (18) by removing screw (19) and lockwasher (20) from each.
- 2 Disconnect connectors (1 through 5) from right headlight base wiring harness (21).



- 3 Disconnect connector (6) from high beam indicator lamp (22).
- 4 Disconnect connector (7) from switch panel to head lamps and bulkhead wiring harness (23).
- 5 Disconnect connectors (8 through 10) from switch panel to gage panel and miscellaneous switches wiring harness (24).
- 6 Disconnect connector (11) from dimmer switch (25).
- 7 Disconnect connectors (12 through 17) from left headlight base wiring harness (26).



6-65 REPLACE/REPAIR HEADLIGHT AND DIMMER SWITCH WIRING HARNESS (10866950)--Continued**b. DISASSEMBLY**

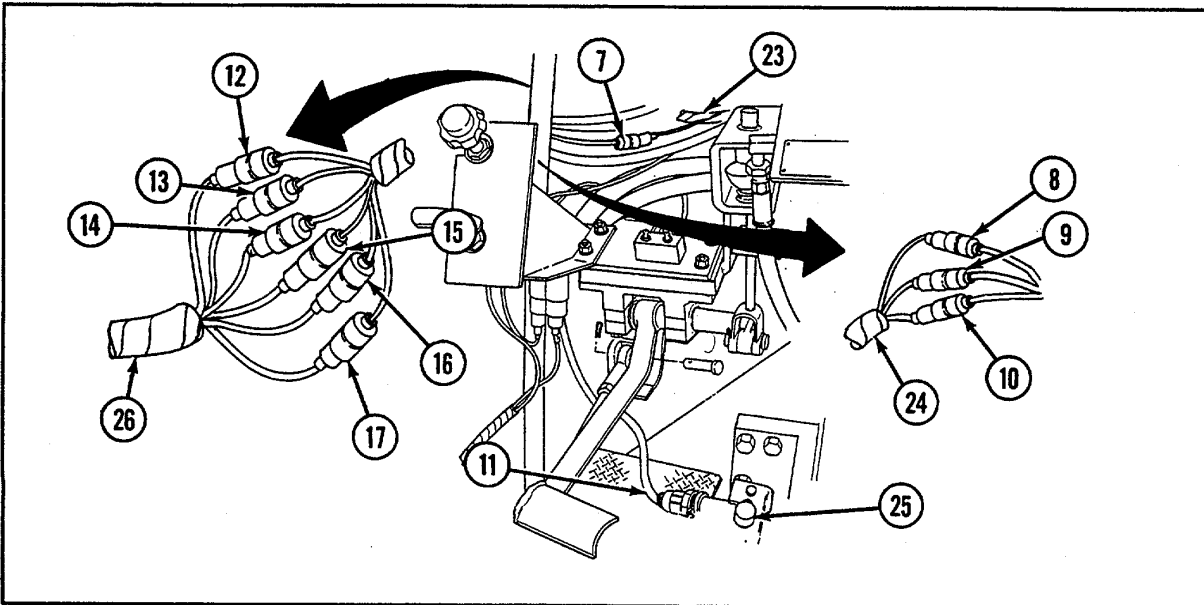
Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

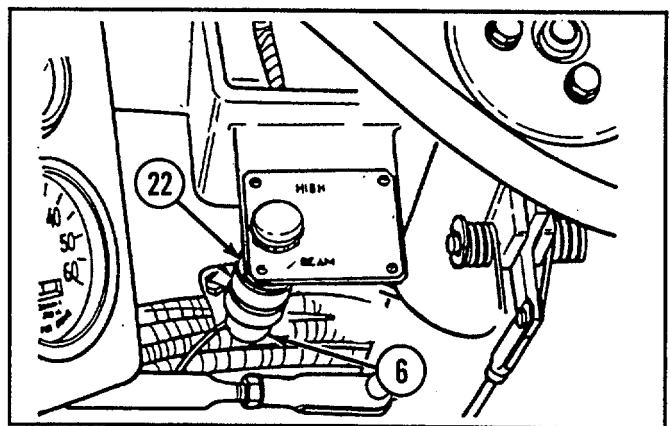
Assemble wiring harness (see Chapter 6, Section VII).

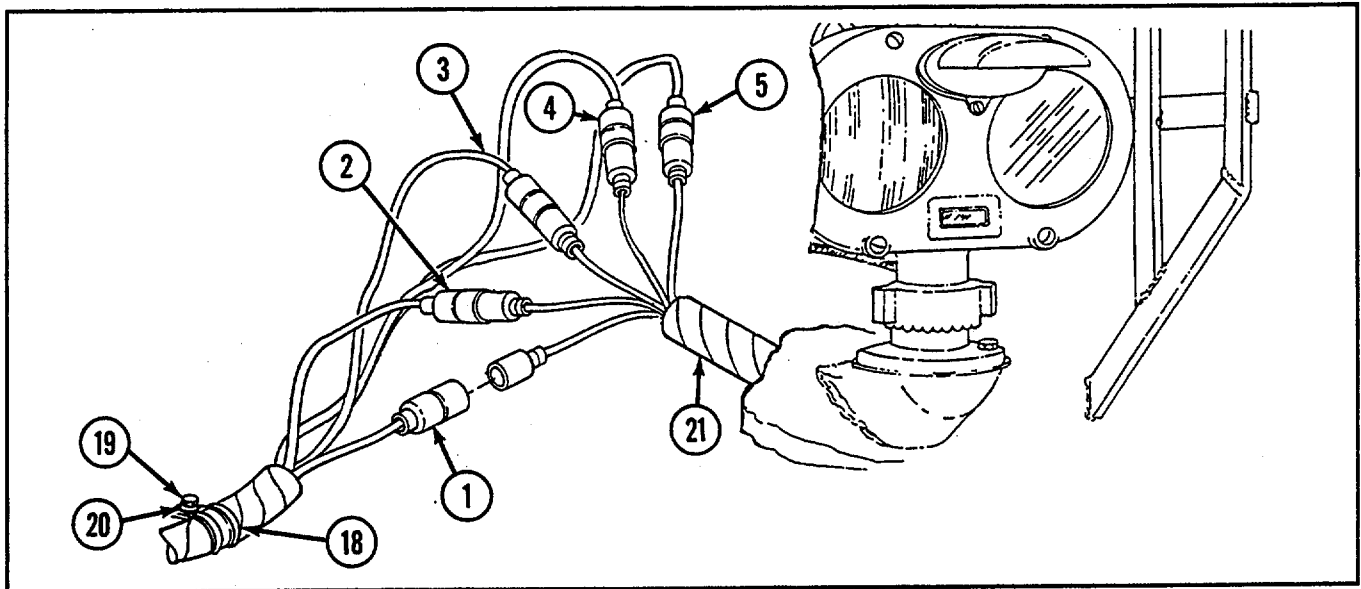
d. INSTALLATION

- 1 Connect connectors (12 through 17) to left headlight base wiring harness (26).
- 2 Connect connector (11) to dimmer switch (25).
- 3 Connect connectors (8 through 10) to switch panel to gage panel and miscellaneous switches wiring harness (24).
- 4 Connect connector (7) to switch panel to head lamps and bulkhead wiring harness (23).



- 5 Connect connector (6) to high beam indicator lamp (22).
- 6 Connect connectors (1 through 5) to right headlight base wiring harness (21).
- 7 Install seven clamps (18) using screw (19) and new lockwasher (20) for each.





6-66 REPLACE/REPAIR RED FLASHER BREAKER TO SWITCH WIRING HARNESS(11672371)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

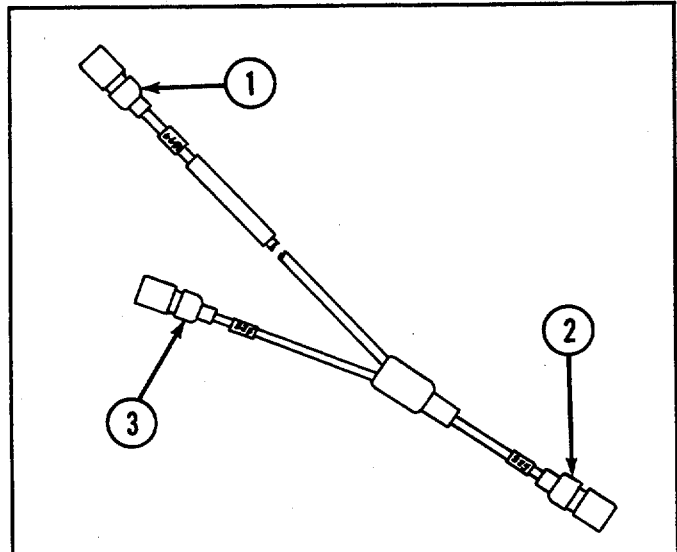
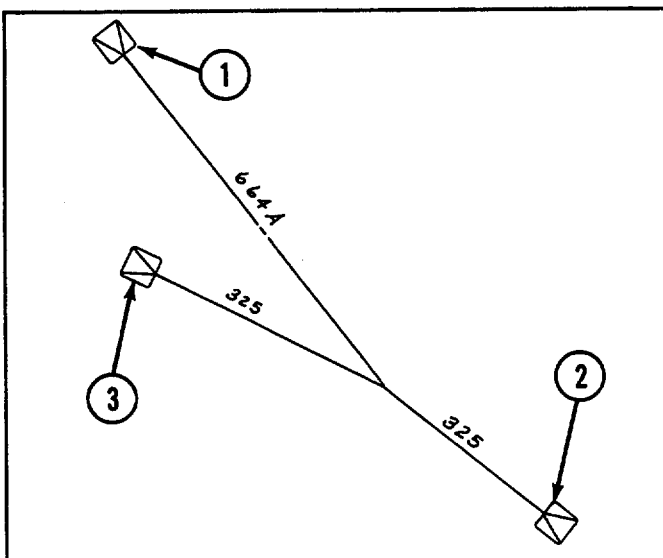
Tools:

Tool kit, general mechanic's (Appendix C, item 53)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Hydraulic oil temperature indicator	664A
2	Flasher switch	325
3	Circuit breaker	325



6-66 REPLACE/REPAIR RED FLASHER BREAKER TO SWITCH WIRING HARNESS (11672371)--Continued

a. REMOVAL

- 1 Disconnect connector (1) from hydraulic oil temperature indicator (4).
- 2 Disconnect connector (2) from flasher switch (5).
- 3 Disconnect connector (3) from circuit breaker (6).

b. DISASSEMBLY

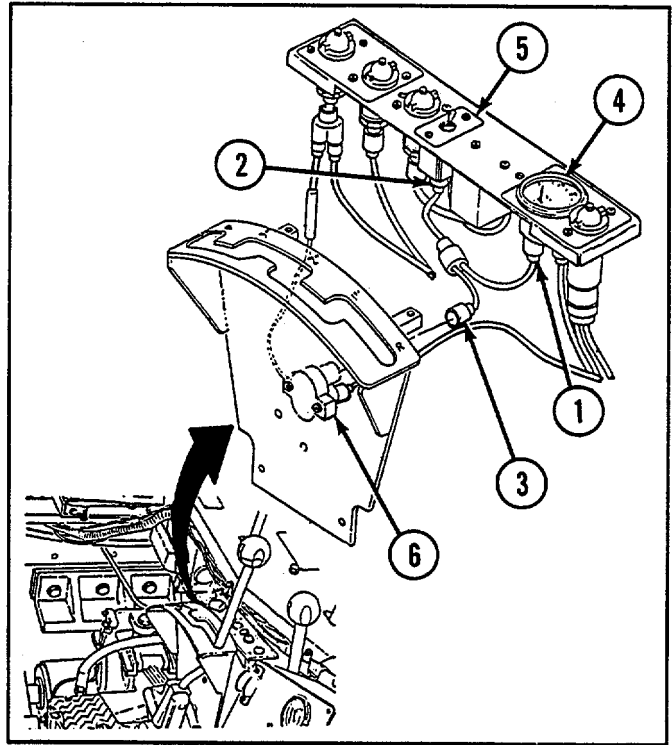
Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect connector (3) to circuit breaker (6).
- 2 Connect connector (2) to flasher switch (5).
- 3 Connect connector (1) to hydraulic oil temperature indicator (4).



6-67 REPLACE/REPAIR TURN SIGNAL FLASHER WIRING HARNESS (11672273)

THIS TASK COVERS

- a. Removal
- b. Disassembly
- c. Assembly
- d. Installation

INITIAL SET-UP

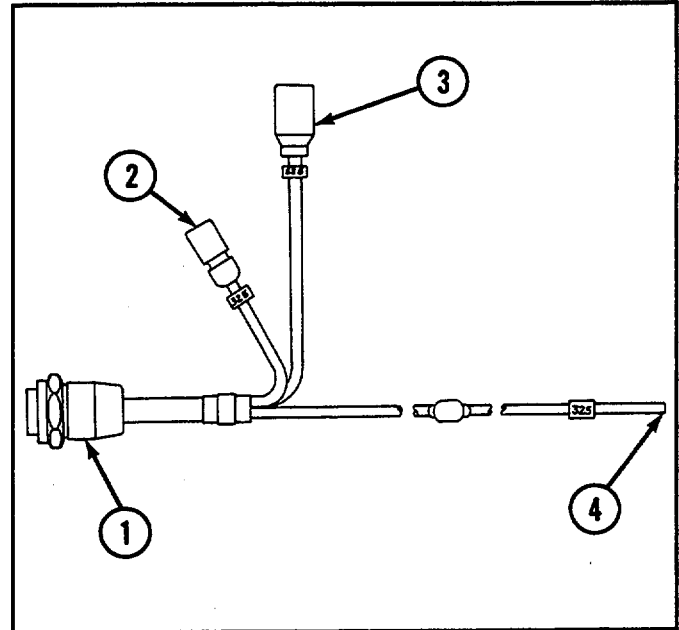
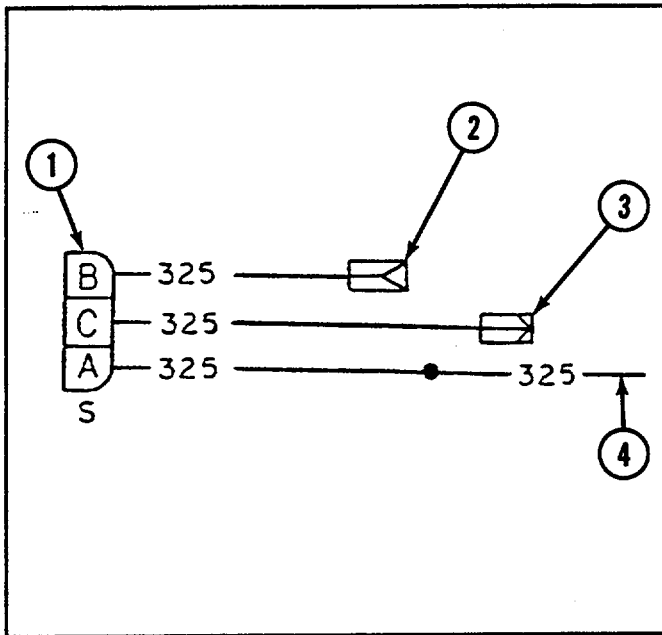
Tools:
Tool kit, general mechanic's (Appendix C, item 53)

Parts:
Lockwashers (8) (Appendix G, item 116)

WARNING

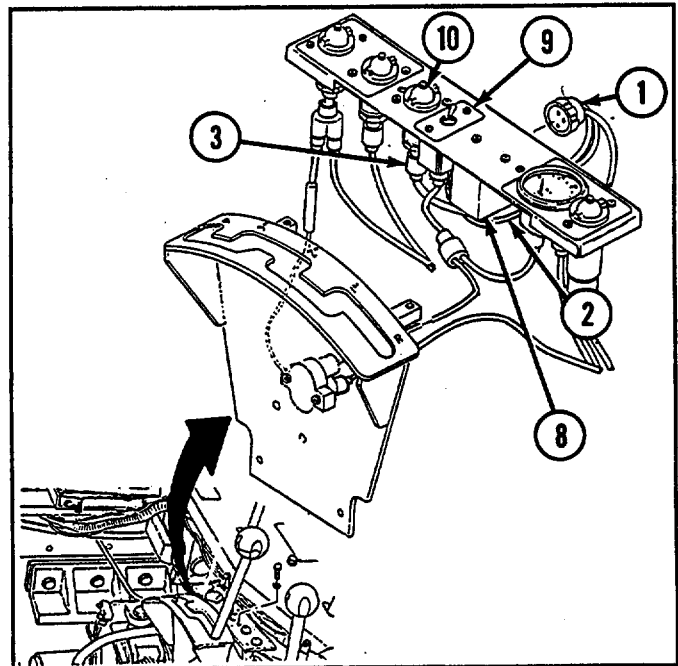
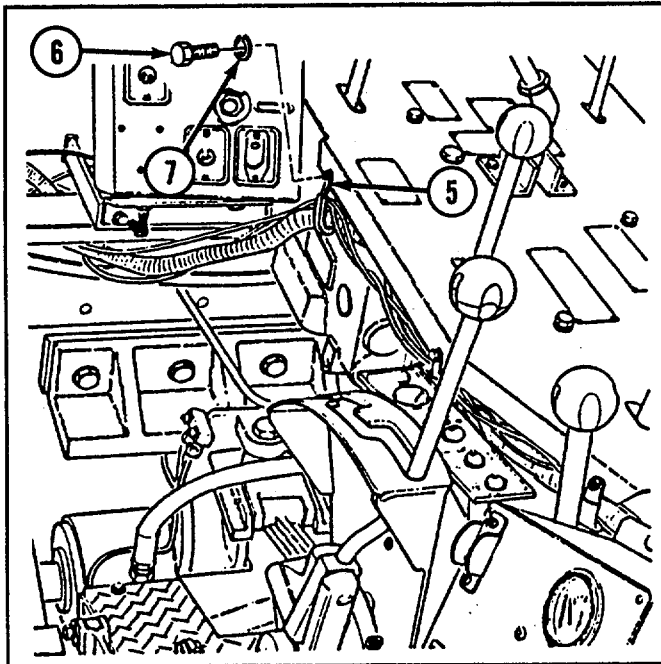
Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Thermal flasher	325
2	Flasher switch	325
3	Flasher light	325
4	Front signal light	325



a. REMOVAL

- 1 Remove eight clamps (5) by removing screw (6) and lockwasher (7) from each.
- 2 Disconnect connector (1) from thermal flasher (8).
- 3 Disconnect connector (2) from flasher switch (9).
- 4 Disconnect connector (3) from flasher light (10).



6-67 REPLACE/REPAIR TURN SIGNAL FLASHER WIRING HARNESS (11672273)--Continued

5 Disconnect connector (4) from front signal light (11).

b. DISASSEMBLY

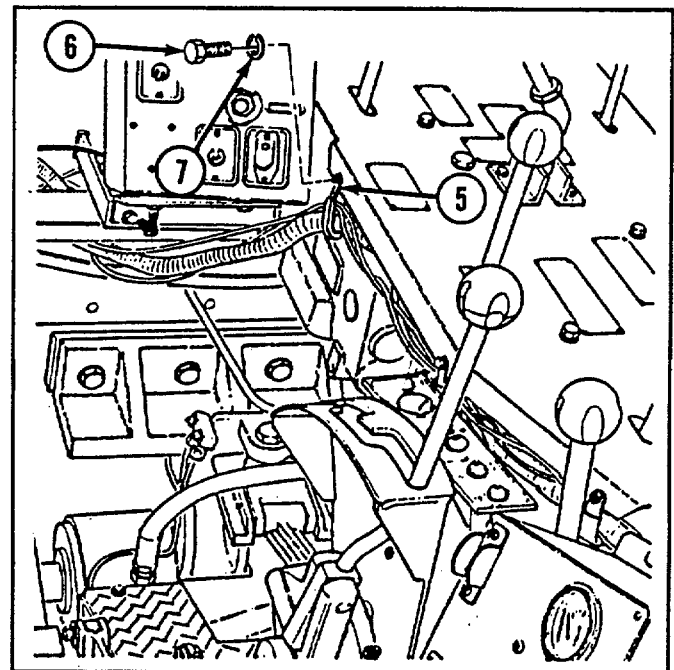
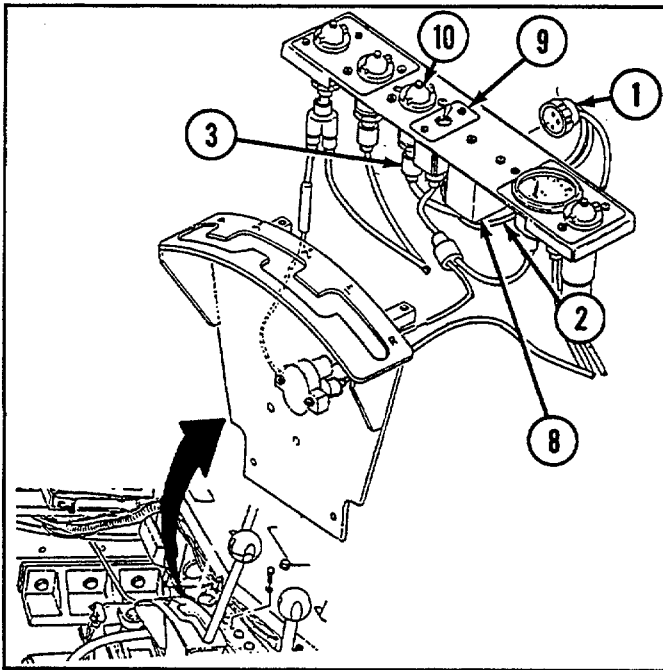
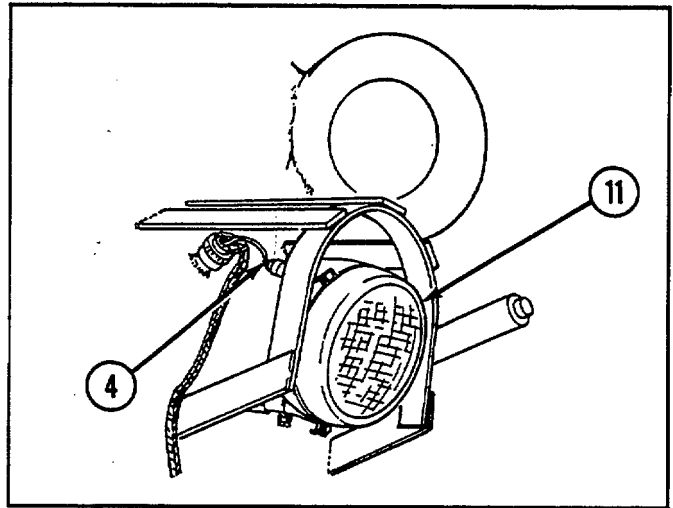
Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect connector (4) to front signal light (11).
- 2 Connect connector (2) to flasher light (10).
- 3 Connect connector (3) to flasher switch (9).
- 4 Connect connector (1) to thermal flasher (8).
- 5 Install eight clamps (5) using new lockwasher (7) and screw (6) for each.

**6-68 REPLACE/REPAIR B.O. SELECTOR LEAD ASSEMBLY (10911920)****THIS TASK COVERS**

- | | | | |
|------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
|------------|----------------|-------------|-----------------|

INITIAL SET-UP

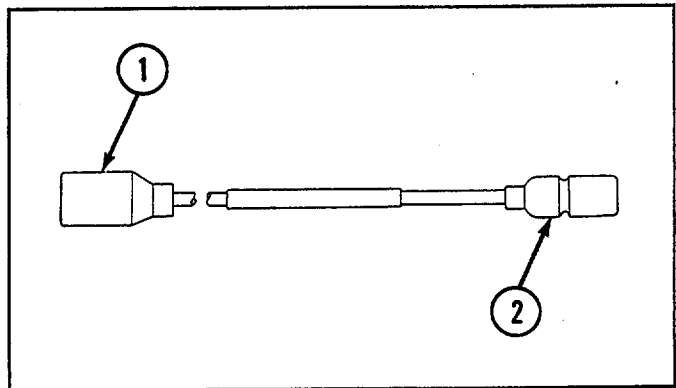
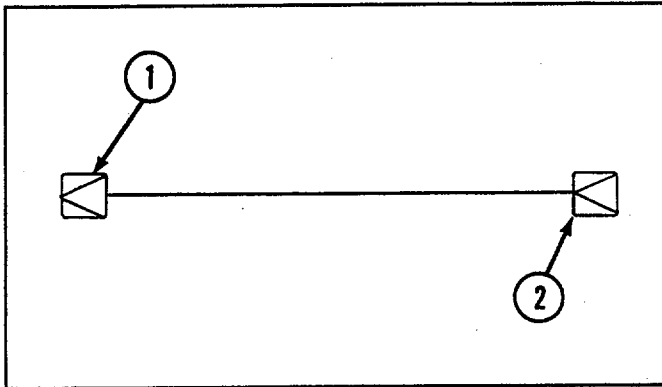
Equipment Condition:

Main switch panel removed (see paragraph 6-10)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	B.O. selector	520
2	Main lighting and master relay wiring harness	520

**a. REMOVAL**

- 1 Disconnect connector (1) from B.O. selector switch (3).
- 2 Disconnect connector (2) from main lighting and master relay wiring harness (4).

b. DISASSEMBLY

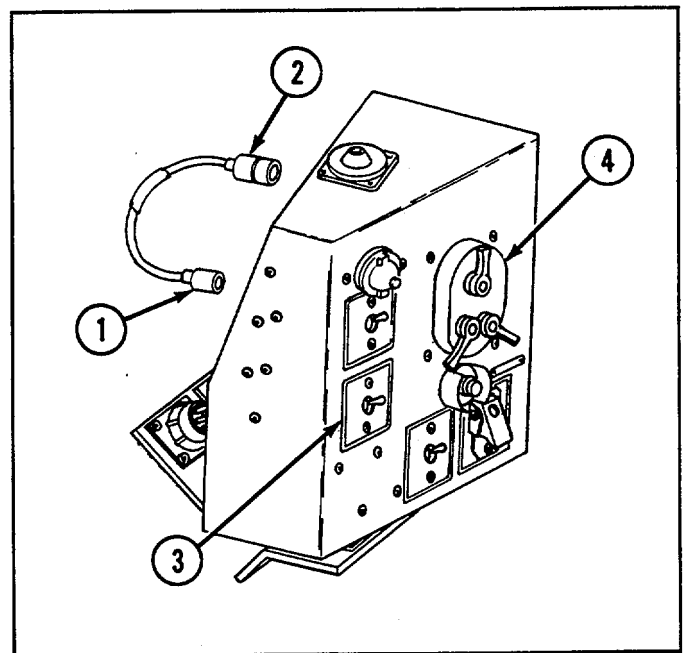
Disassemble lead assembly (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble lead assembly (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect connector (2) to main lighting and master relay wiring harness (4).
- 2 Connect connector (1) to B.O. selector switch (3).

**NOTE**

Follow-on maintenance: Install main switch panel (see paragraph 6-10)

6-69 REPLACE/REPAIR MAIN LIGHTING AND B.O. SELECTOR SWITCH WIRING HARNESS (11671796)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

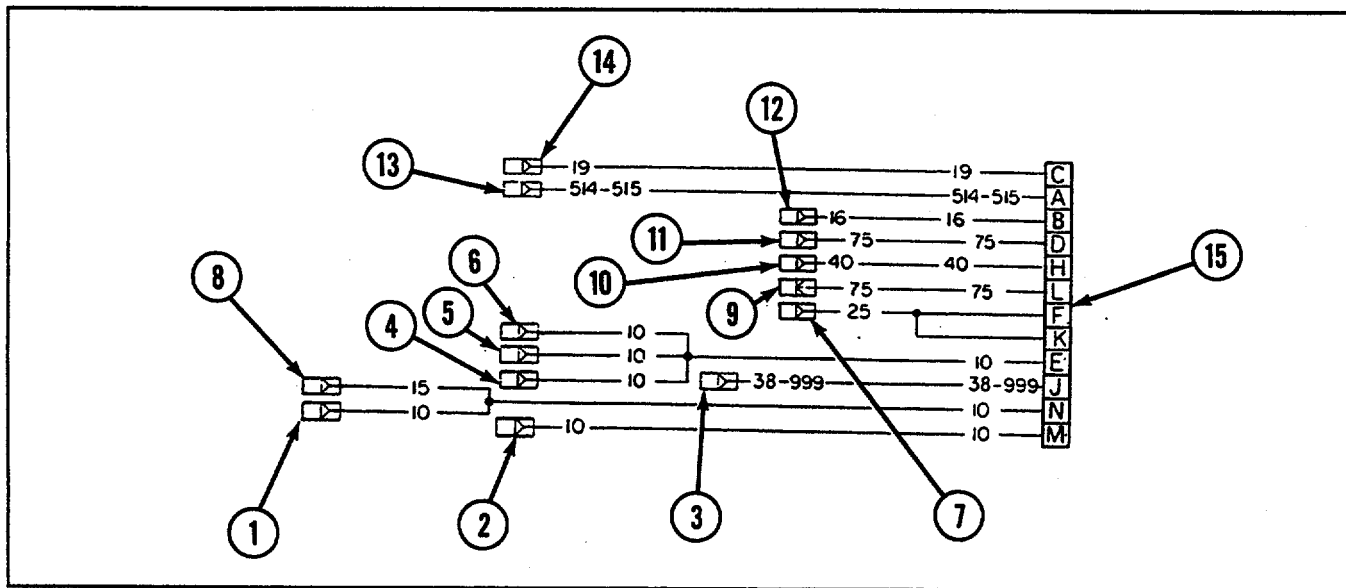
Equipment Condition:

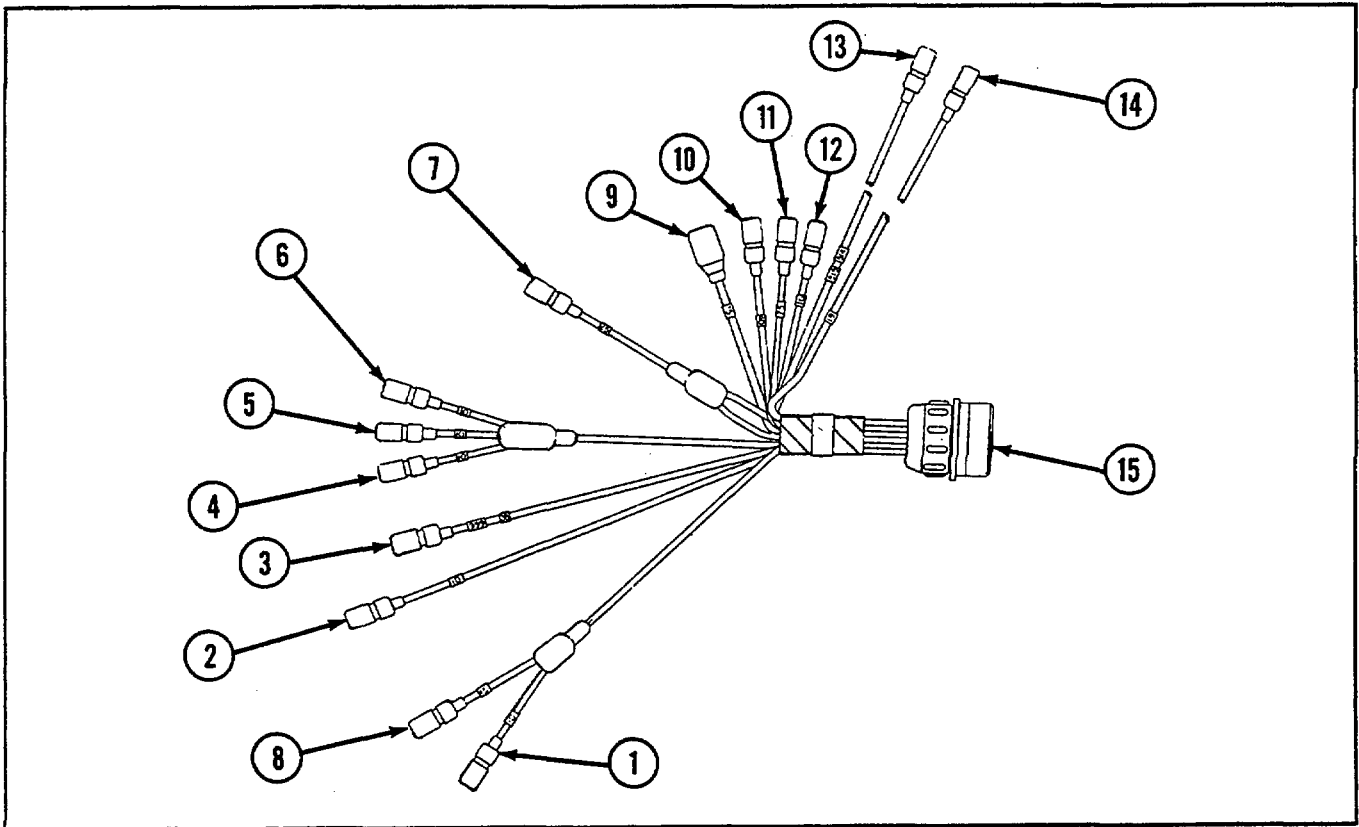
Main switch panel removed (see paragraph 6-10)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

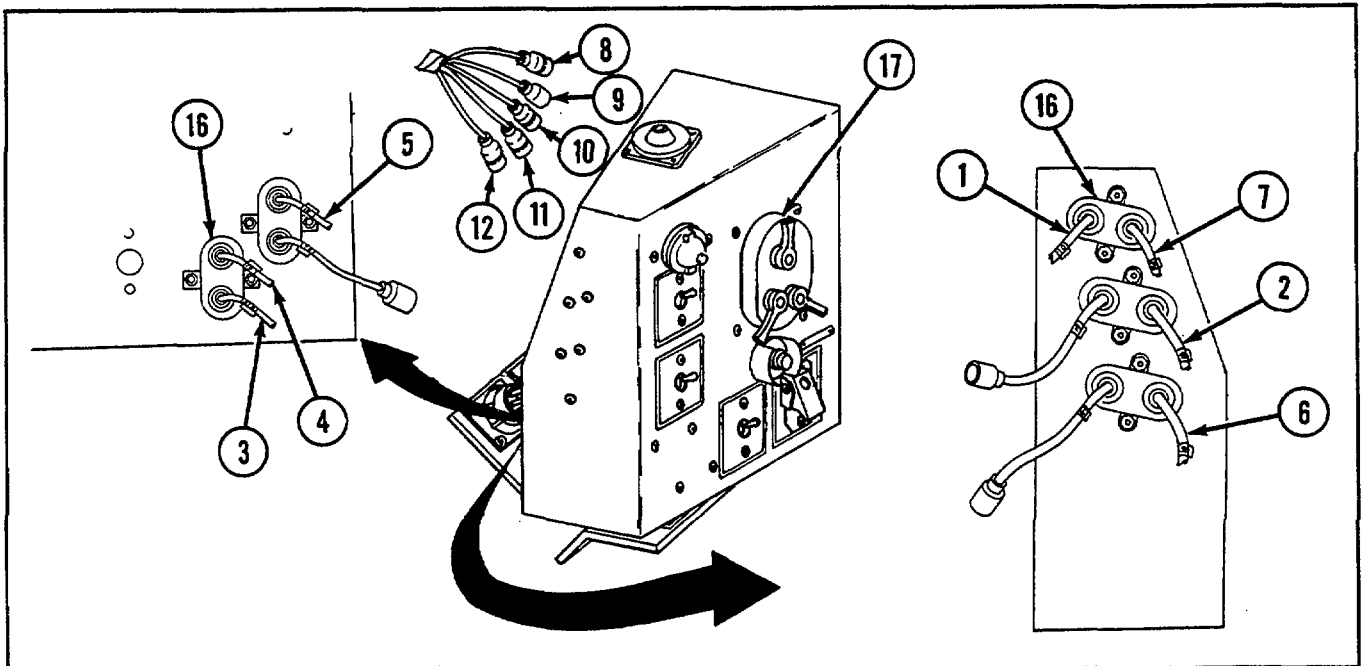
Connector No.	Electrical Lead To:	Wire No.
1	Circuit breaker	10
2	Circuit breaker	10
3	Circuit breaker	999, 38
4	Circuit breaker	10
5	Circuit breaker	10
6	Circuit breaker	10
7	Circuit breaker	25
8	Main lighting and master relay wiring harness	15
9	Main lighting and master relay wiring harness	75
10	Main lighting and master relay wiring harness	40
11	Main lighting and master relay wiring harness	75/16
12	Main lighting and master relay wiring harness	16
13	B.O. selector switch	515/514
14	B.O. selector switch	19
15	Panel outlet	10, 515/514, 19, 16, 75/16, 40, 75, 10, 10, 25, 27, 38/999





a. REMOVAL

- 1 Disconnect seven connectors (1 through 7) from five circuit breakers (16).
- 2 Disconnect five connectors (8 through 12) from main lighting and master relay wiring harness (17).



6-69 REPLACE/REPAIR MAIN LIGHTING AND B.O. SELECTOR SWITCH WIRING HARNESS (11671796)-Continued

- 3 Disconnect two connectors (13 and 14) from B.O. selector switch (18).
- 4 Remove connector (15) from panel outlet (19) by removing four screws (20) and four nuts (21).

b. DISASSEMBLY

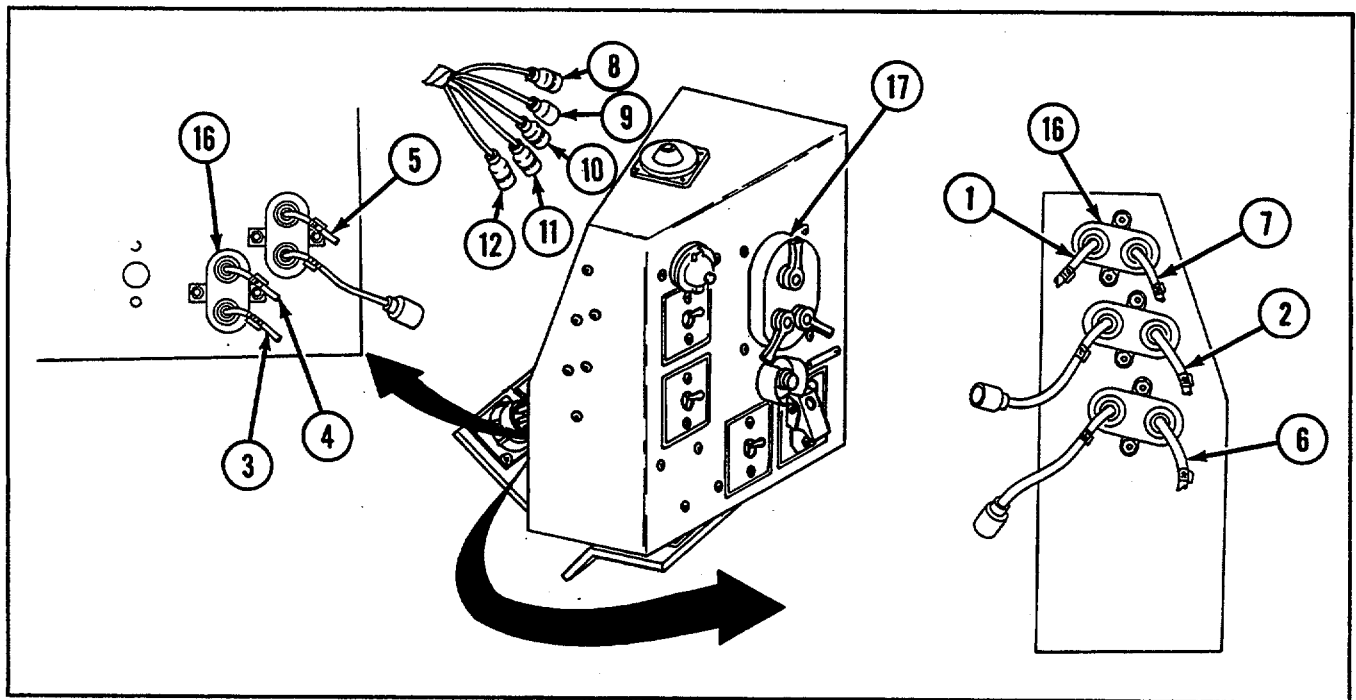
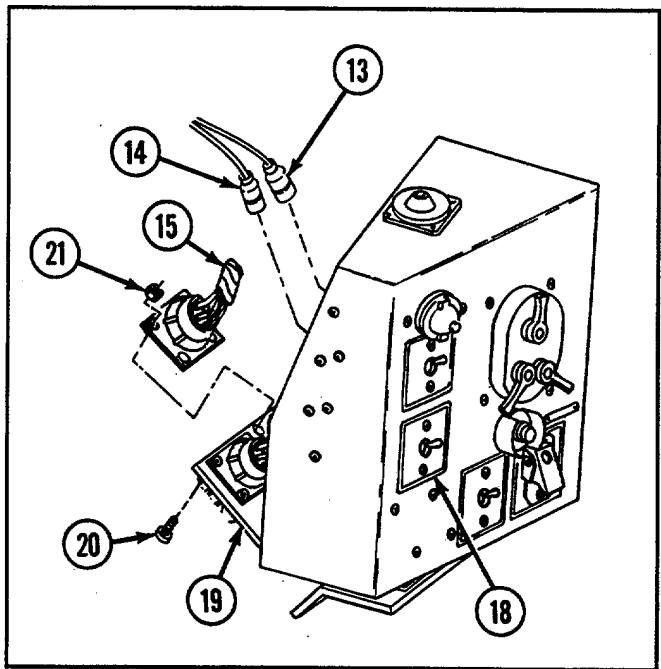
Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Install connector (15) to panel outlet (19) using four screws (20) and four nuts (21).
- 2 Connect two connectors (13 and 14) to B.O. selector switch (18).
- 3 Connect five connectors (8 through 12) to main lighting and master relay wiring harness (17).
- 4 Connect seven connectors (1 through 7) to five circuit breakers (16).



NOTE

Follow-on maintenance: Install main switch panel (see paragraph 6-10)

6-70 REPLACE/REPAIR MAIN LIGHTING AND MASTER RELAY WIRING HARNESS (10866909)

THIS TASK COVERS

- a. Removal
- b. Disassembly
- c. Assembly
- d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

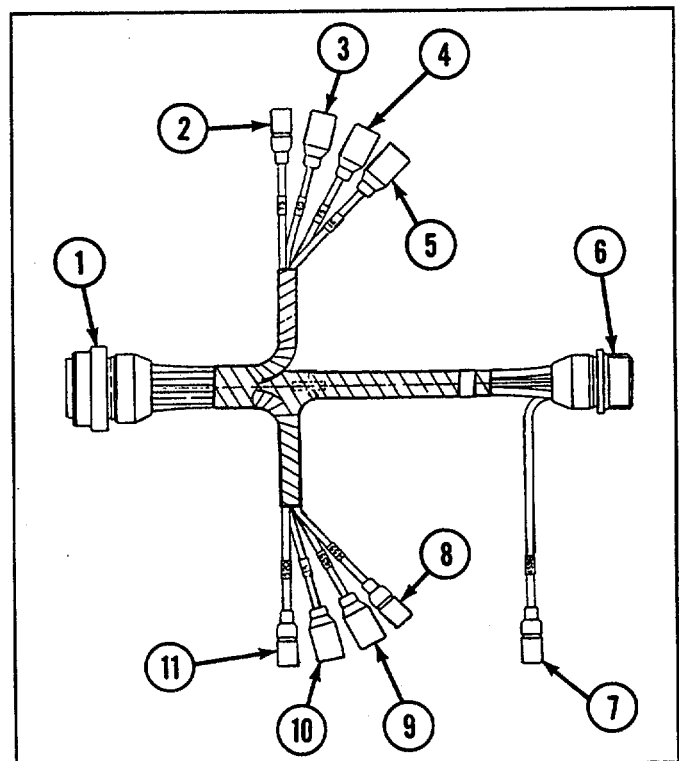
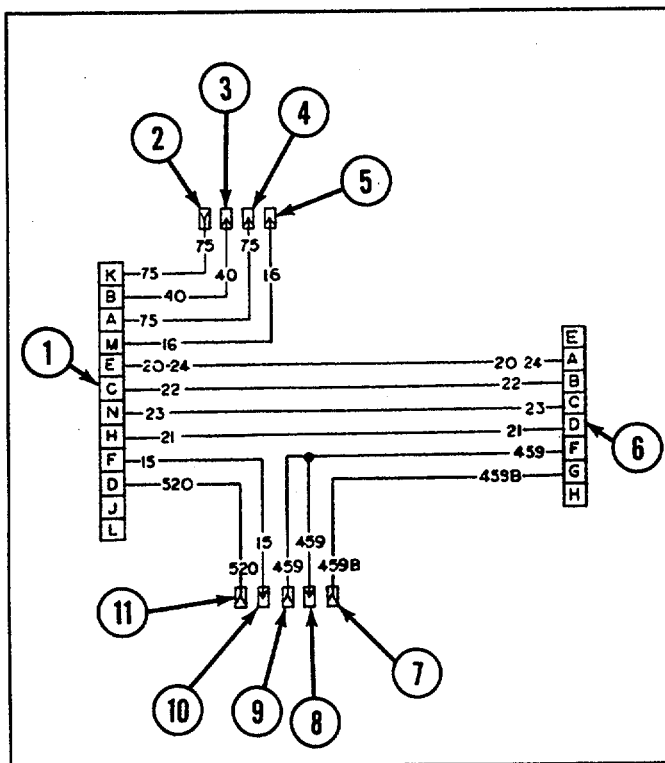
Equipment Condition:

Main switch panel removed (see paragraph 6-10)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

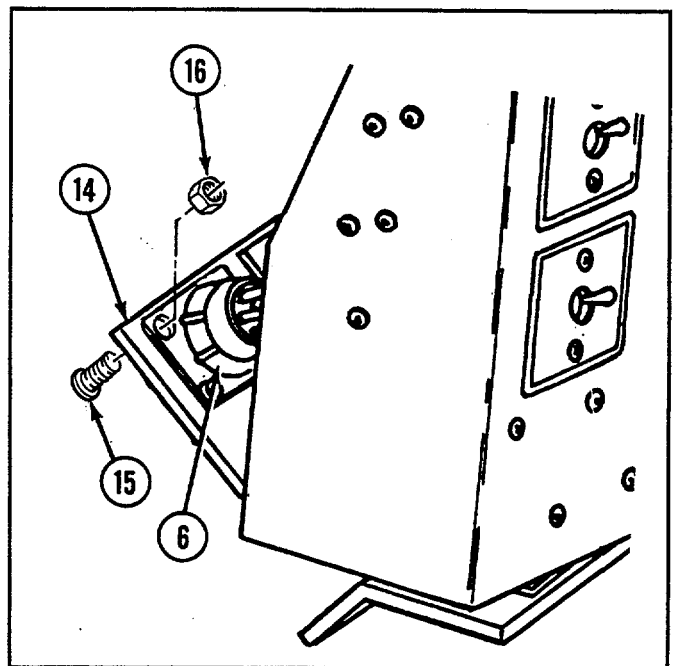
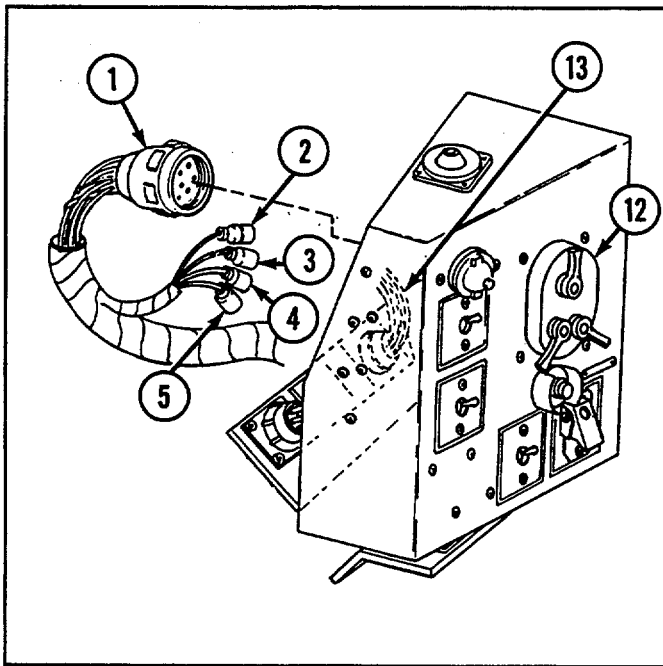
Connector No.	Electrical Lead To:	Wire No.
1	Main lighting switch	75, 40, 75, 16, 20/24, 22, 23, 21, 15, 520
2	Main lighting and B.O. selector switch wiring harness	75
3	Main lighting and B.O. selector switch wiring harness	40
4	Main lighting and B.O. selector switch wiring harness	75
5	Main lighting and B.O. selector switch wiring harness	16
6	Panel outlet	20/24, 22, 23, 21, 459, 459B
7	Master relay switch	459B
8	Master relay indicator lamp assembly	459
9	Master relay switch	459
10	Main lighting and B.O. selector switch wiring harness	15
11	B.O. selector	520



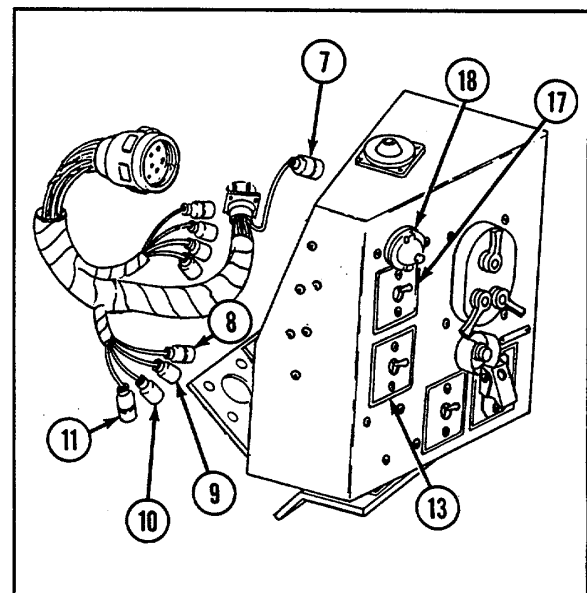
6-70 REPLACE/REPAIR MAIN LIGHTING AND MASTER RELAY WIRING HARNESS (10866909)-Continued

a. REMOVAL

- 1 Disconnect connector (1) from main lighting switch (12).
- 2 Disconnect four connectors (2 through 5) from main lighting and B.O. selector switch wiring harness (13).
- 3 Remove connector (6) from panel outlet (14) by removing four screws (15) and four nuts (16).



- 4 Disconnect connector (7) from master relay switch (17).
- 5 Disconnect connector (8) from master relay indicator lamp assembly (18).
- 6 Disconnect connector (9) from master relay switch (17).
- 7 Disconnect connector (10) from main lighting and B.O. selector switch wiring harness (13).
- 8 Disconnect connector (11) from B.O. selector lead assembly (19).



b. DISASSEMBLY

Disassemble wiring harness and lead assembly (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness and lead assembly (see Chapter 6, Section VII).

- 1 Connect connector (11) to B.O. selector lead assembly (19).
- 2 Connect connector (10) to main lighting and B.O. selector switch wiring harness (13).
- 3 Connect connector (9) to master relay switch (17).
- 4 Connect connector (8) to master relay indicator lamp assembly (18).
- 5 Connect connector (7) to master relay switch (17).
- 6 Install connector (6) using four screws (15) and four nuts (16).
- 7 Connect four connectors (2 through 5) to main lighting and B.O. selector switch wiring harness (13).
- 8 Connect connector (1) to main lighting switch (12).

NOTE

Follow-on maintenance: Install main switch panel (see paragraph 6-10)

6-71 REPLACE/REPAIR BULKHEAD TO MASTER RELAY AND LEFT AND RIGHT TAILLIGHT WIRING HARNESS (116718131)

THIS TASK COVERS

- | | | | |
|------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
|------------|----------------|-------------|-----------------|

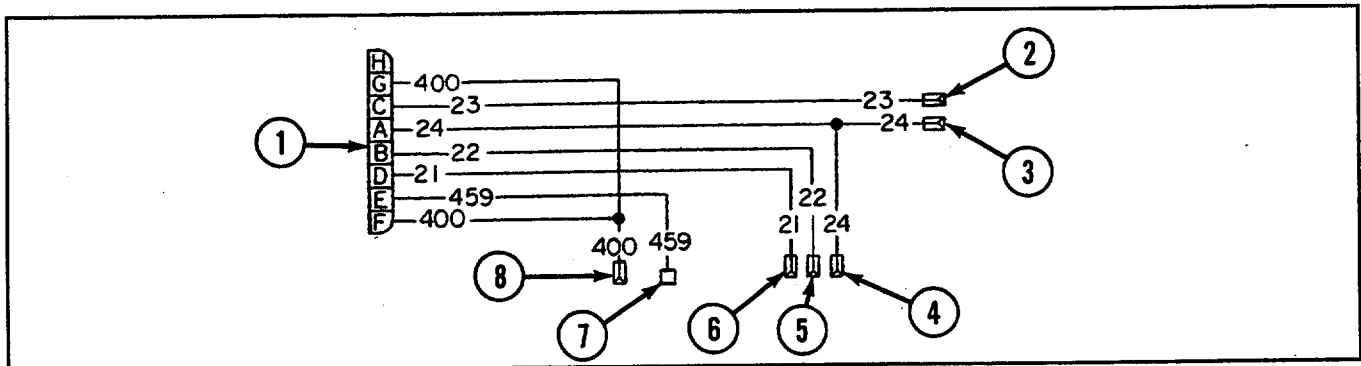
INITIAL SET-UP

Tools: Tool kit, general mechanic's (Appendix C, item 53)	Parts: Lockwashers (11) (Appendix G,	Equipment Condition: Engine deck removed (see item 116) paragraph 9-51)
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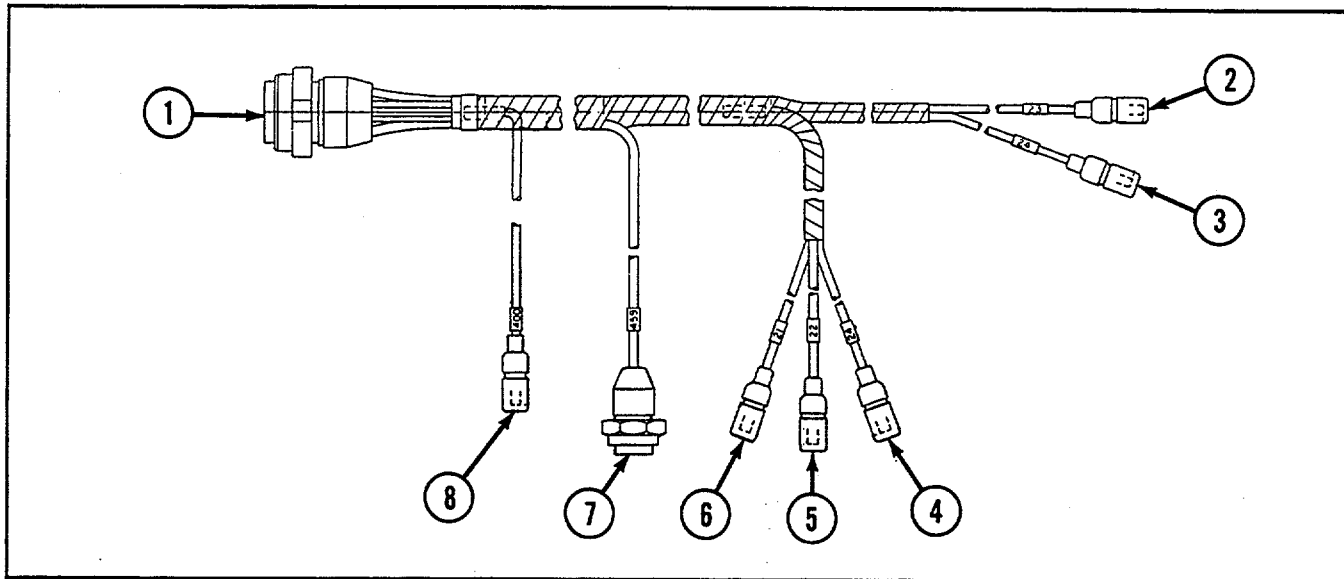
WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Bulkhead disconnect	400, 23, 24, 22, 21, 459, 400
2	Right hand taillight	23
3	Right hand taillight	24
4	Left hand taillight	24
5	Left hand taillight	22
6	Left hand taillight	21
7	Master relay	459
8	Circuit breaker	400

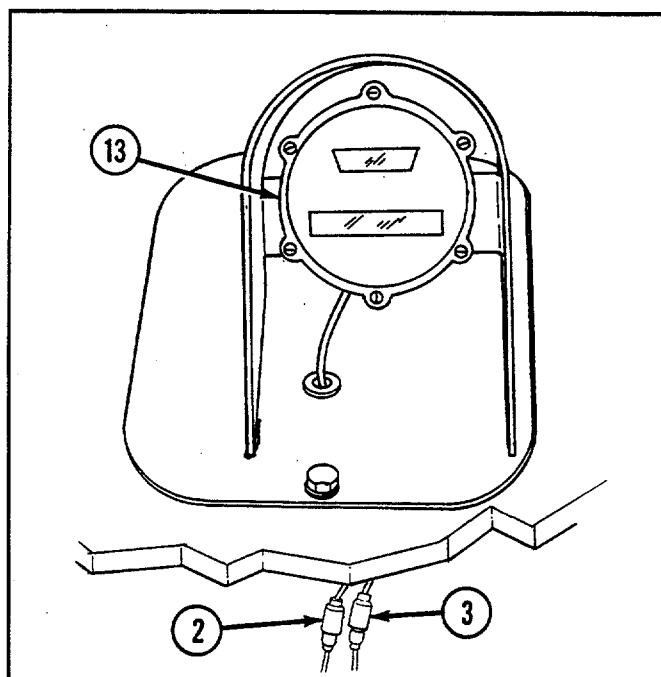
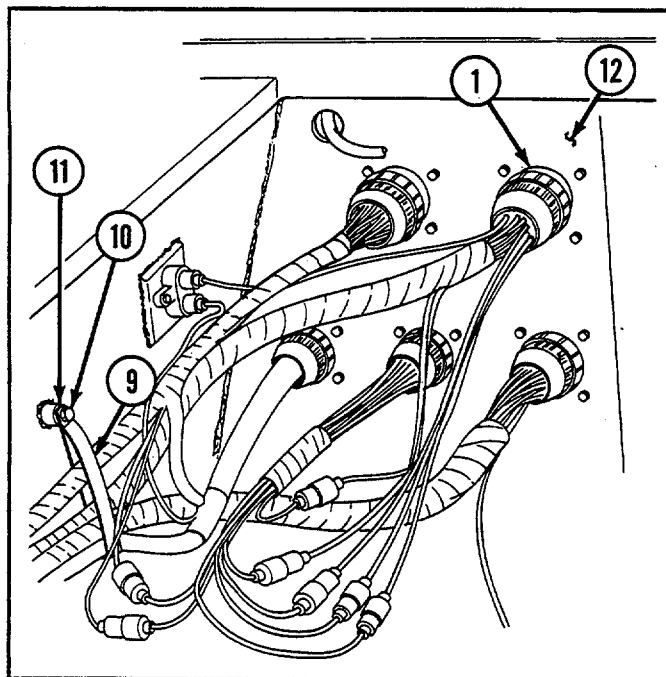


6-71 REPLACE/REPAIR BULKHEAD TO MASTER RELAY AND LEFT AND RIGHT TAILLIGHT WIRING HARNESS (1167181 3)--Continued



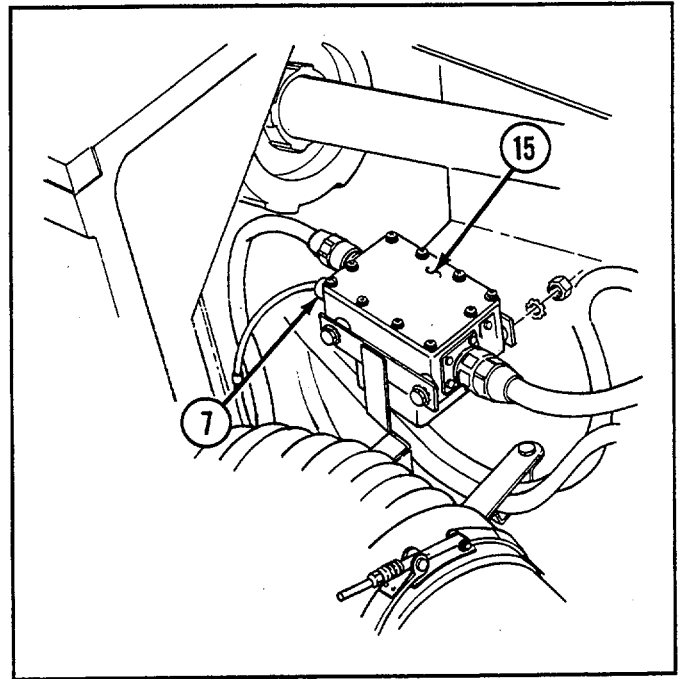
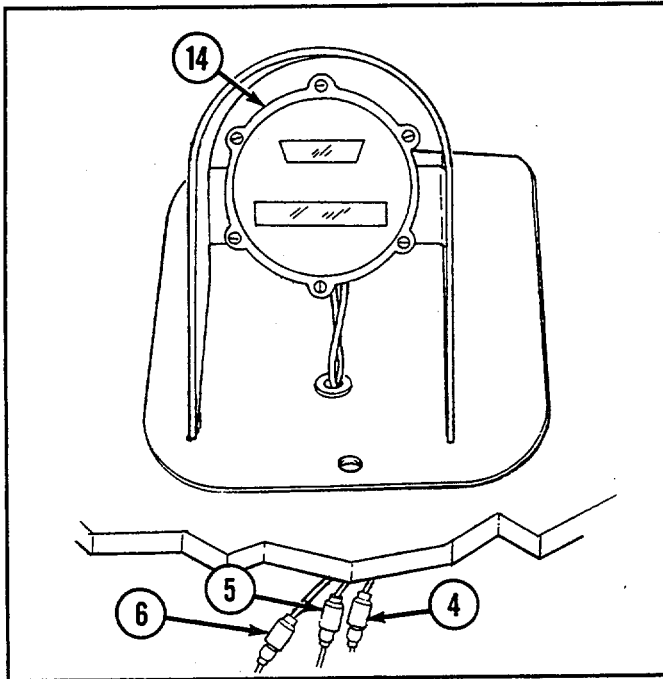
a. REMOVAL

- 1 Remove 11 clamps (9) by removing screw (10) and lockwasher (11) from each.
- 2 Disconnect connector (1) from bulkhead disconnect (12).
- 3 Disconnect two connectors (2 and 3) from right taillight (13).



- 4 Disconnect three connectors (4, 5, and 6) from left taillight (14).

5 Disconnect connector (7) from master relay (15).



6 Disconnect connector (8) from circuit breaker (16).

b. DISASSEMBLY

Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

1 Connect connector (8) to circuit breaker (16).

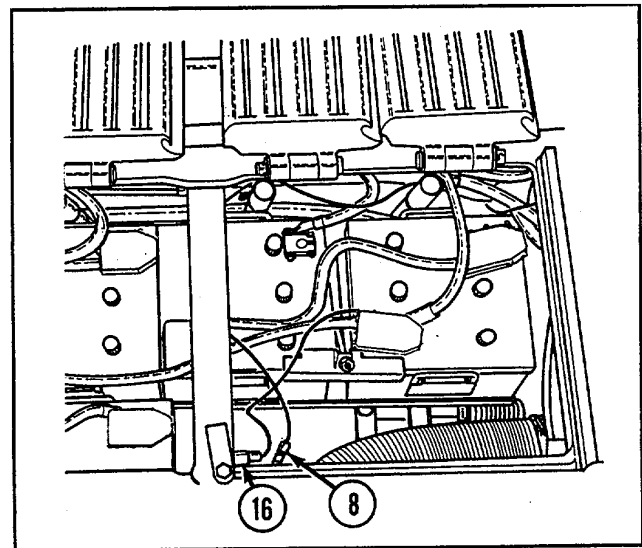
2 Connect connector (7) to master relay (15).

3 Connect three connectors (4, 5, and 6) to left taillight (14).

4 Connect two connectors (2 and 3) to right taillight (13).

5 Connect connector (1) to bulkhead disconnect (12).

6 Install 11 clamps (9) using screw (10) and new lockwasher (11) for each.



NOTE

Follow-on maintenance: Install engine deck (see paragraph 9-51)

6-72 REPLACE/REPAIR BULKHEAD TO ENGINE WIRING HARNESS AND STARTER RELAY WIRING HARNESS (116717901)

THIS TASK COVERS

- a. Removal
- b. Disassembly
- c. Assembly
- d. Installation

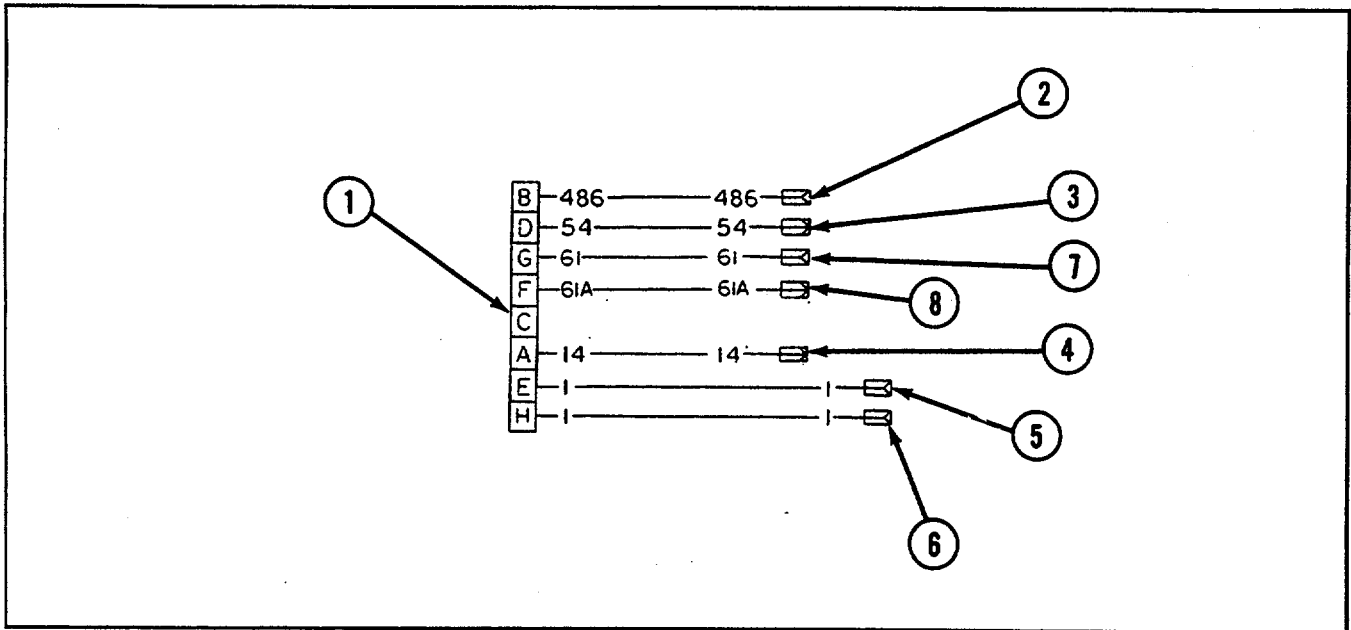
INITIAL SET-UP

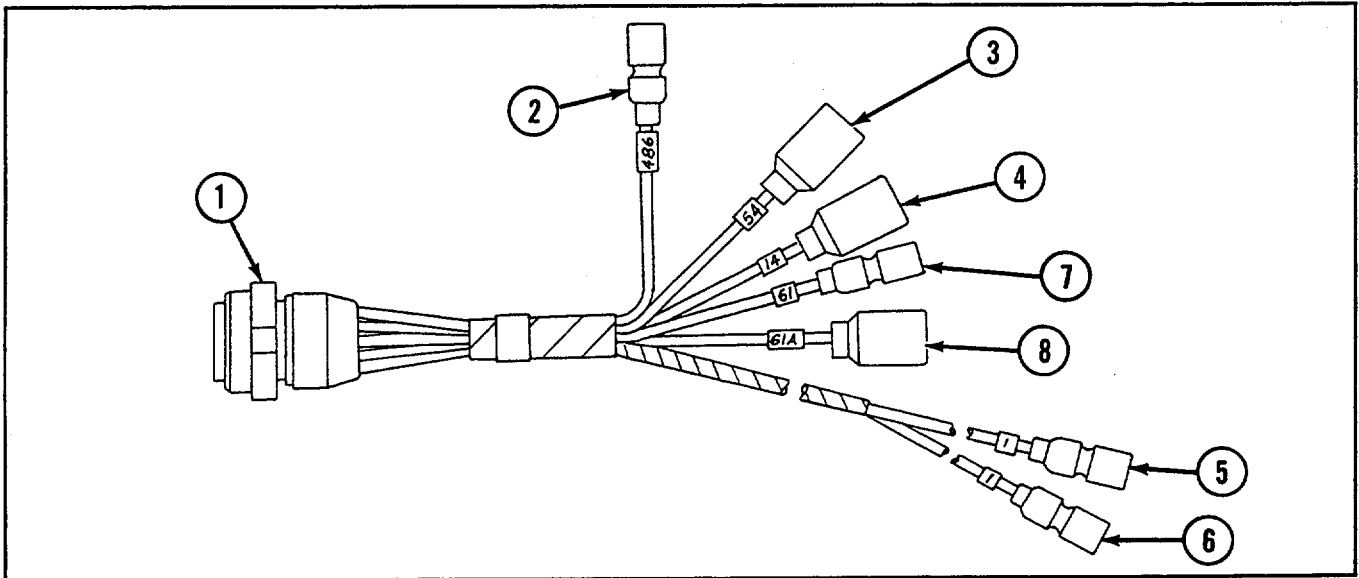
Tools: Parts: Equipment Condition:
 Tool kit, general mechanic's Lockwashers (8) (Appendix G, Air inlet doors removed as
 (Appendix C, item 53) item 116) necessary (see paragraph 9-56)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Bulkhead disconnect	1, 486, 54, 14, 61, 61A, 1
2	Bulkhead to main engine bracket and rear fuel tank transmitter wiring harness	486
3	Bulkhead to main engine bracket and rear fuel tank transmitter wiring harness	54
4	Bulkhead to main engine bracket and rear fuel tank transmitter wiring harness	14
5	Bulkhead to main engine bracket and rear fuel tank transmitter wiring harness	1
6	Bulkhead to main engine bracket and rear fuel tank transmitter wiring harness	1 14
7	Bulkhead to APU, master relay, and rigger's lights wiring harness	61
8	Bulkhead to APU, master relay, and rigger's lights wiring harness	61A



**a. REMOVAL**

- 1 Remove eight clamps (9) by removing screw (10) and lockwasher (11) from each.
- 2 Disconnect connector (1) from bulkhead disconnect (12).
- 3 Disconnect five connectors (2 through 6) from bulkhead to main engine bracket and rear fuel tank transmitter wiring harness (13).
- 4 Disconnect two connectors (7 and 8) from bulkhead to APU, master relay, and rigger's lights wiring harness (14).

b. DISASSEMBLY

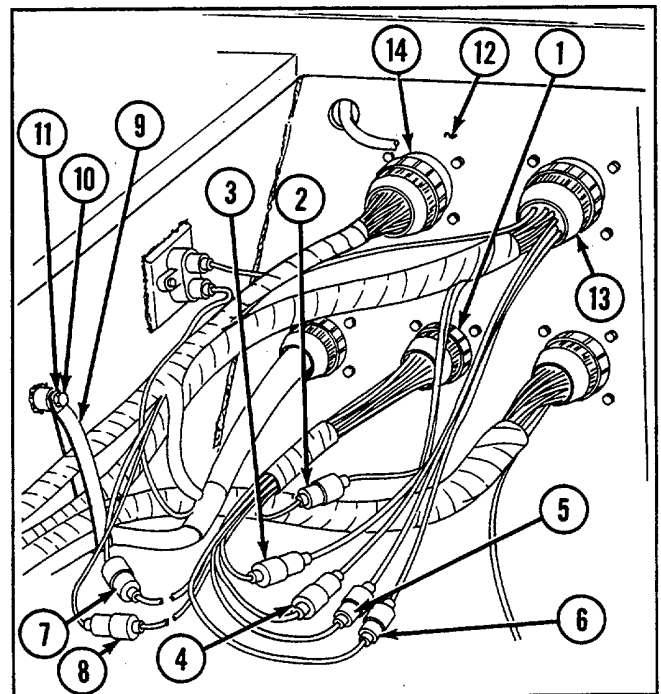
Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

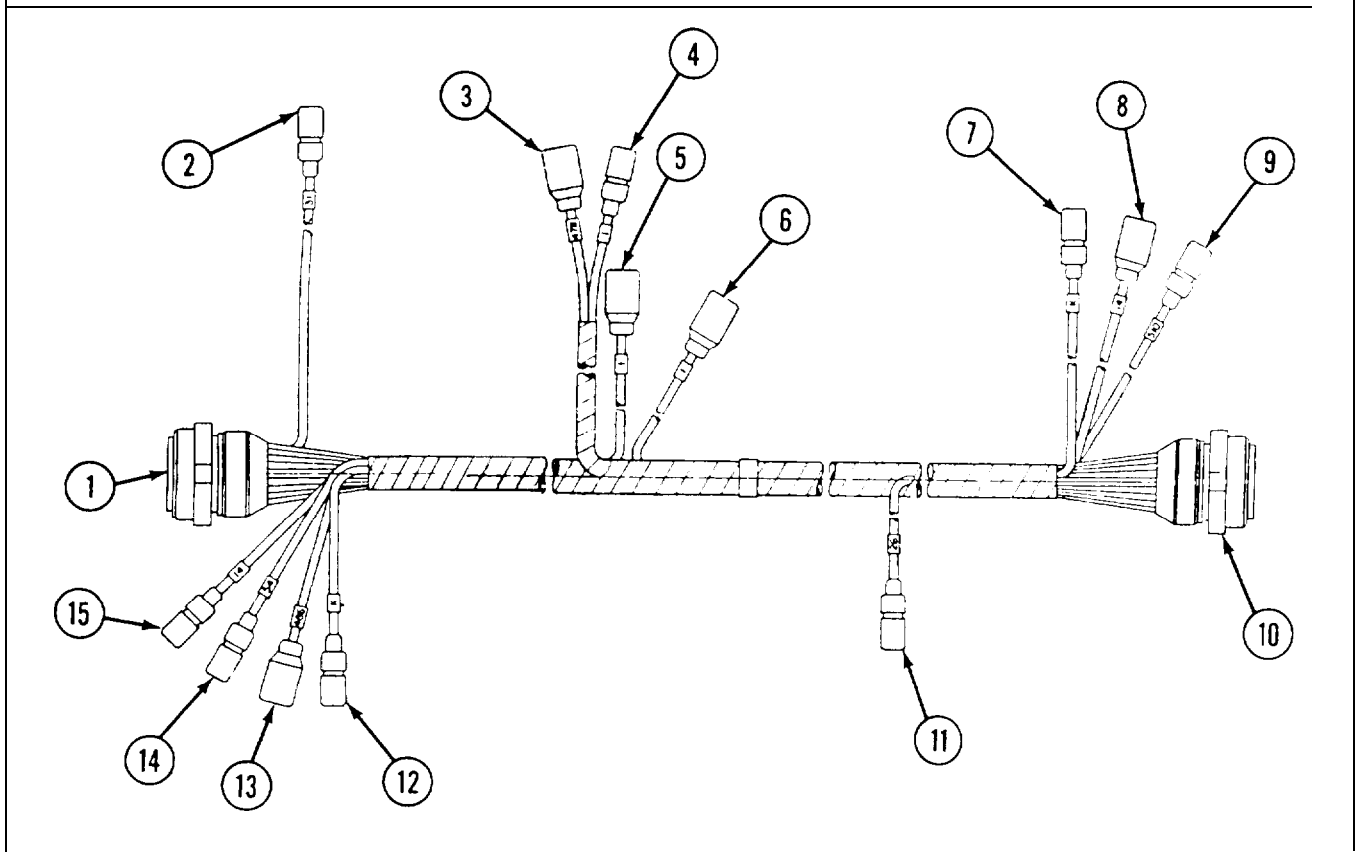
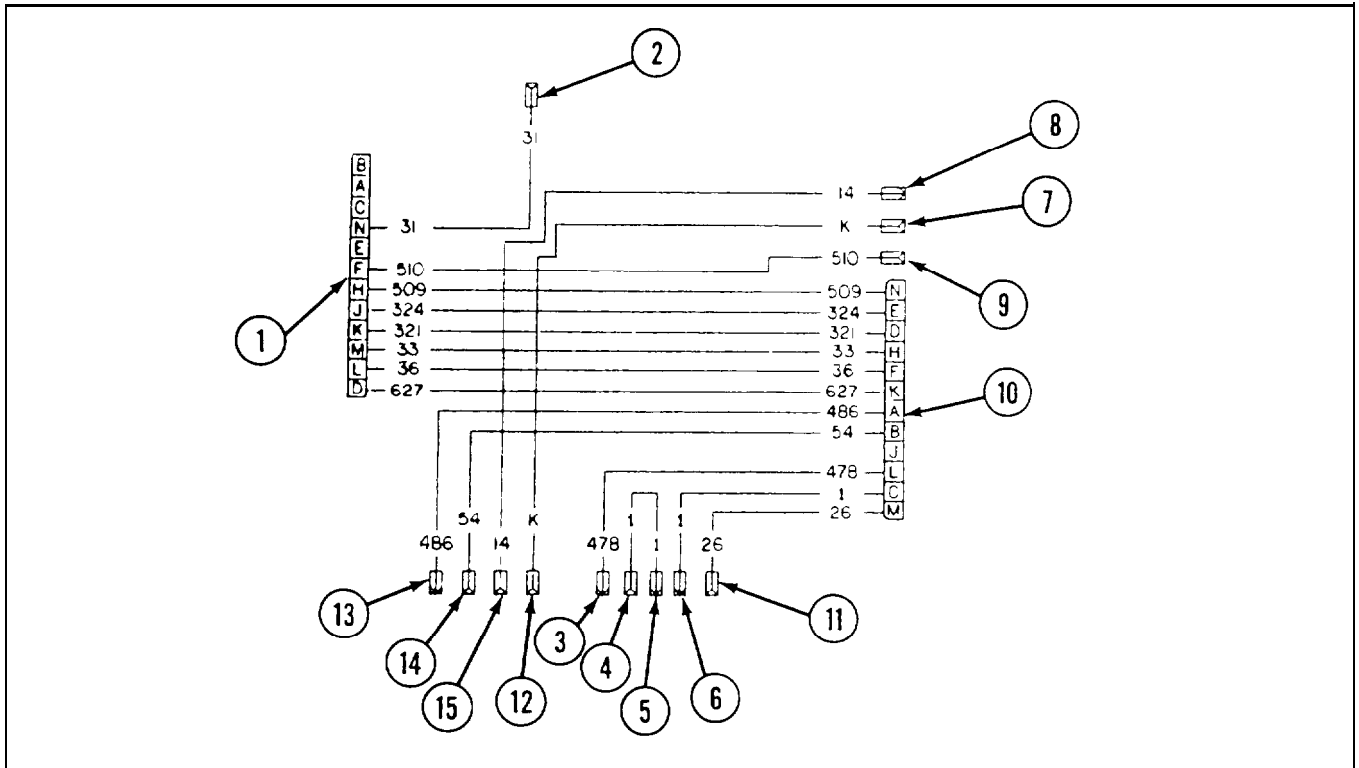
Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect two connectors (7 and 8) to bulkhead to APU, master relay, and rigger's lights wiring harness (14).
- 2 Connect five connectors (2 through 6) to bulkhead to main engine bracket and rear fuel tank transmitter wiring harness (13).
- 3 Connect connector (1) to bulkhead disconnect (12).
- 4 Install eight clamps (9) using new lockwasher (11) and screw (10) for each.

**NOTE**

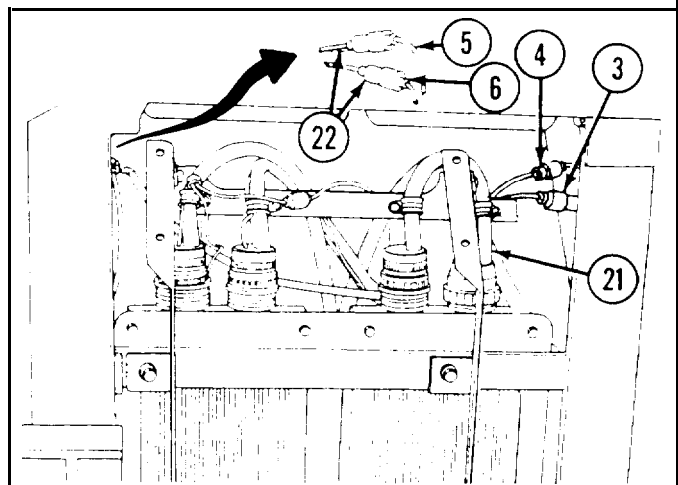
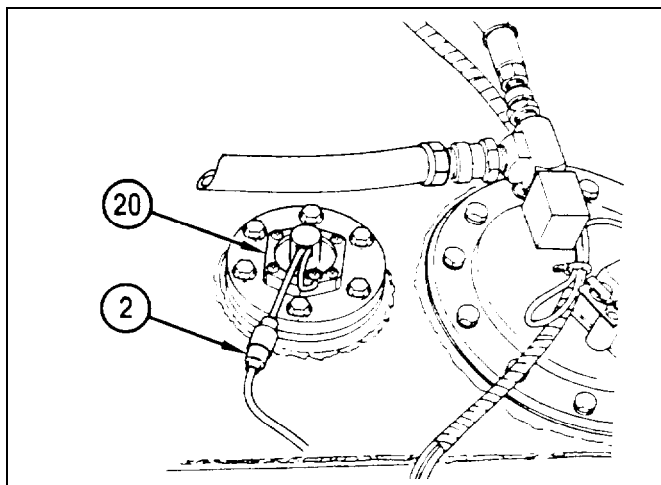
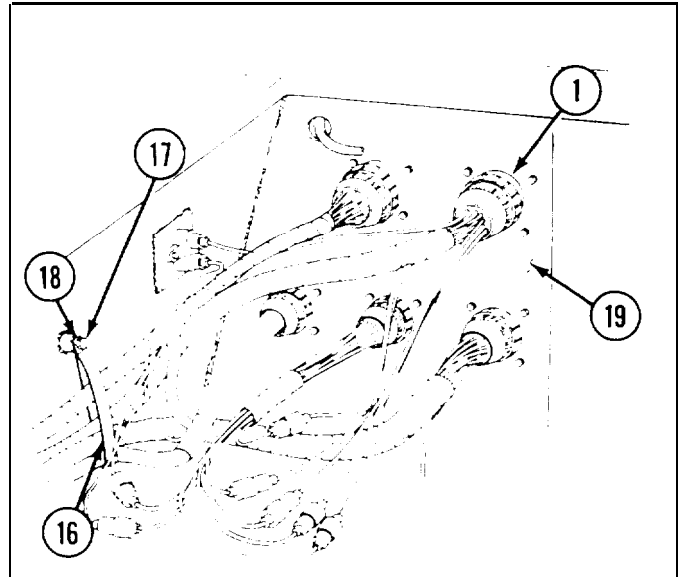
Follow-on maintenance: Install air inlet doors if removed (see paragraph 9-56)



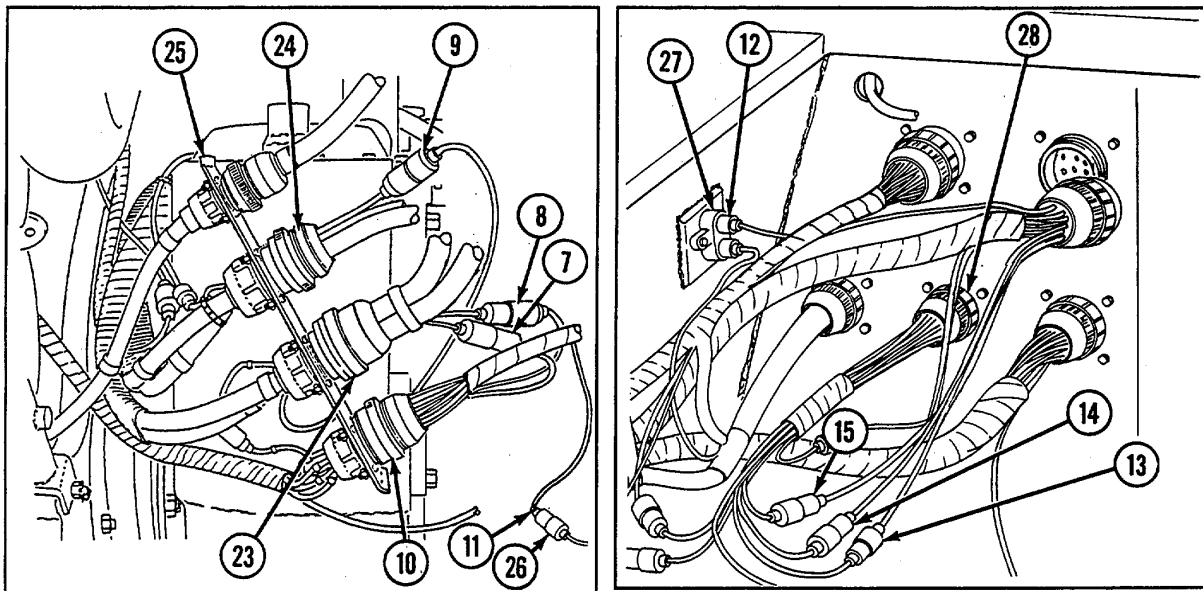
6-73 REPLACE/REPAIR BULKHEAD TO MAIN ENGINE BRACKET AND REAR FUEL TANK TRANSMITTER WIRING HARNESS (DUAL VOLTAGE) (12322588)-Continued

a. REMOVAL

- 1 Remove 16 clamps (16) by removing screw (17) and lockwasher (18) from each.
- 2 Disconnect connector (1) from bulkhead disconnect (19).
- 3 Disconnect connector (2) from rear fuel tank transmitter (20).
- 4 Disconnect two connectors (3 and 4) from main engine voltage regulator to engine disconnect wiring harness (21).
- 5 Disconnect two connectors (5 and 6) from bulkhead to main engine wiring harness and starter relay wiring harness (22)



- 6 Disconnect two connectors (7 and 8) from batteries to master relay, voltage regulators, slave receptacle, and engine disconnect wiring harness (23).
- 7 Disconnect connector (9) from engine disconnect ground lead assembly (24)
- 8 Disconnect connector (10) from main engine disconnect (25)
- 9 Disconnect connector (11) from bulkhead to APU, master relay, and rigger' s lights wiring harness (26).
- 10 Disconnect connector (12) from circuit breaker (27)
- 11 Disconnect three connectors (13, 14, and 15) from bulkhead to main engine wiring harness and starter relay wiring harness (28)



b. DISASSEMBLY

Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect three connectors (13, 14, and 15) to bulkhead to main engine wiring harness and starter relay wiring harness (28).
- 2 Connect connector (12) to circuit breaker (27).
- 3 Connect connector (11) to bulkhead to APU, master relay, and rigger's lights wiring harness (26).
- 4 Connect connector (10) to main engine disconnect (25).
- 5 Connect connector (9) to engine disconnect ground lead assembly (24).
- 6 Connect two connectors (7 and 8) to batteries to master relay, voltage regulators, slave receptacle, and engine disconnect wiring harness (23).
- 7 Connect two connectors (5 and 6) to bulkhead to main engine wiring harness and starter relay wiring harness (22).
- 8 Connect two connectors (3 and 4) to main engine voltage regulator to engine disconnect wiring harness (21).
- 9 Connect connector (2) to rear fuel tank transmitter (20).
- 10 Connect connector (1) to bulkhead disconnect (19).
- 11 Install 16 clamps (16) using new lockwasher (18) and screw (17) for each.

NOTE

Follow-on maintenance: Install air inlet doors if removed (see paragraph 9-56)

6-74 REPLACE/REPAIR BULKHEAD TO ENGINE BRACKET AND REAR FUEL TANK TRANSMITTER WIRING HARNESS (SINGLE VOLTAGE) (11671789)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Equipment Condition:

Air inlet doors removed as necessary (see paragraph 9-56)

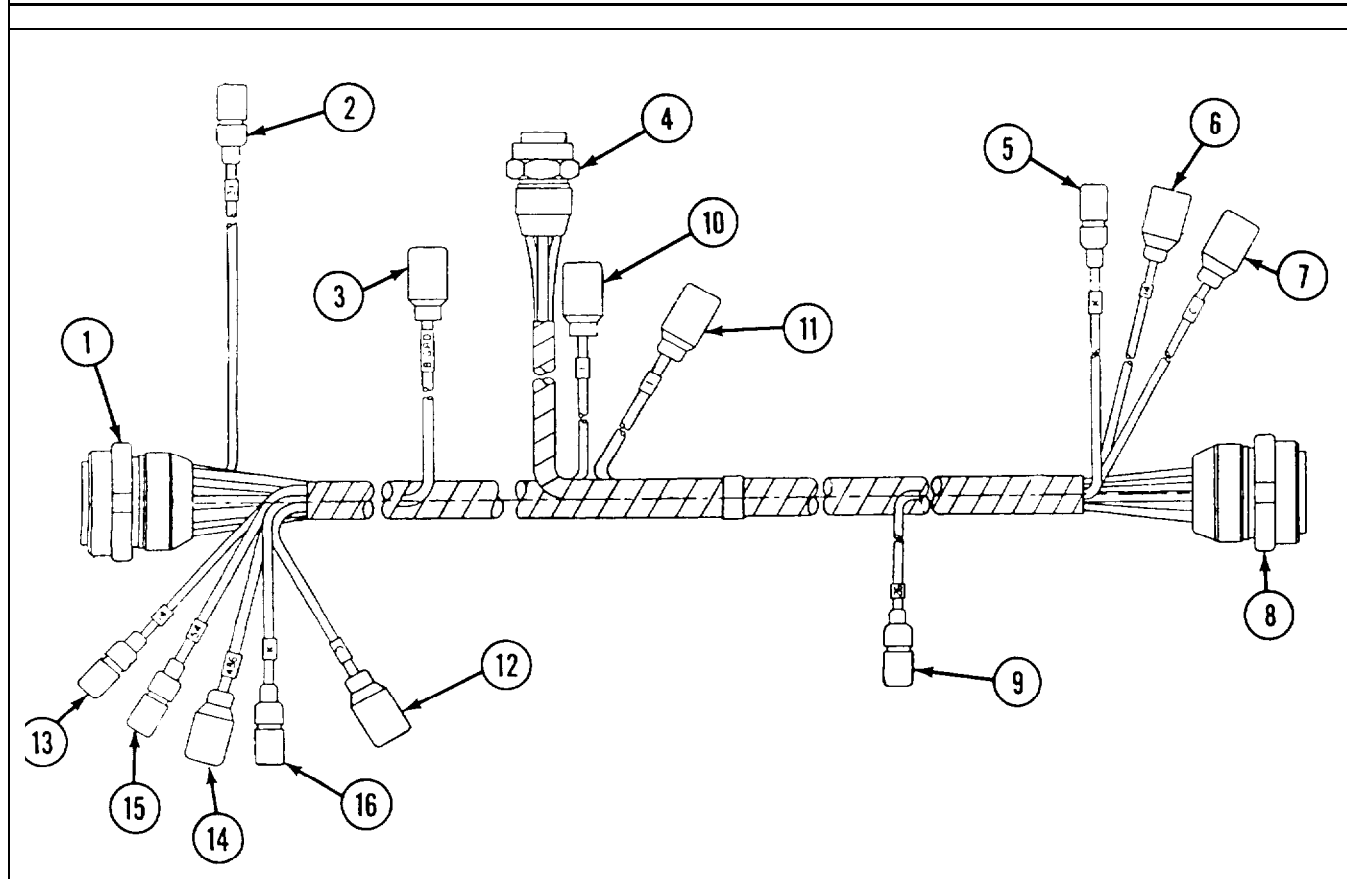
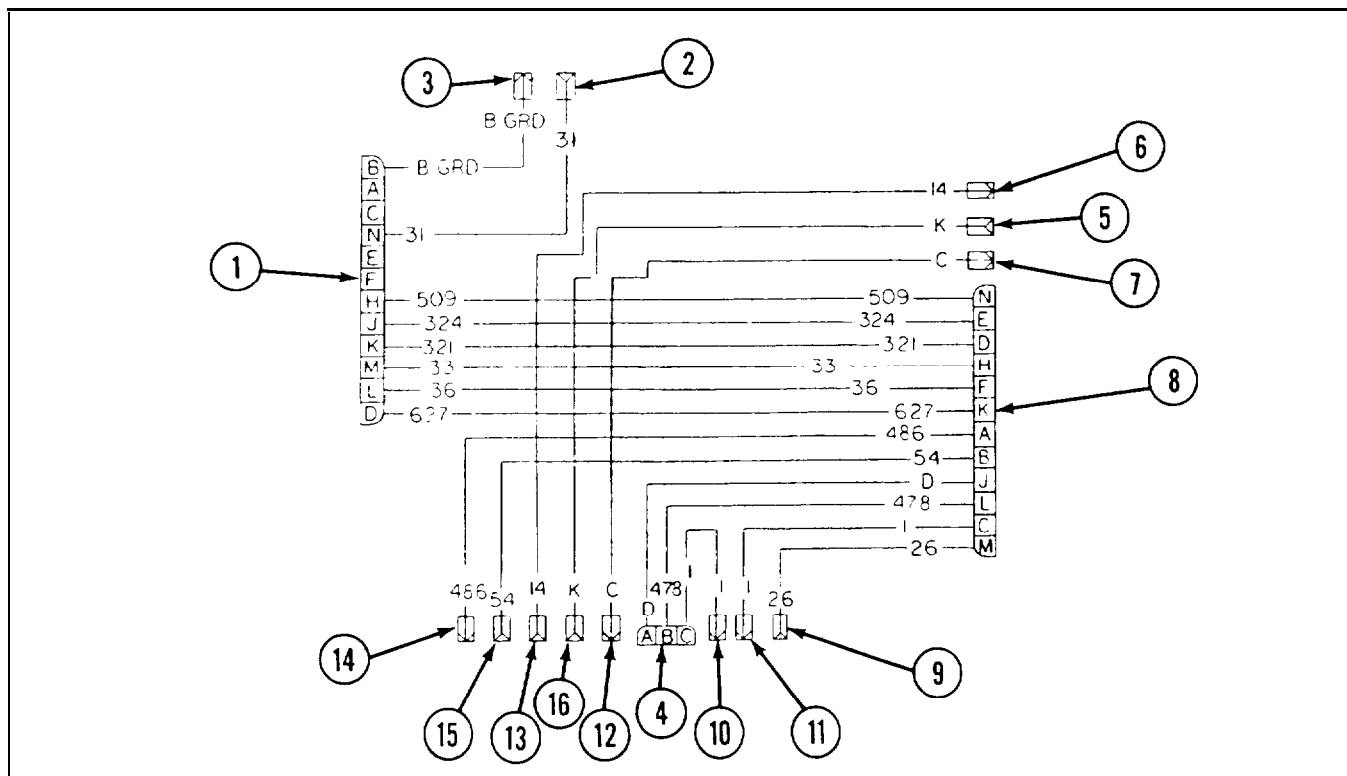
Parts:

Lockwashers (16) (Appendix G, item 116)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

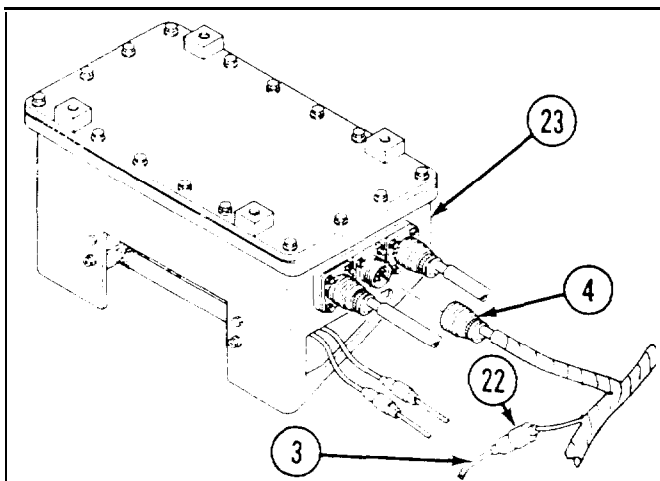
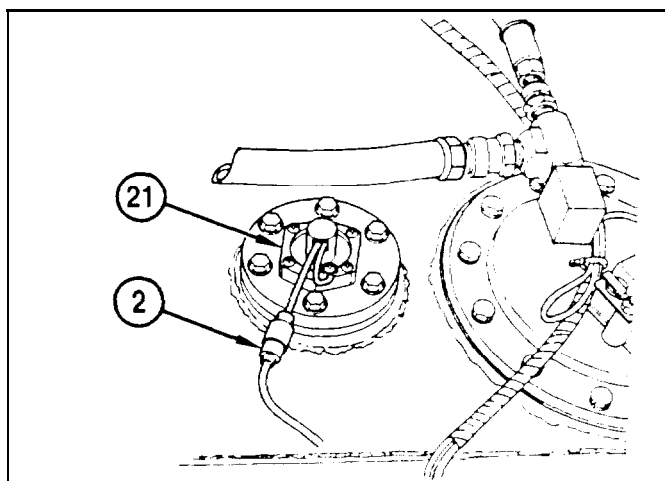
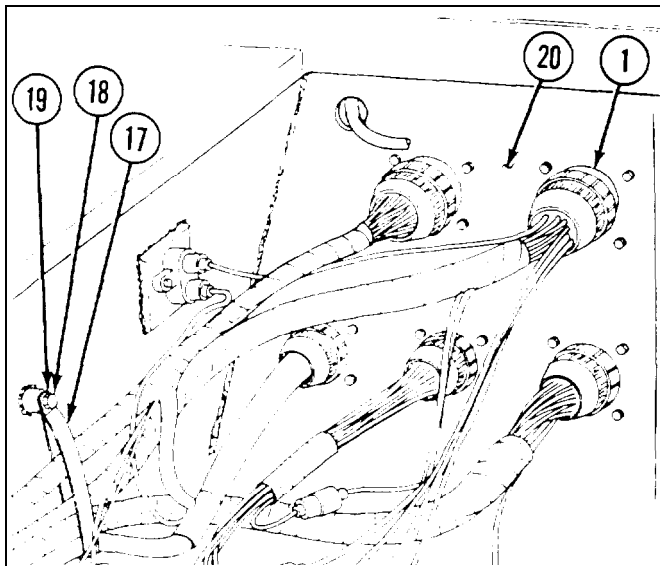
Connector No.	Electrical Lead To:	Wire No.
1	Bulkhead disconnect	B-GND, 31, 509, 324, 321, 33, 36, 627
2	Rear fuel tank transmitter	31
3	APU and main engine armature relays to voltage regulator wiring harness (single voltage)	B-GND
4	Switching relay box	478, D, 1
5	Batteries to master relay, voltage regulator, slave receptacle, and engine disconnect wiring harness (single voltage) (11671791)	K
6	Batteries to master relay, voltage regulator, slave receptacle, and engine disconnect wiring harness (single voltage) (11671791)	14
7	Batteries to master relay, voltage regulator, slave receptacle, and engine disconnect wiring harness (single voltage) (11671791)	C
8	Main engine disconnect	509, 324, 321, 33, 36, 627, 486, 54, D, 478, 1, 26
9	Bulkhead to APU, master relay, and rigger's lights wiring harness (single voltage)	26
10	Bulkhead to main engine wiring harness and starter relay wiring harness	1
11	Bulkhead to main engine wiring harness and starter relay wiring harness	1
12	Bulkhead to main engine wiring harness and starter relay wiring harness	C
13	Bulkhead to main engine wiring harness and starter relay wiring harness	14
14	Bulkhead to main engine wiring harness and starter relay wiring harness	486
15	Bulkhead to main engine wiring harness and starter relay wiring harness	54
16	Circuit breaker	K



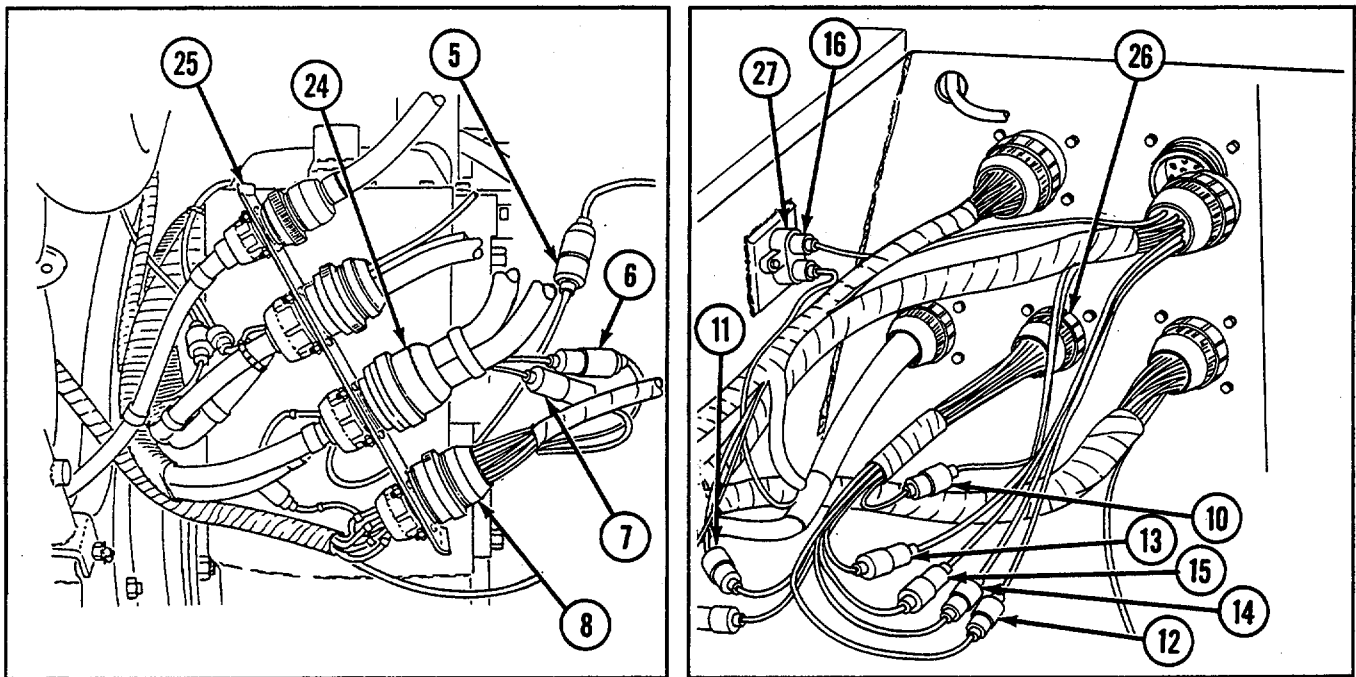
6-74 REPLACE/REPAIR BULKHEAD TO ENGINE BRACKET AND REAR FUEL TANK TRANSMITTER WIRING HARNESS (SINGLE VOLTAGE) (11671789)-Continued

a. REMOVAL

- 1 Remove 16 clamps (17) by removing screw (18) and lockwasher (19) from each.
- 2 Disconnect connector (1) from bulkhead disconnect (20).
- 3 Disconnect connector (2) from rear fuel tank transmitter (21).
- 4 Disconnect connector (3) from APU and main engine armature relays to voltage regulator wiring harness (22).
- 5 Disconnect connector (4) from switching relay box (23).



- 6 Disconnect three connectors (5, 6, and 7) from batteries to master relay, voltage regulator, slave receptacle, and engine disconnect wiring harness (24).
- 7 Disconnect connector (8) from main engine disconnect (25).
- 8 Disconnect six connectors (10 through 15) from bulkhead to main engine wiring harness starter relay wiring harness (26).
- 9 Disconnect connector (16) from circuit breaker (27).



b. DISASSEMBLY

Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect connector (16) to circuit breaker (27).
- 2 Connect seven connectors (9 through 15) to bulkhead to main engine wiring harness and starter relay wiring harness (26).
- 3 Connect connector (8) to main engine disconnect (25).
- 4 Connect three connectors (5, 6, and 7) to batteries to master relay, voltage regulator, slave receptacle, and engine disconnect wiring harness (24).
- 5 Connect connector (4) to switching relay box (23).
- 6 Connect connector (3) to APU and main engine armature relays to voltage regulator wiring harness (22).
- 7 Connect connector (2) to rear fuel tank transmitter (21).
- 8 Connect connector (1) to bulkhead disconnect (20).
- 9 Install 16 clamps (17) using new lockwasher (19) and screw (18) for each.

NOTE

Follow-on maintenance: Install air inlet doors if removed (see paragraph 9-56)

**6-75 REPLACE/REPAIR BULKHEAD TO AUXILIARY POWER UNIT (APU),
MASTER RELAY, AND RIGGER'S LIGHTS WIRING HARNESS (DUAL VOLTAGE) (11672412)**

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

- Lockwashers (20) (Appendix C, item 116)
- Lockwashers (4) (Appendix G, item 103)
- Lockwashers (4) (Appendix G, item 105)

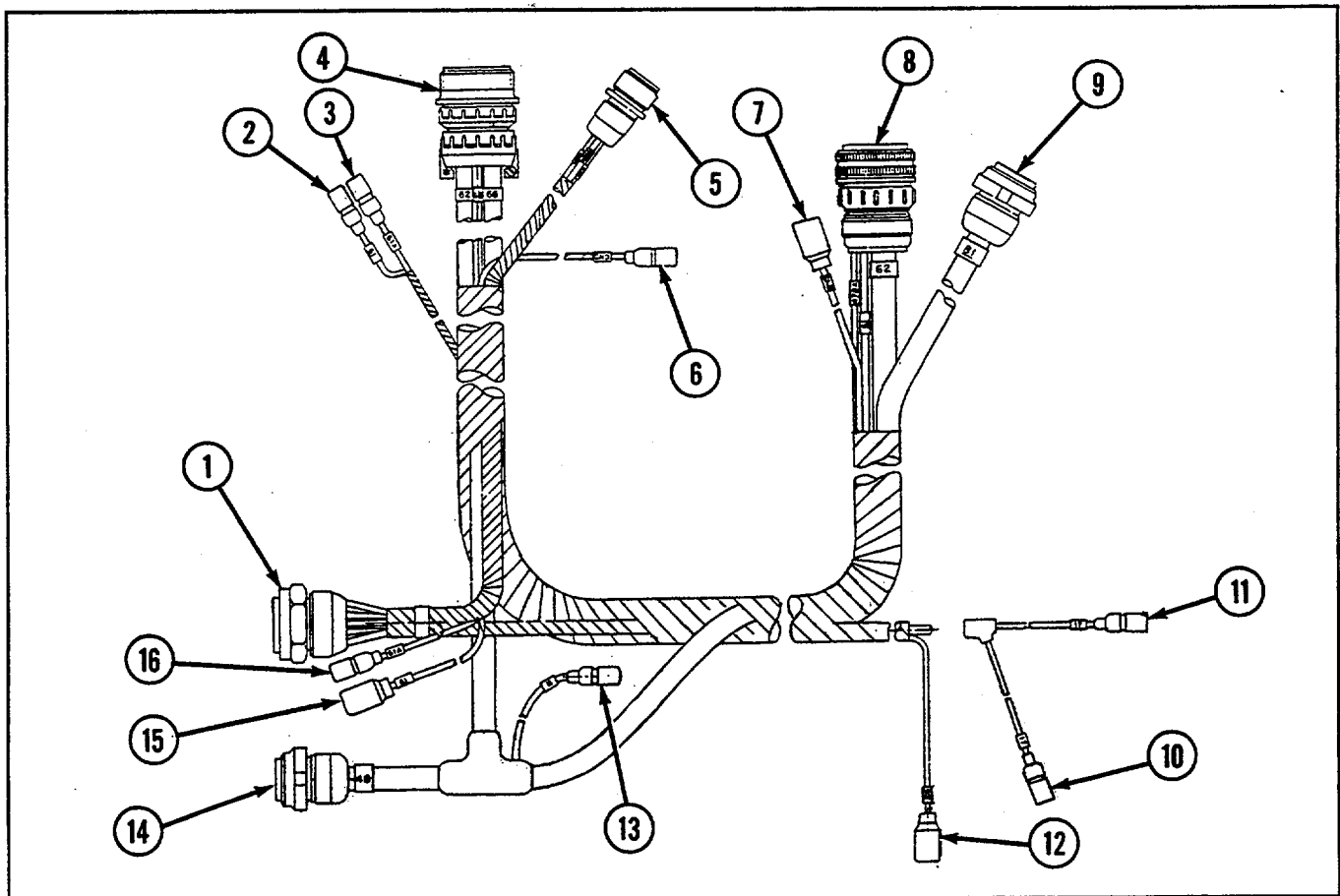
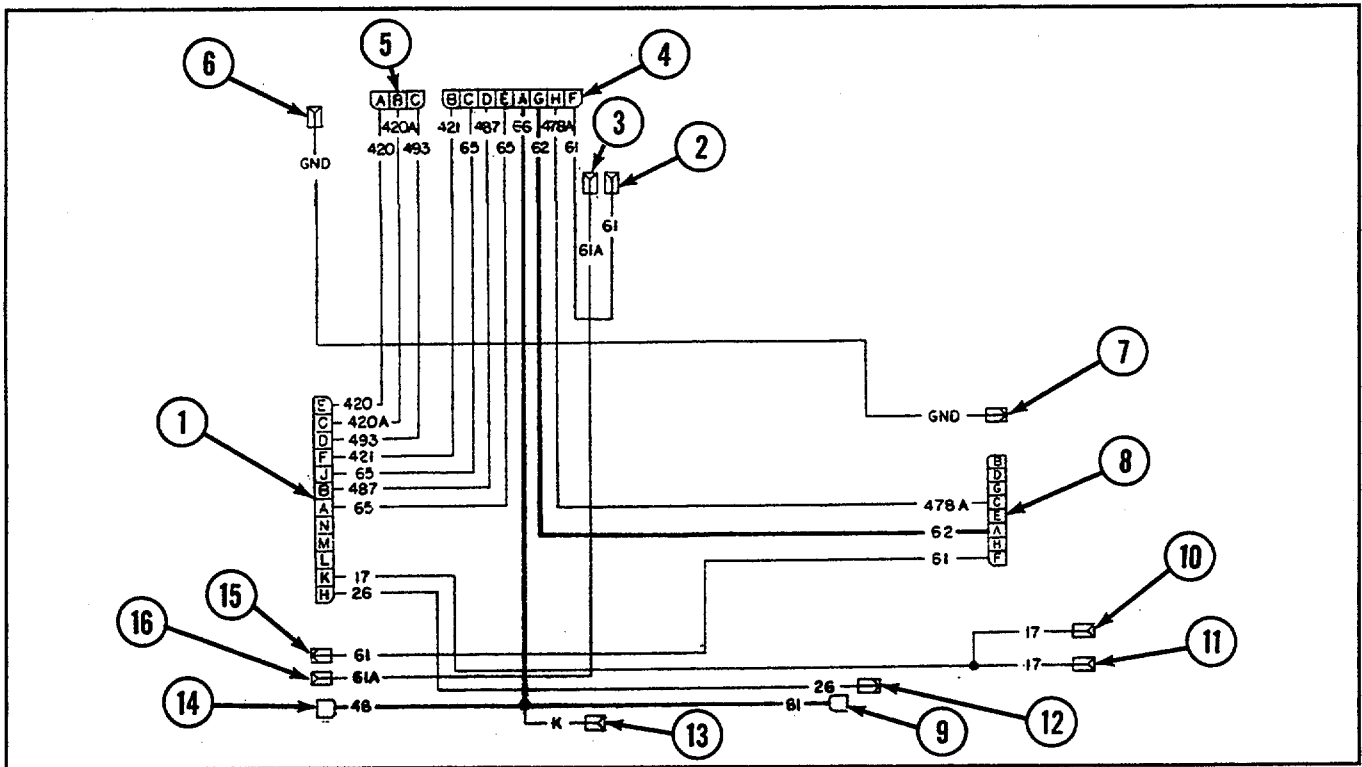
Equipment Condition:

Air inlet doors removed (see paragraph 9-56)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

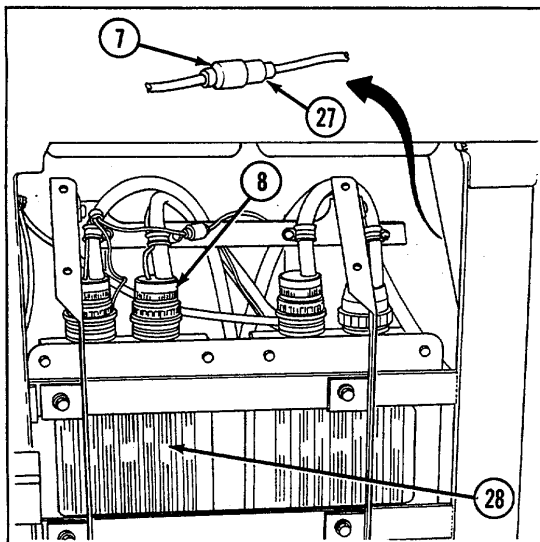
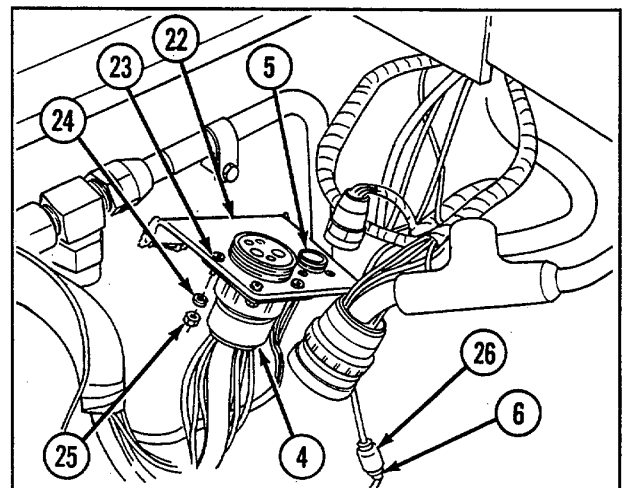
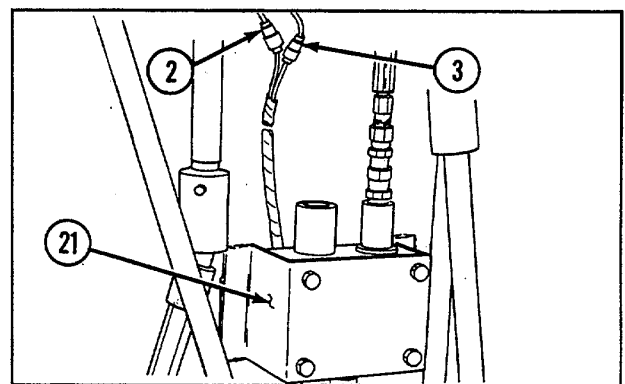
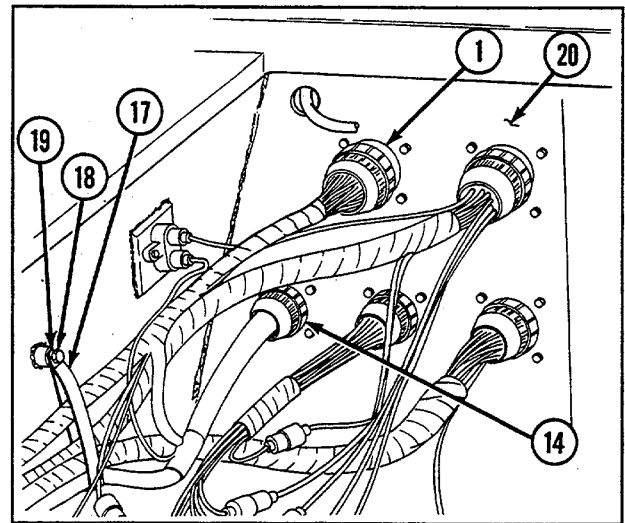
Connector No.	Electrical Lead To:	Wire No.
1	Bulkhead disconnect	420, 420A, 493, 421, 65, 487, 65, 17, 26
2	Hydraulic pressure switch	61
3	Hydraulic pressure switch	61A
4	APU engine disconnect	421, 65, 487, 65, 66, 62, 478A, 61
5	APU engine disconnect	420, 420A, 493
6	APU wiring harness (11672417)	GND
7	Batteries to master relay, voltage regulators, slave receptacle, and engine disconnect wiring harness (dual voltage) (11672413)	GND
8	APU voltage regulator	478A, 62, 61
9	Master relay	81
10	Rigger right service light	17
11	Rigger left service light	17
12	Bulkhead to main engine bracket and rear fuel tank transmitter wiring harness (dual voltage) (11672411)	26
13	Circuit breaker	K
14	Bulkhead disconnect	48
15	Bulkhead to main engine wiring harness and starter relay wiring harness	61
16	Bulkhead to main engine wiring harness and starter relay wiring harness	61A



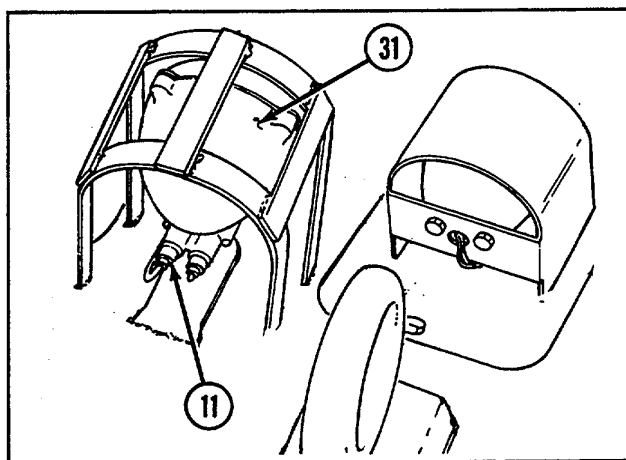
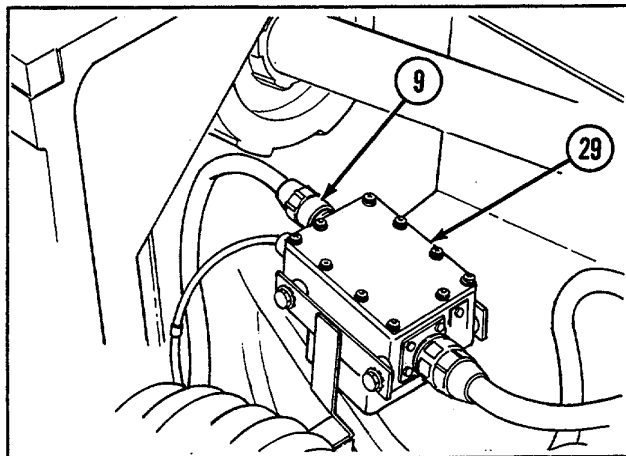
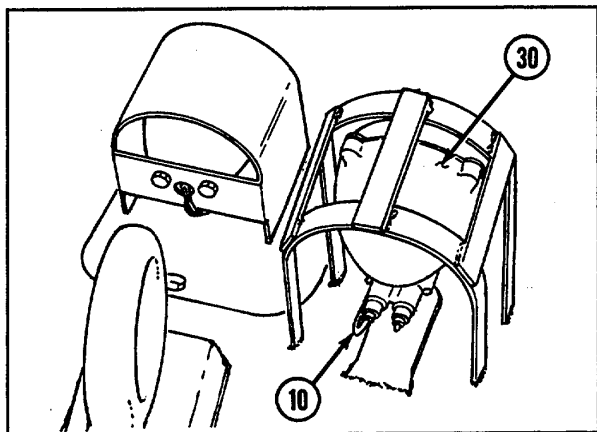
6-75 REPLACE/REPAIR BULKHEAD TO AUXILIARY POWER UNIT (APU), MASTER RELAY, AND RIGGER'S LIGHTS WIRING HARNESS (DUAL VOLTAGE) (1167241 2)-Continued

a. REMOVAL

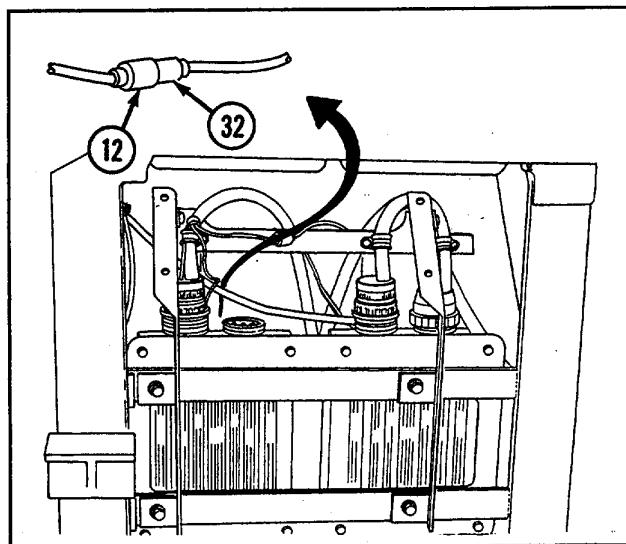
- 1 Remove 20 clamps (17) by removing screw (18) and lockwasher (19) from each.
- 2 Disconnect two connectors (1 and 14) from bulkhead disconnect (20).
- 3 Disconnect two connectors (2 and 3) from hydraulic pressure switch (21).
- 4 Disconnect two connectors (4 and 5) from APU engine disconnect (22) by removing four screws (23), four lockwashers (24), and four nuts (25) from each.
- 5 Disconnect connector (6) from APU wiring harness (26).
- 6 Disconnect connector (7) from batteries to master relay, voltage regulators, slave receptacle, and engine disconnect wiring harness (27).
- 7 Disconnect connector (8) from APU voltage regulator (28).



- 8 Disconnect connector (9) from master relay (29) .
- 9 Disconnect connector (10) from rigger's right service light (30).
- 10 Disconnect connector (11) from rigger's left service light (31).



- 11 Disconnect connector (12) from bulkhead to main engine bracket and rear fuel tank transmitter wiring harness (32).



6-75 REPLACE/REPAIR BULKHEAD TO AUXILIARY POWER UNIT (APU), MASTER RELAY, AND RIGGER'S LIGHTS WIRING HARNESS (DUAL VOLTAGE) (11672412)-Continued

- 12 Disconnect connector (13) from circuit breaker (33) .
- 13 Disconnect two connectors (15 and 16) from bulkhead to main engine wiring harness and starter relay wiring harness (34).

b. DISASSEMBLY

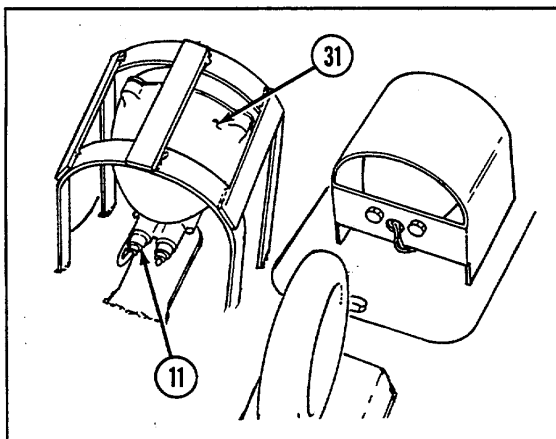
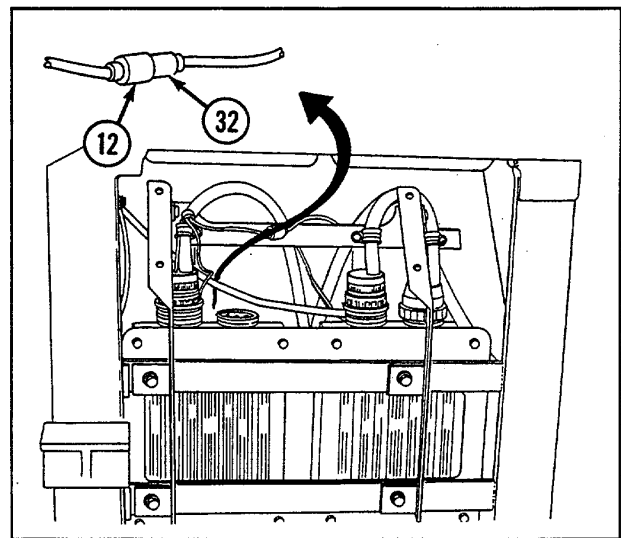
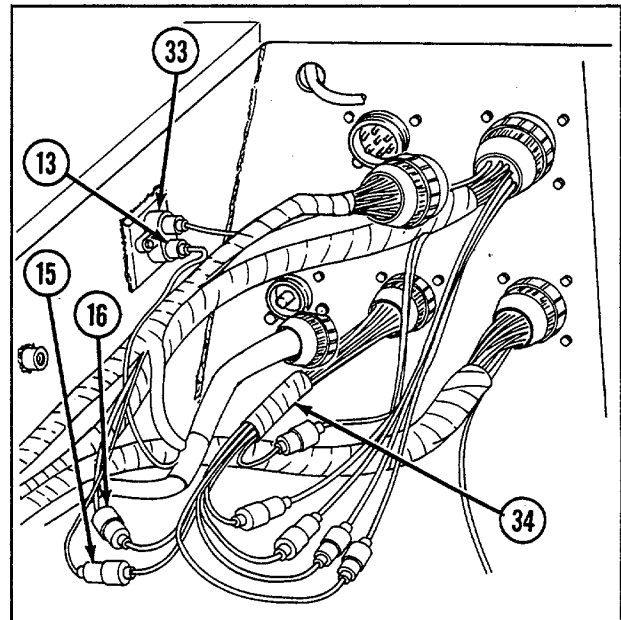
Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

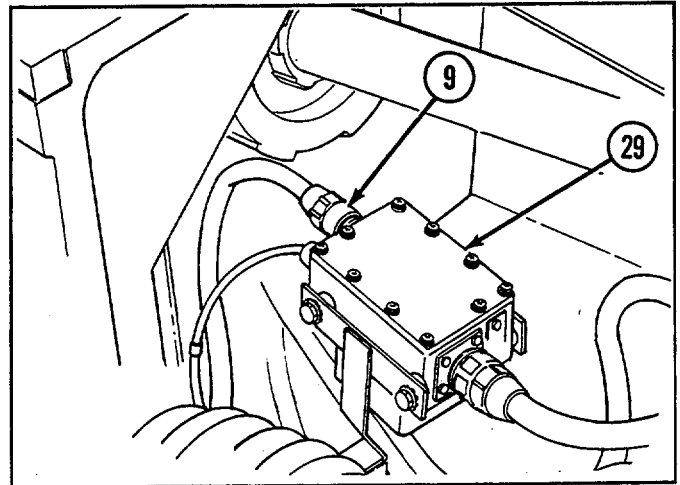
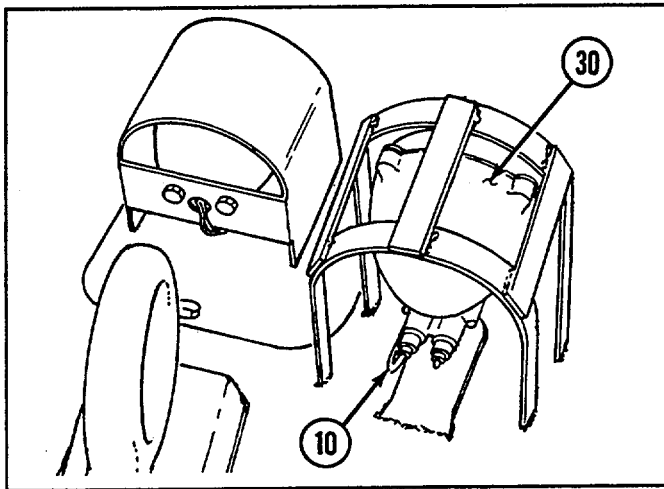
Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect two connectors (15 and 16) to bulkhead to main engine wiring harness and starter relay wiring harness (34).
- 2 Connect connector (13) to circuit breaker (33).
- 3 Connect connector (12) to bulkhead to main engine bracket and rear fuel tank transmitter wiring harness (32).
- 4 Connect connector (11) to rigger's left service light (31).



- 5 Connect connector (10) to rigger's right service light (30).
- 6 Connect connector (9) to master relay (29).



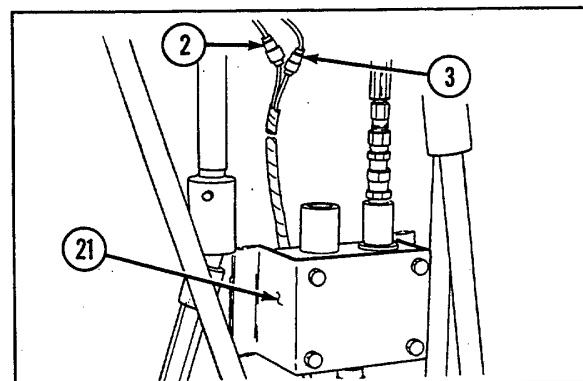
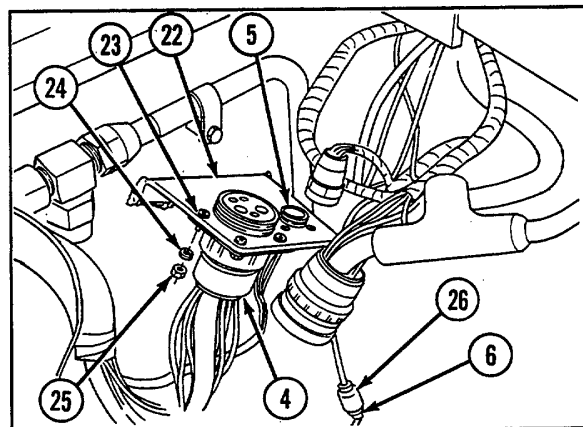
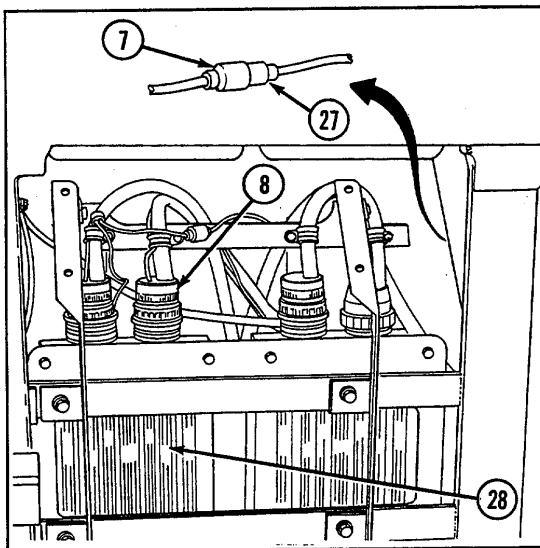
7 Connect connector (8) to APU voltage regulator (28).

8 Connect connector (7) to batteries to master relay, voltage regulators, slave receptacle, and engine disconnect wiring harness (27).

9 Connect connector (6) to APU wiring harness (26).

10 Connect two connectors (4 and 5) to APU engine disconnect (22) using four screws (23), four new lockwashers (24), and four nuts (25) for each.

11 Connect two connectors (2 and 3) to hydraulic pressure switch (221) .

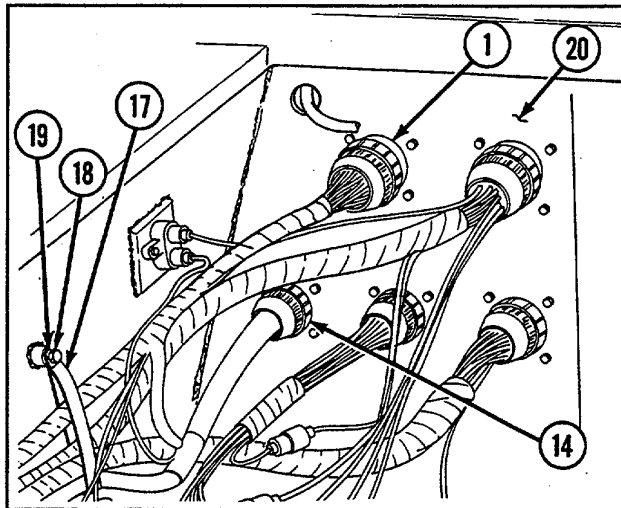


6-75 REPLACE/REPAIR BULKHEAD TO AUXILIARY POWER UNIT (APU), MASTER RELAY, AND RIGGER'S LIGHTS WIRING HARNESS (DUAL VOLTAGE) (1167241 2)-Continued

- 12 Connect two connectors (1 and 14) to bulkhead disconnect (20).
- 13 Install 20 clamps (17) using new lockwasher (19) and screw (18) for each.

NOTE

Follow-on maintenance: Install air inlet doors (see paragraph 9-56)



6-76 REPLACE/REPAIR BULKHEAD TO APU, MASTER RELAY, AND RIGGER'S LIGHTS WIRING HARNESS (SINGLE VOLTAGE) (11671324)

THIS TASK COVERS

- a. Removal
- b. Disassembly
- c. Assembly
- d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Lockwashers (4) (Appendix G, item 103)

Parts-Continued:

- Lockwashers (4) (Appendix G, item 105)
- Lockwashers (10) (Appendix G, item 116)

Equipment Condition:

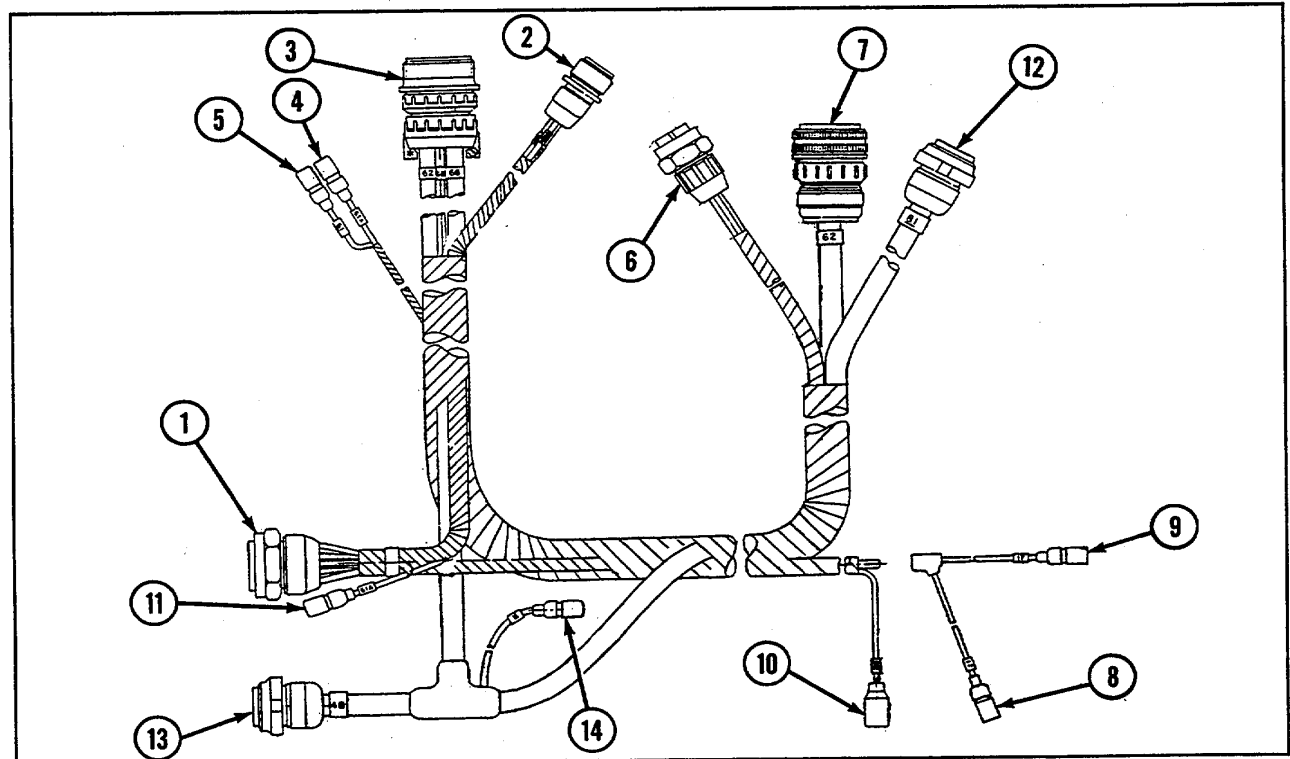
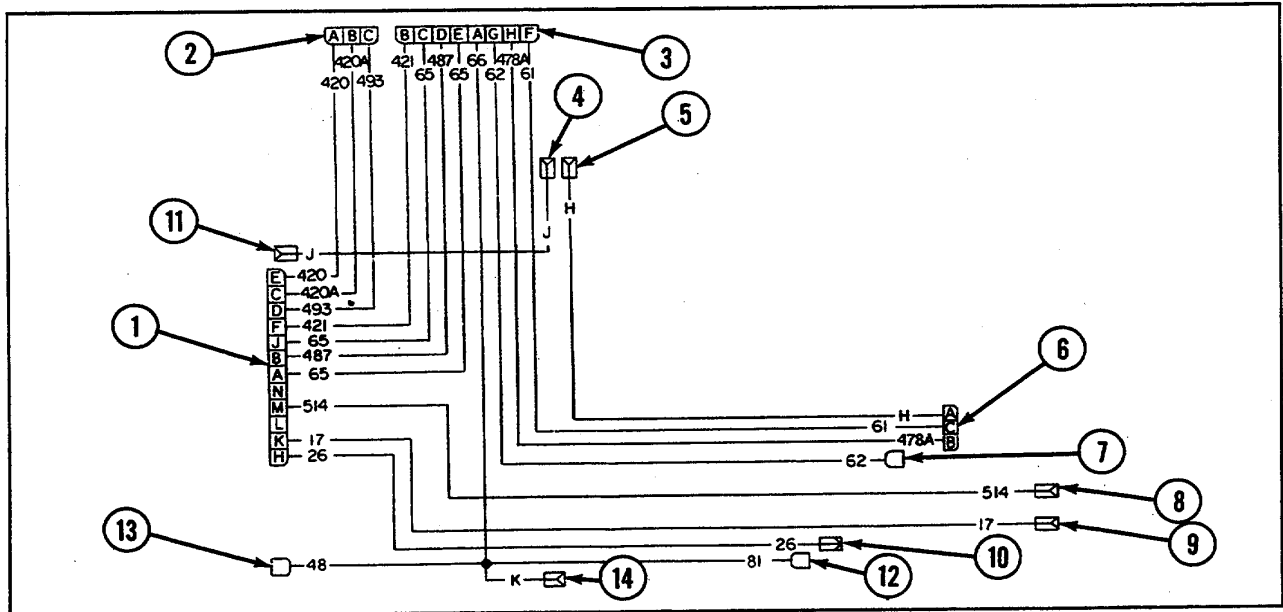
Air inlet grilles removed (see paragraph 9-56)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Bulkhead disconnect	420, 420A, 493, 421, 65, 487, 65, 514, 17, 26
2	APU engine disconnect	420, 420A, 493
3	APU engine disconnect	421, 65, 487, 66, 65, 62, 478A, 61
4	Hydraulic pressure switch	J
5	Hydraulic pressure switch	H
6	Switching relay box	H, 61, 478A
7	Main engine generator relay	62
8	Rigger's right service light	514
9	Rigger's left service light	17
10	Bulkhead to main engine wiring harness and starter relay wiring harness	26
11	Bulkhead to main engine wiring harness and starter relay wiring harness	J

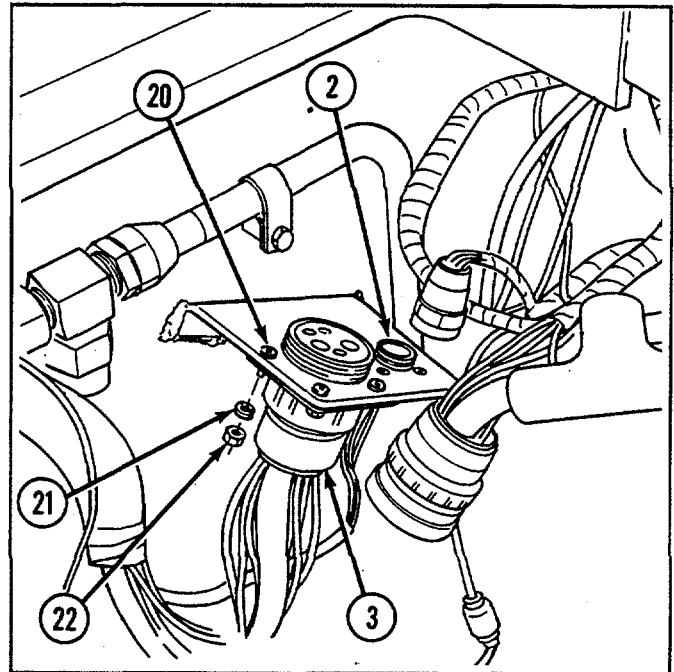
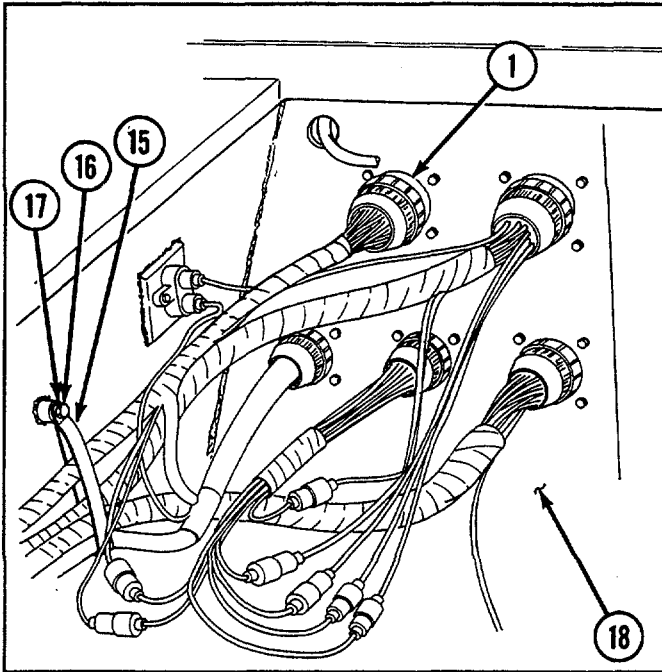
Connector No.	Electrical Lead To:	Wire No.
12	Master relay	81
13	Bulkhead disconnect	48
14	Circuit breaker	K



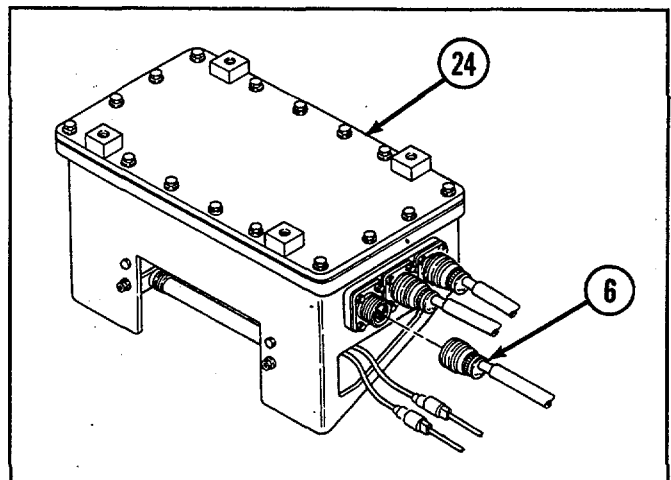
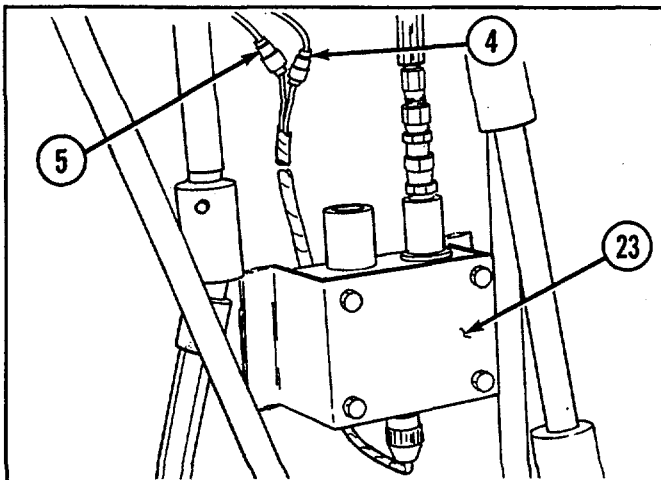
6-76 REPLACE/REPAIR BULKHEAD TO APU, MASTER RELAY, AND RIGGER'S LIGHTS WIRING HARNESS (SINGLE VOLTAGE) (11671324)-Continued

a. REMOVAL

- 1 Remove 10 clamps (15) by removing screw (16) and lockwasher (17) from each.
- 2 Disconnect connector (1) from bulkhead disconnect (18).
- 3 Disconnect two connectors (2 and 3) from APU engine disconnect by removing four screws (20), four lockwashers (21), and four nuts (22) from each.

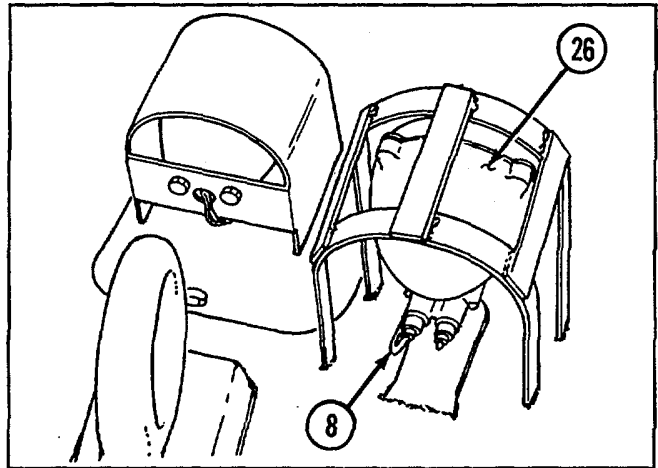
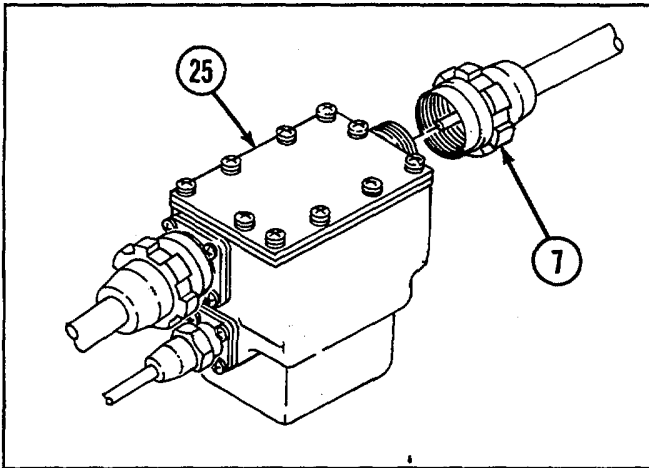


- 4 Disconnect two connectors (4 and 5) from hydraulic pressure switch (23).
- 5 Disconnect connector (6) from switching relay box (24).



6 Disconnect connector (7) from main engine generator relay (25).

7 Disconnect connector (8) from rigger's right service light (26) .



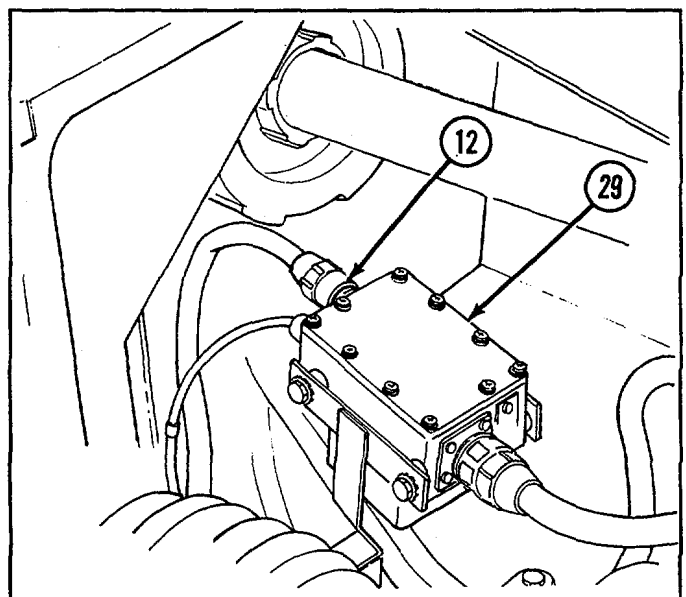
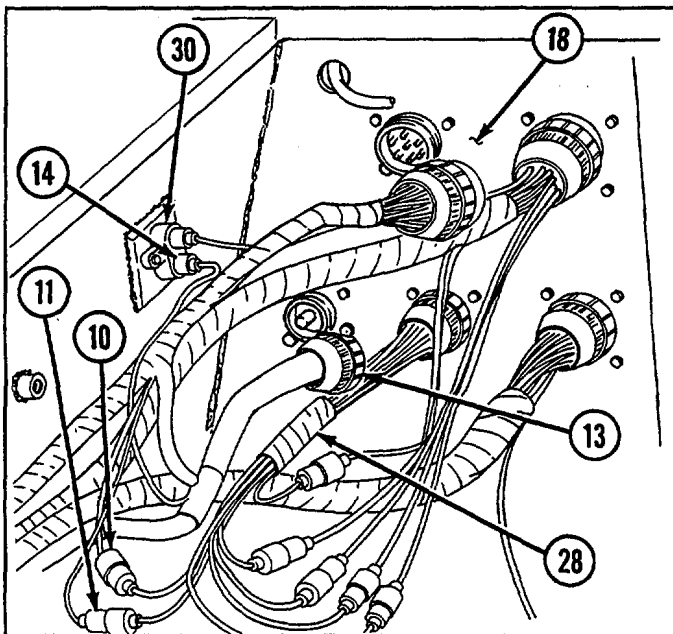
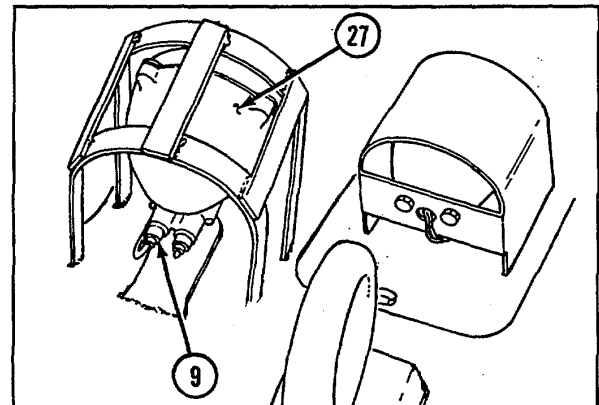
8 Disconnect connector (9) from rigger's left service light (27).

9 Disconnect two connectors (10 and 11) from bulkhead to main engine wiring harness and starter relay wiring harness (28).

10 Disconnect connector (12) from master relay (29).

11 Disconnect connector (13) from bulkhead disconnect (18).

12 Disconnect connector (14) from circuit breaker (30).



6-76 REPLACE/REPAIR BULKHEAD TO APU, MASTER RELAY, AND RIGGER'S LIGHTS WIRING HARNESS (SINGLE VOLTAGE) (11671324)-Continued

b. DISASSEMBLY

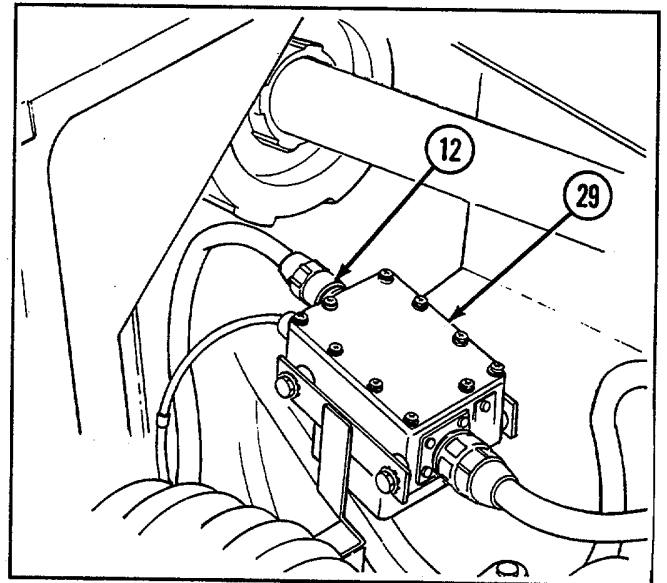
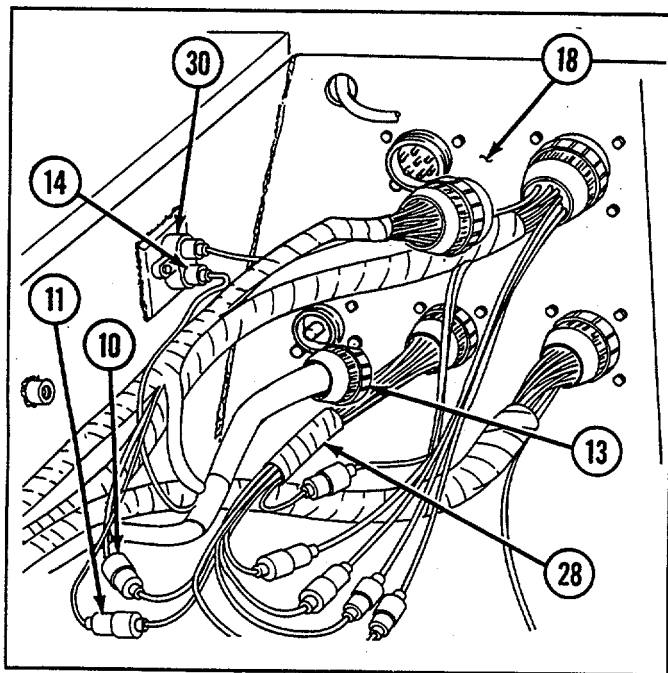
Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

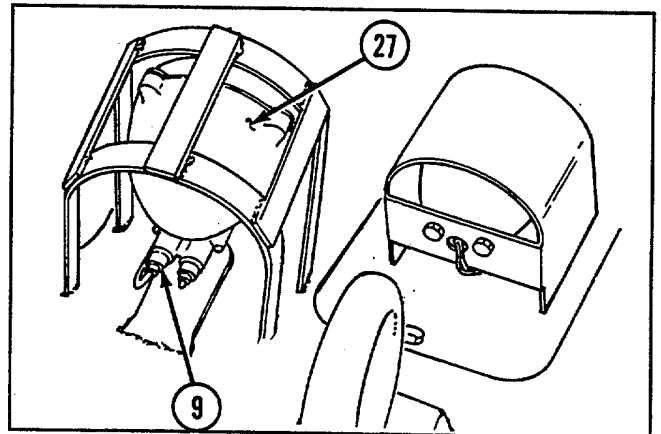
Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect connector (14) to circuit breaker (30).
- 2 Connect connector (13) to bulkhead disconnect (18).
- 3 Connect connector (12) to master relay (29).
- 4 Connect two connectors (10 and 11) to bulkhead to main engine wiring harness and starter relay wiring harness (28).

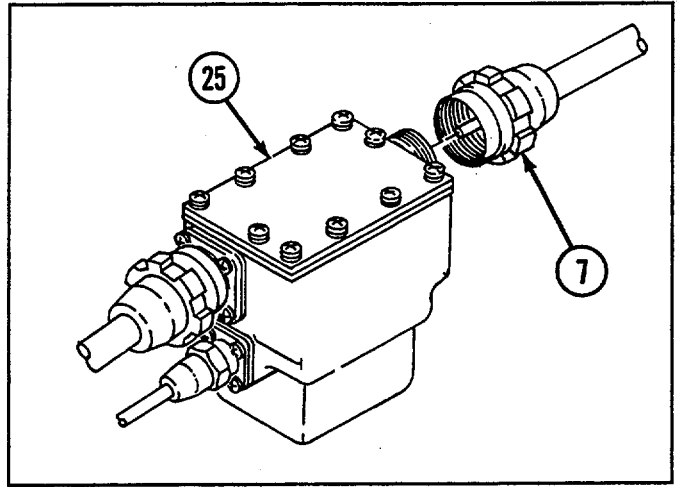
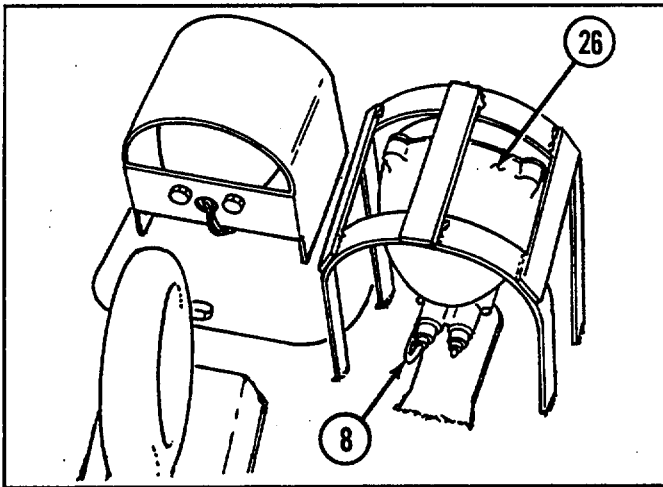


- 5 Connect connector (9) to rigger's left service light (27).



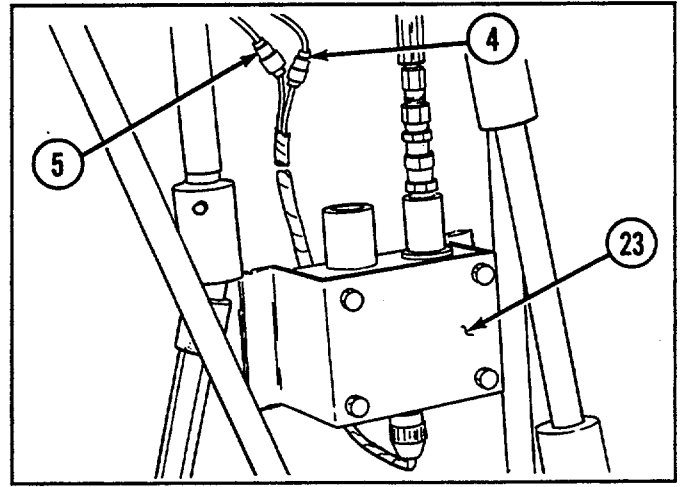
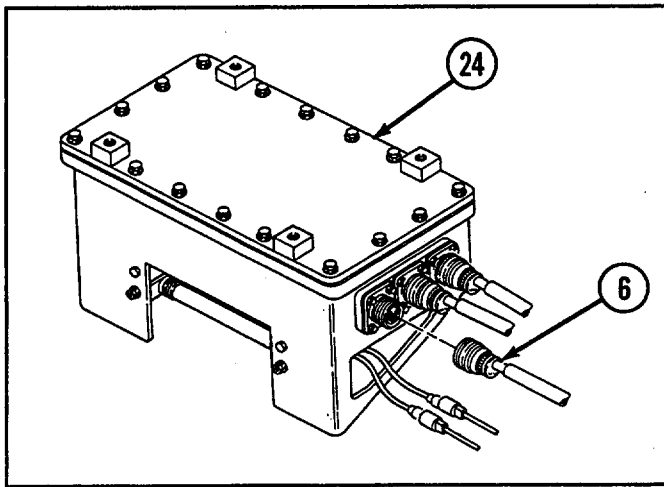
6 Connect connector (8) to rigger's right service light (26).

7 Connect connector (7) to main engine generator relay (25).

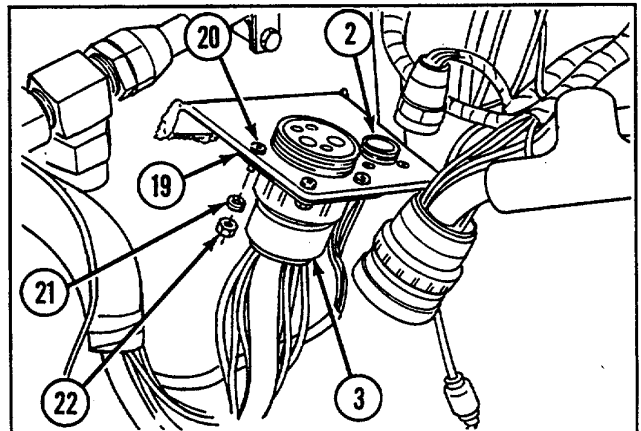


8 Connect connector (6) to rigger's switching relay box (24).

9 Connect two connectors (4 and 5) to hydraulic pressure switch (23).



10 Connect two connectors (2 and 3) to APU engine disconnect (19) using four screws (20), four new lockwashers (21), and four nuts (22).

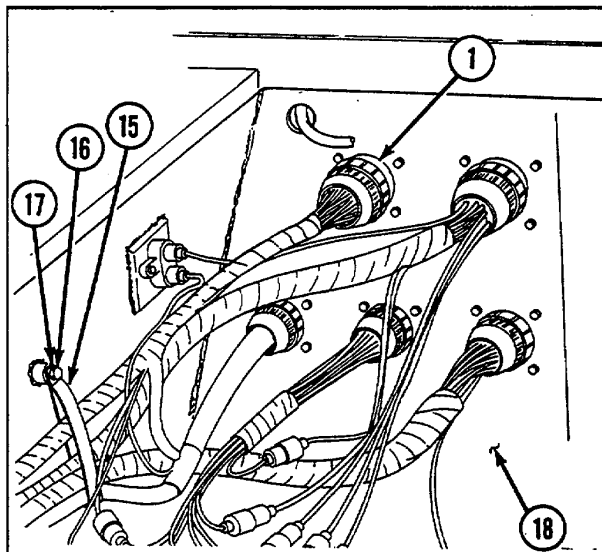


6-76 REPLACE/REPAIR BULKHEAD TO APU, MASTER RELAY, AND RIGGER'S LIGHTS WIRING HARNESS (SINGLE VOLTAGE) (11671324)-Continued

- 11 Connect connector (1) to bulkhead disconnect (18) .
- 12 Install 10 clamps (15) using new lockwasher (17) and screw (16) for each.

NOTE

Follow-on maintenance: Install air inlet grilles (see paragraph 9-56)



6-77 REPLACE/REPAIR BULKHEAD REAR SLAVE RECEPTACLE WIRING HARNESS (10894850-4)

THIS TASK COVERS

- a. Removal
- b. Disassembly
- c. Assembly
- d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts-Continued:

- Lockwashers (4) (Appendix G, item 108)
- Lockwashers (1) (Appendix G, item 151)

Parts:

- Lockwashers (4) (Appendix G, item 105)

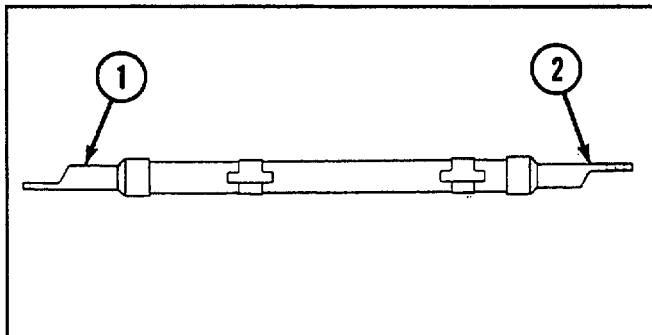
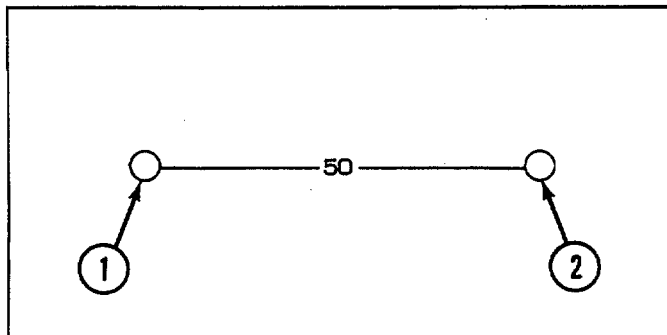
Equipment Condition:

Engine deck removed (see paragraph 9-51)

WARNING

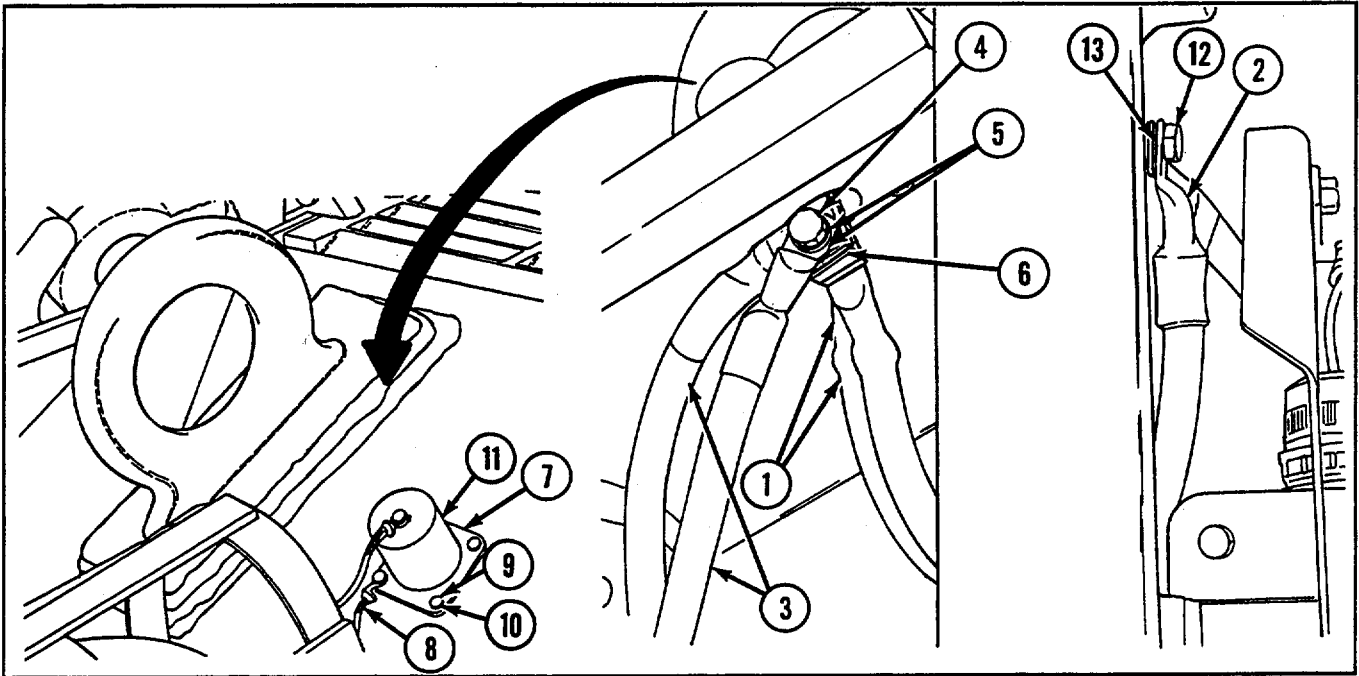
Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Slave receptacle	50
2	Ground	50



a. REMOVAL

- 1 Disconnect two leads (1) and two leads (3) by removing two screws (4) and four lockwashers (5) from slave receptacle (6).
- 2 Remove connector receptacle (7) and cap strap (8) by removing four screws (9) and four lockwashers (10).
- 3 Separate cap (11) from connector receptacle (7).
- 4 Remove two lead assemblies (2) by removing screw (12) and lockwasher (13).

**b. DISASSEMBLY**

Disassemble lead assemblies (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble lead assemblies (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Install two lead assemblies (2) using screw (12) and new lockwasher (13).
- 2 Install cap (11) to connector receptacle (7).
- 3 Install connector receptacle (7) and cap strap (8) using four screws (9) and four new lockwashers (10).
- 4 Connect two leads (1) and two leads (3) to slave receptacle (6) using two screws (4) and four new lockwashers (5).

NOTE

Follow-on maintenance: Install engine deck (see paragraph 9-51)

6-78 REPLACE/REPAIR APU WIRING HARNESS (11672417)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Lockwasher (Appendix G, item 103)
- Lockwashers (4) (Appendix G, item 107)

Parts-Continued:

- Lockwashers (3) (Appendix G, item 108)

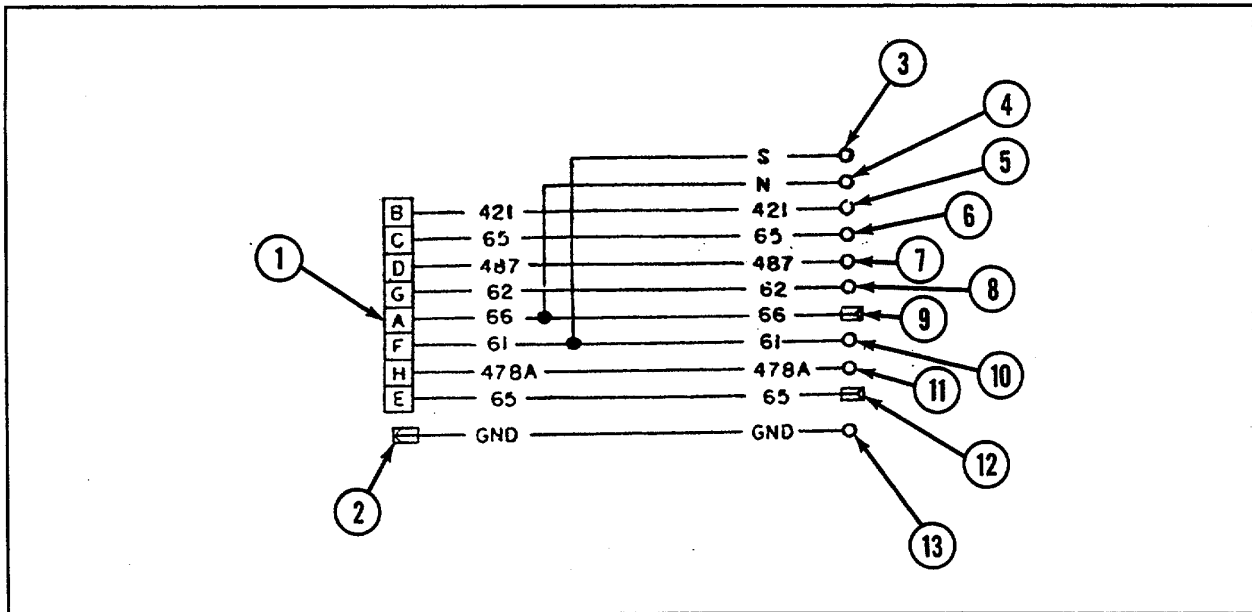
Equipment Condition:

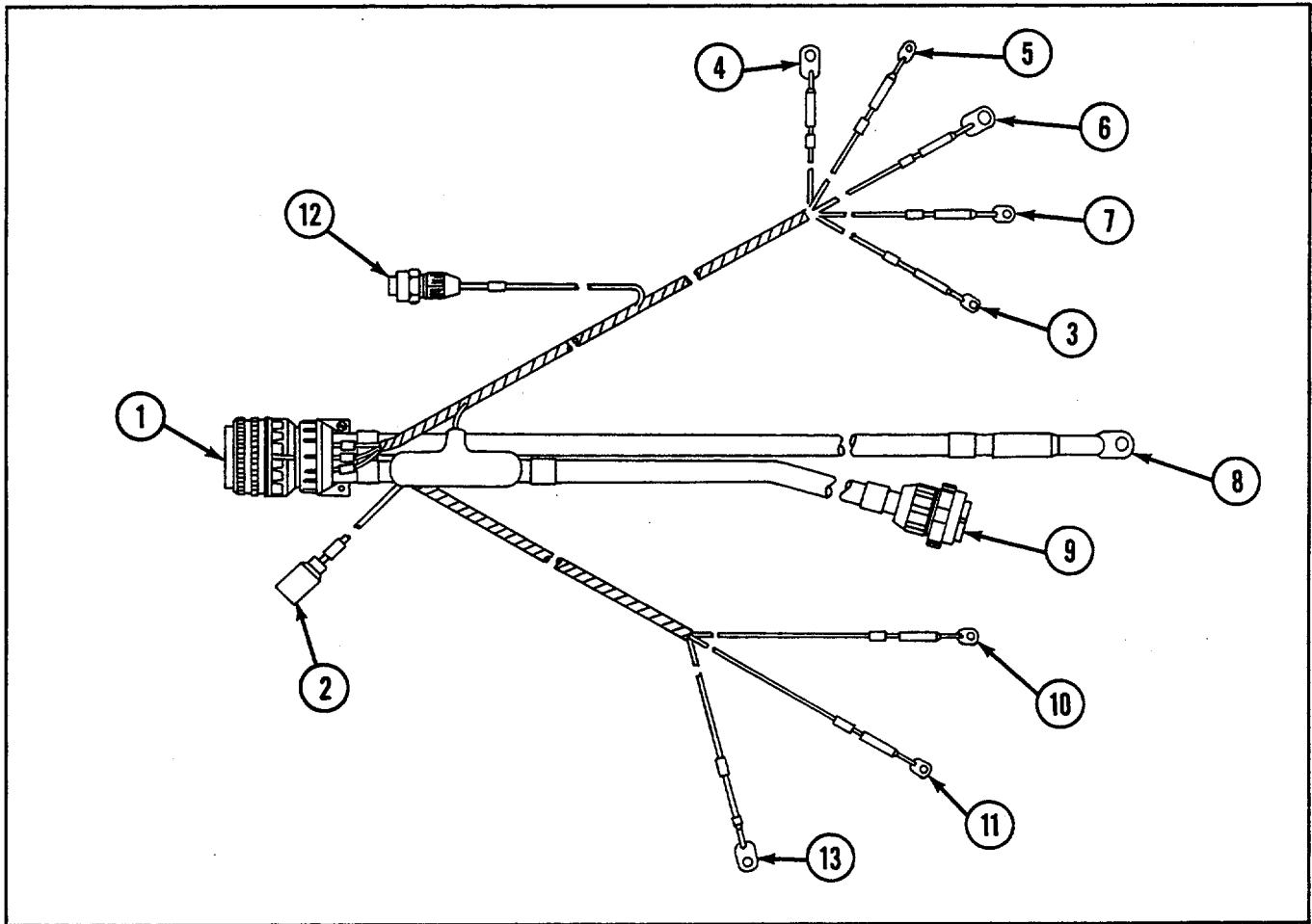
APU access cover assembly removed (see paragraph 9-49)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

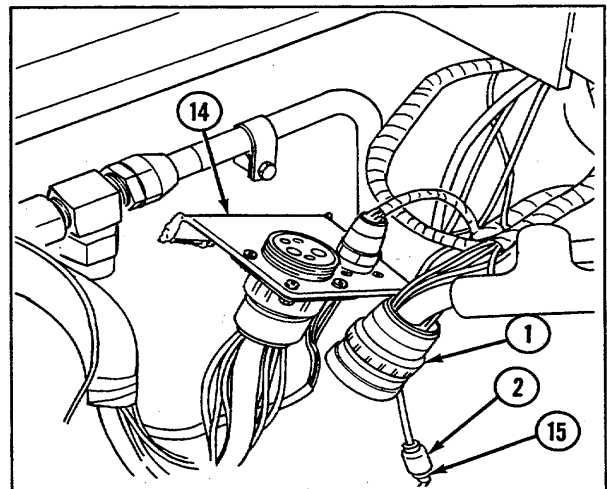
Connector No.	Electrical Lead To:	Wire No.
1	APU engine disconnect bracket	421, 65, 487, 62, 66, 61, 478A, 65
2	Bulkhead to APU, master relay, and rigger's lights wiring harness	GND
3	Diode assembly	S
4	Preheat solenoid	N
5	Fuel shutoff solenoid	421
6	Preheat solenoid	65
7	Preheat solenoid	487
8	APU generator	62
9	APU starter relay	66
10	APU generator	61
11	APU generator	478A
12	APU starter relay	65
13	APU generator	GND





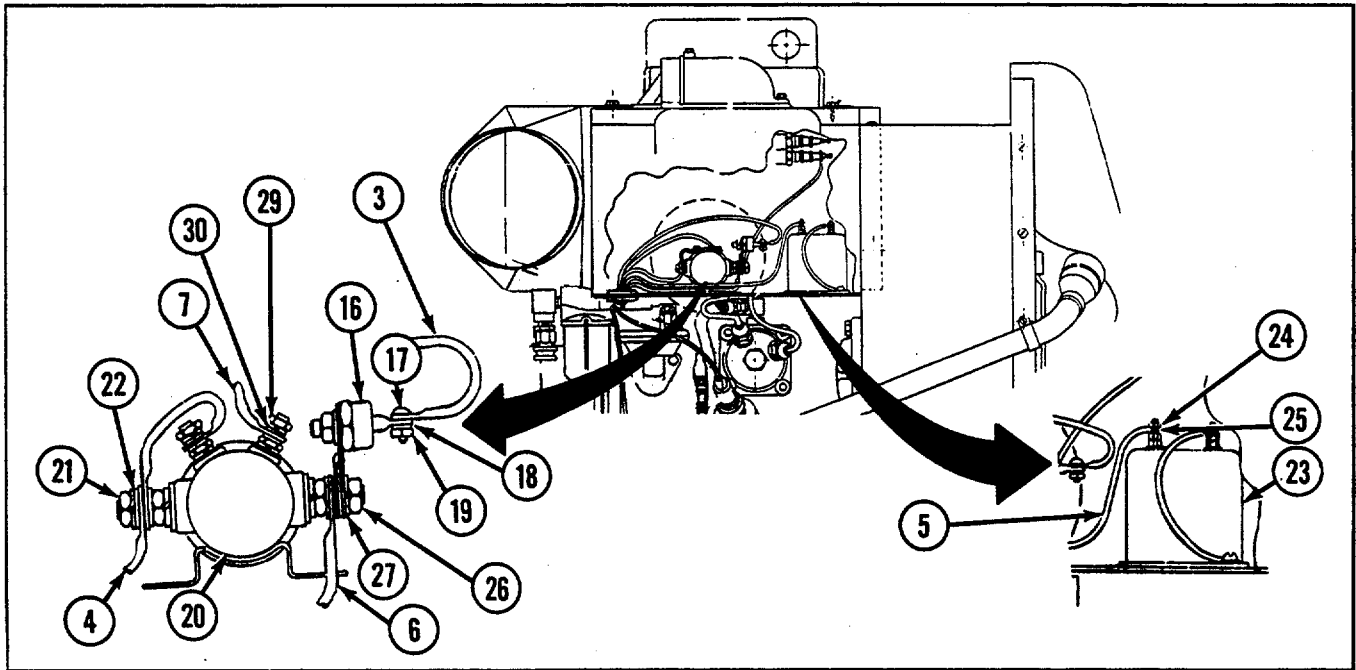
a. REMOVAL

- 1 Disconnect connector (1) from APU engine disconnect bracket (14)
2. Disconnect connector (2) from bulkhead to APU, master relay, and rigger's lights wiring harness (15)

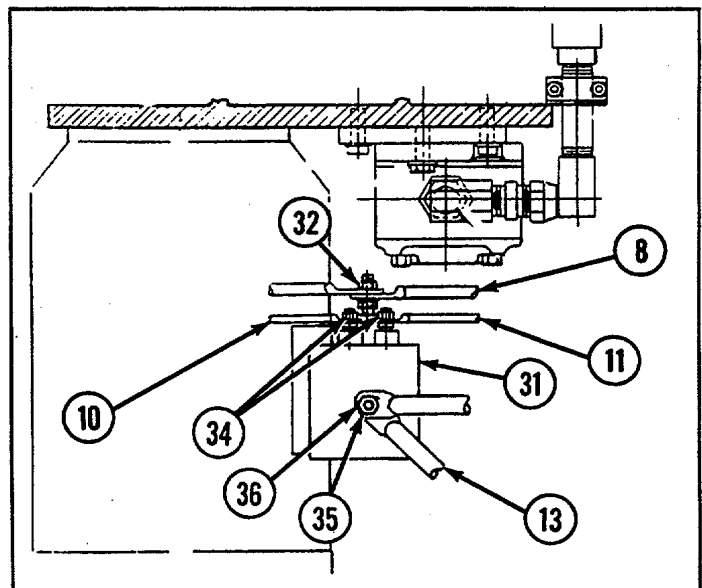


6-78 REPLACE/REPAIR APU WIRING HARNESS (11672417)-Continued

- 3 Disconnect lead (3) from diode assembly (16) by removing screw (17), lockwasher (18), and nut (19).
- 4 Disconnect lead (4) from preheat solenoid (20) by removing nut (21) and washer (22).
- 5 Disconnect lead (5) from fuel shutoff solenoid (23) by removing nut (24) and washer (25).
- 6 Disconnect lead (6) from preheat solenoid (20) by removing nut (26) and four lockwashers (27).
- 7 Disconnect lead (7) from preheat solenoid (20) by removing nut (29) and lockwasher (30).



- 8 Disconnect lead (8) from APU generator (31) by removing nut (32).
- 9 Disconnect two leads (10 and 11) from APU generator (31) by removing two nuts (34).
- 10 Disconnect lead (13) from APU generator (31) by removing nut (35) and three lockwashers (36).



- 11 Disconnect two connectors (9 and 12) from APU starter relay (33).
- 12 Remove two clamps (37) by removing two screws (38) and two washers (39).

b. DISASSEMBLY

Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

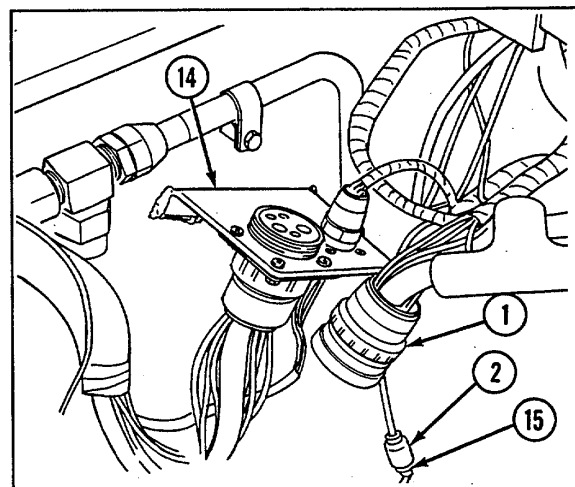
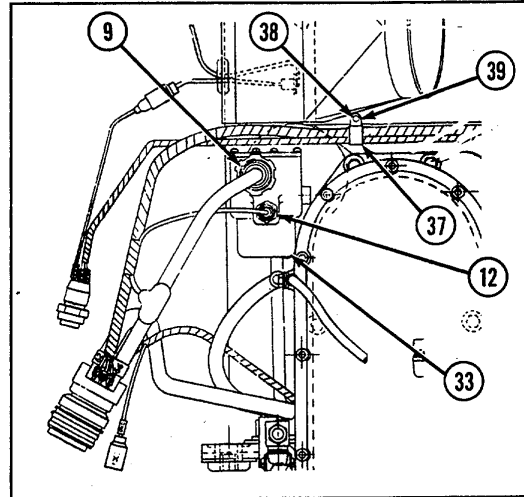
Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Install two clamps (37) using two screws (38) and two washers (39).
- 2 Connect lead (13) to APU generator (31) using three new lockwashers (36) and nut (35).
- 3 Connect two leads (10 and 11) to APU generator (31) using two nuts (34).
- 4 Connect two connectors (9 and 12) to APU starter relay (33).
- 5 Connect lead (8) to APU generator (31) using nut (32).
- 6 Connect lead (7) to preheat solenoid (20) using four lockwashers (27) and nut (26).
- 7 Connect lead (6) to preheat solenoid (20) using four lockwashers (27) and nut (26).
- 8 Connect lead (5) from fuel shutoff solenoid (23) using washer (25) and nut (24).
- 9 Connect lead (4) to preheat solenoid (20) using washer (22) and nut (21).
- 10 Connect lead (3) to diode assembly (16) using screw (17), new lockwasher (18), and nut (19).
- 11 Connect connector (2) to bulkhead to APU, master relay, and rigger's lights wiring harness (15).
- 12 Connect connector (1) to APU engine disconnect bracket (14).

NOTE

Follow-on maintenance	Install APU access cover assembly (see paragraph 9-49)
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6-79 REPLACE/REPAIR APU CONTROL BOX TO FOOT DIMMER SWITCH AND BULKHEAD WIRING HARNESS (DUAL VOLTAGE) (11672466)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts-Continued:

- Lockwashers (4) (Appendix G, item 104)
- Lockwashers (19) (Appendix G, item 118)

Parts:

- Gasket (Appendix G, item 80)
- Lockwasher (Appendix G, item 116)

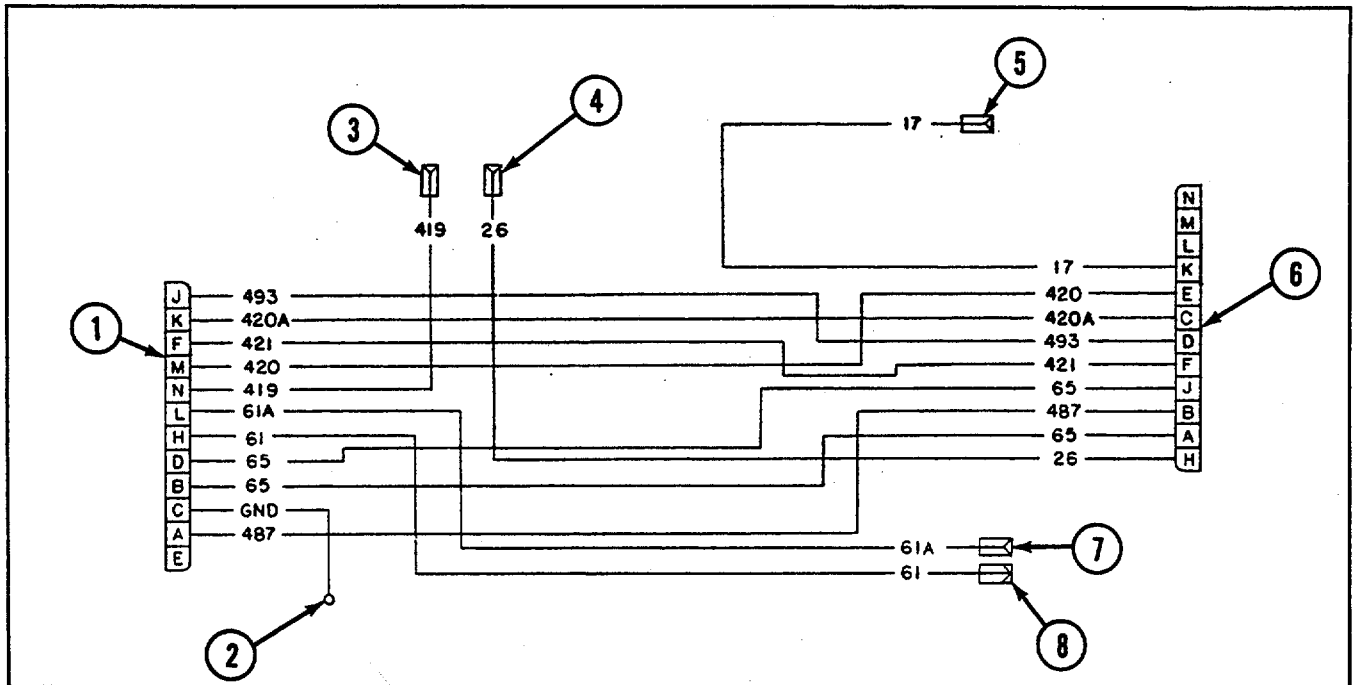
Equipment Condition:

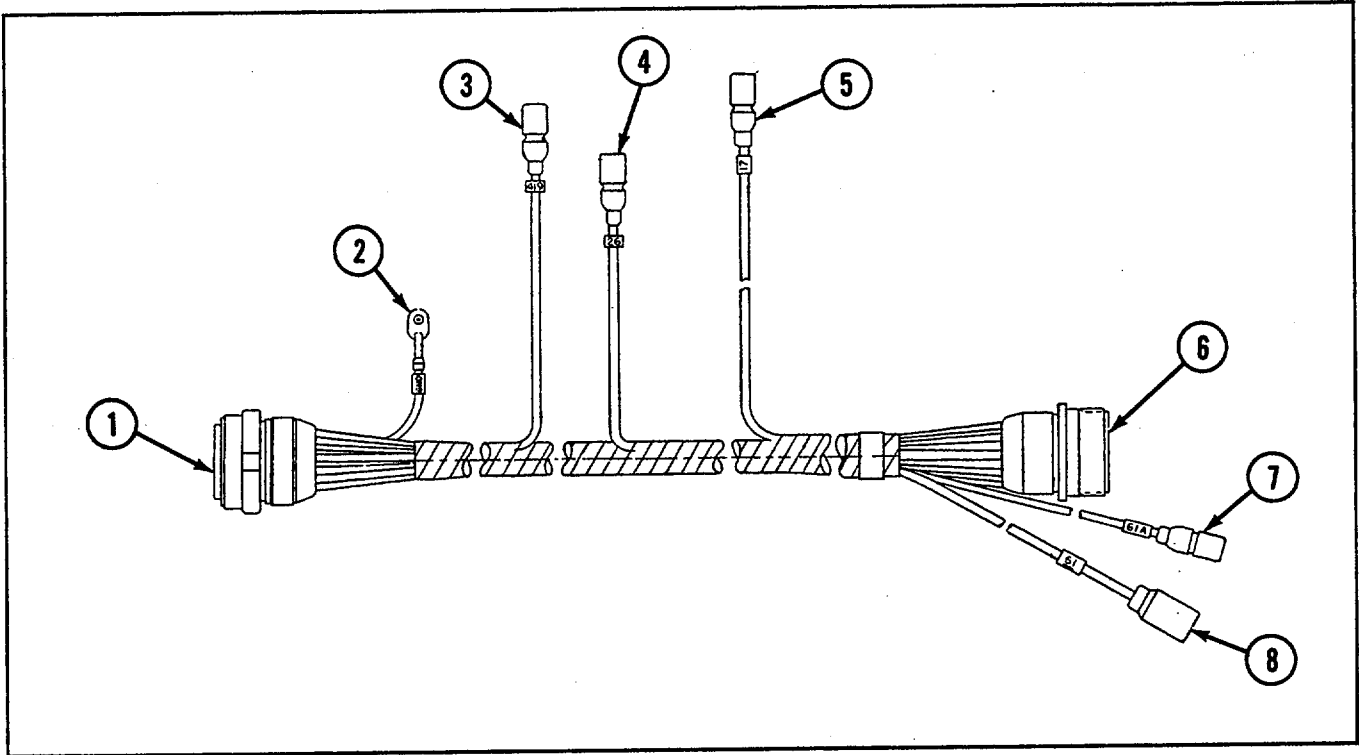
Air cleaner removed (see paragraph 4-24)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

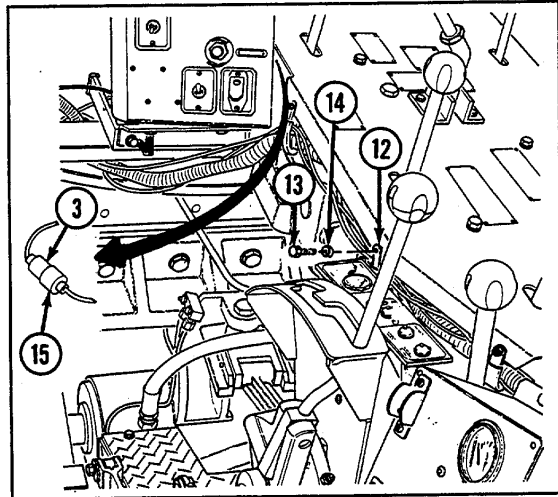
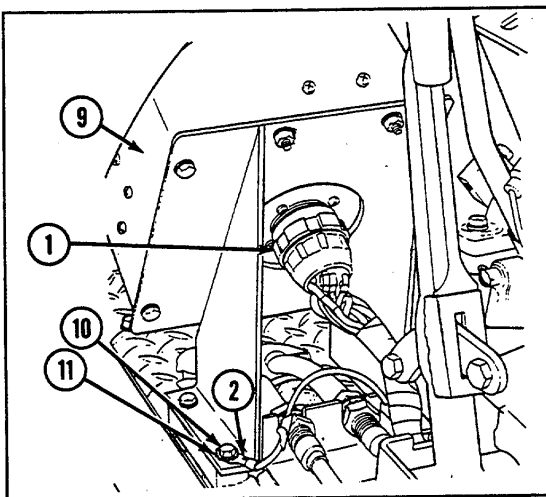
Connector No.	Electrical Lead To:	Wire No.
1	APU control box	493, 420A, 421, 420, 419, 61A, 61, 65, 65, GND, 487
2	APU control box mounting bracket	GND
3	Switch panel to gage panel and miscellaneous switches wiring harness (passive night viewer) (dual voltage) (12322547)	419
4	Gage panel to bulkhead wiring harness (dual voltage) (12322587)	26
5	Rigger's light selector switch	17
6	Bulkhead disconnect	17, 420, 420A, 493, 421, 65, 487, 26, 65
7	Switch panel to neutral safety to bulkhead wiring harness	61A
8	Switch panel to neutral safety to bulkhead wiring harness	61





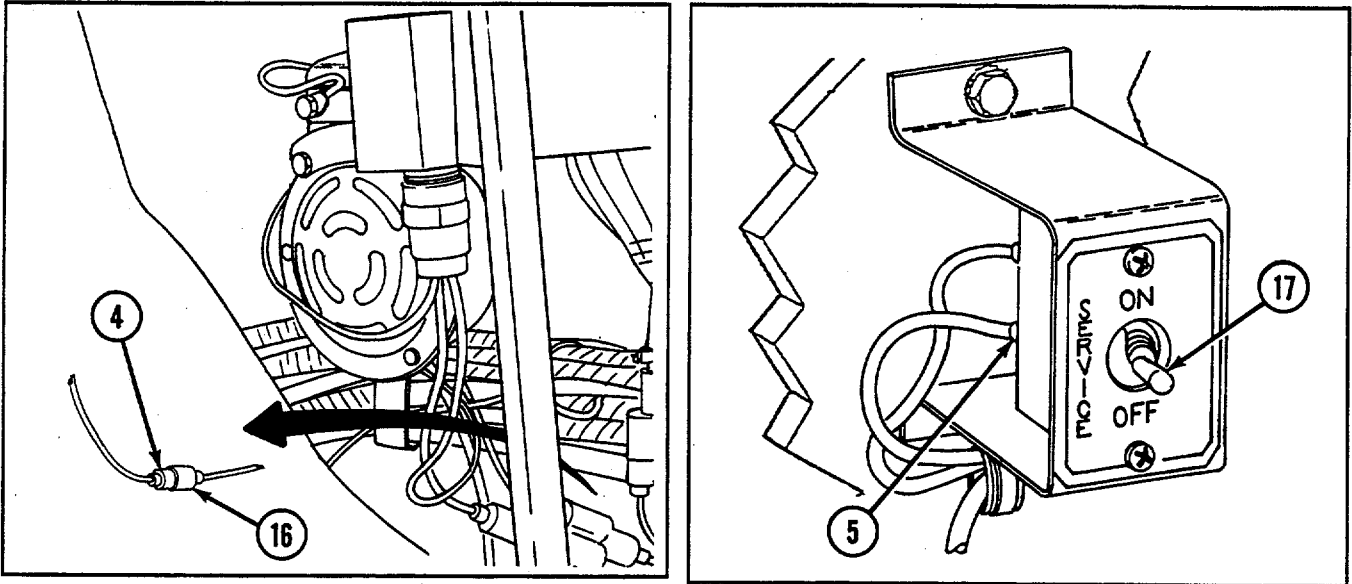
a. REMOVAL

- 1 Disconnect connector (1) from APU control box (9).
- 2 Disconnect lead (2) by removing screw (10) and lockwasher (11).
- 3 Remove 19 clamps (12) by removing screw (13) and lockwasher (14).
- 4 Disconnect connector (3) from switch panel to gage panel and miscellaneous switches wiring harness (passive night viewer) (dual voltage) (15).



6-79 REPLACE/REPAIR APU CONTROL BOX TO FOOT DIMMER SWITCH AND BULKHEAD WIRING HARNESS (DUAL VOLTAGE) (11672466)-Continued

- 5 Disconnect connector (4) from gage panel to bulkhead wiring harness (16).
- 6 Disconnect connector (5) from rigger's light selector switch (17).



- 7 Disconnect connector (6) from bulkhead disconnect (18) by removing four screws (19), four lockwashers (20), and gasket (21).
- 8 Disconnect two connectors (7 and 8) from switch panel to neutral safety to bulkhead wiring harness (22).

b. DISASSEMBLY

Disassemble wiring harness (see Chapter 6, Section VII).

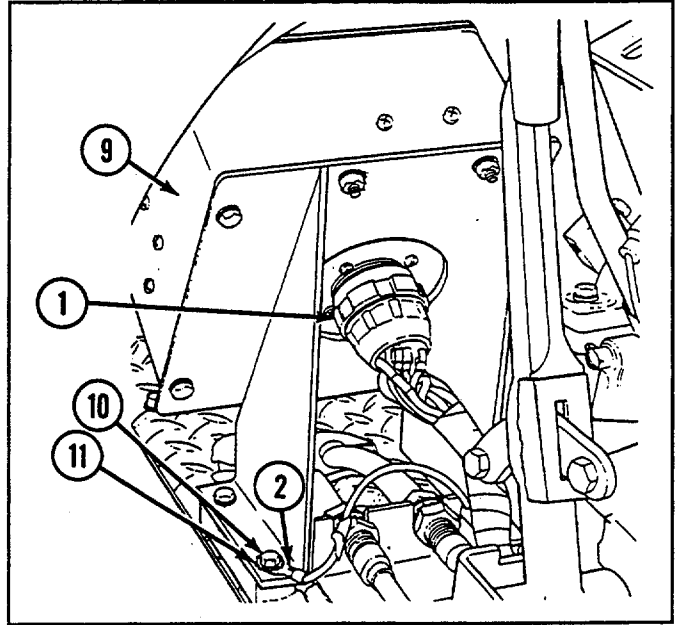
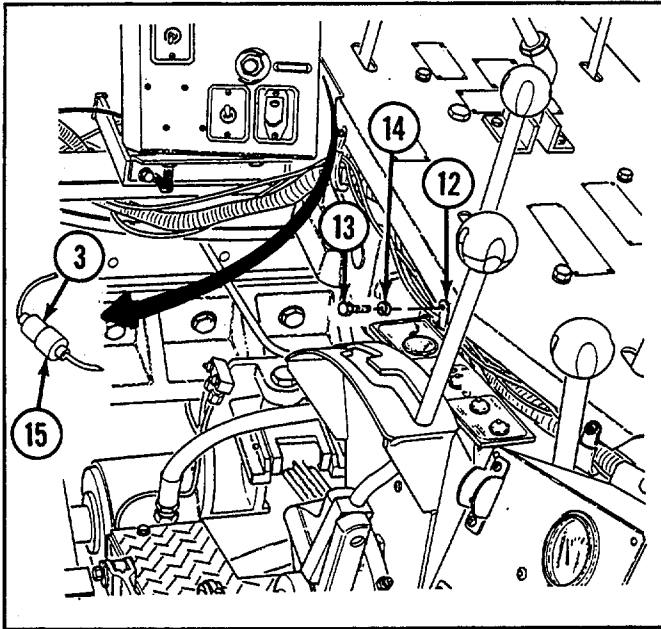
c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect two connectors (7 and 8) to switch panel to neutral safety to bulkhead wiring harness (22).
- 2 Connect connector (6) to bulkhead disconnect (18) using new gasket (21), four new lockwashers (20), and four screws (19).
- 3 Connect connector (5) to rigger's light selector switch (17).
- 4 Connect connector (4) to gage panel to bulkhead wiring harness (16).

- 5 Connect connector (3) to switch panel to gage panel and miscellaneous switches wiring harness (passive night viewer) (dual voltage) (15).
- 6 Install 19 clamps (12) using new lockwasher (14) and screw (13) for each.
- 7 Connect lead (2) using new lockwasher (11) and screw (10).
- 8 Connect connector (1) to APU control box (9).

**NOTE**

Follow-on maintenance: Install air cleaner (see paragraph 4-24)

6-80 APU CONTROL BOX TO FOOT DIMMER SWITCH AND BULKHEAD WIRING HARNESS (SINGLE VOLTAGE) (11671799)

THIS TASK COVERS

a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Gasket (Appendix G, item 80)
- Lockwashers (4) (Appendix G, item 104)

Parts-Continued:

- Lockwashers (19) (Appendix G, item 118)

Equipment Condition:

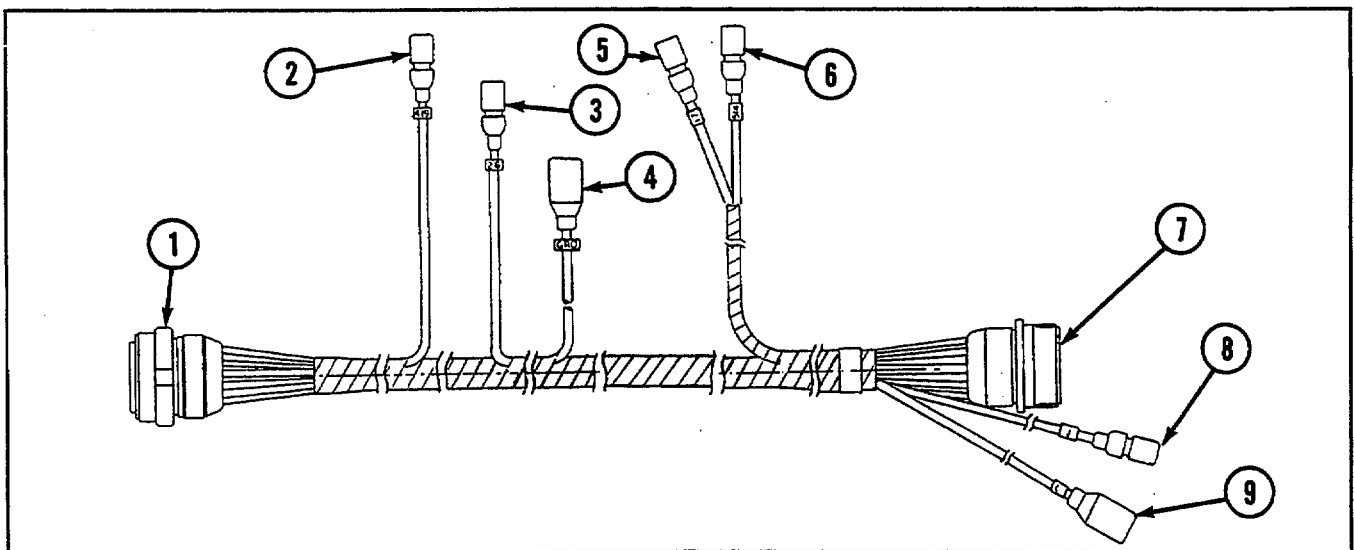
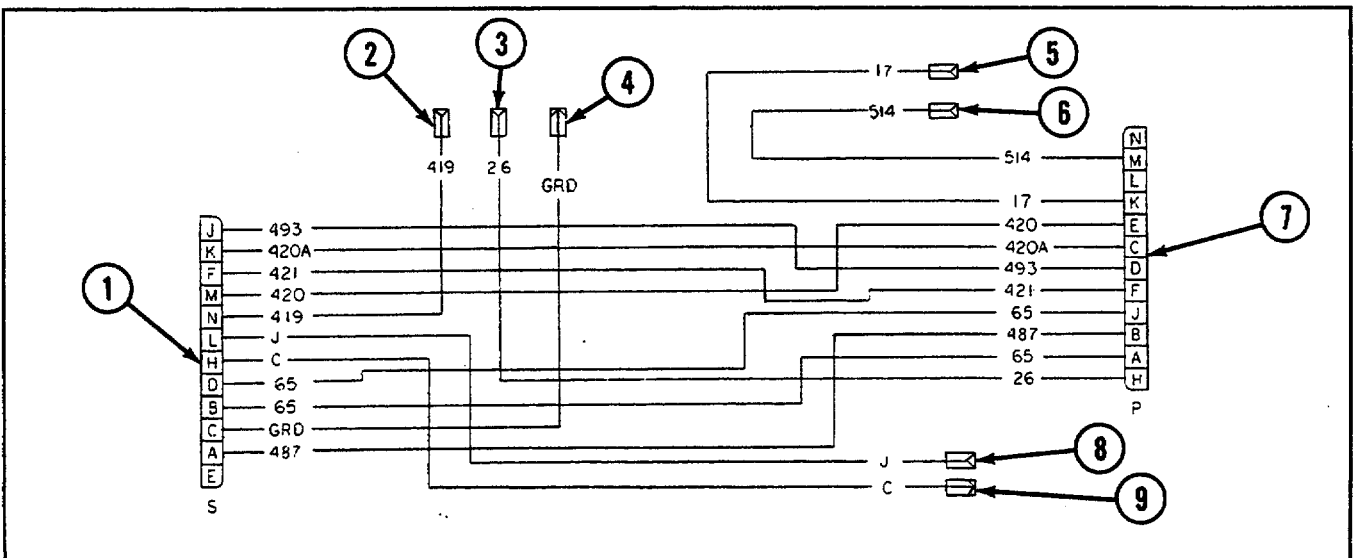
Air cleaner removed (see paragraph 4-24)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

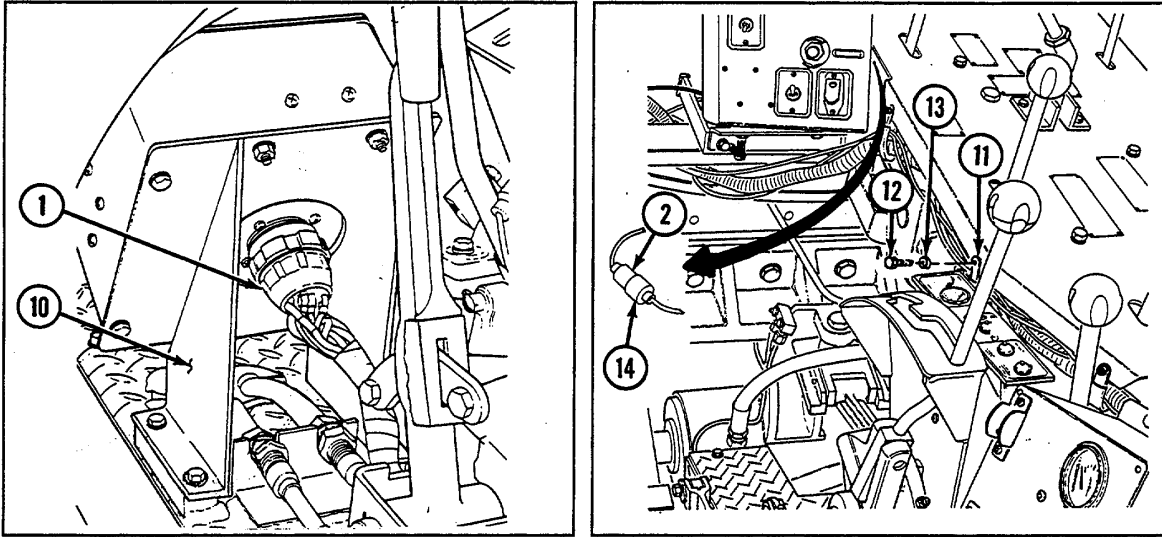
6-80 REPLACE/REPAIR APU CONTROL BOX TO FOOT DIMMER SWITCH AND BULKHEAD WIRING HARNESS (SINGLE VOLTAGE) (11671799)--Continued

Connector No.	Electrical Lead To:	Wire No.
1	APU control box	493, 420A, 421, 420, 419, J, C, 65, GND, 487
2	Switch panel to gage panel and miscellaneous switches wiring harness (infrared night viewer) (single voltage) (11671795)	419
3	Gage panel to bulkhead wiring harness (single voltage) (11671807)	26
4	Gage panel to bulkhead wiring harness (single voltage) (11671807)	GND
5	Rigger's light selector switch	17
6	Rigger's light selector switch	514
7	Bulkhead disconnect	514, 17, 420, 420A, 493, 421, 65, 487, 26
8	Switch panel to neutral safety to bulkhead wiring harness	J
9	Switch panel to neutral safety to bulkhead wiring harness	C

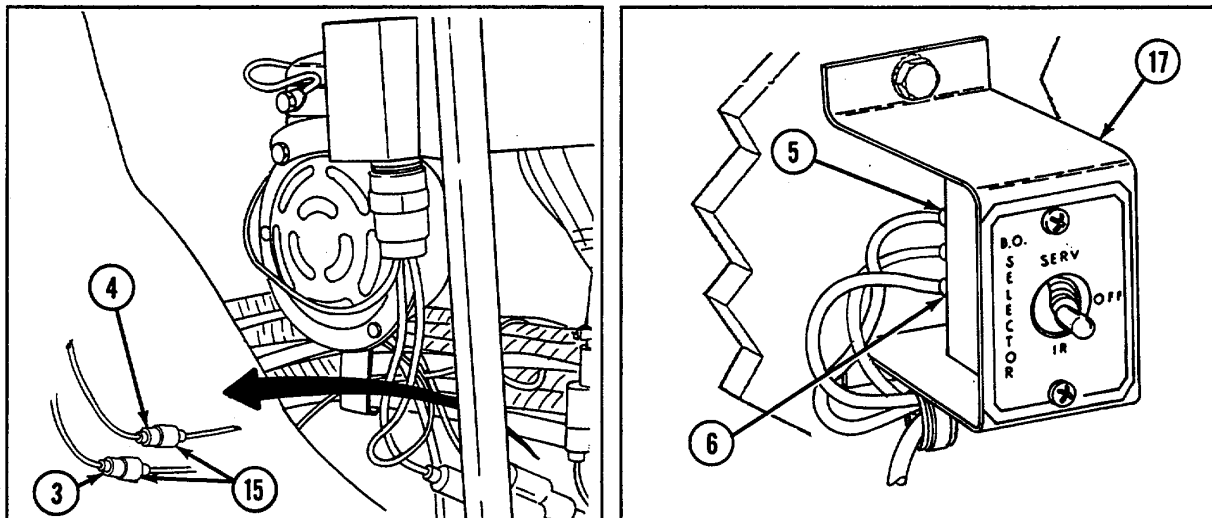


a. REMOVAL

- 1 Disconnect connector (1) from APU control box (10).
- 2 Remove 19 clamps (11) by removing screw (12) and lockwasher (13) from each.
- 3 Disconnect connector (2) from switch panel to gage panel and miscellaneous switches wiring harness (infrared night viewer) (single voltage) (14).



- 4 Disconnect two connectors (3 and 4) from gage panel to bulkhead wiring harness (15).
- 5 Disconnect connectors (5 and 6) from rigger's light selector switch (17).



6-80 REPLACE/REPAIR APU CONTROL BOX TO FOOT DIMMER SWITCH AND BULKHEAD WIRING HARNESS (SINGLE VOLTAGE) (11671799)--Continued

- 6 Disconnect connector (7) from bulkhead disconnect (18) by removing four screws (19), four lockwashers (20), and gasket (21).
- 7 Disconnect two connectors (8 and 9) from switch panel to neutral safety to bulkhead wiring harness (22).

b. DISASSEMBLY

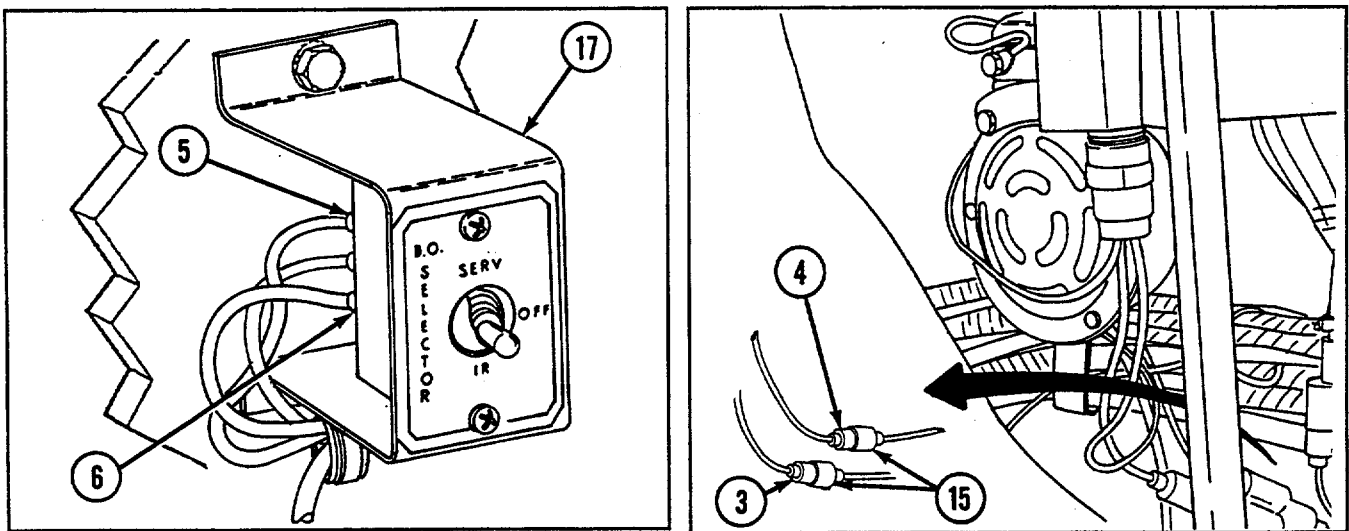
Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

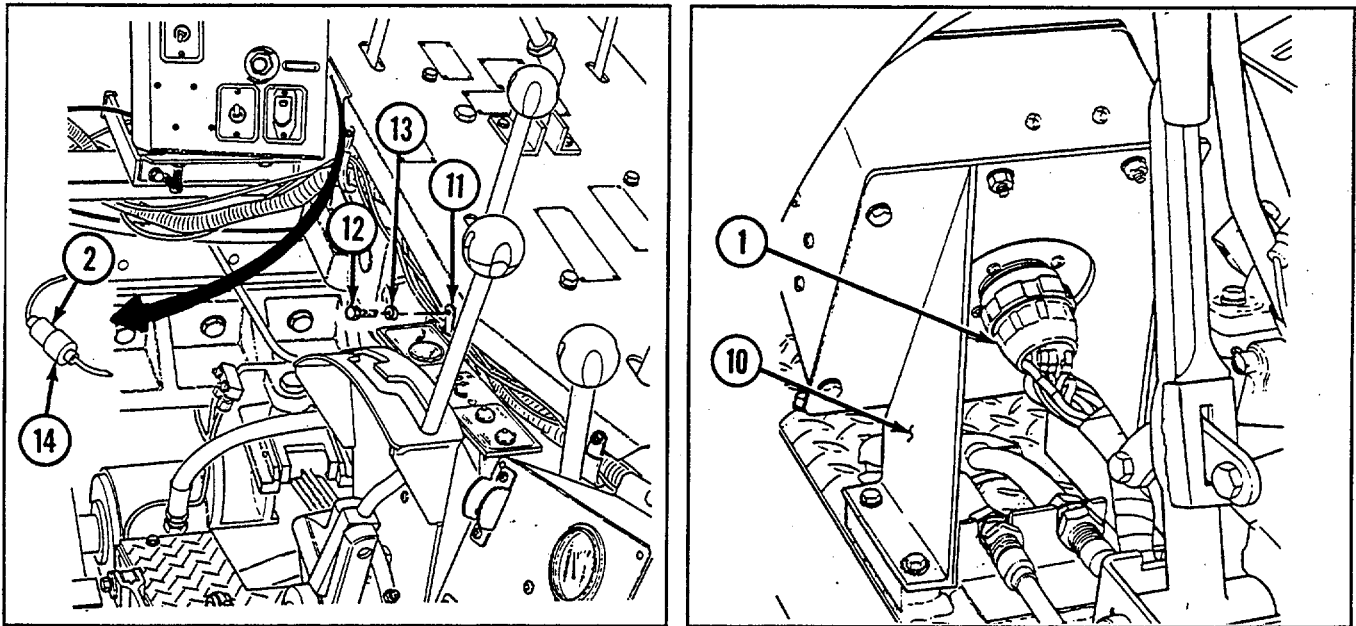
Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect two connectors (8 and 9) to switch panel to neutral safety to bulkhead wiring harness (22).
- 2 Connect connector (7) and install new gasket (21) to bulkhead disconnect (18) using four screws (19) and four new lockwashers (20).
- 3 Connect two connectors (5 and 6) to rigger's light selector switch (17).
- 4 Connect two connectors (3 and 4) to gage panel to bulkhead wiring harness (15).



- 5 Connect connector (2) to switch panel to gage panel and miscellaneous switches wiring harness (infrared night viewer) (14).
- 6 Install 19 clamps (11) using new lockwasher (13) and screw (12) for each.
- 7 Connect connector (1) to APU control box (10).

**NOTE**

Follow-on maintenance: Install air cleaner (see paragraph 4-25)

6-81 REPLACE/REPAIR APU AND ENGINE GENERATOR RELAYS TO VOLTAGE REGULATOR WIRING HARNESS (SINGLE VOLTAGE) (11671793)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's (Appendix C, item 53)

Equipment Condition:

Air inlet grilles removed as necessary (see paragraph 9-56)

Parts:

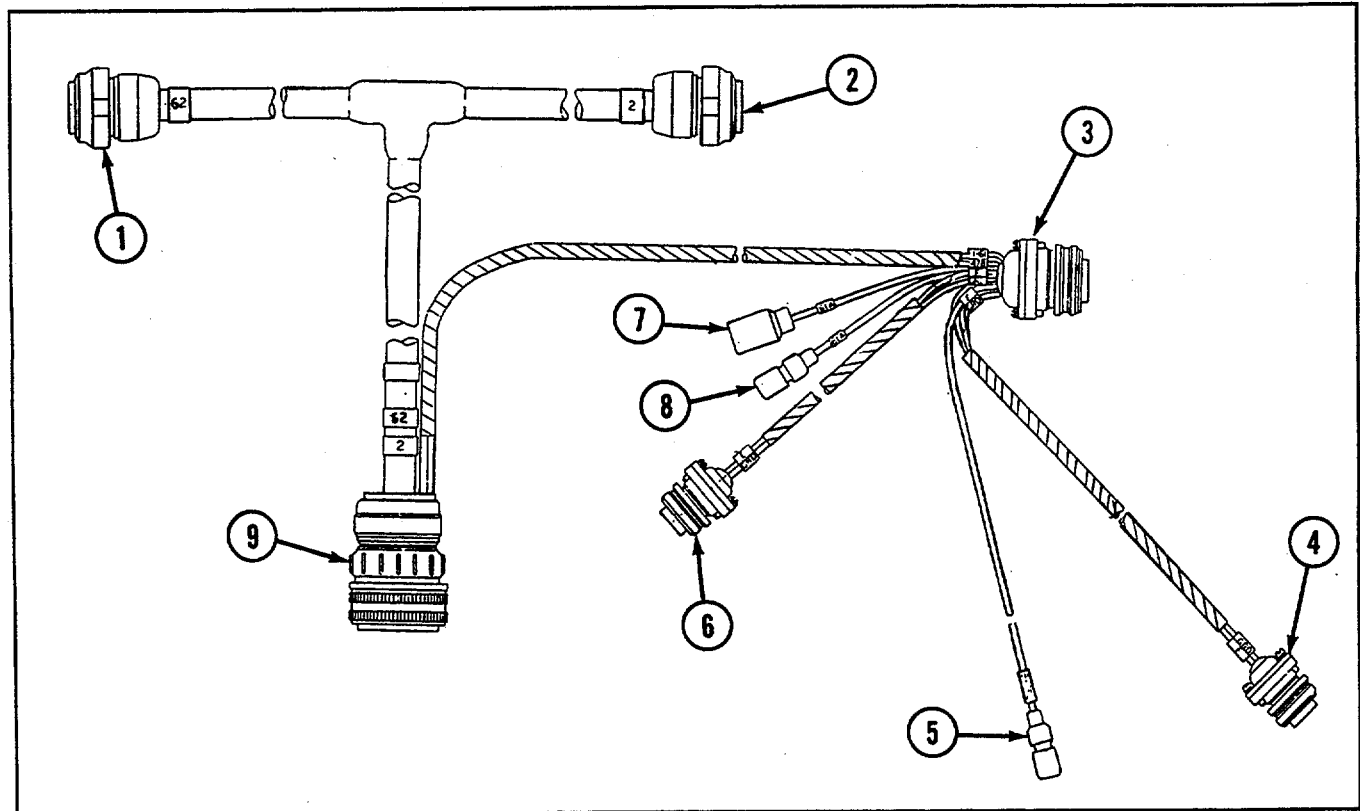
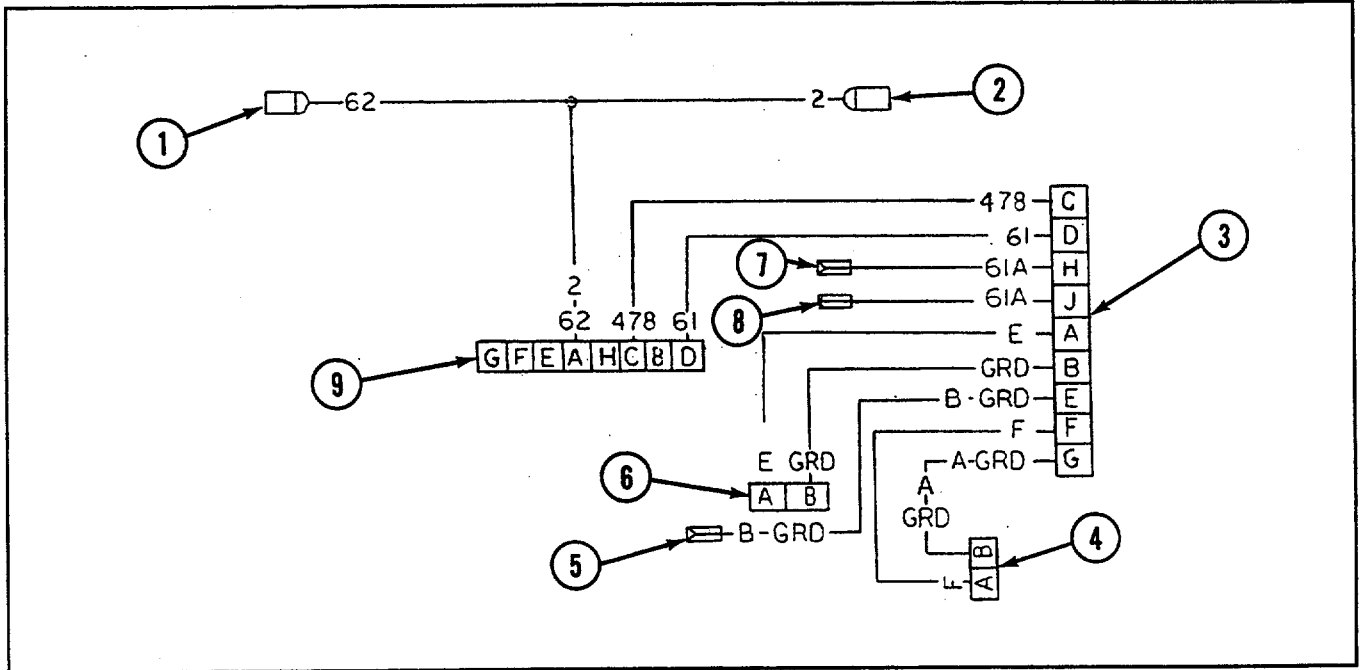
Lockwashers (10) (Appendix G, item 116)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

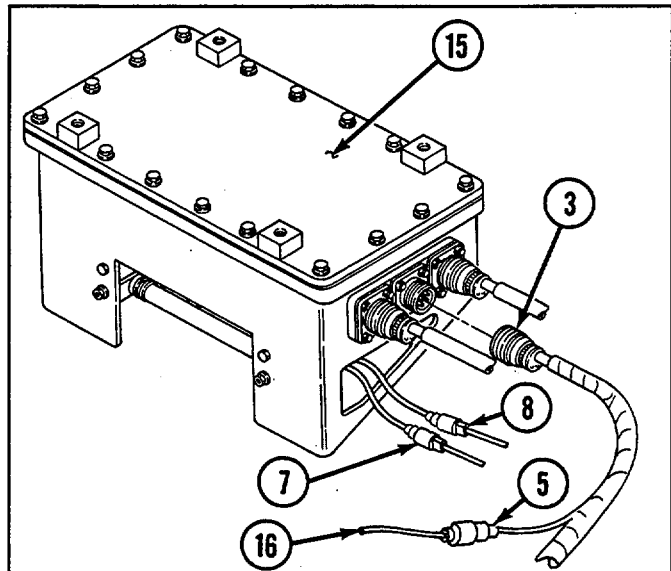
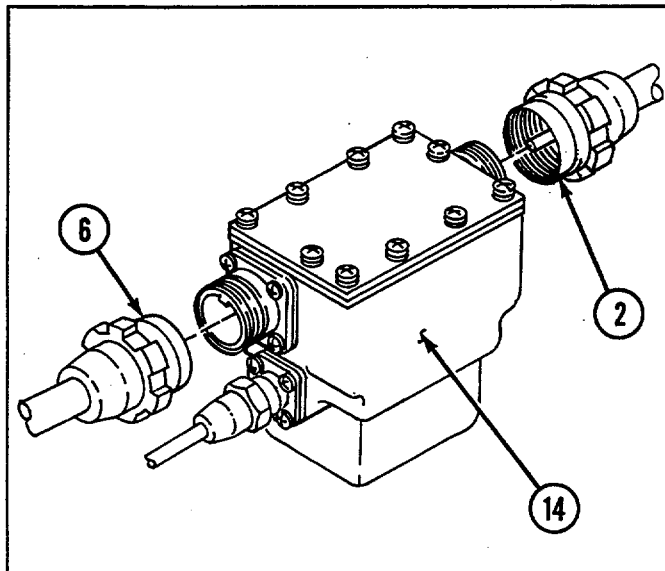
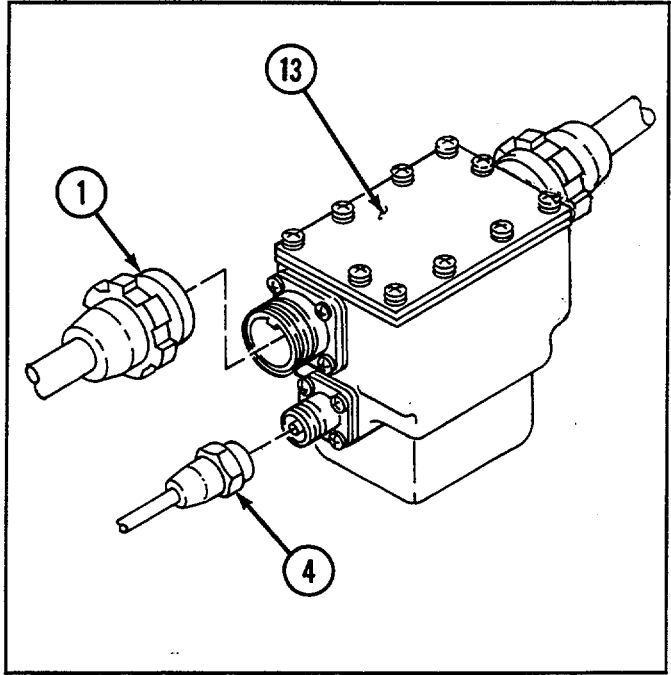
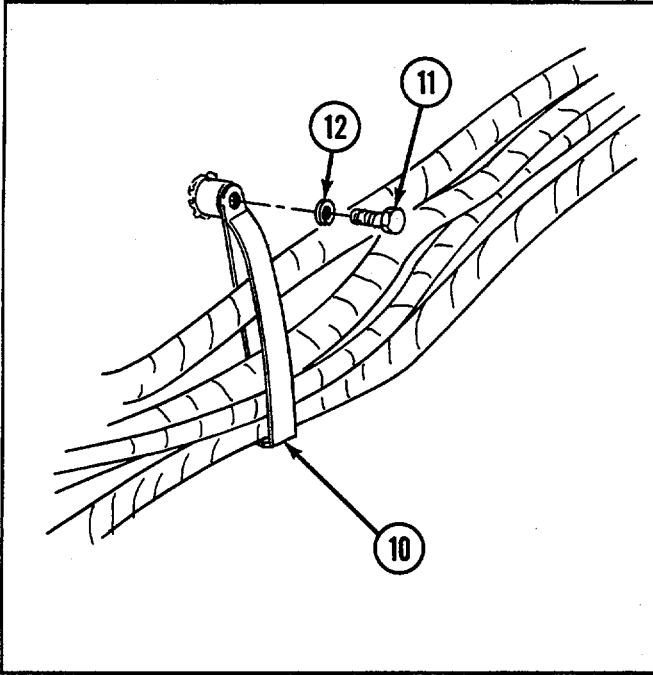
Connector No.	Electrical Lead To:	Wire No.
1	APU armature relay	62
2	Main engine armature relay	2
3	Switching relay box assembly	478, 1-61, 61A, 61A, E, GND, B-GND, F, A-GND
4	APU armature relay	F, A-GND
5	Bulkhead to main engine bracket and rear fuel tank transmitter wiring harness (single voltage) (11671789)	B-GND
6	Main engine armature relay	E, GND
7	Switching relay box assembly	61A
8	Switching relay box assembly	61A
9	Voltage regulator	2/62, 478, 61

6-81 REPLACE/REPAIR APU AND ENGINE GENERATOR RELAYS TO VOLTAGE REGULATOR WIRING HARNESS (SINGLE VOLTAGE) (11671793)-Continued



a. REMOVAL

- 1 Remove 10 clamps (10) by removing screws (11) and lockwasher (12).
- 2 Disconnect two connectors (1 and 4) from APU armature relay (13).



- 3 Disconnect two connectors (2 and 6) from main engine armature relay (14).
- 4 Disconnect three connectors (3, 7, and 8) from switching relay box assembly (15).
- 5 Disconnect connector (5) from bulkhead to main engine bracket and rear fuel tank transmitter wiring harness (16).

6-81 REPLACE/REPAIR APU AND ENGINE GENERATOR RELAYS TO VOLTAGE REGULATOR WIRING HARNESS (SINGLE VOLTAGE) (11671793)--Continued

6 Disconnect connector (9) from voltage regulator (17).

b. DISASSEMBLY

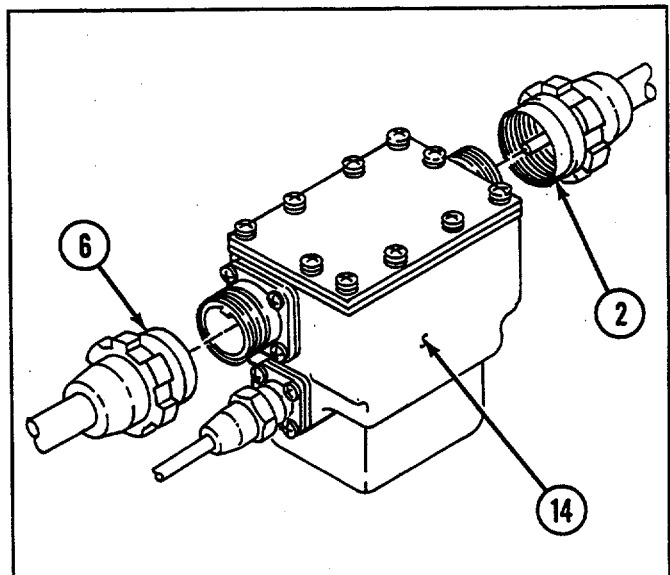
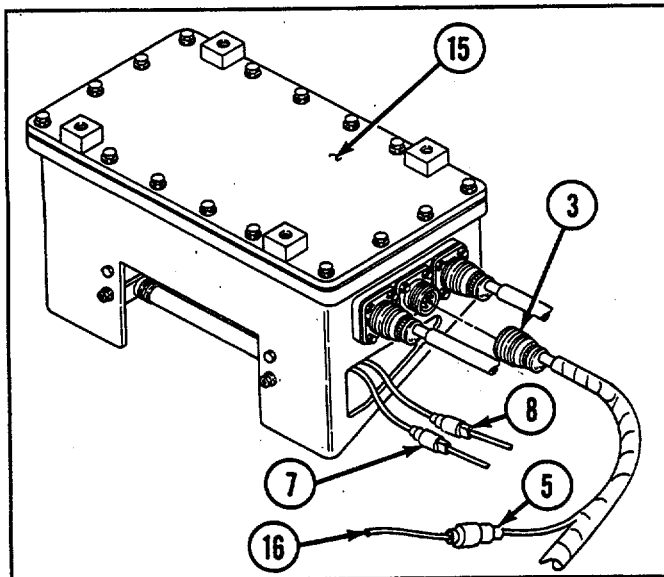
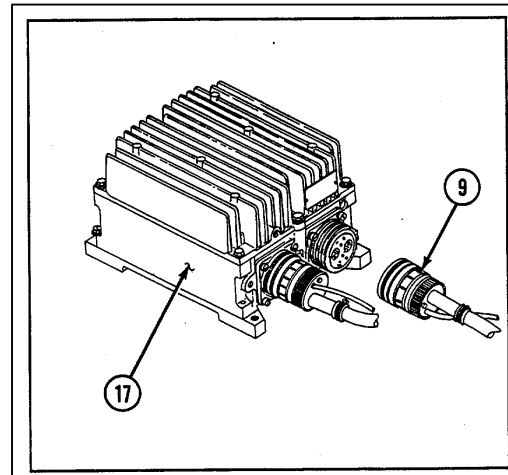
Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

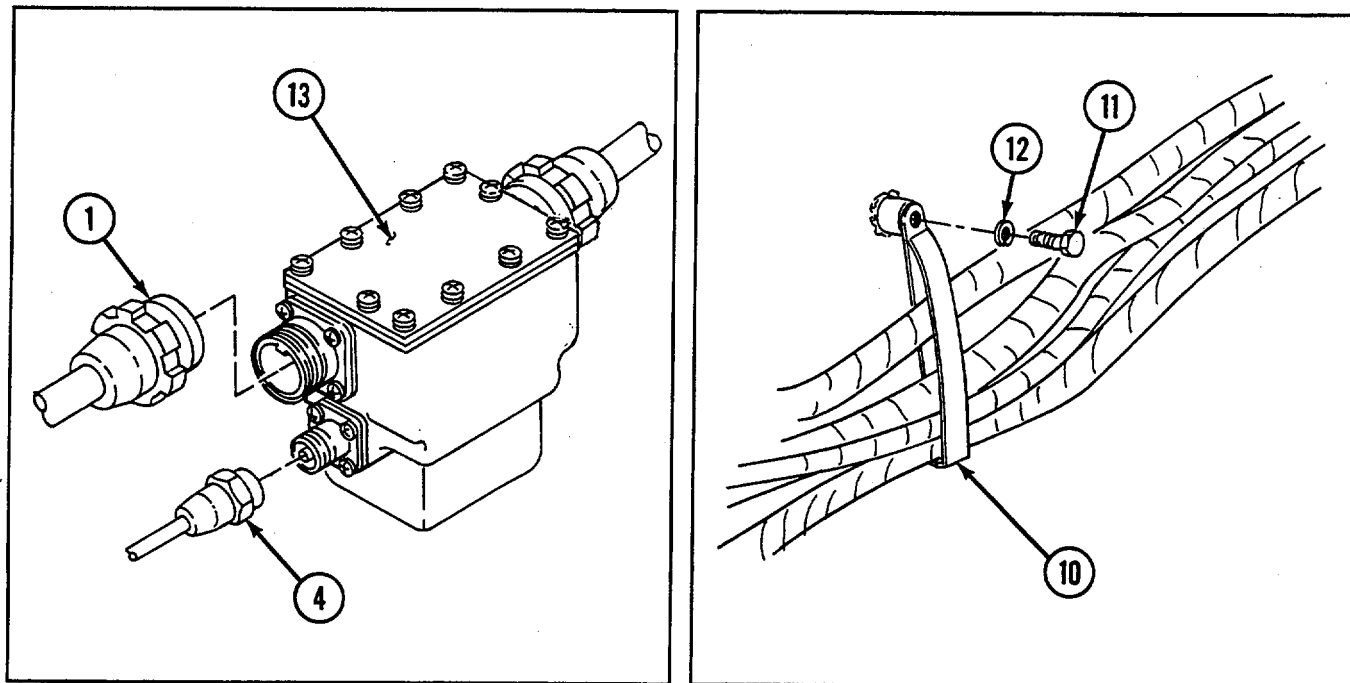
Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect connector (9) to voltage regulator (17).
- 2 Connect connector (5) to bulkhead to main engine bracket and rear fuel tank transmitter wiring harness (16).
- 3 Connect three connectors (3, 7, and 8) to switching relay box assembly (15).
- 4 Connect two connectors (2 and 6) to main engine armature relay (14).



- 5 Connect two connectors (1 and 4) to APU armature relay (13).
- 6 Install 10 clamps (10) using new lockwasher (12) and screw (11) for each.



NOTE

Follow-on maintenance: Install air inlet grilles if removed (see paragraph 9-56)

6-82 REPLACE/REPAIR AIR CLEANER CIRCUIT BREAKER LEAD ASSEMBLY (11671794)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

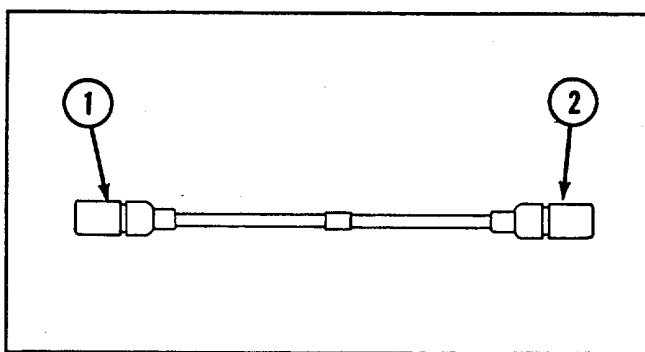
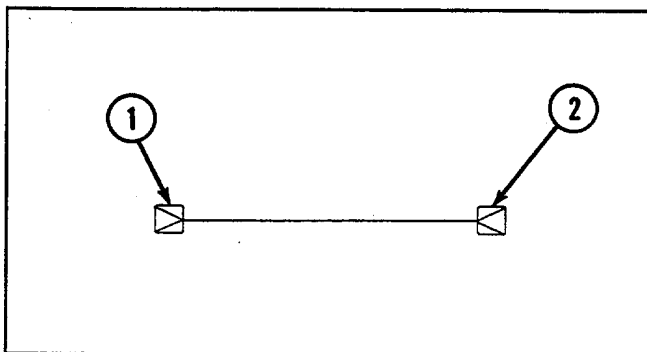
Tools:

Tool kit, general mechanic's (Appendix C, item 53)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

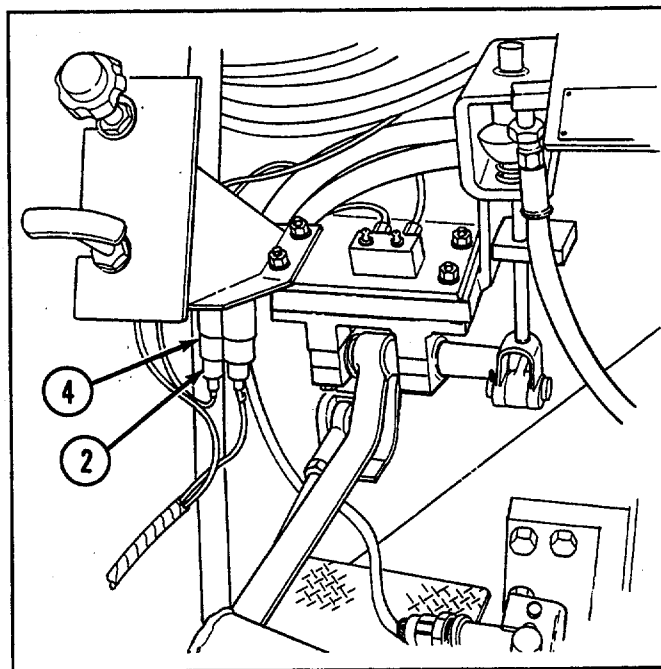
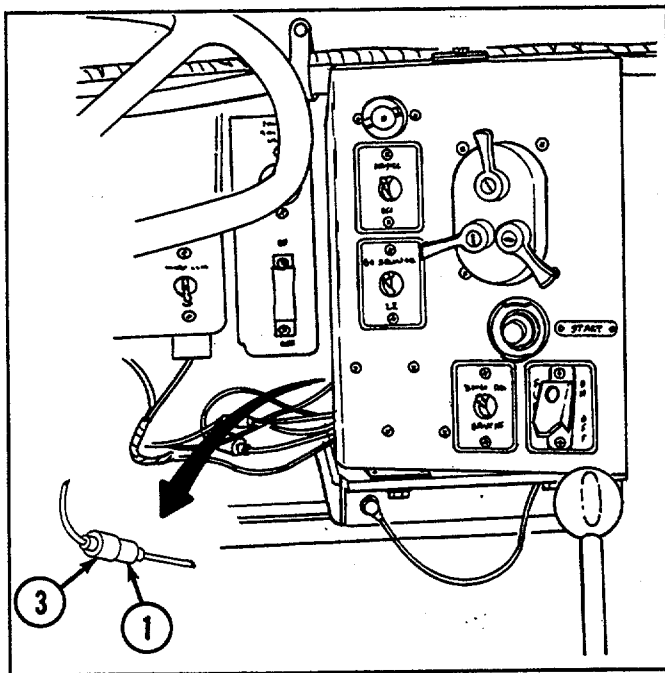
Connector No.	Electrical Lead To:	Wire No.
1	Switch panel to neutral safety to bulkhead wiring harness	486
2	Circuit breaker no. 15	486



6-82 REPLACE/REPAIR AIR CLEANER CIRCUIT BREAKER LEAD ASSEMBLY (11671794)--Continued

a. REMOVAL

- 1 Disconnect connector (1) from switch panel to neutral safety to bulkhead wiring harness (3).
- 2 Disconnect connector (2) from circuit breaker (4).



b. DISASSEMBLY

Disassemble lead assembly (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble lead assembly (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect connector (2) to circuit breaker (4).
- 2 Connect connector (1) to switch panel to neutral safety to bulkhead wiring harness (3).

6-83 REPLACE/REPAIR BILGE PUMP AND GENERATOR CUTOUT SWITCH LEAD ASSEMBLY (10945007)

THIS TASK COVERS

- | | | | |
|------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
|------------|----------------|-------------|-----------------|

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

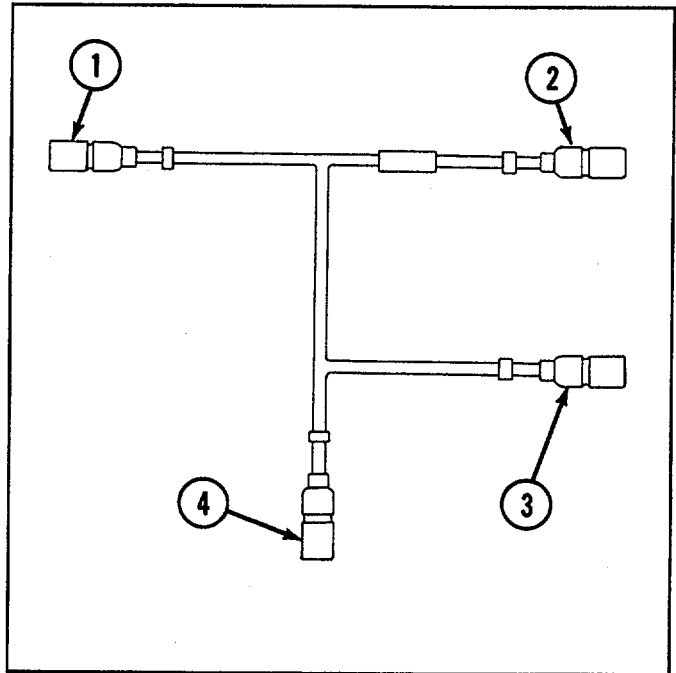
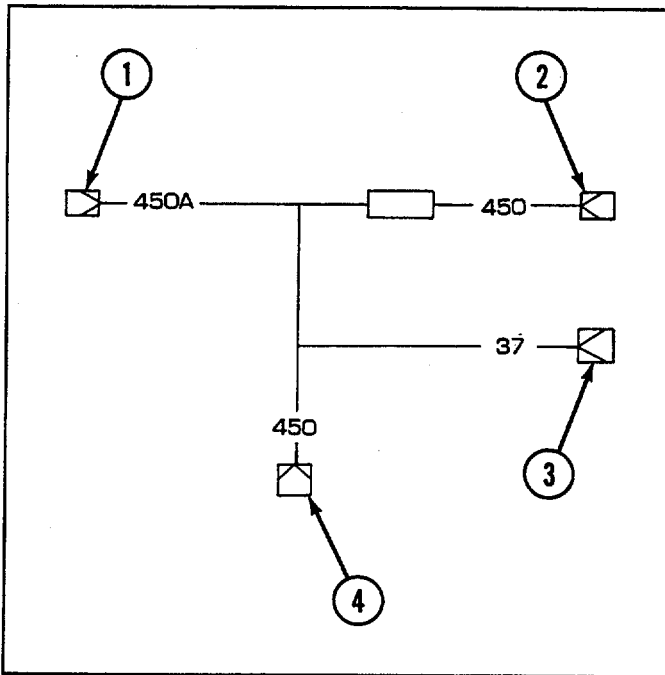
Equipment Condition:

Electrical accessories panel removed (see paragraph 6-9)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Generator cutout switch	450A
2	Bilge pump switch	450
3	Auxiliary outlet	37
4	Circuit breaker no. 3	450

**a. REMOVAL**

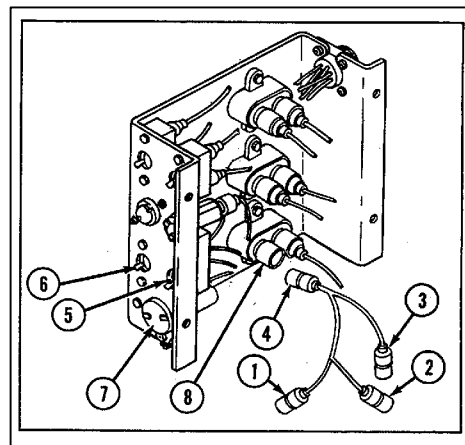
- 1 Disconnect connector (1) from generator cutout switch (5).
- 2 Disconnect connector (2) from bilge pump switch (6).
- 3 Disconnect connector (3) from auxiliary outlet (7).
- 4 Disconnect connector (4) from circuit breaker no. 3 (8).

b. DISASSEMBLY

Disassemble lead assembly (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble lead assembly (see Chapter 6, Section VII).



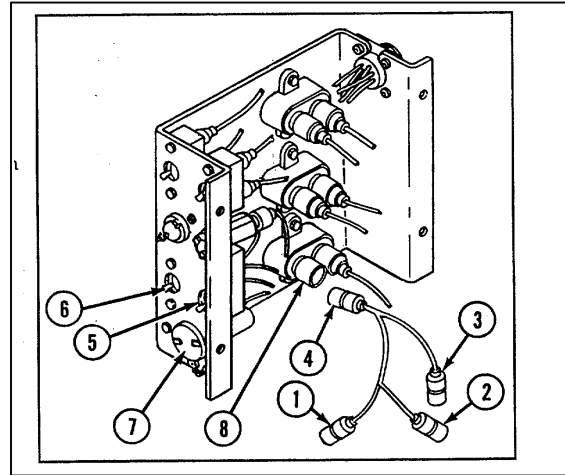
6-83 REPLACE/REPAIR BILGE PUMP AND GENERATOR CUTOUT SWITCH LEAD ASSEMBLY (10945007)-Continued

d. INSTALLATION

- 1 Connect connector (4) to circuit breaker no. 3 (8).
- 2 Connect connector (3) to auxiliary outlet (7).
- 3 Connect connector (2) to bilge pump switch (6).
- 4 Connect connector (1) to generator cutout switch (5).

NOTE

Follow-on maintenance: Install electrical accessories panel (see paragraph 6-9)



6-84 REPLACE/REPAIR BILGE PUMP MAIN POWER WIRING HARNESS (10945008)

THIS TASK COVERS

- a. Removal
- b. Disassembly
- c. Assembly
- d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Lockwashers (4) (Appendix G, item 114)

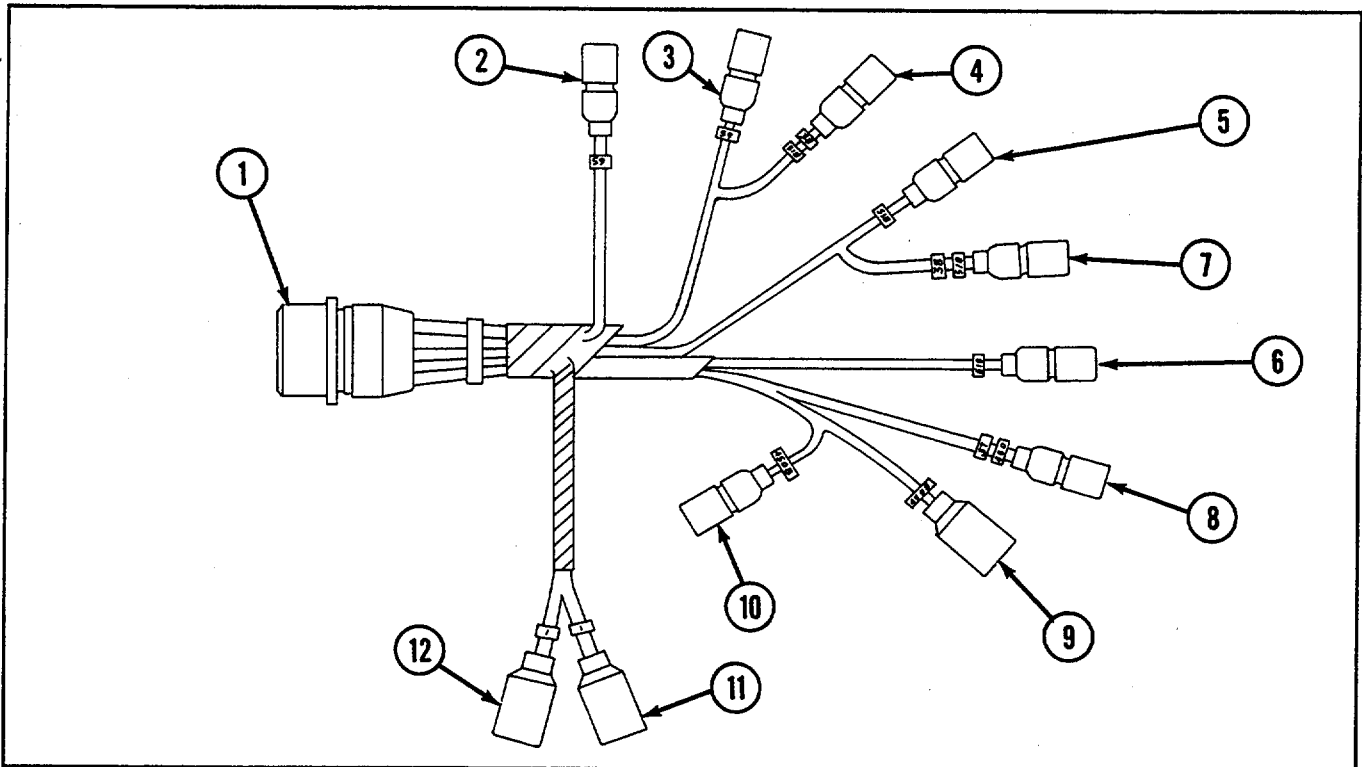
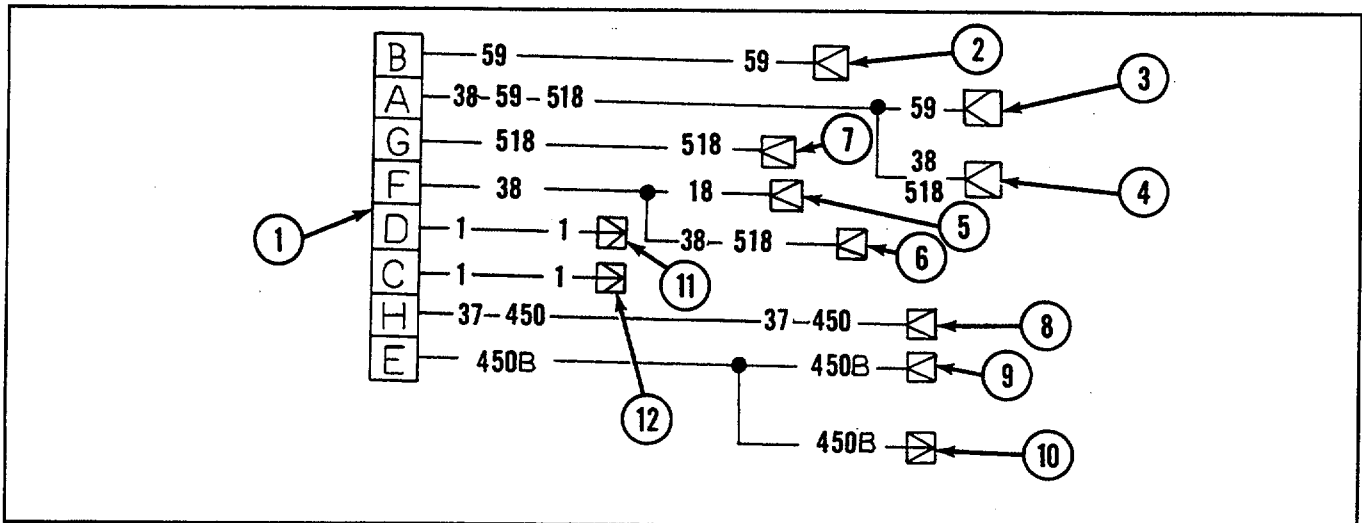
Equipment Condition:

Electrical accessories panel removed (see paragraph 6-9)

WARNING

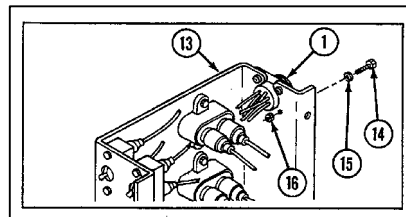
Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Electrical accessories panel outlet	518, 38/59/518, 38, 59, 450B, 37/450, 1, 1
2	Vent blower switch	59
3	Circuit breaker no. 1	59
4	Circuit breaker no. 2	38/518
5	Winch light switch	518
6	Winch light switch	518
7	Circuit breaker no. 2	38/518
8	Circuit breaker no. 3	37/450
9	Bilge pump indicator light	450B
10	Bilge pump switch	450B
11	Generator cutout switch	1
12	Generator cutout switch	1



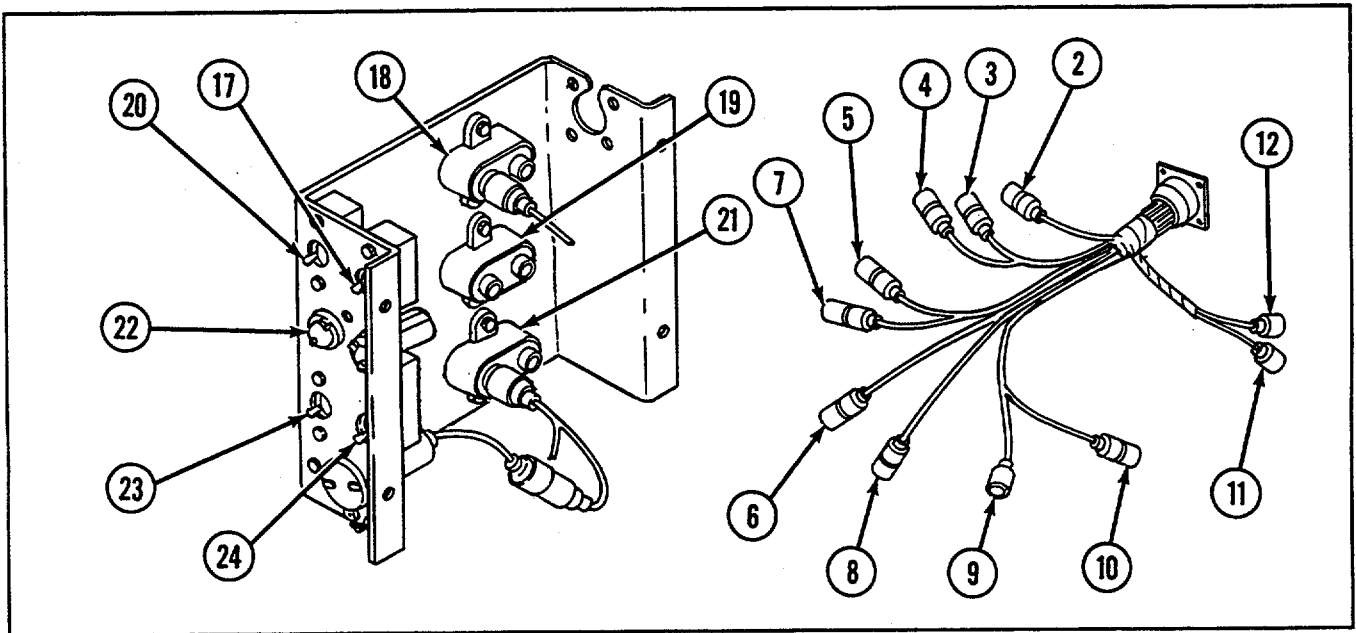
a. REMOVAL

1 Disconnect connector (1) from electrical accessories panel outlet (13) by removing four screws (14), four lockwashers (15), and four nuts (16).



6-84 REPLACE/REPAIR BILGE PUMP MAIN POWER WIRING HARNESS (1 0945008)--Continued

- 2 Disconnect connector (2) from vent blower switch (17).
- 3 Disconnect connector (3) from circuit breaker no. 1 (18).
- 4 Disconnect connector (4) from circuit breaker no. 2 (19).
- 5 Disconnect two connectors (5 and 6) from winch light switch (20).
- 6 Disconnect connector (7) from circuit breaker no. 2 (19).
- 7 Disconnect connector (8) from circuit breaker no. 3 (21).
- 8 Disconnect connector (9) from bilge pump indicator light (22).
- 9 Disconnect connector (10) from bilge pump switch (23).
- 10 Disconnect two connectors (11 and 12) from generator cutout switch (24).



b. DISASSEMBLY

Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

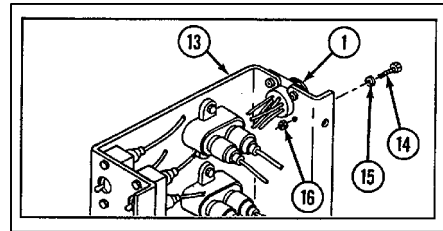
d. INSTALLATION

- 1 Connect two connectors (11 and 12) to generator cutout switch (24).
- 2 Connect connector (10) to bilge pump switch (23).

- 3 Connect connector (9) to bilge pump indicator light (22).
- 4 Connect connector (8) to circuit breaker no. 3 (21).
- 5 Connect connector (7) to circuit breaker no. 2 (19).
- 6 Connect two connectors (5 and 6) to winch light switch (20).
- 7 Connect connector (4) to circuit breaker no. 2 (19).
- 8 Connect connector (3) to circuit breaker no. 1 (18).
- 9 Connect connector (2) to vent blower switch (17).
- 10 Install connector (1) to electrical accessories panel outlet (13) using four screws (14), four new lockwashers (15), and four nuts (16).

NOTE

Follow-on maintenance: Install electrical accessories panel (see paragraph 6-9)



6-85 REPLACE/REPAIR BILGE PUMP CIRCUIT BREAKER TO SWITCH PANEL LEAD (10894546)

THIS TASK COVERS

- a. Removal
- b. Disassembly
- c. Assembly
- d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Equipment Condition:

Stowage basket forward intermediate left floor plate opened (paragraph 9-21)

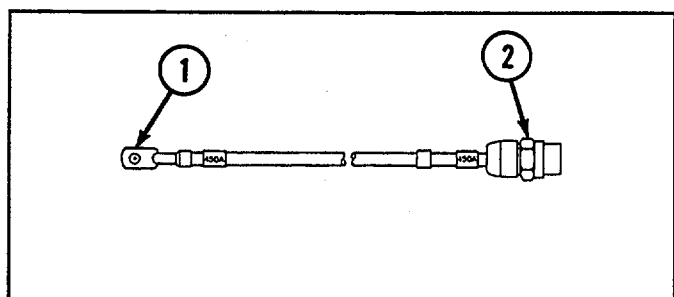
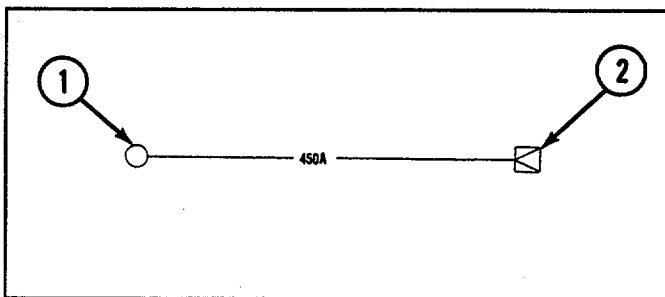
Parts:

Lockwasher (Appendix G, item 115)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Bilge pump circuit breaker	450A
2	Switch panel, radio, and bilge pump to bulkhead wiring harness	450A



6-85 REPLACE/REPAIR BILGE PUMP CIRCUIT BREAKER TO SWITCH PANEL LEAD (10894546)-Continued

a. REMOVAL

- 1 Disconnect lead (1) from circuit breaker (3) by removing screw (4) and lockwasher (5).
- 2 Disconnect connector (2) from switch panel, radio, and bilge pump to bulkhead wiring harness (6).

b. DISASSEMBLY

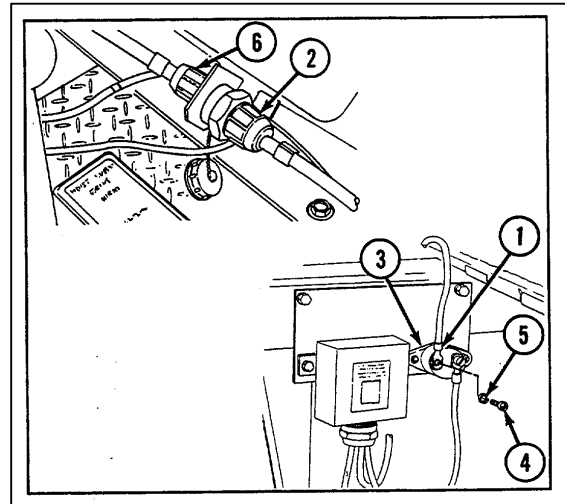
Disassemble lead assembly (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble lead assembly (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect connector (2) to switch panel, radio, and bilge pump to bulkhead wiring harness (6).
- 2 Connect lead (1) to circuit breaker (3) using new lockwasher (5) and screw (4).



NOTE

Follow-on maintenance: Close stowage basket forward intermediate left floor plate (see paragraph 9-21)

6-86 REPLACE/REPAIR BILGE PUMP LEAD RELAY WIRING HARNESS AND CAP (10894548)

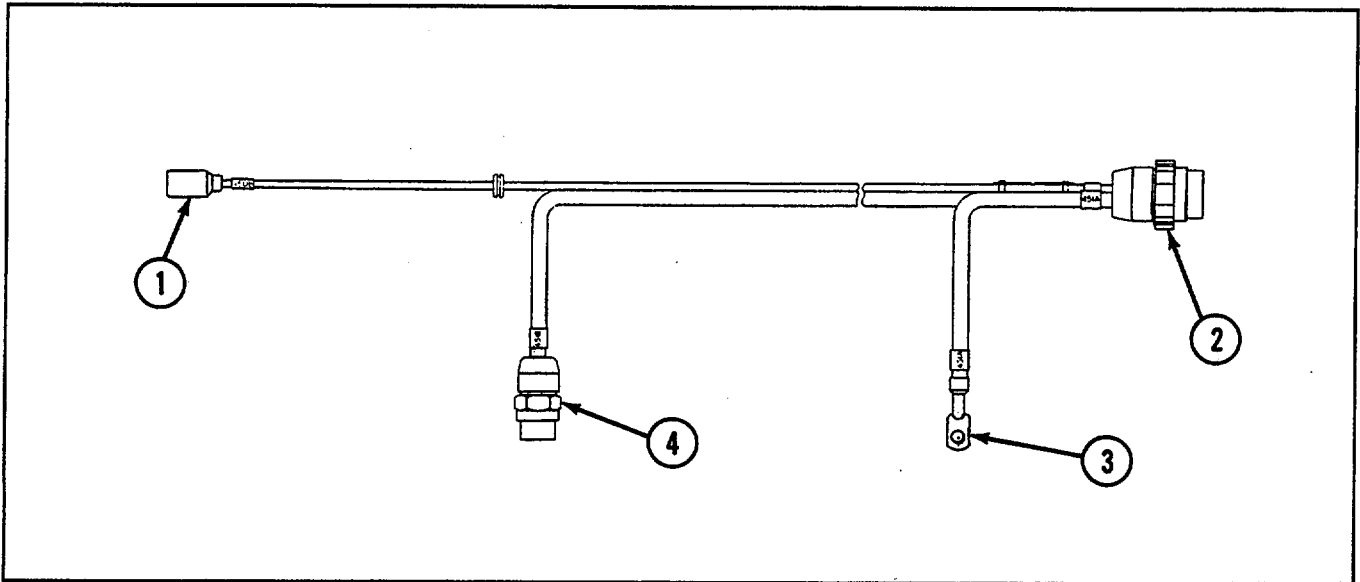
THIS TASK COVERS

a. Removal	b. Disassembly	c. Assembly	d. Installation
INITIAL SET-UP			
Tools: Tool kit, general mechanic's (Appendix C, item 53)	Parts: • Lockwasher (Appendix G, item 115) • Strap (Appendix G, item 268)	Equipment Condition: Stowage basket forward intermediate left floor plate opened (see paragraph 9-21)	

WARNING

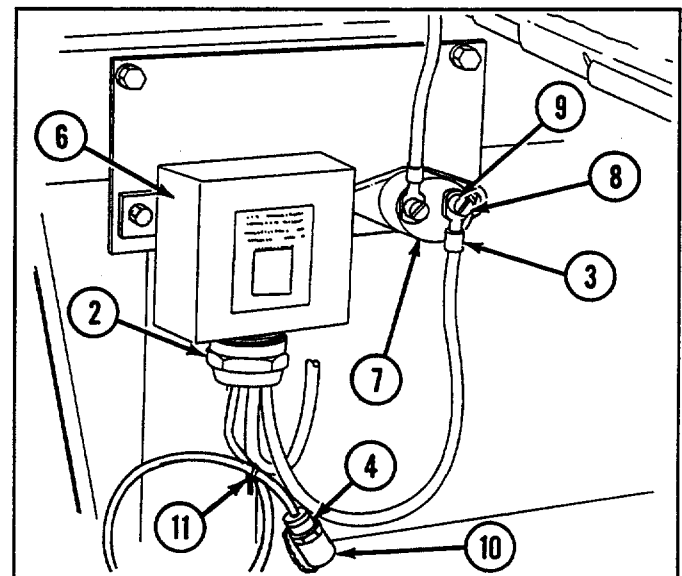
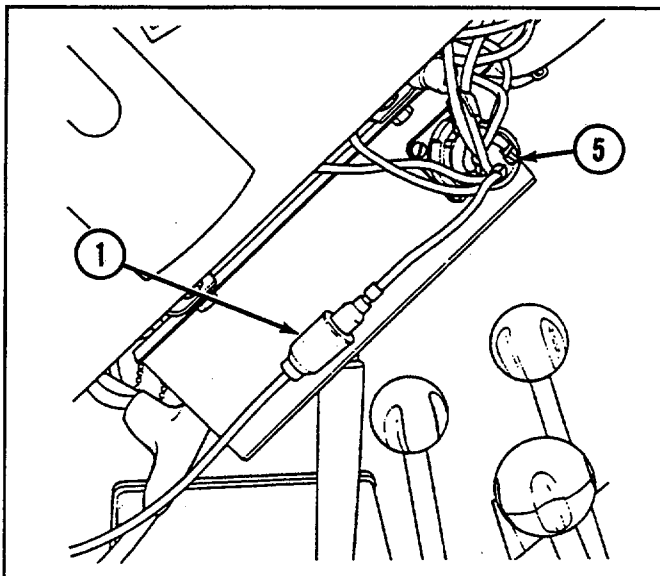
Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Electrical accessories panel wiring harness	450B
2	Bilge pump relay	450B, 451B, 451A
3	Circuit breaker	451A
4	Cap assembly/bilge pump	451B



a. REMOVAL

- 1 Disconnect connector (1) from electrical accessories panel wiring harness (5).
- 2 Disconnect connector (2) from bilge pump relay (6).
- 3 Disconnect lead (3) from circuit breaker (7) by removing screw (8) and lockwasher (9).
- 4 Remove cap assembly (10) from connector (4).
- 5 Remove strap (11).



6-86 REPLACE/REPAIR BILGE PUMP LEAD RELAY WIRING HARNESS AND CAP (10894548)--Continued

6 Disconnect connector (4) from bilge pump (12).

NOTE

Bilge pump is part of deep water fording kit. Perform step 6 if deep water fording kit is installed.

b. DISASSEMBLY

Disassemble wiring harness (see Chapter 6, Section VI).

c. ASSEMBLY

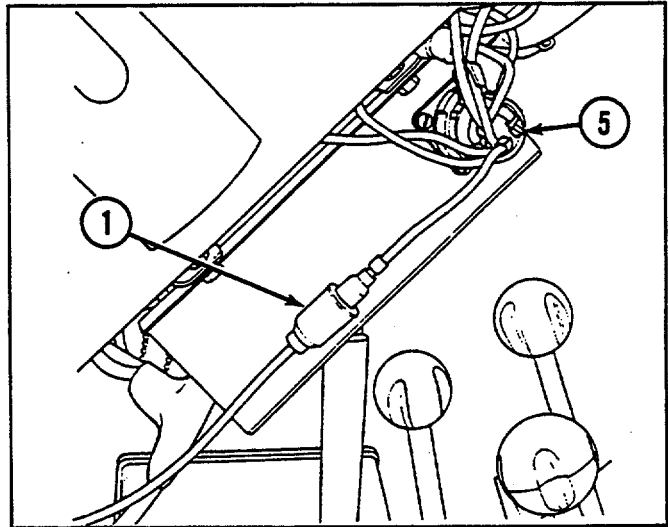
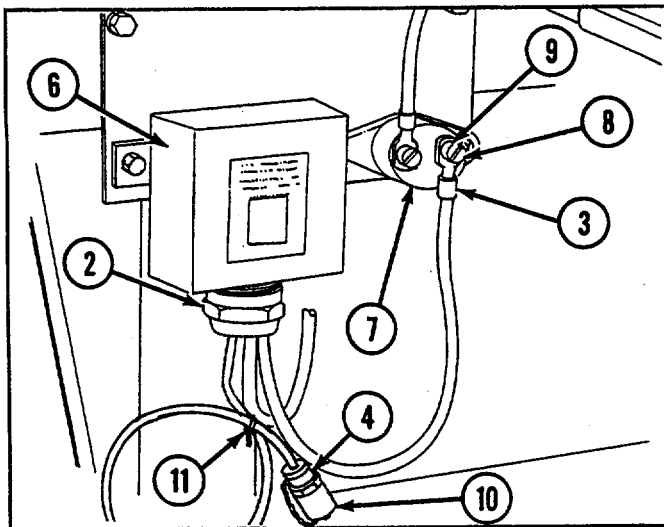
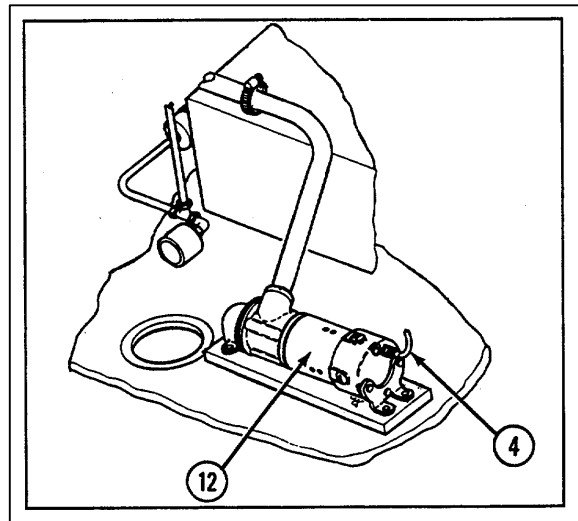
Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

NOTE

Perform step 1 only if deep water fording kit is installed.

- 1 Connect connector (4) to bilge pump (11).
- 2 Install strap (5).
- 3 Install cap assembly (10) on connector (4).
- 4 Connect lead (3) to circuit breaker (7) using screw (8) and new lockwasher (9).
- 5 Connect connector (2) to bilge pump relay (6).
- 6 Connect connector (1) to electrical accessories panel wiring harness (5).



NOTE

Follow-on maintenance: Close stowage basket forward intermediate left floor plate (see paragraph 9-21)

**6-87 REPLACE/REPAIR HEATER CONTROL BOX TO HEATER WIRING HARNESS
(11671353)**

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

Lockwashers (17) (Appendix G,
item 116)

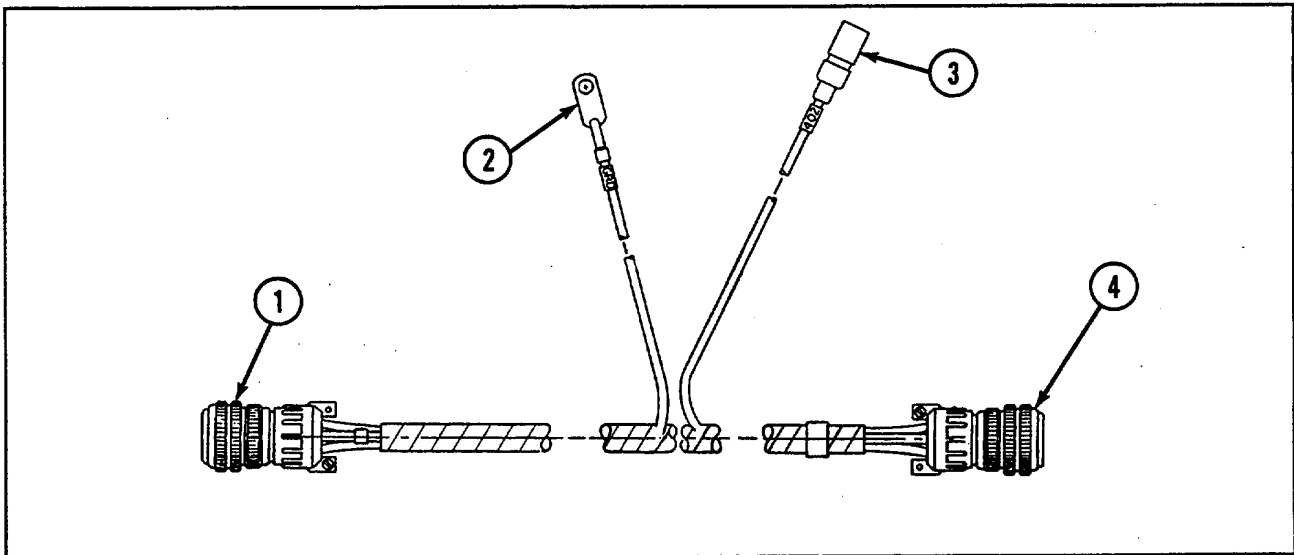
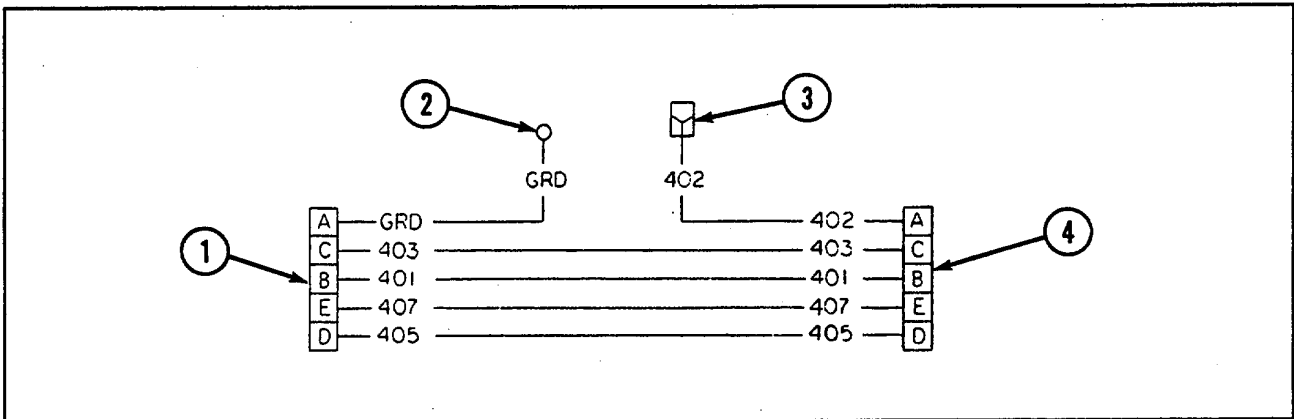
Equipment Condition:

Heater control box removed
(see paragraph 6-12)

WARNING

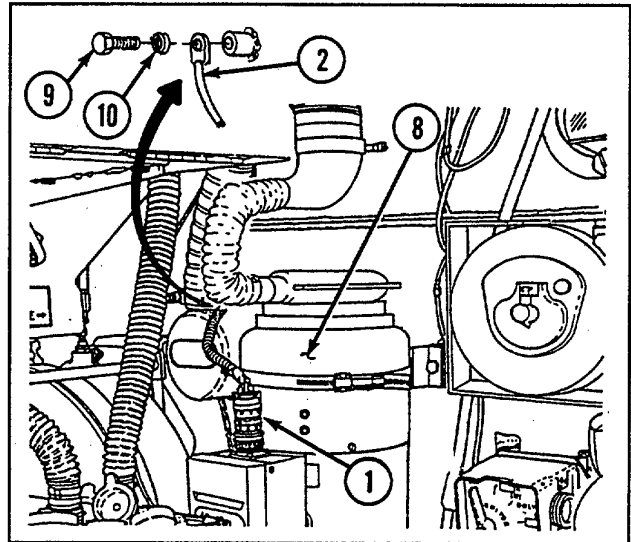
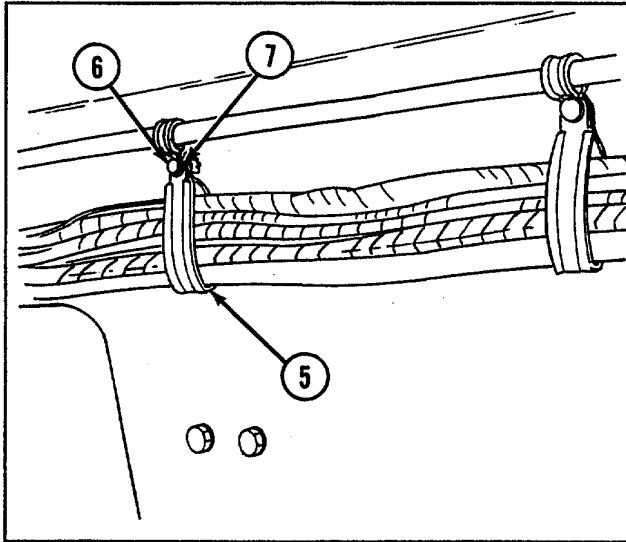
Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Personnel heater	GND, 403, 401, 407, 405
2	Ground	GND
3	Heater fuel pump	402
4	Personnel heater control box	403, 401, 407, 405, 402

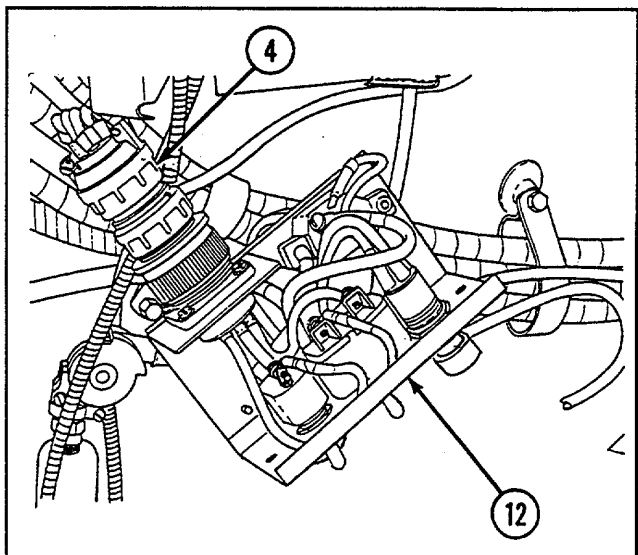
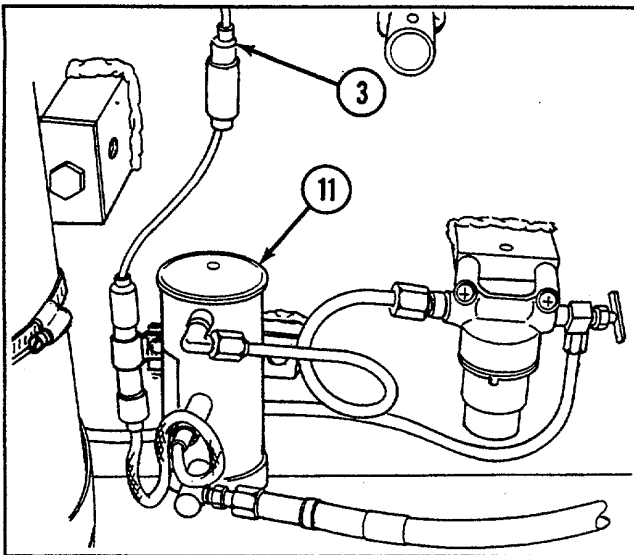


**6-87 REPLACE/REPAIR HEATER CONTROL BOX TO HEATER WIRING HARNESS
(11671353)--Continued****a. REMOVAL**

- 1 Remove 16 clamps (5) by removing screw (6) and lockwasher (7) from each.
- 2 Disconnect connector (1) from personnel heater (8).
- 3 Remove connector (2) from by removing screw (9) and lockwasher (10).



- 4 Disconnect connector (3) from heater fuel pump (11).
- 5 Disconnect connector (4) from personnel heater control box (12).



b. DISASSEMBLY

Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect connector (4) to personnel heater control box (12).
- 2 Connect connector (3) to heater fuel pump (11).
- 3 Install connector (2) using new lockwasher (10) and screw (9).
- 4 Connect connector (1) to personnel heater (8).
- 5 Install 16 clamps (5) using new lockwasher (7) and screw (6) for each.

NOTE

Follow-on maintenance: Install heater control box (see paragraph 9-12)

6-88 REPLACE/REPAIR HYDRAULIC OIL TEMPERATURE TRANSMITTER HOUSING ASSEMBLY WIRING HARNESS (11672366)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

- Gasket (Appendix G, item 85)
- Lockwashers (4) (Appendix G, item 126)

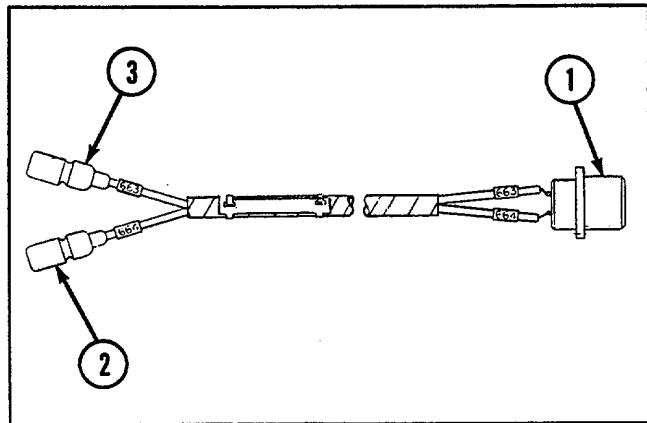
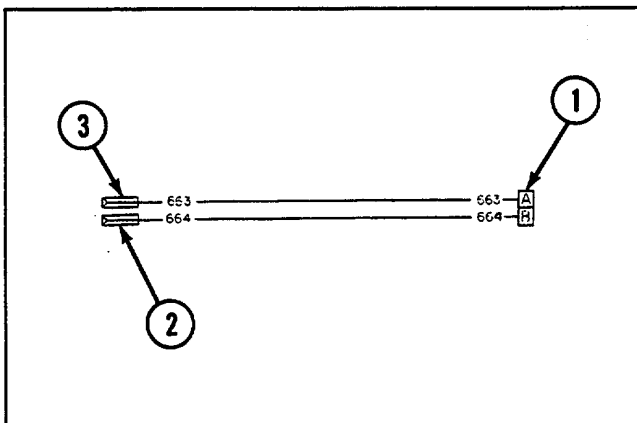
Equipment Condition:

Oil temperature transmitter and switch housing assembly removed (see paragraph 12-10)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock or burns.

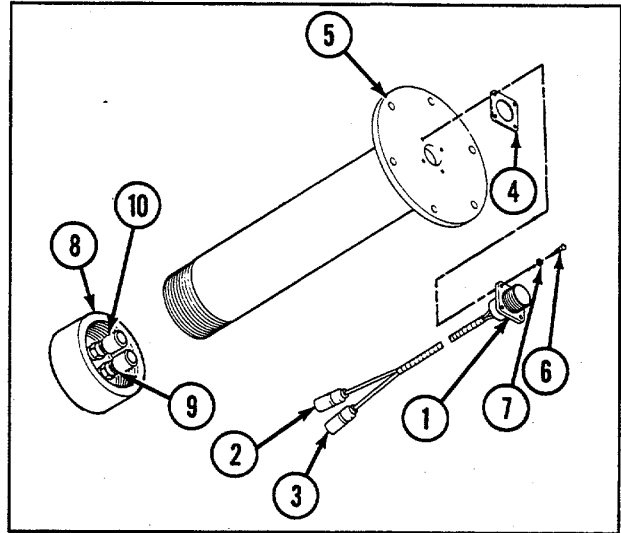
Connector No.	Electrical Lead To:	Wire No.
1	Oil temperature transmitter and housing assembly	663,664
2	Hydraulic oil temperature transmitter	664
3	Hydraulic oil high temperature switch	663



6-88 REPLACE/REPAIR HYDRAULIC OIL TEMPERATURE TRANSMITTER HOUSING ASSEMBLY WIRING HARNESS (11672366)--Continued

a. REMOVAL

- 1 Remove connector (1) and gasket (4) from cover (5) by removing four screws (6) and four lockwashers (7).
- 2 Unscrew cap (8) disconnect connector (2) from hydraulic oil temperature transmitter (9).
- 3 Disconnect connector (3) from hydraulic oil high temperature switch (10).



b. DISASSEMBLY

Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect connector (3) to hydraulic oil high temperature switch (10).
- 2 Connect connector (2) to hydraulic oil temperature transmitter (9) and install cap (8).
- 3 Install connector (1) and new gasket (4) to cover (5) using four new lockwashers (7) and four screws (6).

NOTE

Follow-on maintenance: Install oil temperature transmitter and switch housing assembly (see paragraph 12-10)

6-89 REPLACE/REPAIR DIODE LEAD ASSEMBLY (12322604)

THIS TASK COVERS

- | | | | |
|------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
|------------|----------------|-------------|-----------------|

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Soldering gun (Appendix C, item 19)

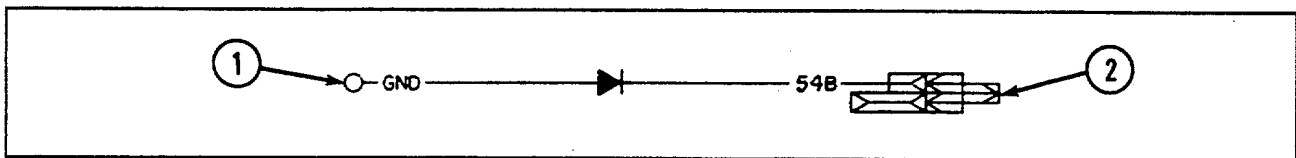
Parts:

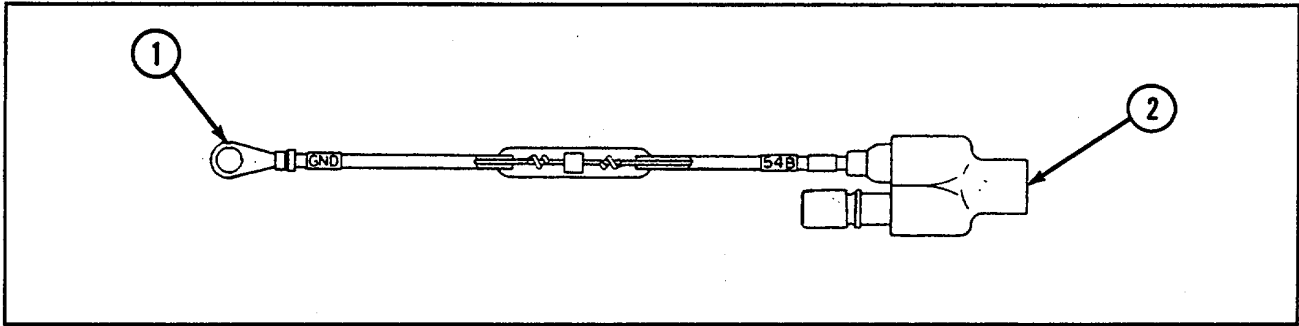
- Lockwashers (2) (Appendix G, item 114)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Ground	GND
2	Fire extinguisher engine shutoff light	54R





a. REMOVAL

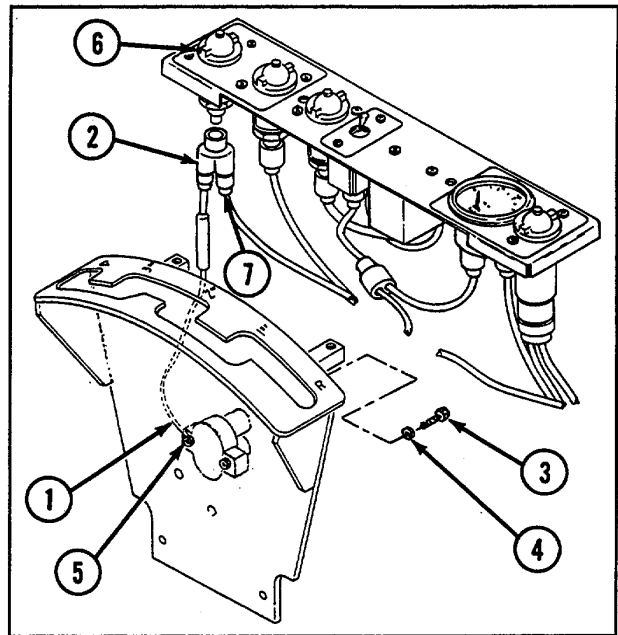
- 1 Disconnect lead (1) from ground by removing screw (3), two lockwashers (4), and nut (5).
- 2 Disconnect connector (2) from fire extinguisher engine shutoff light (6) and disconnect connector (7).

b. DISASSEMBLY

Disassemble lead assembly (see Chapter 6, Section VII).

NOTE

Twist conductors to diode observing proper polarity. Solder using solder comp SN60, per QQ-S-571. A heat sink must be used when soldering to the diode.



c. ASSEMBLY

Assemble lead assembly (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect connector (2) to fire extinguisher engine shutoff light (6) and connect connector (7).
- 2 Connect lead (1) to ground with screw (3), two new lockwashers (4), and two nuts (5).

6-90 REPLACE/REPAIR ENGINE DISCONNECT TO STARTER GROUND WIRING HARNESS (SINGLE VOLTAGE) (11671356)

THIS TASK COVERS

- | | | | |
|------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
|------------|----------------|-------------|-----------------|

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Lockwasher (Appendix G, item 131)
- Lockwashers (4) (Appendix G, item 129)

Equipment Condition:

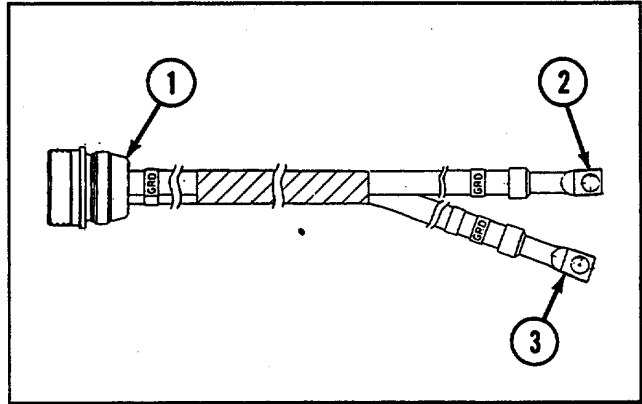
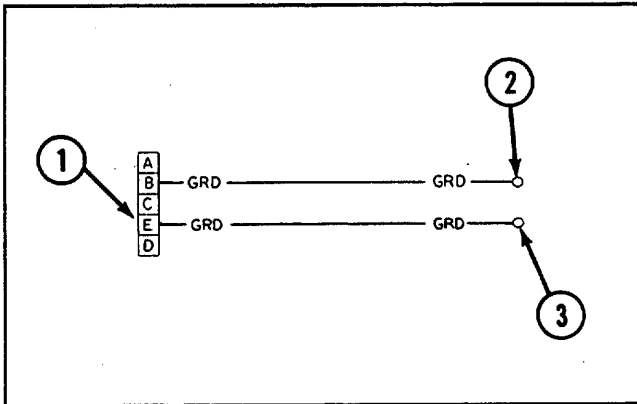
Powerplant removed (see paragraph 3-1)

6-90 REPLACE/REPAIR ENGINE DISCONNECT TO STARTER GROUND WIRING HARNESS (SINGLE VOLTAGE) (11671356)--Continued

WARNING

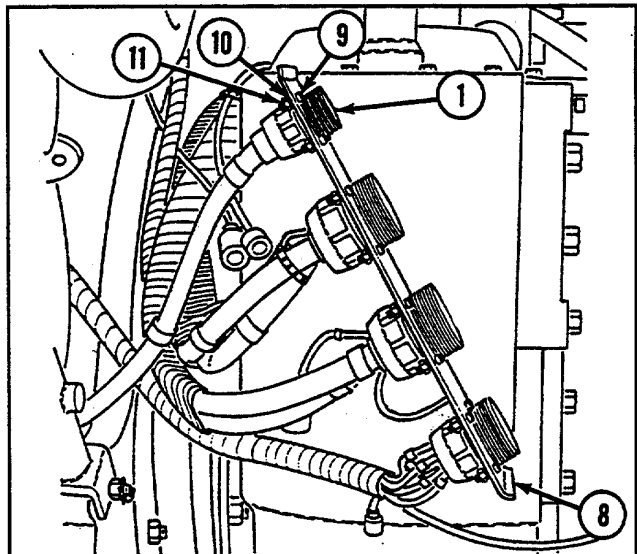
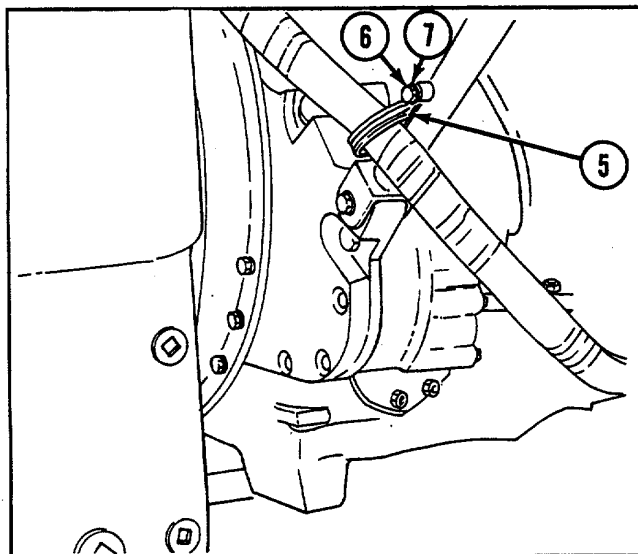
Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Engine disconnect bracket	GND
2	Starter	GND
3	Starter	GND

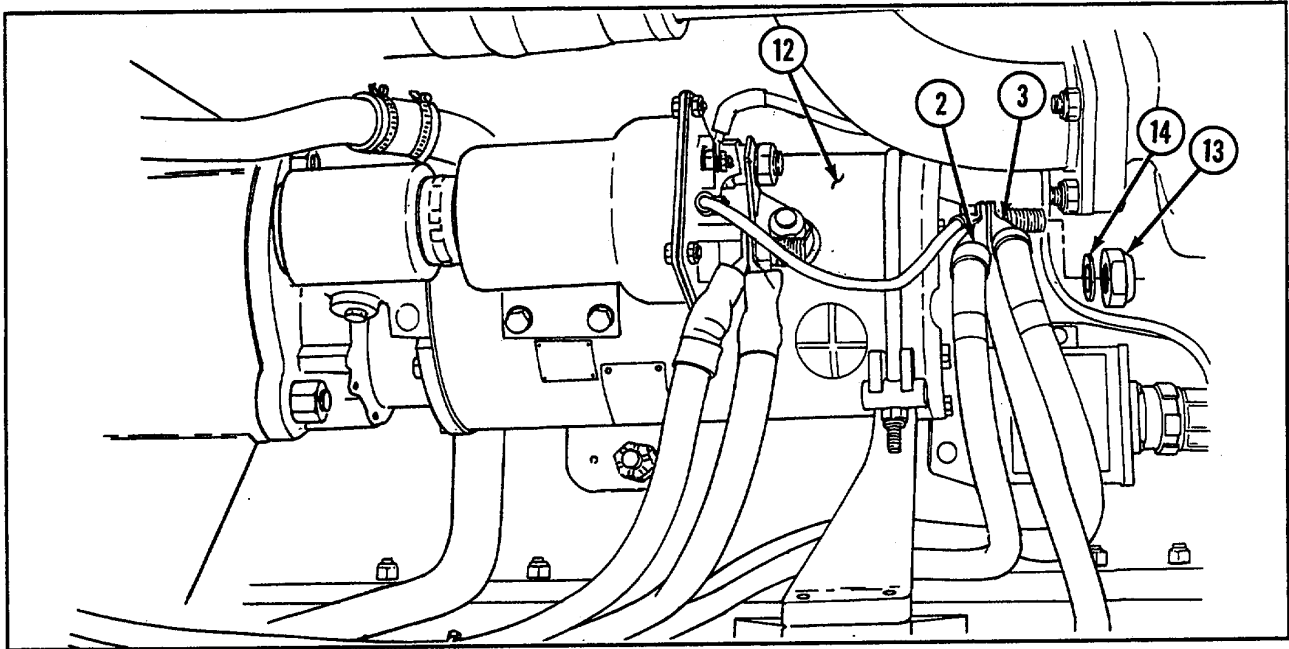


a. REMOVAL

- 1 Remove clamp (5) by removing screw (6) and lockwasher (7).
- 2 Disconnect connector (1) from engine disconnect (8) by removing four screws (9), four lockwashers (10), and four nuts (11).



- 3 Disconnect two leads (2 and 3) from starter (12) by removing nut (13) and lockwasher (14).



b. DISASSEMBLY

Disassemble ground cable (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble ground cable (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect two leads (2 and 3) to starter (12) using lockwasher (14) and nut (13).
- 2 Connect connector (1) to engine disconnect (8) using four nuts (11), four new lockwashers (10), and four screws (9).
- 3 Install clamp (5) using new lockwasher (7) and screw (6).

NOTE

Follow-on maintenance: Install powerplant (see paragraph 3-1)

6-91 REPLACE/REPAIR SMOKE GRENADE LAUNCHER SYSTEM WIRING HARNESS (11672299)

THIS TASK COVERS

a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts::

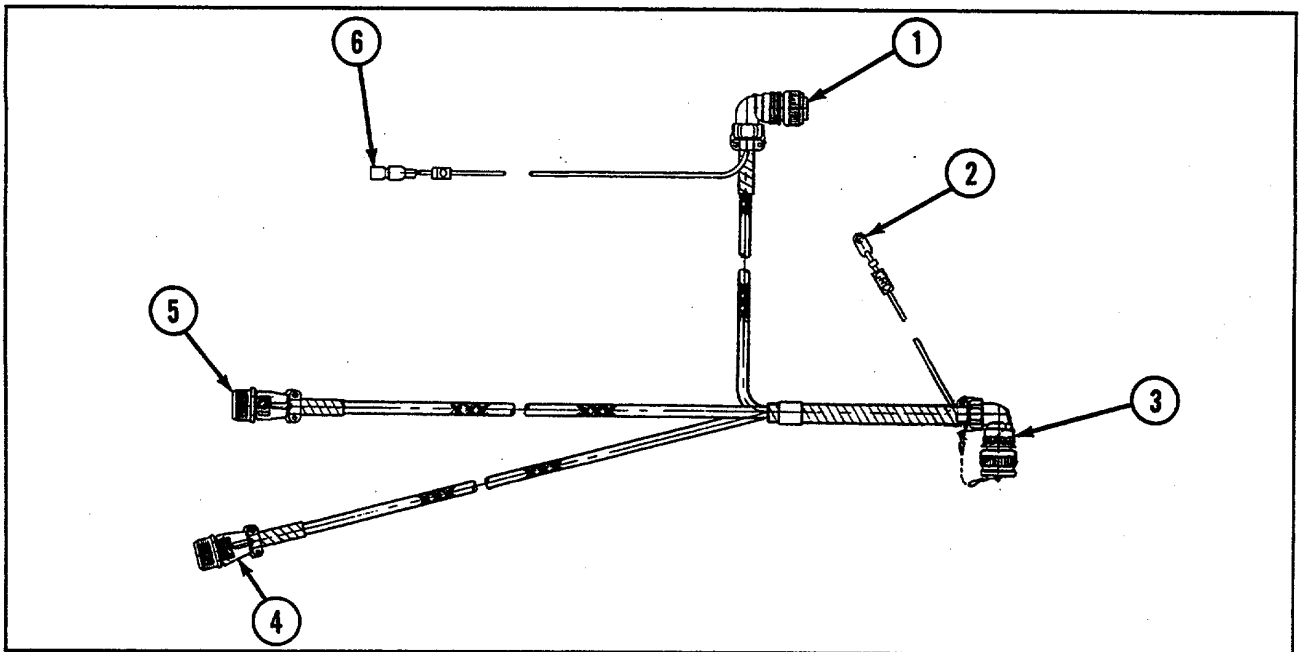
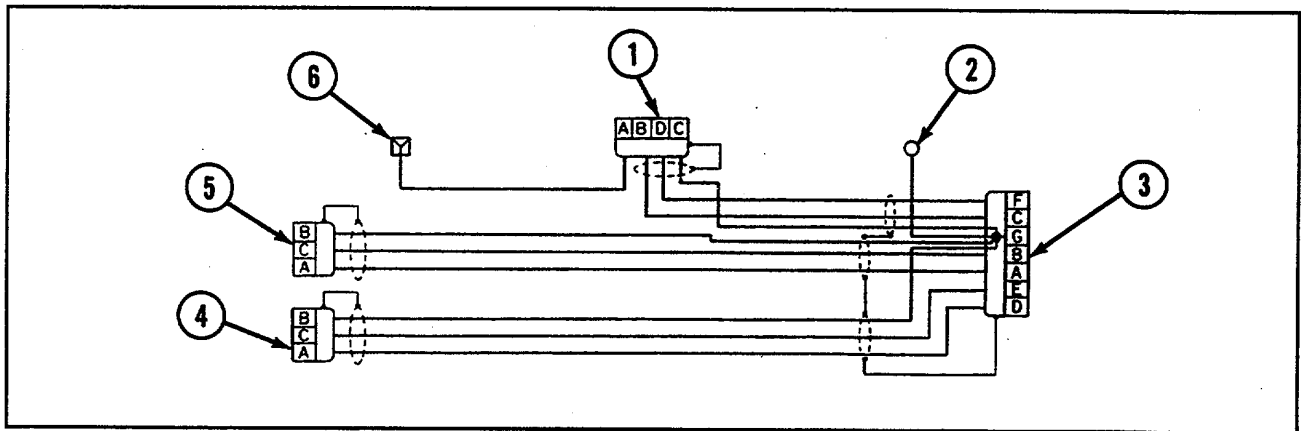
- Lockwasher (Appendix G, item 131)
- Lockwashers (4) (Appendix G, item 116)

6-91 REPLACE/REPAIR SMOKE GRENADE LAUNCHER SYSTEM WIRING HARNESS (11 672299)-Continued

WARNING

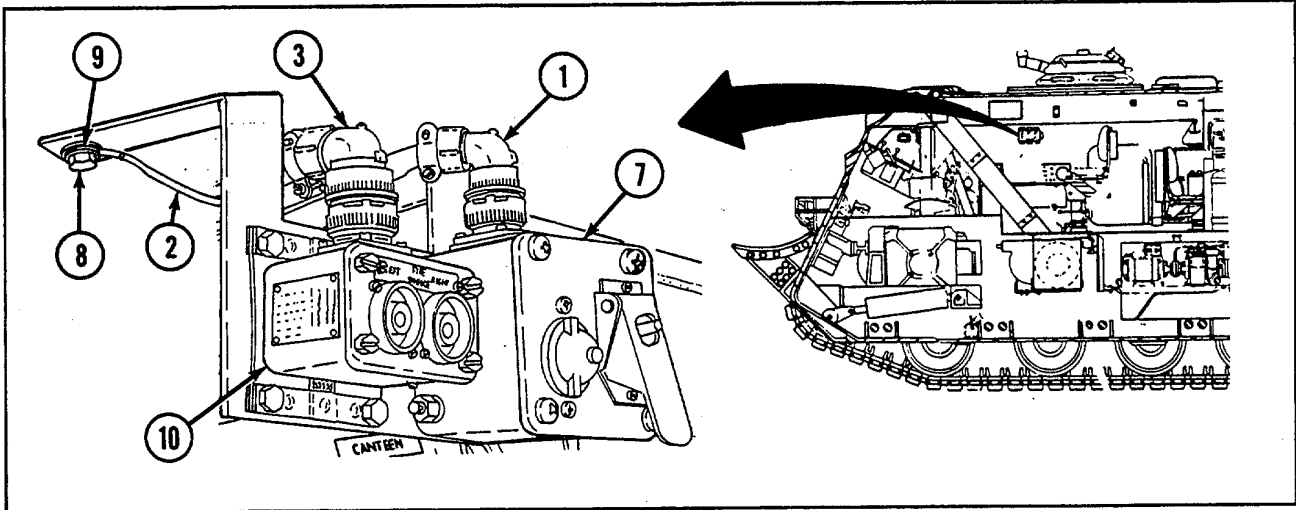
Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Arming switch box	
2	Ground	
3	Firing switch box	
4	Electrical kit for M239 smoke grenade launcher, left-hand side discharger feed through cable assembly wiring harness (11672298-1)	
5	Electrical kit for M239 smoke grenade launcher cable assembly wiring harness (11672298-2)	
6	Accessory panel auxiliary outlet Y-connector	

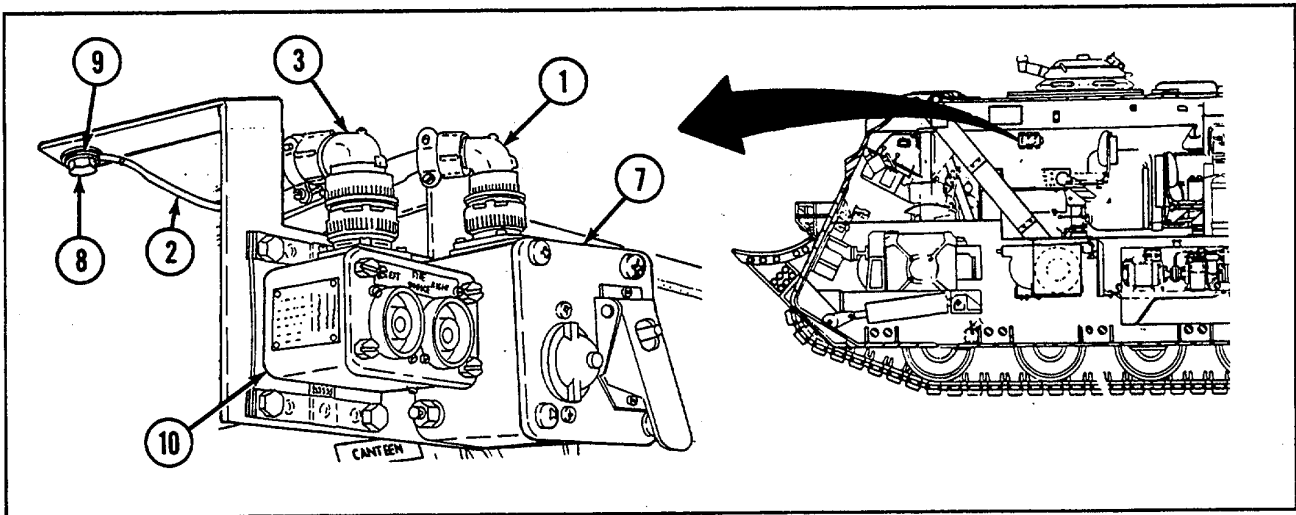


a. REMOVAL

- 1 Disconnect connector (1) from arming switch box (7).
- 2 Disconnect lead (2) from ground by removing screw (8) and lockwasher (9).
- 3 Disconnect connector (3) from firing switch box (10).

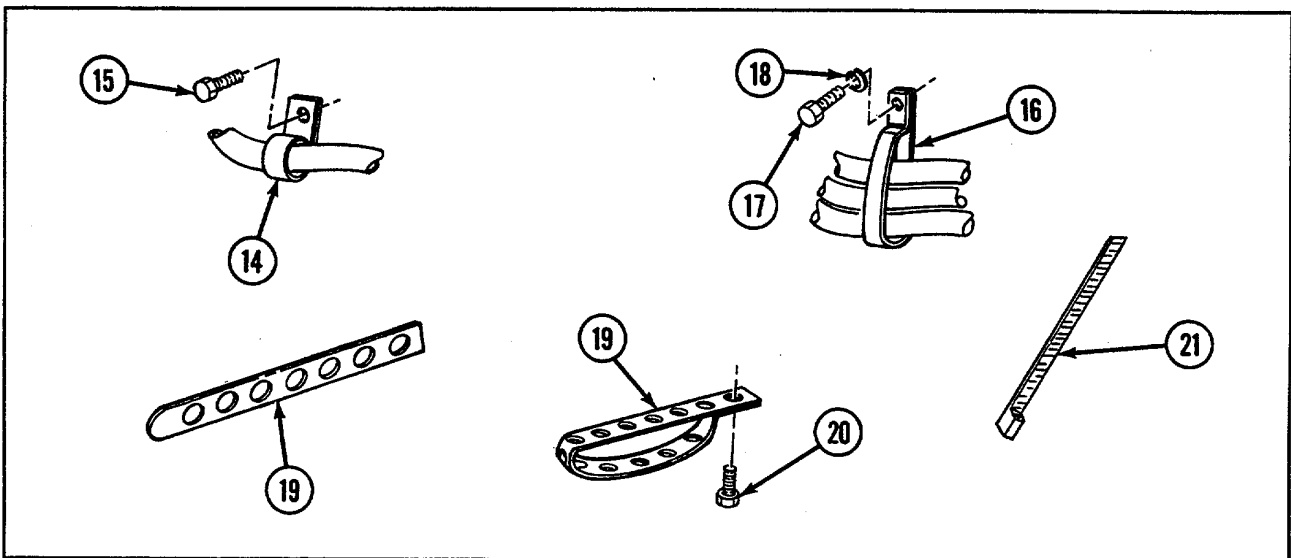
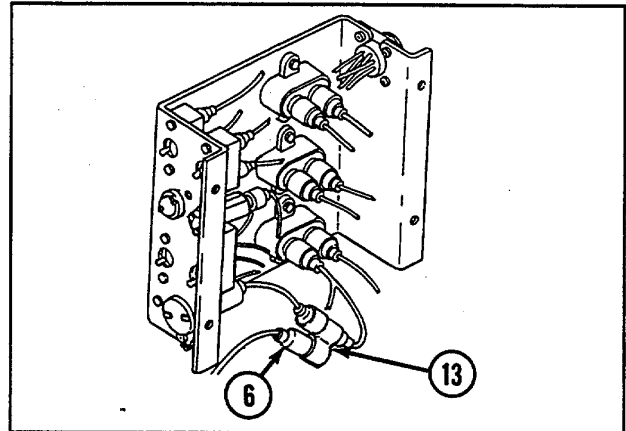


- 4 Disconnect connector (4) from electrical kit for M239 smoke grenade launcher, left-hand side discharger feed through cable assembly wiring harness (11).
- 5 Disconnect connector (5) from electrical kit for M239 smoke grenade launcher cable assembly wiring harness (12).



6-91 REPLACE/REPAIR SMOKE GRENADE LAUNCHER SYSTEM WIRING HARNESS (11672299)-Continued

- 6 Disconnect connector (6) from accessory panel auxiliary outlet Y-connector (13).
- 7 Remove three clamps (14) by removing screw (15) from each.
- 8 Remove four clamps (16) by removing screw (17) and lockwasher (18) from each.
- 9 Remove seven straps (19) by removing screw (20) from each.
- 10 Remove tie down strap (21).

**b. DISASSEMBLY**

Disassemble lead assembly (see Chapter 6, Section VII).

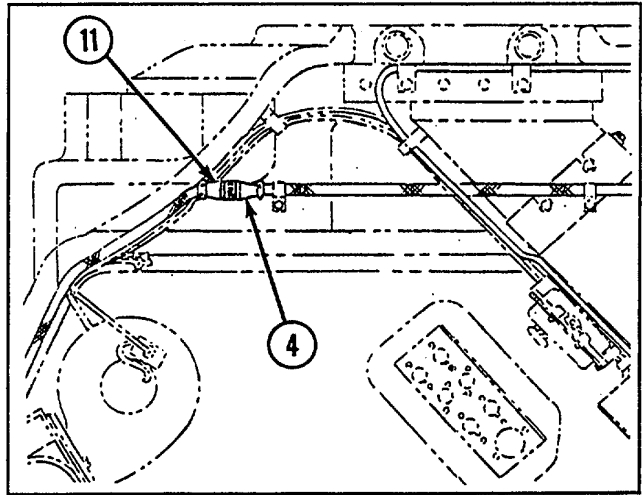
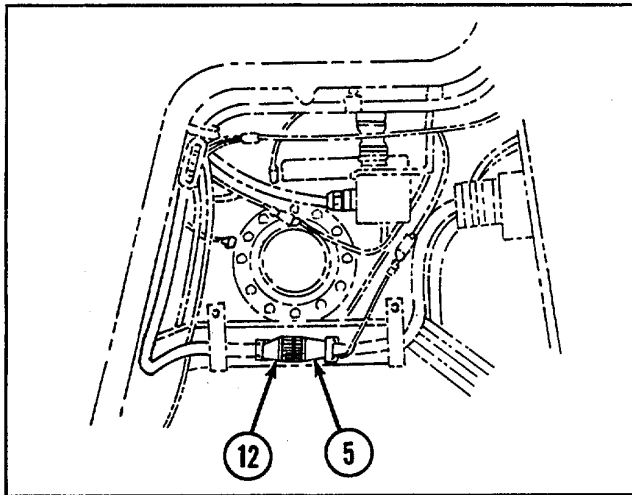
c. ASSEMBLY

Assemble lead assembly (see Chapter 6, Section VII).

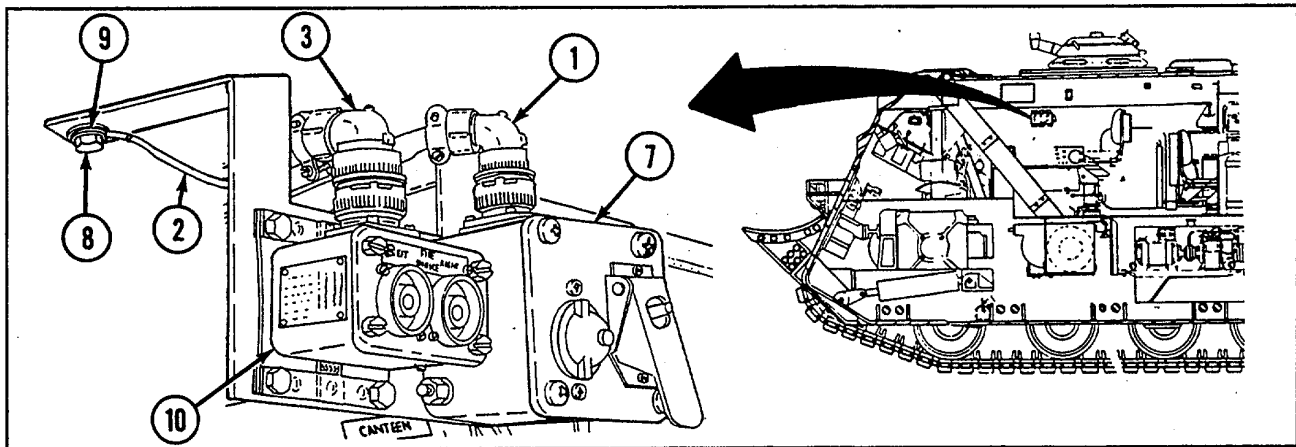
d. INSTALLATION

- 1 Install tie down strap (21).
- 2 Install seven straps (19) using screw (20) for each.
- 3 Install four clamps (16) using new lockwasher (18) and screw (17) for each.
- 4 Install three clamps (14) using screw (15) for each.
- 5 Connect connector (6) to accessory panel auxiliary outlet Y-connector (13).

- 6 Connect connector (5) to electrical kit for M239 smoke grenade launcher cable assembly wiring harness (12).
- 7 Connect connector (4) to electrical kit for M239 smoke grenade launcher, left-hand side discharger feed through cable assembly wiring harness (11).



- 8 Connect connector (3) to firing switch box (10).
- 9 Connect lead (2) to ground using new lockwasher (9) and screw (8).
- 10 Connect connector (1) to arming switch box (7).



6-92 REPLACE/REPAIR POWER SWITCH BOX ASSEMBLY FOR M239 SMOKE GRENADE LAUNCHER WIRING HARNESS (11672315)

THIS TASK COVERS

- a. Removal
- b. Disassembly
- c. Assembly
- d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Lockwasher (Appendix G, item 104)
- Lockwashers (4) (Appendix G, item 126)

Equipment Condition:

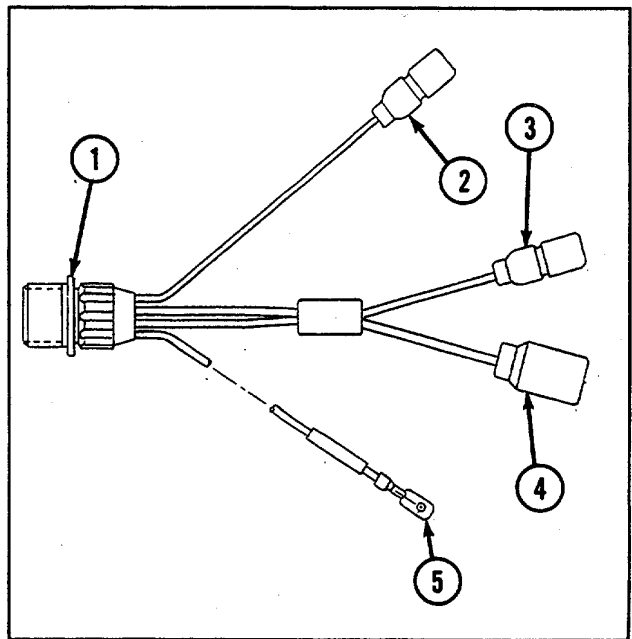
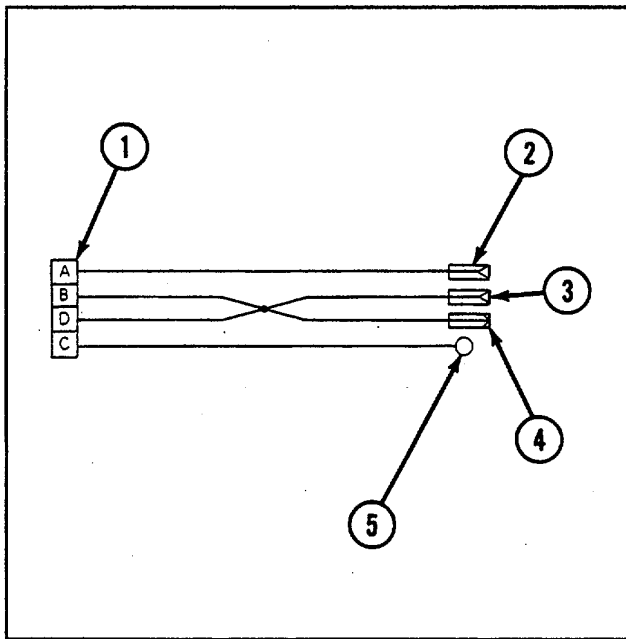
M239 launcher power switch box assembly removed (see paragraph 15-1)

6-92 REPLACE/REPAIR POWER SWITCH BOX ASSEMBLY FOR M239 SMOKE GRENADE LAUNCHER WIRING HARNESS (11672315)-Continued

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	M239 launcher power switch box assembly outlet	
2	Power switch assembly	
3	Power switch assembly	
4	Warning lamp	
5	Ground	

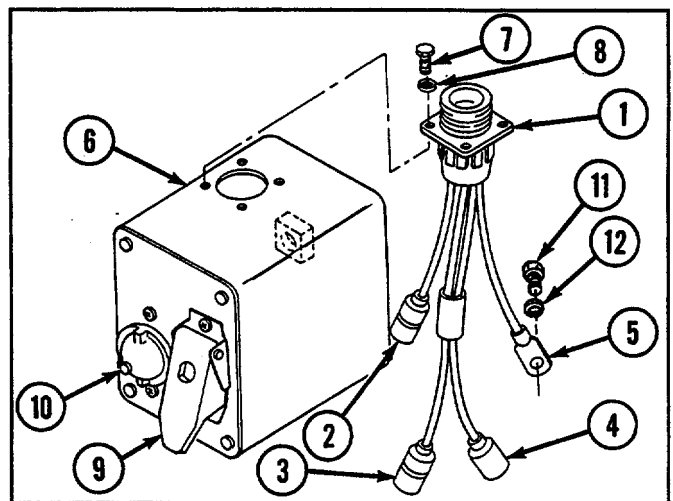


a. REMOVAL

- 1 Disconnect connector (1) from M239 launcher power switch box assembly outlet (6) by removing four screws (7) and four lockwashers (8).
- 2 Disconnect two connectors (2 and 3) from power switch assembly (9).
- 3 Disconnect connector (4) from warning lamp (10).
- 4 Disconnect lead (5) from ground by removing screw (11) and lockwasher (12).

b. DISASSEMBLY

Disassemble wiring harness (see Chapter 6, Section VII).



c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect lead (5) to ground using new lockwasher (11) and screw (12).
- 2 Connect connector (4) to warning lamp (10).
- 3 Connect two connectors (2) to power switch assembly (9).
- 4 Connect connector (1) to M239 launcher power switch box assembly outlet (6) using four new lockwashers (8) and four screws (7).

NOTE

Follow-on maintenance: Install M239 launcher power switch box assembly (see paragraph 15-1)

6-93 REPLACE/REPAIR DRIVER'S VEHICLE EXHAUST SMOKE BRACKET TO BULKHEAD CONNECTION WIRING HARNESS (11672382)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

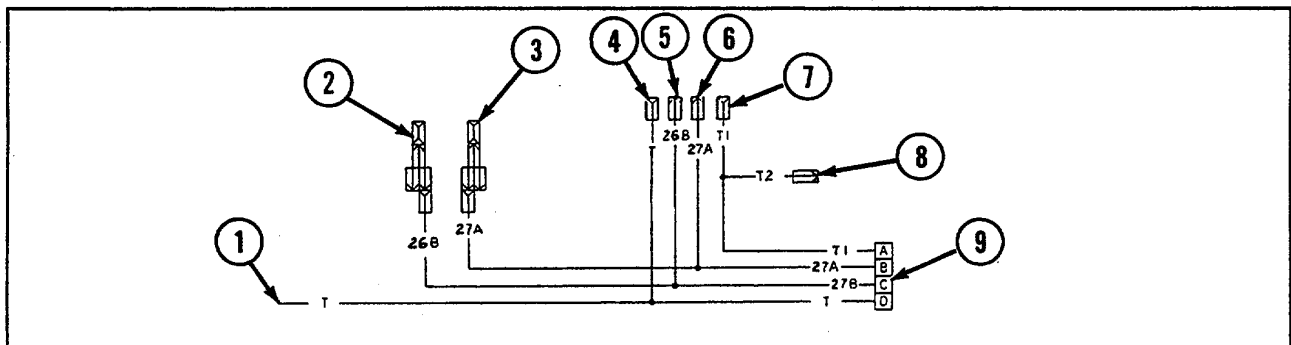
INITIAL SET-UP

Tools:	Parts:	Equipment Condition:
Tool kit, general mechanic's (Appendix C, item 53)	Lockwashers (14) (Appendix G, item 116)	Air cleaner assembly removed (see paragraph 4-24)

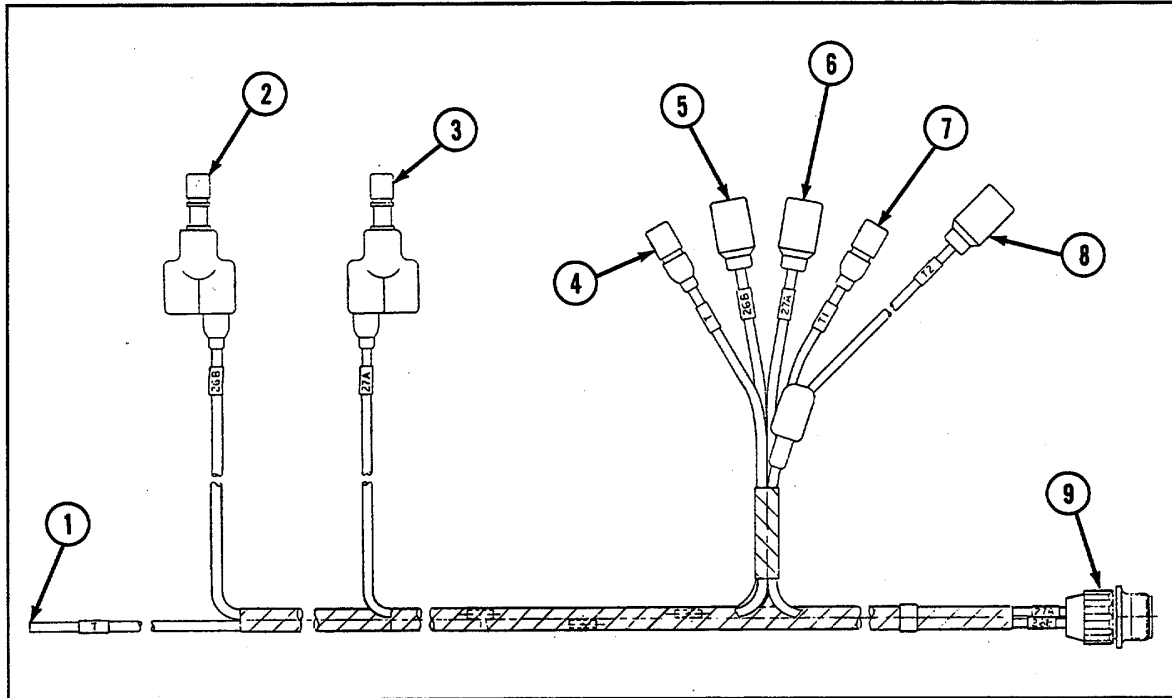
WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Gage panel to bulkhead wiring harness connector at bulkhead disconnect	T
2	Gage panel to bulkhead wiring harness	26B
3	Switch panel to gage panel and miscellaneous switches wiring harness	27A
4	Driver's vehicle exhaust smoke switch	T
5	Driver's vehicle exhaust smoke switch	26B
6	Driver's vehicle exhaust smoke switch	27A
7	Driver's vehicle exhaust smoke switch	T1
8	Driver's vehicle exhaust smoke indicator light	T2
9	Driver's vehicle exhaust smoke disconnect bracket	27A, 26B, T, T1

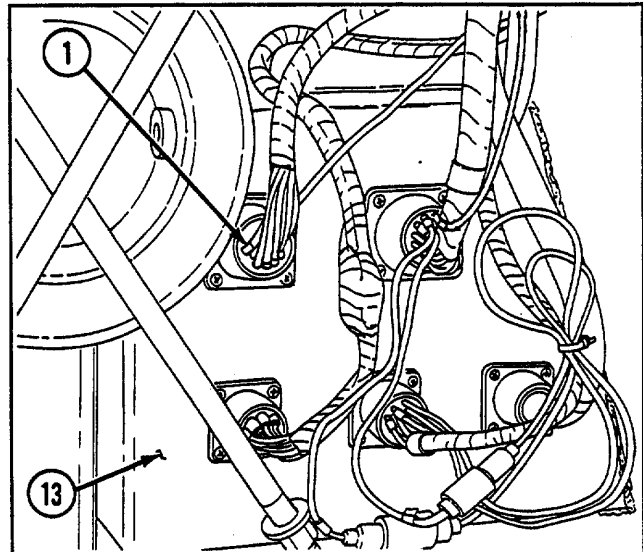
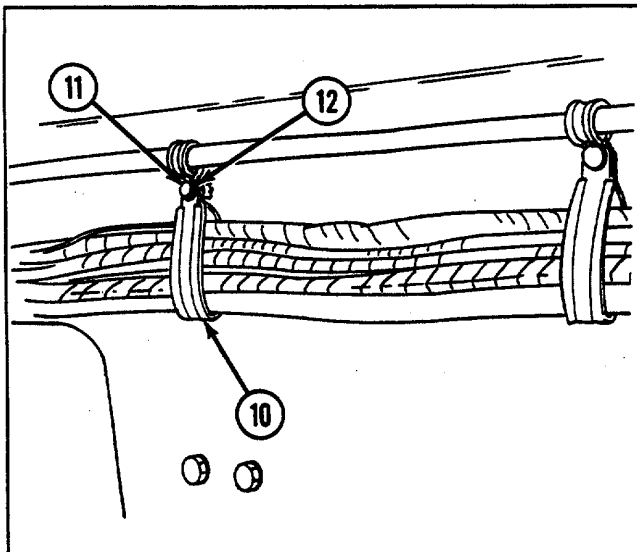


6-93 REPLACE/REPAIR DRIVER'S VEHICLE EXHAUST SMOKE BRACKET TO BULKHEAD CONNECTION WIRING HARNESS (11672382)-Continued

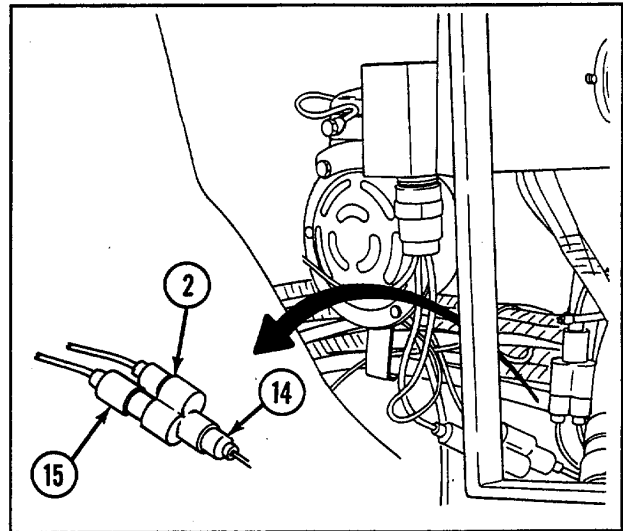


a. REMOVAL

- 1 Remove 14 clamps (10) by removing screw (11) and lockwasher (12) from each.
- 2 Disconnect lead (1) from gage panel to bulkhead wiring harness connector at bulkhead disconnect (13).



- 3 Disconnect Y-connector (2) from gage panel to bulkhead wiring harness (14) and connector (15).
- 4 Disconnect Y-connector (3) from switch panel to gage panel and miscellaneous switches wiring harness (16) and connector (17).
- 5 Disconnect four connectors (4 through 7) from driver's vehicle exhaust smoke switch (18).
- 6 Disconnect connector (8) from driver's vehicle exhaust smoke indicator light (19).
- 7 Disconnect connector (9) from driver's vehicle exhaust smoke disconnect bracket (20) by removing four screws (21), four lockwashers (22), and four nuts (23).



b. DISASSEMBLY

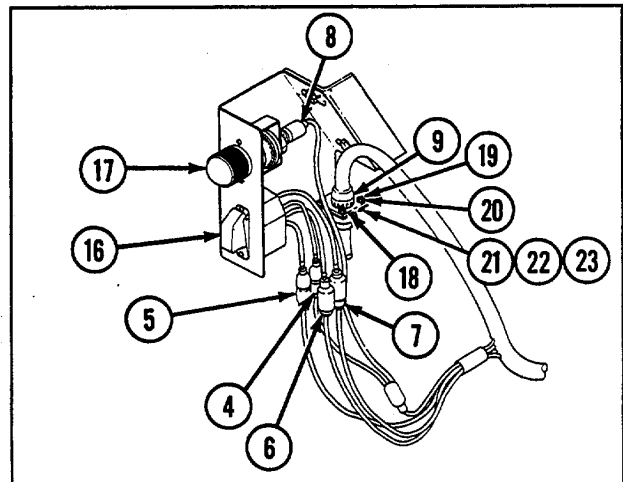
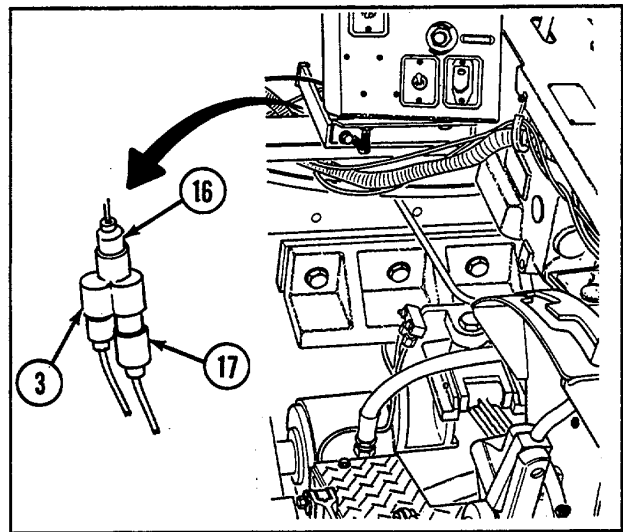
Disassemble wiring harness and lead (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness and lead (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect connector (9) to driver's vehicle exhaust smoke disconnect bracket (20) using four screws (21), four new lockwashers (22), and four nuts (23).
- 2 Connect connector (8) to driver's vehicle exhaust smoke indicator light (19).
- 3 Connect four connectors (4 through 7) to driver's vehicle exhaust smoke switch (18).
- 4 Connect Y-connector (3) to switch panel to gage panel and miscellaneous switches wiring harness (16) and connector (17).
- 5 Connect Y-connector (2) to gage panel to bulkhead wiring harness (14) and connector (15).
- 6 Connect lead (1) to gage panel to bulkhead wiring harness connector at bulkhead disconnect (13).
- 7 Install 14 clamps (10) using new lockwasher (12) and screw (11) for each.



NOTE

Follow-on maintenance: Install air cleaner assembly (see paragraph 4-24)

6-94 REPLACE/REPAIR COMMANDER'S SWITCH PLATE TO DRIVER'S VEHICLE EXHAUST SMOKE BRACKET WIRING HARNESS (11672387)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

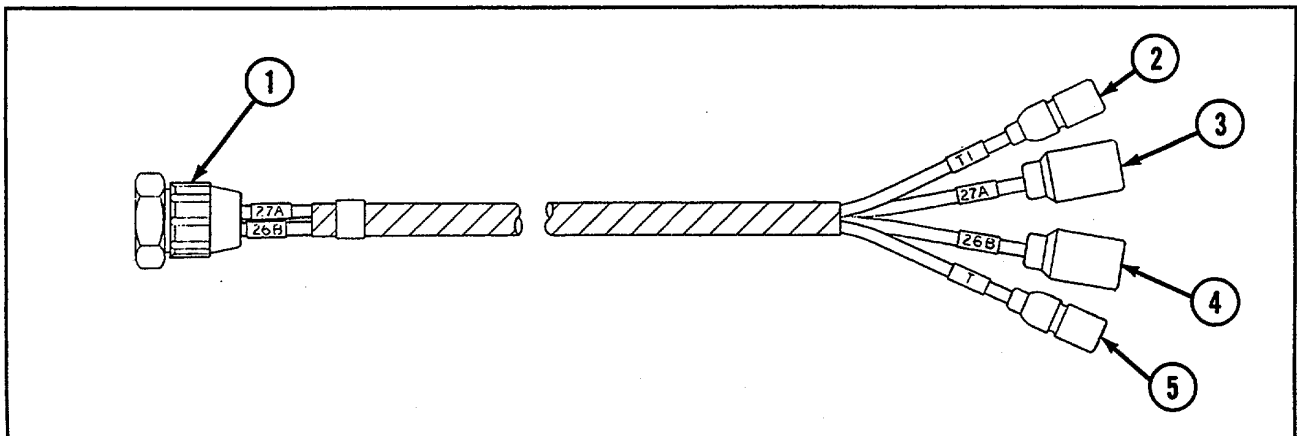
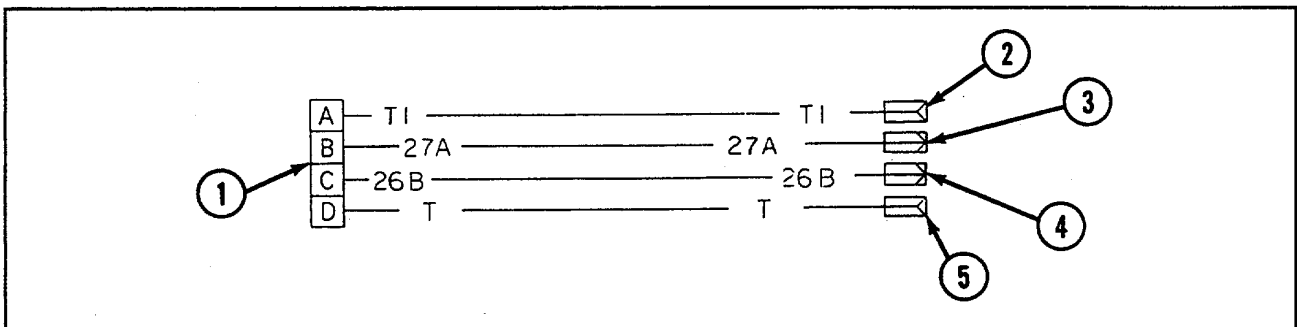
Parts:

Lockwashers (6) (Appendix G, item 116)

WARNING

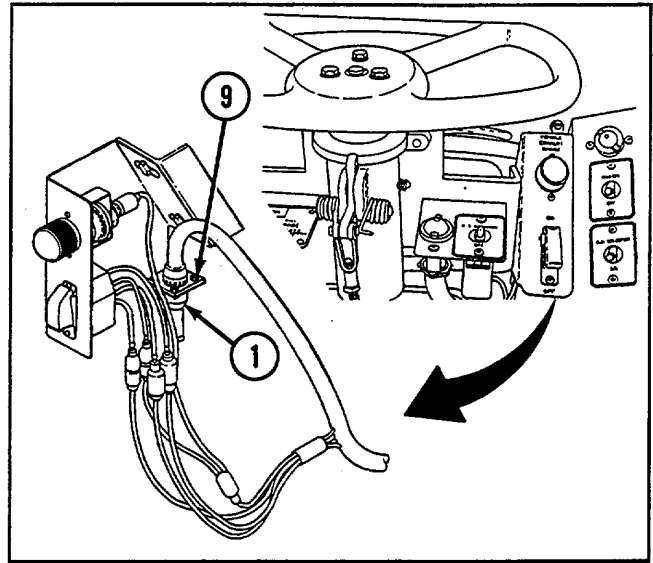
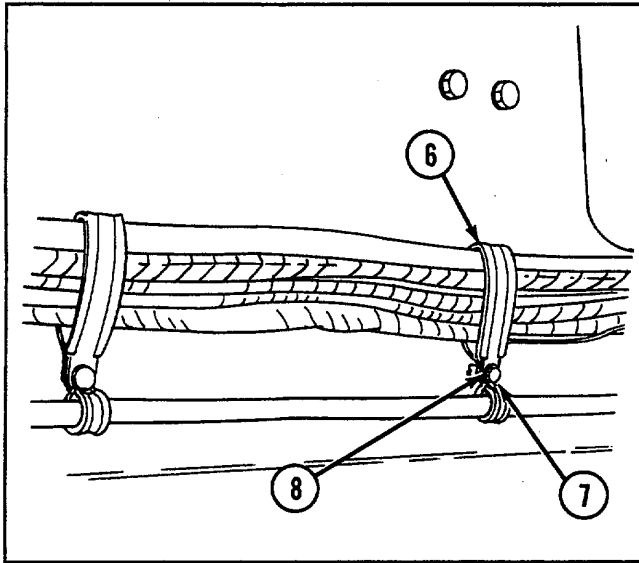
Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Driver's vehicle exhaust smoke disconnect bracket	T1, 27A, 26B, T
2	Commander's smoke activating switch	T1
3	Commander's smoke activating switch	27A
4	Commander's smoke activating switch	26B
5	Commander's smoke activating switch	T



a. REMOVAL

- 1 Remove six clamps (6) by removing screw (7) and lockwasher (8) from each.
- 2 Disconnect connector (1) from driver's vehicle exhaust smoke disconnect bracket (9).



3 Disconnect four connectors (2 through 5) from commander's smoke activating switch (10).

b. DISASSEMBLY

Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

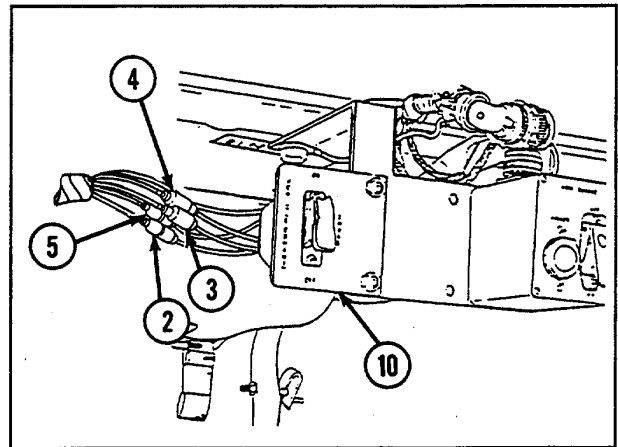
Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

1 Connect four connectors (2 through 5) to commander's smoke activating switch (10).

2 Connect connector (1) to driver's vehicle exhaust smoke disconnect bracket (9).

3 Install six clamps (6) using screw (7) and new lockwasher (8) for each.



6-95 REPLACE/REPAIR FUEL SOLENOID WIRING HARNESS (11672386)

THIS TASK COVERS

a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tools:
Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

Parts:
Locknut (Appendix G,
item 168)

Equipment Condition:

Equipment Condition:
Engine deck removed (see
paragraph 9-51)

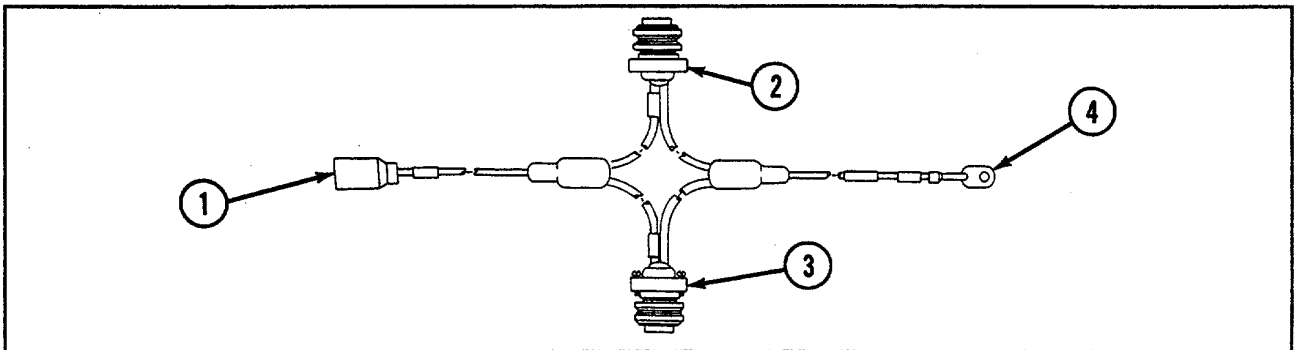
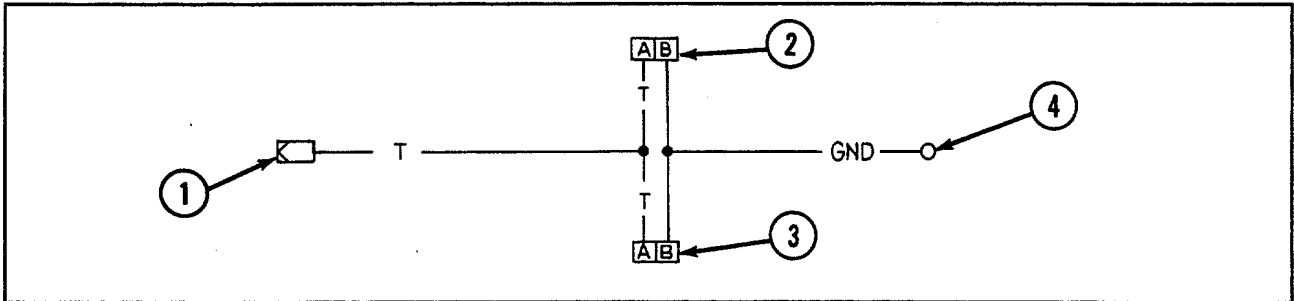
WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

6-95 REPLACE/REPAIR FUEL SOLENOID WIRING HARNESS (11672386)-

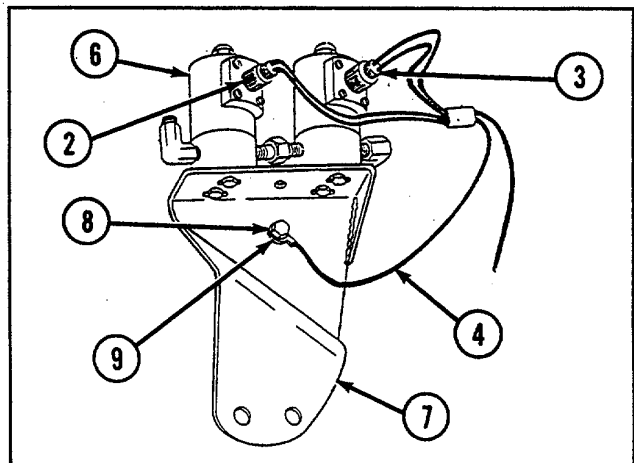
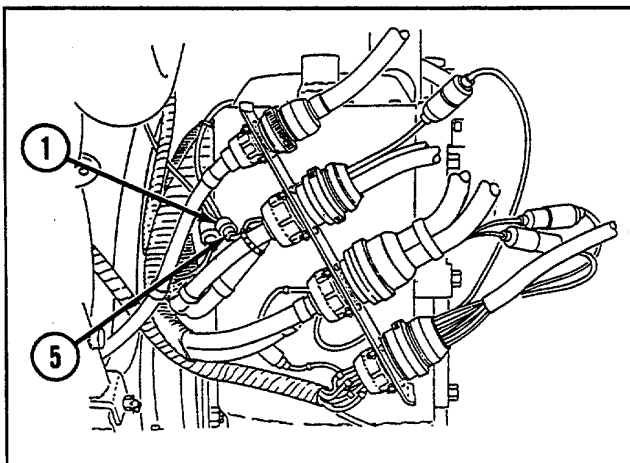
Continued

Connector No.	Electrical Lead To:	Wire No.
1	Exhaust smoke generating system lead assembly (11672473-1)	T
2	Fuel solenoid	T, GND
3	Fuel solenoid	T, GND
4	Ground	GND



a. REMOVAL

- 1 Disconnect connector (1) from exhaust smoke generating system lead assembly (5).
- 2 Disconnect two connectors (2 and 3) and from two fuel solenoids (6).
- 3 Disconnect ground lead (4) from solenoid bracket (7) by removing cap screw (8) and locknut (9).



b. DISASSEMBLY

Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect ground lead (4) to solenoid bracket (7) using new locknut (9) and cap screw (8).
- 2 Connect two connectors (2 and 3) and to two fuel solenoids (6).
- 3 Connect connector (1) to exhaust smoke generating system lead assembly (5).

NOTE

Follow-on maintenance: Install engine deck (see paragraph 9-51)

6-96 REPLACE/REPAIR FUEL/WATER SEPARATOR CONTROL MODULE TO SOLENOID DRAIN VALVE WIRING HARNESS (11684127)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

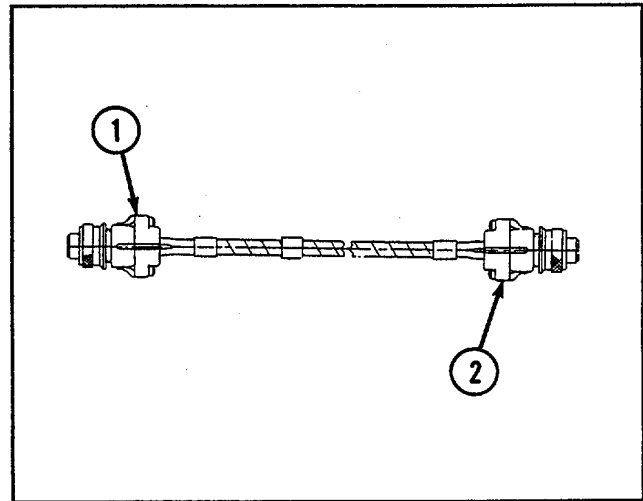
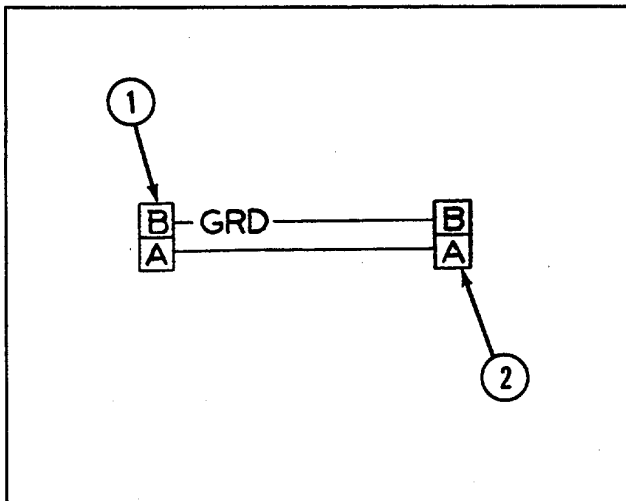
Equipment Condition:

Engine deck removed (see paragraph 9-51)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Solenoid drain valve	GND
2	Fuel/water separator control module	GND



6-96 REPLACE/REPAIR FUEL/WATER SEPARATOR CONTROL MODULE TO SOLENOID DRAIN VALVE WIRING HARNESS (11684127)--Continued

a. REMOVAL

- 1 Disconnect connector (1) from solenoid drain valve (3).
- 2 Disconnect connector (2) from fuel/water separator control module (4).
- 3 Remove clamp (5) by removing screw (6) and washer (7).

b. DISASSEMBLY

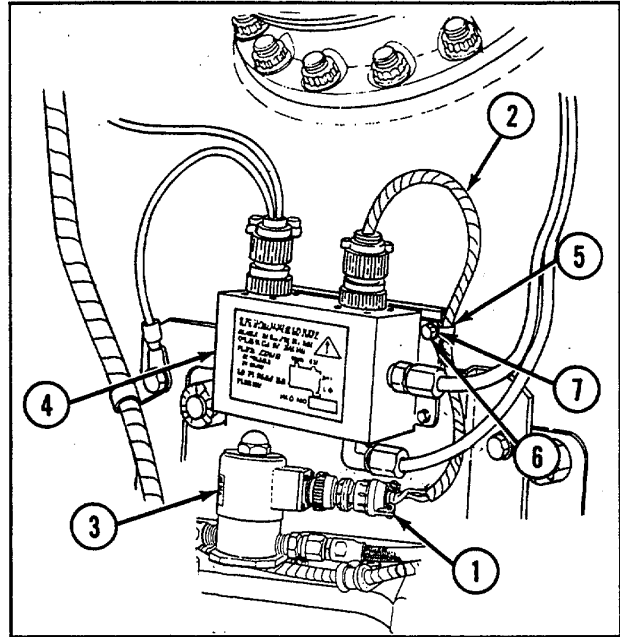
Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Install clamp (5) using washer (7) and screw (6).
- 2 Connect connector (2) to fuel/water separator control module (4).
- 3 Connect connector (1) to solenoid drain valve (3).



NOTE

Follow-on maintenance: Install engine deck (see paragraph 9-51)

6-97 REPLACE/REPAIR EXHAUST SMOKE GENERATING SYSTEM LEAD ASSEMBLY (11672385)

THIS TASK COVERS

- | | | | |
|------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
|------------|----------------|-------------|-----------------|

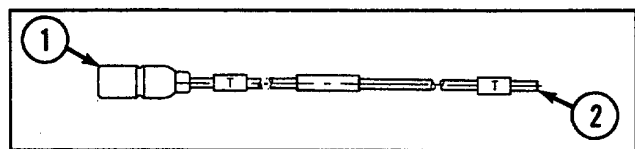
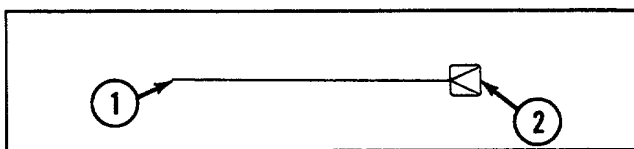
INITIAL SET-UP

Tools: Tool kit, general mechanic's (Appendix C, item 53)	Material: Wire, electrical (Appendix D, item 34)	Equipment Condition: Engine deck removed (see paragraph 9-51)
---	--	---

WARNING

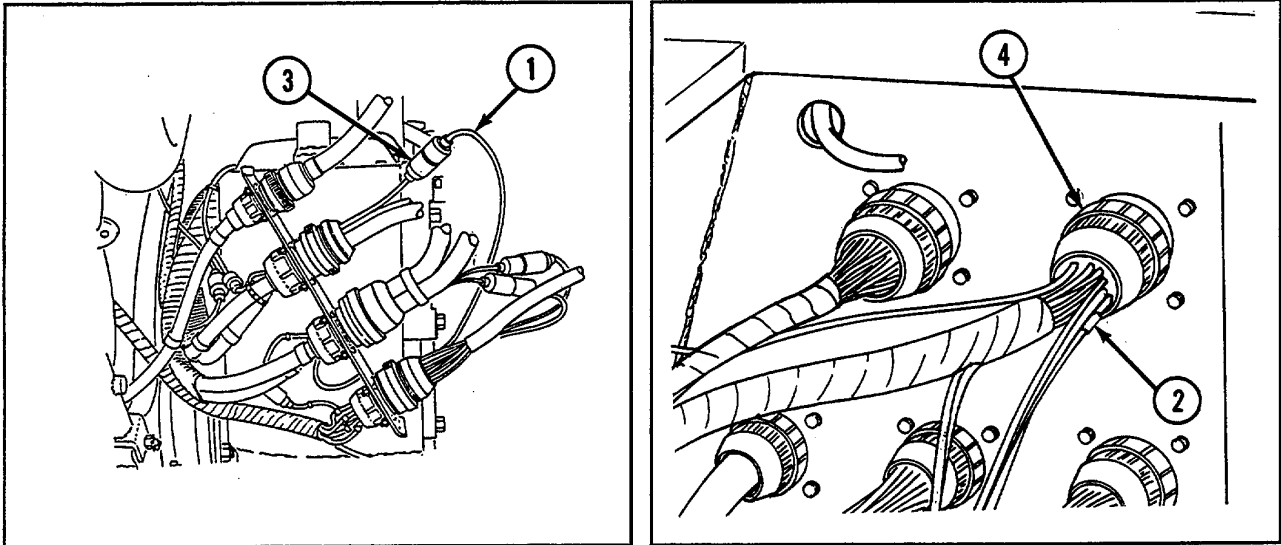
Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Smoke generating system lead assembly (11672473-2)	T
2	Bulkhead to main engine bracket and rear fuel tank transmitter wiring harness at bulkhead disconnect	T



a. REMOVAL

- 1 Disconnect connector (1) from smoke generating system lead assembly (3).
- 2 Disconnect lead (2) from bulkhead to main engine bracket and rear fuel tank transmitter wiring harness at bulkhead disconnect (4).



b. DISASSEMBLY

Disassemble lead assembly (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble lead assembly (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect lead (2) to bulkhead to main engine bracket and rear fuel tank transmitter wiring harness at bulkhead disconnect (4).
- 2 Connect connector (1) to smoke generating system lead assembly (3).

NOTE

Follow-on maintenance: Install engine deck (see paragraph 9-51)

6-98 REPLACE/REPAIR SMOKE GENERATING SYSTEM LEAD ASSEMBLY (11672473-1)

THIS TASK COVERS

a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:
Tool kit, general mechanic's (Appendix C, item 53)

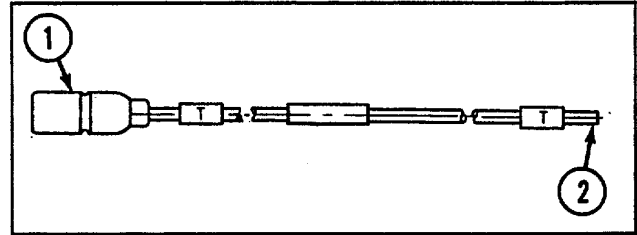
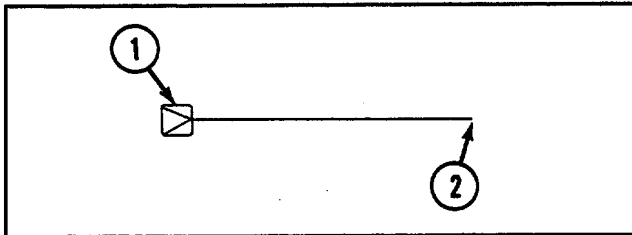
Equipment Condition:
Engine deck removed (see paragraph 9-51)

6-98 REPLACE/REPAIR SMOKE GENERATING SYSTEM LEAD ASSEMBLY
(11672473-1)--Continued

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Fuel solenoid wiring harness	T
2	Engine disconnect to starter wiring harness at engine disconnect	T



a. REMOVAL

- 1 Disconnect connector (1) from fuel solenoid wiring harness (3).
- 2 Disconnect lead (2) from engine disconnect to starter wiring harness at engine disconnect (4).

b. DISASSEMBLY

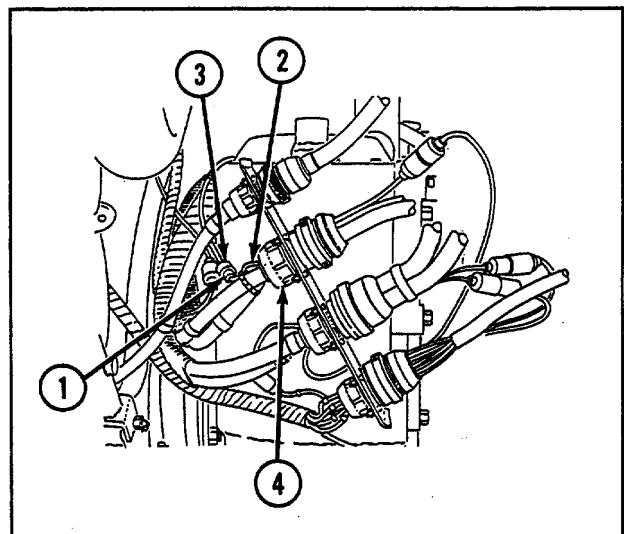
Disassemble lead assembly (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble lead assembly (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect lead (2) to engine disconnect to starter wiring harness at engine disconnect (4).
- 2 Connect connector (1) to fuel solenoid wiring harness (3).



NOTE

Follow-on maintenance: Install engine deck (see paragraph 9-51)

6-99 REPLACE/REPAIR SMOKE GENERATING SYSTEM LEAD ASSEMBLY (11672473-2)

THIS TASK COVERS

a. Removal b. Disassembly c. Assembly d. Installation

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

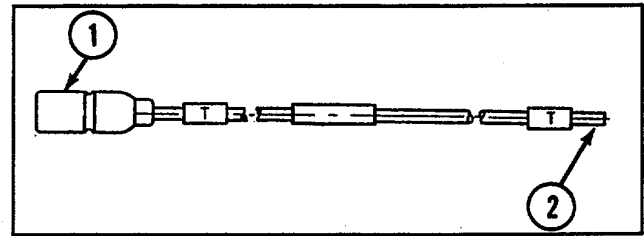
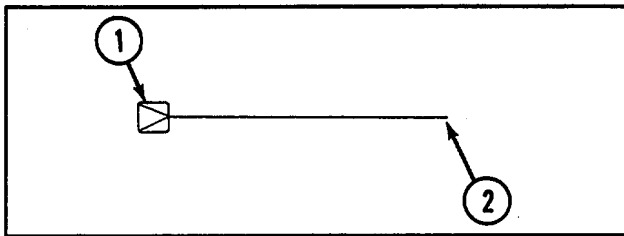
Equipment Condition:

Engine deck removed (see paragraph 9-51)

WARNING

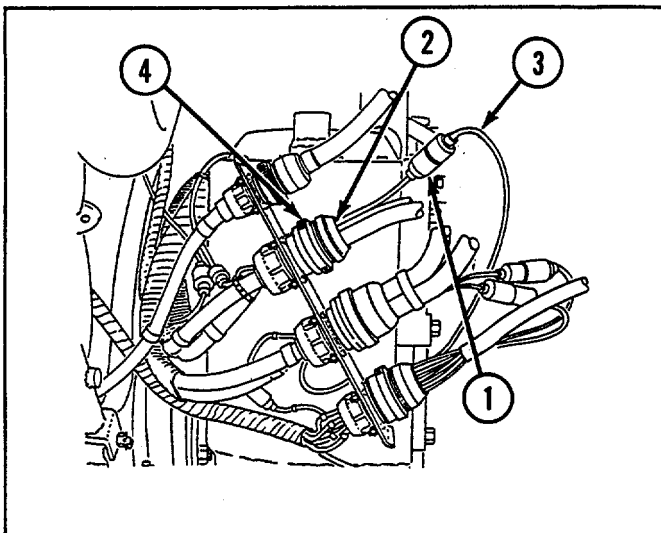
Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Exhaust smoke generating system wiring harness (11672385)	T
2	Engine disconnect ground lead assembly	T



a. REMOVAL

- 1 Disconnect connector (1) from exhaust smoke generating system wiring harness (3).
- 2 Disconnect lead (2) from engine disconnect ground lead assembly (4).



b. DISASSEMBLY

Disassemble lead assembly (see Chapter 6, Section VII).

**6-99 REPLACE/REPAIR SMOKE GENERATING SYSTEM LEAD ASSEMBLY'
(11 672473-2)---Continued**

c. ASSEMBLY

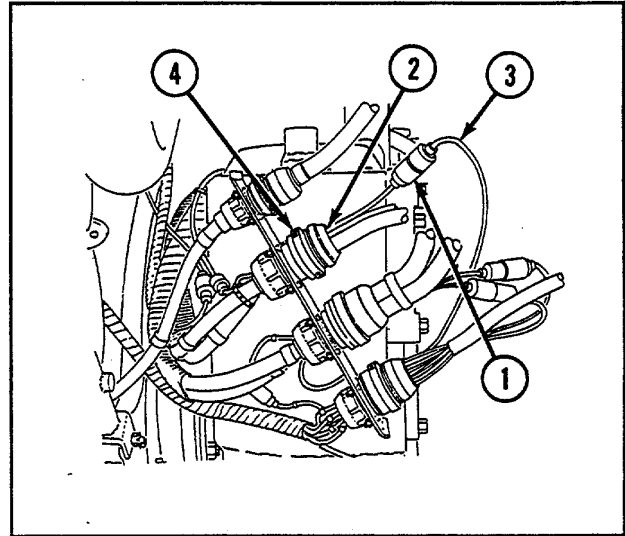
Assemble lead assembly (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect lead (2) to engine disconnect ground lead assembly (4).
- 2 Connect connector (1) to exhaust smoke generating system wiring harness (3).

NOTE

Follow-on maintenance: Install engine deck
(see paragraph 9-51)



**6-100 REPLACE/REPAIR DRIVER'S PERISCOPE TO INFRARED POWER SUPPLY
(SINGLE VOLTAGE) (10866967)**

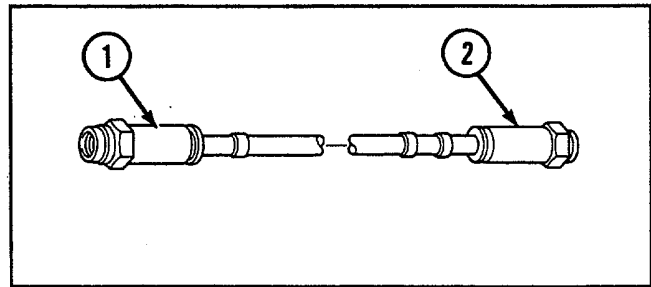
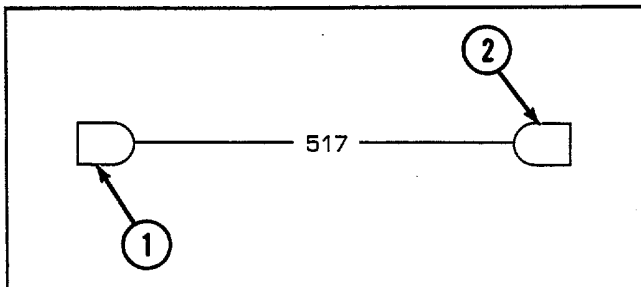
THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

WARNING

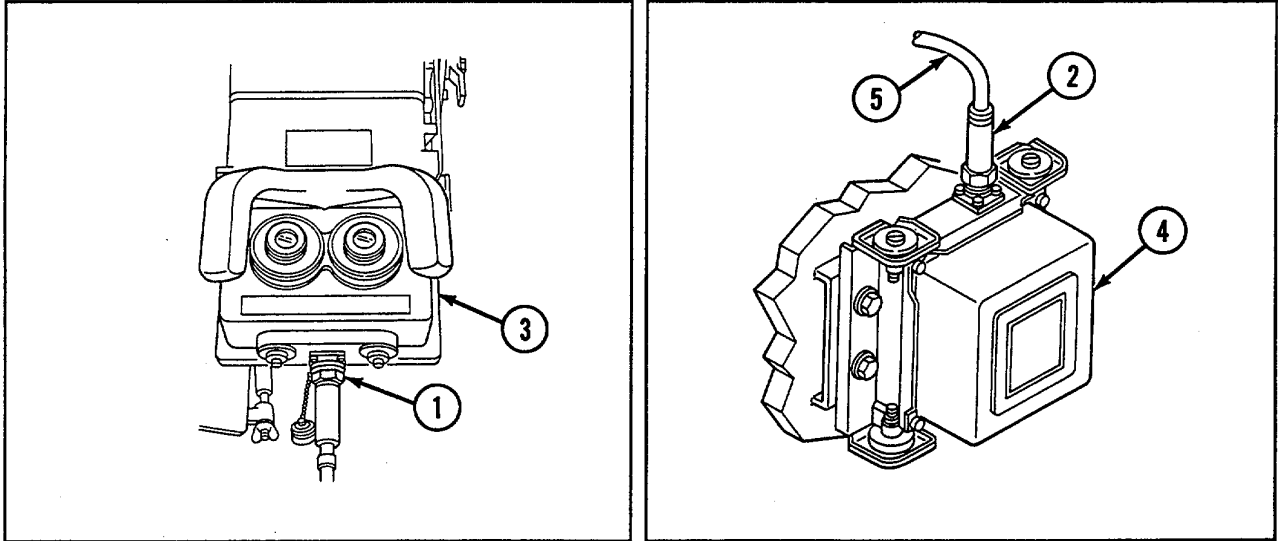
Be certain MASTER switch is OFF and negative battery leads are disconnected to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Driver's periscope	517
2	Infrared power supply	517



a. REMOVAL

- 1 Disconnect connector (1) from driver's periscope (3).
- 2 Disconnect connector (2) from infrared power supply (4) and remove lead assembly (5).

**b. DISASSEMBLY**

Disassemble lead assembly (5) (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble lead assembly (5) (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect connector (2) to infrared power supply (4).
- 2 Connect connector (1) to driver's periscope (3) and install lead assembly (5).

SECTION VI: MISCELLANEOUS ELECTRICAL COMPONENTS

Para. Task	Page
6-101 Replace Ventilator Blower Assembly.....	6-258
6-102 Replace Bilge Pump Power Lead Relay, Mounting Plate, and Circuit Breaker.....	6-258
6-103 Replace Fuel Injection Pump, Fuel Shutoff Solenoid, Lead and Related Parts.....	6-260
6-104 Replace Dummy Connector Assembly (Infrared and Passive Night Viewer).....	6-261
6-105 Replace/Repair Electrical Kit for M239 Smoke Grenade Launcher Feed Through Cable Assemblies (11672298-1 and 11672298-2)	6-261

6-101 REPLACE VENTILATOR BLOWER ASSEMBLY

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

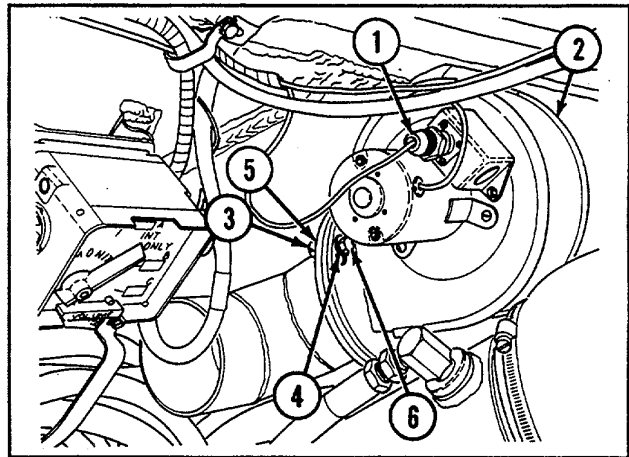
Lockwashers (3) (Appendix G, item 132)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock or burns.

a. REMOVAL

- 1 Disconnect connector (1).
- 2 Remove ventilator blower assembly (2) by removing three nuts (3), three flat washers (4), three lockwashers (5), and three screws (6).



b. INSTALLATION

- 1 Install ventilator blower assembly (2) using three nuts (3), three flat washers (4), three new lockwashers (5), and three screws (6).
- 2 Connect connector (1).

6-102 REPLACE BILGE PUMP POWER LEAD RELAY, MOUNTING PLATE, AND CIRCUIT BREAKER

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Equipment Condition:

Stowage basket forward intermediate left floor plate opened (see paragraph 9-21)

Parts:

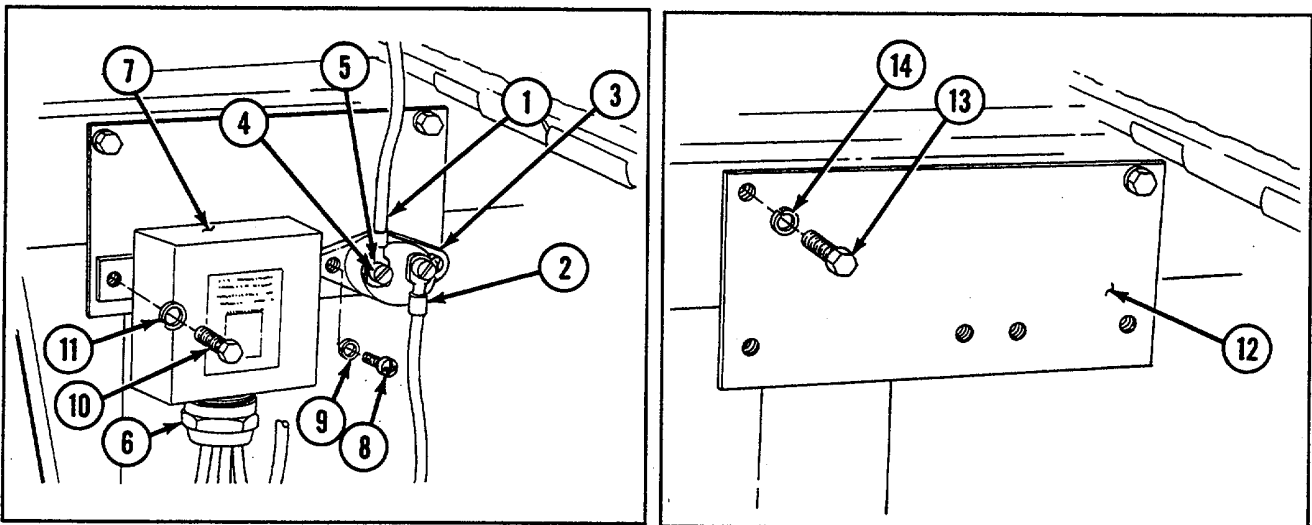
- Lockwashers (6) (Appendix G, item 115)
- Lockwashers (4) (Appendix G, item 116)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock or burns.

a. REMOVAL

- 1 Disconnect two leads (1 and 2) from circuit breaker (3) by removing two screws (4) and two lockwashers (5).
- 2 Disconnect wiring harness (6) from relay (7).
- 3 Remove circuit breaker (3) by removing two screws (8) and two lockwashers (9).
- 4 Remove relay (7) by removing two screws (10) and two lockwashers (11).
- 5 Remove plate (12) by removing two screws (13) and two lockwashers (14).

**b. INSTALLATION**

- 1 Install plate (12) using two new lockwashers (14) and two screws (13).
- 2 Install relay (7) using two new lockwashers (11) and two screws (10).
- 3 Install circuit breaker (3) using two new lockwashers (9) and two screws (8).
- 4 Connect wiring harness (6) to relay (7).
- 5 Connect two leads (1 and 2) to circuit breaker (3) using two new lockwashers (5) and two screws (4).

NOTE

Follow-on maintenance: Close stowage basket forward intermediate left floor plate (see paragraph 9-21)

6-103 REPLACE FUEL INJECTION PUMP, FUEL SHUTOFF SOLENOID, LEAD AND RELATED PARTS**THIS TASK COVERS**

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

- Lockwashers (4) (Appendix G,
item 112)
- Nuts, self-locking (3)
(Appendix G, item 172)

Equipment Condition:

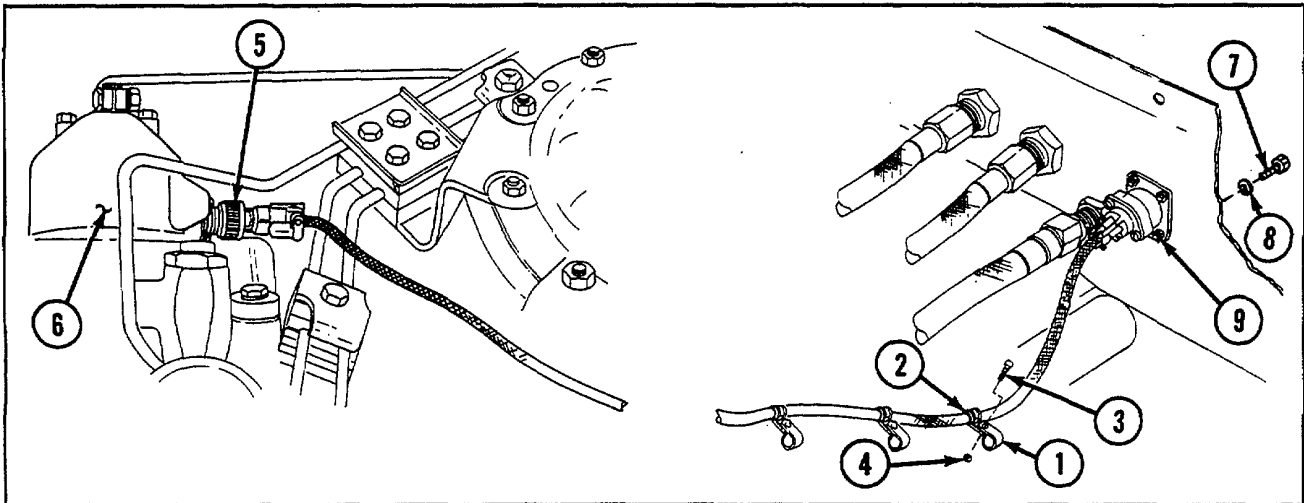
Engine cooling fan housings
removed (see paragraph 5-3)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock or burns.

a. REMOVAL

- 1 Disconnect six loop clamps (1 and 2) by removing three screws (3) and three self-locking nuts (4).
- 2 Remove three loop clamps (2).
- 3 Disconnect lead (5) from fuel injection pump (6).
- 4 Remove lead (5) by removing four screws (7), four lockwashers (8), and four nuts (9).

**b. INSTALLATION**

- 1 Install lead (5) using four screws (7), four new lockwashers (8), and four nuts (9).
- 2 Connect lead (5) to fuel injection pump (6).
- 3 Install three loop clamps (2).
- 4 Connect six loop clamps (1 and 2) using three screws (3) and three new self-locking nuts (4).

NOTE

Follow-on maintenance: Install engine cooling fan housings (see paragraph 5-3)

6-104 REPLACE DUMMY CONNECTOR ASSEMBLY (INFRARED AND PASSIVE NIGHT VIEWER)

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:
Tool kit, general mechanic's (Appendix C, item 53)

Equipment Condition:
Infrared and passive night viewer connector disconnected (see paragraph 6-15)

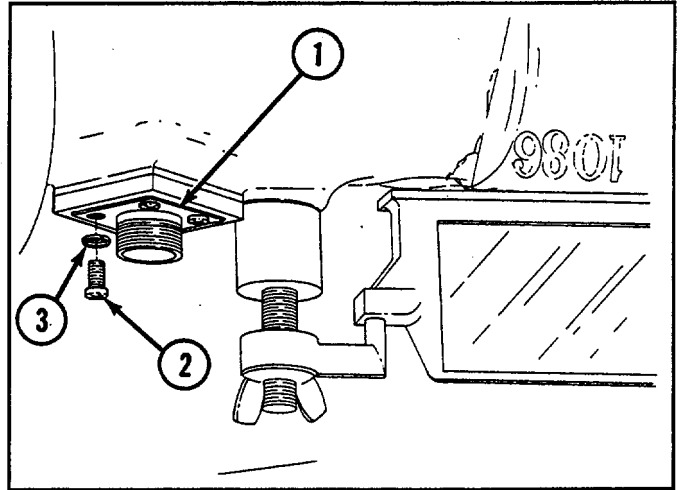
Parts:
Lockwashers (4) (Appendix G, item 102)

a. REMOVAL

Remove dummy connector (1) by removing four screws (2) and four lockwashers (3).

b. INSTALLATION

Install dummy connector (1) using four new lockwashers (3) and four screws (2).



NOTE

Follow-on maintenance: Connect infrared and passive night viewer connector (see paragraph 6-15)

6-105 REPLACE/REPAIR ELECTRICAL KIT FOR M239 SMOKE GRENADE LAUNCHER DISCHARGER FEED THROUGH CABLE ASSEMBLIES (11672298-1 AND 11672298-21)

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

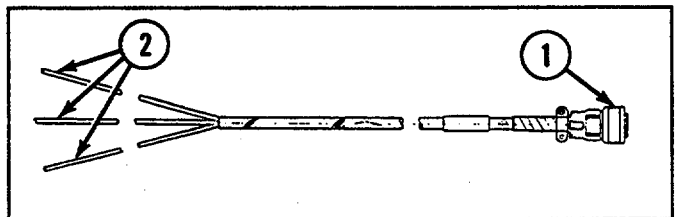
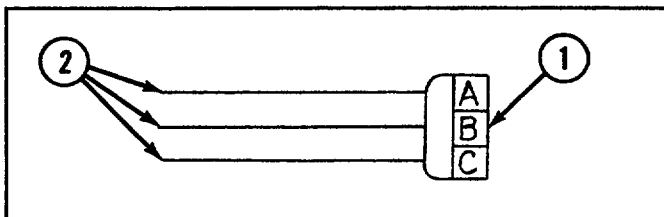
Tools:
• Tool kit, general mechanic's (Appendix C, item 53)
• Soldering gun (Appendix C, item 50)

Equipment Condition:
Discharger removed (see paragraph 15-2)

WARNING

Be certain MASTER switch is OFF when working on electrical systems to avoid electrical shock or burns.

Connector No.	Electrical Lead To:	Wire No.
1	Smoke grenade launcher system wiring harness	
2	Smoke grenade launcher tubes	



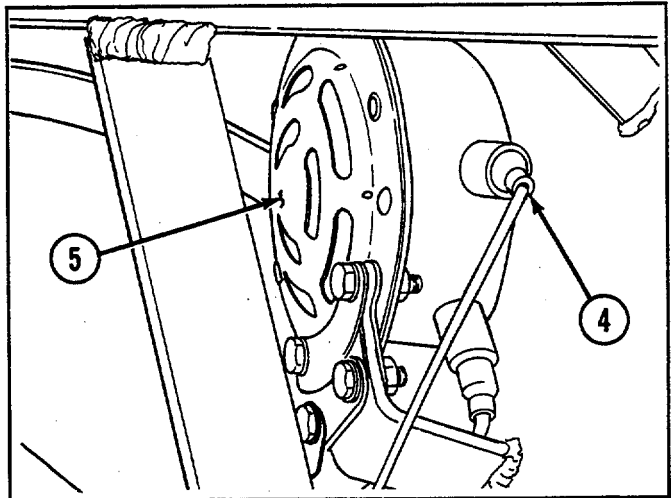
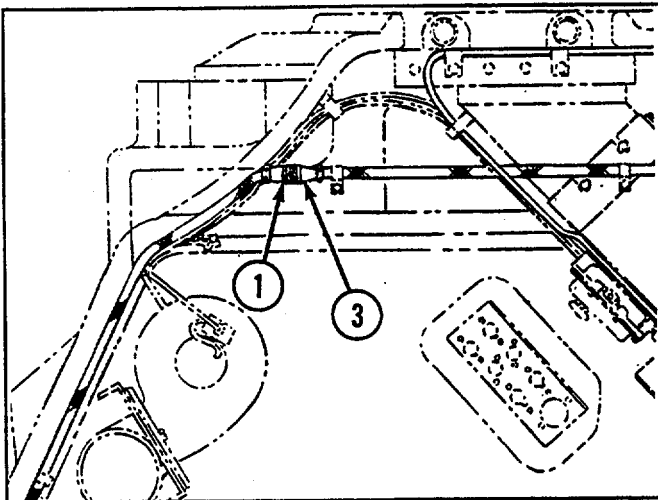
6-105 REPLACE/REPAIR ELECTRICAL KIT FOR M239 SMOKE GRENADE LAUNCHER DISCHARGER FEED THROUGH CABLE ASSEMBLIES (11672298-1 AND 11672298-2)-Continued

a. REMOVAL

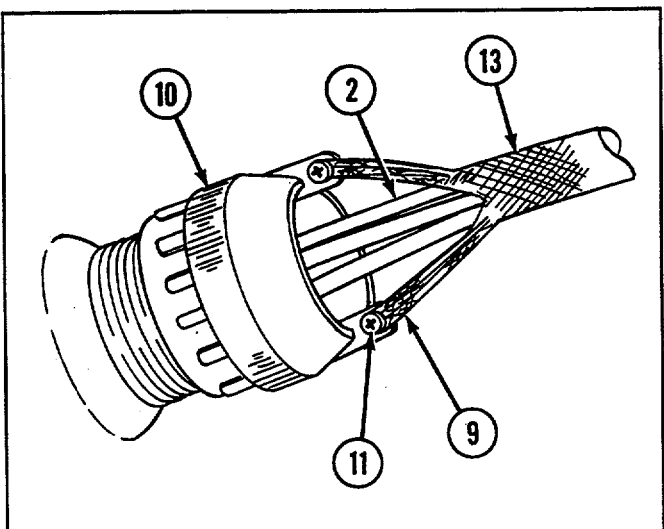
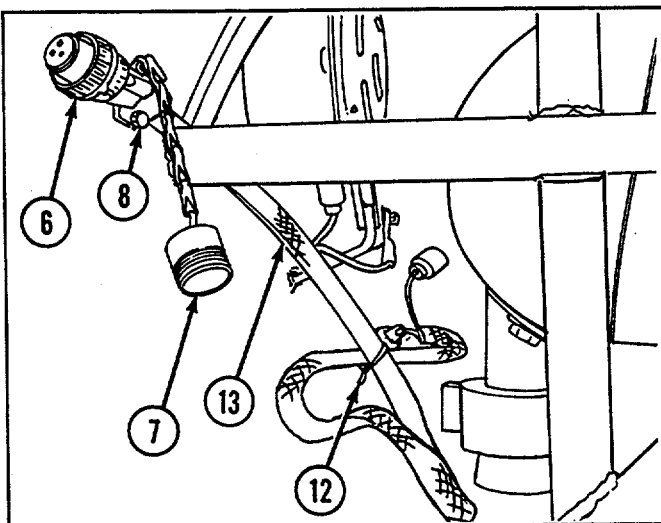
NOTE

Left and right side removed in same manner. Right side connector (4) will be removed from flasher light assembly. Left side shown.

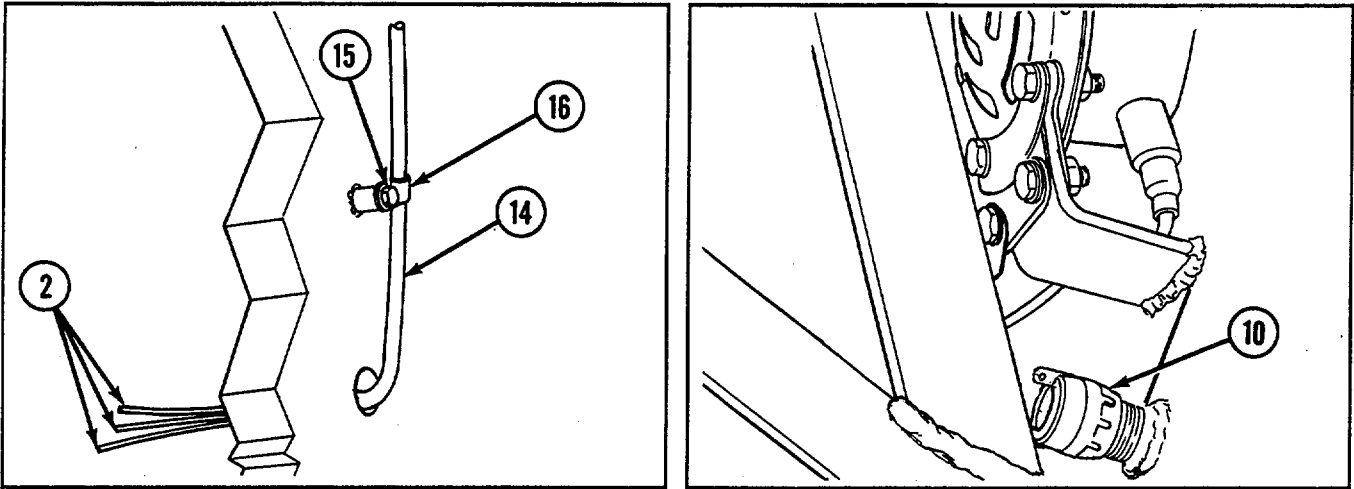
- 1 Disconnect connector (1) from smoke grenade launcher system wiring harness (3).
- 2 Disconnect connector (4) from horn assembly (5).



- 3 Remove terminal (6) and cover (7) from three leads (2) by removing two screws (8).
- 4 Separate cover (7) from terminal (6).
- 5 Disconnect two leads (9) from terminal (10) by removing two screws (11).
- 6 Remove strap (12) and wire braid (13) from three leads (2).



- 7 Remove cable assembly (14) from inside vehicle by removing screw (15) and clamp (16) and pulling three leads (2) through hull.
- 8 Unscrew terminal (10) and remove from hull.



b. INSTALLATION

- 1 Install terminal (10) to hull.
- 2 Install cable assembly (14) to inside vehicle using clamp (16) and screw (15).
- 3 Pull three leads (2) through hull, install wire braid (13), and connect two leads (9) to terminal (10) using two screws (11). Install strap (12).
- 4 Install terminal (6) and cover (7) to three leads (2) using two screws (8).
- 5 Install cover (7) to terminal (6).
- 6 Connect connector (4) to horn assembly (5).
- 7 Connect connector (1) to smoke grenade launcher system wiring harness (3).

NOTE

Follow-on maintenance: Install discharger (see paragraph 15-2)

SECTION VII: TERMINAL CONNECTOR PROCEDURES

Para.	Task	Page
6-106	Repair Cable, Wire, Receptacle, and Plug Identifiers	6-264
6-107	Repair Terminal-Type Cable Connector Replacement.....	6-265
6-108	Repair Male Cable Connector Replacement	6-265
6-109	Repair Female Cable Connector Replacement (with Sleeve).....	6-266
6-110	Repair Typical Female-Type Panel Mounting Receptacle	6-266
6-111	Repair Typical Male-Type Panel Mounting Receptacle	6-267
6-112	Repair Typical Female-Type Panel Mounting Receptacle (with Ridged Locking Nut)	6-268
6-113	Repair Typical Male-Type Panel Mounting Receptacle (with Ridged Locking Nut).....	6-269
6-114	Repair Typical Female-Type Plug	6-270
6-115	Repair Typical Male-Type Plug	6-271

6-106 REPAIR CABLE, WIRE, RECEPTACLE, AND PLUG IDENTIFIERS

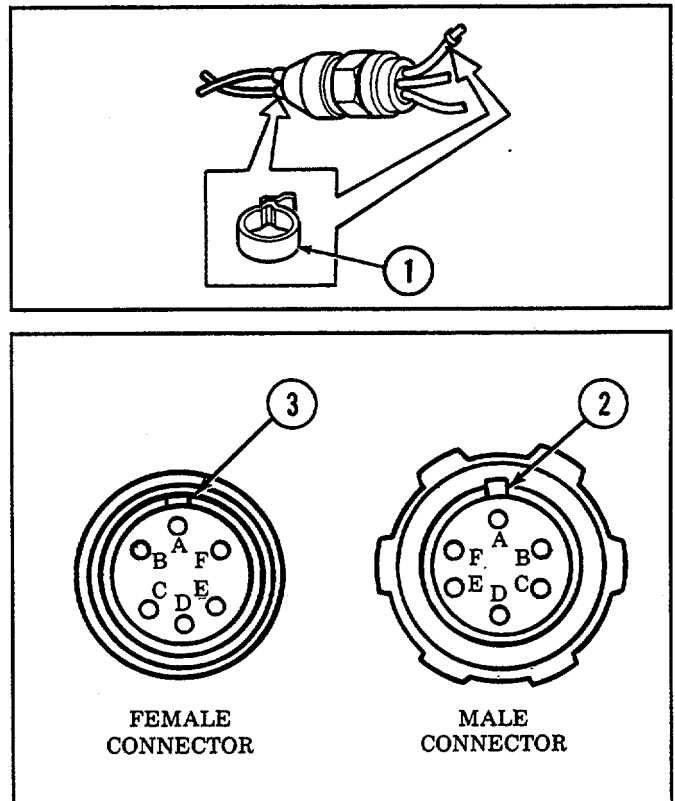
WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

NOTE

If cables or wires are replaced, remove tags from old wires and place them on new wires.

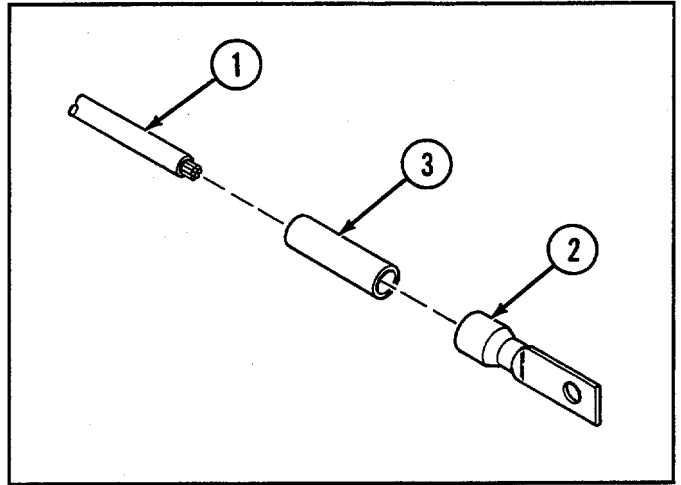
- 1 Cable and wire identifiers (1) are aluminum tags attached to cables. The tags are embossed with cable identification numbers. The identification diagram is the same as shown on the systems wiring diagram.
- 2 All pins (male connectors) and sockets (female connectors) in receptacles and plugs are identified by an alphabetic code. Coded identification starts at the connector key (2) or groove (3).
- 3 Male connector's identifying letters run clockwise.
- 4 Female connector's identifying letters run counterclockwise.



6-107 REPAIR TERMINAL-TYPE CABLE CONNECTOR REPLACEMENT**WARNING**

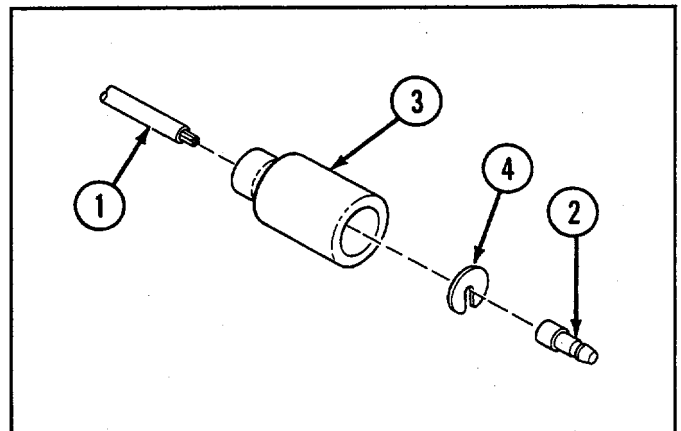
Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

- 1 Strip cable (1) insulation equal to depth of terminal (2) well.
- 2 Slide insulator (3) over cable (1).
- 3 Insert cable into terminal (2) well and crimp.
- 4 Slide insulator (3) over crimped end of terminal (2).

**6-108 REPAIR MALE CABLE CONNECTOR REPLACEMENT****WARNING**

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

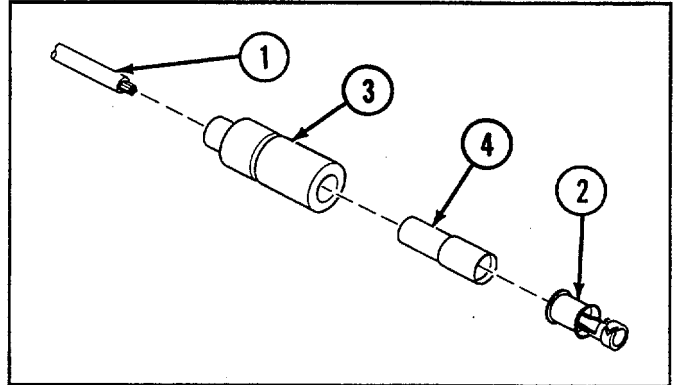
- 1 Strip cable (1) insulation equal to depth of terminal (2) well.
- 2 Slide shell (3) over cable (1).
- 3 Insert cable into terminal (2) well and crimp.
- 4 Place C-washer (4) over cable (1) at crimped junction and slide shell (3) over C-washer and terminal (2).



6-109 REPAIR FEMALE CABLE CONNECTOR REPLACEMENT (WITH SLEEVE)**WARNING**

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

- 1 Strip cable (1) insulation equal to depth of terminal (2) well.
- 2 Slide shell (3) and sleeve (4) over cable (1).
- 3 Insert cable into terminal (2) well and crimp.
- 4 Slide shell (3) and sleeve (4) over terminal (2).

**6-110 REPAIR TYPICAL FEMALE-TYPE PANEL MOUNTING RECEPTACLE****THIS TASK COVERS**

- a. Disassembly
- b. Assembly

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

Rod (Appendix D, item 24)

Reference:

TB SIG 222

WARNING

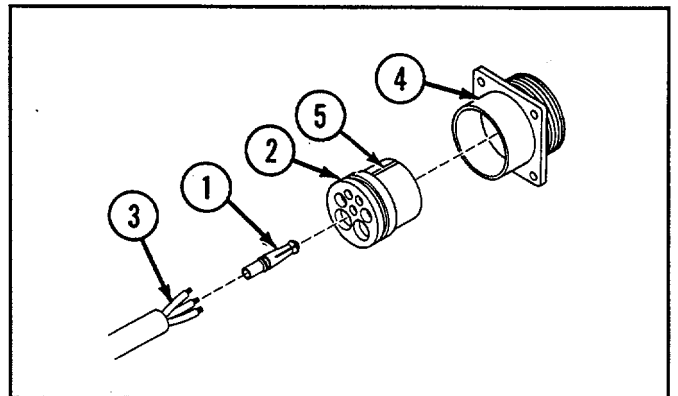
Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

NOTE

In plug and receptacle assemblies, plug all spare grommet holes with rod.

a. DISASSEMBLY

- 1 Drive socket contact (1) out through rear of insert (2) with pin extractor.
- 2 Unsolder cable leads (3) from solder wells on socket contacts (1).
- 3 Slide insert (2) out through rear of shell (4).



b. ASSEMBLY

- 1 Strip cable (3) insulation equal to depth of solder wells of socket contacts (1).
- 2 Insert cable leads (3) into solder wells of socket contacts (1) and solder (use resin core solder only) (refer to TB SIG 222).
- 3 Push insert (2) into shell (4) from rear until seated. Groove (5) in insert must be aligned with guide in shell (4) to ensure proper fit.
- 4 Push socket contacts (1) into insert (2) from rear until seated.

6-111 REPAIR TYPICAL MALE-TYPE PANEL MOUNTING RECEPTACLE**THIS TASK COVERS**

- a. Disassembly b. Assembly

INITIAL SET-UP

Tools:

Tool kit, general mechanic's
(Appendix C, item 53)

Parts: Reference:

Rod (Appendix D, item 24) TB SIG 222

WARNING

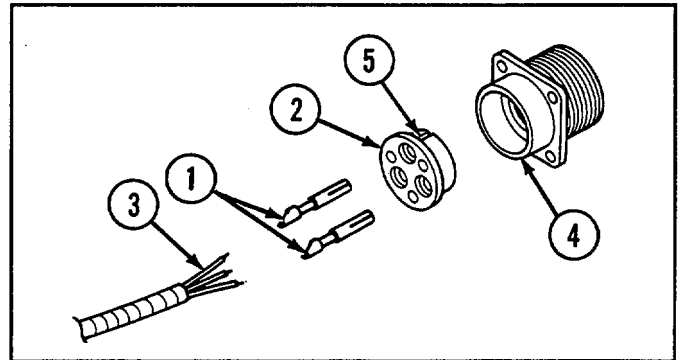
Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

NOTE

In plug and receptacle assemblies, plug all spare grommet holes with rod.

a. 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 (4).

**b. ASSEMBLY**

- 1 Strip cable (3) 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 (use resin core solder only) (refer to TB SIG 222).
- 3 Push insert (2) into shell (4) from rear until seated. Groove (5) in insert must be aligned with guide in shell (4) to ensure proper fit.
- 4 Push pin contacts (1) into insert (2) from rear until seated.

6-112 REPAIR TYPICAL FEMALE-TYPE PANEL MOUNTING RECEPTACLE (WITH RIDGED LOCKING NUT)**THIS TASK COVERS**

- a. Disassembly b. Assembly

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's (Appendix C, item 53)

Reference:

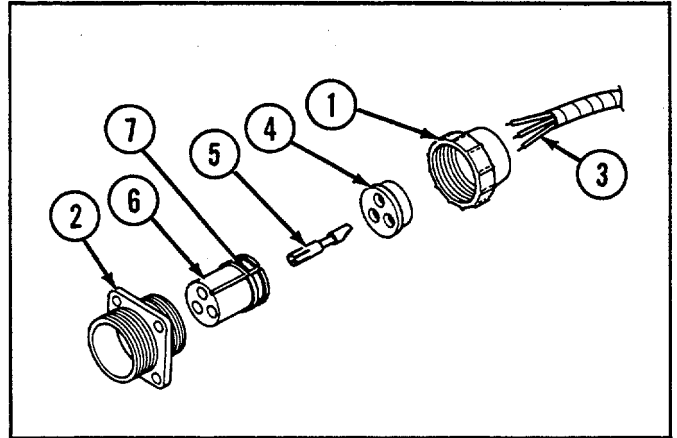
TB SIG 222

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

a. DISASSEMBLY

- 1 Unscrew nut (1) from shell assembly (2) and slide back on cable leads (3).
- 2 Slide grommet (4) back on cable leads (3).
- 3 Drive socket contacts (5) out through front of insert (6) with pin extractor.
- 4 Unsolder cable leads (3) from socket contacts (5). Push insert (6) out through rear of shell (2).

**b. ASSEMBLY**

- 1 Strip cable leads (3) insulation equal to depth of solder wells of socket contacts (1).
- 2 Slide nut (1) over cable leads(3).
- 3 Slide grommet (4) over cable leads (3).
- 4 Insert cable leads (3) into solder wells of socket contacts (5) and solder (use resin core solder only) (refer to TB SIG 222).
- 5 Push insert (6) into shell (2) from rear until seated. Groove (7) in insert must be aligned with guide in shell (4) to ensure proper fit.
- 6 Push socket contacts (5) into insert (6) from rear until seated.
- 7 Push grommet (4) down cable leads (3) and over solder wells of socket contacts (5).
- 8 Screw nut (1) onto shell assembly (2).

6-113 REPAIR TYPICAL MALE-TYPE PANEL MOUNTING RECEPTACLE (WITH RIDGED LOCKING NUT)**THIS TASK COVERS**

- a. Disassembly b. Assembly

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Reference:

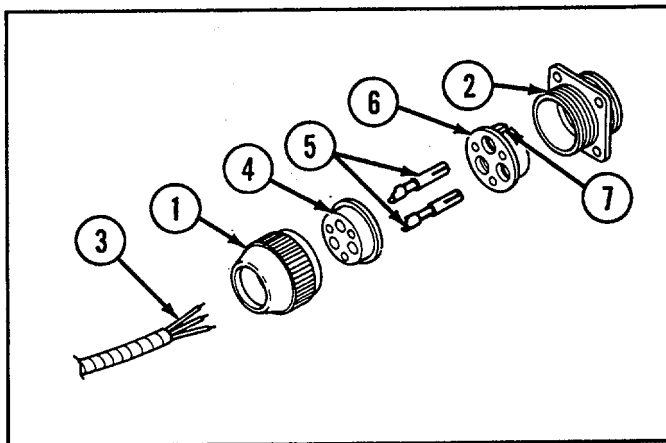
TB SIG 222

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

a. DISASSEMBLY

- 1 Unscrew nut (1) from shell assembly (2) and slide back on cable leads (3).
- 2 Slide grommet (4) back on cable leads (3).
- 3 Drive socket contacts (5) out through front of insert (6) with pin extractor.
- 4 Unsolder cable leads (3) from socket contacts (5).

**b. ASSEMBLY**

- 1 Strip cable leads (3) insulation equal to depth of solder wells of socket contacts (5).
- 2 Slide nut (1) over cable leads(3).
- 3 Slide grommet (4) over cable leads (3).
- 4 Insert cable leads (3) into solder wells of socket contacts (5) and solder (use resin core solder only) (refer to TB SIG 222).
- 5 Push insert (6) into shell (2) from rear until seated. Groove (7) in insert must be aligned with guide in shell (4) to ensure proper fit.
- 6 Push socket contacts (5) into insert (6) from rear until seated.
- 7 Push grommet (4) down cable leads (3) and over solder wells of socket contacts (5).
- 8 Screw nut (1) onto shell assembly (2).

6-115 REPAIR TYPICAL MALE-TYPE PLUG**THIS TASK COVERS**

- a. Disassembly b. Assembly

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Reference:

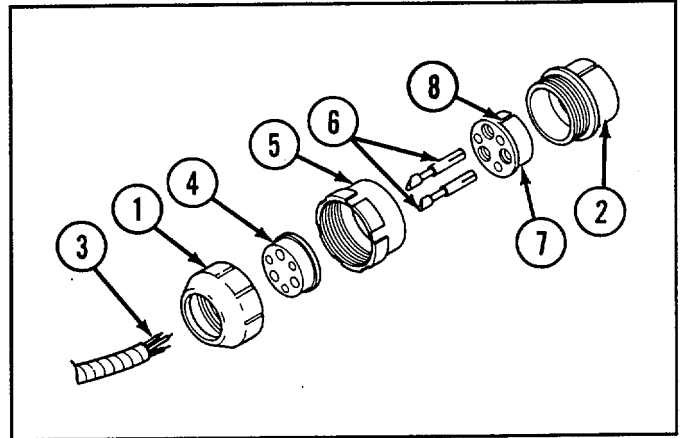
TB SIG 222

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

a. DISASSEMBLY

- 1 Unscrew nut (1) from shell assembly (2) and slide back on cable leads (3).
- 2 Slide grommet (4) back on cable leads (3).
- 3 Slide coupling nut (5) off shell (2).
- 4 Drive socket contacts (6) out through rear if insert (7) with pin extractor.
- 5 Push insert (7) out through rear shell (2).
- 6 Unsolder cable leads (3) from socket contacts (6).

**b. ASSEMBLY**

- 1 Strip cable leads (3) insulation equal to depth of solder wells of socket contacts (6).
- 2 Slide nut (1) over cable leads(3).
- 3 Slide grommet (4) over cable leads (3).
- 4 Insert cable leads (3) into solder wells of socket contacts (6) and solder (use resin core solder only) (refer to TB SIG 222).
- 5 Push insert (7) into shell (2) from rear until seated. Groove (8) in insert must be aligned with guide in shell (2) to ensure proper fit.
- 6 Push socket contacts (6) into insert (7) from rear until seated.
- 7 Slide coupling nut (5) onto shell assembly (2).
- 8 Push grommet (4) down cable leads (3) and over solder wells of sockets contacts (5).
- 9 Screw nut (1) onto shell assembly (2).

CHAPTER 7 MAINTENANCE OF TRANSMISSION AND OUTPUT REDUCTION DRIVES

CHAPTER OVERVIEW

This chapter describes how to remove, service, install, and adjust the transmission and the output reduction drives.

This chapter consists of the following sections:		Page
Section I:	Transmission Testing, Sampling, Servicing, and Adjustment	7-1
Section II:	Transmission Oil Cooler Lines, Bracket, Saddle Seals, and Output Reduction Drives	7-4

SECTION I: TRANSMISSION TESTING, SAMPLING, SERVICING, AND ADJUSTMENT

Para.	Task	Page
7-1	Replace/Service Transmission Actuating Brake Air Valve Linkage	7-1
7-2	Replace/Service Transmission Oil Filter	7-3

7-1 REPLACE/SERVICE TRANSMISSION ACTUATING BRAKE AIR VALVE LINKAGE

THIS TASK COVERS

- | | | |
|------------|-----------------|---------------|
| a. Removal | b. Installation | c. Adjustment |
|------------|-----------------|---------------|

INITIAL SET-UP

Tools: Tool kit, general mechanic's (Appendix C, item 53)	Parts: Pins, cotter (2) (Appendix G, item 212)	Equipment Condition: Engine transmission access doors opened (see paragraph 9-55)
---	--	---

a. REMOVAL

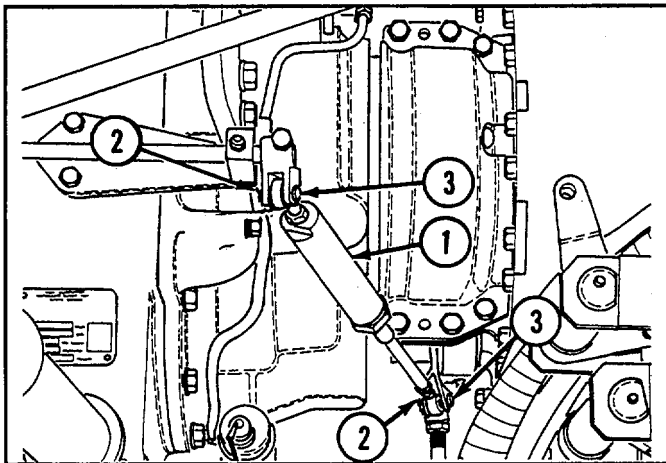
WARNING

Ensure suitable blocking is in place prior to releasing brakes.

- 1 Release brakes.
- 2 Remove actuating brake air valve linkage (1) by removing two cotter pins (2) and two clevis pins (3).

b. INSTALLATION

- 1 Install actuating brake air valve linkage (1) with two clevis pins (3) and two new cotter pins (2).
- 2 Adjust actuating brake air valve linkage (1).



7-1 REPLACE/SERVICE TRANSMISSION ACTUATING BRAKE AIR VALVE LINKAGE-Continued

c. ADJUSTMENT

WARNING

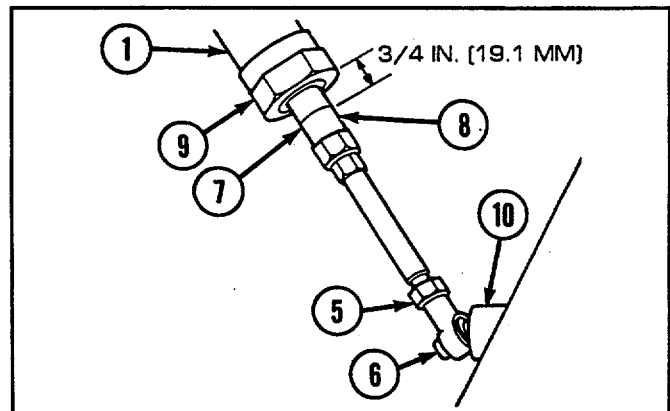
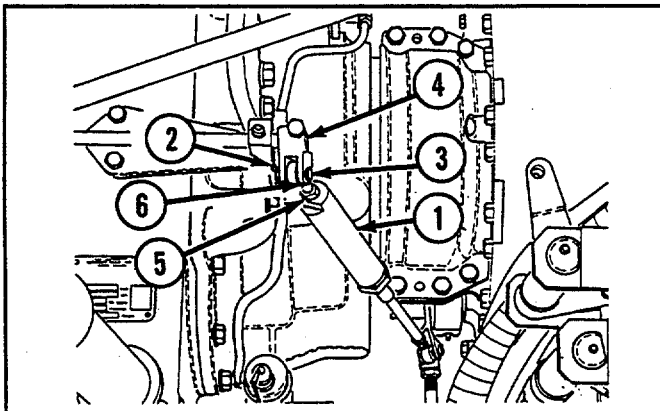
Ensure suitable blocking is in place prior to releasing brakes.

- 1 Release brakes.
- 2 Remove cotter pin (2) and clevis pin (3) and disconnect actuating brake air valve linkage (1) from actuating brake air valve linkage lever (4) on transmission.
- 3 Loosen two rod end locknuts (5) on actuating brake air valve linkage (1) and turn linkage rod ends (6) to adjust free length of actuating brake air valve linkage until clevis pin (3) can be inserted freely through linkage rod end and actuating brake air valve linkage lever (4), with brake air valve linkage lever in released (down) position. Tighten two rod end locknuts. Attach actuating brake air valve linkage to actuating brake air valve linkage lever with cotter pin (2) and clevis pin.

NOTE

Mark (7) appears on linkage rod plunger (8) 3/4 inch (in.) (19.1 millimeters [mm]) from edge of linkage rod plunger stop (9).

- 4 Apply brakes and check position of mark (7). Mark must align with edge of linkage rod plunger stop (9).
- 5 Loosen rod end locknut (5) at lower end of actuating brake air valve linkage (1) near output reduction drive (10), and adjust linkage rod end (6) as required. Tighten rod end locknut.

**NOTE**

Follow-on maintenance:

Close engine transmission access doors (see paragraph 9-55)

7-2 REPLACE/SERVICE TRANSMISSION OIL FILTER**THIS TASK COVERS**

- a. Removal b. Servicing c. Installation

INITIAL SET-UP**Tools:**

- Tool kit, general mechanic's (Appendix C, item 53)
- Wrench, torque (Appendix C, item 61)

Parts:

- Cartridge assemblies, oil filter (4) (Appendix G, item 10)
- Gaskets (2) (Appendix G, item 37)
- Lockwashers (24) (Appendix G, item 132)

Equipment Condition:

Engine transmission access doors opened (see paragraph 9-55)

NOTE

Removal and installation procedures are the same for both left- and right-side oil filter heads.

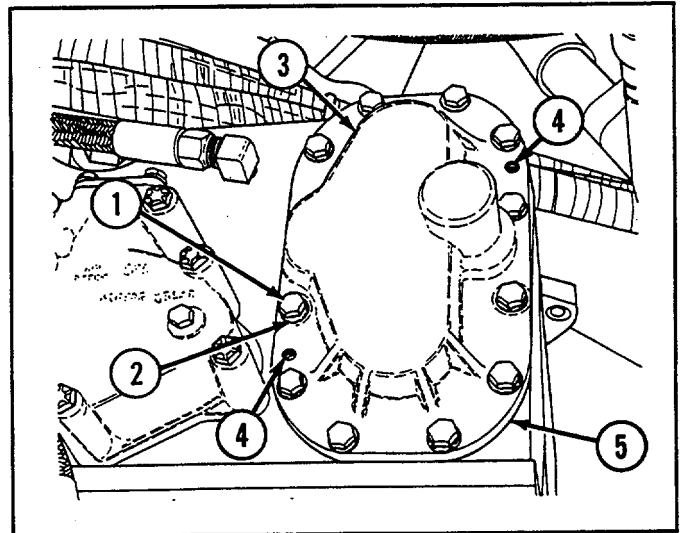
a. REMOVAL

- 1 Remove 12 screws (1) and 12 lockwashers (2).

CAUTION

Prying oil filter head off with screwdriver or other object could cause damage to mating surfaces.

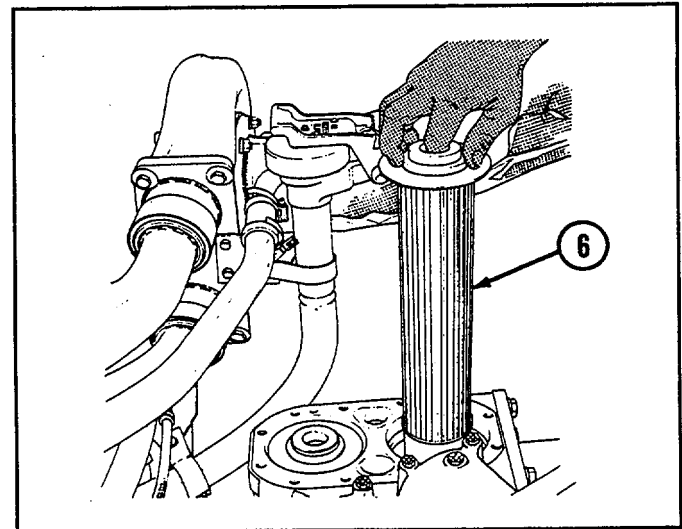
- 2 Use two screws (1) as jackscrews to remove oil filter head (3). Screw two screws into threaded holes (4) and raise oil filter head.
- 3 Remove and discard gasket (5).
- 4 Remove and discard two oil filter cartridge assemblies (6).

**b. SERVICING**

- 1 Clean all surfaces to remove old gasket materials.
- 2 Clean filter cavity in transmission and 12 boltholes in oil filter head (3) of oil or other contaminants.
- 3 Clean and dry all parts and inspect for service ability. Replace all defective or broken parts.

c. INSTALLATION

- 1 Install two new oil filter cartridge assemblies (6).
- 2 Install new gasket (5) and oil filter head (3) using 12 screws (1) and 12 new lockwashers (2). Torque screws to 26-32 pound-feet (lb-ft) (3543 newton-meters [N•m]).



7-2 REPLACE/SERVICE TRANSMISSION OIL FILTER--Continued

WARNING

Oil sprayed from an improperly installed oil filter head assembly can cause fire in the engine compartment.

NOTE

After torquing screws (1), go back and recheck torque. If any screws move during recheck, repeat torquing process again after a short wait.

- 3 Operate engine and thoroughly check transmission (and engine) to make certain that no oil leaks are evident before placing vehicle back into service.

NOTE

Follow-on maintenance: Close engine transmission access doors (see paragraph 9-55)

SECTION II: TRANSMISSION OIL COOLER LINES, BRACKET, SADDLE SEALS, AND OUTPUT REDUCTION DRIVES

Para.	Task	Page
7-3	Replace Transmission Roller Bracket Assembly	7-4
7-4	Replace Transmission Torque Converter Drain Plugs	7-5
7-5	Replace Transmission Gage Rod.....	7-7
7-6	Replace Transmission Breather Assembly and Line	7-7
7-7	Replace Transmission Oil Cooler Lines and Sampling Valve	7-9
7-8	Replace Transmission Saddle Seals.....	7-11
7-9	Replace Transmission Output Reduction Drives and Drive Couplings.....	7-11

7-3 REPLACE TRANSMISSION ROLLER BRACKET ASSEMBLY

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

<p>Tools: Tool kit, general mechanic's (Appendix C, item 53)</p>	<p>Parts: Lockwashers (10) (Appendix G, item 134)</p>	<p>Equipment Condition: Powerplant removed (see paragraph 3-1)</p>
---	--	---

NOTE

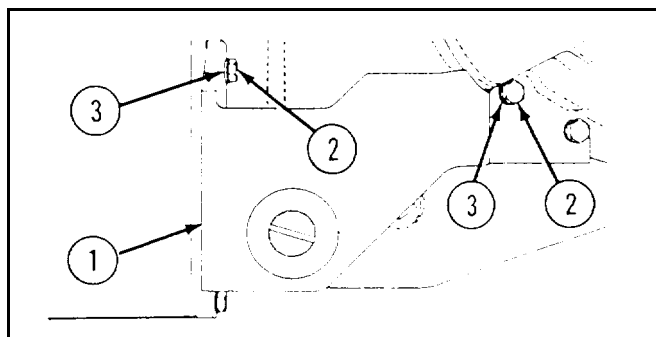
Removal and installation procedures are the same for both left- and right-side transmission roller bracket assemblies.

a. REMOVAL

Remove transmission roller bracket assembly (1) from transmission by removing five screws (3) and five lockwashers (3).

b. INSTALLATION

Install transmission roller bracket assembly (1) on transmission with five screws (2) and five new lockwashers (3).



NOTE

Follow-on maintenance: Install powerplant (see paragraph 3-1)

7-4 REPLACE TRANSMISSION TORQUE CONVERTER DRAIN PLUGS

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tool:

- Tool kit, general mechanic' s (Appendix C, item 53)
- Key, socket head screw (Appendix C, item 24)

Reference:

TM 9-2350-256-10

Parts:

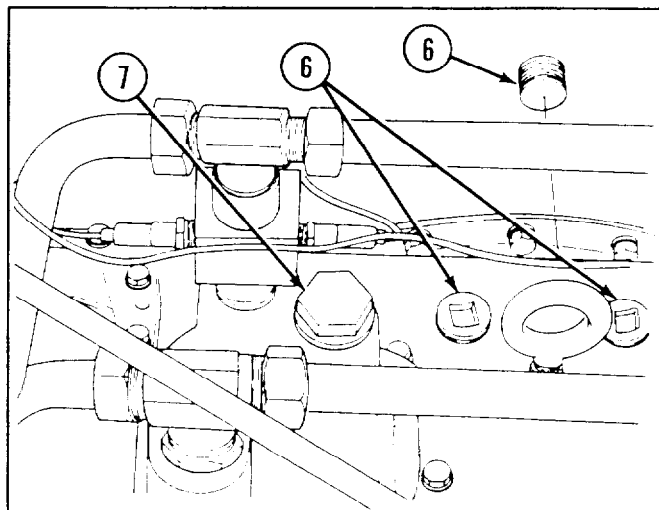
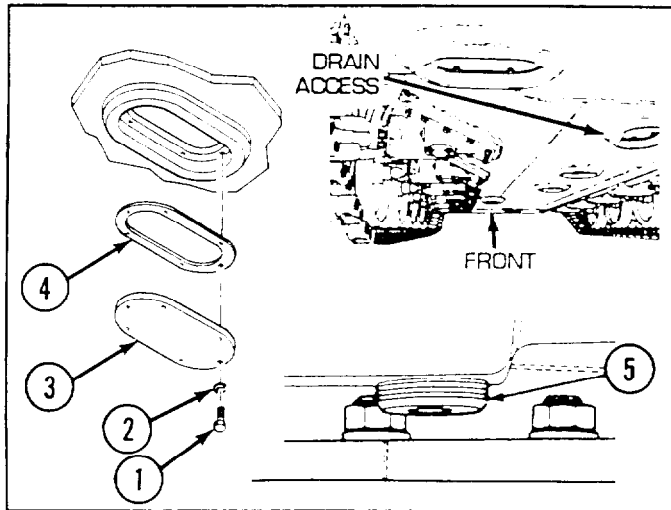
- Gasket (Appendix G, item 56)
- Gasket (Appendix G, item 61)
- Gasket (Appendix G, item 65)
- Lockwashers (18) (Appendix G, item 138)

Equipment Condition:

Engine deck removed (see paragraph 9-51)

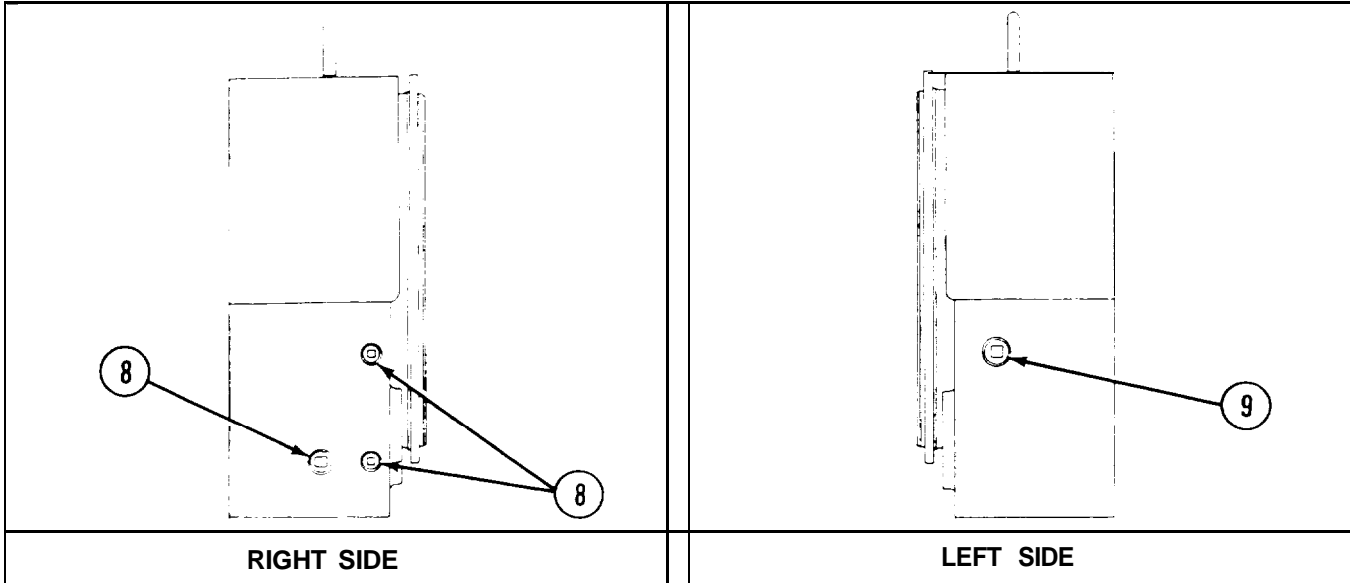
a. REMOVAL

- 1 Remove six bolts (1), six lockwashers (2), drain cover (3), and gasket (4) from dram access
- 2 Place suitable container under torque converter
- 3 Remove four drain plugs (5).
- 4 Remove five plugs (6 and 7), if necessary.



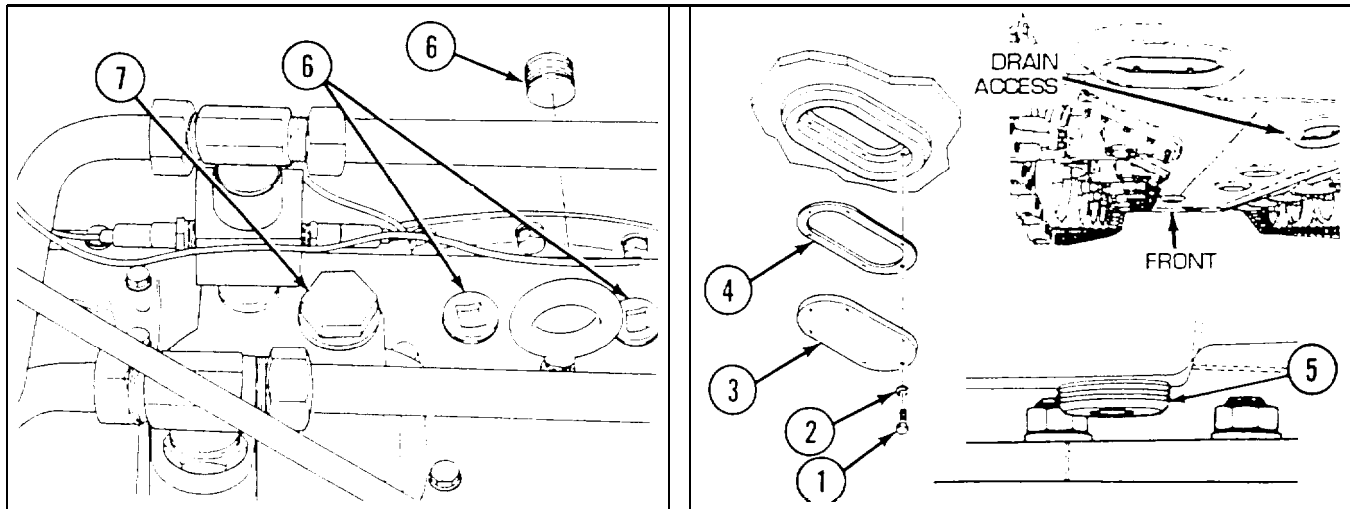
7-4 REPLACE TRANSMISSION TORQUE CONVERTER DRAIN PLUGS-Continued

- 5 Remove three plugs (8) from lower right side
- 6 Remove plug (9) from lower left side.



b. INSTALLATION

- 1 Install five plugs (6 and 7), if necessary.
- 2 Install four dram plugs (5).
- 3 Install new gasket (4), drain cover (3), six new lockwashers (2), and six bolts (1) to drain access.



- 4 Install three plugs (8) to lower right side
- 5 Install plug (9) to lower left side.

6 Fill torque converter (refer to TM 9-2350-356-10).

NOTE

Follow-on maintenance: Install engine deck (see paragraph 9-51)

7-5 REPLACE TRANSMISSION GAGE ROD

THIS TASK COVERS

- a. Removal b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Equipment Condition:

Engine transmission access doors opened (see paragraph 9-55)

a. REMOVAL

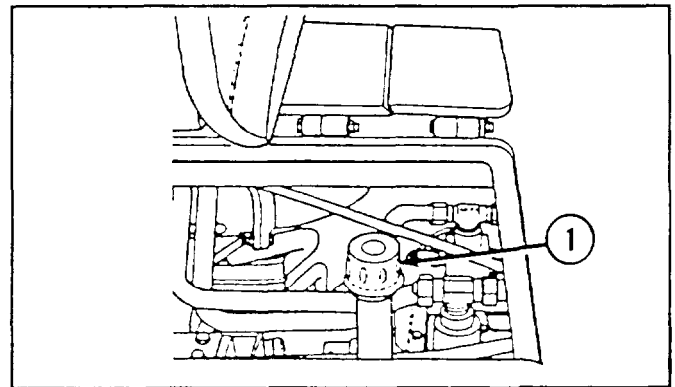
Remove gage rod (1).

b. INSTALLATION

Install gage rod (1).

NOTE

Follow-on maintenance: Close engine transmission access doors (see paragraph 9-55)



7-6 REPLACE TRANSMISSION BREATHER ASSEMBLY AND LINE

THIS TASK COVERS

- a. Removal b. Installation

INITIAL SET-UP

Tools:

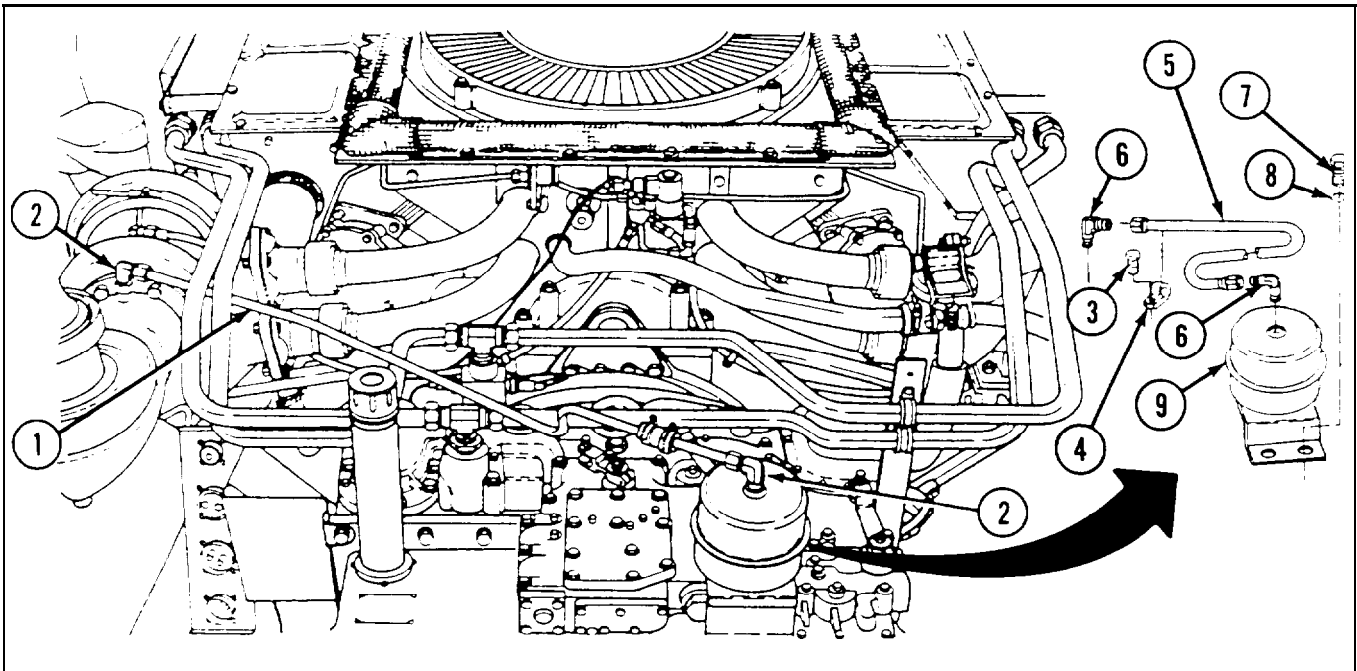
Tool kit, general mechanic's (Appendix C, item 53)

Equipment Condition:

Engine transmission access doors opened (see paragraph 9-55)

7-6 REPLACE TRANSMISSION BREATHER ASSEMBLY AND LINE-Continued**a. REMOVAL**

- 1 Disconnect breather line (1) from two elbows (2).
- 2 Remove two elbows (2).
- 3 Remove two bolts (3) and two clamps (4).
- 4 Disconnect hose assembly (5) from two elbows (6).
- 5 Remove two bolts (7), two flat washers (8), and breather assembly (9).
- 6 Remove two elbows (6).

**b. INSTALLATION**

- 1 Install two elbows (6).
- 2 Install breather assembly (9), two flat washers (8), and two bolts (7)
- 3 Install hose assembly (5) to two elbows (6).
- 4 Install two clamps (4) and two bolts (3).
- 5 Install two elbows (2).
- 6 Install breather line (1) to two elbows (2).

NOTE

Follow-on maintenance: Close engine transmission access doors (see paragraph 9-55)

7-7 REPLACE TRANSMISSION OIL COOLER LINES AND SAMPLING VALVE

THIS TASK COVERS

a. Removal

b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

Gaskets (4) (Appendix G,
item 83)

Equipment Condition:

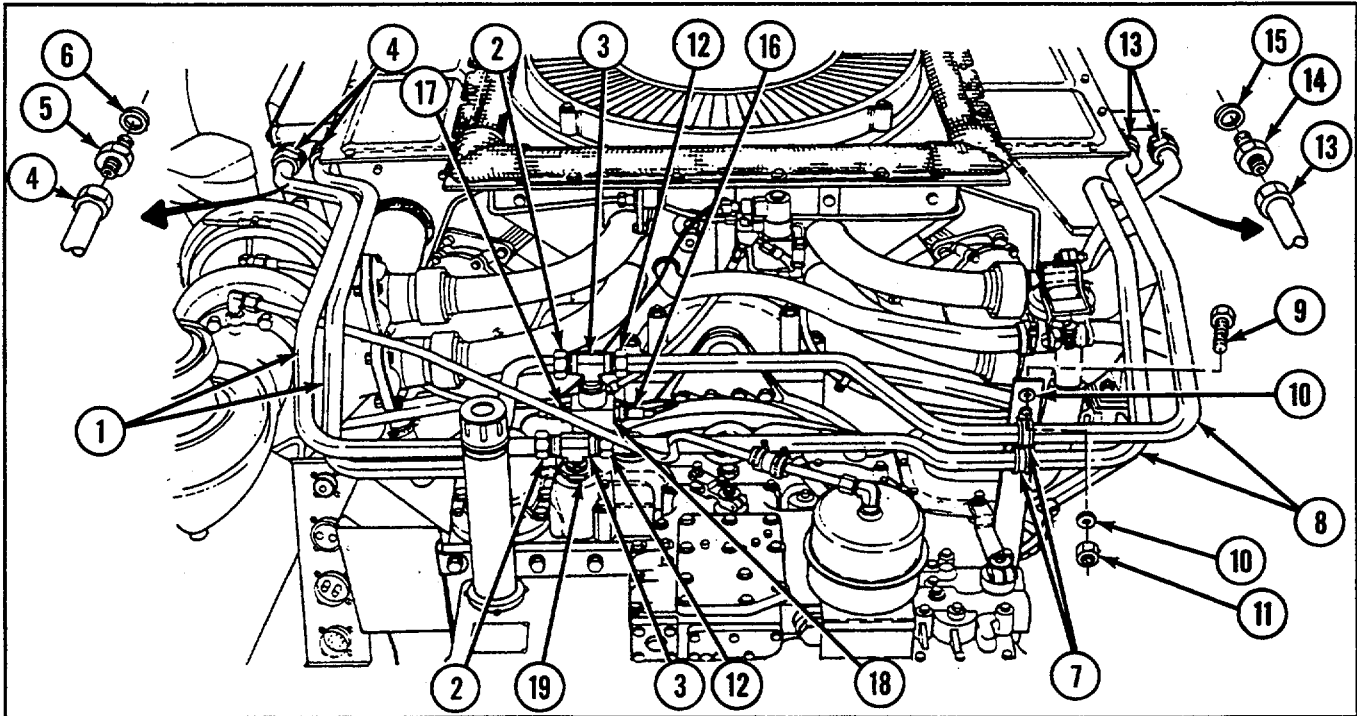
Engine deck removed (see
paragraph 9-51)

a. REMOVAL

NOTE

Engine exhaust pipes removed for clarity.

- 1 Remove two left-side oil cooler lines (1) from transmission by disconnecting two coupling nuts (2) at two tees (3), and two coupling nuts (4) and two reducers (5) on opposite ends of two oil cooler lines. Remove and discard two gaskets (6) from transmission oil cooler.
- 2 Remove two clamps (7) from around two right-side oil cooler lines (8) by removing screw (9), two flat washers (10), and nut (11) from each.
- 3 Remove two right-side oil cooler lines (8) by disconnecting two coupling nuts (12) at two tees (3), and two coupling nuts (13) and two reducers (14) on opposite ends of two oil cooler lines. Remove and discard two gaskets (15) from transmission oil cooler.
- 4 Disconnect temperature transmitter (16) and pressure transmitter (17) from crosspipe (18).
- 5 Remove two tees (3), crosspipe (18), and bushing (19).

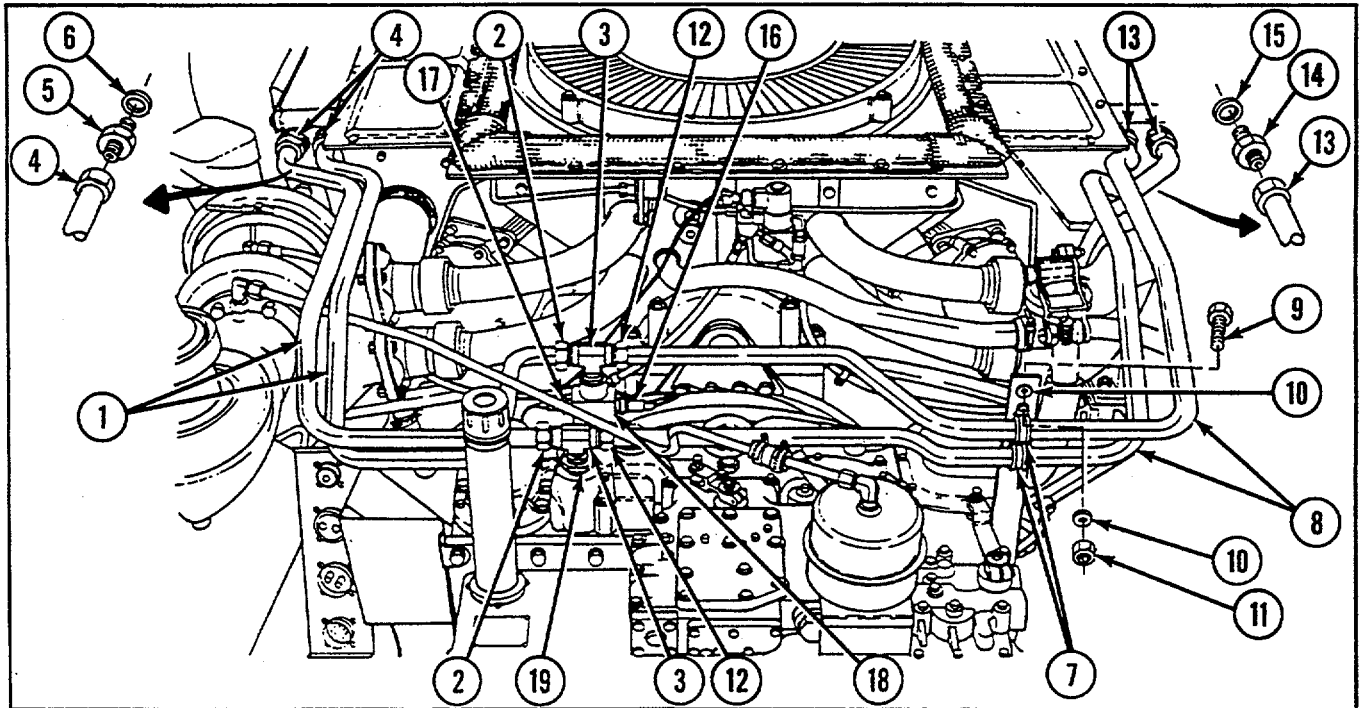
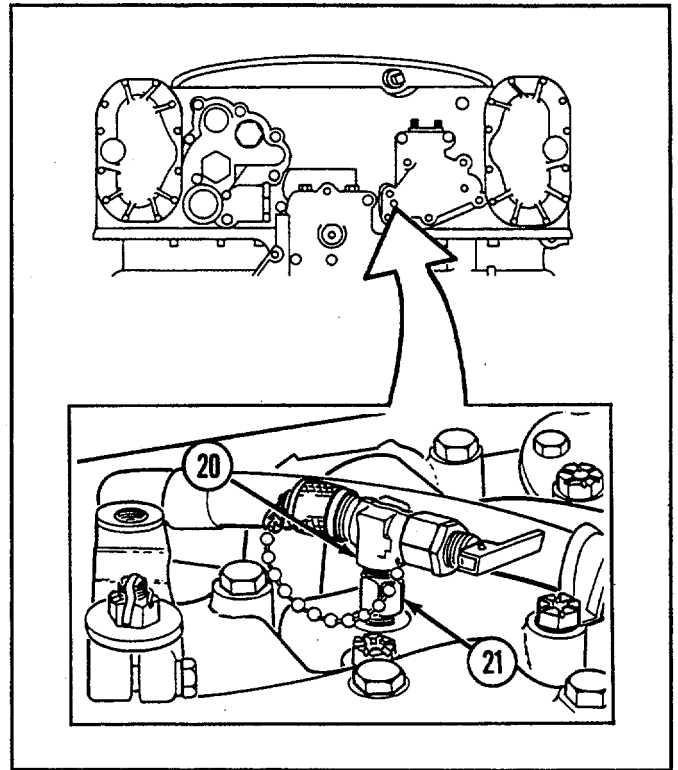


7-7 REPLACE TRANSMISSION OIL COOLER LINES AND SAMPLING VALVE-Continued

6 Remove sampling valve (20) and coupling (21).

b. INSTALLATION

- 1 Install coupling (21) and sampling valve (20).
- 2 Install bushing (19), crosspipe (18), and two tees (3).
- 3 Connect temperature transmitter (16) and pressure transmitter (17) to crosspipe (18).
- 4 Install two right-side oil cooler lines (8) by connecting two coupling nuts (12) to two tees (3). Install two new gaskets (15) on transmission oil cooler; connect two reducers (14) and two coupling nuts (13) on opposite ends of two oil cooler lines.
- 5 Secure two right-side oil cooler lines (8) each with clamp (7), screw (9), two washers (10), and nut (11).
- 6 Install two left-side oil cooler lines (1) to transmission by connecting two coupling nuts (2) to two tees (3). Install two new gaskets (6) on transmission oil cooler; connect two reducers (5) and two coupling nuts (4) on opposite ends of two oil cooler lines.



NOTE

Follow-on maintenance:

Install engine deck (see paragraph 9-51)

7-9 REPLACE TRANSMISSION OUTPUT REDUCTION DRIVES AND DRIVE COUPLINGS--Continued

a. REMOVAL

- 1 Remove drive coupling (1) from output reduction drive (2).

NOTE

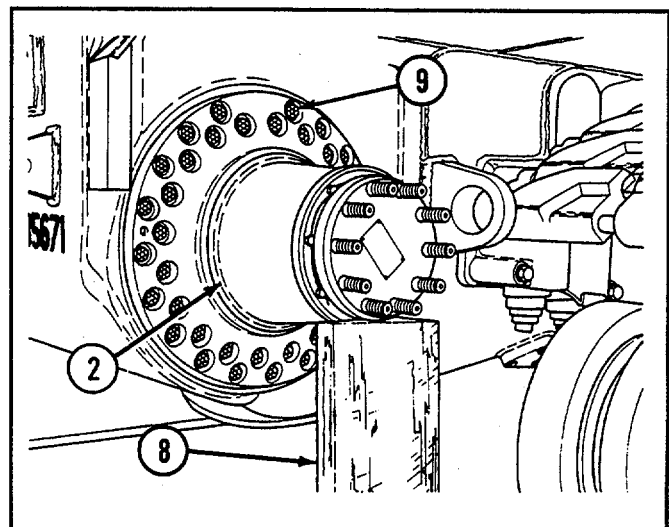
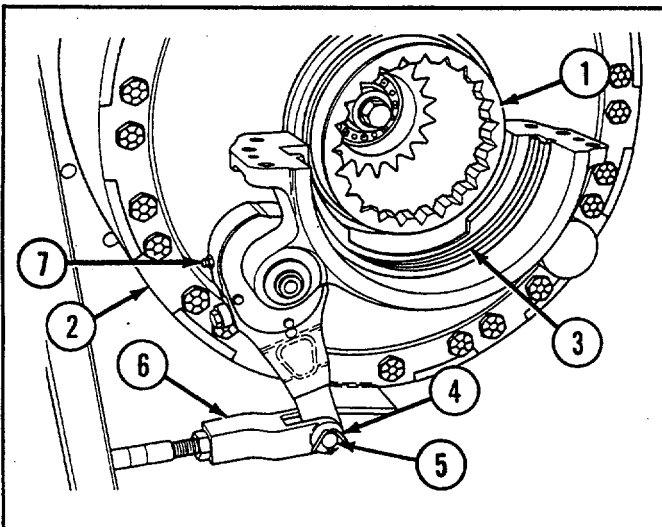
Output reduction drive alignment ring (3) is removed from right-side output reduction drive (2) only.

- 2 Remove output reduction drive alignment ring (3) from output reduction drive (2).
- 3 Remove cotter pin (4) and straight pin (5). Disconnect brake rod (6).
- 4 Remove lubrication fitting (7), if necessary.

WARNING

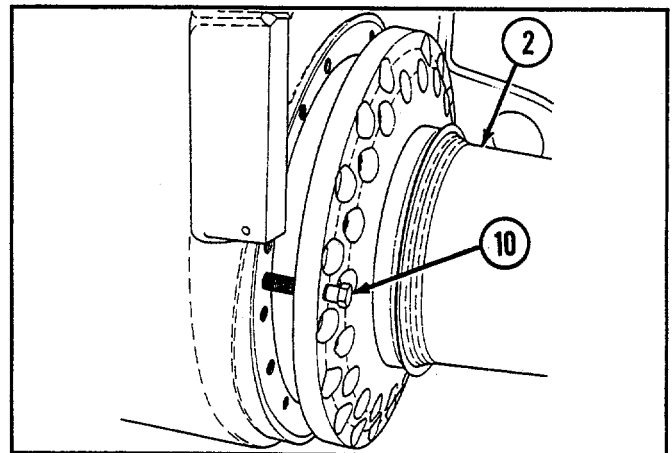
Be sure to place wooden block (8) under output reduction drive (2) before removing.

- 5 Place wooden block (8) under output reduction drive (2).
- 6 Remove 19 self-locking bolts (9) holding output reduction drive (2) to vehicle hull.

**CAUTION**

Jackscrews (10) must make output reduction drive (2) clear hull to ensure proper lifting sling operation.

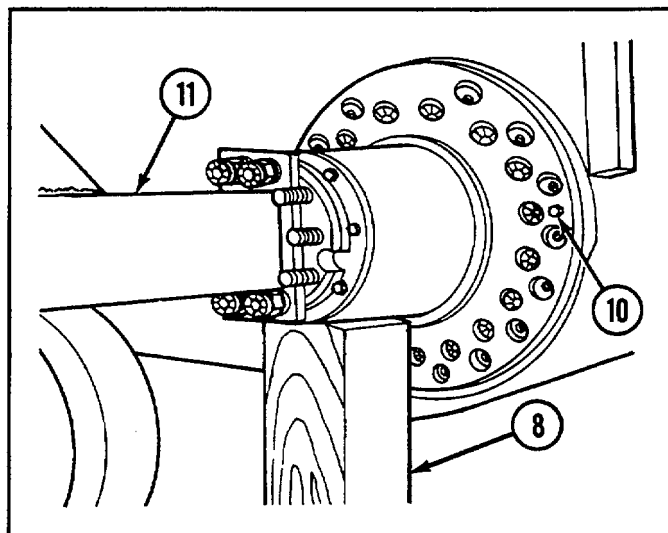
- 7 Install two jackscrews (10) into two threaded holes in output reduction drive (2). Tighten jackscrews alternately and move output reduction drive out approximately 2 in. (51 mm).



- 8 Install lifting sling (11).
- 9 Remove two jackscrews (10).
- 10 Remove wooden block (8).

WARNING

Output reduction drive (2) must clear hull when assembly is lifted by lifting sling (11). If assembly does not clear hull during lift, weight of vehicle will be transferred to lifting sling causing lifting sling failure. All personnel are to stand clear of vehicle hull when lifting operation starts.



- 11 Remove output reduction drive (2) using lifting sling (11).

b. INSTALLATION

- 1 Install lifting sling (11) on output reduction drive (2).

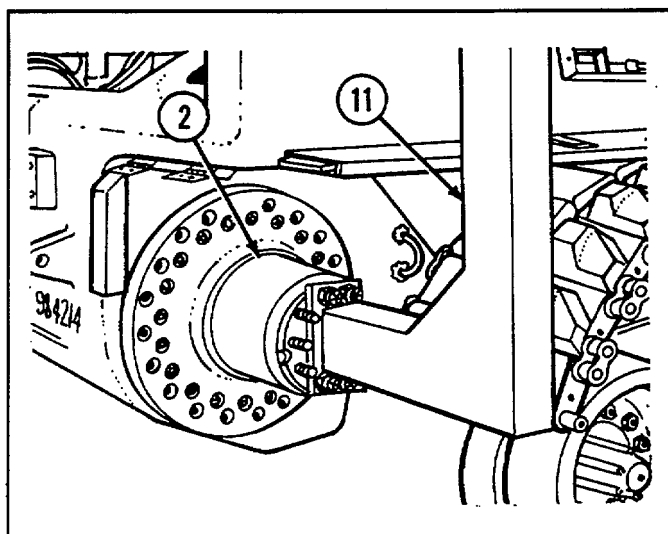
NOTE

Do not thread jackscrews (10) all the way through output reduction drive (2) at this time.

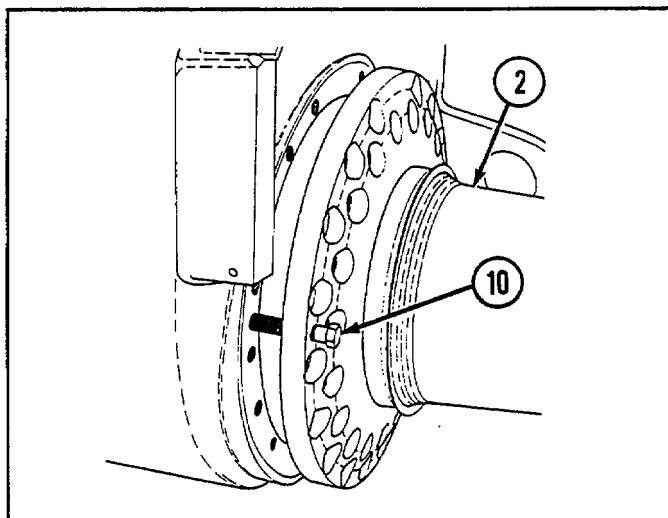
- 2 Install two jackscrews (10).

WARNING

Output reduction drive (2) must clear hull when assembly is lifted by lifting sling (11). If assembly does not clear hull during lift, weight of vehicle will be transferred to lifting sling causing lifting sling failure. All personnel are to stand clear of vehicle hull when lifting operation starts.



- 3 Install output reduction drive (2) using lifting sling (11).
- 4 Place wooden block (8) under output reduction drive (2).
- 5 Thread two jackscrews (10) into hull and remove lifting sling (11).
- 6 Tighten two jackscrews (10) alternately to draw output reduction drive (2) against mating surface.



7-9 REPLACE TRANSMISSION OUTPUT REDUCTION DRIVES AND DRIVE COUPLINGS-Continued

- 7 Install 19 new self-locking bolts (9). Torque self-locking bolts to 337-385 lb-ft (457-522 Nom).
- 8 Remove two jackscrews (10).
- 9 Remove wooden block (8).
- 10 Connect brake rod (6) using straight pin (5) and new cotter pin (4).
- 11 Install lubrication fitting (7), if necessary.

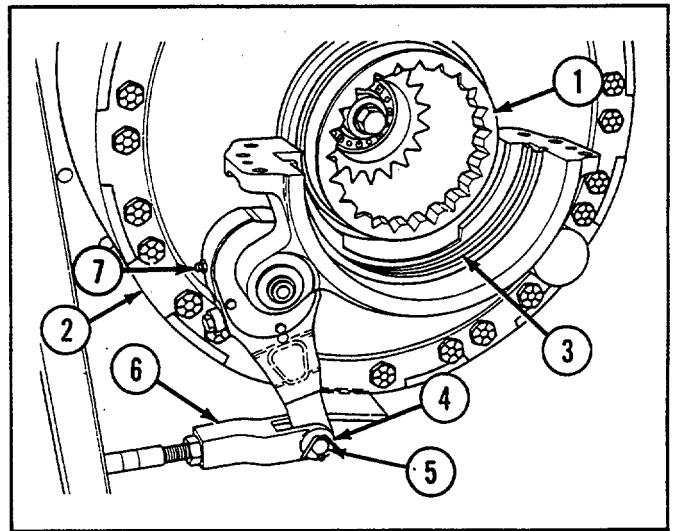
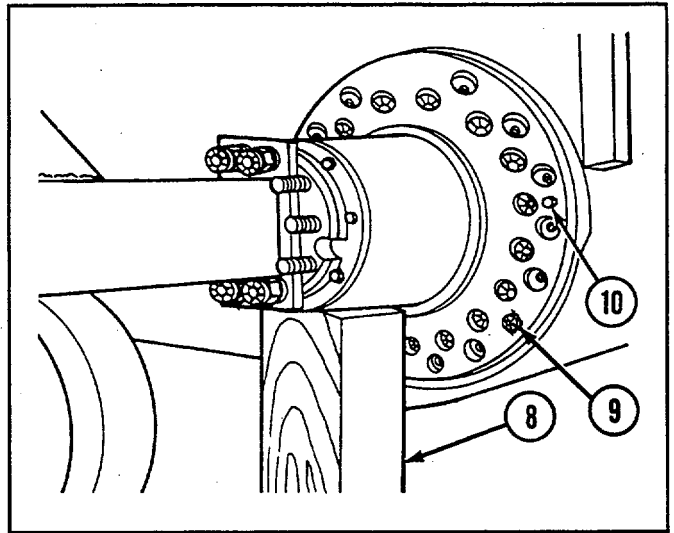
NOTE

Output reduction drive alignment ring (3) is installed in right-side output reduction drive (2) only.

- 12 Install output reduction drive alignment ring (3) in output reduction drive (2).
- 13 Install drive coupling (1) on output reduction drive (2).

NOTE

- Follow-on maintenance:
- Install final drive hub and sprockets (see paragraph 8-10)
 - Install powerplant (see paragraph 3-1)



**CHAPTER 8
MAINTENANCE OF SUSPENSION SYSTEM**

CHAPTER OVERVIEW

This chapter describes how to remove, disassemble, clean, inspect, assemble, and install the suspension system components.

This chapter consists of the following sections: Page
 Section I: Wheels and Tracks.....8-1
 Section II: Springs and Shock Absorbers8-36

SECTION I: WHEELS AND TRACKS

Para.	Task	Page
8-1	Replace Roadwheels	8-1
8-2	Replace Torsion Bar and Torsion Bar Anchors.....	8-3
8-3	Replace Roadwheel Arm Assembly	8-6
8-4	Replace/Service Roadwheel Hub Assembly.....	8-9
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8-6	Replace/Repair/Service Track Support Roller, Bracket, and Wheel	8-14
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8-1 REPLACE ROADWHEELS

THIS TASK COVERS

- a. Removal b. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Lifters (Appendix C, item 26)
- Wrench, torque, 0-600 pound-feet (lb-ft) (0-813 newton-meters [N-m]) (Appendix C, item 63)
- Multiplier, torque wrench (Appendix C, item 27)
- Socket set (Appendix C, item 48)

Reference:

TM 9-2350-256-10

Equipment Condition:

Track tension loosened (refer to TM 9-2350-256-10)

8-1 REPLACE ROADWHEELS-Continued

NOTE

Roadwheels are removed and installed in the same manner.

a. REMOVAL**WARNING**

When driving the vehicle on or off lifters, clear the area. Lifters may fly out from under the vehicle and cause serious injury to personnel.

- 1 Position lifter (1) on roadwheel arm spindle (2) and track link (3) ahead of roadwheel (4). 2 Loosen 10 wheel nuts (5).
- 3 Raise roadwheels (4) off track by carefully and slowly moving vehicle forward.
- 4 Remove 10 wheel nuts (5).
- 5 Remove two roadwheels (4) from hub assembly (6).

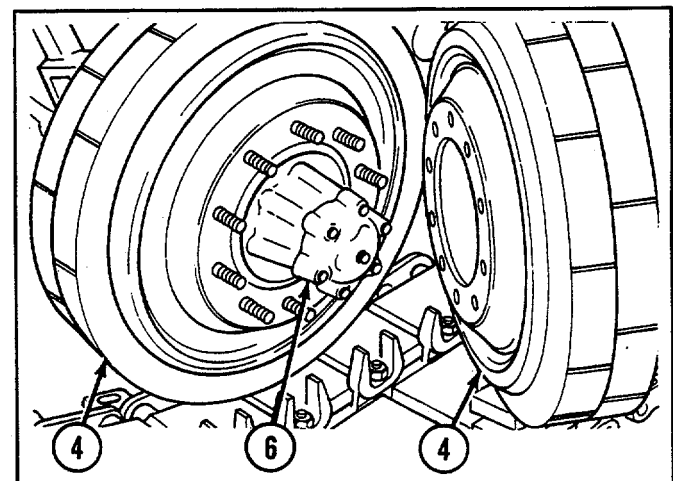
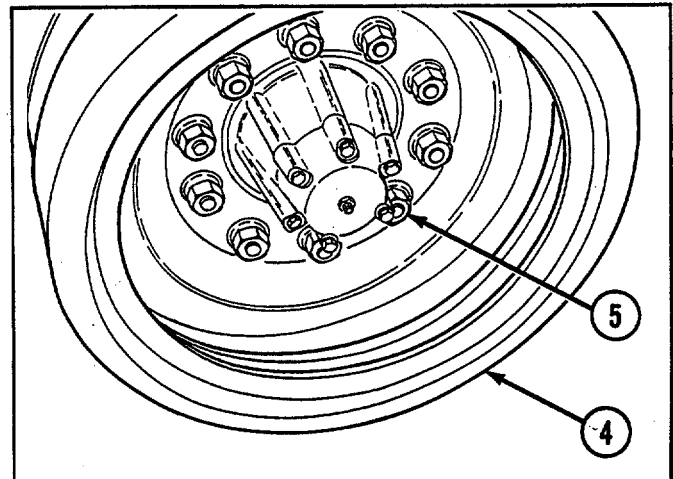
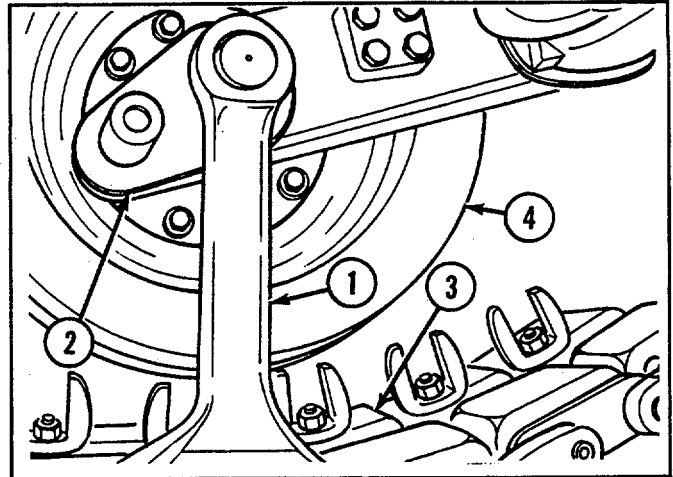
b. INSTALLATION

- 1 Install two roadwheels (4) onto hub assembly (6).
- 2 Install 10 wheel nuts (5).

WARNING

When driving the vehicle on or off lifters, clear the area. Lifters may fly out from under vehicle and cause serious injury to personnel.

- 3 Lower roadwheels (4) onto track by carefully and slowly moving vehicle backward.
- 4 Torque 10 wheel nuts (5) to 320-350 lb-ft (434-475 Nom). Remove lifter (1) from between roadwheel arm spindle (2) and track link (3).
- 5 Adjust track tension (refer to TM 9-2350-256-10).



8-2 REPLACE TORSION BAR AND TORSION BAR ANCHORS

THIS TASK COVERS

- a. Removal b. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Adapter, puller, torsion bar (Appendix C, item 1)
- Puller, slide-hammer type (Appendix C, item 36)
- Wrench (Appendix C, item 57)
- Wrench, plug (Appendix B, item 107)
- Wrench, torque, 0-175 lb-ft (0-237 N•m) (Appendix C, item 61)

Material/Parts:

- Grease, GAA (Appendix D, item 13)
- Gaskets (12) (Appendix G, item 28)

Material/Parts-Continued:

- Gaskets (12) (Appendix G, item 31)
- Lockwashers (12) (Appendix G, item 134)
- Lockwashers (48) (Appendix G, item 144)

Reference:

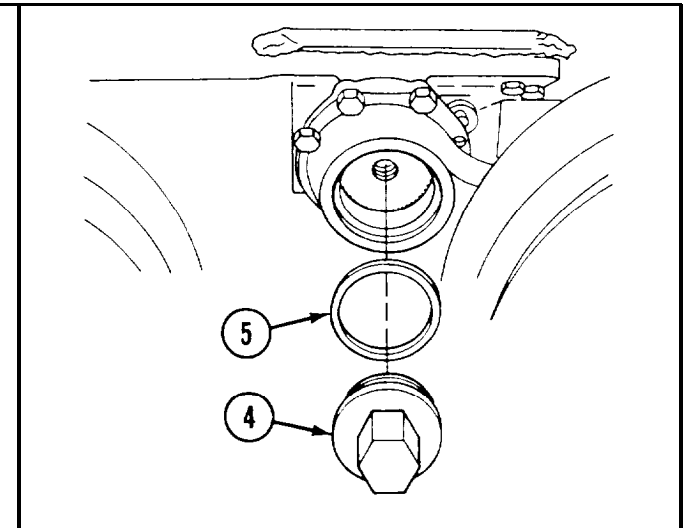
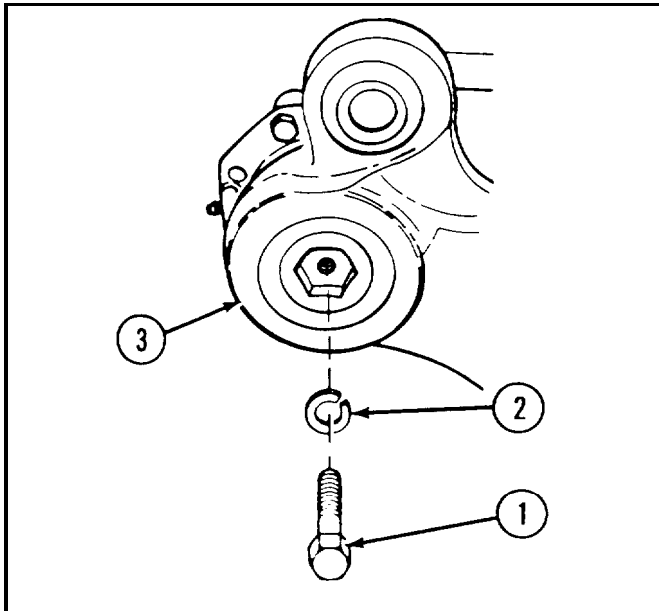
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Equipment Conditions:

- Roadwheel removed (see paragraph 8-1)
- Compensating idler link (see paragraph 8-8) and shock absorber (see paragraph 8-12) disconnected

a. REMOVAL

- 1 Remove screw (1) and lockwasher (2) from roadwheel arm (3).
- 2 Remove torsion bar end plug (4) and gasket (5).

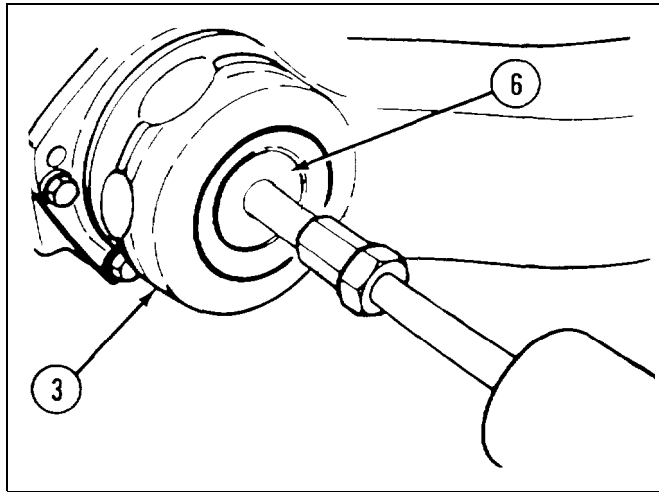


8-2 REPLACE TORSION BAR AND TORSION BAR ANCHORS-Continued

WARNING

Lift arm sufficiently to take weight off torsion bar. Securely block arm to prevent arm from falling after bar has been removed.

- 3 Remove torsion bar (6) by using adapter and puller.
- 4 Remove torsion bar anchor cover plate (7) by removing four screws (8) and four lockwashers (9).
- 5 Remove and discard gasket (11) from torsion bar anchor cover plate (7).
- 6 Remove torsion bar anchor (10).

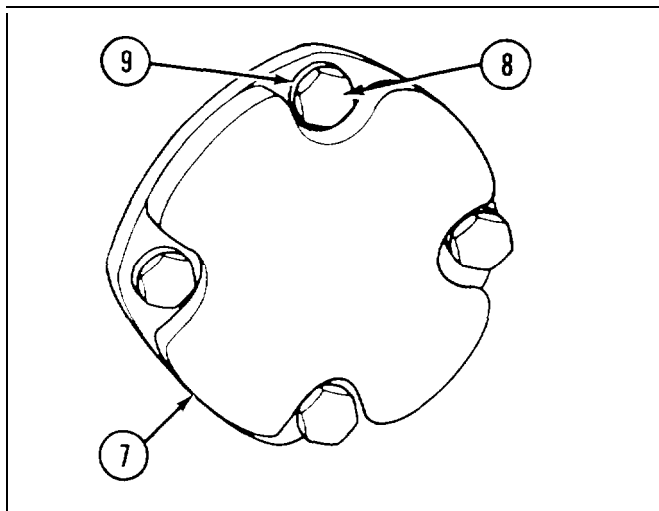


b. INSTALLATION

NOTE

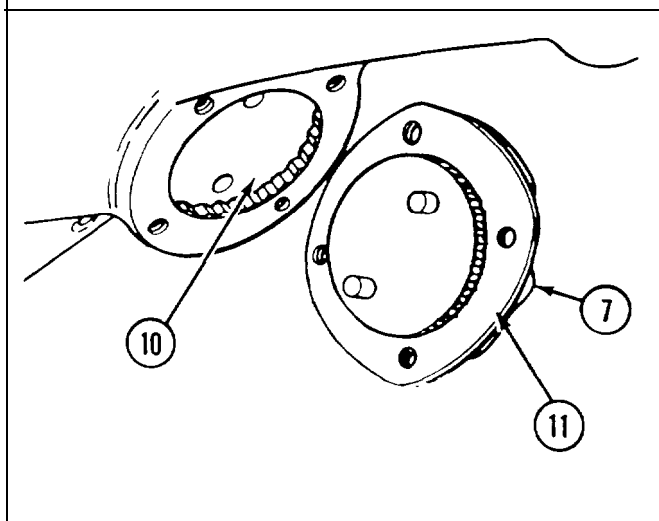
During installation, place the torsion bar anchor (10) in the housing so that the word "FRONT" is toward the front of the vehicle and the cover tangs enter the spanner holes.

- 1 Coat torsion bar anchor (10) and anchor splines with grease and install torsion bar anchor.
- 2 Install torsion bar cover plate (7) and new gasket (11) with four screws (8) and four new lockwashers (9). Torque screw to 40-50 lb-ft (54-68 N•m).



CAUTION

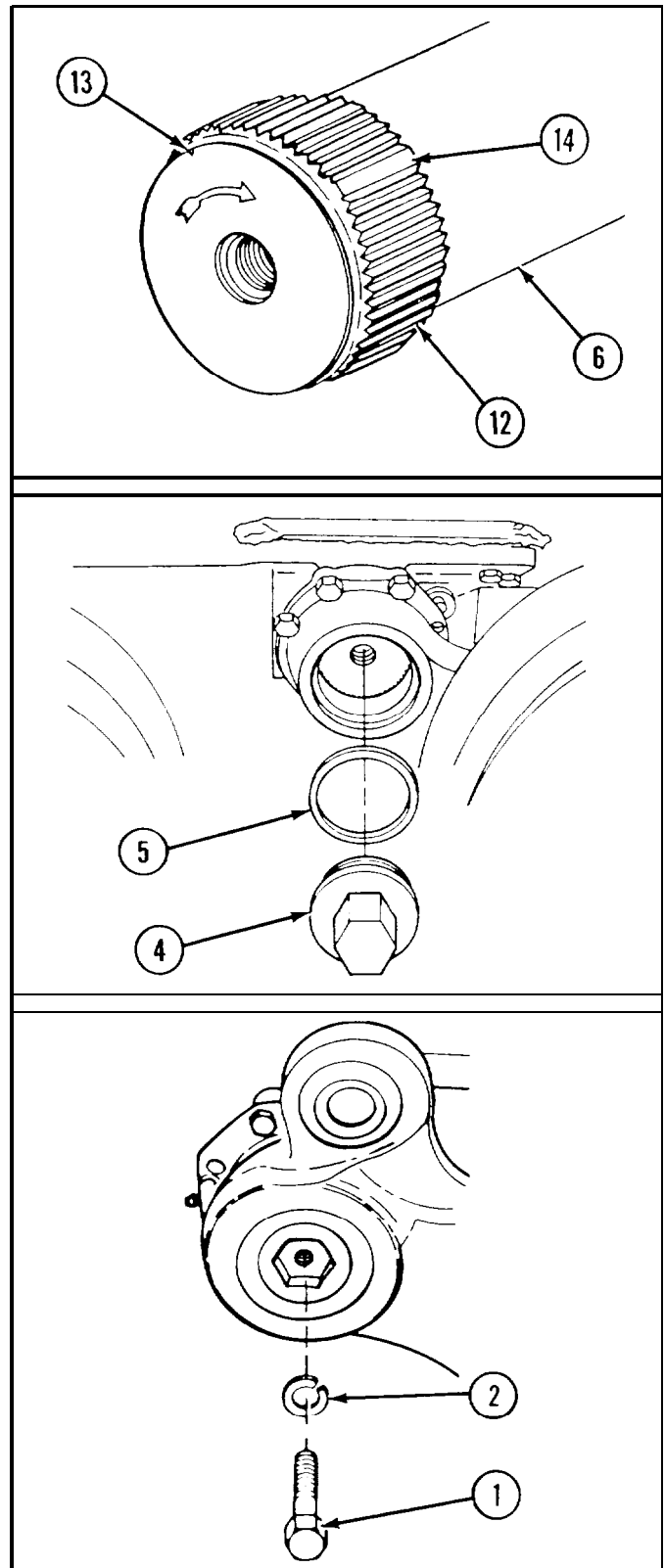
- When installing the torsion bar (6), it is not necessary to drive the bar in. When properly aligned, the bar will slide in easily. If bar is forced, splines will be damaged
- Torsion bars must not be interchanged. Each bar is stamped (on its outside face) with the part number, and an arrow showing the direction of the loading torque. Before installing a new torsion bar, check markings on the bar to be certain that the correct bar is used.



- 3 Install and block roadwheel arm (see paragraph 8-3).
- 4 Install torsion bar (6) using adapter and puller as follows:
Coat serration (12) on both ends of torsion bar with GAA grease (see Appendix J). Screw adapter into tapped holes in end of torsion bar. Screw puller into tapped hole in end of adapter. Hold torsion bar so that V-notch (13) cut into chamfer on outer end is at top. Slide torsion bar in and rotate until blank serration (14) in inner end of torsion bar (opposite V-notch) aligns with blank serration in torsion bar anchor (10). Push torsion bar in far enough to engage torsion bar anchor. Turn roadwheel arm (3) in direction of arrow on torsion bar until blank serration (adjacent to V-groove) in outer end of torsion bar aligns with blank serration in arm (opposite V-groove in arm). Push bar in as far as it will go. Pack cavity in roadwheel arm with grease (see Appendix J).
- 5 Install torsion bar end plug (4) and new gasket (5) using wrench plug.
- 6 Install screw (1) and new lockwasher (2). Torque screw to 75-100 lb-ft (102-136 N•m).

NOTE

- Follow-on maintenance:
- Connect shock absorber (see paragraph 8-12)
 - Connect idler link (see paragraph 8-8)
 - Install roadwheel (see paragraph 8-1)



8-3 REPLACE ROADWHEEL ARM ASSEMBLY

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:

- Handle (Appendix C, item 17)
- Replacer (Appendix C, item 41)
- Wrench, spanner (Appendix C, item 60)
- Wrench, torque, 0-175 lb-ft (0-237 N•m) (Appendix C, item 61)

Materials/Parts-Continued:

- Seals (48) (Appendix G, item 259)
- Washers, key (12) (Appendix G, item 276)

Equipment Conditions:

- Roadwheel removed (see paragraph 8-1)
- Torsion bar removed (see paragraph 8-2)
- Compensating idler link (see paragraph 8-8) or shock absorber (see paragraph 8-12) disconnected
- Track tension loosened (refer to TM 9-2350-256-10)

Personnel Required:

Two

Materials/Parts:

- Grease (Appendix D, item 13)
- Oil, OE (Appendix D, item 18)
- Solvent, dry-cleaning (Appendix D, item 9)
- Gaskets (24) (Appendix G, item 30)
- Lockwashers (72) (Appendix G, item 144)

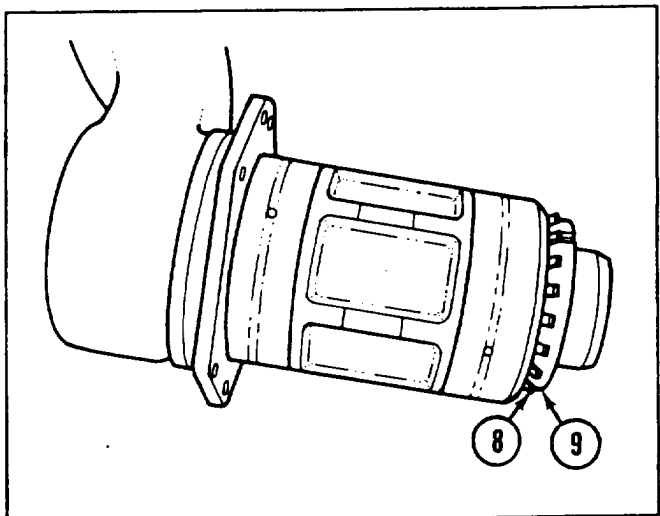
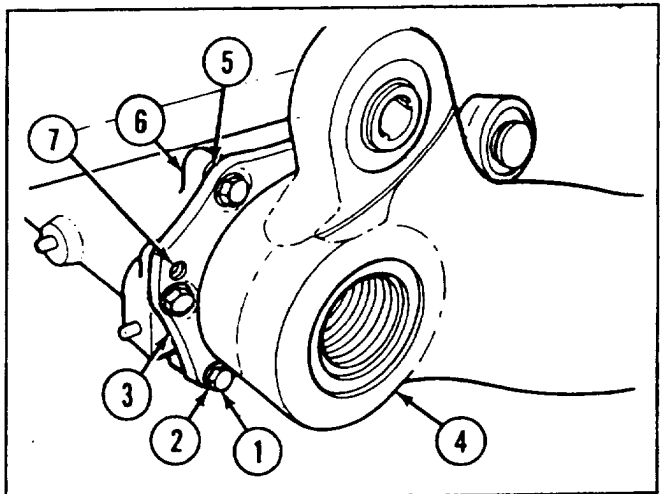
a. REMOVAL

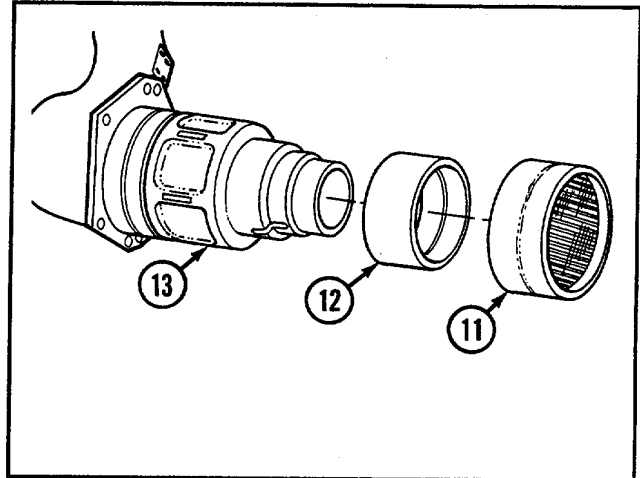
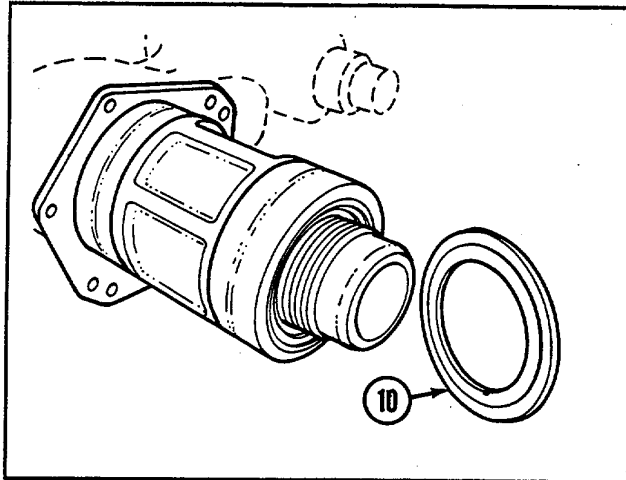
- 1 Remove six screws (1) and six lockwashers (2) from roadwheel arm retainer (3).

WARNING

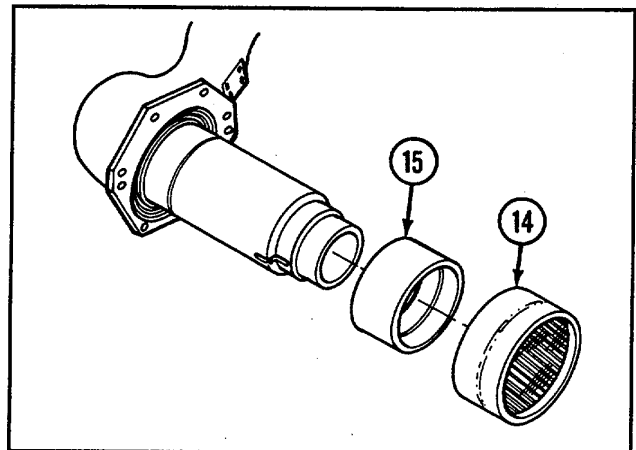
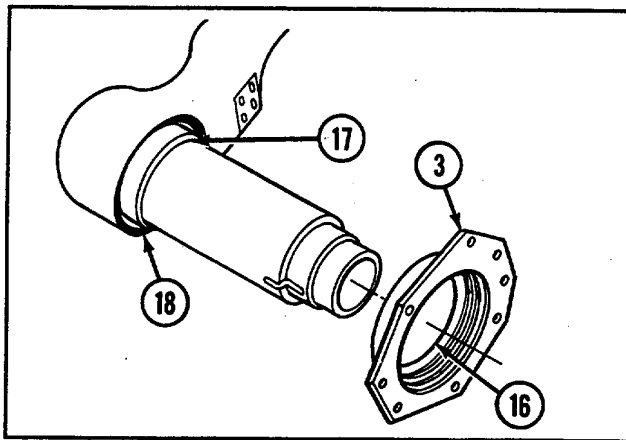
Roadwheel arm assembly is heavy, use care when removing roadwheel arm assembly to avoid injury.

- 2 Remove roadwheel arm assembly (4) and gasket (5) from roadwheel arm support housing (6) using two removed screws (1) as jackscrews in holes (7) provided.
- 3 Bend back and straighten tangs of key washer (8) from bearing nut (9).
- 4 Remove bearing nut (9) and key washer (8).
- 5 Remove bearing washer (10).
- 6 Remove inner bearing (11) with bearing race (12) and spacer (13).



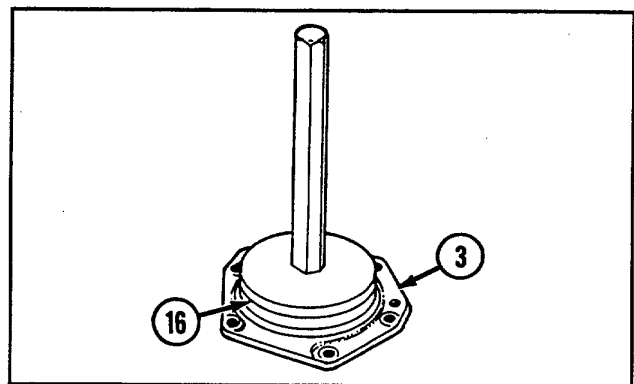


- 7 Remove outer bearing (14) with bearing race (15).
- 8 Remove arm retainer (3).
- 9 Remove oil seal (16).
- 10 Remove spacer (17) and dirt shield (18).



b. INSTALLATION

- 1 Install dirt shield (18) and spacer (17).
- 2 Install new oil seal (16) on roadwheel arm retainer (3) using replacer and handle.
- 3 Install assembled roadwheel arm retainer (3) on roadwheel arm assembly (4).
- 4 Install outer bearing (14) with bearing race (15). Apply light coat of grease.
- 5 Install spacer (13) and inner bearing (11) with bearing race (12). Apply light coat of grease.



CHAPTER 8: MAINTENANCE OF SUSPENSION SYSTEM

8-3 REPLACE ROADWHEEL ARM ASSEMBLY--Continued

- 6 Install bearing washer (10) with shoulder toward bearing.
- 7 Install new key washer (8) and bearing nut (9) using wrench. Tighten bearing nut until bearings (11 and 14) cannot be turned. Then back off bearing nut just enough so that inner bearing and outer bearing will turn by hand 1 complete turn.
- 8 Turn back tangs of key washer (8) to lock bearing nut (9).

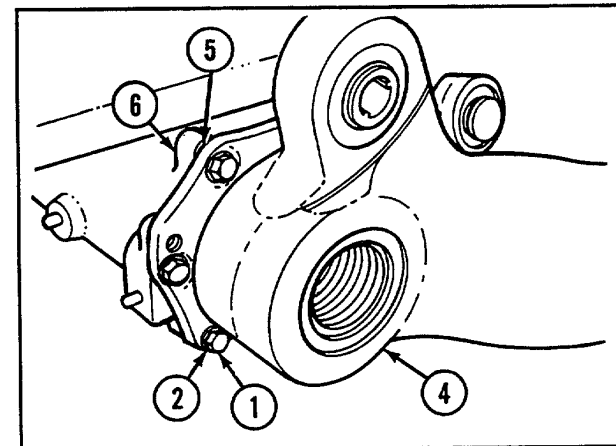
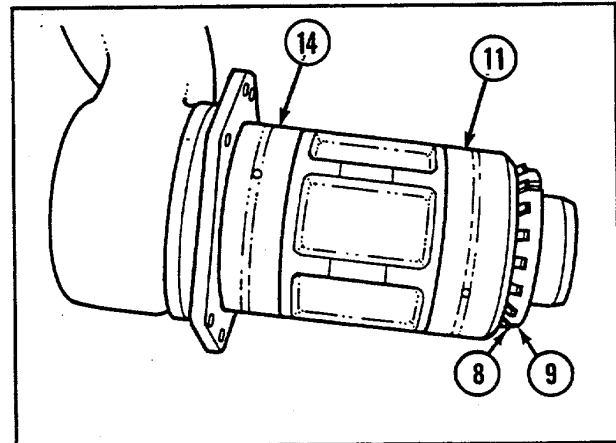
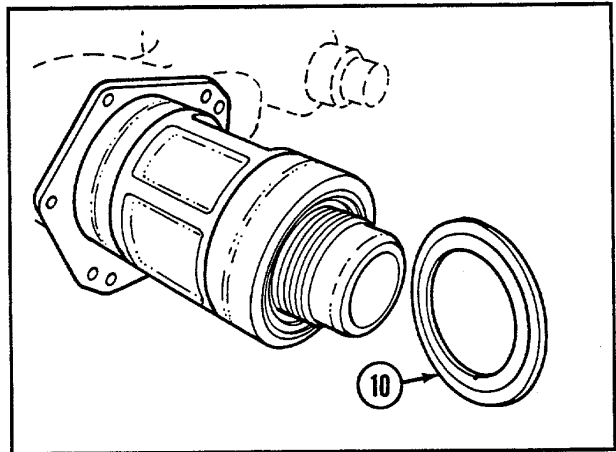
WARNING

Roadwheel arm assembly is heavy, use care when removing assembly to avoid injury.

- 9 Install roadwheel arm assembly (4) and new gasket (5) assembled into roadwheel arm support housing (6) and secure with six screws (1) and six new lockwashers (2). Torque screws to 90-100 lb-ft (122-136 N•m).

NOTE

- Follow-on maintenance:
- Tighten track tension (refer to TM 9-2350-256-10)
 - Connect shock absorber (see paragraph 8-12) or compensating idler link (see paragraph 8-8)
 - Install torsion bar (see paragraph 8-2)
 - Install roadwheel (see paragraph 8-1)



8-4 REPLACE/SERVICE ROADWHEEL HUB ASSEMBLY

THIS TASK COVERS

- a. Removal/Disassembly b. Cleaning c. Inspection d. Assembly/Installation

INITIAL SET-UP**Tools:**

- Tool kit, general mechanic's (Appendix C, item 53)
- Handle (Appendix C, item 18)
- Multiplier torque (Appendix C, item 27)
- Remover and replacer (Appendix C, item 38)
- Socket set (Appendix C, item 48)
- Wrench, socket (Appendix C, item 57)
- Wrench, torque, 0-175 lb-ft (0-237 N•m) (Appendix C, item 61)
- Wrench, torque, 0-600 lb-ft (0-813 N•m) (Appendix C, item 63)
- Track tension loosened (refer to TM 9-2350-256-10)

Material/Parts:

- Solvent, dry-cleaning (Appendix D, item 9)
- Gaskets (6) (Appendix G, item 48)
- Gaskets (6) (Appendix G, item 49)
- Lockwashers (84) (Appendix G, item 132)
- Lockwashers (6) (Appendix G, item 134)

Personnel Required:

- Two

Equipment Conditions:

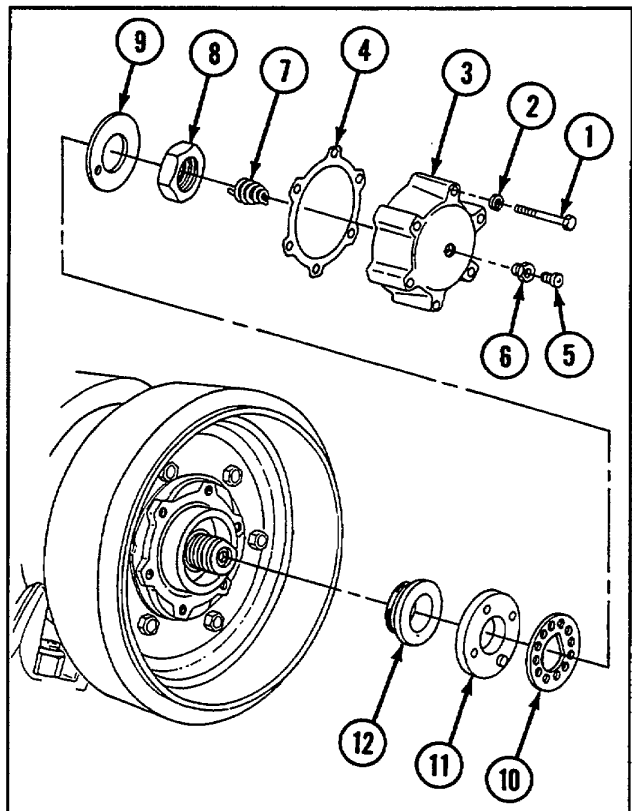
- Roadwheel removed (see paragraph 8-1)

NOTE

The following procedures are the same for all six roadwheel hub assemblies.

a. REMOVAL/DISASSEMBLY

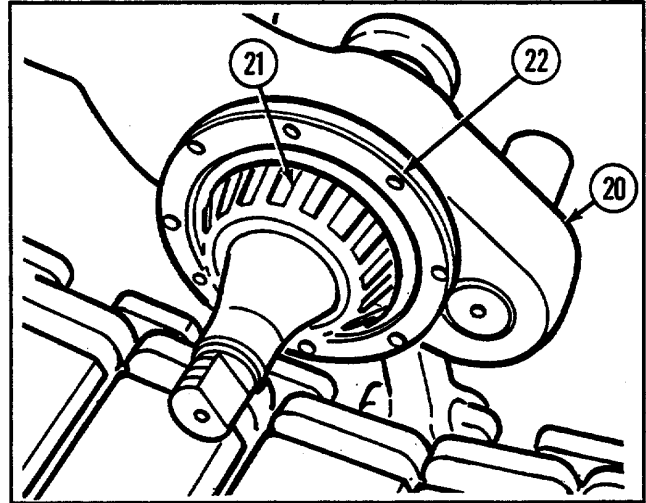
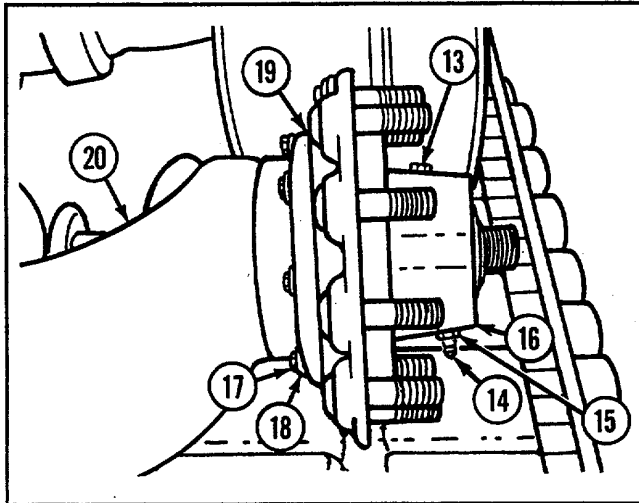
- 1 Remove six screws (1), six lockwashers (2), access cover (3), and gasket (4).
- 2 Remove relief valve (5), bushing (6), and static grounding spring (7).
- 3 Remove nut (8), lockplate (9), ring (10), and adjusting nut (11).
- 4 Remove outer cone bearing (12).



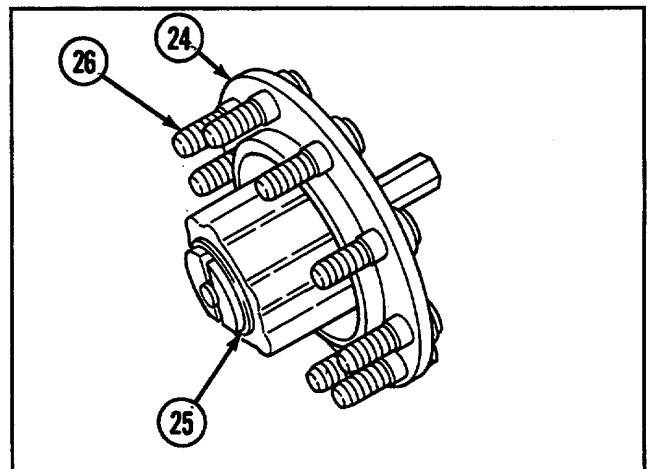
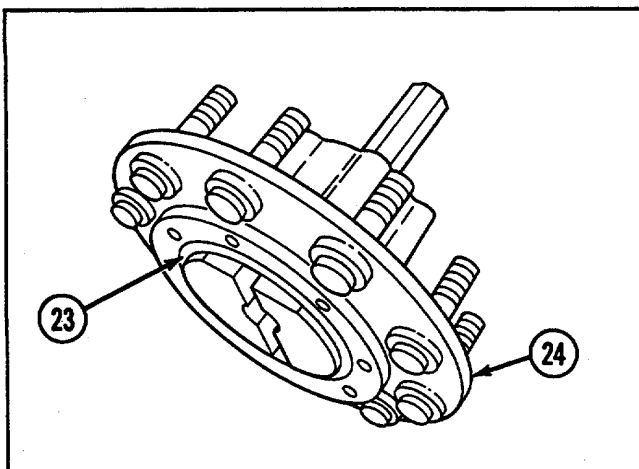
CHAPTER 8: MAINTENANCE OF SUSPENSION SYSTEM

8-4 REPLACE/SERVICE ROADWHEEL HUB ASSEMBLY-Continued

- 5 Remove pipe plug (13), lubrication fitting (14), and bushing (15) from hub assembly (16).
- 6 Remove eight screws (17), eight lockwashers (18), hub assembly (16), and gasket (19) from arm (20).
- 7 Remove inner cone bearing (21).
- 8 Remove hub seal assembly (22) from arm (20).



- 9 Remove inner hub bearing cup (23) from hub (24) using remover, replacer, and handle.
- 10 Remove outer hub bearing cup (25) from hub (24) using remover, replacer, and handle.
- 11 Remove 10 bolts (26) from hub (24).



b. CLEANING**WARNING**

Dry-cleaning solvent used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flashpoint of solvent is 138 degrees (O) Fahrenheit (F) (590 Celsius [C]).

NOTE

Use only clean dry-cleaning solvent for bearings.

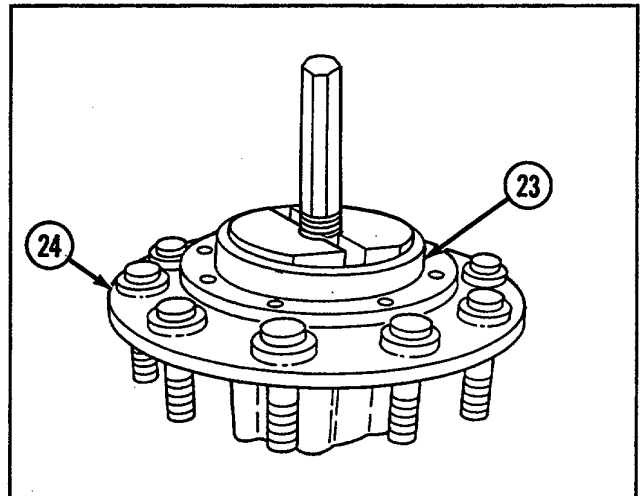
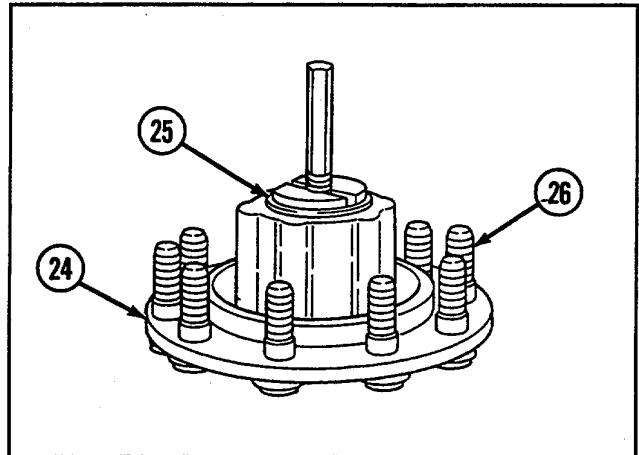
Clean all parts thoroughly using dry-cleaning solvent.

c. INSPECTION

Inspect hub and bearings for wear, pitting, or other damage. Replace defective parts.

d. ASSEMBLY/INSTALLATION

- 1 Install 10 bolts (26) in hub (24).
- 2 Install outer hub bearing cup (25) into hub (24) using remover, replacer, and handle.
- 3 Install inner hub bearing cup (23) into hub (24) using remover, replacer, and handle.
- 4 Install hub seal assembly (22) on arm (20).
- 5 Install inner cone bearing (21).
- 6 Install hub assembly (16) onto arm (20).
- 7 Install eight screws (17), eight new lockwashers (18), hub assembly (16), and new gasket (19).
- 8 Install bushing (15), lubrication fitting (14), and pipe plug (13) into hub assembly (16).



CHAPTER 8: MAINTENANCE OF SUSPENSION SYSTEM

8-4 REPLACE/SERVICE ROADWHEEL HUB ASSEMBLY-Continued

9 Install outer cone bearing (12).

10 Install adjusting nut (11) as follows:

- a. Tighten adjusting nut while rotating hub (24) in both directions to ensure contact of all bearing surfaces.
- b. Back off adjusting nut and torque to 50-70 lb-ft (68-95 N•m). Then back off 1/4 turn.

11 Install ring (10) and align adjusting nut (11) pin and ring hole to lock into place.

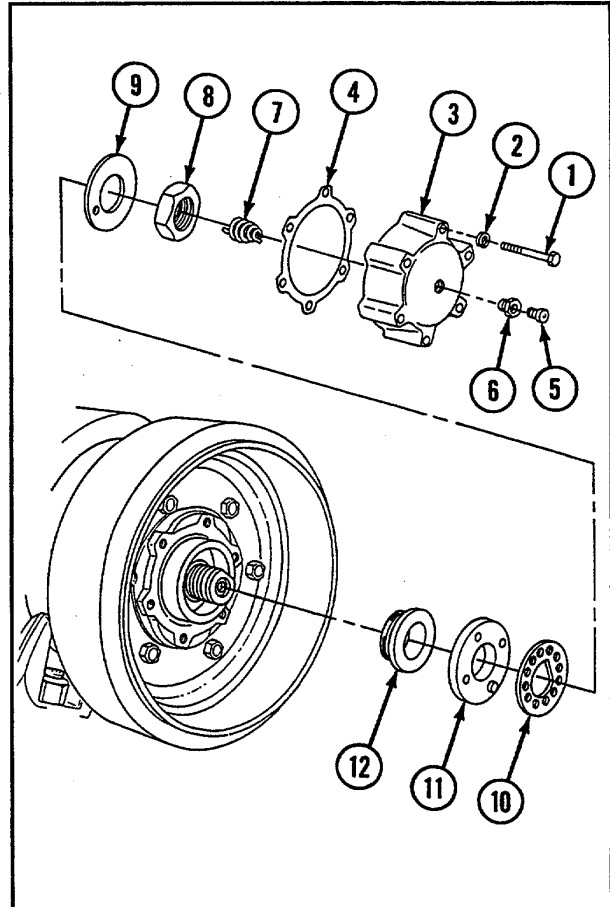
12 Install lockplate (9) and nut (8). Torque nut to 150-300 lb-ft (203-407 N•m).

13 Install static grounding spring (7), bushing (6), and relief valve (5).

14 Install new gasket (4), access cover (3), six new lockwashers (2), and six screws (1). Torque screws to 20-25 lb-ft (27-34 N•m).

NOTE

- Follow-on maintenance:
- Tighten track (refer to TM 9-2350-256-10)
 - Install roadwheel (see paragraph 8-1)



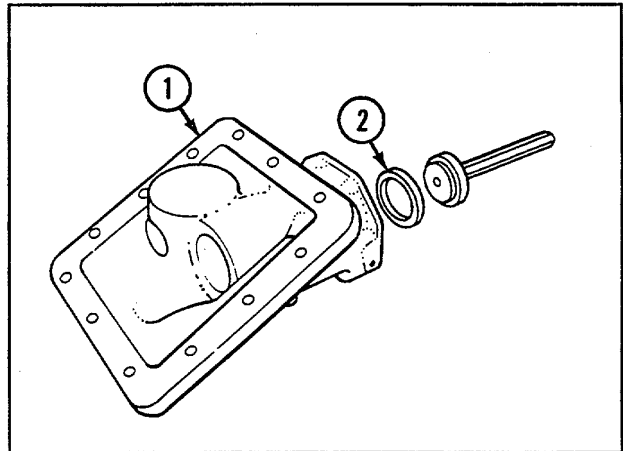
CHAPTER 8: MAINTENANCE OF SUSPENSION SYSTEM

b. INSTALLATION

- 1 Install new oil seal (2) in roadwheel support housing (1) using replacer and handle.

WARNING

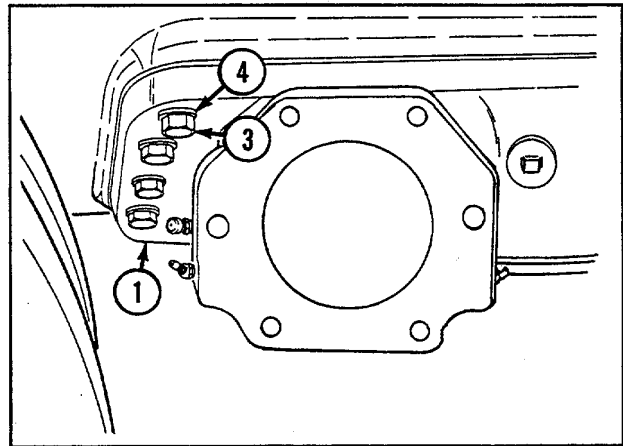
- Sealer coating is toxic and gives off harmful vapors. Use in a well-ventilated area. If adhesive gets in eyes try to keep eyes open; flush eyes with water for 15 minutes and get immediate medical attention.
- Roadwheel support housing is heavy, use care when installing housing to avoid injury.



- 2 Apply sealer coating to mounting surface of roadwheel support housing (1) and vehicle hull. Install roadwheel support housing on hull with 11 screws (3) and 11 new lockwashers (4). Torque screws to 245-270 lb-ft (332-366 N•m).

NOTE

Follow-on maintenance: Install roadwheel arm assembly (see paragraph 8-3)



8-6 REPLACE/REPAIR/SERVICE TRACK SUPPORT ROLLER, BRACKET, AND WHEEL

THIS TASK COVERS

- | | | | |
|-------------|-----------------|-------------|---------------|
| a. Removal | b. Disassembly | c. Cleaning | d. Inspection |
| e. Assembly | f. Installation | | |

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Handle (Appendix C, item 18)
- Multiplier, torque (Appendix C, item 27)
- Remover and replacer (Appendix C, item 38)
- Replacer (Appendix C, item 40)
- Socket set (Appendix C, item 48)
- Wrench, socket (Appendix C, item 57)
- Wrench, torque, 0-175 lb-ft (0-237 N•m) (Appendix C, item 61)
- Wrench, torque, 0-600 lb-ft (0-813 N•m) (Appendix C, item 63)

Materials/Parts:

- Grease, (Appendix D, item 13)
- Solvent, dry-cleaning (Appendix D, item 9)
- Gaskets (5) (Appendix G, item 29)
- Lockwashers (30) (Appendix G, item 132)
- Lockwashers (20) (Appendix G, item 147)
- Seals, oil (5) (Appendix G, item 243)
- Washers, tab (5) (Appendix G, item 280)
- Wood (Appendix D, item 35)

Reference

TM 9-2350-256-10

Personnel Required:

Two

NOTE

Bracket and wheel assemblies are removed, disassembled, assembled, and installed in the same manner.

a. REMOVAL

- 1 Remove two self locking nuts (1), two bolts (2), two center guides (3), and two caps (4).
- 2 Position track so that track link from which track shoe guides were removed is directly on support roller to be removed. Place heavy board on top of roadwheels. Position jack on board and raise track clear of support roller.

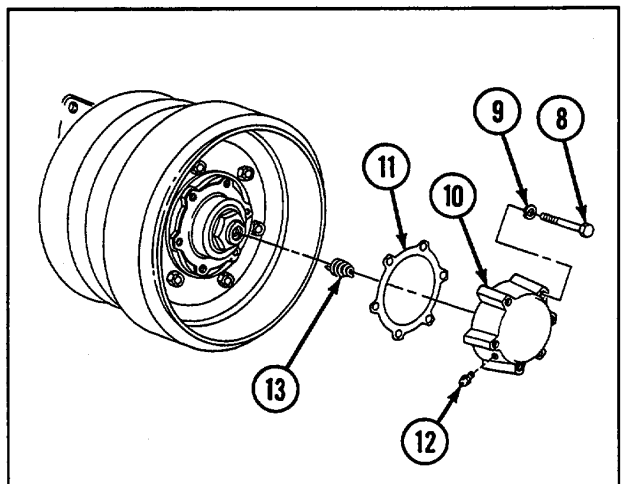
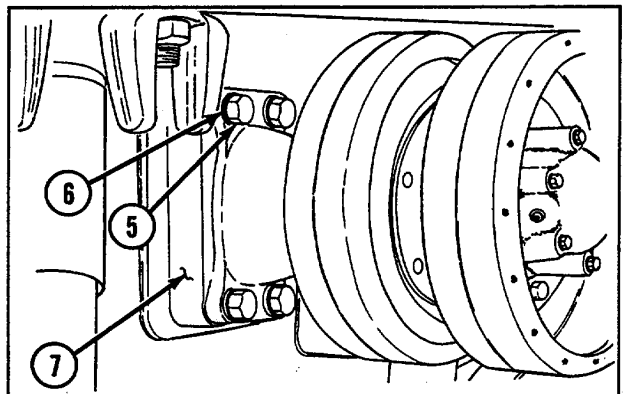
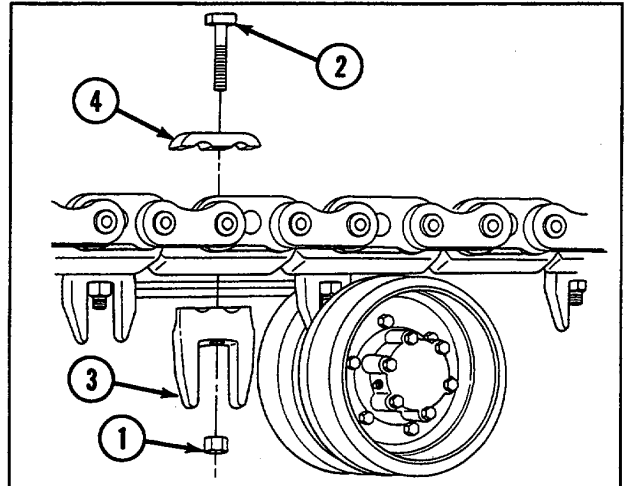
WARNING

Bracket assembly is heavy, get assistance when removing assembly to avoid injury.

- 3 Remove four screws (5), four lockwashers (6), and bracket and wheel assembly (7).

b. DISASSEMBLY

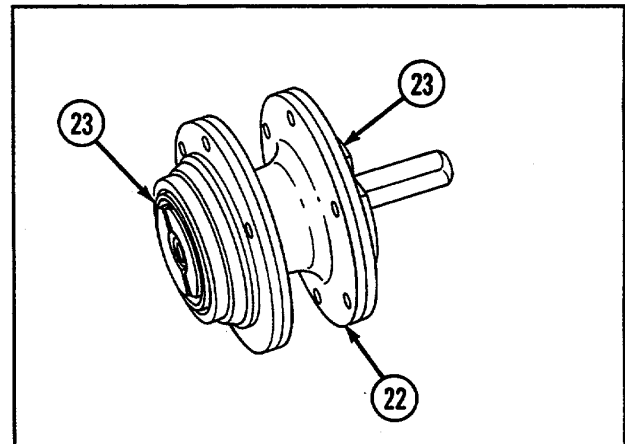
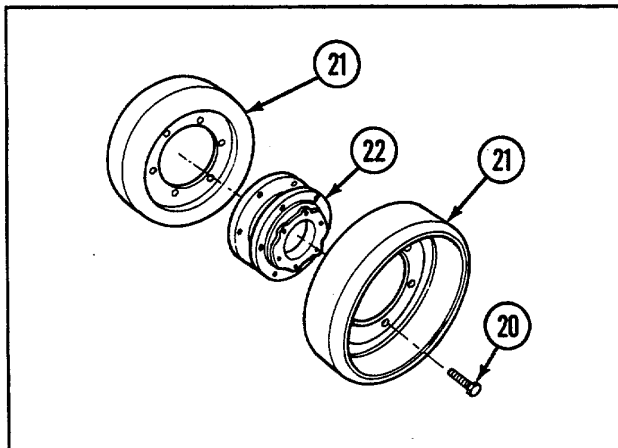
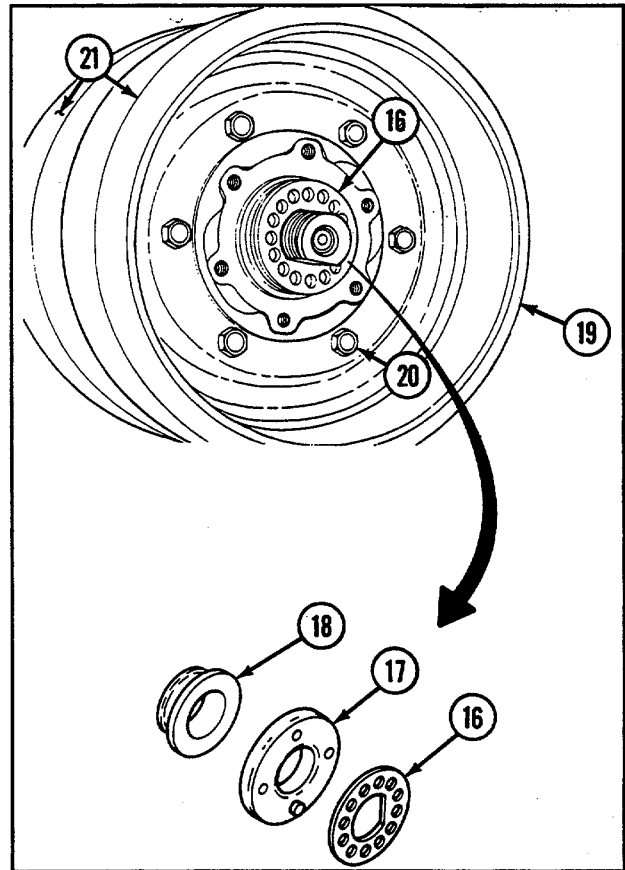
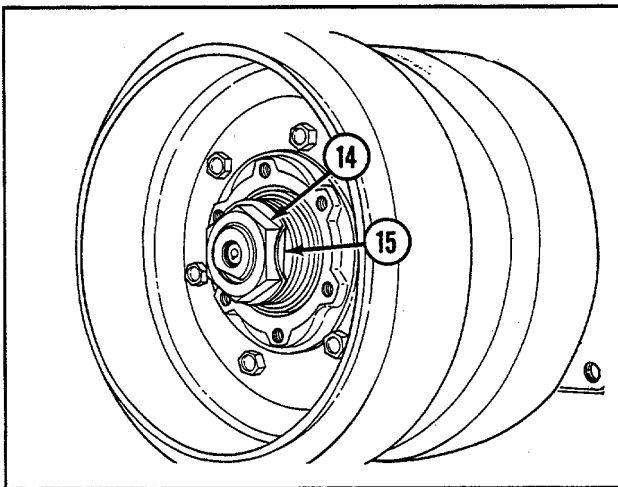
- 1 Remove six screws (8), six lockwashers (9), access cover (10), and gasket (11).
- 2 Remove lubrication fitting (12) and static grounding spring (13).



CHAPTER 8: MAINTENANCE OF SUSPENSION SYSTEM

8-6 REPLACE/REPAIR/SERVICE TRACK SUPPORT ROLLER, BRACKET, AND WHEEL-Continued

- 3 Remove nut (14) and tab washer (15).
- 4 Remove flat washer (16) and adjusting nut (17).
- 5 Remove outer bearing cone (18) and track support roller assembly (19).
- 6 Remove six bolts (20) and two roadwheels (21) from hub (22).
- 7 Remove two bearing cups (23) from hub (22) using remover, replacer, handle, and hammer.



- 8 Remove inner cone bearing (24), inner oil seal (25), and dirt deflector (26) from track support roller bracket (27).

c. CLEANING

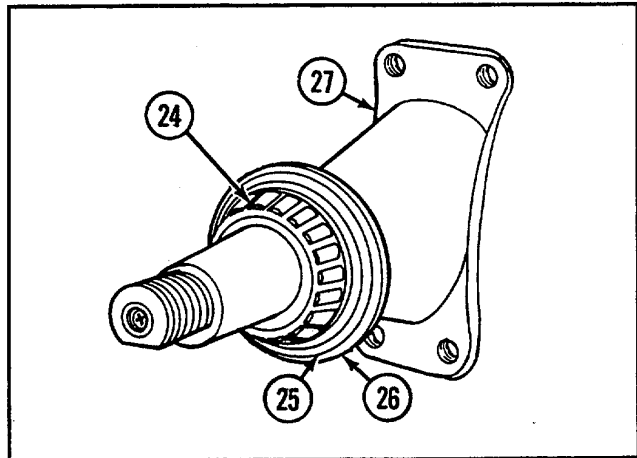
WARNING

Dry-cleaning solvent used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flashpoint of solvent is 138°F (59°C).

NOTE

Use only clean dry-cleaning solvent for bearings.

Clean all parts thoroughly using dry-cleaning solvent.



d. INSPECTION

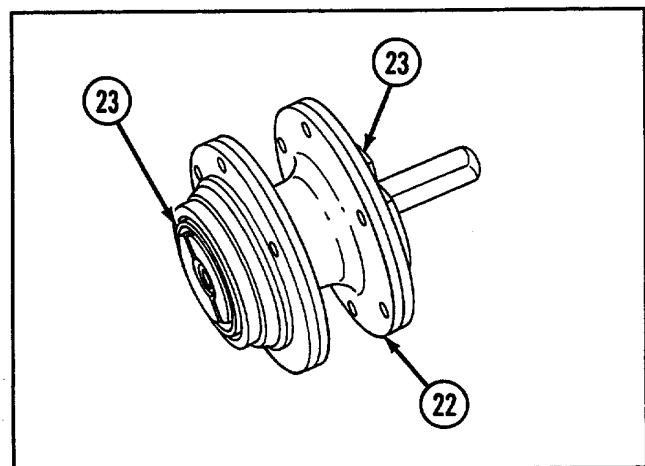
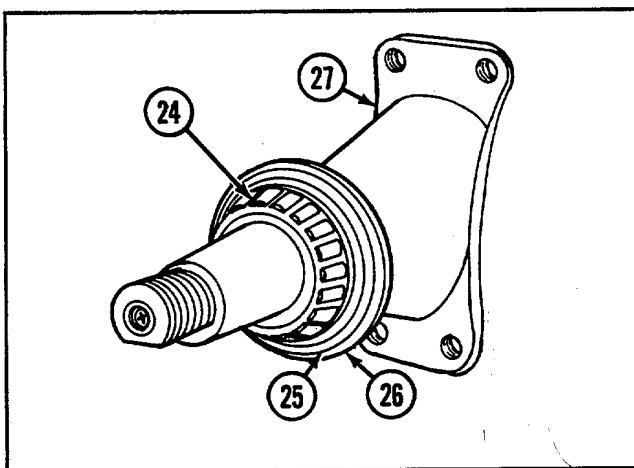
Inspect all parts for wear, pitting, or other damage. Replace all defective parts.

e. ASSEMBLY

NOTE

Pack bearings with grease before assembling.

- 1 Install dirt deflector (26) and new inner oil seal (25) onto track support roller bracket (27) using replacer and hammer.
- 2 Install inner cone bearing (24).
- 3 Install two bearing cups (23) onto hub (22) using remover, replacer, handle, and hammer.

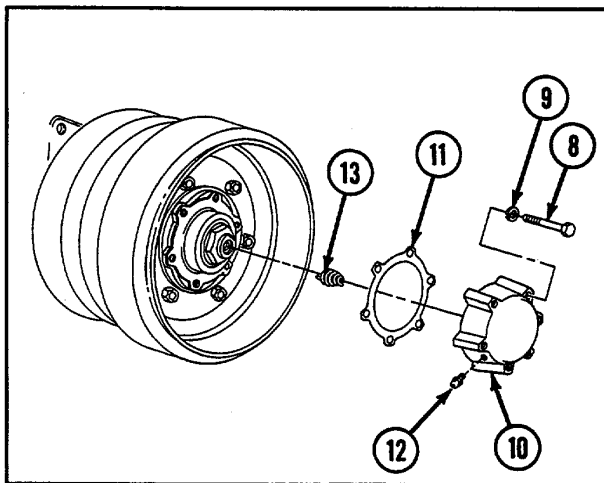
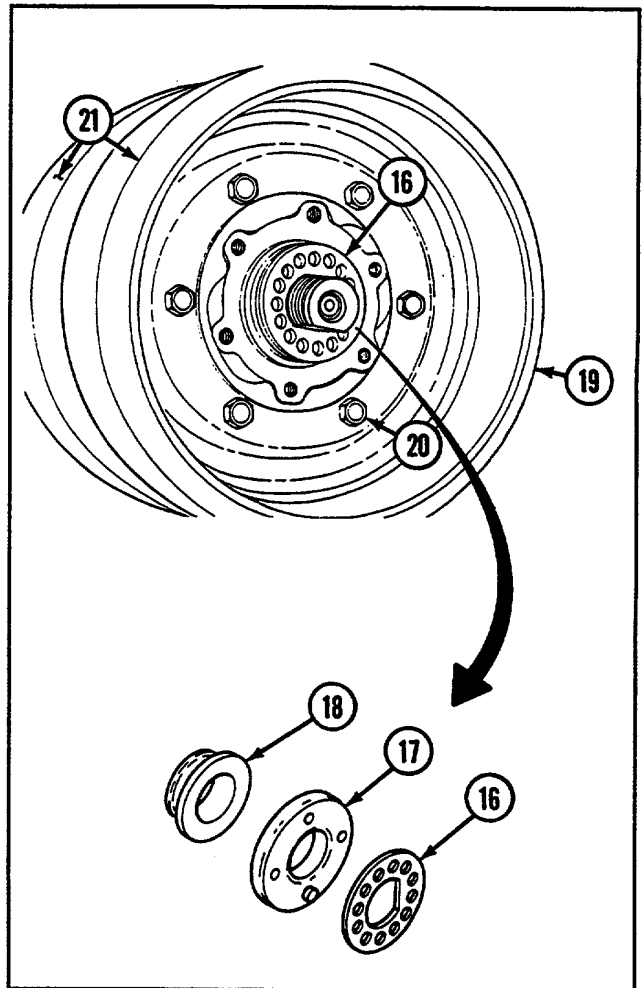
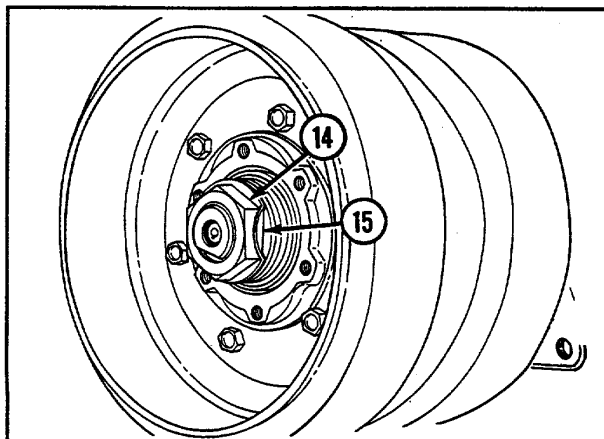
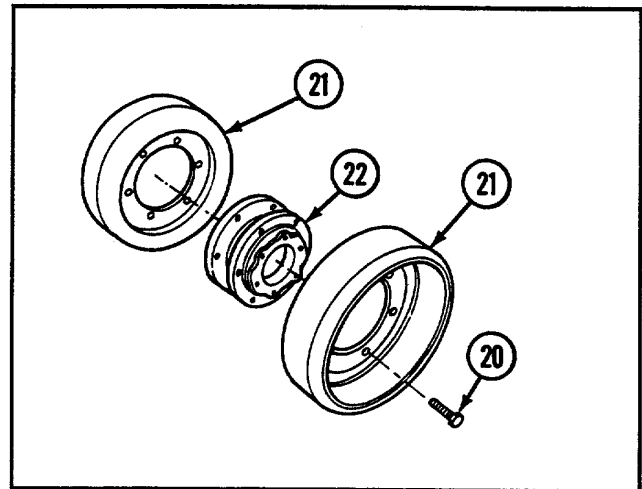


CHAPTER 8: MAINTENANCE OF SUSPENSION SYSEM

8-6 REPLACE/REPAIR/SERVICE TRACK SUPPORT ROLLER, BRACKET, AND WHEEL-Continued

- 4 Install two roadwheels (21) and six bolts (20) on hub (22). Torque bolts to 110-130 lb-ft (149-176 N•m).
- 5 Install track support roller assembly (19) and outer bearing cone (18).
- 6 Install adjusting nut (17) and flat washer (16).
- 7 Install new tab washer (15) and nut (14).
- 8 Install lubrication fitting (12).
- 9 Install static grounding spring (13), new gasket (11), access cover (10), six new lockwashers (9), and six screws.

SIX SCREWS (9).

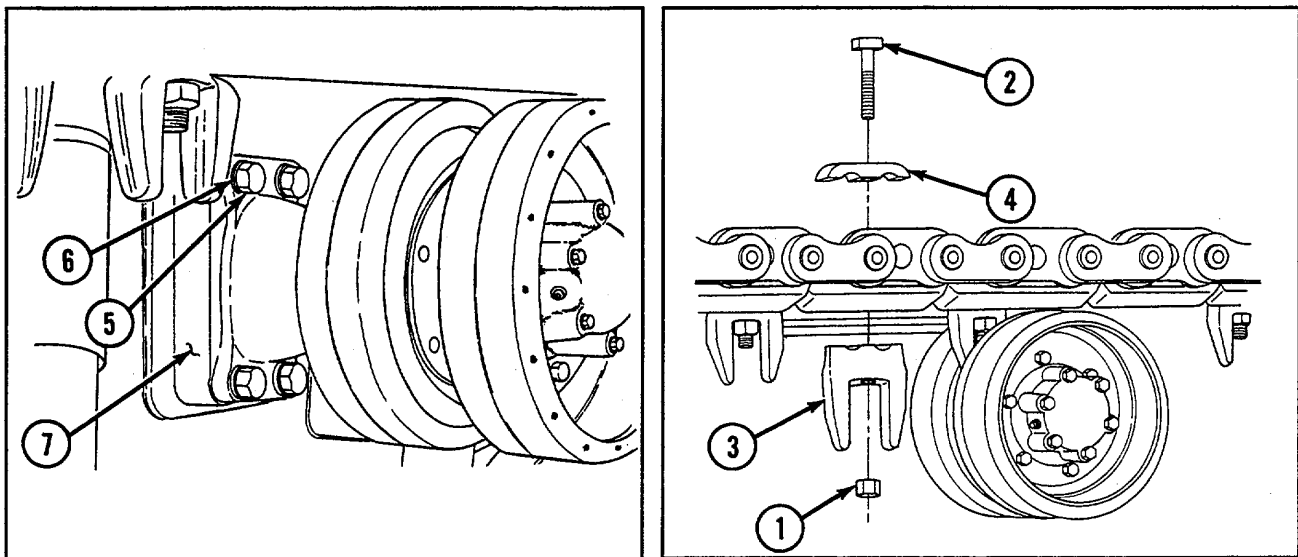


f. INSTALLATION

WARNING

Bracket and wheel assembly are heavy, use care when removing assembly to avoid injury.

- 1 Install bracket and wheel assembly (7), four new lockwashers (6), and four screws (5). Torque screws to 350-400 lb-ft (475-542 N•m).
- 2 Lower track and remove jack and board.
- 3 Install two center guides (3), two caps (4), two bolts (2), and two self locking nuts (1).

**8-7 REPLACE/REPAIR/SERVICE LEFT FRONT TRACK SUPPORT ROLLER, BRACKET, AND WHEEL****THIS TASK COVERS**

- | | | | |
|-------------|-----------------|-------------|---------------|
| a. Removal | b. Disassembly | c. Cleaning | d. Inspection |
| e. Assembly | f. Installation | | |

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Handle (Appendix C, item 18)
- Multiplier, torque (Appendix C, item 27)
- Remover and replacer (Appendix C, item 38)
- Replacer (Appendix C, item 40)
- Socket set (Appendix C, item 48)
- Wrench, socket (Appendix C, item 57)
- Wrench, torque, 0-175 lb-ft (0-237 N•m) (Appendix C, item 61)
- Wrench, torque, 0-600 lb-ft (0-813 N•m) (Appendix C, item 63)

Materials/Parts:

- Grease (Appendix D, item 13)
- Solvent, dry-cleaning (Appendix D, item 9)
- Gaskets (2) (Appendix G, item 29)
- Lockwashers (6) (Appendix G, item 132)
- Lockwashers (4) (Appendix G, item 147)
- Pin, cotter (Appendix G, item 213)
- Seal (Appendix G, item 243)
- Seal, oil (Appendix G, item 260)
- Washer, tab (Appendix G, item 280)
- Wood (Appendix D, item 35)

Reference:

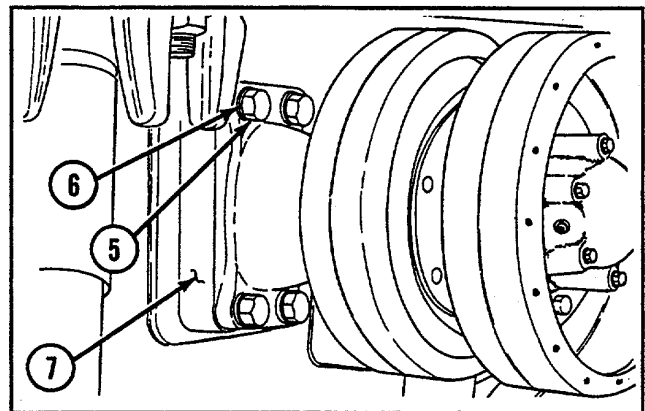
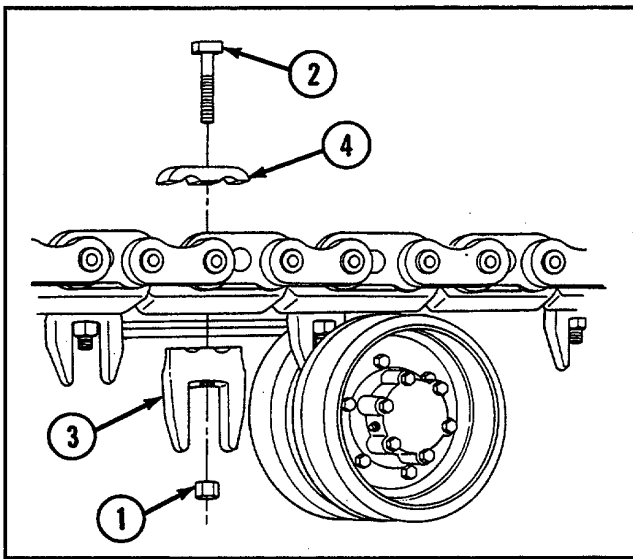
TM 9-2350-256-10

CHAPTER 8: MAINTENANCE OF SUSPENSION SYSTEM

**8-7 REPLACE/REPAIR/SERVICE LEFT FRONT TRACK SUPPORT ROLLER, BRACKET, AND WHEEL-
Continued**

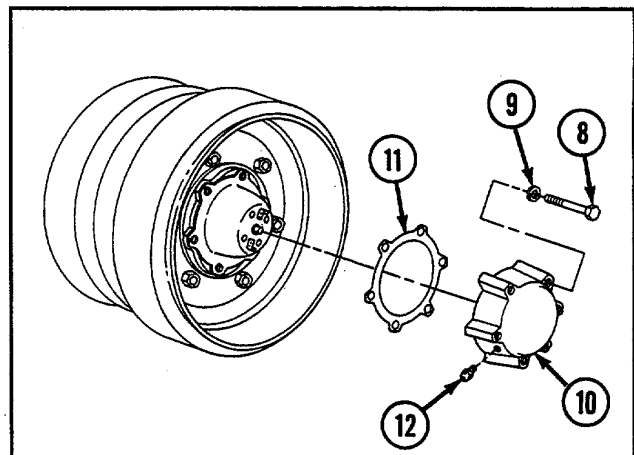
a. REMOVAL

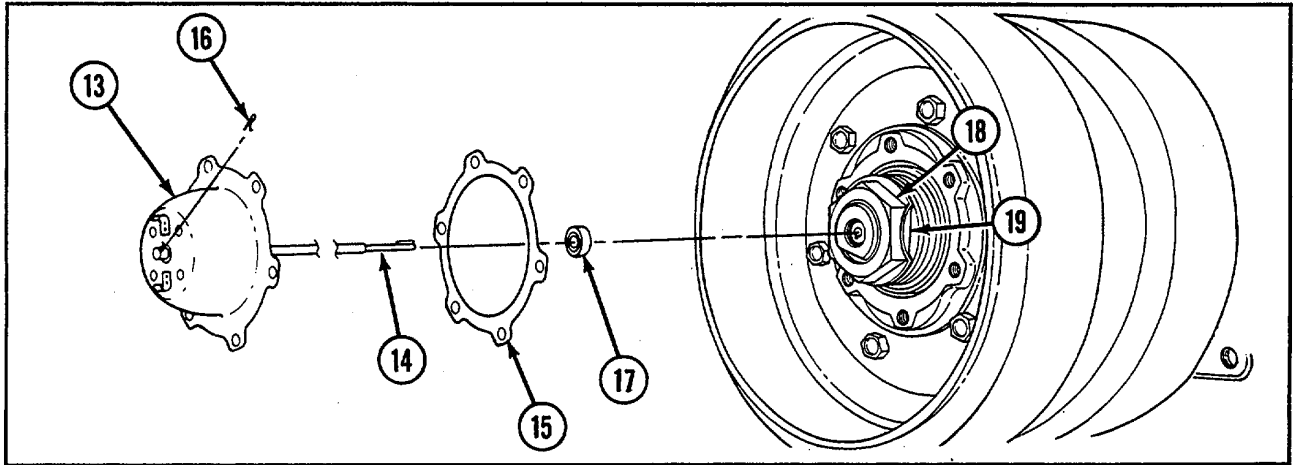
- 1 Remove two self-locking nuts (1), two bolts (2), two center guides (3), and two caps (4).
- 2 Position track so that track link from which track shoe guides were removed is directly on support roller to be removed. Place heavy board on top of roadwheels. Position jack on board and raise track clear of support roller.
- 3 Remove four screws (5), four lockwashers (6), and bracket and wheel assembly (7).



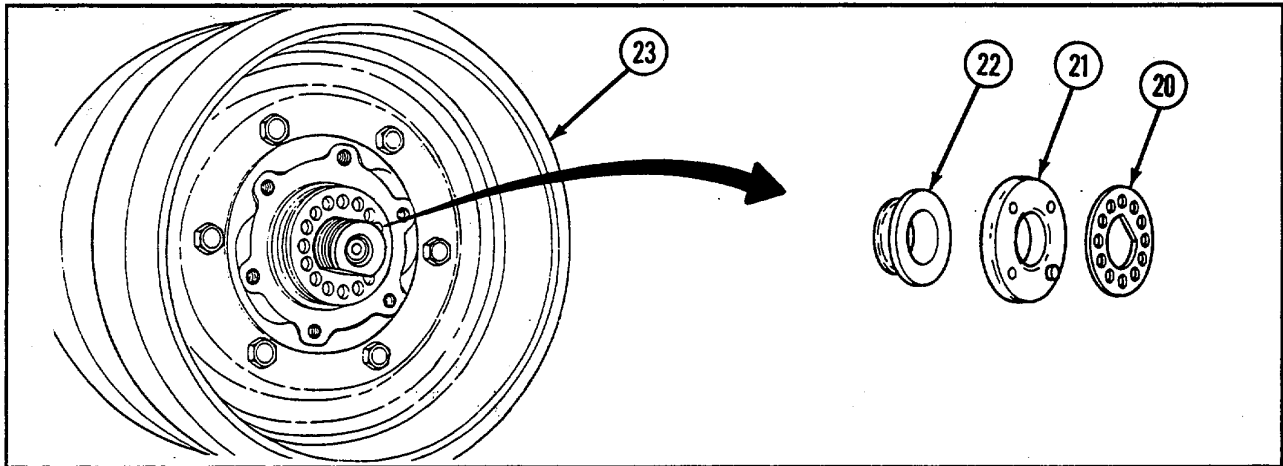
b. DISASSEMBLY

- 1 Remove six screws (8), six lockwashers (9), access cover (10), and gasket (11).
- 2 Remove lubrication fitting (12).
- 3 Remove cup assembly (13) with drive key (14) and gasket (15). Remove gasket from cup assembly.
- 4 Remove cotter pin (16) and seal (17) from drive key (14). Remove drive key from cup assembly (13).
- 5 Remove nut (18) and tab washer (19).

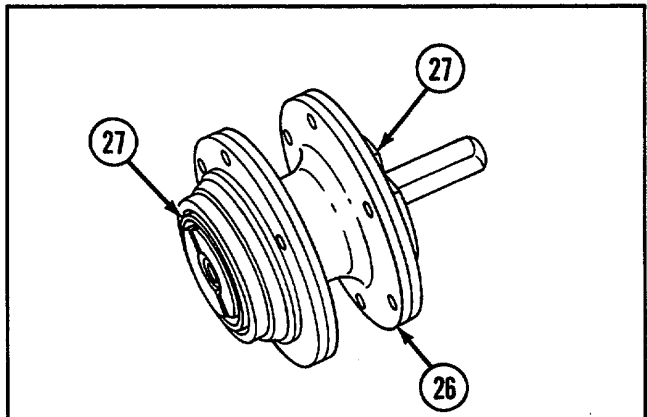
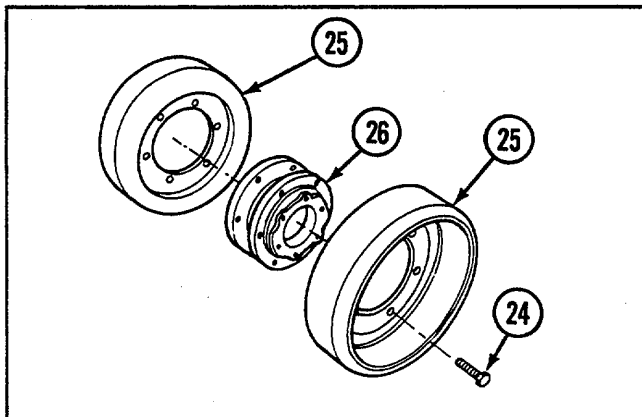




- 6 Remove flat washer (20) and adjusting nut (21) from outer bearing cone (22).
- 7 Remove outer bearing cone (22) and track support roller assembly (23).



- 8 Remove six bolts (24) and two roadwheels (25) from hub (26).
- 9 Remove two bearing cups (27) from hub (26) using remover, replacer, handle, and hammer.



CHAPTER 8: MAINTENANCE OF SUSPENSION SYSTEM

**8-7 REPLACE/REPAIR/SERVICE LEFT FRONT TRACK SUPPORT ROLLER, BRACKET, AND WHEEL-
Continued**

10 Remove inner cone bearing (28), inner oil seal (29), and dirt deflector (30) from track support roller bracket (31).

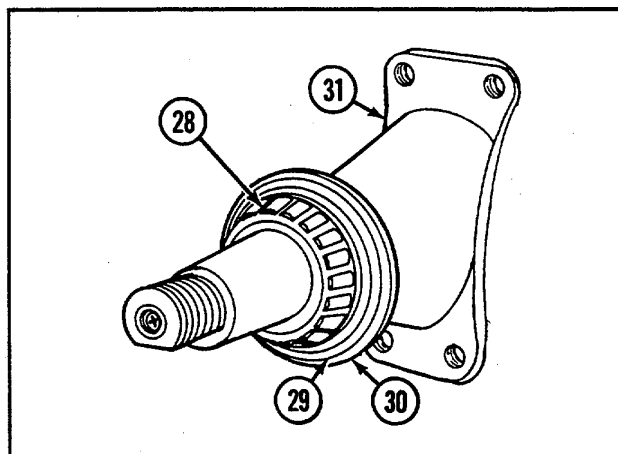
c. CLEANING

WARNING

Dry-cleaning solvent used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flashpoint of solvent is 1380F (590C).

NOTE

Use only clean dry-cleaning solvent for bearings. Clean all parts thoroughly using dry-cleaning solvent.



d. INSPECTION

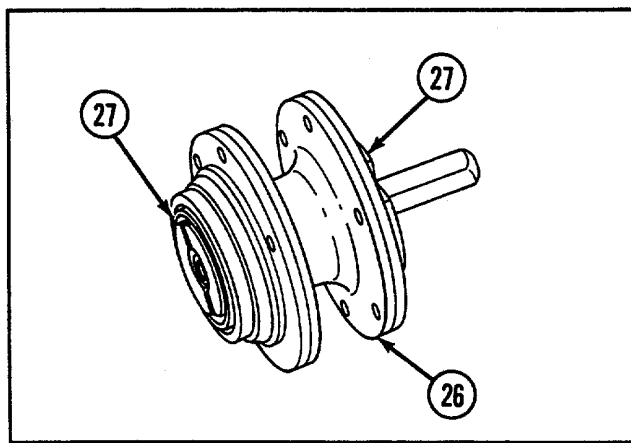
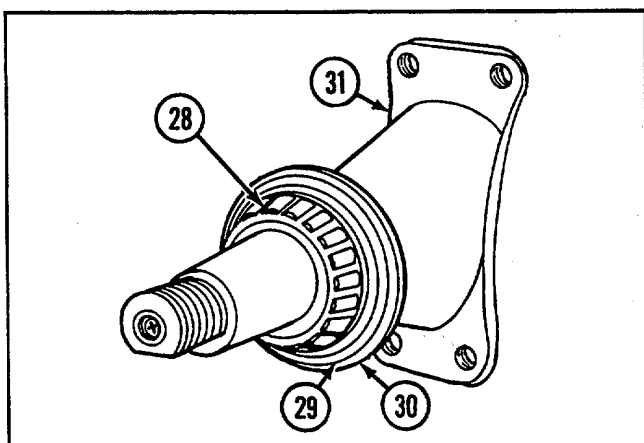
Inspect all parts for wear, pitting, or other damage. Replace all defective parts.

e. ASSEMBLY

NOTE

Pack bearings with grease before assembling.

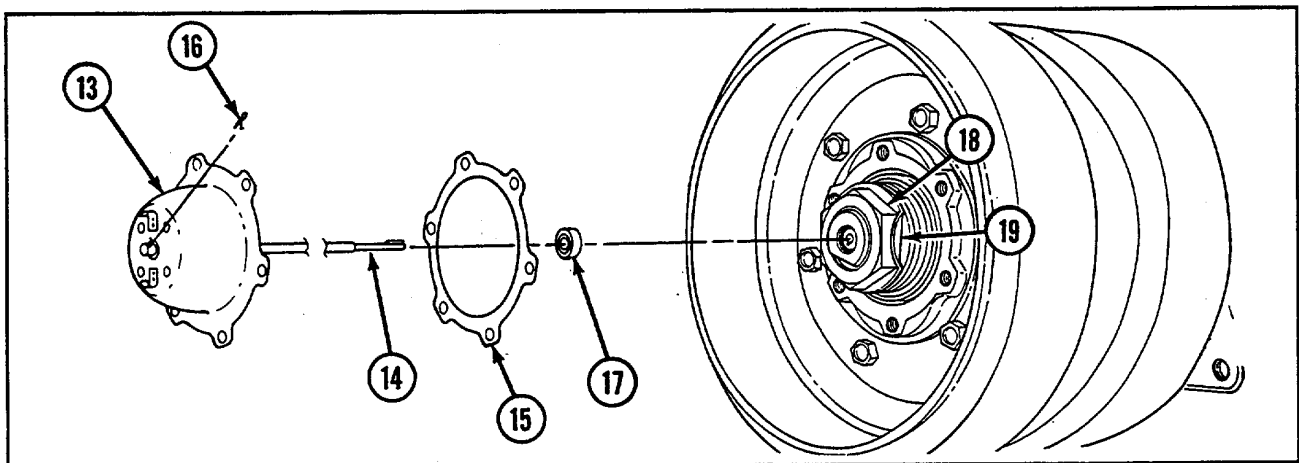
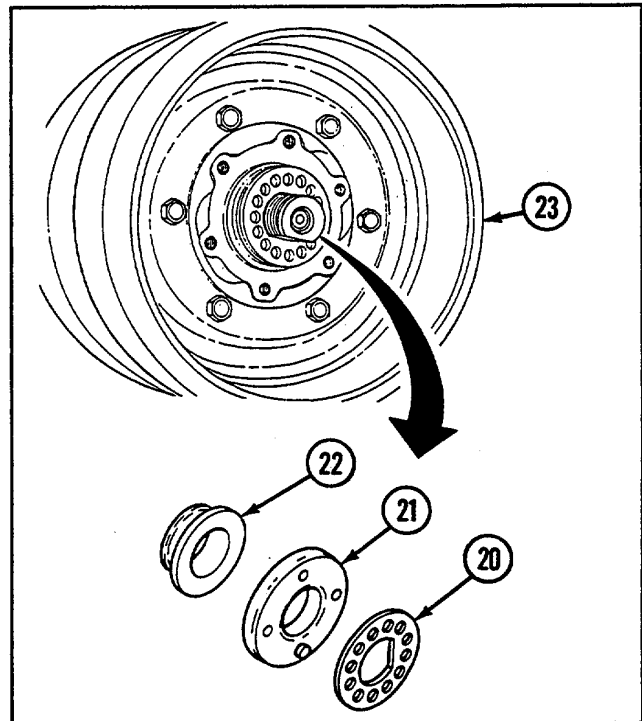
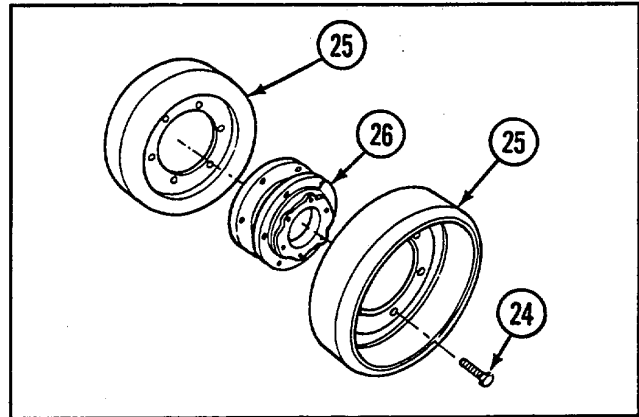
- 1 Install dirt deflector (30) and new inner oil seal (29) onto track support roller bracket (31) using replacer and hammer.
- 2 Install inner cone bearing (28).
- 3 Install two bearing cups (27) onto hub (26) using remover, replacer, handle, and hammer.
- 4 Install two roadwheels (25) and six bolts (24) on hub (26). Torque bolts to 110-130 lb-ft (149-176 N•m).



SECTION I: WHEELS AND TRACKS

TM 9-2350-256-20

- 5 Install track support roller assembly (23) and outer bearing cone (22).
- 6 Install adjusting nut (21) and flat washer (20).
- 7 Install new tab washer (19) and nut (18).
- 8 Install drive key (14) to cup assembly (13).
- 9 Install new seal (17) and new cotter pin (16) to drive key (14).
- 10 Install new gasket (15) and cup assembly (13) with drive key (14).



CHAPTER 8: MAINTENANCE OF SUSPENSION SYSTEM

8-7 REPLACE/REPAIR/SERVICE LEFT FRONT TRACK SUPPORT ROLLER, BRACKET, AND WHEEL - Continued

11 Install lubrication fitting (12).

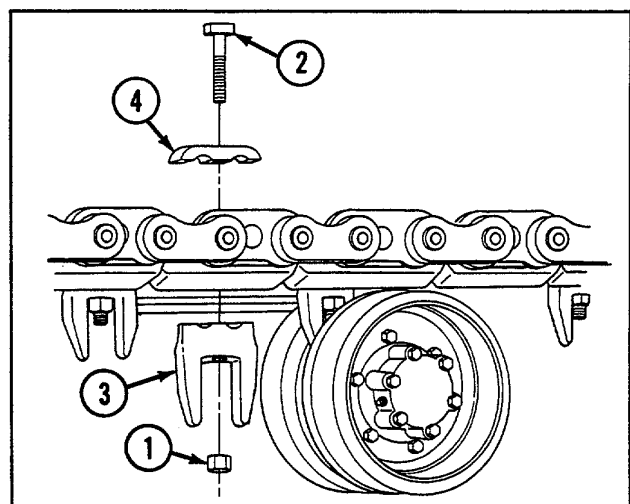
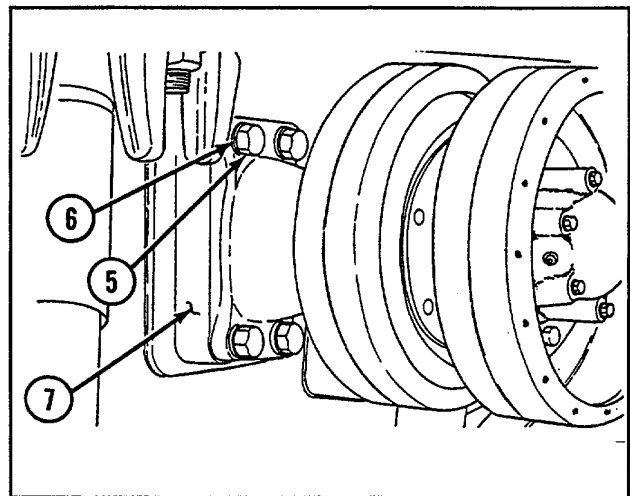
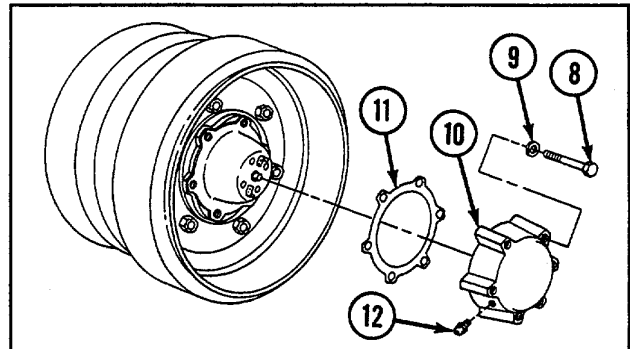
12 Install new gasket (11), access cover (10), six new lockwashers (9), and six screws (8).

f. INSTALLATION

1 Install bracket and wheel assembly (7), four new lockwashers (6), and four screws (5). Torque screws to 350-400 lb-ft (475-542 N•m).

2 Lower track and remove jack and board.

3 Install two centerguides (3), two caps (4), two bolts (2), and two self-locking nuts (1).



8-8 REPLACE COMPENSATING IDLER ARM ASSEMBLY WHEELS, HUB ASSEMBLY, LINKS, AND LINK BEARINGS**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Handle (Appendix C, item 18)
- Puller, mechanical, compensating link bearing (Appendix C, item 35)
- Remover and replacer (Appendix C, item 38)
- Wrench, torque, 0-175 lb-ft (0-237 N•m) (Appendix C, item 61)
- Wrench, torque, 0-600 lb-ft (0-813 N•m) (Appendix C, item 63)

Parts:

- Lockwashers (28) (MS35338-46)
- Gasket (2) (8387092)
- Gasket (2) (8387093)
- Self-locking nuts (20) (12274570)
- Pins, cotter (4) (Appendix G, item 222)

Reference:

TM 9-2350-256-10

Equipment Condition

Loosen track tension (refer to TM 9-2350-256-10)

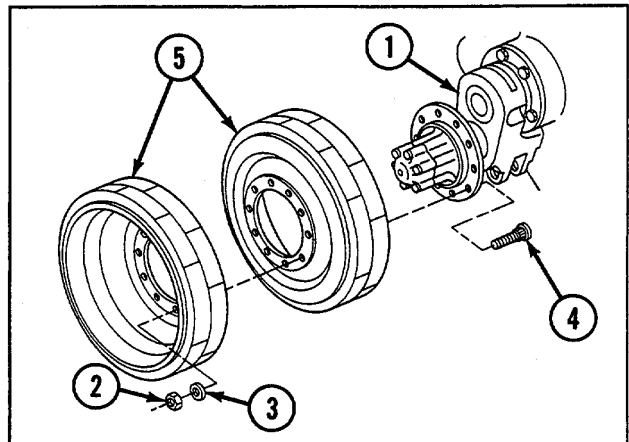
NOTE

Left and right idler links are removed in the same manner.

a. REMOVAL**WARNING**

Be sure to jack up idler wheel to prevent its dropping after idler link (1) is disconnected.

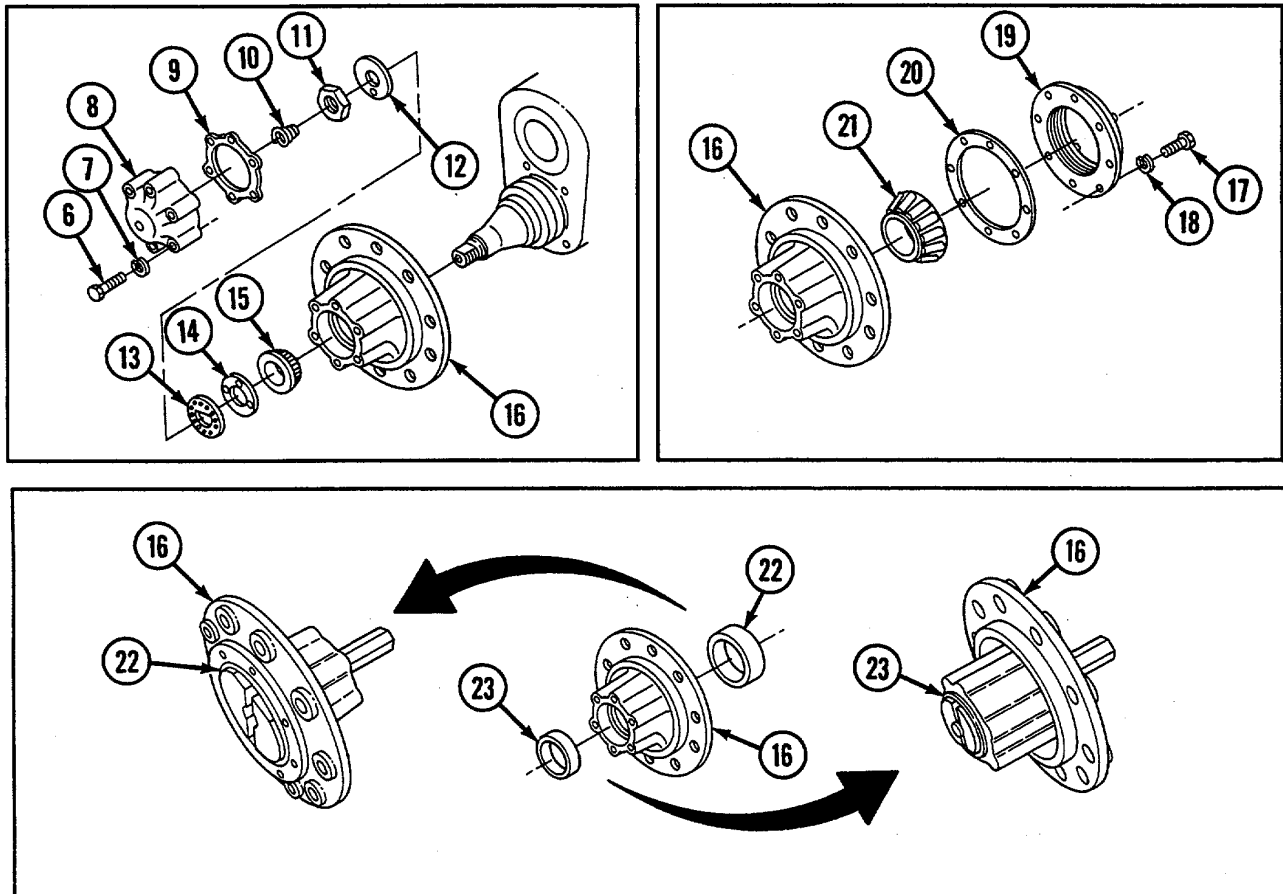
- 1 Jack up and block idler arm assembly (1).
- 2 Remove ten self-locking nuts (2), ten washers (3), ten bolts (4), and two compensating idler wheels (5).



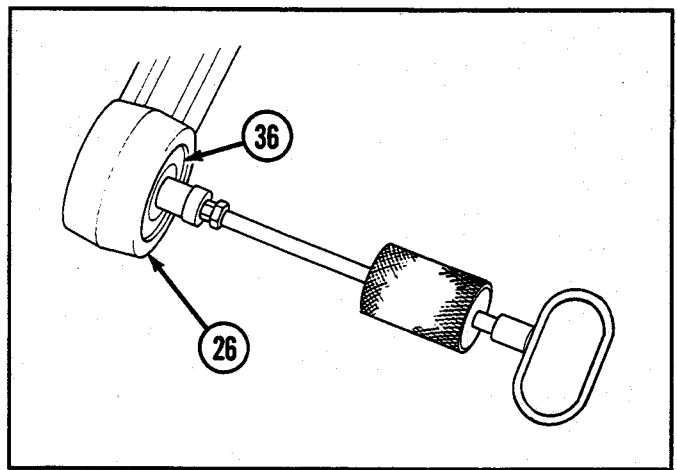
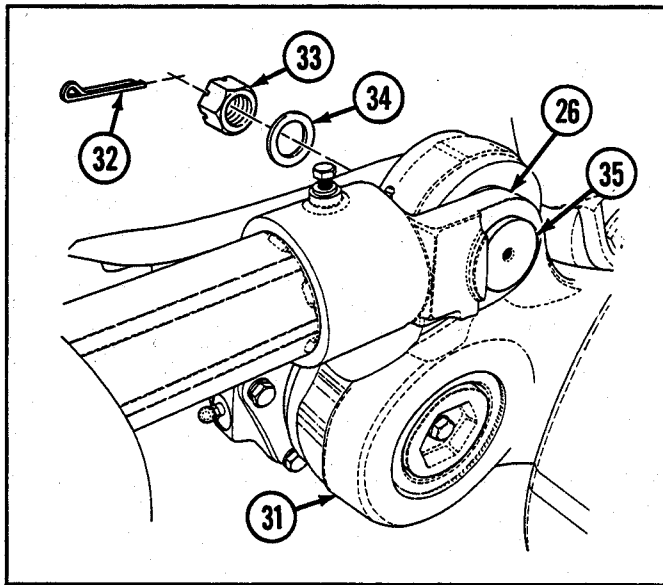
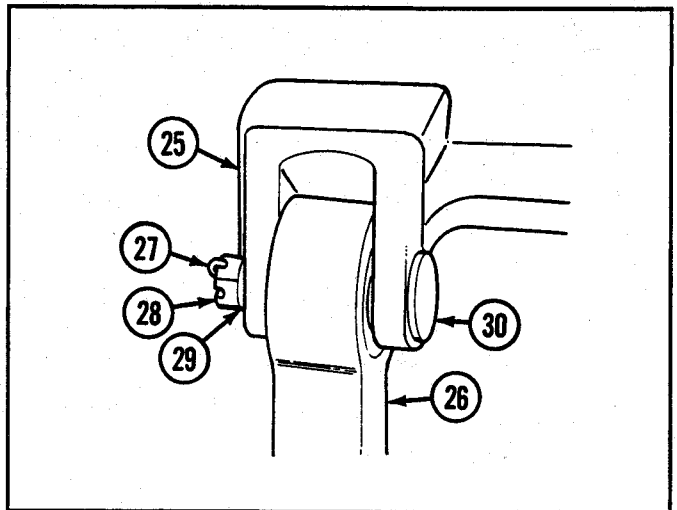
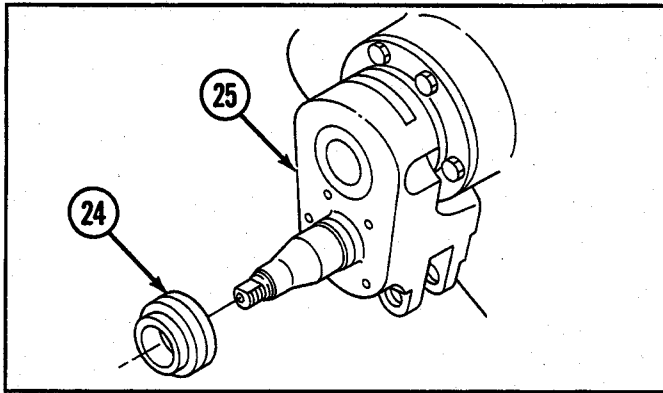
CHAPTER 8: MAINTENANCE OF SUSPENSION SYSTEM

8-8 REPLACE COMPENSATING IDLER ARM ASSEMBLY WHEELS, HUB ASSEMBLY, LINKS, AND LINK BEARINGS--Continued

- 3 Remove six screws (6), six lockwashers (7), access cover (8), gasket (9), spring (10), nut (11), two washers (12 and 13), round nut (14), cone and roller (15), and hub (16).
- 4 Remove eight screws (17), eight lockwashers (18), seal assembly (19), gasket (20), and cone and roller (21) from hub (16).
- 5 Remove inner roller cup (22) from hub (16) using remover, replacer, and handle.
- 6 Remove outer roller cup (23) from hub (16) using remover, replacer, and handle.



- 7 Remove spacer (24) from compensating idler arm (25).
- 8 Disconnect idler link (26) from compensating idler arm (25) by removing cotter pin (27), nut (28), washer (29), and clevis pin (30).
- 9 Disconnect opposite end of idler link (26) from roadwheel arm (31) by removing cotter pin (32), nut (33), washer (34), and clevis pin (35).
- 10 Remove idler link bearing (36) from idler link (26) using puller.



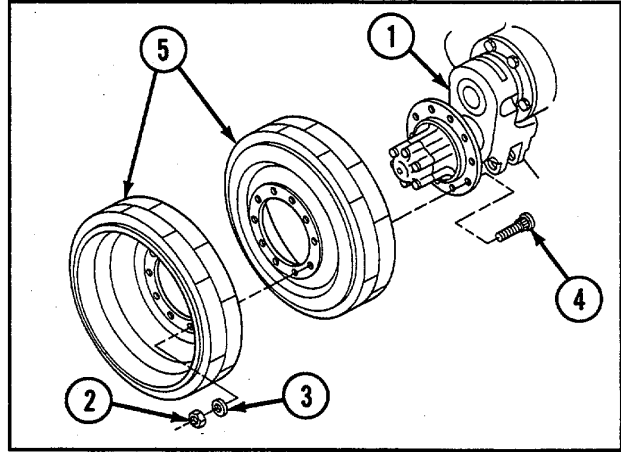
b. INSTALLATION

- 1 Install idler link bearing (36) in idler link (26).
- 2 Connect one end of idler link (26) to roadwheel arm (31) with clevis pin (35), washer (34), nut (33), and new cotter pin (32).
- 3 Connect opposite end of idler link (26) to compensating idler arm (25) with clevis pin (30), washer (29), nut (28), and new cotter pin (27).
- 4 Install spacer (24) to compensating idler arm (25).
- 5 Install outer roller cup (23) to hub (16) using remover, replacer, and handle.
- 6 Install inner roller cup (22) to hub using remover, replacer, and handle.
- 7 Install, cone and roller (21), new gasket (20), seal assembly (19), eight new lockwashers (18), and eight screws (17) to hub (16).
- 8 Install hub (16), cone and roller (15), round nut (14), two washers (12 and 13), nut (11), spring (10), new gasket (9), access cover (8), six new lockwashers (7), and six screws (6). Torque screws to 20–25 lb-ft (27–34 N•m).

CHAPTER 8: MAINTENANCE OF SUSPENSION SYSTEM

8-8 REPLACE COMPENSATING IDLER ARM ASSEMBLY WHEELS, HUB ASSEMBLY, LINKS, AND LINK BEARINGS--Continued

- 9 Install two compensating idler wheels (5), ten bolts (4), ten washers (3), and ten new self-locking nuts (2). Torque self-locking nuts to 320-350 lb-ft (434-475 N•m).
- 10 Remove blocking and lower idler arm assembly (1).



NOTE

Follow-on maintenance: Tighten track tension (refer to TM 9-2350-256-10)

8-9 PLACE/SERVICE COMPENSATING IDLER AND ARM ASSEMBLY

THIS TASK COVERS

- | | | | |
|------------|-------------|---------------|-----------------|
| a. Removal | b. Cleaning | c. Inspection | d. Installation |
|------------|-------------|---------------|-----------------|

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Handle (Appendix C, item 18)
- Replacer (Appendix C, item 40)
- Wrench (Appendix C, item 60)

Materials/Parts-Continued:

- Seal assemblies (2) (Appendix G, item 263)
- Seals (2) (Appendix G, item 273)
- Washers, key (2) (Appendix G, item 277)

Equipment Conditions:

- Roadwheel removed (see paragraph 8-1)
- Compensating idler wheel and hub assembly removed and link disconnected (see paragraph 8-8)
- Track disconnected (refer to TM 9-2350-256-10)

Materials/Parts:

- Grease (Appendix D, item 13)
- Oil, OE (Appendix D, item 18)
- Solvent, dry-cleaning (Appendix D, item 9)
- Gaskets (2) (Appendix G, item 47)

WARNING

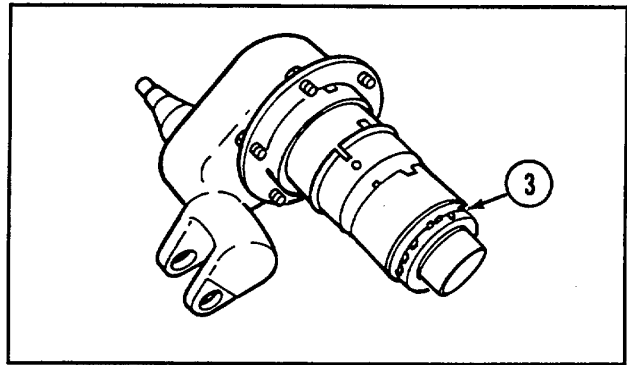
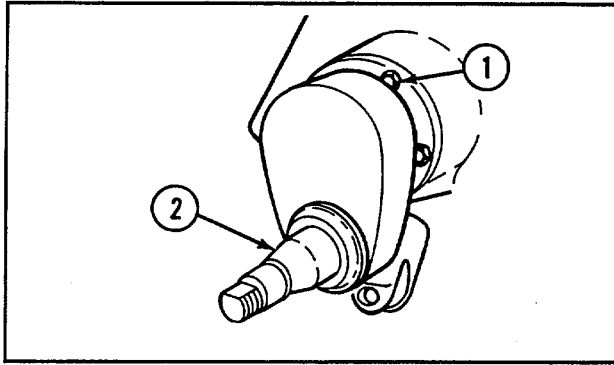
- Ensure track is blocked when performing suspension maintenance. If track is not blocked, vehicle may roll and may cause severe injury or death to personnel.
- Compensating idler arm is heavy and may cause injury if dropped.

NOTE

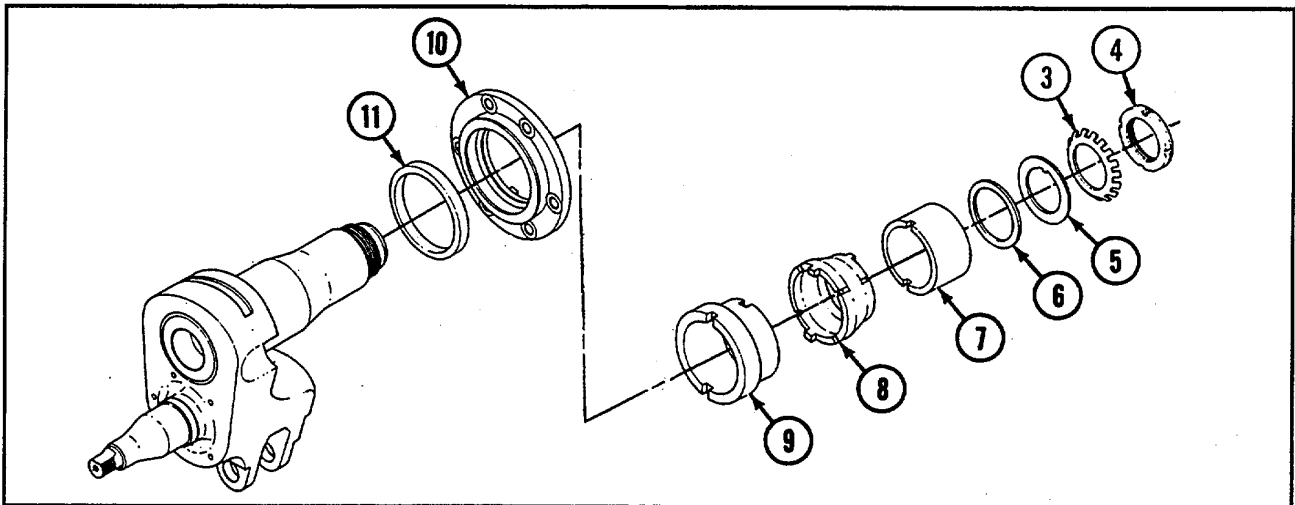
Left and right sides are removed and installed in the same manner.

a. REMOVAL

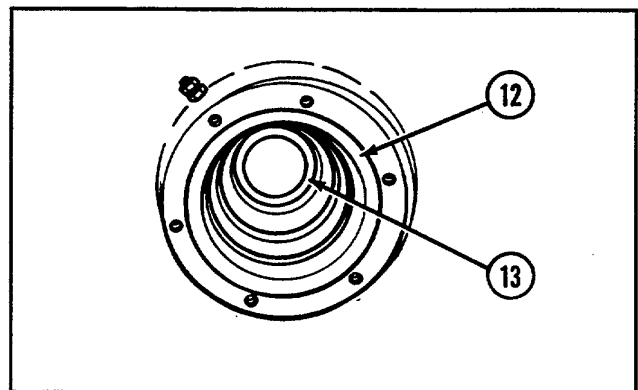
- 1 Remove six screws (1) and compensating idler arm (2) from vehicle hull.



- 2 Turn back edges of key washer (3).
- 3 Remove round bearing nut (4) and key washer (3).
- 4 Remove thrust bearing washer (5), flat washer (6), and inner sleeve bearing (7).
- 5 Remove spacer (8) and outer bearing (9).
- 6 Remove retainer (10) with seal assembly (11) using replacer. Remove old seal assembly from retainer.



- 7 Remove preformed gasket (12).
- 8 Remove compensating idler arm support seal (13).



CHAPTER 8: MAINTENANCE OF SUSPENSION SYSTEM**8-9 REPLACE/SERVICE COMPENSATING IDLER AND ARM ASSEMBLY-Continued****b. CLEANING****WARNING**

Dry-cleaning solvent used to dean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flashpoint of solvent is 138°F (59°C).

NOTE

Use only dean dry-cleaning solvent for bearings.

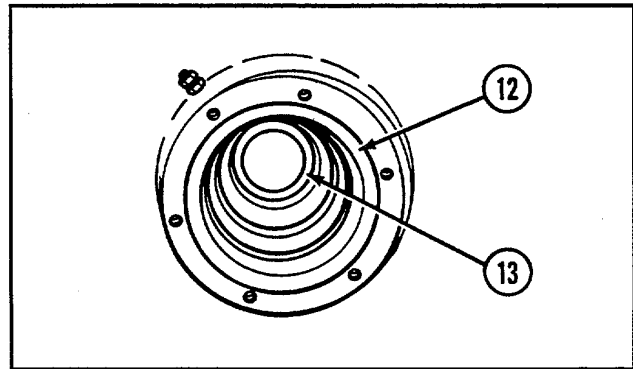
Clean all parts thoroughly using dry-cleaning solvent.

c. INSPECTION

Inspect all parts for wear, pitting, or other damage. Replace defective parts.

d. INSTALLATION

- 1 Lubricate new compensating idler arm support seal (13) with OE oil. Install new compensating idler arm support seal with spring-loaded lip facing outside of vehicle. Use replacer and handle.
- 2 Install new preformed gasket (12).
- 3 Install new seal assembly (11) in retainer (10) with spring-loaded lip facing inside of vehicle.
- 4 Apply light coat of grease to mating surfaces and install outer bearing (9).
- 5 Install spacer (8).

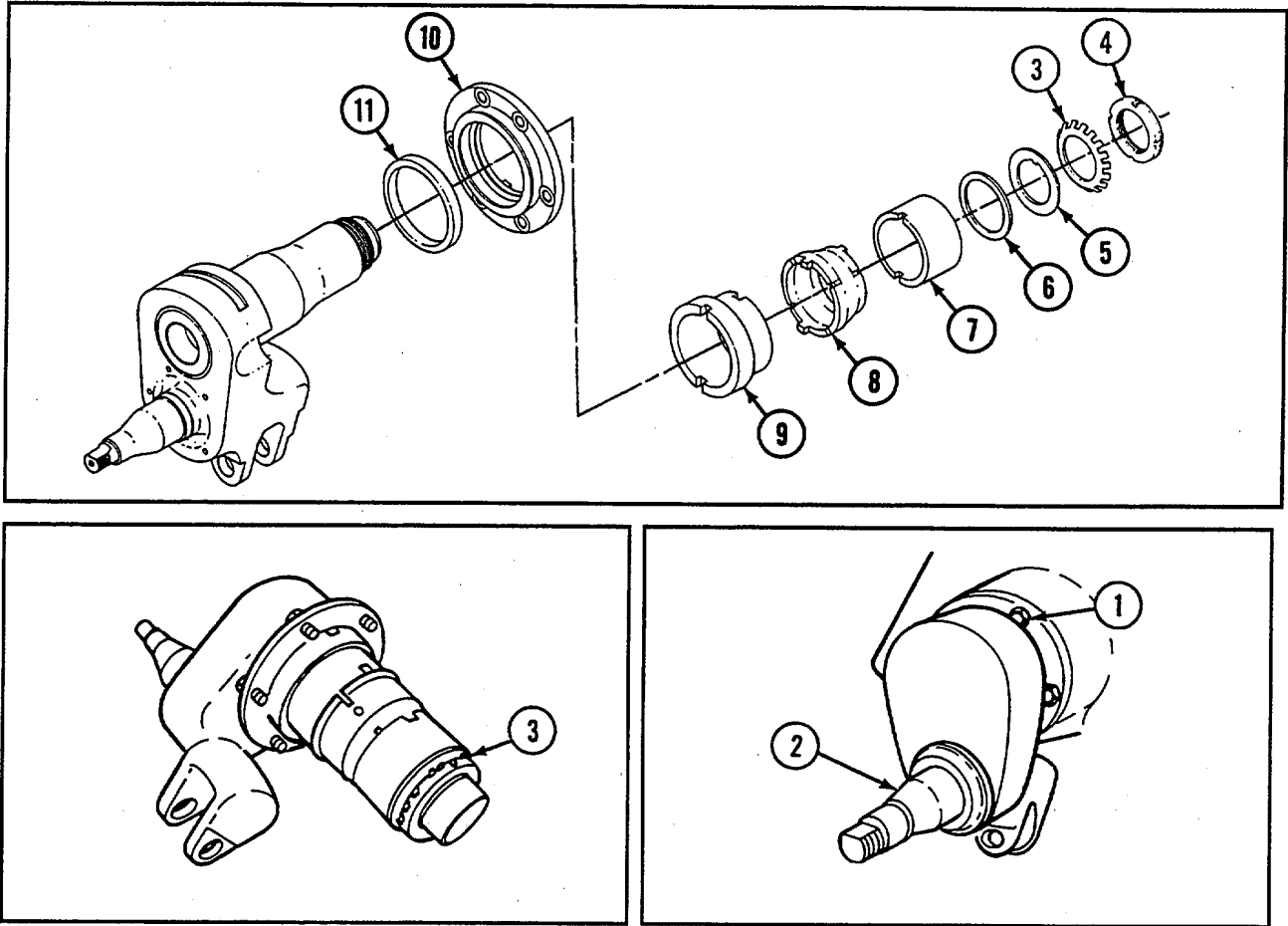


- 6 Install inner sleeve bearing (7), flat washer (6), and thrust bearing washer (5). Apply light coat of grease to mating surfaces.
- 7 Install new key washer (3) and round bearing nut (4). Tighten round bearing nut until bearings (7 and 9) cannot be turned. Then back off round bearing nut just enough so that inner and outer bearings will turn by hand 1 complete turn.
- 8 Fold back edges of key washer (3) to lock round bearing nut (4).

WARNING

Compensating idler arm is heavy, and may cause severe injury if dropped.

- 9 Install compensating idler arm (2) and six screws (1).



NOTE

Follow-on maintenance:

- Connect track (refer to TM 9-2350-256-10)
- Install compensating idler hub assembly and wheels and connect compensating idler link (see paragraph 8-8)
- Install roadwheel (see paragraph 8-1)

CHAPTER 8: MAINTENANCE OF SUSPENSION SYSTEM

8-10 REPLACE FINAL DRIVE SPROCKET AND HUB

THIS TASK COVERS

- a. Removal b. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Lifting sling assembly (Appendix C, item 46)
- Sling assembly (Appendix C, item 45)
- Jackscrews (3) (Appendix C, item 22)
- Multiplier, torque (Appendix C, item 27)
- Socket set (Appendix C, item 48)
- Wrench, torque, 0-175 lb-ft (0-237 N•m) (Appendix C, item 61)
- Wrench, torque, 0-600 lb-ft (0-813 N•m) (Appendix C, item 63)

Material:

Grease, GAA (Appendix D, item 13)

Reference:

TM 9-2350-256-10

Equipment Condition:

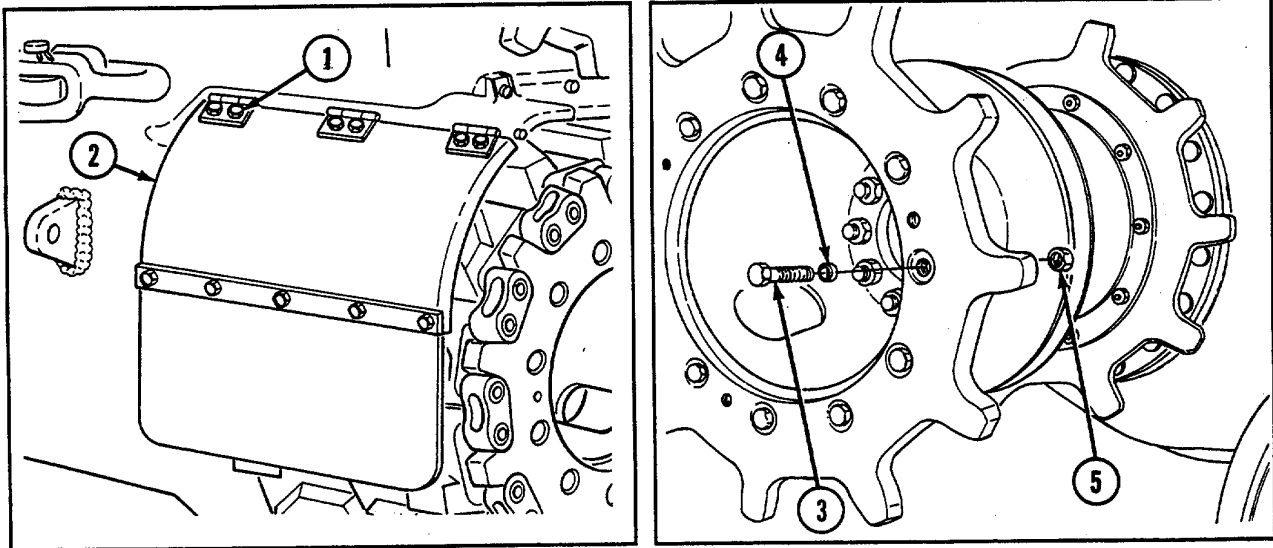
Track disconnected (refer to TM 9-2350-256-10)

a. REMOVAL

NOTE

Left and right track-drive hubs and sprockets are removed in the same manner.

- 1 Remove seven screws (1) (one screw is hidden) and remove hinged rear fender (2).
- 2 Remove 11 bolts (3), 11 bushings (4), and 11 nuts (5).



WARNING

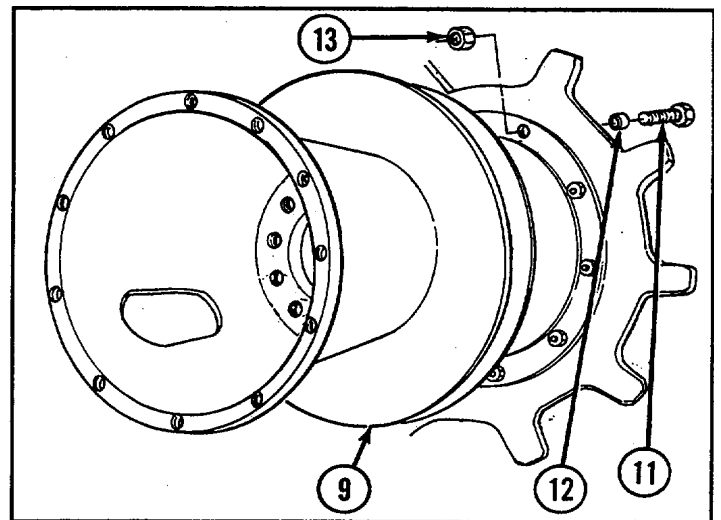
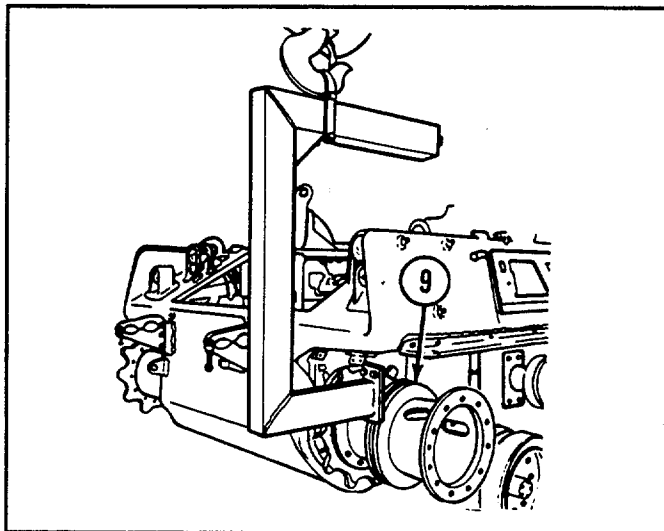
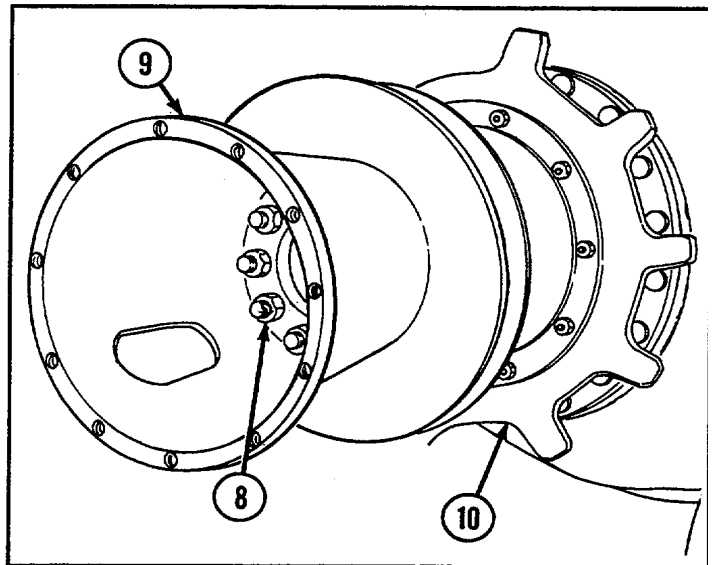
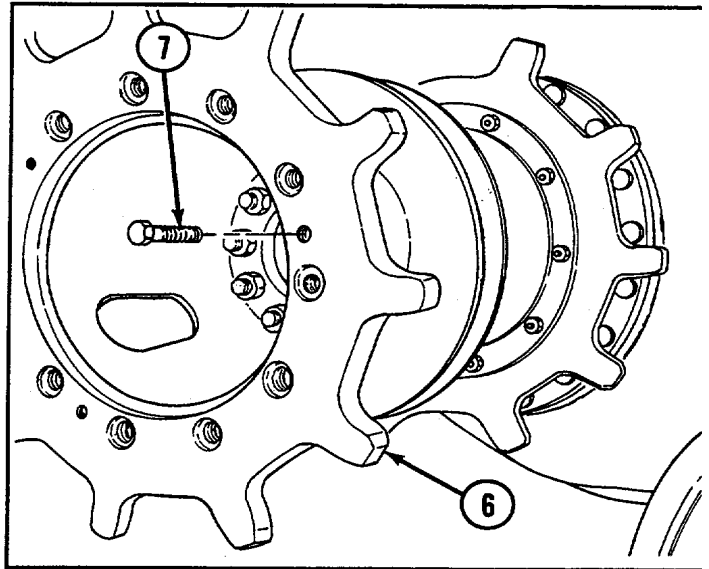
Sprocket is heavy. If sprocket is dropped, it may cause serious injury.

- 3 Remove outer sprocket (6) by installing three jackscrews (7) in three threaded holes. Tighten jackscrews evenly and remove sprocket.
- 4 Remove nine dowel nuts (8) from track-drive hub (9).

WARNING

All personnel are to stand clear of vehicle hull when lifting. Sling failure may cause severe injury or death.

- 5 Install lifting sling assembly and sling assembly on track-drive hub (9).
- 6 Remove dowel nut (8), track-drive hub (9), and inner sprocket (10).
- 7 Remove 11 bolts (11), 11 bushings (12), and 11 nuts (13).



8-10 REPLACE FINAL DRIVE SPROCKET AND HUB--Continued

WARNING

Sprocket is heavy. If sprocket is dropped, it may cause serious injury.

- Remove inner sprocket (10) by installing three jackscrews (14) in three holes provided. Tighten jackscrews evenly and remove sprocket.

b. INSTALLATION**WARNING**

Sprocket is heavy. If sprocket is dropped, it may cause serious injury.

- Install inner sprocket (10), 11 bushings (12), and 11 bolts (11) to track-drive hub (9). Torque bolts to 225-250 lb-ft (305-339 N•m).
- Lubricate threads of 11 bolts (11) and 11 nuts (13) with GAA grease and install nuts. Torque nuts to 70-90 lb-ft (95-122 N•m).

WARNING

All personnel are to stand clear of vehicle hull when lifting. Sling failure may cause severe injury or death.

- Install lifting sling assembly and sling assembly on track-drive hub (9).
- Loosely install track-drive hub (9) and sprocket (10) with dowel nut (8) to prevent track-drive hub from falling. Remove lifting sling assembly and sling assembly.

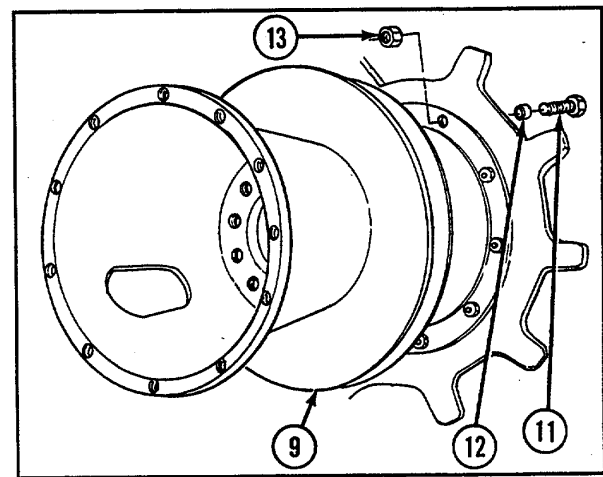
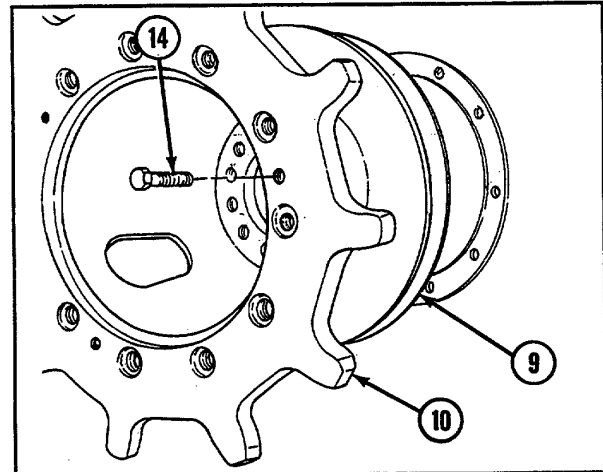
- Lubricate mating surfaces of flange on final drive and track-drive hub (9) with GAA grease.

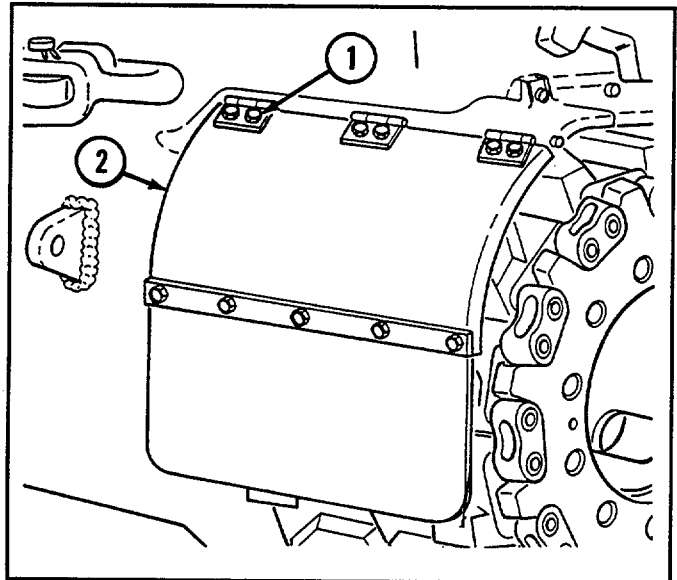
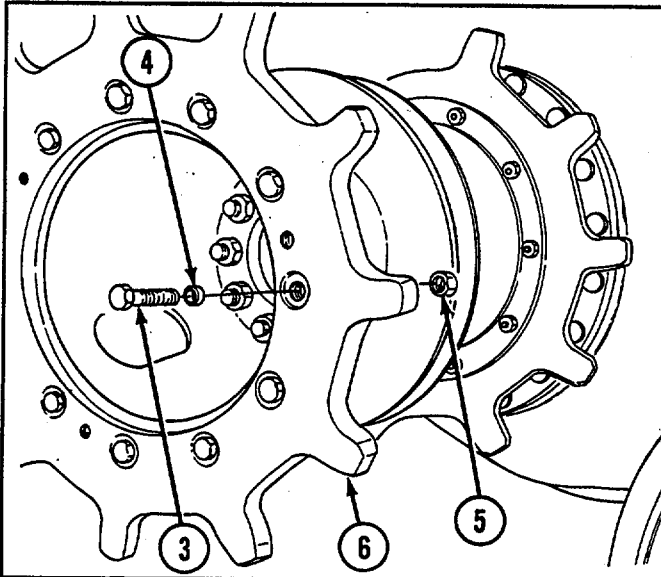
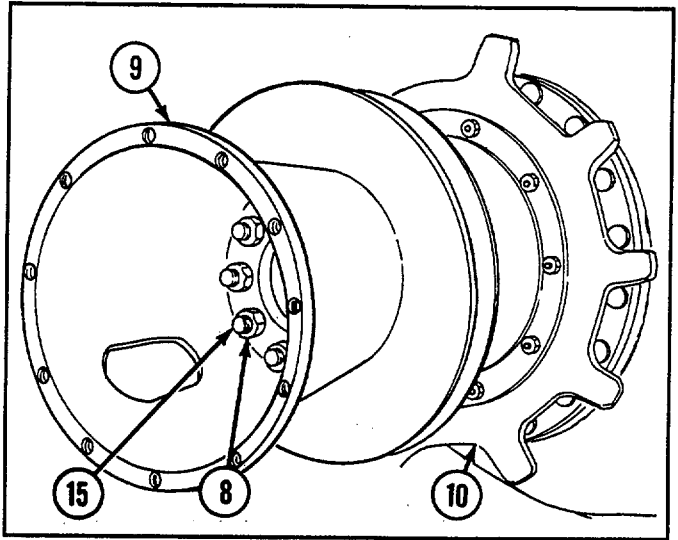
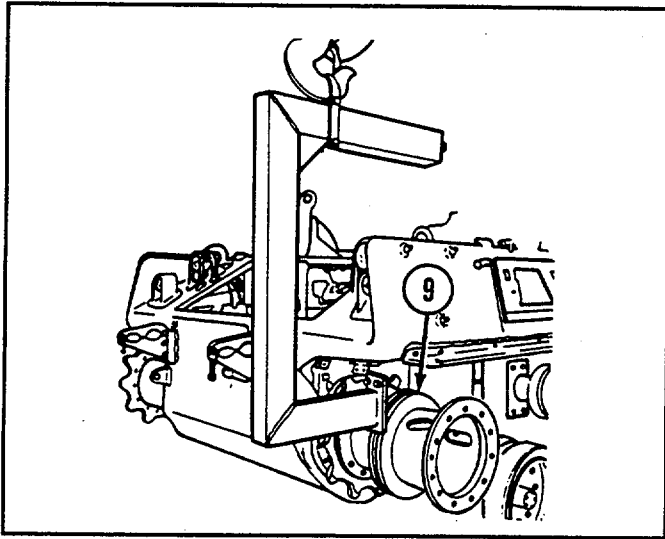
- Lubricate threads of 10 dowels (15) with GAA grease and install remaining dowel nuts (8). Torque dowel nuts to 450-470 lb-ft (610-637 N•m). Wait 3 minutes and retighten dowel nuts. Wait 1 minute and check torque again.

- Install outer sprocket (6), 11 bushings (4), and 11 bolts (3) to track-drive hub (9). Torque bolts to 225-250 lb-ft (305-339 N•m).

- Lubricate threads of 11 bolts (3) and 11 nuts (5) with GAA grease and install nuts. Torque nuts to 70-90 lb-ft (95-122 N•m).

- Install hinged rear fender (2) with seven screws (1).





NOTE

Follow-on maintenance:

Connect track (refer to TM 9-2350-256-10)

SECTION II: SPRINGS AND SHOCK ABSORBERS

Para.	Task	Page
8-11	Replace/Repair Bumper Springs and Brackets	8-36
8-12	Replace Shock Absorbers	8-37

8-11 REPLACE/REPAIR BUMPER SPRINGS AND BRACKETS

THIS TASK COVERS

- | | | | |
|------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
|------------|----------------|-------------|-----------------|

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Multiplier, torque (Appendix C, item 27)
- Socket set (Appendix C, item 48)
- Wrench, torque, 0-175 lb-ft (0-237 N•m) (Appendix C, item 61)

Tools-Continued:

- Wrench, torque, 0-00 lb-ft (0-813 N•m) (Appendix C, item 63)

Parts:

- Lockwashers (8) (Appendix G, item 136)
- Lockwashers (20) (Appendix G, item 147)

NOTE

Left and right bumpers are removed and installed in the same manner.

a. REMOVAL

WARNING

Bumper mounting is heavy. If bumper mounting bracket is dropped, it may cause serious injury.

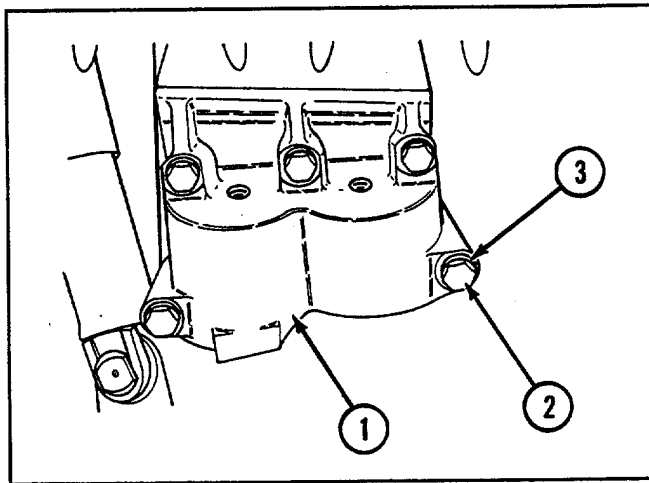
Remove bumper mounting bracket (1) by removing five bolts (2) and five lockwashers (3).

b. DISASSEMBLY

Remove two bumper springs (4), two bumper spring bolts (5), two lockwashers (6), and two flat washers (7).

c. ASSEMBLY

Install two bumper springs (4), and position two flat washers (7), two new lockwashers (6), and two spring bolts (5). Aline bumper springs to ensure maximum contact between bumper spring tappet and arm assembly. When alinement is complete, torque spring bolts to 150-170 lb-ft (203-230 N•m).

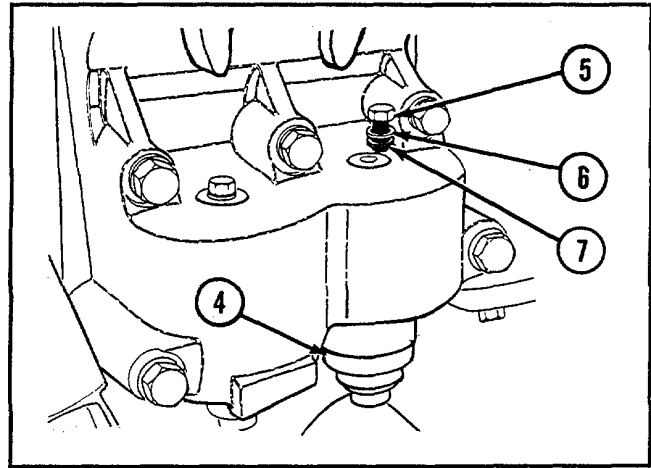


d. INSTALLATION

WARNING

Bumper mounting bracket is heavy. If bumper mounting bracket is dropped, it may cause serious injury.

Install bumper mounting bracket (1) with five bolts (2) and five new lockwashers (3). Torque bolts to 350-400 lb-ft (475-542 N•m).

**8-12 REPLACE SHOCK ABSORBERS****THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Multiplier, torque (Appendix C, item 27)
- Socket set (Appendix C, item 48)
- Wrench, torque 0-175 lb-ft (0-237 Nom) (Appendix C, item 61)

Tools-Continued:

- Wrench, torque 0-600 lb-ft (0-813 N-m) (Appendix C, item 63)

Parts:

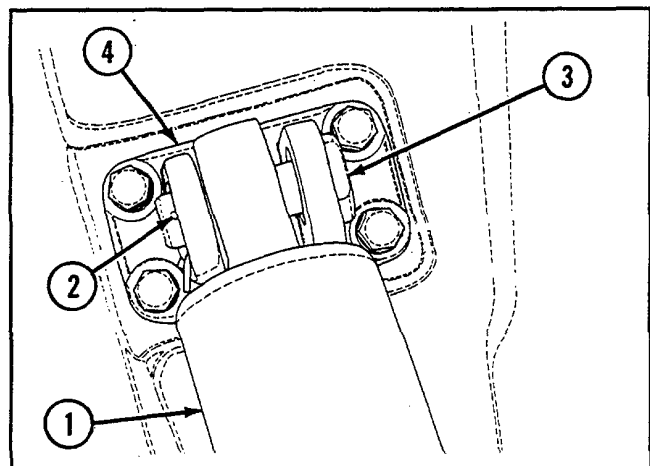
- Lockwashers (24) (Appendix G, item 145)
- Lockwashers (24) (Appendix G, item 146)
- Pins, cotter (12) (Appendix G, item 222)

a. REMOVAL

WARNING

Ensure track is blocked to prevent vehicle from rolling while performing suspension maintenance. If vehicle is not blocked, it may cause serious injury or death.

- 1 Remove top of shock absorber (1) by removing cotter pin (2) and straight pin (3) from upper bracket (4).

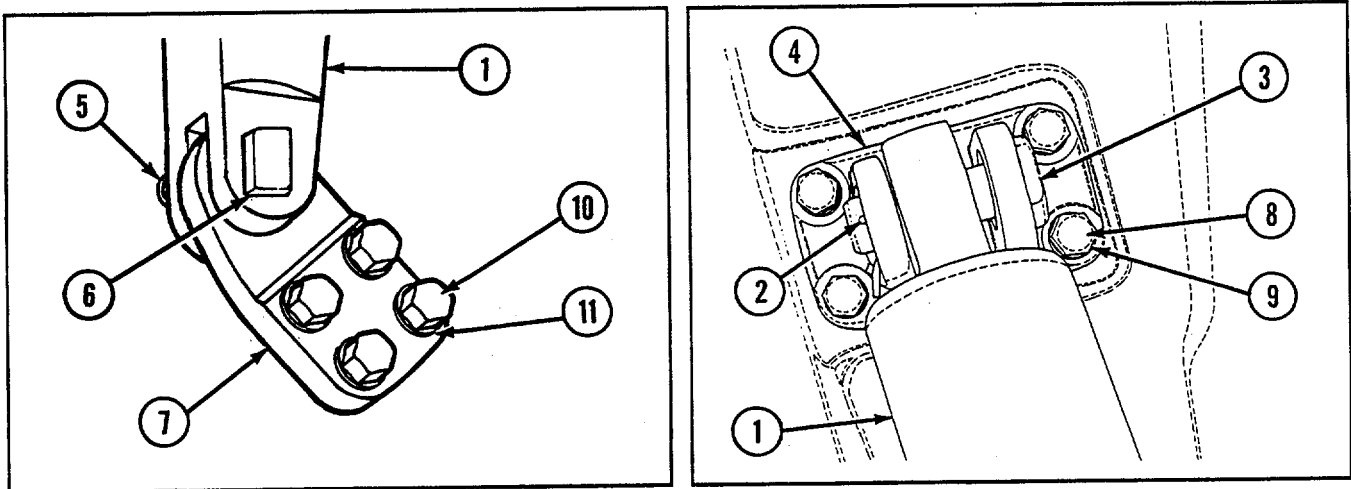


8-12 REPLACE SHOCK ABSORBERS-Continued

WARNING

Shock absorber is heavy. If shock absorber is dropped, it may cause serious injury.

- 2 Remove bottom of shock absorber (1) by removing cotter pin (5) and straight pin (6) from lower bracket (7).
- 3 Remove upper bracket (4) by removing four screws (8) and four lockwashers (9).
- 4 Remove lower bracket (7) by removing four screws (10) and four lockwashers (11).

**b. INSTALLATION****WARNING**

Ensure track is blocked to prevent vehicle from rolling while performing suspension maintenance. If vehicle is not blocked, it may cause serious injury or death.

- 1 Install lower bracket (7) with four screws (10) and four new lockwashers (11). Torque screws to 300-340 lb-ft (407-461 N•m).

WARNING

Shock absorber is heavy. If shock absorber is dropped, it may cause serious injury.

NOTE

Ensure that slotted side of bottom of shock absorber (1) end faces toward centerline of vehicle.

- 2 Install upper bracket (4) with four screws (8) and four new lockwashers (9). Torque screws to 145-175 lb-ft(197-237 N•m).
- 3 Install bottom of shock absorber (1) on lower bracket (7) with straight pin (6) and new cotter pin (5).
- 4 Install top of shock absorber (1) on upper bracket (4) with straight pin (3) and new cotter pin (2).

**CHAPTER 9
MAINTENANCE OF HULL- AND CAB-RELATED COMPONENTS**

CHAPTER OVERVIEW

This chapter describes how to remove, disassemble, clean, inspect, repair, paint, adjust, aline, assemble, and install hull- and cab-related components.

This chapter consists of the following sections:

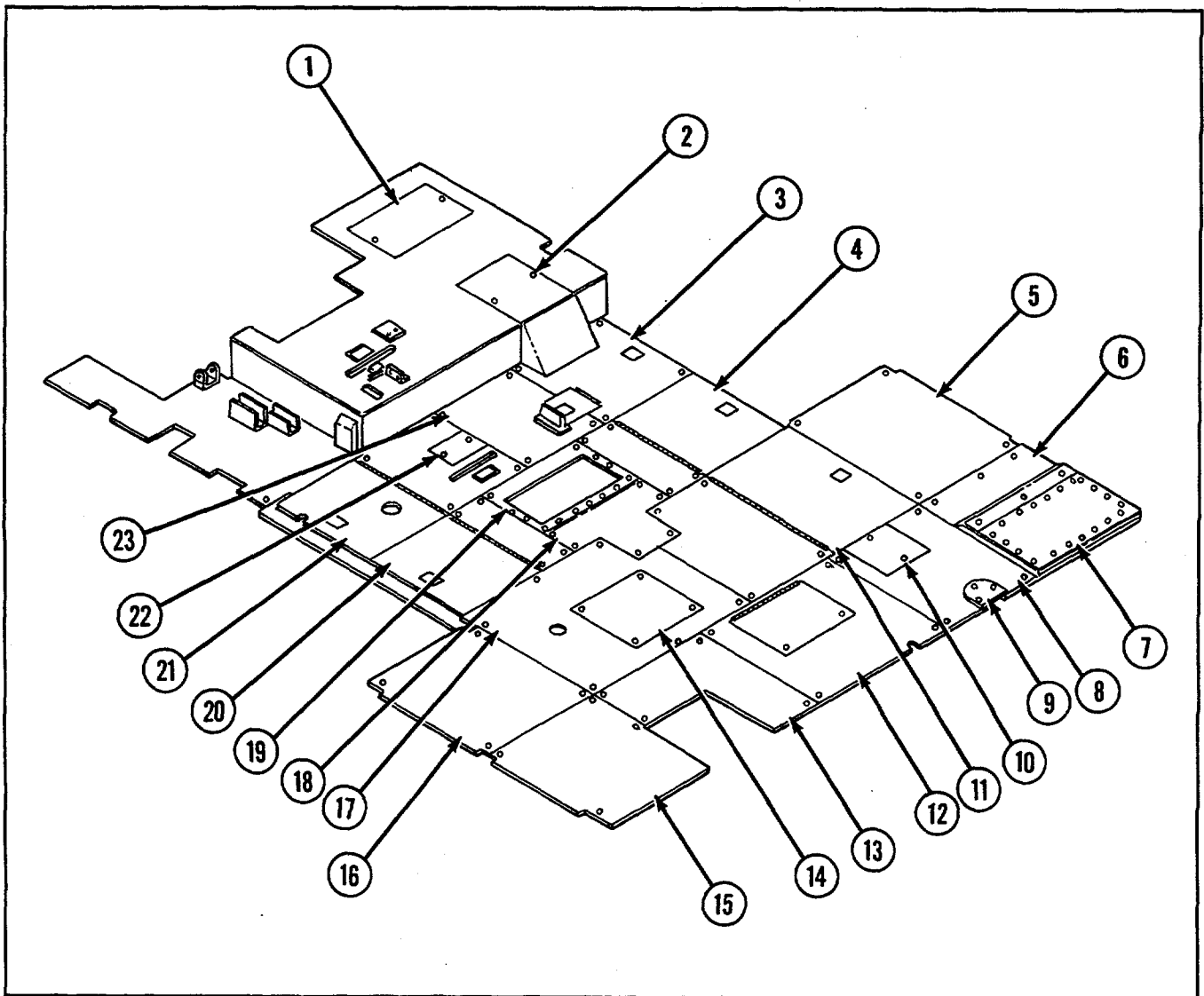
	Page
Section I: Cab Subfloor Plates and Supports	9-1
Section II: Hull and Cab Components	9-31
Section III: Engine Deck, Covers, Grilles, and Doors	9-83
Section IV: Seat Assemblies	9-109
Section V: Controls and Linkages	9-135
Section VI: Exterior Stowage	9-209
Section VII: Interior Stowage	9-223

SECTION I: CAB SUBFLOOR PLATES AND SUPPORTS

Para.	Task	Page
9-1	Replace Right-Front Access Floor Plate	9-3
9-2	Replace Right-Front Floor Plate Rear Access.....	9-4
9-3	Replace Hydraulic Valve Forward Right Floor Plate	9-5
9-4	Replace U-35 Winch Center Right Floor Plate	9-6
9-5	Replace Intermediate Rear Right Floor Plate.....	9-7
9-6	Replace Rear Right-Side Floor Plate	9-8
9-7	Replace Hydraulic Connections Access Cover	9-9
9-8	Replace Rear Intermediate Right Floor Plate	9-10
9-9	Replace Rear Intermediate Right Access Cover	9-11
9-10	Replace Rear Intermediate Right Access Floor Plate	9-12
9-11	Replace Hydraulic Line Intermediate Rear Right Center Floor Plate	9-13
9-12	Replace/Repair Rear Center Floor Plate	9-14
9-13	Replace Rear Left-Side Intermediate Floor Plate	9-15
9-14	Replace Fuel Transmitter Center Left Floor Access Plate	9-16
9-15	Replace Rear Left-Side Floor Plate	9-17
9-16	Replace Intermediate Rear Left-Side Floor Plate.....	9-18
9-17	Replace Intermediate Rear Left-Center Floor Plate	9-19
9-18	Replace Center Rear Floor Plate	9-20
9-19	Replace Center Forward Floor Plate	9-21
9-20	Replace Intermediate Rear Left Access Floor Plate	9-22
9-21	Replace/Repair Stowage Basket Forward Intermediate Left Floor Plate	9-23
9-22	Replace/Repair Floor and Light Mount Plate	9-26
9-23	Replace Hydraulic Valve Forward Intermediate Right Floor Plate.....	9-27
9-24	Replace Front Subfloor Support	9-28
9-25	Replace Center and Rear Subfloor Support	9-29

CAB SUBFLOOR PLATES-SCHEMATIC DIAGRAM:

- | | |
|---|--|
| 1 Right-front access floor plate (see paragraph 9-1) | 14 Fuel transmitter center left floor access plate (see paragraph 9-14) |
| 2 Right-front floor plate rear access (see paragraph 9-2) | 15 Rear left-side floor plate (see paragraph 9-15) |
| 3 Hydraulic valve forward right floor plate (see paragraph 9-3) | 16 Intermediate rear left-side floor plate (see paragraph 9-16) |
| 4 U-35 winch center right floor plate (see paragraph 9-4) | 17 Intermediate rear left-center floor plate (see paragraph 9-17) |
| 5 Intermediate rear right floor plate (see paragraph 9-5) | 18 Center rear floor plate (see paragraph 9-18) |
| 6 Rear right-side floor plate (see paragraph 9-6) | 19 Center forward floor plate (see paragraph 9-19) |
| 7 Hydraulic connections access cover (see paragraph 9-7) | 20 Intermediate rear left access floor plate (see paragraph 9-20) |
| 8 Rear intermediate right floor plate (see paragraph 9-8) | 21 Stowage basket forward intermediate left floor plate (see paragraph 9-21) |
| 9 Rear intermediate right access cover (see paragraph 9-9) | 22 Floor and light mount plate (see paragraph 9-22) |
| 10 Rear intermediate right access floor plate (see paragraph 9-10) | 23 Hydraulic valve forward intermediate right floor plate (see paragraph 9-23) |
| 11 Hydraulic line intermediate rear right center floor plate (see paragraph 9-11) | |
| 12 Rear center floor plate (see paragraph 9-12) | |
| 13 Rear left-side intermediate floor plate (see paragraph 9-13) | |



9-1 REPLACE RIGHT-FRONT ACCESS FLOOR PLATE**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP

Tools:

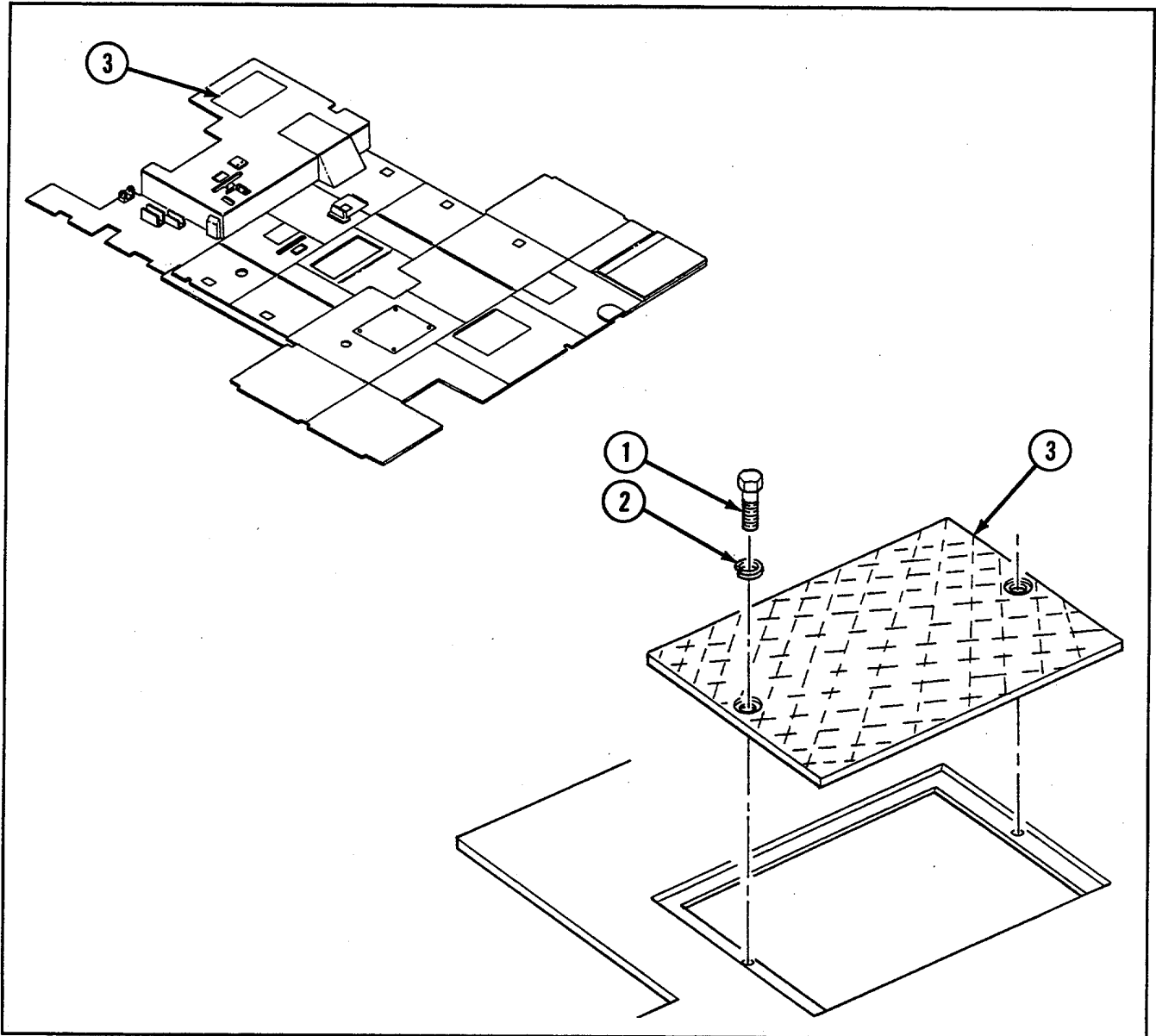
Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Lockwashers (2) (Appendix G, item 118)

a. REMOVAL

Remove two screws (1), two lockwashers (2), and floor plate (3).

**b. INSTALLATION**

Install floor plate (3) with two new lockwashers (2) and two screws (1).

9-2 REPLACE RIGHT-FRONT FLOOR PLATE REAR ACCESS**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP

Tools:

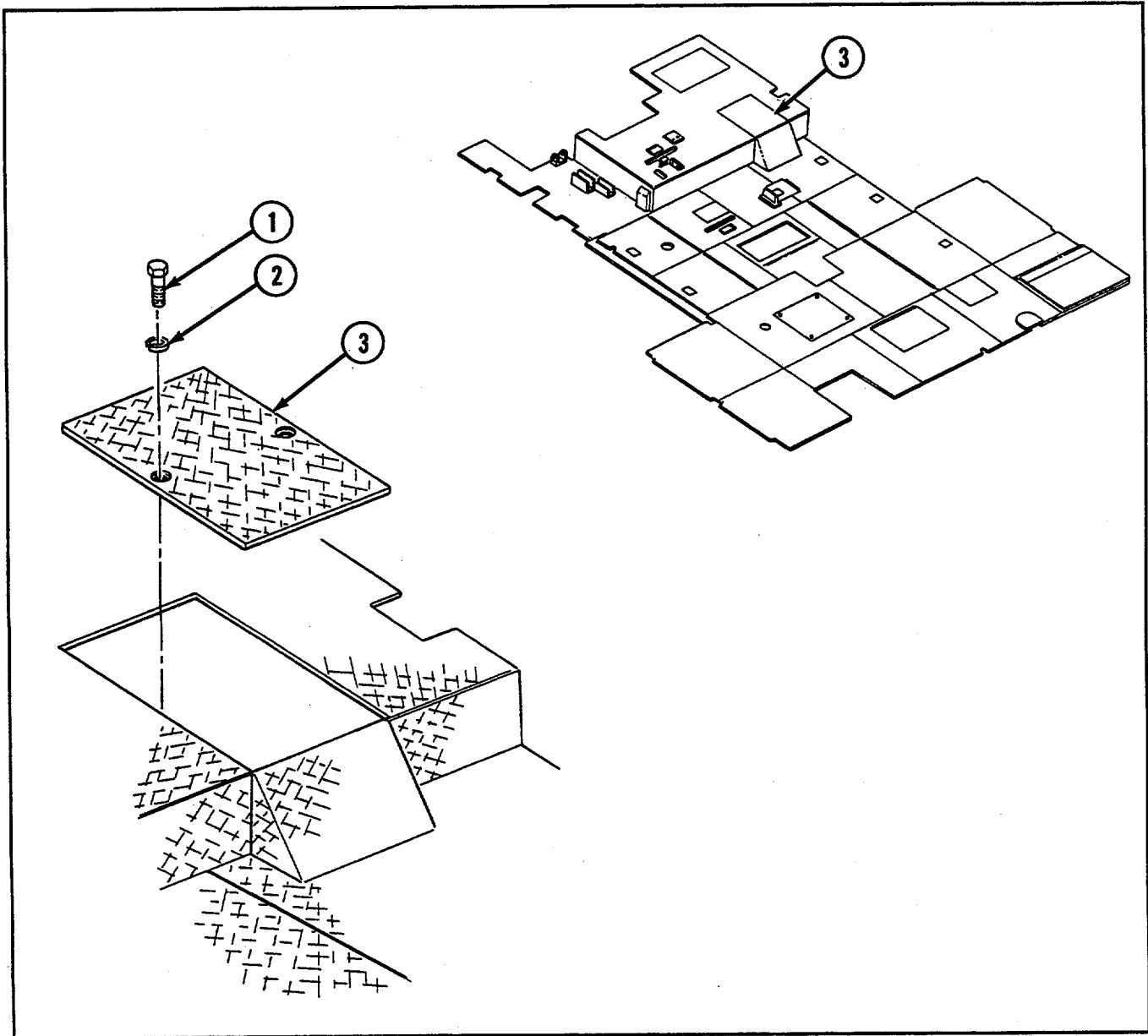
Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Lockwashers (2) (Appendix G, item 118)

a. REMOVAL

Remove two screws (1), two lockwashers (2), and floor plate (3).

**b. INSTALLATION**

Install floor plate (3) with two new lockwashers (2) and two screws (1).

9-3 REPLACE HYDRAULIC VALVE FORWARD RIGHT FLOOR PLATE**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP

Tools:

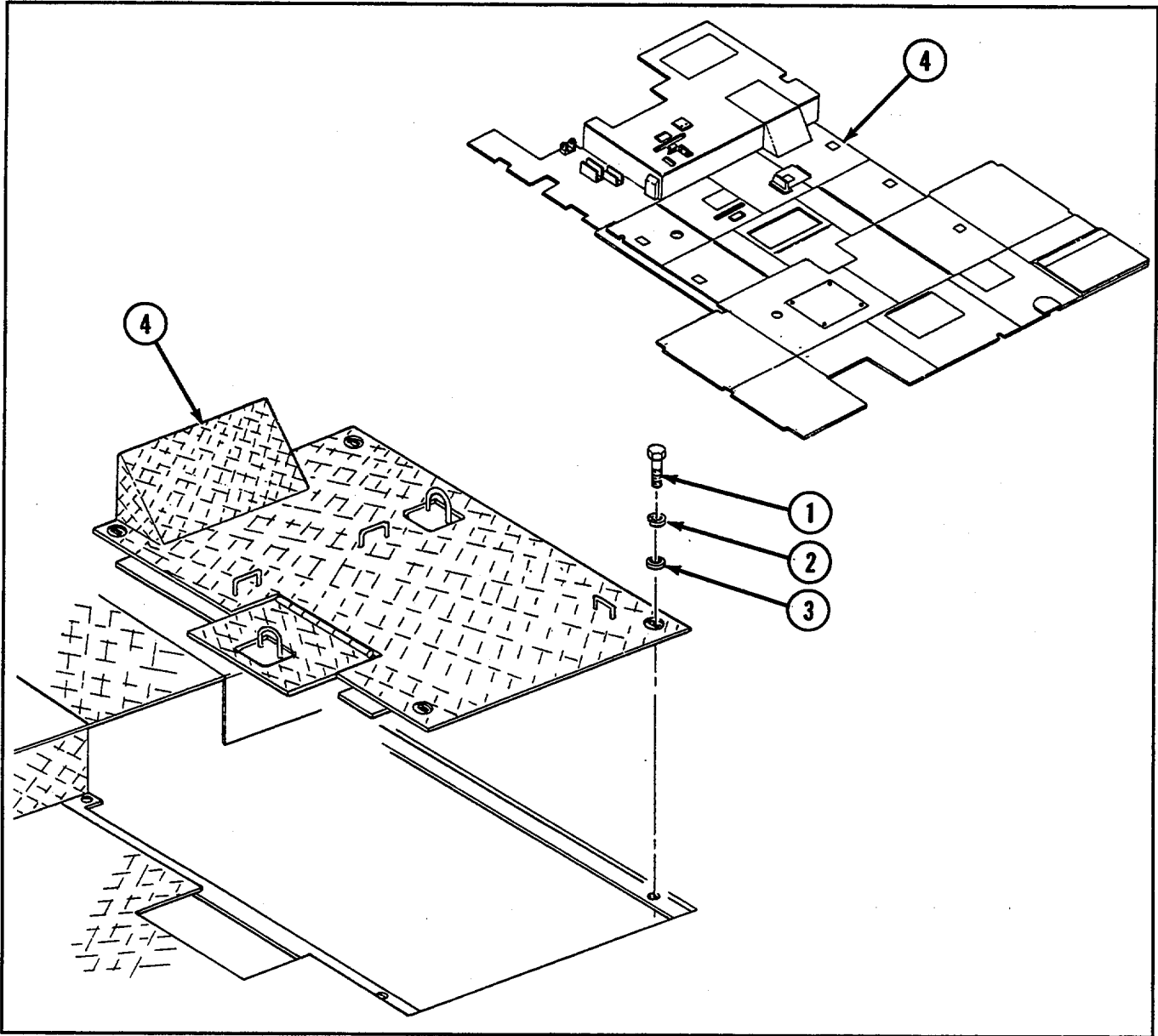
Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Lockwashers (4) (Appendix G, item 118)

a. REMOVAL

Remove four screws (1), four lockwashers (2), four flat washers (3), and floor plate (4).

**b. INSTALLATION**

Install floor plate (4) with four flat washers (3), four new lockwashers (2), and four screws (1).

9-4 REPLACE U-35 WINCH CENTER RIGHT FLOOR PLATE**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

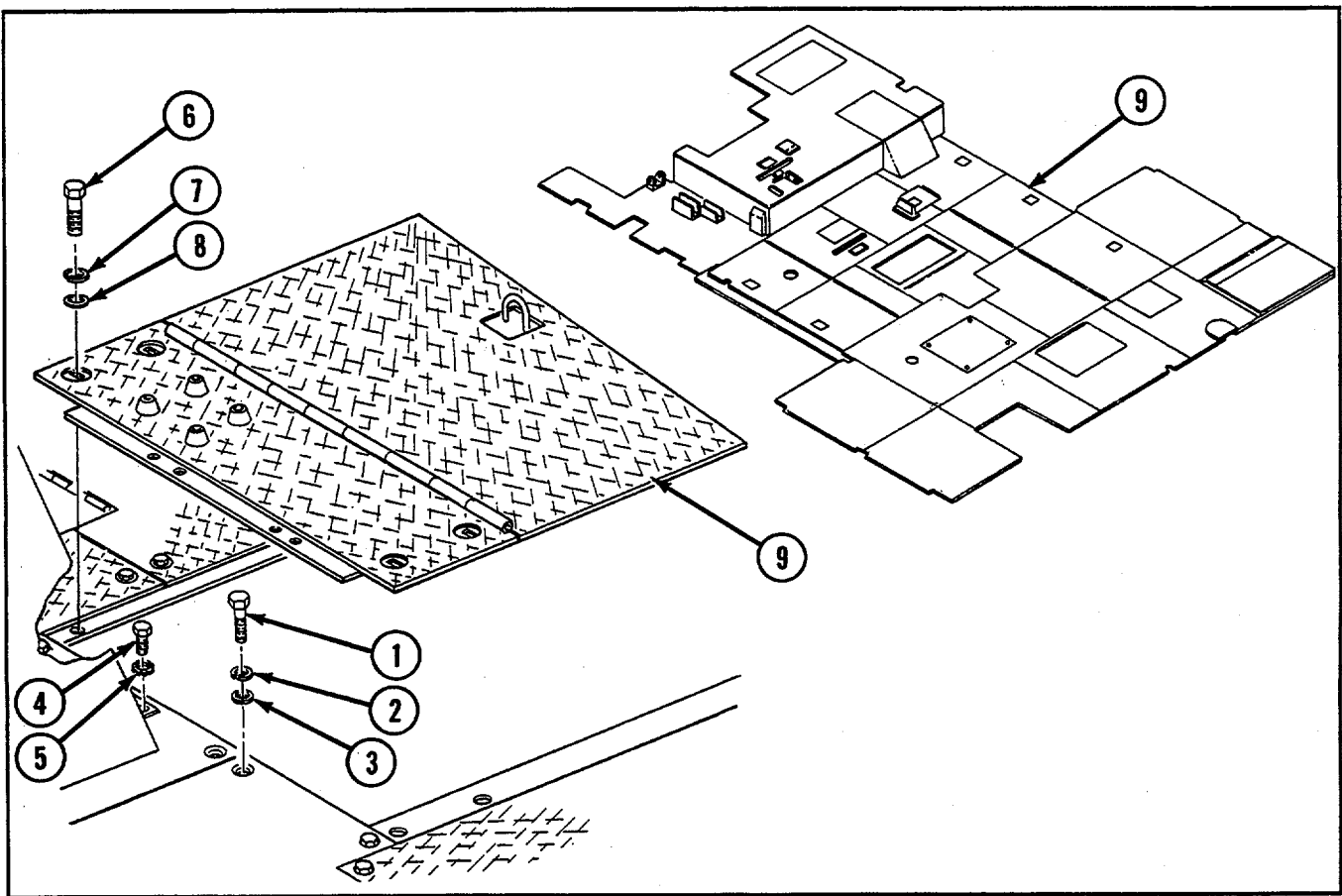
Lockwashers (8) (Appendix G,
item 118)

Equipment Condition:

Floor-mounted bracket
removed (see paragraph 9-106)

a. REMOVAL

- 1 Remove two screws (1), two lockwashers (2), and two flat washers (3).
- 2 Remove two screws (4) and two lockwashers (5).
- 3 Remove four screws (6), four lockwashers (7), four flat washers (8), and floor plate (9).

**b. INSTALLATION**

- 1 Install floor plate (9) with four flat washers (8), four new lockwashers (7), and four screws (6).
- 2 Install two new lockwashers (5) and two screws (4).
- 3 Install two screws (1), two new lockwashers (2), and two flat washers (3).

NOTE

Follow-on maintenance:

Install floor-mounted bracket (see paragraph 9-106)

9-5 REPLACE INTERMEDIATE REAR RIGHT FLOOR PLATE**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP**Tools:**

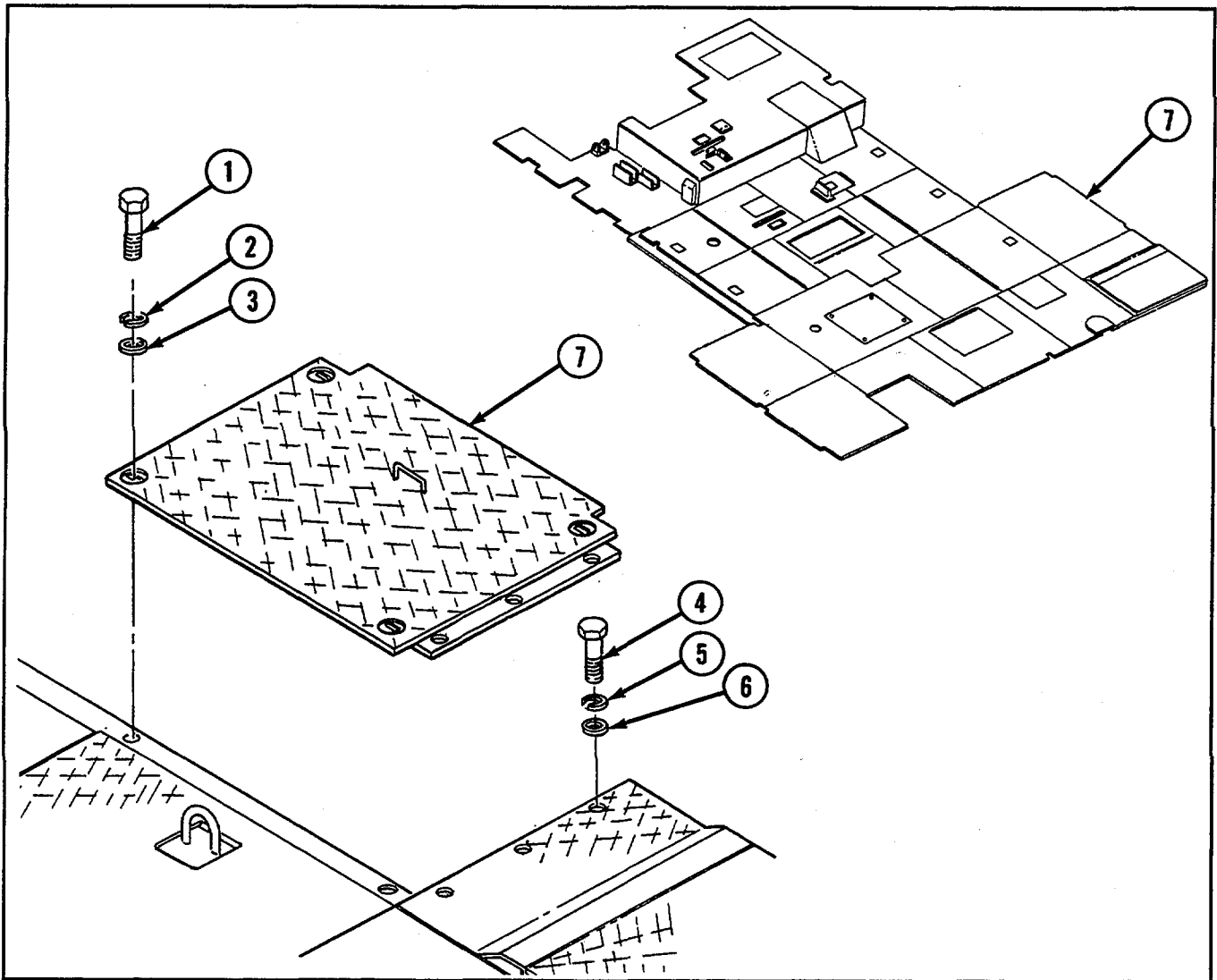
Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Lockwashers (7) (Appendix G, item 118)

a. REMOVAL

- 1 Remove four screws (1), four lockwashers (2), and four flat washers (3).
- 2 Remove three screws (4), three lockwashers (5), three flat washers (6), and floor plate (7).

**b. INSTALLATION**

- 1 Install floor plate (7) with four flat washers (3), four new lockwashers (2), and four screws (1).
- 2 Install three flat washers (6), three new lockwashers (5), and three screws (4).

9-6 REPLACE REAR RIGHT-SIDE FLOOR PLATE**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP

Tools:

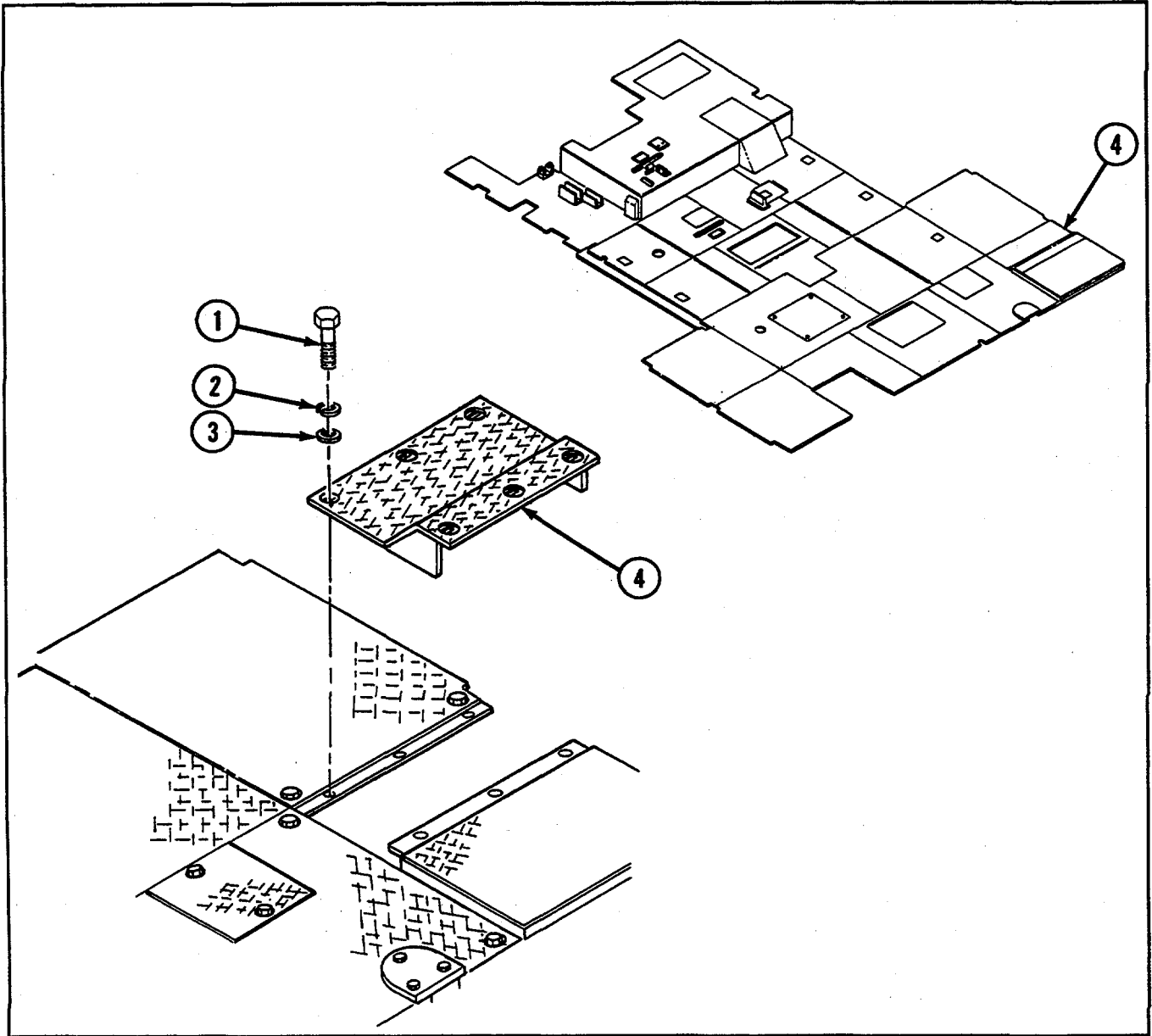
Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Lockwashers (6) (Appendix G, item 118)

a. REMOVAL

Remove six screws (1), six lockwashers (2), six flat washers (3), and floor plate (4).

**b. INSTALLATION**

Install floor plate (4) with six flat washers (3), six new lockwashers (2), and six screws (1).

9-7 REPLACE HYDRAULIC CONNECTIONS ACCESS COVER**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP

Tools:

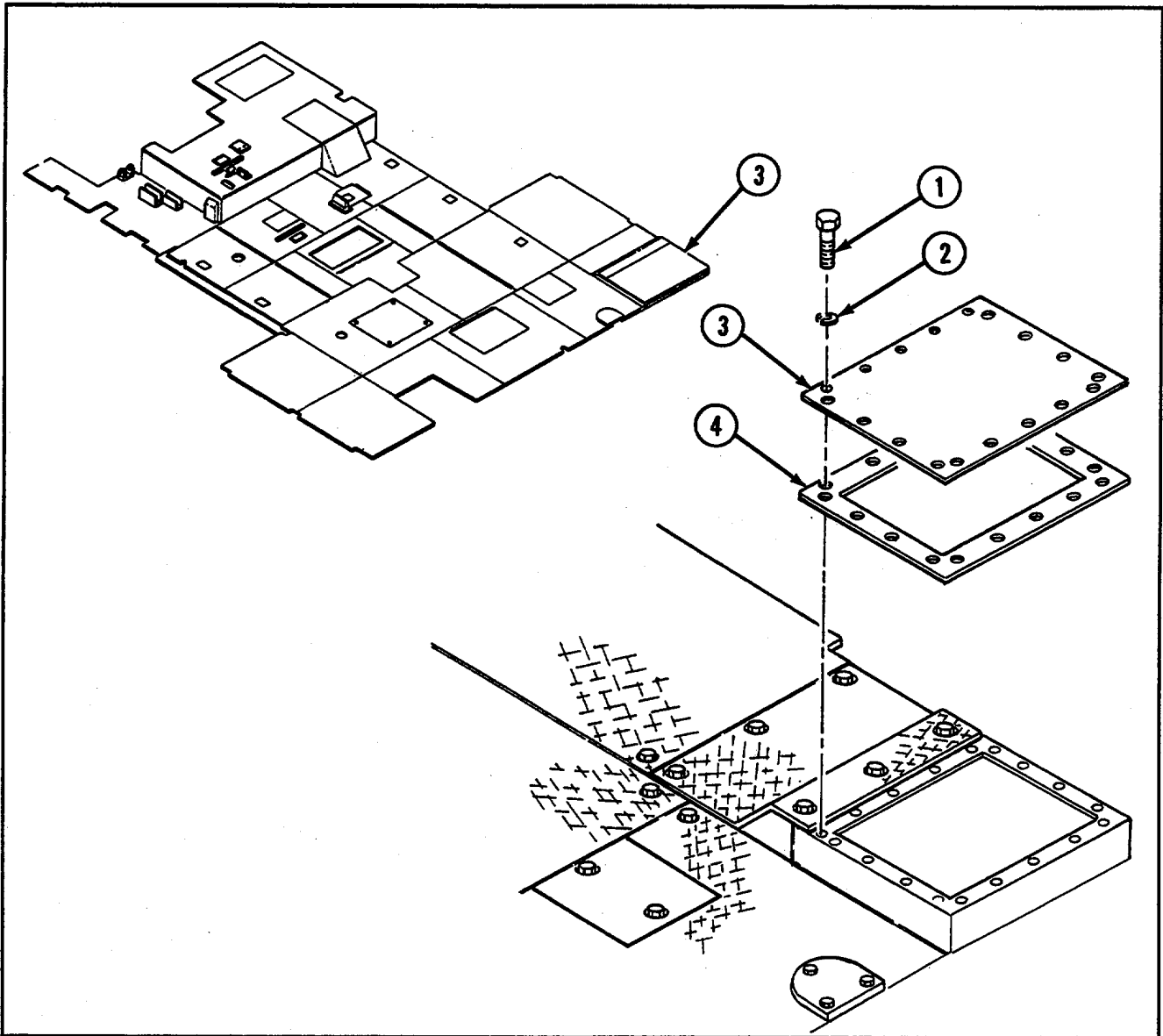
Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Lockwashers (18) (Appendix G, item 255)
- Seal (Appendix G, item 116)

a. REMOVAL

Remove 18 screws (1), 18 lockwashers (2), access cover (3), and seal (4).

**b. INSTALLATION**

Install new seal (4) and access cover (3) with 18 new lockwashers (2) and 18 screws (1).

9-8 REPLACE REAR INTERMEDIATE RIGHT FLOOR PLATE**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

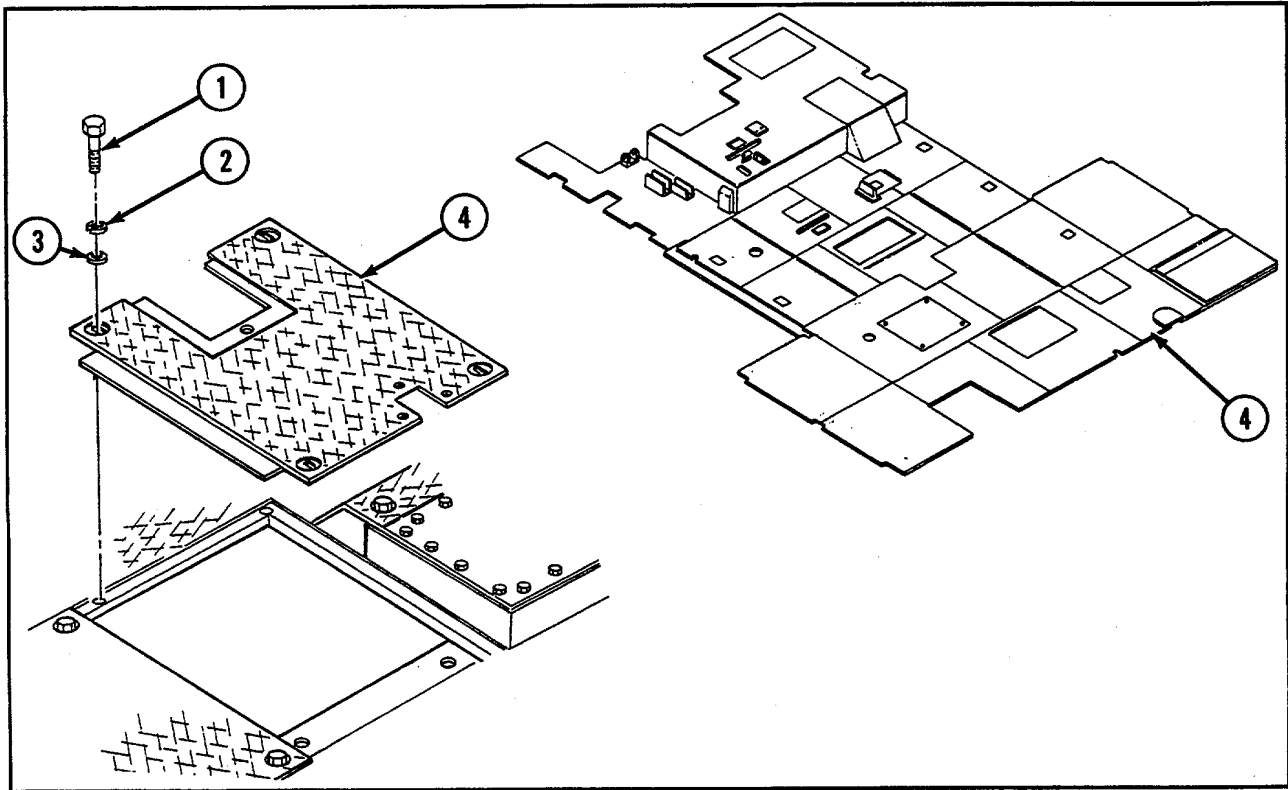
Lockwashers (4) (Appendix G, item 118)

Equipment Conditions:

- Rear intermediate right access cover removed (see paragraph 9-9)
- Rear intermediate right access floor plate removed (see paragraph 9-10)
- Rear center floor plate removed (see paragraph 9-12)
- Personnel heater removed (see paragraph 10-1)

a. REMOVAL

Remove four screws (1), four lockwashers (2), four flat washers (3), and floor plate (4).

**b. INSTALLATION**

Install floor plate (4) with four flat washers (3), four new lockwashers (2), and four screws (1).

NOTE**Follow-on maintenance:**

- Install personnel heater (see paragraph 10-1)
- Install rear center floor plate (see paragraph 9-12)
- Install rear intermediate right access floor plate (see paragraph 9-10)
- Install rear intermediate right access cover (see paragraph 9-9)

9-9 REPLACE REAR INTERMEDIATE RIGHT ACCESS COVER**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP

Tools:

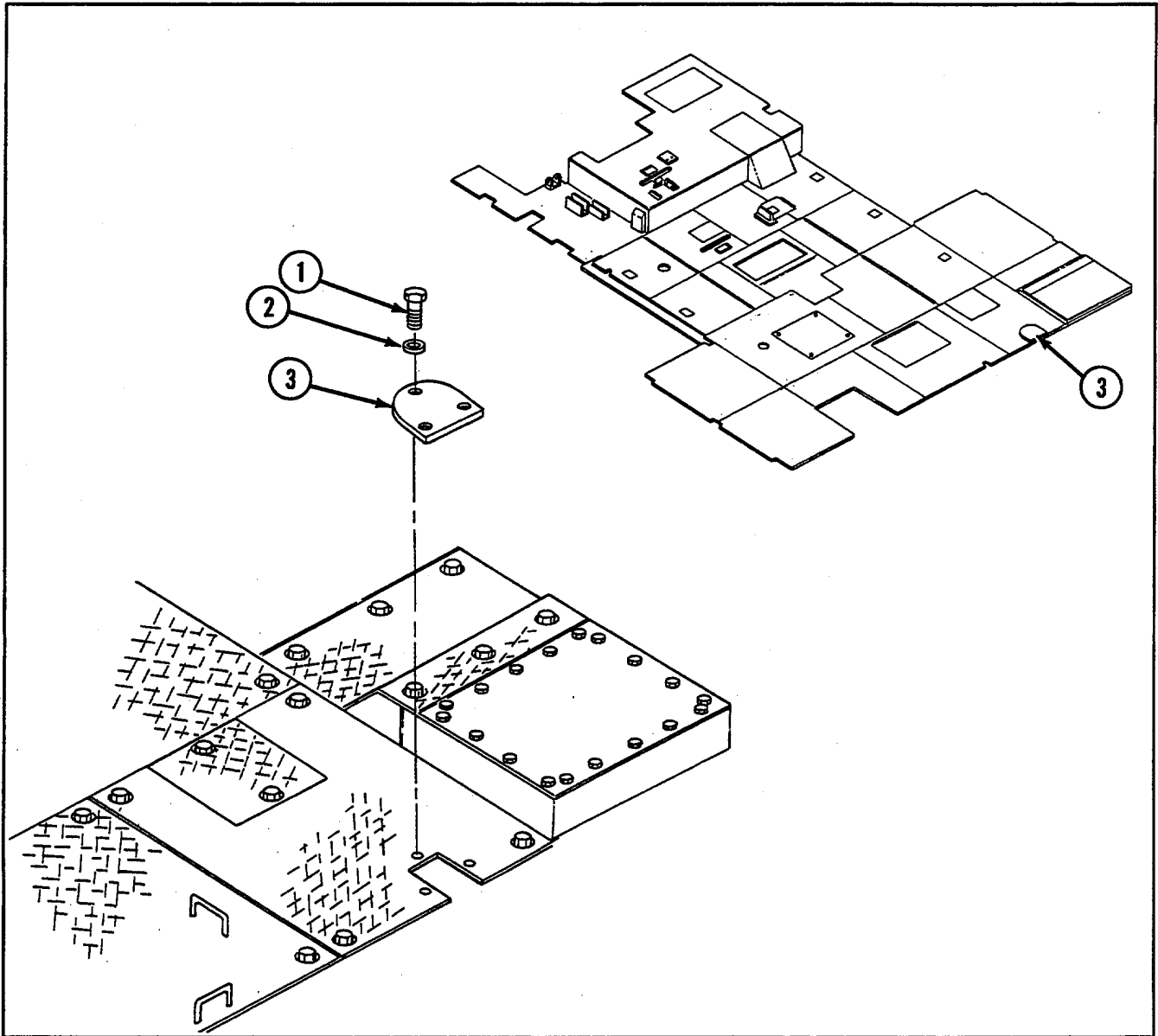
Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Lockwashers (3) (Appendix G, item 116)

a. REMOVAL

Remove three screws (1), three lockwashers (2), and access cover (3).

**b. INSTALLATION**

Install access cover (3) with three new lockwashers (2) and three screws (1).

9-10 REPLACE REAR INTERMEDIATE RIGHT ACCESS FLOOR PLATE**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP**Tools:**

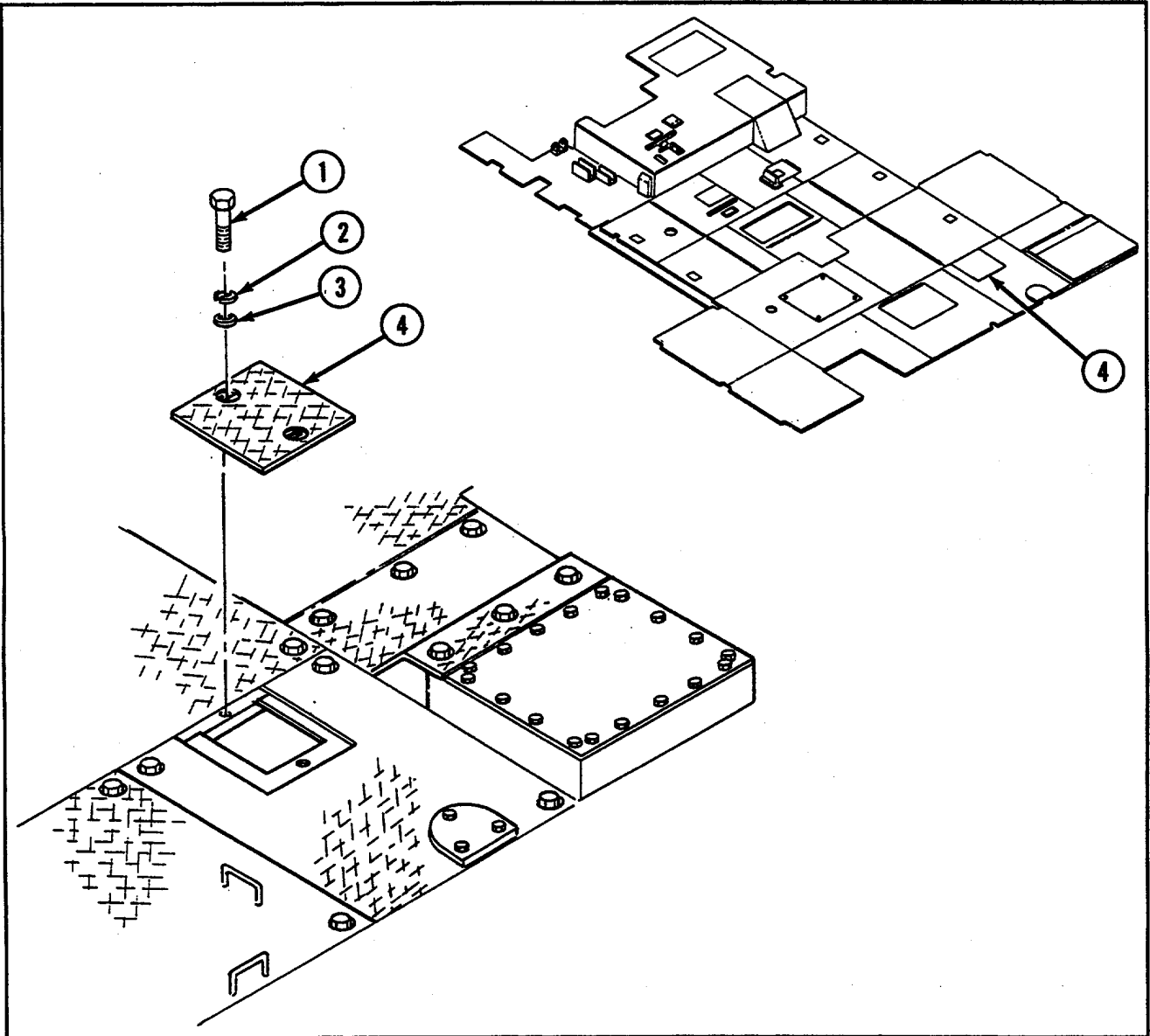
Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Lockwashers (2) (Appendix G, item 118)

a. REMOVAL

Remove two screws (1), two lockwashers (2), two flat washers (3), and floor plate (4).

**b. INSTALLATION**

Install floor plate (4) with two flat washers (3), two new lockwashers (2), and two screws (1).

9-11 REPLACE HYDRAULIC LINE INTERMEDIATE REAR RIGHT CENTER FLOOR PLATE

THIS TASK COVERS

- a. Removal b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

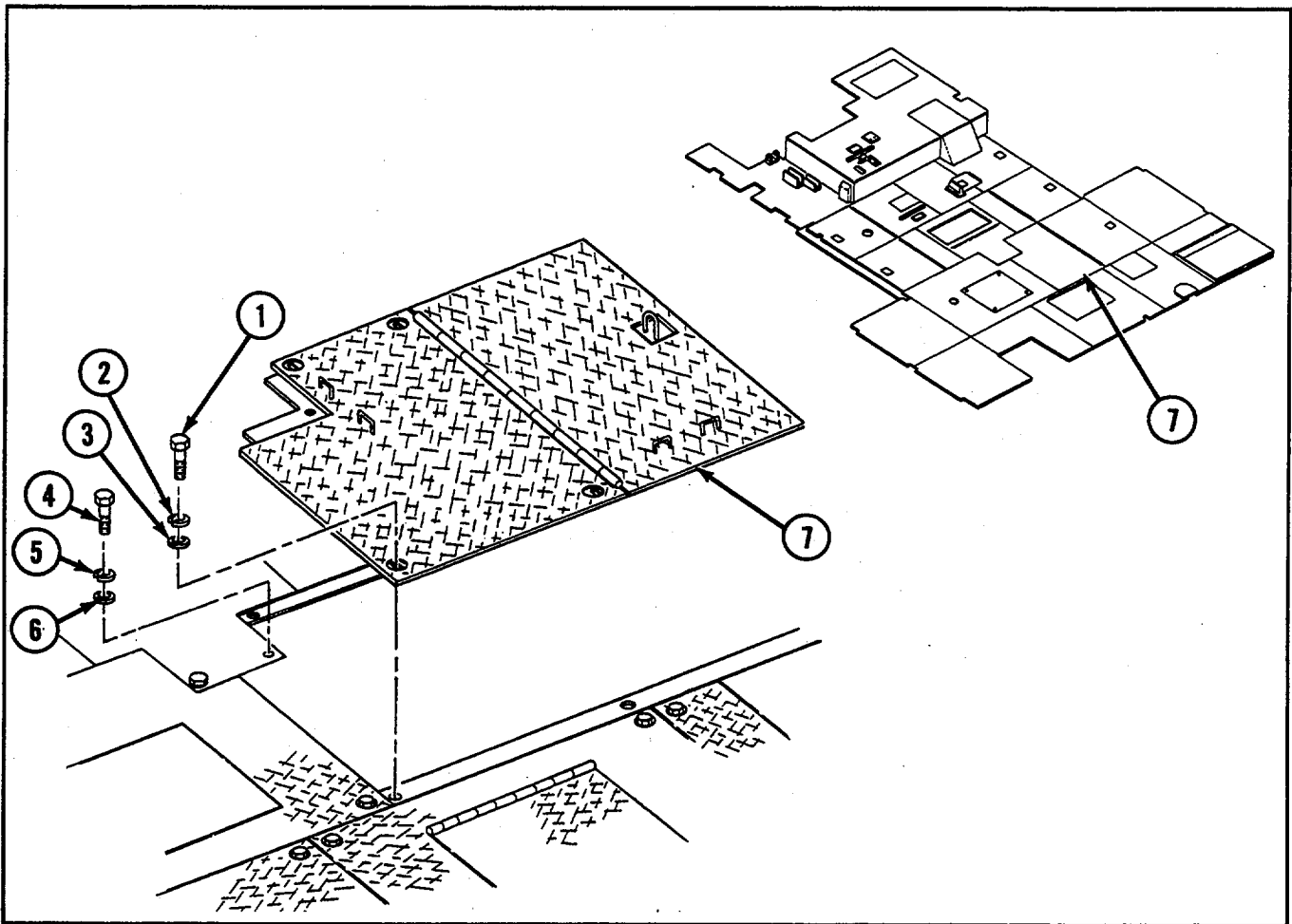
Lockwashers (5) (Appendix G,
item 118)

Equipment Condition:

Center rear floor plate removed
(see paragraph 9-18)

a. REMOVAL

- 1 Remove four screws (1), four lockwashers (2), and four flat washers (3).
- 2 Remove screw (4), lockwasher (5), flat washer (6), and floor plate (7).

**b. INSTALLATION**

- 1 Install floor plate (7) with four flat washers (3), four new lockwashers (2), and four screws (1).
- 2 Install flat washer (6), new lockwasher (5), and screw (4).

NOTE

Follow-on maintenance:

Install center rear floor plate (see paragraph 9-18)

9-12 REPLACE/REPAIR REAR CENTER FLOOR PLATE**THIS TASK COVERS**

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

Lockwashers (6) (Appendix G,
item 118)

Equipment Condition:

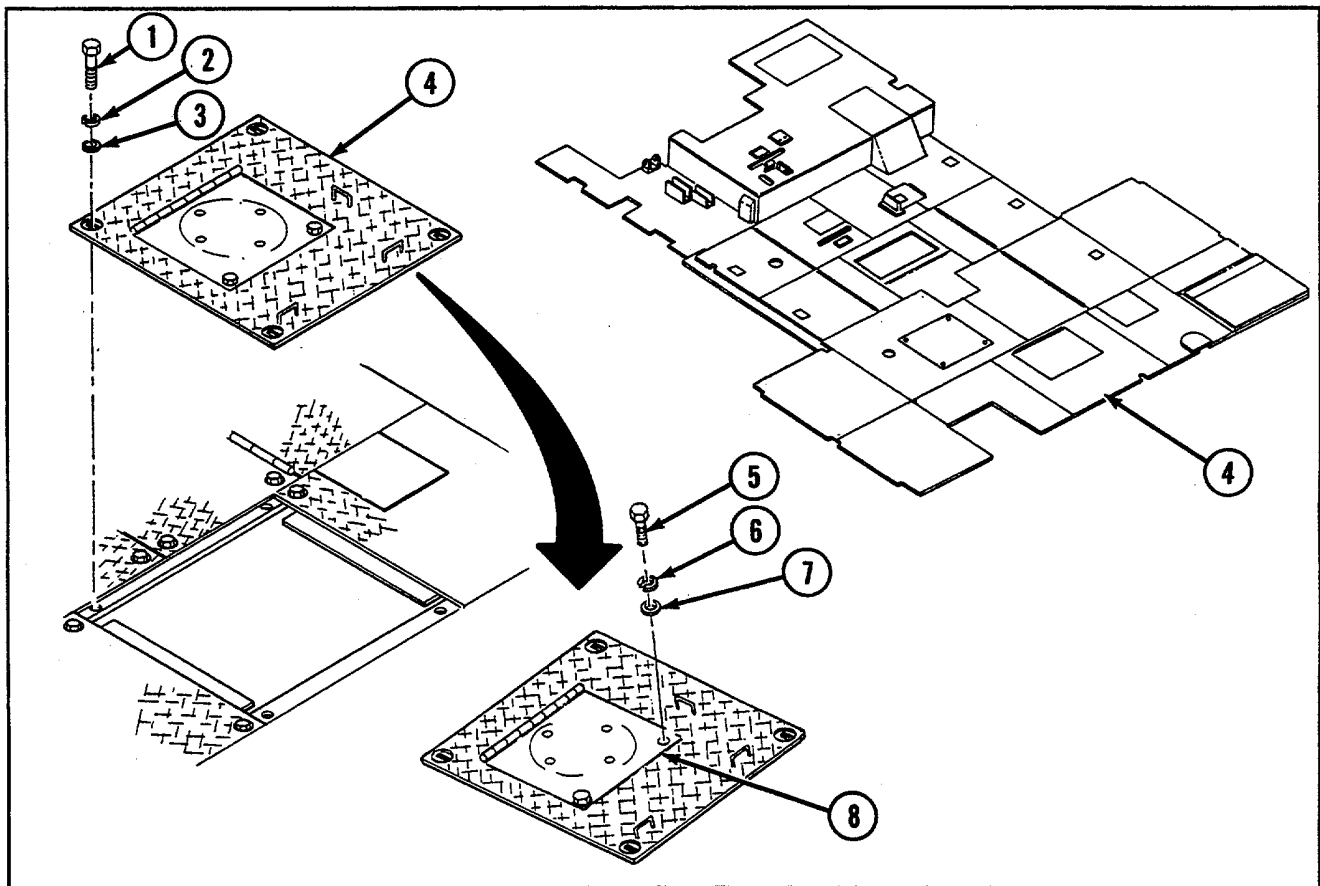
Mechanic's seat removed (see
paragraph 9-67)

a. REMOVAL

Remove four screws (1), four lockwashers (2), four flat washers (3), and floor plate (4).

b. DISASSEMBLY

Remove two screws (5), two flat washers (6), and two lockwashers (7) from mechanic's seat door (8).

**c. ASSEMBLY**

Secure mechanic's seat door (8) with two new lockwashers (7), two flat washers (6), and two screws (5).

d. INSTALLATION

Install floor plate (4) with four flat washers (3), four new lockwashers (2), and four screws (1).

NOTE

Follow-on maintenance:

Install mechanic's seat (see paragraph 9-67)

9-13 REPLACE REAR LEFT-SIDE INTERMEDIATE FLOOR PLATE**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

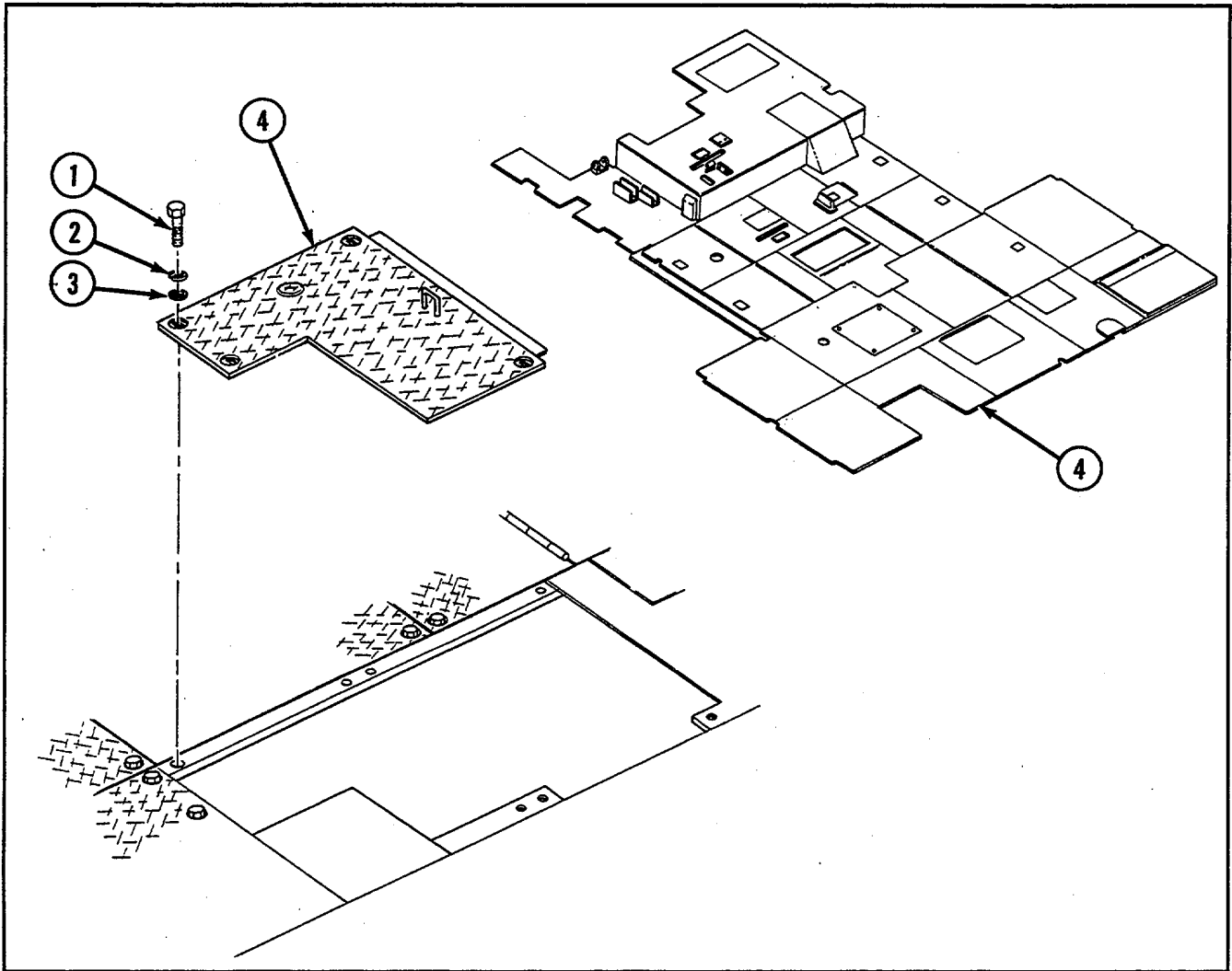
Lockwashers (4) (Appendix G,
item 118)

Equipment Condition:

Rear center floor plate removed
(see paragraph 9-12)

a. REMOVAL

Remove four screws (1), four lockwashers (2), four flat washers (3), and floor plate (4).

**b. INSTALLATION**

Install floor plate (4) with four flat washers (3), four new lockwashers (2), and four screws (1).

NOTE

Follow-on maintenance:

Install rear center floor plate (see paragraph 9-12)

9-14 REPLACE FUEL TRANSMITTER CENTER LEFT FLOOR ACCESS PLATE**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP

Tools:

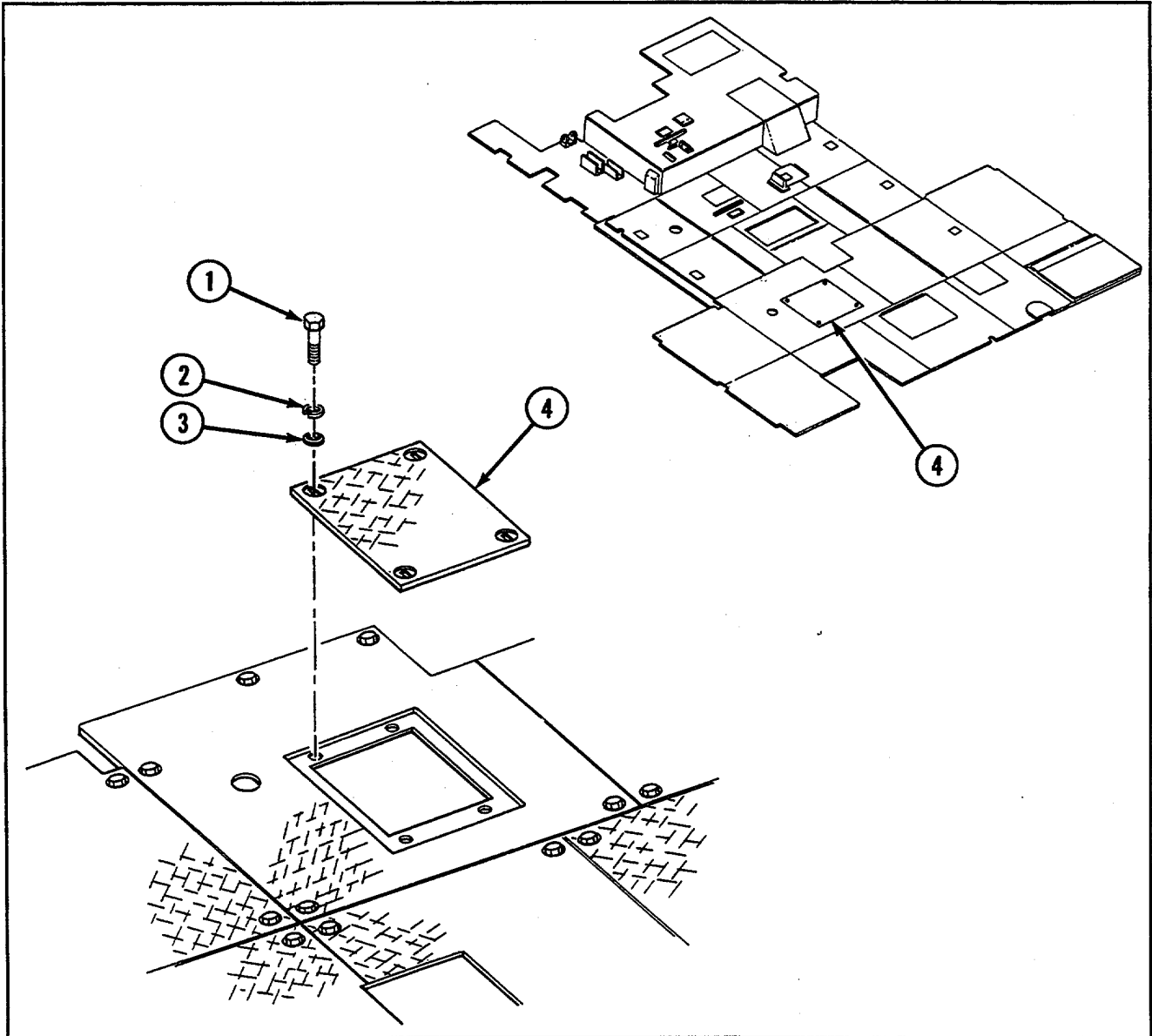
Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Lockwashers (4) (Appendix G, item 118)

a. REMOVAL

Remove four screws (1), four lockwashers (2), four flat washers (3), and floor plate (4).

**b. INSTALLATION**

Install floor plate (4) with four flat washers (3), four new lockwashers (2), and four screws (1).

9-15 REPLACE REAR LEFT-SIDE FLOOR PLATE**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP

Tools:

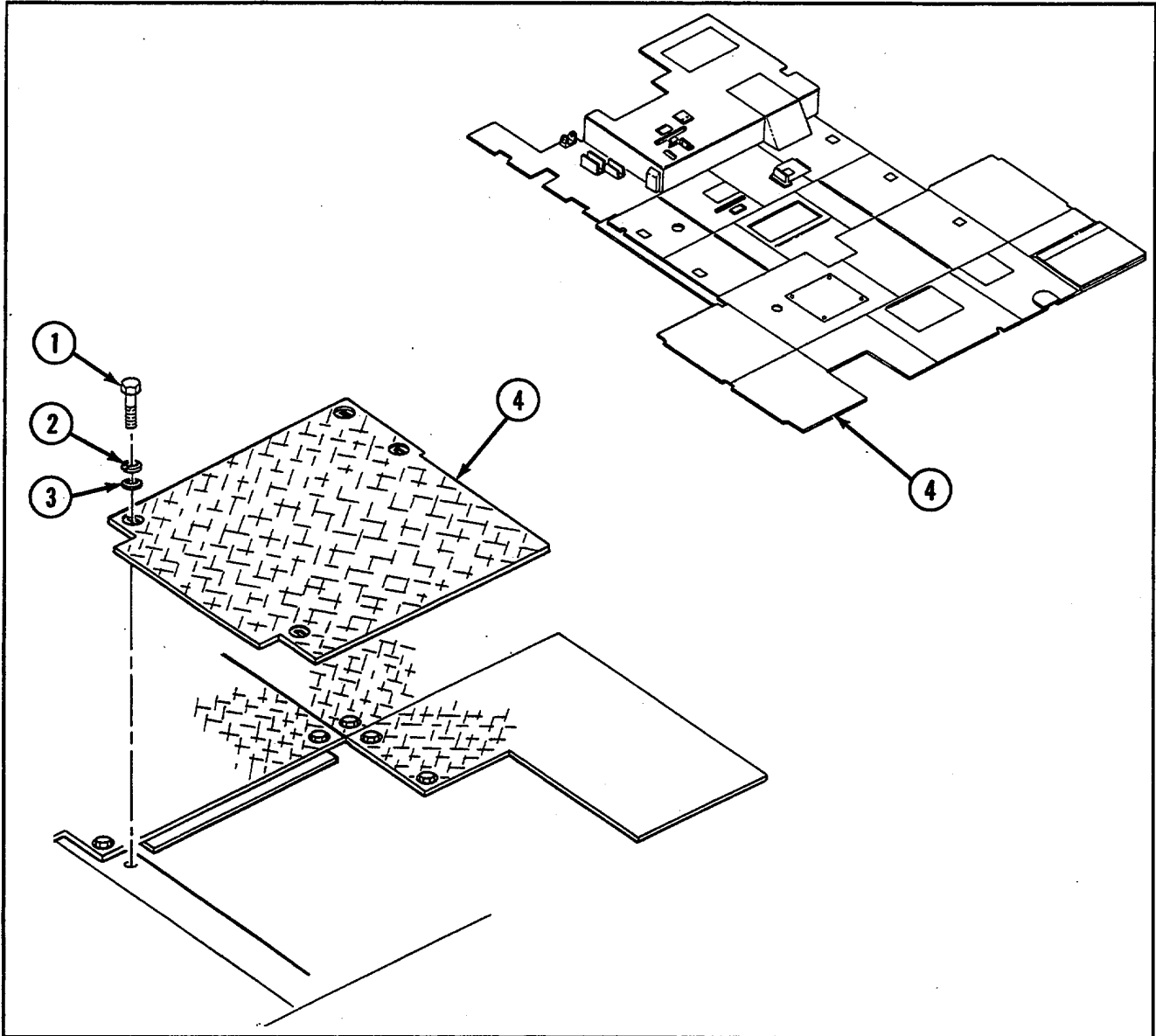
Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Lockwashers (4) (Appendix G, item 118)

a. REMOVAL

Remove four screws (1), four lockwashers (2), four flat washers (3), and floor plate (4).

**b. INSTALLATION**

Install floor plate (4) with four flat washers (3), four new lockwashers (2), and four screws (1).

9-16 REPLACE INTERMEDIATE REAR LEFT-SIDE FLOOR PLATE**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

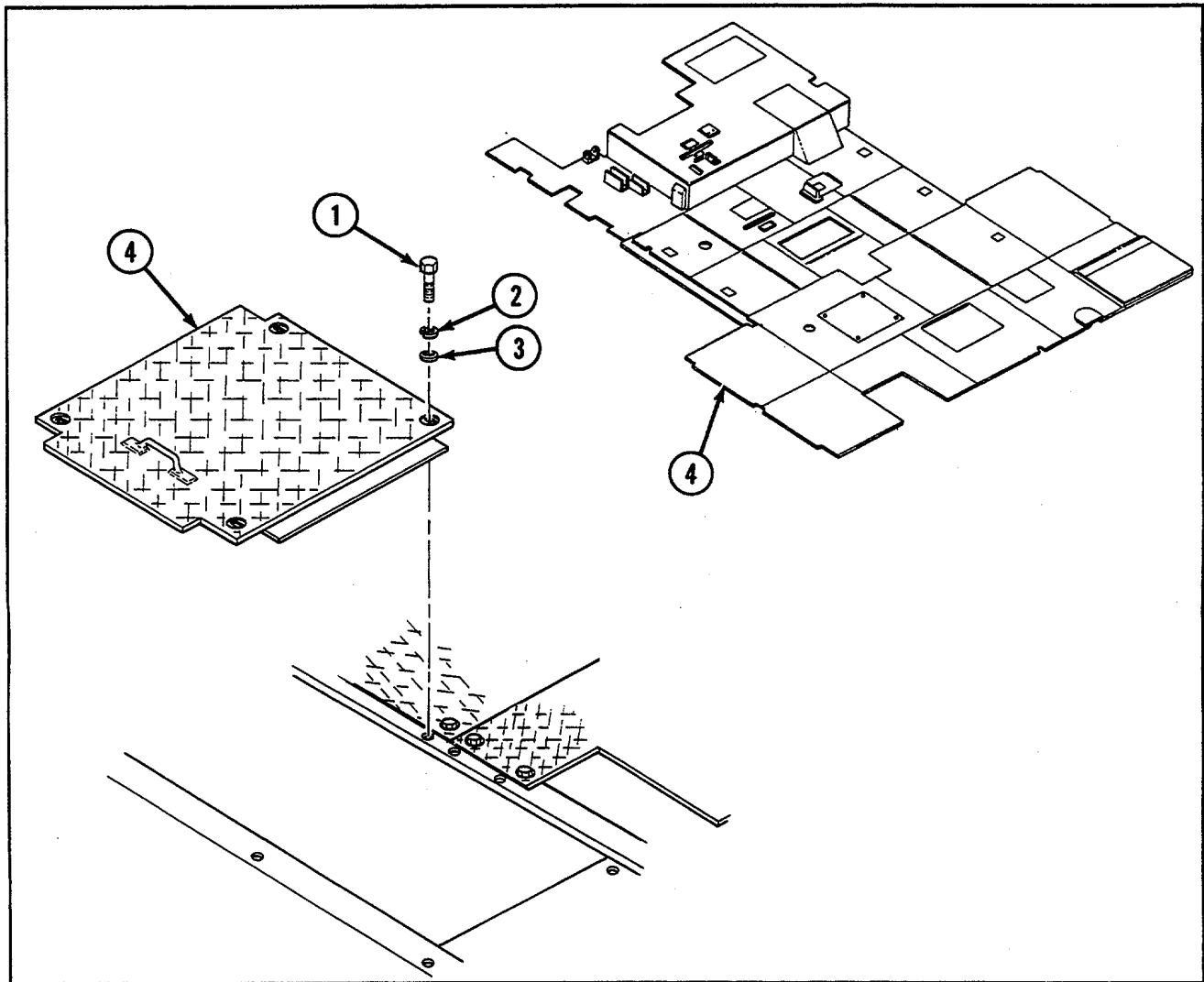
Lockwashers (4) (Appendix G,
item 118)

Equipment Condition:

Rear left-side floor plate
removed (see paragraph 9-15)

a. REMOVAL

Remove four screws (1), four lockwashers (2), four flat washers (3), and floor plate (4).

**b. INSTALLATION**

Install floor plate (4) with four flat washers (3), four new lockwashers (2), and four screws (1).

NOTE

Follow-on maintenance:

Install rear left-side floor plate (see paragraph 9-15)

9-17 REPLACE INTERMEDIATE REAR LEFT-CENTER FLOOR PLATE**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Equipment Conditions:

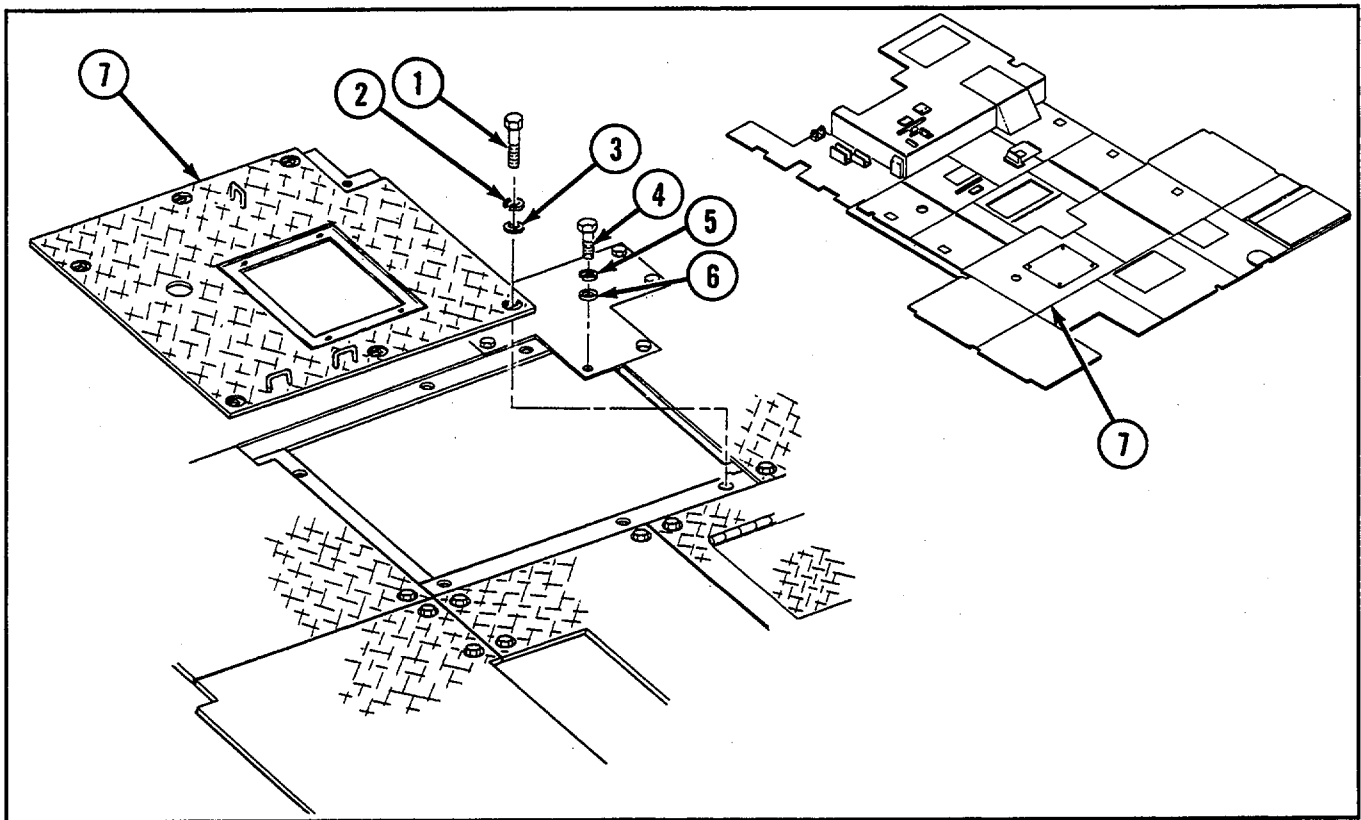
- Personnel seat removed (see paragraph 9-64)
- Fuel transmitter center left floor access plate removed (see paragraph 9-14)

Parts:

Lockwashers (7) (Appendix G, item 118)

a. REMOVAL

- 1 Remove six screws (1), six lockwashers (2), and six flat washers (3).
- 2 Remove screw (4), lockwasher (5), flat washer (6), and floor plate (7).

**b. INSTALLATION**

- 1 Install floor plate (7) with six flat washers (3), six new lockwashers (2), and six screws (1).
- 2 Install flat washer (6), new lockwasher (5), and screw (4).

NOTE

- Follow-on maintenance:
- Install fuel transmitter center left floor access plate (see paragraph 9-14)
 - Install personnel seat (see paragraph 9-64)

9-18 REPLACE CENTER REAR FLOOR PLATE**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

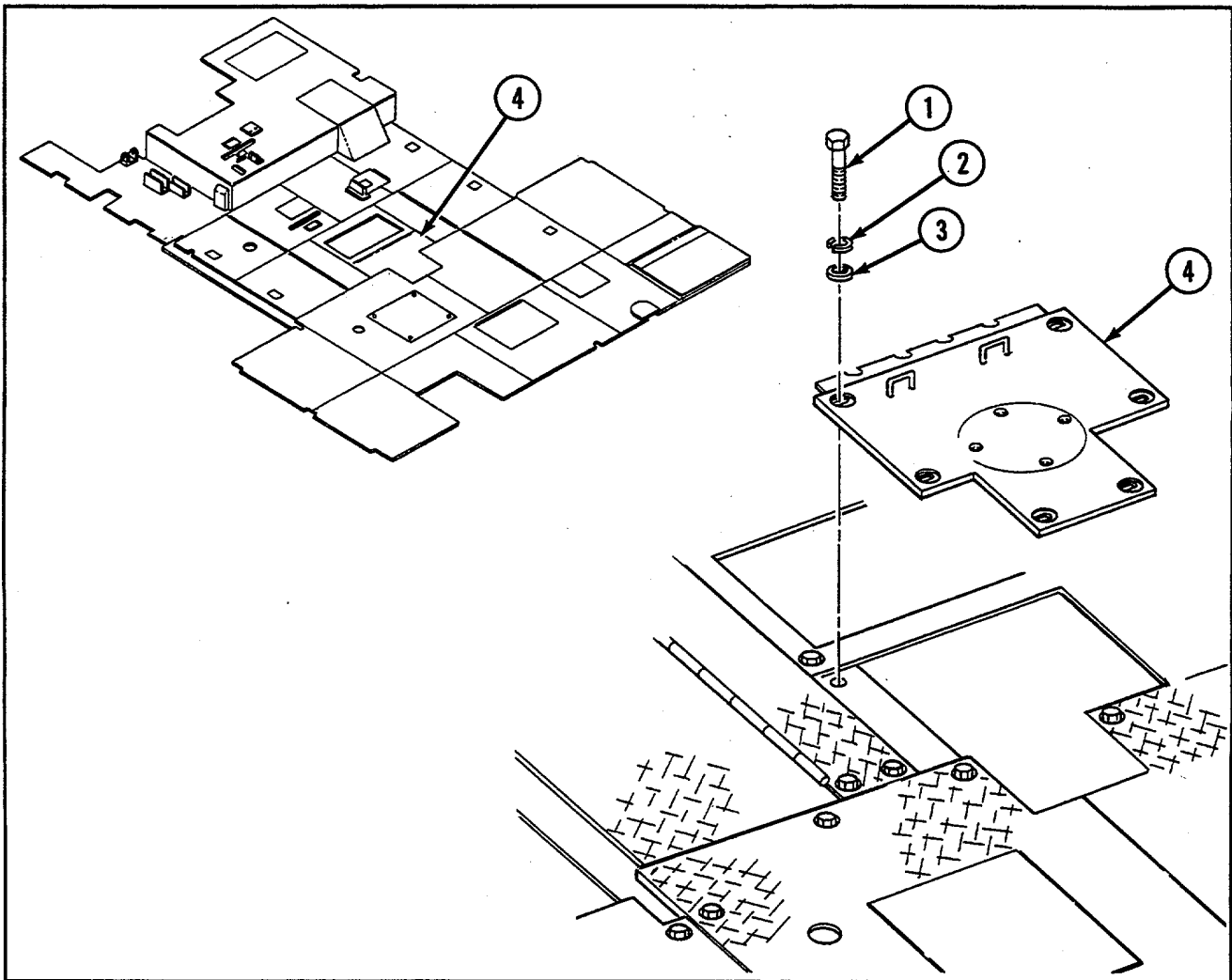
Lockwashers (6) (Appendix G,
item 118)

Equipment Condition:

Commander's seat removed
(see paragraph 9-65)

a. REMOVAL

Remove six screws (1), six lockwashers (2), six flat washers (3), and floor plate (4).

**b. INSTALLATION**

Install floor plate (4) with six flat washers (3), six new lockwashers (2), and six screws (1).

NOTE

Follow-on maintenance: Install commander's seat (see paragraph 9-65)

9-19 REPLACE CENTER FORWARD FLOOR PLATE**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

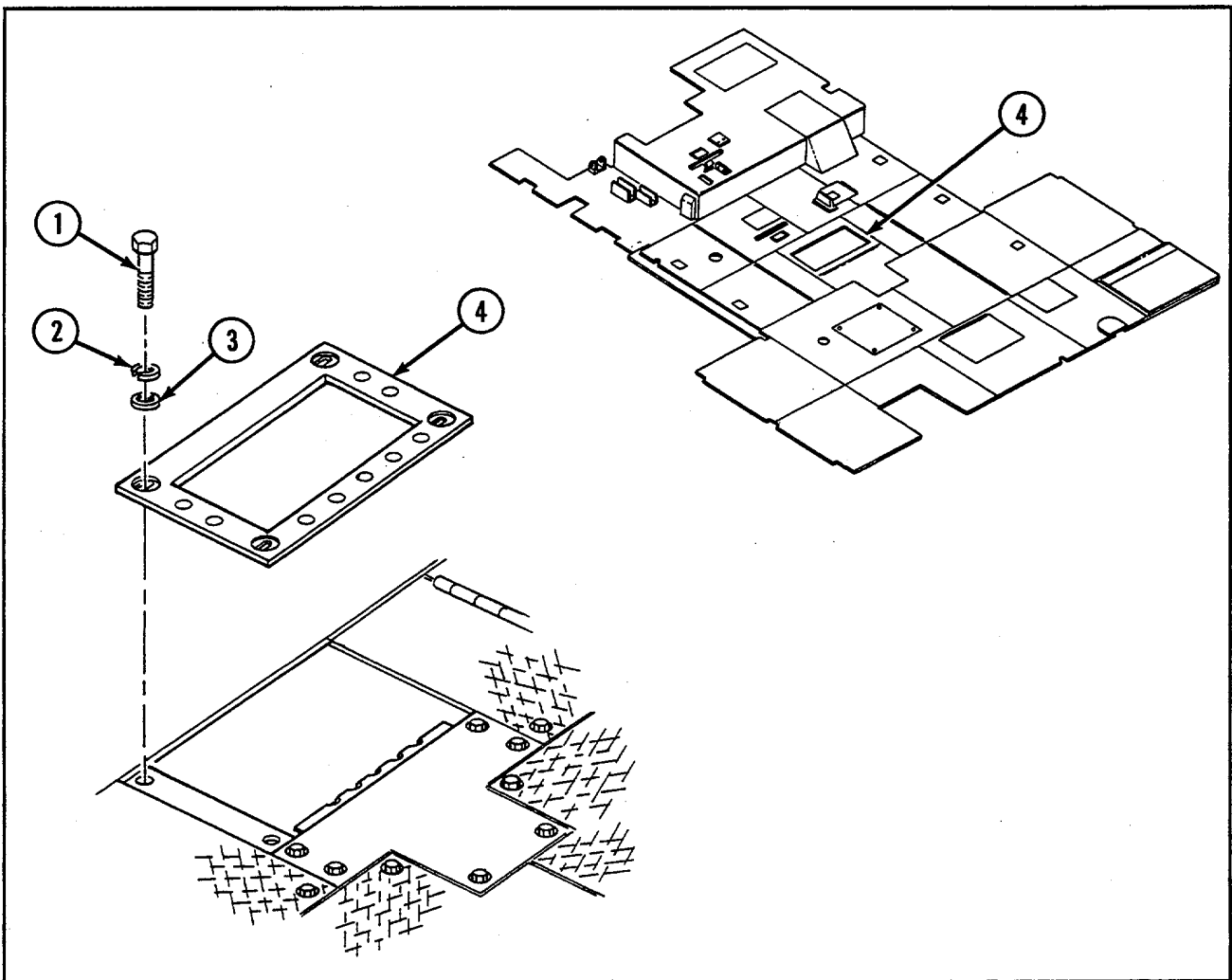
Lockwashers (4) (Appendix G,
item 118)

Equipment Condition:

Wire rope shield removed (see
paragraph 11-9)

a. REMOVAL

Remove four screws (1), four lockwashers (2), four flat washers (3), and floor plate (4).

**b. INSTALLATION**

Install floor plate (4) with four flat washers (3), four new lockwashers (2), and four screws (1).

NOTE

Follow-on maintenance: Install wire rope shield (see paragraph 11-9)

9-20 REPLACE INTERMEDIATE REAR LEFT ACCESS FLOOR PLATE**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

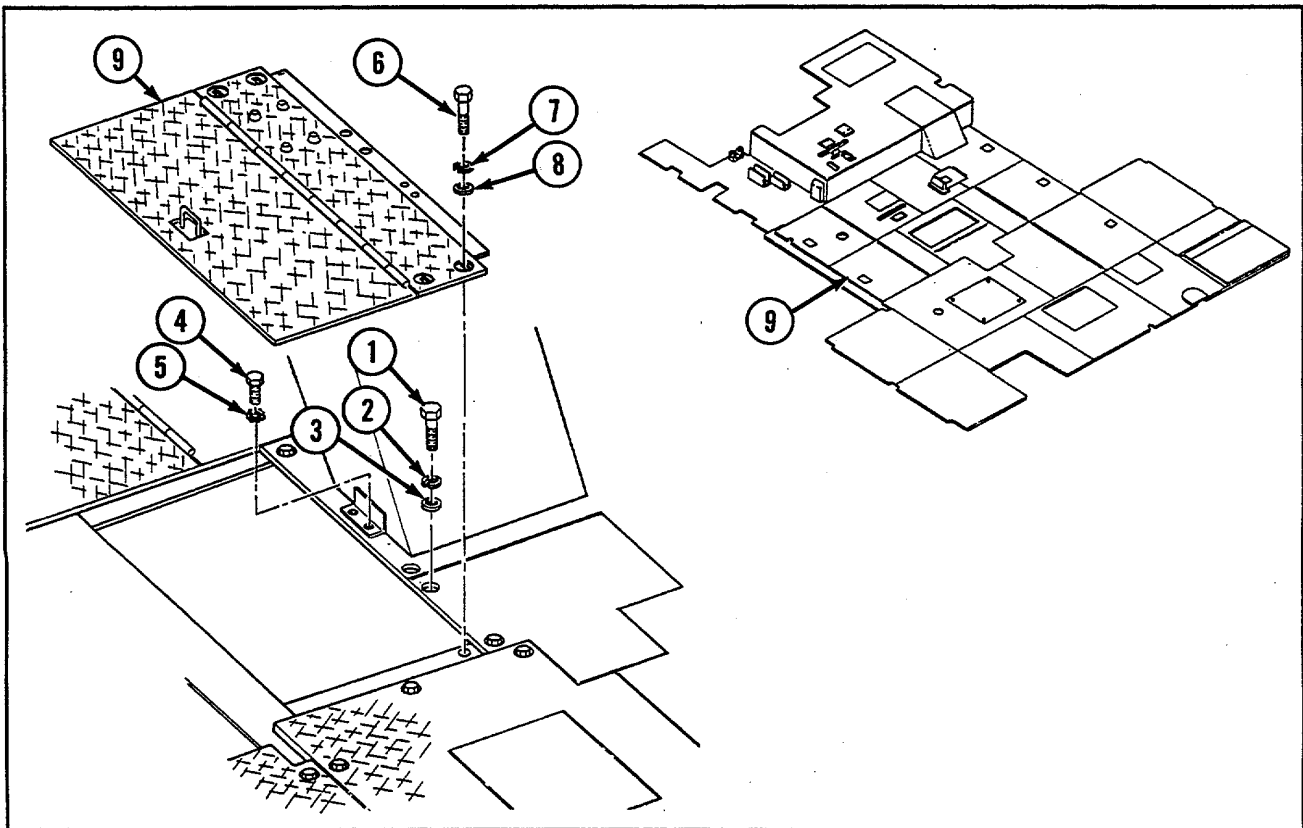
Lockwashers (8) (Appendix G,
item 118)

Equipment Condition:

Floor-mounted bracket
removed (see paragraph 9-106)

a. REMOVAL

- 1 Remove two screws (1), two lockwashers (2), and two flat washers (3).
- 2 Remove two screws (4) and two lockwashers (5).
- 3 Remove four screws (6), four lockwashers (7), four flat washers (8), and floor plate (9).

**b. INSTALLATION**

- 1 Install floor plate (9) with four flat washers (8), four new lockwashers (7), and four screws (6).
- 2 Install two new lockwashers (5) and two screws (4).
- 3 Install two flat washers (3), two new lockwashers (2), and two screws (1).

NOTE

Follow-on maintenance: Install floor-mounted bracket (see paragraph 9-106)

9-21 REPLACE/REPAIR STOWAGE BASKET FORWARD INTERMEDIATE LEFT FLOOR PLATE**THIS TASK COVERS**

a. Removal

b. Disassembly

c. Assembly

d. Installation

INITIAL SET-UP**Tools:**

- Tool kit, general mechanic's (Appendix C, item 53)
- Riveter, blind (Appendix C, item 42)

Parts:

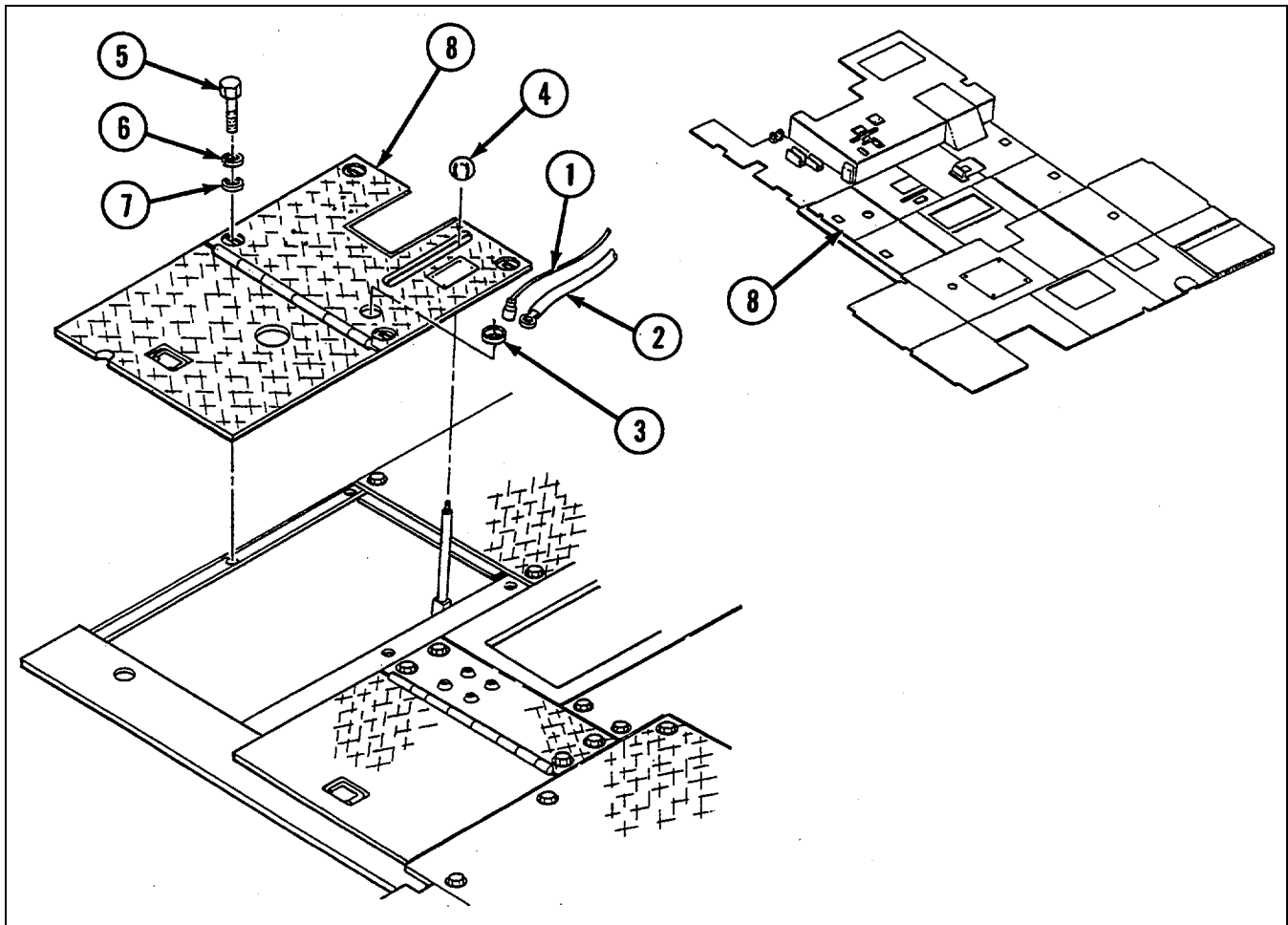
- *Lockwashers (4) (Appendix G, item 118)
- *Rivets (4) (Appendix G, item 238)

Equipment Conditions:

- Spare headlight mounts removed (see paragraph 6-29)
- Floor and light mount plate removed (see paragraph 9-22)
- Personnel seat removed (see paragraph 9-64)

a. REMOVAL

- 1 Disconnect wiring harness 10894546/450A (1) and lead 518 (2).
- 2 Remove grommet (3).
- 3 Remove hoist winch shift lever knob (4).
- 4 Remove four screws (5), four lockwashers (6), four flat washers (7), and floor plate (8).

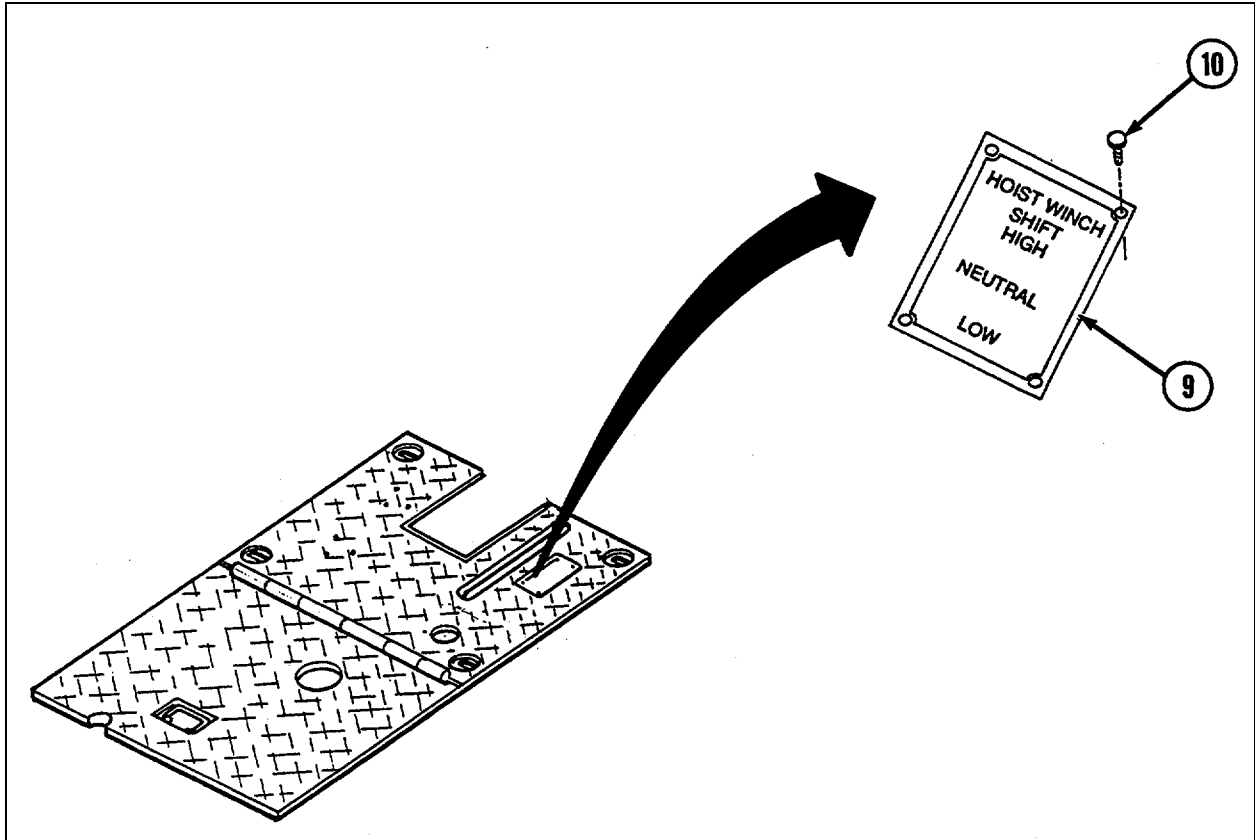


9-21 REPLACE/REPAIR STOWAGE BASKET FORWARD INTERMEDIATE LEFT FLOOR PLATE-Continued**b. DISASSEMBLY**

NOTE

Perform step only if hoist winch shift lever switch identification (ID) plate (9) is illegible.

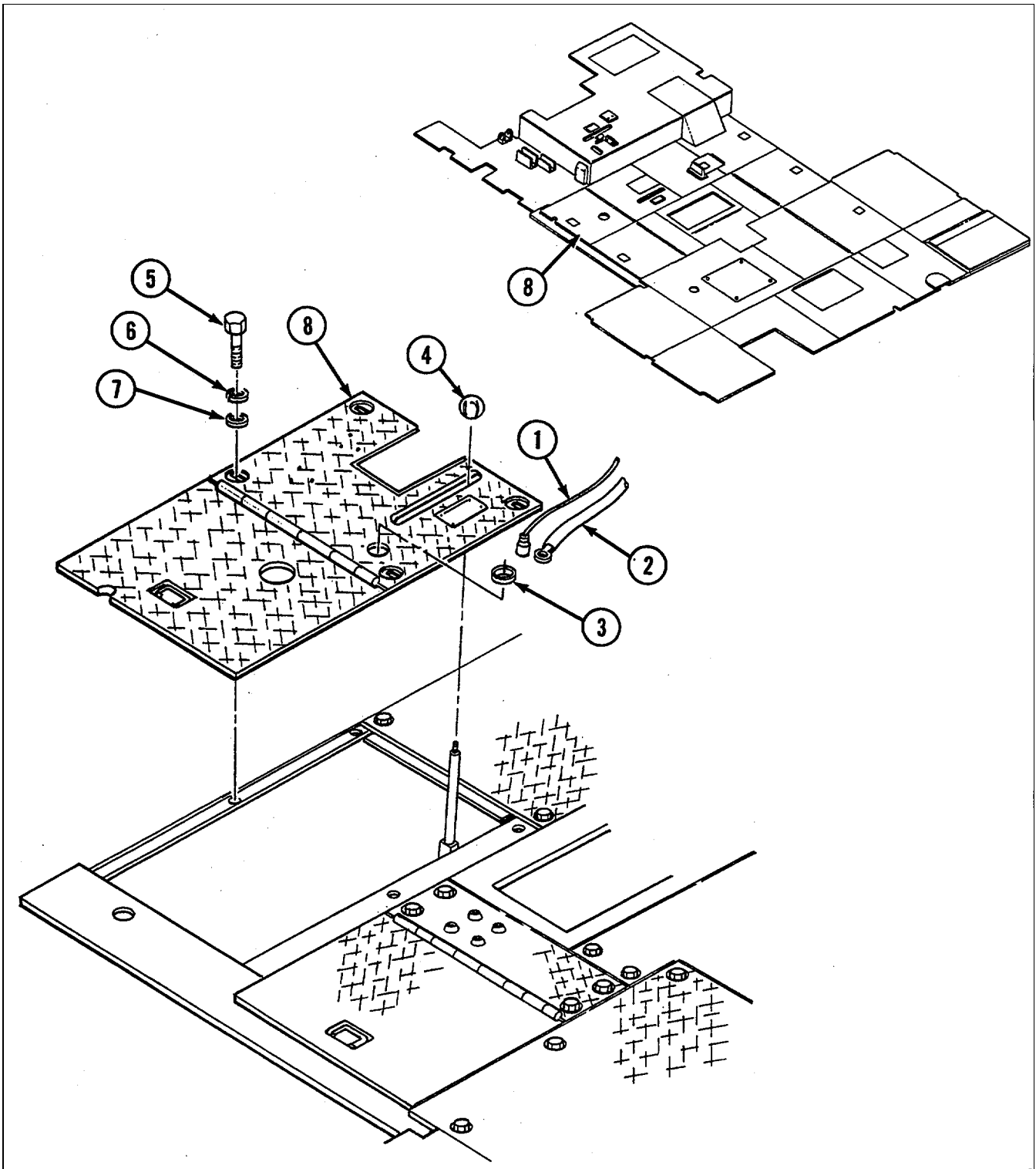
Remove four rivets (10) and ID plate (9).

**c. ASSEMBLY**

Install ID plate (9) with four new rivets (10).

d. INSTALLATION

- 1 Install floor plate (8) with four flat washers (7), four new lockwashers (6), and four screws (5).
- 2 Install hoist winch shift lever knob (4).
- 3 Connect wiring harness 10894546/450A (1) and lead 518 (2).
- 4 Install grommet (3).

**NOTE**

Follow-on maintenance:

- Install personnel seat (see paragraph 9-64)
- Install floor and light mount plate (see paragraph 9-22)
- Install spare headlight mounts (see paragraph 6-29)

9-22 REPLACE/REPAIR FLOOR AND LIGHT MOUNT PLATE**THIS TASK COVERS**

a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

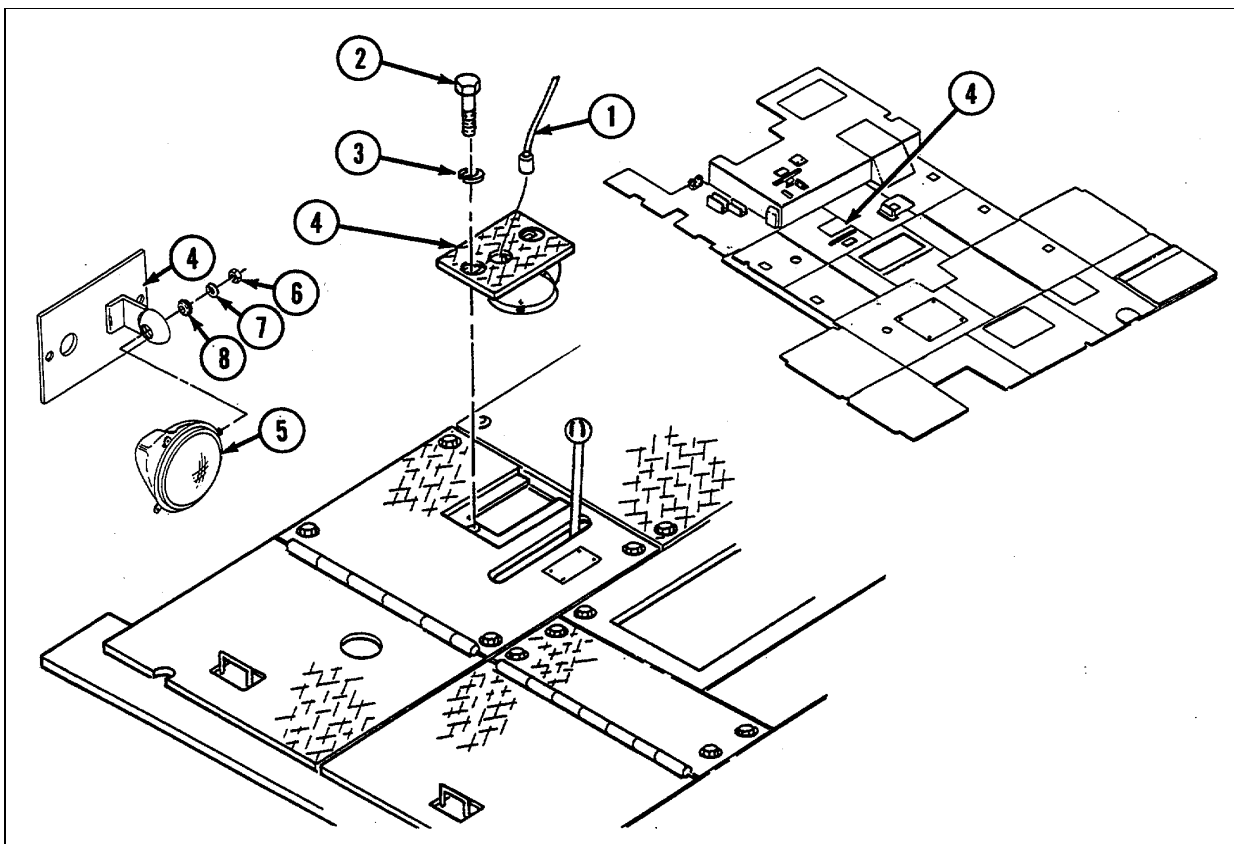
- Lockwasher (Appendix G, item 132)
- Lockwashers (2) (Appendix G, item 118)

a. REMOVAL

- 1 Disconnect wire 451 (1).
- 2 Remove two screws (2), two lockwashers (3), and mount plate (4).

b. DISASSEMBLY

Remove winch compartment light (5) from mount plate (4) by removing nut (6), lockwasher (7), and spacer (8).

**c. ASSEMBLY**

Install winch compartment light (5) to mount plate (4) using spacer (8), new lockwasher (7) and nut (6).

d. INSTALLATION

- 1 Install mount plate (4) with two new lockwashers (3) and two screws (2).
- 2 Connect wire 451 (1)

9-23 REPLACE HYDRAULIC VALVE FORWARD INTERMEDIATE RIGHT FLOOR PLATE**THIS TASK COVERS**

a. Removal	b. Disassembly	c. Assembly	d. Installation
------------	----------------	-------------	-----------------

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

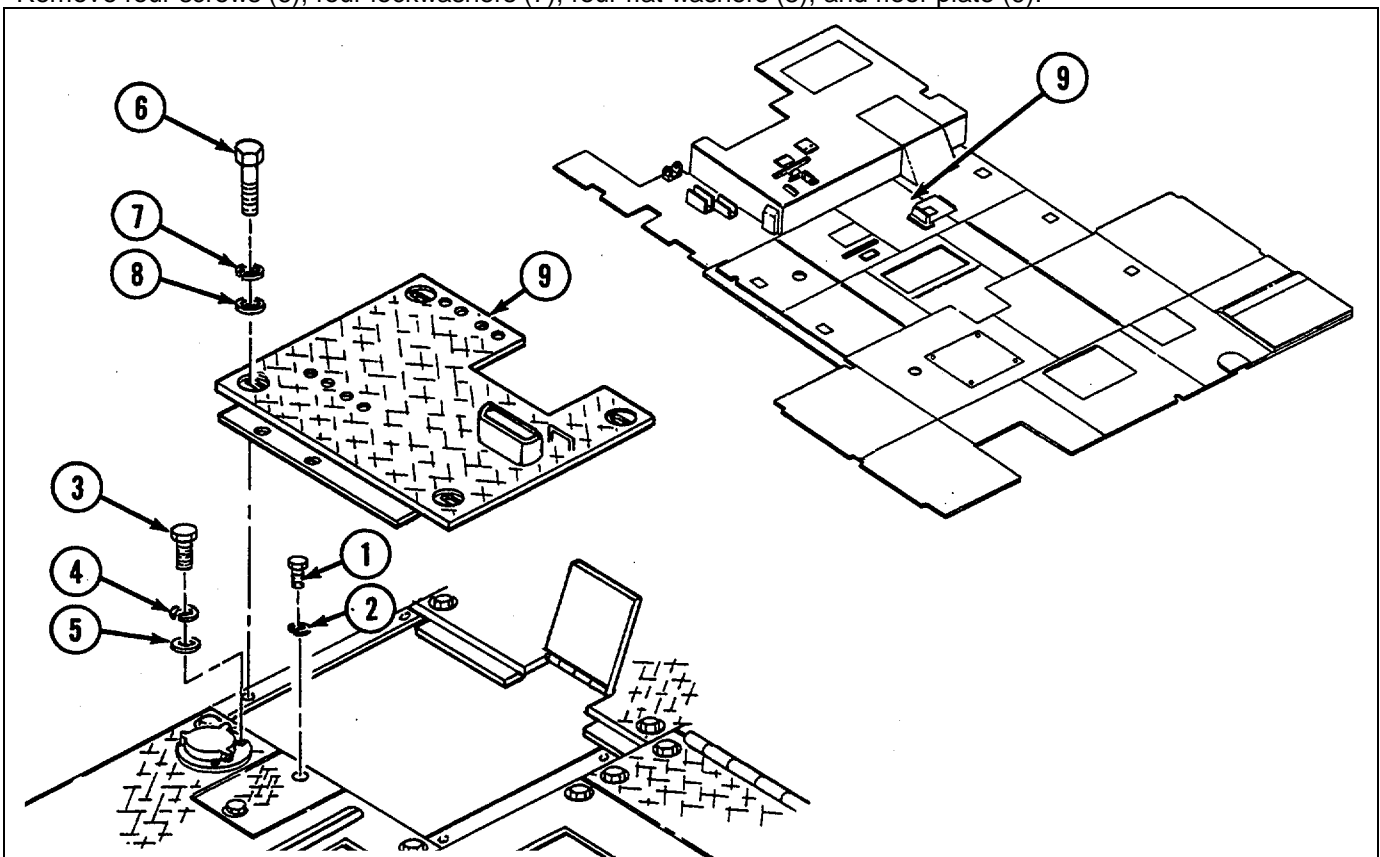
Lockwashers (6) (Appendix G,
item 118)

Equipment Condition:

Hand grenade boxes removed
(see paragraph 9-97)

a. REMOVAL

- 1 Remove screw (1) and lockwasher (2).
- 2 Remove screw (3), lockwasher (4), and flat washer (5).
- 3 Remove four screws (6), four lockwashers (7), four flat washers (8), and floor plate (9).

**b. INSTALLATION**

- 1 Install floor plate (9) with four flat washers (8), four new lockwashers (7), and four screws (6).
- 2 Install flat washer (5), new lockwasher (4), and screw (3).
- 3 Install new lockwasher (2) and screw (1).

NOTE

Follow-on maintenance: Install hand grenade boxes (see paragraph 9-97)

9-24 REPLACE FRONT SUBFLOOR SUPPORT**THIS TASK COVERS**

a. Removal

b. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Lockwashers (12) (Appendix G, item 132)

Equipment Conditions:

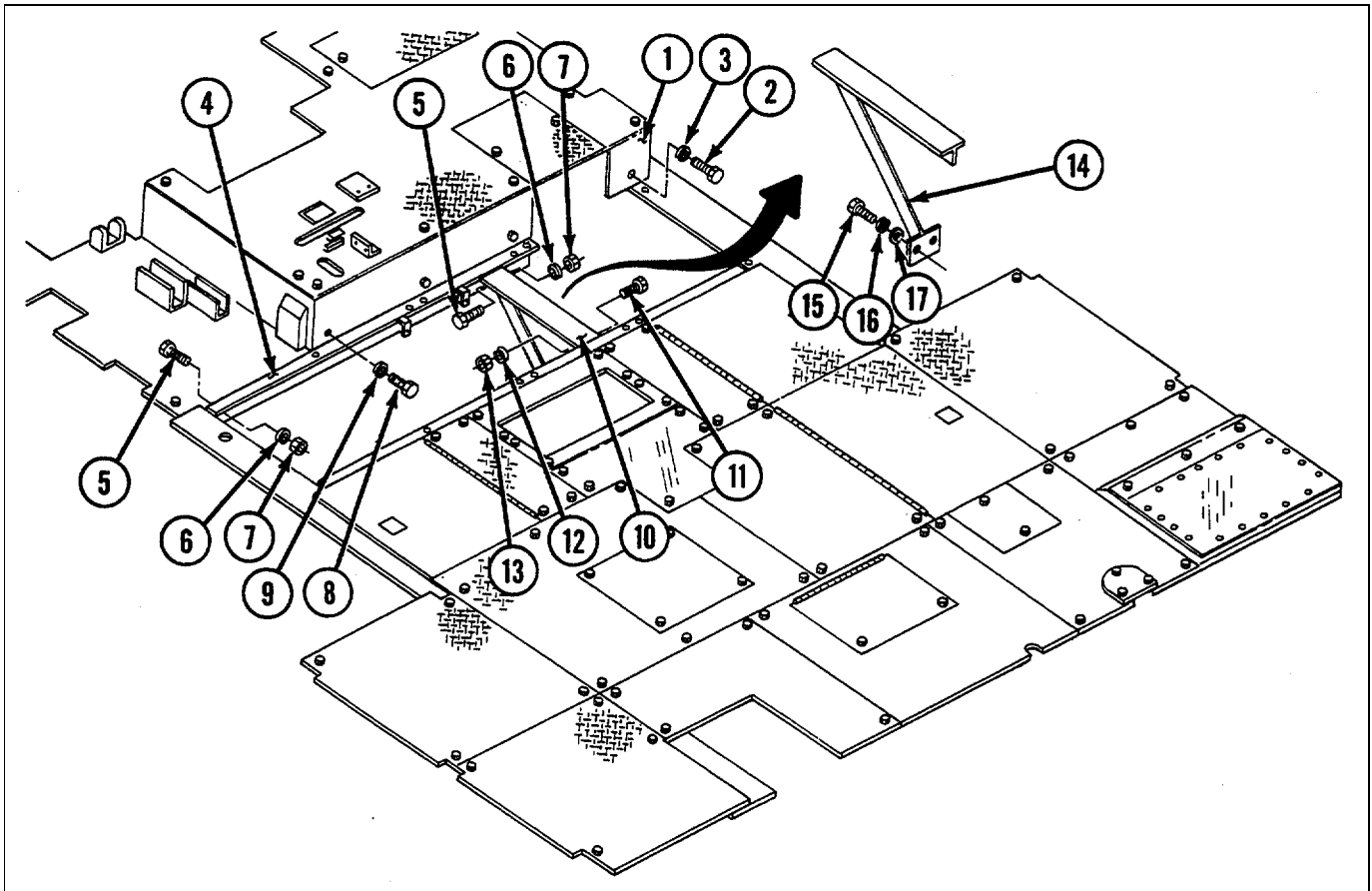
•Bilge pump plate removed (see paragraph 6-102)

Equipment Conditions-Continued

- Hydraulic valve forward right floor plate removed (see paragraph 9-3)
- Stowage basket forward intermediate left floor plate removed (see paragraph 9-21)
- Hydraulic valve forward intermediate right floor plate removed (see paragraph 9-23)
- Fire extinguisher line loop dampers removed (see paragraph 10-7)

a. REMOVAL

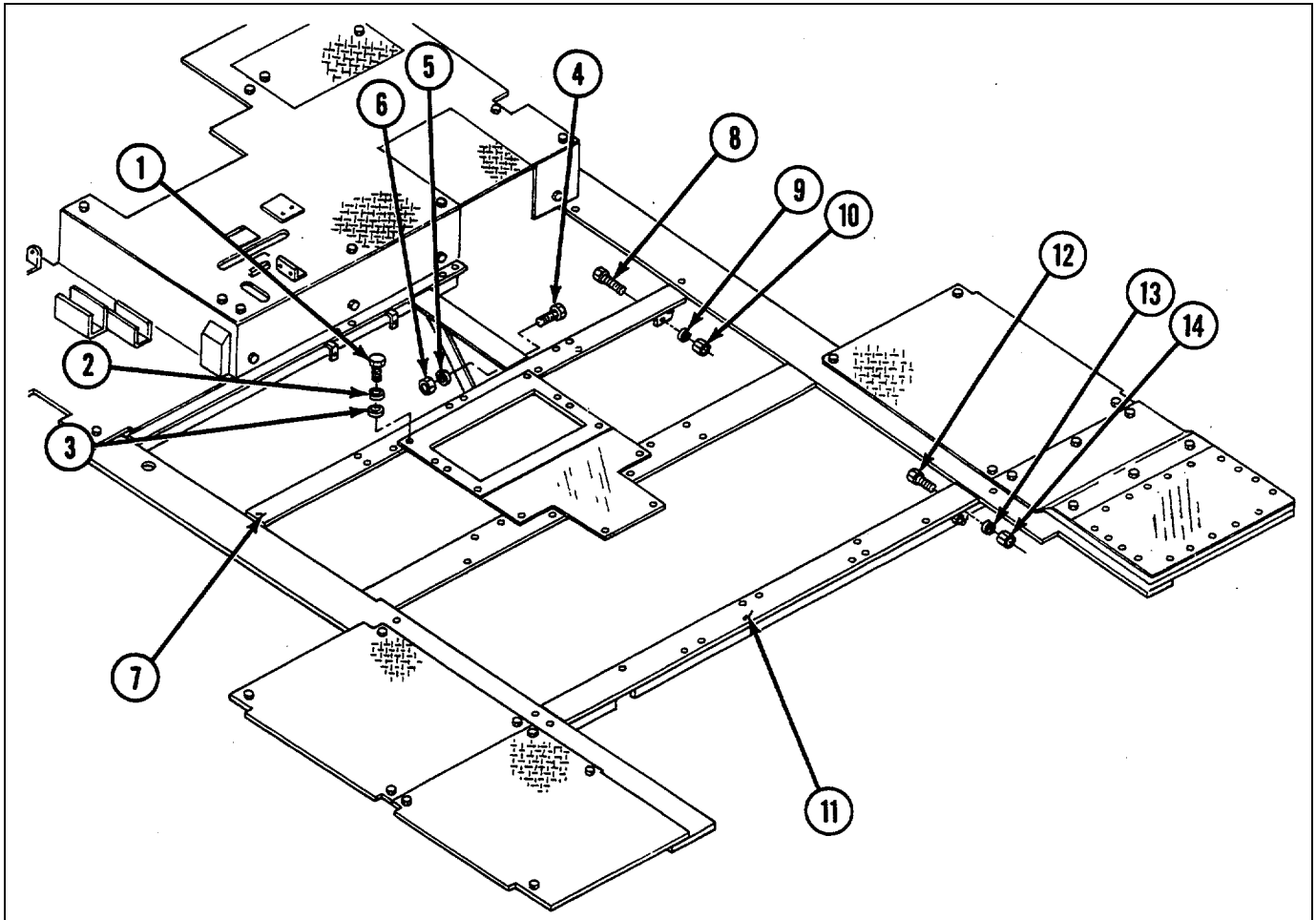
- 1 Remove support (1) by removing screw (2) and lockwasher (3).
- 2 Remove support (4) by removing four screws (5), four lockwashers (6), four nuts (7), three screws (8), and three lockwashers (9).
- 3 Remove support (10) by removing two screws (11), two lockwashers (12), and two nuts (13).
- 4 Remove support (14) by removing two screws (15), two lockwashers (16), and two flat washers (17).



9-25 REPLACE CENTER AND REAR SUBFLOOR SUPPORT--Continued

a. REMOVAL

- 1 Remove two screws (1), two flat washers (2), two lockwashers (3), two screws (4), two lockwashers (5), and two nuts (6).
- 3 Remove center support (7) by removing two screws (8), two lockwashers (9), and two nuts (10) from each side of support.
- 4 Remove rear support (11) by removing two screws (12), two lockwashers (13), and two nuts (14) from each side of support.



b. INSTALLATION

- 1 Install rear support (11) with two screws (12), two new lockwashers (13), and two nuts (14) to each side of support.
- 2 Install center support (7) with two screws (8), two new lockwashers (9), and two nuts (10) to each side of support.
- 3 Install two screws (1), two flat washers (2), two new lockwashers (3), two screws (4), two new lockwashers (5), and two nuts (6).

NOTE

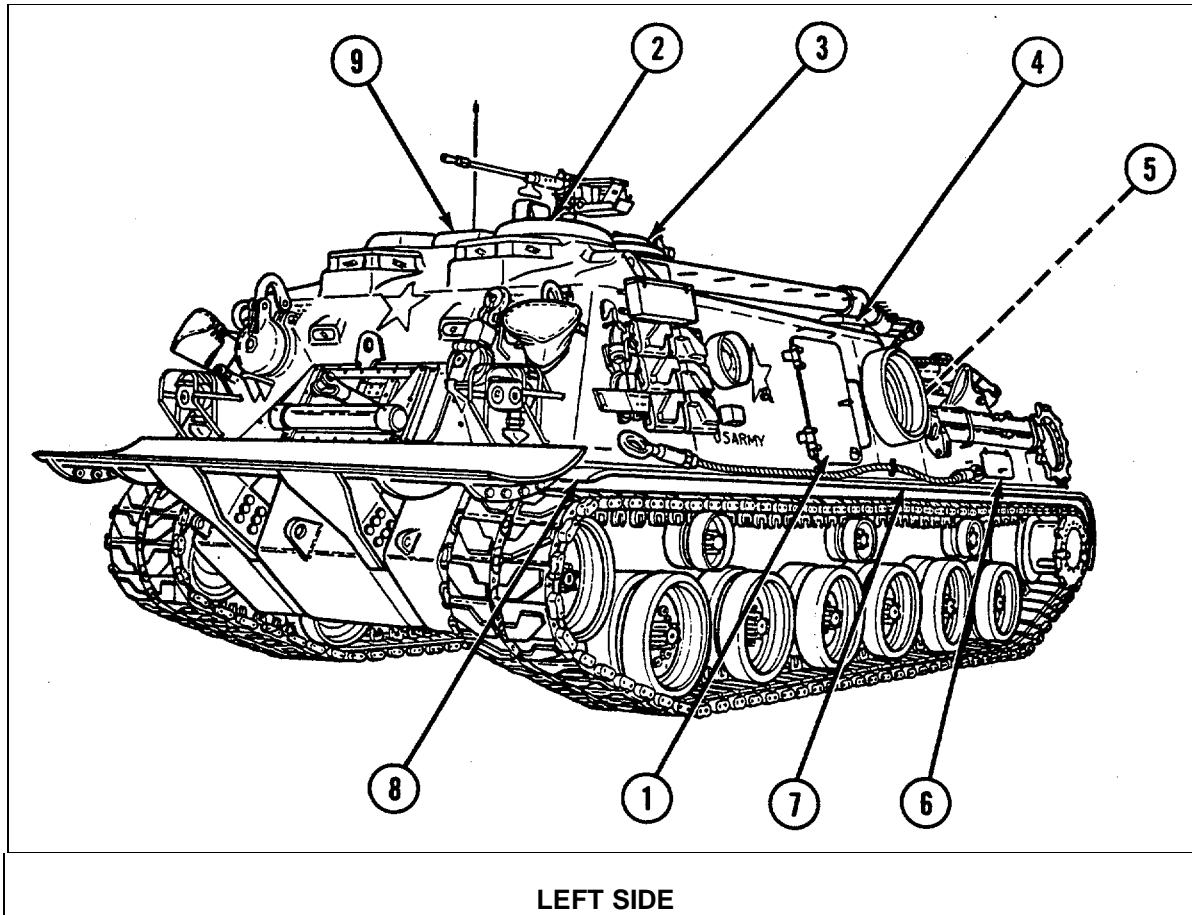
- Follow-on maintenance:
- Install hydraulic valve forward intermediate right floor plate (see paragraph 9-23)
 - Install stowage basket forward intermediate left floor plate (see paragraph 9-21)
 - Install intermediate rear left access floor plate (see paragraph 9-20)
 - Install intermediate rear left-center floor plate (see paragraph 9-17)
 - Install rear left-side intermediate floor plate (see paragraph 9-13)
 - Install rear center floor plate (see paragraph 9-12)
 - Install hydraulic line intermediate rear right center floor plate (see paragraph 9-11)
 - Install rear intermediate right floor plate (see paragraph 9-8)
 - Install U-35 winch center right floor plate (see paragraph 9-4)
 - Install hydraulic valve forward right floor plate (see paragraph 9-3)

SECTION III: HULL AND CAB COMPONENTS

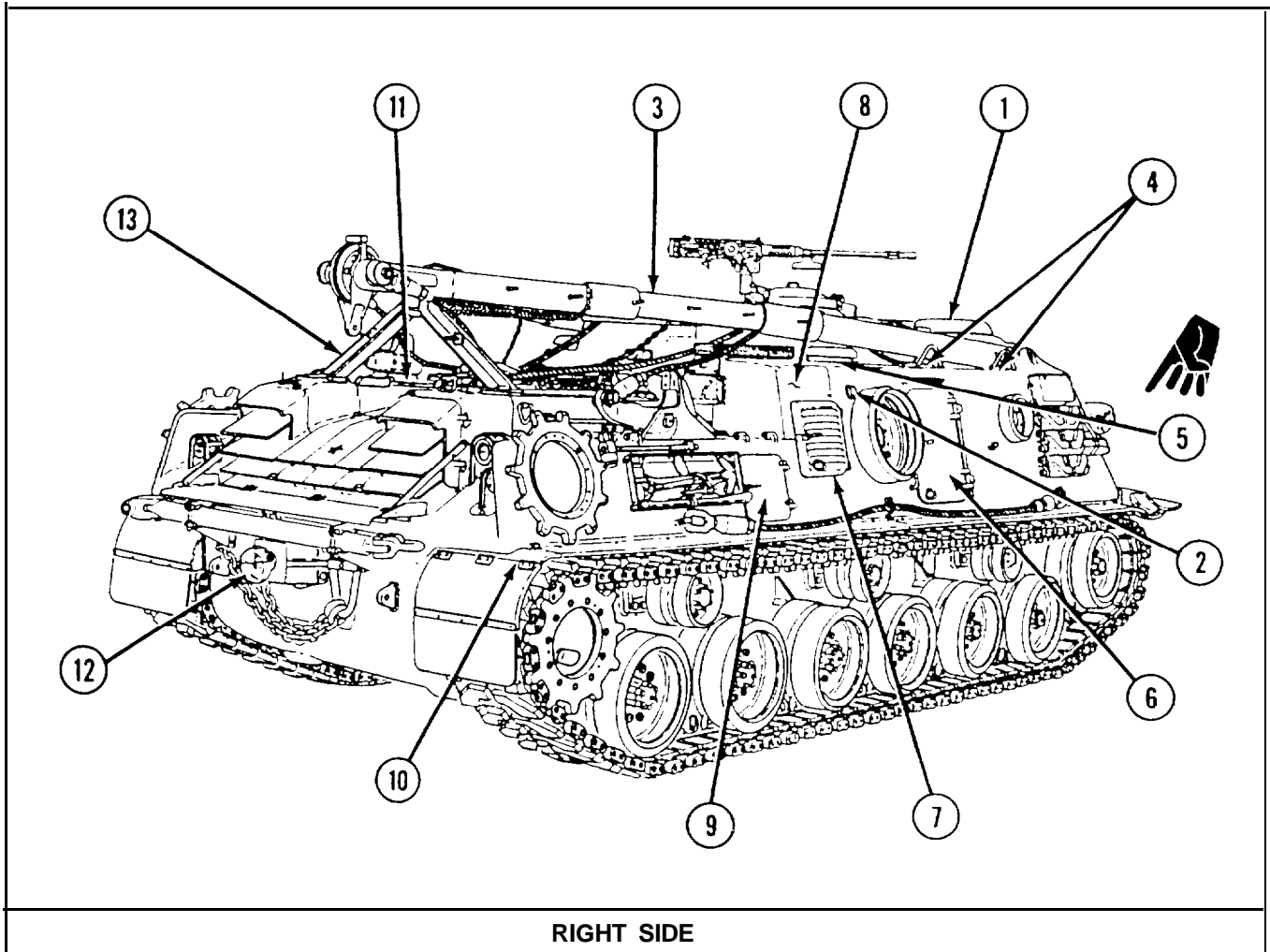
Para.	Task	Page
9-26	Replace/Repair Fenders and Related Parts	9-33
9-27	Replace/Repair Commander's Cupola Assembly	9-36
9-28	Replace/Repair Driver's Cab-top Door and Related Parts.....	9-44
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9-30	Replace/Repair Rigger's Cab-top Door and Related Parts.....	9-50
9-31	Replace Wire Rope Roller Access Door	9-54
9-32	Replace Left and Right Stowage Compartment Doors.....	9-54
9-33	Replace Left and Right Personnel Doors.....	9-57
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9-38	Replace/Repair Passive Night Viewer Mount and Related Parts.....	9-62
9-39	Replace Infrared Power Supply.....	9-65
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9-41	Replace Driver's and Rigger's Periscope Blocks and Vision Prisms.....	9-66
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9-48	Replace Battery Tray Cleaning Tubes	9-78
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The following two illustrations are locator views for left- and right-side hull and cab components.

- | | | | |
|---|-----------------------------------|---|-------------------------------|
| 1 | Left personnel door | 6 | Left stowage compartment door |
| 2 | Driver's cab-top door | 7 | Fender |
| 3 | Commander's cupola | 8 | Front fender |
| 4 | Left-side air cleaner inlet cover | 9 | Wire rope roller access door |
| 5 | Fuel tank filler access cover | | |



- | | |
|--------------------------------------|----------------------------------|
| 1 Rigger' s cab-top door | 8 APU access cover |
| 2 Bilge pump outlet cover | 9 Right stowage compartment door |
| 3 Mechanic' s cab-top door | 10 Rear fender |
| 4 Antenna base covers | 11 Engine deck |
| 5 Right-side air cleaner inlet cover | 12 Towing pintle and mount |
| 6 Right personnel door | 13 Boom support |
| 7 APU access door | |



9-26 REPLACE/REPAIR FENDERS AND RELATED PARTS

THIS TASK COVERS

- | | | | |
|------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
|------------|----------------|-------------|-----------------|

INITIAL SET-UP

Tools:

Tool kit, general mechanic' s (Appendix C, item 53)

Personnel Required:

Two

Parts:

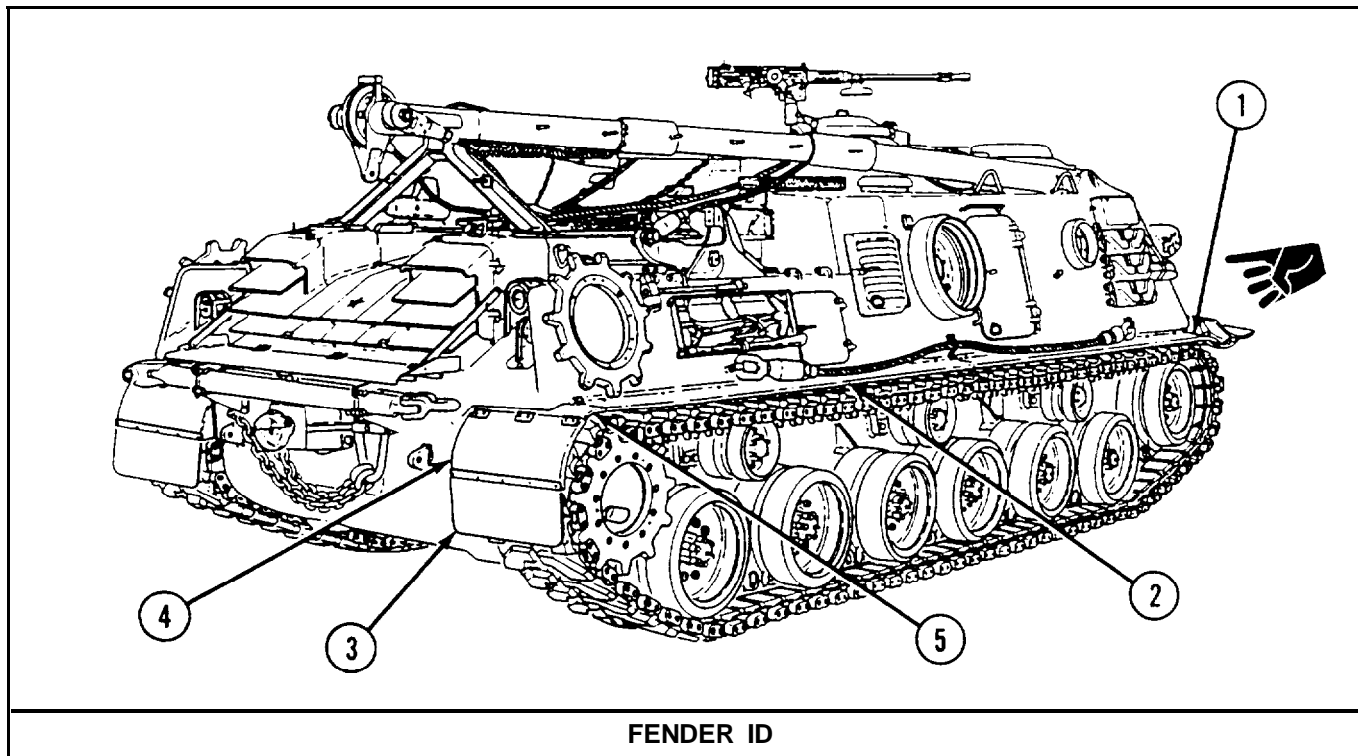
- Lockwashers (106) (Appendix G, item 132)
- Lockwashers (10) (Appendix G, item 134)

Equipment Conditions:

- Tow cables removed as required for clearance (see paragraph 9-89)
- Spade lowered (refer to TM 9-2350-256-10)

9-26 REPLACE/REPAIR FENDERS AND RELATED PARTS-Continued

- | | | | |
|---|--|---|---|
| 1 | Front fender (left- and right-side) | 4 | Hinged rear fender (left- and right-side) |
| 2 | Fenders (four left-side and four right-side) | 5 | Rear fender (left- and right-side) |
| 3 | Splash guard (left- and right-side) | | |



FENDER ID

NOTE

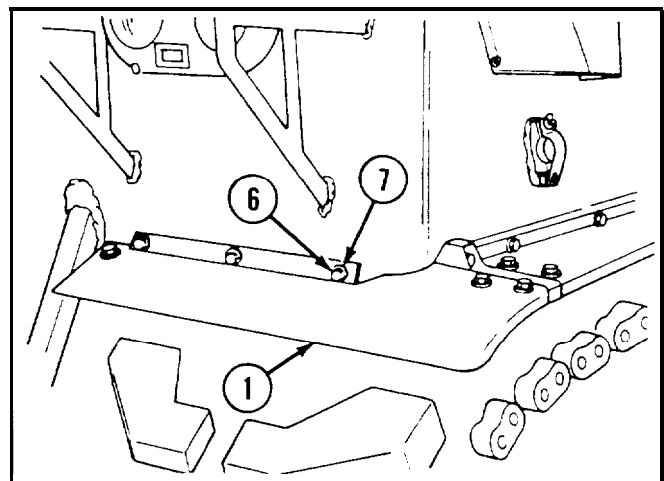
The following procedures are the same for both left- and right-sides.

a. REMOVAL

WARNING

Fenders can fall when screws are removed. Be sure to secure fenders.

- 1 Remove front fender (1) by removing six screws (6) and six lockwashers (7).
- 2 Remove each of four fenders (2) by removing eight screws (8) and eight lockwashers (9).
- 3 Remove splash guard (3) and strip (10) by removing five screws (11) and five lockwashers (12).

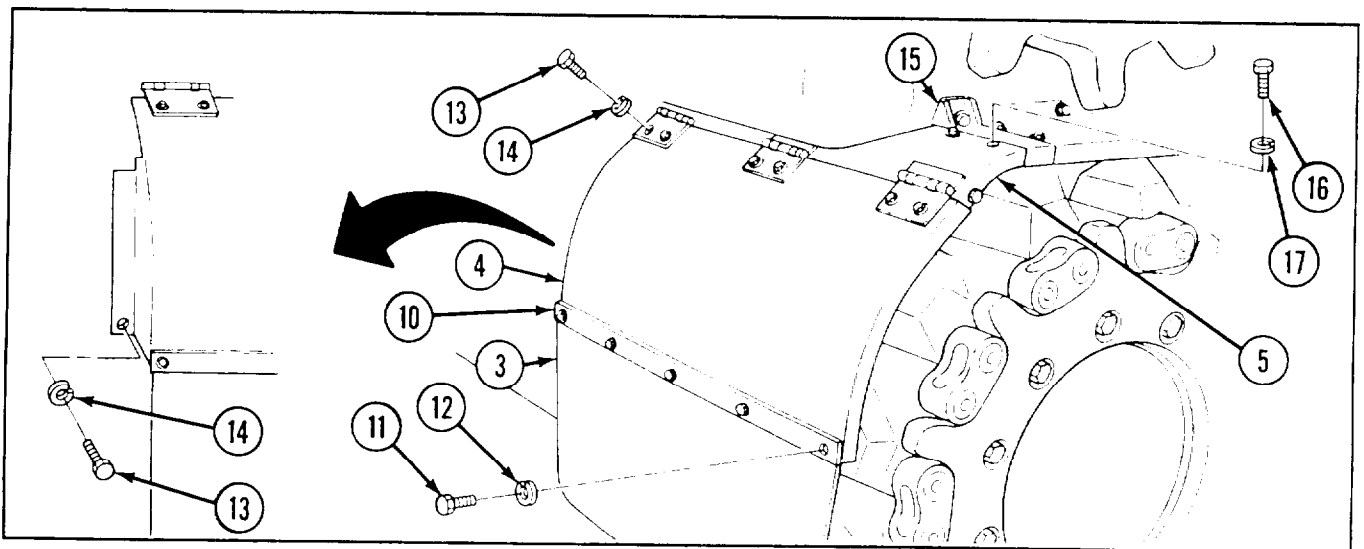
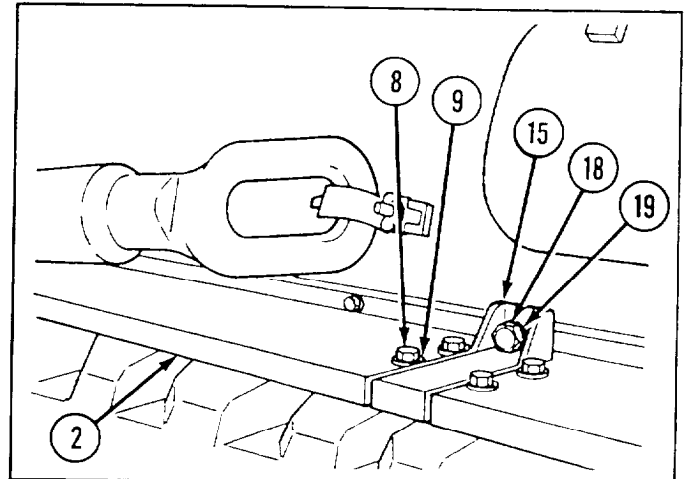


- 4 Remove hinged rear fender (4) by removing eight screws (13) and eight lockwashers (14).
- 5 Remove rear fender (5) from support (15) by removing two screws (16) and two lockwashers (17).

NOTE

Any support (15) can be removed when fenders on both sides of support have been removed.

- 6 Remove five supports (15) by removing from each screw (18) and lockwasher (19).

**b. DISASSEMBLY**

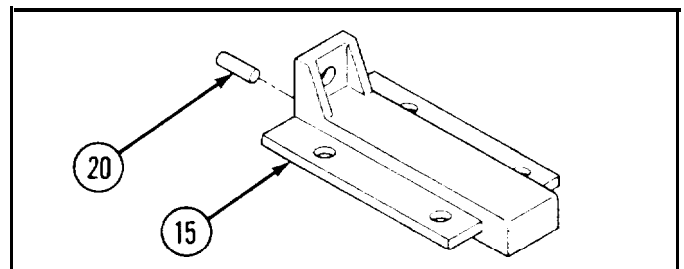
Remove five pins (20) from five supports (15).

c. ASSEMBLY

Install five pins (20) in five supports (15).

d. INSTALLATION

- 1 Install five supports (15) each with screw (18) and new lockwasher (19). Locate pins (20) in hull locating holes.
- 2 Install rear fender (5) on support (15) with two new lockwashers (17) and two screws (16)
- 3 Install hinged rear fender (4) with eight screws (13) and eight new lockwashers (14).
- 4 Install splash guard (3) and strip (10) with five screws (11) and five new lockwashers (12).
- 5 Install each of four fenders (2) with eight screws (8) and eight new lockwashers (9).
- 6 Install front fender (1) with six screws (6) and six new lockwashers (7).



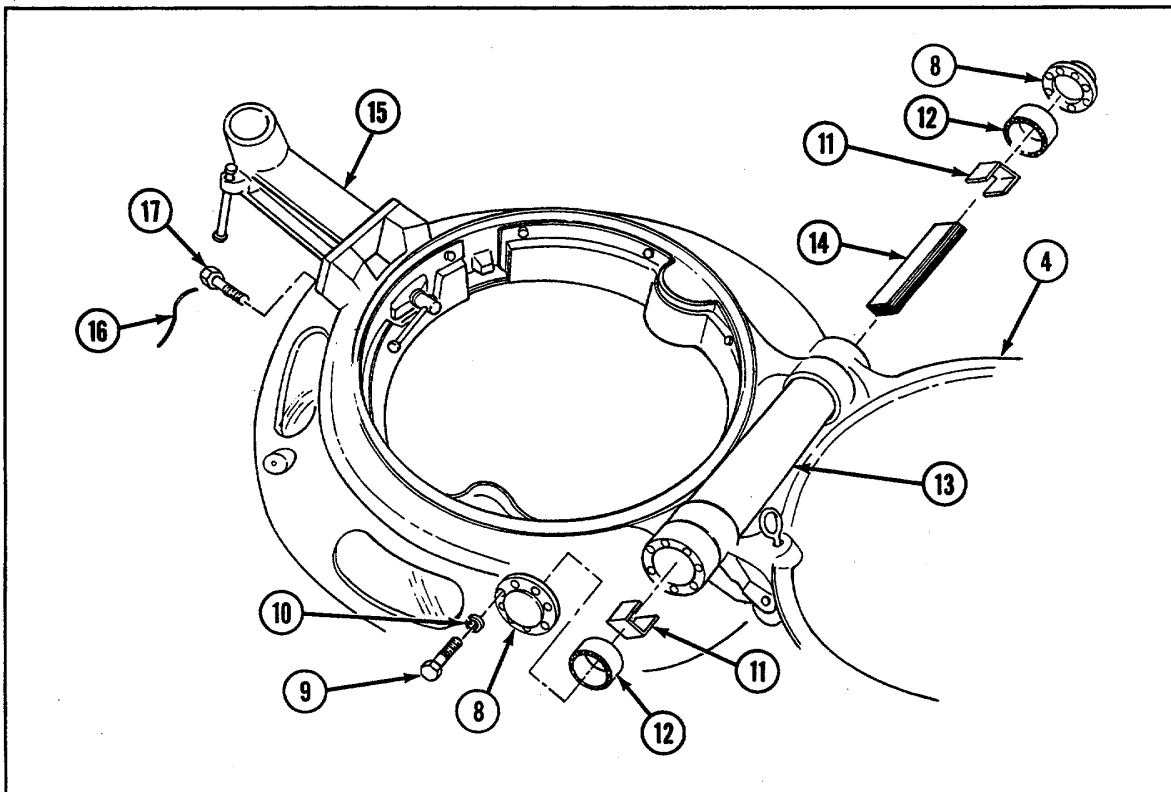
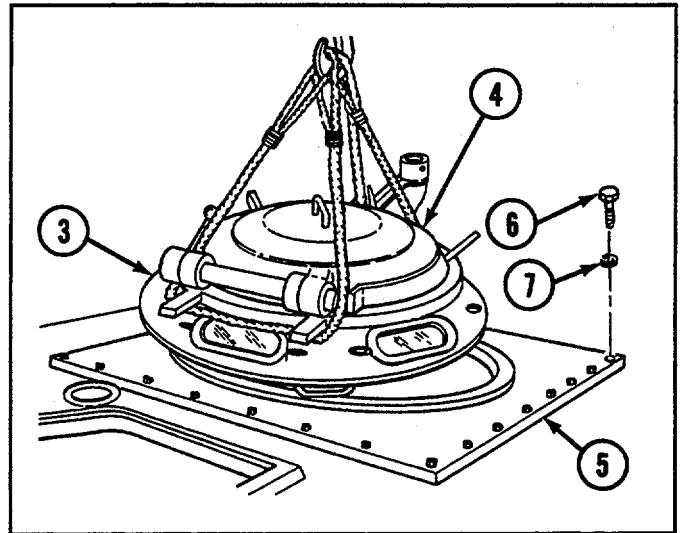
WARNING

Cupola assembly is extremely heavy; two persons are needed during removal and installation.

- 3 Secure cupola (3) so that it does not spin. Close and lock cupola door (4).
- 4 Using a suitable lifting device, remove cupola (3) from mounting plate (5).
- 5 Remove 30 screws (6), 30 lockwashers (7), and mounting plate (5).

b. DISASSEMBLY

- 1 Open cupola door (4) to vertical position. Remove two cap assemblies (8) by removing eight screws (9) and eight lockwashers (10) from each.
- 2 Remove two adapters (11), two bearings (12), tube (13), six springs (14), and cupola door (4).
- 3 Remove gun support pintle (15) by cutting lockwire (16) and removing four screws (17).

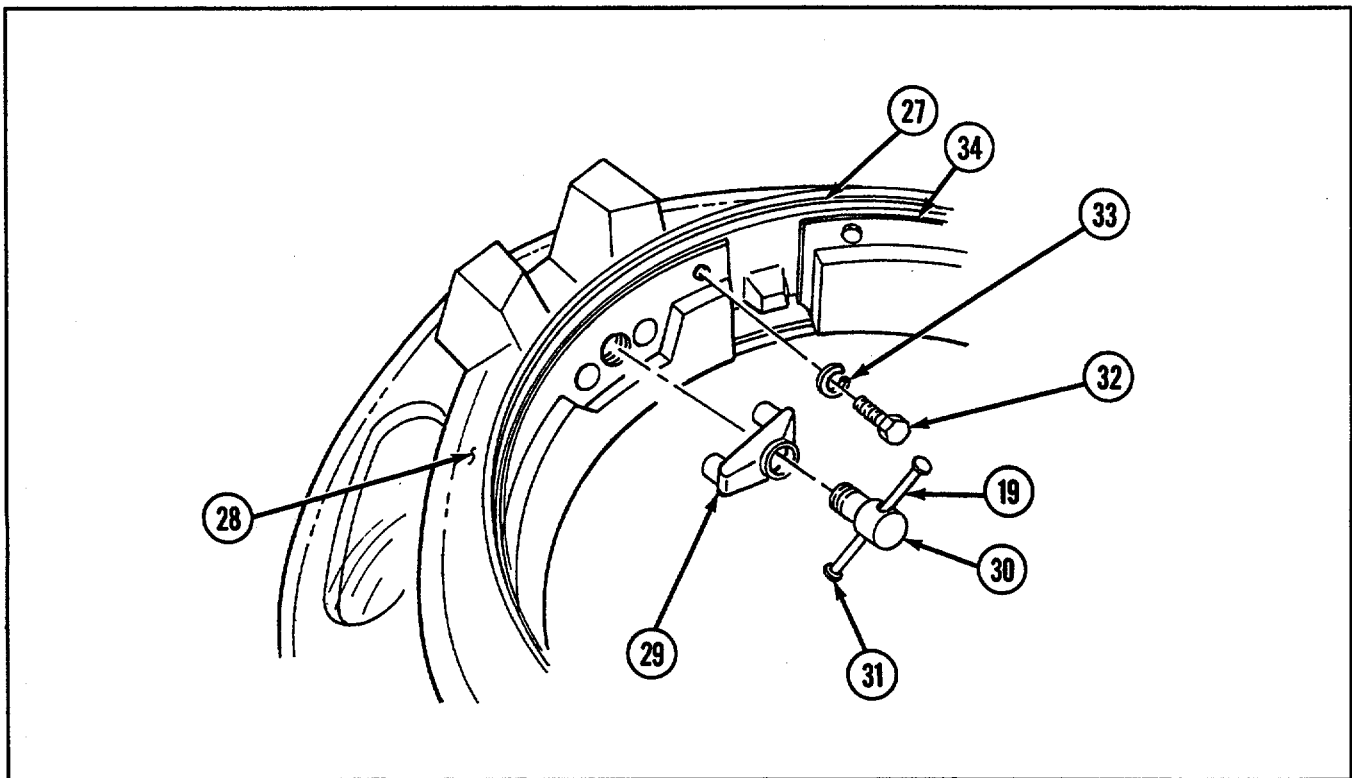
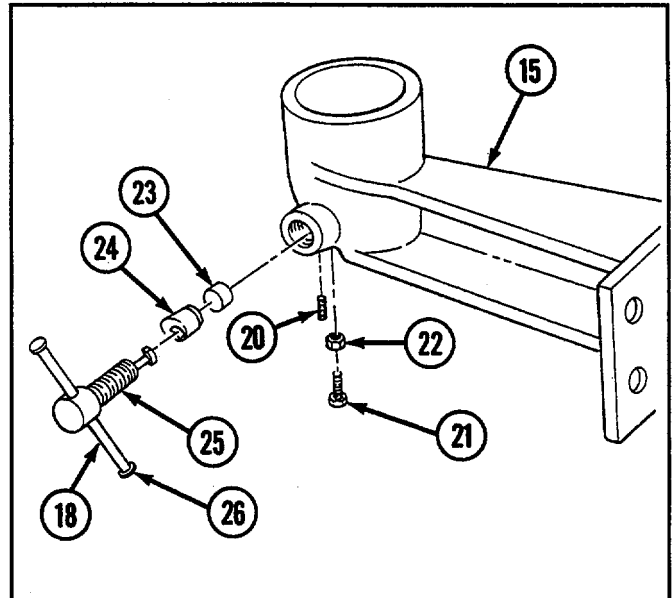


9-27 REPLACE/REPAIR COMMANDER'S CUPOLA ASSEMBLY--Continued

NOTE

Remove pins (18 and 19) only if replacement is necessary.

- 4 Remove from gun support pintle (15), setscrews (20 and 21), nut (22), block (23), adapter (24), screw (25), two buttons (26), and pin (18). File or grind off beveled ends of pin to remove.
- 5 Remove seal (27). Clean all dirt and adhesive from gun ring assembly (28).
- 6 Remove lock ring shoe (29) by removing bolt (30), pin (19), and two buttons (31). File or grind off beveled ends of pin to remove.
- 7 Remove eight screws (32) and eight lockwashers (33). Lift out padding assembly (34).

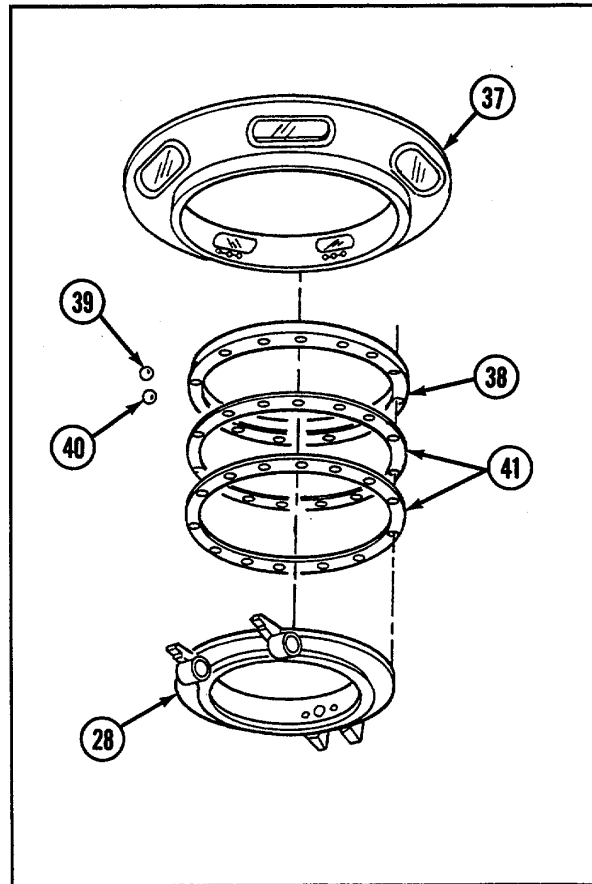
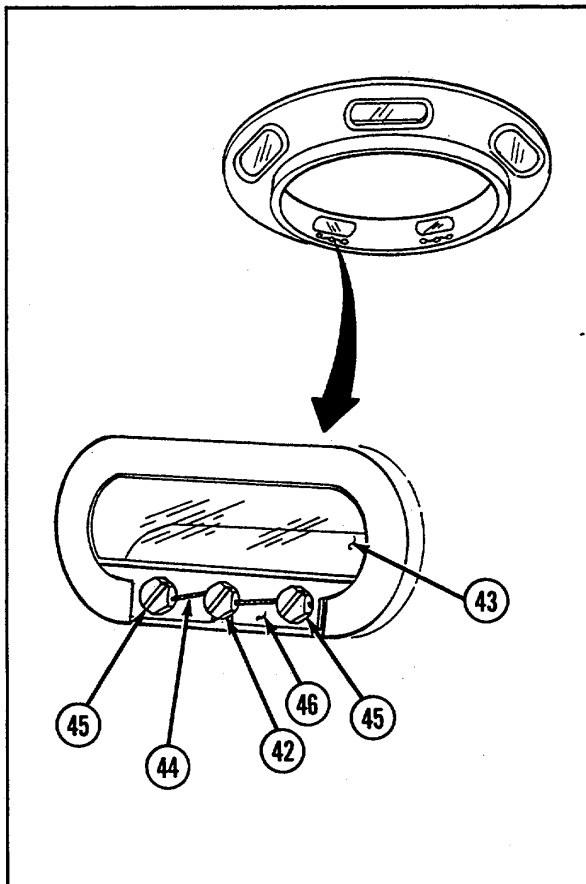
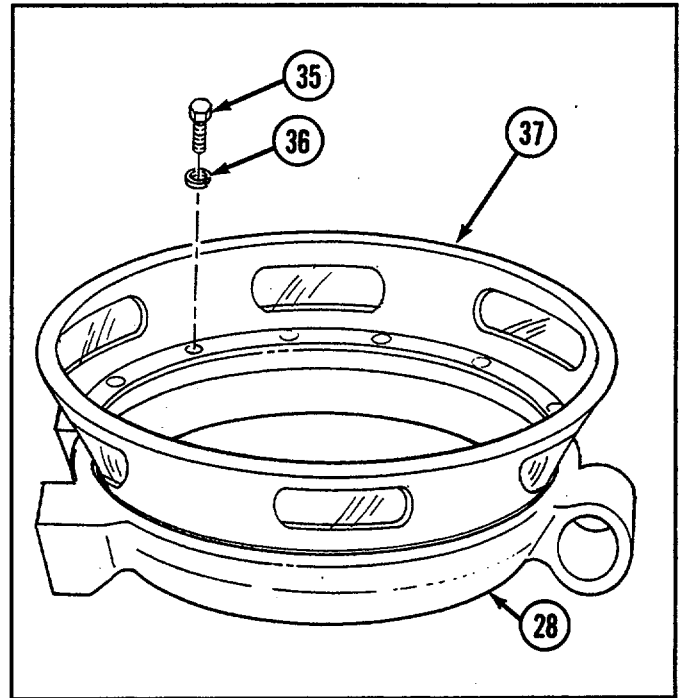


- 8 Remove 17 screws (35) and 17 lockwashers (36) from gun ring assembly (28) and cupola body assembly (37).
- 9 Remove bearing retainer (38), 90 ball bearings (39), and 90 ball bearings (40). Separate gun ring assembly (28) from cupola body assembly (37).
- 10 Remove two bearing retainer shims (41).

NOTE

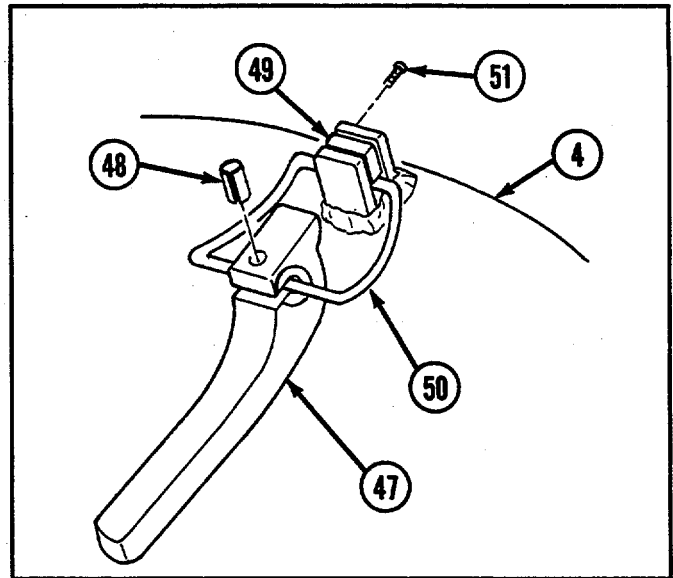
Early design models also use jacking screw (42).

- 11 Remove six direct vision blocks (43) by cutting lockwire (44) and removing two screws (45) on each prism lock wedge (46).
- 12 Remove six prism lock wedges (46).



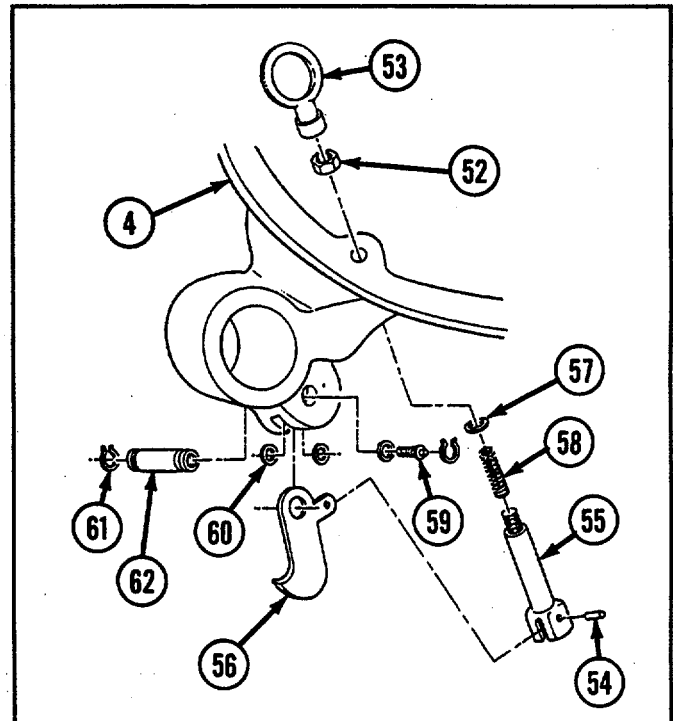
9-27 REPLACE/REPAIR COMMANDER'S CUPOLA ASSEMBLY--Continued

- 13 Remove inside latch (47) from cupola door (4) by removing spring pin (48).
- 14 Remove plug (49) and latch spring (50) by removing two screws (51).
- 15 Loosen jamnut (52) and remove rod end connector (53).
- 16 Remove jamnut (52).
- 17 Drive out pin (54). Separate trigger rod (55) from latch (56) and remove trigger rod, washer (57), and spring (58).
- 18 Remove lubrication fitting (59), three flat washers (60), and two retaining rings (61).
- 19 Drive out pin (62) and remove latch (56) from cupola door (4).



c. ASSEMBLY

- 1 Insert trigger rod (55) through spring (58), washer (57), and cupola door (4).
- 2 Install latch (56) to cupola door (4) with pin (62).
- 3 Install lubrication fitting (59), three flat washers (60), and two retaining rings (61).
- 4 Attach trigger rod (55) to latch (56) with pin (54).
- 5 Install jamnut (52).
- 6 Install rod end connector (53) and tighten jamnut (52).
- 7 Install plug (49) and latch spring (50) with two screws (51).
- 8 Install inside latch (47) to cupola door (4) with spring pin (48).



NOTE

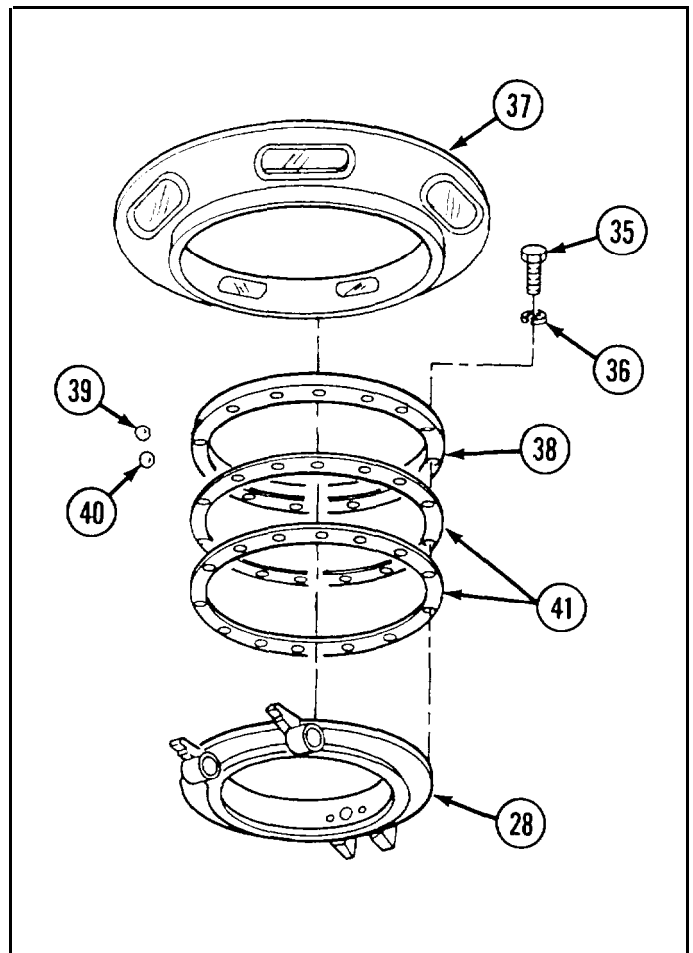
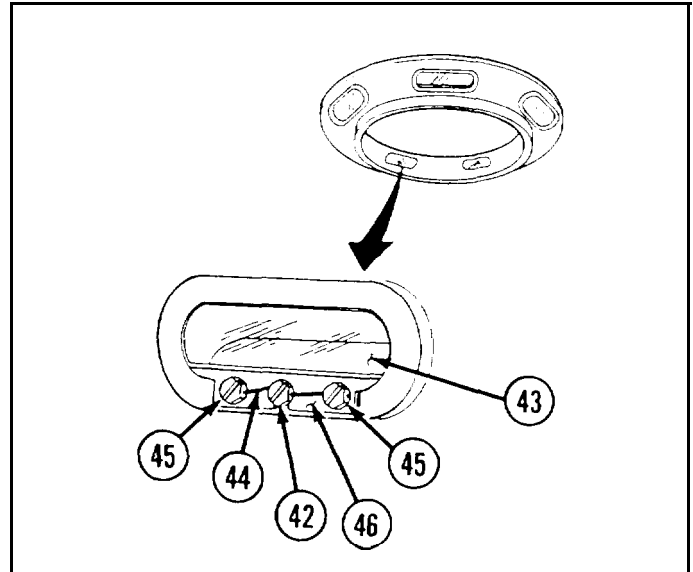
Early design models also use jacking screw (42).

- 9 Install six direct vision blocks (43) and six prism lock wedges (46). Apply sealing compound. Secure with two screws (45). Secure screws with new lockwire (44).
- 10 Install two bearing retainer shims (41) in gun ring assembly (28). Lubricate bearing with grease (see Appendix J).
- 11 Install cupola body assembly (37) on gun ring assembly (28).

CAUTION

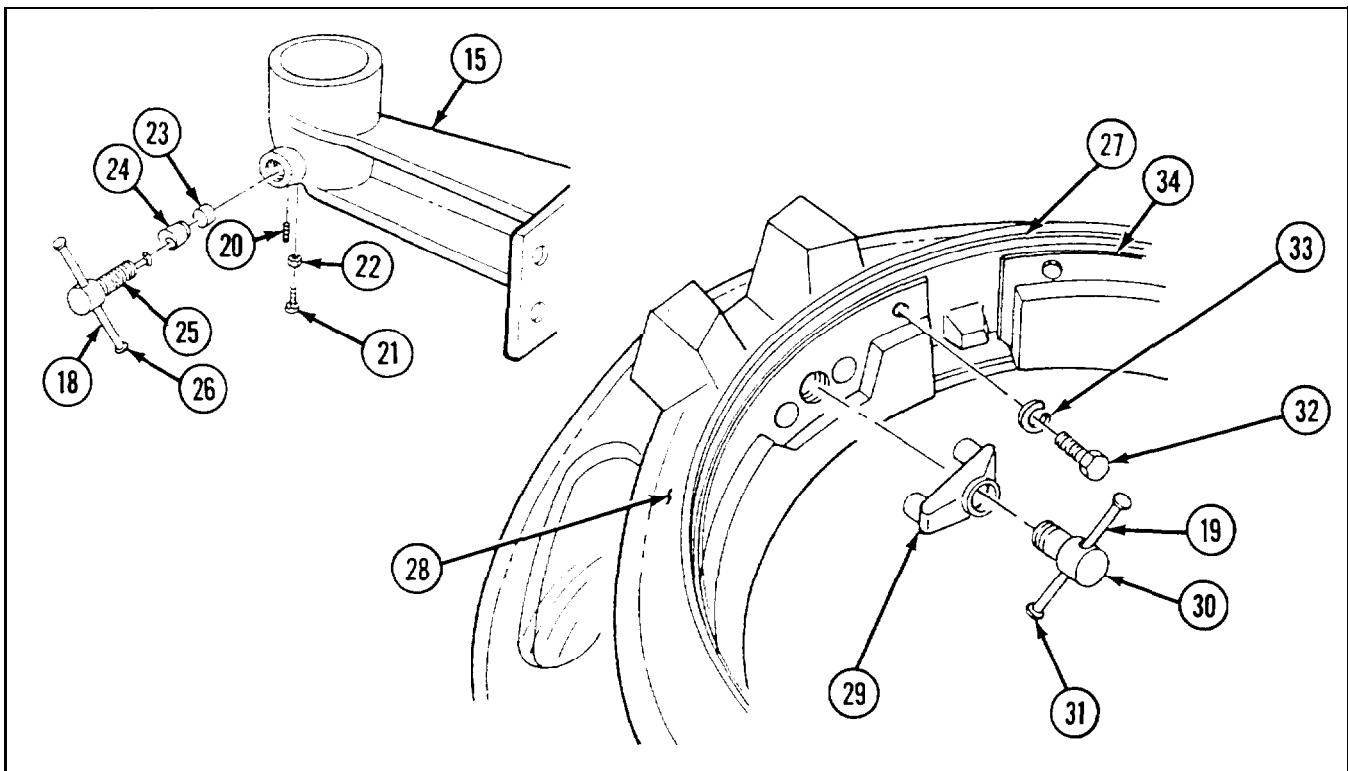
When assembling ball bearings (39 and 40) in gun ring assembly (28), alternate ball bearings around circumference of gun ring assembly.

- 12 Install 90 ball bearings (40), 90 ball bearings (39), and bearing retainer (38) to gun ring assembly (28). Secure with 17 screws (35) and 17 new lockwashers (36).



9-27 REPLACE/REPAIR COMMANDER'S CUPOLA ASSEMBLY-Continued

- 13 Install padding assembly (34) with eight new lockwashers (33) and eight screws (32). Torque not to exceed 96 pound-inches (lb-in.) (10.8 newton-meters [N•m]).
- 14 Install new seal (27) by applying adhesive and pressing seal into place.
- 15 Install lock ring shoe (29) with bolt (30) and new pin (19). Peen ends of pin. Install two buttons (31)
- 16 Install setscrews (20 and 21), nut (22), block (23), adapter (24), screw (25), and new pin (18) to gun support pintle (15). Peen ends of pm. Install two buttons (26)



- 17 Install gun support pintle (15) with four screws (17). Secure screws with new lockwire (16).

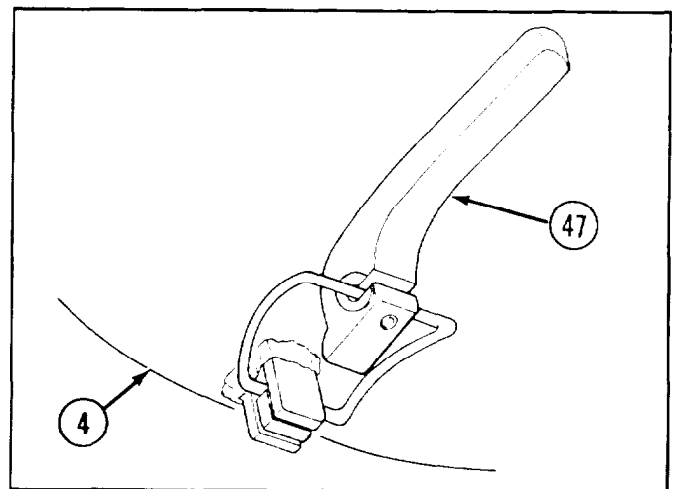
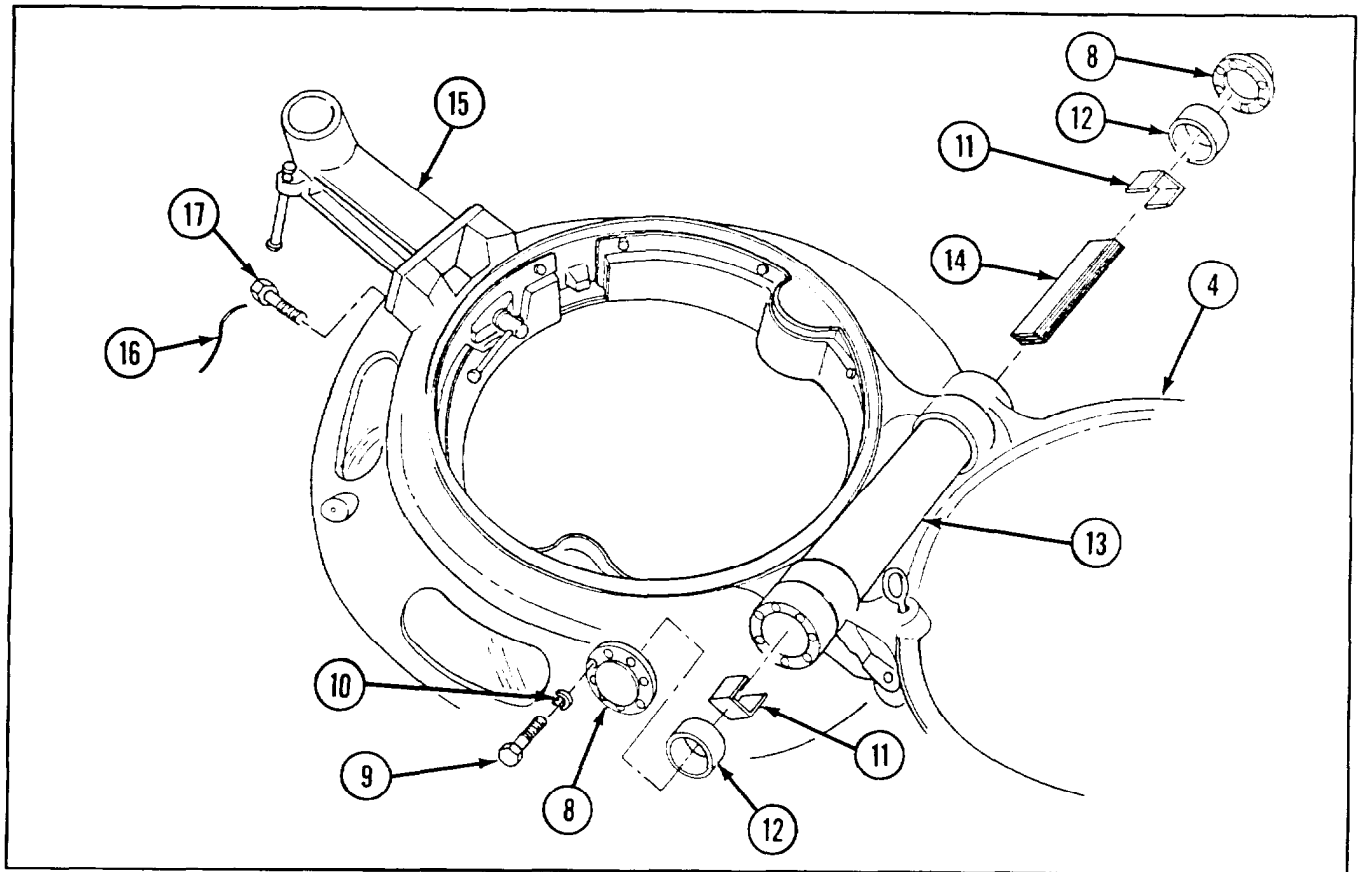
WARNING

Be sure that springs (14) are installed with cupola door (4) open in vertical position. Secure cupola door open to prevent accidental closure.

NOTE

Allow adhesive to dry before closing cupola door (4)

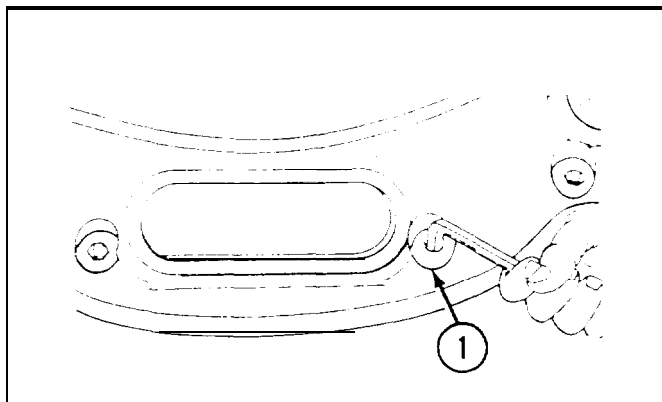
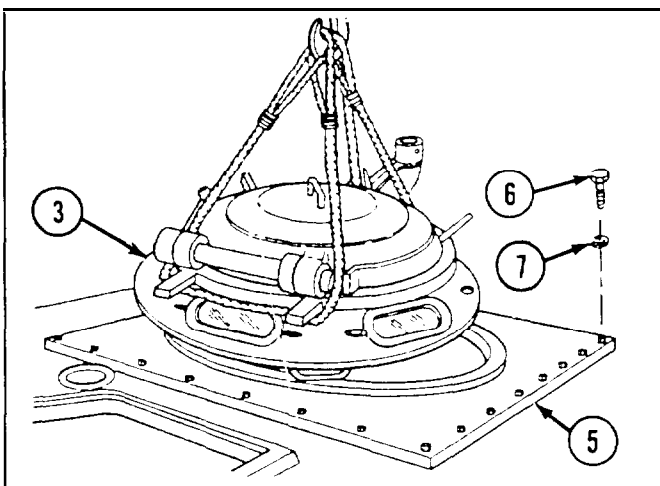
- 18 Place cupola door (4) in vertical position and install with six springs (1-t), tube (13), two bearings (12), two adapters (11), and two cap assemblies (8). Secure cap assemblies with eight screws (9) and eight new lockwashers (10) each.
- 19 Secure cupola door (4) with inside latch (47)



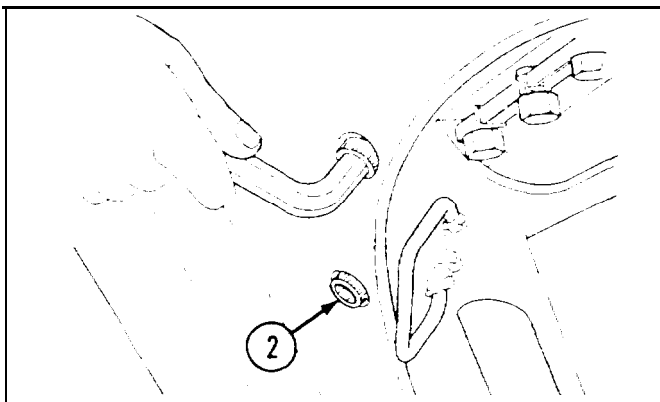
9-27 REPLACE/REPAIR COMMANDER'S CUPOLA ASSEMBLY--Continued

d. INSTALLATION

- 1 Install mounting plate (5) with 30 screws (6) and 30 new lockwashers (7).
- 2 Install cupola (3) on mounting plate (5) with 12 socket nuts (2) and 12 screws (1). Torque to 84-120 lb-m. (9.5-13.6 N•m).



OUTSIDE VIEW



INSIDE VIEW

9-28 REPLACE/REPAIR DRIVER'S CAB-TOP DOOR AND RELATED PARTS

THIS TASK COVERS

- a. Removal
- b. Disassembly
- c. Assembly
- d. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Pliers set, retaining (Appendix C, item 29)

Material/Parts:

- Adhesive (Appendix D, item 1 or 2)
- Lockwashers (5) (Appendix G, item 132)
- Nut, self-locking (Appendix G, item 163)
- Nuts, self-locking (2) (Appendix G, item 171)
- Packing (Appendix G, item 180)
- Pin, cotter (Appendix G, item 211)
- Strip, rubber (Appendix G, item 271)

Personnel Required:

Three

Reference:

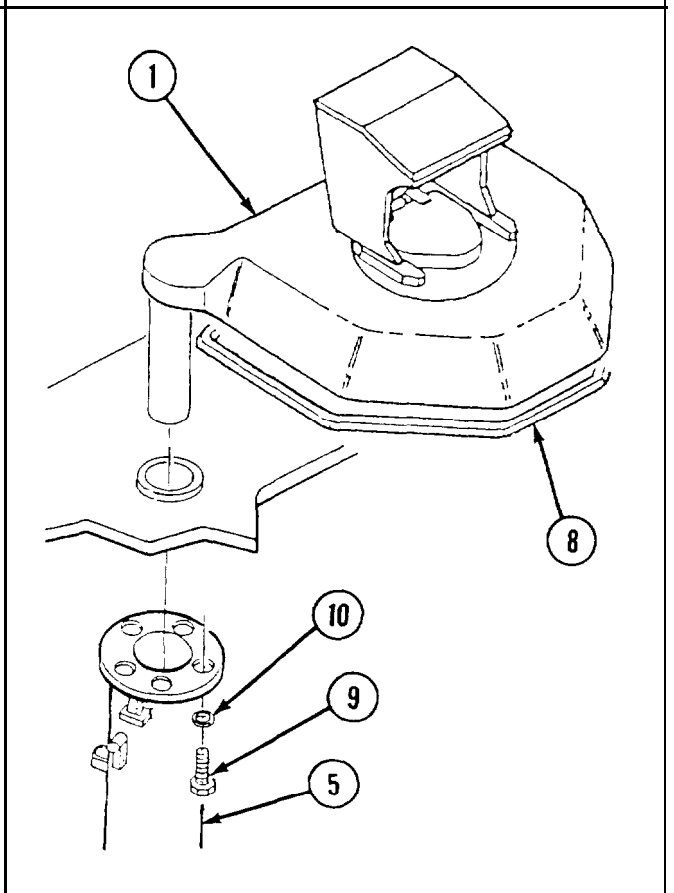
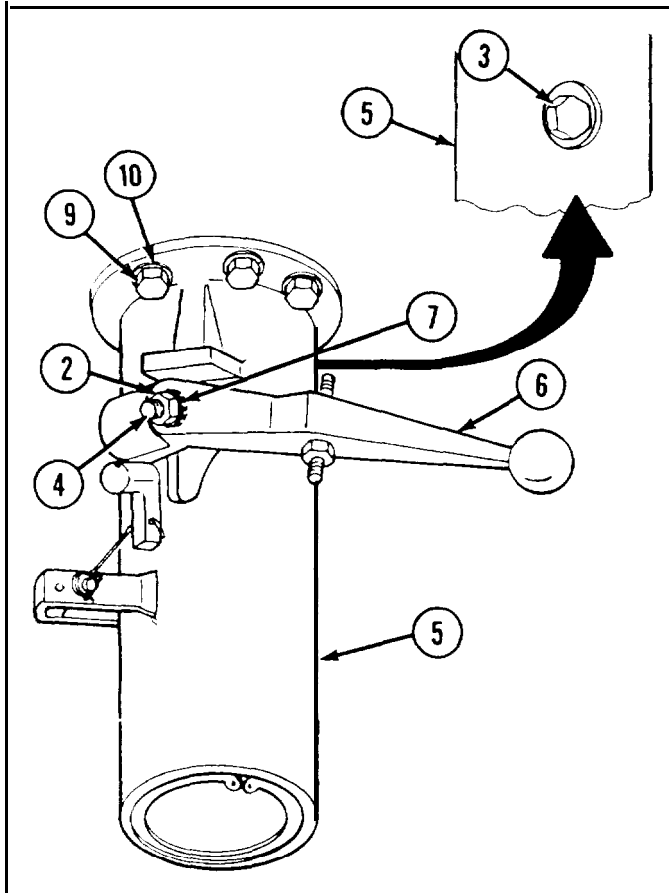
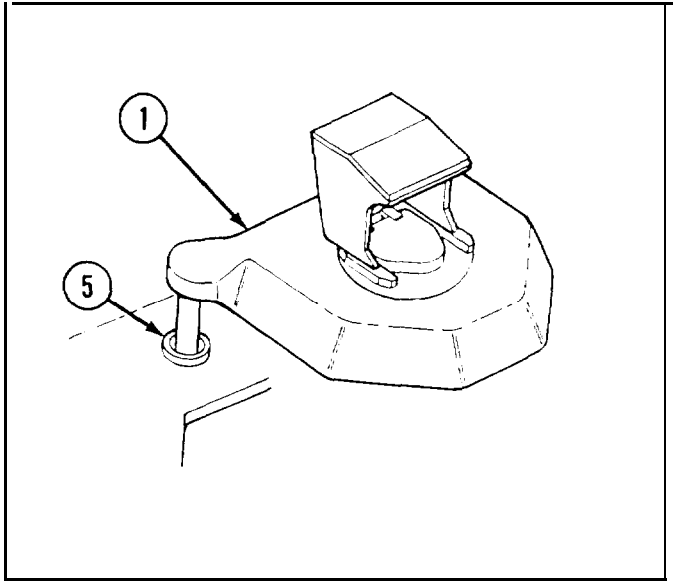
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a. REMOVAL

NOTE

See paragraph 9-38 for removal, disassembly, assembly, and installation of passive night viewer mount.

- 1 Raise driver's cab-top door (1) about 2 inches (in.) (51 millimeters [mm]) to align self-locking nuts (2 and 3) on arm control pin (4) with opening in shaft housing (5).
- 2 Remove control arm (6) by removing self-locking nut (2), arm control pin (4), washer (7), and self-locking nut (3).
- 3 Remove driver's cab-top door (1) by pulling up through shaft housing (5).
- 4 Remove rubber strip (S) from driver's cab-top door (1).
- 5 Remove shaft housing (5) by removing five screws (9) and five lockwashers (10).



3-28 REPLACE/REPAIR DRIVER'S CAB-TOP DOOR AND RELATED PARTS-Continued

- 6 Remove adjusting screw (11) and self-locking nut (12) from control arm (6).
- 7 Remove retaining latch (13) by removing cotter pin (14), straight pm (15), spring (16), and washer (17).
- 8 Remove spring (18) from shaft housing (5).
- 9 Remove retaining ring (19), bearing retainer (20), bearing (21), and disk (22).

b. DISASSEMBLY

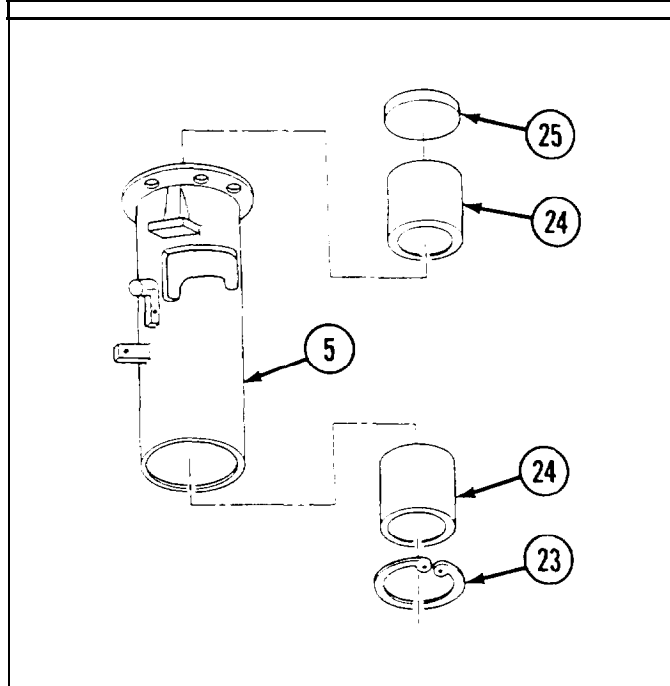
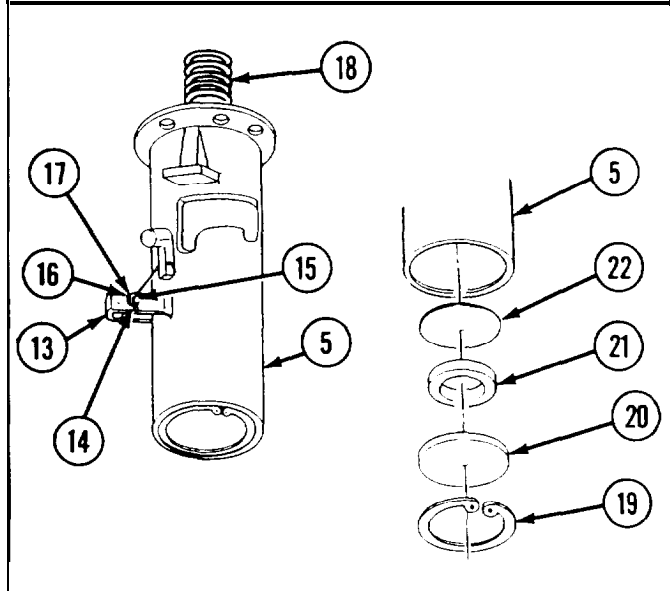
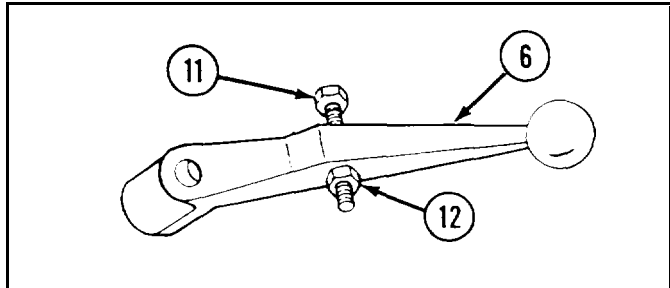
Remove retaining ring (23), two bearings (24), and packing (15) from shaft housing (5).

c. ASSEMBLY

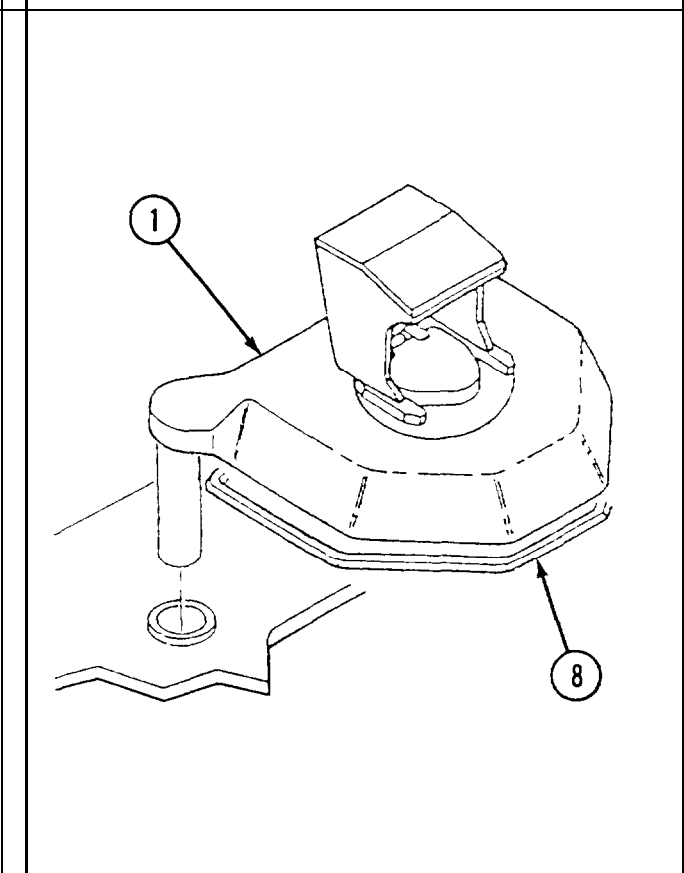
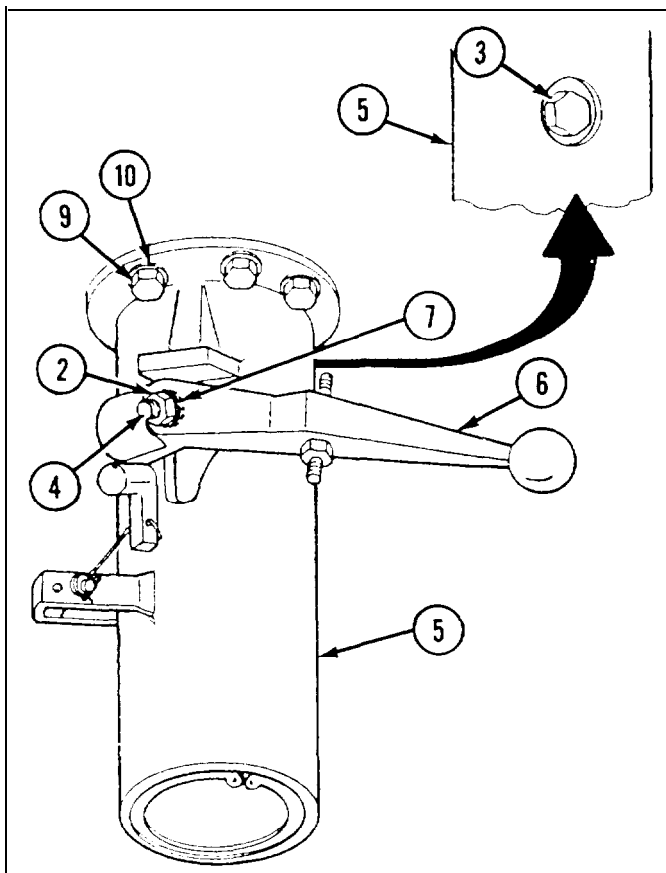
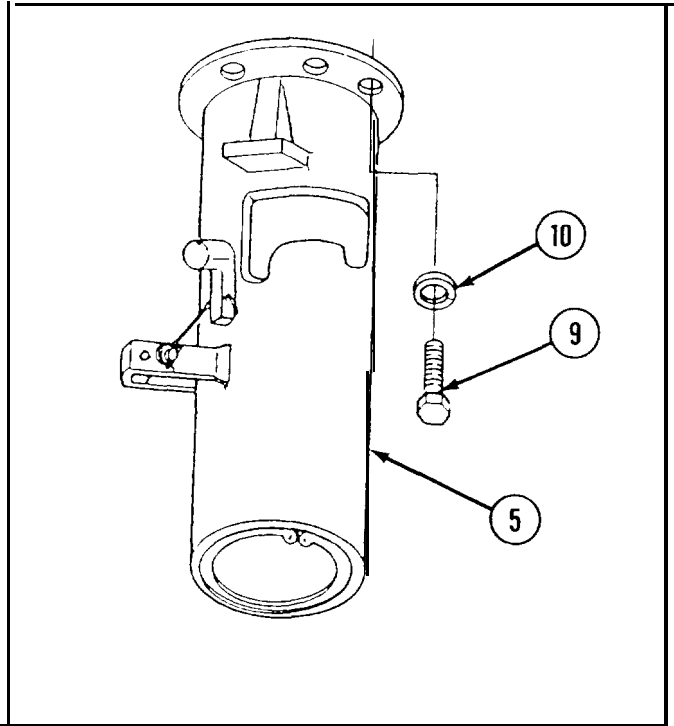
Install two bearings (24), retaining ring (23), and new packing (25) in shaft housing (5) and lubricate (see Appendix J).

d. INSTALLATION

- 1 Install disk (22), bearing (21), and bearing retainer (20), and secure with retaining ring (19).
- 2 Install spring (18) in shaft housing (5).
- 3 Install retaining latch (13) with straight pin (15), spring (16), washer (17), and new cotter pin (14).
- 4 Install adjusting screw (11) and new self-locking nut (12) on control arm (6).



- 5 Install assembled shaft housing (5) with five screws (9) and five new lockwashers (10).
- 6 Install new rubber strip (8) on driver's cab-top door (1) with adhesive.
- 7 Install driver's cab-top door (1) into shaft housing (5).
- 8 Install control arm (6) with new self-locking nut (2), arm control pin (4), washer (7), and new self-locking nut (3).



9-29 REPLACE/REPAIR MECHANIC' S CAB-TOP DOOR AND RELATED PARTS

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic' s (Appendix, C, item 53)
- Pliers set, retaining (Appendix C, item 29)

Material/Parts:

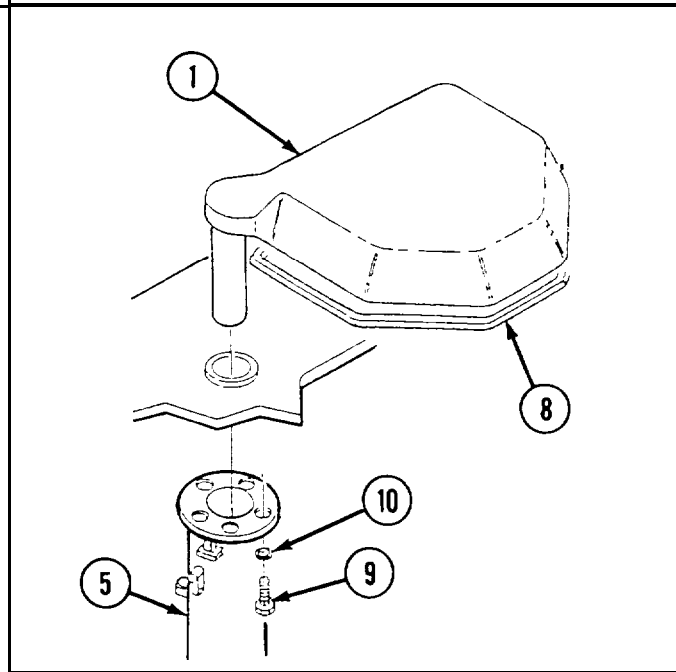
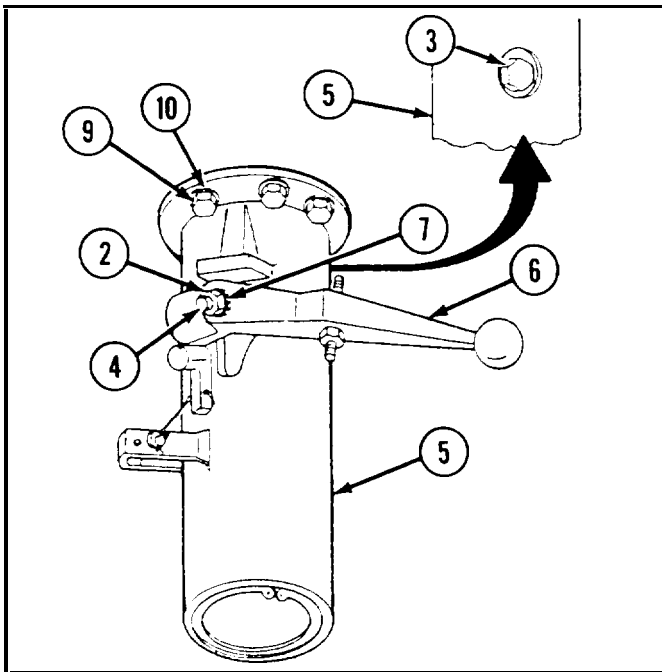
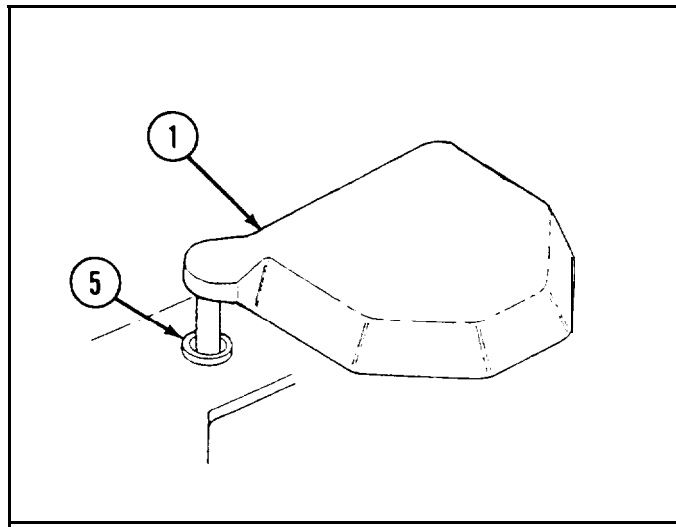
- Adhesive (Appendix D, item 1 or 2)
- Lockwashers (5) (Appendix G, item 132)
- Nuts, self-locking (3) (Appendix G, item 171)
- Packing (Appendix G, item 180)
- Pin, cotter (Appendix G, item 211)
- Seal (Appendix G, item 256)

Personnel Required:
Three

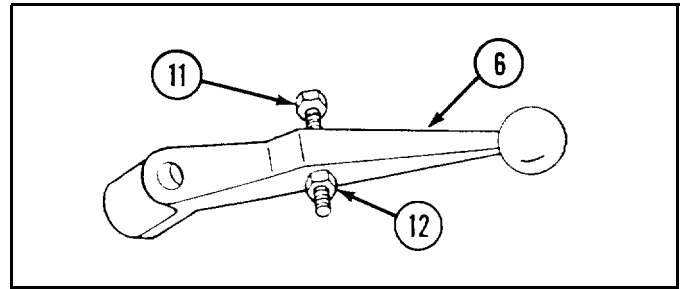
Reference:
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a. REMOVAL

- 1 Raise mechanic' s cab-top door (1) about 2 in. (51 mm) to aline self-locking nuts (2 and 3) on arm control pin (4) with opening in shaft housing (5).
- 2 Remove control arm (6) by removing self-locking nut (2), arm control pm (4), washer (7), and self-locking nut (3).
- 3 Remove mechanic' s cab-top door (1) by pulling up through shaft housing (5).
- 4 Remove seal (8) from mechanic' s cab-top door (1).
- 5 Remove shaft housing (5) by removing five screws (9) and five lockwashers (10).



- 6 Remove adjusting screw (11) and self-locking nut (12) from control arm (6).
- 7 Remove retaining latch (13) by removing cotter pin (14), straight pin (15), spring (16), and washer (17).
- 8 Remove spring (18) from shaft housing (5).
- 9 Remove retaining ring (19), bearing retainer (20), bearing (21), and disk (22).



b. DISASSEMBLY

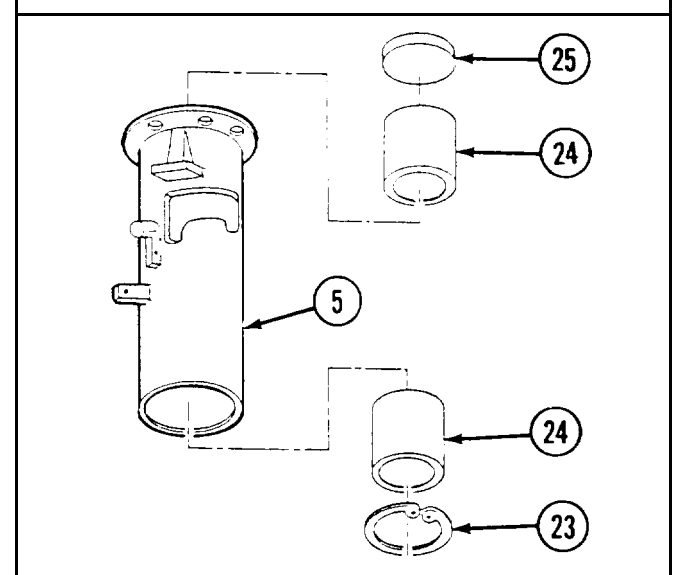
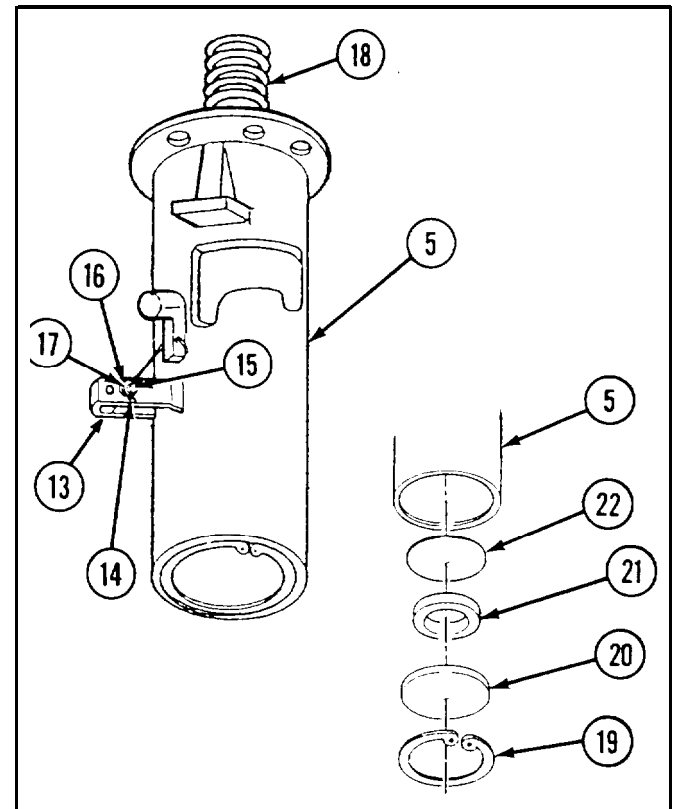
Remove retaining ring (23), two bearings (24), and packing (25) from shaft housing (5).

c. ASSEMBLY

Install two bearings (24), retaining ring (23), and new packing (25) in shaft housing (5) and lubricate (see Appendix J).

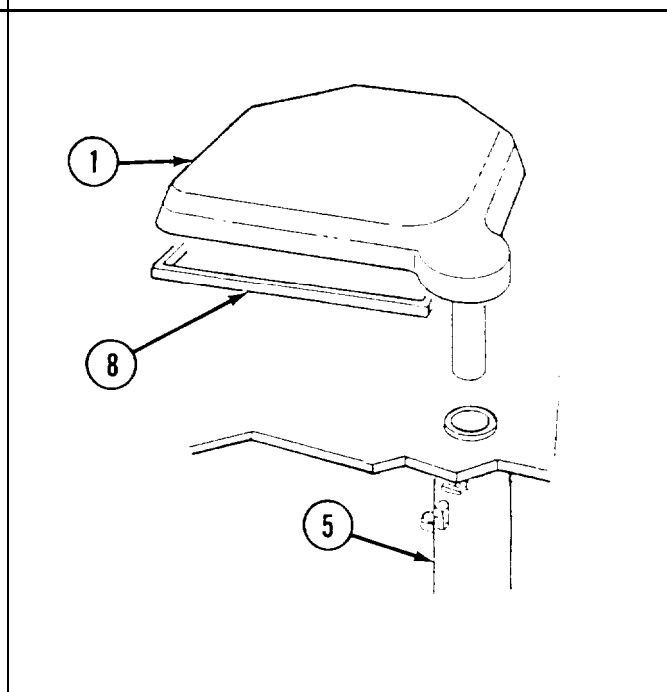
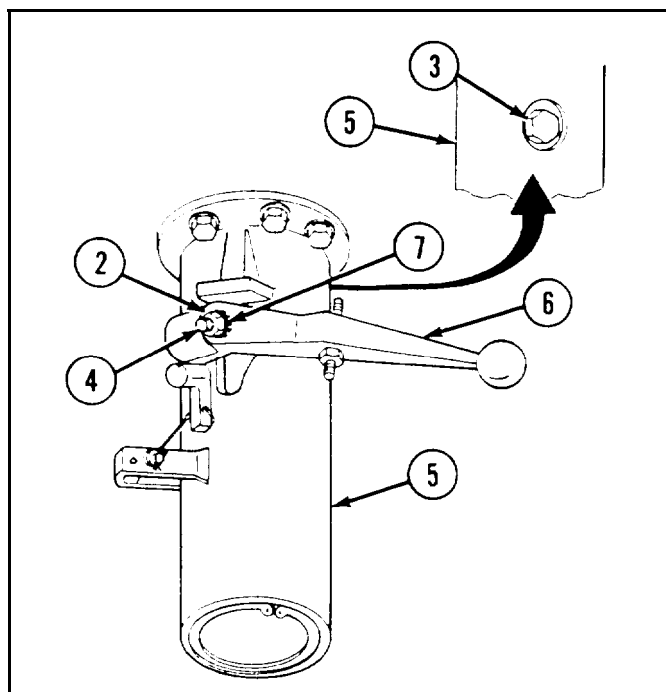
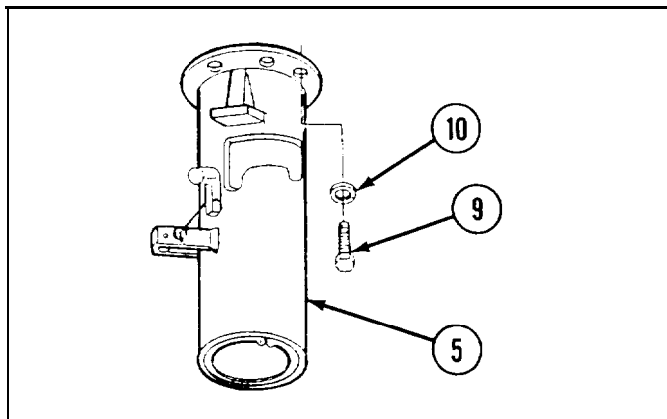
d. INSTALLATION

- 1 Install disk (22), bearing (21), and bearing retainer (20), and secure with retaining ring (19).
- 2 Install spring (18) in shaft housing (5).
- 3 Install retaining latch (13) with straight pin (15), spring (16), washer (17), and new cotter pin (14).
- 4 Install adjusting screw (11) and new self-locking nut (12) on control arm (6).



9-29 REPLACE/REPAIR MECHANIC'S CAB-TOP DOOR AND RELATED PARTS-Continued

- 5 Install assembled shaft housing (5) with five screws (9) and five new lockwashers (10).
- 6 Install new seal (8) on mechanic's cab-top door (1) with adhesive.
- 7 Install mechanic's cab-top door (1) into shaft housing (5).
- 8 Install control arm (6) with new self-locking nut (2), arm control pin (4), washer (7), and new self-locking nut (3).



9-30 REPLACE/REPAIR RIGGER'S CAB-TOP DOOR AND RELATED PARTS

THIS TASK COVERS

- a. Removal
- b. Disassembly
- c. Assembly
- d. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Pliers set, retaining (Appendix C, item 29)

Material/Parts:

- Adhesive (Appendix D, item 1 or 2)
- Gasket (Appendix G, item 75)
- Lockwashers (11) (Appendix G, item 132)
- Nut, self-locking (Appendix G, item 163)
- Nuts, self-locking (2) (Appendix G, item 171)
- Packing (Appendix G, item 180)
- Pin, cotter (Appendix G, item 211)
- Strip, rubber (Appendix G, item 271)

Personnel Required:

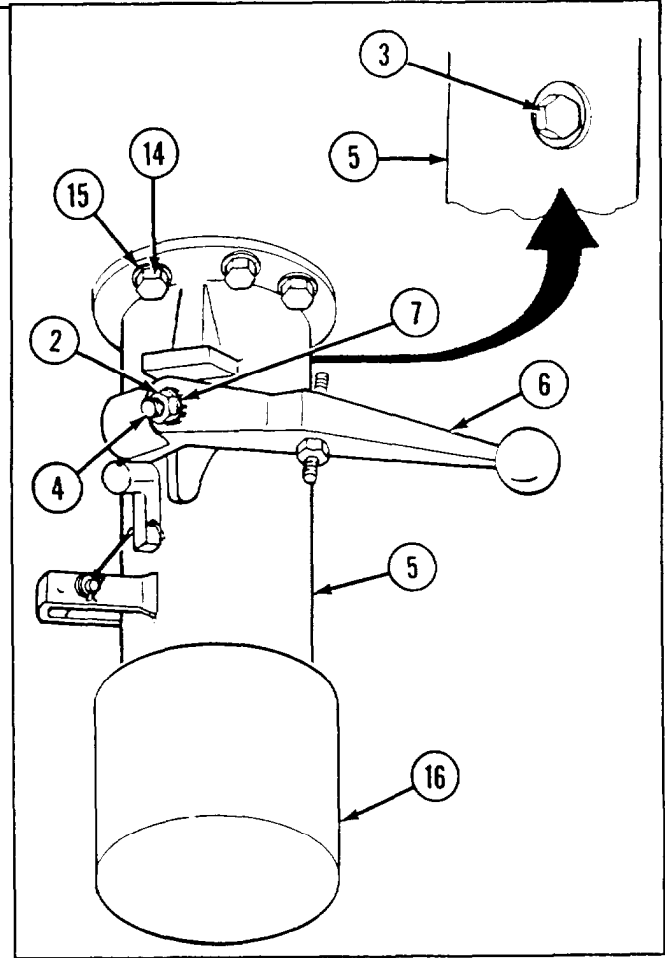
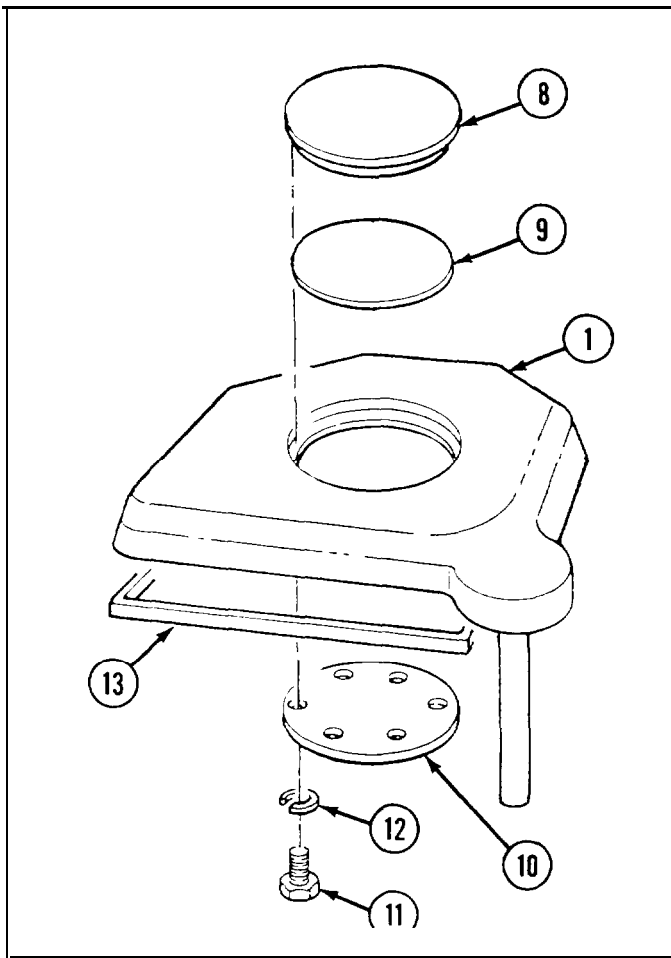
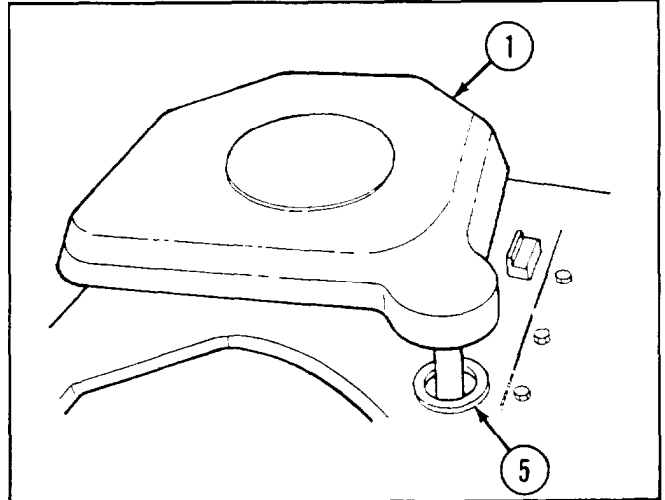
Three

Reference:

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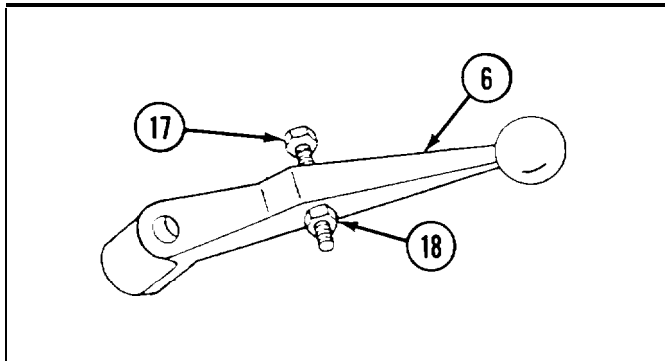
a. REMOVAL

- 1 Raise rigger's cab-top door (1) about 2 in. (51 mm) to align self-locking nuts (2 and 3) on arm control pin (4) with opening in shaft housing (5).
- 2 Remove control arm (6) by removing self-locking nut (2), arm control pin (4), washer (7), and self-locking nut (3).
- 3 Remove rigger's cab-top door (1) by pulling up through shaft housing (5).
- 4 Remove access cover (8), gasket (9), and access cover (10) from inside rigger's cab-top door (1) by removing six screws (11) and six lockwashers (12).
- 5 Remove rubber strip (13) from rigger's cab-top door (1).
- 6 Remove shaft housing (5) by removing five screws (14) and five lockwashers (15).
- 7 Remove cushioning pad (16) from shaft housing (5).



9-30 REPLACE/REPAIR RIGGER'S CAB-TOP DOOR AND RELATED PARTS-Continued

- 8 Remove adjusting screw (17) and self-locking nut (18) from control arm (6).



- 9 Remove retaining latch (19) by removing cotter pin (20), straight pin (21), spring (22), and washer (23).
- 10 Remove spring (24) from shaft housing (5).
- 11 Remove retaining ring (25), bearing retainer (26), bearing (27), and disk (28).

b. DISASSEMBLY

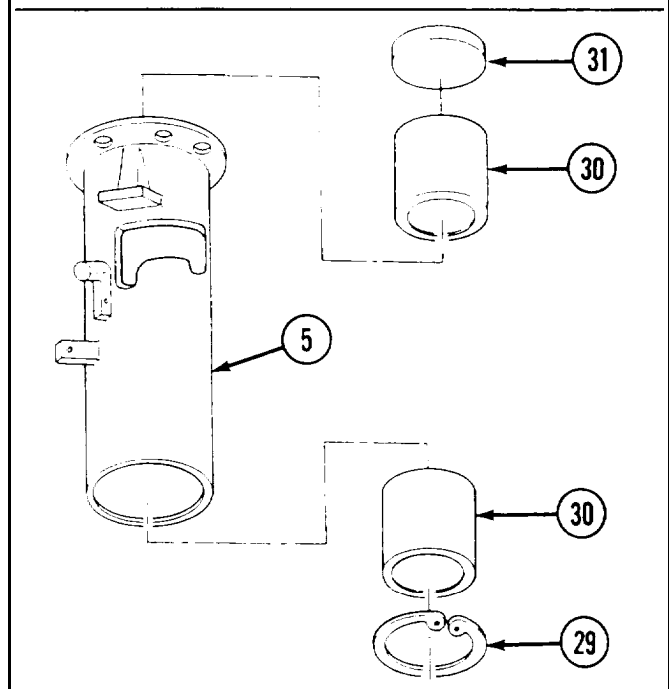
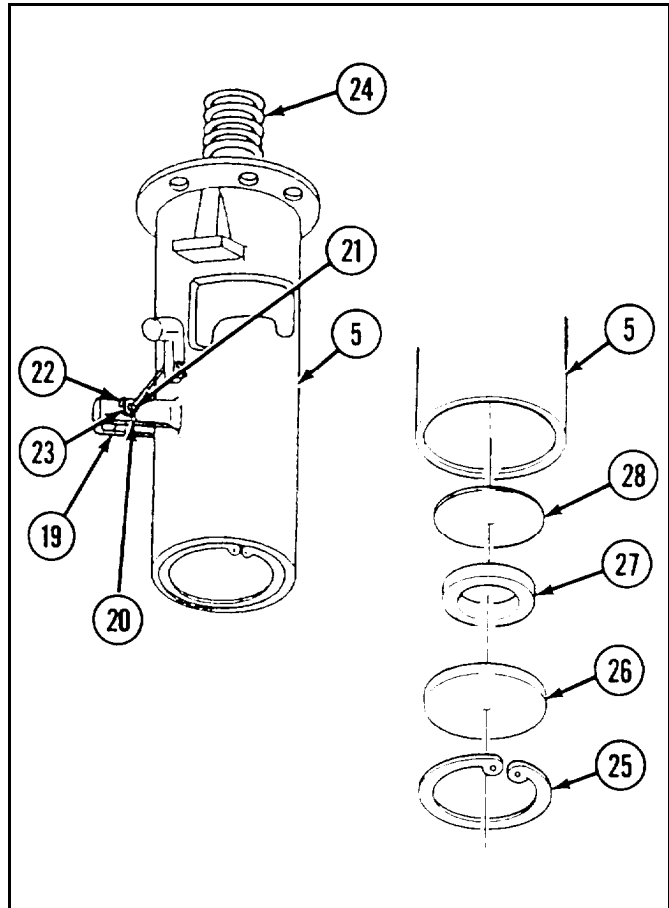
Remove retaining ring (29), two bushings (30), and packing (31) from shaft housing (5).

c. ASSEMBLY

Install two bushings (30), retaining ring (29), and new packing (31) in shaft housing (5) and lubricate (see Appendix J).

d. INSTALLATION

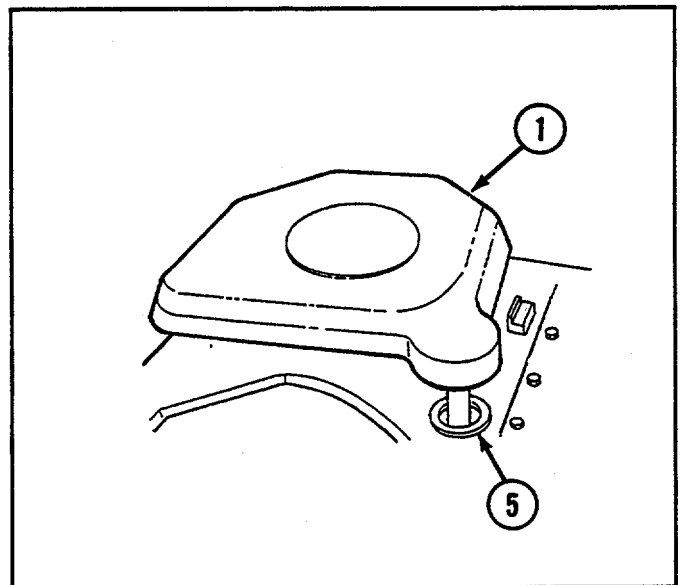
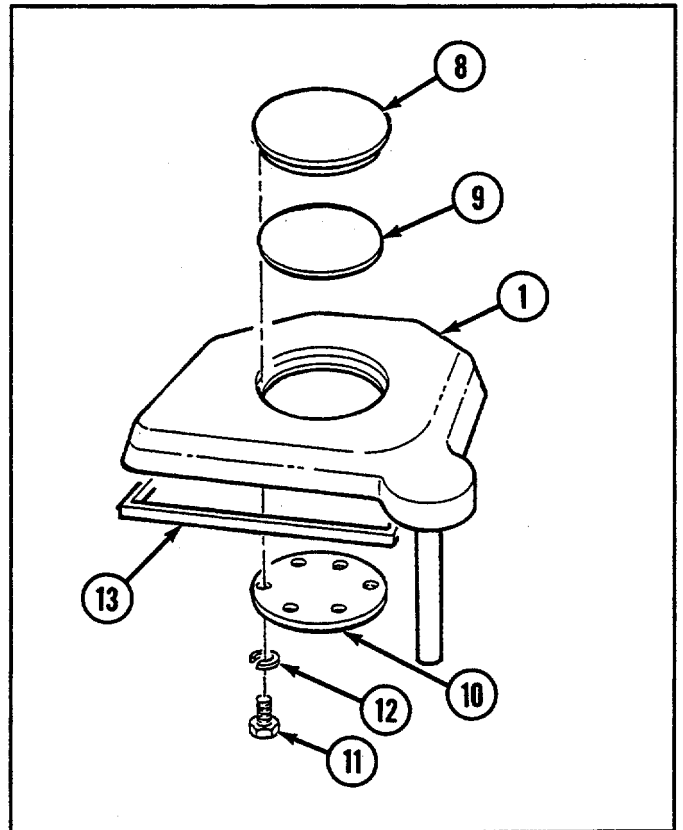
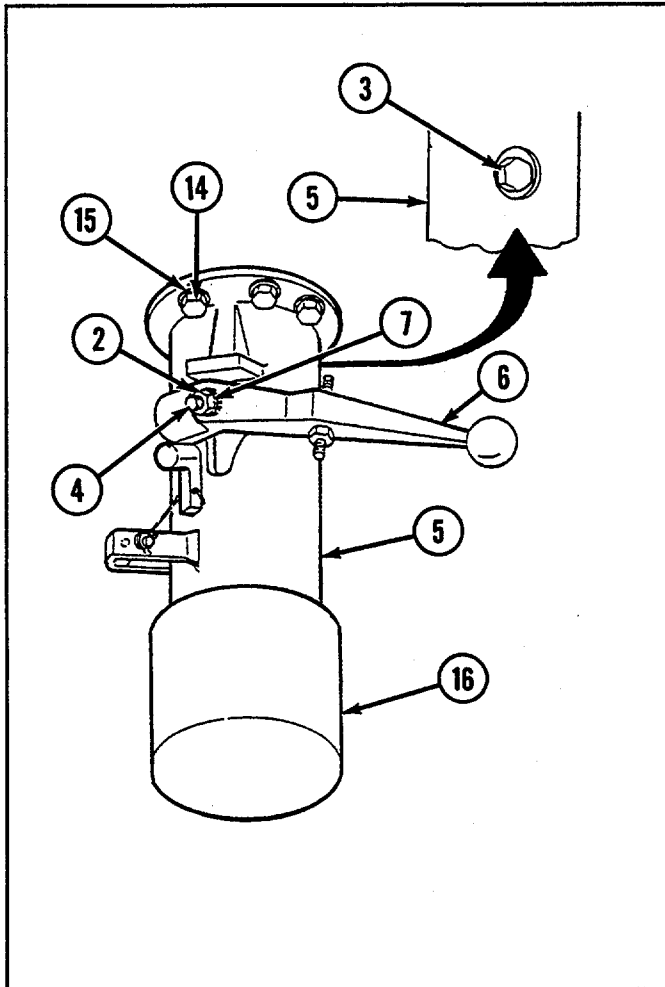
- 1 Install disk (28), bearing (27), bearing retainer (26), and secure with retaining ring (25).
- 2 Install spring (24) in shaft housing (5).
- 3 Install retaining latch (19) with straight pin (21), spring (22), washer (23), and new cotter pin (20).
- 4 Install adjusting screw (17) and new self-locking nut (18) on control arm (6).
- 5 Install cushioning pad (16) on shaft housing (5).
- 6 Install assembled shaft housing (5) with five screws (14) and five new lockwashers (15).



SECTION II: HULL AND CAB COMPONENTS

TM 9-2350-256-20

- 7 Install access cover (8), new gasket (9), and access cover (10) inside rigger's cab-top door (1) with six new lockwashers (12) and six screws (11).
- 8 Install new rubber strip (13) on rigger's cab-top door (1) with adhesive.
- 9 Install rigger's cab-top door (1) into shaft housing (5).
- 10 Install control arm (6) with new self-locking nut (2), arm control pin (4), washer (7), and new self-locking nut (3).



9-31 REPLACE WIRE ROPE ROLLER ACCESS DOOR**THIS TASK COVERS**

a. Removal

b. Installation

INITIAL SET-UP

Material/Parts:

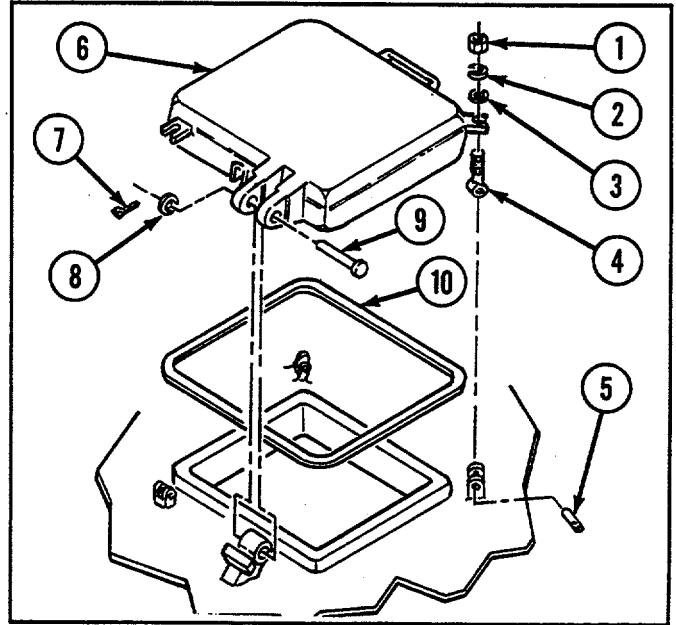
- Adhesive (Appendix D, item 2)
- Lockwashers (2) (Appendix G, item 138)
- Pin, cotter (Appendix G, item 220)
- Pins, spring (2) (Appendix G, item 231)
- Seal (Appendix G, item 257)

a. REMOVAL

- 1 Remove two nuts (1), two lockwashers (2), and two flat washers (3).
- 2 Remove two eyebolts (4) by removing spring pin (5) from each hull tab.
- 3 Remove wire rope roller access door (6) from hull by removing cotter pin (7), flat washer (8), and straight pin (9).
- 4 Remove rubber seal (10) from wire rope roller access door (6).

b. INSTALLATION

- 1 Install new rubber seal (10) on wire rope roller access door (6) with adhesive.
- 2 Install wire rope roller access door (6) with straight pin (9), flat washer (8), and new cotter pin (7).
- 3 Install two eyebolts (4) and secure each to hull with new spring pin (5).
- 4 Secure wire rope roller access door (6) to hull with two flat washers (3), two new lockwashers (2), and two nuts (1).

**9-32 REPLACE LEFT AND RIGHT STOWAGE COMPARTMENT DOORS****THIS TASK COVERS**

a. Removal

b. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Riveter, blind (Appendix C, item 42)

Material/Parts:

- Adhesive (Appendix D, item 3)
- Pins, cotter (2) (Appendix G, item 213)
- Pins, cotter (4) (Appendix G, item 216)
- Rivets (4) (Appendix G, item 238)
- Strip, rubber (Appendix G, item 274)
- Strip, rubber (Appendix G, item 275)

Personnel Required:

Two

NOTE

Removal and installation procedures are the same for both left and right stowage compartment doors.

a. REMOVAL

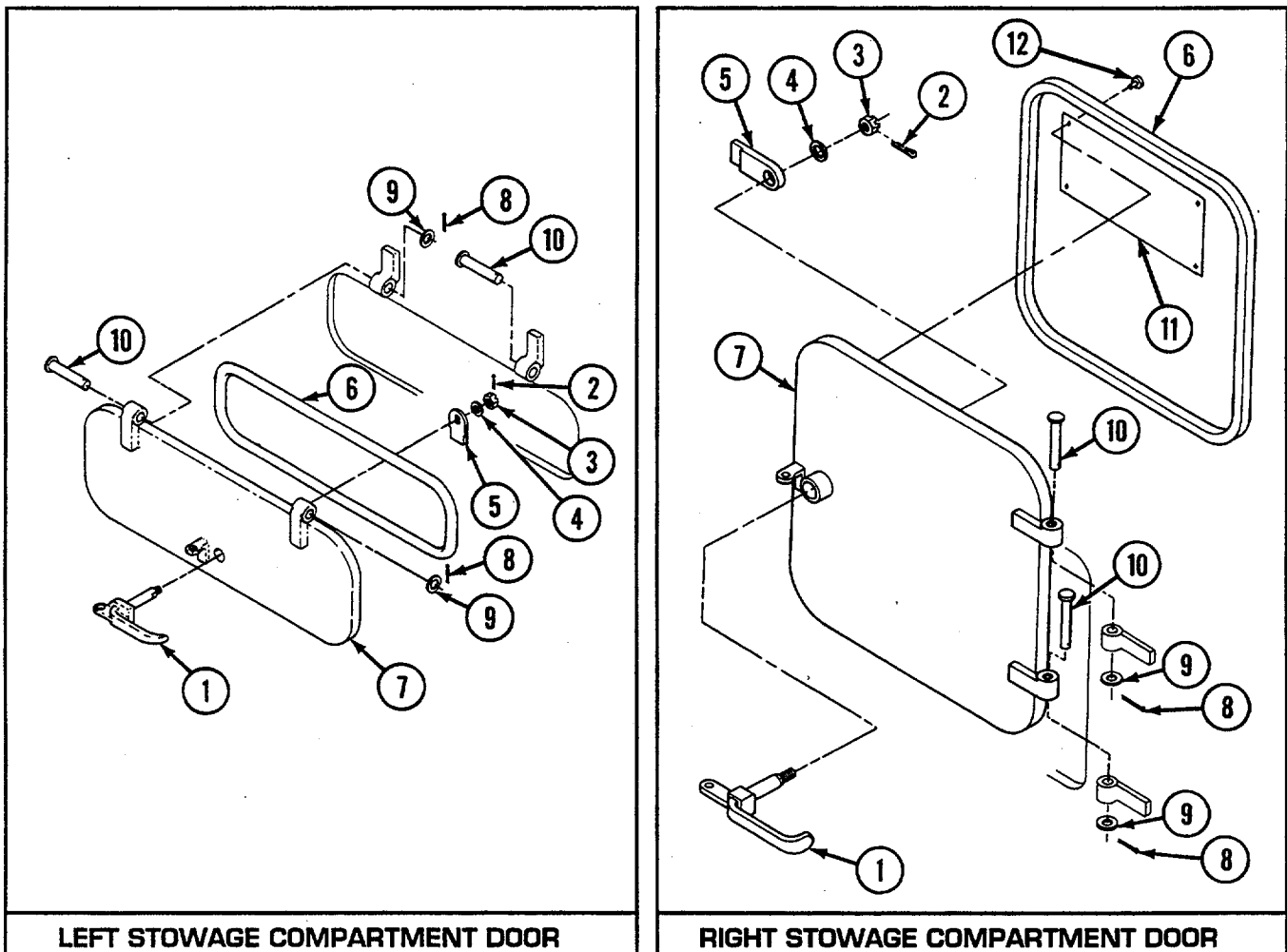
- 1 Remove handle (1) by removing cotter pin (2), nut (3), washer (4), and latch (5).
- 2 Remove rubber strip (6). Clean all dirt and adhesive from stowage compartment door (7).
- 3 Remove stowage compartment door (7) by removing two cotter pins (8), two washers (9), and two straight pins (10).

NOTE

••Step 4 applies only to right stowage compartment door.

••Remove flow regulator setting instruction plate (11) from right stowage compartment door only if illegible.

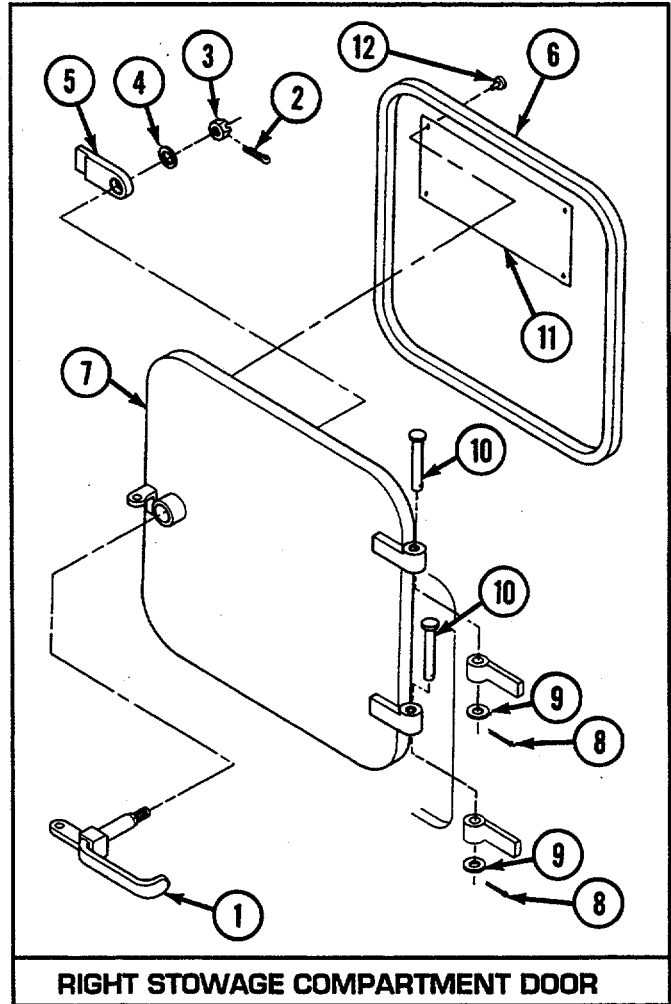
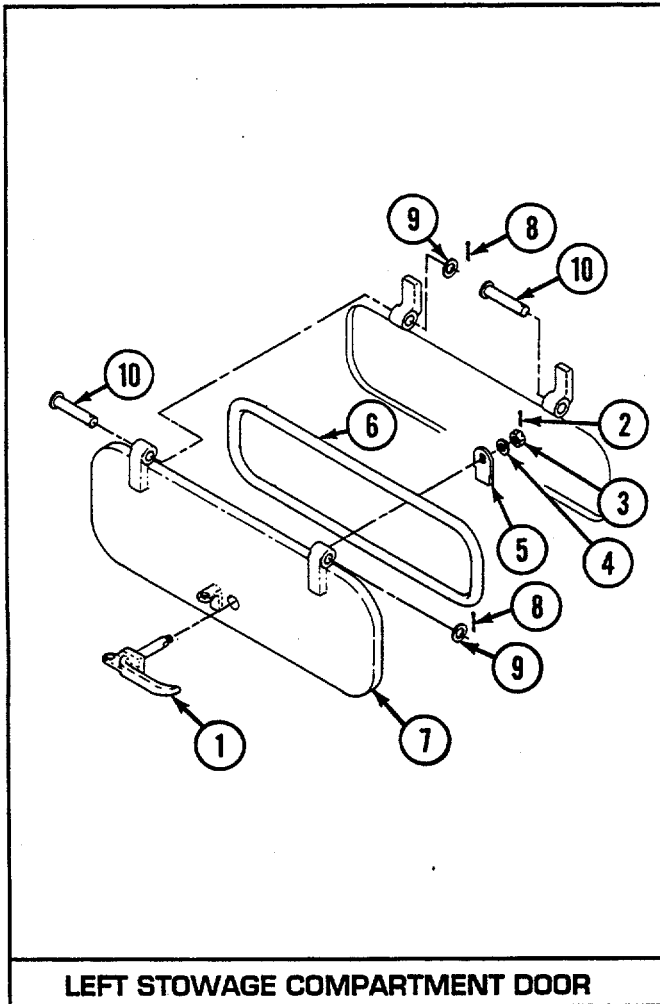
- 4 Remove flow regulator setting instruction plate (11) by removing four rivets (12).



9-32 REPLACE LEFT AND RIGHT STOWAGE COMPARTMENT DOORS-Continued

b. INSTALLATION

- 1 If removed, install flow regulator setting instruction plate (11) with four new rivets (12).
- 2 Install stowage compartment door (7) with two straight pins (10), two washers (9), and two new cotter pins (8).
- 3 Install new rubber strip (6) by applying adhesive and pressing strip in place. Allow adhesive to dry before closing stowage compartment door (7).
- 4 Install handle (1) with latch (5), washer (4), nut (3), and new cotter pin (2).



9-33 REPLACE LEFT AND RIGHT PERSONNEL DOORS

THIS TASK COVERS

a. Removal

b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Material/Parts-Continued:

•Washers, spring (2) (Appendix G, item 279)

Material/Parts:

- Adhesive (Appendix D, item 3)
- Lockwashers (8) (Appendix G, item 130)
- Lockwashers (16) (Appendix G, item 134)
- Pins, cotter (2) (Appendix G, item 216)
- Strips, rubber (2) (Appendix G, item 272)

Personnel Required:

Two

Equipment Condition:

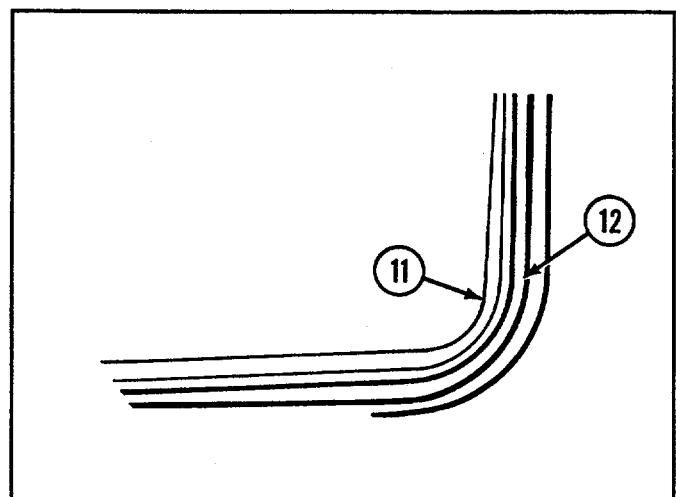
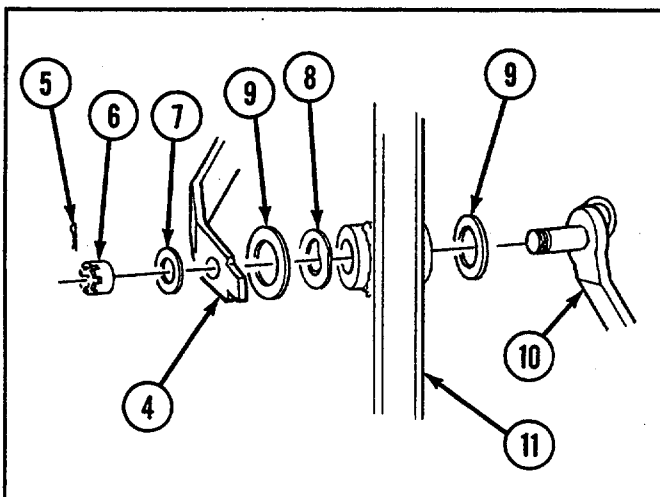
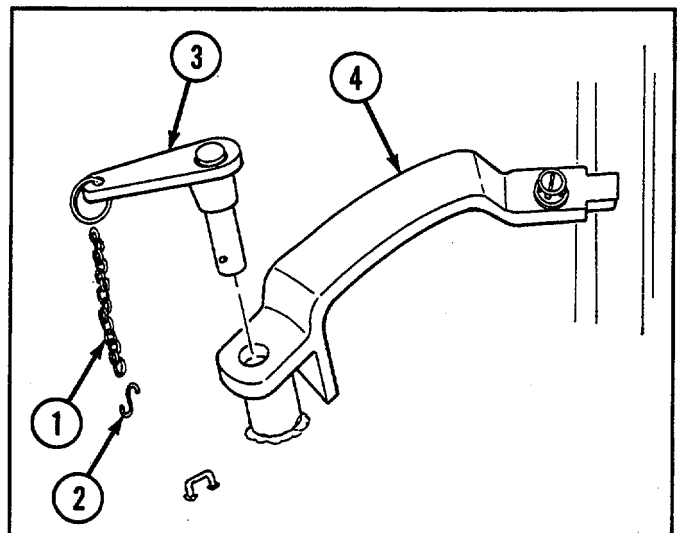
Door-mounted liquid container bracket removed
(see paragraph 9-106)

NOTE

Removal and installation procedures are the same for both left and right personnel doors.

a. REMOVAL

- 1 Remove chain (1) and S-hook (2) from quick-release pin (3).
- 2 Remove quick-release pin (3) from door handle latch (4).
- 3 Remove door handle latch (4) by removing cotter pin (5), nut (6), and washer (7). Remove spring washer (8) and two flat washers (9).
- 4 Remove door handle (10) from personnel door (11).
- 5 Remove rubber strip (12) from personnel door (11). Clean all dirt and adhesive from opening.



9-33 REPLACE LEFT AND RIGHT PERSONNEL DOOR-Continued

NOTE

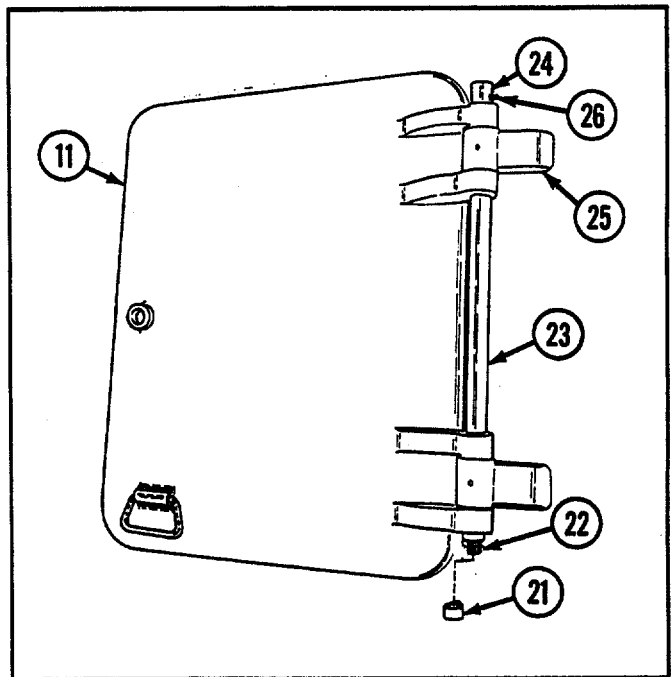
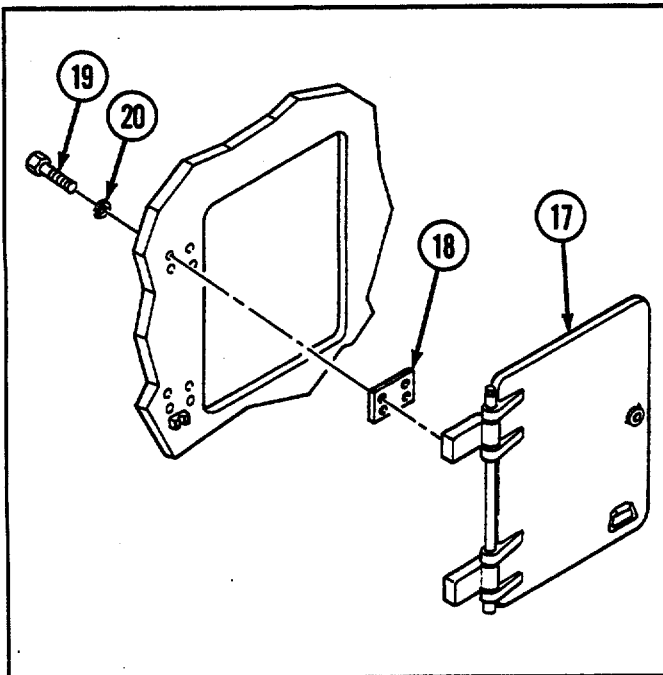
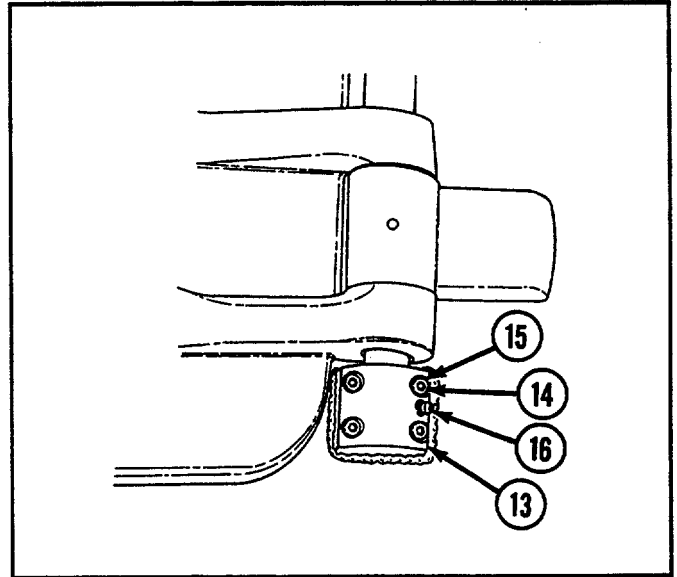
Open door halfway and secure to relieve stress on torsion bar prior to removing retainer.

- 6 Remove torsion bar retainer (13) by removing four screws (14), four lockwashers (15), and lubrication fitting (16).

WARNING

Ensure door is properly supported before removing door assembly (17) to prevent personal injury or equipment damage.

- 7 Remove door assembly (17) and two shims (18) by removing eight screws (19) and eight lockwashers (20).
- 8 Remove control cam (21), torsion bar (22), tube (23), expansion plug (24), and two hinge leaves (25).
- 9 Remove lubrication fitting (26).



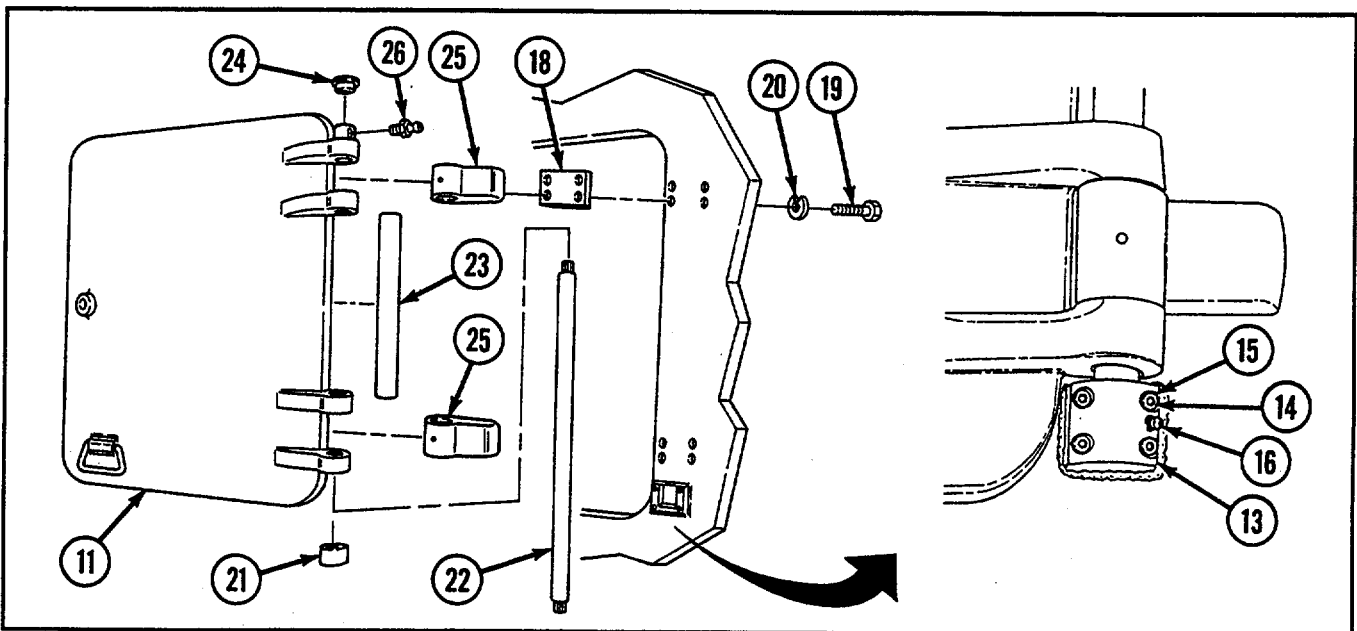
b. INSTALLATION

- 1 Install two hinge leaves (25) with two shims (18), eight new lockwashers (20), and eight screws (19).
- 2 Install personnel door (11) with torsion bar (22), tube (23), control cam (21), and expansion plug (24).
- 3 Install lubrication fitting (26).

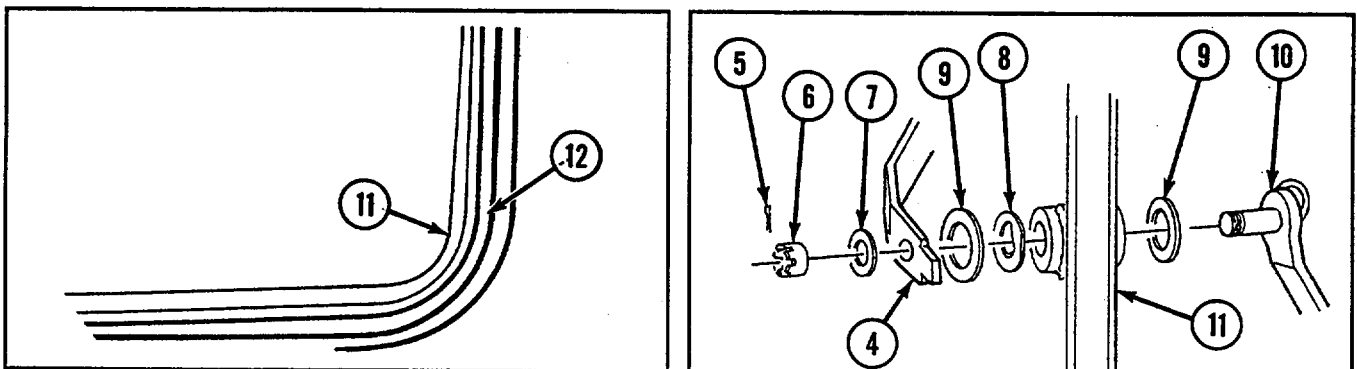
NOTE

Position door halfway open to relieve stress on torsion bar prior to installing retainer. Secure door in position.

- 4 Install lubrication fitting (16) and torsion bar retainer (13) with four new lockwashers (15) and four screws (14).



- 5 Install new rubber strip (12) on personnel door (11) by applying adhesive and pressing strip in place. Allow adhesive to dry before closing personnel door.
- 6 Install door handle (10) and door handle latch (4) with two flat washers (9), spring washer (8), washer (7), nut (6), and new cotter pin (5).

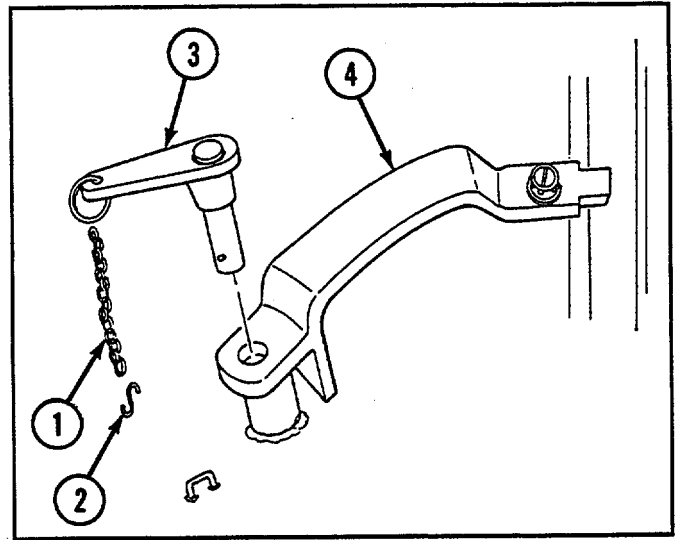


9-33 REPLACE LEFT AND RIGHT PERSONNEL DOORS--Continued

- 7 Install quick-release pin (3) on door handle latch (4).
- 8 Install S-hook (2) and chain (1) on quick-release pin (3).

NOTE

Follow-on maintenance: Install door-mounted liquid container bracket (see paragraph 9-106)

**9-34 REPLACE FUEL TANK FILLER ACCESS COVER****THIS TASK COVERS**

- a. Removal
- b. Installation

INITIAL SETJUP**Tools:**

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

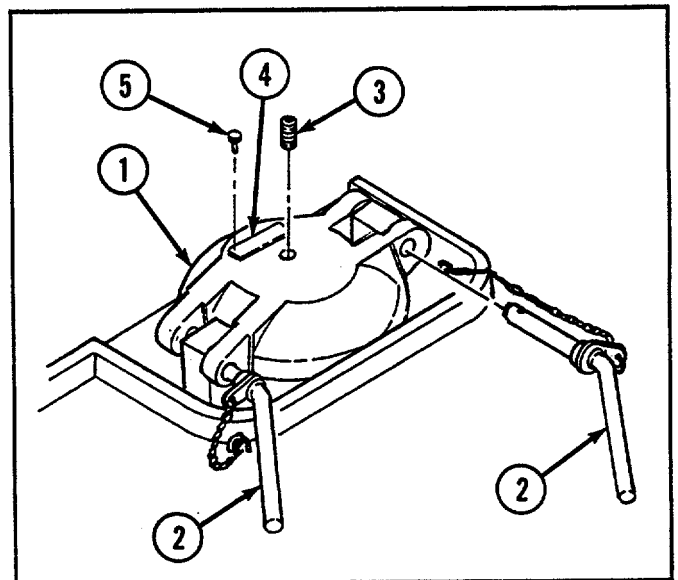
Drivescrews (4) (Appendix G, item 13)

a. REMOVAL

- 1 Remove fuel tank filler access cover (1) by removing two lockpin handles (2).
- 2 Remove pipe plug (3) from fuel tank filler access cover (1).
- 3 Remove ID plate (4) by removing four drivescrews (5).

b. INSTALLATION

- 1 Install ID plate (4) with four new drivescrews (5).
- 2 Install pipe plug (3) in fuel tank filler access cover (1).
- 3 Install fuel tank filler access cover (1) with two lockpin handles (2).



9-35 REPLACE BILGE PUMP OUTLET COVER

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

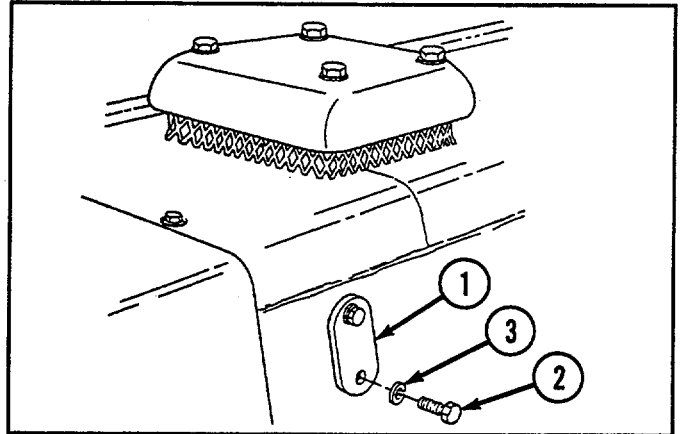
Lockwashers (2) (Appendix G, item 132)

a. REMOVAL

Remove access cover (1) by removing two screws (2) and two lockwashers (3).

b. INSTALLATION

Install access cover (1) with two new lockwashers (3) and two screws (2).



9-36 REPLACE LEFT- AND RIGHT-SIDE AIR CLEANER INLET COVERS

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Lockwashers (8) (Appendix G, item 134)

NOTE

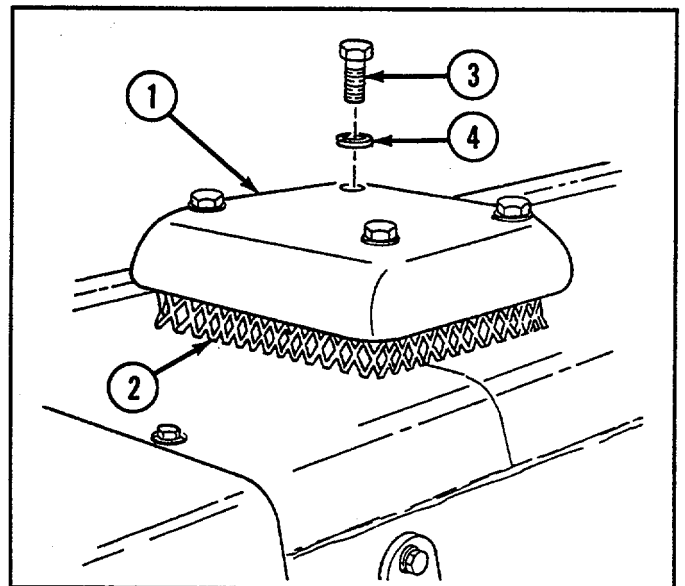
Removal and installation are the same for both left- and right-side air cleaner inlet covers.

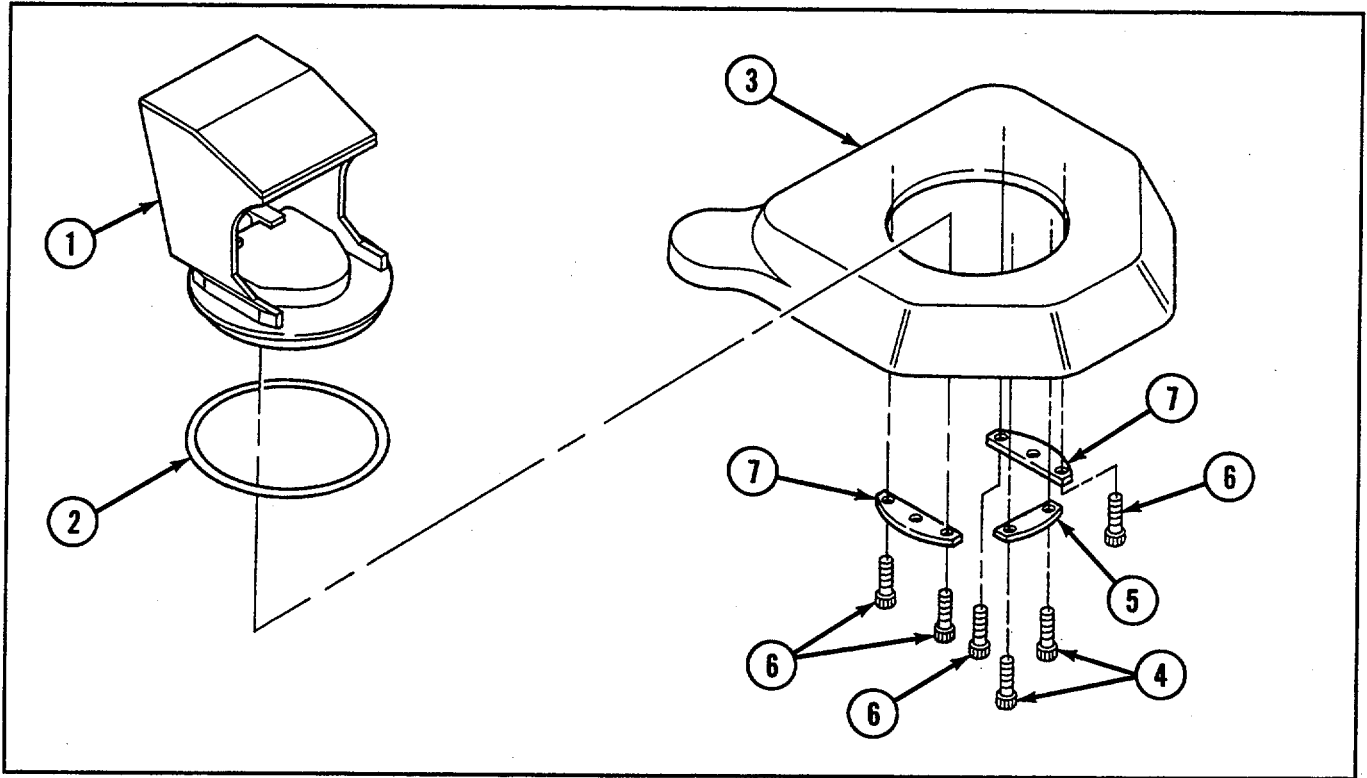
a. REMOVAL

Remove access cover (1) and metal screen assembly (2) by removing four screws (3) and four lockwashers (4).

b. INSTALLATION

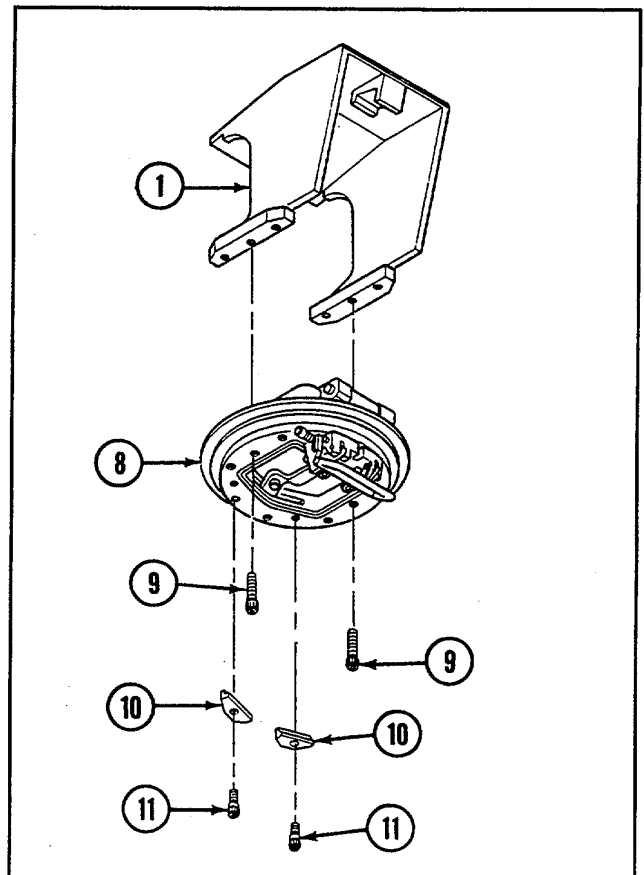
Install access cover (1) and metal screen assembly (2) with four screws (3) and four new lockwashers (4).





b. DISASSEMBLY

- 1 Remove access cover (8) from mount assembly (1) by removing two screws (9).
- 2 Remove two brackets (10) by removing two screws (11).



9-38 REPLACE/REPAIR PASSIVE NIGHT VIEWER MOUNT AND RELATED PARTS--Continued

- 3 Remove packing (12) and setscrew (13) from access cover (8).
- 4 Remove lever (14) from access cover (8) by removing three screws (15) and three flat washers (16).
- 5 Remove access door (17) from access cover (8) by removing straight pin (18).
- 6 Remove gasket (19) from access door (17).

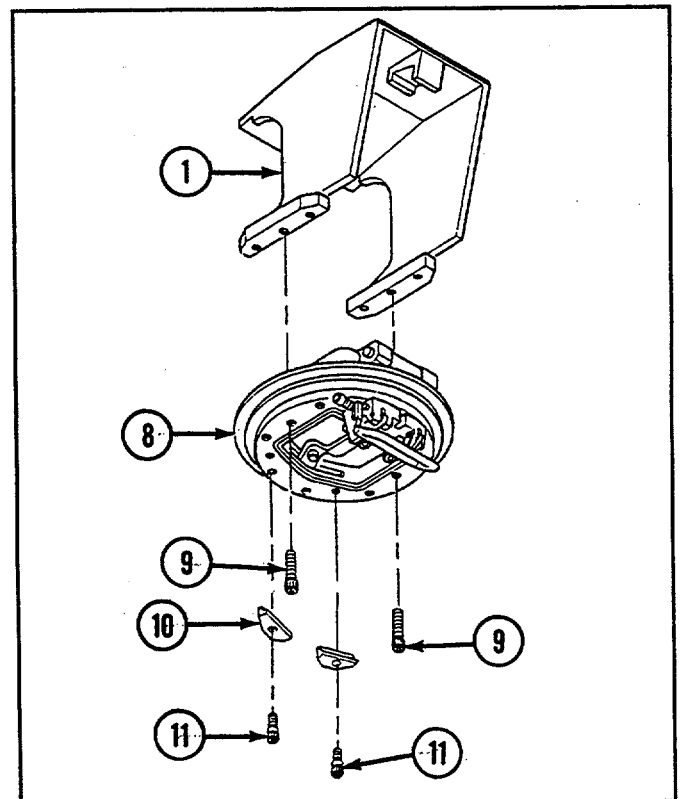
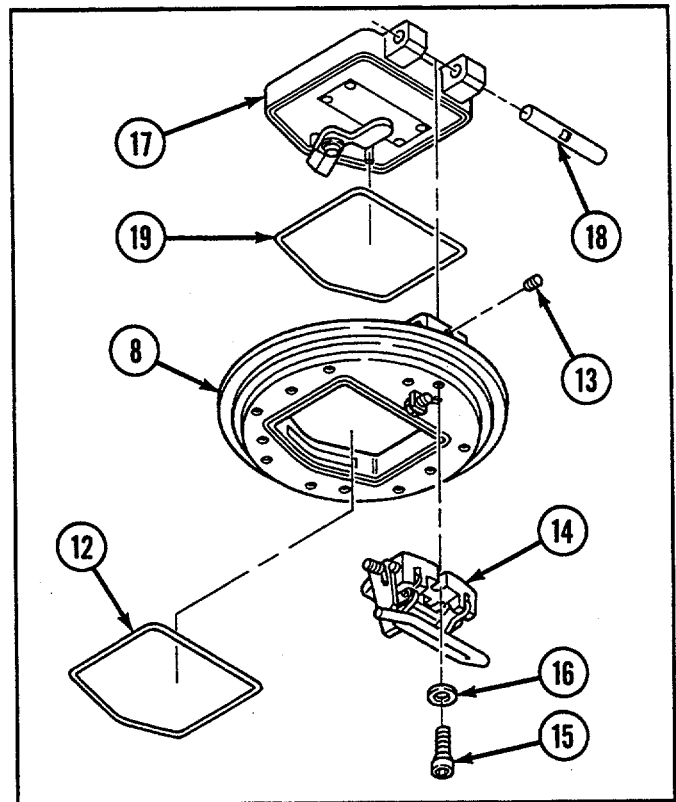
c. ASSEMBLY

- 1 Install new gasket (19) in access door (17).
- 2 Install access door (17) on access cover (8) with straight pin (18).
- 3 Install lever (14) with three flat washers (16) and three screws (15).
- 4 Install new packing (12) and setscrew (13) in access cover (8).
- 5 Install two brackets (10) with two screws (11).

NOTE

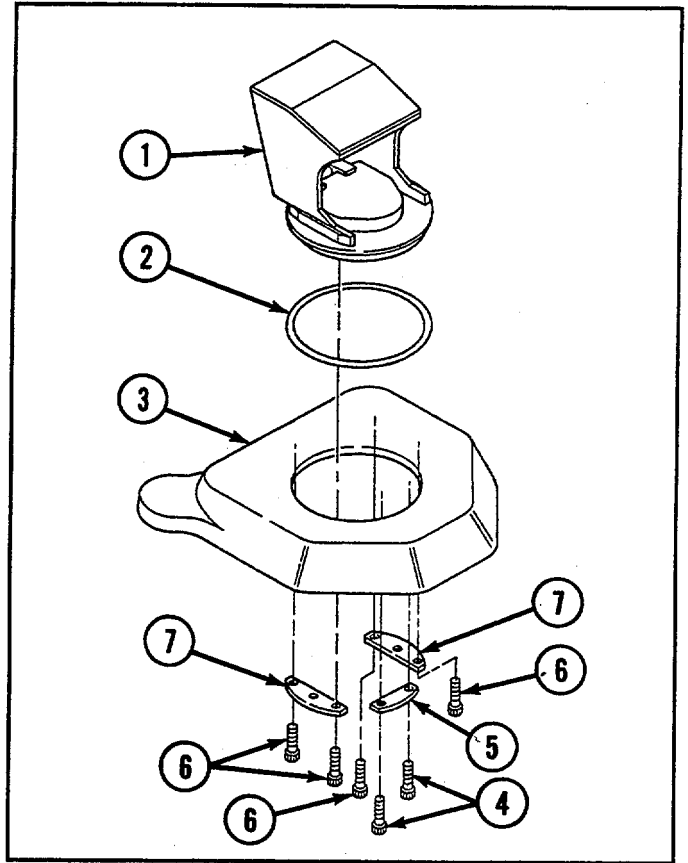
Apply adhesive around tapped holes in mount assembly. Remove excess adhesive from inside of holes if necessary.

- 6 Install access cover (8) on mount assembly (1) with two screws (9).



d. INSTALLATION

Install mount assembly (1) on driver's cab-top door (3) with new gasket (2), two new self-locking screws (4), plate (5), four screws (6), and two plates (7).



9-39 REPLACE INFRARED POWER SUPPLY

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:
 Tool kit, general mechanic's (Appendix C, item 53)

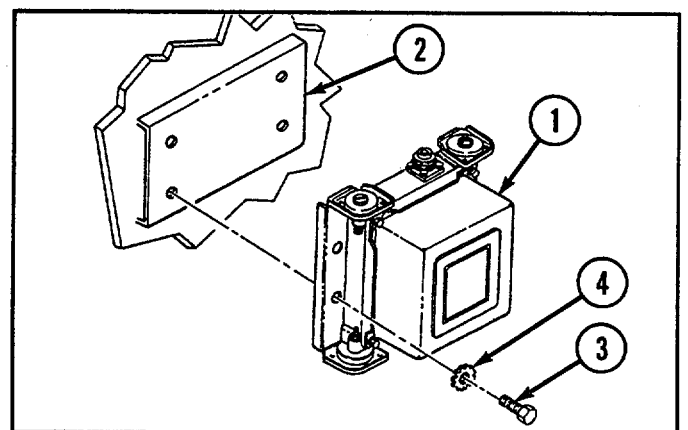
Parts:
 Lockwashers (4) (Appendix G, item 117)

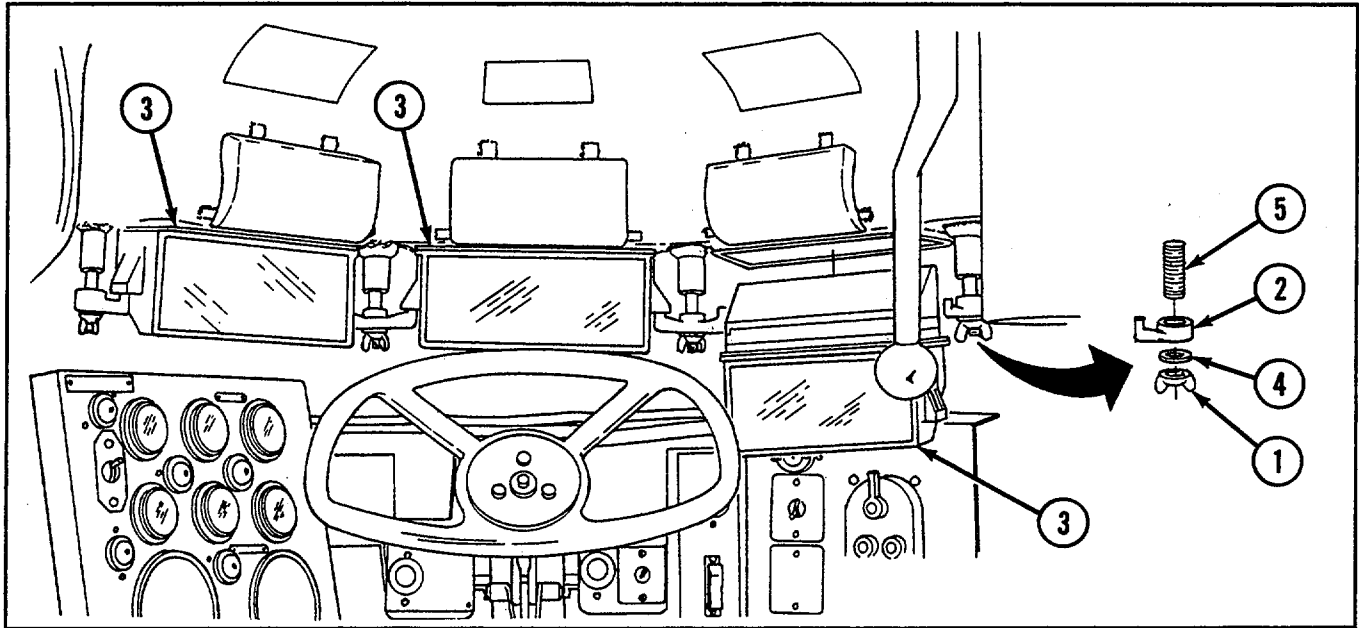
a. REMOVAL

Remove power supply (1) from mount (2) by removing four screws (3) and four lockwashers (4).

b. INSTALLATION

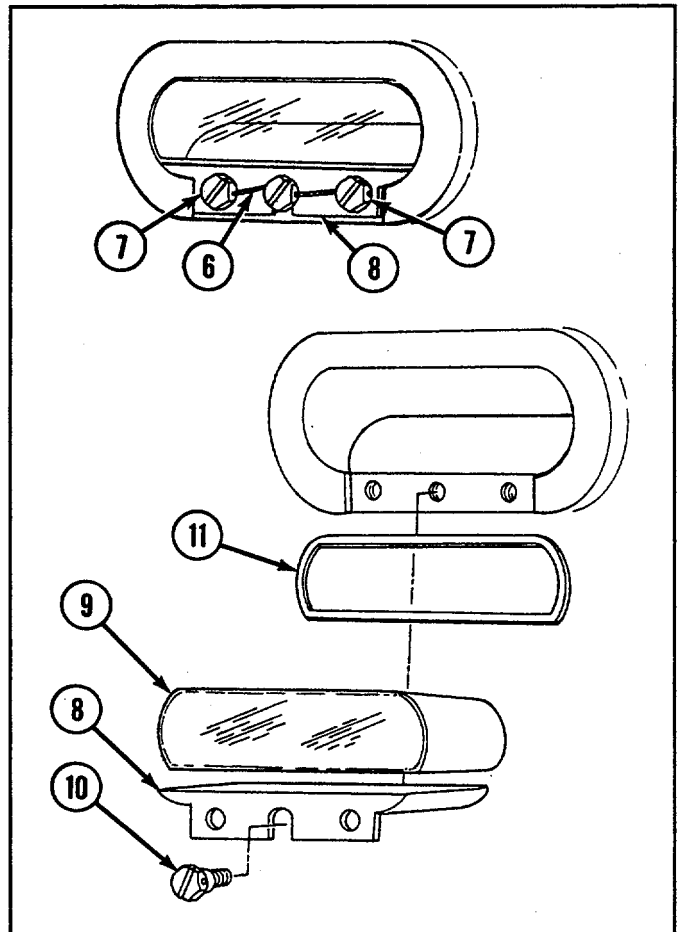
Install power supply (1) on mount (2) with four new lockwashers (4) and four screws (3).



**NOTE**

Steps 3 through 6 apply to basic design vision prism; steps 7 through 10 apply to later design.

- 3 Remove lockwire (6).
- 4 Remove two outer screws (7) from wedge plate (8).
- 5 Remove wedge plate (8) and vision prism (9) by turning center screw (10) counterclockwise until removed.
- 6 Remove seal (11) and all remaining sealing compound from vision prism (9).



9-41 REPLACE DRIVER'S AND RIGGER'S PERISCOPE BLOCKS AND VISION PRISMS—Continued

- 7 Remove lockwire (12).
- 8 Remove two bolts (13).

NOTE

Bolt (13) placed in center hole (14) of wedge plate (15) will act as a jacking screw.

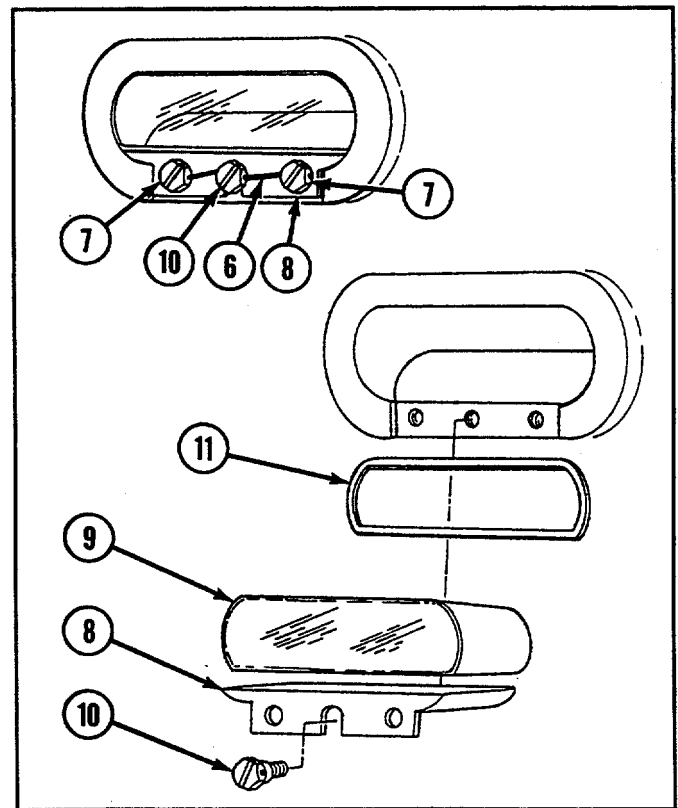
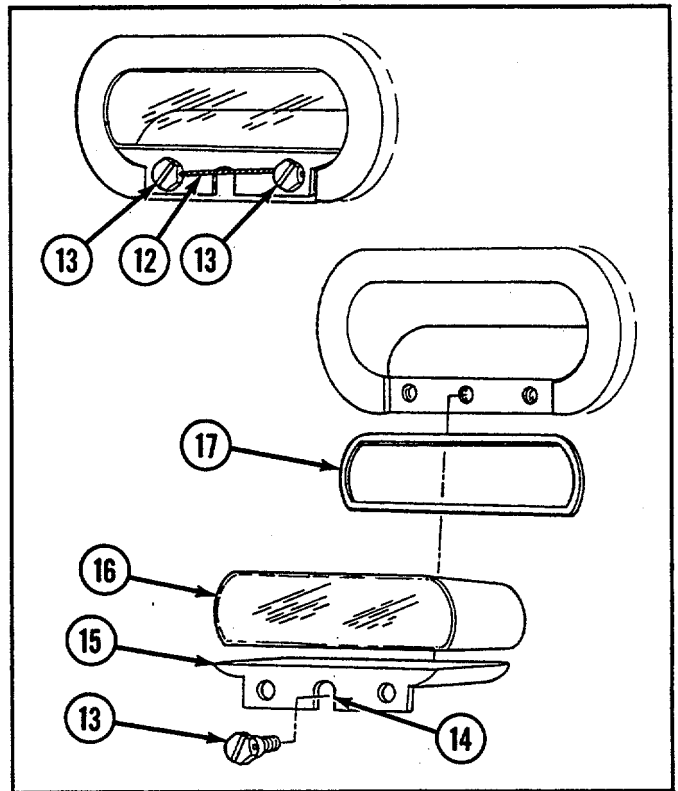
- 9 Place bolt (13) in center hole (14) of wedge plate (15). Turn clockwise until wedge plate and vision prism (16) are removed from hull.
- 10 Remove seal (17) and all remaining sealing compound from vision prism (16).

b. INSTALLATION

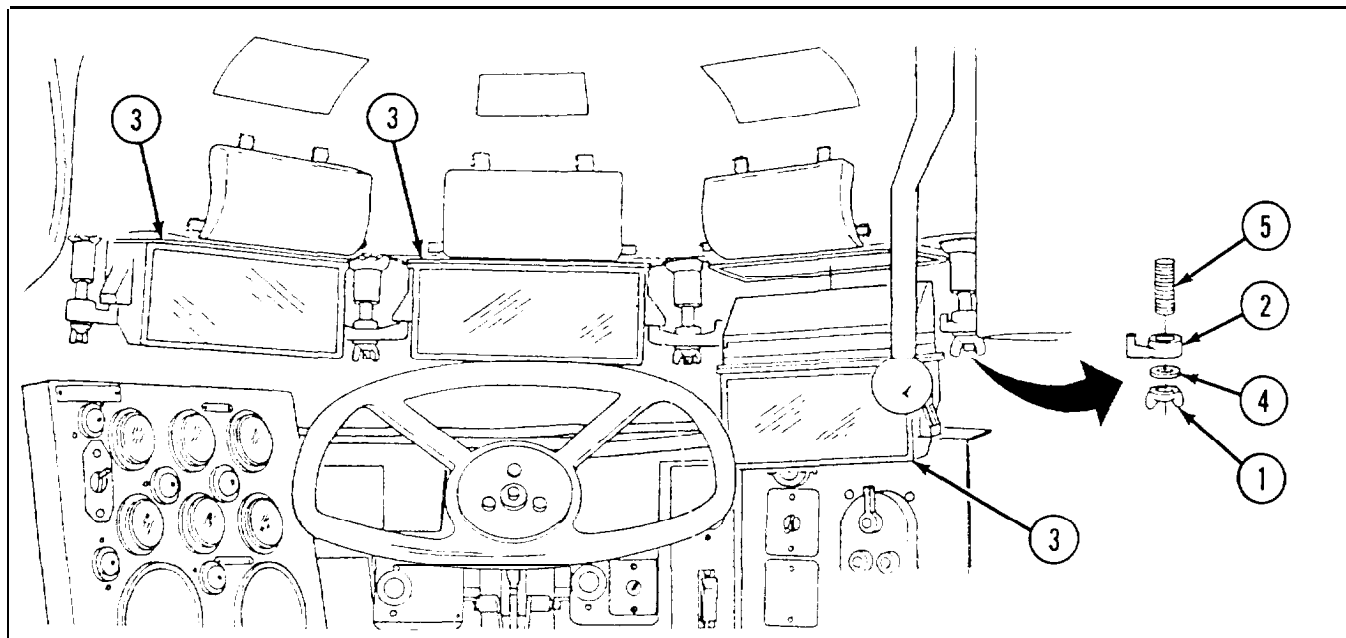
NOTE

- Steps 1 through 4 apply to basic design vision prism; steps 5 through 7 apply to later design.
- Proceed to steps 8 and 9 for periscope block installation.

- 1 Apply sealing compound to vision prism (9) and install new seal (11). Remove excess sealing compound.
- 2 Install vision prism (9) and wedge plate (8) with screw (10) in center hole.
- 3 Install two screws (7) in wedge plate (8). Torque to 84-120 lb-in. (9.5-13.6 N•m).
- 4 Secure three screws (7 and 10) with new lockwire (6).
- 5 Apply sealing compound between vision prism (16), hull opening, and seal (17).
- 6 Install vision prism (16) and wedge plate (15) with two bolts (13). Torque bolts to 84-120 lb-in. (9.5-13.6 N•m).
- 7 Secure two bolts (13) with new lockwire (12).



- 8 Install four studs (5), four retainers (2), four flat Mashers (A), and four wingnuts (1). Do not tighten wingnuts.
- 9 Install three periscope blocks (3) in hull openings and secure with four retainers (3). Tighten four wingnuts (1).



9-42 REPLACE MECHANIC' S PERISCOPE BLOCK AND VISION PRISMS

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic' s (Appendix C, item 53)
- Socket set (Appendix C, item 49)
- Wrench, torque (Appendix C, item 63)

Material/Parts:

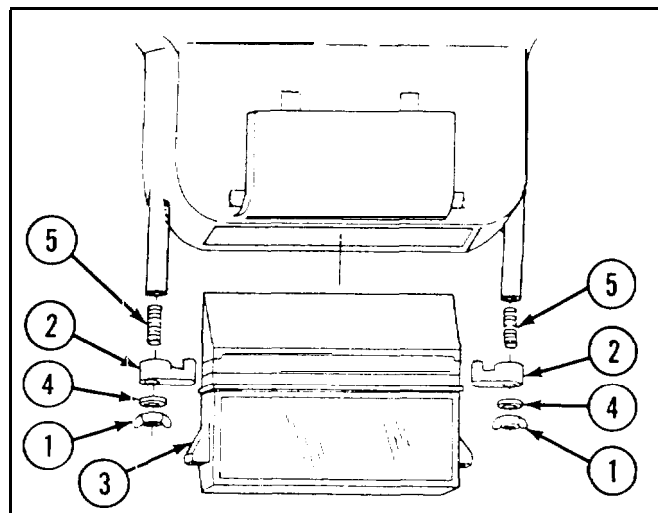
- Compound, sealing (Appendix D, item 27)
- Lockwires (2) (Appendix G, item 154)
- Seals (3) (Appendix G, item 251)

NOTE

See paragraph 9-31 for removal and installation of typical vision prism.

a. REMOVAL

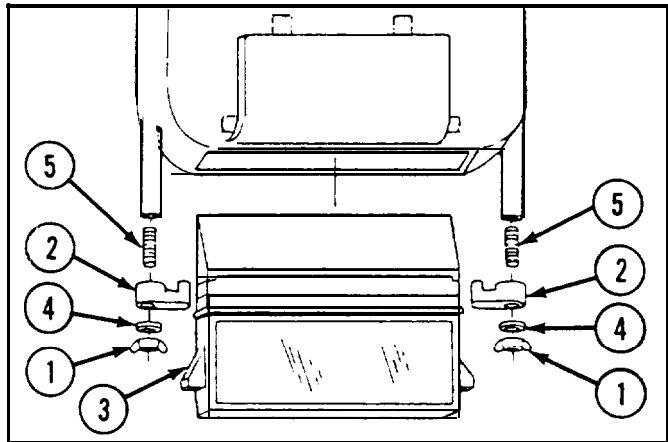
- 1 Loosen two wingnuts (1) and release periscope by turning two retainers (2) 1/2 turn. Pull periscope block (3) from hull opening.
- 2 Remove two wingnuts (1), two flat washers (4), two retainers (3), and two studs (5).



9-42 REPLACE MECHANIC'S PERISCOPE BLOCK AND VISION PRISMS-Continued

b. INSTALLATION

- 1 Install two studs (5), two retainers (2), two flat washers (4), and two wingnuts (1). Do not tighten wingnuts.
- 2 Install periscope block (3) in hull opening and secure with two retainers (2). Tighten two wingnuts (1).



9-43 REPLACE/SERVICE TOWING PINTLE AND MOUNT

THIS TASK COVERS

- a. Removal b. Disassembly c. Cleaning d. Inspection e. Assembly f. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Wrench, open-end adjustable (Appendix C, item 56)

Materials/Parts:

- Cloth, crocus (Appendix D, item 7)
- Solvent, dry-cleaning (Appendix D, item 9)
- Lockwashers (6) (Appendix G, item 148)
- Pin, cotter (Appendix G, item 218)
- Pin, cotter (Appendix G, item 224)

Materials/Parts:

- Pin, cotter (Appendix G, item 225)

Personnel Required:

Three

Reference:

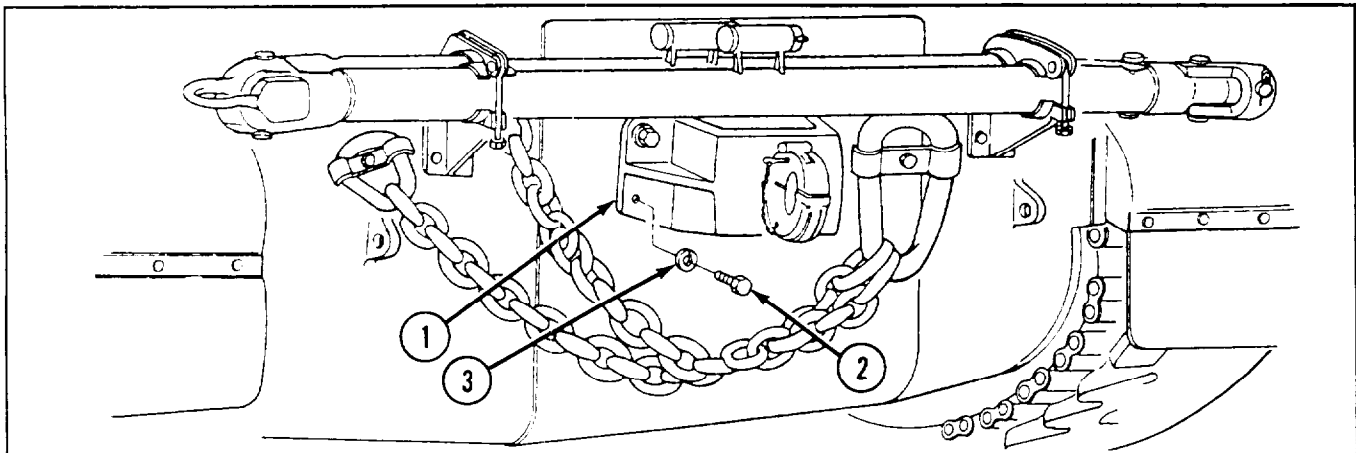
Deleted

Equipment Condition:

Tow bar removed (see paragraph 9-88)

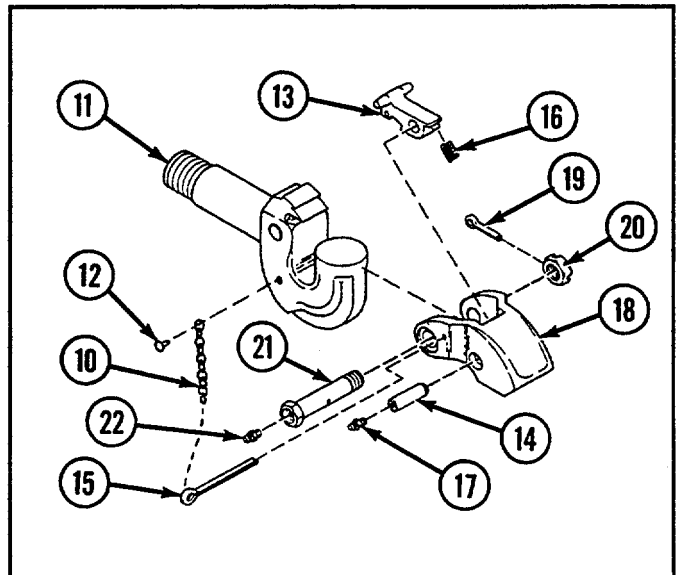
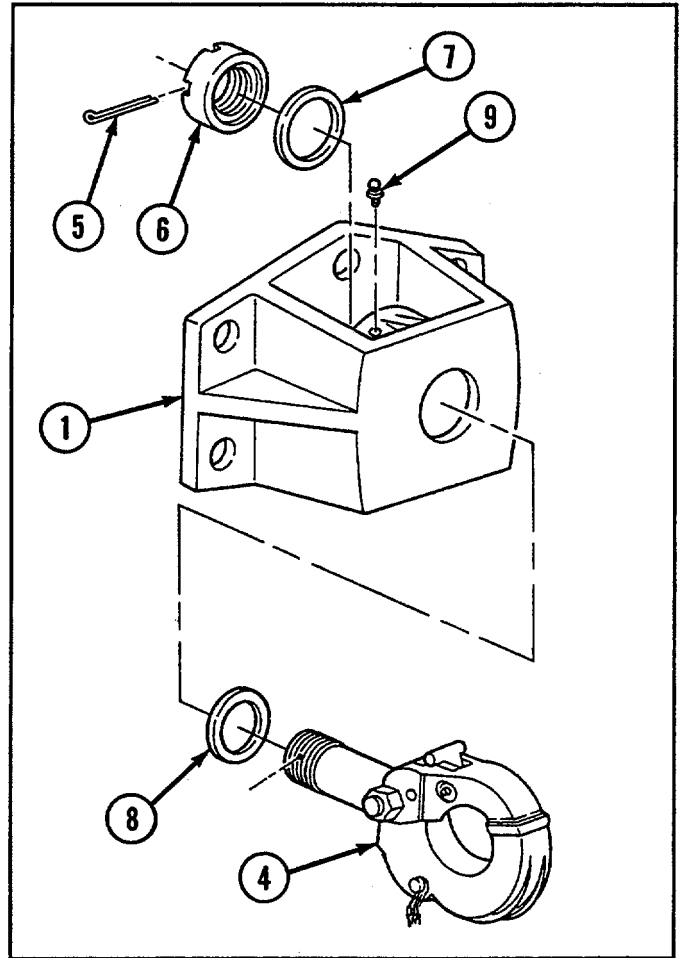
a. REMOVAL

Remove pintle mount (1) by removing six screws (2) and six lockwashers (3).



b. DISASSEMBLY

- 1 Secure towing pintle (4) to prevent it from turning. Remove cotter pin (5), slotted nut (6), and flat washer (7).
- 2 Remove towing pintle (4) and flat washer (8) from pintle mount (1).
- 3 Remove lubrication fitting (9) from pintle mount (1).
- 4 Disconnect chain (10) from pintle hook (11) by removing screw (12).
- 5 Remove latch (13) by removing straight shaft (14), cotter pin (15), and spring (16). Separate cotter pin and chain (10).
- 6 Remove lubrication fitting (17) from straight shaft (14).
- 7 Remove latch (18) from pintle hook (11) by removing cotter pin (19), nut (20), and bolt (21).
- 8 Remove lubrication fitting (22) from bolt (21).



9-43 REPLACE/SERVICE TOWING PINTLE AND MOUNT—Continued

c. CLEANING

WARNING

- Dry-cleaning solvent used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flashpoint of solvent is 138 degrees Fahrenheit (°F) (58.9 degrees Celsius [°C]).
- Particles blown by compressed air can be dangerous. Be certain to direct airstream away from yourself and other personnel in the area. Compressed air used for cleaning will not exceed 30 pounds per square inch (psi) (207 kilopascals [kPa]). Use only with effective chip-guarding and personal protective equipment (goggles/shield and gloves).

Clean all parts with dry-cleaning solvent and dry with low-pressure air.

d. INSPECTION

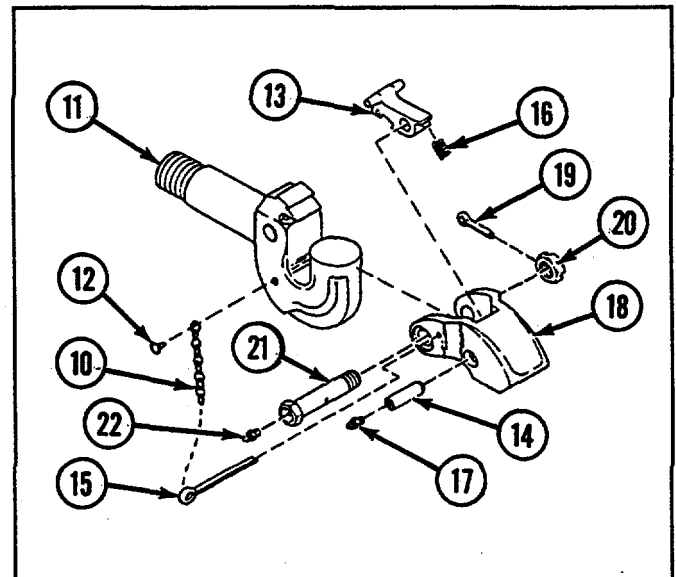
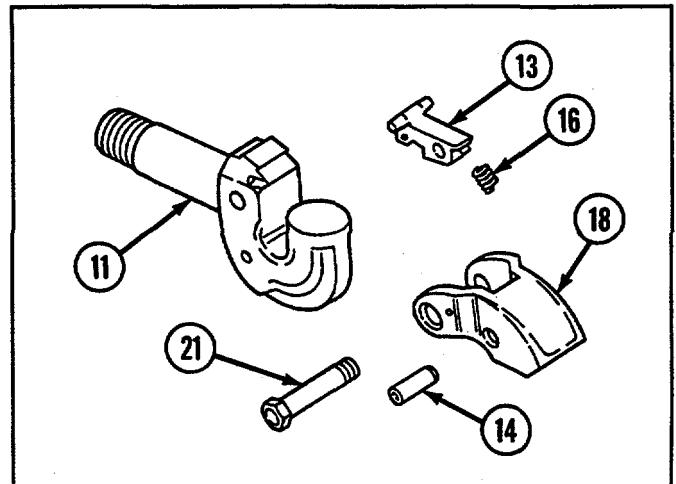
- 1 Inspect spring (16) for corrosion, breaks, and elasticity.
- 2 Inspect all threads for wear and damage.
- 3 Inspect latches (13 and 18), pintle hook (11), straight shaft (14), and bolt (21) for cracks, nicks, and breaks.
- 4 Remove rust and minor nicks and burrs with crocus cloth.
- 5 Replace damaged attaching hardware.

e. ASSEMBLY

NOTE

Repaint parts as required

- 1 Install lubrication fitting (22) on bolt (21).
- 2 Install latch (18) in pintle hook (11) with bolt (21), nut (20), and new cotter pin (19).
- 3 Install latch (13) with straight shaft (14), new cotter pin (15), and spring (16).
- 4 Install lubrication fitting (17) on straight shaft (14).
- 5 Connect chain (10) to new cotter pin (15) and pintle hook (11) with screw (12).



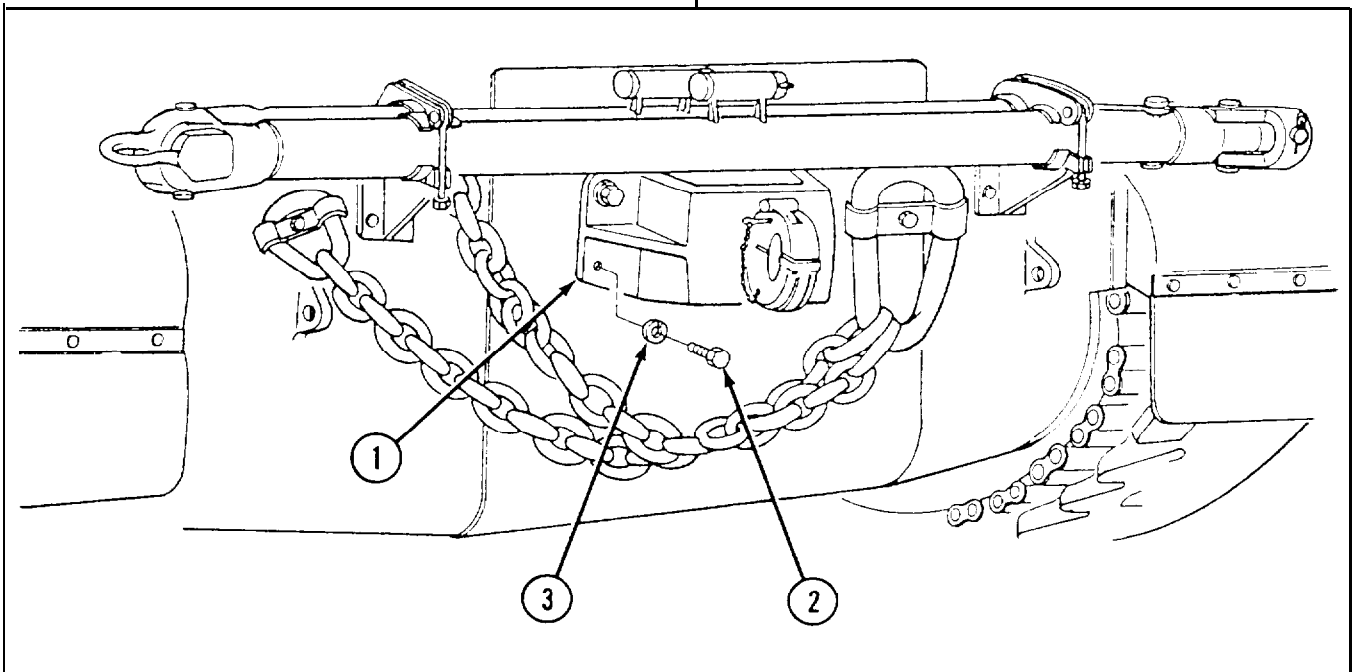
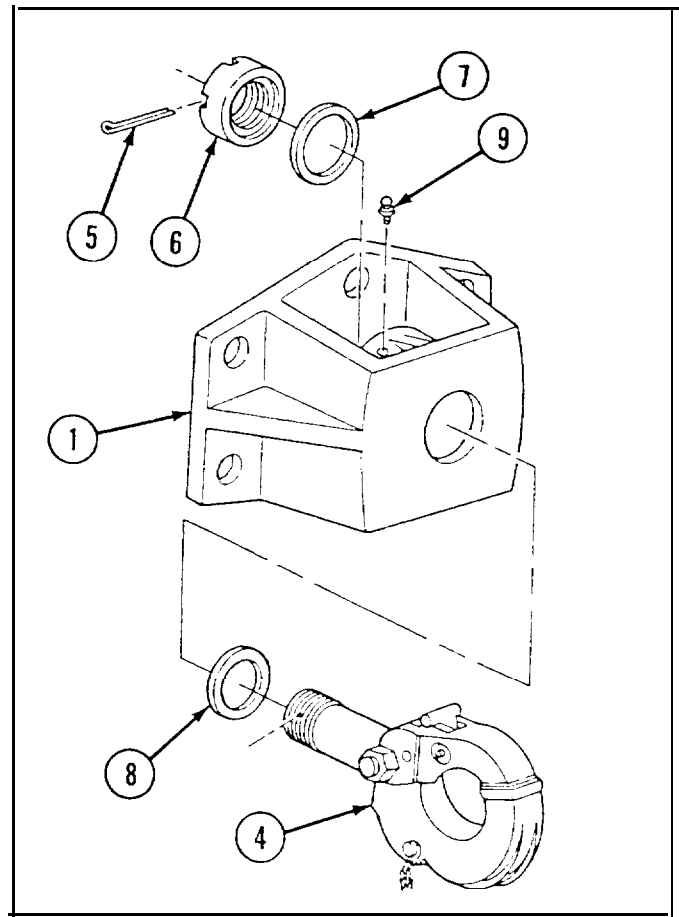
- 6 Install lubrication fitting (9) in pintle mount (1).
- 7 Lubricate towing pintle (4) shaft with GAA lubricant (see Appendix J).
- 8 Place flat washer (8) on pintle mount (1) and insert towing pintle (4).
- 9 Place flat washer (7) over threaded end of towing pintle (4) and secure with slotted nut (6) and new cotter pin (5).
- 10 Grease towing pintle through lubrication fittings (9, 17, and 22) (see Appendix J).

NOTE

Assembled towing pintle must turn freely in pintle mount (1).

f. INSTALLATION

Install pintle mount (1) with six new lockwashers (3) and six screws (2).

**NOTE**

Follow-on maintenance: Install tow bar (see paragraph 9-88)

a. REMOVAL

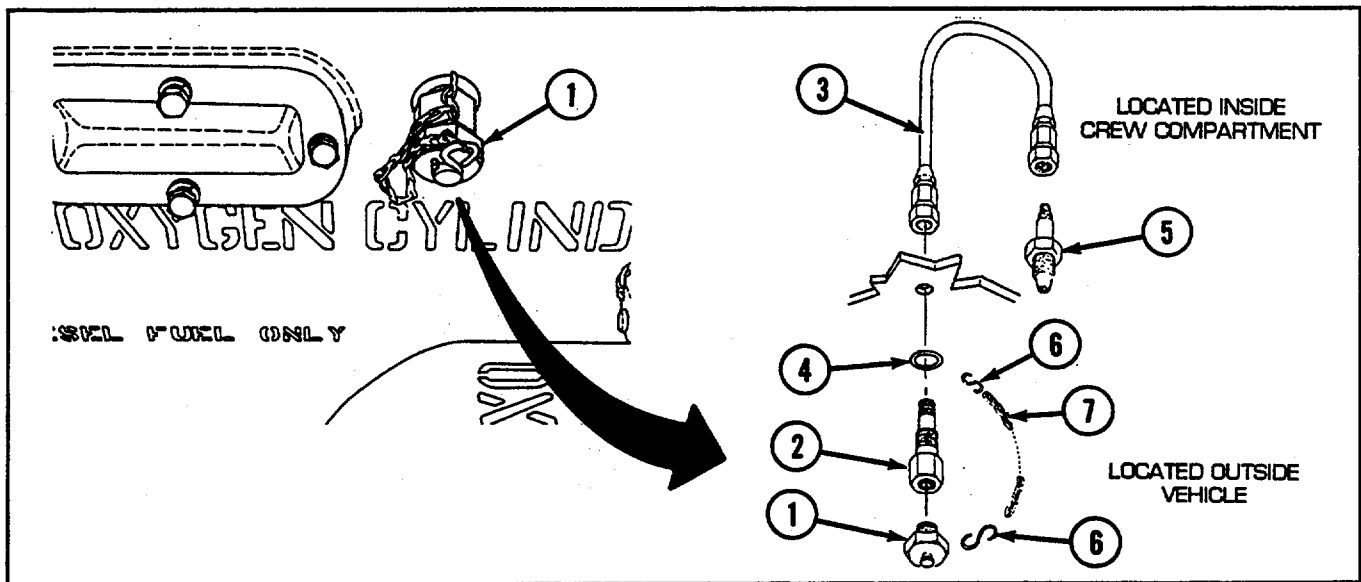
WARNING

Acetylene is very flammable and a potential hazard to personnel and property. Avoid open flames and excessive heat when working around acetylene.

NOTE

Plug and hose adapter are reverse threaded.

- 1 Remove plug (1) from hose adapter (2).
- 2 Remove flexible hose assembly (3) from hose adapter (2).
- 3 Remove hose adapter (2) and ring (4) from rear hull wall.
- 4 Remove acetylene tank adapter (5) from flexible hose assembly (3).
- 5 Remove two S-hooks (6) and chain (7).



b. INSTALLATION

- 1 Connect two S-hooks (6) to chain (7).
- 2 Install chain (7) to plug (1) and vehicle hull.
- 3 Connect acetylene tank adapter (5) to flexible hose assembly (3).
- 4 Install hose adapter (2) and ring (4) in vehicle hull and connect flexible hose assembly (3).
- 5 Install plug (1) on hose adapter (2).

NOTE

Follow-on maintenance: Install acetylene tank (refer to TM 9-2350-256-10)

9-48 REPLACE BATTERY TRAY CLEANING TUBES**THIS TASK COVERS**

a. Removal

b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

Lockwashers (8) (Appendix G,
item 130)

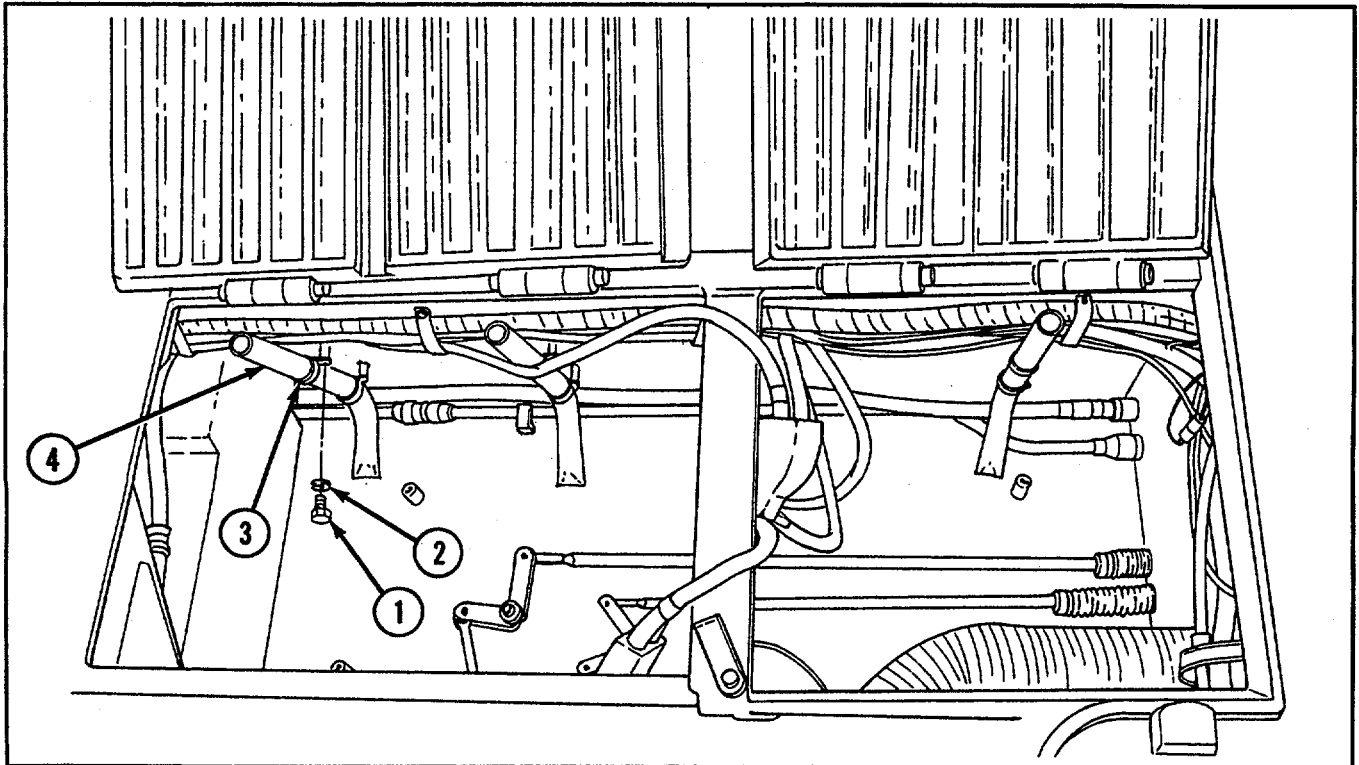
Equipment Condition:

Batteries removed (see
paragraph 6-4)**NOTE**

Removal and installation procedures are the same for all four cleaning tubes.

a. REMOVAL

- 1 Remove two screws (1) and two lockwashers (2) from two clamps (3).
- 2 Remove cleaning tube (4) and two clamps (3).

**b. INSTALLATION**

- 1 Install cleaning tube (4) and two clamps (3).
- 2 Install two screws (1), two new lockwashers (2), and two clamps (3).

NOTE

Follow-on maintenance: Install batteries (see paragraph 6-4)

9-49 REPLACE APU ACCESS COVER ASSEMBLY**THIS TASK COVERS**

a. Removal

b. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Lifting sling (Appendix C, item 9)

Parts:

- Gasket (Appendix G, item 73)
- Lockwashers (2) (Appendix G, item 116)
- Lockwashers (4) (Appendix G, item 130)
- Lockwashers (11) (Appendix G, item 132)

Parts-Continued:

- Lockwashers (12) (Appendix G, item 134)

Personnel Required:

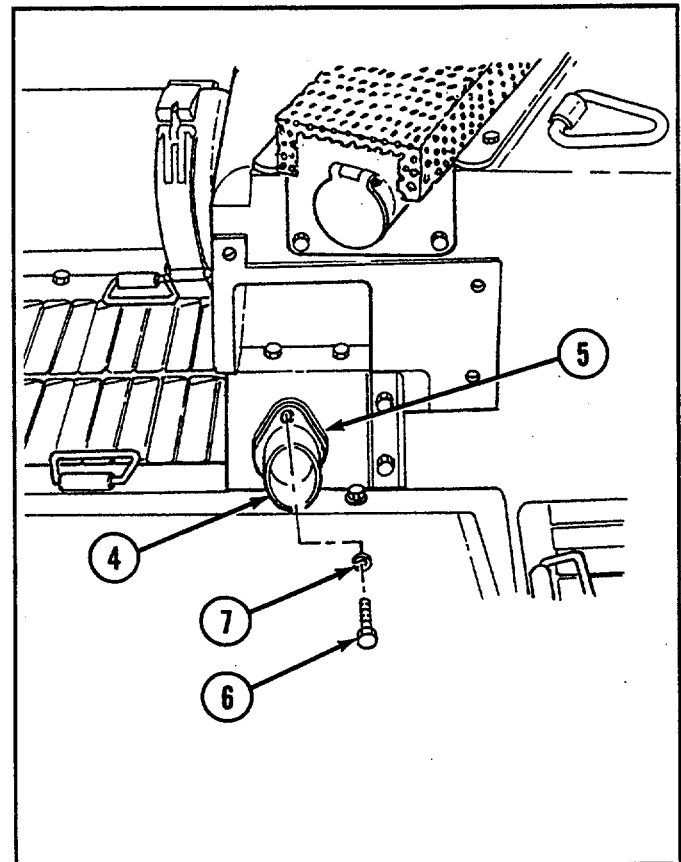
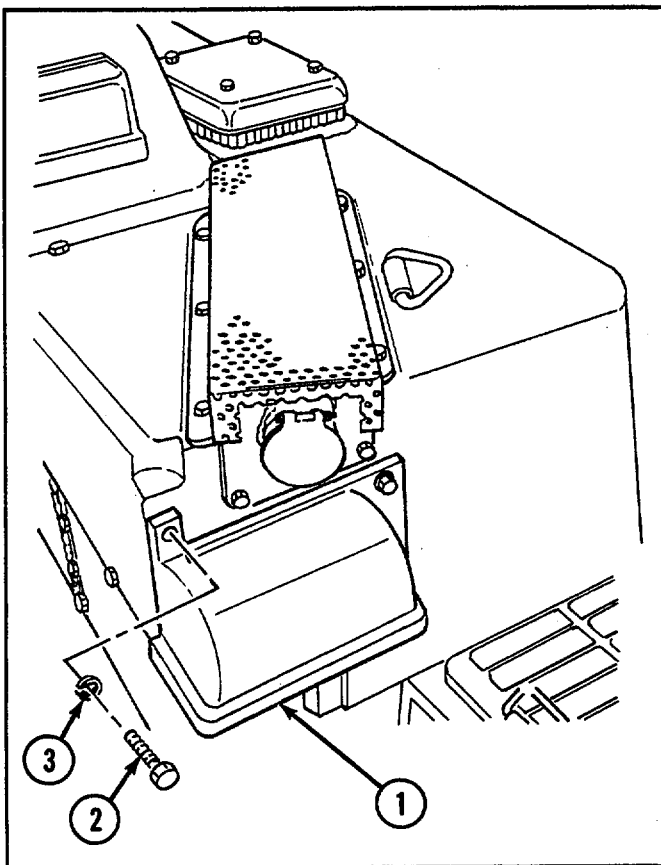
Three

Equipment ConditionS:

- Right-front air inlet door opened (see paragraph 9-56)
- Boom raised (refer to TM 9-2350-256-10)

a. REMOVAL

- 1 Remove APU cooling air shield (1) by removing three screws (2) and three lockwashers (3).
- 2 Remove personnel heater exhaust (4) and gasket (5) by removing two screws (6) and two lockwashers (7).

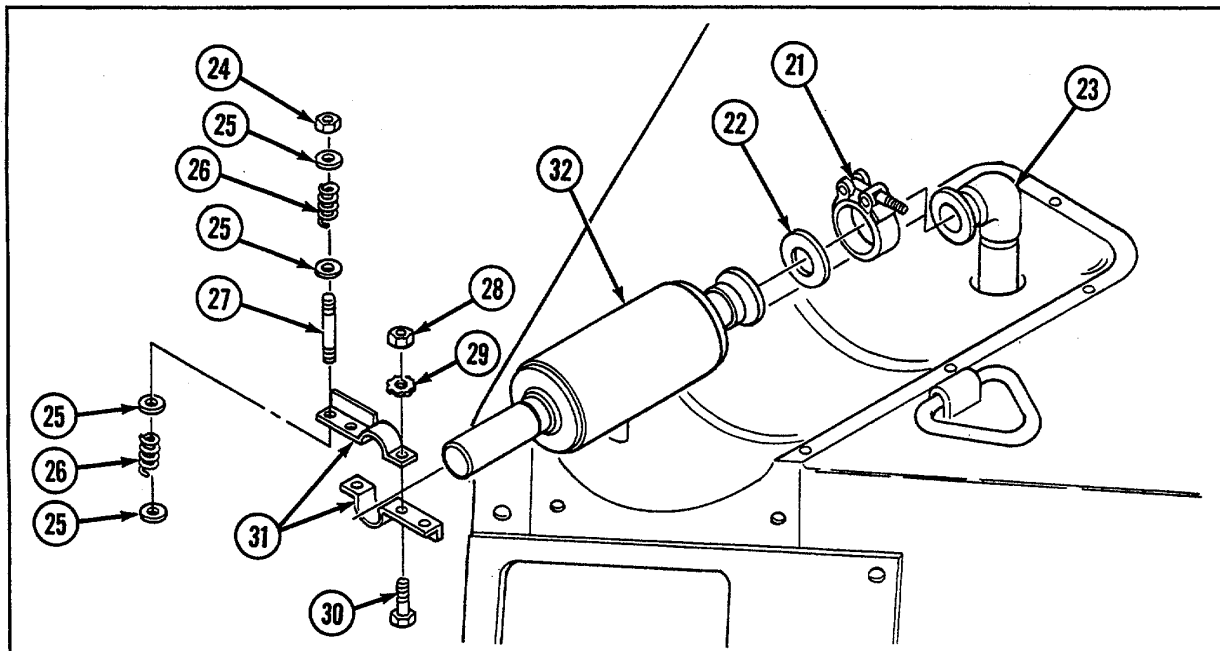
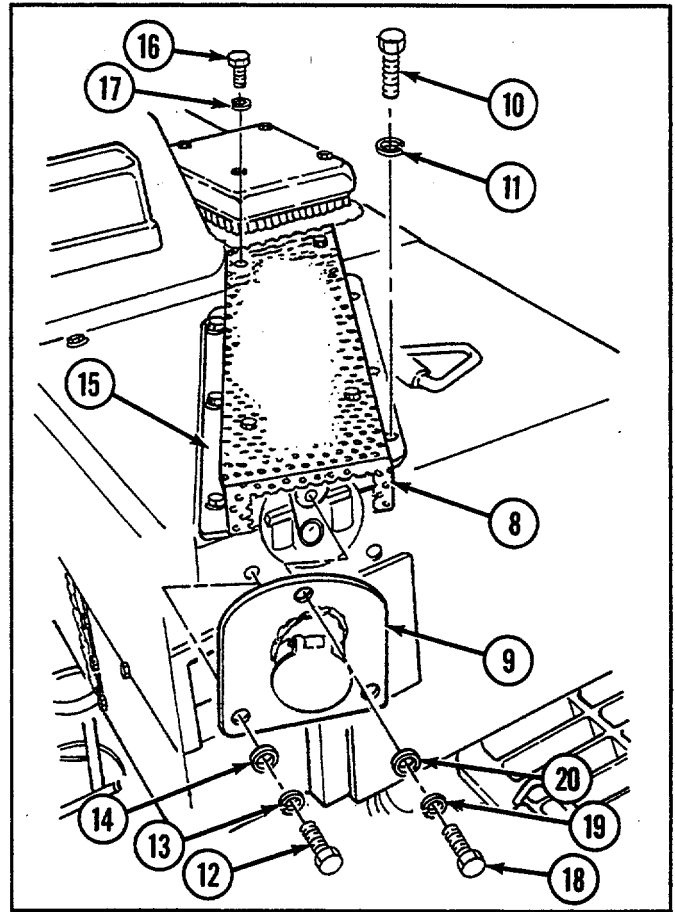


9-49 REPLACE APU ACCESS COVER ASSEMBLY-Continued

NOTE

Slide APU exhaust cover (8) forward to clear exhaust gate (9).

- 3 Remove APU exhaust cover (8) by removing six screws (10), six lockwashers (11), two screws (12), two lockwashers (13), and two washers (14).
- 4 Separate APU exhaust cover (8) from muffler guard (15) by removing four bolts (16) and four lockwashers (17).
- 5 Remove exhaust gate (9) from exhaust cover by removing screw (18), lockwasher (19), and washer (20).
- 6 Remove clamp (21) and shim (22) at elbow (23).
- 7 Remove two nuts (24), eight flat washers (25), four springs (26), two studs (27), two nuts (28), two lockwashers (29), two screws (30), two straps (31), and APU muffler (32).

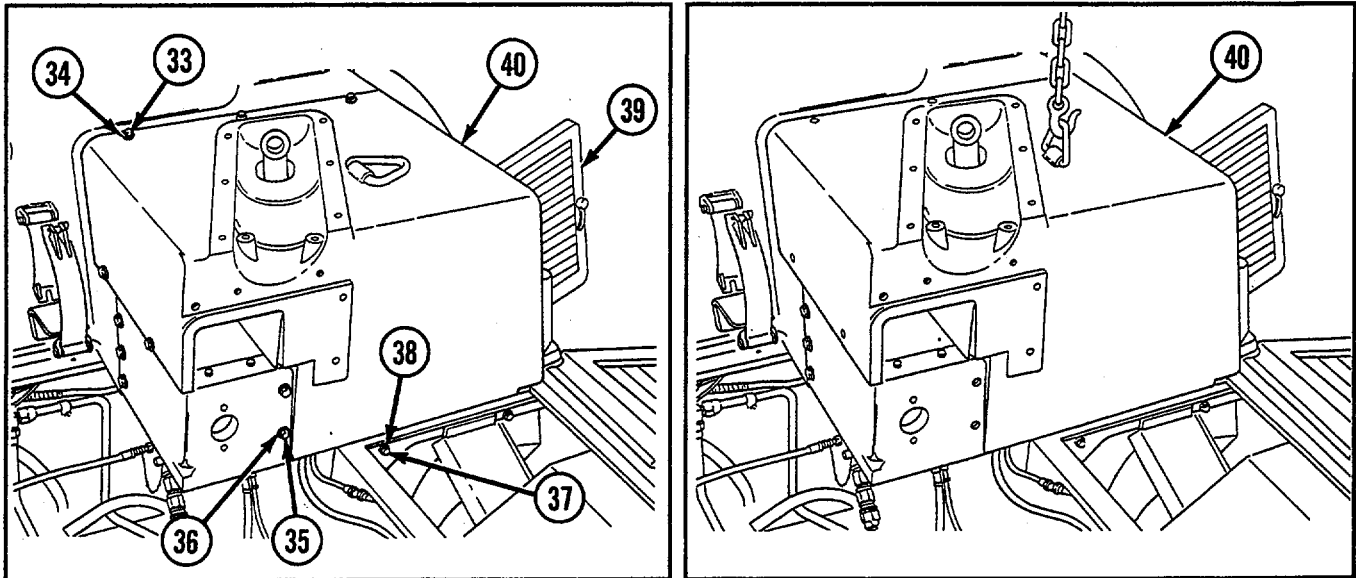


- 8 Remove five screws (33), five lockwashers (34), two screws (35), two lockwashers (36), two screws (37), and two lockwashers (38).

WARNING

Keep clear of equipment when equipment is being raised or lowered. Equipment may fall causing severe injury or death to personnel.

- 9 Open APU access door (39) and remove APU access cover (40) using lifting device.

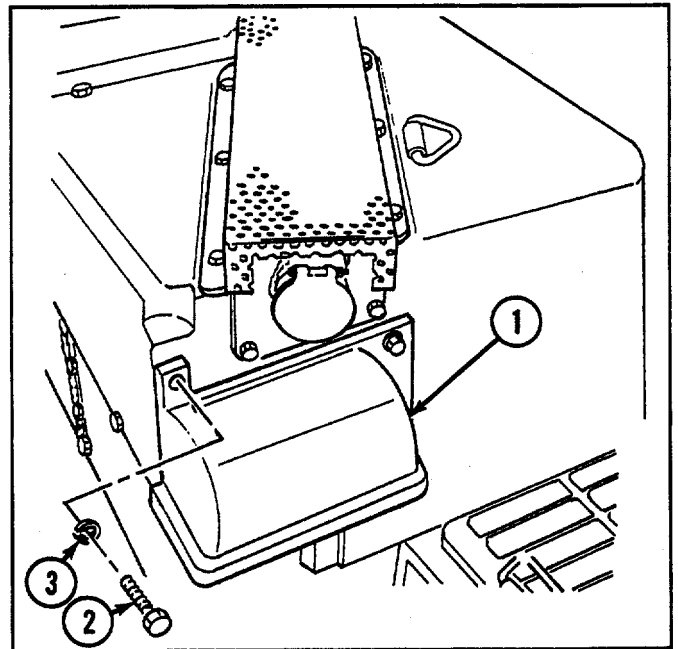
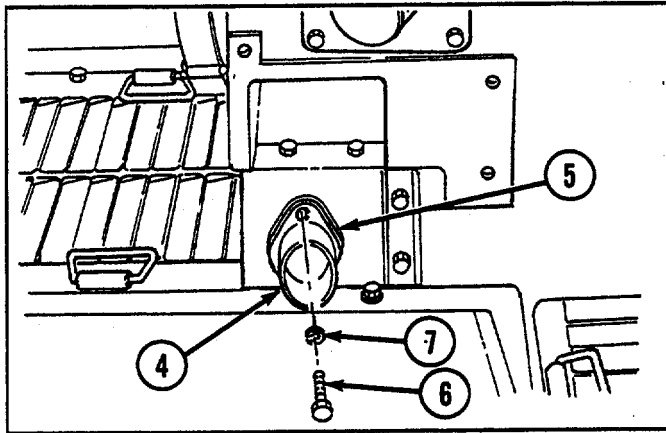
**b. INSTALLATION****WARNING**

Keep clear of equipment when equipment is being raised or lowered. Equipment may fall causing severe injury or death to personnel.

- 1 Place APU access cover (40) using lifting device. Install APU access cover (40) with five screws (33), five new lockwashers (34), two screws (35), two new lockwashers (36), two screws (37), and two new lockwashers (38). Close APU access door (39).
- 2 Install APU muffler (32) with shim (22) and clamp (21) at elbow (23), and two straps (31), two screws (30), two new lockwashers (29), two nuts (28), two studs (27), four springs (26), eight flat washers (25), and two nuts (24).
- 3 Install exhaust gate (9) with screw (18), new lockwasher (19), and washer (20).
- 4 Install APU exhaust cover (8) to muffler guard (15) with four bolts (16) and four new lockwashers (17).
- 5 Install APU exhaust cover (8) with six screws (10), six new lockwashers (11), two screws (12), two new lockwashers (13), and two washers (14).

9-49 REPLACE APU ACCESS COVER ASSEMBLY-Continued

- 6 Install personnel heater exhaust (4) and new gasket (5) with two screws (6) and two new lockwashers (7).
- 7 Install APU cooling air shield (1) with three screws (2) and three new lockwashers (3).



NOTE

Follow-on maintenance:

- Lower boom (refer to TM 9-2350-256-10)
- Close right-front air inlet door (see paragraph 9-56)

9-50 REPLACE APU ACCESS DOOR

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Pin, cotter (Appendix G, item 212)
- Pins, cotter (2) (Appendix G, item 215)

Personnel Required:

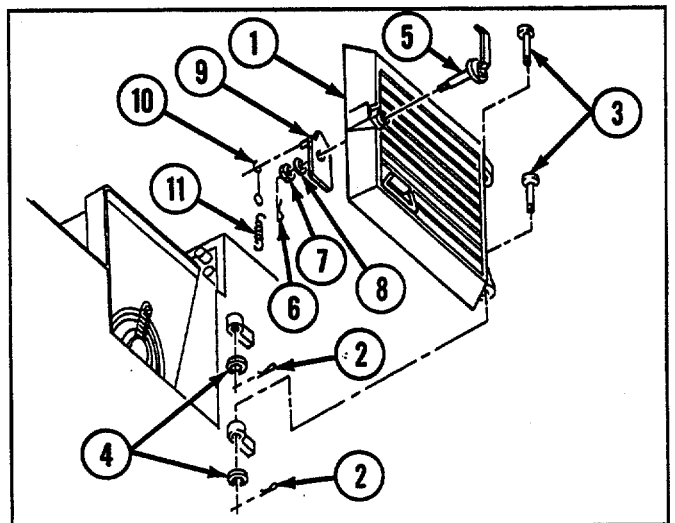
Two

a. REMOVAL

- 1 Remove APU access door (1) by removing two cotter pins (2), two straight pins (3), and two flat washers (4).
- 2 Remove door handle (5) by removing cotter pin (6), nut (7), flat washer (8), latch (9), link (10), and spring (11).

b. INSTALLATION

- 1 Install door handle (5) with spring (11), link (10), latch (9), flat washer (8), nut (7), and new cotter pin (6).
- 2 Install APU access door (1) with two straight pins (3), two flat washers (4), and two new cotter pins (2).

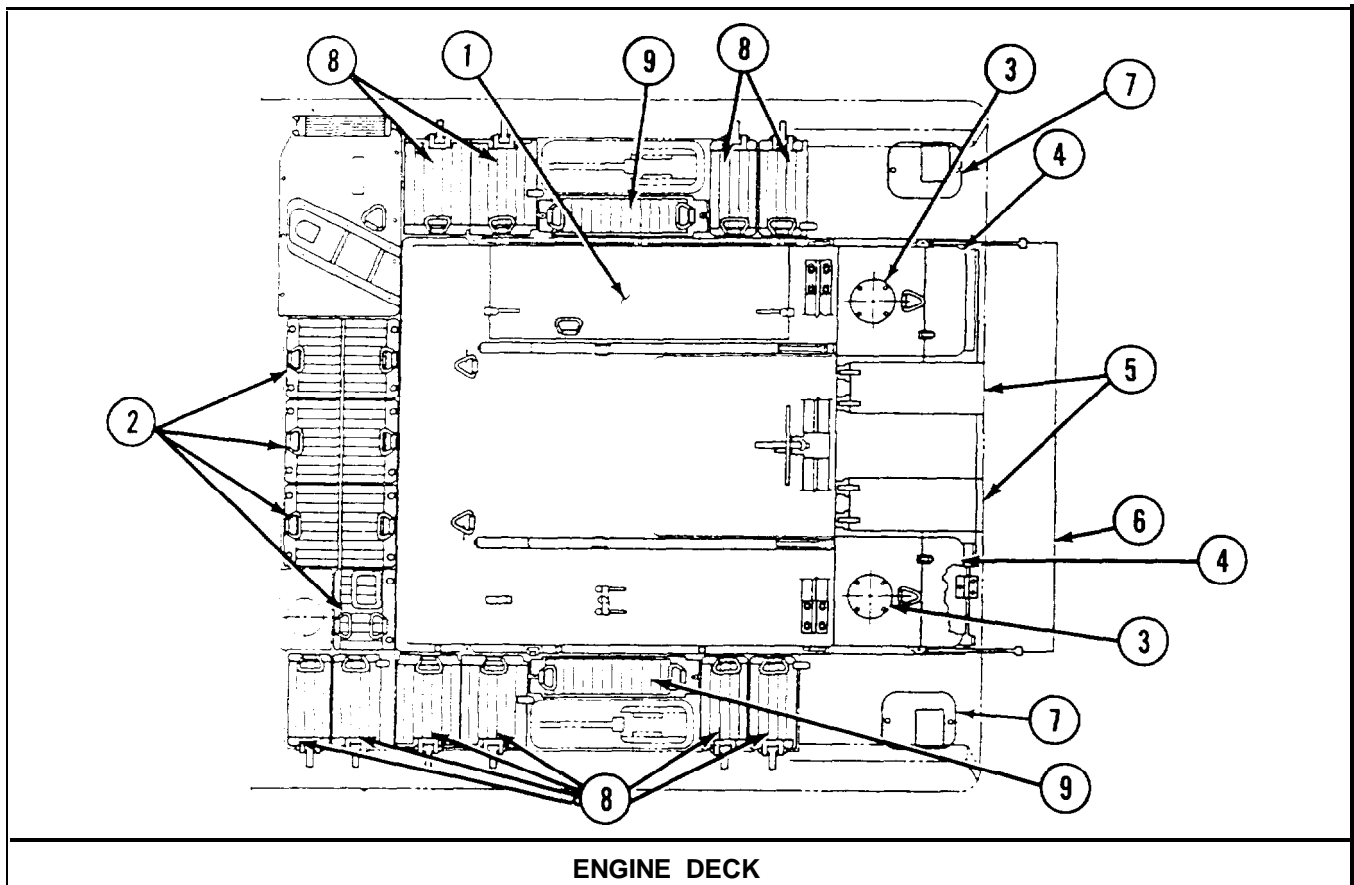


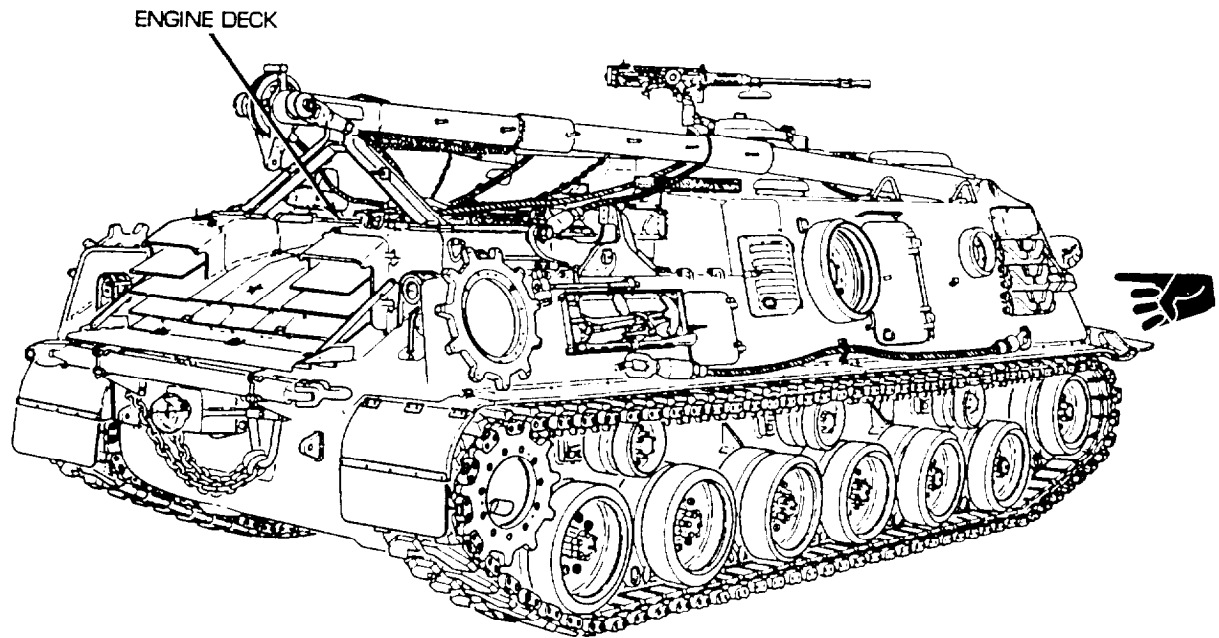
SECTION III: ENGINE DECK, COVERS, GRILLES, AND DOORS

Para.	Task	Page
9-51	Replace/Repair Engine Deck, Deck Base, and Related Parts	9-84
9-52	Replace/Repair Right Engine Deck Door	9-96
9-53	Replace Clamp Assembly.....	9-98
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9-58	Replace Deep Water Forging Exhaust Cover Plates..	9-103
9-59	Replace Exhaust Deflector	9-104
9-60	Replace Left and Right Deck Air Inlet Doors	9-105
9-61	Replace Left and Right Exhaust Doors	9-106
9-62	Replace Center Exhaust Doors.....	9-107
9-63	Service Nonslip Walkway Coating.....	9-108

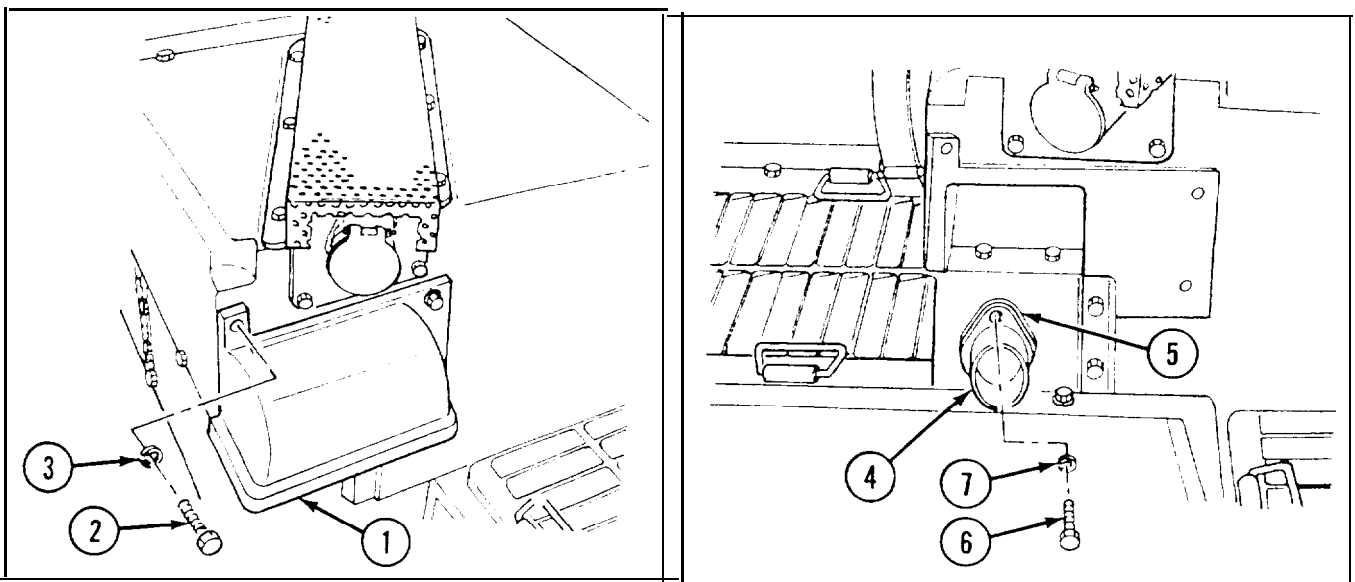
The following two illustrations are locator views of the engine deck and the engine deck base.

- | | |
|--|--|
| 1 Right engine deck door | 6 Exhaust deflector |
| 2 Left- and center-front air Inlet grilles | 7 Left and right hydraulic cylinder access covers (see paragraph 6-30) |
| 3 Deep water forging exhaust cover plates | 8 Air inlet doors |
| 4 Left and right exhaust doors | 9 Left and right deck air inlet doors |
| 5 Center exhaust doors | |



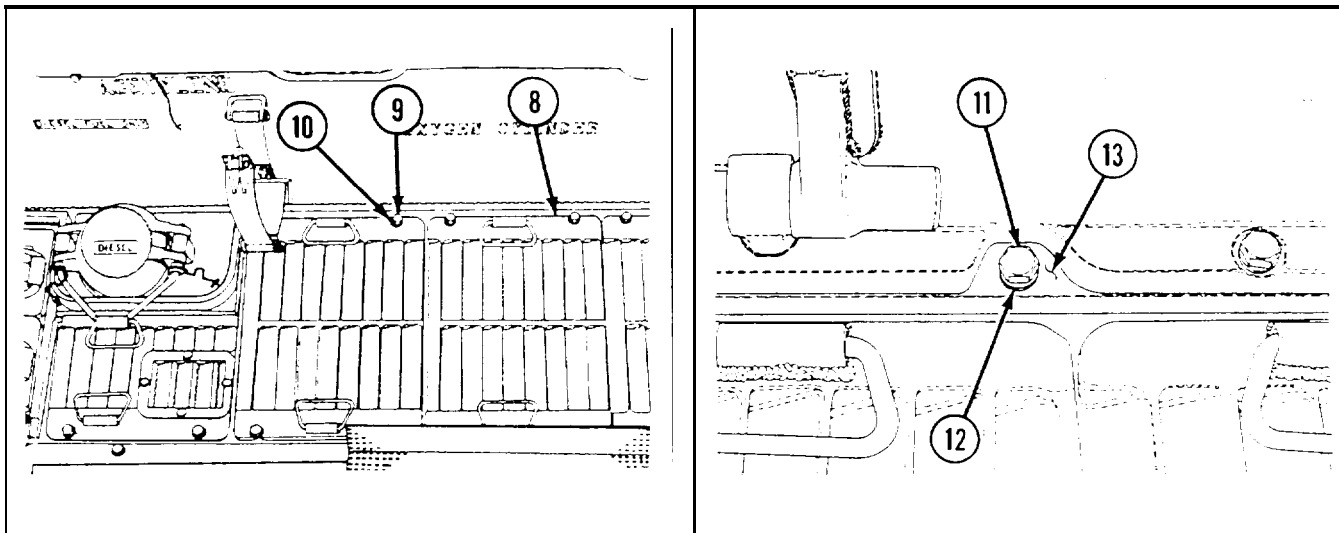
**a. REMOVAL**

- 1 Remove APU cooling air shield (1) by removing three screws (2) and three lockwashers (3).
- 2 Remove personnel heater exhaust (4) and gasket (5) by removing two screws (6) and two lockwashers (7)

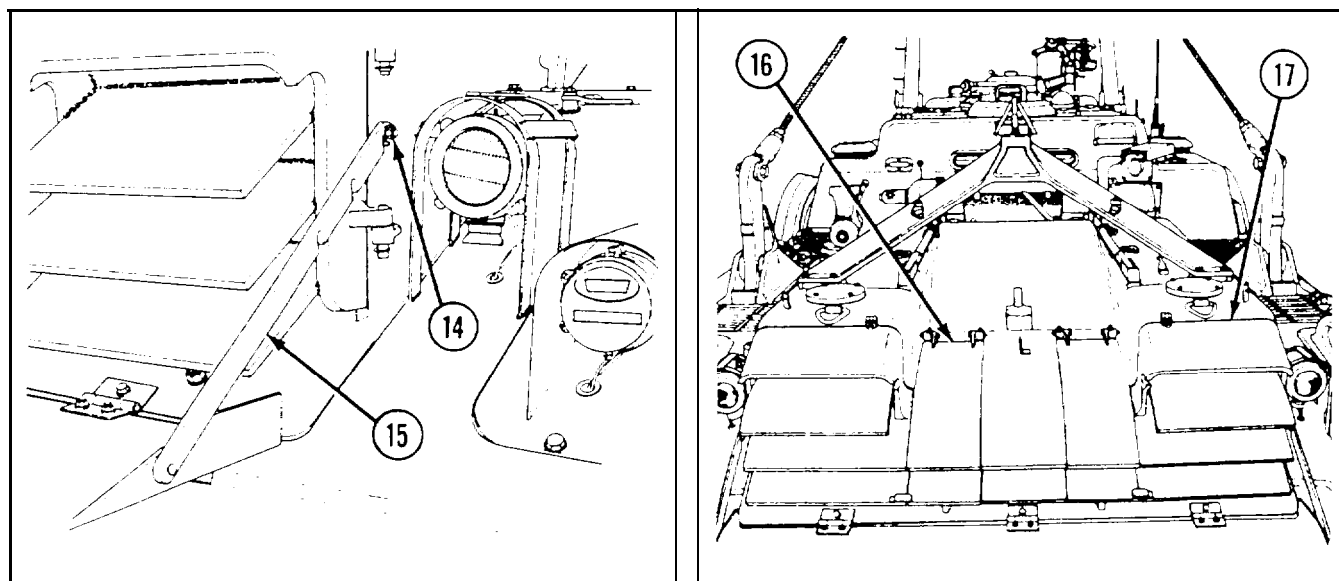


9-51 REPLACE/REPAIR ENGINE DECK, DECK BASE, AND RELATED PARTS- Continued

- 3 Remove 4 front air inlet grilles (8) by removing 14 screws (9) and 14 lockwashers (10)
- 4 Remove screw (11) and lockwasher (12) from each side of engine deck (13).



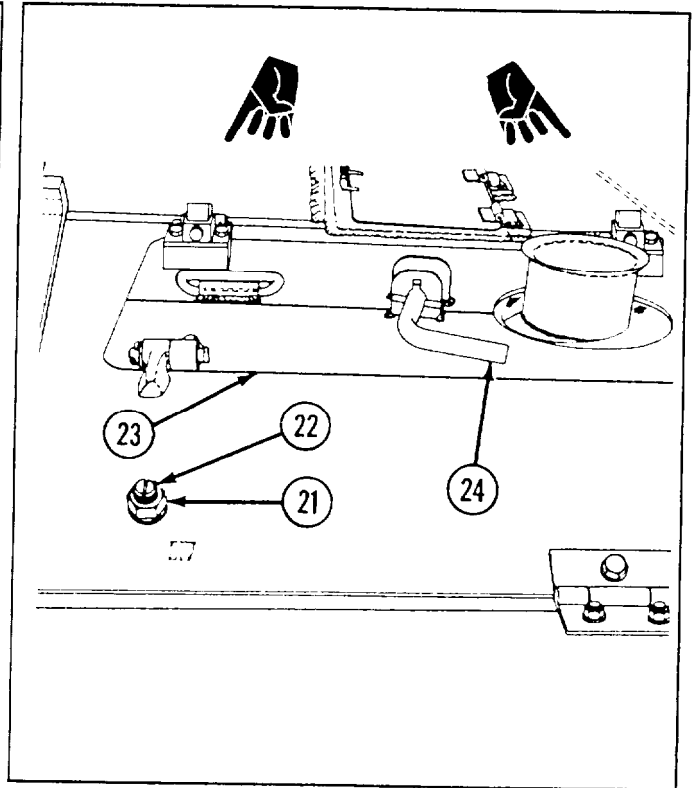
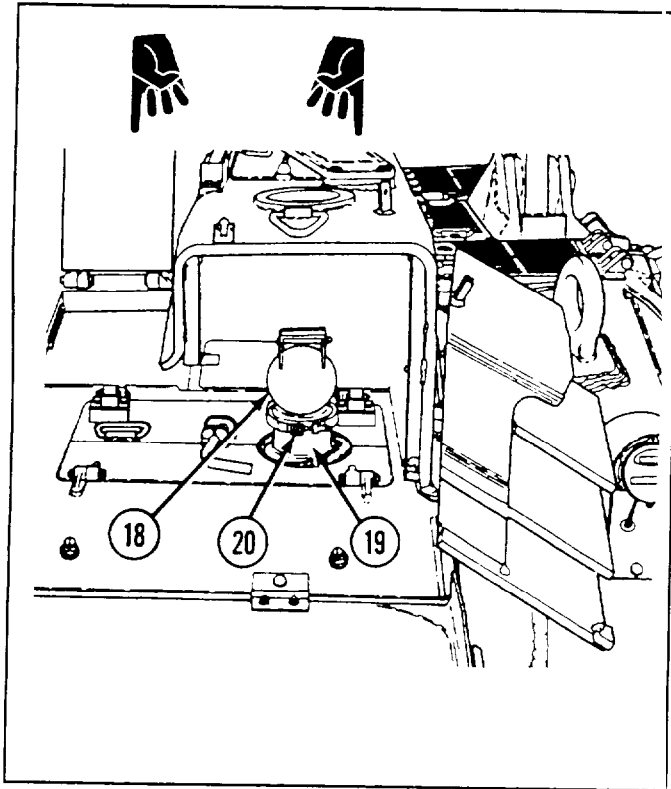
- 5 Loosen nut (14) on each of two exhaust deflector braces (15). Move exhaust deflector braces to rear.
- 6 Open both center exhaust doors (16). Open both exhaust deflector grille doors (17).



- 7 Remove two engine exhaust caps (18) from engine exhaust tubes (19) by removing two clamps (20).
- 8 Loosen four nuts (31) and turn four slotted screws (22).
- 9 Open two engine transmission access doors (23) by releasing two handle assemblies (24).

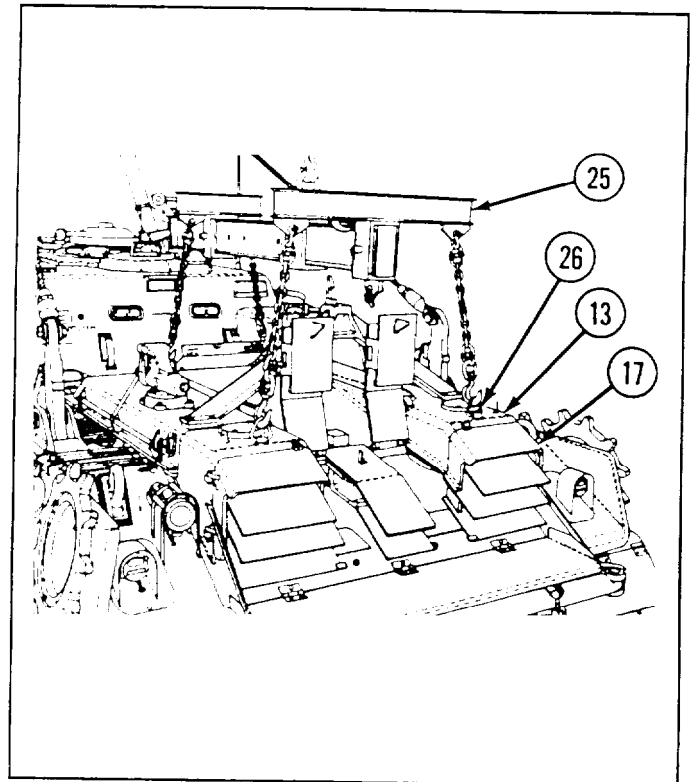
NOTE

Sling is premarked to ensure proper rigging for deck removal.

**WARNING**

All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury or death to personnel.

- 10 Close exhaust deflector grille doors (17). Attach sling (25) to four engine deck handles (26). Using suitable lifting device, remove engine deck.



**9-51 REPLACE/REPAIR ENGINE DECK, DECK BASE, AND RELATED PARTS—
Continued**

b. DISASSEMBLY

CAUTION

Engine cooler fans must be covered to prevent anything from falling into them.

- 1 Remove right engine deck door (see paragraph 9-52).

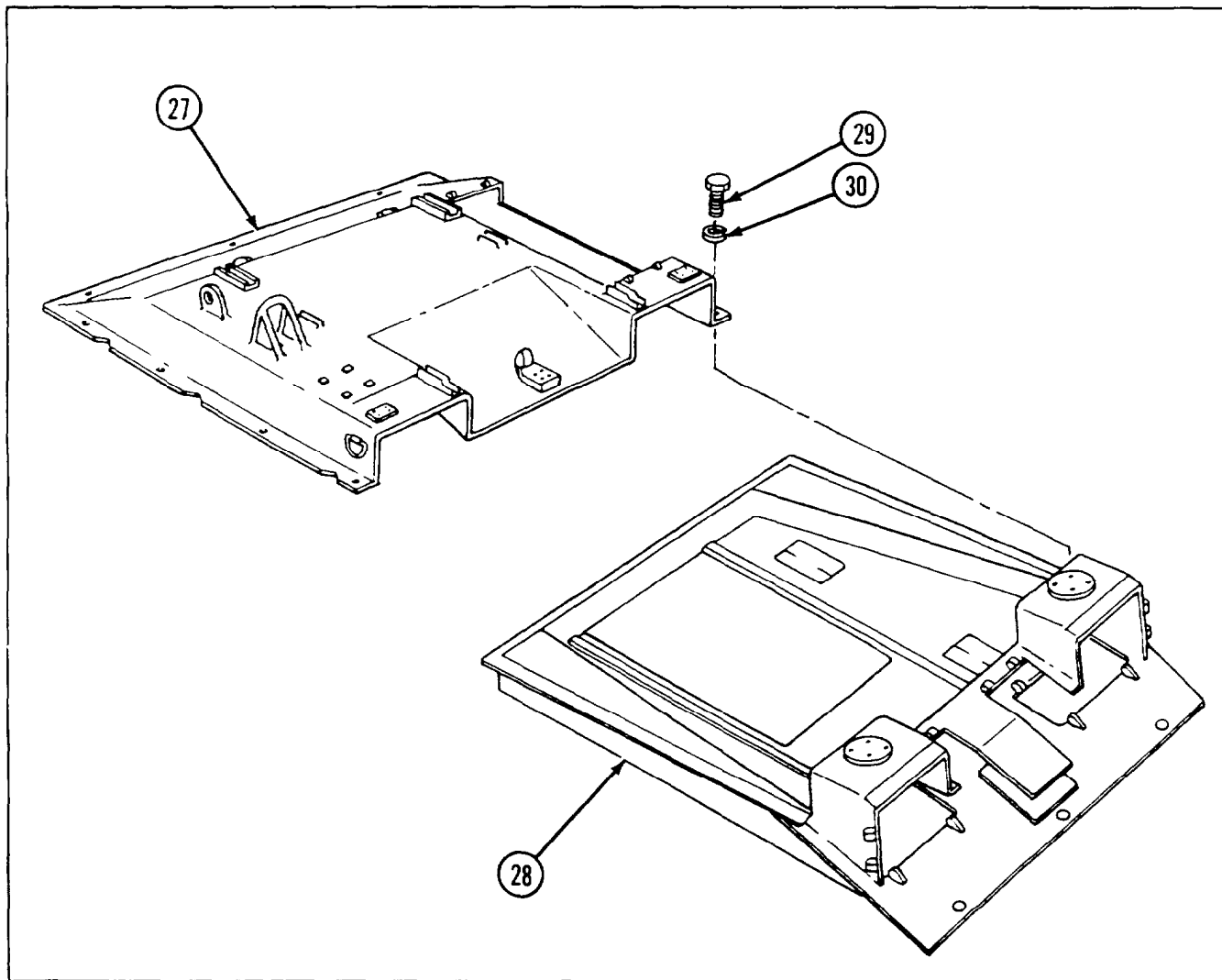
WARNING

All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury or death to personnel.

NOTE

Steps 2 through 6 apply to standard deck base. Steps 7 through 10 apply to optional deck base.

- 2 Separate cover assembly (27) from base assembly (28) by removing 11 screws (29) and 11 lockwashers (30)

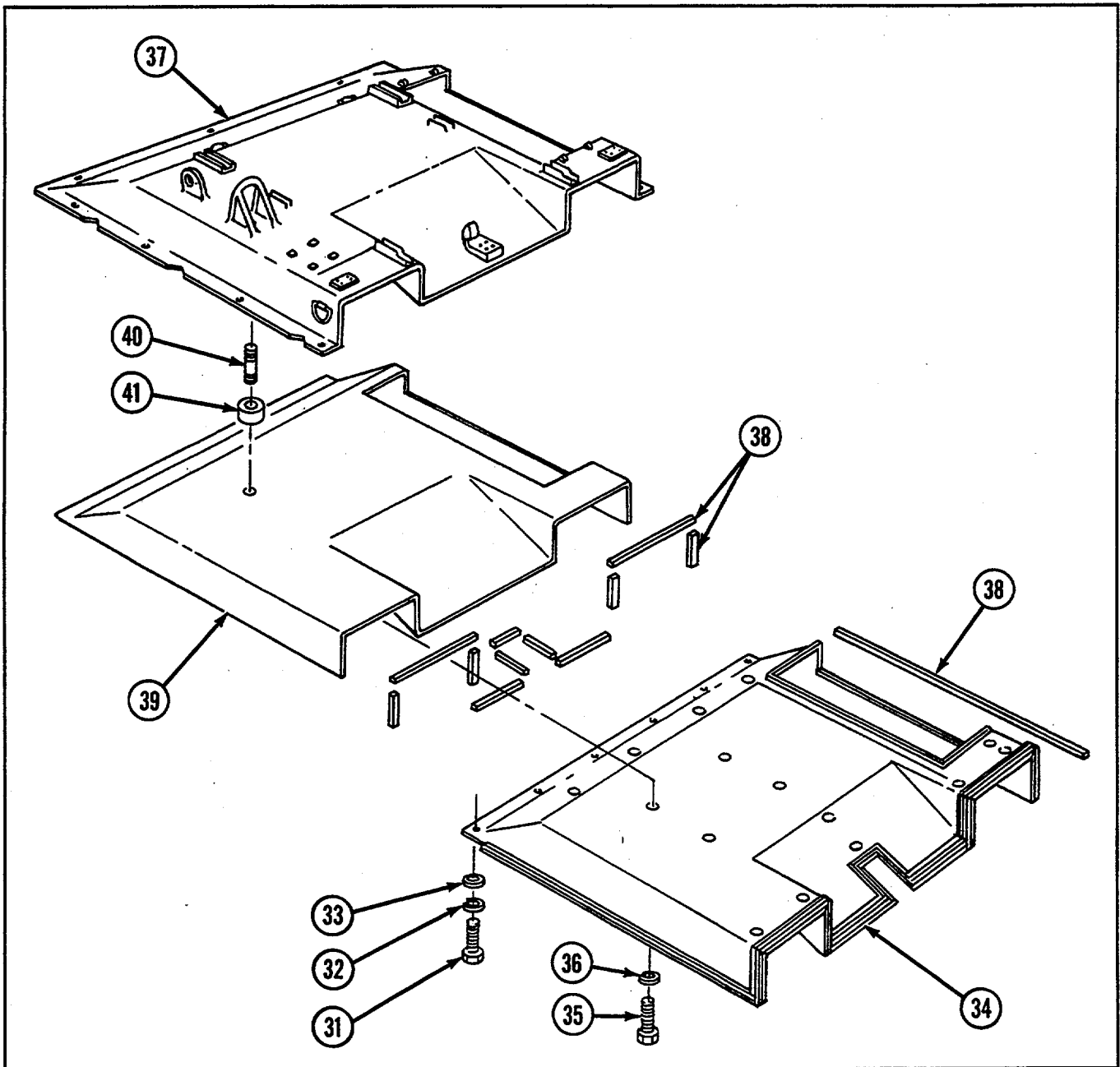


- 3 Remove six screws (31), six lockwashers (32), and six flat washers (33) from bracket mounting (34).

WARNING

All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury or death to personnel.

- 4 Remove 41 screws (35) and 41 lockwashers (36) to separate bracket mounting (34) from cover (37).
- 5 Remove 12 seals (38) and insulation blanket (39).
- 6 Remove 41 studs (40) and 41 spacers (41).

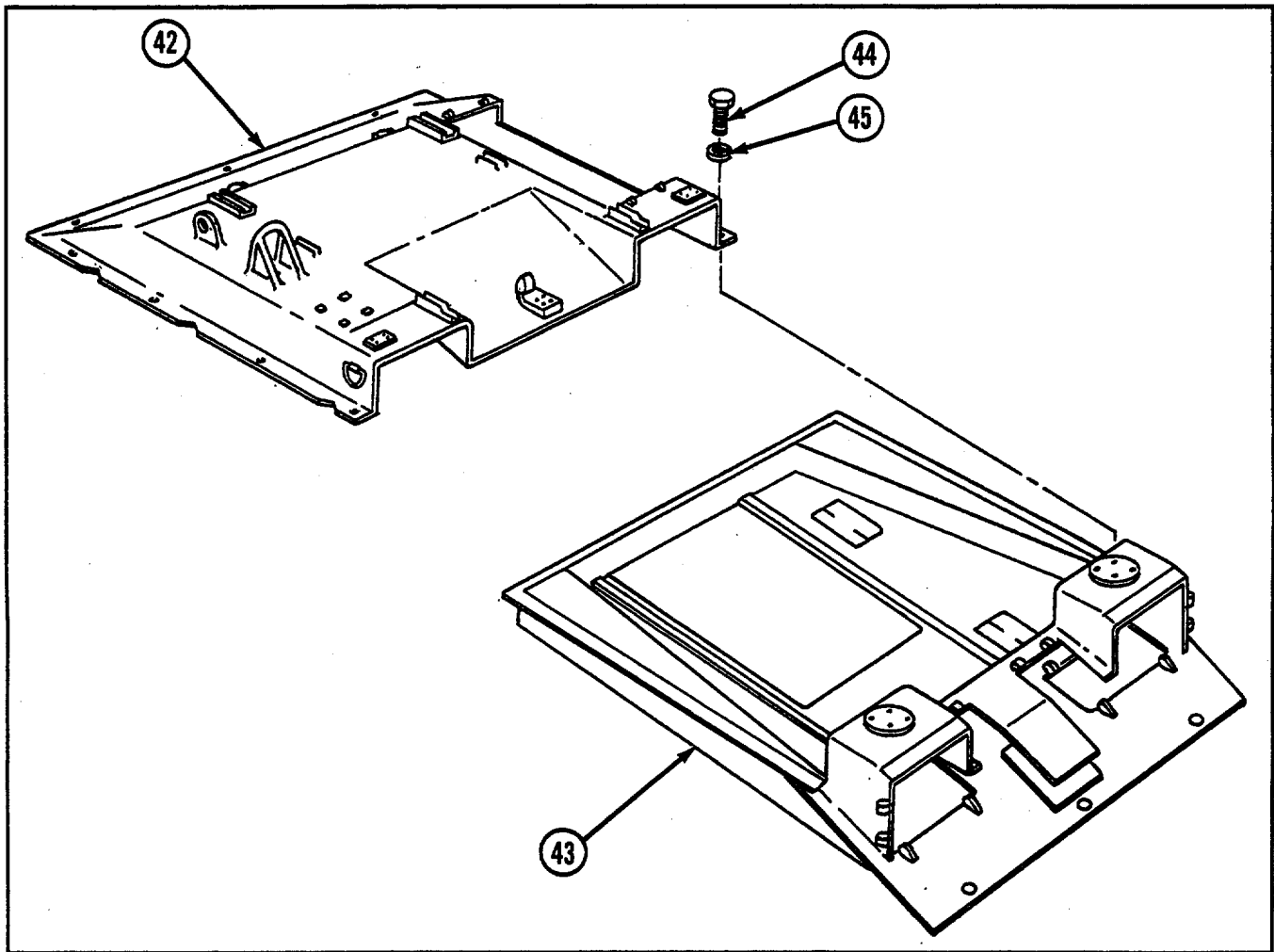


9-51 REPLACE/REPAIR ENGINE DECK, DECK BASE, AND RELATED PARTS-Continued

WARNING

All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury or death to personnel.

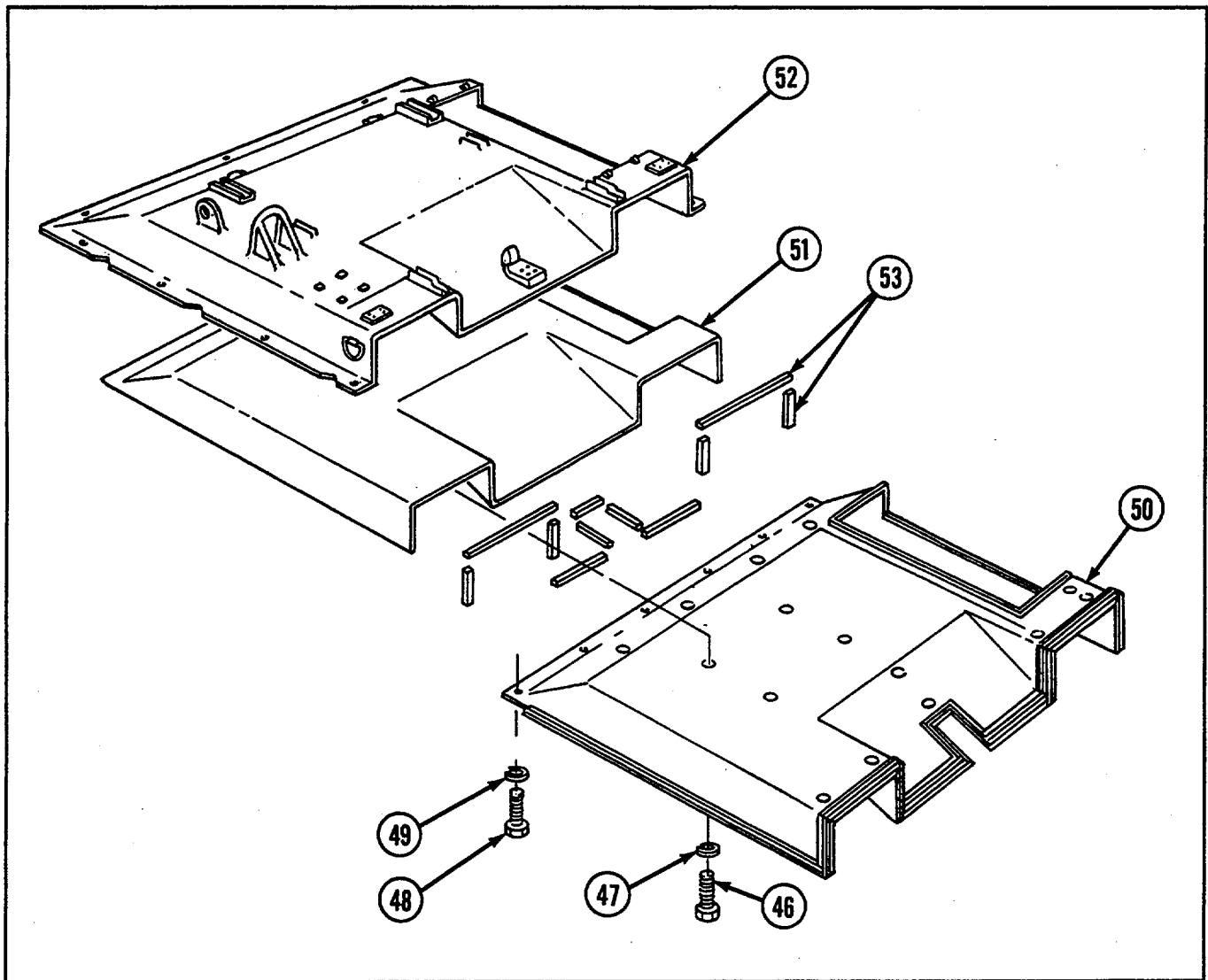
- 7 Separate cover assembly (42) from base assembly (43) by removing 11 screws (44) and 11 lockwashers (45).



- 8 Remove 33 screws (46), 33 lockwashers (47), 10 screws (48), and 10 lockwashers (49) from retainer assembly (50).
 9 Separate retainer assembly (50), insulation (51), and engine deck cover (52).
 10 Remove 11 seals (53).

WARNING

All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury or death to personnel.



c. ASSEMBLY

NOTE

Steps 1 and 2 apply to optional engine deck base. Steps 3 through 8 apply to standard engine deck base.

- 1 Install 11 seals (53).
- 2 Assemble engine deck cover (52), insulation (51), and retainer assembly (50) with 33 screws (46), 33 new lockwashers (47), 10 screws (48), and 10 new lockwashers (49).

WARNING

All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury or death to personnel.

- 3 Assemble cover assembly (42) to base assembly (43) with 11 screws (44) and 11 new lockwashers (45).

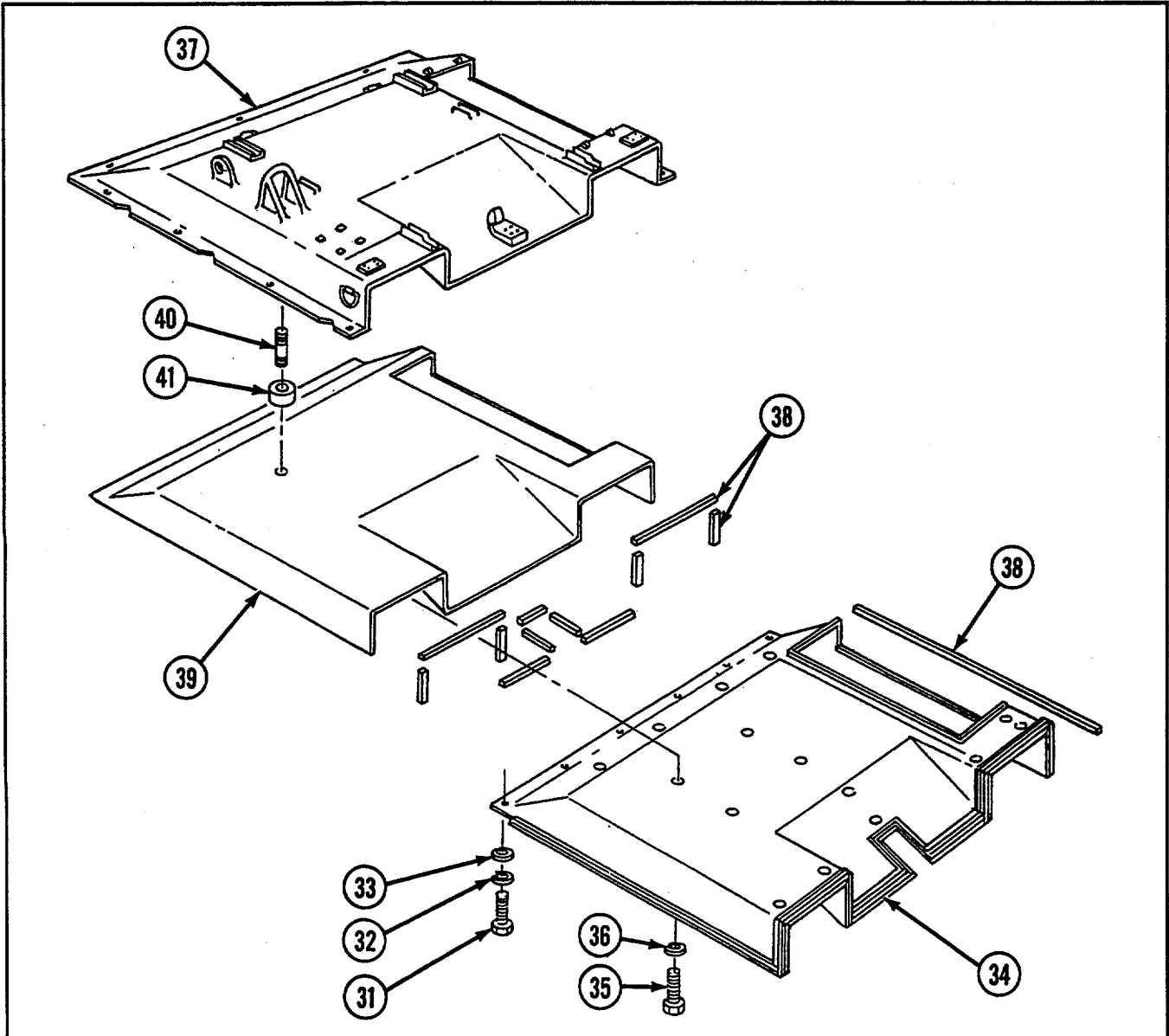
9-51 REPLACE/REPAIR ENGINE DECK, DECK BASE, AND RELATED PARTS-Continued

- 4 Install 41 studs (40) and 41 spacers (41) to cover (37).
- 5 Install 12 seals (38) and insulation blanket (39).

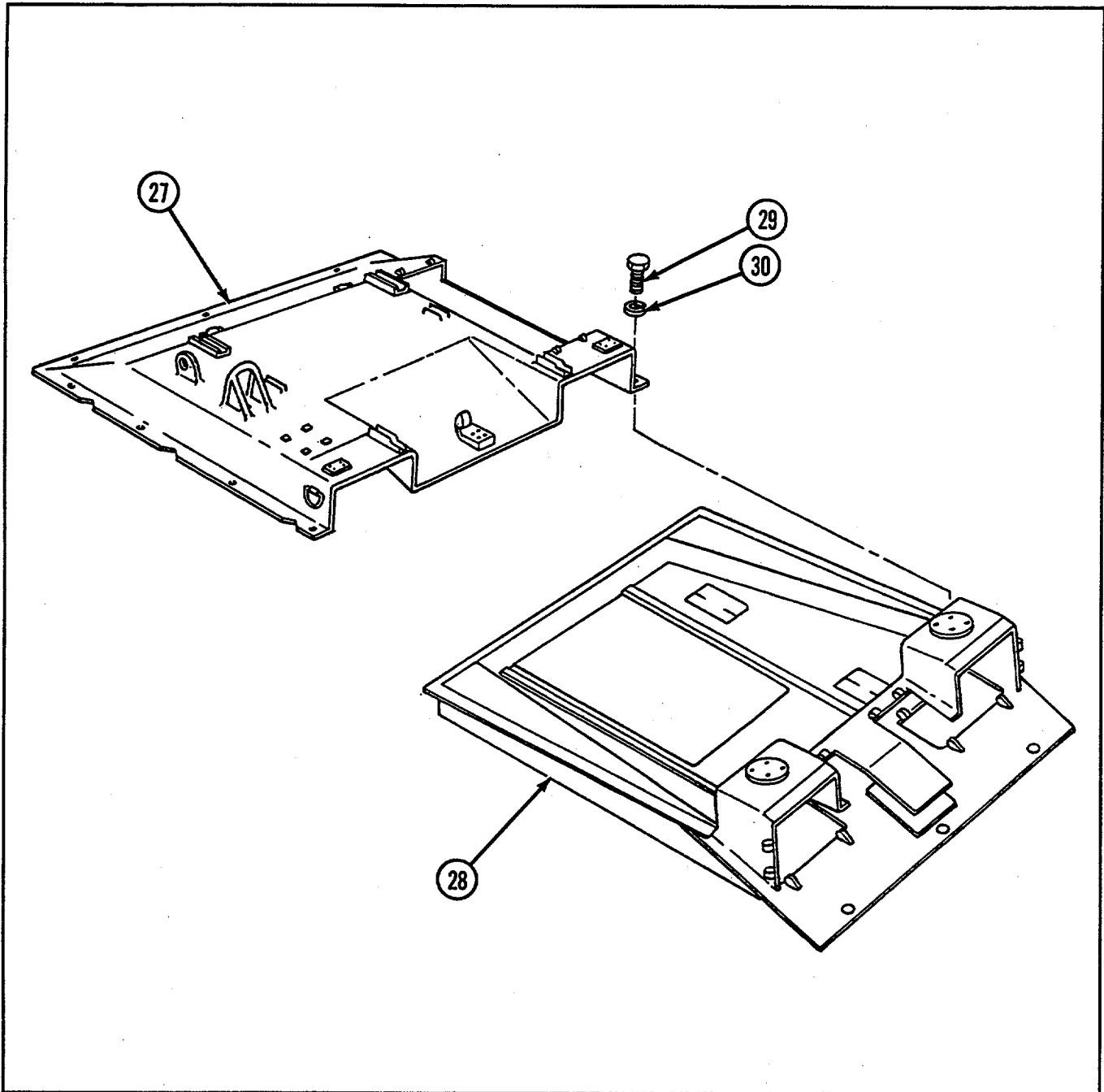
WARNING

All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury or death to personnel.

- 6 Install cover (37) to bracket mounting (34) with 41 screws (35) and 41 new lockwashers (36).
- 7 Install six screws (31), six new lockwashers (32), and six flat washers (33) to bracket mounting (34).



- 8 Install cover assembly (27) to base assembly (28) with 11 screws (29) and 11 new lockwashers (30).
- 9 Install right engine deck door (see paragraph 9-52).



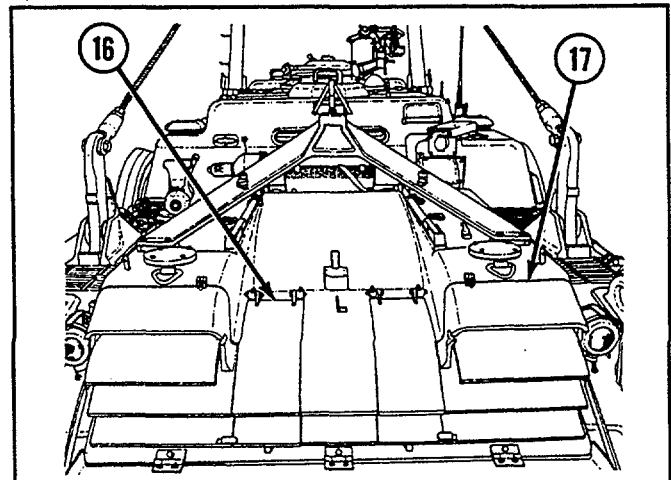
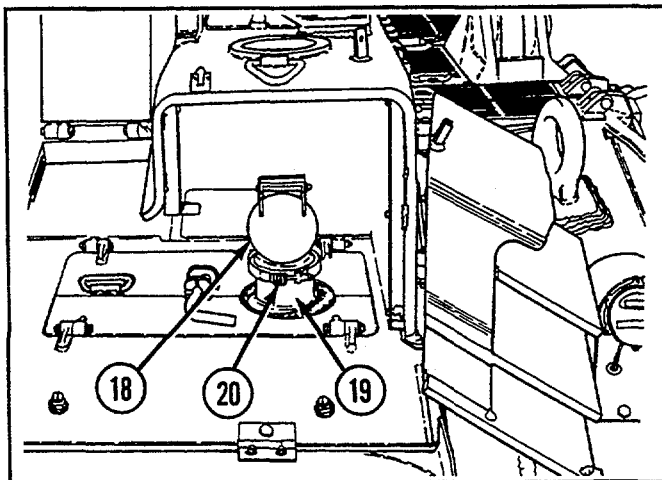
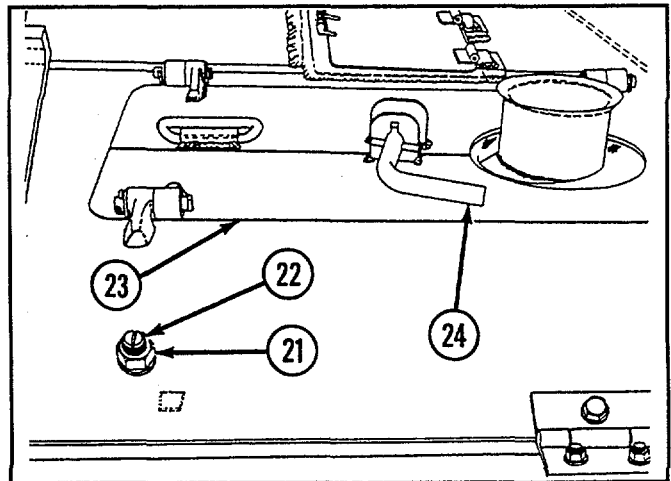
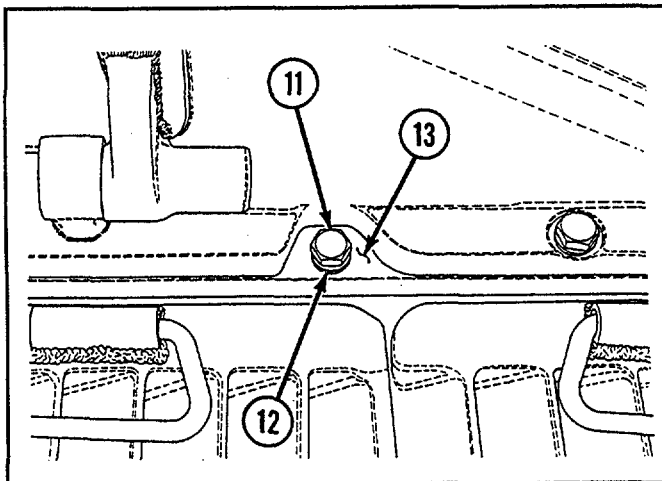
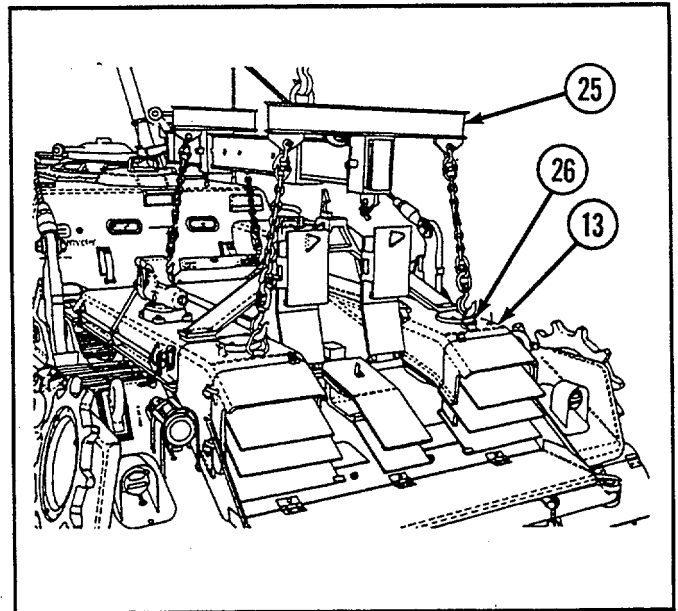
d. INSTALLATION

WARNING

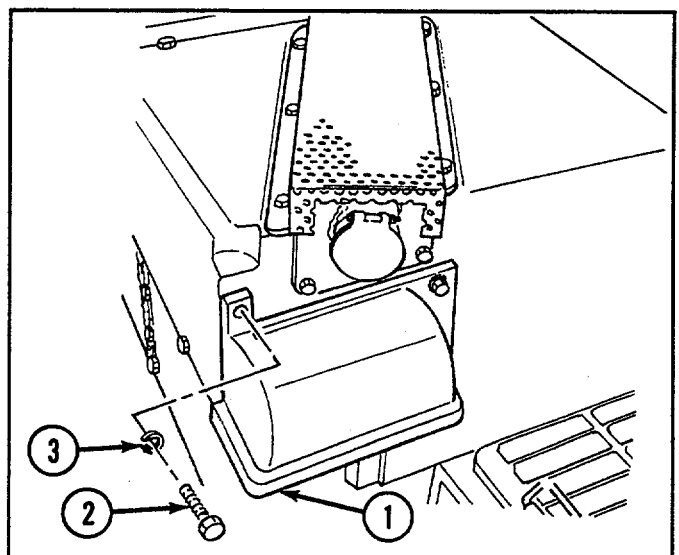
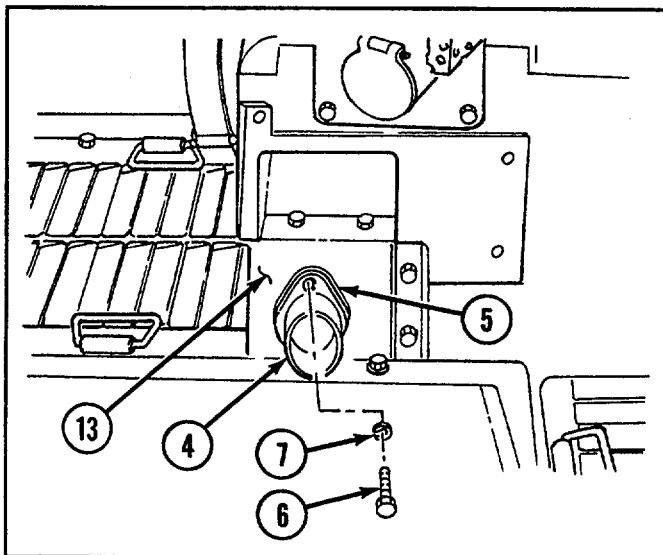
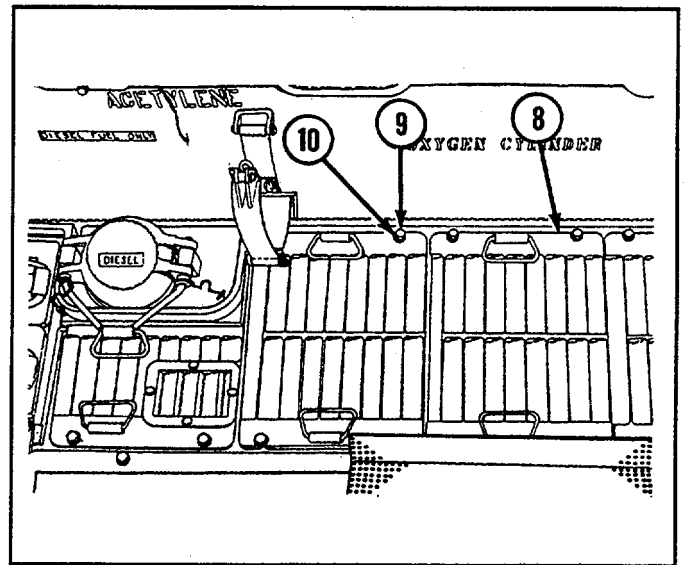
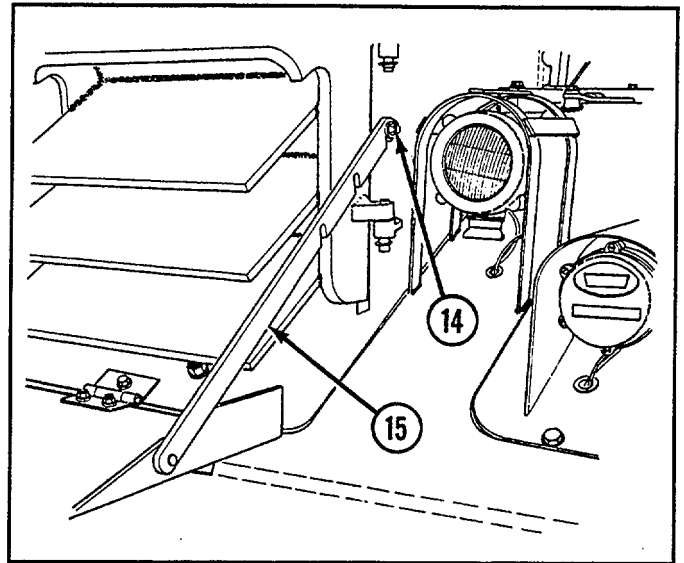
All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury or death to personnel.

9-51 REPLACE/REPAIR ENGINE DECK, DECK BASE, AND RELATED PARTS-Continued

- 1 Attach sling (25) to four engine deck handles (26). Using suitable lifting device. Install engine deck (13).
- 2 Install two screws (11) and two new lockwashers (12) to engine deck (13) and hull.
- 3 Turn four slotted screws (22) clockwise 900 to secure to hull. Then tighten four nuts (21) to secure screws.
- 4 Close two engine transmission access doors (23) and secure with two handle assemblies (24).
- 5 Install two engine exhaust caps (18) to engine exhaust tubes (19) with two clamps (20).
- 6 Close center exhaust doors (16) and exhaust deflector grille doors (17) on both sides.



- 7 Move both exhaust deflector braces (15) forward and tighten two nuts (14).
- 8 Install 4 front air inlet grilles (8) with 14 screws (9) and 14 new lockwashers (10).
- 9 Install personnel heater exhaust (4) and new gasket (5) on engine deck (13) with two screws (6) and two new lockwashers (7).
- 10 Install APU cooling air shield (1) with three screws (2) and three new lockwashers (3).



9-52 REPLACE/REPAIR RIGHT ENGINE DECK DOOR**THIS TASK COVERS**

a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts-Continued:

- Screws (2) (Appendix G, item 240)
- Washers, spring (2) (Appendix G, item 278)

Parts:

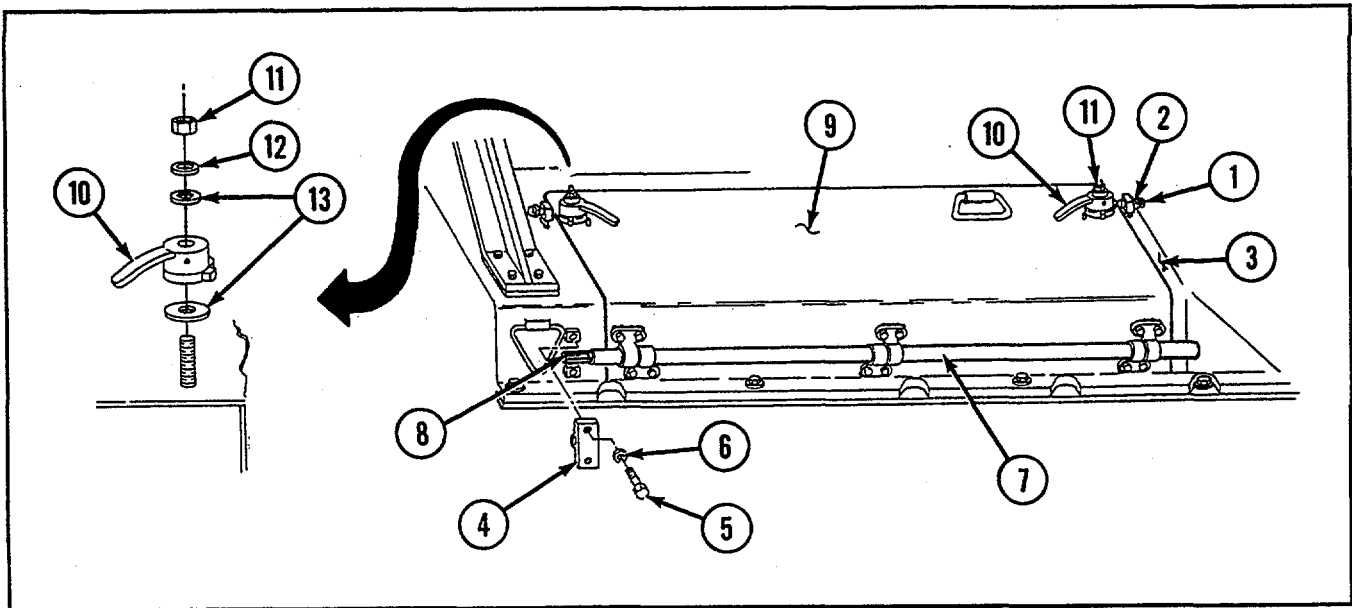
- Lockwashers (10) (Appendix G, item 107)
- Lockwashers (4) (Appendix G, item 132)

Personnel Required:

Two

a. REMOVAL

- 1 Remove two screws (1) and two lockwashers (2) from engine deck cover (3).
- 2 Remove torsion bar support (4) by removing two screws (5) and two lockwashers (6).
- 3 Remove tube (7) and torsion bar (8).
- 4 Remove door (9) from vehicle.
- 5 Remove two handles (10) from door (9) by removing nut (11), spring washer (12), and two flat washers (13) from each.

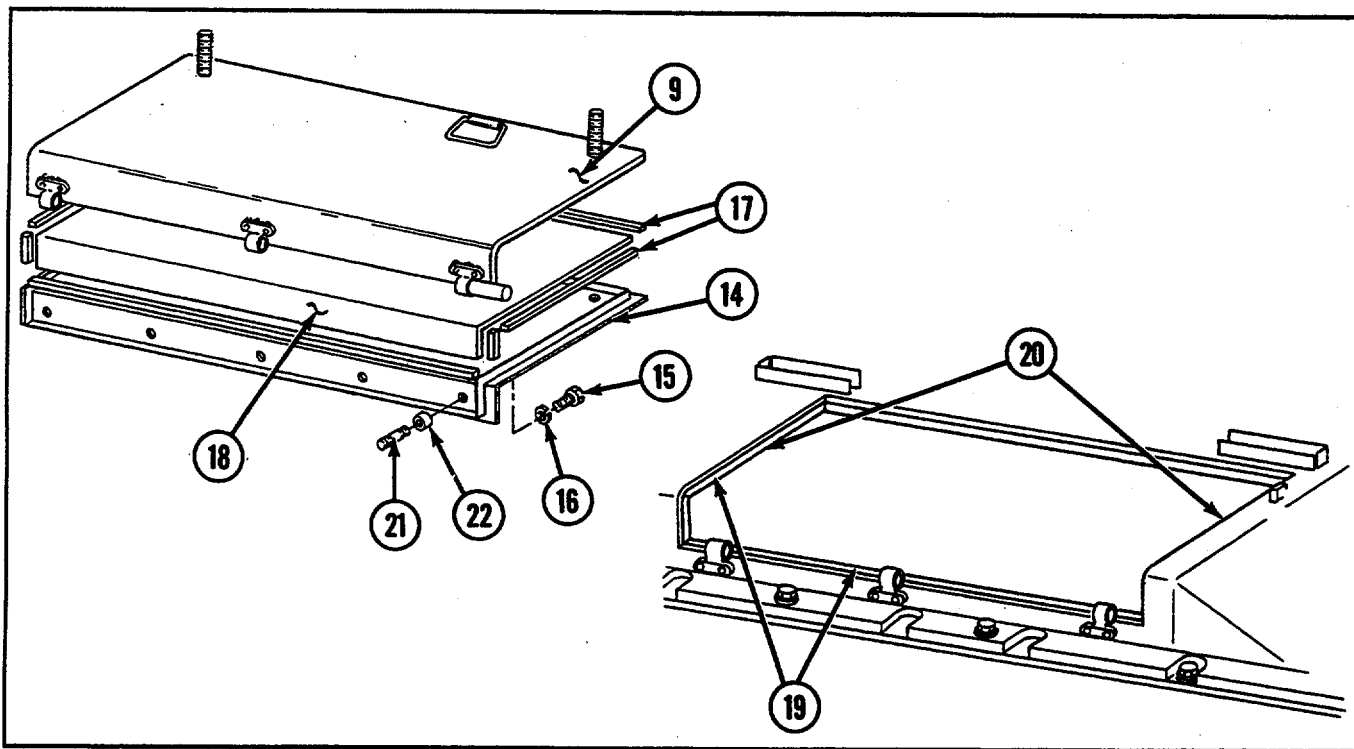


- 6 Remove bracket mounting (14) from door (9) by removing 10 screws (15) and 10 lockwashers (16).
- 7 Remove six seals (17) and insulation blanket (18) from door (9) and remove six seals (19) from door opening (20) on vehicle.

NOTE

Optional door does not have studs (21) or spacers (22).

- 8 Remove 10 studs (21) and 10 spacers (22).

**b. DISASSEMBLY**

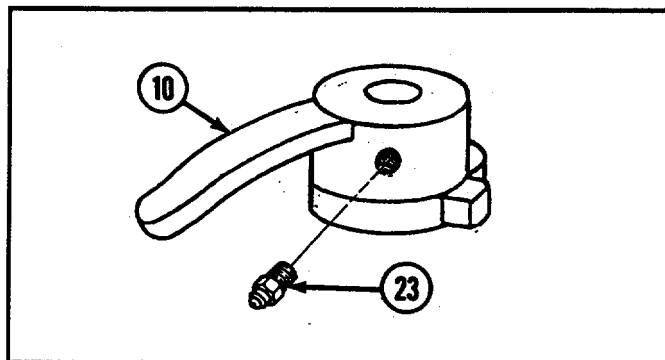
Remove lubrication fitting (23) from each handle (10).

c. ASSEMBLY

Install lubrication fitting (23) to each handle (10).

d. INSTALLATION

- 1 Install 10 studs (21) and 10 spacers (22) to door (9).
- 2 Install six seals (17) and insulation blanket (18) to door (9) and install six seals (19) to door opening (20) on vehicle.
- 3 Install bracket mounting (14) to door (9) with 10 screws (15) and 10 new lockwashers (16).
- 4 Install two handles (10) to door (9) with two flat washers (13), new spring washer (12), and nut (11) each.
- 5 Install door (9) to vehicle.

**NOTE**

Door (9) must be open to set torsion bar (8) and torsion bar support (4).

- 6 Install tube (7) and torsion bar (8).
- 7 Install torsion bar support (4) with two screws (5) and two new lockwashers (6).
- 8 Install two new lockwashers (2) and two screws (1) to engine deck cover (3). Peen screws.

9-53 REPLACE CLAMP ASSEMBLY**THIS TASK COVERS**

a. Removal

b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

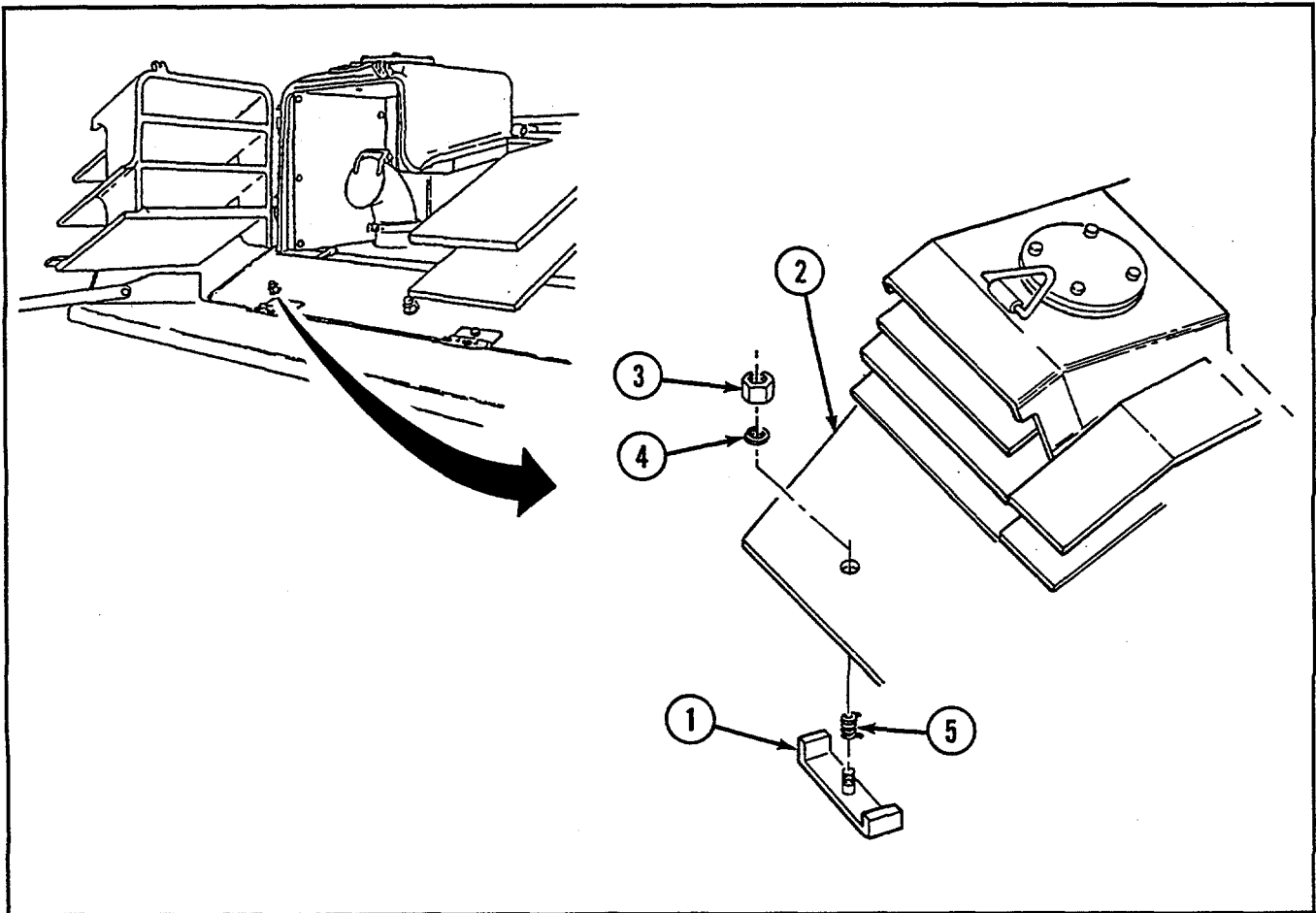
Lockwashers (4) (Appendix G, item 137)

Equipment Condition:

Engine transmission access doors opened (see paragraph 9-55)

a. REMOVAL

Remove four clamps (1) from base assembly (2) by removing four nuts (3), four lockwashers (4), and four springs (5).

**b. INSTALLATION**

Install four clamps (1) to base assembly (2) with four springs (5), four new lockwashers (4), and four nuts (3).

NOTE

Follow-on maintenance:

Close engine transmission access doors (see paragraph 9-55)

9-54 REPLACE INSULATION RETAINER

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic' s (Appendix C, item 53)

Parts:

Lockwashers (32) (Appendix G, item 107)

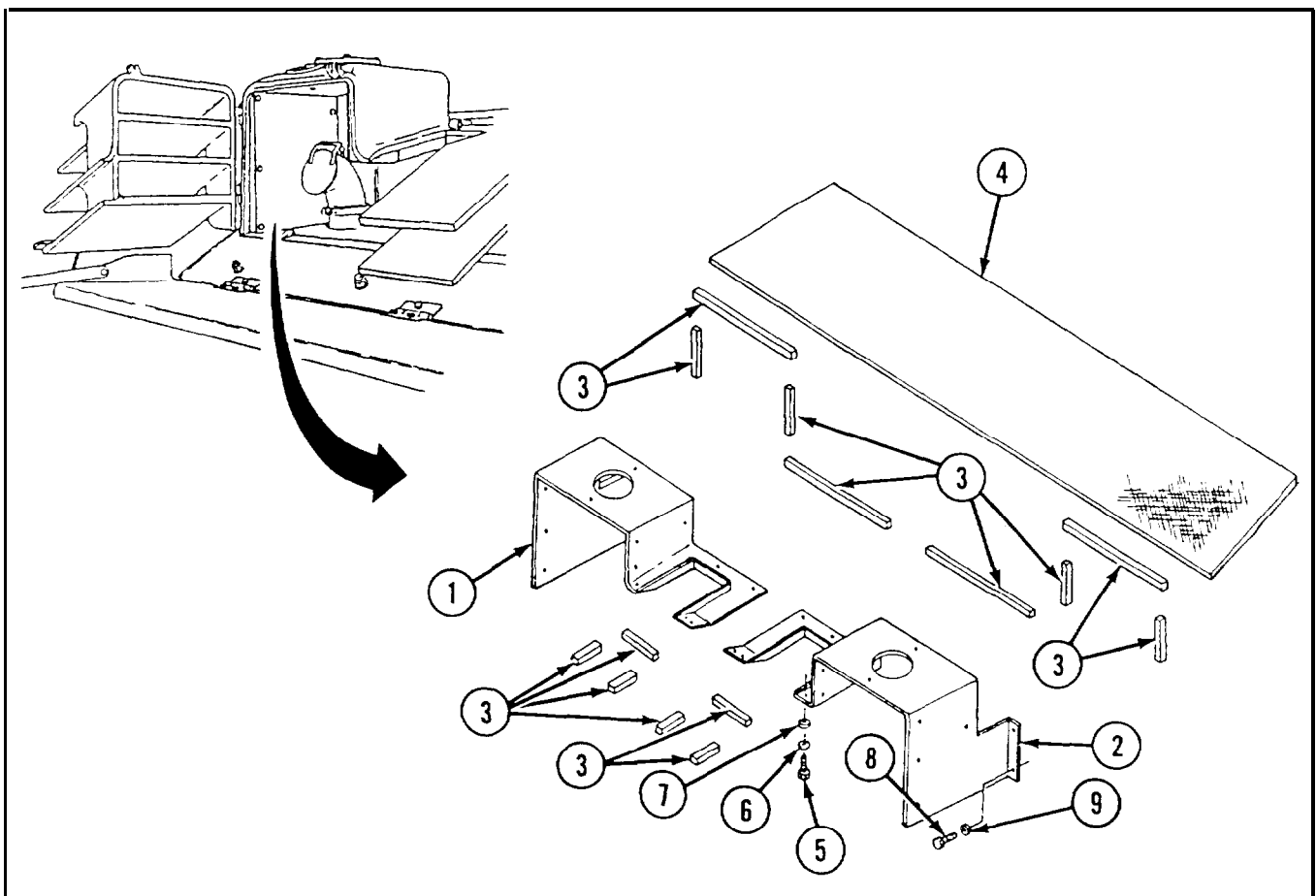
Equipment Conditions:

*Left and right exhaust doors opened (see paragraph 9-61)

*Center exhaust doors opened (see paragraph 9-62)

a. REMOVAL

Remove 2 retainers (1 and 2), 14 seals (3), and insulation blanket (4) by removing 24 screws (5), 24 flat washers (6), 14 lockwashers (7), 8 bolts (8), and 8 lockwashers (9).



b. INSTALLATION

Install 2 retainers (1 and 2), 14 seals (3), and insulation blanket (4) with 8 new lockwashers (9), 8 bolts (8), 24 new lockwashers (7), 24 flat washers (6), and 24 screws (5).

NOTE

Follow-on maintenance:

*Close center exhaust doors (see paragraph 9-62)

*Close left and right exhaust doors (see paragraph 9-61)

9.55 REPLACE ENGINE TRANSMISSION ACCESS DOORS

THIS TASK COVERS

- | | | | |
|------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
|------------|----------------|-------------|-----------------|

INITIAL SET-UP

- | | |
|---|---|
| Tools:
Tool kit, general mechanic' s (Appendix C, item 53) | Equipment Condition:
Exhaust doors opened (see paragraph 9-61) |
|---|---|

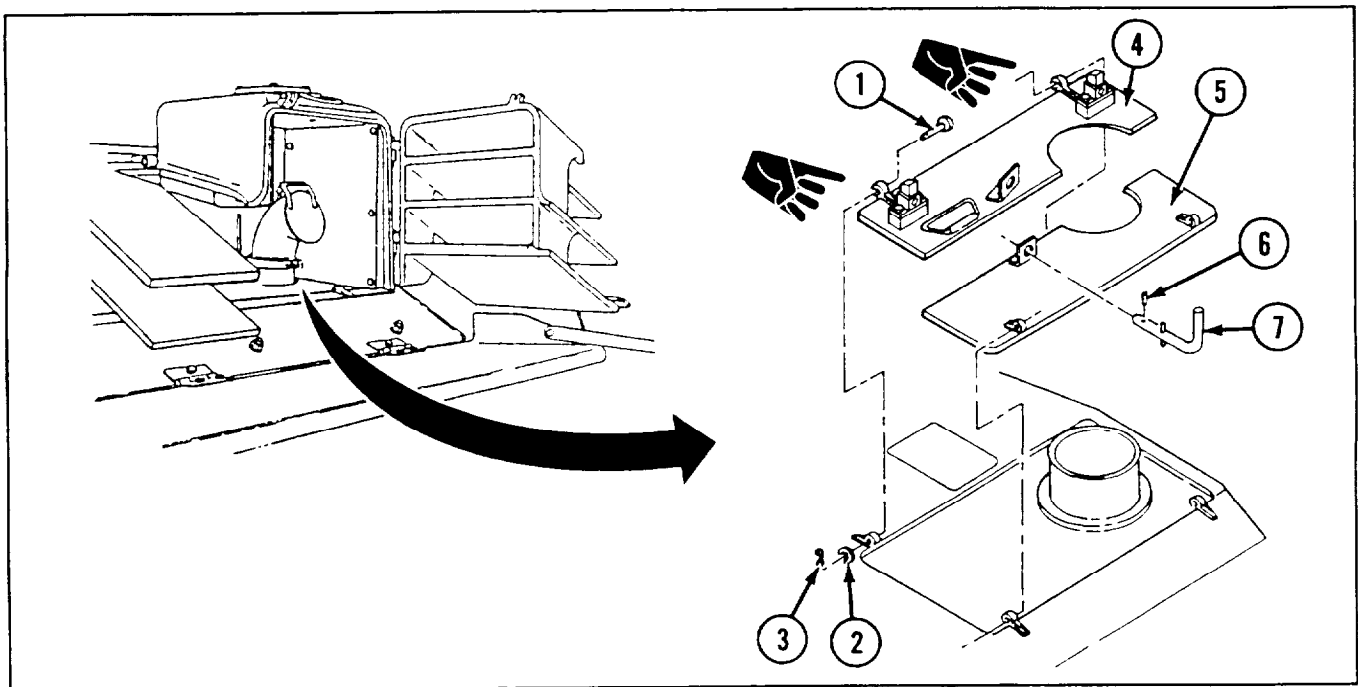
- Parts:
- Pins, cotter (9) (Appendix G, item 216)
 - Locknuts (3) (Appendix G, item 90.1)

a. REMOVAL

NOTE

- Left-forward door is Split and contains an additional straight pm (1), flat washer (2), and cotter pin (3).
- Right door shown.

- 1 Remove four cotter pins (3), four flat washers (3), four straight pins (1), and two access doors (4 and 5).
- 2 Remove groove pm (6) and handle (7).

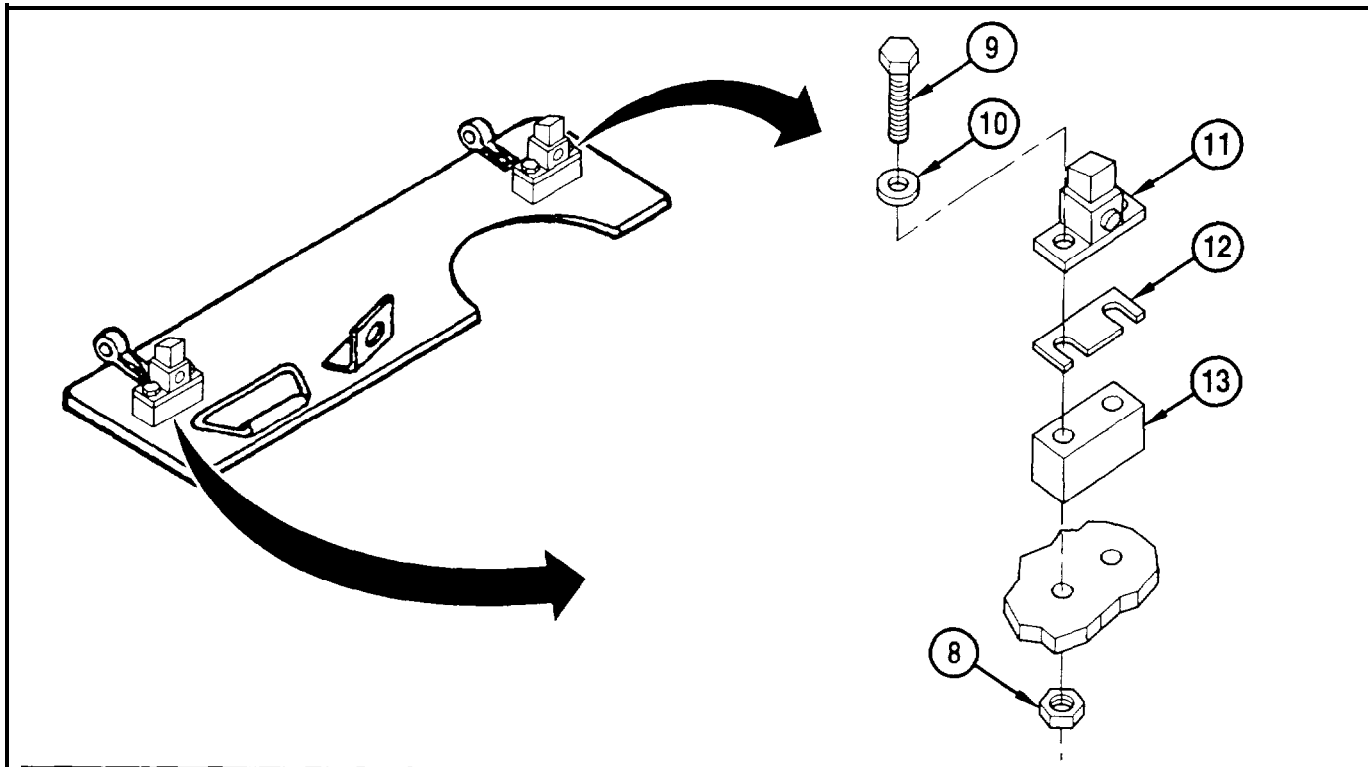


NOTE

Disassembly and assembly are for the right side door only.

b. DISASSEMBLY

Remove four locknuts (8), four screws (9), four washers (10), two bumper assemblies (11), shims (12), and two blocks (13).



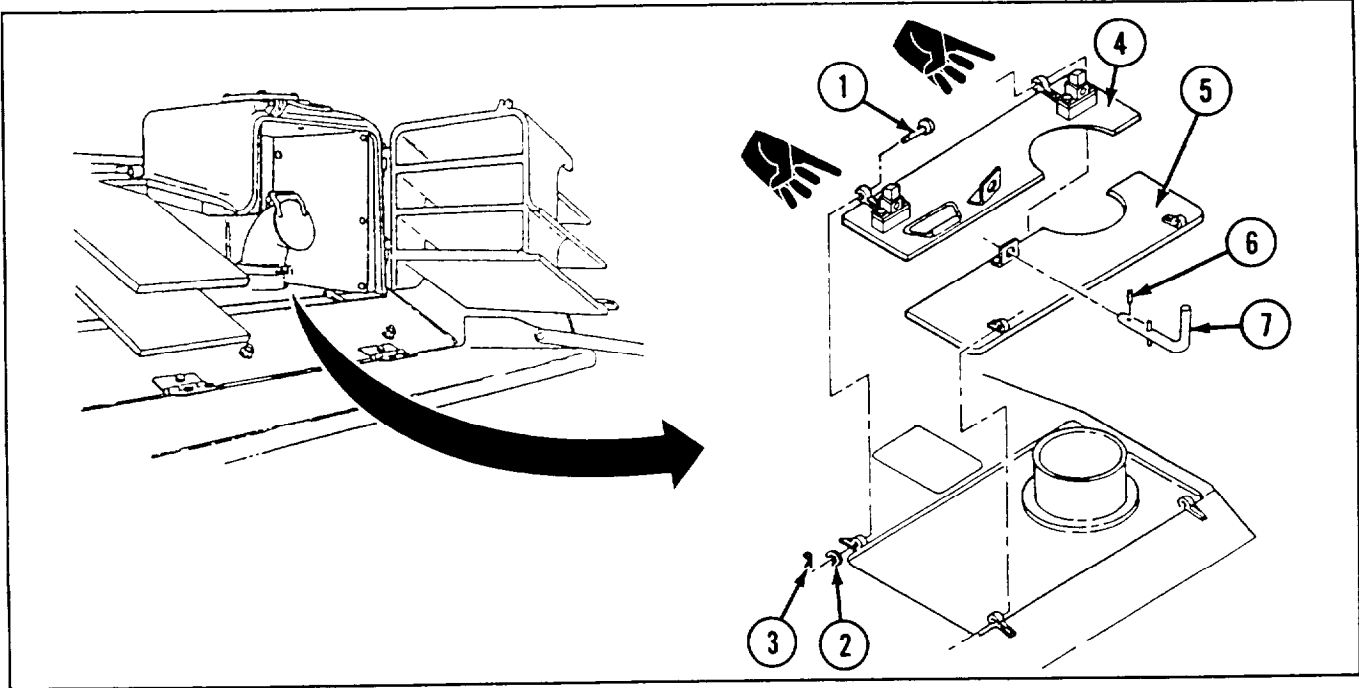
c. ASSEMBLY

Install two blocks (13), shims (12), two bumper assemblies (11), shims (12), four washers (10), four screws (9), and four new locknuts (8).

9-55 REPLACE ENGINE TRANSMISSION ACCESS DOORS-Continued

d. INSTALLATION

- 1 Install handle (7) and groove pin (6) on access door (5).
- 2 Install two access doors (4 and 5) each with two straight pins (1), two flat washers (3), and two new cotter pins (3).



NOTE

Follow-on maintenance: Close exhaust doors (see paragraph 9-61)

9-56 REPLACE AIR INLET DOORS**THIS TASK COVERS**

a. Removal

b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

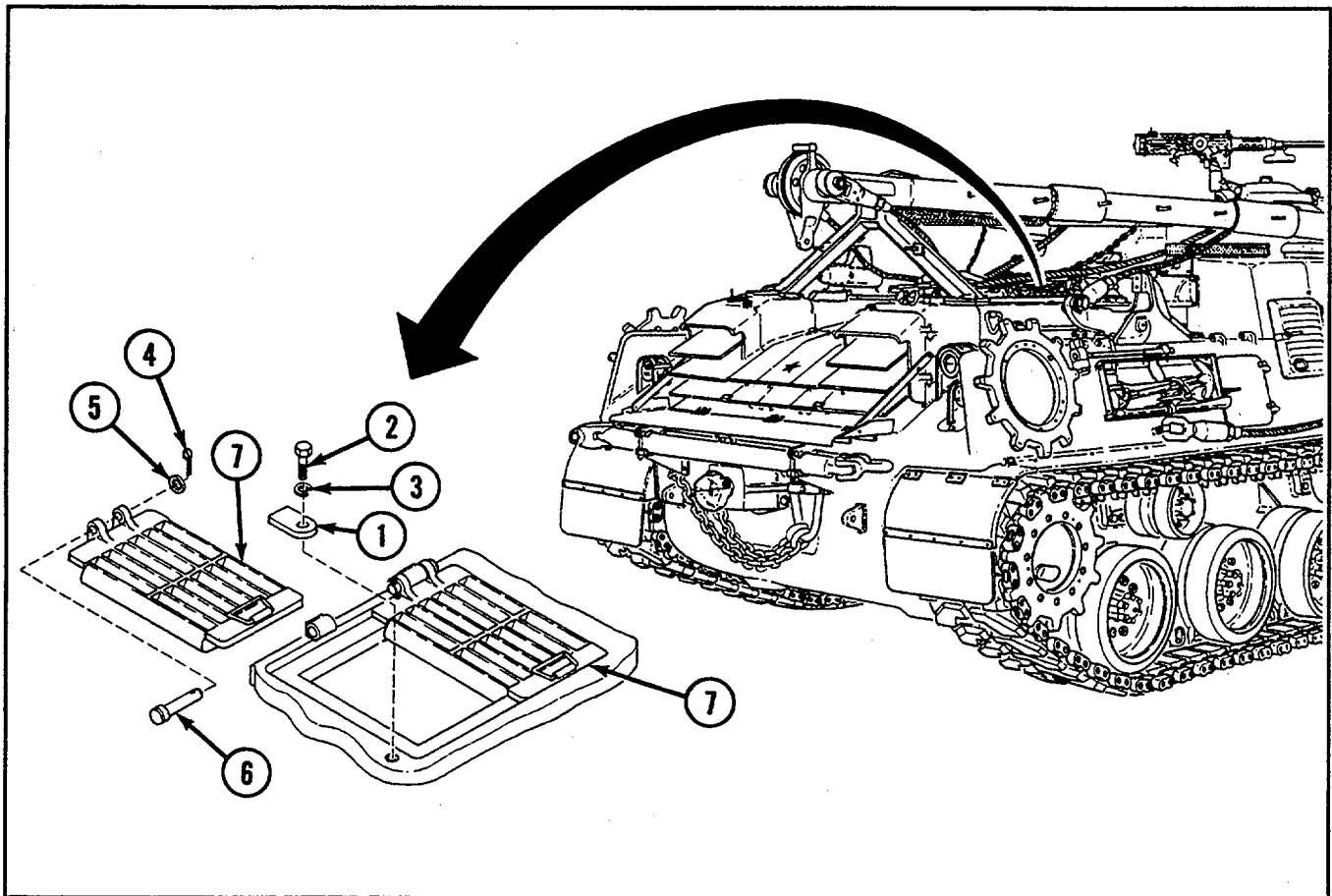
Pins, cotter (10) (Appendix G, item 217)

NOTE

Removal and installation procedures are the same for all five sets of air inlet doors.

a. REMOVAL

- 1 Remove lock (1), screw (2), and flat washer (3).
- 2 Remove two cotter pins (4), two flat washers (5), two straight pins (6), and two air inlet doors (7).

**b. INSTALLATION**

- 1 Install two air inlet doors (7) each with straight pin (6), flat washer (5), and new cotter pin (4).
- 2 Install lock (1) with screw (2) and flat washer (3).

9-57 REPLACE LEFT- AND CENTER-FRONT AIR INLET GRILLES**THIS TASK COVERS**

a. Removal

b. Installation

INITIAL SET-UP

Tools:

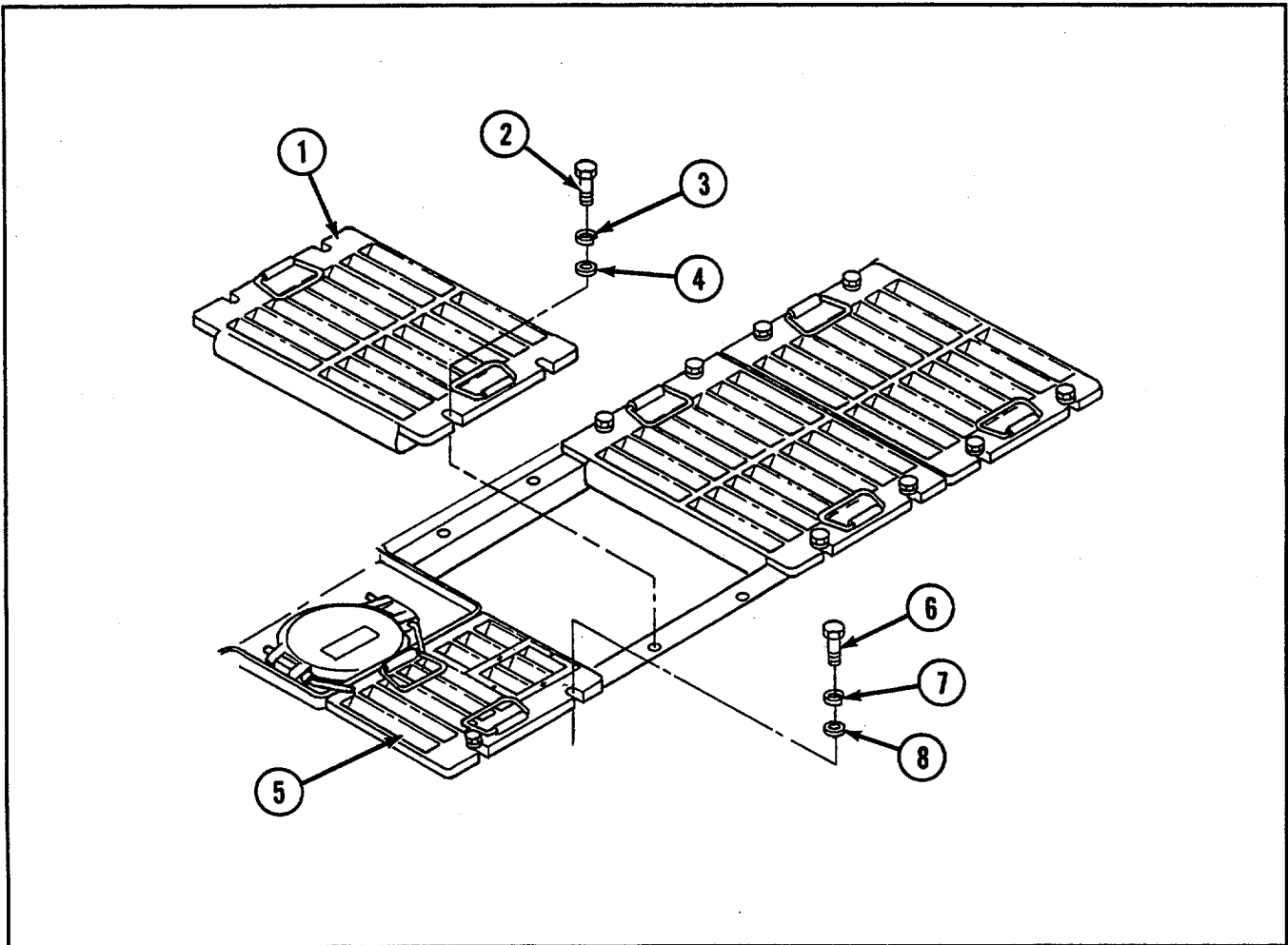
Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Lockwashers (14) (Appendix G, item 134)

a. REMOVAL

- 1 Remove three center-front air inlet grilles (1) by removing four screws (2), four lockwashers (3), and four flat washers (4) from each.
- 2 Remove left-front air inlet grille (5) by removing two screws (6), two lockwashers (7), and two flat washers (8).

**b. INSTALLATION**

- 1 Install three center-front air inlet grilles (1) each with four screws (2), four new lockwashers (3), and four flat washers (4).
- 2 Install left-front air inlet grille (5) with two screws (6), two new lockwashers (7), and two flat washers (8).

9-58 REPLACE DEEP WATER FORDING EXHAUST COVER PLATES**THIS TASK COVERS**

a. Removal

b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

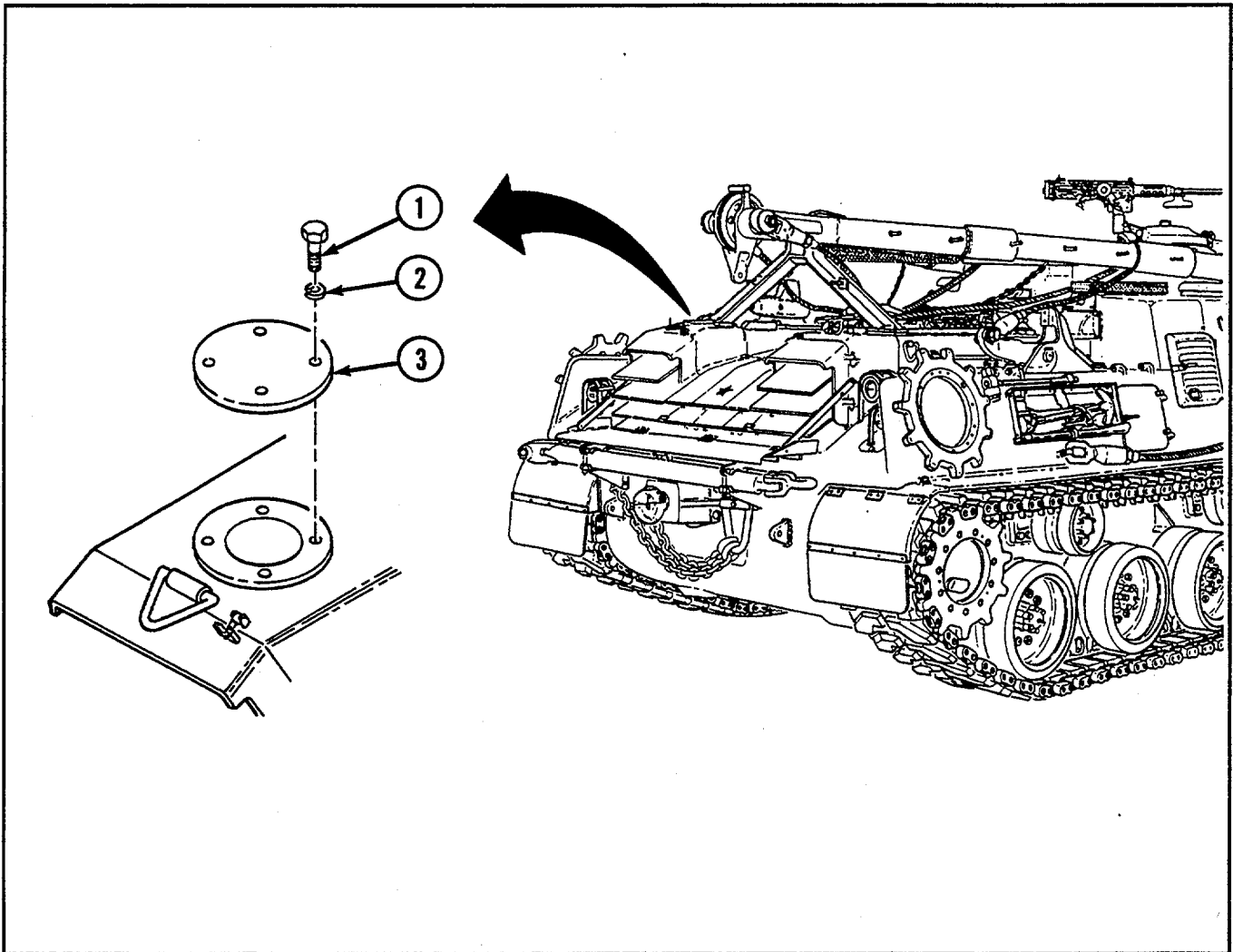
Lockwashers (8) (Appendix G, item 134)

NOTE

Removal and installation procedures are the same for both left and right exhaust cover plates.

a. REMOVAL

Remove four screws (1), four lockwashers (2), and exhaust cover plate (3).

**b. INSTALLATION**

Install exhaust cover plate (3) with four screws (1) and four new lockwashers (2).

9-59 REPLACE EXHAUST DEFLECTOR**THIS TASK COVERS**

a. Removal

b. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's (Appendix C, item 53)

Parts--Continued:

- Lockwashers (6) (Appendix G, item 138)
- Pins, cotter (2) (Appendix G, item 212)

Parts:

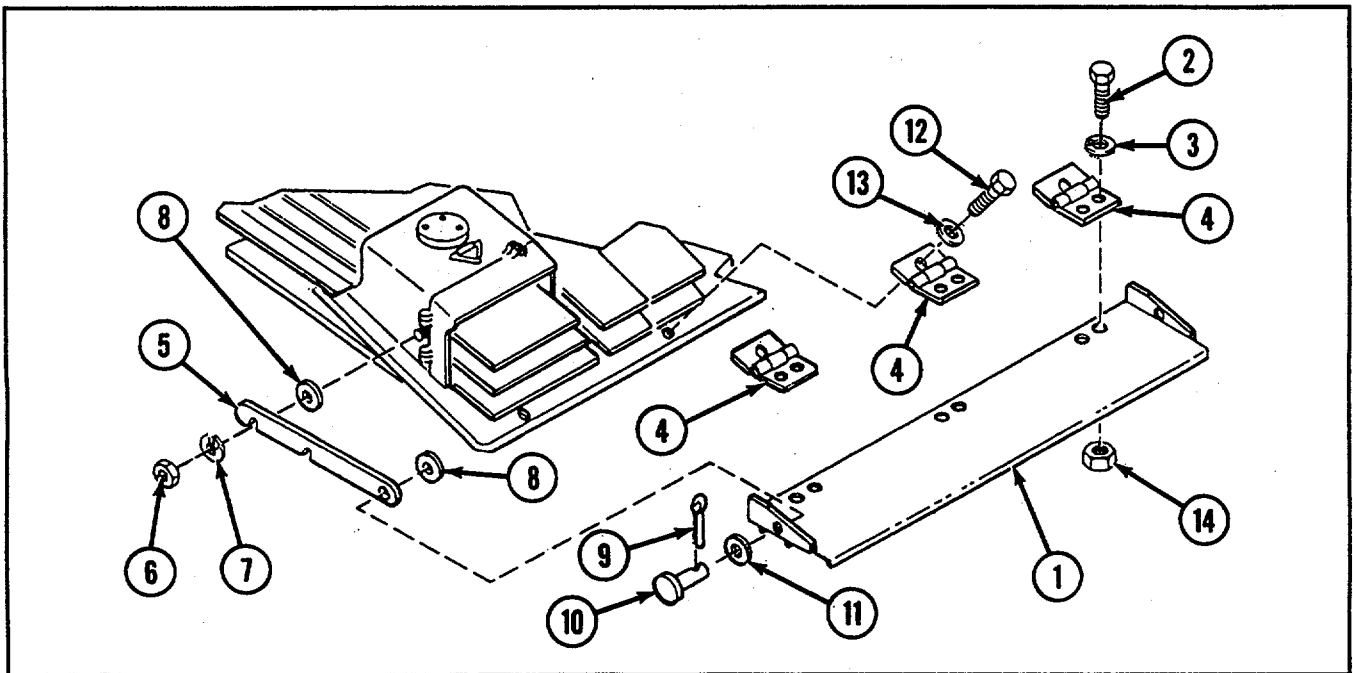
- Lockwashers (2) (Appendix G, item 132)
- Lockwashers (3) (Appendix G, item 134)

Personnel Required

Two

a. REMOVAL

- 1 Remove exhaust deflector (1) by removing screw (2) and lockwasher (3) from each of three hinges (4). Unlatch two levers (5) at top end by removing nut (6), lockwasher (7), and flat washer (8) from each.
- 2 Remove two levers (5) by removing cotter pin (9), pin (10), and two flat washers (11) from each side.
- 3 Remove three hinges (4) from exhaust deflector (1) by removing two screws (12), two lockwashers (13), and two nuts (14) from each.

**b. INSTALLATION**

- 1 Install three hinges (4) to exhaust deflector (1) with two screws (12), two new lockwashers (13), and two nuts (14) on each.
- 2 Install two levers (5) to exhaust deflector (1) with new cotter pin (9), pin (10), and two flat washers (11) on each.
- 3 Install exhaust deflector (1) with three screws (2) and three new lockwashers (3). Latch two levers (5) at top end with flat washer (8), new lockwasher (7), and nut (6) on each.

9-60 REPLACE LEFT AND RIGHT DECK AIR INLET DOORS**THIS TASK COVERS**

a. Removal

b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

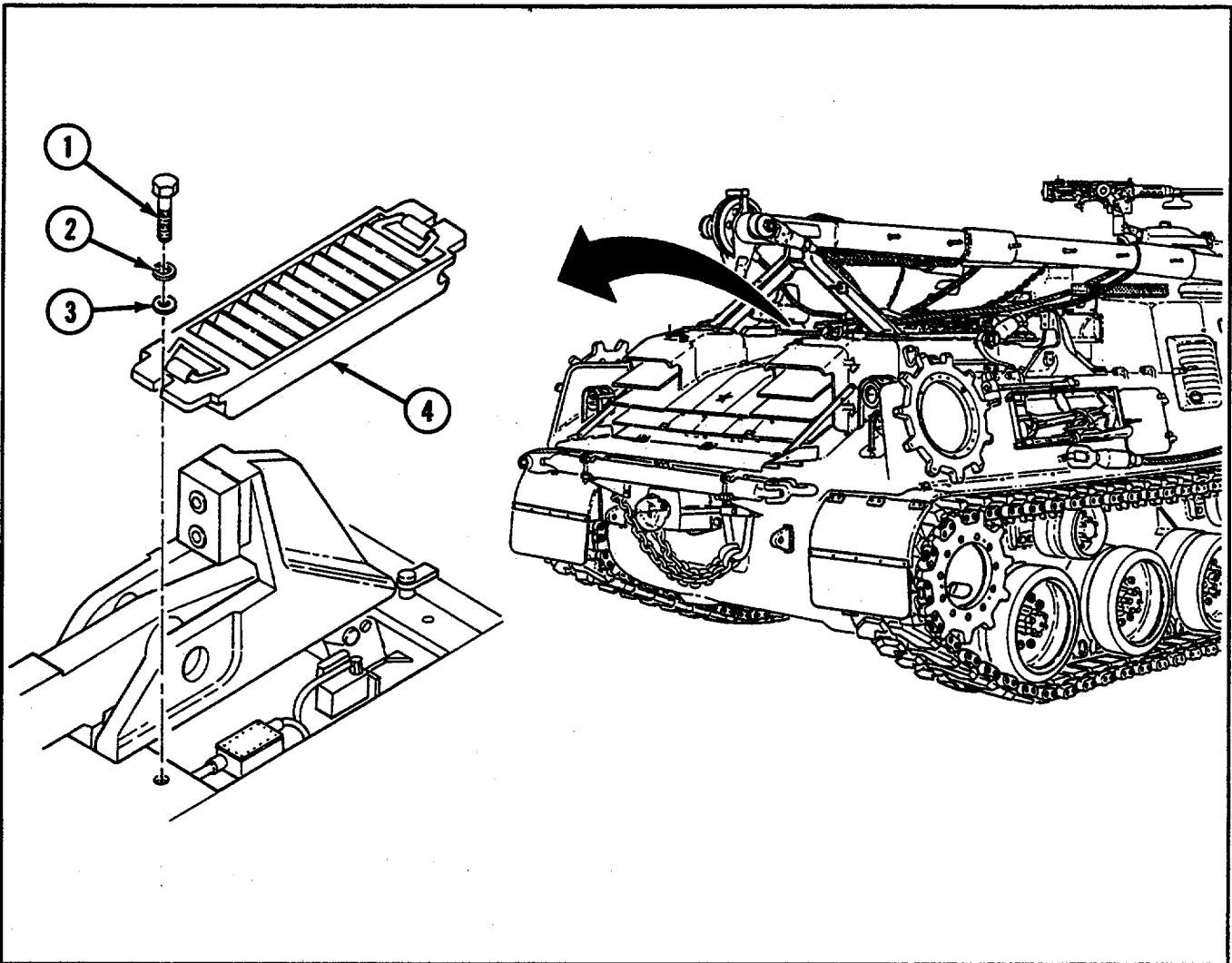
Lockwashers (4) (Appendix G, item 134)

NOTE

Removal and installation procedures are the same for both left and right air inlet doors.

a. REMOVAL

Remove two screws (1), two lockwashers (2), and two flat washers (3) from air inlet door (4).

**b. INSTALLATION**

Install air inlet door (4) with two screws (1), two new lockwashers (2), and two flat washers (3).

9-61 REPLACE LEFT AND RIGHT EXHAUST DOORS**THIS TASK COVERS**

a. Removal

b. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Lockwashers (2) (Appendix G, item 138)
- Pins, cotter (4) (Appendix G, item 216)

Parts-Continued:

- Pins, spring (2) (Appendix G, item 230)

Personnel Required:

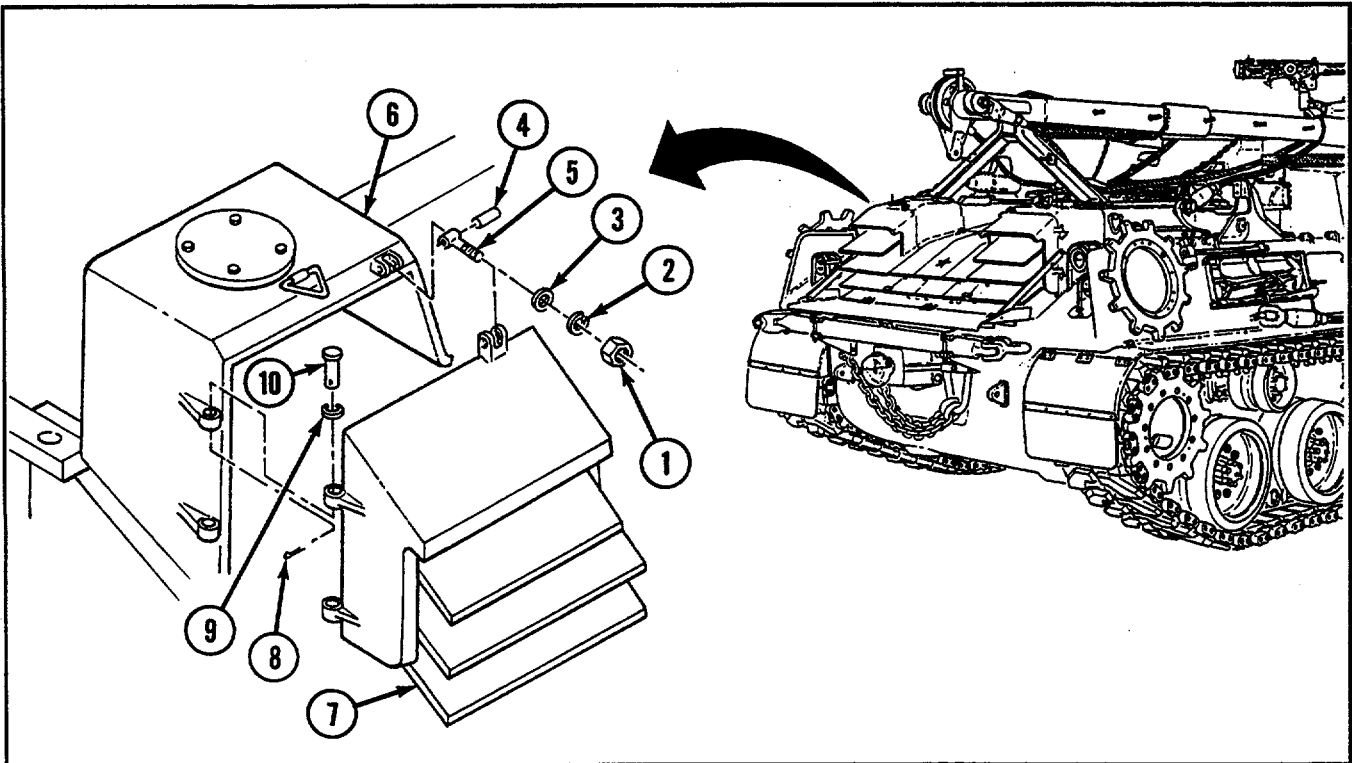
Two

NOTE

Removal and installation procedures are the same for both left and right exhaust doors.

a. REMOVAL

- 1 Remove nut (1), lockwasher (2), and flat washer (3).
- 2 Remove spring pin (4) to remove eyebolt (5) from base assembly (6).
- 3 Remove exhaust door (7) by removing two cotter pins (8), two flat washers (9), and two straight pins (10).

**b. INSTALLATION**

- 1 Install exhaust door (7) with two straight pins (10), two flat washers (9), and two new cotter pins (8).
- 2 Install eyebolt (5) to exhaust door (7) and base assembly (6) with new spring pin (4), flat washer (3), new lockwasher (2), and nut (1).

SECTION IV: SEAT ASSEMBLIES

Para.	Task	Page
9-64	Replace/Repair Personnel Seat Assemblies	9-109
9-65	Replace/Service Commander's Seat Assembly	9-110
9-66	Replace/Service Rigger's Seat Assembly	9-118
9-67	Replace/Service Mechanic's and Driver's Seat Assemblies	9-125

9-64 REPLACE/REPAIR PERSONNEL SEAT ASSEMBLIES**THIS TASK COVERS**

a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Lockwashers (4) (Appendix G, item 130)

NOTE

The following procedures are the same for both personnel seat assemblies.

a. REMOVAL

Remove personnel seat assembly (1) from cab subfloor plate (2) by lifting.

b. DISASSEMBLY

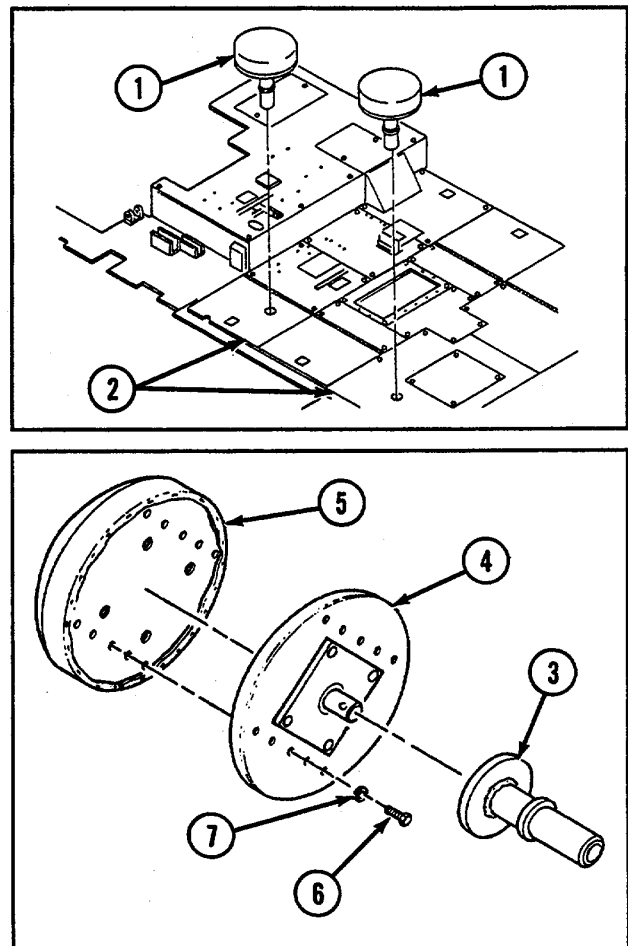
- 1 Pull pedestal assembly (3) from seat (4).
- 2 Remove seat (4) from seat cushion (5) by removing two screws (6) and two lockwashers (7).

c. ASSEMBLY

- 1 Install seat (4) on seat cushion (5) with two new lockwashers (7) and two screws (6).
- 2 Place pedestal assembly (3) onto seat (4).

d. INSTALLATION

Insert personnel seat assembly (1) into cab subfloor plate (2).



9-65 REPLACE/SERVICE COMMANDER'S SEAT ASSEMBLY**THIS TASK COVERS**

a. Removal b. Disassembly c. Inspection d. Repair e. Assembly f. Installation

INITIAL SET-UP**Tools:**

- Tool kit, general mechanic's (Appendix C, item 53)
- Awl, saddler's sewing (Appendix C, item 2)
- File, thread restorer (thread chaser) (Appendix C, item 13)
- Hammer, hand (mallet) (Appendix C, item 16)

Parts:

- Lockwashers (10) (Appendix G, item 130)
- Lockwashers (8) (Appendix G, item 132)
- Lockwashers (4) (Appendix G, item 143)
- Pins, cotter (15) (Appendix G, item 212)

Personnel Required:

Two

Equipment Condition:

Flasher light case removed (see paragraph 9-102)

WARNING

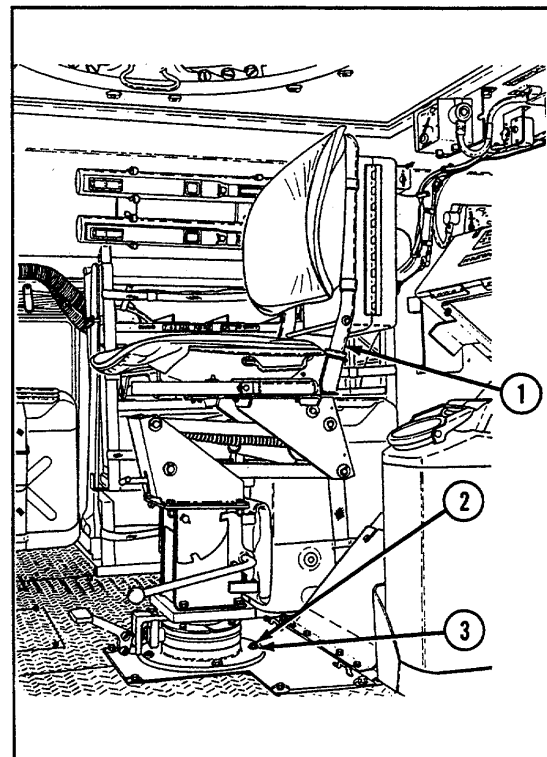
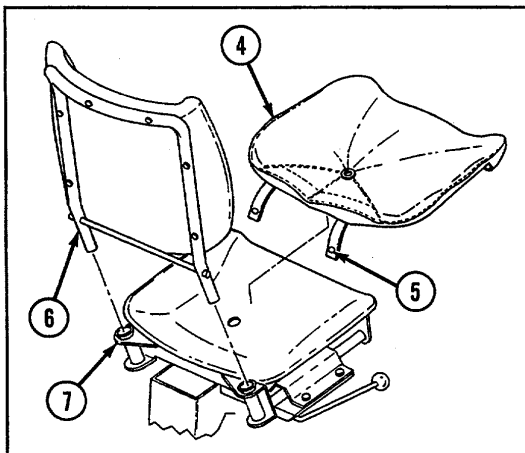
- Commander's seat assembly is extremely heavy-two persons are required to lift it.
- Be sure not to lift commander's seat assembly by seat adjusting lever or seat may spring up and cause injury.

a. REMOVAL

Rotate commander's seat assembly (1) as necessary to gain access to four screws (2). Remove four screws, four lockwashers (3), and commander's seat assembly.

b. DISASSEMBLY

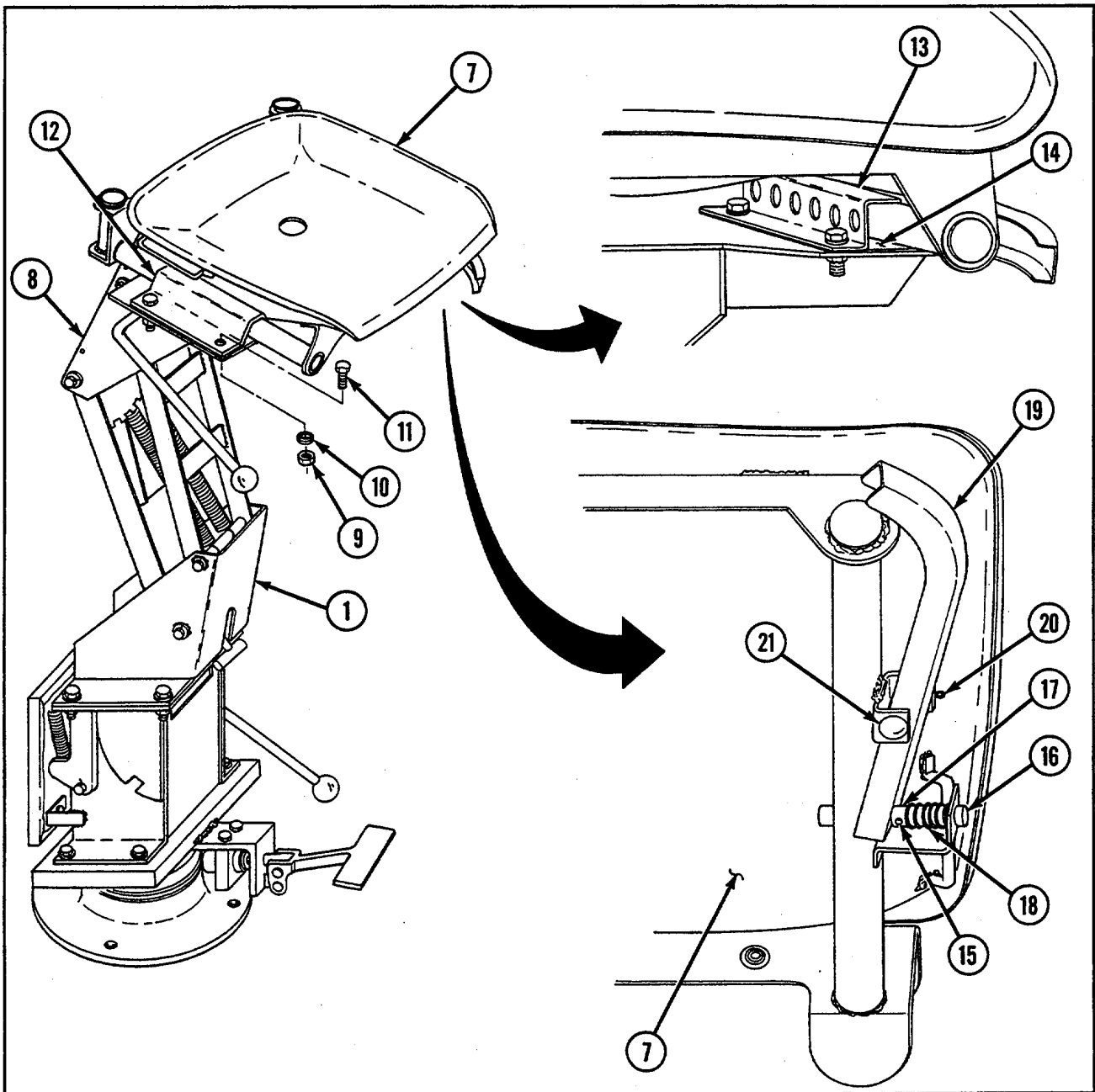
- 1 Remove seat cushion (4) by unsnapping two snaps (5).
- 2 Lift seat back (6) off seat body (7)



WARNING

Raise commander's seat assembly (1) before removing seat body (7) in order to avoid injury.

- 3 Remove seat body (7) from carriage assembly (8) by removing six nuts (9), six lockwashers (10), and six screws (11). Remove brackets (12 and 13) and two plates (14).
- 4 Remove pin (15), pin (16), collar (17), and spring (18).
- 5 Remove handle (19) by removing cotter pin (20) and pin (21).



9-65 REPLACE/SERVICE COMMANDER'S SEAT ASSEMBLY-Continued

6 Remove base assembly (22) by removing four nuts (23), four lockwashers (24), and four screws (25).

WARNING

Ensure that base assembly (22) is raised to full extension and adequately braced prior to spring removal. Failure to do so will result in base assembly collapsing.

7 Pry two adjuster springs (26) from axle (27) to relieve tension. Remove two adjuster springs.

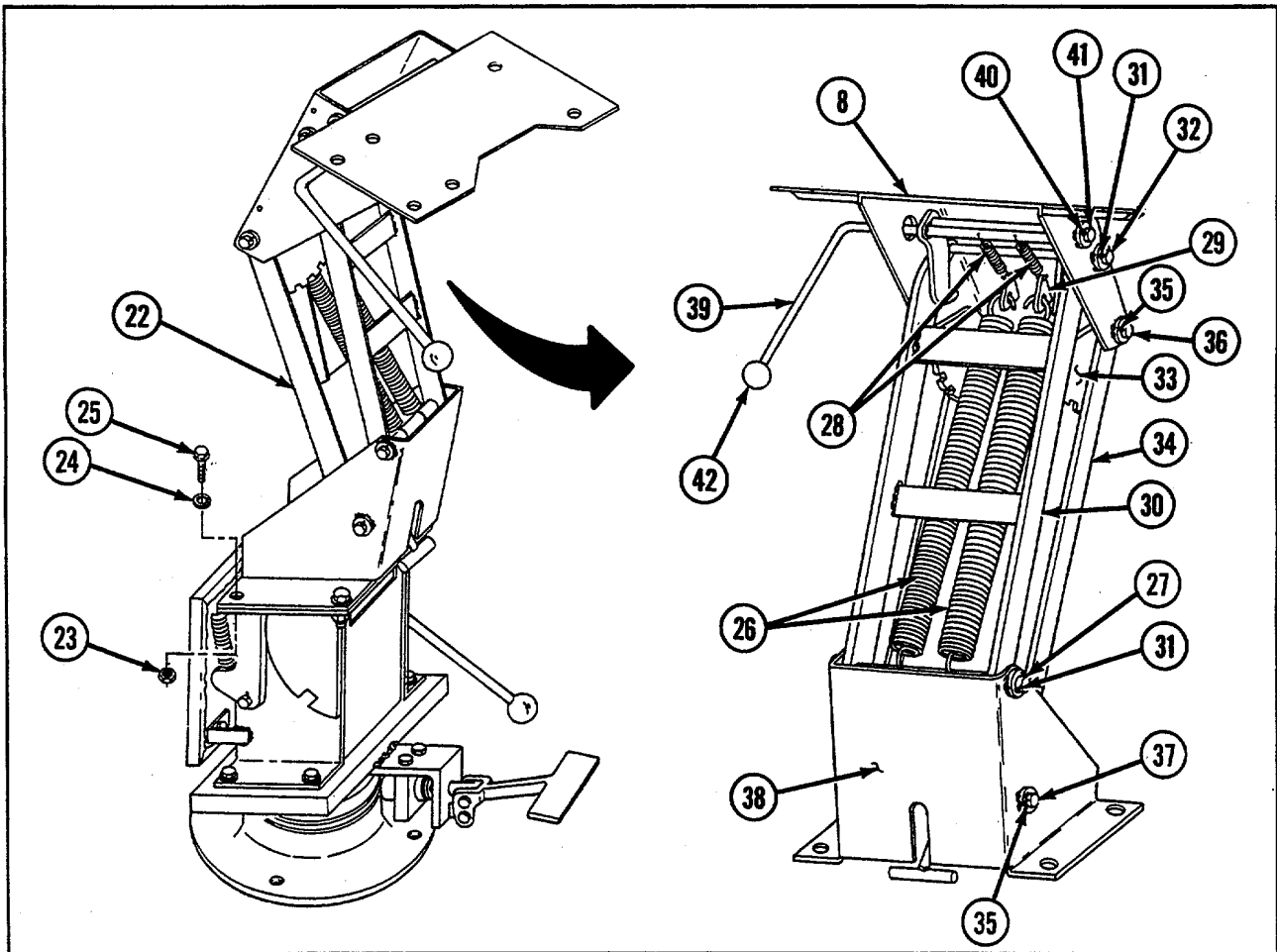
8 Remove two springs (28) and spring retainer (29).

9 Remove bracket (30) by removing four cotter pins (31) and two axles (27 and 32).

10 Remove arm (33) and guard (34) by removing four cotter pins (35) and two axles (36 and 37) from carriage assembly (8) and base (38).

11 Remove release assembly (39) by removing two cotter pins (40) and axle (41) from carriage assembly (8).

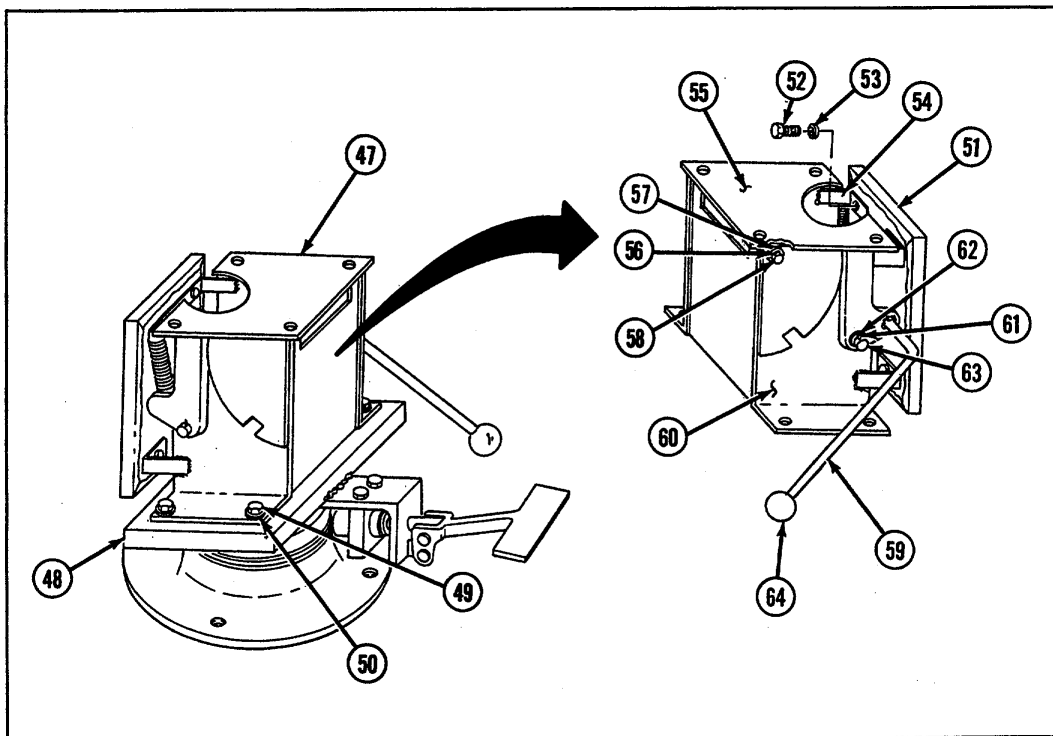
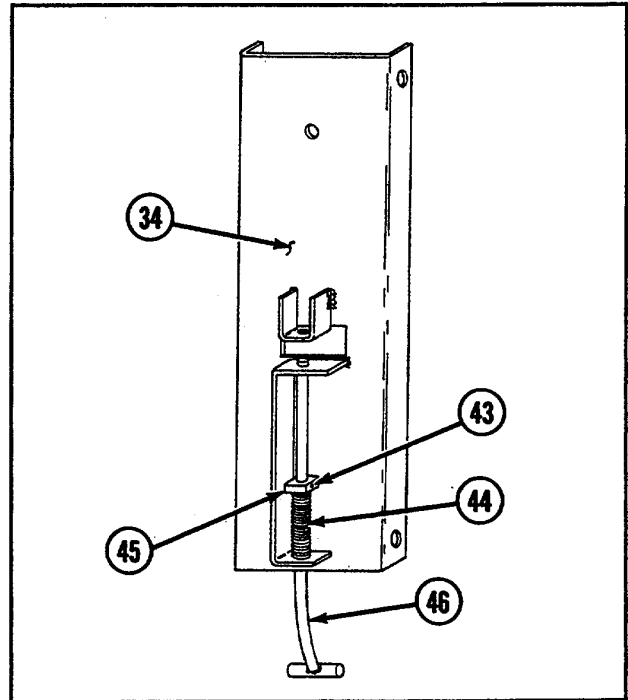
12 Remove knob (42) from release assembly (39).



SECTION IV: SEAT ASSEMBLIES

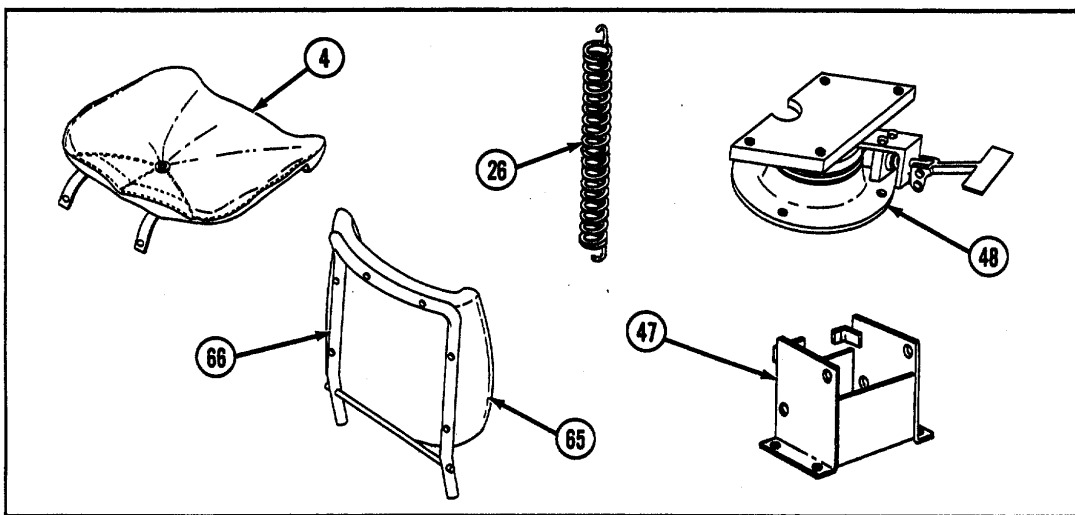
TM 9-2350-256-20

- 13 Remove pin (43), spring (44), collar (45), and pull handle (46).
- 14 Remove subbase assembly (47) from pedestal assembly (48) by removing four screws (49) and four lockwashers (50).
- 15 Remove pad (51) by removing four screws (52) and four lockwashers (53).
- 16 Remove spring (54).
- 17 Remove support (55) by removing two cotter pins (56), two flat washers (57), and axle (58).
- 18 Remove handle (59) from frame (60) by removing two cotter pins (61), two flat washers (62), and axle (63).
- 19 Remove knob (64) from handle (59).



9-65 REPLACE/SERVICE COMMANDER'S SEAT ASSEMBLY-Continued**c. INSPECTION**

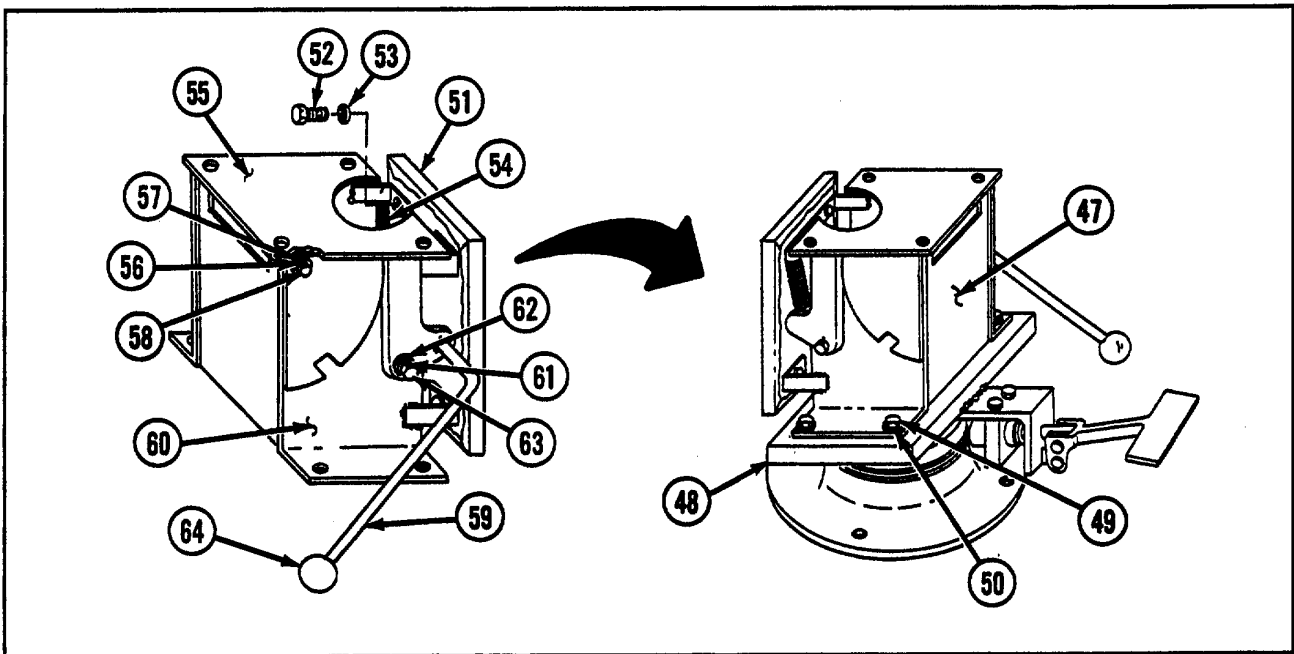
- 1 Inspect seat cushion (4) and seat back cushion (65) for cuts and tears.
- 2 Inspect seat back frame (66) for dents.
- 3 Inspect two adjuster springs (26) for breakage, fatigue, and distortion.
- 4 Inspect adjustment mechanisms for breakage or wear.
- 5 Inspect pedestal assembly (48) for undue wear of components.
- 6 Inspect subbase assembly (47) for breakage or undue wear.

**d. REPAIR**

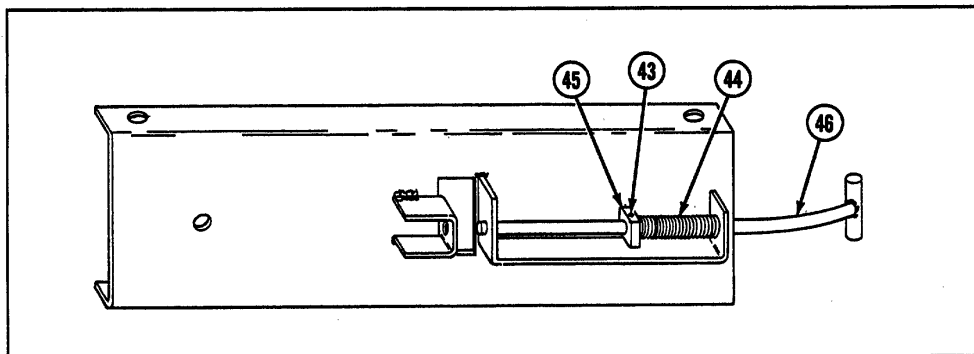
- 1 Minor cuts or tears in pads or cushions may be repaired by hand stitching. If damage is extensive, replace defective parts.
- 2 Repair any dents and straighten any bent parts with a mallet. Replace if part does not lend itself to this type of repair.
- 3 Replace springs if proven defective.
- 4 Repair tapped holes with a thread chaser.
- 5 If wear or breakage affects ease of seat adjustment, replace defective part or parts.
- 6 Replace pedestal assembly (48) if defective.
- 7 Replace subbase assembly (47) if not repairable.

e. ASSEMBLY

- 1 Install knob (64) to handle (59).
- 2 Install handle (59) to frame (60) with axle (63), two flat washers (62), and two new cotter pins (61).
- 3 Install support (55) with axle (58), two flat washers (57), and two new cotter pins (56).
- 4 Install spring (54).
- 5 Install pad (51) with four screws (52) and four new lockwashers (53).
- 6 Install subbase assembly (47) to pedestal assembly (48) with four screws (49) and four new lockwashers (50).

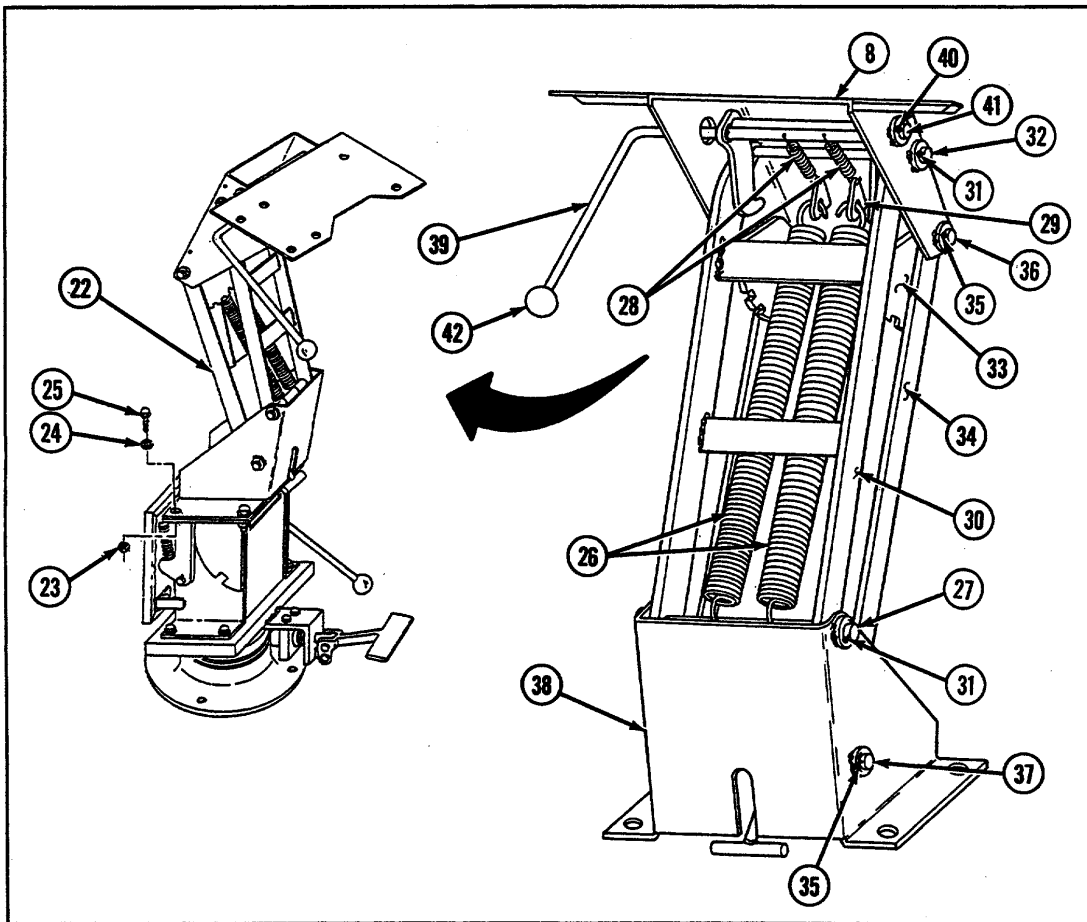


- 7 Install pull handle (46) with spring (44), collar (45), and pin (43).

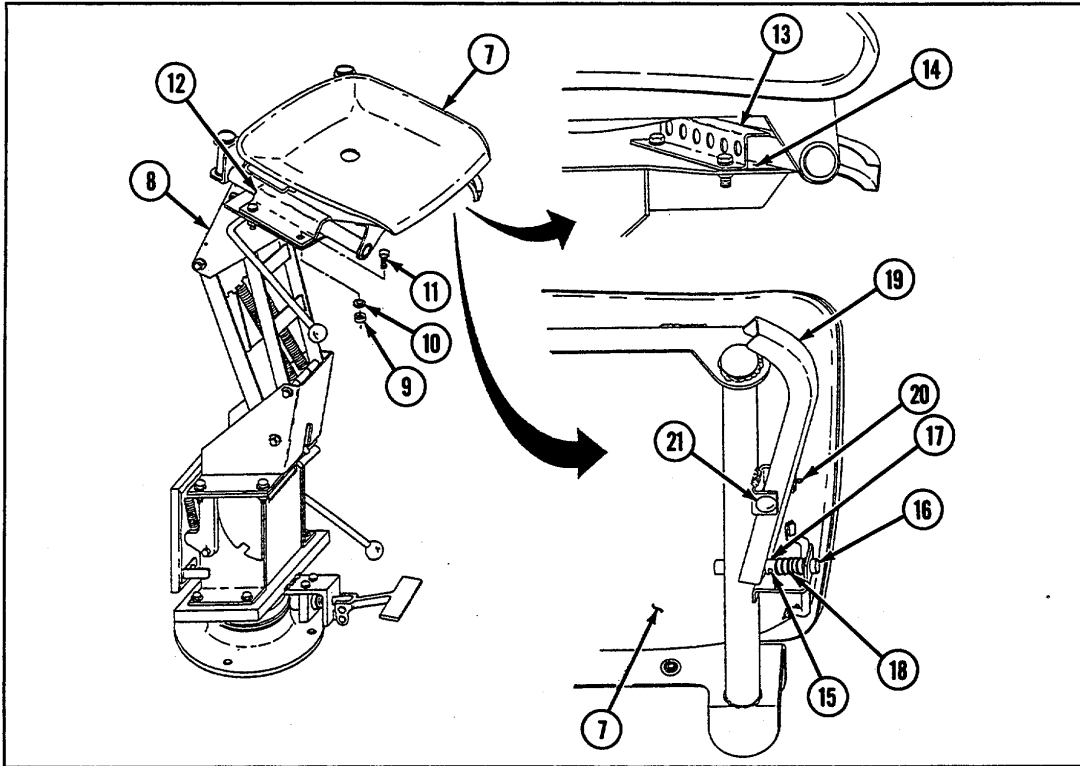


9-65 REPLACE/SERVICE COMMANDER'S SEAT ASSEMBLY-Continued

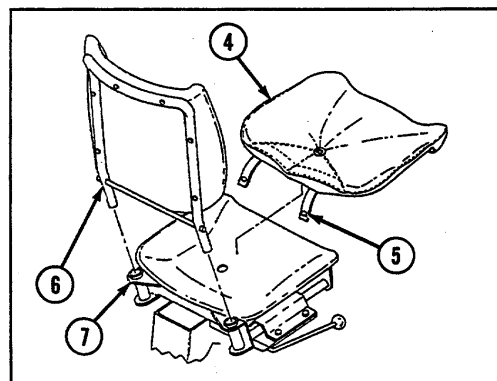
- 8 Install release assembly (39) to carriage assembly (8) with axle (41) and two new cotter pins (40).
- 9 Install knob (42) to release assembly (39).
- 10 Install arm (33) and guard (34) to carriage assembly (8) and base (38) with two axles (36 and 37) and four new cotter pins (35).
- 11 Install bracket (30) to carriage assembly (8) and base (38) with two axles (27 and 32) and four new cotter pins (31).
- 12 Install spring retainer (29) and two springs (28).
- 13 Install two adjuster springs (26) to spring retainer (29) and axle (27).
- 14 Install base assembly (22) with four screws (25), four new lockwashers (24), and four nuts (23).



- 15 Install handle (19) to seat body (7) with new cotter pin (20) and pin (21).
- 16 Install spring (18), collar (17), pin (16), and pin (15).
- 17 Install seat body (7), brackets (12 and 13), and two plates (14) with six screws (11), six new lockwashers (10), and six nuts (9).



- 18 Install seat back (6) to seat body (7).
- 19 Install seat cushion (4) with two snaps (5).



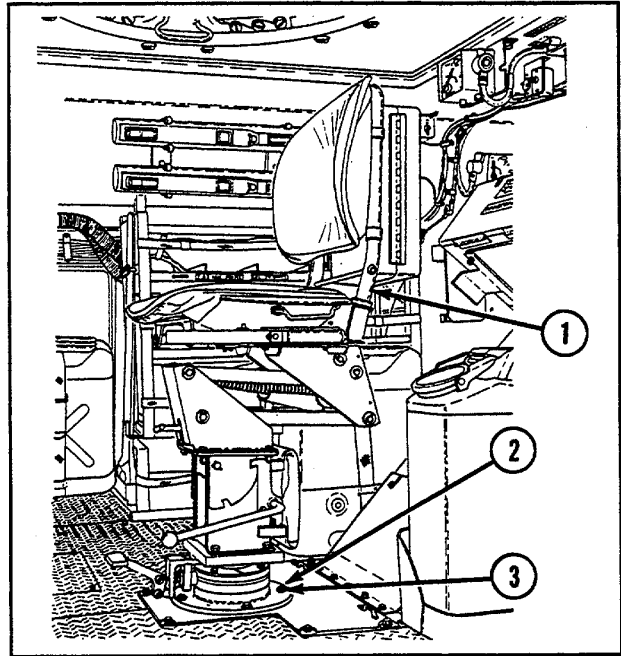
9-65 REPLACE/SERVICE COMMANDER'S SEAT ASSEMBLY-Continued

f. INSTALLATION

Install commander's seat assembly (1) with four screws (2) and four new lockwashers (3).

NOTE

Follow-on maintenance: Install flasher light case (see paragraph 9-102)



9-66 REPLACE/SERVICE RIGGER'S SEAT ASSEMBLY

THIS TASK COVERS

- a. Removal b. Disassembly c. Inspection d. Repair e. Assembly f. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Awl, saddler's sewing (Appendix C, item 2)
- File, thread restorer (thread chaser) (Appendix C, item 13)
- Hammer, hand (mallet) (Appendix C, item 16)

Parts:

- Lockwashers (6) (Appendix G, item 130)
- Lockwashers (4) (Appendix G, item 132)
- Lockwashers (4) (Appendix G, item 141)
- Pins, cotter (11) (Appendix G, item 212)

Personnel Required:

Two

WARNING

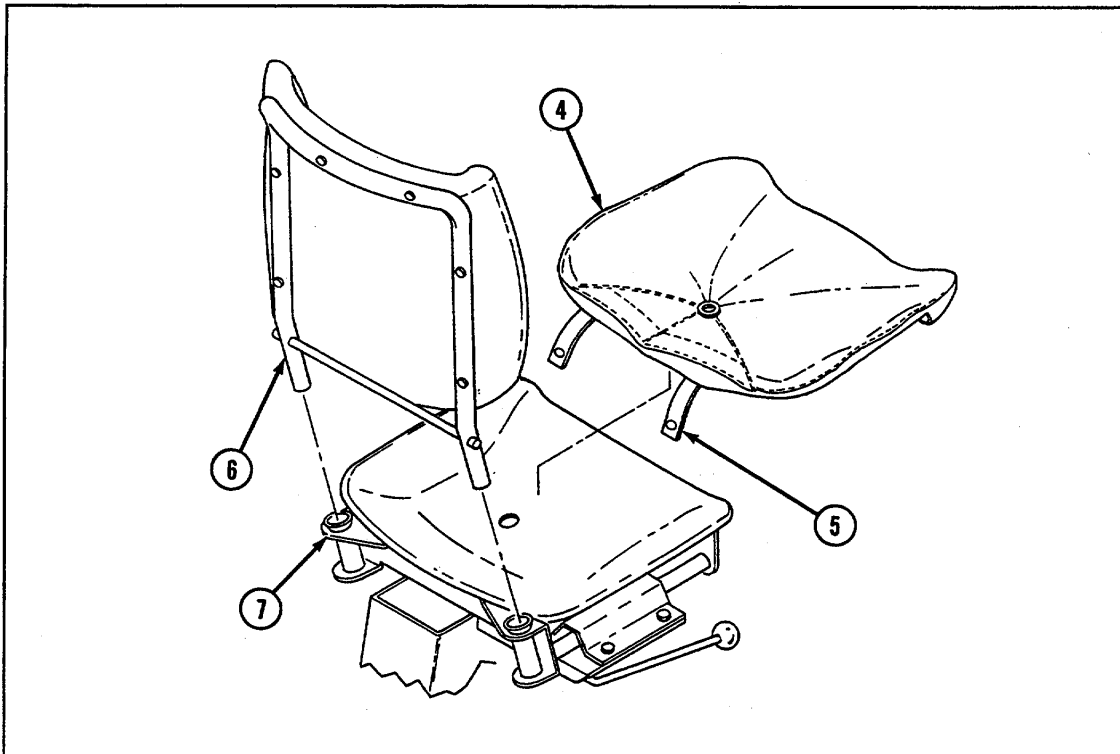
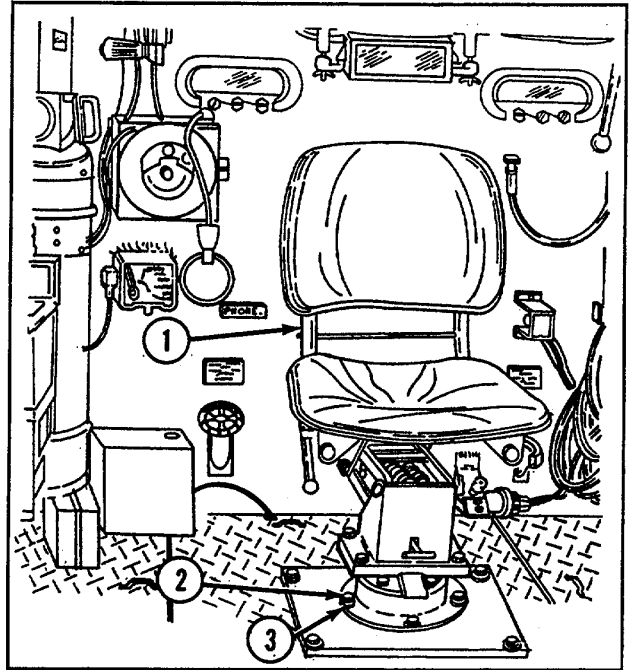
- Rigger's seat assembly is extremely heavy-two persons are required to lift it.
- Be sure not to lift rigger's seat assembly by seat adjusting lever or seat may spring up and cause injury.

a. REMOVAL

Rotate rigger's seat assembly (1) as necessary to gain access to four screws (2). Remove four screws, four lockwashers (3), and rigger's seat assembly.

b. DISASSEMBLY

- 1 Remove seat cushion (4) by unsnapping two snaps(5).
- 2 Lift seat back (6) off seat body (7).

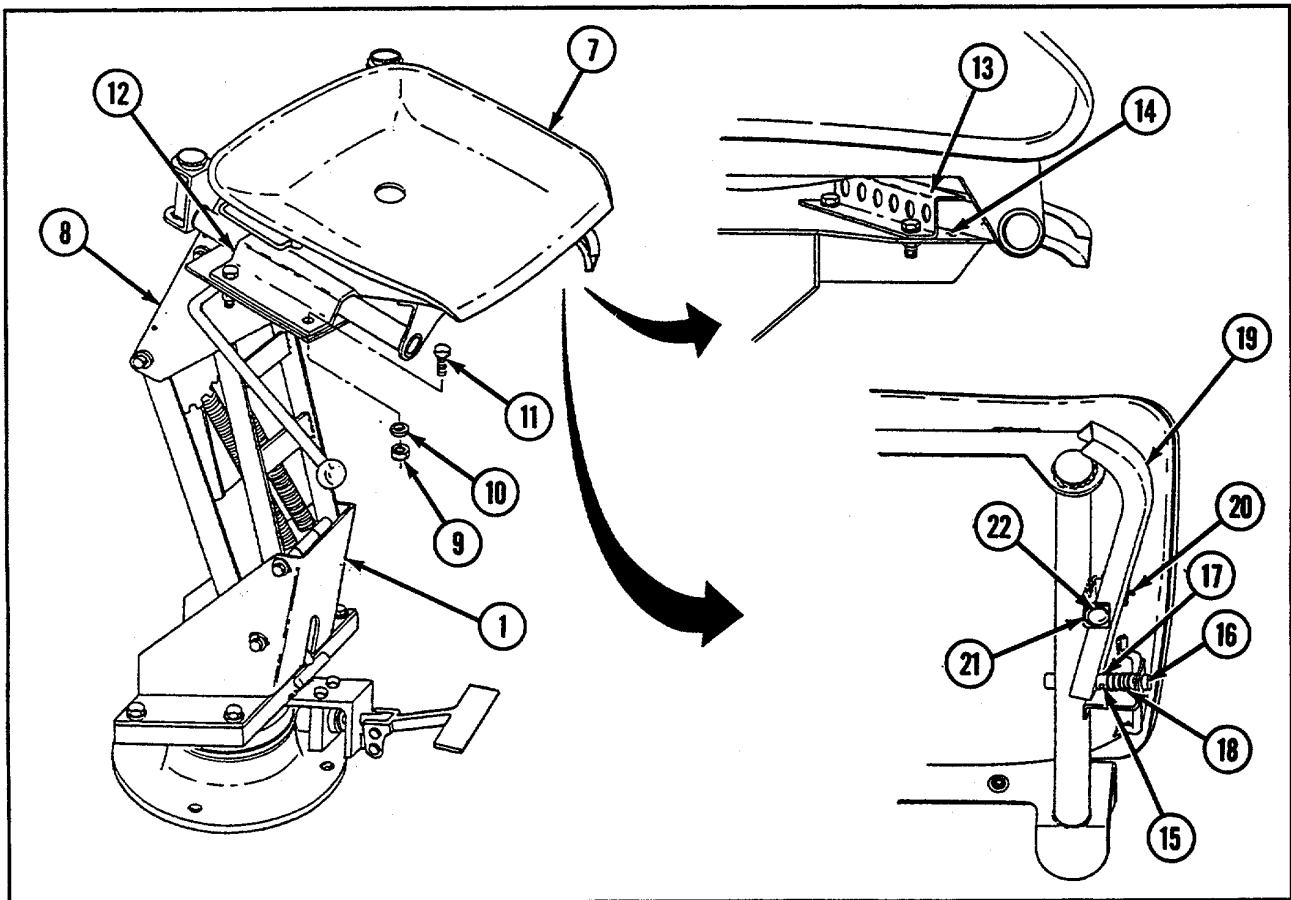


9-66 REPLACE/SERVICE RIGGER'S SEAT ASSEMBLY-Continued

WARNING

Raise rigger's seat assembly (1) before removing seat body (7) in order to avoid injury.

- 3 Remove seat body (7) from carriage assembly (8) by removing six nuts (9), six lockwashers (10), and six screws (11). Remove brackets (12) and plates (13 and 14).
- 4 Remove pin (15), pin (16), collar (17), and spring (18).
- 5 Remove handle (19) by removing cotter pin (20), flat washer (21), and pin (22).



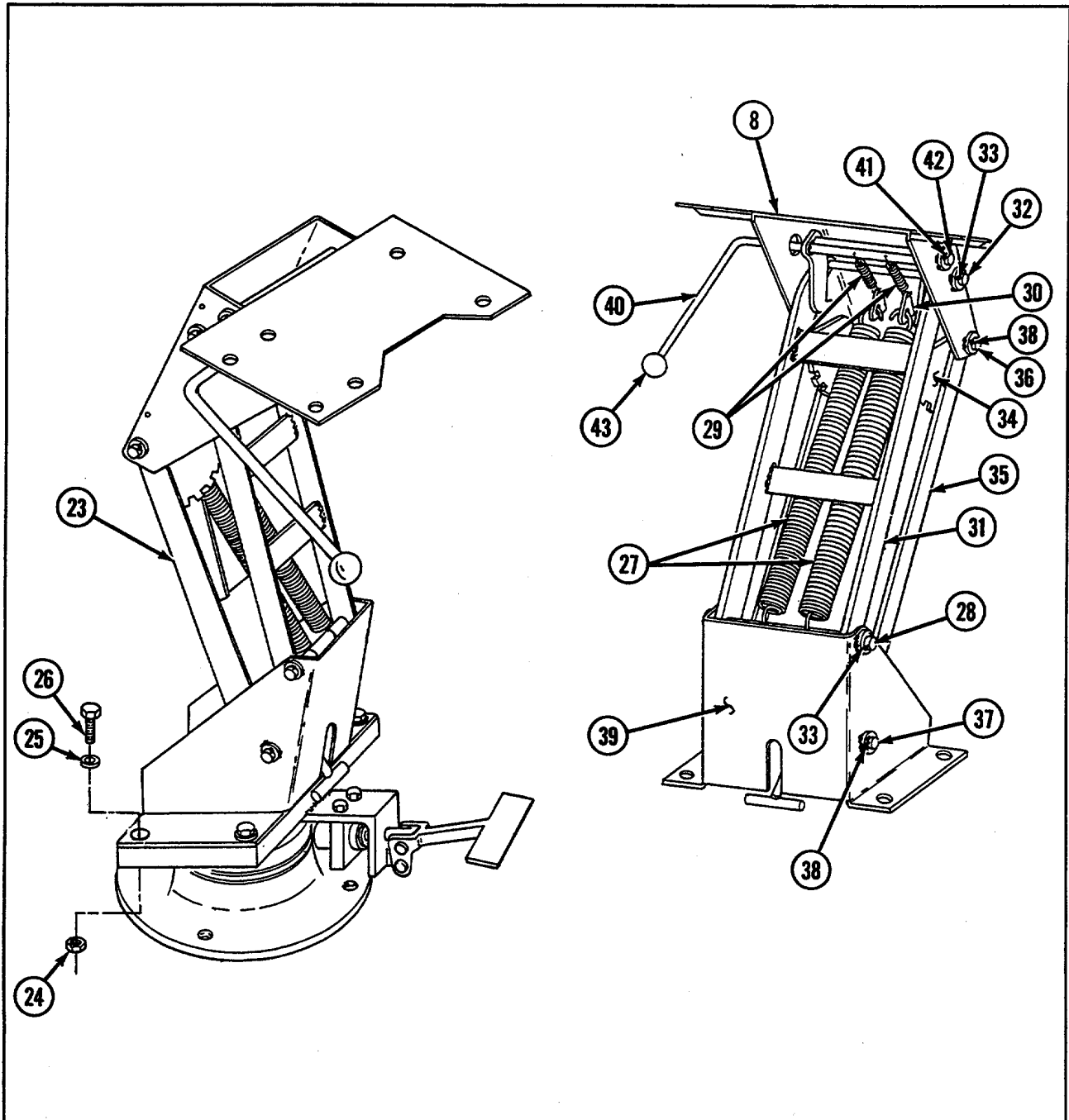
- 6 Remove base assembly (23) by removing four nuts (24), four lockwashers (25), and four screws (26).

WARNING

Ensure that base assembly (23) is raised to full extension and adequately braced prior to spring removal. Failure to do so will result in base assembly collapsing.

- 7 Pry two adjuster springs (27) from axle (28) to relieve tension. Remove two adjuster springs.
- 8 Remove two springs (29) and spring retainer (30).

- 9 Remove bracket (31) by removing two axles (28 and 32) and four cotter pins (33).
- 10 Remove arm (34) and guard (35) by removing two axles (36 and 37) and four cotter pins (38) from carriage assembly (8) and base (39).
- 11 Remove release assembly (40) by removing two cotter pins (41) and axle (42) from carriage assembly (8).
- 12 Remove knob (43) from release assembly (40).

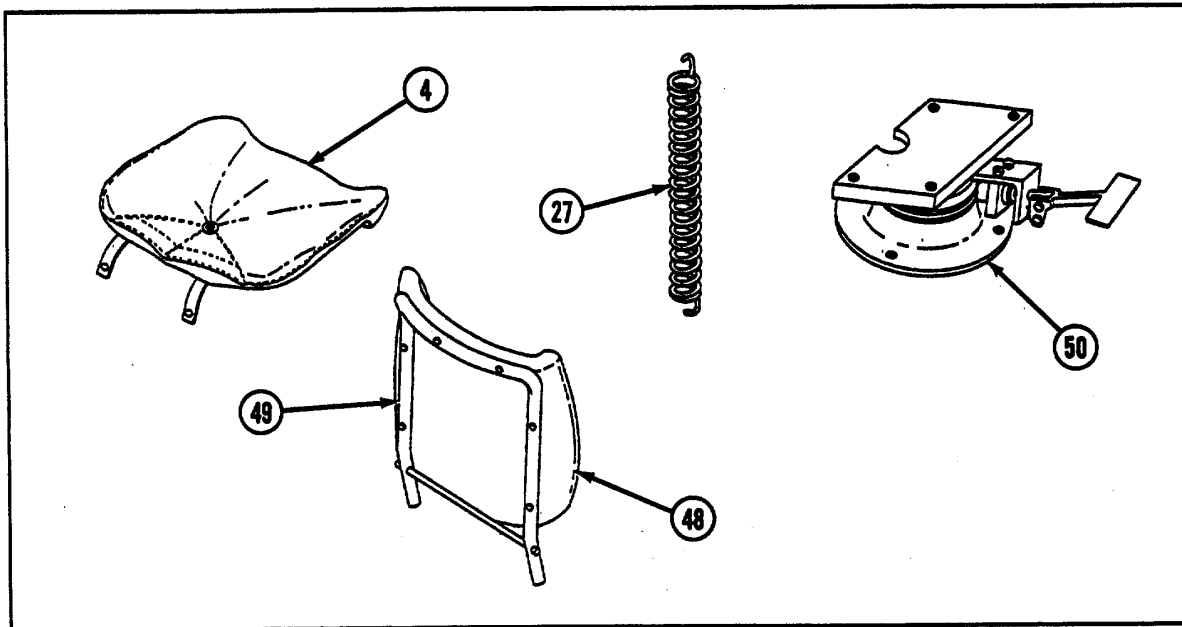
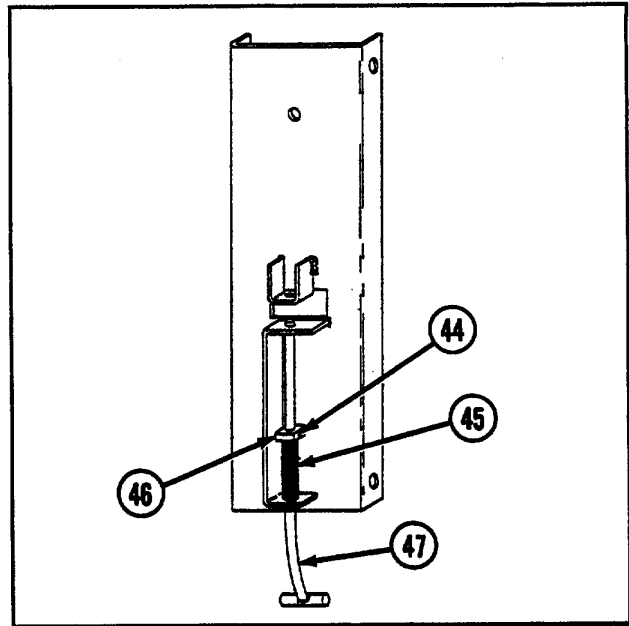


9-66 REPLACE/SERVICE RIGGER'S SEAT ASSEMBLY--Continued

- 13 Remove pin (44), spring (45), collar (46), and pull handle (47).

c. INSPECTION

- 1 Inspect seat cushion (4) and seat back cushion (48) for cuts and tears.
- 2 Inspect seat back frame (49) for dents.
- 3 Inspect two adjuster springs (27) for breakage, fatigue, and distortion.
- 4 Inspect adjustment mechanisms for breakage and wear.
- 5 Inspect pedestal assembly (50) for undue wear of components.



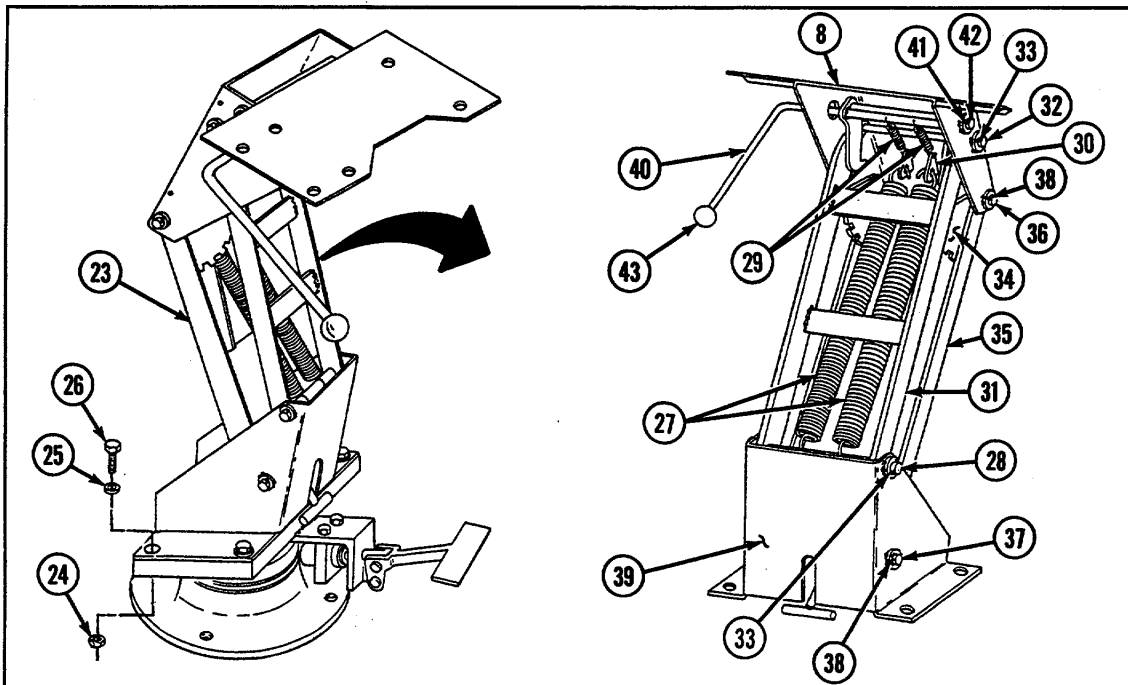
d. REPAIR

- 1 Minor cuts or tears in pads or cushions may be repaired by hand stitching. If damage is extensive, replace defective parts.
- 2 Repair any dents and straighten any bent parts with a mallet. Replace if part does not lend itself to this type of repair.

- 3 Replace springs if proven defective.
- 4 Repair tapped holes with a thread chaser.
- 5 If wear or breakage affects ease of seat adjustment, replace defective part or parts.
- 6 Replace pedestal assembly (50) if defective.

e. ASSEMBLY

- 1 Install pull handle (47) with spring (45), collar (46), and pin (44).
- 2 Install knob (43) to release assembly (40).
- 3 Install release assembly (40) to carriage assembly (8) with axle (42) and two new cotter pins (41).
- 4 Install arm (34) and guard (35) to carriage assembly (8) and base (39) with two axles (36 and 37) and four new cotter pins (38).
- 5 Install bracket (31) to carriage assembly (8) and base (39) with two axles (28 and 32) and four new cotter pins (33).
- 6 Install spring retainer (30) and two springs (29).
- 7 Install two adjuster springs (27) to spring retainer (30) and axle (28).
- 8 Install base assembly (23) with four screws (26), four new lockwashers (25), and four nuts (24).

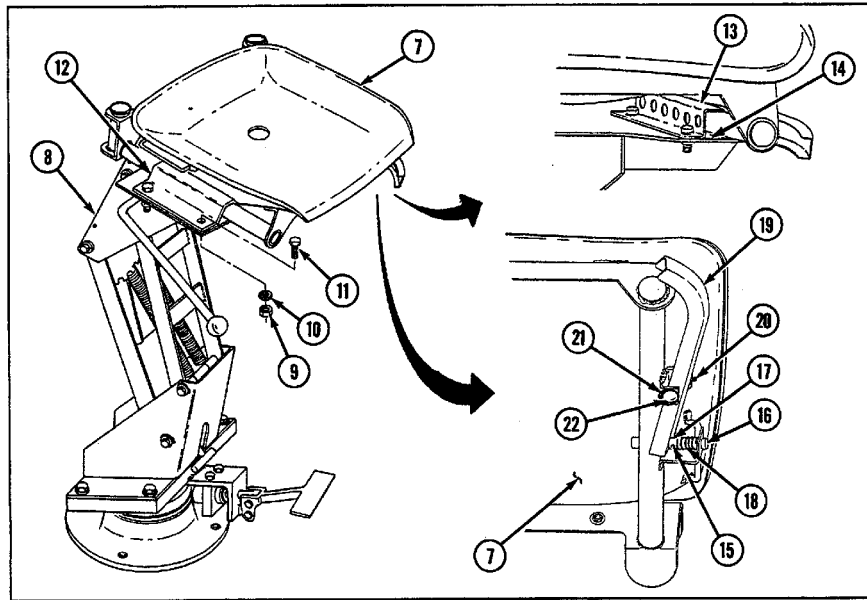


9-66 REPLACE/SERVICE RIGGER'S SEAT ASSEMBLY-Continued

9 Install handle (19) to seat body (7) with new cotter pin (20), flat washer (21), and pin (22).

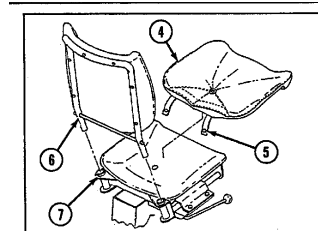
10 Install pin (16), pin (15), collar (17), and spring (18).

11 Install seat body (7), brackets (12), and plates (13 and 14) with six screws (11), six new lockwashers (10), and , six nuts (9).



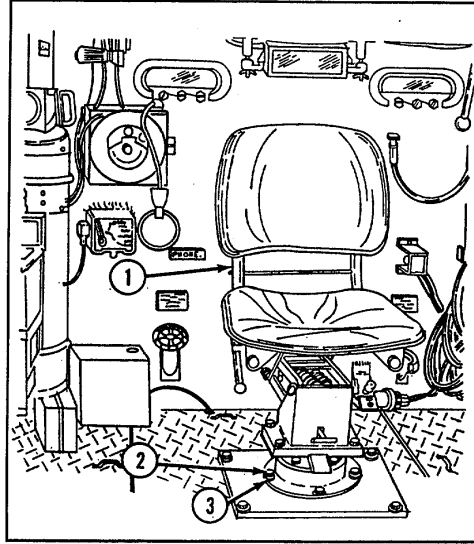
12 Install seat back(6) to seat body

13 Install seat cushion (4) by snapping two snaps (5)



f. INSTALLATION

Install rigger's seat assembly (1) with four screws (2) and four new lockwashers (3).

**9-67 REPLACE/SERVICE MECHANIC'S AND DRIVER'S SEAT ASSEMBLIES****THIS TASK COVERS**

a. Removal b. Disassembly c. Inspection d. Repair e. Assembly f. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Awl, saddler's sewing (Appendix C, item 2)
- File, thread restorer (thread chaser) (Appendix C, item 13)
- Hammer, hand (mallet) (Appendix C, item 16)
- Pliers, retaining ring, external (Appendix C, item 31)

Parts:

- Lockwashers (4) (Appendix G, item 129)
- Lockwashers (8) (Appendix G, item 131)
- Lockwashers (7) (Appendix G, item 132)
- Lockwashers (2) (Appendix G, item 143)
- Lockwashers (2) (Appendix G, item 134)
- Lockwasher (Appendix G, item 144)
- Lockwashers (2) (Appendix G, item 98)
- Lockwashers (2) (Appendix G, item 99)

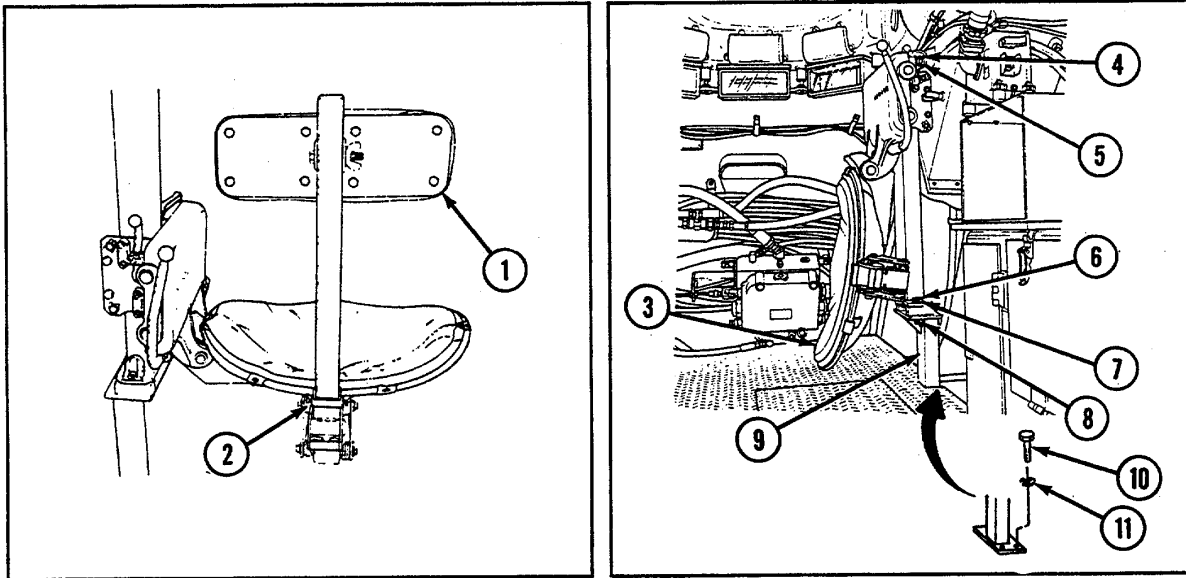
NOTE

The following procedures are the same for both the driver's and mechanic's seat assemblies. Driver's seat assembly is shown.

9-67 REPLACE/SERVICE MECHANIC'S AND DRIVER'S SEAT ASSEMBLIES-Continued

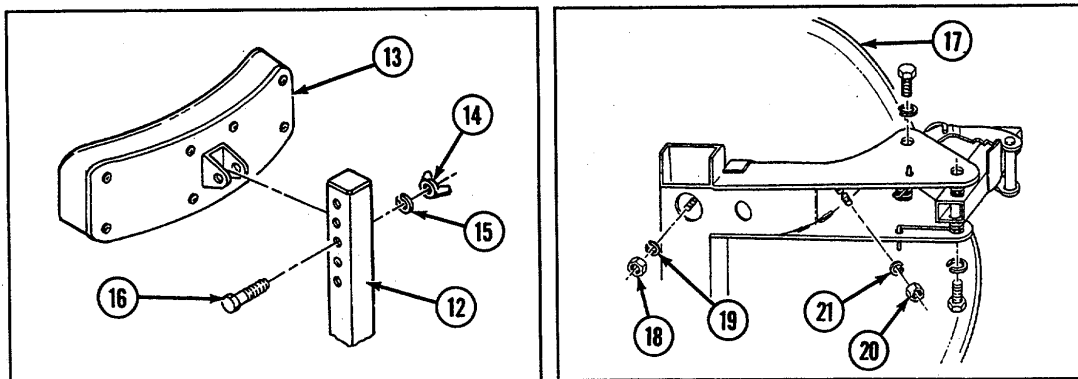
a. REMOVAL

- 1 Remove backrest and support assembly (1) by pulling straight out of retainer assembly (2) socket.
- 2 Remove seat assembly (3) by removing two screws (4) and two lockwashers (5) at top, and two screws (6), two lockwashers (7), and two nuts (8) at seat support (9).
- 3 Remove seat support (9) by removing four screws (10) and four lockwashers (11).



b. DISASSEMBLY

- 1 Remove support (12) from backrest (13) by removing wing nut (14), lockwasher (15), and screw (16).
- 2 Remove seat pan (17) by removing nut (18), lockwasher (19), two nuts (20), and two lockwashers (21).



- 3 Snap ends of two springs (22) out of holes in support assembly (23).

NOTE

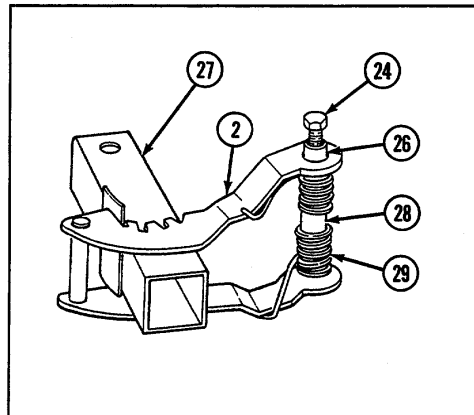
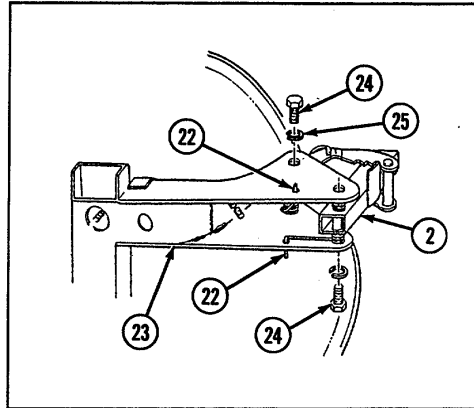
Remove upper screw (24) first. Insert a drive pin punch in upper screw hole while removing lower screw (24) to prevent binding.

- 4 Remove retainer assembly (2) from support assembly (23) by removing four screws (24), four lockwashers (25), and two springs (22).

NOTE

Hollow threaded rod (26) can be pulled out of retainer assembly (2) in same manner as pulled out of adjuster assembly (27) in step 5.

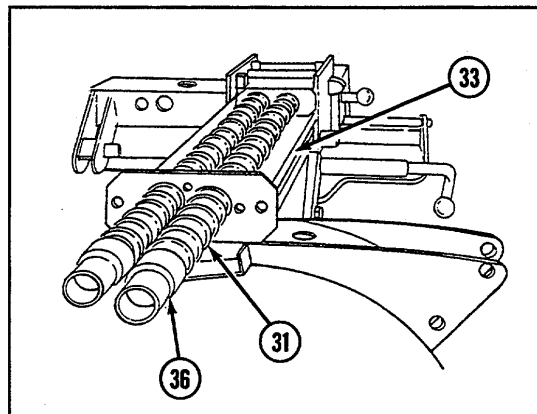
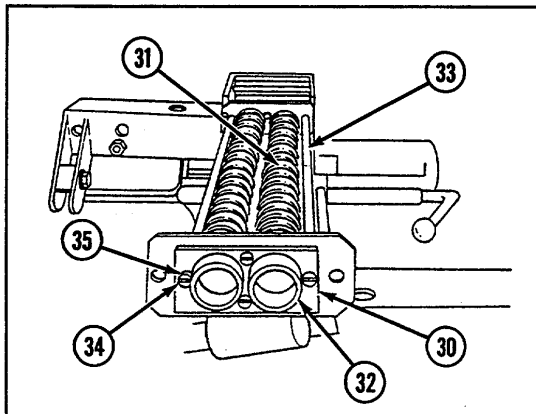
- 5 Use one screw (24) (removed in step 4) and pull hollow threaded rod (26) out of spacer (28). Remove spacer and two springs (29) from adjuster assembly (27).



WARNING

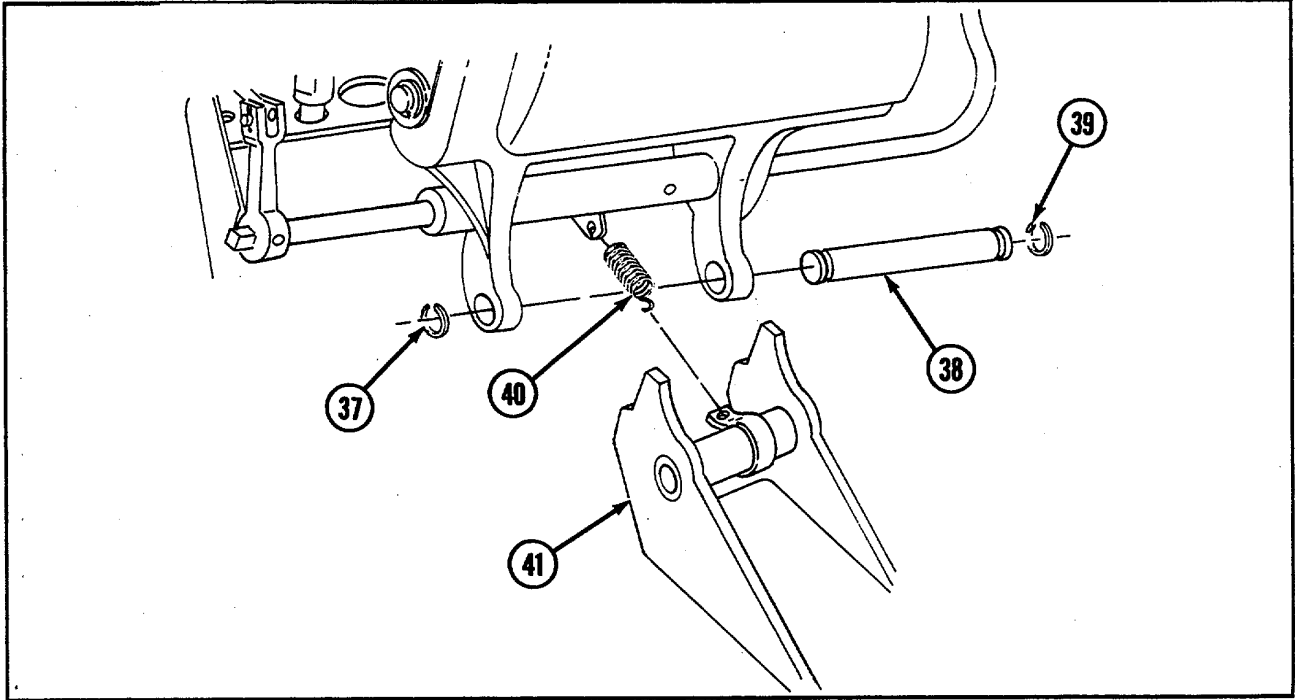
Remove retaining strap (30) carefully to prevent springs (31) from suddenly decompressing.

- 6 Remove retaining strap (30) and two retainers (32) from support assembly (33) by removing four screws (34) and four lockwashers (35).
- 7 Remove two guides (36) and two springs (31) from support assembly (33).

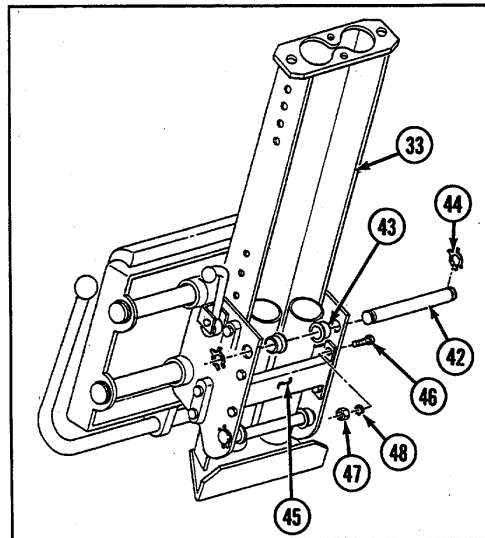


9-67 REPLACE/SERVICE MECHANIC'S AND DRIVER'S SEAT ASSEMBLIES-Continued

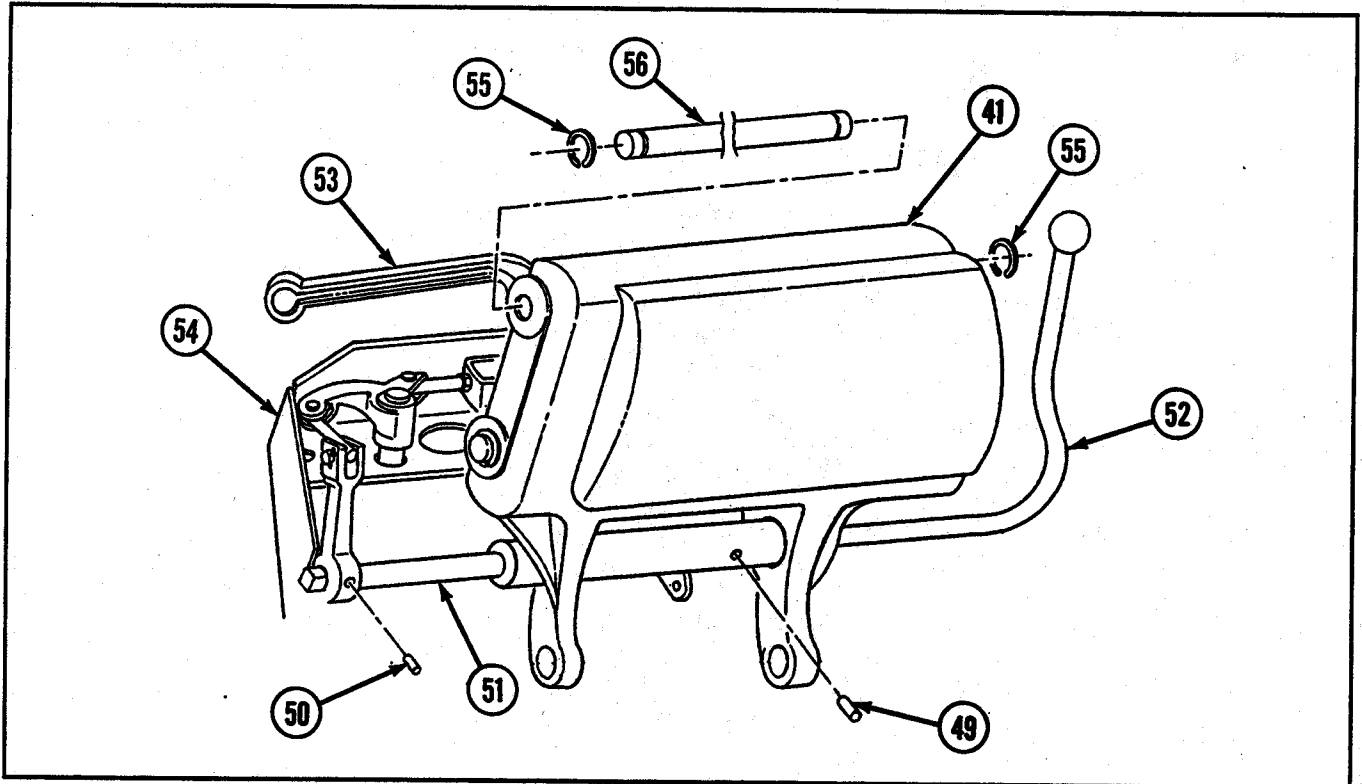
- 8 Remove lockwasher (37). Push out pin (38) and remove lockwasher (39).
- 9 Remove spring (40) and frame (41).



- 10 Remove two pins (42) and four rollers (43) by removing four lockwashers (44).
- 11 Remove retainer assembly (45) by removing four screws (46), four nuts (47), and four lockwashers (48).
- 12 Remove support assembly (33).



- 13 Remove pins (49 and 50).
- 14 Remove shaft (51) and two levers (52 and 53).
- 15 Remove control assembly (54) from frame (41) by removing four retaining rings (55) and two shafts (56).

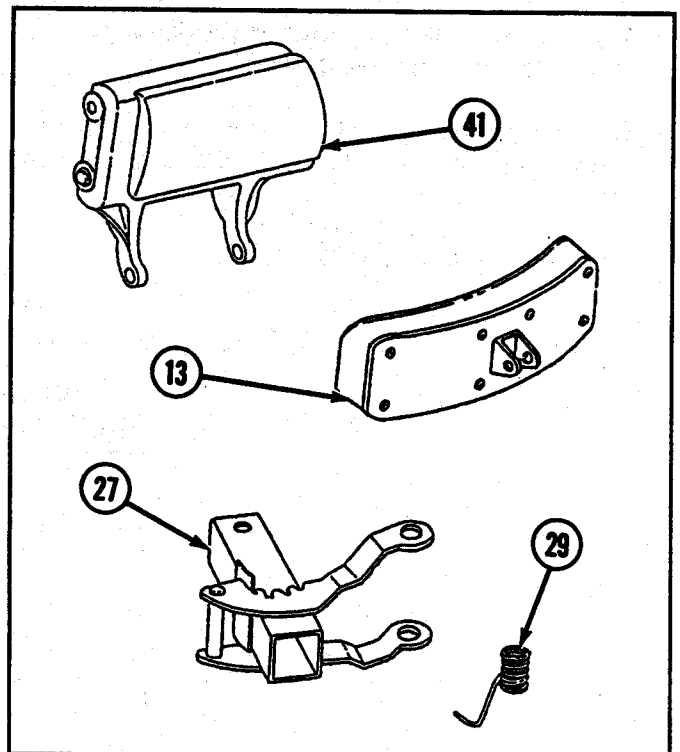


c. INSPECTION

- 1 Inspect backrest (13) cushion for cuts and tears.
- 2 Inspect seat frame (41) for dents.
- 3 Inspect adjuster springs (29) for breakage, fatigue, and distortion.
- 4 Inspect adjustment mechanisms for breakage and wear.
- 5 Inspect adjuster assembly (27) for breakage or wear of pins, linkages, and guides.
- 6 Inspect vertical support assembly for undue wear.

d. REPAIR

- 1 Minor cuts or tears in cushion may be repaired by hand stitching. If damage is extensive, replace part.

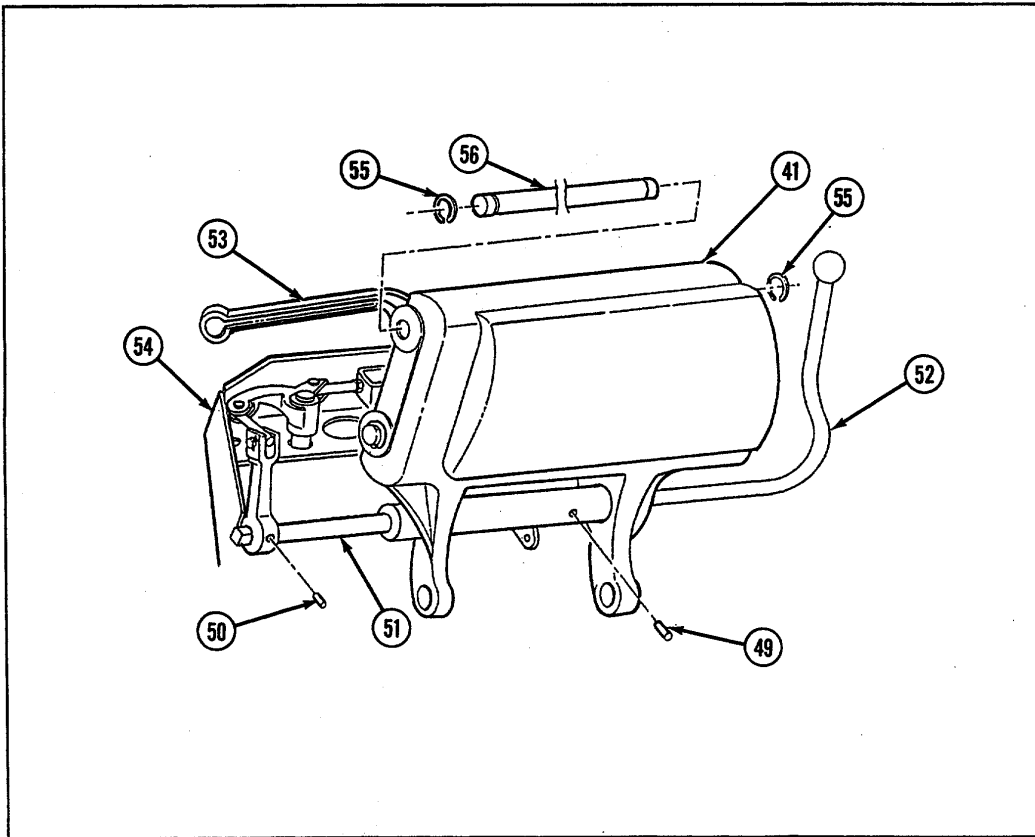


9-67 REPLACE/SERVICE MECHANIC'S AND DRIVER'S SEAT ASSEMBLIES-Continued

- 2 Repair any dents and straighten any bent parts with a mallet. Replace if part does not lend itself to this type of repair.
- 3 Replace springs if proven defective.
- 4 Repair tapped holes with a thread chaser.
- 5 If wear or breakage affects seat adjustment, replace defective parts.

e. ASSEMBLY

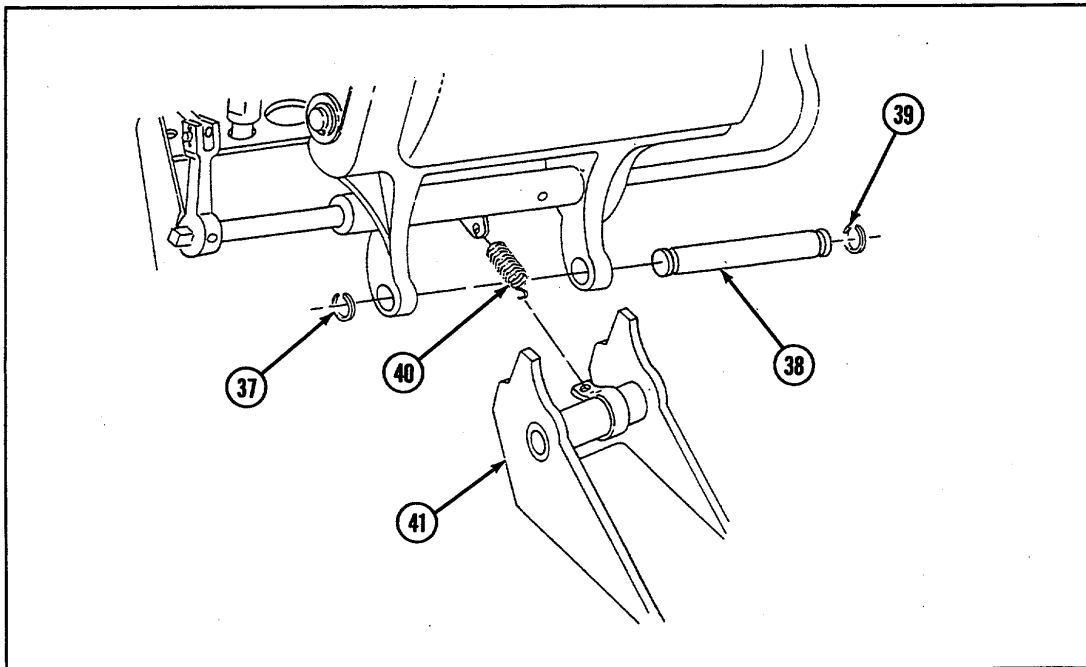
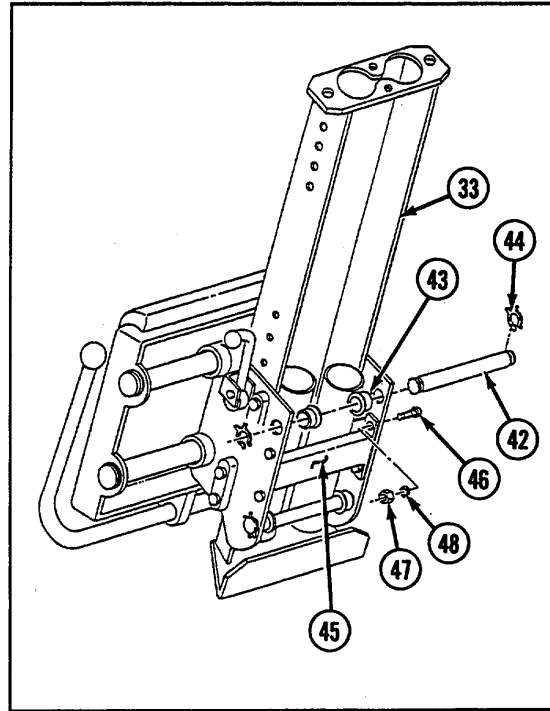
- 1 Install control assembly (54) to frame (41) by installing two shafts (56) and four retaining rings (55).
- 2 Install two levers (52 and 53) and shaft (51) on frame (41).
- 3 Insert pins (49 and 50).



SECTION IV: SEAT ASSEMBLIES

TM 9-2350-256-20

- 4 Insert support assembly (33).
- 5 Install retainer assembly (45) with four screws (46), four nuts (47), and four new lockwashers (48).
- 6 Install four rollers (43) with two pins (42) and four new lockwashers (44).
- 7 Install spring (40) between frame (41) and levers (52 and 53).
- 8 Install pin (38) with two new lockwashers (37 and 39).

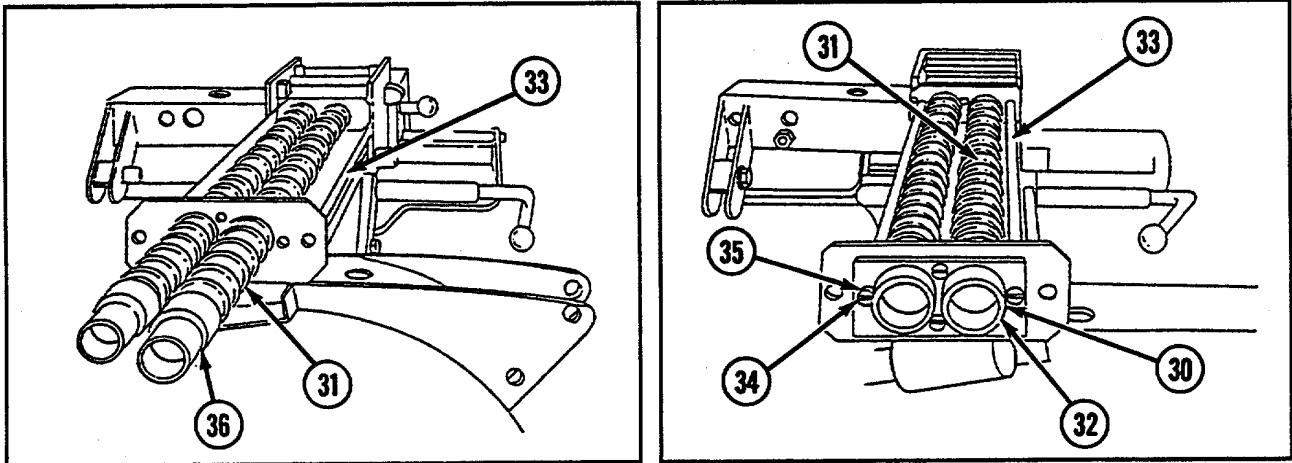


9-67 REPLACE/SERVICE MECHANIC'S AND DRIVER'S SEAT ASSEMBLIES-Continued

WARNING

Springs (31) are installed under compression and should be handled carefully.

- 9 Insert two guides (36) into two springs (31) and into support assembly (33).
- 10 Secure two springs (31) in support assembly (33) by installing retaining strap (30) and two retainers (32) with four screws (34) and four new lockwashers (35).

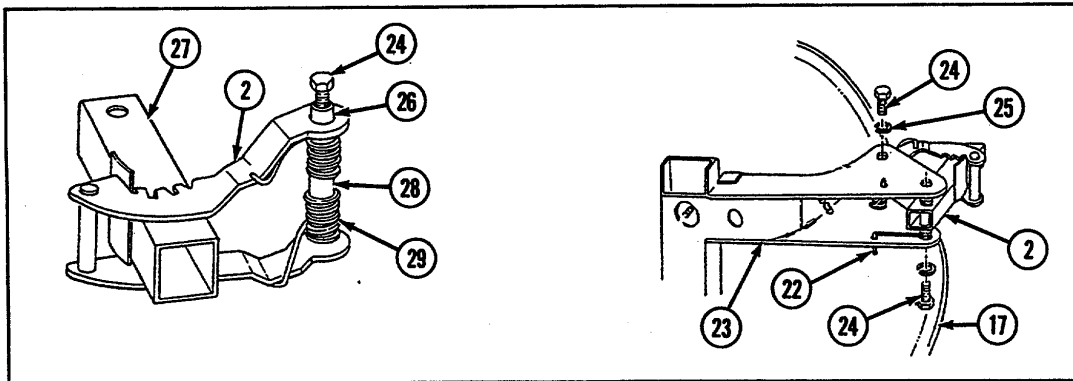


- 11 Insert hollow threaded rod (26) into each of two spacers (28), one in adjuster assembly (27) and one in retainer assembly (2).
- 12 Place springs (29 and 22) over rods (26) and spacers (28) and install as shown.

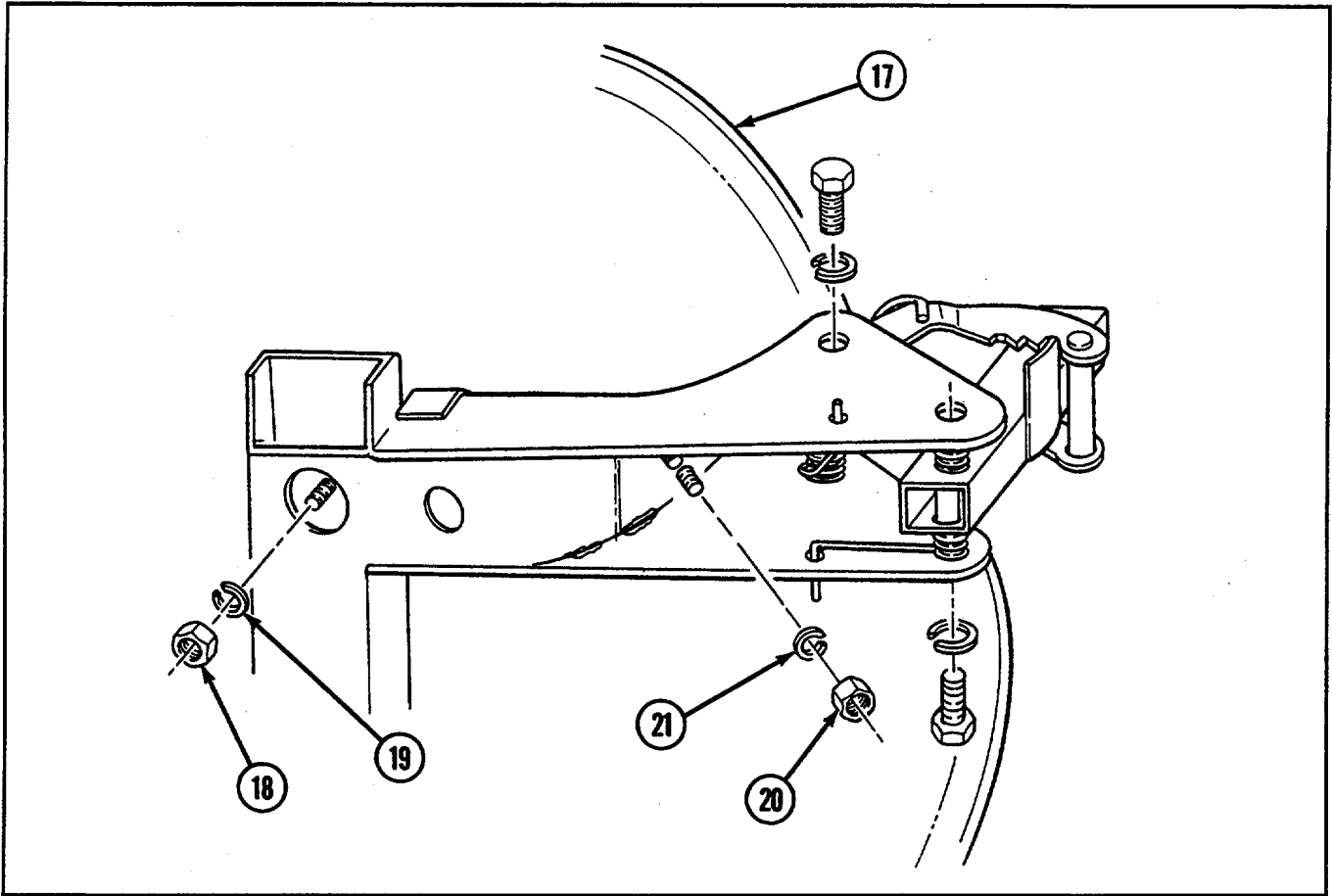
NOTE

When installing retainer assembly (2), be sure spring (22) ends of upper set are behind edge of support assembly (23) and in contact with seat pan (17).

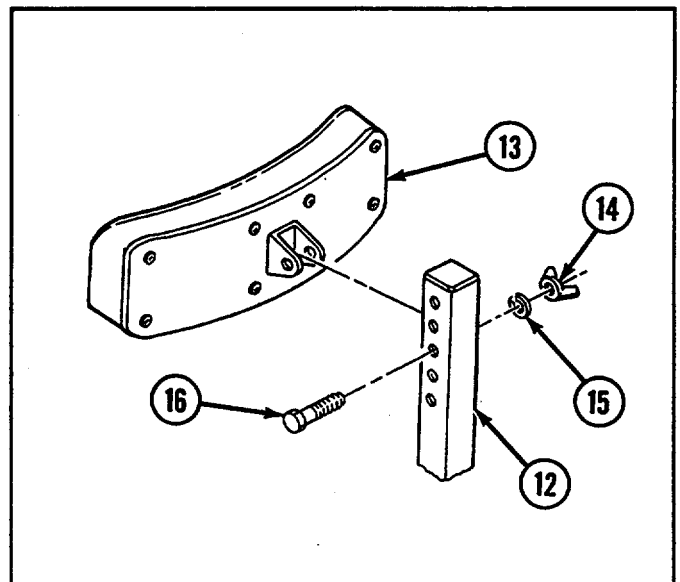
- 13 Install retainer assembly (2) on support assembly (23) with four screws (24) and four new lockwashers (25).



14 Install seat pan (17) with nut (18), new lockwasher (19), two nuts (20), and two new lockwashers (21).



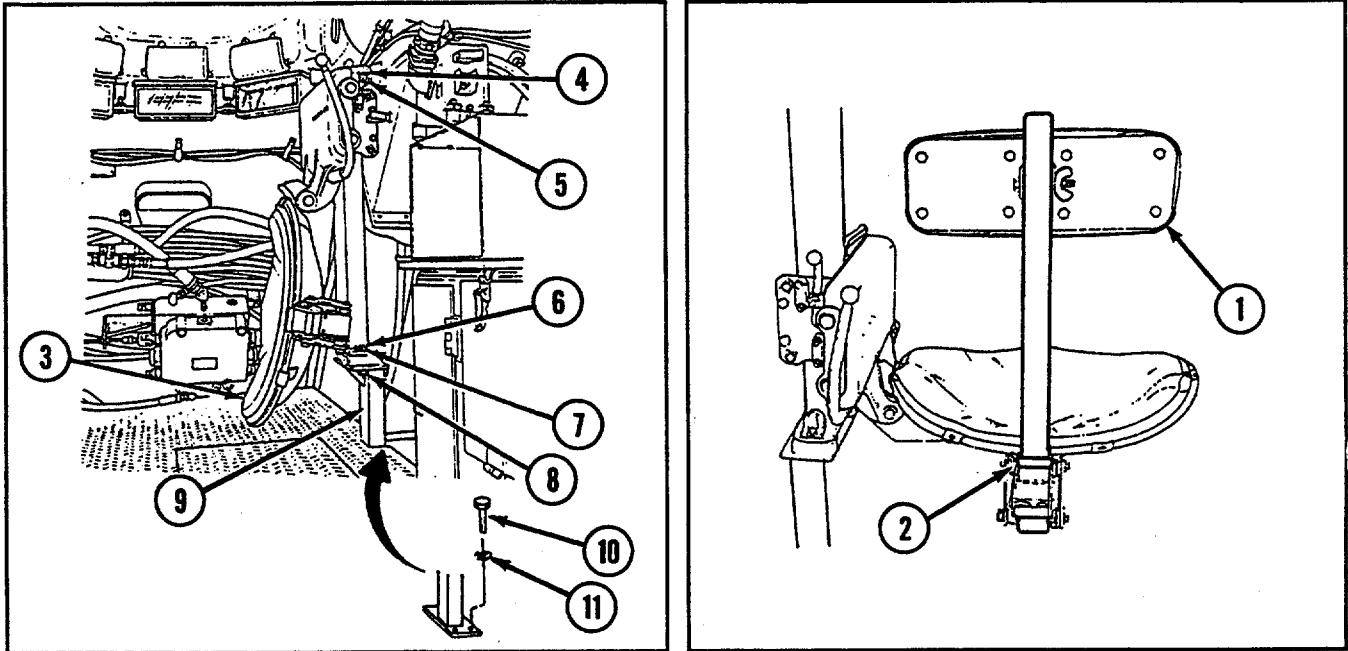
15 Install support (12) to backrest (13) with screw (16), new lockwasher (15), and wing nut (14).



9-67 REPLACE/SERVICE MECHANIC'S AND DRIVER'S SEAT ASSEMBLIES-Continued

f. INSTALLATION

- 1 Install seat support (9) with four screws (10) and four new lockwashers (11).
- 2 Install seat assembly (3) to seat support (9) with two screws (6), two new lockwashers (7), and two nuts (8). Secure seat assembly at top with two screws (4) and two new lockwashers (5).
- 3 Install backrest and support assembly (1) by inserting into retainer assembly (2) socket.



SECTION V: CONTROLS AND LINKAGES

Para.	Task	Page
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9-69	Replace/Service Drain Valve Controls	9-137
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9-71	Replace/Service Mechanical Tachometer and Speedometer Flexible Shafts and Fittings	9-143
9-72	Replace/Repair Steering Controls and Linkages	9-146
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9-68 REPLACE/SERVICE DRAIN VALVES**THIS TASK COVERS**

- | | | | |
|------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
|------------|----------------|-------------|-----------------|

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Lockwashers (6) (Appendix G, item 138)
- Pin, spring (Appendix G, item 232)

NOTE

The following procedures are the same for all drain valves. Remove drain valves from the underside of the vehicle.

9-68 REPLACE/SERVICE DRAIN VALVES Continued**a. REMOVAL**

Remove drain valve assembly (1) by removing six screws (2) and six lockwashers (3).

b. DISASSEMBLY

- 1 Place drain valve assembly (1) on flat surface with valve stem (4) up.
- 2 Press down on actuating spring (5) and remove spring pin (6).
- 3 Remove valve cap (7), actuating spring (5), and valve cage (8) from valve (9).

c. INSPECTION

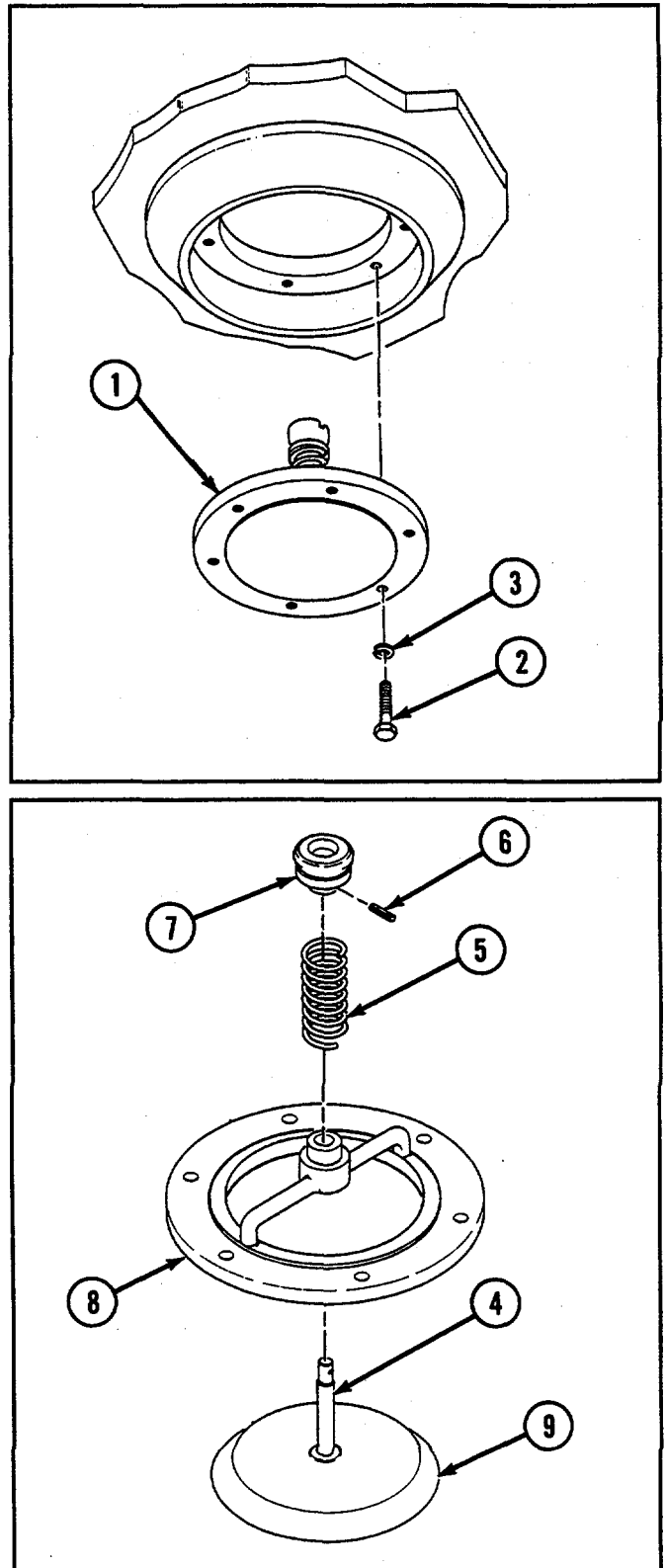
- 1 Inspect valve cage (8) for cracks, warping, and scored bearing and mating surfaces. Replace if worn or damaged.
- 2 Inspect valve stem (4) for scored bearing surface, bends, cracks, nicks, dents, and corrosion. Replace if worn or damaged.
- 3 Inspect actuating spring (5) for signs of fatigue, damage, or deformation. Replace if damaged or deformed.
- 4 Inspect valve (9) bearing for nicks, dents, scored bearing surface, and out-of-roundness. Replace if defective.

d. ASSEMBLY

- 1 Install valve cap (7), actuating spring (5), and valve cage (8) on valve (9).
- 2 Place drain valve assembly (1) on flat surface. Press down on actuating spring (5) and install new spring pin (6).

e. INSTALLATION

Install drain valve assembly (1) on underside of vehicle with six screws (2) and six new lockwashers (3).



9-69 REPLACE/SERVICE DRAIN VALVE CONTROLS**THIS TASK COVERS**

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Material/Parts:

- Cloth, crocus (Appendix D, item 7)
- Lockwasher (Appendix G, item 130)
- Lockwashers (19) (Appendix G, item 132)
- Pins, cotter (4) (Appendix G, item 211)
- Pins, cotter (3) (Appendix G, item 212)
- Pins, cotter (2) (Appendix G, item 217)

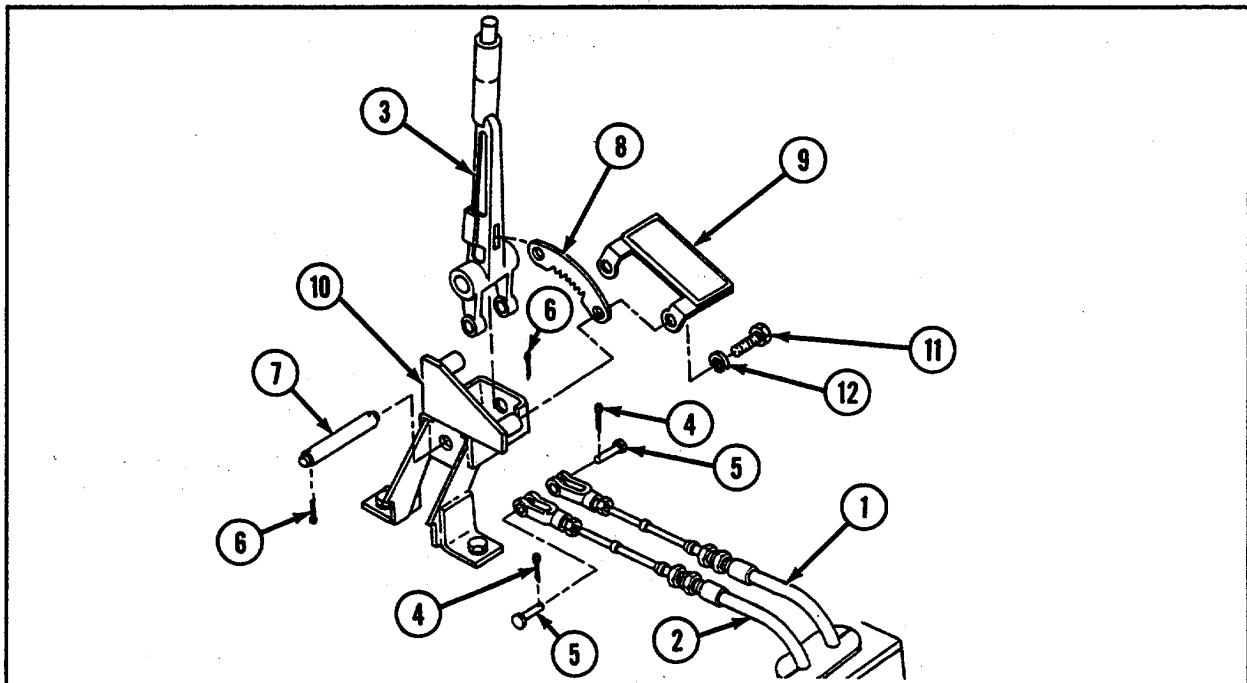
Equipment Condition:

- Powerplant removed for rear cable only (see paragraph 3-1)
- Rear left-side cab subfloor plate removed (see paragraph 9-15)
- Intermediate rear left-side cab subfloor plate removed (see paragraph 9-16)
- Ammunition rack removed (see paragraph 9-100)
- APU control box removed (see paragraph 13-7)

a. REMOVAL**NOTE**

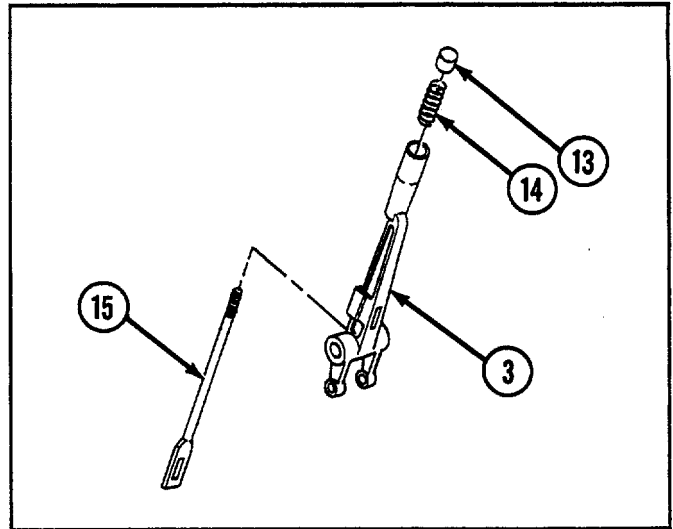
Prior to performing maintenance on drain valves, place a suitable container under valves and open each valve to prevent leakage on maintenance personnel.

- 1 Disconnect front drain valve cable assembly (1) and rear drain valve cable assembly (2) from control lever assembly (3) by removing cotter pin (4) and straight pin (5) from each.
- 2 Remove two cotter pins (6) and pin (7).
- 3 Remove ratchet (8), bracket (9), and control lever assembly (3) from control lever support assembly (10) by removing two screws (11) and two lockwashers (12).

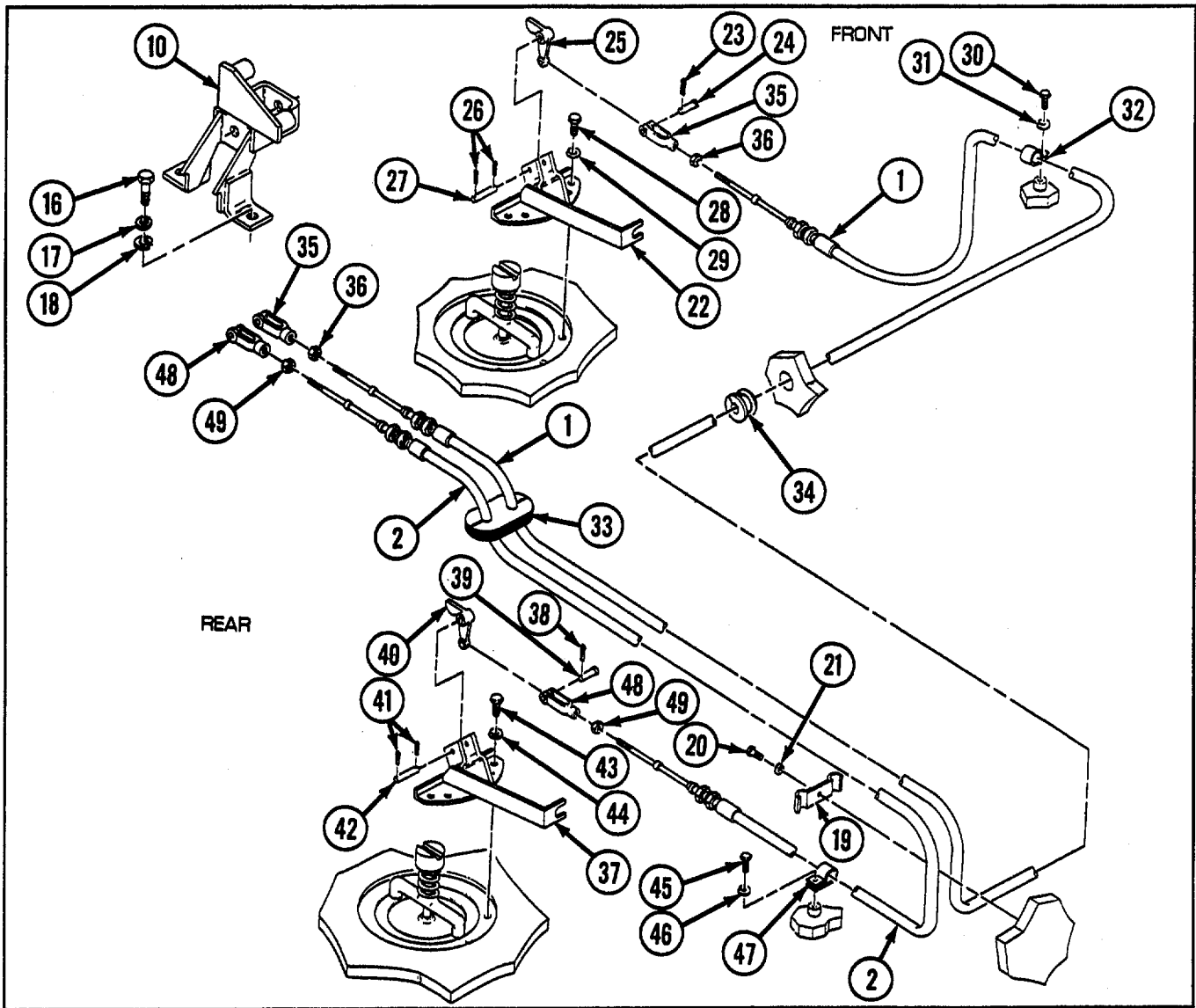


9-69 REPLACE/SERVICE DRAIN VALVE CONTROLS - Continued

- 4 Remove control lever push button (13), spring (14), and lever rod-and-pawl assembly (15) from control lever assembly (3).
- 5 Remove control lever support assembly (10) from vehicle by removing two screws (16), two flat washers (17), and two lockwashers (18).
- 6 Remove retaining strap (19) by removing screw (20) and lockwasher (21).
- 7 Disconnect front drain valve cable assembly (1) from front drain valve bracket assembly (22) by removing cotter pin (23) and straight pin (24).
- 8 Remove drain control lever (25) from front drain valve bracket assembly (22) by removing two cotter pins (26) and straight pin (27).



- 9 Remove front drain valve bracket assembly (22) from vehicle hull by removing three screws (28) and three lockwashers (29).
- 10 Remove front drain valve cable assembly (1) by removing five screws (30), five lockwashers (31), and five cable clamps (32). Pull front drain valve cable assembly through grommets (33 and 34).
- 11 Remove two yokes (35) and two jamnuts (36) from front drain valve cable assembly (1).
- 12 Remove rear drain valve cable assembly (2) from rear drain valve bracket assembly (37) by removing cotter pin (38) and straight pin (39).
- 13 Remove drain control lever (40) from rear drain valve bracket assembly (37) by removing two cotter pins (41) and straight pin (42).
- 14 Remove rear drain valve bracket assembly (37) from vehicle hull by removing three screws (43) and three lockwashers (44).
- 15 Remove rear drain valve cable assembly (2) by removing four screws (45), four lockwashers (46), and four cable clamps (47). Pull rear drain valve cable assembly through grommet (33).
- 16 Remove two yokes (48) and two jamnuts (49) from rear drain valve cable assembly (2).



b. INSPECTION

- 1 Inspect threaded parts for stripped or crossed threads, nicks, and dents.
- 2 Inspect spring for breakage and distortion.
- 3 Inspect pins for bends, scoring, and cracks.
- 4 Inspect supports, ratchets, control levers, and brackets for cracks, bends, and other damage.
- 5 Inspect cables for corrosion, cracks, bends, and wear. Be especially critical of cable cores.

c. REPAIR

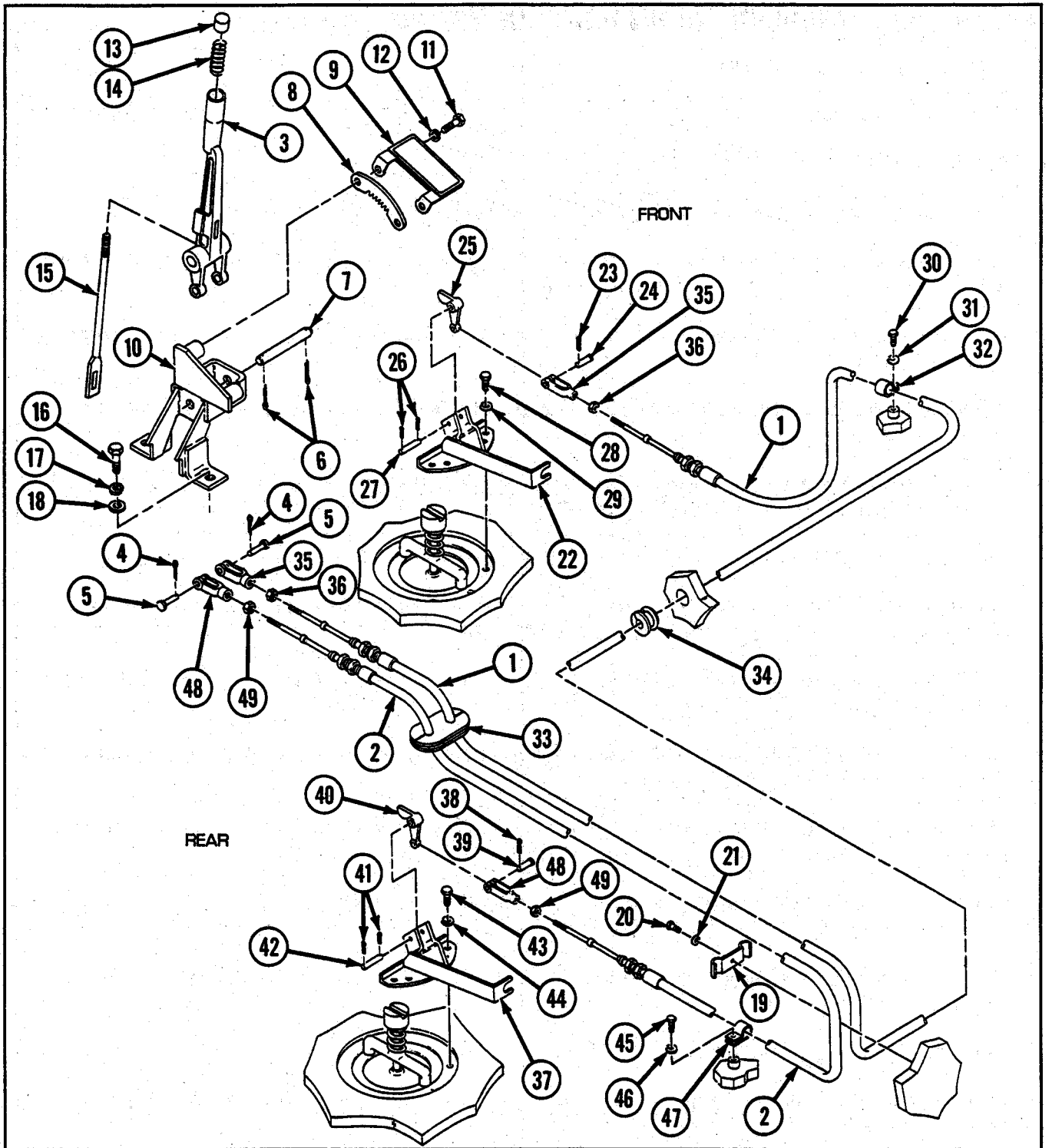
- 1 Dress down light corrosion with crocus cloth.
- 2 Straighten slightly bent parts.

9-69 REPLACE/SERVICE DRAIN VALVE CONTROLS--Continued

- 3 Replace worn or damaged parts
- 4 Replace severely corroded parts.

d. INSTALLATION

- 1 Install yoke (48) and jamnut (49) at each end of rear drain valve cable assembly (2).
- 2 Install rear drain valve cable assembly (2) by pulling through grommet (33) and secure with four cable clamps (47), four screws (45), and four new lockwashers (46).
- 3 Install rear drain valve bracket assembly (37) on vehicle hull with three screws (43) and three new lockwashers (44).
- 4 Install drain control lever (40) on rear drain valve bracket assembly (37) with straight pin (42) and two new cotter pins (41).
- 5 Connect rear drain valve cable assembly (2) to rear drain valve bracket assembly (37) and drain control lever (40) with straight pin (39) and new cotter pin (38).
- 6 Install two yokes (35) and two jamnuts (36) to front drain valve cable assembly (1).
- 7 Install front drain valve cable assembly (1) by pulling through grommets (33 and 34). Secure with five cable clamps (32), five screws (30), and five new lockwashers (31).
- 8 Install front drain valve bracket assembly (22) on vehicle hull with three screws (28) and three new lockwashers (29).
- 9 Install drain control lever (25) on front drain valve bracket assembly (22) with straight pin (27) and two new cotter pins (26).
- 10 Connect front drain valve cable assembly (1) to front drain valve bracket assembly (22) and drain control lever (25) with straight pin (24) and new cotter pin (23).
- 11 Install control lever support assembly (10) on vehicle with two screws (16), two flat washers (17), and two new lockwashers (18).
- 12 Install control lever push button (13), spring (14), and lever rod-and-pawl assembly (15) on control lever assembly (3).
- 13 Install retaining strap (19) with screw (20) and new lockwasher (21).
- 14 Install ratchet (8) and bracket (9) on control lever support assembly (10) with two screws (11) and two new lockwashers (12).
- 15 Install control lever assembly (3) on control lever support assembly (10) with pin (7) and two new cotter pins (6).
- 16 Connect front drain valve cable assembly (1) and rear drain valve cable assembly (2) to control lever assembly (3) each with straight pin (5) and new cotter pin (4).

**NOTE****Follow-on maintenance:**

- Install APU control box (see paragraph 13-7)
- Install ammunition rack (see paragraph 9-100)
- Install intermediate rear left-side cab subfloor plate (see paragraph 9-16)
- Install rear left-side cab subfloor plate (see paragraph 9-15)
- Install powerplant if removed (see paragraph 3-1)

9-70 REPLACE DRAIN COVERS**THIS TASK COVERS**

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)

Parts:

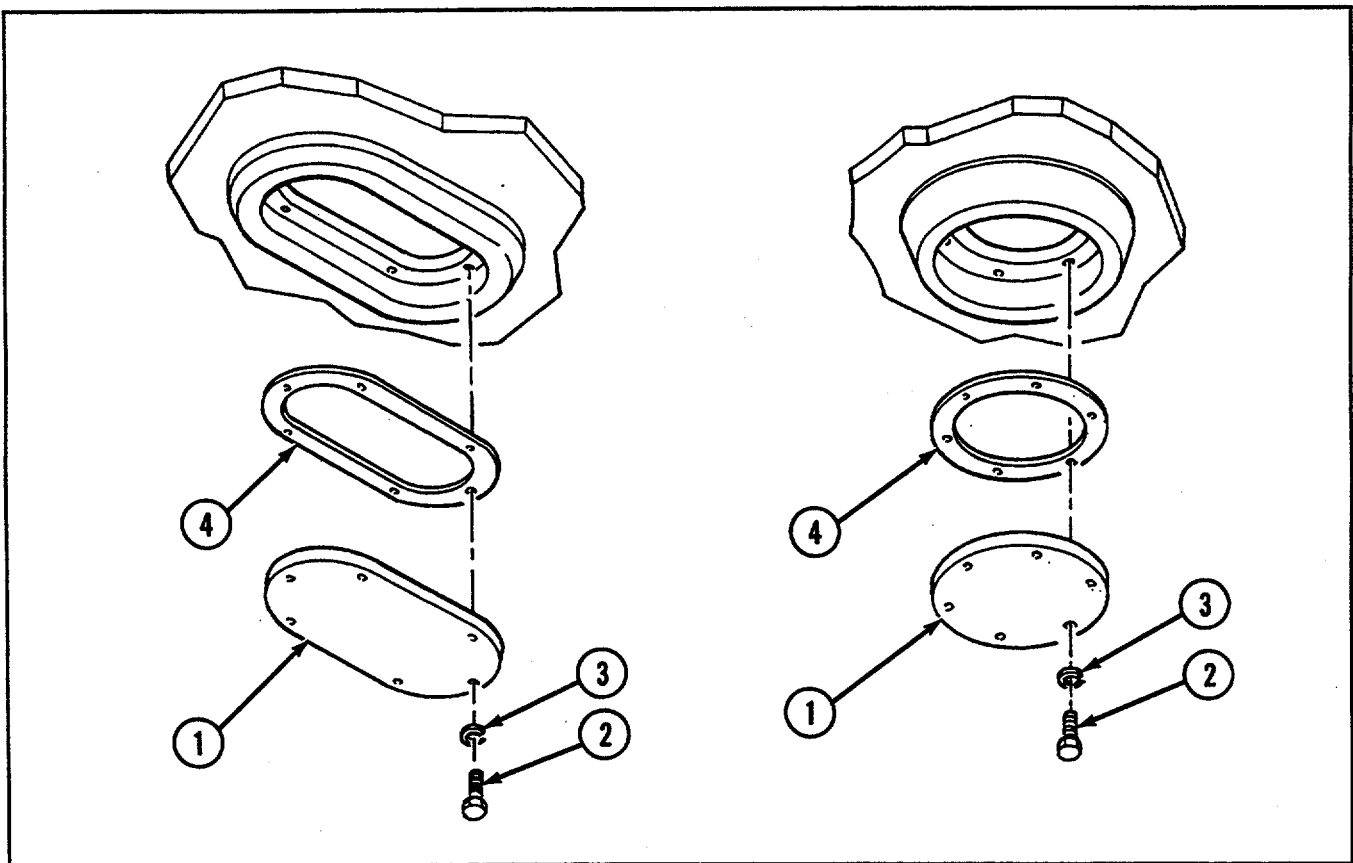
- Gasket (Appendix G, item 56)
- Gasket (Appendix G, item 61)
- Gasket (Appendix G, item 65)
- Lockwashers (18) (Appendix G, item 138)

NOTE

- Ensure adequate collecting device is placed under the drain cover to catch any liquid that drains.
- Removal and installation procedures are the same for all three drain covers.

a. REMOVAL

Remove drain cover (1) by removing six screws (2), six lockwashers (3), and gasket (4).

**b. INSTALLATION**

Install drain cover (1) with new gasket (4), six new lockwashers (3), and six screws (2).

9-71 REPLACE/SERVICE MECHANICAL TACHOMETER AND SPEEDOMETER FLEXIBLE SHAFTS AND FITTINGS**THIS TASK COVERS**

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

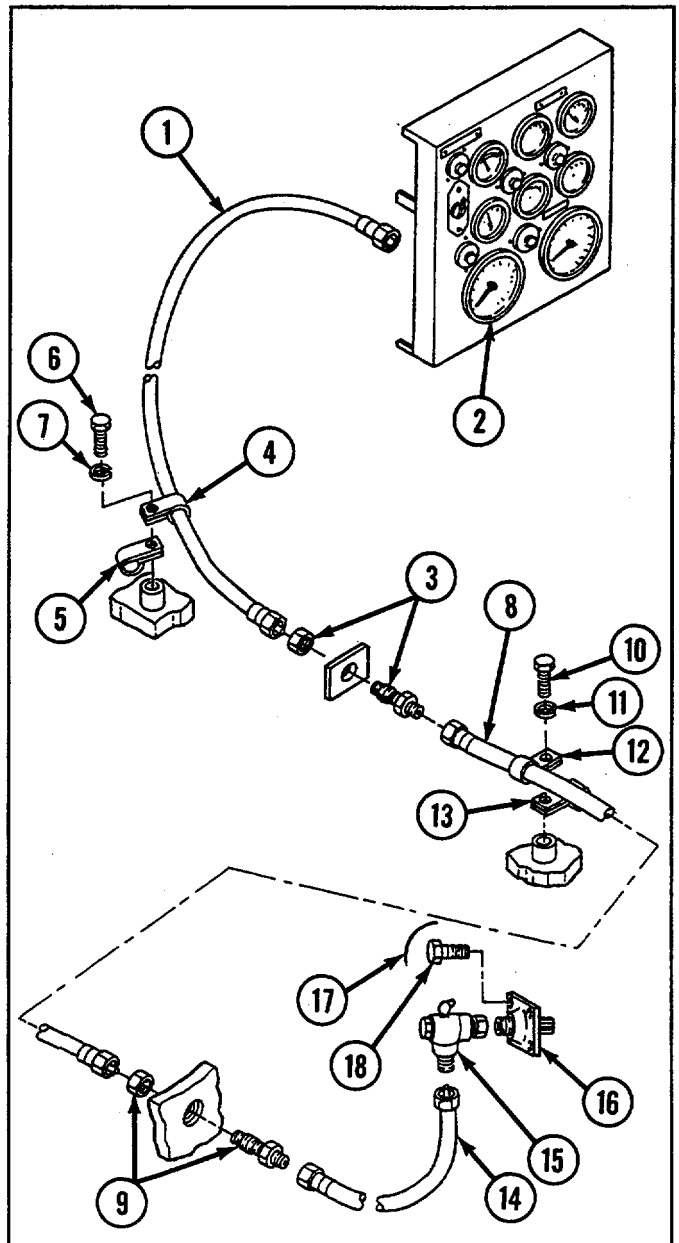
Tool kit, general mechanic's (Appendix C, item 53)

Materials/Parts:

- Solvent, dry-cleaning (Appendix D, item 9)
- Lockwashers (7) (Appendix G, item 106)
- Lockwashers (4) (Appendix G, item 142)
- Lockwires (2) (Appendix G, item 155)

a. REMOVAL

- 1 Disconnect flexible shaft (1) from tachometer (2).
- 2 Disconnect flexible shaft (1) from adapter (3).
- 3 Remove flexible shaft (1) by removing two clamps (4 and 5), screw (6), and lockwasher (7).
- 4 Disconnect flexible shaft (8) from adapters (3 and 9).
- 5 Remove adapter (3).
- 6 Remove flexible shaft (8) by removing screw (10), lockwasher (11), and clamps (12 and 13).
- 7 Disconnect flexible shaft (14) from adapter (9) and elbow (15).
- 8 Remove adapter (9) and elbow (15).
- 9 Remove adapter (16) by removing lockwire (17) and four screws (18).



9-71 REPLACE/SERVICE MECHANICAL TACHOMETER AND SPEEDOMETER FLEXIBLE SHAFTS AND FITTINGS**Continued**

- 10 Disconnect flexible shaft (19) from speedometer (20).
- 11 Disconnect flexible shaft (19) from adapter assembly (21).
- 12 Remove flexible shaft (19) by removing three screws (22), three lockwashers (23), and three clamps (24).
- 13 Remove adapter assembly (21) from bracket (25) by removing two screws (26) and two lockwashers (27).
- 14 Remove bracket (25) by removing lockwire (28), four screws (29), and four lockwashers (30).

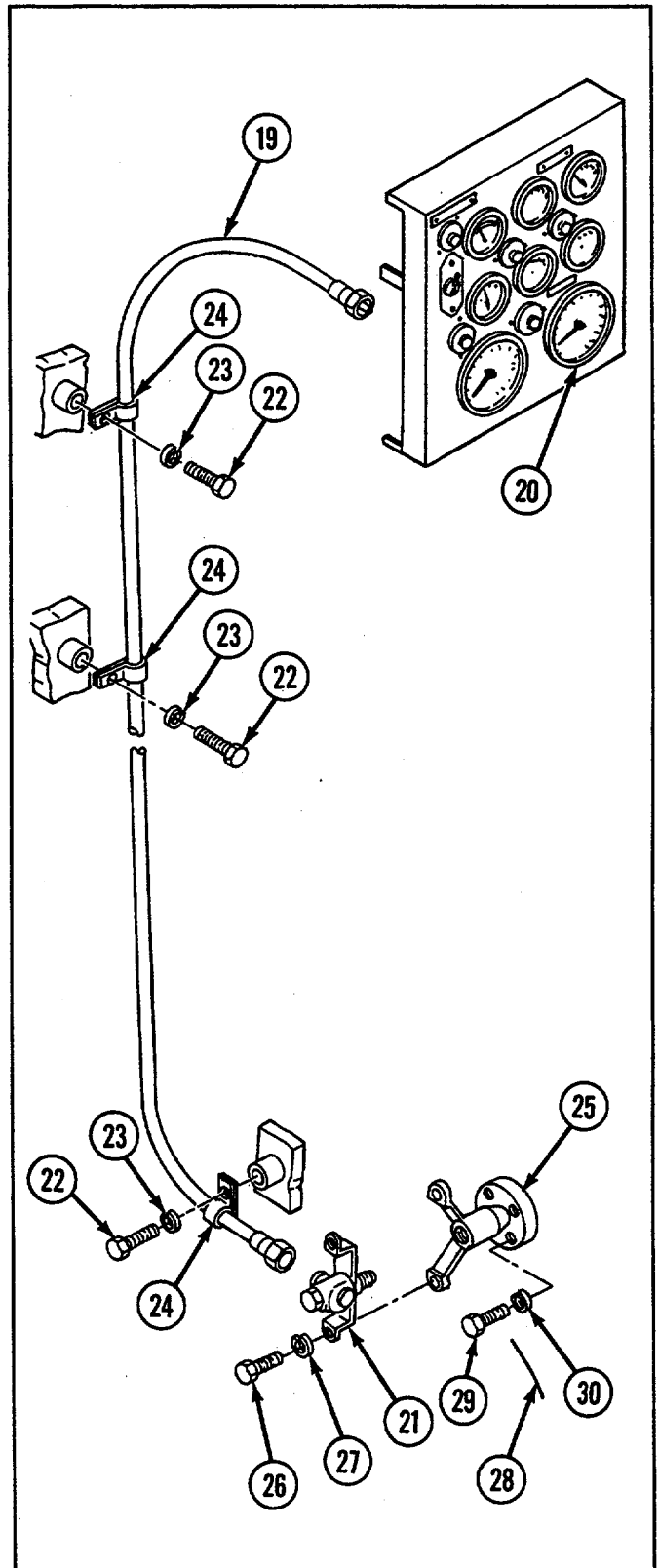
b. CLEANING**WARNING**

- Dry-cleaning solvent used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flashpoint of solvent is 138°F (59°C).
- Particles blown by compressed air can be dangerous. Be certain to direct airstream away from yourself and other personnel in the area. Compressed air used for cleaning will not exceed 30 psi (207 kPa). Use only with effective chip 9-7 guarding and personal protective equipment (goggles/shield and gloves).

- 1 Clean dirt and other foreign materials from flexible shafts. Thoroughly wipe core tips with lint-free rags saturated with dry-cleaning solvent. Wash rubber tubing with clean water; rinse and dry.
- 2 Clean other parts in dry-cleaning solvent and dry with compressed air.

c. INSPECTION

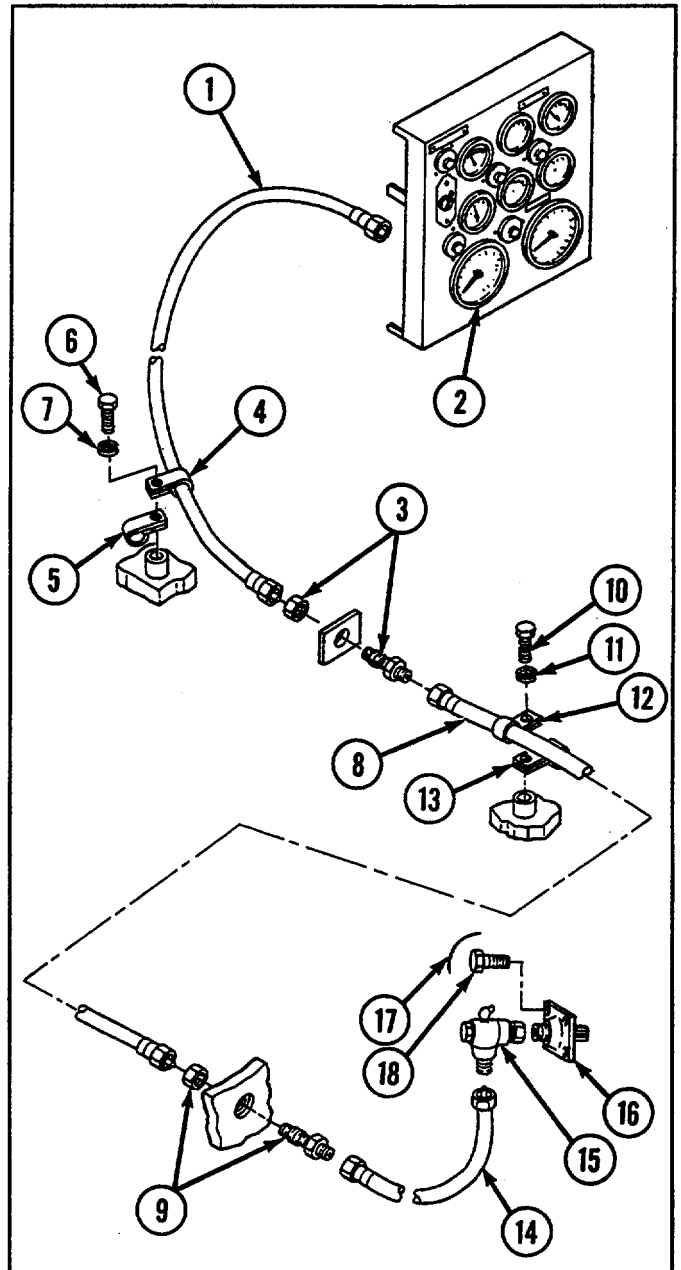
- 1 Inspect flexible shafts for cracking or fraying of rubber cover and for inner damage. Check for excessive flexibility at any point along length of tubing.



- 2 Inspect core tips for nicks and distortion.
- 3 Inspect all threaded parts for cross threading and nicks.
- 4 Inspect clamps, bracket, and welded pad and plate for cracks, distortion, and breakage. Replace all damaged parts. If welded pad and plate are damaged, notify Direct Support.

d. INSTALLATION

- 1 Install bracket (25) with four screws (29) and four new lockwashers (30). Secure four screws with new lockwire (28).
- 2 Install adapter assembly (21) on bracket (25) with two screws (26) and two new lockwashers (27).
- 3 Install flexible shaft (19) on adapter assembly (21) and secure with three clamps (24), three new lockwashers (23), and three screws (22).
- 4 Install adapter (16) with four screws (18). Secure four screws with new lockwire (17).
- 5 Install adapter (9) and elbow (15).
- 6 Connect flexible shaft (14) to adapter (9) and elbow (15).
- 7 Install adapter (3).
- 8 Install flexible shaft (8) on adapters (3 and 9) and secure with clamps (12 and 13) held by screw (10) and new lockwasher (11).
- 9 Connect flexible shaft (1) on adapter (3).
- 10 Install flexible shaft (1) with two clamps (4 and 5), screw (6), and new lockwasher (7).
- 11 Connect flexible shaft (1) to tachometer (2).
- 12 Connect flexible shaft (19) to speedometer (20).



9-72 REPLACE/REPAIR STEERING CONTROLS AND LINKAGES**THIS TASK COVERS**

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Pliers, retaining ring (Appendix C, item 30)

Parts:

- Bearings (4) (Appendix G, item 1)
- Lockwashers (28) (Appendix G, item 132)
- Lockwasher (Appendix G, item 144)
- Pin, cotter (Appendix G, item 212)
- Pin, cotter (Appendix G, item 227)
- Seals (4) (Appendix G, item 249)
- Toolbox rack removed (see paragraph 9-103)
- Oddment tray removed (see paragraph 9-104)

Equipment Conditions -Continued

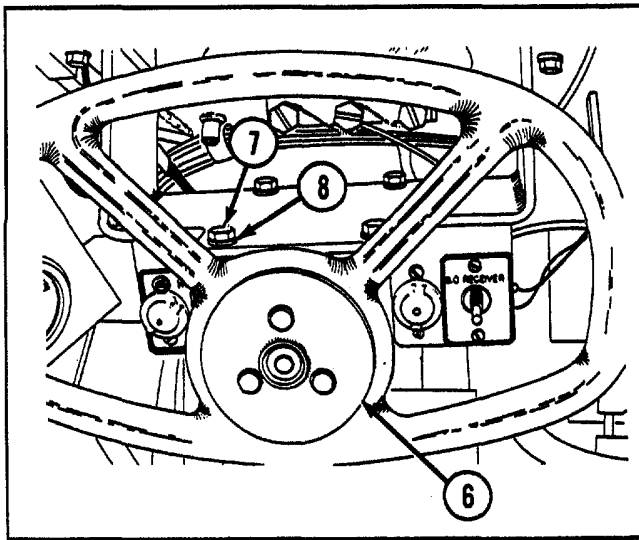
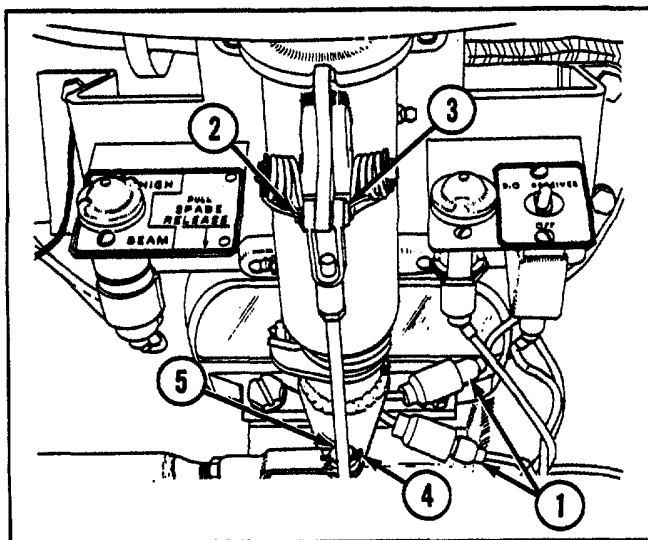
- Powerplant removed (see paragraph 3-1)
- Left-side air cleaner removed (see paragraph 4-24)
- Cab subfloor plates removed (see paragraphs 9-1 through 9-23)
- Air inlet doors removed as necessary (see paragraph 9-56)
- Air inlet grilles removed as necessary (see paragraph 9-57)
- Ammunition rack removed (see paragraph 9-100)

NOTE

Only remove or open items necessary to gain access to area of linkage requiring removal.

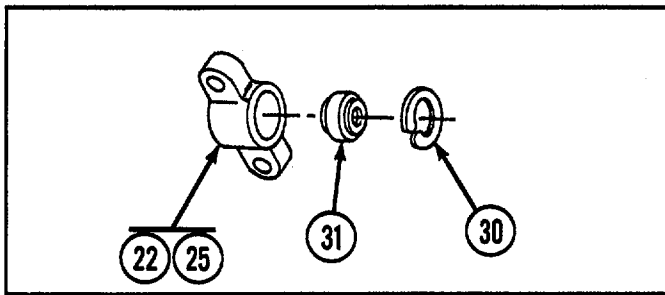
a. REMOVAL

- 1 Disconnect two electrical leads (1).
- 2 Remove cotter pin (2) and straight pin (3).
- 3 Remove cotter pin (4) and straight pin (5).
- 4 Remove steering control assembly (6) by removing four screws (7) and four lockwashers (8).

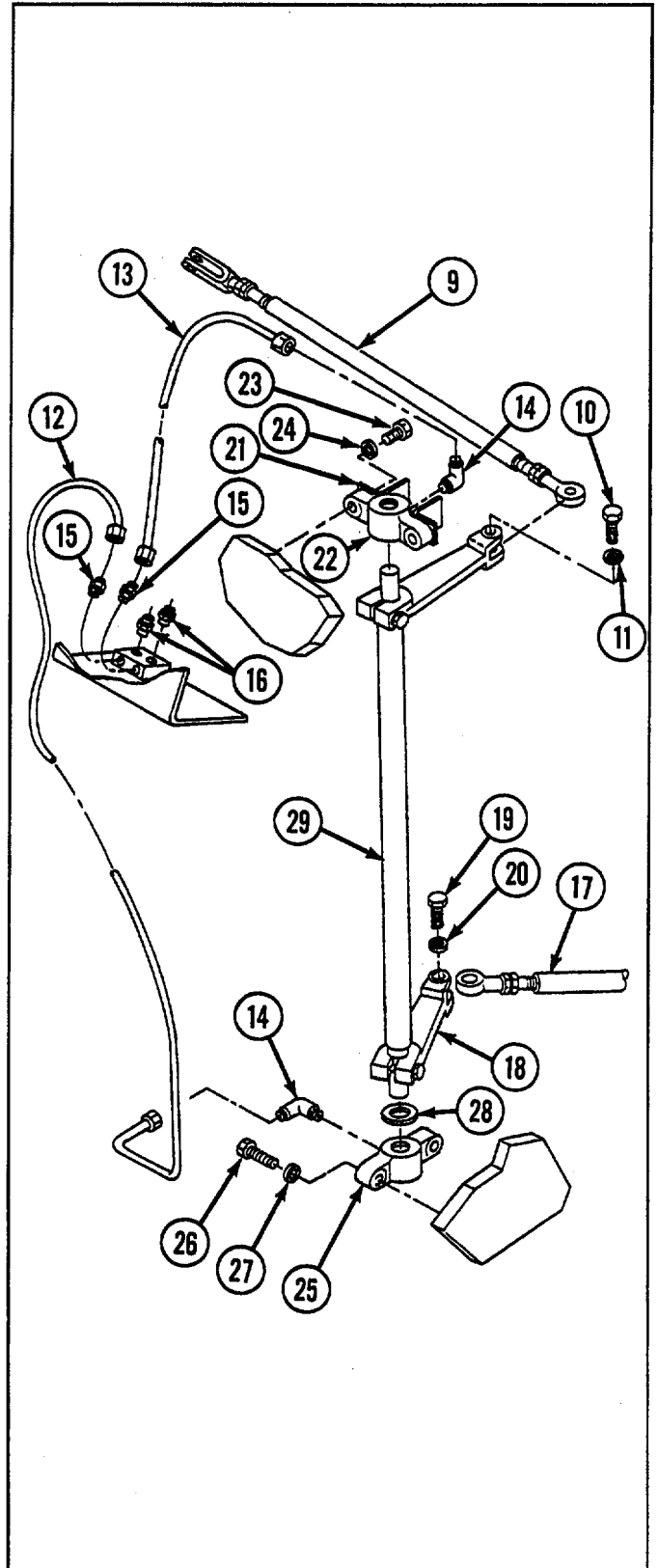
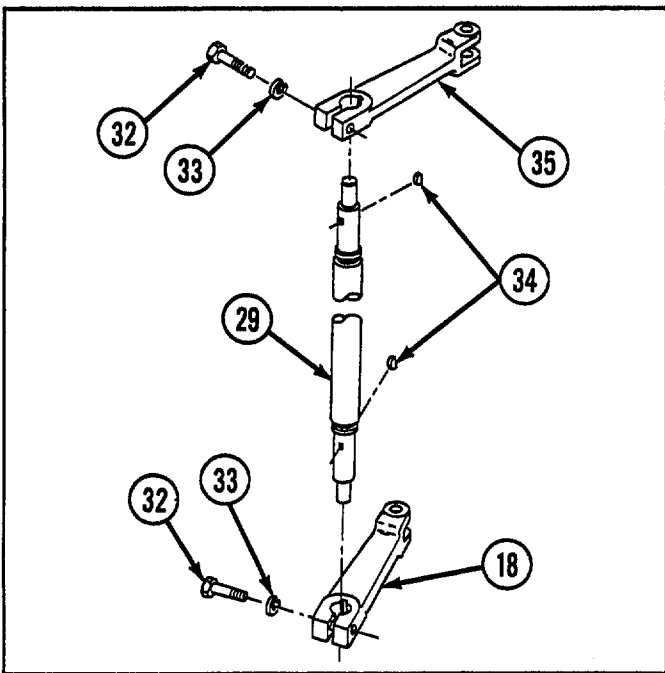


- 5 Remove connecting link (9) by removing screw (10) and lockwasher (11).
- 6 Disconnect and remove two lubrication tubes (12 and 13), two elbows (14), two adapters (15), and two fittings (16).

- 7 Disconnect connecting link (17) from lever (18) by removing screw (19) and lockwasher (20).
- 8 Remove bracket (21) and bearing housing (22) by removing two screws (23) and two lockwashers (24).
- 9 Remove bearing housing (25) by removing two screws (26) and two lockwashers (27).
- 10 Slide two bearing housings (22 and 25) and washer (28) from shaft assembly (29).
- 11 Remove two retainers (30) and two bearings (31) from bearing housings (22 and 25).

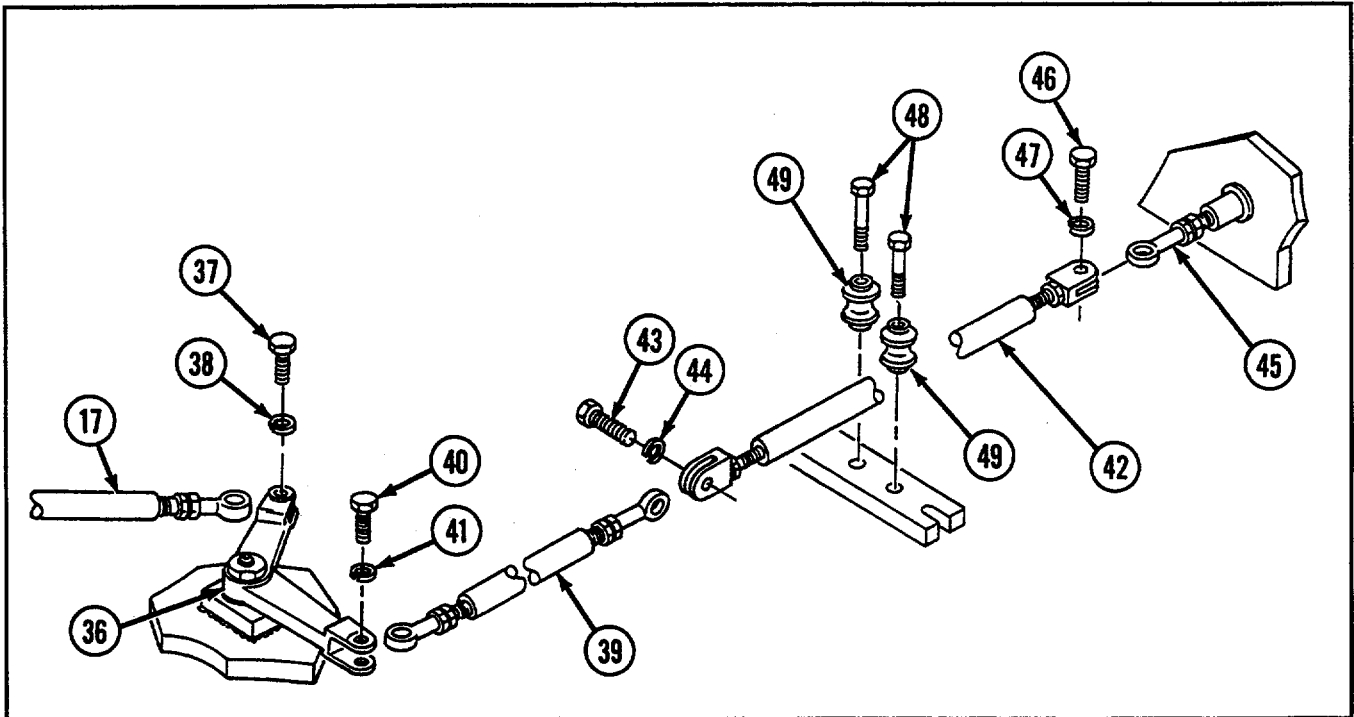


- 12 Remove two screws (32), two lockwashers (33), two keys (34), and two levers (35 and 18) from shaft assembly (29).

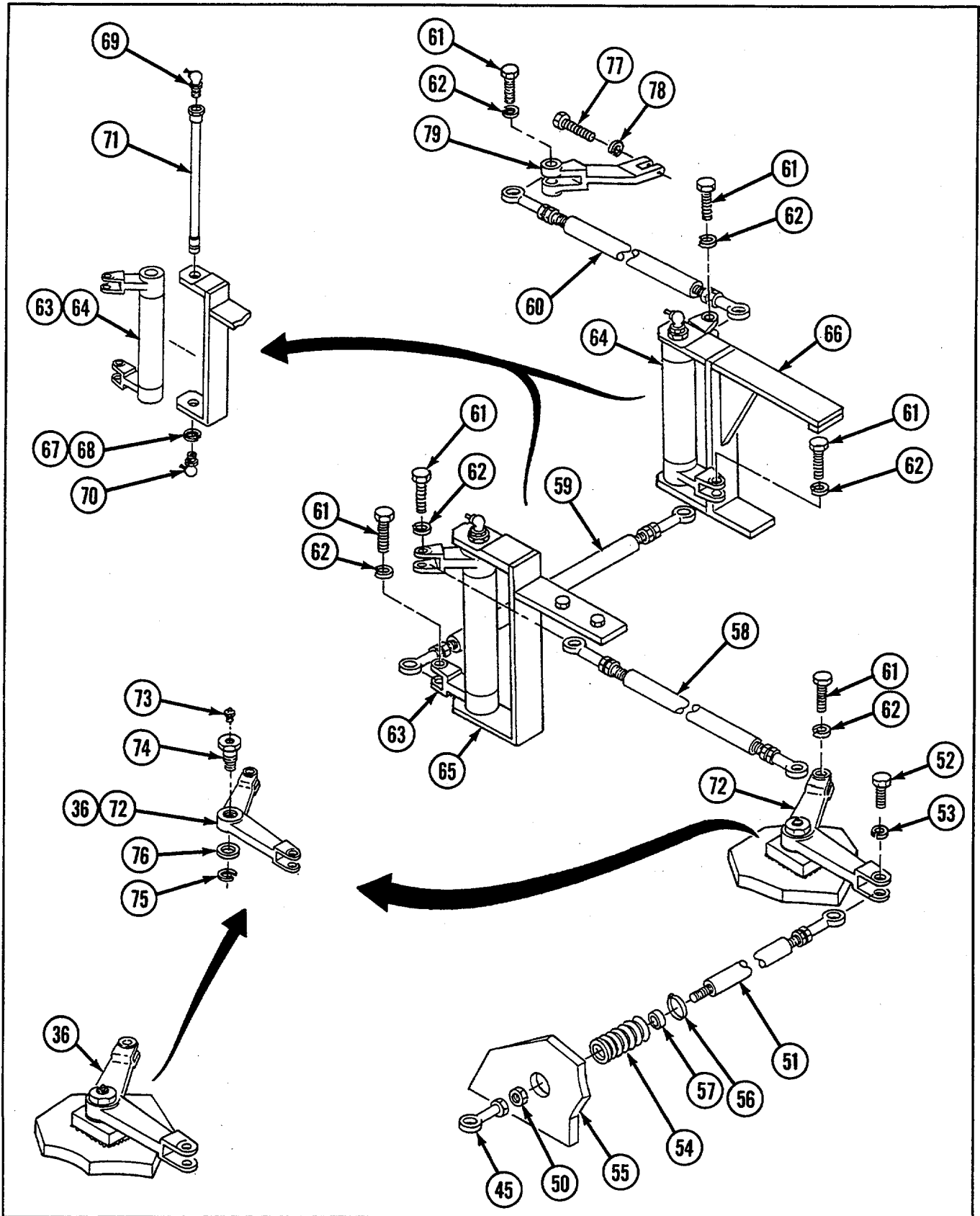


9-72 REPLACE/REPAIR STEERING CONTROLS AND LINKAGE S--Continued

- 13 Remove connecting link (17) from bell crank assembly (36) by removing screw (37) and lockwasher (38).
- 14 Disconnect connecting link (39) from bell crank assembly (36) by removing screw (40) and lockwasher (41).
- 15 Remove connecting link (39) from tube assembly (42) by removing screw (43) and lockwasher (44).
- 16 Remove tube assembly (42) from rod end bearing (45) by removing screw (46) and lockwasher (47).
- 17 Remove six bolts (48) and six rollers (49).

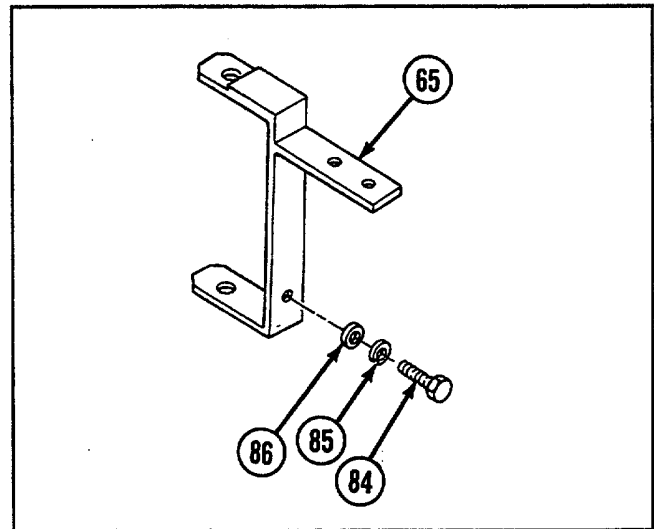
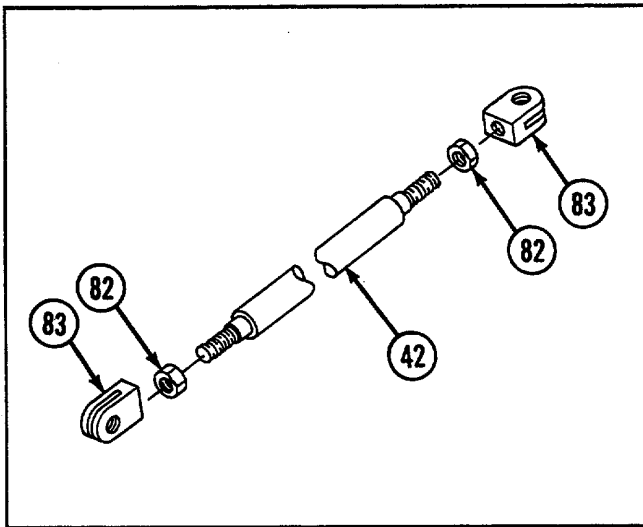
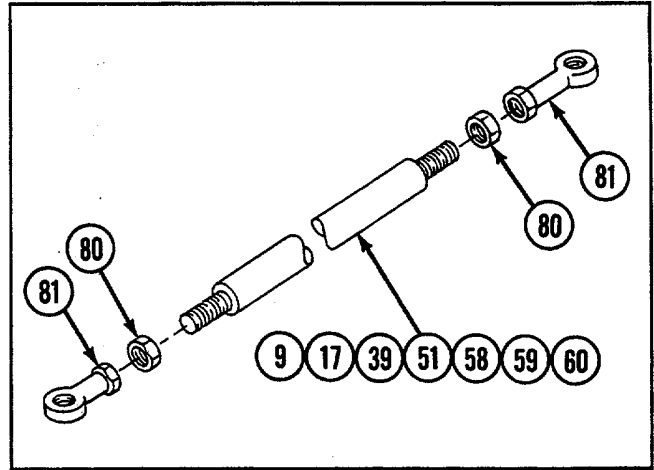


- 18 Loosen nut (50) and unscrew rod end bearing (45) from connecting link (51). Remove nut.
- 19 Remove screw (52) and lockwasher (53).
- 20 Pry rubber bellows (54) loose from bulkhead (55) and pull connecting link (51) from bulkhead.
- 21 Remove rubber bellows (54) from connecting link (51) by removing clamp (56) and bushing (57).
- 22 Remove connecting links (58, 59, and 60) by removing screw (61) and lockwasher (62) from ends of each connecting link
- 23 Remove two bell crank assemblies (63 and 64) from mounting brackets (65 and 66) by removing two retaining rings (67 and 68), four lubrication fittings (69 and 70), and two grooved pins (71).
- 24 Remove two bell cranks (72 and 36) by removing lubrication fitting (73), bolt (74), lockwasher (75), and flat washer (76) from each.
- 25 Remove screw (77), lockwasher (78), and lever (79).



9-72 REPLACE/REPAIR STEERING CONTROLS AND LINKAGES-Continued

- 26 If necessary, remove nut (80) and bearing (81) from each end of connecting links (9, 17, 39, 51, 58, 59, and 60).
- 27 If necessary, remove two nuts (82) and two clevis assemblies (83) from tube assembly (42).
- 28 Remove mounting bracket (65) by removing three screws (84), three lockwashers (85), and flat washer (86).

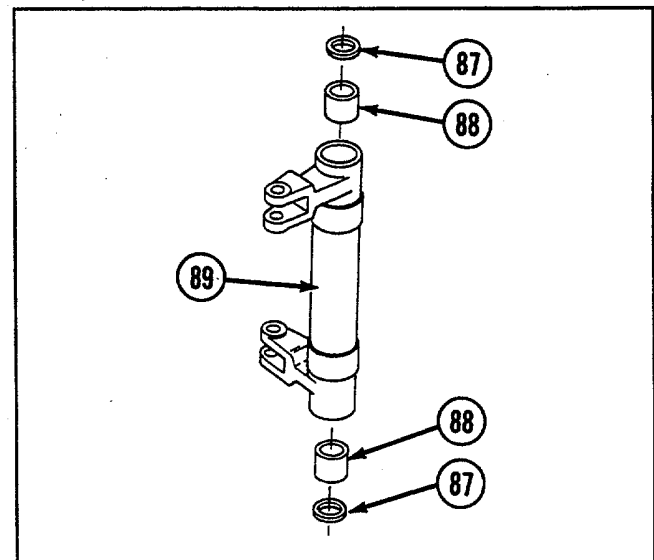


b. DISASSEMBLY

Remove two seals (87) and two bearings (88) from each of two bell cranks (89).

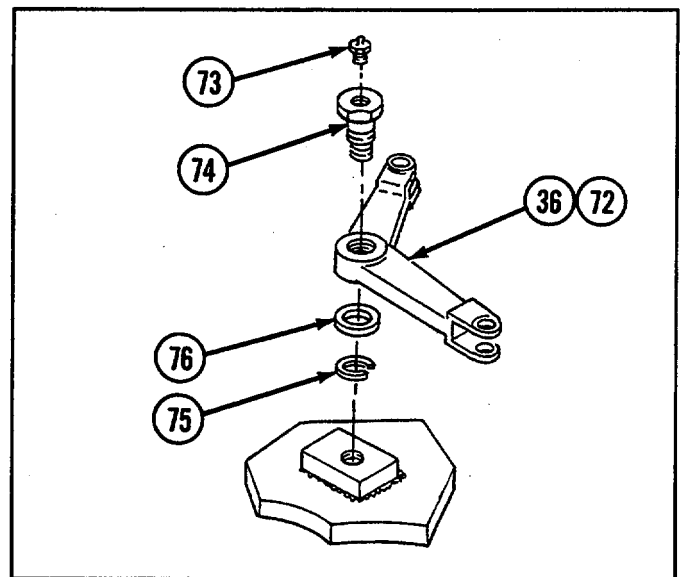
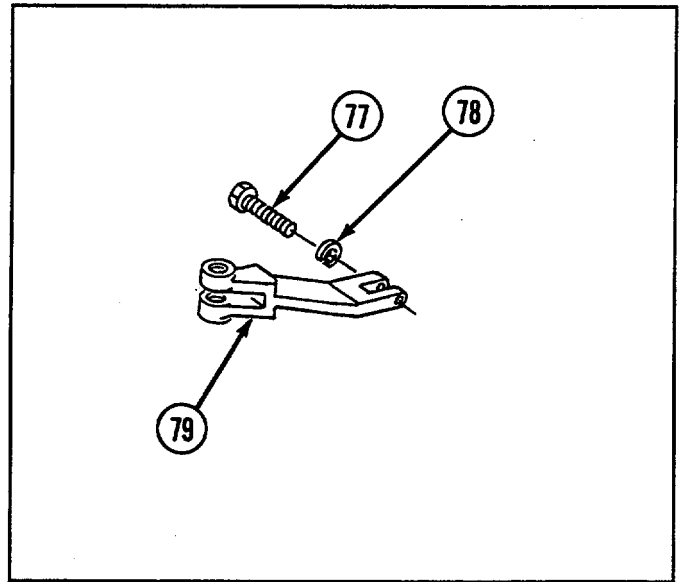
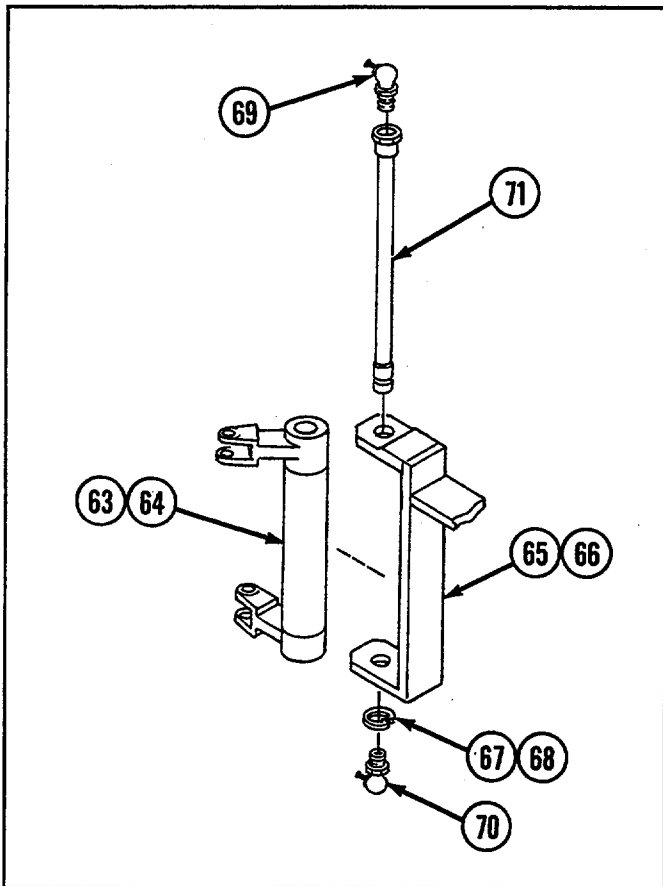
c. ASSEMBLY

Install two new seals (87) and two new bearings (88) to each of two bell cranks (89).



d. INSTALLATION

- 1 Install mounting bracket (65) with three new lockwashers (85), flat washer (86), and three screws (84).
- 2 If removed, install two clevis assemblies (83) and two nuts (82) to tube assembly (42).
- 3 If removed, install bearing (81) and nut (80) to each end of connecting links (9, 17, 39, 51, 58, 59, and 60).
- 4 Install lever (79) with new lockwasher (78) and screw (77).
- 5 Install two bell cranks (72 and 36) each with lubrication fitting (73), flat washer (76), new lockwasher (75), and bolt (74).
- 6 Install two bell crank assemblies (63 and 64) to mounting brackets (65 and 66) with two grooved pins (71), four lubrication fittings (69 and 70), and two retaining rings (67 and 68).



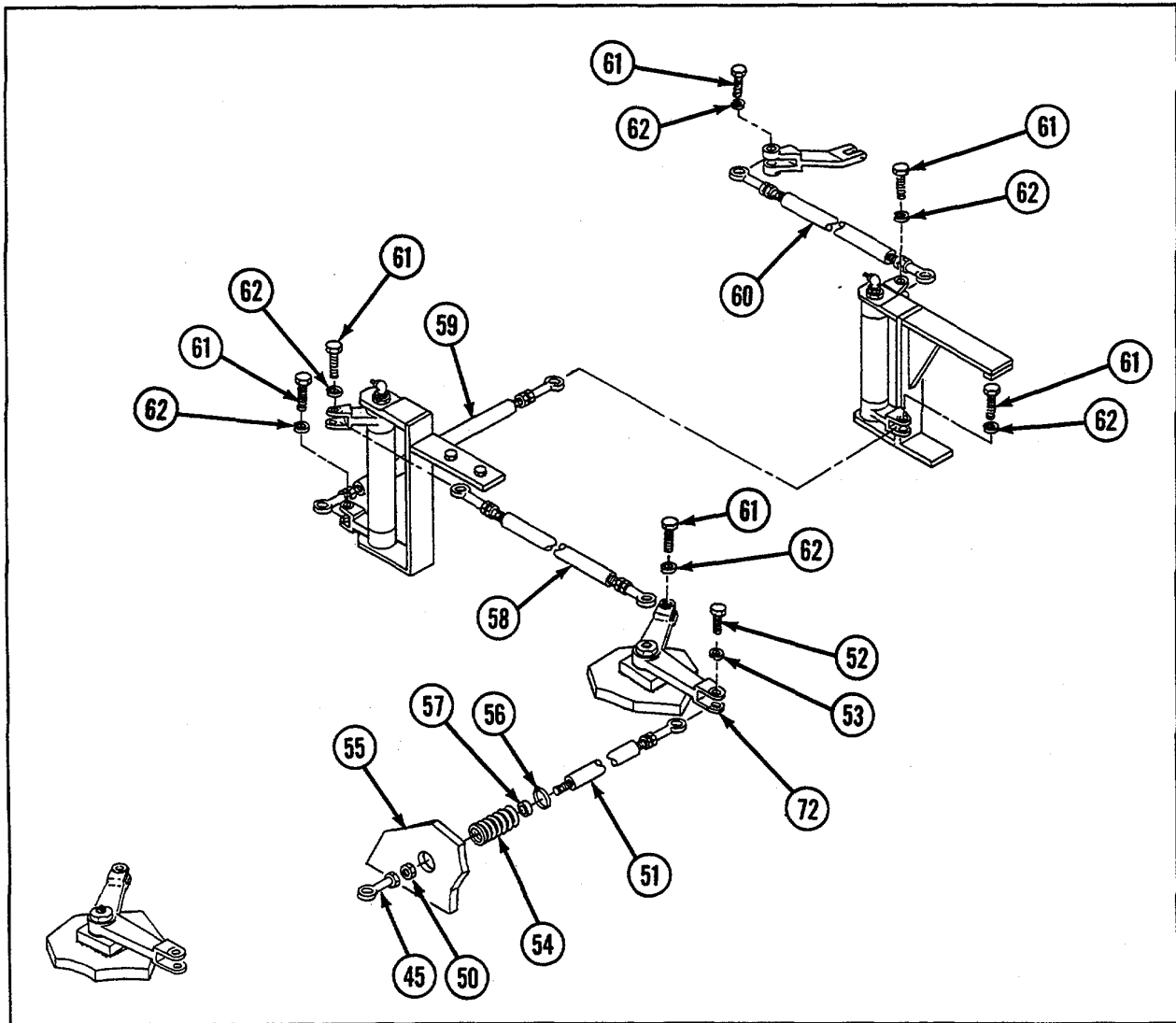
9-72 REPLACE/REPAIR STEERING CONTROLS AND LINKAGES--Continued

- 7 Install each end of connecting links (58,59, and 60) with new lockwasher (62) and screw (61).

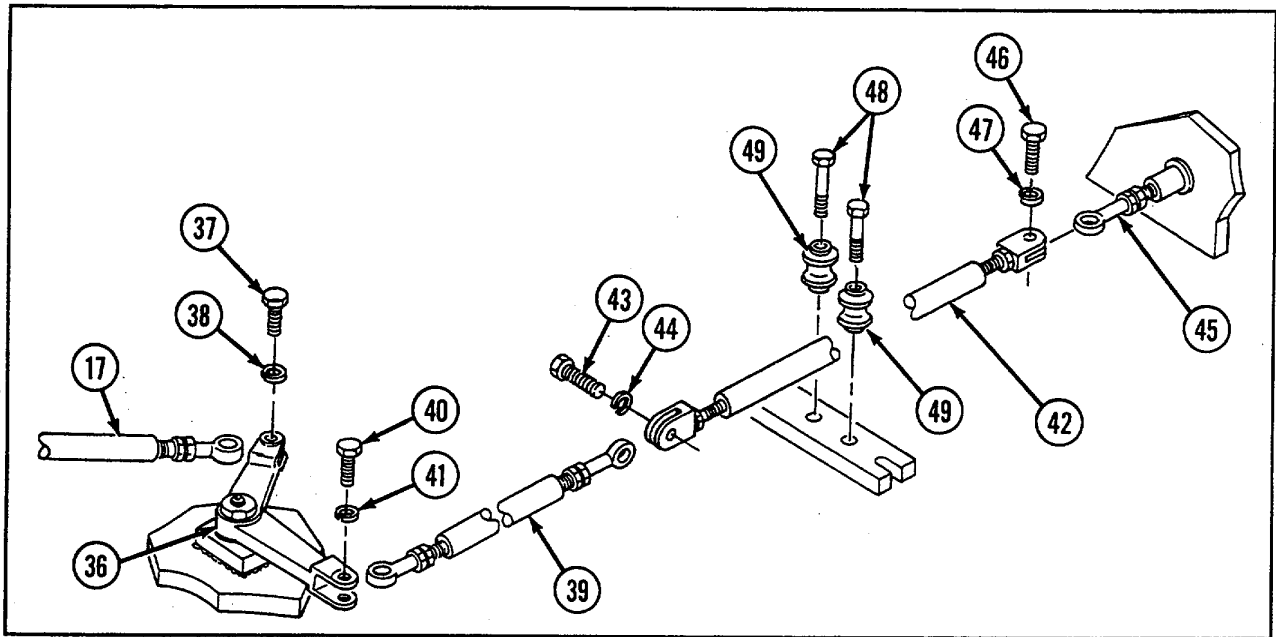
NOTE

Linkages must be completely installed and aligned and rubber bellows must be adjusted (see paragraph 9-73) before cementing rubber bellows in place.

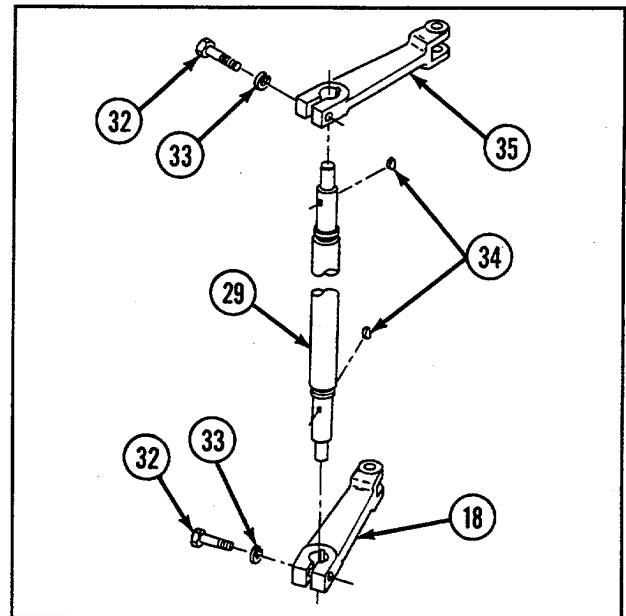
- 8 Install rubber bellows (54) on connecting link (51) with bushing (57) and clamp (56).
 9 Insert connecting link (51) through bulkhead (55).
 10 Connect end of connecting link (51) to bell crank assembly (72) with new lockwasher (53) and screw (52).
 11 Install rod end bearing (45) to connecting link (51) with nut (50).



- 12 Install six rollers (49) with six bolts (48).
- 13 Install tube assembly (42) to rod end bearing (45) with new lockwasher (47) and screw (46).
- 14 Install connecting link (39) to tube assembly (42) with new lockwasher (44) and screw (43).
- 15 Connect connecting link (39) to bell crank assembly (36) with new lockwasher (41) and screw (40).
- 16 Install connecting link (17) to bell crank assembly (36) with new lockwasher (38) and screw (37).

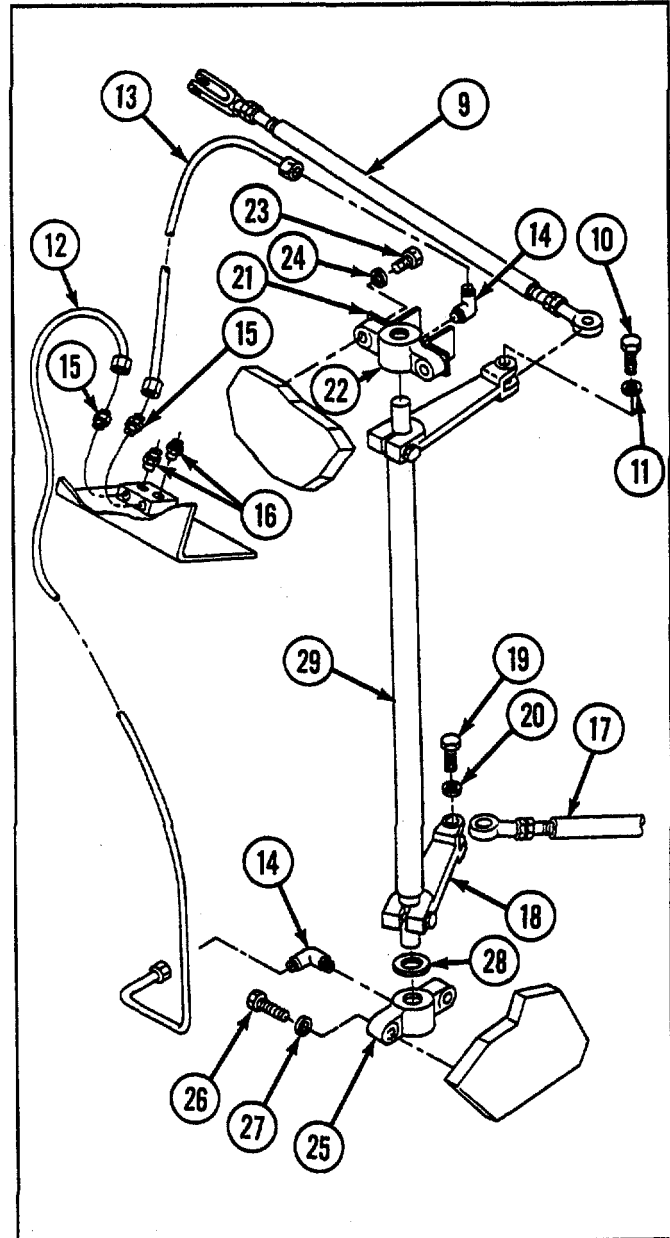
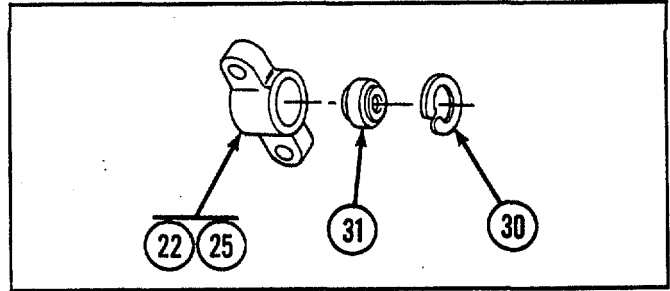


17. Install two levers (35 and 18) to shaft assembly (29) with two keys (34), two new lockwashers (33), and two screws (32).

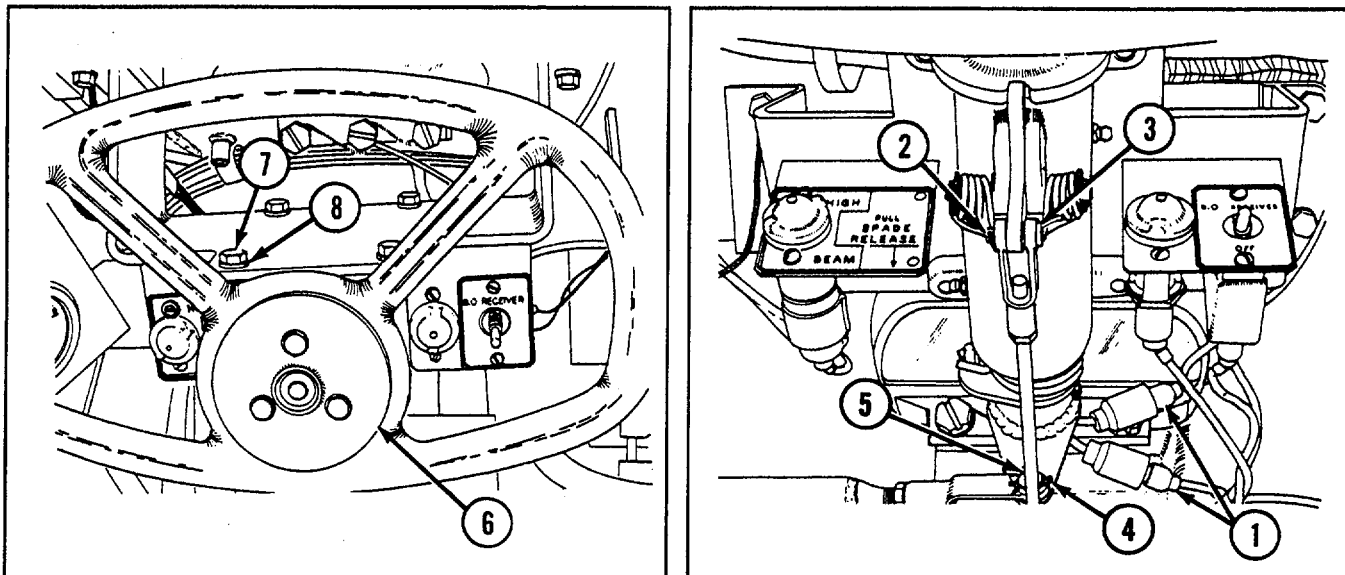


9-72 REPLACE/REPAIR STEERING CONTROLS AND LINKAGES-Continued

- 18 Install two bearings (31) and two retainers (30) to bearing housings (22 and 25). 19 Install two bearing housings (22 and 25) and washer (28) to shaft assembly (29).
- 20 Install bearing housing (25) with two new lockwashers (27) and two screws (26).
- 21 Install bracket (21) and bearing housing (22) with two new lockwashers (24) and two screws (23).
- 22 Connect connecting link (17) to lever (18) with new lockwasher (20) and screw (19).
- 23 Install two elbows (14), two adapters (15), and two fittings (16) and connect two lubrication tubes (12 and 13).
- 24 Install connecting link (9) with new lockwasher (11) and screw (10).



- 25 Install steering control assembly (6) with four new lockwashers (8) and four screws (7).
- 26 Install straight pin (5) and new cotter pin (4).
- 27 Install straight pin (3) and new cotter pin (2).
- 28 Connect two electrical leads (1).

**NOTE**

Follow-on maintenance: Only install or close items necessary to gain access to area of linkage requiring removal.

- Install oddment ray (see paragraph 9-104)
- Install toolbox rack (see paragraph 9-103)
- Install ammunition rack (see paragraph 9-100)
- Install air inlet grilles if removed (see paragraph 9-57)
- Install air inlet doors if removed (see paragraph 9-56)
- Install cab subfloor plates (see paragraphs 9-1 through 9-23)
- Install left-side air cleaner (see paragraph 4-24)
- Install powerplant (see paragraph 3-1)

9-73 SERVICE ALIGNMENT OF STEERING CONTROLS AND LINKAGES**THIS TASK COVERS**

Alignment

INITIAL SET-UP**Tools:**

- Tool kit, general mechanic's (Appendix C, item 53)
- Punches, drive (5) (locating pins) (Appendix C, item 37)

Material:

Adhesive, rubber-base
(Appendix D, item 3)

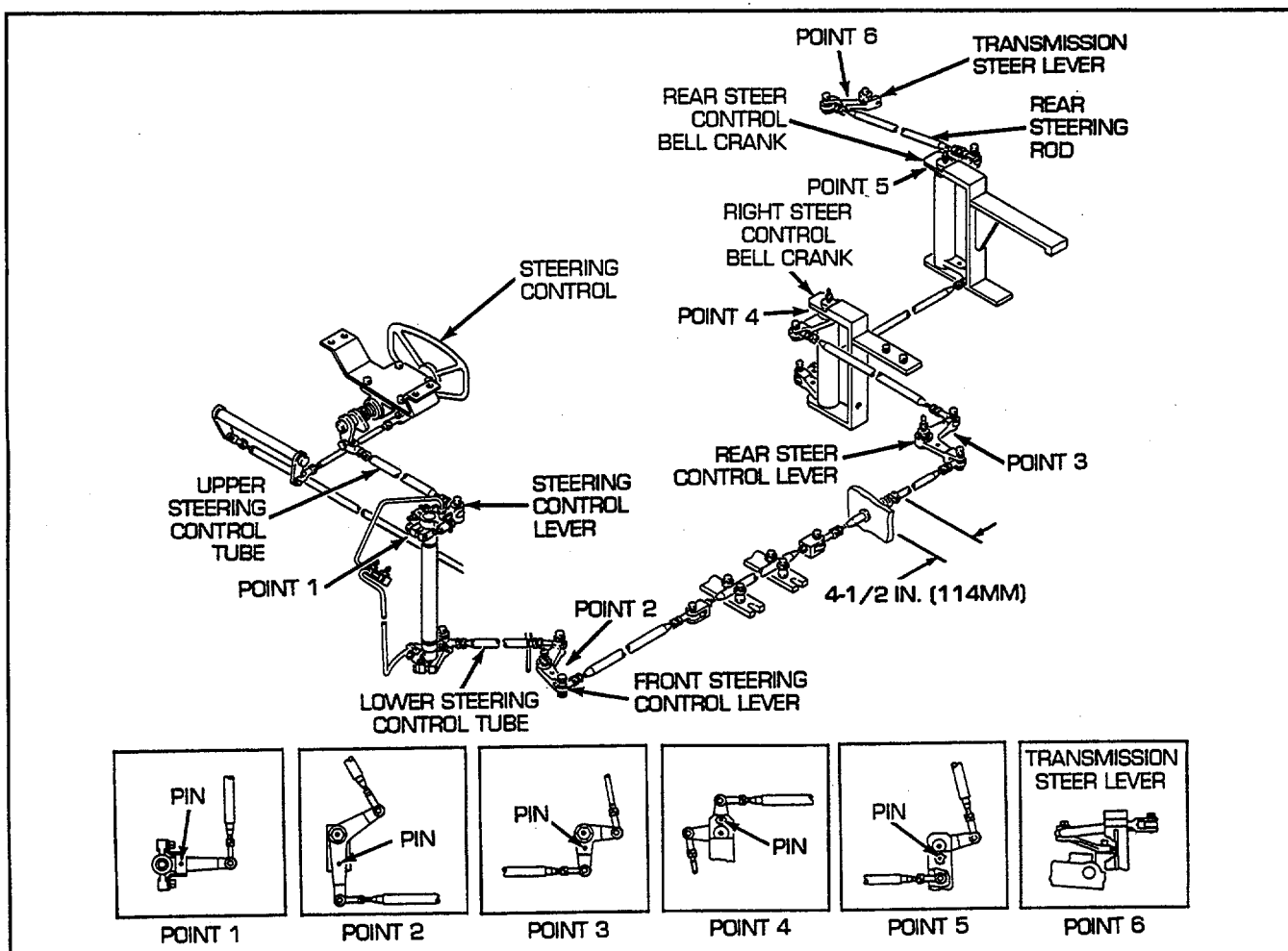
Equipment Conditions:

- Powerplant removed (see paragraph 3-1)
- Batteries removed (see paragraph 6-4)

9-73 SERVICE ALIGNMENT OF STEERING CONTROLS AND LINKAGES-Continued

ALIGNMENT

- 1 Disconnect rear steering rod from transmission steer levers. Insert 1/8-in.- (3.2-mm-) diameter locating pins in steering control lever (point 1) and adjust upper steering control tube until steering control is in center (no-steer) position.
- 2 Insert locating pins in levers at points 2 through 5, adjusting lower steering control tube and linkage between points 2 and 5 as necessary to permit pinning.
- 3 Adjust rear steering rod until rod clevis hole aligns with hole in transmission steer lever with steering position indicator on transmission valve body pointing to center (no-steer) dot (point 6). Connect rod to lever.
- 4 Extend rubber bellows to 4-1/2 in. (114 mm). Cement rubber bellows to bulkhead with adhesive and clamp rubber bellows to rod. Tighten all nuts and remove locating pins. Connect rear steering rod to transmission steer levers.



NOTE

- Follow-on maintenance:
- Install batteries (see paragraph 6-4)
 - Install powerplant (see paragraph 3-1)

9-74 REPLACE/REPAIR STEERING CONTROL ASSEMBLY**THIS TASK COVERS**

a. Removal

b. Disassembly

c. Assembly

d. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Pliers, retaining ring (Appendix C, item 30)

Parts:

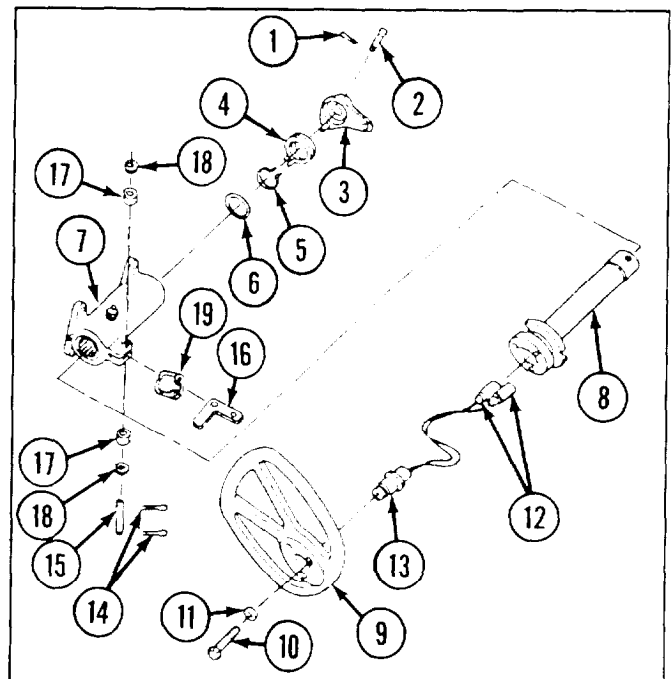
- Lockwasher (3) (Appendix G, item 130)
- Pin, cotter (Appendix G, item 227)
- Pins cotter (2) (Appendix G, item 210)

a. REMOVAL

Remove steering control assembly (see paragraph 9-72)

b. DISASSEMBLY

- 1 Remove cotter pin (1) and straight pin (2) from control lever (3).
- 2 Remove control lever (3) with spring (4).
- 3 Remove retaining ring (5) and washer (6).
- 4 Pull housing assembly (7) from steering column (8).
- 5 Remove steering wheel (9) from steering column (8) by removing three screw (10) and three lockwasher (11).
- 6 Remove connectors (12) from horn switch assembly (13) and pull horn switch assembly out of steering column (8).
- 7 Remove two cotter pin (15) bell crank (16), two spacers (17), two washers (18), and spring (19) from housing assembly (7).

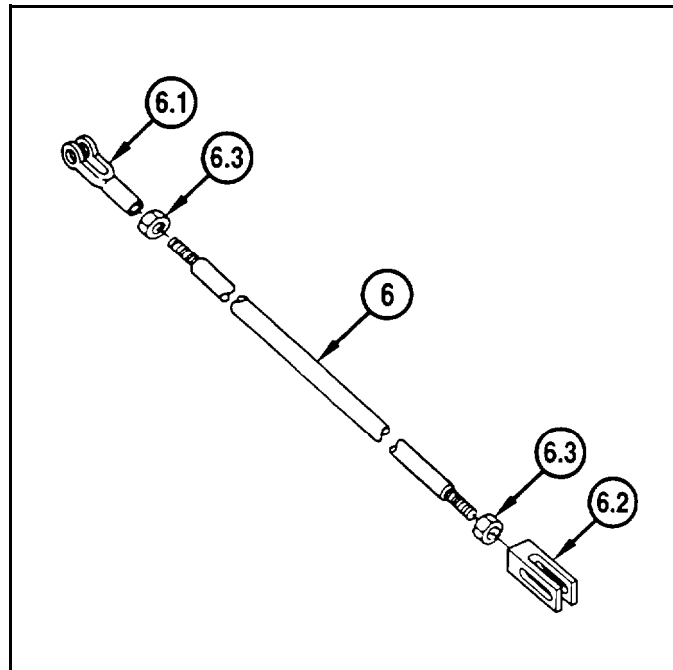
**c. ASSEMBLY**

- 1 Install spring (19), two washers (18), two spacers (17), bell crank (16), pin (15) and two new cotter pins (14) to housing assembly, (7).
- 2 Pull horn switch assembly (13) wires through steering column (8). Install connectors (12) to horn switch assemblies.
- 3 Install steering wheel (1) to steering column (1) with three screws (10) and three new lockwashers, (11)
- 4 Install steering column (8) to housing assembly (7)
- 5 Install washer (6), retaining ring (5), spring (4), and control lever (3).
- 6 Install straight pin (3) and new cotter pin (1).

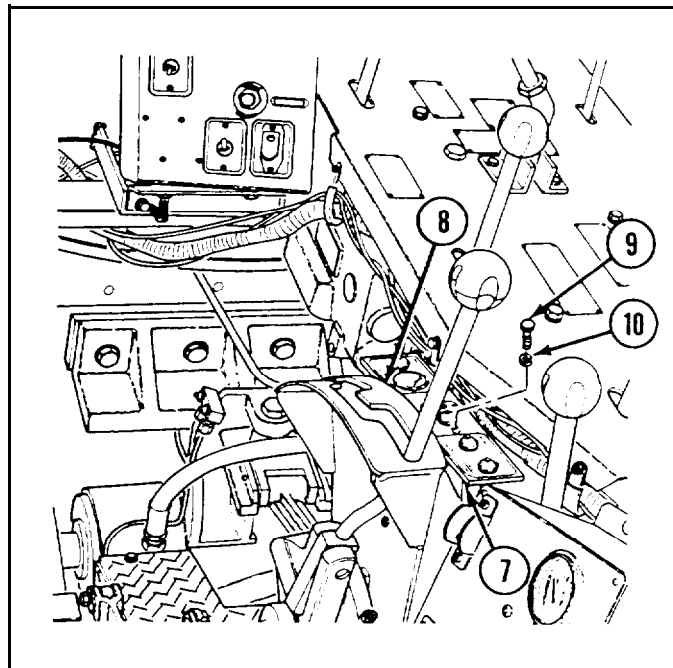
d. INSTALLATION

Install steering control assembly (see paragraph 9-72).

2.1 Remove two clevis (6.1 and 6.2) and two nuts (6.3) from rod (6).

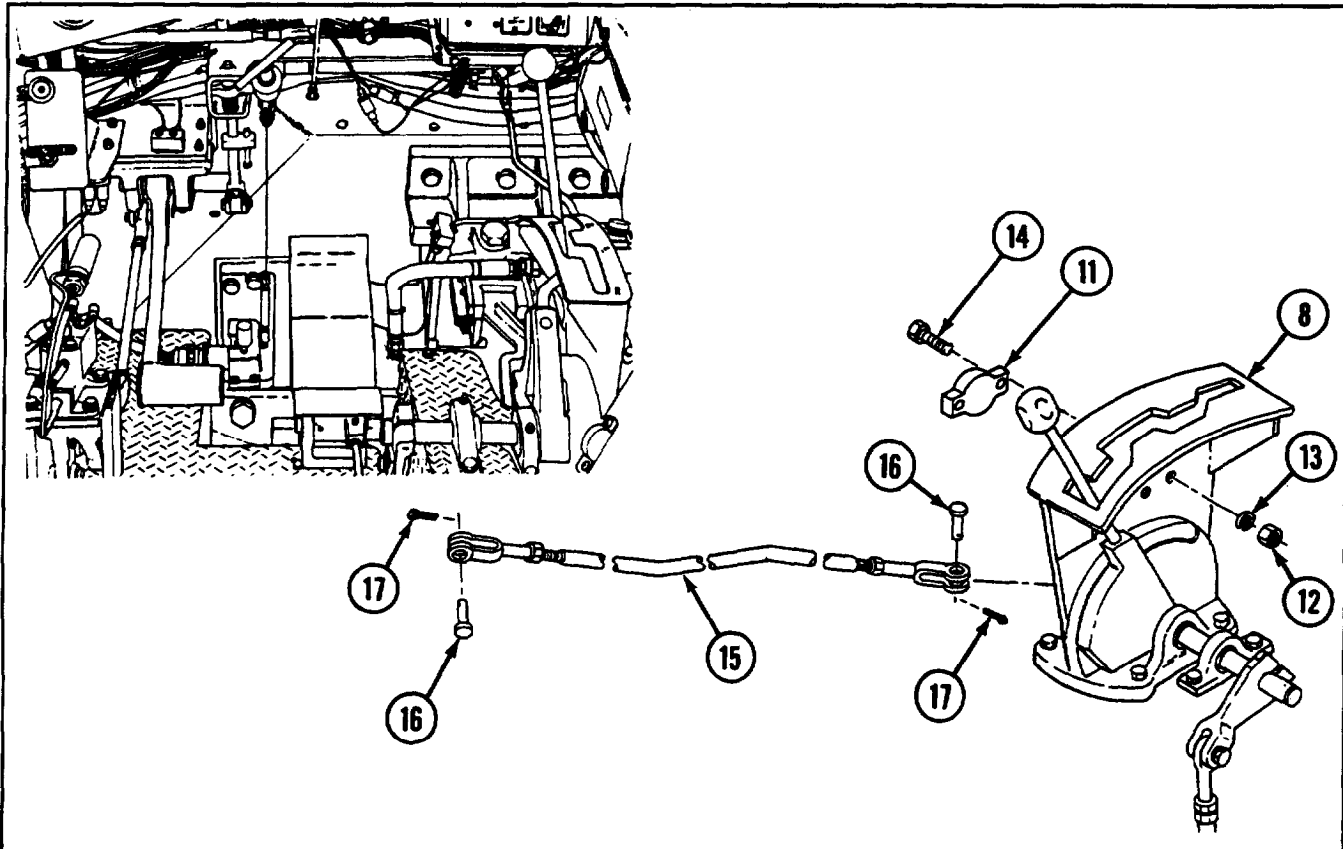


- 3 Remove electrical leads from warning indicator light, gage, and flasher system panel (7) (see paragraph 6-26) attached to transmission shift control assembly (8).
- 4 Remove warning indicator light, gage, and flasher system panel (7) from transmission shift control assemble (8) by removing two screws (9) and two lockwashers (10).

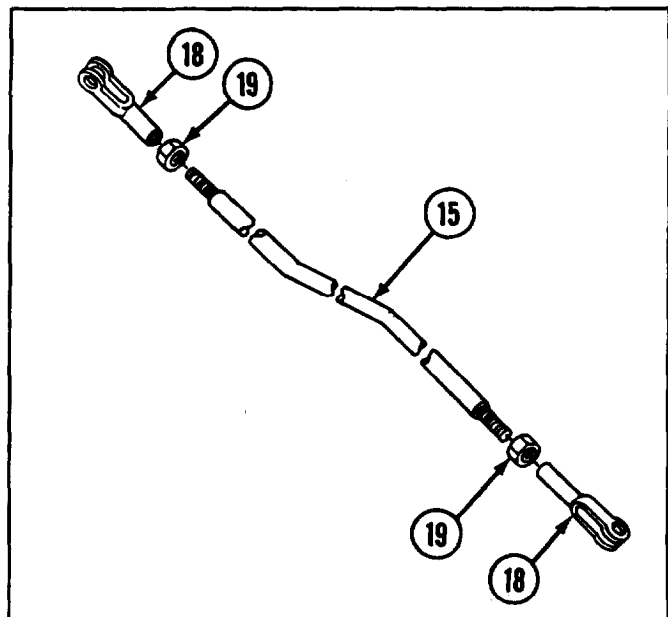


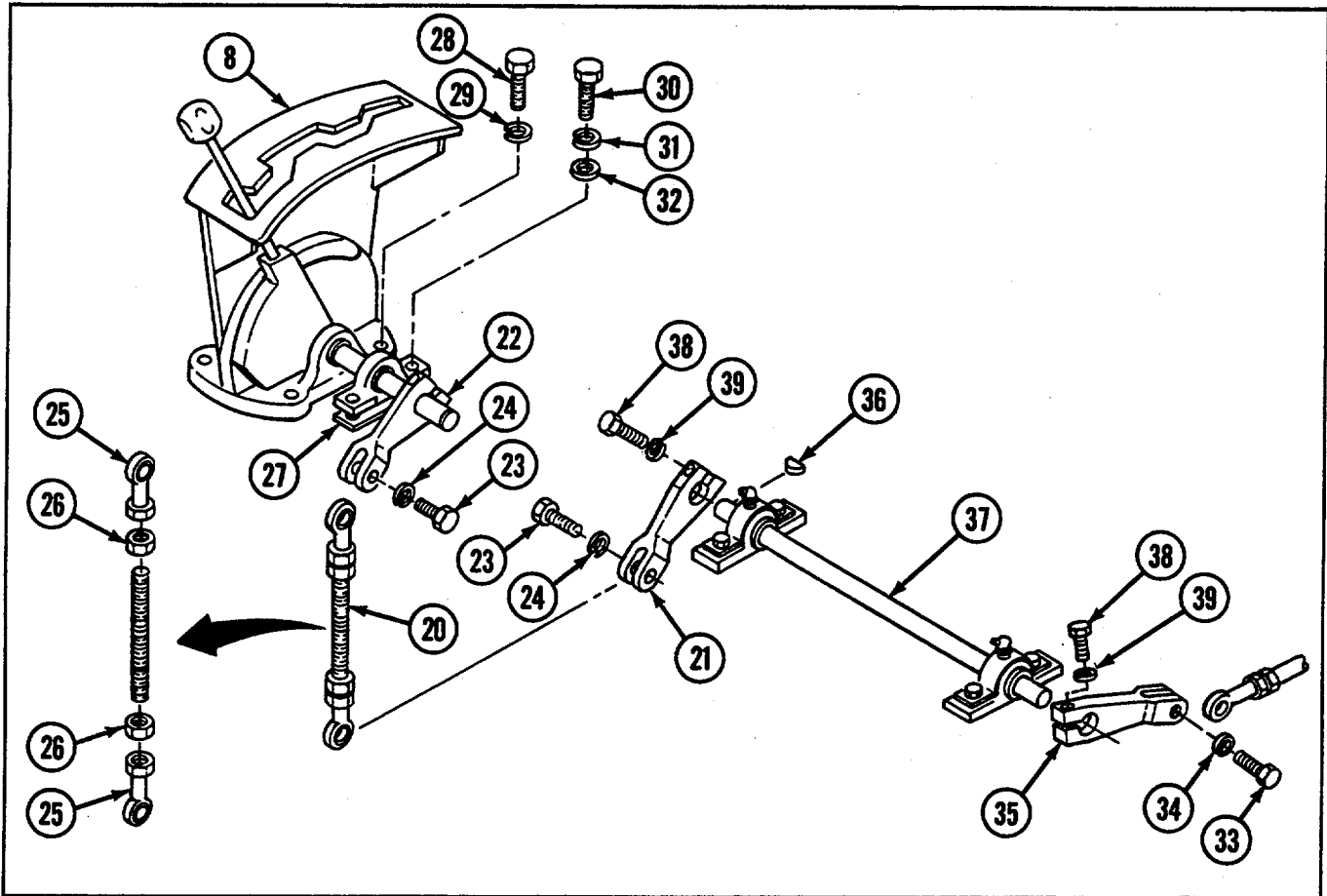
9-76 REPLACE/REPAIR SHIFTING CONTROLS AND LINKAGES-Continued

- 5 Remove circuit breaker (11) from transmission shift control assembly (8) by removing two nuts (12), three lockwashers (13), and two screws (14).
- 6 Remove rod assembly (15) by removing straight pm (16) and cotter pm (17) from each end.

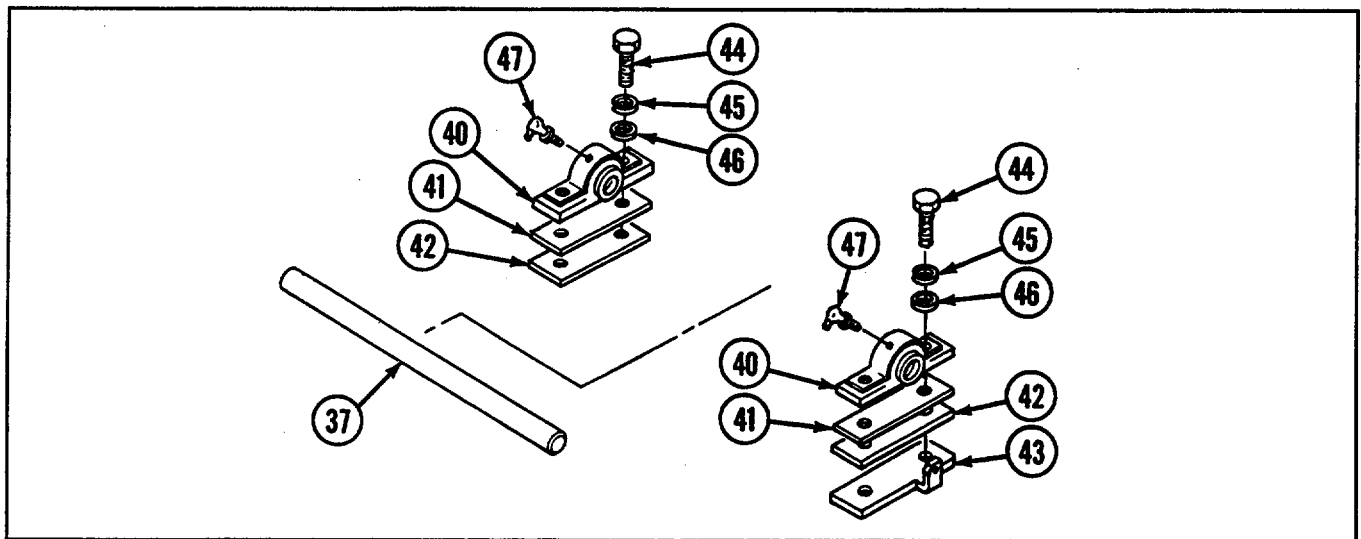


- 7 Remove clevis (18) and nut (19) from each end of rod assembly (15).
- 8 Remove stud assembly (20) from levers (21 and 22) by removing two screws (23) and two lockwashers (24). Remove bearing (25) and nut (26) from each end of stud assembly.
- 9 Remove transmission shift control assembly (8) and shims (27) by removing four screws (28), four lockwashers (29), two screws (30), two lockwashers (31), and two flat washers (32).
- 10 Remove screw (33) and lockwasher (34).
- 11 Remove two levers (21 and 35) and two keys (36) from shaft (37) by removing screw (38) and lockwasher (39) from each lever.



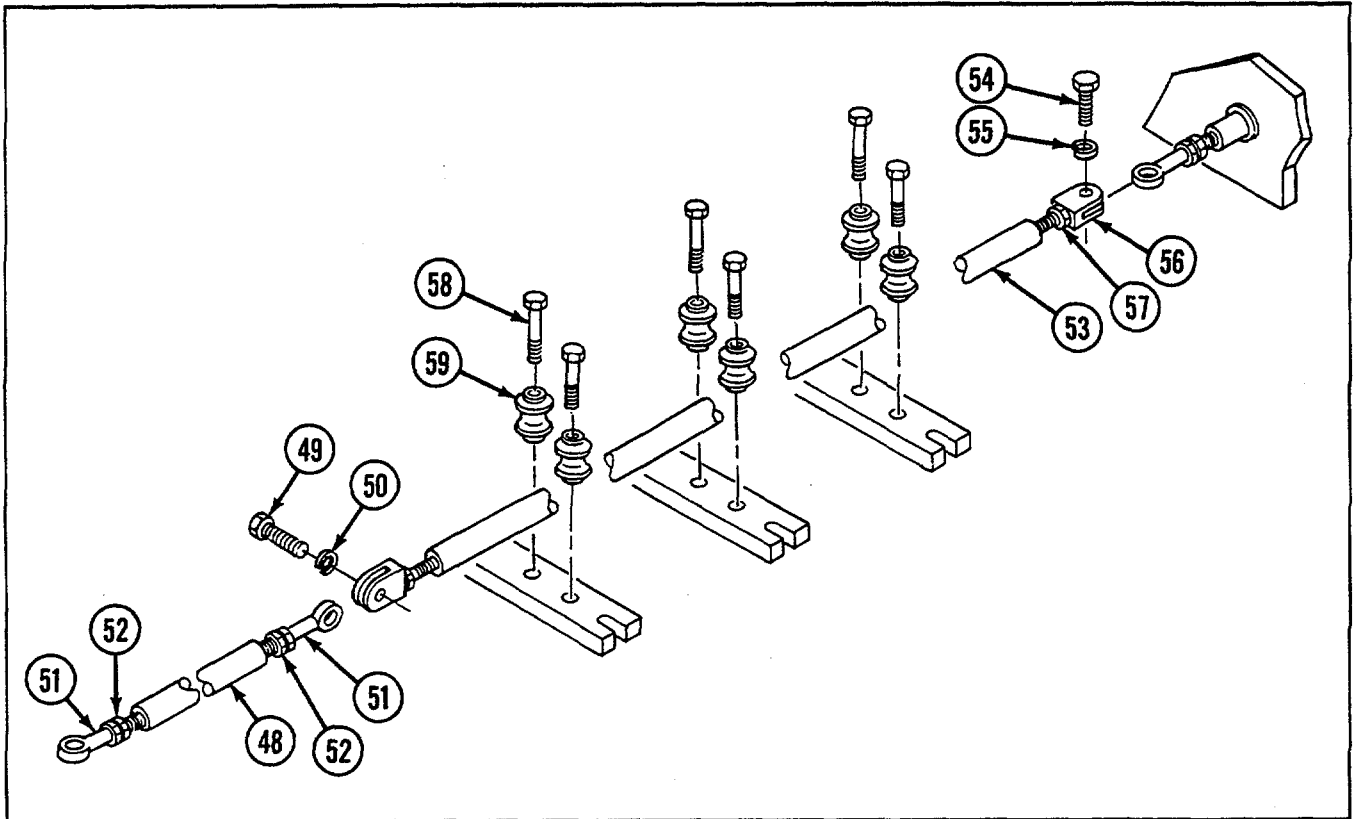


- 12 Remove two bearing units (40), shims (41), two spacers (42), and bracket (43) by removing two screws (44), two lockwashers (45), and two washers (46) from each bearing unit.
- 13 Remove two fittings (47).
- 14 Remove shaft (37) from two bearing units (40).



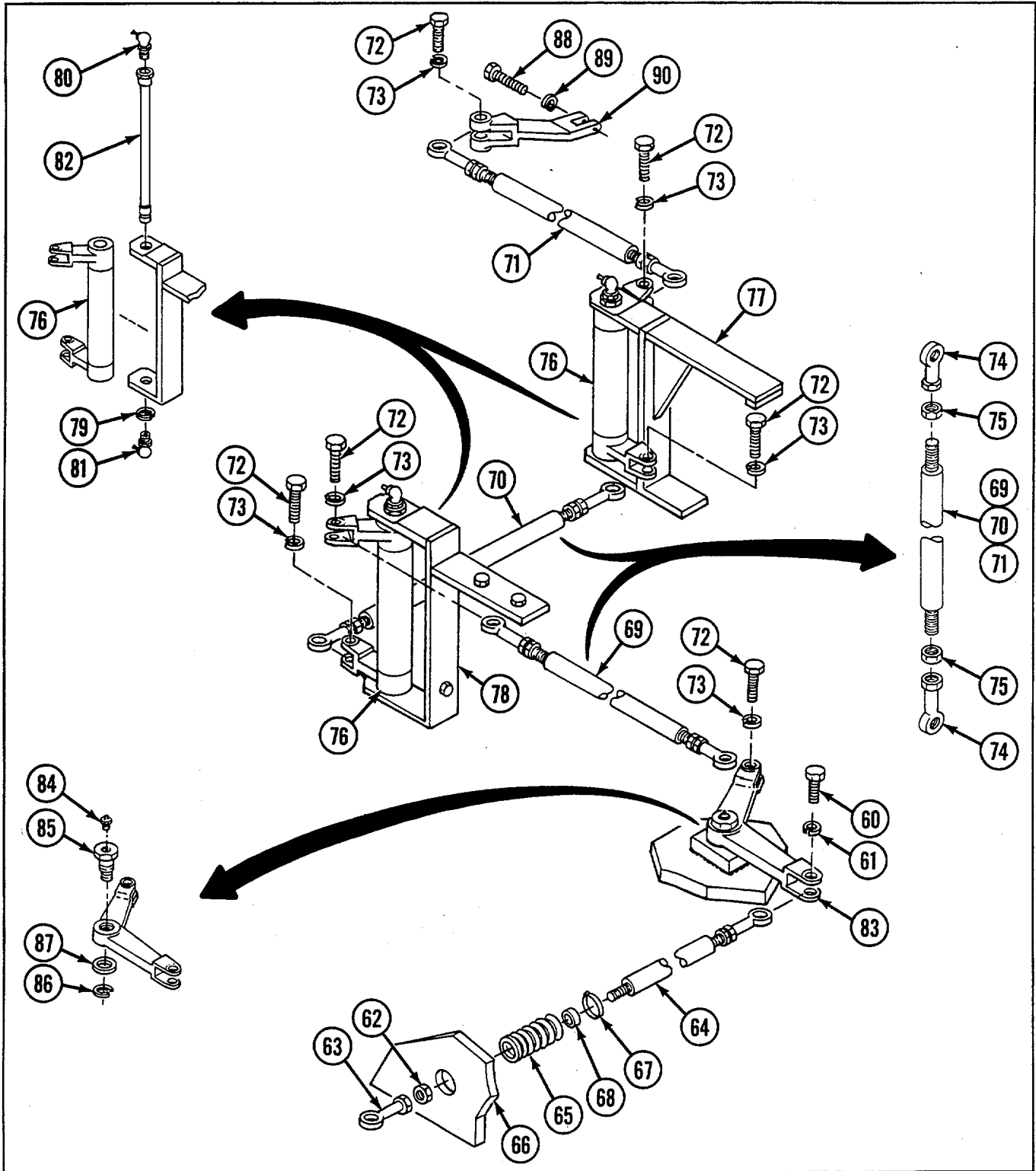
9-76 REPLACE/REPAIR SHIFTING CONTROLS AND LINKAGES-Continued

- 15 Remove tube assembly (48) by removing screw (49) and lockwasher (50). Remove bearing (51) and nut (52) from each end of tube assembly.
- 16 Remove tube assembly (53) by removing screw (54) and lockwasher (55). Remove bearing (56) and nut (57) from each end of tube assembly.
- 17 Remove six bolts (58) and six rollers (59).



- 18 Remove screw (60) and lockwasher (61).
- 19 Loosen nuts (62) and unscrew rod end bearings (63) from tube assembly (64). Remove nuts from each end of tube assembly.
- 20 Pry rubber boot (65) from bulkhead (66) and pull tube assembly (64) from bulkhead.
- 21 Remove rubber boot (65) from tube assembly (64) by removing clamp (67) and bushing (68).
- 22 Remove tube assemblies (69, 70, and 71) by removing screw (72) and lockwasher (73) from ends of each tube assembly.
- 23 Remove bearing (74) and nut (75) from each end of tube assemblies (69, 70, and 71).
- 24 Remove two bell crank assemblies (76) from mounting brackets (77 and 78) by removing two retaining rings (79), four lubrication fittings (80 and 81), and two grooved pins (82).

- 25 Remove bell crank assembly (83) by removing lubrication fitting (84), bolt (85), lockwasher (86), and flat washer (87).
- 26 Remove screw (88), lockwasher (89), and lever (90).

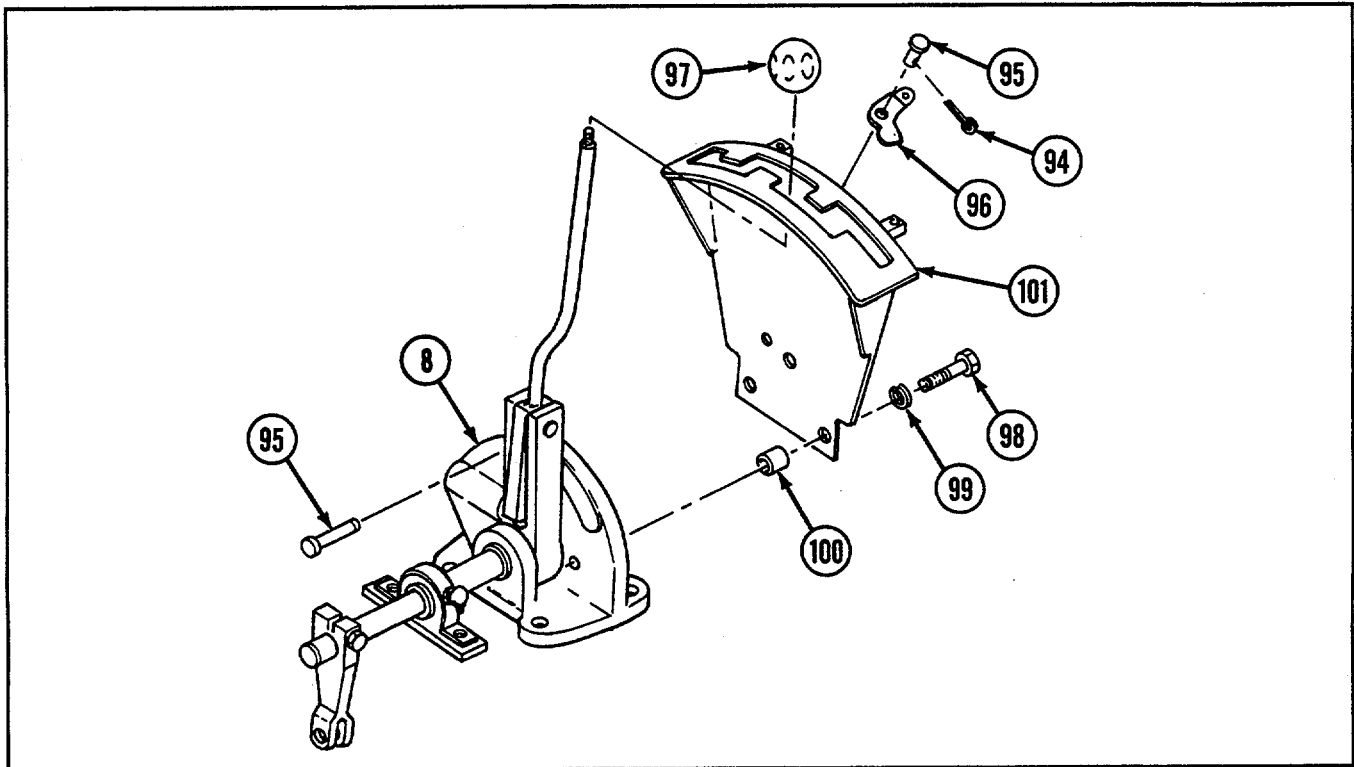
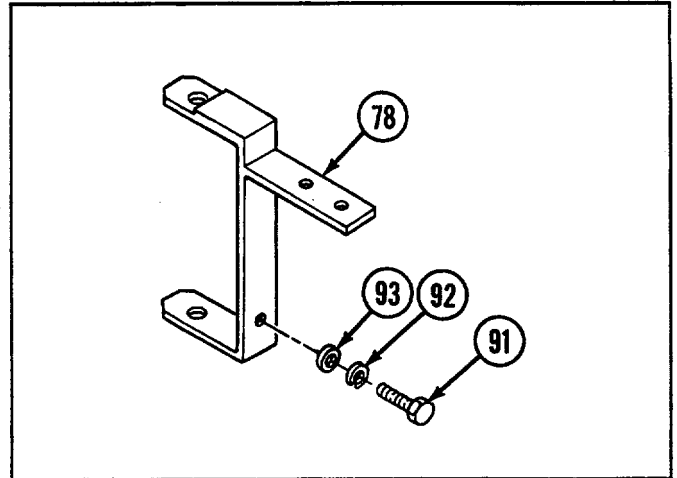


9-76 REPLACE/REPAIR SHIFTING CONTROLS AND LINKAGES-Continued

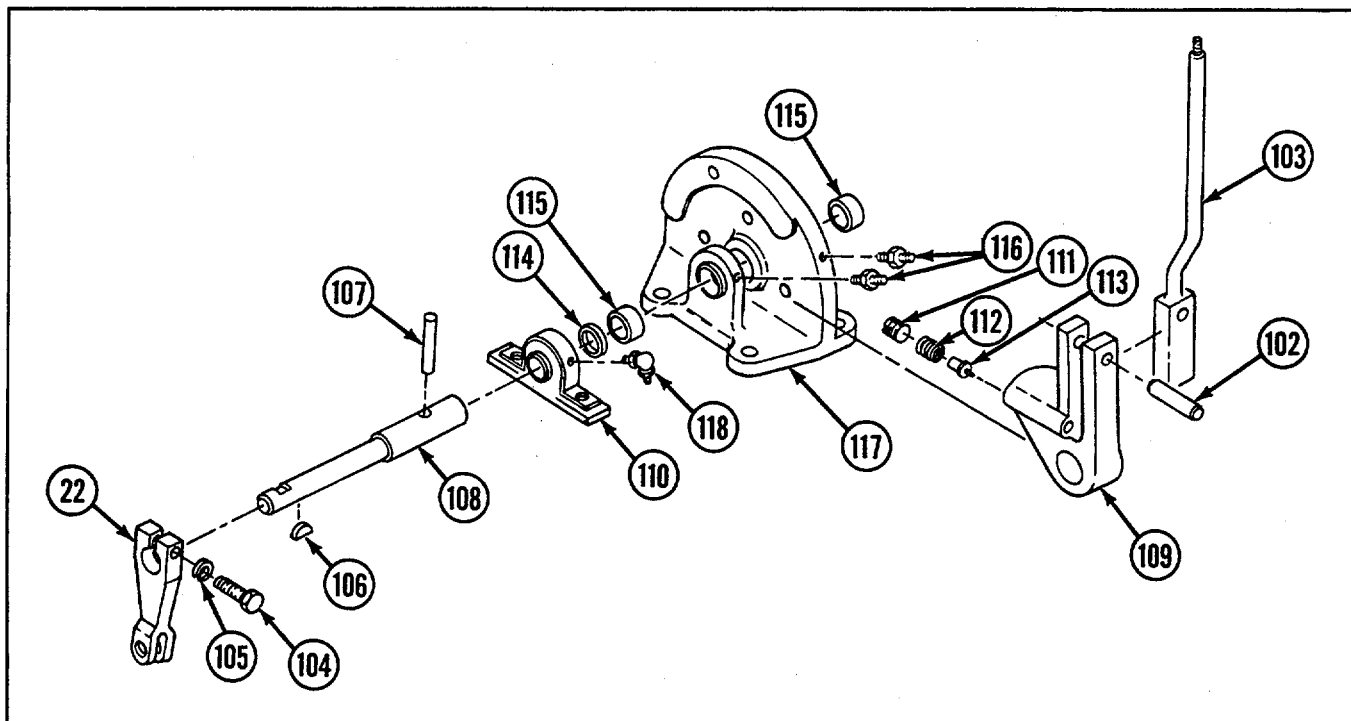
- 27 Remove mounting bracket (78) by removing three screws (91), three lockwashers (92), and flat washer (93).

b. DISASSEMBLY

- 1 Remove cotter pin (94), two straight pins (95), and lever (96) from transmission shift control assembly (8).
- 2 Remove knob (97), three bolts (98), three lockwashers (99), three spacers (100), and mounting bracket (101).



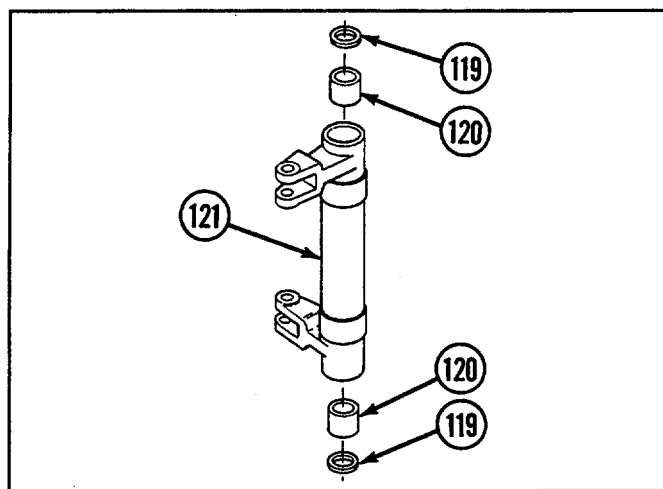
- 3 Remove straight pin (102) and lever (103).
- 4 Remove screw (104), lockwasher (105), lever (22), and key (106).
- 5 Remove straight pin (107), shaft (108), segment assembly (109), and bearing unit (110).
- 6 Remove setscrew (111), spring (112), and plunger (113).
- 7 Remove seal (114) and two bearings (115).
- 8 If necessary, remove two lubrication fittings (116) from base (117) and fitting (118) from bearing unit (110).



- 9 Remove two seals (119) and two bearings (120) from each of two bell cranks (121).

c. ASSEMBLY

- 1 Install two new seals (119) and two new bearings (120) to each of two bell cranks (121).
- 2 If removed, install two lubrication fittings (116) to base (117) and fitting (118) to bearing unit (110).
- 3 Install two bearings (115) and new seal (114).
- 4 Install plunger (113), spring (112), and setscrew (111).



- 5 Install bearing unit (110), segment assembly (109), shaft (108), and straight pin (107).
- 6 Install key (106), lever (22), new lockwasher (105), and screw (104).
- 7 Install lever (103) and straight pin (102).
- 8 Install mounting bracket (101), three spacers (100), three new lockwashers (99), three bolts (98), and knob (97).
- 9 Install lever (96), two straight pins (95), and new cotter pin (94).

d. INSTALLATION

- 1 Install mounting bracket (78) with flat washer (93), three new lockwashers (92), and three screws (91).

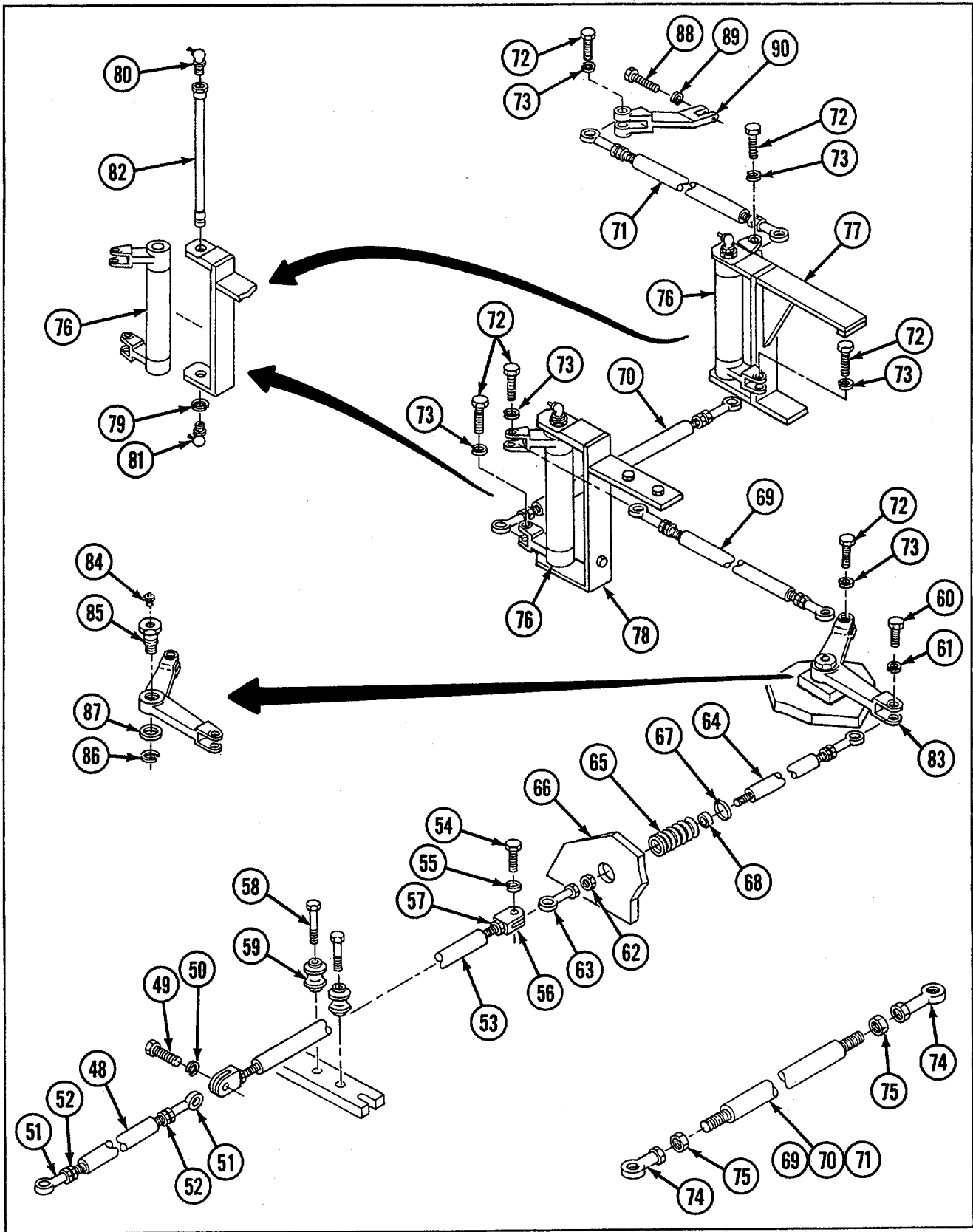
9-76 REPLACE/REPAIR SHIFTING CONTROLS AND LINKAGES-Continued

- 2 Install lever (90), new lockwasher (89), and screw (88).
- 3 Install bell crank assembly (83) with flat washer (87), new lockwasher (86), bolt (85), and lubrication fitting (84).
- 4 Install two bell crank assemblies (76) to mounting brackets (77 and 78) with two grooved pins (82), four lubrication fittings (80 and 81), and two retaining rings (79).
- 5 Install nut (75) and bearing (74) to each end of tube assemblies (69, 70, and 71).
- 6 Install tube assemblies (69, 70, and 71) with new lockwasher (73) and screw (72) at each end.

NOTE

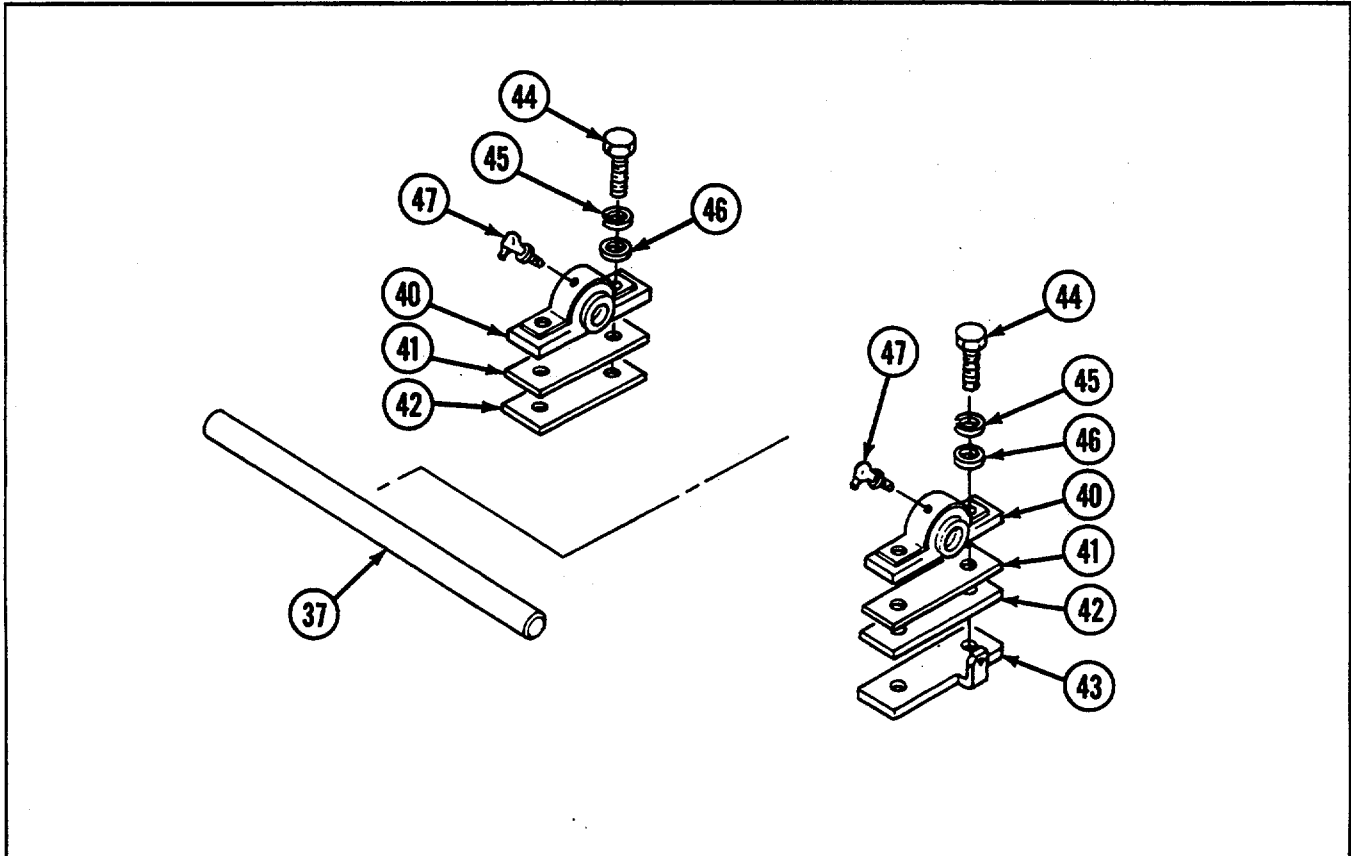
Linkages must be completely installed and aligned and rubber boot must be adjusted (see paragraph 9- 77) before cementing rubber boot in place.

- 7 Install bushing (68), clamp (67), and rubber boot (65) to tube assembly (64). Install tube assembly to bulkhead (66).
- 8 Install nut (62) and rod end bearing (63) to each end of tube assembly (64).
- 9 Install new lockwasher (61) and screw (60).
- 10 Install nut (57) and bearing (56) to each end of tube assembly (53). Install tube assembly with new lockwasher (55) and screw (54).
- 11 Install six rollers (59) with six bolts (58).
- 12 Install nut (52) and bearing (51) to each end of tube assembly (48). Install tube assembly with new lockwasher (50) and screw (49).

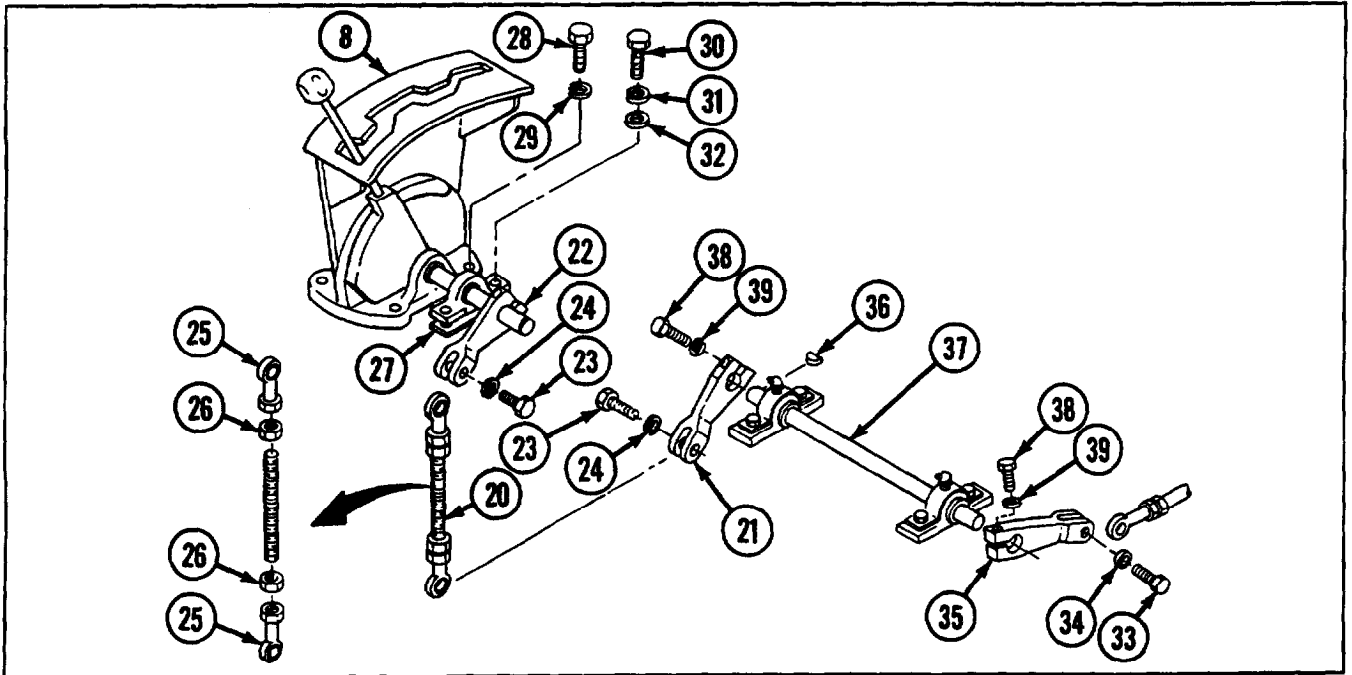


9-76 REPLACE/REPAIR SHIFTING CONTROLS AND LINKAGES--Continued

- 13 Install shaft (37) to two bearing units (40).
- 14 Install two fittings (47).
- 15 Install two bearing units (40), shims (41), two spacers (42), and bracket (43) by installing two washers (46), two new lockwashers (45), and two screws (44) to each bearing unit.



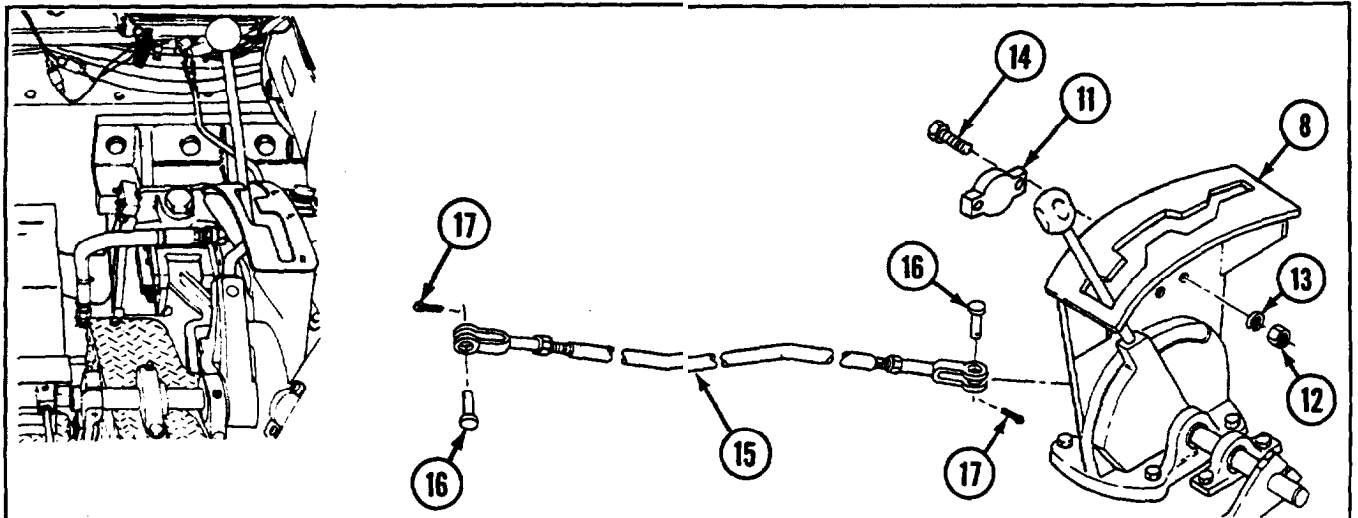
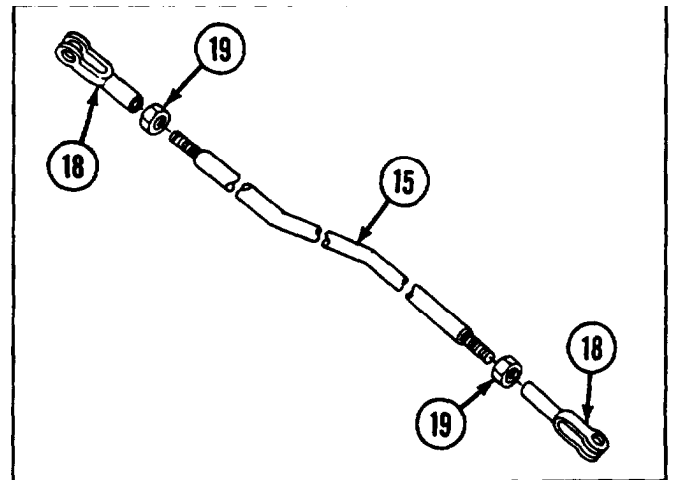
- 16 Install two levers (21 and 35) and two keys (36) to shaft (37) by installing new lockwasher (39) and screw (38) to each lever.
- 17 Install new lockwasher (34) and screw (33).
- 18 Install transmission shift control assembly (8) and shims (27) with two flat washers (32), two new lockwashers (31), two screws (30), four new lockwashers (29), and four screws (28).
- 19 Install nut (26) and bearing (25) to each end of stud assembly (20). Install stud assembly to levers (21 and 22) with two new lockwashers (24) and two screws (23).



20 Install nut (19) and clevis (18) to each end of rod assembly (15).

21 Install rod assembly (15) with straight pin (16) and new cotter pin (17) to each end.

22 Install circuit breaker (11) to transmission shift control assembly (8) with two screws (14), three new lockwashers (13), and two nuts (12).



9-76 REPLACE/REPAIR SHIFTING CONTROLS AND LINKAGES-Continued

23 Install warning indicator light, gage, and flasher system panel (7) to transmission shift control assembly (8) with two new lockwashers (10) and two screws (9).

24 Install electrical leads to warning indicator light, gage, and flasher system panel (7) (see paragraph 6-26) attached to transmission shift control assembly (8).

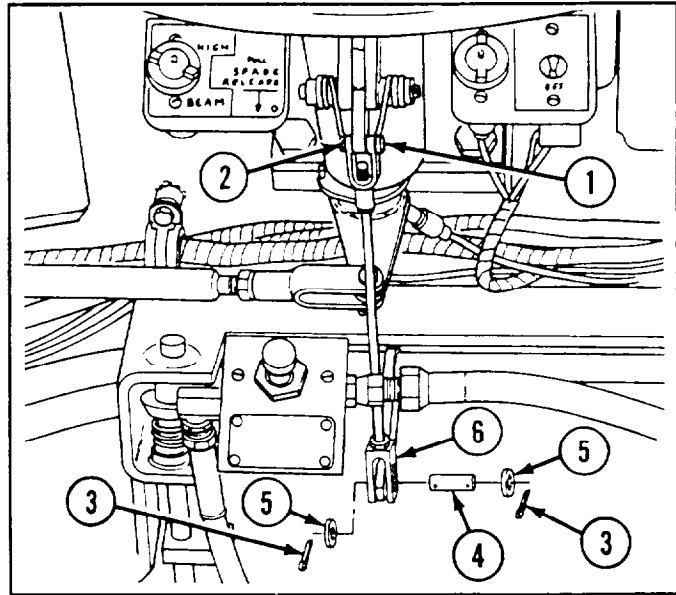
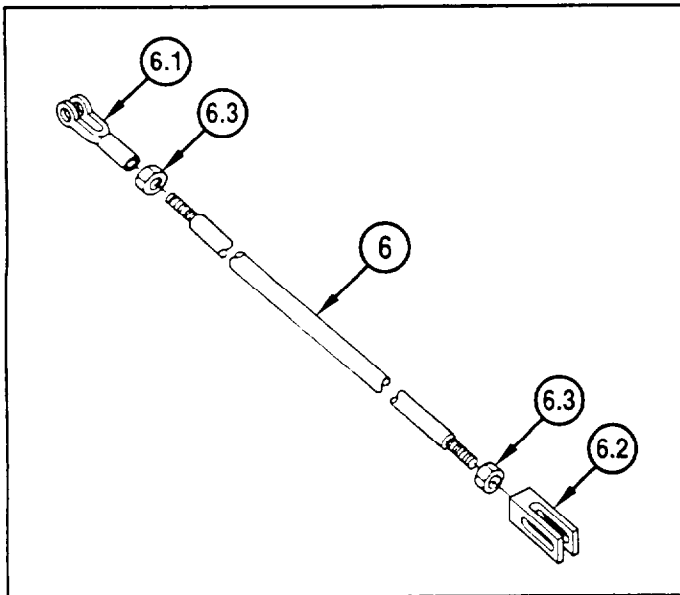
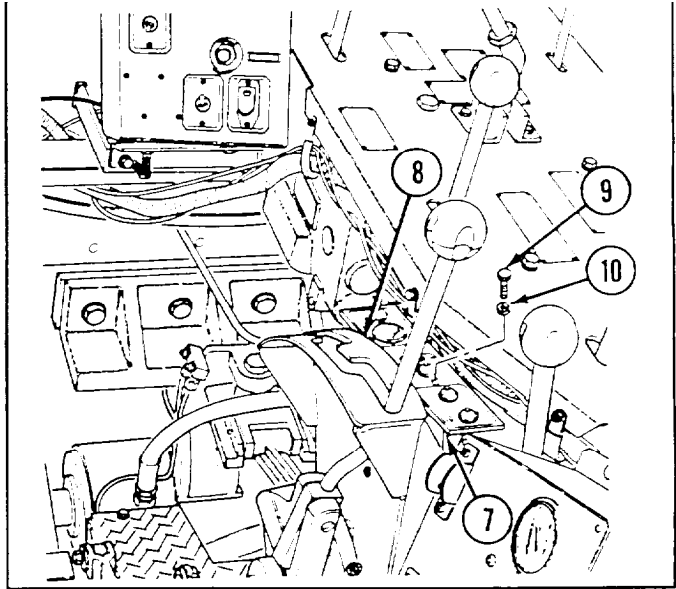
24.1 Install two nuts (6.3) and two clevis (6.1 and 6.2) to rod (6).

NOTE

Be sure that rod (6) is installed with clevis (6.2) at bottom of rod (6).

25 Install rod (6), two washers (5), straight pin (4), and two new cotter pins (3).

26 Install straight pin (2) and new cotter pin (1).



NOTE

Follow-on maintenance:

Only install or close items necessary to gain access to area of linkage requiring removal.

- Install oddment ray (see paragraph 9-104)
- Install toolbox rack (see paragraph 9-103)
- Install ammunition rack (see paragraph 9-100)
- Install air inlet grilles if removed (see paragraph 9-57)
- Install air inlet doors if removed (see paragraph 9-56)
- Install cab subfloor plates (see paragraphs 9-1 through 9-23)
- Install left-side air cleaner (see paragraph 4-24)
- *Install powerplant (see paragraph 3-1)

9-77 SERVICE ALINEMENT OF SHIFTING CONTROLS AND LINKAGES

THIS TASK COVERS

a. Alinement b. Adjustment

INITIAL SET-UP

Tools:

- *Tool kit, general mechanic's (Appendix C, item 53)
- *Punches, drive (4) (locating pins) (Appendix C, item 37)

Equipment Conditions:

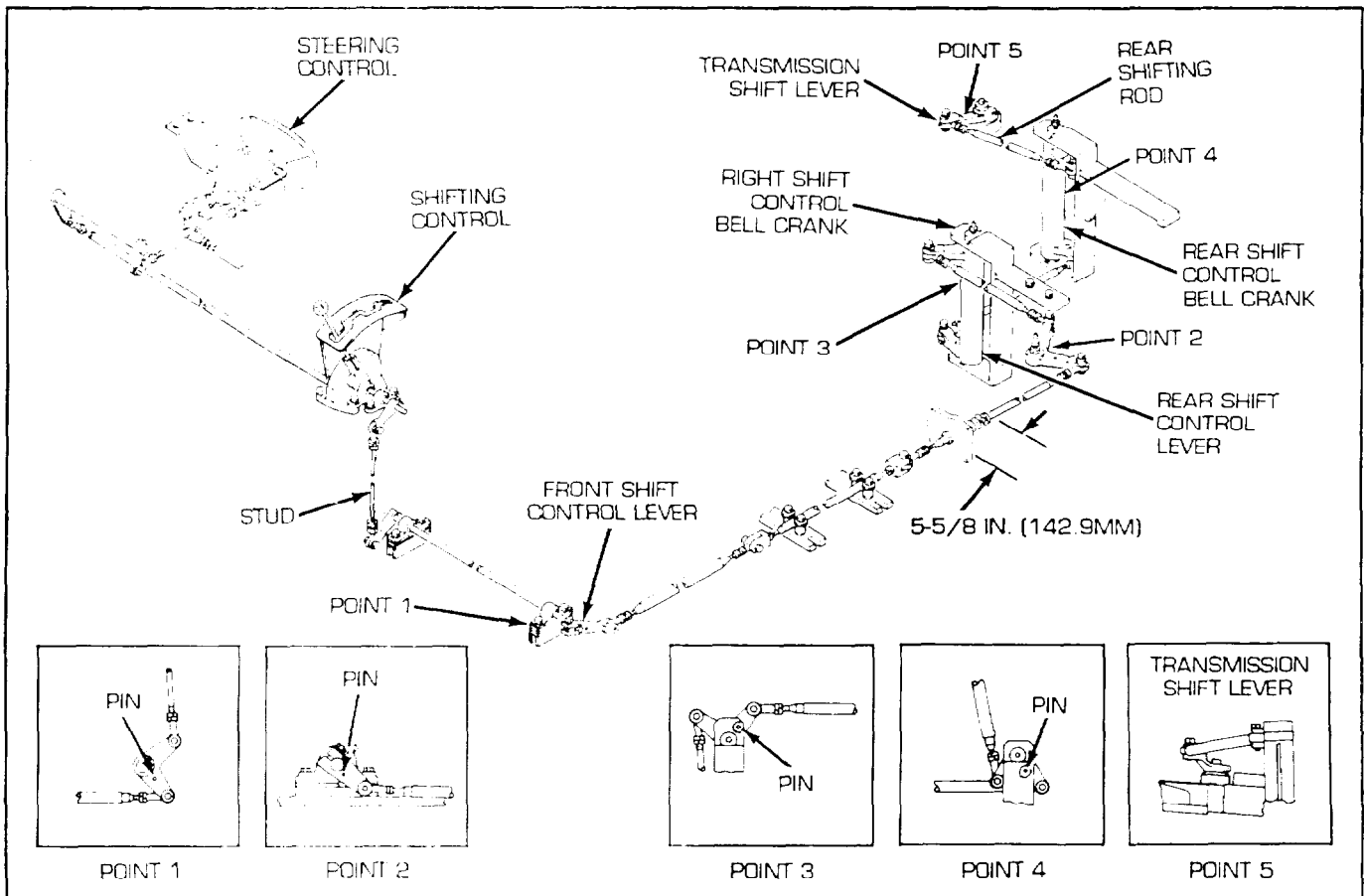
- Powerplant removed (see paragraph 3-1)
- *Batteries removed (see paragraph 6-4)
- *Transmission oil pressure checked

Material:

Adhesive, rubber-base (Appendix D, item 3)

a. ALINEMENT

- 1 Disconnect rear shifting rod from transmission shift lever. Insert 1/8-in.- (3.2-mm-) diameter locating pin in front shift control level (point 1) and adjust stud until shifting control is in N (neutral) position.
- 2 Insert locating pins in lever at points 2, 3, and 4. Adjust linkage between these points as necessary to permit pinning.
- 3 Adjust rear shifting rod until rod clevis holes align with hole in transmission shift lever, when shifting position indicator on transmission valve body is in N (neutral) position (point 5). Connect rod to lever.
- 4 Extend rubber to to 5-5/8 in. (12.9 mm). Cement rubber boot into bulkhead with address and clamp rubber boot to rod. Tighten all nuts and remove locating pins. Connect rear shifting rod to transmission shift lever.



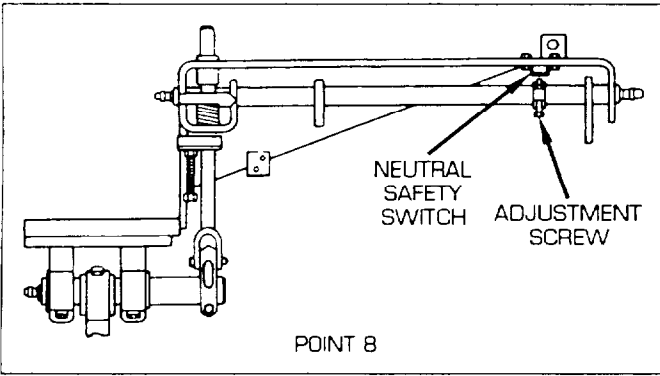
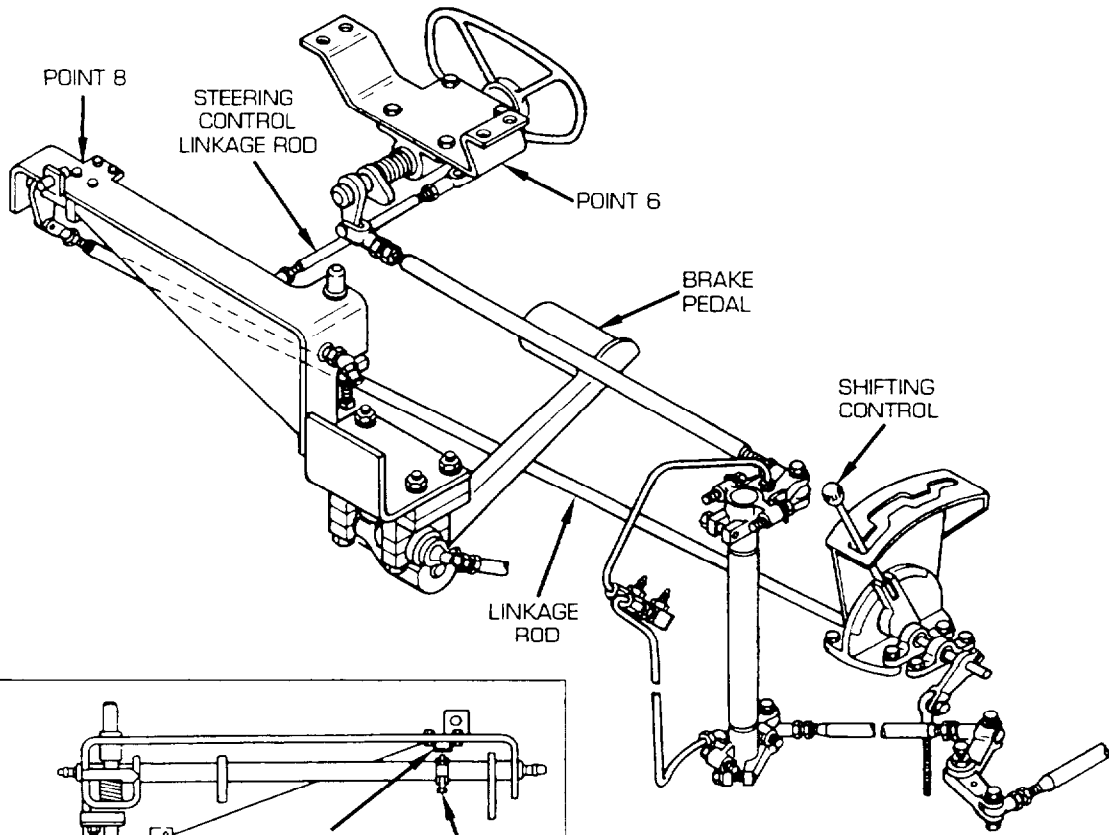
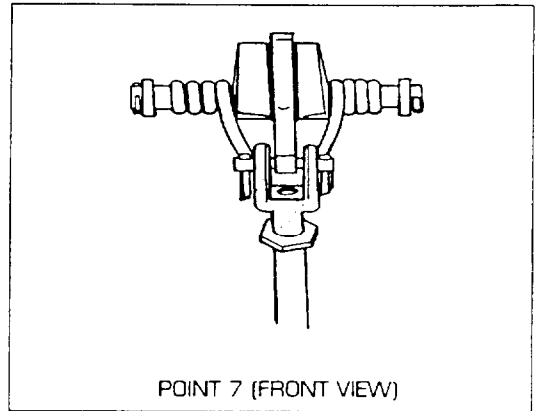
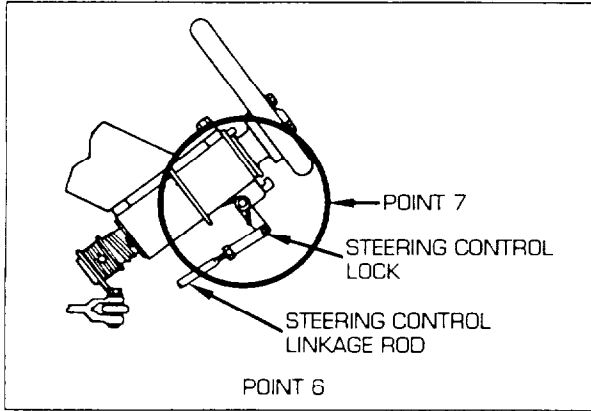
9-77 SERVICE ALINEMENT OF SHIFTING CONTROLS AND LINKAGES— Continued

b. ADJUSTMENT

WARNING

To prevent injury to personnel or damage to equipment, chock track (see paragraph 17-9).

- 1 Place shifting control in PARK (P) position.
- 2 Push brake pedal down as far as possible. Brake pedal should lock in down position.
- 3 If brake pedal does not lock in down position, loosen two locknuts on linkage rod. Loosen neutral safety switch adjustment screw. Adjust rod until brake pedal will lock in down position. Tighten locknuts.
- 4 Check to see if steering control lock engages recess in steering control (point 6). If lock is not engaged, loosen two locknuts on steering control linkage rod. Adjust rod until lock engages recess in steering control. Tighten locknuts.
- 5 After adjustment is made, hold brake pedal down and move shifting control to neutral. Move steering wheel left and right to verify free movement of steering wheel. If lock remains engaged, readjust steering lock control rod linkage and reverify free movement of steering wheel by repeating step 4 above.
- 6 If lock will not seat completely, inspect to see if spring (point 7) is pushed against clevis. If spring is pushing against clevis, replace spring.
- 7 Check adjustment screw on neutral safety switch lever cross shaft (point 8) for contact with neutral safety switch. If adjustment screw is not in contact with neutral safety switch, loosen locknut on adjustment screw. Adjust length of screw until neutral safety switch is engaged.



NOTE

- Follow-on maintenance:
- Check transmission oil pressure
 - Install batteries (see paragraph 6-4)
 - Install powerplant (see paragraph 3-1)

9-78 REPLACE/REPAIR/SERVICE ACCELERATOR CONTROLS AND LINKAGES

THIS TASK COVERS

- | | | | |
|------------|----------------|-----------------|---------------|
| a. Removal | b. Disassembly | c. Cleaning | d. Inspection |
| e. Repair | f. Assembly | g. Installation | |

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- *File, thread restorer (Appendix C, item 13)

Parts:

- Lockwashers (7) (Appendix G, item 130)
- Lockwashers (13) (Appendix G, item 132)
- Pins, cotter (3) (Appendix G, item 216)

Equipment Conditions:

NOTE

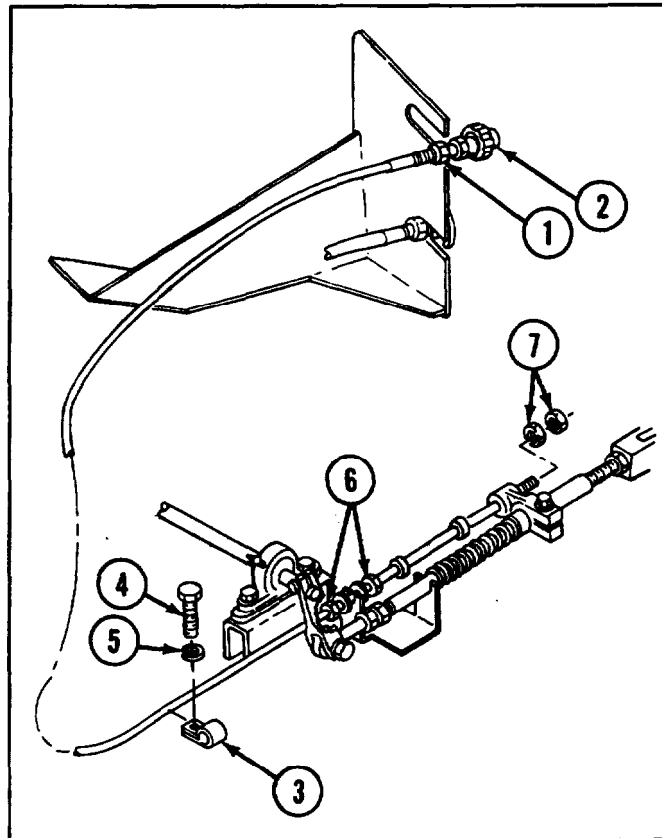
Only remove or open items necessary to gain access to area of linkage requiring removal.

Equipment Conditions-Continued

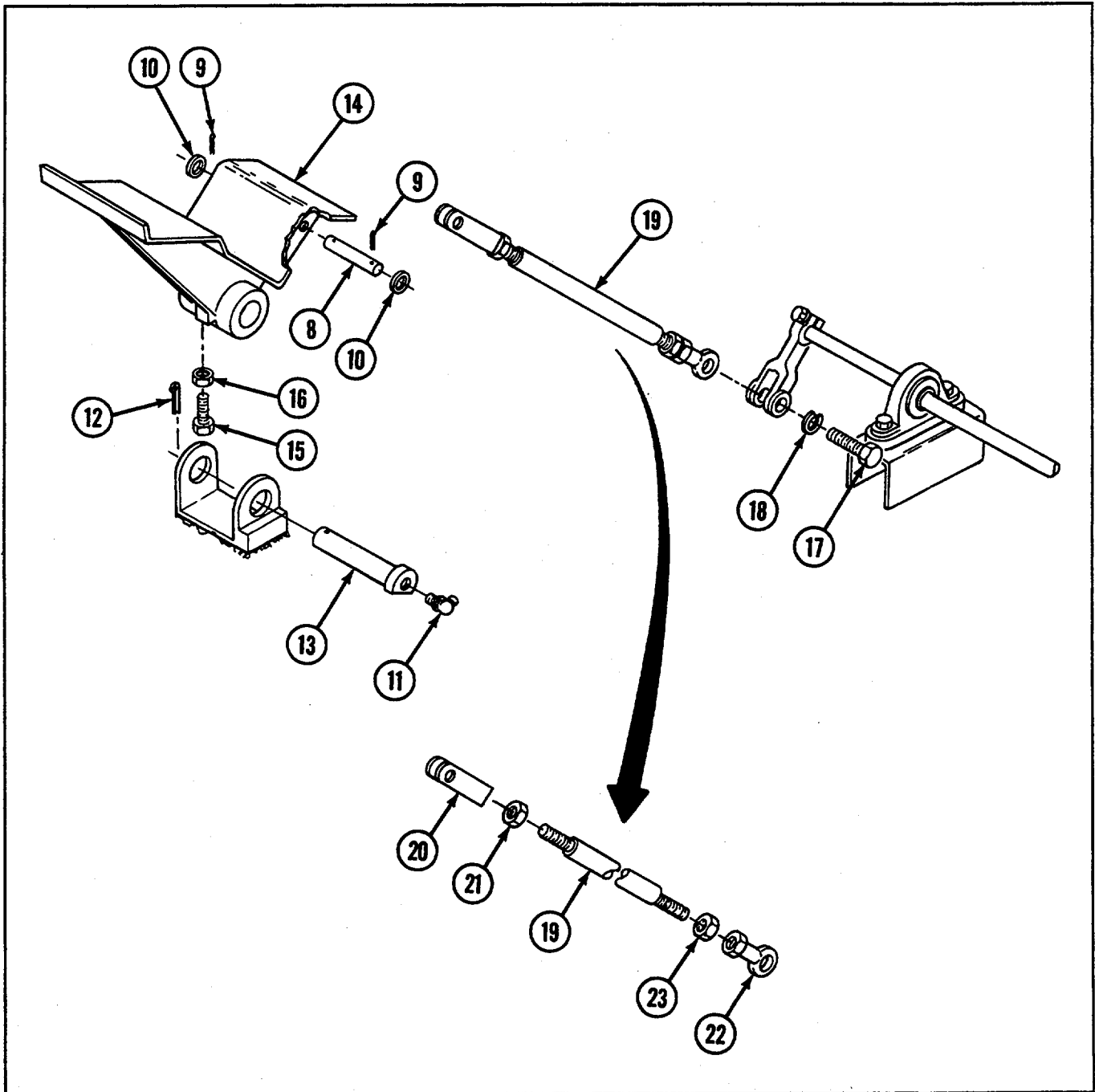
- Powerplant removed (see paragraph 3-1)
- Left-side air cleaner removed (see paragraph 4-24)
- Cab subfloor plates removed (see paragraphs 9-1 through 9-23)
- Air inlet doors removed as necessary (see paragraph 9-56)
- Air inlet grilles removed as necessary (see paragraph 9-57)
- Ammunition rack removed (see paragraph 9-100)
- Toolbox rack removed (see paragraph 9-103)
- Oddment tray removed (see paragraph 9-104)

a. REMOVAL

- 1 Loosen self-locking nut (1) on throttle control assembly (2).
- 2 Remove clamp (3) by removing screw (4) and lockwasher (5).
- 3 Loosen two self-locking nuts (6).
- 4 Remove two nuts (7) and throttle control assembly (2).

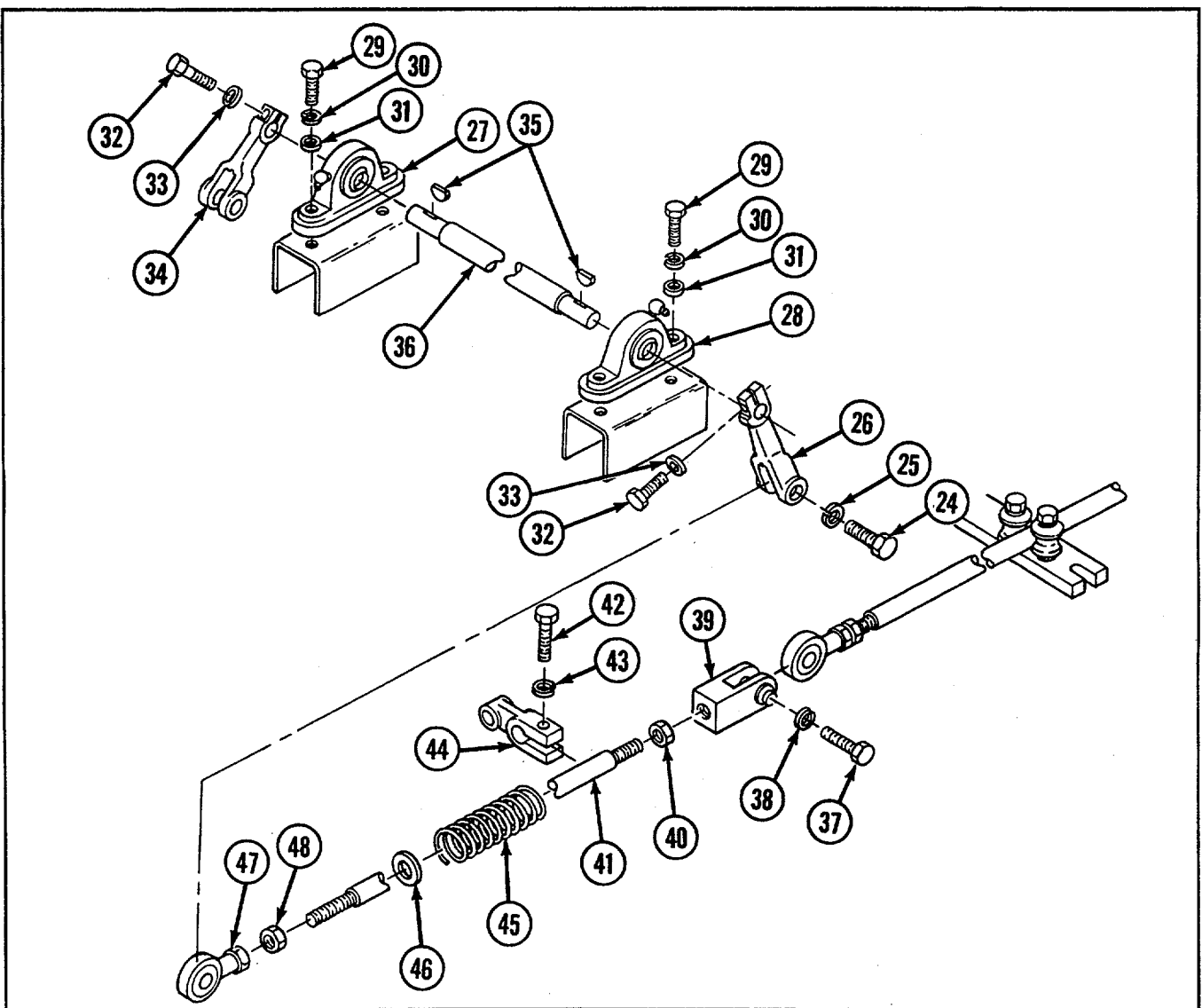


- 5 Remove straight pin (8) by removing two cotter pins (9) and two washers (10).
- 6 Remove lubrication fitting (11), cotter pin (12), headed pin (13), and accelerator control pedal assembly (14).
- 7 Remove screw (15) and nut (16) from accelerator control pedal assembly (14).
- 8 Remove screw (17), lockwasher (18), and rod (19).
- 9 Remove clevis (20) and nut (21) from one end of rod (19) and remove bearing (22) and nut (23) from other end of rod.



9-78 REPLACE/REPAIR/SERVICE ACCELERATOR CONTROLS AND LINKAGES-
Continued

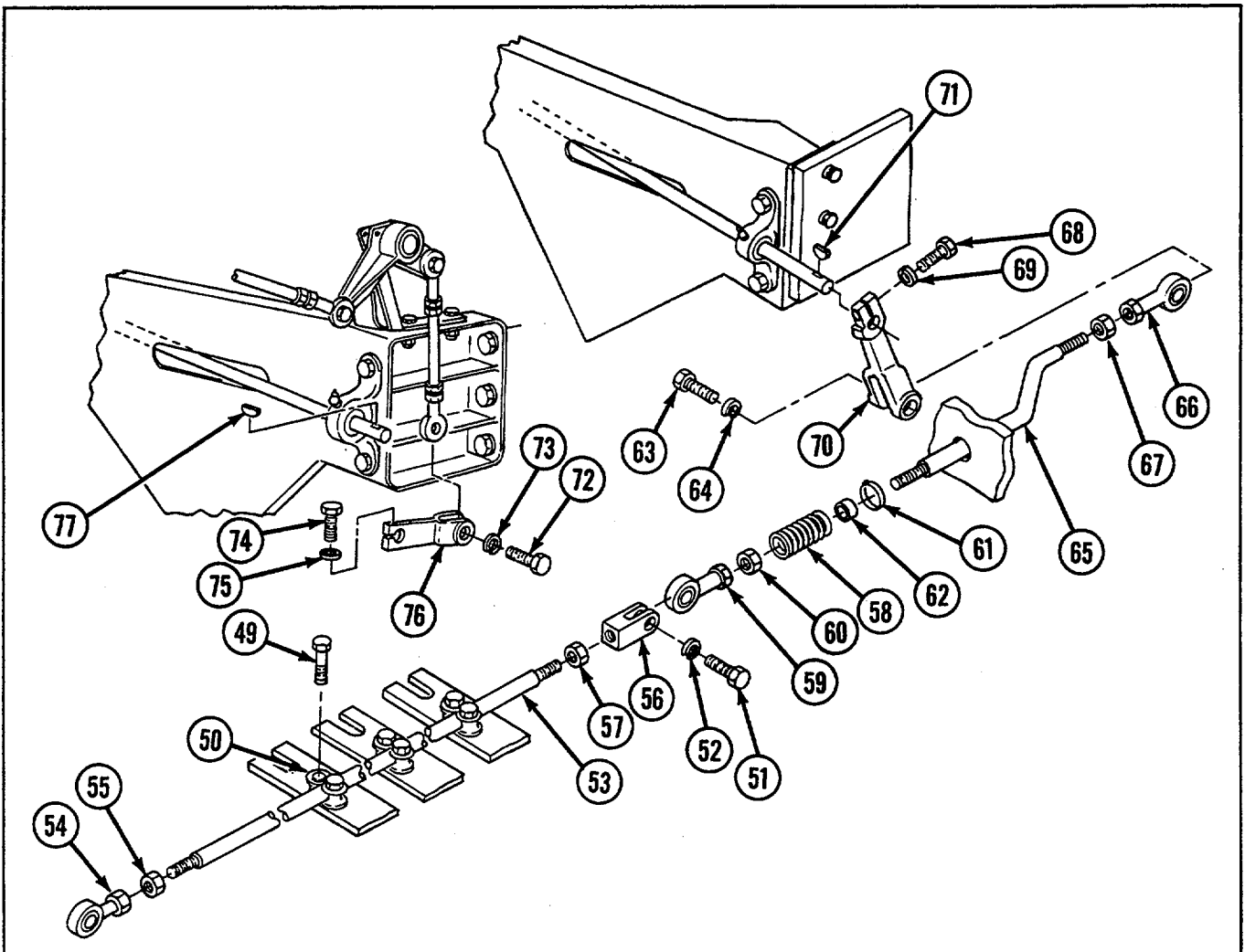
- 10 Remove screw (24) and lockwasher (25) from lever (26).
- 11 Remove from each bearing unit (27 and 28) two screws (29), two lockwashers (30), and two flat washers (31).
- 12 Remove two screws (32) and two lockwashers (33) from levers (34 and 26) and two keys (35) from shaft (36).
- 13 Remove bearing units (27 and 28) from shaft (36).
- 14 Remove screw (37) and lockwasher (38) from clevis (39).
- 15 Remove clevis (39) and nut (40) from rod (41).
- 16 Remove screw (42), lockwasher (43), lever (44), spring (45), flat washer (46), and rod (41). Remove bearing (47) and nut (48) from one end of rod.



SECTION V: CONTROLS AND LINKAGES

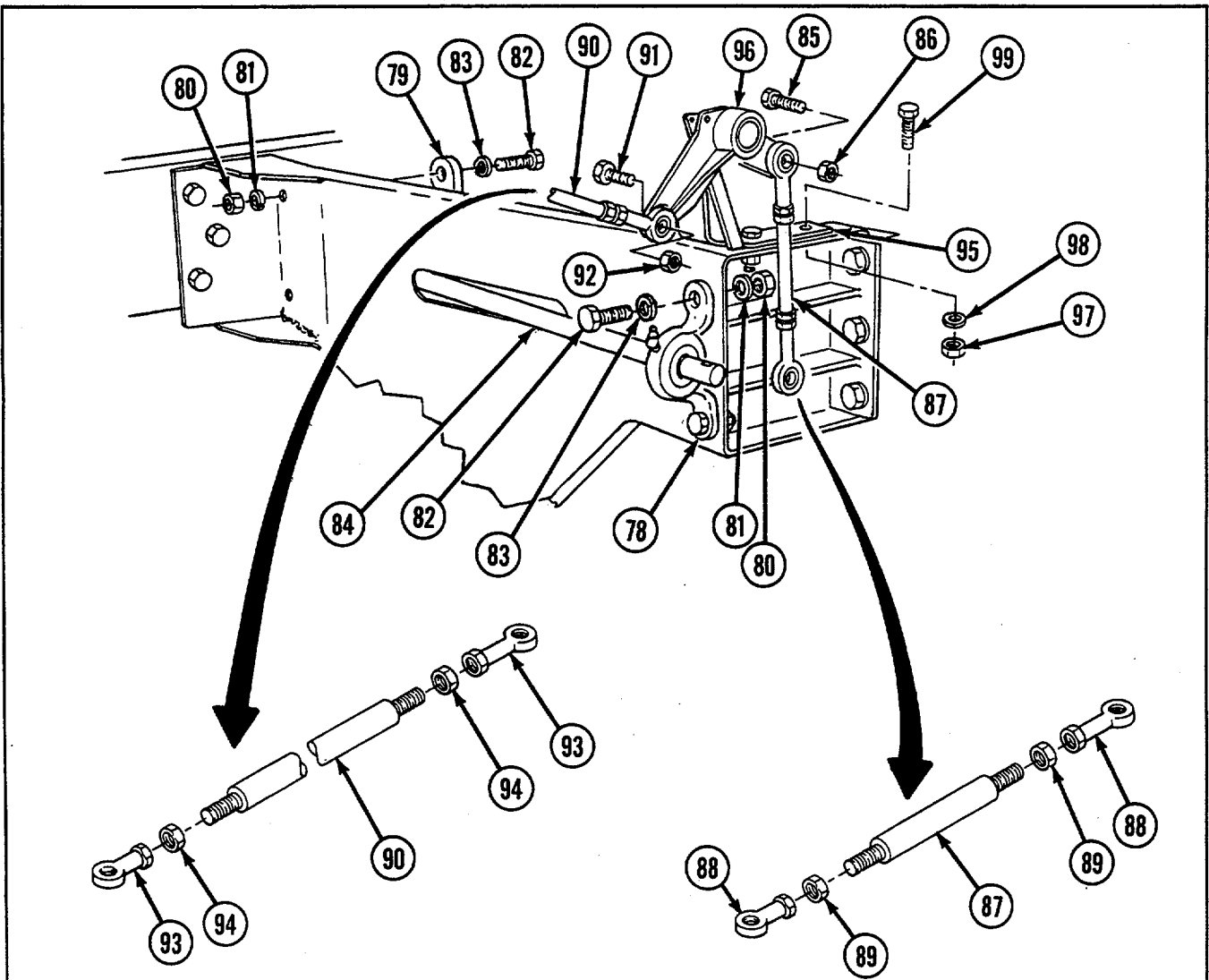
TM 9-2350-256-20

- 17 Remove six bolts (49) and six rollers (50).
- 18 Remove screw (51), lockwasher (52), and tube (53).
- 19 Remove bearing (54) and nut (55) from one end of tube (53) and remove clevis (56) and nut (57) from other end of tube.
- 20 Pry rubber boot (58) free from bulkhead.
- 21 Remove bearing (59), nut (60), clamp (61), rubber boot (58), and rubber bushing (62).
- 22 Remove screw (63), lockwasher (64), and rod (65).
- 23 Remove bearing (66) and nut (67) from rod (65).
- 24 Remove screw (68), lockwasher (69), lever (70), and key (71).
- 25 Remove screw (72) and lockwasher (73).
- 26 Remove screw (74), lockwasher (75), lever (76), and key (77).



9-78 REPLACE/REPAIR/SERVICE ACCELERATOR CONTROLS AND LINKAGES- Continued

- 27 Remove bearing housings (78 and 79) by removing from each two nuts (80), two lockwashers (81), two screws (82), and two flat washers (83).
- 28 Remove bearing housings (78 and 79) from shaft (84).
- 29 Remove screw (85), self-locking nut (86), and rod (87).
- 30 Remove bearing (88) and nut (89) from each end of rod (87).
- 31 Remove rod (90) by removing screw (91) and self-locking nut (92) from each end.
- 32 Remove bearing (93) and nut (94) from each end of rod (90).
- 33 Remove bracket assembly (95) and bell crank assembly (96) by removing two nuts (97), two washers (98), and two screws (99).



SECTION V: CONTROLS AND LINKAGES

TM 9-2350-256-20

34 Remove lubrication fitting (100), retaining ring (101), flat washer (102), and bell crank assembly (96).

b. DISASSEMBLY

Remove lubrication fitting (103) from bearing units (27 and 28).

c. CLEANING

WARNING

Particles blown by compressed air can be dangerous. Be certain to direct airstream away from yourself and other personnel in the area. Compressed air used for cleaning will not exceed 30 psi (207 kPa). Use only with effective chip-guarding and personal protective equipment (goggles/shield and gloves).

Clean rubber parts in mild soap solution. Rinse in clean water and dry with compressed air.

d. INSPECTION

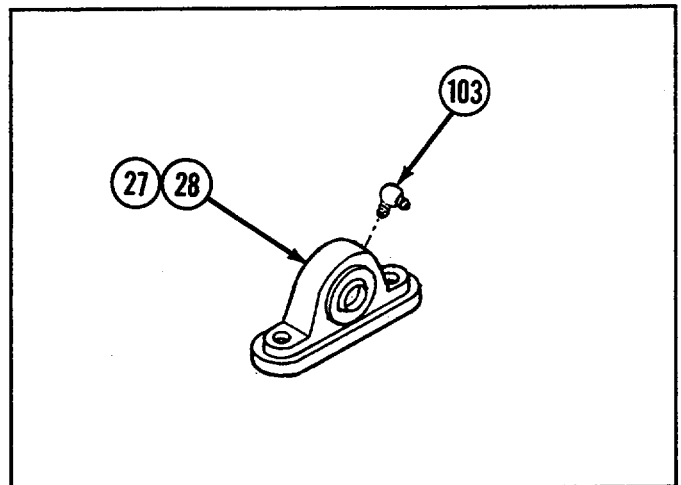
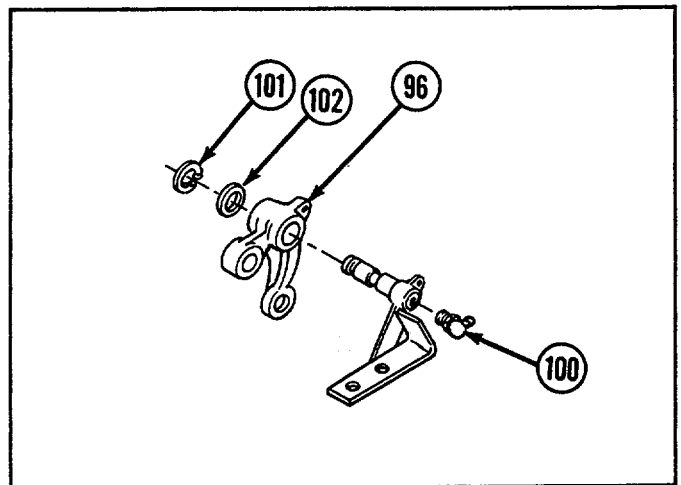
- 1 Inspect all parts for cracks and distortions.
- 2 Inspect connecting and pivot parts for excessive wear.
- 3 Inspect bearings for damage.
- 4 Inspect threaded parts for cross threading and nicks.
- 5 Inspect rubber parts for cracks and hardening.

e. REPAIR

- 1 Straighten any rods which are bowed.
- 2 Replace any badly worn clevis rod ends or pins.
- 3 Repair damaged threads with thread restoring file where possible, or replace defective threaded parts.
- 4 Replace defective rubber parts.

f. ASSEMBLY

Install lubrication fitting (103) to bearing units (27 and 28).

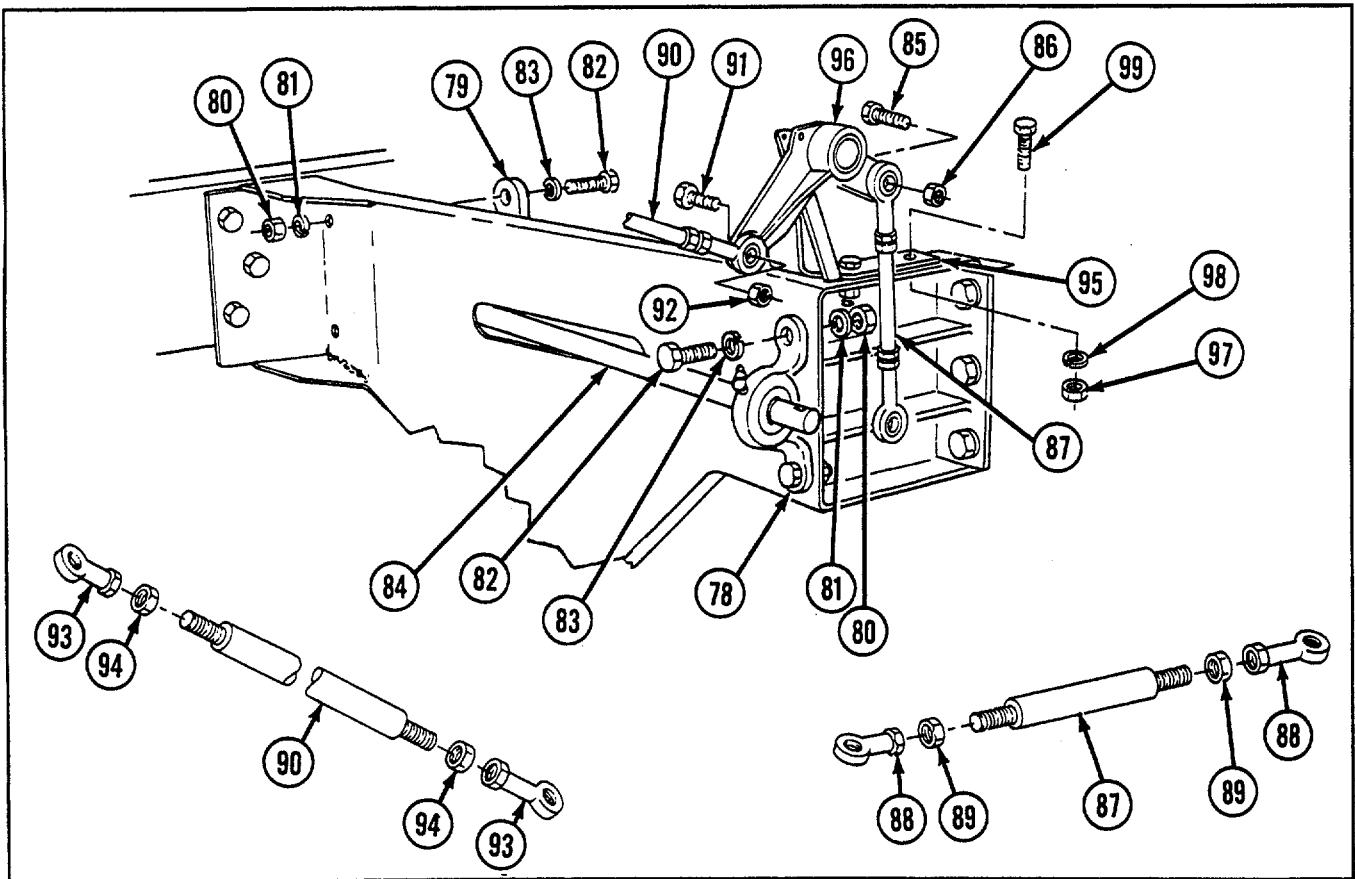
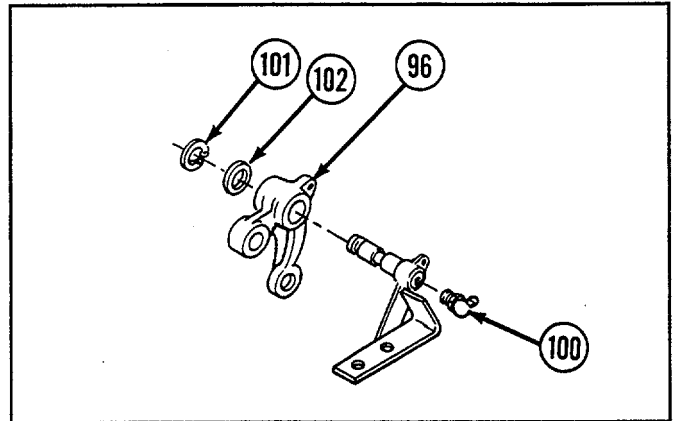


9-78 REPLACE/REPAIR/SERVICE ACCELERATOR CONTROLS AND LINKAGES-

Continued

g. INSTALLATION

- 1 Install bell crank assembly (96) with flat washer (102), retaining ring (101), and lubrication fitting (100).
- 2 Install bracket assembly (95) and bell crank assembly (96) with two screws (99), two washers (98), and two nuts (97).
- 3 Install nut (94) and bearing (93) to each end of rod (90).
- 4 Install self-locking nut (92) and screw (91) to each end of rod (90).
- 5 Install nut (89) and bearing (88) to each end of rod (87).
- 6 Install rod (87) with screw (85) and self-locking nut (86).
- 7 Install bearing housings (78 and 79) to shaft (84) each with two screws (82), two flat washers (83), two new lockwashers (81), and two nuts (80).

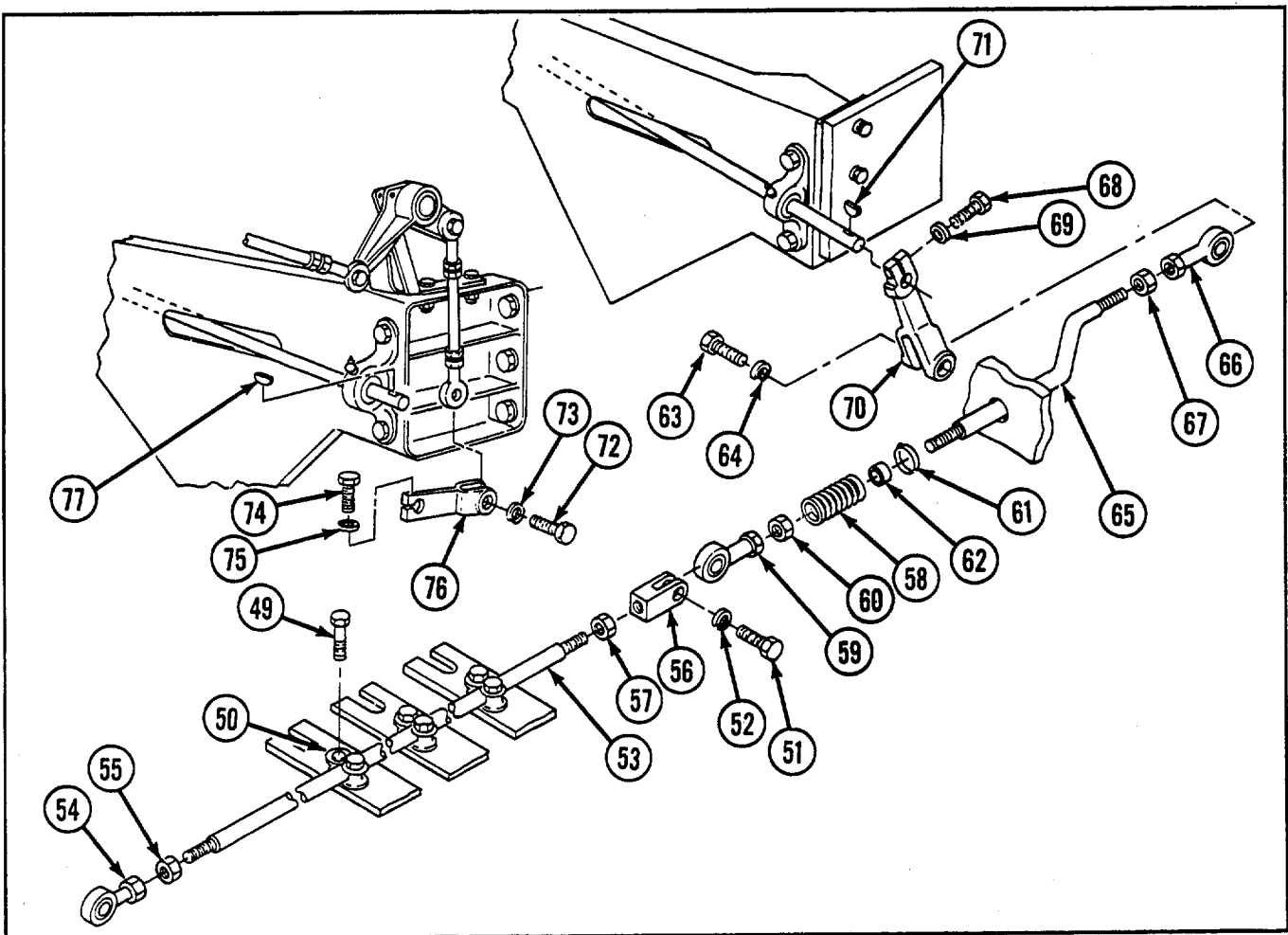


- 8 Install key (77), lever (76), new lockwasher (75), and screw (74).
- 9 Install new lockwasher (73) and screw (72).
- 10 Install key (71), lever (70), new lockwasher (69), and screw (68).
- 11 Install nut (67) and bearing (66) to rod (65).
- 12 Install rod (65) with new lockwasher (64) and screw (63).

NOTE

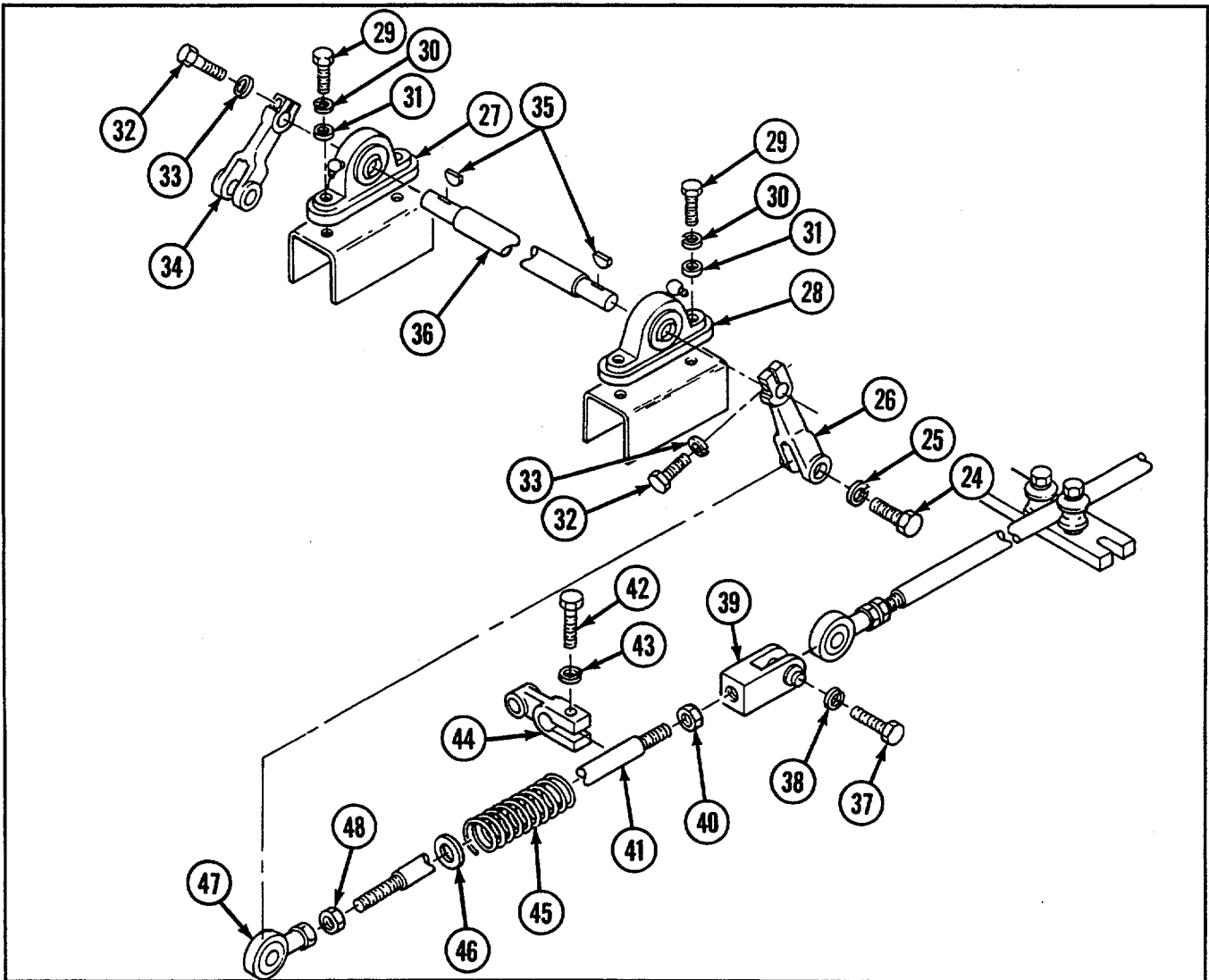
Linkages must be completely installed and aligned and rubber boot must be adjusted (see paragraph 9-79) before cementing rubber boot in place.

- 13 Install rubber bushing (62), rubber boot (58), clamp (61), nut (60), and bearing (59).
- 14 Install nut (55) and bearing (54) to one end of tube (53) and nut (57) and clevis (56) to other end of tube.
- 15 Install tube (53), new lockwasher (52), and screw (51).
- 16 Install six rollers (50) with six bolts (49).

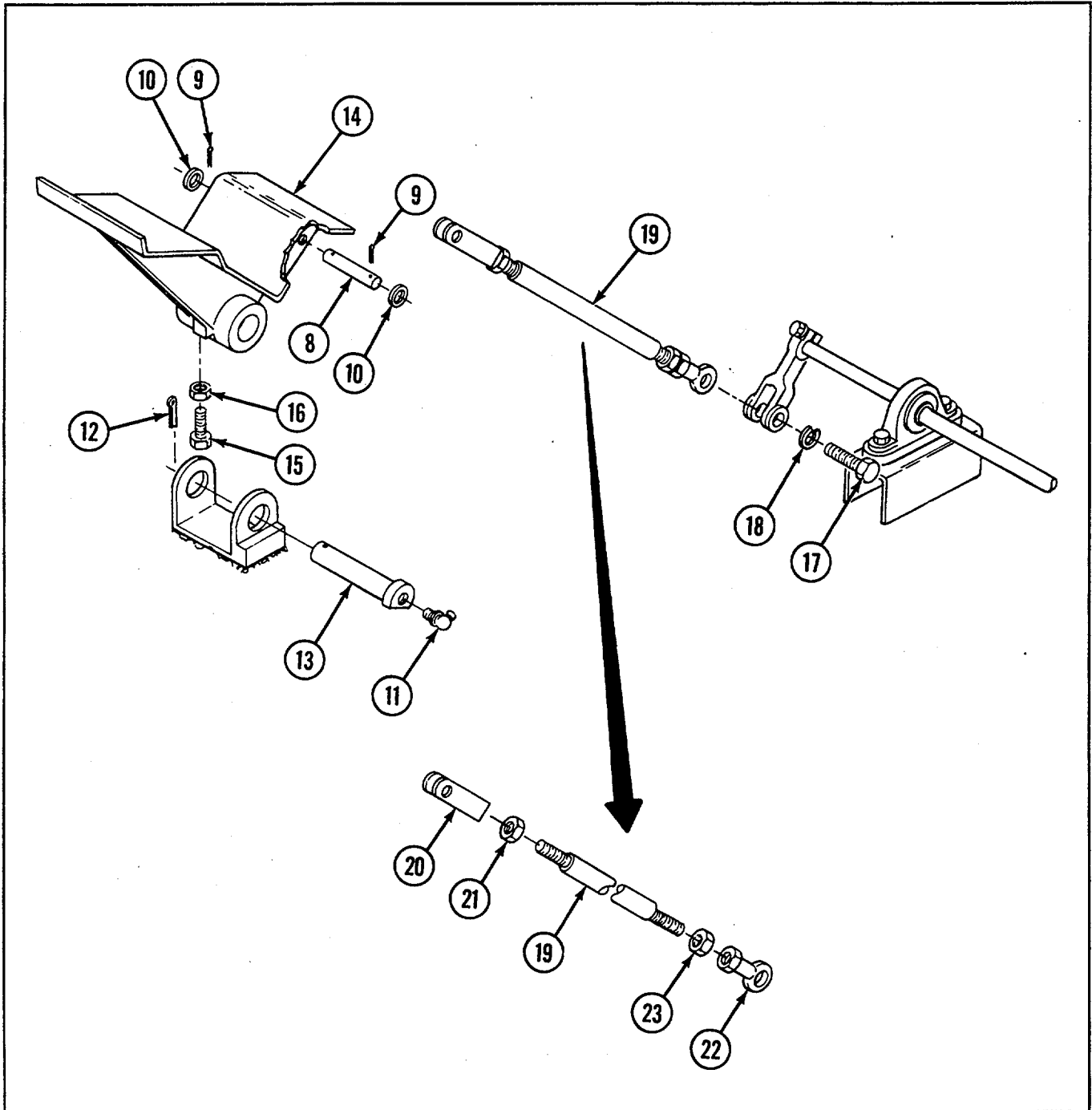


9-78 REPLACE/REPAIR/SERVICE ACCELERATOR CONTROLS AND LINKAGES- Continued

- 17 Install nut (48) and bearing (47) to one end of rod (41).
- 18 Install rod (41), flat washer (46), spring (45), lever (44), new lockwasher (43), and screw (42).
- 19 Install nut (40) and clevis (39) to rod (41).
- 20 Install new lockwasher (38) and screw (37) to clevis (39).
- 21 Install bearing units (27 and 28) to shaft (36).
- 22 Install two keys (35) to shaft (36) and install two new lockwashers (33) and two screws (32) to levers (26 and 34).
- 23 Install two flat washers (31), two new lockwashers (30), and two screws (29) to each bearing unit (27 and 28).
- 24 Install new lockwasher (25) and screw (24) to lever (26).



- 25 Install nut (21) and clevis (20) to one end of rod (19) and nut (23) and bearing (22) to other end of rod. Install rod with new lockwasher (18) and screw (17).
- 26 Install nut (16) and screw (15) to accelerator control pedal assembly (14).
- 27 Install accelerator control pedal assembly (14) with headed pin (13), new cotter pin (12), and lubrication fitting (11).
- 28 Install straight pin (8), two washers (10), and two new cotter pins (9).



- 2 Insert 1/8-in.-(3.2-mm-) diameter locating pin (3) in bracket (4) and accelerator pedal (5) (point 1).
- 3 Adjust linkage leaving nuts (1 and 2) loose until 1/8-in.-(3.2-mm-) diameter locating pin (6) can be inserted in bell crank (7) (point 2).
- 4 Tighten nuts (1 and 2). Remove locating pins (3 and 6) and connect linkage to engine throttle lever (see paragraph 9-78).

b. ADJUSTMENT (FULL THROTTLE)

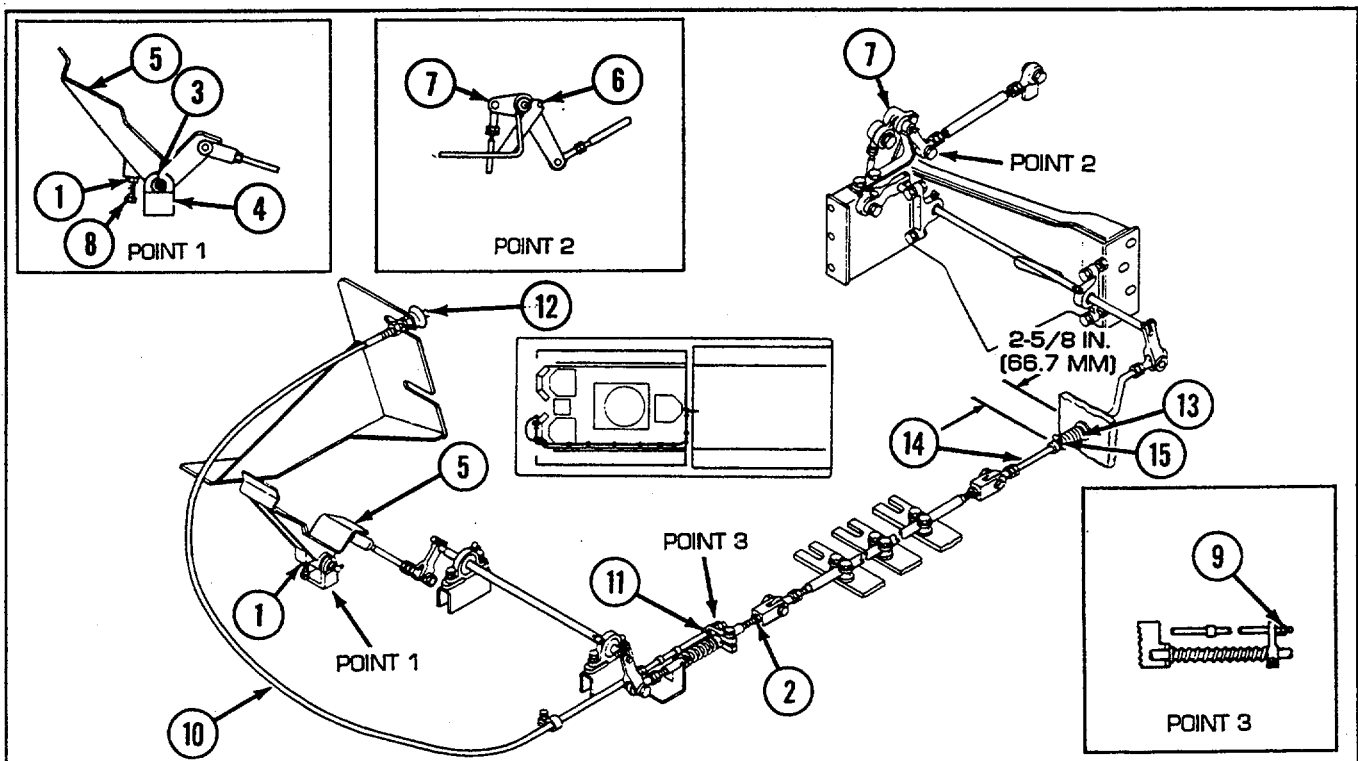
Loosen nut (1) (point 1) and adjust throttle stop (8) as required to obtain full throttle acceleration. Then tighten nut.

c. HAND THROTTLE ADJUSTMENT

- 1 Loosen two nuts (9) (point 3) on throttle control cable (10) at accelerator connecting lever (11). Push in throttle control handle (12) all the way.
- 2 Adjust two nuts (9) until 3/16-in. (4.8-nmm) movement of throttle control handle (12) causes increase in engine speed with engine operating at idle.

d. RUBBER BOOT FINAL ADJUSTMENT

With throttle control handle (12) adjusted and accelerator pedal (5) released, extend rubber boot (13) to 2-5/8 in. (66.7 mm) (as shown in illustration). Cement rubber boot to bulkhead with adhesive and clamp to rod (14) with clamp (15) (see paragraph 9-78).



NOTE

Follow-on maintenance:

- Connect engine throttle lever linkage (see paragraph 9-78)
- Install powerplant if removed (see paragraph 3-1)

9-80 REPLACE/REPAIR/SERVICE SERVICE BRAKE CONTROLS AND LINKAGES**THIS TASK COVERS**

- | | | | |
|-----------------------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
| e. Alinement and Adjustment | | | |

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Pliers, retaining ring, external (Appendix C, item 31)
- Punches, drive (7) (locating pins) (Appendix C, item 37)

Material/Parts:

- Adhesive, rubber-base (Appendix D, item 3)
- Lockwashers (6) (Appendix G, item 130)
- Lockwashers (3) (Appendix G, item 132)
- Lockwashers (19) (Appendix G, item 134)
- Lockwashers (9) (Appendix G, item 136)
- Pins, cotter (14) (Appendix G, item 216)
- Pin, spring (Appendix G, item 234)

Reference:

TM 9-2350-256-10

Equipment Conditions:

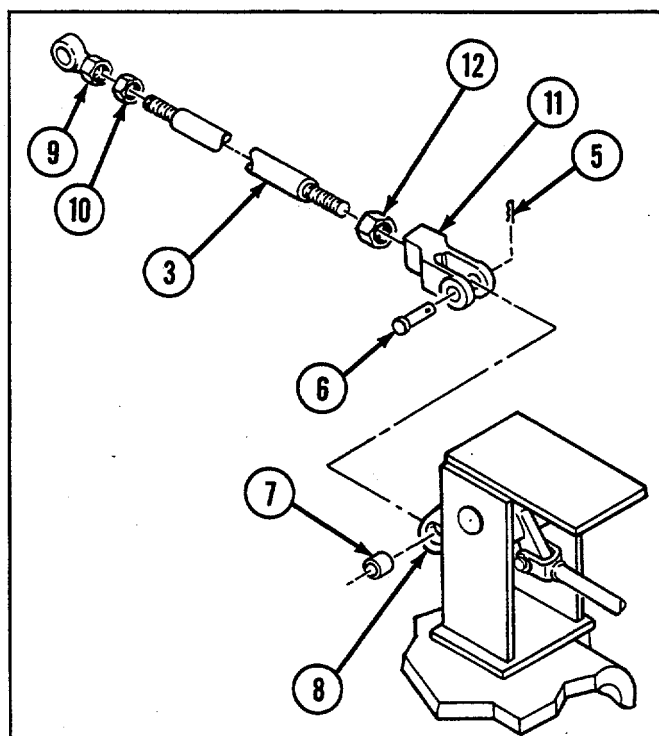
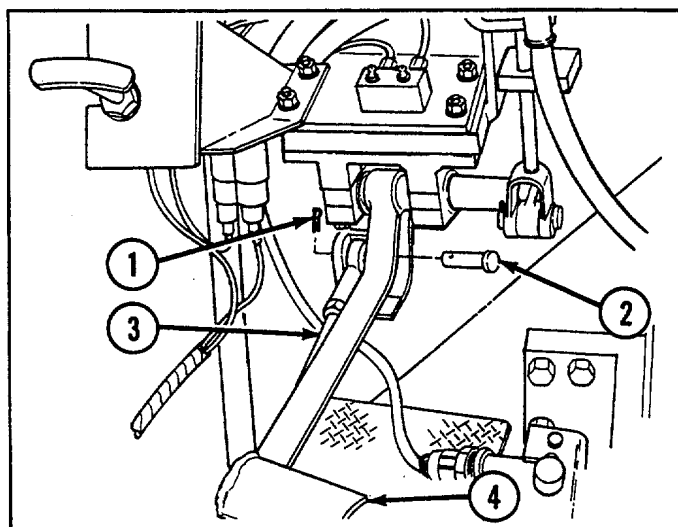
NOTE

Only remove or open items necessary to gain access to area of linkage requiring removal.

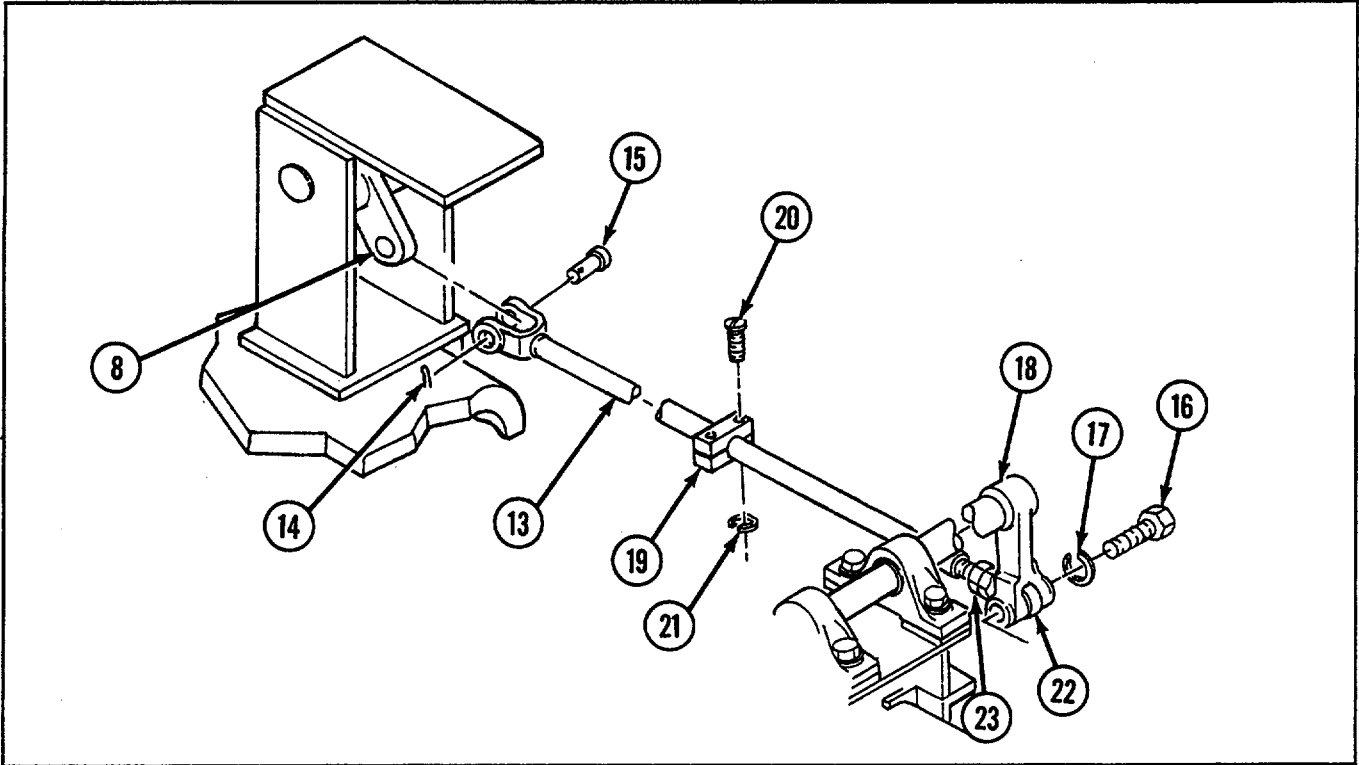
- Powerplant removed (see paragraph 3-1)
- Left-side air cleaner removed (see paragraph 4-24)
- Cab subfloor plates removed (see paragraph 9-1 through 9-23)
- Air inlet doors removed as necessary (see paragraph 9-56)
- Air inlet grilles removed as necessary (see paragraph 9-57)
- Ammunition rack removed (see paragraph 9-100)
- Toolbox rack removed (see paragraph 9-103)
- Oddment tray removed (see paragraph 9-104)

a. REMOVAL

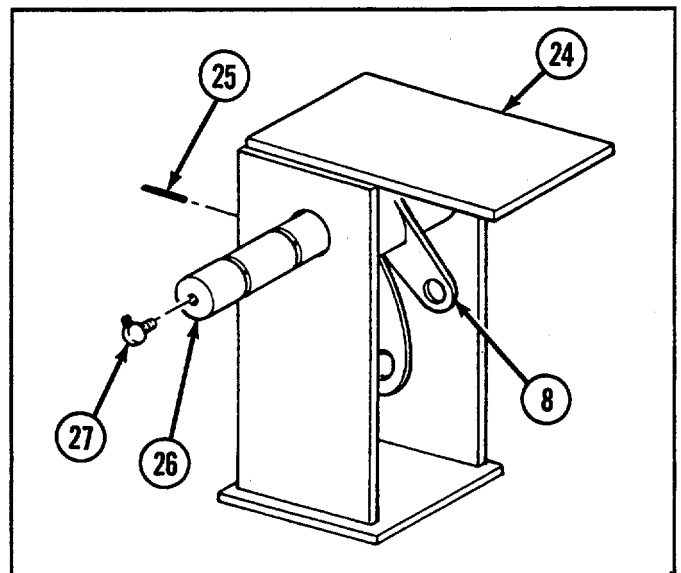
- 1 Remove cotter pin (1) and straight pin (2), and disconnect rod assembly (3) from brake pedal (4).
- 2 Remove cotter pin (5), straight pin (6), bearing (7), a
- 3 Remove rod end (9) and nut (10) from one end of rod assembly (3) and remove clevis (11) and nut (12) from other end of rod assembly.



- 4 Disconnect rod assembly (13) from brake cam assembly (8) by removing cotter pin (14) and straight pin (15).
- 5 Remove rod assembly (13) by removing screw (16) and lockwasher (17) from lever (18).
- 6 Remove two blocks (19) from rod assembly (13) by removing two screws (20) and two lockwashers (21). Remove rod end (22) and nut (23) from rod assembly.

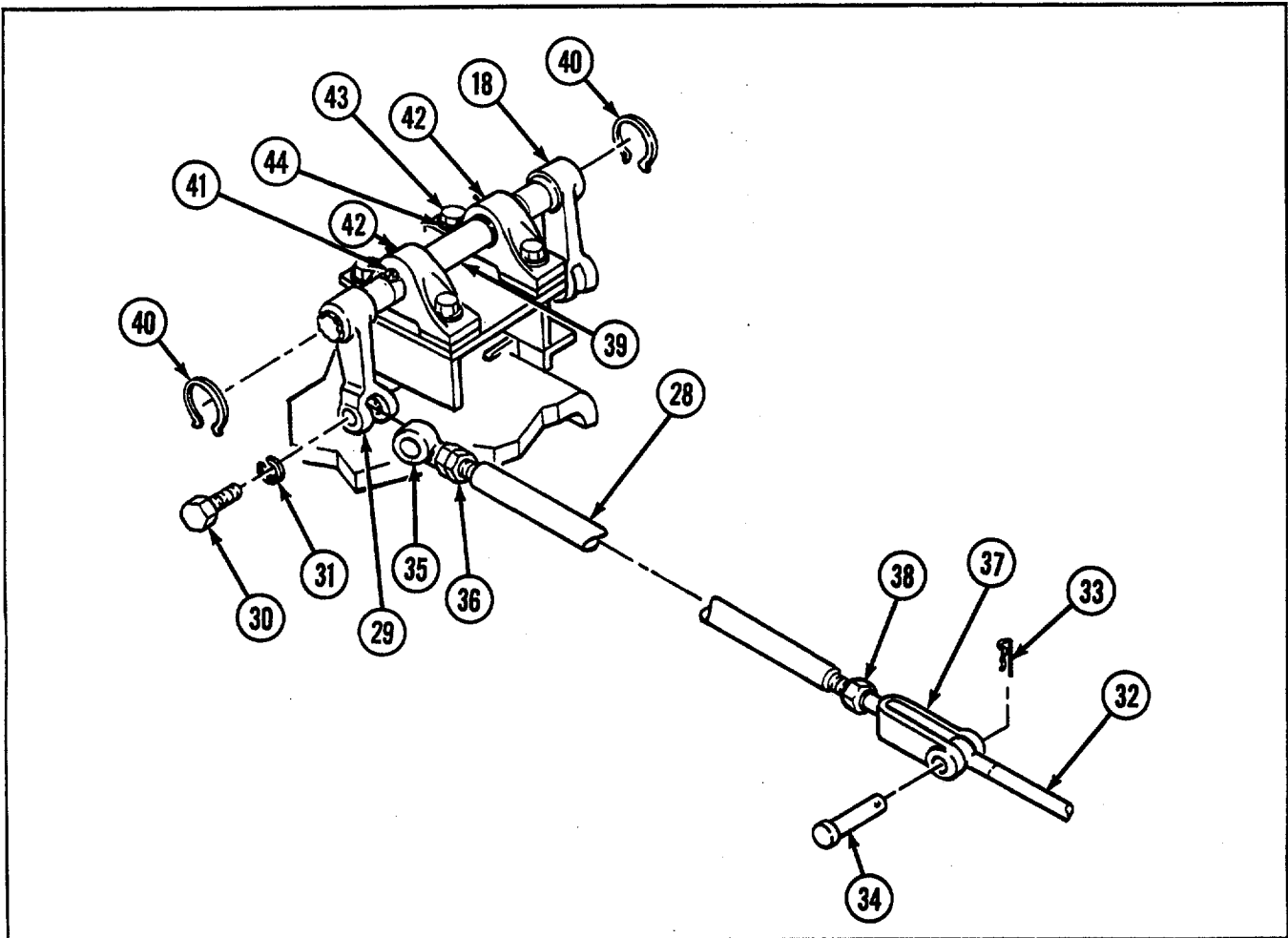


- 7 Remove brake cam assembly (8) from bracket assembly (24) by removing spring pin (25), shaft (26), and lubrication fitting (27).



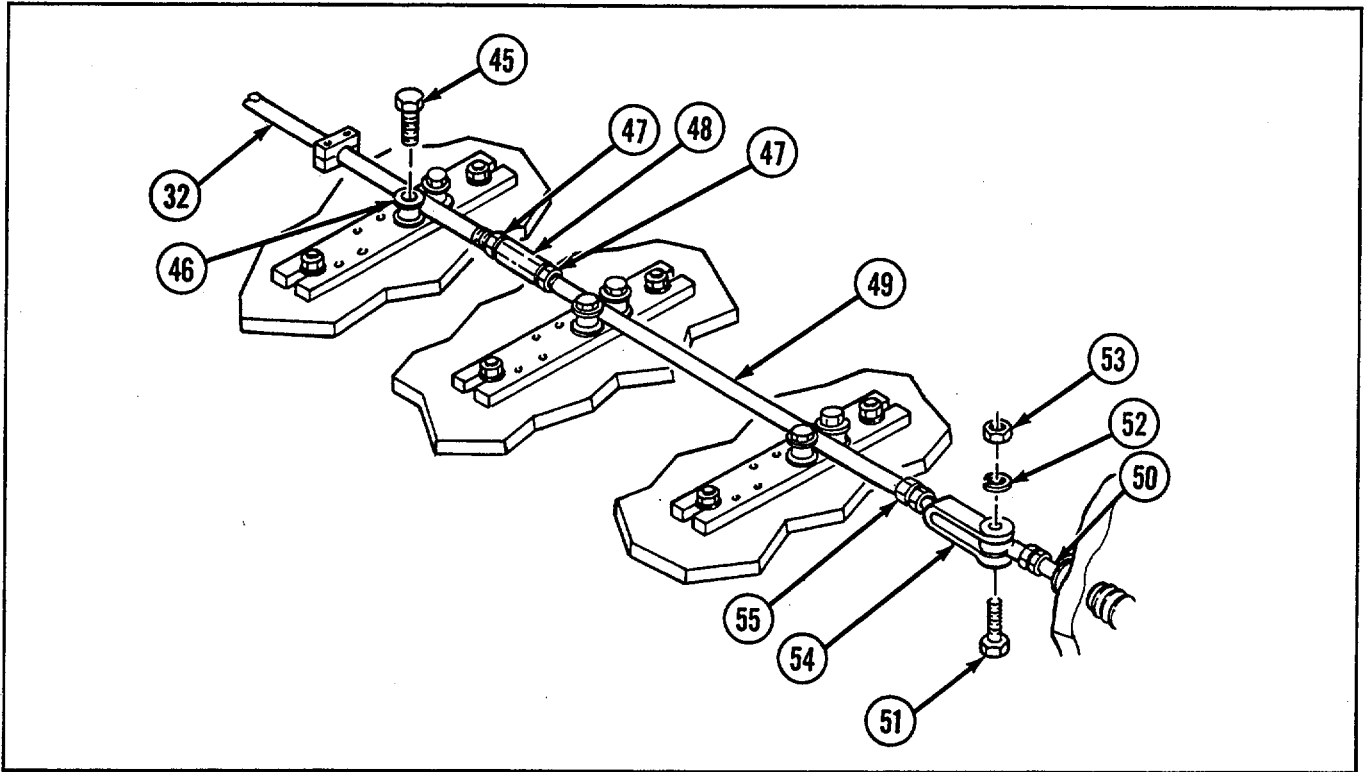
9-80 REPLACE/REPAIR/SERVICE SERVICE BRAKE CONTROLS AND LINKAGES-Continued

- 8 Disconnect rod assembly (28) from lever (29) by removing screw (30) and lockwasher (31). Remove rod assembly (28) from rod assembly (32) by removing cotter pin (33) and straight pin (34). Remove rod end (35), nut (36), clevis (37), and nut (38) from rod assembly (28).
- 9 Remove levers (18 and 29) from shaft (39) by removing two retaining rings (40).
- 10 Loosen two setscrews (41) and remove shaft (39) from two bearing units (42).
- 11 Remove two bearing units (42) by removing four screws (43) and four lockwashers (44).

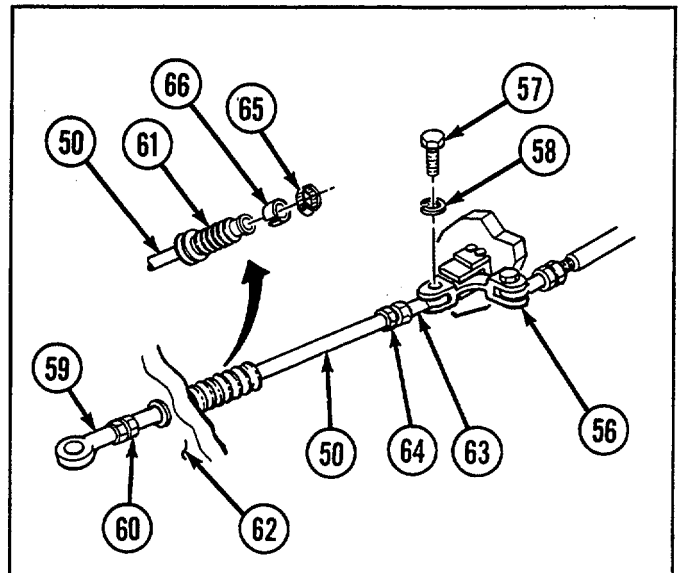


- 12 Remove six bolts (45) and six rollers (46).
- 13 Loosen two nuts (47) and turnbuckle (48) and remove rod assembly (32).
- 14 Remove two nuts (47) and turnbuckle (48).

- 15 Remove rod assembly (49) from rod assembly (50) by removing screw (51), lockwasher (52), and nut (53).
- 16 Remove clevis (54) and nut (55).



- 17 Disconnect rod assembly (50) from lever (56) by removing screw (57) and lockwasher (58).
- 18 Remove rod end (59) and nut (60) from rod assembly (50).
- 19 Pry rubber boot (61) from bulkhead (62) and remove rod assembly (50) from bulkhead.
- 20 Remove rod end (63) and nut (64) from rod assembly (50).
- 21 Remove clamp (65), rubber bushing (66), and rubber boot (61) from rod assembly (50).



9-80 REPLACE/REPAIR/SERVICE SERVICE BRAKE CONTROLS AND LINKAGES--Continued

22 Remove rod assembly (67) from levers (56 and 68) by removing two screws (69) and two lockwashers (70).

23 Remove rod end (71) and nut (72) from each end of rod assembly (67).

24 Remove rod assembly (73) from levers (68 and 74) by removing two screws (75) and two lockwashers (76).

25 Remove rod end (77) and nut (78) from each end of rod assembly (73).

26 Remove levers (56 and 68) by removing from each two lockwashers (79), two screws (80), pin retainer (81), lubrication fitting (82), and grooved pin (83).

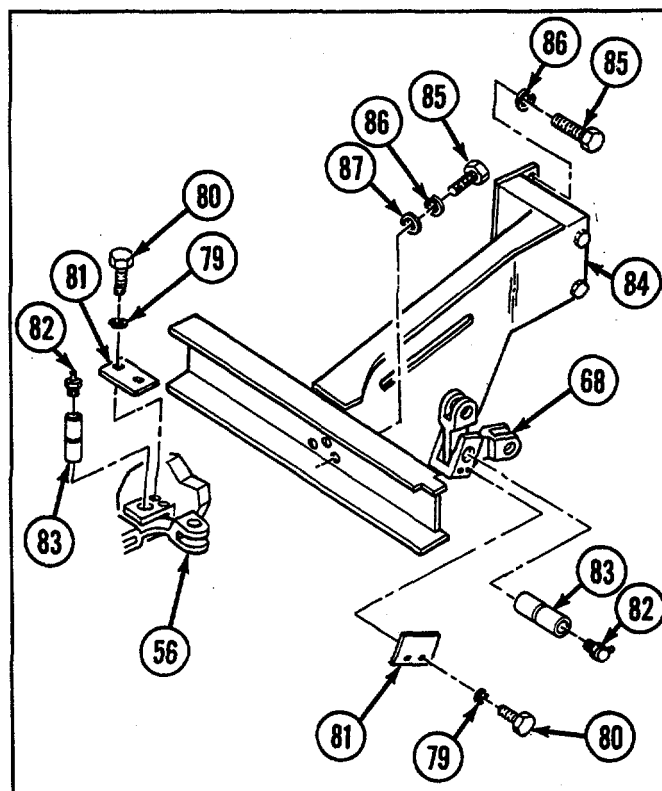
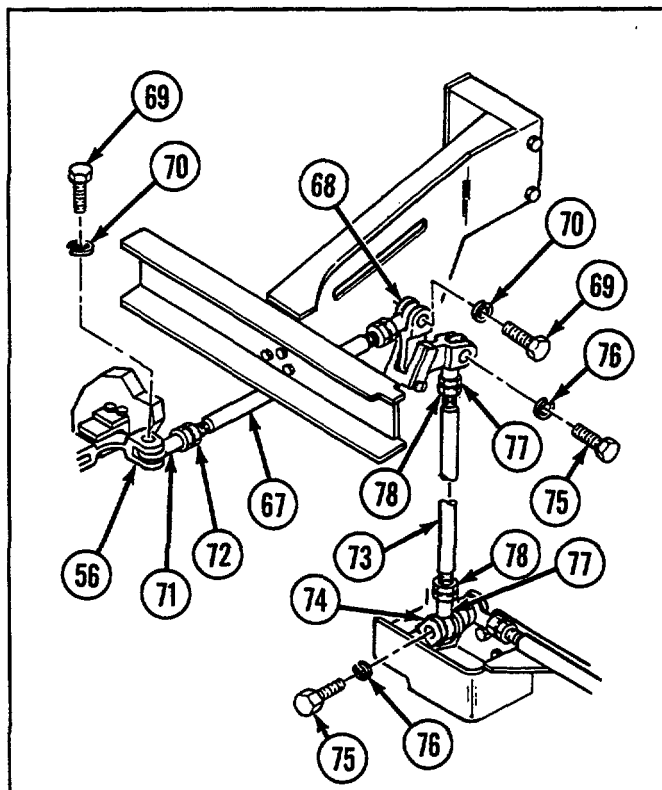
NOTE

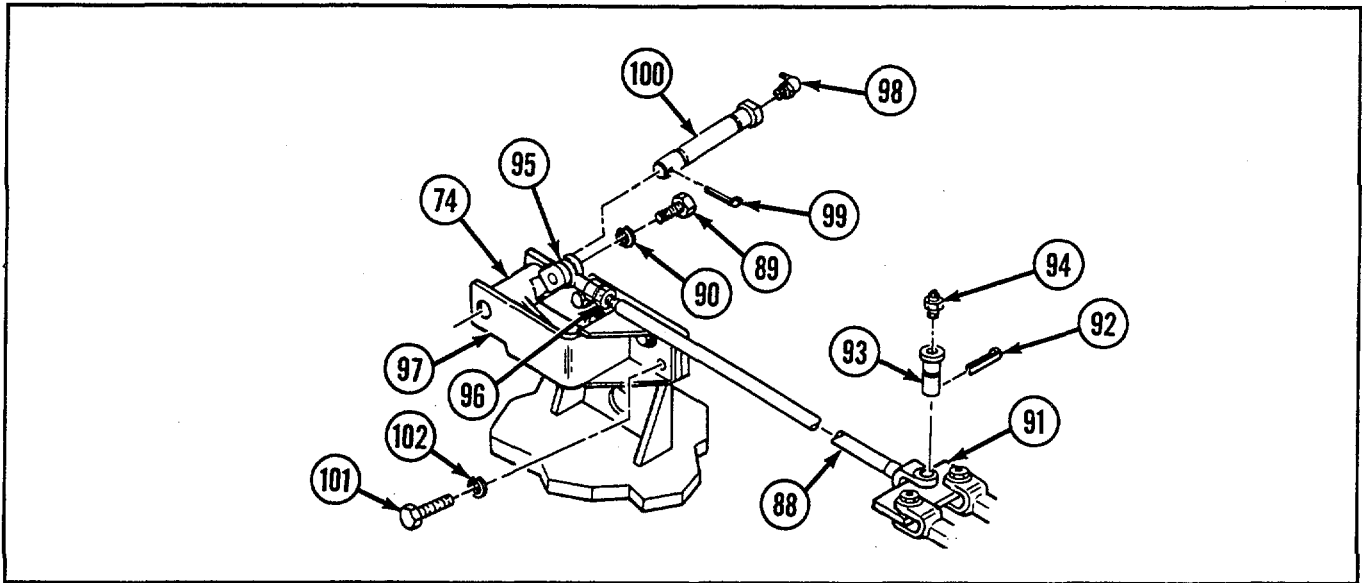
If removal of bracket assembly (84) is required, remove accelerator controls and linkages as necessary (see paragraph 9-78).

27 Remove bracket assembly (84) by removing six screws (85), six lockwashers (86), and three flat washers (87).

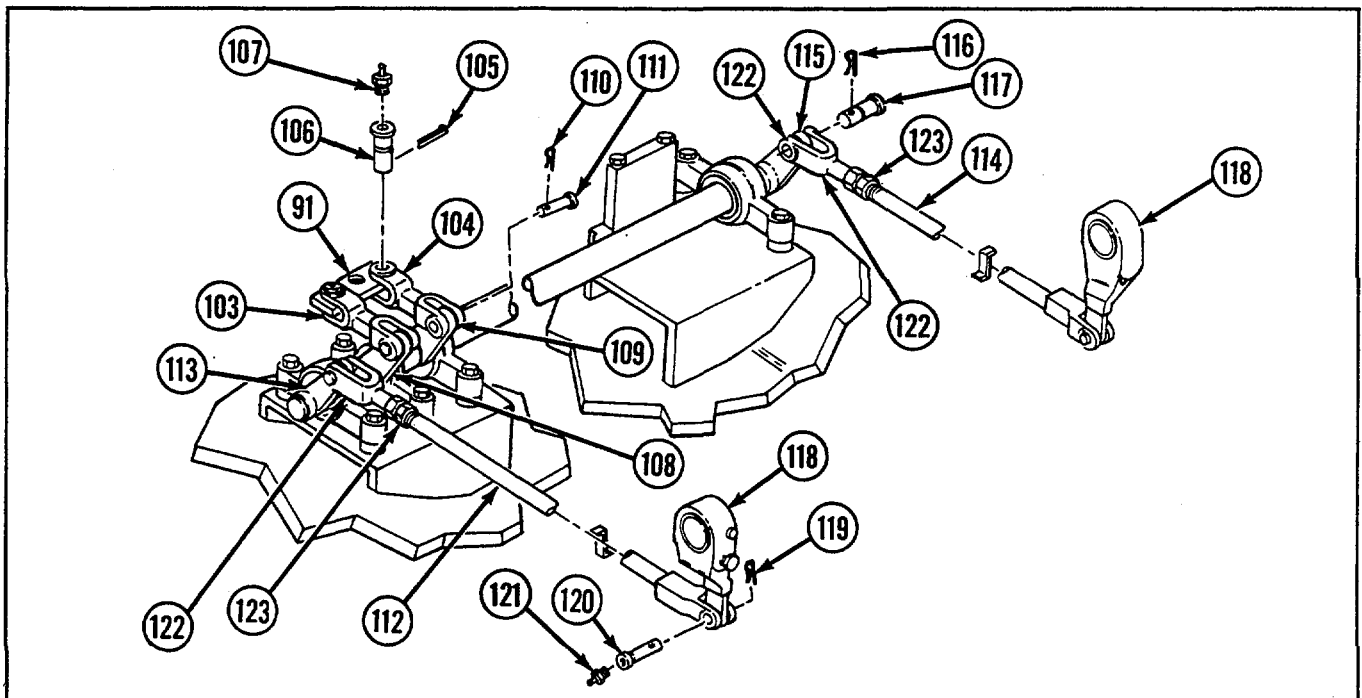
28 Disconnect rod assembly (88) from lever (74) by removing screw (89) and lockwasher (90). Remove rod assembly from plate assembly (91) by removing cotter pin (92), grooved pin (93), and lubrication fitting (94). Remove rod end (95) and nut (96) from rod assembly.

29 Remove bracket assembly (97) and lever (74) by removing lubrication fitting (98), cotter pin (99), grooved pin (100), four screws (101), and four lockwashers (102).



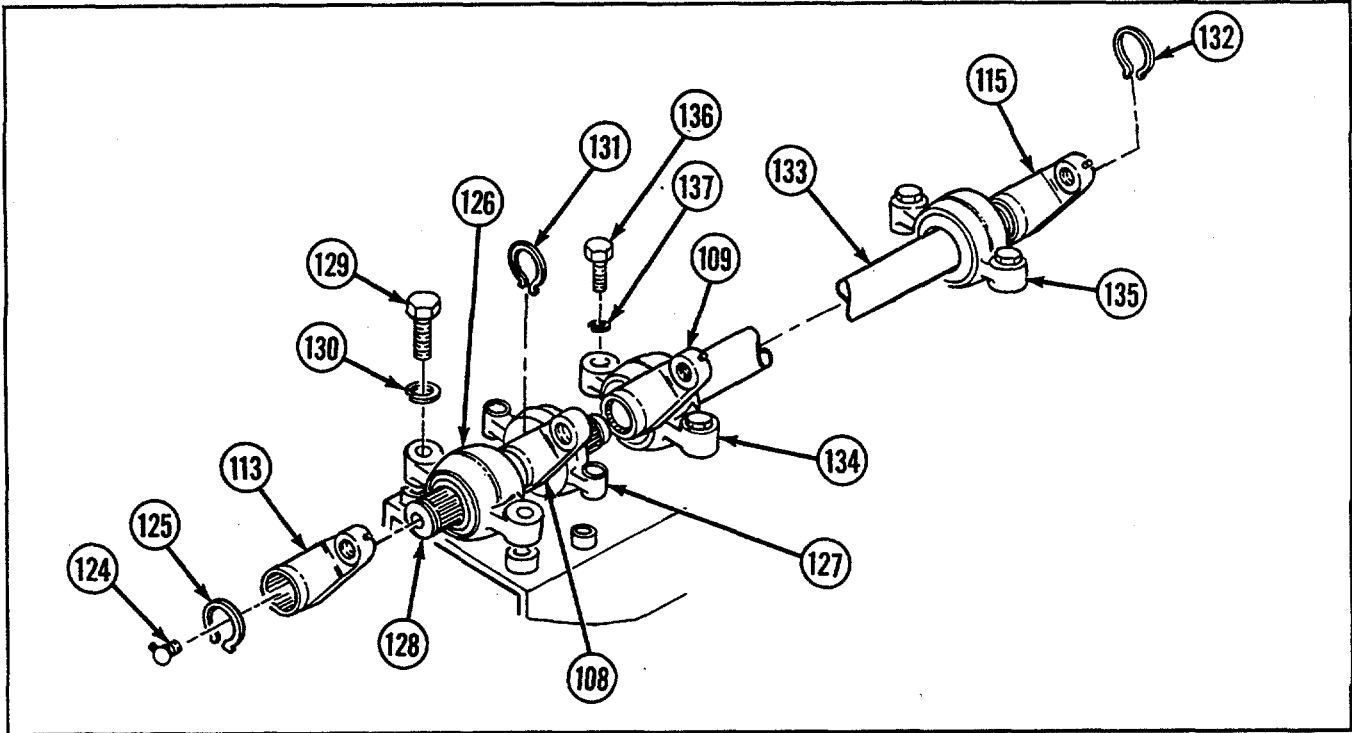


- 30 Remove plate assembly (91) from yokes (103 and 104) by removing two cotter pins (105), two grooved pins (106), and two lubrication fittings (107).
- 31 Remove yokes (103 and 104) from levers (108 and 109) by removing cotter pin (110) and straight pin (111) from each.
- 32 Disconnect rod assembly (112) from lever (113) and rod assembly (114) from lever (115) by removing cotter pin (116) and straight pin (117) from each.
- 33 Remove rod assemblies (112 and 114) from brake-apply-and-slack adjuster levers (118) by removing cotter pin (119), grooved pin (120), and lubrication fitting (121) from each. Remove clevis (122) and nut (123) from each end of rod assemblies.



9-80 REPLACE/REPAIR/SERVICE SERVICE BRAKE CONTROLS AND LINKAGES-Continued

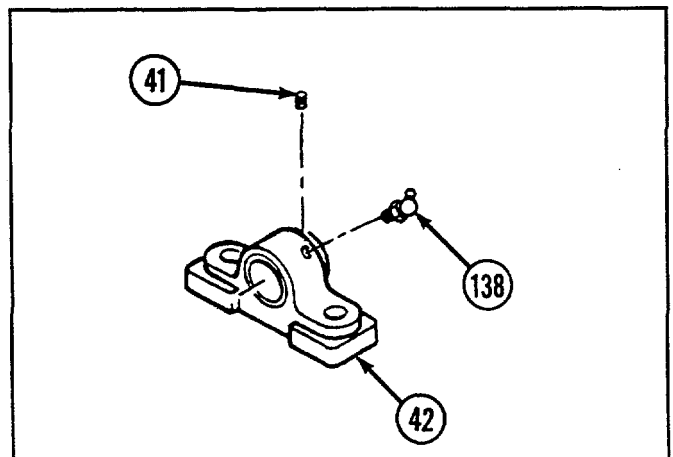
- 34 Remove lever (113) by removing lubrication fitting (124) and retaining ring (125).
- 35 Remove two bearing units (126 and 127) with short left shaft (128) assembled by removing four screws (129) and four lockwashers (130).
- 36 Remove short left shaft (128) from two bearing units (126 and 127) by removing retaining ring (131) and lever (108).
- 37 Remove levers (109 and 115) by removing retaining ring (132) from each end of long right shaft (133).
- 38 Remove two bearing units (134 and 135) and long right shaft (133) by removing four screws (136) and four lockwashers (137). Remove long right shaft from two bearing units.

**b. DISASSEMBLY**

Remove setscrew (41) and lubrication fitting (138) from each bearing unit (42).

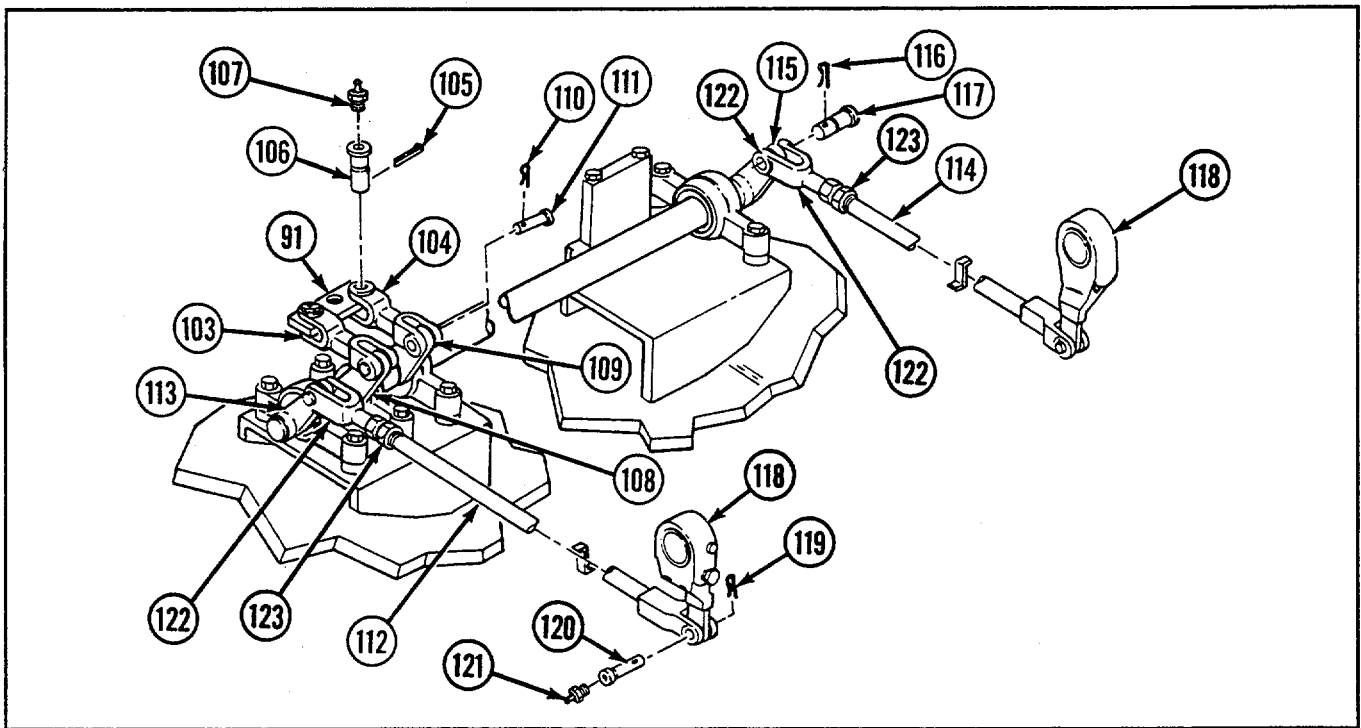
c. ASSEMBLY

Install setscrew (41) and lubrication fitting (138) to each bearing unit (42).



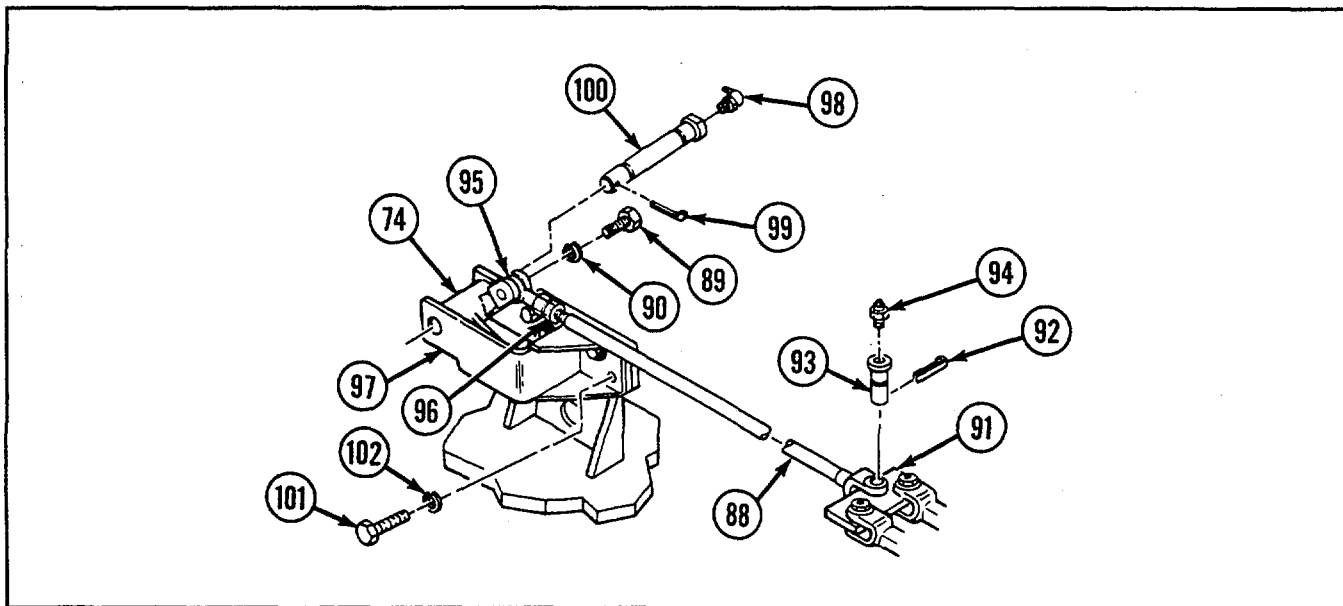
d. INSTALLATION

- 1 Install long right shaft (133) to two bearing units (134 and 135).
- 2 Install levers (109 and 115) with retaining ring (132) at each end of long right shaft (133).
- 3 Install lever (108) with retaining ring (131).
- 4 Install short left shaft (128) to two bearing units (126 and 127).
- 5 Install lever (113) with retaining ring (125) and lubrication fitting (124).
- 6 Install two bearing units (126 and 127) each with two new lockwashers (130) and two screws (129).
- 7 Install two bearing units (134 and 135) each with two new lockwashers (137) and two screws (136).
- 8 Install nut (123) and clevis (122) to each end of rod assemblies (112 and 114).
- 9 Connect rod assembly (112) to lever (113) with straight pin (117) and new cotter pin (116). Install rod assembly to brake-apply-and-slack adjuster lever (118) with grooved pin (120), lubrication fitting (121), and new cotter pin (119).
- 10 Connect rod assembly (114) to lever (115) with straight pin (117) and new cotter pin (116). Install rod assembly to brake-apply-and-slack adjuster lever (118) with grooved pin (120), lubrication fitting (121), and new cotter pin (119).
- 11 Install yokes (103 and 104) to levers (108 and 109) each with straight pin (111) and new cotter pin (110).
- 12 Install plate assembly (91) to yokes (103 and 104) with two grooved pins (106), two new cotter pins (105), and two lubrication fittings (107).



9-80 REPLACE/REPAIR/SERVICE SERVICE BRAKE CONTROLS AND LINKAGES-Continued

- 13 Install bracket assembly (97) and lever (74) with grooved pin (100), new cotter pin (99), lubrication fitting (98), four new lockwashers (102), and four screws (101).
- 14 Install rod end (95) and nut (96) to rod assembly (88).
- 15 Connect rod assembly (88) to plate assembly (91) with grooved pin (93), new cotter pin (92), and lubrication fitting (94).
- 16 Install rod assembly (88) to lever (74) with screw (89) and new lockwasher (90).

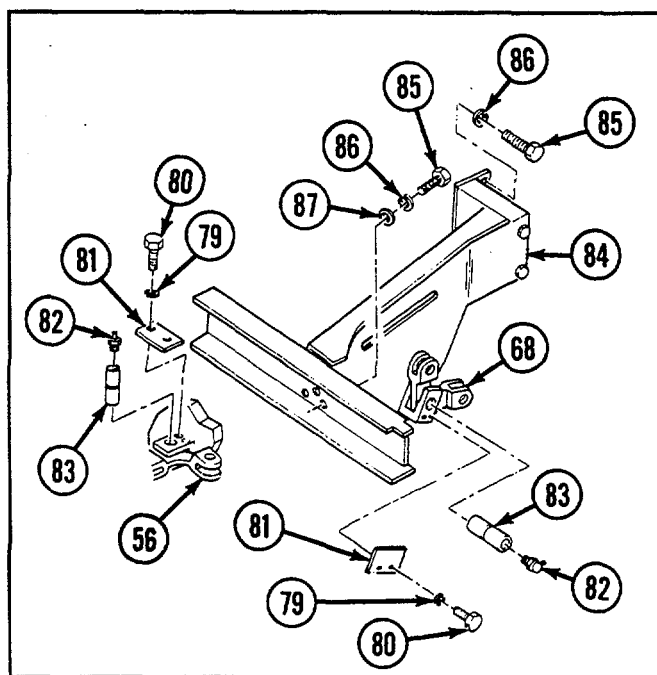


- 17 If removed, install bracket assembly (84) with six screws (85), six new lockwashers (86), and three flat washers (87).

NOTE

Install accelerator controls and linkages if removed (see paragraph 9-78).

- 18 Install levers (56 and 68) each with pin retainer (81), grooved pin (83), lubrication fitting (82), two screws (80), and two new lockwashers (79).

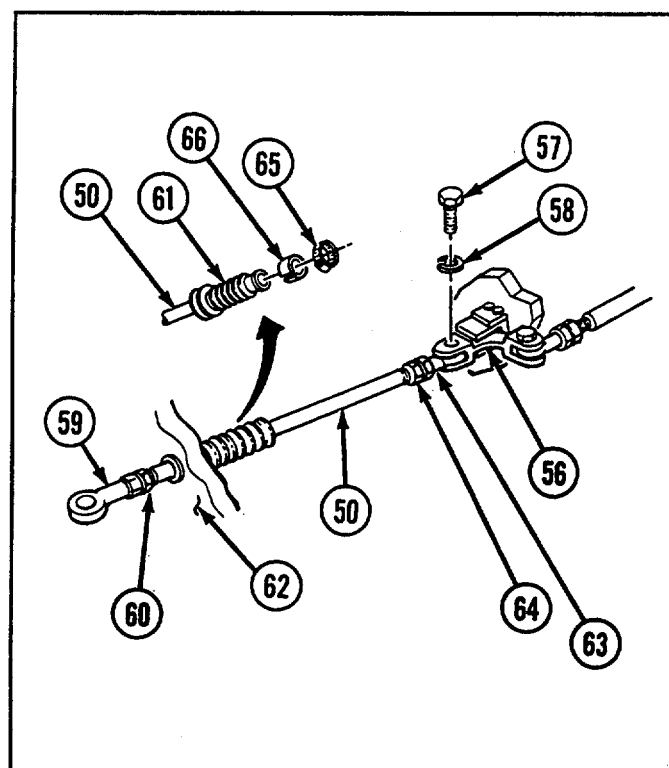
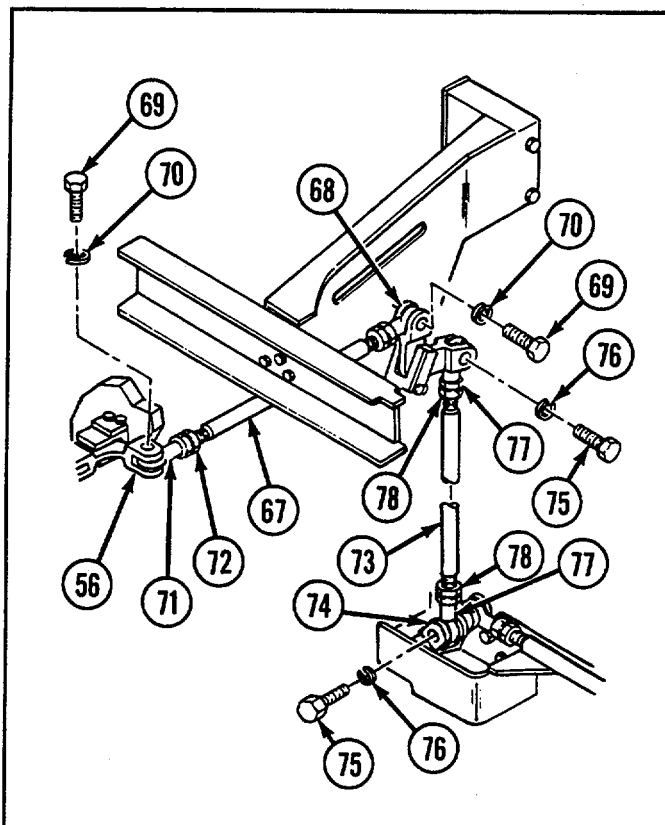


- 19 Install rod end (77) and nut (78) to each end of rod assembly (73).
- 20 Install rod assembly (73) to levers (68 and 74) with two screws (75) and two new lockwashers (76).
- 21 Install rod end (71) and nut (72) to each end of rod assembly (67).
- 22 Install rod assembly (67) to levers (56 and 68) with two screws (69) and two new lockwashers (70).
- 23 Install rubber boot (61), rubber bushing (66), and clamp (65) to rod assembly (50). Do not tighten clamp.
- 24 Install rod end (63) and nut (64) to one end of rod assembly (50) and slide other end of rod assembly through bulkhead (62).
- 25 Connect rod assembly (50) to lever (56) with screw (57) and new lockwasher (58).
- 26 Install rod end (59) and nut (60) to rod assembly (50).

NOTE

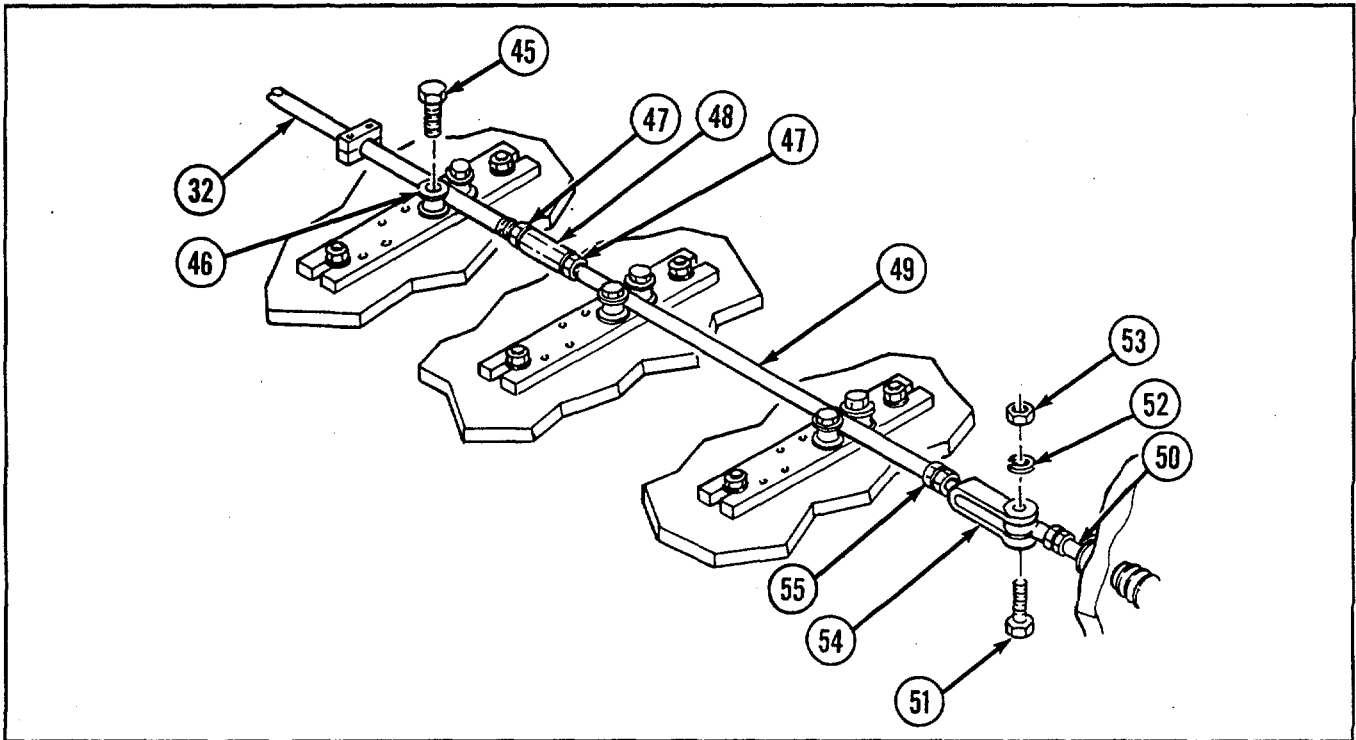
Linkage must be completely installed, aligned, and adjusted before cementing rubber boot in place.

- 27 With control adjusted and brake pedal released, ensure rubber boot (61) is extended to 5-5/8 in. (142.9 mm), tighten clamp (65), and cement rubber boot to bulkhead (62) with adhesive.

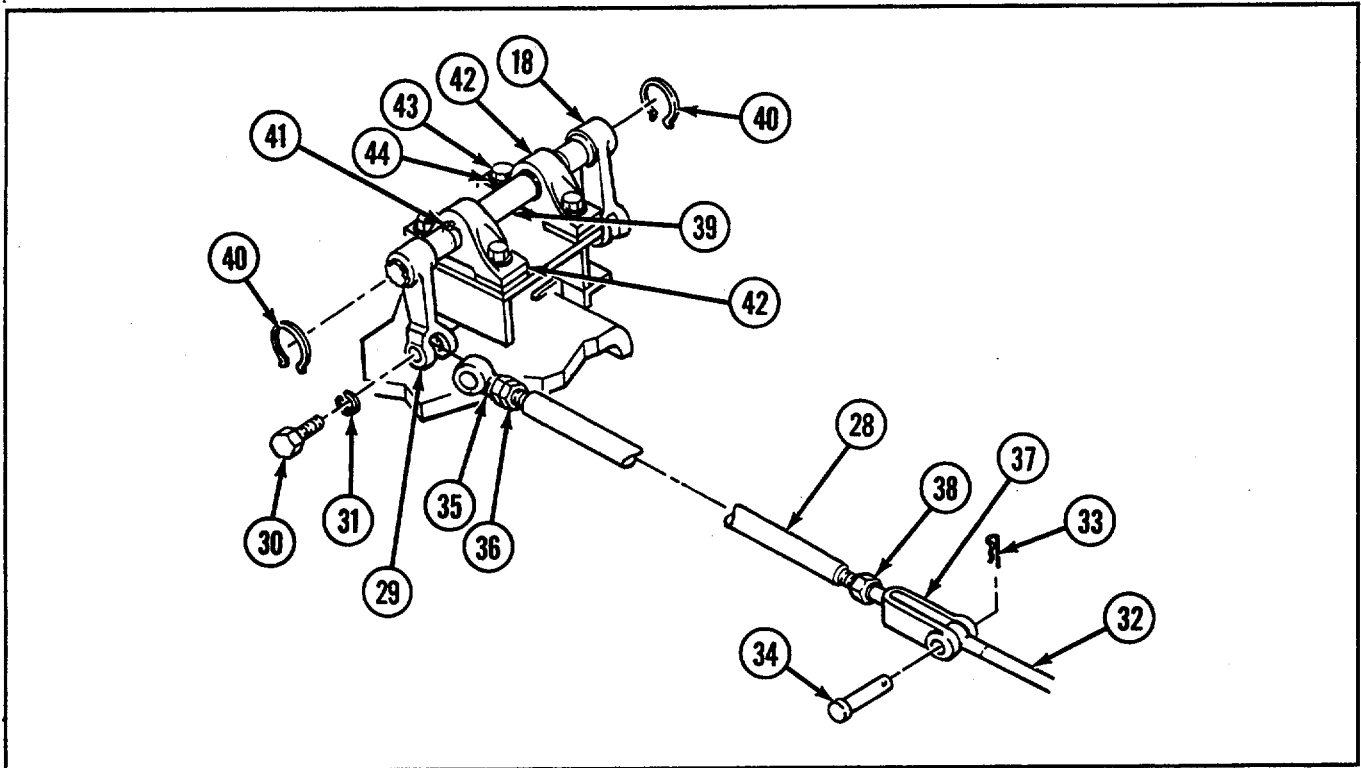


9-80 REPLACE/REPAIR/SERVICE SERVICE BRAKE CONTROLS AND LINKAGES--Continued

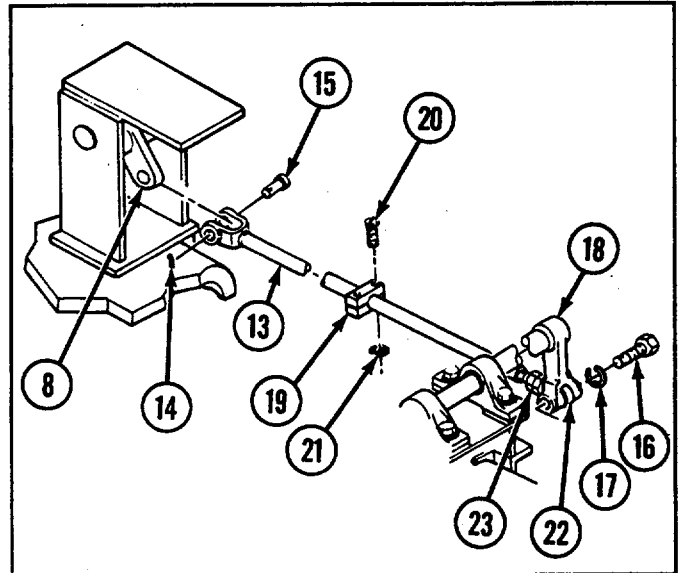
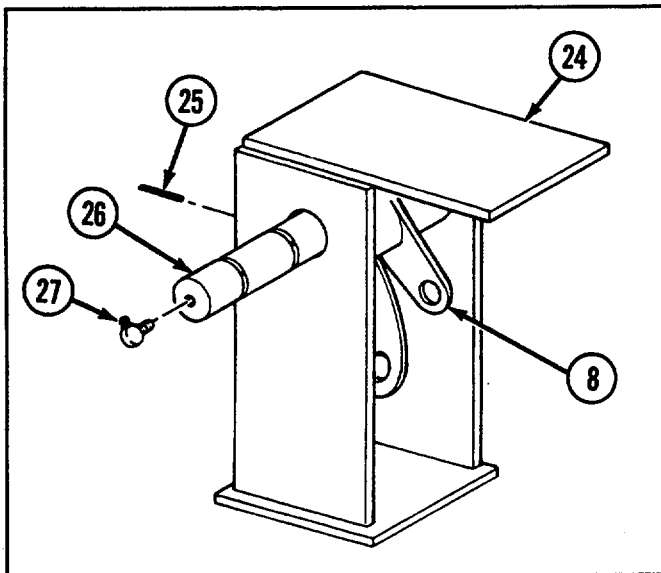
- 28 Install clevis (54) and nut (55) to rod assembly (49).
- 29 Connect rod assembly (49) to rod assembly (50) with screw (51), new lockwasher (52), and nut (53).
- 30 Install rod assembly (32) to rod assembly (49) with two nuts (47) and turnbuckle (48).
- 31 Install six rollers (46) and six bolts (45).



- 32 Install two bearing units (42) with four screws (43) and four new lockwashers (44).
- 33 Install shaft (39) to two bearing units (42) and tighten two setscrews (41).
- 34 Install levers (18 and 29) to shaft (39) with two retaining rings (40).
- 35 Install clevis (37), nut (38), rod end (35), and nut (36) to rod assembly (28).
- 36 Connect rod assembly (28) to rod assembly (32) with straight pin (34) and new cotter pin (33). Install rod assembly (28) to lever (29) with screw (30) and new lockwasher (31).

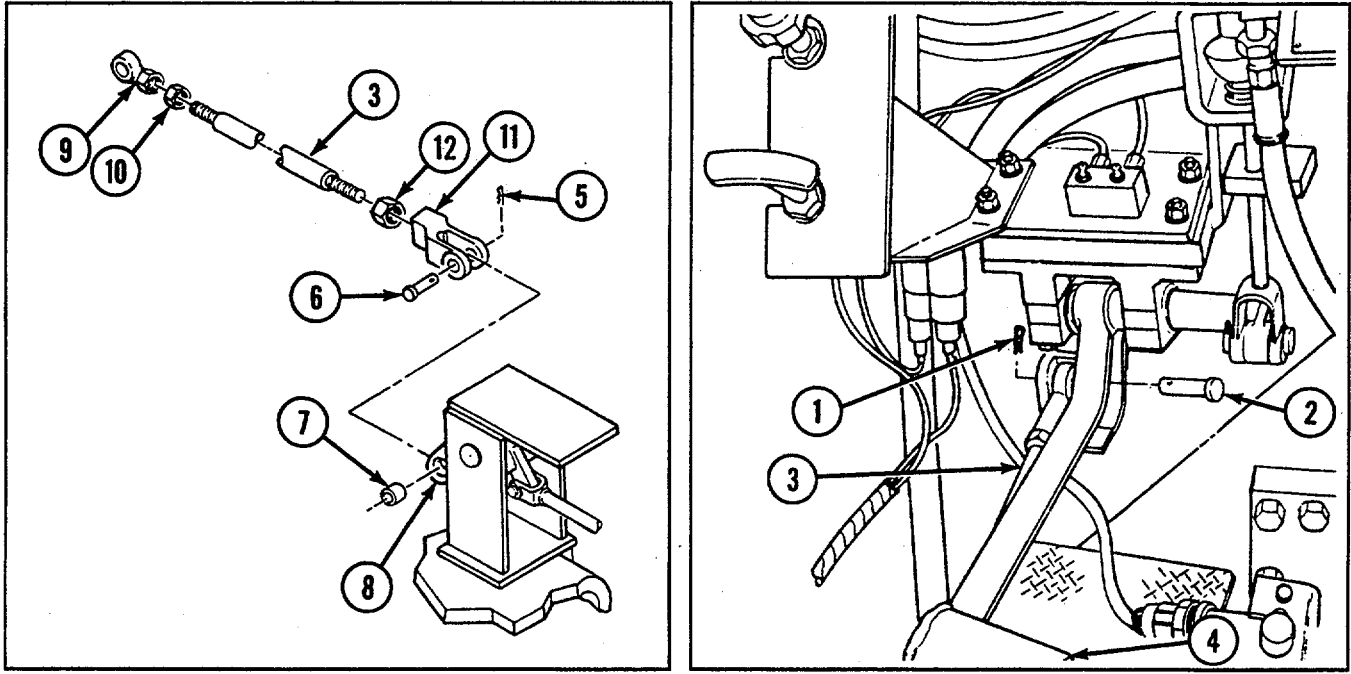


- 37 Install brake cam assembly (8) to bracket assembly (24) with shaft (26), spring pin (25), and lubrication fitting (27).
- 38 Install rod end (22) and nut (23) to rod assembly (13). Connect rod assembly to lever (18) with screw (16) and new lockwasher (17).
- 39 Install rod assembly (13) to brake cam assembly (8) with straight pin (15) and new cotter pin (14).
- 40 Install two blocks (19) to rod assembly (13) with two screws (20) and two new lockwashers (21).



9-80 REPLACE/REPAIR/SERVICE SERVICE BRAKE CONTROLS AND LINKAGES-Continued

- 41 Install rod end (9), nut (10), clevis (11), and nut (12) to rod assembly (3).
- 42 Connect rod assembly (3) to brake cam assembly (8) with straight pin (6), bearing (7), and new cotter pin (5).
- 43 Install rod assembly (3) to brake pedal (4) with straight pin (2) and new cotter pin (1).

**e. ALINEMENT AND ADJUSTMENT****NOTE**

Prior to performing any brake control alinement or adjustment, do the following:

- Block vehicle in place and fully release vehicle brakes (refer to TM 9-2350-256-10).
- Disconnect left and right brake lever rods from brake-apply levers.
- Check each brake-apply lever (point 1). Each lever must be in its fully released position against its external stop with no free travel. If not, use a 9/16-in. socket wrench and, while pushing in with socket wrench to release adjustment bolt, turn bolt clockwise to position each lever against its stop.

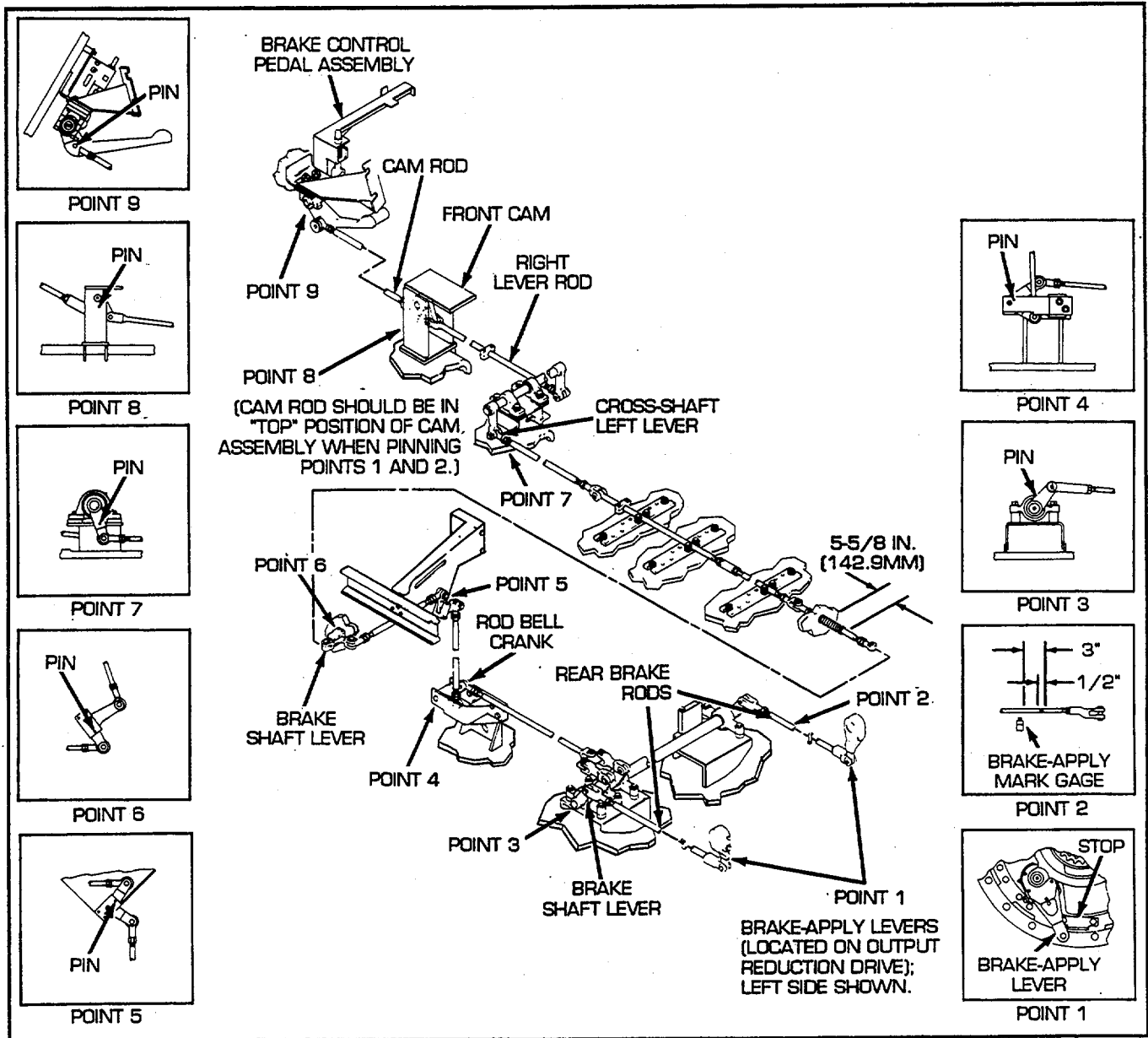
Alinement

- 1 Loosen nuts on linkage rods and insert 1/8-in.- (3.2-mm-) diameter locating pins at points indicated. Adjust rods as necessary to permit pinning.
- 2 While brake control pedal is pinned, adjust brake control pedal height stop.
- 3 With brake-apply levers in fully released position against their stops, adjust rear brake rods equally at both ends until clevis holes in rod ends aline with bottom holes in brake-apply levers. Connect rods to levers.

4 Tighten all nuts and remove locating pins.

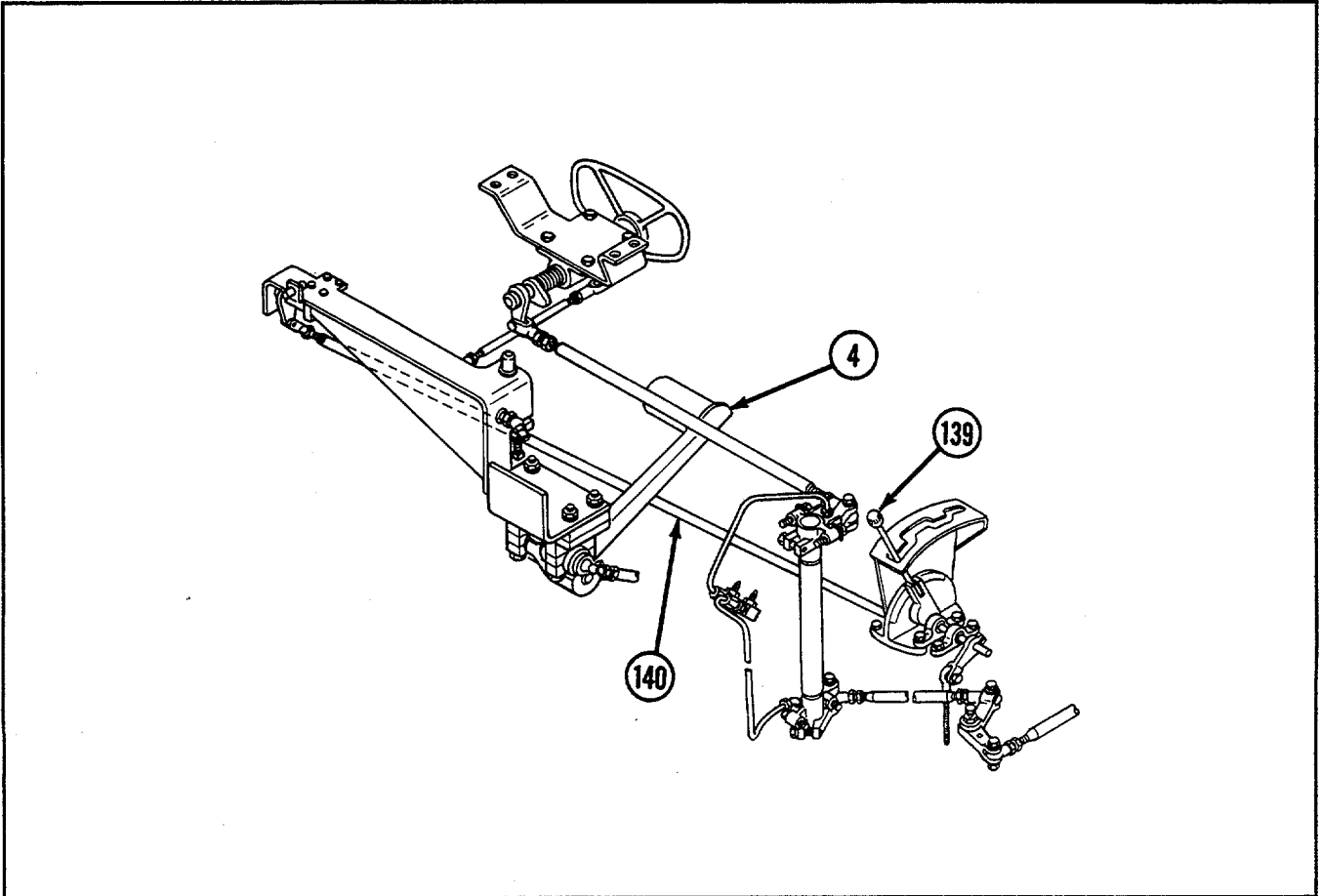
Adjustment

- 1 With brake not applied and each brake-apply lever against its stop, measure 3 in. (76.2 mm) back on each rod from brake adjustment indicator and place mark 1/2-in. (12.7-mm) wide on rod so centerline of mark is 3 in. (76.2 mm) from centerline of indicator (point 2).
- 2 Apply brake fully and note position of mark with respect to indicator; mark and indicator should align. If not, proceed to step 3 and adjust.
- 3 With brake fully applied, place 9/16-in. socket wrench on brake-apply lever adjustment bolt. While pushing in with wrench to release bolt, turn bolt (clockwise if mark is in front of indicator, counterclockwise if mark is behind) until mark on rod aligns with indicator.



9-80 REPLACE/REPAIR/SERVICE SERVICE BRAKE CONTROLS AND LINKAGES-Continued**Brake Control Adjustment**

- 1 Place shift control lever (139) in P (park) position.
- 2 Push brake pedal (4) down as far as possible. Brake pedal should lock in down position.
- 3 If brake pedal (4) does not lock in down position, loosen two nuts on linkage rod (140). Adjust linkage rod until brake pedal will lock in down position. Tighten nuts.

**Brake Adjustment****CAUTION**

- Adjust brakes only after making certain brake linkage alignment is correct.
- Do not adjust travel of brake-apply-and-slack adjuster lever to less than 3 in. (76.2 mm) because of possible damage to brakes.

NOTE

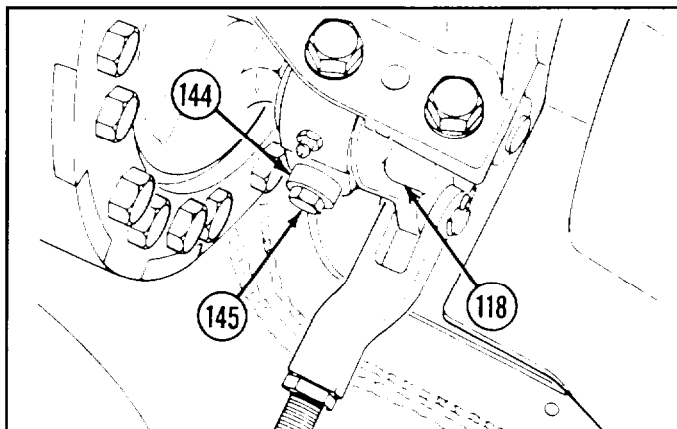
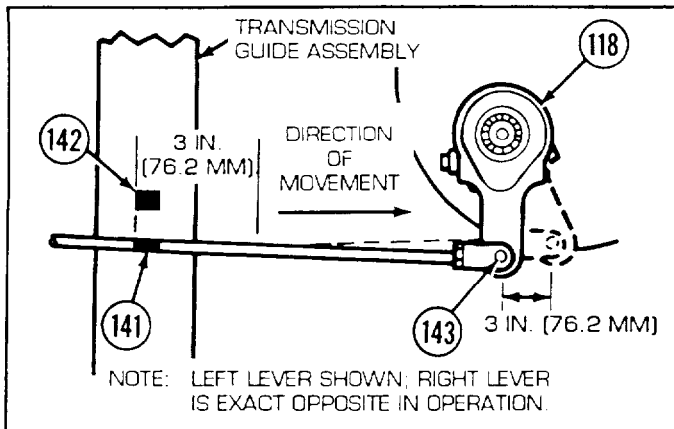
Alignment of black mark (141) on brake rod and black mark (142) on brake adjustment gage indicates that brakes are applied and in proper adjustment.

- 1 Apply brakes and check amount of brake-apply-and-slack adjuster lever (118) travel. Each lever (right or left) must travel not less than 3 in. (76.2 mm), measured at outer hole (143) in end of lever. With brakes applied, black mark (141) on brake rod should align with black mark (142) on brake adjustment gage.

NOTE

Adjustment may be made through access holes in bottom rear of hull.

- 2 Release brakes and press in locking ring (144). Turn adjustment bolt (145) clockwise to shorten travel or counterclockwise to lengthen travel, as required. (Shortening brake-apply-and-slack adjuster lever [118] tightens brakes.)



NOTE

Follow-on maintenance: Only install or close items necessary to gain access to area of linkage requiring removal.

- Install oddment tray (see paragraph 9-104)
- Install toolbox rack (see paragraph 9-103)
- Install ammunition rack (see paragraph 9-100)
- Install air inlet grilles as necessary (see paragraph 9-57)
- Install air inlet doors as necessary (see paragraph 9-56)
- Install cab subfloor plates (see paragraphs 9-1 through 9-23)
- Install left-side air cleaner (see paragraph 4-24)
- Install powerplant (see paragraph 3-1)

9-81 REPLACE/REPAIR BRAKE PEDAL AND BRACKET ASSEMBLY

THIS TASK COVERS

- | | | | |
|------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
|------------|----------------|-------------|-----------------|

INITIAL SET-UP

Tools:

- Tool kit, general mechanic' s (Appendix C, item 53)
- Pliers, retaining ring (Appendix C, item 30)

Parts-Continued:

- *Pins, cotter (7) (Appendix G, item 216)
- *Pins, cotter (2) (Appendix G, item 227)

Parts:

- Lockwashers (4) (Appendix G, item 131)
- Lockwashers (6) (Appendix G, item 132)
- Lockwashers (4) (Appendix G, item 153)

Reference:

Appendix J

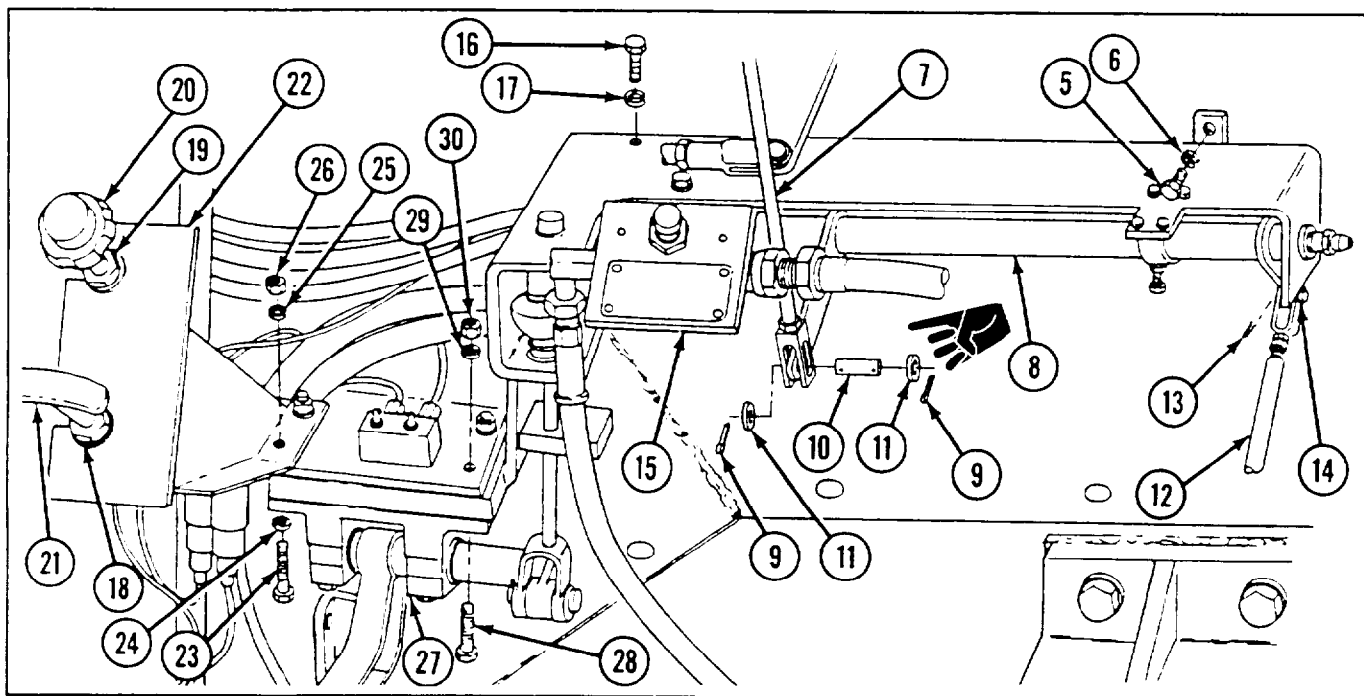
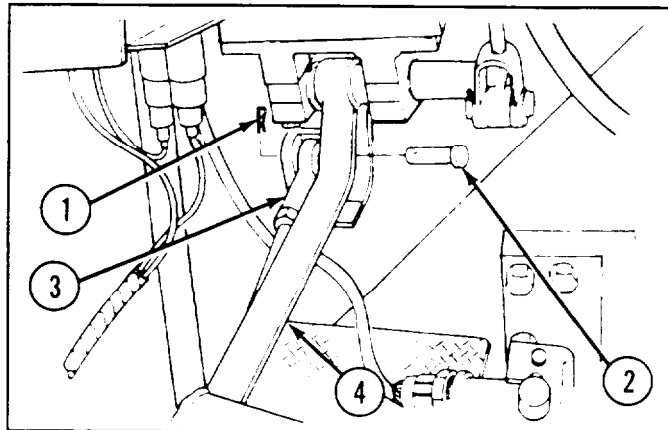
Equipment Condition:

Neutral safety switch removed (see paragraph 6-14)

9-81 REPLACE/REPAIR BRAKE PEDAL AND BRACKET ASSEMBLY—Continued

a. REMOVAL

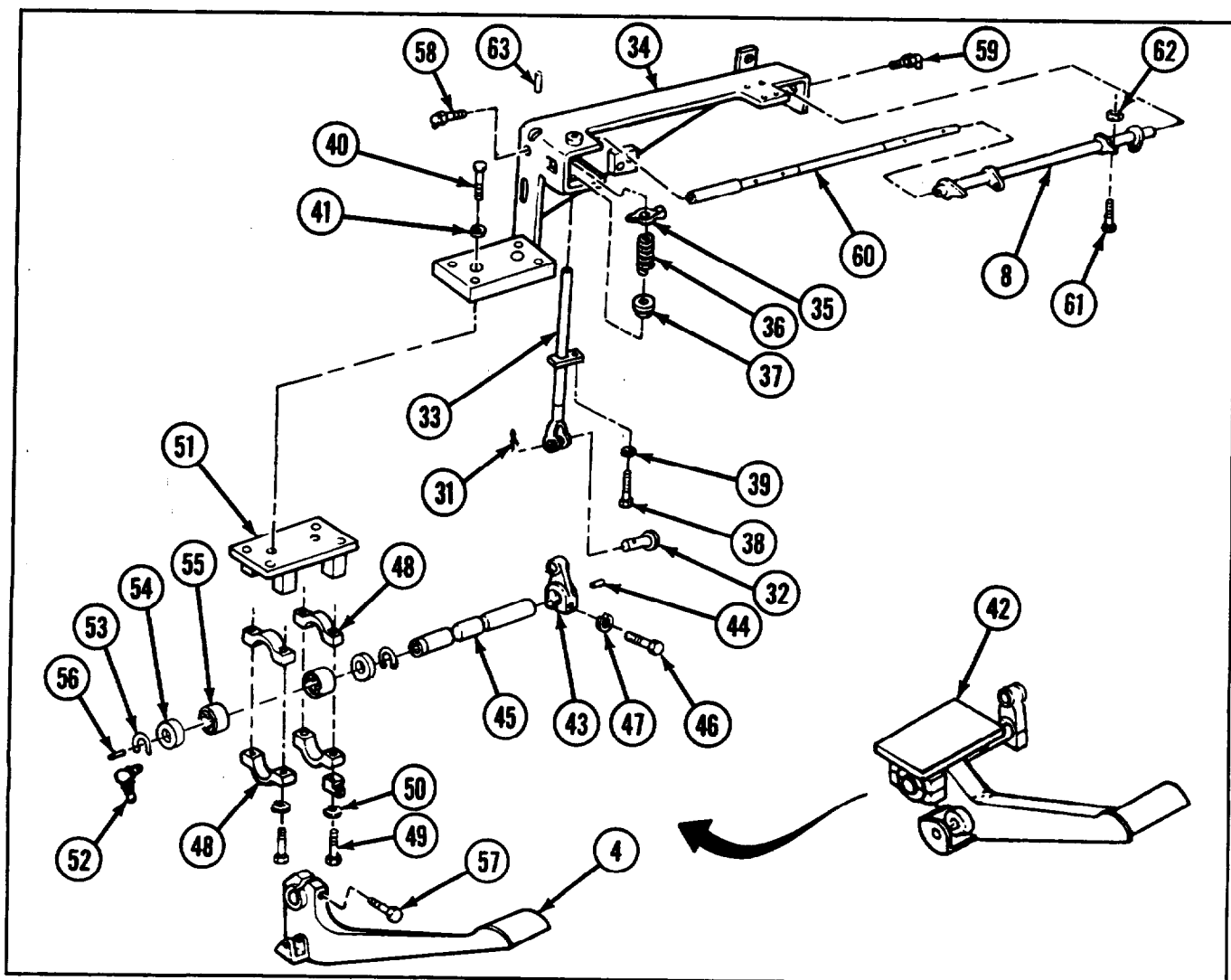
- 1 Remove cotter pin (1) and straight pin (2) and disconnect rod assembly, (3) from brake pedal (4).
- 2 Remove screw (5) and lockwasher (6)
- 3 Disconnect steering rod (7) from lever (8) by removing two cotter pins (9), straight pin (10), and two washers (11).
- 4 Disconnect shifting rod (12) from lever (8) by removing cotter pin (13) and straight pin (14).
- 5 Remove spade release bracket (15) by removing two screws (16) and two lockwashers (17).
- 6 Loosen nuts (18 and 19) and remove throttle control assembly (20) and fuel shutoff (21) from bracket (22).
- 7 Remove bracket (22) by removing two screws (23), two flat washers (24), two lockwashers (25), and two nuts (26).
- 8 Remove brake pedal and bracket assembly (27) by removing two screws (28), two lockwashers (29), and two nuts (30).



b. DISASSEMBLY

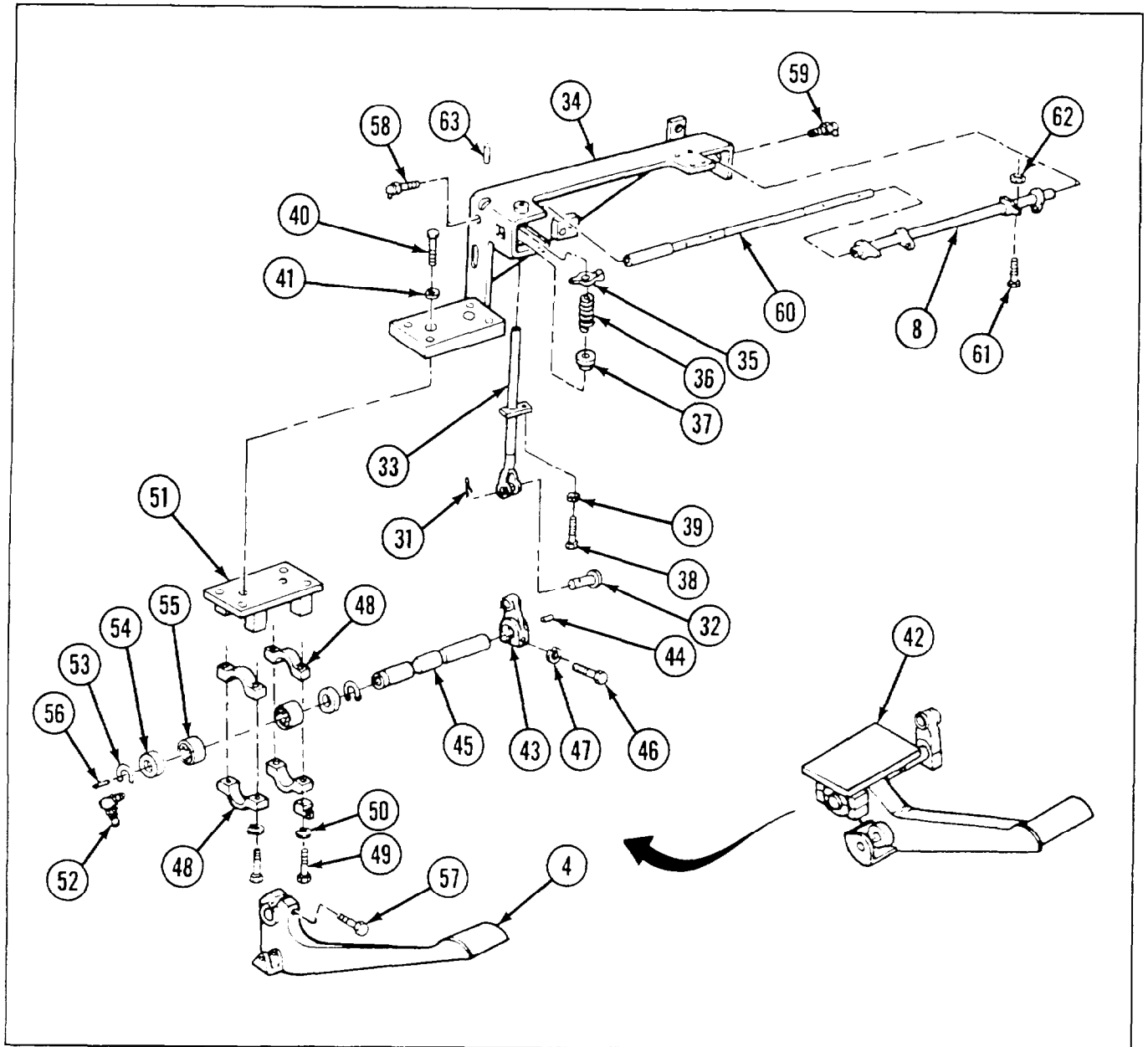
- 1 Remove cotter pin (31) and straight pin (32).
- 2 Pull cam rod (33) out of bracket (34) and remove cam (35), spring (36), and collar (37).
- 3 Remove screw (38) and nut (39) from cam rod (33).

- 4 Remove two screws (40), two lockwashers (41), and brake pedal and support assembly (42).
- 5 Remove lever (43) and key (44) from shaft (45) by removing screw (46) and lockwasher (47).
- 6 Remove four caps (48) by removing four screws (49) and four lockwashers (50). Remove brake pedal (4), with shaft (45), from support (51).
- 7 Remove lubrication fitting (52) from shaft (45).
- 8 Remove two retaining rings (53) and two washers (54) from shaft (45).
- 9 Remove two bearing assemblies (55) and key (56) from shaft (45).
- 10 Remove brake pedal (4) from shaft (45) by removing screw (57).
- 11 Remove lubrication fittings (58 and 59).
- 12 Remove shaft (60) and lever (8) from bracket (34).
- 13 Remove screw (61) and nut (62) from lever (8).
- 14 Remove pin (63) from bracket (34).



9-81 REPLACE/REPAIR BRAKE PEDAL AND BRACKET ASSEMBLY—Continued**c. ASSEMBLY**

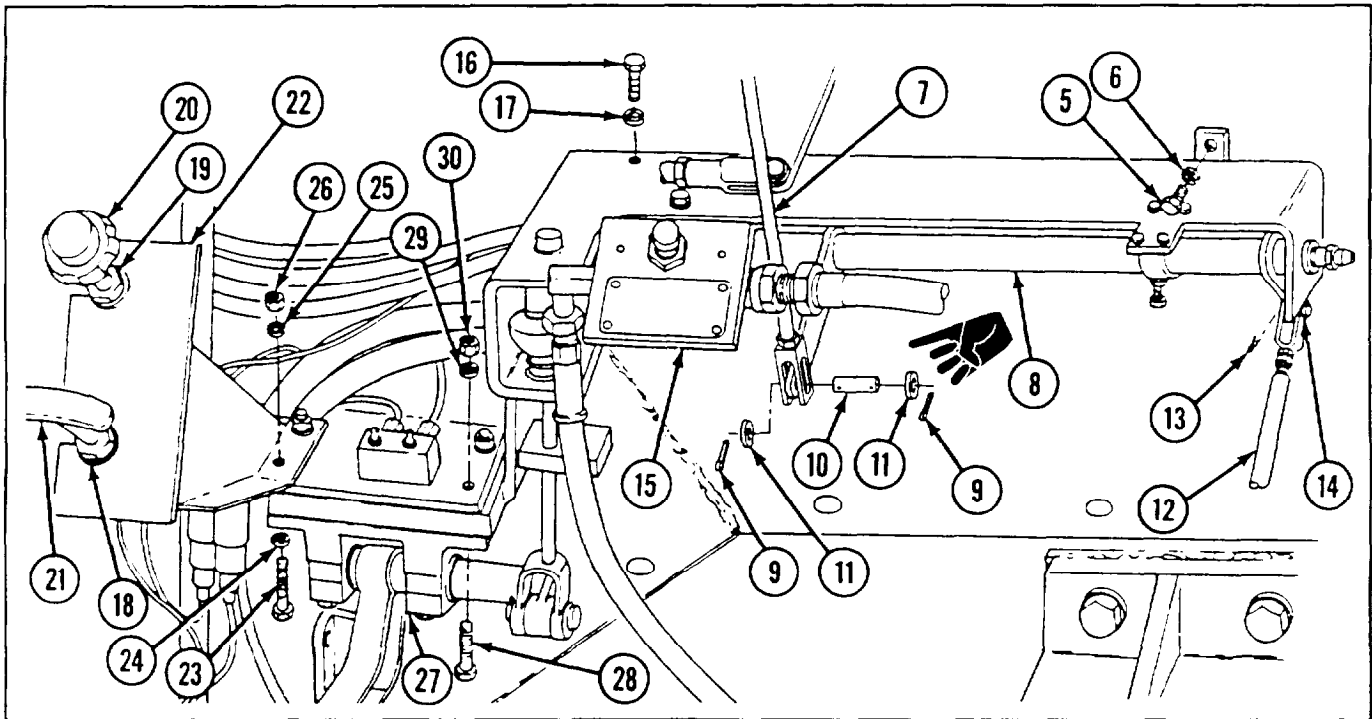
- 1 Install pin (63) to bracket (34).
- 2 Install screw (61) and nut (62) on lever (8).
- 3 Install shaft (60) and lever (8) on bracket (34).
- 4 Install lubrication fittings (58 and 59) on shaft (60).
- 5 Install brake pedal (4) on shaft (45) with screw (57).
- 6 Install two bearing assemblies (55) and key (56) on shaft (45).
- 7 Install two washers (54) and two retaining rings (53) on shaft (45).
- 8 Install lubrication fitting (52) on shaft (45).
- 9 Install assembled brake pedal (4) on support (51) with four caps (48), four screws (49), and four new lockwashers (50).
- 10 Install lever (43) and key (44) on shaft (45) with screw (46) and new lockwasher (47).
- 11 Lubricate in accordance with Appendix J.
- 12 Install brake pedal and support assembly (42) with two screws (40) and two new lockwashers (41).
- 13 Install screw (38) and nut (39) on cam rod (33).
- 14 Install cam rod (33), cam (35), spring (36), and collar (37) on bracket (34).
- 15 Install straight pin (32) and new cotter pin (31).
- 16 Lubricate in accordance with Appendix J.



9-81 REPLACE/REPAIR BRAKE PEDAL AND BRACKET ASSEMBLY-Continued

d. INSTALLATION

- 1 Install brake pedal and bracket assembly (27) with two new lockwashers (29), two screws (28), and two nuts (30).
- 2 Install bracket (22) with two screws (23), two flat washers (24), two new lockwashers (25), and two nuts (26).
- 3 Install new lockwasher (6) and screw (5).
- 4 Install throttle control assembly (20) and fuel shutoff (21) to bracket (22) and tighten nuts (18 and 19).
- 5 Install spade release bracket (15) with two new lockwashers (17) and two screws (16).
- 6 Connect shifting rod (12) to lever (8) with straight pin (14) and new cotter pin (13).
- 7 Connect steering rod (7) to lever (8) with straight pin (10), two washers (11), and two new cotter pins (9).

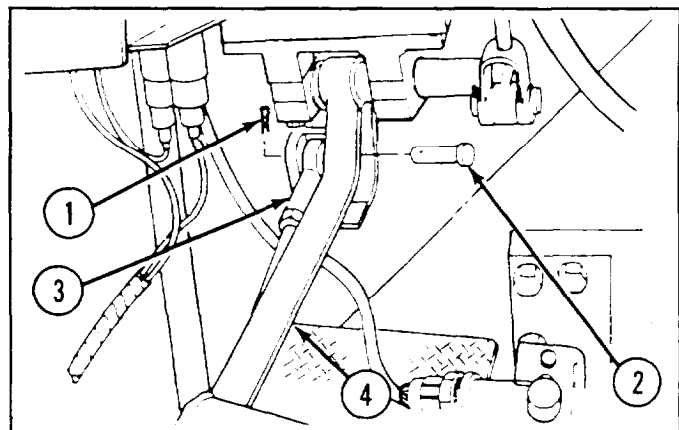


- 8 Connect rod assembly (3) to brake pedal (4) with straight pin (2) and new cotter pin (1).

NOTE

Follow-on maintenance:

Install neutral safety switch (see paragraph 6-14)



9-82 REPLACE/REPAIR BRAKE CAM ASSEMBLY**THIS TASK COVERS**

a. Removal

b. Disassembly

c. Assembly

d. Installation

INITIAL SET-UP

Parts:

- Seals (2) (Appendix G, item 262)
- Seals (2) (Appendix G, item 250)

Reference:

Deleted

a. REMOVAL

Remove brake cam assembly (see paragraph 9-80).

b. DISASSEMBLY

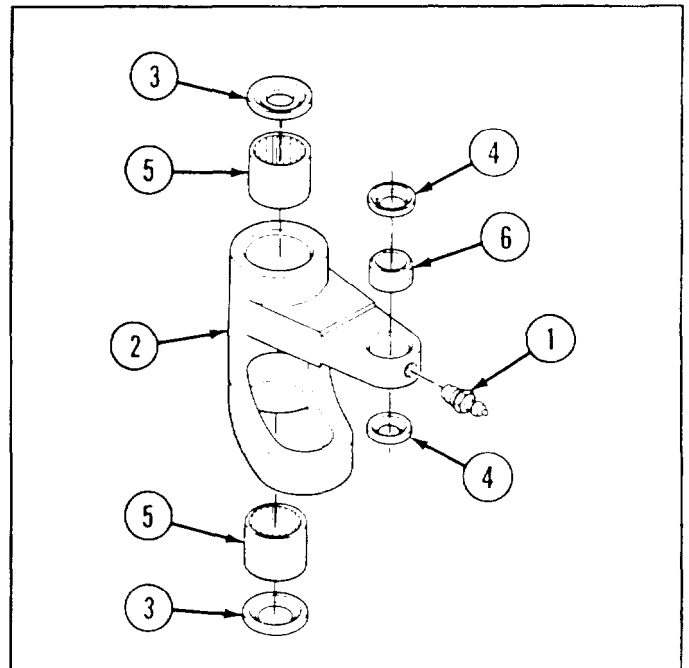
- 1 Remove lubrication fitting (1) from brake cam assembly (2).
- 2 Pry four seals (3 and 4) out of brake cam assembly (2).
- 3 Tap two bearings (5) and bearing (6) out of brake cam assembly (2).

c. ASSEMBLY

- 1 Install two bearings (5) into brake cam assembly (2).
- 2 Install bearing (6) into brake cam assembly (2) making sure that bearing hole aligns with hole in brake cam assembly for lubrication fitting.

NOTE

Seals must be installed with rubber lips facing outward.



- 3 Install four new seals (3 and 4) in brake cam assembly (2).
- 4 Install lubrication fitting (1) in brake cam assembly (2).
- 5 Lubricate in accordance with Appendix J.

d. INSTALLATION

Install brake cam assembly (see paragraph 9-80).

9-83 REPLACE/REPAIR BEARING UNIT HOUSING ASSEMBLY

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic' s (Appendix C, item 53)
- *Pliers, retaining ring (Appendix C, item 30)

Parts:

- Seal (Appendix G, item 244)
- Seal (Appendix G, item 245)
- Seal (Appendix G, item 253) (for left-center brake shaft bearing unit only)

Reference:

Deleted

Equipment Condition:

Service brake linkages removed as necessary (see paragraph 9-80)

a. REMOVAL

Remove bearing unit housing assembly (see paragraph 9-80).

b. DISASSEMBLY

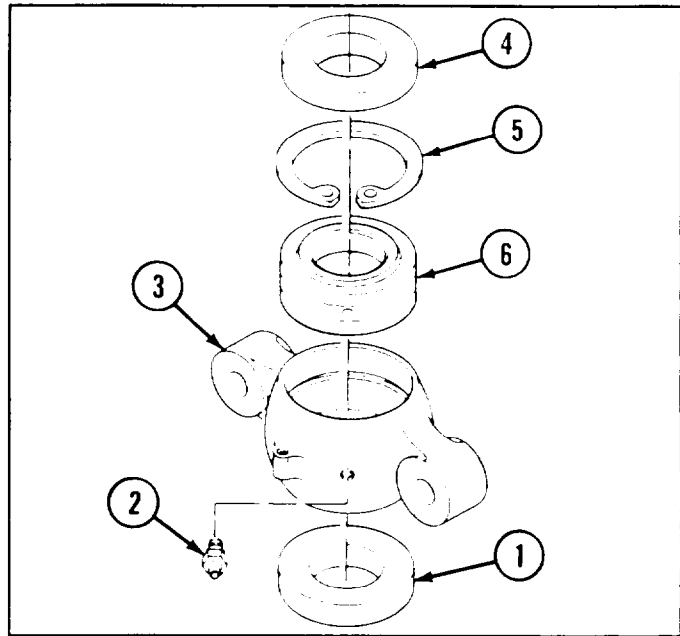
NOTE

Seal (1) and lubrication fitting (2) are not part of left-center brake shaft bearing unit housing assembly.

- 1 Remove lubrication fitting (2) from housing (3).
- 2 Pry seals (1 and -l) out of housing (3).
- 3 Remove retaining ring (5) from housing (3).
- 4 Remove ball bearing (6) from housing (3).

c. ASSEMBLY

- 1 Install ball bearing (6) into housing (3) making sure that bearing hole alines with hole for lubrication fitting in housing. Secure ball bearing with retaining ring (5).



NOTE

Seals (1 and 4) must be installed with rubber lips facing outward.

- 2 Install new seals (1 and 4) into housing (3).
- 3 Install lubrication fitting (3) into housing (3).
- 4 Lubricate in accordance with Appendix J.

d. INSTALLATION

Install bearing unit housing assembly (see paragraph 9-80).

NOTE

Follow-on maintenance: Install service brake linkages if removed (see paragraph 9-80)

9-84 REPLACE/REPAIR PLATE ASSEMBLY
THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP
Tools:

Tool kit, general mechanic' s (Appendix C, item 53)

Parts:

Seals (6) (Appendix G, item 250)

a. REMOVAL

Remove plate assembly (see paragraph 9-80).

b. DISASSEMBLY

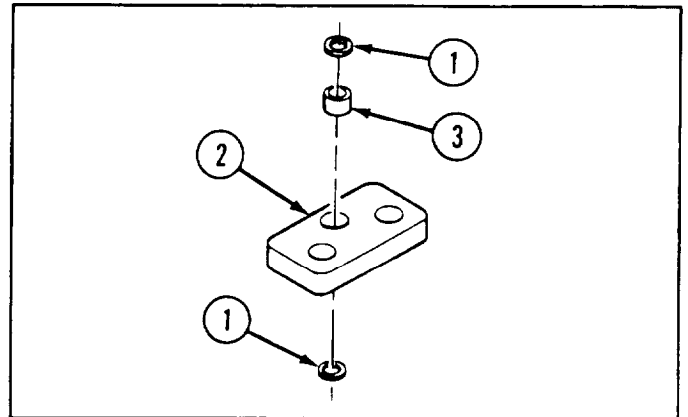
- 1 Pry six seals (1) out of plate (2).
- 2 Tap three bearings (3) out of plate (2).

c. ASSEMBLY

- 1 Install three bearings (3) into plate (2).
- 2 Install three new seals (1) on each side of plate (2).

d. INSTALLATION

Install plate assembly (see paragraph 9-80).


9-85 REPLACE LEVER ASSEMBLY
THIS TASK COVERS

- a. Disassembly b. Assembly

INITIAL SET-UP
Tools:

Tool kit, general mechanic' s (Appendix C, item 53)

Reference:

Deleted

Parts:

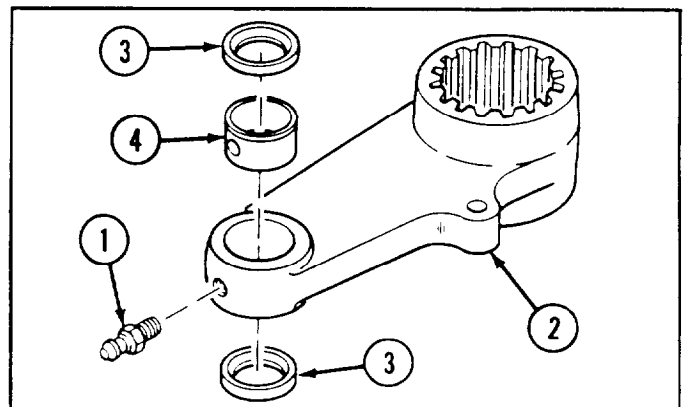
Seals (2) (Appendix G, item 250)

Equipment Condition:

Lever assembly removed (see paragraph 9-80)

a. DISASSEMBLY

- 1 Remove lubrication fitting (1) from lever (2).
- 2 Pry two seals (3) out of lever (2).
- 3 Tap bearing (4) out of lever (2).



9-85 REPLACE LEVER ASSEMBLY-CONTINUED

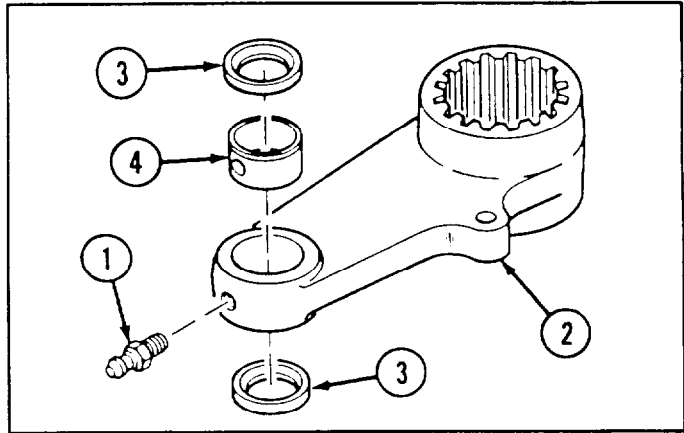
b. ASSEMBLY

- 1 Install bearing (4) into lever (2) making sure that bearing hole aligns with hole for lubrication fitting in lever.

NOTE

Seals (3) must be installed with rubber lips facing outward.

- 2 Install two new seals (3) into lever (2).
- 3 Install lubrication fitting (1) into lever (2).
- 4 Lubricate in accordance with Appendix J.



NOTE

Follow-on maintenance: Install lever assembly (see paragraph 9-80)

9-86 REPLACE LINKAGE ROLLER PLATES

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Lockwashers (6) (Appendix G, item 134)

NOTE

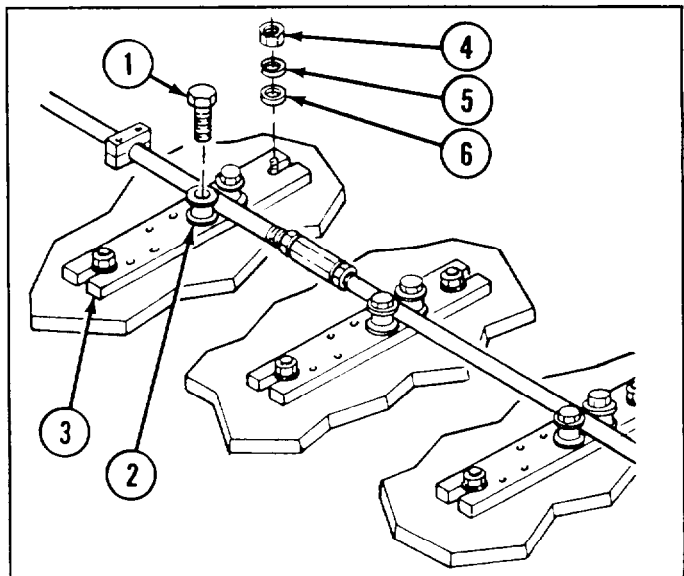
Removal and installation procedures are the same for all three linkage roller plates.

a. REMOVAL

- 1 Removal eight bolts (1) and eight rollers (2) from linkage roller plate (3).
- 2 Remove linkage roller plate (3) by removing two nuts (A), two lockwashers (5), and two flat washers (6).

b. INSTALLATION

- 1 Install linkage roller plate (3) with two flat washers (6), two new lockwashers (5), and two nuts (4).
- 2 Install eight rollers (2) and eight bolts (1) to linkage roller plate (3).



SECTION VI: EXTERIOR STOWAGE

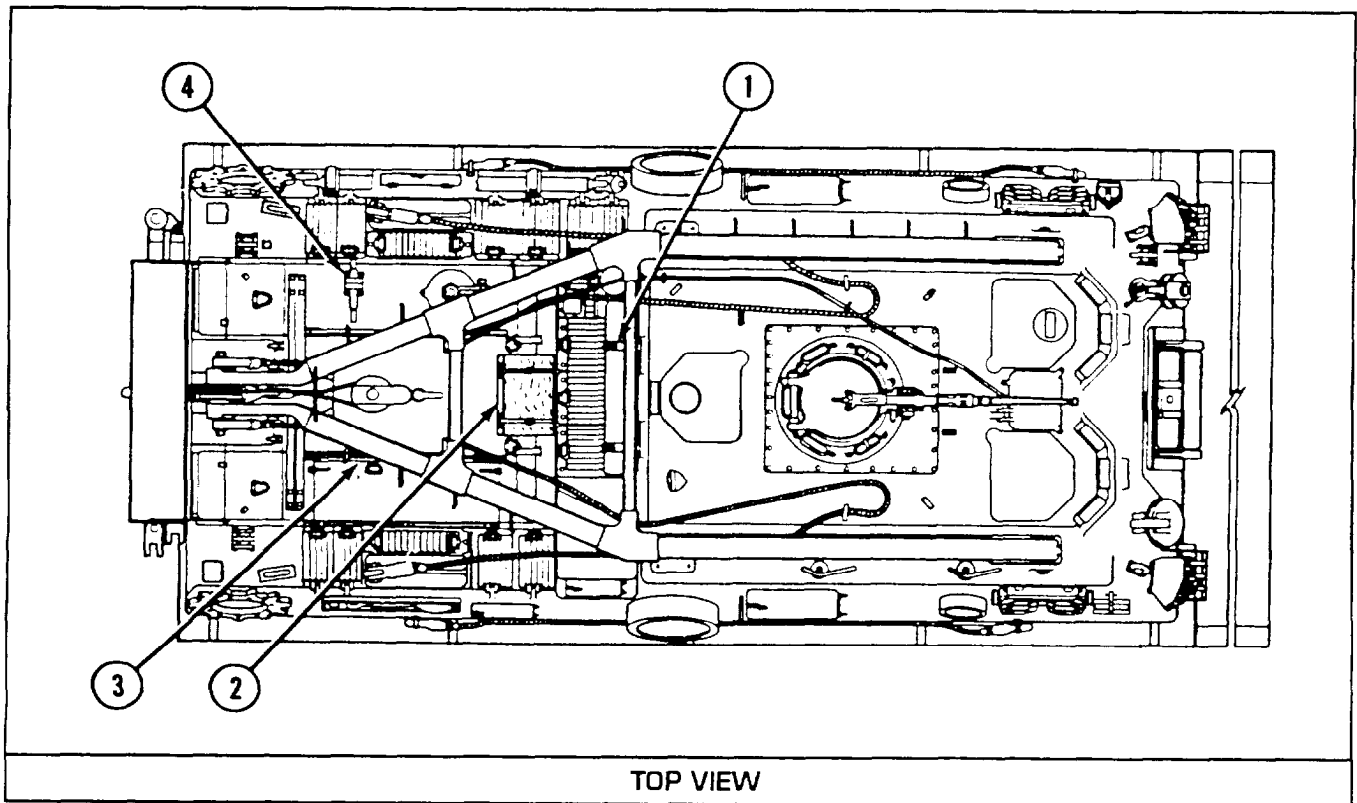
Para.	Task	Page
9-87	Replace Vise Mounting Hardware and Adapter Plate.....	9-211
9-87.1	Replace M13 Decontamination Apparatus Bracket Assembly.....	9-212.1
9-88	Replace/Repair Tow Bar Assembly, Tow Bar Mounting Brackets, and Tow Chain Mounting Brackets.....	9-212.2
9-89	Replace/Repair Bracket Assemblies for Side Tow, Bar and Side Tow Cables.....	9-215
9-90	Replace Tarpaulin Tray.....	9-217
9-91	Replace 10-Ton Snatch Block and Track Link Retainers.....	9-218
9-92	Replace 25-Ton Snatch Block Retainer.....	9-219
9-93	Replace Oxygen Tank Strap Assemblies.....	9-219
9-94	Replace/Repair Pioneer Tool Set Bracket.....	9-220
9-95	Replace Roadwheel, Support Wheel, and Sprocket Attaching Hardware.....	9-222

NOTE

90-ton snatch block retainers are welded to hull

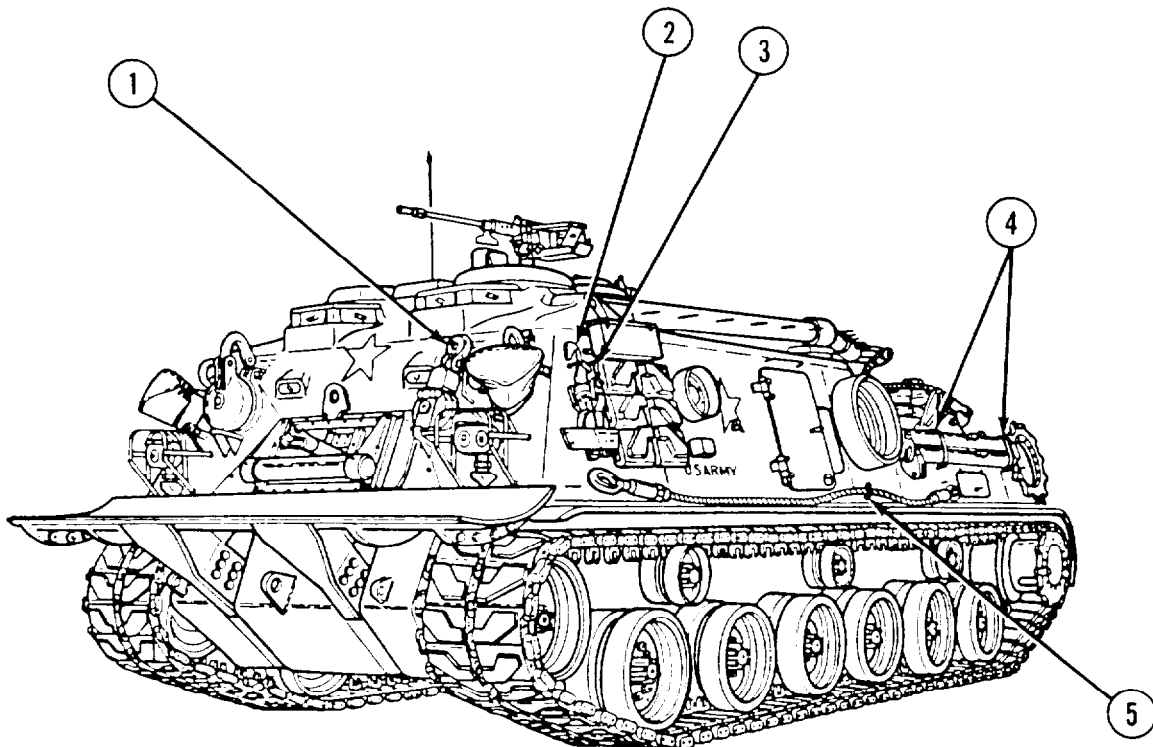
The following three illustrations are locator views for exterior stowage.

- | | |
|--------------------------------|----------------------|
| 1 Oxygen tank strap assemblies | 3 Crowbar straps |
| 2 Tarpaulin tray | 4 Vise adapter plate |



- 1 25-ton snatch block retainer
- 2 10-ton snatch block retainer (left side)
- 3 Track Link retainers (both sides)

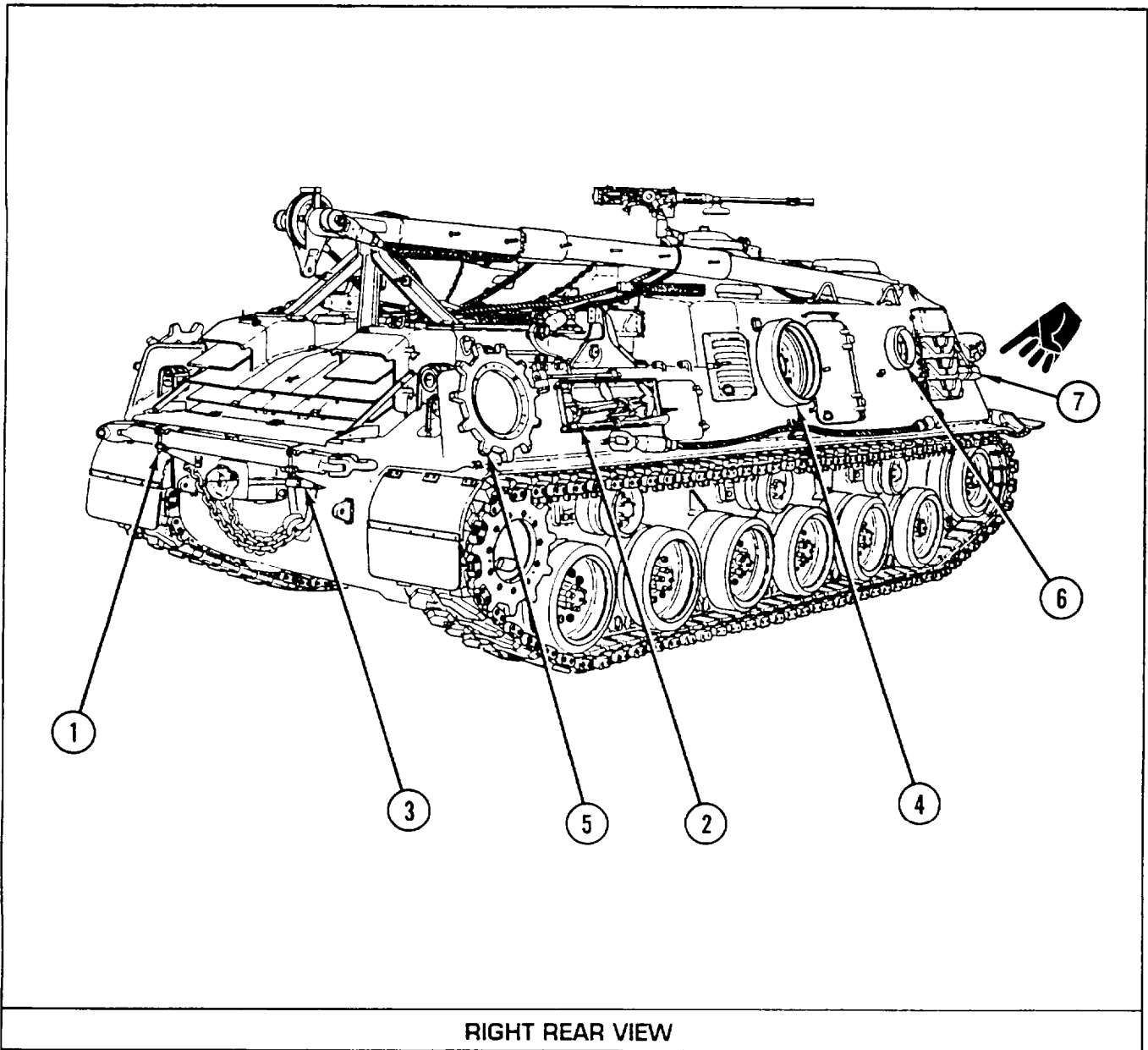
- 4 Side tow bar bracket assemblies
- 5 Tow cable clamps (both sides)



LEFT FRONT VIEW

- 1 Rear tow bar brackets
- 2 Pioneer tool set bracket and straps
- 3 Lifting chain clamps

- 4 Roadwheel
- 5 Sprocket
- 6 Support wheel
- 7 M13 decontamination apparatus



9-87 REPLACE VISE MOUNTING HARDWARE AND ADAPTER PLATE

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic' s (Appendix C, item 53)

Parts:

Lockwashers (8) (Appendix G, item 13-1)

9-87 REPLACE VISE MOUNTING HARDWARE AND ADAPTER PLATE-Continued

NOTE

The M88A1 uses either a three- or four-mounting-hole vise. The four-mounting-hole vise procedure is shown.

a. REMOVAL

- 1 Remove vise (1) by removing four screws (2), four lockwashers (3), and four flat washers (4).

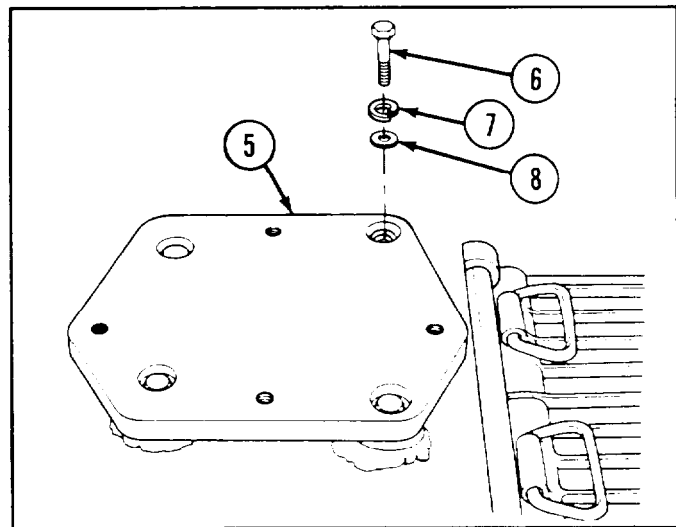
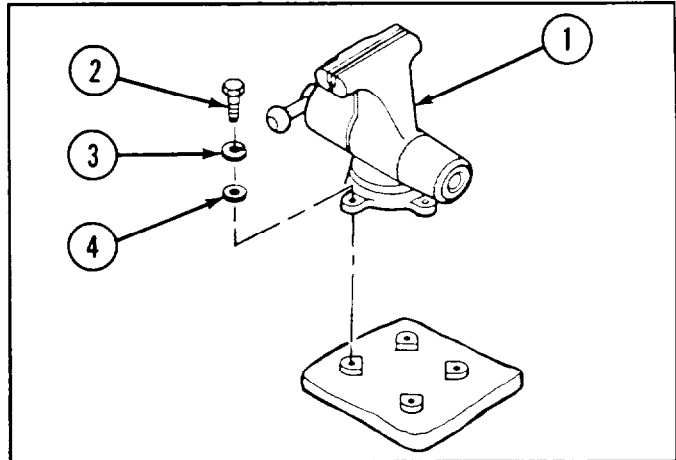
NOTE

Vise adapter plate is required only when three-mounting-hole vise is used. Proceed with step 2 only if necessary.

- 2 Remove vise adapter plate (5) by removing four screws (6), four lockwashers (7), and four flat washers (8).

b. INSTALLATION

- 1 Install vise adapter plate (5) by installing four flat washers (8), four new lockwashers (7), and four screws (6).
- 2 Install vise (1) by installing four flat washers (4), four new lockwashers (3), and four screws (2).



9-88 REPLACE/REPAIR TOW BAR ASSEMBLY, TOW BAR MOUNTING BRACKETS, AND TOW CHAIN MOUNTING BRACKETS

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic' s
(Appendix C, item 53)

Parts:

- Lockwashers (11) (Appendix G, item 134)
- Lockwashers (2) (Appendix G, item 139)
- Pins, cotter (6) (Appendix G, item 719)

Personnel

Required:

Two

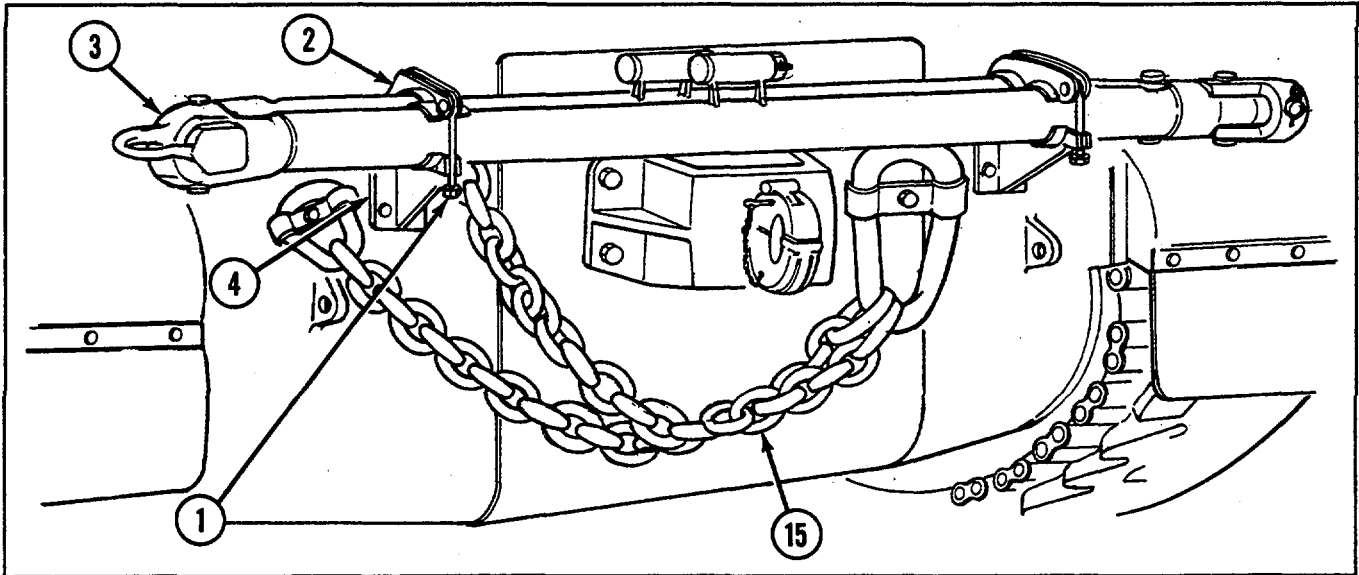
WARNING

Tow bar assembly is extremely heavy—two persons are required for removal and installation.

a. REMOVAL**NOTE**

- Lift or remove exhaust deflector (see paragraph 9-59) as required for clearance.
- Steps 1 through 5 apply to both left- and right-side tow bar mounting brackets.

- 1 Loosen nut (1) to open clamp assembly (2) and remove tow bar (3) from bracket (4).

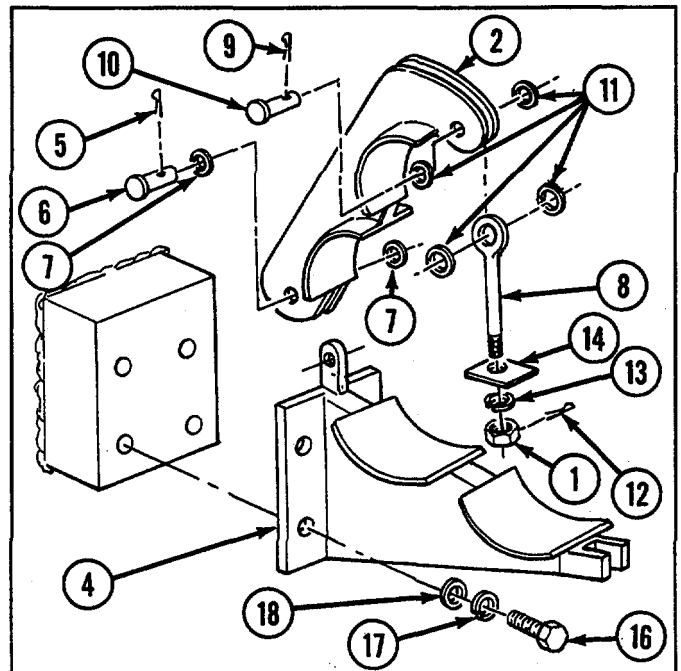


- 2 Remove cotter pin (5), pin (6), two flat washers (7), and clamp assembly (2) from bracket (4).
- 3 Remove eyebolt (8) from clamp assembly (2) by removing cotter pin (9), pin (10), and four flat washers (11).
- 4 Remove cotter pin (12), nut (1), lockwasher (13), and spacer (14) from eyebolt (8).

WARNING

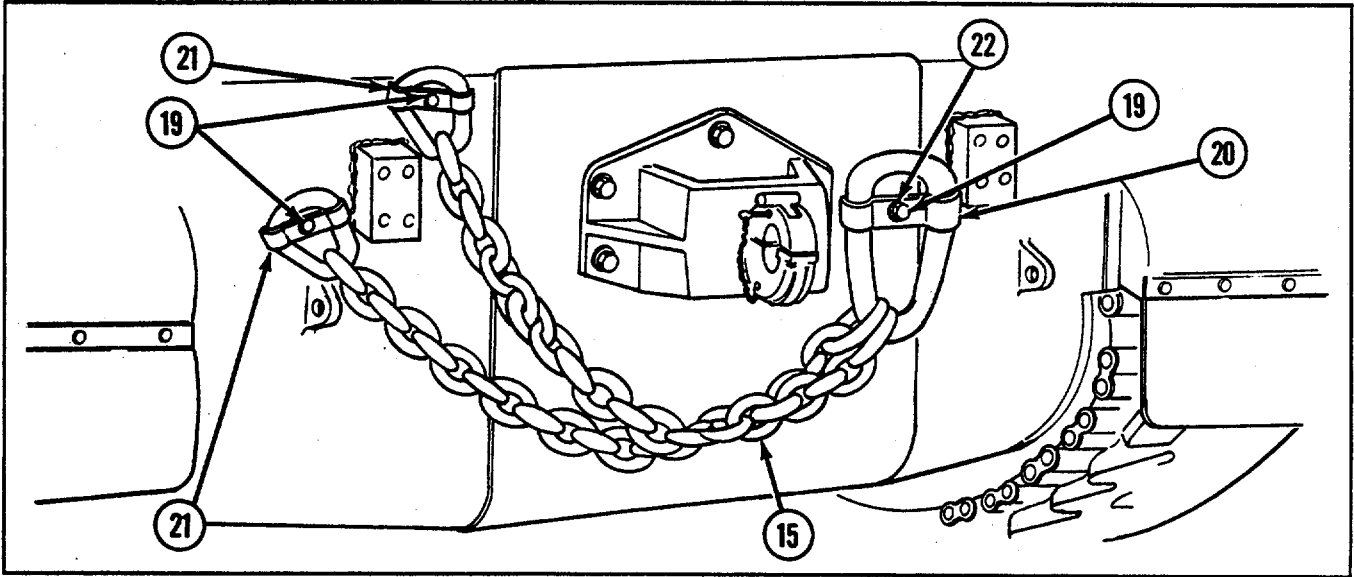
If bracket (4) or tow chain (15) is dropped, it may cause serious injury.

- 5 Remove bracket (4) by removing four screws (16), four lockwashers (17), and four flat washers (18).



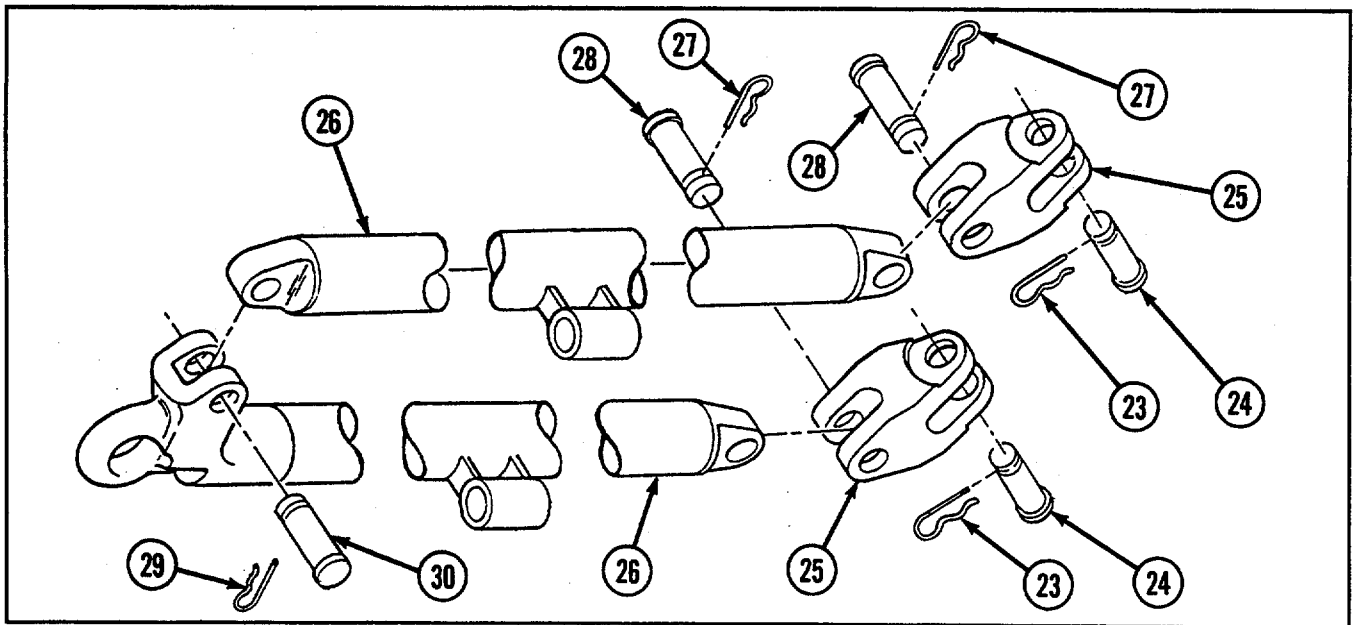
9-88 REPLACE/REPAIR TOW BAR ASSEMBLY, TOW BAR MOUNTING BRACKETS, AND TOW CHAIN MOUNTING BRACKETS-Continued

- 6 Loosen three screws (19) and turn clamps (20 and 21) to release tow chain (15). Remove tow chain.
- 7 Remove three screws (19), three lockwashers (22), two clamps (21), and clamp (20).



b. DISASSEMBLY

- 1 Remove locking pin (23) and headed pin (24) from each of two devices (25).
- 2 Remove clevis (25) from each tube assembly (26) by removing from each locking pin (27) and headed pin (28).
- 3 Separate tube assemblies (26) by removing locking pin (29) and headed pin (30).



c. ASSEMBLY

- 1 Connect tube assemblies (26) with headed pin (30) and locking pin (29).
- 2 Install clevis (25) on each tube assembly (26) with headed pin (28) and locking pin (27).
- 3 Install headed pin (24) and locking pin (23) on each of two devises (25).

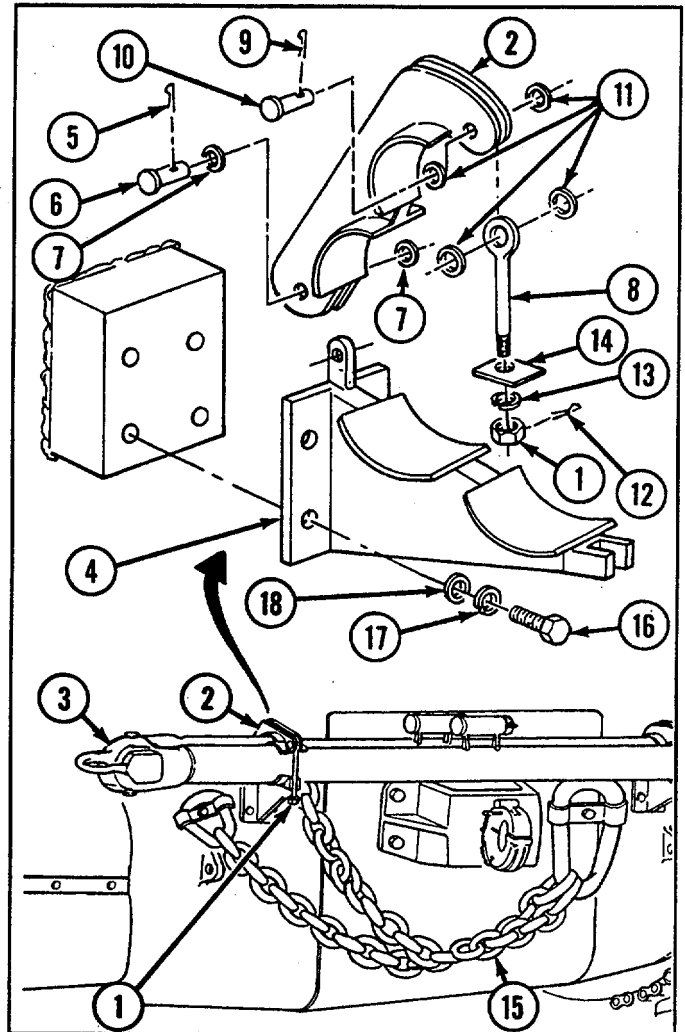
d. INSTALLATION

- 1 Install clamp (20), two clamps (21), three new lockwashers (22), and three screws (19). Do not tighten screws.
- 2 Install tow chain (15) and secure using two clamps (21) and clamp (20). Tighten three screws (19).

NOTE

Steps 3 through 7 apply to both left- and right-side tow bar mounting brackets.

- 3 Install bracket (4) with four screws (16), four new lockwashers (17), and four flat washers (18).
- 4 Install spacer (14), new lockwasher (13), nut (1), and new cotter pin (12) to eyebolt (8).
- 5 Install eyebolt (8) to clamp assembly (2) with four flat washers (11), pin (10), and new cotter pin (9).
- 6 Install clamp assembly (2) to bracket (4) with two flat washers (7), pin (6), and new cotter pin (5).
- 7 Place tow bar (3) in bracket (4), close clamp assembly (2), and tighten nut (1).

**9-89 REPLACE/REPAIR BRACKET ASSEMBLIES FOR SIDE TOW BAR AND SIDE TOW CABLES****THIS TASK COVERS**

a. Removal

b. Disassembly

c. Assembly

d. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's (Appendix C, item 53)

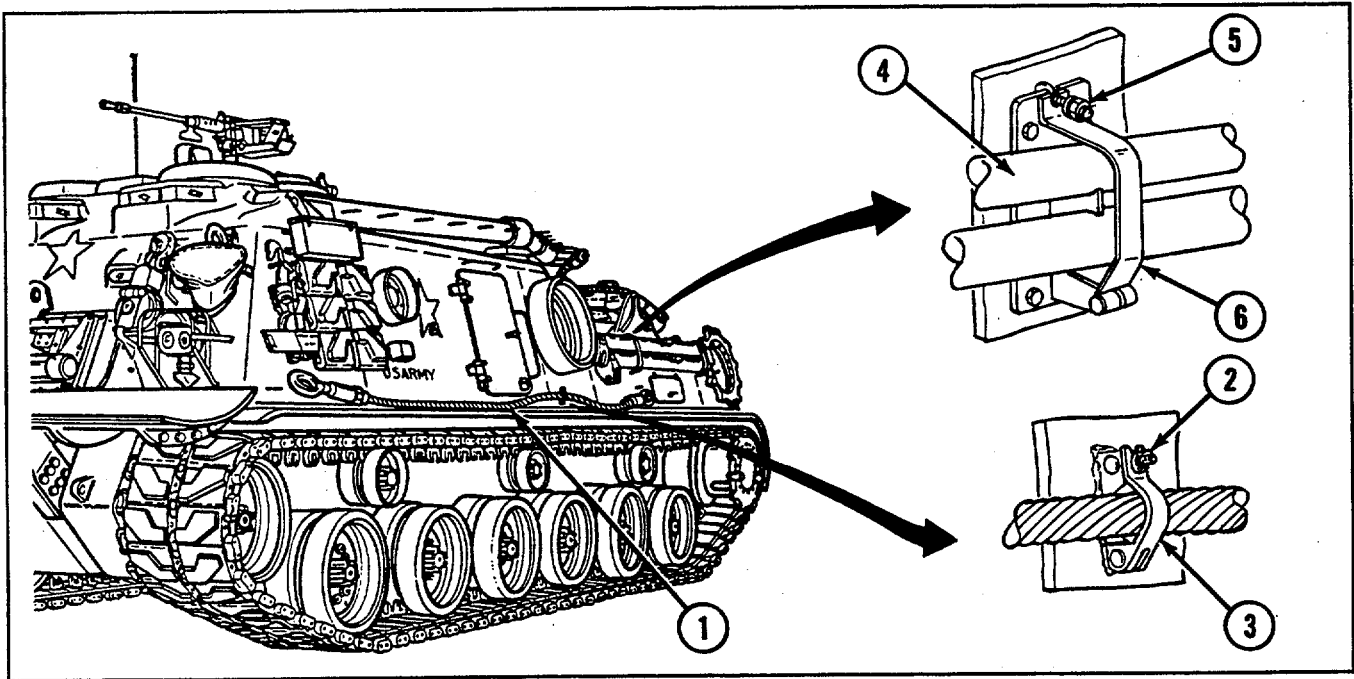
Parts:

- Lockwashers (10) (Appendix G, item 134)
- Pins, cotter (2) (Appendix G, item 213)
- Pins, cotter (2) (Appendix G, item 221)

9-89 REPLACE/REPAIR BRACKET ASSEMBLIES FOR SIDE TOW BAR AND SIDE TOW CABLES-Continued

a. REMOVAL

- 1 Remove two tow cables (1) by loosening six wingnuts (2) and opening six clamps (3).
- 2 Remove tow bar (4) by loosening two nuts (5) and opening two clamps (6).

**NOTE**

The following procedures are the same for both forward and rear bracket assemblies.

- 3 Remove bracket assembly (7) by removing four screws (8) and four lockwashers (9).

9-91 REPLACE 10-TON SNATCH BLOCK AND TRACK LINK RETAINERS**THIS TASK COVERS**

a. Removal

b. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

- Lockwashers (8) (Appendix G, item 132)
- Lockwashers (14) (Appendix G, item 134)

Equipment Condition:

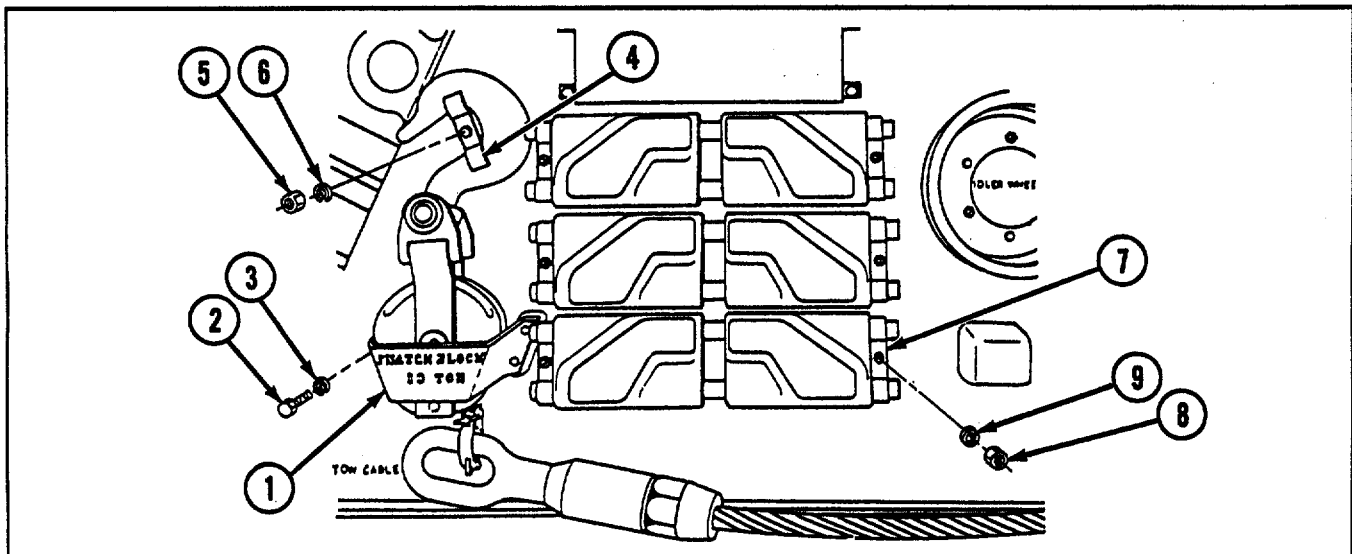
Snatch block and track links
removed (refer to TM 9-2350-
256-10)

NOTE

- Removal and installation procedures are the same for both left- and right-side track link retainers. Left side shown.
- Snatch block and track links shown for clarity.

a. REMOVAL

- 1 Remove snatch block bracket (1) by removing four screws (2) and four lockwashers (3).
- 2 Remove retainer (4) by removing nut (5) and lockwasher (6).
- 3 Remove six track link retainers (7) by removing six nuts (8) and six lockwashers (9).

**b. INSTALLATION**

- 1 Install six track link retainers (7) using six new lockwashers (9) and six nuts (8).
- 2 Install retainer (4) using new lockwasher (6) and nut (5).
- 3 Install snatch block bracket (1) using four new lockwashers (3) and four screws (2).

NOTE

Follow-on maintenance: Install snatch block and track link (refer to TM 9-2350-256-10)

9-93 REPLACE OXYGEN TANK STRAP ASSEMBLIES - Continued

NOTE

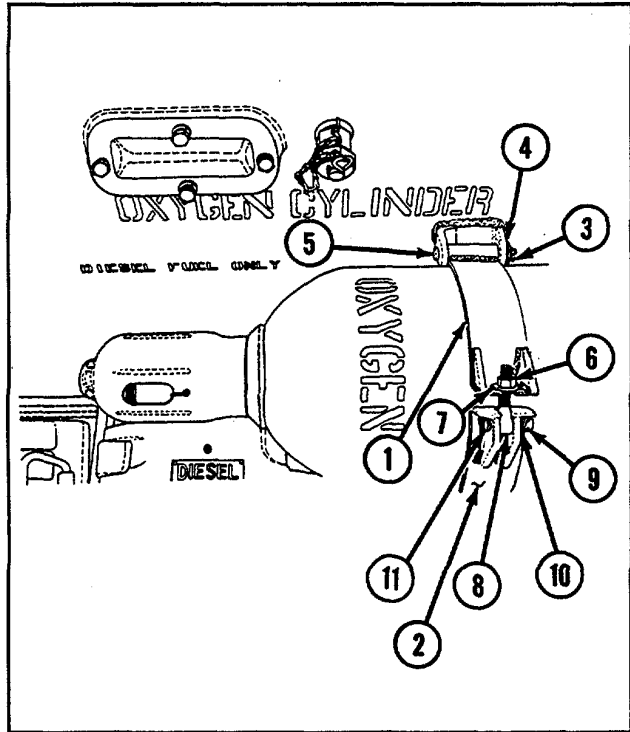
Oxygen tank shown for clarity.

a. REMOVAL

- 1 Remove four straps (1 and 2) by removing four cotter pins (3), four flat washers (4), and four straight pins (5).
- 2 Remove nut (6) and lockwasher (7) from each bolt (8).
- 3 Remove bolt (8) from each of two straps (2) by removing cotter pin (9), flat washer (10), and straight pin (11).

b. INSTALLATION

- 1 Install bolt (8) to each of two straps (2) with straight pin (11), flat washer (10), and new cotter pin (9).
- 2 Install new lockwasher (7) and nut (6) to each bolt (8).
- 3 Install four straps (1 and 2) with four straight pins (5), four flat washers (4), and four new cotter pins (3).



NOTE

Follow-on maintenance: Install oxygen tank (refer to TM 9-23560-256-10)

9-94 REPLACE/REPAIR PIONEER TOOL SET BRACKET

THIS TASK COVERS

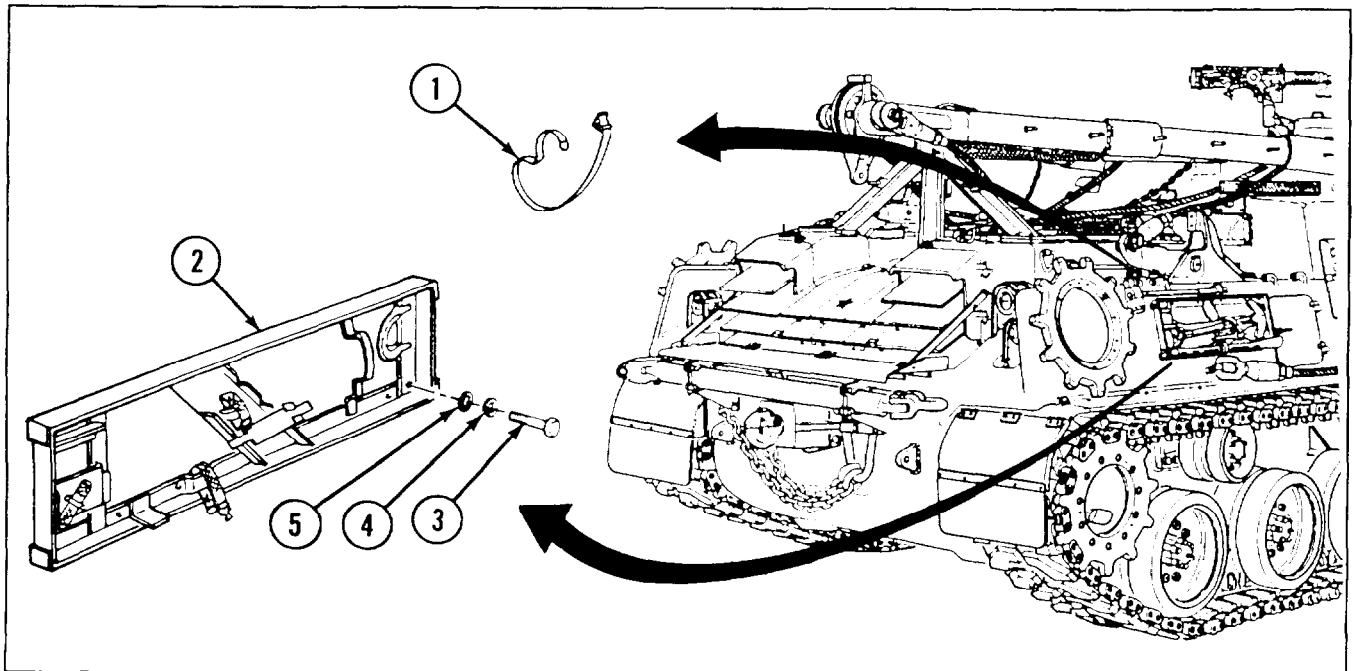
- | | | | |
|------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
|------------|----------------|-------------|-----------------|

INITIAL SET-UP

Tools: Tool kit, general mechanic's (Appendix C, item 53)	Parts: Lockwashers (4) (Appendix G, item 132)	Equipment Condition: Pioneer tool set removed (refer to TM 9-2350-256-10)
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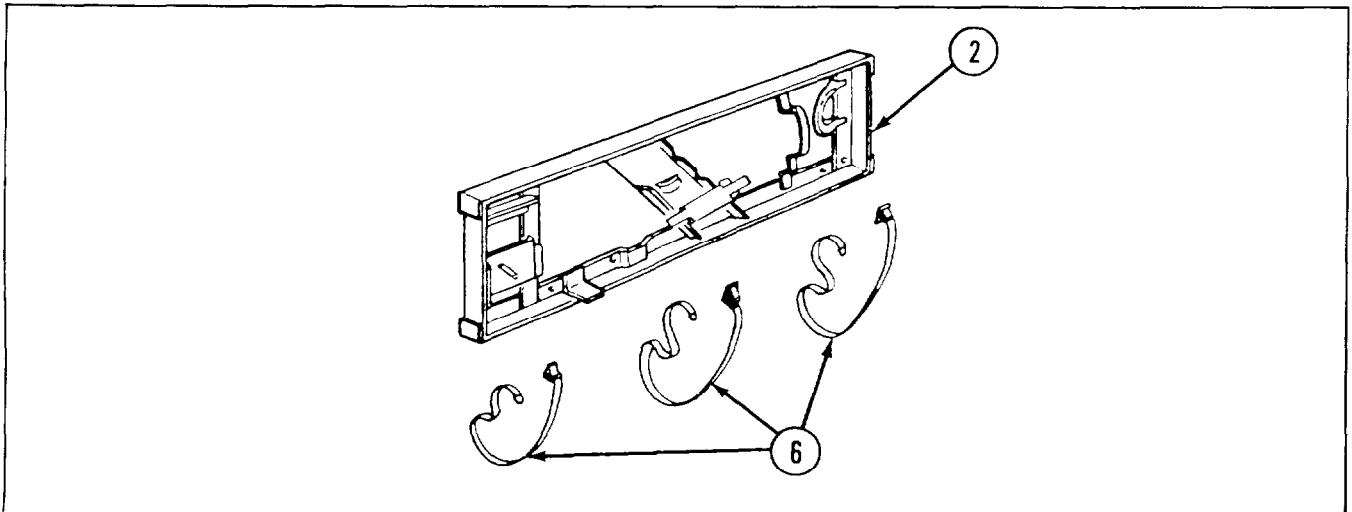
a. REMOVAL

- 1 Remove strap (1).
- 2 Remove pioneer tool set bracket (2) by removing four screws (3), four lockwashers (4), and two flat washers (5).



b. DISASSEMBLY

Remove three straps (6) from pioneer tool set bracket (2).



c. ASSEMBLY

Install three straps (6) on pioneer tool set bracket (2).

d. INSTALLATION

1 Install pioneer tool set bracket (2) using two flat washers (4), and four screws (3).

2 Install strap (1).

NOTE

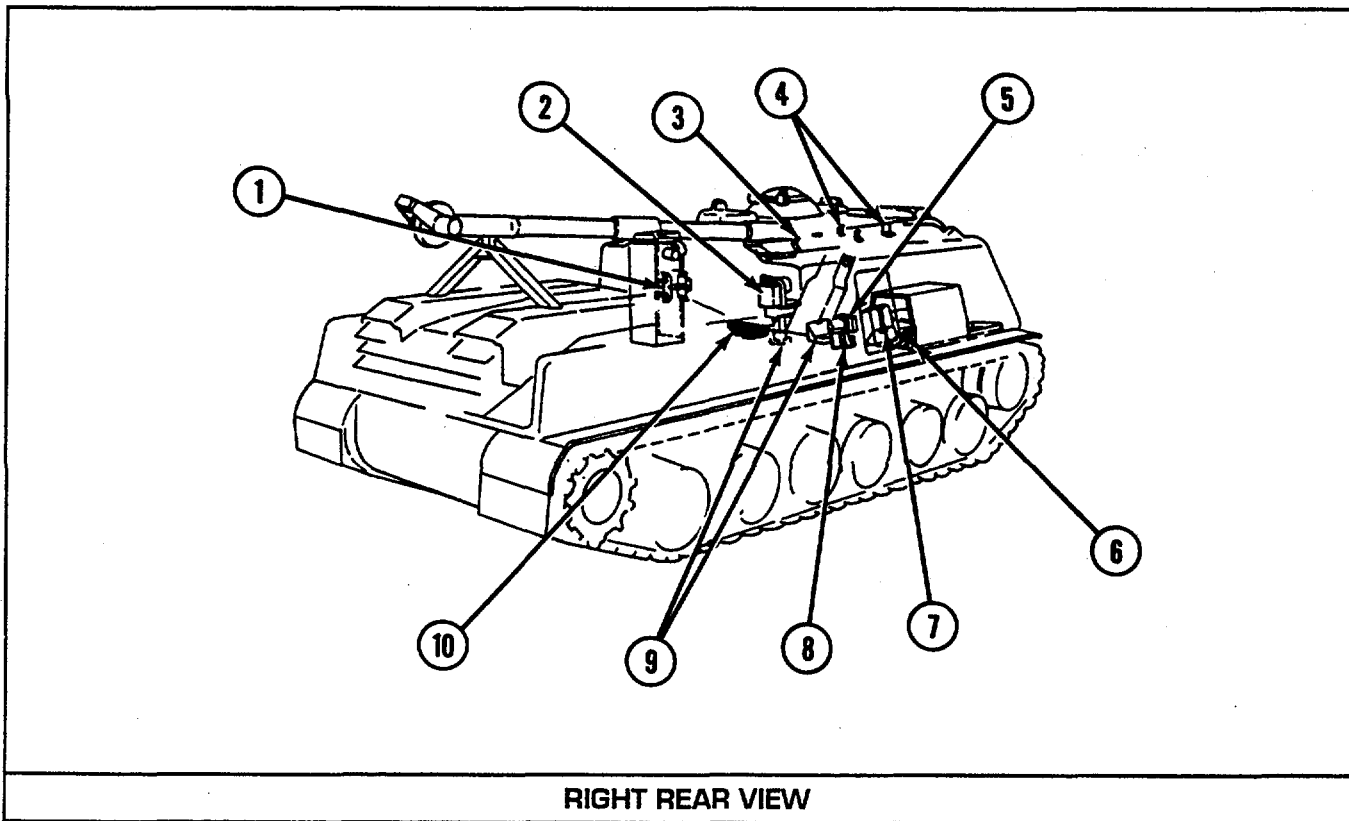
Follow-on maintenance: Install pioneer tool set (refer to TM 9-2350-256-10)

SECTION VII: INTERIOR STOWAGE

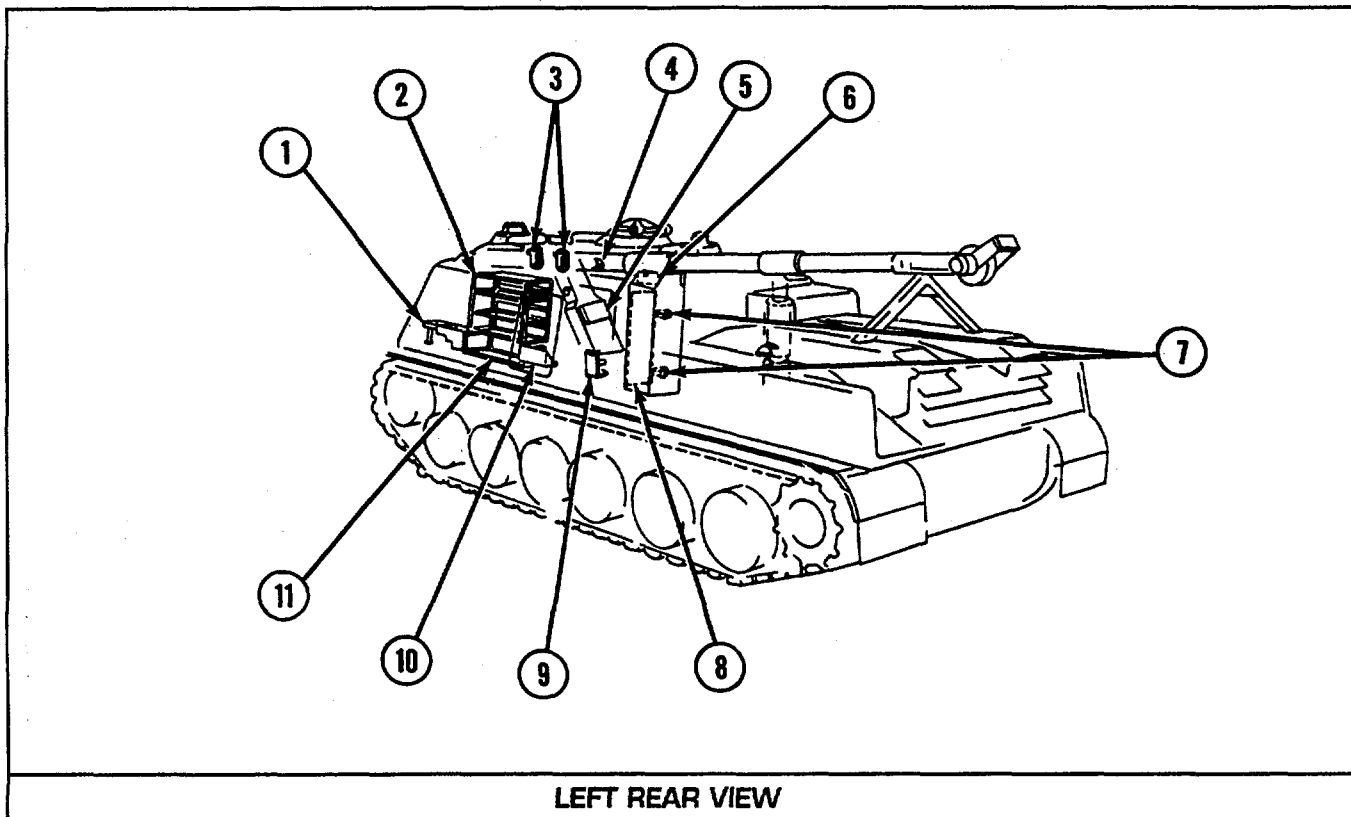
Para.	Task.....	Page
9-96	Replace Stowage Baskets	9-224
9-97	Replace Passive Night Viewer Stowage Box, Hand Grenade Boxes, and Machine Gun and Rifle Holders	9-227
9-98	Replace Hand Fire Extinguisher Brackets	9-229
9-99	Replace Rocket Ammunition Stowage Box Assembly	9-232
9-100	Replace/Repair Caliber .50 Ammunition Rack and Track Wrench Bracket	9-234
9-101	Replace Acetylene and Compartment Door Hardware and Related Parts.....	9-236
9-102	Replace Flasher Light Case	9-238
9-103	Replace Toolbox Rack	9-239
9-104	Replace Oddment Tray, Left Side	9-240
9-105	Replace Caliber .50 Stowage Strap.....	9-241
9-106	Replace Liquid Container Brackets.....	9-241
9-107	Replace/Repair M72 LAW Rocket Launcher Brackets	9-242
9-108	Replace Interior and Exterior Straps.....	9-244
9-109	Replace Vehicle ID Plate	9-245

The following illustrations are of the right and left interior stowage areas.

- | | | | |
|---|---------------------------------|----|---|
| 1 | Hose rack and retainers | 6 | Rocket ammunition stowage box assembly |
| 2 | Flasher light case and brackets | 7 | Stowage straps |
| 3 | Caliber .50 barrel straps | 8 | Hand fire extinguisher bracket (right side) |
| 4 | M16 strap | 9 | Liquid container stowage bracket |
| 5 | Hand grenade boxes | 10 | Stowage baskets (under floor) |



- | | | | |
|---|---|----|---|
| 1 | Oddment tray and signal flare rack | 7 | Acetylene cylinder brackets |
| 2 | Caliber .50 ammunition rack | 8 | Acetylene compartment door hardware and sealing strip |
| 3 | M72 LAW bracket assembly | 9 | Hand fire extinguisher bracket (left side) |
| 4 | Caliber .45 machine gun | 10 | Liquid container mounting brackets |
| 5 | Passive night viewer stowage box, AN/WS-2 | 11 | Toolbox and spare part box rack |
| 6 | Oddment compartment door retainer | | |



9-96 REPLACE STOWAGE BASKETS

THIS TASK COVERS

- a. Removal b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Lockwashers (16) (Appendix G, item 132)

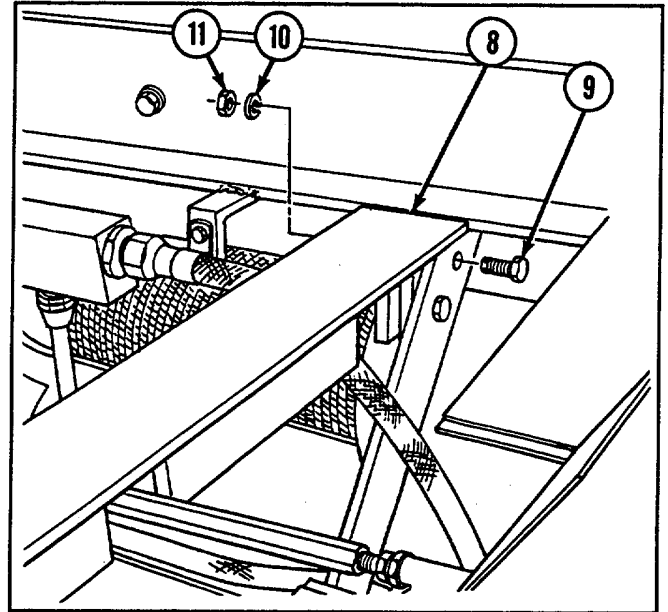
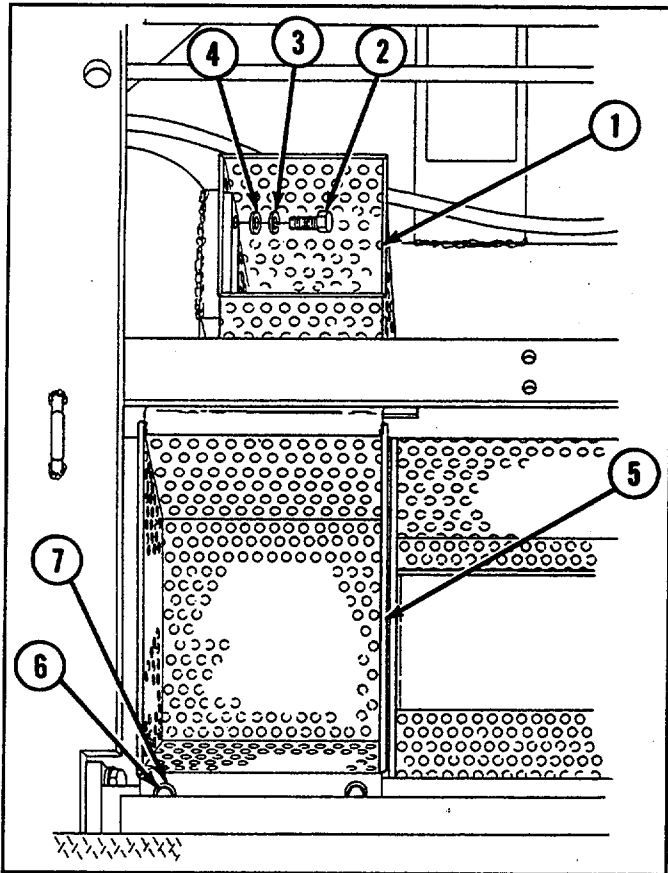
Equipment Conditions:

- Hydraulic valve forward right floor plate removed (see paragraph 9-3)
- Stowage basket forward intermediate left floor plate removed (see paragraph 9-21)
- Hydraulic valve forward intermediate right floor plate removed (see paragraph 9-23)

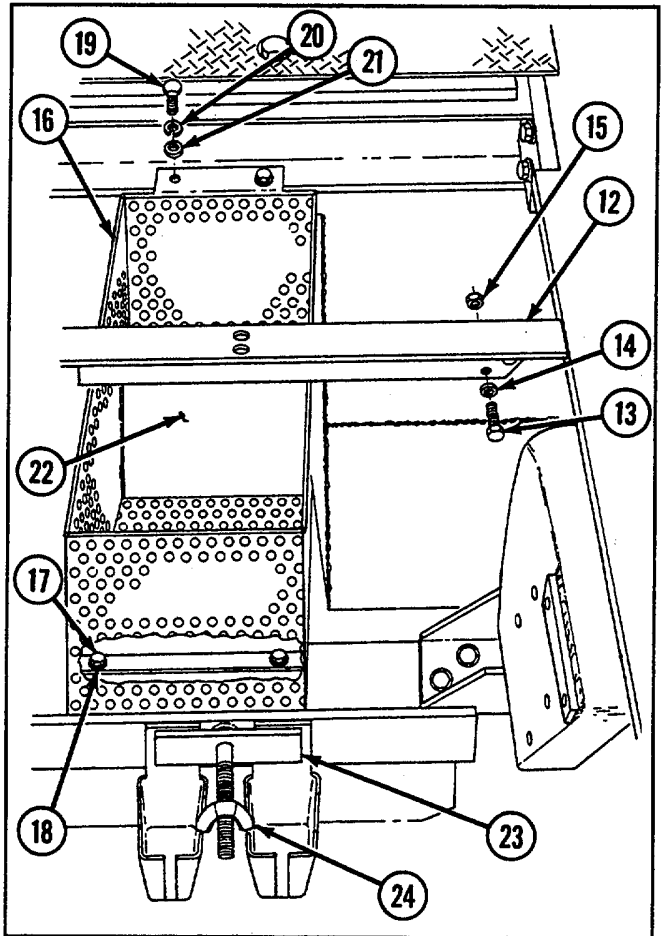
a. REMOVAL

- 1 Remove jack-and-chain stowage basket (1) by removing two screws (2), two lockwashers (3), and two flat washers (4).
- 2 Remove track connector stowage basket (5) by removing two screws (6) and two lockwashers (7).

- 3 Remove support (8) by removing four screws (9), four lockwashers (10), and four nuts (11).



- 4 Remove support (12) by removing four screws (13), four lockwashers (14), and four nuts (15).
- 5 Remove utility chain stowage basket (16) by removing two screws (17), two lockwashers (18), two screws (19), two lockwashers (20), and two flat washers (21).
- 6 Remove divider assembly (22).
- 7 Remove strap (23) by removing wingnut (24).

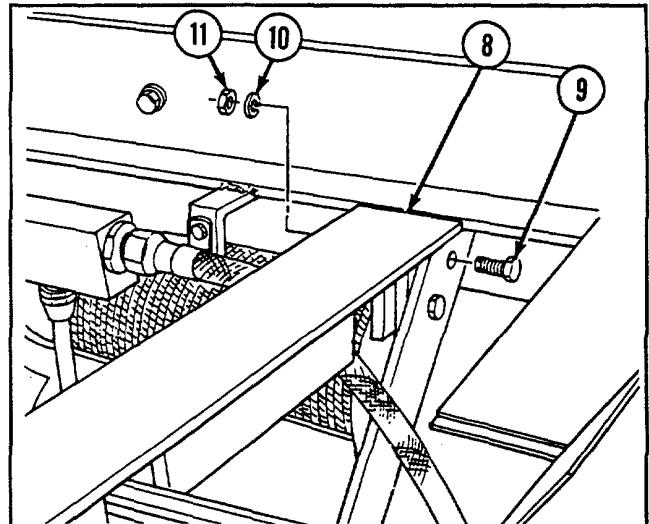
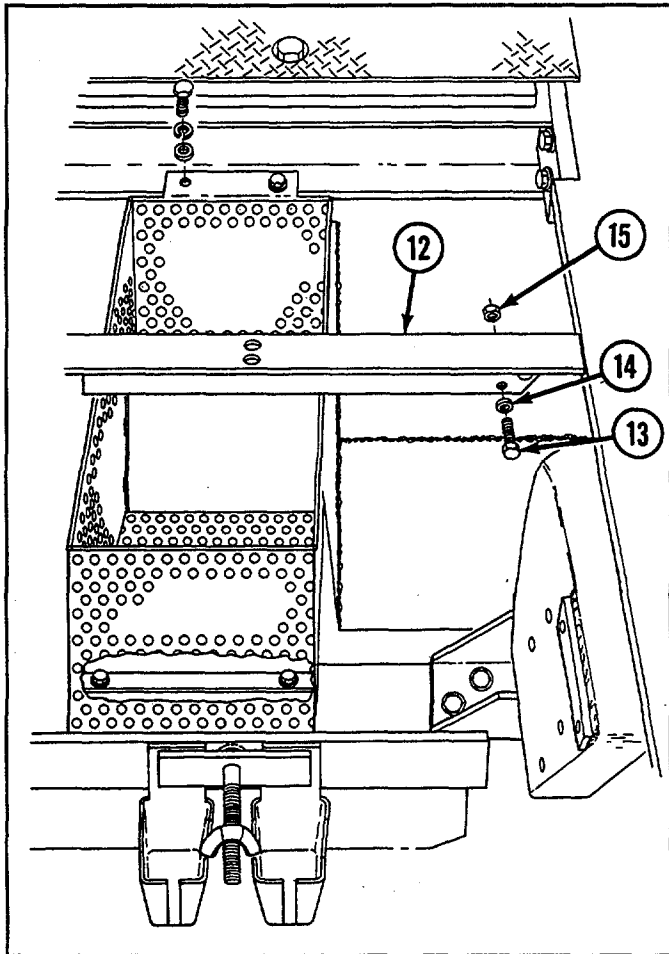


b. INSTALLATION

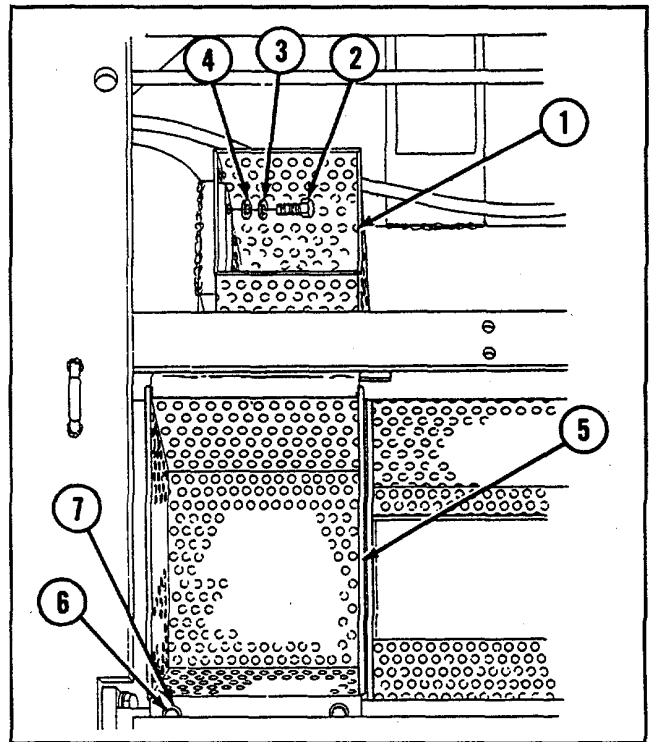
- 1 Install strap (23) with wingnut (24).
- 2 Install divider assembly (22) into utility chain stowage basket (16).
- 3 Install utility chain stowage basket (16) with two screws (17), two new lockwashers (18), two screws (19), two new lockwashers (20), and two flat washers (21).

9-96 REPLACE STOWAGE BASKETS -Continued

- 4 Install support (12) with four screws (13), four new lockwashers (14), and four nuts (15).



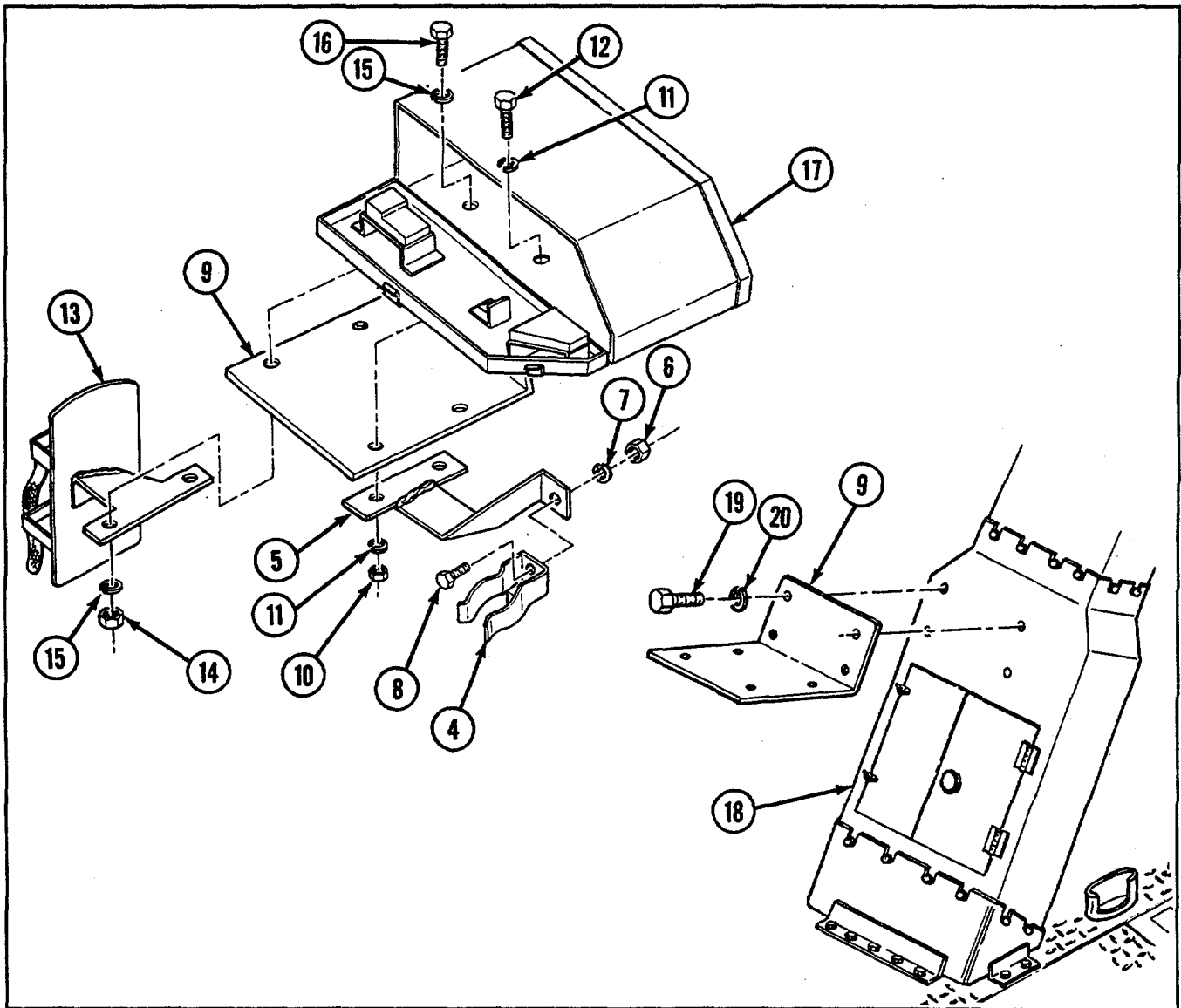
- 5 Install support (8) with four screws (9), four new lockwashers (10), and four nuts (11).
- 6 Install track connector stowage basket (5) with two screws (6) and two new lockwashers (7).
- 7 Install jack-and-chain stowage basket (1) with two screws (2), two new lockwashers (3), and two flat washers (4).

**NOTE**

- Follow-on maintenance:
- Install hydraulic valve forward intermediate right floor plate (see paragraph 9-23)
 - Install stowage basket forward intermediate left floor plate (see paragraph 9-21)
 - Install hydraulic valve forward right floor plate (see paragraph 9-3)

9-97 REPLACE PASSIVE NIGHT VIEWER STORAGE BOX, HAND GRENADE BOXES, AND MACHINE GUN AND RIFLE HOLDERS--Continued**b. INSTALLATION**

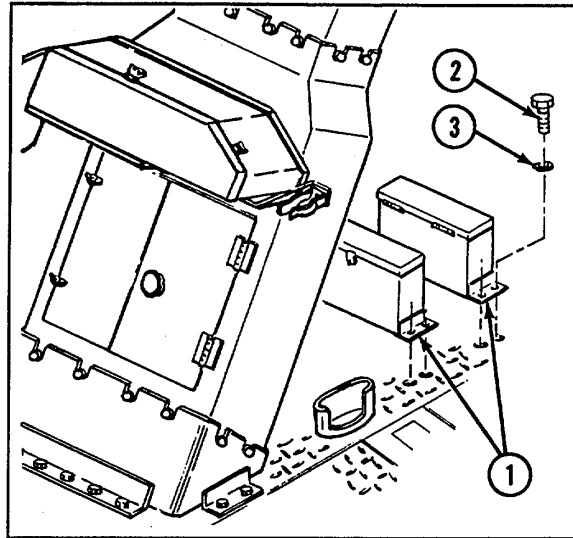
- 1 Install mounting bracket (9) on wire rope shield (18) with four screws (19) and four new lockwashers (20).
- 2 Place passive night viewer storage box (17) on mounting bracket (9) and install machine gun holder (13) by placing two screws (16) through two new lockwashers (15), passive night viewer storage box, and mounting bracket. Secure with two more new lockwashers (15) and two nuts (14).
- 3 Install rifle holder (5) by placing two screws (12) through two new lockwashers (11), passive night viewer storage box (17), and mounting bracket (9), and securing with two more new lockwashers (11) and two nuts (10).
- 4 Install rifle storage clip (4) on rifle holder (5) with screw (8), new lockwasher (7), and nut (6).



- 5 Install two hand grenade boxes (1) each with four screws (2) and four new lockwashers (3).

NOTE

- Follow-on maintenance:
- Install chips to machine guns and rifles
 - Install contents to boxes



9-98 REPLACE HAND FIRE EXTINGUISHER BRACKETS

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

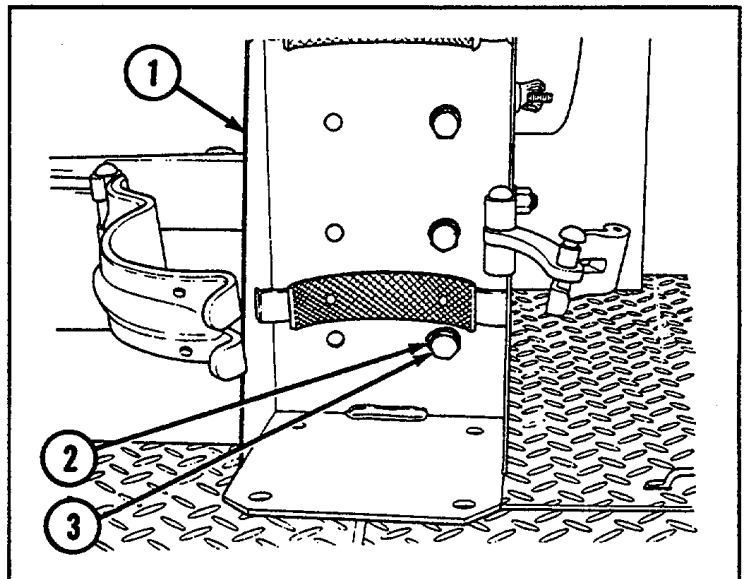
- Lockwashers (13) (Appendix G, item 132)
- Pins, cotter (2) (Appendix G, item 215)

Equipment Conditions:

- Fire extinguishers removed from brackets (refer to TM 9-2350-256-10)
- Two M2A2 air purifiers and two brackets removed as required (see paragraph 14-2)

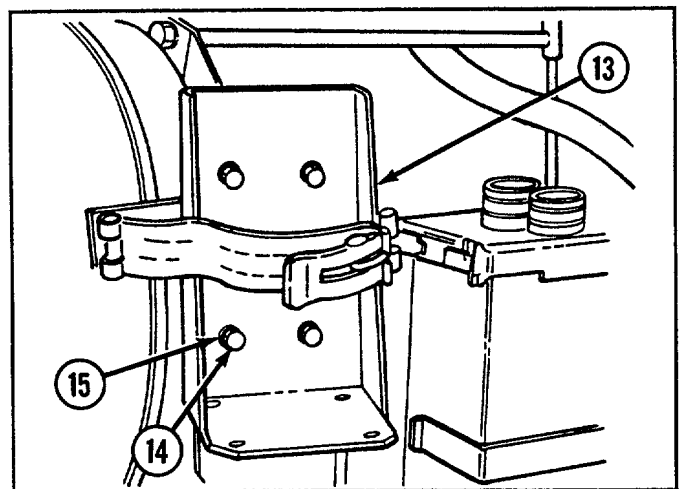
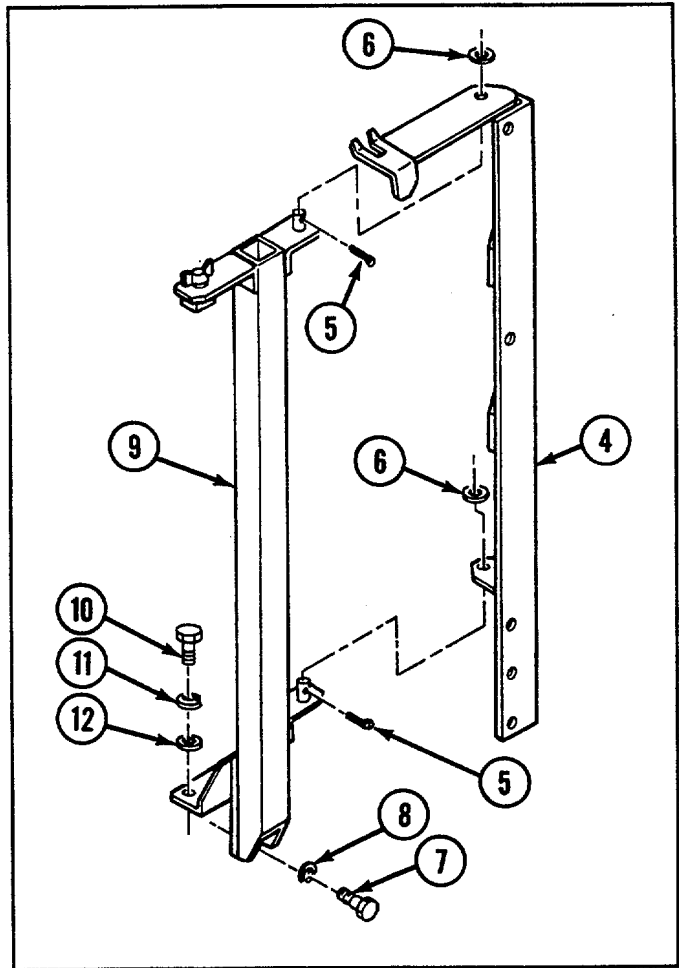
a. REMOVAL

- 1 Remove left-side bracket (1) by removing three screws (2) and three lockwashers (3).



9-98 REPLACE HAND FIRE EXTINGUISHER BRACKETS-Continued

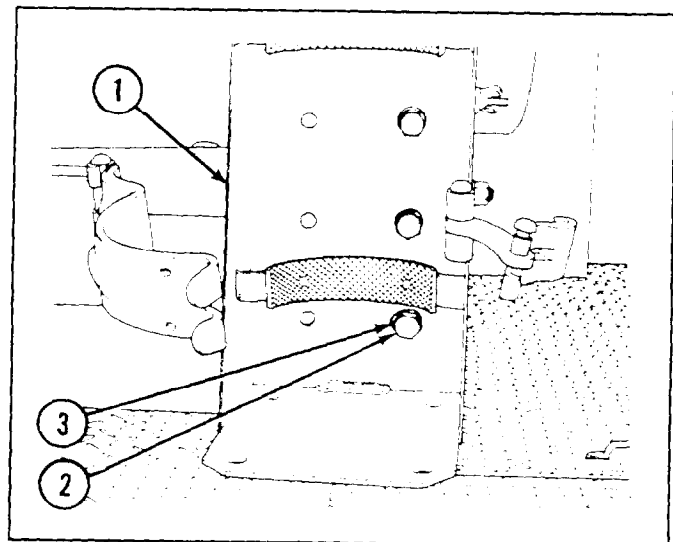
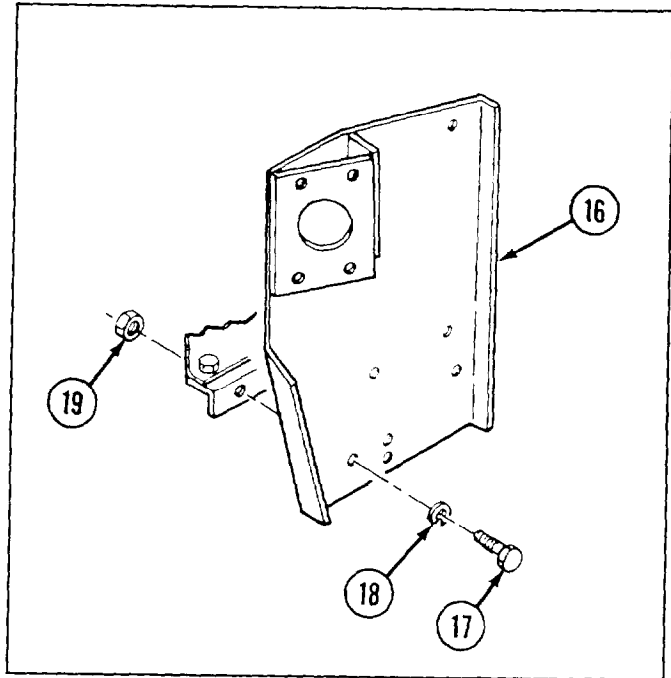
- 2 Remove mounting bracket (4) by removing two cotter pins (5) and two flat washers (6).
- 3 Remove screw (7) and lockwasher (8) from front of mounting bracket (9).
- 4 Remove mounting bracket (9) by removing two screws (10), two lockwashers (11), and two flat washers (12).
- 5 Remove right-side bracket (13) by removing four screws (14) and four lockwashers (15).



- 6 Remove right-side mounting bracket (16) by removing three screws (17), three lockwashers (13) and three nuts (19).

b INSTALLATION

- 1 Install right-side mounting bracket (16) with three nuts (19), three new lockwashers (18), and three screws (17).
- 2 Install right-side bracket (13) with four new lockwashers (15) and four screws (1-1).
- 3 Install mounting bracket (9) with two flat washers (12), two new lockwashers (11), and two screws (10).
- 4 Install new lockwasher (8) and screws (7)
- 5 Install mounting bracket (4) with two flat washers (6) and two new cotter pins (5).
- 6 Install left-side bracket (1) to mounting bracket (4) using three new lockwashers (3) and three screws (2).



NOTE

- Follow-on maintenance:
- Install two M2A2 air purifiers and two brackets if removed (see paragraph 14-2)
 - Install fire extinguishers to brackets (refer to TM 9-2350-256-10)

9-99 REPLACE ROCKET AMMUNITION STOWAGE BOX ASSEMBLY

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic' s (Appendix C, item 53)

Material/Parts-Continued:

• Pads (4) (Appendix G, item 200)

*Pads (2) (Appendix G, item 201)

Material/Parts:

- Adhesive (Appendix D, item 3)
- Lockwashers (11) (Appendix G, item 132)
- Lockwashers (6) (Appendix G, item 151)

Personnel Required:

Three

a. REMOVAL

- 1 Remove shelf assembly (1) by removing six screws (2) and six lockwashers (3).
- 2 Remove two straps (4) by unbuckling and sliding out of slots.
- 3 Remove tray (5) from box assembly (6) by removing two screws (7), two lockwashers (8), two screws (9), and two lockwashers (10).
- 4 Remove support (11) by removing screw (12) and lockwasher (13).
- 5 Remove three screws (14), three lockwashers (15), and three washers (15.1) securing top of box assembly (6)

WARNING

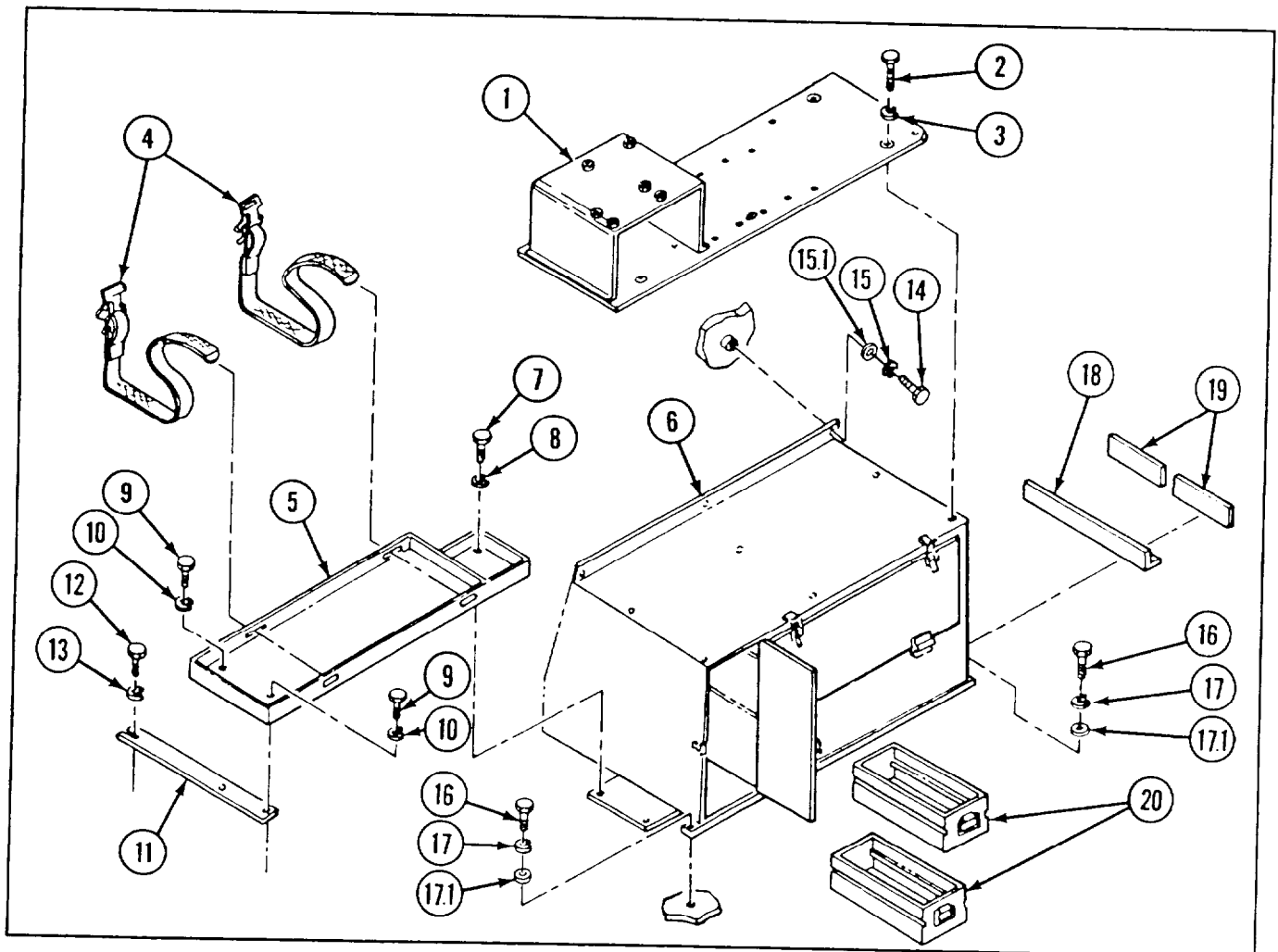
Box assembly is extremely heavy-three persons are required to remove it from vehicle.

- 6 Remove box assembly (6) by removing two screws (16), two lockwashers (17), and two washers (17.1).

NOTE

Box assembly (6) must be inverted to remove pads (18)

- 7 Remove four pads (19) and two pads (18) from box assembly (6).
- 8 Remove two drawers (20), if necessary.



b. INSTALLATION

- 1 Install two drawers (20), if removed.
- 2 Install two new pads (18) and four new pads (19) with adhesive.

WARNING

Box assembly is extremely heavy—three persons are required to lift it.

- 3 Install box assembly (6) with two washers (17.1), two new lockwashers (17), and two screws (16).
- 4 Secure top of box assembly (6) with three washers (15.1), three new lockwashers (15), and three screws (14).
- 5 Install support (11) with new lockwasher (13) and screw (12).
- 6 Install tray (5) with two new lockwashers (10), two screws (9), two new lockwashers (8), and two screws (7).
- 7 Install two straps (4) by sliding through slots. Buckle straps.
- 8 Install shelf assembly (1) with six new lockwashers (3) and six screws (2).

9-100 REPLACE/REPAIR CALIBER .50 AMMUNITION RACK AND TRACK WRENCH BRACKET

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic' s (Appendix C, item 53)

Personnel Required:

Two

Parts:

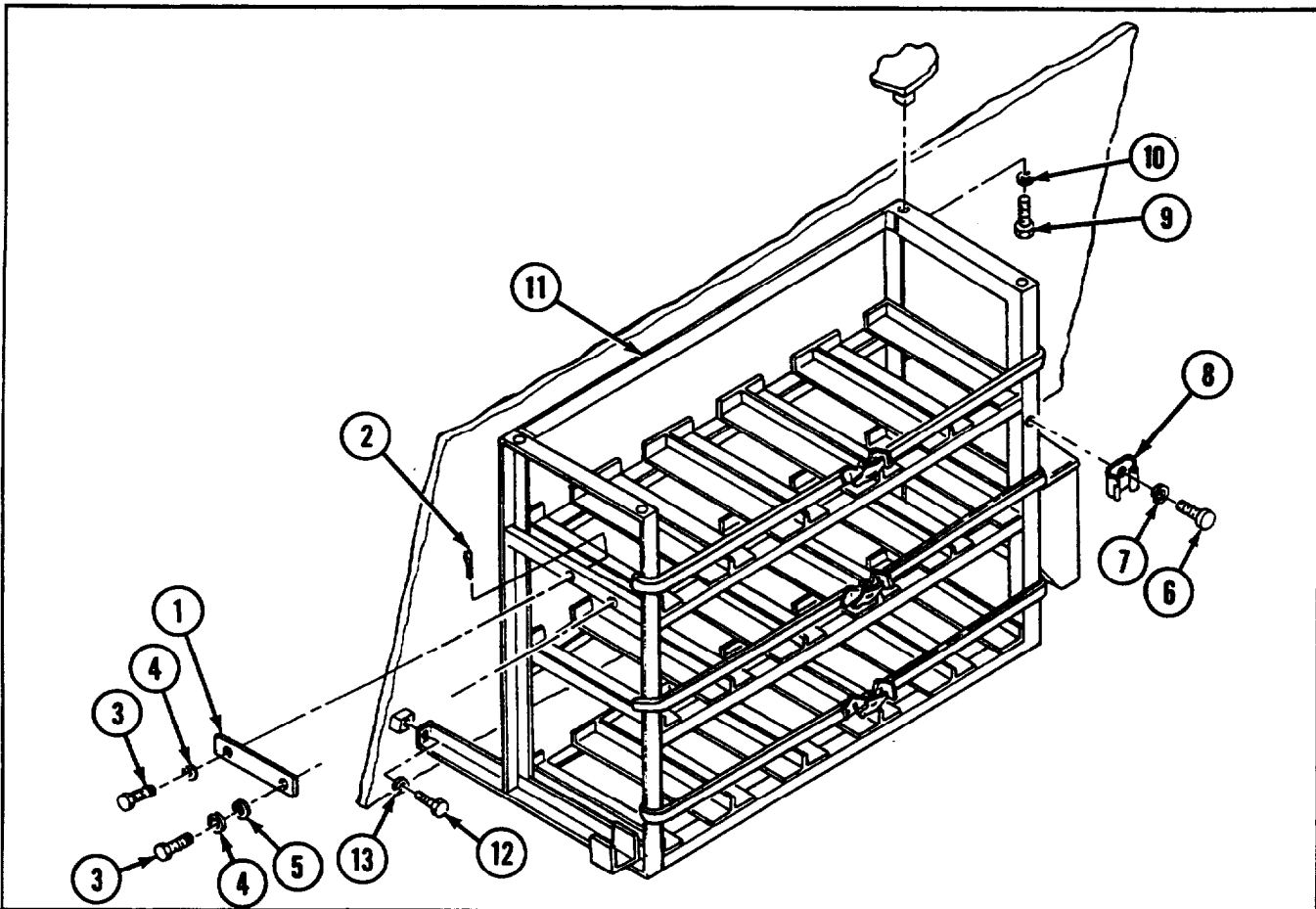
- Lockwasher (Appendix G, item 131)
- Lockwashers (8) (Appendix G, item 132)
- Pins, cotter (2) (Appendix G, item 212)

Equipment Condition:

All ammunition rack contents removed

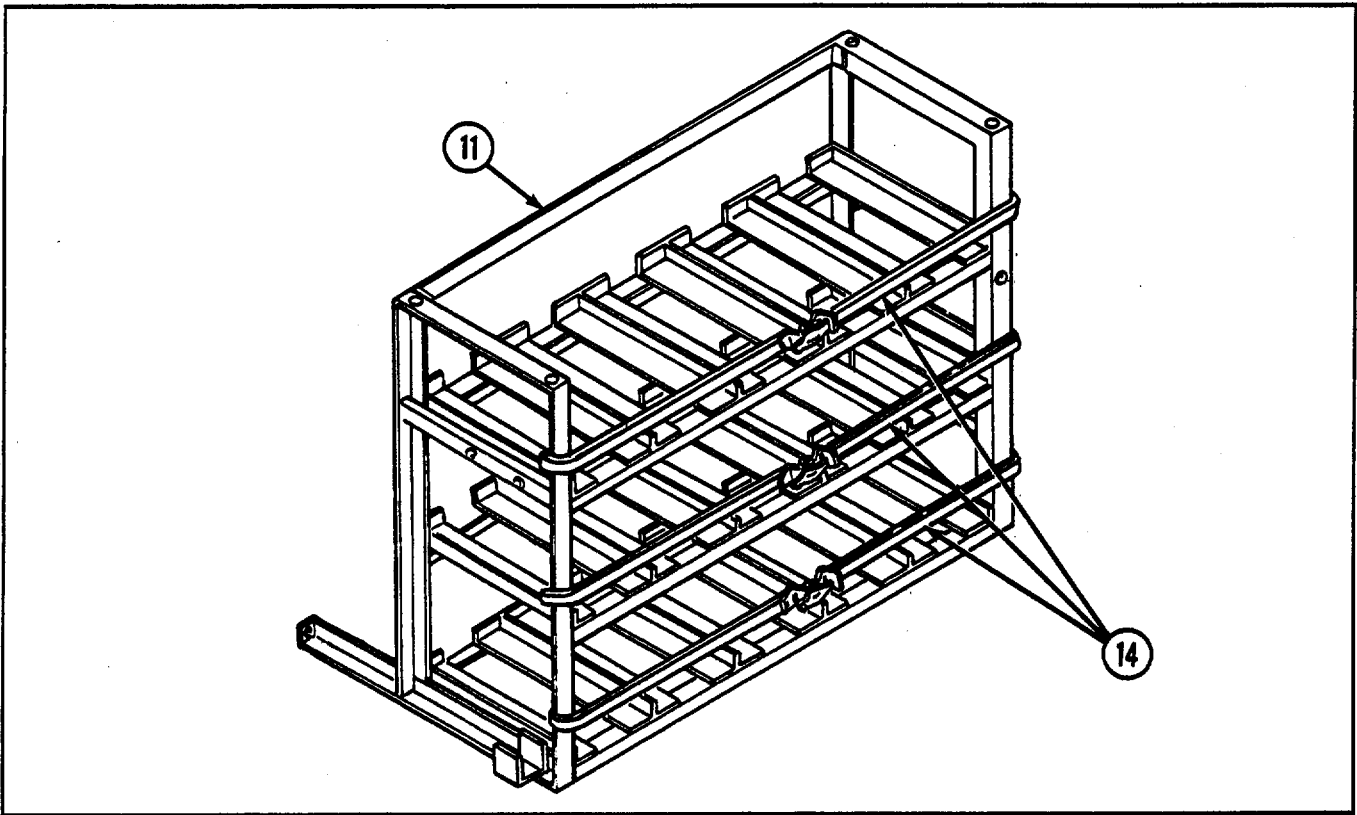
a. REMOVAL

- 1 Remove track wrench bracket (1), if necessary, by removing two cotter pins (2), two screws (3), two lockwashers (4), and flat washer (5).
- 2 Remove screw (6), lockwasher (7), and clip (8).
- 3 Remove four screws (9) and four lockwashers (10) securing top of ammunition rack assembly (11).
- 4 Remove ammunition rack assembly (11) by removing two screws (12) and two lockwashers (13).



b. DISASSEMBLY

Remove three straps (14) from ammunition rack assembly (11) by unbuckling and threading end of straps through slots.

**c. ASSEMBLY**

Install three straps (14) on ammunition rack assembly (11) by threading straps through slots. Buckle straps.

d. INSTALLATION

- 1 Install ammunition rack assembly (11) using two new lockwashers (13) and two screws (12).
- 2 Secure top of ammunition rack assembly (11) using four new lockwashers (10) and four screws (9).
- 3 Install clip (8), new lockwasher (7), and screw (6).
- 4 Install track wrench bracket (1), if removed, using two new cotter pins (2), flat washer (5), two new lockwashers (4), and two screws (3).

NOTE

Follow-on maintenance: Install all ammunition rack contents

9-101 REPLACE ACETYLENE AND COMPARTMENT DOOR HARDWARE AND RELATED PARTS

THIS TASK COVERS

- a. Removal b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Material/Parts-Continued:

- Pins, cotter (2) (Appendix G, item 213)

Material/Parts:

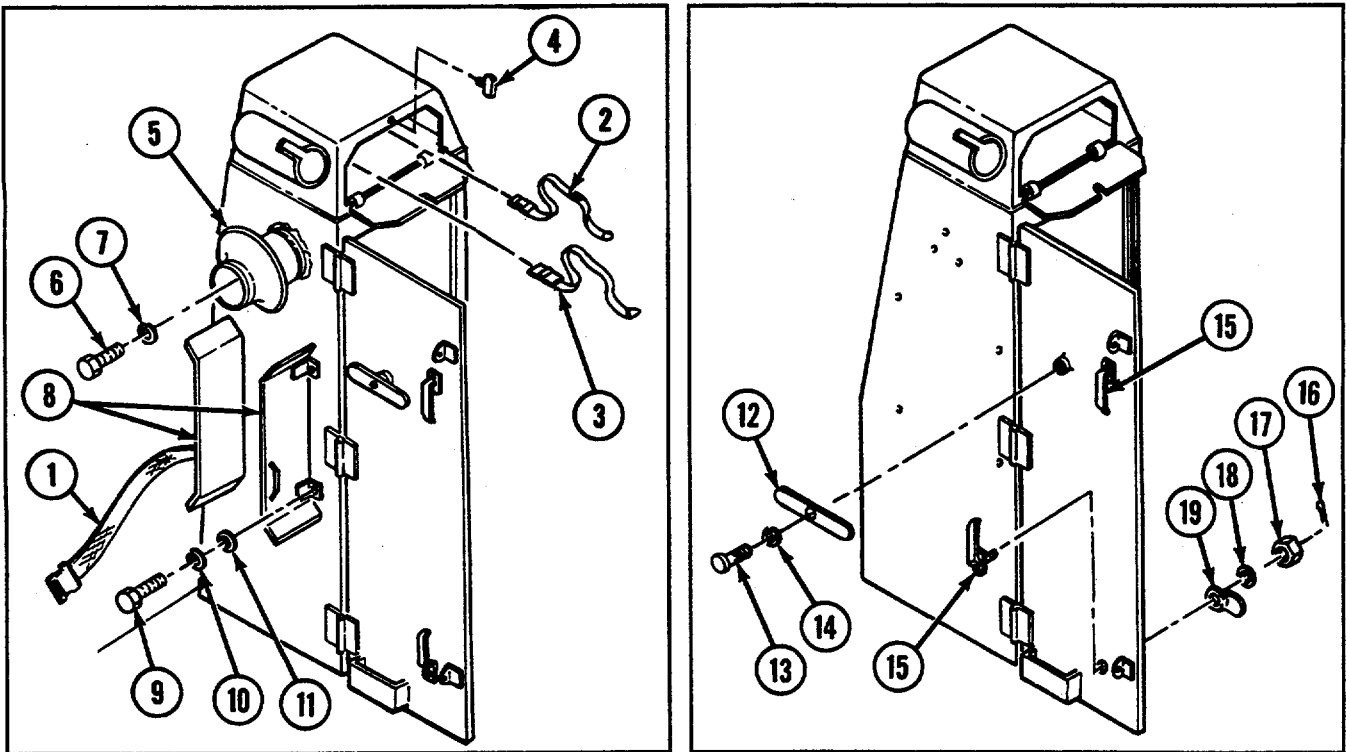
- Cement, adhesive (Appendix D, item 3)
- Lockwashers (20) (Appendix G, item 132)

Reference:

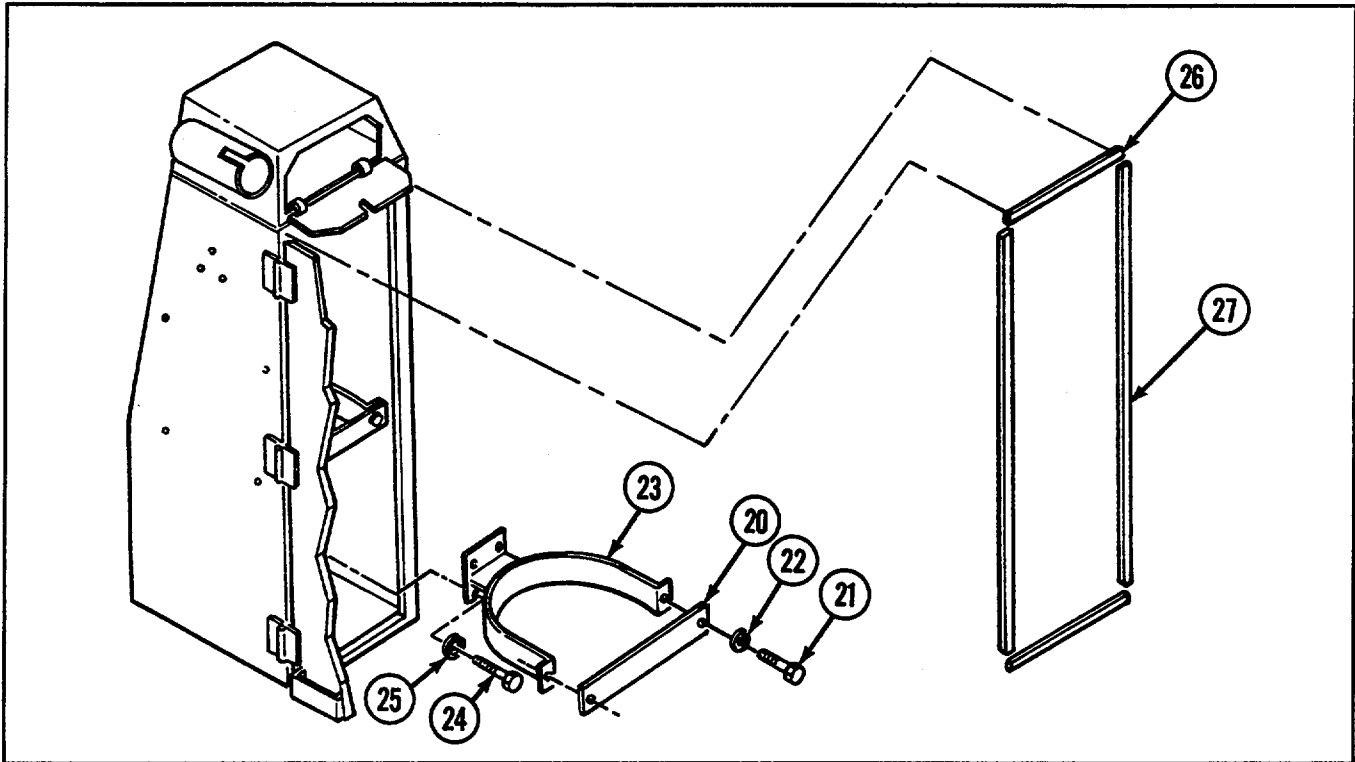
TM 9-2350-256-10

a. REMOVAL

- 1 Remove hose retaining strap (1) and gage straps (2 and 3) by threading end of straps through slots in compartment.
- 2 Remove thumbscrew (4).
- 3 Remove hose rack (5) by removing three screws (6) and three lockwashers (7).
- 4 Remove two hose retainers (8) by removing four screws (9), four lockwashers (10), and four flat washers (11).
- 5 Remove bolt cutter retaining clamp (12) by removing screw (13) and lockwasher (14).
- 6 Remove two door handles (15) by removing two cotter pins (16), two nuts (17), two flat washers (18), and two latches (19).



- 7 Remove two retaining bars (20) by removing four screws (21) and four lockwashers (22). Remove acetylene tank (refer to TM 9-2350-256-10).
- 8 Remove two cylinder bracket assemblies (23) by removing four screws (24) and four lockwashers (25) from each.
- 9 Remove four door seal strips (26 and 27).



b. INSTALLATION

- 1 Install four new door seal strips (26 and 27) (Appendix E, items 3 and 4) with adhesive cement.
- 2 Install two cylinder bracket assemblies (23) with four new lockwashers (25) and four screws (24) in each. Install acetylene tank (refer to TM 9-2350-256-10).
- 3 Install two retaining bars (20) with four new lockwashers (22) and four screws (21).
- 4 Install two door handles (15) with two latches (19), two flat washers (18), two nuts (17), and two new cotter pins (16).
- 5 Install bolt cutter retaining clamp (12) with new lockwasher (14) and screw (13).
- 6 Install two hose retainers (8) with four flat washers (11), four new lockwashers (10), and four screws (9).
- 7 Install hose rack (5) with three new lockwashers (7) and three screws (6).
- 8 Install thumbscrew (4).
- 9 Install gage straps (2 and 3) and hose retaining strap (1).

9-102 REPLACE FLASHER LIGHT CASE**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

Lockwashers (8) (Appendix G,
item 130)

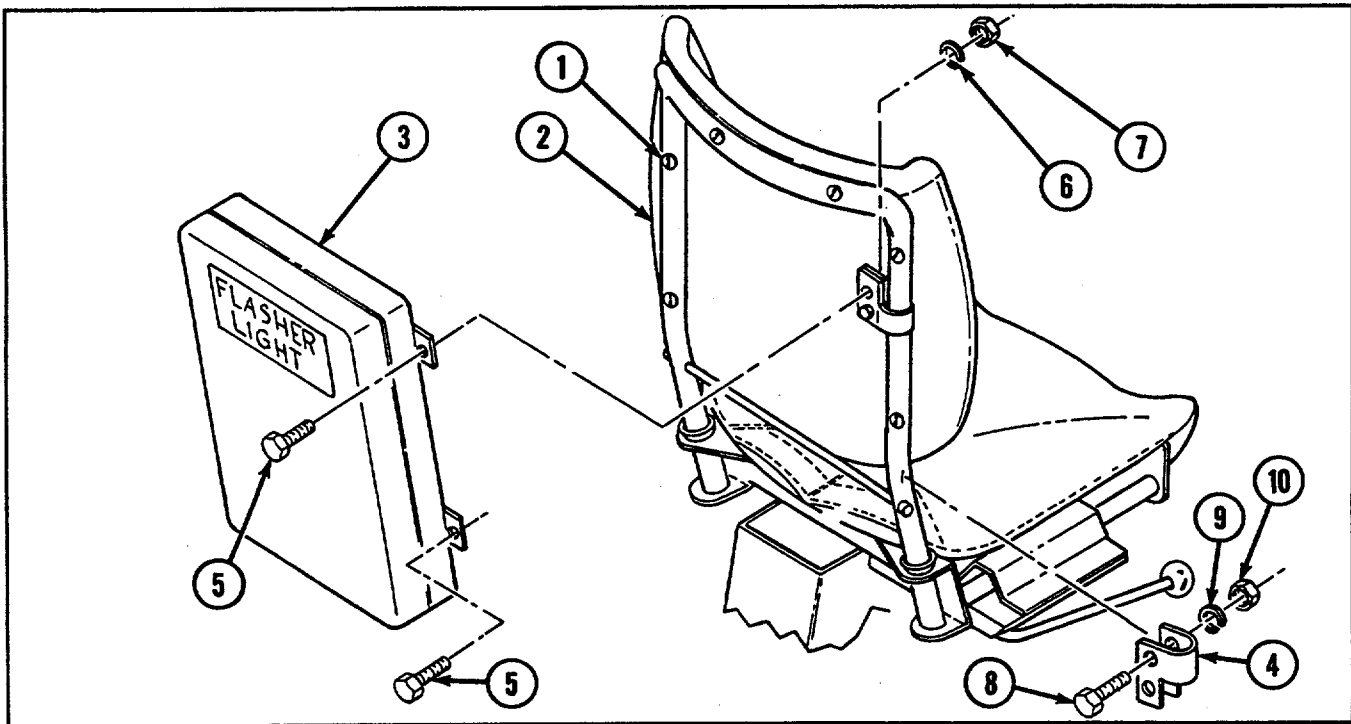
Equipment Condition:

Flasher light case contents
removed

a. REMOVAL**NOTE**

Six screws (1) on seat back (2) may be loosened or removed as necessary for removal and installation of flasher light case (3) and brackets (4).

- 1 Remove flasher light case (3) from four brackets (4) by removing four screws (5), four lockwashers (6), and four nuts (7).
- 2 Remove four brackets (4) from commander's seat by removing four screws (8), four lockwashers (9), and four nuts (10).

**b. INSTALLATION**

- 1 Install four brackets (4) on commander's seat with four screws (8), four new lockwashers (9), and four nuts (10).
- 2 Install flasher light case (3) on four brackets (4) with four screws (5), four new lockwashers (6), and four nuts (7).

NOTE

Follow-on maintenance: Install flasher light case contents

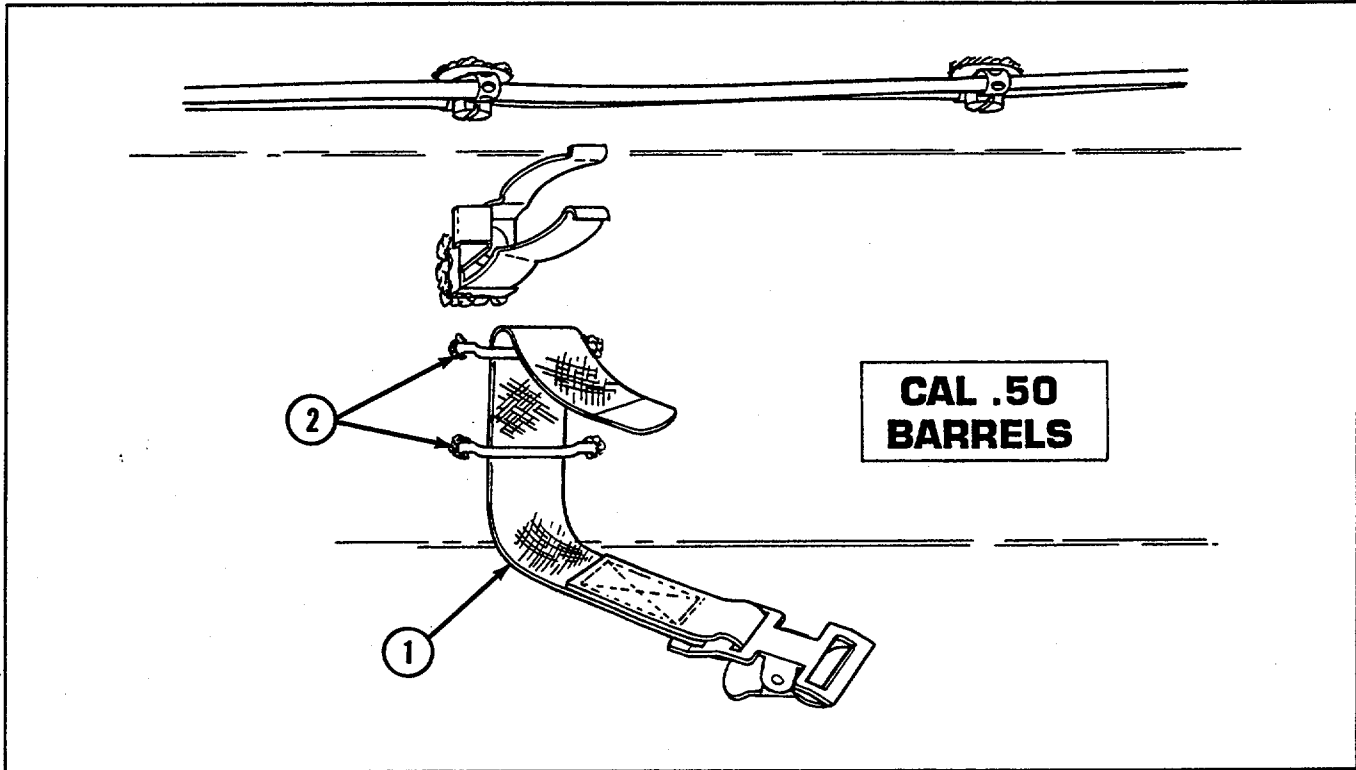
9-105 REPLACE CALIBER .50 STOWAGE STRAP

THIS TASK COVERS

- a. Removal
- b. Installation

a. REMOVAL

Remove strap (1) by sliding out of loops (2).



b. INSTALLATION

Install strap (1) by sliding through loops (2).

9-106 REPLACE LIQUID CONTAINER BRACKETS

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

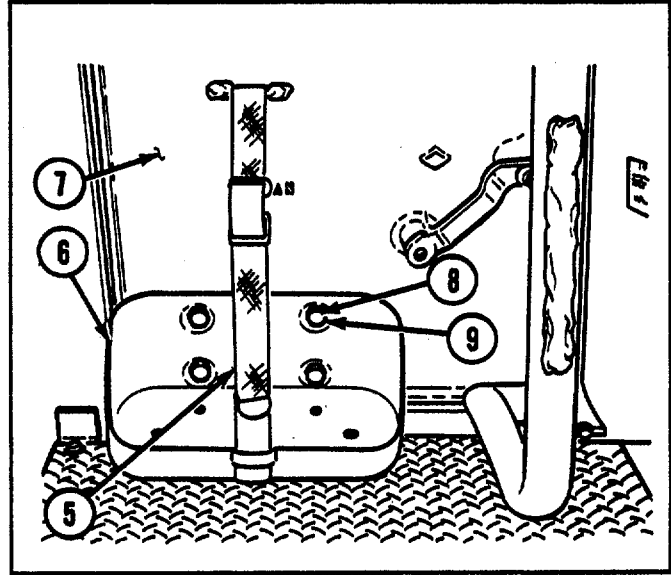
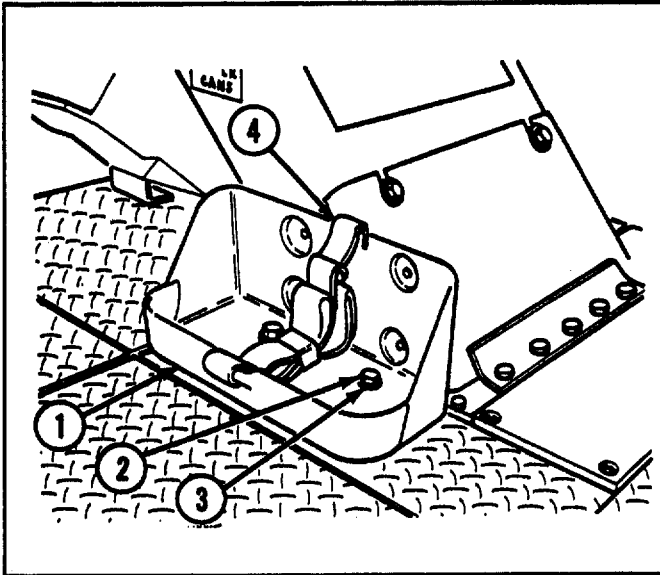
Lockwashers (16) (Appendix G, item 132)

Equipment Condition:

Water and oil cans removed from brackets

9-106 REPLACE LIQUID CONTAINER BRACKETS--Continued**a. REMOVAL**

- 1 Remove two floor-mounted brackets (1) by removing four screws (2) and four lockwashers (3) from each.
- 2 Remove strap (4) from each floor-mounted bracket (1).
- 3 Remove strap (5) from each door-mounted bracket (6) and door (7).
- 4 Remove two door-mounted brackets (6) by removing four screws (8) and four lockwashers (9) from each.

**b. INSTALLATION**

- 1 Install two door-mounted brackets (6) each with four screws (8) and four new lockwashers (9).
- 2 Install strap (5) on each door-mounted bracket (6) and door (7).
- 3 Install two floor-mounted brackets (1) each with four screws (2) and four new lockwashers (3).
- 4 Install strap (4) on each floor-mounted bracket (1).

NOTE

Follow-on maintenance: Install water and oil cans to brackets

9-107 REPLACE/REPAIR M72 LAW ROCKET LAUNCHER BRACKETS**THIS TASK COVERS**

a. Removal

b. Disassembly

c. Assembly

d. Installation

INITIAL SET-UP**Tools:**

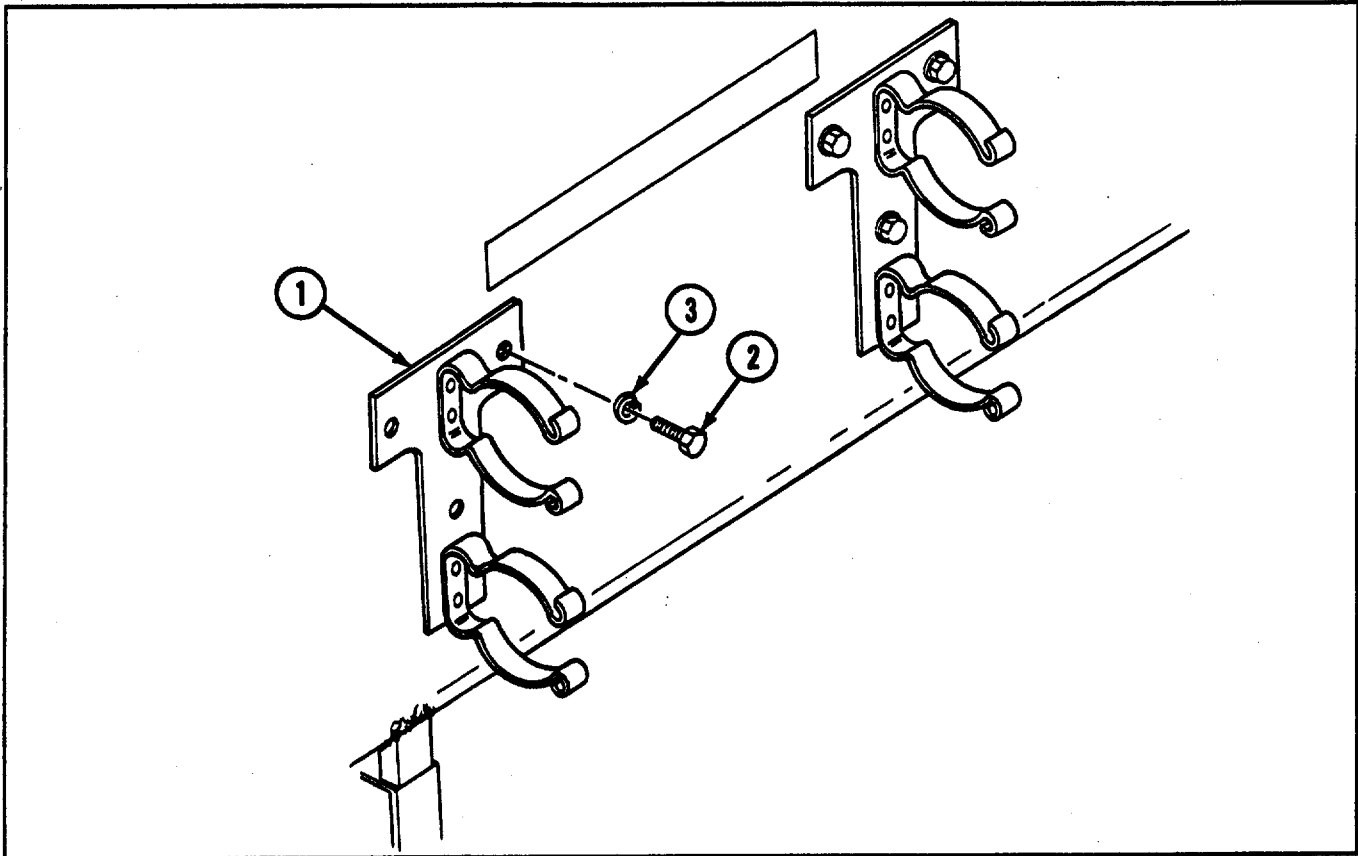
- Tool kit, general mechanic's (Appendix C, item 53)
- Riveter, blind (Appendix C, item 42)

Parts:

- Lockwashers (6) (Appendix G, item 132)
- Rivets (8) (Appendix G, item 237)

a. REMOVAL

Remove two rocket launcher brackets (1) by removing three screws (2) and three lockwashers (3) from each.

**b. DISASSEMBLY**

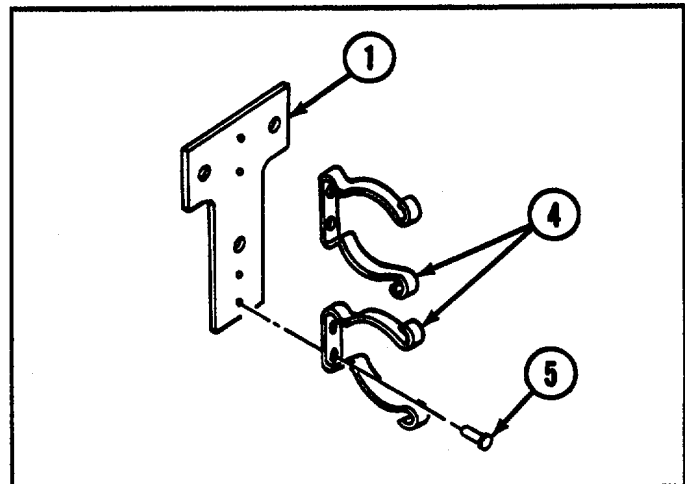
Remove two clips (4) from each rocket launcher bracket (1) by removing four rivets (5).

c. ASSEMBLY

Install two clips (4) to each rocket launcher bracket (1) using four new rivets (5).

d. INSTALLATION

Install two rocket launcher brackets (1) using three new lockwashers (3) and three screws (2) for each.



b. INSTALLATION

Install straps by sliding through slots and buckling. Use illustration as location guide.

9-109 REPLACE VEHICLE ID PLATE

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

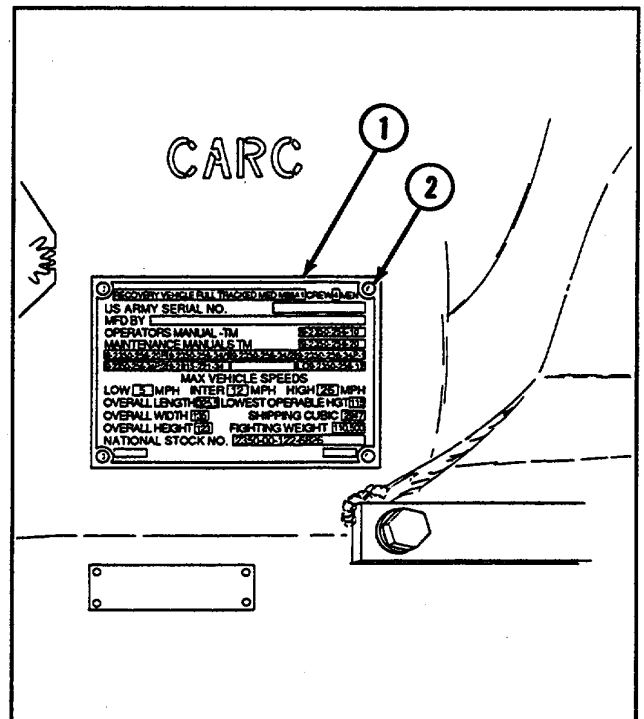
Drivescrews (4) (Appendix G, item 17)

a. REMOVAL

Remove vehicle ID plate (1) by removing four drivescrews (2).

b. INSTALLATION

Install vehicle ID plate (1) with four new drivescrews (2).



9-245 (9-246 blank)

CHAPTER 10

MAINTENANCE OF PERSONNEL HEATER AND CONNECTING COMPONENTS, AND FIXED FIRE EXTINGUISHER SYSTEM

CHAPTER OVERVIEW

This chapter describes how to remove, adjust, inspect, and install the personnel heater and connecting components, and fixed fire extinguisher system components.

This chapter consists of the following sections:

	Page
Section I: Personnel Heater and Connecting Components	10-1
Section II: Fixed Fire Extinguisher System	10-8

SECTION I: PERSONNEL HEATER AND CONNECTING COMPONENTS

Para.	Task	Page
10-1	Replace Personnel Heater	10-1
10-1.1	Replace Personnel Heater and APU Air Intake Water Deflector.	10-4.2
10-2	Replace Personnel Heater Fuel Pump	10-5
10-3	Replace Personnel Heater Fuel Filter	10-7

10-1 REPLACE PERSONNEL HEATER

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:

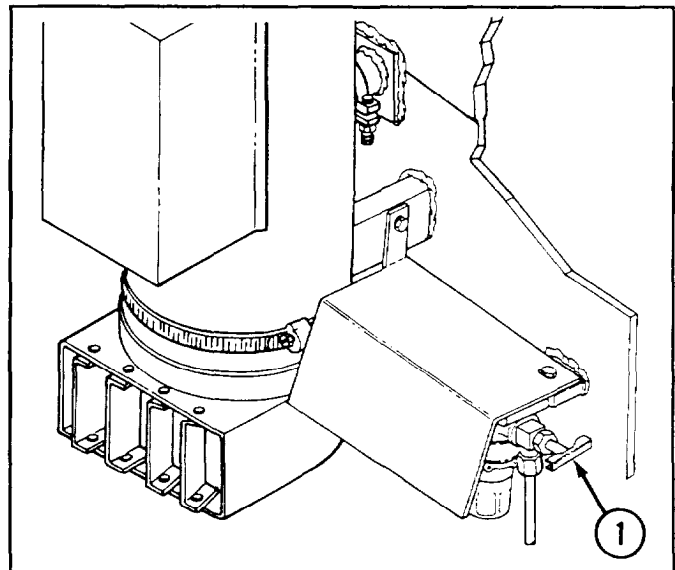
Tool kit, general mechanic' s (Appendix C, item 53)

Parts:

- Gasket (Appendix G, item 66)
- Gasket (Appendix G, item 73)
- Lockwashers (3) (Appendix G, item 118)
- Lockwashers (2) (Appendix G, item 130)
- Lockwashers (10) (Appendix G, item 132)

a. REMOVAL

- 1 Shut off fuel at shutoff valve (1).



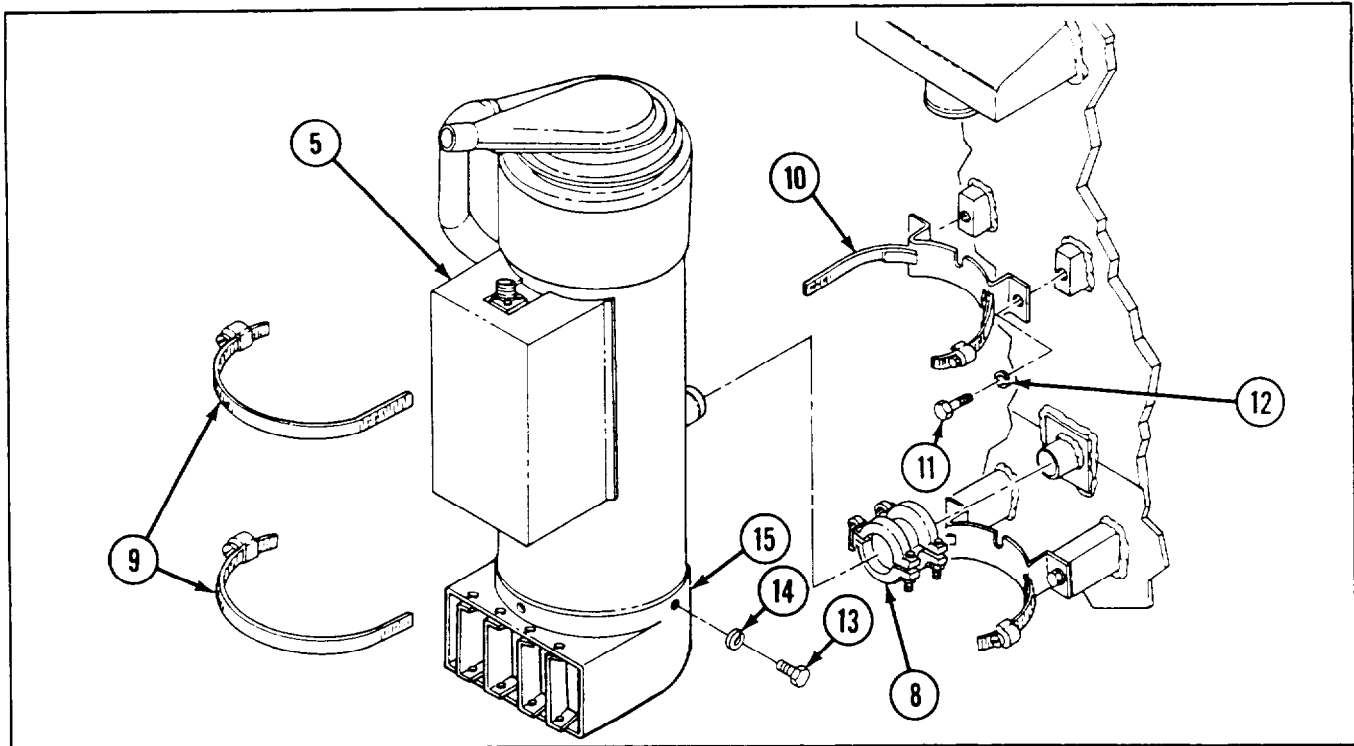
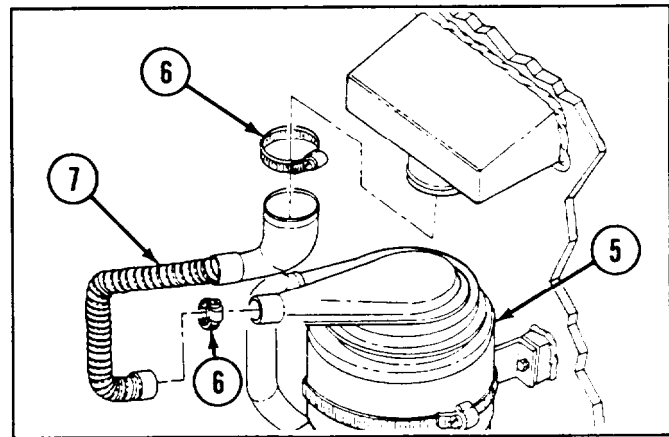
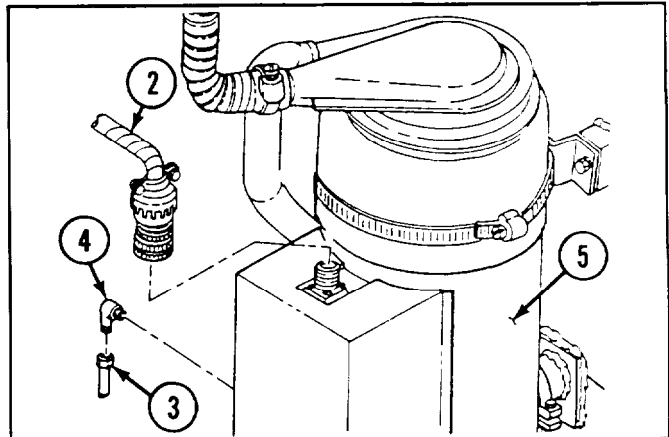
10-1 REPLACE PERSONNEL HEATER-Continued

- 2 Disconnect electrical harness (2).

WARNING

Fuel line contains fuel. Fuel and oil are slippery and can cause falls. To avoid injury, wipe up spilled fuel or oil with rags.

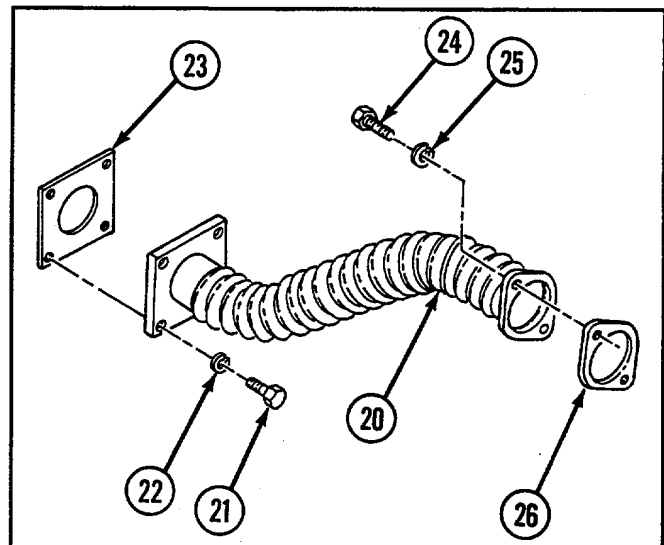
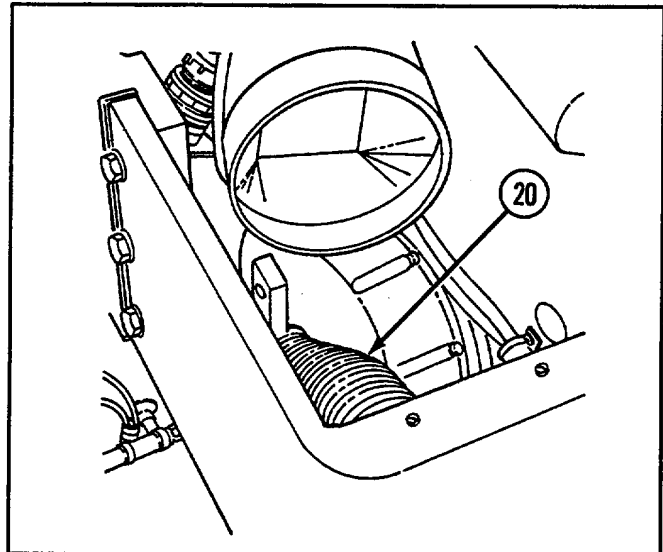
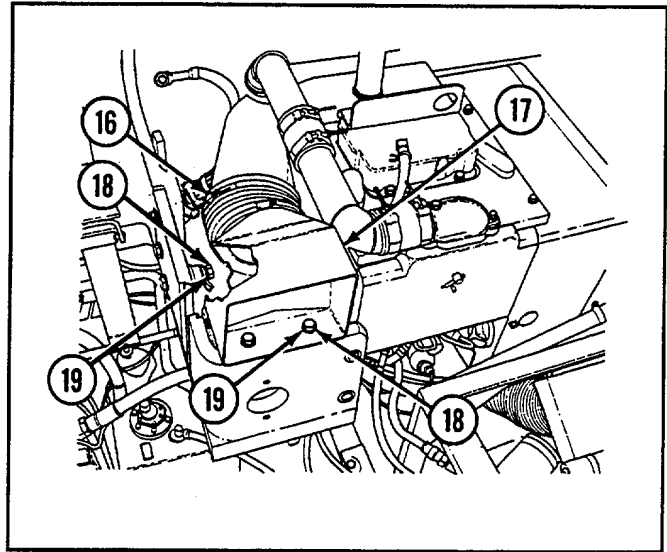
- 3 Disconnect fuel line (3) and adapter (4) from personnel heater (5).
- 4 Remove two clamps (6) and personnel heater hose (7) from personnel heater (5).
- 5 Remove exhaust hose clamp (8).
- 6 Remove two clamps (9) and personnel heater (5).
- 7 Remove two saddle assemblies (10) by removing four screws (11) and four lockwashers (12).
- 8 Remove four screws (13), four lockwashers (14), and air circulation ventilator (15).



- 9 Remove Auxiliary Power Unit (APU) access cover assembly (see paragraph 9-49).
- 10 Loosen clamp (16).
- 11 Remove APU cooling air duct (17) by removing three screws (18) and three lockwashers (19).
- 12 Remove personnel heater exhaust hose assembly (20) by removing four screws (21), four lockwashers (22), gasket (23), two screws (24), two lockwashers (25), and gasket (26).

b. INSTALLATION

- 1 Install personnel heater exhaust hose assembly (20) with four screws (21), four new lockwashers (22), new gasket (23), two screws (24), two new lockwashers (25), and new gasket (26).
- 2 Install APU cooling air duct (17) with three screws (18) and three new lockwashers (19).
- 3 Tighten clamp (16).
- 4 Install APU access cover assembly (see paragraph 9-49).



10-1 REPLACE PERSONNEL HEATER Continued

5 Install air circulation ventilator (15), four lockwashers (14), and four screws (13).

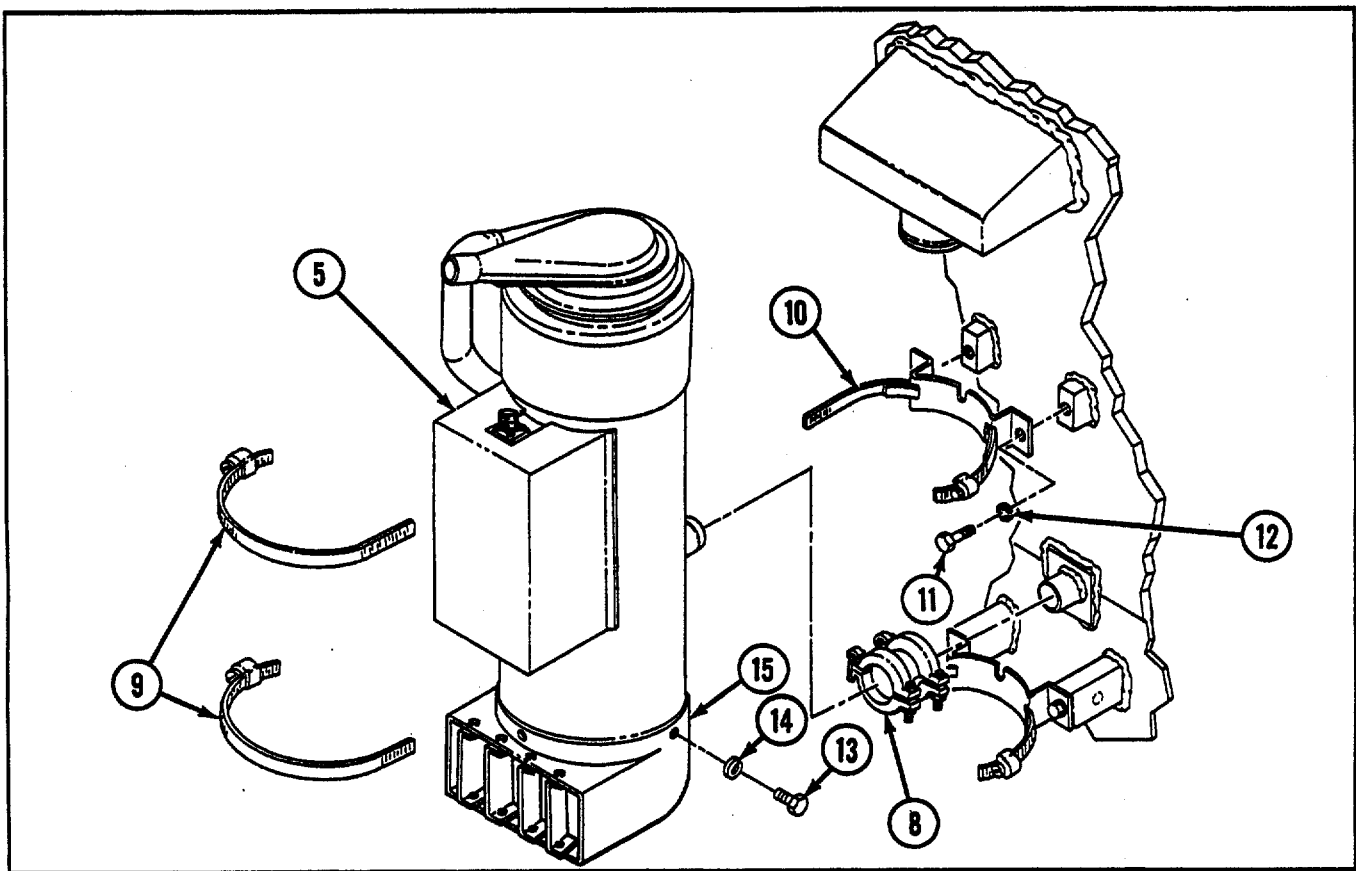
6 Install two saddle assemblies (10) with four screws (11) and four new lockwashers (12).

7 Install personnel heater hose (7) using two clamps (9). Do not tighten clamps. /

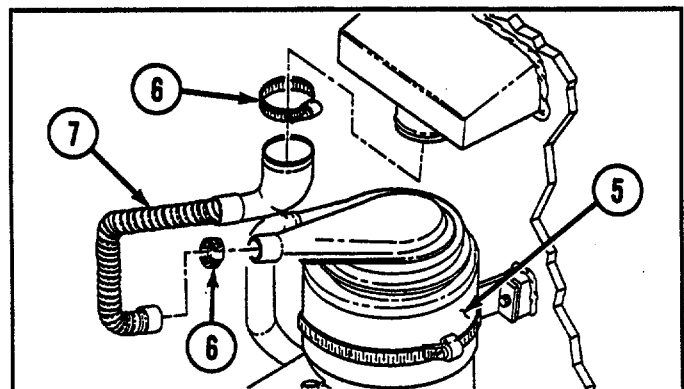
NOTE

Be sure that exhaust flange is properly aligned before tightening clamps.

8 Install exhaust hose clamp (8) and tighten two clamps (9).



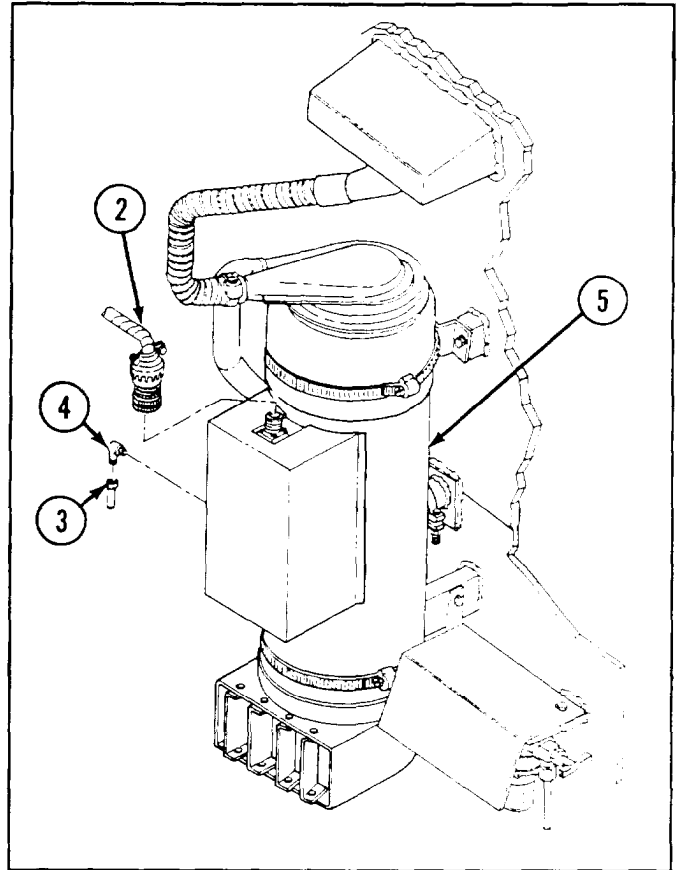
9. Install personnel heater hose (7) with two clamps (6) on personnel heater (5).



WARNING

Ensure fuel lines do not leak after installation. Fuel is flammable and can cause severe injury or death to personnel.

- 10 Install adapter (4) and connect fuel line (3) at personnel heater (5).
- 11 Connect electrical harness (2).
- 12 Check for leaks.



10-4.1 REPLACE PERSONNEL HEATER AND APU AIR INTAKE WATER DEFLECTOR

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SETUP

Tools:

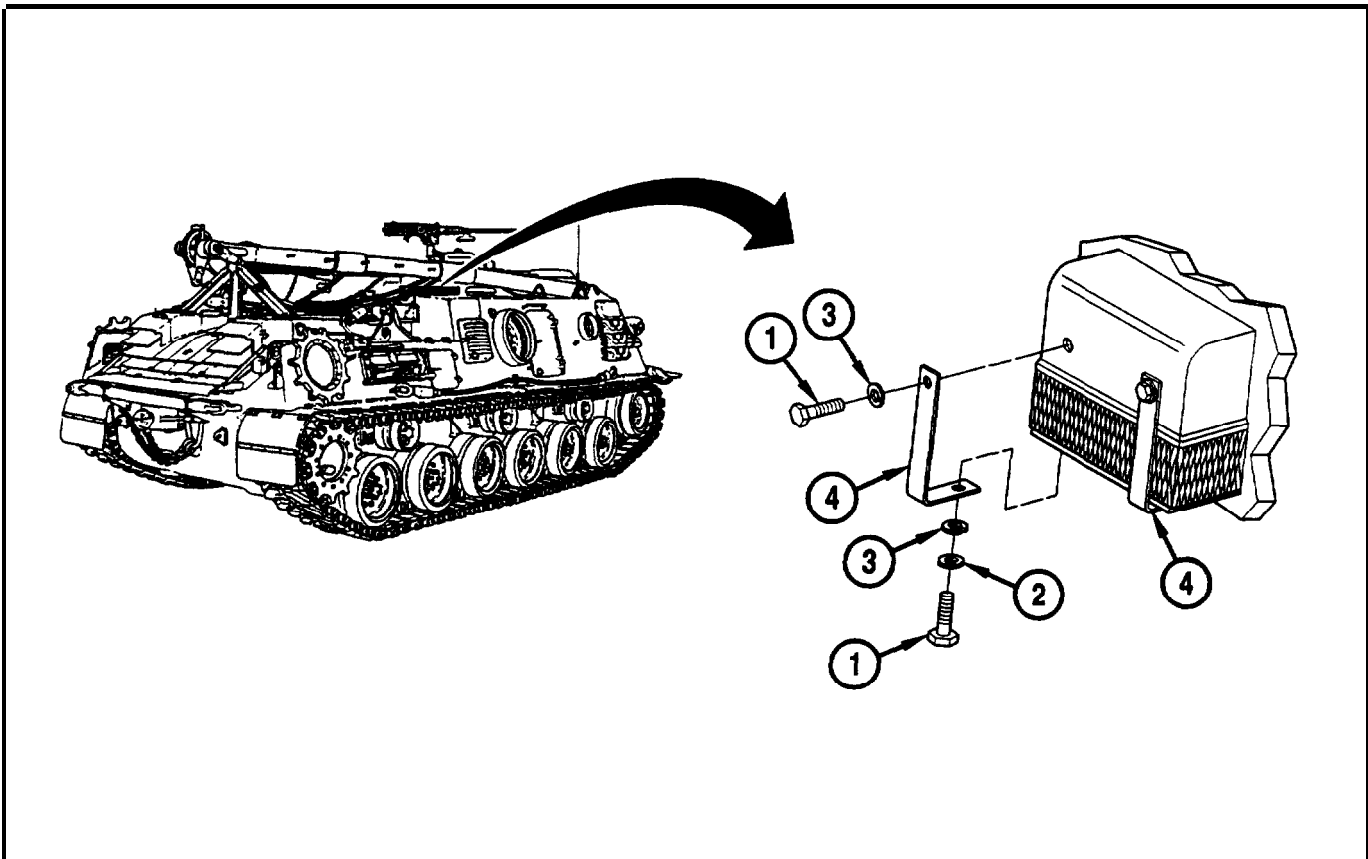
Tool kit, general mechanic' s (Appendix C, item 53)

Parts:

Lockwashers (4) (Appendix G, item 130)

a. REMOVAL

Remove four screws (2), two washers (2), four lockwashers (3), and two brackets (4). Discard lo&washers.



b. INSTALLATION

Install two brackets (4), four new lockwashers (3), two washers (2), and four screws (1).

10-2 REPLACE PERSONNEL HEATER FUEL PUMP

THIS TASK COVERS

a. Removal

b. Installation

INITIAL SET-UP

Tools:

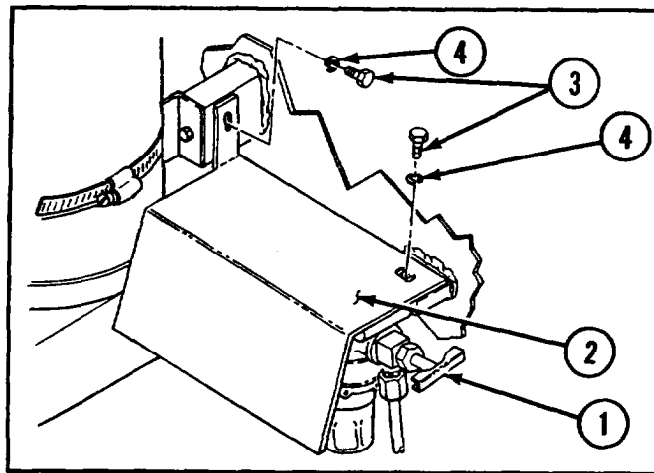
Tool kit, general mechanic' s (Appendix C, item 53)

Parts:

Lockwashers (4) (Appendix G, item 130)

a. REMOVAL

- 1 Shut off fuel at shutoff valve (1).
- 2 Remove shield (2) by removing two screws (3) and two lockwashers (4).



10-2 REPLACE PERSONNEL HEATER FUEL PUMP-Continued

WARNING

Fuel line contains fuel. Fuel and oil are slippery and can cause falls. To avoid injury wipe up spilled fuel or oil with rags.

- 3 Remove fuel line (5) by disconnecting from shutoff valve (1) and personnel heater (6).
- 4 Disconnect electrical fuel pump connector (7).
- 3 Remove two fuel lines (8) and two elbows (9).
- 6 Remove fuel pump (10) and electrical connector mount (11) by removing two screws (12) and two lockwashers (13).

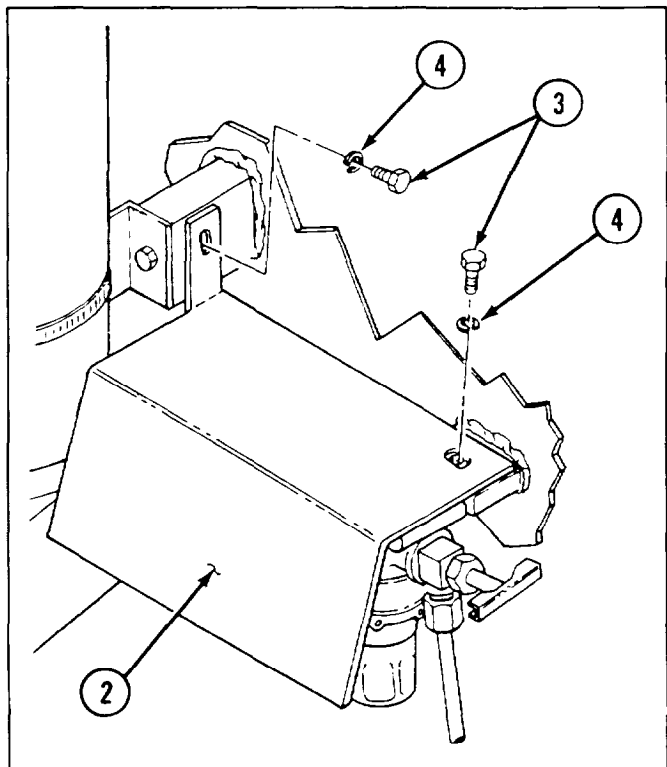
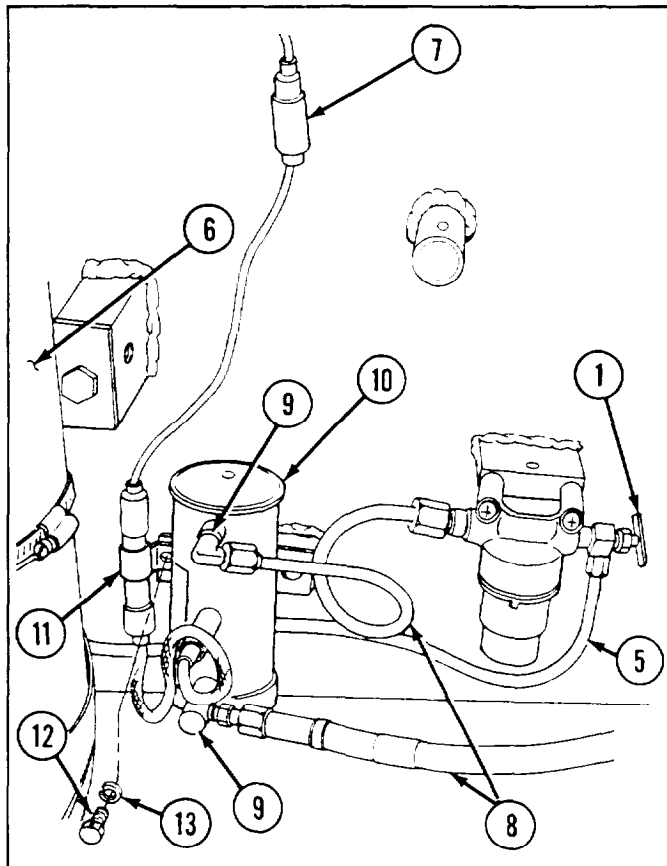
b. INSTALLATION

- 1 Install fuel pump (10) and electrical connector mount (11) with two screw's (12) and two new lockwashers (13).
- 2 Connect two fuel lines (8) and two elbows (9).

WARNING

Ensure fuel lines do not leak after installation, Fuel is flammable and can cause severe injury or death to personnel.

- 3 Install fuel line (5) at shutoff valve (1) and personnel heater (6).
- 4 Connect electrical furl pump connector (7) to harness.
- 5 Open fuel shutoff valve (1).
- 6 Check for leaks.
- 7 Install shield (2) with two screws (3) and two new lockwashers (4).



10-3 REPLACE PERSONNEL HEATER FUEL FILTER**THIS TASK COVERS**

a. Removal

b. Installation

INITIAL SET-UP

Tools: Parts:

Tool kit, general mechanic's (Appendix C, item 53)

- Lockwashers (2) (Appendix G, item 129)
- Lockwashers (2) (Appendix G, item 130)

a. REMOVAL

- 1 Shut off fuel at shutoff valve (1) .
- 2 Remove shield (2) by removing two screws (3) and two lockwashers (4).

WARNING

Fuel line and filter contain fuel. Exercise caution when removing to prevent spilling fuel on deck.

- 3 Disconnect two fuel lines (5) at fuel filter (6) and remove adapter (7).
- 4 Remove fuel filter (6) by removing two screws (8) and two lockwashers (9).
- 5 Remove shutoff valve (1) from fuel filter (6).

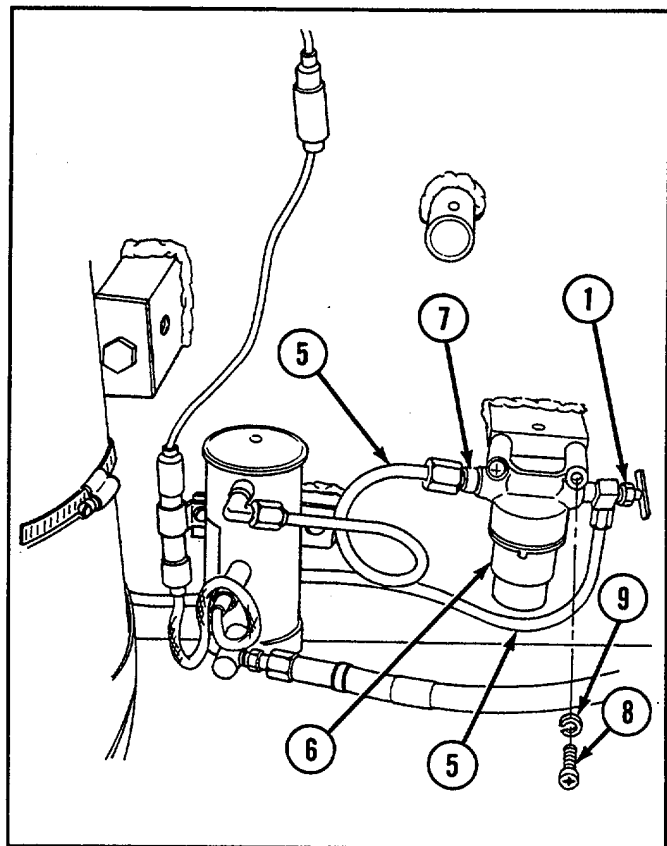
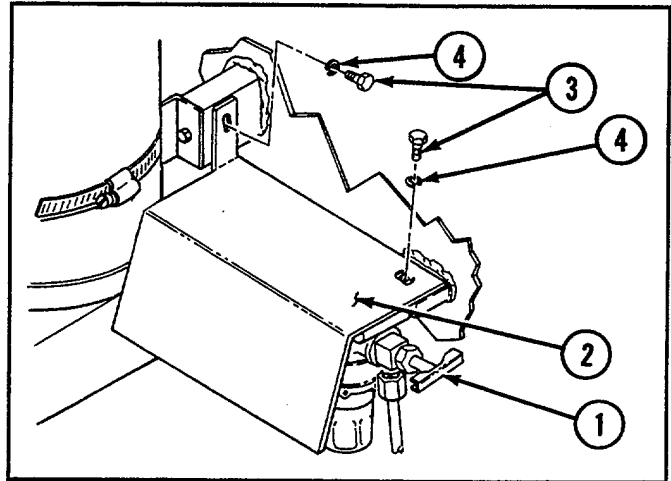
b. INSTALLATION

- 1 Install shutoff valve (1) on fuel filter (6).
- 2 Install fuel filter (6) with two screws (8) and two new lockwashers (9).

WARNING

Ensure fuel lines do not leak after installation. Fuel is flammable and can cause severe injury or death to personnel.

- 3 Install adapter (7) and connect two fuel lines (5).
- 4 Check for leaks.
- 5 Install shield (2) with two screws (3) and two new lockwashers (4).

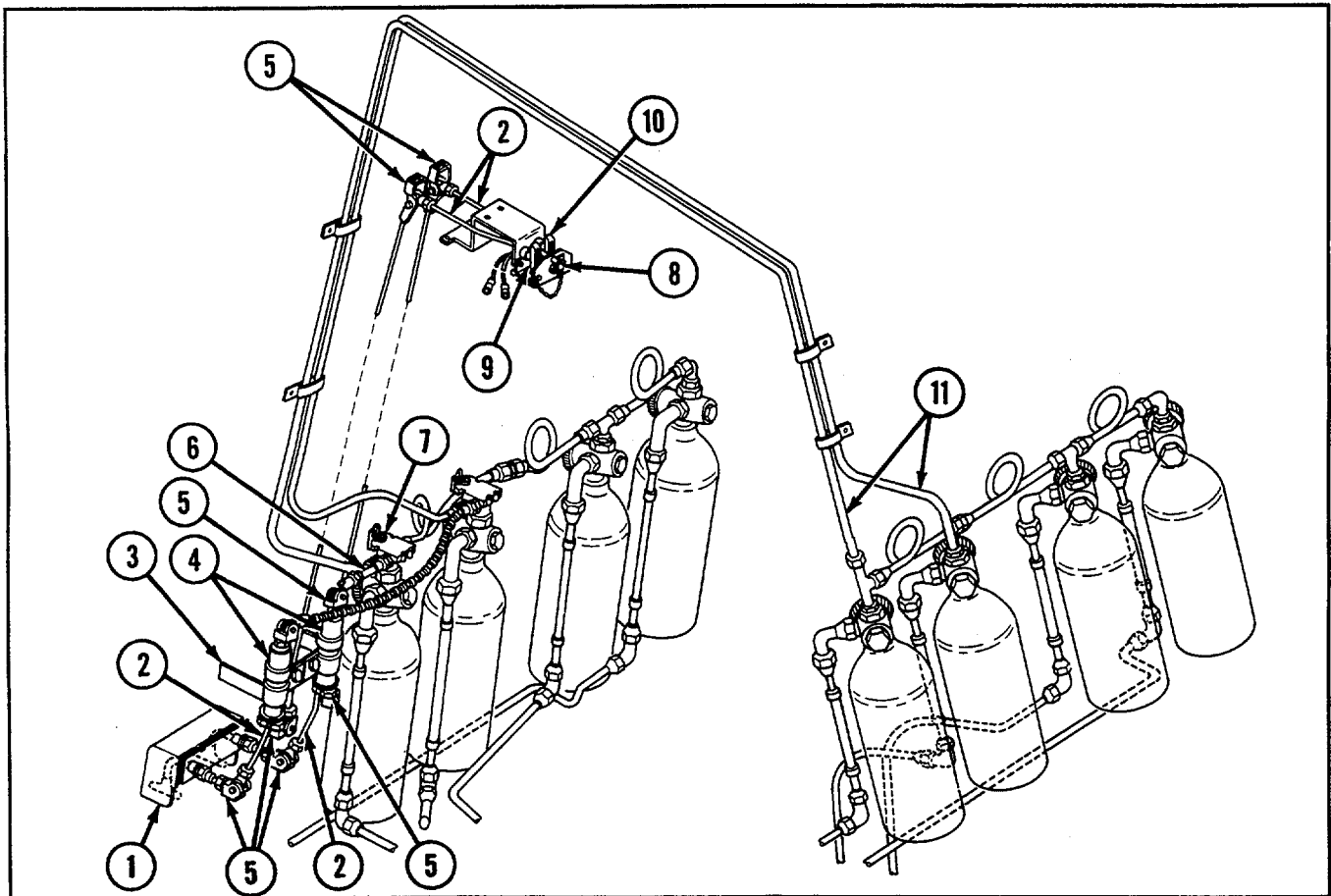


SECTION II: FIXED FIRE EXTINGUISHER SYSTEM

Para.	Task	Page
10-4	Replace/Service Fire Extinguisher Cylinders	10-10
10-5	Replace/Service Fire Extinguisher Cylinder Controls.....	10-14
10-6	Replace/Service Fire Extinguisher System Controls and Linkages.....	10-16
10-7	Replace Fire Extinguisher System Lines and Nozzles.....	10-22

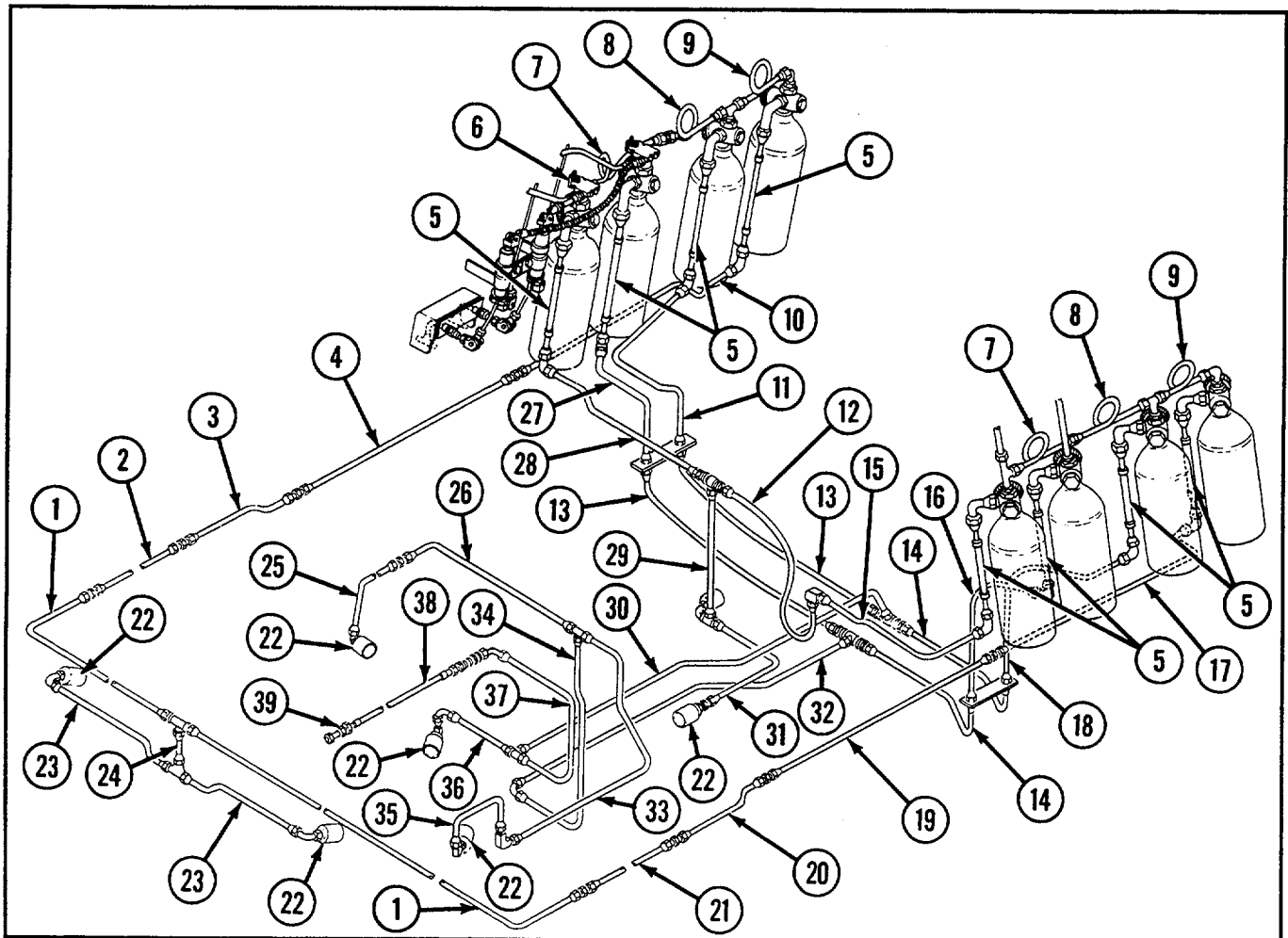
Following is an overview of the fixed fire extinguisher system lines and nozzles.

- | | |
|--|--|
| 1 Outside remote control box | 6 Dual-pull mechanism to cylinder assembly |
| 2 Conduit assembly, control box to dual-pull mechanism | 7 Control valve |
| 3 Dual-pull mechanism mounting bracket, left- and right-side | 8 Engine shutoff |
| 4 Dual-pull mechanism | 9 Pull handle, right-side |
| 5 Cable pulley assembly | 10 Pull handle, left-side |
| | 11 Rubber pressure hose |



- | | | | |
|-----|--|-----|--|
| 1 | Rear left- and right-side cylinder No. 1 to rear of engine tube assembly | 7 | Left and right intercylinder and valve control tube assembly |
| 2 | Rear left-side cylinder No. 1 to rear of engine tube assembly | 8,9 | Left and right intercylinder connecting tube assembly |
| 3,4 | Intermediate left-side cylinder No. 1 to rear of engine tube assembly | 10 | Front left-side cylinder No. 1 to rear of engine tube assembly |
| 5 | Pressure connecting head hose assembly | | |
| 6 | Carbon dioxide cylinder control valve | | |

- | | | | |
|-------|---|-------|--|
| 11 | Front left-side cylinder No. 2 to front of engine and engine bottom tube assembly | 25,26 | Right-side cylinder No. 3 to left front and top of engine bank tube assembly |
| 12 | Winch compartment front of firewall to tube hose assembly | 27 | Front left-side cylinder No. 3 to front and top of engine bank tube assembly |
| 13 | Front lower left-side cylinder No. 3 to front and top of engine bank tube assembly | 28 | Left-side cylinder No. 4 to winch compartment front of firewall tube assembly |
| 14 | Front lower right-side cylinder No. 3 to front and top of engine bank tube assembly | 29 | Left- and right-side cylinder No. 4 to winch compartment front of firewall tube assembly |
| 15 | Right-side cylinder No. 4 to winch compartment front of firewall tube assembly | 30 | Center lower left-side cylinder No. 3 to front and top of engine bank tube assembly |
| 16 | Front right-side cylinder No. 3 to front and top of engine bank tube assembly | 31 | Right-side cylinder No. 4 to winch compartment front of firewall rear nozzle tube assembly |
| 17 | Front right-side cylinder No. 1 to rear of engine tube assembly | 32 | Center lower right-side cylinder No. 3 to front and top of engine bank tube assembly |
| 18 | Front right-side cylinder No. 2 to front of engine and engine bottom tube assembly | 33-35 | Right-side cylinder No. 3 to front and top of engine bank tube assembly |
| 19,20 | Intermediate right-side of cylinder No. 1 to rear of engine tube | 36 | Firewall from left-side cylinder No. 3 to left front bottom of engine tube assembly |
| 21 | Rear right-side cylinder No. 1 to rear of engine tube | 37 | Firewall from left-side cylinder No. 3 to engine vee extinguisher hose tube assembly |
| 22 | Nozzle | 38 | Left side cylinder No. 2 to engine vee extinguisher hose assembly |
| 23 | Rear of engine bottom tube assembly | 39 | Left-side cylinder No. 2 to engine vee extinguisher valve |
| 24. | Rear of engine check valve and bottom tube tee vertical connector tube assembly | | |



10-4 REPLACE/SERVICE FIRE EXTINGUISHER CYLINDERS

THIS TASK COVERS

a. Removal

b. Inspection

c. Installation

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Scale, indicating (Appendix C, item 43)

Parts:

- Lockwashers (16) (Appendix G, item 132)
- Lockwashers (2) (Appendix G, item 136)

WARNING

Handle all fire extinguisher cylinders with care. Do not bump, jar, or drop.

a. REMOVAL

- 1 Remove interconnecting tube assemblies (1 and 2) from cylinder control valve (3) and head assemblies (4).

CAUTION

Be sure to remove cylinder control valve (3) from cylinder before any other disconnections are made.

- 2 Unscrew and remove two cylinder control valves (3) from fire extinguisher cylinders (5).

- 3 Remove six connector head assemblies (4).

- 4 Disconnect eight fire extinguisher lines (6).

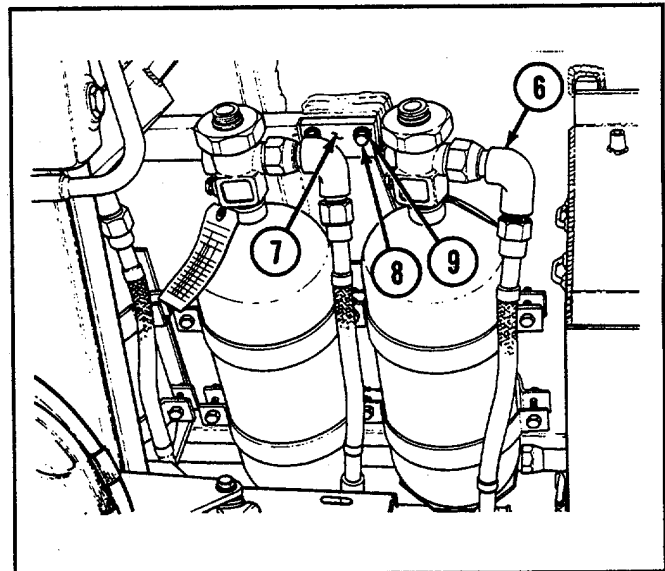
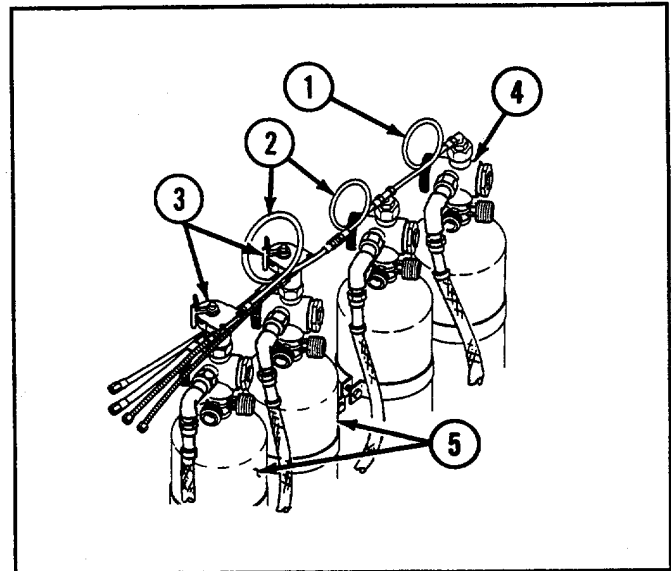
NOTE

Steps 5 through 11 apply to both the left- and right-side fire extinguisher banks.

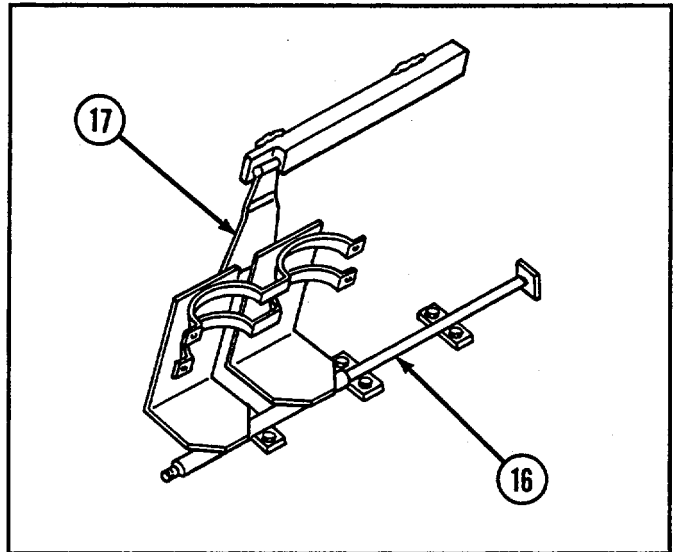
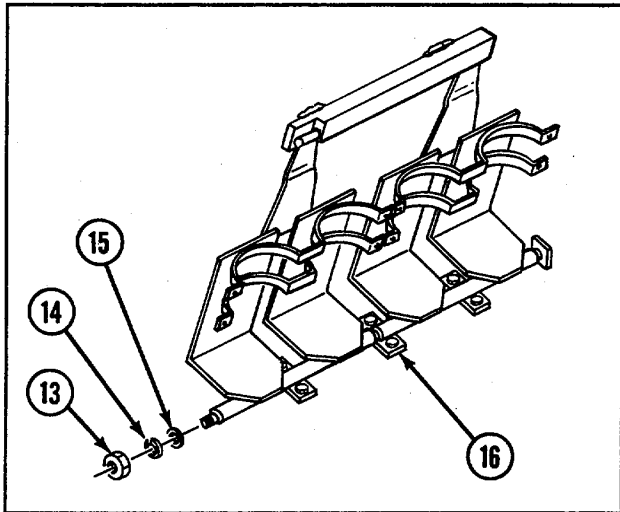
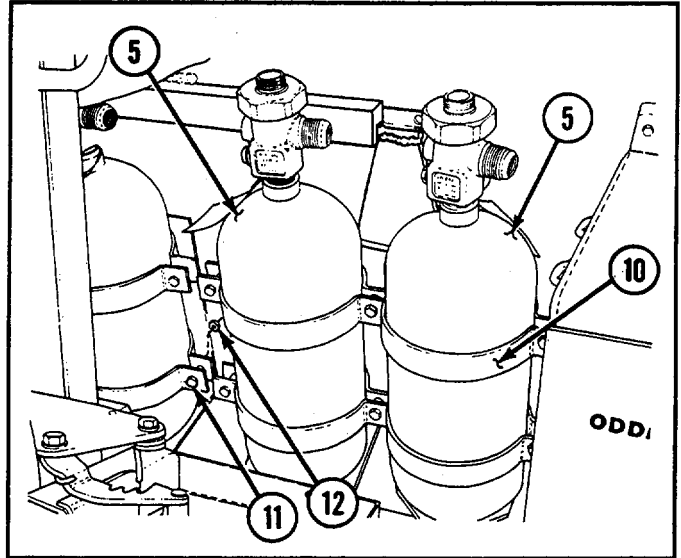
- 5 Remove retaining bar (7) by removing two screws (8) and two lockwashers (9).

NOTE

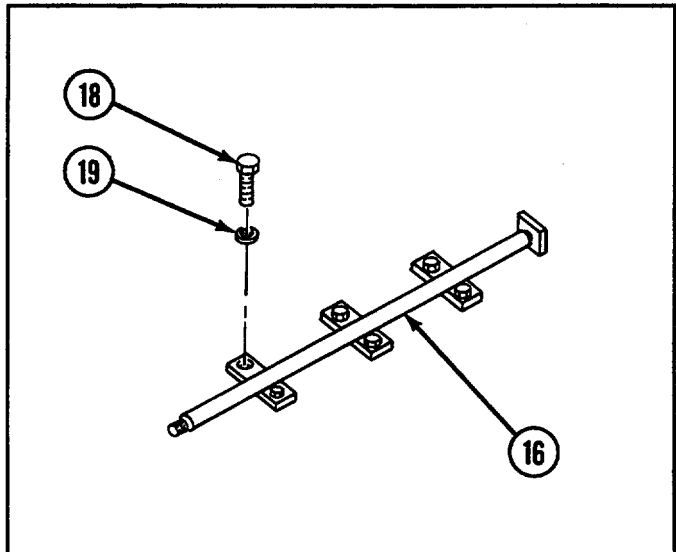
Before removing cylinders, place flexible fire extinguisher lines under oddment tray to prevent any interference during removal.



- 6 Remove bracket (10) from two fire extinguisher cylinders (5) by removing six screws (11) and six nuts (12).
- 7 Lift out two fire extinguisher cylinders (5).
- 8 Remove nut (13), lockwasher (14), and washer (15) from directional slide (16).
- 9 Remove cradle (17) by sliding off directional slide (16).
- 10 Slide the two forward fire extinguisher cylinders (5) and cradle (17) to rear and repeat steps 6, 7, and 9.



- 11 Remove directional slide (16) by removing six screws (18) and six lockwashers (19).



10-4 REPLACE/SERVICE FIRE EXTINGUISHER CYLINDER Continued

b. INSPECTION

- 1 Before installation, weigh each cylinder. The cylinder should weigh about 35 pounds (15.9 kilograms) when fully charged. If weight is less than 90 percent of marked weight of cylinder, replace cylinder.
- 2 Inspect the fire extinguisher data plate to ensure that a hydrostatic test has been performed within the past 5 years. Faulty extinguishers or those beyond the test time limit (5 years) shall be declared unserviceable and replaced.

c. INSTALLATION

NOTE

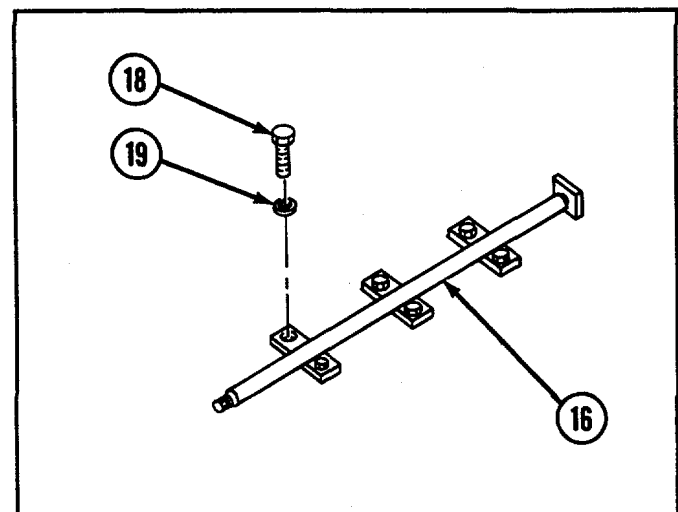
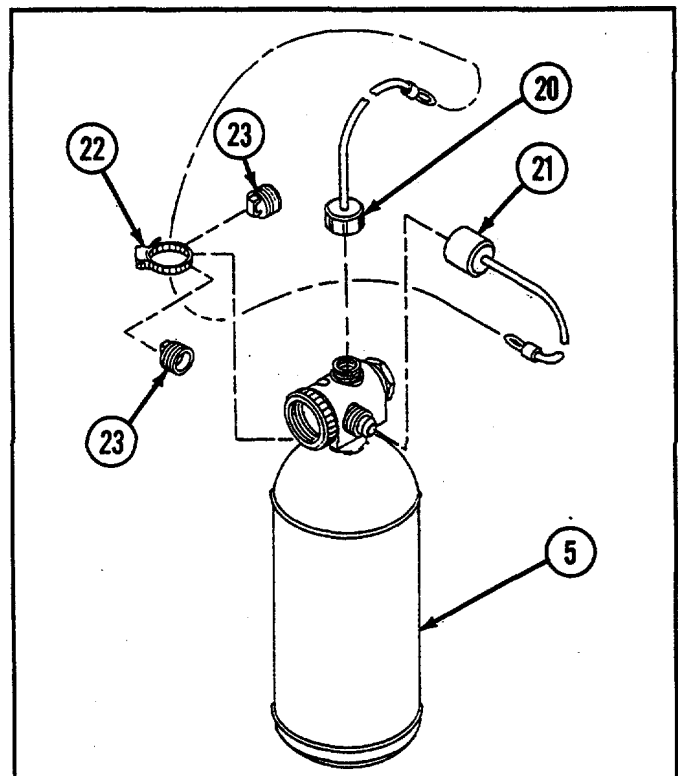
Steps 1 and 2 apply to installation of new fire extinguisher cylinders only.

- 1 Remove two cap assemblies (20 and 21) from each fire extinguisher cylinder (5).
- 2 Remove clamp (22) and two plugs (23) from each fire extinguisher cylinder (5).

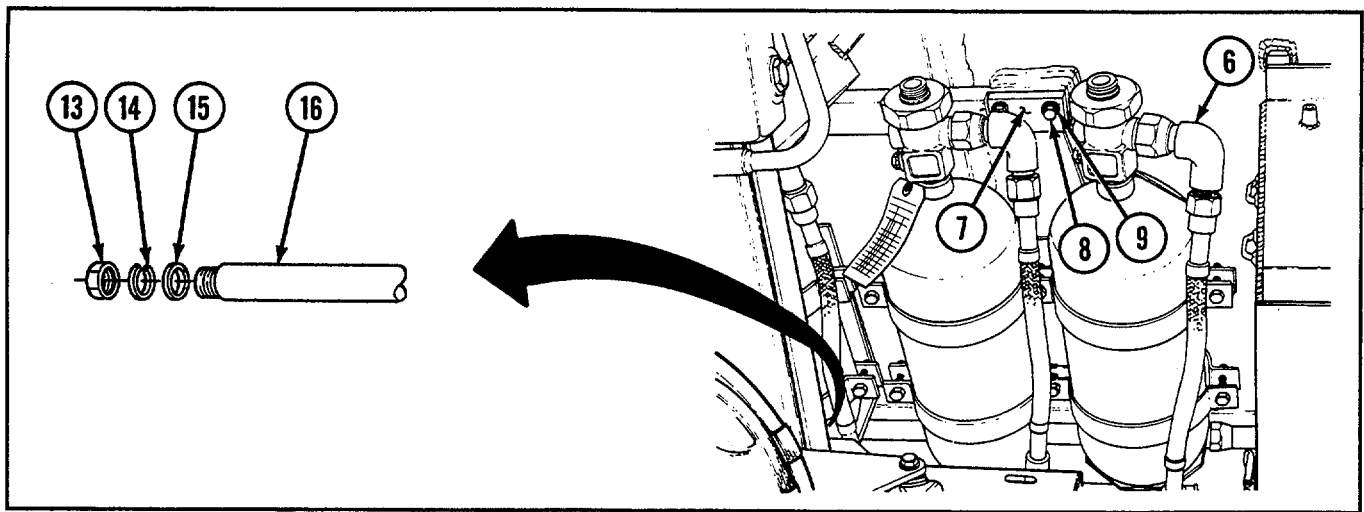
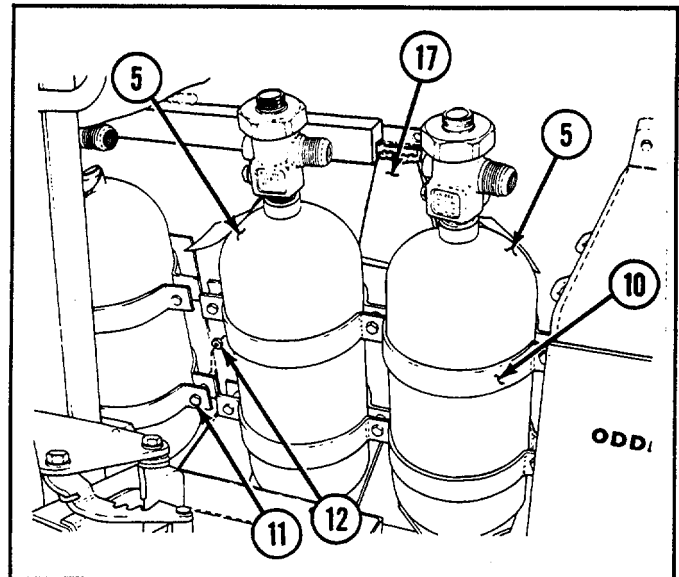
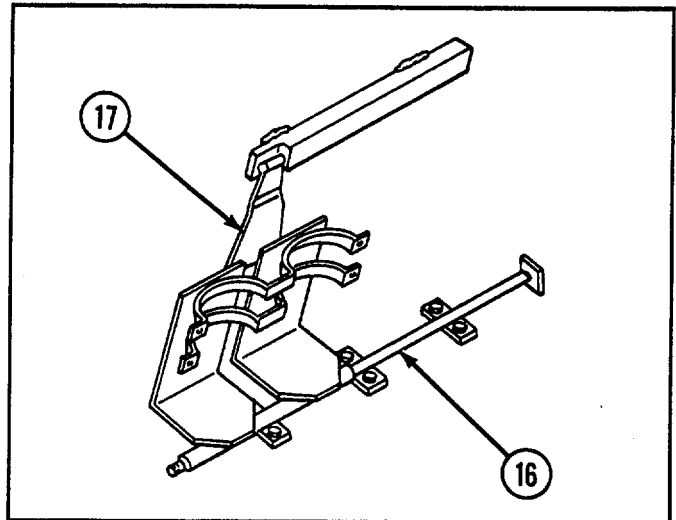
NOTE

Steps 3 through 11 apply to both left and right banks.

- 3 Install directional slide (16) with six new lockwashers (19) and six screws (18).

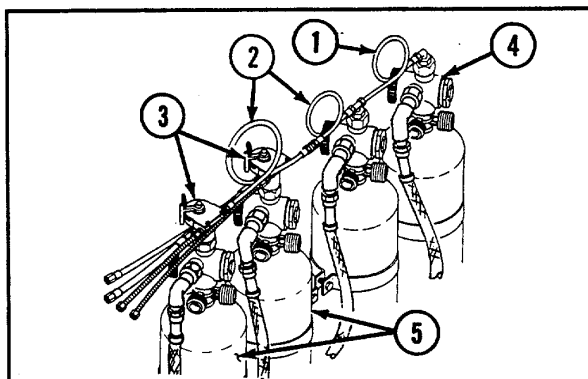


- 4 Install cradle (17) on directional slide (16) .
- 5 Install two fire extinguisher cylinders (5) in cradle (17).
- 6 Install bracket (10) around two fire extinguisher cylinders (5) with six screws (11) and six nuts (12).
- 7 Slide two forward fire extinguisher cylinders (5) and cradle (17) to front.
- 8 Install two rear fire extinguisher cylinders (5) by repeating steps 4 through 6.
- 9 Install retaining bar (7) with two new lockwashers (9) and two screws (8).
- 10 Install washer (15), new lockwasher (14), and nut (13) on directional slide (16).
- 11 Connect eight fire extinguisher lines (6).



10-4 REPLACE/SERVICE FIRE EXTINGUISHER CYLINDERS-Continued

- 12 Install six connector head assemblies (4) .
- 13 Install two cylinder control valves (3) onto fire extinguisher cylinders (5).
- 14 Connect interconnecting tube assemblies (1 and 2) to cylinder control valve (3) and head assemblies (4).



10-5 REPLACE/SERVICE FIRE EXTINGUISHER CYLINDER CONTROLS

THIS TASK COVERS

- a. Removal
- b. Inspection
- c. Installation

INITIAL SETJUP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Lockwashers (6) (Appendix G, item 130)
- Seals, safety (2) (Appendix G, item 265)

WARNING

Handle all fire extinguisher cylinders with care. Do not bump, jar, or drop.

a. REMOVAL

- 1 Remove interconnecting tube assemblies (1 and 2) from cylinder control valves (3) and head assemblies (4).

CAUTION

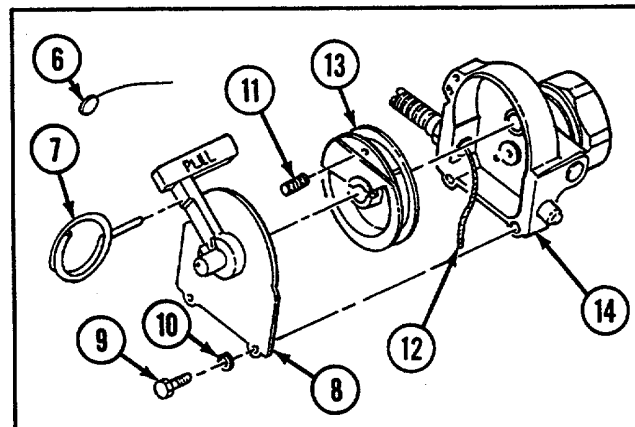
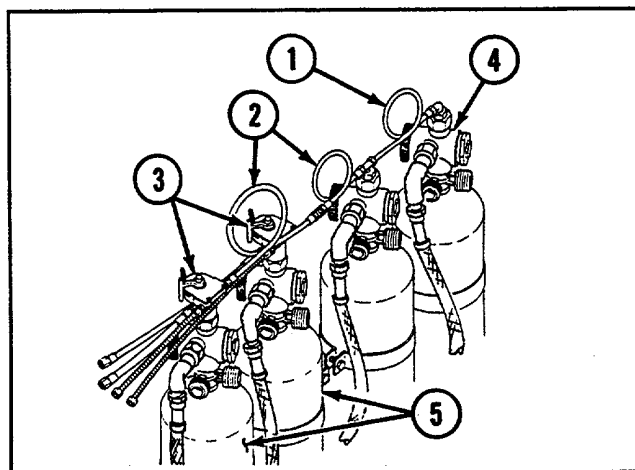
Be sure to remove cylinder control valve (3) from cylinder before any other disconnections are made.

- 2 Unscrew and remove two cylinder control valves (3) from cylinders (5).

NOTE

Repeat steps 3 through 6 for each cylinder control valve.

- 3 Break safety seal (6) and pull safety pin (7).
- 4 Remove cover assembly (8) by removing three' screws (9) and three lockwashers (10).
- 5 Loosen two screws (11) and disconnect cable (12).



6 Remove cable pulley assembly (13) from cylinder control valve housing (14) to remove cable (12) from housing.

b. INSPECTION

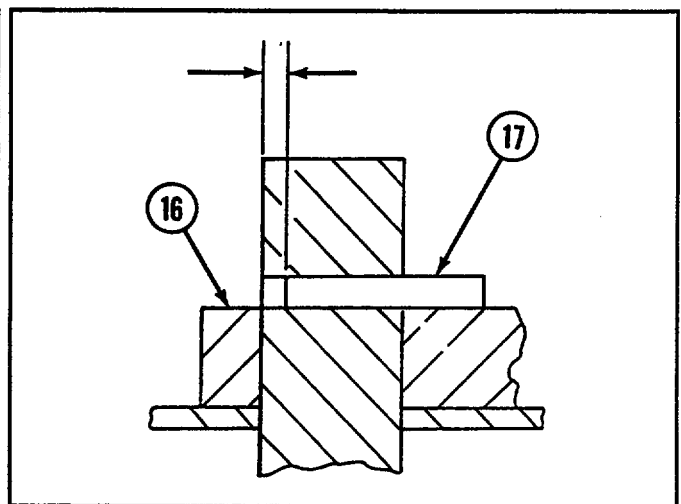
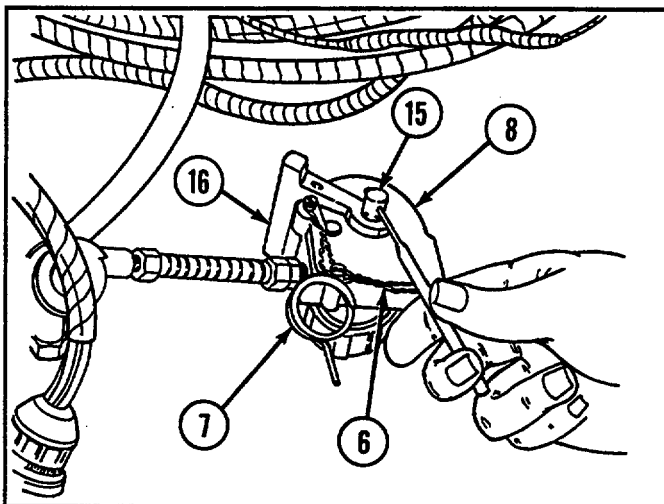
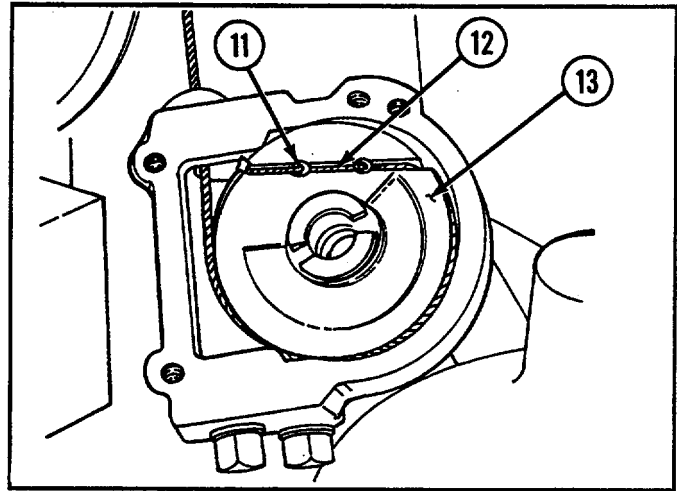
- 1 Inspect system components for wear, corrosion, and damage. If necessary, remove defective parts and replace.
- 2 Clean and dry all items before installation.

c. INSTALLATION

NOTE

Repeat steps 1 through 5 for each cylinder control valve.

- 1 Wind cable (12) around sheave of cable pulley assembly (13) and secure by tightening two screws (11).
- 2 Install cover assembly (8) with three screws (9) and three new lockwashers (10).
- 3 Rotate cylinder control valve shaft (15) and handle (16) counterclockwise to the reset position, and install safety pin (7) through handle and cover assembly (8).
- 4 Install new safety seal (6).
- 5 Inspect two fire extinguisher control valves to be sure pin (17) does not extend beyond shaft on side away from handle (16). If it does, protruding pin must be driven back into shaft 0.062 inch (in.) (1.57 millimeters [mm]). Then stake hole at three places to prevent pin from coming through. File staking flush to ensure free rotation.
- 6 Install two cylinder control valves (3) into cylinders (5).
- 7 Connect interconnecting tube assemblies (1 and 2) to cylinder control valves (3) and head assemblies (4).



10-6 REPLACE/SERVICE FIRE EXTINGUISHER SYSTEM CONTROLS AND LINKAGES

THIS TASK COVERS

a. Removal

b. Installation

c. Adjustment

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Riveter, blind (Appendix C, item 42)

Parts:

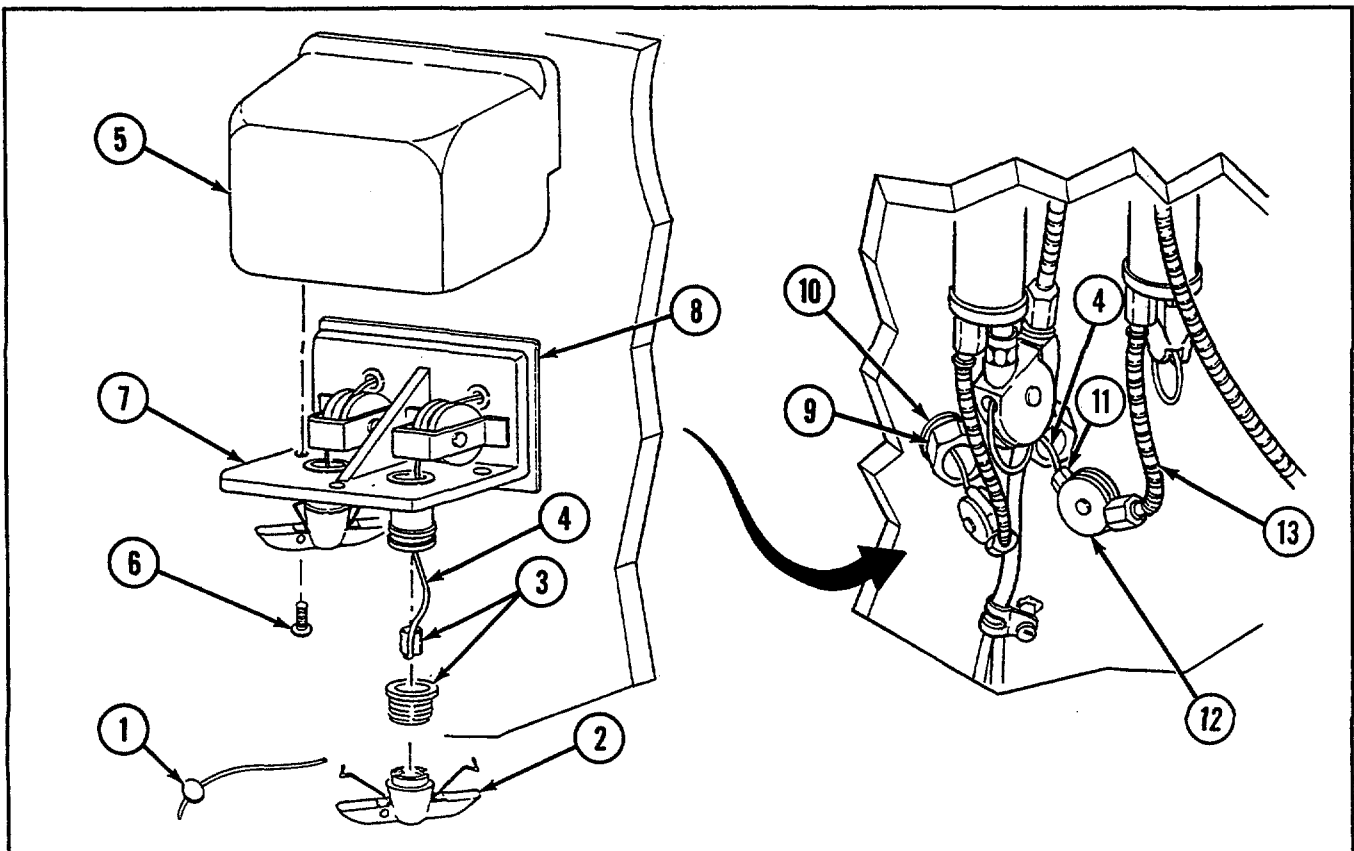
- Gasket (Appendix G, item 63)
- Lockwashers (2) (Appendix G, item 105)
- Lockwashers (2) (Appendix G, item 130)
- Lockwashers (2) (Appendix G, item 132)
- Lockwashers (2) (Appendix G, item 137)
- Rivet (Appendix G, item 236)
- Seals (4) (Appendix G, item 266)

Equipment Condition:

Heater control box removed (see paragraph 6-12)

a. REMOVAL

- 1 Remove two seals (1), two manual control levers (2), and two fastener assemblies (3) from two cables (4).
- 2 Remove cover (5) by removing three screws (6).
- 3 Remove pull-release mechanism (7) and gasket (8) by loosening two nuts (9) and two lockwashers (10) and pulling cable through pull-release mechanism.
- 4 Pull two cables (4) through hull and remove two lockwashers (10) and two nuts (9).
- 5 Remove two adapters (11), two swivel connectors (12), and two conduits (13) from two cables (4).

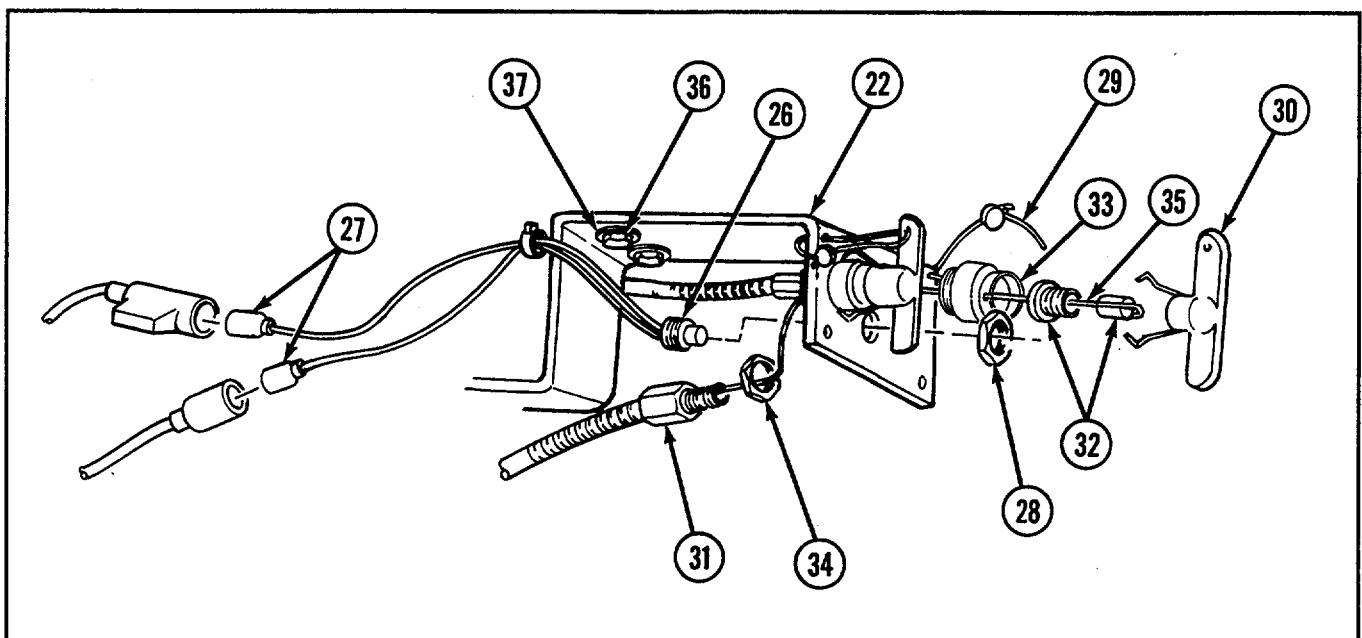
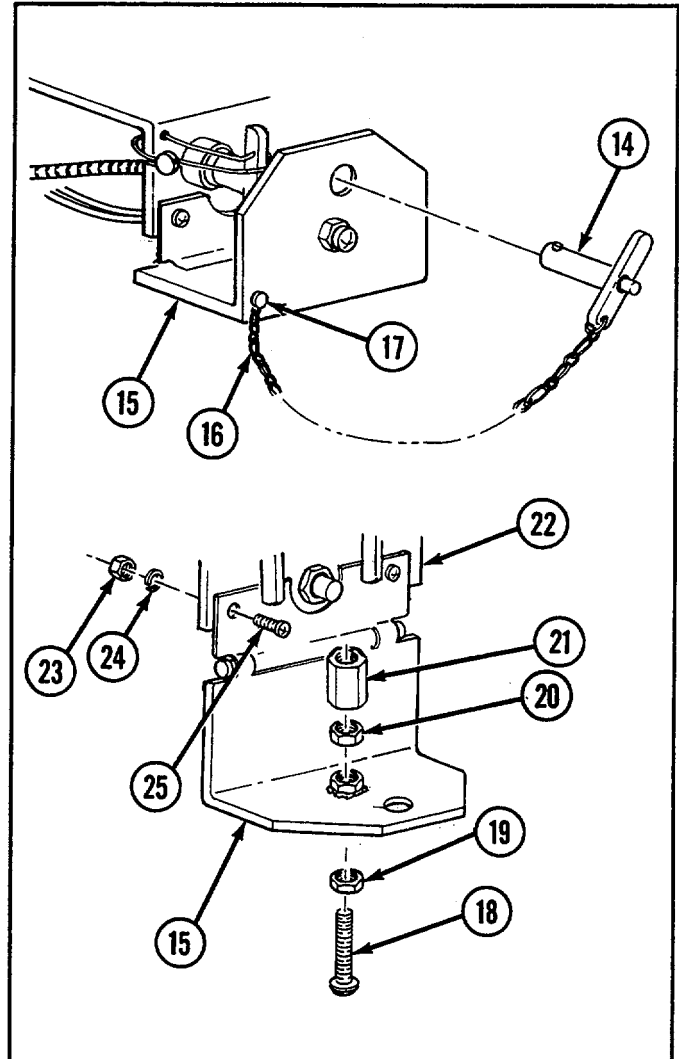


- 6 Remove quick-release pin (14) from shield (15) .

NOTE

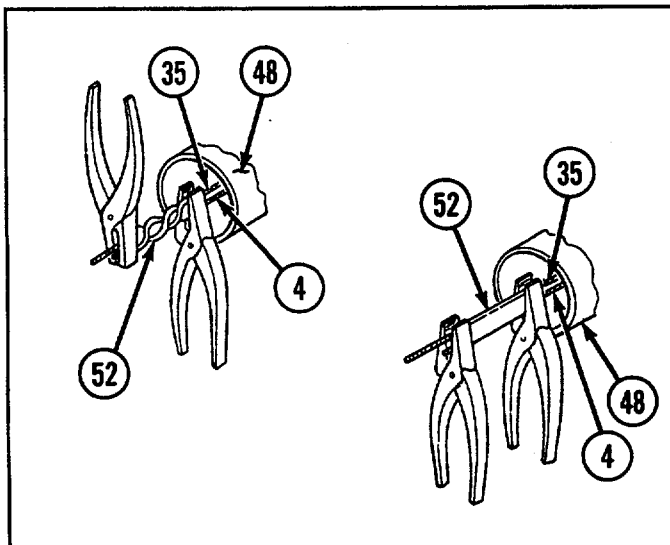
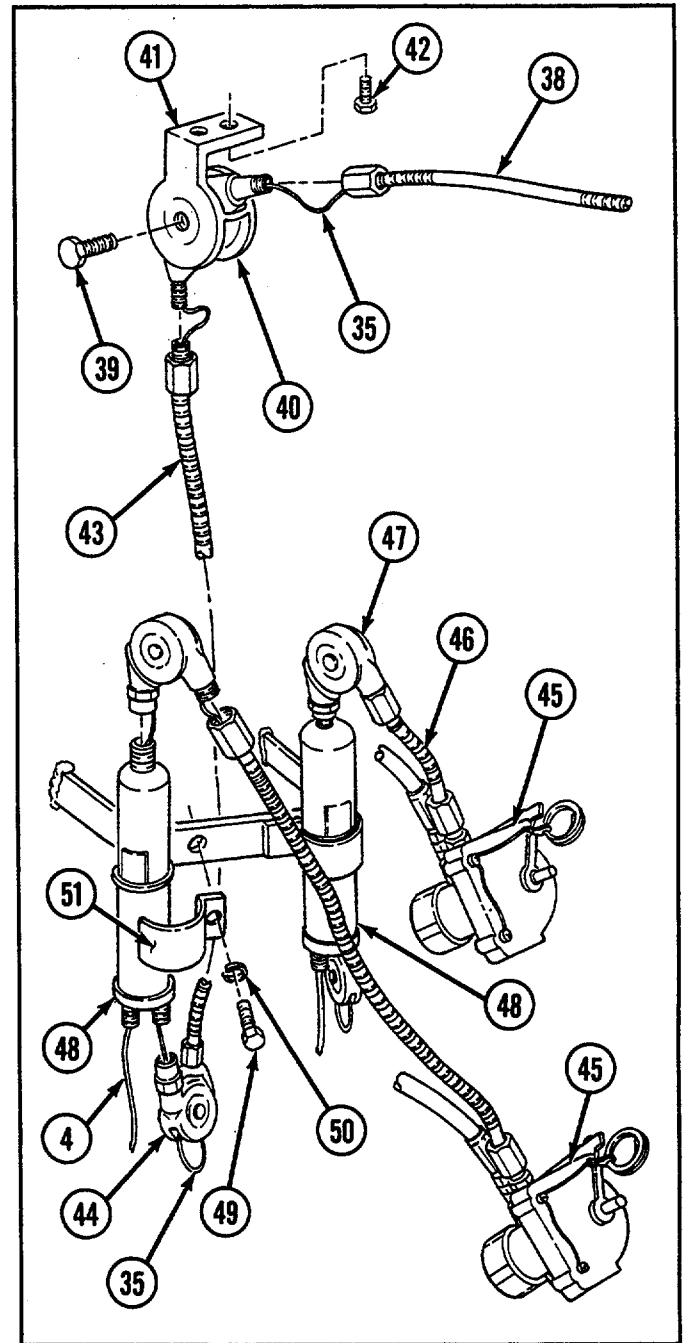
Perform step 7 only if quick-release pin chain (16) is damaged and must be replaced.

- 7 Remove quick-release pin chain (16) from shield (15) by removing rivet (17).
- 8 Remove screw (18), two nuts (19 and 20), and stop (21) from shield (15).
- 9 Remove shield (15) from bracket (22) by removing two nuts (23), two lockwashers (24), and two screws (25).
- 10 Remove interlock switch assembly (26) from bracket (22) by disconnecting two leads (27) and removing locknut (28).
- 11 Remove two seals (29) from two manual control levers (30).
- 12 Remove two manual control levers (30) by unscrewing two conduit nuts (31) and removing two fastener assemblies (32), two reducers (33), and two nuts (34) from two cables (35).
- 13 Pull two cables (35) through bracket (22).
- 14 Remove bracket (22) by removing two screws (36) and two lockwashers (37).



10-6 REPLACE/SERVICE FIRE EXTINGUISHER SYSTEM CONTROLS AND LINKAGES-Continued

- 15 Remove two conduits (38) from two cables (35) .
- 16 Remove two screws (39) and slide two adjustable elbows (40) from two cables (35).
- 17 Remove two adjustable elbow brackets (41) by removing two screws (42).
- 18 Remove two conduits (43) and two swivel connectors (44) from two cables (35).
- 19 Remove two cylinder control valves (45) (see paragraph 10-5) from two cables (35).
- 20 Remove two conduits (46) and two swivel connectors (47) from two cables (35).
- 21 Remove two dual-pull mechanisms (48) with cables (4 and 35) by removing two screws (49), two lockwashers (50), and two clips (51).
- 22 Open two dual-pull mechanisms (48) and remove four cables (4 and 35) as follows: grasp 3/16 in. (5 mm) of each end of cable damp (52) with pliers. Rotate ends of clamp simultaneously until cable clamp has been untwisted and cables are released.

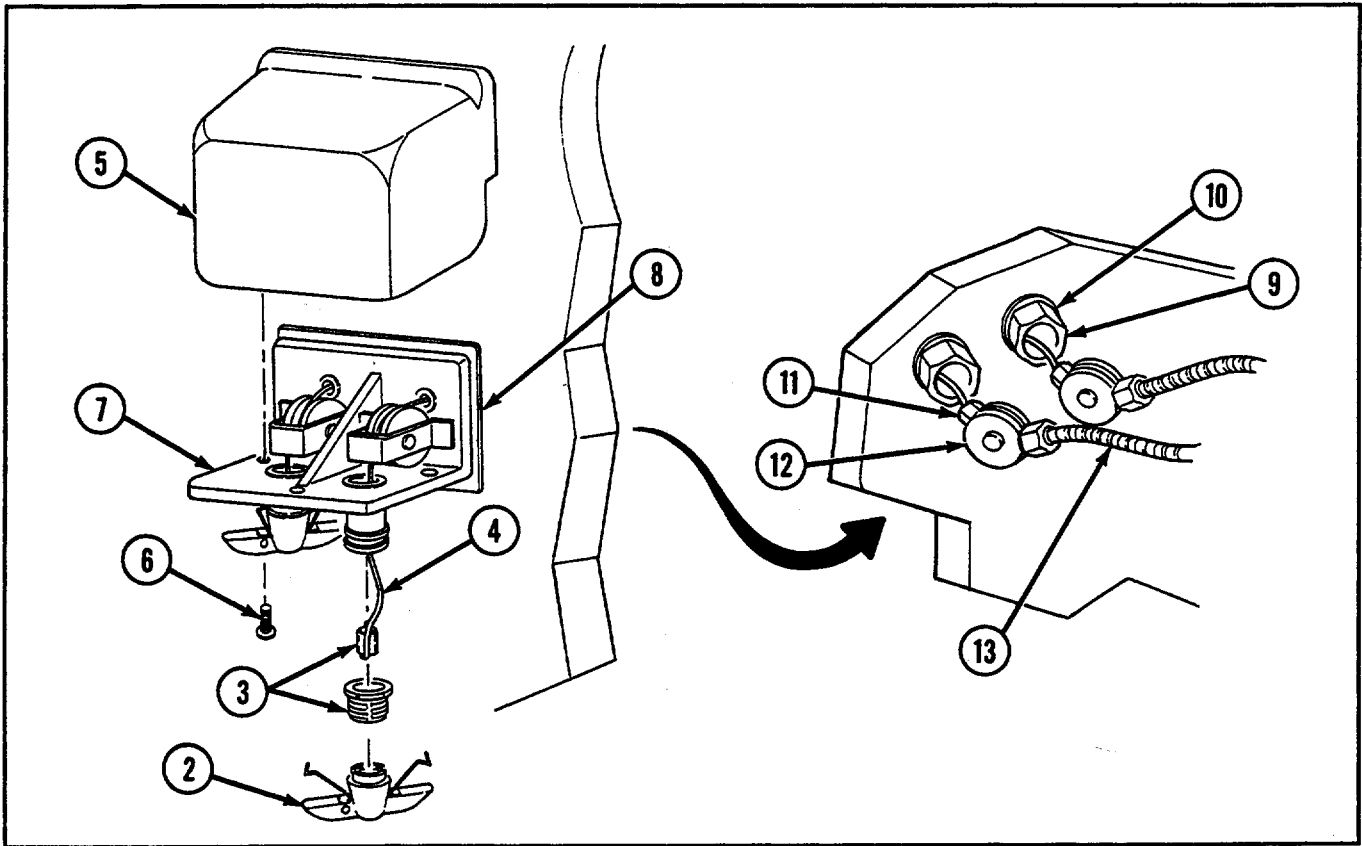


b. INSTALLATION

- 1 Install two fastener assemblies (3) and two manual control levers (2) on two cables (4).
- 2 Install new gasket (8) and pull-release mechanism (7) with two new lockwashers (10) and two nuts (9).
- 3 Install two cables (4) through pull-release mechanism (7).

4 Install two adapters (11), two swivel connectors (12), and two conduits (13).

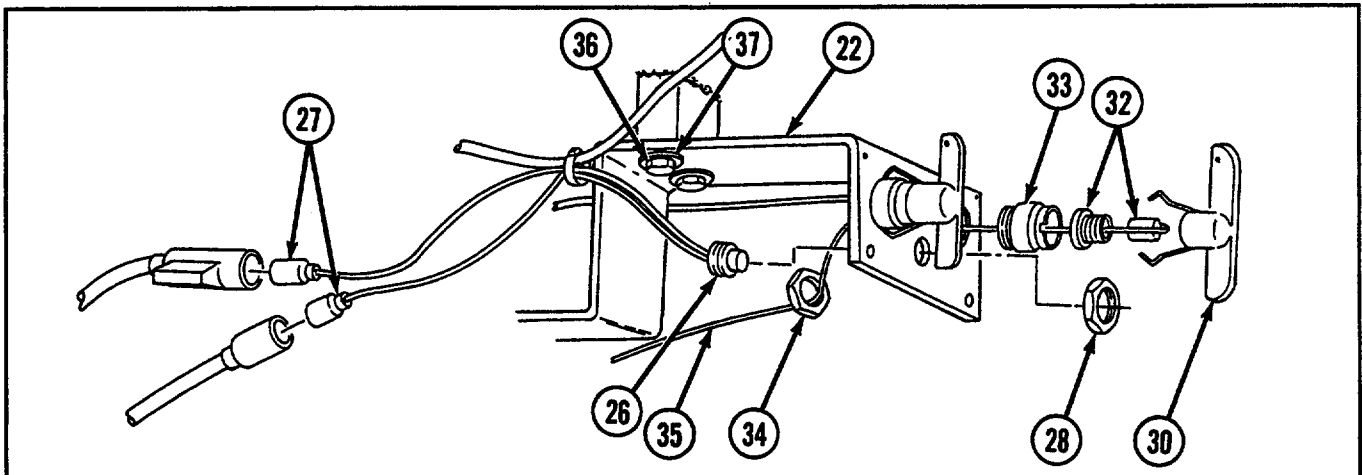
5 Install cover (5) with three screws (6) onto pull-release mechanism (7).



6 Install bracket (22) with two new lockwashers (37) and two screws (36).

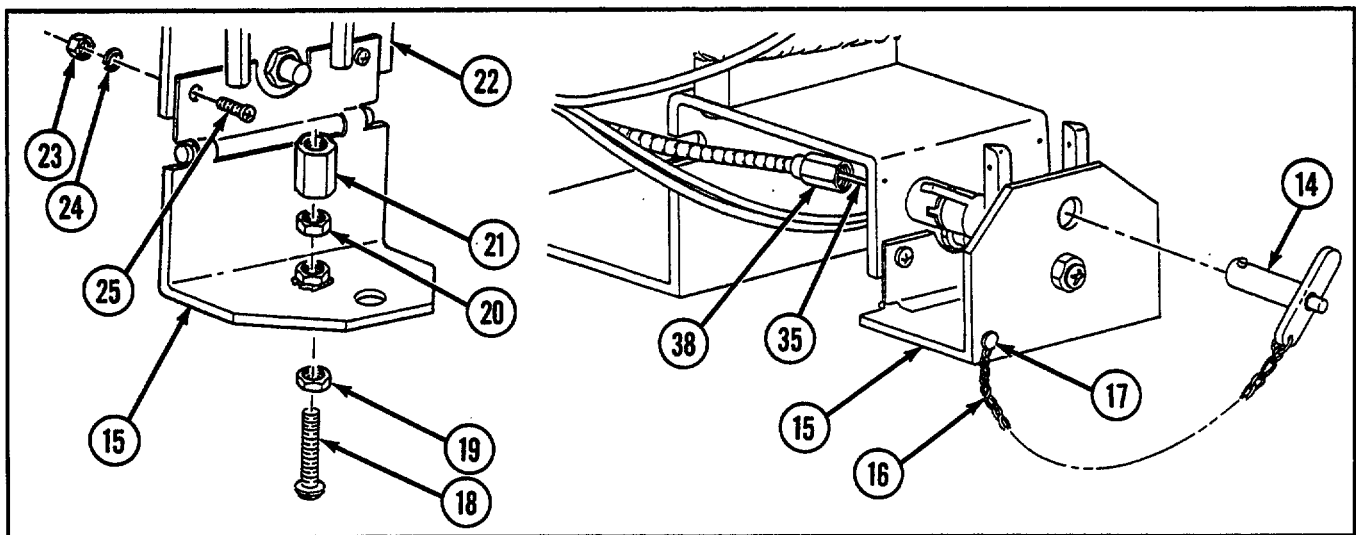
7 Install two manual control levers (30) on two cables (35) with two nuts (34), two reducers (33), and two fastener assemblies (32) on bracket (22).

8 Install interlock switch assembly (26) on bracket (22) by connecting two leads (27) and tightening new locknut (28).



10-6 REPLACE/SERVICE FIRE EXTINGUISHER SYSTEM CONTROLS AND LINKAGES-Continued

- 9 Install shield (15) on bracket (22) with two screws (25), two new lockwashers (24), and two nuts (23).
- 10 Install stop (21), two nuts (19 and 20), and screw (18) on shield (15).
- 11 Install quick-release pin chain (16) on shield (15) with new rivet (17).
- 12 Install quick-release pin (14) on shield (15).
- 13 Install two conduits (38) on two cables (35).



- 14 Install two adjustable elbow brackets (41) with two screws (42).
- 15 Install two adjustable elbows (40) on two cables (35) and two conduits (38) and secure with two screws (39).
- 16 Install two conduits (43) and two swivel connectors (44) on two cables (35).

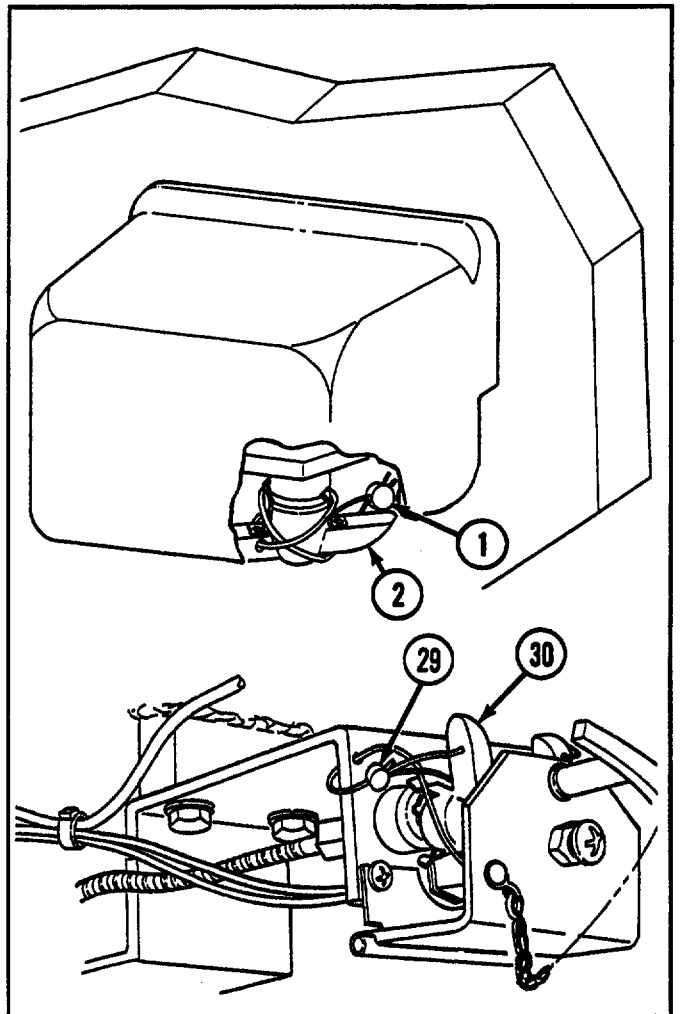
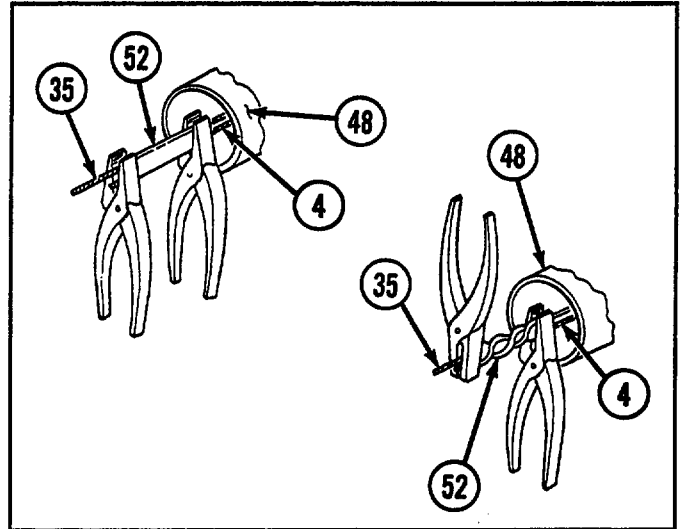
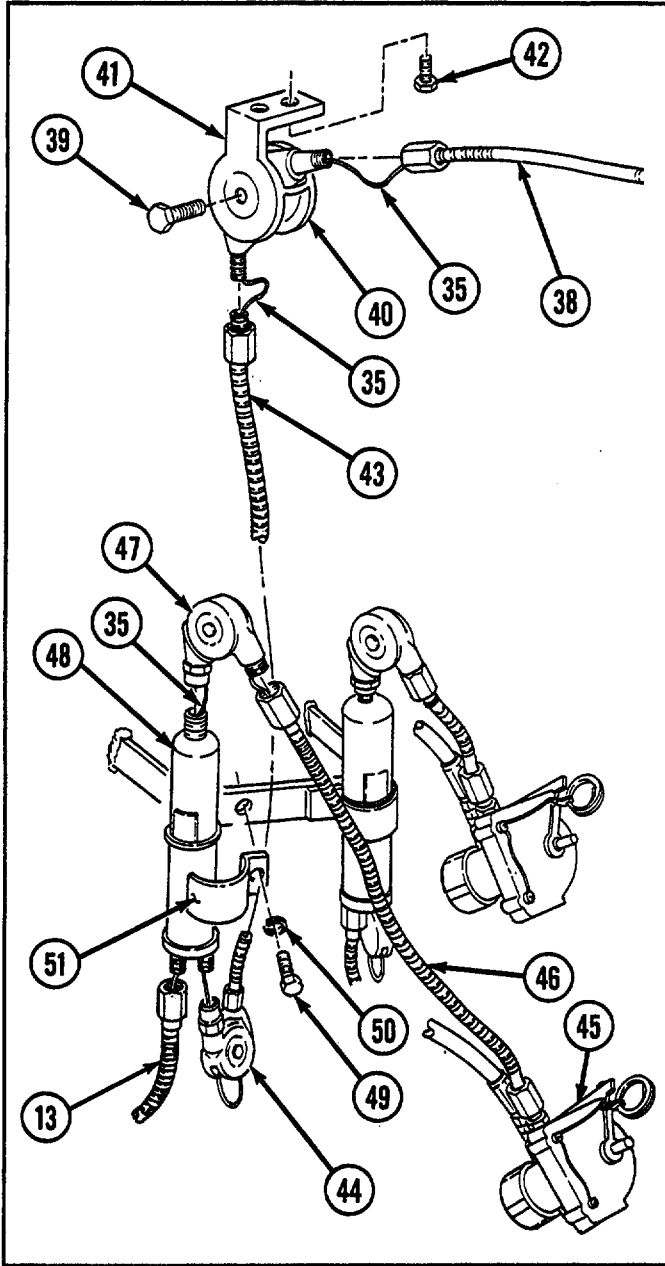
NOTE

- Remove slack from cables.
- Pull splice to inlet end of barrel before attaching to cylinder valve. Apply thin coat of graphite to cable before installing.

- 17 Install four cables (4 and 35) in two dual-pull mechanisms (48) with two cable clamps (52). Insert cable into cable clamp. Squeeze cable clamp tightly along its entire length using pliers, or flatten securely by tapping lightly with a hammer. Grasp 3/16 in. (5 mm) of each end of cable clamp with pliers. Rotate ends of cable clamp in opposite directions simultaneously until cable clamp has been twisted 1-1/2 turns. Cut short end of cable to within 1/16 in. (2 mm) of cable clamp.
- 18 Secure two dual-pull mechanisms (48) to two swivel connectors (44) and two conduits (13).
- 19 Install two dual-pull mechanisms (48) with two clips (51), two new lockwashers (50), and two screws (49).
- 20 Install two swivel connectors (47) and two conduits (46) on two cables (35).
- 21 Install two cylinder control valves (45) on two cables (35) (see paragraph 10-5).

22 Install four new seals (1 and 29) on four manual control levers (2 and 30).

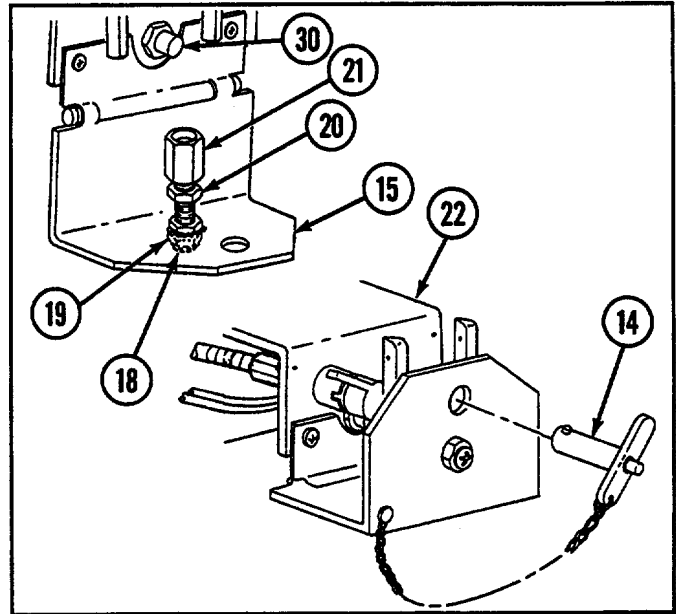
23 Install two cylinder control valves (45) on two fire extinguisher cylinders.



10-6 REPLACE/SERVICE FIRE EXTINGUISHER SYSTEM CONTROLS AND LINKAGECS-Continued

c. ADJUSTMENT

- 1 Loosen two nuts (19 and 20) and back off screw (18) and stop (21).
- 2 Close shield (15) and insert quick-release pin (14) through shield and bracket (22) to locked position.
- 3 Push in button on manual control lever (30) and adjust screw (18) until it touches switch button. Back off screw 1/2 turn. Tighten nut (19) to lock screw.
- 4 Turn stop (21) in until it seats firmly against rim of manual control lever (30). Turn nut (20) in until it seats firmly against stop. Remove quick-release pin (14) and open shield (15). Tighten nut without allowing stop to rotate.
- 5 Repeat step 2 and check for switch operation and locked position of pin.



NOTE

Follow-on maintenance: Install heater control box (see paragraph 6-12)

10-7 REPLACE FIRE EXTINGUISHER SYSTEM LINES AND NOZZLES

THIS TASK COVERS

- a. Removal b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Gaskets (2) (Appendix G, item 82)
- Gaskets (2) (Appendix G, item 82)
- Lockwashers (9) (Appendix G, item 116)
- Lockwashers (9) (Appendix G, item 116)
- Lockwasher (Appendix GC, item 122)
- Lockwashers (29) (Appendix G, item 130)
- Lockwashers (16) (Appendix G, item 132)
- Nut, self-locking (Appendix GC, item 172)
- Ring (Appendix G, item 235)

Equipment Conditions:

- Stowage baskets removed as necessary (see paragraph 9-96)
- Oddment tray assembly removed (see paragraph 9-104)
- Rocket ammunition storage box assembly removed (see paragraph 9-99)
- Subfloor plates removed as necessary (see paragraphs 9-1 through 9-23)

a. REMOVAL

Remove lines and nozzles as required using illustrations as a guide.

- | | | | |
|-----------------|------------------|-------------------|---------------------|
| 1 Screw | 9 Tube assembly | 17 Tube assembly | 25 Elbow |
| 2 Lockwasher | 10 Tee | 18 Tube assembly | 26 Bracket |
| 3 Clamp | 11 Tube assembly | 19 Elbow | 27 Screw |
| 4 Tube assembly | 12 Elbow | 20 Tube assembly | 28 Self-locking nut |
| 5 Nipple | 13 Tube assembly | 21 Tube assembly | 29 Clamp |
| 6 Tube assembly | 14 Nozzle | 22 Tube assembly | 30 Clamp |
| 7 Coupling | 15 Lockwasher | 23 Valve assembly | 31 Screw |
| 8 Gasket | 16 Screw | 24 Tube assembly | 32 Nut |

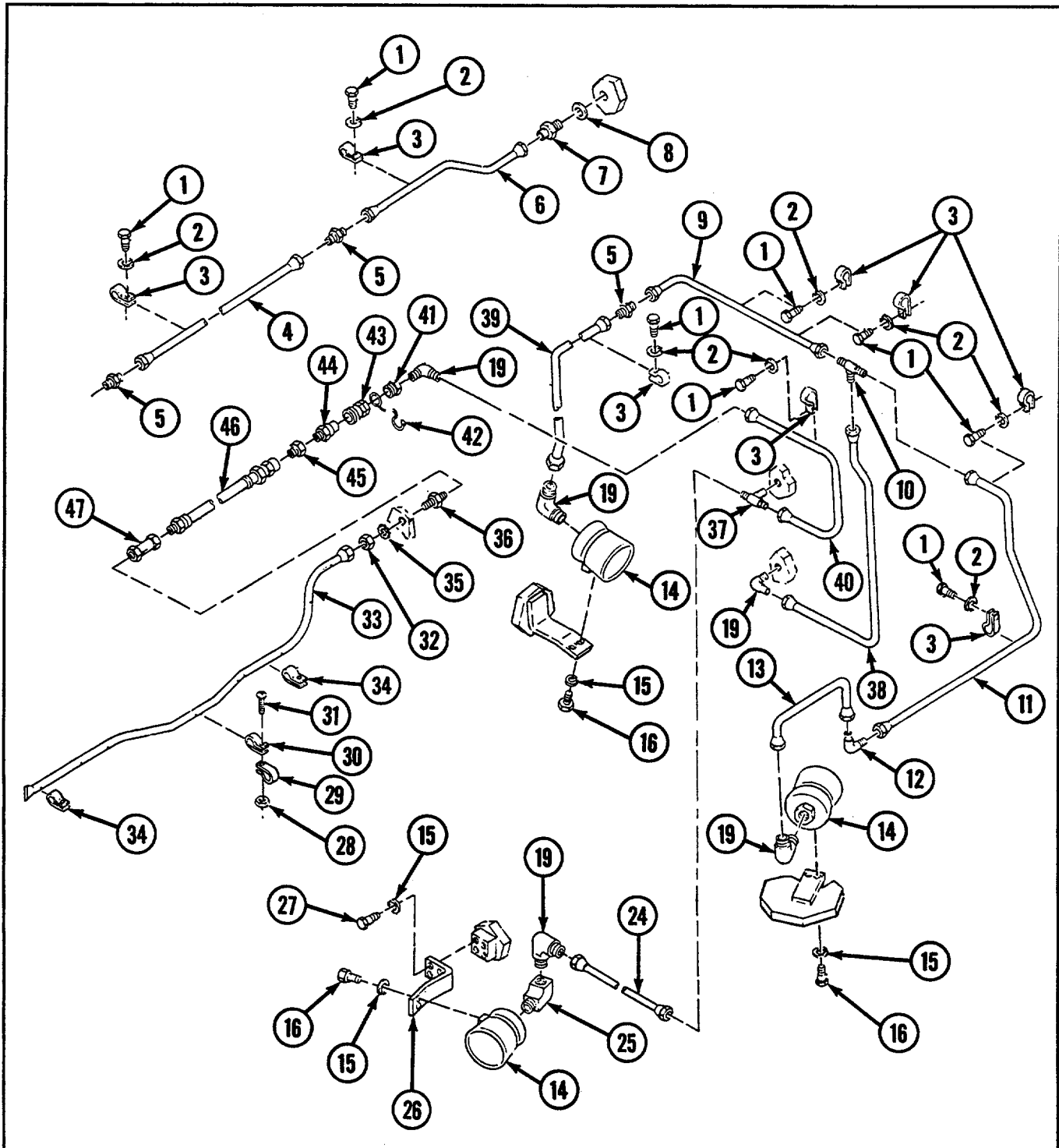
SECTION II: FIXED FIRE EXTINGUISHER SYSTEM

TM 9-2350-256-20

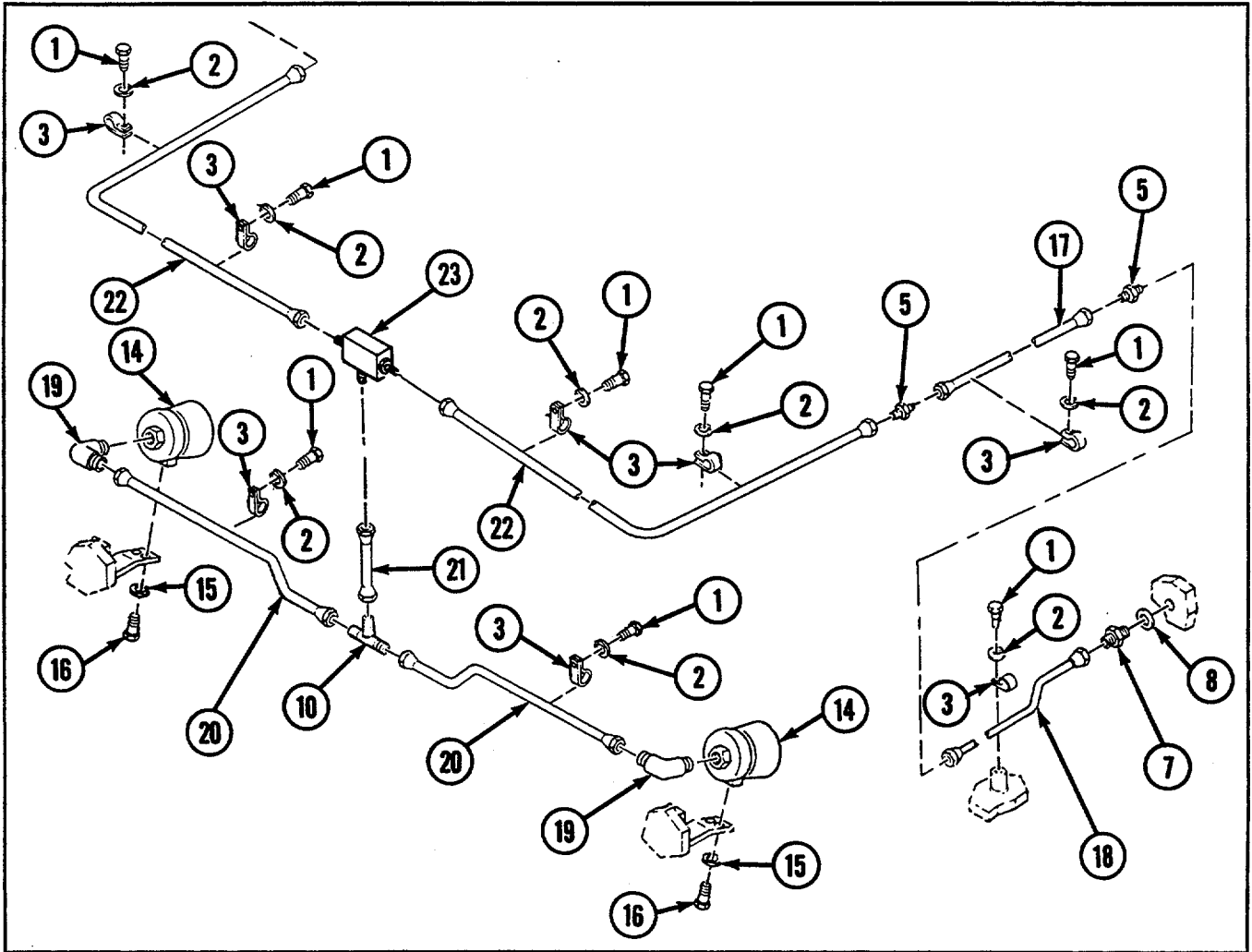
- | | | | |
|------------------|------------------|-------------|------------------|
| 33 Tube assembly | 37 Tee | 41 Bushing | 45 Reducer |
| 34 Clamp | 38 Tube assembly | 42 Ring | 46 Hose assembly |
| 35 Lockwasher | 39 Tube assembly | 43 Coupling | 47 Valve |
| 36 Adapter | 40 Tube assembly | 44 Coupling | |

NOTE

The following illustration is continued on the next page.



10-7 REPLACE FIRE EXTINGUISHER SYSTEM LINES AND NOZZLES-Continued



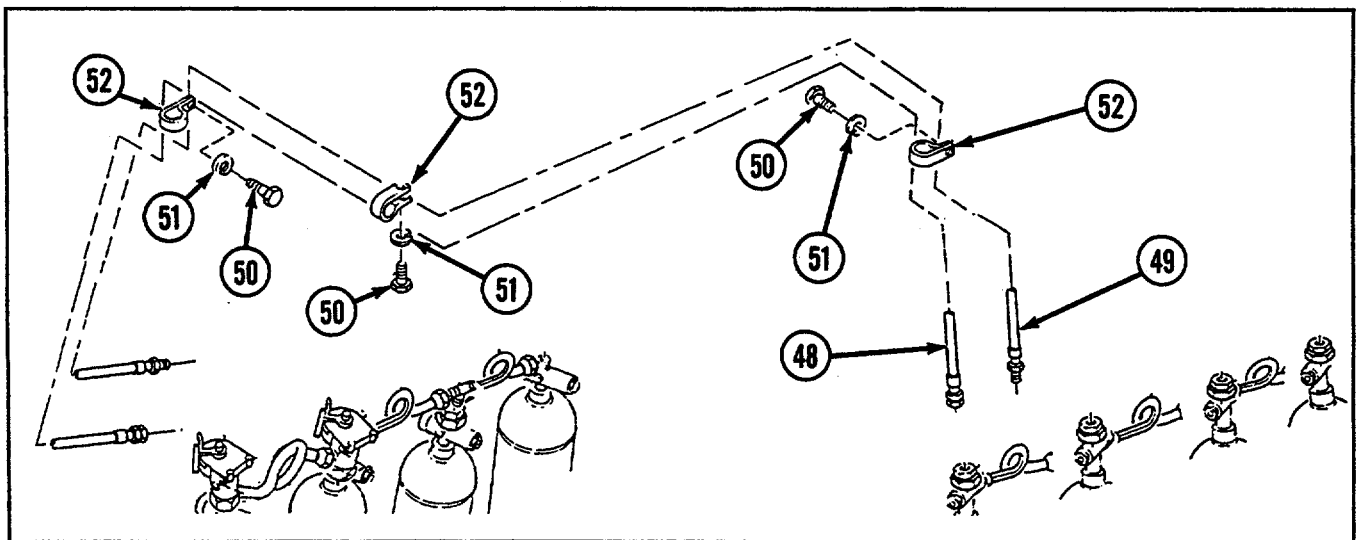
48 Hose assembly

49 Hose assembly

50 Screw

51 Lockwasher

52 Clamp



SECTION II: FIXED FIRE EXTINGUISHER SYSTEM

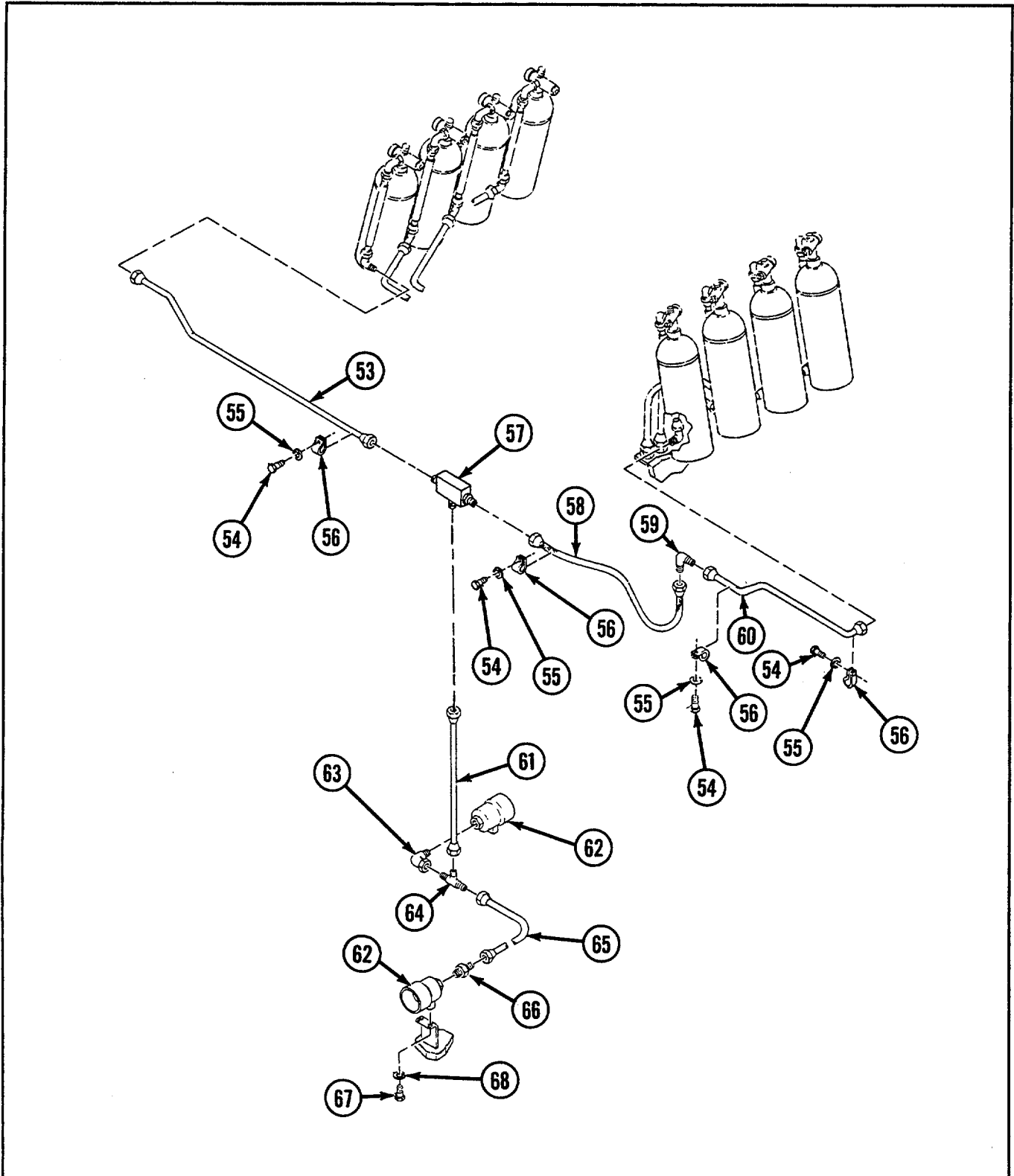
TM 9-2350-256-20

- 53 Tube assembly
- 54 Screw
- 55 Lockwasher
- 56 Clamp

- 57 Check valve
- 58 Tube assembly
- 59 Elbow
- 60 Tube assembly

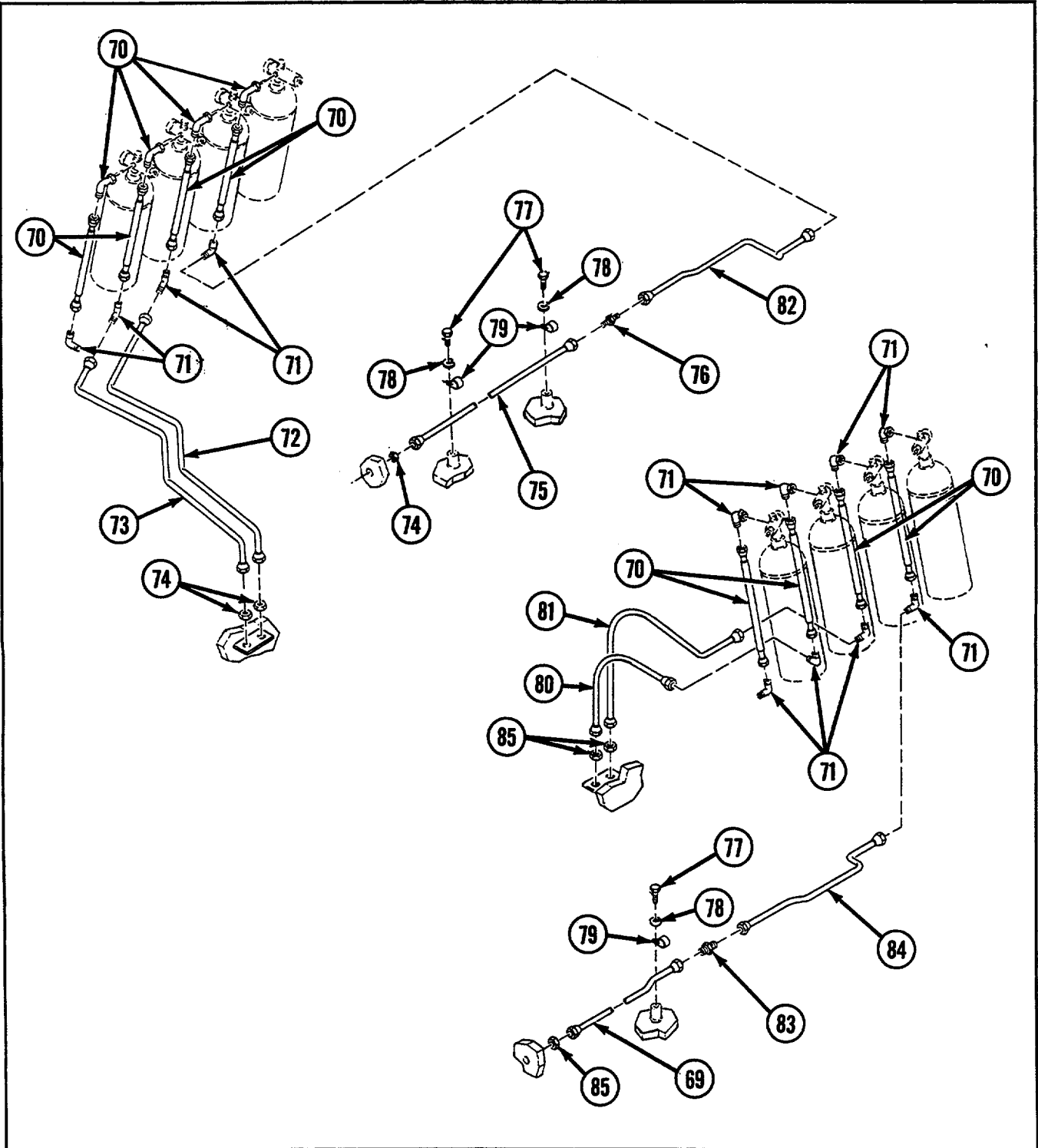
- 61 Tube assembly
- 62 Fire nozzle
- 63 Elbow
- 64 Tee

- 65 Tube assembly
- 66 Adapter
- 67 Screw
- 68 Lockwasher



10-7 REPLACE FIRE EXTINGUISHER SYSTEM LINES AND NOZZLES-Continued

- | | | | |
|------------------|------------------|------------------|------------------|
| 69 Tube assembly | 74 Nut | 79 Camp | 84 Tube assembly |
| 70 Hose assembly | 75 Tube assembly | 80 Tube assembly | 85 Nut |
| 71 Elbow | 76 Nipple | 81 Tube assembly | 86 Coupling |
| 72 Tube assembly | 77 Screw | 82 Tube assembly | 87 Tube assembly |
| 73 Tube assembly | 78 Lockwasher | 83 Nipple | 88 Adapter |

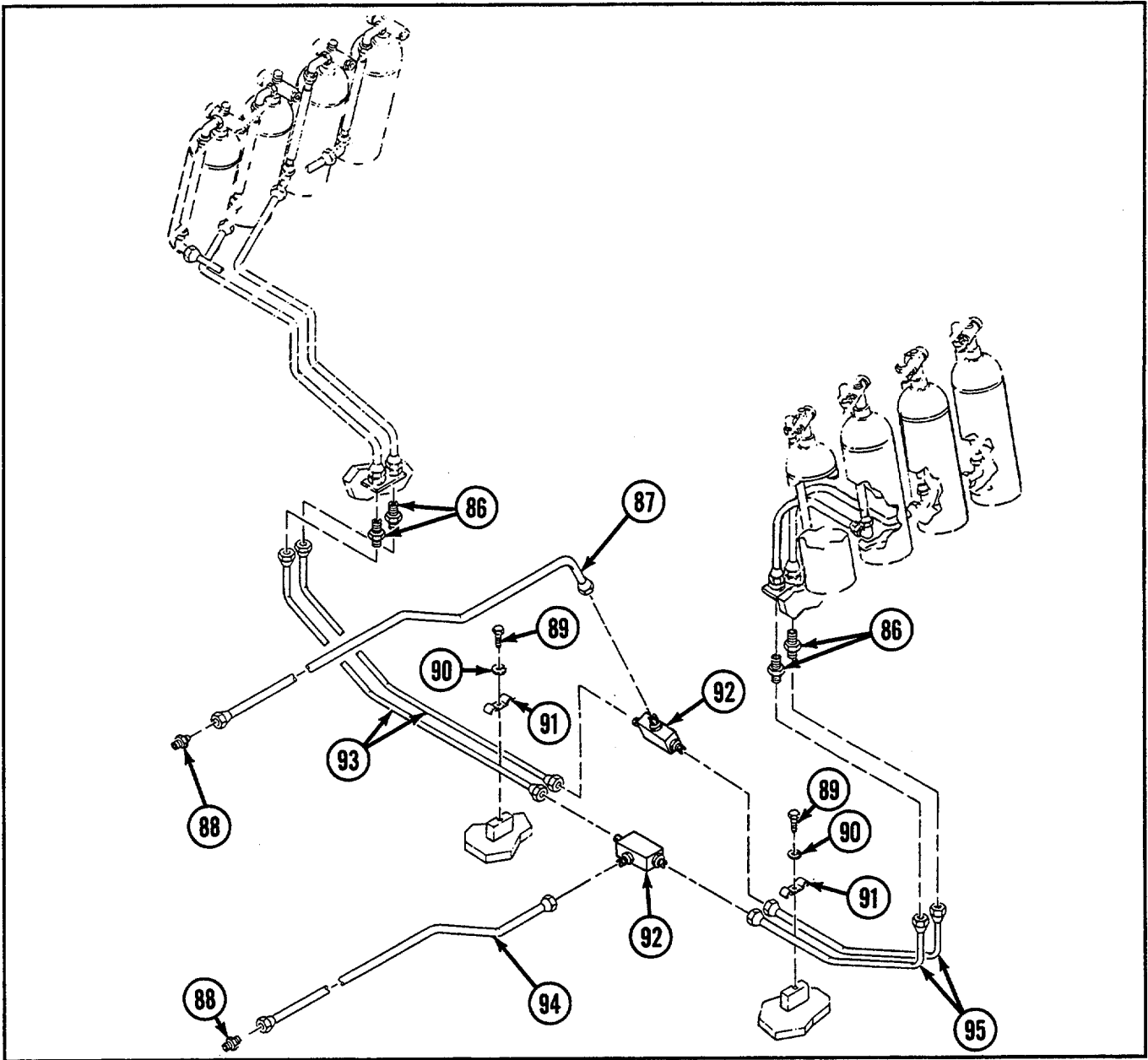


89 Screw
90 Lockwasher

91 Retaining strap
92 Check valve

93 Tube assembly
94 Tube assembly

95 Tube assembly



b. INSTALLATION

Install lines and nozzles in reverse order using illustrations as a guide.

NOTE

- Follow-on maintenance:
- Install subfloor plates if removed (see paragraph 9-1 through 9-23)
 - Install rocket ammunition storage box assembly (see paragraph 9-99)
 - Install oddment tray assembly (see paragraph 9-104)
 - Install stowage basket if removed (see paragraph 9-96)

**CHAPTER 11
MAINTENANCE OF MAIN WINCH, HOIST WINCH,
AND RELATED COMPONENTS**

CHAPTER OVERVIEW

This chapter describes how to adjust, remove, disassemble, assemble, install, and inspect the main winch, hoist winch, and related components.

This chapter consists of the following sections:

		Page
Section I	Main Winch Assembly	11-1
Section II:	Hoist Winch Assembly	11-9
Section III:	Wire Rope Shield and Roller Assembly	11-13
Section IV:	Hoisting Boom Assembly	11-16

SECTION I: MAIN WINCH ASSEMBLY

Para.	Task	Page
11-1	Service Main Winch Level Winder Cylinder Adjustment.....	11-1
11-2	Service Main Winch Brake Band Adjustment	11-2
11-3	Replace Main Winch Manual Control and Linkage	11-3
11-4	Replace Main Winch Controls and Hoses	11-4
11-5	Replace Main Winch Cable	11-7

11-1 SERVICE MAIN WINCH LEVEL WINDER CYLINDER ADJUSTMENT

THIS TASK COVERS

Adjustment

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Wrench, spanner, hydraulic cylinder (Appendix C, item 58)
- Wrench, spanner, level winder adjusting nut (Appendix C, item 59)

Equipment Condition:

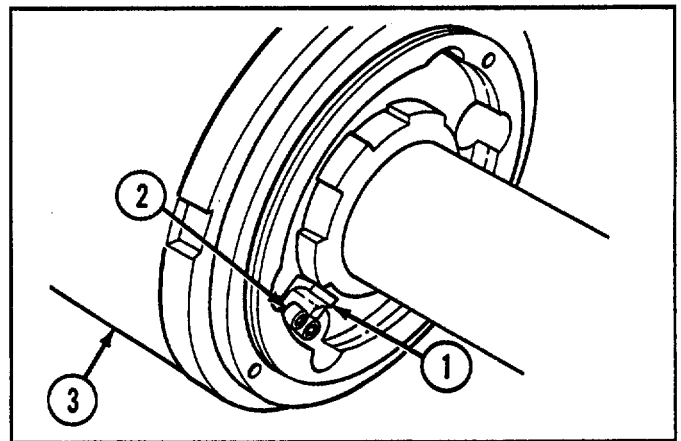
Cab subfloor plates removed as necessary (see paragraphs 9-2 through 9-23)

ADJUSTMENT

CAUTION

Reel in cable under a load heavy enough to keep cable tightly drawn and off ground. Do not reel in cable under load in high gear.

- 1 Remove lockplate (1) by removing two screws (2) on level winder cylinder (3).



11-1 SERVICE MAIN WINCH LEVEL WINDER CYLINDER ADJUSTMENT-
Continued

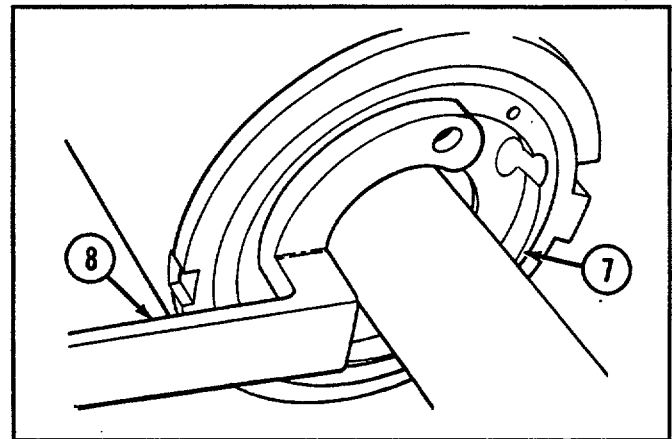
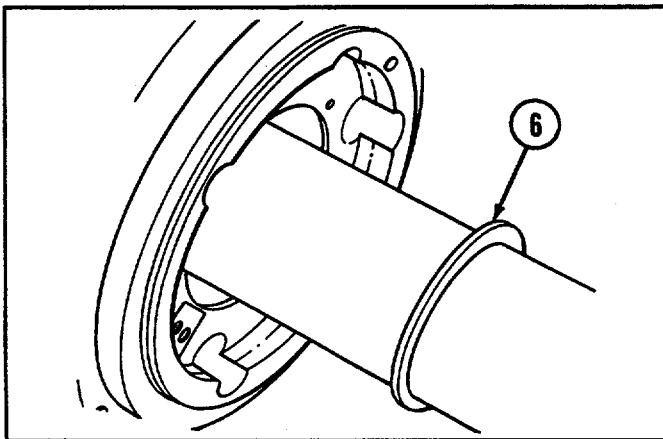
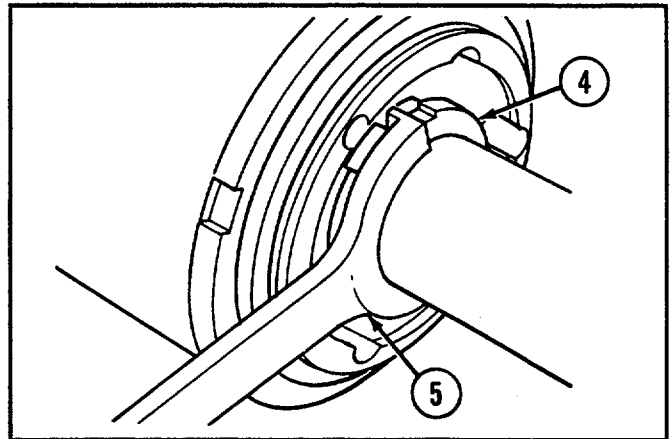
2 Loosen and slide back packing gland nut (4) using wrench (5).

3 Slide back seal (6).

NOTE

Tightening inner cap shortens level winder piston stroke; loosening cap lengthens stroke. Adjust cap at end of cylinder until cable wire winds evenly across winch drum without piling up or falling short at drum ends.

4 Adjust inner cap (7) using wrench (8).



NOTE

Follow-on maintenance: Install cab subfloor plates if removed (see paragraphs 9-2 through 9-23)

11-2 SERVICE MAIN WINCH BRAKE BAND ADJUSTMENT

THIS TASK COVERS

Adjustment

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Equipment Conditions:

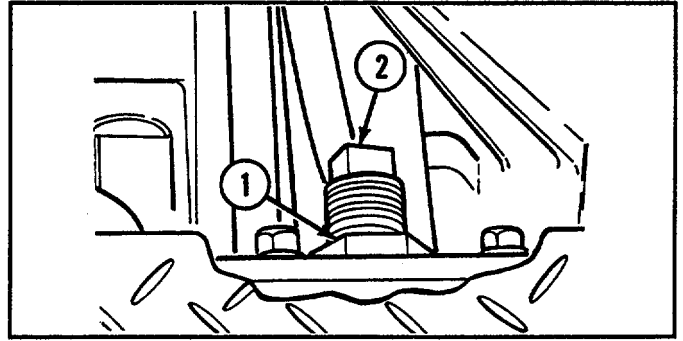
Right-front access floor plate removed (see paragraph 9-2)

ADJUSTMENT

- 1 Loosen locknut (1).
- 2 Tighten adjusting screw (2) clockwise to maximum. Back off adjusting screw 1 full turn. Hold adjusting screw in position and tighten locknut (1).

NOTE

Follow-on maintenance: Install right front access floor plate (see paragraph 9-2)

**11-3 REPLACE MAIN WINCH MANUAL CONTROL AND LINKAGE****THIS TASK COVERS**

- a. Removal
- b. Installation

INITIAL SET-UP**Tools:**

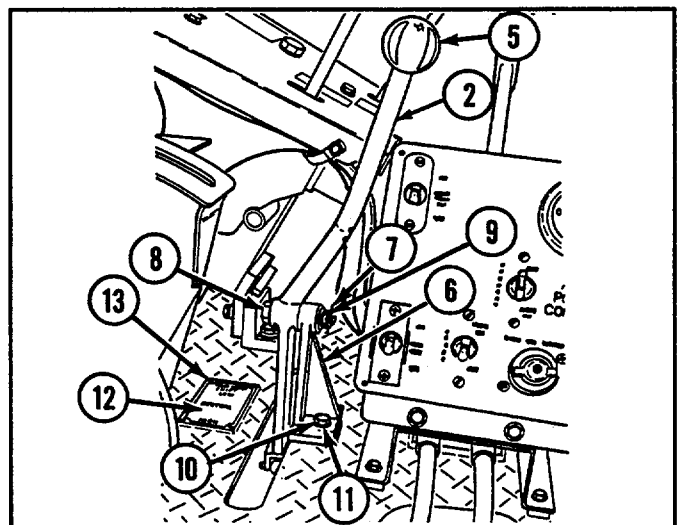
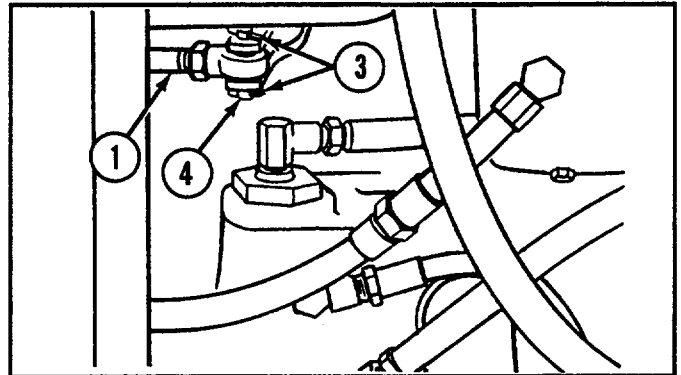
Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Drivescrews (4) (Appendix G, item 13)
- Lockwashers (2) (Appendix G, item 132)
- Pins, cotter (2) (Appendix G, item 212)
- Pin, cotter (Appendix G, item 214)

a. REMOVAL

- 1 Disconnect winch shift rod (1) from winch shift lever (2) by removing two cotter pins (3) and straight pin (4).
- 2 Remove knob (5) from winch shift lever (2).
- 3 Remove winch shift lever (2) from bracket (6) by removing cotter pin (7), screw (8), and nut (9).
- 4 Remove bracket (6) by removing two screws (10) and two lockwashers (11).
- 5 Remove main winch identification (ID) plate (12) by removing four drivescrews (13).

**b. INSTALLATION**

- 1 Install main winch ID plate (12) with four new drivescrews (13).
- 2 Install bracket (6) with two new lockwashers (11) and two screws (10).
- 3 Install winch shift lever (2) to bracket (6) with screw (8), nut (9), and new cotter pin (7).
- 4 Install knob (5) onto winch shift lever (2).
- 5 Connect winch shift rod (1) to winch shift lever (2) with straight pin (4) and two new cotter pins (3).

11-4 REPLACE MAIN WINCH CONTROLS AND HOSES

THIS TASK COVERS

- a. Removal b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Drivescrews (8) (Appendix G, item 16)
- Lockwashers (2) (Appendix G, item 130)
- Lockwashers (8) (Appendix G, item 133)
- Lockwashers (4) (Appendix G, item 134)
- Nuts, seal (5) (Appendix G, item 159)

Parts-Continued:

- Packings, preformed (2) (Appendix G, item 196)
- Packing, preformed (Appendix G, item 197)

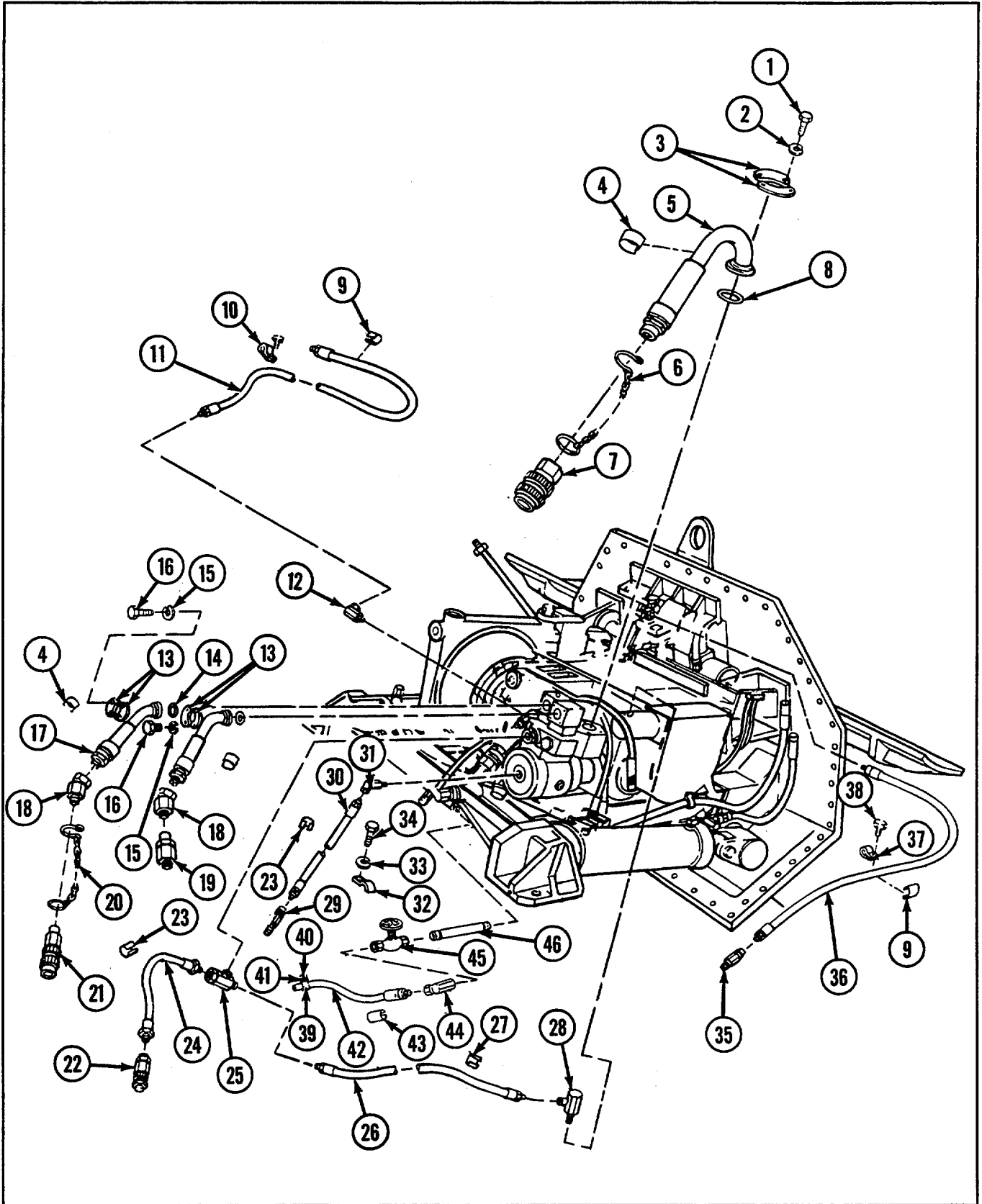
Equipment Conditions:

- Cab subfloor plates removed as necessary (see paragraphs 9-2 through 9-23)
- Cable paid out (refer to TM 9-2350256-10)

a. REMOVAL

Remove lines and fittings as required using illustration as guide.

- | | |
|--------------------------|--------------------|
| 1 Screw (4) | 24 Hose assembly |
| 2 Lockwasher (4) | 25 Tee |
| 3 Pipe flange (2) | 26 Hose assembly |
| 4 Band marker (6) | 27 Band marker (2) |
| 5 Hose assembly | 28 Elbow |
| 6 Connecting ring | 29 Coupling |
| 7 Coupling | 30 Hose assembly |
| 8 Preformed packing | 31 Elbow |
| 9 Band marker (6) | 32 Retaining strap |
| 10 Loop clamp | 33 Lockwasher |
| 11 Hose assembly | 34 Screw |
| 12 Elbow | 35 Coupling |
| 13 Pipe flange (4) | 36 Hose assembly |
| 14 Preformed packing (2) | 37 Loop clamp |
| 15 Lockwasher (8) | 38 Screw |
| 16 Screw (8) | 39 Clamp |
| 17 Hose assembly (2) | 40 Screw |
| 18 Elbow (2) | 41 Lockwasher |
| 19 Coupling | 42 Hose assembly |
| 20 Connecting ring | 43 Band marker (2) |
| 21 Coupling | 44 Elbow |
| 22 Coupling | 45 Gate valve |
| 23 Band marker (4) | 46 Nipple |

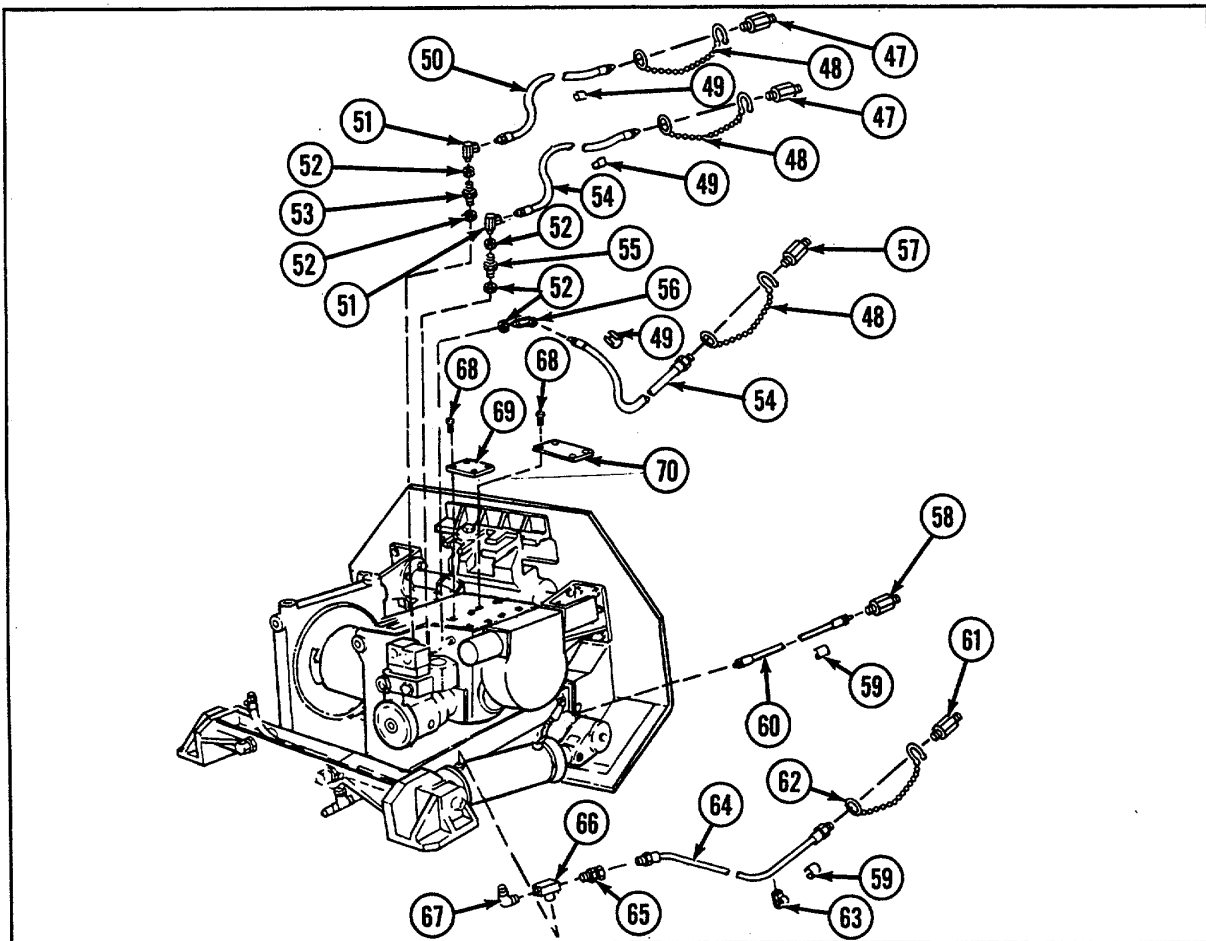


11-4 REPLACE MAIN WINCH CONTROLS AND HOSES--Continued

- | | |
|------------------------|--------------------|
| 47 Coupling (2) | 59 Band marker (5) |
| 48 Connecting ring (3) | 60 Hose assembly |
| 49 Band marker (6) | 61 Coupling |
| 50 Hose assembly | 62 Connecting ring |
| 51 Elbow (2) | 63 Loop clamp |
| 52 Seal nut (5) | 64 Hose assembly |
| 53 Nipple | 65 Reducer |
| 54 Hose assembly (2) | 66 Tee |
| 55 Nipple | 67 Elbow |
| 56 Elbow | 68 Drivescrew (8) |
| 57 Coupling | 69 ID plate |
| 58 Coupling | 70 ID plate |

b. INSTALLATION

Install lines and fittings in reverse order using illustration as guide.



NOTE

- Follow-on maintenance:
- Install cab subfloor plates if removed (see paragraphs 9-2 through 9-23)
 - Retract cable (refer to TM 9-2350-256-10)

11-5 REPLACE MAIN WINCH CABLE**THIS TASK COVERS**

a. Removal

b. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's
(Appendix C, item 53)

Material/Parts:

- Grease, GAA (Appendix D, item 13)
- Lockwashers (16) (Appendix G, item 144)

Equipment Conditions:

Cable paid out (refer to TM
9-2350-256-10)

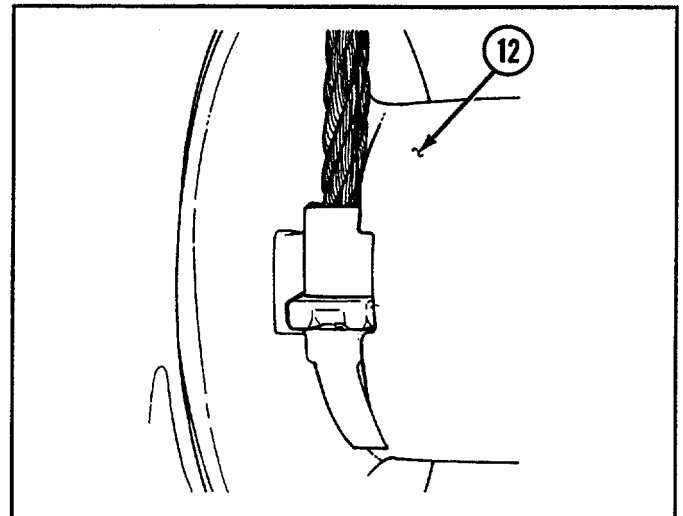
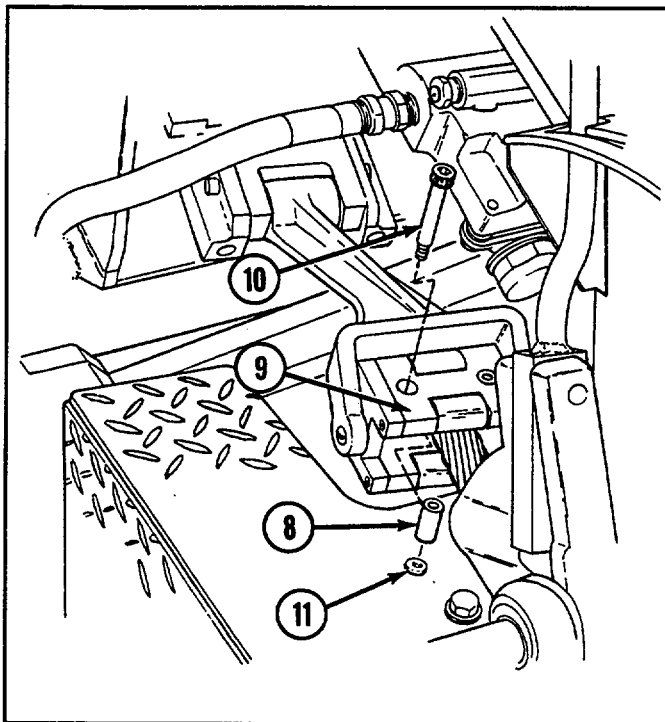
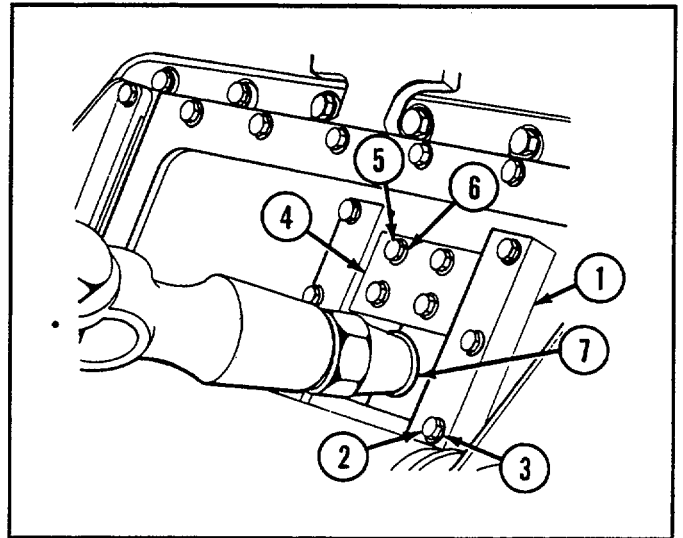
a. REMOVAL

- 1 Remove two guides (1) by removing four screws (2) and four lockwashers (3) from each.
- 2 Remove two retainers (4) by removing four screws (5) and four lockwashers (6) from each. Remove two halfbushings (7).
- 3 Remove two vertical rollers (8), and separate guide assemblies (9) by removing two screws (10) and two bearing washers (11).

WARNING

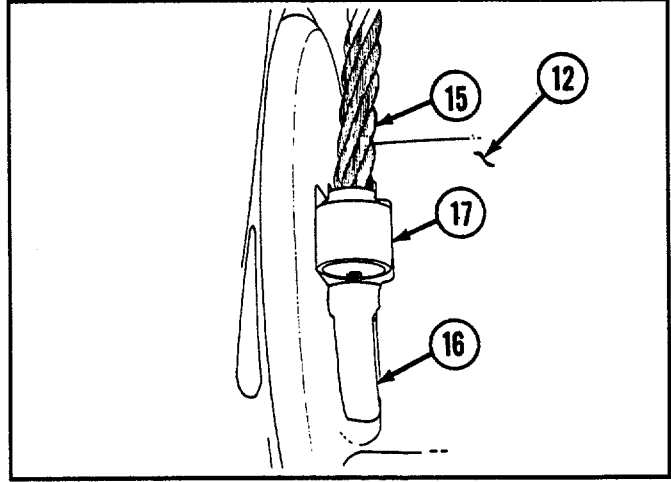
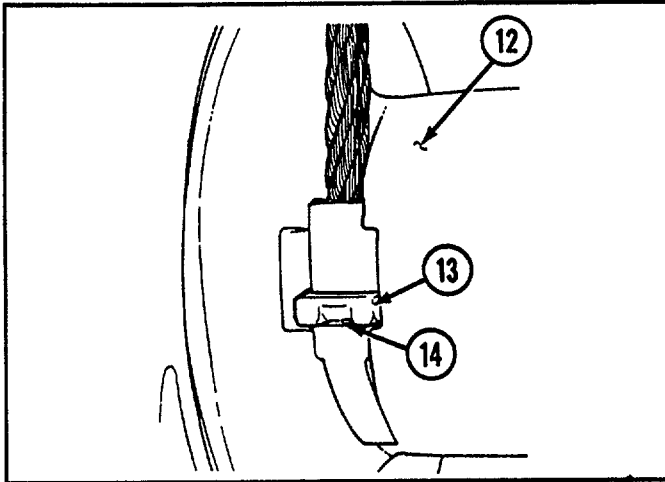
Gloves should be worn when working with cable to prevent cuts and abrasions.

- 4 Run cable slowly out and guide cable off drum (12).



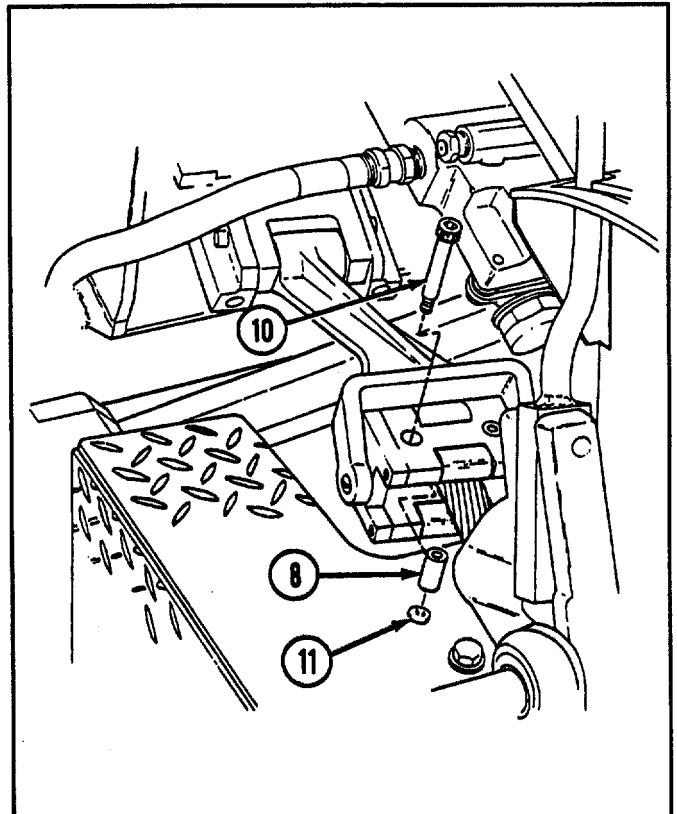
11-5 REPLACE MAIN WINCH CABLE-Continued

- 5 Remove ferrule filler (13) by depressing filler spring (14).
- 6 Remove cable assembly (15) from dummy filler (16) by disengaging rope ferrule (17).
- 7 Remove dummy filler (16) from drum (12).



b. INSTALLATION

- 1 Install dummy filler (16) in drum (12).
- 2 Install cable assembly (15) to dummy filler (16) by engaging rope ferrule (17).
- 3 Coat ferrule filler (13) with GAA grease and install with filler spring (14) in between rope ferrule (17) and dummy filler (16).
- 4 Install two vertical rollers (8) with two screws (10) and two bearing washers (11).

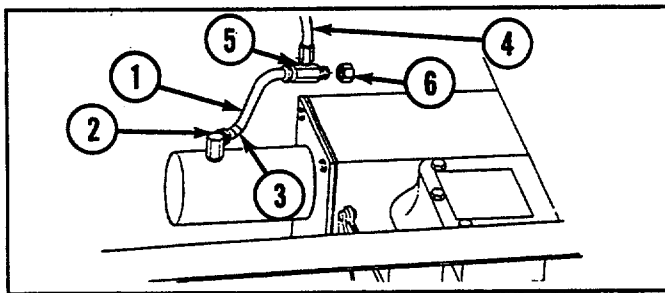
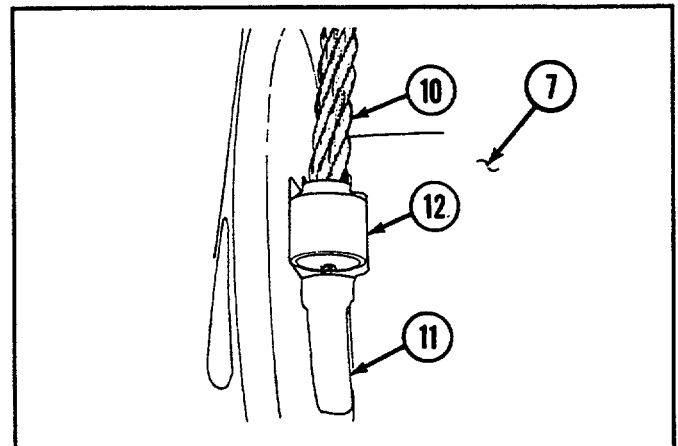
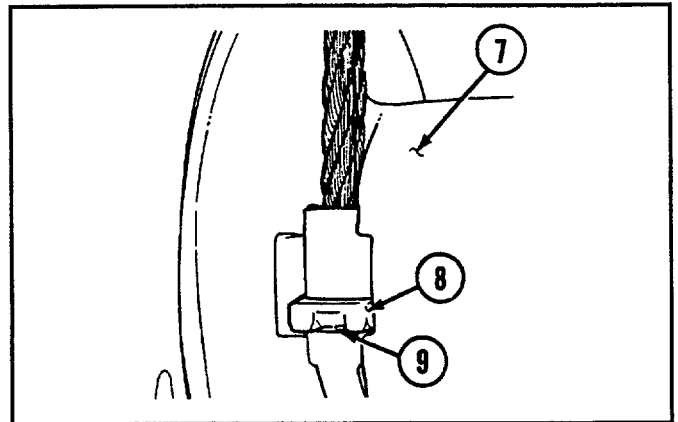


11-6 REPLACE HOIST WINCH HOSE AND CABLE ASSEMBLY-Continued

- 4 Run cable slowly out and guide cable off drum (7).
- 5 Remove ferrule filler (8) by depressing filler spring (9).
- 6 Remove cable assembly (10) from dummy filler (11) by disengaging rope ferrule (12).
- 7 Remove dummy filler (11) from drum (7).

b. INSTALLATION

- 1 Install dummy filler (11) in drum (7).
- 2 Install cable assembly (10) to dummy filler (11) by engaging rope ferrule (12).
- 3 Coat ferrule filler (8) with GAA grease and install with filler spring (9) in between rope ferrule (12) and dummy filler (11).
- 4 Install tee (5) and seal (6).
- 5 Install hoses (1 and 4) on tee (5).
- 6 Install hose (1) onto elbow (2), and install two band markers (3) to hose.
- 7 Run winch slowly and guide cable on drum (7).



NOTE

Follow-on maintenance: Close cab subfloor plates as required (see paragraph 9-2 through 9-23)

11-7 SERVICE HOIST WINCH BRAKE BAND ADJUSTMENT

THIS TASK COVERS

Adjustment

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Equipment Condition:

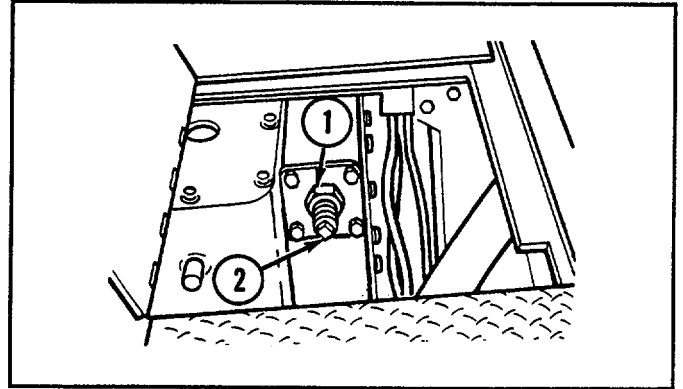
U-35 winch center right floor plate opened (see paragraph 9-4)

ADJUSTMENT

- 1 Loosen locknut (1).
- 2 Tighten adjusting screw (2) clockwise to maximum, then back adjusting screw off 1 full turn. Hold adjusting screw in position and tighten locknut (1).

NOTE

Follow-on maintenance: Close U-35 winch center right floor plate (see paragraph 9-4)

**11-8 REPLACE HOIST WINCH MANUAL CONTROL AND LINKAGE****THIS TASK COVERS**

- a. Removal
- b. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

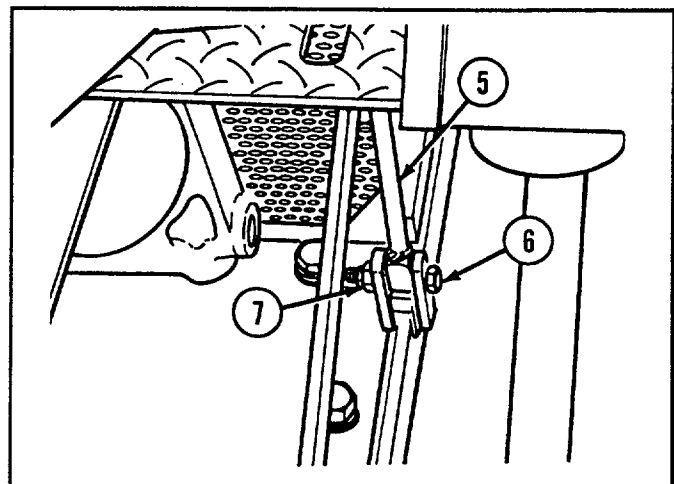
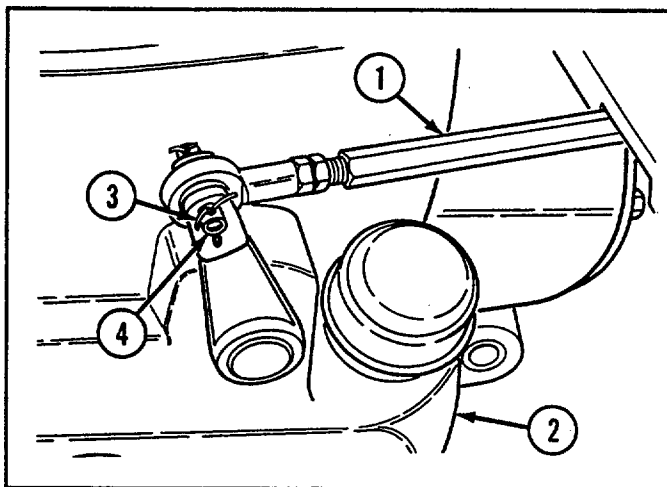
- Nut, self-locking
(Appendix G, item 173)
- Pins, cotter (4)
(Appendix G, item 212)

Equipment Condition:

Stowage basket forward
intermediate left floor plate
removed (see paragraph 9-21)

a. REMOVAL

- 1 Disconnect control rod (1) from hoist winch (2) by removing two cotter pins (3) and straight pin (4).
- 2 Remove control lever (5) by removing screw (6) and self-locking nut (7).

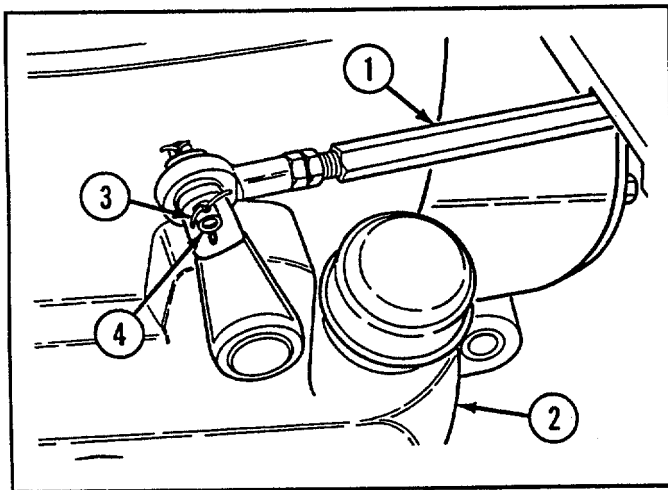
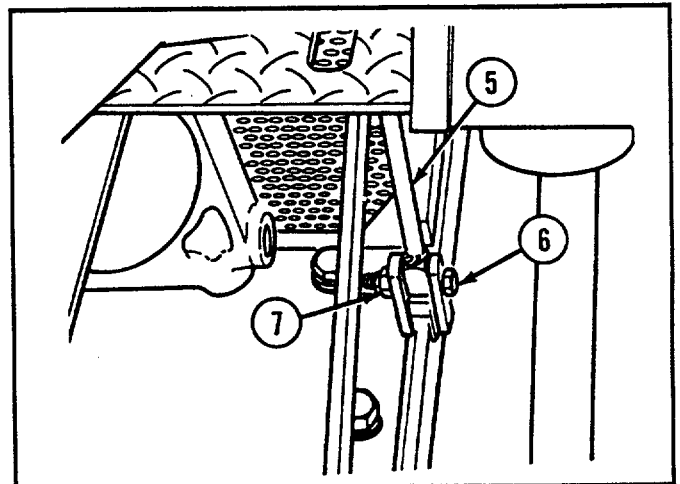
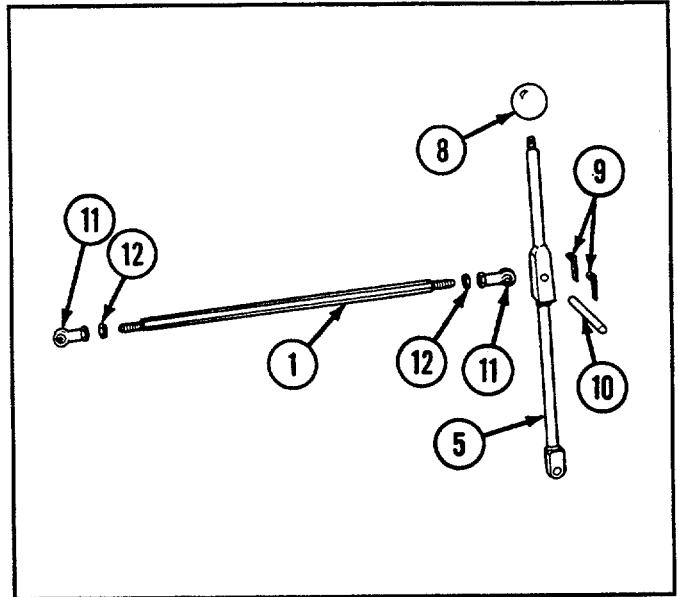


11-8 REPLACE HOIST WINCH MANUAL CONTROL AND LINKAGE-Continued

- 3 Unscrew and remove control knob (8) from control lever (5).
- 4 Remove control rod (1) from control lever (5) by removing two cotter pins (9) and straight pin (10).
- 5 Remove two end bearings (11) and two jamnuts (12) from control rod (1).

b. INSTALLATION

- 1 Install two jamnuts (12) and two rod end bearings (11) on control rod (1).
- 2 Install control rod (1) on control lever (5) with straight pin (10) and two new cotter pins (9).
- 3 Install control knob (8) on control lever (5).
- 4 Install control lever (5) with screw (6) and new self-locking nut (7).
- 5 Connect control rod (1) to hoist winch (2) with straight pin (4) and two new cotter pins (3).



NOTE

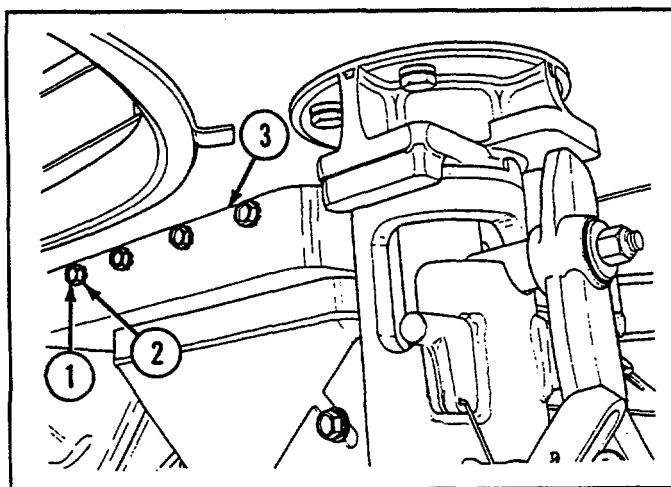
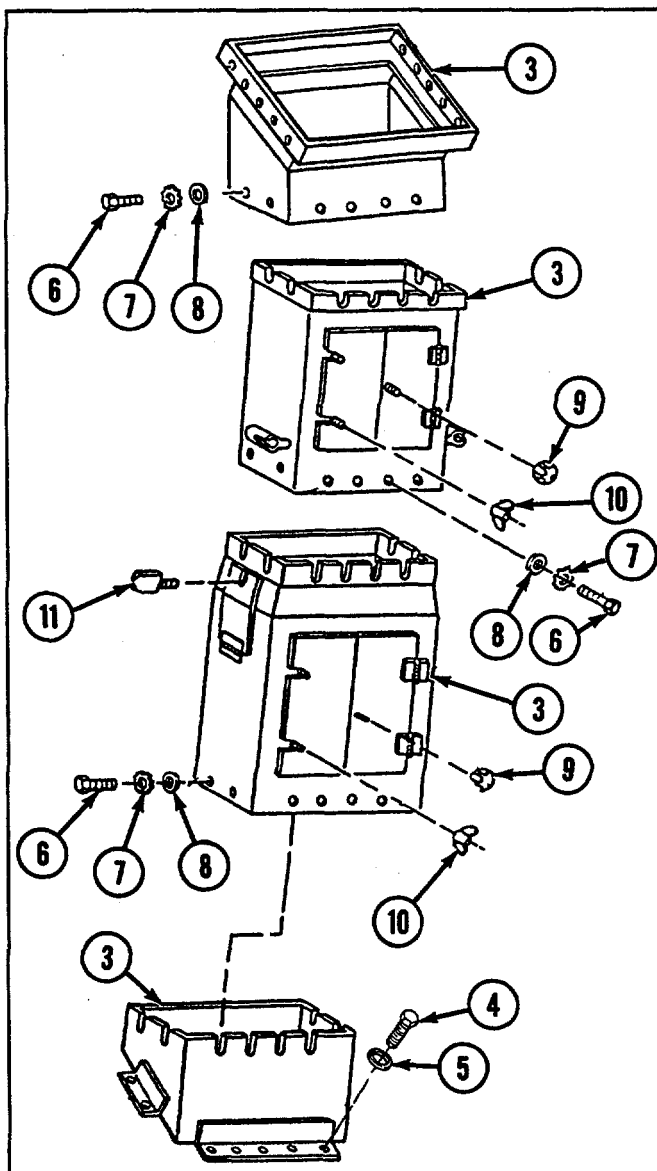
Follow-on maintenance: Install stowage basket forward intermediate left floor plate (see paragraph 9-21)

11-9 REPLACE WIRE ROPE SHIELD-Continued

- 4 Separate shield assemblies (3) by removing 24 screws (6), 24 lockwashers (7), and 24 flat washers (8).
- 5 Remove two knobs (9) and four wingnuts (10) from doors.
- 6 Remove thumbscrew (11) from each side of shield assembly (3).

b. INSTALLATION

- 1 Install thumbscrew (11) to each side of shield assembly (3).
- 2 Install doors with two knobs (9) and four wingnuts (10).
- 3 Connect shield assemblies (3) with 24 screws (6), 24 new lockwashers (7), and 24 flat washers (8).
- 4 Support shield assembly (3) by hand, turn on its side, and insert through personnel door; then place in position.
- 5 Install nine screws (4) and nine new lockwashers (5) to bottom of shield assembly (3).
- 6 Install five screws (1) and five new lockwashers (2) to each side at top of shield assembly

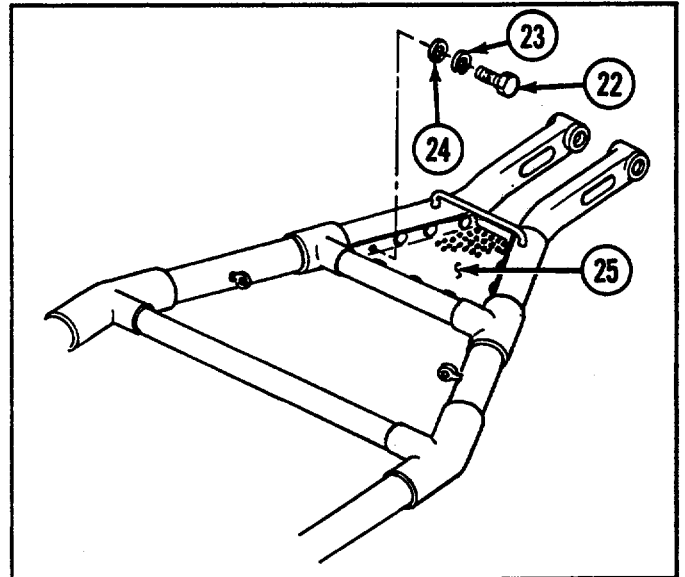
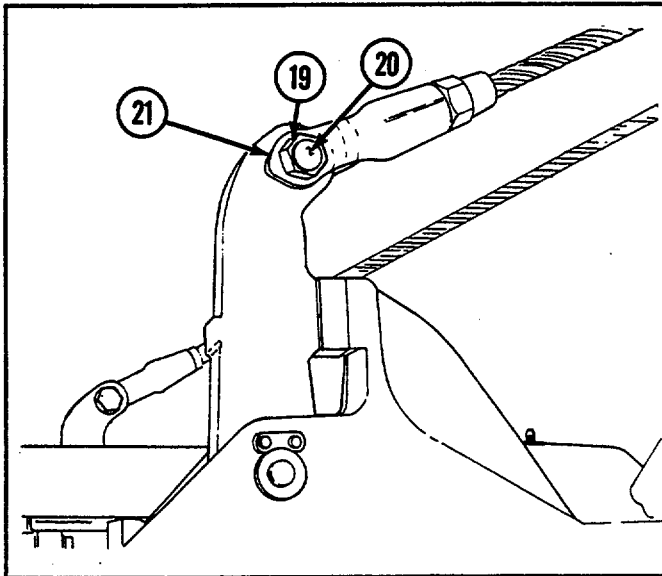
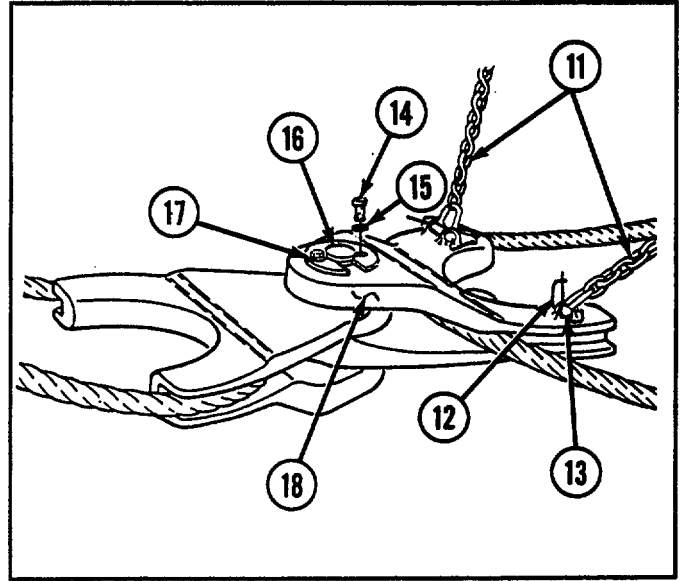


SECTION IV: HOISTING BOOM ASSEMBLY

TM 9-2350-256-20

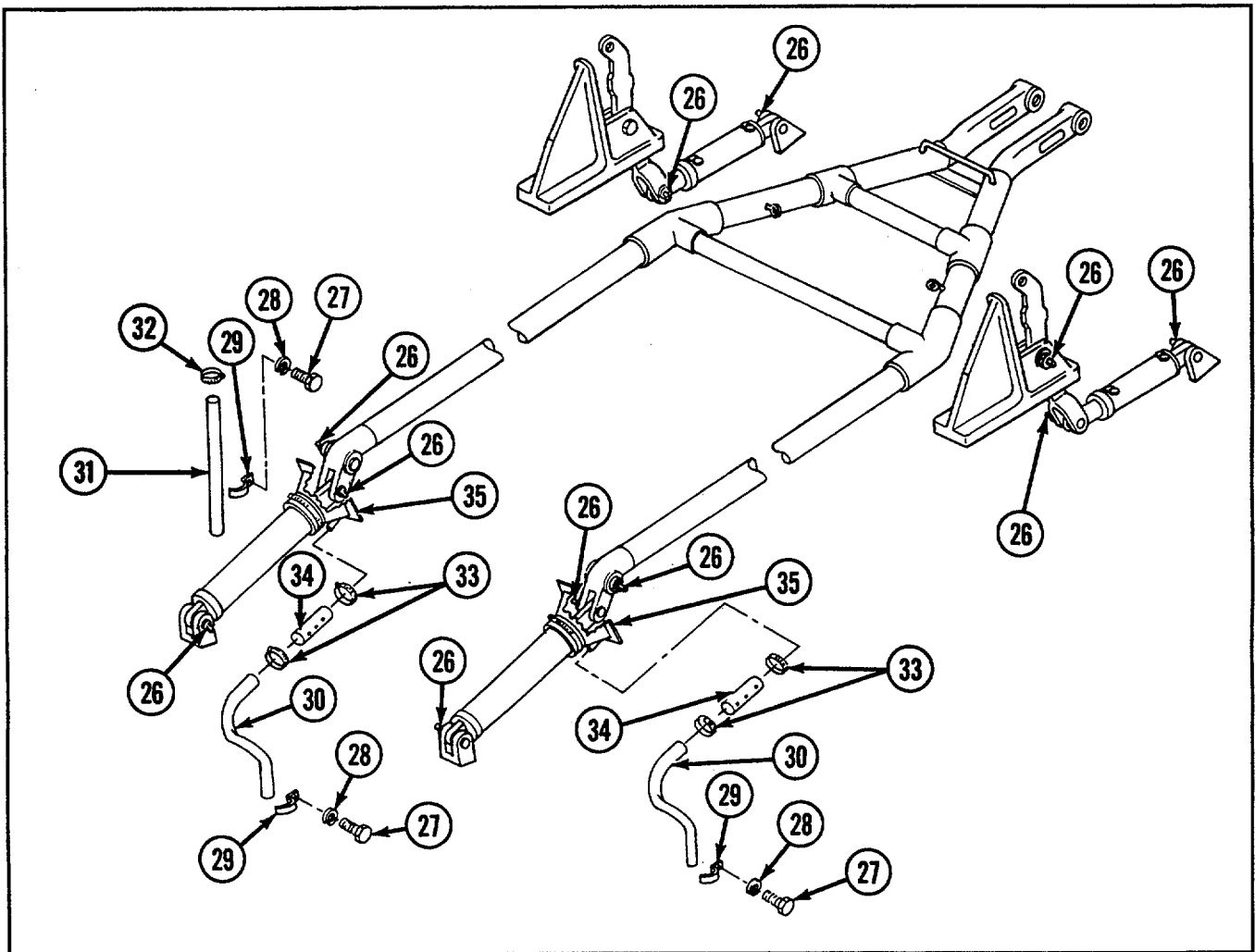
5 Remove two nuts (19), two pins (20), and wire rope assembly (21).

6 Remove 11 screws (22), 11 lockwashers (23), 11 flat washers (24), and tray (25).



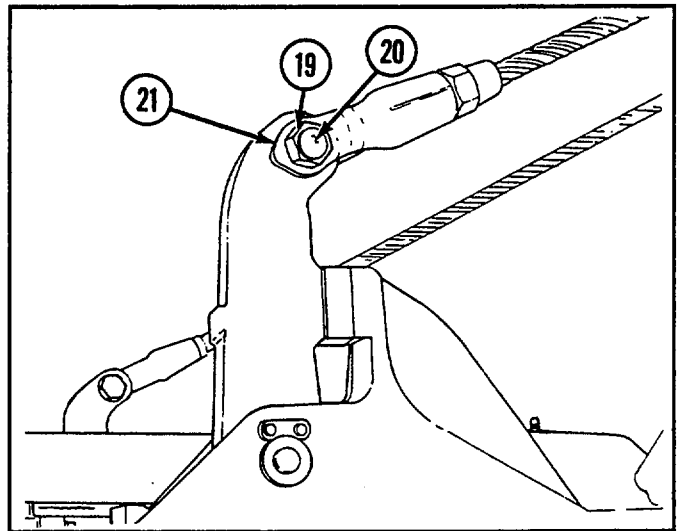
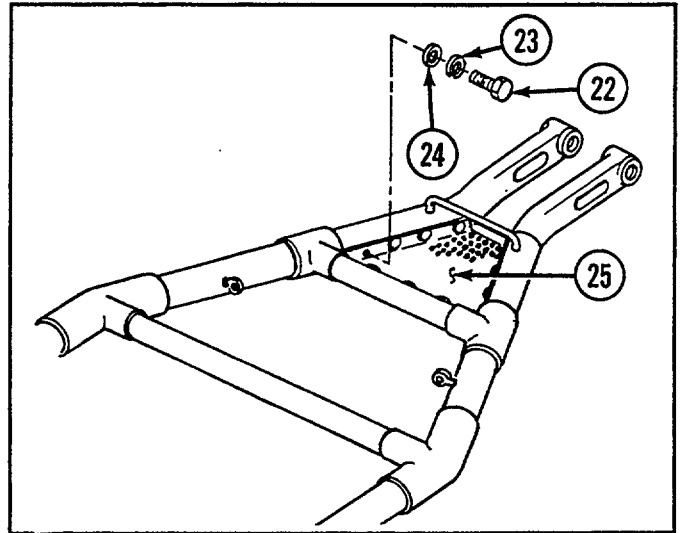
11-11 REPLACE/SERVICE HOISTING BOOM, CYLINDERS, AND RELATED
PARTS-Continued

- 7 Remove 12 fittings (26) as necessary.
- 8 Remove three screws (27), three lockwashers (28), and three clips (29) from two hoses (30) and hose (31).
- 9 Remove hose (31) by removing loop clamp (32).
- 10 Remove two hoses (30) by removing four loop clamps (33) and two pipes (34) from two boot assemblies (35).



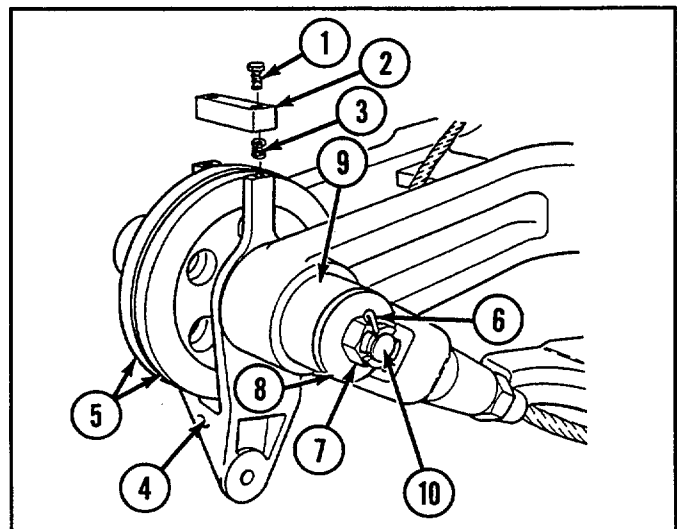
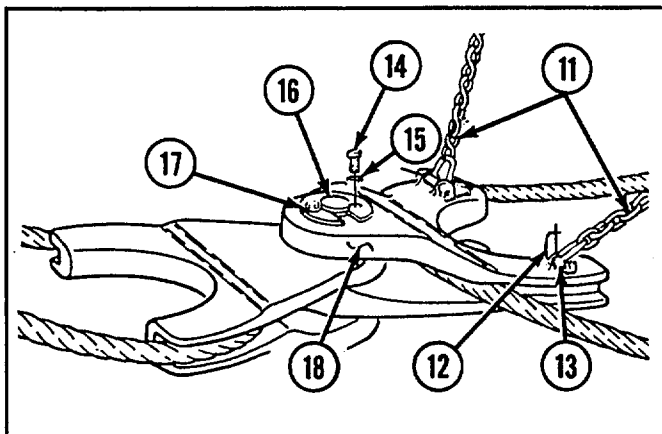
b. INSTALLATION

- 1 Install two boot assemblies (35), two pipes (34), four loop clamps (33), and two hoses (30).
- 2 Install hose (31) with loop clamp (32).
- 3 Install hose (31) and two hoses (30) with clip (29), new lockwasher (28), and screw (27) each.
- 4 Install 12 fittings (26) as necessary.
- 5 Install tray (25) with 11 flat washers (24), 11 new lockwashers (23), and 11 screws (22).
- 6 Install wire rope assembly (21) with two pins (20) and two nuts (19).
- 7 Install shoe tree (18) with washer (17), pin (16), two new lockwashers (15), and two screws (14).
- 8 Install two chains (11) with two pin shackles (13) and two retaining pins (12) each.
- 9 Install two pulleys (5) into guard (4), and insert shaft (10) through guard and pulleys.
- 10 Install wire rope (9) onto shaft (10) with two new lockwashers (8), two nuts (7), and two new cotter pins (6).
- 11 Install guide bar (2), spring (3), and two screws (1) to guard (4).



c. INSPECTION

Inspect pin and last link of chain for defects and wear.



11-12 SERVICE STAYLINE CYLINDER LIMIT VALVE ADJUSTMENT

THIS TASK COVERS

Adjustment

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Equipment Condition:

Air inlet grilles removed (see paragraph 9-57)

ADJUSTMENT

CAUTION

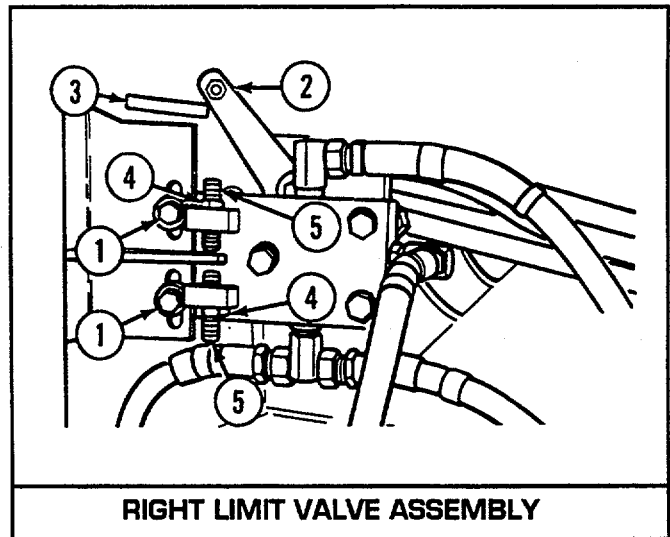
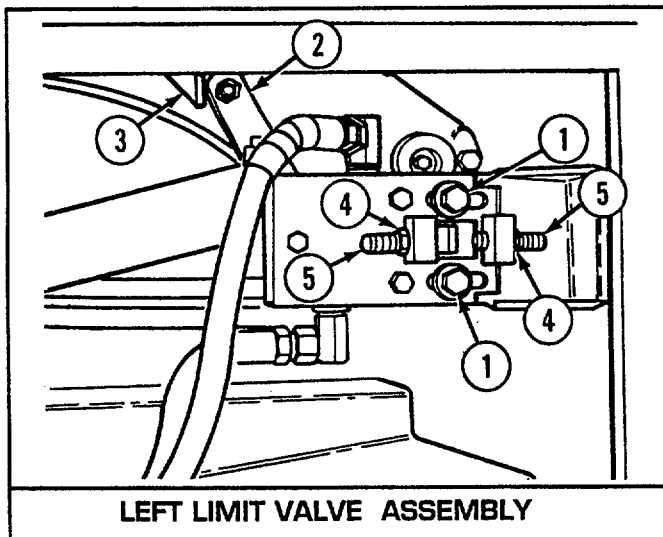
- Do not operate hydraulic system when any hydraulic lines are disconnected.
- Stayline cylinder limit valve adjustment should be accomplished with hoisting boom in stowed position to prevent damage to equipment.

1 Loosen two screws (1) to adjust valve lever roller (2) on cam follower bracket (3).

NOTE

- During adjustment, valve lever roller (2) must ride squarely and freely on upper side of cam follower bracket (3).
- Left and right limit valve assemblies are adjusted in same manner.

2 If necessary, loosen jamnuts (4) and adjust screws (5) to position valve lever roller (2) so that valve lever is in fully open position with stayline crank arms in fully stowed position.



NOTE

Follow-on maintenance: Install air inlet grilles (see paragraph 9-57)

**CHAPTER 12
MAINTENANCE OF MAIN HYDRAULIC SYSTEM**

CHAPTER OVERVIEW

This chapter covers the removal, disassembly, assembly, and installation of the main hydraulic system.

This chapter consists of the following paragraphs:

Para.	Task	Page
12-1	Replace Mechanical Transmission and Hydraulic Pump Hydraulic Lines and Fittings	12-1
12-2	Replace Hydraulic Lines and Fittings	12-7
12-3	Replace Hydraulic Connecting Panel	12-26
12-4	Replace Fuel Transfer Pump and Flow Regulator.....	12-28
12-5	Replace/Repair Hydraulic System Oil	12-31
12-6	Replace External Hydraulic Reservoir Components.....	12-33
12-7	Replace Hydraulic Drain Valve and Related Parts	12-35
12-8	Replace Hydraulic Subplate Identification (ID) Plate.....	12-35
12-9	Replace Hydraulic Oil Reservoir Strainer.....	12-36
12-10	Replace/Repair Oil Temperature Transmitter and Switch Housing Assembly.....	12-37
12-11	Replace Mechanical Transmission ID Plate	12-38
12-12	Replace/Repair Mechanical Transmission Breather and Oil Level Gage.....	12-39
12-13	Replace Spade Release and Lubrication Line (Hydraulic Spade Release)	12-40
12-14	Replace Spade Cable Lubrication Line (Manual Spade Release).....	12-41
12-15	Replace Spade Release Lubrication Fitting	12-42
12-16	Replace Spade Cylinder Hoses	12-43

WARNING

Do not attempt to loosen or tighten hydraulic fittings or lines when the system is pressurized. Ensure that the boom is in the stowed position before doing any maintenance on the hydraulic system.

NOTE

Individual hydraulic lines and fittings may be removed and replaced separately as required. Each line is marked with a part number and code number alternately at 36-inch (in.) (914-millimeter [mm]) intervals along its length. Foldout FO-1 (at the end of this manual) provides a schematic of hydraulic lines and fittings.

**12-1 REPLACE MECHANICAL TRANSMISSION AND HYDRAULIC PUMP
HYDRAULIC LINES AND FITTINGS**

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Material:

Sealant tape (Appendix D, item 29)

**12-1 REPLACE MECHANICAL TRANSMISSION AND HYDRAULIC PUMP
HYDRAULIC LINES AND FITTINGS-Continued**

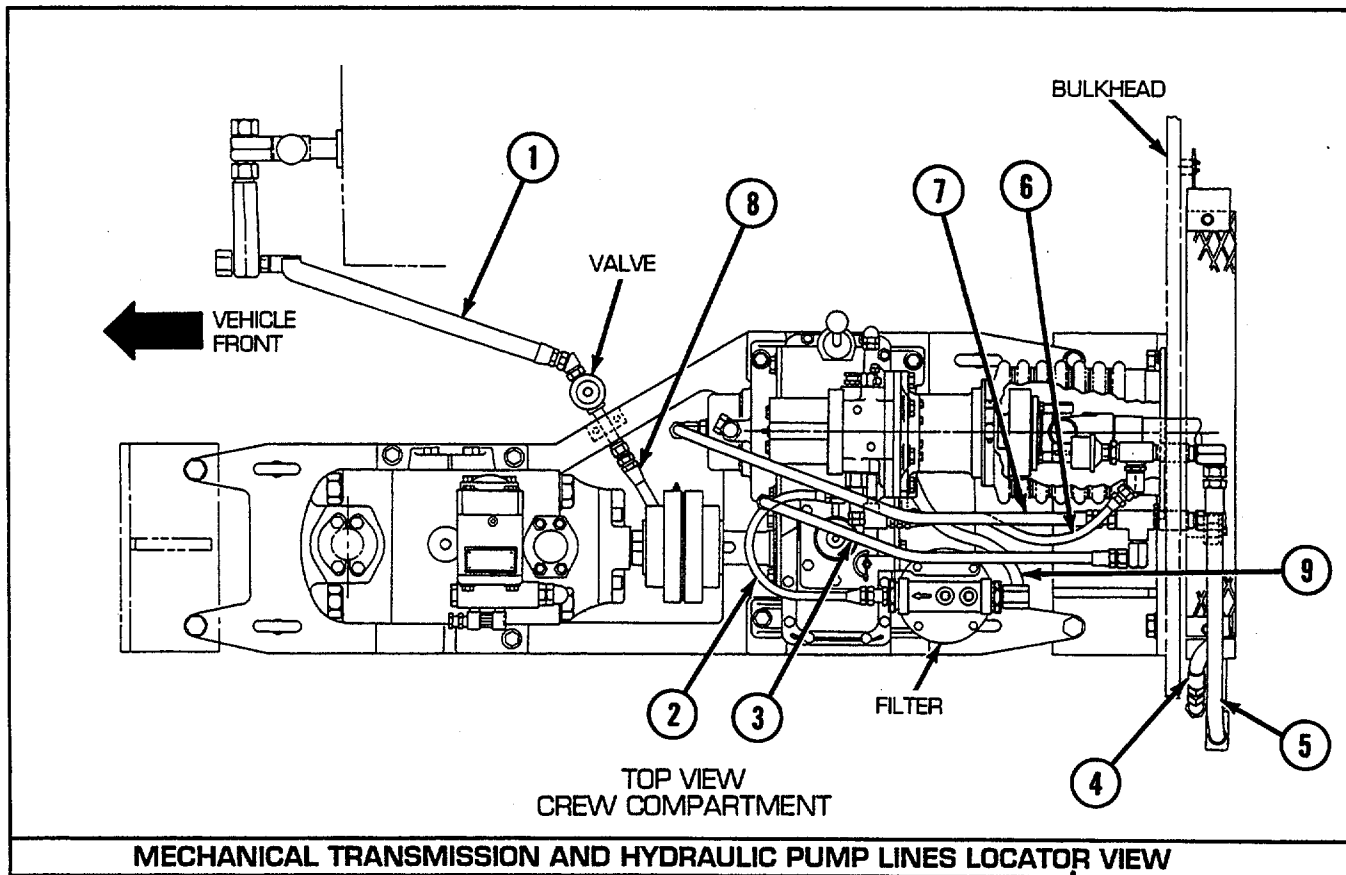
a. REMOVAL

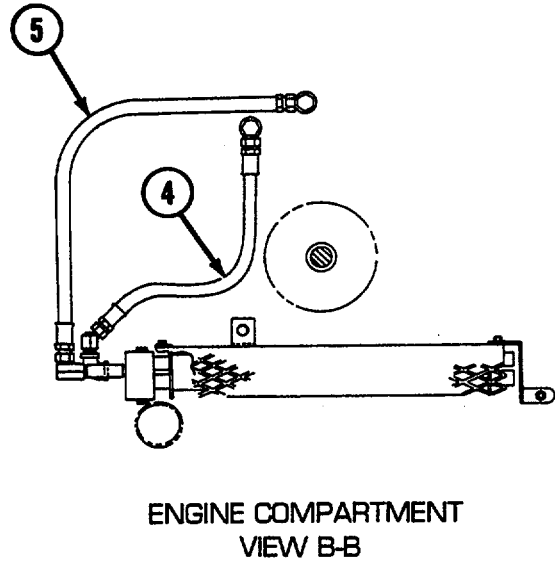
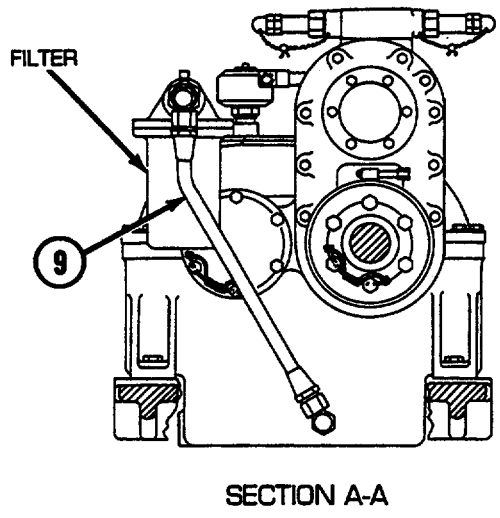
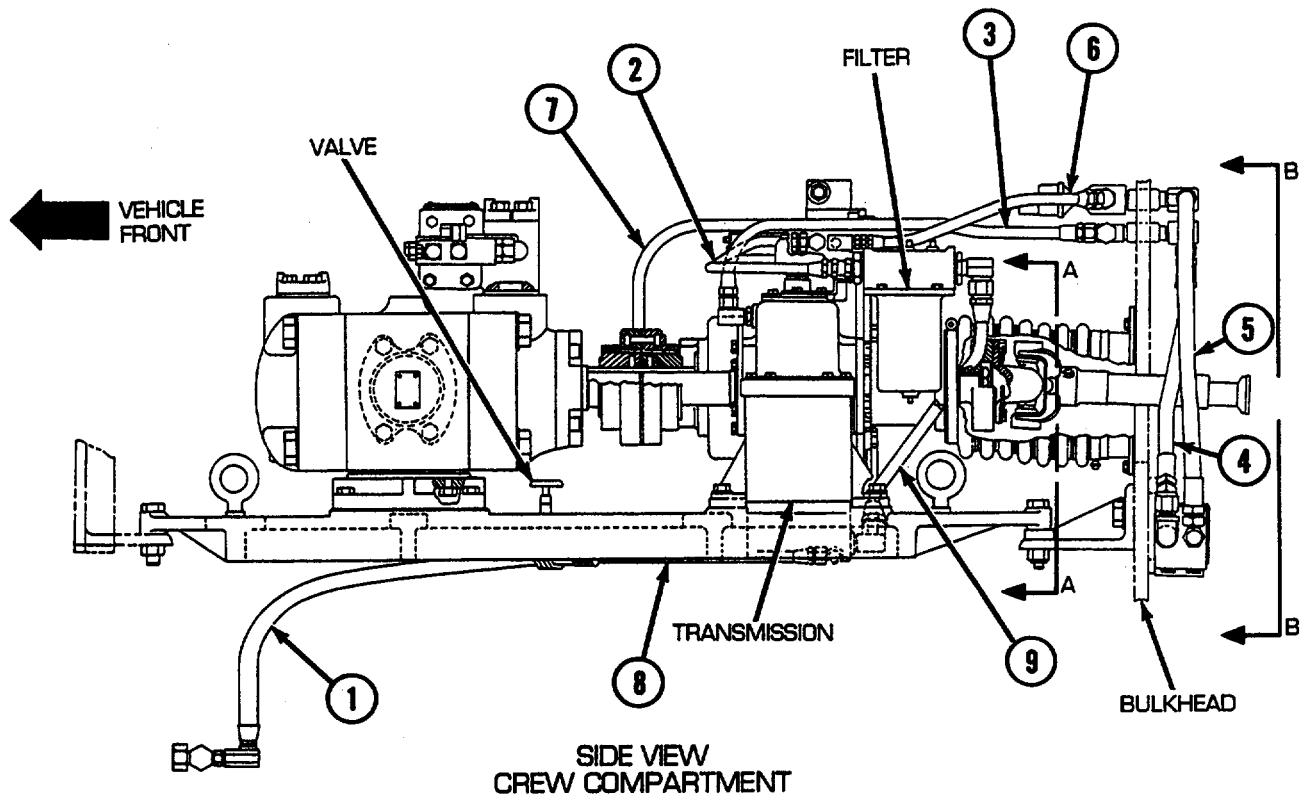
WARNING

- Hydraulic fluid under pressure can penetrate skin or damage eyes. Fluid leaks under pressure may not be visible, use a piece of cardboard or wood to find leaks, but do not use bare hand. Wear safety goggles for protection. If fluid enters skin or eye, get immediate medical attention.
- Do not attempt to loosen or tighten hydraulic fittings or lines when the system is pressurized. Ensure that the boom is in the stowed position before doing any maintenance on the hydraulic system.
- Do not move under any hydraulically controlled implement when making adjustments or repairs to hydraulic system. Lower implement and work from above. If implement must be raised for access, always block to support. If implement drops, injury to personnel can result.

Remove lines and fittings as required using legends, locator views, Table 12-1 for equipment conditions, Table 12-2 for port routing and the line/fitting illustration as a guide.

1 Hose assembly Code No. 75A	4 Hose assembly Code No. 73	7 Hose assembly Code No. 71
2 Hose assembly Code No. 62	5 Hose assembly Code No. 74	8 Hose assembly Code No. 75
3 Hose assembly Code No. 70	6 Hose assembly Code No. 72	9 Hose assembly Code No. 76





MECHANICAL TRANSMISSION AND HYDRAULIC PUMP LINES LOCATOR VIEW

**12-1 REPLACE MECHANICAL TRANSMISSION AND HYDRAULIC PUMP
HYDRAULIC LINES AND FITTING-Continued**

NOTE

The following table lists the equipment condition for removal of the hose in question.

TABLE 12-1. EQUIPMENT CONDITIONS

Callout Number	Hose Code Number	Equipment Conditions
1	75A	Hydraulic Line Intermediate Rear Right Center Floor Plate removed (see paragraph 9-11)
2	62	Rear Center Floor Plate Door opened (see paragraph 9-12)
3	70	Rear Center Floor Plate removed (see paragraph 9-12)
4	73	Powerplant removed (see paragraph 3-1)
5	74	Powerplant removed (see paragraph 3-1)
6	72	Rear Center Floor Plate removed (see paragraph 9-12)
7	71	Rear Center Floor Plate removed (see paragraph 9-12)
8	75	Hydraulic Line Intermediate Rear Right Center Floor Plate removed (see paragraph 9-11) Rear Center Floor Plate removed (see paragraph 9-12)
9	76	Rear Center Floor Plate removed (see paragraph 9-12)

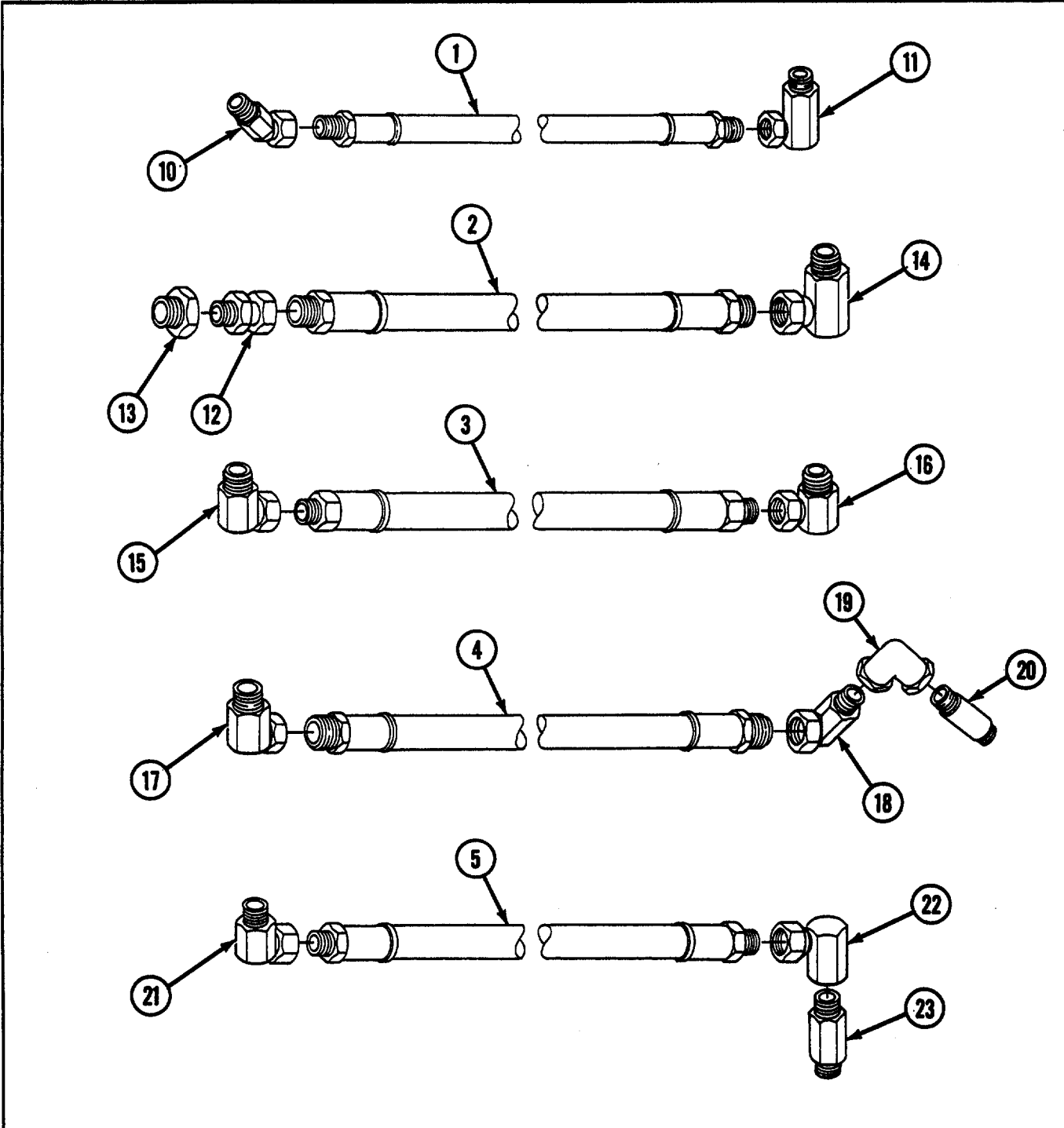
NOTE

Remove and tag each hose with the port number from which it was removed, using port routing chart and illustrations as a guide.

TABLE 12-2. PORT ROUTING

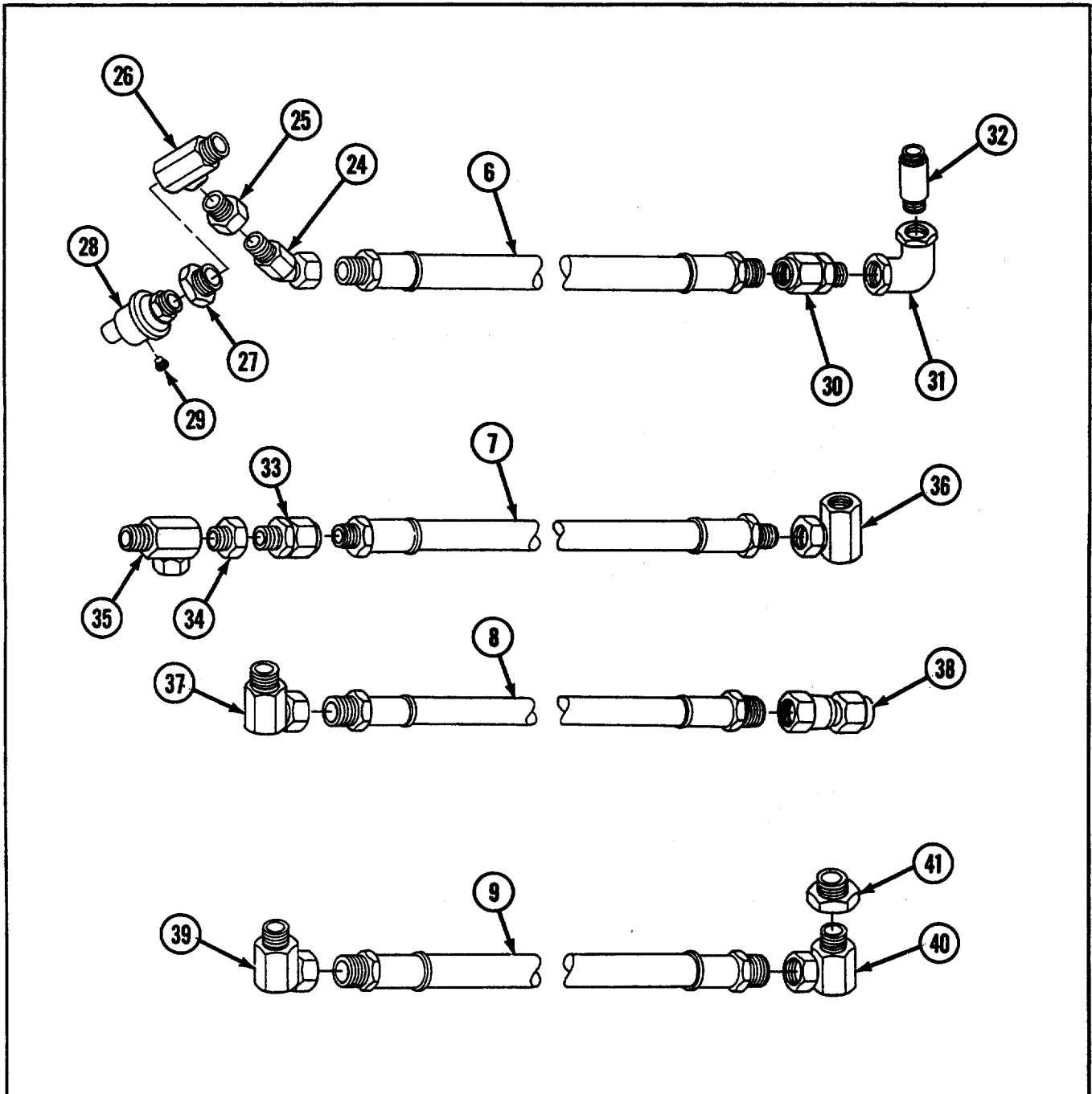
Hose Callout	Hose Code Number	Port	
		From	To
1	75A	Valve 506767	Elbow 7762309
2	62	Filter	163
3	70	93	167
4	73	93	79
5	74	92	78
6	72	92	162
7	71	93	170
8	75	166	Valve 506767
9	76	165	Filter

- | | | |
|-------------------|-------------------|-------------|
| 10 Adapter union* | 15 Adapter union* | 20 Nipple* |
| 11 Elbow* | 16 Adapter union* | 21 Elbow |
| 12 Union | 17 Elbow* | 22 Adapter* |
| 13 Bushing* | 18 Adapter union* | 23 Nipple* |
| 14 Adapter union* | 19 Elbow* | |
- * Apply sealant tape to threads when installing these items.



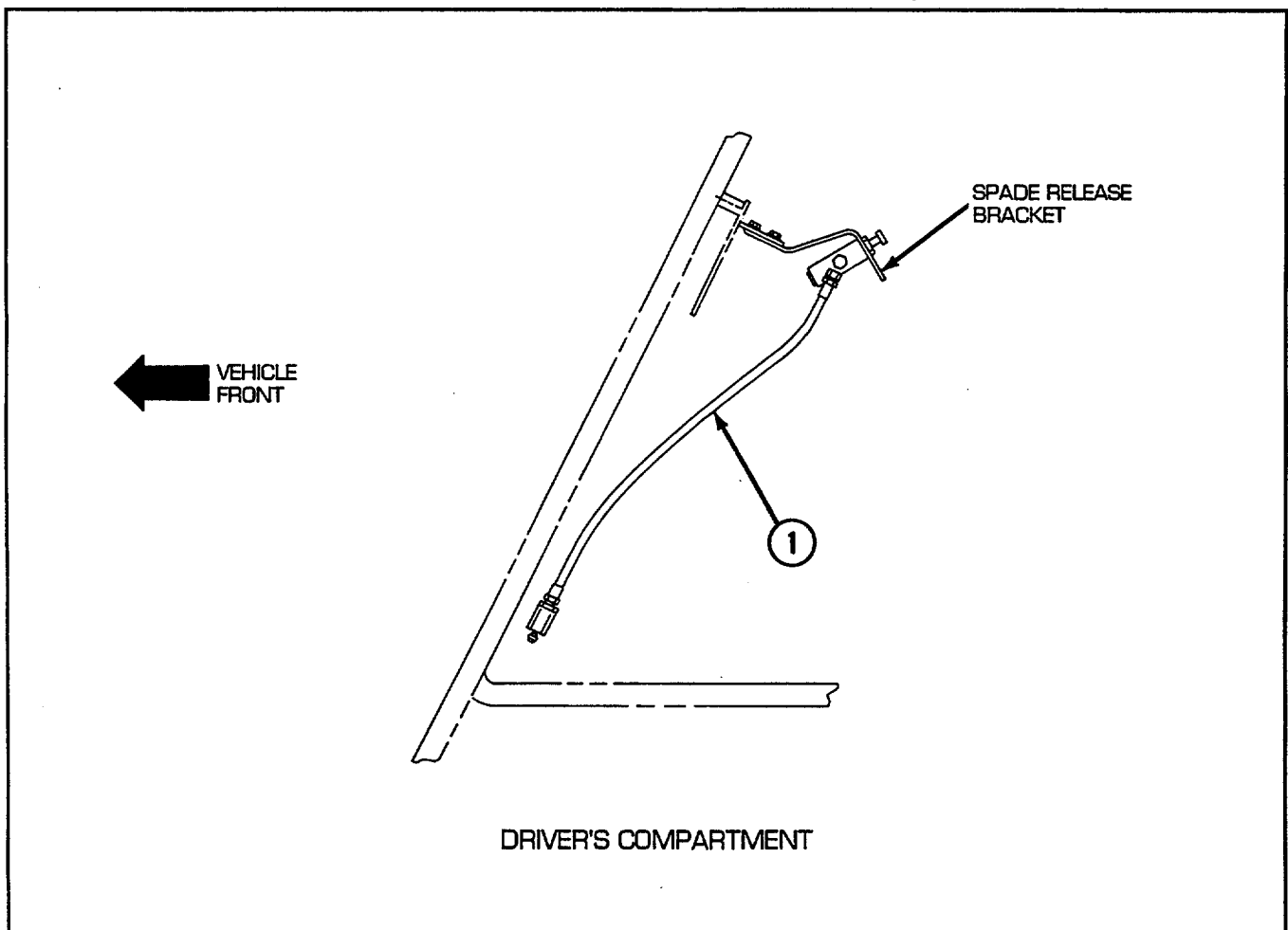
12-1 REPLACE MECHANICAL TRANSMISSION AND HYDRAULIC PUMP
 HYDRAULIC LINES AND FITTINGS-Continued

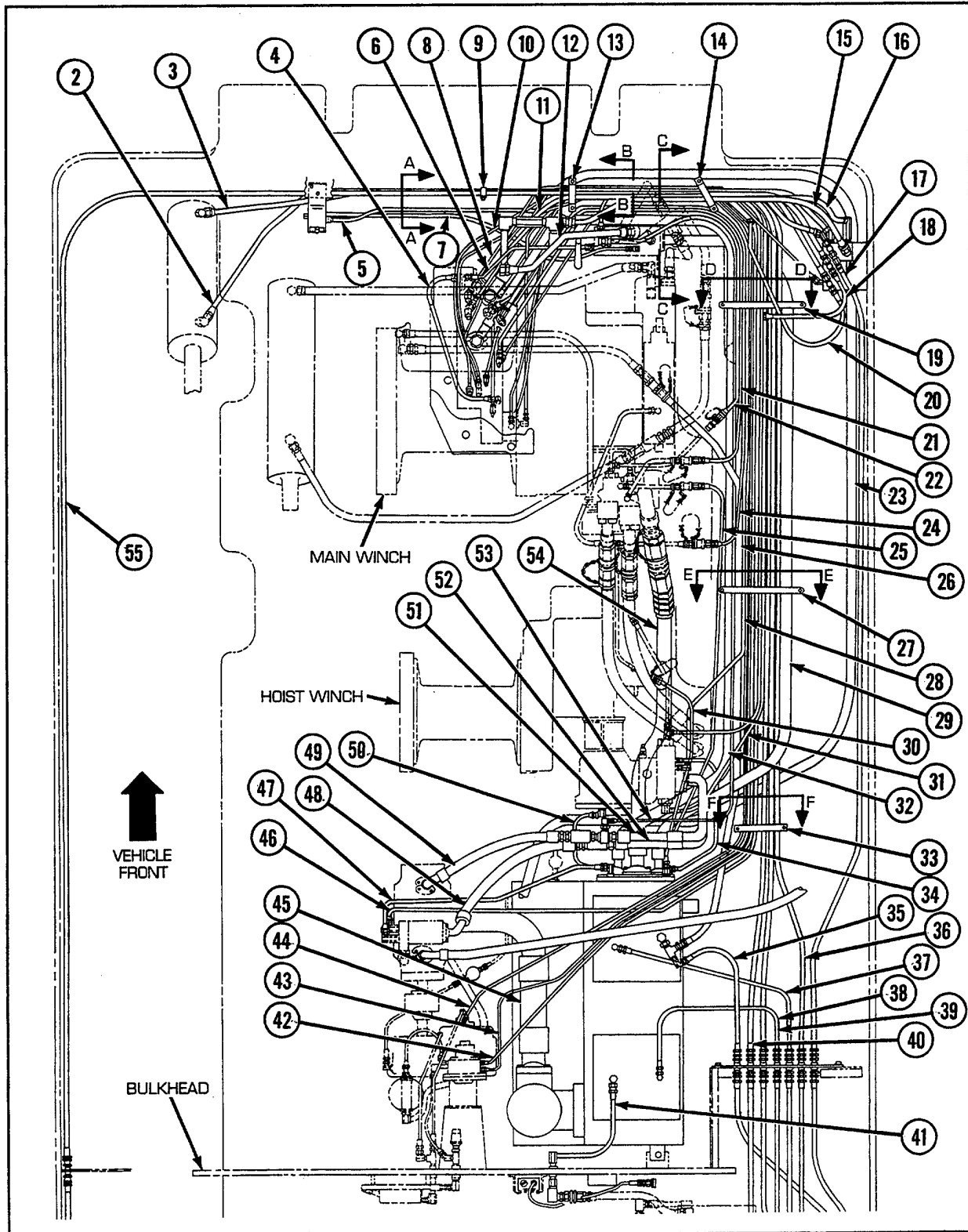
- | | | |
|-------------|-------------|-------------------|
| 24 Union | 30 Union* | 36 Adapter union* |
| 25 Bushing* | 31 Elbow* | 37 Elbow* |
| 26 Fitting* | 32 Nipple* | 38 Adapter union* |
| 27 Bushing* | 33 Union* | 39 Elbow |
| 28 Switch* | 34 Bushing* | 40 Elbow |
| 29 Plug* | 35 Fitting* | 41 Bushing |
- * Apply sealant tape to threads when installing these items.



12-2 REPLACE HYDRAULIC LINES AND FITTINGS-Continued

- | | | |
|--------------------------------|-------------------------------|--------------------------------|
| 1 Hose assembly Code No. 67A | 20 Hose assembly Code No. 15R | 39 Hose assembly Code No. 13 |
| 2 Hose assembly Code No. 14AL | 21 Hose assembly Code No. 21 | 40 Hose assembly Code No. 12A |
| 3 Hose assembly Code No. 15L | 22 Hose assembly Code No. 21B | 41 Hose assembly Code No. 2 |
| 4 Hose assembly Code No. 18A | 23 Hose assembly Code No. 7 | 42 Hose assembly Code No.63 |
| 5 Hose assembly Code No. 69 | 24 Hose assembly Code No. 22A | 43 Hose assembly Code No. 65 |
| 6 Hose assembly Code No. 18 | 25 Hose assembly Code No. 46A | 44 Hose assembly Code No. 66 |
| 7 Hose assembly Code No. 68 | 26 Hose assembly Code No. 45 | 45 Hose assembly Code No. 1 |
| 8 Hose assembly Code No. 14BR | 27 Cover | 46 Hose assembly Code No. 17 |
| 9 Cover | 28 Hose assembly Code No. 23A | 47 Hose assembly Code No. 49 |
| 10 Hose assembly Code No.24 | 29 Hose assembly Code No.43 | 48 Hose assembly Code No. 6B |
| 11 Hose assembly Code No. 14 | 30 Hose assembly Code No. 47A | 49 Hose assembly Code No. 4B |
| 12 Hose assembly Code No. 8 | 31 Hose assembly Code No. 23 | 50 Hose assembly Code No.48 |
| 13 Covers (2) | 32 Hose assembly Code No.42 | 51 Hose assembly Code No. 4A |
| 14 Cover | 33 Cover | 52 Hose assembly Code No. 6A |
| 15 Hose assembly Code No. 9B | 34 Hose assembly Code No. 50 | 53 Hose assembly Code No. 4C |
| 16 Hose assembly Code No. 9A | 35 Hose assembly Code No. 44A | 54 Hose assembly Code No. 41A |
| 17 Hose assembly Code No. 14CR | 36 Hose assembly Code No. 19 | 55 Hose assembly Code No. 14CL |
| 18 Hose assembly Code No. 14AR | 37 Hose assembly Code No. 51C | |
| 19 Cover | 38 Hose assembly Code No. 52B | |





12-2 REPLACE HYDRAULIC LINES AND FITTINGS-Continued

NOTE

The following table lists the equipment condition for removal of the hose in question.

TABLE 12-3. EQUIPMENT CONDITIONS

Callout Number	Hose Code Number	Equipment Conditions
1	67A	None
2	14AL	Covers (9, 13, and 14) removed Section A-A, Section B-B and Section C-C
3	15L	Covers (9, 13, and 14) removed Section A-A, Section B-B and Section C-C
4	18A	None
5	69	None
6	18	None
7	68	None
8	14BR	Covers (13 and 14) removed Section B-B and Section C-C
10	24	U-35 Winch Center Right Floor Plate opened (see paragraph 9-4) Rocket Ammunition Stowage Box Assembly removed (see paragraph 9-99) Covers (13, 14, 19, and 27) removed Section B-B, Section C-C, Section D-D and Section E-E
11	14	Covers (13 and 14) removed Section B-B and Section C-C
12	8	None
15	9B	Covers (13 and 14) removed Section B-B and Section C-C
16	9A	Covers (13 and 14) removed Section B-B and Section C-C
17	14CR	Rocket Ammunition Stowage Box Assembly removed (see paragraph 9-99) Intermediate Rear Right Floor Plate removed (see paragraph 9-5) Rear Right-Side Floor Plate removed (see paragraph 9-6)
18	14AR	None
20	15R	None
21	21	Right-Front Floor Plate Rear Access removed (see paragraph 9-2) Rocket Ammunition Stowage Box Assembly removed (see paragraph 9-99) Cover (19) removed Section D-D
22	21B	Right-Front Floor Plate Rear Access removed (see paragraph 9-2) Rocket Ammunition Stowage Box Assembly removed (see paragraph 9-99) Cover (19) removed Section D-D
23	7	Hydraulic Line Intermediate Rear Right Center Floor Plate opened (see paragraph 9-11) Rocket Ammunition Stowage Box Assembly removed (see paragraph 9-99)
24	22A	Hydraulic Valve Forward Right Floor Plate removed (see paragraph 9-3) Rocket Ammunition Stowage Box Assembly removed (see paragraph 9-99) Cover (19) removed Section D-D
25	46A	Right-Front Floor Plate Rear Access removed (see paragraph 9-2) Hydraulic Line Intermediate Rear Right Center Floor Plate opened (see paragraph 9-11) U-35 Winch Center Right Floor Plate opened (see paragraph 9-4)
26	45	Hydraulic Line Intermediate Rear Right Center Floor Plate opened (see paragraph 9-11) Rocket Ammunition Stowage Box Assembly removed (see paragraph 9-99) Cover (27) removed Section E-E
28	23A	Right-Front Floor Plate Rear Access removed (see paragraph 9-2) U-35 Winch Center Right Floor Plate opened (see paragraph 9-4) Rocket Ammunition Stowage Box Assembly removed (see paragraph 9-99)

		Covers (13, 14, 19, and 27) removed Section B-B, Section C-C, Section D-D and Section E-E
29	43	Hydraulic Line Intermediate Rear Right Center Floor Plate opened (see paragraph 9-11) Rocket Ammunition Stowage Box Assembly removed (see paragraph 9-99) Covers (19 and 27) removed Section D-D and Section E-E
30	47A	Hydraulic Line Intermediate Rear Right Center Floor Plate opened (see paragraph 9-11) U-35 Winch Center Right Floor Plate opened (see paragraph 9-4)
31	23	Hydraulic Line Intermediate Rear Right Center Floor Plate opened (see paragraph 9-11) Rocket Ammunition Stowage Box Assembly removed (see paragraph 9-99) Covers (13, 14, 19, and 27) removed Section B-B, Section C-C, Section D-D and Section E-E
32	42	Hydraulic Line Intermediate Rear Right Center Floor Plate opened (see paragraph 9-11) Rocket Ammunition Stowage Box Assembly removed (see paragraph 9-99) Covers (19 and 27) removed Section D-D and Section E-E
34	50	Hydraulic Line Intermediate Rear Right Center Floor Plate opened (see paragraph 9-11) U-35 Winch Center Right Floor Plate opened (see paragraph 9-4)
35	44A	Rear Right-Side Floor Plate removed (see paragraph 9-6) Hydraulic Line Intermediate Rear Right Center Floor Plate opened (see paragraph 9-11)
36	19	Rear Right-Side Floor Plate removed (see paragraph 9-6) Intermediate Rear Right Floor Plate removed (see paragraph 9-5) Rocket Ammunition Stowage Box Assembly removed (see paragraph 9-99) Covers (13, 14, 19, 27, and 33) removed Section B-B, Section C-C, Section D-D, Section E-E and Section F-F
37	51C	Rear Right-Side Floor Plate removed (see paragraph 9-6) Hydraulic Line Intermediate Rear Right Center Floor Plate opened (see paragraph 9-11)
38	52B	Rear Right-Side Floor Plate removed (see paragraph 9-6) Rear Intermediate Right Access Floor Plate removed (see paragraph 9-10) Rear Intermediate Right Floor Plate removed (see paragraph 9-8)
39	13	Rear Right-Side Floor Plate removed (see paragraph 9-6) Intermediate Rear Right Floor Plate removed (see paragraph 9-5) Rocket Ammunition Stowage Box Assembly removed (see paragraph 9-99) Covers (13, 14, 19, 27, and 33) removed Section B-B, Section C-C, Section D-D, Section E-E and Section F-F
40	12A	Rear Right-Side Floor Plate removed (see paragraph 9-6) Intermediate Rear Right Floor Plate removed (see paragraph 9-5) Rocket Ammunition Stowage Box Assembly removed (see paragraph 9-99) Covers (13, 14, 19, 27, and 33) removed Section B-B, Section C-C, Section D-D, Section E-E and Section F-F
41	2	Rear Intermediate Right Floor Plate removed (see paragraph 9-8)
42	63	Rear Center Floor Plate door opened (see paragraph 9-12) Hydraulic Line Intermediate Rear Right Center Floor Plate opened (see paragraph 9-11) Intermediate Rear Right Floor Plate removed (see paragraph 9-5) Rocket Ammunition Stowage Box Assembly removed (see paragraph 9-99) Covers (13, 14, 19, 27, and 33) removed Section B-B, Section C-C, Section D-D, Section E-E and Section F-F
43	65	Rear Center Floor Plate door opened (see paragraph 9-12) Hydraulic Line Intermediate Rear Right Center Floor Plate opened (see paragraph 9-11) Intermediate Rear Right Floor Plate removed (see paragraph 9-5) Rocket Ammunition Stowage Box Assembly removed (see paragraph 9-99) Covers (13, 14, 19, 27, and 33) removed Section B-B, Section C-C, Section D-D, Section E-E and Section F-F

12-2 REPLACE HYDRAULIC LINES AND FITTINGS-Continued

TABLE 12-3. EQUIPMENT CONDITIONS-Continued

Callout Number	Hose Code Number	Equipment Conditions
44	66	Rear Center Floor Plate door opened (see paragraph 9-12) Hydraulic Line Intermediate Rear Right Center Floor Plate opened (see paragraph 9-11) Intermediate Rear Right Floor Plate removed (see paragraph 9-5) Rocket Ammunition Stowage Box Assembly removed (see paragraph 9-99) Covers (13, 14, 19, 27, and 33) removed Section B-B, Section C-C, Section D-D, Section E-E and Section F-F
45	1	Rear Center Floor Plate removed (see paragraph 9-12) Hydraulic Line Intermediate Rear Right Center Floor Plate removed (see paragraph 9-11)
46	17	Intermediate Rear Left-Center Floor Plate removed (see paragraph 9-17) Hydraulic Line Intermediate Rear Right Center Floor Plate opened (see paragraph 9-11) Intermediate Rear Right Floor Plate removed (see paragraph 9-5) Rocket Ammunition Stowage Box Assembly removed (see paragraph 9-99) Covers (14, 19, 27, and 33) removed Section C-C, Section D-D, Section E-E and Section F-F
47	49	Fuel Transmitter Center Left Floor Access Plate removed (see paragraph 9-14) Hydraulic Line Intermediate Rear Right Center Floor Plate opened (see paragraph 9-11)
48	6B	Hydraulic Line Intermediate Rear Right Center Floor Plate removed (see paragraph 9-11)
49	4B	Fuel Transmitter Center Left Floor Access Plate removed (see paragraph 9-14) Hydraulic Line Intermediate Rear Right Center Floor Plate opened (see paragraph 9-11)
50	48	Hydraulic Line Intermediate Rear Right Center Floor Plate opened (see paragraph 9-11)
51	4A	Hydraulic Line Intermediate Rear Right Center Floor Plate opened (see paragraph 9-11) U-35 Winch Center Right Floor Plate opened (see paragraph 9-4)
52	6A	Hydraulic Line Intermediate Rear Right Center Floor Plate opened (see paragraph 9-11) U-35 Winch Center Right Floor Plate opened (see paragraph 9-4)
53	4C	Hydraulic Line Intermediate Rear Right Center Floor Plate opened (see paragraph 9-11) Rocket Ammunition Stowage Box Assembly removed (see paragraph 9-99) Covers (19 and 27) removed Section D-D and Section E-E
54	41A	Hydraulic Line Intermediate Rear Right Center Floor Plate opened (see paragraph 9-11) U-35 Winch Center Right Floor Plate opened (see paragraph 9-4) Hydraulic Valve Forward Right Floor Plate removed (see paragraph 9-3)
55	14CL	Covers (9, 13, and 14) removed Section A-A, Section B-B and Section C-C Caliber .50 Ammunition Rack and Track Wrench Bracket removed (see paragraph 9-100) Intermediate Rear Left-Side Floor Plate removed (see paragraph 9-16) Rear Left-Side Floor Plate removed (see paragraph 9-15)

NOTE

Remove and tag each hose with the port number from which it was removed, using port routing chart and illustrations as a guide.

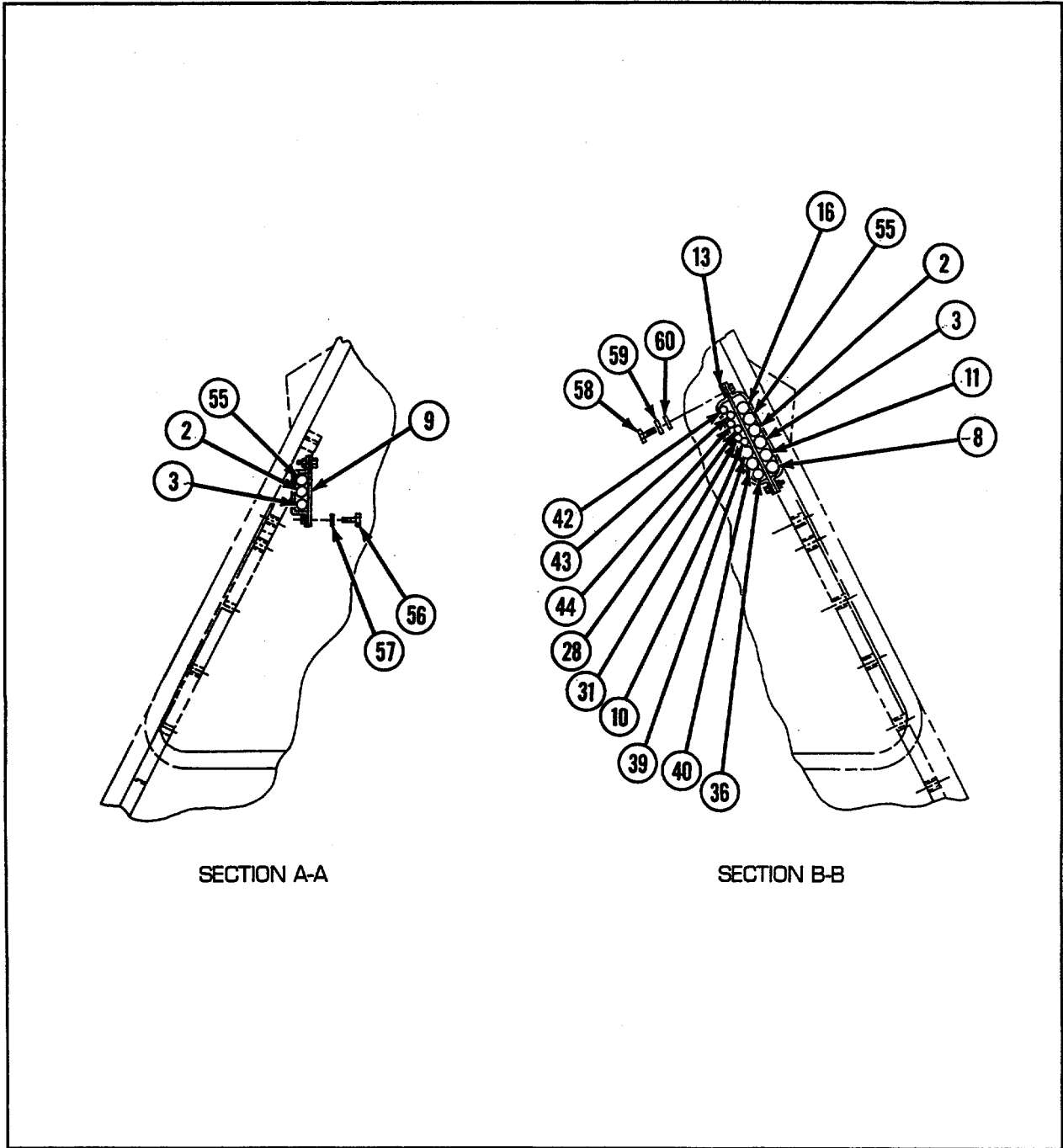
TABLE 12-4. PORT ROUTING

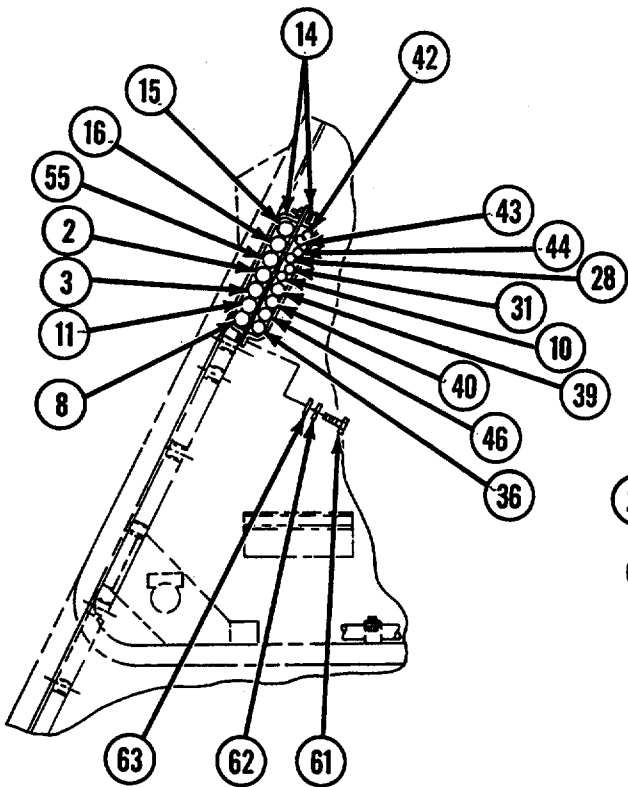
Hose Callout	Hose Code Number	Port	
		From	To
1	67A	Out 12322566 isolator valve	Line 67
2	14AL	195	61FL

3	15L	194	62FL
4	18A	118	148
5	69	Out 12322566 Gage isolator valve	189
6	18	179	118
7	68	Out 12322565 Check valve	190
8	14BR	135	193
10	24	145	19
11	14	139	197
12	8	178	119
15	9B	155	198
16	9A	120	199
17	14CR	196	80
18	14AR	195	61FR
20	15R	194	62FR
21	21	150	Line 21A
22	21B	150	Line 21C
23	7	3	136
24	22A	144	Line 22
25	46A	240	Line 46
26	45	245	Line 45A
28	23A	146	23
29	43	177	235
30	47A	241	Line 47
31	23	146	24
32	42	140	236
34	50	240	21
35	44A	86	245
36	19	149	81
37	51C	82	246
38	52B	83	244
39	13	138	84
40	12A	85	137
41	2	243	87
42	63	226	161
43	65	227	169
44	66	228	171
45	1	242	69
46	17	180	5
47	49	239	6
48	6B	Valve	4
49	4B	Valve	1
50	48	25	238
51	4A	27	Valve
52	6A	22	Valve
53	4C	Valve	Lines 4A-4B
54	41A	237	Line 41
55	14CL	196	91

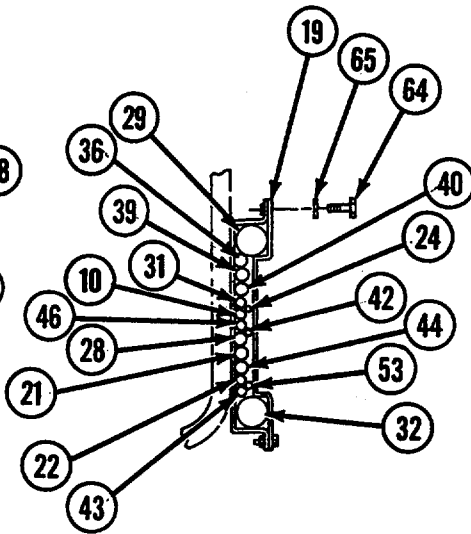
12-2 REPLACE HYDRAULIC LINES AND FITTING-Continued

- | | | |
|-------------------|-------------------|-------------------|
| 56 Screw (2) | 61 Screw (2) | 66 Screw (2) |
| 57 Lockwasher (2) | 62 Lockwasher (2) | 67 Lockwasher (2) |
| 58 Screw (2) | 63 Washer (2) | 68 Screw (2) |
| 59 Lockwasher (2) | 64 Screw (2) | 69 Lockwasher (2) |
| 60 Washer | 65 Lockwasher (2) | |

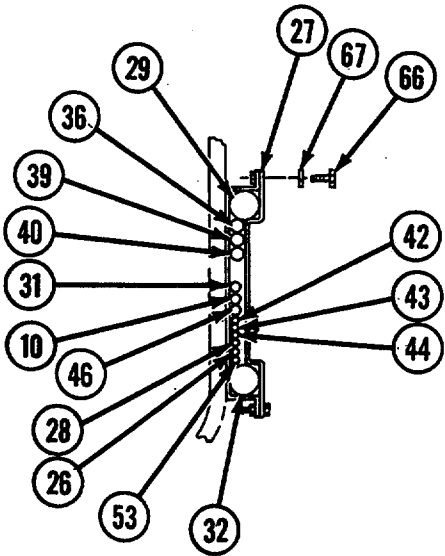




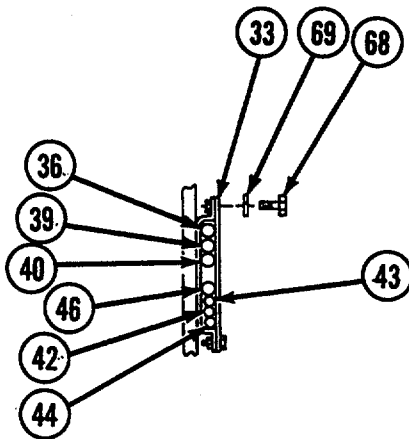
SECTION C-C



SECTION D-D



SECTION E-E

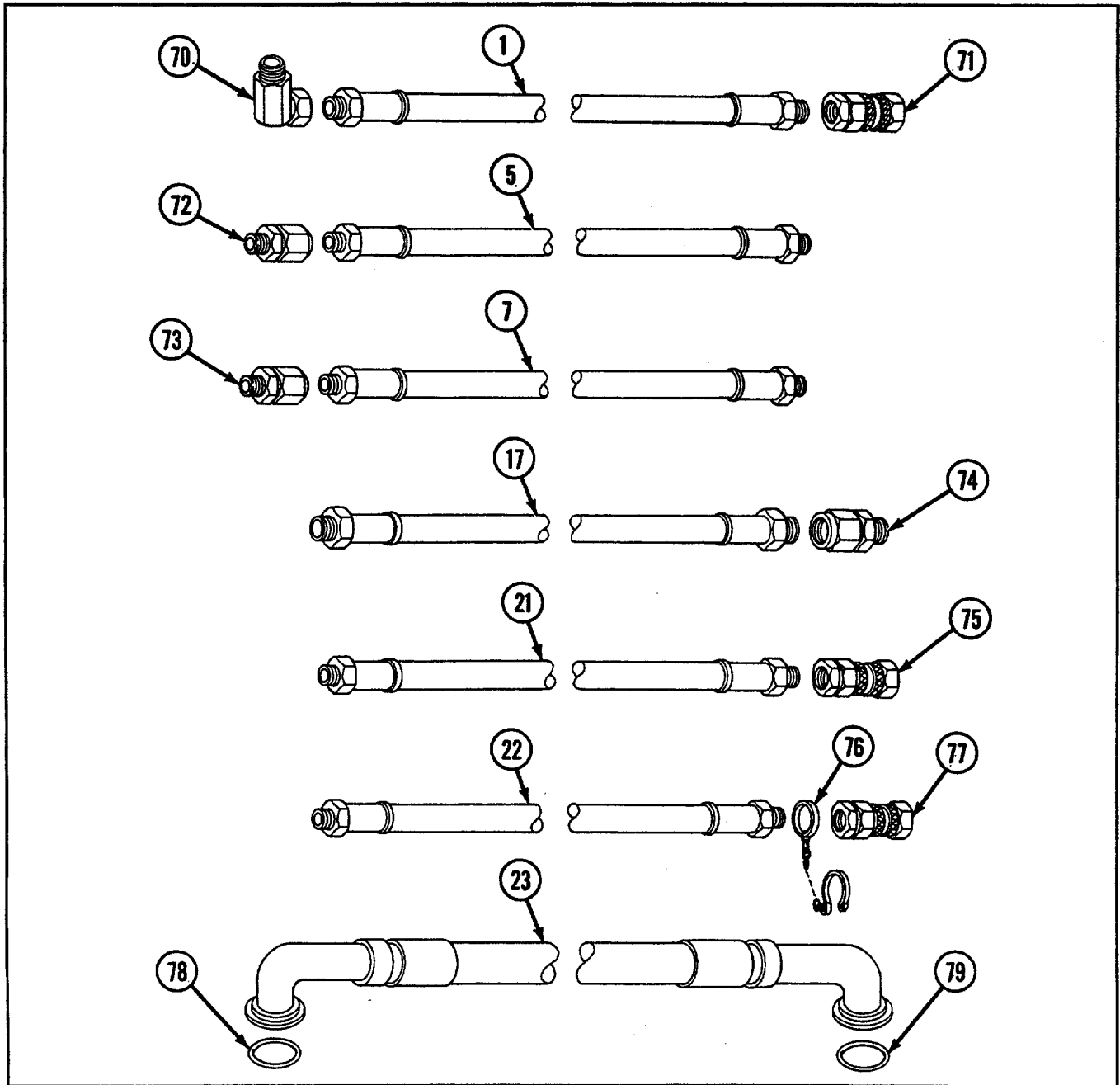


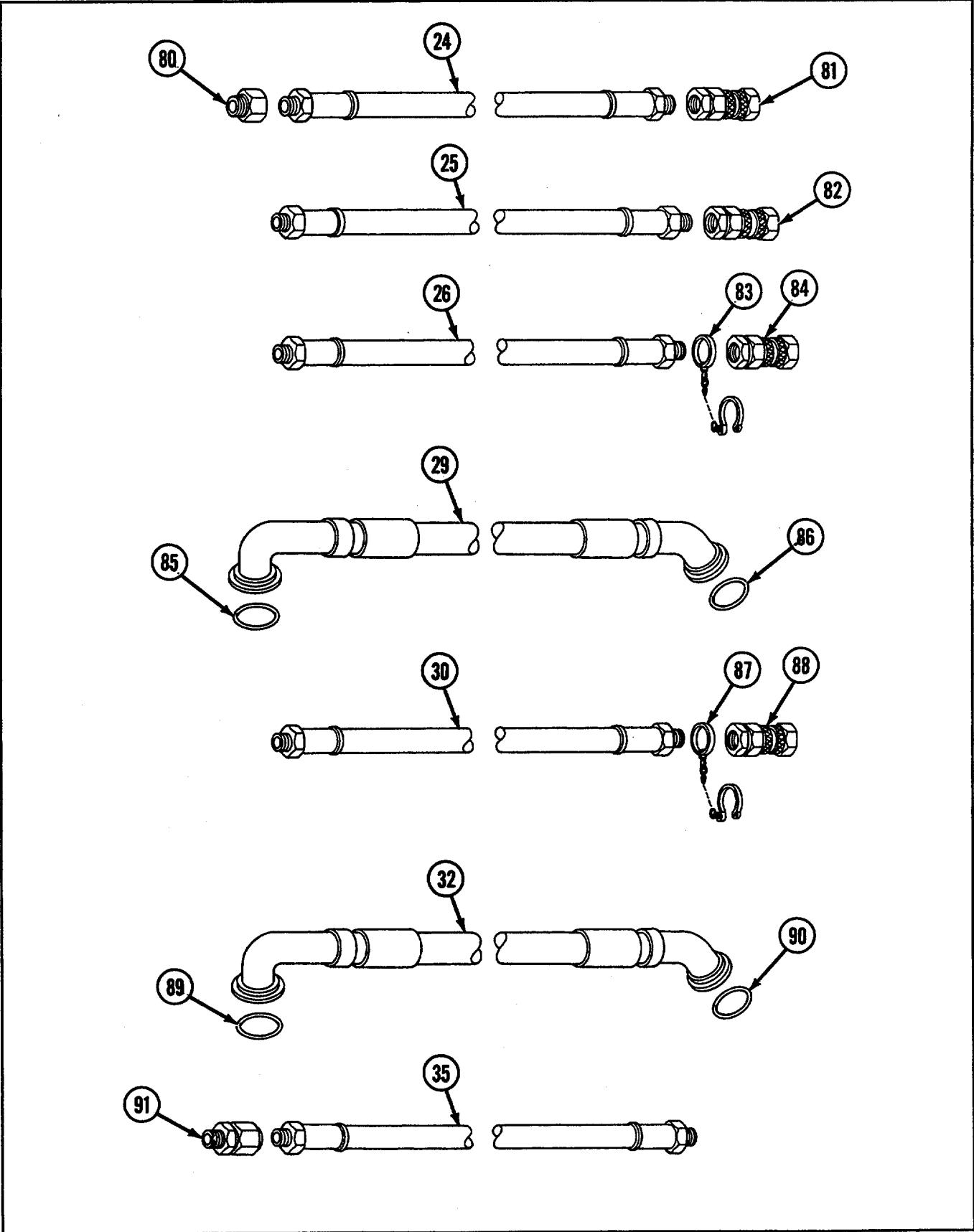
SECTION F-F

12-2 REPLACE HYDRAULIC LINES AND FITTINGS--Continued

- | | | |
|----------------------|----------------------|----------------------|
| 70 Adapter union* | 78 Packing | 86 Packing |
| 71 Coupling half* | 79 Packing | 87 Retainer assembly |
| 72 Union* | 80 Adapter | 88 Coupling half* |
| 73 Union* | 81 Coupling half* | 89 Packing |
| 74 Union* | 82 Coupling half* | 90 Packing |
| 75 Coupling half* | 83 Retainer assembly | 91 Union* |
| 76 Retainer assembly | 84 Coupling half* | |
| 77 Coupling half* | 85 Packing | |

* Apply sealant tape to threads when installing these items.

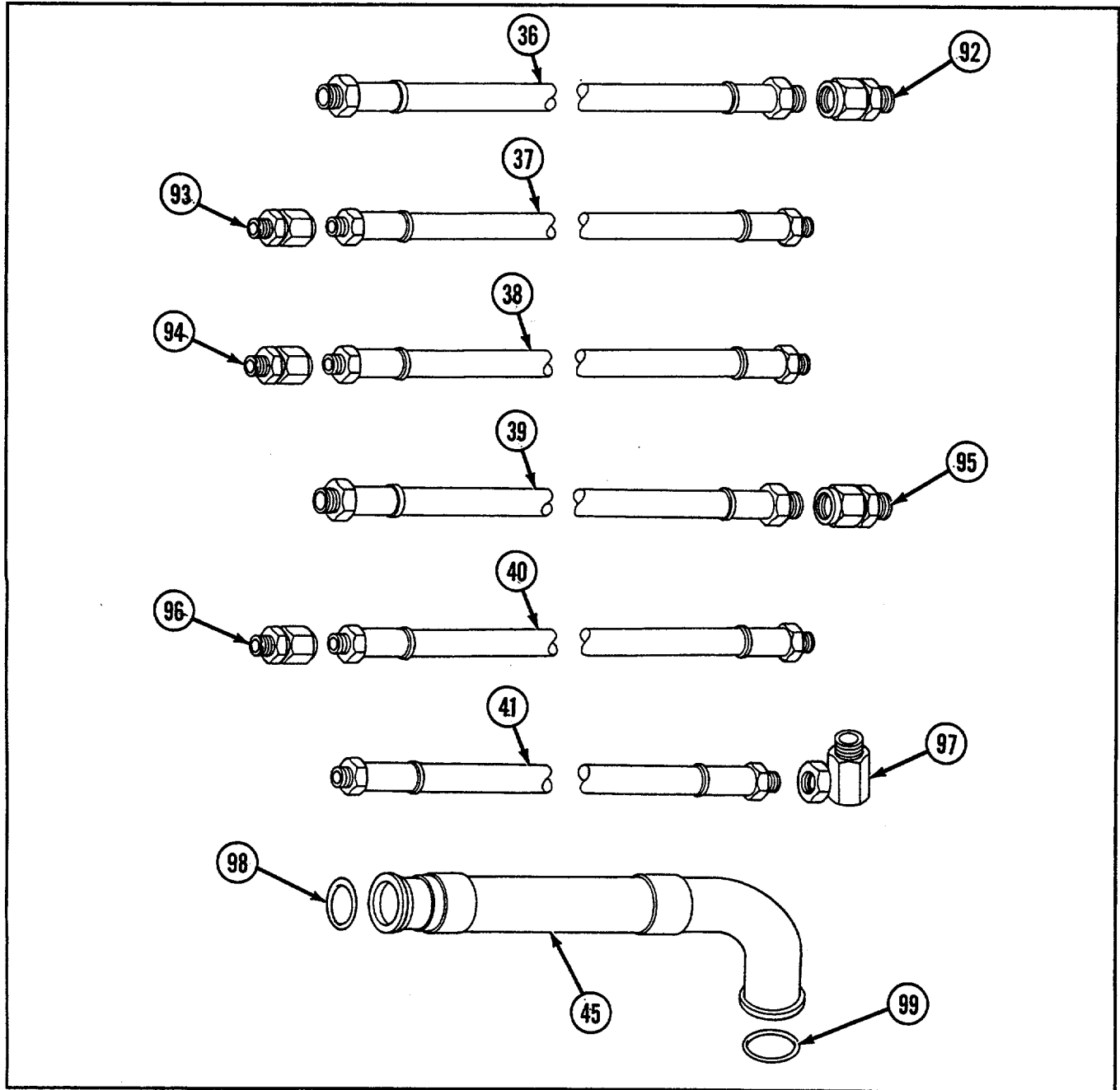


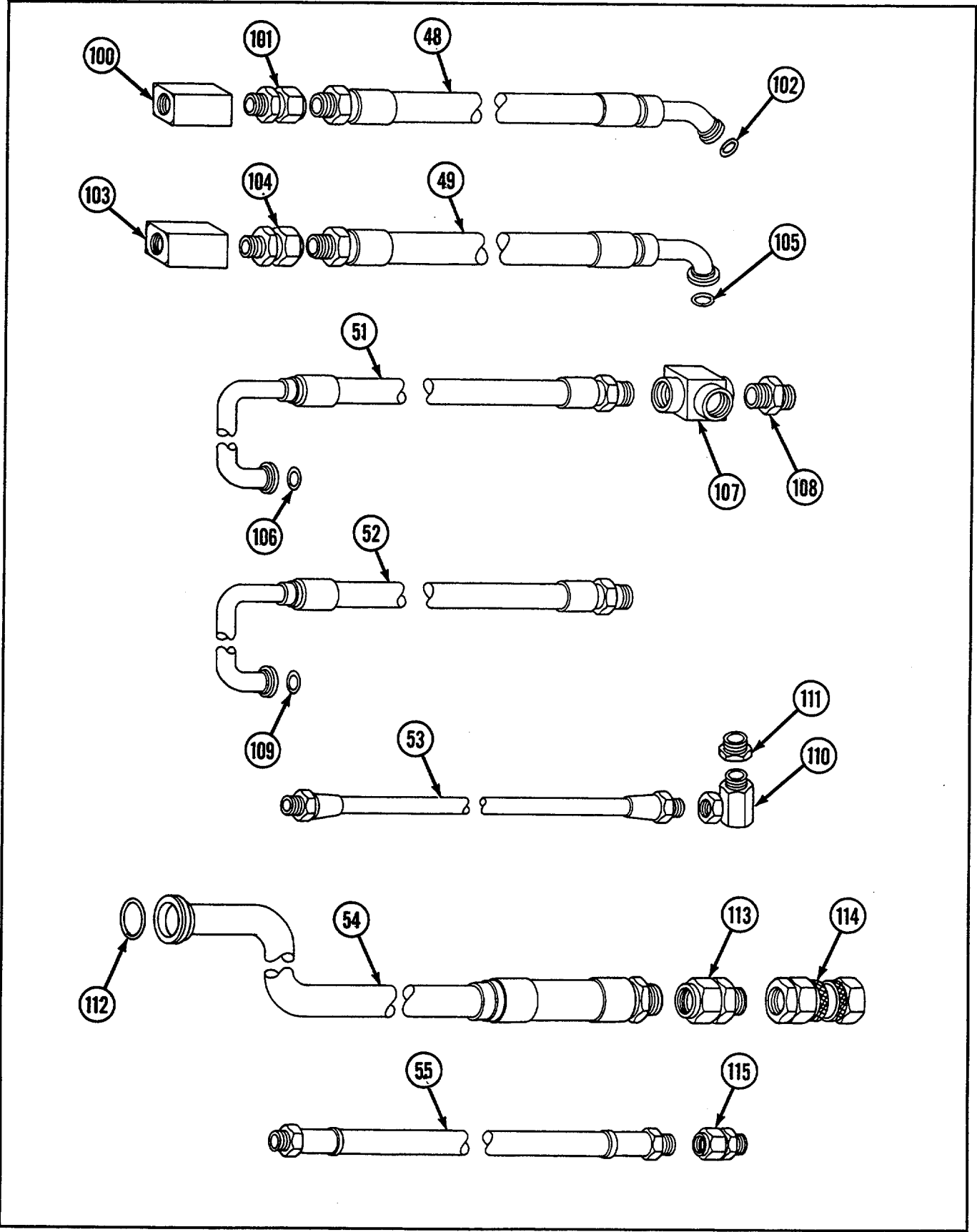


12-2 REPLACE HYDRAULIC LINES AND FITTINGS--Continued

- | | | |
|-------------------|-----------------|-------------------|
| 92 Union* | 100 Check valve | 108 Nipple |
| 93 Union* | 101 Union | 109 Packing |
| 94 Union* | 102 Packing | 110 Elbow |
| 95 Union* | 103 Check valve | 111 Bushing |
| 96 Union* | 104 Union | 112 Packing |
| 97 Adapter union* | 105 Packing | 113 Union* |
| 98 Packing | 106 Packing | 114 Coupling half |
| 99 Packing | 107 Tee | 115 Union* |

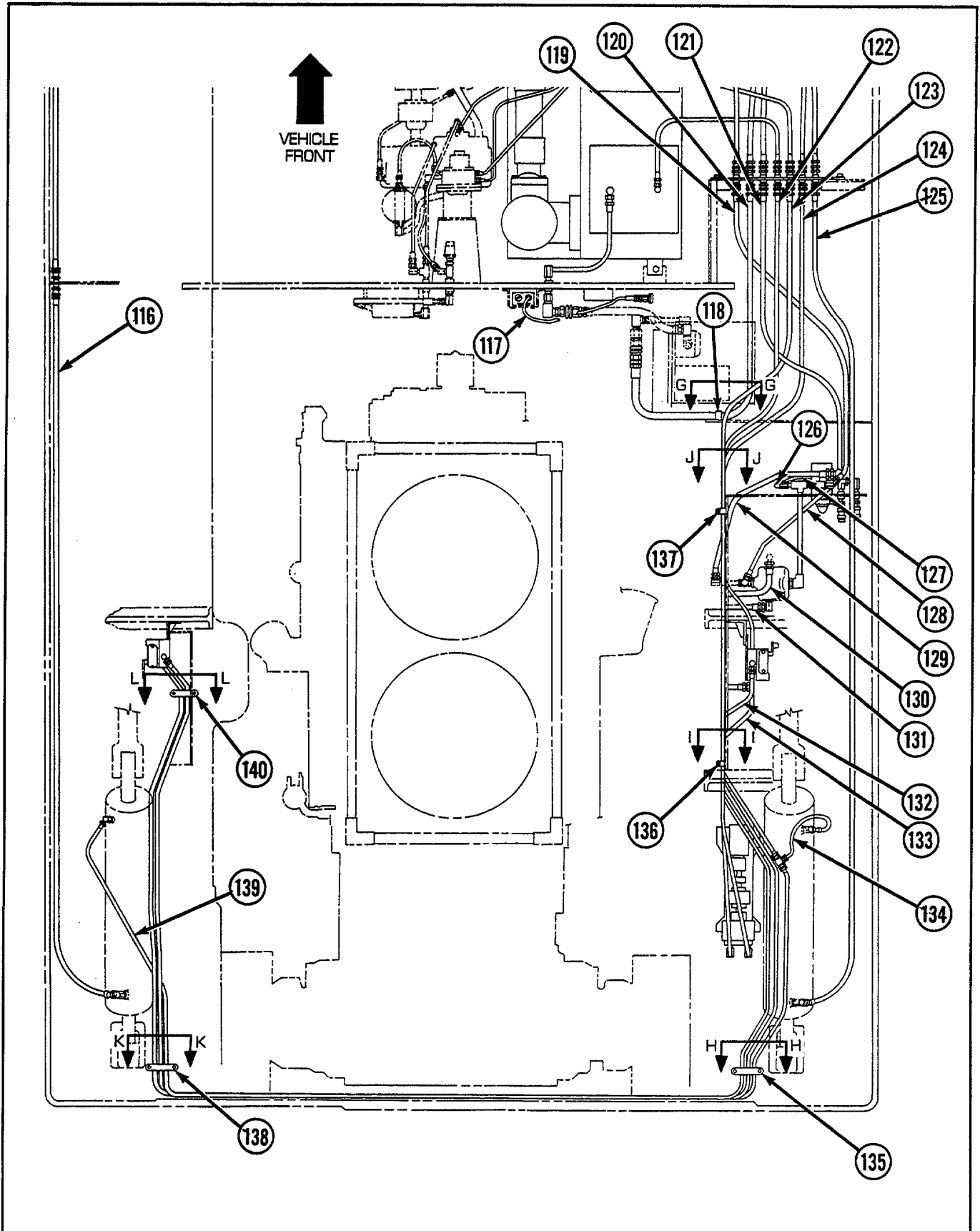
* Apply sealant tape to threads when installing these items.





12-2 REPLACE HYDRAULIC LINES AND FITTINGS--Continued

116 Hose assembly Code No. 14DL	125 Hose assembly Code No. 14DR	134 Hose assembly Code No. 51A
117 Hose assembly Code No. 25	126 Hose assembly Code No. 56	135 Cover
118 Clamp	127 Hose assembly Code No. 53	136 Cover
119 Hose assembly Code No. 44	128 Hose assembly Code No. 26	137 Cover
120 Hose assembly Code No. 12	129 Hose assembly Code No. 13B	138 Cover
121 Hose assembly Code No. 13A	130 Hose assembly Code No. 13D	139 Hose assembly Code No. 51
122 Hose assembly Code No. 52A	131 Hose assembly Code No. 13C	140 Cover
123 Hose assembly Code No. 51B	132 Hose assembly Code No. 20	
124 Hose assembly Code No. 19A	133 Hose assembly Code No. 52	



12-2 HYDRAULIC LINES AND FITTINGS--Continued

NOTE

The following table lists the equipment condition for removal of the hose in question.

TABLE 12-5. EQUIPMENT CONDITIONS

Callout Number	Code Number Hose	Equipment Conditions
116	14DL	Air Inlet Doors (left side) opened (see paragraph 9-56) Batteries removed (see paragraph 6-4) Engine Deck removed (see paragraph 9-51) 117
117	25	Left- and Center-Front Air Inlet Grilles removed (see paragraph 9-57)
119	44	Air Cleaner (right) removed (see paragraph 4-24) Hydraulic Connection Access Cover removed (see paragraph 9-7) APU removed Air Inlet Doors (two front right side) opened (see paragraph 9-56)
120	12	Air Cleaner (right) removed (see paragraph 4-24) Hydraulic Connection Access Cover removed (see paragraph 9-7) APU removed Left- and Center-Front Air Inlet Grilles (far right) removed (see paragraph 9-57)
121	13A	Air Cleaner (right) removed (see paragraph 4-24) Hydraulic Connection Access Cover removed (see paragraph 9-7) APU removed Engine Deck removed (see paragraph 9-51) Air Inlet Doors (two front right side) opened (see paragraph 9-56) Clamp (118) removed Section G-G
122	52A	Air Cleaner (right) removed (see paragraph 4-24) Hydraulic Connection Access Cover removed (see paragraph 9-7) APU removed Engine Deck removed (see paragraph 9-51) Cover (137) removed Section J-J Right Deck Air Inlet Door removed (see paragraph 9-60)
123	51B	Air Cleaner (right) removed (see paragraph 4-24) Hydraulic Connection Access Cover removed (see paragraph 9-7) APU removed Engine Deck removed (see paragraph 9-51) Air Inlet Doors (right side) opened (see paragraph 9-56) Covers (136 and 137) removed Section I-I and Section J-J
124	19A	Air Cleaner (right) removed (see paragraph 4-24) Hydraulic Connection Access Cover removed (see paragraph 9-7) APU removed Engine Deck removed (see paragraph 9-51) Air Inlet Doors (two front right side) opened (see paragraph 9-56) Cover (137) removed Section J-J Right Deck Air Inlet Door removed (see paragraph 9-60)
125	14DR	Air Cleaner (right) removed (see paragraph 4-24) Hydraulic Connection Access Cover removed (see paragraph 9-7) APU removed Engine Deck removed (see paragraph 9-51) Air Inlet Doors (right side) opened (see paragraph 9-56)

126	56	Air Inlet Doors (two front right side) opened (see paragraph 9-56)
127	53	Air Inlet Doors (two front right side) opened (see paragraph 9-56)
128	26	Air Inlet Doors (two front right side) opened (see paragraph 9-56)
129	13B	Air Inlet Doors (two front right side) opened (see paragraph 9-56)
130	13D	Air Inlet Doors (right side) opened (see paragraph 9-56) Right Deck Air Inlet Door removed (see paragraph 9-60) Cover (136) removed Section I-I
131	13C	Air Inlet Doors (right side) opened (see paragraph 9-56) Right Deck Air Inlet Door removed (see paragraph 9-60) Cover (136) removed Section I-I
132	20	Left and Right Deck Air Inlet Doors removed (see paragraph 9-60) Engine Deck removed (see paragraph 9-51) Covers (135, 136, 138, and 140) removed Section H-H, Section I-I, Section K-K and Section L-L
133	52	Engine Deck removed (see paragraph 9-51) Covers (135, 136, 138, and 140) removed Section H-H, Section I-I, Section K-K and Section L-L
134	51A	Air Inlet Doors (two rear right side) opened (see paragraph 9-56)
139	51	Engine Deck removed (see paragraph 9-51) Covers (135 and 138) removed Section H-H and Section K-K

NOTE

Remove and tag each hose with the port number from which it was removed, using port routing chart and illustrations as a guide.

TABLE 12-6. PORT ROUTING

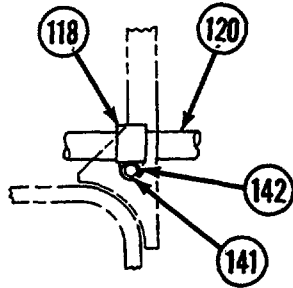
Hose Callout	Hose Code Number	Port	
		From	To
116	14DL	91	62RL
117	25	64	Switch 10894889-1
119	44	86	Return 8352698
120	12	64	85
121	13A	84	In 10884618
122	52A	204	83
123	51B	Lines 51-51A	82
124	19A	81	205
125	14DR	80	62RR
126	56	Out 10884618	Return 8352698
127	53	Return 8352698	93
128	26	92	Press. 8352698
129	13B	In 10884618	Press. 8352698
130	13D	CYL-2 8352698	65
131	13C	CYL-1 8352698	66
132	20	203	214
133	52	215	204
134	51A	61RR	Lines 51-51B
139	51	61RL	Lines 51A-51B

12-2 REPLACE HYDRAULIC LINES AND FITTINGS -Continued

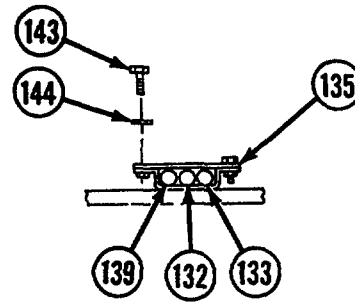
- 141 Screw
- 142 Lockwasher
- 143 Screw (2)
- 144 Lockwasher (2)

- 145 Screw (2)
- 146 Lockwasher (2)
- 147 Screw (2)
- 148 Lockwasher (2)

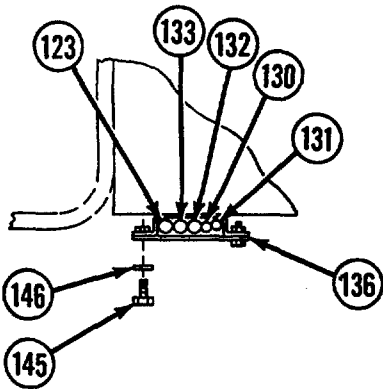
- 149 Screw (2)
- 150 Lockwasher (2)
- 151 Screw (2)
- 152 Lockwasher (2)



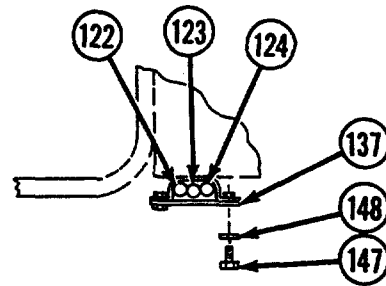
SECTION G-G



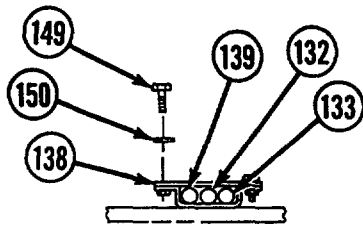
SECTION H-H



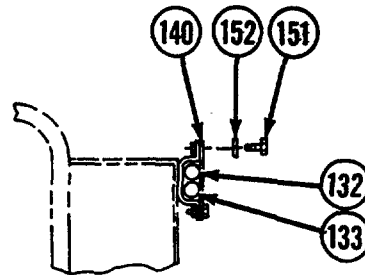
SECTION H



SECTION J-J



SECTION K-K



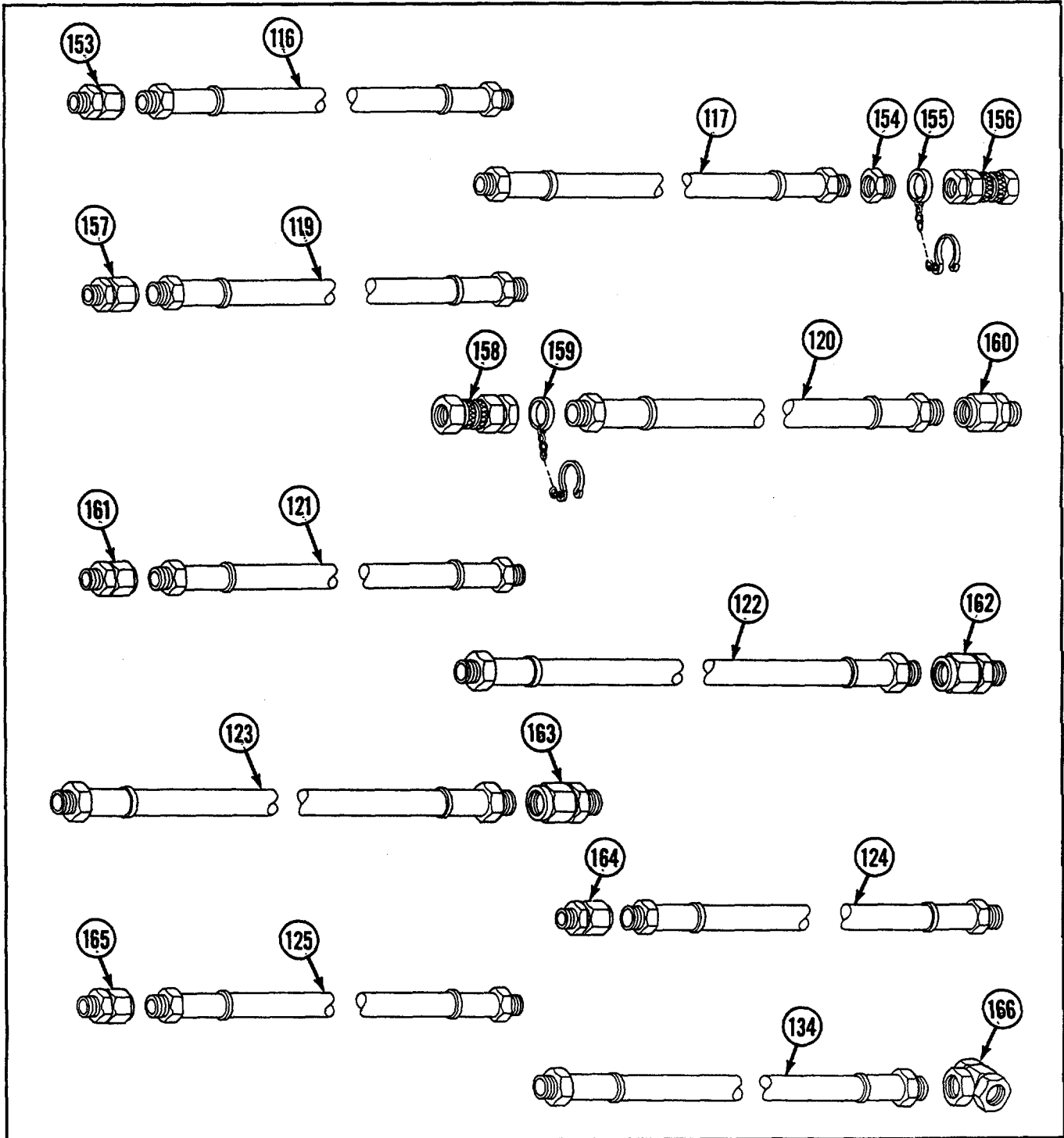
SECTION L-L

- 153 Union*
- 154 Bushing
- 155 Retainer assembly
- 156 Coupling half
- 157 Union*

- 158 Coupling half
- 159 Retainer assembly
- 160 Union
- 161 Union*
- 162 Union*

- 163 Union*
- 164 Union*
- 165 Union*
- 166 Tee

* Apply sealant tape to threads when installing these items.



12-2 REPLACE HYDRAULIC LINES AND FITTINGS--Continued**b. INSTALLATION****WARNING**

- Hydraulic fluid under pressure can penetrate skin or damage eyes. Fluid leaks under pressure may not be visible, use a piece of cardboard or wood to find leaks, but do not use bare hand. Wear safety goggles for protection. If fluid enters skin or eye, get immediate medical attention.
- Do not attempt to loosen or tighten hydraulic fittings or lines when the system is pressurized. Ensure that the boom is in the stowed position before doing any maintenance on the hydraulic system.
- Do not move under any hydraulically controlled implement when making adjustments or repairs to hydraulic system. Lower implement and work from above. If implement must be raised for access, always block to support. If implement drops, injury to personnel can result.

Install lines and fittings as required using legends, locator views, Tables 12-3 and 12-5 for equipment conditions, Tables 12-4 and 12-6 for port routing and the line/fitting illustration as a guide.

12-3 REPLACE HYDRAULIC CONNECTING PANEL**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP**Materials/Parts:**

- Lockwashers (10) (Appendix G, item 150)
- Gasket (Appendix G, item 62)
- Sealant tape (Appendix D, item 29)

Equipment Condition:

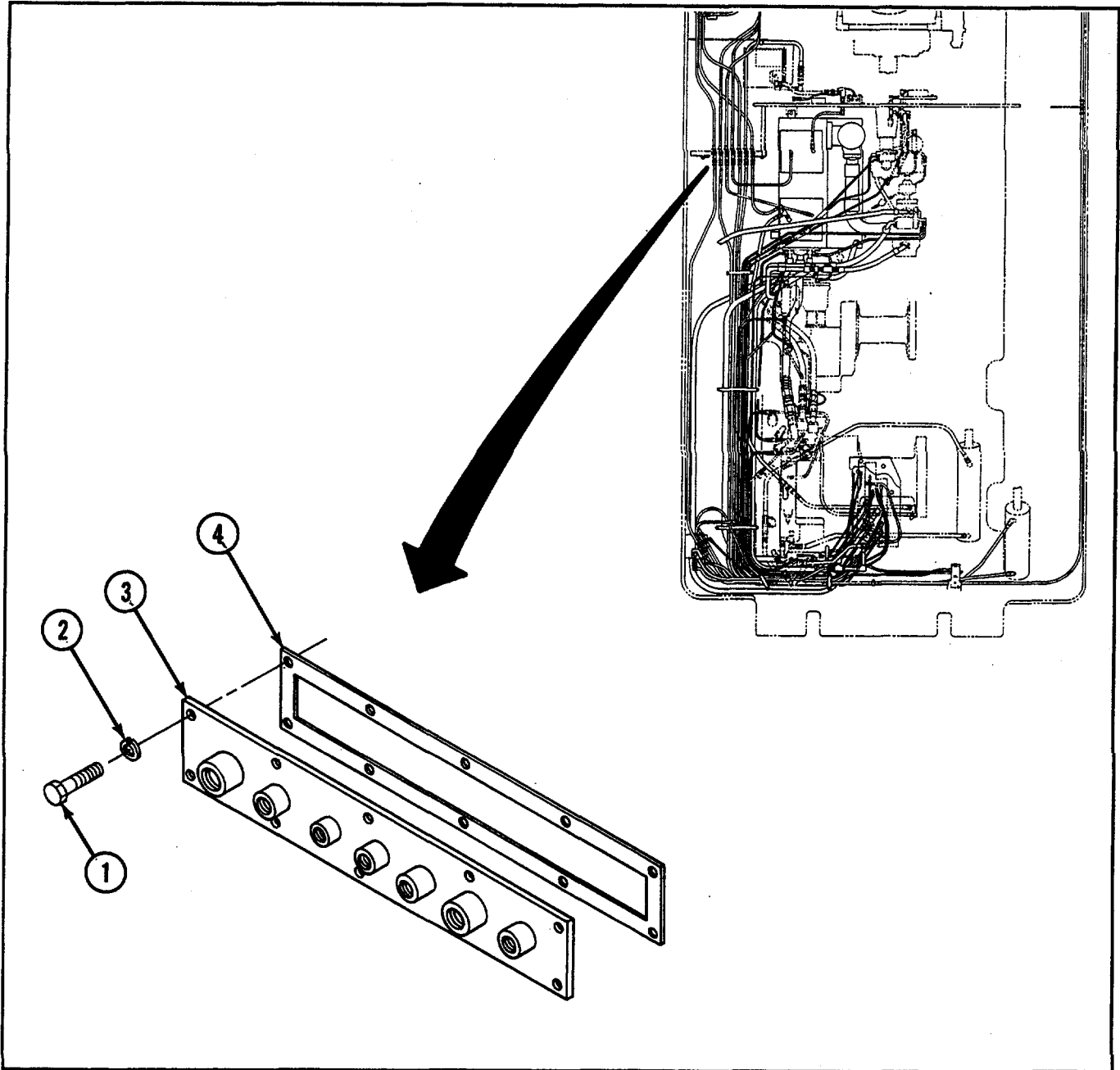
- Air cleaner (right-side) removed (see paragraph 4-24)
- Rear right-side floor plate removed (see paragraph 9-6)
- Hydraulic connections access cover removed (see paragraph 9-7)

a. REMOVAL**WARNING**

- Hydraulic fluid under pressure can penetrate skin or damage eyes. Fluid leaks under pressure may not be visible, use a piece of cardboard or wood to find leaks, but do not use bare hand. Wear safety goggles for protection. If fluid enters skin or eye, get immediate medical attention.
- Do not attempt to loosen or tighten hydraulic fittings or lines when the system is pressurized. Ensure that the boom is in the stowed position before doing any maintenance on the hydraulic system.

1 Disconnect hydraulic lines on both sides of the bulkhead and tag each line with the port number from which it was removed.

2 Remove 10 screws (1), 10 lockwashers (2), hose connecting panel (3) and gasket (4). Discard gasket.



b. INSTALLATION

1 Install new gasket (4) and hose connecting panel (3) with 10 new lockwashers (2) and 10 screws (1).

2 Apply sealant tape to threads and connect hydraulic lines to each side of the bulkhead using port reference tag.

NOTE

Follow-on maintenance:

- Install hydraulic connections access cover (see paragraph 9-7)
- Install rear right-side floor plate (see paragraph 9-6)
- Install air cleaner (right side) (see paragraph 4-24)

12-4 REPLACE FUEL TRANSFER PUMP AND FLOW REGULATOR**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP

Tools:

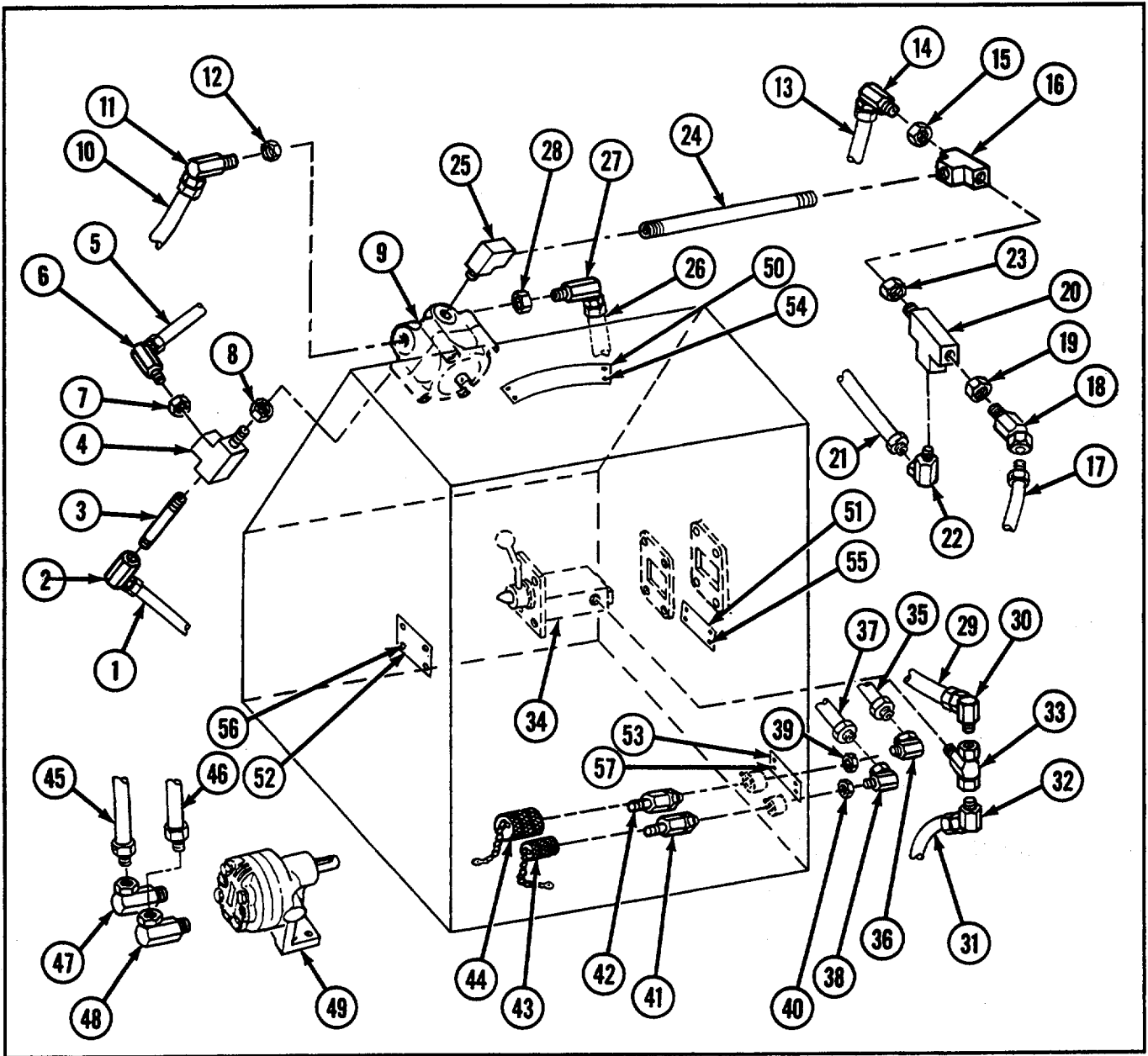
Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Drivescrews (16) (Appendix G, item 13)
- Locknut (Appendix G, item 91)
- Locknuts (8) (Appendix G, item 92)

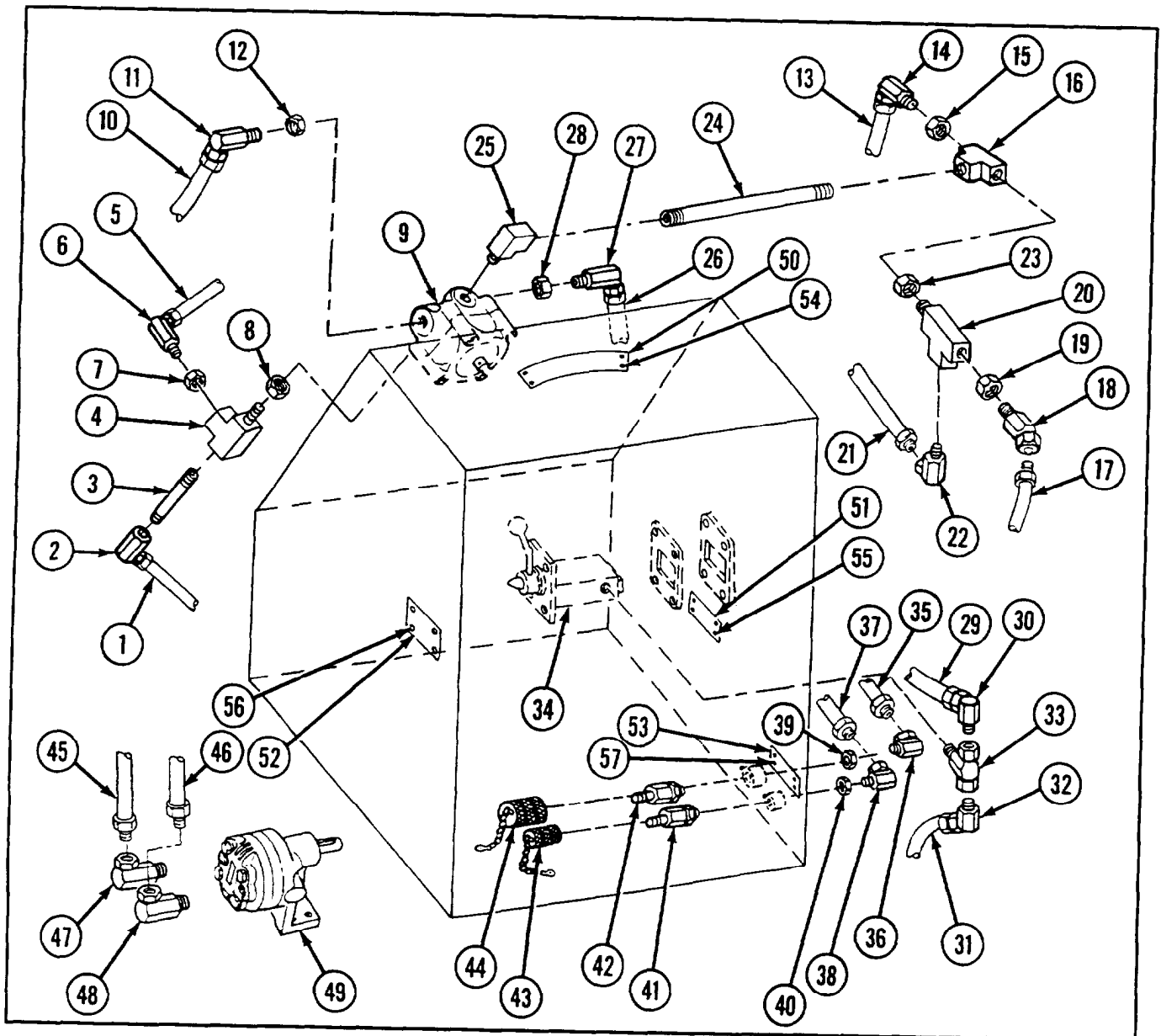
a. REMOVAL

- 1 Disconnect hose (1) from elbow (2) and nipple (3).
- 2 Remove nipple (3) from tee (4), and disconnect hose (5) from elbow (6).
- 3 Remove locknut (7) and elbow (6) from tee (4).
- 4 Remove locknut (8) and tee (4) from control valve (9), and disconnect hose (10) from elbow (11).
- 5 Remove locknut (12) and elbow (11) from control valve (9).
- 6 Disconnect hose (13) from elbow (14), and remove locknut (15) and elbow from tee (16).
- 7 Disconnect hose (17) from elbow (18), and remove locknut (19) and elbow from tee (20).
- 8 Remove hose (21) and tee (20) from elbow (22).
- 9 Remove locknut (23) and tee (20) from tee (16).
- 10 Remove tee (16) from pipe (24) and elbow (25).
- 11 Remove elbow (25) from control valve (9), and disconnect hose (26) from elbow (27).
- 12 Remove locknut (28) and elbow (27) from control valve (9).
- 13 Disconnect hose (29) from elbow (30), and hose (31) from elbow (32).
- 14 Remove elbows (30 and 32) from tee (33), and remove tee from regulating valve (34).
- 15 Remove hose (35) from elbow (36), and hose (37) from elbow (38).
- 16 Remove two locknuts (39 and 40) and two elbows (36 and 38) from two couplings (41 and 42).
- 17 Remove two caps (43 and 44) and two couplings (41 and 42).
- 18 Remove hoses (45 and 46) from elbows (47 and 48).
- 19 Remove elbows (47 and 48) from fuel transfer pump (49).
- 20 Remove ID plates (50, 51, 52, and 53) by removing four drivescrews (54, 55, 56, and 57) from each.



12-4 REPLACE FUEL TRANSFER PUMP AND FLOW REGULATOR-Continued**b. INSTALLATION**

- 1 Install ID plates (50, 51, 52, and 53) with four new drivescrews (54, 55, 56, and 57) each.
- 2 Install elbows (47 and 48) to fuel transfer pump (49).
- 3 Connect hoses (45 and 46) to elbows (47 and 48).
- 4 Install two caps (43 and 44) and two couplings (41 and 42).
- 5 Install two new locknuts (39 and 40) and two elbows (36 and 38) to two couplings (41 and 42).
- 6 Connect hose (37) to elbow (38), and hose (35) to elbow (36).
- 7 Install tee (33) to regulating valve (34), and elbows (30 and 32) to tee.
- 8 Connect hose (31) to elbow (32), and hose (29) to elbow (30).
- 9 Install elbow (27) and new locknut (28) to control valve (9).
- 10 Connect hose (26) to elbow (27), and install elbow to control valve (9).
- 11 Install pipe (24) to elbow (25) and tee (16).
- 12 Install new locknut (23) and tee (20) to tee (16).
- 13 Install elbow (22) to tee (20) and hose (21).
- 14 Install new locknut (19) and elbow (18) to tee (20), and hose (17) to elbow.
- 15 Install new locknut (15) and elbow (14) to tee (16), and connect hose (13) to elbow.
- 16 Install new locknut (12) and elbow (11) to control valve (9).
- 17 Connect hose (10) to elbow (11), and install new locknut (8) and tee (4) to control valve (9).
- 18 Install new locknut (7) and elbow (6) to tee (4).
- 19 Connect hose (5) to elbow (6), and install nipple (3) to tee (4).
- 20 Install elbow (2) to nipple (3), and connect hose (1) to elbow.



12-5 REPLACE/REPAIR HYDRAULIC SYSTEM OIL FILTER

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Material/Parts-Continued:

- *Packings, preformed (4) (Appendix G, item 198)
- *Gaskets (2) (Appendix G, item 78.1)

Material/Parts:

- *Solvent, dry-cleaning (Appendix D, item 9)
- *Lockwashers (4) (Appendix G, item 135)
- *Packings, preformed (2) (Appendix G, item 193)

Equipment Condition:

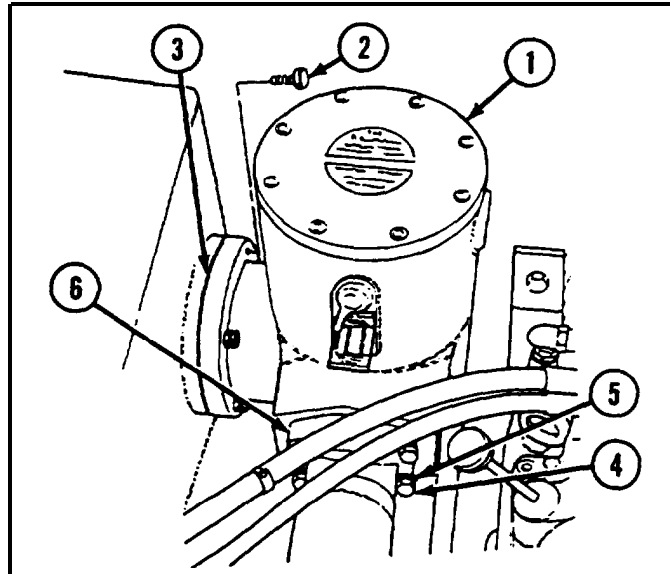
Rear center floor plate removed (see paragraph 9-12)

12-5 REPLACE/REPAIR HYDRAULIC SYSTEM OIL FILTER-CONTINUED

a. REMOVAL

NOTE

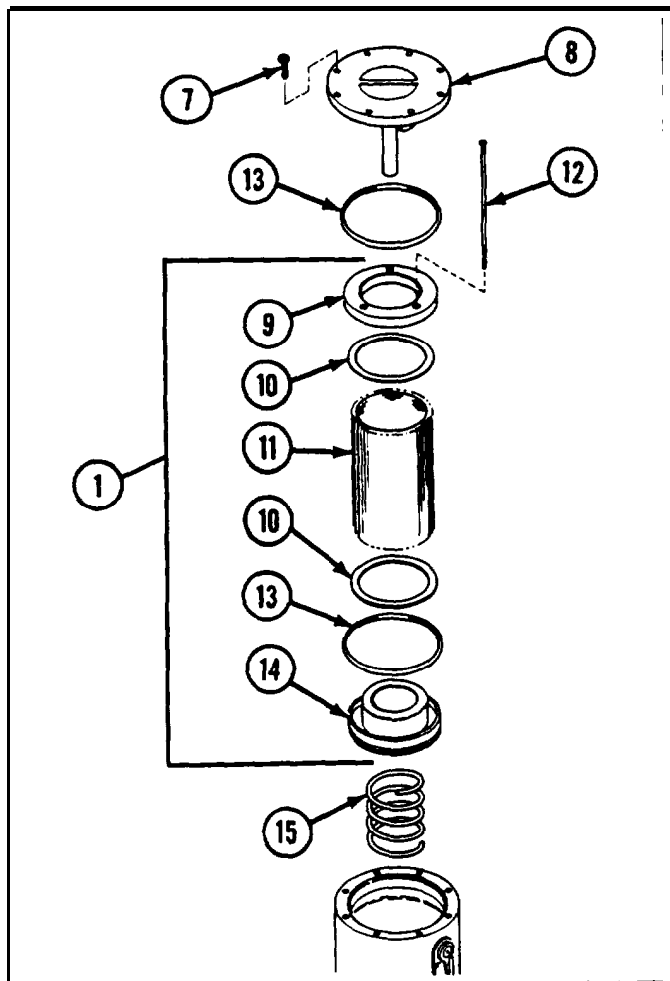
- It is not necessary to remove oil filter housing to service filter element assembly (1).
- Place suitable container under filter housing prior to removal to catch any hydraulic oil that drains.



- 1 Remove four screws (2) and preformed packings (3).
- 2 Remove four screws (4), four lockwashers (5), and two flanges (6) from filter element assembly (1).

b. DISASSEMBLY

- 1 Remove eight screws (7) and cover (8) with filter element assembly (1).
- 2 Remove filter retainer (9), two preformed packings (10), and filter element (11) by removing three screws (12) from cover (8).
- 3 Remove two gaskets (13) from cover (14).
- 4 Remove spring (15) from filter element assembly (1).



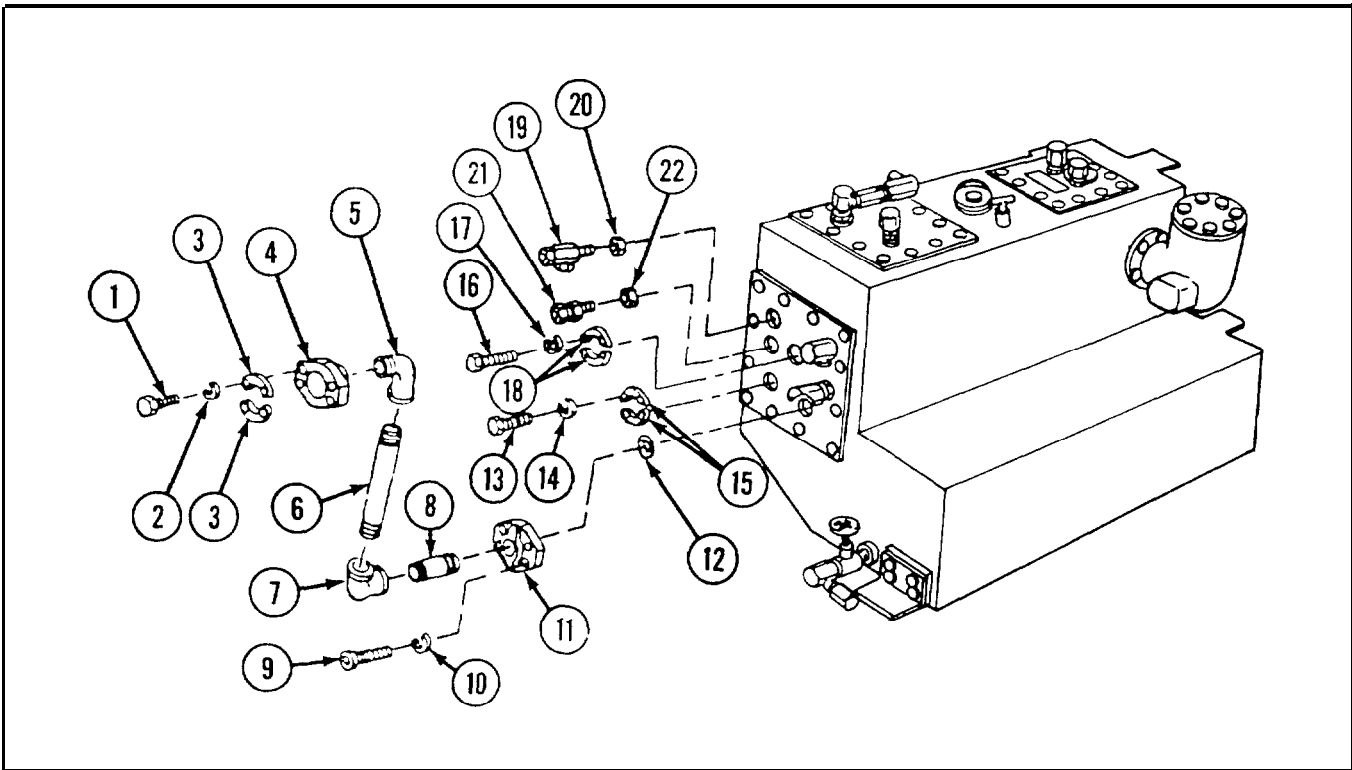
c. ASSEMBLY

WARNING

- Dry-cleaning solvent used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flashpoint of solvent is 138 degrees (°) Fahrenheit (F) (59° Celsius [C]).
- Particles blown by compressed air can be dangerous. Be certain to direct air stream away from user and other personnel in area. Compressed air used for cleaning will not exceed 30 pounds per square inch (207 kilopascals). Use only with effective chip-guarding and personal protective equipment (goggles, shield, and gloves).

12-6 REPLACE EXTERNAL HYDRAULIC RESERVOIR COMPONENTS-Continued

- 4 Remove four screws (13), four lockwashers (14), and two flanges (15).
- 5 Remove four screws (16), four lockwashers (17), and two flanges (18).
- 6 Remove tee (19) and nut (20).
- 7 Remove coupling (21) and nut (22).



b. INSTALLATION

- 1 Install nut (73) with coupling (21).
- 2 Install nut (20) with tee (19).
- 3 Install two flanges (18) with four new lockwashers (17) and four screws (16).
- 4 Install two flanges (15) with four new lockwashers (14) and four screws (13).
- 5 Install new preformed packing (12), flange (11), four new lockwashers (10), and four screws (9).
- 6 Install nipple (8), elbow (7) with nipple (6), and elbow (5) to flange (4).
- 7 Install two flanges (3) with four new lockwashers (2) and four screws (1).

NOTE

Follow-on maintenance: Install cab subfloor plates if removed (see Chapter 9, Section I)

12-7 REPLACE HYDRAULIC DRAIN VALVE AND RELATED PARTS**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Drivescrews (4) (Appendix G, item 12)
- Lockwashers (4) (Appendix G, item 132)

Equipment Conditions:

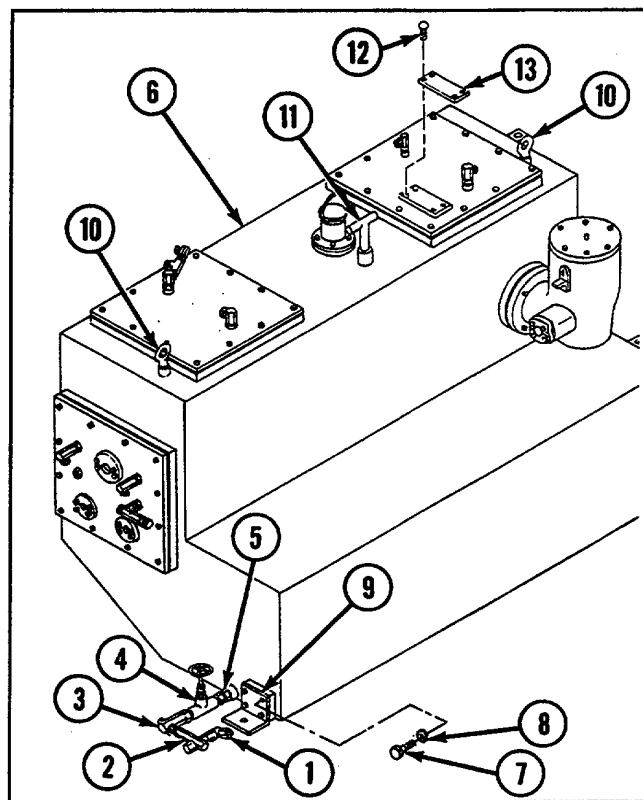
- Rear intermediate right floor plate removed (see paragraph 9-8)
- Rear center floor plate removed (see paragraph 9-12)

a. REMOVAL

- 1 Remove elbow (1) and tee (2).
- 2 Remove tee (3), valve (4), and nipple (5) from tank (6).
- 3 Remove four screws (7) with four lockwashers (8) and bracket (9).
- 4 Remove two eyebolts (10).
- 5 Remove gage rod (11).
- 6 Remove four drivescrews (12) and plate (13).

b. INSTALLATION

- 1 Install plate (13) with four new drivescrews (12).
- 2 Install gage rod (11) and two eyebolts (10).
- 3 Install bracket (9) with four new lockwashers (8) and four screws (7).
- 4 Install nipple (5), valve (4), and tee (3) to tank (6).
- 5 Install tee (2) with elbow (1).

**NOTE**

- Follow-on maintenance: • Install rear center floor plate (see paragraph 9-12)
 • Install rear intermediate right floor plate (see paragraph 9-8)

12-8 REPLACE HYDRAULIC SUBPLATE ID PLATE**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Drivescrews (36) (Appendix G, item 13)
- Lockwashers (4) (Appendix G, item 129)

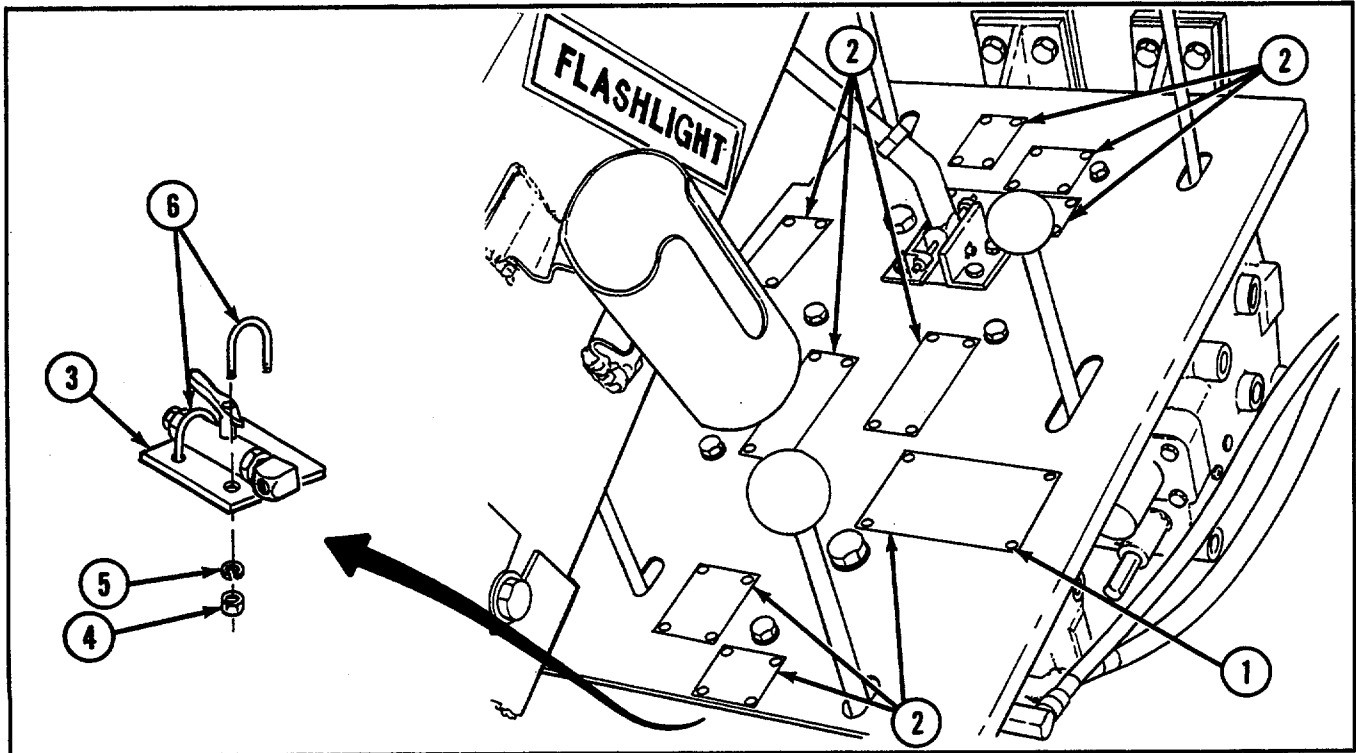
12-8 REPLACE HYDRAULIC SUBPLATE ID PLATE-Continued

NOTE

Removal and installation procedures are the same for all plates.

a. REMOVAL

- 1 Remove four drivescrews (1) each from nine plates (2).
- 2 Remove plate (3) by removing four nuts (4), four lockwashers (5), and two U-bolts (6).

**b. INSTALLATION**

- 1 Install plate (3) with two U-bolts (6), four new lockwashers (5), and four nuts (4).
- 2 Install nine plates (2) with four new drivescrews (1) each.

12-9 REPLACE HYDRAULIC OIL RESERVOIR STRAINER**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET4UP**Tools:**

Tool kit, general mechanic's (Appendix C, item 53)

Equipment Condition:

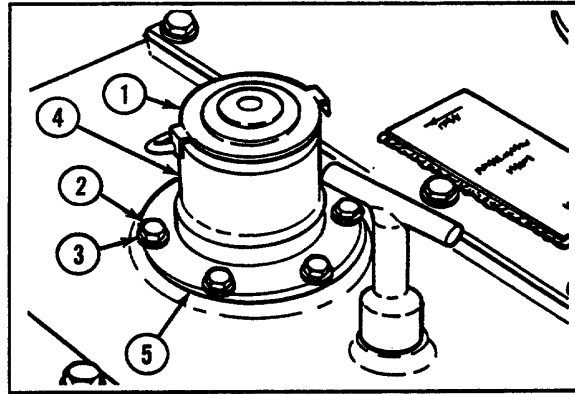
Rear intermediate right access floor plate removed
(see paragraph 9-10)

Parts:

- Filter (Appendix G, item 22)
- Gasket (Appendix G, item 59)
- Lockwashers (6) (Appendix G, item 130)

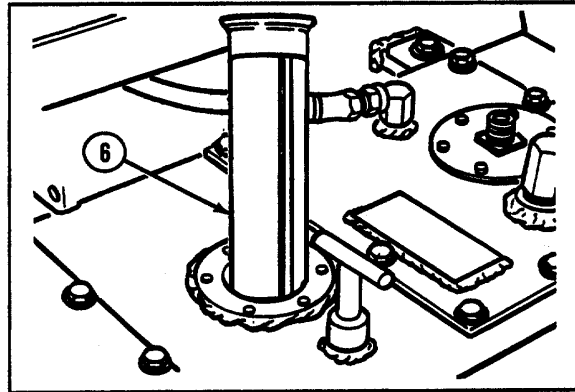
a. REMOVAL

- 1 Remove filler cap (1).
- 2 Remove six screws (2) and six lockwashers (3).
- 3 Remove filler neck (4), gasket (5), and filter (6).
- 4 Discard gasket (5) and filter (6).



b. INSTALLATION

- 1 Install new filter (6), new gasket (5), and filler neck (4).
- 2 Install six new lockwashers (3) and six screws (2).
- 3 Install filler cap (1).



NOTE

Follow-on maintenance: Install rear intermediate right access floor plate (see paragraph 9-10)

12-10 REPLACE/REPAIR OIL TEMPERATURE TRANSMITTER AND SWITCH HOUSING ASSEMBLY

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts--Continued:

- Lockwashers (4) (Appendix C, item 126)
- Lockwashers (6) (Appendix G, item 130)

Parts:

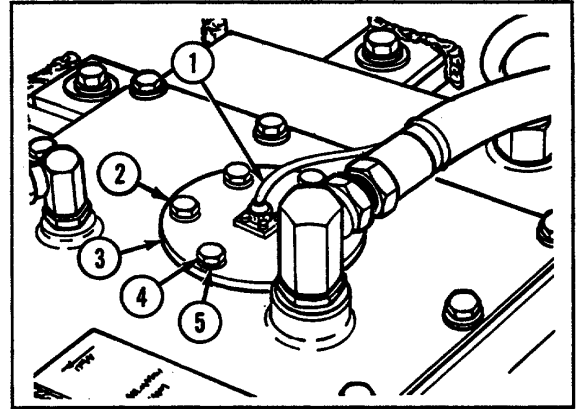
- Gasket (Appendix G, item 85)
- Gasket (Appendix G, item 33)

Equipment Condition:

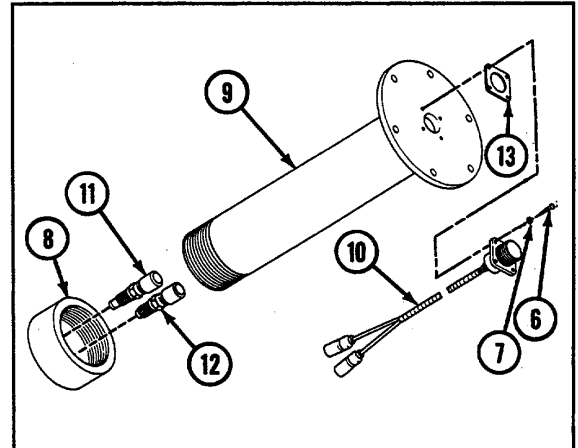
Rear intermediate right access floor plate removed (see paragraph 9-10)

12-10 REPLACE/REPAIR OIL TEMPERATURE TRANSMITTER AND SWITCH HOUSING ASSEMBLY-Continued**a. REMOVAL**

Disconnect harness assembly (1), and remove housing assembly (2) and gasket (3) by removing six screws (4) and six lockwashers (5). Discard gasket.

**b. DISASSEMBLY**

- 1 Remove four screws (6) and four lockwashers (7).
- 2 Unscrew cap (8) and remove from cover (9).
- 3 Disconnect harness assembly (10), connector (wire number 664) from transmitter (11), and connector (wire number 663) from switch (12).
- 4 Unscrew and remove transmitter (11) and switch (12) from cap (8).
- 5 Remove harness assembly (10) and gasket (13) from cover (9). Discard gasket.

**c. ASSEMBLY**

- 1 Place harness assembly (10) and new gasket (13) in cover (9).
- 2 Install transmitter (11) and switch (12) on cap (8).
- 3 Connect harness assembly (10), connector (wire number 664) to transmitter (11), and connector (wire number 663) to switch (12).
- 4 Screw cap (8) on cover (9).
- 5 Secure harness assembly (10) and new gasket (13) to cover (9) with four screws (6) and four new lockwashers (7).

d. INSTALLATION

Install harness assembly (1), housing assembly (2), and new gasket (3) to tank with six screws (4) and six new lockwashers (5).

NOTE

Follow-on maintenance: Install rear intermediate right access floor plate (see paragraph 9-10)

12-11 REPLACE MECHANICAL TRANSMISSION ID PLATE**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP**Tools:**

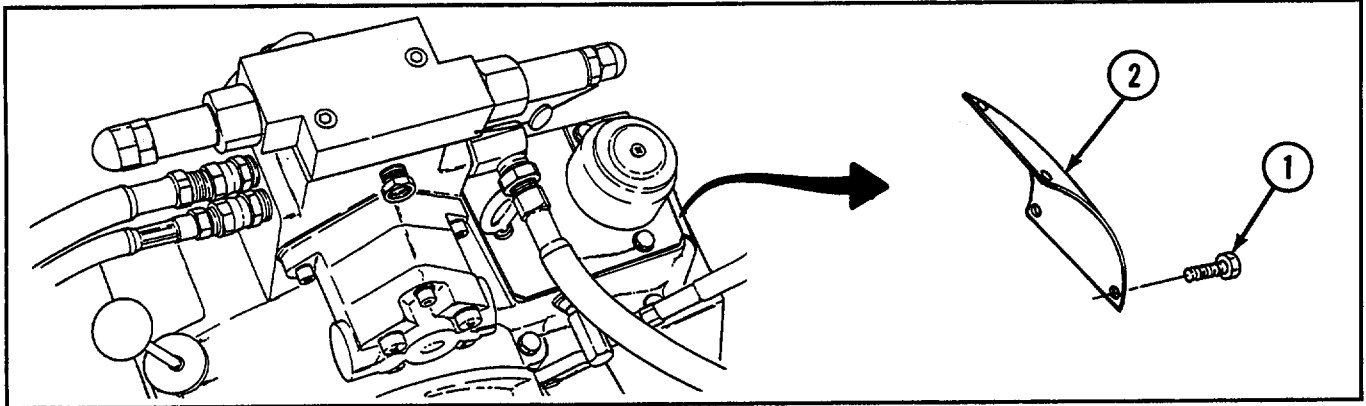
Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Drivescrews (4) (Appendix G, item 18)

a. REMOVAL

Remove four drivescrews (1) and plate (2) from mechanical transmission.



b. INSTALLATION

Install plate (2) and four new drivescrews (1) to mechanical transmission.

12-12 REPLACE/REPAIR MECHANICAL TRANSMISSION BREATHER AND OIL LEVEL GAGE

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Part:
Lockwasher (Appendix G, item 132)

Equipment Condition:
Rear center floor plate removed (see paragraph 9-12)

a. REMOVAL

- 1 Remove oil level gage (1).
- 2 Turn and remove breather (2).
- 3 Turn and remove eyebolt (3) and lockwasher (4).

b. DISASSEMBLY

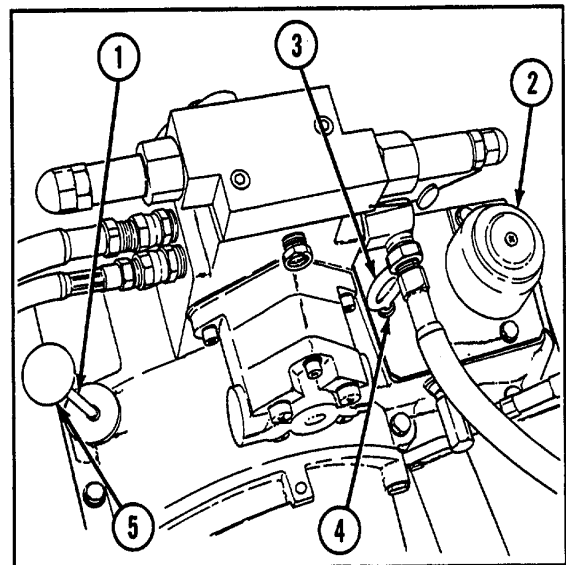
Remove knob (5) from oil level gage (1).

c. ASSEMBLY

Install knob (5) to oil level gage (1).

d. INSTALLATION

- 1 Install eyebolt (3) and new lockwasher (4).
- 2 Clean and dry breather (2) and install.
- 3 Install oil level gage (1).



NOTE

Follow-on maintenance: Install rear center floor plate (see paragraph 9-12)

12-13 REPLACE SPADE RELEASE AND LUBRICATION LINE (HYDRAULIC SPADE RELEASE)**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP**Tools:**

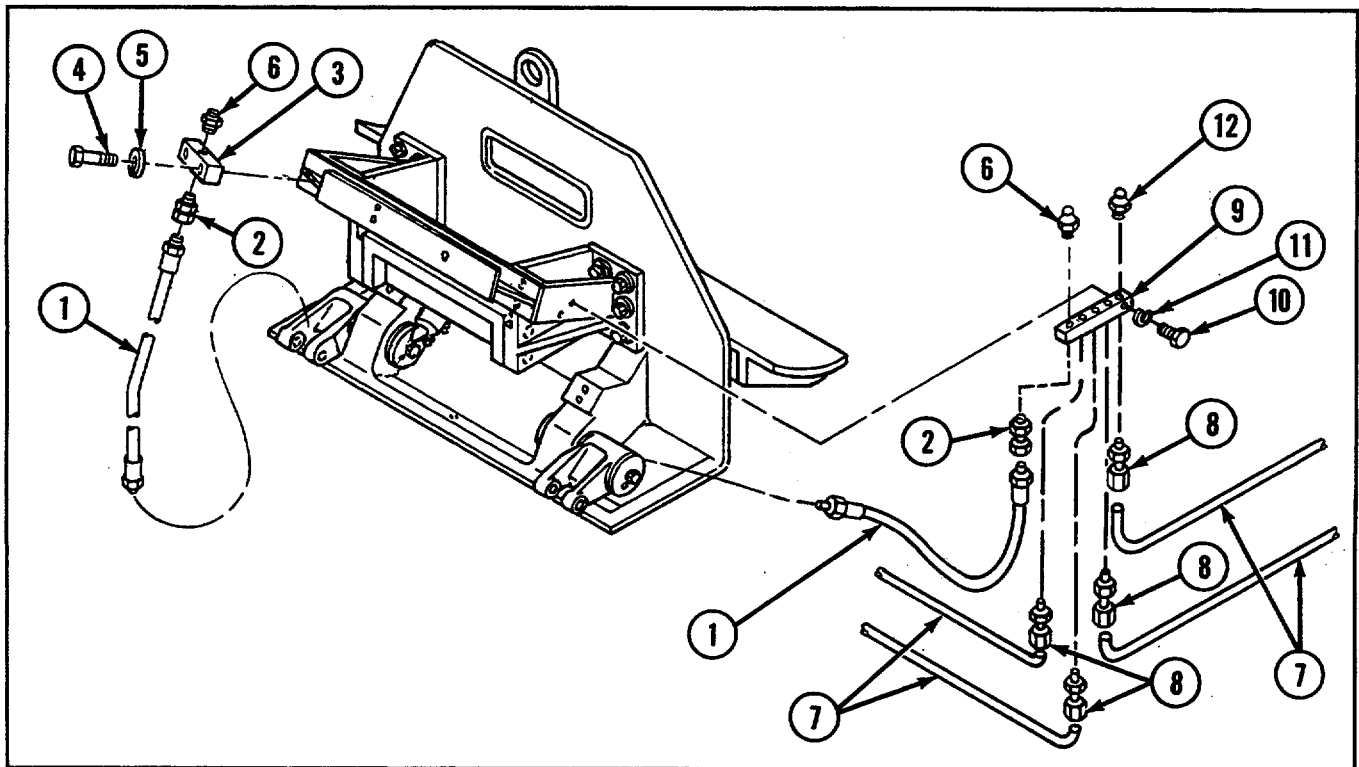
Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Lockwashers (4) (Appendix G, item 130)

a. REMOVAL

- 1 Disconnect and remove two hoses (1) and remove coupling (2) from connector (3) end of each hose.
- 2 Remove connector (3) by removing two screws (4), two lockwashers (5), and two lubrication fittings (6).
- 3 Disconnect four hoses (7) and remove four couplings (8) from connector (9) end of hoses.
- 4 Remove connector (9) by removing two screws (10), two lockwashers (11), and four lubrication fittings (12) in connector.

**b. INSTALLATION**

- 1 Install connector (9) with two screws (10), two new lockwashers (11), and four lubrication fittings (12) in connector.
- 2 Install four couplings (8) to four hoses (7) and connect to connector (9) end of hoses.
- 3 Install connector (3) with two screws (4), two new lockwashers (5), and two lubrication fittings (6).
- 4 Install two hoses (1) and coupling (2) to connector (3) end of each hose.

12-14 REPLACE SPADE CABLE LUBRICATION LINE (MANUAL SPADE RELEASE)

THIS TASK COVERS

- a. Removal. b. Installation

INITIAL SET-UP

Tools:

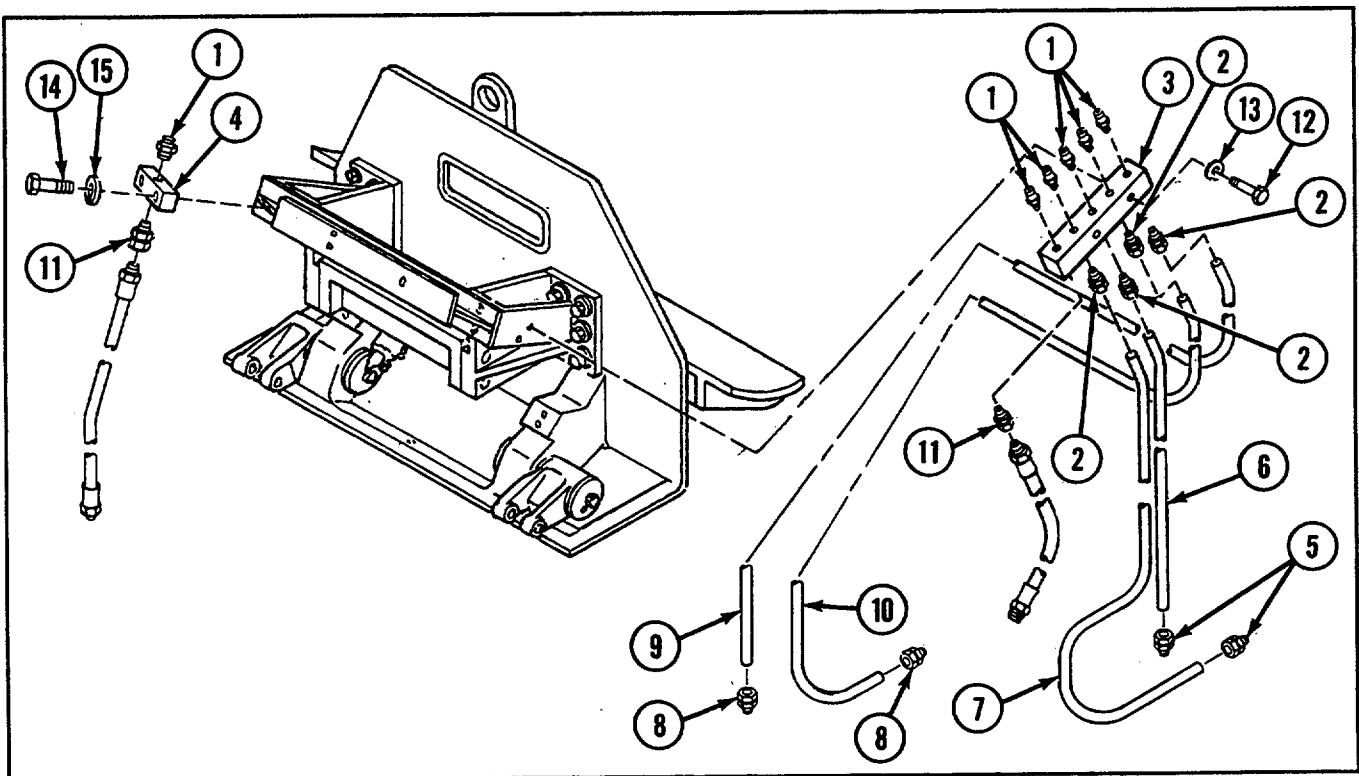
Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Lockwashers (4) (Appendix G, item 130)

a. REMOVAL

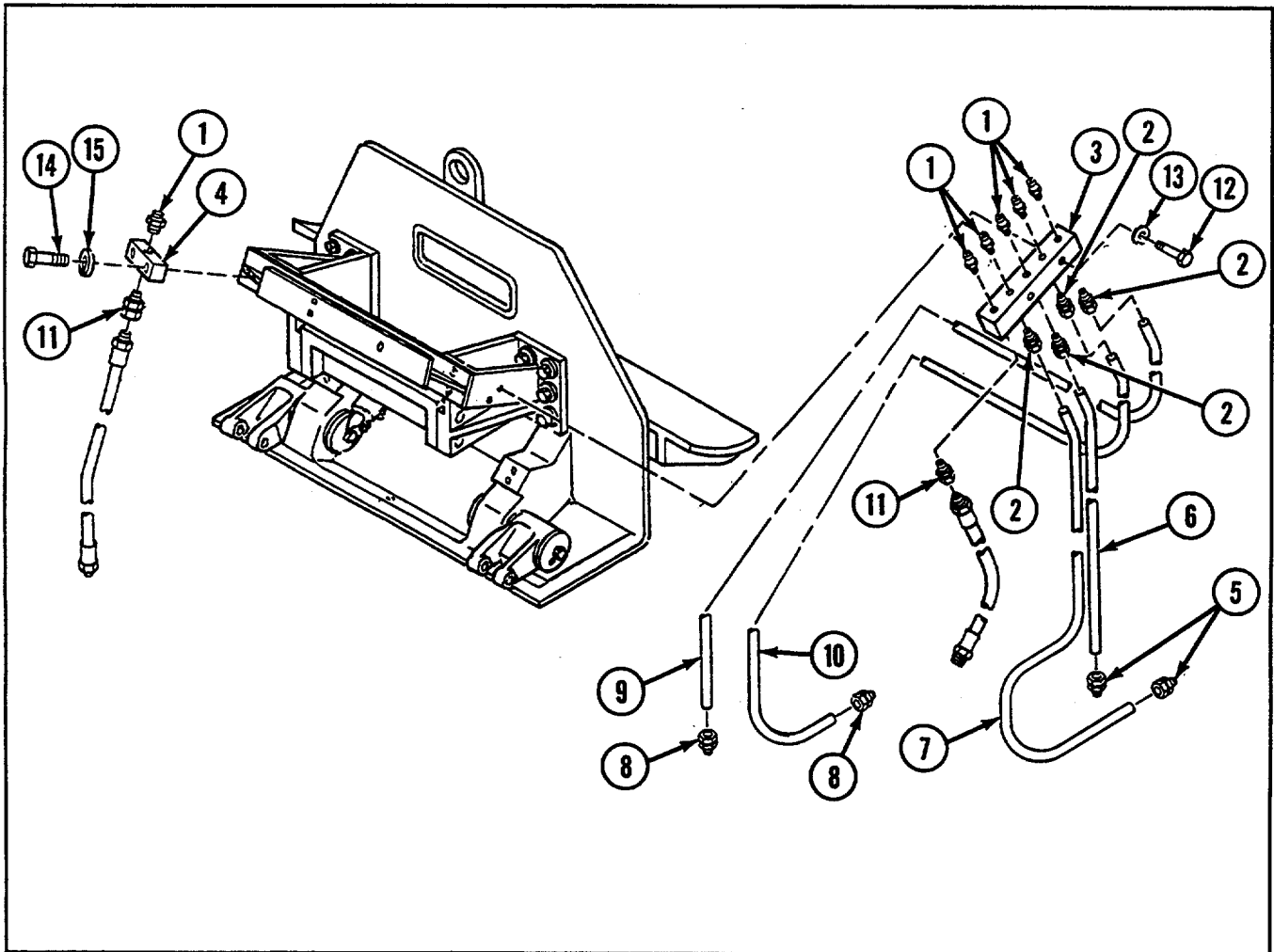
- 1 Remove six fittings (1) and four adapters (2) from connectors (3 and 4).
- 2 Remove two adapters (5) from tubes (6 and 7).
- 3 Remove two adapters (8) from tubes (9 and 10).
- 4 Remove two couplings (11) from connectors (3 and 4).
- 5 Remove connector (3) by removing two screws (12) and two lockwashers (13).
- 6 Remove connector (4) by removing two screws (14) and two lockwashers (15).



12-14 REPLACE SPADE CABLE LUBRICATION LINE (MANUAL SPADE RELEASE)-Continued

b. INSTALLATION

- 1 Install connector (4) by installing two new lockwashers (15) and two screws (14).
- 2 Install connector (3) by installing two new lockwashers (13) and two screws (12).
- 3 Install couplings (11) into connectors (3 and 4).
- 4 Install two adapters (8) onto tubes (9 and 10).
- 5 Install two adapters (5) onto tubes (6 and 7).
- 6 Install four adapters (2) and six fittings (1) to connectors (3 and 4).



12-15 REPLACE SPADE RELEASE LUBRICATION FITTING

THIS TASK COVERS

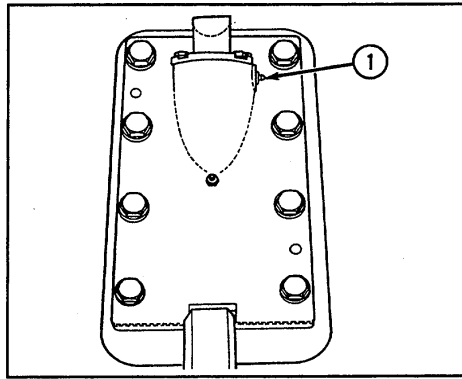
- a. Removal
- b. Installation

a. REMOVAL

Remove lubrication fitting (1).

b. INSTALLATION

Install lubrication fitting (1).



12-16 REPLACE SPADE CYLINDER HOSES

THIS TASK COVERS

- a. Removal b. Installation

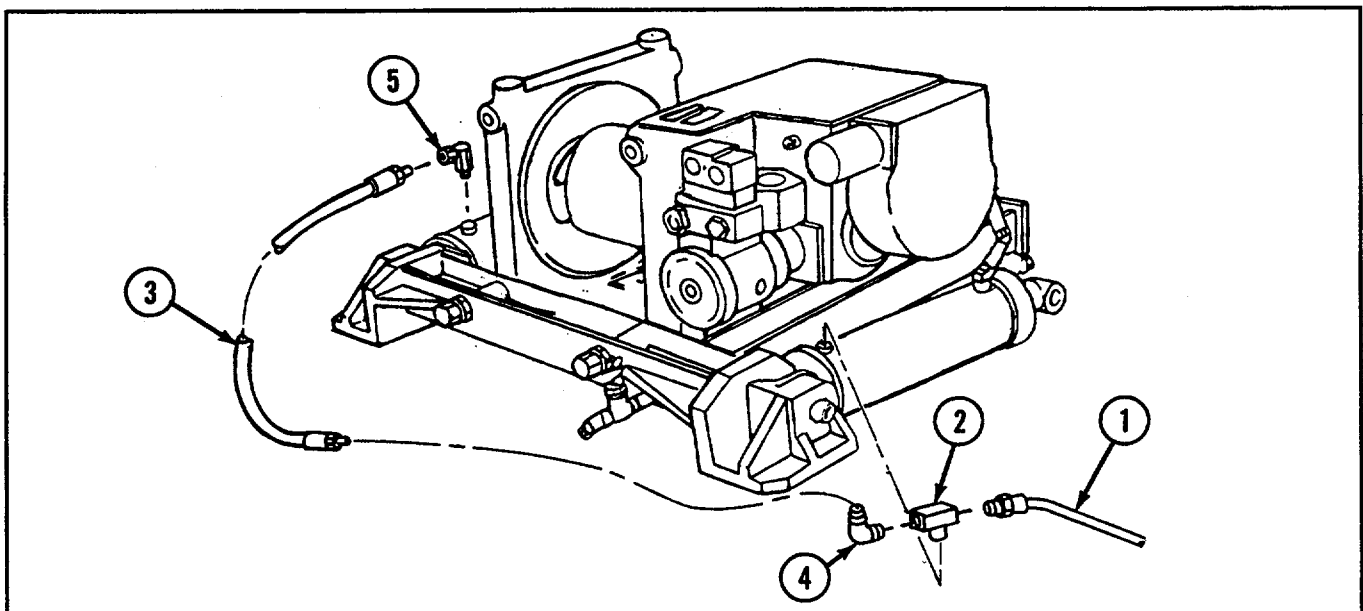
INITIAL SET-UP

Tool:

Pliers, snap ring (Appendix C, item 29)

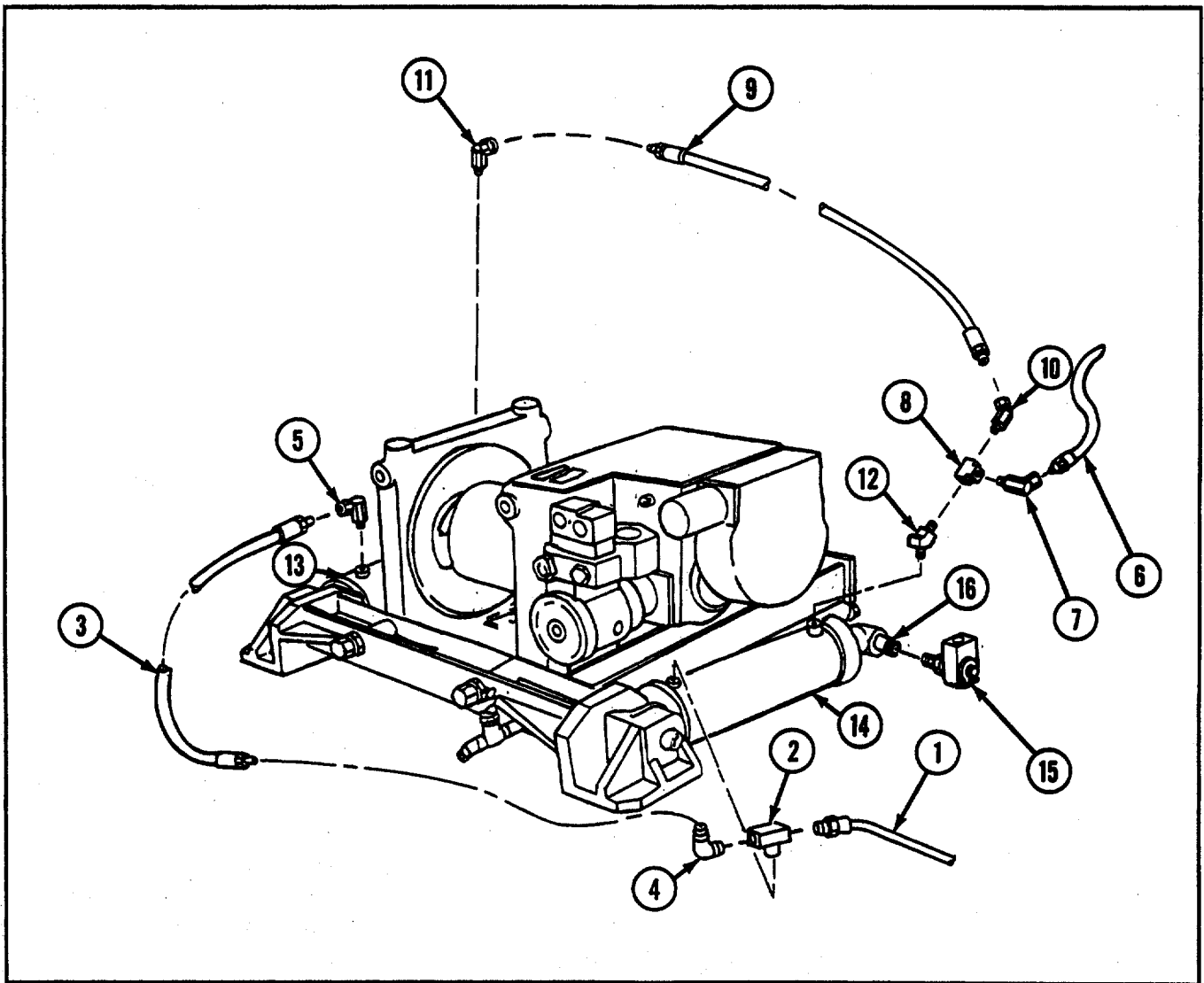
a. REMOVAL

- 1 Disconnect hose (1) from tee (2).
- 2 Remove hose (3) from elbows (4 and 5).
- 3 Remove elbow (4) from tee (2).



12-16 REPLACE SPADE CYLINDER HOSEC Continued

- 4 Disconnect hose (6) from elbow (7).
- 5 Remove elbow (7) from tee (8).
- 6 Disconnect hose (9) from elbows (10 and 11).
- 7 Remove elbow (10) from tee (8).
- 8 Remove tee (8) from elbow (12).
- 9 Remove elbows (11 and 12) from cylinders (13 and 14).
- 10 Remove elbow (5) and tee (2) from cylinders (13 and 14).
- 11 Remove two fittings (15) from shaft (16).



b. INSTALLATION

- 1 Install two fittings (15) to shaft (16).
- 2 Install elbow (5) and tee (2) to cylinders (13 and 14).
- 3 Install elbows (11 and 12) to cylinders (13 and 14).
- 4 Install tee (8) to elbow (12).
- 5 Install elbow (10) to tee (8).
- 6 Install hose (9) to elbows (10 and 11).
- 7 Install elbow (7) to tee (8).
- 8 Install hose (6) to elbow (7).
- 9 Install elbow (4) to tee (2).
- 10 Install hose (3) to elbows (4 and 5).
- 11 Install hose (1) to tee (2).

**CHAPTER 13
MAINTENANCE OF AUXILIARY POWER UNIT (APU)**

CHAPTER OVERVIEW

This chapter describes how to remove, service, and install the APU components.

This chapter consists of the following paragraphs:

Para.	Task	Page
13-1	Replace APU Pressure Switch Assembly.....	13-1
13-2	Replace/Service APU Engine Air Cleaner, Filter, and Air Intake Tubes.....	13-2
13-3	Replace APU Cooling Air Exhaust	13-4
13-4	Replace APU Identification (ID) Plate	3-5
13-5	Replace APU Engine Fuel Filters.....	13-5
13-6	Replace APU Engine Oil Filter.....	13-8
13-7	Replace/Repair APU Control Box	13-8

When working on the APU, the following must be observed:

WARNING

Unless the APU access door is properly secured by a strap, the access door can swing shut and injure personnel working on the unit, especially if the spare roadwheel is mounted in place on the hull. To secure the door, refer to TM 9-2350-256-10. The strap is routed through the lower access door ring handle and stowed roadwheel hub, and tied to secure the door in the open position.

13-1 REPLACE APU PRESSURE SWITCH ASSEMBLY

THIS TASK COVERS

- a. Removal b. Installation

INITIAL SET-UP

Tools: Tool kit, general mechanic's (Appendix C, item 53)	Parts: Lockwashers (4) (Appendix G, item 130)	Equipment Condition: Center front air inlet grilles removed (see paragraph 9-57)
--	--	---

a. REMOVAL

WARNING

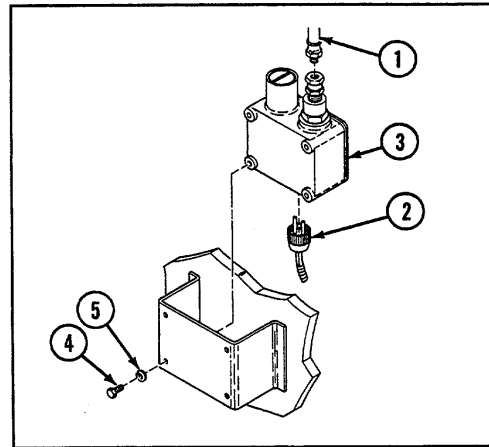
Do not attempt to loosen, tighten, or remove hydraulic fittings or lines when system is pressurized.

13-1 REPLACE APU PRESSURE SWITCH ASSEMBLY--Continued

- 1 Disconnect hose (1).
- 2 Disconnect electrical connection (2).
- 3 Remove pressure switch assembly (3) by removing four screws (4) and four lockwashers (5).

b. INSTALLATION

- 1 Install pressure switch assembly (3) with four screws (4) and four new lockwashers (5).
- 2 Connect electrical connection (2).
- 3 Connect hose (1).



NOTE

Follow-on maintenance: Install center front air inlet grilles (see paragraph 9-57)

13-2 REPLACE/SERVICE APU ENGINE AIR CLEANER, FILTER, AND AIR INTAKE TUBES

THIS TASK COVERS

- a. Removal b. Servicing c. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

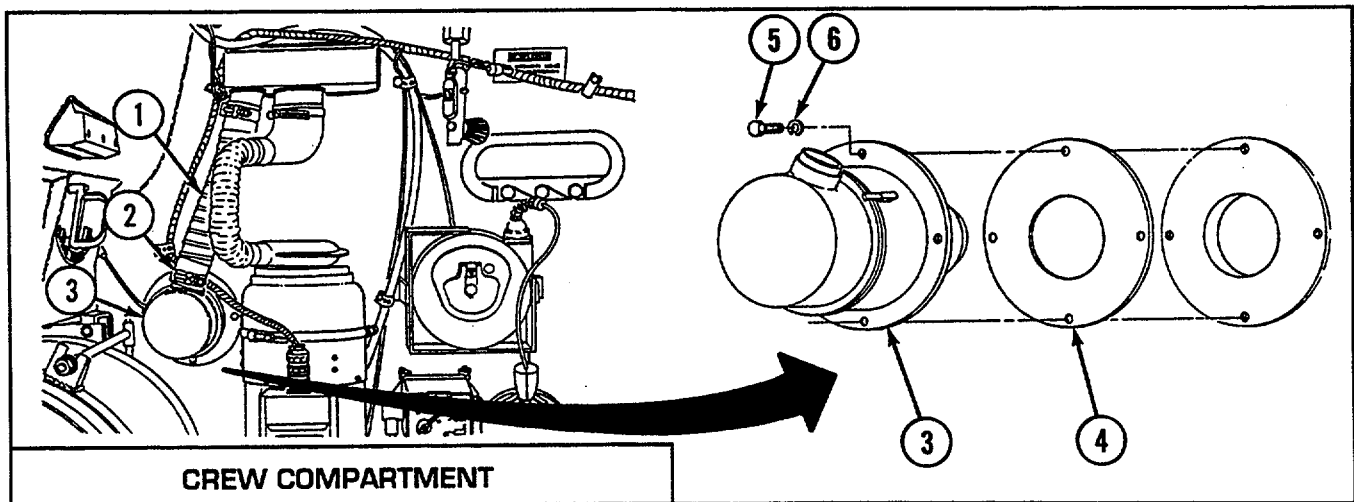
- Gasket (Appendix G, item 64)
- Lockwashers (4) (Appendix G, item 132)

Reference

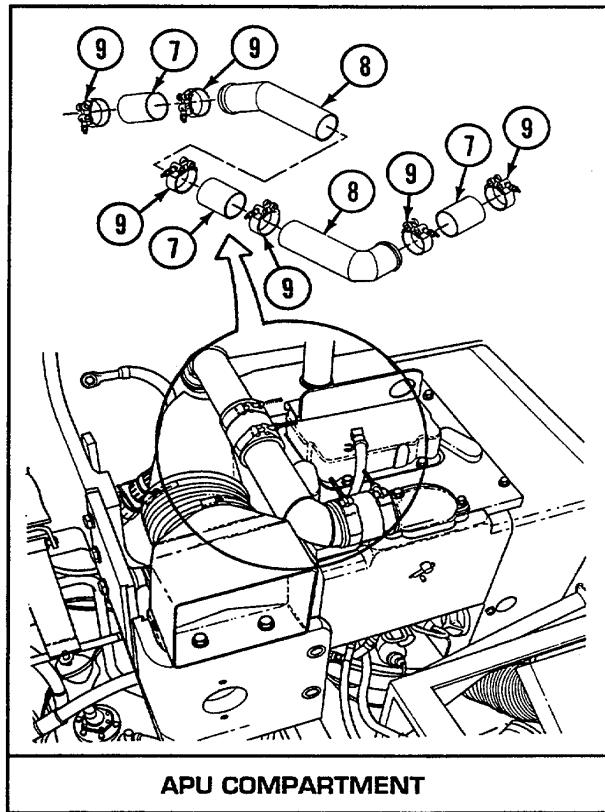
TM 9-2350-256-10

a. REMOVAL

- 1 Remove air intake tube (1) by loosening two clamps (2).
- 2 Remove APU air cleaner (3) and gasket (4) by removing four screws (5) and four lockwashers (6).
- 3 Remove APU access cover (see paragraph 9-49).



4 Remove three hoses (7) and two tubes (8) by loosening six clamps (9).



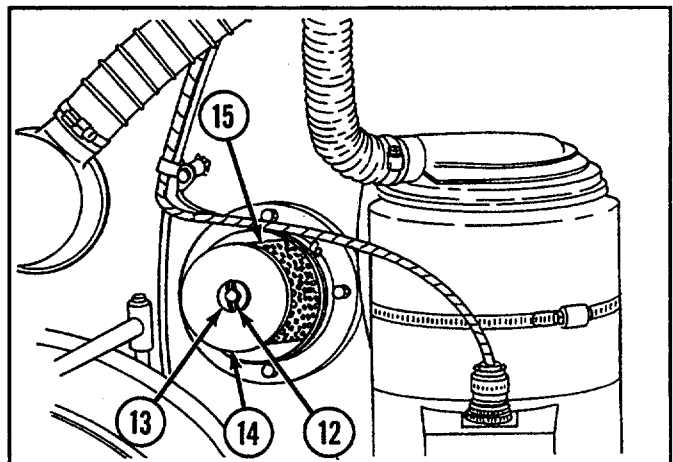
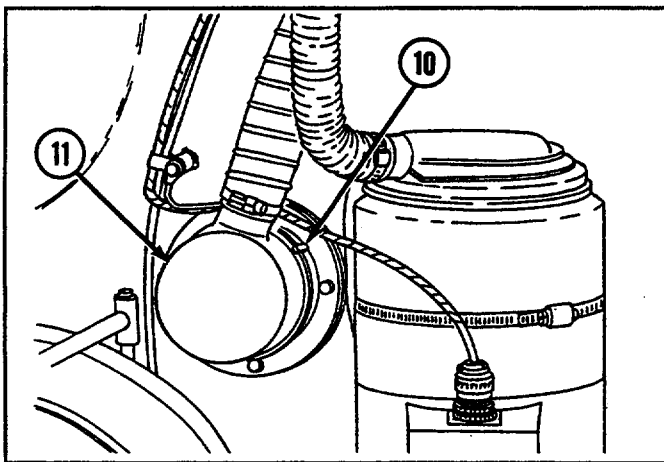
b. SERVICING

1 Release two latches (10) and remove cover (11).

NOTE

Refer to TM 9-2350-25610 for service instructions of filter element.

2 Remove wing nut (12), washer (13), plate (14), and filter element (15).

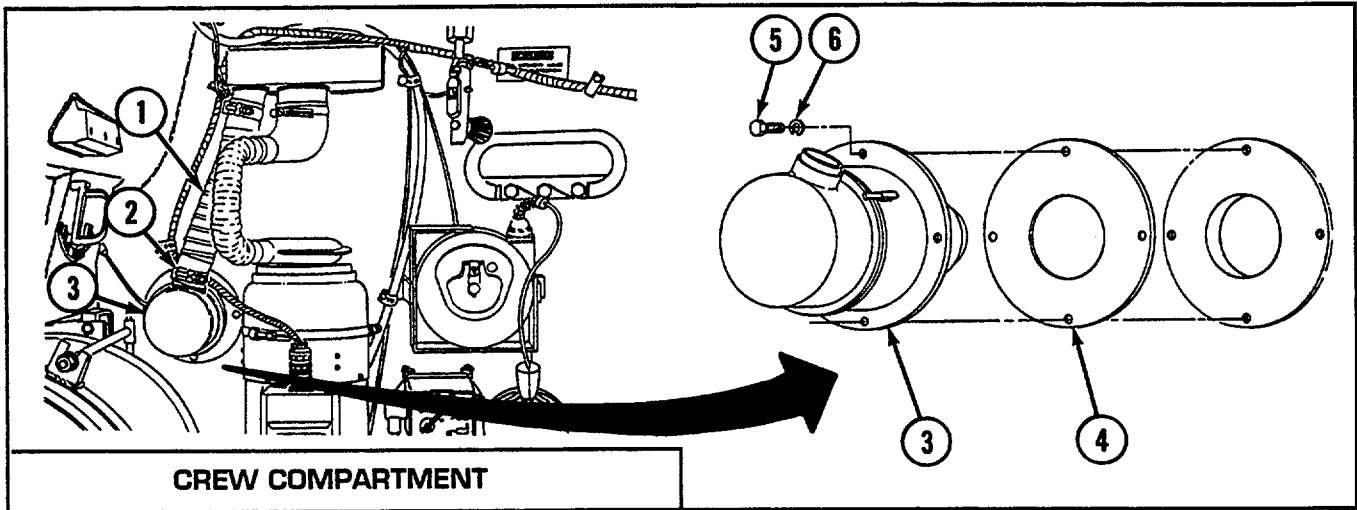


c. INSTALLATION

1 Install three hoses (7) and two tubes (8) with six clamps (9).

13-2 REPLACE/SERVICE APU ENGINE AIR CLEANER, FILTER, AND AIR INTAKE TUBES--Continued

- 2 Install APU access cover (see paragraph 9-49).
- 3 Install APU air cleaner (3) and gasket (4) with four screws (5) and four new lockwashers (6).
- 4 Install air intake tube (1) with two clamps (2).



13-3 REPLACE APU COOLING AIR EXHAUST

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Lockwashers (3) (Appendix G, item 118)

Equipment Condition:

APU access cover removed (see paragraph 9-49)

a. REMOVAL

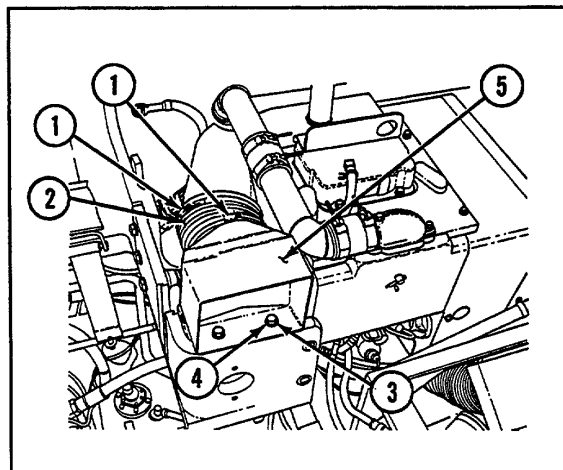
- 1 Loosen two clamps (1).
- 2 Remove APU cooling air exhaust (2) by removing three screws (3) and three lockwashers (4).
- 3 Remove duct (5) and two clamps (1).

b. INSTALLATION

- 1 Install duct (5) and two clamps (1).
- 2 Install APU cooling air exhaust (2) with three screws (3) and three new lockwashers (4).
- 3 Tighten two clamps (1).

NOTE

Follow-on maintenance: Install APU access cover (see paragraph 9-49)



13.5 REPLACE APU ENGINE FUEL FILTERS-Continued

a. REMOVAL

- 1 Remove clamp (1) from fuel line (2) by removing nut (3), lockwasher (4), flat washer (5), and screw (6).
- 2 Remove U-bolt (7) from fuel line (8) by removing two nuts (9) and two lockwashers (10).
- 3 Disconnect fuel lines (2 and 8) from the APU engine fuel filter fittings (11).

NOTE

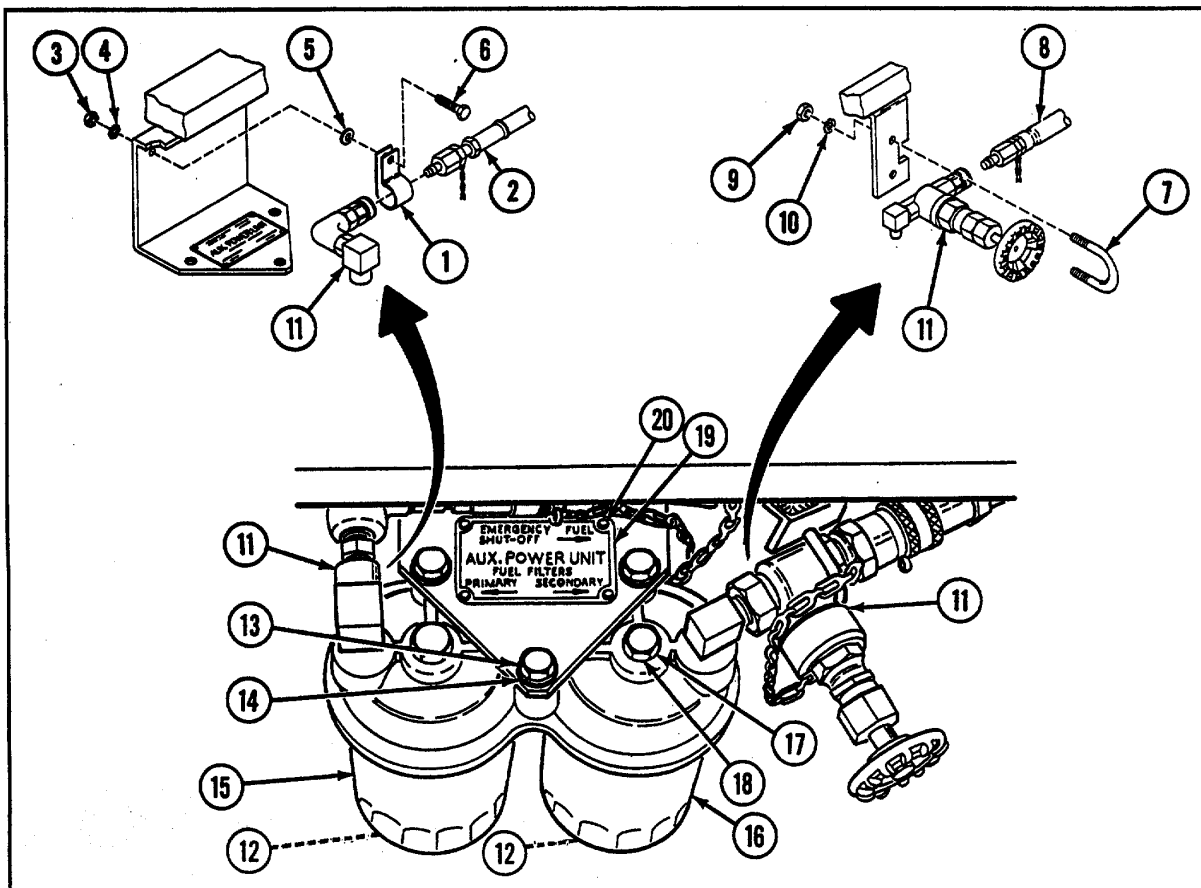
Open drain cocks (12) on bottom of each filter and drain before removal of filters.

- 4 Remove APU engine fuel filters and fittings (11) by removing three screws (13) and three lockwashers (14).
- 5 Remove primary fuel filter (15) and secondary fuel filter (16) by removing from each one screw (17) and one flat washer (18).

NOTE

Remove ID plate (19) only if required.

- 6 Remove ID plate (19) by removing four rivets (20).



b. INSTALLATION

CAUTION

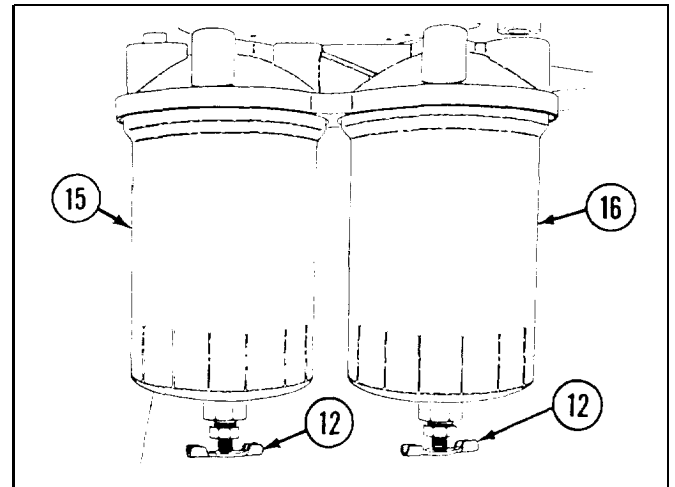
Use of replacement filters other than those specified in TM 9-2350-256-20P will cause damage to the APU engine.

- 1 Install ID plate (19) with four new rivets (20).

NOTE

When replacing fuel filters (15 and 16), remove plug from bottom of new filter and install drain cock (12) from old filter.

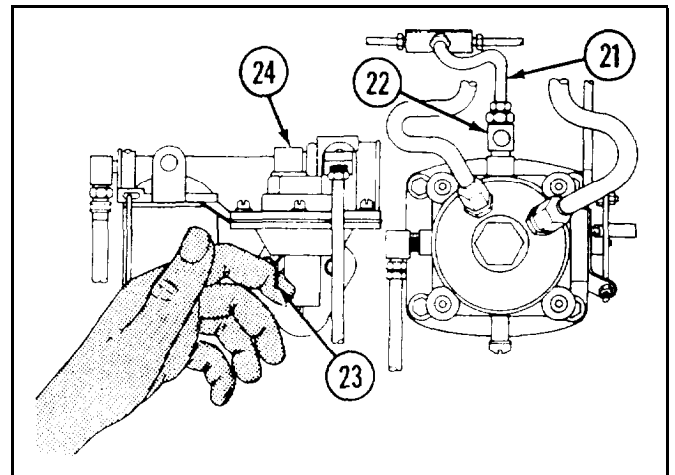
- 2 Install primary fuel filter (15) and secondary fuel filter (16) each with one screw (17) and one new flat washer (18).
- 3 Install APU engine fuel filters and fittings (11) with three screws (13) and three new lockwashers (14).
- 4 Connect fuel line (2) on primary fuel filter (15) and fuel line (8) on secondary fuel filter (16).
- 5 Install U-bolt (7) over fuel line (8) with two new lockwashers (10) and two nuts (9).
- 6 Install clamp (1) over fuel line (2) with screw (6), flat washer (5), new lockwasher (4), and nut (3).
- 7 Bleed fuel system after installation of fuel filters.
- 8 Disconnect fuel return line (21) at return line fitting (22).



NOTE

If pump lobe of camshaft is up, crank engine one revolution to permit hand priming.

- 9 Operate priming lever (23) on fuel transfer pump (24) until no oil bubbles appear in fluid flowing from return line fitting (22).
- 10 Connect fuel return line (21) to return line fitting (22).
- 11 Return priming lever (23) to disengaged position for normal operation.

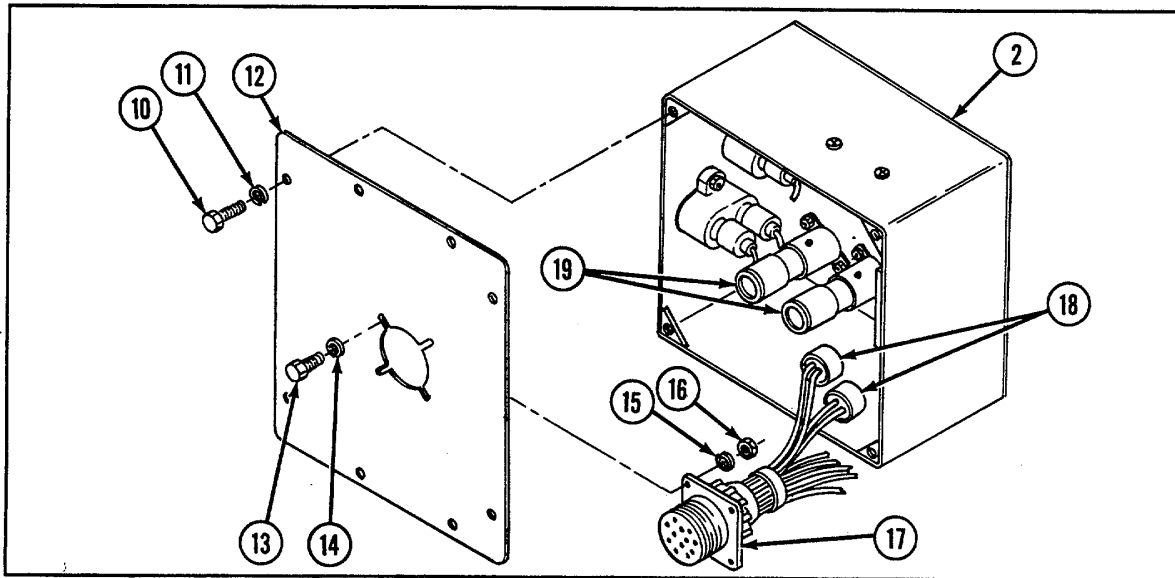


NOTE

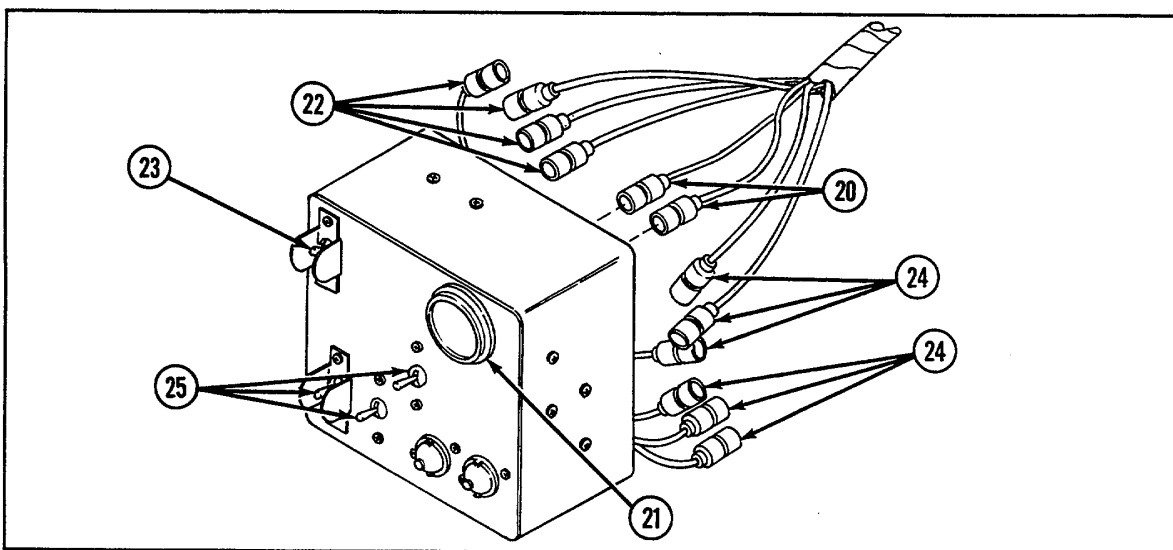
Follow-on maintenance: Close left front air inlet grille doors (see paragraph 9-57)

b. DISASSEMBLY

- 1 Remove four screws (10), four lockwashers (11) and pull rear panel (12) from APU control box (2).
- 2 Remove four screws (13), four washers (14), four lockwashers (15), four nuts (16), and connector (17) from rear panel (12).
- 3 Disconnect four connectors (18) from two indicator lights (19).

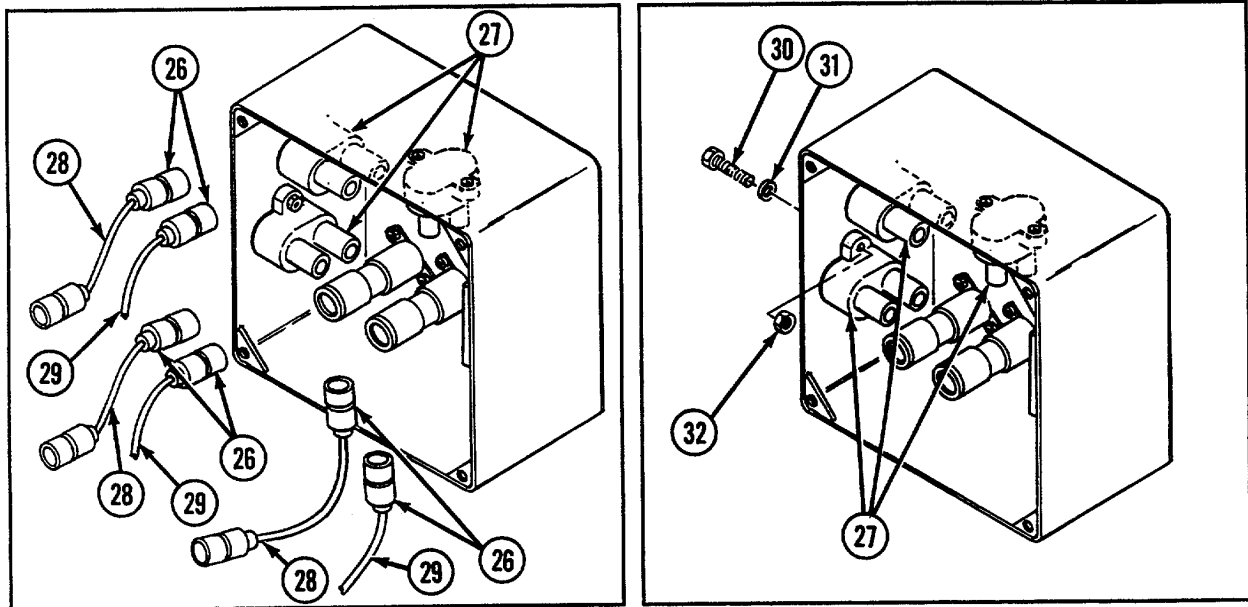


- 4 Disconnect two connectors (20) from oil pressure indicator (21).
- 5 Disconnect four connectors (22) from APU generator switch (23).
- 6 Disconnect six connectors (24) from three switches (25).



13-7 REPLACE/REPAIR APU CONTROL BOX-Continued

- 7 Disconnect six connectors (26) from three circuit breakers (27) and remove three lead assemblies (28) and APU control box wiring harness (29).
- 8 Remove three circuit breakers (27) by removing two screws (30), two lockwashers (31), and two nuts (32) from each.

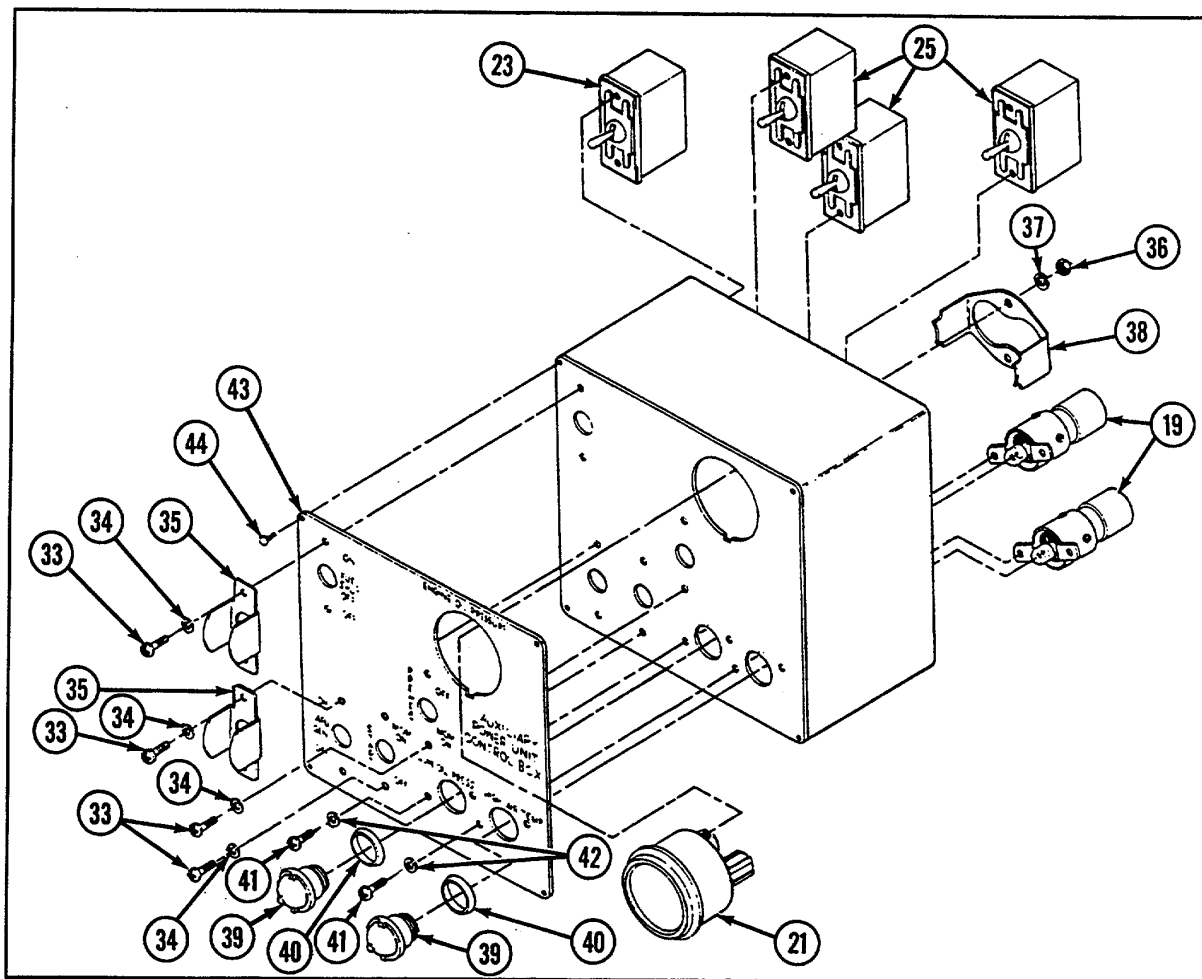


- 9 Remove APU generator switch (23) and three switches (25) by removing eight screws (33), eight lockwashers (34), and two switch guards (35).
- 10 Remove oil pressure indicator (21) by removing two nuts (36), two lockwashers (37), and bracket (38).
- 11 Remove two indicator lights (19) by removing lens (39), gasket (40), two screws (41), and two lockwashers (42) from each.

NOTE

Remove ID plate (43) only if required.

- 12 Remove control box ID plate (43) by removing four rivets (44).
- 13 Disassemble three lead assemblies (28) and APU control box wiring harness (29) (see Chapter 6, Section VII).

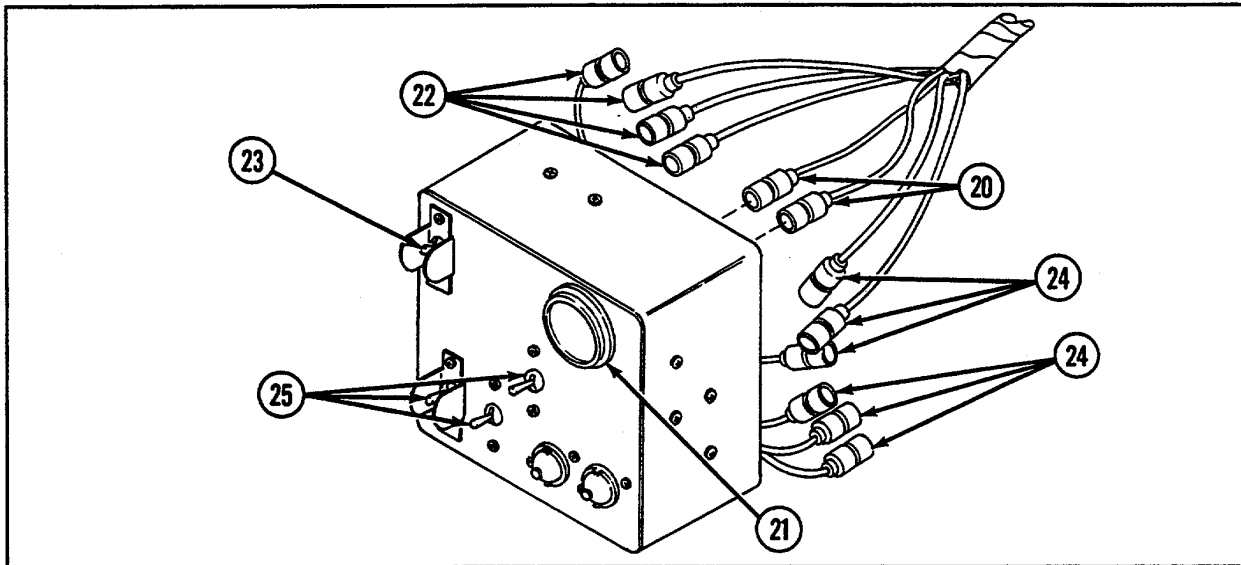


c. ASSEMBLY

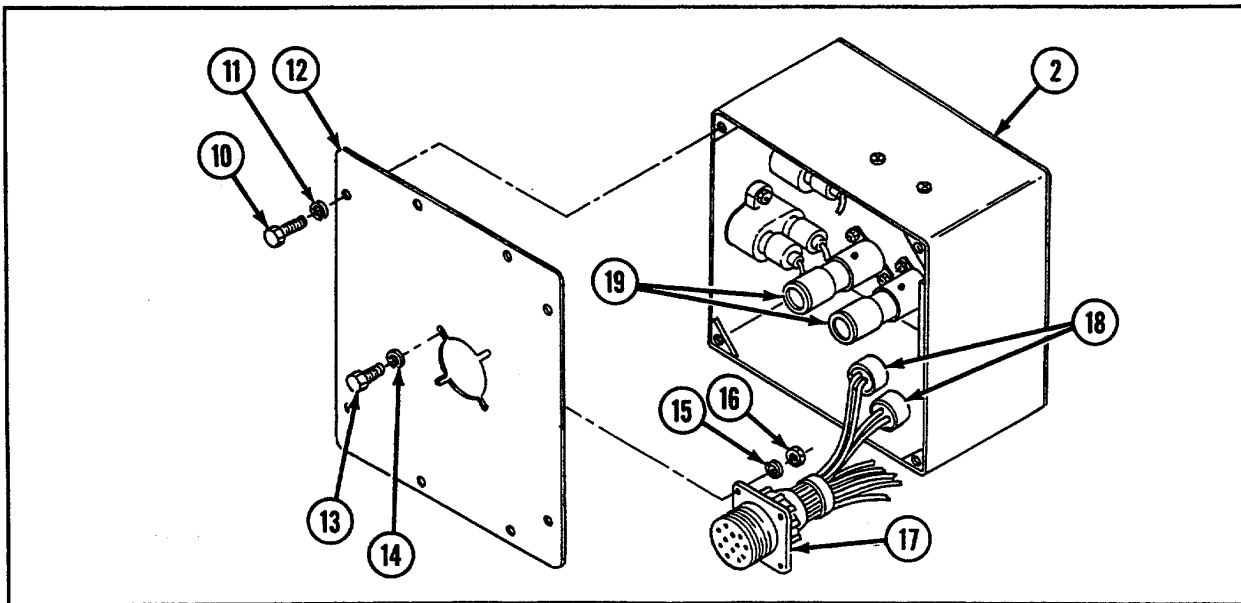
- 1 Assemble three lead assemblies (28) and APU control box wiring harness (29) (see Chapter 6, Section VII).
- 2 Install control box ID plate (43) with four new rivets (44), if removed.
- 3 Install two indicator lights (19) using two new lockwashers (42), two screws (41), gasket (40), and lens (39) for each.
- 4 Install oil pressure indicator (21) using bracket (38), two new lockwashers (37), and two nuts (36).
- 5 Install APU generator switch (23) and three switches (25) using two switch guards (35), eight new lockwashers (34), and eight screws (33).
- 6 Install three circuit breakers (27) using two nuts (32), two new lockwashers (31), and two screws (30) for each.
- 7 Connect six connectors (26) to three circuit breakers (27).

13-7 REPLACE/REPAIR APU CONTROL BOX-Continued

- 8 Connect six connectors (24) to three switches (25).
- 9 Connect four connectors (22) to APU generator switch (23).
- 10 Connect two connectors (20) to oil pressure indicator (21).

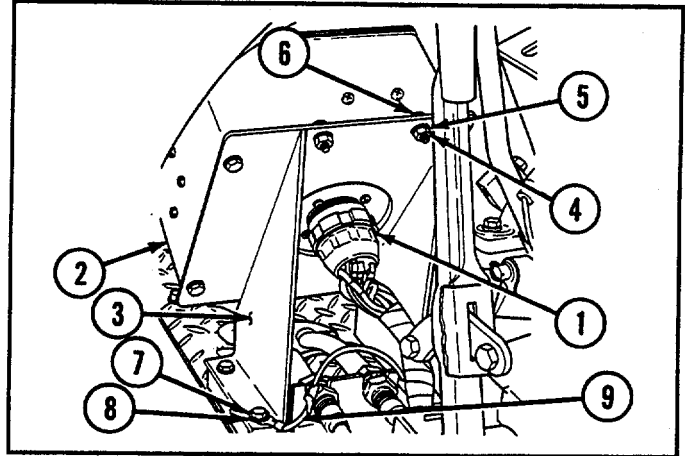


- 11 Connect four connectors (18) to two indicator lights (19).
- 12 Install connector (17) to rear panel (12) using four screws (13), four washers (14), four new lockwashers (15) and four nuts (16).
- 13 Install rear panel (12) to APU control box (2) using four screws (10) and four new lockwashers (11).



d. INSTALLATION

- 1 Install mounting bracket (3) with four screws (7), four new lockwashers (8), and ground strap (9).
- 2 Install APU control box (2) on mounting bracket (3) with four screws (6), four new lockwashers (5), and four nuts (4).
- 3 Connect cable connector (1) to back of APU control box (2).



**CHAPTER 14
MAINTENANCE OF M8A3 GAS/PARTICULATE FILTER UNIT**

CHAPTER OVERVIEW

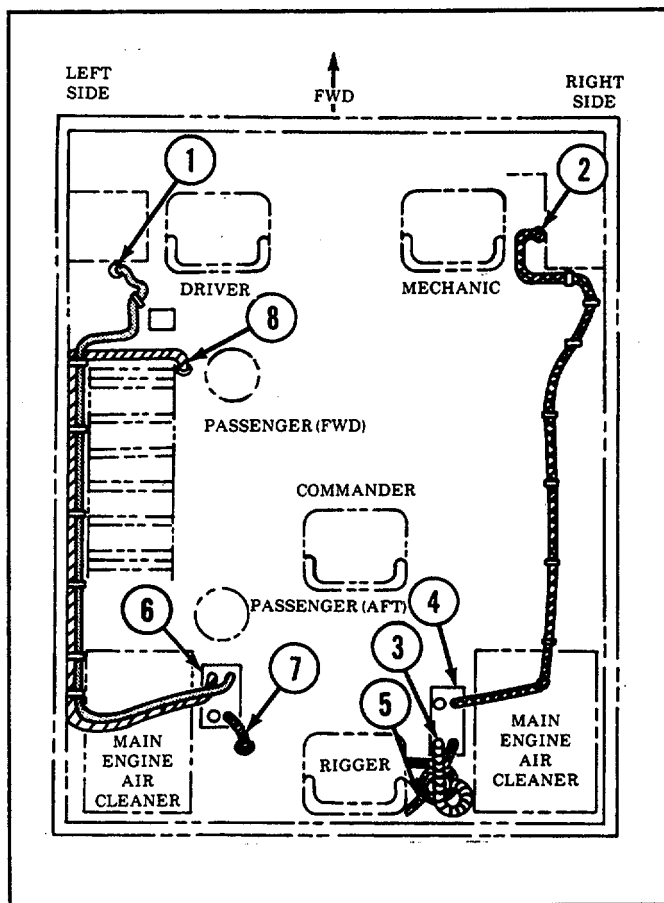
This chapter covers removal, disassembly, assembly, installation, and test of the two M8A3 gas/particulate filter unit systems used in the vehicle.

This chapter consists of the following paragraphs:

Para.	Task	Page
14-1	Replace/Repair M8A3 Filter Unit System.....	14-2
14-2	Replace/Repair M8A3 Filter Unit M2A2 Air Purifier.....	14-9
14-3	Replace/Repair M8A3 Filter Unit Switch Assembly.....	14-11

MSA3 GAS/PARTICULATE FILTER UNITS INSTALLED

- 1 Driver's hose assembly
- 2 Mechanic's hose assembly
- 3 Commander's hose assembly
- 4 M2A2 air purifier and frame assembly (right side)
- 5 Rigger's hose assembly
- 6 M2A2 air purifier and frame assembly (left side)
- 7 Passenger's (AFT) hose assembly
- 8 Passenger's (FWD) hose assembly



14-1 REPLACE/REPAIR M8A3 FILTER UNIT SYSTEM**THIS TASK COVERS**

- | | | | |
|------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
| e. Test | | | |

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Lockwashers (29) (Appendix G, item 116)
- Lockwashers (2) (Appendix G, item 128)

Test Equipment:

Tester, airflow (Appendix C, item 52)

Reference:

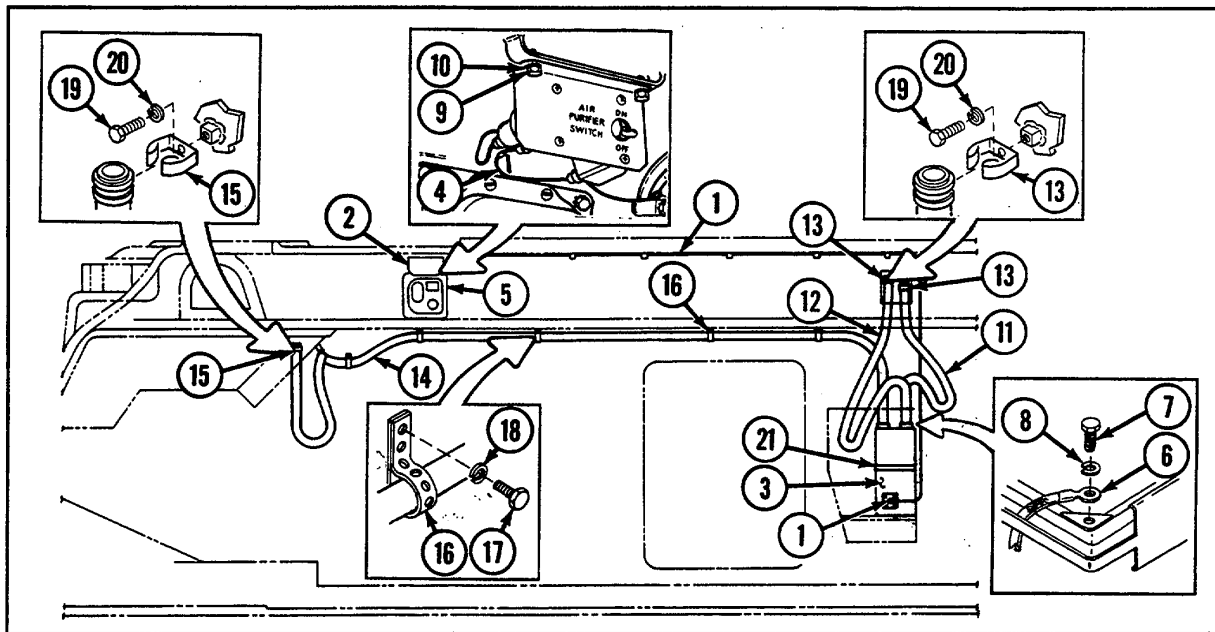
TM 9-2350-256-10

WARNING

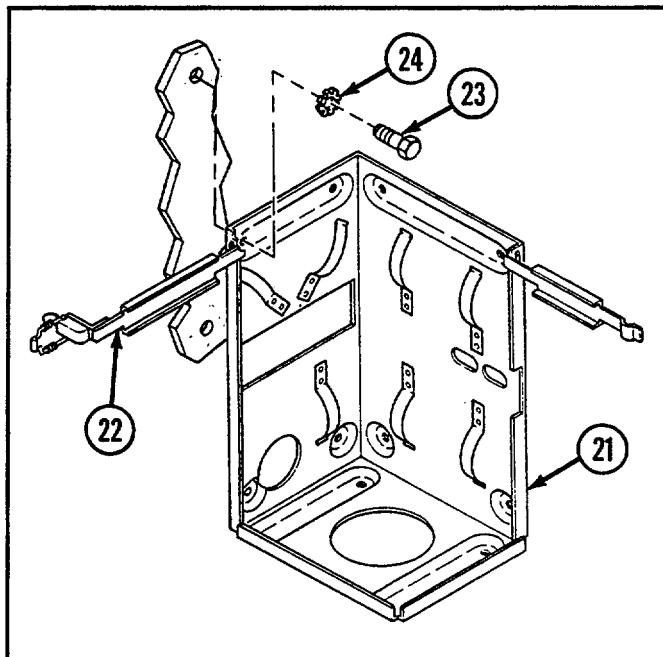
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in heating of tools, damage to equipment, and injury or death to personnel.

a. REMOVAL**Right Side**

- 1 Disconnect and remove cable assembly (1) from circuit breaker and switch assembly (2) and M2A2 air purifier (3).
- 2 Disconnect and remove cable assembly (4) from circuit breaker and switch assembly (2) and dome light (5).
- 3 Remove ground wire (6) from M2A2 air purifier (3) by removing screw (7) and lockwasher (8).
- 4 Remove circuit breaker and switch assembly (2) by removing two screws (9) and two lockwashers (10).
- 5 Disconnect and remove rigger's hose (11) and commander's hose (12) from manifold of M2A2 air purifier (3) and clamps (13).
- 6 Disconnect mechanic's hose (14) from clamp (15) and manifold of M2A2 air purifier (3). Remove six clamps (16) by removing from each screw (17) and lockwasher (18).
- 7 Remove two clamps (13) and clamp (15) by removing from each screw (19) and lockwasher (20).



- 8 Remove M2A2 air purifier (3) from frame assembly (21) by opening catch assembly (22) on frame assembly.
- 9 Remove frame assembly (21) by removing four screws (23) and four lockwashers (24).



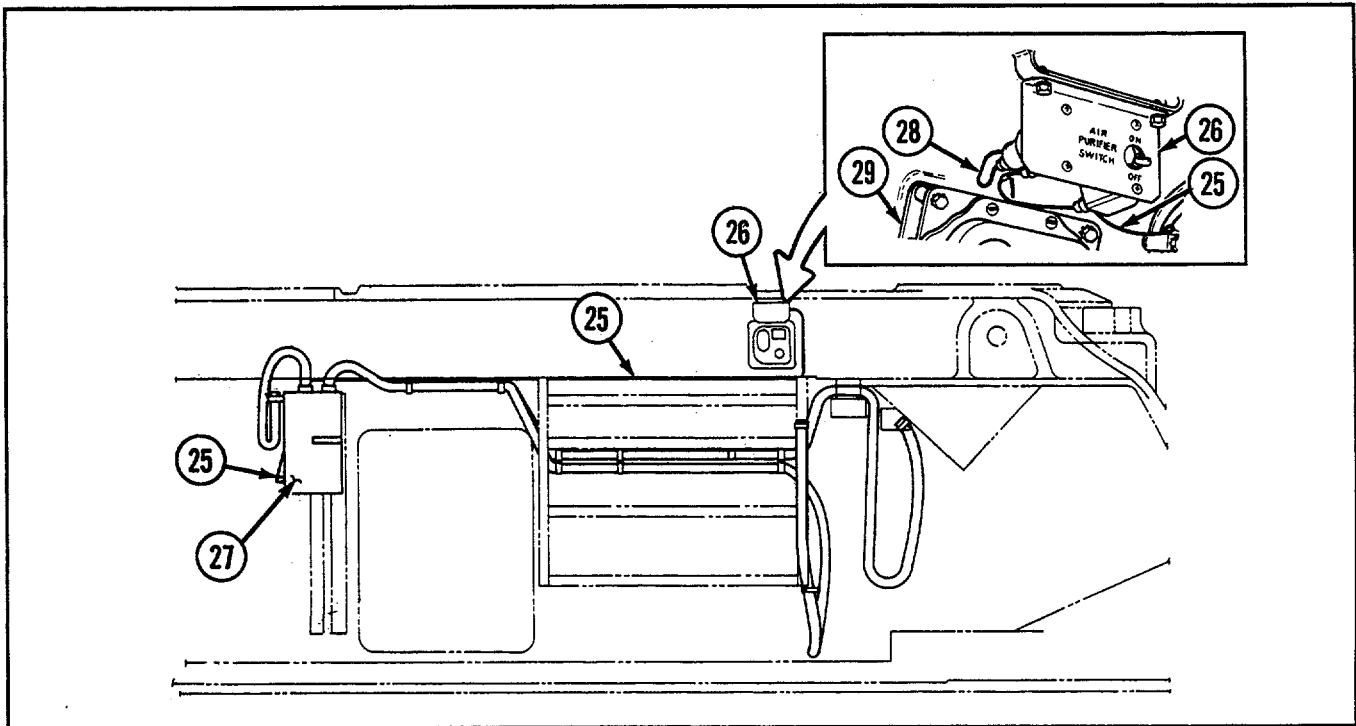
Left Side

WARNING

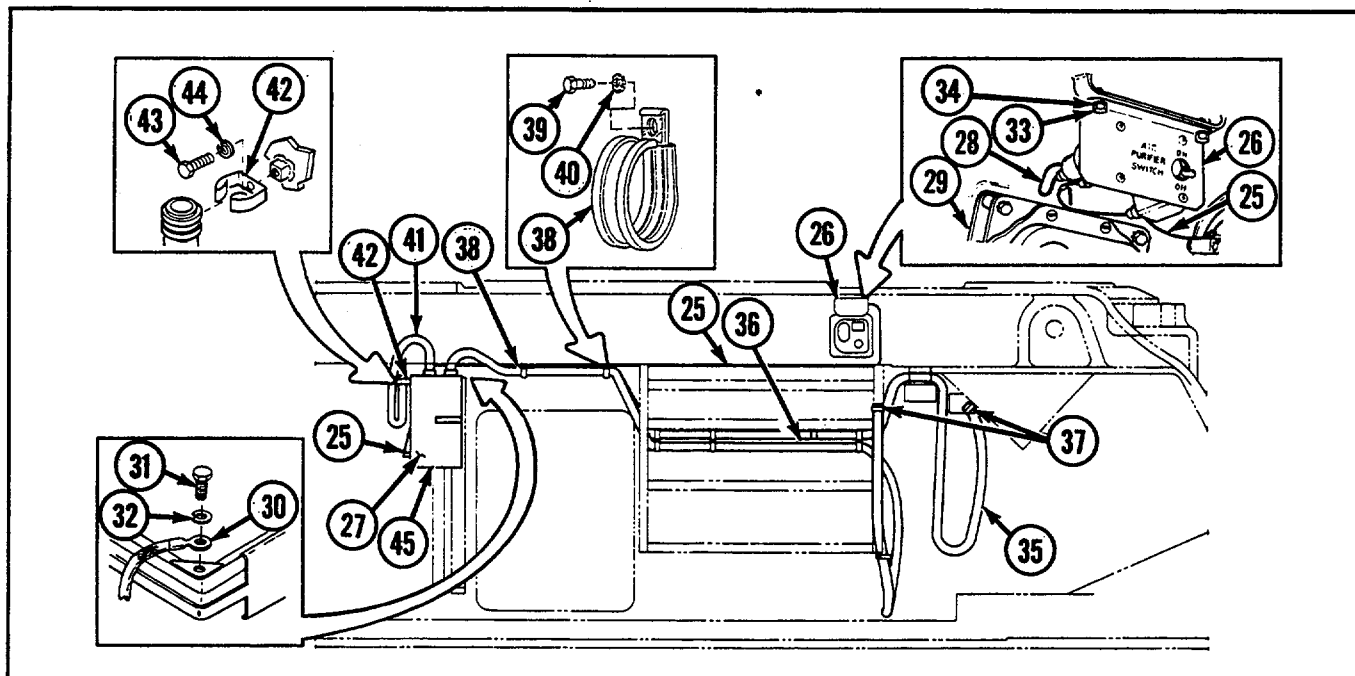
Remove all jewelry such as rings, dog tags, bracelets, etc. If jewelry contacts a metal surface a direct short may result in heating of tools, damage to equipment, and injury or death to personnel.

14-1 REPLACE/REPAIR M8A3 FILTER UNIT SYSTEM-Continued

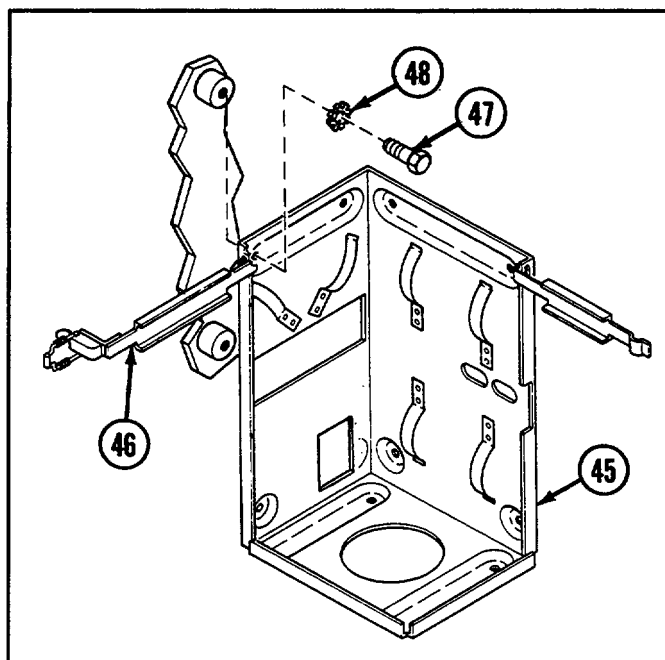
- 10 Disconnect and remove cable assembly (25) from circuit breaker and switch assembly (26) and M2A2 air purifier (27).
- 11 Disconnect and remove cable assembly (28) from circuit breaker and switch assembly (26) and dome light (29).



- 12 Remove ground wire (30) from M2A2 air purifier (27) by removing screw (31) and lockwasher (32).
- 13 Remove circuit breaker and switch assembly (26) by removing two screws (33) and two lockwashers (34).
- 14 Disconnect and remove driver's hose (35) and FWD passenger's hose (36) from manifold of M2A2 air purifier (27) and clamps (37). Remove 12 clamps (38) by removing from each pair screw (39) and lockwasher (40).
- 15 Disconnect and remove AFT passenger's hose (41) from manifold of M2A2 air purifier (27) and clamp (42).
- 16 Remove two clamps (37) and clamp (42) by removing from each screw (43) and lockwasher (44).



- 17 Remove M2A2 air purifier (27) from frame assembly (45) by opening catch assembly (46) on frame assembly.
- 18 Remove frame assembly (45) by removing three screws (47) and three lockwashers (48).



14-1 REPLACE/REPAIR M8A3 FILTER UNIT SYSTEM-Continued

b. DISASSEMBLY

NOTE

Step 1 applies only to driver's hose.

- 1 Separate hoses (1 and 2) by removing two clamps (3) and tube (4).
- 2 Disassemble hose assembly by removing coupling half (5) and clamp (6) from each end of hose (7).
- 3 Disassemble electrical cable assemblies and wire lead (see Chapter 6, Section VII).

c. ASSEMBLY

- 1 Assemble hose assembly by installing coupling half (5) and clamp (6) to each end of hose (7).

NOTE

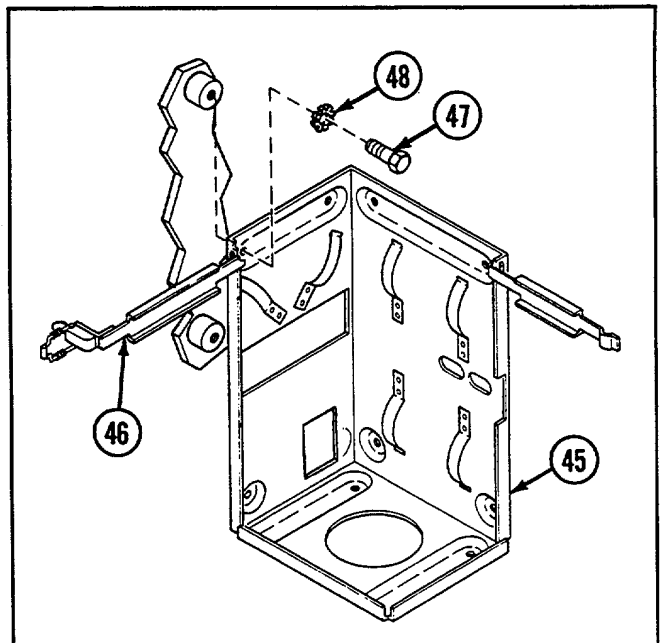
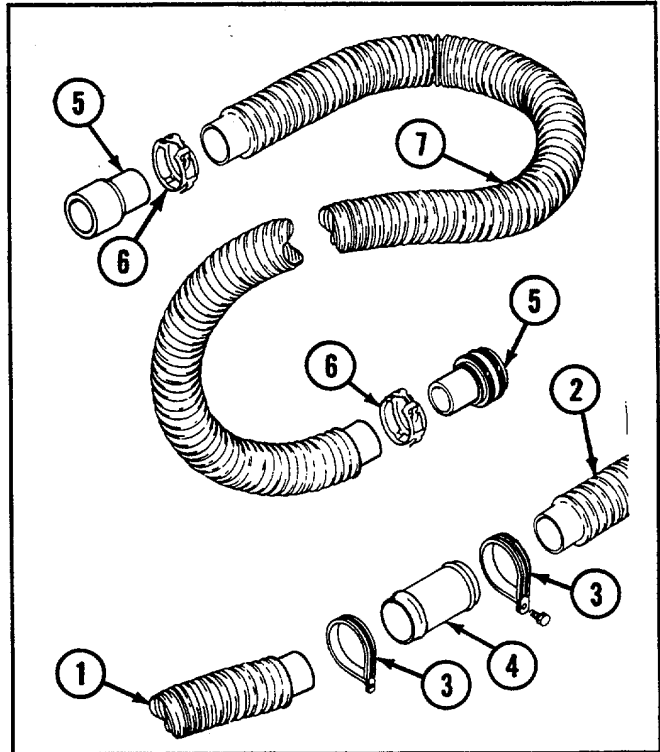
Step 2 applies only to driver's hose.

- 2 Connect hoses (1 and 2) to each other with two clamps (3) and tube (4).
- 3 Assemble electrical cable assemblies and wire lead (see Chapter 6, Section VII).

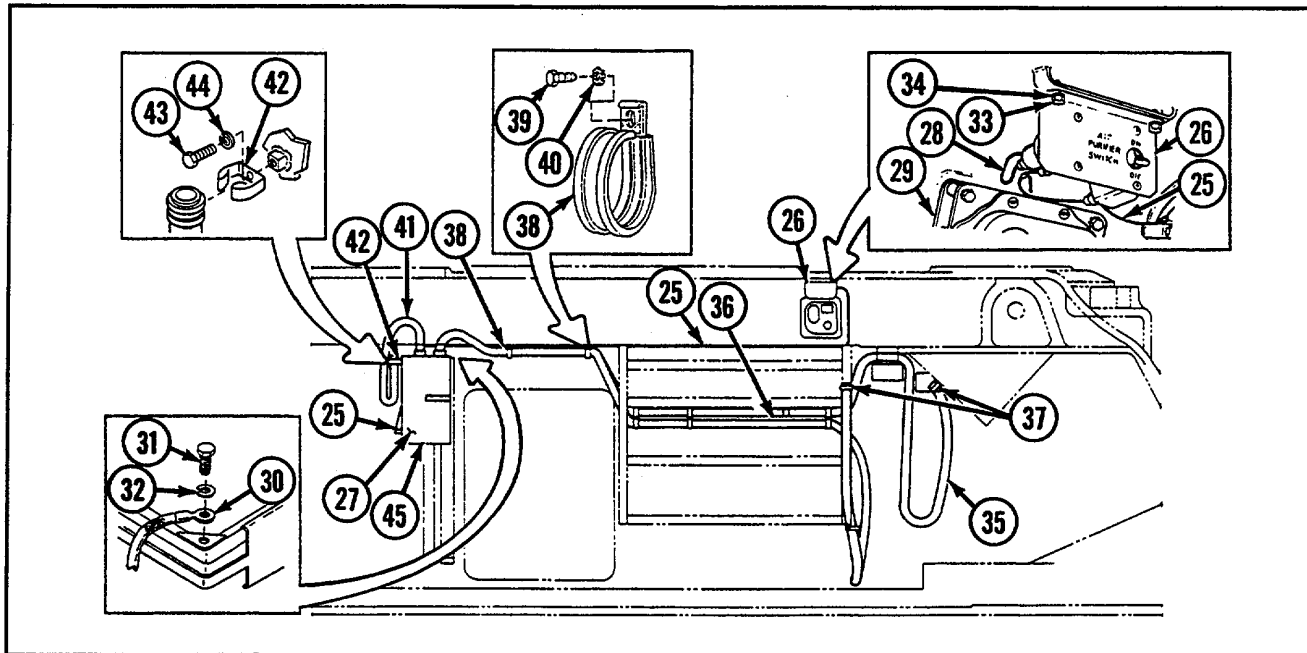
d. INSTALLATION

Left Side

- 1 Install frame assembly (45) with three screws (47) and three new lockwashers (48).
- 2 Install M2A2 air purifier (27) in frame assembly (45) and close catch assembly (46).
- 3 Install two clamps (37) and clamp (42) each with screw (43) and new lockwasher (44).
- 4 Connect and install AFT passenger's hose (41) on manifold of M2A2 air purifier (27) and clamp (42).
- 5 Connect and install driver's hose (35) and FWD passenger's hose (36) on manifold of M2A2 air purifier (27) and clamps (37). Secure hoses to vehicle with 12 clamps (38). Each pair of clamps is held by screw (39) and new lockwasher (40).
- 6 Install circuit breaker and switch assembly (26) with two screws (33) and two new lockwashers (34).

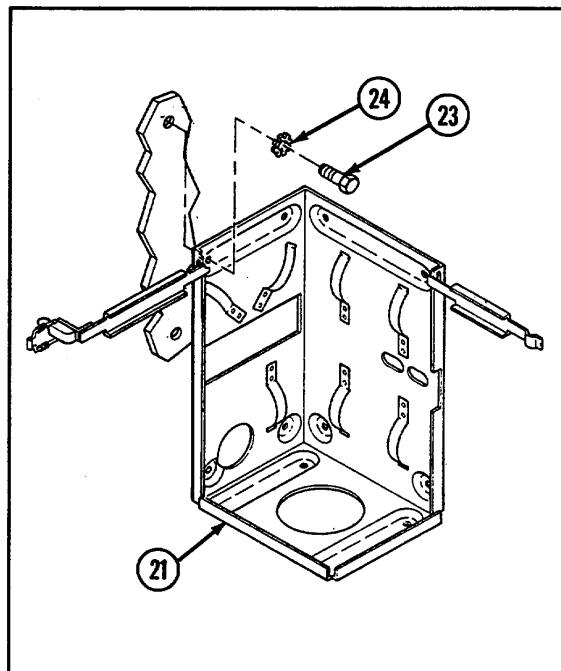


- 7 Connect ground wire (30) on M2A2 air purifier (27) with screw (31) and new lockwasher (32).
- 8 Connect cable assembly (28) from circuit breaker and switch assembly (26) to dome light (29).
- 9 Connect cable assembly (25) from circuit breaker and switch assembly (26) to M2A2 air purifier (27).



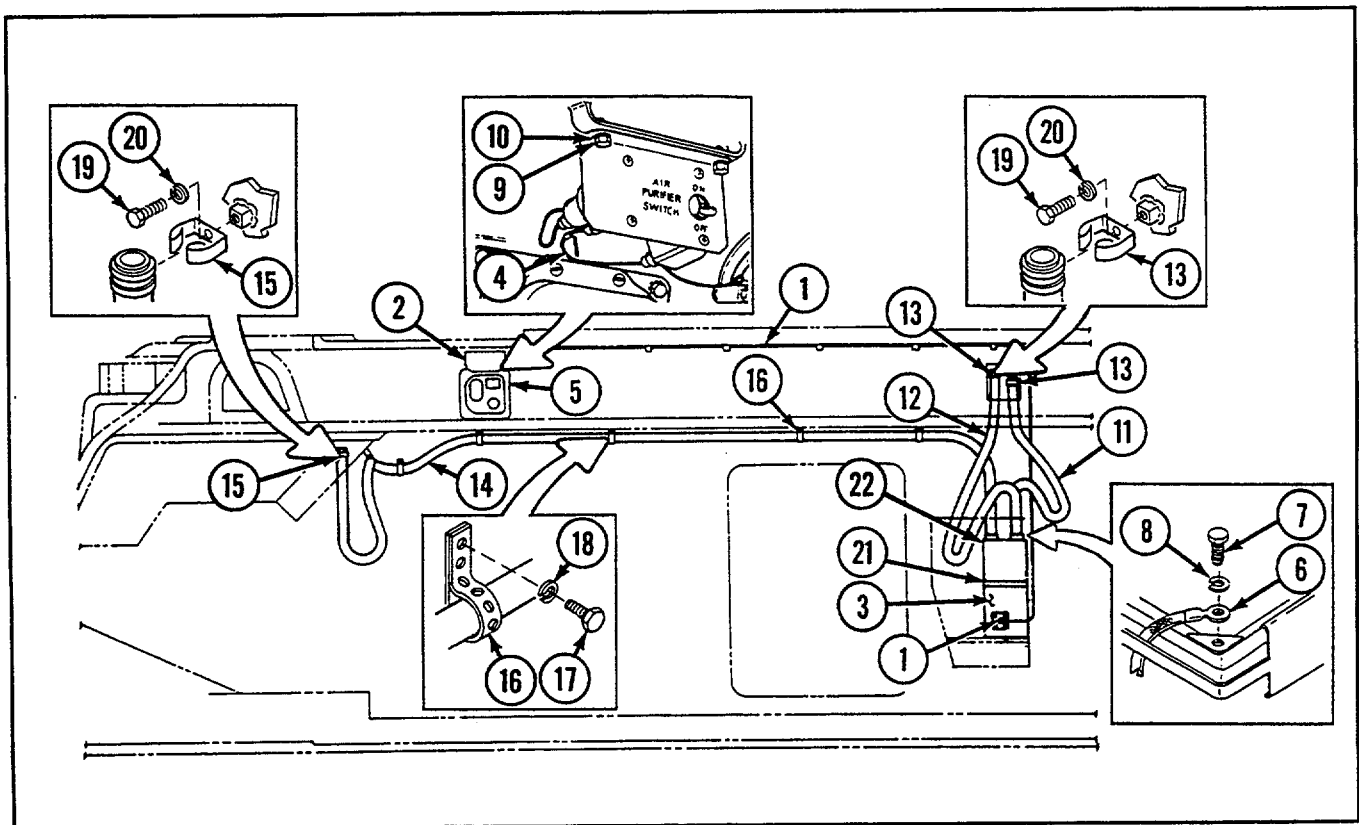
Right Side

- 10 Install frame assembly (21) with four screws (23) and four new lockwashers (24).



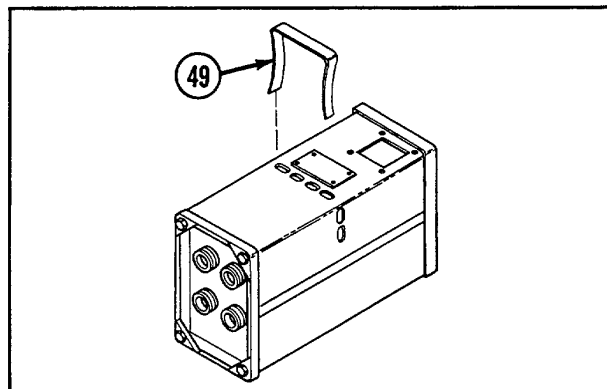
14-1 REPLACE/REPAIR MBA3 FILTER UNIT SYSTEM-Continued

- 11 Place ground wire (6) between frame assembly (21) and M2A2 air purifier (3). Install M2A2 air purifier in frame assembly by closing catch assembly (22).
- 12 Install two clamps (13) and clamp (15) each with screw (19) and new lockwasher (20).
- 13 Connect mechanic's hose (14) between manifold of M2A2 air purifier (3) and clamp (15). Secure hose with six clamps (16), each held by screw (17) and new lockwasher (18).
- 14 Connect rigger's hose (11) and commander's hose (12) between manifold of M2A2 air purifier (3) and clamps (13).
- 15 Install circuit breaker and switch assembly (2) with two screws (9) and two new lockwashers (10).
- 16 Connect ground wire (6) on M2A2 air purifier (3) with screw (7) and new lockwasher (8).
- 17 Connect cable assembly (4) between circuit breaker and switch assembly (2) and dome light (5).
- 18 Connect cable assembly (1) between circuit breaker and switch assembly (2) and M2A2 air purifier (3).



e. TEST

- 1 Move spring clip (49) from M2A2 air purifier air intake holes. Perform test as instructed in operator's manual TM 9-2350-256-10 located in airflow tester container.
- 2 Replace spring clip (49) at completion of test



14-2 REPLACE/REPAIR M8A3 FILTER UNIT M2A2 AIR PURIFIER

THIS TASK COVERS

- | | | | |
|------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
|------------|----------------|-------------|-----------------|

INITIAL SET-UP

Parts:

Lockwashers (4) (Appendix G, item 128)

a. REMOVAL

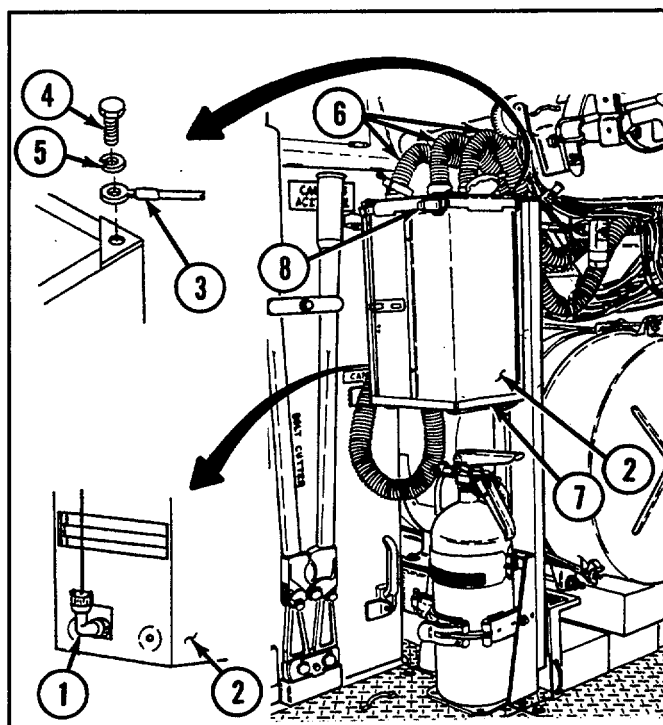
WARNING

After suspected NBC exposure of this vehicle, all air filter media shall be handled only by personnel wearing full NBC-protective equipment.

NOTE

The following procedures apply to either right or left M2A2 air purifier.

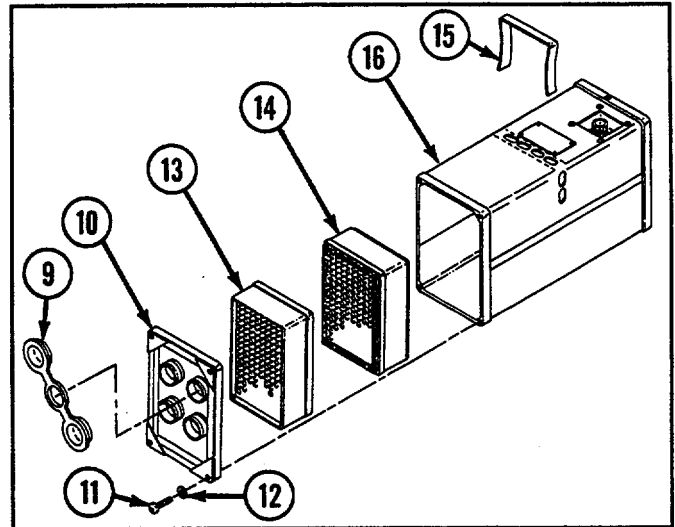
- 1 Disconnect cable assembly (1) from M2A2 air purifier (2).
- 2 Remove ground wire (3) from M2A2 air purifier (2) by removing screw (4) and lockwasher (5).
- 3 Tag and disconnect hoses (6).
- 4 Remove M2A2 air purifier (2) from frame assembly (7) by opening catch assembly (8).



14-2 REPLACE/REPAIR MSA3 FILTER UNIT M2A2 AIR PURIFIER-continued

b. DISASSEMBLY

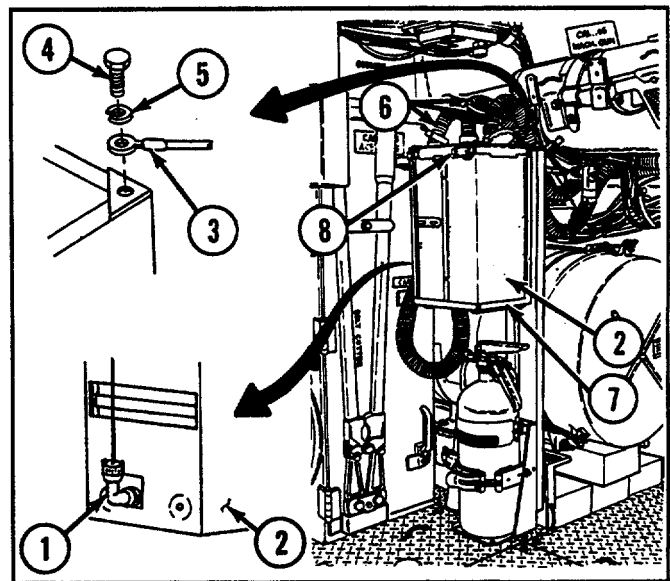
- 1 Remove four airflow caps (9).
- 2 Remove manifold assembly (10) by removing three screws (11) and three lockwashers (12).
- 3 Remove filters (13 and 14) and spring clip (15) from housing (16).

**c. ASSEMBLY**

- 1 Install spring clip (15) and filters (13 and 14) to housing (16).
- 2 Install manifold assembly (10) with three screws (11) and three new lockwashers (12).
- 3 Install four airflow caps (9).

d. INSTALLATION

- 1 Place ground wire (3) between frame assembly (7) and M2A2 air purifier (2). Install M2A2 air purifier in frame assembly and close catch assembly (8).
- 2 Install ground wire (3) to M2A2 air purifier (2) with new lockwasher (5) and screw (4).
- 3 Reconnect hoses (6) and remove tags.
- 4 Connect cable assembly (1).
- 5 Test M2A2 air purifier (see paragraph 4-1).



14-3 REPLACE/REPAIR M8A3 FILTER UNIT SWITCH ASSEMBLY

THIS TASK COVERS

- | | | | |
|------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
|------------|----------------|-------------|-----------------|

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Lockwashers (2) (Appendix G, item 114)
- Lockwashers (2) (Appendix G, item 116)
- Lockwashers (2) (Appendix G, item 128)

a. REMOVAL

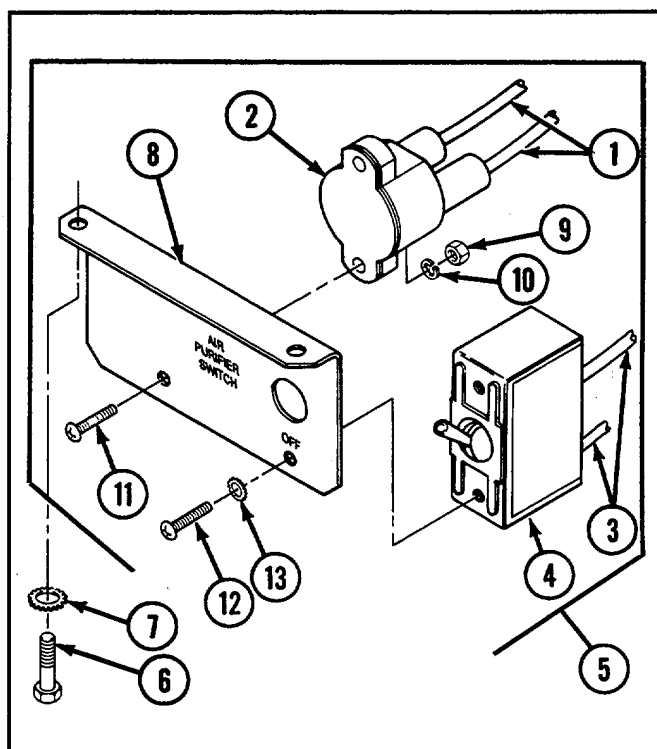
- 1 Tag and disconnect two electrical leads (1) from circuit breaker (2) and two electrical leads (3) from switch (4).
- 2 Remove circuit breaker and switch assembly (5) by removing two screws (6) and two lockwashers (7).

b. DISASSEMBLY

- 1 Remove circuit breaker (2) from bracket (8) by removing two nuts (9), two lockwashers (10), and two screws (11).
- 2 Remove switch (4) from bracket (8) by removing two screws (12) and two lockwashers (13).

c. ASSEMBLY

- 1 Install switch (4) to bracket (8) with two screws (12) and two new lockwashers (13).
- 2 Install circuit breaker (2) to bracket (8) with two screws (11), two new lockwashers (10), and two nuts (9).



d. INSTALLATION

- 1 Install circuit breaker and switch assembly (5) with two screws (6) and two new lockwashers (7).
- 2 Connect two electrical leads (3) to switch (4) and two electrical leads (1) to circuit breaker (2). Remove tags.

**CHAPTER 15
MAINTENANCE OF M239 SMOKE
GRENADE LAUNCHER SYSTEM**

CHAPTER OVERVIEW

This chapter covers the removal, disassembly, assembly, and installation of M239 smoke grenade launcher system components.

This chapter consists of the following paragraphs:

Para.	Task	Page
15-1	Replace/Repair M239 Launcher Power Switch Box Assembly	15-1
15-2	Replace/Repair M239 Launcher Dischargers	15-3
15-3	Replace M239 Launcher Stowage Boxes	15-3

WARNING

Make sure all launcher tubes are empty before performing maintenance on launcher system. DEATH or serious injury may result if tubes launch accidentally.

15-1 REPLACE/REPAIR M239 LAUNCHER POWER SWITCH BOX ASSEMBLY

THIS TASK COVERS

- | | | | |
|------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
|------------|----------------|-------------|-----------------|

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Riveter, blind (Appendix C, item 42)

Parts:

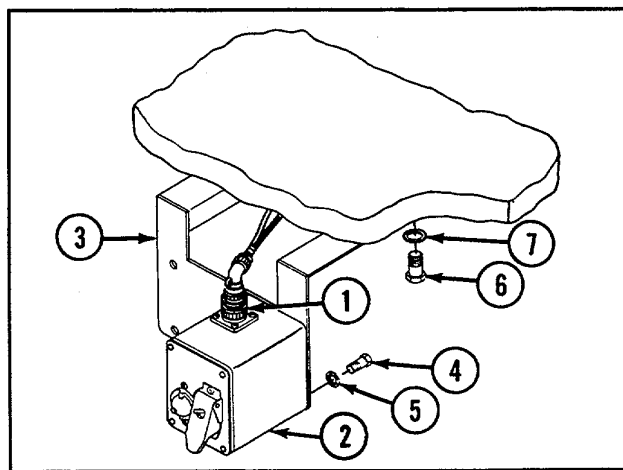
- Lockwashers (2) (Appendix G, item 104)
- Lockwashers (2) (Appendix G, item 119)
- Lockwashers (4) (Appendix G, item 106)
- Rivets (4) (Appendix G, item 238)

Equipment Condition:

Commander's plate and switch assembly removed (see paragraph 16-5)

a. REMOVAL

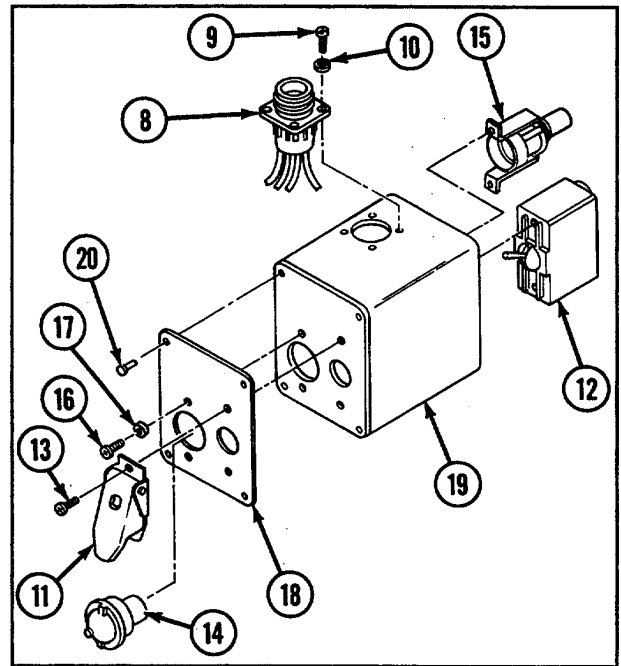
- 1 Disconnect harness connector (1) from switch box (2).
- 2 Remove switch box (2) from mounting bracket (3) by removing four screws (4) and four lockwashers (5).
- 3 Remove mounting bracket (3) by removing two screws (6) and two lockwashers (7).



15-1 REPLACE/REPAIR M239 LAUNCHER POWER SWITCH BOX ASSEMBLY-Continued

b. DISASSEMBLY

- 1 Remove panel harness (8), four screws (9), and four lockwashers (10).
- 2 Remove switch guard (11) and switch (12) by removing two screws (13).
- 3 Remove light lens (14).
- 4 Remove indicator light (15) by removing two screws (16) and two lockwashers (17).
- 5 Remove identification (ID) plate (18) from enclosure (19) by removing four rivets (20).



c. ASSEMBLY

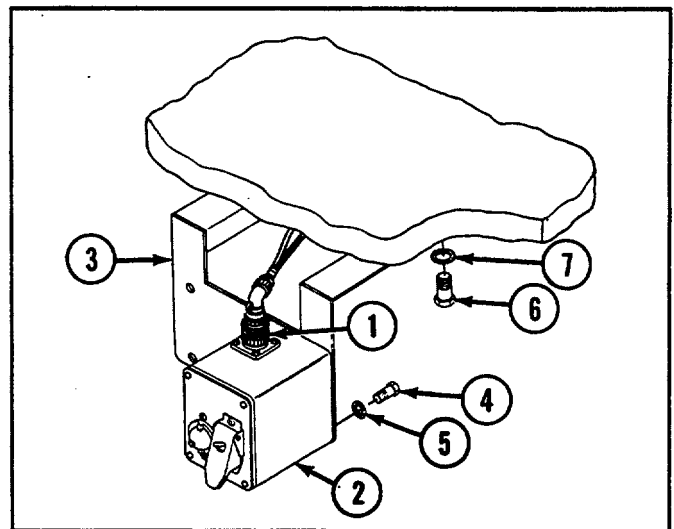
- 1 Install ID plate (18) to enclosure (19) using four new rivets (20).
- 2 Install indicator light (15) with two screws (16) and two new lockwashers (17).
- 3 Install light lens (14).
- 4 Install switch (12) and switch guard (11) with two screws (13).
- 5 Install panel harness (8) with four screws (9) and four new lockwashers (10).

d. INSTALLATION

- 1 Install mounting bracket (3) with two screws (6) and two new lockwashers (7).
- 2 Install switch box (2) to mounting bracket (3) with four screws (4) and four new lockwashers (5).
- 3 Connect harness connector (1) to switch box (2).

NOTE

Follow-on maintenance: Install commander's plate and switch assembly (see paragraph 16-5)



15-3 REPLACE M239 LAUNCHER STOWAGE BOXES--Continued

NOTE

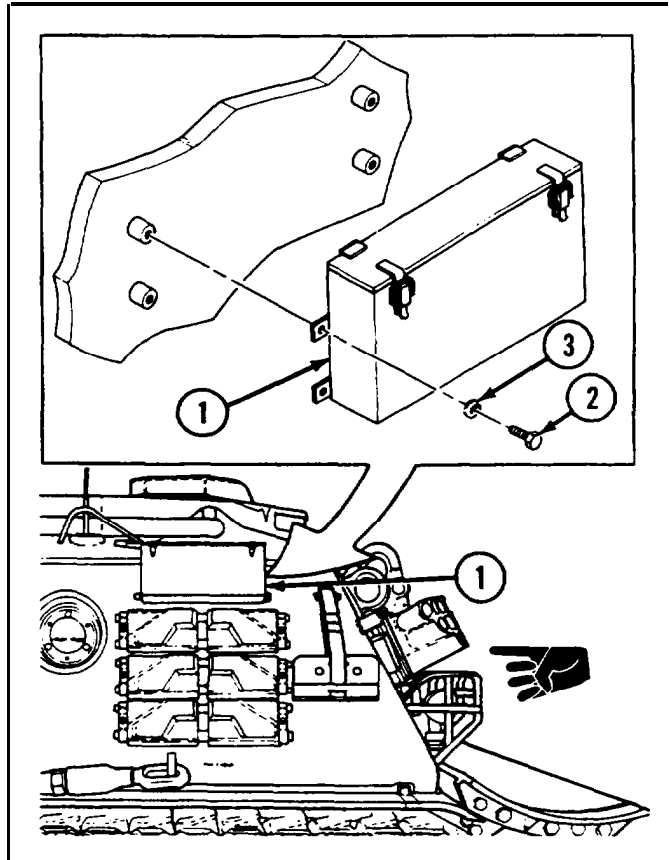
Left and right stowage boxes are removed and installed in the same manner.

a. REMOVAL

Remove smoke grenade stowage boxes (1) by removing four screws (2) and four lockwashers (3).

b. INSTALLATION

Install smoke grenade stowage boxes (1) with four screws (2) and four new lo&washers (3).



**CHAPTER 16
MAINTENANCE OF EXHAUST SMOKE GENERATING SYSTEM**

CHAPTER OVERVIEW

This chapter describes how to remove, disassemble, assemble, and install the exhaust smoke generating system.

This chapter consists of the following sections:	Page
Section I: Engine Components.....	16-1
Section II: Hull Components	16-7

SECTION I: ENGINE COMPONENTS

Para.	Task	Page
16-1	Replace Solenoid Valve Assemblies and Bracket.....	16-1
16-2	Replace Fuel Tube Assemblies	16-3
16-3	Replace Fuel Shutoff Valve Assembly.....	16-6

16-1 REPLACE SOLENOID VALVE ASSEMBLIES AND BRACKET

THIS TASK COVERS

- | | |
|------------|-----------------|
| a. Removal | b. Installation |
|------------|-----------------|

INITIAL SET-UP

Tools:

- Tool kit, general mechanic's (Appendix C, item 53)
- Socket set (Appendix C, item 49)
- Vise, soft-jaw (Appendix C, item 54)

Tools-Continued:

- Wrench, torque (Appendix C, item 62)

Part:

- Nut, self-locking (Appendix G, item 168)

Reference:

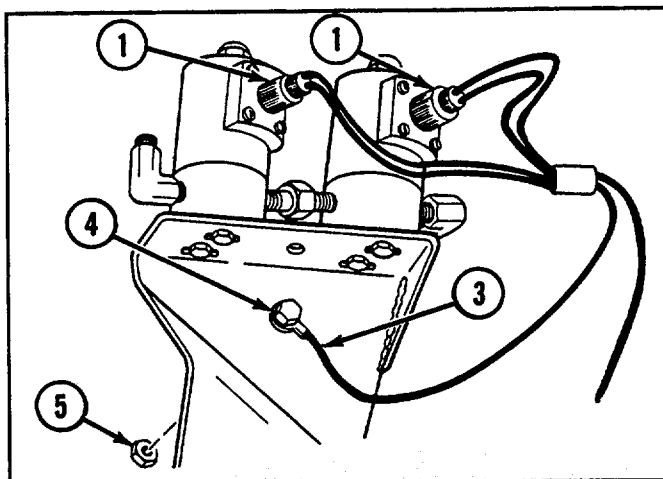
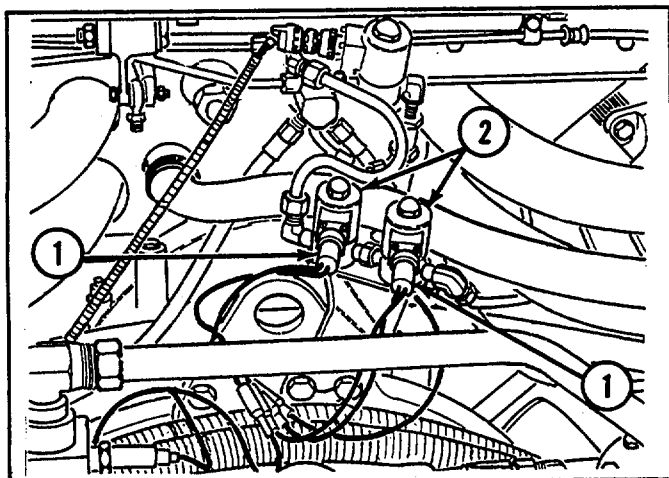
TM 9-2350-256-10

Equipment Condition:

Engine deck removed (see paragraph 9-51)

a. REMOVAL

- 1 Disconnect two cable assemblies (1) from two solenoid valves (2)
- 2 Disconnect ground lead (3) by removing screw (4) and self-locking nut (5).



16-1 REPLACE SOLENOID VALVE ASSEMBLIES AND BRACKET-Continued

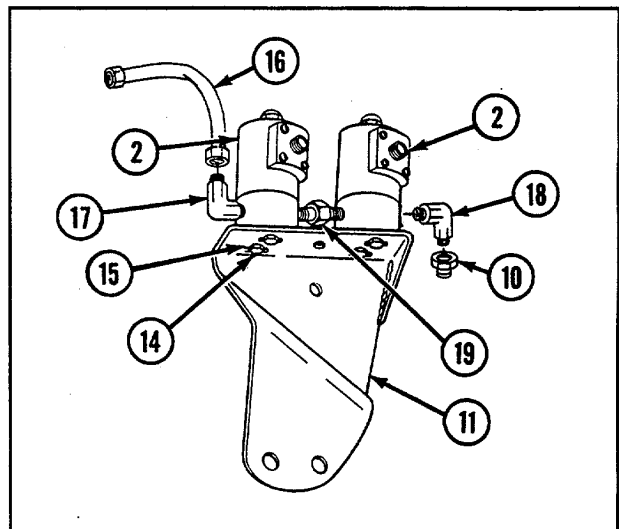
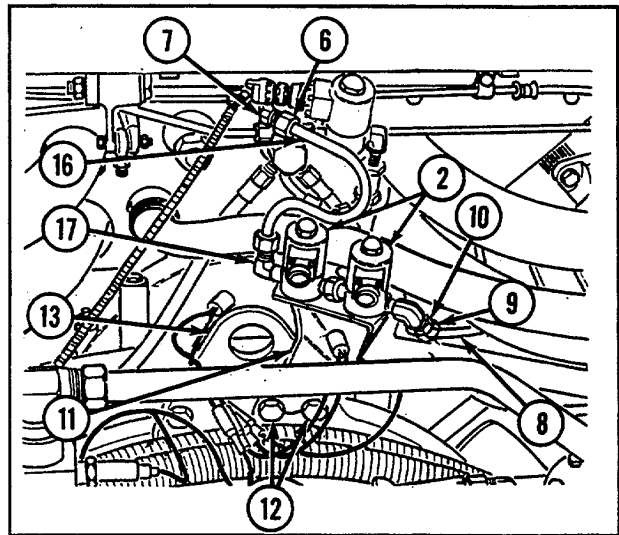
- 3 Loosen nut (6) at elbow (7).
- 4 Remove fuel line (8) by removing nut (9) from adapter (10).
- 5 Remove mounting bracket (11) by removing two bolts (12) from engine lifting eye (13).
- 6 Remove solenoid valves (2) from mounting bracket (11) by removing four bolts (14) and four flat washers (15).
- 7 Place solenoid valves (2) in soft-jaw vise and disconnect fuel tube assembly (16) from elbow (17).
- 8 Remove elbows (17 and 18) from two solenoid valves (2).
- 9 Remove adapter (10) from elbow (18).
- 10 Remove pipe nipple (19).

b. INSTALLATION

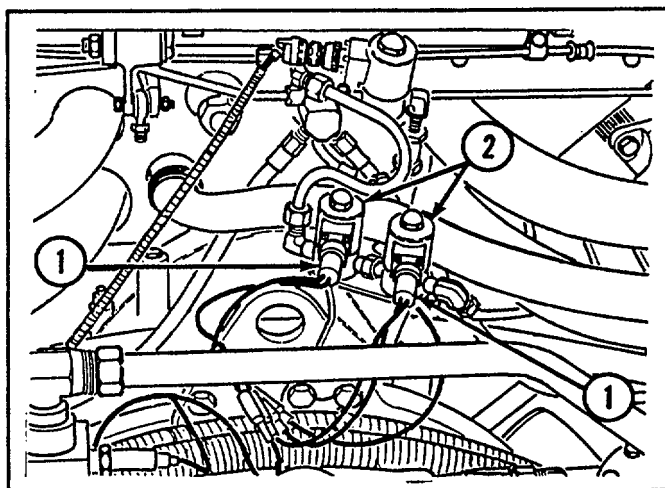
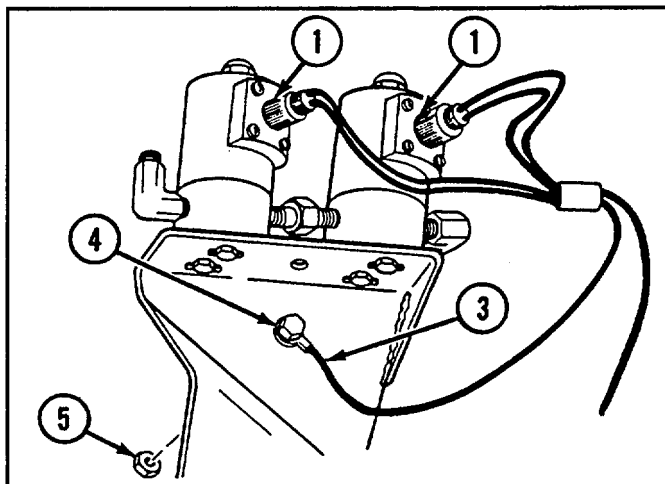
NOTE

- If new solenoid valve is to be used, check position of electrical connector by holding valve with inlet port to right side and outlet port to left side. Electrical connector must be 45 degrees (°) from inlet port and pointing to right. Reposition, if necessary, by placing solenoid valve in soft-jawed vise and loosening acorn nut at top of valve. Position electrical connector and torque acorn nut to 50 pound-inches (5.6 newton-meters).
- If new solenoid valves are used, remove protective covers and felt filtering disks (if present) from inlet and outlet ports.
- Bottom surfaces of solenoid valves must be parallel (check on flat surface).

- 1 Install pipe nipple (19) between outlet port of one solenoid valve (2) and inlet port of second solenoid valve.
- 2 Place solenoid valves (2) in soft-jawed vise.
- 3 Install elbow (17) into remaining solenoid valve (2) outlet port with connection end of elbow at 12 o'clock position.



- 4 Install elbow (18) into remaining solenoid valve (2) inlet port with connection end of elbow at 4 o'clock position.
- 5 Install adapter (10) to elbow (18).
- 6 Mount solenoid valves (2) on mounting bracket (11) with four flat washers (15) and four bolts (14).
- 7 Install mounting bracket (11) with two bolts (12) to engine lifting eye (13).
- 8 Position fuel line (8) and tighten nut (9) at adapter (10).
- 9 Connect fuel tube assembly (16) to elbow (17).
- 10 Position fuel tube assembly (16) and tighten nut (6) at elbow (7).
- 11 Connect ground lead (3) with screw (4) and new self-locking nut (5).
- 12 Connect two cable assemblies (1) to two solenoid valves (2).



WARNING

Move vehicle out of building before attempting to check system for operation/leaks and extinguish all open flames in the immediate area. Refer to TM 9-2350-256-10 for operating procedures.

- 13 Check all connections to ensure tightness.

NOTE

Follow-on maintenance: Install engine deck (see paragraph 9-51)

16-2 REPLACE FUEL TUBE ASSEMBLIES

THIS TASK COVERS

- a. Removal
- b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Locknut (Appendix G, item 94)
- Lockwasher (Appendix G, item 120)

Reference:

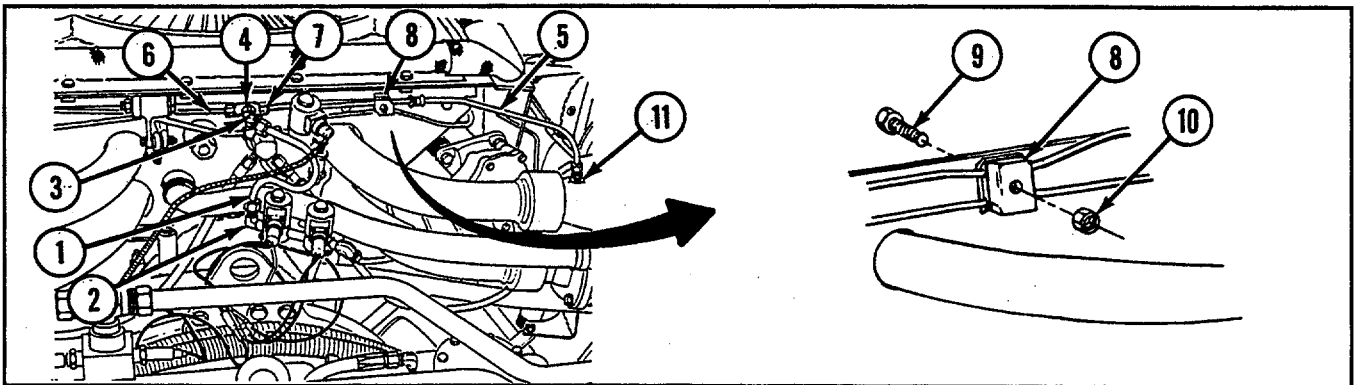
TM 9-2350-256-10

Equipment Condition:
Engine deck removed (see paragraph 9-51)

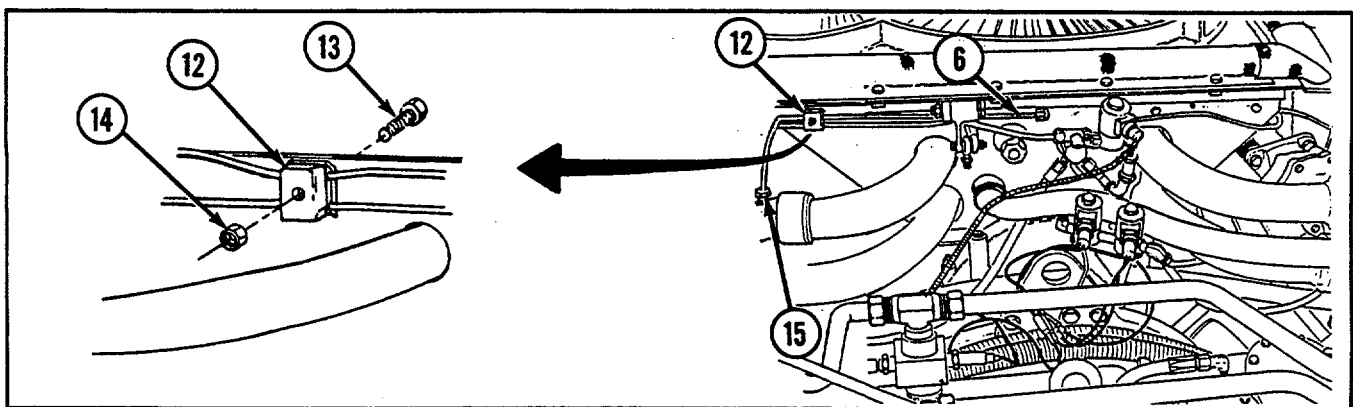
16-2 REPLACE FUEL TUBE ASSEMBLIES-Continued

a. REMOVAL

- 1 Remove tube assembly (1) by disconnecting from 90° elbow (2) and 45° elbow (3).
- 2 Remove tee (4) from between two tube assemblies (5 and 6) by loosening two nuts (7).
- 3 Remove 45° elbow (3) from tee (4).
- 4 Remove clamp (8) by removing bolt (9) and nut (10).
- 5 Remove tube assembly (5) by disconnecting from right exhaust manifold tube (11).



- 6 Remove clamp (12) by removing bolt (13) and nut (14).
- 7 Remove tube assembly (6) by disconnecting from left exhaust manifold tube (15).



- 8 Remove clamp (16) from gear housing cover (17) by removing screw (18) and flat washer (19).
- 9 Remove tube assembly (20) by disconnecting from elbow (21) and bulkhead elbow (22).
- 10 Disconnect tube assembly (23) from bulkhead elbow (22).
- 11 Remove bulkhead elbow (22) and flat washer (24) from shroud bracket (25) by removing lockwasher (26) and locknut (27).

12 Remove four clamps (28) by removing four screws (29).

13 Remove tube assembly (23) by disconnecting from elbow (30).

b. INSTALLATION

1 Install bulkhead elbow (22) and flat washer (24) to shroud bracket (25) with new lockwasher (26) and new locknut (27).

2 Install tube assembly (23) by connecting at bulkhead elbow (22) and elbow (30).

3 Secure tube assembly (23) with four clamps (28) and four screws (29).

4 Install tube assembly (20) by connecting to elbow (21) and bulkhead elbow (22).

5 Secure tube assembly (23) to gear housing cover (17) with clamp (16), screw (18), and flat washer (19).

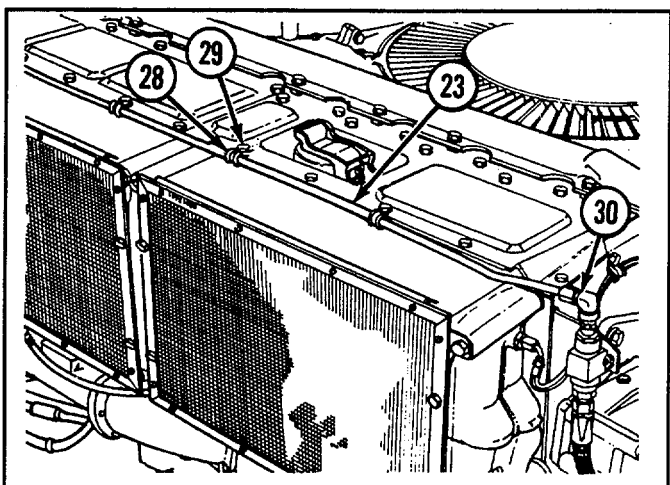
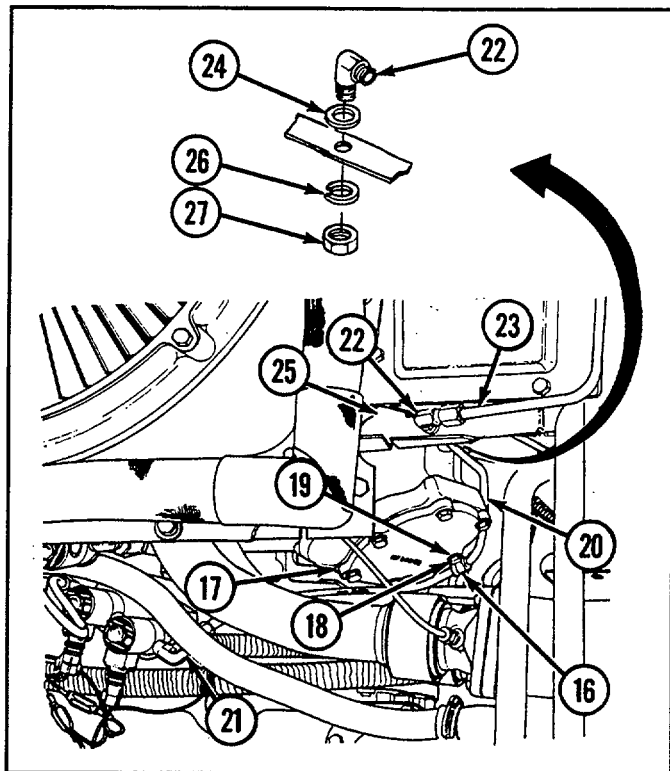
6 Install tube assembly (6) onto left exhaust manifold tube (15) and secure tube assembly with clamp (12), bolt (13), and nut (14).

7 Install tube assembly (5) onto right exhaust manifold tube (11) and secure tube assembly with clamp (8), bolt (9), and nut (10).

8 Install 45° elbow (3) to tee (4).

9 Install tee (4) between two tube assemblies (5 and 6) by tightening two nuts (7).

10 Install tube assembly (1) by connecting to 90° elbow (2) and 45° elbow (3).



WARNING

Move vehicle out of building before attempting to check system for operation/leaks and extinguish all open flames in the immediate area. Refer to TM 9-2350-256-10 for operating procedures.

11 Check all connections to ensure tightness.

NOTE

Follow-on maintenance: Install engine deck (see paragraph 9-51)

16-3 REPLACE FUEL SHUTOFF VALVE ASSEMBLY**THIS TASK COVERS**

- a. Removal b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's
(Appendix C, item 53)

Parts:

Nuts, self-locking (2)
(Appendix G, item 168)

Equipment Condition:

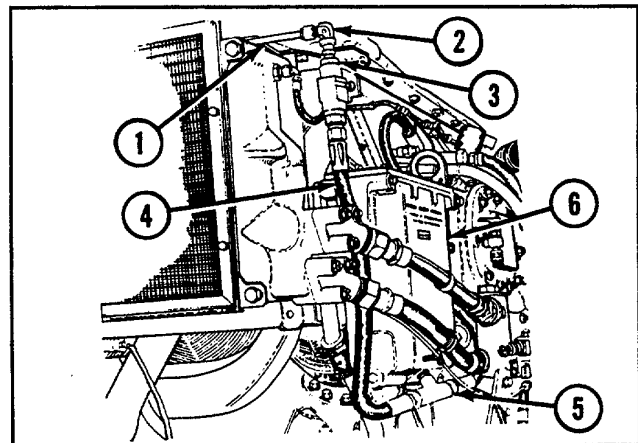
Engine deck removed (see
paragraph 9-51)

Reference:

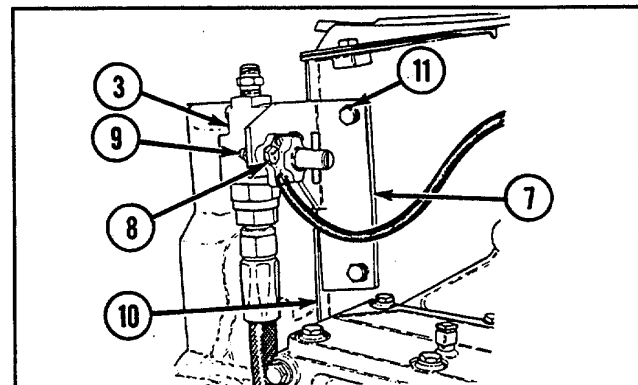
TM 9-2350-256-10

a. REMOVAL

- 1 Disconnect tube assembly (1) from elbow (2).
- 2 Remove elbow (2) from fuel shutoff valve (3).
- 3 Remove fuel hose assembly (4) by disconnecting from fuel shutoff valve (3) and from tee (5) at bottom of fuel/water separator (6).
- 4 Remove fuel shutoff valve (3) from mounting bracket (7) by removing two screws (8) and two self-locking nuts (9).
- 5 Remove mounting bracket (7) from front shroud plate (10) by removing two assembled washer screws (11).

**b. INSTALLATION**

- 1 Install mounting bracket (7) on front shroud plate (10) with two assembled washer screws (11).
- 2 Install fuel shutoff valve (3) into mounting bracket (7) with two screws (8) and two new self-locking nuts (9).
- 3 Connect fuel hose assembly (4) to tee (5) at bottom of fuel/water separator (6) and to fuel shutoff valve (3).
- 4 Install elbow (2) on fuel shutoff valve (3).
- 5 Connect tube assembly (1) to elbow (2).

**WARNING**

Move vehicle out of building before attempting to check system for operation/leaks and extinguish all open flames in the immediate area. Refer to TM 9-2350-256-10 for operating procedures.

- 6 Check all connections to ensure tightness.

NOTE

Follow-on maintenance: Install engine deck (see paragraph 9-51)

SECTION II: HULL COMPONENTS

Para.	Task	Page
16-4	Repair/Replace Driver's Bracket and Switch Assembly	16-7
16-5	Repair/Replace Commander's Plate and Switch Assembly	16-9

16-4 REPAIR/REPLACE DRIVER'S BRACKET AND SWITCH ASSEMBLY

THIS TASK COVERS

- | | | | |
|------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
|------------|----------------|-------------|-----------------|

INITIAL SET-UP

Tools:

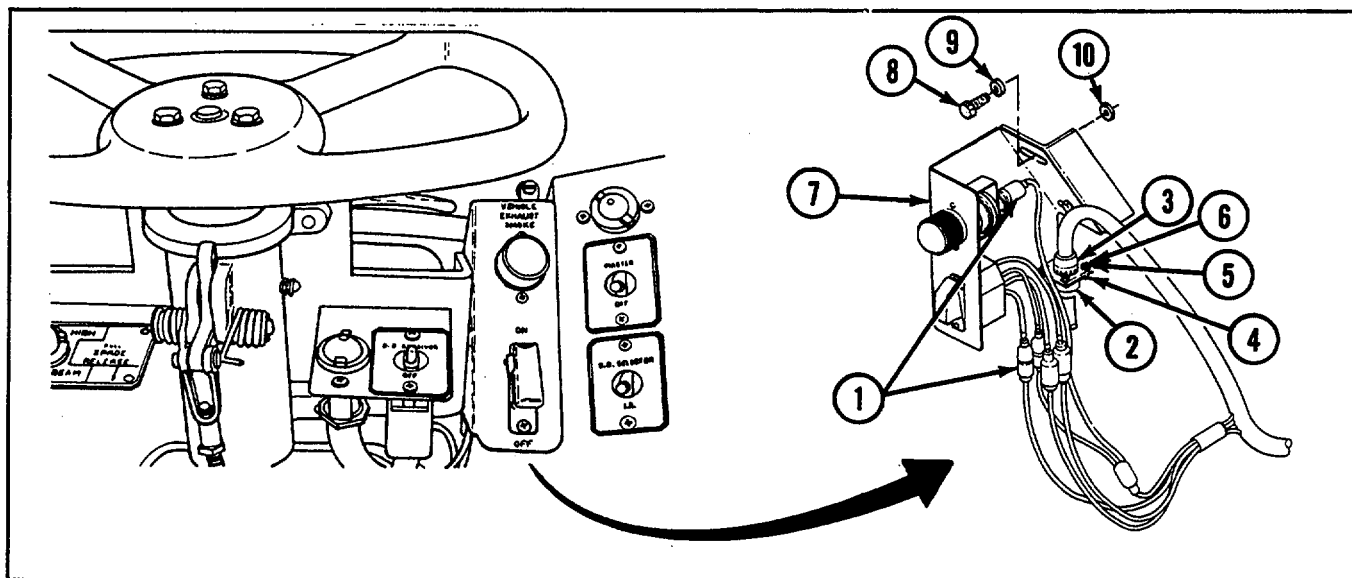
Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Lockwashers (2) (Appendix GC, item 104)
- Lockwashers (2) (Appendix G, item 108)
- Lockwashers (4) (Appendix G, item 127)
- Packing, preformed (Appendix G, item 194)

a. REMOVAL

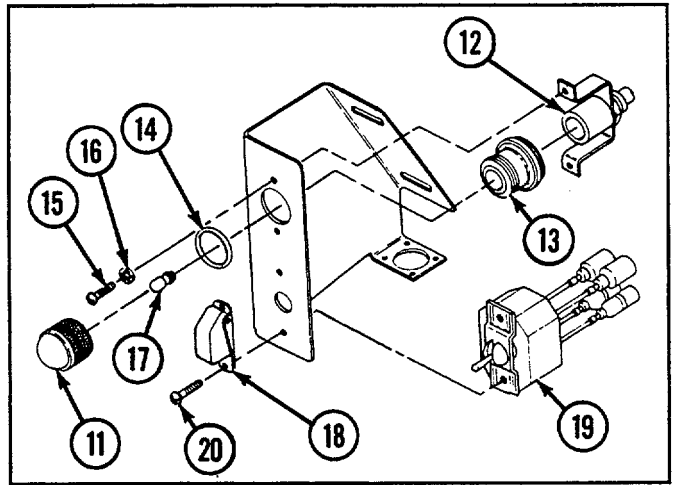
- 1 Tag and disconnect five electrical cables (1).
- 2 Disconnect wiring harness (2).
- 3 Disconnect wiring harness (3) by removing four screws (4), four lockwashers (5), and four nuts (6).
- 4 Remove bracket (7) by removing two screws (8), two lockwashers (9), and two flat washers (10).



16.4 REPAIR/REPLACE DRIVER'S BRACKET AND SWITCH ASSEMBLY- Continued

b. DISASSEMBLY

- 1 Unscrew and remove light lens (11).
- 2 Remove indicator light (12), adapter (13), and preformed packing (14) by removing two screws (15) and two lockwashers (16).
- 3 Remove lamp (17) from indicator light (12) by pressing in lamp and turning counterclockwise.
- 4 Remove switch guard (18) and switch assembly (19) by removing two screws (20).
- 5 Disassemble switch assembly (19) cables (see Chapter 6, Section VII).

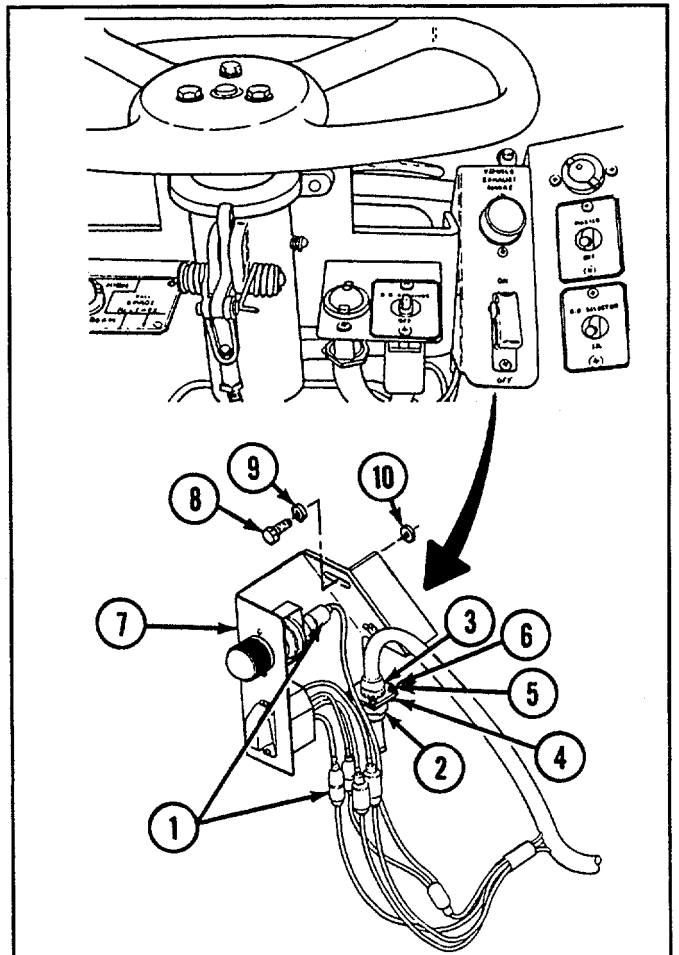


c. ASSEMBLY

- 1 Assemble switch assembly (19) cables (see Chapter 6, Section VII).
- 2 Install switch guard (18) and switch assembly (19) with two screws (20).
- 3 Install lamp (17) in indicator light (12) by pressing in lamp and turning clockwise.
- 4 Install indicator light (12), adapter (13), and new preformed packing (14) with two screws (15) and two new lockwashers (16).
- 5 Install light lens (11).

d. INSTALLATION

- 1 Install bracket (7) with two screws (8), two new lockwashers (9), and two flat washers (10).
- 2 Connect wiring harness (3) with four screws (4), four new lockwashers (5), and four nuts (6).
- 3 Connect wiring harness (2).
- 4 Connect five electrical cables (1). Remove tags.



16-5 REPAIR/REPLACE COMMANDER'S PLATE AND SWITCH ASSEMBLY**THIS TASK COVERS**

a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP**Tools:**

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Lockwashers (2) (Appendix G, item 106)

NOTE

Commander's plate and switch assembly is only found in vehicles equipped with an M239 smoke grenade launcher.

a. REMOVAL

- 1 Remove plate (1) from M239 launcher switch bracket (2) by removing two nuts (3), two screws (4), and two lockwashers (5).
- 2 Tag and disconnect four electrical cables (6).

b. DISASSEMBLY

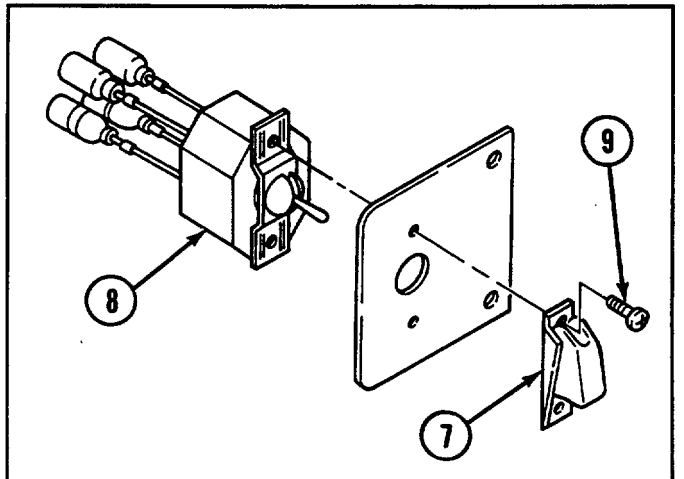
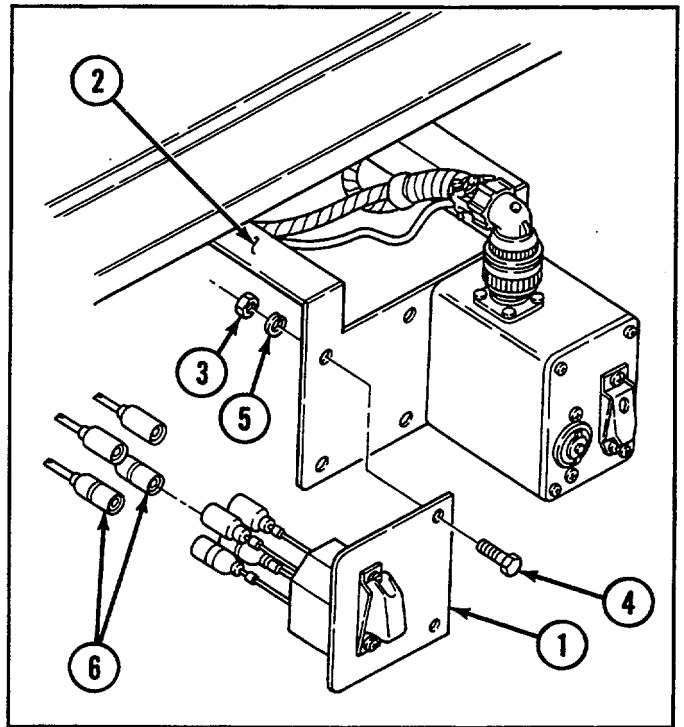
- 1 Remove switch guard (7) and switch assembly (8) by removing two screws (9).
- 2 Disassemble switch assembly (8) leads (see Chapter 6, Section VII).

c. ASSEMBLY

- 1 Assemble switch assembly (8) leads (see Chapter 6, Section VII).
- 2 Install switch assembly (8) and switch guard (7) with two screws (9).

d. INSTALLATION

- 1 Connect four electrical cables (6). Remove tags.
- 2 Install plate (1) to M239 launcher switch bracket (2) with two screws (4), two new lockwashers (5), and two nuts (3).



**CHAPTER 17
PREPARATION FOR STORAGE AND SHIPMENT**

CHAPTER OVERVIEW

This chapter covers the requirements for storage and shipment of the M88A1.

This chapter consists of the following paragraphs:

Para.	Task	Page
17-1	Preparation for Shipment.....	17-1
17-2	Preservatives	17-1
17-3	Army Shipping Documents.....	17-1
17-4	Limited Storage Instructions.....	17-1
17-5	Receiving Inspection	17-2
17-6	Inspection During Storage.....	17-2
17-7	Removal from Limited Storage	17-2
17-8	Loading	17-2
17-9	Blocking.....	17-3
17-10	Vehicle Size Reduction to Accommodate Rail Clearance.....	17-3
17-11	Rail Carrier Limitation Accommodations	17-3
17-12	Transportability Data.....	17-4

17-1 PREPARATION FOR SHIPMENT

When shipping the M88A1, the officer in charge of preparing the shipment will be responsible for furnishing the materiel in serviceable condition, properly cleaned, processed, packaged, and packed.

17-2 PRESERVATIVES

Personnel withdrawing the vehicle from storage for shipment must not remove preservatives other than to ensure that the materiel is complete and serviceable. If preservatives have been removed, they must be restored to prescribed level of preservation prior to shipment.

17-3 ARMY SHIPPING DOCUMENTS

Prepare all Army shipping documents in accordance with AR 55-355.

17-4 LIMITED STORAGE INSTRUCTIONS

When received for storage and already processed for domestic shipment by the manufacturer as indicated on DD Form 1397, the vehicle will not be reprocessed unless inspection performed on receipt of materiel reveals corrosion, deterioration, etc.

Upon receipt from manufacturing facilities, if the procession data on the tag indicated that preservation has been rendered ineffective by operation or by freight shipping damage, completely process the vehicle in accordance with MIL-R-62220.

Vehicle to be prepared for administrative storage must be given a limited technical inspection and processed as prescribed on DD Form 1397. The results of the inspection and classification will be entered on DA Form 2404.

17-5 RECEIVING INSPECTION

Immediately upon receipt of the vehicle for storage, inspect and service the vehicle as prescribed. Perform a systematic inspection. Replace or repair all missing or broken parts. If repairs are beyond the scope of the unit and materiel will be inactivated for an appreciable length of time, place materiel in limited storage and attach tags specifying the repairs needed. The report of these conditions will be submitted by the unit commander for action by an ordnance maintenance unit.

When materiel is inactivated for a limited time (not to exceed 90 days), it will be processed in accordance with TM 740-90-1.

Prepare a DD Form 6 for all shipments received in a damaged or otherwise unsatisfactory condition due to deficiencies in preservation, packaging, marking, handling, loading, or storage, and for apparently excessive preservation.

The preferred storage site for vehicles is in dry, covered sheds. When it is necessary to store materiel outdoors, protect it against the elements as prescribed in TM 743-200.

17-6 INSPECTION DURING STORAGE

Perform a visual inspection periodically to determine general condition. If corrosion is found, remove it and clean, paint, and treat vehicle with the prescribed preservatives.

NOTE

Touchup painting will be in accordance with TM 43-0139.

17-7 REMOVAL FROM LIMITED STORAGE

If a vehicle is not shipped or issued upon expiration of the limited storage period, process as applicable in accordance with MIL-R-62220.

If a vehicle to be shipped will reach its destination within the limited storage period, it need not be reprocessed when removed from storage, unless necessary because of anticipated in-transit weather conditions.

When the vehicle is to be placed into service, immediately deprocess in accordance with instructions on DD Form 1397.

17-8 LOADING

CAUTION

The height and width of a vehicle, when prepared for rail transportation, must not exceed the limitations prescribed for particular railroad lines. Whenever possible, local transportation officers must be consulted about the limitations of the particular railroad lines to be used for the movement in order to avoid delays, dangerous conditions, and damage to equipment.

When a vehicle is shipped by rail, every precaution must be taken to see that it is properly loaded, blocked, and securely fastened to flatcar floor.

Inspect flatcar prior to loading and see that it is in a suitable condition to carry loads safely.

Prepare flatcar for loading by removing debris, previous blocking, nails, and other obstructions. Inspect flatcar for loose or broken floor planks. If found unsatisfactory, reject car for use.

If suitable hoisting equipment, permanent loading ramps, and handling equipment are not available for loading or unloading materiel, improvised runways, ramps, and spanning platforms can be constructed.

Loading must be governed by the capacity and length of flatcars available at time of shipment, as well as requirements of bills of lading and shipping instructions.

17-9 BLOCKING

All blocking instructions specified herein are in accordance with the Association of American Railroads Pamphlet, Section No. 6 (Rules Governing the Loading of Department of Defense Materiel on Open-Top Cars). Additional blocking may be added at the discretion of the officer in charge.

17-10 VEHICLE SIZE REDUCTION TO ACCOMMODATE RAIL CLEARANCE

The height and width of the M88A1 vehicle can be reduced to conform to the limitations prescribed by a particular railroad line for transportation on its standard flatcar by removing the items noted in the rail carrier limitation accommodations table.

The overall width of 135 inches (in.) (3429 millimeters [mm]) can be reduced to 124 in. (3150 mm) by the removal of fender assemblies, tracks, hub and sprocket assemblies, spade extensions, table block brackets, tow bar brackets, pioneer tool kit bracket, and clamps.

The overall height can also be reduced from 117-1/4 in. (2978.2 mm) to 112-5/8 in. (2860.7 mm) by the removal of tracks.

17-11 RAIL CARRIER LIMITATION ACCOMMODATIONS

Items Recommended For Removal To Accommodate Rail Carrier Limitations	Rail Carrier And Clearances (X Denotes Removal Required)			
	Bernie International (Car Deck Height 50 In. [1270 Mm])	Near East (Car Deck Height 49 In. [1245 Mm])	Association of American Railroads (Car Deck Height 41 In. [1041 Mm])	Far East (Car Deck Height 50 In. [1270 Mm])
Caliber .50 machine gun	X	X	X	X
Tracks (2)	X	X	X	X
Track drive hubs (2) and sprockets (4)	X	X	X	X
Tow cables (2)	X	X	X	X
Fenders, supports, etc.	X	X	X	X
Spare roadwheels (2)	X	X	X	X
Snatch block and bracket	X	X	X	
Tow bar and mounting brackets (2)	X	X	X	
Spade extensions (2)	X	X	X	X
Spare track support rollers (2)	X	X		
Spare drive sprockets (2)	X	X		
Tow cable mounting brackets (6)	X	X		
Spare track link (6)	X			
Pioneer kit mounting bracket	X			
Boom support	X			
M13 decontamination apparatus bracket assembly	X	X	X	X

17-12 TRANSPORTABILITY DATA

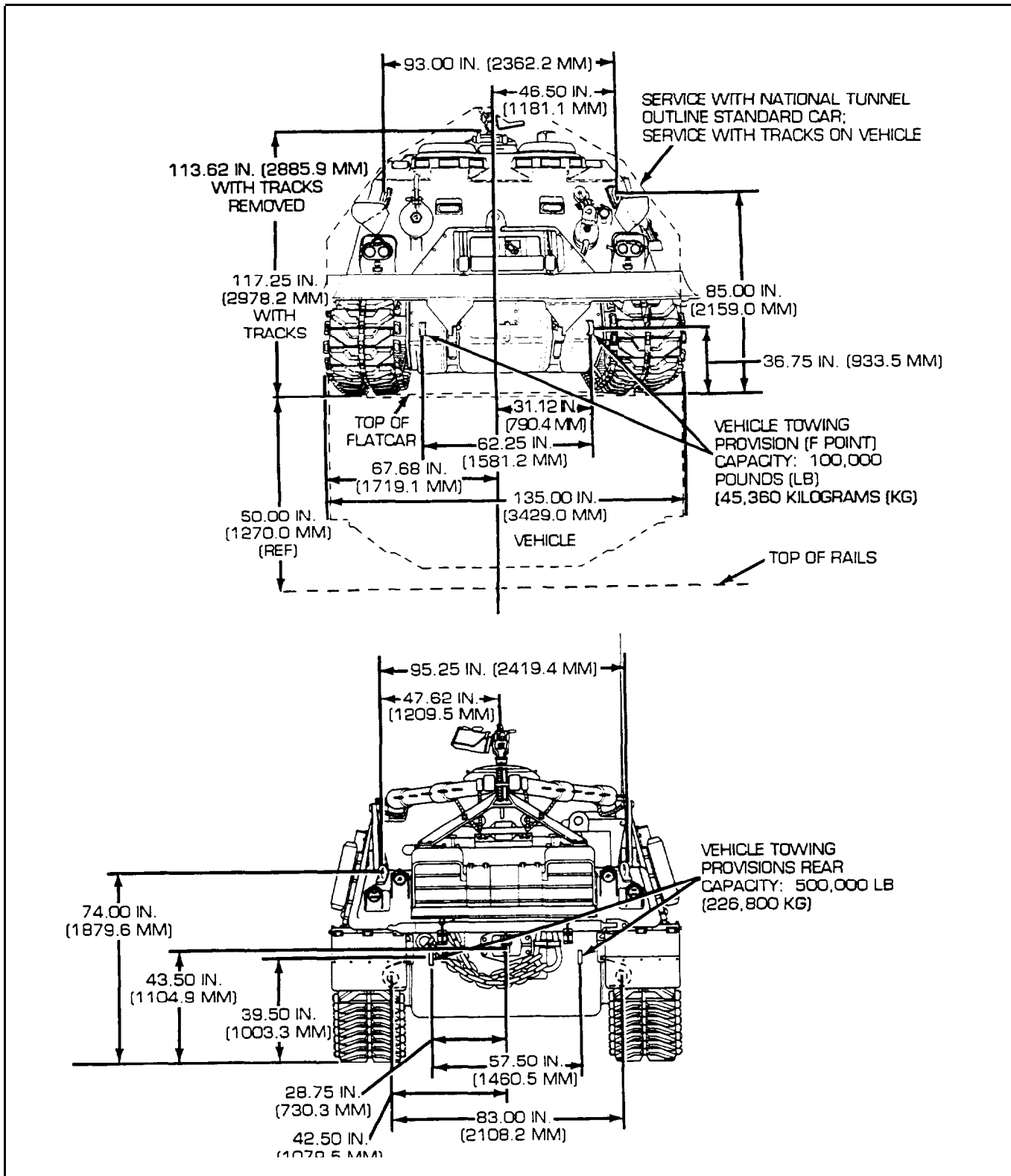


Figure 17-1 Transportability Data (1 of 2).

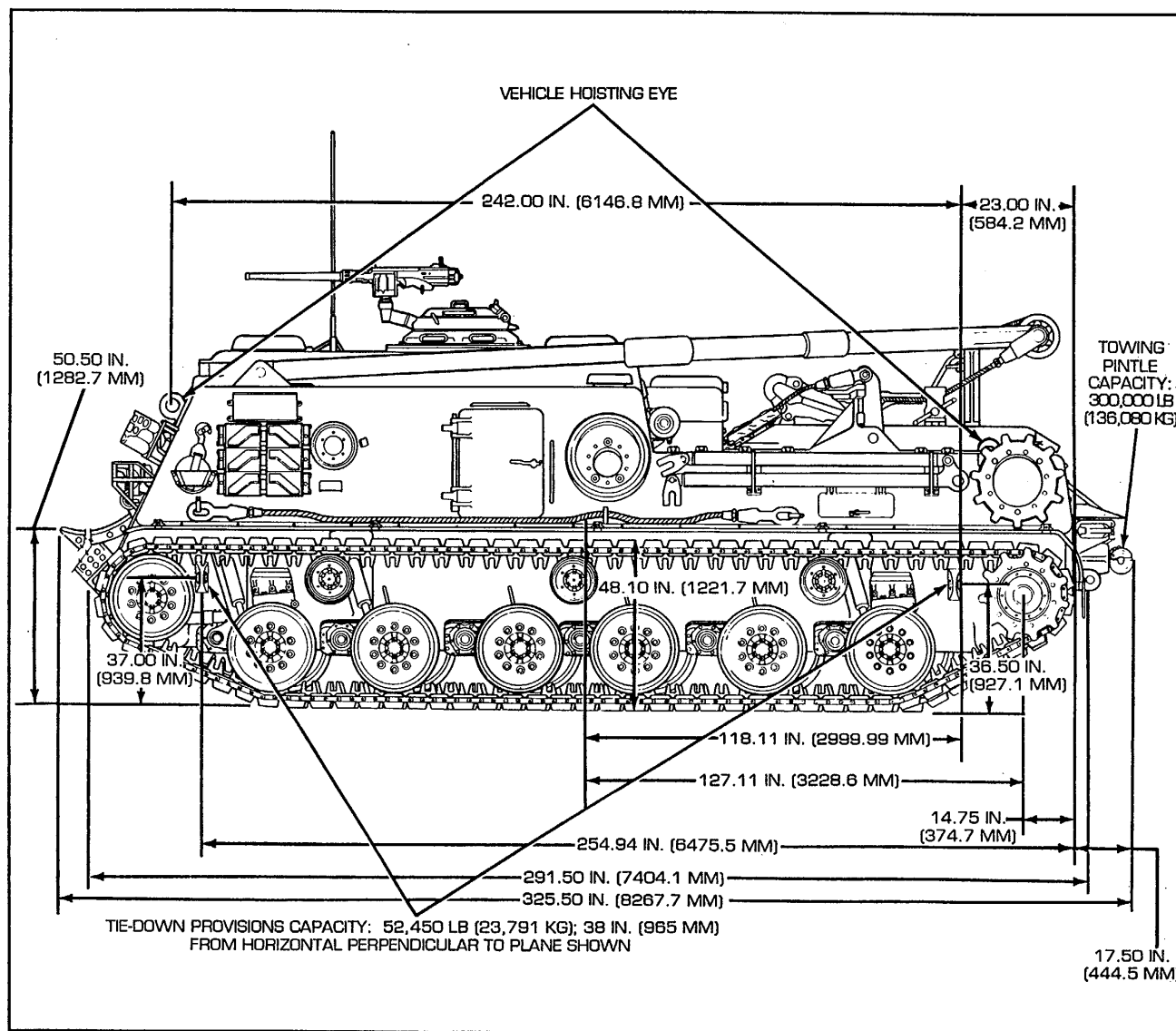


Figure 17-1. Transportability Data (2 of 2).

17-12 TRANSPORTABILITY DATA continued

Nomenclature	Assembled	Items Removed
Length	325-1/2 in. (8268 mm)	325-1/2 in. (8268 mm) (maximum [max])
Width	135 in. (3429 mm)	124 in. (3150 mm) (Berne Tunnel)
Height	117-1/4 in. (2978.2 mm)	112-5/8 in. (2860.7 mm) (max)
Weight	110,000 lb (49896 kg) (max)	93,612.95 lb (42462.834 kg)
Unit ground pressure	109 psi (752 kilopascals)	
Shipping dimensions:		
Area	305.16 square feet (sq. ft) (28.349 square meters [sq. m])	280.29 sq. ft (26.039 sq. m)
Volume	2981.63 cubic feet (cu. ft) (84.440 cubic meters [cu. m])	2630.53 cu. ft (74.497 cu. m)
Center of gravity:		
Above ground	45.1 in. (1146 mm)	
From centerline of cross-drive	127.11 in. (3228.6 mm)	

APPENDIX A REFERENCES

APPENDIX OVERVIEW

This appendix lists all technical bulletins, forms, field manuals, technical manuals, pamphlets, lubrication orders, and regulations referenced in this manual.

This appendix consists of the following paragraphs:

Para.	Task	Page
A-1	Army Regulations	A-1
A-2	Department of Defense Forms	A-1
A-3	Department of the Army Forms	A-1
A-4	Department of the Army Pamphlets	A-1
A-5	Field Manuals	A-2
A-6	Lubrication Order	A-2
A-7	Standard Form	A-2
A-8	Technical Bulletins	A-2
A-9	Technical Manuals	A-2

A-1 ARMY REGULATIONS

Packaging of Army Materiel for Shipment and Storage	AR. 746-1
Requisitioning, Receipt, and Issue System	AR.725-50
Transportation Facility Guide (TFG) Records, U.S. Army.	AR. 55-355

A-2 DEPARTMENT OF DEFENSE FORMS

Duty Roster	DD Form 6
Processing and Deprocessing Record for Shipment, Storage and Issue of Vehicles and Spare Engines	DD Form 1397

A-3 DEPARTMENT OF THE ARMY FORMS

Equipment Daily or Monthly Log	D.A. Form 2408-1
Equipment Inspection and Maintenance Worksheet.	D.A Form 2404
Maintenance Request.	D.A. Form 2407
Recommended Change to Equipment Technical Publications	DA Form 2028-2
Recommended Changes to Publications and Blank Forms	D.A Form 2028

A-4 DEPARTMENT OF THE ARMY PAMPHLETS

Index of Administrative Publications (Regulations, Circulars, Pamphlets, Posters, Joint Chiefs of Staff Publications, DOD and Miscellaneous)	DPAM 310-1
Index of Army Motion Pictures and Related Audio-Visual Aids	DA PAM 108-1
Index of Blank Forms	PAM 310-2
Index of Doctrinal, Training, and Organizational Publications	DPAM 310-3
Index of Supply Catalogs and Supply Manuals (excluding types 7, 8, and 9)	DA PAM 310-6
index of Technical Manuals, Technical Bulletins, Supply Manuals (types 7,8, and 9), Supply Bulletins, and Lubrication Orders	DPAM 310-4

A-4 DEPARTMENT OF THE ARMY PAMPHLETS-Continued

The Army Maintenance Management System (TAMMS)DA PAM 738-750
 U.S. Army Equipment Index of Modification Work Orders.....DA PAM 310-7

A-5 FIELD MANUALS

Browning Machinegun, .50-Caliber HB, M2..... FM 23-65
 Camouflage..... FM 5-20
 Explosives and Demolition..... FM 5-25
 First Aid for Soldiers.....FM.21-11
 NBC (Nuclear, Biological, and Chemical) Defense FM 21-40
 Operation and Maintenance of Ordnance Material in Extreme Cold Weather 0° to -65° F..... FM 9-207
 Vehicle Recovery Operations..... FM 20-22

A-6 LUBRICATION ORDER

Deleted

A-7 STANDARD FORM

Product Quality Deficiency Report..... SF Form 368

A-8 TECHNICAL BULLETINS

Domelight Lens Replacement..... TB 9-2300-278-20
 Nonaeronautical Equipment Army Oil Analysis Program (AOAP)..... TB 43-0210
 Solder and Soldering I-B SIG-222

A-9 TECHNICAL MANUALS

Chemical, Biological, and Radiological (CBR) Decontamination..... TM 3-220
 Lead Acid Storage Batteries..... TM 9-6140-200-14
 Operator's and Organizational Maintenance Manual: Grenades, Hand and Rifle TM 9-1330-200-12
 Operator's Manual for Recovery Vehicle, Full-Tracked: Medium, M88A1
 (NSN 2350-00-122-6826) TM 9-2350-256-10
 Organizational Maintenance Repair Parts and Special Tools List for Recovery
 Vehicle, Full-Tracked: Medium, M88A1 (NSN 2350-00-122-6826) TM 9-2350-256-24P-1
 Operator's Manual Machinegun, .50-Caliber; Browning M2, Heavy Barrel,
 Flexible, w/e (NSN 1005-00-322-9716); Mount, Machinegun, Anti-aircraft,
 .50-Caliber, M63 w/e (NSN 1005-00-673-3246)..... TM 9-1005-213-10
 Operator's Organizational, Direct Support, and General Support Maintenance
 Manual (Including Repair Parts and Special Tools Lists) (Including Depot
 Maintenance Repair Parts and Special Tools): Various Machinegun Mounts
 and Combinations Used on Tactical and Armored Vehicles TM 9-1005-245-14
 Operator's Organizational, Direct Support, and General Support Maintenance Manual
 for Lead-Acid Storage Batteries; 4 HN, 24 V (NSN 6140-00-059-3528) MS75047-1; 2 HN,
 12 V (6140-00-057-2553) MS3500C-1; 6 TN 12 V (6140-00-057-2554) MS35000-3 TM 9-6140-200-14
 Operator's and Organizational Maintenance Manual Including Repair Parts and Special
 Tools List Simplified Test Equipment for Internal Combustion Engines-
 Reprogrammable TM 9-4910-571-12&P
 Organizational Maintenance Manual (Including Repair Parts and Special Tools Lists):
 Launcher, Grenade, Smoke: Screening, RR, M239 (NSN 1040-01-015-0874) TM 3-1040-266-20&P

Organizational, Direct Support, and General Support Maintenance Manual:
Standards for Inspection and Classification of Tracks, Track Components
and Solid-Rubber Tires (FSC 2530) TM 9-2350-200-24

Organizational, Field, and Depot Maintenance Repair Parts List for Wrench, Impact,
Hydraulic TM 9-5130-338-15P

Painting Instructions for Field Use TM 43-0139

Personnel Heater TM 9-2540-205-24&P

Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use TM 750-244-6

Radio Interference Suppression TM 11-483

**APPENDIX B
MAINTENANCE ALLOCATION CHART (MAC)**

APPENDIX OVERVIEW

This appendix provides a general explanation of all maintenance and repair functions, designates overall authority and responsibility for the performance of maintenance functions, and lists the tools and test equipment required for each maintenance function.

This appendix consists of the following sections:

		Page
Section I:	Introduction	B-1
Section II:	MAC	B-4
Section III:	Tools and Test Equipment	B-26

SECTION I: INTRODUCTION

Para.	Task	Page
B-1	The Army Maintenance System MAC	B-1
B-2	Maintenance Functions	B-1
B-3	Explanation of Columns in the MAC, Section II	B-2
B-4	Explanation of Columns in Tools and Test Equipment, Section III.....	B-3

B-1 THE ARMY MAINTENANCE SYSTEM MAC

a. This introduction provides a general explanation of all maintenance and repair functions authorized at various maintenance levels under the standard Army Maintenance System concept.

b. The MAC in Section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of *the designated maintenance levels, which* are shown on the MAC in column 4 as:

- Unit-includes two subcolumns, C (Operator/Crew) and O (Unit) Maintenance.
- Direct Support-includes an F subcolumn.
- General Support-includes an H subcolumn.
- Depot-includes a D subcolumn.

c. Section III lists the tools and test equipment required for each maintenance function as referenced from Section II.

B-2 MAINTENANCE FUNCTIONS

Maintenance functions are limited to and defined as follows:

a. INSPECT To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).

b. TEST To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. SERVICE Operations required periodically to keep an item in proper operating condition, e.g., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

B2 MAINTENANCE FUNCTIONS-Continued

d. ADJUST To maintain or regulate, within prescribed limits, by bringing into proper position, or by setting the operating characteristics to specified parameters.

e. ALINE To adjust specified variable elements of an item to bring about optimum or desired performance.

f. CALIBRATE To determine and cause corrections to be made or to be adjusted on instruments or test, measuring, and diagnostic equipment used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. REMOVE/INSTALL To remove and install the same item when required to perform services or other maintenance functions. "Install" may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. REPLACE To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and assigned maintenance level is shown as the third position code of the Source, Maintenance, and Recoverability (SMR) code.

i. REPAIR The application of maintenance services 1 including fault location/troubleshooting, 2 removal/installation, disassembly/assembly 3 procedures, and maintenance actions 4 to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. OVERHAUL That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications (i.e., Depot Maintenance Work Requirement [DMWR]). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like-new condition.

k. REBUILD Consists of those services/actions necessary for the restoration of unserviceable equipment to a like- new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (e.g., hours/miles) considered in classifying Army equipment/components.

B3 EXPLANATION OF COLUMNS IN THE MAC, SECTION II

a. COLUMN 1, GROUP NUMBER This lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly.

b. COLUMN 2, COMPONENT/ASSEMBLY This contains the item names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

¹ Inspect, test, service, adjust, aline, calibrate, and/or replace.

² The process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or unit under test (UUT).

³ The step-by-step breakdown (taking apart) of a spare functional group coded item to the level of its least component that is assigned an SMR code for the level of maintenance under consideration (i.e., identified as maintenance significant).

⁴ Welding, grinding, riveting, straightening, facing, machining, and/or resurfacing.

c. COLUMN 3, MAINTENANCE FUNCTION This lists the functions to be performed on the item listed in column 2. (For detailed explanation of these functions, see paragraph B-2.)

d. COLUMN 4, MAINTENANCE LEVEL This specifies each level of maintenance authorized to perform each function listed in column 3 by indicating work-time required (expressed as man-hours in whole hours or decimals) in the appropriate subcolumn. This work-time figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance levels, appropriate work-time figures are to be shown for each level. The work-time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), fault location/troubleshooting time, and quality assurance time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the MAC. The symbol designations for the various maintenance levels are as follows:

C Operator/Crew Maintenance
 O Unit Maintenance
 F Direct Support Maintenance
 L Specialized Repair Activity (SRA)⁵
 H General Support Maintenance
 D Depot Maintenance

e. COLUMN 5, TOOLS AND TEST EQUIPMENT REFERENCE CODE This specifies, by code, those common tools sets (not individual tools), common Test, Measurement, and Diagnostic Equipment (TMDE), and special tools, special TMDE, and special support equipment required to perform the designated function. Codes are keyed to tools and test equipment in Section III.

f. COLUMN 6, REMARKS When applicable, this contains a letter code, in alphabetical order.

B4 EXPLANATION OF COLUMNS IN TOOLS AND TEST EQUIPMENT, SECTION III

a. COLUMN 1, REFERENCE CODE This is correlated with the code used in the MAC, Section II, column 5.

b. COLUMN 2, MAINTENANCE LEVEL This is the lowest level of maintenance authorized to use the tool or test equipment.

c. COLUMN 3, NOMENCLATURE This is the name or identification of the tools or test equipment.

d. COLUMN 4, NATIONAL STOCK NUMBER (NSN) This is assigned to the tool or test equipment; use it to request or requisition the item.

e. COLUMN 5, TOOL NUMBER This is the manufacturer's part number, model number, or type number.

⁵ This maintenance level is not included in Section II, column 4 of the MAC. Functions to this level of maintenance are identified by a work-time figure in the "H" column of Section II, column 4 and an associated referenced code is used in the "Remarks" column, column 6.

SECTION II: MAC

(1) Group Number	(2) Component /Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			C	O	F	H	D		
01 0100	ENGINE Adapter assembly	Replace				1.0			
		Repair				2.0			
	Powerplant	Inspect	0.1	0.5				133 thru 140	
		Test		0.4					
		Service	0.2	0.8					
		Adjust		0.4					
		Replace		9.0					
		Repair		3.5					
	Engine, diesel	Inspect			1.0			1,2,3,7,10 thru 14,16 thru 22,	
		Test		2.0	0.3			25,27 thru 31,39,41	
		Adjust		0.5	2.0			49 thru 57,140	
		Replace		25.0					
		Repair		8.0	50.0				
	Overhaul						297.0		
	Engine front mounting	Inspect		0.2					
		Replace		25.5					
		Repair		0.5					
	Cylinders assembly and valves	Inspect				1.5		4,5,6,8,9, 15,23 thru 26,32,33,	
		Replace				4.0			
		Repair				8.0			
0101	Cylinder head	Inspect				1.5			
	Replace					3.0			
	Repair						4.0		
0102	Crankshaft	Inspect				1.5			
	Replace					2.0			
	Repair						3.0		
0104	Connecting rod, piston	Inspect					1.0		
		Replace					1.5		
		Repair					2.0		
0105	Rocker arm assembly (intake/exhaust)	Inspect			0.5				
	Replace				1.0				
	Repair				2.0				
	Housing assembly, camshaft	Replace					0.5		
	Repair						1.0		
	Plate assembly, camshaft	Replace					0.5		
	Repair						1.0		
0106	Housing assembly, crankshaft	Replace					0.5		
	Repair						1.5		

SECTION II: MAC

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(1) Group Number	(2) Component /Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			C	O	F	H	D		
0108	Filler, neck Replace Oil pan	Inspect		0.2					
		Replace		0.5					
		Oil pan	Inspect				0.3		
	Oil pump	Replace					0.5		
		Repair					1.0		
		Oil pump	Inspect			0.2			
	Oil cooler, engine/transmission	Replace					0.5		
		Repair					1.5		
		Oil cooler, engine/transmission	Inspect	0.1	0.3				
		Service		0.5					
		Test		0.5					
	Oil cooler frames and shrouds	Replace							
		Repair					3.0		
		Inspect							
		Replace					12.0		
Repair						2.0			
Exhaust manifold and pipe	Inspect					0.5			
	Replace					1.0			
	Repair						1.5		
Exhaust manifolds	Inspect					0.5			
	Replace					1.0			
	Housing assembly accessory drive	Replace					0.3		
Control, automatic	Repair						0.5		
	Replace						0.5		
	Repair						1.0		
Power, take off	Replace					0.5			
	Repair					1.0			
	FUEL SYSTEM								
0301 Injector, fuel	Inspect					1.0			
	Test					1.0			
	Replace					3.0			
	Repair					4.0			
0302 Pump, fuel injection	Inspect					0.3			
	Replace					0.5			
	Repair						1.0		
	Pump, fuel, electric	Test		0.3					
	Replace			3.0					
Pump, fuel motoring	Repair						3.5		
	Replace					0.3			
	Repair						0.5		
Nozzle and holder assembly, fuel injector	Inspect			0.3					
	Test					1.0			
	Adjust					1.0			
	Replace					3.0			
Repair	Repair					1.0			

170 thru
178

12,13,51,
29,57

(1) Group Number	(2) Component /Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			C	O	F	H	D		
0304	Pump, fuel (engine)	Inspect			0.3				
		Service			0.3				
		Test		0.3					
		Adjust			0.1				
		Replace		0.1					
		Repair			2.0				
	Pump, fuel electrical (fuel tank)	Test			0.3	0.5			
		Replace			3.0				
		Repair			0.5				
	Coupling, flexible shaft	Replace				1.0			
		Repair				1.5			
		Overhaul				2.0			
0304	Air cleaner	Inspect	0.1						
		Replace		4.0					
		Repair		2.0					
0305	Turbosupercharger	Inspect			0.3			166 thru 169	
		Replace			3.0				
		Repair				4.0			
0306	Tank, fuel	Inspect		0.3					
		Service	0.5						
		Replace			11.0				
	Fuel filler tube	Repair			4.0				
		Inspect			0.3				
		Repair			0.3				
	Pump, purge	Replace			0.3				
		Inspect			0.2				
		Replace			1.0				
	0309	Gate valves, fuel control	Inspect			2.0			
			Replace		0.5				
			Repair		1.0				
Fuel filter bracket assembly		Repair		0.5					
		Inspect			1.0				
		Replace			1.0				
Filter assembly, primary		Repair			0.1				
		Inspect			0.3				
		Service			10.0				
Filter assembly, fuel/water separator		Replace			0.3				
		Inspect			1.0				
		Service			0.4				
0311	Heater assembly, manifold	Replace		10.0				12,13	
		Repair		0.3					
		Inspect		0.3					
	Heater, coolant engine	Service			0.3				
		Replace			10.3				
		Inspect			1.0				

SECTION II: MAC

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(1) Group Number	(2) Component /Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			C	O	F	H	D		
0312	Tube assembly, manifold heater Controls and linkage, accelerator and throttle	Replace		1.5					
		Repair		1.5					
		Service		0.5					
		Align		0.5					
		Inspect	0.5	0.5					
		Adjust		2.0					
		Replace		1.0					
		Repair		5.0					
04 0401	EXHAUST SYSTEM Pipes	Replace		1.5					
05 0502	COOLING SYSTEM Engine seal, air inlet	Inspect		0.3					
0505	Fan assembly	Replace		1.0				31,45	
		Inspect		0.3					
		Test		0.3					
		Replace		4.0					
		Repair			4.5				
		Inspect		1.0					
		Replace		4.0					
		Repair		2.0					
06 0601	ELECTRICAL SYSTEM Generator, engine accessory	Replace		1.0					
		Repair		4.0					
		Retainer and oil seal assembly		1.0					
		Repair		0.5					
		Inspect		0.3					
		Test			0.3				
		Replace		13.0					
		Repair			3.4			55	
0602	Bracket mounting	Replace		0.3					
		Repair		0.5					
		Inspect	0.2	0.2					
		Test		0.2					
0603	Regulator, generator (dual and single voltage)	Replace		0.4					
		Repair		1.0					
		Inspect		0.3		0.3			
		Test							
0603	Motor, starting	Replace		12.0				56	
		Repair			2.4				
		Overhaul					7.0		
		Inspect		0.2					
		Test		0.7					
		Adjust			0.7				
		Replace			0.8				
		Repair			5.6				
0603	Switching relay box assembly (single voltage regulator)	Inspect		0.2					
		Test		0.7					
		Adjust			0.7				
		Replace			0.8				
0603	Switching relay box assembly (single voltage regulator)	Repair			5.6				

(1) Group Number	(2) Component /Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			C	O	F	H	D		
0606	Fuel injection pump, fuel shutoff solenoid, Electrical Lead and Related Parts	Inspect Replace		0.5 1.0					
0607	Main Switch panel assembly	Inspect Replace Repair	0.5	1.0 1.5					
	Main lighting and blackout (B.O.) selector switch wiring harness	Inspect Replace Repair		0.5 1.0 1.0					
	Main lighting and master relay wiring harness	Inspect Replace Repair		0.5 1.0 1.0					
	Starter switch wiring harness	Inspect Replace Repair		0.5 1.0 1.0					
	Switch panel electrical lead (10911920)	Inspect Replace Repair		0.5 0.5 0.5					
	Switch panel electrical lead (11671227-2)	Inspect Replace Repair		0.5 0.5 0.5					
	Switch panel electrical lead (11671227-3)	Inspect Replace Repair		0.5 0.5 0.5					
	Gage panel assembly (11671903)	Inspect Replace Repair		1.0 1.0 1.0					
	Gage panel wiring harness assembly	Inspect Replace Repair		0.5 1.0 1.0					
	Electrical accessories panel	Inspect Replace Repair	0.5	1.0 1.0 1.5					
	Bilge pump, generator cutout switch, FTO	Replace Repair		0.5 0.5					
	Engagement and M239 smoke launcher power box warning light								
	Accessories panel generator cutout switch assembly	Inspect Replace Repair		0.5 1.0 1.0					
	Bilge pump and generator cutout switch lead assembly	Inspect Replace Repair		0.5 1.0 0.5					

(1) Group Number	(2) Component /Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			C	O	F	H	D		
0608	Bilge pump main power harness	Inspect		0.5					
		Replace		1.0					
		Repair		1.0					
	Auxiliary Power Unit (APU) control box (dual and single voltage)	Inspect		0.5					
		Replace		0.5					
		Repair		2.0					
	APU generator switch assembly (dual voltage regulator)	Inspect		0.5					
		Replace		1.0					
		Repair		1.0					
	APU preheat switch lead assembly	Inspect		0.5					
		Replace		0.5					
		Repair		0.5					
	APU starting switch lead	Inspect		0.5					
		Replace		0.5					
		Repair		0.5					
APU fuel shutoff lead assembly	Inspect		0.5						
	Replace		0.5						
	Repair		0.5						
APU control box wire harness assembly (single and dual voltage)	Inspect		0.5						
	Replace		0.5						
	Repair		1.0						
Heater control box assembly	Inspect		0.5						
	Replace		0.5						
	Repair		1.0						
0609	Spare headlight mounting assembly	Replace		0.5					
		Repair		0.5					
	APU pressure switch	Replace		0.5					
		Inspect		0.5					
	Fire extinguisher interlock switch assembly	Replace		1.0					
		Repair		0.5					
	Driver's infrared or passive night viewer indicator lamps	Replace		0.5					
		Repair		0.5					
	Rigger's service light	Replace		0.3					
		Repair		0.2					
	Front signal light assembly	Inspect		0.5					
		Replace		0.5					
		Repair		0.5					
	Front headlight assembly	Inspect		0.5					
		Replace		0.5					
Repair			0.5						
Stoplight/taillight assembly, left and right	Inspect		0.5						
	Replace		0.5						
	Repair		0.5						
	Replace		0.5						
Light extension	Replace		0.5						
	Repair		0.5						

(1) Group Number	(2) Component /Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			C	O	F	H	D		
0610	Spotlight, hand and reel assembly	Inspect	0.5	0.5					
		Replace		0.5					
		Repair		0.5					
	High beam indicator light	Replace		0.5					
		Repair		0.5					
	Hydraulic reservoir temperature caution light	Replace		0.5					
		Repair		0.5					
	Dome light	Inspect	0.2	0.2					
		Replace		0.5					
		Repair		0.2					
	Winch illumination lamp assembly	Inspect	0.5	0.5					
		Replace		0.5					
		Repair		0.5					
	Front signal light assembly	Inspect	0.5	0.5					
		Replace		1.0					
Repair			1.0						
Switches, warning	Test		0.5						
	Replace		0.5						
	Repair		0.3						
Oil temperature transmitter unit and wiring harness	Replace		0.5						
	Repair		0.5						
0611	Horn assembly	Inspect	0.5						
Replace			1.0						
0612	Battery	Inspect	0.4						
		Test		0.3					
		Service	0.4						
0613	Master relay to rectifier lead assembly	Replace		1.5					
		Repair		1.0					
		Inspect		0.5					
	Red flasher breaker to switch cable assembly	Replace		0.5					
		Repair		0.5					
		Inspect		0.5					
	Panel wiring harness (11672373)	Replace		0.5					
		Repair		1.0					
		Inspect		0.5					
	Red flasher wiring harness assembly	Replace		0.5					
		Repair		0.5					
	Engine wiring harness assembly (single voltage regulator)	Replace		1.0					
		Repair		1.0					
	Engine wiring harness (dual voltage regulator)	Inspect		0.5					
		Replace		1.0					
Repair			1.0						

(1) Group Number	(2) Component /Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			C	O	F	H	D		
	Generator power lead assembly	Inspect		0.5					
		Replace		0.5					
		Repair		0.5					
	Starter ground cable	Inspect		0.5					
		Replace		0.5					
		Repair		0.5					
	Starter wiring harness branched (12314745)	Inspect		0.5					
		Replace		1.0					
		Repair		1.0					
	Starter wiring harness (12314651)	Inspect	0.5	0.5					
		Replace		1.0					
		Repair		1.0					
	Starter wiring harness (11671792)	Inspect		0.5					
		Replace		1.0					
		Repair		1.0					
	Headlight wiring harness assembly	Inspect		0.5					
		Replace		1.0					
		Repair		1.0					
	Bulkhead rear slave receptacle wiring harness assembly	Inspect		0.5					
		Replace		1.0					
		Repair		1.0					
	Air cleaner circuit breaker lead assembly	Inspect		0.5					
		Replace		0.5					
		Repair		0.5					
	Bulkhead to master relay and left and right taillight wiring harness assembly	Inspect		0.5					
		Replace		1.0					
		Repair		1.0					
	Bulkhead to engine harness and starter relay wiring harness assembly	Inspect		0.5					
		Replace		1.0					
		Repair		1.0					
	Bulkhead to engine bracket and rear fuel tank transmitter wiring harness (dual voltage regulator)	Inspect		0.5					
		Replace		1.0					
		Repair		1.0					
	Bulkhead to engine bracket and rear fuel tank transmitter wiring harness (single voltage regulator)	Inspect		0.5					
		Replace		1.0					
		Repair		1.0					

(1) Group Number	(2) Component /Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			C	O	F	H	D		
	Batteries to master relay, voltage regulator and slave receptacle wiring harness assembly engine disconnect (dual voltage regulator)	Inspect Replace Repair		0.5 1.0 1.0					
	Batteries to master relay, voltage regulator and slave receptacle wiring harness assembly engine disconnect (single voltage regulator)	Inspect Replace Repair		0.5 1.0 1.0					
	Bulkhead to APU master relay and rigger's lights wiring harness (dual voltage regulator)	Inspect Replace Repair		0.5 1.0 1.0					
	Bulkhead to APU, master relay and rigger's lights wiring harness assembly (single voltage regulator)	Inspect Replace Repair		0.5 1.0 1.0					
	APU and engine armature relays to voltage regulator harness (single voltage regulator)	Inspect Replace Repair		0.5 1.0 1.0					
	Gage panel to bulkhead wiring harness assembly (dual voltage regulator)	Inspect Replace Repair		0.5 1.0 1.0					
	Gage panel to bulkhead wiring harness assembly (single voltage regulator)	Inspect Replace Repair		0.5 1.0 1.0					
	Switch panel to head lamps and bulkhead wiring harness assembly	Inspect Replace Repair		0.5 1.0 1.0					
	Switch panel to park position switch to bulkhead wiring harness assembly	Inspect Replace Repair		0.5 1.0 1.0					

(1) Group Number	(2) Component /Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			C	O	F	H	D		
	APU control box to foot dimmer switch and bulkhead wiring harness (single voltage regulator)	Inspect Replace Repair		0.5 1.0 1.0					
	Switch panel, radio and bilge pump to bulkhead wiring harness	Inspect Replace Repair		0.5 1.0 1.0					
	Heater control box to heater wiring harness assembly	Inspect Replace Repair		0.5 1.0 1.0					
	Engine disconnect ground lead assembly	Inspect Replace Repair		0.5 0.5 0.5					
	Battery to circuit breaker lead assembly	Inspect Replace Repair		0.5 0.5 0.5					
	Engine voltage regulator to engine disconnect wiring harness assembly (dual voltage regulator)	Inspect Replace Repair		0.5 1.0 1.0					
	Switch panel to gage panel and miscellaneous switches wiring harness (passive night viewer) (single voltage regulator)	Inspect Replace Repair		0.5 1.0 1.0					
	Engine disconnect to engine armature relay electrical lead (single voltage regulator)	Inspect Replace Repair		0.5 1.0 1.0					
	Switch panel to gage panel and miscellaneous switches wiring harness (passive night viewer) (dual voltage regulator)	Inspect Replace Repair		0.5 1.0 1.0					
	Engine wiring connectors and terminals harness (single voltage regulator)	Inspect Replace Repair		0.5 1.0 1.0					

(1) Group Number	(2) Component /Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			C	O	F	H	D		
	Driver's powerpack to infrared scope lead assembly (infrared night viewer)	Inspect Replace Repair	0.5	0.5 1.0 1.0					
	Headlight and dimmer switch wiring harness assembly	Inspect Replace Repair		0.5 1.0 1.0					
	Accessories panel cable assembly	Inspect Replace Repair		0.3	1.5 1.0				
	Horn switch to horn lead assembly	Inspect Replace Repair		0.2 1.0 1.0					
	Horn ground cable assembly	Inspect Replace Repair		0.5 1.0 1.0					
	Bilge pump lead relay wiring harness	Inspect Replace Repair		0.5 1.0 1.0					
	Lead assembly, smoke generating system (11672473-1)	Inspect Replace Repair		0.5 0.5 0.5					
	Bilge pump circuit breaker to switch panel lead assembly	Inspect Replace Repair		0.5	0.5 0.5				
	Wiring harness, electrical kit for M239	Inspect Replace Repair		0.5 1.0 1.0					
	smoke grenade launcher								
	Cable assembly, electrical kit for M239	Inspect Replace Repair		0.5 0.5 0.5					
	smoke grenade launcher								
	Wiring harness, box assembly, power switch for M239	Inspect Replace Repair		0.5 1.0 1.0					
	smoke grenade launcher								
	Switch plate to driver's vehicle exhaust	Inspect Replace Repair		0.5 1.0 1.0					
	smoke bracket wiring harness								
	Exhaust, smoke generating system to fuel solenoid lead assembly	Replace Repair		0.5 0.5					

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(1) Group Number	(2) Component /Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			C	O	F	H	D		
	Driver's vehicle exhaust smoke bracket to bulkhead connection wiring harness	Inspect		0.5					
		Replace		1.0					
		Repair		1.0					
	Exhaust smoke generating system	Inspect		0.5					
		Replace		0.5					
	lead assembly (11672385)	Repair		0.5					
	Lead assembly, smoke generating system	Replace		0.5					
		Repair		1.0					
	Diode assembly	Inspect		0.5					
		Replace		0.5					
		Repair		0.5					
	Fuel gage panel lead assembly	Inspect		0.5					
		Replace		0.5					
		Repair		0.5					
	Starter electrical lead assembly (10887570)	Inspect		0.5					
		Replace		1.0					
		Repair		1.0					
	Turn signal red flasher wiring harness assembly (11672273)	Inspect		0.5					
		Replace		1.0					
		Repair		1.0					
	Wiring harness, bilge pump lead relay	Inspect		0.5					
		Replace		2.0					
		Repair		2.0					
0616	Ventilating blower	Inspect		0.5					
		Replace		1.0					
07	TRANSMISSION								
0700	Linkage, transmission	Adjust		0.5					
		Replace		1.0					
0705	Control assembly, transmission shifting	Inspect	1.0	1.0					
		Service		0.5					
		Replace		3.0					
		Repair		1.5					
	Segment assembly	Inspect	1.0	1.0					
		Replace	1.0						
		Repair	1.0						
0708	Converter, torque	Inspect				1.0		62,63,80,68,75	
		Replace				1.0			
		Repair				4.0			
0710	Overhaul Transmission assembly	Inspect					4.0		
		Service	0.3	0.3				62,64,60,61,76,78,66,70,149	
		Test		0.3	18.0				
		Replace					50.0		
		Repair					80.0		
		Overhaul							
		Adjust		3.5					

(1) Group Number	(2) Component /Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			C	O	F	H	D		
0714	Housing assembly, high range clutch	Replace				1.5			
		Repair				3.5			
0724	Pump assembly, output oil	Replace			1.0				
		Repair				2.5			
		Replace				0.5			
		Repair				1.0			
		Replace				0.5			
0724	Pump assembly, input oil	Repair				1.0			
		Clutch, steer		0.5					
0726	Saddles, mounting brakes	Inspect				3.5			
		Replace			2.0				
11 1103	REAR AXLE Output reduction assembly (left side)	Inspect		1.0				74,75,72, 73,85,105, 77,79	
		Replace		4.0					
		Repair		4.0					
		Overhaul					8.0		
11 1103	Final drive assembly (right side)	Inspect		1.0				74,75,72, 73,85,105, 77,79	
		Replace		4.0					
		Repair			4.0				
		Overhaul					8.0		
12 1206	BRAKES Service brake control linkage, front and rear	Adjust		2.0					
		Inspect		1.0					
		Service		1.0					
		Replace		12.0					
		Repair	0.5	1.0					
		Replace		0.5					
		Repair		0.5					
		Replace		0.5					
1301	13 WHEELS AND TRACKS Hub assembly, track	Inspect	0.5	0.5					
		Service		0.5					
		Replace		5.0					
		Repair		2.0					
		Inspect	0.5	0.5					
		Service		0.5					
	Arm assembly, pivot	Replace		7.0					
		Repair		3.0					
		Inspect	0.2	0.5				93 thru	
		Service	0.5		1.0				
		Replace		7.5					
		Repair		3.0					

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(1) Group Number	(2) Component /Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			C	O	F	H	D		
1302	Track support roller, bracket and wheel	Inspect	0.5	0.5					
		Service		0.5					
		Replace		6.0					
	Track support roller, bracket and wheel (left front)	Repair		3.0					
		Inspect	0.5	0.5					
		Service		0.5					
1303	Compensating idler arm assembly	Replace		6.0					
		Repair		3.0					
		Inspect	0.5	0.5					
	Brake shoe link	Service		1.0					
		Replace		5.0					
		Repair		2.0					
1304	Sprocket, drive hub	Inspect	0.5	0.5					
		Replace		2.0					
		Repair		1.5					
1305	Track assembly	Inspect	0.1	0.3				89,96,107	
		Replace		7.5					
		Repair					5.0		
1311	Shoe assembly	Adjust	0.4	0.5					
		Inspect		1.0					
		Service	4.0						87,88,89, 90,107
	Wheel, road	Replace	0.5	1.5					
		Repair	0.5						
		Inspect	0.5						
14 1401	STEERING Steering and shifting controls, front and rear	Replace		3.0					
		Repair		1.0					
		Replace		1.0					
	Bell cranks	Repair		3.5					
		Inspect		1.0					
		Service		1.0					
15 1503	FRAME, TOWING ATTACHMENTS AND DRAWBARS Pintle and mount assembly	Replace		1.0					
		Repair		2.0					
		Inspect		0.3					
	Heavy duty tow bar assembly	Service		0.5					
		Replace		1.0					
		Repair		0.5					

(1) Group Number	(2) Component /Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			C	O	F	H	D		
16	SPRINGS AND SHOCK ABSORBERS								
1601	Bumper assembly, left and right	Inspect Replace	0.1	0.7 1.0					
1604	Shock absorber	Inspect Replace		0.6	0.1			100	
18	BODY, CAB, HOOD, AND HULL								
1801	Door assembly, APU	Inspect Replace Repair		0.3 1.5 1.0					
	.Engine deck	Replace Repair		1.5 1.0					
	Optional engine deck cover assembly	Replace Repair		1.5 1.0					
1802	Brace, fender	Inspect Replace Repair	0.5	2.0 3.0					
1803	Housing assembly, cab door	Inspect Replace Repair	0.1	2.0 2.0					
	Mount, passive night viewer	Replace Repair		0.5 0.5					
1804	Valve assembly	Inspect	0.5	0.5					
	Service			0.8					
	Replace			1.0					
	Repair			0.5					
1805	Subfloors and related parts	Replace		4.0					
1806	Personnel seat assembly	Inspect Replace Repair	0.2	0.5 0.5					
	Commander's and rigger's seat assembly	Inspect Service Replace Repair	0.2 0.5	0.5 1.5					
	Driver's, and mechanic's seat assembly	Inspect Service Replace Repair	0.2 0.5	0.5 1.5					
	Cushion assembly, backrest, commander's and rigger's	Inspect Replace Repair	0.1	0.2 1.2					
1808	Rack, ammunition stowage	Inspect Replace Repair	0.2	0.5 1.0 1.0					

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(1) Group Number	(2) Component /Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			C	O	F	H	D		
19 1903	Stowage boxes, brackets and straps	Inspect	0.5						
		Service	0.2						
	Toolbox rack, caliber .50 barrel stowage straps, liquid container and rocket launcher	Replace		1.0					
		Repair		1.0					
	Pioneer tool set bracket	Inspect		0.2					
		Replace		0.2					
	Vise, tow bar assembly mounting bracket and Repair tow chain mounting brackets	Repair		0.5					
		Replace		1.5					
	TURRET Commander's cupola assembly	Inspect		0.1					
		Service			0.1				
	Commander's cupola door assembly	Test			1.0				
		Replace			2.0				
	WINCH, PTO AND HOIST	Repair			4.0				
		Inspect		0.2					
20 2001	Winch and motor assembly, main	Service		0.2					
		Adjust		1.0					
Winch and motor assembly, hoist	Service			1.0					
	Replace			1.0					
Wire rope assembly, hoist winch	Repair				20.0			141,143, 147,151, 162	
	Overhaul						18.0 75.0		
Wire rope shield and roller, hoist winch	Inspect		1.0	2.0					
	Adjust			1.0					
Wire rope shield and roller, hoist winch	Service			1.0					
	Replace				15.0			141,142, 147,154, 156,157, 159	
Wire rope shield and roller, hoist winch	Repair						18.0 70.0		
	Overhaul								

(1) Group Number	(2) Component /Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			C	O	F	H	D		
2002	Mounting brackets, level winder arm assembly Brake band assembly, hoist and main winch	Inspect	0.5	0.5					
		Replace			1.0				
		Repair			1.0				
		Adjust		0.5					
		Service			0.5				
		Replace			2.0				
	Main winch cover	Repair			0.5				
		Inspect	0.5						
		Replace				0.4			
	Governor, hydraulic (on engine)	Repair				0.2			
		Adjust			1.2				
		Replace			1.0				
	Main winch level winder assembly	Repair			2.0				
		Inspect	0.5	0.5					
		Adjust		1.0					
Main winch, and hoist cable roller	Service		1.0						
	Replace			24.0					
	Repair			5.2					
	Inspect	0.5	0.5						
	Service		1.0						
Spade support assembly and mounting	Replace			3.0					
	Repair			2.0					
	Inspect		1.0						
	Replace			2.0					
	Inspect	1.0	1.0						
Hydraulic subplate assembly	Adjust		0.3						
	Replace			1.2					
	Repair			1.0					
	Inspect	0.5							
	Adjust			1.5					
Spade subplate and hydraulic valve assembly	Replace			1.5					
	Repair			2.0					
	Inspect		0.2						
	Service		0.2						
	Replace			8.0					
2004	Propeller shaft with universal joint assembly	Repair			4.0				
		Inspect	1.0	1.0					
		Replace		1.0					
		Repair					12.0		
2005	Transmission assembly, mechanical	Overhaul					30.0		
		Test		1.0					
		Inspect	0.5	1.0					
2005	Spade latch assembly	Service		1.0					
		Replace			1.5				
		Repair			1.0				
		Inspect							

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(1) Group Number	(2) Component /Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			C	O	F	H	D		
2007	Spade assembly	Inspect	0.5	1.0				150,151, 152	
	Boom, hoisting	Service		1.0					
		Replace				4.0			
22	Cylinder	Repair				4.0		8.0	
		Inspect	0.5	0.5					
		Service		1.0					
2207	ACCESSORY ITEMS	Replace		1.5					
		Repair			2.0				
		Inspect	0.5	0.5					
2210	Personnel heater	Inspect	0.3	1.0					
		Test		0.5					
		Replace		2.5					
24	Stencils, identification plates, and instruction plates	Repair			4.5				
		Inspect		0.5					
		Replace		0.5					
2400	HYDRAULIC LIFT COMPONENTS	Service		1.0					
		Replace				3.0			
		Repair				4.0			
2401	Tank assembly, hydraulic	Inspect	0.5	0.5					
		Service		1.0					
		Replace			4.0				
2402	Coupling, shaft	Repair				3.0			
		Inspect				4.0			
		Replace				3.0			
2406	Flow regulator subplate assembly	Inspect	0.5	0.5					
		Repair			2.0		2.0		
		Replace				2.0			
29	Mechanical transmission, hydraulic and lubricating lines	Inspect	0.5	1.0					
		Replace		3.0					
		Service			4.0				
2901	APU AND CONTROLS	Repair				3.0			
		Inspect				2.0			
		Replace				2.0			
2902	APU assembly	Inspect	0.5					110,112, 113,122, 121 thru 127	
		Test		1.5					
		Service		1.5					
2910	Filter, oil	Replace		11.5					
		Repair			20.0				
		Inspect	0.1						
2910	Engine assembly, diesel	Service		0.2				114 thru 121,128 thru 132	
		Replace			2.0				
		Repair			24.0				
		Overhaul				30.0			

(1) Group Number	(2) Component /Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			C	O	F	H	D		
2916	Lever, lock release	Replace		0.3					
	Cooler assembly, oil pump, lubricating oil	Repair		0.5					
		Inspect			0.5				
		Service			1.0				
2919	Adapter assembly, oil filter	Replace			0.5				
		Repair	0.2		2.0				
		Inspect			0.5				
		Replace			1.0				
2932	Driving mechanisms, APU	Service		1.0					
2932	Nozzle and holder assembly, fuel	Replace			2.0				
		Inspect			1.5				
		Replace			0.5				
		Repair				2.0			
2933	Air cleaner assembly	Inspect			0.2				
		Pump assembly, fuel injection			0.2				
		Adjust			0.2				
		Replace			2.0				
2933	Adapter and heater assembly	Repair				2.5			
		Inspect		0.1					
		Service		0.5					
		Replace		0.2					
2936	Linkage, governor	Inspect			0.5				
		Replace			2.0				
		Repair			1.0				
		Adjust			0.5				
2937	Fuel filter assembly	Replace			1.8				
		Repair			1.5				
		Inspect	0.3						
		Service	0.5						
2938	Engine fuel lines and fittings, APU	Replace		0.4					
		Repair		0.5					
		Inspect		0.5					
		Replace		0.5					
2941	Muffler and exhaust system, APU	Inspect	0.2						
2952	Engine shrouds and exhaust cooling ducts, APU	Replace		1.0					
		Inspect		0.5					
2960	Pressure transmitter, APU	Replace		1.0	1.0				
		Replace		1.0	1.0				
2961	Generator/starter (combination)	Test			0.3				
		Replace			1.0				
		Repair			2.0				
		Inspect		0.5					
2961	Wiring, electric, APU	Replace			2.0				
		Repair			2.0				
		Replace			2.0				

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(1) Group Number	(2) Component /Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			C	O	F	H	D		
2963	APU wiring harness	Inspect		0.5					
		Replace		1.0					
		Repair		2.0					
	APU sending unit wiring harness	Inspect		0.5					
		Replace			1.0				
	Ground lead, APU	Repair			0.5				
		Inspect		0.5					
	APU starter relay to generator harness	Replace			1.0				
		Repair			1.0				
	APU fuel shutoff, preheat solenoid and leads	Inspect		0.5					
		Replace			1.0				
	High air temperature switch lead, APU	Repair			1.0				
		Inspect		0.2					
	APU fuel shutoff, preheat solenoid and leads	Replace		1.5	1.5				
Repair				1.5					
High air temperature switch lead, APU	Inspect		0.5						
	Replace			1.0					
Repair				0.5					
33	SPECIAL PURPOSE KITS								
3301	Shipping and storage container, engine	Replace			0.5				
		Repair					2.0		
3305	Deep water fording engine valve assembly	Overhaul					4.0		
		Inspect	1.0	1.0					
3307	Pump, deep water fording kit	Replace		2.0					
		Repair		4.0					
3307	Electrical kit for M239 smoke grenade launcher	Replace		1.0					
		Repair		4.0					
	Power switch box assembly (M239 smoke grenade launcher)	Replace		1.0					
		Repair		1.0					
	Bracket and switch assembly	Inspect		1.5					
		Replace		1.0					
	Commander's plate and switch assembly	Repair		1.5					
		Inspect		1.0					
	Rear stoplight, left and right (USAREUR signal kit)	Replace		1.0					
		Repair		1.0					
	Wiring harness (USAREUR signal kit (12322614))	Inspect		1.0					
		Replace		1.0					
	Repair		1.0						
	Inspect		0.2	0.2					
Replace		0.2	1.0						
Repair		0.2	0.5						
Inspect		0.5	0.5						
Replace		1.0	1.0						
Repair		0.5	0.5						

(1) Group Number	(2) Component /Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			C	O	F	H	D		
	Wiring harness (USAREUR signal kit) (12322615-1 & 12322615-2)	Inspect Replace Repair		0.5 1.0 0.5					
	Wiring harness (USAREUR signal kit) (12322611)	Inspect Replace Repair		0.5 1.0 1.0					
	Wiring harness (USAREUR signal kit) (12322612)	Inspect Replace Repair		0.5 1.0 0.5					
	Wiring harness (USAREUR signal kit) (12322613)	Inspect Replace Repair		0.5 1.0 0.5					
	Discharger, smoke grenade	Test Repair Replace		0.5 1.5 1.3					
44	WELDING, METALIZING, METAL HEATING, AND PLATING EQUIPMENT								
4415	Acetylene hose adapter and related parts	Inspect Replace		1.0 1.0					
47	GAGES (NONELECTRICAL)								
4701	Tachometer and speedometer, mechanical	Inspect Replace	1.0	1.5					
68	WARNING, SCANNING, AND SIGNALING DEVICES AND NAVIGATIONAL INSTRUMENTS								
6810	Infrared power supply and mount	Inspect Replace Repair Overhaul		0.5 1.5		1.5		1.5	
76	FIRE FIGHTING EQUIPMENT COMPONENTS								
7639	Fire extinguisher	Inspect Replace Repair		1.0 2.0 1.0					

(1) Group Number	(2) Component /Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			C	O	F	H	D		
91	Valve, fire extinguisher	Inspect Replace Repair		0.2 0.5 0.5					
	CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL (CBR)								
9111	Hose assemblies	Inspect Replace Repair	0.3	1.3 0.3					
	Purifier, M2A2	Inspect Test Replace Repair	0.3	0.5 1.3 1.5					
	Cable, assembly	Inspect Replace Repair	0.3	0.3 1.0 0.5					
	Circuit breaker and switch assembly	Replace Repair		0.3 0.3					
95	GENERAL USE STANDARDIZED PARTS								
9501	Bulk material, cables, wire, and hoses	Replace Repair		1.0	1.0 2.0				

SECTION III: TOOLS AND TEST EQUIPMENT

(1) Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) NSN	(5) Tool Number
1	F,D	ENGINE Adapter, compression (used with gage 4910-00-870-6283)	4910-00-795-7961	8743024
2	H,D	Adapter, mechanical input, scavenger pump (used with remover 5120-00-473- 7352)	5120-00-708-2774	7082774
3	H,D	Adapter, mechanical puller, starter generator idler gearshaft and main bearing caps (used with puller 5120-00- 310-4668)	5120-00-837-5091	8375091
4	H,D	Alinement tool, output reduction planetary spindles		8389997
5	F,H,D	Blade, thickness gage, exhaust valve	5210-00-793-7899	10882616
6	F,H,D	Blade, thickness gage, intake valve	5210-00-793-7898	10882615
7	F,H,D	Blade, thickness gage, intake valve timing	5210-00-793-7897	10882617
8	F,H,D	Bracket, transmission (used with 4910-00- 610-5961)	4910-00-610-5962	8742052
9	F,H,D	Bracket, transmission (used with 4910-00- 610-5962)	4910-00-610-5961	8742051
10	H,D	Bushing, reamer pilot, exhaust valve guides (used with reamers 5110-00-708- 3696 and 5110-00-708-3697)	5110-00-003-1010	11642089
11	H,D	Bushing, reamer pilot, intake valve guides (used with reamers 5110-00- 7080-3698 and 5110-00-708-3699)	5110-00-460-5831	11642088
12	H,D	Compressor assembly, brake-apply assembly, torque converter lockup clutch backing plate or steering tie shaft drive gear	5120-00-330-4274	8708939
13	D	Compressor, piston ring (used to install 0.010 or 0.020 oversize pistons and rings)	5120-01-005-3001	10882888-1
14	D	Compressor, piston ring (used to install 0.030 and 0.040 oversize pistons and rings)	5120-01-005-3000	10882888-2
15	F,H,D	Crowfoot attachment, injector nozzle and holder (used to install adapter 4910-00- 795-7961)	5120-01-039-2809	12254244
16	F,H,D	Cutter, carbon nozzle, injector nozzle seat	4910-00-795-7958	10882949
17	H,D	Extractor, screw thread, inserts (#10 thru 3/8 inch [in.] [10 millimeter (mm)])	5120-00-723-6833	MIL-T- 0021309
18	H,D	Extractor, screw thread, inserts (7/16 in [11 mm] to 1 in. [25 mm])	5120-00-251-1527	77521056
19	F,H,D	Eyebolt, flywheel	5306-00-017-6143	MS51937-7
20	H,D	Fixture, stator springs and cam rollers	4910-00-098-6732	8390000
21	H,D	Gage and compressor, piston ring	4910-00-795-7956	10882888

(1) Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) NSN	(5) Tool Number
22	F, H, D	Gage assembly, compression (used with adapter 4910-00-795-7961)	4910-00-870-6283	10899180
23	H, D	Insertor, screw thread (7/16-20)	5120-00-797-2407	MIL-T-21309
24	F, H, D	Gage, fan rotor, checking erosion	5120-01-099-1477	12275775
25	H, D	Gage, piston ring, checking piston top ring groove	5220-01-084-1230	12254296
26	D	Gage, ring, plain (0.010 or 0.030 oversize)	5209-01-005-3003	10912589-1
27	H, D	Gage, ring, plain (standard and 0.020 oversize)	5220-00-988-8774	10912589
28	H, D	Gage, ring, plain (standard or 0.040 oversize)	5220-01-005-3002	10912589-2
29	H, D	Insertor, screw thread (1/2-20)	5120-00-672-8897	8761582
30	H, D	Insertor, screw thread (3/8-24)	5120-00-710-7437	8375324
31	H, D	Insertor, screw thread (5/16-24)	5120-00-797-2405	3552-5
32	H, D	Lifter assembly, valve spring (used with stand 4910-00-554-1317)	5120-00-678-5285	8761535
33	O, F, H, D	Parts kit, steering clutch housing output shaft	2590-00-330-8642	8708831
34	H, D	Pin, hollow (for loading low-range planetary carrier pinion gear spindle rollers or alining low-range planetary carrier pinion gear thrust washers and spindle rollers)	5315-00-098-6736	8390006
35	H, D	Pin, hollow (for loading reverse-range planetary carrier pinion gear spindle rollers or alining reverse-range planetary carrier pinion gear thrust washers and spindle rollers)	5315-00-098-6737	8390007
36	H, D	Pin, straight, threaded (for alining input scavenger oil pump assembly to torque converter housing)	5315-00-098-6733	8390002
37	H, D	Pin, straight, threaded (for alining lockup clutch housing assembly to converter pump)	5315-00-333-6081	8708909
38	H, D	Pliers, retaining ring, fan drive shaft	5120-00-752-9755	WT28163
39	H, D	Proctor, crankcase	4910-00-785-7951	10882790
40	H, D	Puller attachment, mechanical, reverse range planetary carrier pinion gear spindle or input scavenger pump (used with adapter 5120-00-708-2774)	5120-00-473-7352	7082201
41	F, H, D	Puller, adapter, output reduction planetary carrier (used with puller 5120-00-423-1596)	5120-00-534-7830	5347830
42	H, D	Puller, mechanical, camshaft drive quill	5120-00-678-5282	8761297
43	H, D	Puller, mechanical, exhaust valve guide	5120-00-448-0401	10882954

(1) Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) NSN	(5) Tool Number
44	F, H, D	Puller, mechanical, generator and starter gearshaft or crankshaft main bearing cap (used with adapter 5120-00-837-5091 and spreader 5120-00-575-7767); hydraulic cylinder pins (used with adapter 5120-00-767-9102)	5120-00-310-4668	8708712
45	F, H, D	Puller, mechanical, injector nozzle and holder	5120-01-119-4172	12275805
46	H, D	Puller, mechanical, intake valve guide	5120-00-448-0400	10882953
47	F, H, D	Puller, mechanical, vibration damper and fan drive oil seal retainer	5120-00-473-7222	5379997
48	H, D	Reamer, hand, exhaust valve guide (used with bushing 5110-00-003-1010)	5110-00-708-3696	7083696
49	H, D	Reamer, hand, exhaust valve guide (used with bushing 5110-00-003-1010)	5110-00-708-3697	7083697
50	H, D	Reamer, hand, intake valve guide (used with bushing 5110-00-003-1010)	5110-00-708-3698	7083698
51	H, D	Reamer, hand, intake valve guide (used with bushing 5110-00-003-1010)	5110-00-708-3699	7083699
52	H, D	Remover and replacer, piston rings	5120-00-494-1846	7950177
53	H, D	Adapter, torque wrench, cylinder hold-down nut		
54	H, D	Remover assembly, bearing, output reduction planetary carrier assembly roller bearing	5120-00-776-1861	8351087
55	H, D	Replacer guide, intake valve	5120-00-448-0402	10883052
56	H, D	Replacer, exhaust valve guide	5120-00-448-7993	10883053
57	H, D	Replacer, final drive output shaft seal or O-ring	5120-00-977-5581	8355822
58	H, D	Replacer, output reduction planetary carrier pinion gear spindle	5120-00-776-1862	8351083
59	D	Reset device, power electrical, hour meter	5999-00-294-2332	11668287
60	H, D	Sling	4910-00-795-7954	10882945
61	H, D	Sling, crankshaft and connecting rod	4910-00-795-7955	10882958
62	H, D	Sling, lifting, torque converter housing, lockup clutch housing, low-range clutch anchor, brake apply reaction plate, output reduction gear planetary assembly or steering flywheel	4910-00-708-3778	7083778
63	F, H, D	Sling, lifting, transmission	4910-00-473-7556	7081593
64	H, D	Socket wrench, face, low-range planetary carrier locknut	5120-00-596-4472	8708178
65	F, H, D	Socket wrench, face, output reduction gear assembly output shaft locknut	5120-00-348-7505	8389992
66	F, H, D	Socket wrench, injector nozzle and holder	5120-00-875-9556	11610171
67	F, H, D	Socket, socket wrench injection pump inlet housing filter cap nut	5120-01-034-1698	12254213

SECTION III: TOOLS AND TEST EQUIPMENT

TM 9-2350-256-20

(1) Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) NSN	(5) Tool Number
68	O, F, H, D	Spacer, fan rotor hub sleeve	4910-00-795-7952	10882651
69	H, D	Spreading tool, crankcase (used with puller 5120-00-310-4668 and adapter 5120-00-837-5091)	5120-00-575-7767	8708361
70	H, D	Stand, maintenance, engine overhaul	4910-00-856-4137	10912260
71	H, D	Remover assembly, dead steer shaft	5120-00-572-8729	8356047
72	H, D	Stand, valve removing and installing (used with lifter 5120-00-678-5285)	4910-00-554-1317	8708419
73	D	Stone and holder assembly, cylinder	3460-00-689-3368	5704380
74	H, D	Test stand, timing unit, injector pump	4910-00-986-9873	10898928
75	F, H, D	Tube, attaching injector nozzle	4910-00-795-7953	10882963
76	H, D	Tube, metallic (for removing output reduction planetary pinion gear spindles or loading pinion gear rollers)	4710-00-098-6734	8389996
77	H, D	Wrench assembly, spanner, converter retaining nut	5120-00-977-5582	8355710
78	O, F, H, D	Wrench, box and open-end combination generator mounting nuts	5120-00-789-4881	10935476
79	H, D	Wrench, box, cylinder hold-down nut 11684130-2	5120-00-466-5948	11684130-1
80	H, D	Wrench, box, cylinder hold-down nut	5120-00-475-5414	8761562
81	O, F, H, D	Wrench, open-end fixed, starter mounting nuts	5120-00-678-5288	8761568
82	H, D	Wrench, splined (for measuring bearing pre-load of output drive shaft)	5120-00-348-7506	8399995
83	O, F, H, D	Wrench, spanner, PTO gearshaft retaining nut	5220-01-005-3002	12254282
SUSPENSION				
84	O, F, H, D	Adapter, puller, torsion bar (used with puller 5120-00-557-3615)	5120-01-017-5328	12251805
85	O, F, H, D	Adapter, roadwheel arm assembly (used with puller 5120-00-557-3615)	5120-00-483-6927	7080285
86	F, H, D	Adapter, socket wrench (for attaching power wrench to fixture 5120-00-605-3926)	5120-00-632-5797	7026898
87	F, H, D	Fixture, track connecting (used with adapter 5120-00-632-5797)	5120-00-605-3926	8741739
88	O, F, H, D	Gage, sprocket tooth	5120-00-563-7324	8708391
89	O, F, H, D	Gage, wear, end connector	4910-00-799-8732	10887333
90	O, F, H, D	Handle (used with removers and/or replacers)	5120-00-473-7121	7082881
91	O, F, H, D	Handle, remover and replacer (used with adapters and/or replacers)	5120-00-708-3883	7083883
92	O, F, H, D	Lifter, roadwheel arm	5120-00-611-7137	7010355
93	O, F, H, D	Puller and pump track end connector	5120-01-052-5642	11669394-1

(1) Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) NSN	(5) Tool Number
94	O, F, H, D	Puller, mechanical, compensating link bearing	5120-00-614-1454	7027414
95	O, F, H, D	Puller, slide hammer-type (used with adapters and/or replacers)	5120-00-557-3615	5573615
96	O, F, H, D	Remover and replacer, roadwheel hub inner bearing cup or compensating idler wheel hub inner bearing cup (used with handle 5120-00-708-3883)	5120-00-473-7373	7092876
97	O, F, H, D	Remover and replacer, roadwheel hub outer bearing cup or track support compensating idler wheel hub outer bearing cup (used with handle 5120-00-708-3883)	5120-00-473-7374	7082834
98	O, F, H, D	Remover and replacer, shock absorber bearings	5120-00-279-8325	11654533
99	O, F, H, D	Remover and replacer, track support roller wheel hub inner bearing cup (used with handle 5120-00-708-3883)	5120-00-473-7372	7082863
100	O, F, H, D	Remover, final drive sprocket hub, split tapered dowel	5120-00-034-8445	8390335
101	O, F, H, D	Replacer, oil seal and retainer, compensating arm	5120-00-492-3672	8708188
102	O, F, H, D	Replacer, roadwheel arm support spindle inner bearing oil seal (used with handle 5120-00-473-7121)	5120-00-473-7494	7078977
103	O, F, H, D	Replacer, roadwheel arm support spindle outer bearing oil seal (used with handle 5120-00-473-7121)	5120-00-473-7475	7078973
104	O, F, H, D	Replacer, track support roller wheel inner bearing oil seal	5120-00-473-7471	7082882
105	O, F, H, D	Sling assembly, final drive hub and sprocket assembly (used with adapter, hoisting 4910-00-766-1961)	4010-00-800-8900	10884613
106	O, F, H, D	Sling assembly, lifting	4910-01-046-8944	11672258
107	O, F, H, D	Wrench, plug, roadwheel arm torsion bar end plug	5120-00-473-7716	7078976
108	O, F, H, D	Wrench, socket, roadwheel bearing adjusting nut or track support roller bearing adjusting nut or compensating idler wheel adjusting nut	5120-00-588-4808	8708459
119	O, F, H, D	Wrench, spanner, roadwheel arm supporting spindle inner and outer bearing and spacer retaining nut	5120-00-473-7761	7078980
110	F, H, D	Wrench, track tension adjusting	5120-00-293-2106	GGG-W-636D

(1) Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) NSN	(5) Tool Number
APU				
111	F,H,D	Cable assembly, special purpose, electrical (for test run outside of vehicle)	2590-00-521-6223	8708290
112	F,H,D	Cable assembly, special purpose, electrical (for test run outside of vehicle)	2590-00-614-7544	11671511-3
113	F,H,D	Cable assembly, special pm-pose, electrical (for test run outside of vehicle)	2590-00-614-7545	116718581-4
114	F,H,D	Compression tool, valve spring		420-0210
115	F,H,D	Cutter, engine valve seat		420-0311
116	F,H,D	Driver, engine cam bearing		420-0264
117	F,H,D	Driver, engine main bearing	5120-00-125-4402	420-0326
118	F,H,D	Driver, engine oil seal (used with loader 420-0338)		420-0281
119	F,H,D	Driver, engine oil seal (used with loader 420-0339)	5120-00-125-4411	420-0250
120	F,H,D	Driver, engine valve guide		420-0327
121	F,H,D	Driver, engine valve seat	5120-00-169-3032	420-0170
132	F,H,D	Gage, alignment, chain sprocket	5710-00-613-6779	11671961
123	F,H,D	Hose assembly, nonmetallic (for test run outside of vehicle)	4720-00-617-6929	11671580-1
124	F,H,D	Hose assembly, nonmetallic (for test run outside of vehicle)	4120-00-619-9706	11671580-2
125	F,H,D	Hose assembly, nonmetallic (for test run outside of vehicle)	4720-00-619-9691	11671580-3
126	F,H,D	Hose assembly, nonmetallic (for test run outside of vehicle)		11671580-4
127	F,H,D	Hose assembly, nonmetallic (for test run outside of vehicle)	4720-00-619-9681	11671580-5
128	F,H,D	Loader, oil seal (used with driver 420-0250)		420-0339
129	F,H,D	Loader, oil seal (used with handle 420-0281)		430-0338
130	F,H,D	Puller, gear engine ring		420-0275
131	F,H,D	Puller, mechanical, flywheel and sprocket	5120-00-613-6775	11671732
132	F,H,D	Remover, engine main bearing		420-0325
POWERPLANT				
133	O,F,H,D	Cable assembly, special purpose, electrical, accessories (for test run outside of vehicle)	6150-00-615-8737	11671581-2
134	O,F,H,D	Cable assembly, special purpose, electrical, generator armature (for test run outside of vehicle)	2920-00-614-7203	10864167
135	O,F,H,D	Cable assembly, special purpose, electrical, starter (for test run outside of vehicle)	5150-00-614-7543	11671581-1

(1) Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) NSN	(5) Tool Number
136	O,F,H,D	Cable assembly, special purpose, electrical, ground (for test run outside of vehicle)	3995-00-674-8738	10864170
136.1	O,F,H,D	Clamp, hose, T-bolt (for test run outside of vehicle)		11669087-6
137	O,F,H,D	Cleaner, oil cooler	4910-00-494-8257	11641959
137.1	O,F,H,D	Filter assembly (for test run outside of vehicle)		12390176
137.2	O,F,H,D	Hose (for test run outside of vehicle)		12390186
138	O,F,H,D	Hose assembly, nonmetallic, engine primer (for test run outside of vehicle)	4720-01-044-8393	11671580-7
139	O,F,H,D	Hose assembly, nonmetallic, main fuel line and fuel injector return (for test run outside of vehicle)	4720-01-041-3375	11671580-6
140	O,F,H,D	Sling, beam-type, powerplant or engine	3940-00-622-7288	11671664
MISCELLANEOUS				
141	F,H,D	Adapter, bearing, tow or hoist winch pinion bearings (used with remover 5120-00-767-9107)	5120-00-767-9101	10867493
142	F,H,D	Adapter, mechanical puller, tow or hoist winch drum shaft bearings (used with puller 5120-00-557-3615)	5120-00-767-9103	10867491
143	F,H,D	Adapter, mechanical, hydraulic cylinder pins (used with puller 5120-00-310-4668)	5120-00-767-9102	10867497
144	O,F,H,D	Automotive maintenance common no. 1 tool kit	4910-00-754-0654	SC 4910-95-A74
145	O,F,H,D	Automotive maintenance common no. 2 tool kit	4910-00-754-0650	SC 4910-95-A72
146	F,H,D	Bushing, pipe (used with kit assembly 4910-00-572-8612)	4730-00-193-0869	WW-P-471
147	F,H,D	Gage assembly, testing, hydraulic (for checking main winch pressure, hoist winch pressure, spade system pressure, boom system pressure, or auxiliary hydraulic system pressure)	4910-00-766-3355	10884612
148	O,F,H,D	General mechanic' s tool kit	5180-00-177-7033	SC 5180-90-N26
149	F,H,D	Guide, shaft (for installing spade shaft through oil seal, used with handle 4910-00-766-1964)	4910-00-767-0419	10884600
150	D	Guide, spanner wrench (used with wrench 5120-00-767-0419)	5120-00-062-9479	10894347
151	F,H,D	Handle (for installing spade shaft through oil seal, used with handle 4910-00-767-0419)	4910-00-766-1964	10867499
152	D	Handle (used with remover 5120--00-767-9105 and replacer 5120-00-767-0419)	5120-00-316-9182	7950864

(1) Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) NSN	(5) Tool Number
153	F,H,D	Kit assembly, gage, pressure (for checking PTO lubricating oil pressure, used with bushing 4730-00-193-0869, or for checking PTO clutch operating pressure, used with tee 4730-01-083-4 =)	4910-00-572-8612	8356176
154	F,H,D	Lifting eye, hoist winch	4910-00-766-1963	10884605
155	F,H,D	Lifting eye, tow winch	4910-00-766-1962	10884606
156	D	Plate, mechanical, hoist winch drum support bearings (used with puller 5120-00-557-3615)	5120-00-767-9104	10867492
157	D	Remover and replacer, hoist winch drum shaft bearing (used with handle 5120-00-316-9182)	5120-00-767-9106	10867490
158	D	Remover and replacer, hoist winch drum support bearing (used with handle 5120-00-316-9182)	5120-00-767-9105	10867494
159	D	Remover and replacer, tow and hoist winch pinion bearing (used with adapter 5120-00-767-9101 and puller set 5120-00-42301596)	5120-00-767-9107	10867495
160		STE/ICE-R kit	4910-01-222-6589	12259266
161	O,F,H,D	Tee, pipe (used with gage assembly 4910-00-572-8612)	4730-01-083-4422	4MT-4F-4F
162		rester, airflow	6680-00-436-4212	ES-77-2120
163	O,F,H,D	Tool kit, electrical	5180-00-876-9336	7550526
164	F,H,D	Wrench assembly, hydraulic cylinder piston retaining nut	5120-00-532-3836	8747917
165	O,F,H,D	Wrench spanner, level winder cylinder adjusting nut	5120-00-767-9099	10884603
166	O,F,H,D	Wrench, open-end, hydraulic line fittings	5120-00-555-0060	8395504
167	D	Wrench, socket, tow winch drum shaft bearing retaining nut (used with guide 5120-00-062-9479)	5120-00-062-9478	10894346
168	O,F,H,D	Wrench, spanner, hydraulic cylinder packing nut	5120-00-777-1388	10884649
TURBO SUPER CHARGER				
169	F,H,D	Gage, finger sleeve and shaft ring groove width	4910-00-793-503	10882675
170	H,D	Pliers, retaining ring	5120-00-792-8624	10935598
171	H,D	Sleeve, instaRing, finger sleeve and shaft seal ring expander	4910-00-870-2122	10899149
172	H,D	Wrench, box, bearing housing	5120-00-323-4875	8708189
FUEL INJECTION PUMP				
173	H,D	Zompressor, spring seat	5120-00-793-5049	10882862
174	H,D	Fixture, positioning, plunger	4910-00-793-5039	10882859
175	H,D	Gage, weight and spider springs	4910-00-793-5040	10882854

(1) Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) NSN	(5) Tool Number
176	H,D	Puller, mechanical, weight and spider weight and spider assembly	5120-00-793-5048	10882818
177	H,D	Remover and replacer, weight and spider assembly	5120-00-793-5055	10882856
178	H,D	Wrench, socket, clutch torque adjusting	5120-00-793-5046	10882889
179	H,D	Wrench, spanner, access plug	5120-00-793-5045	10882851
180	H,D	Wrench, torque, clutch	5120-00-230-6380	GGG-W-686
181	H,D	Wrench, turning, shaft	5120-00-793-5057	10882894

APPENDIX C TOOL IDENTIFICATION [ID] LIST

APPENDIX OVERVIEW

This appendix lists tools needed to maintain the M88A1 Recovery Vehicle.

This appendix consists of the following sections:

	Page
Section I: Introduction	C-1
Section II: Tool ID List	C-2

SECTION I: INTRODUCTION

Task		Page
C-1	Explanation of Columns for Tool ID List, Section II.....	C-1

C-1 EXPLANATION OF COLUMNS FOR TOOL ID LIST. SECTION II

a. COLUMN 1, ITEM NUMBER

This number is assigned to the entry in the listing and is referenced in the initial setup of procedures to identify the tool.

b. COLUMN 2, ITEM NAME

This lists the name and the dimensions of each item.

c. COLUMN 3, NATIONAL STOCK NUMBER [NSN]

This indicates the NSN assigned to the tool; use it to request or requisition the tool.

d. COLUMN 4, PART NUMBER

This indicates the manufacturer' s part number.

e. COLUMN 5, REFERENCE

This references the supply catalog or Repair Parts and Special Tools List (RPSTL) that provides a description of the tool.

SECTION II: TOOL ID LIST

(1) Item Number	(2) Item Name	(3) NSN	(4) Part Number	(5) Reference
1	Adapter, puller, torsion bar (used with puller 5120-00-557-3615)	5120-01-017-5328	12251805	TM 9-2350-25624P-1
2	Awl, saddler's sewing	5120-00-221-1541		SC 4910-95-CL-A72
3	Bolt, machine (jackscrew)	5305-00-269-2807		
4	Bolt, machine (jackscrew)	5306-00-270-8239	FF-S-85	
5	Cable assembly, special purpose, electrical, accessories (for test run outside of vehicle)	6150-00-615-8737	11671581-2	TM 9-2350-256-24P-1
6	Cable assembly, special purpose, electrical, generator armature (for test run outside of vehicle)	2920-00-614-7203	10864167	TM 9-2350-256-24P-1
7	Cable assembly, special purpose, electrical, starter (for test run outside of vehicle)	6150-00-614-7543	11671581-1	TM 9-2350-25624P-1
8	Cable assembly, special purpose, electrical, ground (for test run outside of vehicle)	5995-00-674-8738	10864170	TM 9-2350-25624P-1
9	Chain assembly, single leg	4010-00-171-4426		CTA 50-970
9.1	Clamp, T-bolt, hose (for test run outside of vehicle)		11669087-6	TM 9-2350-256-24P-1
10	Cleaning tool, oil cooler	4910-00-494-8257	11641959	TM 9-2350-256-24P-1
11	Compressor assembly, brake-apply assembly, torque converter lockup clutch backing plate or steering tie shaft drive gear	5120-00-330-4274	8708939	TM 9-2520-215-34P
12	Cutter, carbon nozzle, injector nozzle seat	4910-00-795-7958	10882949	TM 9-2815-220-34P
13	File, thread restorer (thread chaser)	5110-00-373-1691		SC 4910-95-CL-A72
13.1	Filter assembly (for test run outside of vehicle)		12390176	TM 9-2350-256-24P-1
14	Gage and compressor, piston ring	4910-00-795-7956	10882888	
15	Gage, wear, end connector	4910-00-799-8732	10887333	TM 9-2350-256-24P-1
16	Hammer, hand (mallet)	5120-00-902-0089		SC 4910-95-CL-A74
17	Handle (used with removers and/or replacers)	5120-00-473-7121	7082881	TM 9-2350-256-24P-1
18	Handle, remover and replacer (used with adapters and/or replacers)	5120-00-708-3883	7083883	TM 9-2350-256-24P-1
18.1	Hose (for test run outside of vehicle)		12390186	TM 9-2350-256-24P-1
18.2	Hose assembly, nonmetallic (for emergency boom operation)	4720-00-619-9681	11671580-5	TM 9-2350-256-24P-1
18.3	Hose assembly, nonmetallic (for emergency boom operation)	4720-00-619-9689	11671580-4	TM 9-2350-256-24P-1
18.4	Hose assembly, nonmetallic (for emergency boom operation)	4720-00-619-9691	11671580-3	TM 9-2350-256-24P-1
19	Hose assembly, nonmetallic, engine primer (for test run outside of vehicle)	4720-01-044-8393	11671580-7	TM 9-2350-256-24P-1

SECTION II: TOOL ID LIST

TM 9-2350-256-20

(1) Item Number	(2) Item Name	(3) NSN	(4) Part Number	(5) Reference
20	Hose assembly, nonmetallic, main fuel line and fuel injector return (for test run outside of vehicle)	4720-01-041-3375	11671580-6	TM 9-2350-256-24P-1
21	Insertor, screw thread (7/16-20)	5120-00-797-2407	MIL-T-21309	TM 9-2350-256-24P-1
22	Jackscrews	5306-01-331-6273		
23	Key, socket head screw, 3/8 inches (in.) (set) hex, 4-1/4 in. (108.0 millimeter [mm]) long	5120-00-198-5390	41-W-2456	SC 4910-95-CL-A74
24	Key, socket head screw, 5/8 in., hex, 6-1/4 in. (158.8 mm) long	5120-00-224-2510	GGG-N-652	SC 4910-95-CL-A74
25	Kit assembly, gage, pressure	4910-00-572-8612	8356176	
26	Lifter, roadwheel arm	5120-00-611-7137	7010355	TM 9-2350-256-24P-1
27	Multiplier, torque wrench	5120-00-574-9318	TD-1000	SC 4910-95-CL-A72
28	Parts kit, steering clutch housing output shaft	2590-00-330-8642	8708831	TM 9-2520-215-34P
29	Pliers set, retaining	5120-00-789-0492		SC 4910-95-CL-A74
30	Pliers, retaining ring	5120-00-595-9551		SC 4910-95-CL-A74
31	Pliers, retaining ring	5120-00-288-9717		SC 4910-95-CL-A74
32	Pliers, retaining ring, external	5120-00-088-9393		SC 4910-95-CL-A74
33	Puller and pump track end connector	5120-01-052-5642		
34	Puller kit, mechanical	5120-00-313-9496		SC 4910-95-CL-A72
35	Puller, mechanical, compensating link bearing	5120-00-614-1454	7027414	
36	Puller, slide hammer-type (used with adapters and/or replacers)	5120-00-557-3615	5573615	TM 9-2350-256-24P-1
37	Punches, drive	5120-00-242-3435	GG-P-831	CTA 50-970
38	Remover and replacer, roadwheel hub inner bearing cup or compensating idler wheel hub inner bearing cup (used with handle 5120-00-708-3883)	5120-00-473-7373	7092876	TM 9-2350-256-24P-1
39	Remover and replacer, roadwheel hub outer bearing cup or track support compensating idler wheel hub outer bearing cup (used with handle 5120-00-708-3883)	5120-00-473-7374	7082834	TM 9-2350-256-24P-1
40	Replacer, roadwheel arm support spindle outer bearing oil seal (used with handle 5120-00-473-7121)	5120-00-473-7475	7078973	TM 9-2350-256-24P-1
41	Replacer, track support roller wheel inner bearing oil seal	5120-00-473-7471	7082882	TM 9-2350-256-24P-1
42	Riveter, blind	5120-00-017-2849		SC 4933-95-CL-A11
43	Scale, indicating	6670-00-254-4634		SC 4910-95-CL-A72
44	Screws, cap (jackscrews)	5305-00-720-7994		
45	Sling assembly, final drive hub and sprocket assembly (used with adapter, hoisting 4910-00-766-1961)	4010-00-800-8900	10884613	TM 9-2350-256-24P-1
46	Sling assembly, lifting	4910-01-046-8944	11672258	TM 9-2350-256-2413-1

(1) Item Number	(2) Item Name	(3) NSN	(4) Part Number	(5) Reference
47	Sling, beam-type, powerplant or engine	3940-00-622-7288	11671664	TM 9-2350-256-24P-1
48	Socket set	5120-00-204-1999	G G G - W - 6 4 1	SC 4910-95-CL-A72
49	Socket set	5120-00-322-6231		SC 4910-95-CL-A72
50	Soldering gun	3439-00-732-7798		SC 4933-95CL-AI2
51	STE /ICE-R kit	4910-01-222-6589	12259266	TM 9-4910-571-12&P
52	Tester, airflow	6680-00-436-4217	ES77-2120	TM 3-6680-316-10
53	Tool kit, general mechanic' s	5180-00-177-7033		SC 5180-90-N26
54	Vise, soft-jaw	5120-00-221-1506		SC 4910-95-CL-A74
55	Wrench, box and open-end combination generator mounting nuts	5120-00-789-4881	10935476	TM 9-2815-220-34P
56	Wrench, open-end, adjustable	5120-00-277-6470		
57	Wrench, socket, roadwheel bearing adjusting nut or track support roller bearing adjusting nut or compensating idler wheel adjusting nut	5120-00-588-4808	8708459	TM 9-2350-256-24P-1
58	Wrench, spanner, hydraulic cylinder packing nut	5120-00-777-1388	10884649	TM 9-2350-256-2413-I
59	Wrench, spanner, level winder cylinder adjusting nut	5120-00-767-9099	10884603	TM 9-2350-256-24P-1
60	Wrench, spanner, roadwheel arm supporting spindle inner and outer bearing and spacer retaining nut	5120-00-473-7761	7078980	TM 9-2350-256-24P-1
61	Wrench, torque, 0-175 pound-feet (lb-ft) (0-237 Newton-meters [N° m])	5120-00-640-6364		SC 4910-95-CL-A72
62	Wrench, torque, 0-200 pound-inches (0-22.6 N° m)	5120-00-853-4538		SC 4910-95-CL-A72
63	Wrench, torque, 0-600 lb-ft (0-813 N° m)	5120-00-221-7983		SC 4910-95-CL-A74

APPENDIX D EXPENDABLE AND DURABLE ITEMS LIST

APPENDIX OVERVIEW

This appendix lists expendable and durable items you will need to maintain the M88A1 Recovery, Vehicle. This listing is for informational purposes only and is not authority to requisition the listed items.

This appendix consists of the following sections:

	Page
Section I: Introduction	D-1
Section II: Expendable and Durable Items List	D-3

SECTION I: INTRODUCTION

Task		Page
D-1	Scope	D-1
D-2	Explanation of Columns for Expendable and Durable Items List, Section II	D-1

D-1 SCOPE

This appendix lists expendable and durable items that you will need to operate and maintain the MSS Medium Recovery Vehicle. This listing is for information 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 S-100, Army Medical Department Expendable/Durable Items.

D-2 EXPLANATION OF COLUMNS FOR EXPENDABLE AND DURABLE ITEMS LIST, SECTION II

a. COLUMN 1, ITEM NUMBER

This is assigned to the entry in the listing for referencing when required.

b. COLUMN 2, LEVEL

This identifies the lowest level of maintenance that requires the listed item:

- C..... Operator,/Crew
- O Unit Maintenance
- F Direct Support Maintenance
- H General Support Maintenance

c. COLUMN 3. NATIONAL STOCK NUMBER (NSN)

This is assigned to the item; use it to request or requisition the item.

d. COLUMN 4, DESCRIPTION

This indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the Commercial and Government Entity Code (CAGEC) in parenthesis followed by the part number.

D-2 EXPLANATION OF COLUMNS FOR EXPENDABLE AND DURABLE ITEMS LIST, SECTION II - Continued

e. COLUMN 5, UNIT OF MEASURE (U/M] OR UNIT OF ISSUE (U/I)

This is expressed by a two-character alphabetical abbreviation (e.g., EA, IN, PR). If the U/M differs from the U/I as shown in the Army Master Data File (AMDF), requisition the lowest U/I that will satisfy your requirements.

<u>Abbreviation</u>	<u>Unit</u>	<u>Abbreviation</u>	<u>Unit</u>
BDL	bundle	LG	length
CN	can	PT	pint
GL	gallon	QT	quart
KT	kit	RO	roll

SECTION II: EXPENDABLE AND DURABLE ITEMS LIST

(1) Item Number	(2) Level	(3) NSN	(4) Description	(5) U/M or U/I
1		8040-00-281-1972	Adhesive, rubber	
2		8040-00-843-3461	Adhesive, rubber	QT
3		8040-00-285-1104	Adhesive, rubber-base, general purpose, type II, MMM-A-1617	QT
4		8040-00-833-9563	Adhesive, sealant, silicone, RTV, one component, white, type I, MIL-A-46106	QT
5		8040-01-009-1562	Adhesive, sealant, silicone, RTV, one component, white, type II, MIL-A-46106	QT
6		8040-01-221-3841	Cement, gasket	PT
7		5350-00-221-0872	Cloth, abrasive, crocus, P-C-458	
8		8010-00-148-7042	Coating, epoxy, VOC-compliant, acid-resistant, black, class 2, type III, MIL-C-22750	QT
9		6850-00-281-1985	Dry-cleaning and degreasing solvent, P-D-680	GL
10		8010-00-111-7930	Enamel, alkyd, camouflage, forest green, type II, MIL-E-52798	QT
11		8010-00-286-7725	Enamel, alkyd, gloss, low VOC content, white, synthetic, TT-E-489	QT
12		8010-00-664-7653	Enamel, alkyd, semi-gloss, low VOC, white, TT-E-5291	QT
13		9150-00-190-0905	Grease, automotive and artillery (GAA), MIL-G-10924	LB
14		9150-00-269-8255	Grease, pneumatic, MIK-G-4343	CN
15			Insulation tape, electrical, pressure-sensitive, adhesive, plastic, MIL-I-7798	RO
16		8010-00-292-3029	Lacquer, spraying, clear and pigmented for interior use, TT-L-58	PT
16.1		9150-00-234-5197	Lubricating oil, chain, wire rope, exposed gear, VV-L-751	CN
16.2		9150-01-048-4593	Lubricating oil, gear, MIL-L-2105	GL
16.3		9150-00-257-5440	Lubricating oil, gear, MIL-L-10324	CN
17		9150-00-261-8146	Lubricating oil, general purpose, 1 oz. bottle (81348) VV-L-800	OZ
17.1		9150-00-402-4478	Lubricating oil, internal combustion engine, arctic, MIL-L-46167	QT

(1) Item Number	(2) Level	(3) NSN	(4) Description	(5) U/M or U/I
18		9150-01-152-4117	Lubricating oil, internal combustion engine, combat/tactical service, MIL-L-2104	QT
19			Paint, flat, type I, TT-P-948, black, no. 37038 per FED-STD-595	QT
20			Paint, flat, type I, TT-P-948, white, no. 37875 per FED-STD-595	QT
21		2910-00-801-1152	Parts kit, outer filter elements	
22		8010-00-292-3048	Primer coating and surfacer: synthetic, tints, and white, TT-P-659	QT
23			Rags, wiping cotton, grade B, 5-lb, DD-R-30	BDL
24		9390-00-180-7289	Rod	
25		8030-00-543-4384	Sealing compound, non-curing, polybutane, MIL-S-12158	QT
26		8030-00-275-8111	Sealing compound, non-curing, polybutene, type I, MIL-S-12158	PT
27		8030-00-965-2437	Sealing compound, single-component, non-curing, polysulfide base, type I, MIL-S-11030	QT
28		6850-00-295-7685	Silicone compound, NATO code number S-736, MIL-S-8660	CN
29		8030-00-964-5968	Tape, antiseize, polytetrafluoroethylene, 18 yard each (81349) MIL-T-27730	YD
30			Tape, teflon, thread sealant, 1/2-inch- (12.7-millimeter-) wide, drawing 10379740	RO
31		8010-00-165-4432	Varnish, spar, water-resisting, TT-V-121	
32		5610-00-141-7838	Walkway compound, nonslip, and walkway matting, nonslip, forest green, type II, MIL-W-5044	QT
33		6145-00-705-6674	Wire, electrical M13486/1-14	RO
34			Wire, electrical M13486/1-5	RO
35		5510-00-274-5381	Wood, hardwood, board foot (81348) MM-L-736	BF

**APPENDIX E
ILLUSTRATED LIST OF MANUFACTURED ITEMS**

APPENDIX OVERVIEW

This appendix includes complete instructions for making items authorized to be manufactured or fabricated at unit maintenance level. An item number index is provided for cross-referencing the item to be manufactured to the figure which covers fabrication criteria. All bulk materials needed for manufacture of an item are listed by National Stock Number (NSN) in a tabular list on the illustration.

This appendix consists of the following sections:

	Page
Section I: Introduction	E-1
Section II: Manufactured Items Index	E-2
Section III: Manufactured Items Illustration	E-2

SECTION I: INTRODUCTION

Para.	Task	Page
E-1	Explanation of Columns for Manufactured Items Index, Section II.....	E-1
E-2	Explanation of Columns for Manufactured Items Illustration, Section III	E-1

**E-1 EXPLANATION OF COLUMNS FOR MANUFACTURED ITEMS INDEX,
SECTION II**

a. COLUMN 1, ITEM NUMBER

This is the item number assigned to a part.

b. COLUMN 2, MANUFACTURED ITEMS

This identifies the item to be manufactured or fabricated.

c. COLUMN 3, FIGURE NUMBER

This is the cross-reference to the manufactured item.

**E-2 EXPLANATION OF COLUMNS FOR MANUFACTURED ITEMS
ILLUSTRATION, SECTION III**

a. COLUMN 1, DESCRIPTION

This identifies the bulk material used in the manufacture of the item.

b. COLUMN 2, NSN

This indicates the NSN assigned to the bulk material; use it to request or requisition the material.

SECTION II: MANUFACTURED ITEMS

(1) Item Number	(2) Manufactured Item	(3) Figure Number
1	Fabricated stop	E-1
2	Lumber, wood block	E-2
3	Seal strip	E-3
4	Seal strip	E-4
5	Weldless chain	E-5

SECTION III: MANUFACTURED ITEMS ILLUSTRATIONS

ITEM 1 FABRICATED STOP

Materials	
(1) Description	(2) NSN
Fabricate from 0.125 in. (3.18 mm) sheet metal: ASTM A569	9515-00-184-8467

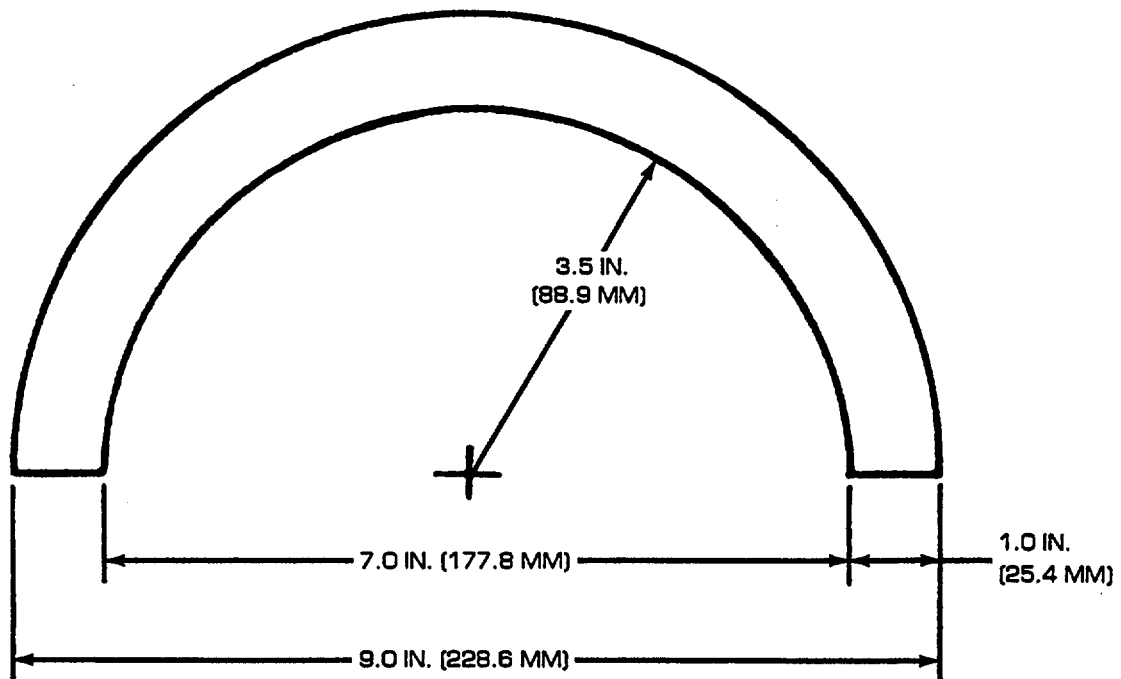


Figure E-1

ITEM 2 LUMBER, WOOD BLOCK

Materials	
(1) Description	(2) NSN
Fabricate from hardwood lumber: MM-L-736	5510-00-274-5381

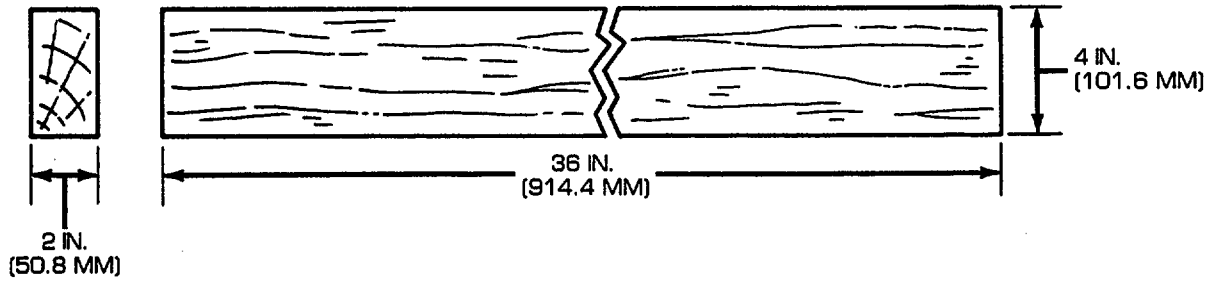


Figure E-2

ITEM 3 SEAL STRIP

Materials	
(1) Description	(2) NSN
Fabricate from rubber, cellular grade RN 11AB or 12 AB SPEC MIL-C-3133: PN 8764337	9320-01-379-6428

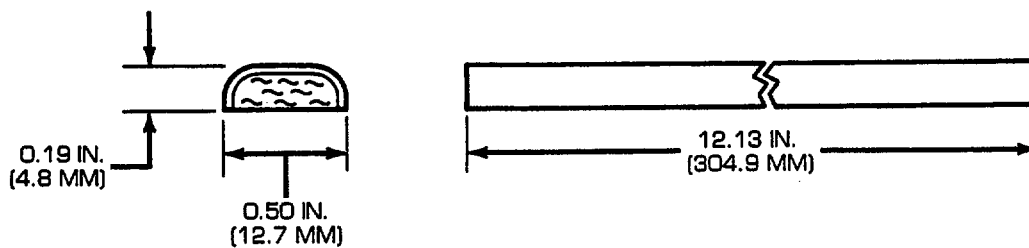


Figure E-3

ITEM 4 SEAL STRIP

Materials	
(1) Description	(2) NSN
Fabricate from silicone rubber MIL-C-3133: PN 204-030-853	9320-00-880-4520

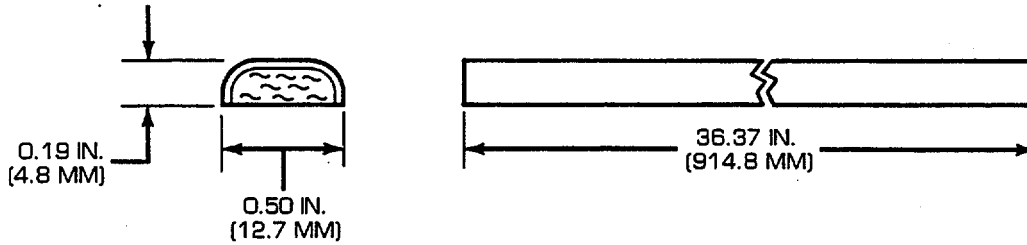


Figure E-4

ITEM 5 WELDLESS CHAIN

Materials	
(1) Description	(2) NSN
Fabricate from 0.072 in. (1.83 mm) steel: PN 42C15120-205	4010-00-129-3221



Figure E-5

**APPENDIX F
TORQUE LIMITS**

APPENDIX OVERVIEW

This appendix provides general torque limits for screws used on the M88A1 Recovery Vehicle. Special torque limits are indicated in the maintenance procedures for applicable components. The general torque limits given in this appendix shall be used when specific torque limits are not indicated in the maintenance procedure. These general torque limits cannot be applied to screws that retain rubber components. The rubber components will be damaged before the correct torque limit is reached. If a special torque limit is not given in the maintenance instructions, tighten the screw or nut until it touches metal, then tighten it 1 more turn.

This appendix contains the following paragraphs:

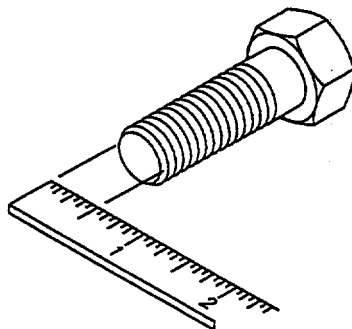
Para.	Task	Page
F-1	Torque Limits	F-1
F-2	How To Use Torque Table	F-1
F-3	Tightening Metal fasteners.....	F-4
F-4	Fastener Size and Thread Pattern	F-5
F-5	Fastener Grade	F-6

F-1 TORQUE LIMITS

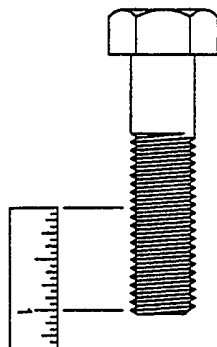
Table F-1 lists dry torque limits. Dry torque limits are used on screws that do not have lubricants applied to the threads. Table F-2 lists wet torque limits. Wet torque limits are used on screws that have high-pressure lubricants applied to the threads.

F-2 HOW TO USE TORQUE TABLE

- 1 Measure the diameter (dia.) of the screw you are installing.



- 2 Count the number of threads per 1 inch (in.) (25.4 millimeters [mm]) or use a pitch gage.

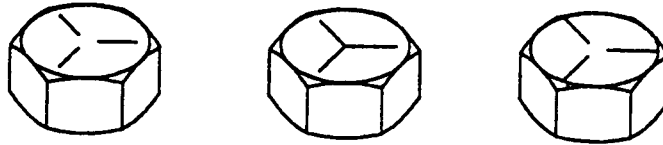


F-1

F-2 HOW TO USE TORQUE TABLE-Continued

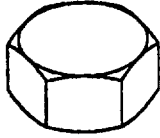
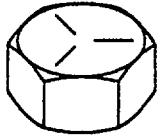
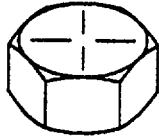
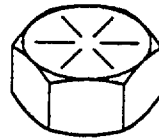
- 3 Under the heading Size, look down the left-hand column until you find the dia. of the screw you are installing (there will usually be two lines beginning with the same size).
- 4 In the second column under Size, find the number of threads per 1 in. (25.4 mm) that matches the number of threads you counted in step 2.
- 5 To find the grade screw you are installing, match the markings on the head to the correct picture of SAE Cap Screw Head Markings on the torque table.
- 6 Look down the column under the picture you found in step 5 until you find the torque limit in pound-feet (lb- ft) or Newton-meters (N-m) for the diameter and threads per 1 in. (25.4 mm) of the screw you are installing.

Manufacturer's marks may vary. These are all SAE Grade 5 (3-line).



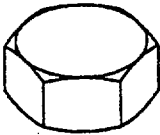
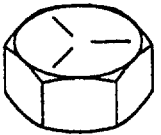
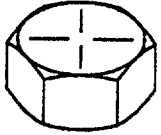
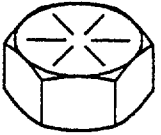
STANDARD CAP SCREW HEAD MARKINGS

TABLE F-1. TORQUE LIMITS FOR DRY FASTENERS.

SAE Cap Screw Head Markings										
Size			Torque							
			SAE Grade No. 1 or 2		SAE Grade No. 5		SAE Grade No. 6 or 7		SAE Grade No. 8	
Dia. (In.)	Threads Per 1 In. (25.4 Mm)	Dia (Mm)	Lb-ft	N•m	Lb-ft	N•m	Lb-ft	N•m	Lb-ft	N•m
1/4	20	6.35	5	6.78	8	10.85	10	13.56	12	16.27
1/4	28	6.35	6	8.14	10	13.56	-	-	14	18.98
5/16	18	7.94	11	14.92	17	23.05	19	25.76	24	32.52
5/16	24	7.94	13	17.63	19	25.76	-	-	27	36.61
3/8	16	9.53	18	24.41	31	42.04	34	46.1	44	59.66
3/8	24	9.53	20	27.12	35	47.46	-	-	49	66.44
7/16	14	11.11	28	37.97	49	66.44	55	74.58	70	94.92
7/16	20	-	30	40.68	55	74.58	-	-	78	105.77
1/2	13	12.7	39	52.88	75	101.7	85	115.26	105	142.38
1/2	20	-	41	55.6	85	115.26	-	-	120	162.78
9/16	12	14.29	51	69.16	110	149.16	120	162.72	155	210.18
9/16	18	-	55	74.58	120	162.72	-	-	170	230.52
5/8	11	15.88	63	85.43	150	203.4	167	226.45	210	284.76
5/8	18	-	95	128.82	170	230.52	-	-	240	325.44
3/4	10	19.05	105	142.38	270	366.12	280	379.68	375	508.5
3/4	16	-	115	155.94	295	400.02	-	-	420	596.52
7/8	9	22.23	160	216.96	395	535.62	440	596.64	605	820.38
7/8	14	-	175	237.3	435	589.86	-	-	675	915.3
1	8	25.4	235	318.66	590	800.04	660	894.96	910	1233.96
1	14	-	250	339	660	894.96	-	-	990	1342.44
1-1/8	-	28.58	-	-	800	1084.8	-	-	1280	1735.7
					880	1193.3			1440	1952.8
1-1/4	-	31.75	-	-	-	-	-	-	1820	2467.9
					-	-	-	-	2000	2712
1-3/8	-	34.93	-	-	1460	1979.8	-	-	2380	3227.3
					1680	2278.1	-	-	2720	3688.3
1-1/2	-	38.1	-	-	1940	2630.6	-	-	3160	4285
					2200	2983.2	-	-	3560	4827.4

F-2 HOW TO USE TORQUE TABLE-Continued

TABLE F-2. TORQUE LIMITS FOR WET FASTENERS.

SAE Cap Screw Head Markings										
Size			Torque							
			SAE Grade No. 1 or 2		SAE Grade No. 5		SAE Grade No. 6 or 7		SAE Grade No. 8	
Dia. (In.)	Threads Per 1 In. (25.4 Mm)	Dia (Mm)	Lb-ft	N•m	Lb-ft	N•m	Lb-ft	N•m	Lb-ft	N•m
1/4	20	6.35	4.5	6.10	7.2	9.76	9.0	12.20	10.8	14.64
1/4	28	6.35	5.4	7.33	9	12.2	-	-	12.6	17.08
5/16	18	7.94	9.9	13.34	15.3	20.74	17.1	23.18	21.6	29.27
5/16	24	7.94	11.7	15.87	17.1	23.18	-	-	24.3	32.95
3/8	16	9.53	16.2	21.97	27.9	37.84	30.6	41.49	39.6	53.69
3/8	24	9.53	18	24.41	31.5	42.71	-	-	44.1	59.8
7/16	14	11.11	25.2	34.17	44.1	59.8	49.5	67.12	63	85.42
7/16	20	-	27	36.61	49.5	67.12	-	-	70.2	95.19
1/2	13	12.7	35.1	47.59	67.5	91.53	76.5	103.73	94.5	128.14
1/2	20	-	36.9	50.04	76.5	103.73	-	-	108	146.45
9/16	12	14.29	45.9	62.24	99	134.24	108	146.45	139.5	189.16
9/16	18	-	49.5	67.12	108	146.45	-	-	153	207.47
5/8	11	15.88	56.7	76.89	135	183.06	150.3	203.8	189	256.28
5/8	18	-	85.5	115.94	153	207.47	-	-	216	292.89
3/4	10	19.05	94.5	128.14	243	329.51	252	341.71	337.5	457.65
3/4	16	-	103.5	140.35	265.5	360.2	-	-	378	512.56
7/8	9	22.23	144	195.26	355.5	482.06	396	536.98	544.5	738.34
7/8	14	-	157.5	213.57	391.5	530.87	-	-	607.5	823.77
1	8	25.4	211.5	286.79	531	720.04	594	805.46	819	1110.56
1	14	-	225	305.1	594	805.46	-	-	891	1208.2
1-1/8	-	28.58	-	-	720	976.32	-	-	1152	1562.13
					792	1073.97	-	-	1296	1757.52
1-1/4	-	31.75	-	-	-	-	-	-	1638	2221.11
					-	-	-	-	1800	2440.8
1-3/8	-	34.93	-	-	1314	1781.82	-	-	2142	2904.57
					1512	2050.29	-	-	2448	3319.47
1-1/2	-	38.1	-	-	1746	2367.54	-	-	2844	3856.5
					1980	2684.88	-	-	3204	4344.66

F-3 TIGHTENING METAL FASTENERS

When torquing a metal fastener, select a torque wrench whose range fits the required torque value. A torque wrench is most accurate from 25% to 75% of its stated range. A torque wrench with a stated range of 0 to 100 lb-ft will be most accurate from 25 to 75 lb-ft. The accuracy of readings will decrease as you approach 0 lb-ft or 100 lb-ft. The ranges in Table F-3 are based on this principle.

TABLE F-3. TORQUE RANGES.

Stated Range	Most Effective Range
0-200 pound-inches (lb-in.) (0-23 N•m)	50-150 lb-in. (6-17 N•m)
15-75 lb-ft (20-102 N•m)	30-60 lb-ft (41-81 N•m)
0-175 lb-ft (0-237 N•m)	44-131 lb-ft (60-178 N•m)
0-600 lb-ft (0-813 N•m)	150-450 lb-ft (203-610 N•m)

F-4 FASTENER SIZE AND THREAD PATTERN

Threaded fasteners are categorized according to the dia. of the fastener shank. Thread styles are divided into broad groups, the two most common being coarse (Unified Coarse [UNC]) and fine (Unified Fine [UNF]). These groups are defined by the number of threads per 1 in. (25.4 mm) on the bolt shank. In addition, threads are categorized by thread class (see Table F-4), which is a measure of the degree of fit between the threads of the bolt or screw (external threads) and the threads of the attaching nut or tapped hole (internal threads). The most common thread class for bolts and screws is Class 2.

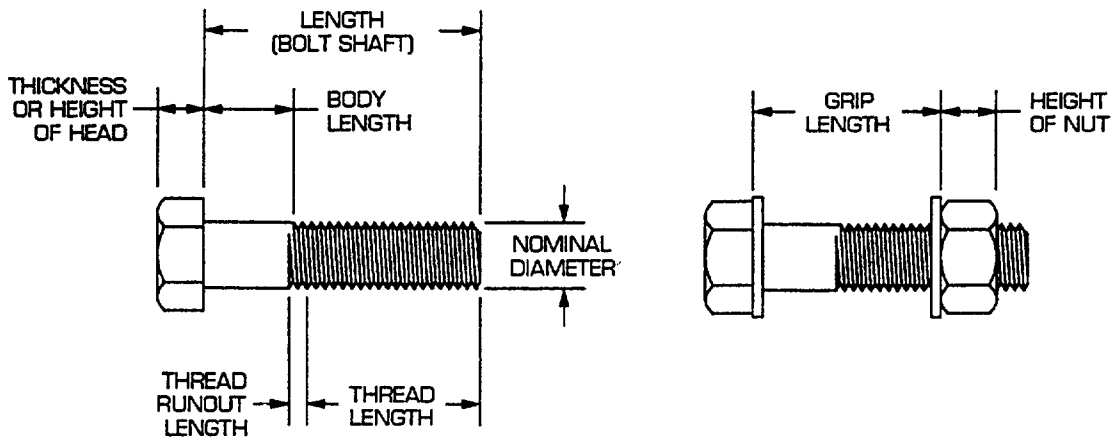
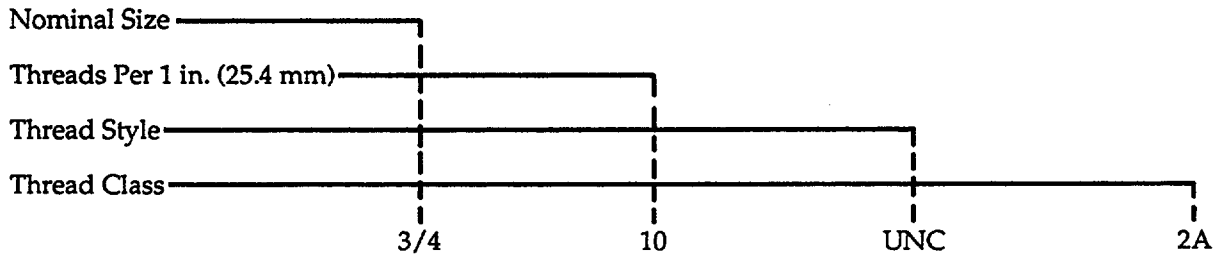
TABLE F4. THREAD CLASSES AND DESCRIPTION.

External	Internal	Fit
1A	1B	Loose
2A	2B	Medium
3A	3B	Close

Thread patterns are designed as follows:

NOTE

Unless followed with-LH (e.g., 3/4-10-UNC-2A-LH), threads are right-hand.



F-5 FASTENER GRADE

In addition to being classified by thread type, threaded fasteners are also classified by material. The most familiar fastener classification system is the SAE grading system (see Table F-5).

TABLE F-5. SAE SCREW AND BOLT MARKINGS.

Screws	Bolts
SAE Grade 2 No Marking	SAE Grade 6 4 Radial Dashes 90° Apart
SAE Grade 3 2 Radial Dashes 180° Apart	SAE Grade 7 5 Radial Dashes 72° Apart
SAE Grade 5 3 Radial Dashes 120° Apart	SAE Grade 8 6 Radial Dashes 60° Apart

NOTE

The following is a listing of various manufacturer markings on hex locknuts:

- Grade A—No Marks/No Notches/No Letter
- Grade B—3 Marks/One Notch/Letter B
- Grade C—6 Marks/Two Notches/Letter C

**APPENDIX G
MANDATORY REPLACEMENT PARTS**

APPENDIX OVERVIEW

This appendix provides a cross-reference list of mandatory replacement parts and is included for that purpose only.

This appendix consists of the following sections:

	Page
Section I: Explanation of Columns	G-1
Section II: Mandatory Replacement Parts List	G-1

SECTION I: EXPLANATION OF COLUMNS
--

Para.	Task	Page
G-1	Explanation of Columns	G-1

G-1 EXPLANATION OF COLUMNS

a. Column (1)—Item Number

This number is assigned to the entry in the listing for cross-referencing to the part number.

b. Column (2)—Part Number

Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specification, standards, and inspection requirements to identify an item of range of items.

c. Column (3)—Nomenclature

This column contains the description that appears on the first page of the task under the subheading Materials.

SECTION II: MANDATORY REPLACEMENT PARTS LIST

(1) Item Number	(2) Part Number	(3) Nomenclature
1	MS17131-23	Bearing
2	MS17131-40	Bearing
3	MS35764-1603	Bolt, self-locking
4	22-P-471BD1QBDCB	Bushing
5	119922	Bushing
6	8395411-1	Bushing
7	10894397	Bushing
8	10934437	Bushing
9	MS14315-1XA	Bushing
10	8356910	Cartridge, oil filter
11	MS21318-13	Drivescrew
12	MS21318-20	Drivescrew
13	MS21318-21	Drivescrew

APPENDIX G: MANDATORY REPLACEMENT PARTS

TM 9-2350-256-20

(1) Item Number	(2) Part Number	(3) Nomenclature
14	MS21318-22	Drivescrew
15	MS21318-27	Drivescrew
16	MS21318-46	Drivescrew
17	MS21318-52	Drivescrew
18	MS21318-8	Drivescrew
19	MS21318-9	Drivescrew
20	122-0325	Filter
21	122-0326	Filter
22	7520804	Filter
23	11602061	Filter
24	11602062	Filter
25	1-220889	Gasket
26	585094	Gasket
27	1235403	Gasket
28	5380884	Gasket
29	6295364	Gasket
30	6295371	Gasket
31	7014010	Gasket
32	7084278	Gasket
33	7398878	Gasket
34	7398879	Gasket
35	7403580	Gasket
36	7415354	Gasket
37	7709260	Gasket
38	7726600	Gasket
39	7962267	Gasket
40	7972324	Gasket
41	7972333	Gasket
42	7972340	Gasket
43	7972345	Gasket
44	7972346	Gasket
45	7972350	Gasket
46	7991273	Gasket
47	8381708	Gasket
48	8387092	Gasket
49	8387093	Gasket
50	8682503	Gasket
51	8682505	Gasket
52	8682679	Gasket
53	8682680	Gasket
54	8682770	Gasket
55	8682772	Gasket
56	8697673	Gasket
57	8725239	Gasket
58	8761547	Gasket
59	8764500	Gasket
60	10862830	Gasket
61	10866626	Gasket

(1) Item Number	(2) Part Number	(3) Nomenclature
62	10867389	Gasket
63	10870150	Gasket
64	10894116	Gasket
65	10894371	Gasket
66	10894496	Gasket
67	10894505	Gasket
68	10897166	Gasket
69	10935621	Gasket
70	11610232	Gasket
71	11639519-2	Gasket
72	11671277	Gasket
73	11672014	Gasket
74	11672220-1	Gasket
75	11672222	Gasket
76	11672439	Gasket
77	11684095	Gasket
78	12254235	Gasket
78.1	12322675	Gasket
79	12360844	Gasket
80	MS2000-10	Gasket
81	MS2000-8	Gasket
82	MS35769-26	Gasket
83	MS35769-31	Gasket
84	MS35769-47	Gasket
85	MS52000-5	Gasket
86	MS90484-16-1	Gasket
87	MS90484-22-1	Gasket
88	MS124657	Insert
89	MS124658	Insert
90	10863508	Insulation sleeving
90.1	8712289-9	Locknut
91	8764825	Locknut
92	8764826	Locknut
93	MS51860-53	Locknut
94	MS51860-55	Locknut
95	12-50641	Lockwasher
96	23E06	Lockwasher
97	125774	Lockwasher
98	7404671	Lockwasher
99	7404672	Lockwasher
100	7410218	Lockwasher
101	MS27183-10	Lockwasher
102	MS35333-36	Lockwasher
103	MS35333-37	Lockwasher
104	MS35333-38	Lockwasher
105	MS35333-39	Lockwasher
106	MS35333-40	Lockwasher
107	MS35333-41	Lockwasher
108	MS35333-42	Lockwasher

(1) Item Number	(2) Part Number	Nomenclature
109	MS35333-88	Lockwasher
110	MS35334-22	Lockwasher
111	MS35335-15	Lockwasher
112	MS35335-29	Lockwasher
113	MS35335-30	Lockwasher
114	MS35335-31	Lockwasher
115	MS35335-32	Lockwasher
116	MS35335-33	Lockwasher
117	MS35335-34	Lockwasher
118	MS35335-35	Lockwasher
119	MS35335-37	Lockwasher
120	MS35335-38	Lockwasher
121	MS35335-39	Lockwasher
122	MS35335-40	Lockwasher
123	MS35335-58	Lockwasher
124	MS35336-27	Lockwasher
125	MS35336-39	Lockwasher
126	MS35338-40	Lockwasher
127	MS35338-41	Lockwasher
128	MS35338-42	Lockwasher
129	MS35338-43	Lockwasher
130	MS35338-44	Lockwasher
131	MS35338-45	Lockwasher
132	MS35335-46	Lockwasher
133	MS35338-47	Lockwasher
134	MS35338-48	Lockwasher
135	MS35338-49	Lockwasher
136	MS35338-50	Lockwasher
137	MS35338-51	Lockwasher
138	MS35338-65	Lockwasher
139	MS35338-47	Lockwasher
140	MS35338-99	Lockwasher
141	MS35339-27	Lockwasher
142	MS35340-44	Lockwasher
143	MS35340-46	Lockwasher
144	MS35340-48	Lockwasher
145	MS35340-50	Lockwasher
146	MS35340-51	Lockwasher
147	MS35340-52	Lockwasher
148	MS35340-53	Lockwasher
149	MS35338-44	Lockwasher
150	MS45904-68	Lockwasher
151	MS45904-76	Lockwasher
152	MS51848-13	Lockwasher
153	N405P39C15	Lockwasher
154	ASTM A853	Lockwire
155	MS20995-F41	Lockwire
156	MS20995-NC	Lockwire
157	MS20995F47	Lockwire

(1) Item Number	(2) Part Number	(3) Nomenclature
158	MS20995NC40-12	Lockwire
159	8764824	Nut, seal
160	5PL51712-6	Nut, self-locking
161	503345	Nut, self-locking
162	503351	Nut, self-locking
163	MS21044-N4	Nut, self-locking
164	MS21044N10	Nut, self-locking
165	MS21044N3	Nut, self-locking
166	MS21044N5	Nut, self-locking
167	MS21044N6	Nut, self-locking
168	MS21045-4	Nut, self-locking
169	MS21045-5	Nut, self-locking
170	MS21045-6	Nut, self-locking
171	MS21083-N6	Nut, self-locking
172	MS21083N3	Nut, self-locking
173	MS51922-37	Nut, self-locking
174	MS51922-53	Nut, self-locking
175	MS51922-61	Nut, self-locking
176	MS51943-18	Nut, self-locking
177	SPL51712-6	Nut, self-locking
178	122A185	Oil filter
179	110 5-16	Packing
180	7364324	Packing
181	11684058	Packing
182	MS28775-256	Packing
183	MS29513-115	Packing
184	MS29513-465	Packing preformed
185	7230658	Packing, preformed
186	7358626	Packing, preformed
187	7708793	Packing, preformed
188	7962268	Packing, preformed
189	10862216	Packing, preformed
190	11672102	Packing, preformed
191	M8324811-012	Packing, preformed
192	M8324811-327	Packing, preformed
193	MS28775-006	Packing, preformed
194	MS28775-021	Packing, preformed
195	MS28775-110	Packing, preformed
196	MS28775-222	Packing, preformed
197	MS28775-228	Packing, preformed
198	MS28775-238	Packing, preformed
199	Deleted	Deleted
200	11672074	Pad
201	11672075	Pad
202	5704486	Parts kit
203	5704487	Parts kit, fuel filter
204	5140855	Pin
205	12Z48PC611	Pin, cotter

(1) Item Number	(2) Part Number	(3) Nomenclature
206	112726	Pin, cotter
207	AN415-2	Pin, cotter
208	MS24665-132	Pin, cotter
209	MS24665-151	Pin, cotter
210	MS24665170	Pin, cotter
211	MS24665-281	Pin, cotter
212	MS24665-283	Pin, cotter
213	MS24665-285	Pin, cotter
214	MS24665-287	Pin, cotter
215	MS24665-351	Pin, cotter
216	MS24665-353	Pin, cotter
217	MS24665-355	Pin, cotter
218	MS24665-359	Pin, cotter
219	MS24665-37	Pin, cotter
230	MS24665-421	Pin, cotter
221	MS24665-423	Pin, cotter
222	MS24665-425	Pin, cotter
223	MS24665-426	Pin, cotter
234	MS24665-631	Pin, cotter
225	MS24665-689	Pin, cotter
226	MS24665-752	Pin, cotter
227	TR50-80	Pin, cotter
228	MS16562-51	Pin, spring
229	MS16562-52	Pin, spring
230	MS16562-65	Pin, spring
231	MS165662-159	Pin, spring
232	MS171567	Pin, spring
233	MS9048-104	Pin, spring
234	MS9048-176	Pin, spring
235	10894259	Ring
236	MS20470B4-5	Rivet
237	MS20613-8C8	Rivet
238	MS21318-21	Rivet
239	8764829	Rivet, blind
240	MS90727-63	Screw
241	MS16998-74L	Screw, self-locking
242	63X87	Seal
243	343XW420	Seal
244	106224	Seal
245	323135	Seal
246	738835	Seal
247	7059845	Seal
245	7355018	Seal
249	7388835	Seal
250	7100356	Seal
251	6371846	Seal
252	8376364	Seal
253	8395496	Seal

SECTION II: MANDATORY REPLACEMENT PARTS LIST

TM 9-2350-256-20

(1) Item Number	(2) Part Number	(3) Nomenclature
254	8693757	Seal
255	10867195	Seal
256	10894380	Seal
257	10894382	Seal
258	10894407	Seal
259	MS51000-178-2	Seal
260	MS51920-1	Seal
261	MS51938-6	Seal
262	SL5961	Seal
263	MS51912-2-9	Seal assembly
264	10935537	Seal, oil
265	7962254	Seal, rubber
266	8720150	Seal, safety
267	ED89D	Spark plug (with gasket)
268	MS3367-1-0	Strap
269	MS3367-1-9	Strap
270	MS3367-3-0	Strap
271	10894380	Strip, rubber
272	10894381	Strip, rubber
273	10894471	Strip, rubber
274	10894378	Strip, rubber (Left)
275	10894379	Strip, rubber (Right)
276	6295381	Washer, key
277	11655771	Washer, key
278	12322577	Washer, spring
279	8725595	Washer, spring tension
280	5146162	Washer, tab
281	MS28775-237	Packing

G-7 (G-8 blank)

**APPENDIX H
UNITED STATES ARMY, EUROPE (USAREUR) SAFETY LIGHTING
MODIFICATION KIT**

APPENDIX OVERVIEW

This appendix covers maintenance procedures for specific components of the USAREUR safety lighting modification kit.

This appendix consists of the following paragraphs:

Para.	Task	Page
H-1	Stoplights and Covers	H-1
H-2	Reflectors and Mounting Plates	H-3
H-3	Flasher Assembly and Related Parts	H-4
H-4	Directional Signal Control and Mount Assembly.....	H-6
H-5	Mirror and Mount Assemblies	H-6
H-6	Front Directional Signal Lamps and Related Parts.....	H-7
H-7	Directional Signal Control Wiring Harness (12322611)	H-9
H-8	Right Tail Lamp to Left Tail Lamp to Bulkhead Wiring Harness (12322613)	H-11
H-9	Flasher Wiring Harness (12322612)	H-12
H-10	Directional Signal Control to Bulkhead Wiring Harness (12322614)	H-14
H-11	Main Lighting Switch Panel Wire Assemblies (12322615-1 and-2).....	H-15
H-12	Headlight Base Assembly to Headlight and Dimmer Switch Wiring Harnesses (12322668)	H-16
H-13	Directional Signal Wiring Harness (12322660)	H-18
H-14	Directional Signal/Directional Signal Lamp Wire Assemblies (12322648).....	H-19
H-15	Directional Signal Lamp Wire Assembly (12322658).....	H-20

NOTE

The left headlight is modified during safety lighting kit installation. However, while the part number is different, the maintenance procedure is unchanged (see paragraph 6-26).

H-1 STOPLIGHTS AND COVERS

THIS TASK COVERS

- | | | | |
|------------|----------------|-------------|-----------------|
| a. Removal | b. Disassembly | c. Assembly | d. Installation |
|------------|----------------|-------------|-----------------|

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Gaskets (2) (Appendix G, item 71)
- Lockwashers (2) (Appendix G, item 115)
- Lockwashers (4) (Appendix G, item 116)
- Lockwashers (4) (Appendix G, item 118)
- Lockwashers (4) (Appendix G, item 130)
- Lockwashers (4) (Appendix G, item 134)

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

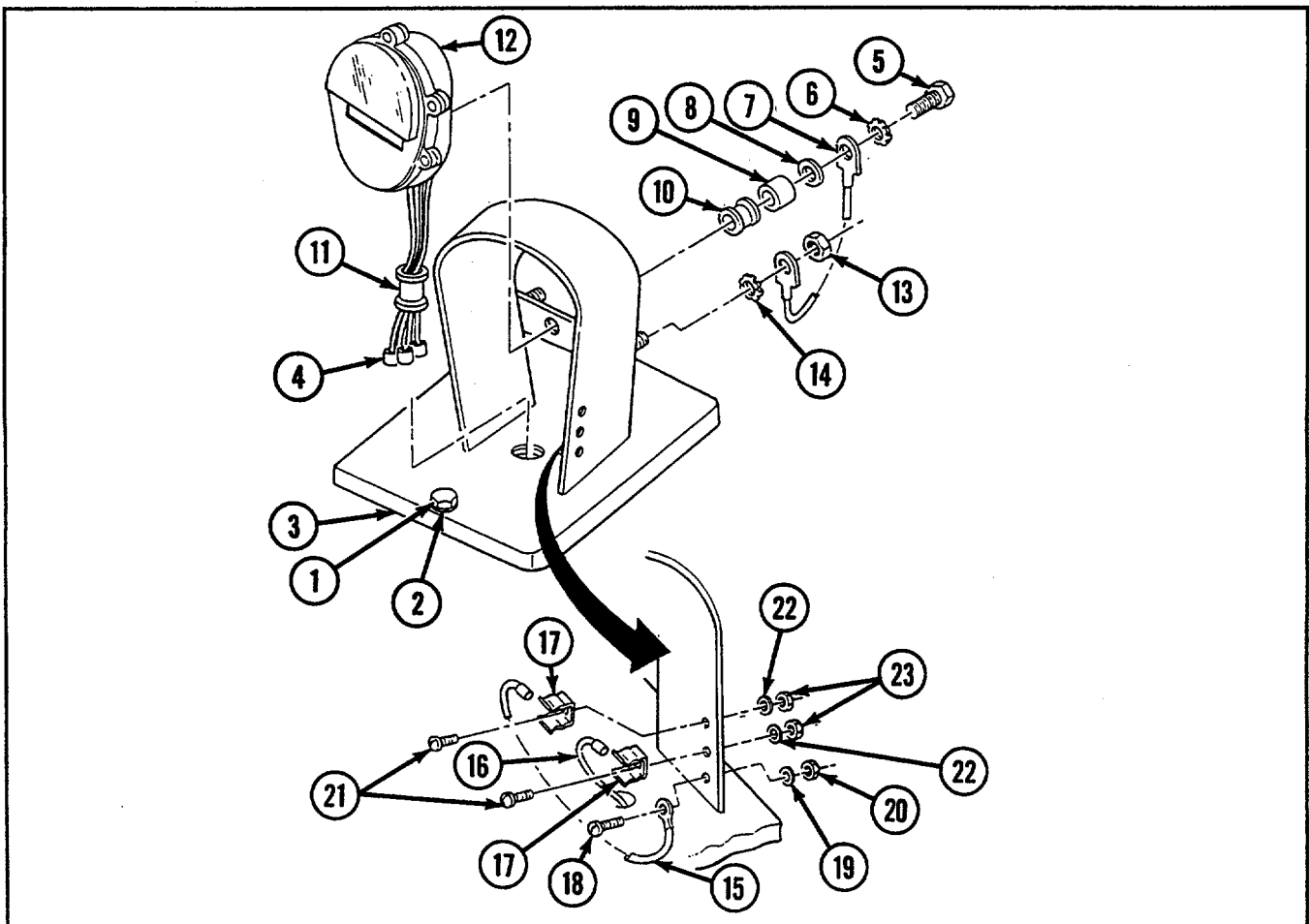
H-1 STOPLIGHTS AND COVERS-Continued

NOTE

The following procedures apply to both left and right stoplights.

a. REMOVAL

- 1 Remove two screws (1), two lockwashers (2), and cover (3).
- 2 Disconnect four electrical cables (4).
- 3 Remove two screws (5), two lockwashers (6), two ground leads (7), two flat washers (8), two bushings (9), and two grommets (10).
- 4 Remove grommet (11) and taillight (12), pulling electrical connectors through grommet hole.
- 5 Remove two nuts (13), two ground leads (7), and two lockwashers (14).
- 6 Remove two electrical cables (15 and 16) from clips (17). Remove screw (18), electrical cable (15), lockwasher (19), and nut (20).
- 7 Remove two screws (21), two clips (17), two lockwashers (22), and two nuts (23).



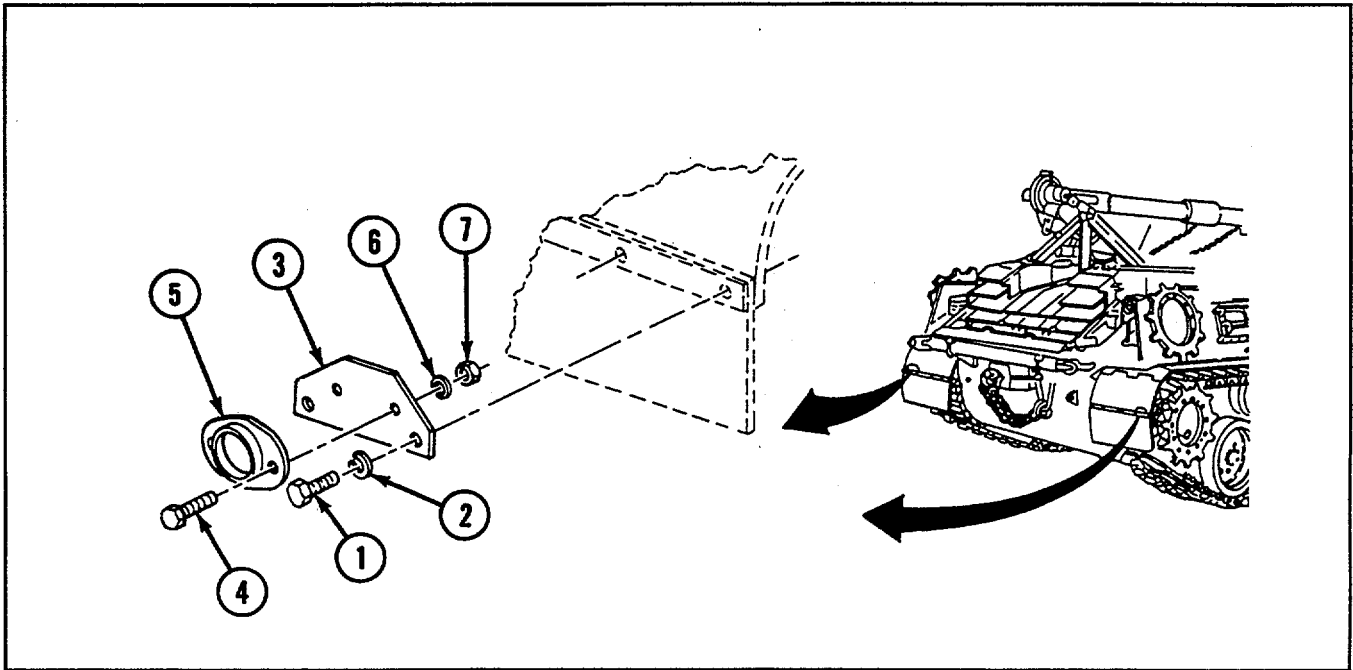
H-2 REFLECTORS AND MOUNTING PLATES-Continued

NOTE

The following procedures apply to both left and right reflectors.

a. REMOVAL

- 1 Remove two screws (1), two lockwashers (2), and reflector mounting plate (3).
- 2 Remove two screws (4), reflector (5), two lockwashers (6), and two nuts (7).



b. INSTALLATION

- 1 Install reflector (5), two screws (4), two new lockwashers (6), and two nuts (7).
- 2 Install reflector mounting plate (3), two new lockwashers (2), and two screws (1).

H-3 FLASHER ASSEMBLY AND RELATED PARTS

THIS TASK COVERS

a. Removal

b. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

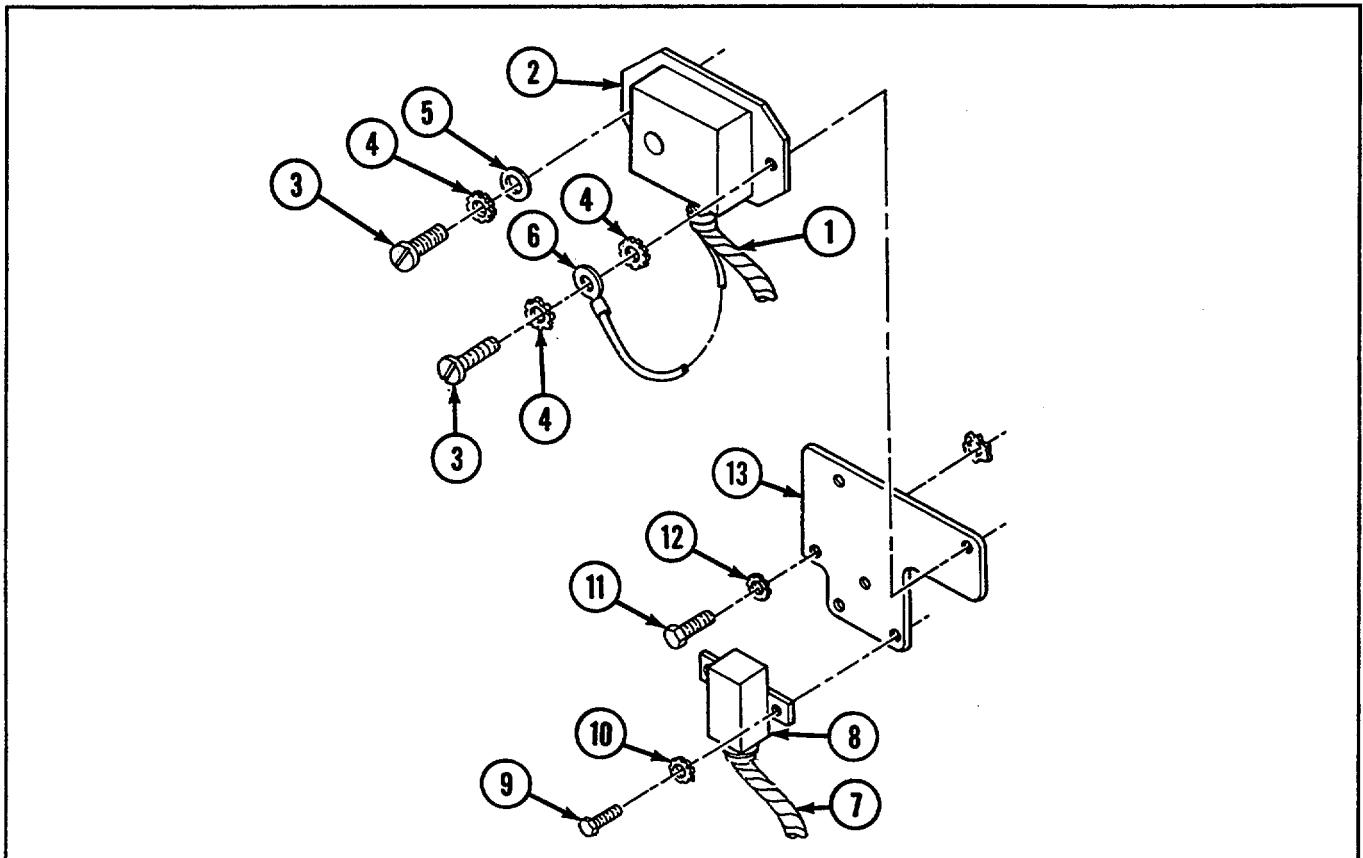
- Lockwashers (3) (Appendix G, item 115)
- Lockwashers (4) (Appendix G, item 116)

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

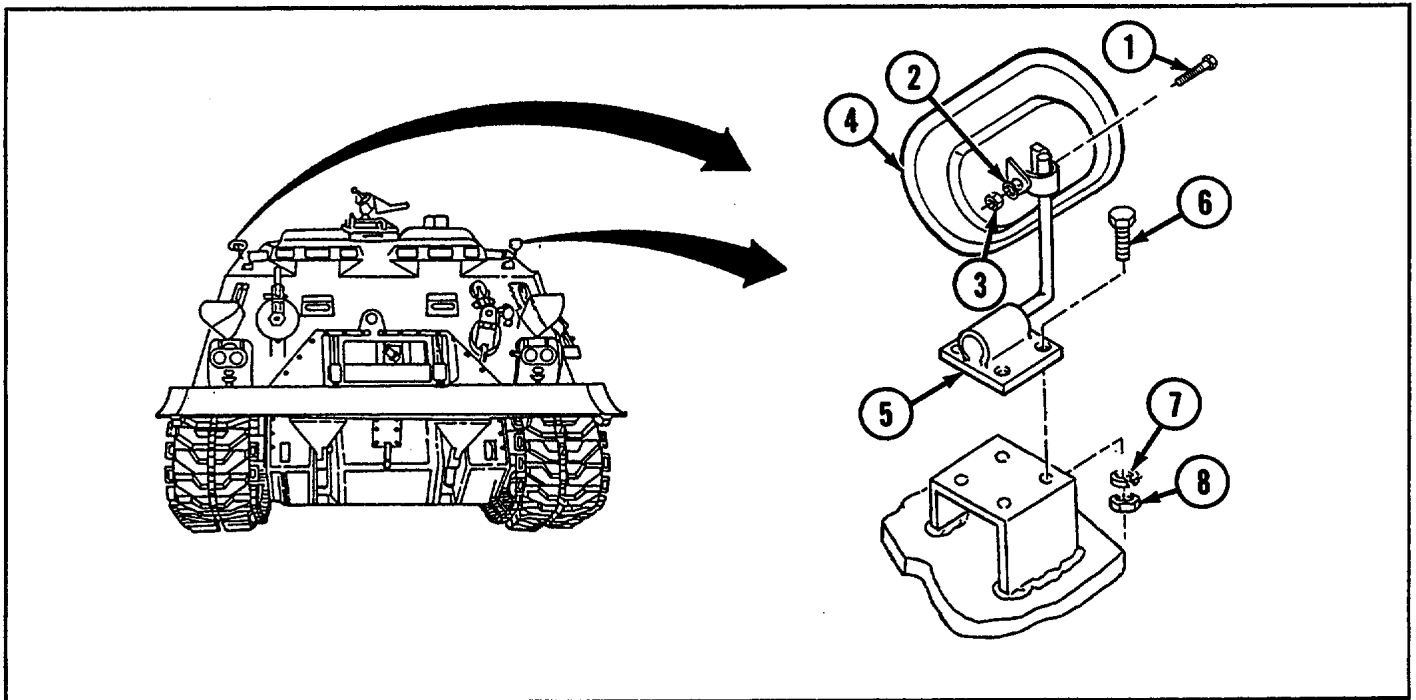
a. REMOVAL

- 1 Disconnect wiring harness (1) from flasher (2).
- 2 Remove two screws (3), three lockwashers (4), flat washer (5), ground lead (6), and flasher (2).
- 3 Disconnect wiring harness (7) from warning horn relay (8).
- 4 Remove two screws (9), two lockwashers (10), and warning horn relay (8).
- 5 Remove two screws (11), two lockwashers (12), and mounting plate (13).



b. INSTALLATION

- 1 Install mounting plate (13), two screws (11), and two new lockwashers (12).
- 2 Install warning horn relay (8), two screws (9), and two new lockwashers (10).
- 3 Connect wiring harness (7) to warning horn relay (8).
- 4 Install flasher (2), ground lead (6), two screws (3), three new lockwashers (4), and flat washer (5).
- 5 Connect wiring harness (1) to flasher (2).



b. INSTALLATION

- 1 Install mount assembly (5), four screws (6), four new lockwashers (7), and four nuts (8).
- 2 Slide mirror (4) onto mount assembly (5) and secure using screw (1), new lockwasher (2), and nut (3).

H-6 FRONT DIRECTIONAL SIGNAL LAMPS AND RELATED PARTS

THIS TASK COVERS

- | | |
|------------|-----------------|
| a. Removal | b. Installation |
|------------|-----------------|

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

- Gaskets (4) (Appendix G, item 41)
- Lockwashers (6) (Appendix G, item 101)
- Lockwashers (10) (Appendix G, item 117)

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

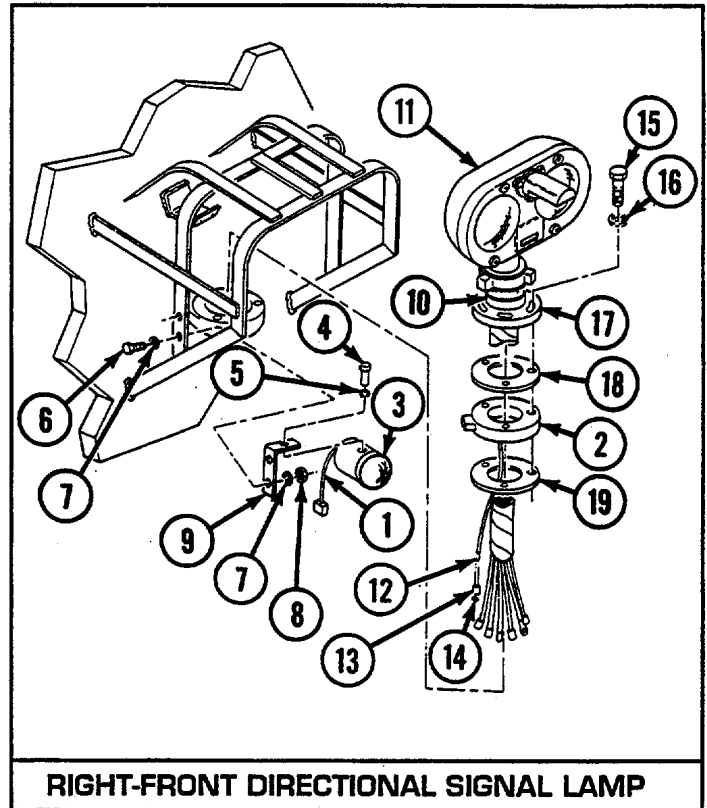
NOTE

The following procedures apply to both left-and right-front directional signal lamps.

H-6 FRONT DIRECTIONAL SIGNAL LAMPS AND RELATED PARTS-Continued

a. REMOVAL

- 1 Disconnect signal lamp wire assembly (1) from adapter assembly (2) and signal lamp (3).
- 2 Remove screw (4), lockwasher (5), and signal lamp (3).
- 3 Remove two screws (6), four lockwashers (7), two nuts (8), and bracket (9).
- 4 Loosen quick-disconnect coupling nut (10). Pull front headlight assembly (11) up and remove (pulling up disconnects electrical connector).
- 5 Disconnect adapter assembly harness (12) in compartment. Remove shell (13) and flat washer (14) if required.
- 6 Remove three screws (15), three lockwashers (16), cover (17), gasket (18), adapter assembly (2), and gasket (19).



b. INSTALLATION

- 1 Install new gasket (19), adapter assembly (2), new gasket (18), cover (17), three new lockwashers (16), and three screws (15).
- 2 Install shell (13) and flat washer (14).
- 3 Connect adapter assembly harness (12) in crew compartment.
- 4 Place front headlight assembly (11) over mounting and push down to engage connector. Then, securely tighten quick-disconnect coupling nut (10).
- 5 Install bracket (9), two screws (6), four new lockwashers (7), and two nuts (8).
- 6 Install signal lamp (3), screw (4), and new lockwasher (5).
- 7 Connect signal lamp wire assembly (1) to adapter assembly (2) and signal lamp (3).

H-7 DIRECTIONAL SIGNAL CONTROL WIRING HARNESS (12322611)

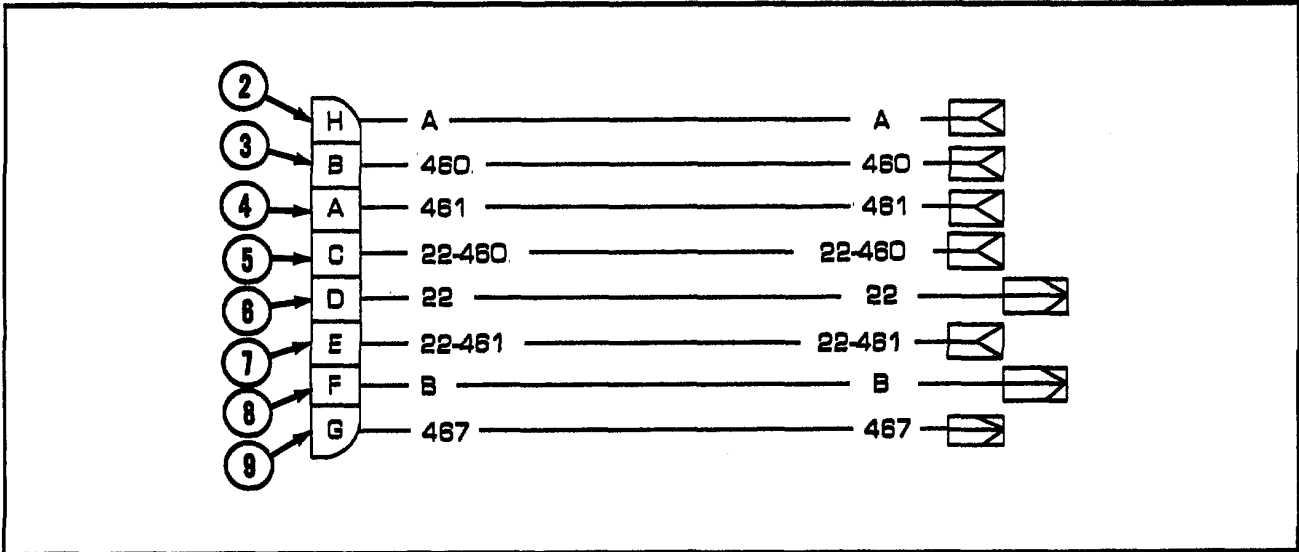
THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Directional signal control	
2	Flasher wiring harness (12322612)	A
3	Directional signal wiring harness (12322660)	460
4	Directional signal wiring harness (12322660)	461
5	Directional signal control to bulkhead wiring harness (12322614)	22-460
6	Main lighting switch panel wire assembly (12322615-1)	22
7	Directional signal control to bulkhead wiring harness (12322614)	22-461
8	Flasher wiring harness (12322612)	B
9	Main lighting switch panel wire assembly (12322615-2)	467



**H-7 DIRECTIONAL SIGNAL CONTROL WIRING HARNESS (12322611)-
Continued****a. REMOVAL**

- 1 Disconnect connector (1) at directional signal control (10).
- 2 Disconnect connectors (2 through 9).

b. DISASSEMBLY

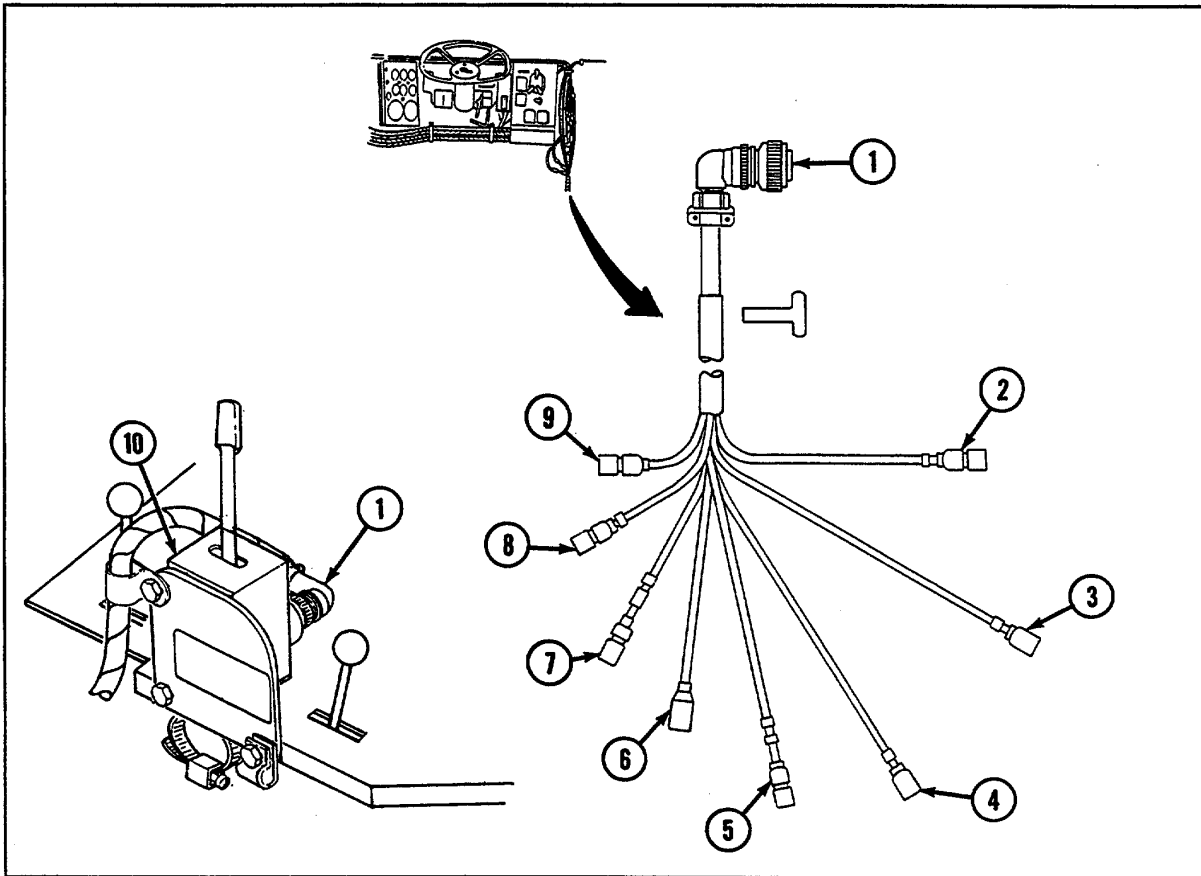
Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect connectors (2 through 9).
- 2 Connect connector (1) at directional signal control (10).



**H-8 RIGHT TAIL LAMP TO LEFT TAIL LAMP TO BULKHEAD WIRING HARNESS
(12322613)**

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

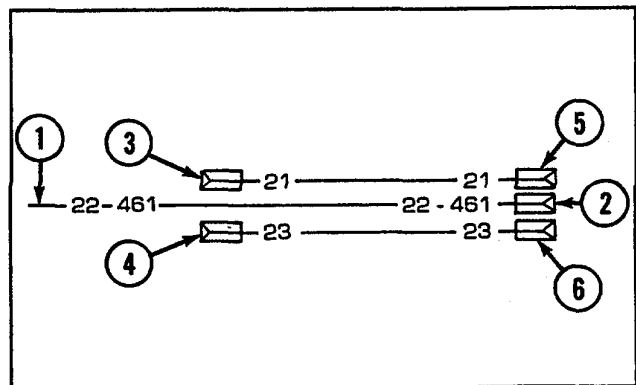
WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Bulkhead connector	22-461
2	Right tail lamp assembly	22-461
3	Left tail lamp assembly	21
4	Left tail lamp assembly	23
5	Right tail lamp assembly	21
6	Right tail lamp assembly	23

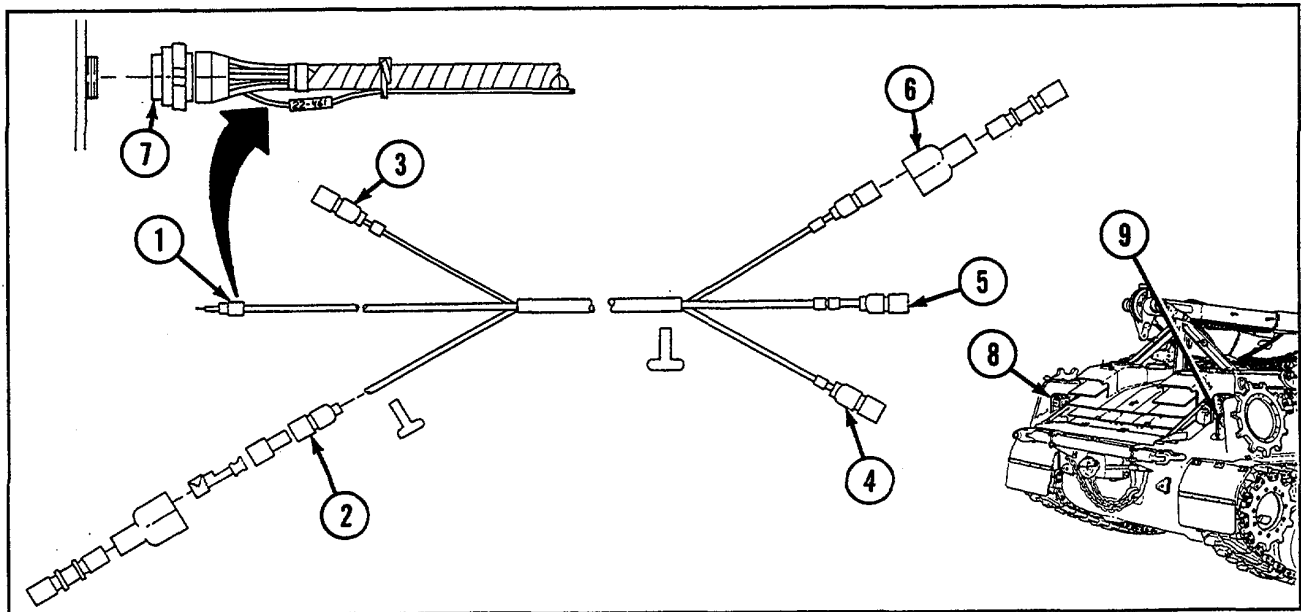
a. REMOVAL

- 1 Disconnect lead (1) at bulkhead connector (7).
- 2 Disconnect two connectors (2 and 3) at left taillamp (8).
- 3 Disconnect three connectors (4, 5, and 6) at right tail lamp (9).



b. DISASSEMBLY

Disassemble wiring harness (see Chapter 6, section).



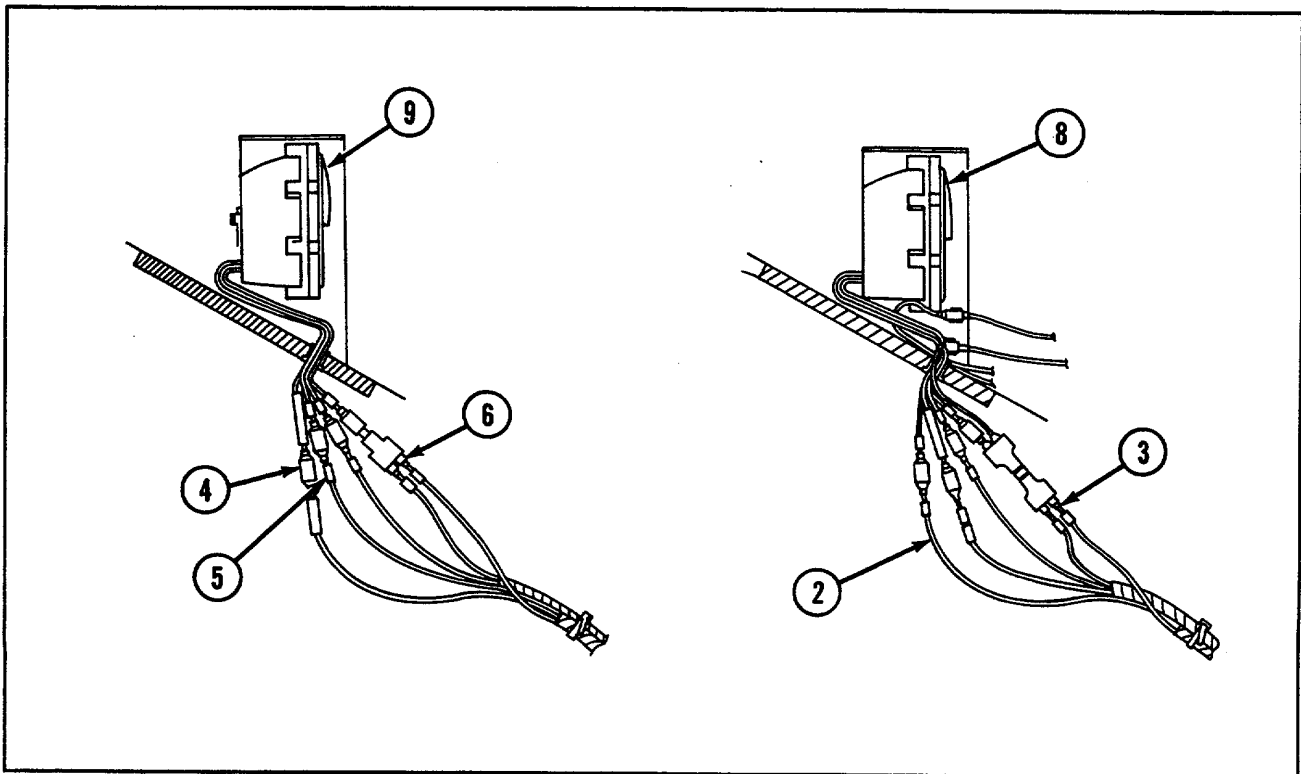
H-8 RIGHT TAIL LAMP TO LEFT TAIL LAMP TO BULKHEAD WIRING HARNESS (12322613)-Continued

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect three connectors (4, 5, and 6) at right tail lamp (9).
- 2 Connect two connectors (2 and 3) at left tail lamp (8).
- 3 Connect lead (1) at bulkhead connector (7).



H-9 FLASHER WIRING HARNESS (12322612)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

INITIAL SET-UP

Tools:

Tool kit, general mechanic's (Appendix C, item 53)

Parts:

Lockwashers (2) (Appendix G, item 115)

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Flasher assembly	
2	Ground	GND
3	Directional signal control wiring harness (12322611)	A
4	Directional signal control wiring harness (12322611)	B

a. REMOVAL

- 1 Disconnect connector (1) from flasher (5).
- 2 Disconnect ground lead (2) by removing screw (6) and two lockwashers (7).
- 3 Disconnect two connectors (3 and 4).

b. DISASSEMBLY

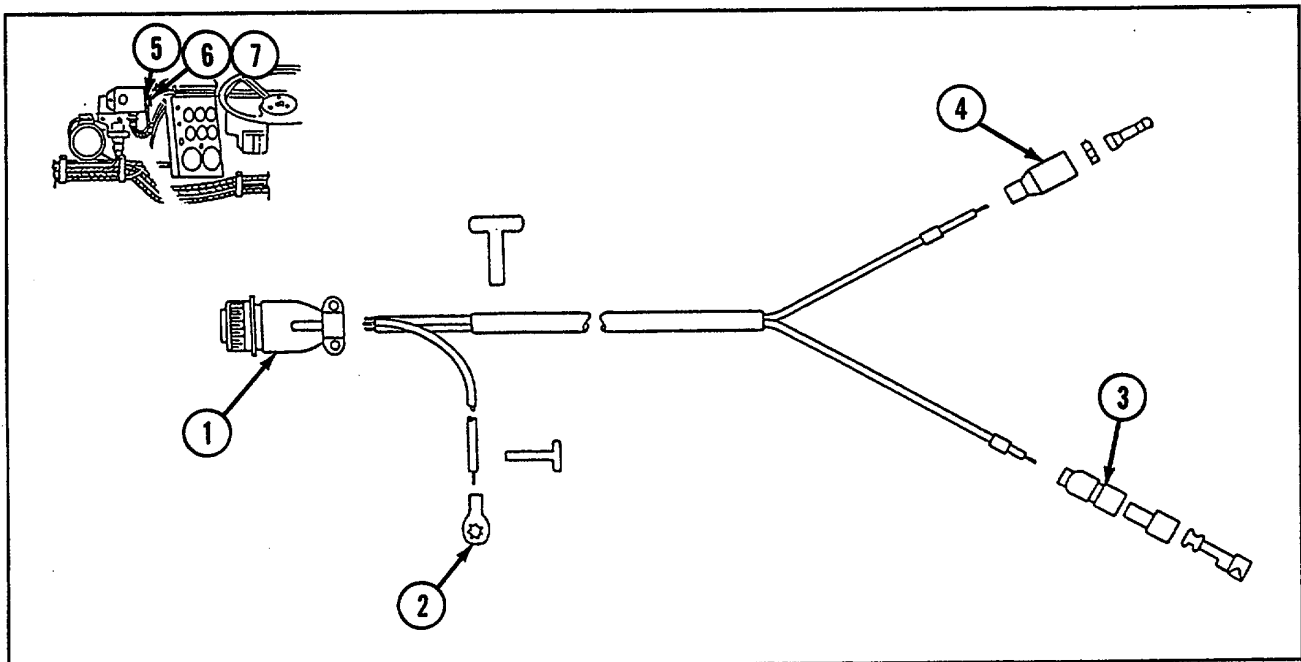
Disassemble wiring harness (see Chapter 6, Section VI).

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect two connectors (3 and 4).
- 2 Connect ground lead (2) using screw (6) and two new lockwashers (7).
- 3 Connect connector (1) to flasher (5).



**H-10 DIRECTIONAL SIGNAL CONTROL TO BULKHEAD WIRING HARNESS
(12322614)**

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Directional signal control wiring harness (12322611)	22-460
2	Directional signal control wiring harness (12322611)	22-461
3	Bulkhead connector	22-460
4	Bulkhead connector	22-461

a. REMOVAL

- 1 Disconnect connectors (1 and 2).
- 2 Disconnect leads (3 and 4) at bulkhead connector (5).

b. DISASSEMBLY

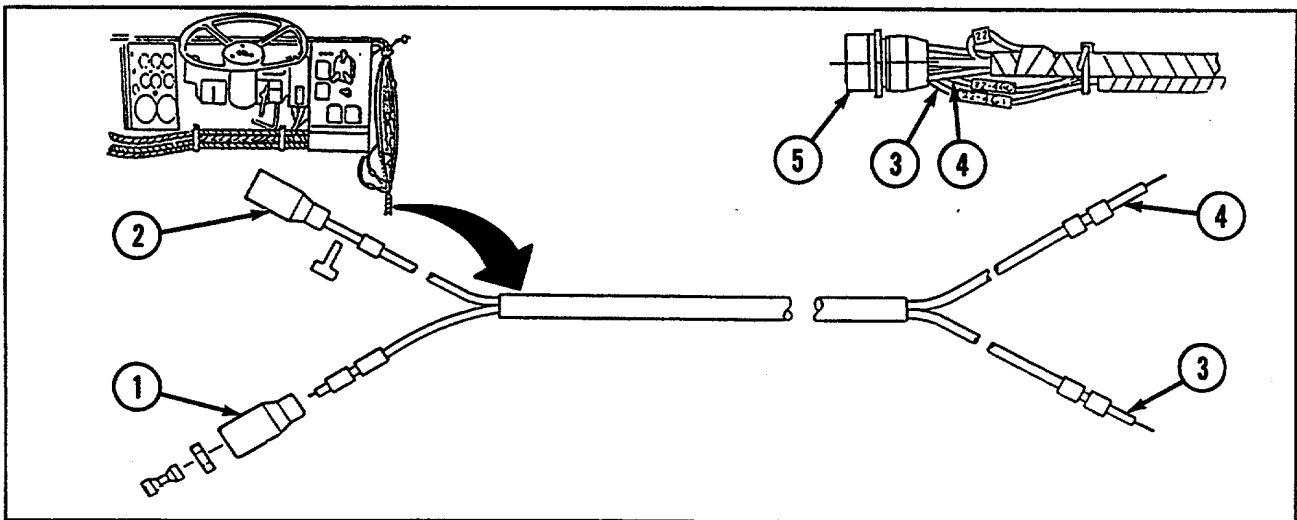
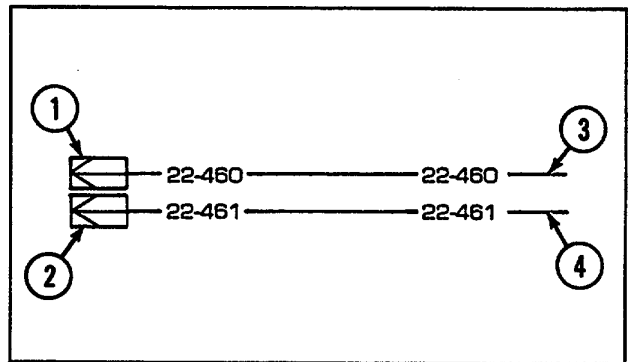
Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect leads (3 and 4) at bulkhead (5).
- 2 Connect connectors (1 and 2).



H-11 MAIN LIGHTING SWITCH PANEL WIRE ASSEMBLIES (12322615-1 AND -2)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Directional signal control wiring harness (12322611)	22
2	Directional signal control wiring harness (12322611)	467
3	Main lighting switch panel connector	22
4	Main lighting switch panel connector	467

a. REMOVAL

- 1 Disconnect connectors (1 and 2).
- 2 Disconnect leads (3 and 4) from connector (5).

b. DISASSEMBLY

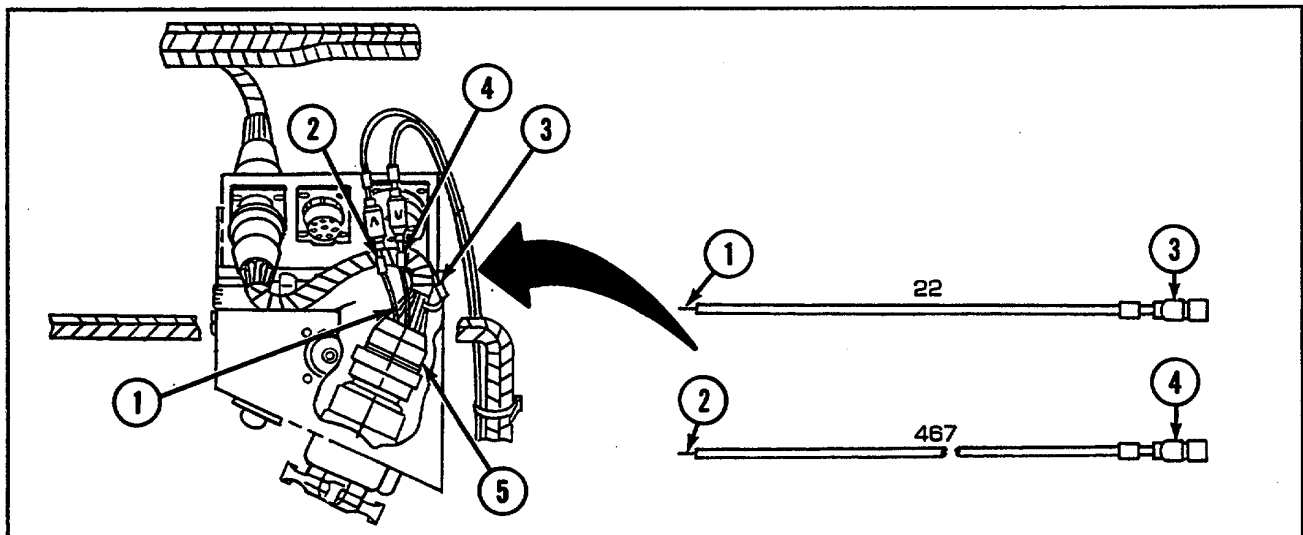
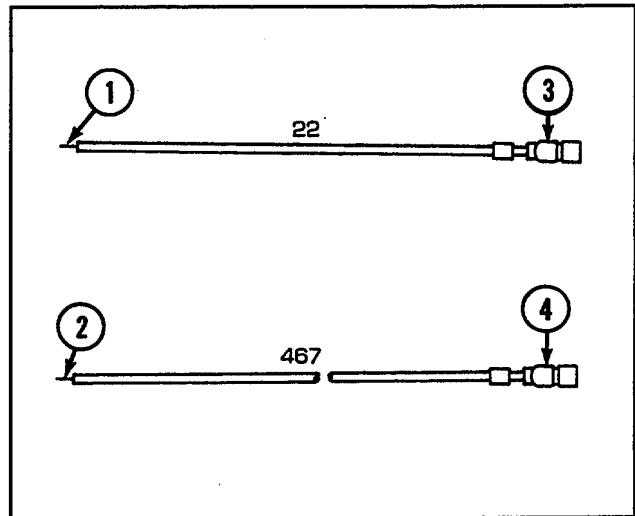
Disassemble wire assembly (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wire assembly (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect leads (3 and 4) to connector (5).
- 2 Connect connectors (1 and 2).



**H 12 HEADLIGHT BASE ASSEMBLY TO HEADLIGHT AND DIMMER SWITCH
WIRING HARNESSES (12322668)**

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

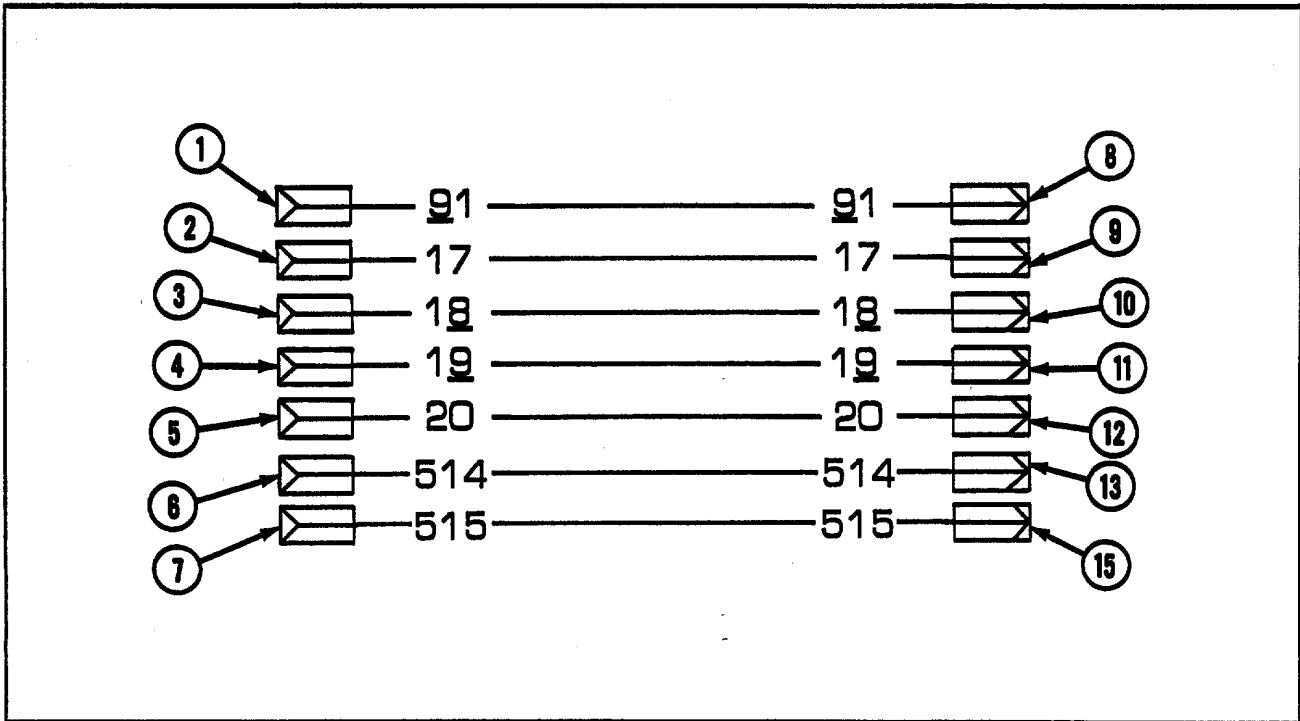
WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

NOTE

The following procedures apply to both left and right harnesses.

Connector No.	Electrical Lead To:	Wire No.
1	Headlight base assembly	91
2	Headlight base assembly	17
3	Headlight base assembly	18
4	Headlight base assembly	19
5	Headlight base assembly	20
6	Headlight base assembly	514
7	Headlight base assembly	515
8	Headlight and dimmer switch wiring harness (10866950)	91
9	Headlight and dimmer switch wiring harness (10866950)	17
10	Headlight and dimmer switch wiring harness (10866950)	18
11	Headlight and dimmer switch wiring harness (10866950)	19
12	Headlight and dimmer switch wiring harness (10866950)	20
13	Headlight and dimmer switch wiring harness (10866950)	514
14	Headlight and dimmer switch wiring harness (10866950)	515



a. REMOVAL

- 1 Disconnect connectors (1 through 7) at headlight base assembly.
- 2 Disconnect connectors (8 through 14).

b. DISASSEMBLY

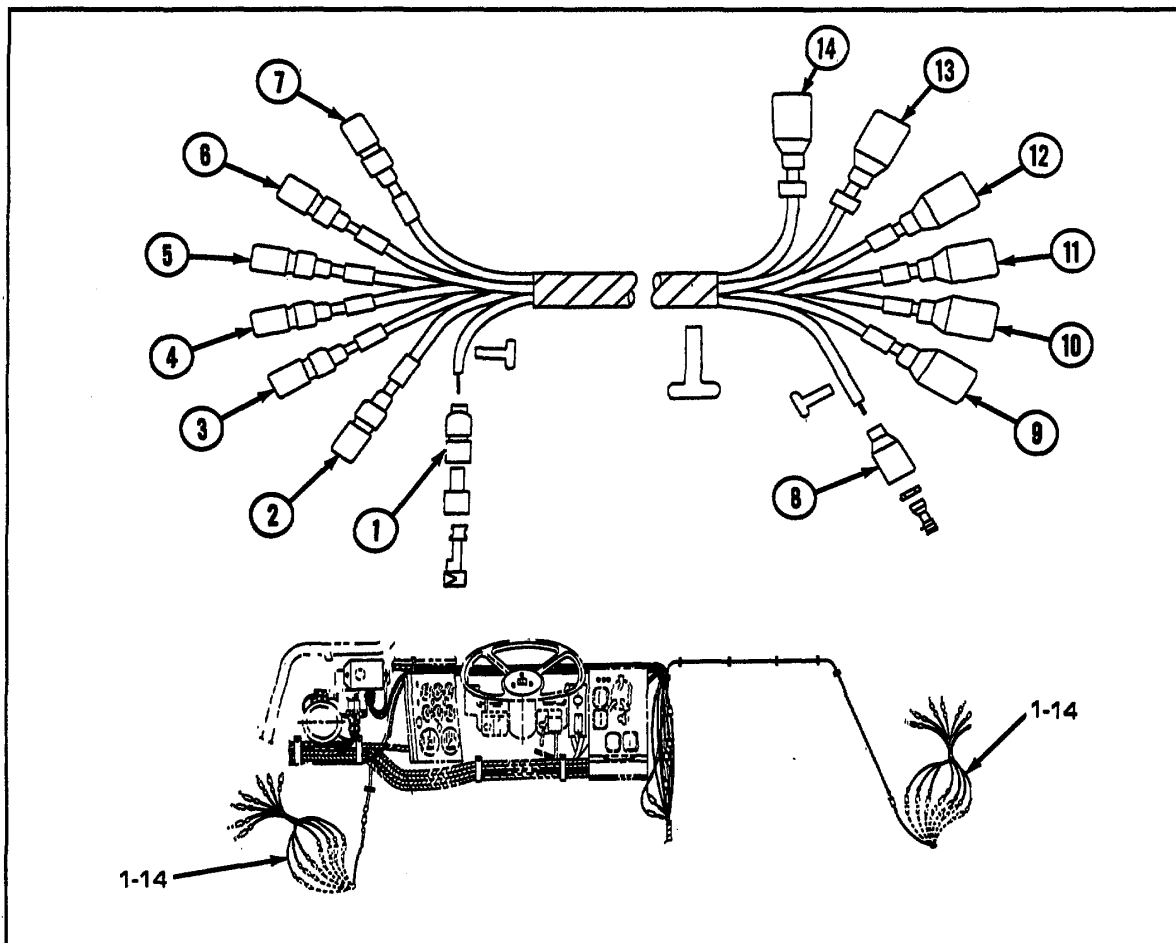
Disassemble wiring harness (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Connect connectors (8 through 14).
- 2 Connect connectors (1 through 7) at headlight base assembly.



H-13 DIRECTIONAL SIGNAL WIRING HARNESS (12322660)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Directional signal/directional signal lamp wire assembly (12322648)	460
2	Directional signal/directional signal lamp wire assembly (12322648)	461
3	Directional signal control wiring harness (12322611)	460
4	Directional signal control wiring harness (12322611)	461

a. REMOVAL

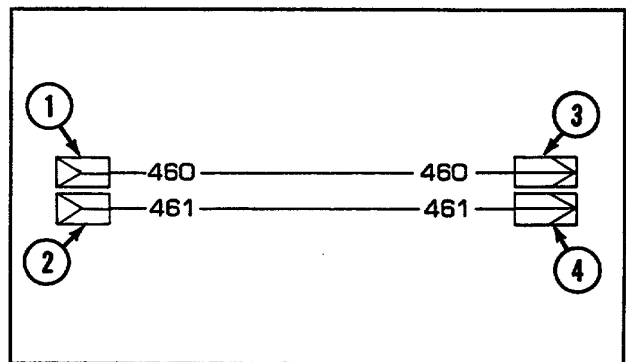
- 1 Disconnect connectors (1 and 2).
- 2 Disconnect connectors (3 and 4).

b. DISASSEMBLY

Disassemble wiring harness (see Chapter 6, Section VII).

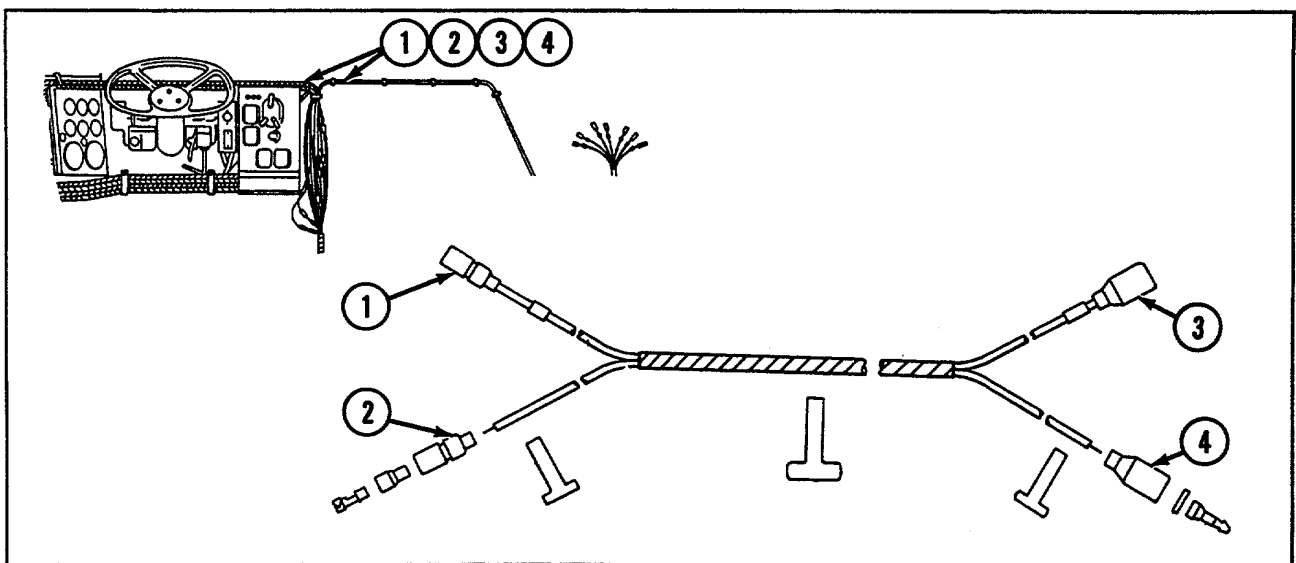
c. ASSEMBLY

Assemble wiring harness (see Chapter 6, Section VII).



d. INSTALLATION

- 1 Connect connectors (3 and 4).
- 2 Connect connectors (1 and 2).



**H-14 DIRECTIONAL SIGNAL/DIRECTIONAL SIGNAL LAMP WIRE ASSEMBLIES
(12322648)**

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

NOTE

The following procedures apply to both left and right wire assemblies.

Connector No.	Electrical Lead To:	Wire No.
1	Adapter assembly (12322647)	460/461
2	Directional signal wiring harness (12322660)	460/461

a. REMOVAL

- 1 Disconnect connectors (1 and 2).
- 2 Remove flat washer (3) and shell (4).

b. DISASSEMBLY

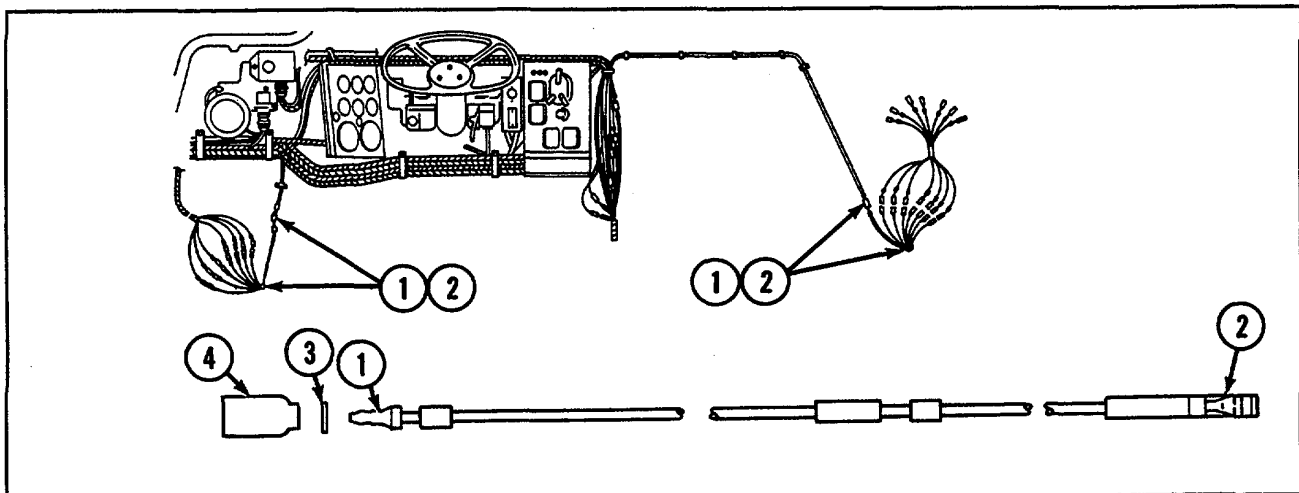
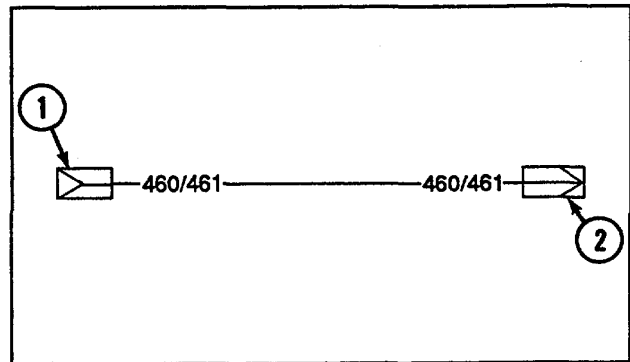
Disassemble wire assembly (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wire assembly (see Chapter 6, Section VII).

d. INSTALLATION

- 1 Install shell (4) and flat washer (3).
- 2 Connect connectors (1 and 2).



H-15 DIRECTIONAL SIGNAL LAMP WIRE ASSEMBLY (112322658)

THIS TASK COVERS

- a. Removal b. Disassembly c. Assembly d. Installation

WARNING

Be certain MASTER switch is OFF when working on electrical system to avoid electrical shock and burns.

Connector No.	Electrical Lead To:	Wire No.
1	Right/left directional signal lamp	460/461
2	Adapter assembly (12322647)	460/461

a. REMOVAL

Disconnect connectors (1 and 2).

b. DISASSEMBLY

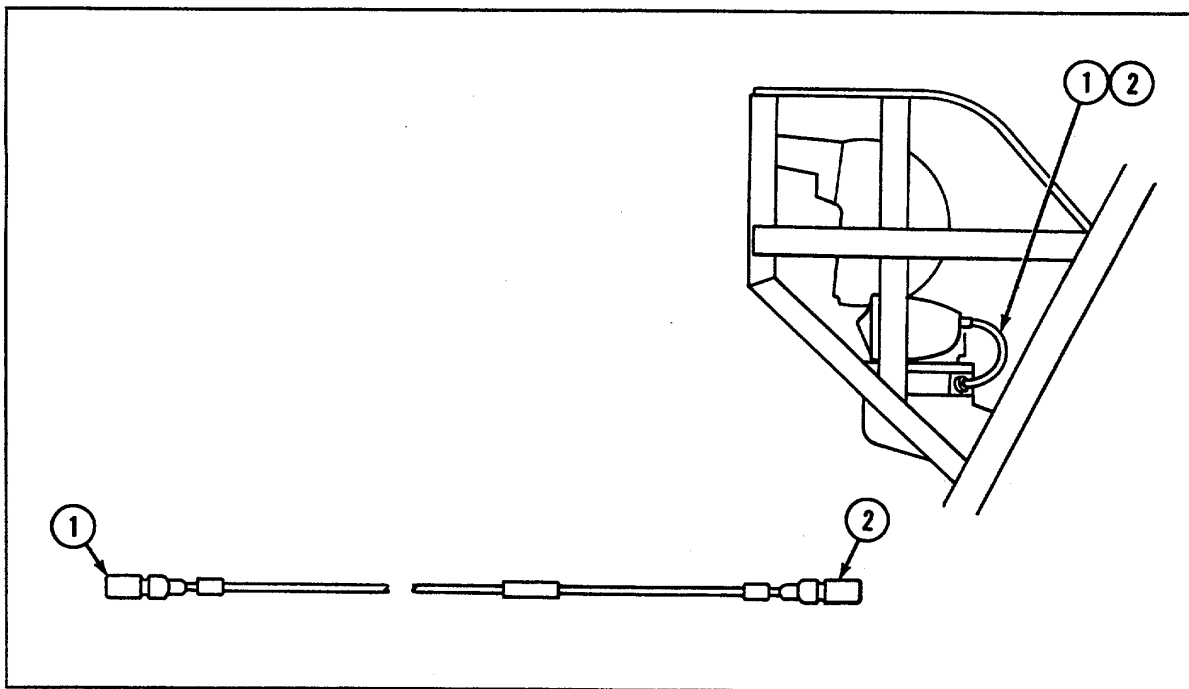
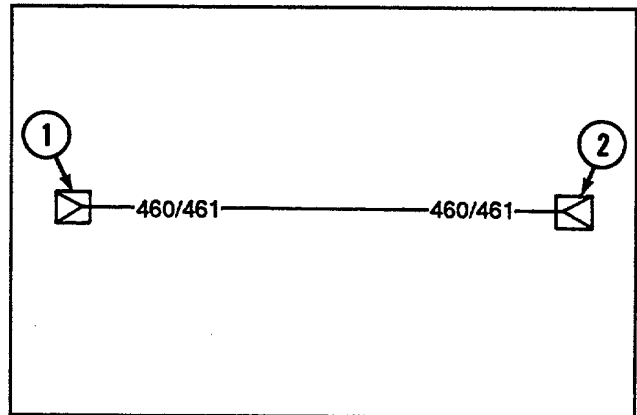
Disassemble wire assembly (see Chapter 6, Section VII).

c. ASSEMBLY

Assemble wire assembly (see Chapter 6, Section VII).

d. INSTALLATION

Connect connectors (1 and 2).



APPENDIX I DEEP WATER FORDING KIT

APPENDIX OVERVIEW

This appendix covers the installation, operation, and servicing of the deep water fording kit.

This appendix consists of the following sections:	Page
Section I: Pre-Installation Procedures	I-1
Section II: Installation Procedures	I-3
Section III: Operations	I-14
Section IV: Post Operations	I-15

NOTE

Although parts listed in the initial set-up are kit furnished, part numbers are provided in the appendices for replenishment purposes.

INITIAL SET-UP

Tools:

Tool kit, general mechanic' s (Appendix C, item 53)

References:

- * Deleted
- *TM 9-2350-256-10
- *TM 9-6140-200-14

Materials/Parts:

- Solvent, dry-cleaning (Appendix D, item 9)
- Gasket (Appendix G, item 67)
- Lockwashers (12) (Appendix G, item 130)
- Lockwashers (15) (Appendix G, item 132)
- Lockwashers (20) (Appendix G, item 134)
- Pin, cotter (Appendix G, item 208)
- Seal (Appendix G, item 247)
- Seal (Appendix G, item 254)
- Strips, rubber (2) (Appendix G, item 273)

Equipment Conditions:

- Boom raised to hoisting position (refer to TM 9-2350-256-10)
- Engine deck assembly removed (see paragraph 9-51)

SECTION I: PRE-INSTALLATION PROCEDURES

Para.	Task	Page
I-1	Cleaning	I-2
I-2	Inspection	I-2
I-3	Test	I-3
I-4	Lubrication	I-3

NOTE

The following miscellaneous items are included in the deep water fording kit. This table is provided for replenishment purposes.

TABLE I-1. MISCELLANEOUS ITEMS

Item Number	Document / Part Number	National Stock Number	Description
1	MMM-A-1617	— —	Adhesive, rubber, type III-I-pint (0.47-liter) can
2	H-B-643	7920-00-223-8005	Brush, acid-swabbing, type II, class I, size 2

TABLE I-1. MISCELLANEOUS ITEMS-Continued

Item Number	Document/ Part Number	National Stock Number	Description
3	11672186	8030-01-031-9155	Caulking compound-1-1/2-inch-(in.-) (38-millimeter) wide x 25-foot- (ft-) (7.62-meter-[m-]) long roll
4	MIL-A-46106	8040-01-010-8758	Sealant, adhesive, RTV, general purpose, white-1-ounce (28.4-gram) primer and 10.3-ounce (292-gram) adhesive
5	MIL-A-46146	8040-01-063-7509	Sealing compound, RTV general noncorrosive-1-gallon (3.79-liter) pail
6	ASTM D 3400	6810-00-247-0607	Sodium silicate, type 2-5-gallon (3.79-liter) pail
7	PPP-T-60	- -	Tape, adhesive, type I, class I, olive drab number 34087-2-m- (51-millimeter-) wide x 60-yard- (54.9-m-) long roll
8	MIL-I-24391	5970-00-419-4290	Tape, insulation, electrical, black-0.50-in.- (12.7-millimeter-) wide x 0.010-in- (0.25-millimeter-) thick roll
9	DDD-R-30	7920-00-205-1711	Wiping rags, cotton, grade B-50 pounds (22.7 kilograms)
10	GGG-W-665	5120-00-293-1602	Wrench, spanner, universal hose coupling, type V

I-1 CLEANING

Clean and dry vehicle thoroughly. Surfaces to be covered with nonhygroscopic tape or sealer must be clean and dry.

I-2 INSPECTION

- 1 Perform semiannual Preventive Maintenance Checks and Services (PMCS) (see paragraph 2-10).
- 2 Inspect drain valves for proper operation and fit. Repair or replace if necessary.
- 3 Inspect rubber boots used to seal service brake, steer-and-shift, and accelerator rods at side of bulkhead on sponson. Notify Direct Support Maintenance to replace boots that are defective or do not provide a watertight fit.
- 4 Inspect rubber drain boots on boom for proper seal. Replace if necessary.
- 5 Inspect main engine and Auxiliary Power Unit (APU) oil filler caps, main engine and APU oil level gages, and transmission filler cap/oil level gage to ensure watertight fits. Replace if necessary.

- 6 Inspect main engine air induction hoses, APU air induction hose, main engine generator air induction hose, and main engine exhaust cooling hoses. Replace any item found defective.
- 7 Inspect cover and gasket on armature and master relays for possibility of leakage. Replace if necessary.
- 8 Inspect waterproof electrical connections for possibility of leakage. Replace if necessary.
- 9 Inspect personnel door seals for watertight fit. Replace if necessary.
- 10 Inspect caliber .50 machine gun cover for tears or damage. Replace if necessary.
- 11 Operate engine and troubleshoot any malfunction or deficiency as required (see Chapter 2, Section IV).

I-3 TEST

- 1 Check release torque of main engine cooling fans (see paragraph 5-2).
- 2 Check batteries to see that they are fully charged and properly filled with electrolyte. Also, check battery caps for tightness; battery vents, however, must be open.

I-4 LUBRICATION

Lubricate vehicle in accordance with TM 9-2350-256-10 and Appendix J.

SECTION II: INSTALLATION PROCEDURES

Para.	Task	Page
I-5	APU	I-3
I-6	Engine Generator Cooling Exhaust..	I-55
I-7	Engine Exhaust Pipe Supports	I-7
I-8	Engine Air Inlet Pipes..	I-8
I-9	Fuel Tank Vent	I-9
I-10	Acetylene Vent	I-9
I-11	Crew Fan and Boom Boot Drain Shutoff Clamp..	I-10
I-12	Bilge Pump	I-10
I-13	Fire Extinguisher Nozzles and Electrical Connections in Engine Compartment..	I-12
I-14	Caulking Exterior Fire Extinguisher Remote Control	I-12
I-15	Other Applications of Caulking Compound	I-13
I-16	Armament Protection	I-14
I-17	Sealing Inspection	I-14

NOTE

- Items removed for installation of kit and not reused should be stowed for reinstallation when kit parts are removed.
- Personnel heater and APU are not operational during fording operation. Air inlets and exhausts for both components are plugged and must be unplugged after fording operation to become operational.

I-5 APU

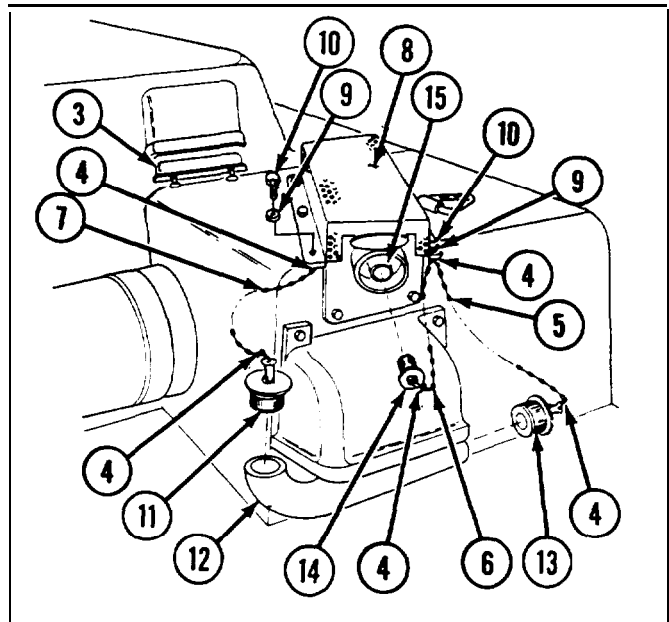
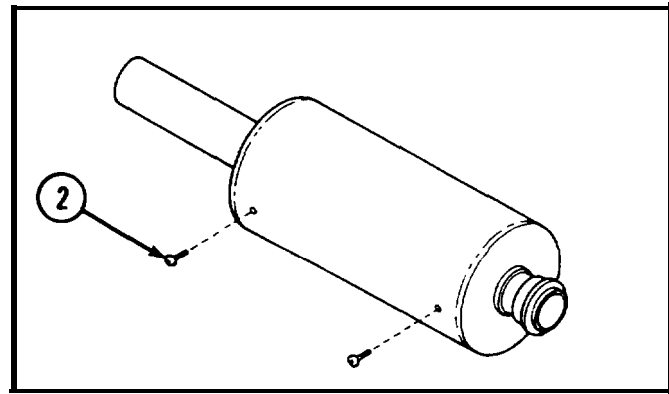
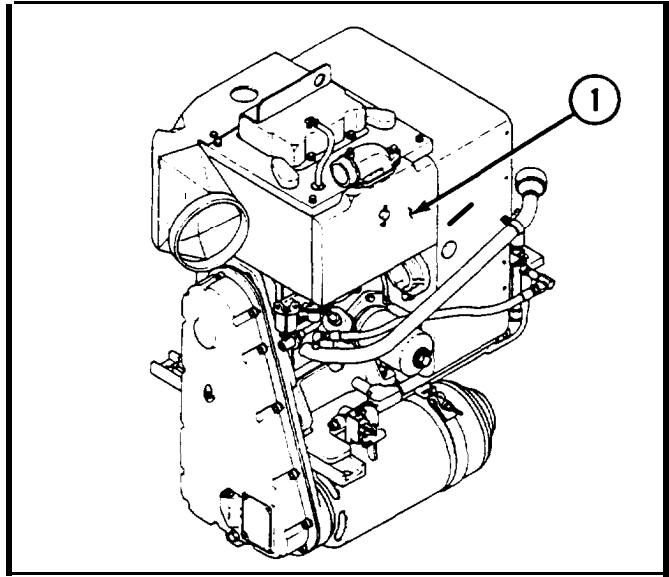
- 1 Remove APU access cover (see paragraph 9-49).

I-5 APU-Continued

WARNING

APU access door must be secured prior to performing any work on unit. Unless properly secured by a strap, access door can swing shut and injure personnel working on unit, especially if spare roadwheel is mounted in place on hull.

- 2 Remove access (1) to expose electrical terminals.
- 3 Apply adhesive sealant (Table I-1, item 4) on all exposed exterior and interior electrical terminals.
- 4 Install access (1).
- 5 Install two kit-furnished screws (2) in holes on bottom of muffler and apply adhesive sealant (Table I-1, item 4) around head of each screw.
- 6 Install APU access cover (see paragraph 9-49).
- 7 Install kit-furnished seal assembly (3) into air inlet, located above APU engine compartment.
- 8 Attach two kit-furnished S-hooks (4) to ends of each kit-furnished chain (5, 6, and 7).
- 9 Attach S-hooks (4) of chains (5 and 6) to muffler guard (8) by using new lockwasher (9) and existing screws (10).
- 10 Attach S-hook (4) of chain (7) to muffler guard (8) using new lockwasher (9) and existing screw (10).
- 11 Attach kit-furnished plug (11) to chain (7) Shook (4) and install into personnel heater exhaust pipe (12).
- 12 Attach kit-furnished plug (13) to chain (5) S-hook (4) and install into opposite end of personnel heater exhaust pipe (12).
- 13 Attach kit-furnished plug (14) to chain (6) S-hook (4) and install into end of APU muffler (15).



1-6 ENGINE GENERATOR COOLING EXHAUST

- 1 Remove exhaust air elbow from front shroud and exhaust air tube (see paragraph 6-1).
- 2 Remove right-rear upper engine cover (see paragraph 4-2).

NOTE

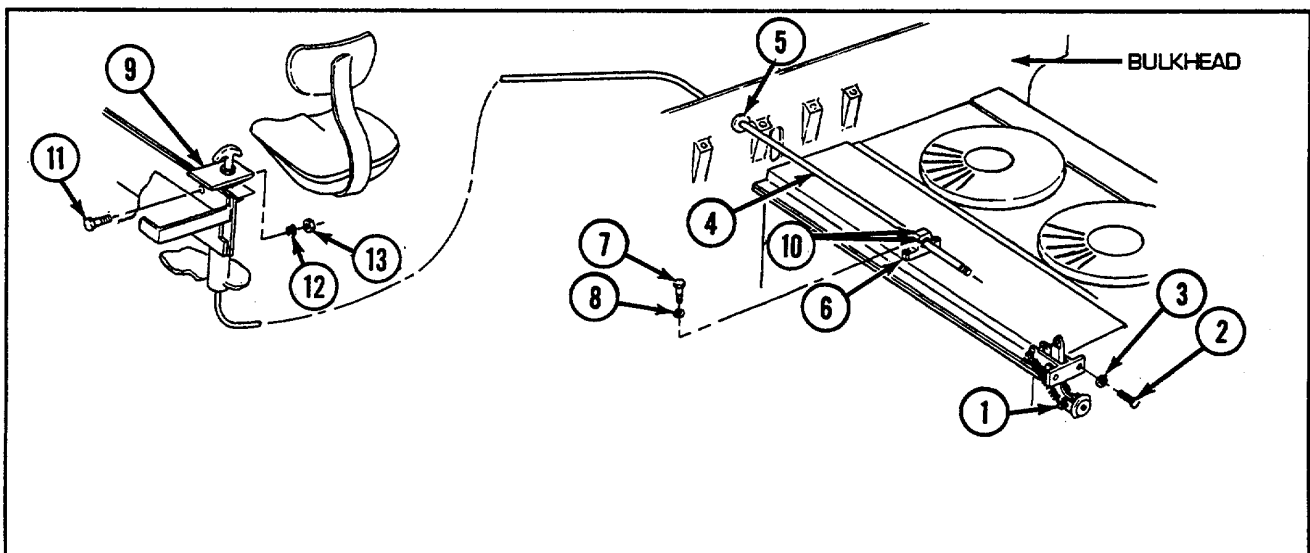
Valve assembly (1) should be operated manually to ensure that valve is centered properly in shroud opening prior to tightening screws (2).

- 3 Install kit-furnished valve assembly (1) on right-rear flywheel end, upper shroud assembly with two kit-furnished screws (2) and two new lockwashers (3).
- 4 Install right-rear upper engine cover (see paragraph 4-2), previously removed.
- 5 Remove pipe plug in bulkhead (engine compartment side) to provide opening for control cable (4).
- 6 Install kit-furnished grommet (5) in bulkhead using rubber adhesive (Table I-I, item 1).
- 7 Install kit-furnished support (6) with two kit-furnished screws (7) and two new lockwashers (8).
- 8 Install kit-furnished bracket and control assembly (9) as follows:

NOTE

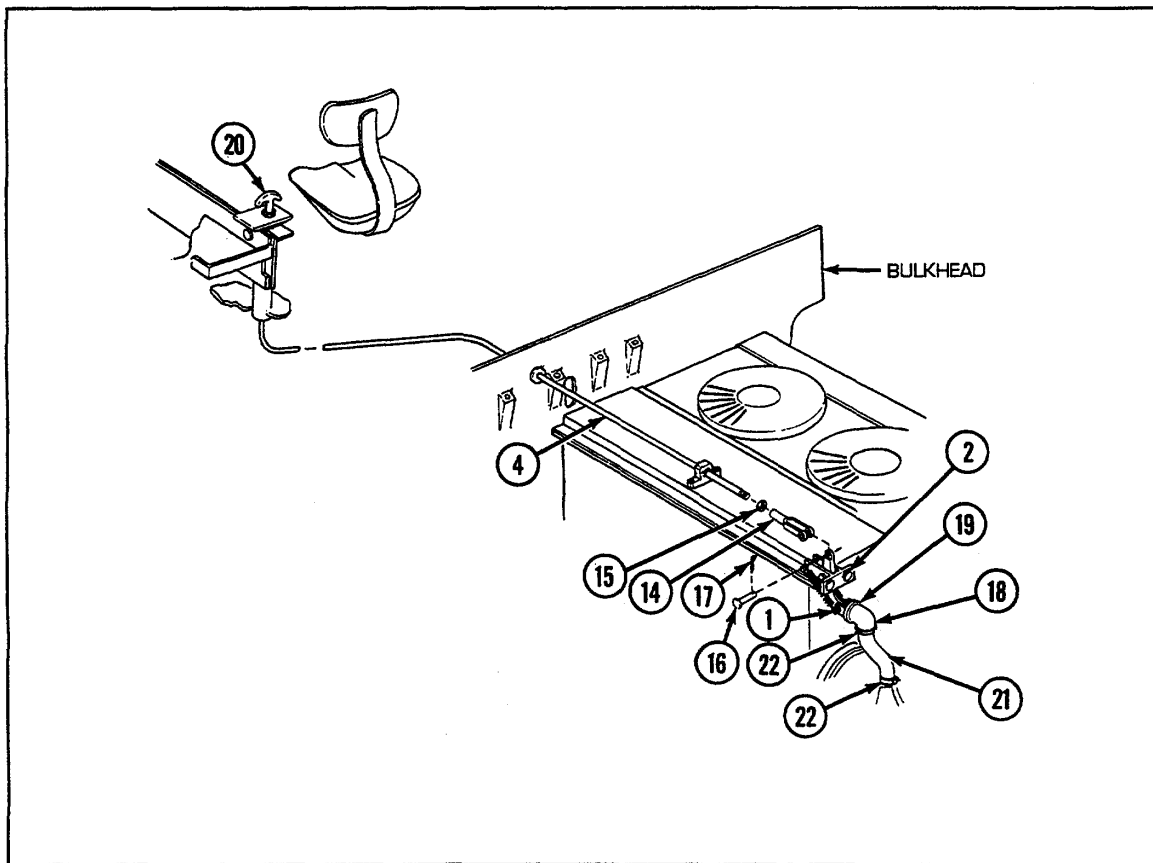
Care should be taken not to damage rubber seals (10) when removing them from their retaining ferrules.

- a. Remove two rubber seals (10) with nuts from control cable (4). Discard nuts.
- b. Route control cable (4) through floor plate support at oddment tray on driver's side, under floor plates, through bulkhead grommet (5), and through support (6). Place rubber seal (10) on each side of support.
- c. Secure bracket and control assembly (9) with screw (11), new lockwasher (12), and nut (13).



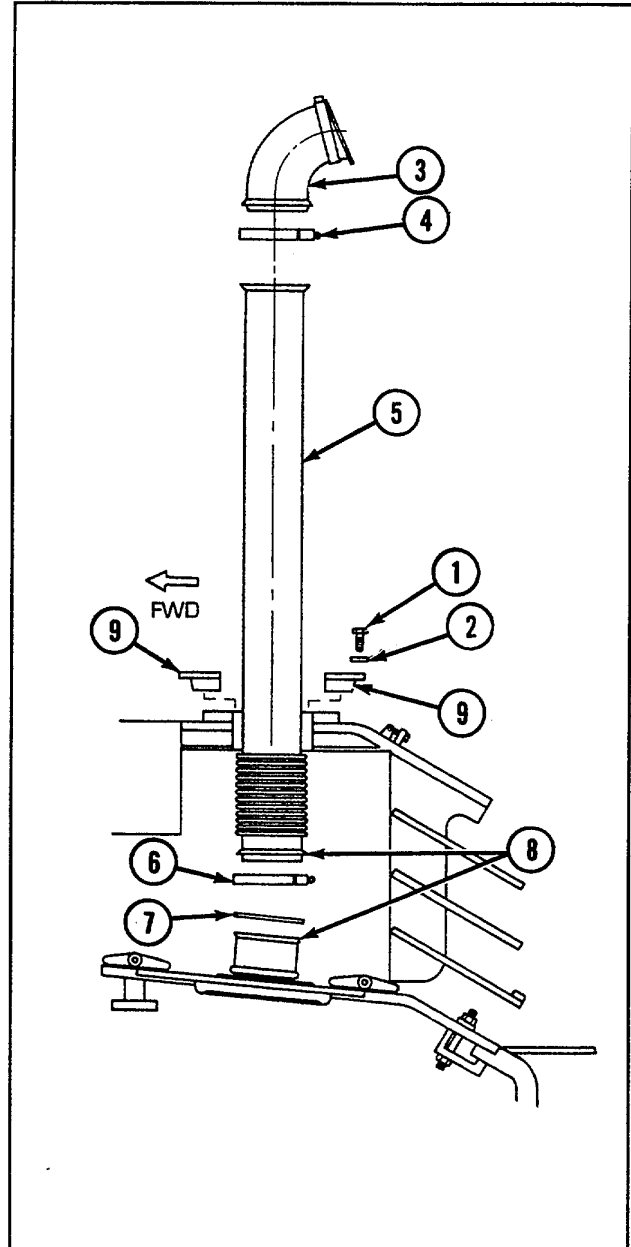
1-6 ENGINE GENERATOR COOLING EXHAUST--Continued

- d. Install clevis (14) and *nut* (15) onto end of control cable (4). Tighten nut.
 - e. Attach clevis (14) to valve assembly (1) with pin (16) and new cotter pin (17).
- 9 Position air exhaust elbow (18) on shroud connection in an inverted position (pointing up) and secure with hose clamp (19).
 - 10 Operate hand lever by exerting sufficient pull on T-handle (20) and valve assembly (1), and lock in place by rotating T-handle clockwise.
 - 11 Fill air exhaust elbow (18) with water and allow to sit for 5 minutes. If valve assembly (1) is seated properly and no leakage is detected, reposition valve assembly by loosening two screws (2). Then, tighten screws and recheck for watertight seal.
 - 12 Reposition air exhaust elbow (18) on exhaust air tubes (21) and shroud connection and secure with two hose clamps (22).



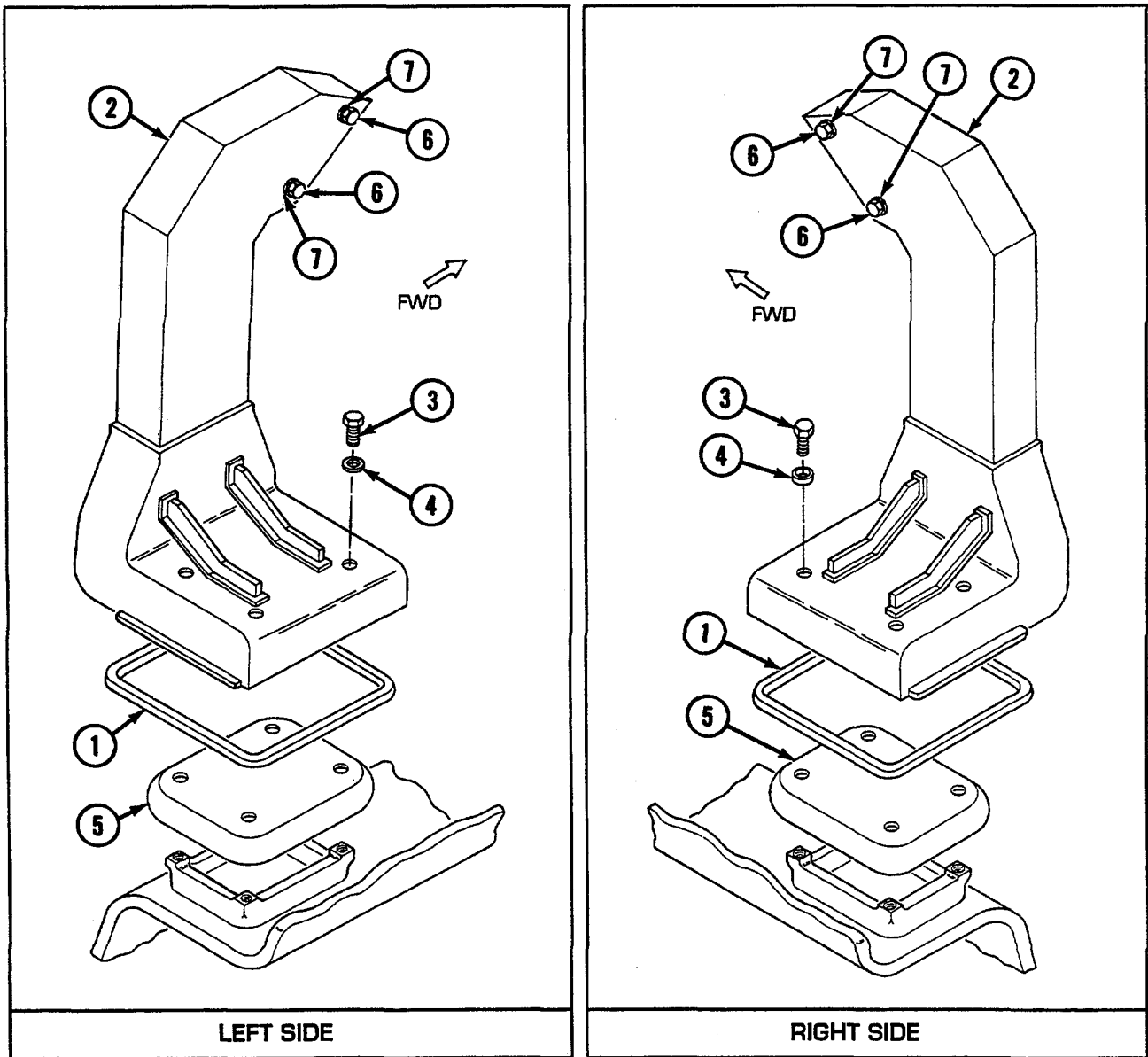
I-7 ENGINE EXHAUST PIPE SUPPORTS

- 1 Remove two cover plates (see paragraph 9-58) on top of engine deck from exhaust stack by removing eight screws (1) and eight lockwashers (2). Retain screws.
- 2 Remove two existing elbows (3) by removing two clamps (4) and retain.
- 3 Install two kit-furnished flexible exhaust pipes (5) on engine exhaust outlets using kit-furnished clamp (6) and seal (7). Apply adhesive sealant (Table I-1, item 4) to pipe flange (8).
- 4 Install four kit-furnished clamps (9) with eight previously removed screws (1) and eight new lockwashers (2).
- 5 Install two previously removed elbows (3) on flexible exhaust pipes (5) each with previously removed clamp (4). Apply adhesive sealant (Table I-1, item 4) around joint to prevent entry of water.
- 6 Start and operate engine (refer to TM 9-2350-256-10). While exhaust system is hot, tighten all exhaust system clamped joints.



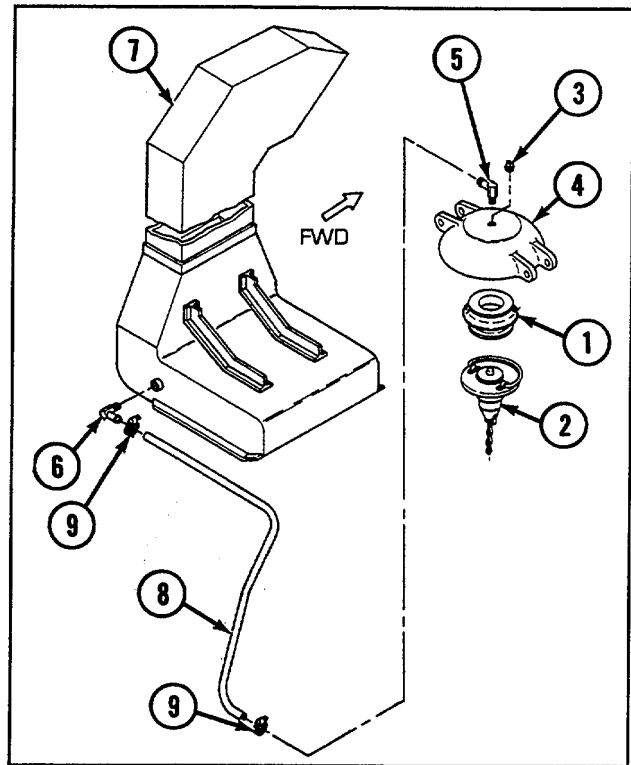
I-8 ENGINE AIR INLET PIPES

- 1 Bond kit-furnished rubber strip (1) to left and right kit-furnished air inlet pipes (2) with adhesive sealant (Table I-1, item 4).
- 2 Remove four existing screws (3) and four lockwashers (4) securing armor covers (5). Do not remove either armor cover.
- 3 Install left and right kit-furnished air inlet pipes (2) and secure each with four previously removed screws (3) and four new lockwashers (4). Apply adhesive sealant (Table I-1, item 4) around heads of screws and base of air inlet pipes at installation.
- 4 Install four kit-furnished screws (6) and four new lockwashers (7) in both left and right air inlet pipes (2).



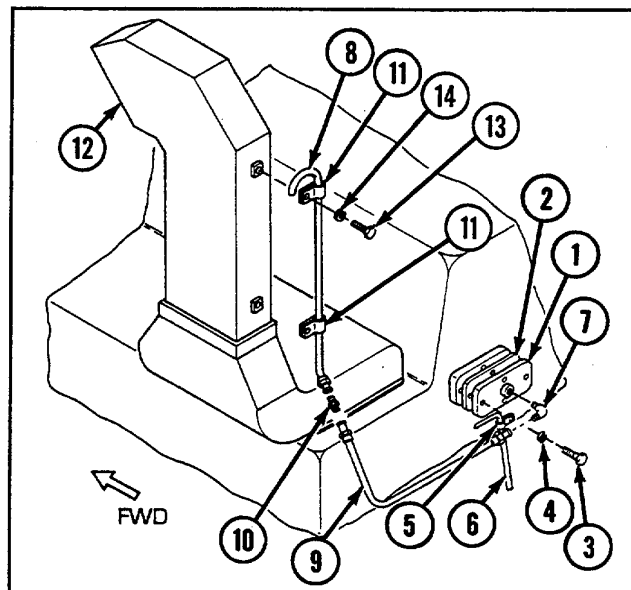
1-9 FUEL TANK VENT

- 1 Bond kit-furnished seal (1) to existing cap assembly (2) with adhesive sealant (Table I-1, item 4).
- 2 Remove plug (3) from fuel tank filler cover (4).
- 3 Install kit-furnished elbow (5) in fuel tank filler cover (4).
- 4 Install kit-furnished elbow (6) in left engine air inlet pipe (7).
- 5 Connect kit-furnished hose (8) between elbows (5 and 6). Secure each end with clamp (9).
- 6 Seal fuel tank filler cover (4) to mating surface with caulking compound (Table I-1, item 3).



I-10 ACETYLENE VENT

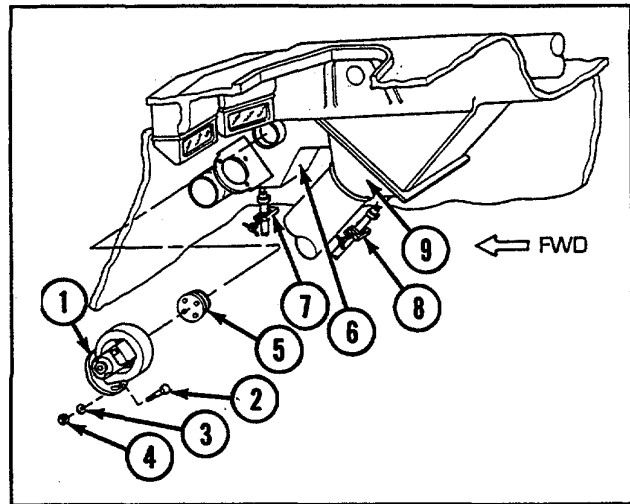
- 1 Install kit-furnished cover (1) and new gasket (2) over acetylene vent holes with three kit-furnished screws (3) and three new lockwashers (4). Apply adhesive sealant (Table I-1, item 4) to gasket upon installation.
- 2 Install kit-furnished loop clamp (5) over fuel tank vent hose (6) and secure with fourth kit-furnished screw (3) and new lockwasher (4).
- 3 Install kit-furnished elbow (7) in cover (1).
- 4 Connect kit-furnished tube assembly (8) to tube assembly (9) with kit-furnished union (10).
- 5 Place two kit-furnished loop clamps (11) over kit-furnished tube assembly (8).
- 6 Connect end of tube assembly (9) to kit-furnished elbow (7).



- 7 Secure kit-furnished tube assembly (8) to left air inlet pipe (12) with two kit-furnished screws (13) and two new lockwashers (14).

1-11 CREW FAN AND BOOM BOOT DRAIN SHUTOFF CLAMP

- 1 Tape crew fan switch, located on accessories panel, to OFF position with adhesive tape (Table I-1, item 7).
- 2 Remove ventilating blower assembly (1) by removing three screws (2), three lockwashers (3), and three nuts (4).
- 3 Apply caulking compound (Table I-1, item 3) to seal assembly (5) and place seal assembly into opening of crew fan housing (6). Tighten seal assembly screws until watertight fit is obtained.
- 4 Install ventilating blower assembly (1) with three screws (2), three new lockwashers (3), and three nuts (4).
- 5 Install kit-furnished clamp (7) on crew fan housing (6) drain hose.
- 6 Install one kit-furnished clamp (8) on right and left drain hoses of boom cylinder boot (9).



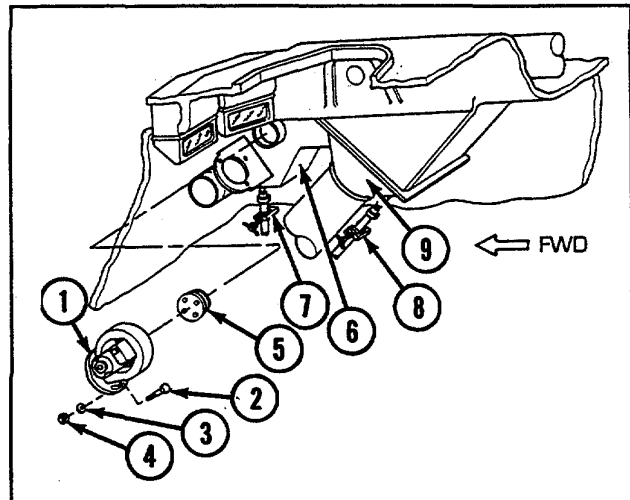
1-12 BILGE PUMP

- 1 Remove rear center floor plate (1) and storage basket forward intermediate left floor plate (2), and retain.
- 2 Remove rear intermediate right access cover (3).

CAUTION

Do not apply adhesive sealant to fire extinguisher nozzle caps.

- 3 Install kit-furnished rubber cap (4) in two fire extinguisher nozzles (5) in main winch compartment.



NOTE

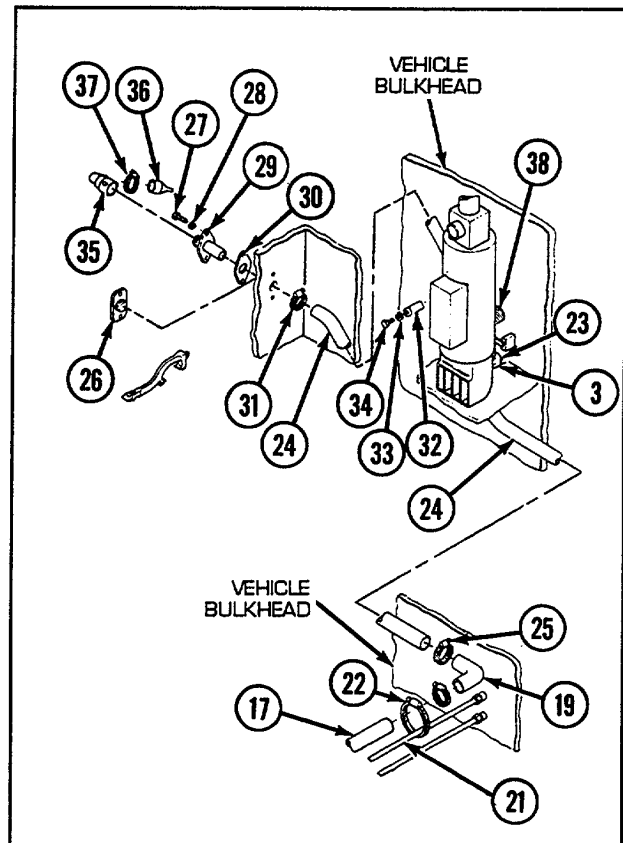
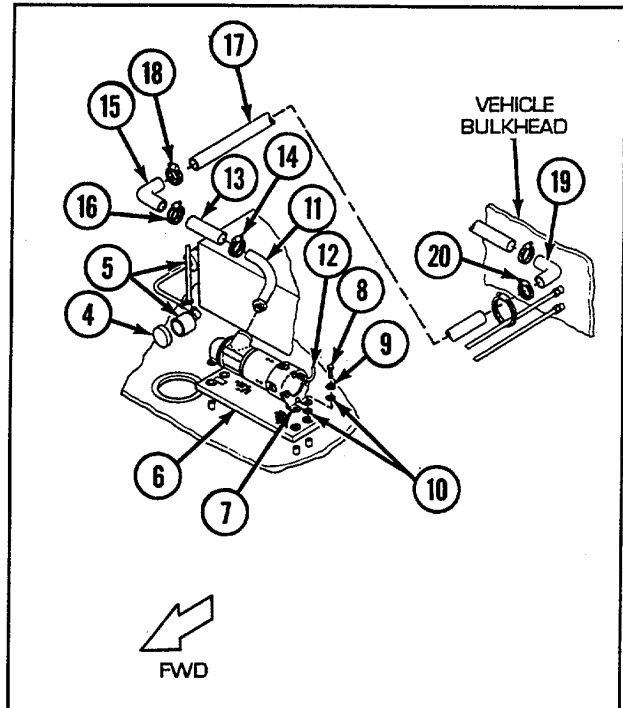
All of the following items are kit furnished unless otherwise noted.

- 4 Install strainer assembly (6) and bilge pump assembly (7) with four screws (8), four new lockwashers (9), and eight flat washers (10).
- 5 Install bent tube (11) with spanner wrench (Table I-1, item 10) and existing wiring harness (12) to bilge pump assembly (7).
- 6 Connect hose (13) to bent tube (11) with clamp (14).

SECTION II: INSTALLATION PROCEDURES

TM 9-2350-256-20

- 7 Connect bent tube (15) to hose (13) with clamp (16).
- 8 Connect one end of hose (17) to bent tube (15) with clamp (18) and other end to bent tube (19) with clamp (20).
- 9 Secure hose (17) to existing fire extinguisher tubing (21) with clamp (22).
- 10 Install grommet (23) in opening from which rear intermediate right access cover (3) was removed.
- 11 Route hose (24) through grommet (23) and attach one end to bent tube (19) with clamp (25).
- 12 Remove cover (26) from hull by removing two existing screws (27) and two lockwashers (28). Retain screws.
- 13 Install adapter (29) and gasket (30) to outside of hull with two screws (27) and two new lockwashers (28).
- 14 Connect second end of hose (24) to adapter (29) and secure with clamp (31).
- 15 Secure hose (24) to bulkhead with clip (32), new lockwasher (33), and screw (34).
- 16 Connect adapter (35) to adapter (29) using spanner wrench (Table I-1, item 10).
- 17 Attach seal (36) to adapter (35) with clamp (37).
- 18 Wrap asbestos tape several times around personnel heater exhaust (38), applying sodium silicate (Table I-1, item 6) while wrapping.



I-13 FIRE EXTINGUISHER NOZZLES AND ELECTRICAL CONNECTIONS IN ENGINE COMPARTMENT

- 1 Open battery access doors.
- 2 Clean and dry all electrical connections to which sealer is to be applied.

WARNING

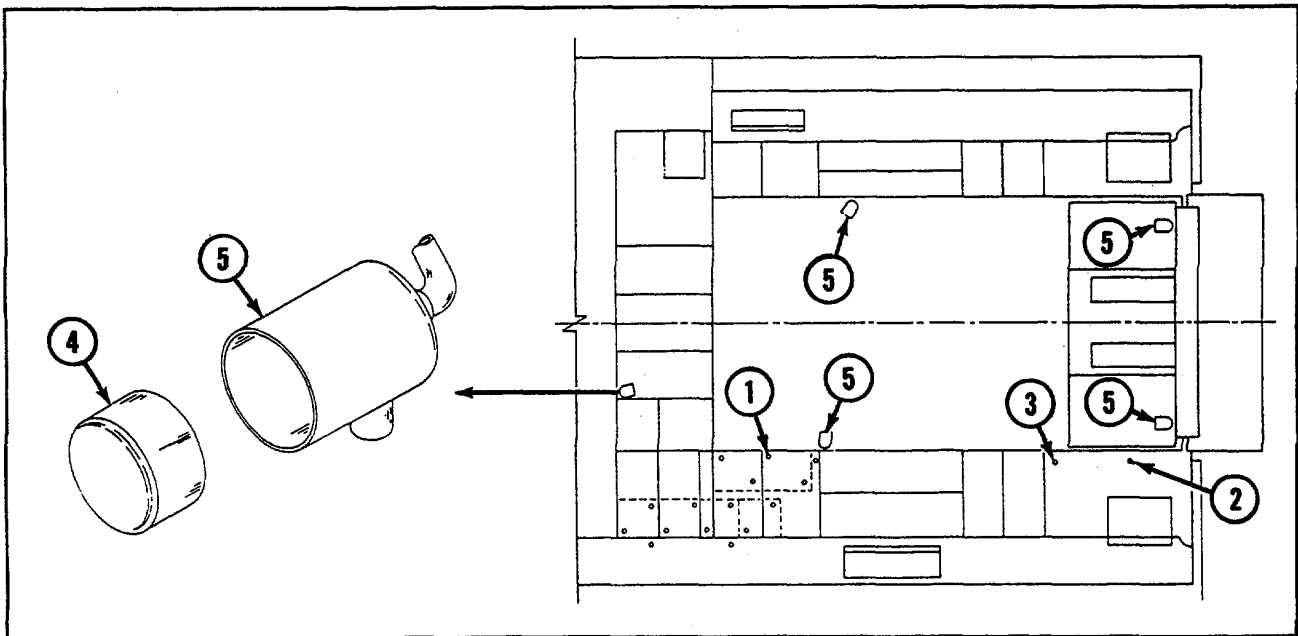
Do not seal battery cap vents.

- 3 Apply asbestos sealing compound (Table I-1, item 5) to all 15 battery terminals and ground (1).
- 4 Close battery access doors.
- 5 Apply adhesive sealant (Table I-1, item 4) to main engine ground (2) and slave ground (3).

CAUTION

Do not apply adhesive sealant to fire extinguisher nozzle caps.

- 6 Install kit-furnished rubber caps (4) in five fire extinguisher nozzles (5).

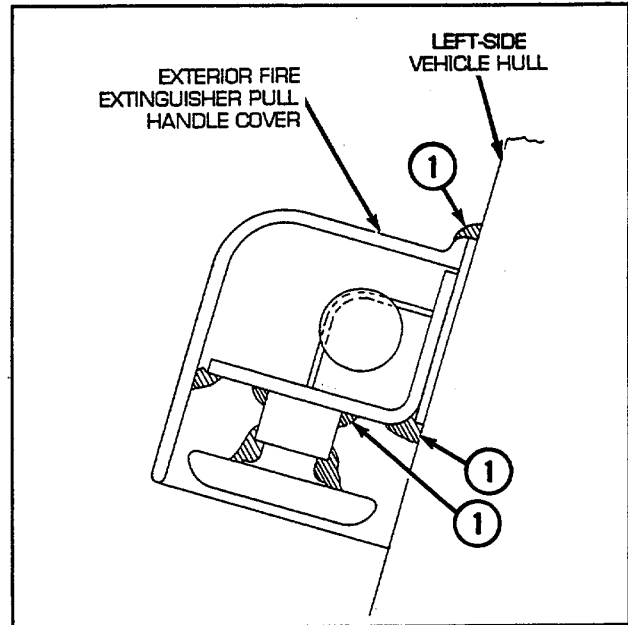


1-14 CAULKING EXTERIOR FIRE EXTINGUISHER REMOTE CONTROL

WARNING

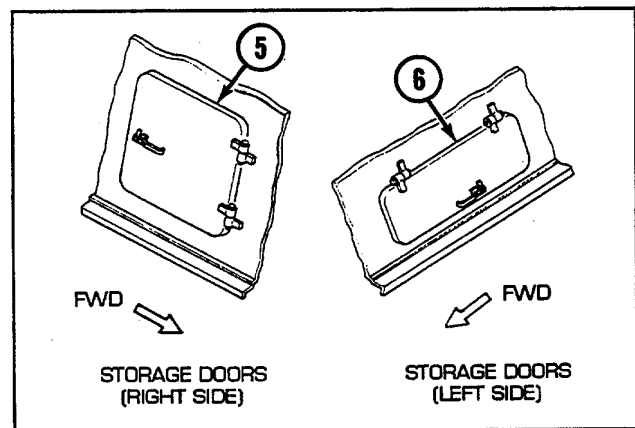
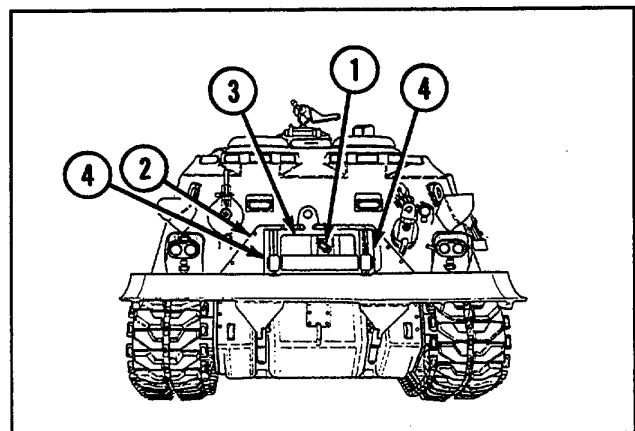
Dry-cleaning solvent used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 138 degrees (°) Fahrenheit (59° Celsius).

- 1 Clean area around exterior and interior with dry-cleaning solvent.
- 2 Apply caulking compound (Table I-1, item 3) all around areas indicated (1).



I-15 OTHER APPLICATIONS OF CAULKING COMPOUND

- 1 Pull main winch cable (1) in until a light pressure is applied between clevis and opening. Seal exposed area around cable with caulking compound (Table I-1, item 3).
- 2 Seal hull front cover (2) with caulking compound (Table I-1, item 3).
- 3 Seal all around cover plate (3) at opening in hull front cover (2) with caulking compound (Table I-1, item 3).
- 4 Seal at both ends of cover plate (4) with caulking compound (Table I-1, item 3).
- 5 Seal personnel doors with caulking compound (Table I-1, item 3) only if watertight seal cannot be obtained with regular door seals.
- 6 Check drain plugs in exterior stowage compartments to ensure watertight fit. Seal stowage compartment doors (5 and 6) with caulking compound (Table I-1, item 3).
- 7 Use caulking compound (Table I-1, item 3) to seal around all mounting surfaces of deep water fording components, such as right and left engine air intake pipes, personnel heater air intake cover and exhaust, acetylene vent, fuel tank vent, and engine generator vent.



I-16 ARMAMENT PROTECTION

Cover caliber .50 machine gun with its protective bag

1-17 SEALING INSPECTION

When time and facilities permit, engine compartment should be flooded with water. At this time, a thorough inspection should be made at bulkhead and power takeoff drive shaft cover to determine any leaks. Engine should be operated (refer to TM 9-2350-256-10) to detect any malfunctions as a result of water leakage.

NOTE

Remove and stow two access plates from underside of engine compartment. This is done to prevent buildup of sand during fording operations.

SECTION III: OPERATIONS

Para.	Task	Page
I-18	Operations During Deep Water Fording	I-14
I-19	Operations After Deep Water Fording	I-15

1-18 OPERATIONS DURING DEEP WATER FORDING

WARNING

Maximum depth of water should be known. Do not exceed a depth of 8 ft, 6 in. (2.59 m). Highest wave should not reach opening of engine air intake pipes.

CAUTION

Do not operate APU or personnel heater until after deep water fording kit has been removed.

- 1 Engine. Refer to TM 9-2350-256-10 for operational instructions pertaining to deep water fording kit.
 - a. Warm up vehicle engine as directed in TM 9-2350-256-10.
 - b. Do not move vehicle until engine is properly warmed up.
 - c. Drive vehicle in low range while fording.

- 2 Fording procedure and precautions.
 - a. Have at least one hatch door open on cab top throughout fording operations.
 - b. Close valve of main engine generator cooling air exhaust system.
 - c. Enter water slowly to avoid surge of "bow wave."
 - d. Speed up engine to overcome possibility of stalling when engine is chilled by water.
 - e. Do not operate engine below 950 revolutions per minute (rpm) while fording.
 - f. Drive at moderate speed of 3 to 4 miles per hour (4.8 to 6.4 kilometers per hour) to avoid forming a "bow wave." Hold this speed by braking if necessary.

- g. If it becomes necessary to stop vehicle while engine is submerged, place transmission in neutral, lock brakes, and use throttle to maintain engine speed at 950 to 1000 rpm.

NOTE

Should engine accidentally stop while vehicle is submerged, restart engine immediately. If engine does not start, continue cranking. Vehicle engine has a restart capability after being stopped for a period of 15 minutes.

- 3 Bilge pump. Turn on bilge pump only when excessive water seepage is apparent.

I-19 OPERATIONS AFTER DEEP WATER FORDING

NOTE

The following operations should be performed as soon as possible after landing, when tactical situation permits.

- 1 Open drain valves in hull floor as directed in TM 9-2350-256-10 to drain vehicle of any water which may have accumulated in hull.
- 2 Check oil level in APU engine for excessive amount of water in crankcase. (Drain and refill if necessary.)
- 3 Remove nonhygroscopic adhesive tape from all components.
- 4 Clean caulking compound from all places where it had been applied.

NOTE

Removal of kit components depends upon tactical situation.

- 5 Remove all deep water fording kit components and install any item that was removed and stowed at time of kit installation.
- 6 Drain any accumulated water from stowage compartments and impact wrench hydraulic hoses.
- 7 Start APU engine and run under load until engine and generator assembly are free from residual moisture in or about unit.

SECTION IV: POST OPERATIONS

Para.	Task	Page
I-20	Service After Deep Water Fording	I-15

I-20 SERVICE AFTER DEEP WATER FORDING

NOTE

Procedures in this section should be performed as soon as possible after landing, or when tactical situation permits.

- 1 Inspect for water entry.
 - a. Engine and transmission.

I-20 SERVICE AFTER DEEP WATER FORDING-Continued

- (1) Check lubricant in engine and transmission for evidence of water.
 - (2) If there is evidence that water has entered these units, flush and refill with correct lubricants as instructed in Appendix J.
 - (3) Remove and clean engine oil filter as directed in Appendix J.
 - (4) Remove and clean transmission oil filter as directed in Appendix J.
- b. Air cleaner intake assemblies.
- (1) Check air cleaner intake assemblies for evidence of water.
 - (2) If water is found, clean air cleaner intake assemblies.
- c. Batteries.
- (1) Check quantity of battery electrolyte.
 - (2) Check specific gravity of battery electrolyte (refer to TM 9-6140-200-14).
 - (3) Service batteries, as necessary, if water has entered them.
- 2 Service armament.
- a. Empty gun of any accumulated water. Clean, dry, and apply prescribed lubricant to all exposed, unpainted surfaces.
 - b. If fording was conducted in salt water, remove all traces of salt water deposits from parts of gun.
- 3 Wash and clean.

NOTE

While washing vehicle, do not permit water to enter opening of engine exhaust and air intake pipes.

- a. If vehicle was forded in salt water, wash vehicle thoroughly in clean water.
 - b. Clean out hull. Touch up all parts with paint where necessary.
- 4 Lubrication. Lubricate vehicle completely in accordance with instructions given in Appendix J.

NOTE

Emphasis should be placed upon need for regular inspection (particularly of switches, relays, and similar equipment) to guard against possible aftereffects of submersion, such as corrosion and fusion of contact points.

- 5 PMCS. Perform PMCS as directed in TM 9-2350-256-10 or this manual.

NOTE

- Follow-on maintenance:
- Install engine deck assembly (see paragraph 9-51)
 - Lower boom (refer to TM 2350-256-10)

APPENDIX J LUBRICATION INSTRUCTIONS

APPENDIX OVERVIEW

This appendix covers the lubrication instructions for the M88A1.

Para.	Task	Page
J-1	General Statements	J-1
J-2	Oil Filter Statement	J-3
J-3	AOAP Sampling Interval Statement	J-3
J-4	Warranty Hard-time Statement	J-4
J-5	Lubrication Instructions	J-4

J-I GENERAL STATEMENTS

a. SCOPE

This appendix provides lubrication instructions, procedures, and information on the authorized lubricants, lubrication intervals, and Army Oil Analysis Program (AOAP) for the M88A1 Medium Recovery Vehicle.

b. LUBRICATION INTERVALS AND INTERVAL SYMBOLS

The lubrication instructions found in this appendix are presented in grouped sequence by location. Intervals (on-condition or hard-time) and related man-hour times are based on normal operation. The man-hour time specified is the time you need to do all the services prescribed for a particular interval. The following symbols are used to indicate how often the lubrication services will be performed.

- D-Daily
- Q-Quarterly
- S-Semiannually
- A--Annually
- OC--- On Condition

TOTAL MAN-HOURS*	
<u>INTERVALS</u>	<u>MAN-HOURS</u>
D	7.3
Q	13.3
S	7.0
A	1.0
OC	5.8
After Fording	24.0

*If AOAP support is not available and hard-time intervals are used, 2 man-hours will be required for each 25-hour period or monthly (whichever comes first); additionally, quarterly labor requirements will increase by 1.3 man-hours, and semiannual requirements will increase by 2.5 man-hours.

J-1 GENERAL STATEMENTS-Continued**c. MAINTENANCE LEVEL**

The maintenance level for all lubrication services in this appendix is Unit.

d. EXCEPTIONAL OPERATIONAL REQUIREMENTS

Lubricate more often to compensate for abnormal and extreme conditions. High or low temperatures, prolonged periods of high rate operation, continued operation in sand, dust, or exposure to moisture may quickly destroy the protective qualities of the lubricant. Before performing lubrication checks and services, observe the following:

- 1 Never use incorrect lubricant or use too much lubricant.
- 2 Always:
 - a. Clean grease fittings before lubrication
 - b. Use this appendix as a guide
 - c. Lubricate after fording
 - d. Ensure vehicle is level prior to checking fluid levels.
- 3 Lubrication after fording operations.

As soon as possible after any fording operation in water of 12 inches or more, lubricate all chassis points to cleanse of water or grit. Also lubricate any other points requiring maintenance after fording. If vehicle has been in deep water for a considerable length of time, or was submerged beyond its fording capabilities, the following precautions must be taken as soon as practicable to avoid damage to engine and other vehicle components:

- a. Perform a complete lubrication service.
 - b. Check APU, main engine and transmission for presence of water or sludge in oil. If found, drain and flush transmission with PE-1 Lubricating Oil, Internal Combustion engine, and drain and flush engines with OE-30 Lubricating Oil, Internal Combustion engine. If PE-1 is not available, flush transmission with OE-10 Lubricating Oil, Internal Combustion engine. Before refilling with clean oil, remove, clean, and install transmission oil filters (see paragraph 7-2). Replace engine oil filter elements (see paragraph 3-6).
 - c. Check lubricant in hydraulic reservoir and winch gear cases for evidence of water or sludge contamination. If there is evidence of contamination, drain and refill with correct lubricant.
- 4 For operation of equipment in protracted cold temperatures below -10° F (-23° C).

Remove lubricants prescribed in table for temperatures above -10° F (-23° C). Clean parts with dry-cleaning solvent, type II (Appendix D, item 9) or equivalent. Relubricate with lubricants specified in table J-1, Lubricant Table for M88A1 Medium Recovery Vehicle, for temperatures of 0 F to -65° F (-18° C to -50° C).

e. ABBREVIATIONS

The following abbreviations for the various lubricants used in this appendix are provided below.

GAA.. Grease, Automotive and Artillery (MIL-G-10924)

- GO Lubricating Oil, Gear (MIL-L-2105)
- GOS Lubricating Oil, Gear (MIL-L-10324)
- OE-HDO..... Lubricating Oil, Internal Combustion Engine (ICE), Tactical Service (MIL-L-2104)
- OEA Lubricating Oil, ICE, Arctic (MIL-L-46167)
- CW Lubricating Oil, Chain, Wire Rope, Exposed Gear (W-L-751)

f. FITTINGS AND PARTS CLEANING

WARNING

Dry-cleaning solvent, type II, used to clean parts, is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 138° F (59° C).

NOTE

Always install dust caps on fittings after lubrication procedures.

Use dry-cleaning solvent, type II (SD-2) or equivalent (Appendix D, item 9) to clean parts. Dotted arrow points indicate lubrication on both sides of the equipment.

Do not lubricate personnel heater motor, ventilating blower motor, or auxiliary power unit air cleaner.

Lubricate at assembly by field or depot maintenance units starter, commander' s cupola, fuel injector drive coupling, and driver' s, rigger' s, and mechanic' s hatch mechanisms.

g. CORROSION CONTROL

Follow corrosion control procedures as indicated in paragraph 1-7.

J-2 OIL FILTER STATEMENT

Oil filters shall be serviced/cleaned/changed as applicable, when:

- 1 They are known to be contaminated or clogged,
- 2 Service is recommended by AOAP laboratory analysis, or
- 3 At prescribed hard-time intervals.

J-3 AOAP SAMPLING INTERVAL STATEMENT

On-condition (OC) oil sample intervals shall be applied unless changed by the AOAP laboratory. Change the hard-time interval if your lubricants are contaminated or if you are operating the equipment under adverse conditions, including longer-than-usual operating hours. The hard-time interval may be extended during periods of low activity. If extended, adequate preservation precautions must be taken. Hard-time intervals will be applied in the event AOAP laboratory support is not available.

J-4 WARRANTY HARD-TIME STATEMENT

For equipment under manufacturer' s warranty, hard-time oil service intervals shall be followed. Intervals shall be shortened if lubricants are known to be contaminated or if operation is under adverse conditions (such as longer than usual operating hours, extended idling periods, or extreme dust).

J-5 LUBRICATION INSTRUCTIONS

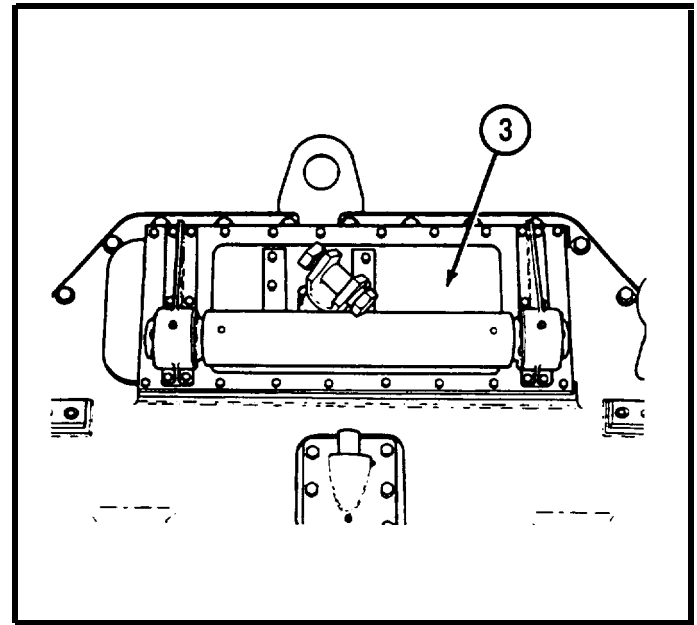
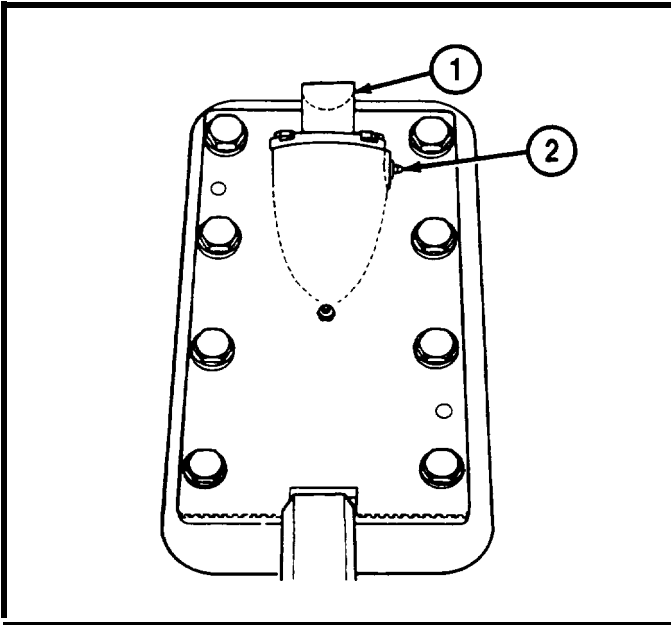
TABLE J-1. LUBRICANT TABLE FOR MBBA1 MEDIUM RECOVERY VEHICLE

Lubricants		Capacities	Expected Temperatures For Arctic Operation, Refer to FM 9-207			Interval
			Above 15° F (Above -9° C)	+40° F to -10° F (+4° C to -23° C)	0° F to -65° F (-18° C to -54° C)	
GAA MIL-G-10924	GREASE, Automotive and Artillery All grease points	As Required	All Temperatures			
GO MIL-L-2105 or GOS MIL-L-10324	LUBRICATING OIL, Gear, Multipurpose LUBRICATING OIL, Gear, Subzero Hoist Winch Gear Case Main Winch Gear Case	3 gal (11.36 L) 11 gal (41.64 L)	GO 90	GO 90	GOS	
OE/HDO MIL-L-2104 or OEA MIL-L-46167	LUBRICATING OIL, Internal Combustion Engine, Tactical Service LUBRICATING OIL, Internal Combustion Engine, Arctic Boom Stayline Cables Hoist Winch Cable Mechanical Transmission Hydraulic Reservoir	As Required 1 gal (3.79 L) 95 gal (359.58 L)	OE/HDO-10	OE/HDO-10	OEA	
CW W-L-751	LUBRICATING OIL, Chain, Wire Rope, Exposed Gear Hoist Winch Cable	As Required	CW-IIC	CW-IIB	CW-ILA	

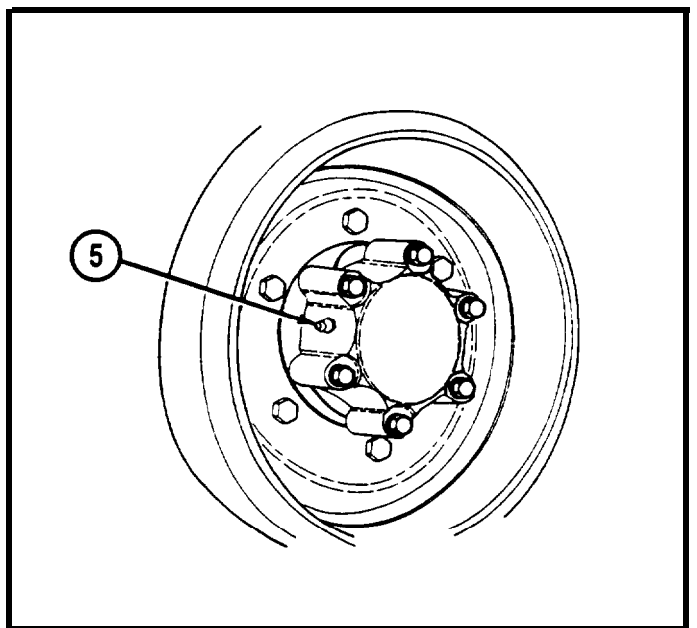
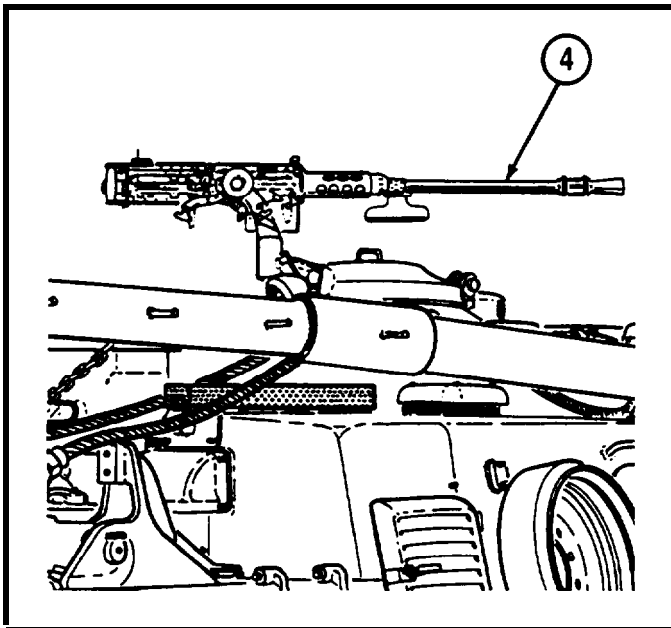
J-5 LUBRICATION INSTRUCTIONS-Continued

a. SERVICE FROM OUTSIDE OF VEHICLE-Continued

- 1 Spade release mechanism. Clean and coat exposed part of spade lockpin (1) with GAA. Use a hand grease gun to pump grease into fitting (2) on right side of pin housing.
- 2 Bearing plate. Clean and coat plate (3) with GAA.

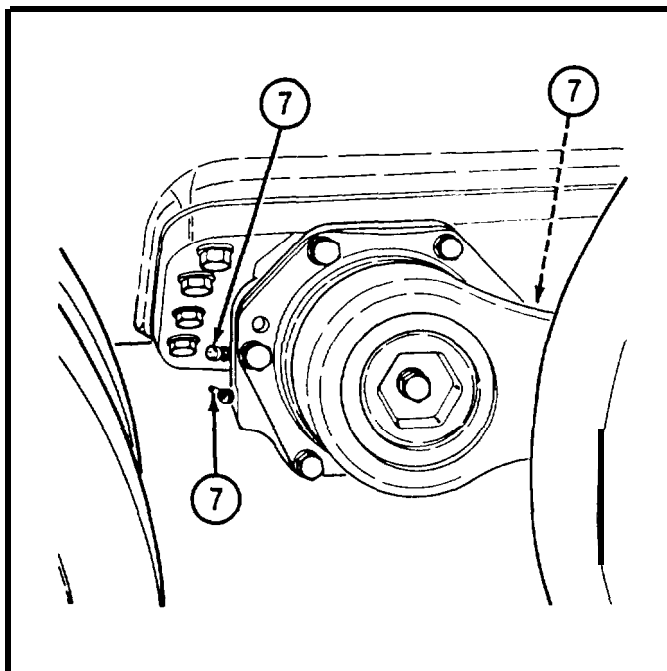
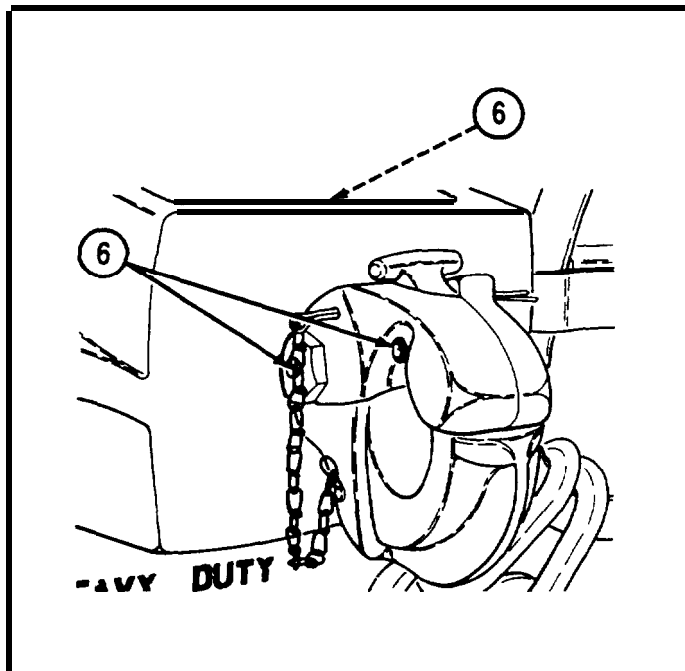


- 3 Flexible M2 0.50 caliber machine gun. Lubricate machine gun (4) with GAA (refer to TM 9-1005-213-10).
- 4 Track support rollers. Lubricate with GAA through three fittings (5) on each wheel.



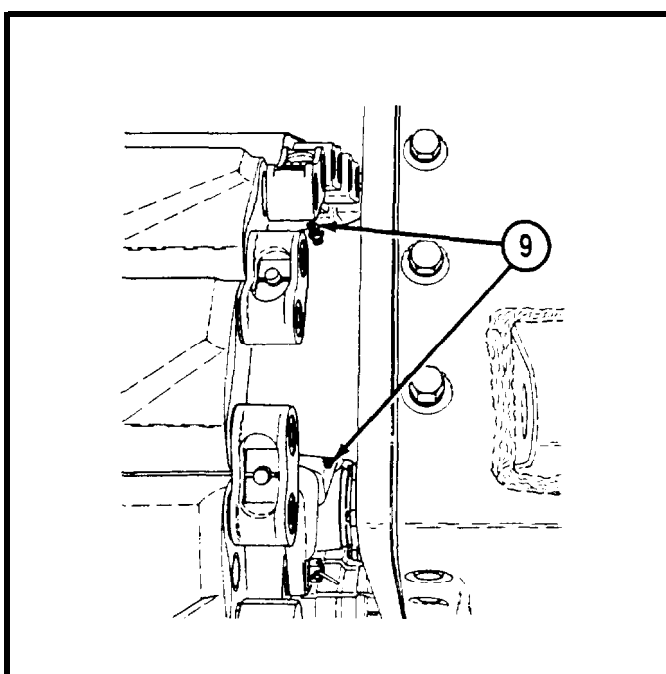
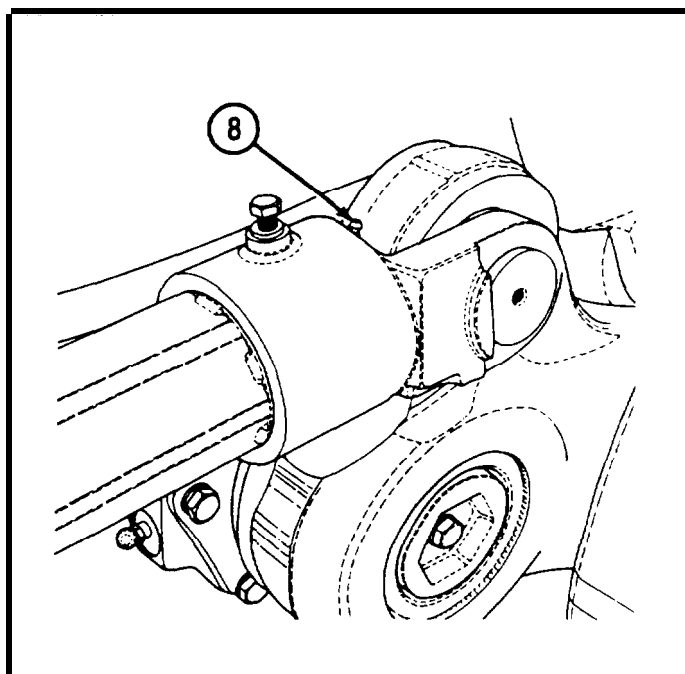
5 Towing pintle. Lubricate with GAA through three fittings (6).

6 Roadwheel arm bearings. Lubricate with GAA through three fittings (7) on each roadwheel arm.



7 Track adjusting link. Lubricate with GAA through fitting (8).

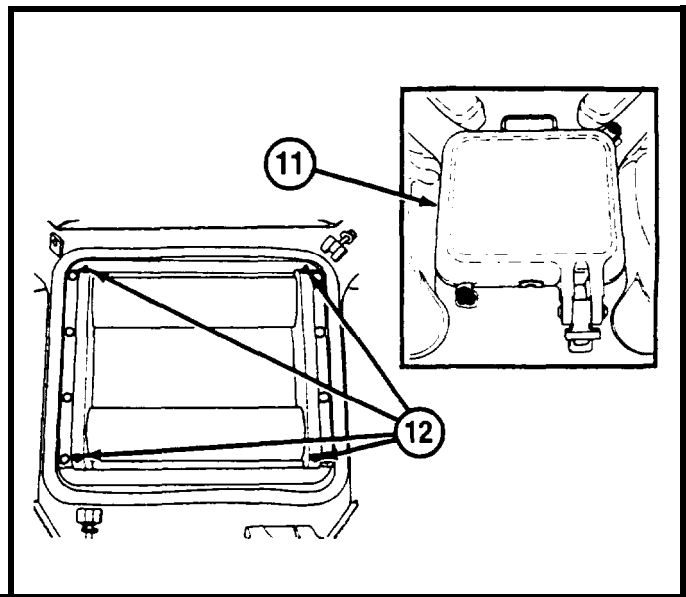
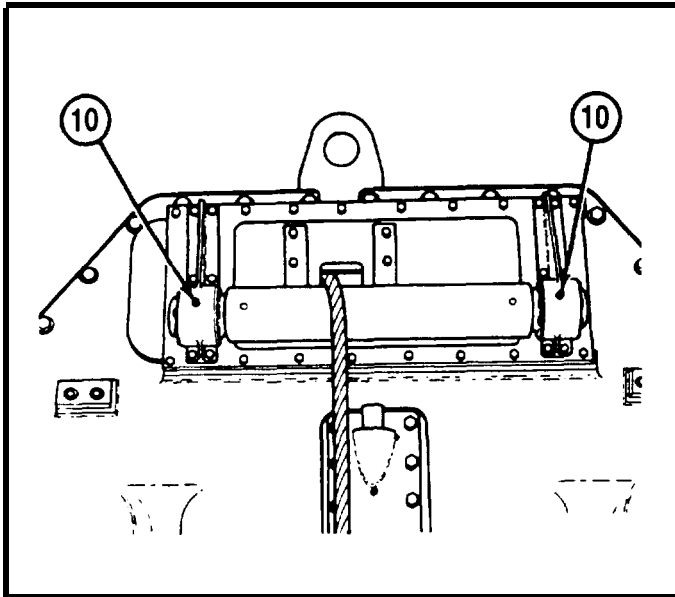
8 Compensating idler wheel arm bearings. Lubricate with GAA through fittings (9).



J-5 LUBRICATION INSTRUCTIONS-Continued

a. SERVICE FROM OUTSIDE OF VEHICLE-Continued

- 9 Main winch cable roller. Lubricate with GAA through two fittings (10).
- 10 Hoist winch cable roller bearings. Open hoist winch cable access cover (11) and lubricate with GAA through four fittings (12). Close access cover.

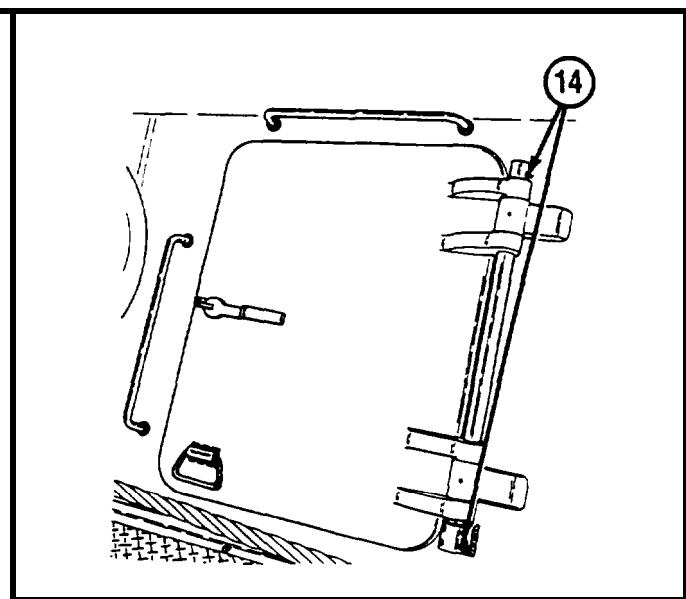
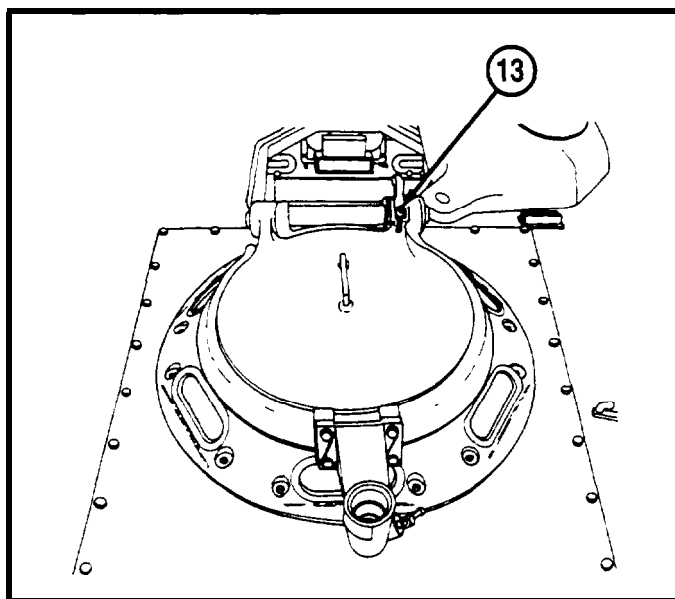


- 11 Commander's cupola hold-open latch. Lubricate with GAA through fitting (13) at end of pivot pin.
- 12 Personnel door torsion bar.

NOTE

There are two fittings on each door.

Lubricate with GAA through four fittings (14).



NOTE

There is one fitting at each pin.

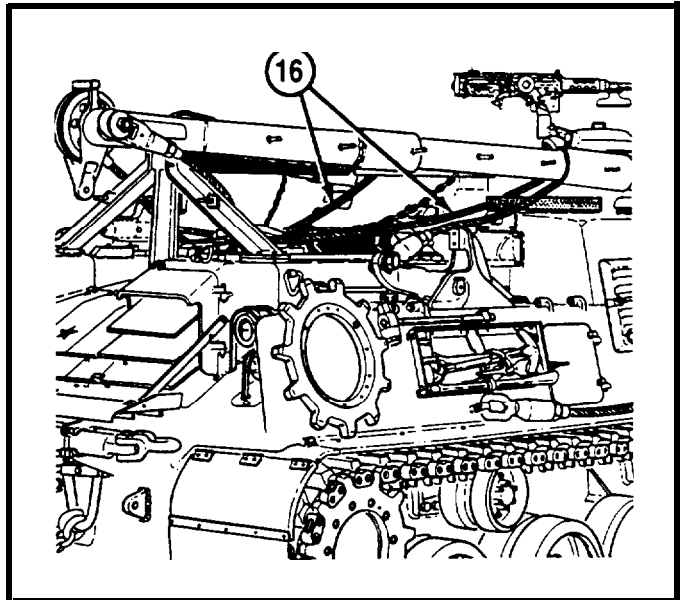
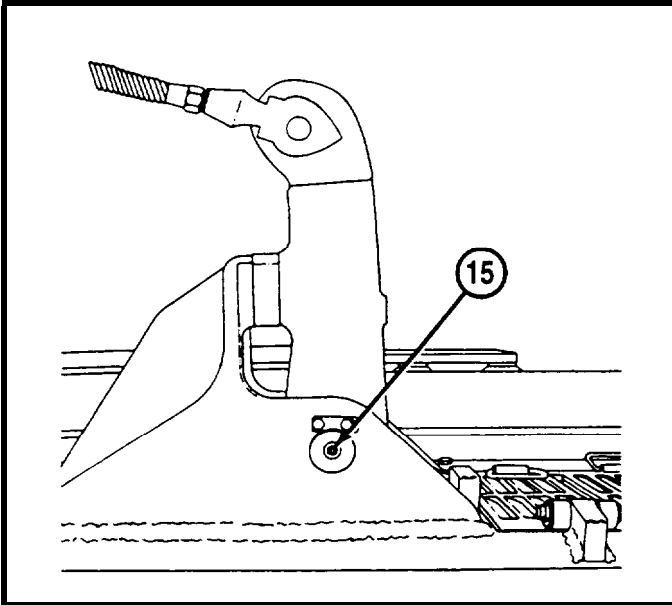
13 Boom lever pin. Lubricate with GAA through fitting (15).

14 Boom stayline cables.

WARNING

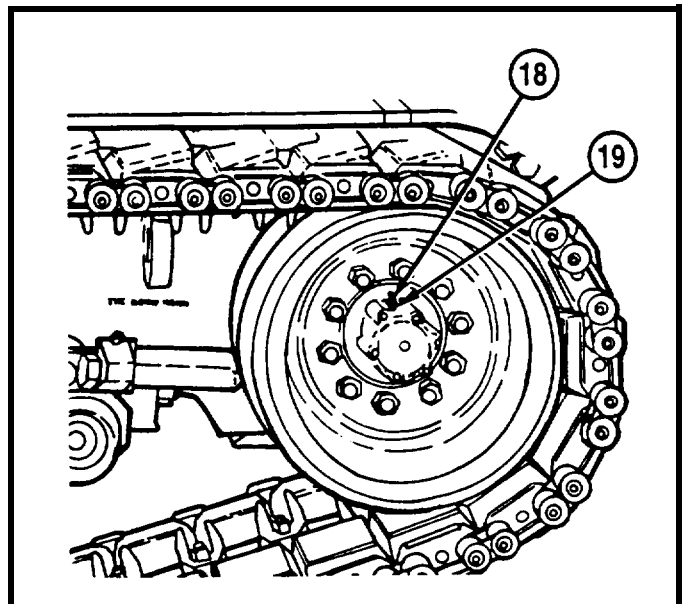
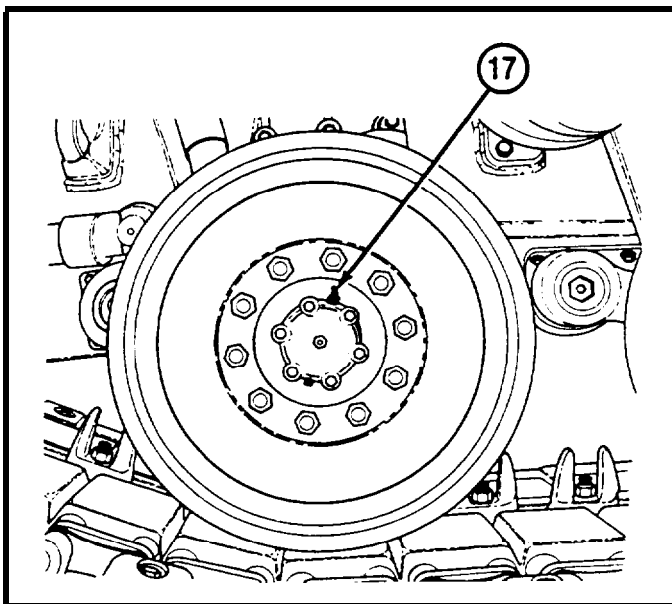
Never handle cable with bare hands. Broken or frayed wire strands can cause severe cuts. Always wear protective (leather) gloves when handling cable.

Clean and oil cable (16) with OE. If cable has not been used within a six-month period, clean entire cable and brush soak it with OE. Wipe cable to remove excess oil. Coat cable with CW.



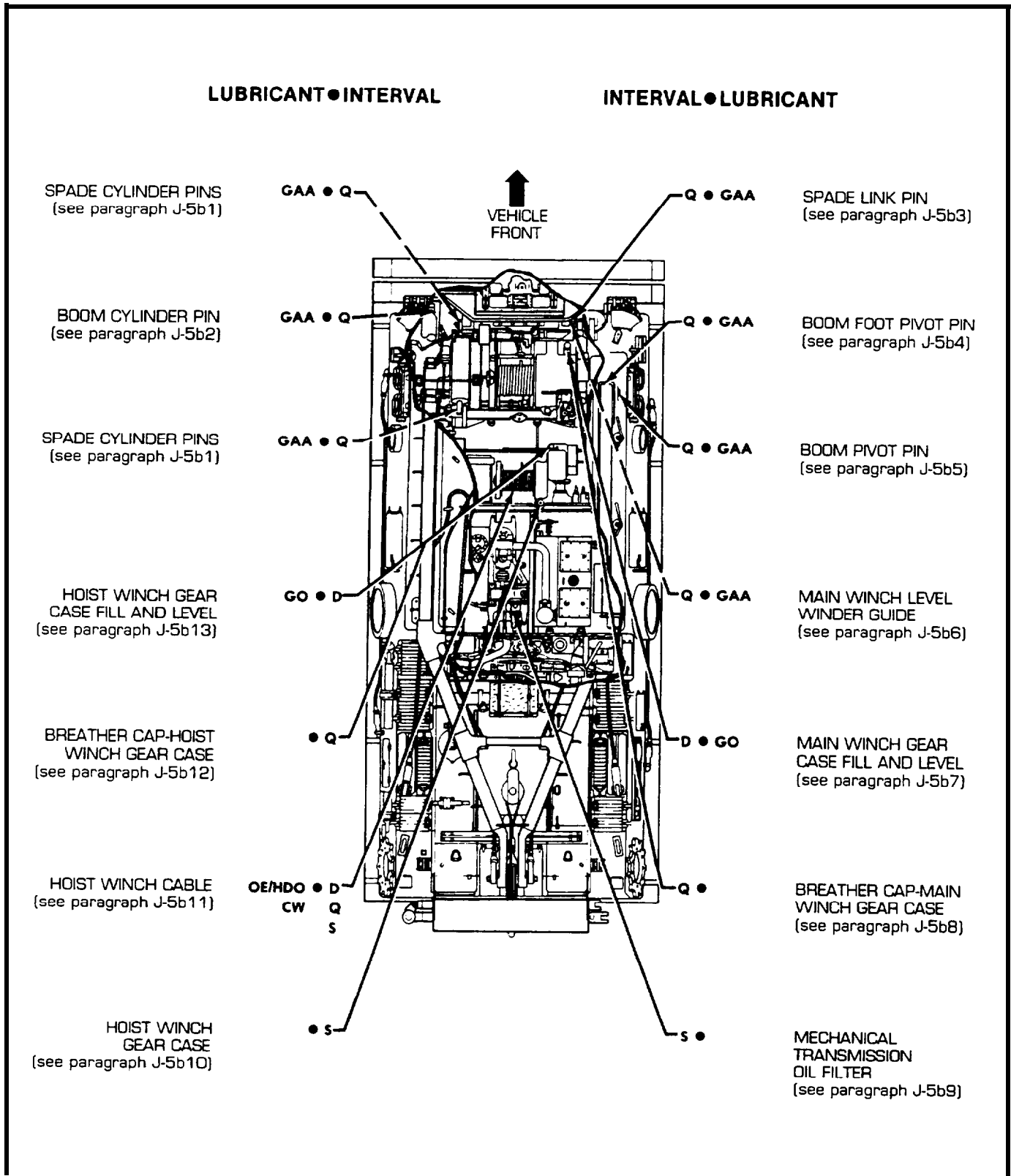
15 Roadwheel bearings. Lubricate with GAA through six fittings (17) at each side.

16 Compensating idler wheel bearings. If vehicle is without grease fitting (18), remove plug (19) and insert fitting. Lubricate with GAA through fitting. Remove fitting and install plug.



J-5 LUBRICATION INSTRUCTIONS-Continued

b. SERVICE FROM CREW COMPARTMENT



LUBRICANT • INTERVAL

INTERVAL • LUBRICANT

↑
VEHICLE
FRONT

HYDRAULIC RESERVOIR
DRAIN
(see paragraph J-5b16)

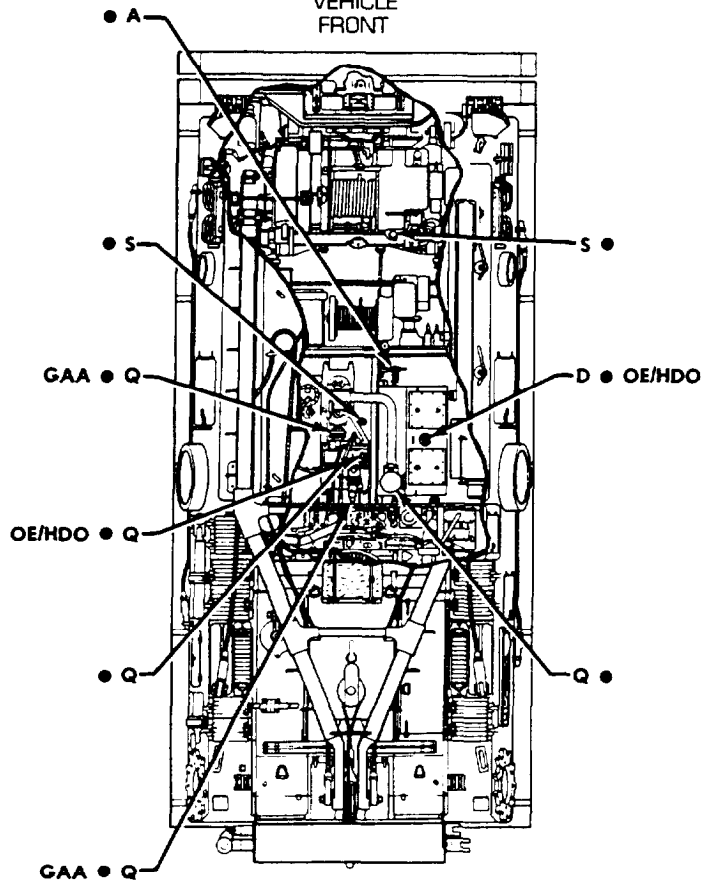
MECHANICAL
TRANSMISSION DRAIN
(see paragraph J-5b14)

MECHANICAL
TRANSMISSION AND
HYDRAULIC PUMP SHAFT
(see paragraph J-5b22)

MECHANICAL
TRANSMISSION
FILL AND LEVEL
(see paragraph J-5b21)

BREATHER CAP-
MECHANICAL
TRANSMISSION
(see paragraph J-5b20)

MECHANICAL
TRANSMISSION
SHAFT UNIVERSAL JOINT
(see paragraph J-5b19)



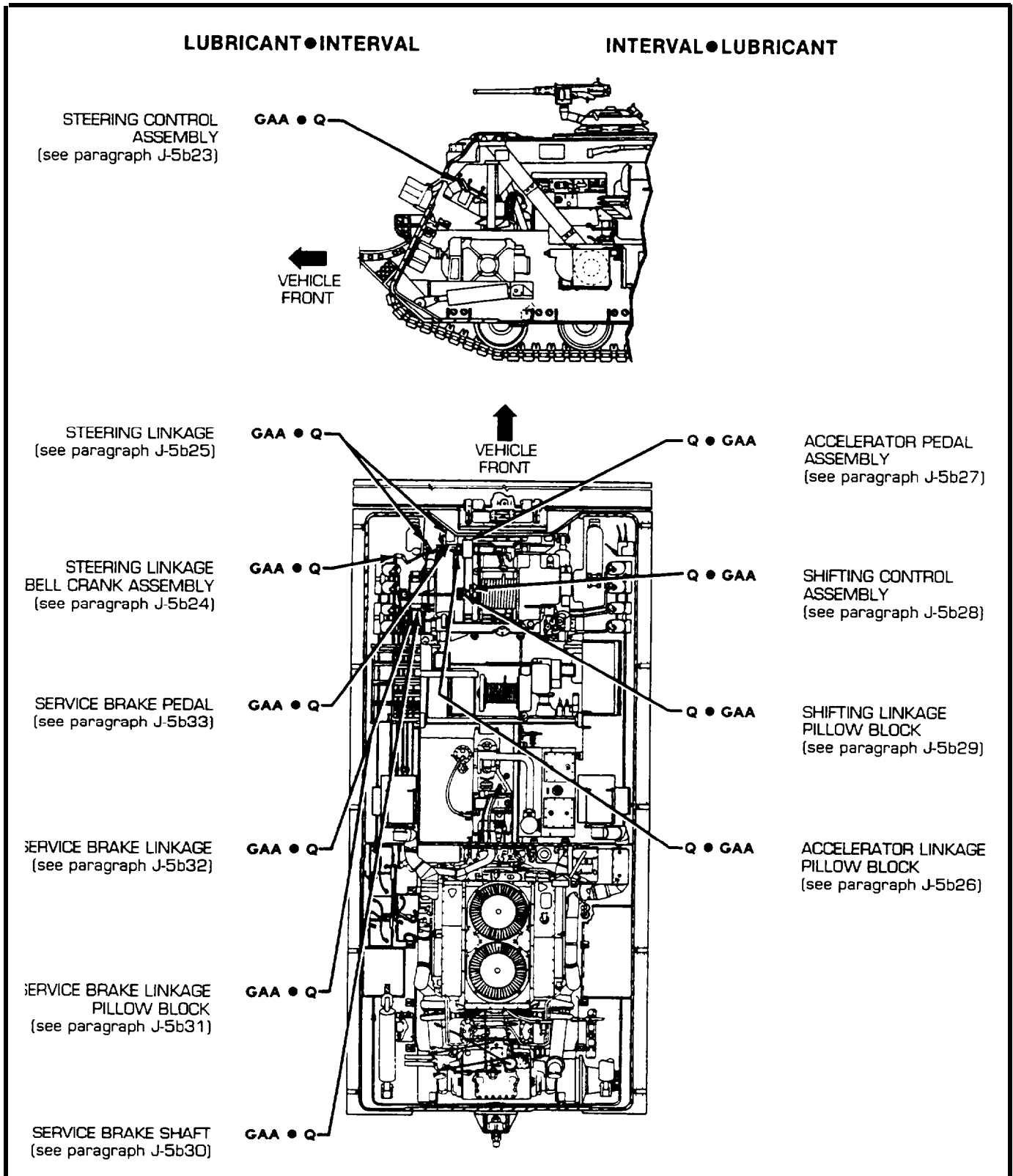
MAIN WINCH GEAR
CASE DRAIN
(see paragraph J-5b15)

HYDRAULIC RESERVOIR
FILL AND LEVEL
(see paragraph J-5b17)

HYDRAULIC RESERVOIR
FILTER
(see paragraph J-5b18)

J-5 LUBRICATION INSTRUCTIONS-Continued

b. SERVICE FROM CREW COMPARTMENT-Continued



1 Spade cylinder pins.

a. Front left pin.

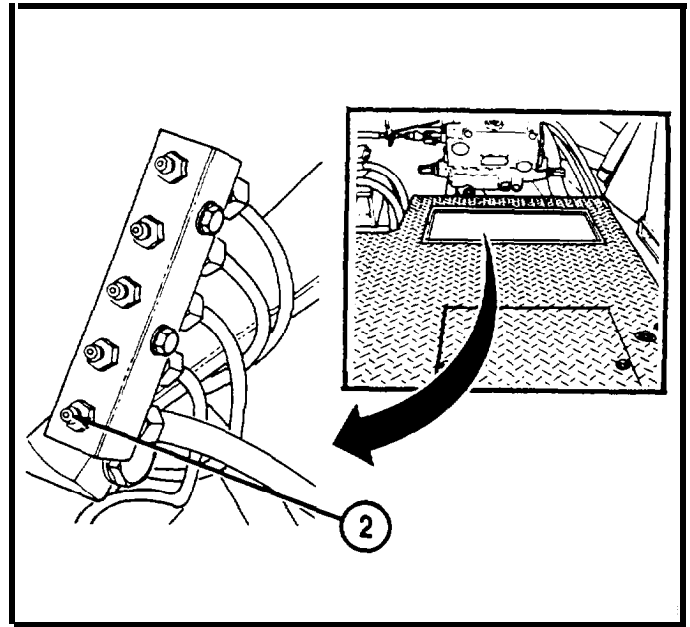
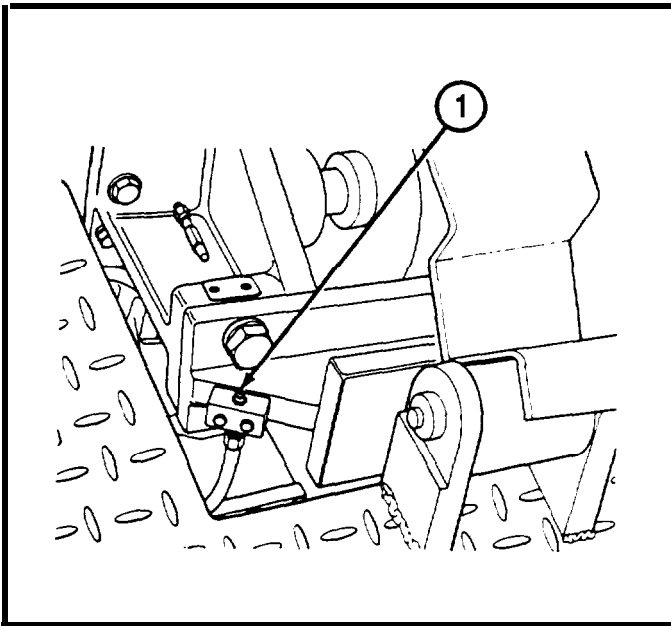
Lubricate with GAA through fitting (1) at front of each cylinder and fitting at rear of each cylinder.

b. Front right pin.

(1) Remove subfloor plate (see paragraph 9-1).

(2) Lubricate with GAA through fitting (2) at front of each cylinder and fitting at rear of each cylinder.

(3) Install subfloor plate (see paragraph 9-1).

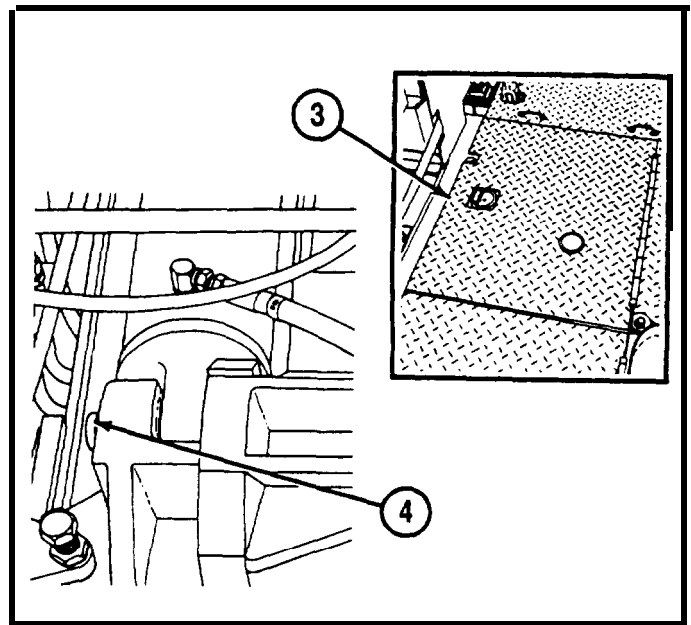


c. Rear left pin.

(1) Open access door (3).

(2) Lubricate with GAA through fitting (4) at front of each cylinder and fitting at rear of each cylinder.

(3) Close access door (3).

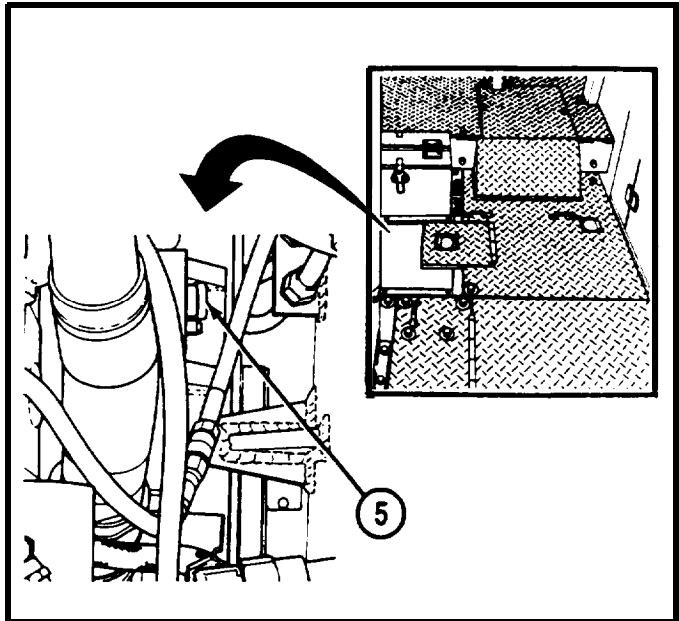


J-5 LUBRICATION INSTRUCTIONS-Continued

b. SERVICE FROM CREW COMPARTMENT-Continued

d. Rear right pin.

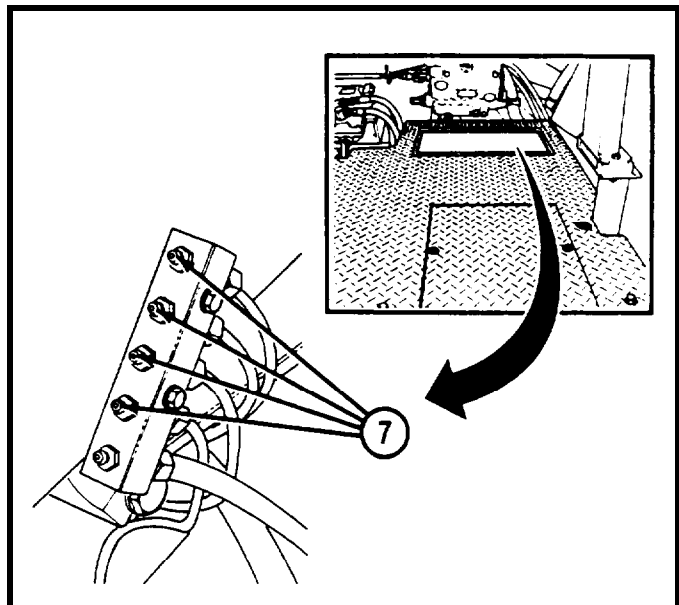
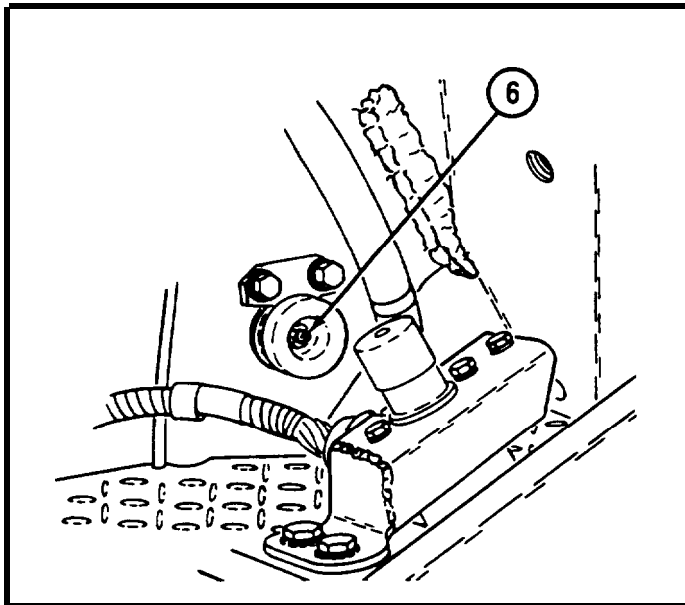
- (1) Remove subfloor plate (see paragraph 9-23).
- (2) Lubricate with GAA through fitting (5) at front of each cylinder and fitting at rear of each cylinder.
- (3) Install subfloor plate (see paragraph 9-23).



2 Boom cylinder pin. Lubricate with GAA through fitting (6).

3 Spade link pm.

- a. Remove subfloor plate (see paragraph 9-1).
- b. Lubricate with GAA through fittings (7).
- c. Install subfloor plate (see paragraph 9-1).



- 4 Boom foot pivot pin.

NOTE

There is one fitting on each side of vehicle.

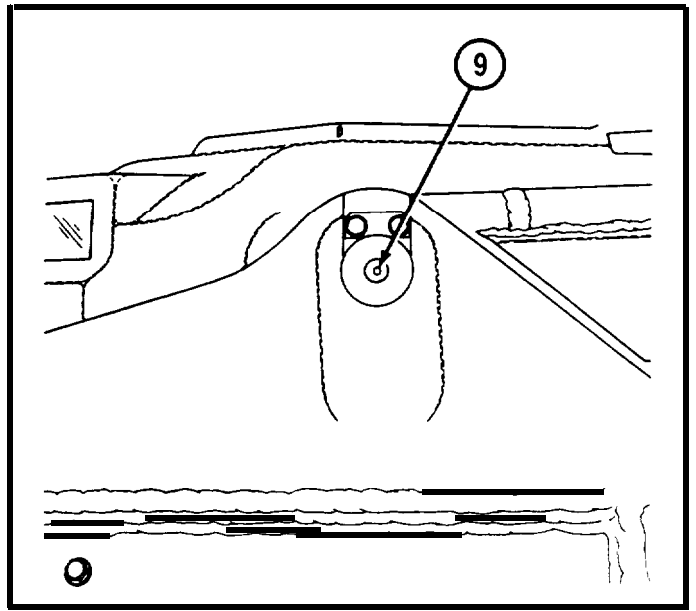
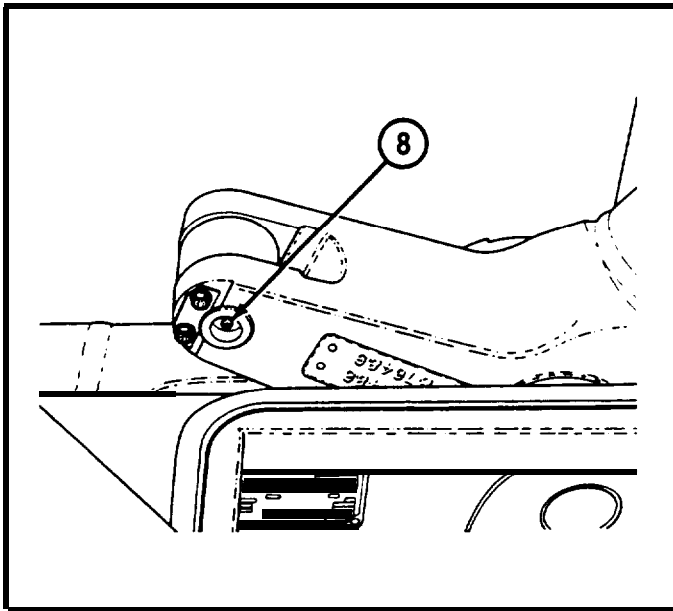
Raise boom and lubricate with GAA through fitting (8). Lower boom.

- 5 Boom pivot pin.

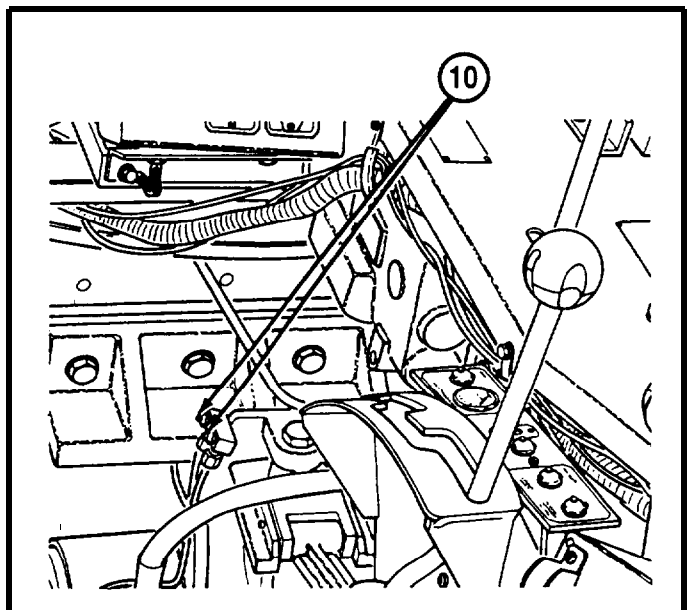
NOTE

There is one fitting on each side of vehicle.

Lubricate with GAA through fitting (9).



- 6 Main winch level winder guide. Lubricate with GAA through two fittings (10).

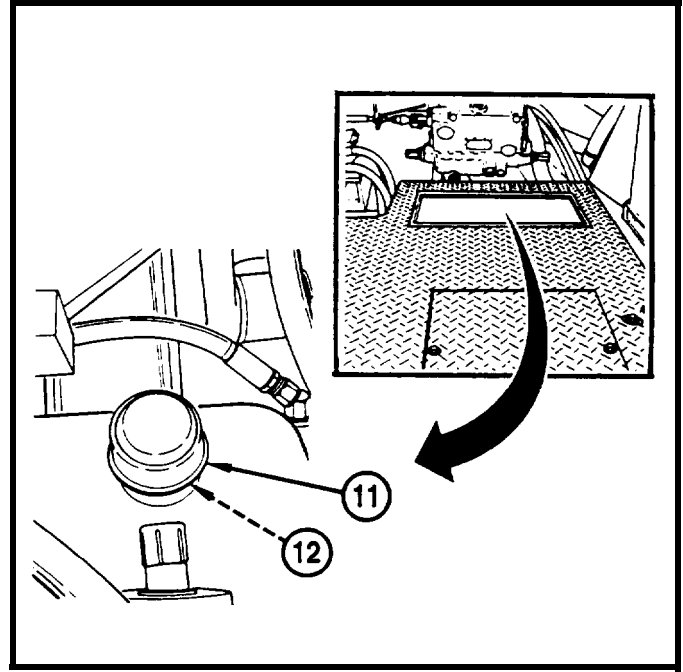


J-5 LUBRICATION INSTRUCTIONS-Continued

b. SERVICE FROM CREW COMPARTMENT-Continued

7 Main winch gear case fill and level.

- a. Remove subfloor plate (see paragraph 9-1).
- b. Before operation, remove breather cap (11) and bayonet gage (12). Check to see that oil level is to the FULL mark on gage. If level is below FULL mark, add oil (see Table J-1) until oil level rises to FULL mark.
- c. Install bayonet gage (12) and cap (11).
- d. Install subfloor plate (see paragraph 9-1).

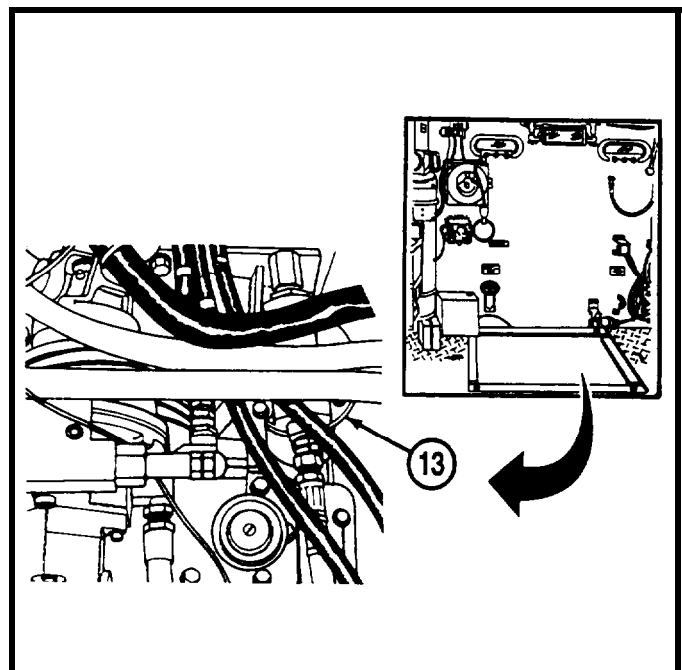


8 Breather cap-main winch gear case.

- a. Remove subfloor plate (see paragraph 9-1).
- b. Remove breather cap (11) and clean it with dry-cleaning solvent (SD-2) (Appendix D, item 9).
- c. Install breather cap (11).
- d. Install subfloor plate (see paragraph 9-1).

9 Mechanical transmission oil filter.

- a. Remove subfloor plate (see paragraph 9-12).
- b. Remove filter (13) from mechanical transmission.
- c. Clean filter (13) with dry-cleaning solvent (SD-2) (Appendix D, item 9).
- d. Install filter (13).
- e. Install subfloor plate (see paragraph 9-12).

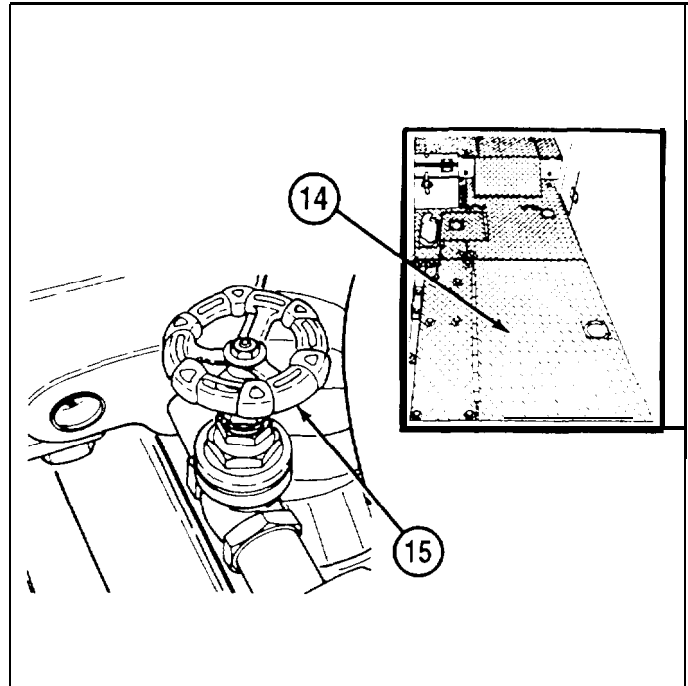


10 Hoist winch gear case drain.

NOTE

Dram oil from hoist winch gear case when oil is at operating temperature

- a. Open access door (14)
- b. Place a suitable receiving container of three-gallon capacity under oil outlet. open hull drain valves (15); then open hoist winch drain valve.
- c. After oil has drained, close hoist winch valve; then close hull dram valve (15).
- d. Refill hoist winch gear case with appropriate weight of oil (see Table J-1).
- e. Close access door (13).

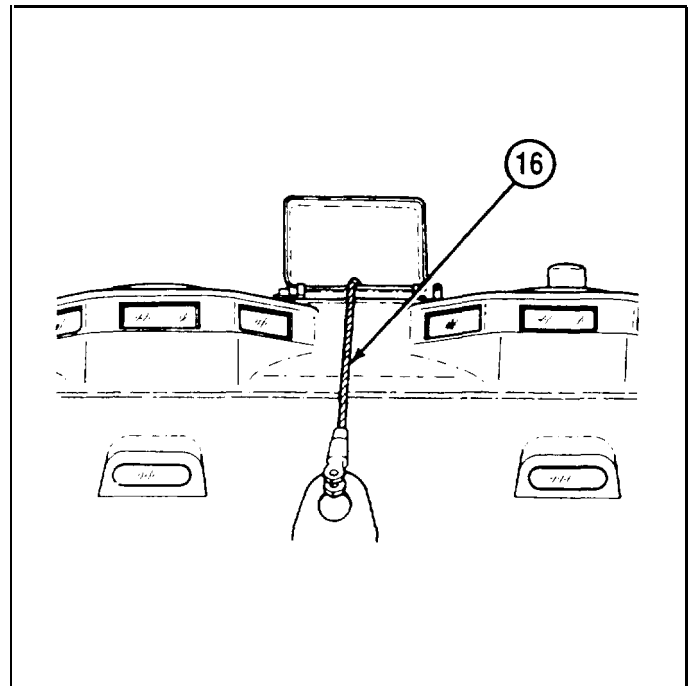


11 Hoist winch cable.

WARNING

Never handle cable with bare hands. Broken or frayed wire strands can cause severe cuts. Always wear protective (leather) gloves when handling cable.

- a. Daily. If winch has been used, clean cable (16) and oil with OE.
- b. Quarterly. Unwind entire cable (16) and clean it; then oil cable with OE.
- c. Semiannually. If winch has not been used since last semiannual service, unwind and clean entire cable (16). Brush soak with OE and wipe to remove excess oil. Coat and drain cable with CW before rewinding cable.

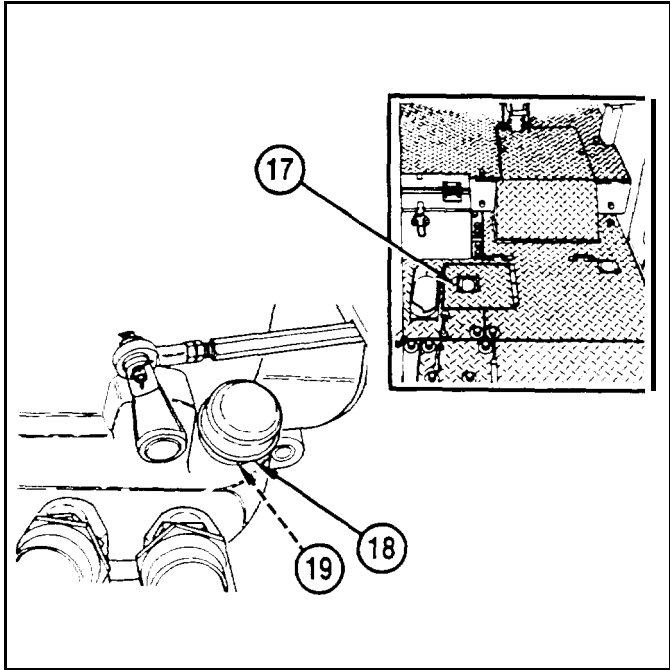


J-5 LUBRICATION INSTRUCTIONS-Continued

b. SERVICE FROM CREW COMPARTMENT-Continued

12 Breather cap-hoist winch gear case.

- a. Open access door (17).
- b. Remove breather cap (18) and clean it with dry-cleaning solvent (SD-2) (Appendix D, item 9).
- c. Install breather cap (18).
- d. Close access door (17).

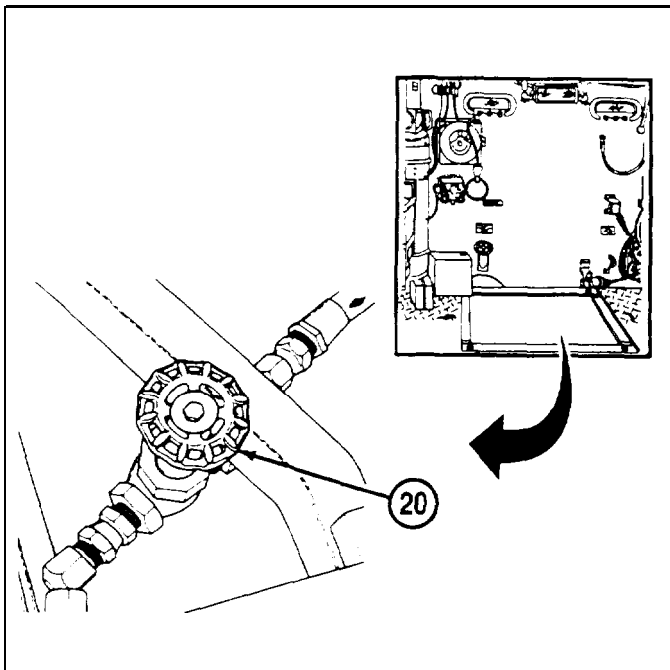


13 Hoist winch gear case fill and level.

- a. Open access door (17).
- b. Remove bayonet gage (19) and check to see that oil level is not below ADD mark on the gage rod. If necessary, add GO (see Table J-1) up to FULL mark.
- c. Close access door (17).

14 Mechanical transmission drain.

- a. Remove subfloor plate (see paragraph 9-12).
- b. Drain oil from mechanical transmission semiannually or every 1500 miles. Start main engine to operate transmission until warm. Shut down engine and open hull drain valve (20).
- c. Open mechanical transmission and oil cooler drain valve. After oil has drained, close mechanical transmission and oil cooler drain valve, and close hull drain valves.
- d. Fill mechanical transmission (see paragraph J-5b21).
- e. Install subfloor plate (see paragraph 9-13).



15 Main winch gear case dram.

- a. Open access cover (17).
- b. Operate main winch to warm oil to operating temperature. Shut down all systems.
- c. Open hull dram valves (21) and open main winch drain valve. After draining, close main winch dram valve and hull drain valves.
- d. Refill main winch (see paragraph J-5b7) with oil (see Table J-1).
- e. Close access cover (17).

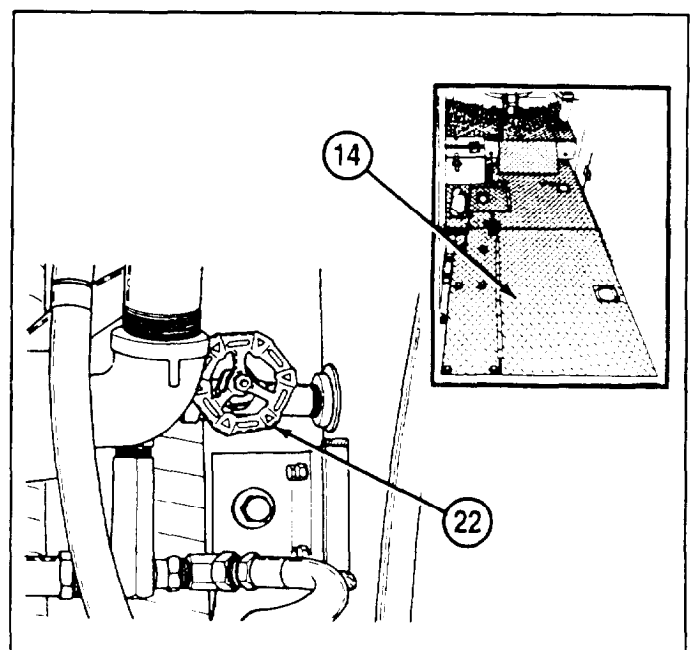
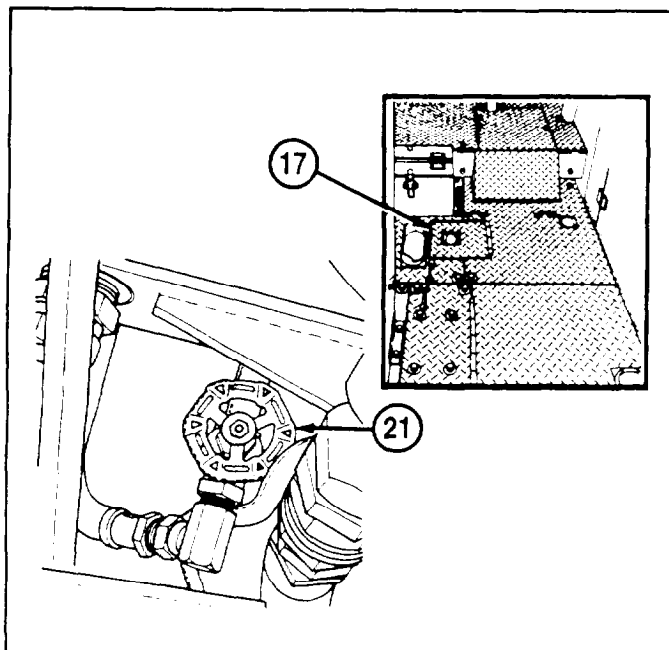
16 Hydraulic reservoir drain.

- a. Open access door (14).
- b. Before draining hydraulic system, warm hydraulic fluid by idling main engine at 675 rpm for 5 minutes with main hydraulic pump engaged and all hydraulic levers in neutral.
- c. Shut down engine and open hull drain valves. Open hydraulic reservoir dram valve (13). After reservoir is drained, close hydraulic reservoir drain valve and hull drain valves.
- d. Refill reservoir (see paragraph J-5b17).

NOTE

Each time hydraulic oil is changed, hydraulic reservoir filter should be serviced (see paragraph J-5b18).

- e. Close access door (13).



J-5 LUBRICATION INSTRUCTIONS-Continued

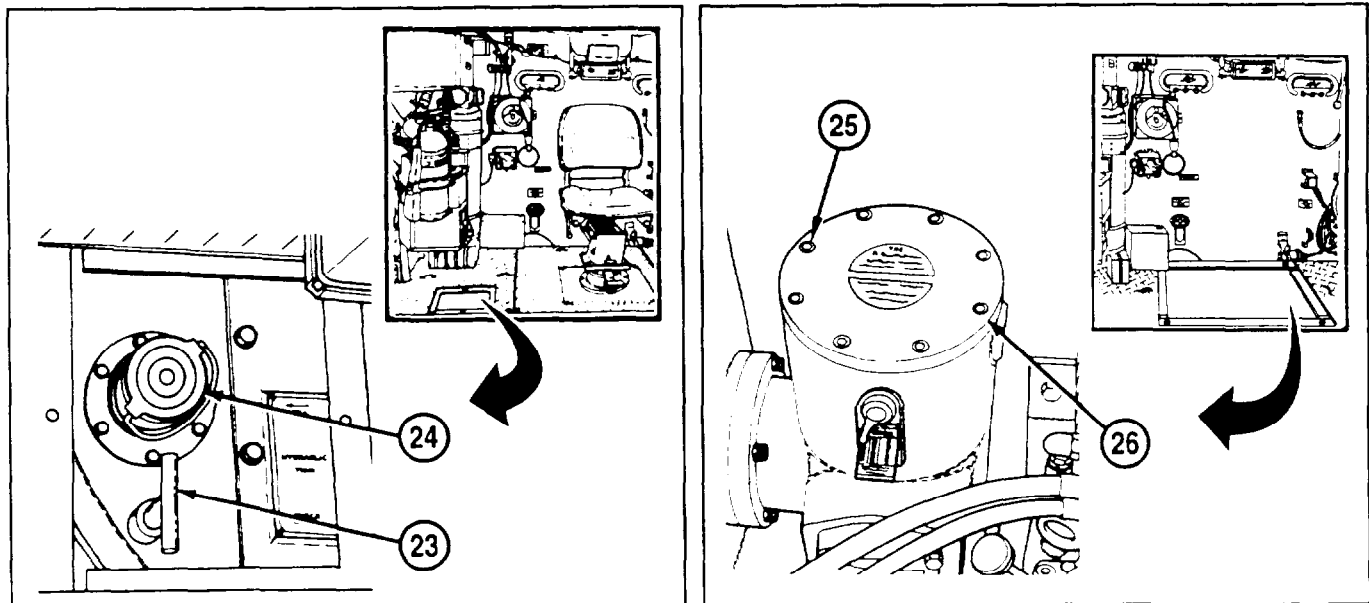
b. SERVICE FROM CREW COMPARTMENT-Continued

17 Hydraulic reservoir fill and level.

- a. Remove subfloor plate (see paragraph 9-10).
- b. Before operation, remove bayonet gage (23) and check that oil level in the reservoir measures up to the FULL mark. If necessary, remove fill cap (24) and add oil (see Table J-1) until oil level reaches FULL on bayonet gage.
- c. Install bayonet gage (23) and fill cap (24).
- d. Operate hydraulic system until hydraulic oil reaches operating temperature. Shut down all systems and check oil level again. Add oil, if necessary.
- e. Install subfloor plate (see paragraph 9-10).

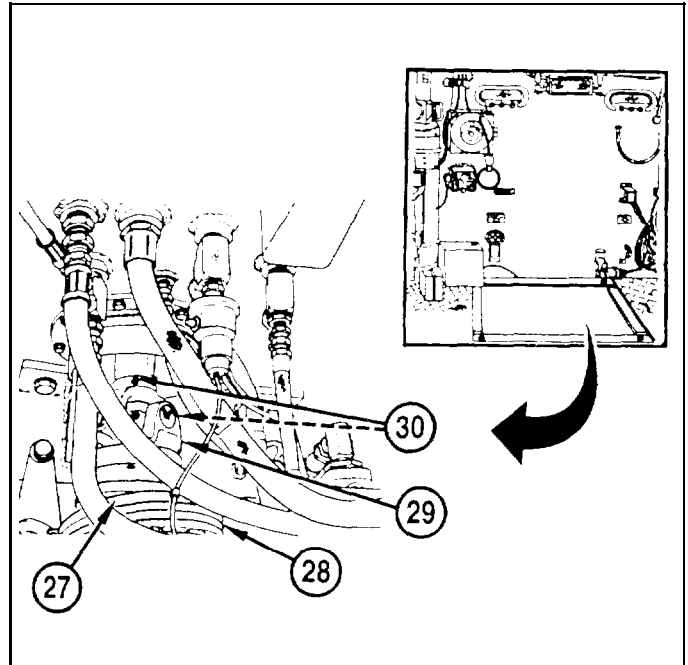
18 Hydraulic resevoir filter.

- a. Remove subfloor plate under rigger' s seat (see paragraph 9-12).
- b. Remove eight screws (25) in filter cover (26), and remove cover.
- c. Remove filter element (see paragraph 12-5) and clean it with dry-cleaning solvent (SD-2) (Appendix D, item 9); then dry with low-pressure compressed air.
- d. Remove two preformed gaskets from between cover and filter element. Discard used gaskets and install new gaskets (see paragraph 12-5).
- e. Install filter element (see paragraph 12-5), filter cover (26), and eight attaching screws (25).
- f. Operate hydraulic system and check for leaks. Shut down system and install subfloor plate (see paragraph 9-12).



19 Mechanical transmission shaft universal joint.

- a. Remove subfloor plate (see paragraph 9-13)
- b. Loosen clamp (27) and pull boot (28) out of way.
- c. Rotate joint (29) as necessary to obtain access to two grease fittings (30).
- d. Lubricate with GAA through fittings (30)
- e. Reposition boot and install subfloor plate (see paragraph 9-12).

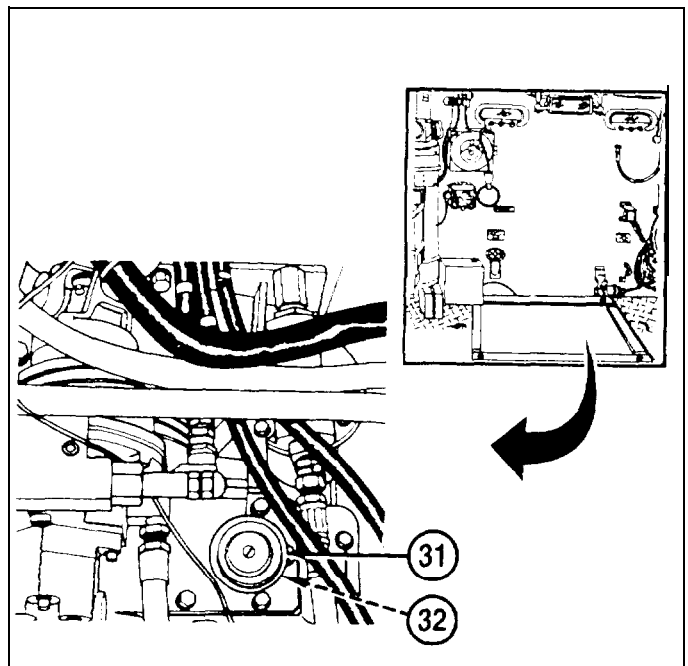


20 Breather cap-mechanical transmission

- a. Remove subfloor plate (see paragraph 9-13).
- b. Remove breather cap (31) and clean it with dry-cleaning solvent (SD-2) (Appendix D, item 9).
- c. install cap (31).
- d. Install subfloor plate (see paragraph 9-12).

21 Mechanical transmission fill and level.

- a. Remove subfloor plate (see paragraph 9-12)
- b. Before operation, remove cap (31) and bayonet gage (32).
- c. Check that oil level is to the FULL mark on gage. If necessary, fill mechanical transmission with oil (see Table J-1) until FULL mark is reached.
- d. Start main engine to operate mechanical transmission for a few minutes. Stop engine and check oil level again. Add oil, if necessary.
- e. Install subfloor plate (see paragraph 9-12)

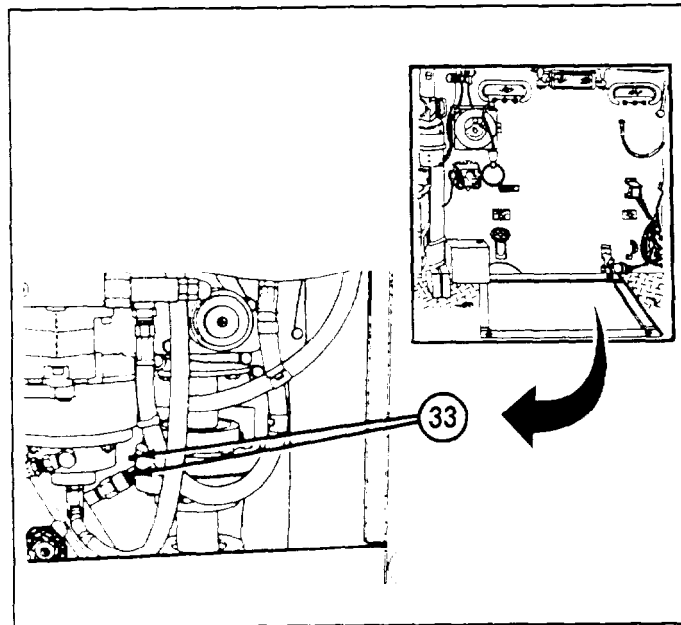


J 5 LUBRICATION INSTRUCTIONS-Continued

b. SERVICE FROM CREW COMPARTMENT-Continued

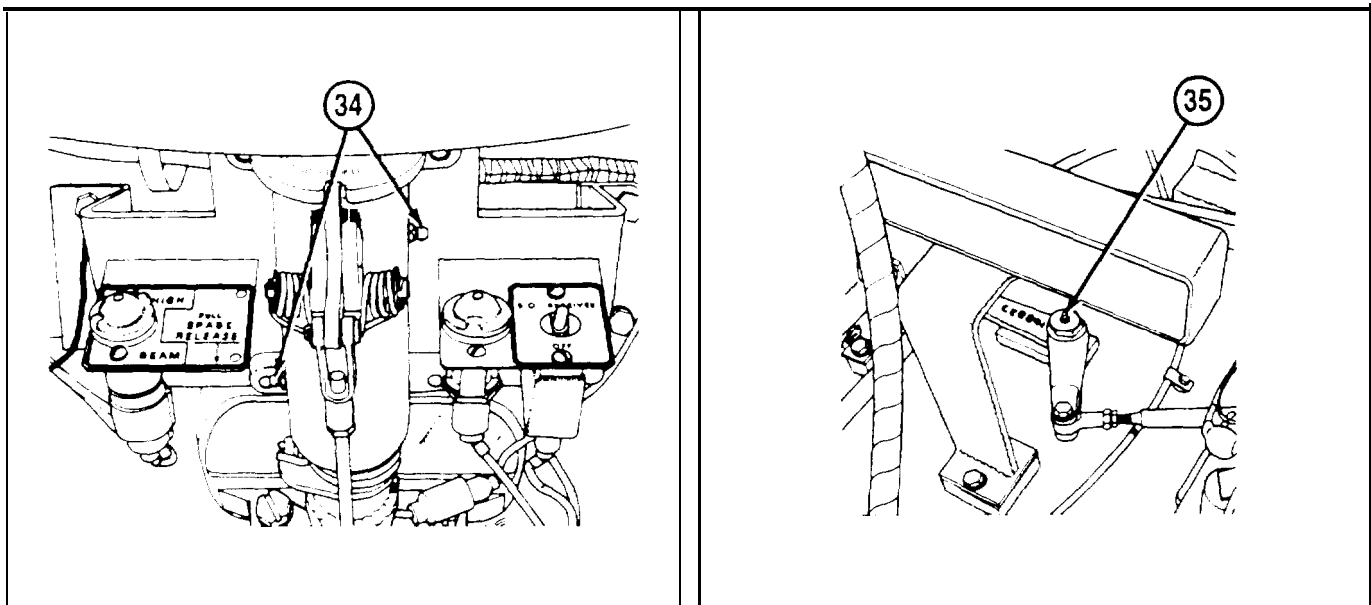
22 Mechanical transmission and hydraulic pump shaft coupling

- a. Remove subfloor plate (see paragraph 9-12).
- b. Lubricate with GAA through two fillings (33).
- c. Install subfloor plate (see paragraph 9-12).



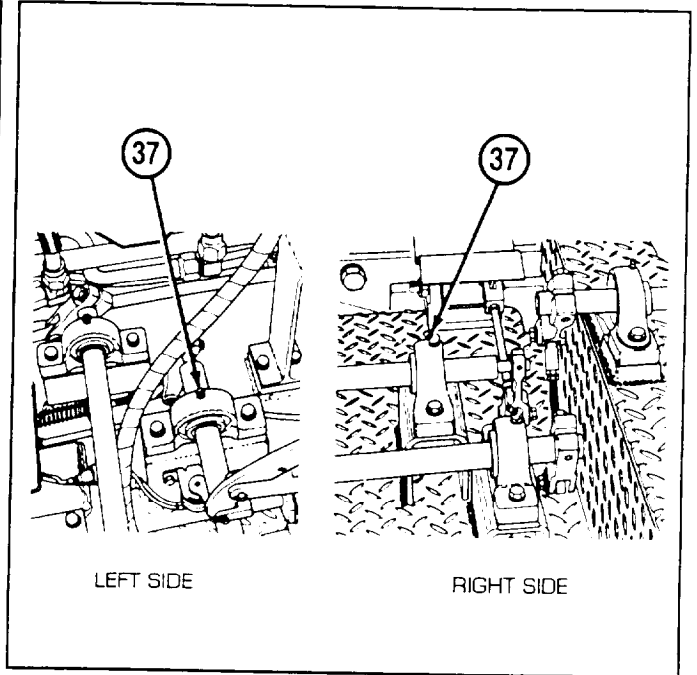
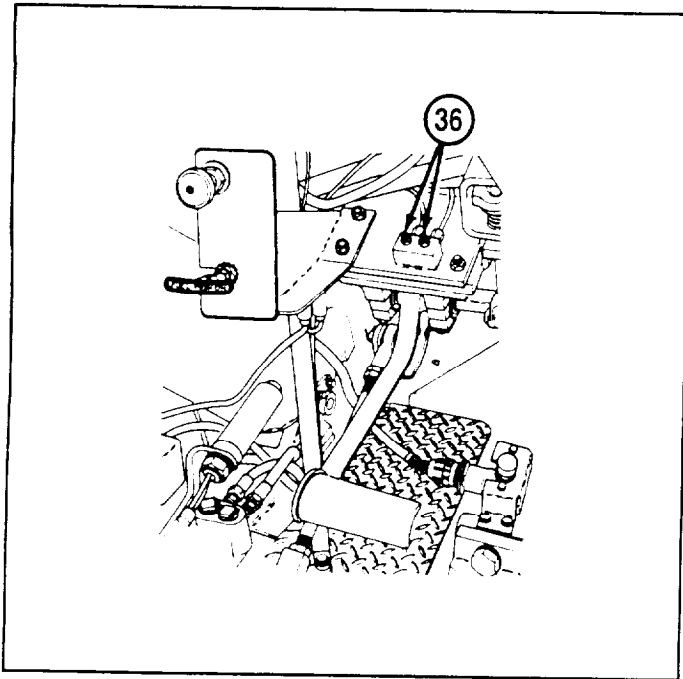
2 3 Steering control assembly. Lubricate with through two fittings (34)

2 4 Steering linkage bell crank assembly. Lubricate with GAA through fitting (35)



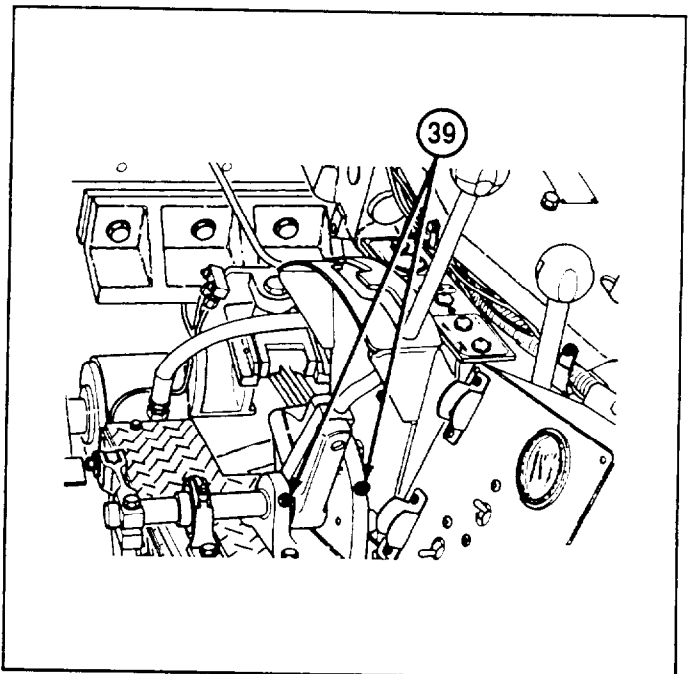
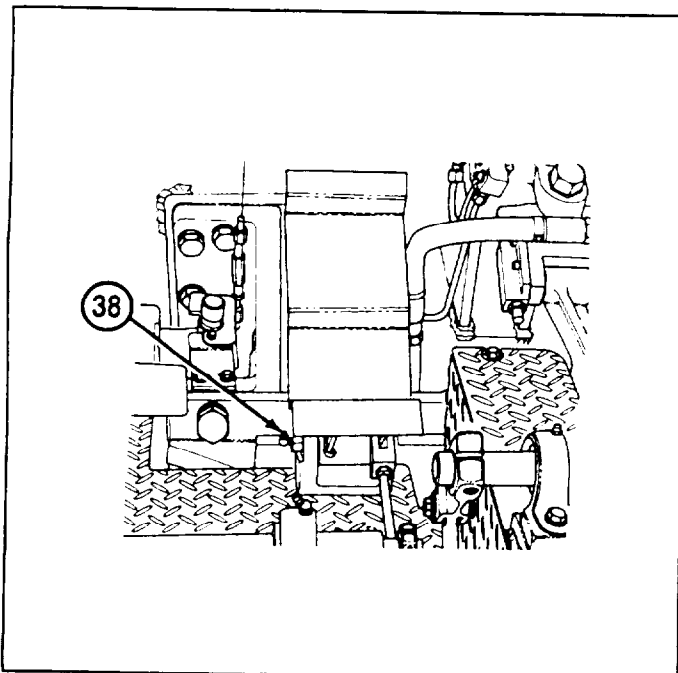
25 Steering linkage. Lubricate with GAA through two fittings (36).

26 Accelerator linkage pillow block. Lubricate with GAA through two fittings (37)



27 Accelerator pedal assembly. Lubricate with GAA through fitting (38).

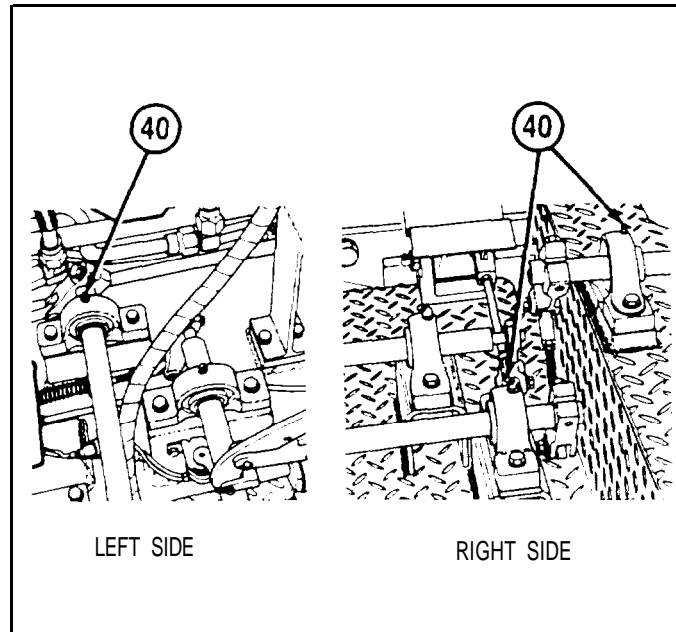
28 Shifting control assembly. Lubricate with GAA through two fittings (39).



J-5 LUBRICATION INSTRUCTIONS-Continued

b. SERVICE FROM CREW COMPARTMENT-Continued

29 Shifting linkage pillow block. Lubricate with GAA through three fittings (40).

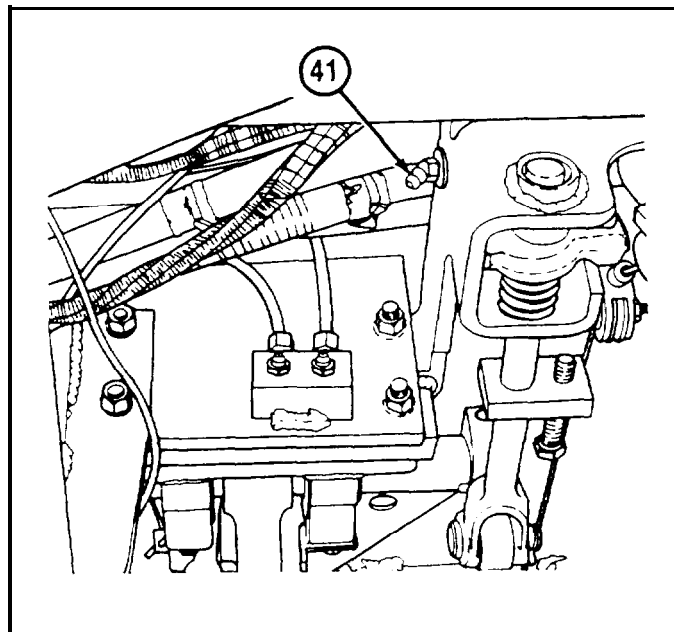


30 Service brake shaft.

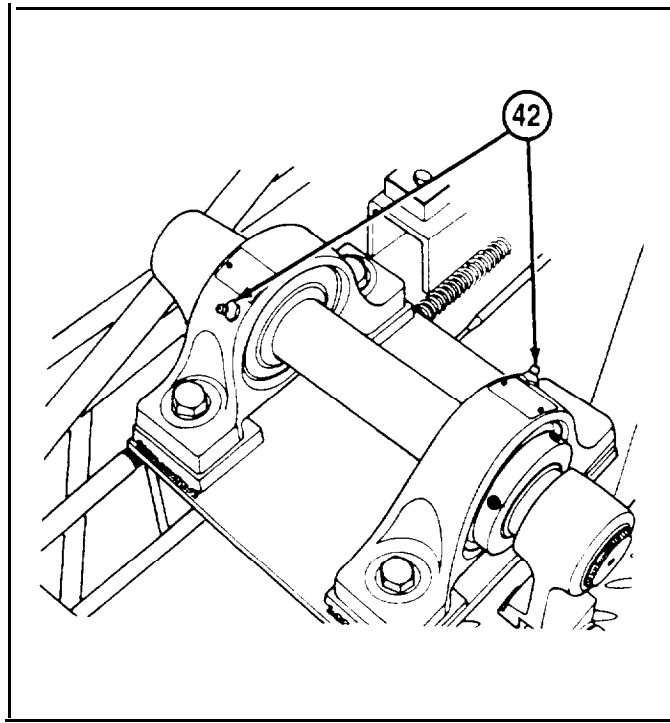
NOTE

There is one fitting at each end of shaft.

Lubricate with GAA through two fittings (41).

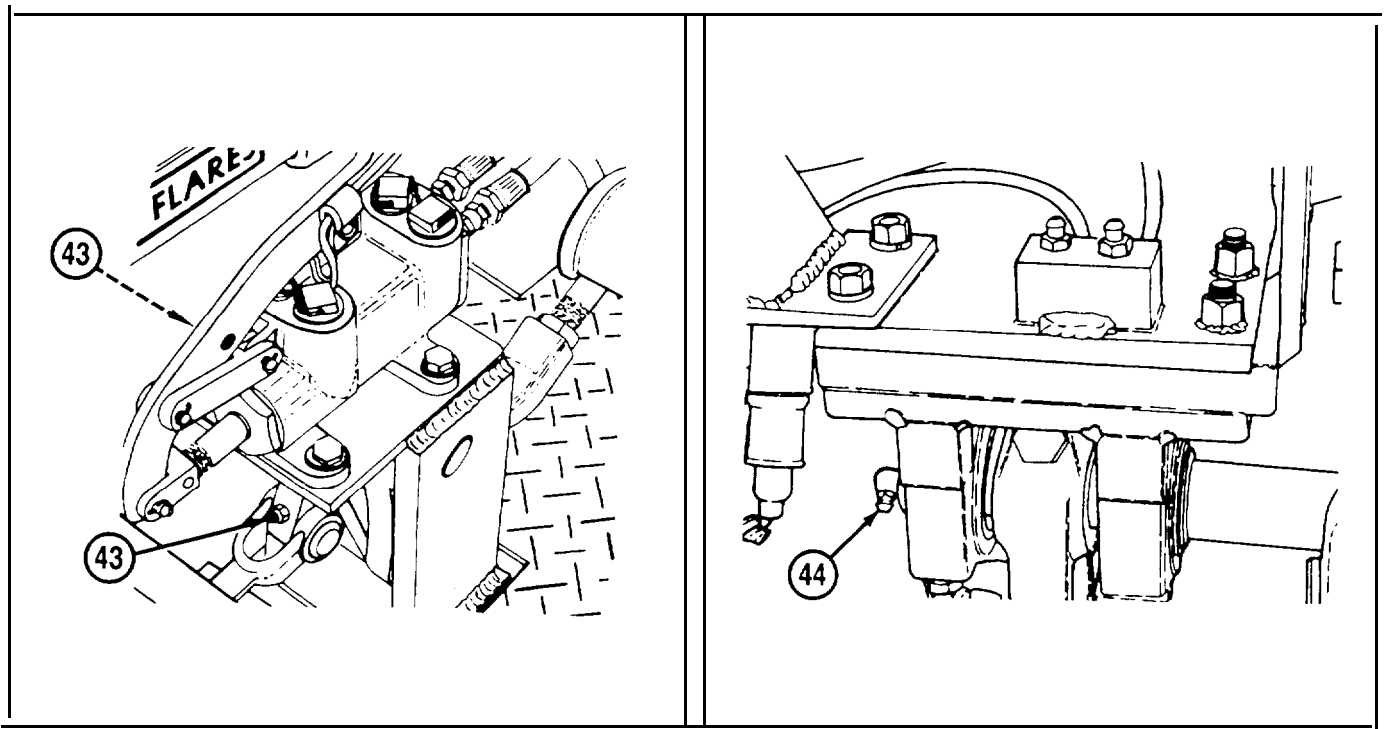


31 Service brake linkage pillow block. Lubricate with GAA through two fittings (42)



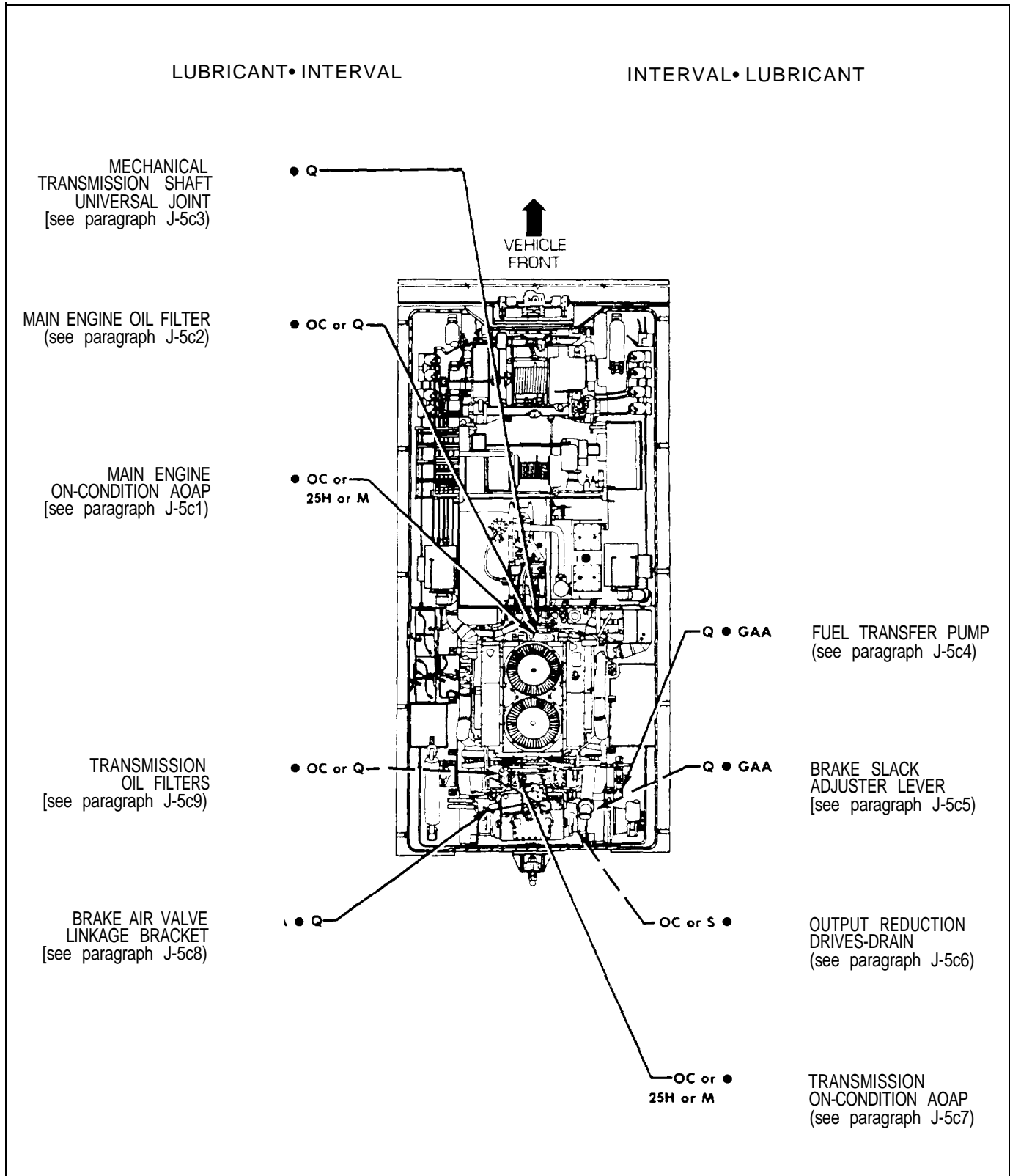
32 Service brake linkage. Lubricate with GAA through fitting (43).

33 Service brake pedal. Lubricate with GAA through fitting (44).



J-5 LUBRICATION INSTRUCTIONS--Continued

c. SERVICE FROM ENGINE COMPARTMENT



LUBRICANT • INTERVAL

INTERVAL • LUBRICANT

ACCELERATOR LINKAGE
BELL CRANK
[see paragraph J-5c10]

ACCELERATOR LINKAGE
PILLOW BLOCK
[see paragraph J-5c10]

SERVICE BRAKE
LINKAGE LEVER
[see paragraph J-5c15]

SERVICE BRAKE
LINKAGE SHAFT
[see paragraph J-5c14]

SERVICE BRAKE
LINKAGE BELL CRANK
[see paragraph J-5c13]

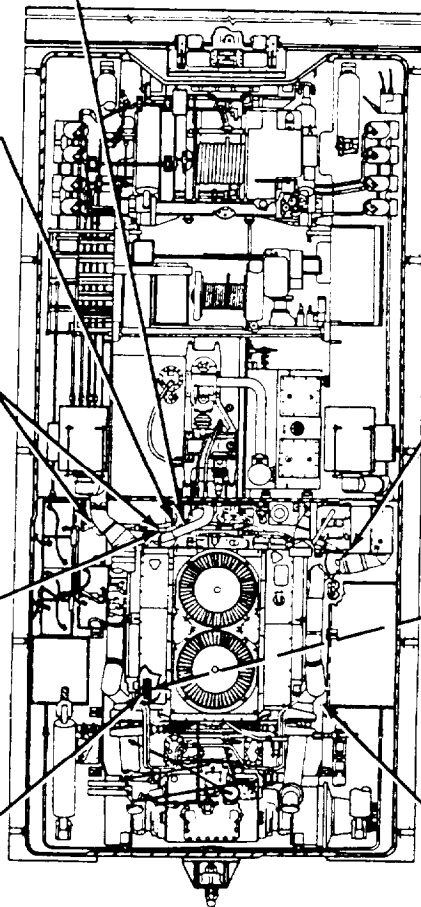
GAA • Q

GAA • Q

GAA • Q

GAA • Q

GAA • Q



Q •

Q • GAA

Q • GAA

AUXILIARY POWER UNIT
ENGINE FILTER
[see paragraph J-5c11]

SERVICE BRAKE LINKAGE
PILLOW BLOCK
[see paragraph J-5c13]

SERVICE BRAKE
LINKAGE SHAFT
[see paragraph J-5c12]

J-5 LUBRICATION INSTRUCTIONS-Continued

c. SERVICE FROM ENGINE COMPARTMENT-Continued

LUBRICANT • INTERVAL

INTERVAL • LUBRICANT

VEHICLE
FRONT

SHIFTING LINKAGE
BELL CRANK
(see paragraph J-5c16)

GAA • Q

STEERING LINKAGE
BELL CRANK
(see paragraph J-5c18)

GAA • Q

SHIFTING LINKAGE
BELL CRANK
(see paragraph J-5c16)

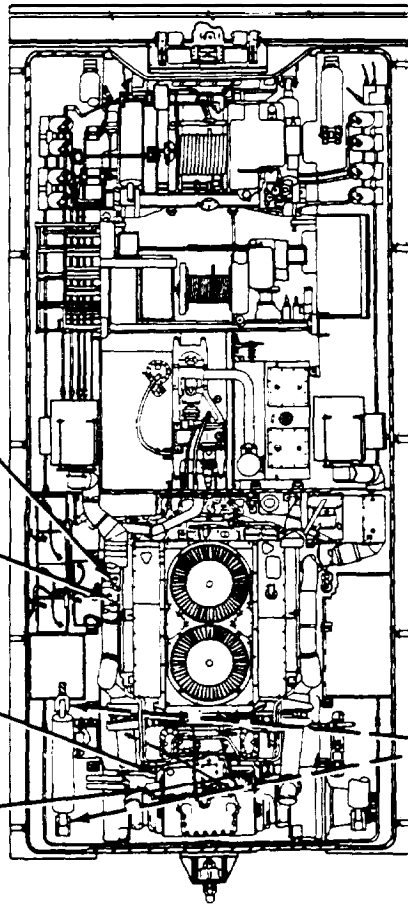
GAA • Q

STEERING LINKAGE
BELL CRANK
(see paragraph J-5c18)

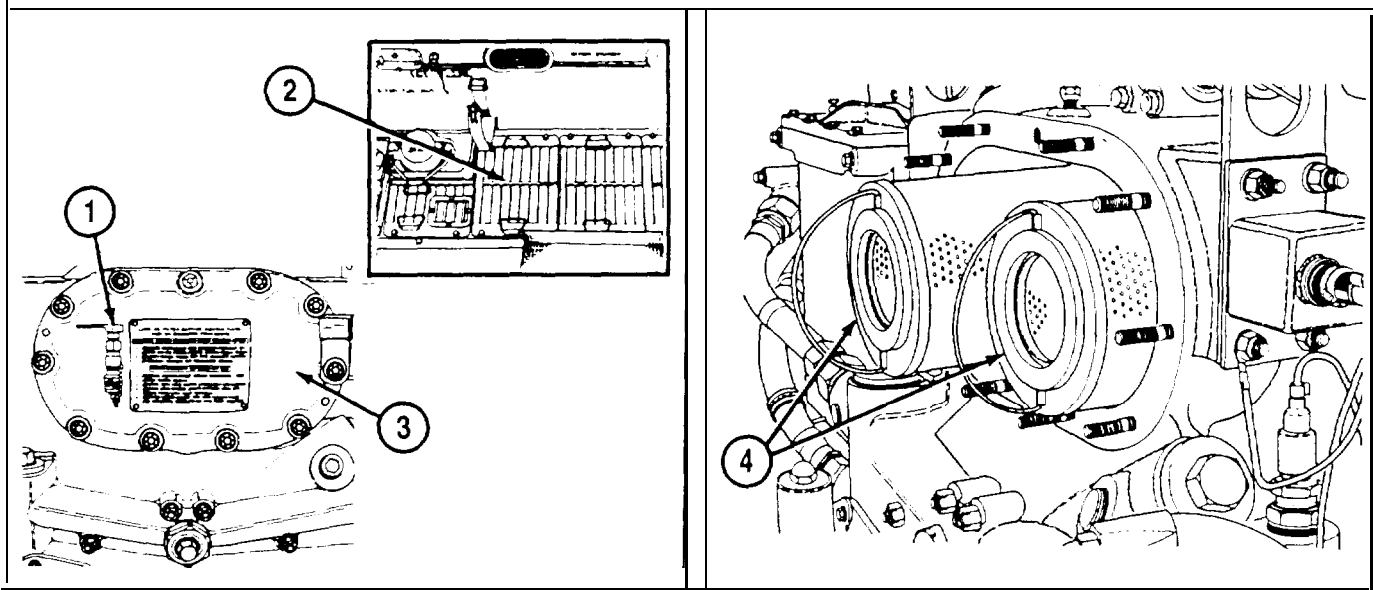
GAA • Q

Q • GAA

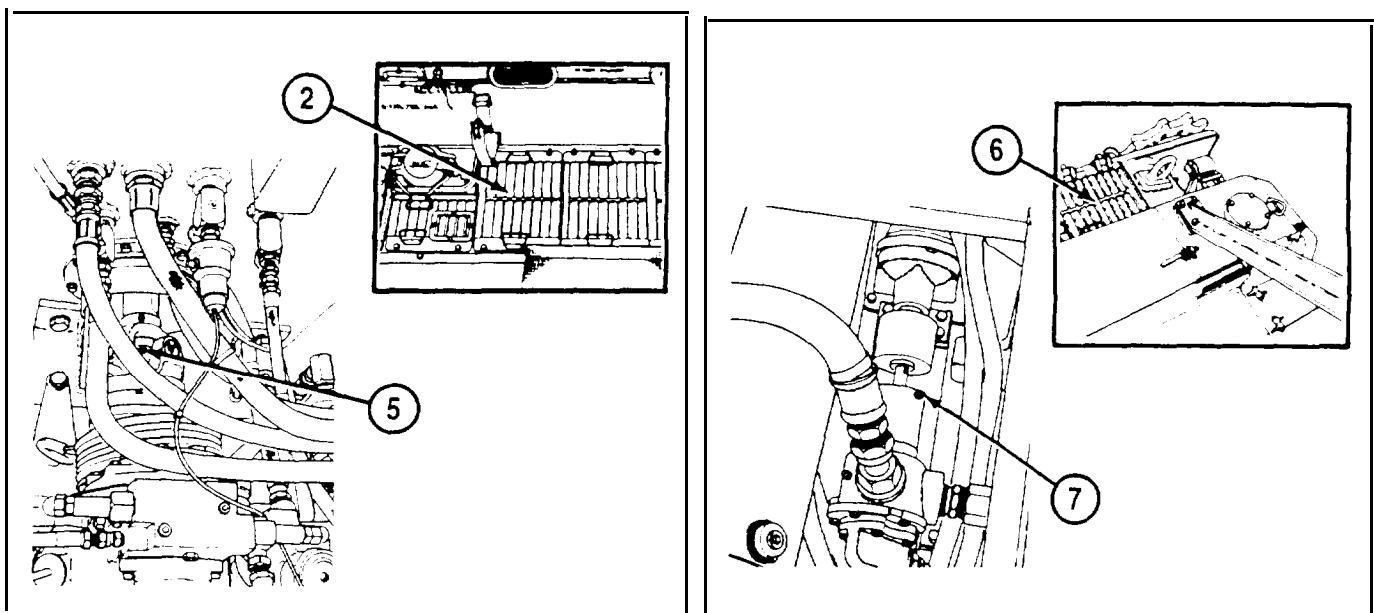
REAR BOOM LEVER
CYLINDER PINS
(see paragraph J-5c17)



- 1 AOAP-main engine. For active units, obtain oil samples from engine (1) every 25 hours of operation or 30 days (whichever comes first). Send these samples to nearest AOAP laboratory. Refer to TB C-0310 for sampling instructions. If or when AOAP laboratory support is unavailable, hard-time intervals will apply.
- 2 Main engine oil filter.
 - a. Remote front engine deck grille (2).
 - b. Remove oil filter cover (3) (see paragraph 3-6) and remove elements (4). Discard removed elements and install new elements.
 - c. Install oil filter cover (3) (see paragraph 3-6) and front engine deck grille (3).



- 3 Mechanical transmission shaft universal joint. Remove front engine deck grille (2) and lubricate universal joint with GAA through fitting (5). Install front engine deck grille.
- 4 Fuel transfer pump. Raise engine grille doors (6) and lubricate with GAA through fitting (7). Lower engine grille door.

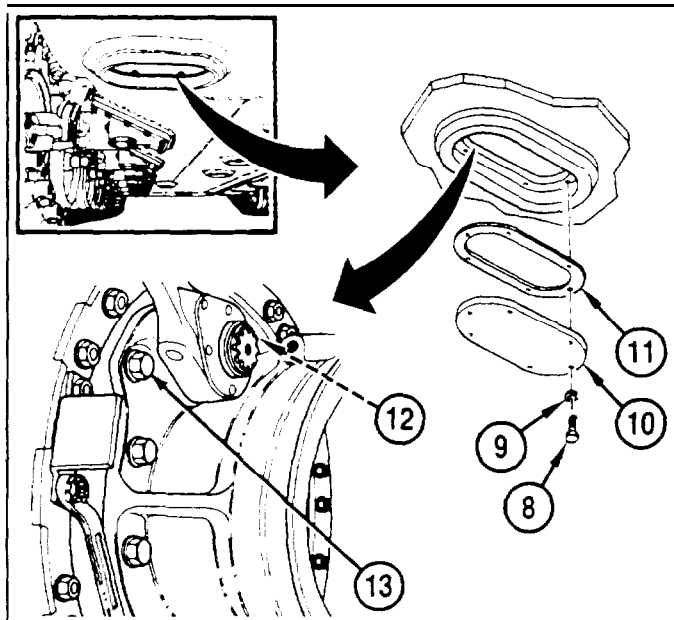


J-5 LUBRICATION INSTRUCTIONS-Continued

c. SERVICE FROM ENGINE COMPARTMENT-Continued

5 Brake slack adjuster lever.

- a. Reemove six screws (8) and six lockwashers (9) which secure brake adjustment access cover (10) to bottom of hull.
- b. Remove access cover (10) and gasket (11).
- c. Lubricate brake slack adjuster lever with GAA through fitting (12).
- d. Install gasket (11), access cover (10), six screws (8), and lockwashers (9). Repeat procedure for other side of vehicle.



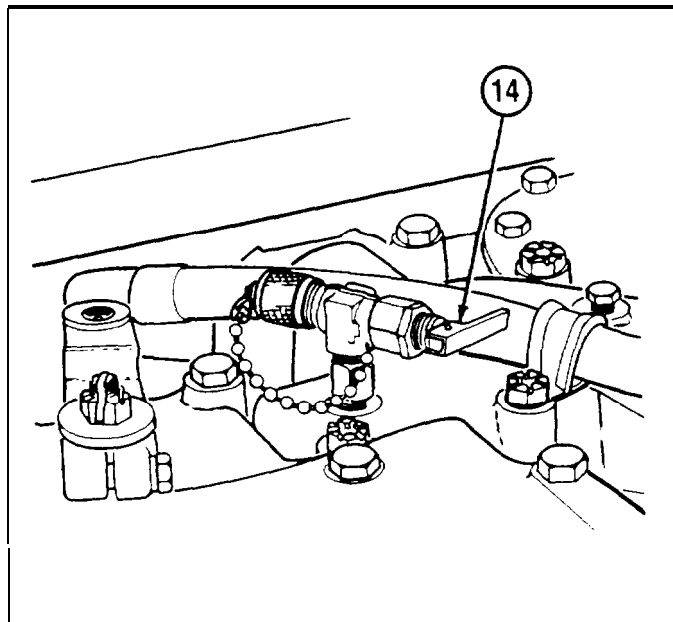
6 Output reduction drives drain

NOTE

Each time transmission is drained, approximately five gallons of oil remain in each output reduction assembly. Drain oil each time transmission is flushed.

- a. Remove six screws (8) and six lockwashers (9) which secure brake adjustment access cover to bottom of hull.
- b. Remove access cover (10) and gasket (11). Remove bolt (13) located at bottom centerline of saddle mounting face (this is the same bolt that secures end of brake stop to assembly). After oil has drained, install bolt.
- c. Install gasket (11), access cover (10), six screws (8), and lockwashers (9). Repeat procedure for other side of vehicle.

- 7 AOAP-transmission. For active units, obtain oil samples from transmission (14) every 25 hours of operation or 30 days (whichever comes first). Send these samples to the nearest AOAP laboratory. Refer to TB 43-0210 for sampling instructions. If or when AOAP laboratory support is unavailable, hard-time intervals will apply.

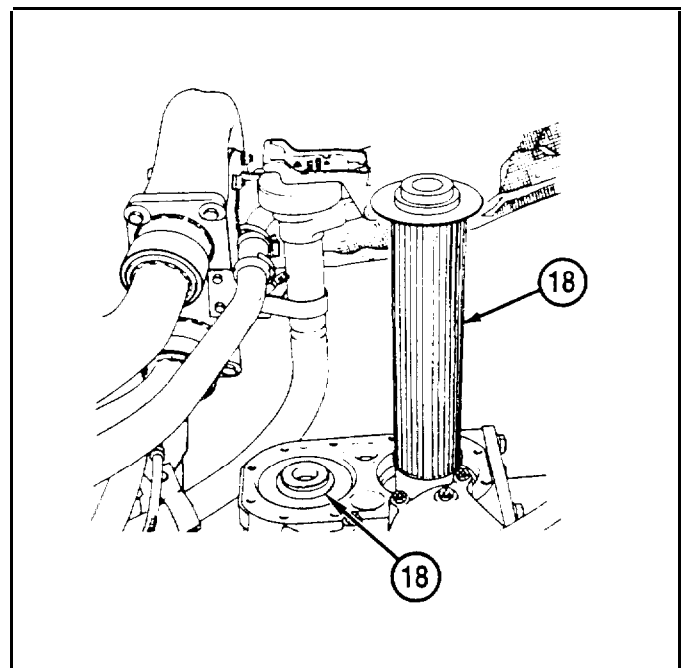
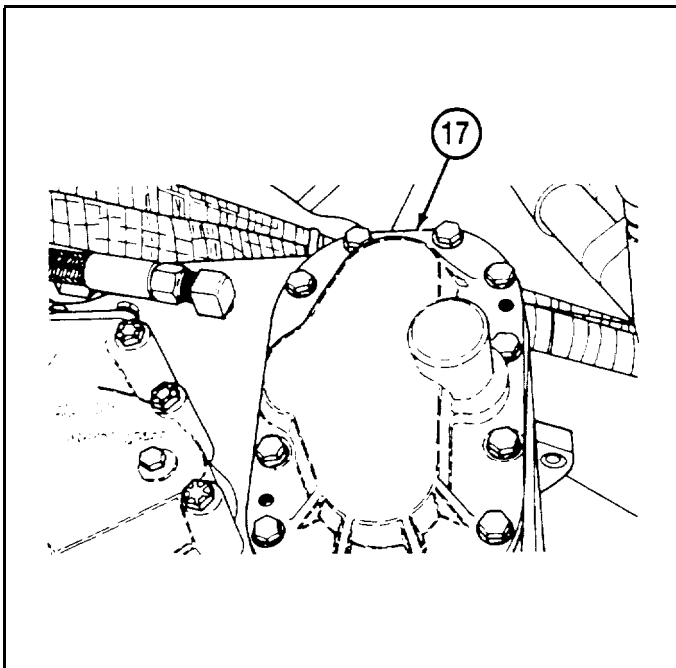
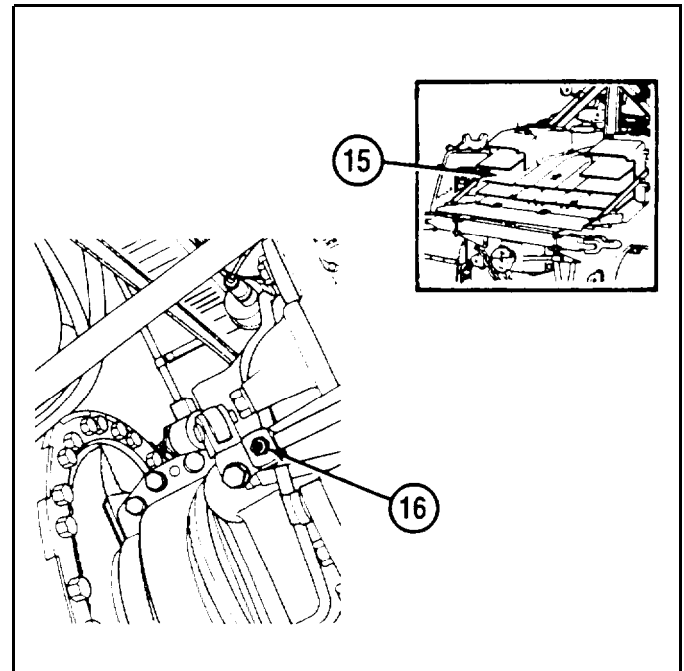


- 8 Brake air valve linkage bracket.
 - a. Open rear engine deck grille exhaust deflector and grille (15).
 - b. Lubricate linkage with GAA through fitting (16).
 - c. Close rear engine deck grille exhaust deflector and grille (15).
- 9 Transmission oil filters.

NOTE

There is only one cover plate on each side of transmission.

- a. Open rear engine deck grille exhaust deflector and grille (15). Remove left and right cover plates (17) (see paragraph 7-2) and remove four elements (18) (two under each plate).
- b. Clean elements (18) and covers (17) with dry-cleaning solvent (SD-2) (Appendix D, item 9).
- c. Install elements (18) and install left and right covers (17) (see paragraph 7-2). Close rear engine deck grille exhaust deflector and grille (15).



J-5 LUBRICATION INSTRUCTIONS-Continued

c. SERVICE FROM ENGINE COMPARTMENT-Continued

- 10 Accelerator linkage bell crank and pillow block. Each time engine is removed, lubricate with GAA through bell crank fitting (19) and two pillow block fittings (20).
- 11 Auxiliary Power Unit (APU) engine oil filter.

WARNING

APU! engine is hot after operation. Use caution when reaching into APU compartment.

NOTE

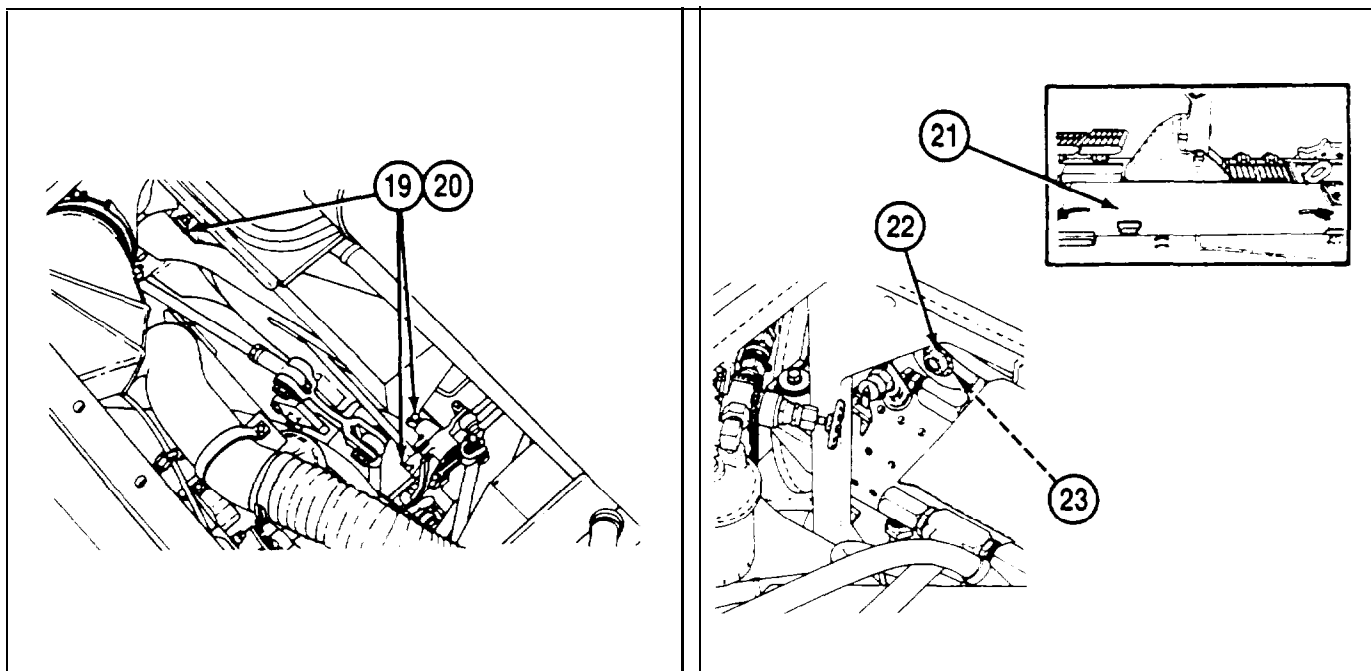
Oil filter should be changed each time the APU engine crankcase oil is changed. Filter should be replaced more frequently when operating in extremely dusty environments.

- a. Open right front engine grille door (21).
- b. Remove oil filter (22) with a wrench, and discard filter.
- c. Lightly lubricate gasket (23) of replacement filter and tighten it until gasket contacts base; then tighten filter (32) an additional one-half turn.

NOTE

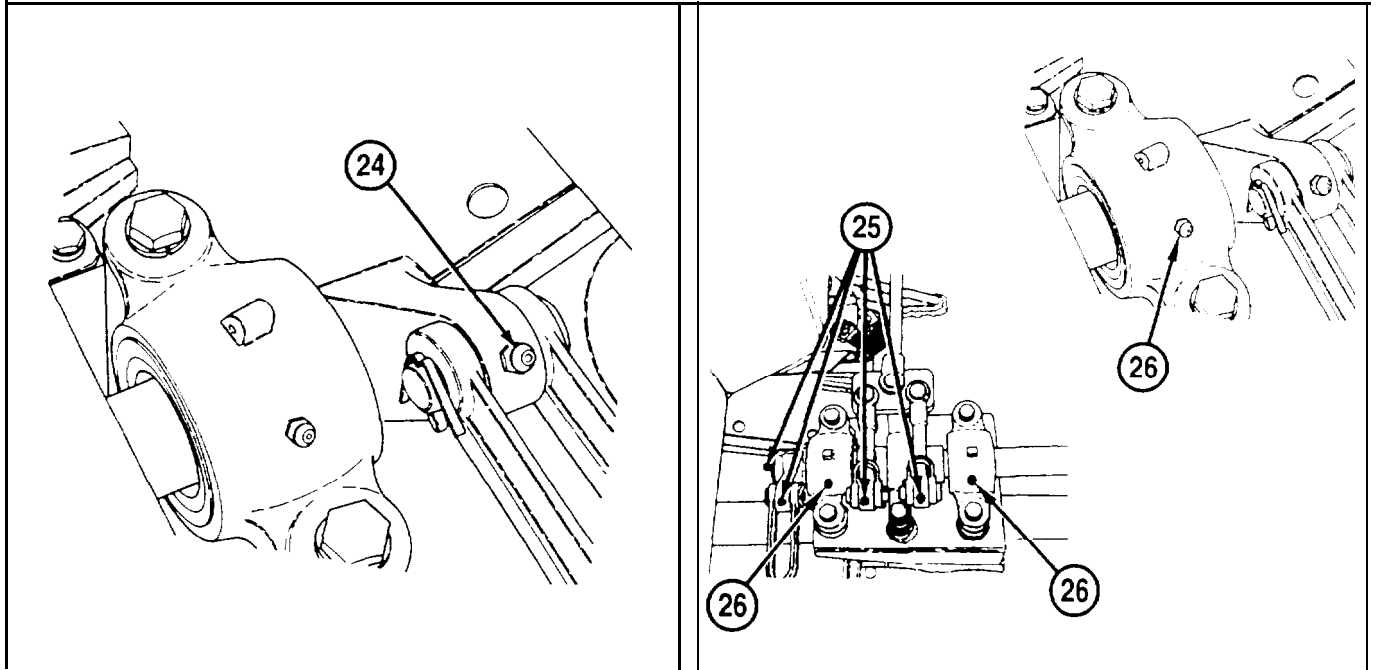
Do not overtighten filter.

- d. Start APC engine (refer to TM 9-2350-256-10) and check for oil leaks around filter gasket (23). Tighten filter (23) as necessary if leakage occurs.
- e. Close right front engine grille door (21).



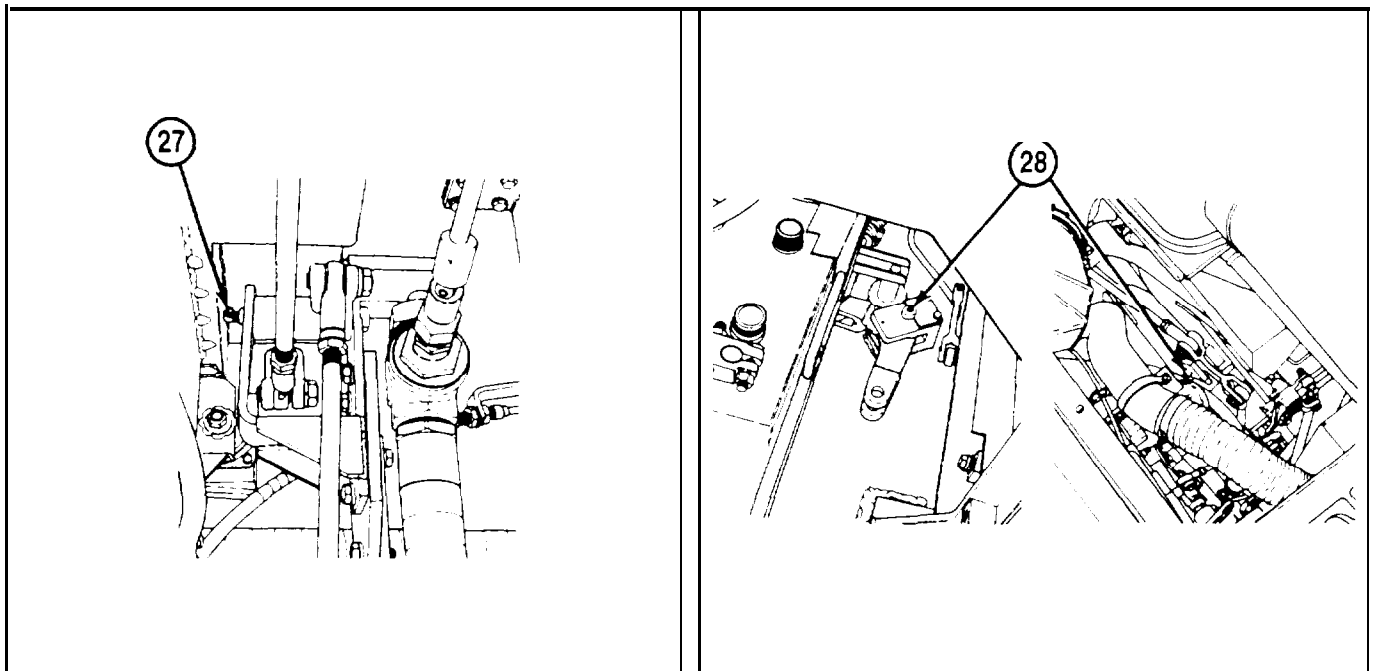
12 Service brake linkage shaft. Each time main engine is removed, lubricate with GAA through fitting (24).

13 Service brake linkage bell crank and pillow blocks. Each time main engine is removed, lubricate bell cranks through four fittings (25) and lubricate pillow blocks through three fittings (26). Use GAA as lubricant.



14 Service brake linkage shaft. Each time main engine is removed, lubricate shaft with GAA through fitting (27).

15 Service brake linkage lever. Each time main engine is removed, lubricate lever with GAA through two fittings (28)



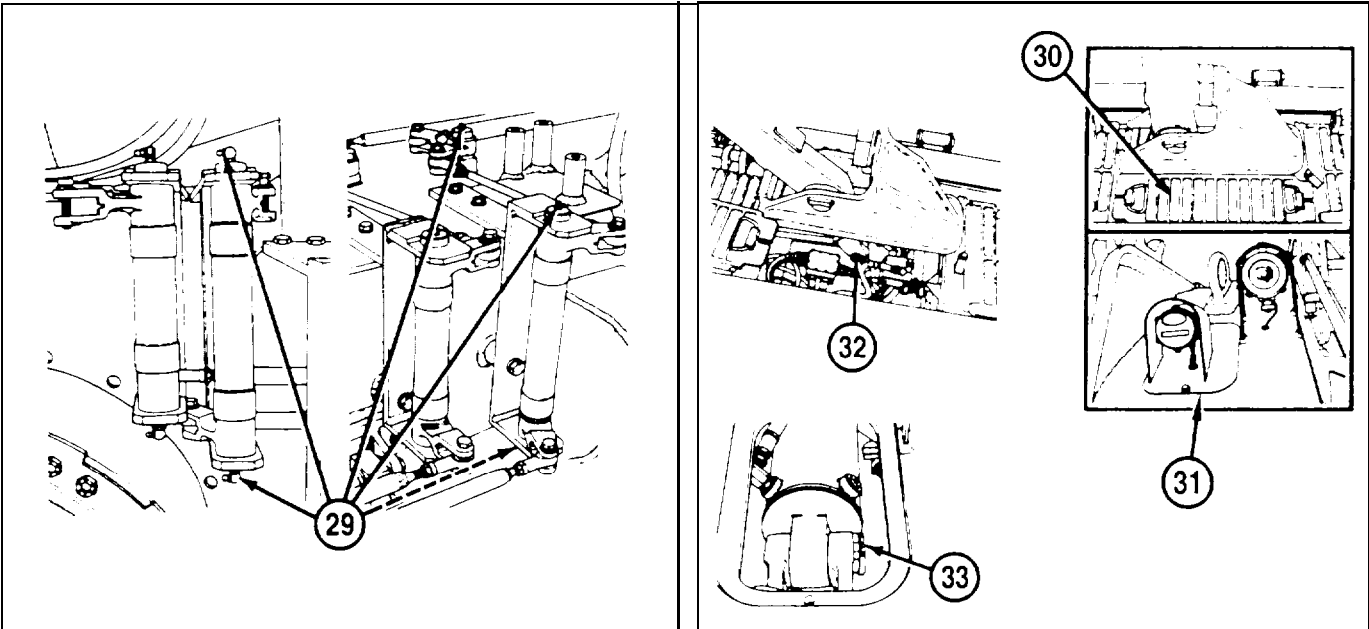
J-5 LUBRICATION INSTRUCTIONS-Continued

c. SERVICE FROM ENGINE COMPARTMENT-Continued

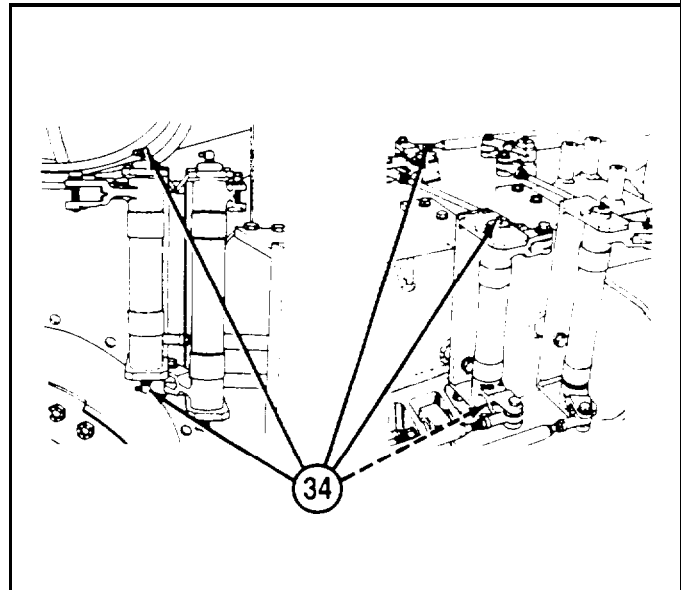
16 Shifting linkage bell crank. Each time main engine is removed, lubricate with GAA through five fittings (29)

17 Rear boom lever cylinder pins.

- a. Open engine grilles (30) and remove stoplight plate (31).
- b. Lubricate with GAA through front fittings (32) (accessible through grille) and rear fittings (33) (through stoplight access).
- c. Install stoplight plate (31) and close engine grilles (30).

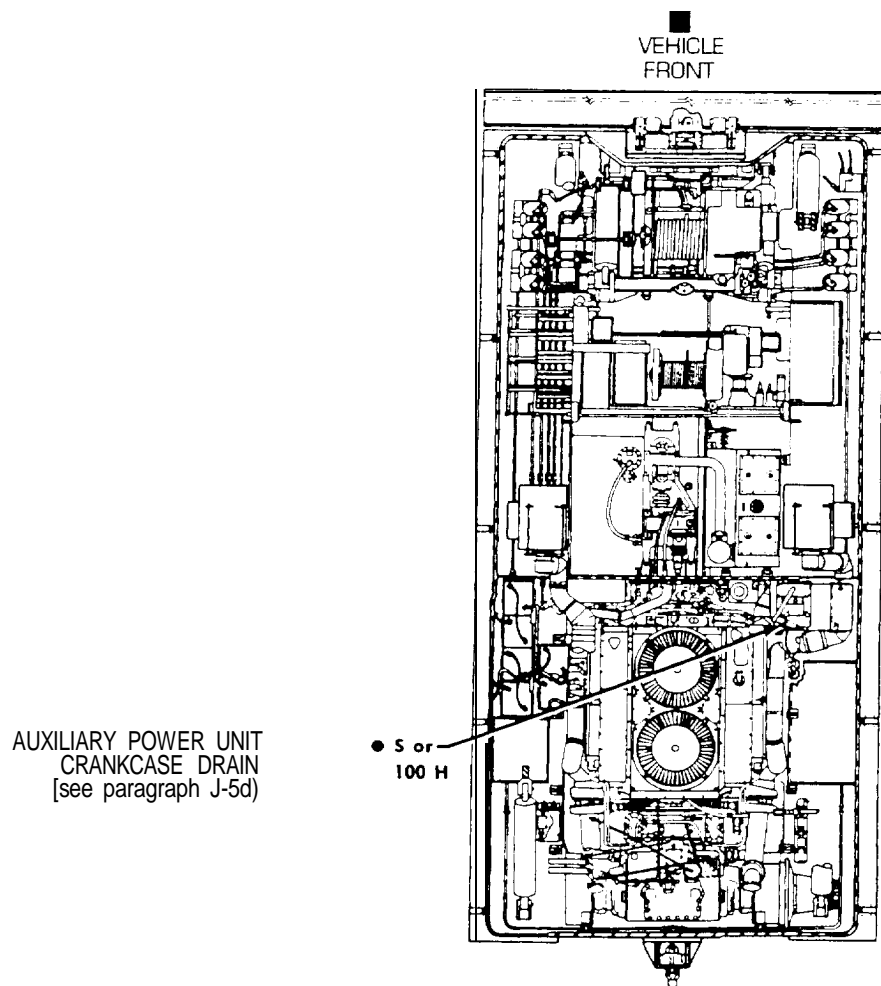


18 Steering linkage bell crank. Each time main engine is removed, lubricate with GAA through five fittings (34).



d. SERVICE FROM APU COMPARTMENT

LUBRICANT•INTERVAL



J-5 LUBRICATION INSTRUCTIONS-Continued

d. SERVICE FROM APU COMPARTMENT-Continued

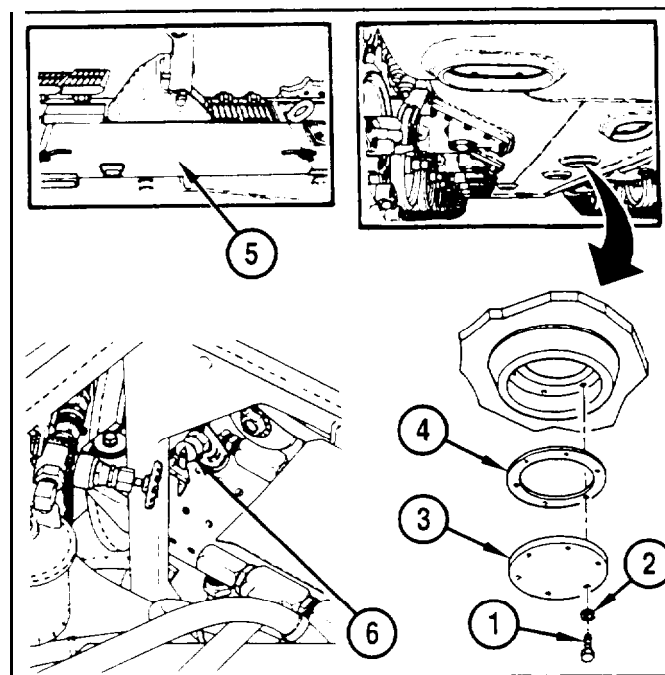
APU crankcase dram.

WARNING

APU engine is hot after operation. Use caution when reaching into APU compartment.

NOTE

- Drain oil only when hot after operation.
 - Coordinate any seasonal change of oil weight with this service.
- d. Remove six screws (1) and six lockwashers (2) which secure hull dram cover (3) to bottom of hull.
 - b. Remove dram plate (3) and gasket (4).
 - c. Open right front engine grille door (5).
 - d. Open APU crankcase drain valve (6). When oil has drained from crankcase, close drain valve.
 - e. Close right front engine grille door (5). Refill engine crankcase with proper grade of oil (see Table J-I).
 - f. Start APU engine (refer to TM 9-2350-256-10) and check for oil leaks past drain valve (indicated by oil dripping from dram hose). If oil leak is present, double check that drain valve handle is closed securely. Notify Direct Support Maintenance if leakage persists.
 - g. Install gasket (4) and engine drain cover (3) at bottom of hull and install six lockwashers (3) and screws (1).



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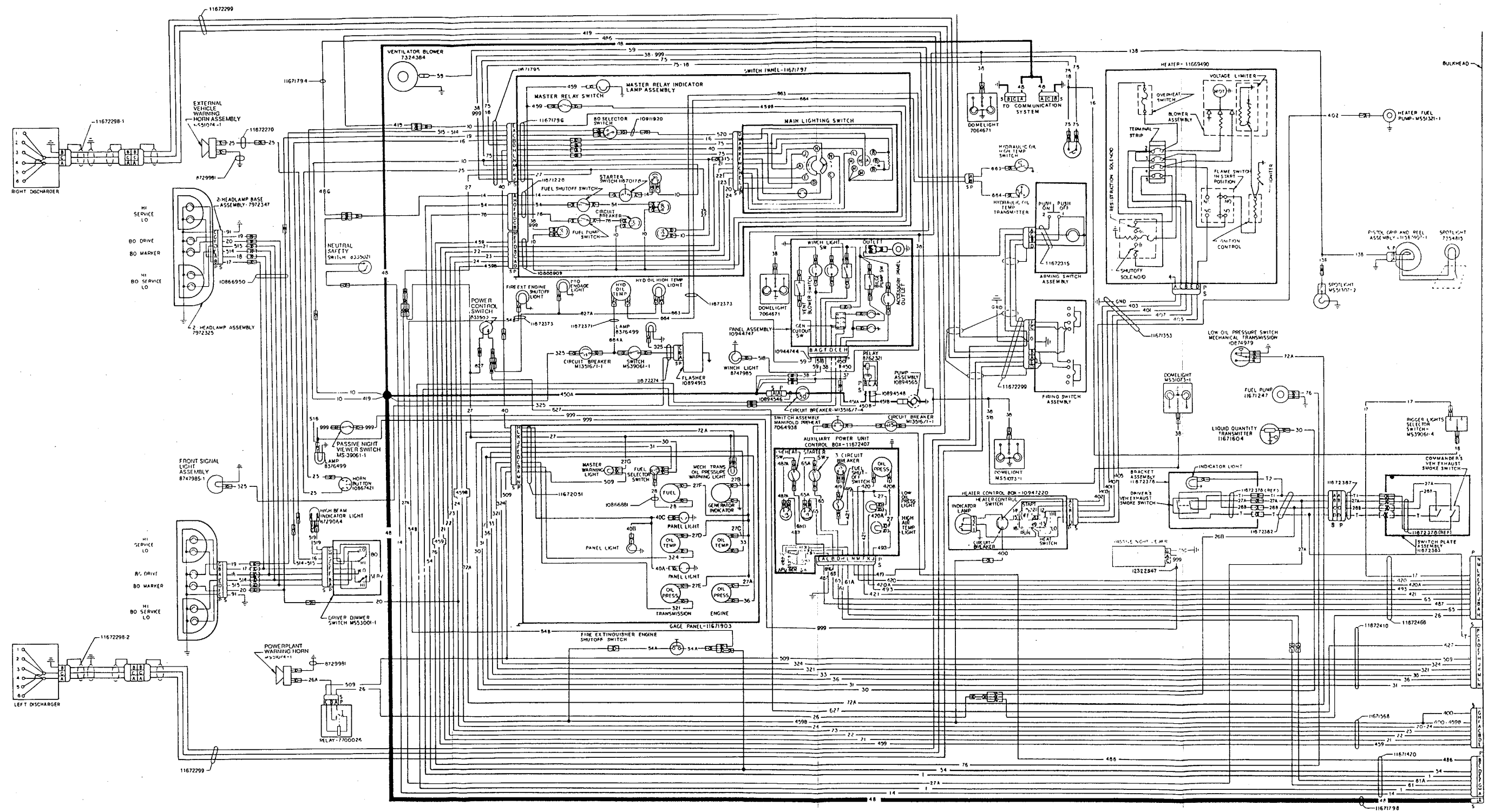
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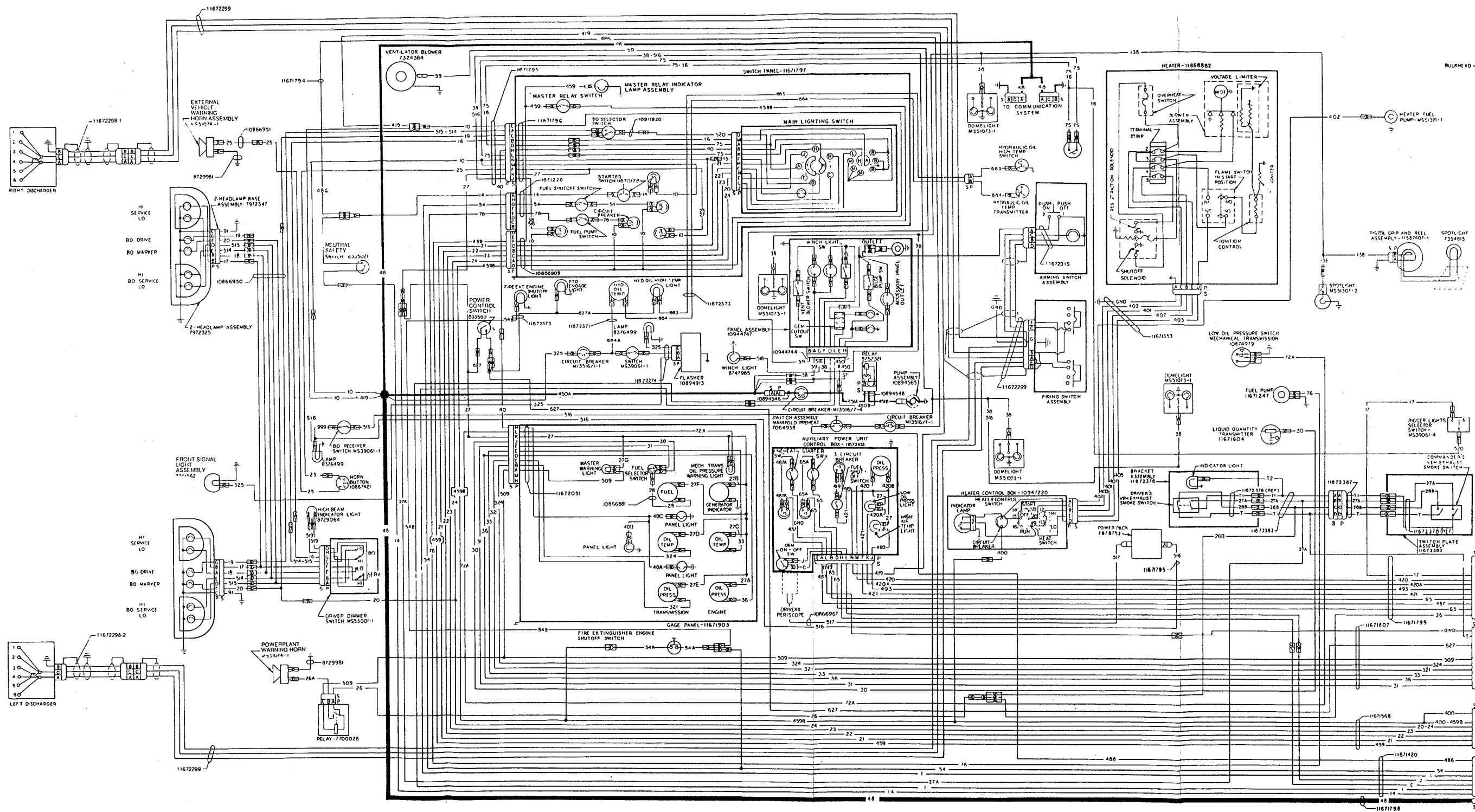
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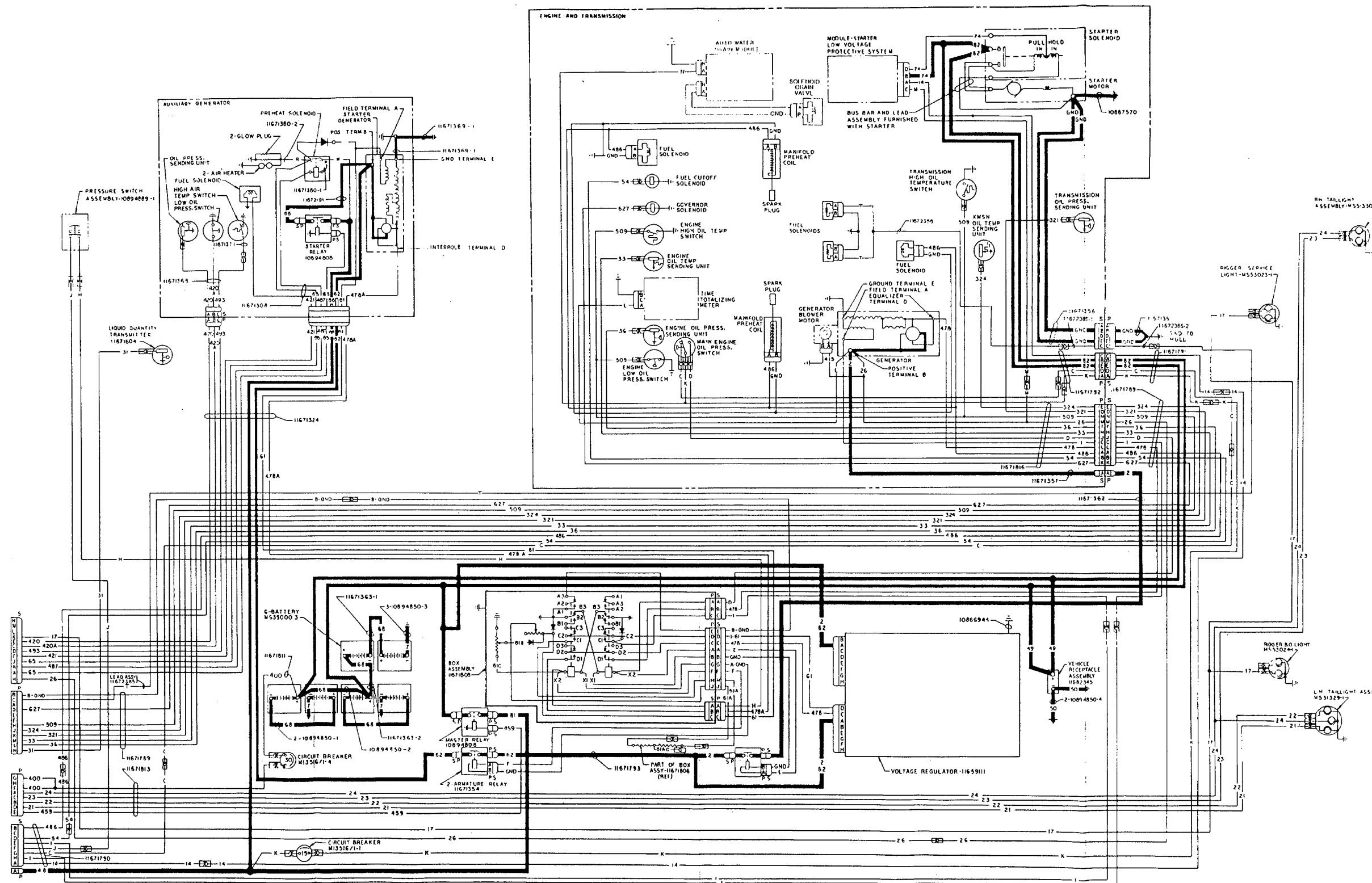


INTERIOR—DUAL VOLTAGE
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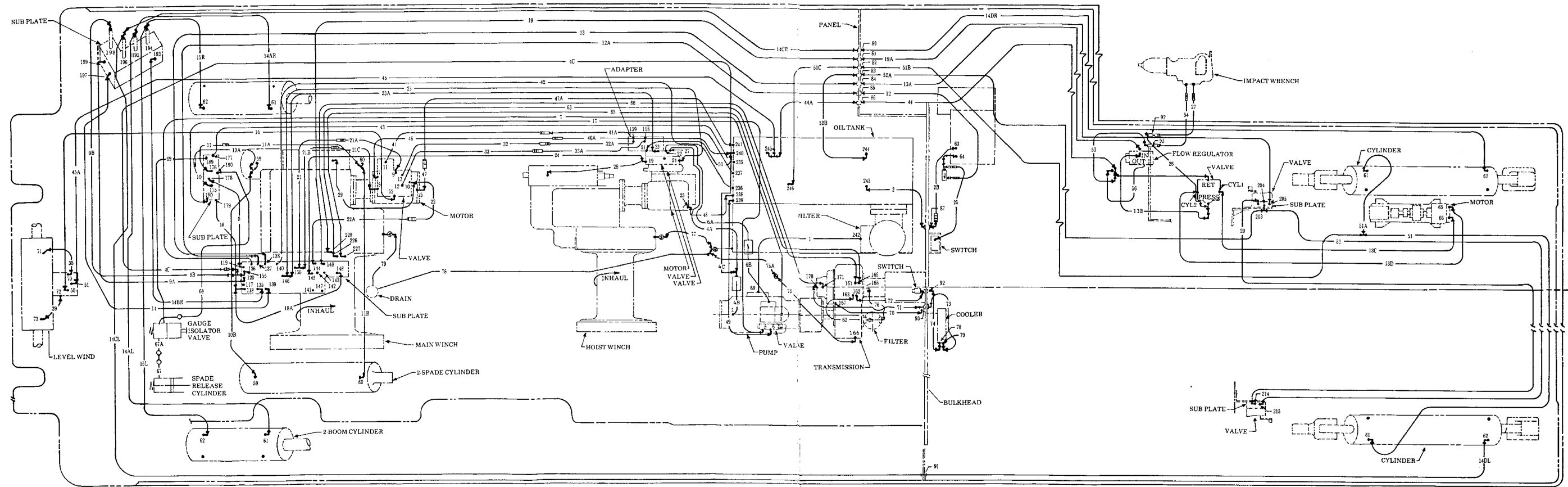
INTERIOR—SINGLE VOLTAGE

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EXTERIOR—SINGLE VOLTAGE

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HYDRAULIC LINES AND FITTINGS

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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
 1 decimeter = 10 centimeters = 3.94 inches
 1 meter = 10 decimeters = 39.37 inches
 1 decameter = 10 meters = 32.8 feet
 1 hectometer = 10 decameters = 328.08 feet
 1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
 1 decigram = 10 centigrams = 1.54 grains
 1 gram = 10 decigrams = .035 ounce
 1 decagram = 10 grams = .35 ounce
 1 hectogram = 10 decagrams = 3.52 ounces
 1 kilogram = 10 hectograms = 2.2 pounds
 1 quintal = 100 kilograms = 220.46 pounds
 1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce
 1 deciliter = 10 centiliters = 3.38 fl. ounces
 1 liter = 10 deciliters = 33.81 fl. ounces
 1 dekaliters = 10 liters = 2.64 gallons
 1 hectoliter = 10 dekaliters = 26.42 gallons
 1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
 1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
 1 sq. decameter (are) = 100 sq. meters = 1,076.4 sq. feet
 1 sq. hectometer (hectare) = 100 sq. decameters = 2.47 acres
 1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
 1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
 1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	To	Multiply by	To change	To	Multiply by
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C
----	------------------------	----------------------------	---------------------	----

