

Supersedes copy dated 4
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TECHNICAL MANUAL UNIT MAINTENANCE MANUAL

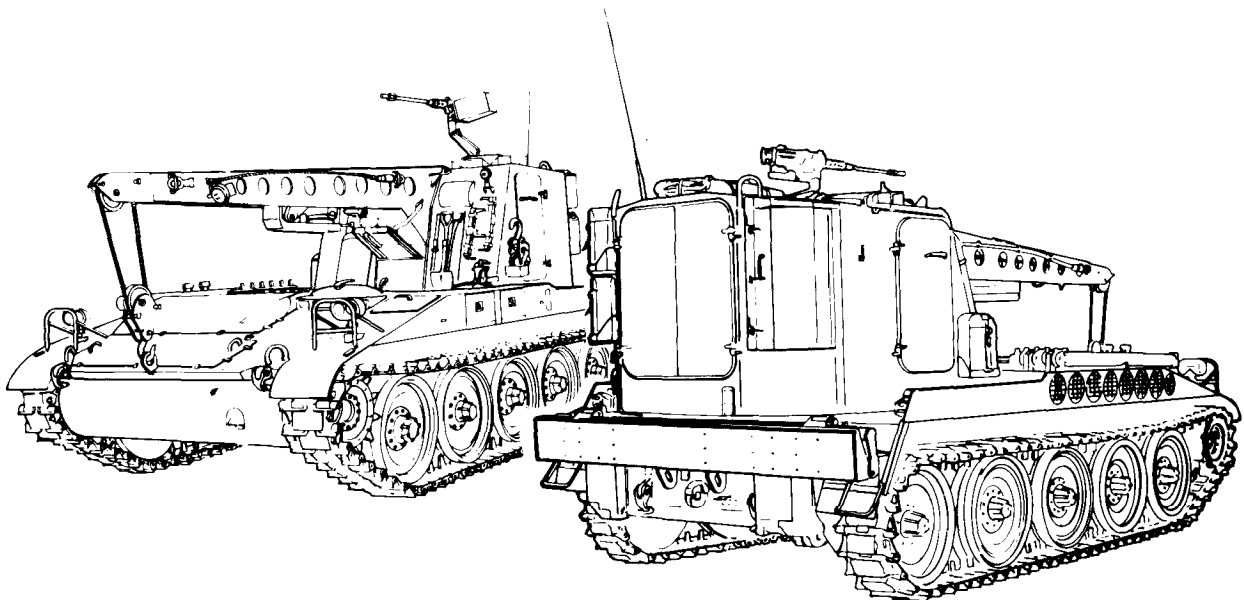
CRANE (CAB) COMPONENTS
RECOVERY VEHICLE,
FULL-TRACKED: LIGHT,
ARMORED, M578
(2350-00-439-6242) (EIC:3LA)

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CHANGE

No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC 28 May 1993

UNIT MAINTENANCE

CRANE (CAB) COMPONENTS
RECOVERY VEHICLE,
FULL-TRACKED: LIGHT,
ARMORED, M578
(2350-00-439-6242) (EIC:3LA)

TM 9-2350-238-20-2, March 1992, 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 miniature pointing hand, or vertical bar adjacent to the illustration identification number.

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2-3 and 2-4
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none
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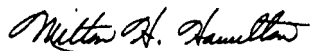
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2-225 and 2-226
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C-3 and C-4
Front Cover

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

By Order of the secretary of the Army:

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

Official:



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Secretary of the Army

04194

DISTRIBUTION:

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WARNING**GENERAL**

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

Unusable CARC mixtures may be considered hazardous waste and may require disposal IAW Federal, state, DoD, and DA hazardous waste regulations. Consult the installation environmental office for proper disposal guidance. Mixed CARC has a flashpoint of approximately 38°F (3°C) due to the incorporation of solvents and is highly flammable.

CARC paint contains isocyanate, a constituent that can cause respiratory effects during and after the application of the material. During the application of CARC paint, coughing, shortness of breath, pain on respiration, increased sputum, and chest tightness may occur. CARC paint also produces itching and reddening of the skin, a burning sensation of the throat and nose, and watering of the eyes. 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 insure the safety of personnel when CARC paint is applied.

- For brush/roller painting in confined spaces, an airline respirator is required, unless an air sampling shows exposure to be below standards. If the air sampling is below standards, either chemical cartridge or airline respirators are required.
- Ž Spot painters applying CARC paint by brush or roller must wear clothing and gloves affording full coverage.
- Ž Do not use water, alcohol, or amine based solvents to thin or remove CARC paints. Use of these solvents with CARC paints can produce chemical reactions resulting in nausea, disease, burns, or severe illness to personnel.
- Do not use paint solvents to remove paint/coating from your skin.
- Mix paint/coating in a well-ventilated mixing room or spraying area away from open flames. Personnel mixing paint/coating should wear eye protection.
- Use paint/coating with adequate ventilation.

BOOM AND WINCH

Make sure all personnel stand clear of boom and block before traversing cab.

Always wear leather gloves when handling winch cable. Never allow cable to run through hands. Do not operate winch crane with less than four turns of wire rope on drums. Failure to observe these warnings could result in personnel injuries.

Wire rope failure will result if more than half the wires in any single strand are broken, separating from pulled out kinks, or fraying after crushing under the track. Wire rope failure will result in injury to personnel.

Use hoist with 2000 lb (908 kg) minimum lifting capacity to prevent injury to personnel and damage to equipment.

Sling boom as shown to prevent unbalanced boom action which could cause serious injury.

WARNING (CONT)

GAS PARTICULATE FILTER

Gas and particulate filters must be removed and/or installed by trained personnel (FM 3-100). The officer in charge must specify the necessary protective clothing (TM 10-277). The officer must also specify safety measures and decontamination procedures before filters are installed (FM 3-5).

ELECTRICAL COMPONENTS

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

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

Do not connect battery cables before activating batteries with electrolyte to avoid battery blowup.

HYDRAULICS

Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

Relieve hydraulic pressure before repairing any hydraulic system. Failure to observe this warning could result in personnel injuries.

Wipe up any spilled hydraulic fluid to prevent injury to personnel.

FIRST AID

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

TECHNICAL MANUAL
No. 9-2350-238-20-2

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D. C., 5 March 1992

UNIT MAINTENANCE MANUAL

CRANE (CAB) COMPONENTS
RECOVERY VEHICLE,
FULL-TRACKED: LIGHT,
ARMORED, M578
(2350-00-439-6242) (EIC:3LA)

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, U.S. Army Armament, Munitions and Chemical Command, ATTN: AMSMC-MAS, Rock Island, IL 61299-6000. A reply will be furnished to you.

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*This manual supersedes crane (cab) components portions of TM 9-2350-238-20, 4 October 1982, including all changes.

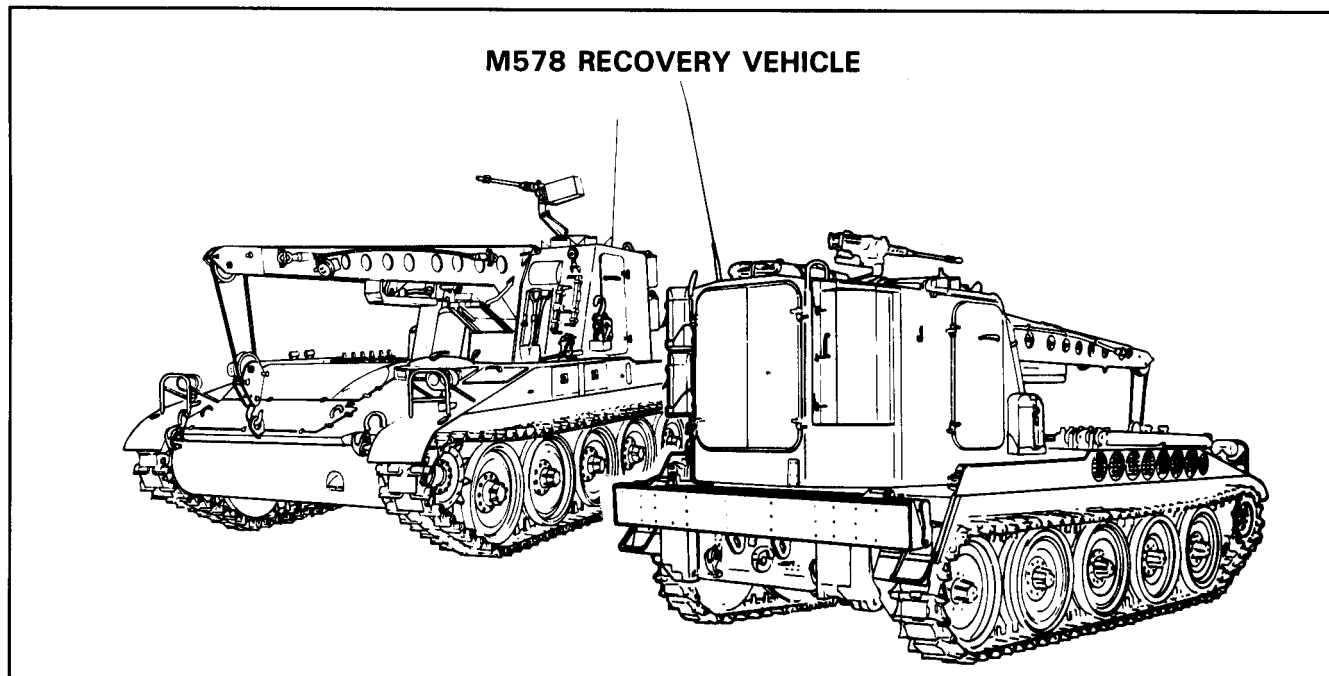
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HOW TO USE THIS MANUAL

This manual (TM 9-2350-238-20-2) contains unit level maintenance procedures for the crane (cab) components of the M578 Recovery Vehicle. This manual is to be used in conjunction with TM 9-2350-238-10 and TM 9-2350-238-24P-2. Chapter 1 contains general information; equipment description and data; and principles of operation. Chapter 2 contains information concerning repair parts, special tools, TMDE, and support equipment; and unit level troubleshooting and maintenance procedures.

Be sure to read and understand maintenance instructions before beginning any maintenance task. Also, read and understand information in chapter 1 and general maintenance procedures on page 2-75 before beginning any maintenance task.



CHAPTER 1

INTRODUCTION

CHAPTER INDEX

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Section I. GENERAL INFORMATION

1-1. SCOPE.

a. *Type of Manual.* Unit level maintenance.

b. *Model Number and Equipment Name.* M578, light armored, full-tracked recovery vehicle.

c. *Purpose of Equipment.* The vehicle is provided with a boom, winches, and equipment to perform its recovery mission. Special purpose kits are provided to aid recovery operations in cold climates.

1-2. MAINTENANCE FORMS, RECORDS, AND REPORTS. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750, The Army Maintenance Management System (TAMMS).

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

a. *Tactical Situations.* Situations may arise in which it is necessary to abandon equipment in the combat zone. All abandoned

equipment must be destroyed to prevent its use by the enemy. The destruction of equipment subject to capture or abandonment in the combat zone will be undertaken only upon authority delegated by a division or higher commander.

b. *Plans.*

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

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

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

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

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

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

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

1-4. PREPARATION FOR STORAGE OR SHIPMENT. Administrative storage is restricted to 90 days and must not be extended. Refer to page 2-351 for detailed instructions on administrative storage.

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

Nomenclature Cross-Reference List.

<i>Common Name</i>	<i>Official Nomenclature</i>
Cab door catch spring	Cab left door flat catch spring
Cab door catch spring	Cab right door flat catch spring
Ground Wire	Ground cable assembly
Rigger's cupola	Commander's cupola
Strap	Marker band

1-6. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR). If your M578 Recovery Vehicle needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about 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 us at Commander, U.S. Army Armament, Munitions and Chemical Command, ATTN: AMSMC-QAD, Rock Island, IL 61299-6000. We will send you a reply.

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

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

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

c. 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 assure that the information is identified as a CPC problem.

d. The form should be submitted to: Commander, U.S. Army Armament, Munitions and Chemical Command, ATTN: AMSMC-QAS/ Customer Feedback Center, Rock Island, IL 61299-6000.

Section II. EQUIPMENT DESCRIPTION AND DATA

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

a. Purpose. The M578 Recovery Vehicle is used to pick up or tow disabled mechanized equipment, as a crane at repair base, and as a carrying platform for spare parts and maintenance personnel.

b. Capabilities and Features.

CAUTION

Do not ford water which exceeds 42 in. (106.7 cm) in depth. Check for soft mud or sandy bottoms.

(1) The M578 Recovery Vehicle is a light, full-tracked, self-propelled, diesel-powered vehicle with a 30,000 lb (13,620 kg) boom winch and a 60,000 lb (27,240 kg)

tow winch mounted in an armored cab. It is highly mobile and maneuverable and may be air transported. The vehicle is capable of long-range, high-speed operation on improved roads. It can also traverse rough terrain, muddy or marshy ground, snow or ice, and can ford streams of a depth of 42 in. (106.7 cm).

(2) A suspension lockout system and a spade assembly provide a stable platform and increase lifting and winching capabilities of the vehicle. Suspension lockout system, boom, winches, cab, and spade are hydraulically powered.

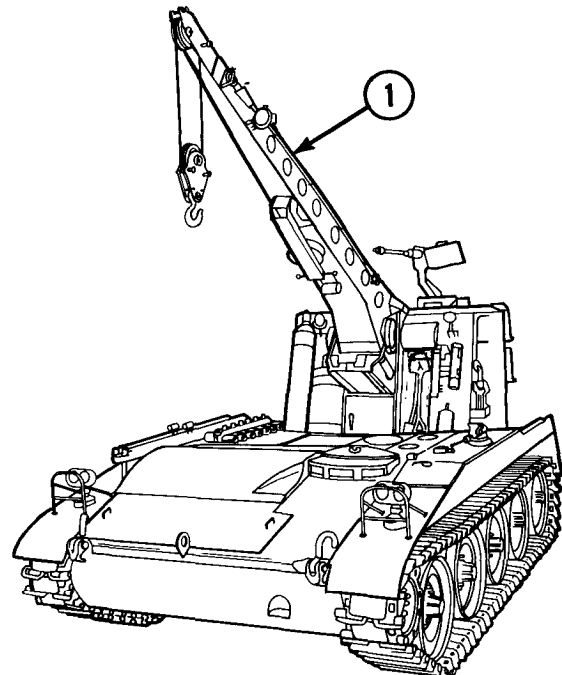
(3) A machine gun mount support is installed on the rigger/gunner cupola to accommodate a Browning M2 .50 caliber machine gun.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS. Refer to TM 9-2350-238-10 for location and description of major components not listed below.

a. Boom and Winches (1). The boom and winch assembly includes a boom, boom winch, and tow winch.

(1) The boom is a tapered box-like steel structure pivot mounted at one end to the cab. The outer end of the boom houses a pulley over which the boom winch wire rope travels. Two hydraulic cylinders are attached to the lower edge of the base of the boom. When the hydraulic cylinders are extended the boom is raised. When the cylinders are retracted the boom is lowered.

M578 VEHICLE-LEFT-FRONT VIEW



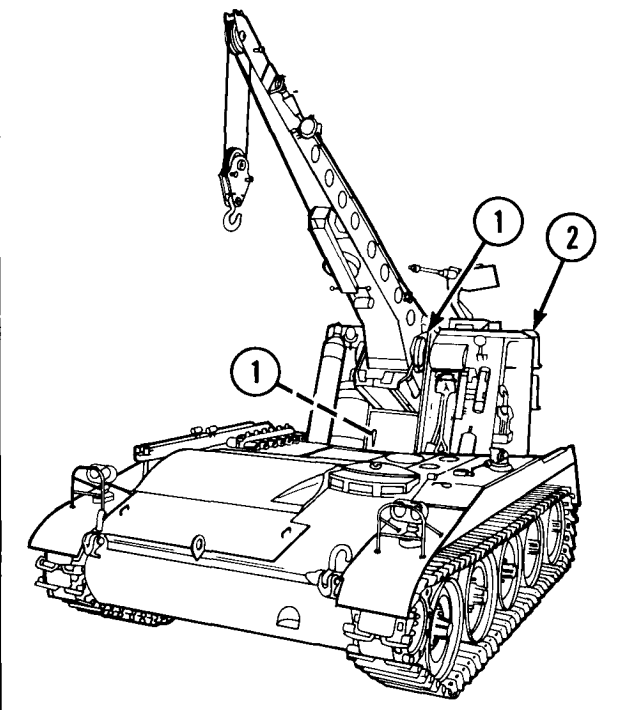
1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (CONT).

(2) The boom winch is mounted on the forward wall of the cab at the base of the boom. A two-way hydraulic motor powers the boom winch. The capacity of the boom winch is 30,000 lb (13,620 kg) with 0.625 in. (1.588 cm) diameter wire cable.

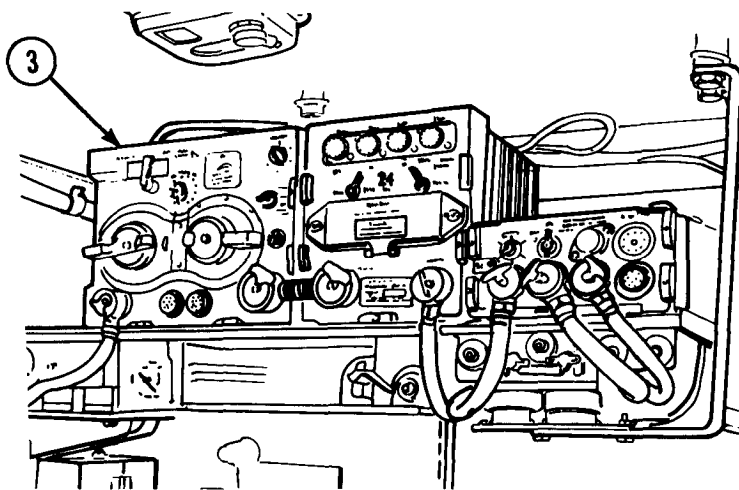
(3) The tow winch is mounted to the forward deck of the cab under the boom winch. The capacity of the tow winch is 60,000 lb (27,240 kg) with 1.00 in. (2.54 cm) diameter wire cable.

b. *Cab (2).* The cab is made of high-tensile steel plates welded into a box-like structure. It supports the boom, boom winch, tow winch, controls, and many of the hydraulic system components and reservoir. The cab can be traversed a full 360 degrees.

M578 VEHICLE-LEFT-FRONT VIEW

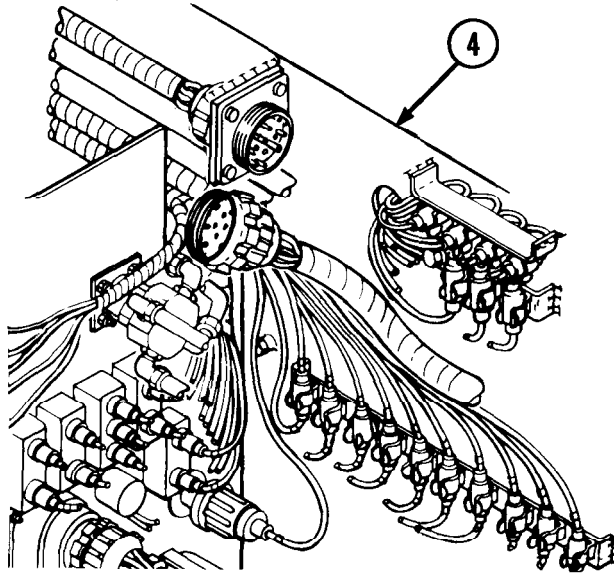


M578 VEHICLE-COMMUNICATIONS EQUIPMENT



c. *Communications Equipment (3).* The communications equipment installed on the recovery vehicle consists of radio set, amplifier, power supply, intercommunication set, and antenna. For information on communica-

tion equipment, refer to TM 9-2350-238-10, TM 11-291, TM 11-5820-401-10-1, TM 11-5820-401-10-2, TM 11-5820-401-20-1, and TM 11-5820-401-20-2.

M578 VEHICLE-ELECTRICAL COMPONENTS

d. Electrical System (4). The electrical system includes batteries, master relay, generator, voltage regulator, starter and solenoid, neutral position switch and starter control relay, instrument and switch panels, circuit breakers, vehicle lighting, warning switches and transmitters, and wiring harnesses and leads. Electrical power is provided by a 24-volt, 300-ampere generator and four series-parallel-connected, 12-volt storage batteries. Output of the generator is controlled by a solid state voltage regulator. Electrical components are controlled by switches located in the driver's compartment. Leads and wiring harnesses distribute current to all electrical components. A slave receptacle allows connection of the vehicle electrical system to another power source.

(1) Four 12-volt batteries are connected in series-parallel to produce 24 volts, and to provide electrical power to start and operate the vehicle.

(2) The batteries transmit power through contacts in the master relay. When the master switch is on, the master relay is energized and power is available to all circuits in the vehicle.

(3) The 300-ampere, 24-volt dc generator operates whenever the engine is running. It provides electrical power to re-charge the batteries and operate the vehicle.

(4) The voltage regulator controls the output voltage and current of the generator. It is a solid state unit and is not adjustable. Circuit breakers protect the generator from electrical overload.

(5) The starter is a direct cranking, non-reversible, 24-volt unit. It is actuated by a two-coil starter motor solenoid mounted on the starter.

(6) The neutral position switch closes when the transmission shift lever is in neutral position. This completes the circuit for the starter control relay to supply battery power to the two starter windings when the start switch is pressed.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (CONT).

(7) The instrument and switch panels contain the switches, indicator lights, and gages required for operation of the vehicle. Refer to TM 9-2350-238-10 for description of the separate items on each panel.

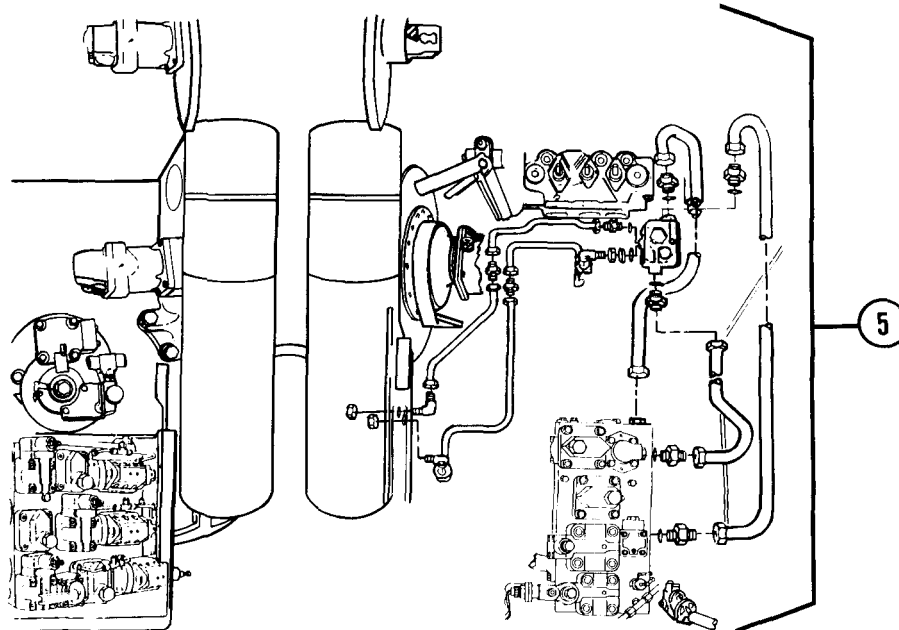
(8) Thermal break, automatic reset, 15-ampere and 20-ampere circuit breakers protect the vehicle components and circuits.

(9) The service headlamps are set for high or low beam by the dimmer switch. The two headlamps are combination units. Each headlamp consists of an incandescent driving lamp, blackout driving lamp, and blackout marker lamp. The taillights are combination units. The right taillight consists of a blackout stoplight and marker light. The left taillight consists of a service taillight, service stoplight, and blackout marker light. The dome lights are a standard combination blackout and service light. The flasher assembly turns the flasher signal headlight on and off repeatedly when the FLASHER SIGNAL switch is in the ON position. Operation of the flasher signal headlight is indicated by the indicator lamp in the cab. The two floodlights are controlled by the FLOODLIGHTS switch in the cab.

(10) When the brake foot pedal is depressed, the brake warning sensitive switch roller guide is released, causing the switch contacts to close. Closing the switch contacts causes the service stoplight or blackout stoplight to light. The engine low oil pressure

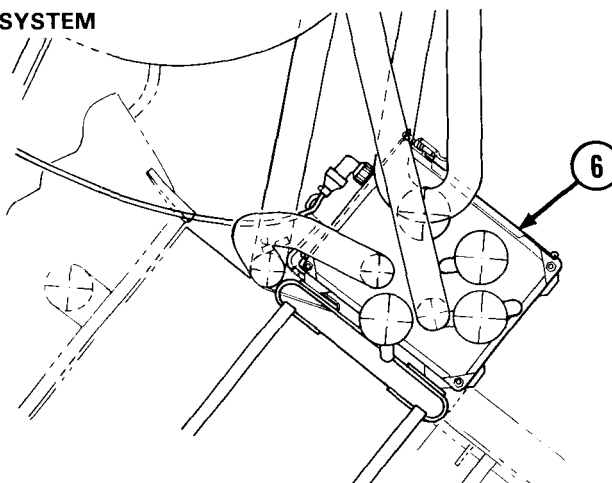
warning switch opens at 9 to 13 psi (62 to 90 kPa) on increasing pressure. When the switch is closed, a circuit is completed to light the warning light and cause the warning horn to sound. The engine oil pressure transmitter is a variable resistance unit. It gives a reading on the engine oil pressure indicator. The engine oil temperature warning switch closes at 300°F to 310°F (149°C to 155°C) on increasing temperature. When the switch is closed, a circuit is completed that causes the warning light to light and the warning horn to sound. The transmission oil temperature transmitter is a variable resistance unit. It gives a reading on the transmission oil temperature indicator. The transmission oil pressure transmitter is a variable resistance unit. It gives a reading on the transmission oil pressure indicator. The fuel level transmitter is a sparkproof, float-operated variable resistance unit. It gives a reading on the fuel level indicator.

(11) Vehicle components are connected with single wire leads or multiple lead wiring harnesses. All wiring is standard ordnance waterproof cable. Connections are made by waterproof, rubber, single wire quick-disconnect connectors, plug-receptacle, connectors, or solderless waterproof terminals. All leads are identified by a marker band attached to the wire and stamped with a circuit number. The socket and pin contacts of the connectors are identified by upper case letters of the alphabet, stamped on the connector insert.

M578 VEHICLE-HYDRAULIC COMPONENTS

e. *Hydraulic System (5).* The M 578 Recovery Vehicle has an open-center type hydraulic system. This means that the hydraulic fluid continuously circulates through the main hydraulic supply lines. When no hydraulic subsystem is being used, the hydraulic fluid pressure in the main supply lines is near zero. When a subsystem is used, hydraulic fluid

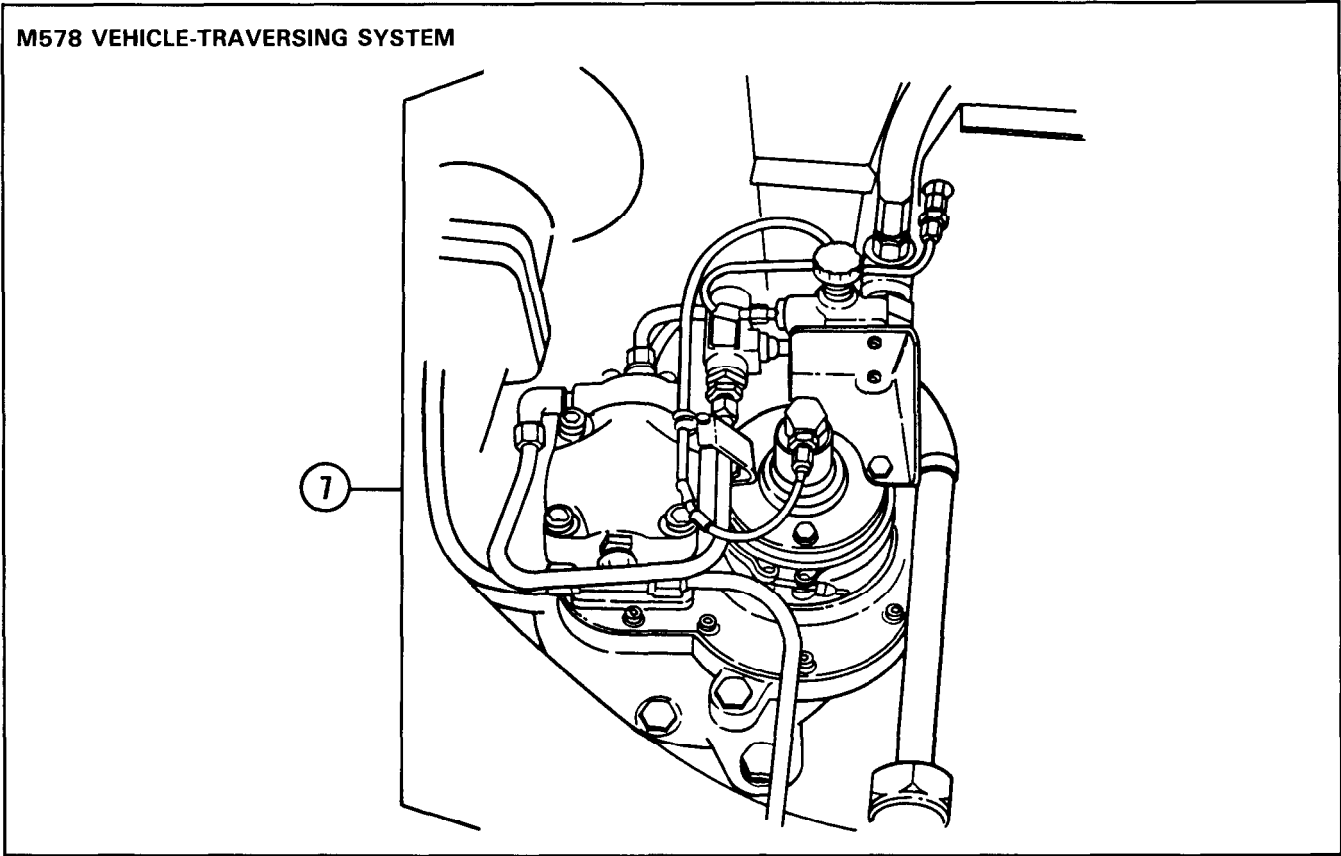
from the main supply lines is diverted through the subsystem. Hydraulic fluid pressure builds up within the subsystem to a level high enough for the subsystem to function. Preset pressure relief or pressure reducing valves protect the subsystem from too much pressure,

M578 VEHICLE-AIR PURIFIER SYSTEM

f. *Gas-particulate Filter (6).* The gas-particulate filter is used with face masks to protect crew members from toxic gases and dusty conditions. One filter is mounted in the

cab on the boom cylinder and a second filter is mounted on the floor board in the driver's compartment.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (CONT).



g. *Traversing System (7).* The traversing system consists of a two-way hydraulic motor, hydraulically released brake, and planetary gear drive unit. The direction and speed of traversing is controlled by the winch operator using a foot pedal. When operating the tow winch, the level wind traversing system automatically traverses the cab so that the wire rope winds evenly on the winch drum. The winch operator can override the level wind traversing system by using the foot pedal.

1-10. EQUIPMENT DATA. The following tabulated data is for guidance of unit maintenance. Refer to TM 9-2350-238-10 for information concerning the general characteristics and performance of the M578 recovery vehicle.

a. Crew.	
Number	2
b. Electrical System.	
(1) Circuit breakers	
(a) Type	Thermal-break automatic reset
(b) Rating (quantity)	.15A (10)
	20A (1)
	30A (1)
	60A (1)

(2) Wiring

- (a) Type Standard ordnance waterproof cabling
- (b) Circuits Standard ordnance single wire, ground return

c. Hydraulic System.

- (1) System pressure 0 to 2000 psi (0 to 13,790 kPa)
- (2) 8 GPM pump
 - (a) Type Dual vane
 - (b) Output (1350 to 1450 rpm) 7.6 gpm at 2000 psi (28.8 l/min at 13,790 kPa)
- (3) 80 GPM pump (dual section)
 - (a) Type Dual vane
 - (b) Output (each section at 1350 to 1450 rpm)
 - 1 Maximum 52 gpm at 0 psi (197 l/min at 0 kPa)
 - 2 Minimum 42 gpm at 2000 psi (159 l/min at 13,790 kPa)
- (4) Spade cylinders
 - (a) Number 2
 - (b) Type Double-acting

d. Boom Winch.

- (1) Wire rope diameter 0.625 in. (1.588 cm)
- (2) Wire rope length 220 ft (67m)
- (3) Line pull 30,000 lb (13,620 kg)

e. Tow Winch.

- (1) Wire rope diameter 1.0 in. (2.5 cm)
- (2) Wire rope length 230 ft. (70m)
- (3) Line pull 60,000 lb (27,240 kg)

f. Cab.

- (1) Hydraulically operated
- (2) Traverses both clockwise and counterclockwise through 360°

Section III. PRINCIPLES OF OPERATION

1-11. GENERAL.**a. M578 Recovery Vehicle.**

(1) The M578 Recovery Vehicle is a fully-tracked, self-propelled recovery vehicle with a 30,000 lb (13,620 kg) boom winch and a 60,000 lb (27,240 kg) tow winch mounted in an armored cab. The vehicle is

used to pick up or tow disabled mechanical equipment, such as a crane at repair bases, and as a carrying platform for spare parts and maintenance personnel. The vehicle is highly mobile and maneuverable and may be transported in a large cargo aircraft.

1-11. GENERAL (CONT).

(2) The M578 Recovery Vehicle is capable of long-range, high-speed operation on improved roads. It can traverse rough terrain, muddy and marshy ground, snow or ice, and it can ford streams to a depth of 42 in. (107 cm). The vehicle has: 1) a low, all-welded steel structure with a turret-mounted cab; 2) a suspension lock-out system, and 3) a spade assembly. The spade assembly provides a stable platform to increase the lifting capabilities of the winch. The suspension lock-out system, boom, winches, cab, and spade are hydraulically powered. Power is supplied by a V-8 diesel engine and a gear-steer transmission.

b. Crane.

(1) *Cab.* Is an armor steel weldment which houses the hydraulic reservoir; supports boom, winches, and controls; and provides protection for the crew members. Space has been provisioned for radio and intercommunication equipment. Doors are provided for access to the cab and stowage compartments. The cab can be traversed a full 360 degrees.

(2) *Boom.* Is a box section of steel plate which can be raised or lowered by the hydraulic cylinders for hoisting operations.

(3) *Boom Winch.* Is a two-speed, planetary-gear unit with an internal automatic brake. The winch is hydraulically powered and has a capacity of 30,000 lb (13,620 kg) with 5/8-in. (1.6 cm) rope and two-part line.

(4) *Tow Winch.* Is a two-speed, planetary-gear unit with an internal automatic brake which has the load capacity of 60,000 lb (27,240 kg) with a 1.0 in. (2.5-cm) diameter wire cable.

c. *Communications Equipment.* The communications equipment installed on the M578 Recovery Vehicle consists of a radio set, amplifier, power supply, intercommunication set, and antennas. This equipment allows the crew to maintain communication with the driver and outside command posts.

d. *Gas-Particulator Unit.* The gas-particulator unit is used with face masks to protect the crew members from toxic gases (except carbon monoxide) and extremely dusty conditions. The unit is mounted between the rigger and crane operator seats in the cab.

e. Turret Traversing System.

(1) *General.* The turret traversing system consists of a two-way hydraulic motor, hydraulically-released brake, and planetary gear drive unit. The direction and speed of traversing is controlled by the winch operator using a lever on the control panel, or by using the remote controller when outside the vehicle. When operating the tow winch, the level wind traversing system automatically traverses the cab so the wire rope winds evenly on the winch drum. The winch operator can override and level wind traversing system by using the control lever or the remote controller.

(2) *Turret.* The turret is mounted toward the rear of the vehicle. The turret can be traversed 360 degrees.

(3) *Turret Bearing.* The turret bearing is a 4-point contact radial and thrust type ball bearing on which the turret is mounted. The bearing is provided with lubrication fittings and seals to prevent foreign matter from entering the bearing. The bearing inner race contains the ring gear of the traversing final drive.

f. Electrical Power System.

(1) *General.* Electrical power is provided by a 24-volt, 300 ampere generator and four series-parallel connected 12-volt storage batteries. Leads and wiring harnesses distribute current to all electrical components.

(2) *Circuit Breakers.* Thermal set, automatic reset, 15 ampere and 20 ampere circuit breakers protect the vehicle components and circuits.

(3) *Vehicle Lighting.* The dome lights are a standard combination blackout and service light. Illumination of the flasher signal headlight is indicated by the indicator lamp in the cab and used for warning oncoming traffic and personnel during travel and recovery operations. The two floodlights are controlled by the floodlight switch in the cab and used for operation during night/darkness recovery operations.

(4) *Wiring Harnesses and Leads.* Vehicle components are connected with single leads or multiple lead wiring harnesses. All wiring is standard ordnance waterproof cable. Connections are made by waterproof rubber, single wire quick-disconnectors, plug-receptacle connectors, or solderless waterproof terminals.

g. Hydraulic Power System.

(1) *General.* The M578 Recovery Vehicle has a closed-centered type hydraulic system. Hydraulic pressure is present and the directional control valves are activated by the control levers. Hydraulic pressure is delivered to the subsystem that is controlled by the directional control valve.

(2) *Hydraulic Oil Reservoir.* The hydraulic oil reservoir provides reserve capacity and ensures a steady supply of hydraulic oil to the pumps. The reservoir has a capacity of 165 gal. (625 l).

(3) *Hydraulic Pumps.* Two hydraulic pumps provide hydraulic pressure when the engine is operating and the magnetic clutch is engaged to power all hydraulic components.

1-12. ARMAMENT. Armament for the M578 Recovery Vehicle consists of an M2 Browning .50 caliber machine gun, which is mounted next to the rigger/gunner cupola, and is the prime fire power support.

CHAPTER 2

UNIT MAINTENANCE INSTRUCTIONS

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

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

9-2350-238-24P-2 and the Maintenance Allocation Chart (MAC), appendix B of this manual. For an illustrated list of special tools and equipment, refer to appendix G of this manual.

2-2. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT. Tools, special tools, and test equipment necessary to maintain the M578 Recovery Vehicle are listed in TM

2-3. REPAIR PARTS. Repair parts are listed and illustrated in TM 9-2350-238-24P-2 covering unit maintenance for this equipment.

Section II. SERVICE UPON RECEIPT

2-4. SERVICE UPON RECEIPT OF MATERIEL.

a. When you receive a vehicle, you must determine if the supplying agency has properly prepared it for service and if it is in condition to perform any mission.

b. Perform a run-in road test of at least 5 mi (8 km) on all vehicles to completely check their operation.

2-4. SERVICE UPON RECEIPT OF MATERIEL (CONT).

WARNING

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

c. Most armament parts received from storage are coated with rust-preventive compound. Clean these parts thoroughly with shop rags or a brush that is saturated with dry cleaning solvent (SD2) (item 10, appx C). Then lubricate the parts as specified, refer to page 2-8.

NOTE

Component parts of each vehicle should be cleaned separately whenever possible. Although like parts are interchangeable, the parts originally assembled work best together.

d. Whenever possible, the vehicle crew will help do these services.

e. Follow all precautions to tag DD Form 1397 (Processing and Deprocessing Record for Shipment, Storage, and Issue of Vehicle

and Spare Engines). This tag is in the driver's compartment attached to the steering bar, shift lever, or MASTER switch, For vehicles from administrative storage, check DA forms in vehicle log book to determine vehicle readiness. Fill fuel cell and radiators and lubricate vehicle as specified, refer to page 2-8.

NOTE

Engine, transmission, and final drives will not be drained unless expected temperatures require different viscosity oil. New engines and transmissions contain CLP (item 5, appx C). This oil will be used until the next regularly scheduled oil change. General purpose lubricating oil (item 14, appx C) may be added to CLP (item 5, appx C) to maintain proper oil level.

f. Vehicles prepared for shipment by the manufacturer require additional services, refer to Table 2-1.

Table 2-1. SERVICE UPON RECEIPT OF MATERIEL-M578 RECOVERY VEHICLE

LOCATION	ITEM	ACTION	REMARKS
M 5 7 8 Recovery Vehicle	Protective Covers	a. Remove vehicle closure kit. b. Remove seal securing driver's cupola cover and open cover. c. Check tag DD Form 1397 (Processing and Deprocessing Record for Shipment, Storage, and Issue Vehicle and Spare Engines) to determine level of processing, and follow all precautions.	

Table 2-1. SERVICE UPON RECEIPT OF MATERIEL-M578 RECOVERY VEHICLE (CONT)

LOCATION	ITEM	ACTION	REMARKS
M 578 Recovery Vehicle	Protective Covers (Continued)	d. Remove securing fastenings from: impact-wrench access-door, engine air cleaner access doors, riggers door, stowage-compartment access door, tool-locker door, crane operator's door, tow-winch access door, crane operator's cupola cover, and riggers/gunner cupola cover. e. Remove securing straps from: portable fire extinguishers, outside and inside of cab, snatch block on left front of cab, tow winch snatch block in tray or bottom of boom, level wind, two tow-cables, one each side of boom, tow bar on right fender, track shoes on right deck, acetylene and oxygen cylinders on right front of cab, all chains in exterior cab stowage compartment. f. Remove tape and barrier material from machine gun pintle support. g. Remove machine gun mount from cab. Remove tape and barrier material and install mount on pintle support. h. Remove M17 periscopes from inside cab stowage compartment. Remove tape, paper and cushioning material. Install periscopes in driver's, crane operator's, and riggers/gunner cupolas. i. Remove tape and protective cover from headlights, taillights, flasher, and floodlights. j. Remove tape and protective cover from all seats, backrests, and crash pads. k. Remove screen from turret hull cleanout cover opening. Remove wire securing cover and close cover. l. Remove screens from transmission and radiator access cover openings. Remove access covers from box in cab and install in access openings.	

2-4. SERVICE UPON RECEIPT OF MATERIEL (CONT).

Table 2-1. SERVICE UPON RECEIPT OF MATERIEL-M578 RECOVERY VEHICLE (CONT)

LOCATION	ITEM	ACTION	REMARKS
M578 Recovery Vehicle	Protective Covers (Continued)	m. Remove pipe plug from power plant reservoir drain cover.	
	General Services	a. Attach tag to plug and hang on driver's throttle control in driver's compartment.	
		b. Remove tow hooks from box in cab and install on vehicle.	
		c. Remove basic issue item shipping containers from OVE rack.	
		d. Open containers, unpack items and inventory contents with packing list.	
		e. Record missing or damaged items.	
		f. Clean basic issue items as required and install in stowage provisions on hull and cab. Refer to TM 9-2350-238-10 for location.	
	Batteries	WARNING Do not connect battery cables before activating batteries with electrolyte to avoid battery blowup. a. Remove dry-charged batteries and electrolyte from shipping containers. b. Install batteries in battery compartment. c. Tape positive battery cables to the battery-to-ground cable. d. Add electrolyte and charge batteries. e. Connect all battery cables.	
	Machine Gun	Install and set up M2 .50 caliber machine gun on machine gun mount (TM 9-2350-238-10).	

Table 2-1. SERVICE UPON RECEIPT OF MATERIEL-M578 RECOVERY VEHICLE (CONT)

LOCATION	ITEM	ACTION	REMARKS
M578 Recovery Vehicle	Fan belts	a. Remove fan well deck. b. Adjust tension of fan belts.	
	Engine	a. Remove engine cover. b. Remove plastic caps from engine crankcase breathers. c. Remove tape from turbocharger regulator exhaust pipe valve and engine exhaust manifold elbow valve. d. Remove plug and tape from air duct opening into driver's compartment. e. Connect hose to opening and generator air duct. Secure with clamp. f. Remove tape from engine oil filler cap and auxiliary drive fill and level caps. g. Check lubricant level in engine, transmission, and auxiliary drive. h. Check DD Form 1397 for oil viscosity used. i. Install engine cover.	

2-5. CHECKING UNPACKED EQUIPMENT.

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6, Packaging Improvement Report.

b. Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies IAW the instructions of DA PAM 738-750.

c. Check to see if the equipment has been modified.

Section III. UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) AND LUBRICATION INSTRUCTIONS

2-6. SCOPE. This section details the preventive maintenance checks and services (PMCS) and the lubrication instructions for the cab at the unit level. Preventive maintenance is the care, inspection, and service of the M578 Recovery Vehicle to keep it operating and to find troubles before repairs or replacements are needed. Preventive maintenance is performed at crew and unit levels.

a. Crew. All crew PMCS and lubrication tasks must be completed before unit PMCS is begun; refer to TM 9-2350-238-10.

b. Unit. This section tells what preventive maintenance tasks are done by unit maintenance mechanics. Always start at the front and follow it in order to the back.

2-7. INTERVALS.

a. Unit Preventive Maintenance Tasks. PMCS tasks will normally be done quarterly; every 3 months, 750 kilometers, or 75 hours of vehicle operation, whichever comes first.

(1) Semiannually. Every 6 months, 2400 kilometers (1500 miles), or 150 hours of operation, whichever comes first.

(2) Annually. Once a year, as specified.

(3) Eighteen (18) months. As specified.

b. Column 1. The "Item No." column contains the item number which shall be used as a source of item numbers for the TM Number Column on the DA Form 2404, Equipment inspections and Maintenance Worksheet, in recording results of PMCS.

c. Column 2. The "Interval" column lists the specific interval at which the PMCS will be performed. They are as follows:

Q - Quarterly
S - Semiannually
A - Annually
18- 18 Months

d. Column 3. The "Item to Check/Service" column identifies the item to be checked, serviced, or lubricated.

e. Column 4. The "Procedure" column describes the check, service, or lubrication to be performed.

f. Column 5. The "Not Fully Mission Capable If" column contains the criteria which will render the system incapable of performing its primary mission.

NOTE

Ž All semiannual preventive maintenance tasks are also done during annual maintenance.

- High temperature is more than 100°F (38° C). Low temperature is less than 0° F (-18° C).

Ž Salt water is present during fording, sea spray, and morning mist in coastal areas.

- Dust conditions are high when oil level in hubcaps cannot be seen.

Operating the M578 Recovery Vehicle in very high or very low temperatures, in dust, mud, or salt water may require additional preventive maintenance.

2-7.1 GENERAL PROCEDURES.

a. General Cleaning Instructions.

WARNING

Dry cleaning solvent (SD2) (item 10, appx C) is toxic and flammable. Wear protective goggles and gloves and use only in well ventilated areas.

(1) Use dry cleaning solvent (item 10, appx C) to clean grease, oil, or dirt from all metal parts. If a water hose is available, it may be used to take off heavy dirt. If a steam cleaner is available, it may be used to take off any remaining dirt. Make sure steam or water does not enter roadwheel bearings, shock absorbers, optics, hatches, and powerpack openings. After water or steam cleaning, lubricate vehicle. Check all lubricant reservoirs for water droplets. If water is found, drain and refill. Clean grease, oil, or dirt from all metal parts with dry cleaning solvent, cleaning compound, or equivalent.

(2) Use mild soap and water to clean or wash parts not made of metal. Rinse thoroughly after cleaning with water and then dry.

(3) Remove rust or dirt from fine-machined surfaces with dry cleaning solvent (item 10, appx C) and crocus cloth (item 6, appx C), if necessary. Do not use any other material. Be careful not to change the dimensions of parts when rubbing off rust. Coat bare metal surfaces, after cleaning, with CLP (item 5, appx C).

(4) Nameplates, caution plates, and instruction plates may rust quickly. When they are rusty, clean parts and coat them with CLP (item 5, appx C).

b. *Precautions.* The following precautions will help prevent personal injury or damage to equipment.

(1) Do not spill solvent, fuel, or lubricants on rubber parts. Solvent, fuel, and lubricants may damage rubber parts.

(2) Do not use turbine fuel, diesel fuel, gasoline, paint thinner, or benzene (benzol) for cleaning. These liquids may cause personal injury.

(3) Always wear protective clothing when using solvent. Solvent may dry skin.

CAUTION

Improper use of high pressure water hose or steam cleaner can damage seals and electrical components resulting in equipment failure. Use high pressure water only on suspension system.

(4) Do not clean inside cab with high pressure steam or air. Some parts inside cab may rust or be damaged.

(5) When washing outside of vehicle, close and lock all hatches. Cover periscope with plastic sheets. Remove covers after washing.

(6) Do not use polishing cloths, liquids, pastes, or other rough cleaners to clean instrument lenses or periscopes lenses. Use lens paper (item 15.1, appx C) to clean lenses. Take off fingerprints, oil, and dirt with lens cleaning compound and lens paper.

(7) If anything looks wrong and cannot be fixed, report it on DA Form 2404. If something looks dangerous or may cause equipment damage, report it to the maintenance supervisor right away.

c. *Services.* Services performed by the unit maintenance mechanic consist of the following tasks:

(1) *Adjusting.* Make all necessary adjustments and alinements.

2-7.1 GENERAL PROCEDURES (CONT).

(2) *Servicing.* This usually means draining and refilling units with oil and changing or cleaning oil filters, fuel filters, and air cleaners.

(3) *Tightening.* Tighten nuts, bolts, screws, and other types of fasteners with a torque wrench to the value listed in the maintenance manual. Do not over tighten; this may strip threads and break off the part being tightened.

(4) *Repairing.* Repair includes inspecting, cleaning, preserving, adjusting, replacing, welding, riveting, strengthening, and other tasks associated with putting parts in working condition.

(a) Inspect for burrs, cracks, gouges, or nicks.

(b) Replace bent, broken, or stripped bolts, nuts, screws, and washers. Bolts, screws, and nuts may be loose if rust, chipped paint, or bare metal is around them. Tighten loose screws, bolts, and nuts. Replace missing parts.

(c) Look for bad welds where chipped paint, rust, or gaps are present. Have bad welds repaired.

(d) Look at electric wires for cracked, frayed, loose, discolored, or broken insulation. Replace bad parts and tighten loose clamps and connectors.

NOTE

When tightening fittings, always hold fitting adapter with one wrench and tighten nut with another wrench until snug. Tighten nut around 1/6-turn to 1/3-turn. If fitting leaks, unscrew nut a full turn and retighten it. If still leaking, replace leaking parts.

(e) Look at hose, fluid lines, and tubes for bends, wear, cracks, or leaks. Replace bad parts. Make sure all clamps and fittings are tight. If a fitting leaks, tighten it.

CAUTION

Equipment operation is allowable with minor leakages (Class I or II). Of course, you must consider the fluid capacity in the item/system being checked/inspected. When in doubt, notify your supervisor. When operating with Class I or Class II leaks, continue to check fluid levels as required in your PMCS. Class III leaks must be repaired.

NOTE

Fluid leaks affect vehicle status. Learn the following classes of fluid leaks 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.

Class III- Leakage of fluid great enough to form drops that fall from the item being checked. Class III leaks should be reported to your supervisor or direct support maintenance.

(5) *Corrosion.* Check for signs of deterioration, rust, unusual cracking, softening, swelling, or breaking on entire M578 Recovery Vehicle. Become familiar with the four stages of corrosion listed below, and take the appropriate required maintenance action outlined below.

Stage 1 - Red, black, or white corrosion deposits on surface with etching or pitting. However, base metal is sound.

Stage 2 - Powdered granular or scaled condition. Base metal is sound.

Stage 3 - Surface condition is similar to stage 2 except that metal in the corroded area is unsound and pin holes may be present.

Stage 4 - No metal remaining at point of severest corrosion. Corrosion holes in the area or metal completely worn away.

Stage 1 & 2 - Areas are to be cleaned, primed, and painted IAW TB 43-0213.

Stage 3 & 4 - Try to repair metal. If not economical or repairable, replace with new parts.

d. Modification Work Order (MWO) Application. Check the list of current MWOs in DA PAM 25-30. Do not make any modifications except as ordered by official Army directive.

2-7.2 SPECIAL PROCEDURES FOR SEMIANNUAL (2400 KILOMETER) PREVENTIVE MAINTENANCE.

Semiannual preventive maintenance includes complete inspection to make sure adjustment, securing, and assembly of all parts of vehicle are right. All cleaning, replacement, lubrication, and protection of parts and/or assemblies must be done as stated for trouble-free operation until the next preventive maintenance is performed.

a. Maintenance Forms and Records. Refer to DA PAM 738-750.

b. Publications. Be sure all needed publications are on hand before starting task.

c. Special Tools. Be sure all special tools are on hand.

d. Supplies. Be sure all parts and supplies are on hand.

e. Tools. Be sure all common tools are on hand.

2-7.3 TOOLS AND SUPPLIES. The following list identifies special tools and supplies needed to perform PMCS on the M578 Recovery Vehicle.

a. Tools.

Automotive maintenance and repair shop equipment: organizational maintenance, common no. 1, less power (item 21, appx B)
General mechanic's tool kit (item 25, appx B)

b. Supplies.

Cleaner, lubricant, and preservative (CLP) (item 5, appx C)
Dry cleaning solvent (SD2) (item 10, appx C)
Grease, automotive and artillery (GAA) (item 12, appx C)
Oil, lubricating (CW-II) (item 13.1, appx C)
Oil, lubricating (GO-75) (item 13.2, appx C)
Oil, lubricating (OE/HDO) (item 14.1, appx C)
Oil, lubricating (OEA) (item 14.2, appx C)

2-7.3 TOOLS AND SUPPLIES (CONT).

c. *Mandatory Replacement Parts.* The following table reflects the mandatory replacement parts that must be replaced during PMCS whether they have failed or not.

Mandatory Replacement Parts

Item No.	Part Number	National Stock Number	Nomenclature	Qty
1	10908813	5330-00-991-8401	Quarterly Reservoir filter and strainer gasket	2
2	MS35338-46	5310-00-637-9541	Lockwasher	6

d. *Lubrication.* The lubrication procedures identified in the PMCS table are for unit maintenance. Lubrication intervals (on-condition or hard time) are based on normal operation. Lubricate more often during constant use or in severe conditions.

(1) Use only authorized lubricants identified in the lubricant table.

(2) Dispose of used lubricants in accordance with local Standard Operating Procedure (SOP).

(3) For arctic operation, see FM 9-207.

(4) For desert operation, see FM 90-3.

(5) Clean all grease fittings before attaching grease gun.

(6) When using grease gun, operate until grease appears around seals or out of relief valve and check escaping grease for contamination. If contamination is found, replace the grease.

NOTE

- If no other treatment is directed, coat unprotected metal surfaces with CLP (item 5, appx C) after cleaning.
- Clean around filler necks/drain plugs/openings before servicing to keep dirt from entering system.

(7) Perform a quarterly lubrication as soon as possible after water fording operation.

(8) Type of lubricants used at each point are identified by arrows as follows:



- (9) Observe the following:
- Never use the wrong type of grease.
 - Never use too much lubrication.
 - Always clean grease fittings before lubrication.
 - Always use the Lubrication Instructions.

WARNING

Dry cleaning solvent (item 10, appx C) is toxic and flammable. To avoid injury, wear protective goggles and gloves and use only in well-ventilated areas. Avoid contact with skin or eyes and do not breathe vapors. Do not use near open fire or excessive heat. The flash point for Type I dry cleaning solvent is 100°F (38°C), and for Type II is 140°F (60°C). If you feel dizzy while using dry cleaning solvent, get fresh air immediately and get medical aid. If contact with eye is made, wash your eyes with water and get medical aid immediately.

(10) *Cleaning.* Use clean rag (item 16, appx C) and dry cleaning solvent (item 10, appx C) to clean grease or oil from all metal surfaces except those exposed to powder fouling. For powder fouled surfaces, use CLP (item 5, appx C).

LUBRICANT TABLE

LUBRICANT/COMPONENTS		REFILL CAPACITY (APPROX)	EXPECTED TEMPERATURE	INTERVALS
Oil, Lubricating, OE/HDO (item 14.1, appx C)	Tow Winch	5.0 qt (4.7 l)	Above 0°F (Above -18°C)	Quarterly/ Semiannually/ Annually
Oil, Lubricating, OE/HDO (item 14.1, appx C)	Boom Winch	3.0 qt (2.8 l)	Above 0°F (Above -18°C)	Quarterly/ Semiannually/ Annually
Oil, Lubricating, OE/HDO 10 (item 14.1, appx C) Oil, Lubricating, OEA (item 14.2, appx C)	Hydraulic Reservoir	Refill 140 gal. (530 l) Dry 165 gal. (624.5 l)	0°F to +40°F (-18°C to +4°C)	Quarterly/ 18 Month
Oil, Lubricating, OEA (item 14.2, appx C)	Tow Winch	5.0 qt (4.7 l)	Below +40°F (Below +4°C)	Quarterly/ Semiannually/ Annually
Oil, Lubricating, OEA (item 14.2, appx C)	Boom Winch	3.0 qt (2.8 l)	Below +40°F (Below +4°C)	Quarterly/ Semiannually/ Annually
Oil, Lubricating, OEA (item 14.2, appx C)	Traversing Gearcase Upper Section	1.0 qt (0.95 l)	0°F to +40°F (-18°C to +4°C)	Quarterly/ Annually
Oil, Lubricating, OEA (item 14.2, appx C)	Traversing Gearcase Lower Section	3.0 qt (2.8 l)	0°F to +40°F (-18°C to +4°C)	Quarterly/ Annually

2-7.3 TOOLS AND SUPPLIES (CONT).

LUBRICANT TABLE (CONT)

LUBRICANT/COMPONENTS		REFILL CAPACITY (APPROX)	EXPECTED TEMPERATURE	INTERVALS
Grease, Automotive and Artillery (GAA) (item 12, appx C)		NA	All Temperatures	Quarterly/ Annually
Cleaner, Lubricant and Preservative (item 5, appx C)	Machine Gun and Oil Can Points	NA	0°F to +40°F (-18°C to +4°C)	Quarterly/ Semiannually
Dry Cleaning Solvent (item 10, appx C)		NA	All Temperatures	Quarterly/ Semiannually/ Annually
Oil, Lubricating, CW-IIC (item 13.1, appx C)	Chain, Wire Rope, Exposed Gear, and Cables	NA	Above +80°F (Above +27°C)	Semiannually
Oil, Lubricating, CW-IIB (item 13.1, appx C)	Chain, Wire Rope, Exposed Gear, and Cables	NA	80°F to 30° F (27°C to -1°C)	Semiannually
Oil, Lubricating, CW-IIA (item 13.1, appx C)	Chain, Wire Rope, Exposed Gear, and Cables	NA	30°F to -30°F (-1°C to -34°C)	Semiannually
Oil, Lubricating, GO-75 (item 13.2, appx C)	Chain, Wire Rope, Exposed Gear, and Cables	NA	-30°F to -65°F (-34°C to -54°C)	Semiannually

FOR ARCTIC OPERATIONS, REFER TO FM 9-207.

(11) *Total Man-Hour Requirements.* Total man-hour requirements required to perform lubrication requirements.

Total Man-Hours	
Interval	Man-Hours
Quarterly	2 0
Semiannually	3 0
Annually	1 1 0
18 Month	1 5 0

**Table 2-2. PREVENTIVE MAINTENANCE CHECKS AND SERVICES WITH LUBRICATION
INSTRUCTIONS FOR M578 RECOVERY VEHICLE**

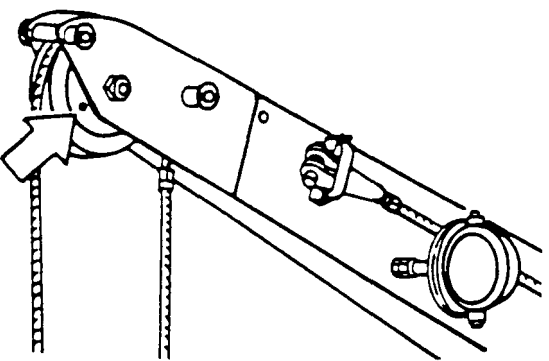
Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
1	Q	Boom Lift Block Bearing	 Lubricate fitting sparingly with grease (item 12, appx C).	
2	Q	Boom Sheave Bearing	 Lubricate fitting with grease (item 12, appx C).	

**Table 2-2. PREVENTIVE MAINTENANCE CHECKS AND SERVICES WITH LUBRICATION
INSTRUCTIONS FOR M578 RECOVERY VEHICLE (CONT)**

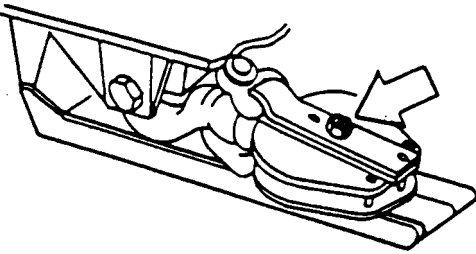
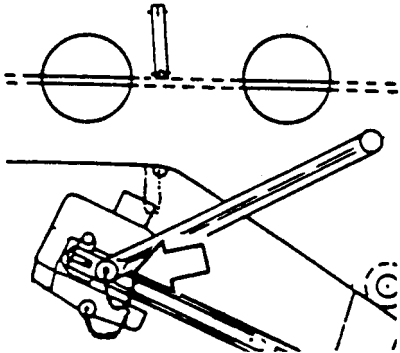
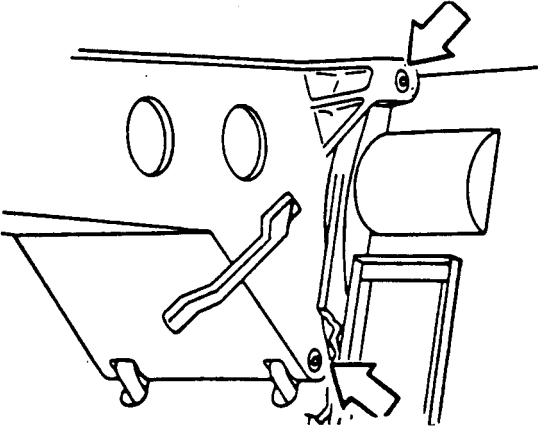
Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
3	Q	Tow Cable Single Block Bearing	 Lubricate fitting with grease (item 12, appx C).	
4	Q	Level Wind Housing Bearing	 Lubricate fitting with grease (item 12, appx C).	
5	Q	Boom and Boom Cylinder Hinge Pins	 Lubricate fittings on both sides of boom with grease (item 12, appx C).	

**Table 2-2. PREVENTIVE MAINTENANCE CHECKS AND SERVICES WITH LUBRICATION
INSTRUCTIONS FOR M578 RECOVERY VEHICLE (CONT)**

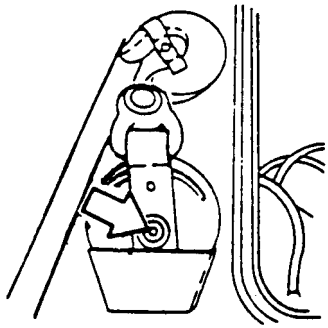
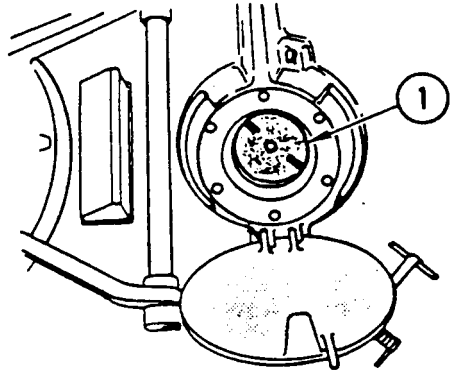
Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
6	Q	Snatch Block Bearing	 Lubricate fitting with grease (item 12, appx C).	
7	Q	Hydraulic Reservoir Filter and Strainer Assembly	 Service quarterly, when reservoir is drained, or upon indication that filter is plugged. NOTE Crane operator's control panel indicator will light when hydraulic fluid is bypassing the filter, indicating the filter is plugged. a. Open hydraulic reservoir fill cap (1).	

Table 2-2. PREVENTIVE MAINTENANCE CHECKS AND SERVICES WITH LUBRICATION
INSTRUCTIONS FOR M578 RECOVERY VEHICLE (CONT)

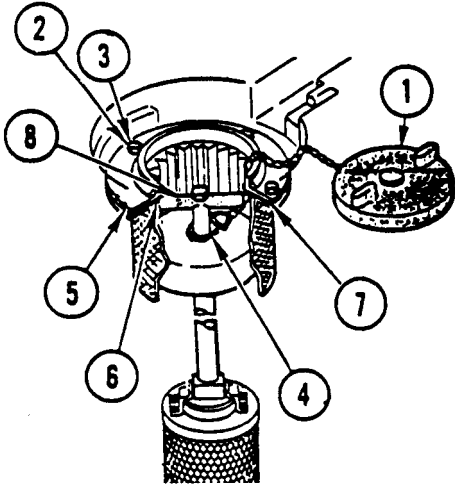
Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
7 (cont)			 b. Remove the following items in the order listed below: (1) Six machine screws (2) and lockwashers (3). (2) Retaining pin (4). (3) Flange (5). (4) Retainer (6). (5) Gaskets (7). c. Rotate T-handle (8) in strainer counterclockwise, several turns, to release strainer assembly. d. Lift filter and strainer assembly from reservoir. WARNING Dry cleaning solvent (SD2) is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated area. e. Clean filter and strainer assembly with dry cleaning solvent (item 10, appx C). f. Dry and inspect filter and strainer assembly. g. Replace both gaskets (7). h. Install filter and strainer assembly by reversing removal procedure above.	

**Table 2-2. PREVENTIVE MAINTENANCE CHECKS AND SERVICES WITH LUBRICATION
INSTRUCTIONS FOR M578 RECOVERY VEHICLE (CONT)**

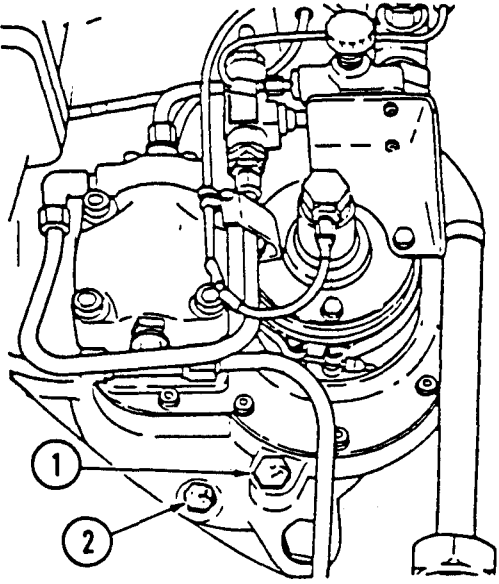
Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
8	Q	Traversing Gearcase Fill and Level	 Check oil level of upper and lower sections. - Open access door in left floor cover. - To check upper section oil level, remove plug (1) and check that oil level is 0.25 in. (0.64 cm) below top of plug hole. - Fill with OEA (item 14.2, appx C) until oil level is 0.25 in. (0.64 cm) below top of plug hole. WARNING Dry cleaning solvent (SD2) is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated area. - Clean plug (1) with dry cleaning solvent (item 10, appx C) and install. - To check lower section, remove plug dipstick (2) and check that oil level indication is at knurled end on dipstick. - Fill with OEA (item 14.2, appx C) until oil level indicates on knurled end of dipstick. - Install plug dipstick (2).	

**Table 2-2. PREVENTIVE MAINTENANCE CHECKS AND SERVICES WITH LUBRICATION
INSTRUCTIONS FOR M578 RECOVERY VEHICLE (CONT)**

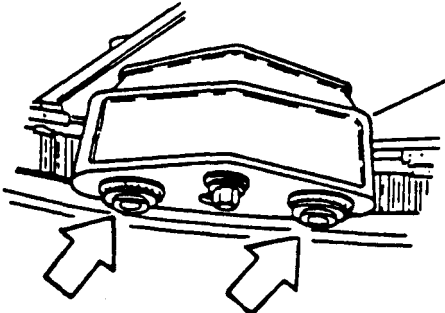
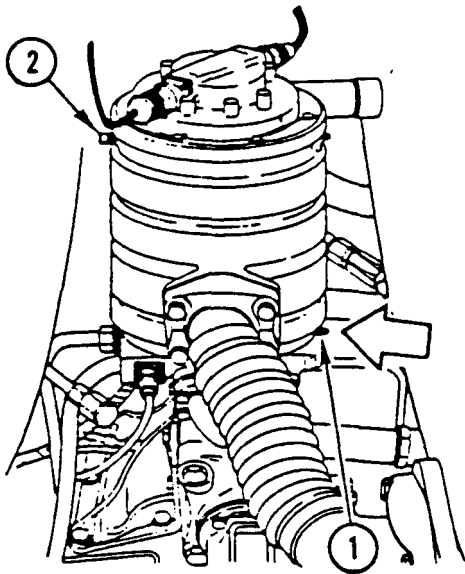
Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
9	Q	Traversing Final Drive Bearings	 Lubricate two fittings with grease (item 12, appx C).	
10	Q	Slip Ring Breather and Bearing	 a. Lubricate fitting on slip ring bearing (1) with grease (item 12, appx C). WARNING Dry cleaning solvent (SD2) is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated area. b. Remove breather (2) and clean with dry cleaning solvent (item 10, appx C). c. Dry, inspect, and install breather (2).	

**Table 2-2. PREVENTIVE MAINTENANCE CHECKS AND SERVICES WITH LUBRICATION
INSTRUCTIONS FOR M578 RECOVERY VEHICLE (CONT)**

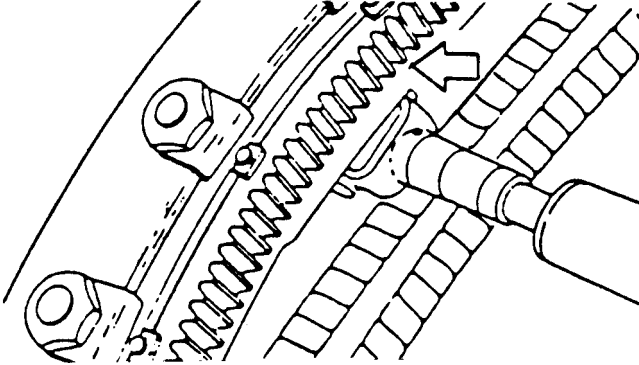
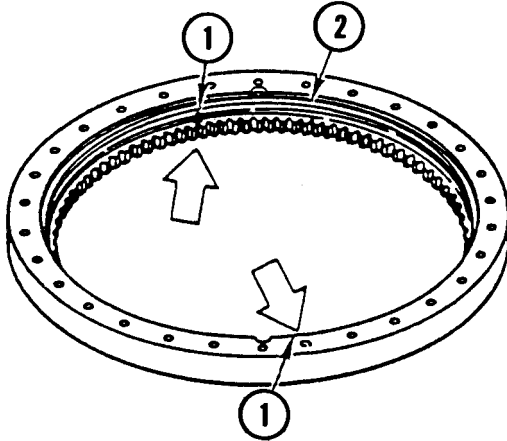
Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
11	Q	Traversing Ring Gear	 Clean with CLP (item 5, appx C) and coat with grease (item 12, appx C).	
12	Q	Turret Bearing	 WARNING Make sure no personnel are in turret well before traversing cab. Lubricate quarterly, after 75 hours of operation, or after each cleaning operation, when turret well is exposed to steam or high-pressure water. - Apply grease (item 12, appx C) to both lubrication fittings (1) until clean grease is observed at seals (2). - Wipe away dirty grease that is forced through seals. - Repeat until only clean grease is observed at seals. - Traverse cab four complete revolutions, alternating left and right.	

**Table 2-2. PREVENTIVE MAINTENANCE CHECKS AND SERVICES WITH LUBRICATION
INSTRUCTIONS FOR M578 RECOVERY VEHICLE (CONT)**

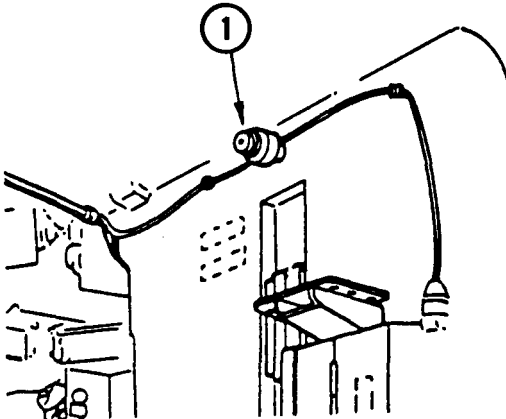
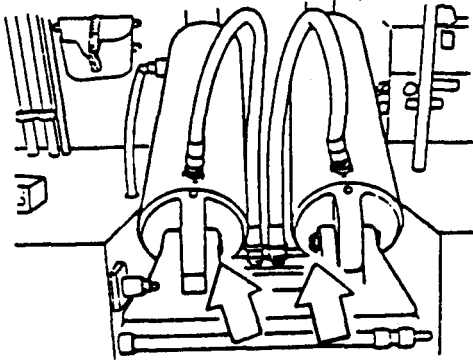
Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
13	Q	Hydraulic Reservoir Breather	 WARNING Dry cleaning solvent (SD2) is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated area. - Remove breather (1) and clean with dry cleaning solvent (Item 10, appx C). - Dry, inspect, dip in OE/HDO or OEA (item 14.1 or 14.2, appx C) and install.	
14	Q	Boom Cylinder Hinge Pins	 Lubricate two fittings with grease (item 12, appx C).	

**Table 2-2. PREVENTIVE MAINTENANCE CHECKS AND SERVICES WITH LUBRICATION
INSTRUCTIONS FOR M578 RECOVERY VEHICLE (CONT)**

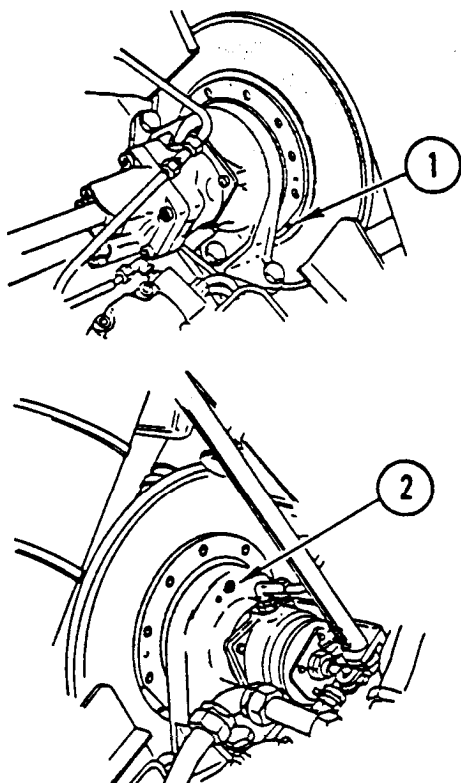
Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
15	Q	Tow Winch Fill and Level	 Check oil level. - Rotate drum until check plug (1) is in horizontal (3 or 9 o'clock) position. - Remove check plug (1) at motor end of winch. - Remove fill plug (2) at brake end. - Add OE/HDO or OEA (item 14.1 or 14.2, appx C) through fill hole (2) until oil runs out of check plug hole (1). WARNING Dry cleaning solvent (SD2) is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated area. - Clean fill plug (2) and check plug (1) with dry cleaning solvent (item 10, appx C) and install.	

**Table 2-2. PREVENTIVE MAINTENANCE CHECKS AND SERVICES WITH LUBRICATION
INSTRUCTIONS FOR M578 RECOVERY VEHICLE (CONT)**

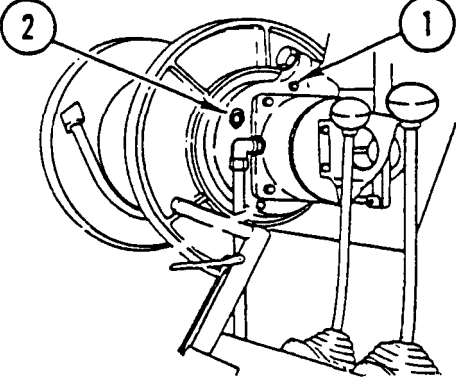
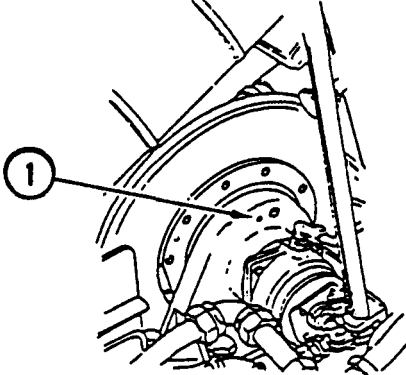
Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
16	Q	Boom Winch Fill and Level	 NOTE Remove boom winch cover to gain access to plugs. Check oil level. - Remove fill plug (1) and level plug (2). - Add OE/HDO or OEA (item 14.1 or 14.2, appx C) through fill hole (1) until oil runs out of level plug hole (2). WARNING Dry cleaning solvent (SD2) is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated area.	
17	S	Tow Winch Breather	Clean fill plug (1) and level plug (2) with dry cleaning solvent (item 10, appx C) and install. 	

**Table 2-2. PREVENTIVE MAINTENANCE CHECKS AND SERVICES WITH LUBRICATION
INSTRUCTIONS FOR M578 RECOVERY VEHICLE (CONT)**

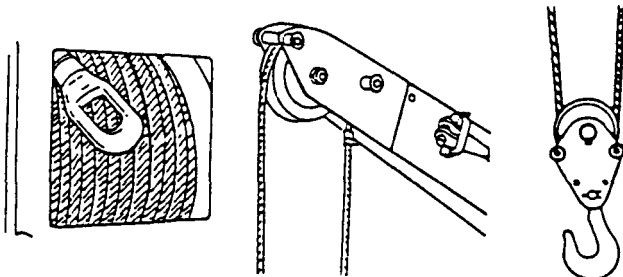
Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
17 (cont)			WARNING Dry cleaning solvent (SD2) is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated area. a. Remove breather (1) and clean with dry cleaning solvent (item 10, appx C). b. Dry, inspect, dip in OE/HDO (item 14.1, appx C) and install.	
18	S	Boom Winch and Tow Winch Drum and Cable	 Perform the following semiannually if winch or cable has not been used. a. Unwind and clean entire cable. b. Brush-soak cable and drum with OE/HDO or OEA (item 14.1 or 14.2, appx C). c. Wipe off excess oil and coat cable and drum with lubricating oil (CWII or GO-75) (item 13.1 or 13.2, appx C). CAUTION Cable is unsafe if three broken wires are found in one strand of 6 x 7 ft (1.8 x 2.1 m) rope, six broken wires in one strand of 6 x 19 ft (1.8 x 5.8 m) rope, or nine broken wires in one strand of 6 x 37 ft (1.8 x 11.3 m) rope. d. Check the boom and tow winch cables for damage resulting from kinks, bends, crushed sections, or fraying which cause potential weak points and hazards.	Frayed, kinked, worn, or corroded ropes.

**Table 2-2. PREVENTIVE MAINTENANCE CHECKS AND SERVICES WITH LUBRICATION
INSTRUCTIONS FOR M578 RECOVERY VEHICLE (CONT)**

Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
19	S	Boom Winch and Tow Winch Controls	CAUTION If more than half the wires in any single strand are broken, strands are separating from pulled out kinks, or if fraying after crushing under the track, replace damaged cable. - Start engine and operate hydraulic pumps to pressurize hydraulic system. - Check shift control of both winches. Pay in cables in hi-lo settings, checking for smoothness of operation. - Set LEVEL WIND switch ON. - Move cable to left and right. Observe traversing of cab for smoothness and alinement of cable to cab. If cab does not traverse, troubleshoot level wind, refer to page 2-21. - Check boom and tow winch cables for damage resulting from kinks, bends, crushed sections, or fraying which cause potential weak points and hazard. Replace cables if kinked, crushed, or one half the wires are broken in one strand of cable, refer to pages 2-148 and 2-137.	Class III leaks or any unusual noises.
20	S	Crane Traversing, Crane and Boom Controls	- Lower boom and relieve any residual hydraulic pressure. - Clean hydraulic reservoir filter and strainer assembly; refer to Item 7.	Any loose lines, fittings, and pump mount bolts. Any leaks or pump will not pressurize hydraulic system.

**Table 2-2. PREVENTIVE MAINTENANCE CHECKS AND SERVICES WITH LUBRICATION
INSTRUCTIONS FOR M578 RECOVERY VEHICLE (CONT)**

Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
20 (cont)			c. Start engine and operate hydraulic pumps to pressurize hydraulic system. Check filter, lines, and fittings for leaks. Tighten connection if loose or leaking. d. Release boom block from front of vehicle. Traverse cab left and right. If rotation is not smooth, notify direct support maintenance. e. Check crane and boom control for smooth and steady operation. f. Check boom cylinders for smoothness and ease of operation.	
21	S	Electrical Wiring	Inspect, tighten, or connect wiring terminals and connections. Tape cable or harnesses that are frayed or have broken insulation. Repair damaged connectors.	Any broken wiring terminal or frayed wire and broken connector.
22	A	Hydraulic System	a. Lower boom and relieve any residual hydraulic pressure. b. Clean hydraulic reservoir filter and strainer assembly; refer to Item 7. c. Start engine and operate hydraulic pumps to pressurize hydraulic system. Check the filters, lines, and fittings for leaks.	Filters, lines, or fittings leaking.

**Table 2-2. PREVENTIVE MAINTENANCE CHECKS AND SERVICES WITH LUBRICATION
INSTRUCTIONS FOR M578 RECOVERY VEHICLE (CONT)**

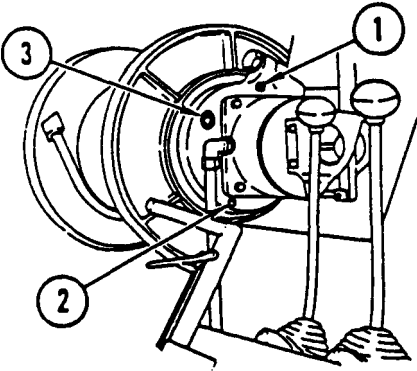
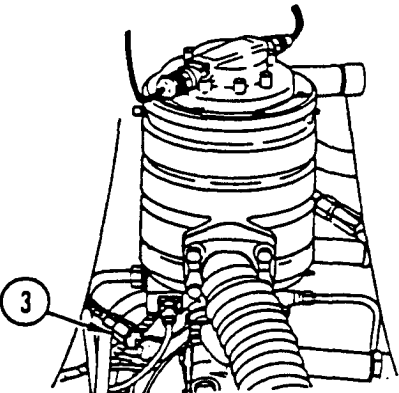
Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
23	A	Boom Winch Drain and Fill	 Drain oil from winch. - Remove fill plug (1), drain plug (2), and level plug (3). - Drain oil into a suitable container. WARNING Dry cleaning solvent (SD2) is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated area. - Clean drain plug (2) with dry cleaning solvent (item 10, appx C) and install. - Fill with OE/HDO or OEA (item 14.1 or 14.2, appx C) at fill plug (1) until oil runs out of level plug (3) hole. - Clean fill plug (1) and level plug (3) with dry cleaning solvent (item 10, appx C) and install.	
24	A	Traversing Gearcase Drain and Fill and Swivel Joint Lube		

**Table 2-2. PREVENTIVE MAINTENANCE CHECKS AND SERVICES WITH LUBRICATION
INSTRUCTIONS FOR M578 RECOVERY VEHICLE (CONT)**

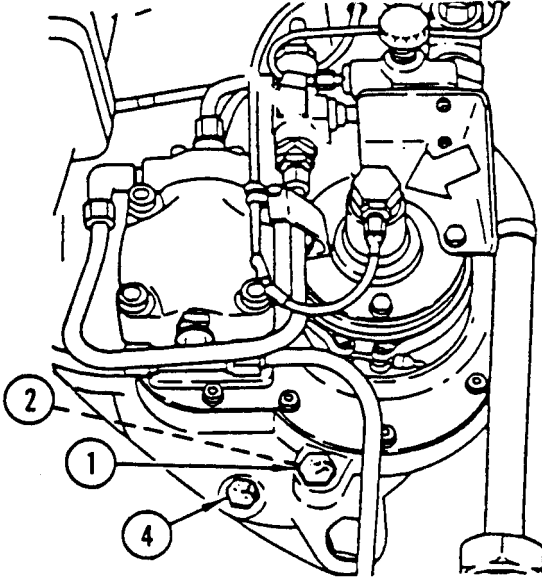
Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
2 4 (cont)			 Drain gearcase and lubricate upper section swivel joint. NOTE Drain only after operation. - Open access door in left floor cover. - Remove upper gearcase fill plug (1). - Insert 1/4 in. square drive extension through gearcase plug (1) and remove intermediate plug (2). - Remove cap (3) from oil drain line and drain oil into a suitable container. WARNING Dry cleaning solvent (SD2) is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated area. - Clean intermediate plug (2) and drain line cap (3) with dry cleaning solvent (item 10, appx C) and install. - Remove lower section fill plug (4) and fill with OEA (item 14.2, appx C) until it reaches knurled end of gage on lower fill plug.	

**Table 2-2. PREVENTIVE MAINTENANCE CHECKS AND SERVICES WITH LUBRICATION
INSTRUCTIONS FOR M578 RECOVERY VEHICLE (CONT)**

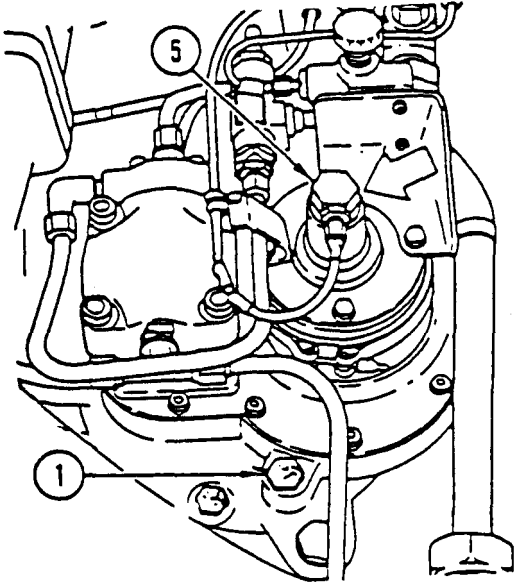
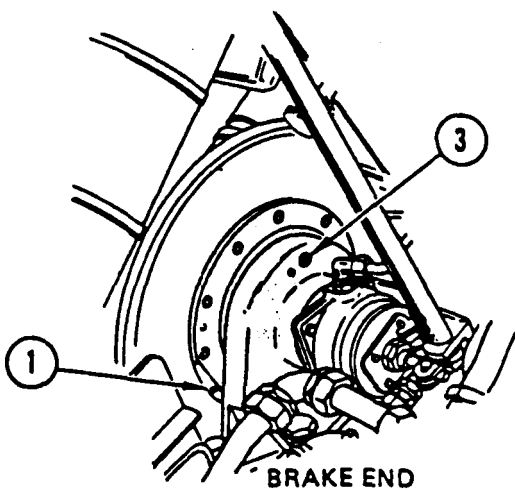
Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
24 (cont)			 g. Fill upper section with OEA (item 14.2, appx C) to about 0.25 in. (0.64 cm) below top of fill hole. h. Install upper gearcase fill plug (1). i. Lubricate upper section swivel joint (5) with grease (item 12, appx C).	
25	A	Tow Winch Drain and Fill	 BRAKE END	

**Table 2-2. PREVENTIVE MAINTENANCE CHECKS AND SERVICES WITH LUBRICATION
INSTRUCTIONS FOR M578 RECOVERY VEHICLE (CONT)**

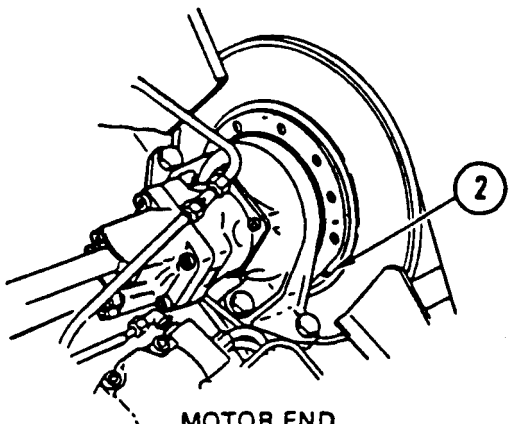
Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
25 (cont)			 MOTOR END Drain oil from tow winch. - Rotate drum until drain and check plugs (1) and (2) are down. - Remove drain and check plugs (1) and (2) from both ends of drum and drain oil into a suitable container. WARNING Dry cleaning solvent (SD2) is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated area. - Clean drain and check plug (1) with dry cleaning solvent (item 10, appx C) and install in brake end. - Rotate drum until drain and check plug (1) is horizontal (3 or 9 o'clock) position. - Remove fill plug (3) from support bracket. - Add OE/HDO or OEA (item 14.1 or 14.2, appx C) at fill plug (3) opening until oil comes out drain and check plug (2) opening at motor end. - Clean drain and check plug (2) and fill plug (3) with dry cleaning solvent (item 10, appx C) and install.	

Table 2-2. PREVENTIVE MAINTENANCE CHECKS AND SERVICES WITH LUBRICATION
INSTRUCTIONS FOR M578 RECOVERY VEHICLE (CONT)

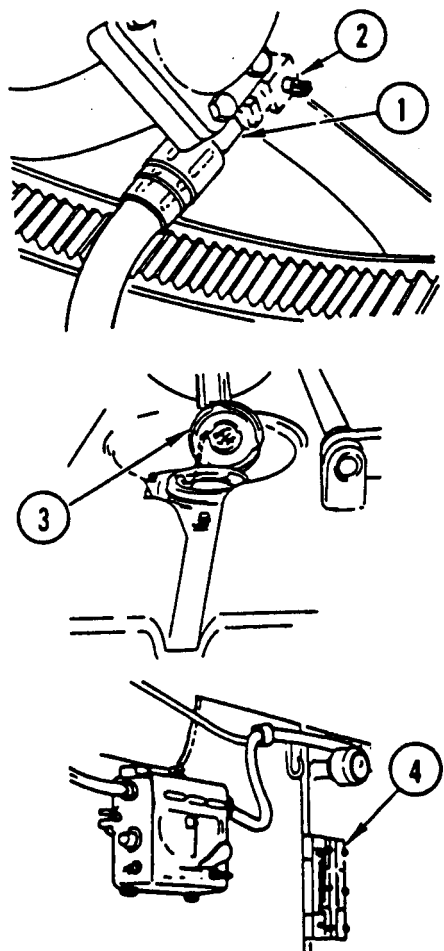
Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
26	18	Hydraulic Reservoir Drain and Fill	 Drain hydraulic reservoir. NOTE Drain only after operation. - Attach a drain hose to quick-disconnect fitting (1) under reservoir. - Open hull cleanout cover in turret well and place drain hose in opening.	

**Table 2-2. PREVENTIVE MAINTENANCE CHECKS AND SERVICES WITH LUBRICATION
INSTRUCTIONS FOR M578 RECOVERY VEHICLE (CONT)**

Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
26 (cont)			CAUTION Hydraulic reservoir contains 140 gal. (530 l) of oil. c. Open drain valve (2) at top of quick-disconnect fitting and drain oil into a suitable container. d. After draining, close drain valve (2), remove drain hose, and close hull cleanout cover. e. Open reservoir fill cap (3) and fill reservoir with OE/HDO 10 (item 14.1, appx C) or OEA (item 14.2, appx C) until it indicates halfway on level gage (4) in cab. NOTE Perform the following services at the same time the reservoir is drained: • Change filter element; refer to TM 9-2350-238-10. • Clean hydraulic reservoir breather; refer to Item 13. • Clean filter and strainer assembly; refer to Item 7.	

Section IV. UNIT TROUBLESHOOTING

2-9. TROUBLESHOOTING INFORMATION.

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

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

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

UNIT TROUBLESHOOTING SYMPTOM INDEX

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	Troubleshooting Procedure Page
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Vehicular intercommunication system operates intermittently when there is no outside interference	2-16

Table 2-3. UNIT TROUBLESHOOTING

MALFUNCTION	
TEST OR INSPECTION	CORRECTIVE ACTION
BOOM AND WINCH INSTALLATION	
1. TOW WINCH DOES NOT OPERATE WHEN CAB TRAVERSES AND BOOM RAISES AND LOWERS NORMALLY.	<i>Step 1.</i> Check for broken or jammed control lever or shift linkage. If damaged or jammed, notify direct support maintenance. <i>Step 2.</i> Check for damaged hydraulic brake cylinder to valve tube. Replace damaged hydraulic brake cylinder to valve tube, refer to page 2-187. <i>Step 3.</i> Check for damaged or jammed hydraulic winch motor, control cylinder or shift mechanism. If damaged or jammed, notify direct support maintenance.
2. TOW WINCH REELS IN, BUT WILL NOT PAY OUT, OR WINCH PAYS OUT, BUT WILL NOT REEL IN.	Check for leaking counterbalance valve. If counterbalance valve is leaking, notify direct support maintenance.

2-9. TROUBLESHOOTING INFORMATION (CONT).

Table 2-3. UNIT TROUBLESHOOTING (CONT)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
BOOM AND WINCH INSTALLATION (CONT)		
3.	TOW WINCH OPERATION IS SLOW IN EITHER DIRECTION WHEN CAB TRAVERSES AND BOOM RAISES AND LOWERS NORMALLY.	<i>Step 1.</i> Check for hydraulic leak. Tighten all lines and fittings. <i>Step 2.</i> Check for damaged lines and hoses. Replace damaged hydraulic lines or hoses, refer to page 2-191.
4.	BOOM WINCH DOES NOT OPERATE WHEN CAB TRAVERSES AND BOOM RAISES AND LOWERS NORMALLY.	<i>Step 1.</i> Check for broken or jammed boom winch control valve or linkage. If boom winch control valve or linkage is damaged, notify direct support maintenance. <i>Step 2.</i> Check for damaged hydraulic brake cylinder to valve tube. Replace damaged hydraulic brake cylinder to valve tube, refer to page 2-187. <i>Step 3.</i> Check for damaged or jammed hydraulic winch motor, control cylinder, or shift mechanism. If damaged or jammed, notify direct support maintenance.
5.	BOOM WINCH REELS IN, BUT WILL NOT PAY OUT, OR WINCH PAYS OUT, BUT WILL NOT REEL IN.	Check for leaking counterbalance valve. If counterbalance valve is leaking, notify direct support maintenance.
6.	BOOM WINCH IS SLOW IN EITHER DIRECTION WHEN CAB TRAVERSES AND BOOM RAISES AND LOWERS NORMALLY.	<i>Step 1.</i> Check for hydraulic leaks. Tighten all lines and fittings.

Table 2-3. UNIT TROUBLESHOOTING (CONT)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	Step 2. Check for damaged lines and hoses.	Replace damaged hydraulic lines or fittings, refer to page 2-183.
7.	BOOM WINCH SPEED CANNOT BE SHIFTED.	Check for sticking shift mechanism. Attempt to free mechanism by lightly tapping shift control handle to engage splines. If shift mechanism will not engage, notify direct support maintenance.
8.	BOOM WINCH IS SLOW WHEN REELING IN WHEN ALL OTHER OPERATIONS ARE NORMAL.	Notify direct support maintenance to adjust relief valve.
9.	LEVEL WIND ASSEMBLY DOES NOT CENTER ITSELF.	Step 1. Clean cable level guide, refer to page 2-75. Adjust level wind, refer to TM 9-2350-238-10. Step 2. Check for broken or distorted level wind slide spring. If damaged, notify direct support maintenance.
10.	LEVEL WIND DOES NOT TRAVERSE CAB IN EITHER DIRECTION.	Troubleshoot level wind circuit, refer to Electrical Circuit Symptom Index, page 2-19.
CAB FILTER INSTALLATION		
11.	CAB AIR PURIFIER UNIT DOES NOT OPERATE.	Step 7. Check motor ground for bad connection. Clean ground connections with crocus cloth (item 6, appx C). Make sure ground connections are tight. Step 2. Troubleshoot cab air purifier unit. a. Refer to Electrical Circuit Symptom Index, page 2-19. b. If cab air purifier unit still does not operate, notify direct support maintenance.

2-9. TROUBLESHOOTING INFORMATION (CONT).

Table 2-3. UNIT TROUBLESHOOTING (CONT)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
ELECTRICAL INSTALLATION		
12. VEHICULAR INTERCOMMUNICATION SYSTEM OPERATES INTERMITTENTLY WHEN THERE IS NO OUTSIDE INTERFERENCE.	Check continuity between amplifier and wiring harness, line disconnects and driver's control box, and wiring harness.	a. If multimeter does not indicate 0 ohms, repair wiring harness, refer to page 2-66. b. If multimeter indicates 0 ohms, refer to TM 11-2643 for AN/U1C-1 set or TM 11-5830-340-12 for AN/V1C-1 (V) set.
13. ALL CIRCUITS IN CAB ARE NOT OPERATING WHEN MASTER SWITCH IS ON.	Check slip ring ground for bad connection.	a. Clean ground connections with crocus cloth (item 6, appx C). Make sure ground connections are tight. b. Troubleshoot slip ring circuit, refer to Electrical Circuit Symptom Index, page 2-19.
14. FILTER BYPASS INDICATOR IS OFF WHEN LEVEL WIND CIRCUITS ARE NOT OPERATING.	Troubleshoot filter bypass indicator circuit, refer to Electrical Circuit Symptom Index, page 2-19.	
15. FILTER BYPASS INDICATOR IS NOT OPERATING WHEN LEVEL WIND CIRCUITS ARE OPERATING NORMALLY.	Troubleshoot filter bypass indicator circuit, refer to Electrical Circuit Symptom Index, page 2-19.	

Table 2-3. UNIT TROUBLESHOOTING (CONT)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
16. FILTER BYPASS INDICATOR STAYS ON WHEN LEVEL WIND CIRCUITS ARE OPERATING NORMALLY.	Check ground lead on differential pressure switch for bad connection.	a. Clean ground connections with crocus cloth (item 6, appx C). Make sure ground connections are tight. b. Troubleshoot filter bypass indicator circuit, refer to Electrical Circuit Symptom Index, page 2-19.
17. LEVEL WIND DOES NOT TRAVERSE CAB WHEN MASTER AND LEVEL WIND SWITCHES ARE ON AND FILTER BYPASS INDICATOR LIGHT IS ON.	Check solenoid pressure relief valve ground for bad connection.	a. Clean ground connections with crocus cloth (item 6, appx C). Make sure ground connections are tight. b. Troubleshoot level wind circuit, refer to Electrical Circuit Symptom Index, page 2-19.
18. LEVEL WIND TRAVERSES CAB IN ONLY ONE DIRECTION.	Check solenoid direction control valve ground for bad connection.	a. Clean ground connections with crocus cloth (item 6, appx C). Make sure ground connections are tight. b. Troubleshoot level wind circuit, refer to Electrical Circuit Symptom Index, page 2-19.
19. ONLY ONE FLOODLIGHT IS OPERATING WHEN MASTER AND FLOODLIGHTS SWITCHES ARE ON.	Check floodlight ground for bad connection.	a. Clean ground connections with crocus cloth (item 6, appx C). Make sure ground connections are tight. b. Troubleshoot floodlight circuit, refer to Electrical Circuit Symptom Index, page 2-19.
20. BOTH FLOODLIGHTS ARE NOT OPERATING WHEN MASTER AND FLOODLIGHTS SWITCHES ARE ON.	Troubleshoot floodlight circuit, refer to Electrical Circuit Symptom Index, page 2-19.	

2-9. TROUBLESHOOTING INFORMATION (CONT).

Table 2-3. UNIT TROUBLESHOOTING (CONT)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
ELECTRICAL INSTALLATION (CONT)		
21. CAB SIGNAL FLASHER HEADLIGHT AND FLASHER INDICATOR LAMPS ARE NOT OPERATING WHEN MASTER AND FLASHER SIGNAL SWITCHES ARE ON.		Troubleshoot cab flasher headlight and dome light circuit, refer to Electrical Circuit Symptom Index, page 2-19.
22. FLASHER INDICATOR LAMP IS NOT OPERATING WHEN CAB SIGNAL FLASHER HEADLIGHT IS ON.		Check flasher indicator lamp ground for bad connection. a. Clean ground connections with crocus cloth (item 6, appx C). Make sure ground connections are tight. b. Troubleshoot cab flasher headlight and dome light circuit, refer to Electrical Circuit Symptom Index, page 2-19.
23. CAB SIGNAL FLASHER HEADLIGHT DOES NOT OPERATE WHEN FLASHER INDICATOR LAMP IS ON AND MASTER AND FLASHER SIGNAL SWITCHES ARE ON.		Troubleshoot cab flasher headlight and dome light circuit, refer to Electrical Circuit Symptom Index, page 2-19.
24. EITHER DOME LIGHT DOES NOT OPERATE WHEN MASTER SWITCH IS ON.		Troubleshoot cab flasher headlight and dome light circuit, refer to Electrical Circuit Symptom Index, page 2-19.
25. UTILITY OUTLET DOES NOT OPERATE WHEN BOTH DOME LIGHTS ARE ON AND MASTER SWITCH IS ON.		Troubleshoot cab flasher headlight and dome light circuit, refer to Electrical Circuit Symptom Index, page 2-19.
26. UTILITY OUTLET IS NOT OPERATING AND CAB FLASHER HEADLIGHT AND DOME LIGHTS ARE OFF WHEN MASTER SWITCH IS ON AND DOME LIGHT SWITCHES ARE ON.		Troubleshoot cab flasher headlight and dome light circuit, refer to Electrical Circuit Symptom Index, page 2-19.

2-10. ELECTRICAL CIRCUIT TROUBLESHOOTING.

a. The electrical circuit troubleshooting table lists the procedures necessary to inspect/repair applicable electrical circuits.

b. If you have a problem with an electrical circuit which is not covered in the steps below, notify your supervisor.

ELECTRICAL CIRCUIT SYMPTOM INDEX

Troubleshooting Procedure Page

BOOM AND WINCH INSTALLATION

Level wind circuit

Lever wind does not traverse cab when MASTER and LEVEL WIND switches are ON. Filter bypass indicator light is on	2-21
Level wind traverses cab in only one direction	2-27

HYDRAULIC INSTALLATION

Filter bypass indicator circuit

Filter bypass indicator is not operating when level wind circuits are operating normally	2-37
Filter bypass indicator is off when level wind circuits are not operating	2-35
Filter bypass indicator stays on when level wind circuits are operating normally	2-41
Slip ring circuit	2-30

CAB FILTER INSTALLATION

Cab air purifier circuit	2-42

ELECTRICAL INSTALLATION

Cab flasher headlight and dome light circuit

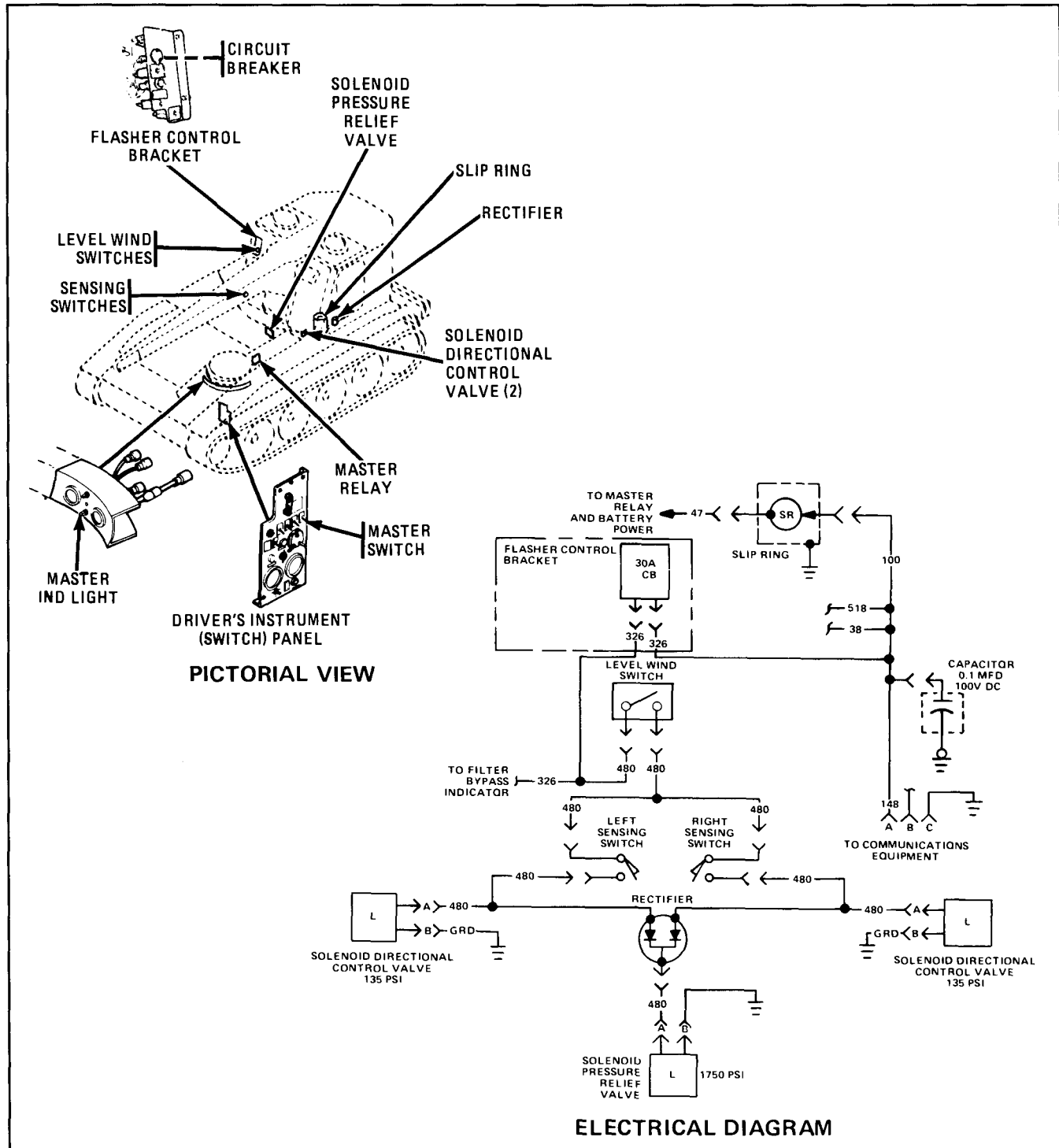
Cab signal flasher headlight and flasher indicator lamps are not operating when MASTER and FLASHER SIGNAL switches are ON	2-55
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Either dome light does not operate when MASTER switch is ON	2-61
Flasher indicator lamp is not operating when cab signal flasher headlight is on	2-57
Utility outlet does not operate when both dome lights are on and MASTER switch is on	2-63
Utility outlet is not operating when cab flasher headlight and dome lights are off and MASTER switch is ON and dome light switches are ON	2-65
Floodlight circuit	
Both floodlights are not operating when MASTER and FLOODLIGHTS switches are ON	2-51
Only one floodlight is operating when MASTER and FLOODLIGHTS switches are ON	2-49

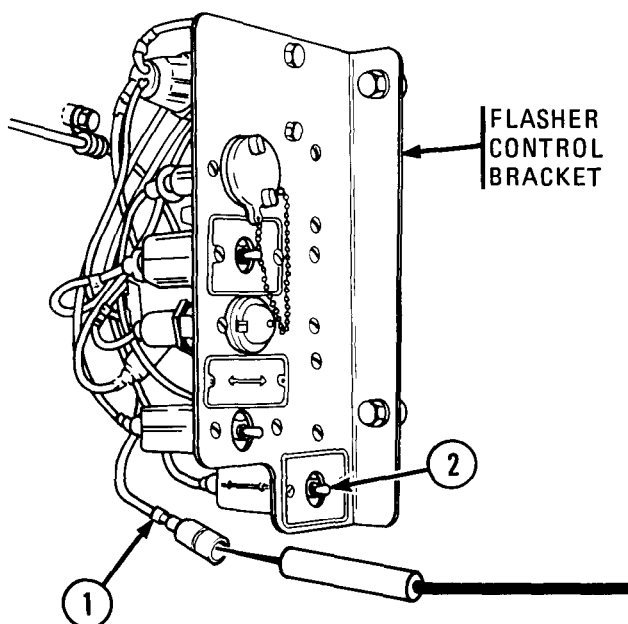
2-10. ELECTRICAL CIRCUIT TROUBLESHOOTING (CONT).

Table 2-4. ELECTRICAL CIRCUIT TROUBLESHOOTING

A. BOOM AND WINCH INSTALLATION

Level Wind Circuit.





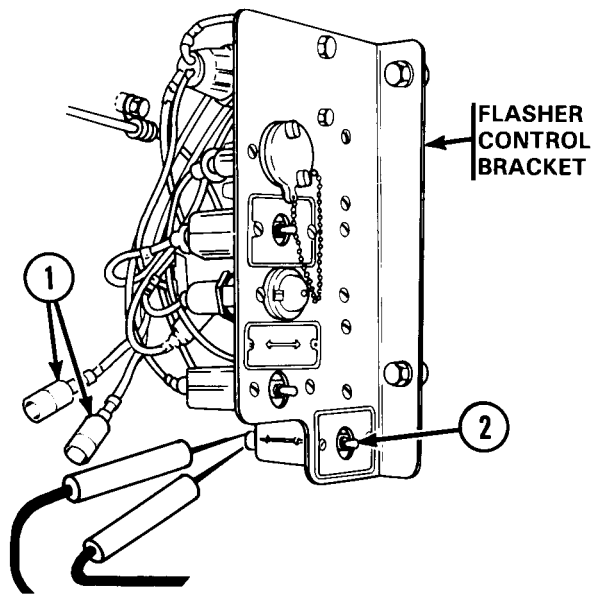
- (1) Level wind does not traverse cab when MASTER and LEVEL WIND switches are ON. Filter bypass indicator light is on.

WARNING

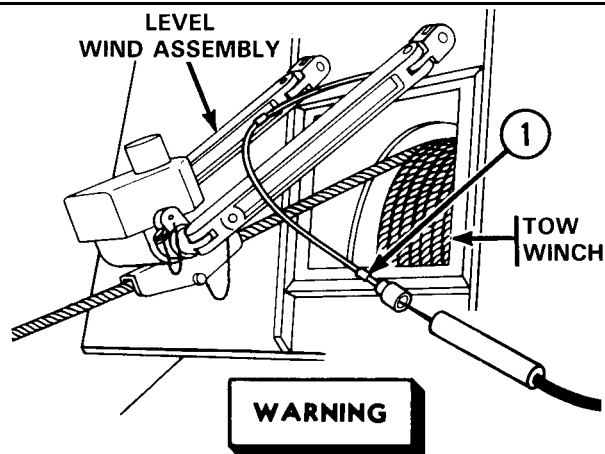
Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.

- Step 1.* Disconnect lead 480 (1) from input side of LEVEL WIND switch (2). Place red probe in lead 480. Ground black probe. Set MASTER switch ON. If multimeter indicates about 24 volts, go to step 2. If multimeter indicates no voltage, repair lead 480 between LEVEL WIND switch and circuit breaker, refer to page 2-66. Set MASTER switch OFF. Connect lead.

2-10. ELECTRICAL CIRCUIT TROUBLESHOOTING (CONT).

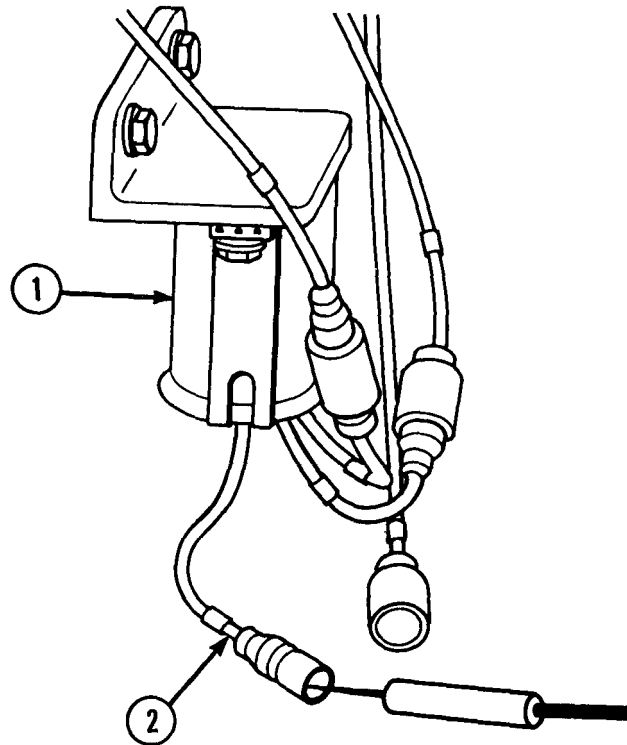


Step 2. Disconnect both leads 480 (1) from LEVEL WIND switch (2). Set LEVEL WIND switch ON. If multimeter indicates continuity, go to step 3. If multimeter indicates infinity, replace LEVEL WIND switch, refer to page 2-271. Set LEVEL WIND switch OFF. Connect leads.



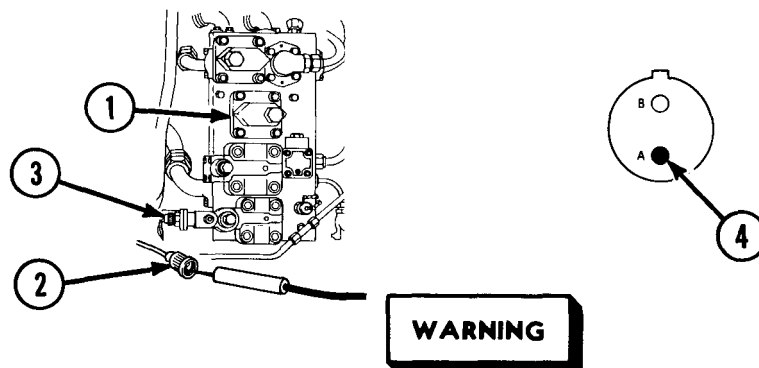
Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.

Step 3. Disconnect lead 480 (1) from either sensing switch. Place red probe in lead 480. Ground black probe. Set MASTER switch ON. Set LEVEL WIND switch ON. If multimeter indicates about 24 volts, go to step 4. If multimeter indicates no voltage, repair lead 480 between LEVEL WIND switch and sensing switches, refer to page 2-66. Set MASTER switch OFF. Set LEVEL WIND switch OFF. Connect lead.



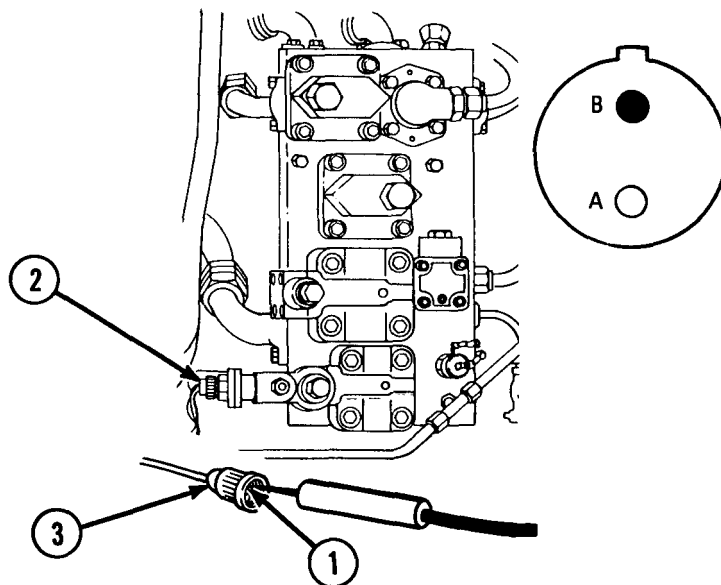
Step 4. Remove vehicle equipment stowage box for access to rectifier (1), refer to page 2-330. Disconnect lead 480 (2) at rectifier from solenoid pressure relief valve. Place red probe in lead 480. Ground black probe. Set MASTER switch ON. Set LEVEL WIND switch ON. Press either sensing switch to close. If multimeter indicates about 24 volts, go to step 5. If multimeter indicates no voltage, replace rectifier, refer to page 2-271. Set MASTER switch OFF. Set LEVEL WIND switch OFF. Connect lead.

2-10. ELECTRICAL CIRCUIT TROUBLESHOOTING (CONT).

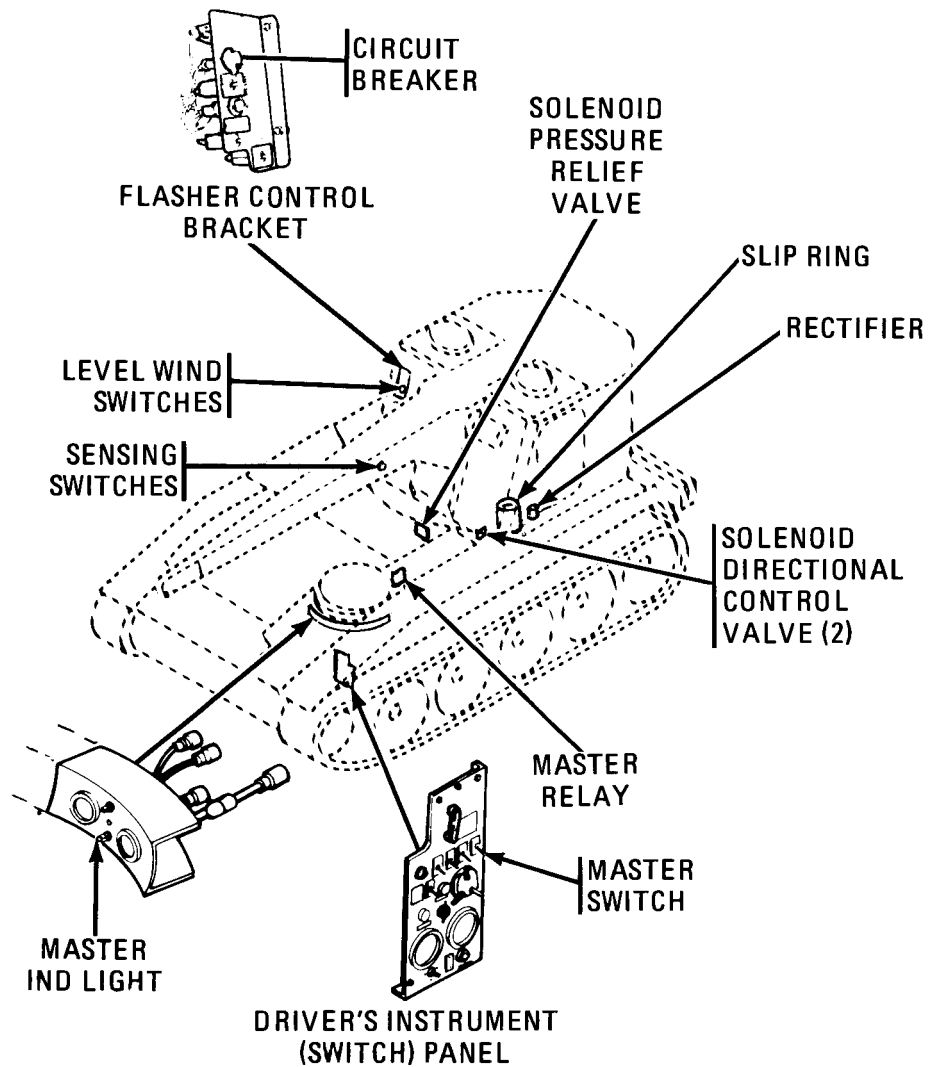


Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.

Step 5. Remove floor plate for access to flow divider manifold (1), refer to page 2-116. Disconnect connector (2) from solenoid pressure relief valve (3). Place red probe in socket A (4) (lead-480). Ground black probe. Set MASTER switch ON. Set LEVEL WIND switch ON. Press either sensing switch to close. If multimeter indicates about 24 volts, go to step 6. If multimeter indicates no voltage, repair lead 480 between rectifier and solenoid pressure relief valve, refer to page 2-66. Set MASTER switch OFF. Set LEVEL WIND switch OFF. Connect connector.

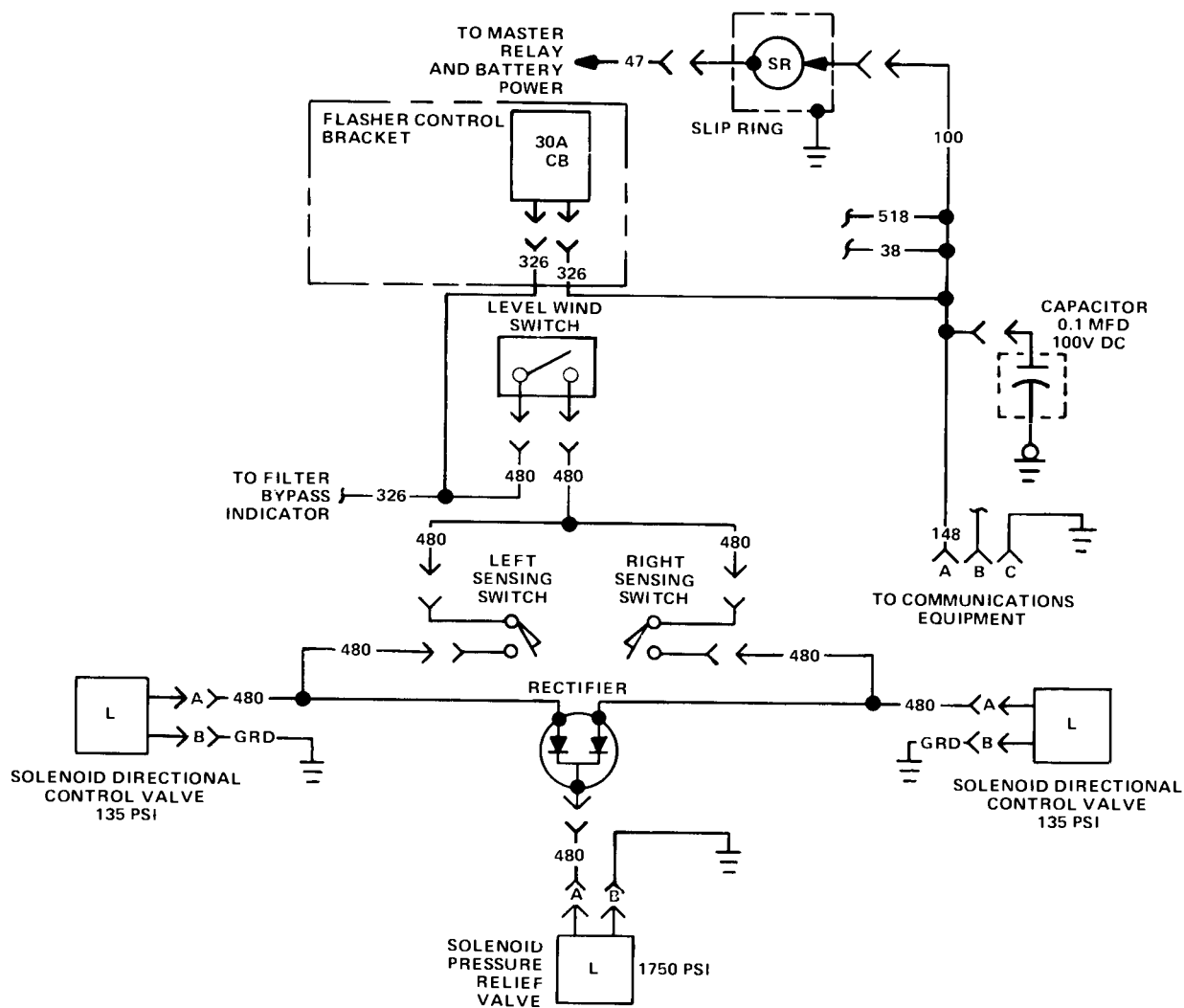


Step 6. Place red probe in socket B (1) (GND). Ground black probe. If multimeter indicates continuity, notify direct support maintenance for replacement of solenoid pressure relief valve (2). If multimeter indicates infinity, repair GND lead, refer to page 2-66. Connect connector (3).

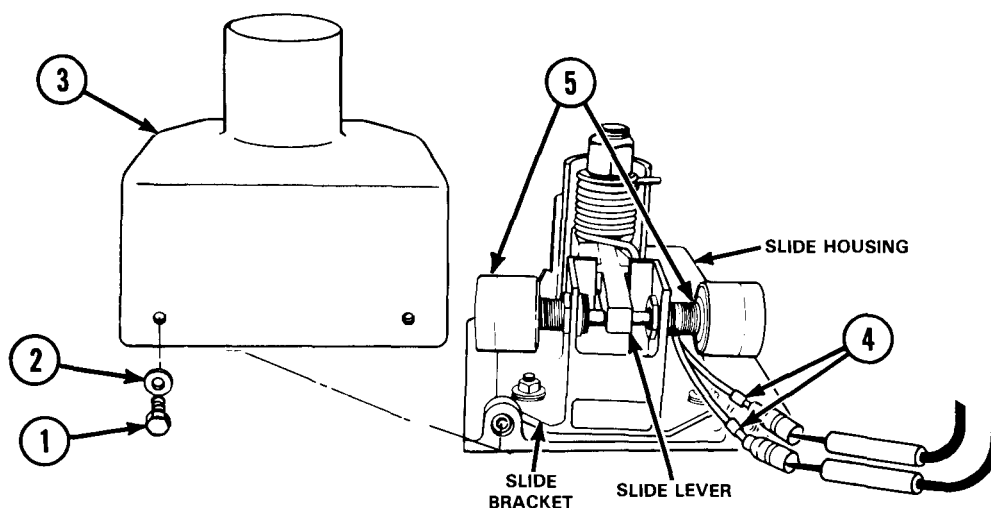


PICTORIAL VIEW

2-10 ELECTRICAL CIRCUIT TROUBLESHOOTING (CONT).

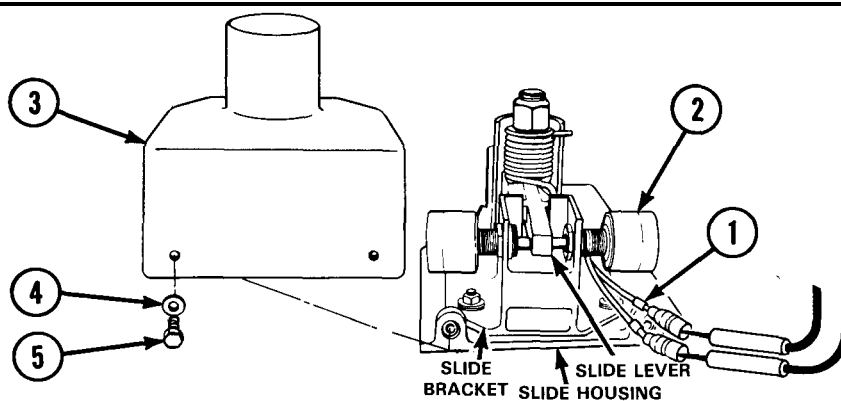


ELECTRICAL DIAGRAM



(2) Level wind traverses cab in only one direction.

Step 1. Remove three screws (1), three washers (2), and cover (3) for access to sensing switches. Disconnect leads 480 (4) from sensing switch (5) of the inoperative traversing circuit. Connect multimeter to sensing switch. Press sensing switch to close. If multimeter indicates continuity, go to step 2. If multimeter indicates infinity, notify direct support maintenance for replacement of sensing switches. Connect leads.

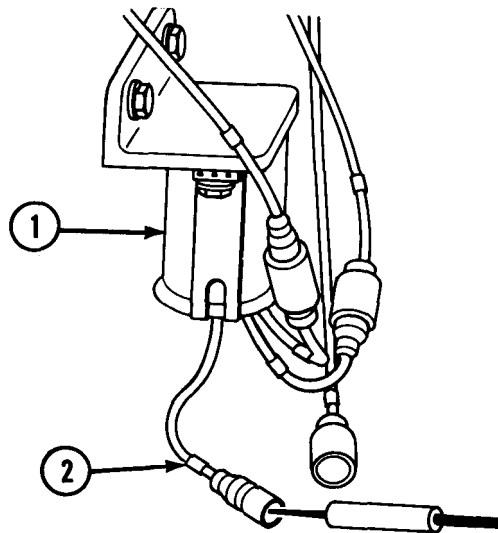


WARNING

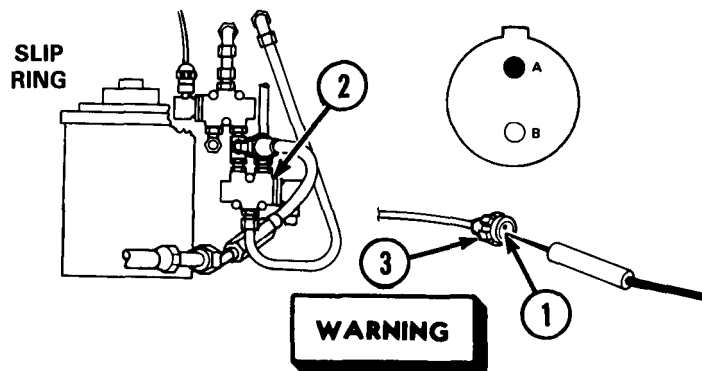
Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.

Step 2. Place red probe in lead 480 (1). Ground black probe. Set MASTER switch ON. Set LEVEL WIND switch ON. If multimeter indicates about 24 volts, go to step 3. If multimeter indicates no voltage, repair lead 480 between sensing switch (2) and LEVEL WIND switch, refer to page 2-66. Set MASTER switch OFF. Set LEVEL WIND switch OFF. Connect leads. Install cover (3) with three washers (4) and three screws (5).

2-10. ELECTRICAL CIRCUIT TROUBLESHOOTING (CONT).

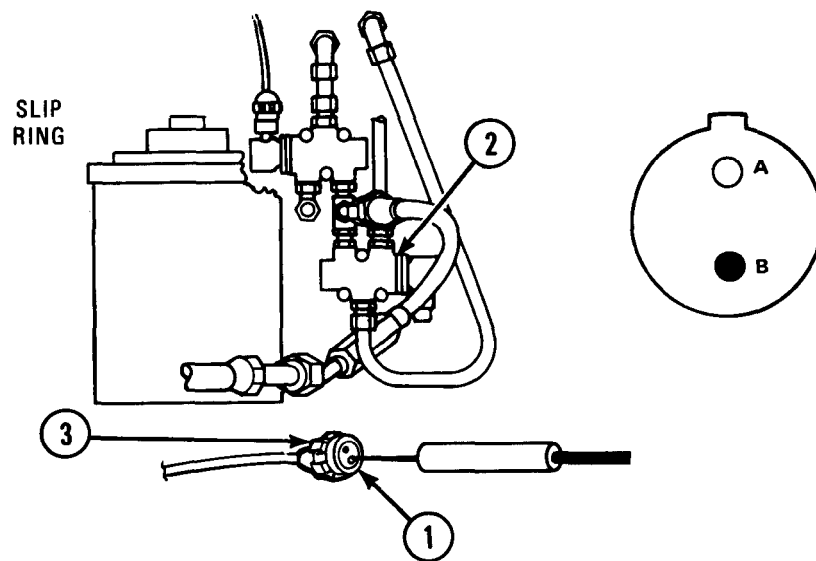


Step 3. Remove vehicle equipment stowage box for access to rectifier (1), refer to page 2-330. Disconnect lead 480 (2) from solenoid pressure relief valve to rectifier. Place red probe in lead 480. Ground black probe. Set MASTER switch ON. Set LEVEL WIND switch ON. Press sensing switch of in-operative traversing circuit to close. If multimeter indicates about 24 volts, go to step 4. If multimeter indicates no voltage, go to step 6. Set MASTER switch OFF. Set LEVEL WIND switch OFF. Connect lead.

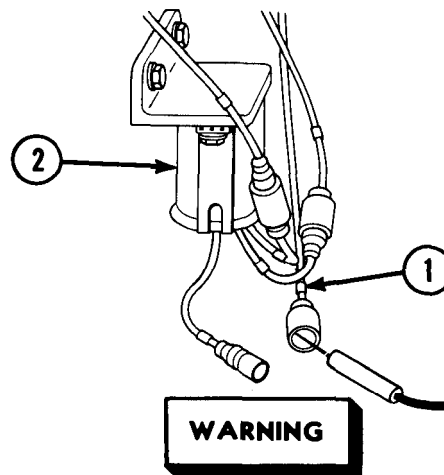


Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.

Step 4. Disconnect connector (1) from solenoid directional control valve (2) of in-operative traversing circuit. Place red probe in socket A (3) (lead 480). Ground black probe. Set MASTER switch ON. Set LEVEL WIND switch ON. Press sensing switch of inoperative traversing circuit to close. If multimeter indicates about 24 volts, go to step 5. If multimeter indicates no voltage, repair lead 480 between solenoid pressure relief valve and rectifier, refer to page 2-66. Set MASTER switch OFF. Set LEVEL WIND switch OFF. Connect connector.



Step 5. Place red probe on socket B (1) (GND). Ground black probe. If multimeter indicates continuity, notify direct support maintenance for replacement of solenoid directional control valve (2). If multimeter indicates infinity, repair GND lead, refer to page 2-66. Connect connector (3).



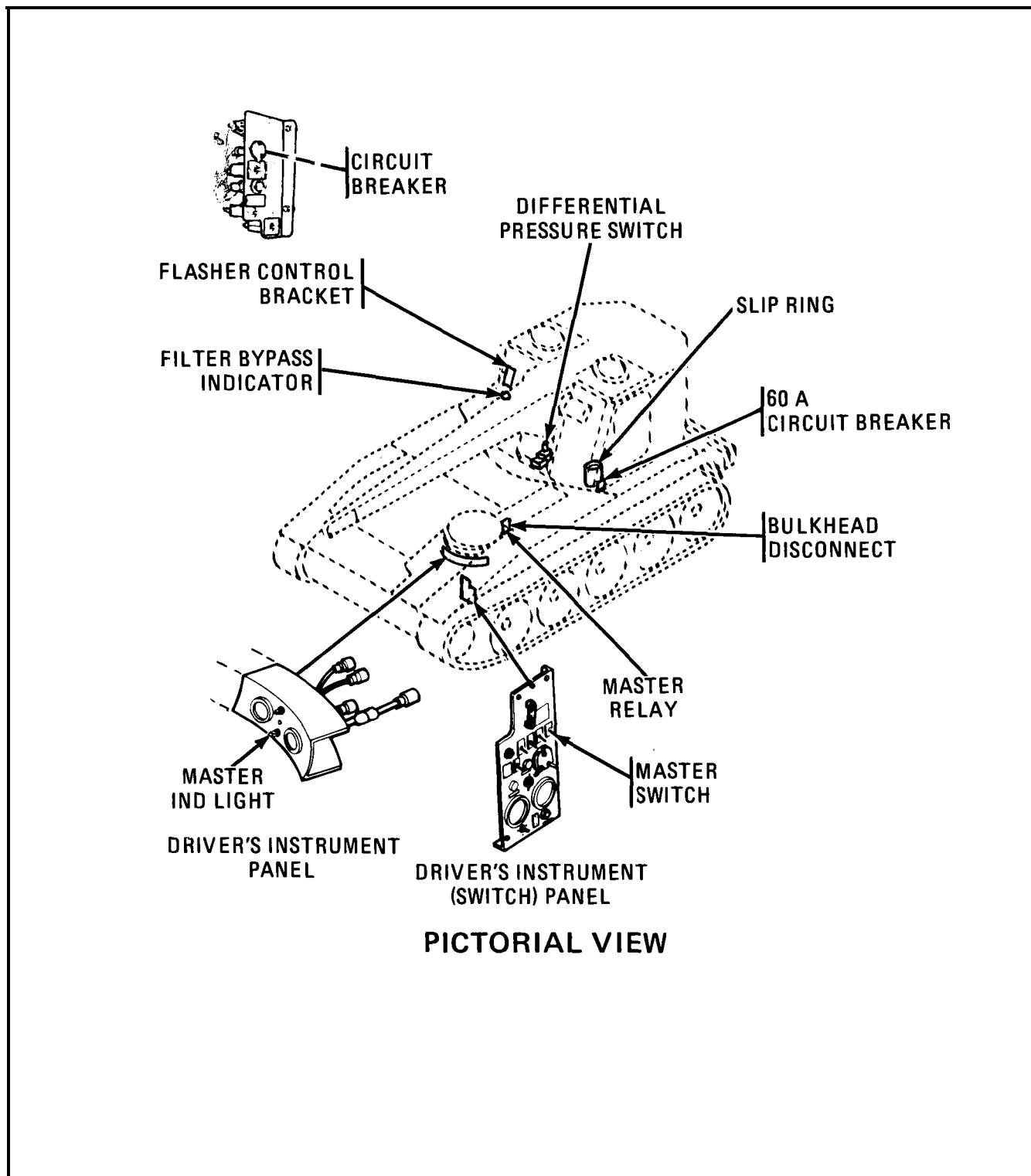
Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.

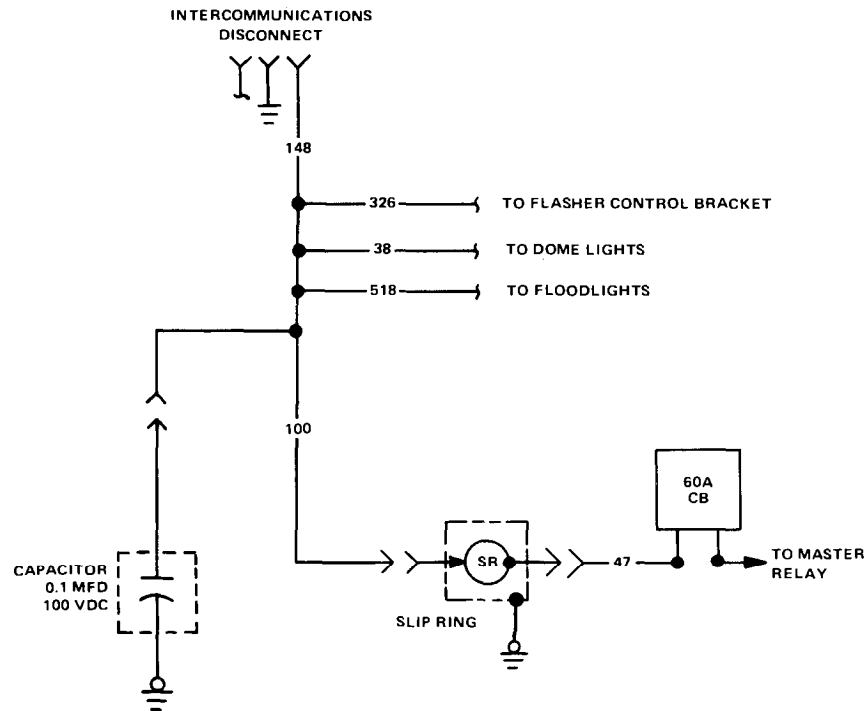
Step 6. Disconnect lead 480 (1) from inoperative traversing circuit at rectifier (2). Place red probe in lead 480. Ground black probe. Set MASTER switch ON. Set LEVEL WIND switch ON. Press sensing switch of inoperative traversing circuit to close. If multimeter indicates about 24 volts, replace rectifier, refer to page 2-271. If multimeter indicates no voltage, repair lead 480 between rectifier and sensing switch, refer to page 2-66. Set MASTER switch OFF. Set LEVEL WIND switch OFF. Connect lead.

2-10. ELECTRICAL CIRCUIT TROUBLESHOOTING (CONT).

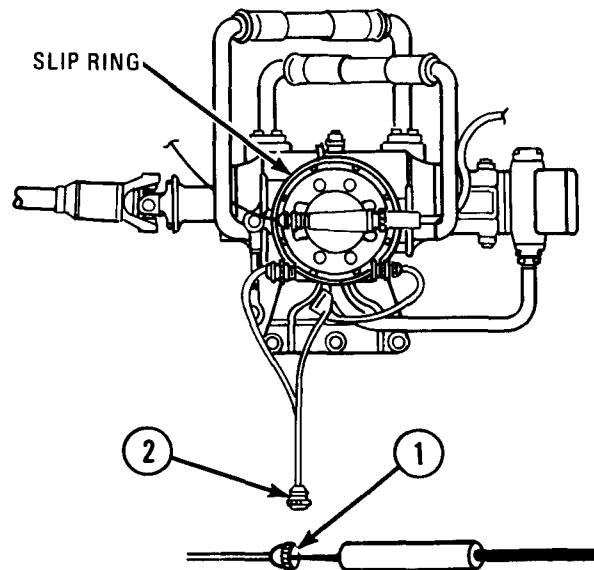
B. HYDRAULIC INSTALLATION

a. Slip Ring Circuit.



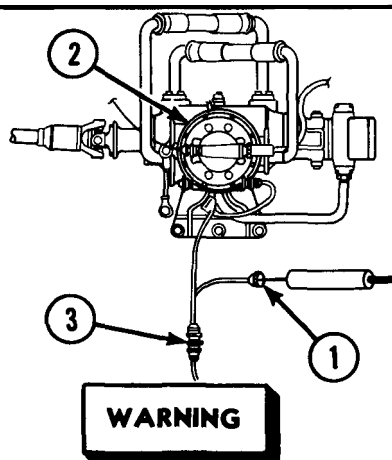


ELECTRICAL DIAGRAM



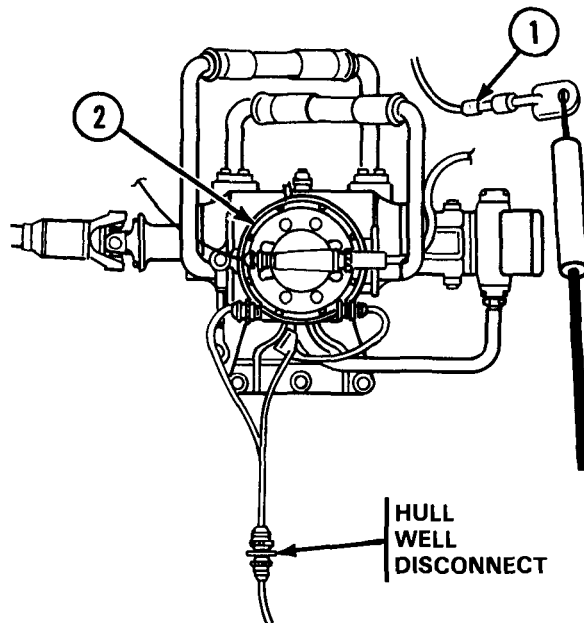
Step 1. Remove vehicle equipment stowage box, refer to page 2-330. Disconnect lead 47 (1) at hull well disconnect (2). Place red probe in lead 47. Ground black probe. Set MASTER switch ON. If multimeter indicates about 24 volts, go to step 2. If multimeter indicates no voltage, troubleshoot MASTER SWITCH CIRCUIT, refer to page 2-13. Set MASTER switch OFF. Connect lead.

2-10. ELECTRICAL CIRCUIT TROUBLESHOOTING (CONT).

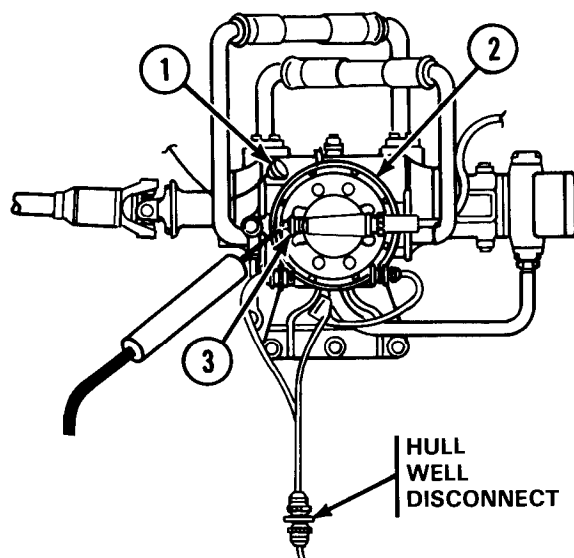


Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.

Step 2. Disconnect lead 47 (1) from slip ring (2). Place red probe in lead 47. Ground black probe. Set MASTER switch ON. If multimeter indicates about 24 volts, go to step 3. If multimeter indicates no voltage, repair lead 47 between hull well disconnect (3) and slip ring, refer to page 2-66. Set MASTER switch OFF. Connect lead.



Step 3. Disconnect GND lead (1) from slip ring (2). Place red probe on GND lead. Ground black probe. If multimeter indicates continuity, go to step 4. If multimeter indicates infinity, repair GND lead, refer to page 2-66. Connect lead.

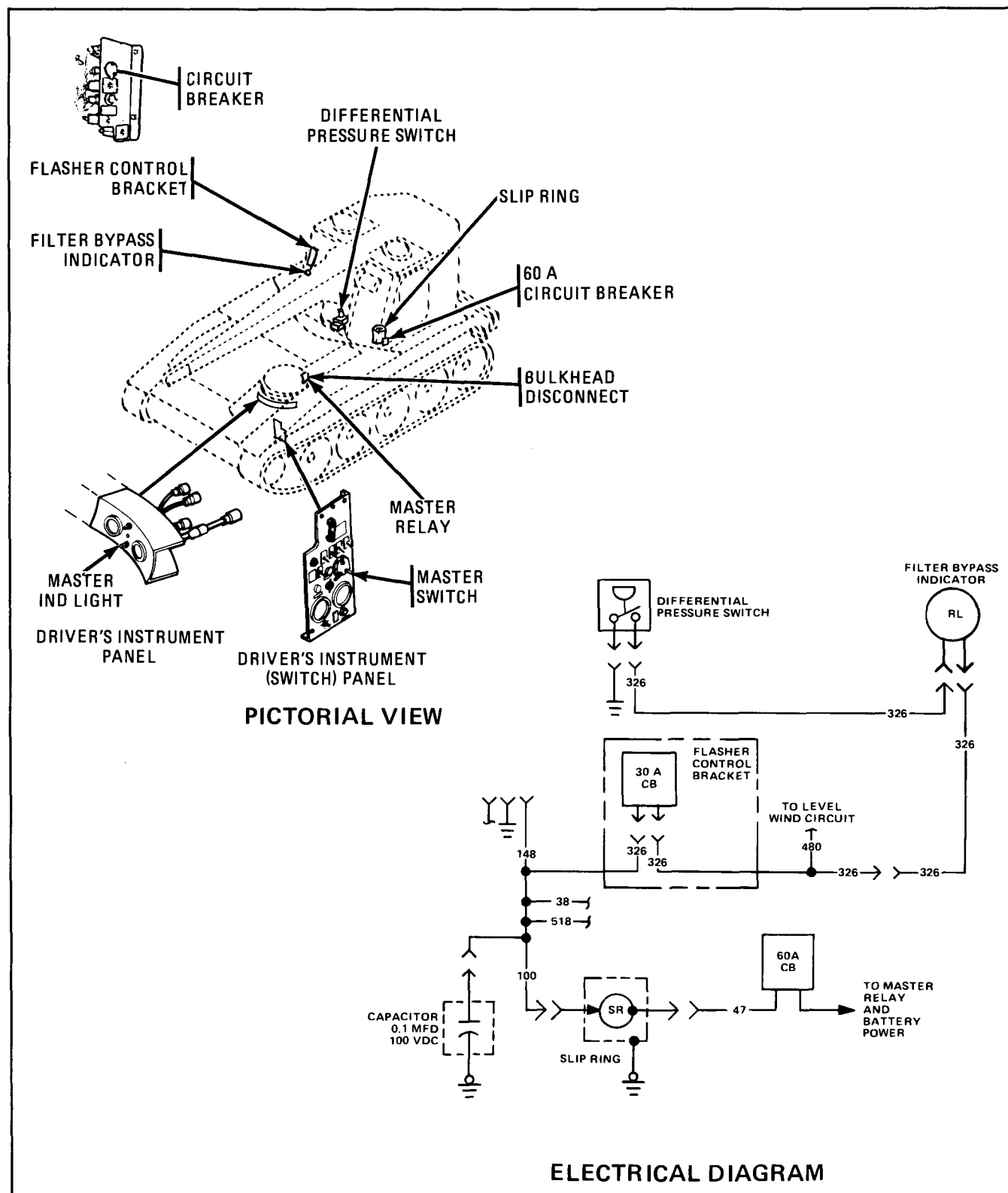
**WARNING**

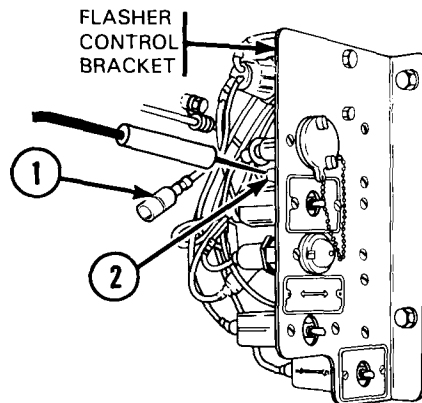
Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.

- Step 4.* Disconnect lead 100 (1) from slip ring (2). Place red probe in slip ring receptacle (3). Ground black probe. Set MASTER switch ON. If multimeter indicates about 24 volts, repair lead 100, refer to page 2-66. If multimeter indicates no voltage, notify direct support maintenance. Set MASTER switch OFF. Connect lead.

2-10. ELECTRICAL CIRCUIT TROUBLESHOOTING (CONT).

b. Filter Bypass Indicator Circuit.



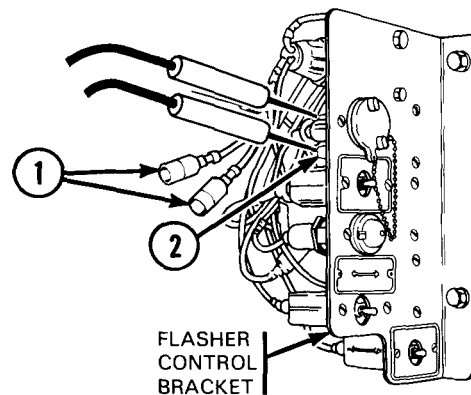


(1) Filter bypass indicator is off when level wind circuits are not operating.

WARNING

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

Step 1. Disconnect lead 326 (1) from circuit breaker (2) output. Place red probe in circuit breaker receptacle. Ground black probe. Set MASTER switch ON. If multimeter indicates about 24 volts, repair lead 326 between circuit breaker and line disconnect, refer to page 2-66. If multimeter indicates no voltage, go to step 2. Set MASTER switch OFF. Connect lead.

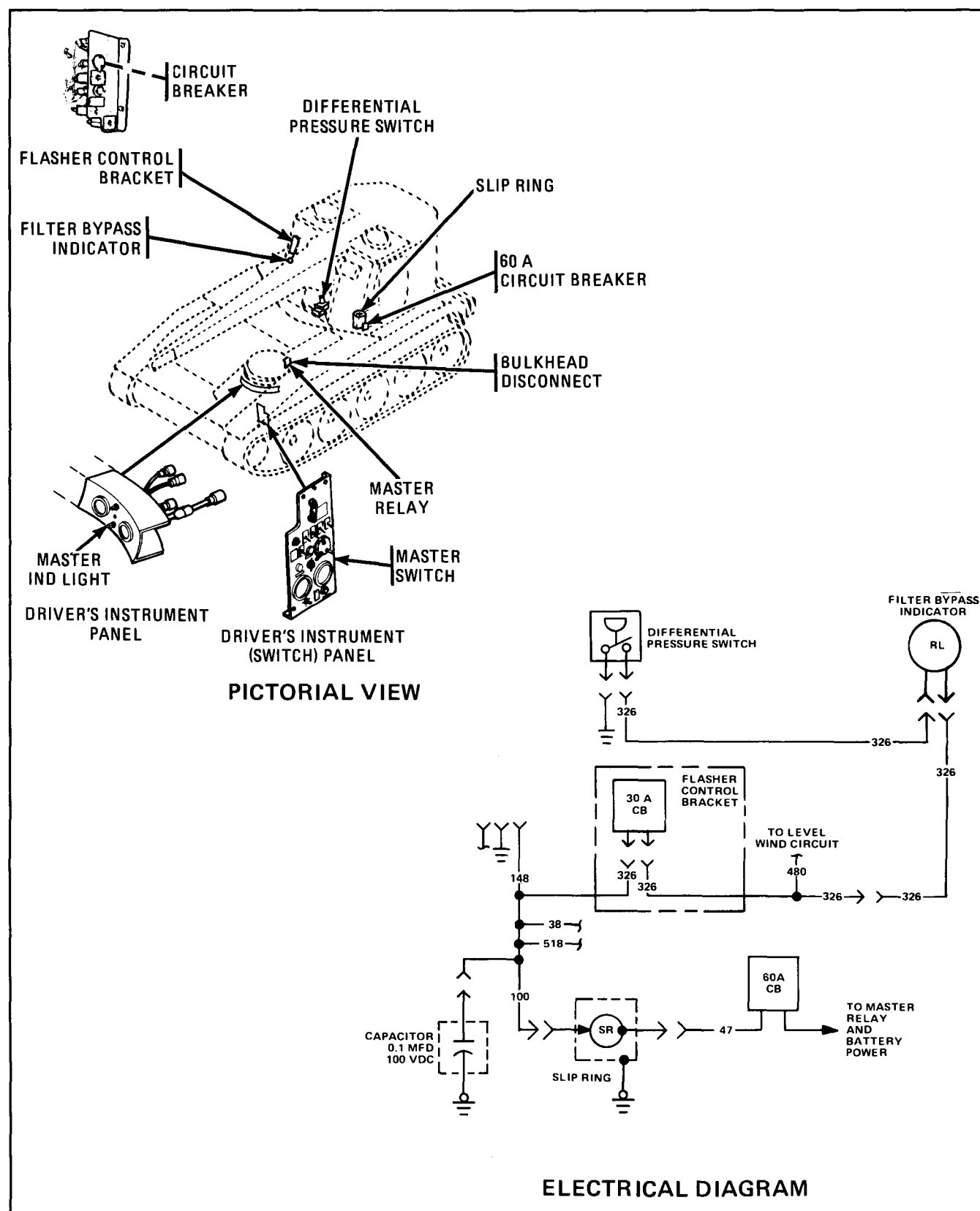


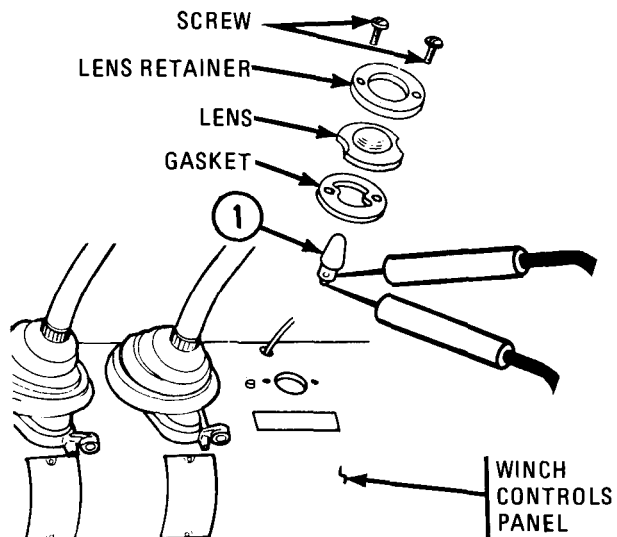
WARNING

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

Step 2. Disconnect both leads 326 (1) from circuit breaker (2). Connect multimeter to receptacles of circuit breaker. If multimeter indicates continuity, repair lead 326 between circuit breaker finity, replace circuit breaker, refer to page 2-297. Set MASTER switch OFF. Connect leads.

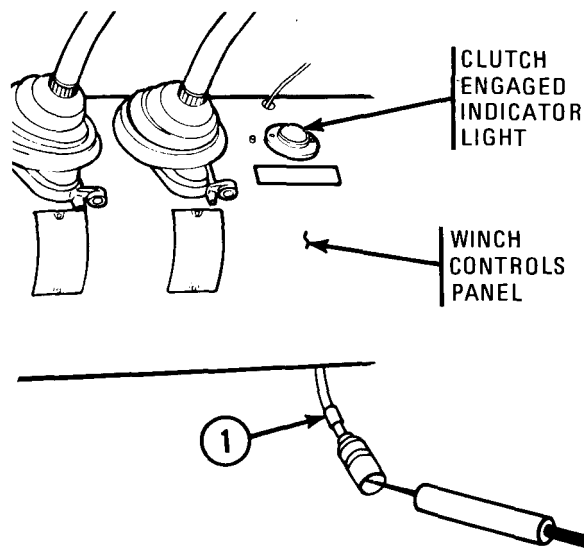
2-10 ELECTRICAL CIRCUIT TROUBLESHOOTING (CONT).





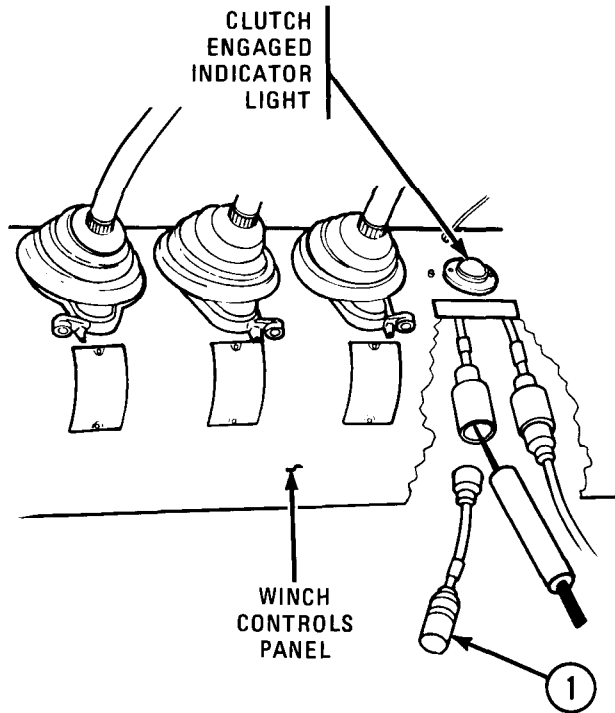
(2) Filter bypass indicator is not operating when level wind circuits are operating normally.

Step 1. Remove lamp (1) from filter bypass indicator, refer to page 2-296. Connect multimeter to contacts of lamp. If multimeter indicates about 1 ohm, install lamp and go to step 2. If multimeter indicates infinity, replace lamp, refer to page 2-296.



Step 2. Remove access panel, refer to page 2-128. Disconnect lead 326 (1) from filter bypass indicator (circuit breaker side). Place red probe in lead 326. Ground black probe. Set MASTER switch ON. If multimeter indicates about 24 volts, go to step 3. If multimeter indicates no voltage, go to step 4. Set MASTER switch OFF. Connect lead.

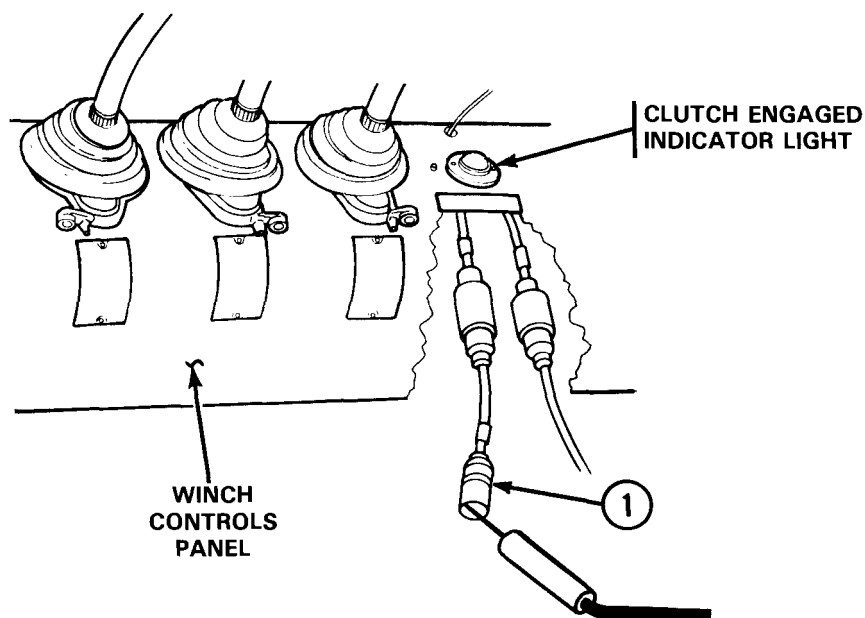
2-10. ELECTRICAL CIRCUIT TROUBLESHOOTING (CONT).



WARNING

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

- Step 3.* Disconnect other lead 326 (1) from filter bypass indicator. Place red probe in filter bypass indicator receptacle. Ground black probe. Set MASTER switch ON. If multimeter indicates about 24 volts, repair lead 326 between differential pressure switch and filter bypass indicator, refer to page 2-66. If multimeter indicates no voltage, replace filter bypass indicator light, refer to page 2-296. Set MASTER switch OFF. Connect lead.

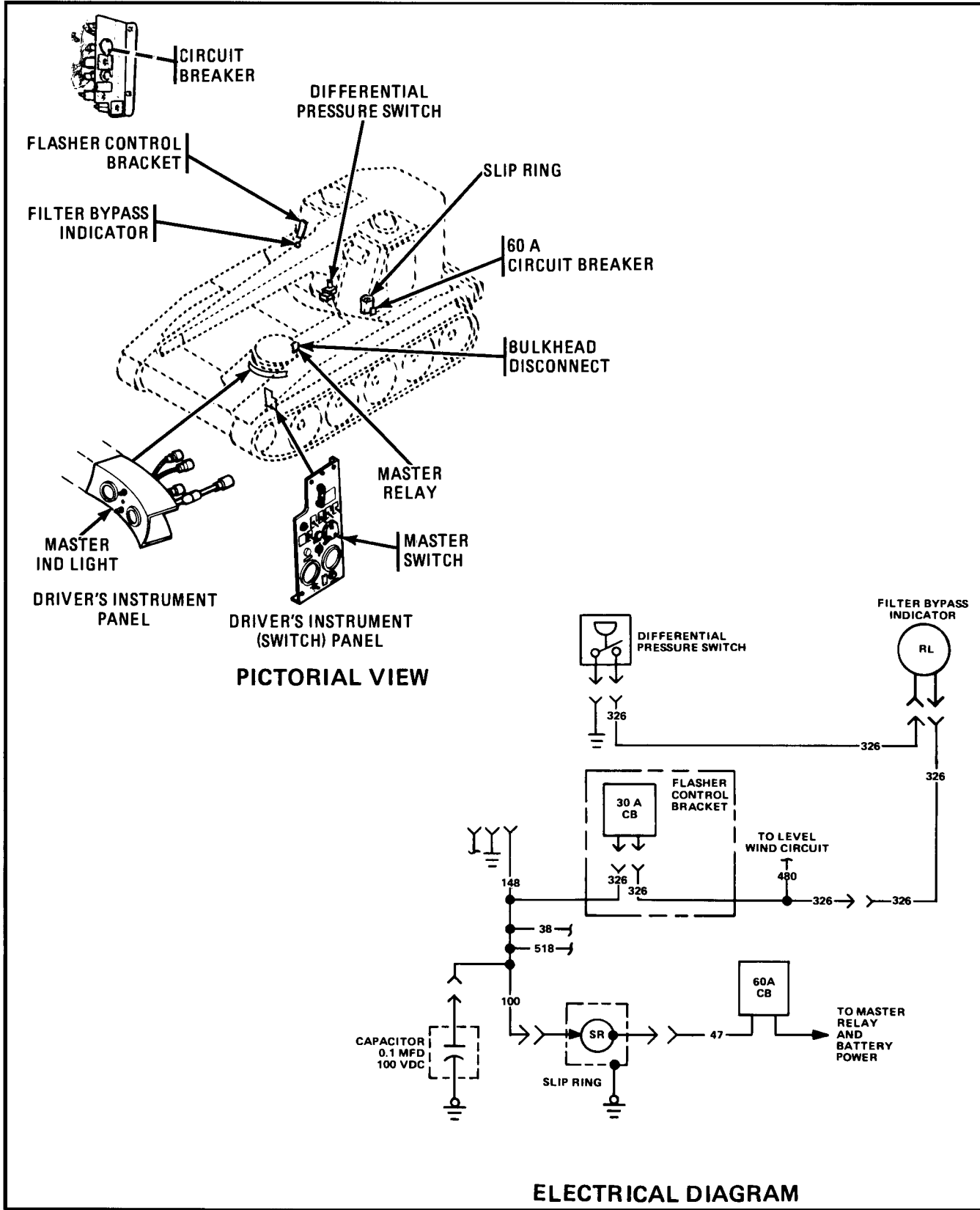


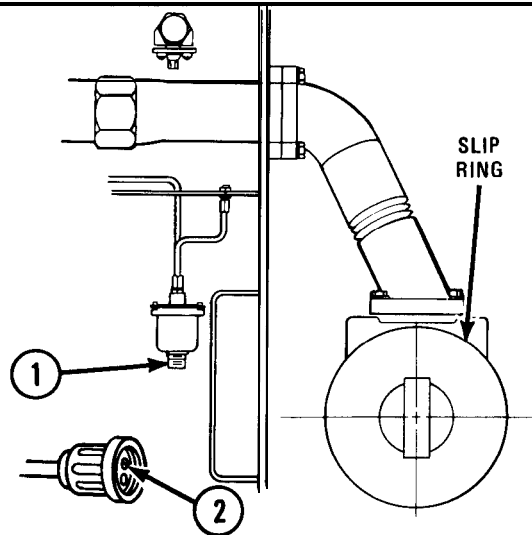
WARNING

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

- Step 4.* Disconnect line disconnect. Place red probe in lead 326 (1). Ground black probe. Set MASTER switch ON. If multimeter indicates about 24 volts, repair lead 326 between line disconnect and filter bypass indicator, refer to page 2-66. If multimeter indicates no voltage, repair lead 326 between level wind circuit and line disconnect, refer to page 2-66. Set MASTER switch OFF. Connect lead.

2-10. ELECTRICAL CIRCUIT TROUBLESHOOTING (CONT).



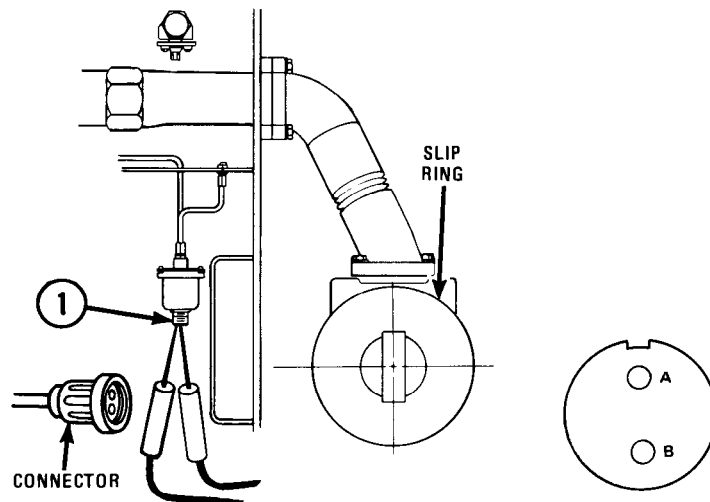


(3) Filter bypass indicator stays on when level wind circuits are operating normally.

WARNING

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

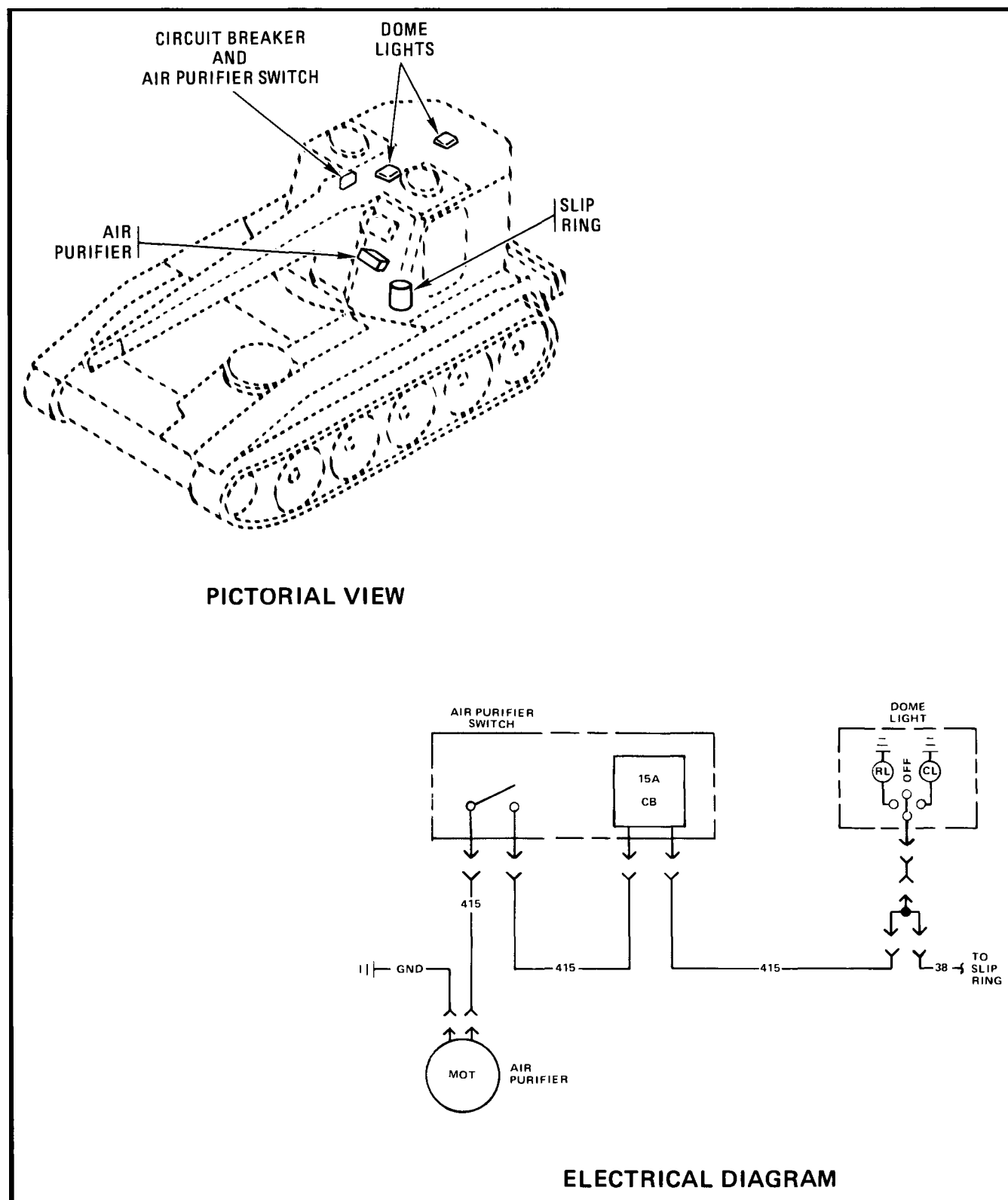
Step 1. Remove vehicle equipment stowage box, refer to page 2-330. Disconnect connector from differential pressure switch (1). If filter bypass indicator goes off, go to step 2. If filter bypass indicator stays on, repair lead 326 between filter bypass indicator and differential pressure switch, refer to page 2-66. Connect connector (2).

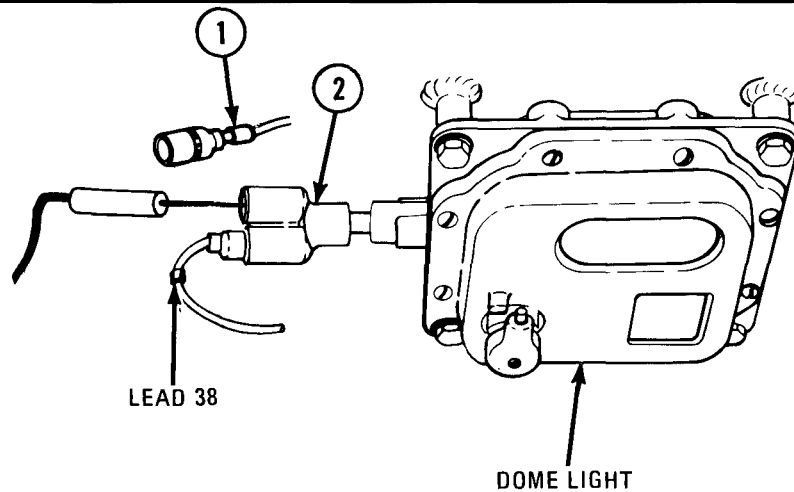


Step 2. Connect multimeter to differential pressure switch (1). If multimeter indicates continuity, repair (GND) lead, refer to page 2-66. If multimeter indicates infinity, replace differential pressure switch, refer to page 2-225.

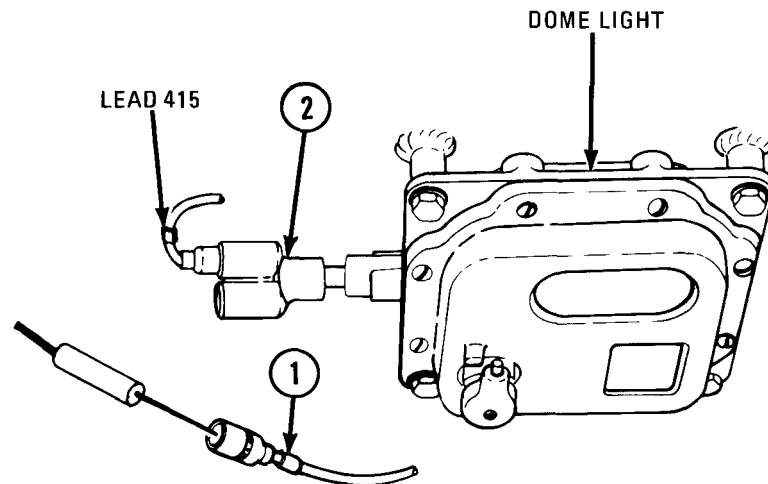
2-10. ELECTRICAL CIRCUIT TROUBLESHOOTING (CONT).

C. CAB FILTER INSTALLATION-Cab Air Purifier Circuit.





Step 1. Disconnect lead 415 (1) from dome light connector (2). Place red probe in dome light connector. Ground black probe. Set MASTER switch ON. If multimeter indicates about 24 volts, go to step 3. If multimeter indicates no voltage, go to step 2. Set MASTER switch OFF. Connect lead.

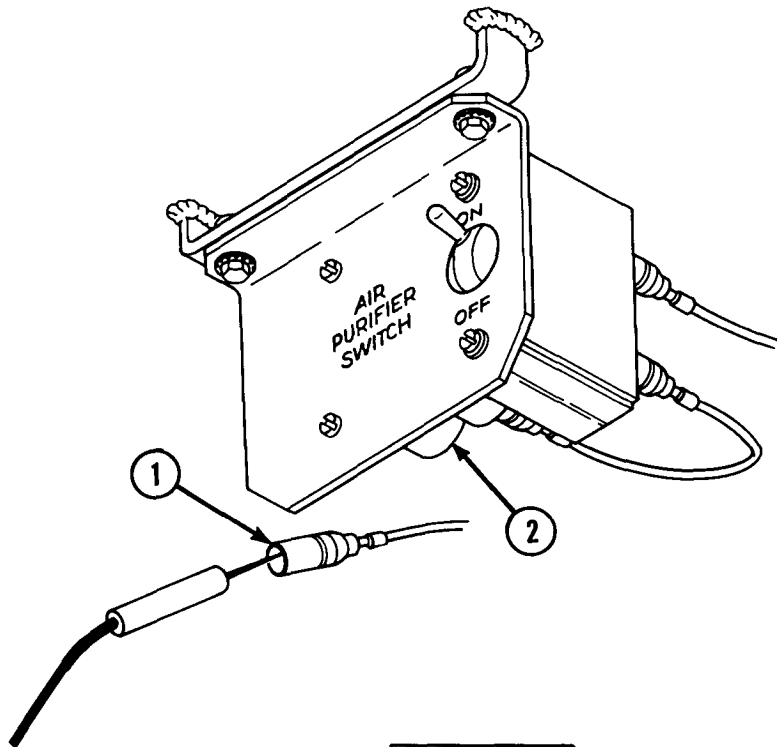


WARNING

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

Step 2. Disconnect lead 38 (1) from dome light connector (2). Place red probe in lead 38. Ground black probe. Set MASTER switch ON. If multimeter indicates about 24 volts, replace dome light connector, refer to page 2-291. If multimeter indicates no voltage, troubleshoot cab dome light circuit, refer to page 2-19. Set MASTER switch OFF. Connect lead.

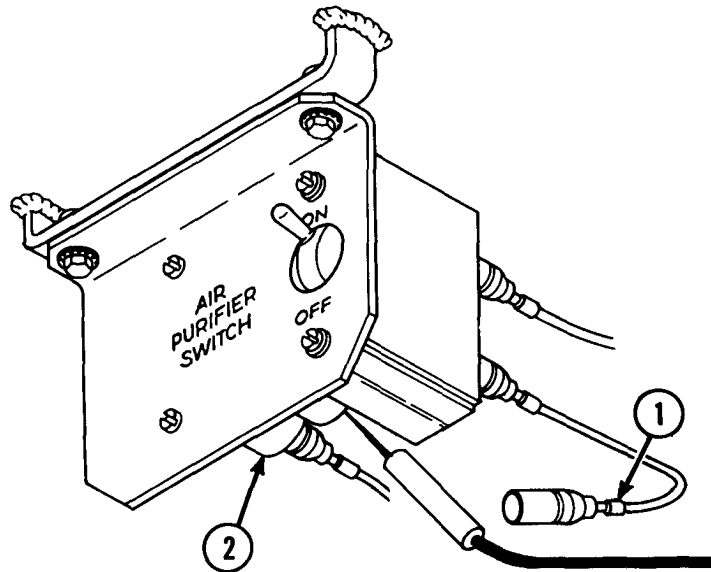
2-10. ELECTRICAL CIRCUIT TROUBLESHOOTING (CONT).



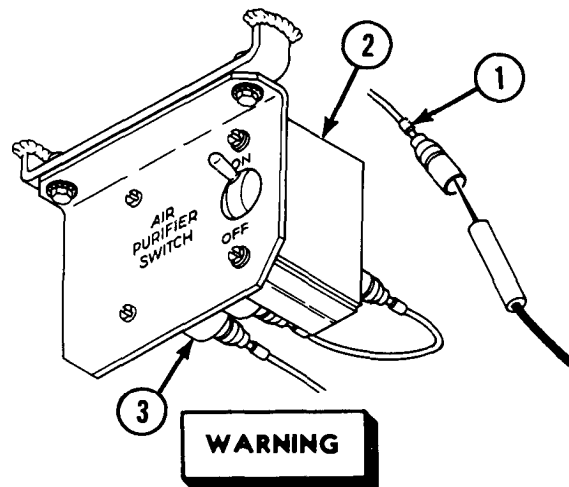
WARNING

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

- Step 3.* Disconnect lead 415 (1) from input side of circuit breaker (2). Place red probe in lead 415. Ground black probe. Set MASTER switch ON. If multimeter indicates about 24 volts, go to step 4. If multimeter indicates no voltage, repair lead 415 between dome light connector and circuit breaker, refer to page 2-66. Set MASTER switch OFF. Connect lead.



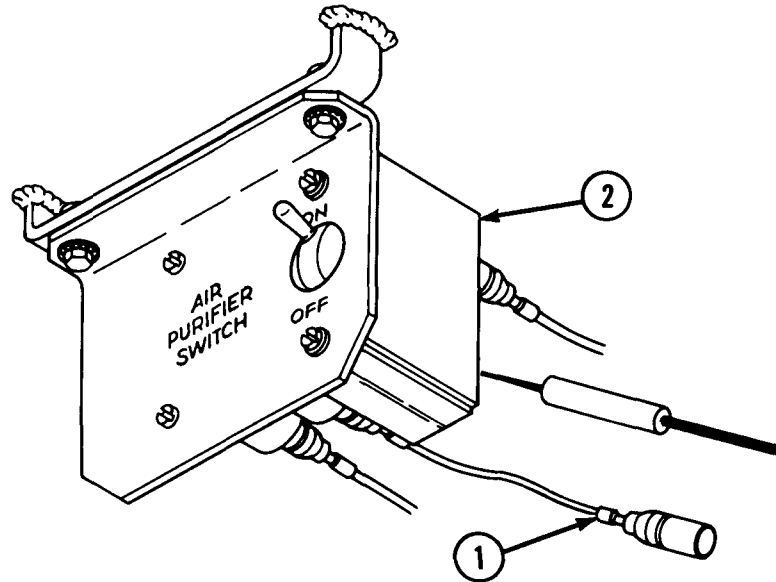
Step 4. Disconnect lead 415 (1) from output side of circuit breaker (2). Place red probe in circuit breaker. Ground black probe. Set MASTER switch ON. If multimeter indicates about 24 volts, go to step 5. If multimeter indicates no voltage, replace circuit breaker, refer to page 2-314. Set MASTER switch OFF. Connect leads.



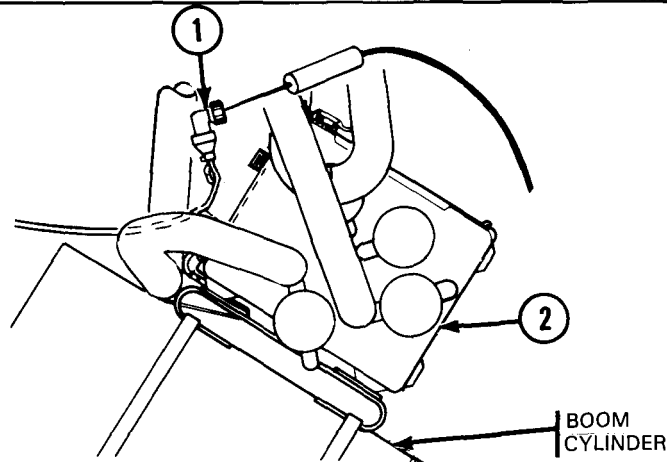
Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.

Step 5. Disconnect lead 415 (1) from input side of AIR PURIFIER SWITCH (2). Place red probe in lead 415. Ground black probe. Set MASTER switch ON. If multimeter indicates about 24 volts, go to step 6. If multimeter indicates no voltage, repair lead 415 between AIR PURIFIER SWITCH and circuit breaker (3), refer to page 2-66. Set MASTER switch OFF. Connect lead.

2-10. ELECTRICAL CIRCUIT TROUBLESHOOTING (CONT).

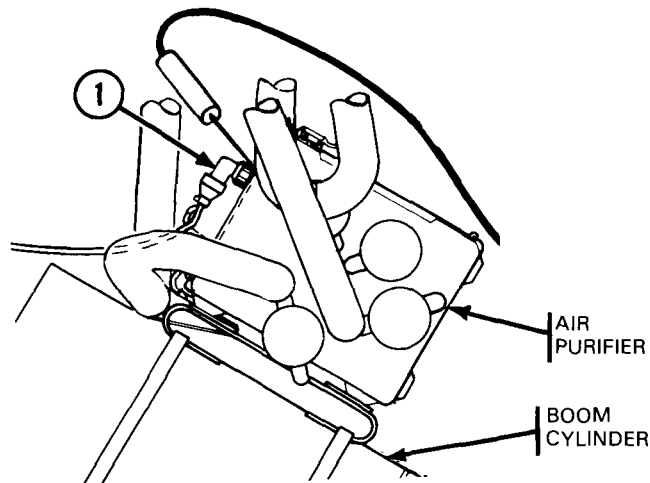


Step 6. Disconnect lead 415 (1) from output side of AIR PURIFIER SWITCH (2). Place red probe in AIR PURIFIER SWITCH. Ground black probe. Set MASTER switch ON. If multimeter indicates about 24 volts, go to step 7. If multimeter indicates no voltage, replace AIR PURIFIER SWITCH, refer to page 2-314. Set MASTER switch OFF. Set AIR PURIFIER SWITCH OFF. Connect connector.



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

Step 7. Disconnect connector (1) (lead 415) from air purifier (2) motor. Place red probe in connector. Ground black probe. Set MASTER switch ON. Set AIR PURIFIER SWITCH ON. If multimeter indicates about 24 volts, go to step 8. If multimeter indicates no voltage, repair lead 415 between air purifier motor and AIR PURIFIER SWITCH, refer to page 2-66. Set MASTER switch OFF. Set AIR PURIFIER SWITCH OFF. Connect connector.

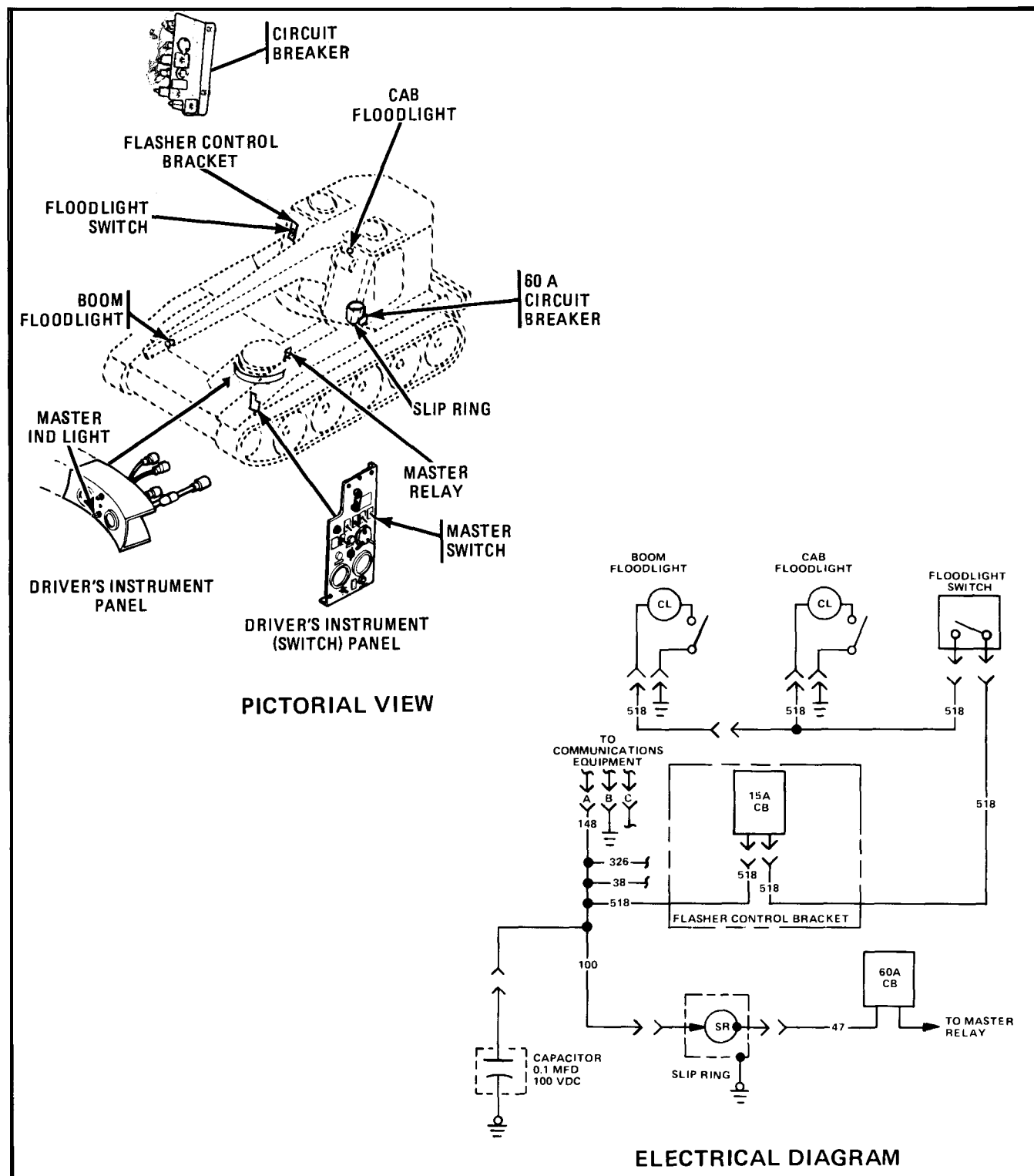


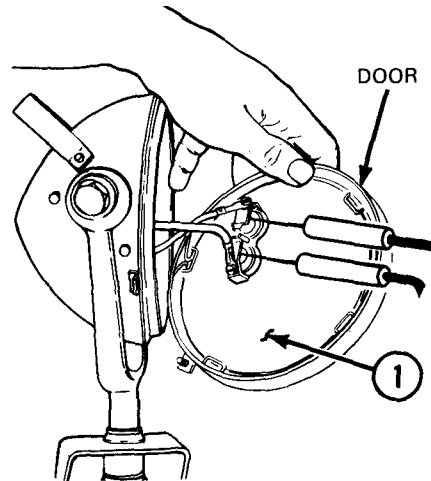
Step 8. Place red probe on air purifier connector (1). Ground black probe. If multimeter indicates continuity, replace air purifier, refer to page 2-309. If multimeter indicates infinity, repair GND lead, refer to page 2-302.

2-10. ELECTRICAL CIRCUIT TROUBLESHOOTING (CONT).

D. ELECTRICAL INSTALLATION

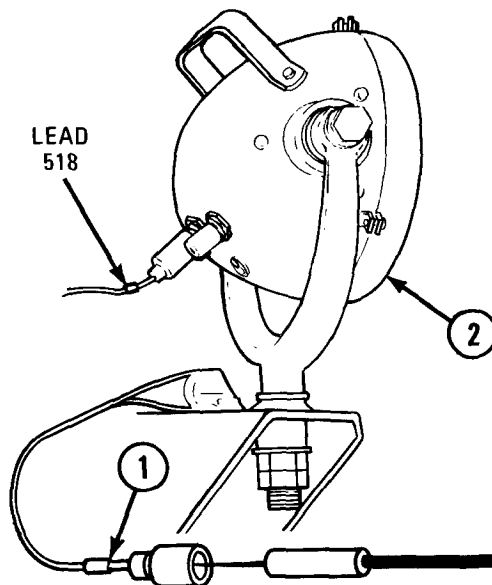
a. Floodlight Circuit.





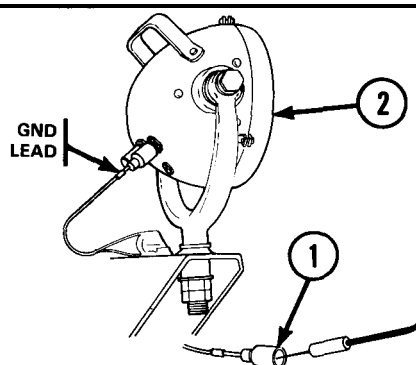
(1) Only one floodlight is operating when MASTER and FLOODLIGHTS switches are ON.

Step 1. Remove lamp (1) from inoperative floodlight, refer to page 2-279. Connect multimeter to contacts of lamp. If multimeter indicates about 1 ohm, go to step 2. If multimeter indicates infinity, replace lamp, refer to page 2-279.



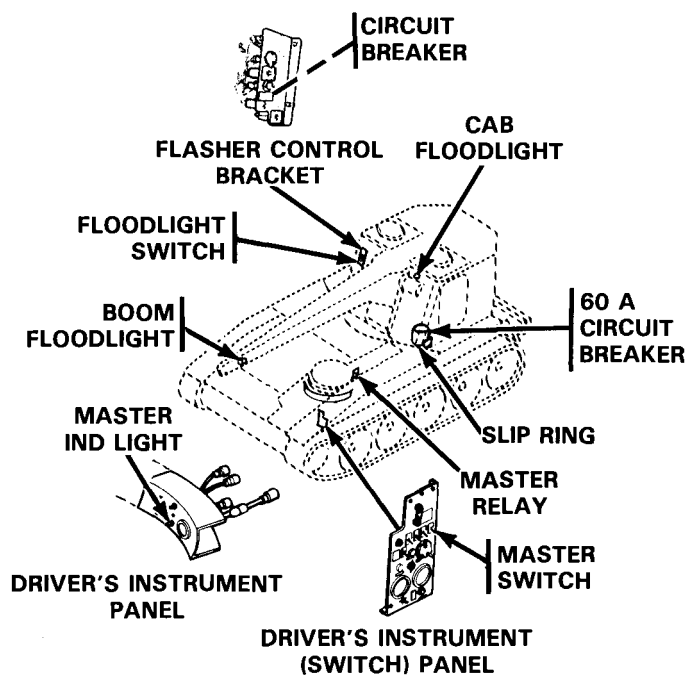
Step 2. Disconnect GND lead (1) from floodlight (2). Place red probe in GND lead. Ground black probe. If multimeter indicates continuity, go to step 3. If multimeter indicates infinity, repair GND lead, refer to page 2-66. Connect lead.

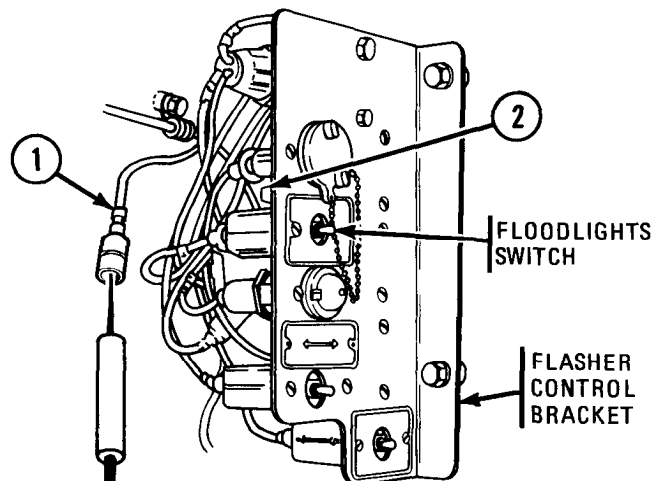
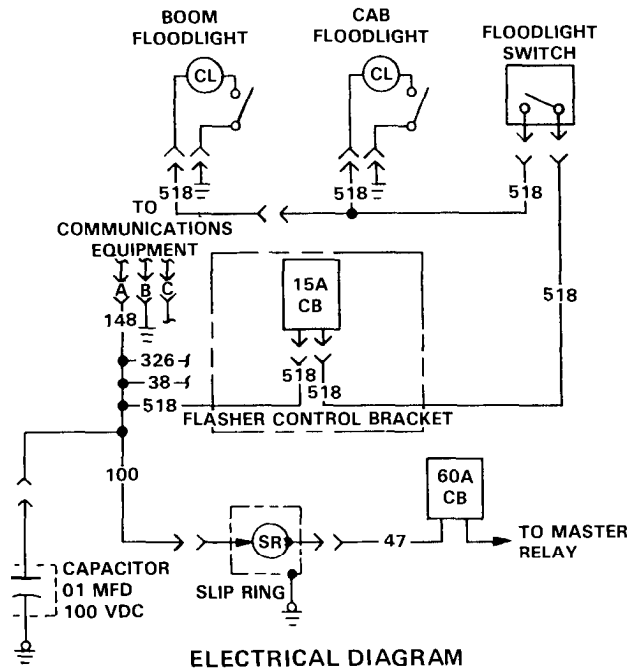
2-10. ELECTRICAL CIRCUIT TROUBLESHOOTING (CONT).

**WARNING**

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

Step 3. Disconnect lead 518 (1) from floodlight (2). Place red probe in lead 518. Ground black probe. Set MASTER switch ON. Set FLOODLIGHTS switch ON. If multimeter indicates about 24 volts, replace floodlight, refer to page 2-279. If multimeter indicates no voltage, repair lead 518, refer to page 2-66. Set MASTER switch OFF. Set FLOODLIGHTS switch OFF. Connect lead.

**PICTORIAL VIEW**



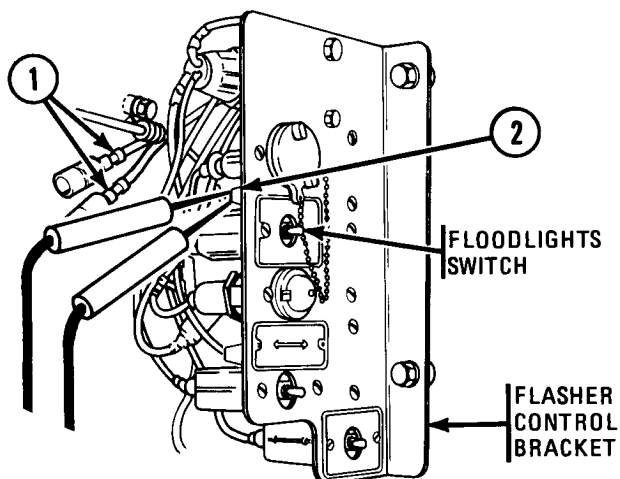
- (2) Both floodlights are not operating when MASTER and FLOODLIGHTS switches are ON.

WARNING

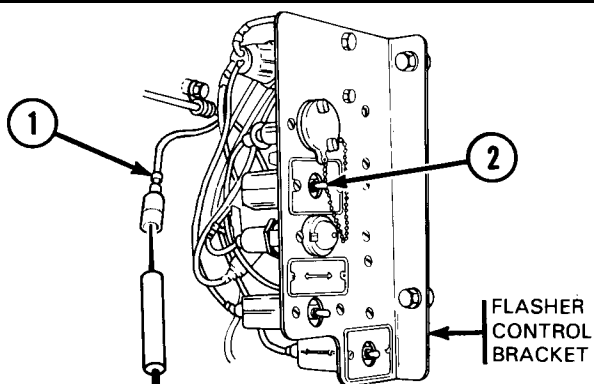
Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.

- Step 1.* Disconnect lead 518 (1) from input side of circuit breaker (2). Place red probe in lead 518. Ground black probe. Set MASTER switch ON. If multimeter indicates about 24 volts, go to step 2. If multimeter indicates no voltage, repair lead 518 from slip ring to circuit breaker, refer to page 2-66. Set MASTER switch OFF. Connect lead.

2-10. ELECTRICAL CIRCUIT TROUBLESHOOTING (CONT).



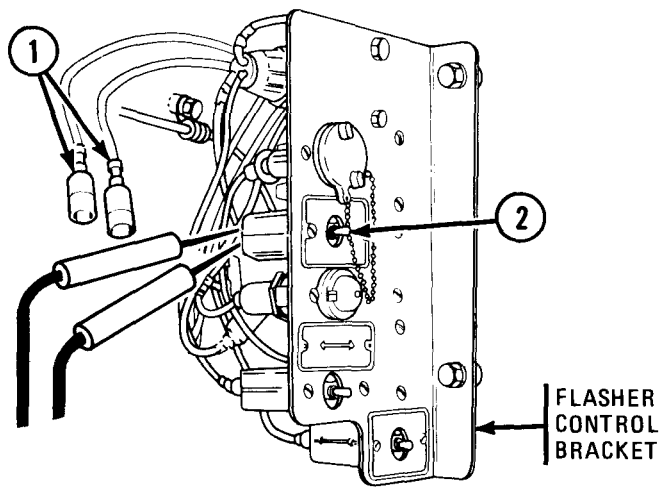
Step 2. Remove both leads 518 (1) from circuit breaker (2). Connect multimeter to receptacles of circuit breaker. If multimeter indicates continuity, go to step 3. If multimeter indicates infinity, replace circuit breaker, refer to page 2-297. Connect leads.



WARNING

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

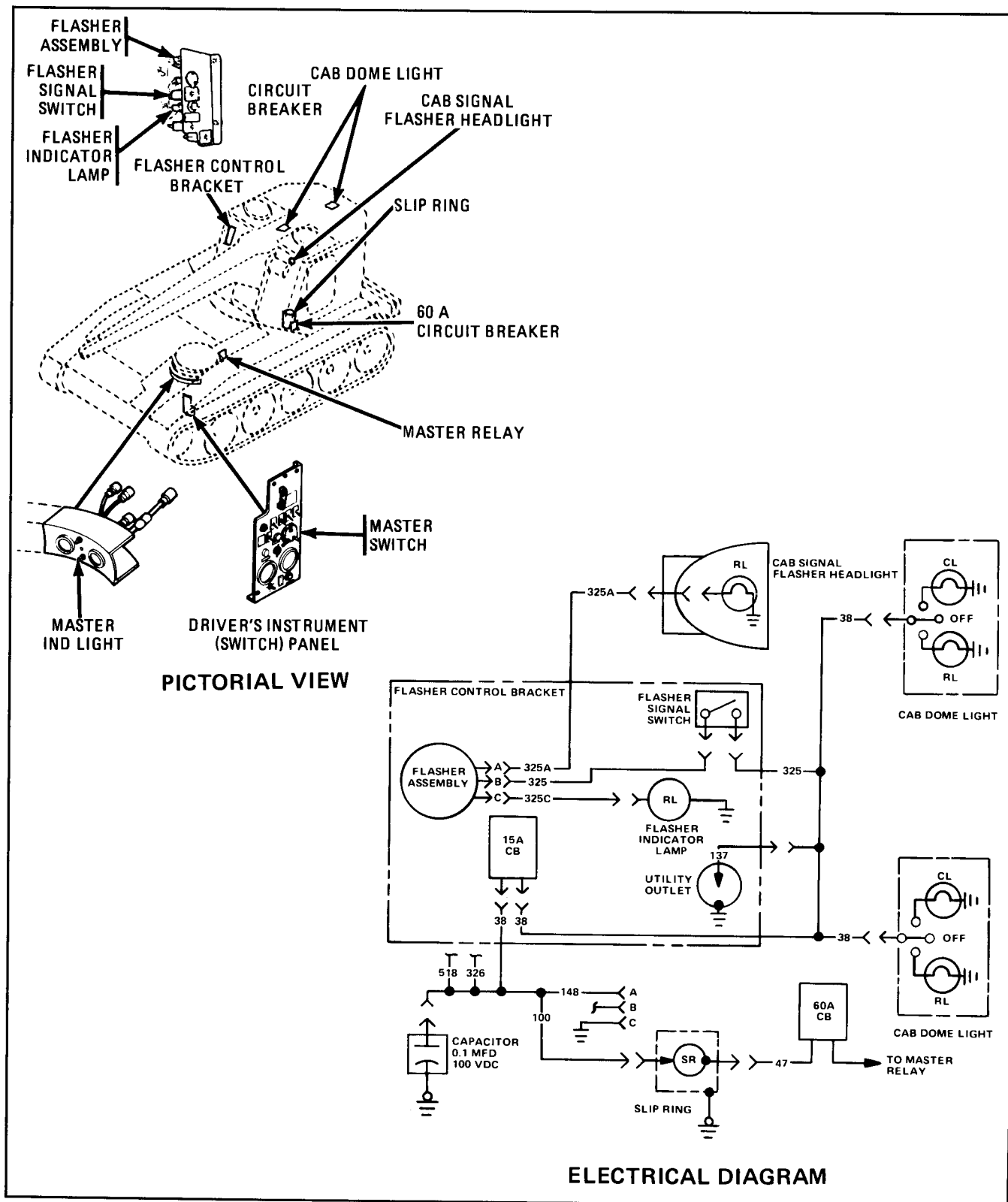
Step 3. Disconnect lead 518 (1) from FLOODLIGHTS switch (2) input. Place red probe in lead 518. Ground black probe. Set MASTER switch ON. If multimeter indicates about 24 volts, go to step 4. If multimeter indicates no voltage, repair lead 518 between FLOODLIGHTS switch and circuit breaker, refer to page 2-66. Set MASTER switch OFF. Connect lead.

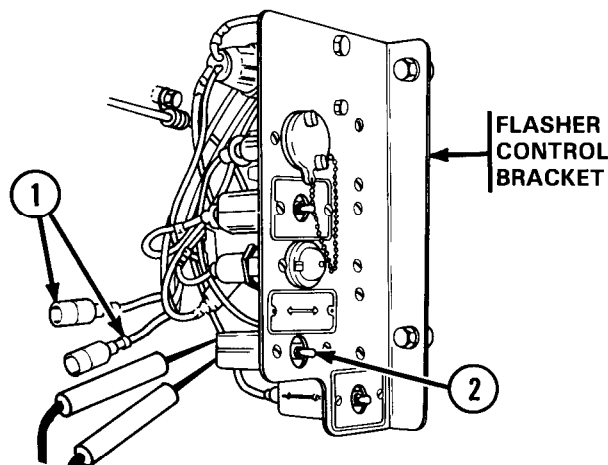


Step 4. Disconnect both leads 518 (1) from FLOODLIGHTS switch (2). Connect multimeter to FLOODLIGHTS switch. Set FLOODLIGHTS switch ON. If multimeter indicates continuity, repair lead 518 between floodlights and FLOODLIGHTS switch, refer to page 2-66. If multimeter indicates infinity, repair FLOODLIGHTS switch, refer to page 2-297. Set FLOODLIGHTS switch OFF. Connect leads.

2-10. ELECTRICAL CIRCUIT TROUBLESHOOTING (CONT).

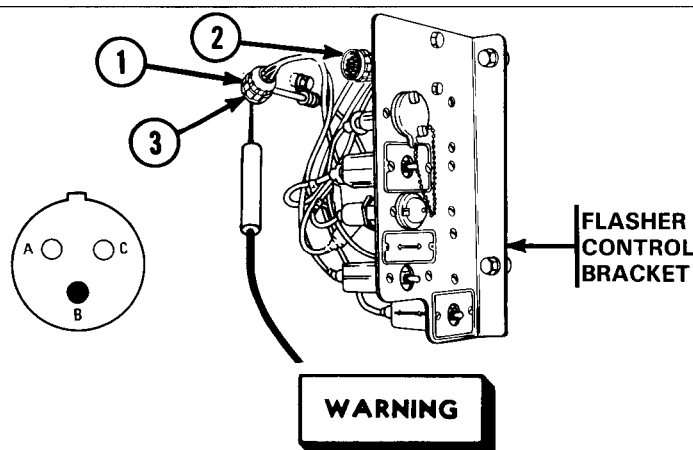
b. Cab Flasher Headlight and Dome Light Circuit.





(1) Cab signal flasher headlight and flasher indicator lamps are not operating when MASTER and FLASHER SIGNAL switches are ON.

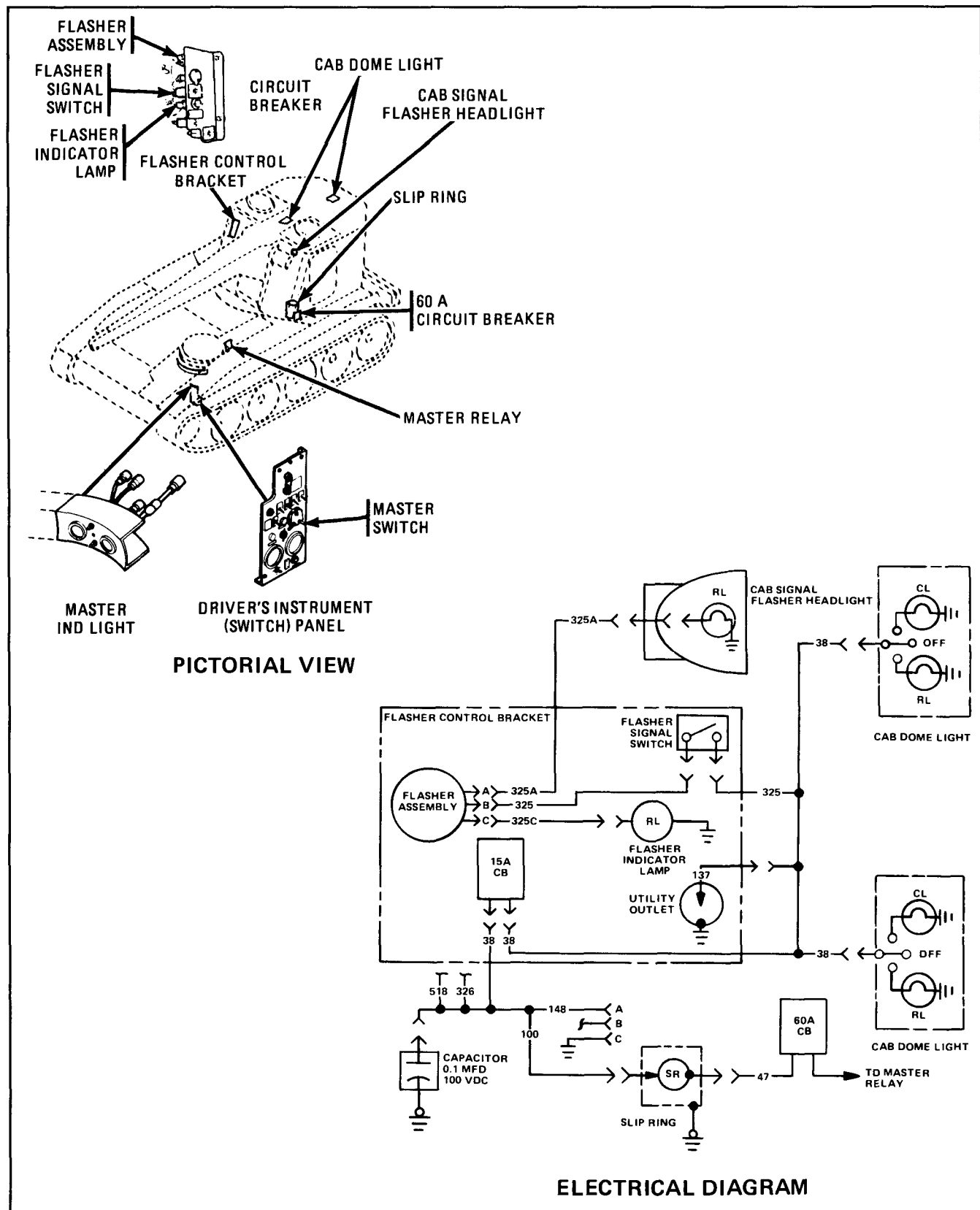
Step 1. Disconnect both leads 325 (1) from FLASHER SIGNAL switch (2). Connect multimeter to FLASHER SIGNAL switch. Set FLASHER SIGNAL switch ON. If multimeter indicates continuity, go to step 2. If multimeter indicates infinity, replace FLASHER SIGNAL switch, refer to page 2-271. Set FLASHER SIGNAL switch OFF. Connect leads.

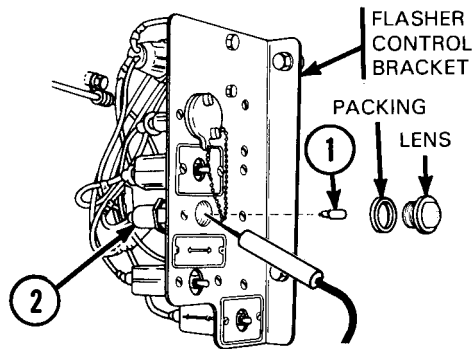


Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.

Step 2. Disconnect connector (1) from flasher assembly (2). Place red probe in socket B (3) (lead 325). Ground black probe. Set MASTER switch ON. Set FLASHER SIGNAL switch ON. If multimeter indicates about 24 volts, replace flasher assembly, refer to page 2-271. If multimeter indicates no voltage, repair lead 325 between flasher assembly and FLASHER SIGNAL switch, refer to page 2-66. Set MASTER switch OFF. Set FLASHER SIGNAL switch OFF. Connect connector.

2-10. ELECTRICAL CIRCUIT TROUBLESHOOTING (CONT).



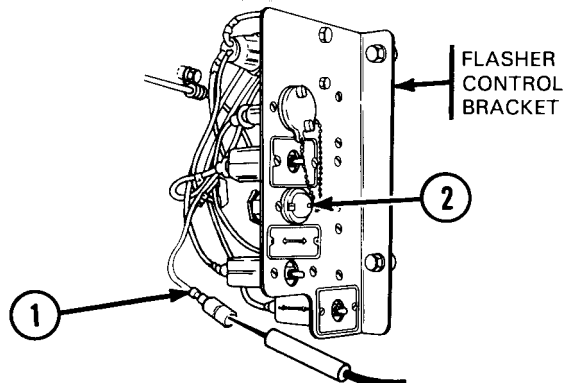


(2) Flasher indicator lamp is not operating when cab signal flasher headlight is on.

WARNING

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

Step 1. Remove LED (1) from flasher indicator light (2), refer to page 2-271. Set MASTER switch ON. Set FLASHER SIGNAL switch ON. Place red probe in socket. Ground black probe. If multimeter indicates about 24 volts, replace LED. If multimeter indicates no voltage, set MASTER switch OFF, install LED and go to step 2.

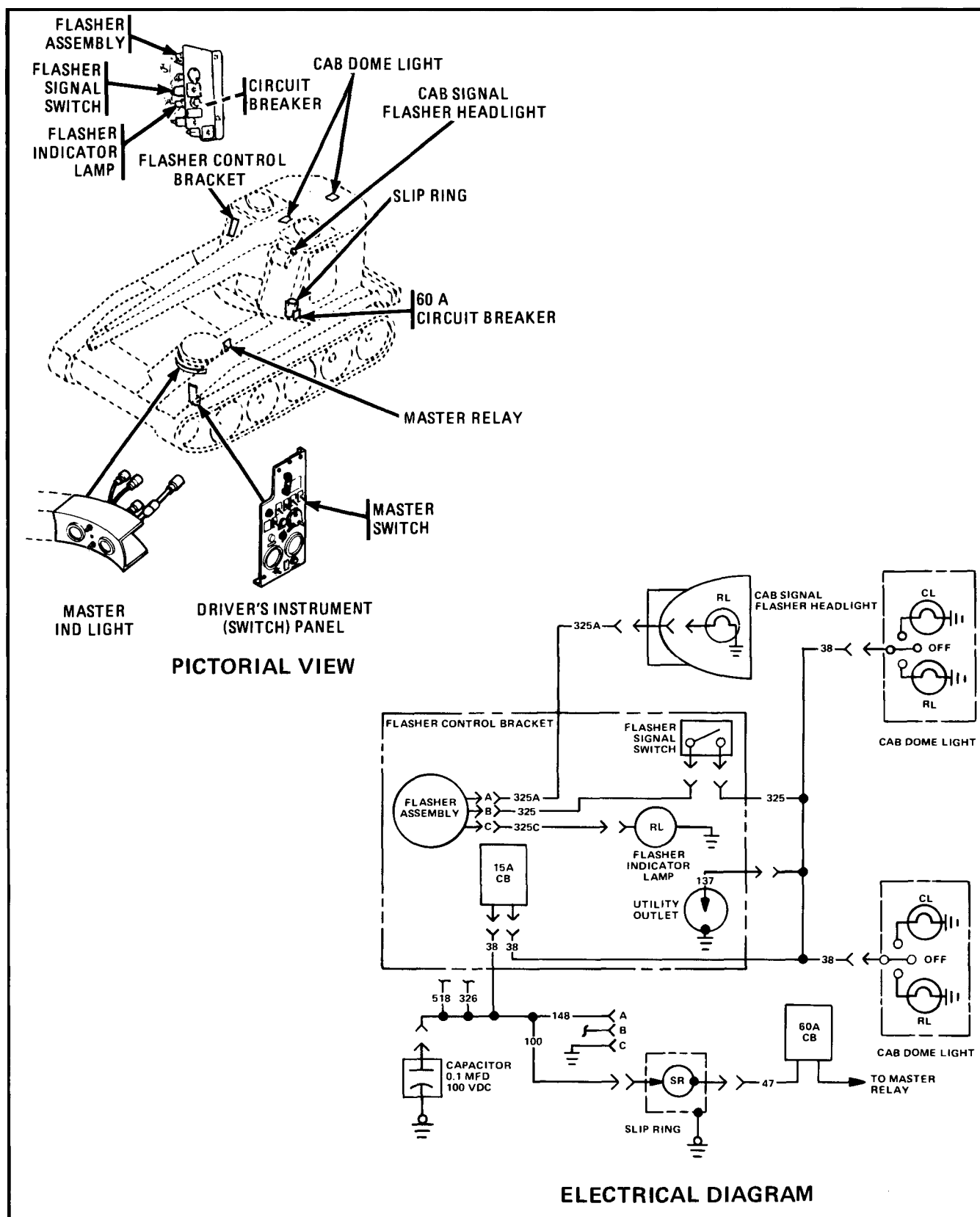


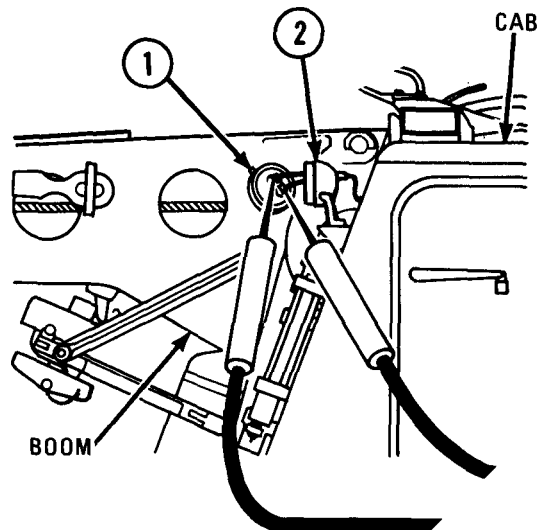
WARNING

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

Step 2. Disconnect lead 325C (1) from flasher indicator lamp (2). Place red probe in lead 325C. Ground black probe. Set MASTER switch ON. Set FLASHER SIGNAL switch ON. If multimeter indicates about 24 volts, replace flasher indicator lamp, refer to page 2-297. If multimeter indicates no voltage, repair lead 325C between flasher indicator lamp and flasher assembly, refer to page 2-66. Set MASTER switch OFF. Set FLASHER SIGNAL switch OFF. Connect lead.

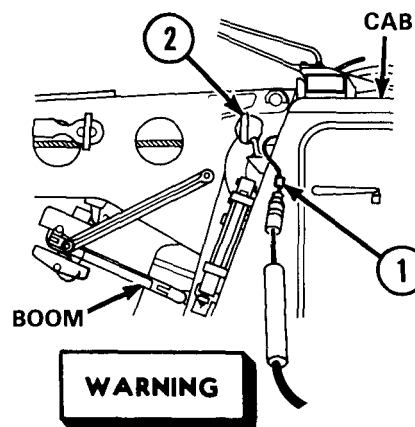
2-10. ELECTRICAL CIRCUIT TROUBLESHOOTING (CONT).





(3) Cab signal flasher headlight does not operate when flasher indicator lamp is on and MASTER and FLASHER SIGNAL switches are ON.

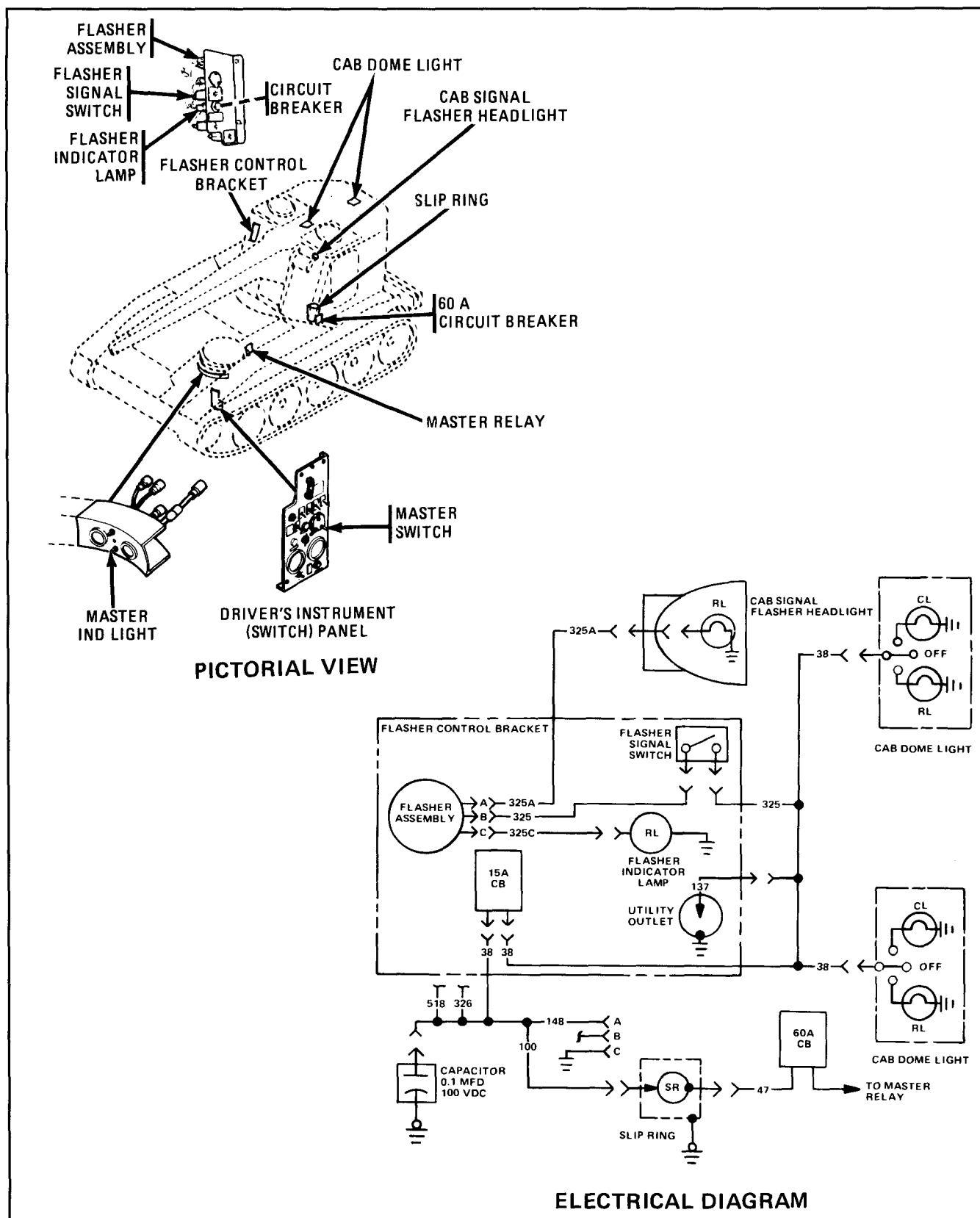
Step 1. Remove lamp (1) from cab signal flasher headlight (2), refer to page 2-279. Connect multimeter to contacts of lamp. If multimeter indicates about 1 ohm, go to step 2. If multimeter indicates infinity, replace lamp, refer to page 2-279.

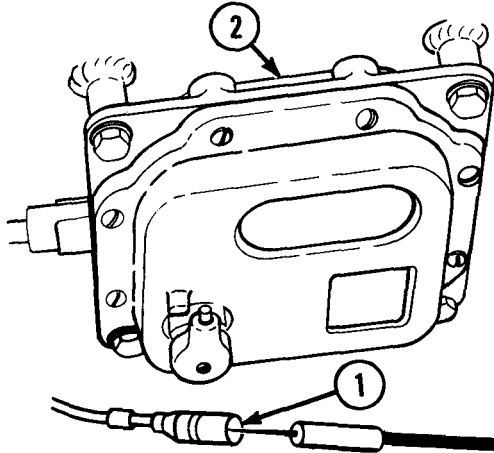


Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.

Step 2. Disconnect lead 325A (1) from cab signal flasher headlight (2). Place red probe in lead 325A. Ground black probe. Set MASTER switch ON. Set FLASHER SIGNAL switch ON. If multimeter indicates about 24 volts, replace cab signal flasher headlight, refer to page 2-279. If multimeter indicates no voltage, repair lead 325A between cab signal flasher headlight and flasher assembly, refer to page 2-66. Set MASTER switch OFF. Set FLASHER SIGNAL switch OFF. Connect lead.

2-10. ELECTRICAL CIRCUIT TROUBLESHOOTING (CONT).



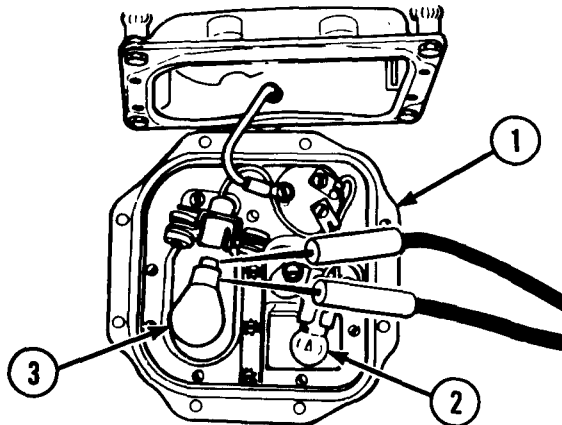


(4) Either dome light does not operate when MASTER switch is ON.

WARNING

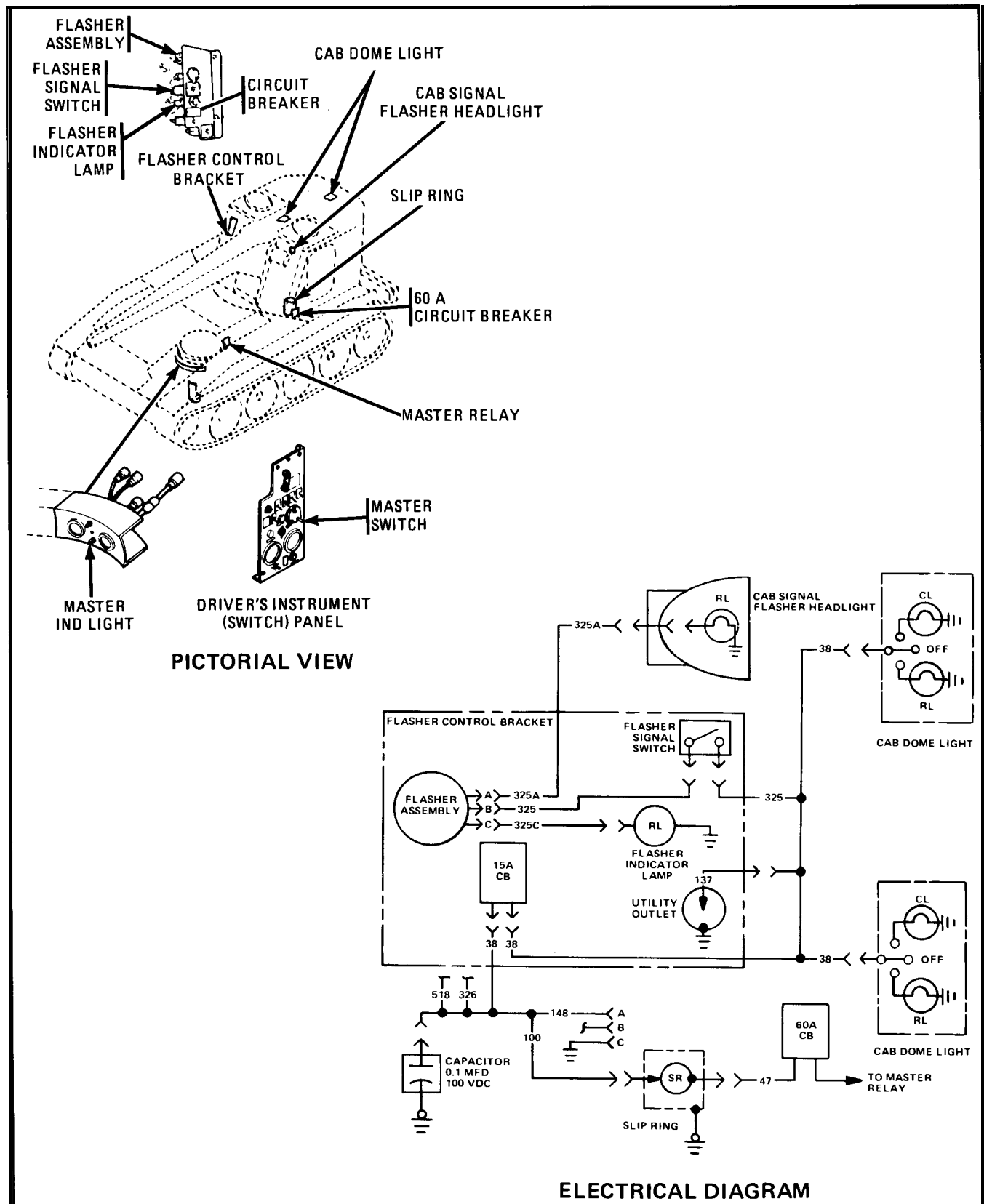
Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.

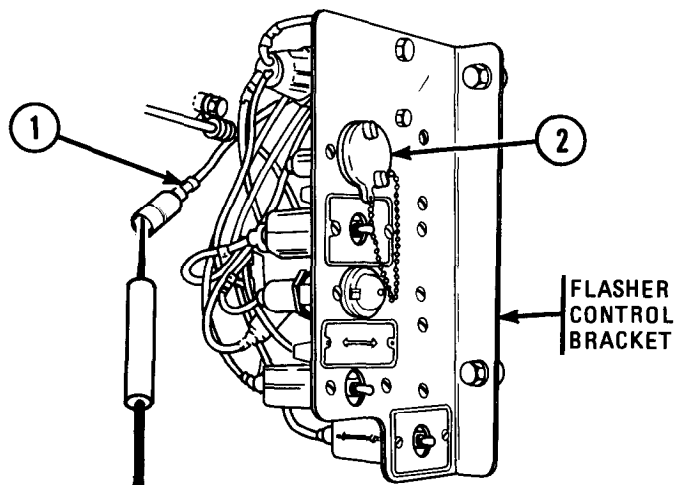
Step 1. Disconnect lead 38 (1) from inoperative dome light (2). Place red probe in lead 38. Ground black probe. Set MASTER switch ON. If multimeter indicates about 24 volts, go to step 2. If multimeter indicates no voltage, repair lead 38, refer to page 2-66. Set MASTER switch OFF. Connect lead.



Step 2. Remove inoperative lamp from dome light (1), refer to page 2-291. Connect multimeter to contacts of lamp. If multimeter indicates about 3 ohms for red lamp (2) or about 10 ohms for white lamp (3), replace dome light, refer to page 2-291. If multimeter indicates infinity replace lamp, refer to page 2-291.

2-10. ELECTRICAL CIRCUIT TROUBLESHOOTING (CONT).



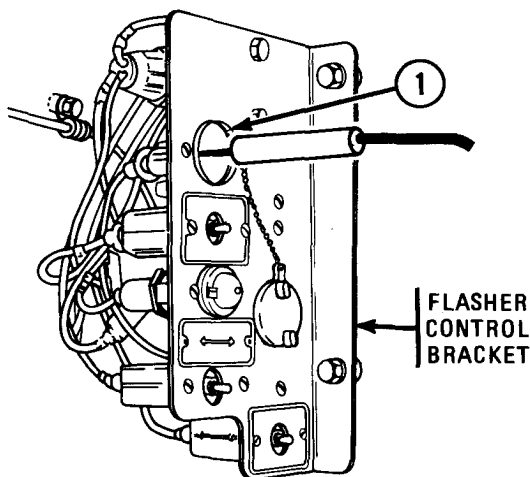


- (5) Utility outlet does not operate when both dome lights are on and MASTER switch is ON.

WARNING

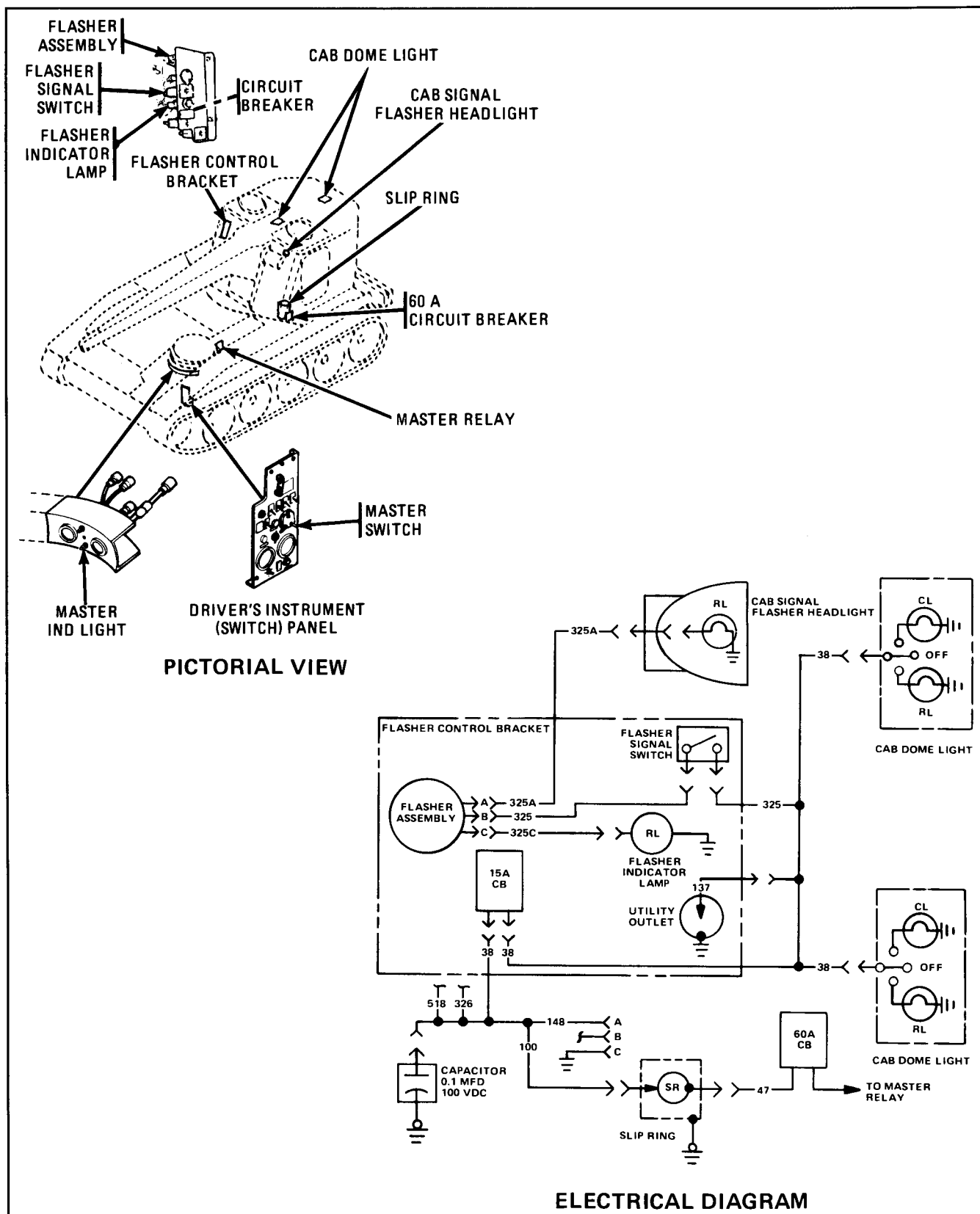
Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.

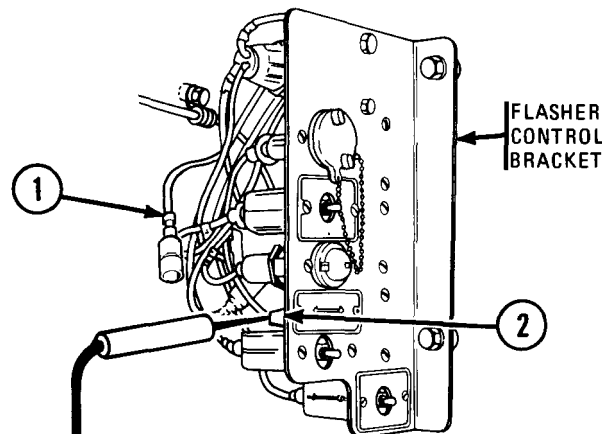
- Step 1.* Disconnect lead 137 (1) from utility outlet (2). Place red probe in lead 137. Ground black probe. Set MASTER switch ON. If multimeter indicates about 24 volts, go to step 2. If multimeter indicates no voltage, repair lead 137, refer to page 2-66. Set MASTER switch OFF. Connect lead.



- Step 2.* Place red probe in utility outlet (1). Ground black probe. If multimeter indicates continuity, utility outlet is operating normally. If multimeter indicates infinity, replace utility outlet, refer to page 2-297.

2-10. ELECTRICAL CIRCUIT TROUBLESHOOTING (CONT).



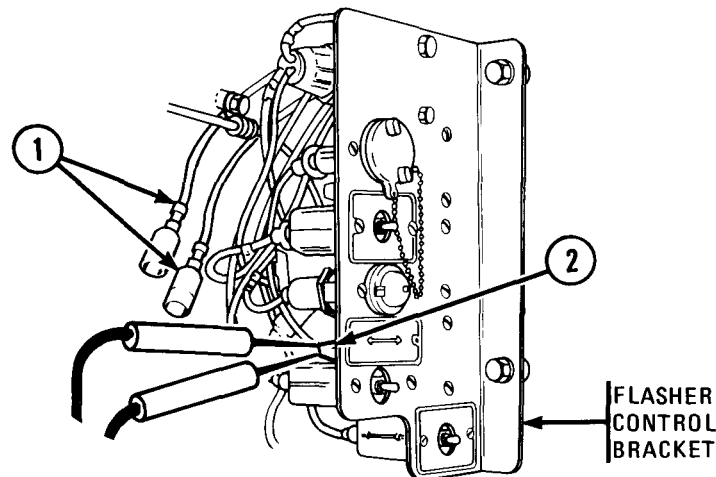


- (6) Utility outlet is non operating when cab flasher headlight and dome lights are off and MASTER switch is ON and dome light switches are on.

WARNING

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

- Step 1.* Remove lead 38 (1) from circuit breaker (2) output. Place red probe in circuit breaker receptacle. Ground black probe. Set MASTER switch ON. If multimeter indicates about 24 volts, repair lead 38 from output side of circuit breaker, refer to page 2-66. If multimeter indicates no voltage, go to step 2. Set MASTER switch OFF. Connect lead.



- Step 2.* Disconnect both leads 38 (1) from circuit breaker (2). Connect multimeter to receptacles of circuit breaker. If multimeter indicates continuity, repair lead 38 between circuit breaker and slip ring disconnect, refer to page 2-66. If multimeter indicates infinity, replace circuit breaker, refer to page 2-297. Connect leads.

Section V. WIRING HARNESS AND CABLE REPAIR

2-11. GENERAL. This section contains instructions on repair of wiring harnesses and cables (leads). Repair of wiring harnesses and cables consists of replacement of defective connectors, shells and terminals or taping cut or worn insulation and exposed wire conductors. Pages 2-66 thru 2-72 show exploded views of typical harness and cable connectors used on the vehicle, and give procedures for disassembly and assembly of connectors. When soldering is required, procedures in TB SIG 222 must be followed.

NOTE

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

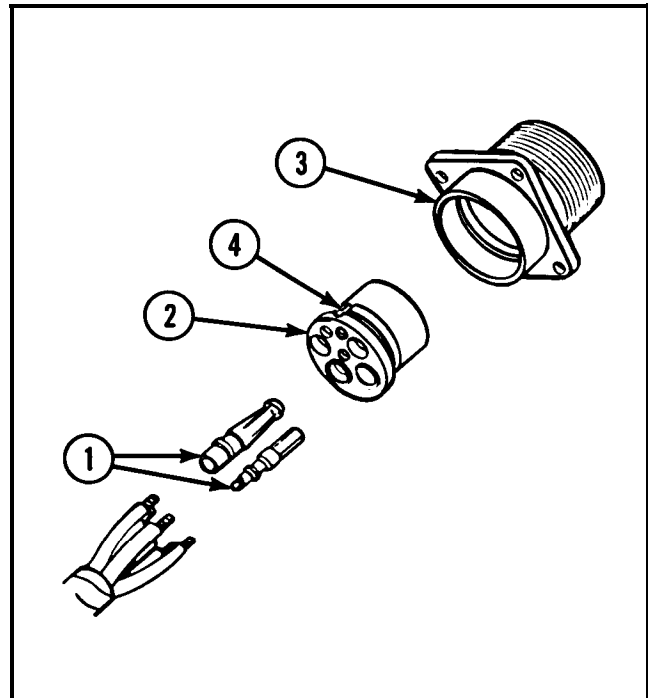
2-12. TYPICAL FEMALE-TYPE PANEL MOUNTING RECEPTACLE.

DISASSEMBLY

- 1 Drive socket contacts (1) out through rear of insert (2) with pin extractor.
- 2 Unsolder cable leads from solder wells on socket contacts (1).
- 3 Slide insert out through rear of shell assembly (3).

REASSEMBLY

- 1 Strip cable insulation equal to depth of solder wells of socket contacts (1).
- 2 Insert cable leads into solder wells of socket contacts (1) and solder.
- 3 Push insert (2) into shell assembly (3) from rear until seated. Groove (4) in insert must be aligned with guide in shell assembly (3) to ensure proper fit.
- 4 Push socket contacts (1) into insert (2) from rear until seated.



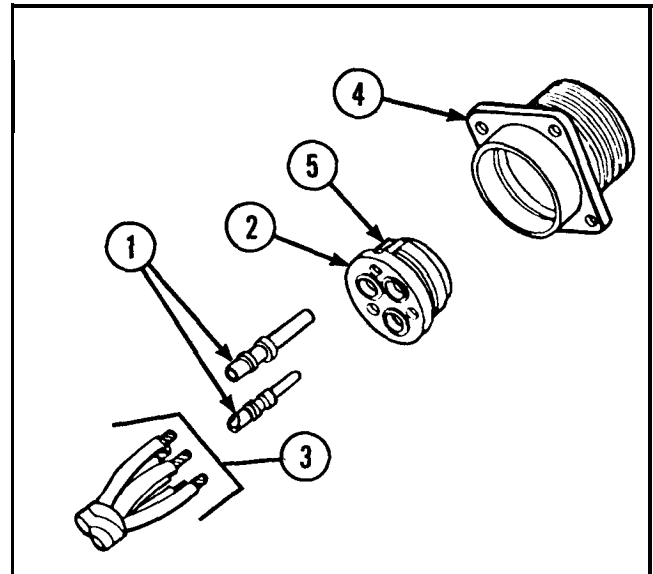
2-13. TYPICAL MALE-TYPE PANEL MOUNTING RECEPTACLE.

DISASSEMBLY

- 1 Drive pin contacts (1) out through rear of insert (2) with pin extractor.
- 2 Unsolder cable leads (3) from solder wells on pin contacts (1).
- 3 Slide insert (2) out through rear of shell assembly (4).

REASSEMBLY

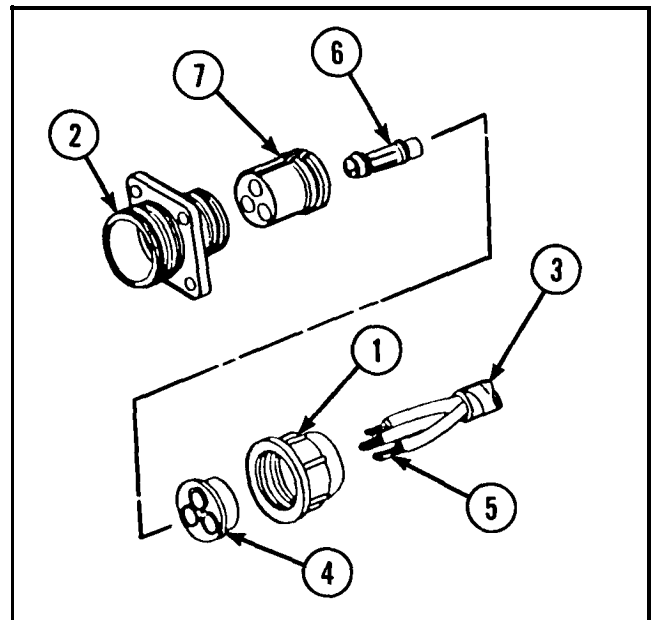
- 1 Strip cable insulation equal to depth of solder wells of pin contacts (1).
- 2 Insert cable leads (3) into solder wells of pin contacts (1) and solder.
- 3 Push insert (2) into shell assembly (4) from rear until seated. Groove (5) in insert must be aligned with guide in shell assembly (4) to ensure proper fit.
- 4 Push pin contacts (1) into insert (2) from rear until seated.



2-14. TYPICAL FEMALE-TYPE PANEL MOUNTING RECEPTACLE.

DISASSEMBLY

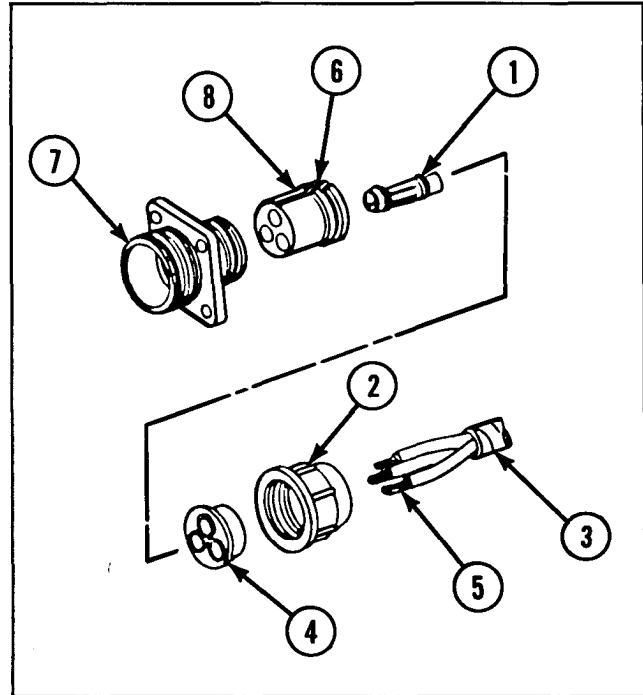
- 1 Unscrew nut (1) from shell assembly (2) and slide back on cable (3).
- 2 Slide grommet (4) back on cable leads (5).
- 3 Drive socket contacts (6) out through front of insert (7) with pin extractor.
- 4 Unsolder lead from socket contacts (6).
- 5 Push insert (7) out through rear of shell assembly (2).



2-14. TYPICAL FEMALE-TYPE PANEL MOUNTING RECEPTACLE (CONT).

REASSEMBLY

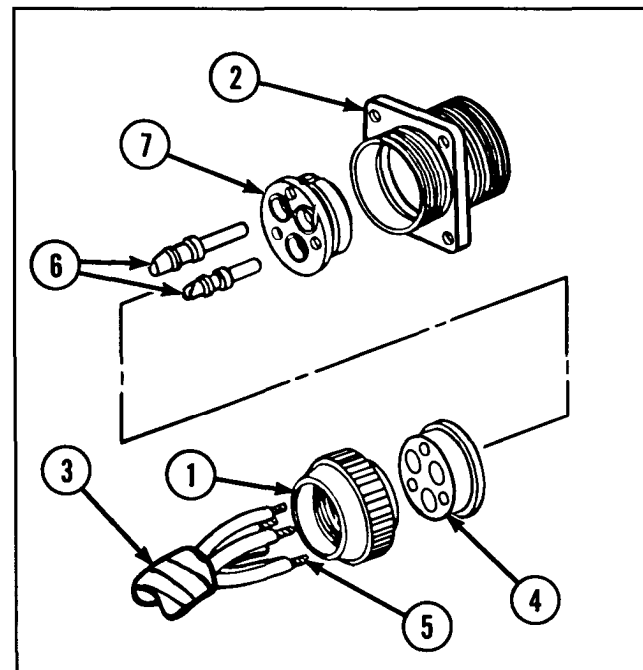
- 1 Strip cable insulation to depth of solder wells of socket contacts (1).
- 2 Slide nut (2) over cable (3).
- 3 Slide grommet (4) over cable leads (5).
- 4 Insert cable leads (5) into solder wells of socket contacts (1) and solder.
- 5 Push insert (6) into shell assembly (7) from rear until seated. Groove (8) in insert (6) must be aligned with guide in shell assembly (7) to ensure proper fit.
- 6 Push socket contacts (1) into insert (6) from rear until seated.
- 7 Push grommet (4) down cable leads (5) and over solder wells of socket contacts (1).
- 8 Screw nut (2) onto shell assembly (7).



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

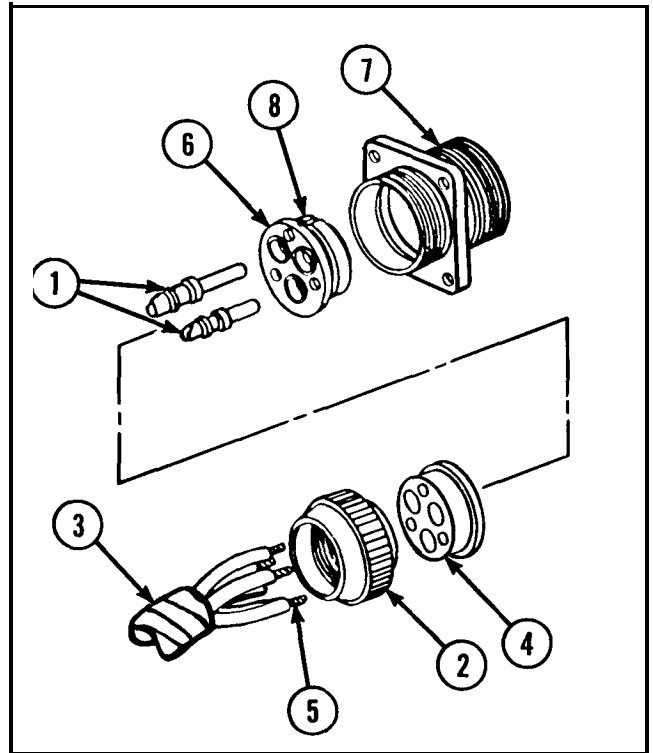
DISASSEMBLY

- 1 Unscrew nut (1) from shell assembly (2) and slide back on cable (3).
- 2 Push grommet (4) back on cable leads (5).
- 3 Drive pin contacts (6) out through rear of insert (7) with pin extractor.
- 4 Push insert (7) out through rear of shell assembly (2).
- 5 Unsolder cable leads (5) from pin contacts (6).

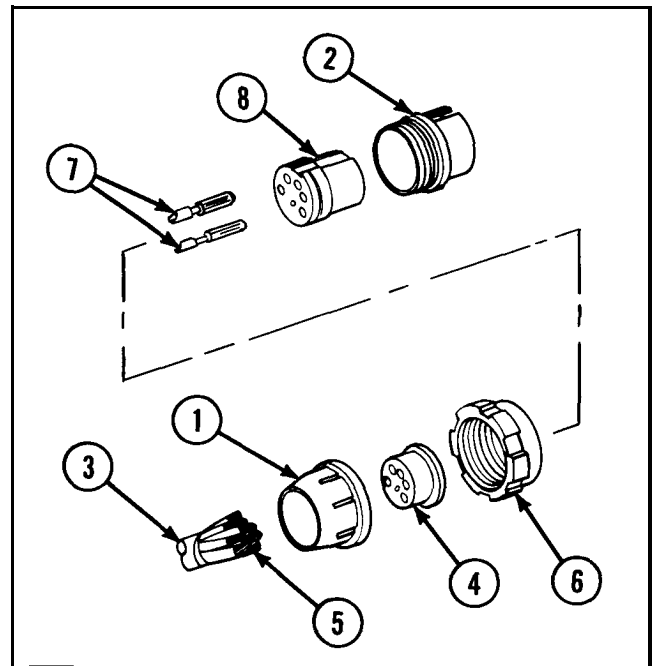


REASSEMBLY

- 1 Strip cable insulation equal to depth of solder wells of pin contacts (1).
- 2 Slide nut (2) onto cable (3).
- 3 Slide grommet (4) over cable leads (5).
- 4 Insert cable leads (5) into solder wells of pin contacts (1) and solder.
- 5 Push insert (6) into shell assembly (7) from rear until seated. Groove (8) in insert (6) must be aligned with guide in shell assembly (7) to ensure proper fit.
- 6 Push pin contacts (1) into insert (6) from rear until seated.
- 7 Push grommet (4) down cable leads (5) and over solder wells of pin contacts (1).
- 8 Screw nut (2) onto shell assembly (7).

**2-16. TYPICAL FEMALE-TYPE PLUG.****DISASSEMBLY**

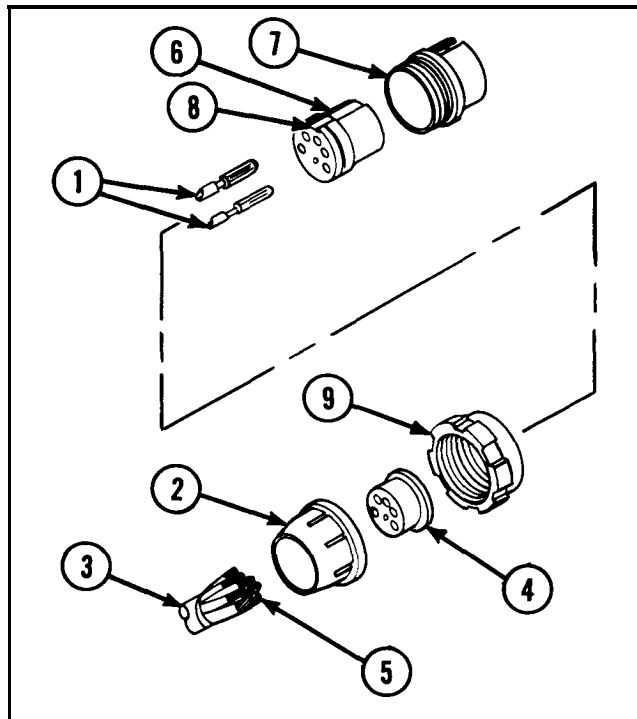
- 1 Unscrew nut (1) from shell assembly (2) and slide back on cable (3).
- 2 Slide grommet (4) back on cable leads (5).
- 3 Slide coupling (6) off shell assembly (2).
- 4 Drive socket contacts (7) out through rear of insert (8) with pin extractor.
- 5 Push insert (8) out through rear of shell assembly (2).
- 6 Unsolder cable leads (5) from socket contacts (7).



2-16. TYPICAL FEMALE-TYPE PLUG (CONT).

REASSEMBLY

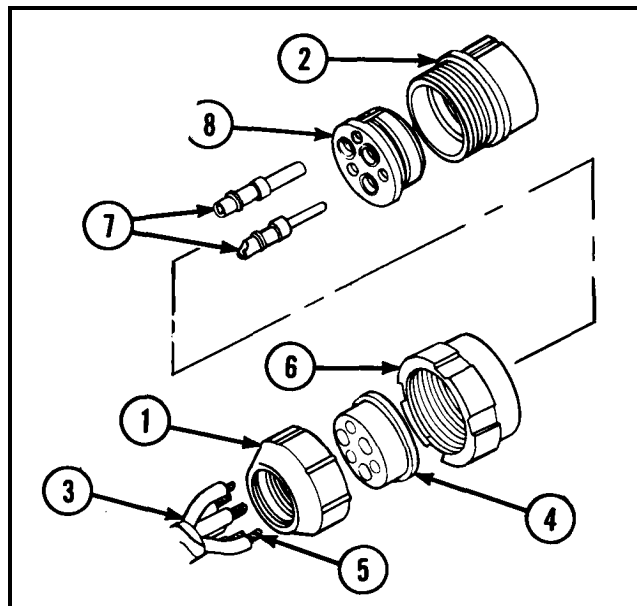
- 1 Strip cable insulation equal to depth of solder wells of socket contacts (1).
- 2 Slide nut (2) over cable (3).
- 3 Slide grommet (4) over cable leads (5).
- 4 Insert cable leads (5) into solder wells of socket contacts (1) and solder.
- 5 Push insert (6) into shell assembly (7) from rear until seated. Groove (8) in insert (6) must be aligned with guide in shell assembly (7) to ensure proper fit.
- 6 Push socket contacts (1) into insert (6) from rear until seated.
- 7 Slide coupling (9) onto shell assembly (7).
- 8 Push grommet (4) down cable leads (5) and over solder wells of socket contacts (1).
- 9 Screw nut (2) onto shell assembly (7).



2-17. TYPICAL MALE-TYPE PLUG.

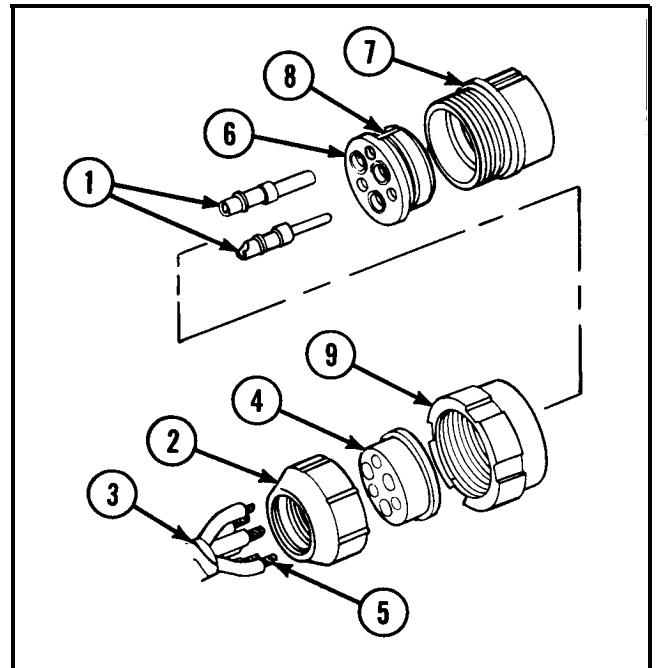
DISASSEMBLY

- 1 Unscrew nut (1) from shell assembly (2) and slide back on cable (3).
- 2 Slide grommet (4) back on cable leads (5).
- 3 Slide coupling (6) off shell assembly (2).
- 4 Drive pin contacts (7) out through rear of insert (8) with pin extractor.
- 5 Push insert (8) out through rear of shell assembly (2).
- 6 Unsolder cable leads (5) from pin contacts (7).

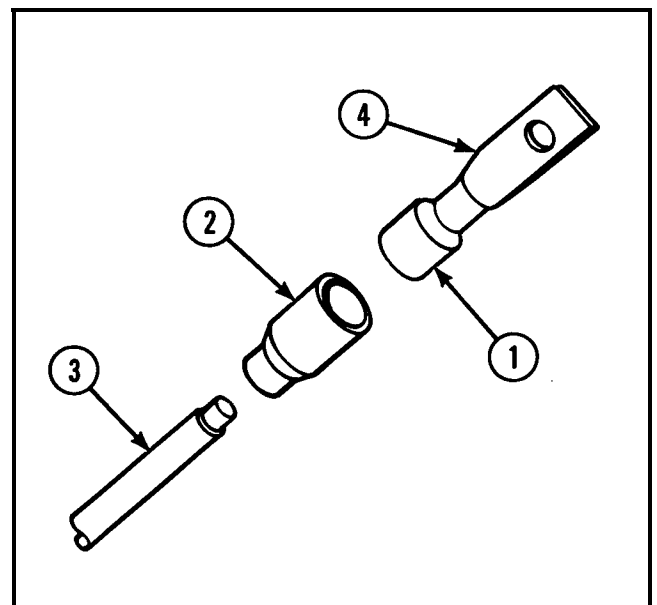


REASSEMBLY

- 1 Strip cable of insulation equal to depth of solder wells of pin contacts (1).
- 2 Slide nut (2) over cable (3).
- 3 Slide grommet (4) over cable leads (5).
- 4 Insert cable leads (5) into solder wells of pin contacts (1) and solder.
- 5 Push insert (6) into shell assembly (7) from rear until seated. Groove (8) in insert (6) must be aligned with guide in shell assembly (7) to ensure proper fit.
- 6 Push pin contacts (1) into insert (6) from rear until seated.
- 7 Slide coupling (9) onto shell assembly (7).
- 8 Push grommet (4) down cable leads (5) and over solder wells of pin contacts (1).
- 9 Screw nut (2) onto shell assembly (7).

**2-18. REPLACING CABLE TERMINALS AND CONNECTORS.****TERMINAL-TYPE CABLE CONNECTOR**

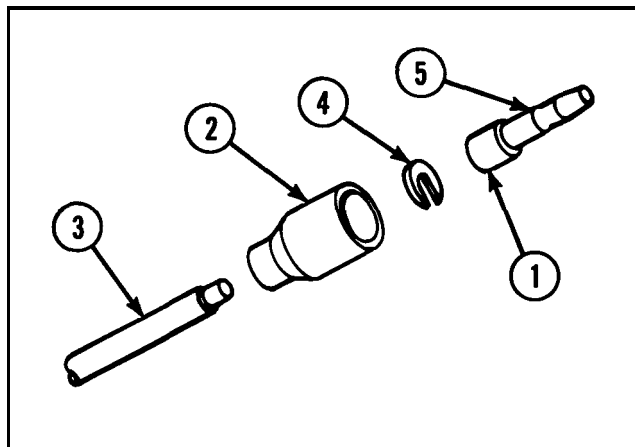
- 1 Strip cable insulation equal to depth of terminal well (1).
- 2 Slide insulator (2) over cable (3).
- 3 Insert cable (3) into terminal well (1) and crimp.
- 4 Slide insulator (2) over crimped end of terminal (4).



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

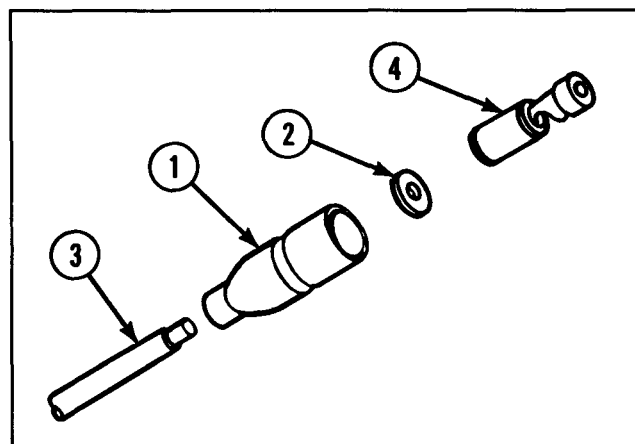
MALE CABLE CONNECTOR

- 1 Strip cable insulation equal to depth of ferrule well (1).
- 2 Slide shell assembly (2) over cable (3).
- 3 Insert cable (3) into ferrule well (1) and crimp.
- 4 Place C-washer (4) over cable (3) at crimped junction and slide shell assembly (2) over C-washer (4) and ferrule (5).



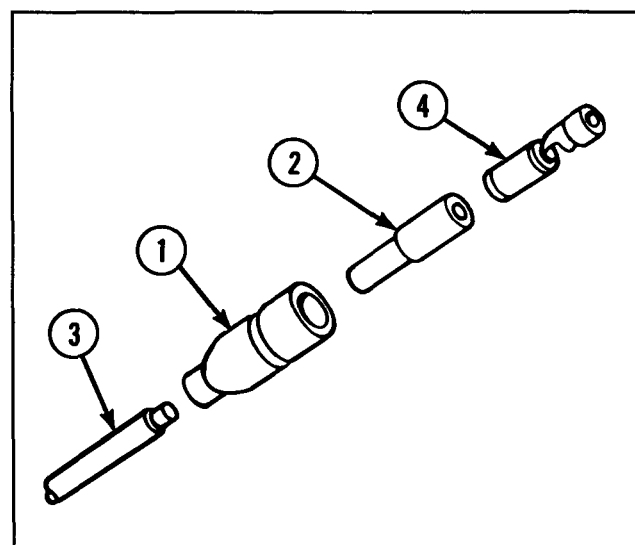
FEMALE CABLE CONNECTOR (WITH WASHER)

- 1 Strip cable insulation approximately 0.125 in. (0.318 cm).
- 2 Slide shell assembly (1) and washer (2) over cable (3).
- 3 Place cable (3) in cylindrical end of terminal (4) and crimp.
- 4 Slide shell assembly (1) and washer (2) over terminal (4).



FEMALE CABLE CONNECTOR (WITH SLEEVE)

- 1 Strip cable insulation approximately 0.125 in. (0.318 cm).
- 2 Slide shell assembly (1) and sleeve (2) over cable (3).
- 3 Place cable (3) in cylindrical end of terminal (4) and crimp.
- 4 Slide shell assembly (1) and sleeve (2) over terminal (4).



Section VI. MAINTENANCE OF HYDRAULIC LINES AND FITTINGS

2-19. GENERAL.

a. This section contains instructions on repair of hydraulic lines and fittings. Repair of hydraulic lines and fittings consists of replacement of preformed packings, tube fitting locknuts, lockwashers, and defective sleeve spacers and washers. Pages 2-73 and 2-74 show exploded views of typical hydraulic lines and fittings used on the vehicle, and give procedures for disassembly and reassembly of fittings. For complete inspection procedures, refer to b. below. Refer to TM 9-2350-238-24P-2 for ordering of authorized parts. Ensure hydraulic pressure is relieved before performing any disassembly of hydraulic lines and fittings.

b. Inspect all unions, nipples, tees, reducers, plugs, elbows, and parts on which end fittings are used for thread damage, fractures, corrosion, distortion, slivers, restrictions, sealing surface scratches, or mutilation. Hex corners shall not be rounded. Repair is by replacement of authorized parts (TM 9-2350-238-24P-2) which do not meet above criteria.

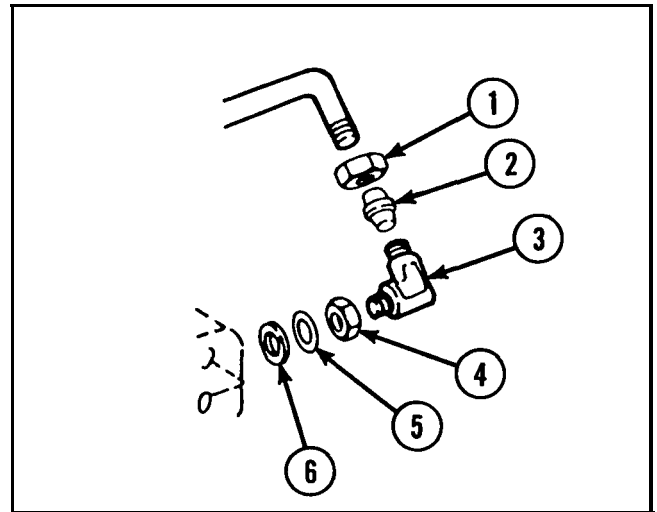
2-20. TUBE ELBOW TO TUBE FITTING.

DISASSEMBLY

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

REASSEMBLY

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



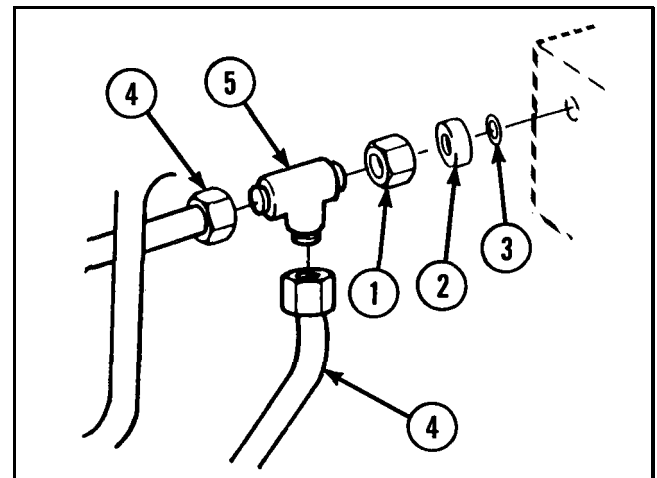
2-21. TUBE TEE TO TUBE FITTING.

DISASSEMBLY

Remove tube fitting locknut (1), flat washer (2), and preformed packing (3) before disconnecting tube assemblies (4) from tube tee (5). Remove tube tee (5).

REASSEMBLY

Install tube tee (5) in tube assembly (4) before installing new preformed packing (3), flat washer (2), and new tube fitting locknut (1).



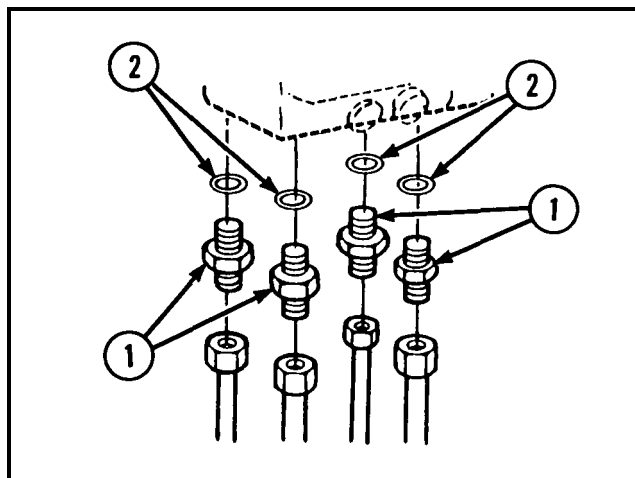
2-22. TUBE REDUCER TO TUBE FITTING.

DISASSEMBLY

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

REASSEMBLY

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



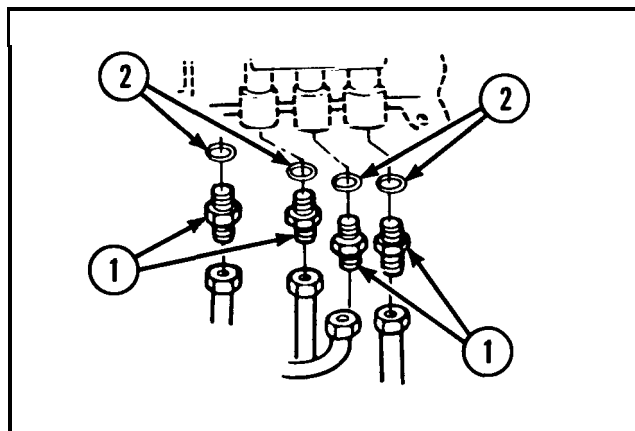
2-23. TUBE NIPPLE TO TUBE FITTING.

DISASSEMBLY

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

REASSEMBLY

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



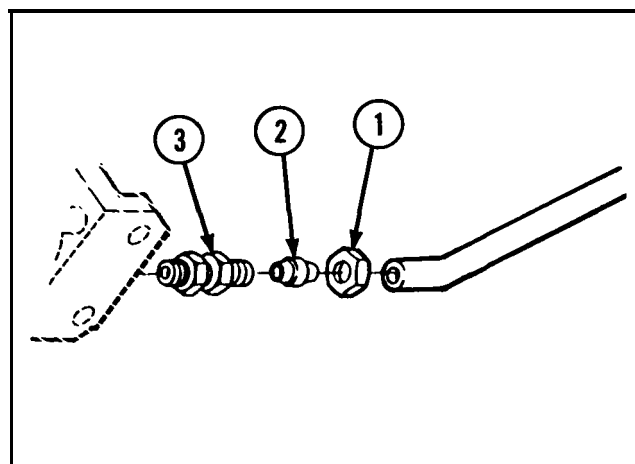
2-24. STRAIGHT ADAPTER TO TUBE FITTING.

DISASSEMBLY

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

REASSEMBLY

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



Section VII. UNIT MAINTENANCE INSTRUCTIONS

2-25. GENERAL. This section provides general repair methods and cleaning procedures. Special repair and cleaning procedures are provided, as required, in the individual maintenance instructions.

2-26. REPAIR METHODS.

- 1 Complete disassembly is not always necessary to make a repair. Exercise good judgement to keep disassembly and reassembly to a minimum.
- 2 Repair or replace unserviceable parts and hardware. Always replace packings, gaskets, and seals with new parts.
- 3 Remove burrs with a stone or file. Remove burrs on closely fitted mating surfaces by lapping the surfaces with lapping grinding compound (item 13, appx C).
- 4 Remove corrosion or rust with crocus cloth (item 6, appx C) or emery cloth (item 7, appx C). Use the method that will not damage the surface being cleaned. Crocus cloth (item 6, appx C) should be used to remove corrosion and rust from polished surfaces. Make sure that critical dimensions are not altered when using crocus cloth.
- 5 Repair damaged threads with a thread chaser or die.
- 6 When welding is authorized, procedures in TM 9-237 must be followed. Welds must be inspected for cracks.
- 7 Bearings should be inspected and maintained following procedures in TM 9-214.
- 8 Clean electrical ground contacts with crocus cloth (item 6, appx C) or emery cloth (item 7, appx C). Make sure ground connections are tight.
- 9 Repair chafed, broken, or damaged electrical wiring with insulation tape (item 20, appx C). When soldering is required,

procedures in TB SIG 222 must be followed.

- 10 After locating the malfunction and repairing the component, test it for proper function.
- 11 Follow torque values given throughout this manual. When no torque value is given, follow the torque limits guide, provided in appendix E of this manual, to prevent damaging parts.

2-27. CLEANING.

- 1 Wire brush metal parts to remove rust and corrosion.

WARNING

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

- 2 Clean metal parts with dry cleaning solvent (SD2) (item 10, appx C). Metal or fiber brushes may be used to apply cleaning solvent and to remove softened or dissolved material. Hand scraping with metal scrapers may be used to remove soft coatings or deposits.
- 3 Soak oily or greasy metal parts in a tank containing dry cleaning solvent (SD2) (item 10, appx C). The time parts must be in solvent varies with the type and amount of material to be removed.
- 4 Do not use solvent to clean electrical insulation, wires, cables, or wiring harnesses. Clean these parts by wiping with a damp cloth. Use a mild soap solution if necessary. Dry immediately with clean dry cloths. Clean contact points with flint abrasive paper (item 1, appx C) and dust thoroughly after cleaning.

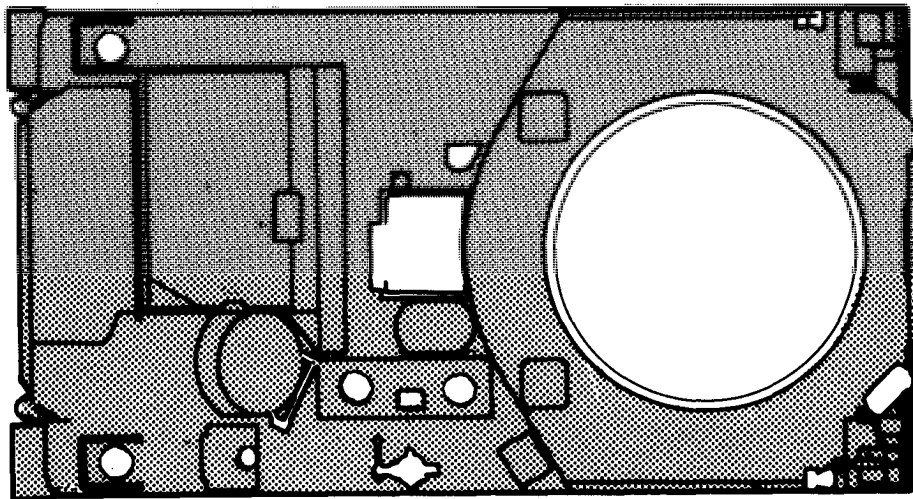
2-27. CLEANING (CONT).

- 5 Do not use solvent to clean rubber parts. Clean rubber parts by washing with mild solution of soap and water.
- 6 Dry parts by blowing with low-pressure compressed air or wiping with clean, lint-free cloths (item 8, appx C).
- 7 Bearings should be cleaned by procedures in TM 9-214.
- 8 Spot paint metal surfaces after repairs, as required. Sand damaged areas, clean with solvent, and rinse with water. Surface must be clean and dry. Paint with CARC to match existing color, refer to TM 43-0139.

2-28. LUBRICATION. Keep a light coat of lubricating oil (CLP) (item 5, appx C) on parts during repair procedures to prevent rusting. Lubricate parts during repair and assembly as required. Refer to page 2-8.

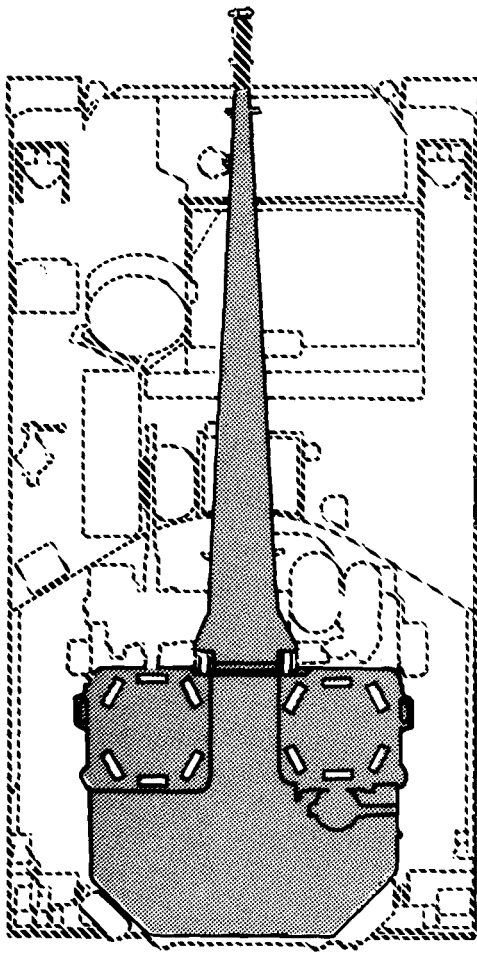
2-29. PAINTING INSTRUCTIONS. Complete painting is authorized for and done by general support maintenance personnel or higher. Spot painting and restenciling vehicle markings is done by unit maintenance personnel. Instructions for material preparation, priming, and finish are given in TM 43-0139.

2-30. NONSKID AREAS.

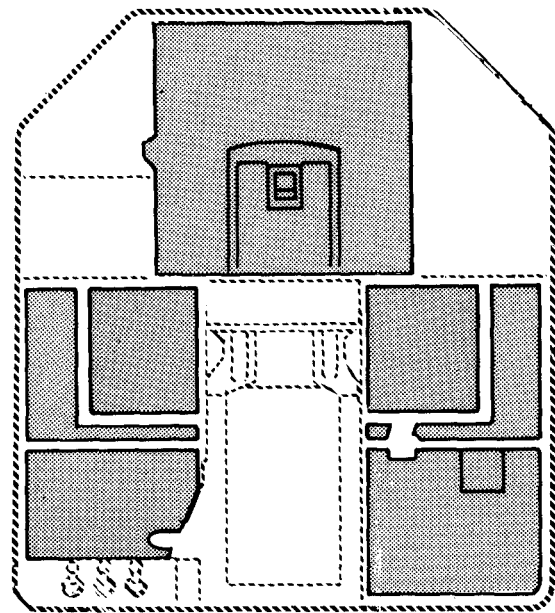


HULL EXTERIOR WALKWAYS

Nonslip paint (item 15, appx C) will be used to coat deck areas where personnel walk. The areas to be coated with nonslip paint are shown shaded in the above illustration and on page 2-77.



CAB EXTERIOR AND BOOM WALKWAYS



CAB INTERIOR WALKWAYS

2-31. TOUCHUP AND RECOATING.

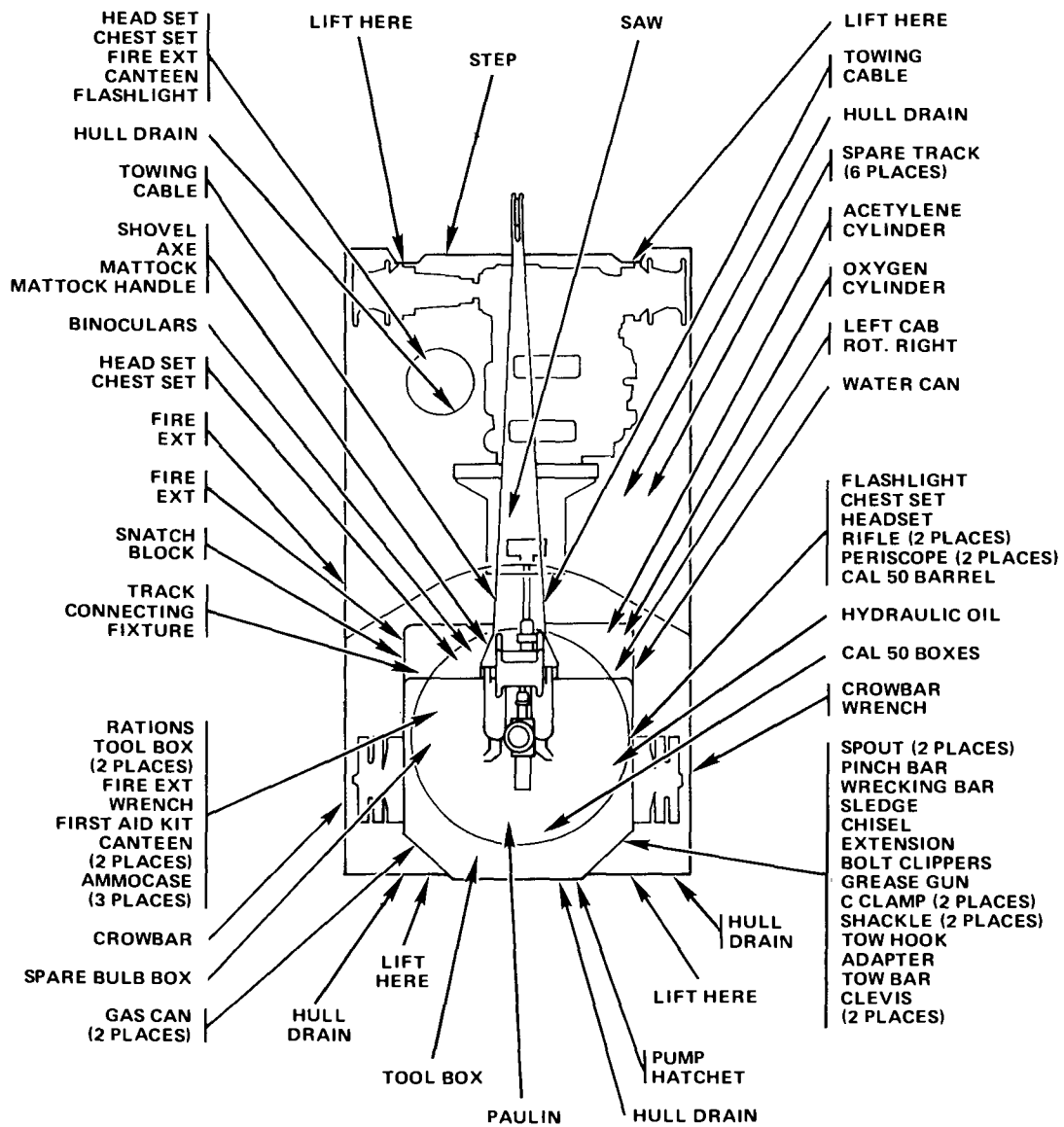
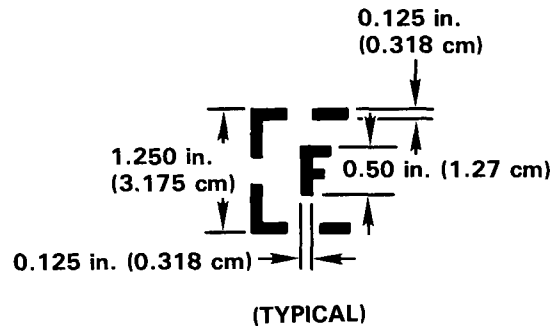
WARNING

- Chemical Agent Resistant Coating (CARC) Paint: CARC paint contains isocyanate, a constituent that can cause respiratory effects during and after the application of the material. During the application of CARC paint, coughing, shortness of breath, pain on respiration, increased sputum, and chest tightness may occur. CARC paint also produces itching and reddening of the skin, a burning sensation of the throat and nose, and watering of the eyes.
- 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 insure the safety of personnel when CARC paint is applied.
- For brush/roller painting in confined spaces, an airline respirator is required, unless an air sampling shows exposure to be below standards. If the air sampling is below standards, either chemical cartridge or airline respirators are required.
- Spot painters applying CARC paint by brush or roller must wear clothing and gloves affording full coverage.
- Do not use water, alcohol, or amine based solvents to thin or remove CARC paints. Use of these solvents with CARC paints can produce chemical reactions resulting in nausea, disease, burns, or severe illness to personnel.
- Do not use paint solvents to remove paint/coating from your skin.
- Mix paint/coating in a well-ventilated mixing room or spraying area away from open flames. Personnel mixing paint/coating should wear eye protection.
- Use paint/coating with adequate ventilation.
- Unusable CARC mixtures may be considered hazardous waste and may require disposal IAW Federal, state, DoD, and DA hazardous waste regulations. Consult the installation environmental office for proper disposal guidance. Mixed CARC has a flashpoint of approximately 38° F (3° C) due to the incorporation of solvents and is highly flammable.

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

2-32. RESTENCILING VEHICLE MARKINGS.

Apply stencils to clean, painted surfaces only. Use black enamel (item 11, appx C). When possible, position the stencil so that it is covered by the item named when the item is stowed in its proper place. Stencil dimensions and locations are shown below and to the right.



2-33. MAINTENANCE OF CAB ASSEMBLY COVERS, DOORS, AND RELATED PARTS.

This task covers: a. *Removal*

b. *Inspection/Repair*

c. *Installation*

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive
(appx B)

Sealing compound (item 17, appx C)
Self-locking nut (MS21044N6)

References

TM 9-2350-238-24P-2

Materials/Parts

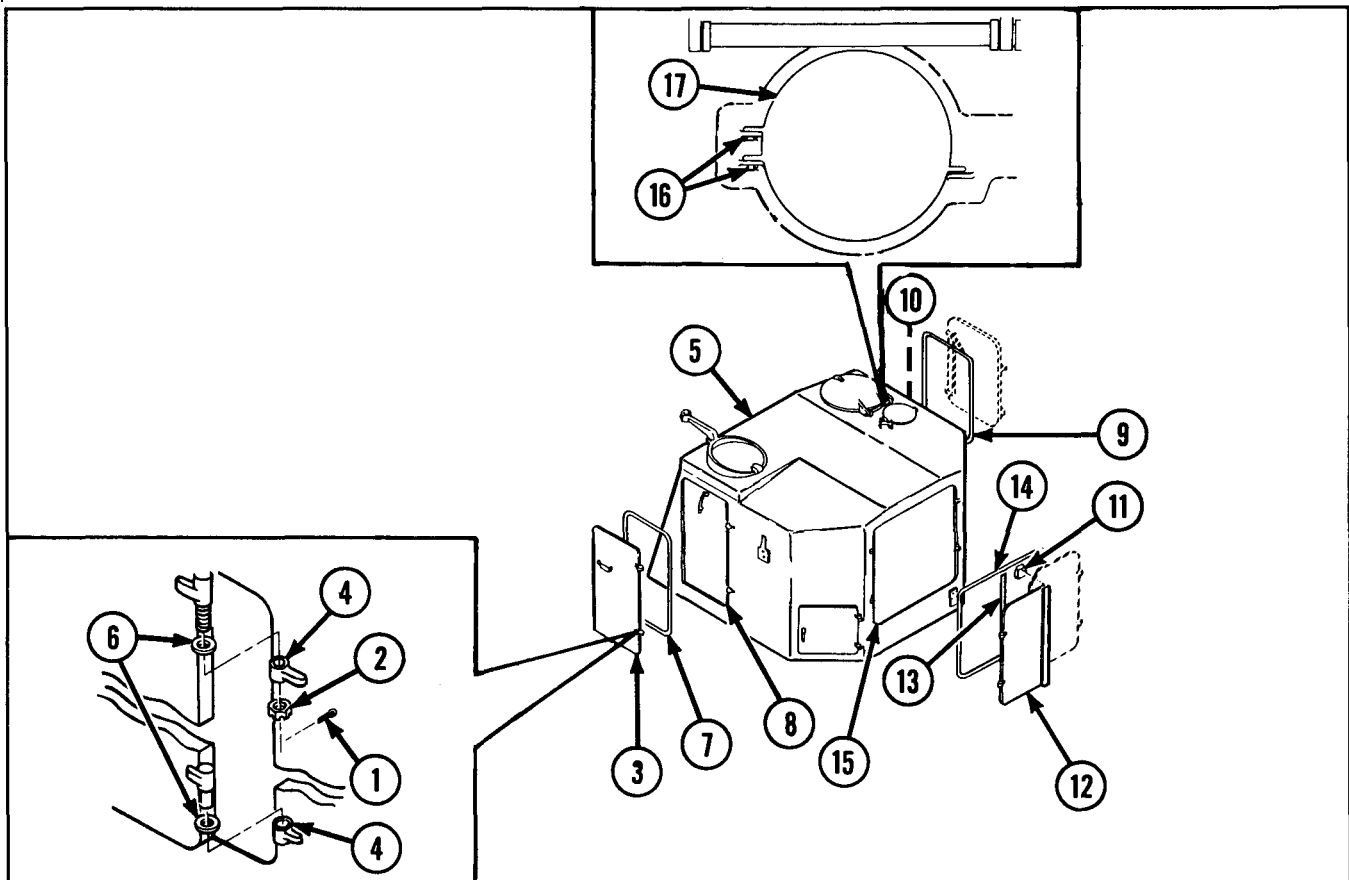
Cotter pin (2) (MS24665-285)
Cotter pin (4) (MS24665-355)
Dry cleaning solvent (item 10, appx C)
Lockwasher (4) (MS35338-44)
Lockwasher (4) (MS35338-46)
Nonmetallic seal (2) (10908671-2)
Nonmetallic gasket (10908671-3)
Nonmetallic seal (10908671-4)
Nonmetallic seal tab (2) (11592841)
Plastic adhesive (item 3, appx C)

General Safety Instructions

WARNING

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

REMOVAL

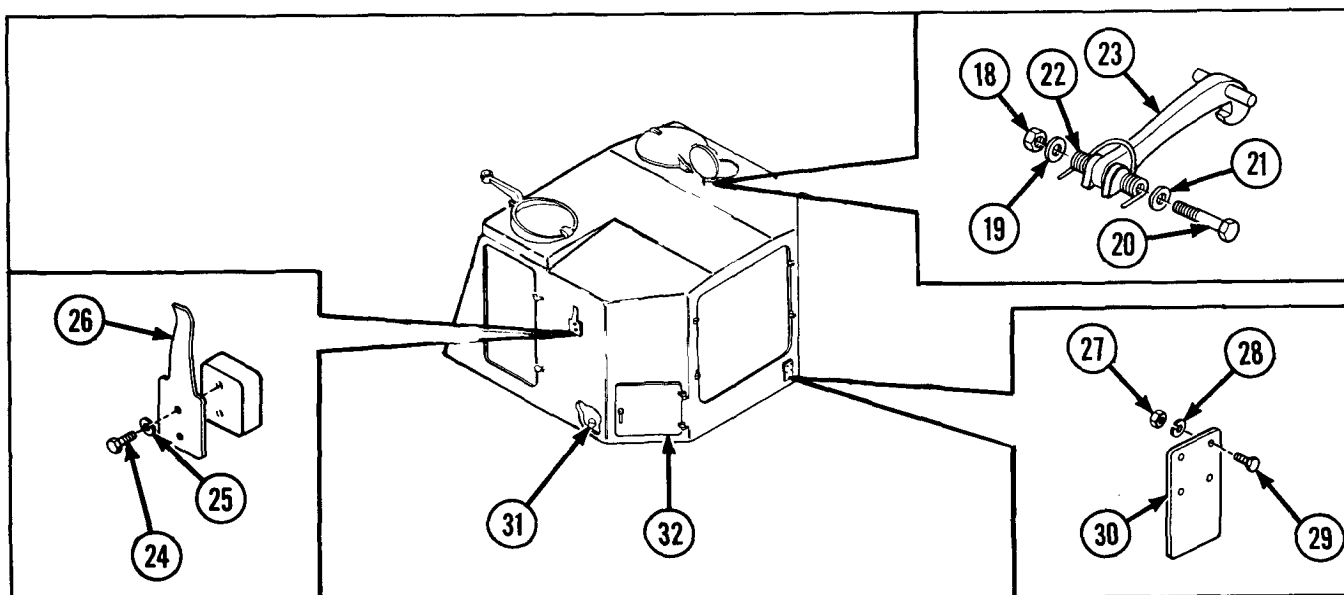


NOTE

Steps 1 thru 3 are written for removal of left side cab swinging metal door, but also apply to removal of left rear cab swinging metal door, right rear vehicle cab hatch door, and right side cab vehicle hatch door.

- 1 Remove cotter pin (1) and slotted nut (2).
- 2 Open left side cab swinging metal door (3), lift off hinges (4), and remove from cab (5).
- 3 Remove two sleeve bearings (6) from hinges (4).
- 4 If damaged, remove nonmetallic seal (7) from left side cab swinging metal door opening (8).

- 5 If damaged, remove nonmetallic seal (9) from right side cab vehicle hatch door opening (10).
- 6 If damaged, remove two nonmetallic seal tabs (11) from left rear cab swinging metal door (12).
- 7 If damaged, remove nonmetallic seal (13) from left rear cab swinging metal door (12).
- 8 If damaged, remove nonmetallic gasket (14) from rear door opening (15) of cab (5).
- 9 Remove two cotter pins (16); lift hydraulic reservoir filter access door (17) to upright position and remove.



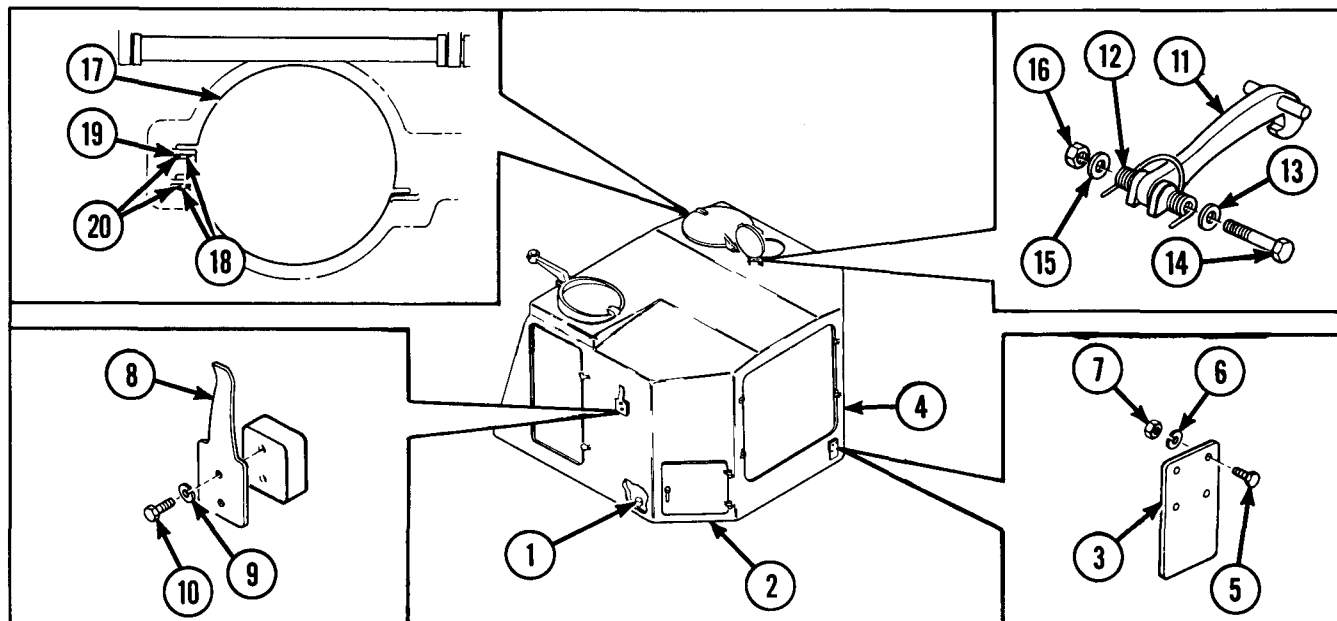
- 10 Remove self-locking nut (18), flat washer (19), capscrew (20), and flat washer (21).
- 11 Remove helical spring (22) and crane operator's hatch thumb latch (23).
- 12 Remove four capscrews (24), four lockwashers (25), and right and left cab door catch springs (26).
- 13 Remove four hexagon plain nuts (27), four lockwashers (28), four capscrews (29), and receptacle hole slave access cover (30).
- 14 Remove pipe plug (31) from floor inside rear cab stowage compartment (32).

2-33. MAINTENANCE OF CAB ASSEMBLY COVERS, DOORS, AND RELATED PARTS (CONT).

INSPECTION/REPAIR

- 1 Check for broken, damaged, or missing parts.
- 2 Right side cab vehicle hatch door is a repairable assembly. Refer to page 2-84.
- 3 Left rear cab swinging metal door is a repairable assembly. Refer to page 2-86.
- 4 Left side cab swinging metal door is a repairable assembly. Refer to page 2-84.
- 5 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

INSTALLATION



- 1 Install pipe plug (1) on floor inside rear cab stowage compartment (2).
- 2 Install receptacle hole slave access cover (3) to cab (4) and secure with four cap screws (5), four new lockwashers (6), and four hexagon plain nuts (7).
- 3 Install right and left cab door catch springs (8) to cab (4) and secure with four new lockwashers (9) and four cap screws (10).
- 4 Install crane operator's hatch thumb latch (11) and helical spring (12) on top of cab (4).
- 5 Install flat washer (13), capscrew (14), flat washer (15), and new self-locking nut (16).
- 6 Install hydraulic reservoir filter access door (17).
- 7 Rotate hydraulic reservoir filter access door (17) counterclockwise to engage two access door studs (18) with cab weldments (19). Secure with two new cotter pins (20).

WARNING

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

- 8 Remove residual adhesive from bonding surfaces around rear door opening (21) of cab (4) and left rear cab swinging metal door (22) using dry cleaning solvent (item 10 appx C) and wire brush.
- 9 Apply plastic adhesive (item 3, appx C) to bonding surfaces of nonmetallic gasket (23), nonmetallic seal (24), and two nonmetallic seal tabs (25).
- 10 If removed, install two nonmetallic seal tabs (25) to left rear cab swinging metal door (22).
- 11 If removed, install new nonmetallic seal (24) to left rear cab swinging metal door (22).
- 12 If removed, install new nonmetallic gasket (23) to door frame (21) of cab (4).

WARNING

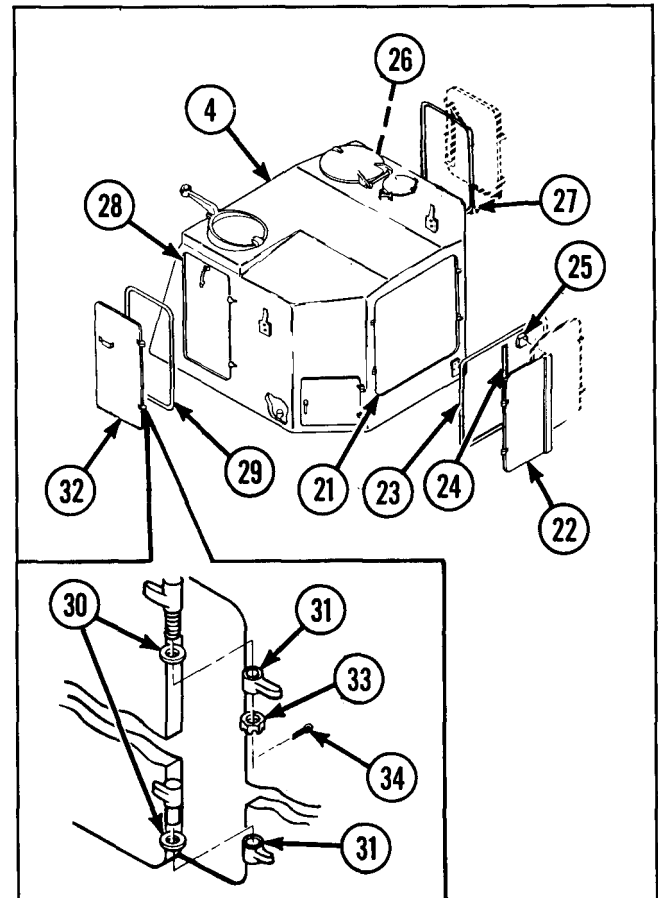
Dry cleaning solvent (SD2) is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated areas.

- 13 Remove residual adhesive from right side cab vehicle hatch door opening (26) using dry cleaning solvent (item 10, appx C) and wire brush.
- 14 Apply plastic adhesive (item 3, appx C) to new nonmetallic seal (27) and if removed, install new nonmetallic seal to right side cab vehicle hatch door opening (26).

WARNING

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

- 15 Remove residual adhesive from back of left side cab swinging metal door opening



(28) using dry cleaning solvent (item 10, appx C) and wire brush.

- 16 Apply plastic adhesive (item 3, appx C) to new nonmetallic seal (29). Install new nonmetallic seal to left side cab swinging metal door opening (28).

NOTE

Steps 17 and 18 are written for installation of left side cab swinging metal door, but also apply to installation of left rear cab swinging metal door, right rear cab vehicle hatch door, and right side cab vehicle hatch door.

- 17 Install two sleeve bearings (30) on hinges (31) of cab (4).
- 18 Install left side cab swinging metal door (32) on hinges (31) of cab (4) and secure with slotted nut (33) and new cotter pin (34).

2-34. MAINTENANCE OF LEFT SIDE CAB SWINGING METAL DOOR AND RIGHT SIDE CAB VEHICLE HATCH DOOR.

This task covers: a. *Disassembly*

b. *Inspection/Repair*

c. *Reassembly*

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive
(appx B)

Materials/Parts

Lockwasher (4) (MS35338-46)

References

TM 9-2350-238-24P-2

Equipment Conditions

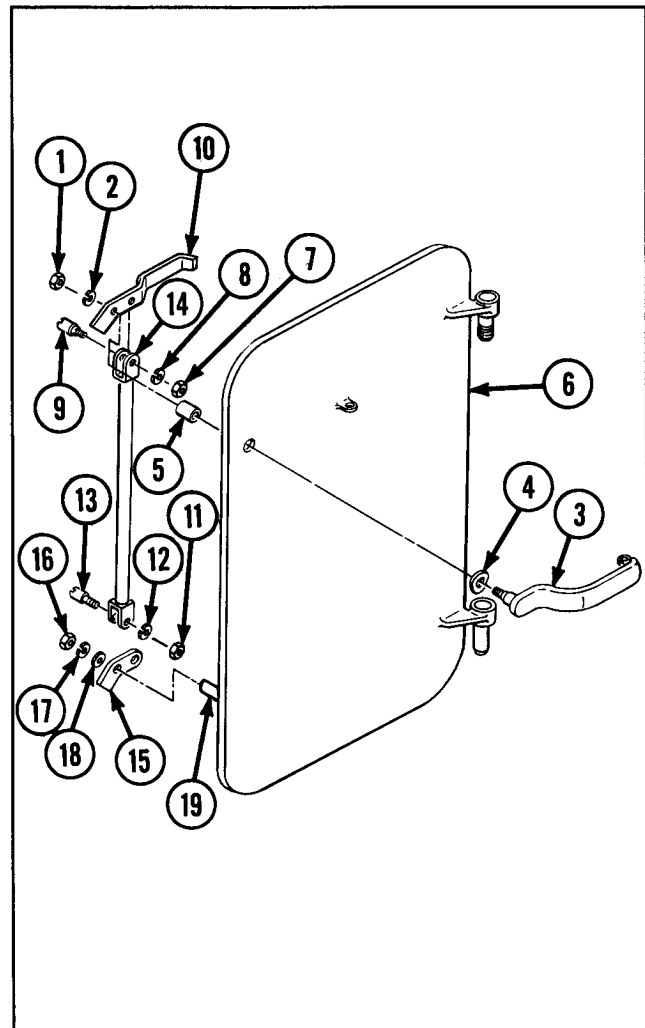
2-80 Left side cab swinging metal door
and right side cab vehicle hatch door
removed

DISASSEMBLY

NOTE

The following procedures are written for left side cab swinging metal door, but also apply to right side cab vehicle hatch door.

- 1 Remove hexagon plain nut (1), lockwasher (2), outer door handle (3), outer handle spring tension washer (4), and handle sleeve bearing (5) from left-hand side door (6).
- 2 Remove hexagon plain nut (7), lockwasher (8), door latch link machine screw (9), and left-hand side door inner door handle (10).
- 3 Remove hexagon plain nut (11), lockwasher (12), door latch link machine screw (13), and rig assembly connecting link (14) from side door vehicular door latch (15).
- 4 Remove hexagon plain nut (16), lockwasher (17), flat washer (18), and side door vehicular door latch (15) from stud (19) on left-hand side door (6).



INSPECTION/REPAIR

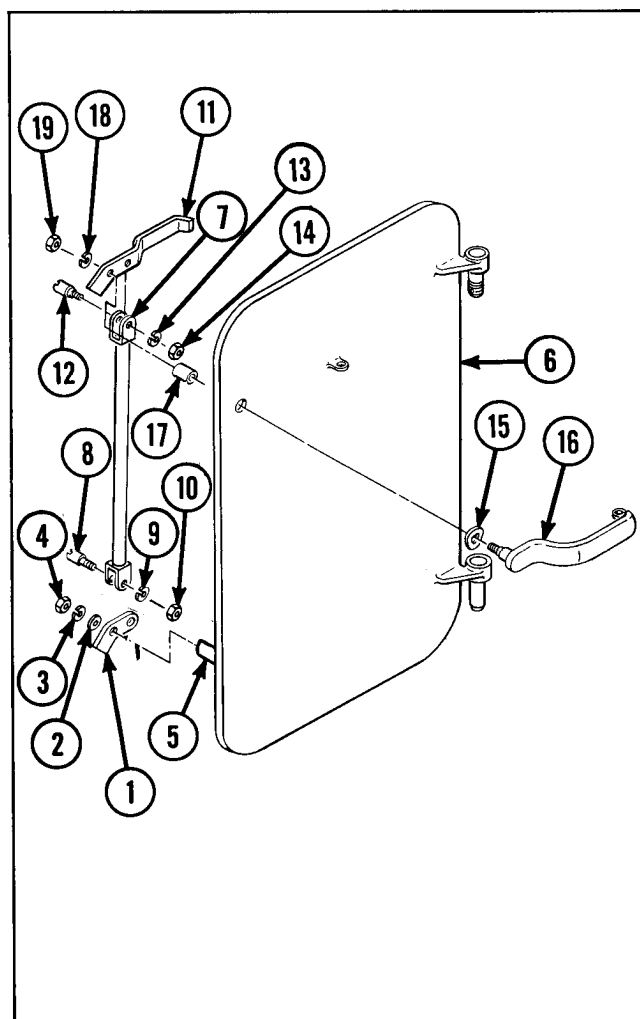
- 1 Check for broken, damaged, or missing parts.
- 2 If left-hand side door is broken or damaged, repair is by replacement of next higher assembly.
- 3 If right-hand side door is broken or damaged, repair is by replacement of next higher assembly.
- 4 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

REASSEMBLY

NOTE

The following procedures are written for left side cab swinging metal door, but also apply to right side cab vehicle hatch door.

- 1 Install side door vehicular door latch (1), flat washer (2), new lockwasher (3), and hexagon plain nut (4) on stud (5) on left-hand side door (6).
- 2 Install rig assembly connecting link (7) to side door vehicular door latch (1) and secure with door latch link machine screw (8), new lockwasher (9), and hexagon plain nut (10).
- 3 Install left-hand side door inner door handle (11) on rig assembly connecting link (7) and secure with door latch machine screw (12), new lockwasher (13), and hexagon plain nut (14).
- 4 Install outer handle spring tension washer (15), outer door handle (16), handle sleeve bearing (17), new lockwasher (18), and hexagon plain nut (19).



2-35. MAINTENANCE OF LEFT REAR CAB SWINGING METAL DOOR.

This task covers: a. *Disassembly*

b. *Inspection/Repair*

c. *Reassembly*

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive
(appx B)

Materials/Parts

Cotter pin (2) (MS24665-285)

References

TM 9-2350-238-24P-2

Equipment Conditions

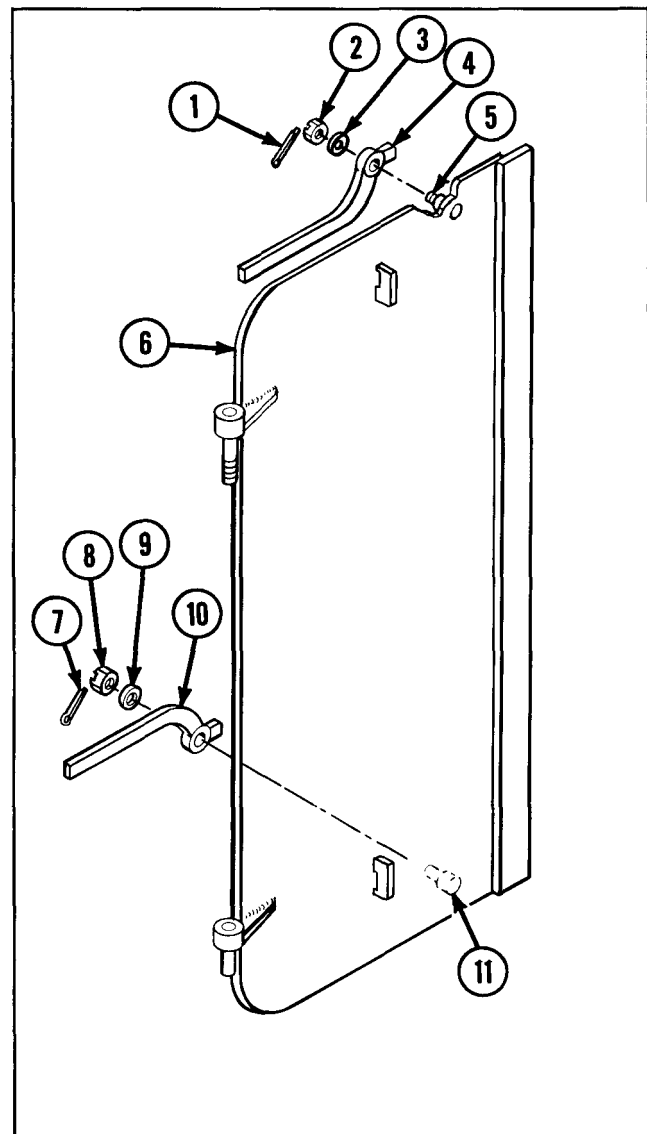
2-80 Left rear cab swinging metal door
removed

DISASSEMBLY

- 1 Remove cotter pin (1), slotted plain nut (2), flat washer (3), and upper door locking arm (4) from stud (5) on cab door (6).
- 2 Remove cotter pin (7), slotted plain nut (8), flat washer (9), and lower manual control door locking handle (10) from stud (11) on cab door (6).

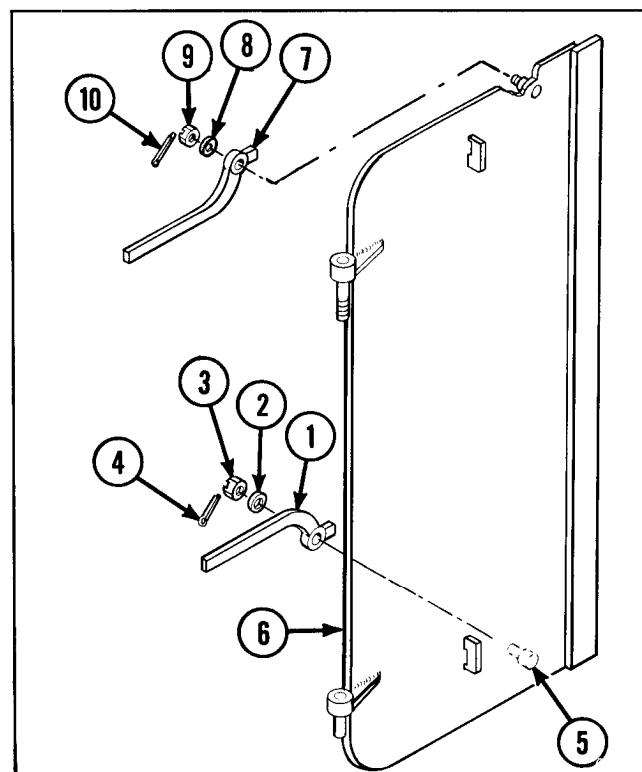
INSPECTION/REPAIR

- 1 Check for broken, damaged, or missing parts.
- 2 If cab door is broken or damaged, repair is by replacement of next higher assembly.
- 3 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).



REASSEMBLY

- 1 Install lower manual control door locking handle (1), flat washer (2), slotted nut (3), and new cotter pin (4) on stud (5) of cab door (6).
- 2 Install upper door locking arm (7), flat washer (8), slotted nut (9), and new cotter pin (10) on stud (11) of cab door (6).



2-36. MAINTENANCE OF CAB ASSEMBLY TOW WINCH ACCESS DOOR AND RELATED PARTS.

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

d. *Reassembly*
 e. *Installation*

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive (appx B)
 Shop equipment, automotive maintenance and repair: organizational maintenance, common no. 1, less power (appx B)
 Wire brush

Materials/Parts

Cotter pin (MS24665-287)
 Dry cleaning solvent (item 10, appx C)
 Epoxy resin adhesive (item 2, appx C)
 Lockwasher (3) (MS35338-44)
 Lockwasher (MS35338-46)
 Nonmetallic seal (2) (10956690-1)
 Nonmetallic seal (2) (10956690-2)
 Self-locking nut (MS21044N6)

References

TM 9-2350-238-24P-2

Equipment Conditions

Boom raised and 4x4 wooden block placed under boom for support

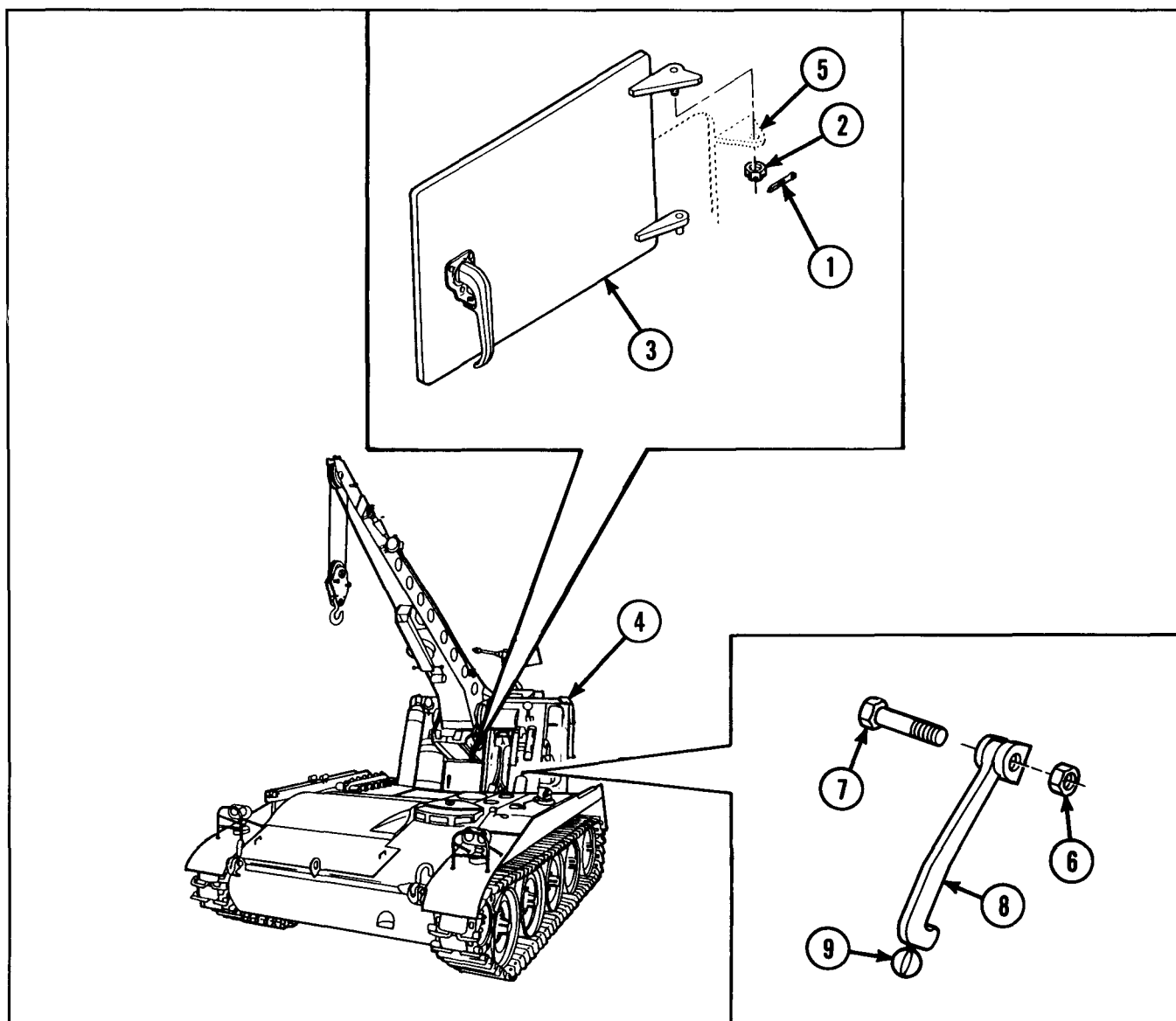
General Safety Instructions

WARNING

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

2-36. MAINTENANCE OF CAB ASSEMBLY TOW WINCH ACCESS DOOR AND RELATED PARTS (CONT).

REMOVAL



1 Remove cotter pin (1) and slotted nut (2) securing tow winch access door (3) to cab (4).

2 Open tow winch access door (3) and lift off hinges (5) of cab (4) to remove.

3 Remove self-locking nut (6), cap screw (7), and tow winch door rim latch (8). Remove tow winch door catch knob (9) from tow winch door rim latch (8).

DISASSEMBLY

- 1 Remove capscrew (1), lockwasher (2), flat washer (3), and door lock-release lever (4) from access door (5).
- 2 Remove three capscrews (6), three lockwashers (7), and stowage door handle (8) from access door (5).
- 3 If damaged, remove two nonmetallic seals (9) from top and bottom of access door opening (10).
- 4 If damaged, remove nonmetallic seals (11) from both sides of access door opening (10).

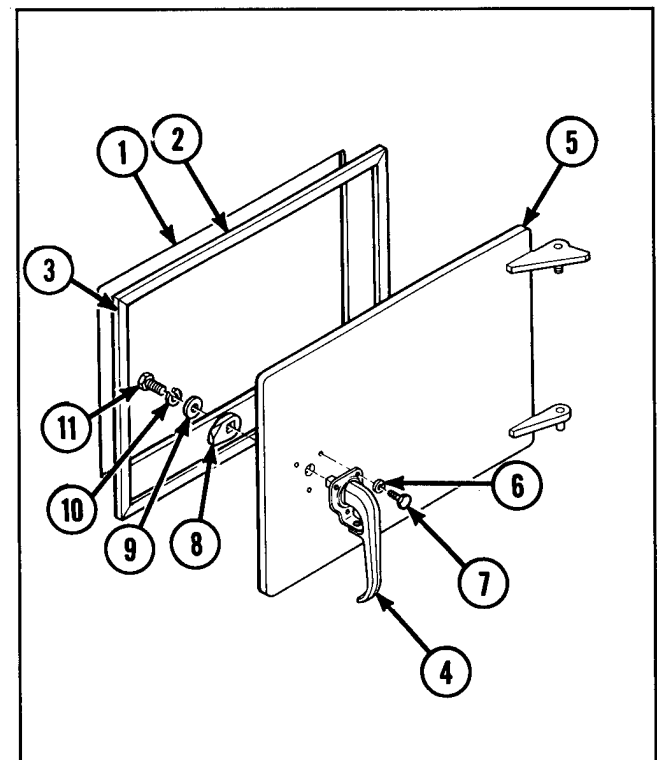
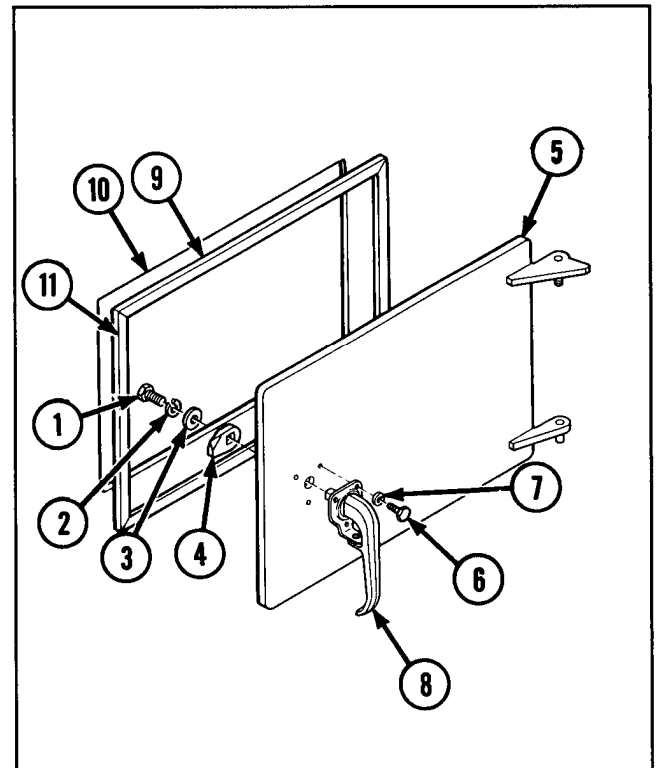
INSPECTION/REPAIR

- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

REASSEMBLY**WARNING**

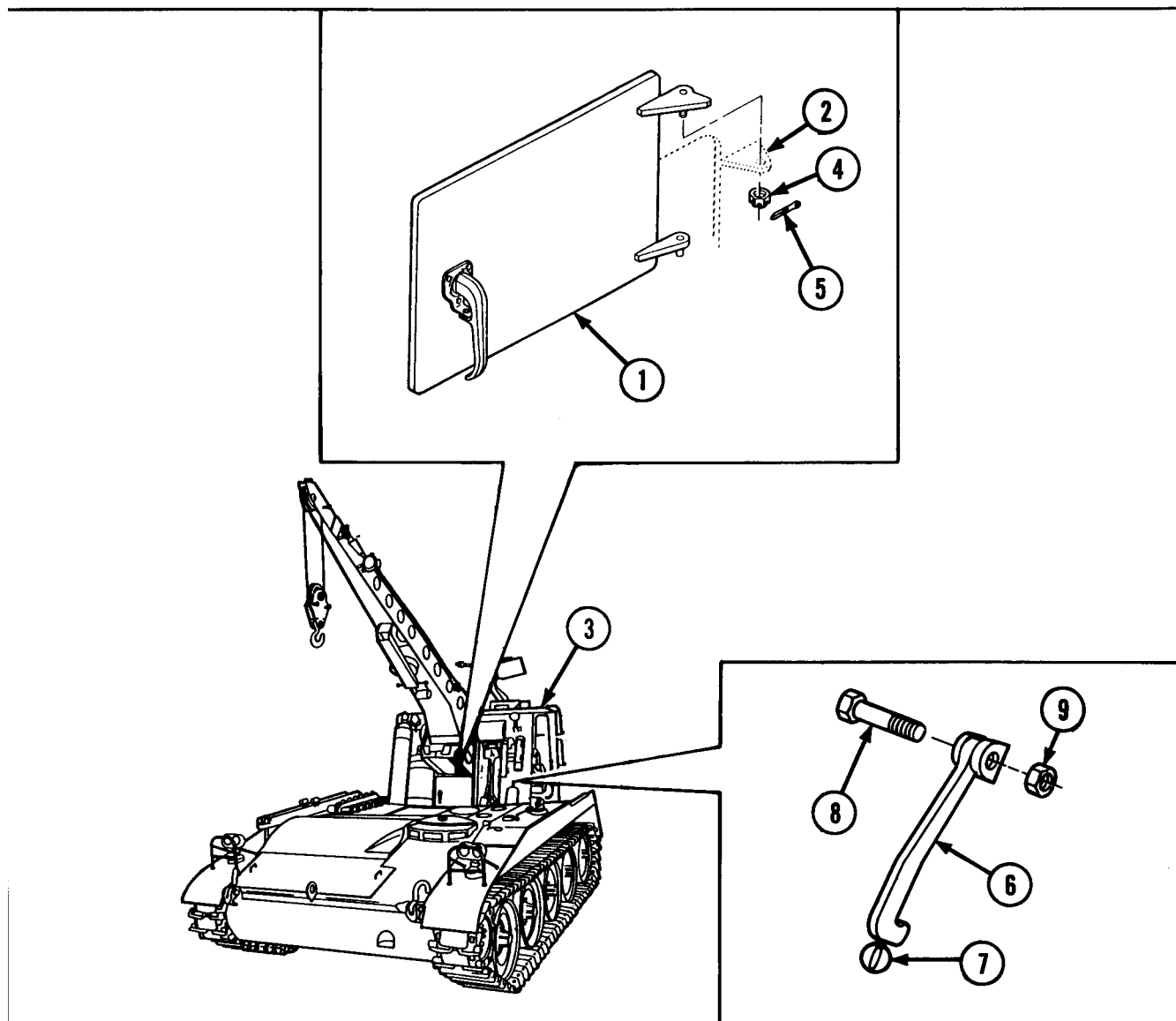
Dry cleaning solvent is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated areas.

- 1 Remove residual adhesive from rear of access door opening (1) using dry cleaning solvent (item 10, appx C) and wire brush.
- 2 Apply epoxy resin adhesive (item 2, appx C) to two new nonmetallic seals (2), two new nonmetallic seals (3), and mounting area on rear of access door opening (1). Install new nonmetallic seals (2) and (3) on access door opening (1).
- 3 Install stowage door handle (4) on access door (5) and secure with three new lockwashers (6) and three capscrews (7).
- 4 Install door lock-release lever (8), flat washer (9), new lockwasher (10), and capscrew (11) on access door (5).



2-36. MAINTENANCE OF CAB ASSEMBLY TOW WINCH ACCESS DOOR AND RELATED PARTS (CONT).

INSTALLATION



1 Install tow winch access door (1) on hinges (2) of cab (3) and secure with slotted nut (4) and new cotter pin (5).

2 Apply sealing compound (item 17, appx C) to threads of tow winch door rim latch

(6). Screw tow winch door catch knob (7) onto tow winch door rim latch.

3 Install tow winch door rim latch (6), cap-screw (8), and new self-locking nut (9).

2-37. MAINTENANCE OF COMMANDER'S CUPOLA ASSEMBLY.

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

d. *Reassembly*
e. *Installation*

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive (appx B)

Shop equipment, automotive maintenance and repair: organizational maintenance, common no. 1, less power (appx B)
Wire brush

Materials/Parts

Dry cleaning solvent (item 10, appx C)
Epoxy resin adhesive (item 2, appx C)
Grease (item 12, appx C)
Lockwasher (2) (MS35338-43)
Lockwasher (12) (MS35338-45)
Lockwasher (4) (MS35338-48)
Sealing compound (item 17, appx C)

Self-locking nut (MS21044N3)
Self-locking nut (MS51922-37)
Solid rivet (4) (MS20613-6P6)

References

TM 9-2350-238-24P-2

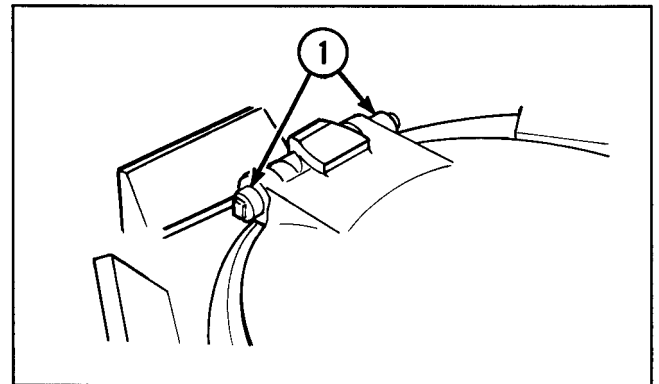
General Safety Instructions

WARNING

Dry cleaning solvent (item 10, appx C) is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated areas.

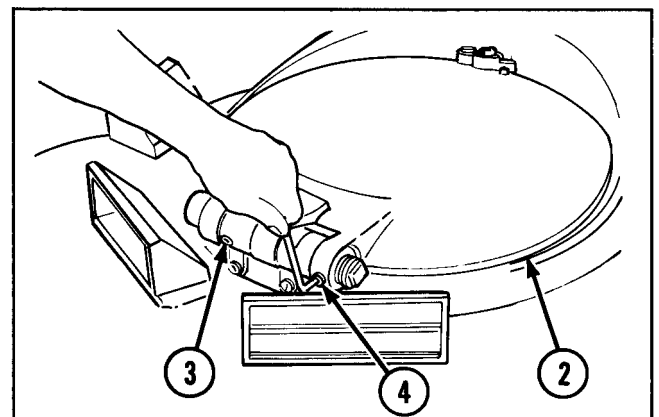
REMOVAL

1 Remove two sleeve nuts (1).



2 Place rigger's cupola vehicle hatch door (2) in upright position and remove set-screw (3).

3 Close rigger's cupola vehicle hatch door (2) and remove setscrew (4).



2-37. MAINTENANCE OF COMMANDER'S CUPOLA ASSEMBLY (CONT).

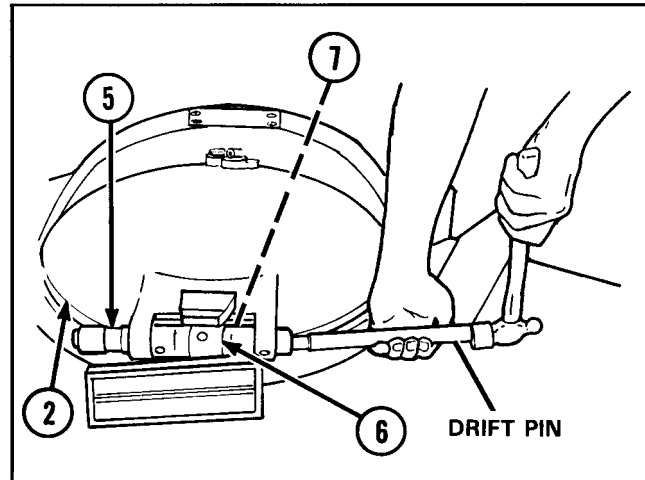
REMOVAL (CONT)

4 Drive out straight shaft 5) using hammer and drift pin.

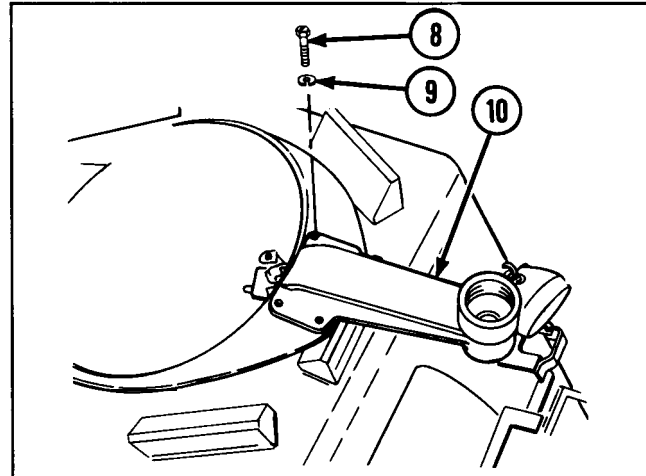
5 Remove fourteen cupola cover torsion flat springs (6).

6 Drive out outboard cupola shaft (7) using hammer and drift pin.

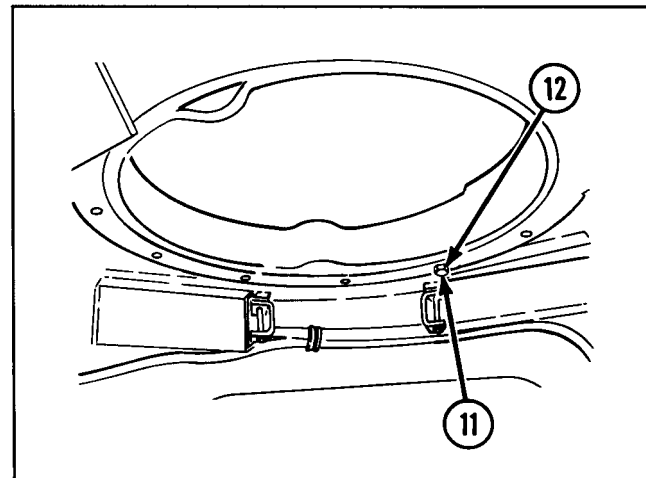
7 Remove riggers cupola vehicle hatch door (2).



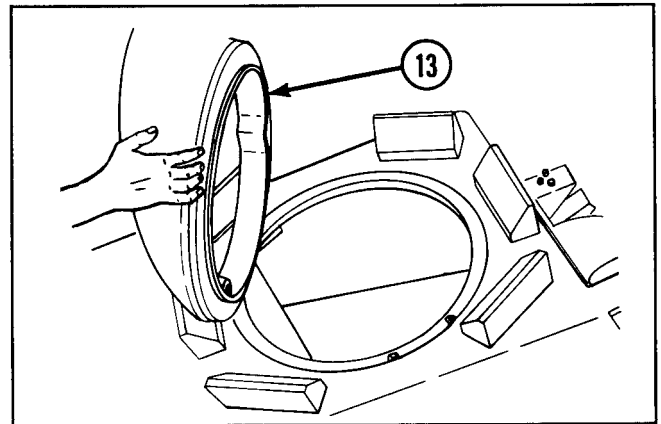
8 Remove four hexagon capscrews (8), four lockwashers (9), and machine gun mount pintle (10).



9 Remove twelve machine bolts (11) and twelve lockwashers (12).

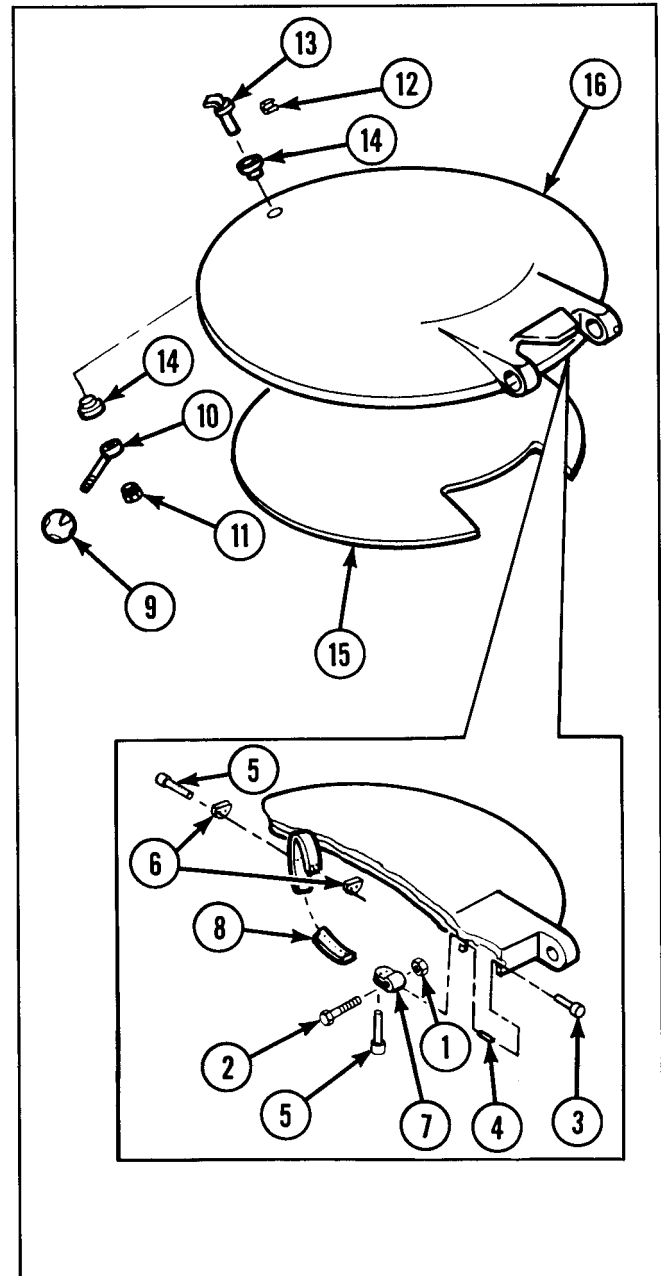


- 10 Remove rigger's cupola assembly cupola ring (13).



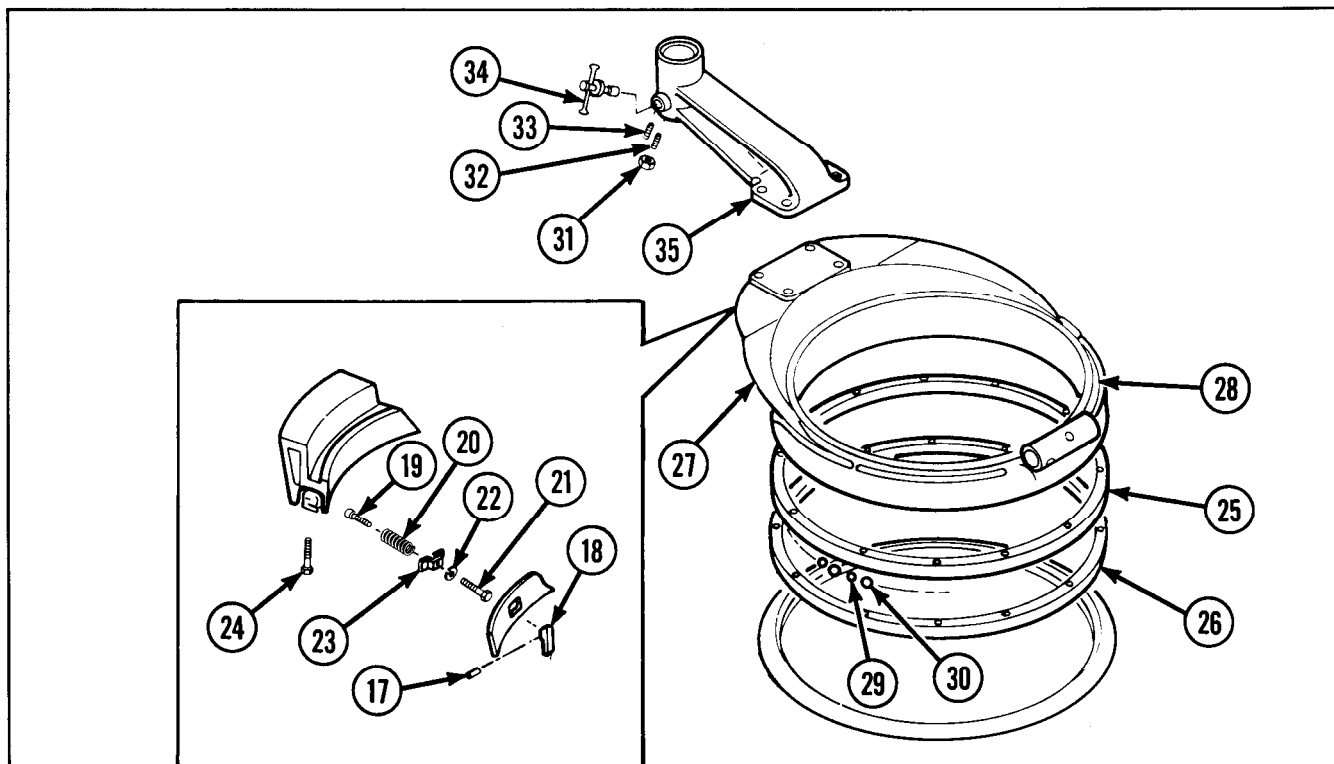
DISASSEMBLY

- 1 Remove self-locking nut (1), machine screw (2), headless shoulder pin (3), helical compression spring (4), four solid rivets (5), two riggers cupola cover strap plates (6), cupola lid strap end (7), and cupola lid webbing strap (8).
- 2 Remove cupola inner handle knob (9) from cupola cover inner latch manual control lever (10).
- 3 Remove self-locking nut (11), cupola cover inner latch manual control lever (10), woodruff key (12), cupola cover outer lever latch (13), and two sleeve bearings (14).
- 4 If damaged, remove cupola cover cushioning pad (15) from underside of rigger's cupola vehicle hatch door (16).



2-37. MAINTENANCE OF COMMANDER'S CUPOLA ASSEMBLY (CONT).

DISASSEMBLY (CONT)



5 Remove headless grooved pin (17), cupola cover door handle (18), headless shoulder pin (19), and helical compression spring (20).

6 Remove two machine screws (21), two lockwashers (22), and cupola ring release handle retaining strap (23).

7 Remove four socket head capscrews (24) securing upper cupola retainer (25) and lower cupola base retainer (26) together.

8 Remove rigger's cupola assembly cupola ring (27) and upper cupola retainer (25).

9 If damaged, remove rigger's cupola hatch crash cushioning pad (28) from rigger's cupola assembly cupola ring (27). Discard rigger's cupola hatch crash cushioning pad.

10 Remove lower cupola base retainer (26). Remove 78 ball bearings (29) and 78 cupola ring ball bearings (30).

11 Remove hexagon plain nut (31), rigger's cupola setscrew (32), setscrew (33), and gun lock clamp assembly (34) from machine gun mount pintle (35).

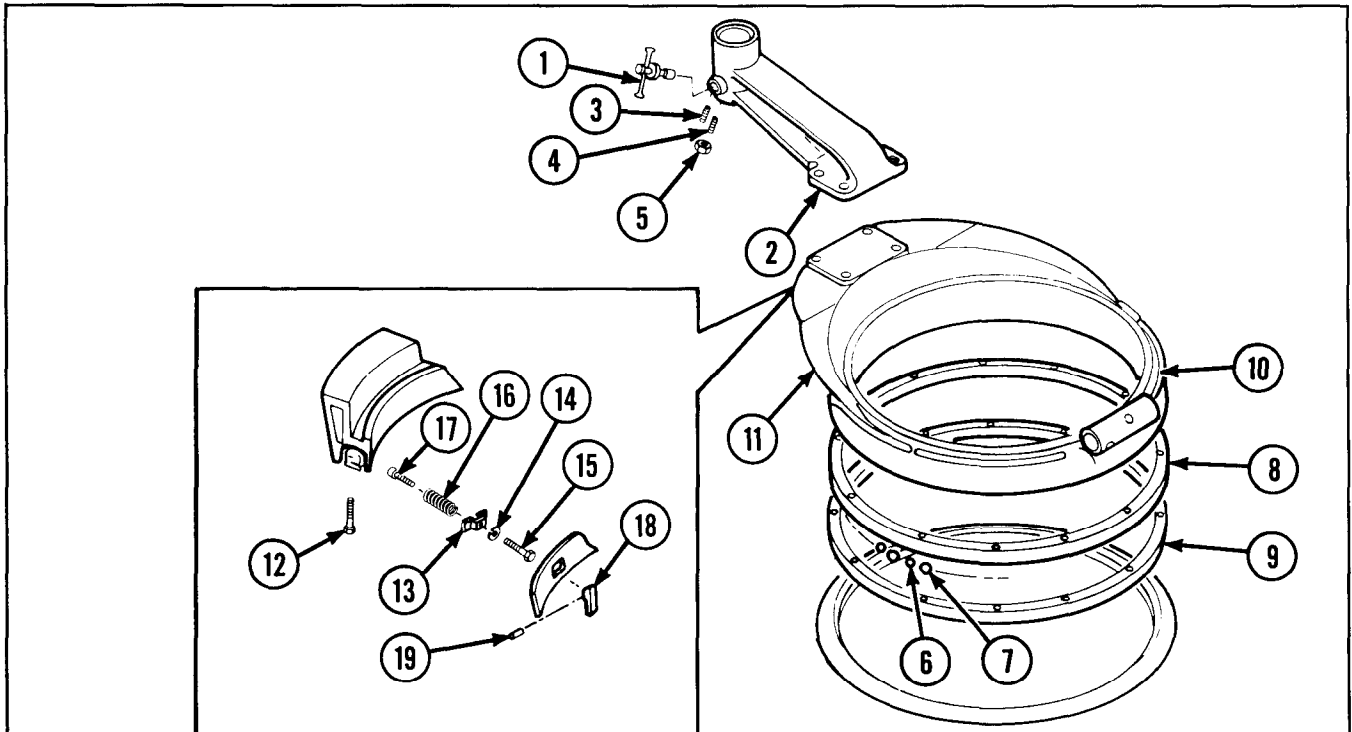
INSPECTION/REPAIR

1 Check for broken, damaged, or missing parts.

2 If rigger's cupola assembly cupola ring is broken, damaged, or missing, repair is by replacement of next higher assembly.

3 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

REASSEMBLY



- 1 Install gun lock clamp assembly (1) on machine gun mount pintle (2) and secure with setscrew (3), rigger's cupola setscrew (4) and hexagon plain nut (5).
- 2 Apply grease (item 12, appx C) to 78 ball bearings (6), 78 cupola ring ball bearings (7), upper cupola retainer (8), and lower cupola base retainer (9).
- 3 Install lower cupola base retainer (9). Install 78 ball bearings (6) and 78 cupola ring ball bearings (7) alternately around lower cupola base retainer (9).

WARNING

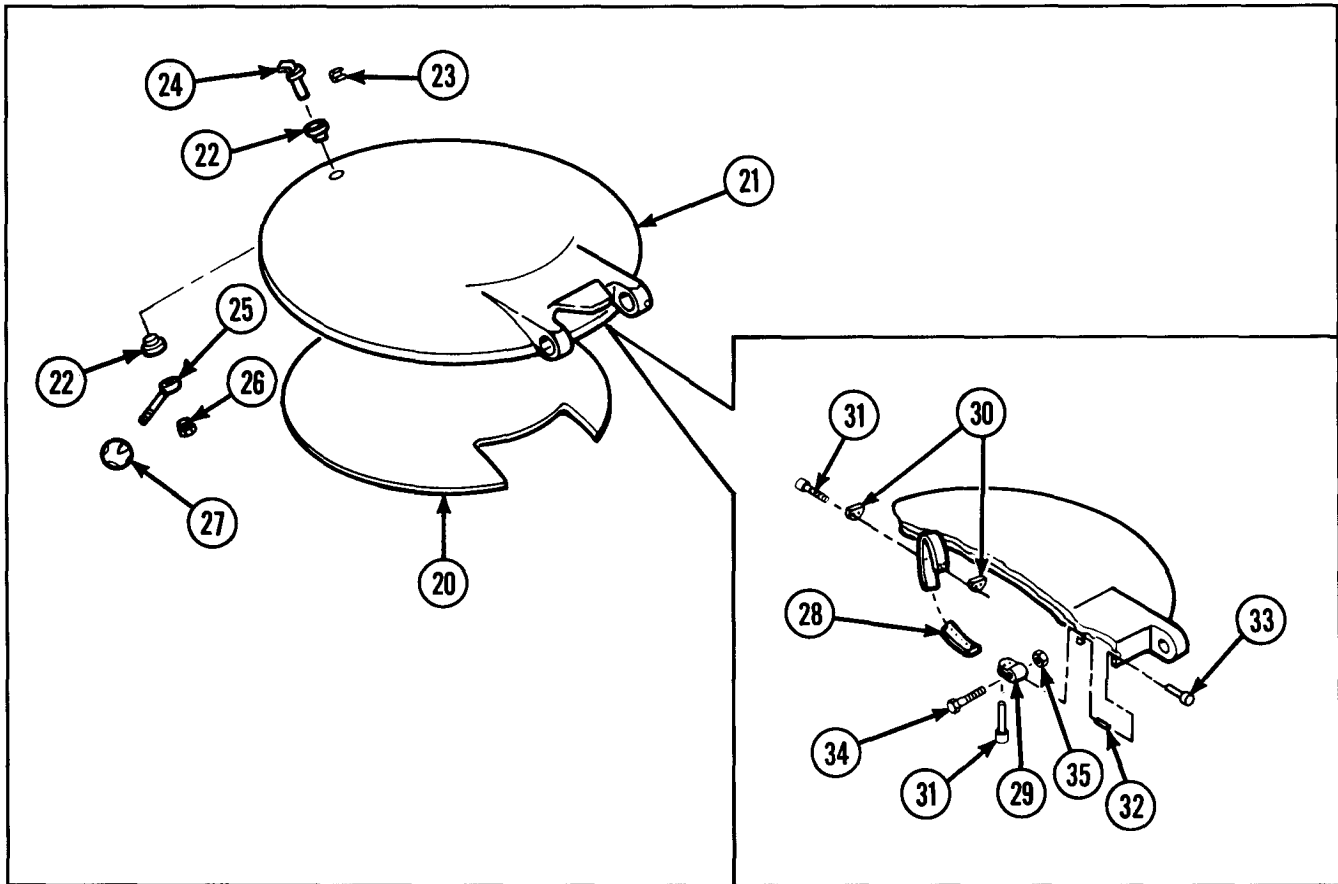
Dry cleaning solvent (SD2) is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated areas.

- 4 If rigger's cupola hatch crash cushioning pad (10) was removed, use dry cleaning solvent (item 10, appx C) and wire brush to remove residual adhesive from bonding surfaces of rigger's cupola assembly.

- 5 Apply epoxy resin adhesive (item 2 appx C) to bonding surfaces of rigger's cupola assembly cupola ring (11) and install new rigger's cupola hatch crash cushioning pad (10). Center pad in rigger's cupola assembly cupola ring within 0.030 in. (0.076 cm) and bend tabs to hold firmly in place.
- 6 Install upper cupola retainer (8) on rigger's cupola assembly cupola ring (11).
- 7 Install four socket head capscrews (12) securing lower cupola base retainer (9) to upper cupola retainer (8).
- 8 Install cupola ring release handle retaining strap (13), two new lockwashers (14), and two machine screws (15).
- 9 Install helical compression spring (16) on headless shoulder pin (17). Install headless shoulder pin, cupola cover door handle (18) and headless grooved pin (19) on rigger's cupola assembly cupola ring (11).

2-37. MAINTENANCE OF COMMANDER'S CUPOLA ASSEMBLY (CONT).

REASSEMBLY (CONT)



WARNING

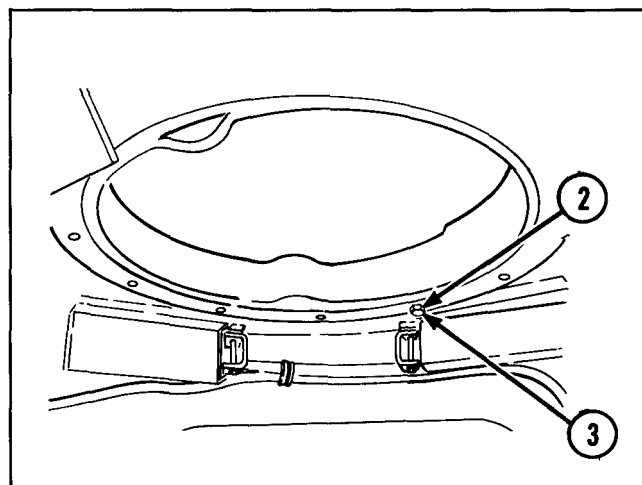
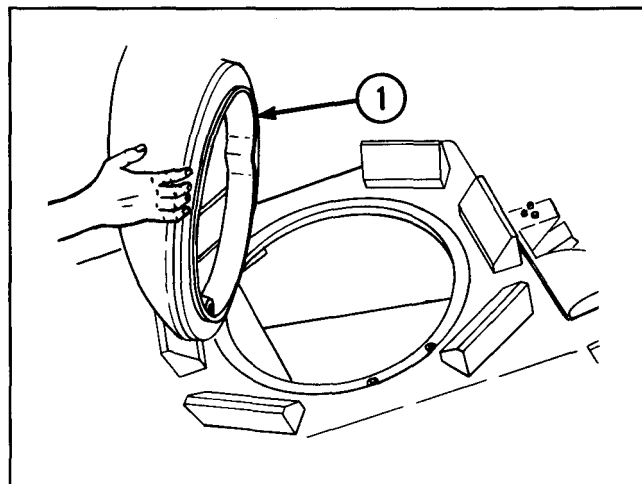
Dry cleaning solvent is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated areas.

- 10 If cupola cover cushioning pad (20) was removed, use dry cleaning solvent (item 10, appx C) and wire brush to remove residual adhesive from bonding surfaces of rigger's cupola vehicle hatch door (21).
- 11 Apply epoxy resin adhesive (item 2 appx C) to bonding surfaces of rigger's cupola vehicle hatch door (21) and install new cupola cover cushioning pad (20) to underside of rigger's cupola vehicle hatch door (21).

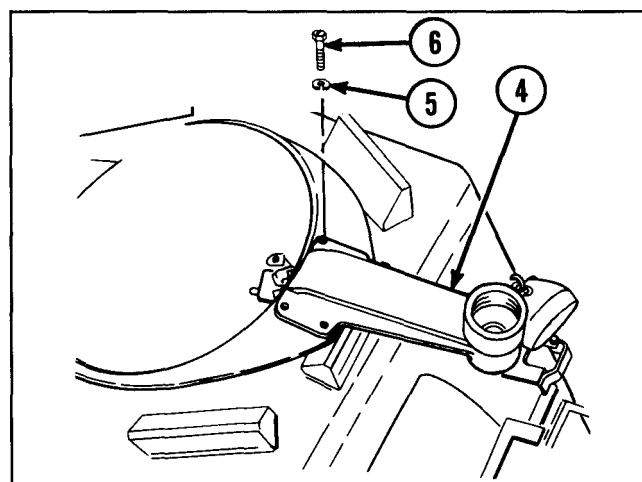
- 12 Install two sleeve bearings (22), wood-ruff key (23), cupola lever latch (24), cupola cover inner latch manual control lever (25), and new self-locking nut (26).
- 13 Apply sealing compound (item 17, appx C) to threads of cupola inner handle knob (27). Install cupola inner handle knob on cupola cover inner latch manual control lever (25).
- 14 Install cupola lid webbing strap (28), cupola lid strap end (29), two rigger's cupola cover strap plates (30), four new solid rivets (31), helical compression spring (32), headless shoulder pin (33), machine screw (34), and new self-locking nut (35).

INSTALLATION

- 1 Install rigger's cupola assembly cupola ring (1) and secure with twelve new lockwashers (2) and twelve machine bolts (3).



- 2 Install machine gun mount pintle (4) and secure with four new lockwashers (5) and four hexagon capscrews (6).



2-37. MAINTENANCE OF COMMANDER'S CUPOLA ASSEMBLY (CONT).

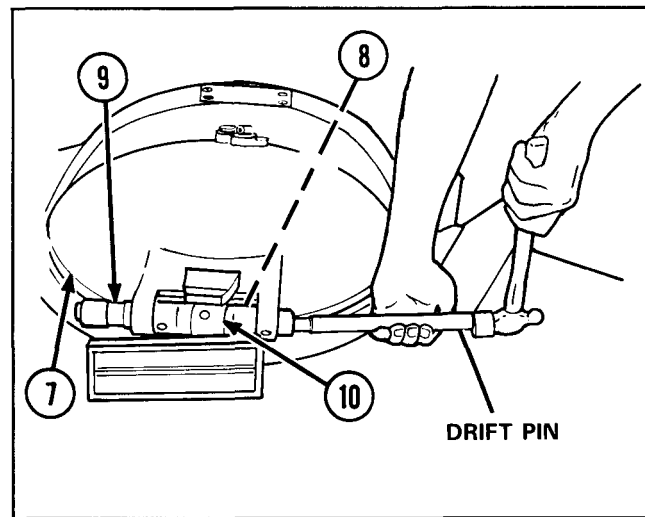
INSTALLATION (CONT)

- 3 Install rigger's cupola vehicle hatch door (7).

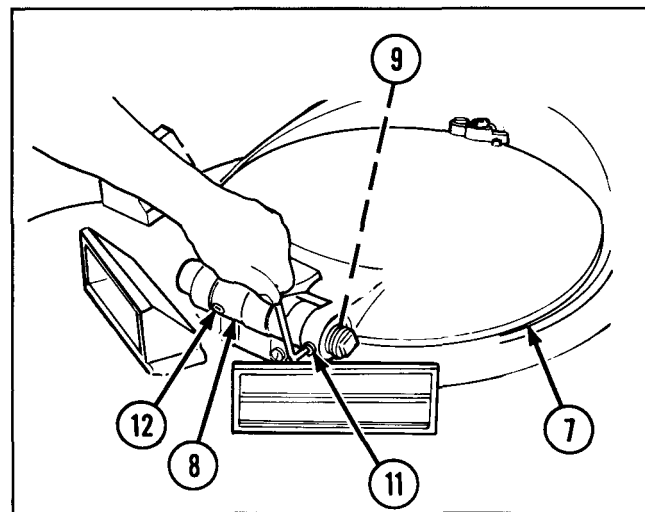
NOTE

Install outboard cupola shaft with setscrew hole facing up.

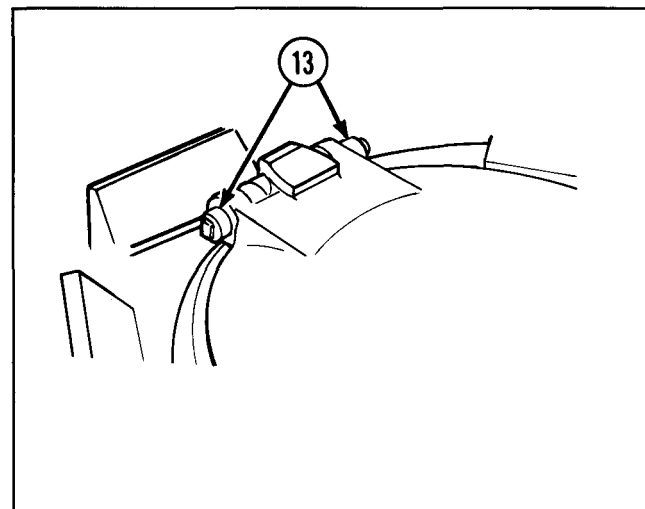
- 4 Install outboard cupola shaft (8) with straight shaft (9).
- 5 Install fourteen cupola cover torsion flat springs (10).



- 6 Close rigger's cupola vehicle hatch door (7). Install setscrew (11) in straight shaft (9).
- 7 Place rigger's cupola vehicle hatch door (7) in upright position. Install setscrew (12) in outboard cupola shaft (8).



- 8 Install two sleeve nuts (13).



2-38. MAINTENANCE OF OPERATOR'S CUPOLA,

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

d. *Reassembly*
 e. *Installation*

INITIAL SETUP*Tools and Special Tools*

General mechanic's tool kit, automotive (appx B)
 Shop equipment, automotive maintenance and repair: organizational maintenance, common no. 1, less power (appx B)
 Wire brush

Materials/Parts

Dry cleaning solvent (item 10, appx C)
 Epoxy resin adhesive (item 2, appx C)
 Grease (item 12, appx C)
 Lockwasher (2) (MS35338-43)
 Lockwasher (2) (MS35338-48)
 Sealing compound (item 17, appx C)
 Self-locking nut (MS20500-820)

References

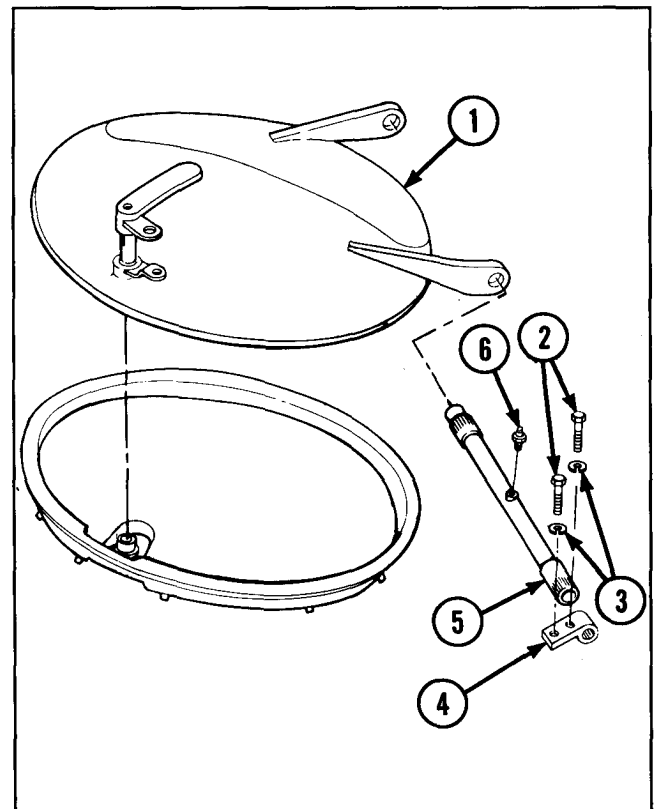
TM 9-2350-238-24P-2

*General Safety Instructions***WARNING**

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

REMOVAL

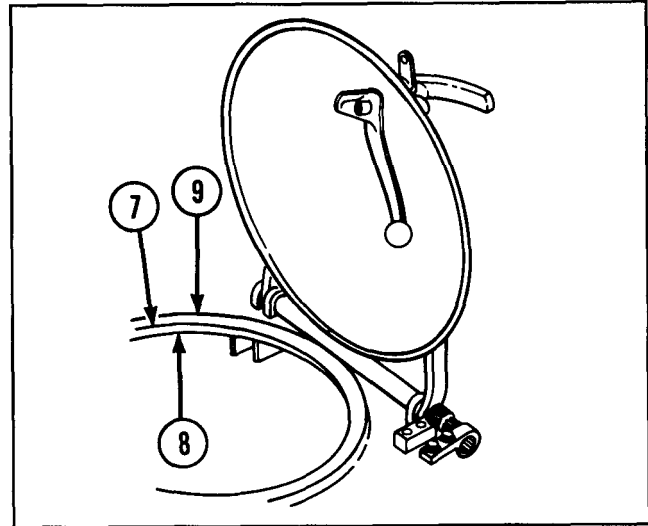
- 1 Place cupola vehicle hatch door (1) in upright position.
- 2 Remove two hexagon capscrews (2) and two lockwashers (3).
- 3 Remove cupola spring anchor (4) from around cupola hinge torsion bar (5).
- 4 Remove lubrication fitting (6) from cupola hinge torsion bar (5).
- 5 Remove cupola hinge torsion bar (5) and cupola vehicle hatch door (1).



2-38. MAINTENANCE OF OPERATOR'S CUPOLA (CONT).

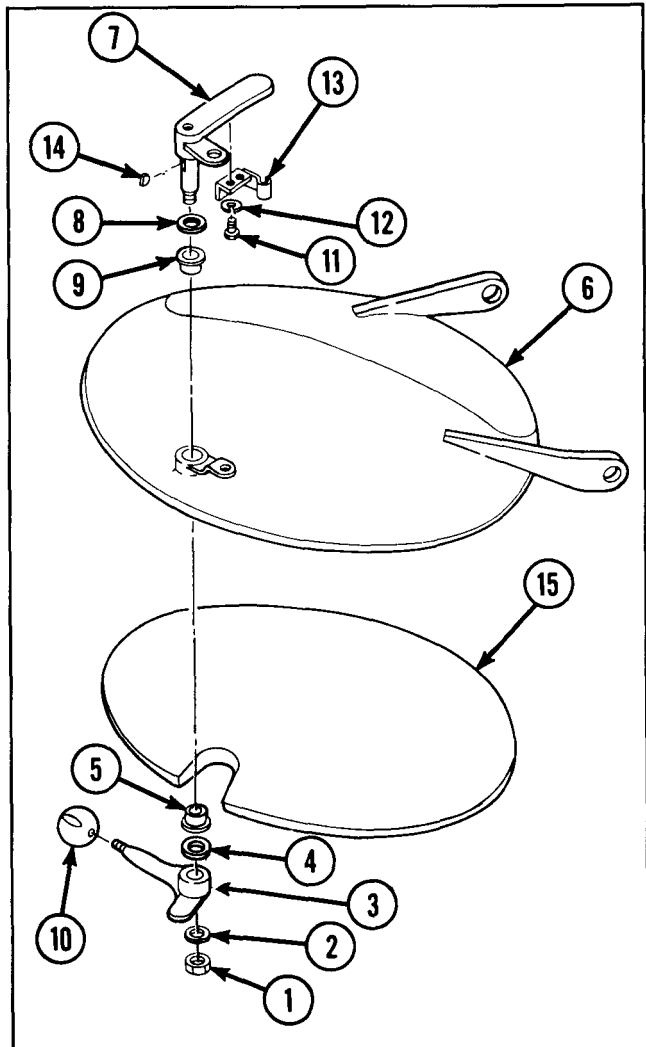
REMOVAL (CONT)

- 6 If damaged, bend back tabs (7) on operator's cupola ring cushioning pad (8).
- 7 Remove operator's cupola ring cushioning pad (8) from cupola ring (9).



DISASSEMBLY

- 1 Remove self-locking nut (1), flat washer (2), door handle (3), flat washer (4), and sleeve bearing (5) from underside of cupola vehicle hatch door (6).
- 2 Remove outer cupola door handle (7), flat washer (8), and sleeve bearing (9) from top of cupola vehicle hatch door (6).
- 3 Remove cupola inner handle knob (10) from door handle (3).
- 4 Remove two machine screws (11), two lockwashers (12), and spring tension clip (13) from outer cupola door handle (7).
- 5 Remove woodruff key (14) from outer cupola door handle (7).
- 6 If damaged, remove operator's cupola lid cushioning pad (15) from underside of cupola vehicle hatch door (6).



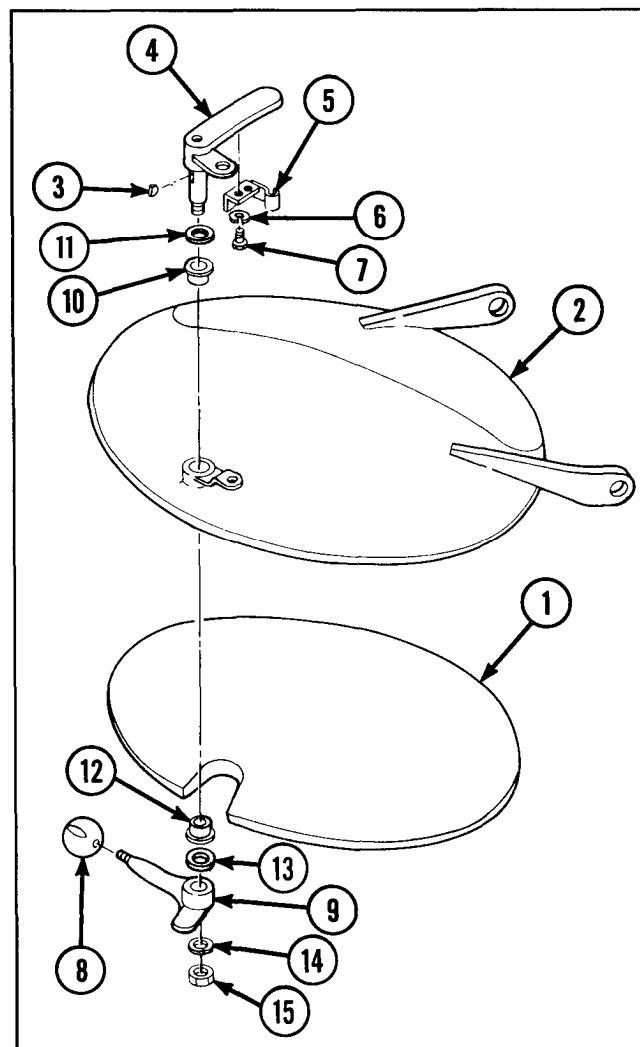
INSPECTION/REPAIR

- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

REASSEMBLY**WARNING**

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

- 1 If operator's cupola lid cushioning pad (1) was removed, use dry cleaning solvent (item 10, appx C) and wire brush to remove residual adhesive from underside of cupola vehicle hatch door (2).
- 2 Apply epoxy resin adhesive (item 2, appx C) to bonding surfaces of operator's cupola lid cushioning pad (1) and underside of cupola vehicle hatch door (2). Install new cupola lid cushioning pad.
- 3 Install woodruff key (3) in outer cupola door handle (4).
- 4 Install spring tension clip (5) to outer cupola door handle (4) and secure with two new lockwashers (6) and two machine screws (7).
- 5 Apply sealing compound (item 17, appx C) to threads of cupola inner handle knob (8) and install on door handle (9).
- 6 Install sleeve bearing (10), flat washer (11), and outer cupola door handle (4) to cupola vehicle hatch door (2).
- 7 Install sleeve bearing (12), flat washer (13), door handle (9), flat washer (14), and new self-locking nut (15) to underside of cupola vehicle hatch door (2).



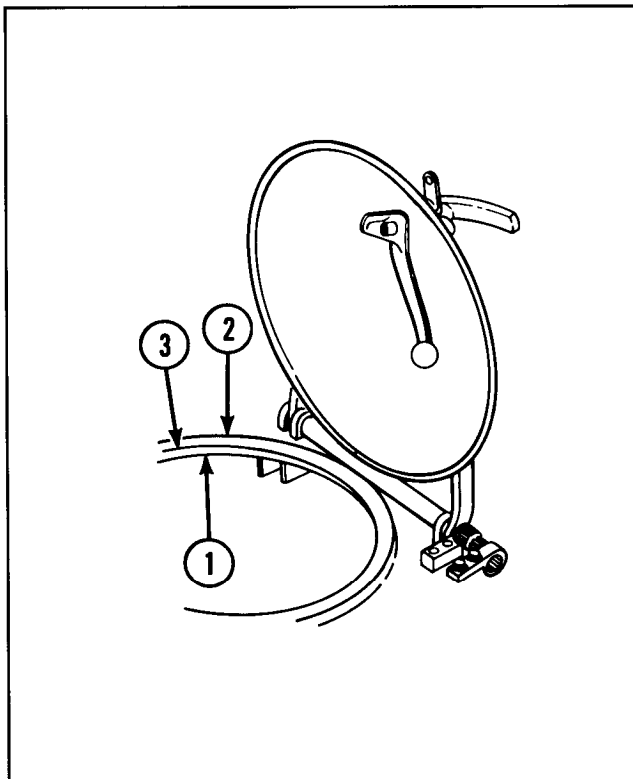
2-38. MAINTENANCE OF OPERATOR'S CUPOLA (CONT).

INSTALLATION

WARNING

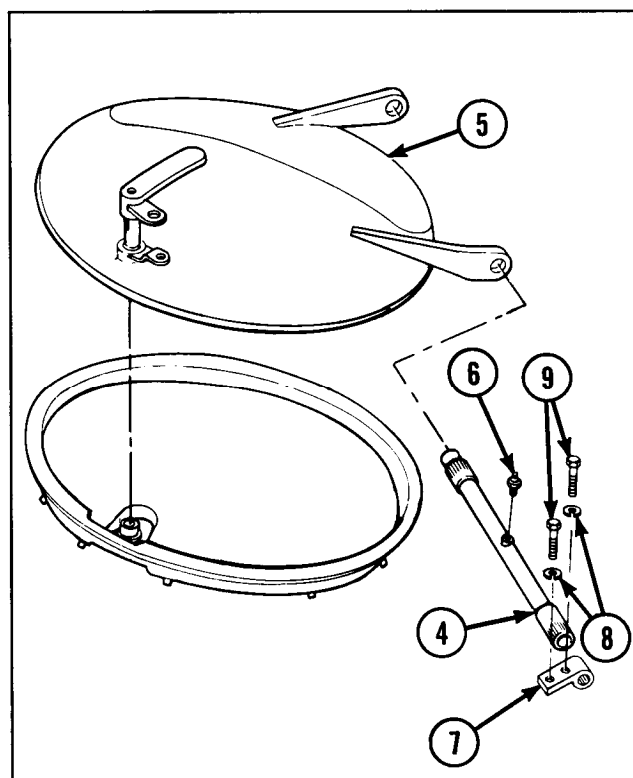
Dry cleaning solvent is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated areas.

- 1 If operator's cupola ring cushioning pad (1) was removed, use dry cleaning solvent (item 10, appx C) and wire brush to remove residual adhesive from mounting surface of cupola ring (2).
- 2 Apply epoxy resin adhesive (item 2, appx C) to bonding surfaces of cupola ring (2) and operator's cupola ring cushioning pad (1). Install operator's cupola ring cushioning pad. Center in cupola within 0.03 in. (0.08 cm) total and bend tabs (3) on operator's cupola ring cushioning pad to hold firmly in place.

**NOTE**

Cupola hinge torsion bar (4) shall be installed so that cupola vehicle hatch door (5) will have equal torsion in open and closed positions.

- 3 Install cupola vehicle hatch door (5) and cupola hinge torsion bar (4).
- 4 Install lubrication fitting (6) in cupola hinge torsion bar (4) and fill with grease (item 12, appx C).
- 5 Install cupola spring anchor (7) on top of cab and interlock cupola hinge torsion bar (4). Secure cupola spring anchor with two new lockwashers (8) and two hexagon capscrews (9).



2-39. MAINTENANCE OF CAB ASSEMBLY STOWAGE COMPARTMENT DOORS.This task covers: a. *Removal*b. *Inspection/Repair*c. *Installation***INITIAL SETUP***Tools and Special Tools*

General mechanic's tool kit, automotive (appx B)
 Shop equipment, automotive maintenance and repair: organizational maintenance, common no. 1, less power (appx B)
 Wire brush

Materials/Parts

Cotter pin (MS24665-287)
 Dry cleaning solvent (item 10, appx C)
 Epoxy resin adhesive (item 2, appx C)
 Lockwasher (11) (MS35338-44)
 Lockwasher (MS35338-46)

Nonmetallic gasket (10908671-1)
 Safety chain (figure 5, appx D)
 Self-locking nut (2) (MS21042-02)

References

TM 9-2350-238-24P-2

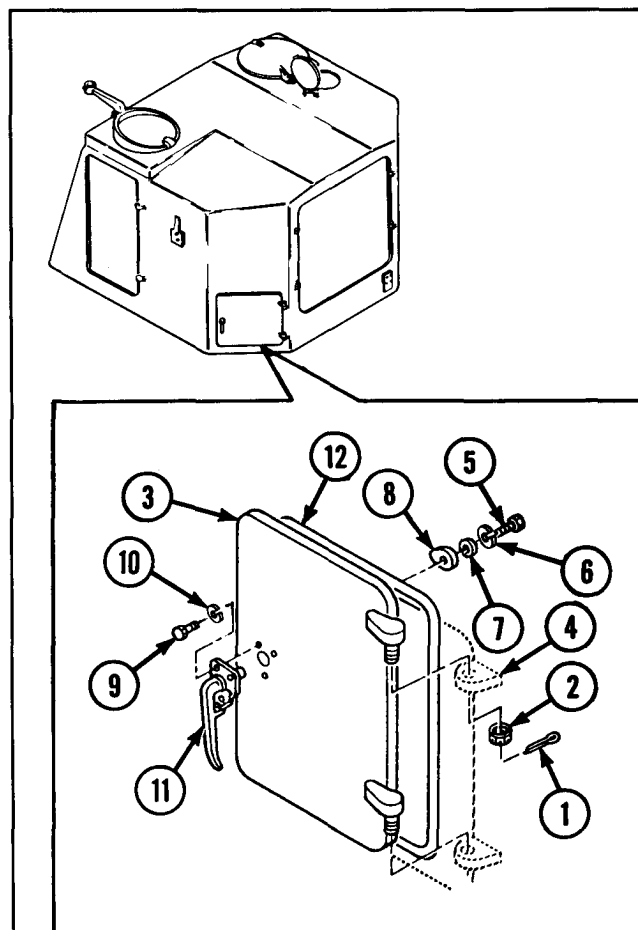
*General Safety Instructions***WARNING**

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

REMOVAL**NOTE**

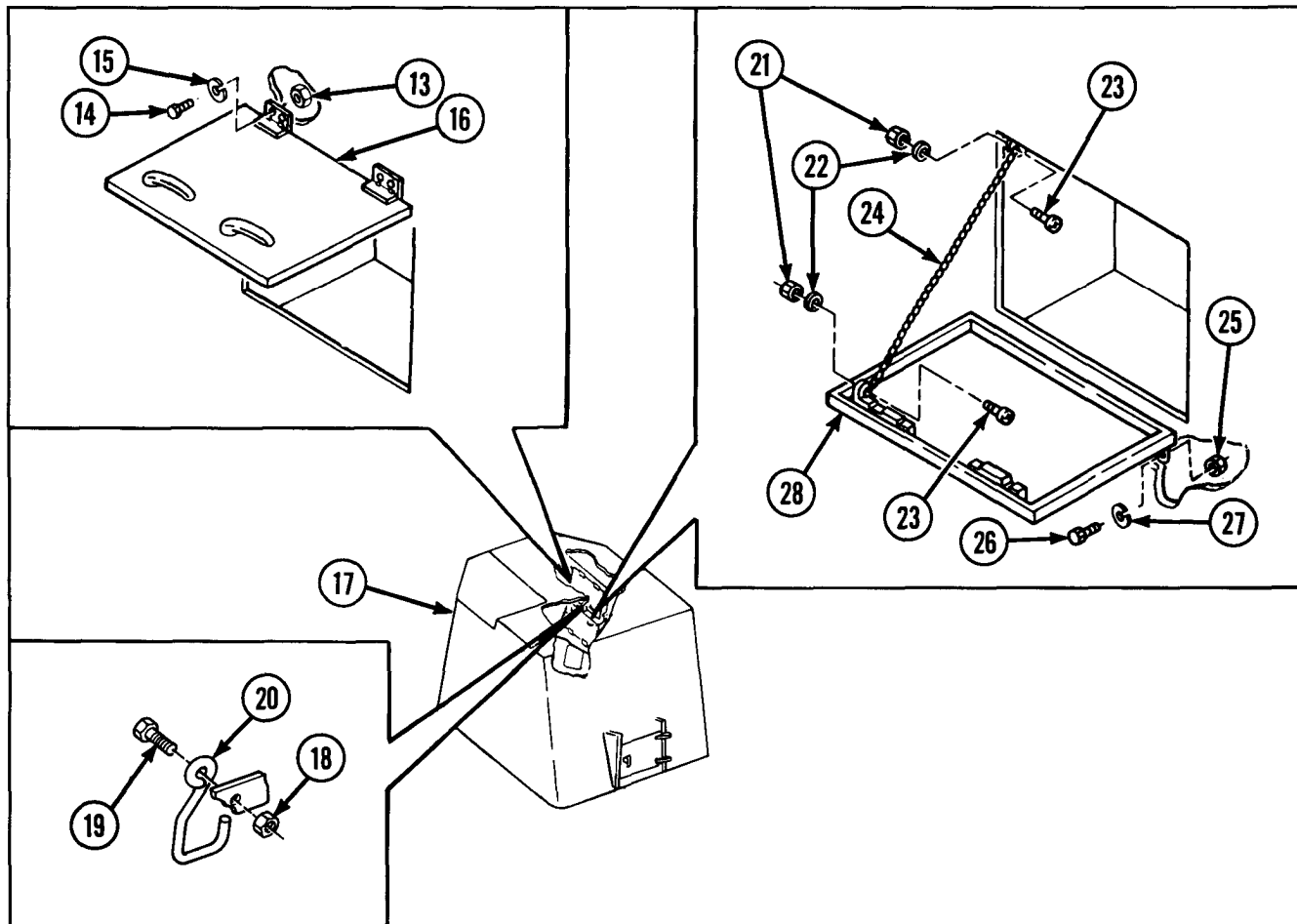
Steps 1 thru 5 are written for removal of rear cab stowage hatch door.

- 1 Remove cotter pin (1) and slotted plain nut (2).
- 2 Open rear cab stowage hatch door (3) and lift off of hinges (4) and remove.
- 3 Remove capscrew (5), lockwasher (6), flat washer (7), and door handle lock-release lever (8).
- 4 Remove three capscrews (9), three lockwashers (10), and door handle (11) from rear cab stowage hatch door (3).
- 5 If damaged, remove nonmetallic gasket (12) from rear cab stowage hatch door (3).



2-39. MAINTENANCE OF CAB ASSEMBLY STOWAGE COMPARTMENT DOORS (CONT).

REMOVAL (CONT)



NOTE

Steps 6 thru 8 are written for removal of upper left cab stowage hatch door.

- 6 Remove four hexagon plain nuts (13), four machine bolts (14), and four lockwashers (15).
- 7 Remove upper left cab stowage hatch door (16) from cab (17).
- 8 Remove hexagon plain nut (18), machine screw (19), and stowage door hook (20) from upper left cab stowage hatch door (16).

NOTE

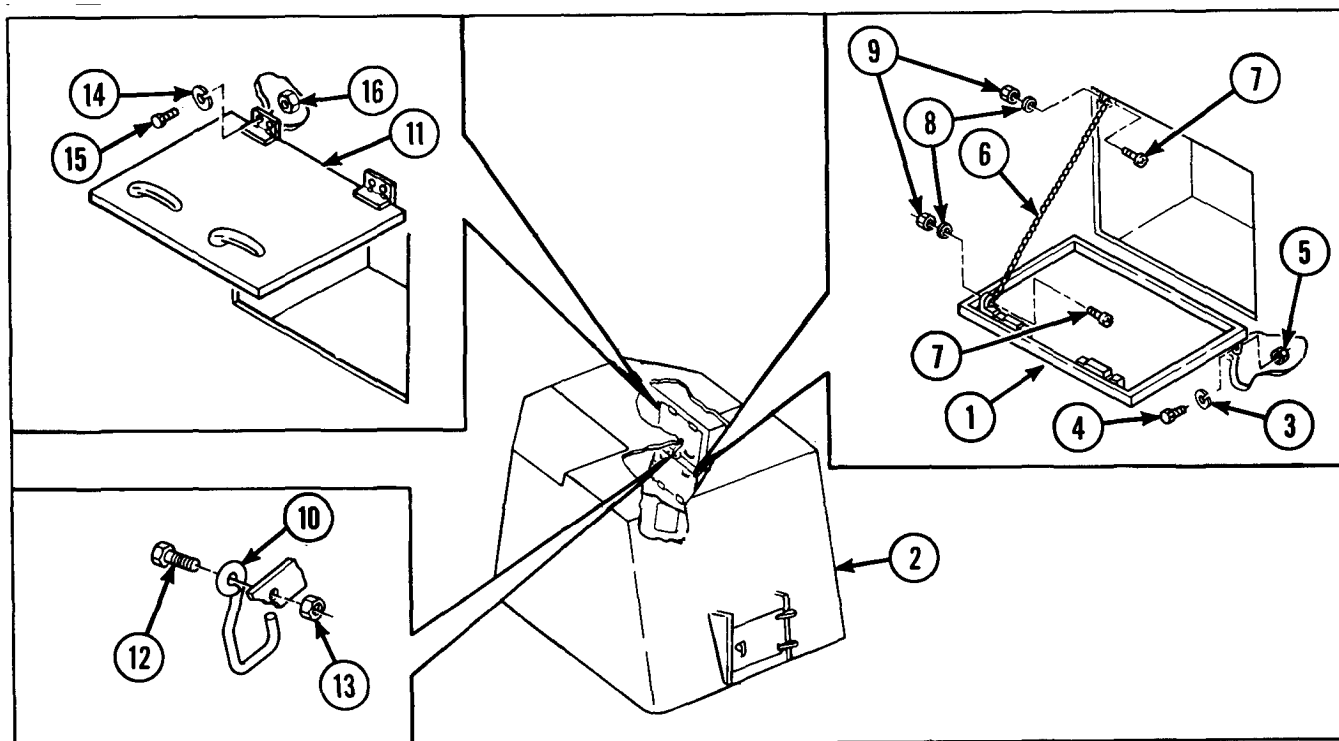
Steps 9 thru 12 are written for removal of lower left cab stowage hatch door.

- 9 Remove two self-locking nuts (21), two flat washers (22), and two machine screws (23).
- 10 Remove safety chain (24).
- 11 Remove four hexagon plain nuts (25), four machine bolts (26), and four lockwashers (27).
- 12 Remove lower left cab stowage hatch door (28) from cab (17).

INSPECTION/REPAIR

- 1 Check for broken, damaged, or missing parts.
- 2 Upper left cab stowage hatch door is a repairable assembly. Refer to page 2-107.
- 3 Lower left cab stowage hatch door is a repairable assembly. Refer to page 2-107.
- 4 Safety chain is a manufactured item, refer to appendix D.
- 5 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

INSTALLATION



NOTE

Steps 1 and 2 are written for installation of lower left cab stowage hatch door.

- 1 Install lower left cab stowage hatch door (1) to cab (2) and secure with four new lockwashers (3), four machine bolts (4), and four hexagon plain nuts (5).
- 2 Install safety chain (6) to cab (2) and lower left cab stowage hatch door (1) and secure with two machine screws (7), two flat washers (8), and two new self-locking nuts (9).

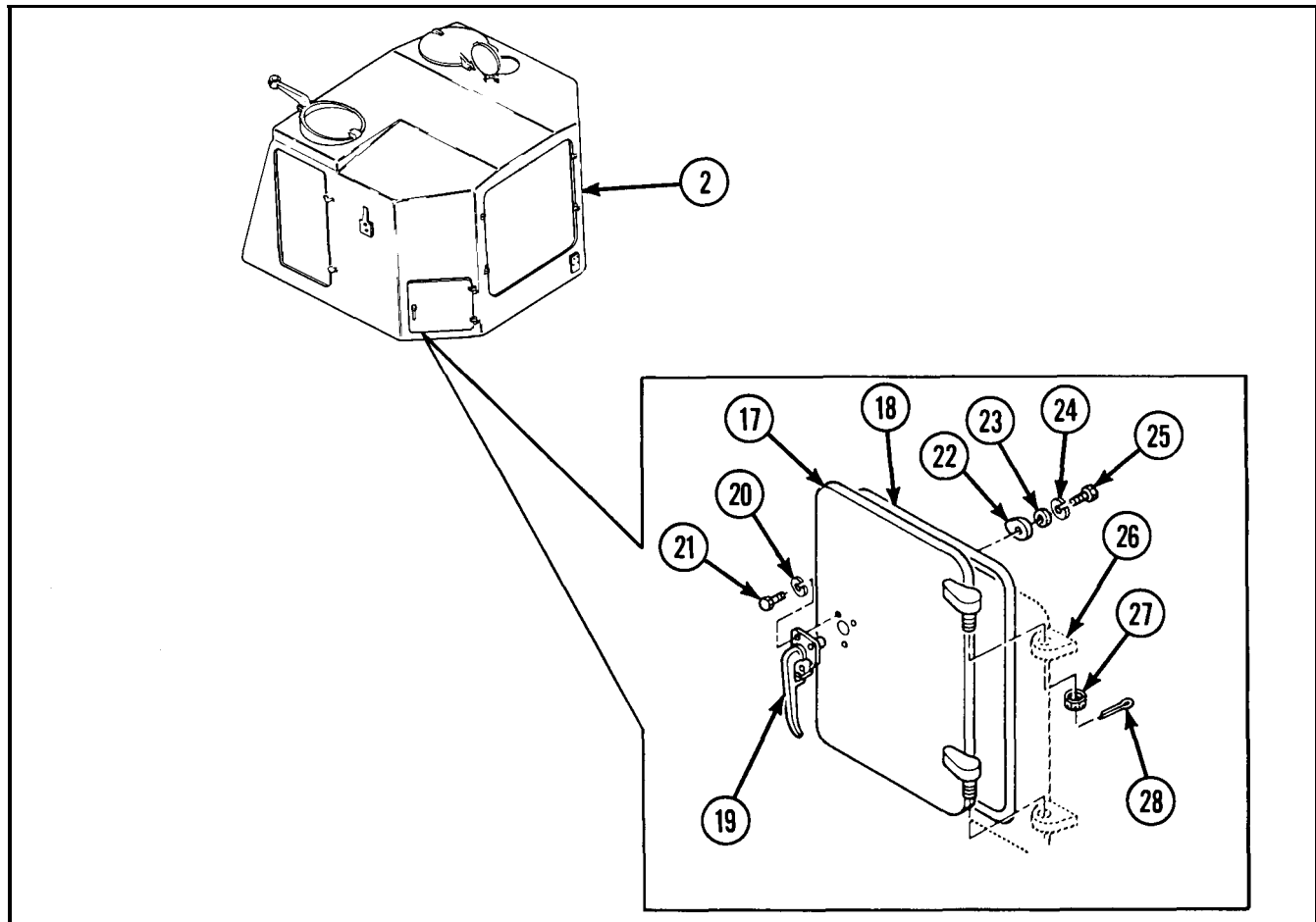
NOTE

Steps 3 and 4 are written for installation of upper left cab stowage hatch door.

- 3 Install stowage door hook (10) to upper left cab stowage hatch door (11) and secure with machine screw (12) and hexagon plain nut (13).
- 4 Install upper left cab stowage hatch door (11) to cab (2) and secure with four new lockwashers (14), four machine bolts (15), and four hexagon plain nuts (16).

2-39. MAINTENANCE OF CAB ASSEMBLY STOWAGE COMPARTMENT DOORS (CONT).

INSTALLATION (CONT)



NOTE

Steps 5 thru 9 are written for installation of rear cab stowage hatch door.

WARNING

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

- 5 Remove residual adhesive from rear cab stowage hatch door (17) using dry cleaning solvent (item 10, appx C) and wire brush.

- 6 Apply epoxy resin adhesive (item 2, appx C) to new nonmetallic gasket (18) and mounting area of rear cab stowage hatch door (17). Install new nonmetallic gasket (18).
- 7 Install door handle (19) to rear cab stowage hatch door (17) and secure with three new lockwashers (20) and three cap screws (21).
- 8 Install door handle lock-release lever (22), flat washer (23), new lockwasher (24), and cap screw (25).
- 9 Install rear cab stowage hatch door (17) on hinges (26). Install slotted nut (27) and new cotter pin (28) to secure.

2-40. MAINTENANCE OF UPPER AND LOWER LEFT CAB STOWAGE VEHICLE HATCH DOORS.

This task covers: a. *Disassembly*

b. *Inspection/Repair*

c. *Reassembly*

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive (appx B)
Shop equipment, automotive maintenance and repair: organizational maintenance, common no. 1, less power (appx B)
Wire brush

Materials/Parts

Dry cleaning solvent (item 10, appx C)
Epoxy resin adhesive (item 2, appx C)
Lockwasher (10) (MS35338-43)

References

TM 9-2350-238-24P-2

Equipment Conditions

2-103 Upper and lower left cab stowage vehicle hatch doors removed

General Safety Instructions

WARNING

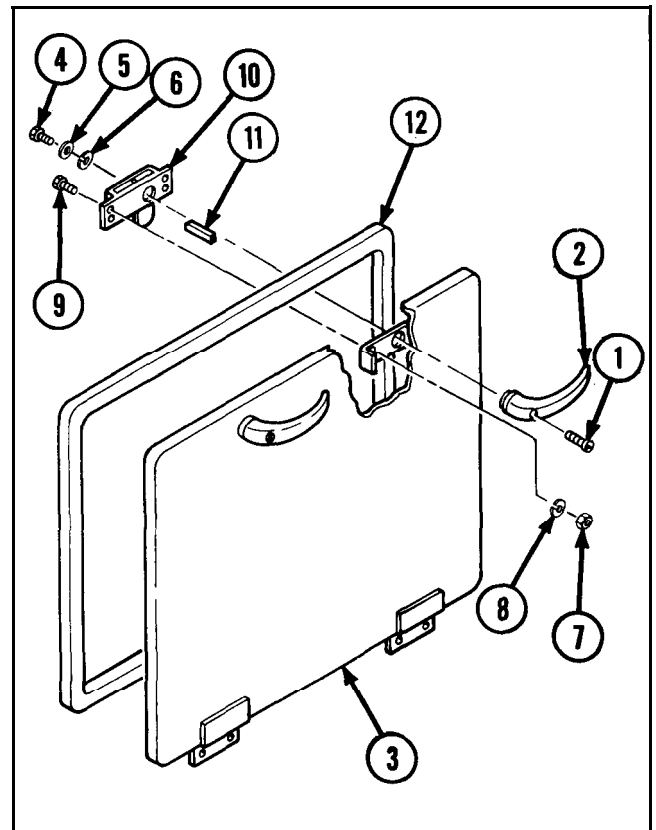
Dry cleaning solvent (SD2) is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated areas.

DISASSEMBLY

NOTE

The following procedures are written for the lower left cab stowage vehicle hatch door, but also apply to upper left cab stowage vehicle hatch door.

- 1 Remove two screws (1) and two stowage compartment door handles (2) from lower cab stowage cover (3).
- 2 Remove two machine screws (4), two flat washers (5), and two lockwashers (6).
- 3 Remove eight hexagon plain nuts (7), eight lockwashers (8), eight machine screws (9), two stowage door compartment locks (10) and two straight shafts (11).
- 4 If damaged, remove nonmetallic seal (12) from back side of lower cab stowage cover (3).



2-40. MAINTENANCE OF UPPER AND LOWER LEFT CAB STOWAGE VEHICLE HATCH DOORS (CONT).

INSPECTION/REPAIR

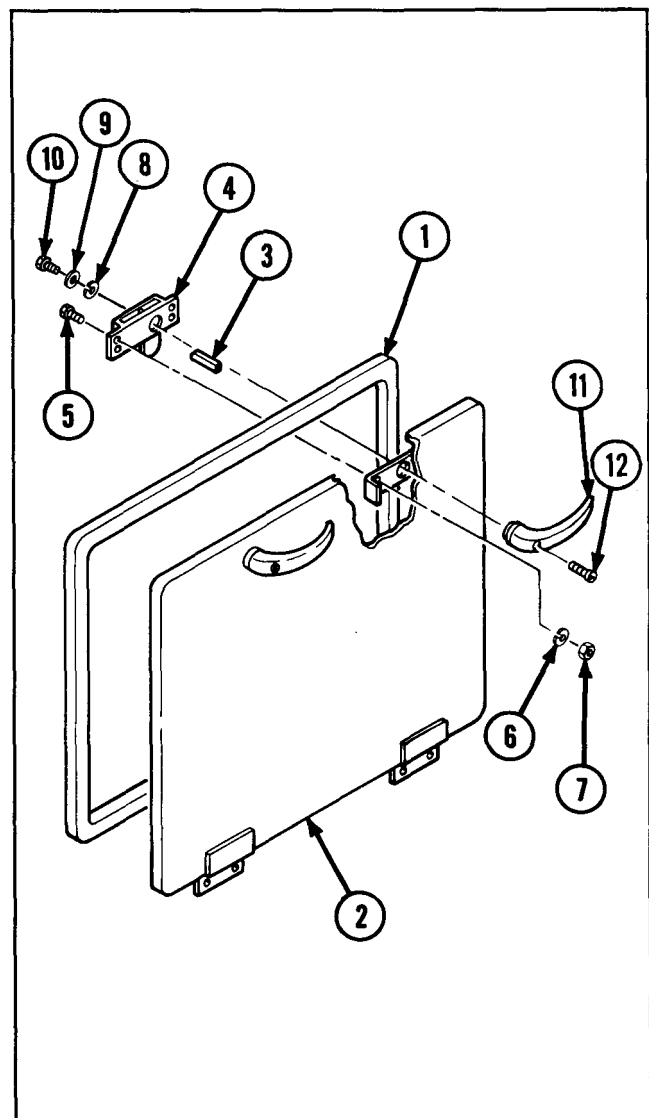
- 1 Check for broken, damaged, or missing parts.
- 2 If cab stowage covers are broken, damaged, or missing, repair is by replacement of next higher assembly.
- 3 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

REASSEMBLY

WARNING

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

- 1 If nonmetallic seal (1) was removed, clean residual rubber adhesive from mounting surface on back side of lower cab stowage cover (2) using dry cleaning solvent (item 10, appx C) and wire brush.
- 2 Apply epoxy resin adhesive (item 2, appx C) to mounting surface of lower cab stowage cover (2) and new nonmetallic seal (1). Install new nonmetallic seal on back side of lower cab stowage cover.
- 3 Install two straight shafts (3), two stowage door compartment locks (4), eight machine screws (5), eight new lockwashers (6), and eight hexagon plain nuts (7).
- 4 Install two new lockwashers (8), two flat washers (9) and two machine screws (10).
- 5 Install two stowage compartment door handles (11) on lower cab stowage cover (2) and secure with two screws (12).



2-41. MAINTENANCE OF OPERATOR'S AND RIGGER'S SEAT.This task covers: a. *Removal*b. *Inspection/Repair*c. *Installation***INITIAL SETUP***Tools and Special Tools*

General mechanic's tool kit, automotive
(appx B)

References

TM 9-2350-238-24P-2

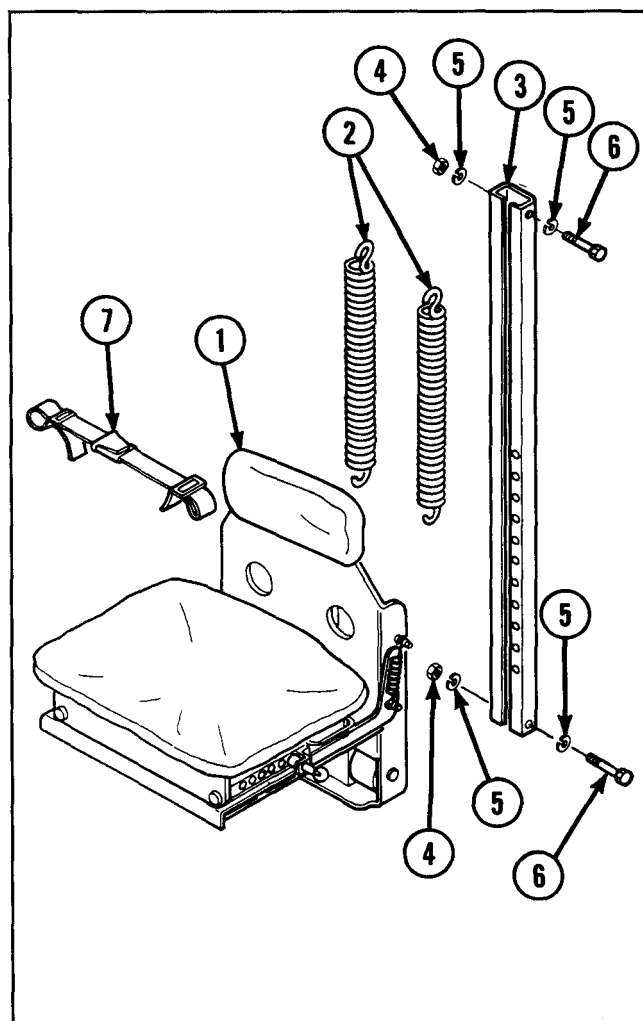
Materials/Parts

Lockwasher (8) (MS35338-46)

REMOVAL**NOTE**

The following procedures are written for one seat but apply to both the operator's and rigger's seats.

- 1 Set vehicular seat (1) to highest position.
- 2 Disconnect two vertical adjust tension helical extension springs (2) from seat post support (3).
- 3 Disconnect other end of two vertical adjust tension helical extension springs (2) and remove from vehicular seat (1).
- 4 Remove two hexagon plain nuts (4), four lockwashers (5), and two hexagon cap-screws (6).
- 5 Remove vehicular seat (1) and seat post support (3) as a unit. Separate if necessary for repair of either item.
- 6 Remove vehicular safety belt (7) from vehicular seat (1).



2-41. MAINTENANCE OF OPERATOR'S AND RIGGER'S SEAT (CONT).

INSPECTION/REPAIR

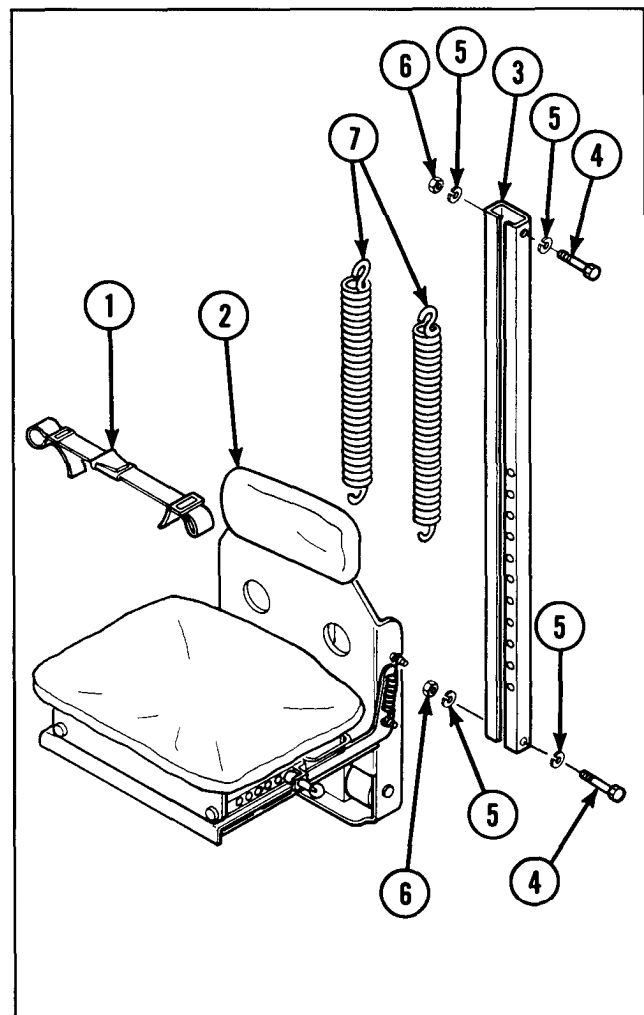
- 1 Check for broken, damaged, or missing parts.
- 2 Vehicular seat is a repairable assembly. Refer to page 2-111.
- 3 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

INSTALLATION

NOTE

The following procedures are written for one seat but apply to both the operator's and rigger's seats.

- 1 Install vehicular safety belt (1) on vehicular seat (2).
- 2 Install vehicular seat (2) and seat post support (3). Secure seat post support with two hexagon capscrews (4), four new lockwashers (5), and two hexagon plain nuts (6).
- 3 Install one end of two vertical adjust tension helical extension springs (7) to vehicular seat (2).
- 4 Install other end of vertical adjust tension helical extension springs (7) to seat post support (3).
- 5 Adjust vehicular seat (2) to desired position.



2-42. MAINTENANCE OF VEHICULAR SEAT AND MANUAL CONTROL LEVER.This task covers: a. *Disassembly*b. *Inspection/Repair*c. *Reassembly***INITIAL SETUP***Tools and Special Tools*

General mechanic's tool kit, automotive
(appx B)

Shop equipment, automotive main-
tenance and repair: organizational
maintenance, common no. 1, less
power (appx B)
Wire brush

Materials/Parts

Dry cleaning solvent (item 10, appx C)
Cotter pin (MS24665-208)
Cotter pin (4) (MS24665-285)
Epoxy resin adhesive (item 2, appx C)
Lockwasher (4) (AN935-416)
Lockwasher (12) (MS35333-40)
Sealing compound (item 17, appx C)

References

TM 9-2350-238-24P-2

Equipment Conditions

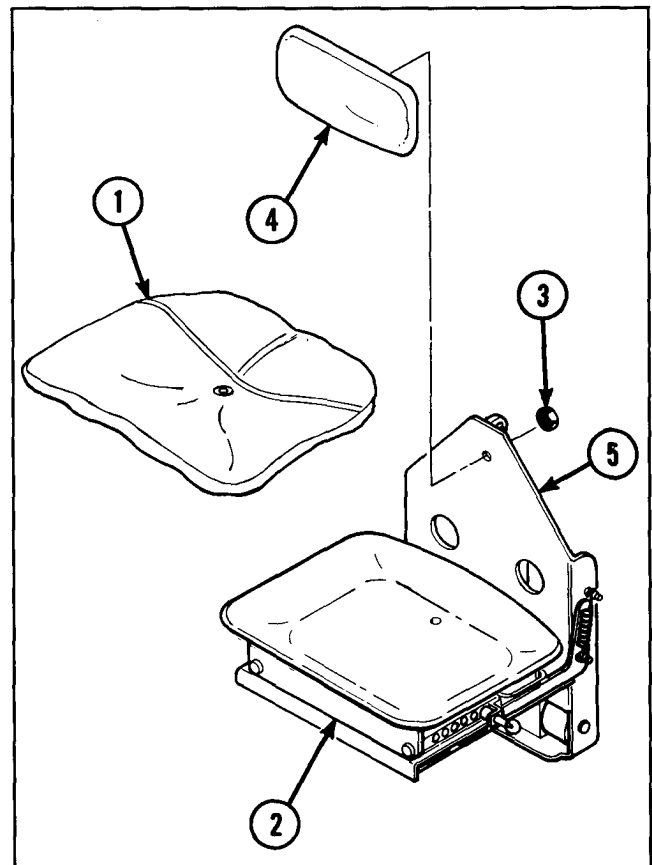
2-109 Vehicular seat removed

*General Safety Instructions***WARNING**

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

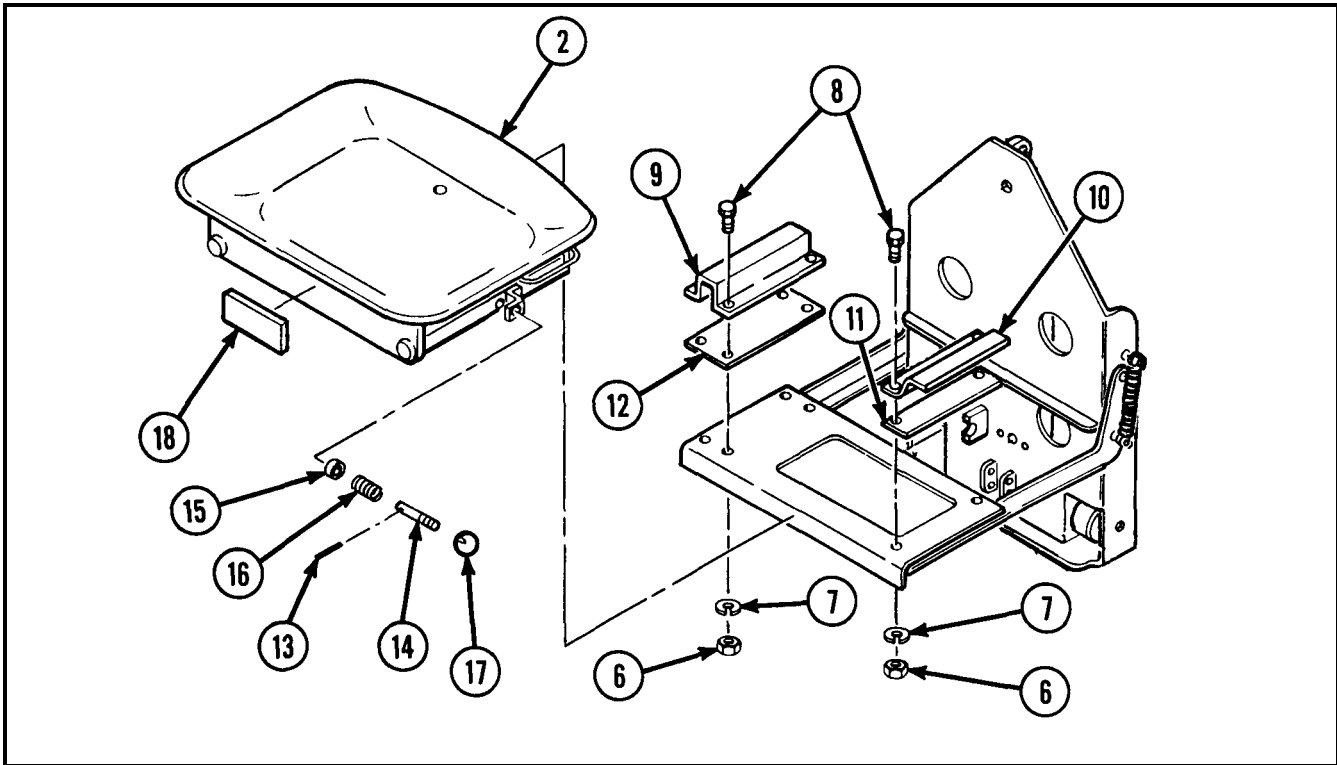
DISASSEMBLY

- 1 Remove vehicular seat cushion (1) from
cab seat frame (2).
- 2 Remove hexagon plain nut (3) and seat
back cushion (4) from cab seat frame (5).



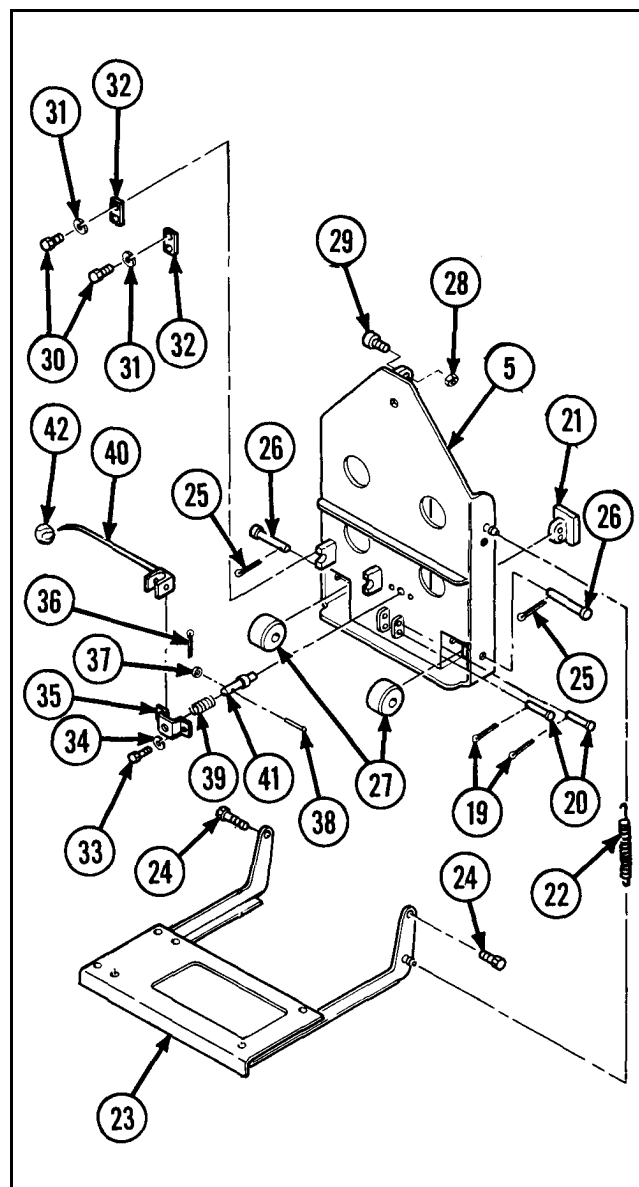
2-42. MAINTENANCE OF VEHICULAR SEAT AND MANUAL CONTROL LEVER (CONT).

DISASSEMBLY (CONT)



- 3 Remove six hexagon plain nuts (6), six lockwashers (7), and six hexagon cap-screws (8).
- 4 Remove cab seat frame (2), right retaining strap (9), double angle bracket (10), left bearing plate (11), and right bearing plate (12).
- 5 Drive out headless straight pin (13) from threaded straight pin (14).
- 6 Remove shaft collar (15), helical compression spring (16), and threaded straight pin (14) from cab seat frame (2).
- 7 Remove knob (17) from threaded straight pin (14).
- 8 If damaged, remove nonmetallic bumper (18) from cab seat frame (2).

- 9 Remove two cotter pins (19), two headed straight pins (20), vertical adjust seat guide shoe (21).
- 10 Remove two helical extension springs (22) from rigger and gunner seat support (23).
- 11 Remove two shoulder screws (24) and rigger and gunner seat support (23) from cab seat frame (5).
- 12 Remove two cotter pins (25), two headed straight pins (26), and two seat back rollers (27).
- 13 Remove hexagon plain nut (28) and needle bearing bolt (29) from cab seat frame (5).
- 14 Remove four hexagon capscrews (30), four lockwashers (31), and two vertical adjustment handle connecting links (32).
- 15 Remove two hexagon capscrews (33) and two lockwashers (34), releasing retaining strap (35) from cab seat frame (5).
- 16 Remove cotter pin (36), flat washer (37), and headed straight pin (38).
- 17 Remove helical spring (39), manual control lever (40), and headless shoulder pin (41).
- 18 Remove knob (42) from manual control lever (40).



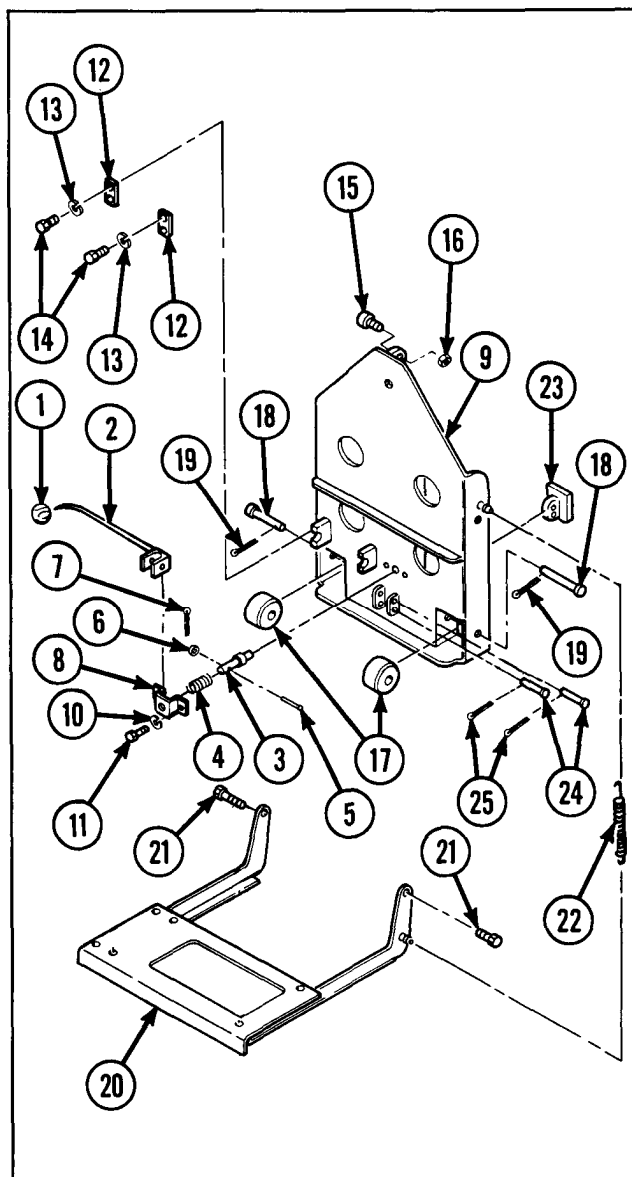
INSPECTION/REPAIR

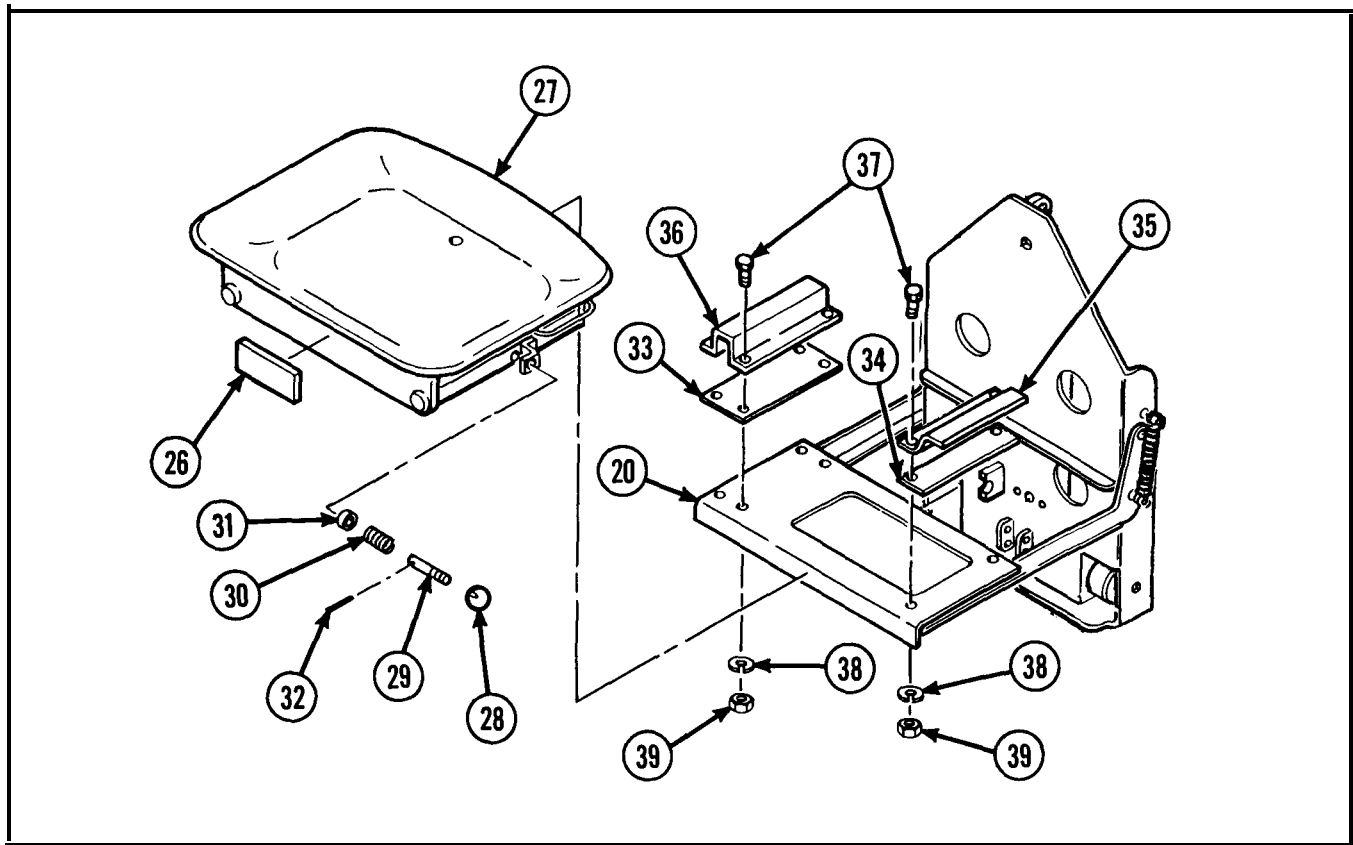
- 1 Check for broken, damaged, or missing parts.
- 2 If cab seat frame is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 3 If rigger and gunner seat support is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 4 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2) which do not meet inspection criteria.

2-42. MAINTENANCE OF VEHICULAR SEAT AND MANUAL CONTROL LEVER (CONT).

REASSEMBLY

- 1 Apply sealing compound (item 17, appx C) to threads of knob (1).
- 2 Install knob (1) on manual control lever (2).
- 3 Install headless shoulder pin (3), manual control lever (2), and helical spring (4).
- 4 Install headed straight pin (5), flat washer (6), and new cotter pin (7).
- 5 Install retaining strap (8) to cab seat frame (9) and secure with two new lockwashers (10), and two hexagon capscrews (11).
- 6 Install two vertical adjustment handle connecting links (12) and secure with four new lockwashers (13), and four hexagon capscrews (14).
- 7 Install needle bearing bolt (15) and hexagon plain nut (16) to cab seat frame (9).
- 8 Install two seat back rollers (17), and secure with two headed straight pins (18) and two new cotter pins (19).
- 9 Connect cab seat frame (9) and rigger and gunner seat support (20) together and secure with two shoulder screws (21).
- 10 Attach two helical extension springs (22) to cab seat frame (9) and rigger and gunner seat support (20).
- 11 Install vertical adjust seat guide shoe (23) to cab seat frame (9) and secure with two headed straight pins (24) and two new cotter pins (25).




WARNING

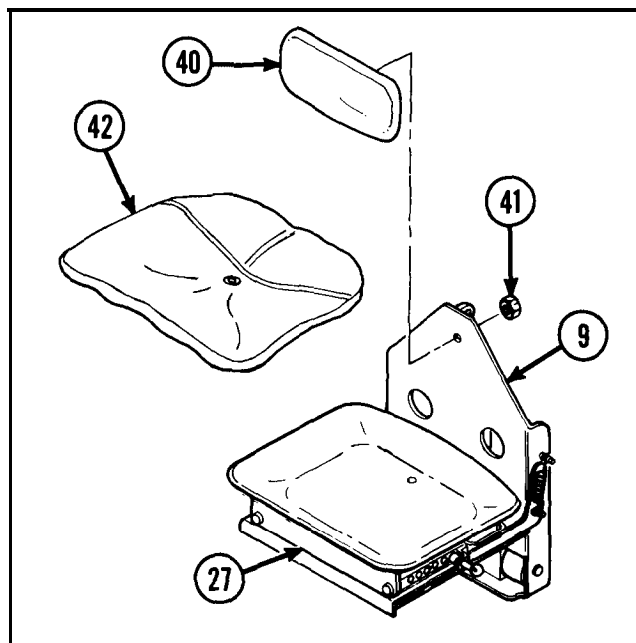
Dry cleaning solvent is toxic and flammable. Wear protective goggles and gloves and use only in well-ventilated areas.

- 12 If nonmetallic bumper (26) was removed, use dry cleaning solvent (item 10, appx C) and wire brush to remove residual adhesive from cab seat frame (27).
- 13 Apply epoxy resin adhesive (item 2, appx C) to bonding surface of new nonmetallic bumper (26).
- 14 Install new nonmetallic bumper (26) to cab seat frame (27).
- 15 Apply sealing compound (item 17, appx C) to threads of knob (28).
- 16 Install knob (28) on threaded straight pin (29).
- 17 Install threaded straight pin (29), helical compression spring (30), and shaft collar (31) on cab seat frame (27).
- 18 Install headless straight pin (32) in threaded straight pin (29).
- 19 Install right bearing plate (33), left bearing plate (34), double angle bracket (35), right retaining strap (36), and cab seat frame (27) on rigger and gunner seat support (20).
- 20 Install six hexagon capscrews (37), six new lockwashers (38), and six hexagon plain nuts (39).

2-42. MAINTENANCE OF VEHICULAR SEAT AND MANUAL CONTROL LEVER (CONT).

REASSEMBLY (CONT)

- 21 Install seat back cushion (40) to cab seat frame (9) and secure with hexagon plain nut (41).
- 22 Install vehicular seat cushion (42) on cab seat frame (27).



2-43. MAINTENANCE OF TRAVERSING FOOT PEDAL LINKAGE, AND CAB ASSEMBLY, FLOORS, PLATES, AND RELATED PARTS.

This task covers: a. *Removal*

b. *Inspection/Repair*

c. *Installation*

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive
(appx B)

References

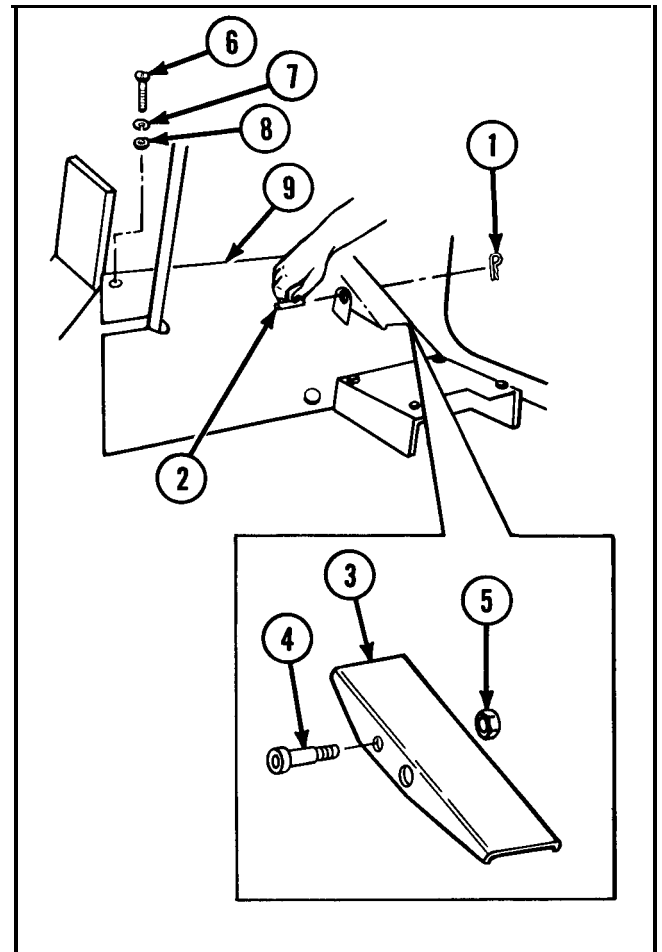
TM 9-2350-238-24P-2

Materials/Parts

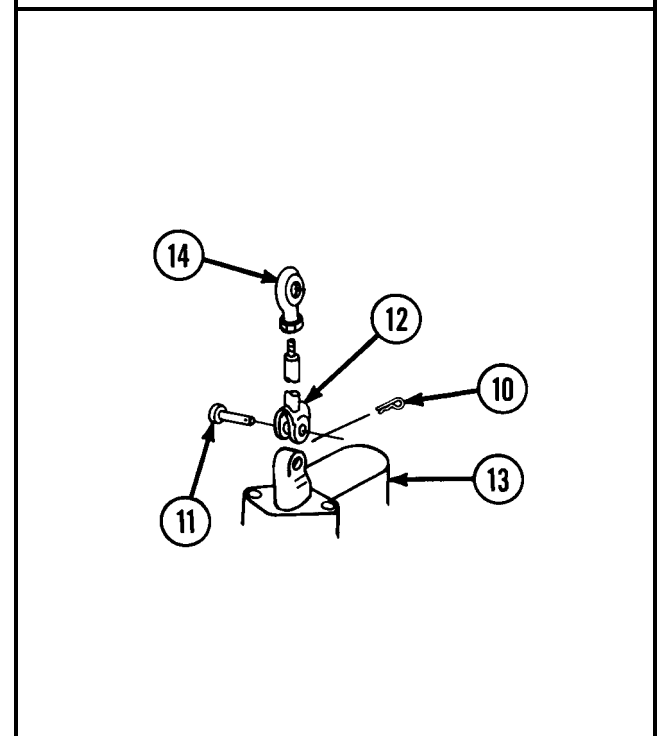
Cotter pin (MS24665-214)
Cotter pin (MS24665-283)
Drive screw (2) (MS21318-9)
Identification plate (10909052)
Lockwasher (14) (MS35338-46)

R E M O V A L

- 1 Remove cotter pin (1) and headed straight pin (2).
- 2 Gain access through hole in traversing hydraulic valve control pedal (3) and remove shoulder screw (4) and hexagon plain nut (5).
- 3 Remove traversing hydraulic valve control pedal (3).
- 4 Remove three hexagon capscrews (6), three lockwashers (7), and three flat washers (8).
- 5 Remove forward right-hand nonskid metallic tread (9).



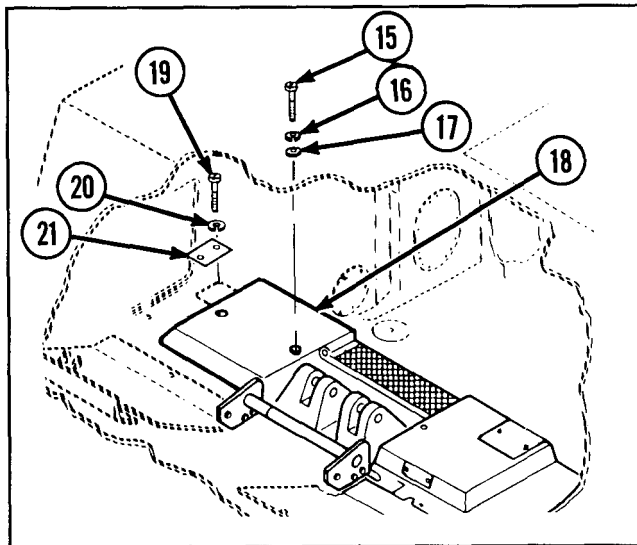
- 6 Remove cotter pin (10) and headed straight pin (11).
- 7 Remove traversing shift pedal linkage rod end clevis (12) from traversing control valve (13).
- 8 Unscrew and remove traversing shift pedal rod end plain bearing (14) from traversing shift pedal linkage rod end clevis (12).



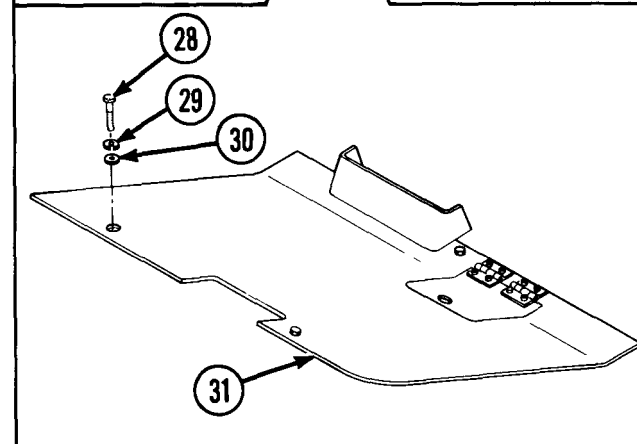
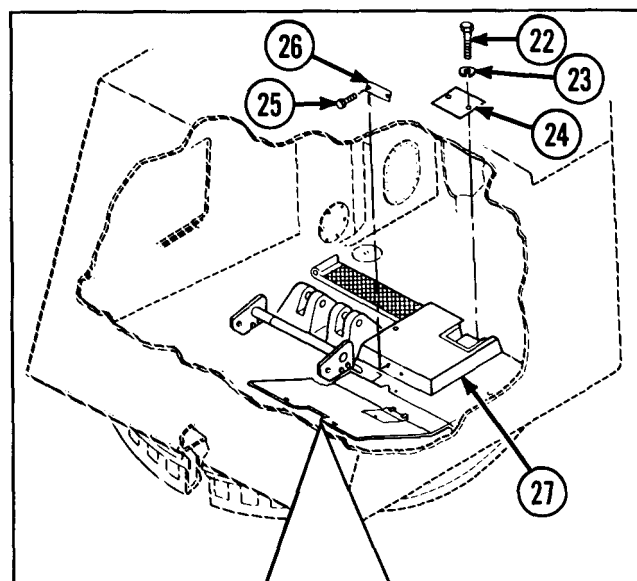
2-43. MAINTENANCE OF TRAVERSING FOOT PEDAL LINKAGE, AND CAB ASSEMBLY, FLOORS, PLATES, AND RELATED PARTS (CONT).

REMOVAL (CONT)

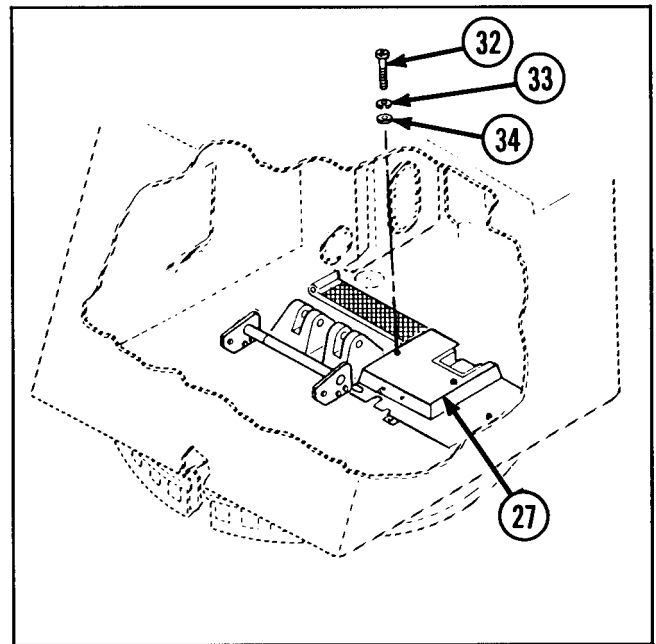
- 9 Remove two hexagon capscrews (15), two lockwashers (16), and two flat washers (17).
- 10 Remove rear right-hand nonskid metallic tread (18).
- 11 Remove two hexagon capscrews (19), two lockwashers (20), and hydraulic quick disconnect access cover (21).



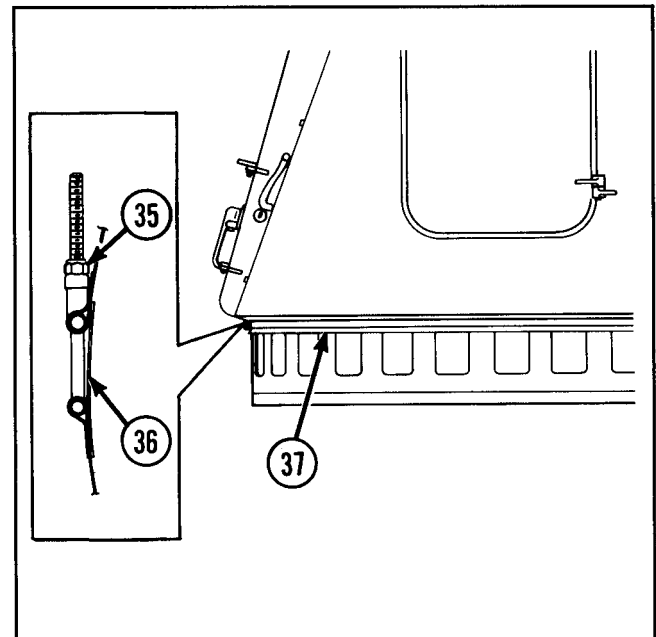
- 12 Remove two hexagon capscrews (22), two lockwashers (23), and hydraulic valve access cover (24).
- 13 If damaged, remove two drive screws (25) and traverse brake pressure selector identification plate (26) from rear left-hand nonskid metallic tread (27).
- 14 Remove three hexagon capscrews (28), three lockwashers (29), and three flat washers (30).
- 15 Remove forward left-hand nonskid metallic tread (31).



- 16 Remove two hexagon capscrews (32), two lockwashers (33), and two flat washers (34).
- 17 Remove rear left-hand nonskid metallic tread (27).



- 18 Remove nut (35) from cab base seal hose clamp (36).
- 19 Remove cab base turret weather seal (37).



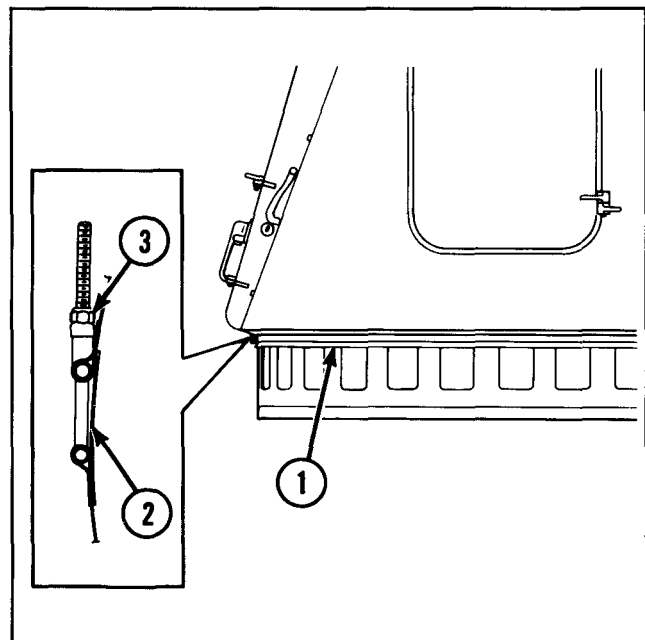
2-43. MAINTENANCE OF TRAVERSING FOOT PEDAL LINKAGE, AND CAB ASSEMBLY, FLOORS, PLATES, AND RELATED PARTS (CONT).

INSPECTION/REPAIR

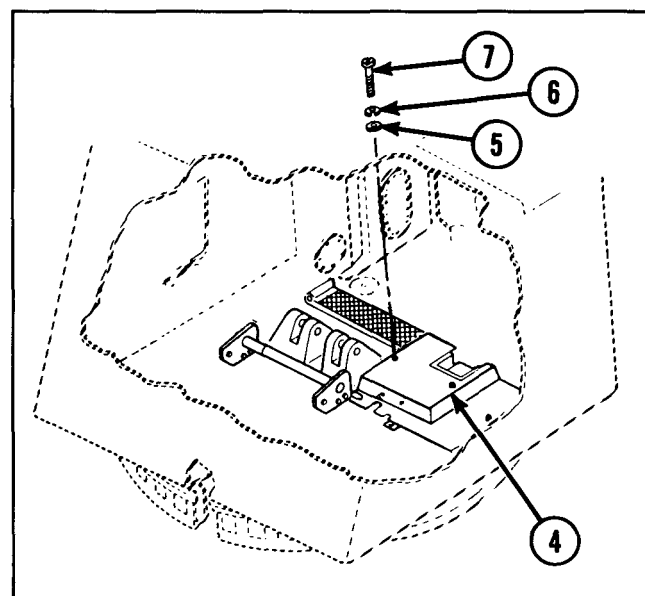
- 1 Check for broken, damaged, or missing parts.
- 2 Forward left-hand nonskid metallic tread is a repairable assembly. Refer to page 2-126.
- 3 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

INSTALLATION

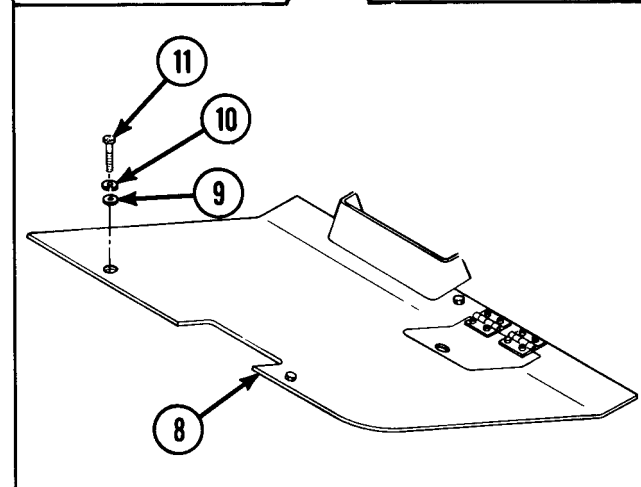
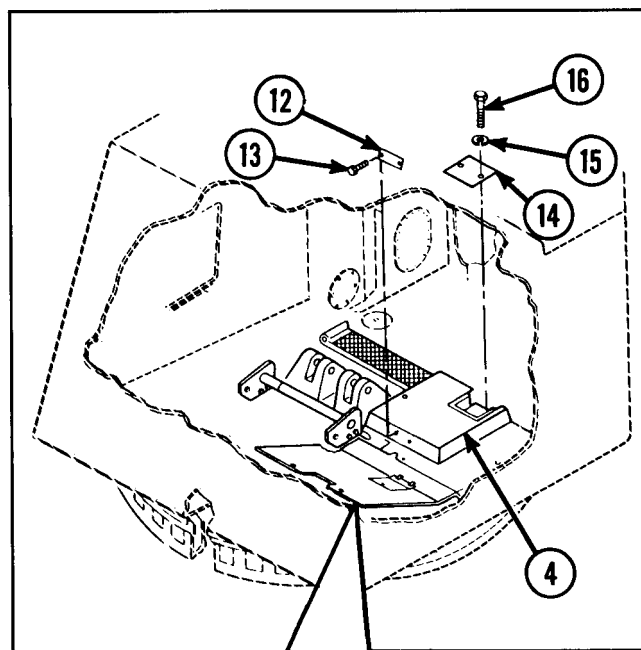
- 1 Install cab base turret weather seal (1) and cab base seal hose clamp (2) and secure with nut (3).



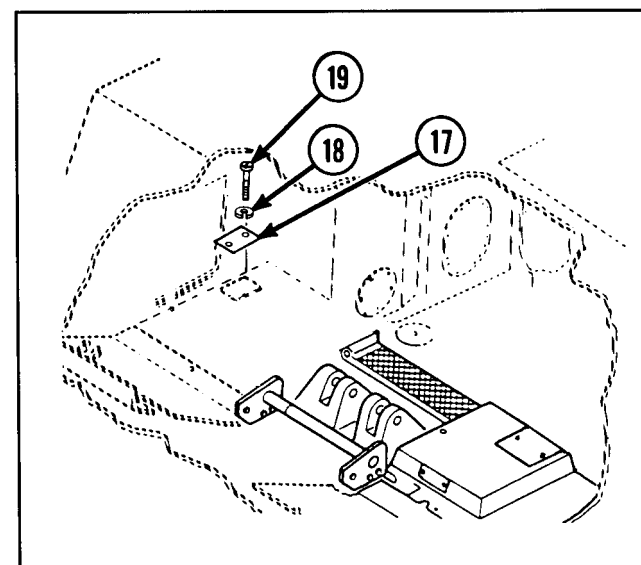
- 2 Install rear left-hand nonskid metallic tread (4). Secure with two flat washers (5), two new lockwashers (6), and two hexagon capscrews (7).



- 3 Install forward left-hand nonskid metallic tread (8). Secure with three flat washers (9), three new lockwashers (10), and three hexagon capscrews (11).
- 4 If removed, install new traverse brake pressure selector identification plate (12) on rear left-hand nonskid metallic tread (4) and secure with two new drive screws (13).
- 5 Install hydraulic valve access cover (14) on rear left-hand nonskid metallic tread (4) and secure with two new lockwashers (15) and two hexagon capscrews (16).



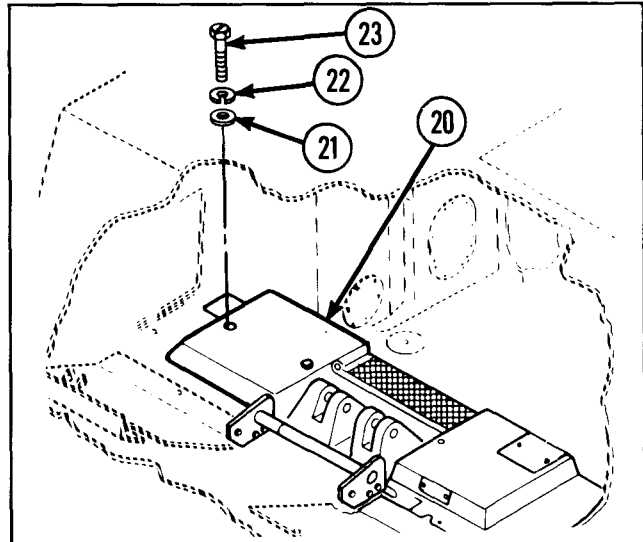
- 6 Install hydraulic quick disconnect access cover (17) and secure with two new lockwashers (18) and two hexagon capscrews (19).



2-43. MAINTENANCE OF TRAVERSING FOOT PEDAL LINKAGE, AND CAB ASSEMBLY, FLOORS, PLATES, AND RELATED PARTS (CONT).

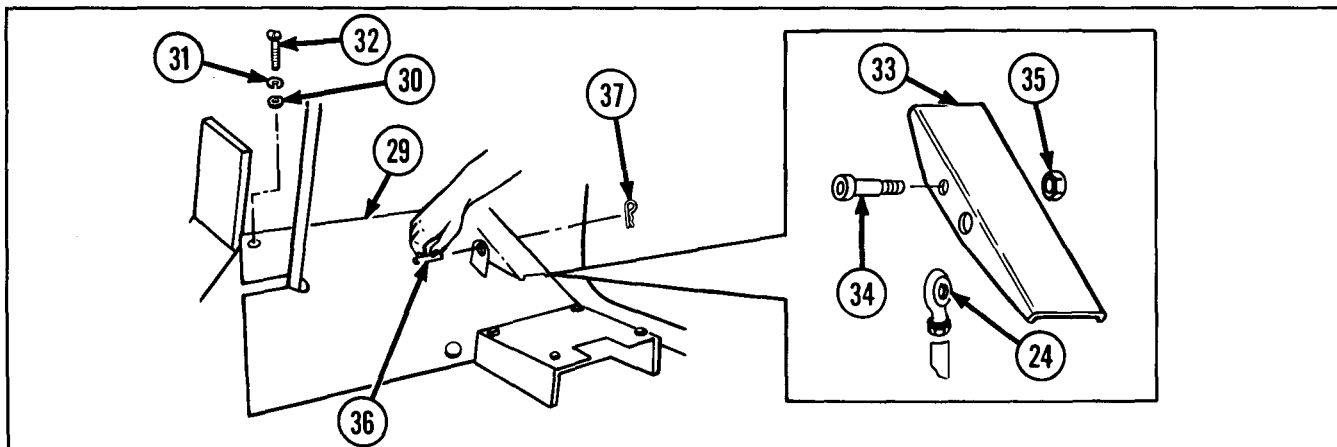
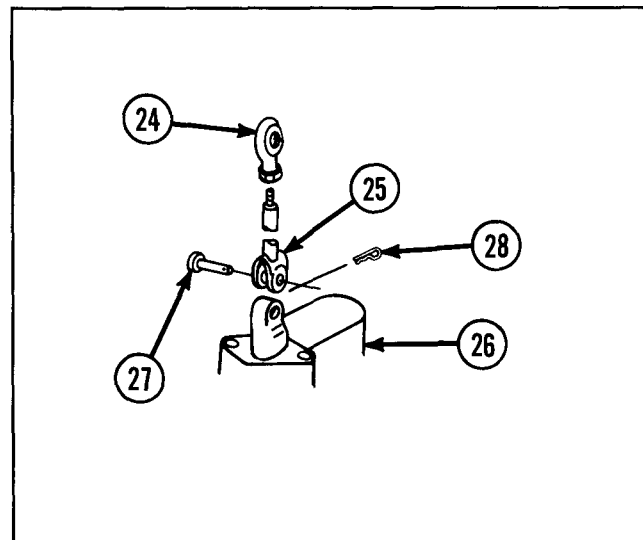
INSTALLATION (CONT)

- 7 Install rear right-hand nonskid metallic tread (20). Secure with two flat washers (21), two new lockwashers (22), and two hexagon capscrews (23).

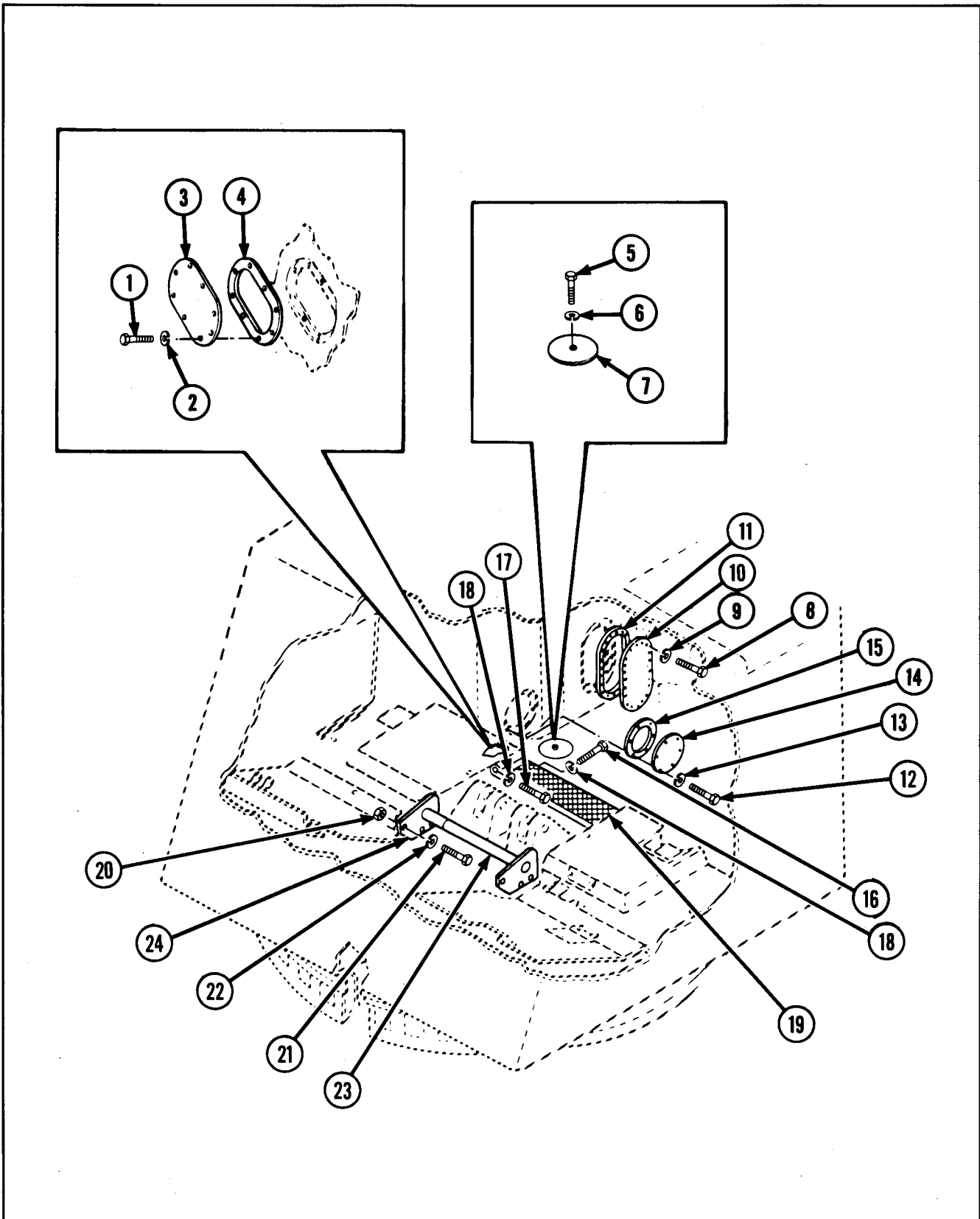


- 8 Install traversing shift pedal rod end plain bearing (24) on traversing shift pedal linkage rod end clevis (25).

- 9 Install traversing shift pedal linkage rod end clevis (25) on traversing control valve (26) and secure with headed straight pin (27) and new cotter pin (28).



2-44. MAINTENANCE OF INTERIOR COVERS, PLATES, AND RELATED PARTS (CONT).



REMOVAL

- 1 Remove eight hexagon capscrews (1), eight lockwashers (2), and reservoir access cover (3).
- 2 If damaged, remove reservoir access cover gasket (4).
- 3 Remove hexagon capscrew (5), lockwasher (6), and cab cleanout access cover (7).
- 4 Remove 20 hexagon capscrews (8), 20 lockwashers (9), and hydraulic reservoir access cover (10).
- 5 If damaged, remove reservoir access cover gasket (11).
- 6 Remove six hexagon capscrews (12), six lockwashers (13), and hydraulic reservoir access cover (14).
- 7 If damaged, remove reservoir cover gasket (15).
- 8 Remove two hexagon capscrews (16), two hexagon capscrews (17), four lockwashers (18), and metal cab grille (19).
- 9 Remove six hexagon plain nuts (20), six hexagon capscrews (21), and six lockwashers (22).
- 10 Remove tow winch electrical guard (23) and tow winch cable mechanical guard (24).

INSPECTION/REPAIR

- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

INSTALLATION

- 1 Install tow winch cable mechanical guard (24) and tow winch electrical guard (23). Secure with six new lockwashers (22), six hexagon capscrews (21), and six hexagon plain nuts (20).
- 2 Install metal cab grille (19) and secure with four new lockwashers (18), two hexagon capscrews (17), and two hexagon capscrews (16).
- 3 If removed, install new reservoir cover gasket (15).
- 4 Install hydraulic reservoir access cover (14), six new lockwashers (13), and six hexagon capscrews (12).
- 5 If removed, install new reservoir access cover gasket (11).
- 6 Install hydraulic reservoir access cover (10) and secure with 20 new lockwashers (9) and 20 hexagon capscrews (8).
- 7 Install cab cleanout access cover (7) and secure with new lockwasher (6) and hexagon capscrew (5).
- 8 If removed, install new reservoir access cover gasket (4).
- 9 Install reservoir access cover (3) and secure with eight new lockwashers (2) and eight hexagon capscrews (1).

WARNING

Wipe up any spilled hydraulic fluid to prevent injury to personnel.

- 10 Fill hydraulic reservoir. Refer to page 2-8.

2-45. MAINTENANCE OF FORWARD LEFT-HAND NONSKID METALLIC TREAD.

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

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive
(appx B)

Equipment Conditions

2-116 Forward left-hand nonskid
metallic tread removed

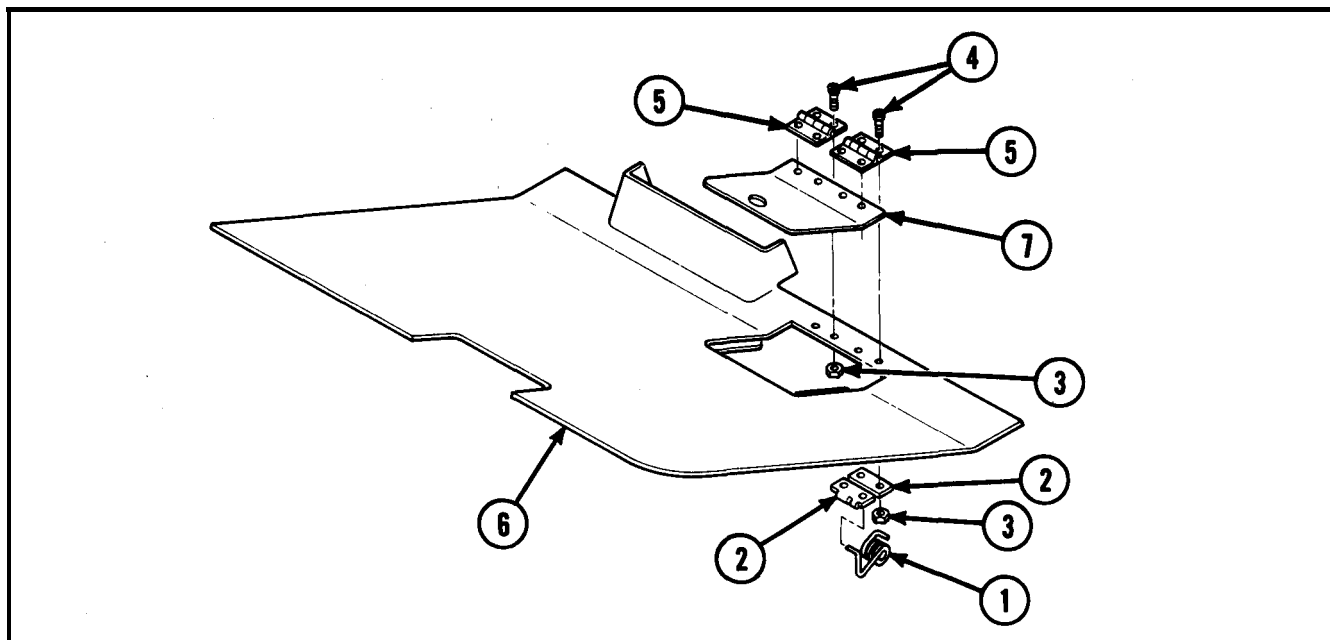
Materials/Parts

Self-locking nut (8) (MS21044N3)

References

TM 9-2350-238-24P-2

DISASSEMBLY



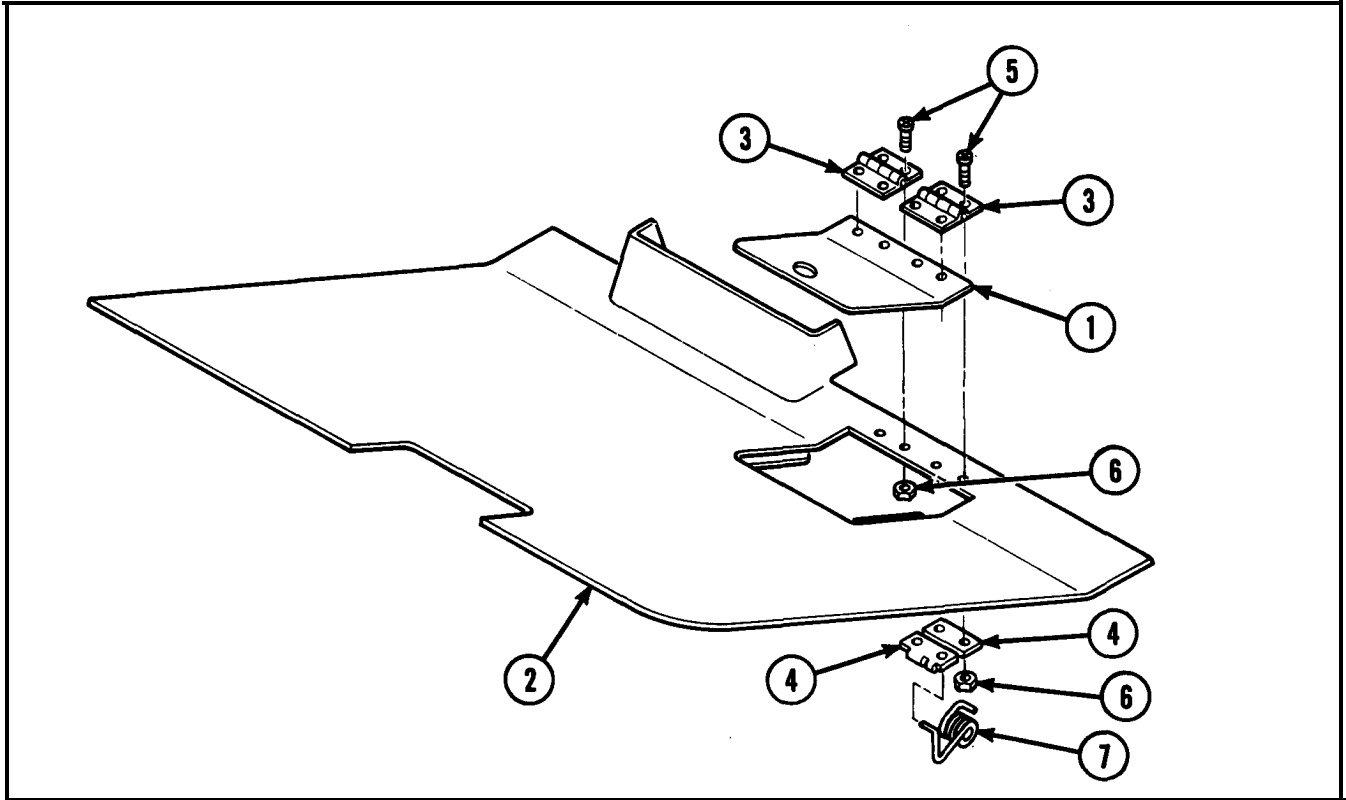
- 1 Remove helical torsion spring (1) from two access door spring retainers (2).
- 2 Remove eight self-locking nuts (3), eight machine screws (4), two access door spring retainers (2), and two access plate hinges (5) from floor plate (6).
- 3 Remove cab floor plate access door (7) from floor plate (6).

INSPECTION/REPAIR

1 Check for broken, damaged, or missing parts.

2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

REASSEMBLY



1 Install cab floor plate access door (1) on floor plate (2).

2 Install two access plate hinges (3) and two access door spring retainers (4) and secure with eight machine screws (5) and eight new self-locking nuts (6).

3 Install helical torsion spring (7) attaching feet into access door spring retainers (4).

2-46. MAINTENANCE OF BOOM ELEVATING, BOOM AND TOW WINCH CONTROLS AND LINKAGE.

This task covers: a. *Removal*

b. *Inspection/Repair*

c. *Installation*

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive
(appx B)

Materials/Parts

Cotter pin (6) (MS24665-353)
Cotter pin (3) (MS24665-355)
Drive screws (22) (MS21318-14)
Epoxy resin adhesive (item 2, appx C)
Lockwasher (4) (MS35338-43)
Lockwasher (2) (MS35338-44)
Lockwasher (6) (MS35338-46)
Retaining ring (7) (7613189)

Sealing compound (item 17, appx C)
Tiedown strap (3) (MS3367-3-9)

References

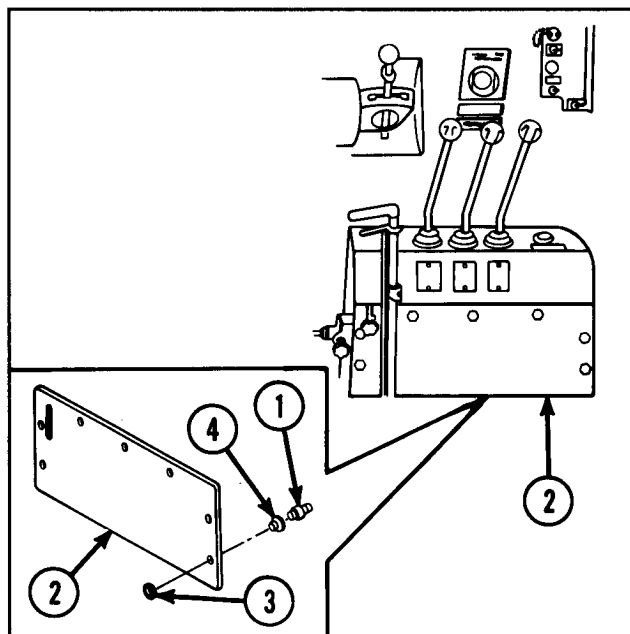
TM 9-2350-238-24P-2

Equipment Conditions

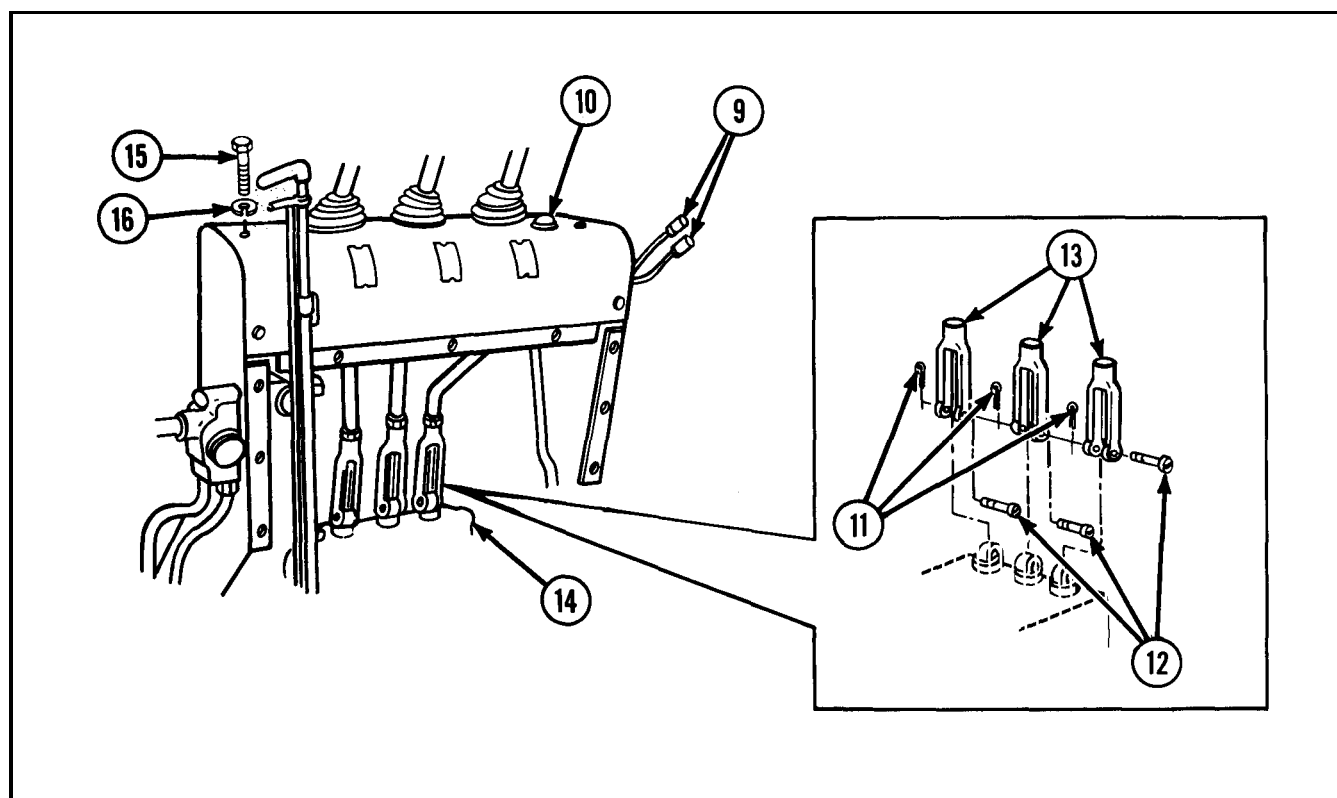
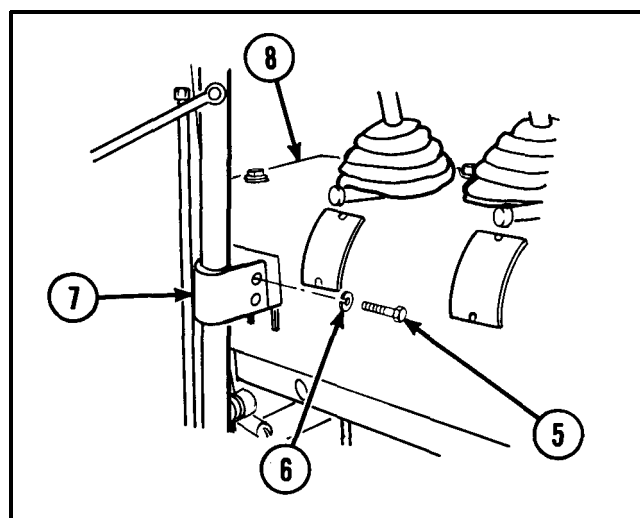
Hydraulic pressure released. Refer to page 2-8.
2-116 Forward right-hand nonskid
metallic tread removed

REMOVAL

- 1 Loosen seven shift lever turnlock fastener studs (1) and remove cab assembly winch controls access cover (2).
- 2 Remove seven shift lever panel retaining rings (3), seven shift lever turnlock fastener eyelets (4), and seven shift lever turnlock fastener studs (1).



- 3 Remove four machine screws (5), four lockwashers (6), and winch control panel bracket (7) from control camlock support (8).

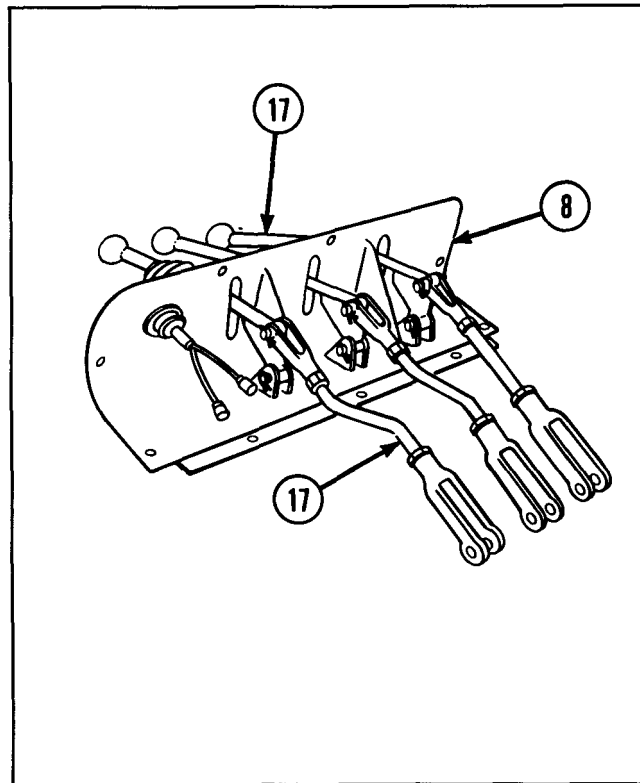


- 4 Disconnect two electrical connectors (9) from filter bypass indicator light (10).
- 5 Remove three cotter pins (11) and three headed straight pins (12) releasing three rod end clevises (13) from three spool manifold (14).
- 6 Remove six hexagon capscrews (15) and six lockwashers (16).

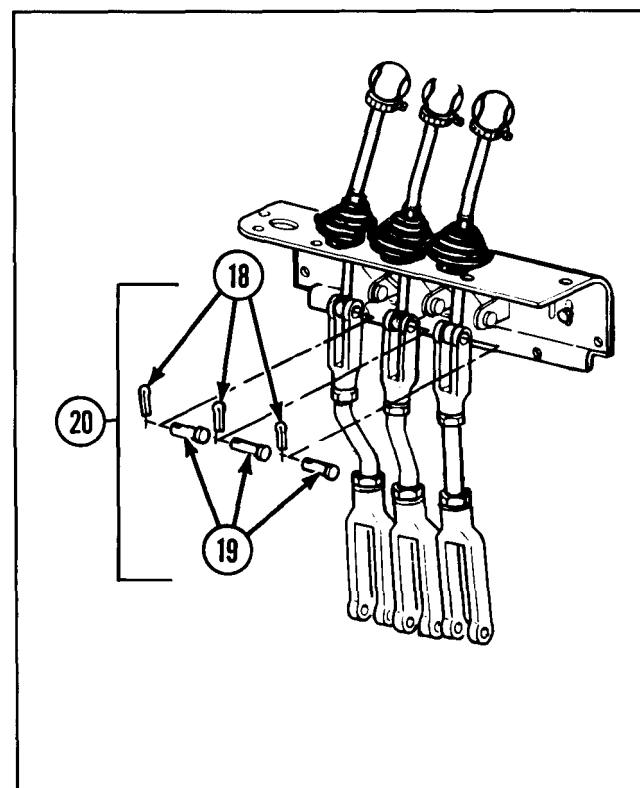
2-46. MAINTENANCE OF BOOM ELEVATING, BOOM AND TOW WINCH CONTROLS AND LINKAGE (CONT).

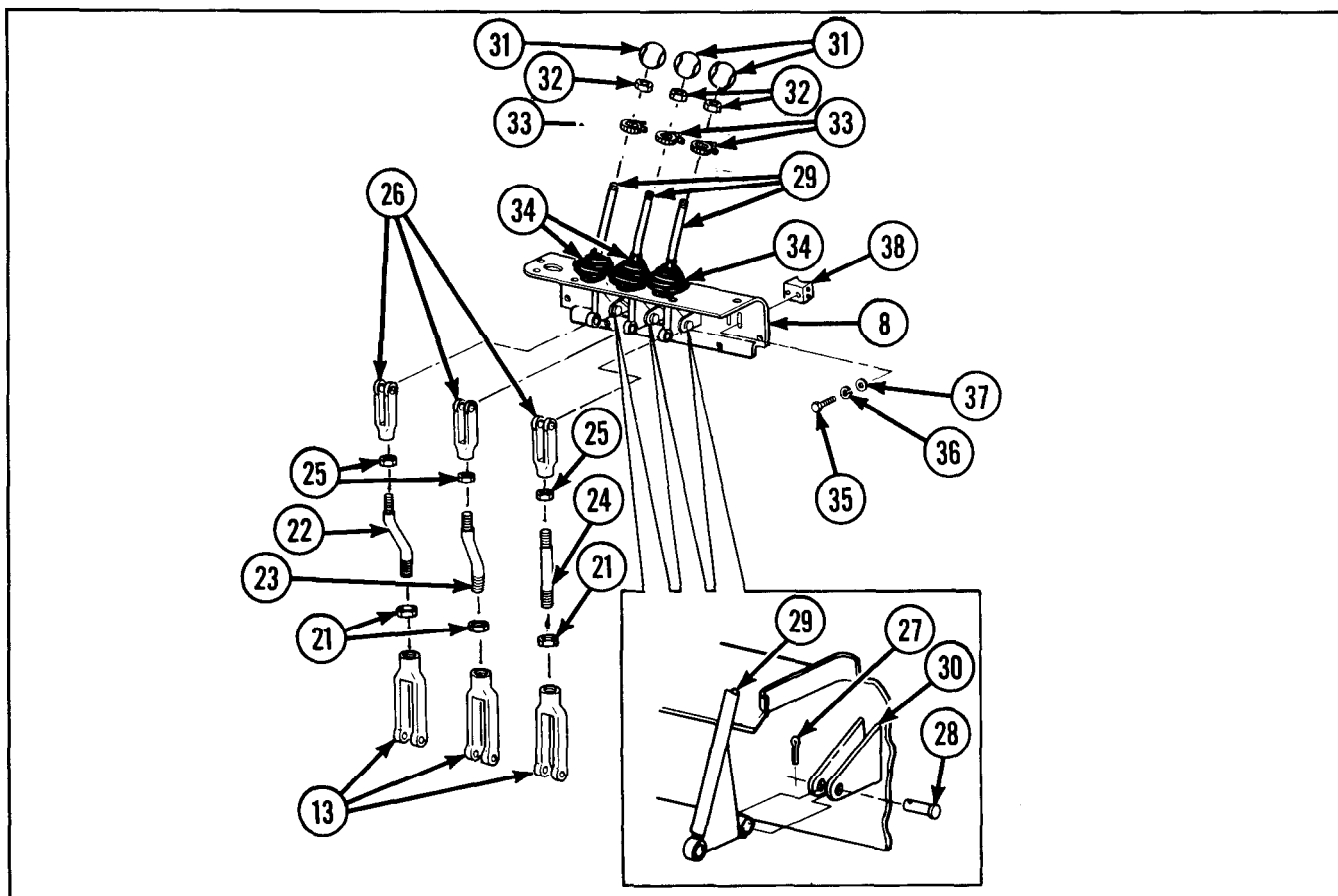
REMOVAL (CONT)

- 7 Remove camlock controls support (8) and attached boom elevating and boom and tow winch controls and linkage (17).



- 8 Remove three cotter pins (18), three headed straight pins (19), and the lower linkage controls (20).



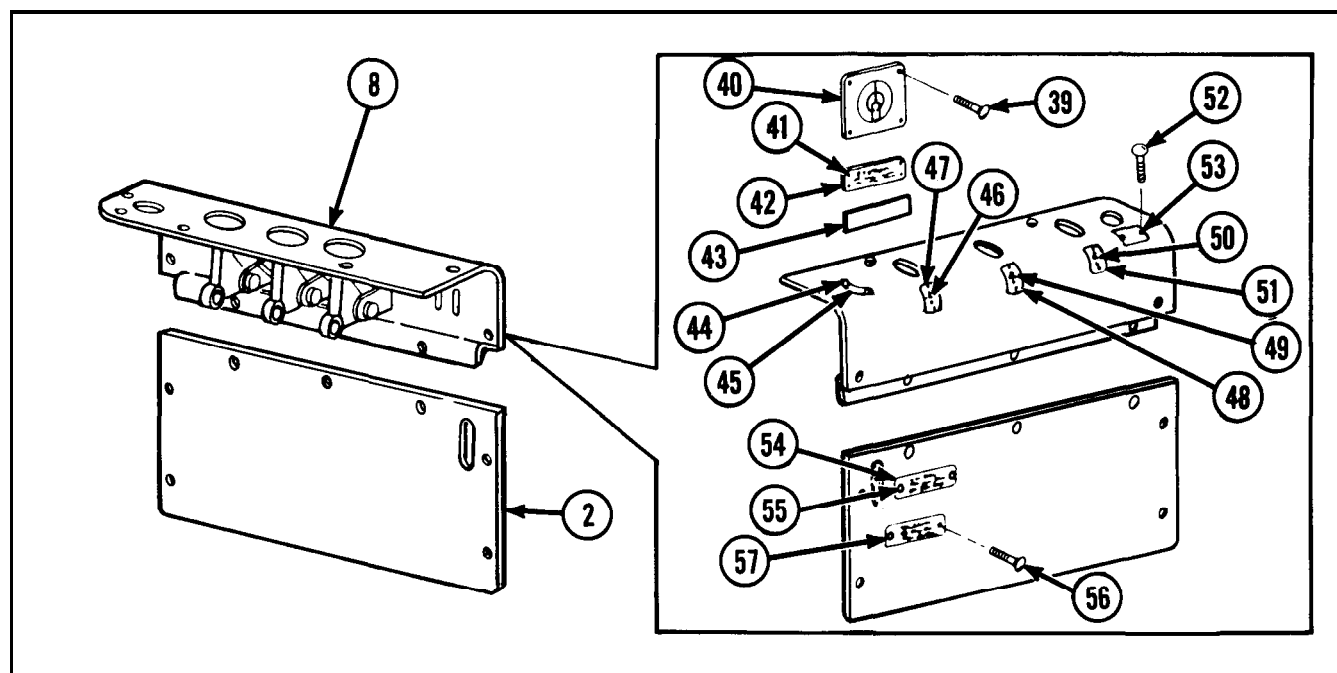
**NOTE**

Measure length center to center of lower linkage controls prior to disassembly of clevises and nuts from rods and shaft to assure accuracy upon reassembly.

- 9 Loosen three hexagon plain nuts (21). Remove one end of two hydraulic valve shift rods (22 and 23), and hydraulic valve shift stud (24), and three hexagon plain nuts (21) from three rod end clevises (13).
- 10 Loosen three hexagon plain nuts (25). Remove other end of two hydraulic valve shift rods (22 and 23), and hydraulic valve shift stud (24), and three hexagon plain nuts (25) from three rod end clevises (26).
- 11 Remove three cotter pins (27) and three headed straight pins (28), releasing three boom and tow winch manual control levers (29) from mounting plates (30) of camlock controls support (8).
- 12 Remove three shift lever handle knobs (31), three hexagon plain nuts (32), three tiedown straps (33), and three shift handle boots (34) from three boom and tow winch manual control levers (29). Remove three boom and tow winch manual control levers.
- 13 Remove two hexagon capscrews (35), two lockwashers (36), two flat washers (37), and winch control panel bracket (38) from camlock controls support (8).

2-46. MAINTENANCE OF BOOM ELEVATING, BOOM AND TOW WINCH CONTROLS AND LINKAGE (CONT).

REMOVAL (CONT)



14 If damaged, remove four drive screws (39) and load rating capacities identification plate (40).

15 If damaged, remove four drive screws (41) and winch load instruction plate (42).

16 If damaged, scrape or pry off high noise instruction plate (43) using putty knife.

17 If damaged, remove two drive screws (44) and LO-N-HI instruction plate (45) from camlock controls support (8).

18 If damaged, remove two drive screws (46) and BOOM WINCH LOWER-RAISE instruction identification plate (47) from camlock controls support (8).

19 If damaged, remove two drive screws (48) and TOW WINCH OUT IN identification plate (49) from camlock controls support (8).

20 If damaged, remove two drive screws (50) and BOOM LOWER RAISE identifica-

tion plate (51) from camlock controls support (8).

21 If damaged, remove two drive screws (52) and filter bypassing instruction plate (53) from camlock controls support (8).

22 If damaged, remove two drive screws (54) and tow winch brake pressure selector identification plate (55) from cab assembly winch controls access cover (2).

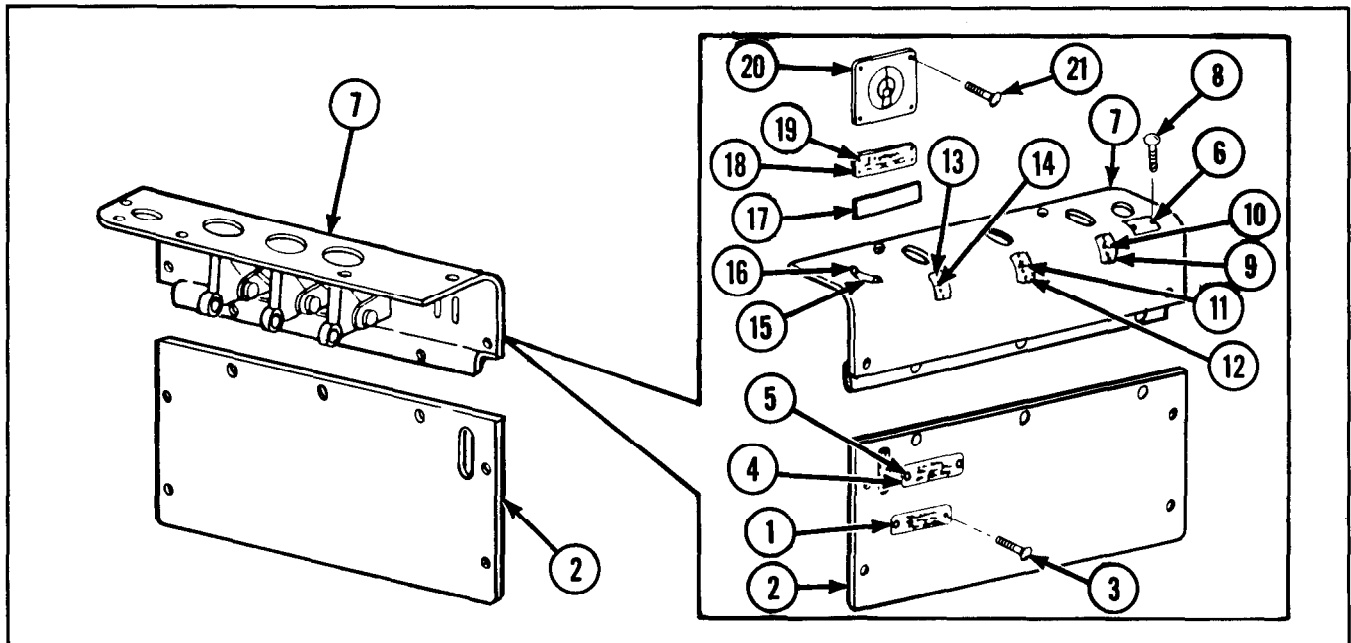
23 If damaged, remove two drive screws (56) and boom winch brake pressure identification plate (57) from cab assembly winch controls access cover (2).

INSPECTION/REPAIR

1 Check for broken, damaged, or missing parts.

2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

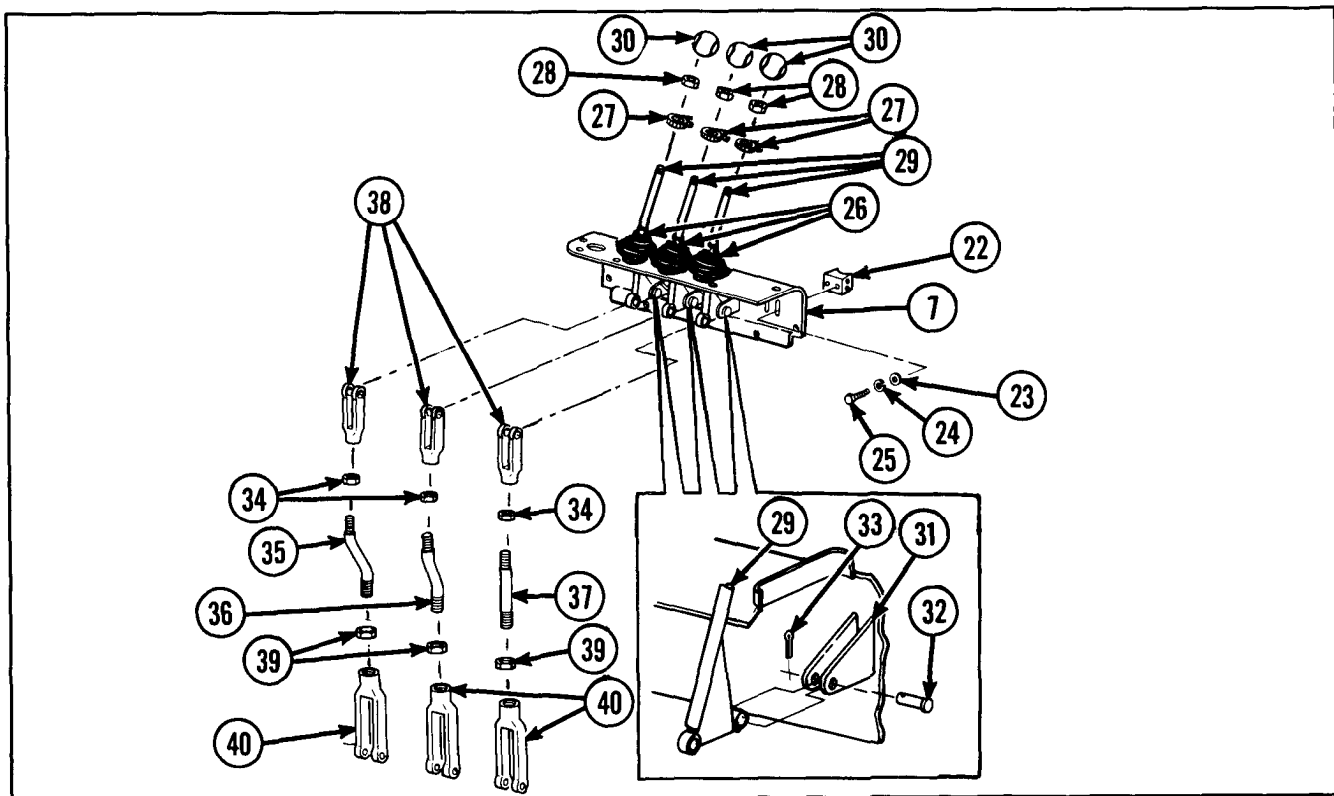
INSTALLATION



- 1 If necessary, install boom winch brake pressure identification plate (1) on cab assembly winch controls access cover (2) and secure with two new drive screws (3).
- 2 If necessary, install tow winch brake pressure selector identification plate (4) on cab assembly winch controls access cover (2) and secure with two new drive screws (5).
- 3 If necessary, install filter bypassing instruction plate (6) on camlock controls support (7) and secure with two new drive screws (8).
- 4 If necessary, install BOOM LOWER RAISE identification plate (9) on camlock controls support (7) and secure with two new drive screws (10).
- 5 If necessary, install TOW WINCH OUT IN identification plate (11) on camlock controls support (7) and secure with two new drive screws (12).
- 6 If necessary, install BOOM WINCH LOWER-RAISE instruction identification plate (13) on camlock controls support (7) and secure with two new drive screws (14).
- 7 If necessary, install LO-N-HI instruction plate (15) on camlock controls support (7) and secure with two new drive screws (16).
- 8 If high noise instruction plate (17) was removed, clean mounting surface where plate is to be installed.
- 9 Apply epoxy resin adhesive (item 2, appx C) to high noise instruction plate (17) and install.
- 10 If necessary, install winch load instruction plate (18) and secure with four new drive screws (19).
- 11 If necessary, install load rating capacities identification plate (20) and secure with four new drive screws (21).

2-46. MAINTENANCE OF BOOM ELEVATING, BOOM AND TOW WINCH CONTROLS AND LINKAGE (CONT).

INSTALLATION (CONT)



12 Install winch control panel bracket (22) on camlock controls support (7) and secure with two flat washers (23), two new lockwashers (24), and two hexagon capscrews (25).

13 Install three shift handle boots (26), three new tiedown straps (27), and three hexagon plain nuts (28) on three boom and tow winch manual control levers (29).

14 Apply sealing compound (item 17, appx C) to threads in three shift lever handle knobs (30) and install on three boom and tow winch manual control levers (29).

15 Install three boom and tow winch manual control levers (29) to mounting plates (31) of camlock controls support (7) and secure with three headed straight pins (32) and three new cotter pins (33).

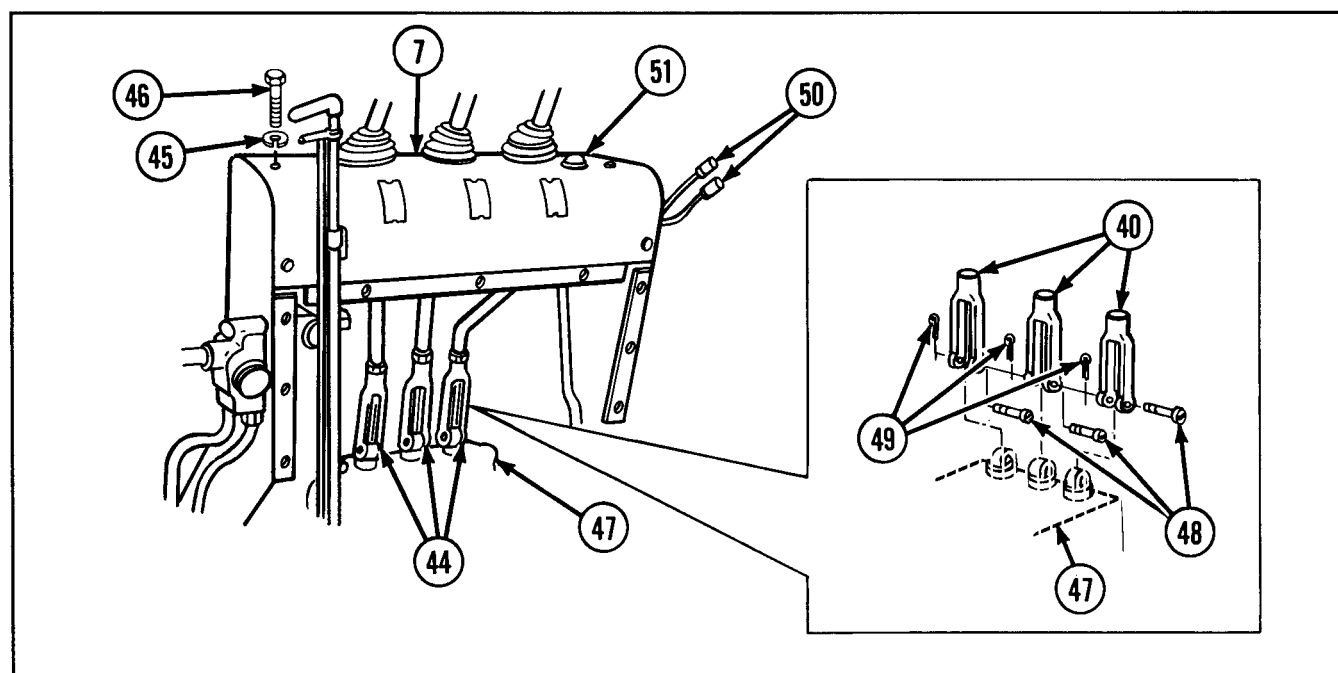
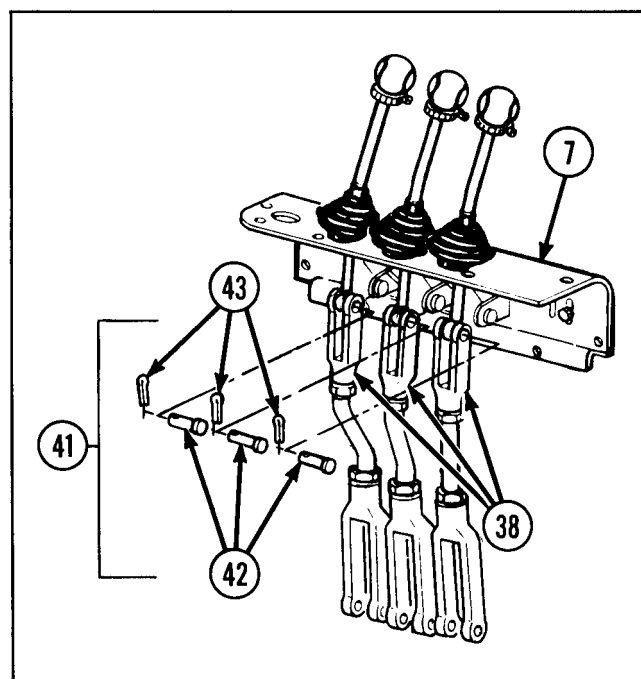
16 Install three hexagon plain nuts (34) on one end of two hydraulic valve shift rods (35 and 36), and hydraulic valve shift stud (37). Install two hydraulic valve shift rods and hydraulic valve shift stud into three rod end clevises (38) and tighten three hexagon plain nuts (34).

17 Install three hexagon plain nuts (39) on other end of two hydraulic valve shift rods (35 and 36), and hydraulic valve shift stud (37). Install two hydraulic valve shift rods and hydraulic valve shift stud into three rod end clevises (40) and tighten three hexagon plain nuts (39).

NOTE

Check measurement of lower control linkage controls after reassembly of clevises and nuts to rods prior to installation to manual control levers.

- 18** Install three rod end clevises (38) and attached lower linkage controls (41) to camlock controls support (7) and secure with three headed straight pins (42) and three new cotter pins (43).



- 19** Install camlock controls support (7) and attached boom elevating and boom and tow winch controls and linkage (44) to interior of cab and secure with six new lockwashers (45) and six hexagon cap-screws (46).

- 20** Install three rod end clevises (40) and attached lower linkage controls (41) to three spool manifold (47) and secure

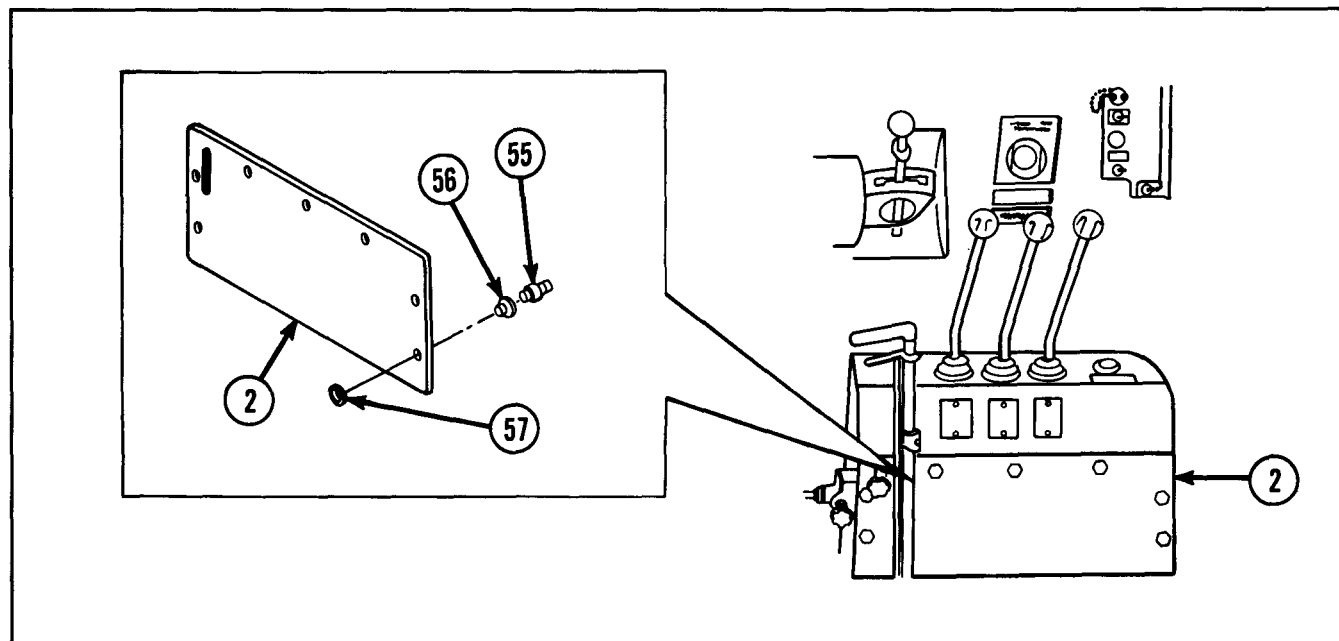
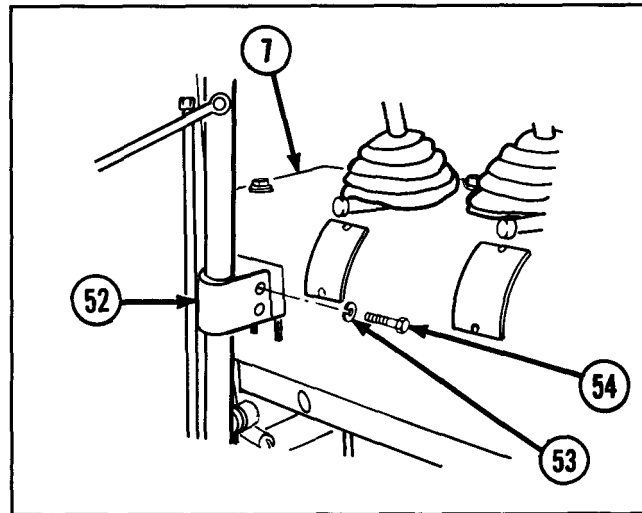
with three headed straight pins (48) and three new cotter pins (49).

- 21** Connect two electrical connectors (50) to leads of filter bypass indicator light (51).

2-46. MAINTENANCE OF BOOM ELEVATING, BOOM AND TOW WINCH CONTROLS AND LINKAGE (CONT).

INSTALLATION (CONT)

- 22 Install winch control panel bracket (52) on camlock controls support (7) and secure with four new lockwashers (53) and four hexagon capscrews (54).



- 23 Install cab assembly winch controls access cover (2) and secure with seven shift lever turnlock fastener studs (55), seven eyelets (56), and seven new shift lever panel retaining rings (57). Twist shift lever turnlock fastener studs (55) to lock into place.

2-47. MAINTENANCE OF TOW WINCH CABLE WIRE ROPE ASSEMBLY.This task covers: a. *Removal*b. *Inspection/Repair*c. *Installation***INITIAL SETUP***Tools and Special Tools*

Anchor

Chain

General mechanic's tool kit, automotive
(appx B)*References*

TM 9-2350-238-10

TM 9-2350-238-24P-2

*General Safety Instructions***WARNING**

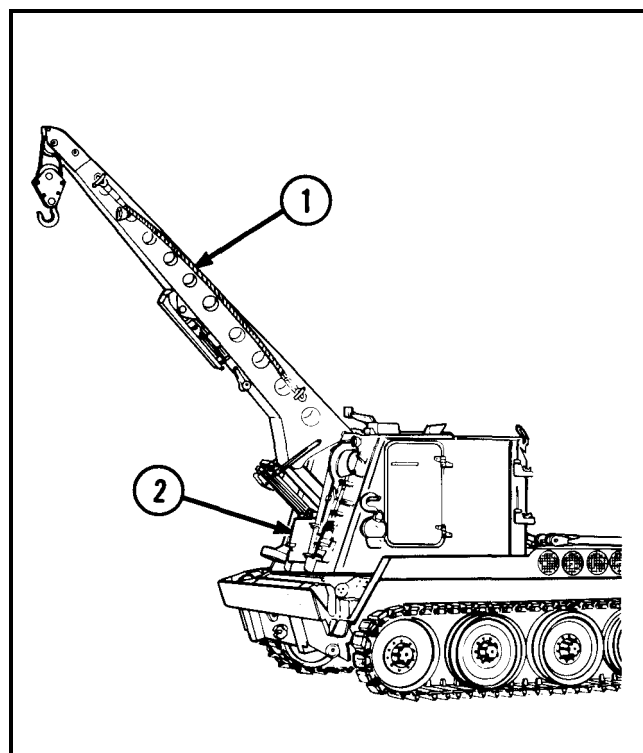
- Make sure all personnel stand clear of boom and block before traversing cab.

- Always wear leather gloves when handling winch cable. Never allow cable to run through hands. Do not operate winch crane with less than four turns of wire rope on drums. Failure to observe these warnings could result in personnel injuries.
- Wire rope failure will result if more than half the wires in any single strand are broken, separating from pulled out kinks, or fraying after crushing under the track. Wire rope failure will result in injury to personnel.

REMOVAL**WARNING**

Make sure all personnel stand clear of boom and block before traversing cab.

- 1 Turn cab until boom (1) is at rear of vehicle.
- 2 Raise boom (1) to 45 degrees.
- 3 Open tow winch access door (2) and secure with latch.



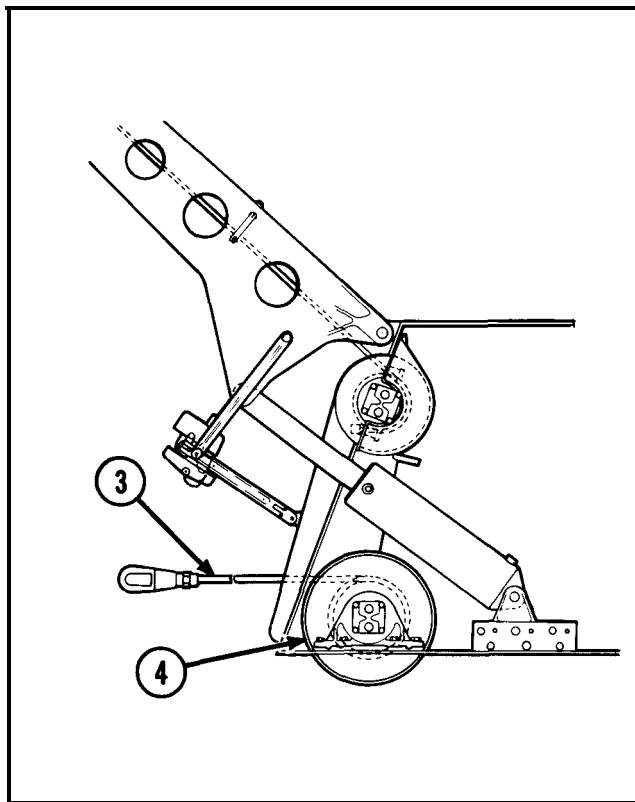
2-47. MAINTENANCE OF TOW WINCH CABLE WIRE ROPE ASSEMBLY (CONT).

REMOVAL (CONT)

WARNING

Always wear leather gloves when handling winch cable. Never allow cable to run through hands. Do not operate winch crane with less than four turns of wire rope on drums. Failure to observe these warnings could result in personnel injuries.

- 4 Pay out tow winch cable wire rope assembly (3) until about 12.00 in. (30.48 cm) of cable remains on tow winch drum (4). Refer to TM 9-2350-238-10.
- 5 Release tension on tow winch cable wire rope assembly (3) and remove tow winch cable wire rope assembly from tow winch drum (4).



INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

INSTALLATION

WARNING

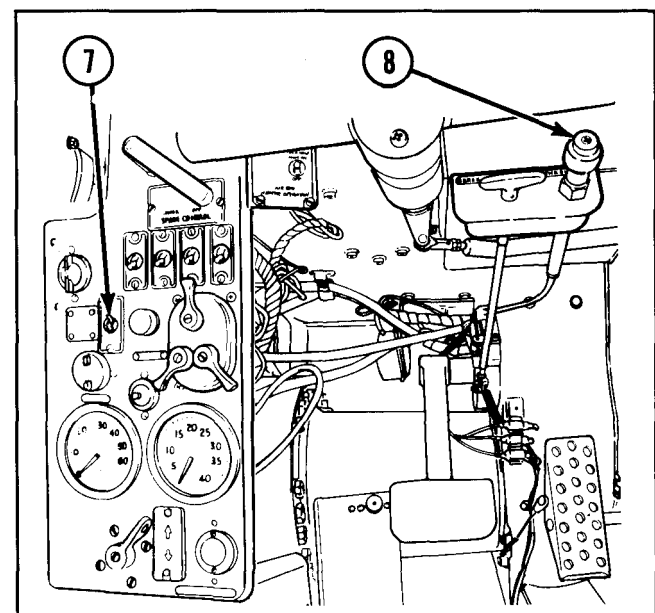
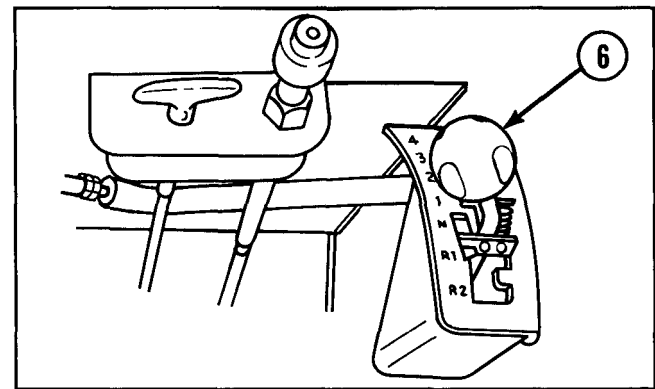
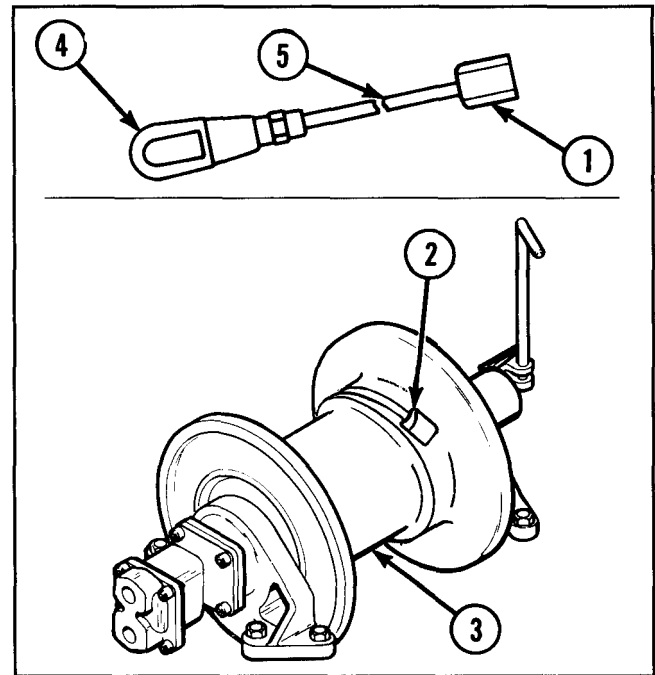
Make sure all personnel stand clear of boom and block before traversing cab.

- 1 Turn cab until boom is at rear of vehicle.
- 2 Raise boom to 45 degrees.

WARNING

Always wear leather gloves when handling winch cable. Never allow cable to run through hands. Do not operate winch or crane with less than four turns of wire rope on drums. Failure to observe these warnings could result in personnel injuries.

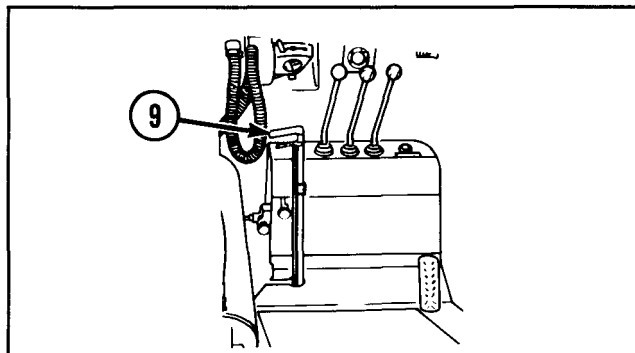
- 3 Install ferrule (1) in socket (2) with flat side of ferrule (1) flush with tow winch drum (3).
- 4 Attach clevis (4) of cable wire rope assembly (5) to 15.00 ft (4.57 m) tie line cable or chain capable of supporting 30,500 lb (13,847 kg) line pull.
- 5 Attach other end of tie line cable or chain to anchor capable of supporting 30,500 lb (13,847 kg) line pull.
- 6 Move vehicle until slack is removed from cable and set driver shift control lever (6) to N (neutral).
- 7 Set HYDR PUMP PTO CLUTCH switch (7) to ON.
- 8 Pull hand throttle push-pull control (8) completely out.



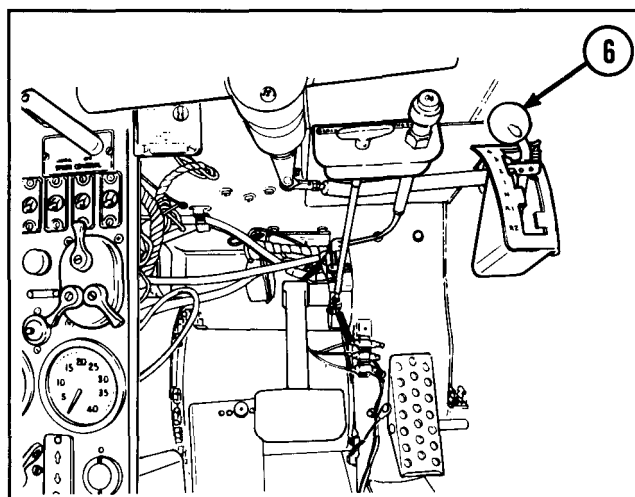
2-47. MAINTENANCE OF TOW WINCH CABLE WIRE ROPE ASSEMBLY (CONT).

INSTALLATION (CONT)

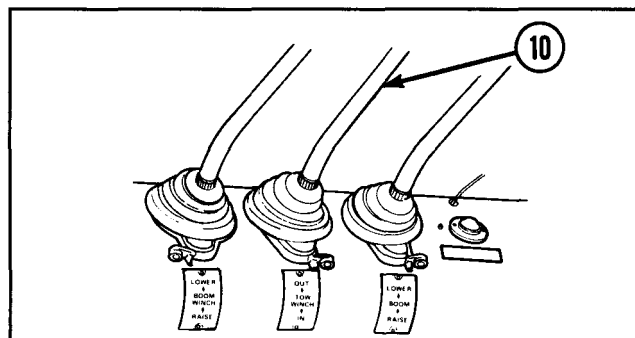
- 9 Set tow winch manual control lever (9) to LO.



- 10 Set driver shift control lever (6) to range 2.



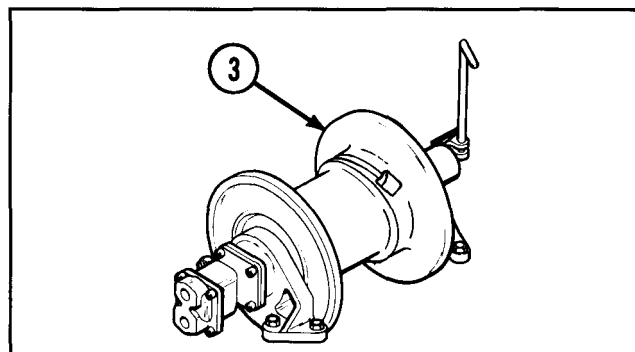
- 11 Set TOW WINCH control handle (10) to IN and pay in tow winch cable, slowly pulling vehicle to anchor.



WARNING

Wire rope failure will result if more than half the wires in any single strand are broken, separating from pulled out kinks, or fraying after crushing under the track. Wire rope failure will result in injury to personnel.

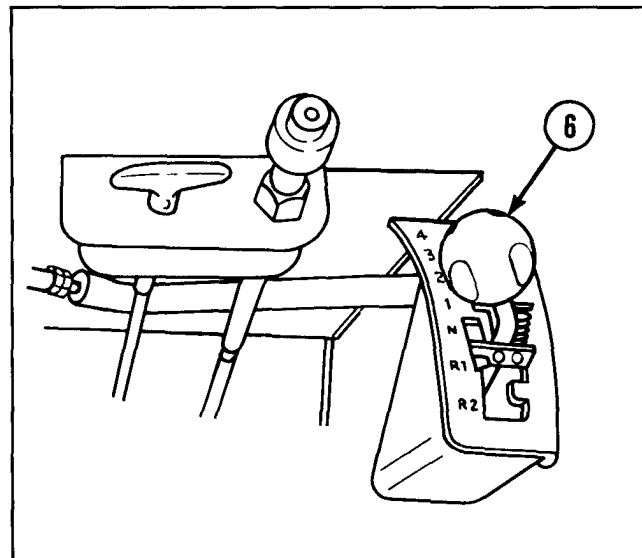
- 12 Using crowbar and hammer, make an even, tight wrap on tow winch drum (3).



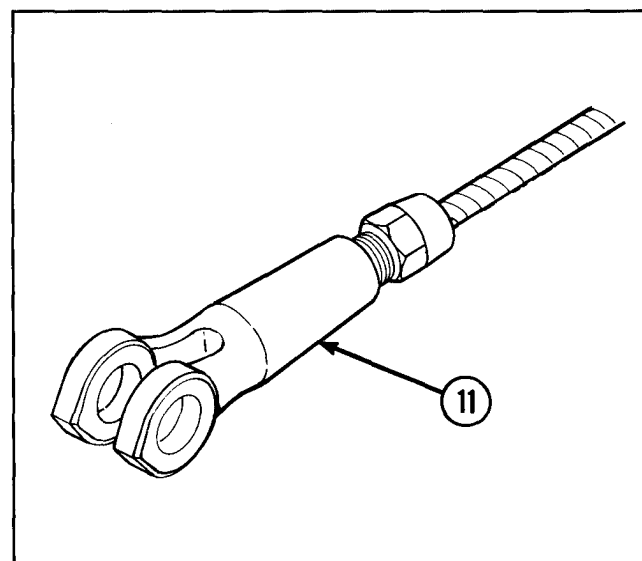
NOTE

After first complete layer of cable on winch drum is completed the level wind may be used to make tow winch cable installation easier, refer to TM 9-2350-238-10.

- 13 When cable is completely installed on drum, set driver shift control lever (6) to R1 (reverse) to release tension on cable. Set driver shift control lever to N (neutral) and disconnect cable from tie line.

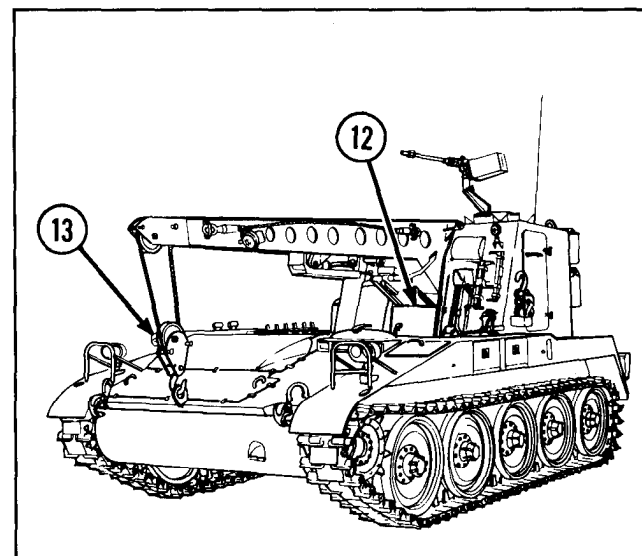


- 14 Place cable clevis (11) inside tow winch access door (12).
- 15 Close and secure tow winch access door (12).

**WARNING**

Make sure all personnel stand clear of boom and block before traversing cab.

- 16 Turn cab 180 degrees.
- 17 Secure single tackle block (13) to front of vehicle.



2-48. MAINTENANCE OF BOOM AND WINCH SINGLE TACKLE BLOCK.

This task covers: a. *Removal*

b. *Inspection/Repair*

c. *Installation*

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive
(appx B)

References

TM 9-2350-238-10
TM 9-2350-238-24P-2

Equipment Conditions

Single tackle block disconnected from
front of vehicle and lowered to the
ground (TM 9-2350-238-10)

General Safety Instructions

WARNING

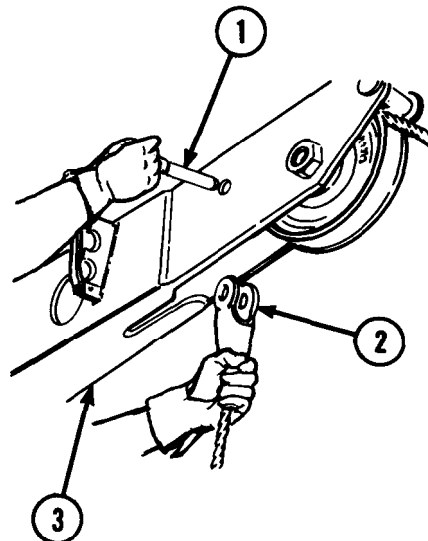
Always wear leather gloves when handling winch cable. Never allow cable to run through hands. Broken wires can cause painful injuries. Do not operate winch/crane with less than four turns of wire rope on drums. Failure to observe these warnings could result in injury to personnel.

REMOVAL

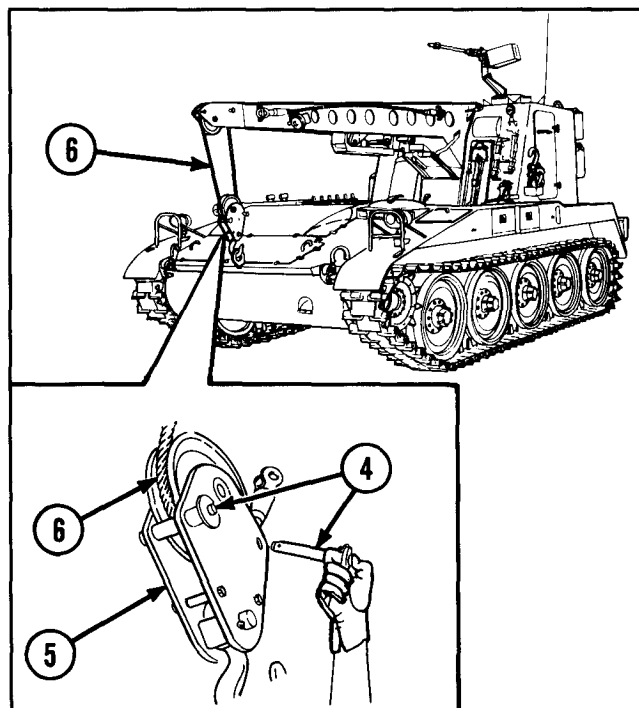
WARNING

Always wear leather gloves when handling winch cable. Never allow cable to run through hands. Broken wires can cause painful injuries. Do not operate winch/crane with less than four turns of wire rope on drums. Failure to observe these warnings could result in injury to personnel.

- 1 Remove quick release pin (1) and clevis (2) from crane boom (3).



- 2 Remove two quick-release pins (4) from single tackle block (5).
- 3 Pull wire rope assembly (6) through single tackle block (5) and remove single tackle block from boom cable.



INSPECTION/REPAIR

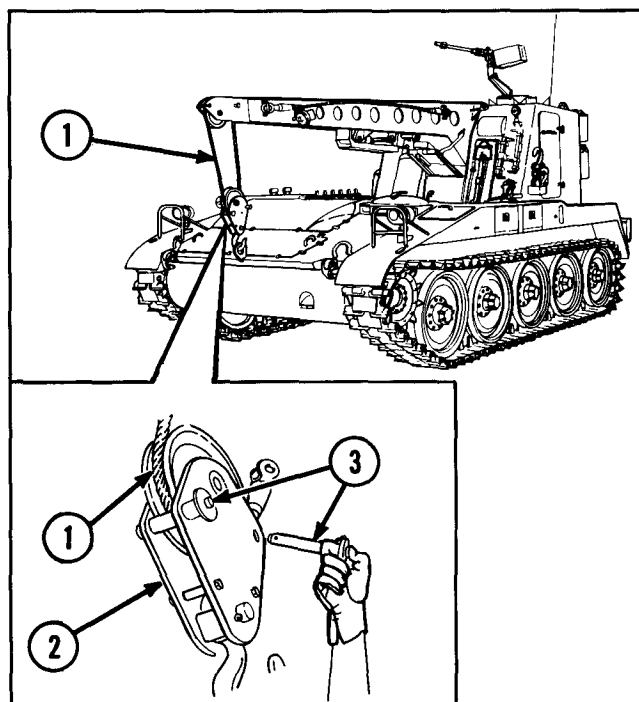
- 1 Inspect for broken, damaged, or missing parts.
- 2 Single tackle block is a repairable assembly. Refer to page 2-144.
- 3 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

INSTALLATION

WARNING

Always wear leather gloves when handling winch cable. Never allow cable to run through hands. Broken wires can cause painful injuries. Do not operate winch/crane with less than four turns of wire rope on drums. Failure to observe these warnings could result in injury to personnel.

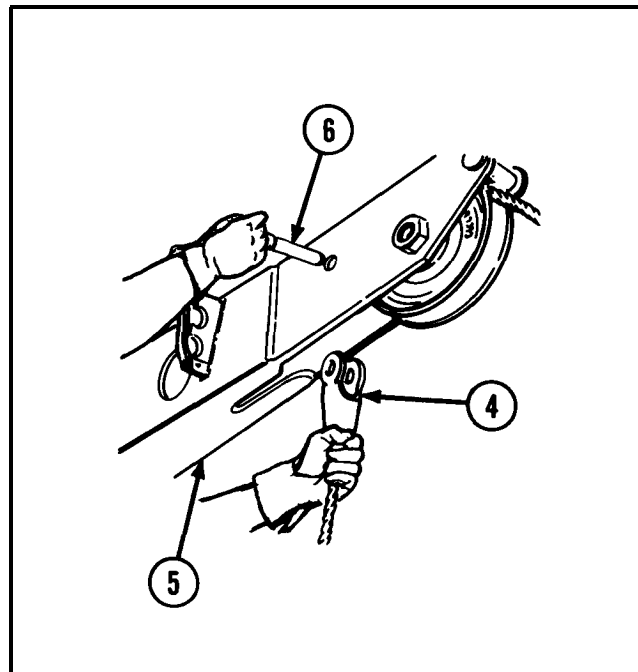
- 1 Insert wire rope assembly (1) through single tackle block (2).
- 2 Install two quick-release pins (3) to single tackle block (2).



2-48. MAINTENANCE OF BOOM AND WINCH SINGLE TACKLE BLOCK (CONT).

INSTALLATION (CONT)

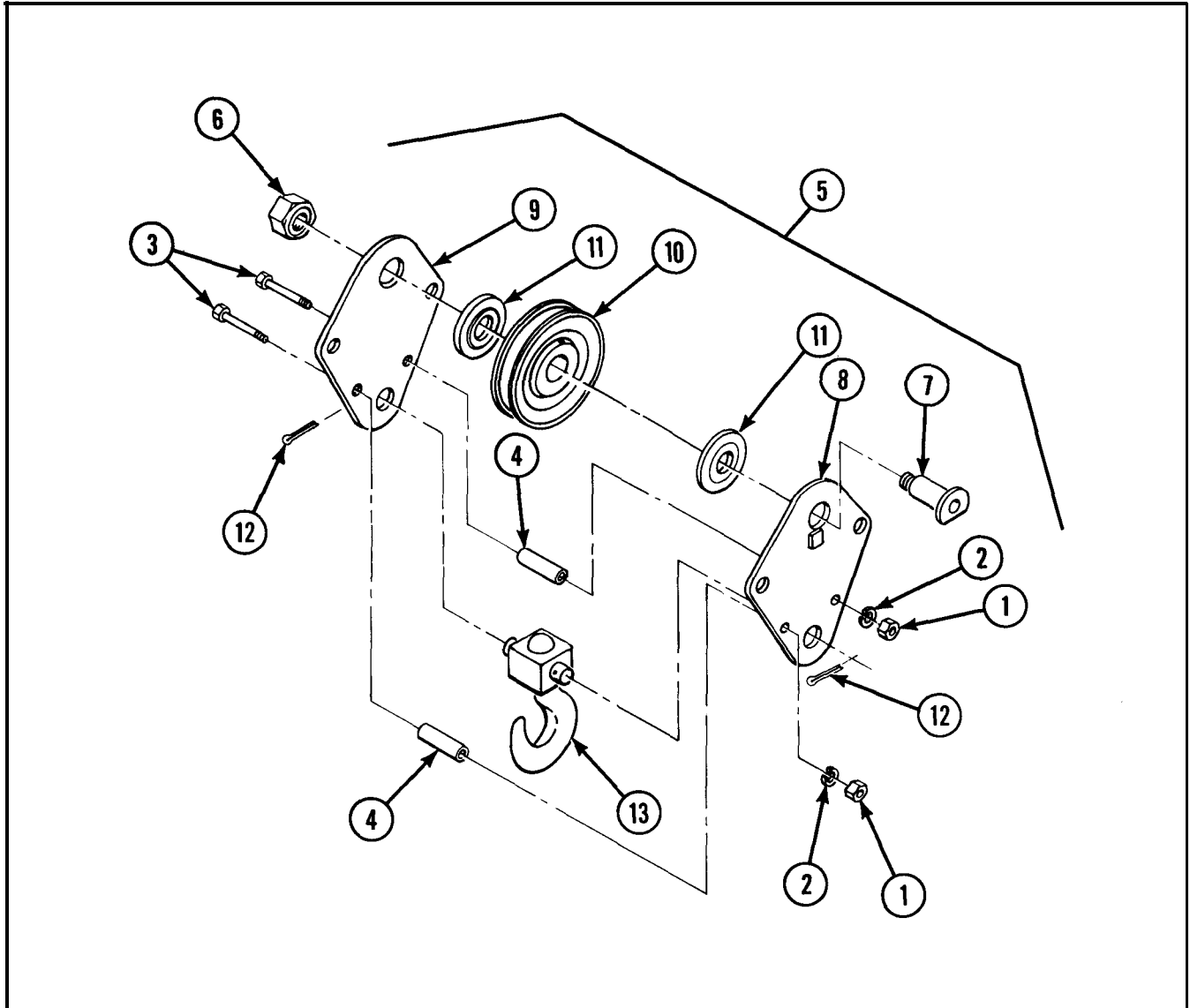
- 3 Position clevis (4) in crane boom (5) and secure with quick release pin (6).
- 4 Raise and stow single tackle block, refer to TM 9-2350-238-10.



2-49. MAINTENANCE OF SINGLE TACKLE BLOCK.

This task covers:		
a. <i>Disassembly</i>	b. <i>Inspection/Repair</i>	c. <i>Reassembly</i>
INITIAL SETUP		
Tools and Special Tools		Materials/Parts
Bearing cup replacer (10902752)		Cotter pin (2) (MS24665-625)
General mechanic's tool kit, automotive (appx B)		Lockwasher (2) (MS35338-48)
Remover and replacer handle (7950864)		References
Shop equipment, automotive maintenance and repair: organizational maintenance, common no. 1, less power (appx B)		TM 9-2350-238-24P-2
Adjustable wrench: S, automotive		Equipment Conditions
Torque wrench (0-175 ft-lb)		2-142 Single tackle block removed

DISASSEMBLY



1 Remove two hexagon plain nuts (1), two lockwashers (2), two hexagon head cap-screws (3), and two sleeve spacers (4) from single tackle block (5).

2 Remove hexagon plain nut (6) and straight shaft (7) from two boom block plates (8 and 9) with attached parts.

3 Remove grooved pulley (10) and two boom plate spacers (11) from two boom block plates (8 and 9) with attached parts.

4 Remove two cotter pins (12) from boom block hook (13).

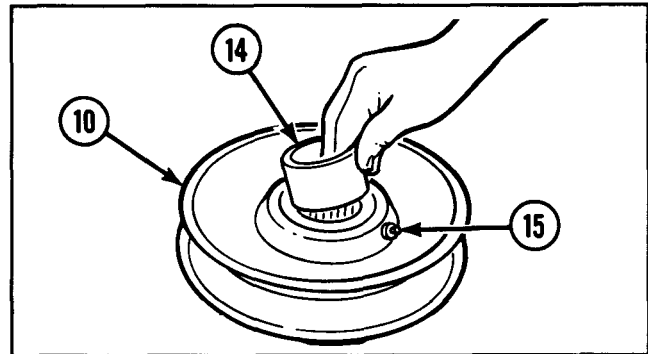
5 Remove two boom block plates (8 and 9) from boom block hook (13).

2-49. MAINTENANCE OF SINGLE TACKLE BLOCK (CONT).

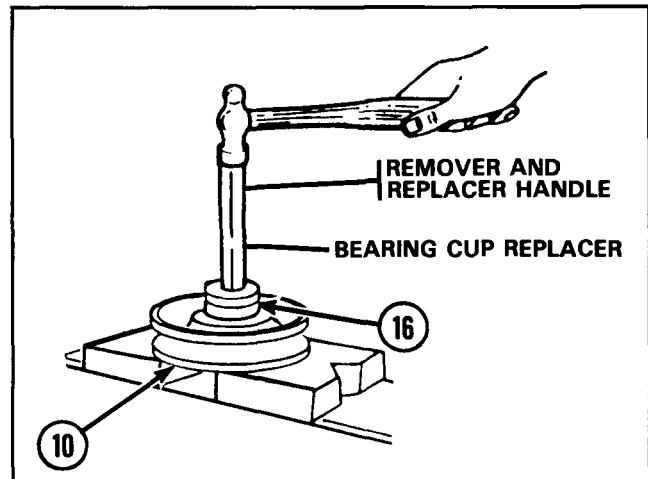
DISASSEMBLY (CONT)

6 Remove inner bearing ring (14) from grooved pulley (10).

7 Remove lubrication fitting (15) from grooved pulley (10).



8 Using bearing cup replacer and remover and replacer handle, remove roller bearing (16) from grooved pulley (10).



INSPECTION/REPAIR

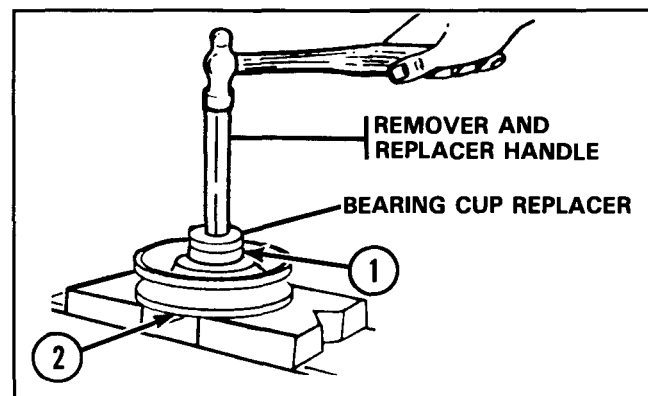
1 Inspect for broken, damaged, or missing parts.

2 If boom block plates are broken, damaged, or missing, repair is by replacement of next higher assembly.

3 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2) which do not meet inspection criteria.

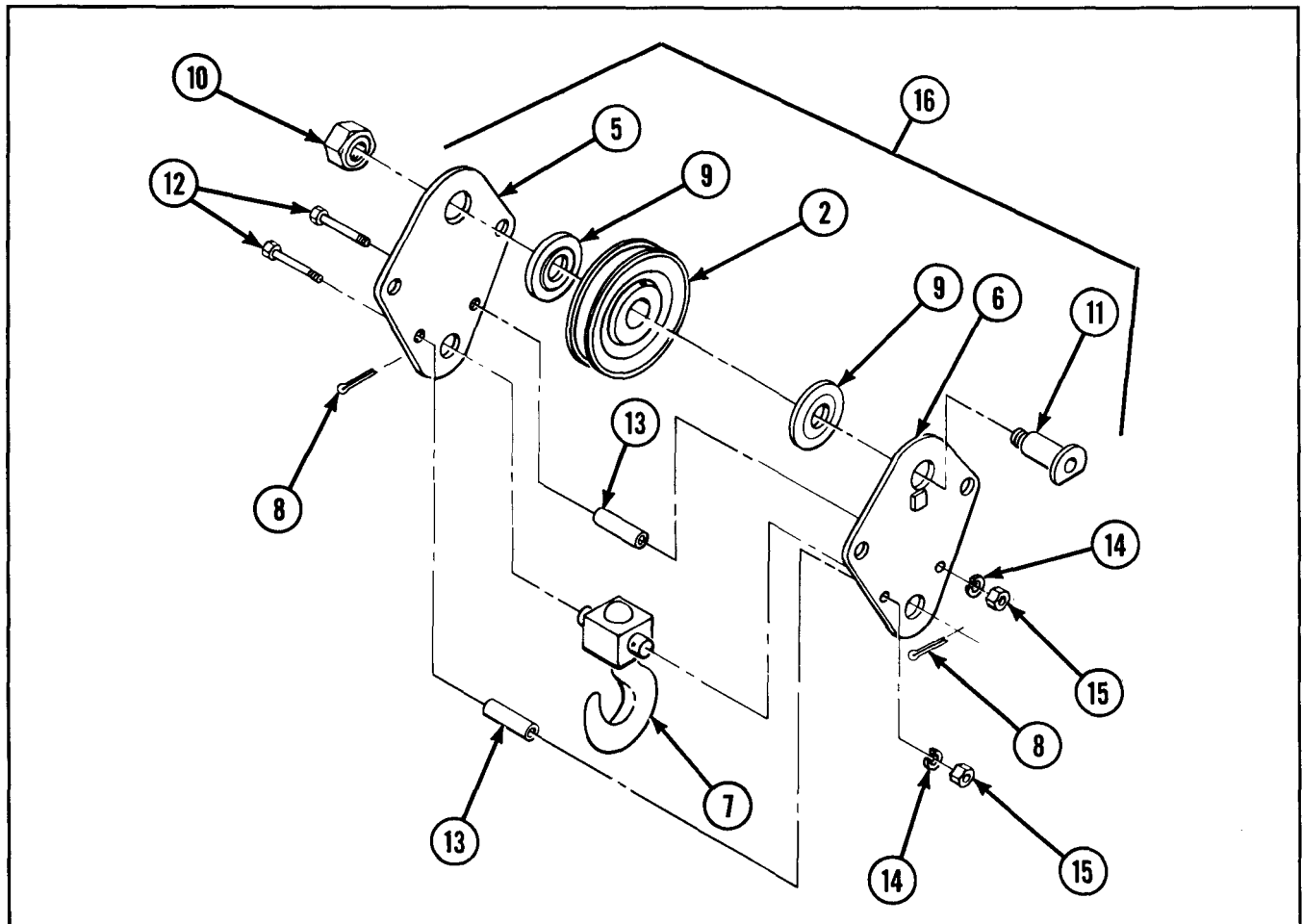
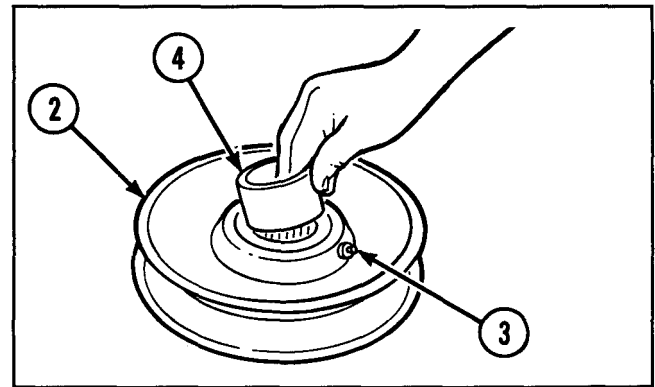
REASSEMBLY

1 Using bearing cup replacer and remover and replacer handle, install roller bearing (1) in grooved pulley (2).



2 Install lubrication fitting (3) on grooved pulley (2).

3 Install inner bearing ring (4) in grooved pulley (2).



4 Install two boom block plates (5 and 6) to 7 boom block hook (7).

5 Install two new cotter pins (8) to hook (7).

6 Install grooved pulley (2) and two boom plate spacers (9) to two boom block plates (5 and 6) with attached parts.

Install hexagon plain nut (10) and torque nut to 100 ft-lb (136 N-m). Install straight shaft (11) to two boom block plates (5 and 6) with attached parts.

8 Install two hexagon head capscrews (12), two sleeve spacers (13), two new lockwashers (14), and two hexagon plain nuts (15) to single tackle block (16).

2-50. MAINTENANCE OF BOOM WINCH CABLE WIRE ROPE ASSEMBLY.

This task covers: a. *Removal*

b. *Inspection/Repair*

c. *Installation*

INITIAL SETUP

Tools and Special Tools

Anchor
General mechanic's tool kit, automotive
(appx B)

References

TM 9-2350-238-10
TM 9-2350-238-24P-2

General Safety Instructions

WARNING

- Make sure all personnel stand clear of boom and block before traversing cab.

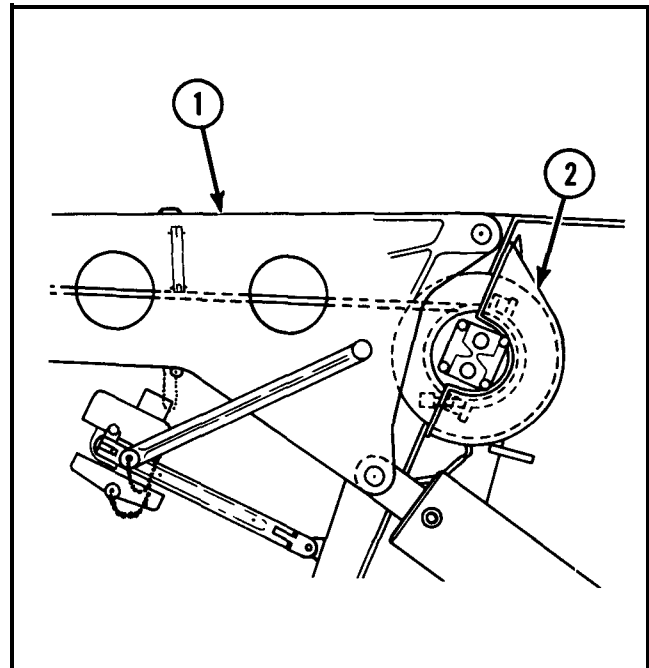
- Always wear leather gloves when handling winch cable. Never allow cable to run through hands. Do not operate winch crane with less than four turns of wire rope on drums. Failure to observe these warnings could result in personnel injuries.

- Wire rope failure will result if more than half the wires in any single strand are broken, separating from pulled out kinks, or fraying after crushing under the track. Wire rope failure will result in injury to personnel.

WARNING

Make sure all personnel stand clear of boom and block before traversing cab.

- 1 Turn cab until boom (1) is at rear of vehicle.
- 2 Remove boom winch cover (2), refer to page 2-166.



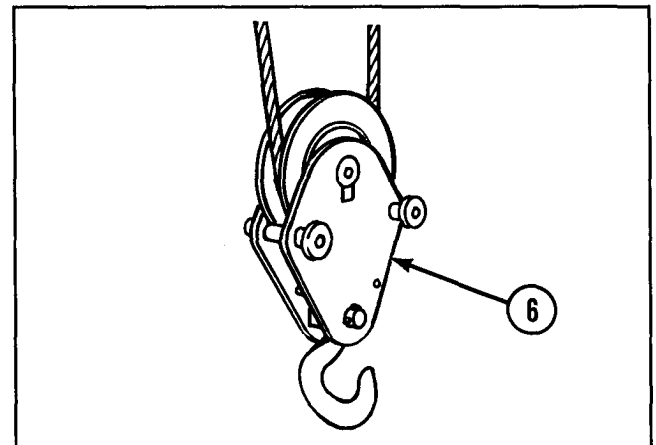
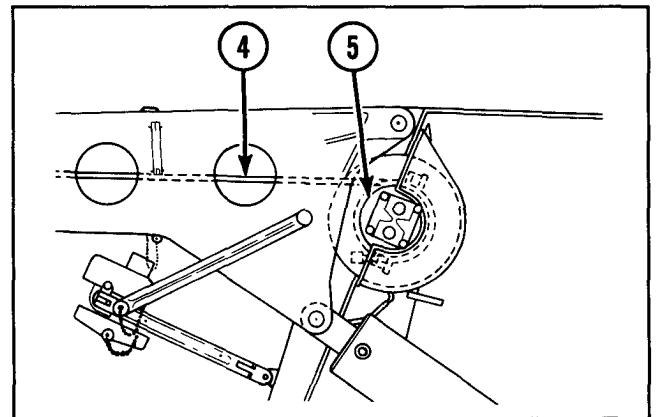
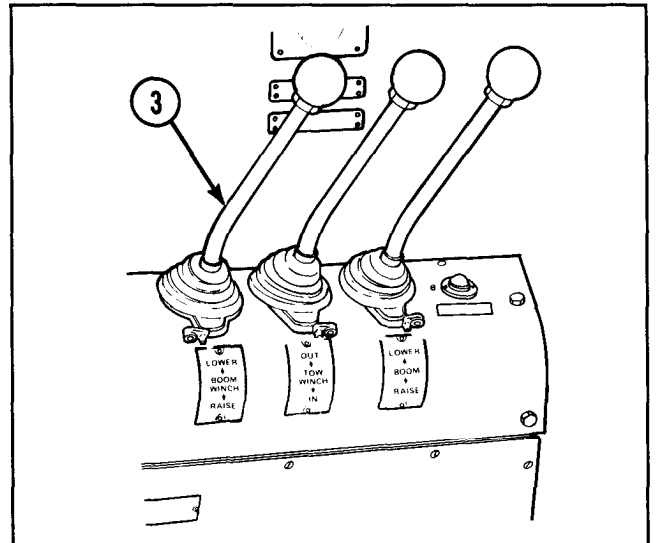
- 3 Set BOOM WINCH control handle (3) to LOWER.

WARNING

Always wear leather gloves when handling winch cable. Never allow cable to run through hands. Do not operate winch crane with less than four turns of wire rope on drums. Failure to observe these warnings could result in personnel injuries.

- 4 Pay out boom winch cable wire rope assembly (4) until about 12.00 in. (30.48 cm) of cable remains on boom winch drum (5). Refer to TM 9-2350-238-10.

- 5 Remove single tackle block (6), refer to page 2-142.
- 6 Release tension on boom winch cable wire rope assembly (4) and remove boom winch cable wire rope assembly from boom winch drum (5).



INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

2-50. MAINTENANCE OF BOOM WINCH CABLE WIRE ROPE ASSEMBLY (CONT).

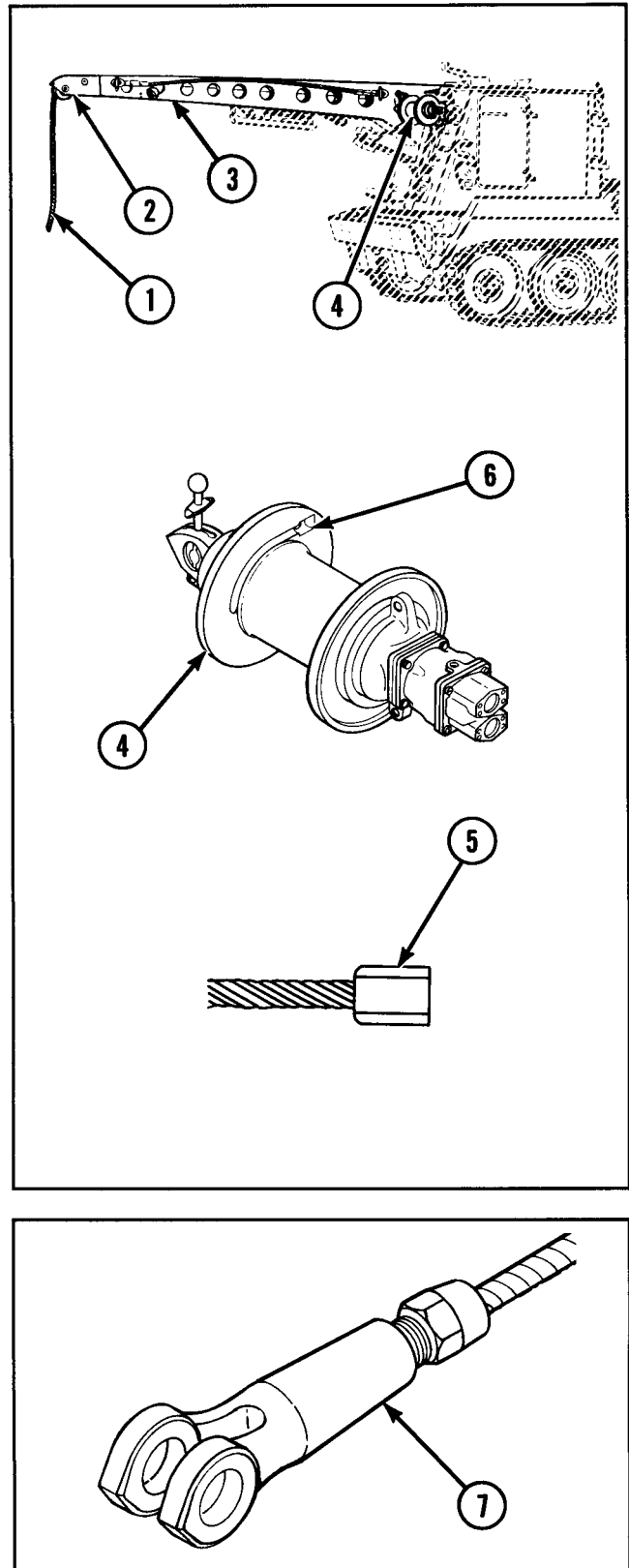
INSTALLATION

WARNING

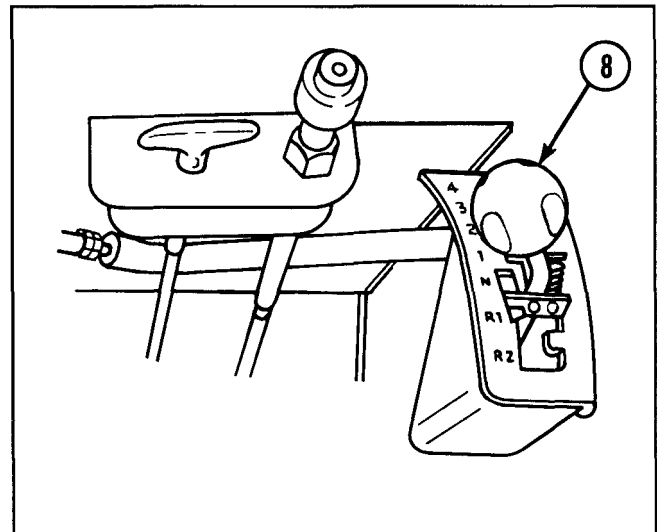
Always wear leather gloves when handling winch cable. Never allow cable to run through hands. Do not operate winch crane with less than four turns of wire rope on drums. Failure to observe these warnings could result in personnel injuries.

- 1 Pull ferrule end of cable wire rope assembly (1) over boom sheave (2) and through crane boom (3) to boom winch drum (4).
- 2 Install ferrule (5) in socket (6) with flat side of ferrule flush with boom winch drum (4).

- 3 Attach clevis (7) to anchor capable of supporting 8000 lb (3632 kg) line pull.

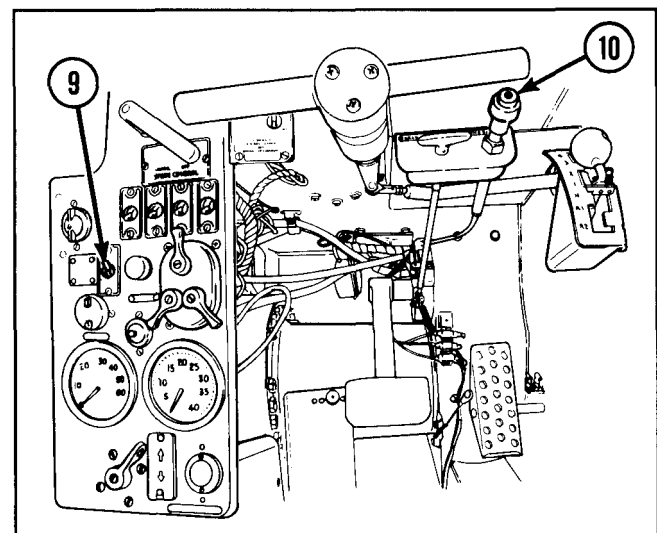


- 4 Move vehicle until slack is removed from cable and set driver shift control lever (8) to N (neutral).

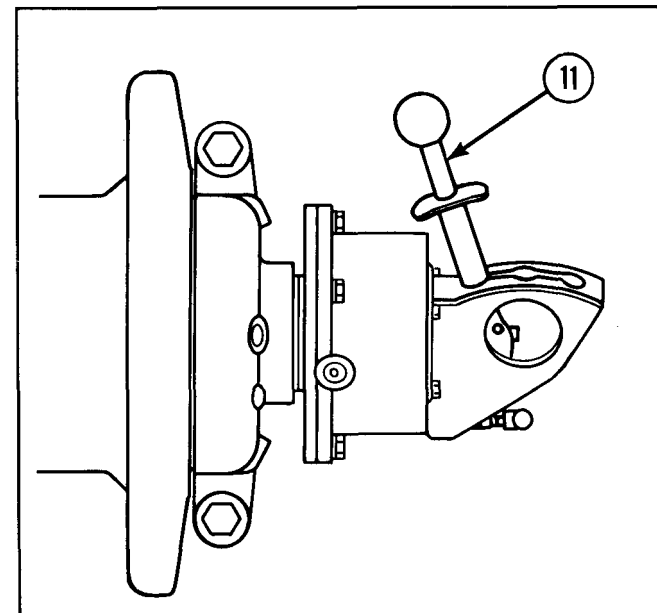


- 5 Set HYDR PUMP PTO CLUTCH switch (9) to ON.

- 6 Pull hand throttle push-pull control (10) completely out.



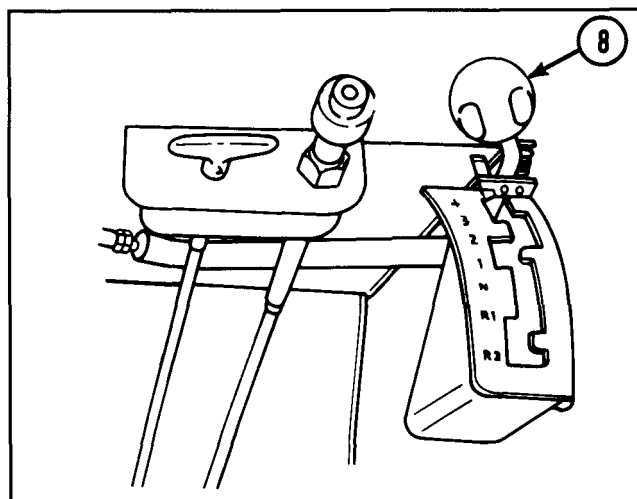
- 7 Set boom winch shift manual lever (11) to LO.



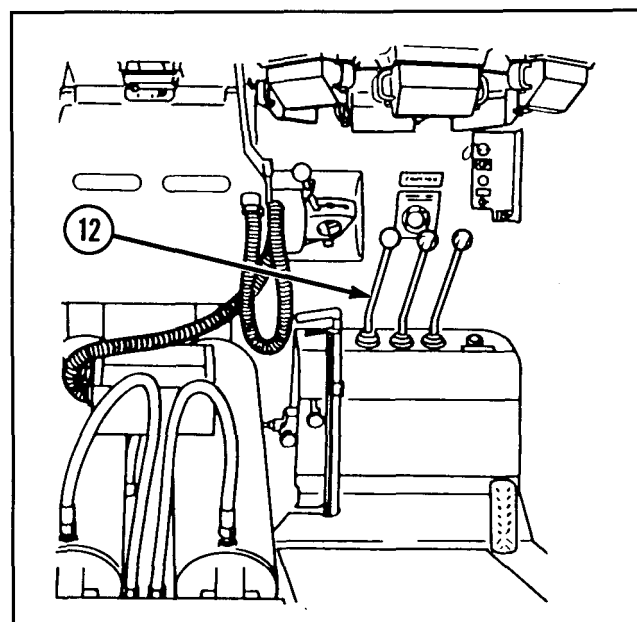
2-50. MAINTENANCE OF BOOM WINCH CABLE WIRE ROPE ASSEMBLY (CONT).

INSTALLATION (CONT)

- 8 Set driver shift control lever (8) to range 4.



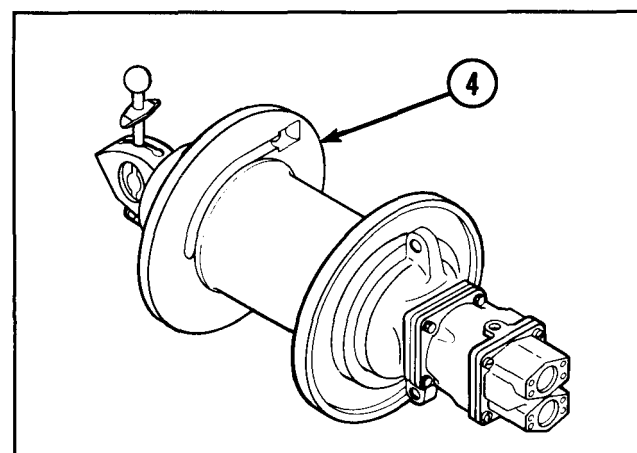
- 9 Set BOOM WINCH control handle (12) to RAISE and pay in boom winch cable slowly pulling vehicle to anchor.



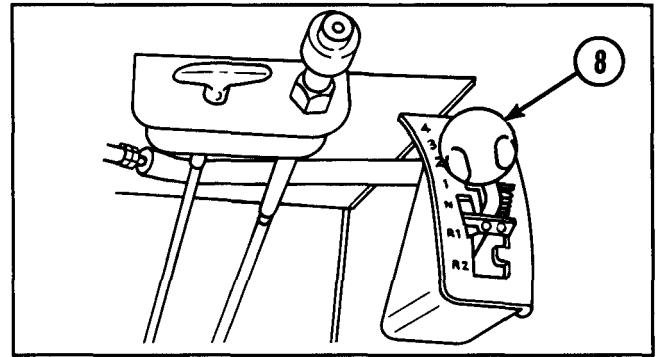
WARNING

Wire rope failure will result if more than half the wires in any single strand are broken, separating from pulled out kinks, or fraying after crushing under the track. Wire rope failure will result in injury to personnel.

- 10 Using crowbar and hammer as needed, make an even, tight wrap on boom winch drum (4).

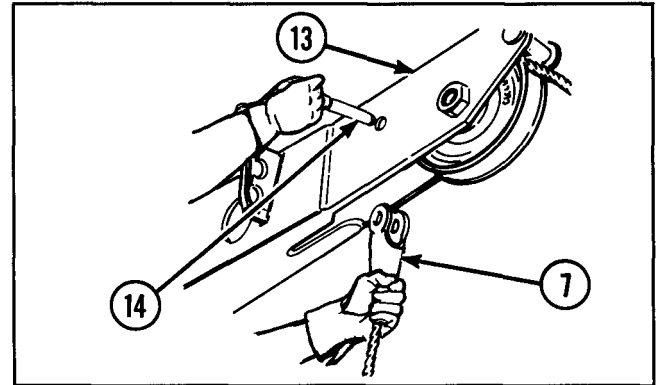


- 11 When vehicle reaches anchor, set driver shift control lever (8) to R1 (reverse) and release tension on cable. Set driver shift control lever to N (neutral) and disconnect boom winch cable from anchor.

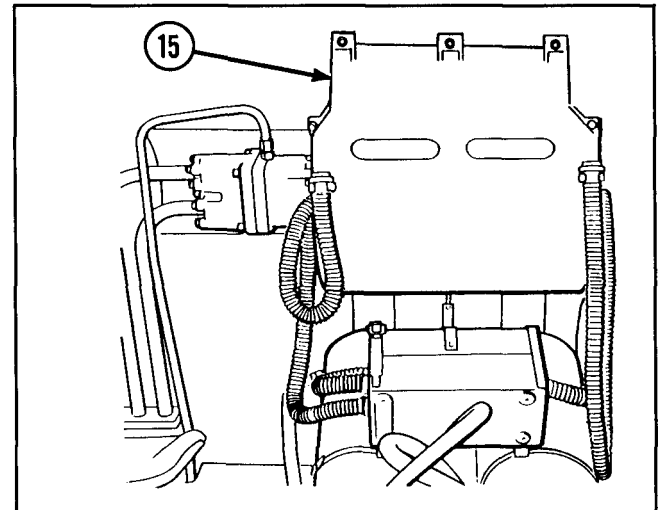


- 12 Position clevis (7) on crane boom (13).

- 13 Secure clevis (7) to crane boom (13) with quick release pin (14).



- 14 Install boom winch cover (15), refer to page 2-166.

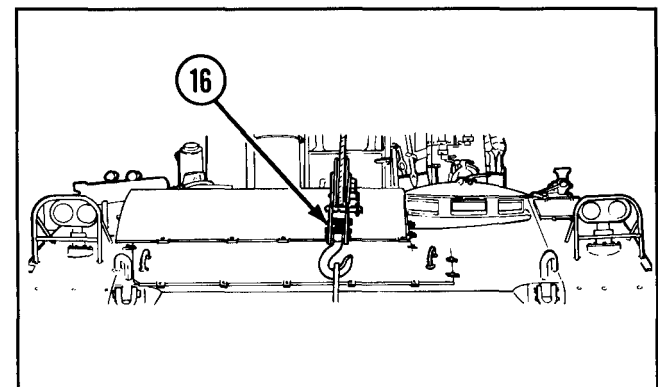


WARNING

Make sure all personnel stand clear of boom and block before traversing cab.

- 15 Turn cab 180 degrees.

- 16 Install single tackle block (16) to boom winch cable and secure to front of vehicle, refer to page 2-142.



2-51. MAINTENANCE OF WINCH LEVEL WIND.

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

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive
(appx B)

Materials/Parts

Lockwasher (6) (MS35340-48)
Self-locking nut (2) (MS21044N12)

References

TM 9-2350-238-24P-2

General Safety Instructions

WARNING

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

REMOVAL

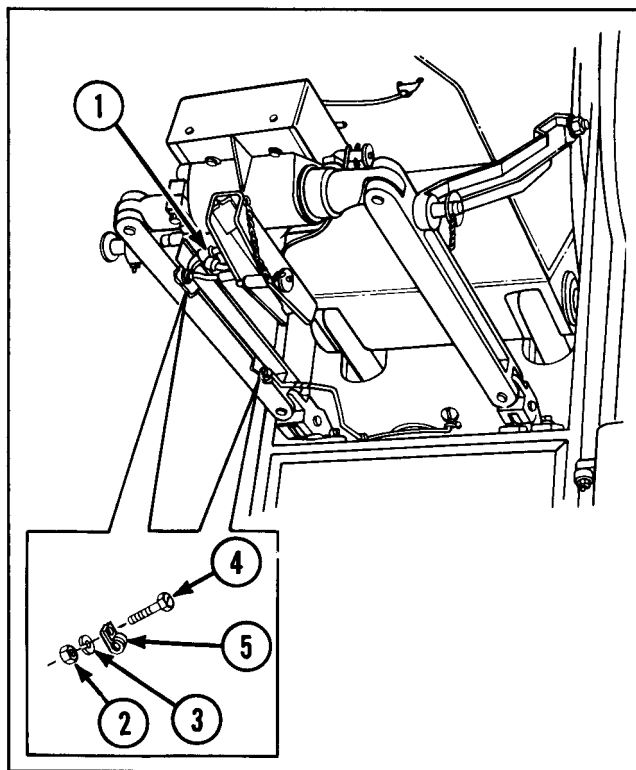
WARNING

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

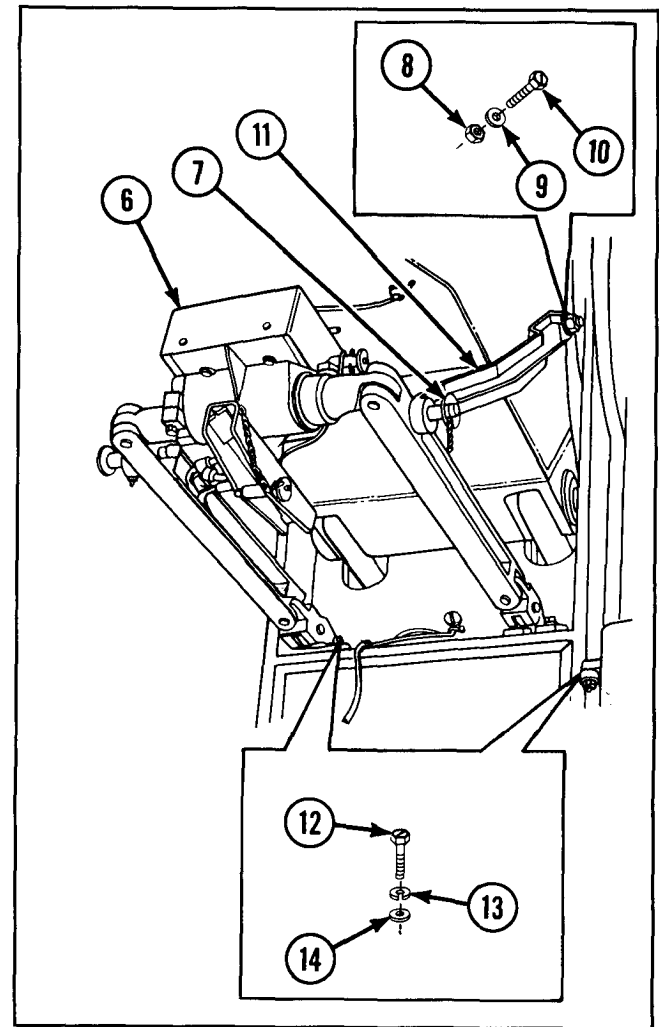
NOTE

Tag all electrical leads prior to removal.

- 1 Disconnect four electrical connectors (1).
- 2 Remove two hexagon plain nuts (2), two lockwashers (3), two hexagon capscrews (4), and two loop clamps (5).



- 3 Support weight of winch level wind (6) and remove two quick release pins (7), and gently lower winch level wind.
- 4 Remove two self-locking nuts (8), two flat washers (9), two hexagon head cap-screws (10), and yoke level wind bracket (11).
- 5 Remove four hexagon head capscrews (12), four lockwashers (13), and four flat washers (14), and winch level wind (6).

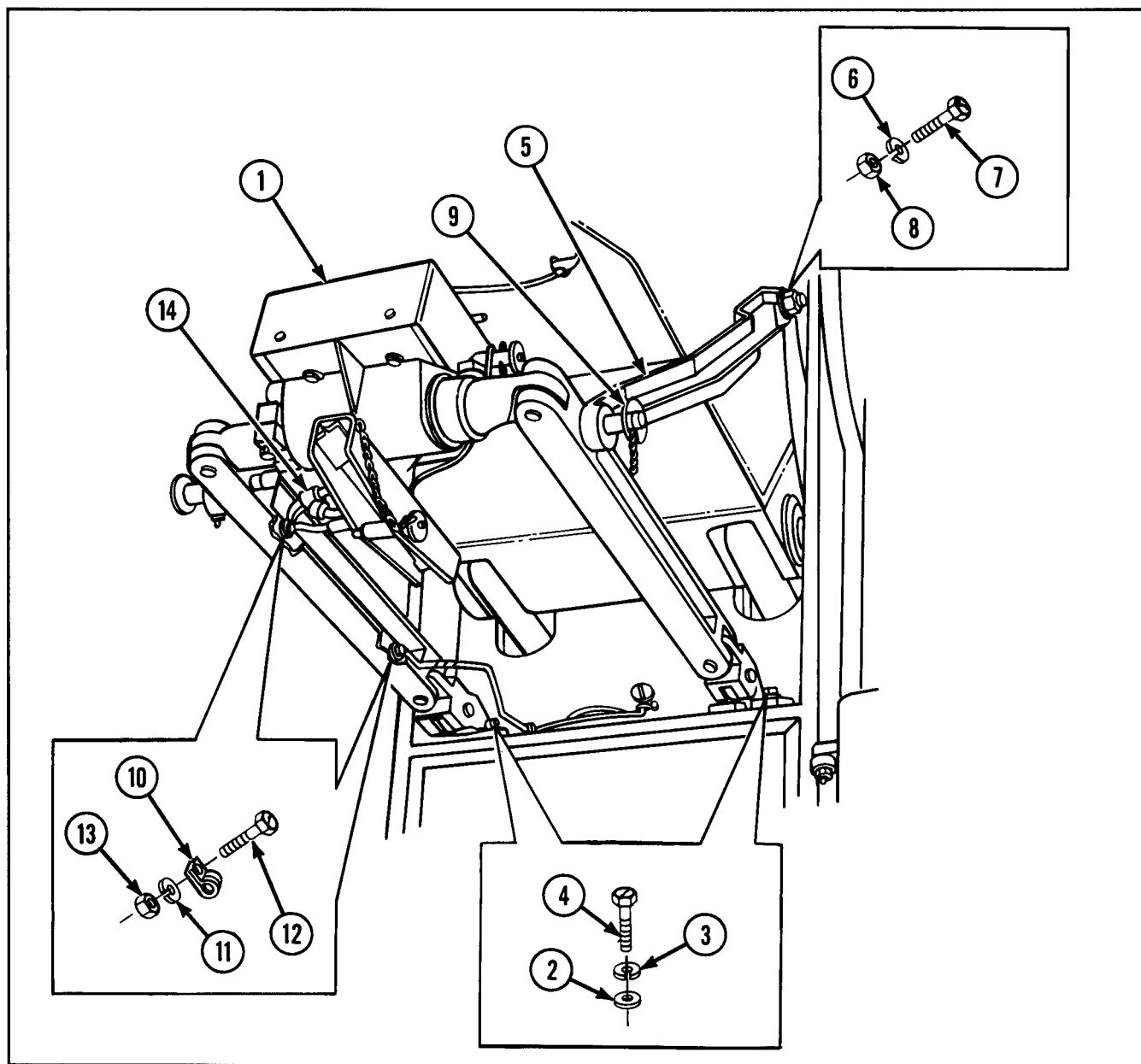


INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 If winch level wind is broken, damaged, or missing, notify direct support maintenance.
- 3 If quick-release pins are broken, damaged, or missing, notify direct support maintenance.
- 4 Repair by replacement of authorized parts (TM 9-2350-238-24P-2) which do not meet inspection criteria.

2-51. MAINTENANCE OF WINCH LEVEL WIND (CONT).

INSTALLATION



1 Install winch level wind (1) and secure with four flat washers (2), four new lockwashers (3), and four hexagon head capscrews (4).

2 Install yoke level wind bracket (5), two flat washers (6), two hexagon head capscrews (7), and two new self-locking nuts (8).

3 Install two quick release pins (9) to secure yoke level wind bracket (5) to winch level wind (1).

4 Install two loop clamps (10), two new lockwashers (11), two hexagon capscrews (12), and two hexagon plain nuts (13).

5 Connect four electrical connectors (14).

2-52. MAINTENANCE OF BOOM AND WINCH, BOOM, PULLEY, AND RELATED PARTS.

This task covers:

a. <i>Removal</i>	d. <i>Reassembly</i>
b. <i>Disassembly</i>	e. <i>Installation</i>
c. <i>Inspection/Repair</i>	

INITIAL SETUP

Tools and Special Tools

Bearing cup replacer (10902752)
 General mechanic's tool kit, automotive (appx B)
 Hoist, 2000 lb (908 kg) minimum lifting capacity
 Remover and replacer handle (7083883)
 Shop equipment, automotive maintenance and repair: organizational maintenance, common no. 1, less power (appx B)
 Adjustable wrench: S, automotive
 Sling, chain, 4000 lb (1816 kg) minimum lifting capacity

Materials/Parts

Lockwasher (2) (MS35338-43)
 Lockwasher (8) (MS35340-46)

References

TM 9-2350-238-24P-2

Equipment Conditions

2-154 Winch level wind removed
 2-142 Single tackle block removed
 2-148 Boom winch cable wire rope assembly removed

General Safety Instructions

WARNING

- Make sure MASTER switch is OFF before repairing electrical circuits. Failure to observe this warning could result in injury to personnel.
- Sling boom as shown to prevent unbalanced boom action which could cause serious injury.
- Use hoist with 2000 lb (908 kg) minimum lifting capacity to prevent injury to personnel and damage to equipment.

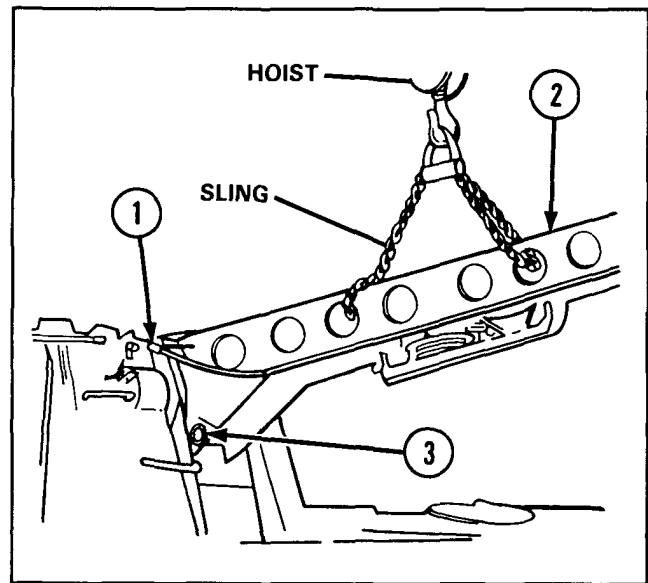
2-52. MAINTENANCE OF BOOM AND WINCH, BOOM, PULLEY, AND RELATED PARTS (CONT).

REMOVAL

WARNING

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

- 1 Disconnect boom floodlight electrical lead (1).
- 2 Raise crane boom (2) until two lower hinge headless straight pins (3) are clear of cab to permit removal.



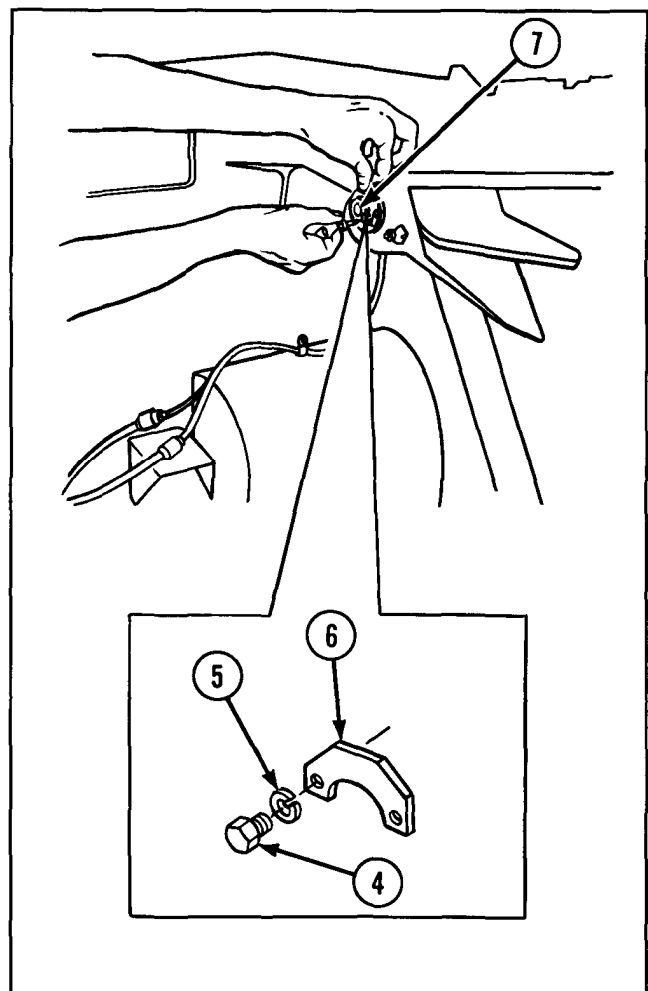
WARNING

- Sling boom as shown to prevent unbalanced boom action which could cause serious injury.
- Use hoist with 2000 lb (908 kg) minimum lifting capacity to prevent injury to personnel and damage to equipment.

NOTE

Another M578 Recovery Vehicle or an M88A1 Recovery Vehicle, if available, may be used for lifting.

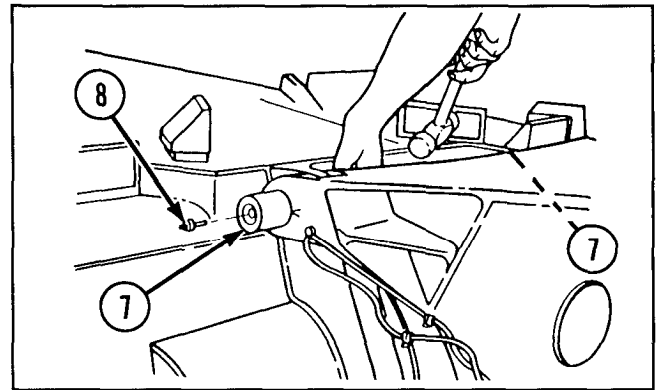
- 3 Install sling to crane boom (2) as shown. Attach sling to hoist of 2000 lb (908 kg) minimum capacity and take out slack to support weight of crane boom.
- 4 Remove two hexagon head capscrews (4), two lockwashers (5), and nut and pin boom hinge pin locking plate (6) securing each of two upper hinge headless straight pins (7).



NOTE

There may be shims between the boom eyes and cylinder eyes. If reinstalling old shims, they must be retained in the same position.

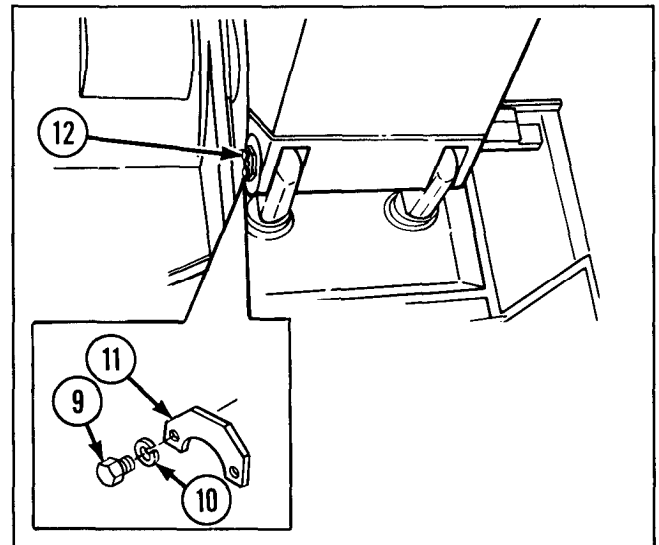
- 5 Using hammer and drift, remove two upper hinge headless straight pins (7).
- 6 Remove lubrication fitting (8) from upper hinge headless straight pin (7).



- 7 Remove two hexagon head capscrews (9), two lockwashers (10), and nut and pin boom hinge pin locking plate (11) securing each of two lower hinge headless straight pins (12).

CAUTION

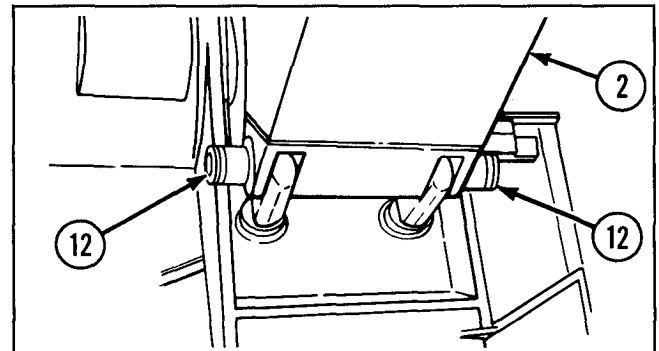
Place rags or suitable pads between the bottom of the cylinder rods and cab wall to protect machined surface of cylinder rods.



- 8 Remove two lower hinge headless straight pins (12) from crane boom (2).

WARNING

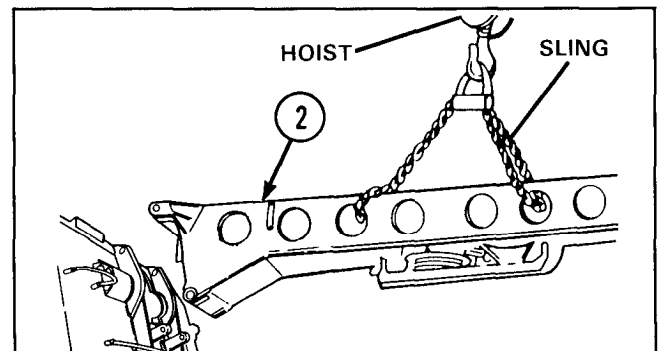
- Sling boom as shown to prevent unbalanced boom action which could cause serious injury.
- Use hoist with 2000 lb (908 kg) minimum lifting capacity to prevent injury to personnel and damage to equipment.



NOTE

Another M578 Recovery Vehicle or an M88A1 Recovery Vehicle, if available, may be used for lifting.

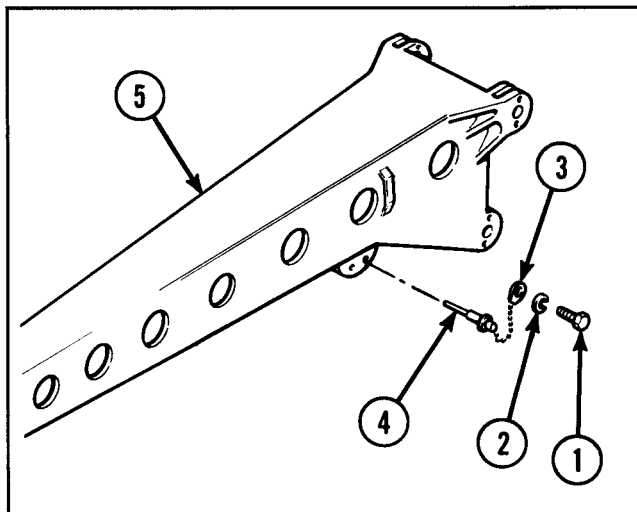
- 9 Using a hoist with a lifting capacity of 2000 lb (908 kg), lift crane boom (2) clear of cab.



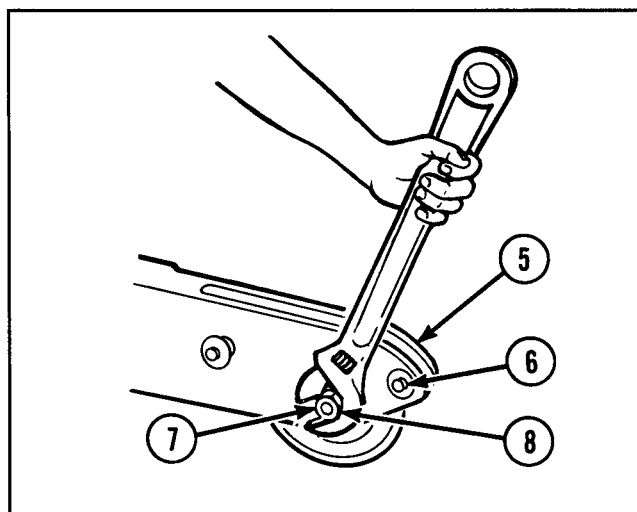
2-52. MAINTENANCE OF BOOM AND WINCH, BOOM, PULLEY, AND RELATED PARTS (CONT).

DISASSEMBLY

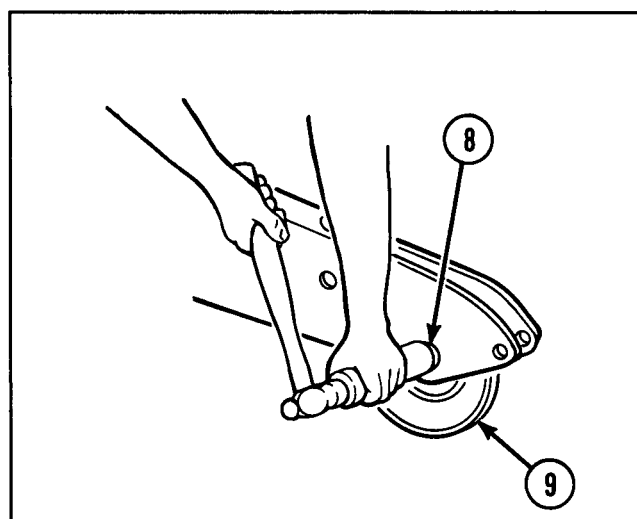
- 1 Remove machine screw (1), lockwasher (2), chain assembly (3), and quick release pin (4) from crane boom (5).



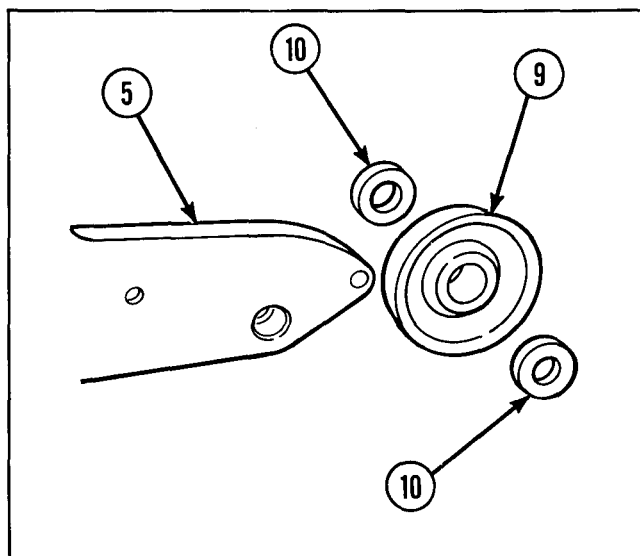
- 2 Remove quick-release pin (6) from crane boom (5).
- 3 Remove hexagon plain nut (7) from boom sheave straight shaft (8).



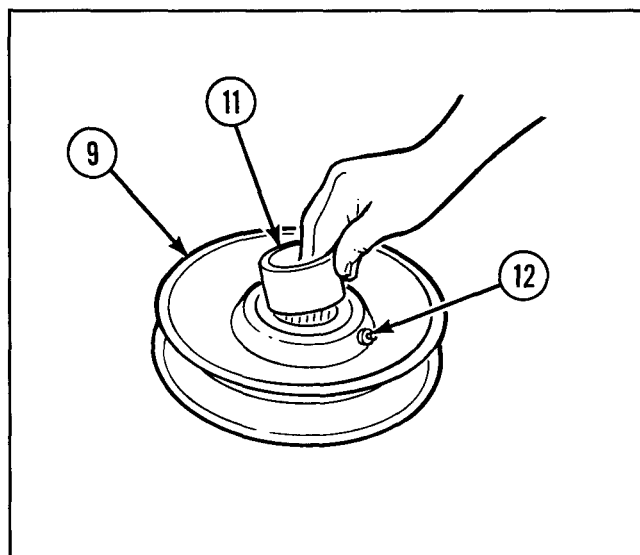
- 4 Using brass drift, drive boom sheave straight shaft (8) from boom assembly groove pulley (9).



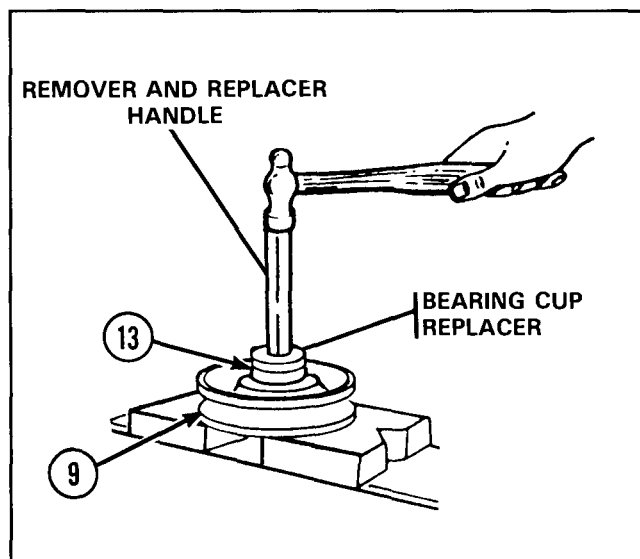
- 5 Remove boom assembly groove pulley (9) and two boom sheave plate spacers (10) from crane boom (5).



- 6 Remove boom sheave inner bearing ring (11) from boom assembly groove pulley (9).
- 7 Remove lubrication fitting (12) from boom assembly groove pulley (9).



- 8 Using bearing cup replacer and remover and replacer handle, drive the boom sheave roller bearing (13) from boom assembly groove pulley (9).



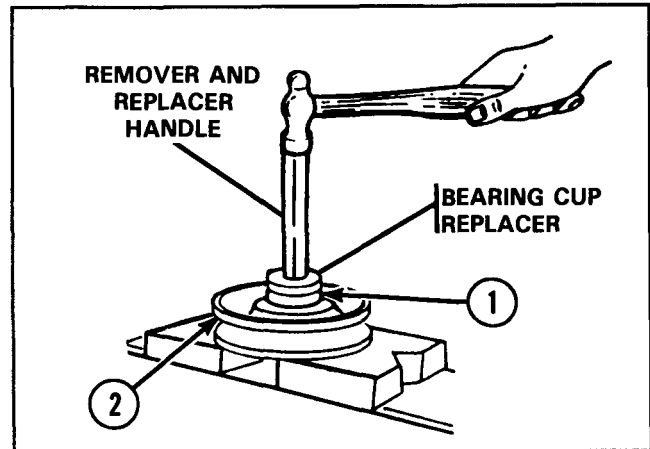
2-52. MAINTENANCE OF BOOM AND WINCH, BOOM, PULLEY, AND RELATED PARTS (CONT).

INSPECTION/REPAIR

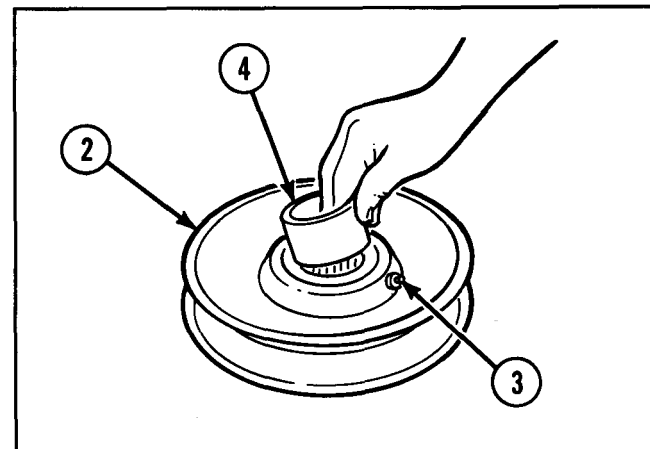
- 1 Inspect for broken, damaged, or missing parts.
- 2 Repair by replacement of authorized parts (TM 9-2350-238-24P-2).

REASSEMBLY

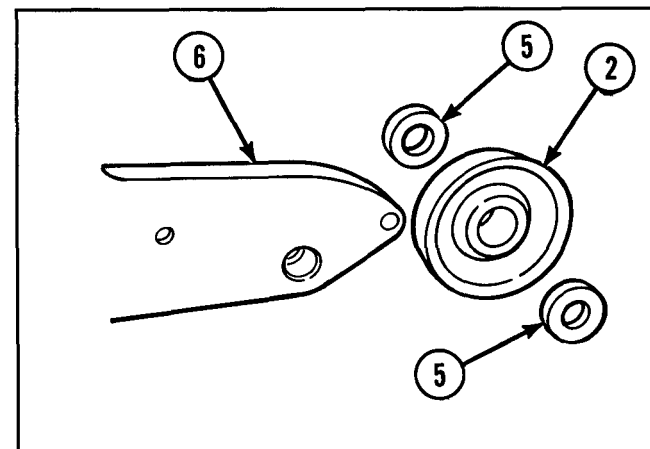
- 1 Using bearing cup replacer and remover and replacer handle, install boom sheave roller bearing (1) to boom assembly groove pulley (2).



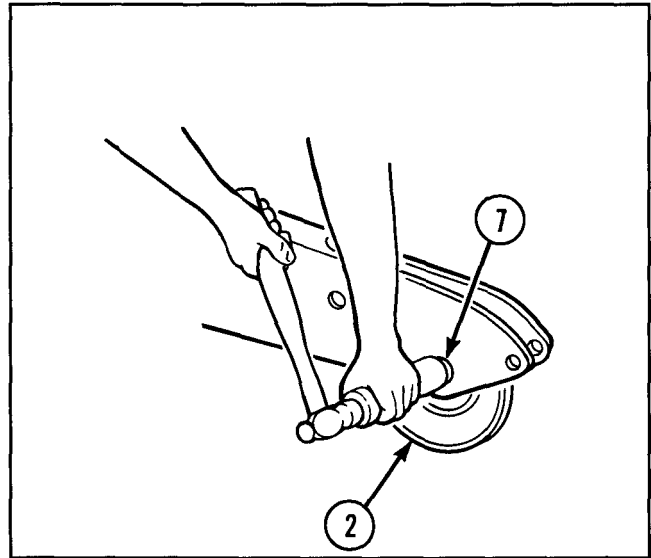
- 2 Install lubrication fitting (3) to boom assembly groove pulley (2).
- 3 Install boom sheave inner bearing ring (4) to boom assembly groove pulley (2).



- 4 Install two boom sheave plate spacers (5) and boom assembly groove pulley (2) to crane boom (6).

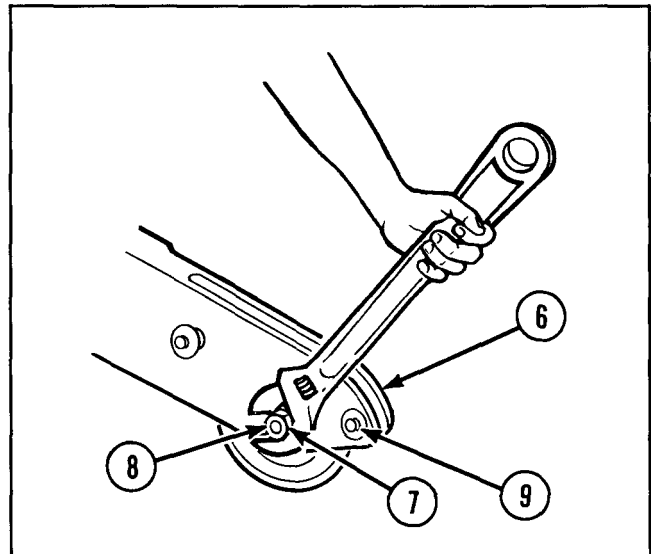


- 5 Using brass drift, tap boom sheave straight shaft (7) through boom assembly groove pulley (2).

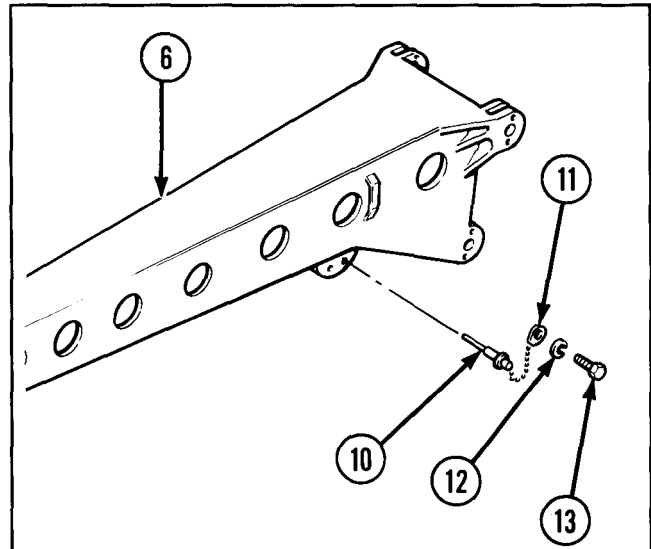


- 6 Install hexagon plain nut (8) to boom sheave straight shaft (7).

- 7 Install quick release pin (9) to crane boom (6).



- 8 Install quick release pin (10), chain assembly (11), new lockwasher (12), and machine screw (13) to crane boom (6).



2-52. MAINTENANCE OF BOOM AND WINCH, BOOM, PULLEY, AND RELATED PARTS (CONT).

INSTALLATION

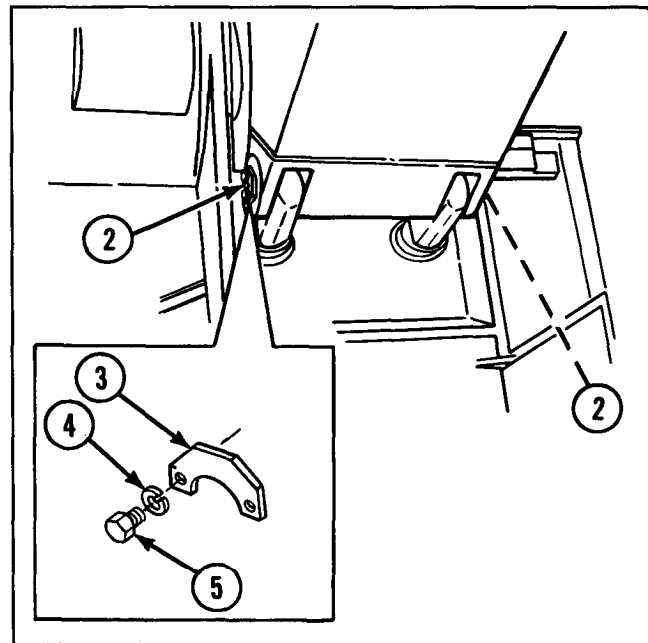
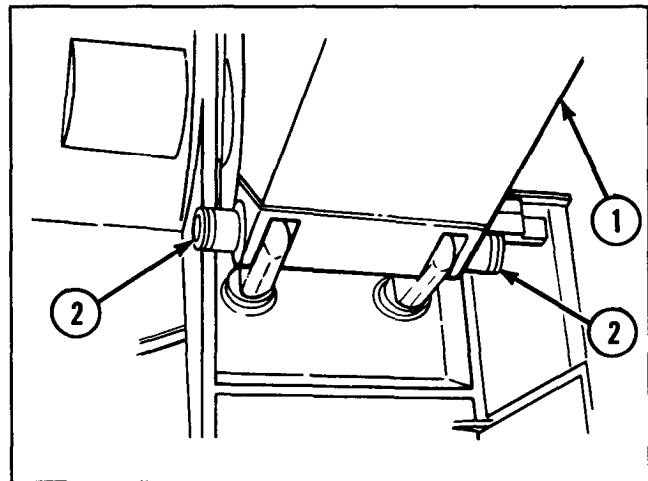
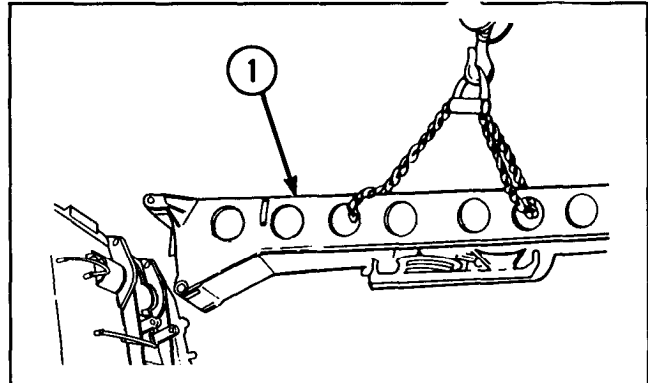
WARNING

- Sling boom as shown to prevent unbalanced boom action which could cause serious injury.
- Use hoist with 2000 lb (908 kg) minimum lifting capacity to prevent injury to personnel and damage to equipment.

NOTE

- Start engine and activate boom cylinders to aid in aligning boom cylinder eyes.
- Another M578 Recovery Vehicle or an M88A1 Recovery Vehicle, if available, may be used for lifting.

- 1 Using hoist with a lifting capacity of 2000 lb (908 kg), lower crane boom (1) and align boom eyes with cylinder eyes and cab eyes.
- 2 Install two lower hinge headless straight pins (2) to crane boom (1).
- 3 Install two nut and pin boom hinge pin locking plates (3), two new lockwashers (4), and two hexagon capscrews (5) securing two lower hinge headless straight pins (2).

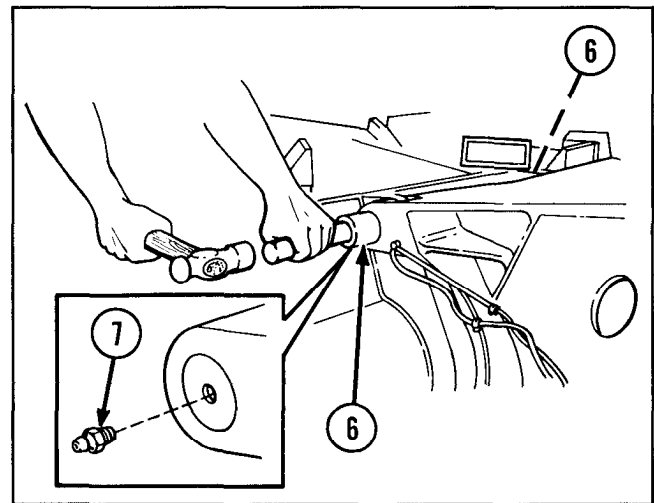


NOTE

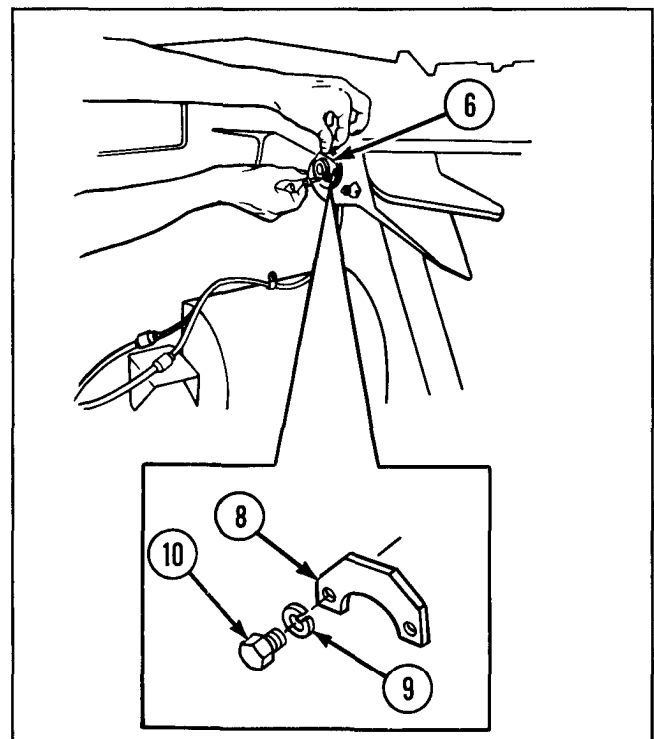
There may be shims between the boom eyes and cylinder eyes. If reinstalling old shims, they must be retained in the same position.

- 4 Using hammer and drift, install two upper hinge headless straight pins (6).

- 5 Install lubrication fitting (7) to upper hinge headless straight pin (6).



- 6 Install two nut and pin boom hinge pin locking plates (8), two new lockwashers (9), and two hexagon capscrews (10) securing two upper hinge headless straight pins (6).

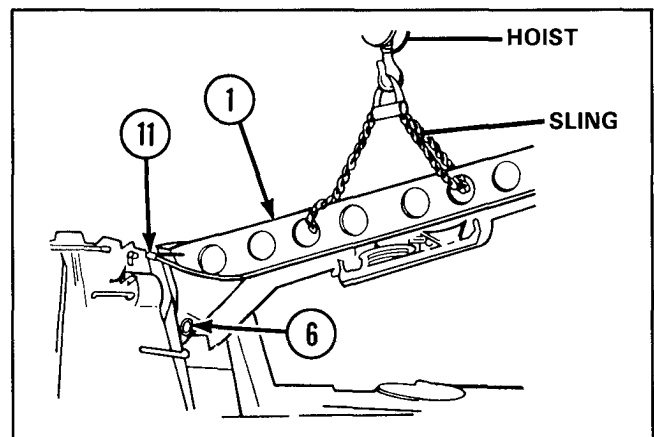


- 7 Remove sling from hoist. Remove sling from crane boom (1).

WARNING

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

- 8 Connect boom floodlight electrical lead (11).



2-53. MAINTENANCE OF BOOM AND WINCH AND BOOM WINCH COVER.

This task covers:

a. <i>Removal</i>	d. <i>Reassembly</i>
b. <i>Disassembly</i>	e. <i>Installation</i>
c. <i>Inspection/Repair</i>	

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive
(appx B)

Materials/Parts

Hose (figure 2, appx D)
Lockwasher (2) (MS35338-41)

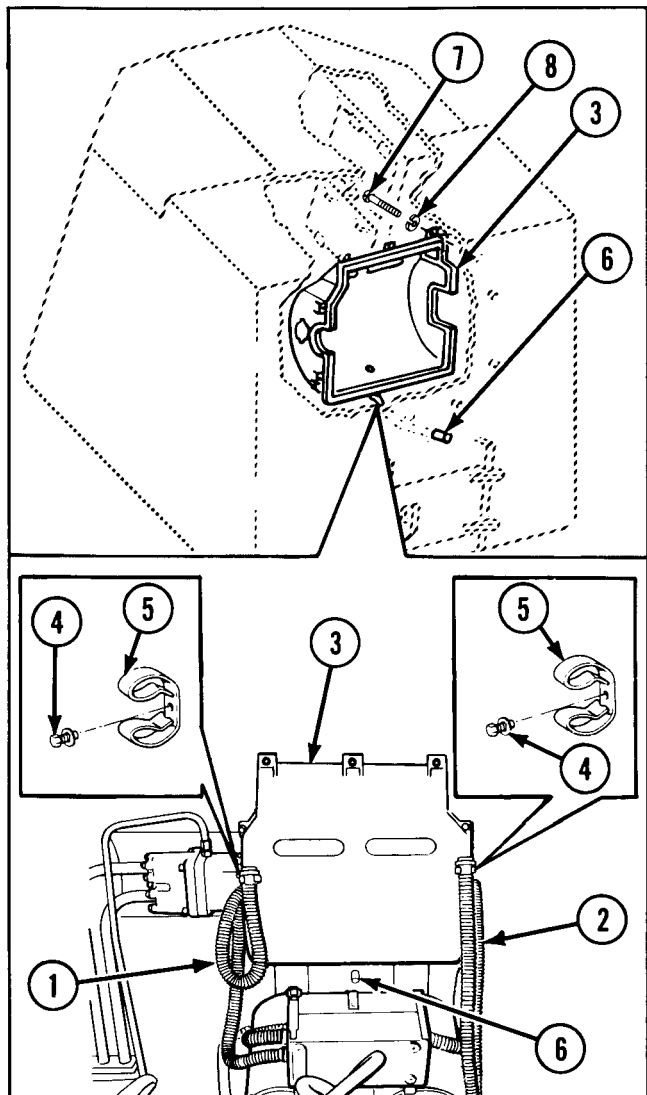
Lockwasher (9) (MS35338-46)
Winch rubber seal (10908943)

References

TM 9-2350-238-24P-2

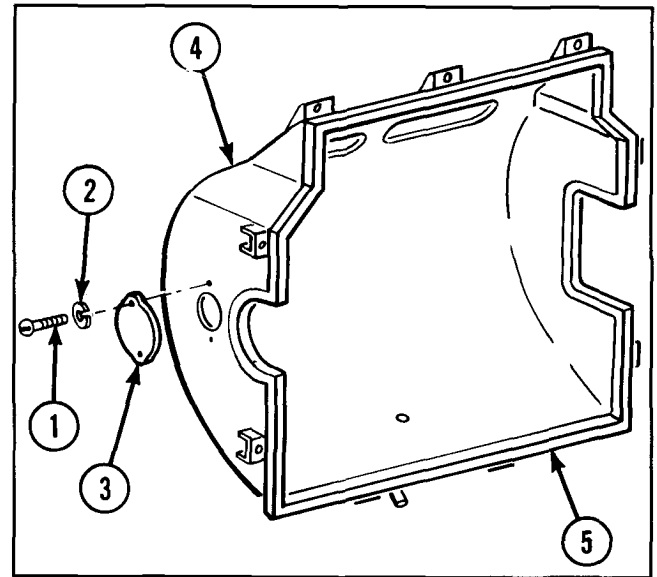
REMOVAL

- 1 Disconnect two air duct hose assemblies (1 and 2) from clips of boom winch cover (3).
- 2 Remove two assembled washer bolts (4) and two marker hose hold-down bands (5) securing hose assemblies (1 and 2) to boom winch cover (3).
- 3 Disconnect and remove hose (6) from boom winch cover (3).
- 4 Remove nine hexagon head capscrews (7), nine lockwashers (8), and boom winch cover (3).



DISASSEMBLY

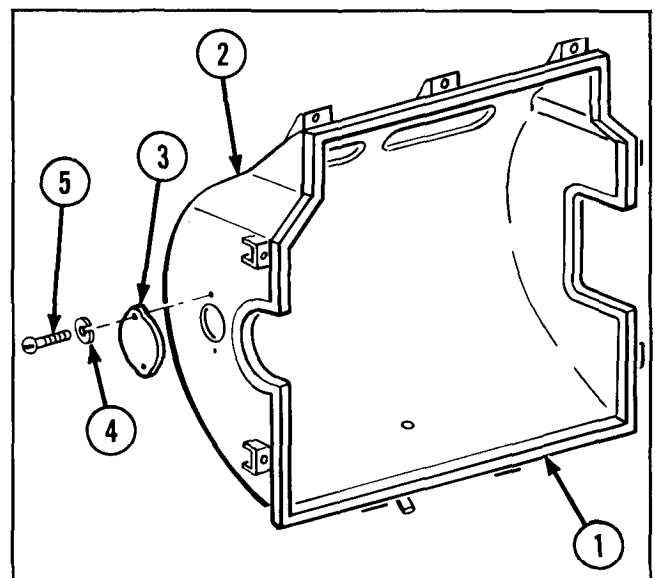
- 1 Remove two machine screws (1), two lockwashers (2), and access cover (3) from cover (4).
- 2 If necessary, remove winch rubber seal 5) from cover (4).

**INSPECTION/REPAIR**

- 1 Inspect for broken, damaged, or missing parts.
- 2 If cover is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 3 Hose assembly is a manufactured item, refer to appendix D.
- 4 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2) which do not meet inspection criteria.

REASSEMBLY

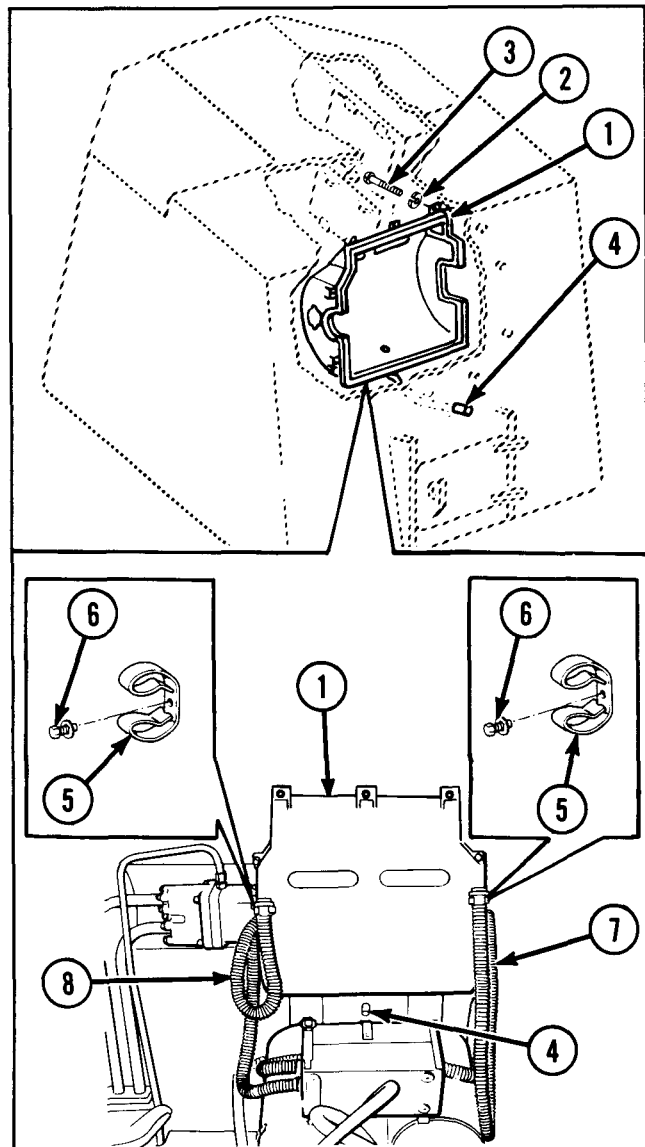
- 1 If removed, install new winch rubber seal (1) to cover (2).
- 2 Install access cover (3), two new lockwashers (4), and two machine screws (5) to cover (2).



2-53. MAINTENANCE OF BOOM AND WINCH AND BOOM WINCH COVER (CONT).

INSTALLATION

- 1 Place boom winch cover (1) over boom winch.
- 2 Install nine new lockwashers (2) and nine hexagon head capscrews (3).
- 3 Connect hose (4) to boom winch cover (1).
- 4 Install two marker hose hold-down bands (5) and two assembled washer bolts (6) on boom winch cover (1).
- 5 Connect two air duct hose assemblies (7 and 8) to clips on boom winch cover (1).



2-54. MAINTENANCE OF VEHICLE DRUM WINCH AND MANUAL CONTROL LEVER.

This task covers:	a. <i>Removal</i>	d. <i>Reassembly</i>
	b. <i>Disassembly</i>	e. <i>Installation</i>
	c. <i>Inspection/Repair</i>	

INITIAL SETUP*Tools and Special Tools*

General mechanic's tool kit, automotive
(appx B)

Lockwasher (5) (MS35338-44)

Sealing compound (item 17, appx C)

Materials/Parts

Cotter pin (MS24665-132)

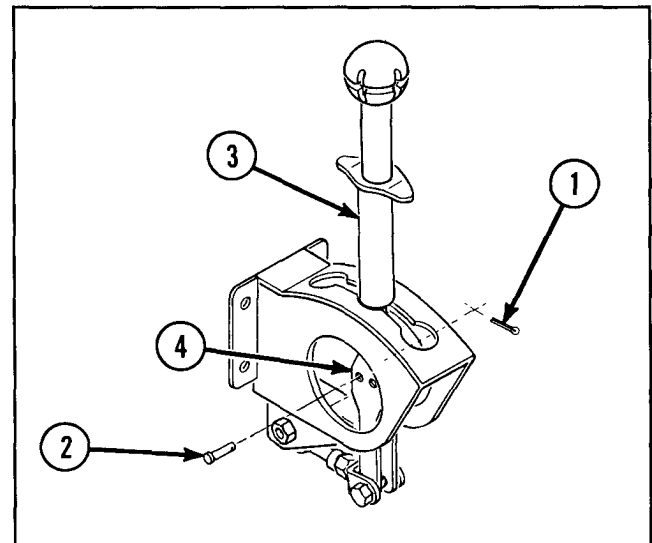
Lockwasher (MS35338-43)

References

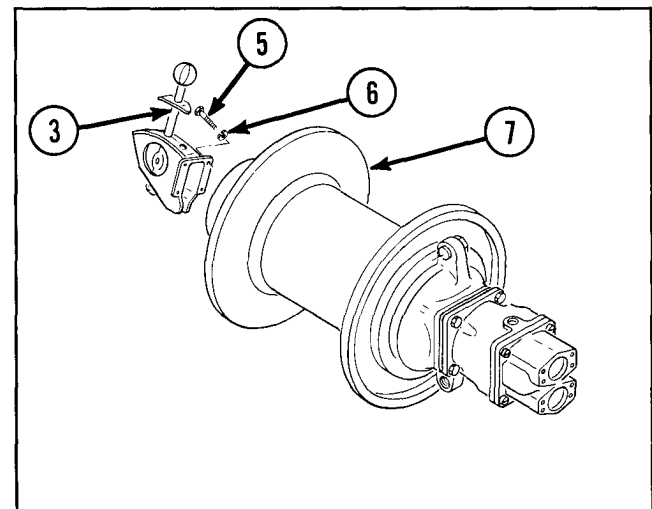
TM 9-2350-238-24P-2

R E M O V A L

- 1 Remove cotter pin (1) and headed straight pin (2) securing manual control lever (3) to winch shift fork (4).



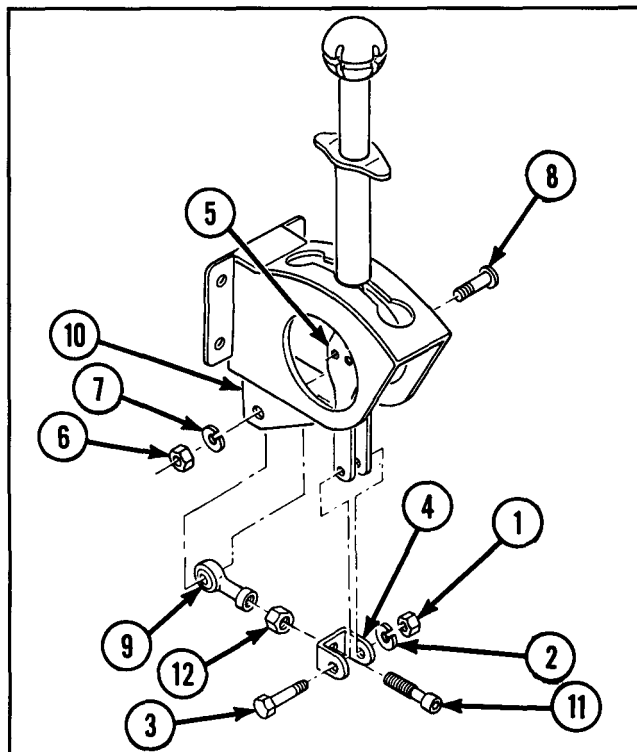
- 2 Remove four hexagon head capscrews (5), four lockwashers (6), and manual control lever (3) from planetary winch (7).



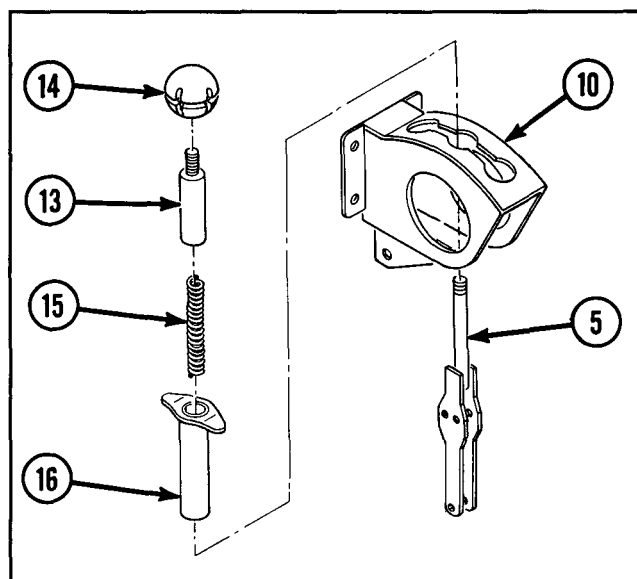
2-54. MAINTENANCE OF VEHICLE DRUM WINCH AND MANUAL CONTROL LEVER (CONT).

DISASSEMBLY

- 1 Remove hexagon plain nut (1), lockwasher (2), hexagon head capscrew (3), and rod end clevis (4) from winch shift fork (5).
- 2 Remove hexagon plain nut (6), lockwasher (7), machine screw (8), and rod end ball bearing (9) from quadrant shaft (10).
- 3 Remove clevis bolt (11), rod end clevis (4), and hexagon plain nut (12) from rod end ball bearing (9).



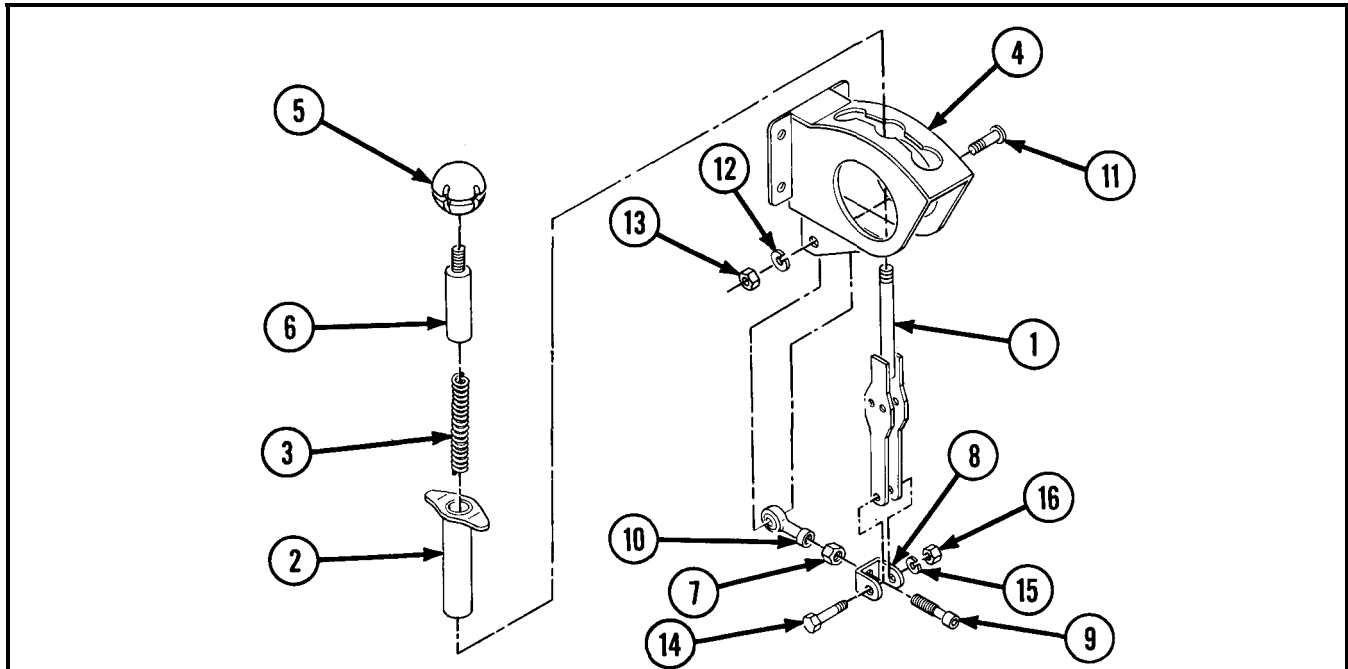
- 4 Remove shouldered shaft (13) from winch shift fork (5).
- 5 Remove shift fork plunger tube knob (14) from shouldered shaft (13).
- 6 Remove helical compression plunger spring (15), winch handle (16), and winch shift fork (5) from quadrant shaft (10).



INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 If quadrant shaft is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 3 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2) which do not meet inspection criteria.

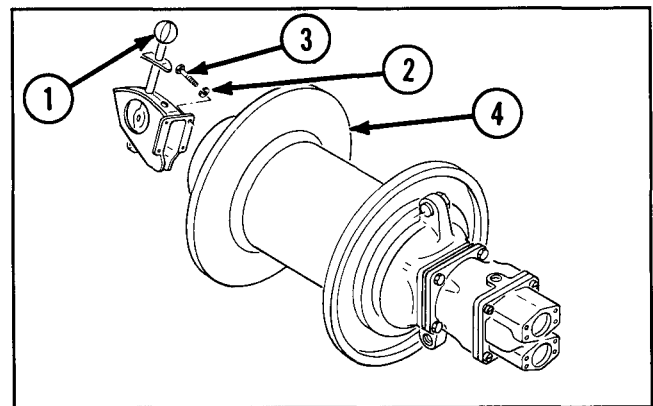
REASSEMBLY



- 1 Install winch shift fork (1), winch handle (2), and helical compression plunger spring (3) to quadrant shaft (4).
- 2 Apply sealing compound (item 17, appx C) to threads of shift fork plunger tube knob (5) and install knob to shouldered shaft (6).
- 3 Install shouldered shaft (6) with attached knob to winch shift fork (1).
- 4 Install hexagon plain nut (7), rod end clevis (8), and clevis bolt (9) to rod end ball bearing (10).
- 5 Install rod end ball bearing (10), machine screw (11), new lockwasher (12), and hexagon plain nut (13) to quadrant shaft (4).
- 6 Install rod end clevis (8), hexagon head capscrew (14), new lockwasher (15), and hexagon plain nut (16) to winch shift fork (1).

INSTALLATION

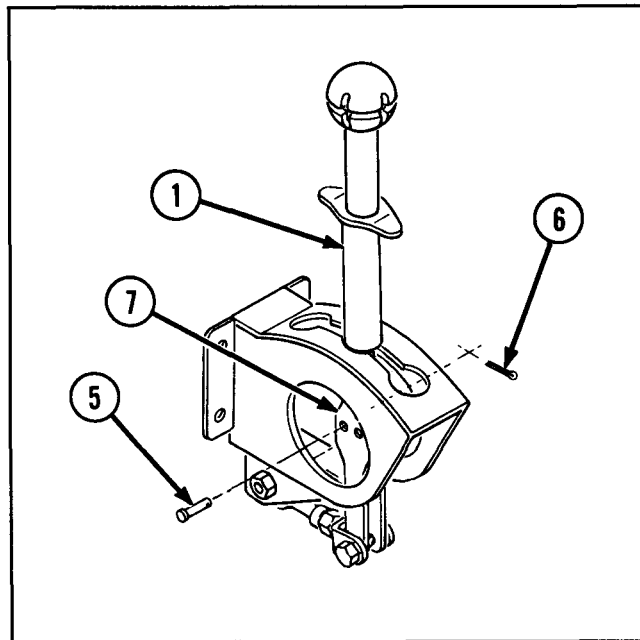
- 1 Install manual control lever (1), four new lockwashers (2), and four hexagon head capscrews (3) to planetary winch (4).



2-54. MAINTENANCE OF VEHICLE DRUM WINCH AND MANUAL CONTROL LEVER (CONT).

INSTALLATION (CONT)

2 Install headed straight pin (5) and new cotter pin (6) securing manual control lever (1) to winch shift fork (7).



2-55. MAINTENANCE OF BOOM AND WINCH AND MANUAL CONTROL LEVER.

This task covers:

a. <i>Removal</i>	d. <i>Reassembly</i>
b. <i>Disassembly</i>	e. <i>Installation</i>
c. <i>Inspection/Repair</i>	

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive (appx B)

Materials/Parts

Cotter pin (P7170)
Lockwasher (4) (MS35338-44)
Lockwasher (6) (MS35338-46)
Self-locking nut (MS21044N4)

References

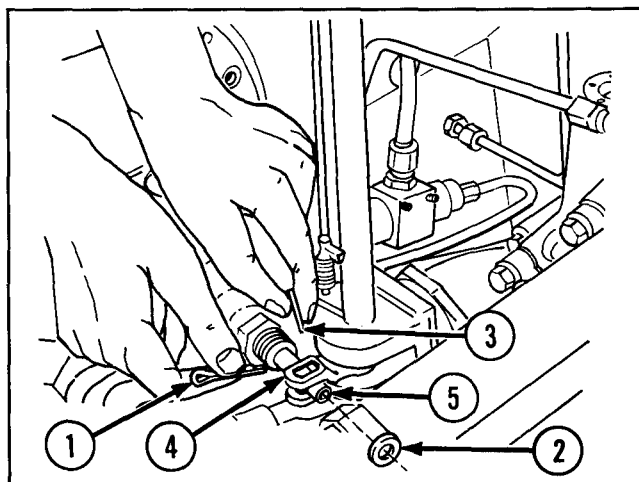
TM 9-2350-238-24P-2

Equipment Conditions

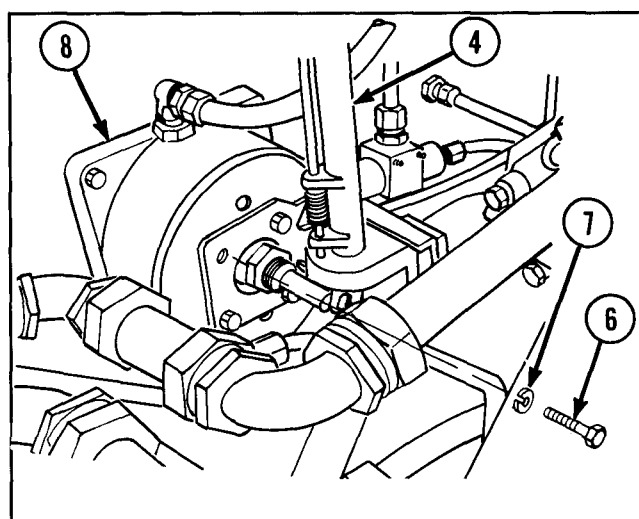
2-116 Forward right-hand nonskid metallic tread removed
2-128 Winch control panel bracket removed

REMOVAL

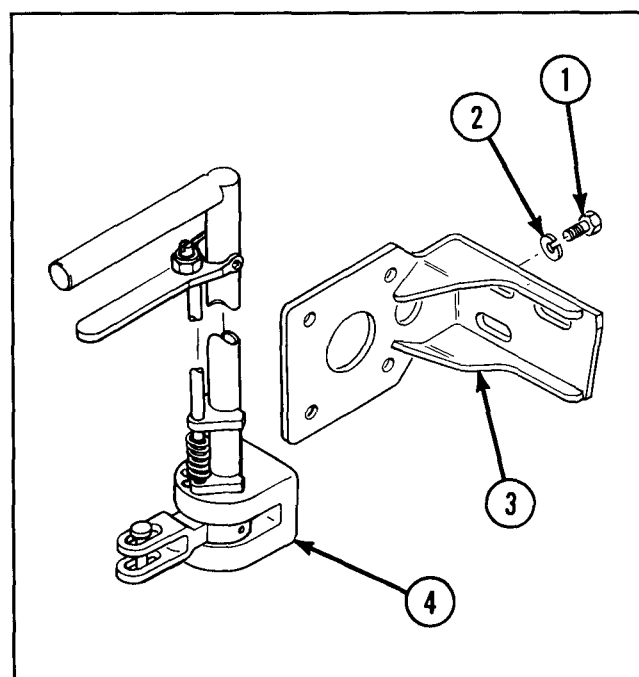
- 1 Remove cotter pin (1), flat washer (2), and headed straight pin (3) securing manual control lever (4) to winch shift rod (5).



- 2 Remove four machine bolts (6), four lockwashers (7), and manual control lever (4) from vehicle tow drum winch (8).

**DISASSEMBLY**

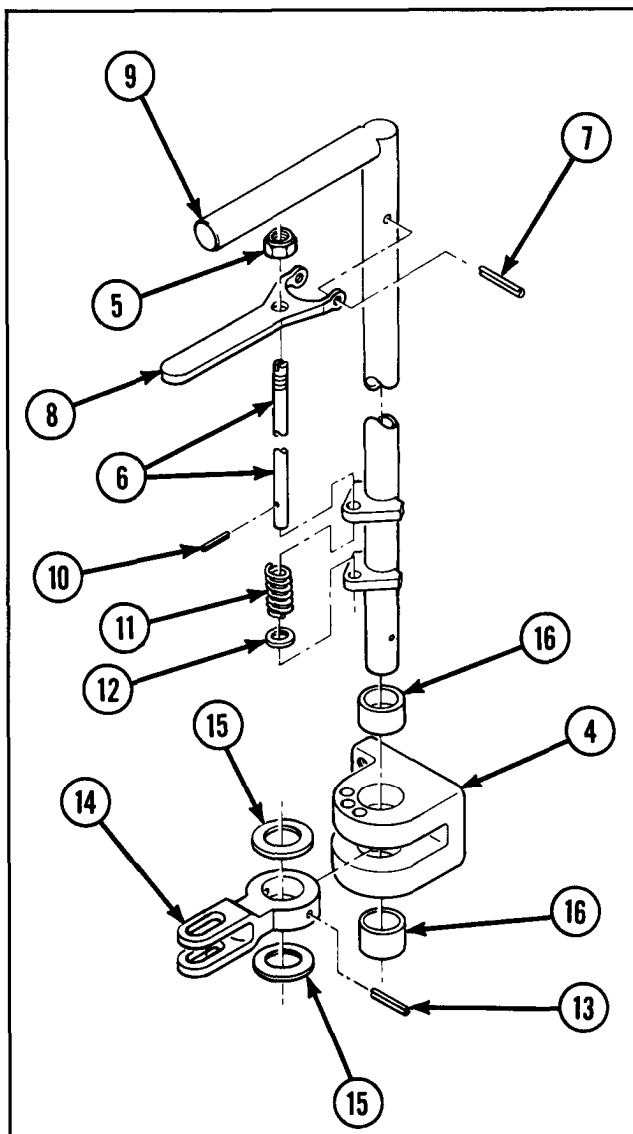
- 1 Remove three hexagon head capscrews (1), three lockwashers (2), and bracket (3) from guide (4).



2-55. MAINTENANCE OF BOOM AND WINCH AND MANUAL CONTROL LEVER (CONT).

DISASSEMBLY (CONT)

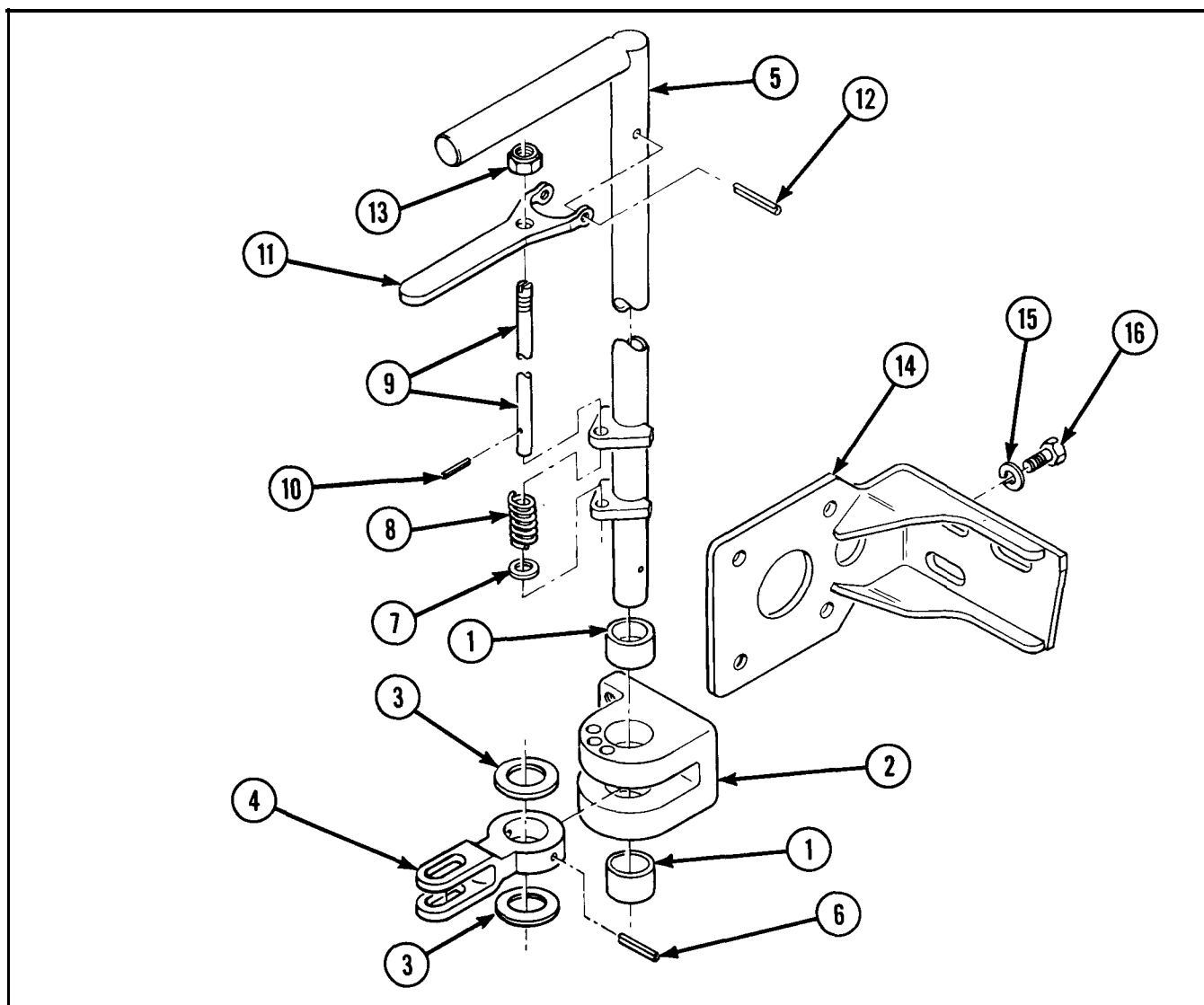
- 2 Remove self-locking nut (5) from shifter fork trigger threaded end rod (6).
- 3 Remove spring pin (7) and winch shift control lever trigger (8) from handle (9).
- 4 Remove spring pin (10), shifter fork trigger threaded end rod (6), helical compression spring (11), and flat washer (12) from handle (9).
- 5 Remove spring pin (13) from shift control fork (14) and handle (9).
- 6 Remove handle (9) from guide (4).
- 7 Remove shift control fork (14) and two shifter fork thrust washer bearings (15) from guide (4).
- 8 If necessary, press out two sleeve bearings (16) from guide (4).



INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 If handle is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 3 If bracket is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 4 If guide is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 5 If shift control fork is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 6 If winch control lever winch shift trigger is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 7 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2) which do not meet inspection criteria.

REASSEMBLY

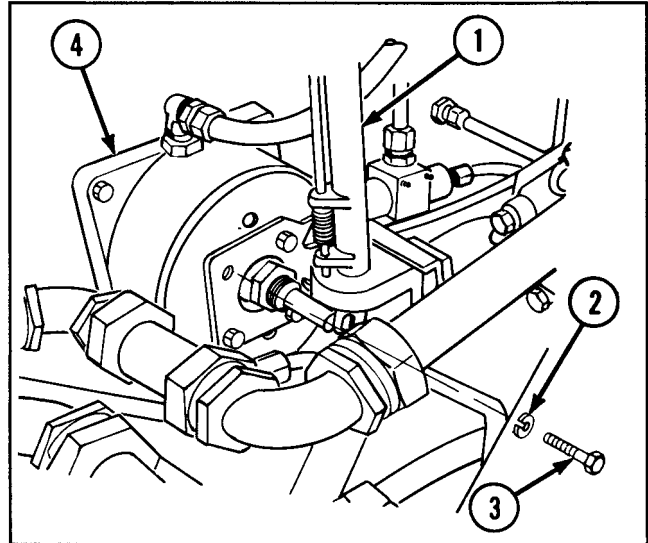


- 1 If removed, install two sleeve bearings (1) into guide (2).
- 2 Install two shifter fork thrust washer bearings (3) and shift control fork (4) into guide (2).
- 3 Slide handle (5) into guide (2).
- 4 Install spring pin (6), shift control fork (4), and handle (5).
- 5 Install flat washer (7), helical compression spring (8), shifter fork trigger threaded end rod (9), and spring pin (10) on handle (5).
- 6 Install winch shift control lever trigger (11) and spring pin (12) on handle (5).
- 7 Install new self-locking nut (13) on shifter fork trigger threaded end rod (9).
- 8 Install bracket (14), three new lockwashers (15), and three hexagon head cap-screws (16) on guide (2).

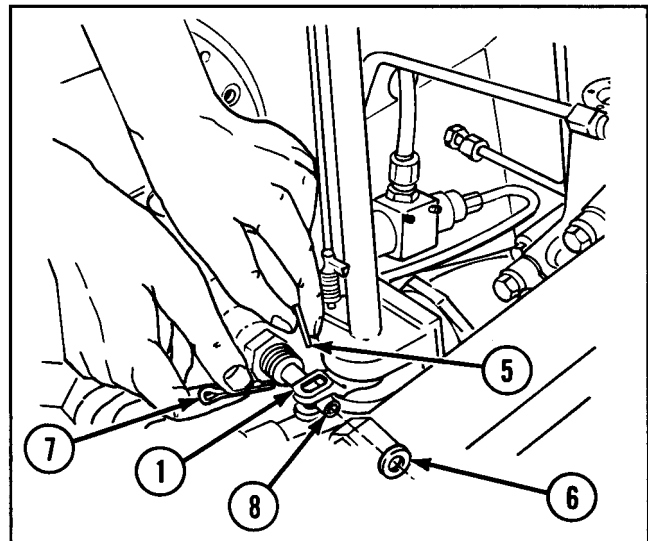
2-55. MAINTENANCE OF BOOM AND WINCH AND MANUAL CONTROL LEVER (CONT).

INSTALLATION

- 1 Install manual control lever (1), four new lockwashers (2), and four machine bolts (3) to vehicle tow drum winch (4).



- 2 Install headed straight pin (5), flat washer (6), and new cotter pin (7) securing manual control lever (1) to winch shift rod (8).



2-56. MAINTENANCE OF BOM ELEVATING HYDRAULIC LINES AND FITTINGS.

This task covers: a. *Removal* d. *Reassembly*
 b. *Disassembly* e. *Installation*
 c. *Inspection/Repair*

INITIAL SETUP**Tools and Special Tools**

General mechanic's tool kit, automotive (appx B)

Materials/Parts

Lockwasher (16) (MS35338-47)
 Preformed packing (4) (MS28775-218)
 Preformed packing (4) (MS28775-222)

References

TM 9-2350-238-24P-2

Equipment Conditions

Oil drained from boom elevating hydraulic lines and fittings. Refer to page 2-8.

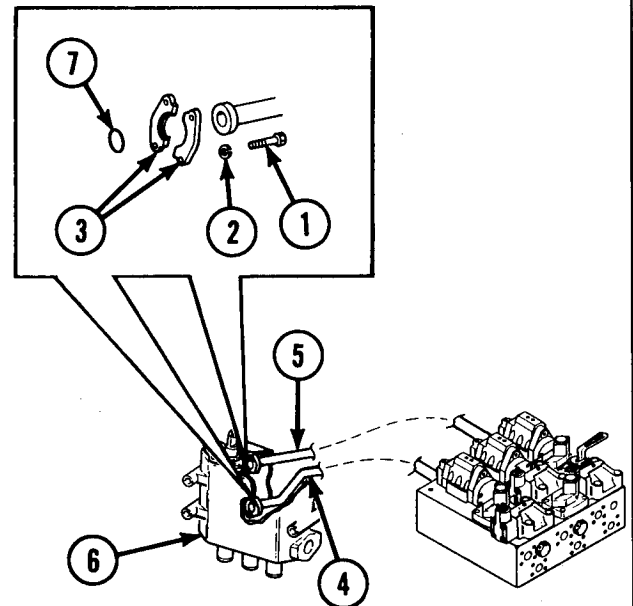
2-116 Rear right-hand nonskid metallic tread removed
 2-116 Forward right-hand nonskid metallic tread removed
 2-116 Forward left-hand nonskid metallic tread removed
 2-116 Rear left-hand nonskid metallic tread removed
 2-123 Metal cab grille removed

REMOVAL**NOTE**

The vehicle hydraulic system is of the open center type and has pressure only when the hydraulic pumps are operating.

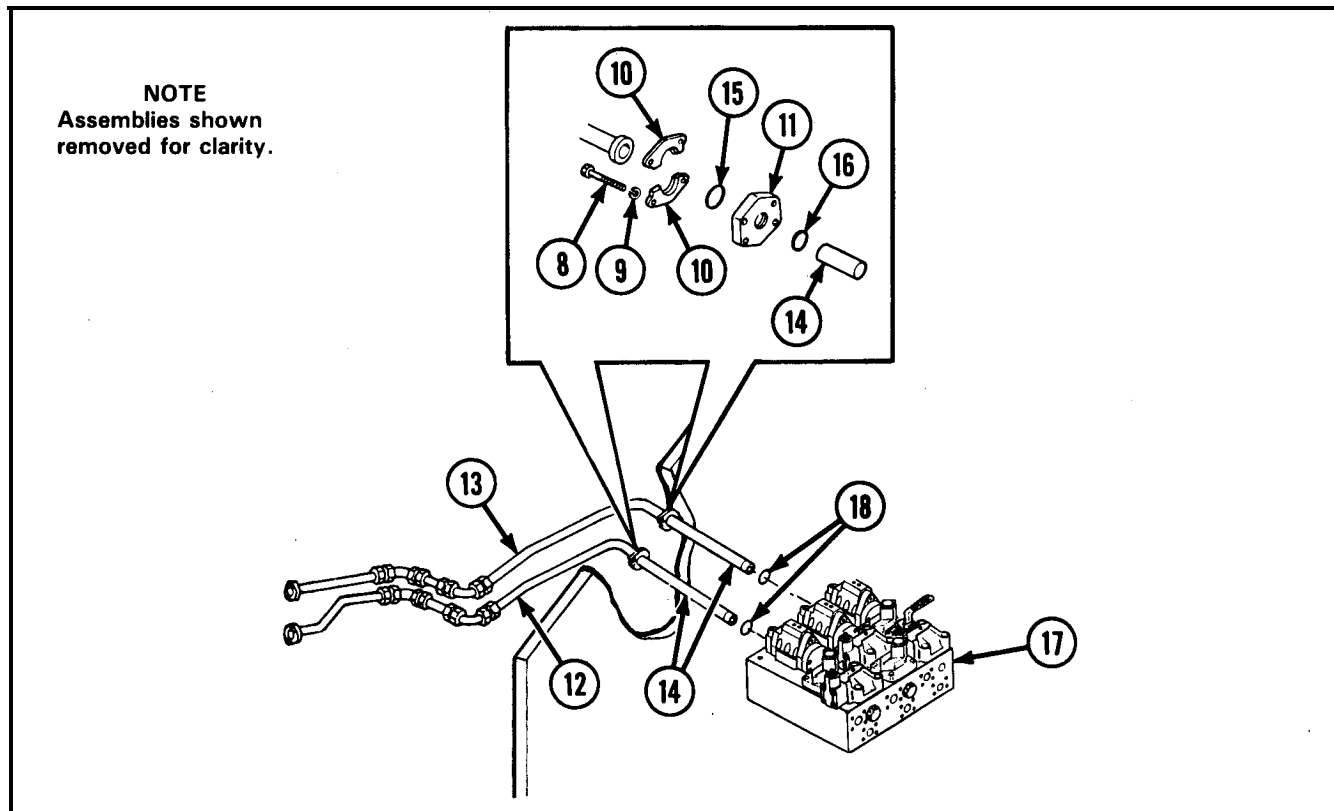
- 1 Remove eight hexagon head capscrews (1), eight lockwashers (2), and four split-flange clamp halves (3) securing two three-spool valve metal tube assemblies (4 and 5) to three-spool valve (6).
- 2 Disconnect two three-spool valve metal tube assemblies (4 and 5) and remove two preformed packings (7) from three-spool valve (6).

NOTE
 Assemblies shown removed for clarity.



2-56. MAINTENANCE OF BOOM ELEVATING HYDRAULIC LINES AND FITTINGS (CONT).

REMOVAL (CONT)



- 3 Remove eight hexagon head capscrews (8), eight lockwashers (9), four split-flange clamp halves (10), and two boom cylinder control line flange adapters (11) securing two elbow to adapter metal tube assemblies (12 and 13) to two counterbalance manifold metallic tube assemblies (14). Remove two preformed packings (15) and two preformed packings (16).

- 4 Disconnect two counterbalance manifold metallic tube assemblies (14) from manifold assembly counterbalance (17). Remove two preformed packings (18).

INSPECTION/REPAIR

- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

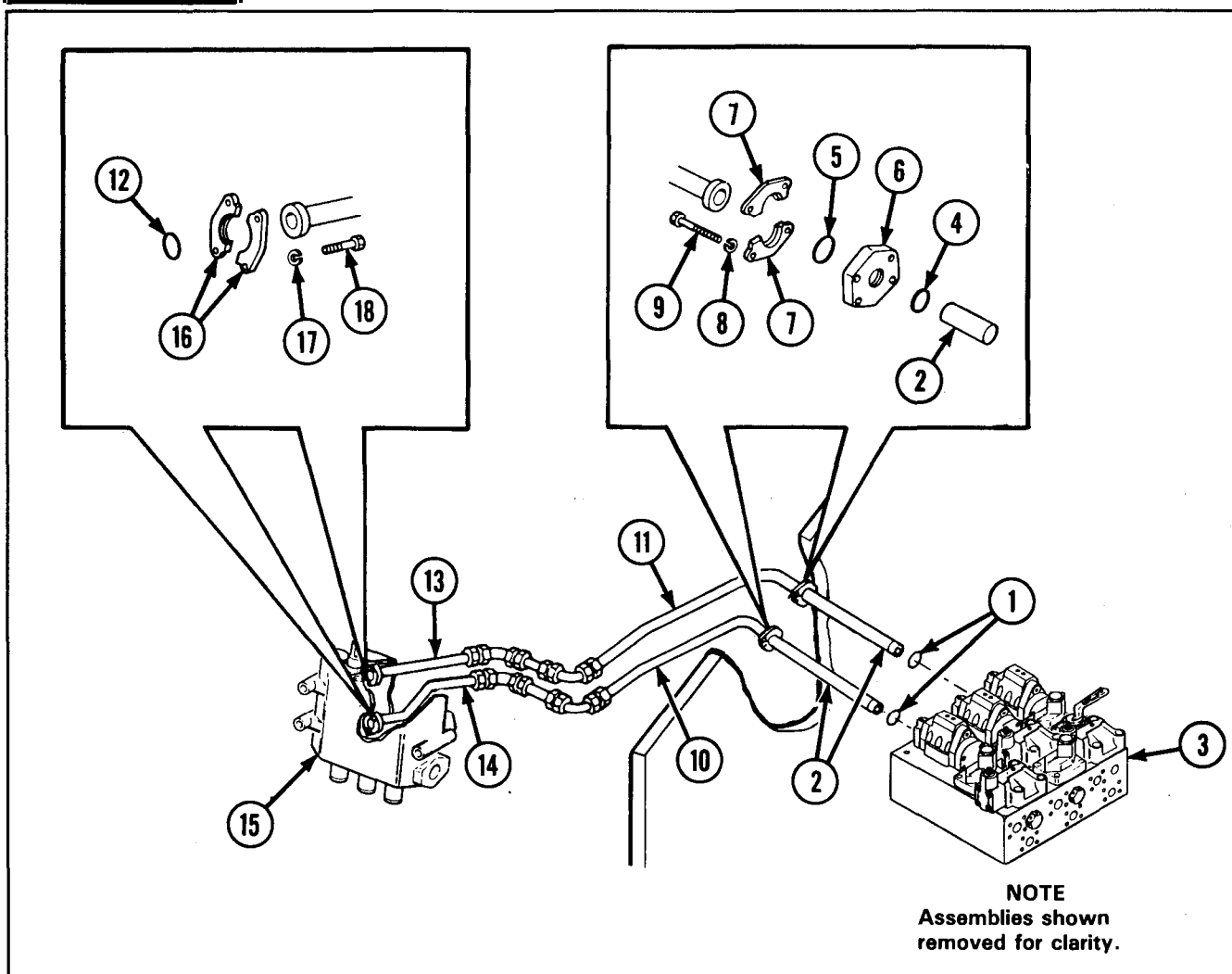
REASSEMBLY

Refer to page 2-73 for complete reassembly of all hydraulic lines and fittings.

DISASSEMBLY

Refer to page 2-73 for complete disassembly of all hydraulic lines and fittings.

INSTALLATION



1 Install two new preformed packings (1) and connect two counterbalance manifold metallic tube assemblies (2) to manifold assembly counterbalance (3).

3 Install two new preformed packings (12) and connect two three-spool valve metal tube assemblies (13 and 14) to three-spool valve (15).

2 Install two new preformed packings (4), two new preformed packings (5), two boom cylinder control line flange adapters (6), four split-flange clamp halves (7), eight new lockwashers (8), and eight hexagon head capscrews (9) connecting two counterbalance manifold metallic tube assemblies (2) to two elbow to adapter metal tube assemblies (10 and 11).

4 Secure two three-spool valve metal tube assemblies (13 and 14) to three-spool valve (15) using four split-flange clamp halves (16), eight new lockwashers (17), and eight hexagon head capscrews (18).

2-57. MAINTENANCE OF BOOM CYLINDER HYDRAULIC LINES AND FITTINGS.

This task covers:

a. <i>Removal</i>	d. <i>Reassembly</i>
b. <i>Disassembly</i>	e. <i>Installation</i>
c. <i>Inspection/Repair</i>	

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive (appx B)
 Shop equipment, automotive maintenance and repair; organizational maintenance, common no. 1, less power (appx B)
 Wrench, 1-1/4 in.
 Wrench, 1-3/8 in.

Materials/Parts

Lockwasher (2) (MS35338-46)
 Lockwasher (12) (MS35338-47)
 Packing retainer (2) (MS28777-12)
 Preformed packing (3) (MS28775-222)
 Preformed packing (6) (MS28778-12)
 Tube fitting locknut (4) (AN6289-12)

References

TM 9-2350-238-24P-2

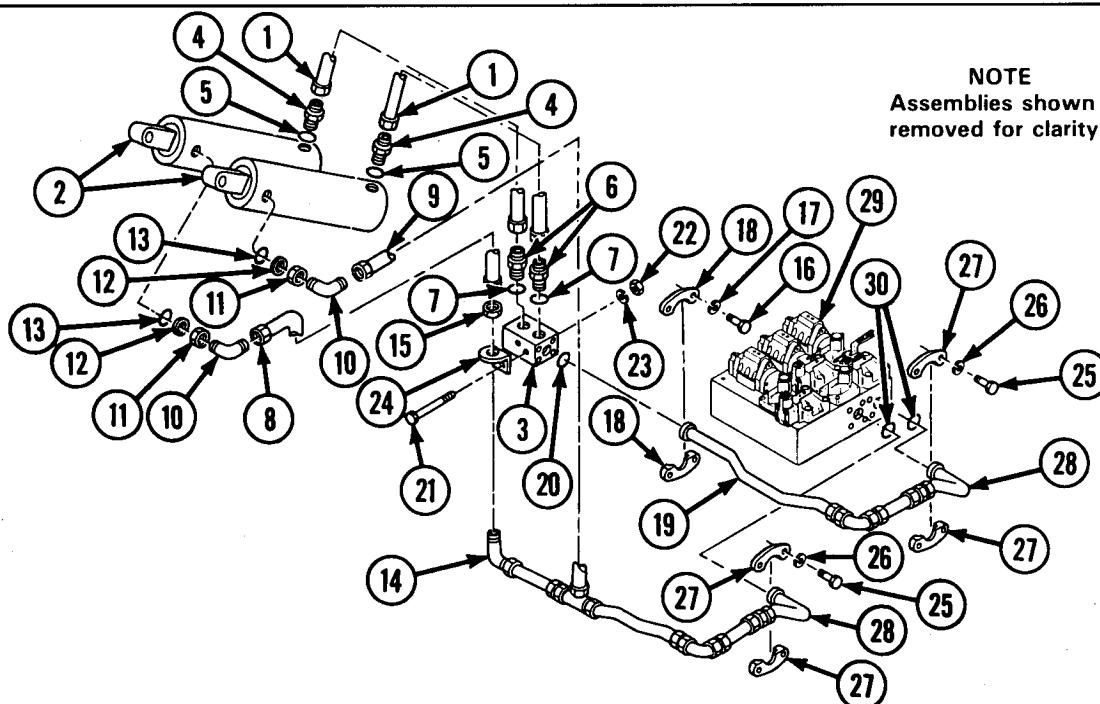
Equipment Conditions

Oil drained from boom cylinder elevating hydraulic lines and fittings. Refer to page 2-8.

2-116 Rear left-hand nonskid metallic tread removed

2-116 Forward left-hand nonskid metallic tread removed

REMOVAL



NOTE

The vehicle hydraulic system is of the open center type and has pressure only when the hydraulic pumps are operating.

- 1 Disconnect two boom cylinder hose assemblies (1) from two boom control cylinder assemblies (2) and boom cylinder tube-to-hose manifold (3).
- 2 Remove two tube nipples (4), two preformed packings (5), two tube nipples (6), and two preformed packings (7).
- 3 Disconnect two boom cylinder hose assemblies (8 and 9) from two boom control cylinder assemblies (2).
- 4 Remove two tube elbows (10), two tube fitting locknuts (11), two packing retainers (12), and two preformed packings (13) from two boom control cylinder assemblies (2).
- 5 Disconnect boom cylinder hose assembly (8) from tube elbow (14). Remove tube fitting locknut (15).
- 6 Remove four hexagon head capscrews (16), four lockwashers (17), and two split-flange clamp halves (18) securing manifold to elbow tube assembly (19) to boom cylinder tube-to-hose manifold (3).
- 7 Disconnect manifold to elbow tube assembly (19) from boom cylinder tube-to-hose manifold (3). Remove preformed packing (20).

- 8 Remove two hexagon head capscrews (21), two hexagon plain nuts (22), two lockwashers (23), and angle bracket (24) from boom cylinder tube-to-hose manifold (3).

- 9 Remove eight hexagon head capscrews (25), eight lockwashers (26), and four split-flange clamp halves (27) securing two counterbalance manifold tube assemblies (28) to manifold assembly counterbalance (29).

- 10 Disconnect two counterbalance manifold tube assemblies (28) and remove two preformed packings (30) from manifold assembly counterbalance (29).

DISASSEMBLY

Refer to page 2-73 for complete disassembly of all hydraulic lines and fittings.

INSPECTION/REPAIR

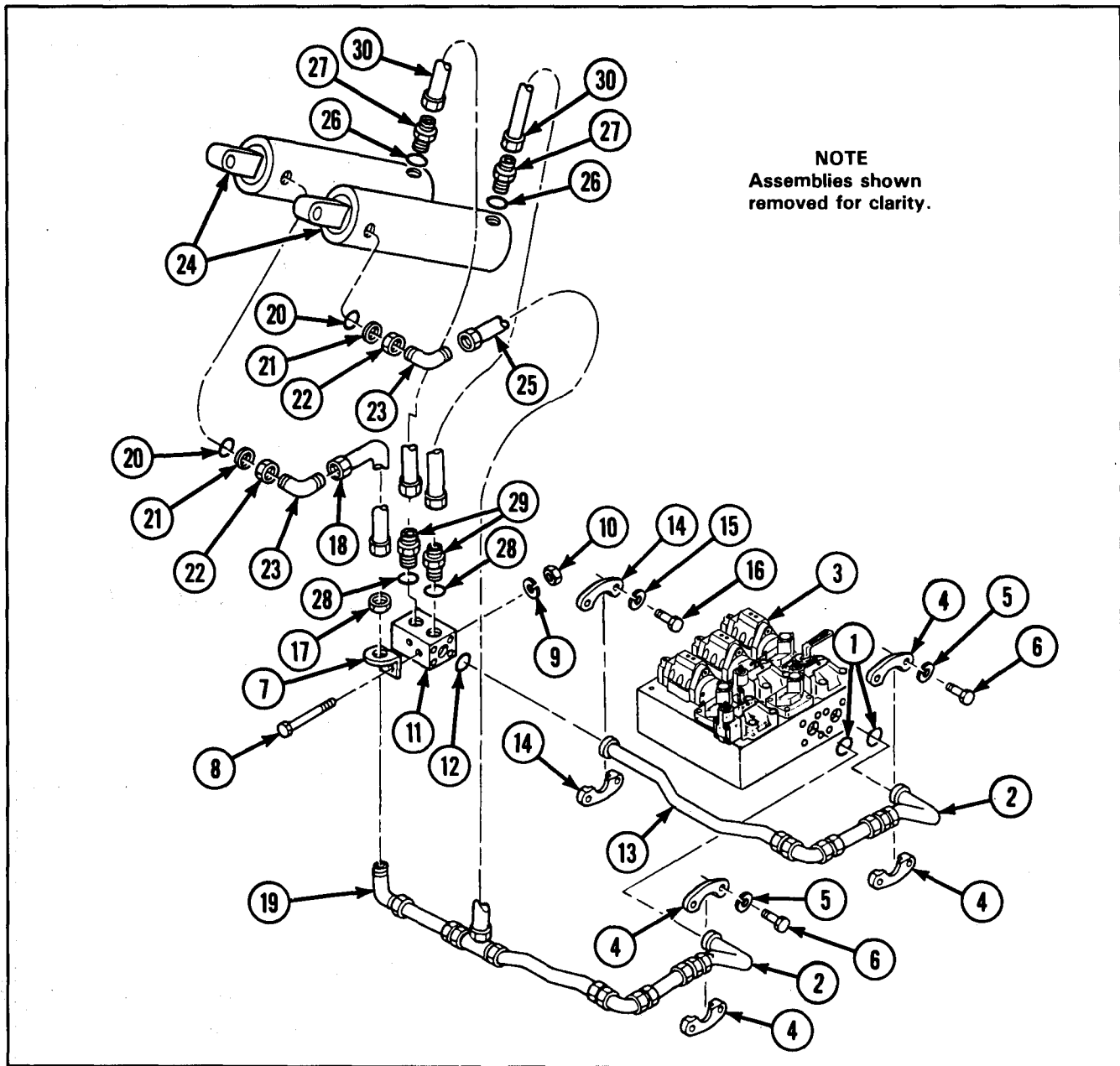
- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

REASSEMBLY

Refer to page 2-73 for complete reassembly of all hydraulic lines and fittings.

2-57. MAINTENANCE OF BOOM CYLINDER HYDRAULIC LINES AND FITTINGS (CONT).

INSTALLATION



1 Install two new preformed packings (1) and connect two counterbalance manifold tube assemblies (2) to manifold assembly counterbalance (3).

2 Install four split-flange clamp halves (4), eight new lockwashers (5), and eight hexagon head capscrews (6) securing two counterbalance manifold tube assemblies (2) to manifold assembly counterbalance (3).

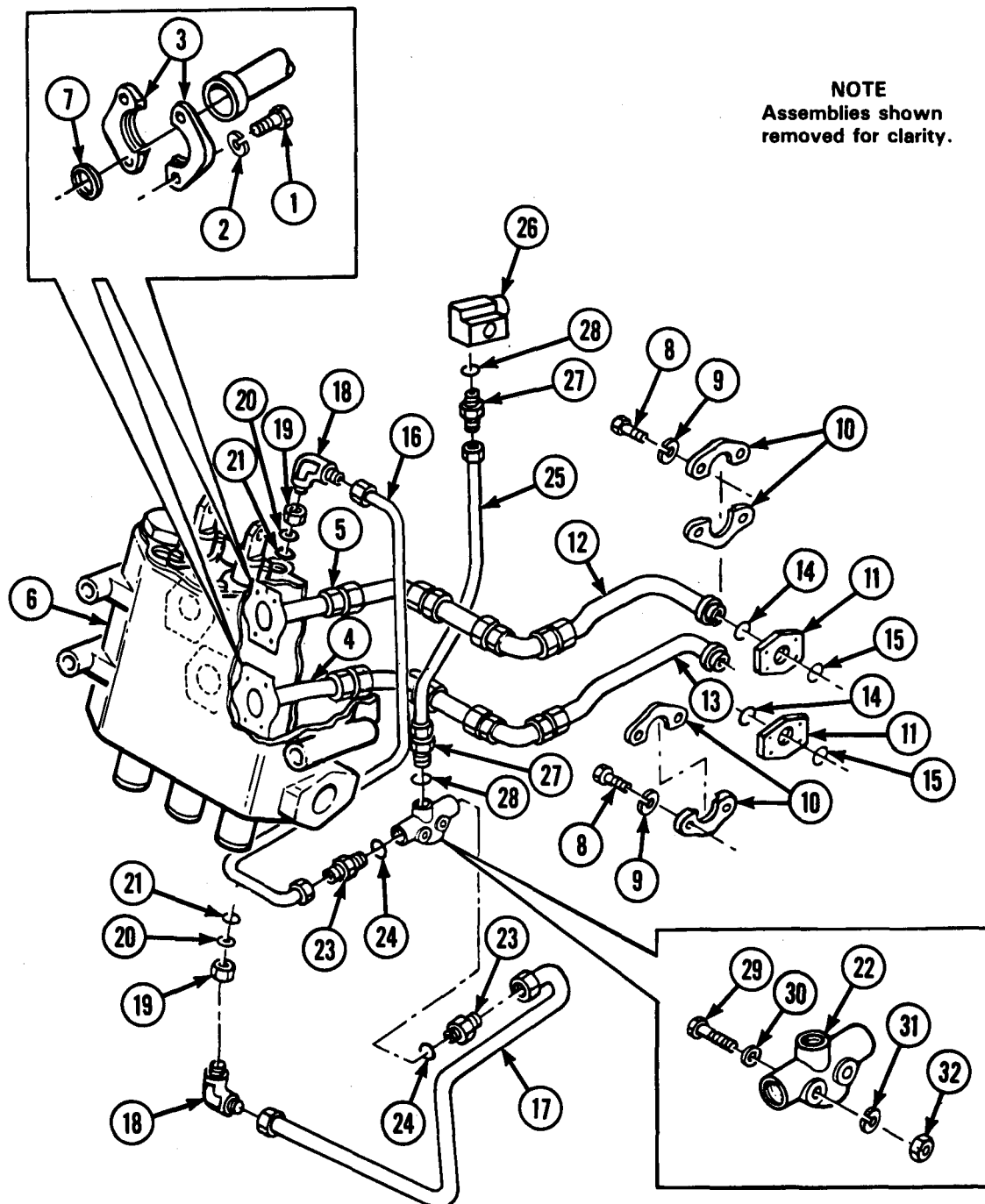
- 3 Install angle bracket (7), two hexagon head capscrews (8), two new lockwashers (9), and two hexagon plain nuts (10) on boom cylinder tube-to-hose manifold (11).
- 4 Install new preformed packing (12) and connect manifold to elbow tube assembly (13) to boom cylinder tube-to-hose manifold (11).
- 5 Install two split-flange clamp halves (14), four new lockwashers (15), and four hexagon head capscrews (16) securing manifold to elbow tube assembly (13) to boom cylinder tube-to-hose manifold (11).
- 6 Install new tube fitting locknut (17) and connect boom cylinder hose assembly (18) to tube elbow (19).
- 7 Install two new preformed packings (20), two new packing retainers (21), two new tube fitting locknuts (22), and two tube elbows (23) on two boom control cylinder assemblies (24).
- 8 Connect two boom cylinder hose assemblies (18 and 25) to two boom control cylinder assemblies (24).
- 9 Install two new preformed packings (26) and two tube nipples (27) on two boom control cylinder assemblies (24), and install two new preformed packings (28) and two tube nipples (29) on boom cylinder tube-to-hose manifold (11).
- 10 Connect two boom cylinder hose assemblies (30) to two boom control cylinder assemblies (24) and boom cylinder tube-to-hose manifold (11).

2-58. MAINTENANCE OF BOOM WINCH THREE-SPOOL VALVE HYDRAULIC LINES AND FITTINGS.

This task covers:		a. <i>Removal</i>	d. <i>Reassembly</i>
		b. <i>Disassembly</i>	e. <i>Installation</i>
		c. <i>Inspection/Repair</i>	
INITIAL SETUP			
<i>Tools and Special Tools</i>		<i>References</i>	
General mechanic's tool kit, automotive (appx B)		TM 9-2350-238-24P-2	
<i>Materials/Parts</i>		<i>Equipment Conditions</i>	
Lockwasher (2) (MS35338-42)		Oil drained from system. Refer to page 2-8.	
Lockwasher (16) (MS35338-47)		2-116 Rear right-hand nonskid metallic tread removed	
Preformed packing (2) (MS28775-218)		2-116 Forward right-hand nonskid metallic tread removed	
Preformed packing (4) (MS28775-222)			
Preformed packing (2) (MS28778-6)			
Preformed packing (4) (MS28778-8)			
Tube fitting locknut (2) (AN6289-6)			

2-58. MAINTENANCE OF BOOM WINCH THREE-SPOOL VALVE HYDRAULIC LINES AND FITTINGS (CONT).

REMOVAL



NOTE

The vehicle hydraulic system is of the open center type and has pressure only when the hydraulic pumps are operating.

- 1 Remove eight hexagon head capscrews (1), eight lockwashers (2), and four split-flange clamp halves (3) securing three-spool valve to elbow boom winch tube assembly (4) and three-spool valve to elbow tube assembly (5) to three-spool valve (6).
- 2 Disconnect three-spool valve to elbow boom winch tube assembly (4) and three-spool valve to elbow tube assembly (5) from three spool valve (6) and remove two preformed packings (7).
- 3 Remove eight hexagon head capscrews (8), eight lockwashers (9), four split-flange clamp halves (10), and two three-spool valve flange clamp adapters (11).
- 4 Disconnect two elbow to adapter boom winch tube assemblies (12 and 13) and remove two preformed packings (14) and two preformed packings (15).
- 5 Disconnect two three-spool valve to in-board shuttle valve tube assemblies (16 and 17) from three-spool valve (6).
- 6 Remove two tube elbows (18), two tube fitting locknuts (19), two flat washers (20), and two preformed packings (21).
- 7 Disconnect two three-spool valve to in-board shuttle valve tube assemblies (16 and 17) from boom winch shuttle valve (22).

- 8 Remove two tube reducers (23) and two preformed packings (24).
- 9 Disconnect inboard shuttle valve to selector valve tube assembly (25) from selector valve (26) and boom winch shuttle valve (22).
- 10 Remove two tube nipples (27) and two preformed packings (28).
- 11 Remove two machine screws (29), two flat washers (30), two lockwashers (31), two plain hexagon plain nuts (32), and boom winch shuttle valve (22).

DISASSEMBLY

Refer to page 2-73 for complete disassembly of all hydraulic lines and fittings.

INSPECTION/REPAIR

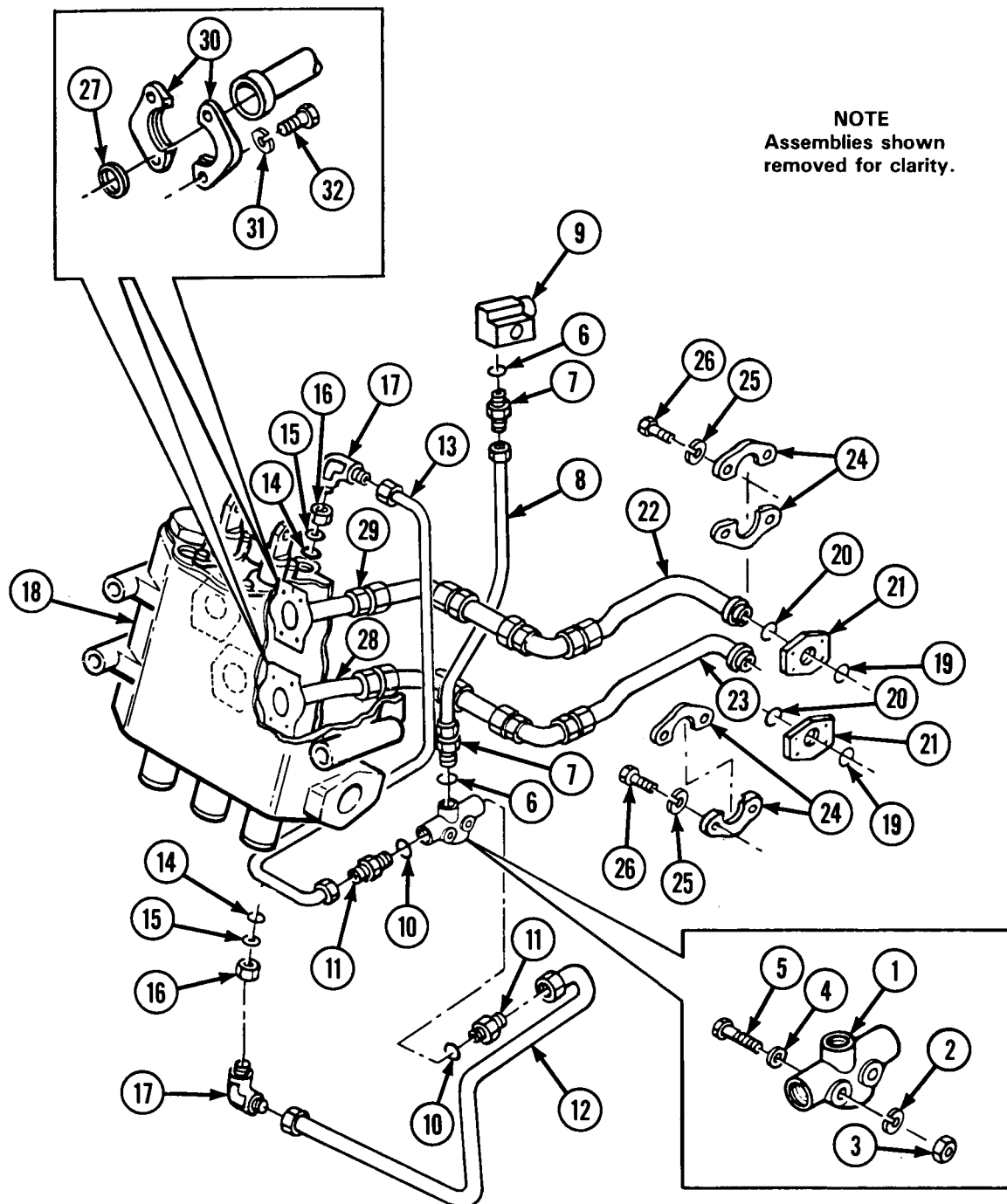
- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

REASSEMBLY

Refer to page 2-73 for complete reassembly of all hydraulic lines and fittings.

2-58. MAINTENANCE OF BOOM WINCH THREE-SPOOL VALVE HYDRAULIC LINES AND FITTINGS (CONT).

INSTALLATION



- 1

Install boom winch shuttle valve (1) and secure using two new lockwashers (2), two hexagon plain nuts (3), two flat washers (4), and two machine screws (5).
- 2

Install two new preformed packings (6) and two tube nipples (7).
- 3

Connect inboard shuttle valve to selector valve tube assembly (8) to boom winch shuttle valve (1) and selector valve (9).
- 4

Install two new preformed packings (10) and two tube reducers (11).
- 5

Connect two three-spool valve to inboard shuttle valve tube assemblies (12 and 13) to boom winch shuttle valve (1).
- 6

Install two new preformed packings (14), two flat washers (15), two new tube fitting locknuts (16), and two tube elbows (17).
- 7

Connect two three-spool valve to inboard shuttle valve tube assemblies (12 and 13) to three-spool valve (18).
- 8

Install two new preformed packings (19), two new preformed packings (20), and two three-spool valve flange clamp adapters (21), and connect two elbow to adapter boom winch tube assemblies (22 and 23).
- 9

Install four split-flange clamp halves (24), eight new lockwashers (25), and eight hexagon head capscrews (26).
- 10

Install two new preformed packings (27) and connect three-spool valve to elbow boom winch tube assembly (28) and three-spool valve to elbow tube assembly (29) to three-spool valve (18).
- 11

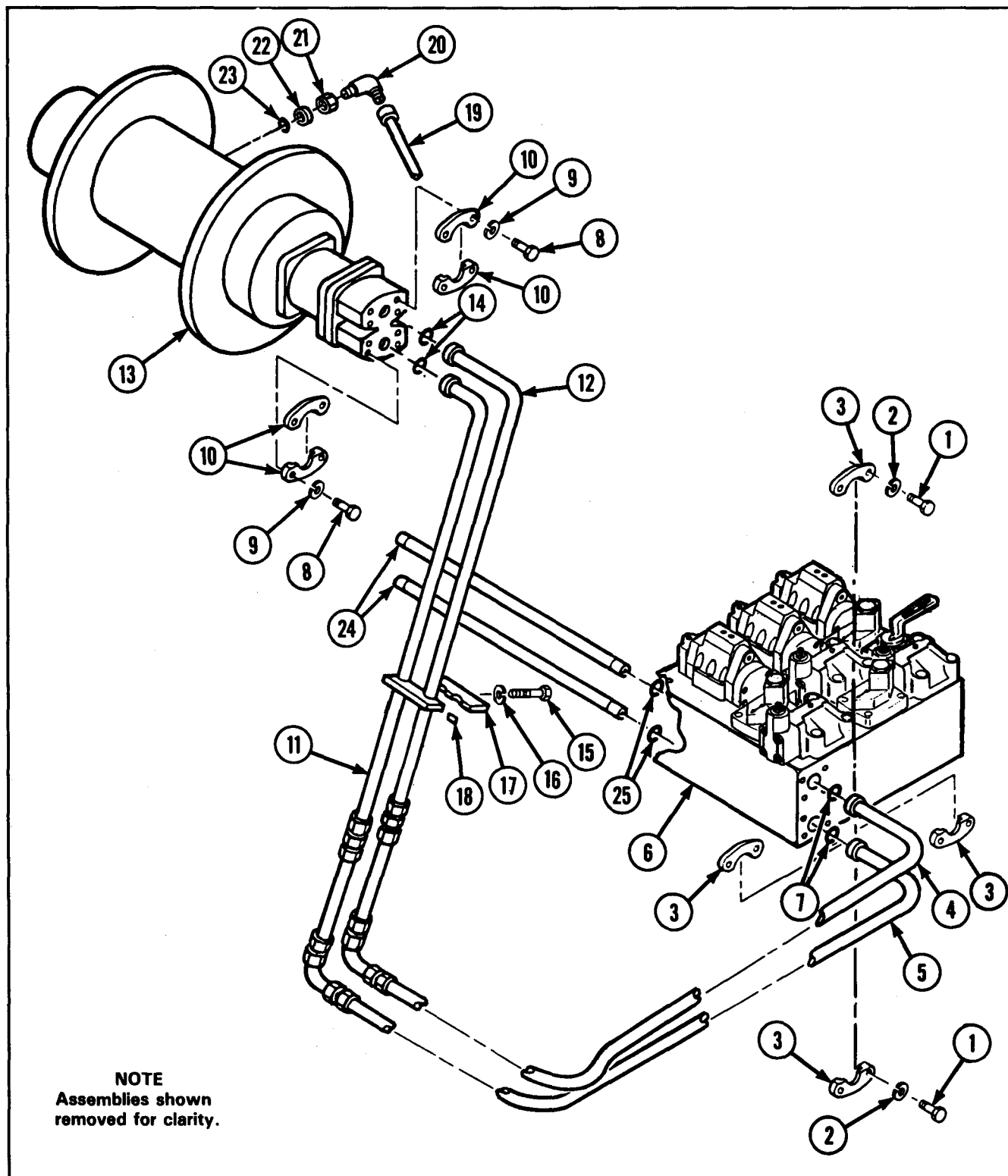
Install four split-flange clamp halves (30), eight new lockwashers (31), and eight hexagon head capscrews (32).

2-59. MAINTENANCE OF BOOM WINCH COUNTERBALANCE MANIFOLD HYDRAULIC LINES AND FITTINGS.

This task covers:		a. <i>Removal</i>	d. <i>Reassembly</i>
		b. <i>Disassembly</i>	e. <i>Installation</i>
		c. <i>Inspection/Repair</i>	
INITIAL SETUP			
<i>Tools and Special Tools</i>		<i>References</i>	
General mechanic's tool kit, automotive (appx B)		TM 9-2350-238-24P-2	
<i>Materials/Parts</i>		<i>Equipment Conditions</i>	
Lockwasher (MS35338-46)		Oil drained from system. Refer to page 2-8.	
Lockwasher (8) (MS35338-47)		2-116 Rear left-hand nonskid metallic tread removed	
Lockwasher (8) (MS35338-48)		2-116 Rear right-hand nonskid metallic tread removed	
Preformed packing (2) (MS28775-218)		2-116 Forward left-hand nonskid metallic tread removed	
Preformed packing (2) (MS28775-222)			
Preformed packing (2) (MS28775-225)			
Preformed packing (MS28778-8)			
Tube fitting locknut (AN6289-8)			

2-59. MAINTENANCE OF BOOM WINCH COUNTERBALANCE MANIFOLD HYDRAULIC LINES AND FITTINGS (CONT).

REMOVAL



NOTE

The vehicle hydraulic system is of the open center type and has pressure only when the hydraulic pumps are operating.

- 1 Remove eight hexagon head capscrews (1), eight lockwashers (2), and four split-flange clamp halves (3) securing two manifold to elbow tube assemblies (4 and 5) to manifold assembly counterbalance (6).
- 2 Disconnect two manifold to elbow tube assemblies (4 and 5) and remove two preformed packings (7) from manifold assembly counterbalance (6).
- 3 Remove eight hexagon head capscrews (8), eight lockwashers (9), and four flange clamp halves (10) securing nipple to winch motor tube assembly (11) and union to boom winch motor tube assembly (12) to boom and winch and vehicle drum winch (13).
- 4 Remove two preformed packings (14) from nipple to winch tube assembly (11) and union to boom winch motor tube assembly (12).
- 5 Remove hexagon head capscrew (15), lockwasher (16), retaining lines to bulkhead strap (17), and two cushioning control clamp pads (18).

- 6 Disconnect brake cylinder to selector valve metal tube assembly (19) from boom and winch and vehicle drum winch (13).
- 7 Remove tube elbow (20), tube fitting locknut (21), flat washer (22), and preformed packing (23).
- 8 Disconnect two manifold to adapter hydraulic cylinder metallic tubes (24) and remove two preformed packings (25).

<i>DISASSEMBLY</i>

Refer to page 2-73 for complete disassembly of all hydraulic lines and fittings.

<i>INSPECTION/REPAIR</i>

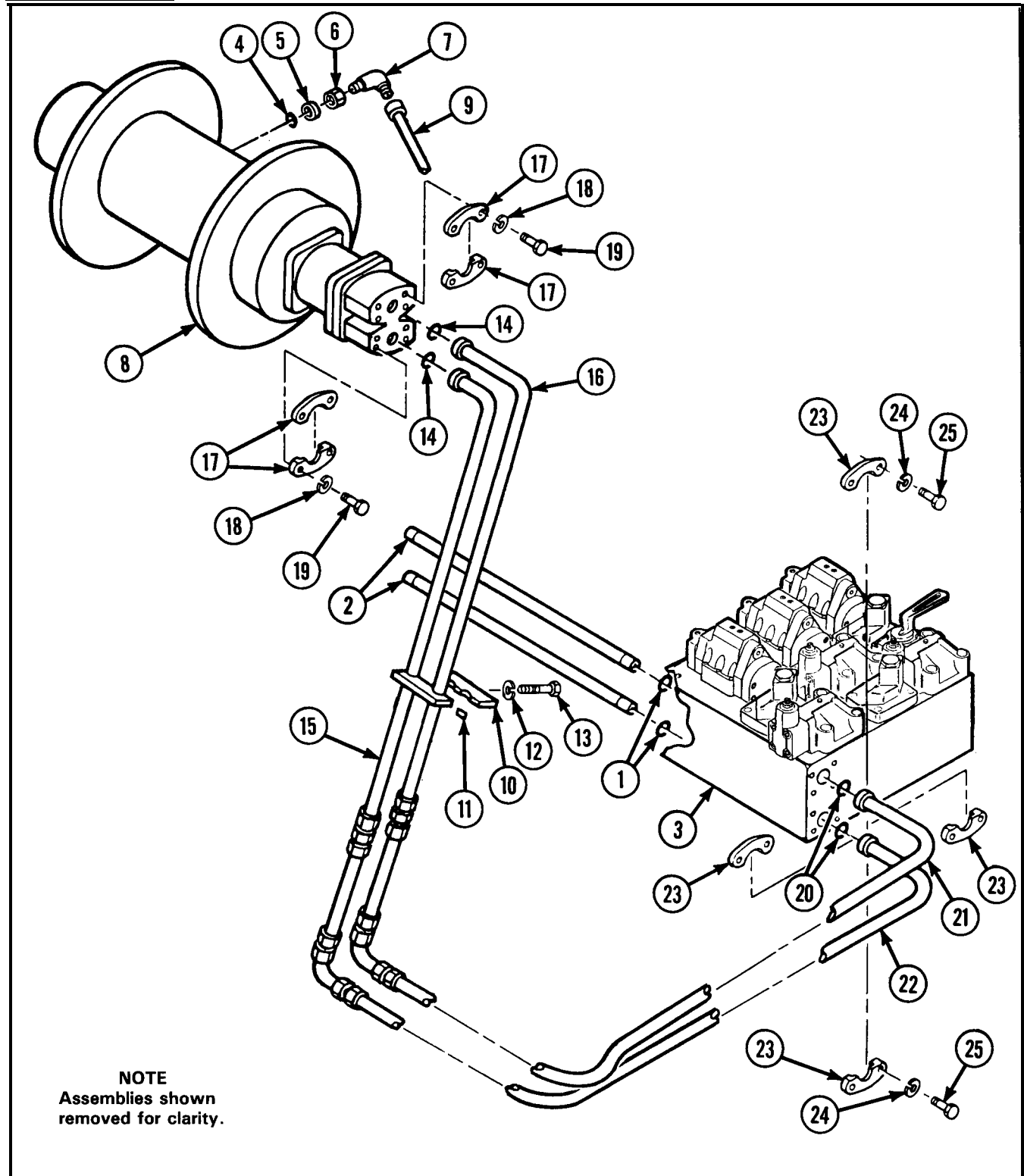
- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

<i>REASSEMBLY</i>

Refer to page 2-73 for complete reassembly of all hydraulic lines and fittings.

2-59. MAINTENANCE OF BOOM WINCH COUNTERBALANCE MANIFOLD HYDRAULIC LINES AND FITTINGS (CONT).

INSTALLATION



- 1 Install two new preformed packings (1) and connect two manifold to adapter hydraulic cylinder metallic tubes (2) to manifold assembly counterbalance (3).
- 2 Install new preformed packing (4), flat washer (5), new tube fitting locknut (6), and tube elbow (7) on boom and winch and vehicle drum winch (8).
- 3 Connect brake cylinder to selector valve metal tube assembly (9) to boom and winch and vehicle drum winch (8).
- 4 Install retaining lines to bulkhead strap (10), two cushioning control clamp pads (11), new lockwasher (12), and hexagon head capscREW (13).
- 5 Install two new preformed packings (14) in nipple to winch tube assembly (15) and union to boom winch motor tube assembly (16) and connect two tube assemblies (15 and 16) to boom and winch and vehicle drum winch (8).
- 6 Install four flange clamp halves (17), eight new lockwashers (18), and eight hexagon head capscREWS (19).
- 7 Install two new preformed packings (20) and connect two manifold to elbow tube assemblies (21 and 22) to manifold assembly counterbalance (3).
- 8 Install four split-flange clamp halves (23), eight new lockwashers (24), and eight hexagon head capscREWS (25).

2-60. MAINTENANCE OF TOW WINCH THREE-SPOOL VALVE HYDRAULIC LINES AND FITTINGS.

This task covers:

a. <i>Removal</i>	d. <i>Reassembly</i>
b. <i>Disassembly</i>	e. <i>Installation</i>
c. <i>Inspection/Repair</i>	

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive (appx B)

Materials/Parts

Lockwasher (2) (MS35338-42)
 Lockwasher (3) (MS35338-44)
 Lockwasher (13) (MS35338-48)
 Preformed packing (4) (MS28775-225)
 Preformed packing (2) (MS28778-6)
 Preformed packing (6) (MS28778-8)
 Tube fitting locknut (2) (AN6289-6)
 Tube fitting locknut (2) (AN6289-8)

References

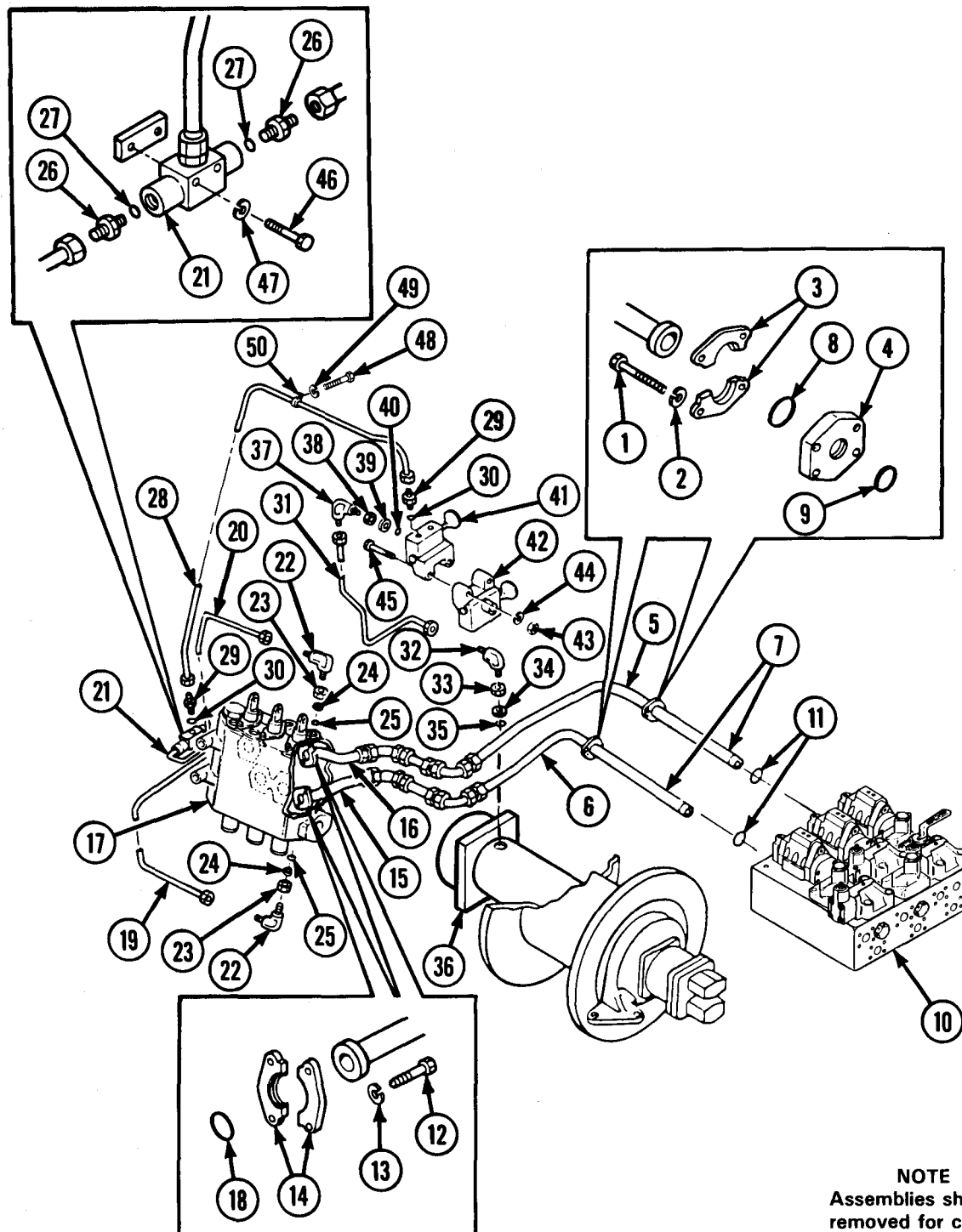
TM 9-2350-238-24P-2

Equipment Conditions

Oil drained from system. Refer to page 2-8.
 2-116 Forward left-hand nonskid metallic tread removed
 2-116 Forward right-hand nonskid metallic tread removed
 2-116 Rear left-hand nonskid metallic tread removed
 2-116 Rear right-hand nonskid metallic tread removed

2-60. MAINTENANCE OF TOW WINCH THREE-SPOOL VALVE HYDRAULIC LINES AND FITTINGS (CONT).

REMOVAL



NOTE

The vehicle hydraulic system is of the open center type and has pressure only when the hydraulic pumps are operating.

- 1 Remove eight hexagon head capscrews (1), eight lockwashers (2), four counterbalance manifold three-spool valve flange clamp halves (3), and two tow winch counterbalance manifold clamp pipe flanges (4) securing elbow to adapter metal tube assembly (5) and elbow to adapter control line metal tube assembly (6) to two adapter to manifold hydraulic winch metallic tubes (7). Remove two preformed packings (8) and two preformed packings (9).
- 2 Disconnect two adapter to manifold hydraulic winch metallic tubes (7) from manifold assembly counterbalance (10). Remove two preformed packings (11).
- 3 Remove eight hexagon head capscrews (12), eight lockwashers (13), and four counterbalance manifold three-spool valve flange clamp halves (14) securing three-spool valve control lines metal tube assembly (15) and three-spool valve control line metal tube assembly (16) to three-spool valve (17).
- 4 Disconnect three-spool valve control lines metal tube assembly (15) and three-spool valve control line metal tube assembly (16) and remove two preformed packings (18).
- 5 Disconnect shuttle valve to three-spool valve metal tube assembly (19) and shuttle valve to three-spool valve metal tube assembly (20) from tow winch brake shuttle valve (21).
- 6 Remove two tube elbows (22), two tube fitting locknuts (23), two flat washers (24), and two preformed packings (25) from three-spool valve (17).
- 7 Remove two tube reducers (26) and two preformed packings (27) from tow winch brake shuttle valve (21).
- 8 Disconnect shuttle valve to selector valve metal tube assembly (28) and remove two tube nipples (29) and two preformed packings (30).
- 9 Disconnect outboard selector valve metal tube assembly (31). Remove tube elbow (32), tube fitting locknut (33), flat washer (34), and preformed packing (35) from winch control cylinder (36).
- 10 Remove tube elbow (37), tube fitting locknut (38), flat washer (39), and preformed packing (40) from hand pump direct selector linear valve (41). Separate two hand pump direct selector linear valves (41 and 42) by removing two hexagon plain nuts (43), two lockwashers (44), and two hexagon head capscrews (45).
- 11 Remove two machine screws (46), two lockwashers (47), and tow winch brake shuttle valve (21) from three-spool valve (17).
- 12 Remove hexagon head capscrew (48), lockwasher (49), and loop clamp (50) from shuttle valve to selector valve metal tube assembly (28).

DISASSEMBLY

Refer to page 2-73 for complete disassembly of all hydraulic lines and fittings.

INSPECTION/REPAIR

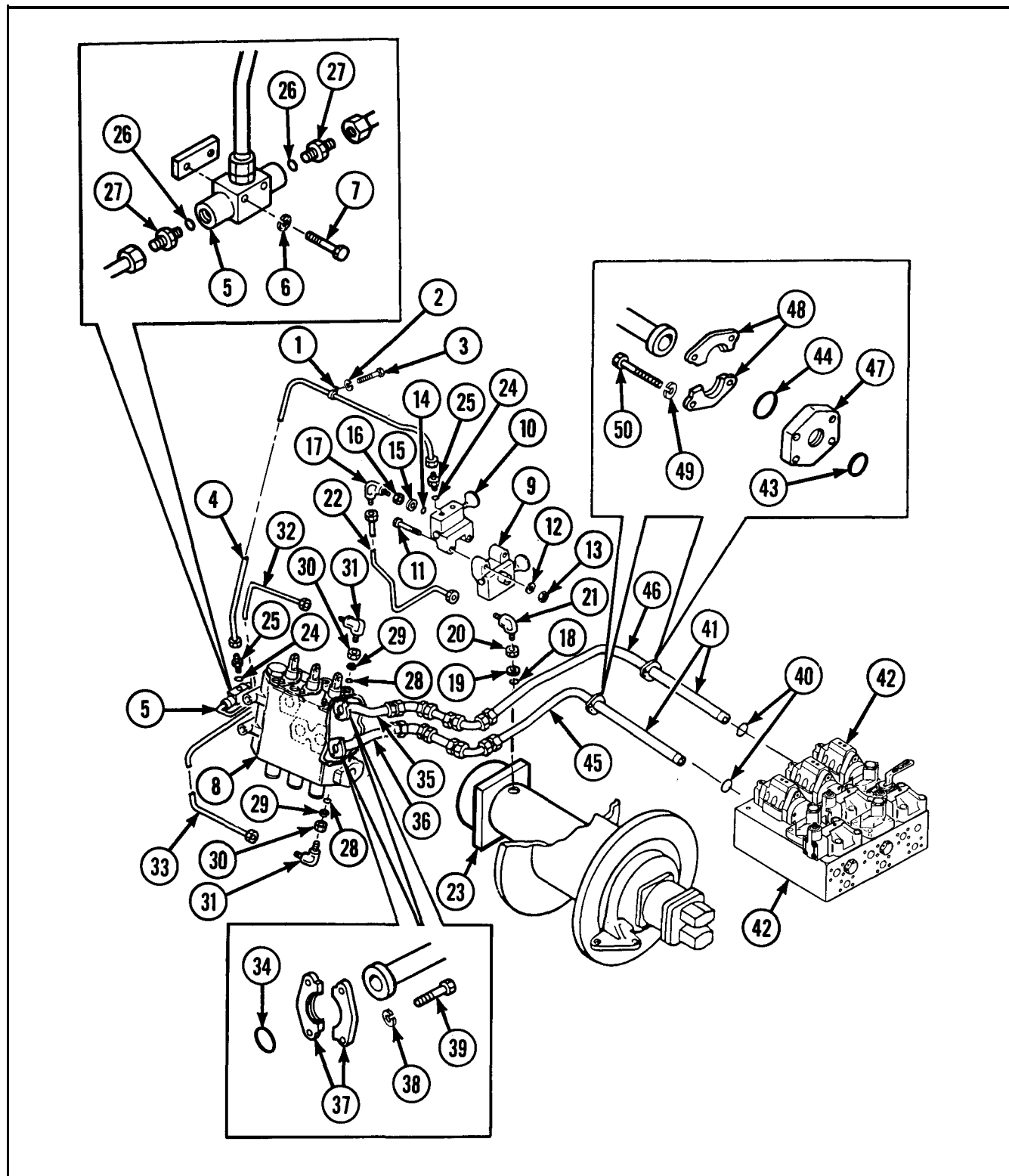
- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

REASSEMBLY

Refer to page 2-73 for complete reassembly of all hydraulic lines and fittings.

2-60. MAINTENANCE OF TOW WINCH THREE-SPOOL VALVE HYDRAULIC LINES AND FITTINGS (CONT).

INSTALLATION



- 1 Install loop clamp (1), new lockwasher (2), and hexagon head capscrew (3) on shuttle valve to selector valve metal tube assembly (4).
- 2 Install tow winch brake shuttle valve (5), two new lockwashers (6), and two machine screws (7) on three-spool valve (8).
- 3 Install two hand pump direct selector linear valves (9 and 10) with two hexagon head capscrews (11), two new lockwashers (12), and two hexagon plain nuts (13). Install new preformed packing (14), flat washer (15), new tube fitting locknut (16), and tube elbow (17) on hand pump direct selector linear valve (10).
- 4 Install new preformed packing (18), flat washer (19), new tube fitting locknut (20), and tube elbow (21) connecting outboard selector valve metal tube assembly (22) to winch control cylinder (23).
- 5 Install two new preformed packings (24) and two tube nipples (25) connecting shuttle valve to selector valve metal tube assembly (4) to tow winch brake shuttle valve (5) and hand pump direct selector linear valve (10).
- 6 Install two new preformed packings (26) and two tube reducers (27) on tow winch brake shuttle valve (5).
- 7 Install two new preformed packings (28), two flat washers (29), two new tube fitting locknuts (30), and two tube elbows (31) on three-spool valve (8).
- 8 Connect shuttle valve to three-spool valve metal tube assembly (32) and shuttle valve to three-spool valve metal tube assembly (33) to tow winch brake shuttle valve (5).
- 9 Install two new preformed packings (34). Connect three-spool valve control line metal tube assembly (35) and three-spool valve control line metal tube assembly (36).
- 10 Secure three-spool valve control line metal tube assembly (35) and three-spool valve control line metal tube assembly (36) to three-spool valve (8) with four counterbalance manifold three-spool valve flange clamp halves (37), eight new lockwashers (38), and eight hexagon head capscrews (39).
- 11 Install two new preformed packings (40). Connect two adapter to manifold hydraulic winch metallic tubes (41) to manifold assembly counterbalance (42).
- 12 Install two new preformed packings (43) and two new preformed packings (44). Secure elbow to adapter metal tube assembly (45) and elbow to adapter control line metal tube assembly (46) to two adapter to manifold hydraulic winch metallic tubes (41) with two tow winch counterbalance manifold clamp pipe flanges (47), four counterbalance manifold three-spool valve flange clamp halves (48), eight new lockwashers (49), and eight hexagon head capscrews (50).

2-61. MAINTENANCE OF TOW WINCH COUNTERBALANCE MANIFOLD HYDRAULIC LINES AND FITTINGS.

This task covers:

a. <i>Removal</i>	d. <i>Reassembly</i>
b. <i>Disassembly</i>	e. <i>Installation</i>
c. <i>Inspection/Repair</i>	

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive (appx B)

Materials/Parts

Lockwasher (16) (MS35338-48)
Preformed packing (4) (MS28775-225)

References

TM 9-2350-238-24P-2

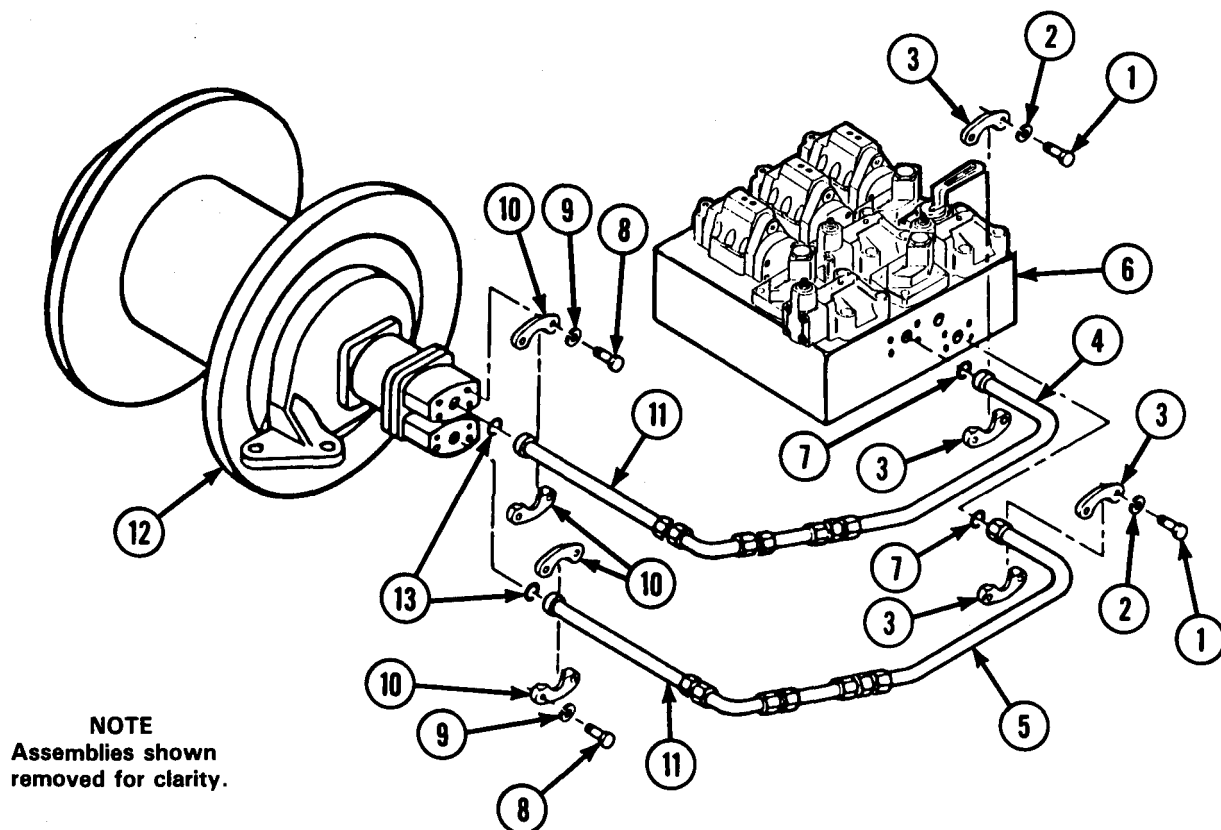
Equipment Conditions

Oil drained from system. Refer to page 2-8.

2-116 Forward left-hand nonskid metallic tread removed

2-116 Rear left-hand nonskid metallic tread removed

REMOVAL



NOTE

The vehicle hydraulic system is of the open center type and has pressure only when the hydraulic pumps are operating.

- 1 Remove eight hexagon head capscrews (1), eight lockwashers (2), and four winch motor adapter flange clamp halves (3) securing manifold to nipple metal tube assembly (4) and manifold to nipple metal tube assembly (5) to manifold assembly counterbalance (6).
- 2 Disconnect two manifold to nipple metal tube assemblies (4 and 5) and remove two preformed packings (7).
- 3 Remove eight hexagon head capscrews (8), eight lockwashers (9), and four winch motor adapter flange clamp halves (10) securing two elbow to winch control line metal tube assemblies (11) to vehicle drum winch (12).
- 4 Disconnect two elbow to winch control line metal tube assemblies (11) and remove two preformed packings (13).

DISASSEMBLY

Refer to page 2-73 for complete disassembly of all hydraulic lines and fittings.

INSPECTION/REPAIR

- 1 Check for broken, damaged, or missing parts.

- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

REASSEMBLY

Refer to page 2-73 for complete reassembly of all hydraulic lines and fittings.

INSTALLATION

- 1 Install two new preformed packings (13) and connect two elbow to winch control line metal tube assemblies (11).
- 2 Install two elbow to winch control lines metal tube assemblies (11) to vehicle drum winch (12) using four winch motor adapter flange clamp halves (10), eight new lockwashers (9), and eight hexagon head capscrews (8).
- 3 Install two new preformed packings (7) and connect two manifold to nipple metal tube assemblies (4 and 5).
- 4 Install manifold to nipple metal tube assembly (4) and manifold to nipple metal tube assembly (5) to manifold assembly counterbalance (6) using four winch motor adapter flange clamp halves (3), eight new lockwashers (2), and eight hexagon head capscrews (1).

2-62. MAINTENANCE OF TRAVERSING SYSTEM CONTROL VALVE HYDRAULIC LINES AND FITTINGS.

This task covers:

a. <i>Removal</i>	d. <i>Reassembly</i>
b. <i>Disassembly</i>	e. <i>Installation</i>
c. <i>Inspection/Repair</i>	

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive (appx B)

Shop equipment, automotive maintenance and repair: organizational maintenance, common no. 1, less power (appx B)
Wrench, 1-1/4 in.
Wrench, 1-3/8 in.

Materials/Parts

Lockwasher (3) (MS35338-46)
Preformed packing (2) (MS28778-10)
Preformed packing (5) (MS28778-12)
Tube fitting locknut (AN6289-10)

References

TM 9-2350-238-24P-2

Equipment Conditions

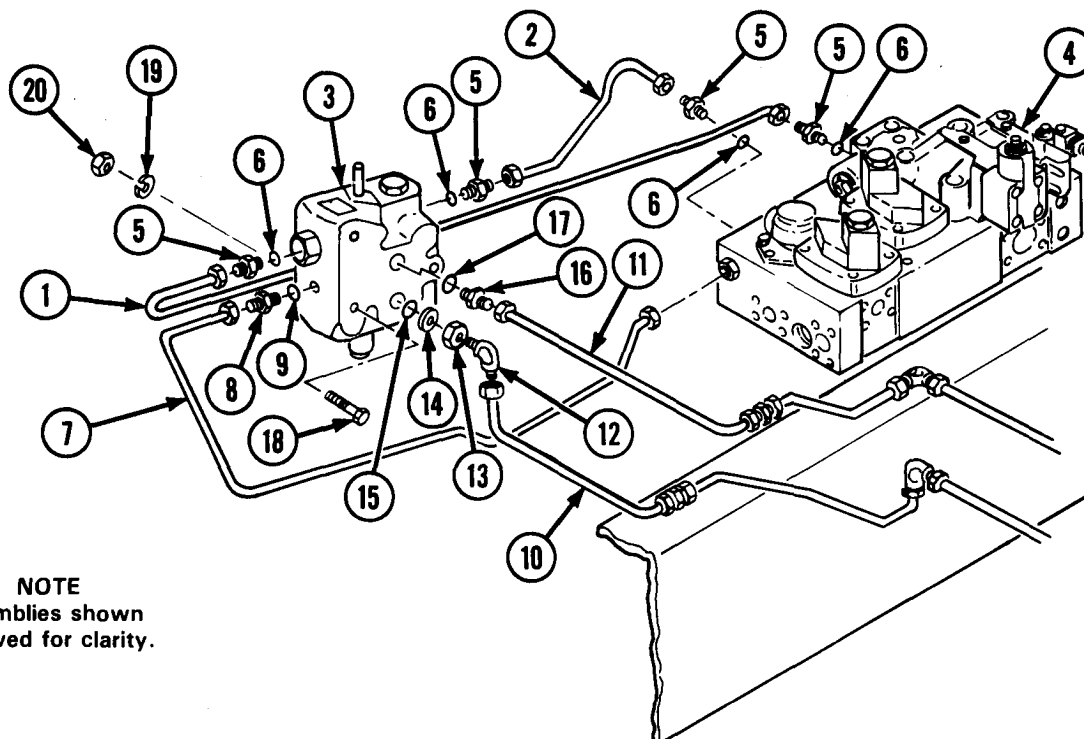
Oil drained from system. Refer to page 2-8.

2-116 Forward right-hand nonskid metallic tread removed

2-116 Rear right-hand nonskid metallic tread removed

2-116 Traversing hydraulic valve control pedal removed

REMOVAL



NOTE
Assemblies shown
removed for clarity.

NOTE

The vehicle hydraulic system is of the open center type and has pressure only when the hydraulic pumps are operating.

- 1 Disconnect control valve return metal tube assembly (1) and control valve metal tube assembly (2) from direct turret traverse control linear valve (3) and flow divider hydraulic manifold (4).
- 2 Remove four tube nipples (5) and four preformed packings (6).
- 3 Disconnect high pressure metal tube assembly (7) from direct turret traverse control linear valve (3) and flow divider hydraulic manifold (4).
- 4 Remove tube nipple (8) and preformed packing (9).
- 5 Disconnect control valve output line metal tube assembly (10) and output metal tube assembly (11) from direct turret traverse control linear valve (3).
- 6 Remove tube elbow (12), tube fitting locknut (13), flat washer (14), preformed packing (15), tube nipple (16), and preformed packing (17).

- 7 Remove three hexagon head capscrews (18), three lockwashers (19), three hexagon plain nuts (20), and direct turret traverse control linear valve (3).

DISASSEMBLY

Refer to page 2-73 for complete disassembly of all hydraulic lines and fittings.

INSPECTION/REPAIR

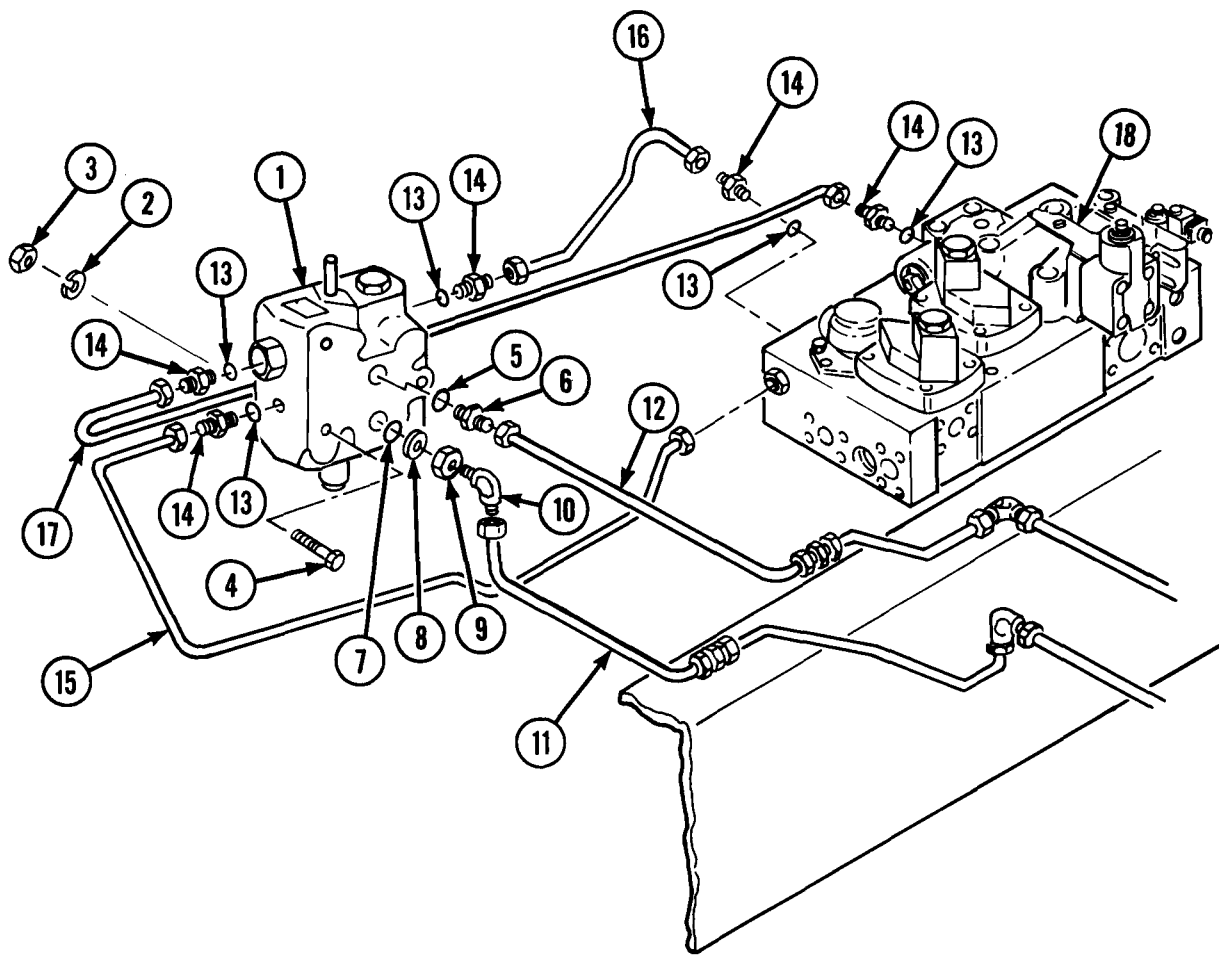
- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

REASSEMBLY

Refer to page 2-73 for complete reassembly of all hydraulic lines and fittings.

2-62. MAINTENANCE OF TRAVERSING SYSTEM CONTROL VALVE HYDRAULIC LINES AND FITTINGS (CONT).

INSTALLATION



NOTE
Assemblies shown
removed for clarity.

- 1 Install direct turret traverse control linear valve (1), three new lockwashers (2), three hexagon plain nuts (3), and three hexagon head capscrews (4).
- 2 Install new preformed packing (5), tube nipple (6), new preformed packing (7), flat washer (8), new tube fitting locknut (9), and tube elbow (10).
- 3 Connect control valve output line metal tube assembly (11) and output metal tube assembly (12) to direct turret traverse control linear valve (1).
- 4 Install five new preformed packings (13) and five tube nipples (14).
- 5 Connect high pressure metal tube assembly (15), control valve metal tube assembly (16), and control valve return metal tube assembly (17) to direct turret traverse control linear valve (1) and flow divider hydraulic manifold (18).

2-63. MAINTENANCE OF TRAVERSING SYSTEM CONTROL SOLENOID VALVES HYDRAULIC LINES AND FITTINGS.

This task covers:

a. <i>Removal</i>	d. <i>Reassembly</i>
b. <i>Disassembly</i>	e. <i>Installation</i>
c. <i>Inspection/Repair</i>	

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive (appx B)

Materials/Parts

Lockwasher (6) (MS35333-40)
Packing retainer (MS28777-12)
Preformed packing (7) (MS28778-8)
Preformed packing (MS28778-12)
Tube fitting locknut (3) (AN6289-8)
Tube fitting locknut (AN6289-12)

References

TM 9-2350-238-24P-2

Equipment Conditions

Oil drained from system. Refer to page 2-8.
2-330 Equipment stowage accessories box removed

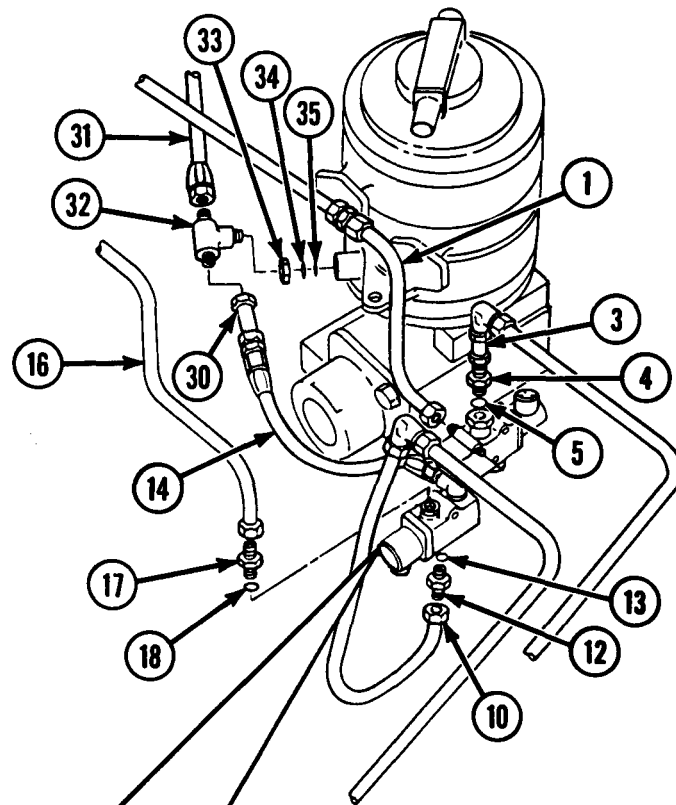
General Safety Instructions

WARNING

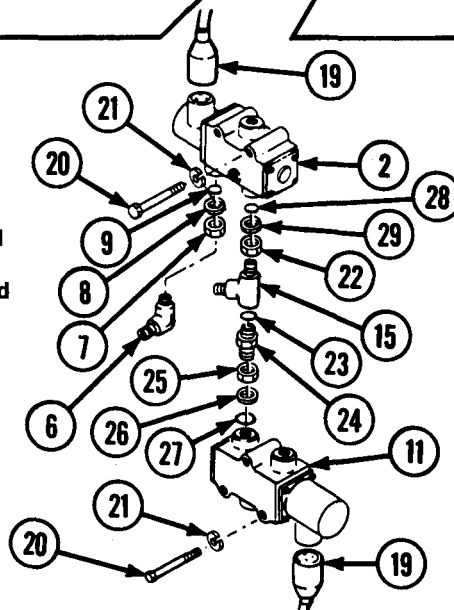
Make sure MASTER switch is OFF before removing electrical leads. Failure to observe this warning could result in injury to personnel.

2-63. MAINTENANCE OF TRAVERSING SYSTEM CONTROL SOLENOID VALVES
HYDRAULIC LINES AND FITTINGS (CONT).

REMOVAL



NOTE
Assemblies shown
removed for clarity.



NOTE
Two level wind
traverse directional
control solenoid
valves are mounted
on left turret wall.

NOTE

- Gain access to traversing system solenoid valves hydraulic lines and fittings through well.

- The vehicle hydraulic system is of the open center type and has pressure only when the hydraulic pumps are operating.

- Two level wind traverse directional control solenoid valves are mounted on left turret wall.

- 1 Disconnect traverse motor control line tube assembly (1) from level wind traverse directional control solenoid valve (2).
- 2 Disconnect solenoid valve motor control metal tube assembly (3) from level wind traverse directional control solenoid valve (2).
- 3 Remove external thread tube reducer (4), preformed packing (5), tube elbow (6), tube fitting locknut (7), flat washer (8), and preformed packing (9) from level wind traverse directional control solenoid valve (2).
- 4 Disconnect solenoid valve to motor input metal tube assembly (10) from level wind traverse directional control solenoid valve (11).
- 5 Remove tube reducer (12) and preformed packing (13).
- 6 Disconnect level wind solenoid valve input pressure line nonmetallic hose assembly (14) from tube to boss tee (15).
- 7 Disconnect traverse motor control line metal tube assembly (16) from level wind traverse directional control solenoid valve (11).

- 8 Remove tube reducer (17) and preformed packing (18).

WARNING

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

- 9 Tag and disconnect two electrical leads (19) from two level wind traverse directional control solenoid valves (2 and 11).
- 10 Remove six hexagon capscrews (20), six lockwashers (21), and two level wind traverse directional control solenoid valves (2 and 11).
- 11 Back off tube fitting locknut (22) on tube to boss tee (15) and remove level wind traverse directional control solenoid valve (2).
- 12 Remove tube to boss tee (15), preformed packing (23), tube nipple (24), tube fitting locknut (25), flat washer (26), and preformed packing (27).
- 13 Remove preformed packing (28), flat washer (29), and tube fitting locknut (22) from tube to boss tee (15).
- 14 Disconnect level wind solenoid valve pressure line to tee metal tube assembly (30) and tube assembly (31) from tube tee (32).
- 15 Remove tube tee (32), tube fitting locknut (33), packing retainer (34), and preformed packing (35).

2-63. MAINTENANCE OF TRAVERSING SYSTEM CONTROL SOLENOID VALVES HYDRAULIC LINES AND FITTINGS (CONT).

DISASSEMBLY

Refer to page 2-73 for complete disassembly of all hydraulic lines and fittings.

INSPECTION/REPAIR

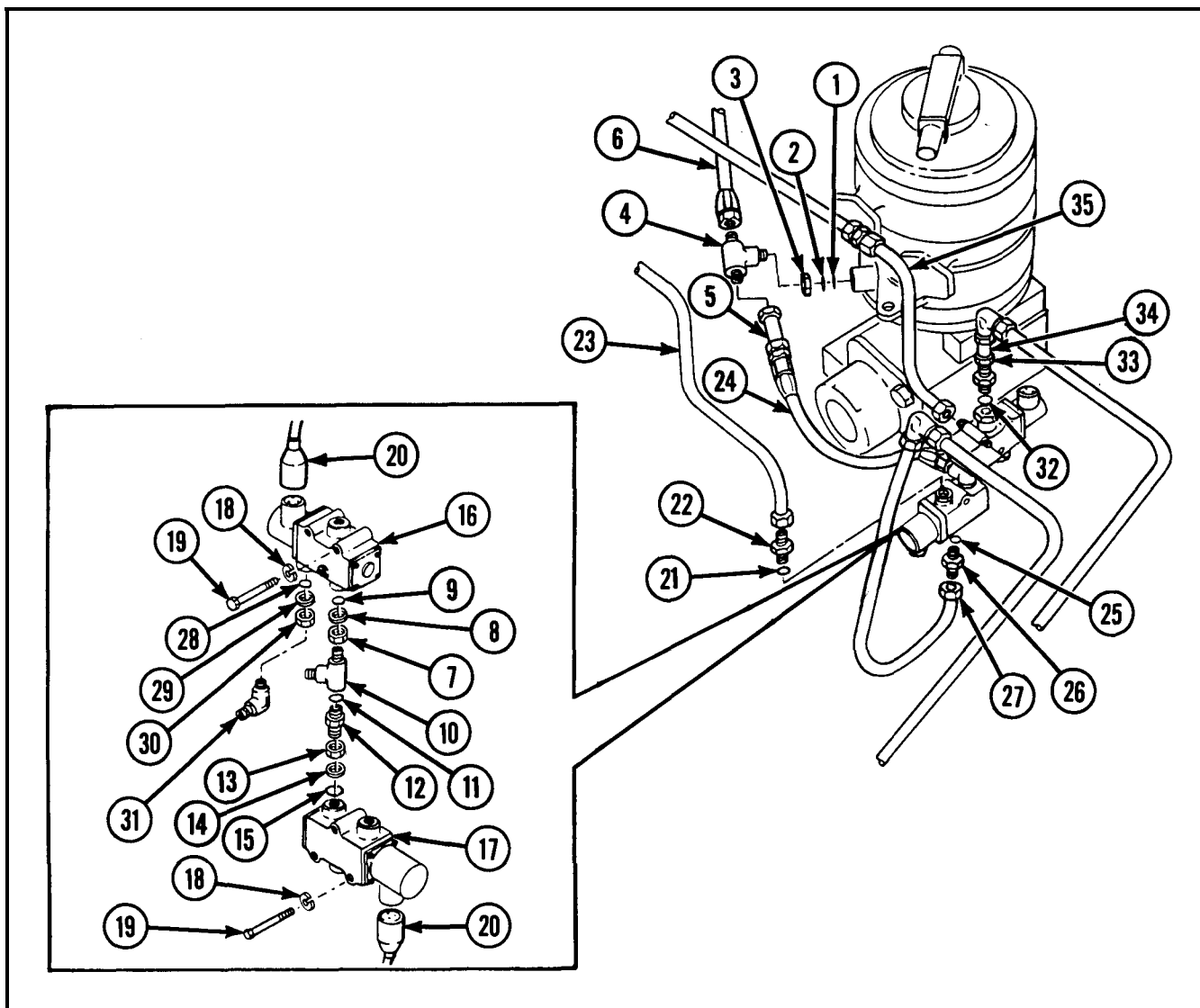
1 Check for broken, damaged, or missing parts.

2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

REASSEMBLY

Refer to page 2-73 for complete reassembly of all hydraulic lines and fittings.

INSTALLATION



- 1 Install new preformed packing (1), new packing retainer (2), new tube fitting locknut (3), and tube tee (4).
- 2 Connect level wind solenoid valve pressure line to tee metal tube assembly (5) and tube assembly (6) to tube tee (4).
- 3 Install new tube fitting locknut (7), flat washer (8), and new preformed packing (9) on tube to boss tee (10).
- 4 Install tube to boss tee (10), new preformed packing (11), tube nipple (12), tube fitting locknut (13), flat washer (14), and new preformed packing (15).
- 5 Install level wind traverse directional control solenoid valve (16) and tighten tube fitting locknut (7) on tube to boss tee (10).
- 6 Install two level wind traverse directional control solenoid valves (16 and 17), six new lockwashers (18), and six hexagon capscrews (19).
- 7 Connect two electrical leads (20) to two level wind traverse directional control solenoid valves (16 and 17).
- 8 Install new preformed packing (21) and tube reducer (22) on level wind traverse directional control solenoid valve (17).
- 9 Connect traverse motor control line metal tube assembly (23) to level wind traverse directional control solenoid valve (17).
- 10 Connect level wind solenoid valve input pressure line nonmetallic hose assembly (24) to tube to boss tee (10).
- 11 Install new preformed packing (25) and tube reducer (26).
- 12 Connect solenoid valve to motor input metal tube assembly (27) to level wind traverse directional control solenoid valve (17).
- 13 Install new preformed packing (28), flat washer (29), new tube fitting locknut (30), tube elbow (31), new preformed packing (32), and external thread tube reducer (33) on level wind traverse directional control solenoid valve (16).
- 14 Connect solenoid valve motor control metal tube assembly (34) and traverse motor control line tube assembly (35) to level wind traverse directional control solenoid valve (16).

2-64. MAINTENANCE OF TRAVERSING SYSTEM POWER UNIT HYDRAULIC LINES AND FITTINGS.

This task covers:

a. <i>Removal</i>	d. <i>Reassembly</i>
b. <i>Disassembly</i>	e. <i>Installation</i>
c. <i>Inspection/Repair</i>	

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive
(appx B)

References

TM 9-2350-238-24P-2

Materials/Parts

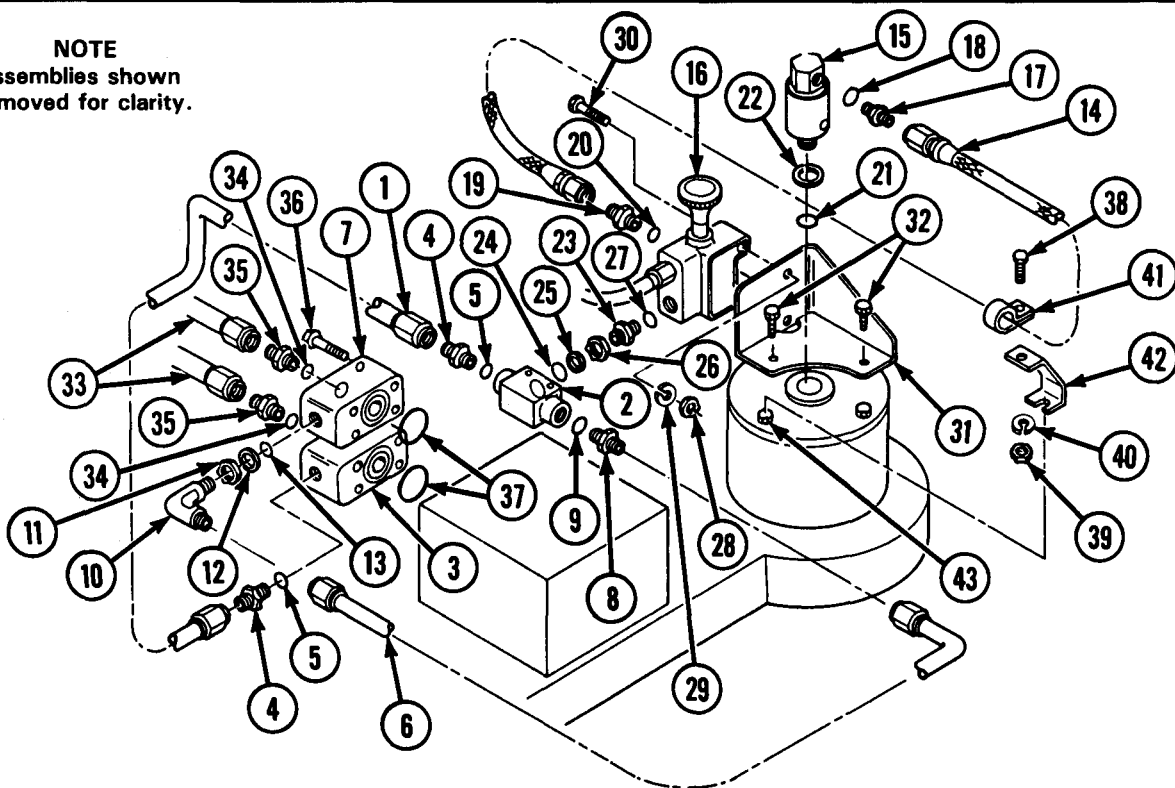
Lockwasher (3) (MS35338-44)
Nonmetallic seal (11593122)
Preformed packing (2) (MS28775-219)
Preformed packing (2) (MS28778-6)
Preformed packing (7) (MS28778-8)
Preformed packing (2) (MS28778-10)
Tube fitting locknut (2) (AN6289-8)

Equipment Conditions

Oil drained from system. Refer to page 2-8.
2-116 Forward left-hand nonskid metallic
tread removed

REMOVAL

NOTE
Assemblies shown
removed for clarity.



NOTE

The vehicle hydraulic system is of the open center type and has pressure only when the hydraulic pumps are operating.

- 1 Disconnect motor to shuttle valve metal tube assembly (1) from traverse brake control shuttle valve (2) and lower motor control line flange support (3).
- 2 Remove two tube nipples (4) and two preformed packings (5).
- 3 Disconnect motor to shuttle valve metal tube assembly (6) from traverse brake control shuttle valve (2) and upper motor control line flange support (7).
- 4 Remove tube nipple (8), preformed packing (9), tube elbow (10), tube fitting locknut (11), flat washer (12), and preformed packing (13).
- 5 Disconnect cylinder traverse brake control line nonmetallic hose assembly (14) from brake pipe hose swivel joint (15) and traverse brake direct selector linear valve (16).
- 6 Remove tube reducer (17), preformed packing (18), tube reducer (19), and preformed packing (20).
- 7 Remove brake pipe hose swivel joint (15), preformed packing (21), and traverse brake nonmetallic seal (22).
- 8 Remove traverse brake control shuttle valve (2) from tube nipple (23).
- 9 Remove preformed packing (24), flat washer (25), tube fitting locknut (26), tube nipple (23), and preformed packing (27).
- 10 Remove two hexagon plain nuts (28), two lockwashers (29), two hexagon head capscrews (30), and traverse brake direct selector linear valve (16) from motor brake selector valve angle bracket (31).

- 11 Remove two hexagon head capscrews (32) and motor brake selector valve angle bracket (31).
- 12 Disconnect two tube assemblies (33) and remove two preformed packings (34) and two tube nipples (35).
- 13 Remove eight socket head capscrews (36) and two motor control line flange supports (3 and 7).
- 14 Remove two preformed packings (37) from two motor control line flange supports (3 and 7).
- 15 Remove hexagon head capscrew (38), hexagon plain nut (39), and lockwasher (40) securing loop clamp (41) to brake hose clamp retaining strap (42).
- 16 Loosen hexagon head capscrew (43) and remove brake hose clamp retaining strap (42).

DISASSEMBLY

Refer to page 2-73 for complete disassembly of all hydraulic lines and fittings.

INSPECTION/REPAIR

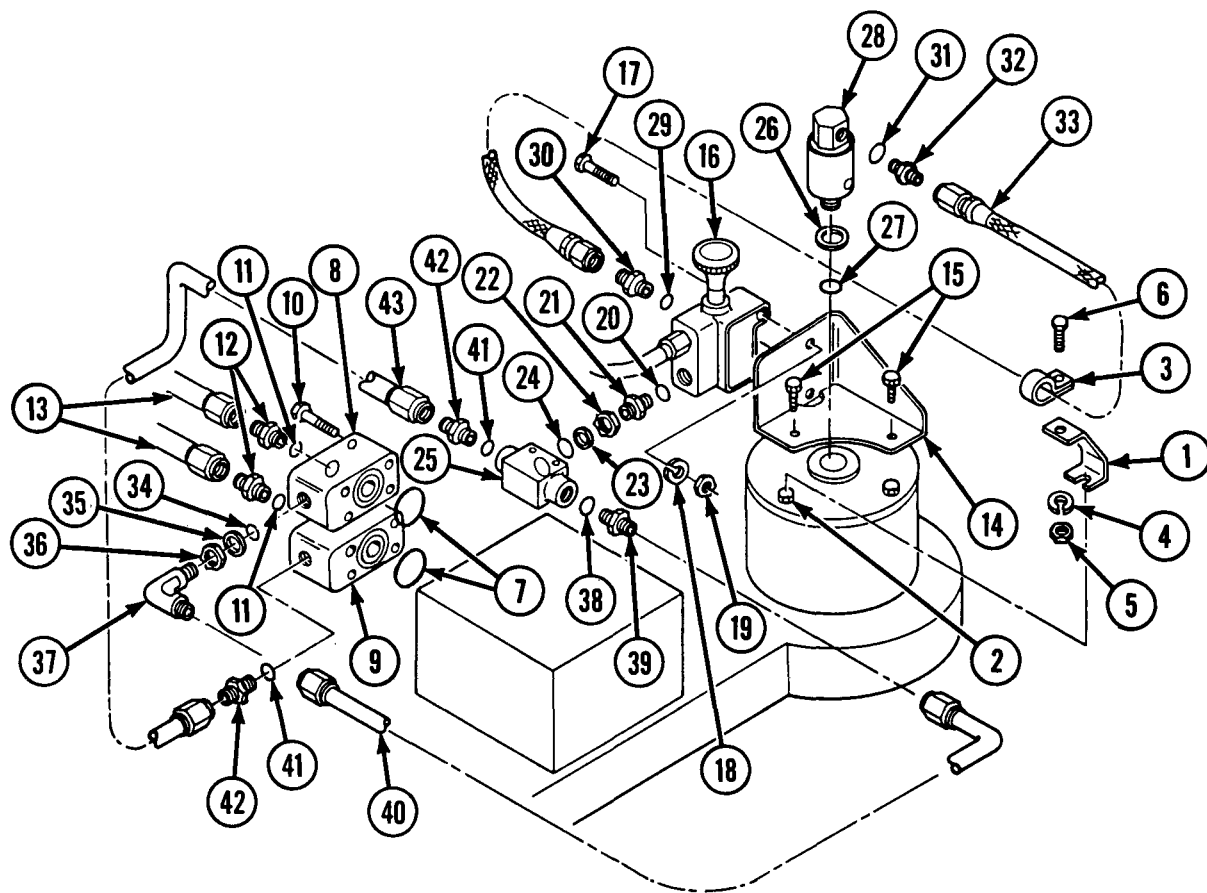
- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

REASSEMBLY

Refer to page 2-73 for complete reassembly of all hydraulic lines and fittings.

2-64. MAINTENANCE OF TRAVERSING SYSTEM POWER UNIT HYDRAULIC LINES AND FITTINGS (CONT).

INSTALLATION



NOTE
Assemblies shown
removed for clarity.

1 Install brake hose clamp retaining strap (1) and tighten hexagon head capscrew (2) to secure.

2 Install loop clamp (3) on brake hose clamp retaining strap (1) and secure using new lockwasher (4), hexagon plain nut (5), and hexagon head capscrew (6).

3 Install two new preformed packings (7) on two motor control line flange supports (8 and 9).

4 Install two motor control line flange supports (8 and 9) and eight socket head capscrews (10).

5 Install two new preformed packings (11) and two tube nipples (12) and connect two tube assemblies (13).

6 Install motor brake selector valve angle bracket (14) and two hexagon head capscrews (15).

- 7 Install traverse brake direct selector linear valve (16), two hexagon head capscrews (17), two new lockwashers (18), and two hexagon plain nuts (19) on motor brake selector valve angle bracket (14).
- 8 Install new preformed packing (20), tube nipple (21), new tube fitting locknut (22), flat washer (23), and new preformed packing (24).
- 9 Install traverse brake control shuttle valve (25) on tube nipple (21).
- 10 Install traverse brake nonmetallic seal (26), new preformed packing (27), and brake pipe hose swivel joint (28).
- 11 Install new preformed packing (29), tube reducer (30), new preformed packing (31), and tube reducer (32).
- 12 Connect cylinder traverse brake control line nonmetallic hose assembly (33) to brake pipe hose swivel joint (28) and traverse brake direct selector linear valve (16).
- 13 Install new preformed packing (34), flat washer (35), new tube fitting locknut (36), tube elbow (37), new preformed packing (38), and tube nipple (39).
- 14 Connect motor to shuttle valve metal tube assembly (40) to traverse brake control shuttle valve (25) and upper motor control line flange support (8).
- 15 Install two new preformed packings (41) and two tube nipples (42).
- 16 Connect motor to shuttle valve metal tube assembly (43) to traverse brake control shuttle valve (25) and lower motor control line flange support (9).

2-65. MAINTENANCE OF SLIP RING, FLOW DIVIDER MANIFOLD, AND CONTROL VALVE HYDRAULIC LINES AND FITTINGS.

This task covers:	a. <i>Removal</i>	d. <i>Reassembly</i>
	b. <i>Disassembly</i>	e. <i>Installation</i>
	c. <i>Inspection/Repair</i>	

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive (appx B)

Materials/Parts

Lockwasher (32) (MS35338-47)
 Lockwasher (11) (MS35338-48)
 Preformed packing (8) (MS28775-222)
 Preformed packing (2) (MS28775-228)

References

TM 9-2350-238-24P-2

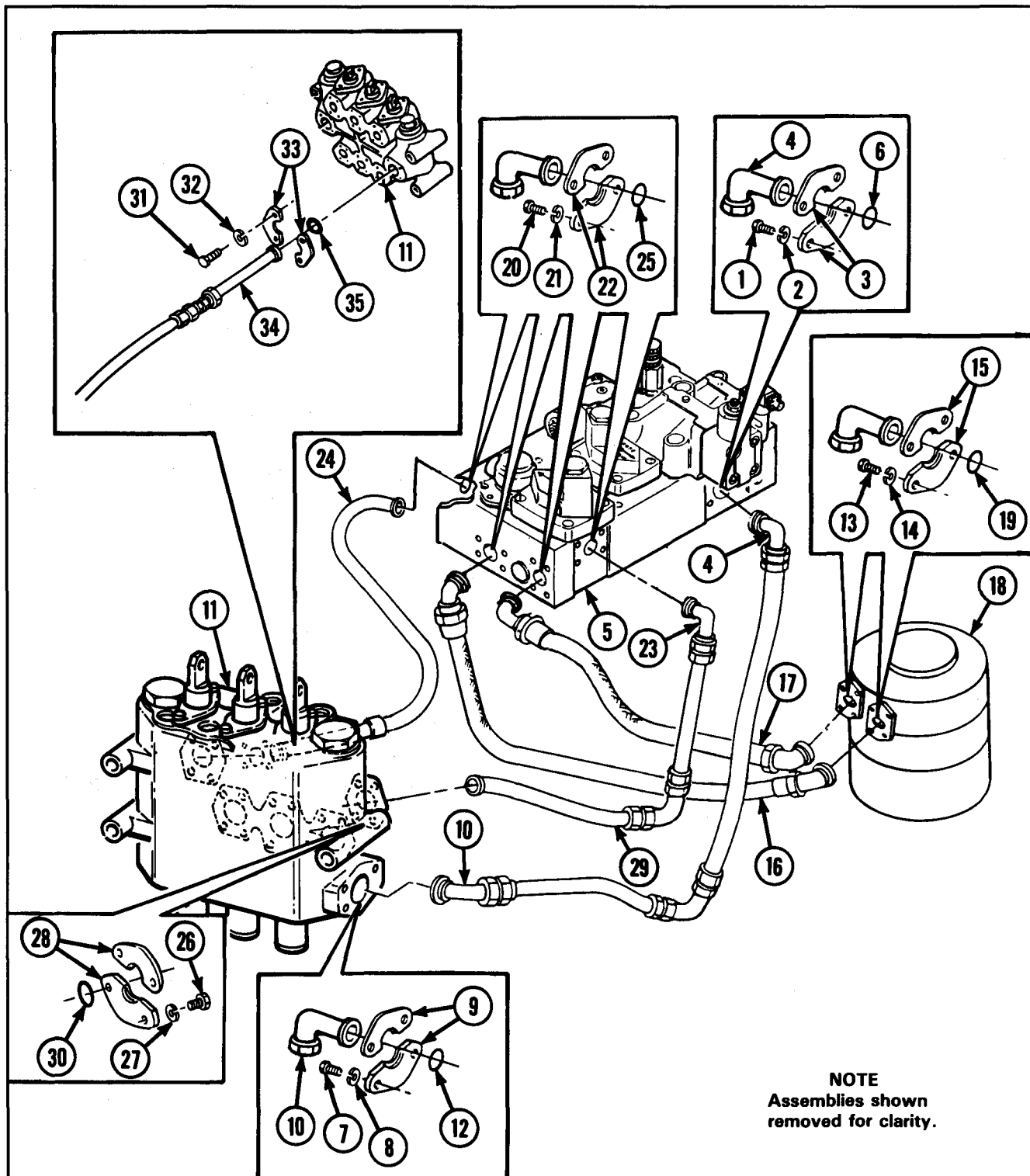
Equipment Conditions

Oil drained from system. Refer to page 2-8.

2-116 Forward right-hand nonskid metallic tread removed
 2-116 Rear right-hand nonskid metallic tread removed
 2-330 Equipment stowage accessories box removed

2-65. MAINTENANCE OF SLIP RING, FLOW DIVIDER MANIFOLD, AND CONTROL VALVE HYDRAULIC LINES AND FITTINGS (CONT).

REMOVAL



NOTE

The vehicle hydraulic system is of the open center type and has pressure only when the hydraulic pumps are operating.

- 1 Remove four hexagon head capscrews (1), four lockwashers (2), and two split-flange clamp halves (3) securing tube elbow (4) to flow divider hydraulic manifold (5).
- 2 Remove preformed packing (6) from tube elbow (4).
- 3 Remove four hexagon head capscrews (7), four lockwashers (8), and two split-flange clamp halves (9) securing tube elbow (10) to three-spool direct linear valve (11).
- 4 Remove preformed packing (12) from tube elbow (10).
- 5 Remove eight hexagon head capscrews (13), eight lockwashers (14), and four split-flange clamp halves (15) securing two manifold supply nonmetallic tube assemblies (16 and 17) to slip ring (18).
- 6 Remove two preformed packings (19) from two manifold supply nonmetallic tube assemblies (16 and 17).
- 7 Remove sixteen hexagon head capscrews (20), sixteen lockwashers (21), and eight split-flange halves (22) securing tube elbow (23), three-spool valve pressure tube assembly (24), and two manifold supply nonmetallic tube assemblies (16 and 17) to flow divider hydraulic manifold (5).
- 8 Remove four preformed packings (25) from tube elbow (23), three-spool valve pressure metal tube assembly (24) and two manifold supply nonmetallic tube assemblies (16 and 17).
- 9 Remove four hexagon head capscrews (26), four lockwashers (27), and two split-flange clamp halves (28) securing three-spool valve pressure tube assembly (29) to three-spool direct linear valve (11).
- 10 Remove preformed packing (30) from three-spool valve pressure tube assembly (29).
- 11 Remove four hexagon head capscrews (31), four lockwashers (32), and two split-flange clamp halves (33) securing three-spool valve to motor tube assembly (34) to three-spool direct linear valve (11).
- 12 Remove preformed packing (35) from three-spool valve to motor tube assembly (34).

DISASSEMBLY

Refer to page 2-73 for complete disassembly of all hydraulic lines and fittings.

INSPECTION/REPAIR

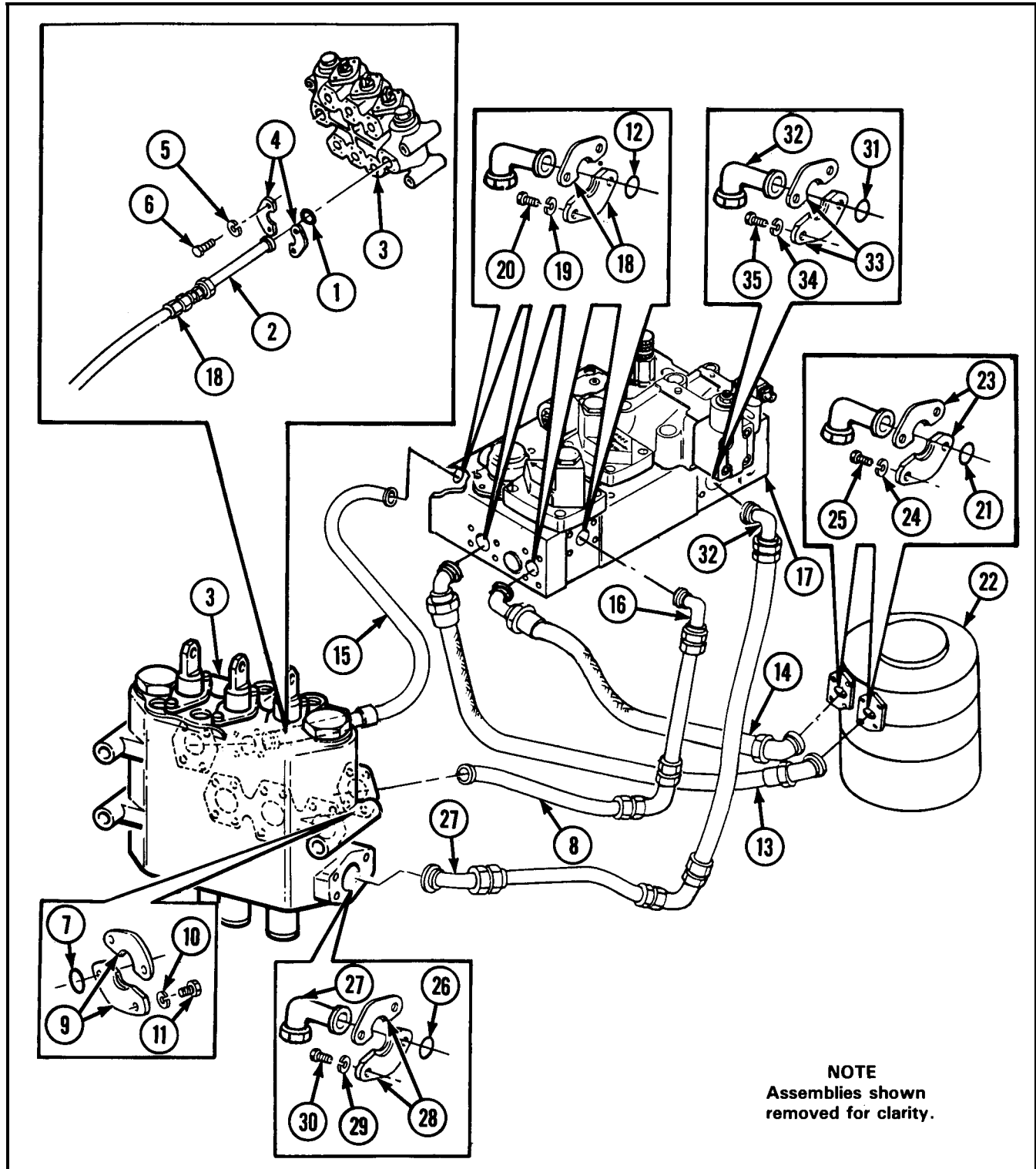
- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

REASSEMBLY

Refer to page 2-73 for complete reassembly of all hydraulic lines and fittings.

2-65. MAINTENANCE OF SLIP RING, FLOW DIVIDER MANIFOLD, AND CONTROL VALVE HYDRAULIC LINES AND FITTINGS (CONT).

INSTALLATION



- 1** Install new preformed packing (1) and connect three-spool valve to motor tube assembly (2) to three-spool direct linear valve (3).
- 2** Install two split-flange clamp halves (4), four new lockwashers (5), and four hexagon head capscrews (6) securing three-spool valve to motor tube assembly (2) to three-spool direct linear valve (3).
- 3** Install new preformed packing (7) and connect three-spool valve pressure tube assembly (8) to three-spool direct linear valve (3).
- 4** Install two split-flange clamp halves (9), four new lockwashers (10), and four hexagon head capscrews (11) securing three-spool valve pressure tube assembly (8) to three-spool direct linear valve (3).
- 5** Install four new preformed packings (12) and connect two manifold supply nonmetallic tube assemblies (13 and 14), three-spool valve pressure tube assembly (15), and tube elbow (16) to flow divider hydraulic manifold (17).
- 6** Install eight split-flange clamp halves (18), sixteen new lockwashers (19), and sixteen hexagon head capscrews (20) securing two manifold supply nonmetallic tube assemblies (13 and 14), three-spool valve pressure tube assembly (15), and tube elbow (16) to flow divider hydraulic manifold (17).
- 7** Install two new preformed packings (21) and connect two manifold supply nonmetallic tube assemblies (13 and 14) to slip ring (22).
- 8** Install four split-flange clamp halves (23), eight new lockwashers (24), and eight hexagon head capscrews (25) securing two manifold supply nonmetallic tube assemblies (13 and 14) to slip ring (22).
- 9** Install new preformed packing (26) and connect tube elbow (27) to three-spool direct linear valve (3).
- 10** Install two split-flange clamp halves (28), four new lockwashers (29), and four hexagon head capscrews (30) securing tube elbow (27) to three-spool direct linear valve (3).
- 11** Install new preformed packing (31) and tube elbow (32) on flow divider hydraulic manifold (17).
- 12** Install two split-flange clamp halves (33), four new lockwashers (34), and four hexagon head capscrews (35) securing tube elbow (32) to flow divider hydraulic manifold (17).

2-66. MAINTENANCE OF HYDRAULIC DRAIN LINES, FITTINGS, AND COMPONENTS.

This task covers:

a. <i>Removal</i>	d. <i>Reassembly</i>
b. <i>Disassembly</i>	e. <i>Installation</i>
c. <i>Inspection/Repair</i>	

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive
(appx B)

References

TM 9-2350-238-24P-2

Materials/Parts

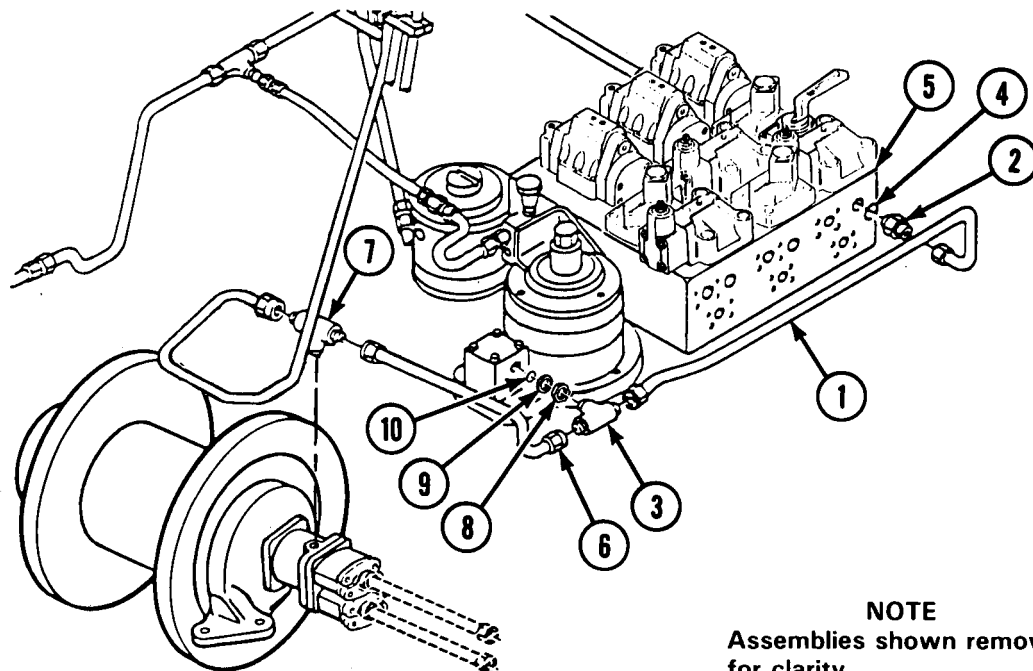
Hand pump handle grip (10910352)
Lockwasher (3) (MS35338-44)
Lockwasher (4) (MS35338-48)
Packing retainer (2) (MS28777-12)
Preformed packing (MS28775-232)
Preformed packing (MS28778-4)
Preformed packing (4) (MS28778-6)
Preformed packing (5) (MS28778-8)
Preformed packing (4) (MS28778-12)
Spring pin (MS9048-173)
Tube fitting locknut (3) (AN6289-6)
Tube fitting locknut (2) (AN6289-12)

Equipment Conditions

Oil drained from system. Refer to page 2-8.

2-116 Forward right-hand nonskid
metallic tread removed
2-116 Rear right-hand nonskid metallic
tread removed
2-116 Forward left-hand nonskid metallic
tread removed
2-116 Rear left-hand nonskid metallic
tread removed

REMOVAL

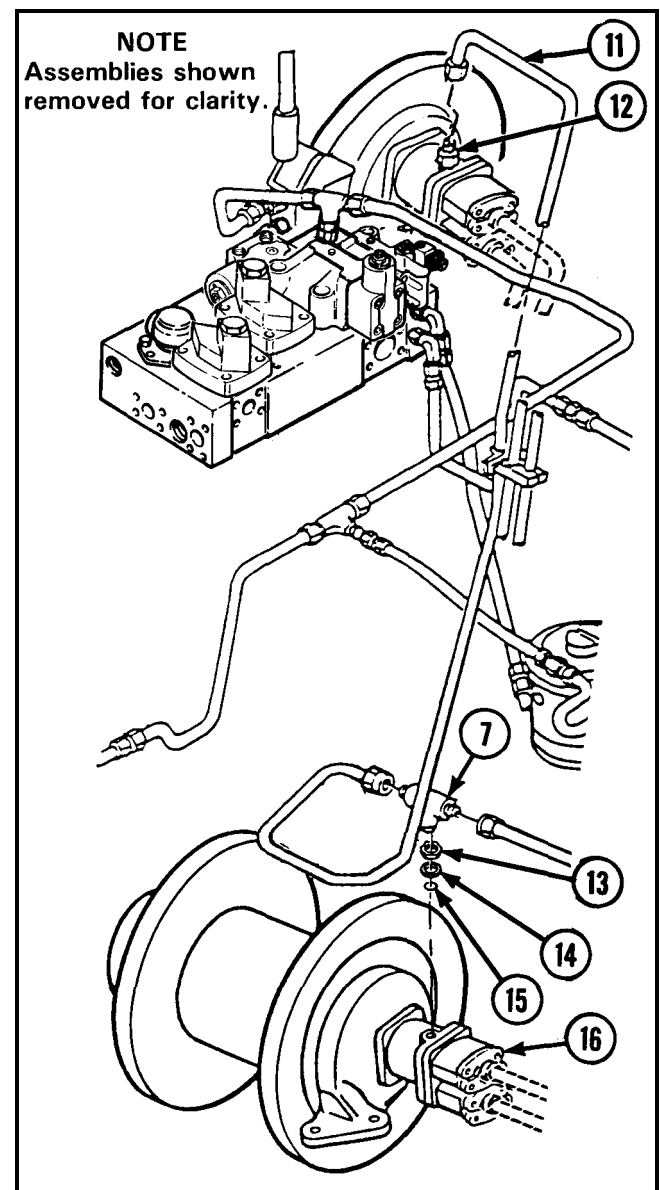


NOTE

The vehicle hydraulic system is of the open center type and has pressure only when the hydraulic pumps are operating.

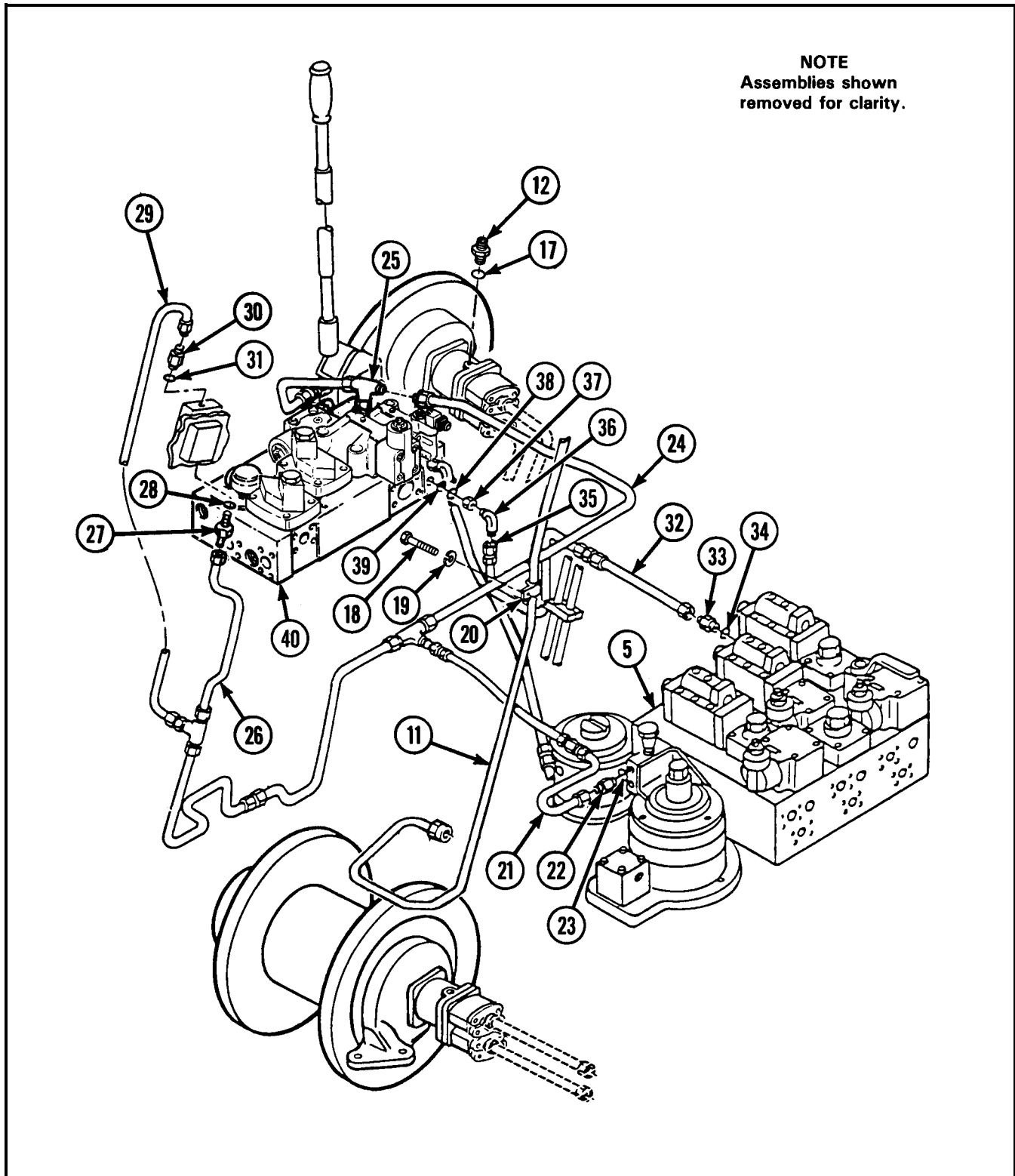
- 1 Disconnect boom and tow winch motor drain metal tube assembly (1) from tube reducer (2) and traverse motor drain tow winch motor drain hydraulic motor drain tee (3).
- 2 Remove tube reducer (2) and preformed packing (4) from manifold assembly counterbalance (5).
- 3 Disconnect tow winch motor drain metal tube assembly (6) from two traverse motor drain tow winch motor drain hydraulic motor drain tees (3 and 7).
- 4 Remove traverse motor drain tow winch motor drain hydraulic motor drain tee (3), tube fitting locknut (8), flat washer (9), and preformed packing (10).

- 5 Disconnect boom winch motor drain metal tube assembly (11) from traverse motor drain tow winch motor drain hydraulic motor drain tee (7) and tube reducer (12).
- 6 Remove traverse motor drain tow winch motor drain hydraulic motor drain tee (7), tube fitting locknut (13), flat washer (14), and preformed packing (15) from hydraulic motor (16).



2-66. MAINTENANCE OF HYDRAULIC DRAIN LINES, FITTINGS, AND COMPONENTS (CONT).

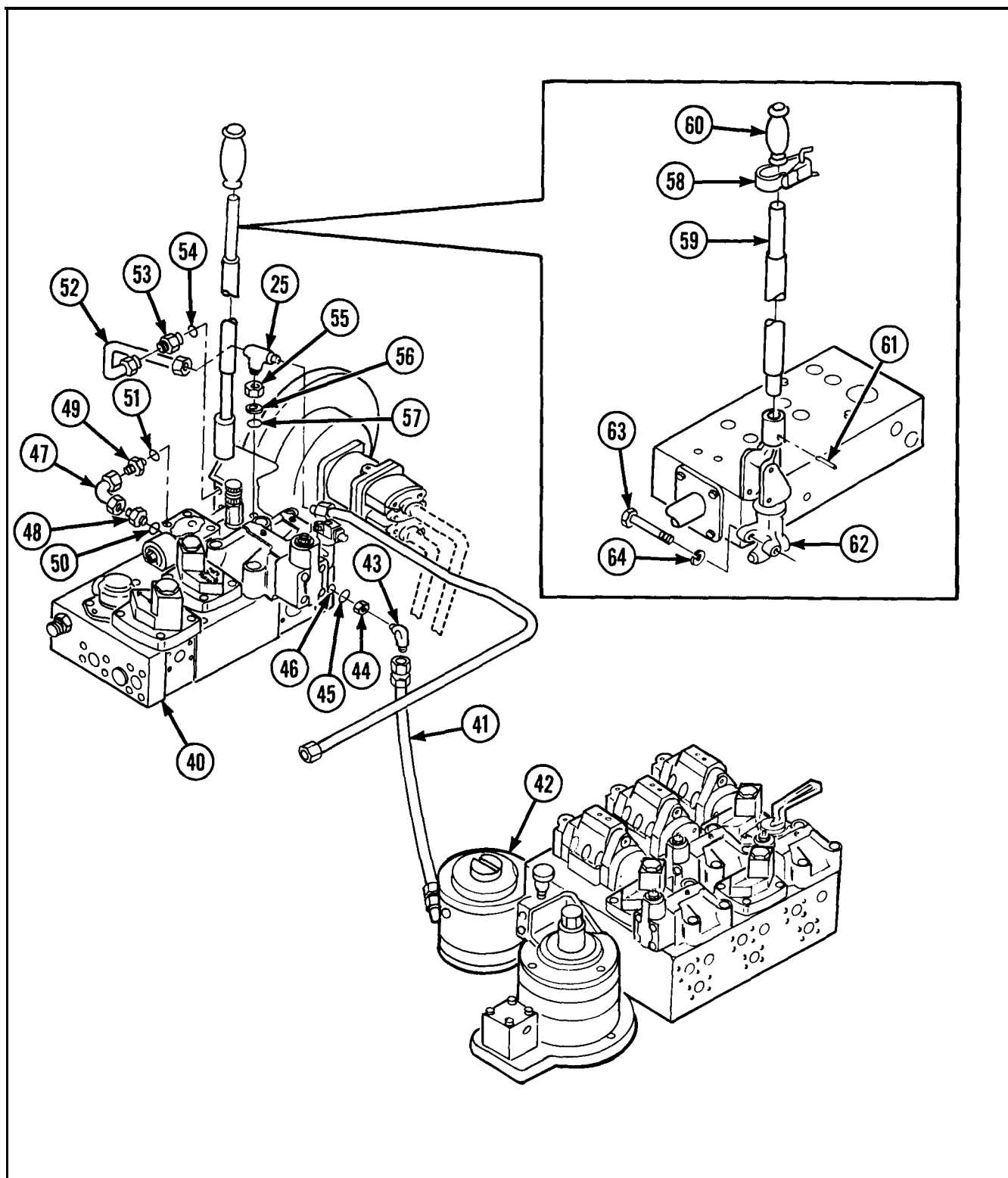
REMOVAL (CONT)



- 7 Remove tube reducer (12) and preformed packing (17).
- 8 Remove hexagon head capscrew (18), lockwasher (19), and boom winch motor drain metal tube assembly (11) from loop clamp (20).
- 9 Disconnect traverse motor hand pump pressure metal tube assembly (21) from tube reducer (22).
- 10 Remove tube reducer (22) and preformed packing (23).
- 11 Disconnect hand pump pressure metal tube assembly (24) from tube tee (25).
- 12 Disconnect inboard selector valve metal tube assembly (26) from tube reducer (27).
- 13 Remove tube reducer (27) and preformed packing (28).
- 14 Disconnect outboard selector valve metal tube assembly (29) from tube reducer (30).
- 15 Remove tube reducer (30) and preformed packing (31).
- 16 Disconnect motor drain metal tube assembly (32) from tube nipple (33).
- 17 Remove tube nipple (33) and preformed packing (34) from manifold assembly counter-balance (5).
- 18 Disconnect cylinder motor drain metal tube assembly (35) from tube elbow (36).
- 19 Remove tube elbow (36), tube fitting locknut (37), packing retainer (38), and preformed packing (39) from flow divider hydraulic manifold (40).

2-66. MAINTENANCE OF HYDRAULIC DRAIN LINES, FITTINGS, AND COMPONENTS (CONT).

REMOVAL (CONT)



- 20 Disconnect hull return line nonmetallic hose assembly (41) from slip ring (42) and tube elbow (43).
- 21 Remove tube elbow (43), tube fitting locknut (44), packing retainer (45), and preformed packing (46) from flow divider hydraulic manifold (40).
- 22 Disconnect hand pump suction metal tube assembly (47) from two tube nipples (48 and 49).
- 23 Remove tube nipple (48) and preformed packing (50) from flow divider hydraulic manifold (40).
- 24 Remove tube nipple (49) and preformed packing (51).
- 25 Disconnect hand pump pressure metal tube assembly (52) from tube reducer (53) and tube tee (25).
- 26 Remove tube reducer (53) and preformed packing (54).
- 27 Remove tube tee (25), tube fitting locknut (55), flat washer (56), and preformed packing (57) from flow divider hydraulic manifold (40).
- 28 Remove hydraulic hand pump webbing strap (58) from hydraulic hand pump shouldered shaft (59).

- 29 If damaged, remove hand pump handle grip (60) from hydraulic hand pump shouldered shaft (59).

- 30 Remove spring pin (61) and hydraulic hand pump shouldered shaft (59) from reciprocating pump (62).

- 31 Remove two hexagon head capscrews (63), two lockwashers (64), and reciprocating pump (62).

DISASSEMBLY

Refer to page 2-73 for complete disassembly of all hydraulic lines and fittings.

INSPECTION/REPAIR

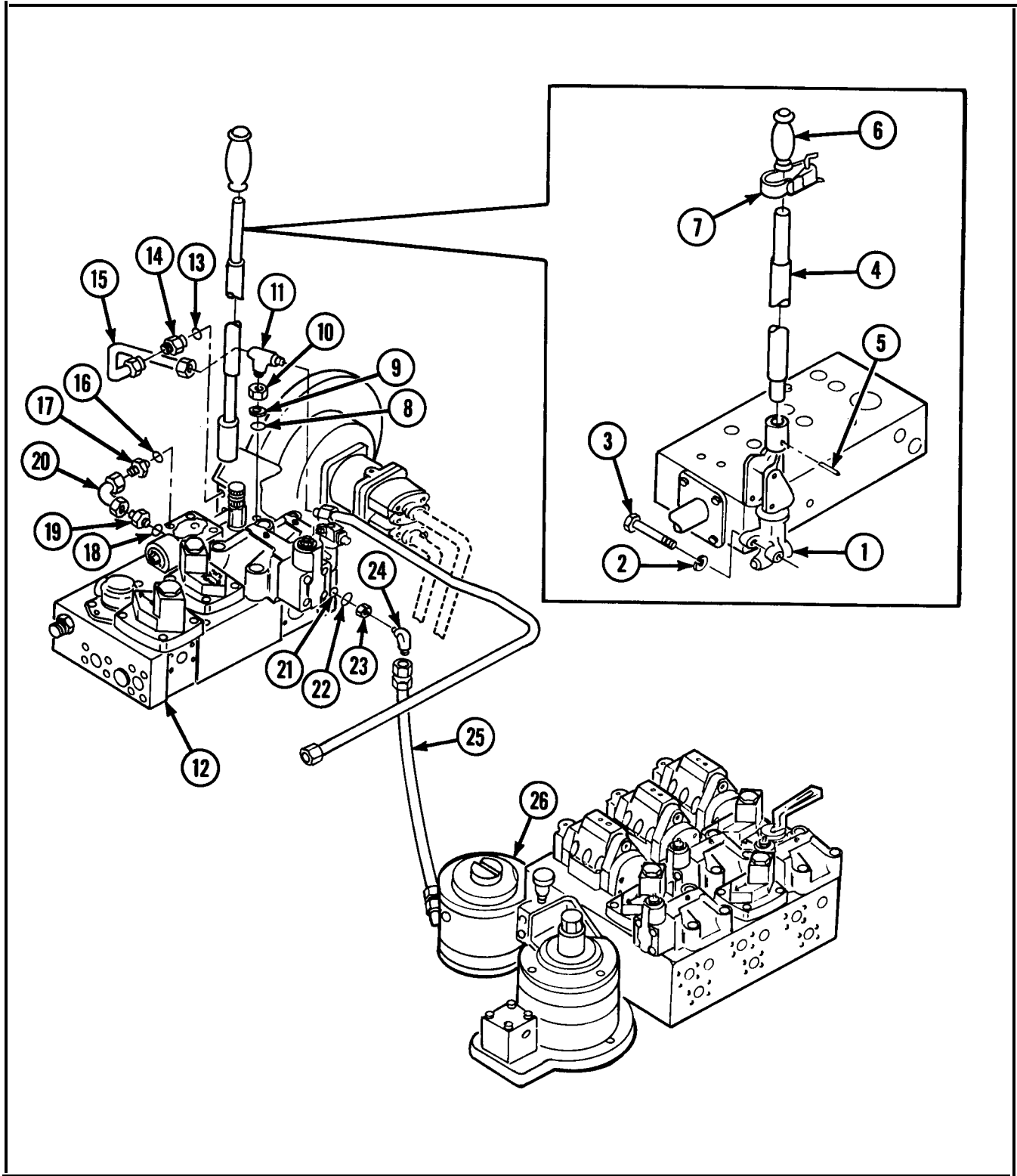
- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

REASSEMBLY

Refer to page 2-73 for complete reassembly of all hydraulic lines and fittings.

2-66. MAINTENANCE OF HYDRAULIC DRAIN LINES, FITTINGS, AND COMPONENTS (CONT).

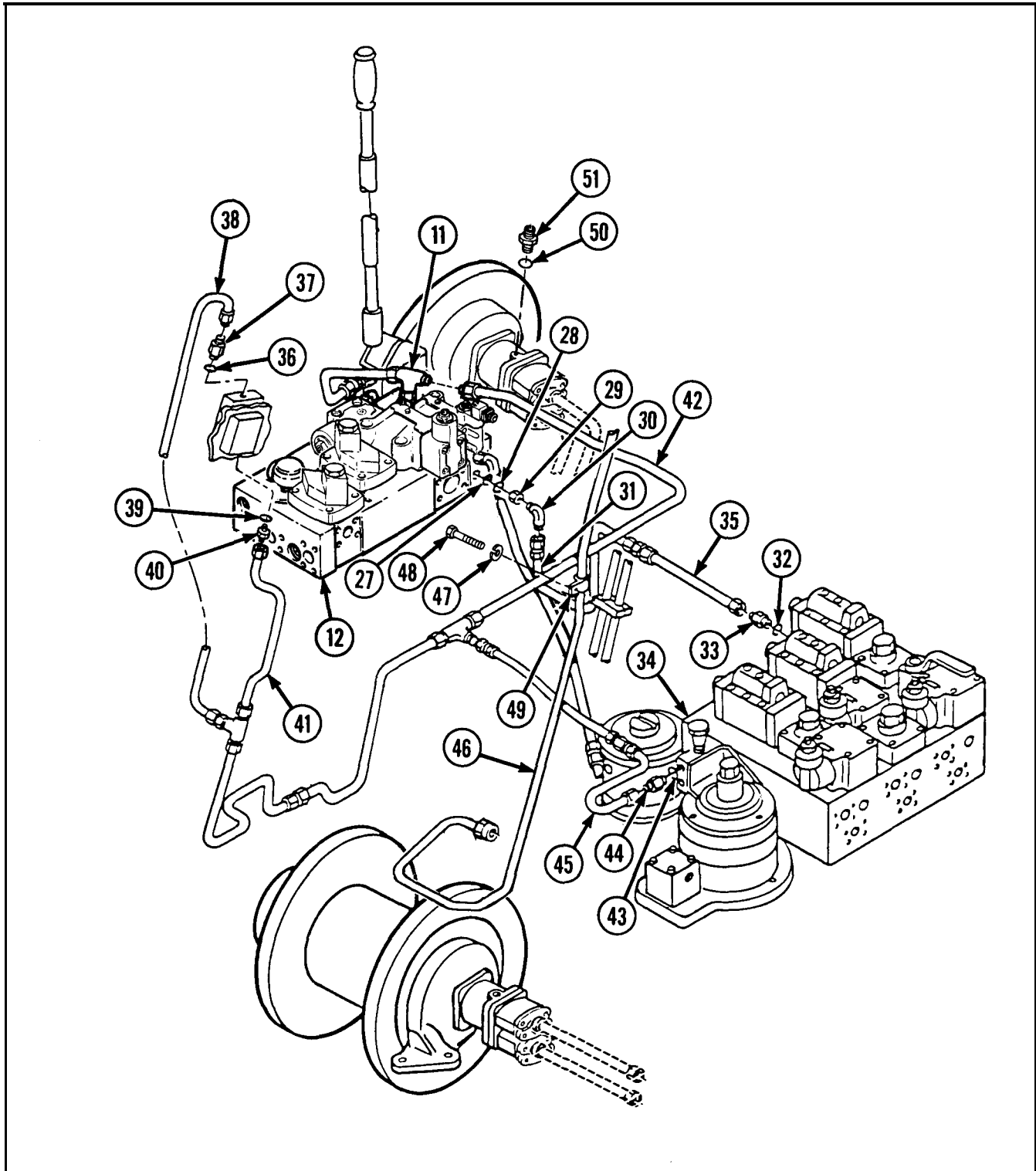
INSTALLATION



- 1 Install reciprocating pump (1), two new lockwashers (2), and two hexagon head capscrews (3).
- 2 Install hydraulic hand pump shouldered shaft (4) and spring pin (5) on reciprocating pump (1).
- 3 If removed, install new hand pump handle grip (6) on hydraulic hand pump shouldered shaft (4).
- 4 Install hydraulic hand pump webbing strap (7) on hydraulic hand pump shouldered shaft (4).
- 5 Install new preformed packing (8), flat washer (9), new tube fitting locknut (10), and tube tee (11) on flow divider hydraulic manifold (12).
- 6 Install new preformed packing (13) and tube reducer (14).
- 7 Connect hand pump pressure metal tube assembly (15) to tube tee (11) and tube reducer (14).
- 8 Install new preformed packing (16) and tube nipple (17).
- 9 Install new preformed packing (18) and tube nipple (19) on flow divider hydraulic manifold (12).
- 10 Connect hand pump suction metal tube assembly (20) to two tube nipples (17 and 19).
- 11 Install new preformed packing (21), new packing retainer (22), new tube fitting locknut (23), and tube elbow (24) on flow divider hydraulic manifold (12).
- 12 Connect hull return nonmetallic hose assembly (25) to tube elbow (24) and slip ring (26).

2-66. MAINTENANCE OF HYDRAULIC DRAIN LINES, FITTINGS, AND COMPONENTS (CONT).

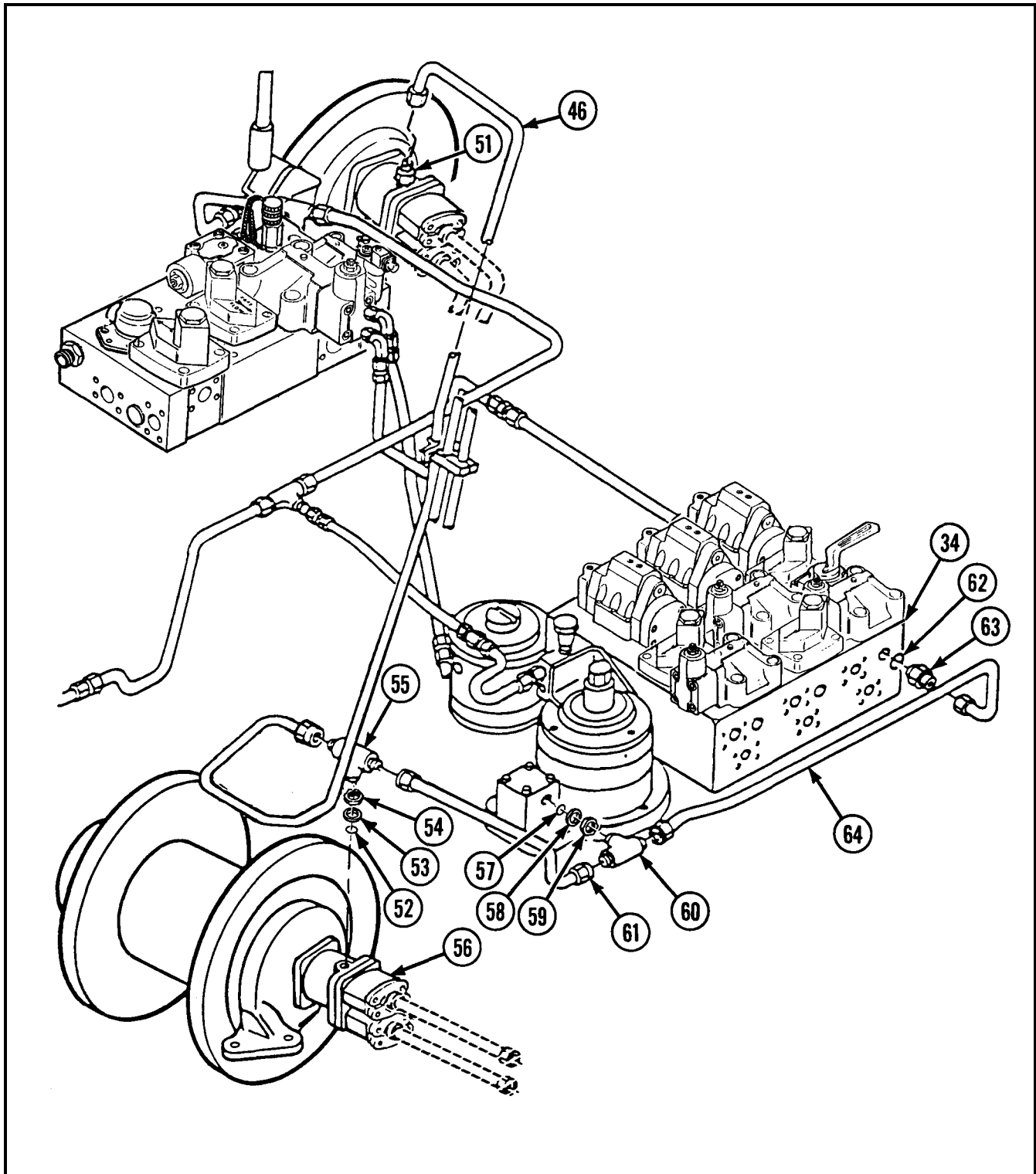
INSTALLATION (CONT)



- 13 Install new preformed packing (27), new packing retainer (28), new tube fitting locknut (29), and tube elbow (30) on flow divider hydraulic manifold (12).
- 14 Connect cylinder motor drain metal tube assembly (31) to tube elbow (30).
- 15 Install new preformed packing (32) and tube nipple (33) on manifold assembly counter-balance (34).
- 16 Connect motor drain metal tube assembly (35) to tube nipple (33).
- 17 Install new preformed packing (36) and tube reducer (37).
- 18 Connect outboard selector valve metal tube assembly (38) to tube reducer (37).
- 19 Install new preformed packing (39) and tube reducer (40).
- 20 Connect inboard selector valve metal tube assembly (41) to tube reducer (40).
- 21 Connect hand pump pressure metal tube assembly (42) to tube tee (11).
- 22 Install new preformed packing (43) and tube reducer (44).
- 23 Connect traverse motor hand pump pressure metal tube assembly (45) to tube reducer (44).
- 24 Install boom winch motor drain metal tube assembly (46), new lockwasher (47), and hexagon head capscrew (48) on loop clamp (49).
- 25 Install new preformed packing (50) and tube reducer (51).

2-66. MAINTENANCE OF HYDRAULIC DRAIN LINES, FITTINGS, AND COMPONENTS
(CONT).

INSTALLATION (CONT)



- 26 Install new preformed packing (52), flat washer (53), new tube fitting locknut (54), and traverse motor drain tow winch motor drain hydraulic motor drain tee (55) on hydraulic motor (56).
- 27 Connect boom winch motor drain metal tube assembly (46) to tube reducer (51) and traverse motor drain tow winch motor drain hydraulic motor drain tee (55).
- 28 Install new preformed packing (57), flat washer (58), new tube fitting locknut (59), and traverse motor drain tow winch motor drain hydraulic motor drain tee (60).
- 29 Connect tow winch motor drain metal tube assembly (61) to two traverse motor drain tow winch motor drain hydraulic motor drain tees (55 and 60).
- 30 Install new preformed packing (62) and tube reducer (63) on manifold assembly counterbalance (34).
- 31 Connect boom and tow winch motor drain metal tube assembly (64) to traverse motor drain tow winch motor drain hydraulic motor drain tee (60) and tube reducer (63).

2-67. MAINTENANCE OF HYDRAULIC RESERVOIR LINES AND FITTINGS AND HYDRAULIC RESERVOIR FILTER AND STRAINER ASSEMBLY.

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

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive (appx B)

Materials/Parts

Cotter pin (MS24665-357)
Lockwasher (4) (MS35333-39)
Lockwasher (MS35338-45)
Lockwasher (10) (MS35338-46)
Lockwasher (8) (MS35338-49)
Preformed packing (2) (MS28775-237)
Preformed packing (3) (MS28778-4)
Reservoir filter and strainer gasket (2) (10908813)
Retaining ring (7966618)
Rubber gasket (MS35643-1)

References

TM 9-2350-238-24P-2

Equipment Conditions

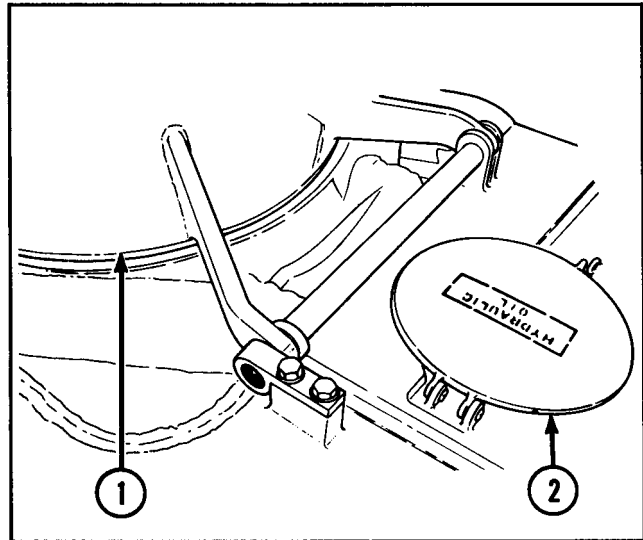
Oil drained from system. Refer to page 2-8.

2-330 Equipment stowage accessories box removed
2-116 Access covers removed
2-330 Periscope stowage box removed

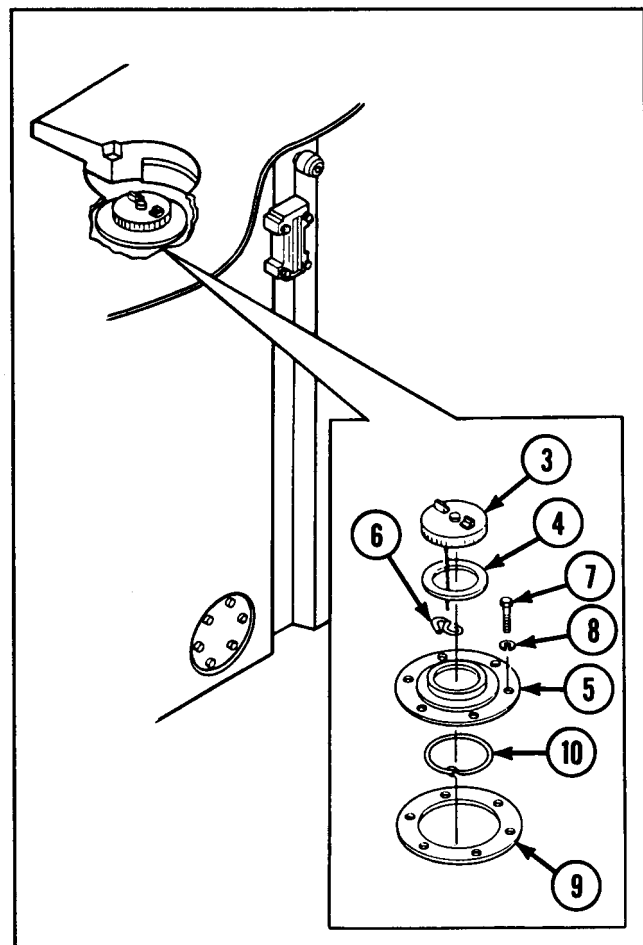
2-67. MAINTENANCE OF HYDRAULIC RESERVOIR LINES AND FITTINGS AND HYDRAULIC RESERVOIR FILTER AND STRAINER ASSEMBLY (CONT).

REMOVAL/DISASSEMBLY

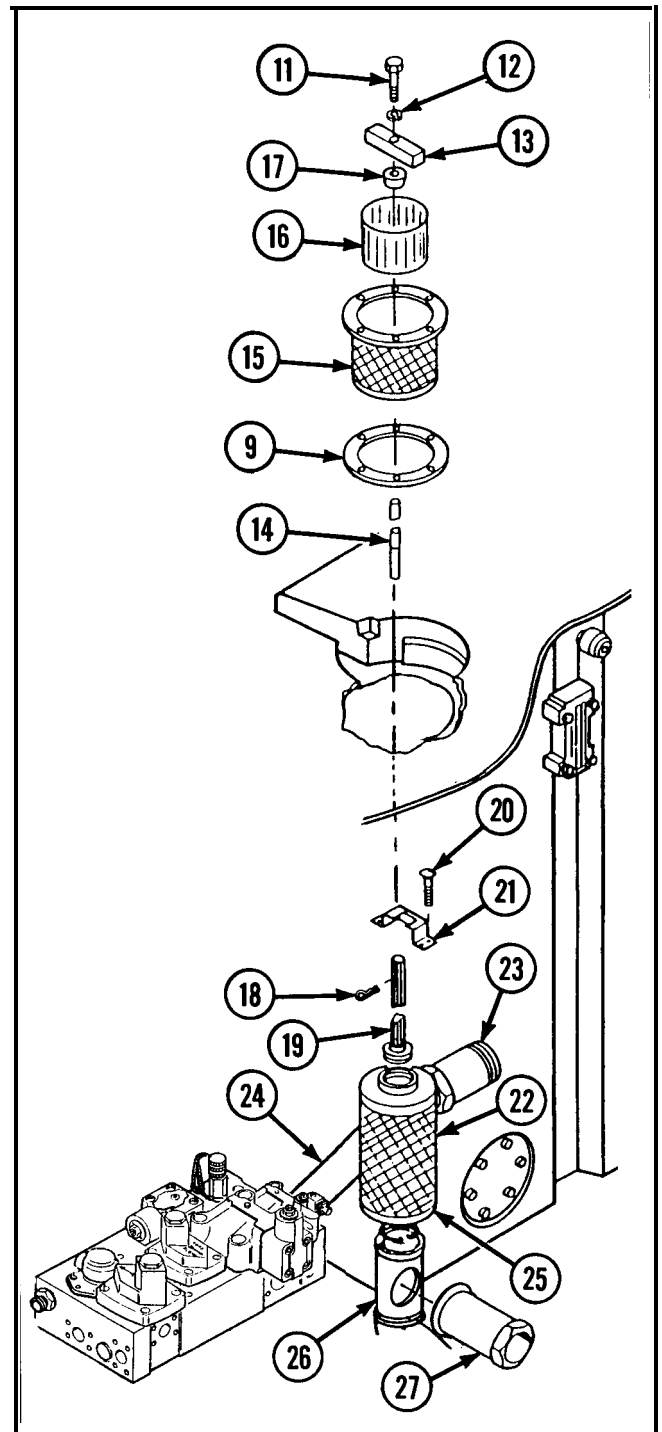
- 1 Close vehicle cupola hatch door (1).
- 2 Open hydraulic reservoir filter access door (2).



- 3 Remove reservoir filter filler opening cap (3) and rubber gasket (4) from oil filter filler neck (5).
- 4 Disconnect retaining pin (6) from reservoir filter filler opening cap (3) and remove reservoir filter filler opening cap.
- 5 Remove six hexagon head capscrews (7), six lockwashers (8), oil filter filler neck (5), and reservoir filter and strainer gasket (9).
- 6 Remove retaining pin (6) and filter and strainer oil filter cap connecting ring (10).
- 7 Remove retaining pin (6) from filter and strainer oil filter cap connecting ring (10).

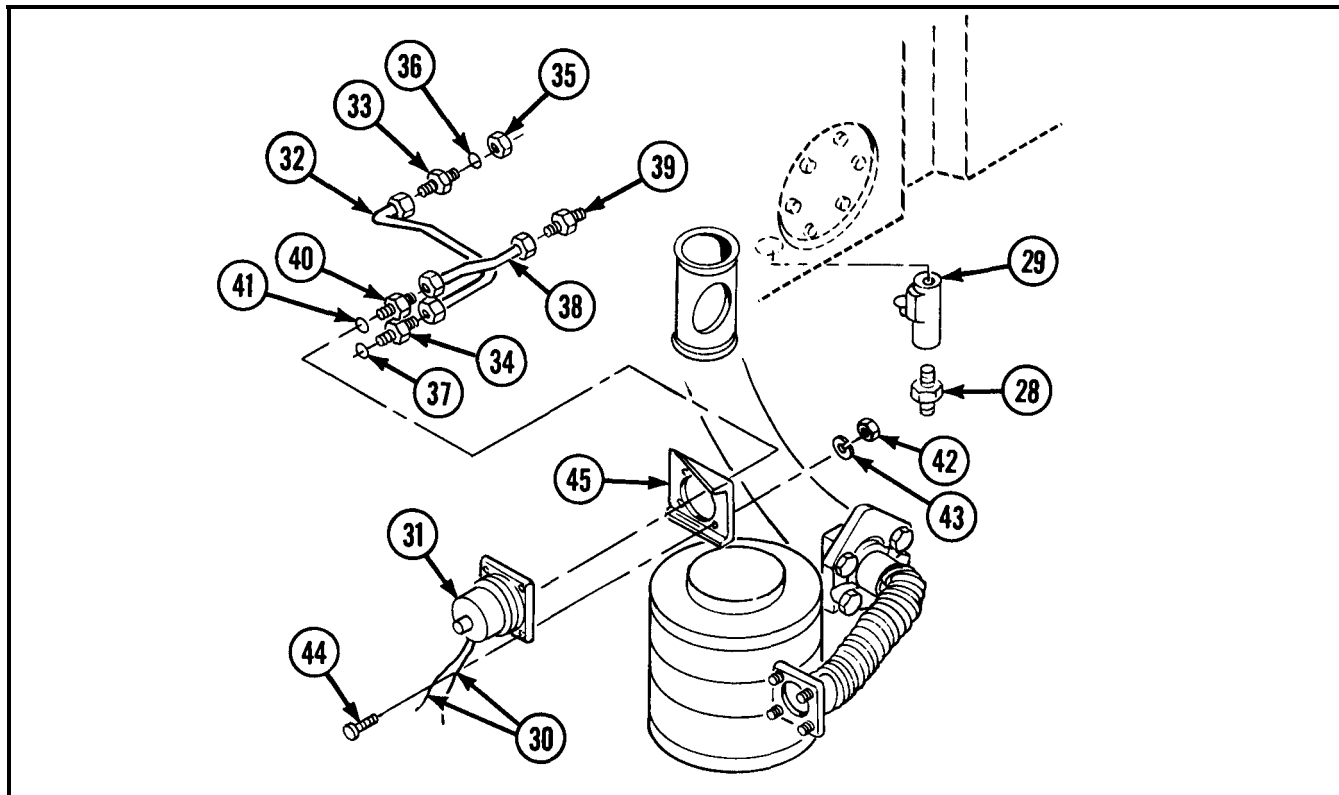


- 8 Remove hexagon head capscrew (11), lockwasher (12), and bar (13) from handle (14).
- 9 Remove reservoir filter and strainer gasket (9), strainer body (15), strainer element (16), and strainer plug (17) from handle (14).
- 10 Remove reservoir filter and strainer gasket (9), strainer plug (17), and strainer element (16) from strainer body (15).
- 11 Remove cotter pin (18) and handle (14) from handle (19).
- 12 Remove four thread tapping screws (20) and bracket (21) from hydraulic sediment strainer (22).
- 13 Remove handle (19) from hydraulic sediment strainer (22).
- 14 Remove filter by-pass reservoir check valve (23) from reservoir inlet tube (24).
- 15 Remove hydraulic sediment strainer (22) and retaining ring (25) from reservoir outlet tube (26).
- 16 Remove head back-up reservoir check valve (27) from reservoir outlet tube (26).



2-67. MAINTENANCE OF HYDRAULIC RESERVOIR LINES AND FITTINGS AND HYDRAULIC RESERVOIR FILTER AND STRAINER ASSEMBLY (CONT).

REMOVAL/DISASSEMBLY (CONT)



17 Remove drain valve quick coupling half (28) from reservoir drain ball valve (29).

18 Remove reservoir drain ball valve (29).

19 Disconnect two electrical leads (30) from hydraulic differential pressure switch (31).

20 Disconnect and remove pressure switch metal tube assembly (32) at both ends from two tube nipples (33 and 34).

21 Remove plain hexagon nut (35) and preformed packing (36) from tube nipple (33).

22 Remove tube nipple (33).

23 Remove tube nipple (34) and preformed packing (37) from hydraulic differential pressure switch (31).

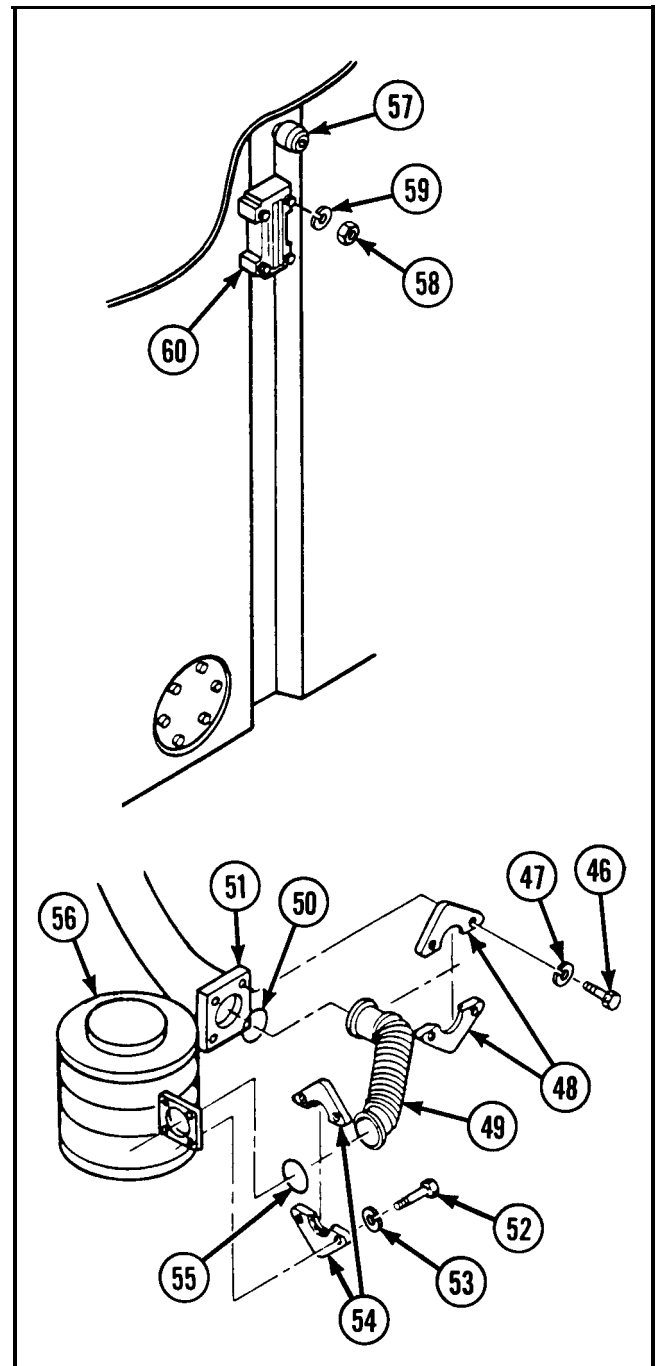
24 Disconnect and remove pressure switch metal tube assembly (38) from pipe straight adapter (39) and tube nipple (40).

25 Remove pipe straight adapter (39).

26 Remove tube nipple (40) and preformed packing (41) from hydraulic differential pressure switch (31).

27 Remove four hexagon plain nuts (42), four lockwashers (43), four machine screws (44), and hydraulic differential pressure switch (31) from bracket (45).

- 28 Remove four hexagon capscrews (46), four lockwashers (47), two hose end split clamp halves (48), metal hose assembly (49), and preformed packing (50) from inlet tube flange (51).
- 29 Remove four hexagon capscrews (52), four lockwashers (53), two hose end split clamp halves (54), metal hose assembly (49), and preformed packing (55) from slip ring (56).
- 30 Remove reservoir air filter breather (57).
- 31 Remove four hexagon plain nuts (58), four lockwashers (59), and liquid reservoir sight indicator (60).



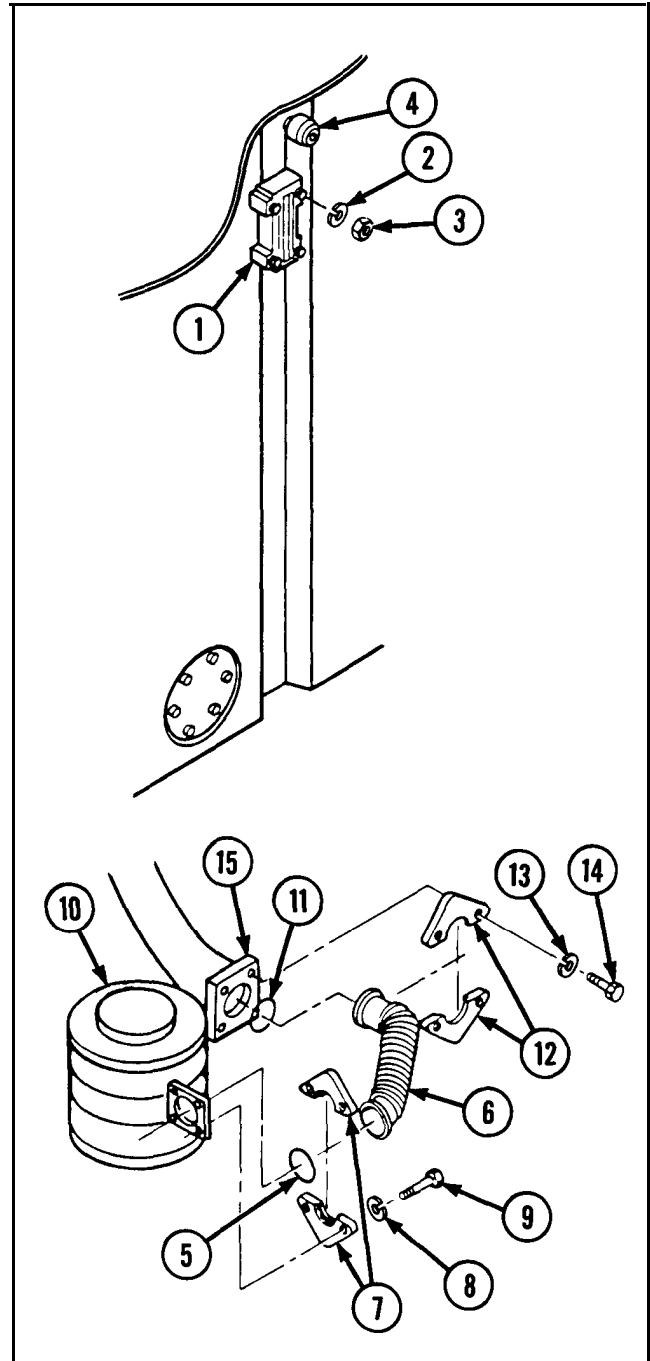
INSPECTION/REPAIR

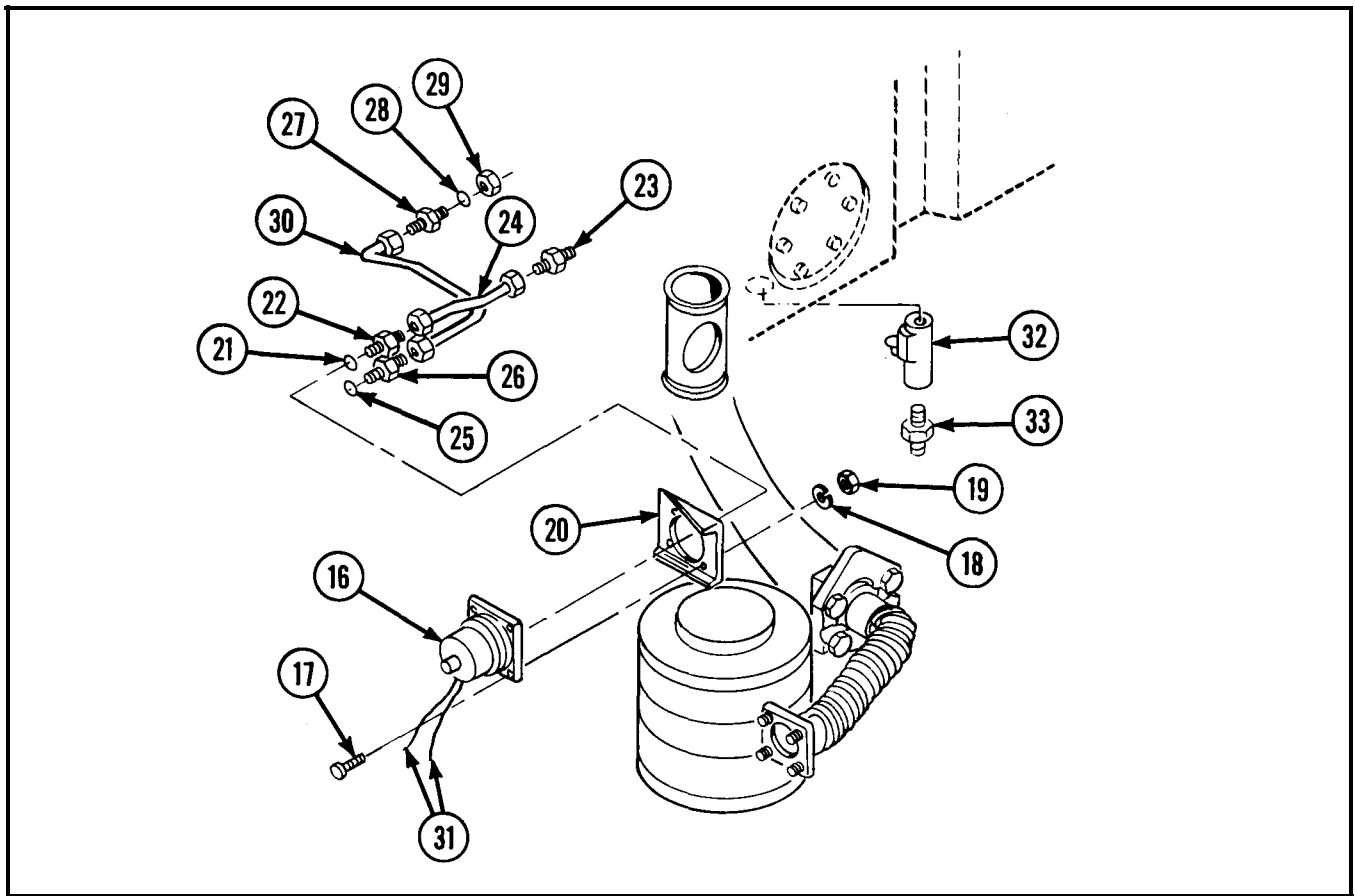
- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

2-67. MAINTENANCE OF HYDRAULIC RESERVOIR LINES AND FITTINGS AND HYDRAULIC RESERVOIR FILTER AND STRAINER ASSEMBLY (CONT).

REASSEMBLY/INSTALLATION

- 1 Install liquid reservoir sight indicator (1), four new lockwashers (2), and four hexagon plain nuts (3).
- 2 Install reservoir air filter breather (4).
- 3 Install new preformed packing (5) on metal hose assembly (6).
- 4 Install metal hose assembly (6), two hose end split clamp halves (7), four new lockwashers (8), and four hexagon capscrews (9) on slip ring (10).
- 5 Install new preformed packing (11) on metal hose assembly (6).
- 6 Install metal hose assembly (6), two hose end split clamp halves (12), four new lockwashers (13), and four hexagon capscrews (14) on inlet tube flange (15).





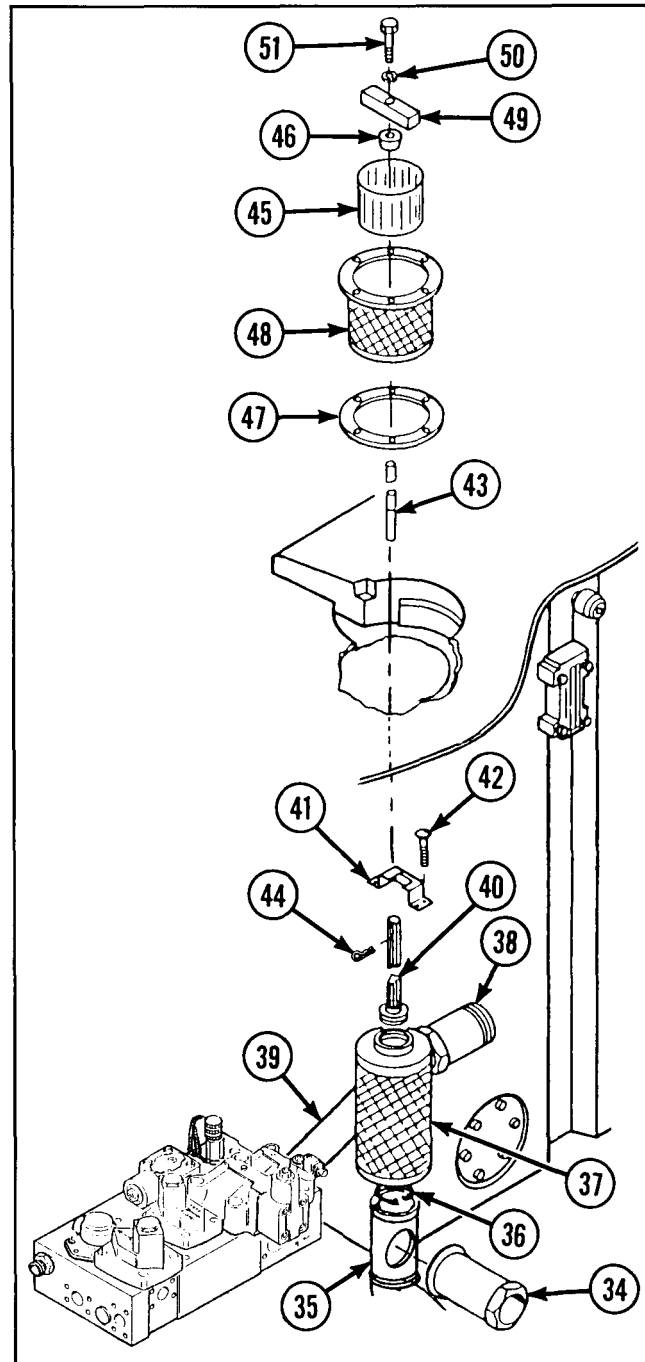
- 7 Install hydraulic differential pressure switch (16), four machine screws (17), four new lockwashers (18), and four hexagon plain nuts (19) on bracket (20).
- 8 Install new preformed packing (21) and tube nipple (22) on hydraulic differential pressure switch (16).
- 9 Install pipe straight adapter (23).
- 10 Install and connect pressure switch metal tube assembly (24) on tube nipple (22) and pipe straight adapter (23).
- 11 Install new preformed packing (25) and tube nipple (26) on hydraulic differential pressure switch (16).
- 12 Install tube nipple (27), new preformed packing (28), and plain hexagon nut (29).
- 13 Install and connect pressure switch metal tube assembly (30) on both ends on two tube nipples (26 and 27).
- 14 Connect two electrical leads (31) on hydraulic differential pressure switch (16).
- 15 Install reservoir drain ball valve (32).
- 16 Install drain valve quick coupling half (33) on reservoir drain ball valve (32).

2-67. MAINTENANCE OF HYDRAULIC RESERVOIR LINES AND FITTINGS AND HYDRAULIC RESERVOIR FILTER AND STRAINER ASSEMBLY (CONT).

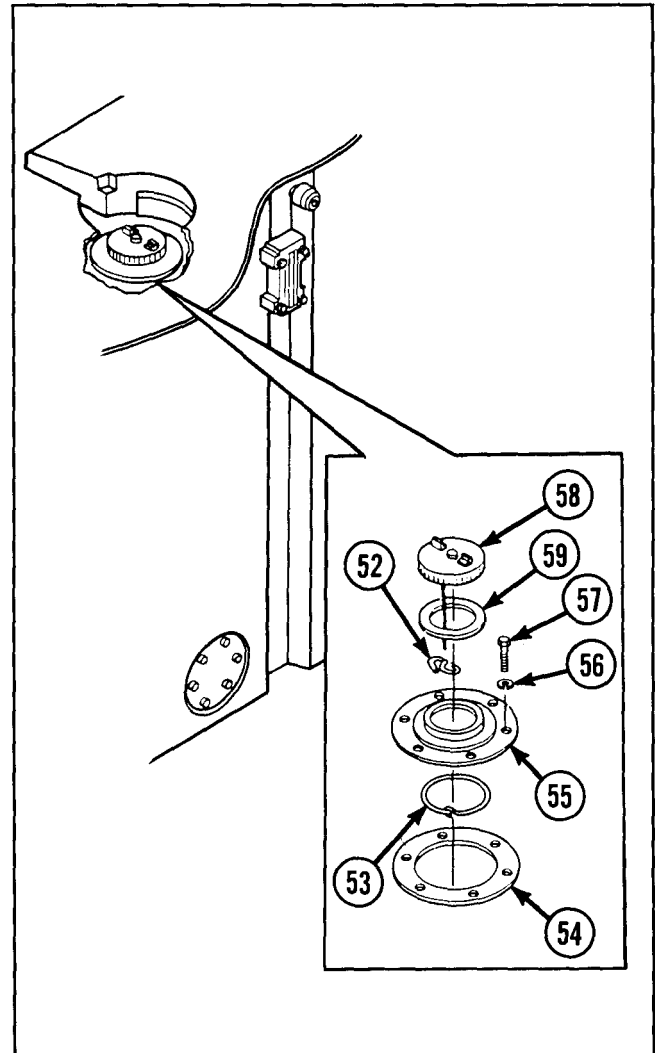
REASSEMBLY/INSTALLATION

(CONT)

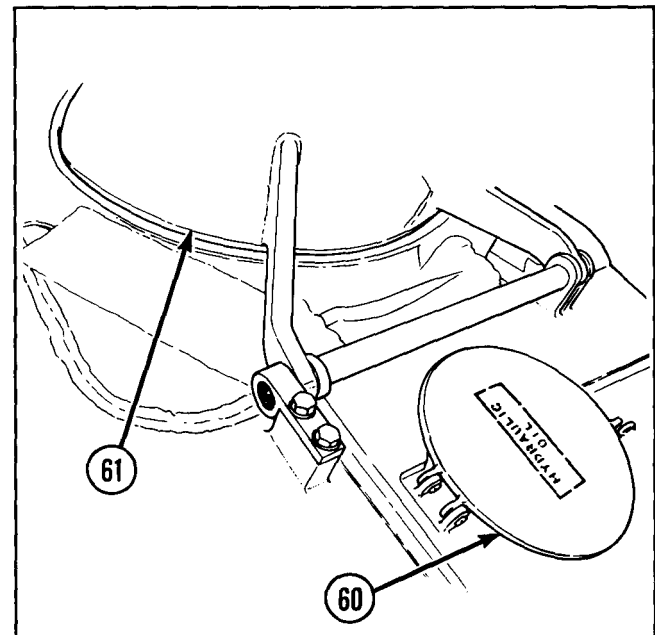
- 17 Install head back-up reservoir check valve (34) on reservoir outlet tube (35).
- 18 Install new retaining ring (36) and hydraulic sediment strainer (37) on reservoir outlet tube (35).
- 19 Install filter by-pass reservoir check valve (38) on reservoir inlet tube (39).
- 20 Install handle (40) on hydraulic sediment strainer (37).
- 21 Install bracket (41) and four thread tapping screws (42) on hydraulic sediment strainer (37).
- 22 Install handle (43) and new cotter pin (44) on handle (40).
- 23 Install strainer element (45), strainer plug (46), and new reservoir filter and strainer gasket (47) on strainer body (48).
- 24 Install strainer body (48) with assembled parts and new reservoir filter and strainer gasket (47) on handle (43).
- 25 Install bar (49), new lockwasher (50), and hexagon capscrew (51) on handle (43).



- 2 6 Install retaining pin (52) on filter and strainer oil filter cap connecting ring (53).
- 2 7 Install filter and strainer oil filter cap connecting ring (53) and retaining pin (52).
- 2 8 Install new reservoir filter and strainer gasket (54), oil filter filler neck (55), six new lockwashers (56), and six hexagon capscrews (57).
- 2 9 Install reservoir filter filler opening cap (58) and connect retaining pin (52) to reservoir filter filler opening cap.
- 3 0 Install new rubber gasket (59) and reservoir filter filler opening cap (58) on oil filter filler neck (55).



- 3 1 Close hydraulic reservoir access door (60).
- 3 2 Open vehicle cupola hatch door (61).



2-68. MAINTENANCE OF TRAVERSING INSTALLATION.

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

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive
(appx B)

2-330 Equipment stowage accessories
box removed

2-123 Cab metal grille removed

Materials/Parts

Preformed packing (MS28775-019)

General Safety Instructions

WARNING

Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

References

TM 9-2350-238-24P-2

Equipment Conditions

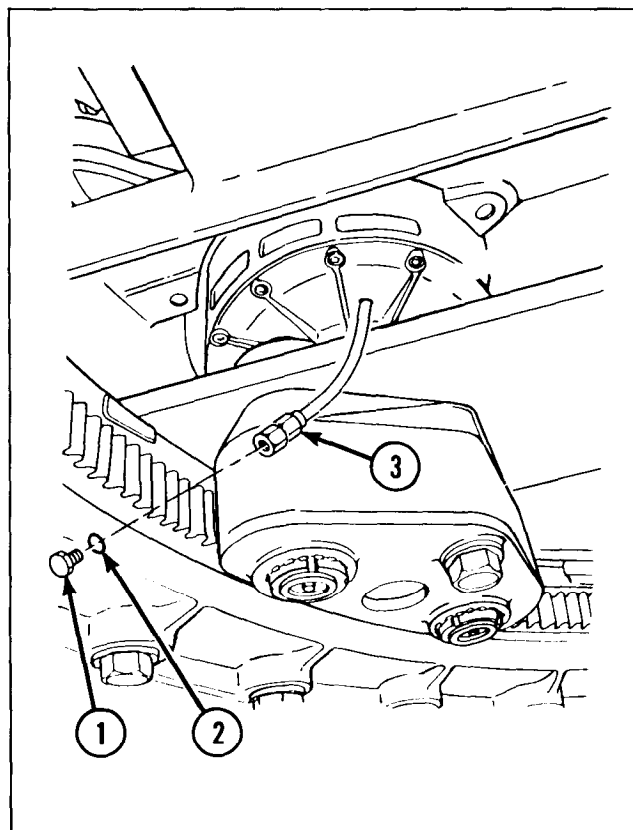
Cab is traversed until left side cab metal
swinging door is at rear of vehicle
2-116 Forward left-hand nonskid metallic
tread removed
2-116 Rear left-hand nonskid metallic
tread removed

REMOVAL

WARNING

Hydraulic system is under high pressure. Make sure all hydraulic pressure is relieved before removal of any tubes or fittings. Follow safety procedures to prevent injury. Wipe up spilled hydraulic fluid.

Remove machine thread plug (1) and preformed packing (2) from oil drain metal tube assembly (3).

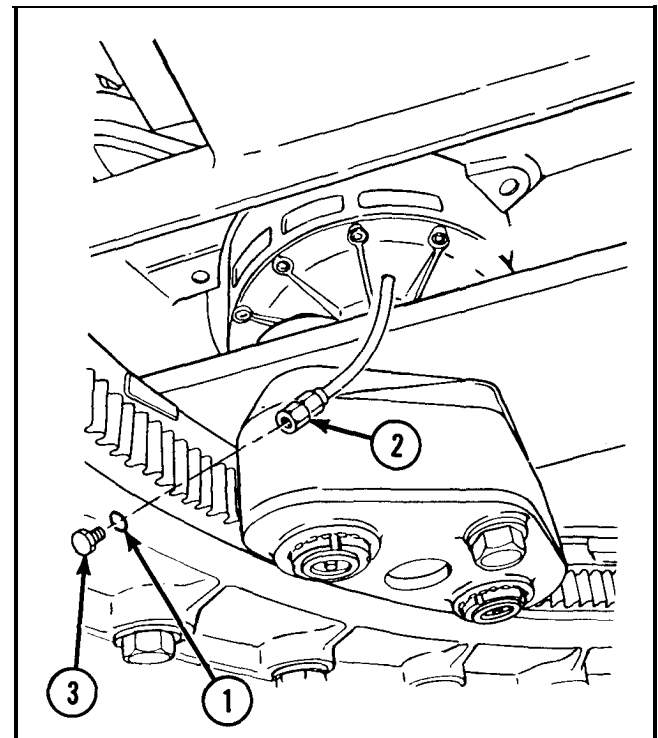


INSPECTION/REPAIR

- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

INSTALLATION

Install new preformed packing (1) in oil drain metal tube assembly (2) and secure with machine thread plug (3).



2-69. MAINTENANCE OF TRAVERSING UNIT AND PRIMARY PLANETARY SPEED GEAR ASSEMBLY.

This task covers: a. *Disassembly*

b. *Inspection/Repair*

c. *Reassembly*

INITIAL SETUP***Tools and Special Tools***

General mechanic's tool kit, automotive (appx B)

Materials/Parts

Preformed packing (2) (MS28775-017)

References

TM 9-2350-238-24P-2

Equipment Conditions

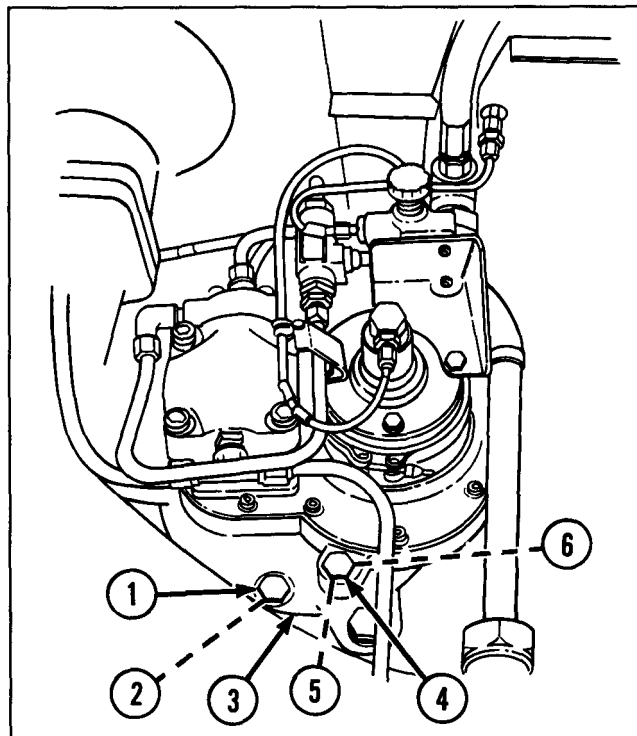
2-116 Forward left-hand nonskid metallic tread removed

2-116 Rear left-hand nonskid metallic tread removed

2-69. MAINTENANCE OF TRAVERSING UNIT AND PRIMARY PLANETARY SPEED GEAR ASSEMBLY (CONT).

DISASSEMBLY

- 1 Remove liquid oil check gage redcap (1) and preformed packing (2) from mechanical gear housing (3).
- 2 Remove machine thread plug (4) and preformed packing (5) from mechanical gear housing (3).
- 3 Using 1/4-in. square drive, remove oil check plug (6) from hole in mechanical gear housing (3).



INSPECTION/REPAIR

- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

REASSEMBLY

- 1 Using 1/4-in. square drive, install oil check plug (6) in hole in mechanical gear housing (3).
- 2 Install new preformed packing (5) and machine thread plug (4) in mechanical gear housing (3).
- 3 Install new preformed packing (2) and oil check gage rod-cap (1) in mechanical gear housing (3).

2-70. MAINTENANCE OF TRAVERSING FINAL DRIVE.

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

INITIAL SETUP*Tools and Special Tools*

General mechanic's tool kit, automotive
(appx B)

References

TM 9-2350-238-24P-2

Equipment Conditions

Cab traversed until left side cab metal
swinging door is at rear of vehicle to
enable easier well accessibility

2-330 Equipment stowage accessories
box removed

2-123 Metal cab grille removed

DISASSEMBLY

Remove two lubrication fittings (1) from two
idler gear shouldered shafts (2).

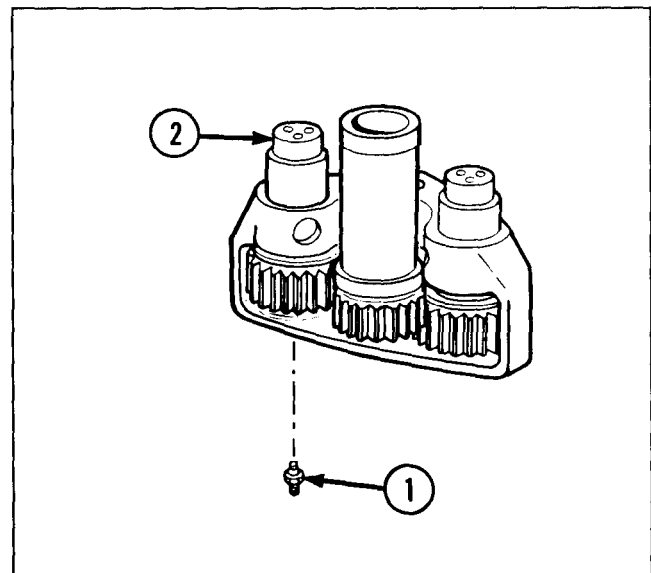
INSPECTION/REPAIR

1 Check for broken, damaged, or missing
parts.

2 Repair is by replacement of authorized
parts (TM 9-2350-238-24P-2).

REASSEMBLY

Install two lubrication fittings (1) in two idler
gear shouldered shafts (2).



2-71. MAINTENANCE OF BRANCHED WIRING HARNESS.

This task covers: a. *Removal*

b. *Inspection/Repair*

c. *Installation*

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive
(appx B)

References

TM 9-2350-238-24P-2

Equipment Conditions

- 2-116 Rear right-hand nonskid metallic tread removed
- 2-116 Front right-hand nonskid metallic tread removed
- 2-123 Reservoir access cover removed
- 2-128 Camlock controls support removed

MASTER switch turned OFF

INSTRUMENT switch turned OFF

General Safety Instructions

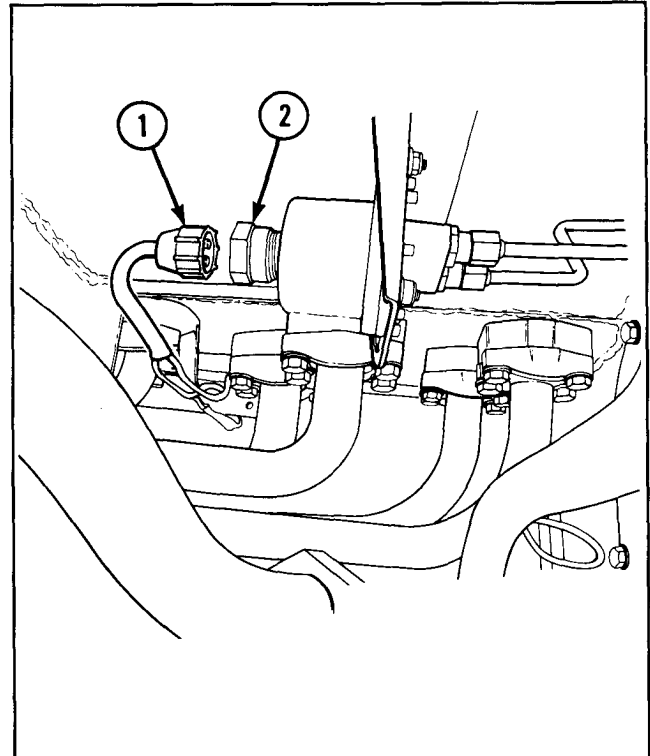
WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

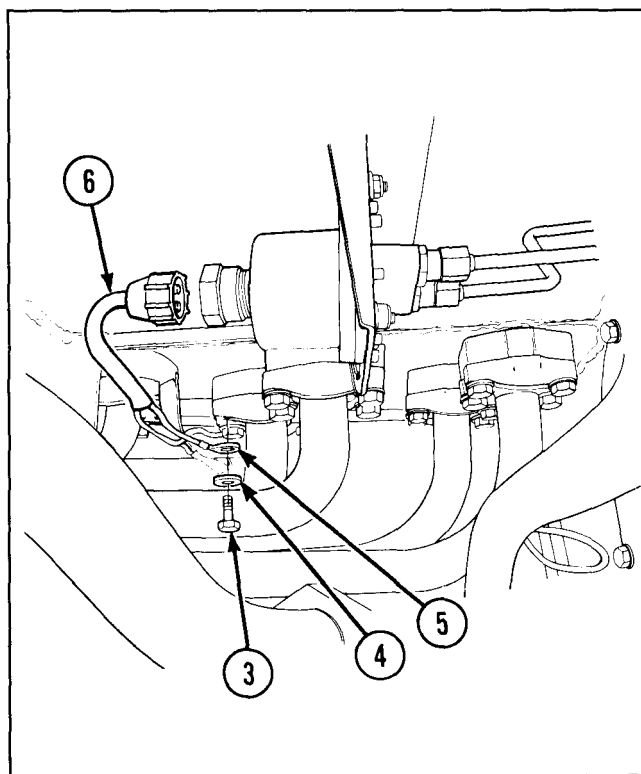
WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

- 1 Disconnect branched wiring harness electrical connector (1) from differential pressure switch (2).



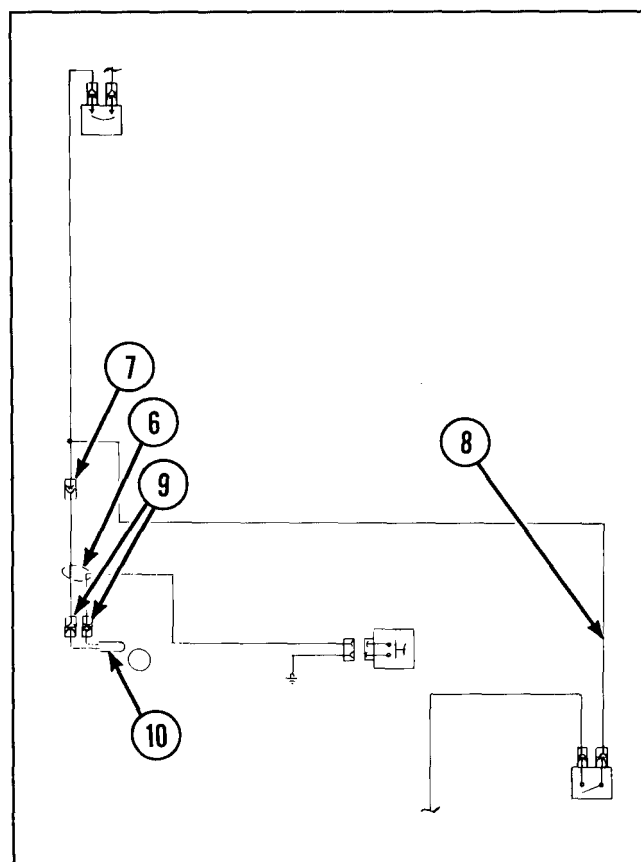
- 2 Remove screw (3), washer (4), and ground wire (5).
- 3 Remove fasteners and clamps from branched wiring harness (6).



- 4 Disconnect branched wiring harness plug connector (7) from wiring harness (8).
- 5 Disconnect two branched wiring harness plug connectors (9) from filter bypass indicator light (10) and remove branched wiring harness (6).

INSPECTION/REPAIR

- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).



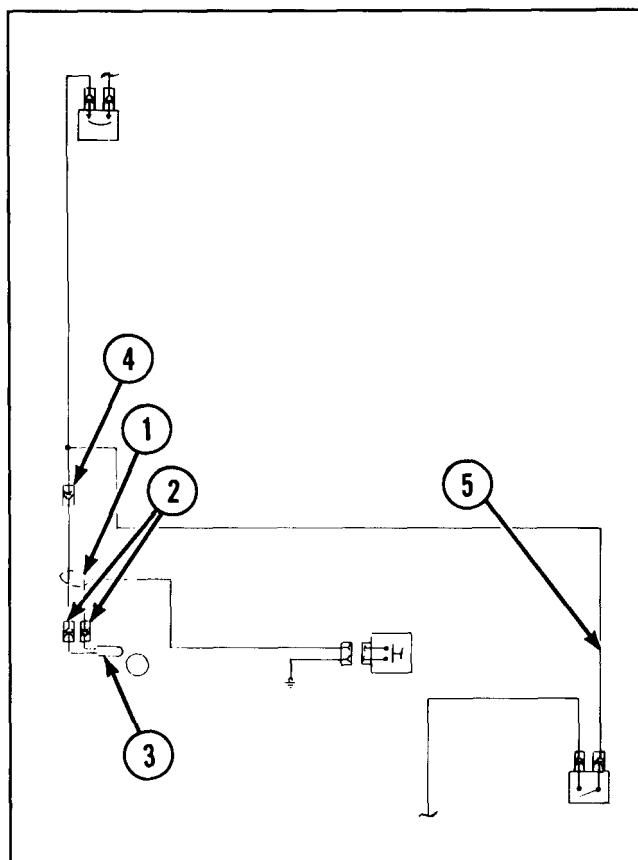
2-71. MAINTENANCE OF BRANCHED WIRING HARNESS (CONT).

INSTALLATION

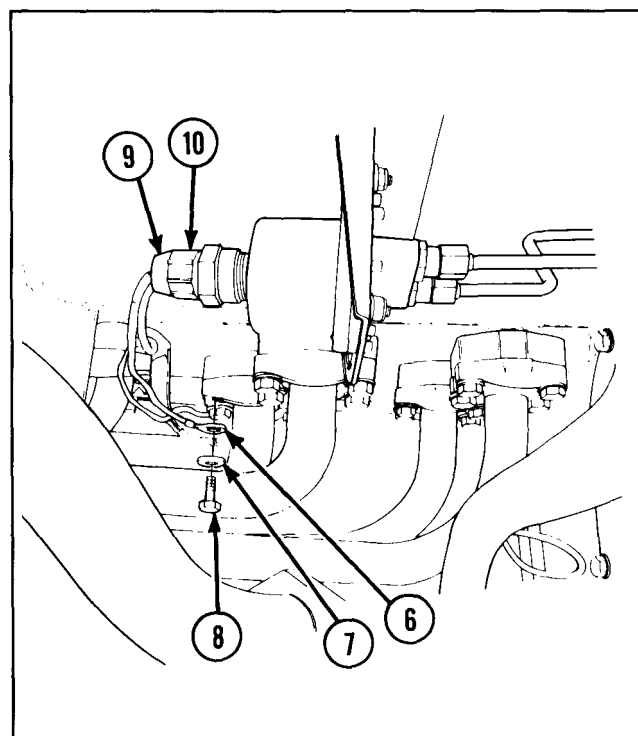
WARNING

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

- 1 Install branched wiring harness (1) and connect two branched wiring harness plug connectors (2) to filter bypass indicator light (3).
- 2 Connect branched wiring harness plug connector (4) to wiring harness (5).
- 3 Install clamps and fasteners on branched wiring harness (1).



- 4 Connect ground wire (6) and secure using washer (7) and screw (8).
- 5 Connect branched wiring harness electrical connector (9) to differential pressure switch (10).



2-72. MAINTENANCE OF DOME LIGHT FEED BRANCHED WIRING HARNESS.

This task covers: a. *Removal*b. *Inspection/Repair*c. *Installation***INITIAL SETUP***Tools and Special Tools*General mechanic's tool kit, automotive
(appx B)*References*

TM 9-2350-238-24P-2

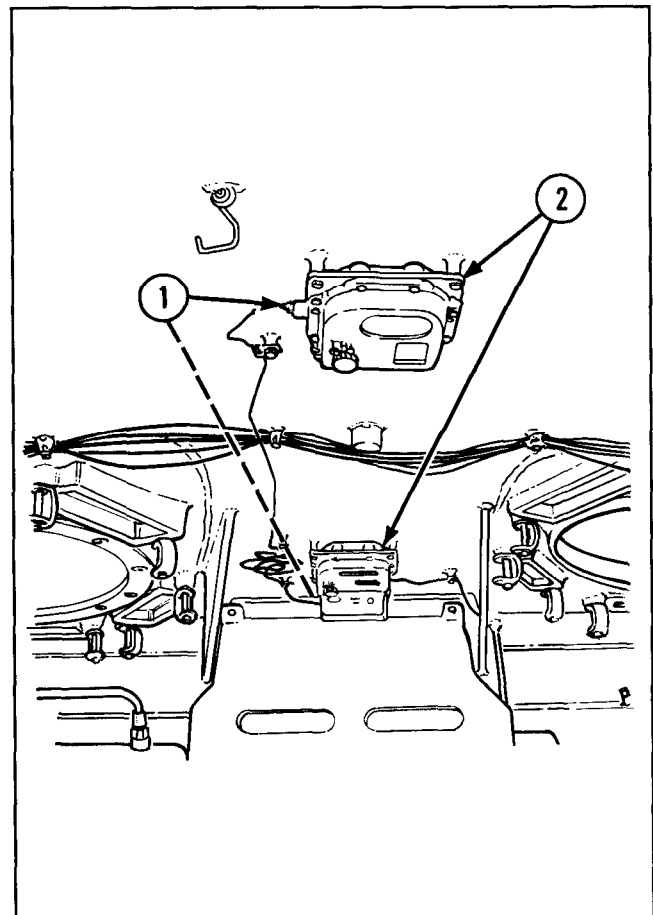
*Equipment Conditions*2-279 Flasher control panel removed
MASTER switch turned OFF
INSTRUMENT switch turned OFF*General Safety Instructions***WARNING**

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

REMOVAL**WARNING**

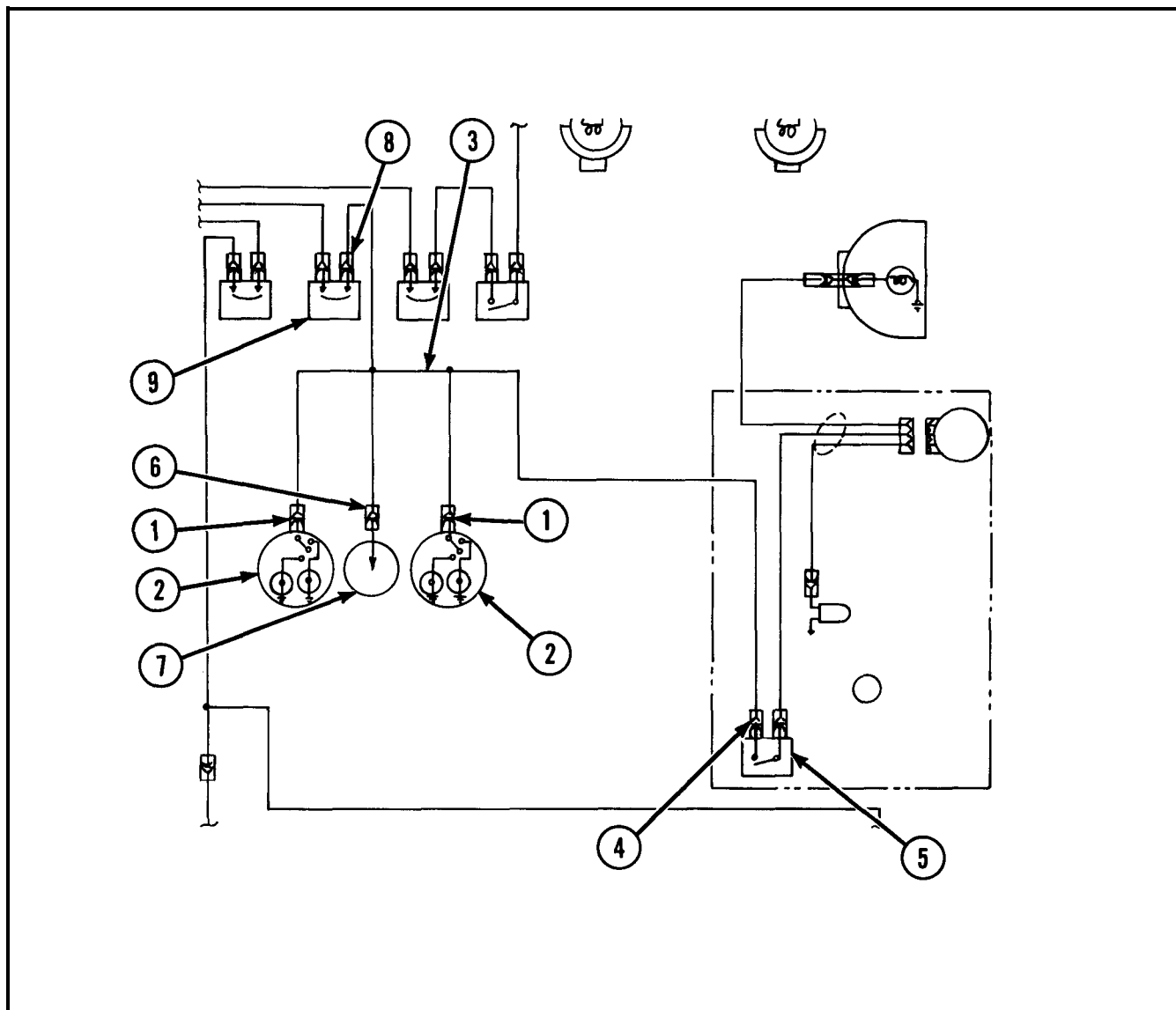
- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

- 1 Disconnect two electrical lead 38 plug connectors (1) from two cab dome lights (2).



2-72. MAINTENANCE OF DOME LIGHT FEED BRANCHED WIRING HARNESS (CONT).

REMOVAL (CONT)

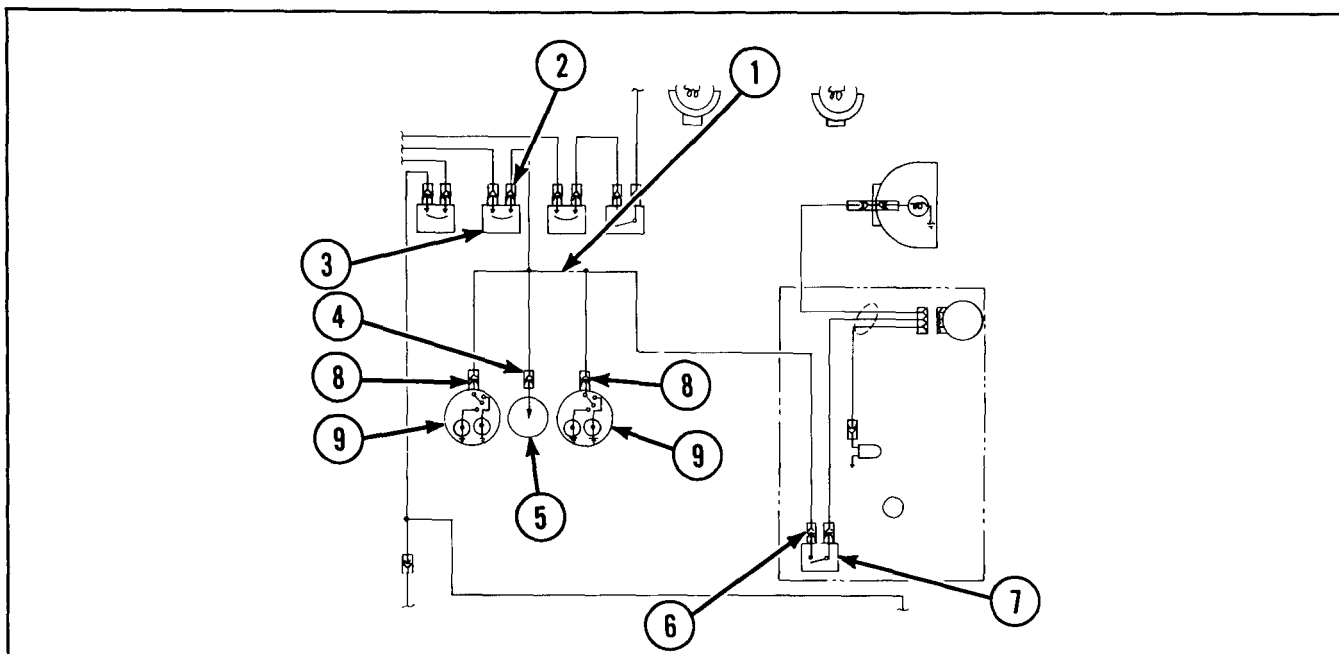


- 2 Remove clamps and fasteners from dome light feed branched wiring harness (3).
- 3 Disconnect electrical lead 325 plug connector (4) from flasher signal switch (5).
- 4 Disconnect electrical lead 137 and plug connector (6) from utility outlet (7).
- 5 Disconnect electrical lead 38 plug connector (8) from circuit breaker (9) and remove dome light feed branched wiring harness (3).

INSPECTION/REPAIR

- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

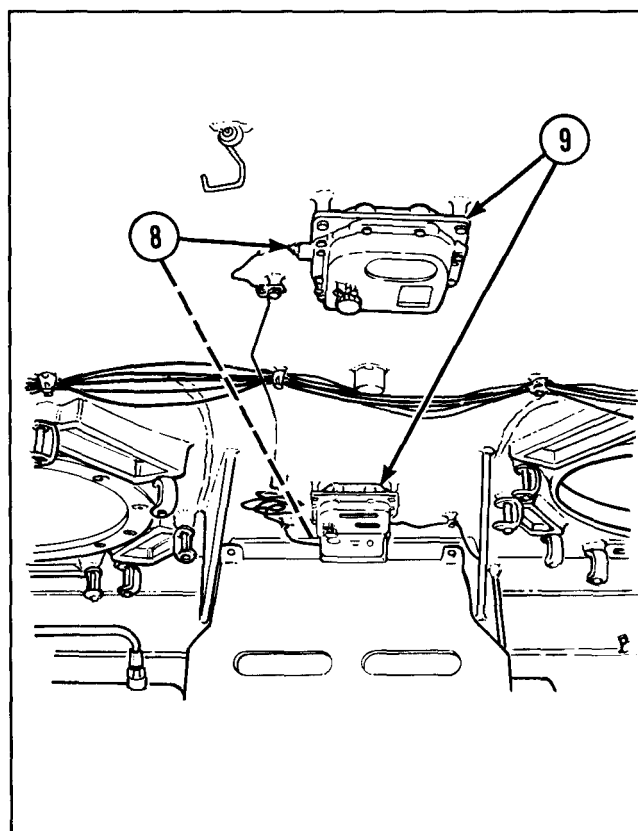
INSTALLATION



WARNING

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

- 1 Install dome light feed branched wiring harness (1) and connect electrical lead 38 plug connector (2) to circuit breaker (3).
- 2 Connect electrical lead 137 plug connector (4) to utility outlet (5).
- 3 Connect electrical lead 325 plug connector (6) to flasher signal switch (7).
- 4 Install clamps and fasteners securing dome light feed branched wiring harness (1).
- 5 Connect two electrical lead 38 plug connectors (8) to two cab dome lights (9).



2-73. MAINTENANCE OF SLIP RING TO CIRCUIT BREAKERS AND RADIO POWER DISCONNECT BRANCHED WIRING HARNESS.

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

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive (appx B)

Materials/Parts

Lockwasher (4) (MS35338-42)
Lockwasher (MS45904-68)

References

TM 9-2350-238-24P-2

Equipment Conditions

2-279 Flasher control panel removed
2-339 Tool box removed from well
MASTER switch turned OFF
INSTRUMENT switch turned OFF

General Safety Instructions

WARNING

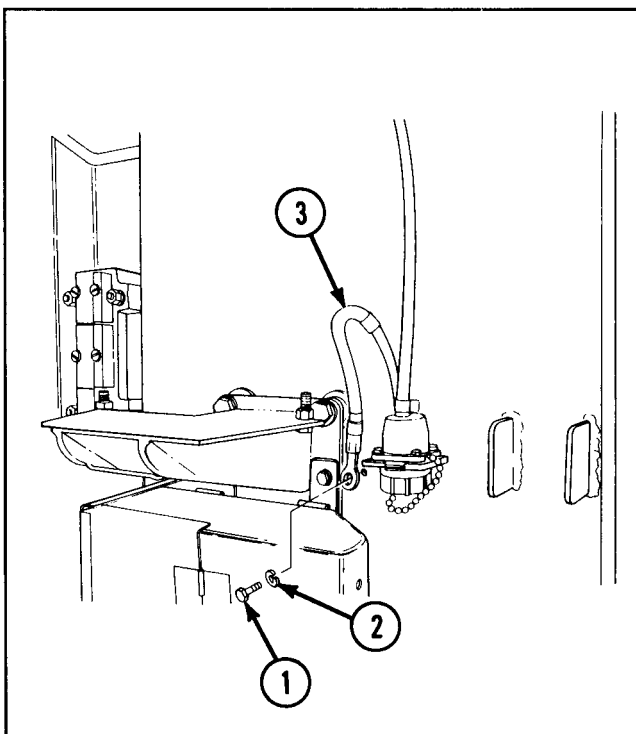
- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

REMOVAL

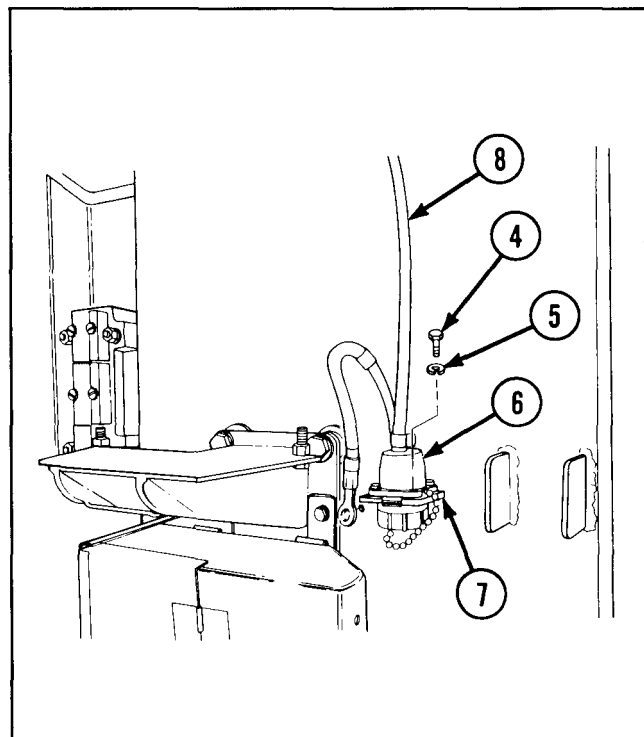
WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

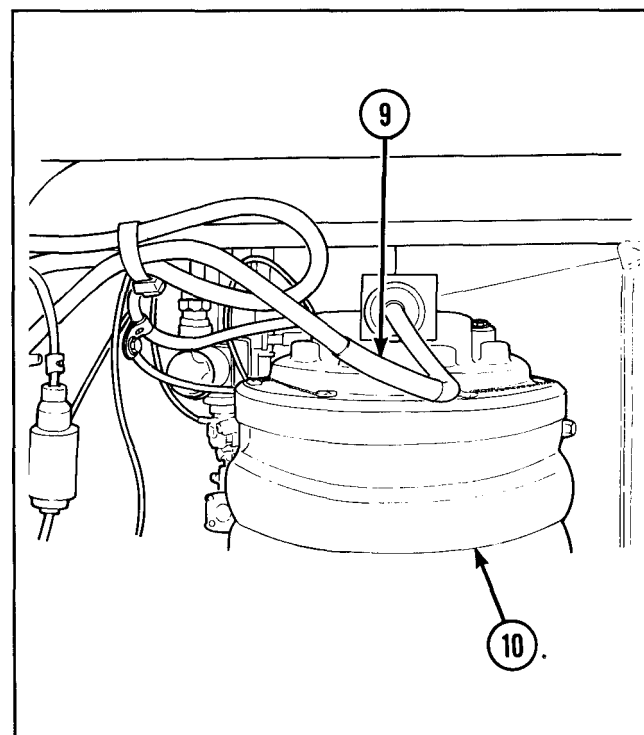
- 1 Remove assembled washer bolt (1), lockwasher (2), and ground wire (3).



- 2 Remove four capscrews (4), four lock-washers (5), and electrical connector (6) from wall bracket (7).
- 3 Remove clamps and fasteners from slip ring to circuit breakers and radio power disconnect branched wiring harness (8).



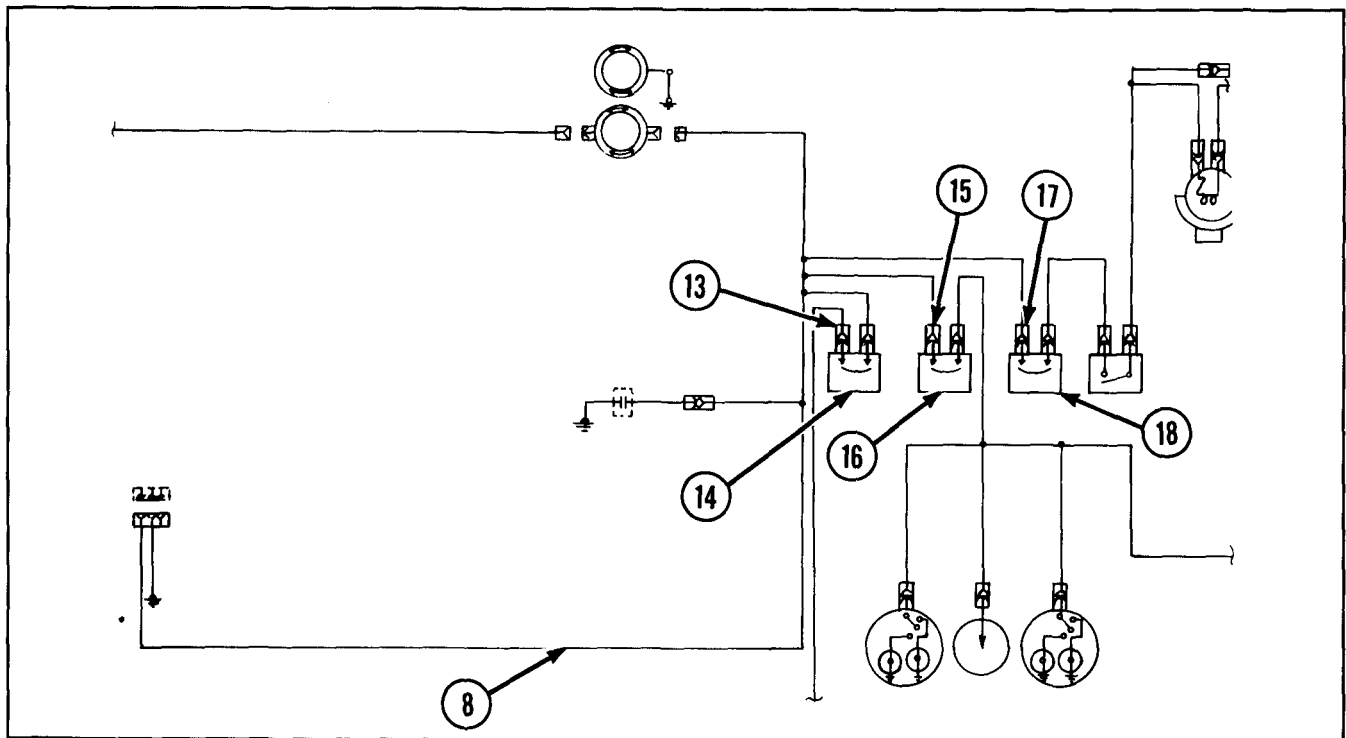
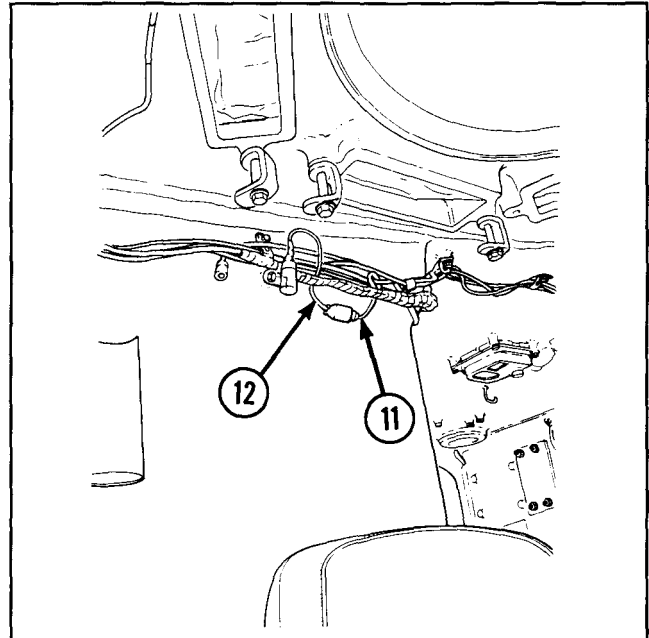
- 4 Disconnect electrical lead 100 (9) from slip ring (10).



2-73. MAINTENANCE OF SLIP RING TO CIRCUIT BREAKERS AND RADIO POWER DISCONNECT BRANCHED WIRING HARNESS (CONT).

REMOVAL (CONT)

- 5 Disconnect electrical lead 148 (11) from electrical lead (12).



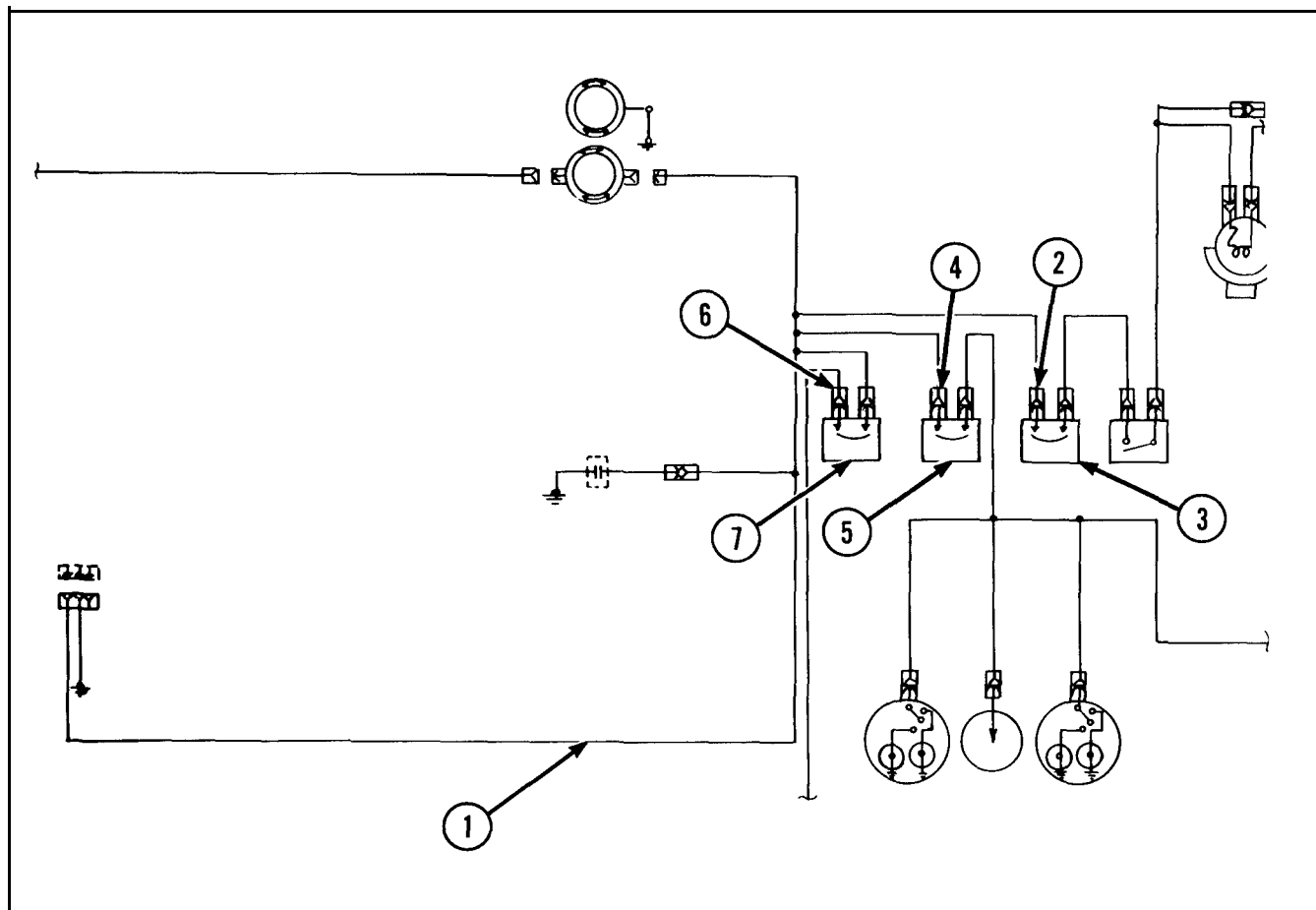
- 6 Disconnect electrical lead 326 (13) from circuit breaker (14).

- 7 Disconnect electrical lead 38 (15) from circuit breaker (16).

- 8 Disconnect electrical lead 518 (17) from circuit breaker (18) and remove slip ring to circuit breakers and radio power disconnect branched wiring harness (8).

INSPECTION/REPAIR

- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

INSTALLATION**WARNING**

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

- 1 Install slip ring to circuit breakers and radio power disconnect branched wiring

harness (1) and connect electrical lead 518 (2) to circuit breaker (3).

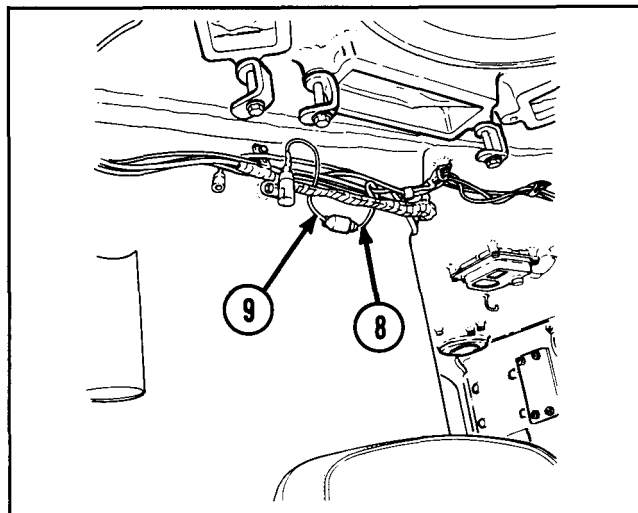
- 2 Connect electrical lead 38 (4) to circuit breaker (5).

- 3 Connect electrical lead 326 (6) to circuit breaker (7).

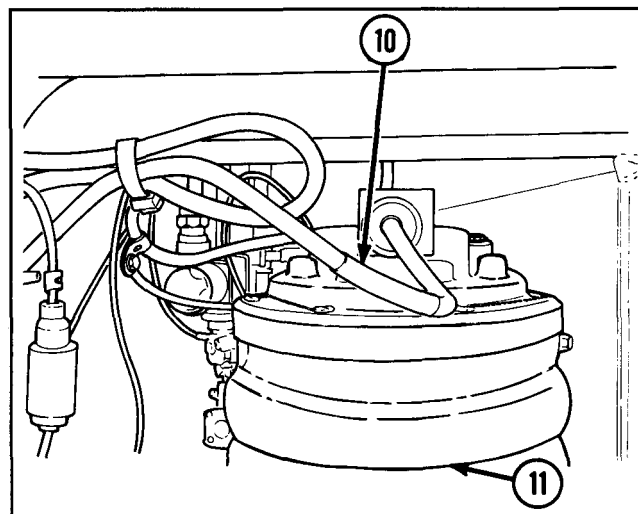
2-73. MAINTENANCE OF SLIP RING TO CIRCUIT BREAKERS AND RADIO POWER DISCONNECT BRANCHED WIRING HARNESS (CONT).

INSTALLATION (CONT)

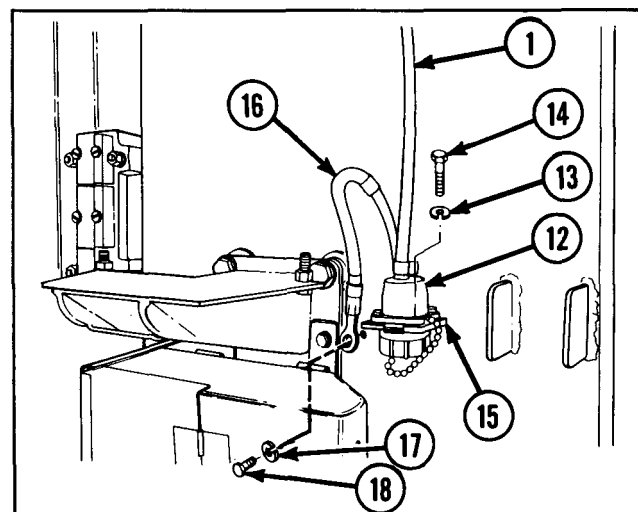
- 4 Connect electrical lead 148 (8) to electrical lead (9).



- 5 Connect electrical lead 100 (10) to slip ring (11).



- 6 Install clamps and fasteners on slip ring to circuit breakers and radio power disconnect branched wiring harness (1).
- 7 Install electrical connector (12), four lockwashers (13), and four capscrews (14) on wall bracket (15).
- 8 Install ground wire (16), new lockwasher (17), and assembled washer bolt (18).



2-74. MAINTENANCE OF SWITCH TO CAB FLOODLIGHTS BRANCHED WIRING HARNESS.

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

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive
(appx B)

References

TM 9-2350-238-24P-2

Equipment Conditions

2-279 Flasher control panel removed
MASTER switch turned OFF
INSTRUMENT switch turned OFF

General Safety Instructions

WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

REMOVAL

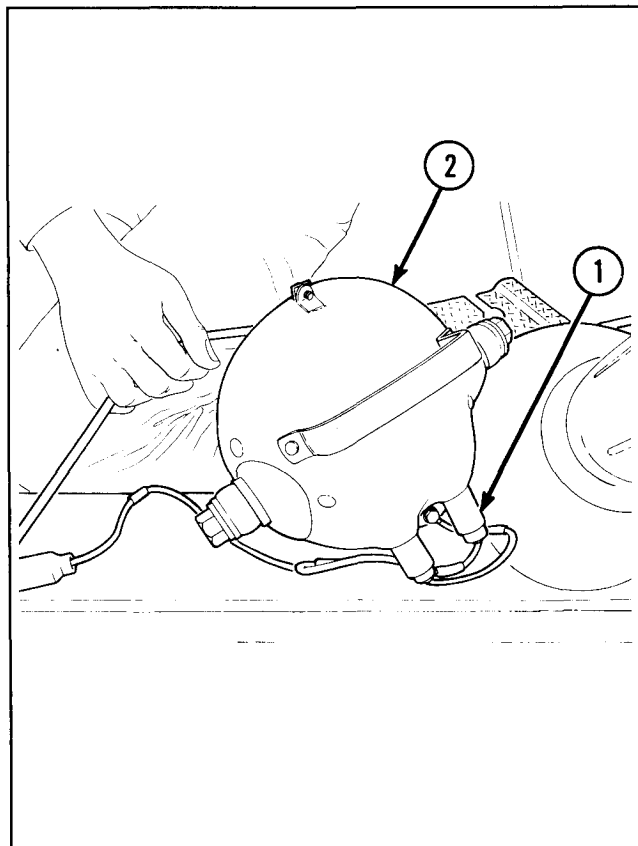
WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

NOTE

Electrical lead tag numbers appear more than once.

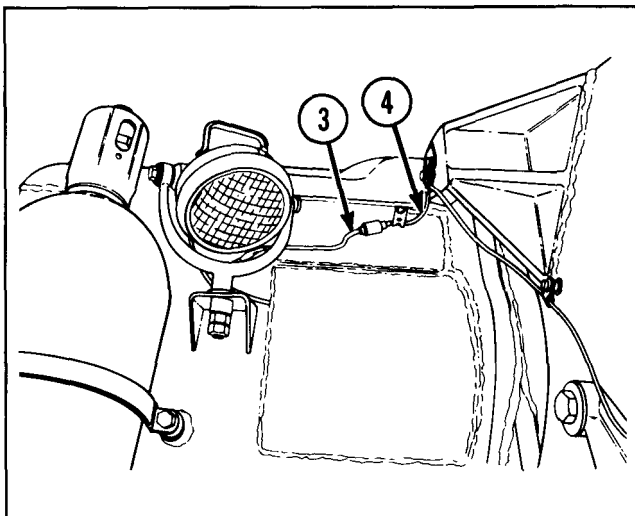
- 1 Disconnect electrical lead 518 (1) from cab floodlight (2).



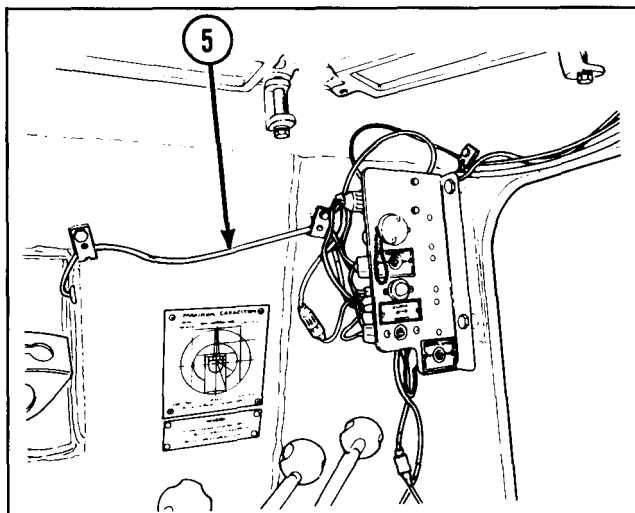
2-74. MAINTENANCE OF SWITCH TO CAB FLOODLIGHTS BRANCHED WIRING HARNESS (CONT).

REMOVAL (CONT)

- 2 Disconnect electrical lead 518 (3) from electrical lead (4).



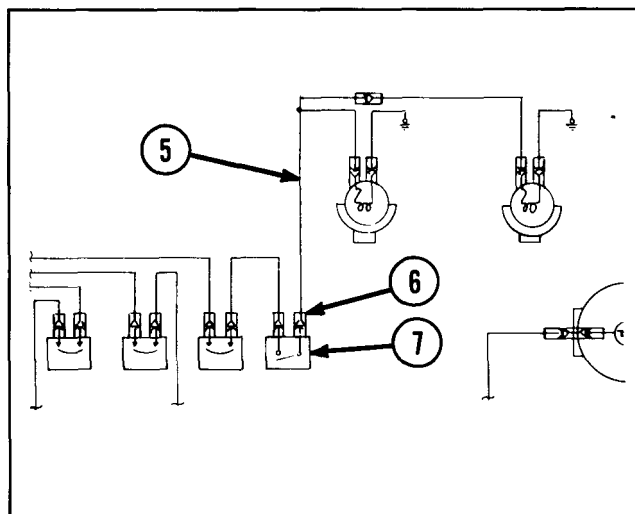
- 3 Remove clamps, fasteners, and grommets from switch to cab floodlights branched wiring harness (5).



- 4 Disconnect electrical lead 518 (6) from floodlight switch (7). Remove switch to cab floodlights branched wiring harness (5).

INSPECTION/REPAIR

- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).



Section VIII. PREPARATION FOR STORAGE OR SHIPMENT

2-102. DEFINITION OF ADMINISTRATIVE STORAGE. The placement of equipment in administrative storage can be for short periods of time when: (1) An organization lacks operating funds, personnel, other resources, or normal usage of its organic materiel, and (2) materiel which exceeds the capability of the owning organization to operate or maintain must be retained by that organization for contingency or other cogent reasons.

Installation or organization commanders may authorize the administrative storage of their materiel within guidance furnished by MACOM commanders and AR 750-1. Recovery vehicles should be ready for use within the time factors as determined by the directing authority.

During the storage period appropriate maintenance records will be kept.

a. Scope. The requirements specified herein are necessary to maintain the M578 Recovery Vehicle in administrative storage in such a way as to achieve the maximum readiness condition.

b. General.

(1) Except as indicated in the Maintenance Services and Inspection and Corrections of Shortcomings and Deficiencies paragraphs, equipment that is placed in administrative storage should be capable of being readied to perform its mission within a 24-hour period or as otherwise prescribed by the approving authority. Before equipment is placed in administrative storage, current maintenance services, shortcomings, and deficiencies should be corrected, and all modification work orders (MWOS) should be applied.

(2) Report equipment in administrative storage in Materiel Readiness and Unit Readiness reports as prescribed for all reportable equipment. See AR 220-1.

(3) Perform inspections, maintenance services, and lubrications IAW TM 9-2350-238

series manuals or applicable technical manuals. In case of conflict in lubrication instructions, the applicable technical manual will apply.

(4) Records and reports to be maintained for equipment in administrative storage are those prescribed by DA PAM 738-750, for equipment in use.

(5) Ten percent variance is acceptable on time running hours, or mileage used to determine maintenance actions required.

c. Security. Instructions contained herein do not modify security procedures and requirements for classified or pilferable items. See AR 190-13, DA PAM 738-750, and 750-35.

d. Storage Site.

(1) Select the best available site for administrative storage. Separate stored equipment from equipment in use. Conspicuously mark the area "Administrative Storage".

(2) Covered space is preferred. When sufficient covered space for all Recovery Vehicles to be stored is not available, select an open site.

(3) Open sites should be improved hardstand, if available. Unimproved sites should be firm, well-drained, and kept free of excessive vegetation.

e. Storage Plan.

(1) Store equipment so as to provide maximum protection from the elements and to provide access for inspection, maintenance, and exercise. Anticipate removal or deployment problems and take suitable precautions.

(2) Take into account environmental conditions, such as extreme heat or cold; high humidity; blowing sand, dust, or loose debris; soft ground; mud; heavy snows; earthquakes; or combinations thereof and take adequate precautions.

2-102. DEFINITION OF ADMINISTRATIVE STORAGE (CONT).

e. *Storage Plan. (cont)*

(3) Establish a fire plan and provide for adequate firefighting equipment and personnel.

f. *Maintenance Services and Inspection.* Prior to storage, perform the next scheduled major preventive maintenance service (monthly, quarterly, or semiannually).

g. *Auxiliary Equipment and Basic Issue Items.* Process auxiliary and basic issue items simultaneously with the Recovery Vehicle to which they are assigned. If possible, store auxiliary and basic issue items with the Recovery Vehicle. If stored apart from the Recovery Vehicle, mark auxiliary and basic issue items with tags indicating the Recovery Vehicle, its registration or serial number and location, and store in protective type closures. In addition, place a tag or list indicating the location of the removed items in a conspicuous place on the Recovery Vehicle.

h. *Corrections of Shortcomings and Deficiencies.* Correct all shortcomings and deficiencies prior to storage, or obtain a deferment from the approving authority.

i. *Lubrication.* Lubricate equipment IAW the applicable technical manual. Retract hydraulic systems linkage and coat exposed portion of shafts with grease.

j. *General Cleaning, Painting, and Preservation.*

CAUTION

Do not direct water or steam under pressure against air cleaners, air duct outlets, exhaust outlets, unsealed electrical systems, fire control instruments, upholstery, or any exterior opening which will damage a component.

(1) Clean the equipment of dirt, grease, and other contaminants IAW this manual.

(2) Removal of rust and damaged paint by scraping, wire brushing, sanding, or buffing is not authorized on armament components.

(3) After cleaning and drying, immediately coat unpainted metal surfaces with an oil or grease as appropriate.

CAUTION

Place a piece of barrier material between desiccant bags and metal surfaces.

NOTE

Air circulation under draped covers reduces deterioration from moisture and heat.

(4) Sunlight, heat, moisture (humidity), and dirt tend to accelerate deterioration. Install all covers (including vehicle protection closures) authorized for the equipment. Close and secure all openings except those required for venting and draining. Seal openings to prevent the entry of rain, snow, or dust. Insert desiccant when complete seal is required. Place equipment and provide blocking or framing to allow for ventilation and water drainage. Support cover away from Recovery Vehicle surfaces which may rust, rot, or mildew.

2-103. CARE OF EQUIPMENT IN ADMINISTRATIVE STORAGE.

a. *Maintenance Services.* After equipment has been placed in administrative storage, suspend all regularly scheduled preventive maintenance services and inspect and exercise as specified herein. Do not reduce Prescribed Load List. See DA PAM 738-750 and DA PAM 750-35.

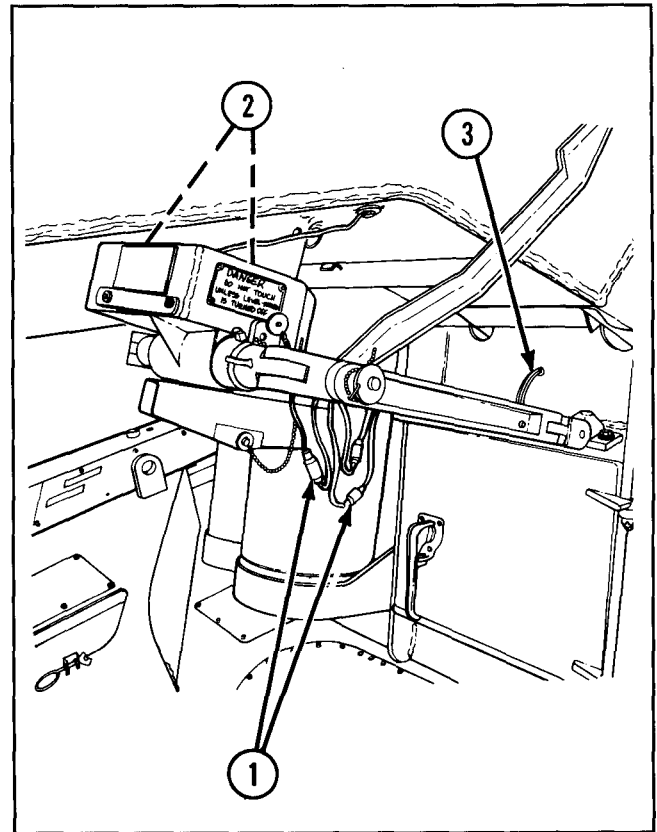
REMOVAL**WARNING**

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

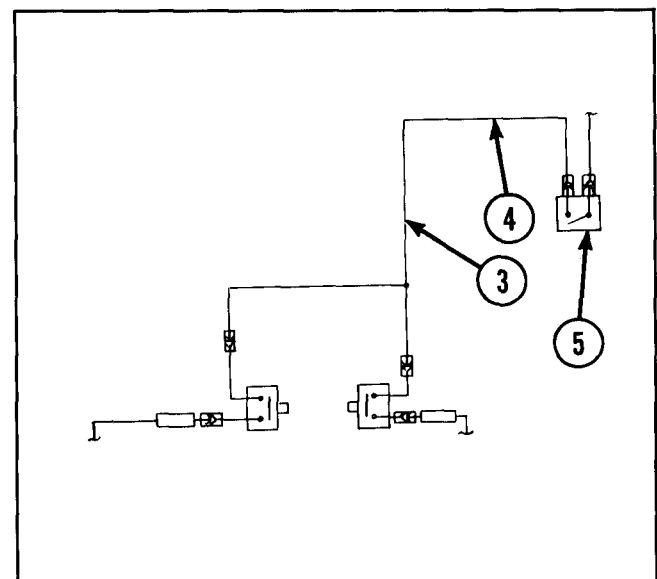
NOTE

Electrical lead tag numbers appear more than once.

- 1 Disconnect two electrical leads 480 (1) from right and left sensing switches (2).
- 2 Remove clamps, fasteners, and grommets from level wind switch to sensing switches electrical lead assembly (3).



- 3 Disconnect electrical lead 480 (4) from level wind switch (5). Remove level wind switch to sensing switches electrical lead assembly (3).

**INSPECTION/REPAIR**

- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

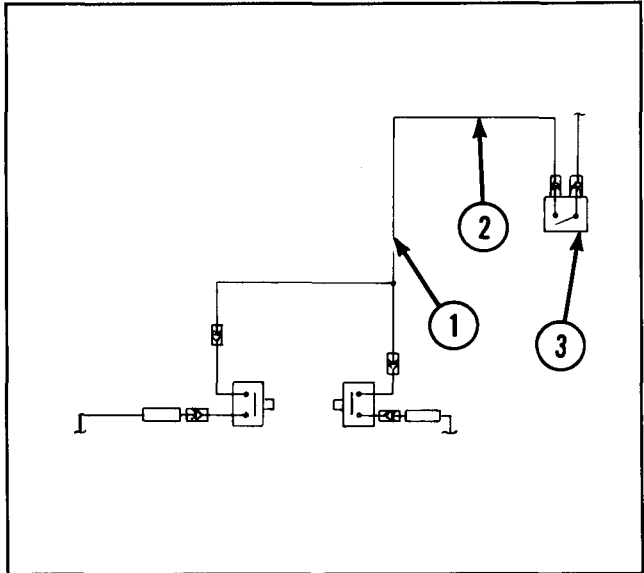
2-75. MAINTENANCE OF LEVEL WIND SWITCH TO SENSING SWITCHES ELECTRICAL LEAD ASSEMBLY (CONT).

INSTALLATION

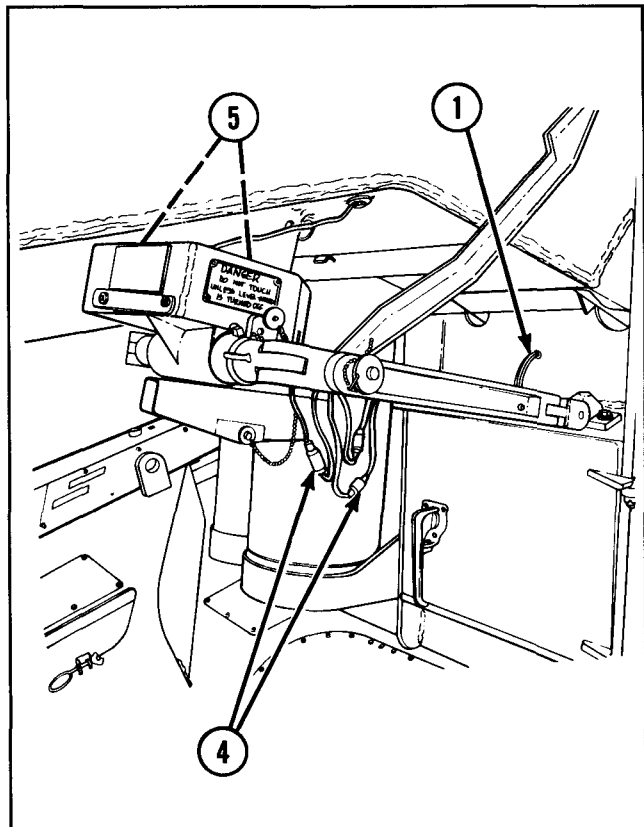
WARNING

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

- 1 Install level wind switch to sensing switches electrical lead assembly (1). Connect electrical lead 480 (2) to level wind switch (3).



- 2 Install clamps, fasteners, and grommets on level wind switch to sensing switches electrical lead assembly (1).
- 3 Connect two electrical leads 480 (4) to right and left sensing switches (5).



2-76. MAINTENANCE OF LAMP AND SWITCH FLASHER LIGHT ELECTRICAL LEAD ASSEMBLY.

This task covers: a. *Removal*

b. *Inspection/Repair*

c. *Installation*

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive
(appx B)

References

TM 9-2350-238-24P-2

Equipment Conditions

2-279 Flasher control panel removed
MASTER switch turned OFF
INSTRUMENT switch turned OFF

General Safety Instructions

WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

REMOVAL

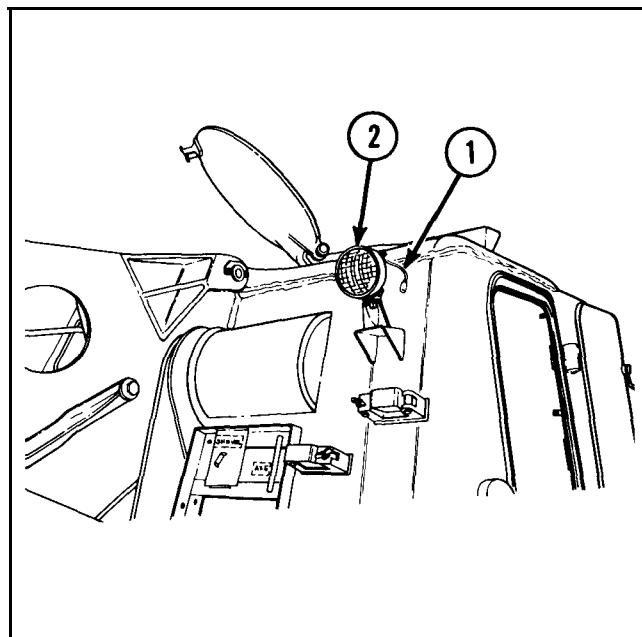
WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

NOTE

Electrical lead tag numbers may appear more than once.

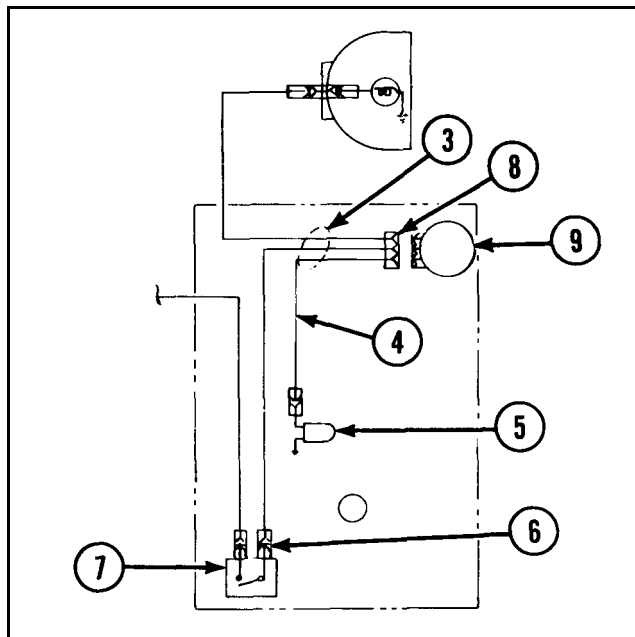
- 1 Disconnect electrical lead 325A (1) from signal flasher (2).



2-76. MAINTENANCE OF LAMP AND SWITCH FLASHER LIGHT ELECTRICAL LEAD ASSEMBLY (CONT).

REMOVAL (CONT)

- 2 Remove clamps, fasteners, and grommets from lamp and switch flasher light electrical lead assembly (3).
- 3 Disconnect electrical lead 325C (4) from flasher signal light (5).
- 4 Disconnect electrical lead 325 (6) from flasher signal switch (7).
- 5 Disconnect plug connector (8) from flasher assembly (9) and remove lamp and switch flasher light electrical lead assembly (3).



INSPECTION/REPAIR

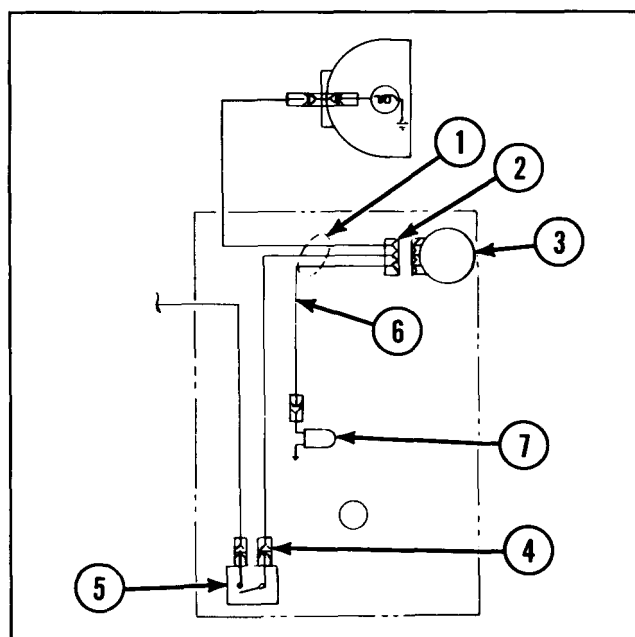
- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

INSTALLATION

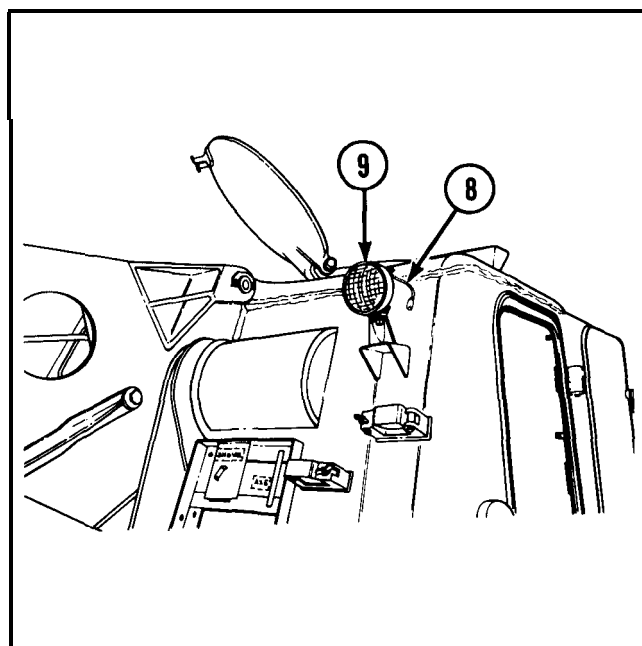
WARNING

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

- 1 Install lamp and switch flasher light electrical lead assembly (1) and connect plug connector (2) to flasher assembly (3).
- 2 Connect electrical lead 325 (4) to flasher signal switch (5).
- 3 Connect electrical lead 325C (6) to flasher signal light (7).
- 4 Install clamps, fasteners, and grommets on lamp and switch flasher light electrical lead assembly (1).



- 5 Connect electrical lead 325A (8) to signal flasher (9).



2-77. MAINTENANCE OF FLOODLIGHT TO GROUND ELECTRICAL LEAD.

This task covers: a. *Removal*

b. *Inspection/Repair*

c. *Installation*

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive
(appx B)

Materials/Parts

Lockwasher (2) (MS45904-68)

References

TM 9-2350-238-24P-2

Equipment Conditions

MASTER switch turned OFF
INSTRUMENT switch turned OFF

General Safety Instructions

WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

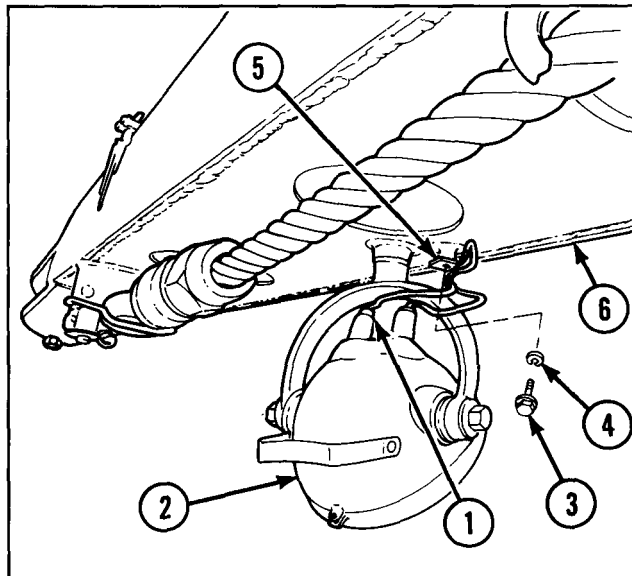
2-77. MAINTENANCE OF FLOODLIGHT TO GROUND ELECTRICAL LEAD (CONT).

REMOVAL

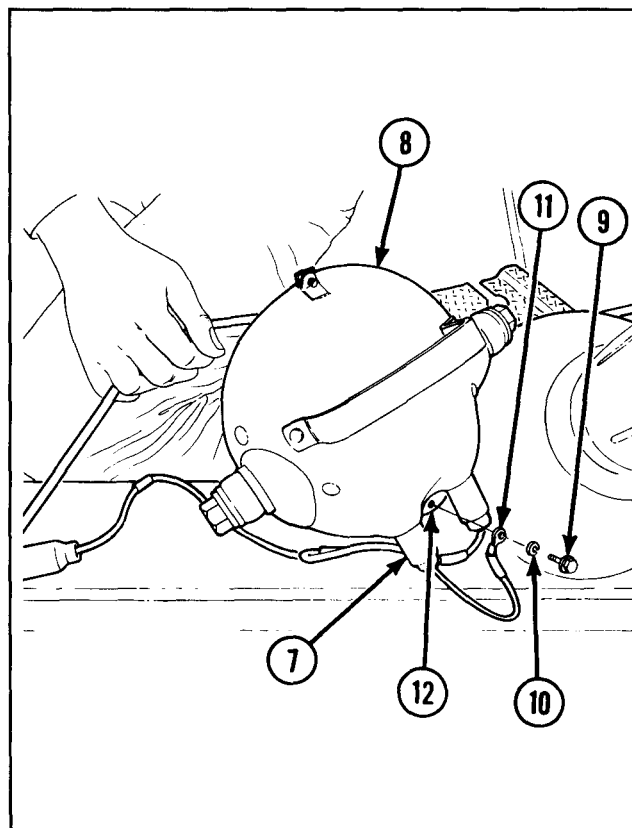
WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

- 1 Disconnect floodlight to ground electrical lead plug (1) from boom floodlight (2).
- 2 Remove assembled washer bolt (3), lockwasher (4), and floodlight to ground electrical lead (5) from boom (6).



- 3 Disconnect floodlight to ground electrical lead plug (7) from cab floodlight (8).
- 4 Remove assembled washer bolt (9), lockwasher (10), and floodlight to ground electrical lead (11) from cab floodlight bracket (12).



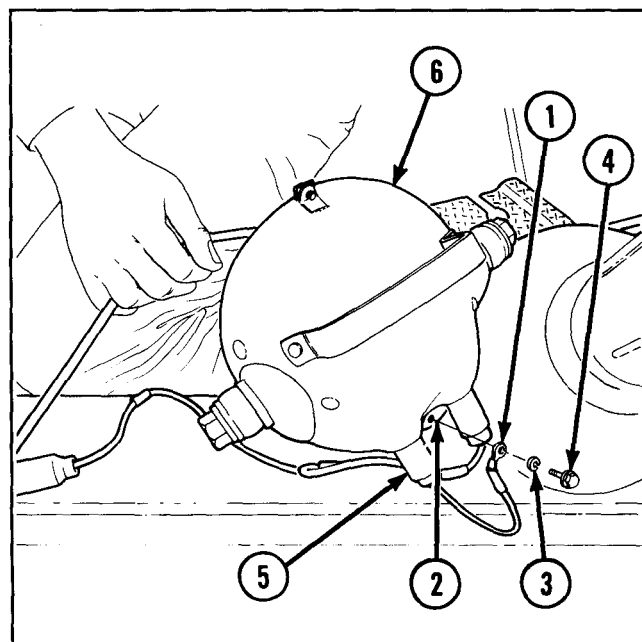
INSPECTION/REPAIR

- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

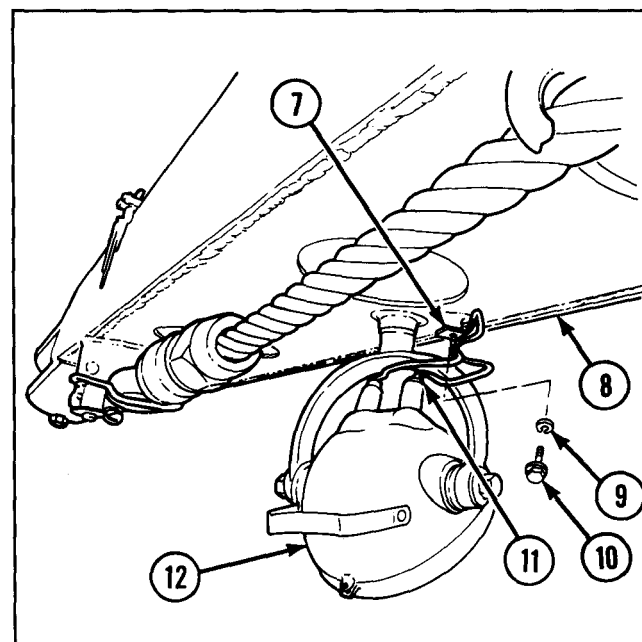
INSTALLATION**WARNING**

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

- 1 Connect floodlight to ground electrical lead (1) to cab floodlight bracket (2) and secure using new lockwasher (3) and assembled washer bolt (4).
- 2 Connect floodlight to ground electrical lead plug (5) to cab floodlight (6).



- 3 Connect floodlight to ground electrical lead (7), to boom (8) and secure using new lockwasher (9) and assembled washer bolt (10).
- 4 Connect floodlight to ground electrical lead plug (11) to boom floodlight (12).



2-78. MAINTENANCE OF GROUNDED 24-VOLT FEED TO CAPACITOR ELECTRICAL LEAD.

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

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive
(appx B)

Materials/Parts

Lockwasher (MS35333-40)

References

TM 9-2350-238-24P-2

Equipment Conditions

MASTER switch turned OFF
INSTRUMENT switch turned OFF

General Safety Instructions

WARNING

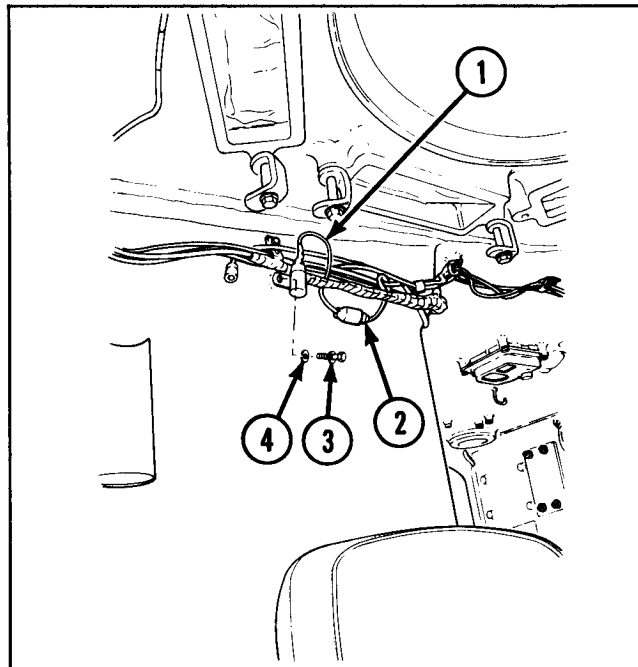
- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

REMOVAL

WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

- 1 Disconnect grounded 24-volt feed to capacitor electrical lead (1) from electrical lead (2).
- 2 Remove assembled washer bolt (3), lockwasher (4) and grounded 24-volt feed to capacitor lead (1) from wall.



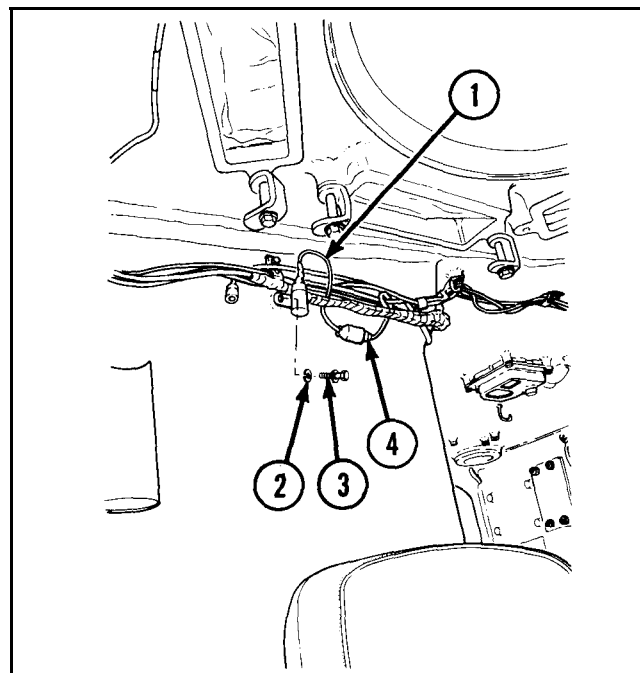
INSPECTION/REPAIR

- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

INSTALLATION**WARNING**

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

- 1 Install grounded 24-volt feed to capacitor electrical lead (1) to wall using new lockwasher (2) and assembled washer bolt (3).
- 2 Connect grounded 24-volt feed to capacitor electrical lead (1) to electrical lead (4).

**2-79. MAINTENANCE OF ELECTRICAL COVER.**This task covers: a. *Removal*b. *Inspection/Repair*c. *Installation***INITIAL SETUP*****Tools and Special Tools***

General mechanic's tool kit, automotive
(appx B)

References

TM 9-2350-238-24P-2

Materials/Parts

Lockwasher (MS45904-68)

2-79. MAINTENANCE OF GROUNDED 24-VOLT FEED TO CAPACITOR ELECTRICAL LEAD (CONT).

REMOVAL

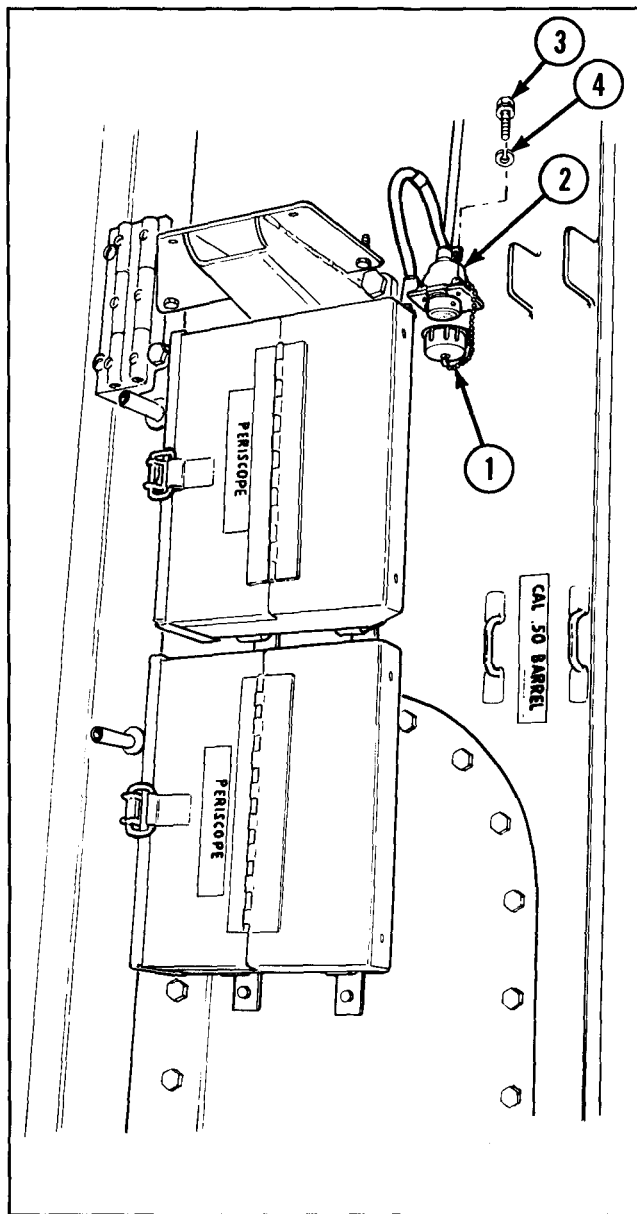
- 1 Remove electrical cover (1) from slip ring to circuit breakers and radio power disconnect branched wiring harness connector (2).
- 2 Remove assembled washer bolt (3), lockwasher (4), and electrical cover (1).

INSPECTION/REPAIR

- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

INSTALLATION

- 1 Install electrical cover (1), new lockwasher (4), and assembled washer bolt (3).
- 2 Install electrical cover (1) on slip ring to circuit breakers and radio power disconnect branched wiring harness connector (2).



2-80. MAINTENANCE OF RECTIFIER TO FLOW DIVIDER RELIEF VALVE ELECTRICAL LEAD ASSEMBLY.

This task covers: a. *Removal*

b. *Inspection/Repair*

c. *Installation*

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive
(appx B)

References

TM 9-2350-238-24P-2

Equipment Conditions

2-116 Rear left-hand nonskid metallic
tread removed
2-339 Tool box removed from well
MASTER switch turned OFF
INSTRUMENT switch turned OFF

General Safety Instructions

WARNING

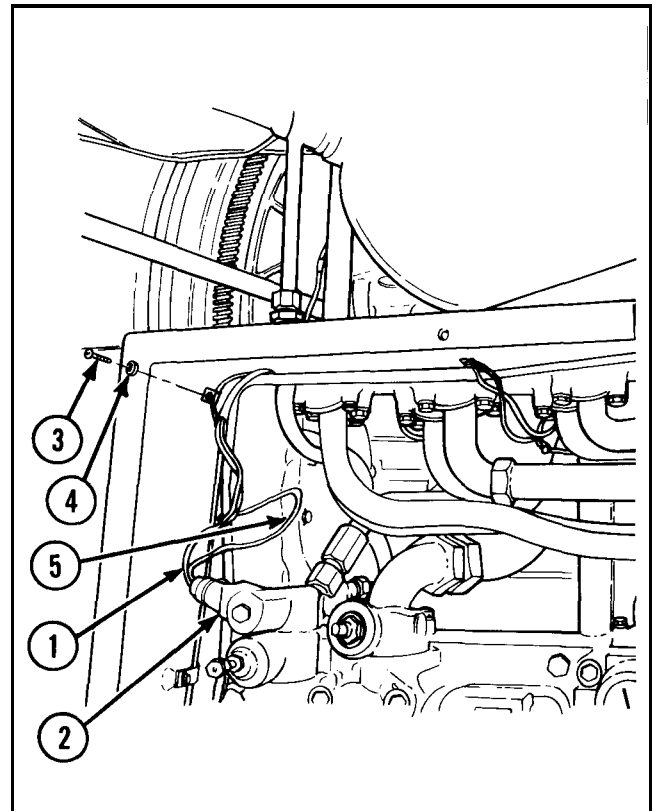
- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

REMOVAL

WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

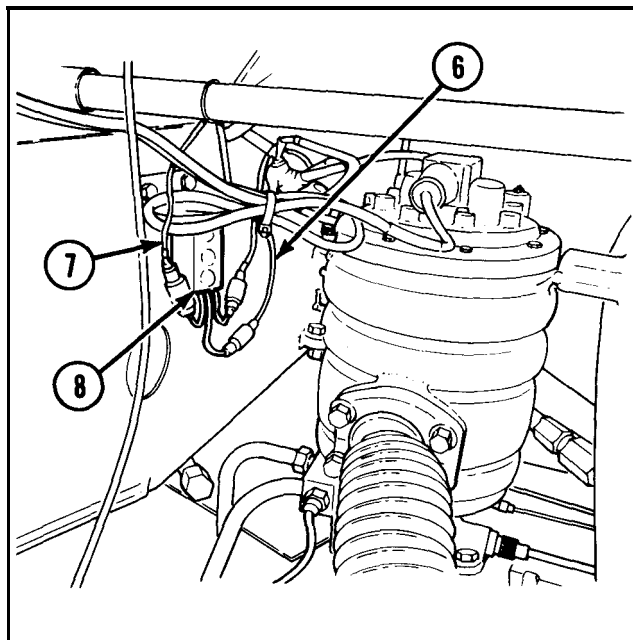
- 1 Disconnect electrical lead 480 1) from solenoid valve (2).
- 2 Remove screw (3), washer (4), and disconnect ground wire (5).



2-80. MAINTENANCE OF RECTIFIER TO FLOW DIVIDER RELIEF VALVE ELECTRICAL LEAD ASSEMBLY (CONT).

REMOVAL (CONT)

- 3 Remove all necessary clamps and fasteners from rectifier to flow divider relief valve electrical lead assembly (6).
- 4 Disconnect electrical lead 480 (7) from rectifier (8) and remove rectifier to flow divider relief valve electrical lead assembly (6).



INSPECTION/REPAIR

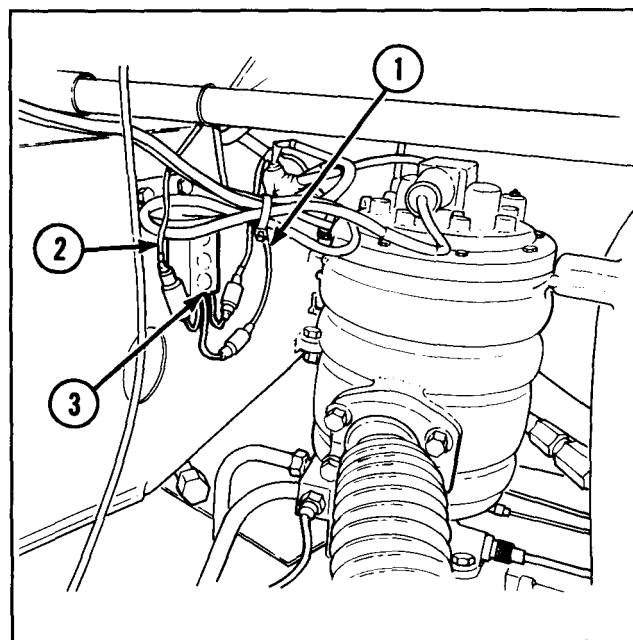
- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

INSTALLATION

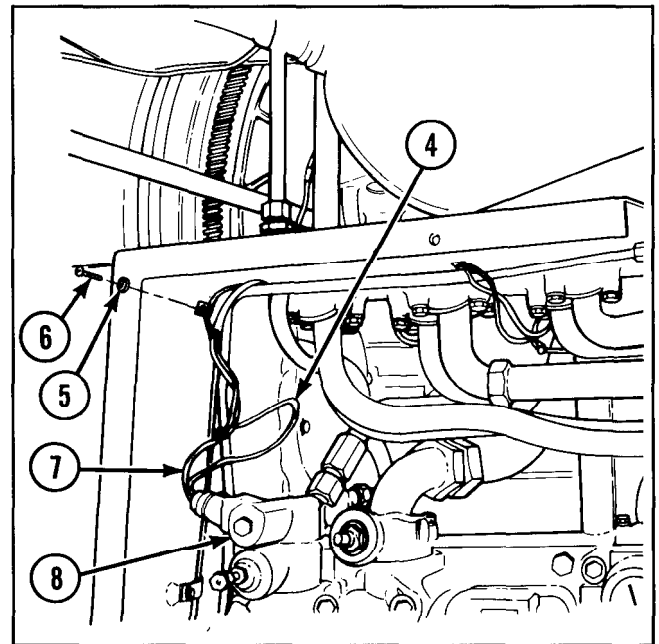
WARNING

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

- 1 Connect rectifier to flow divider relief valve electrical lead assembly (1) and connect electrical lead 480 (2) on rectifier (3).
- 2 Install clamps and fasteners on rectifier to flow divider relief valve electrical lead assembly (1).



- 3 Connect ground wire (4) and secure using washer (5) and screw (6).
- 4 Connect electrical lead 480 (7) to solenoid valve (8).



2-81. MAINTENANCE OF ELECTRICAL LEVEL WIND SOLENOID TO SENSING SWITCH AND LEFT RECTIFIER BRANCHED WIRING HARNESS.

This task covers: a. *Removal*

b. *Inspection/Repair*

c. *Installation*

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive
(appx B)

References

TM 9-2350-238-24P-2

Equipment Conditions

2-116 Forward left-hand nonskid
metallic tread removed
2-339 Tool box removed from well
MASTER switch turned OFF
INSTRUMENT switch turned OFF
Turret traversed 90 degrees to the left.

General Safety Instructions

WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

2-81. MAINTENANCE OF ELECTRICAL LEVEL WIND SOLENOID TO SENSING SWITCH AND LEFT RECTIFIER BRANCHED WIRING HARNESS (CONT).

REMOVAL

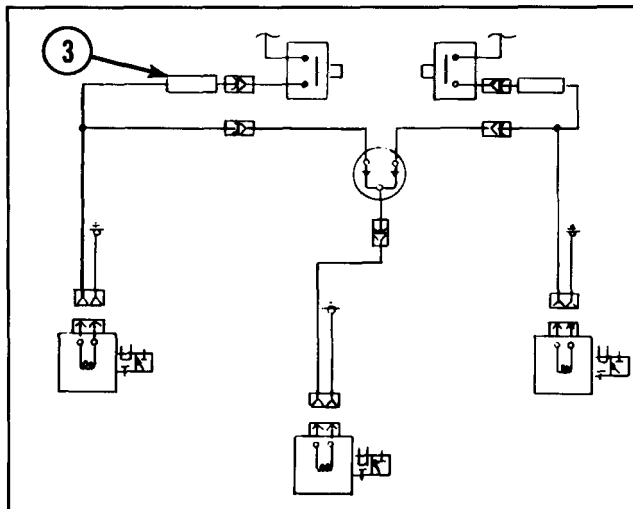
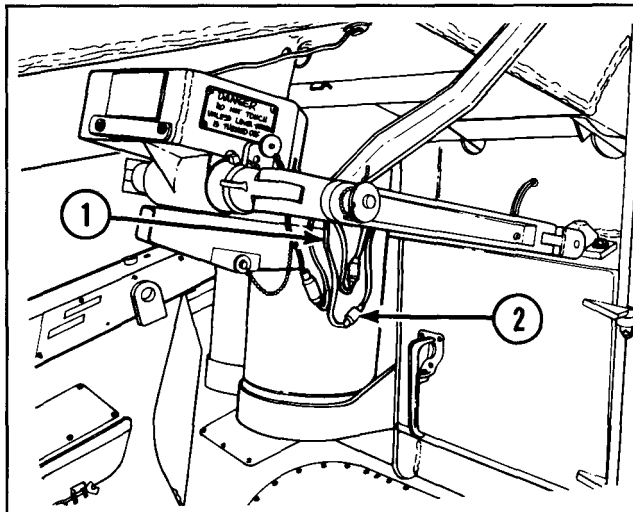
WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

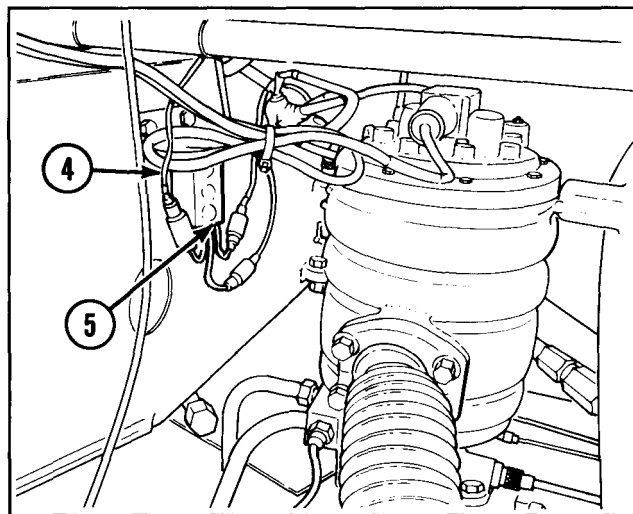
NOTE

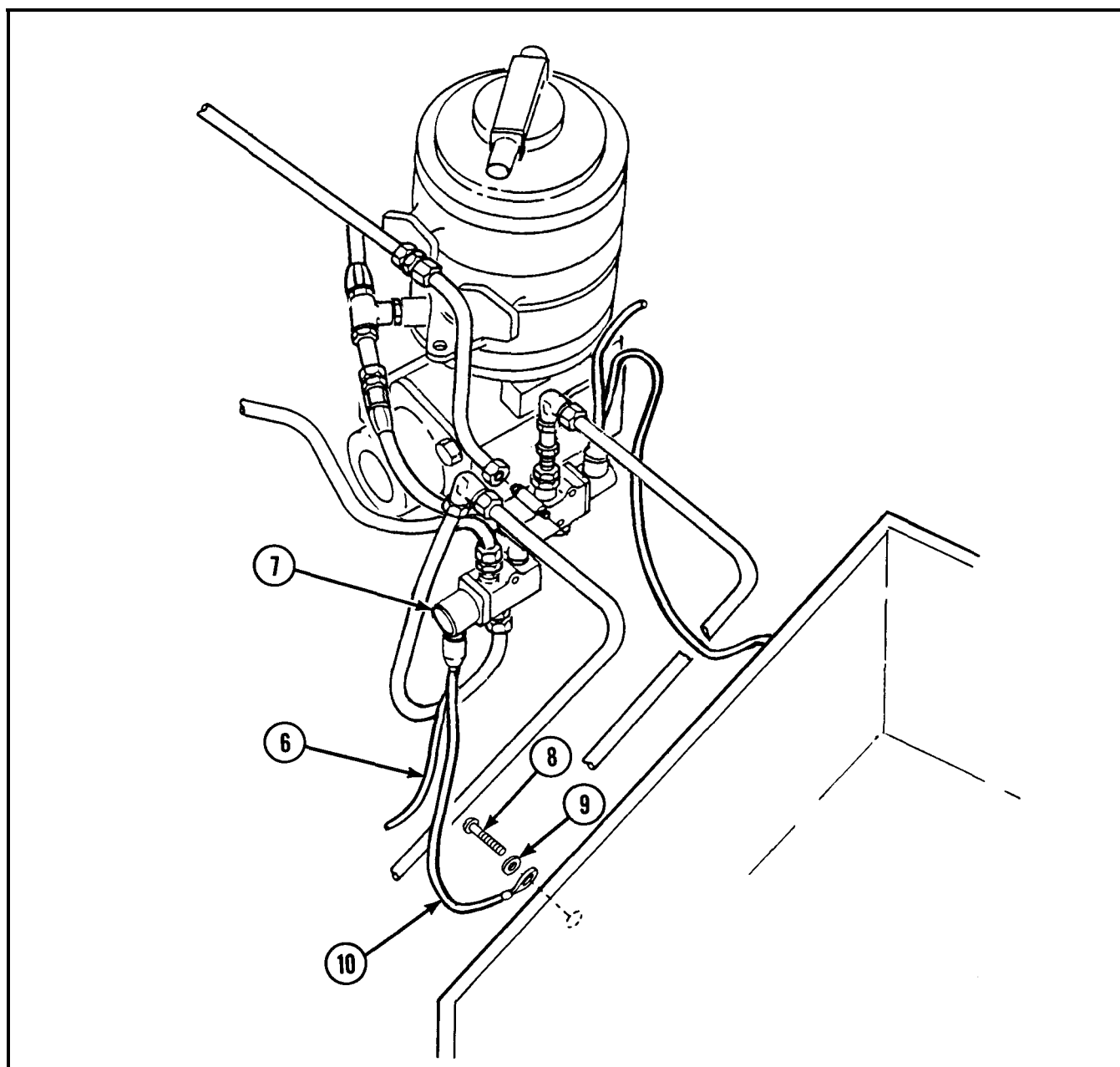
Electrical lead tag numbers appear more than once.

- 1 Disconnect electrical lead 480 (1) from left level wind sensing switch (2).
- 2 Remove all necessary clamps, fasteners, and grommets from electrical level wind to sensing switch and left rectifier branched wiring harness (3).



- 3 Disconnect electrical lead 480 (4) from rectifier (5).





4 Disconnect electrical lead 480 (6) from solenoid valve (7).

5 Remove screw (8), washer (9), and disconnect ground wire (10). Remove electrical level wind to sensing switch and left rectifier branched wiring harness (3).

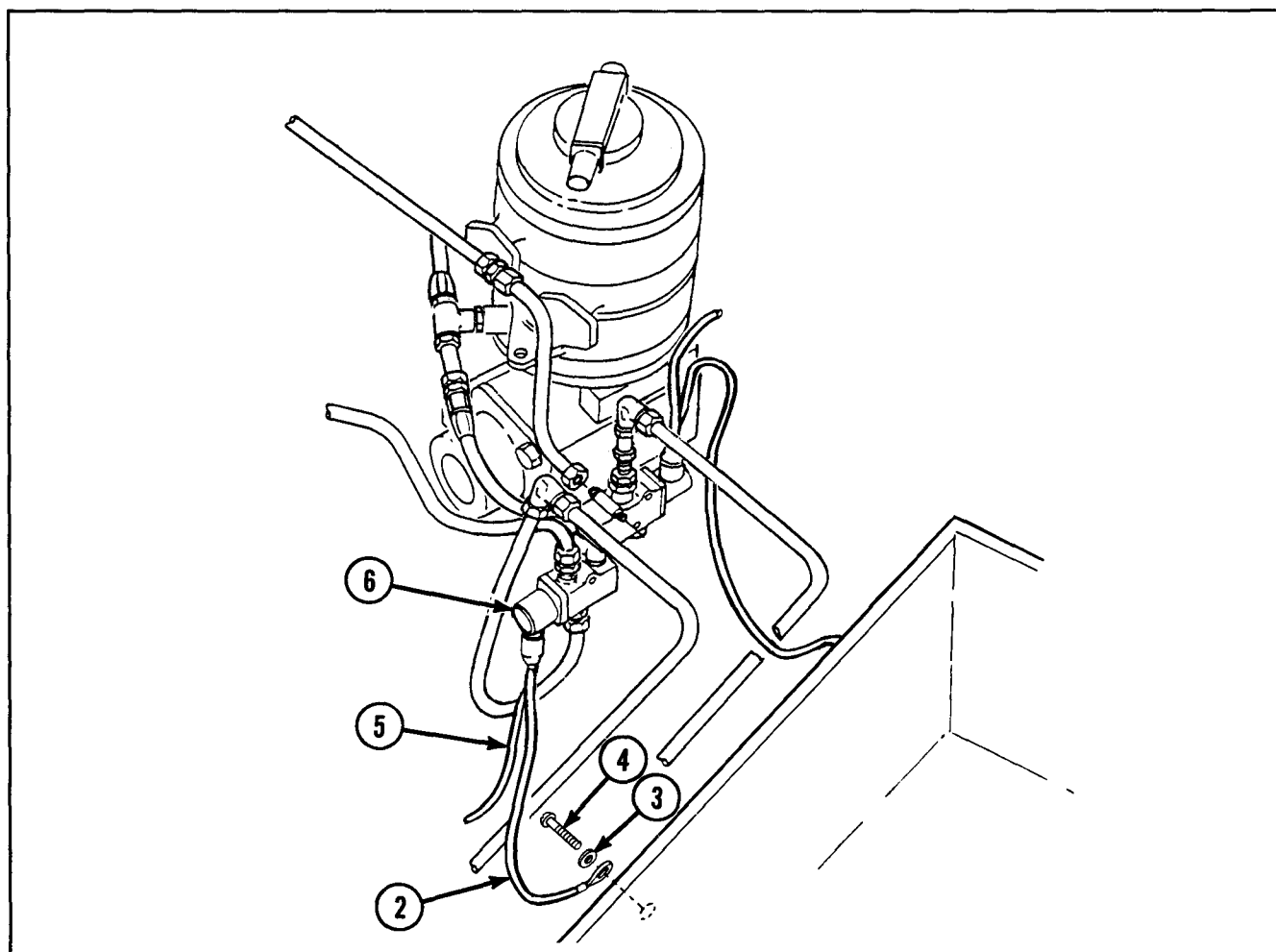
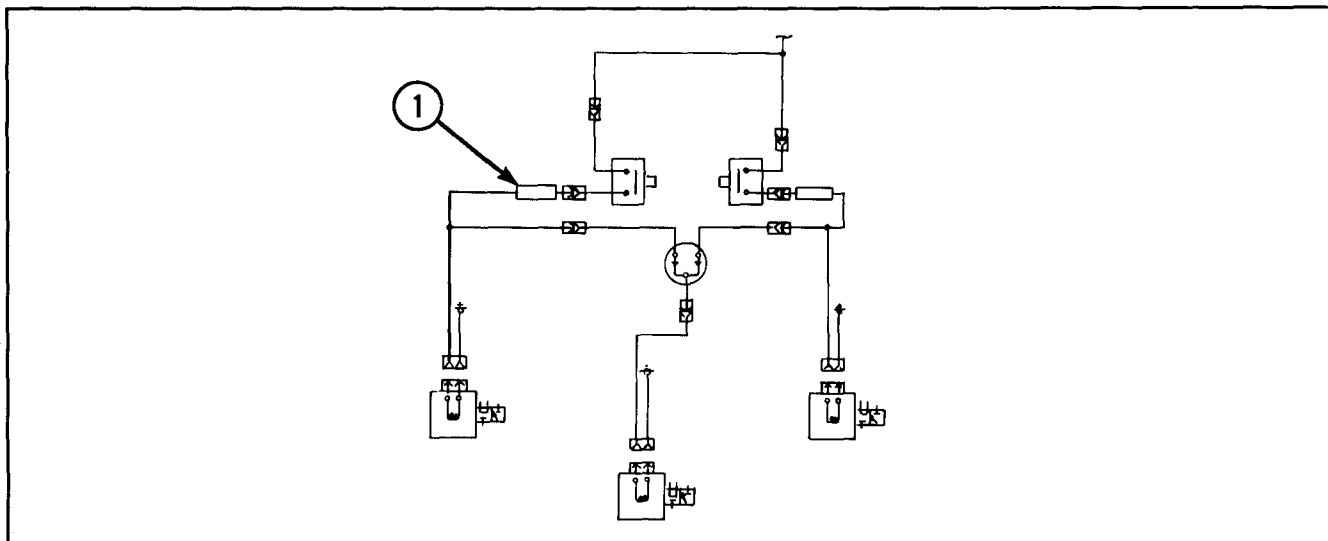
INSPECTION/REPAIR

1 Check for broken, damaged, or missing parts.

2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

2-81. MAINTENANCE OF ELECTRICAL LEVEL WIND SOLENOID TO SENSING SWITCH
AND LEFT RECTIFIER BRANCHED WIRING HARNESS (CONT).

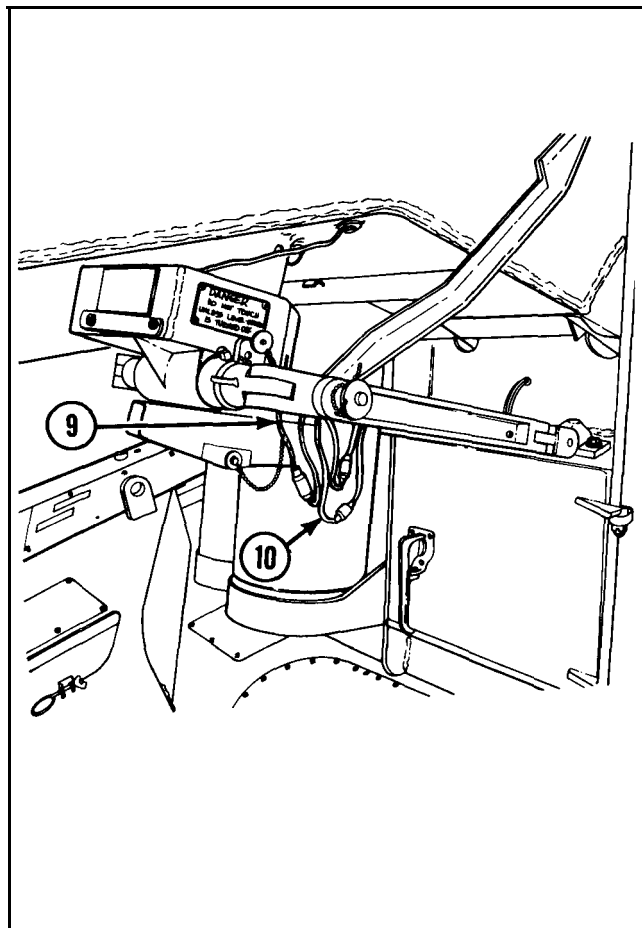
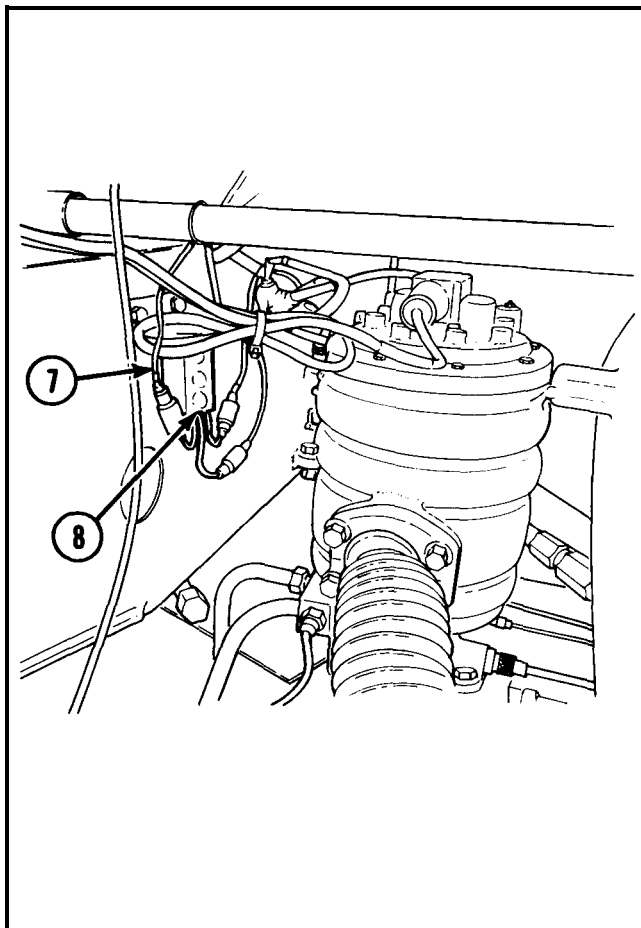
INSTALLATION



WARNING

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

- 1 Install electrical level wind solenoid to sensing switch and left rectifier branched wiring harness (1). Connect ground wire (2) and install using washer (3) and screw (4).
- 2 Connect electrical lead 480 (5) on solenoid valve (6).



- 3 Connect electrical lead 480 (7) on rectifier (8).
- 4 Install clamps, fasteners, and grommets on electrical level wind solenoid to sensing switch and left rectifier branched wiring harness (1).
- 5 Connect electrical lead 480 (9) on left level wind sensing switch (10).

2-82. MAINTENANCE OF CAB TO SLIP RING GROUND ELECTRICAL LEAD.

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

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive (appx B)

References

TM 9-2350-238-24P-2

Equipment Conditions

2-339 Tool box removed from well
MASTER switch turned OFF
INSTRUMENT switch turned OFF

General Safety Instructions

WARNING

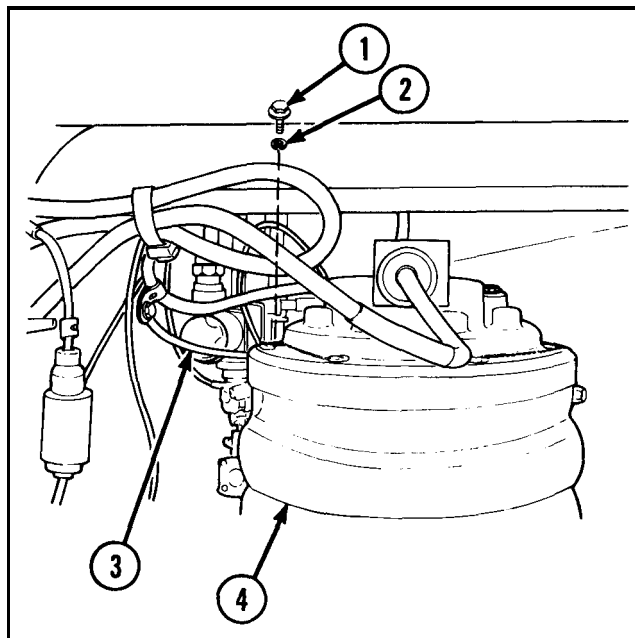
- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

REMOVAL

WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

Remove assembled washer bolt (1) and lockwasher (2) and disconnect cab to slip ring ground electrical lead (3) from slip ring (4).



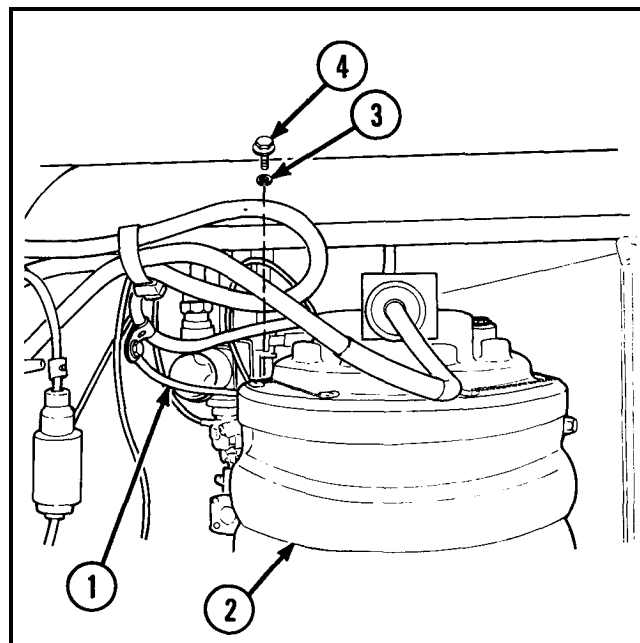
INSPECTION/REPAIR

- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

INSTALLATION**WARNING**

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

Connect cab to slip ring ground electrical lead (1) to slip ring (2) and install new lockwasher (3) and assembled washer bolt (4).



2-83. MAINTENANCE OF RIGHT AND LEFT LEVEL WIND SOLENOID TO SENSING SWITCH AND RECTIFIER ELECTRICAL LEAD ASSEMBLIES.

This task covers: a. *Removal*

b. *Inspection/Repair*

c. *Installation*

INITIAL SETUP*Tools and Special Tools*

General mechanic's tool kit, automotive (appx B)

References

TM 9-2350-238-24P-2

Equipment Conditions

2-116 Forward left-hand nonskid metallic tread removed
 2-339 Tool box removed from well
 MASTER switch turned OFF
 INSTRUMENT switch turned OFF

*General Safety Instructions***WARNING**

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

2-83. MAINTENANCE OF RIGHT AND LEFT LEVEL WIND SOLENOID TO SENSING SWITCH AND RECTIFIER ELECTRICAL LEAD ASSEMBLIES (CONT).

REMOVAL

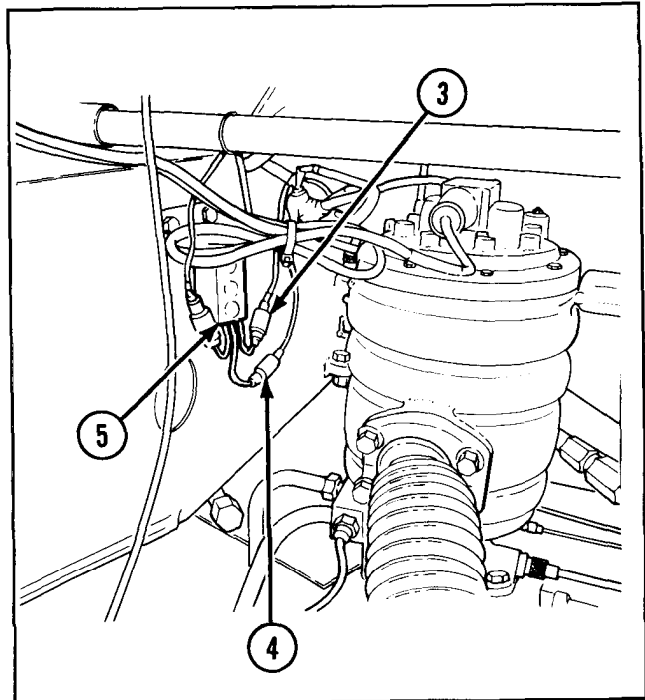
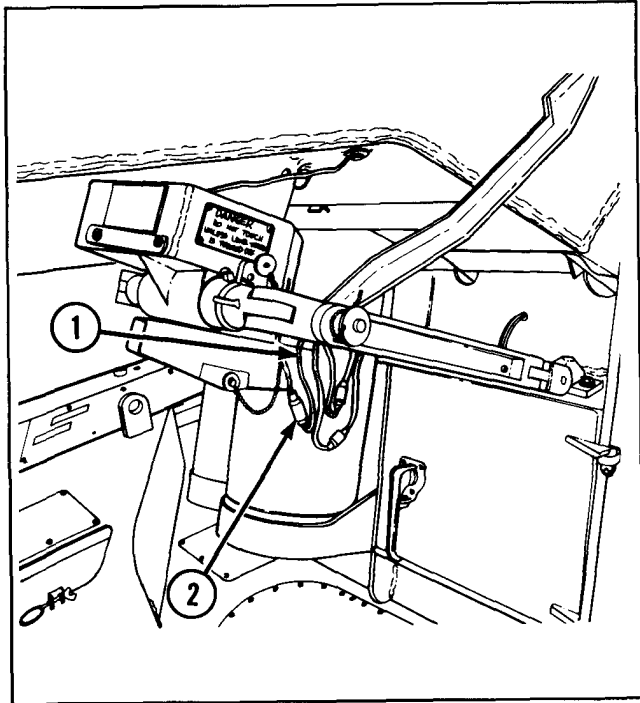
WARNING

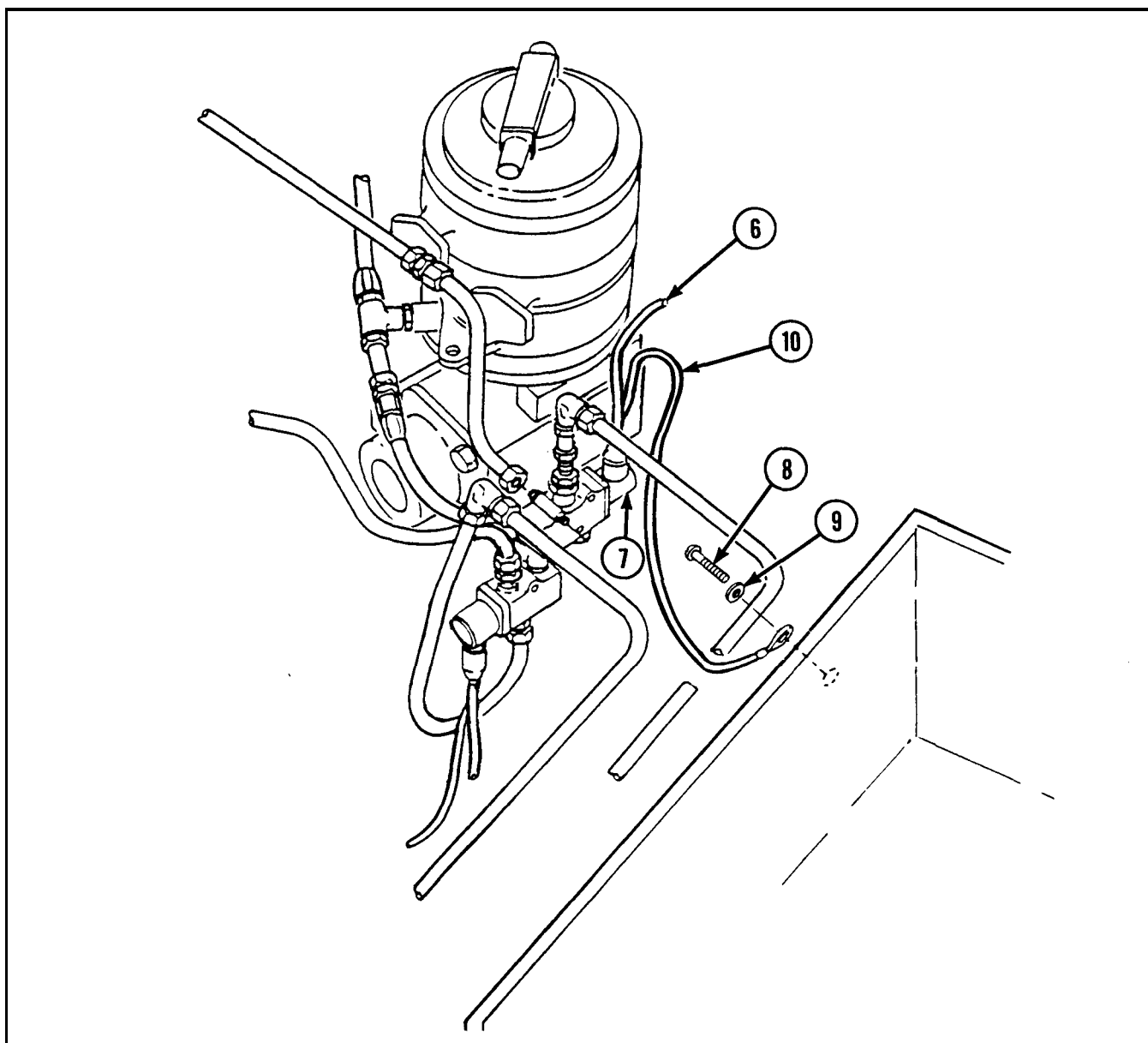
- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

NOTE

- Electrical lead tag numbers appear more than once.
- Traverse turret 90 degrees to the left for ease of removal/installation of wiring harness.
- The following removal steps are written and illustrated for the right level wind solenoid to sensing switch and rectifier electrical lead assembly but also apply to left level wind solenoid to sensing switch and rectifier electrical lead assembly.

- 1 Disconnect electrical lead 480 (1) from right level wind sensing switch (2).
- 2 Remove all necessary clamps, fasteners, and grommets from level wind solenoid to sensing switch and rectifier electrical lead assembly (3).
- 3 Disconnect electrical lead 480 (4) from rectifier (5).





4 Disconnect electrical lead 480 (6) from solenoid valve (7).

5 Remove screw (8), washer (9), and disconnect ground wire (10). Remove level wind solenoid to sensing switch and rectifier electrical lead assembly (3).

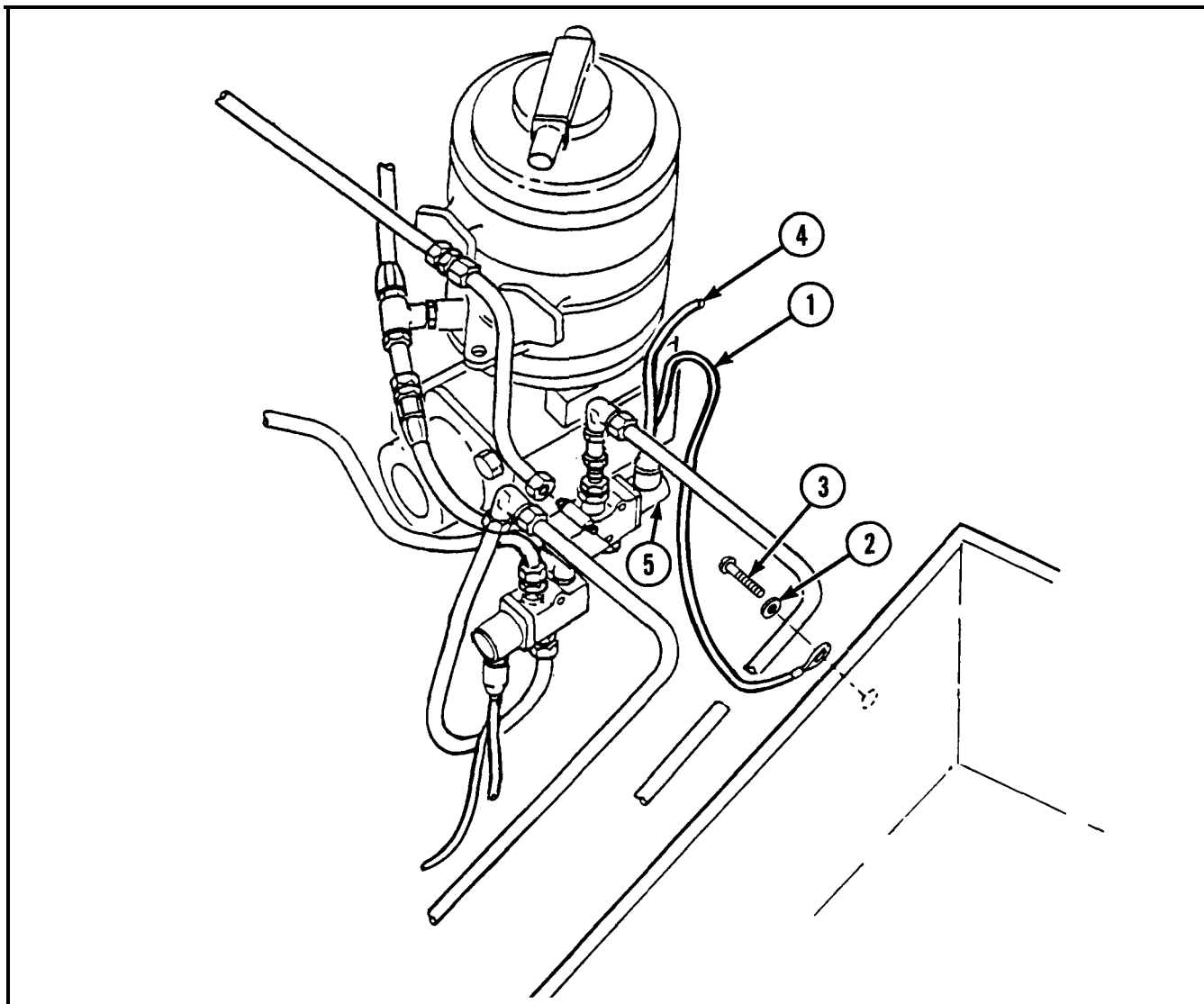
INSPECTION/REPAIR

1 Check for broken, damaged, or missing parts.

2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

2-83. MAINTENANCE OF RIGHT AND LEFT LEVEL WIND SOLENOID TO SENSING SWITCH AND RECTIFIER ELECTRICAL LEAD ASSEMBLIES (CONT).

INSTALLATION



WARNING

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

NOTE

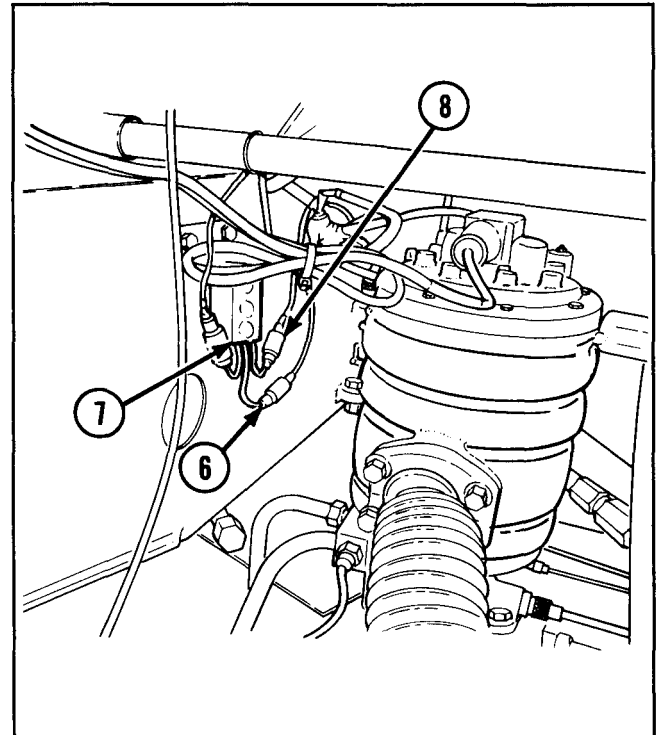
The following installation steps are written and illustrated for the right level wind solenoid to sensing switch and rectifier electrical lead assembly but also apply to left level wind solenoid to sensing switch and rectifier electrical lead assembly.

- 1 Connect level wind solenoid to sensing switch and rectifier electrical lead assembly. Ground wire (1) and install using washer (2) and screw (3).

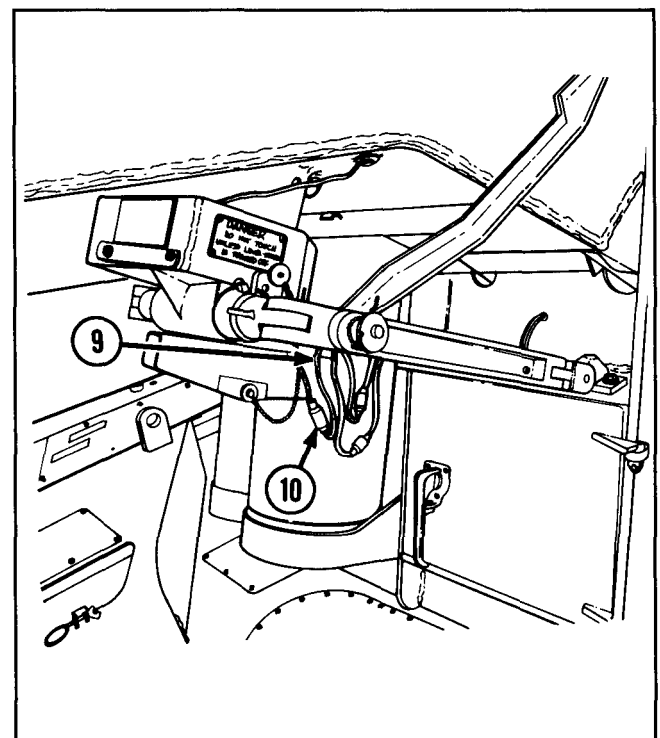
2 Connect electrical lead 480 (4) on solenoid valve (5).

3 Connect electrical lead 480 (6) on rectifier (7).

4 Install clamps, fasteners, and grommets on level wind solenoid to sensing switch and rectifier electrical lead assembly (8).



5 Connect electrical lead 480 (9) on right level wind sensing switch (10).



2-84. MAINTENANCE OF FLOODLIGHT TO BOOM FLOODLIGHT CAB ELECTRICAL LEAD.

This task covers: a. *Removal*

b. *Inspection/Repair*

c. *Installation*

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive
(appx B)

References

TM 9-2350-238-24P-2

Equipment Conditions

MASTER switch turned OFF
INSTRUMENT switch turned OFF

General Safety Instructions

WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

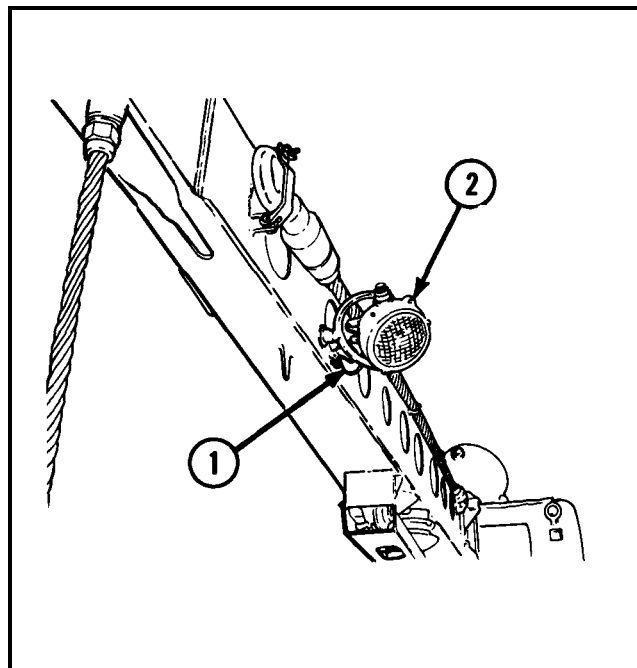
WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

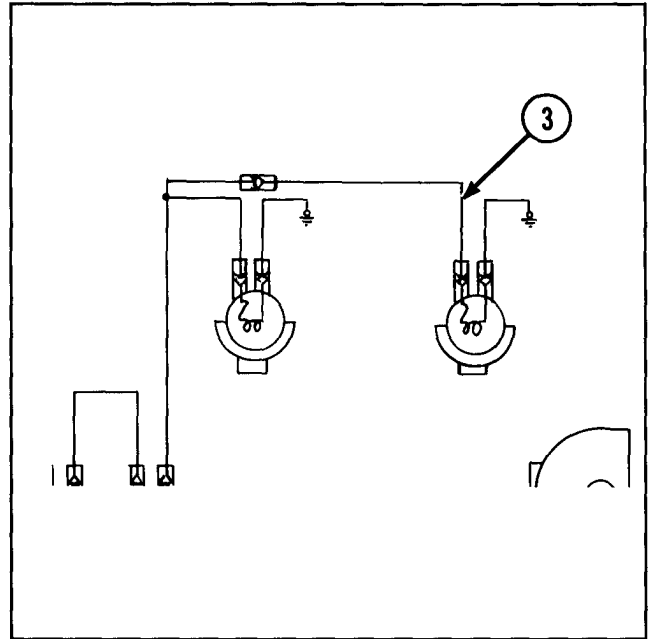
NOTE

Electrical lead tag numbers are used more than once.

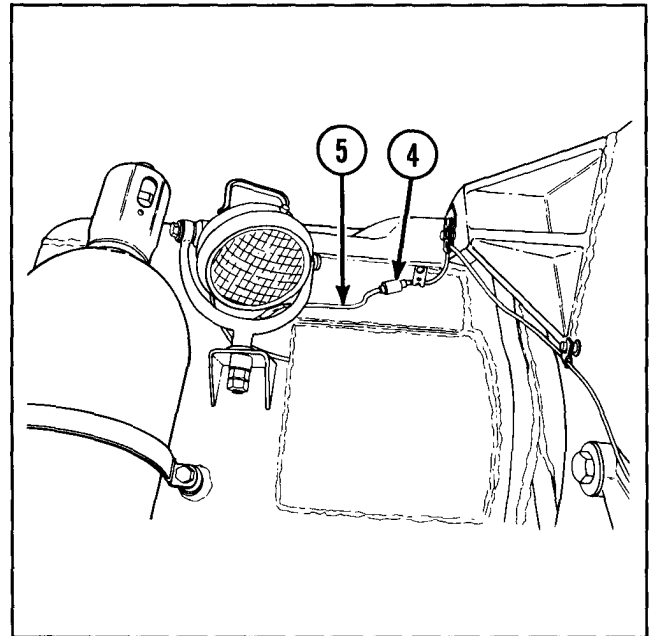
- 1 Disconnect electrical lead 518 (1) from boom flood lamp assembly (2).



- 2 Remove all necessary clamps, fasteners, and grommets from floodlight to boom floodlight cab electrical lead (3).



- 3 Disconnect electrical lead 518 (4) from floodlight to boom floodlight cab electrical lead (5).



INSPECTION/REPAIR

- 1 Check for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

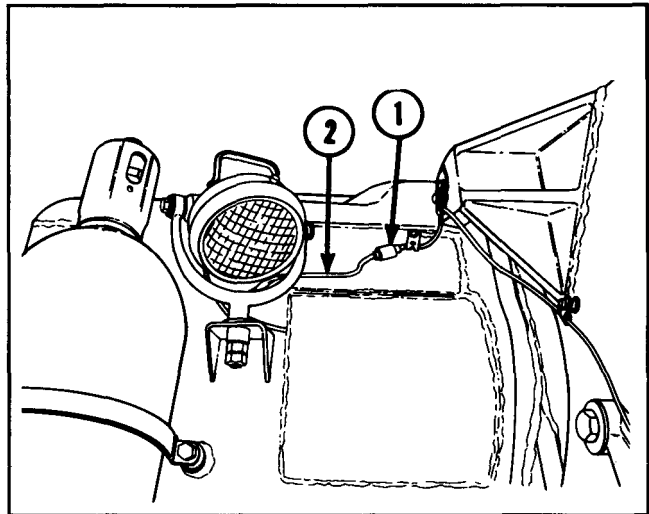
2-84. MAINTENANCE OF FLOODLIGHT TO BOOM FLOODLIGHT CAB ELECTRICAL LEAD (CONT).

INSTALLATION

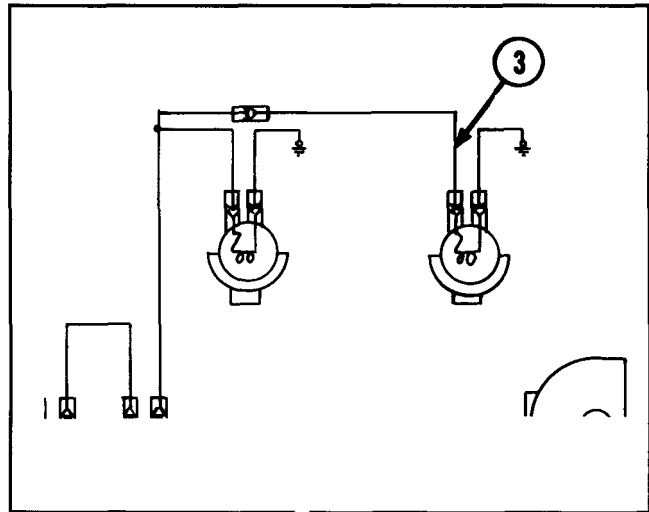
WARNING

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

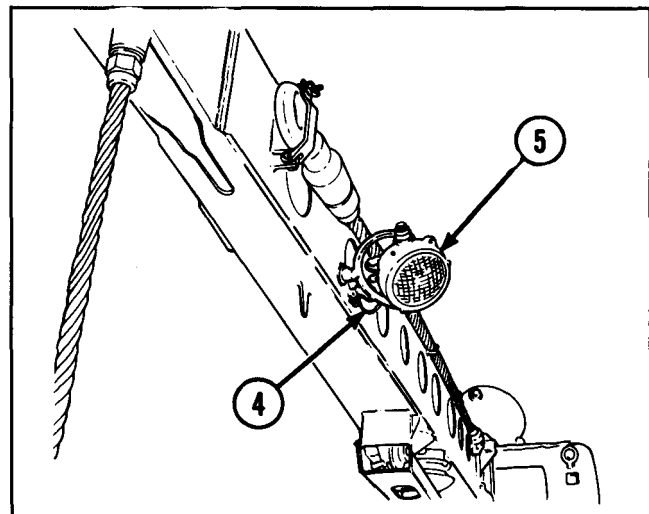
- 1 Connect electrical lead 518 (1) to floodlight to boom floodlight cab electrical lead (2).



- 2 Install clamps, fasteners, and grommets on floodlight to boom floodlight cab electrical lead (3).



- 3 Connect electrical lead 518 (4) on boom flood lamp assembly (5).



2-85. MAINTENANCE OF FLOODLIGHTS AND CAB ELECTRICAL COMPONENTS.

This task covers: a. *Removal* b. *Inspection/Repair* c. *Installation***INITIAL SETUP***Tools and Special Tools*

General mechanic's tool kit, automotive
(appx B)

Materials/Parts

Lockwasher (3) (MS35333-41)
Lockwasher (2) (MS35338-41)
Lockwasher (2) (MS35338-44)
Lockwasher (2) (MS35338-46)
Lockwasher (MS45904-68)
Marker band (figure 1, appx D)
Spring tension washer (7057358)

References

TM 9-2350-238-24P-2

Equipment Conditions

2-128 Cab assembly winch controls
access cover removed

MASTER switch turned OFF
INSTRUMENT switch turned OFF

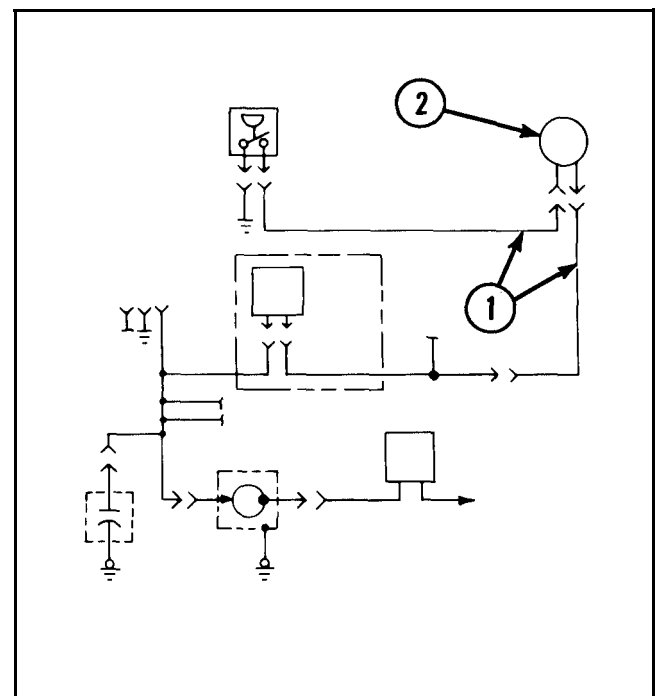
*General Safety Instructions***WARNING**

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

REMOVAL**WARNING**

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

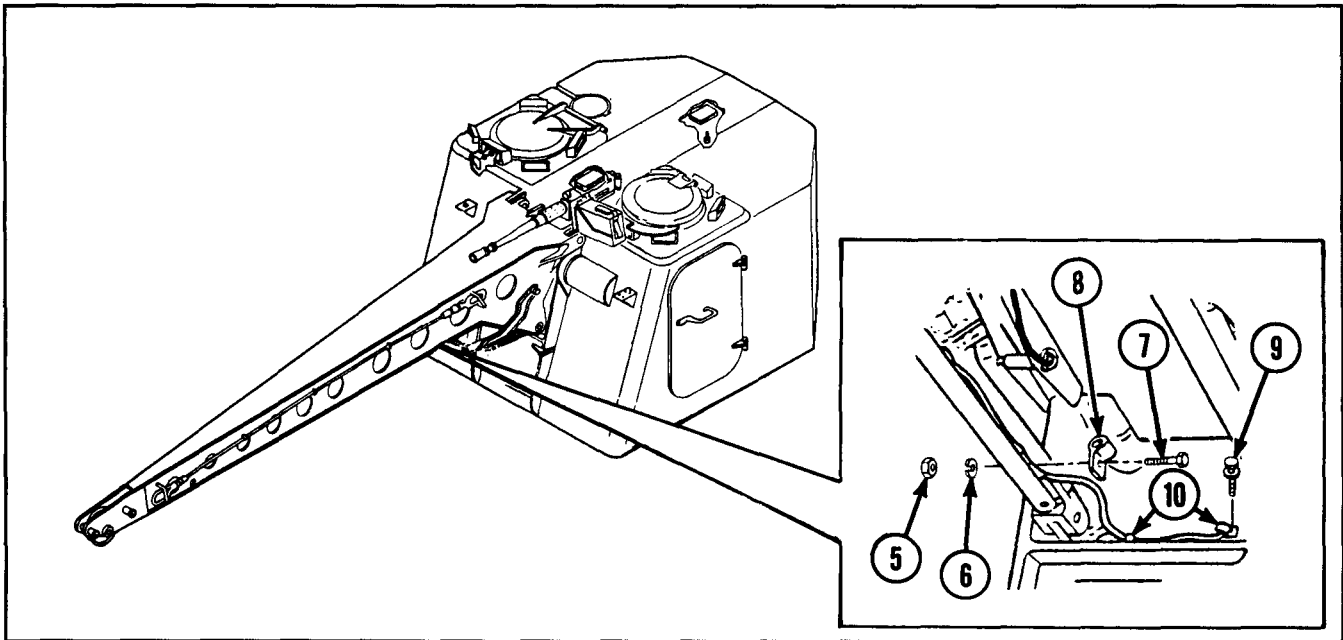
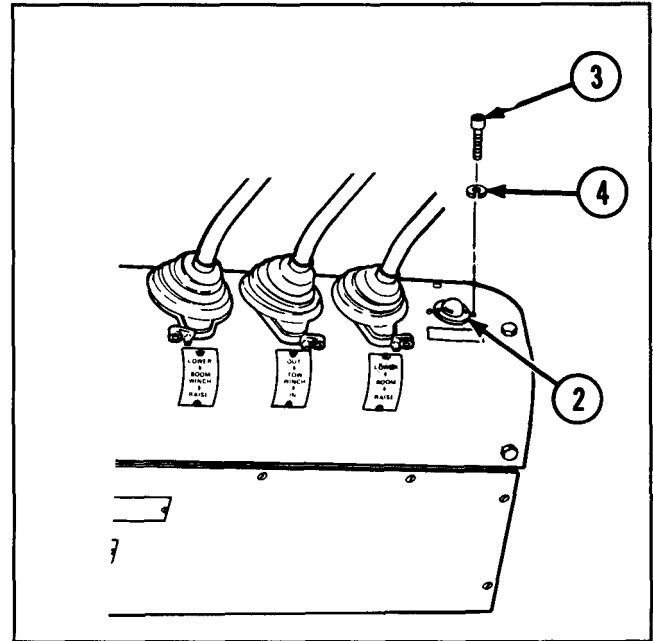
- 1 Disconnect two electrical leads (1) from warning light (2).



2-85. MAINTENANCE OF FLOODLIGHTS AND CAB ELECTRICAL COMPONENTS (CONT).

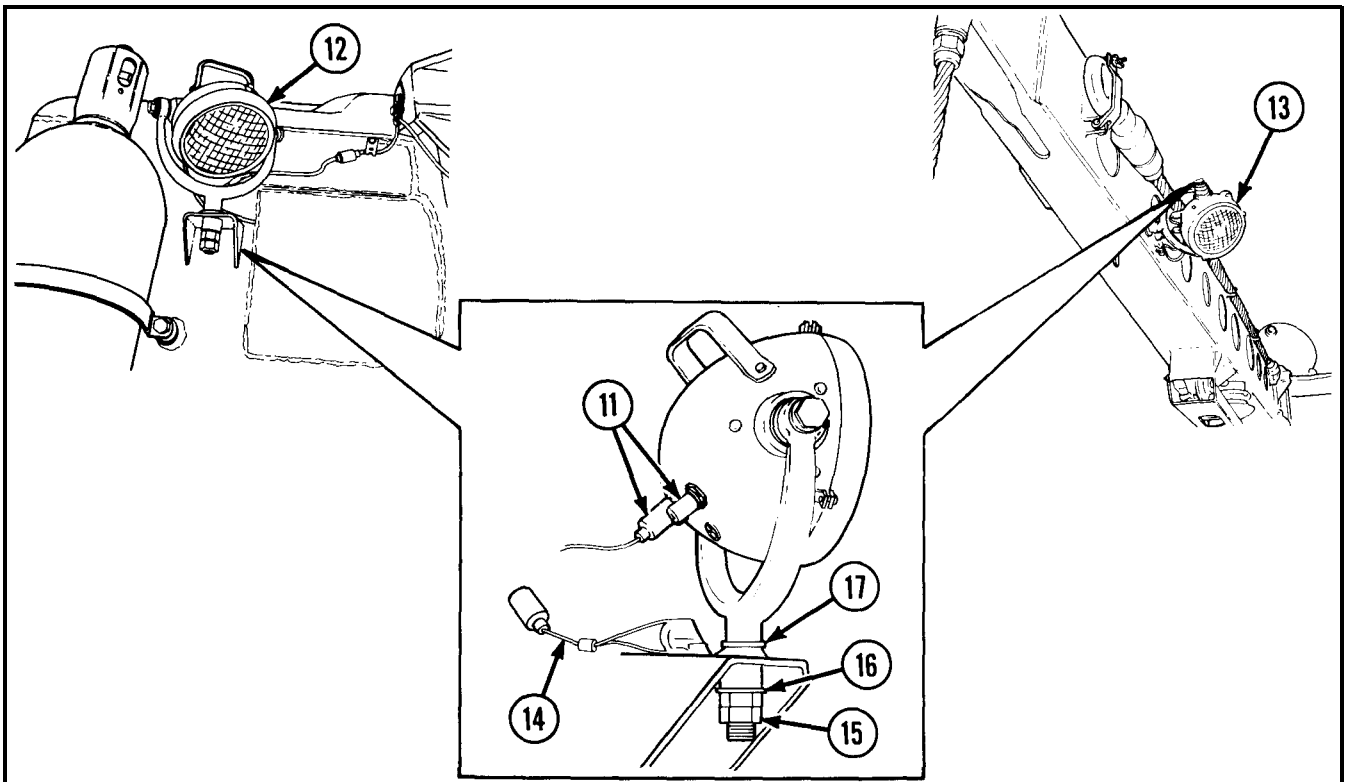
REMOVAL (CONT)

- 2 Remove two socket head capscrews (3), two lockwashers (4), and warning light (2).



- 3 Remove two hexagon plain nuts (5), two lockwashers (6), two hexagon capscrews (7), and two loop clamps (8).

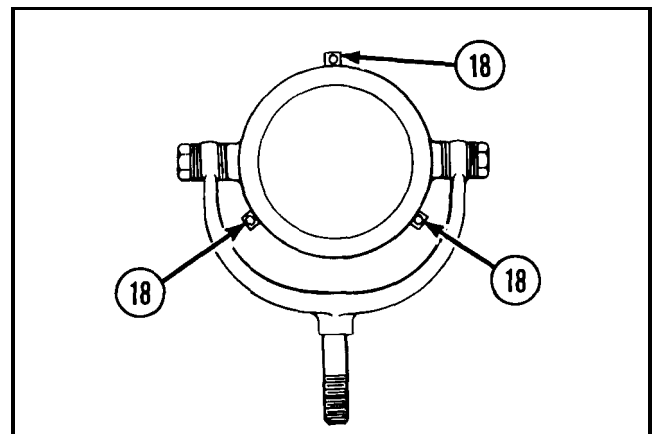
- 4 Remove two assembled washer bolts (9) and two loop clamps (10).

**NOTE**

Tag all leads for identification.

- 5 Disconnect two electrical leads (11) from two electric floodlights (12 and 13).
- 6 Disconnect floodlamp to ground electrical lead (14) from electric floodlight (13).
- 7 Remove two hexagon plain nuts (15), two lockwashes (16), and two packing gland spring tension washers (17) from two electric floodlights (12 and 13).
- 8 Remove two electric floodlights (12 and 13).

- 9 Loosen three screws (18).



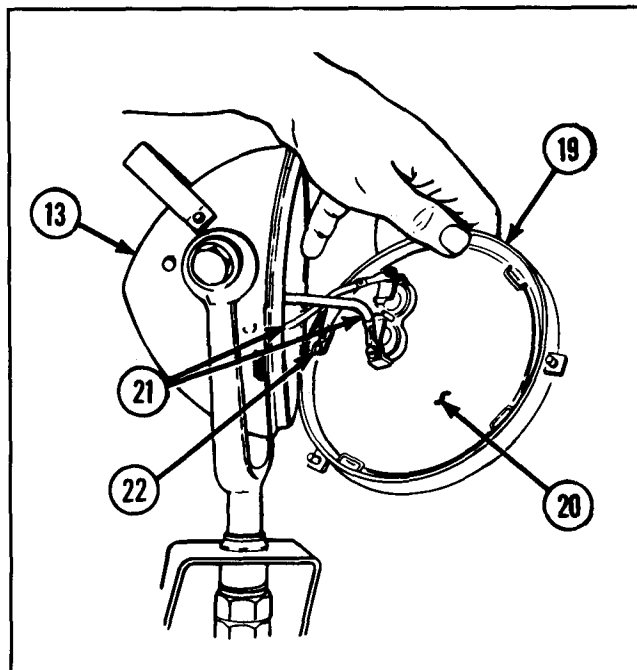
2-85. MAINTENANCE OF FLOODLIGHTS AND CAB ELECTRICAL COMPONENTS (CONT).

REMOVAL (CONT)

NOTE

Tag all leads for identification.

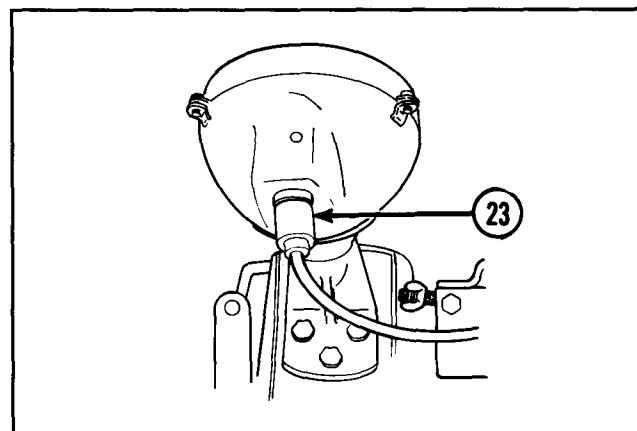
- 10 pull door (19) and incandescent lamp (20) from electric floodlight (13).
- 11 Disconnect two electrical leads (21) from incandescent lamp (20).
- 12 Remove four springs (22) from door (19).
- 13 Remove incandescent lamp (20).



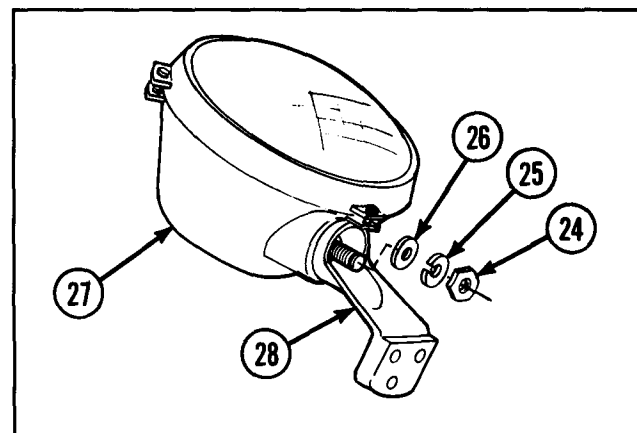
NOTE

Tag all leads for identification.

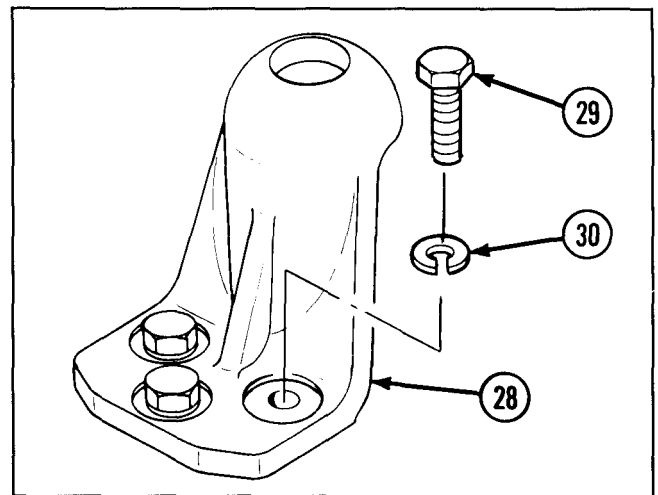
- 14 Disconnect electrical lead at connector (23).



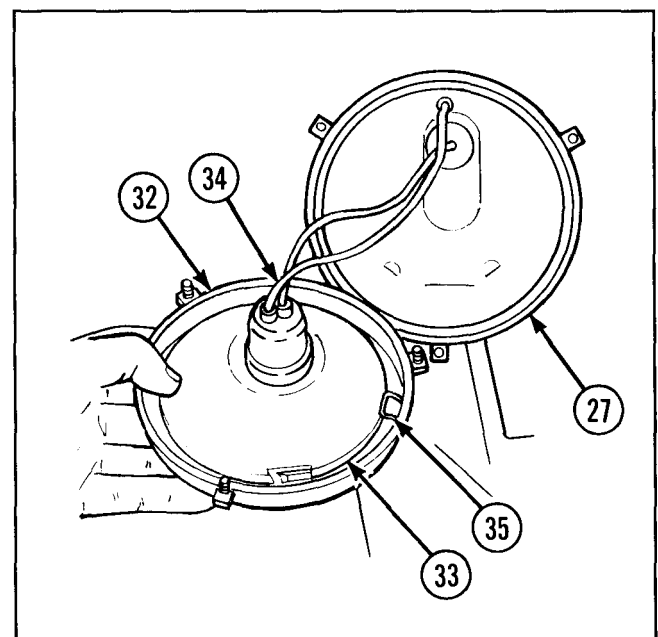
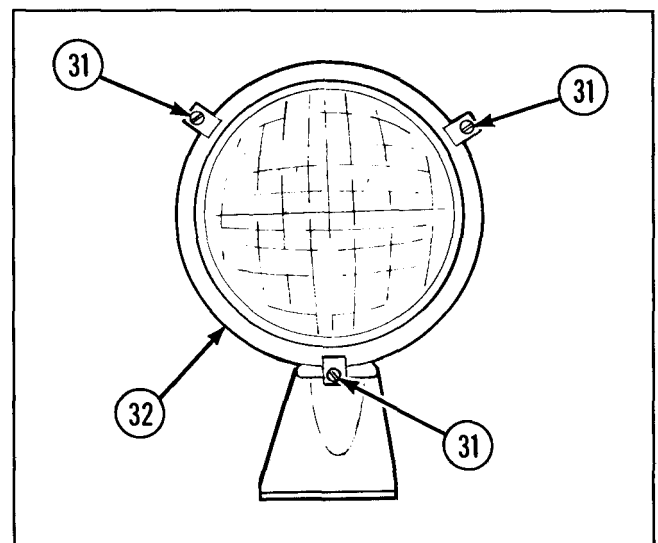
- 15 Remove nut (24), washer (25), and washer (26).
- 16 Remove headlight (27) from flasher assembly headlamp bracket (28).



- 17 Remove three machine bolts (29) and three lockwashers (30) securing flasher assembly headlamp bracket (28) to cab. Remove flasher assembly headlamp bracket.



- 18 Loosen three screws (31).
- 19 Pull door (32) and flasher lamp assembly incandescent lamp (33) from headlight (27).
- 20 Disconnect electrical lead (34) from flasher lamp assembly incandescent lamp (33).
- 21 Remove three springs (35) from door (32).
- 22 Remove flasher lamp assembly incandescent lamp (33) from door (32).



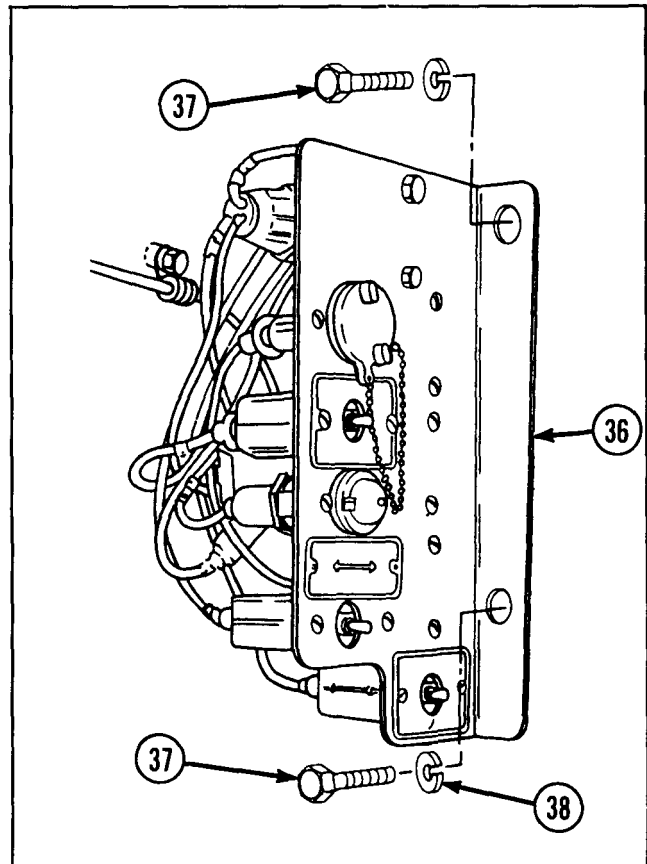
2-85. MAINTENANCE OF FLOODLIGHTS AND CAB ELECTRICAL COMPONENTS (CONT).

REMOVAL (CONT)

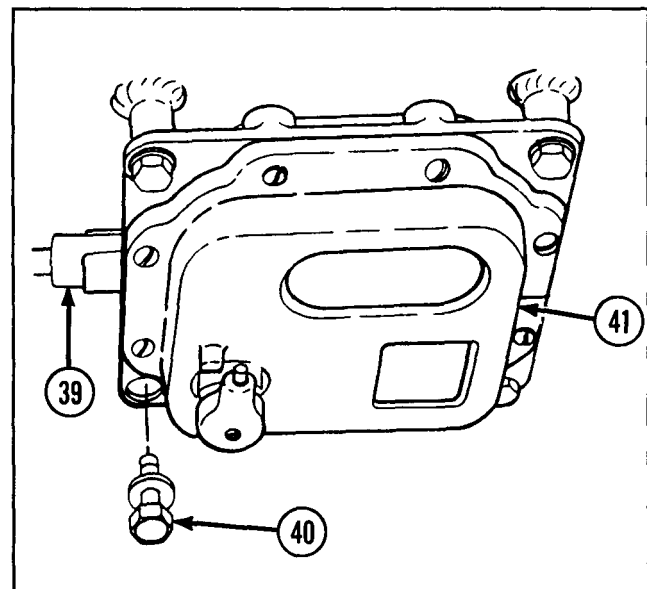
NOTE

Tag all leads for identification.

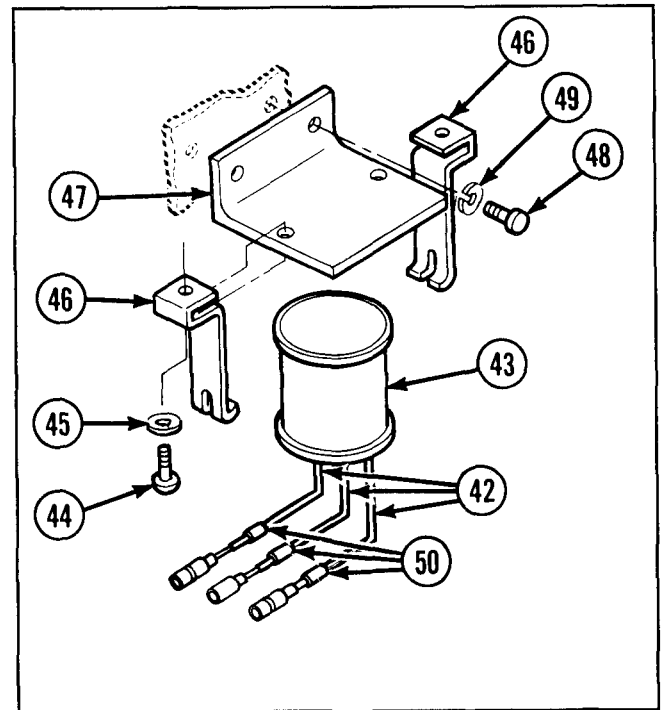
- 23 Disconnect electrical leads at rear of flasher control panel (36).
- 24 Support flasher control panel (36) and remove two hexagon capscrews (37) and two lockwashers (38).
- 25 Remove flasher control panel (36).



- 26 Disconnect two electrical connectors (39).
- 27 Remove eight assembled washer bolts (40) from two cab dome lights (41).
- 28 Remove two cab dome lights (41).



- 29 Disconnect electrical leads (42) from rectifier (43).
- 30 Remove two machine screws (44), two flat washers (45), two level wind rectifier mounting brackets (46), and rectifier (43) from level wind rectifier support bracket (47).
- 31 Remove two hexagon capscrews (48), two lockwashers (49), and level wind rectifier support bracket (47).
- 32 Refer to page 2-66 for complete disassembly of electrical leads (42).
- 33 If damaged, remove three marker bands (50) from electrical leads (42).

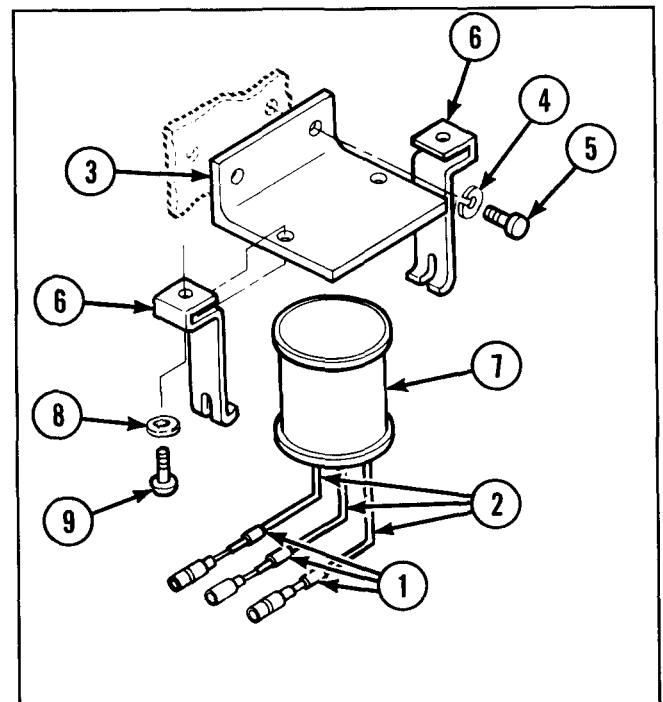


INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 Marker bands are manufactured items, refer to appendix D.
- 3 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

INSTALLATION

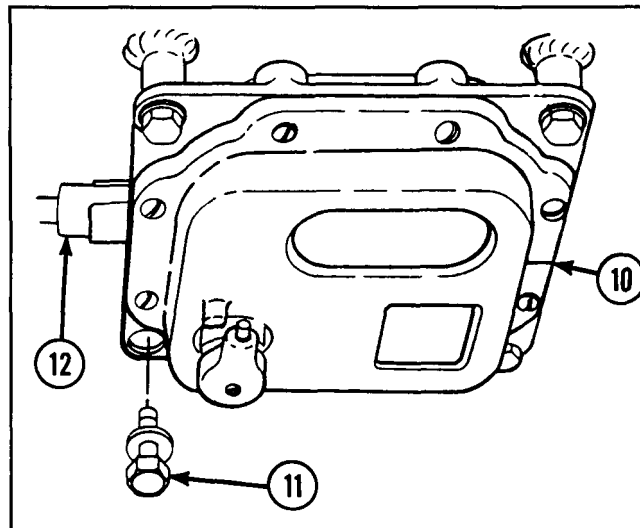
- 1 If necessary, install three new marker bands (1) on electrical leads (2).
- 2 Refer to page 2-66 for complete reassembly of electrical leads (2).
- 3 Install level wind rectifier support bracket (3) and secure with two new lockwashers (4) and two hexagon capscrews (5).
- 4 Install two level wind rectifier mounting brackets (6) and rectifier (7) on level wind rectifier support bracket (3) and secure with two flat washers (8) and two machine screws (9).
- 5 Connect three electrical leads (2) to rectifier (7).



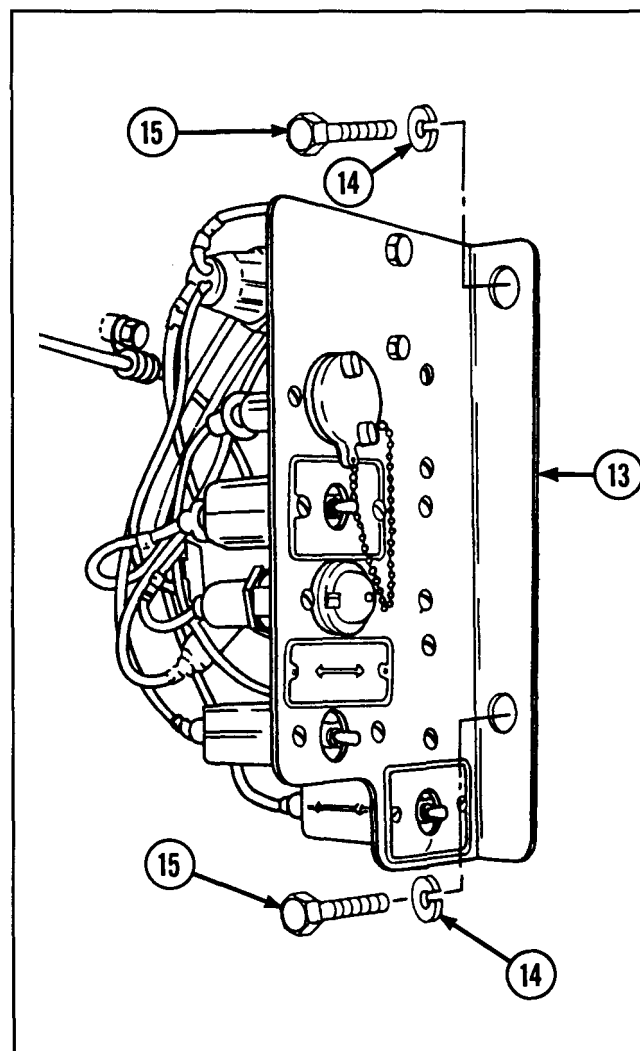
2-85. MAINTENANCE OF FLOODLIGHTS AND CAB ELECTRICAL COMPONENTS (CONT).

INSTALLATION (CONT)

- 6 Install two cab dome lights (10) and secure with eight assembled washer bolts (11).
- 7 Connect two electrical connectors (12).



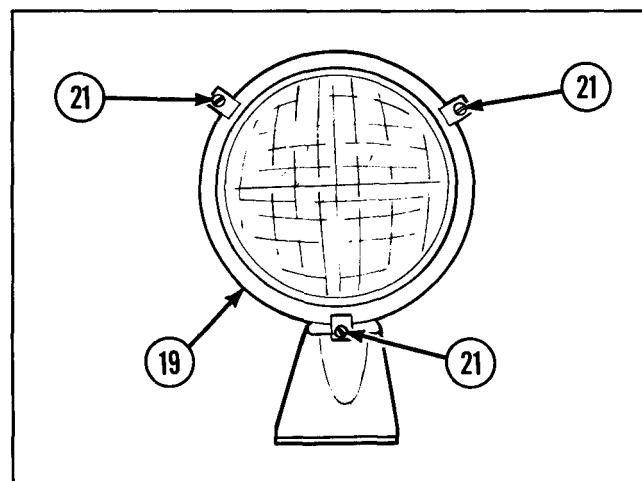
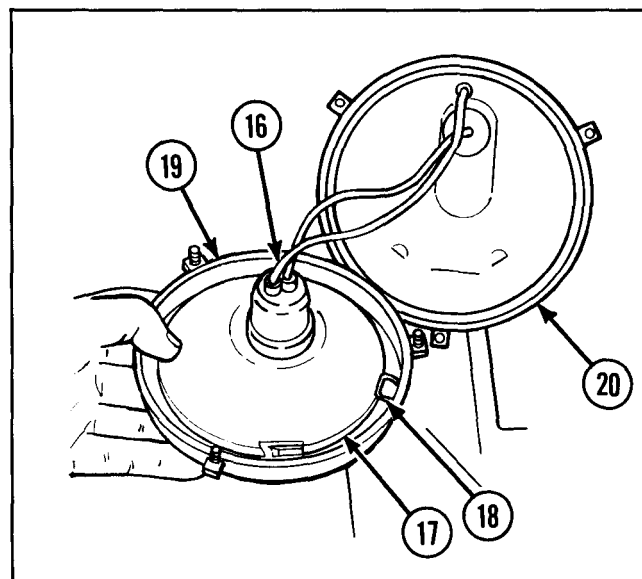
- 8 Install flasher control panel (13) and secure with two new lockwashers (14) and two hexagon capscrews (15).
- 9 Connect electrical leads at rear of control panel (13).



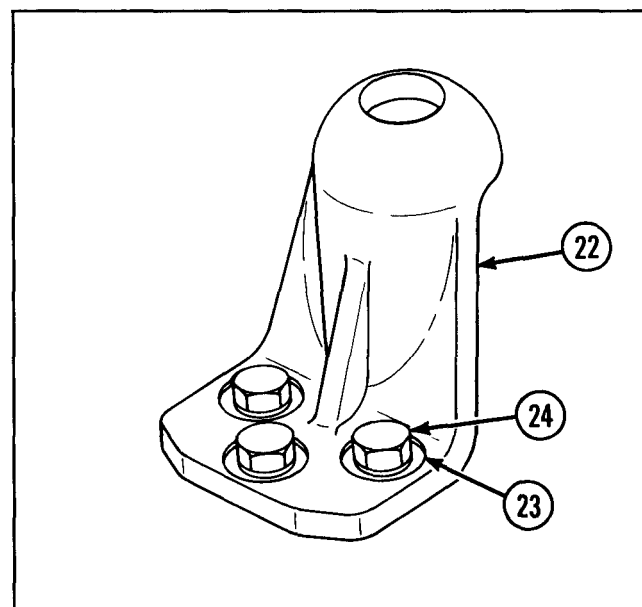
10 Connect electrical leads (16) in flasher lamp assembly incandescent lamp (17).

11 Install three springs (18) on door (19).

12 Install door (19) and flasher lamp assembly incandescent lamp (17) on headlight (20) and secure with three screws (21).



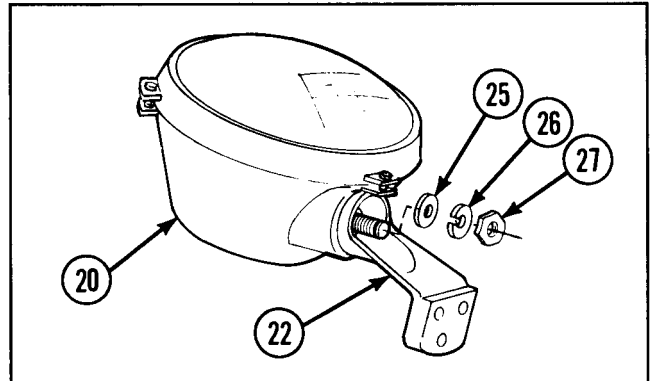
13 Install flasher assembly headlamp bracket (22) and secure with three new lock-washers (23) and three machine bolts (24).



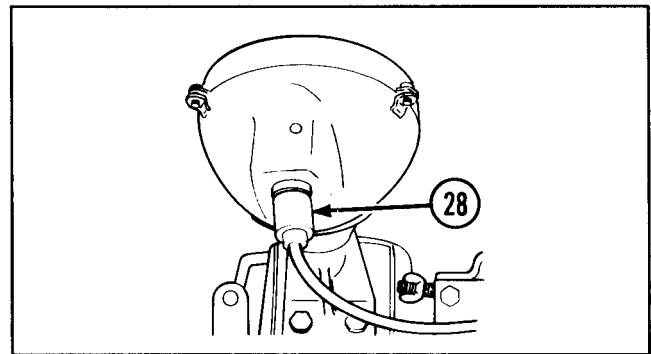
2-85. MAINTENANCE OF FLOODLIGHTS AND CAB ELECTRICAL COMPONENTS (CONT).

INSTALLATION (CONT)

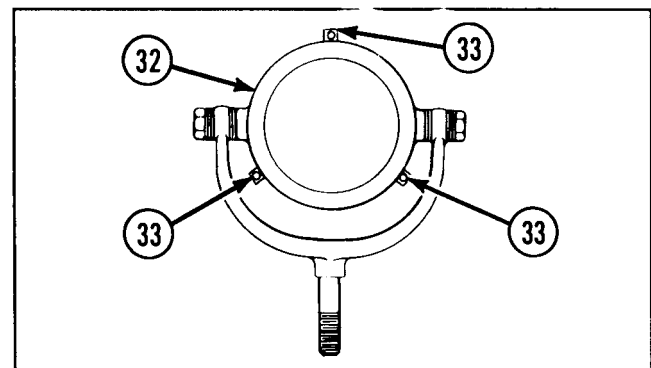
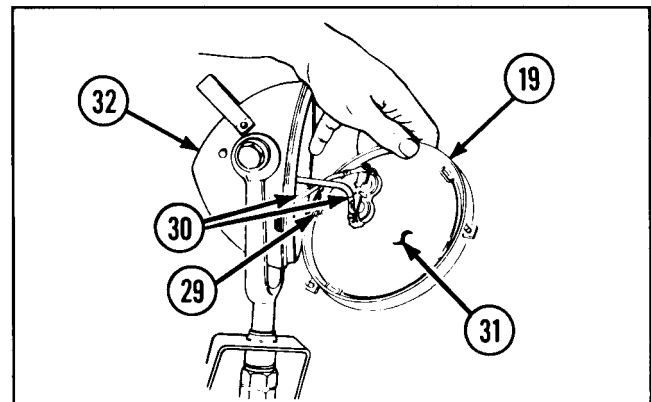
- 14 Install headlight (20) on flasher assembly headlamp bracket (22) and secure with washer (25), new lockwasher (26), and nut (27).



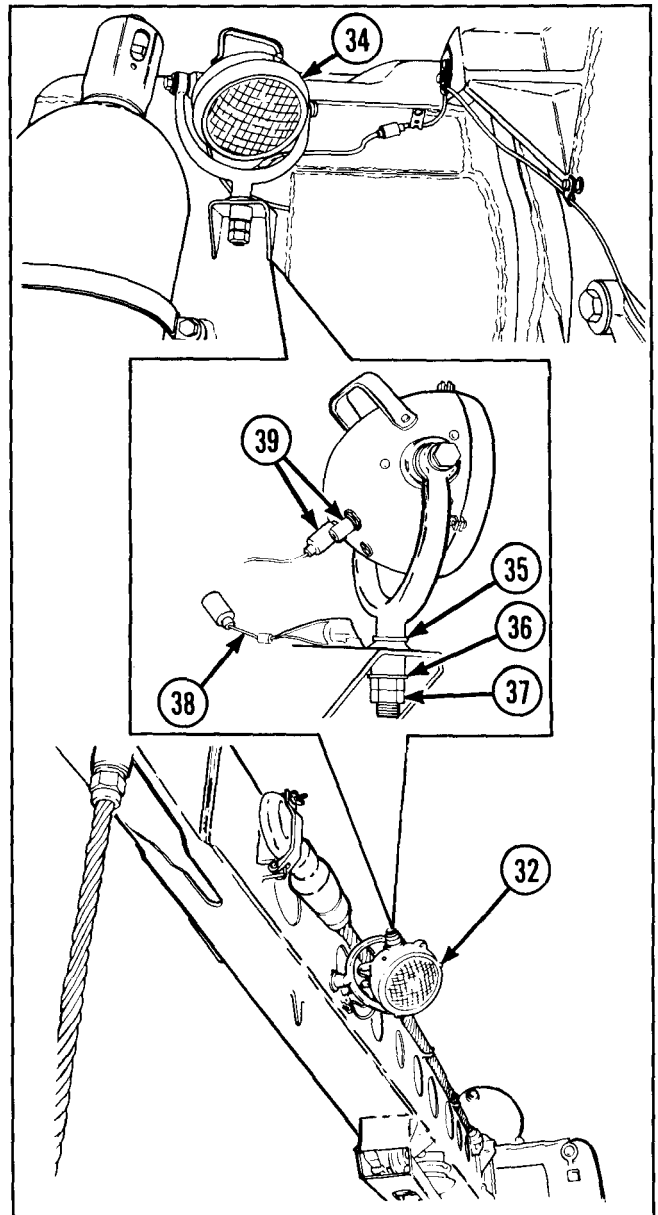
- 15 Connect electrical lead at connector (28).



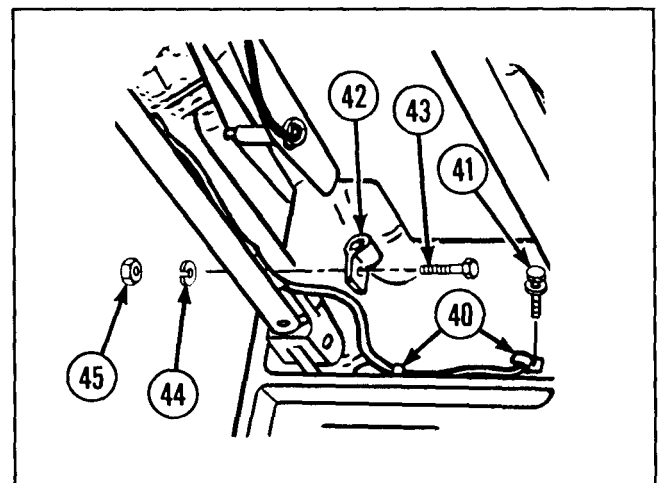
- 16 Install four springs (29) on door (19).
- 17 Connect two electrical leads (30) to incandescent lamp (31).
- 18 Install door (19) and incandescent lamp (31) on electric floodlight (32) and secure with three screws (33).



- 19 Install two electric floodlights (32 and 34) and secure with two packing gland spring tension washers (35), two new lockwashers (36), and two hexagon plain nuts (37).
- 20 Connect floodlamp to ground electrical lead (38) to electric floodlight (34).
- 21 Connect two electrical leads (39) to two electric floodlights (32 and 34).

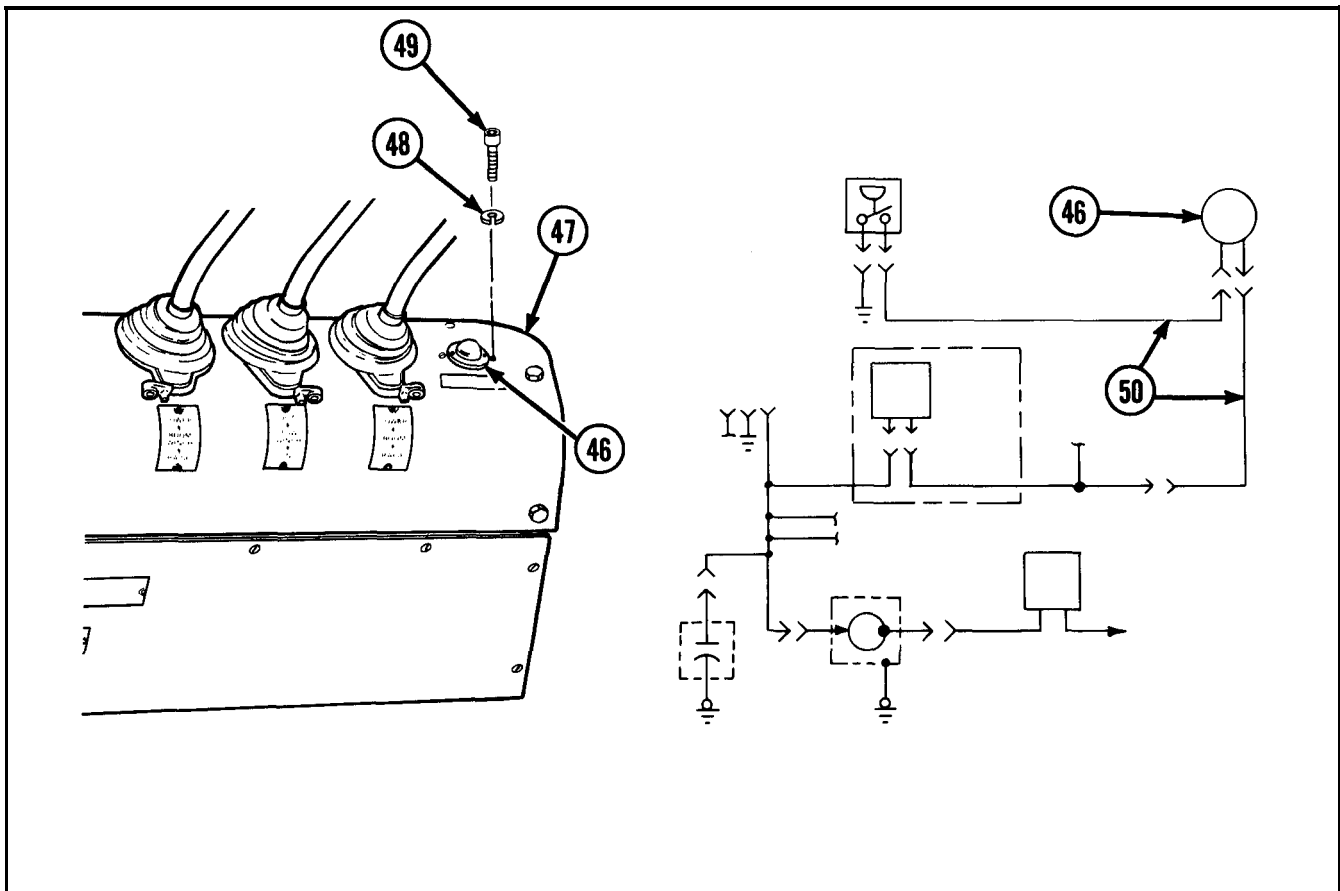


- 22 Install two loop clamps (40) and secure with two assembled washer bolts (41).
- 23 Install two loop clamps (42) and secure with two hexagon capscrews (43), two new lockwashers (44), and two hexagon plain nuts (45).



2-85. MAINTENANCE OF FLOODLIGHTS AND CAB ELECTRICAL COMPONENTS (CONT).

INSTALLATION (CONT)



24 Install warning light (46) on cab assembly winch controls access cover (47) and secure with two new lockwashers (48) and two socket head capscrews (49).

25 Connect two electrical leads (50) to warning light (46).

2-86. MAINTENANCE OF DOME LIGHT.

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

INITIAL SETUP*Tools and Special Tools*

General mechanic's tool kit, automotive
(appx B)

Rubber gasket (7962243)

Rubber gasket (8335240)

Sealing compound (item 18, appx C)

Materials/Parts

Lockwasher (5) (MS35335-30)

Lockwasher (4) (MS35338-42)

Nonmetallic grommet (2) (7064900)

Nonmetallic seal (7962242)

Nonmetallic seal (7962254)

Preformed packing (7962251)

Rubber gasket (7320655)

References

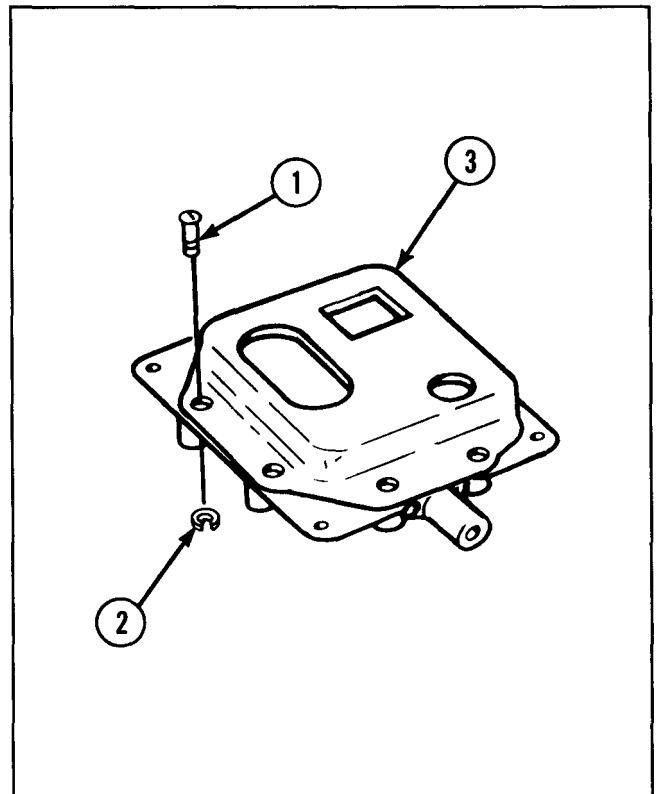
TM 9-2350-238-24P-2

Equipment Conditions

2-279 Dome light removed

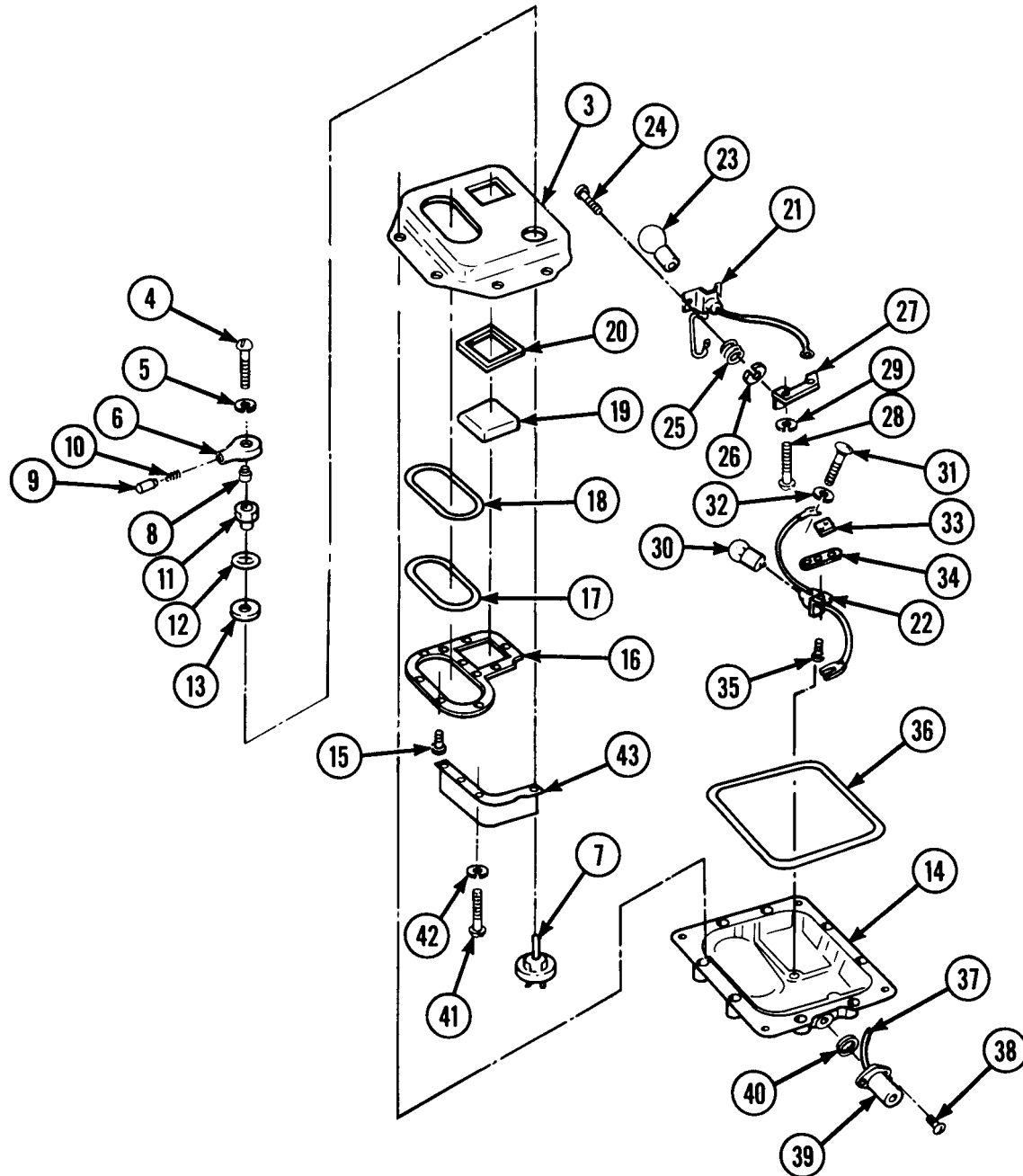
DISASSEMBLY

- 1 Remove eight machine screws (1) and eight retaining clips (2) from lens retainer (3).



2-86. MAINTENANCE OF DOME LIGHT (CONT).

DISASSEMBLY (CONT)



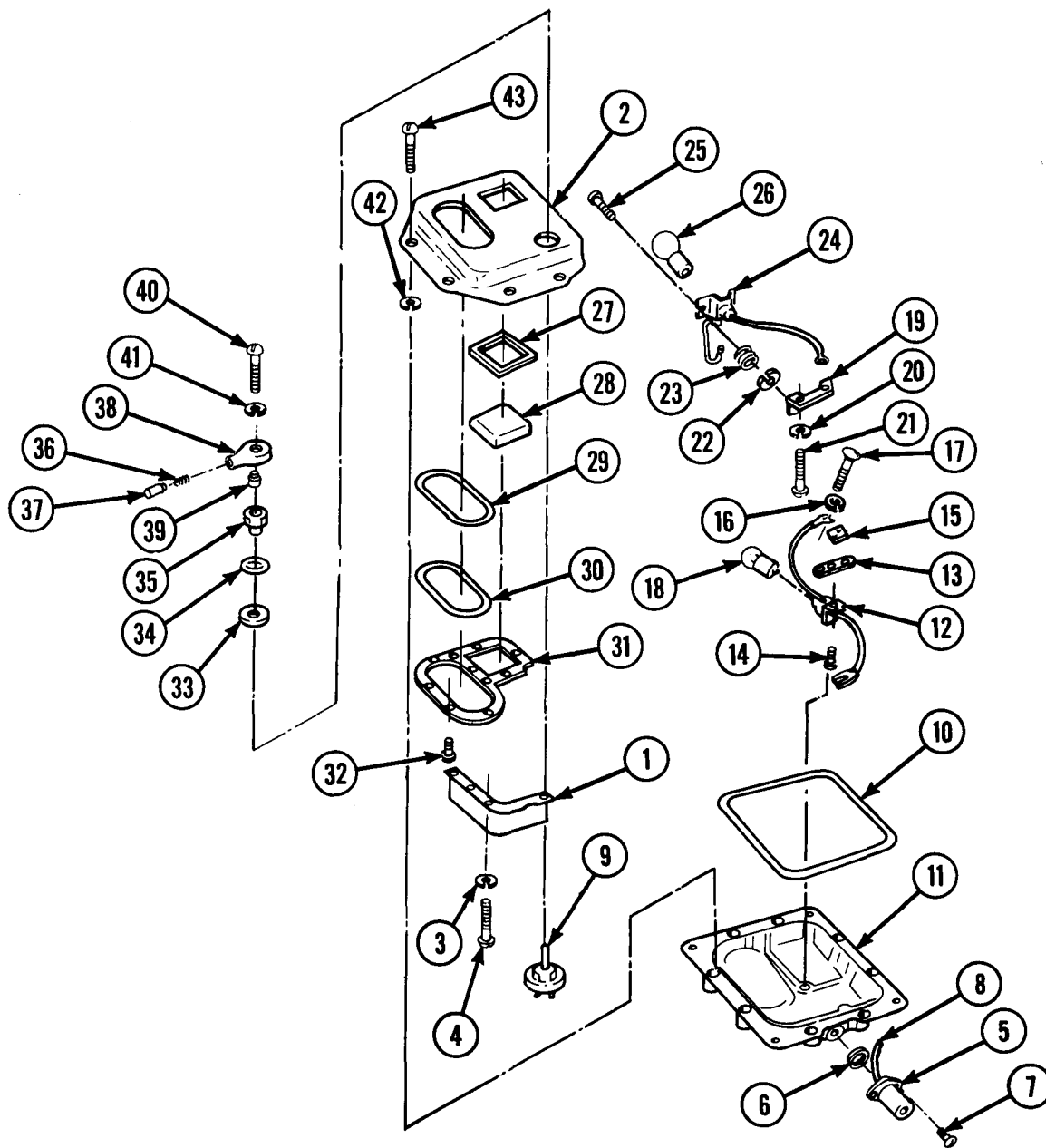
- 2 Remove machine screw (4), lockwasher (5), and switch stop knob (6) from rotary switch (7).
- 3 Remove setscrew (8), switch stop knob pushbutton (9), and switch stop knob helical compression spring (10) from switch stop knob (6).
- 4 Remove switch knob mounting nut (11), rubber switch knob gasket (12), flat washer (13), and rotary switch (7) from lens retainer (3).
- 5 Remove lens retainer (3) from body (14).
- 6 Remove seven machine screws (15), lens retainer retaining plate (16), dome light white light lens (17), white lens rubber nonmetallic seal (18), light lens (19), and lens rubber gasket (20) from lens retainer (3).
- 7 Tag and disconnect all leads from lamp-holder (21) and lamp holder (22).
- 8 Remove incandescent lamp (23) from lamp holder (21).
- 9 Remove two shoulder screws (24), lamp holder (21), two nonmetallic grommets (25), and two lockwashers (26) from lamp mounting plate (27).
- 10 Remove two machine screws (28), two lockwashers (29), and lamp mounting plate (27) from body (14).
- 11 Remove incandescent lamp (30) from lamp holder (22).
- 12 Remove two shoulder screws (31), two flat washers (32), and rubber gasket (33) from lamp mounting plate (34).
- 13 Remove two machine screws (35), lamp mounting plate (34), and lamp holder (22) from body (14).
- 14 Remove nonmetallic seal (36) from body (14).
- 15 Tag and disconnect electrical lead (37) from rotary switch (7).
- 16 Remove two machine screws (38), receptacle connector (39), and preformed packing (40) from body (14).
- 17 Remove four machine screws (41), four lockwashers (42), and dome light partition (43) from lens retainer (3).

INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 If lamp mounting plate is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 3 If body is broken or damaged, repair is by replacement of next higher assembly.
- 4 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2) which do not meet inspection criteria.

2-86. MAINTENANCE OF DOME LIGHT (CONT).

REASSEMBLY



- 1 Install dome light partition (1) on lens retainer (2) and secure with four new lockwashers (3) and four machine screws (4).
- 2 Install receptacle connector (5) and preformed packing (6) and secure with two machine screws (7).
- 3 Connect electrical lead (8) to rotary switch (9).
- 4 Install new nonmetallic seal (10) on body (11).
- 5 Install lamp holder (12) and lamp mounting plate (13) on body (11) and secure with two machine screws (14).
- 6 Install new rubber gasket (15), two flat washers (16), and two shoulder screws (17) on lamp mounting plate (13).
- 7 Install incandescent lamp (18) in lamp holder (12).
- 8 Install lamp mounting plate (19) in body (11) and secure with two new lockwashers (20) and two machine screws (21).
- 9 Install two new lockwashers (22), two new nonmetallic grommets (23), lamp holder (24), and two shoulder screws (25) on lamp mounting plate (19).
- 10 Install incandescent lamp (26) in lamp holder (24).
- 11 Connect all leads to lamp holder (24) and lamp holder (12).
- 12 Install new lens rubber gasket (27), light lens (28), new white lens rubber non-metallic seal (29), dome light white light lens (30), lens retainer retaining plate (31), and seven machine screws (32) in lens retainer (2).
- 13 Install rotary switch (9) in lens retainer (2) and secure with flat washer (33), new switch knob rubber gasket (34), and switch knob mounting nut (35).
- 14 Install switch stop knob helical compression spring (36) and switch stop knob pushbutton (37) on switch stop knob (38) and secure with setscrew (39).
- 15 Apply sealing compound (item 18, appx C) to machine screw (40).
- 16 Install switch stop knob (38) on rotary switch (9) and secure with new lockwasher (41) and machine screw (40).
- 17 Install eight retaining clips (42) and lens retainer (2) on body (11) and secure with eight machine screws (43).

2-87. MAINTENANCE OF WARNING LIGHT.

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

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive
(appx B)

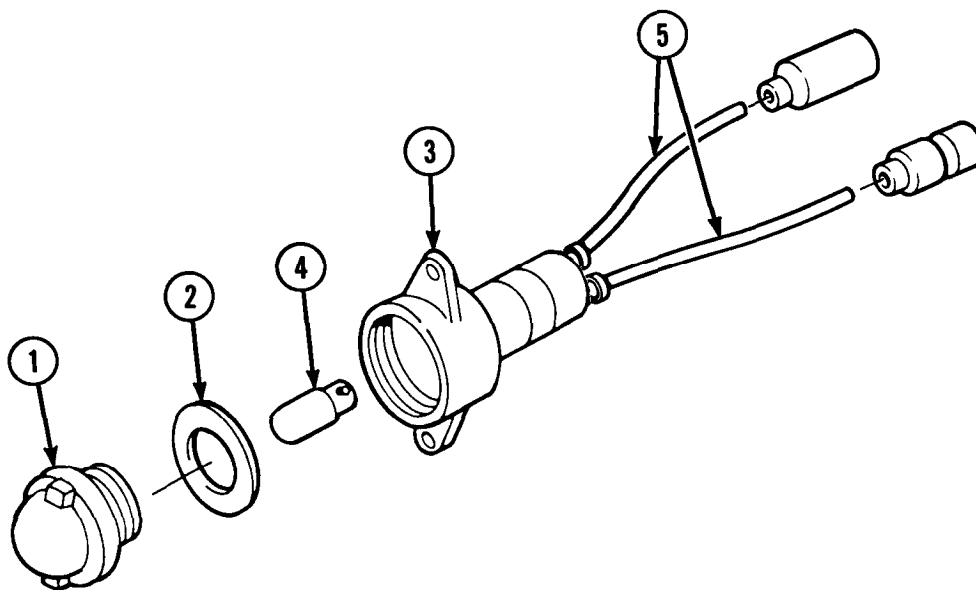
Equipment Conditions

2-279 Warning light removed

References

TM 9-2350-238-24P-2

DISASSEMBLY



NOTE

Removal of warning light is not required to replace light emitting diode (LED).

- 1 Remove light lens (1) and flat washer (2) from warning light housing (3).
- 2 Remove flat washer (2) from light lens (1).
- 3 Remove LED (4) from warning light housing (3).
- 4 Refer to page 2-66 for complete disassembly of warning light electrical leads (5).

INSPECTION/REPAIR

- 1 Check for broken, damaged, or missing parts.

- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

REASSEMBLY

- 1 Refer to page 2-66 for complete reassembly of warning light electrical leads (5).
- 2 Install LED (4) in warning light housing (3).
- 3 Install flat washer (2) on light lens (1).
- 4 Install light lens (1) in warning light housing (3).

2-88. MAINTENANCE OF OPERATOR VEHICULAR FLASHER CONTROL PANEL AND FLASHER INDICATOR LIGHT.

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

c. *Reassembly/Installation*

INITIAL SETUP*Tools and Special Tools*

General mechanic's tool kit, automotive (appx B)

Materials/Parts

Drive screw (2) (MS21318-9)
Lockwasher (2) (MS35338-41)
Lockwasher (14) (MS35338-42)
Lockwasher (2) (MS35338-44)
Preformed packing (7358626)

References

TM 9-2350-238-24P-2

Equipment Conditions

2-279 Flasher control panel removed
2-279 Electrical leads disconnected from flasher control panel

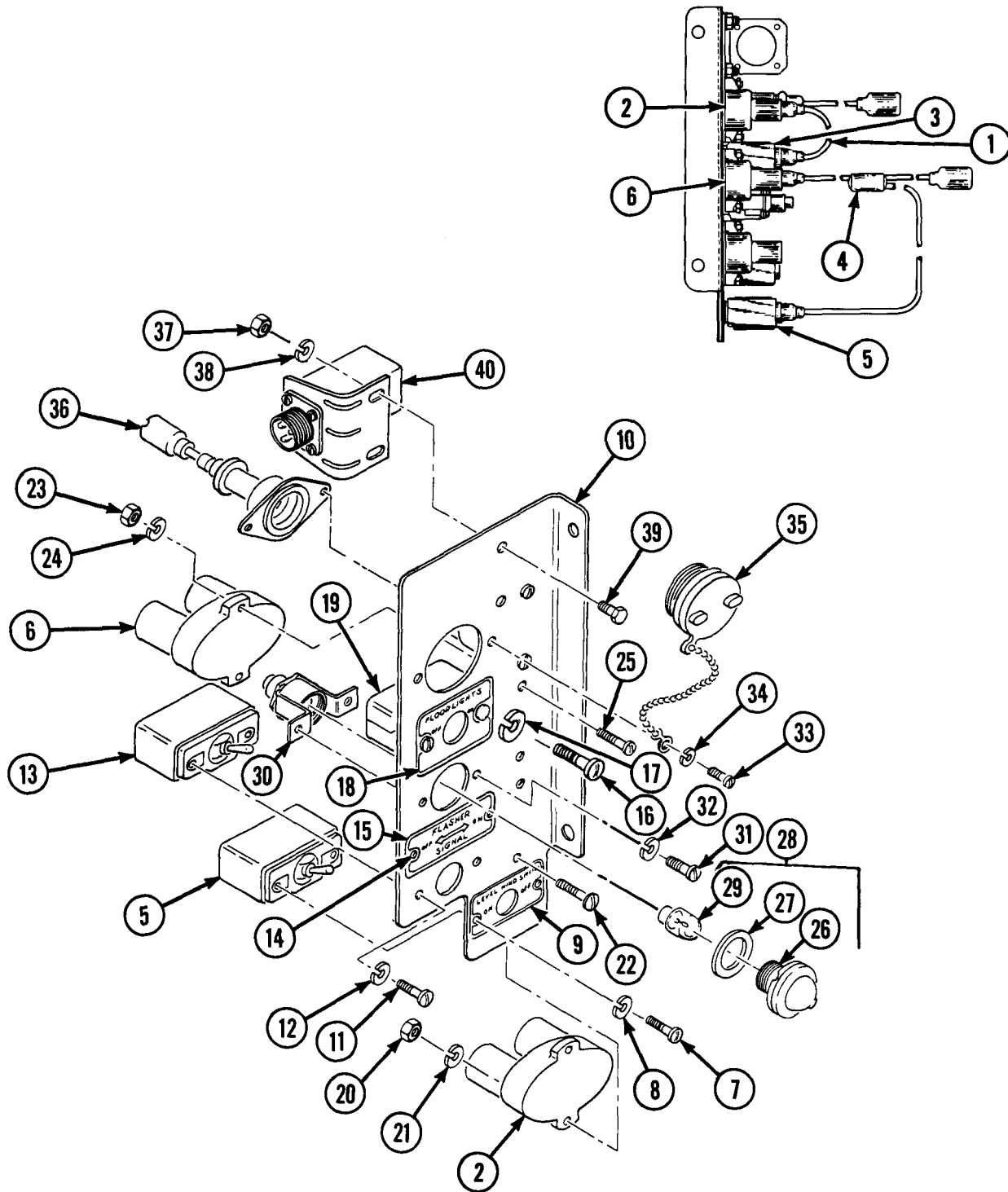
MASTER switch turned OFF
INSTRUMENT switch turned OFF

*General Safety Instructions***WARNING**

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

2-88. MAINTENANCE OF OPERATOR VEHICULAR FLASHER CONTROL PANEL AND
FLASHER INDICATOR LIGHT (CONT).

REMOVAL/DISASSEMBLY



WARNING

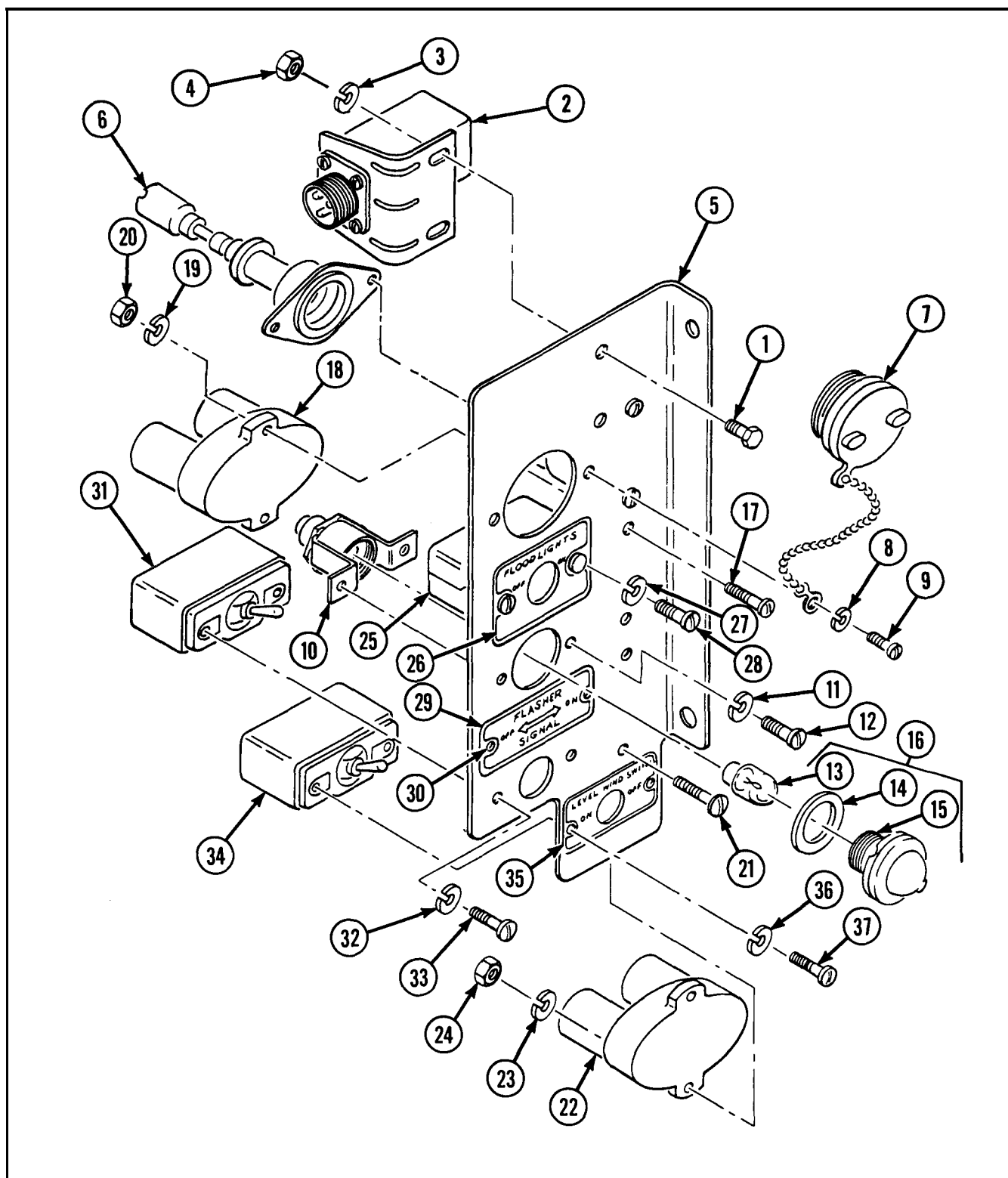
- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
 - Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.
- 1 Disconnect and remove circuit breaker to floodlight switch electrical lead (1) from 15 amp circuit breaker (2) and 24 volt toggle switch (3).
 - 2 Disconnect and remove level wind switch to circuit breaker electrical lead assembly (4) from 24 volt toggle switch (5) and 30 amp circuit breaker (6).
 - 3 Remove two machine screws (7), two lockwashers (8), level wind switch instruction plate (9), and toggle switch (5) from angle bracket (10).
 - 4 Remove two machine screws (11), two lockwashers (12), and 24 volt flasher control toggle switch (13) from angle bracket (10).
 - 5 If damaged, remove two drive screws (14) and flasher signal switch identification plate (15) from angle bracket (10).
 - 6 Remove two machine screws (16), two lockwashers (17), floodlight switch identification plate (18), and toggle switch (19) from angle bracket (10).
 - 7 Remove four hexagon plain nuts (20), four lockwashers (21), four machine screws (22), and two 15 amp circuit breakers (2) from angle bracket (10).
 - 8 Remove two hexagon plain nuts (23), two lockwashers (24), two machine screws (25), and 30 amp circuit breaker (6) from angle bracket (10).
 - 9 Remove flasher indicator assembly light lens (26) and flasher indicator lens pre-formed packing (27) from flasher indicator light (28).
 - 10 Remove LED (29) from flasher indicator housing (30).
 - 11 Remove two machine screws (31), two lockwashers (32), and flasher indicator housing (30) from angle bracket (10).
 - 12 Remove two machine screws (33), two lockwashers (34), utility outlet cover (35), and utility outlet electrical lead (36) from angle bracket (10).
 - 13 Remove two hexagon plain nuts (37), two lockwashers (38), two hexagon capscrews (39), and cab signal light thermal flasher (40) from angle bracket (10).

INSPECTION/REPAIR

- 1 Check for broken, damaged, or missing parts.
- 2 If angle bracket is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 3 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2) which do not meet inspection criteria.

2-88. MAINTENANCE OF OPERATOR VEHICULAR FLASHER CONTROL PANEL AND FLASHER INDICATOR LIGHT (CONT).

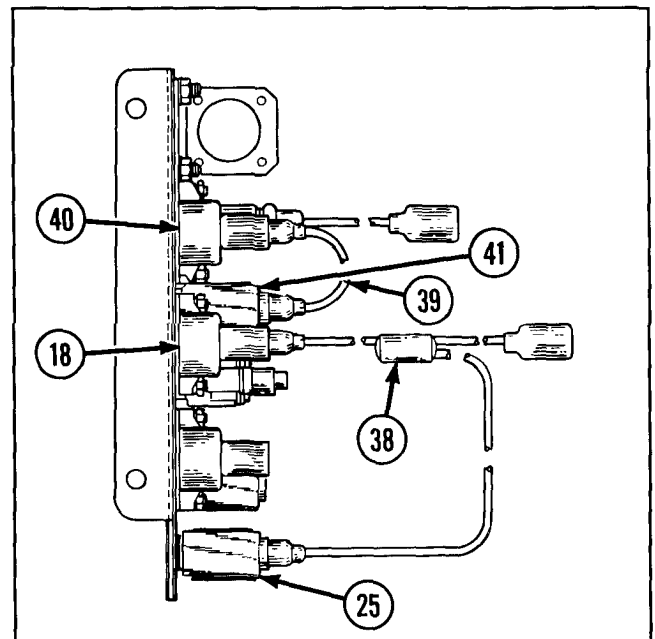
REASSEMBLY/INSTALLATION



WARNING

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

- 1 Install two hexagon capscrews (1), cab signal light flasher (2), two new lockwashers (3), and two hexagon plain nuts (4) on angle bracket (5).
- 2 Install utility outlet electrical lead (6), utility outlet cover (7), two new lockwashers (8), and two machine screws (9) on angle bracket (5).
- 3 Install flasher indicator housing (10), two new lockwashers (11), and two machine screws (12) on angle bracket (5).
- 4 Install LED (13) in flasher indicator housing (10).
- 5 Install new preformed packing (14) on flasher indicator light (15).
- 6 Install flasher indicator assembly light lens (16) in flasher indicator light housing (10).
- 7 Install two machine screws (17), 30 amp circuit breaker (18), two new lockwashers (19), and two hexagon plain nuts (20) on angle bracket (5).
- 8 Install four machine screws (21), two 15 amp circuit breakers (22), four new lockwashers (23), and four hexagon plain nuts (24) on angle bracket (5).
- 9 Install 24 volt toggle switch (25), floodlight switch identification plate (26), two new lockwashers (27), and two machine screws (28) on angle bracket (5).
- 10 If removed, install flasher signal switch identification plate (29) and two new drive screws (30) on angle bracket (5).
- 11 Install 24 volt flasher signal toggle switch (31), two new lockwashers (32), and two machine screws (33) on angle bracket (5).
- 12 Install toggle switch (34), level wind switch instruction plate (35), two new lockwashers (36), and two machine screws (37) on angle bracket (5).
- 13 Install and connect level wind switch to circuit breaker electrical lead assembly (38) to 24 volt toggle switch (25) and 30 amp circuit breaker (18).
- 14 Install and connect circuit breaker to floodlight switch electrical lead (39) to 15 amp circuit breaker (40) and 24 volt toggle switch (41).



2-89. MAINTENANCE OF CAB FILTER INSTALLATION CABLE ASSEMBLY (B5-19-1768) AND ELECTRICAL LEAD (B5-19-1767) AND CABLE ASSEMBLY (B5-19-1663).

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

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive
(appx B)

References

TM 9-2350-238-24P-2

Equipment Conditions

MASTER switch turned OFF
INSTRUMENT switch turned OFF

General Safety Instructions

WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

REMOVAL

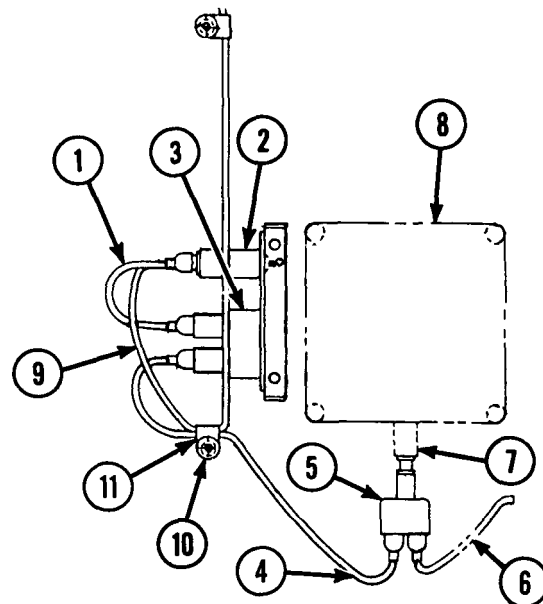
WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

NOTE

Tag and label electrical cables prior to removal.

- 1 Disconnect and remove cable assembly (1) from toggle switch (2) and circuit breaker (3).



- 2 Disconnect cable assembly (4) from connector adapter (5).
- 3 Disconnect cable assembly (6) from connector adapter (5).
- 4 Remove connector adapter (5) from connector adapter (7).
- 5 Remove connector adapter (7) from dome lamp assembly (8).
- 6 Disconnect electrical lead (9) from toggle switch (2).
- 7 Remove five assembled washer bolts (10), five loop clamps (11), and electrical lead (9).

- 8 Disconnect electrical lead (9) from gas particulate filter unit (12).

INSPECTION/REPAIR

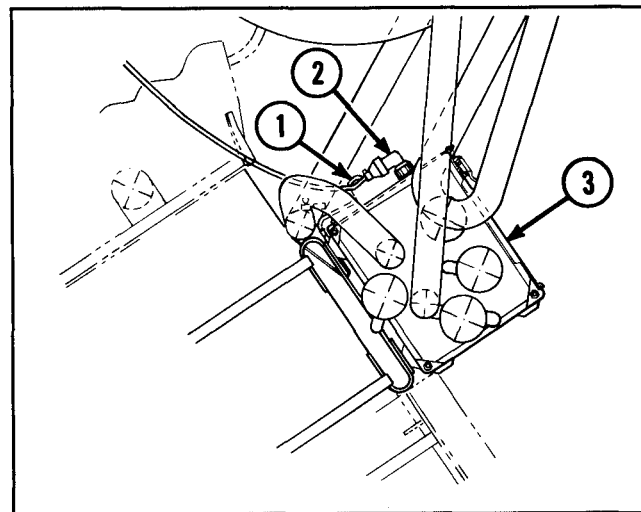
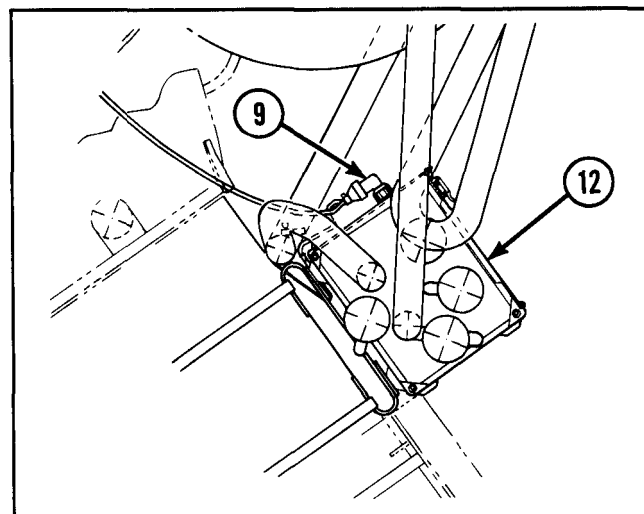
- 1 Inspect for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

INSTALLATION

WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

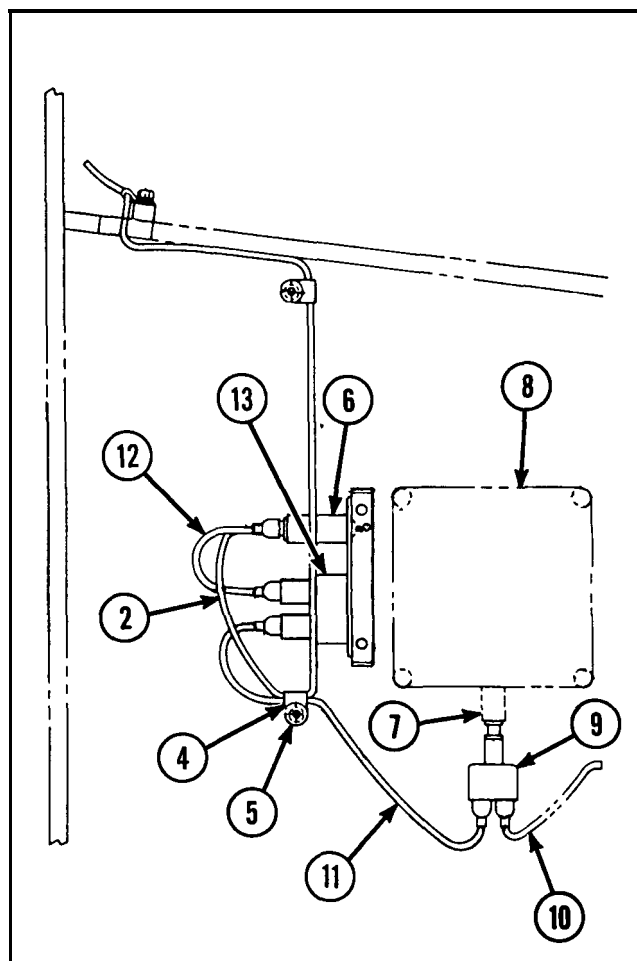
- 1 Connect ground cable assembly (1).
- 2 Connect electrical lead (2) to gas particulate filter unit (3).



2-89. MAINTENANCE OF CAB FILTER INSTALLATION CABLE ASSEMBLY (B5-19-1768) AND ELECTRICAL LEAD (B5-19-1767) AND CABLE ASSEMBLY (B5-19-1663) (CONT).

INSTALLATION (CONT)

- 3 Install electrical lead (2), five loop clamps (4), and five assembled washer bolts (5).
- 4 Connect electrical lead (2) to toggle switch (6).
- 5 Install connector adapter (7) in dome lamp assembly (8).
- 6 Install connector adapter (9) in connector adapter (7).
- 7 Connect cable assembly (10) to connector adapter (9).
- 8 Connect cable assembly (11) to connector adapter (9).
- 9 Connect cable assembly (12) to toggle switch (6) and circuit breaker (13).



2-90. MAINTENANCE OF HOSE ASSEMBLIES (C5-19-876-4, C5-19-876-2, AND C5-19-876-3).

This task covers:

a. <i>Removal</i>	d. <i>Reassembly</i>
b. <i>Disassembly</i>	e. <i>Installation</i>
c. <i>Inspection/Repair</i>	

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive (appx B)

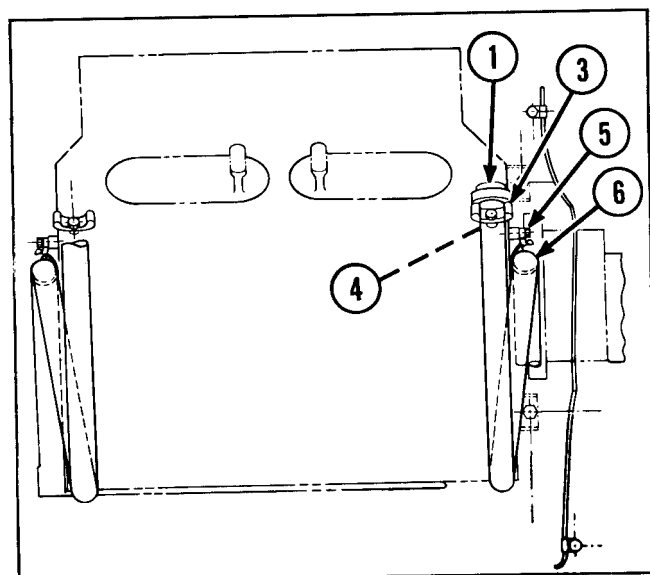
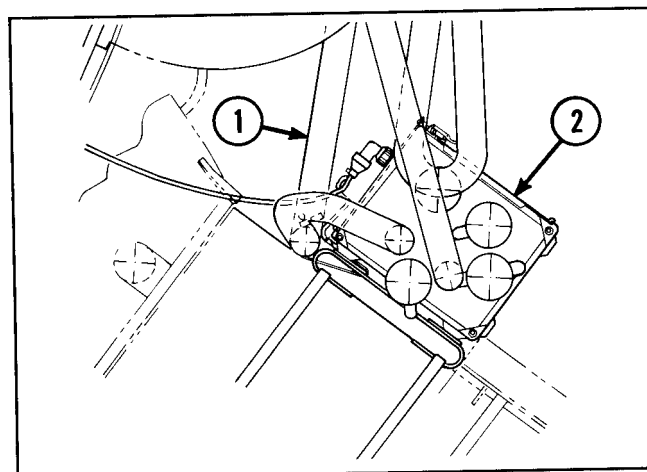
References

TM 9-2350-238-24P-2

REMOVAL**NOTE**

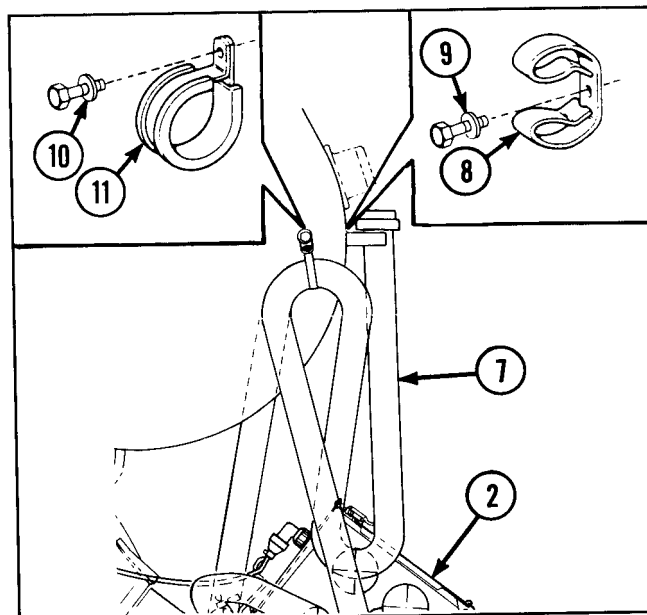
Steps 1 thru 4 are written for removal of hose assembly (C5-19-876-4).

- 1 Disconnect air hose assembly (1) from gas particulate filter unit (2).
- 2 Unsnap air hose assembly (1) from spring tension clip (3).
- 3 Remove assembled washer bolt (4) and spring tension clip (3).
- 4 Remove assembled washer bolt (5), marker hose hold-down band (6), and air hose assembly (1).

**NOTE**

Steps 5 thru 8 are written for removal of hose assembly (C5-19-876-2).

- 5 Disconnect air hose assembly (7) from gas particulate filter unit (2).
- 6 Unsnap air hose assembly (7) from spring tension clip (8).
- 7 Remove assembled washer bolt (9) and spring tension clip (8).
- 8 Remove assembled washer bolt (10), marker hose hold-down band (11), and air hose assembly (7).



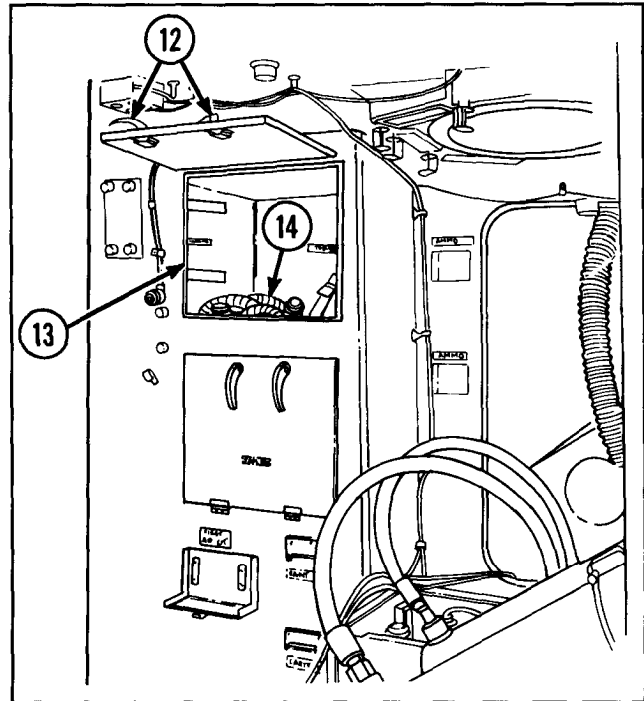
2-90. MAINTENANCE OF HOSE ASSEMBLIES (C5-19-876-4, C5-19-876-2, and C5-19-876-3) (CONT).

REMOVAL (CONT)

NOTE

- Steps 9 and 10 are written for removal of hose assembly (C5-19-876-3).
- Hose assembly (C5-19-876-3) is an additional 9 foot hose used for crew member protection while performing work outside the cab during toxic or extremely dusty conditions.

- 9 Unfasten latch (12) and open stowage box (13).
- 10 Remove hose assembly (14) from stowage box (13).

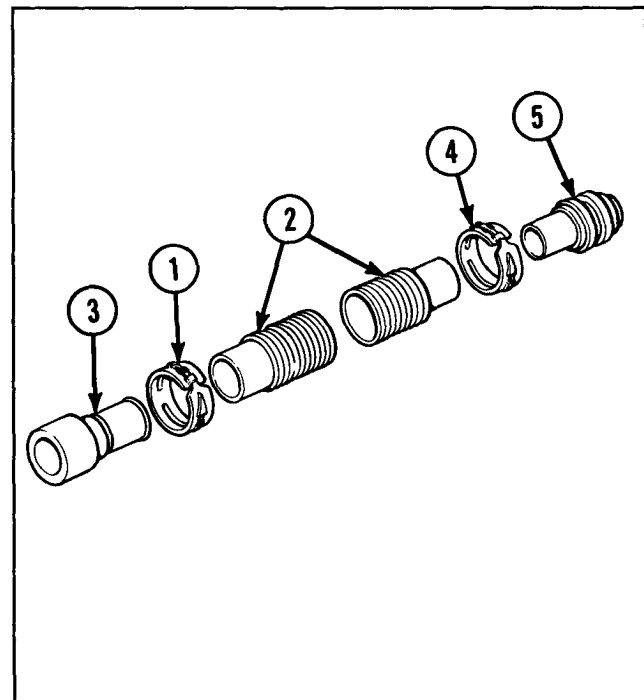


DISASSEMBLY

NOTE

Steps 1 thru 4 are written for disassembly of one hose assembly but apply to all three hose assemblies.

- 1 Loosen hose clamp (1) from air duct hose (2) and remove quick disconnect coupling half (3).
- 2 Remove hose clamp (1) from air duct hose (2).
- 3 Loosen hose clamp (4) from air duct hose (2) and remove quick coupling half (5).
- 4 Remove hose clamp (4) from air duct hose (2).



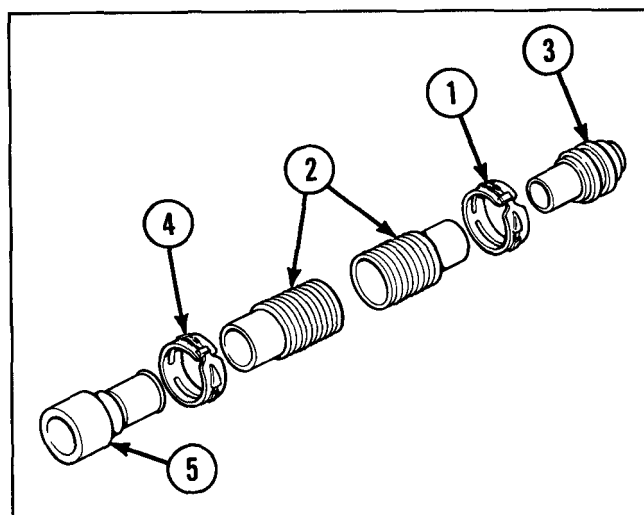
INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

REASSEMBLY**NOTE**

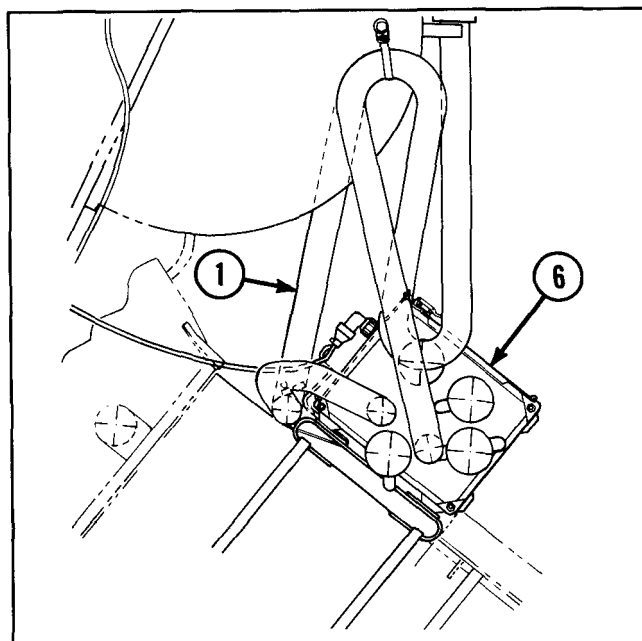
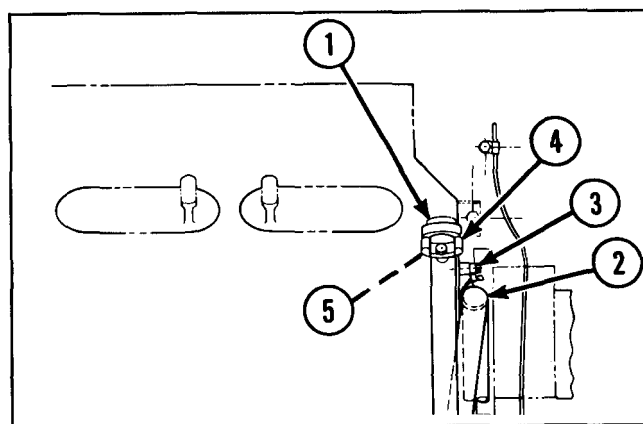
Steps 1 thru 4 are written for re-assembly of one hose assembly but apply to all three hose assemblies.

- 1 Install hose clamp (1) on air duct hose (2).
- 2 Install quick coupling half (3) and tighten hose clamp (1) on air duct hose (2).
- 3 Install hose clamp (4) on air duct hose (2).
- 4 Install quick disconnect coupling half (5) and tighten hose clamp (4) on air duct hose (2).

**INSTALLATION****NOTE**

Steps 1 thru 4 are written for installation of hose assembly (C5-19-876-4).

- 1 Install air hose assembly (1), marker hose hold-down band (2), and assembled washer bolt (3).
- 2 Install spring tension clip (4) and assembled washer bolt (5).
- 3 Snap air hose assembly (1) into spring tension clip (4).
- 4 Connect air hose assembly (1) to gas particulate filter unit (6).



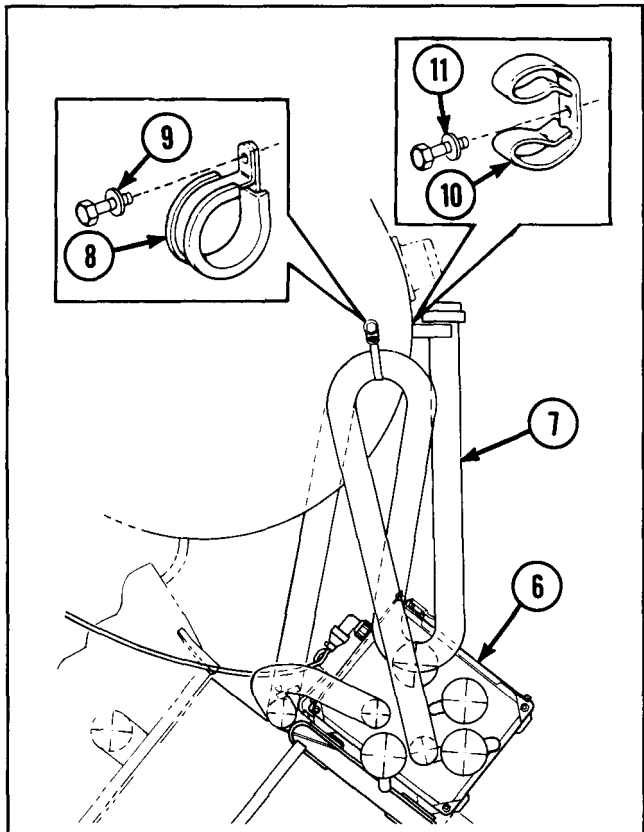
2-90. MAINTENANCE OF HOSE ASSEMBLIES (C5-19-876-4, C5-19-876-2, and C5-19-876-3) (CONT).

INSTALLATION (CONT)

NOTE

Steps 5 thru 8 are written for installation of hose assembly (C5-19-876-2).

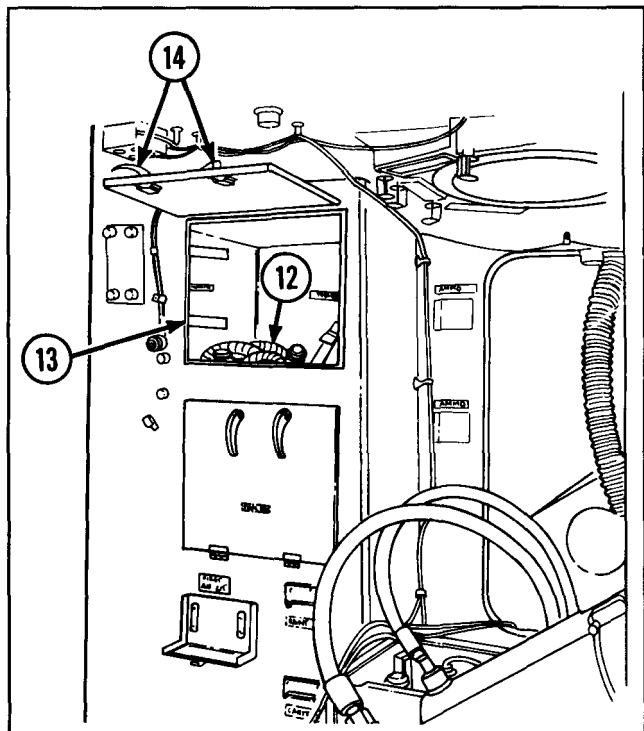
- 5 Install air hose assembly (7), marker hose hold-down band (8), and assembled washer bolt (9).
- 6 Install spring tension clip (10) and assembled washer bolt (11).
- 7 Snap air hose assembly (7) into spring tension clip (10).
- 8 Connect air hose assembly (7) to gas particulate filter unit (6).



NOTE

Steps 9 and 10 are written for installation of hose assembly (C5-19-876-3).

- 9 Install hose assembly (12) in stowage box (13).
- 10 Close stowage box (13) and fasten latch (14).



2-91. MAINTENANCE OF GAS PARTICULATE FILTER UNIT, AIR PURIFIER ASSEMBLY, HOUSING PRECLEANED ASSEMBLY, AND GROUND CABLE ASSEMBLY.

This task covers:

a. <i>Removal</i>	d. <i>Reassembly</i>
b. <i>Disassembly</i>	e. <i>Installation</i>
c. <i>Inspection/Repair</i>	

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive (appx B)

Materials/Parts

Lockwasher (4) (MS35338-42)

References

FM 3-5

FM 3-100

TM 9-2350-238-24P-2

TM 10-277

Equipment Conditions

MASTER switch turned OFF

INSTRUMENT switch turned OFF

General Safety Instructions

WARNING

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

- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.
- Gas and particulate filters must be removed and/or installed by trained personnel (FM 3-100). The officer in charge must specify the necessary protective clothing (TM 10-277). The officer must also specify safety measures and decontamination procedures before filters are installed (FM 3-5).

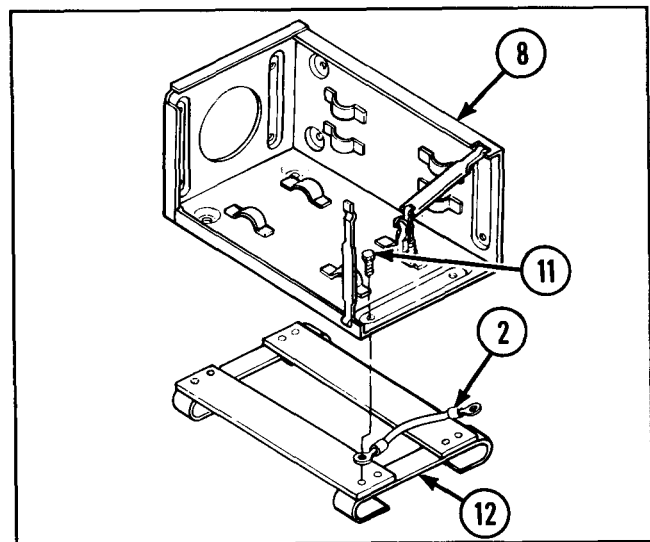
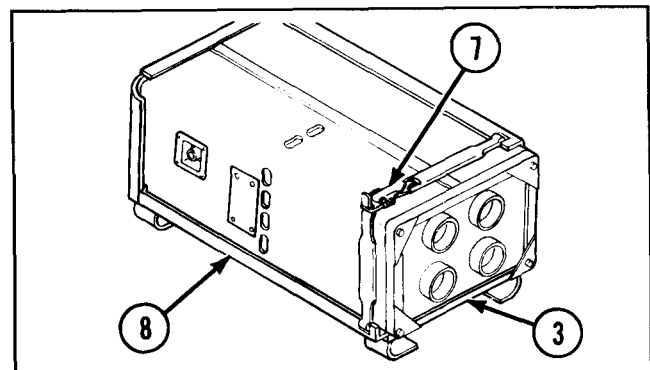
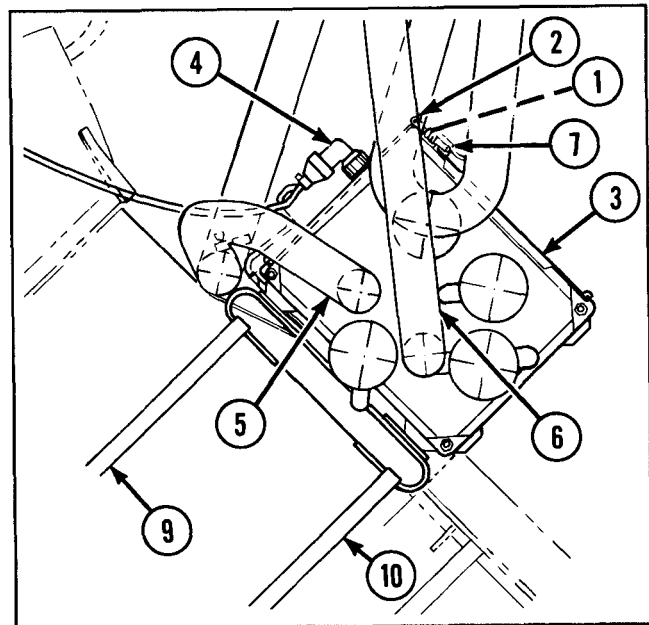
2-91. MAINTENANCE OF GAS PARTICULATE FILTER UNIT, AIR PURIFIER ASSEMBLY, HOUSING PRECLEANER ASSEMBLY, AND GROUND CABLE ASSEMBLY (CONT).

REMOVAL

WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury or death.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

- 1 Set MASTER switch to OFF. Loosen machine screw (1) and disconnect ground cable assembly (2) from gas particulate filter unit (3).
- 2 Unscrew and disconnect connector (4) from gas particulate filter unit (3).
- 3 Disconnect M7 hose assembly (5) and M10 hose assembly (6) from gas particulate filter unit (3).
- 4 Release holddown latch (7). Remove gas particulate filter unit (3) from frame assembly (8). Remove two shock mount to boom cylinders hose clamps (9 and 10).
- 5 Remove four assembled washer bolts (11) securing frame assembly (8) and ground cable assembly (2) to shock assembly mount (12).



DISASSEMBLY

- 1 Remove four airflow control caps (1) from M2A2 air purifier assembly (2).
- 2 Remove four machine screws (3), four lockwashers (4), and manifold assembly (5).

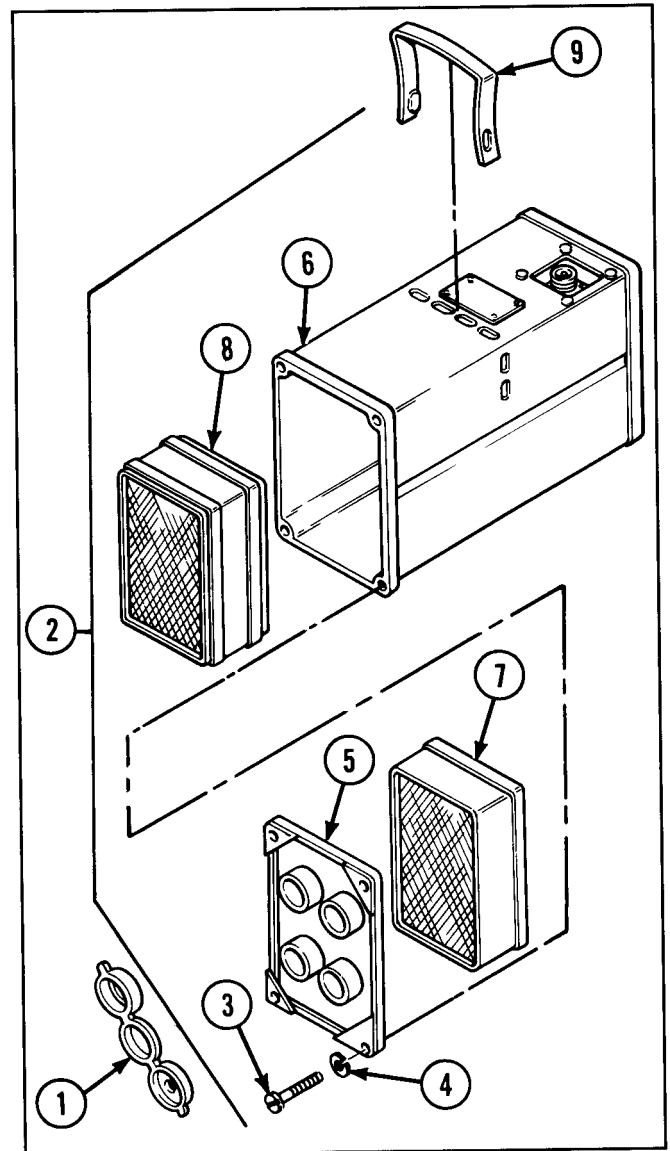
WARNING

Gas and particulate filters must be removed only by trained personnel (FM 3-100). The officer in charge must specify the necessary protective clothing (TM 10-277). The officer must also specify safety measures and decontamination procedures that must be performed before filters are installed (TM 3-220).

CAUTION

Do not drop or damage filters.

- 3 Tilt precleaned and housing assembly (6) until gas filter (7) slides out.
- 4 Tilt precleaned and housing assembly (6) until particulate filter (8) slides out.
- 5 Remove precleaned and housing assembly (6) from vehicle.
- 6 Remove spring clip (9) from precleaner and housing assembly (6).

**INSPECTION/REPAIR**

- 1 Inspect for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

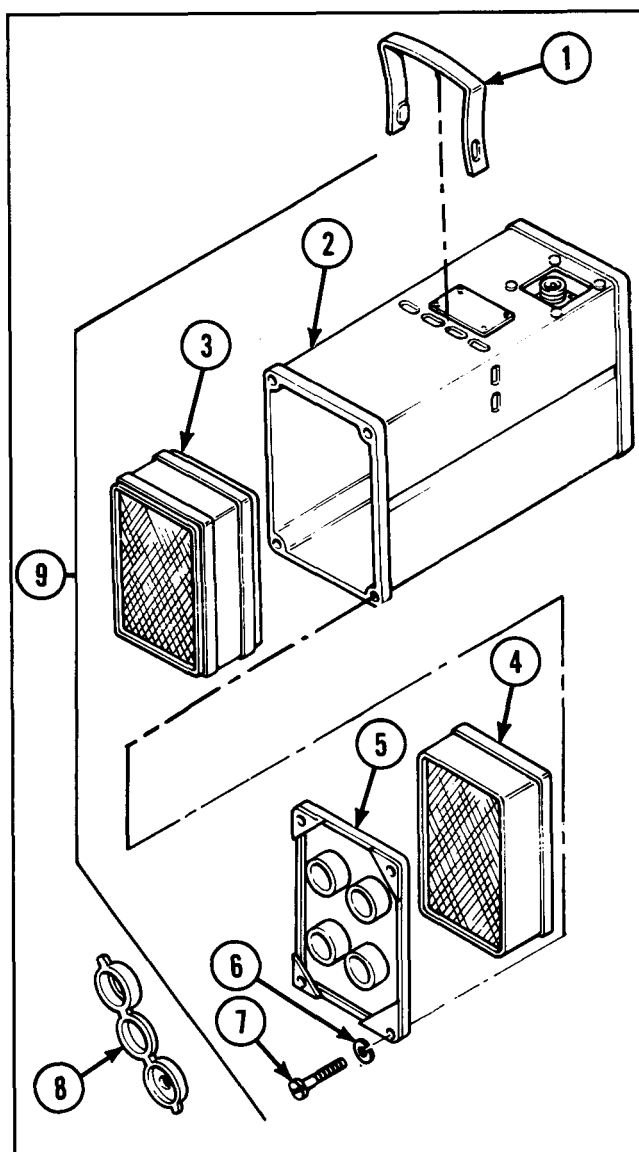
2-91. MAINTENANCE OF GAS PARTICULATE FILTER UNIT, AIR PURIFIER ASSEMBLY, HOUSING PRECLEANED ASSEMBLY, AND GROUND CABLE ASSEMBLY (CONT).

REASSEMBLY

WARNING

Gas and particulate filters must be installed only by trained personnel (FM 3-100). The officer in charge must specify the necessary protective clothing (TM 10-277). The officer must also specify safety measures and decontamination procedures that must be performed before filters are installed (FM 3-5).

- 1 Decontaminate gas filter. Refer to FM 3-5.
- 2 Install spring clip (1) to precleaned and housing assembly (2).
- 3 Install precleaned and housing assembly (2) to vehicle.
- 4 Install particulate filter (3) in precleaned and housing assembly (2).
- 5 Install gas filter (4) in precleaned and housing assembly (2) with flush side against particulate filter (3).
- 6 Install manifold assembly (5) and secure with four new lockwashers (6) and four machine screws (7).
- 7 Install four airflow control caps (8) to M2A2 air purifier assembly (9).

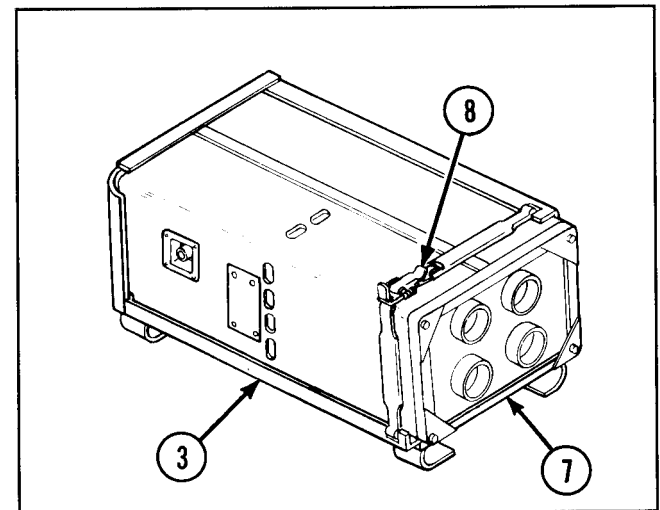
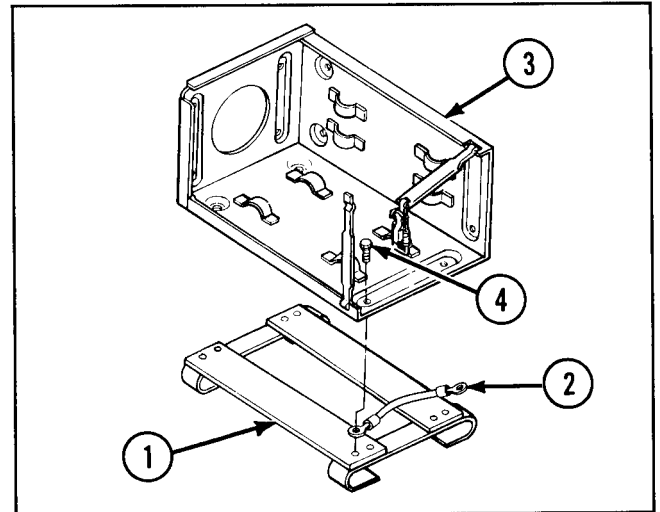


INSTALLATION

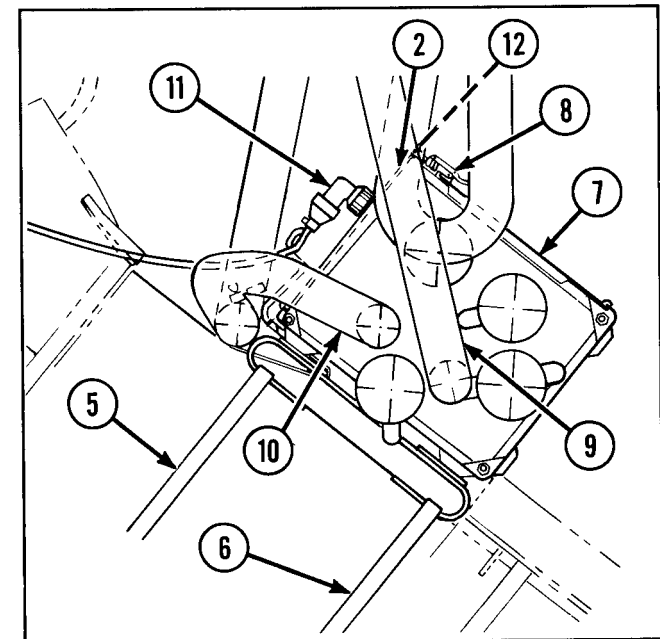
WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury or death.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

- 1 Install shock assembly mount (1), ground cable assembly (2), and frame assembly (3) and secure using four assembled washer bolts (4).
- 2 Install two shock mount to boom cylinders hose clamps (5) and (6). Install gas particulate filter unit (7) in frame assembly (3) and secure by engaging holdown latch (8).
- 3 Connect M10 hose assembly (9) and M7 hose assembly (10) to gas particulate filter unit (7).



- 4 Connect and screw in connector (11) to gas particulate filter unit (7).
- 5 Connect ground cable assembly (2) to gas particulate filter unit (7). Tighten machine screw (12). Turn MASTER switch to ON.



2-92. MAINTENANCE OF CIRCUIT BREAKER AND SWITCH ASSEMBLY.

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

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive
(appx B)

Materials/Parts

Lockwasher (2) (MS35335-3)
Lockwasher (2) (MS35338-42)

References

TM 9-2350-238-24P-2

Equipment Conditions

MASTER switch turned OFF
INSTRUMENT SWITCH turned OFF

General Safety Instructions

WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

REMOVAL/DISASSEMBLY

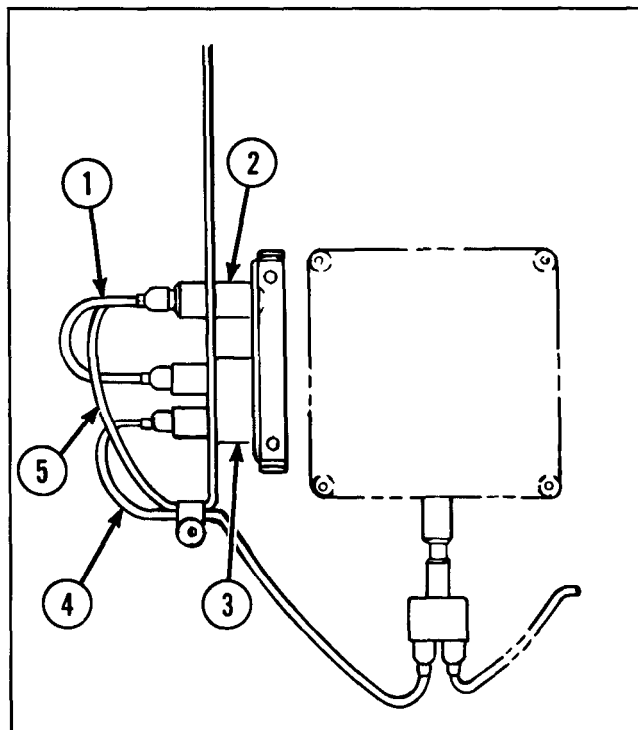
WARNING

- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
- Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.

NOTE

Tag and label electrical cables prior to removal.

- 1 Disconnect and remove cable assembly (1) from toggle switch (2) and circuit breaker (3).



- 2 Disconnect cable assembly (4) from circuit breaker (3).
- 3 Disconnect electrical lead (5) from toggle switch (2).
- 4 Remove two assembled washer bolts (6) and angle bracket (7).
- 5 Remove two hexagon plain nuts (8), two lockwashers (9), two machine screws (10), and circuit breaker (3) from angle bracket (7).
- 6 Remove two machine screws (11), two lockwashers (12), and toggle switch (2) from angle bracket (7).

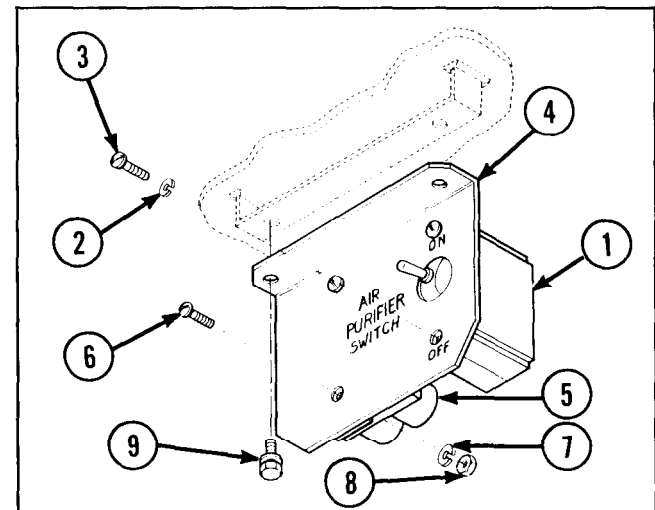
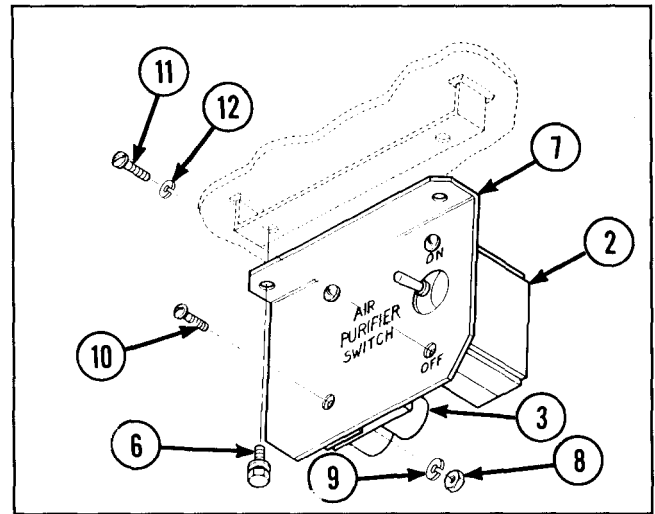
INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-304-24P-2).

REASSEMBLY/INSTALLATION

WARNING

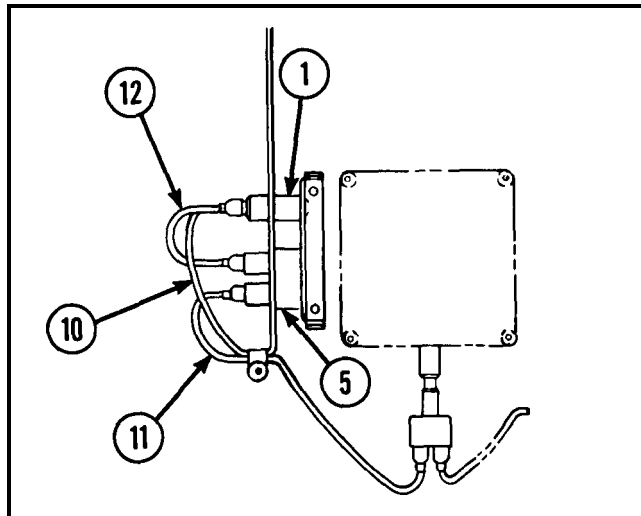
- Make sure MASTER switch is OFF before repairing electrical components. Failure to observe this warning could result in injury to personnel.
 - Failure to remove or disconnect the batteries before removing or installing any electrical wiring harness or lead may result in injury or damaged equipment.
- 1 Install toggle switch (1), two new lockwashers (2), and two machine screws (3) on angle bracket (4).
 - 2 Install circuit breaker (5), two machine screws (6), two new lockwashers (7), and two hexagon plain nuts (8) on angle bracket (4).
 - 3 Install angle bracket (4) and secure with two assembled washer bolts (9).



2-92. MAINTENANCE OF CIRCUIT BREAKER AND SWITCH ASSEMBLY (CONT).

REASSEMBLY/INSTALLATION (CONT)

- 4 Connect electrical lead (10) to toggle switch (1).
- 5 Connect cable assembly (11) to circuit breaker (5).
- 6 Connect cable assembly (12) to toggle switch (1) and circuit breaker (5).

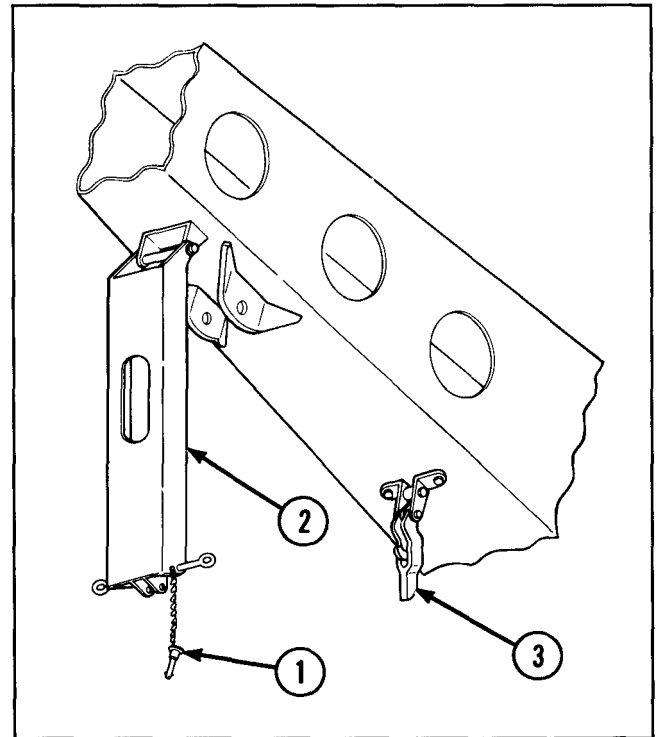


2-93. MAINTENANCE OF EQUIPMENT STOWAGE INSTALLATION, TACKLE STOWAGE TRAY, AND BOOM TRAY STOWAGE HANDLE.

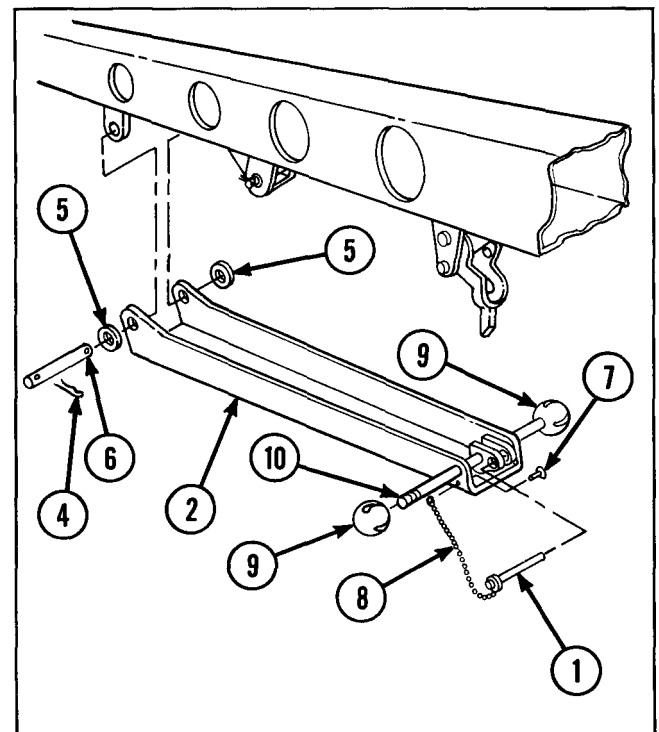
This task covers: a. <i>Removal</i> b. <i>Inspection/Repair</i> c. <i>Installation</i>		
INITIAL SETUP		
<i>Tools and Special Tools</i>		<i>References</i>
General mechanic's tool kit, automotive (appx B)		TM 9-2350-238-24P-2
<i>Materials/Parts</i>		
Cotter pin (4) (MS24665-283)		
Lockpin (2) (10934724)		
Lockwasher (MS35338-46)		
Lockwasher (2) (MS35338-48)		
Safety chain (figure 5, appx D)		
Sealing compound (item 17, appx C)		
Solid rivet (MS20613-3C6)		

REMOVAL

- 1 Remove quick release pin (1) from snatch block stowage tray (2).
- 2 Pull handle (3) to release snatch block stowage tray (2).



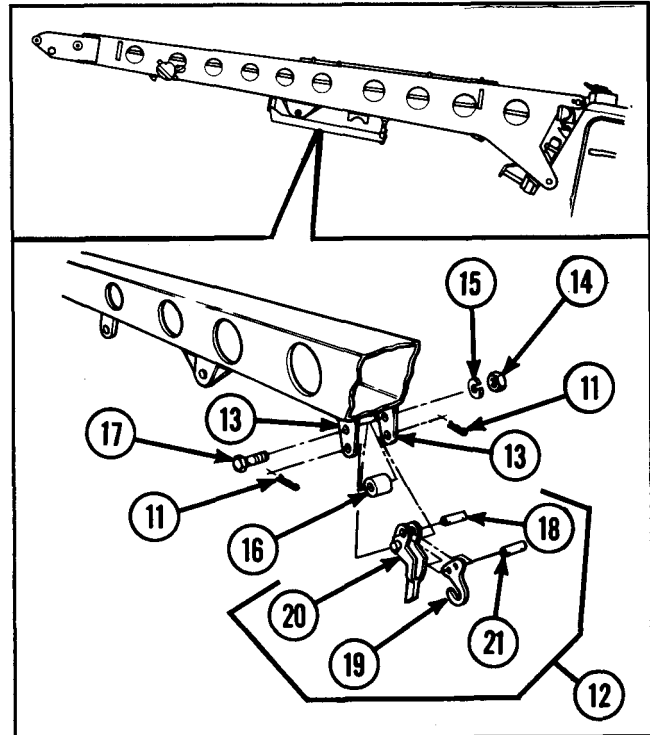
- 3 Remove two cotter pins (4), two flat washers (5), and headless straight pin (6) from snatch block stowage tray (2).
- 4 Remove solid rivet (7) securing safety chain (8) and attached quick release pin (1) from snatch block stowage tray (2).
- 5 If damaged, remove safety chain (8) from quick release pin (1).
- 6 Remove two tray handle knobs (9) from handle (10).



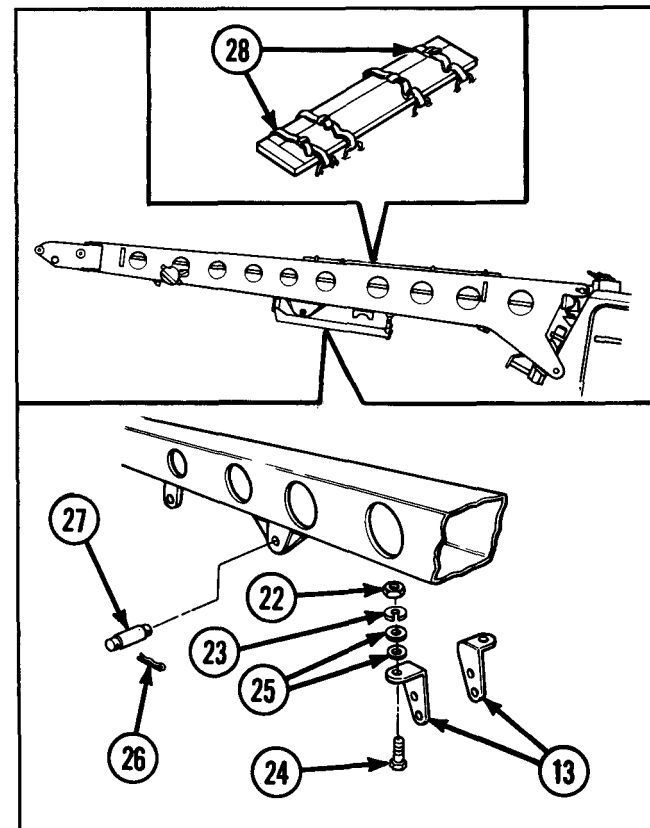
2-93. MAINTENANCE OF EQUIPMENT STOWAGE INSTALLATION, TACKLE STOWAGE TRAY, AND BOOM TRAY STOWAGE HANDLE (CONT).

REMOVAL (CONT)

- 7 Remove two cotter pins (11) and boom tray stowage handle (12) from two boom tray angle brackets (13).
- 8 Remove hexagon plain nut (14), lock-washer (15), sleeve spacer (16), and hexagon capscrew (17).
- 9 Remove headless straight pin (18) and handle hook (19) from handle (20).
- 10 Remove headless straight pin (21) from handle hook (19).



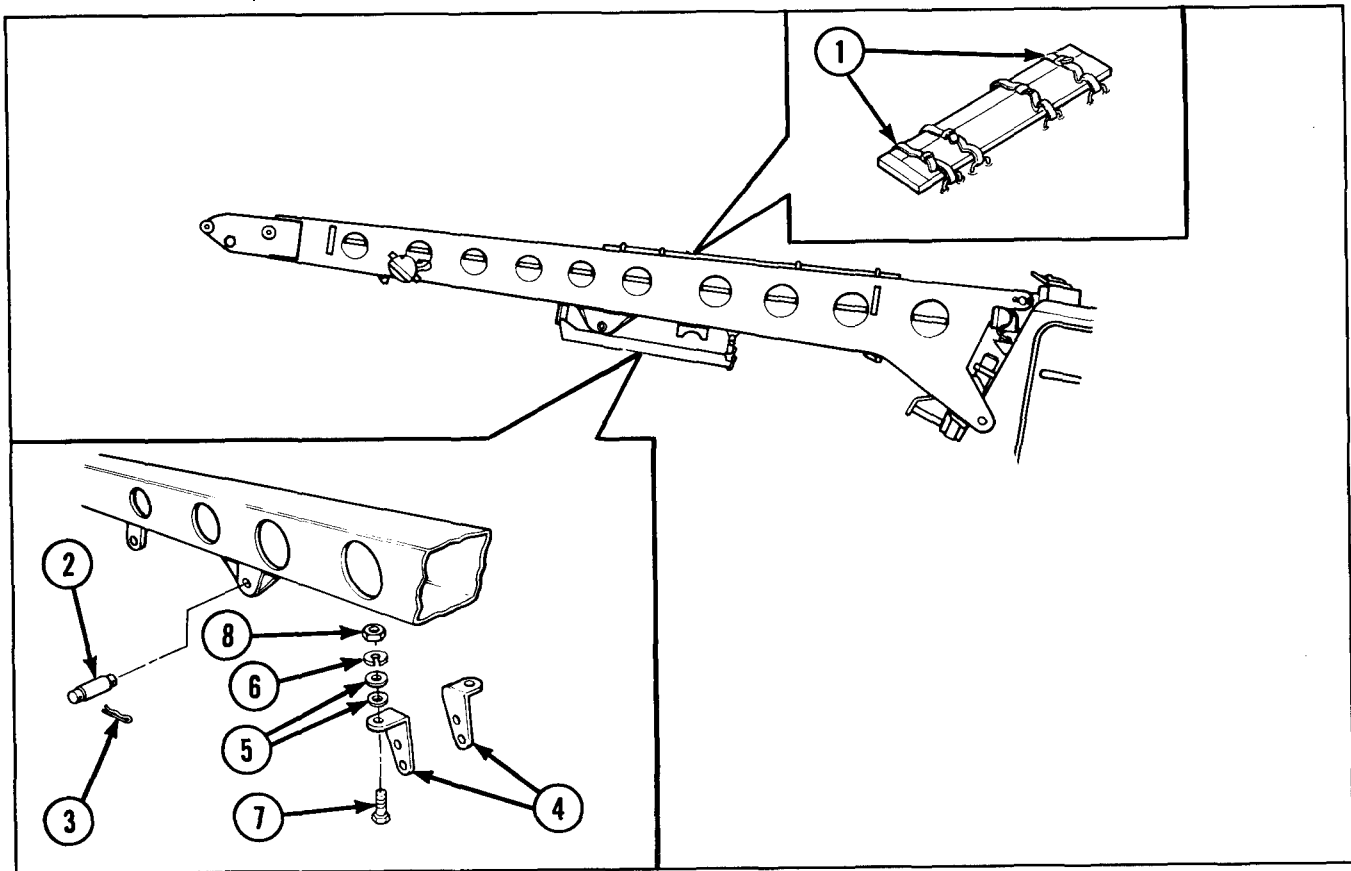
- 11 Remove two hexagon plain nuts (22), two lockwashers (23), two hexagon capscrews (24), four flat washers (25), and two boom tray angle brackets (13).
- 12 Remove two lockpins (26) and headless grooved pin (27).
- 13 If damaged, remove two webbing straps (28).



INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 Safety chain is a manufactured item, refer to appendix D.
- 3 If snatch block stowage tray is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 4 If handle hook is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 5 If handle is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 6 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2) which do not meet inspection criteria.

INSTALLATION

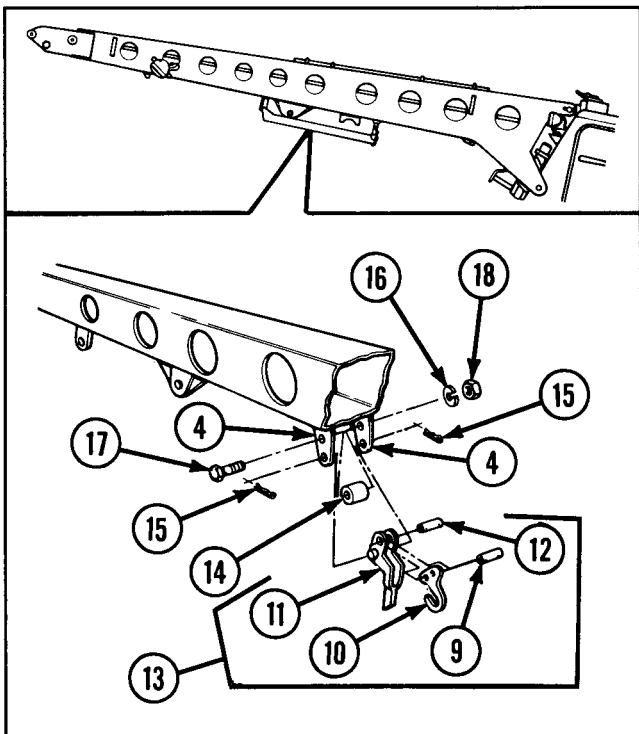


- 1 If removed, install two new webbing straps (1).
- 2 Install headless grooved pin (2) and secure with two new lockpins (3).
- 3 Position two boom tray angle brackets (4) and secure with four flat washers (5), two new lockwashers (6), two hexagon capscrews (7), and two hexagon plain nuts (8).

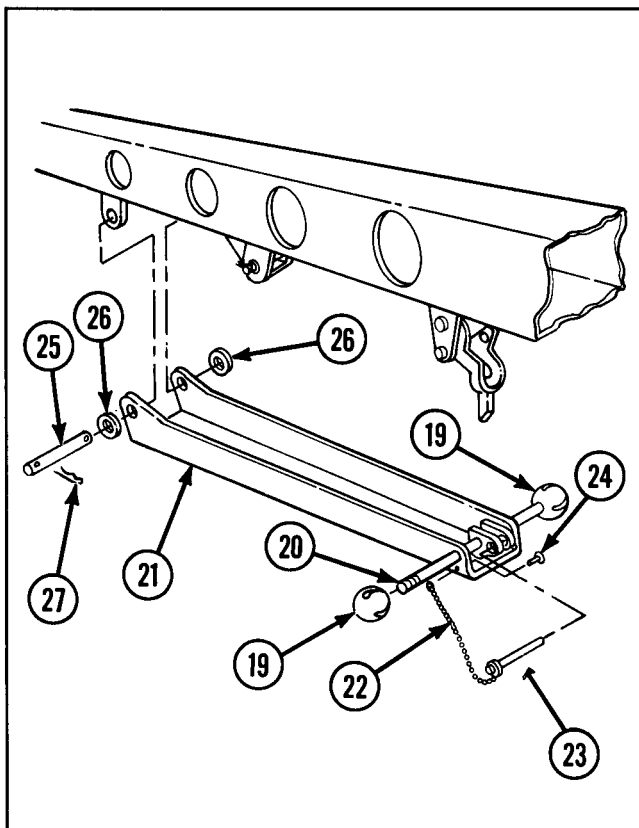
2-93. MAINTENANCE OF EQUIPMENT STOWAGE INSTALLATION, TACKLE STOWAGE TRAY, AND BOOM TRAY STOWAGE HANDLE (CONT).

INSTALLATION (CONT)

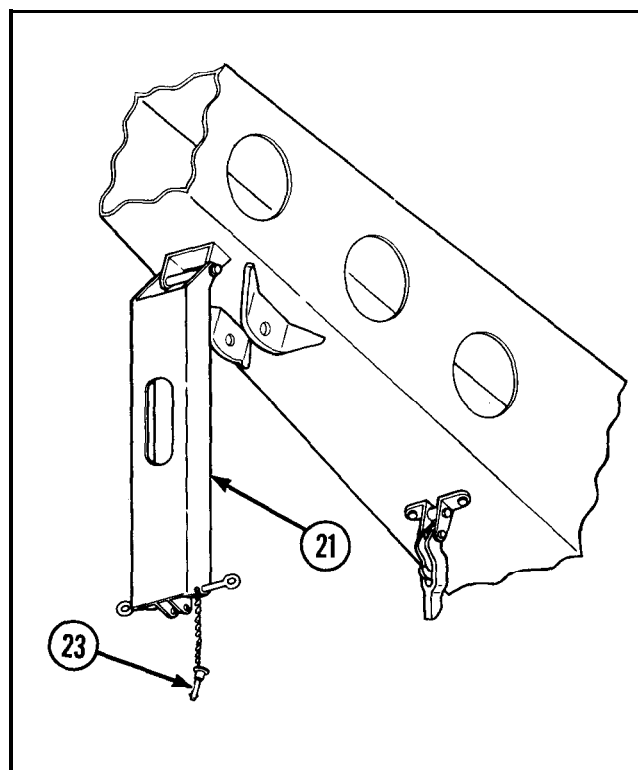
- 4 Install headless straight pin (9) in hook handle (10).
- 5 Install hook handle (10) in handle (11) and secure with headless straight pin (12).
- 6 Install boom tray stowage handle (13) and sleeve spacer (14) between two boom tray angle brackets (4) and secure with two new cotter pins (15), new lockwasher (16), hexagon capscrew (17), and hexagon plain nut (18).



- 7 Apply sealing compound (item 17, appx C) to threads of two tray handle knobs (19) and install two tray handle knobs on handle (20) of snatch block stowage tray (21).
- 8 If removed, install safety chain (22) to quick release pin (23).
- 9 Position safety chain (22) and quick release pin (23) on snatch block stowage tray (21) and secure with new solid rivet (24).
- 10 Install snatch block stowage tray (21) and secure with headless straight pin (25), two flat washers (26), and two new cotter pins (27).



- 11 Close snatch block stowage tray (21) and secure with quick release pin (23).

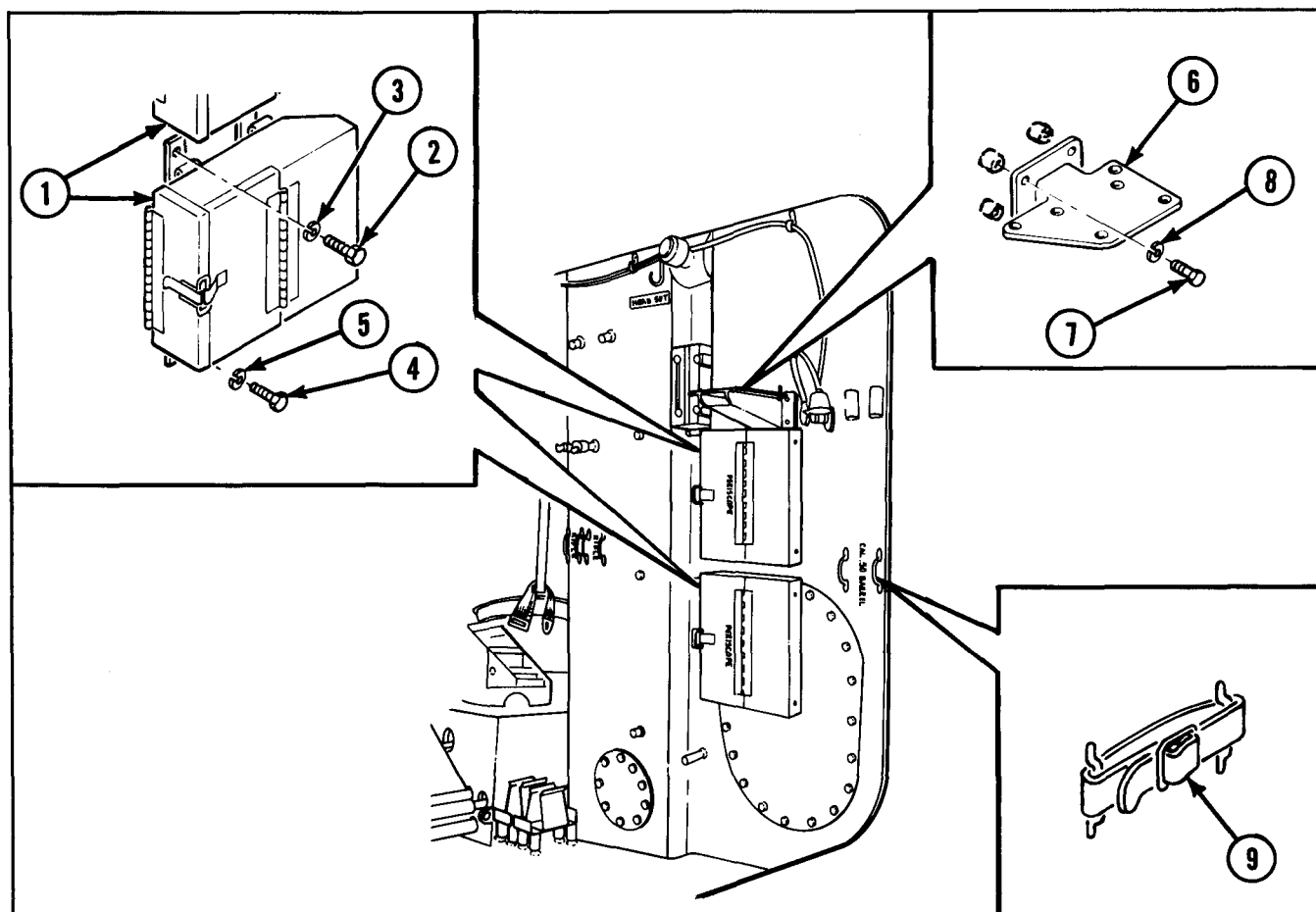


2-94. MAINTENANCE OF CAB INTERIOR BOXES, BRACKETS, STRAPS, AND RELATED PARTS.

This task covers: a. <i>Removal</i> b. <i>Inspection/Repair</i> c. <i>Installation</i>		
INITIAL SETUP		
<i>Tools and Special Tools</i>		<i>References</i>
General mechanic's tool kit, automotive (appx B)		TM 9-2350-238-24P-2
<i>Materials/Parts</i>		
Lockwasher (6) (MS35333-44)		
Lockwasher (16) (MS35338-44)		
Lockwasher (4) (MS35338-46)		

2-94. MAINTENANCE OF CAB INTERIOR BOXES, BRACKETS, STRAPS, AND RELATED PARTS (CONT).

REMOVAL



NOTE

Steps 1 and 2 are written for removal of periscope accessories boxes.

1 Remove two periscopes from two periscope stowage accessories boxes (1).

2 Remove two hexagon capscrews (2), two lockwashers (3), four hexagon capscrews (4), four lockwashers (5), and two periscope stowage accessories boxes (1).

NOTE

Steps 3 and 4 are written for removal of hull radio bracket.

3 Remove hull radio from hull radio bracket (6).

4 Remove four hexagon capscrews (7), four lockwashers (8), and hull radio bracket (6).

NOTE

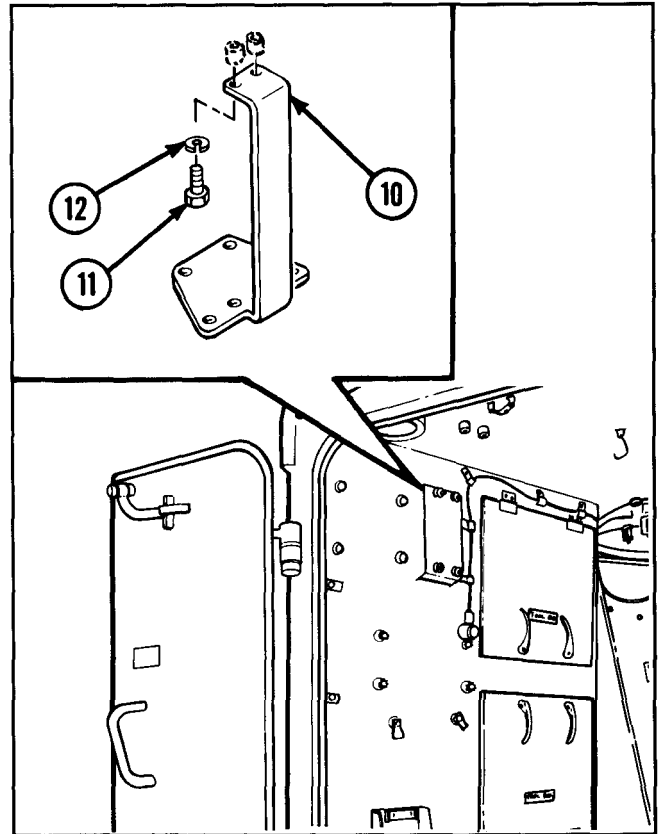
Step 5 is written for removal of .50 caliber barrel webbing straps.

5 If damaged, unbuckle two webbing straps (9) and remove .50 caliber barrel. Remove webbing straps from strap loops.

NOTE

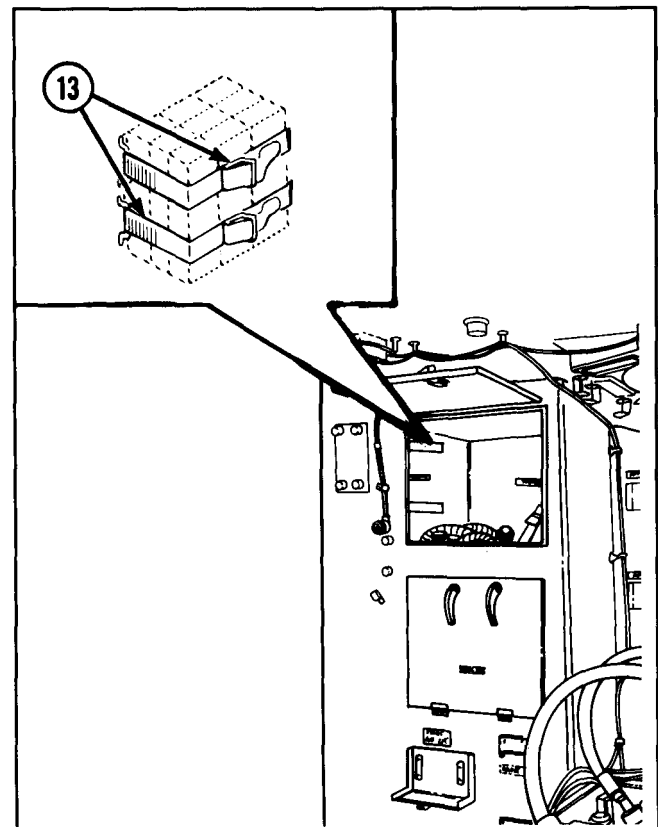
Steps 6 and 7 are written for removal of radio support bracket.

- 6 Remove radio from radio support bracket (10).
- 7 Remove two hexagon capscrews (11), two lockwashers (12), and radio support bracket (10).

**NOTE**

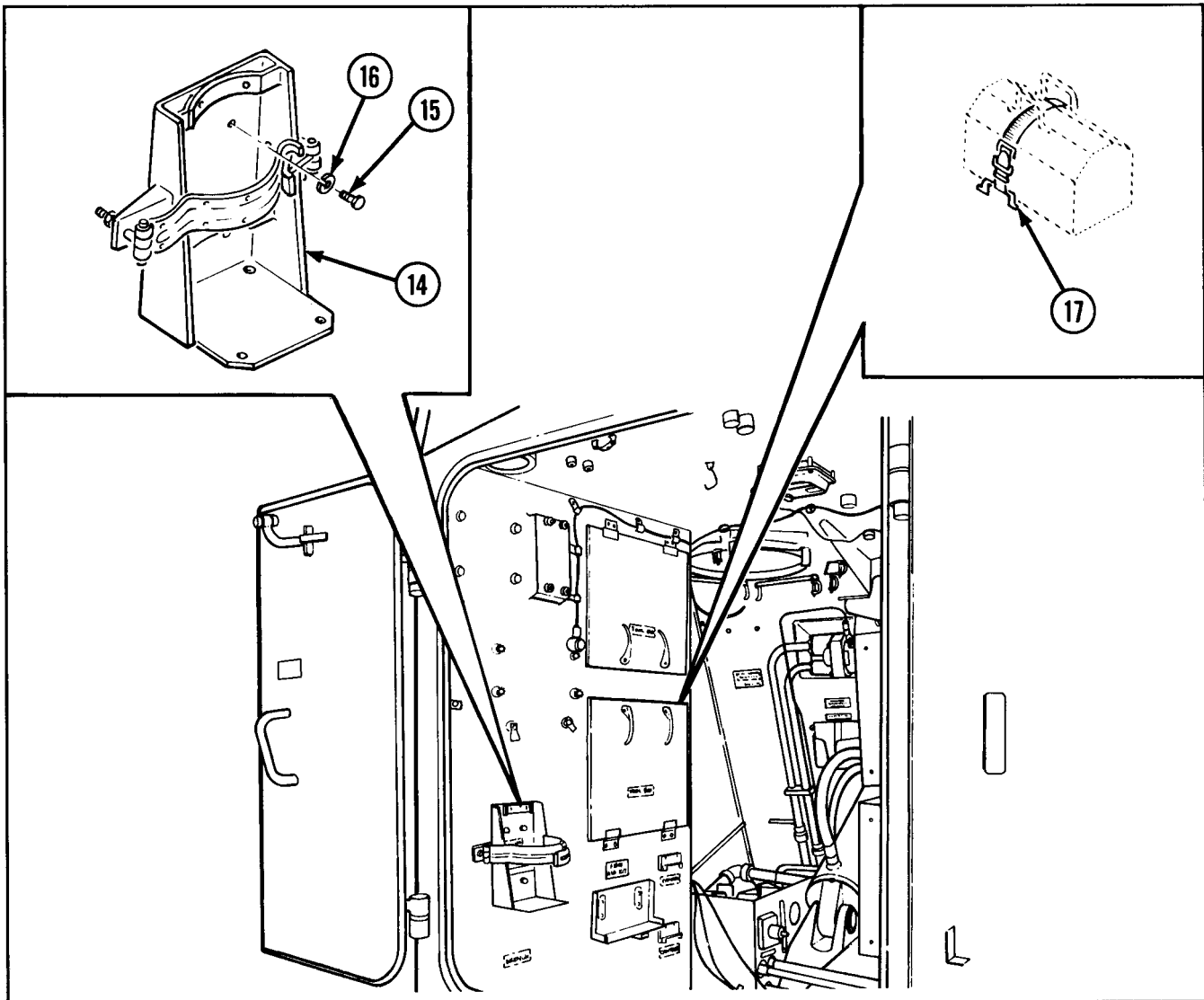
Step 8 is written for removal of field rations webbing straps.

- 8 If damaged, unbuckle two field rations webbing straps (13) and remove field rations. Remove field rations webbing straps from four strap loops.



2-94. MAINTENANCE OF CAB INTERIOR BOXES, BRACKETS, STRAPS, AND RELATED PARTS (CONT).

REMOVAL (CONT)



NOTE

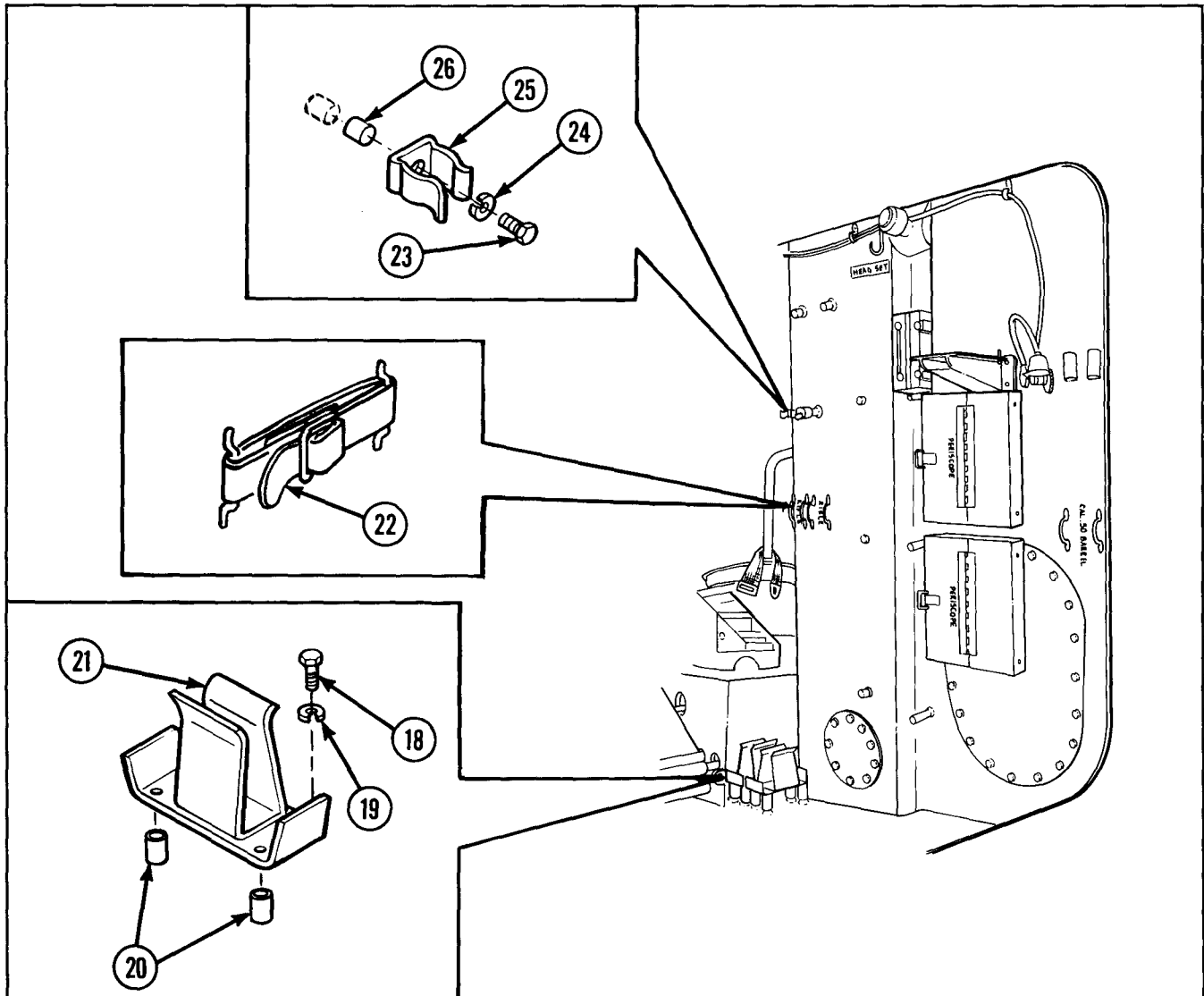
Steps 9 and 10 are written for removal of portable fire extinguisher bracket.

- 9 Remove portable fire extinguisher from portable fire extinguisher bracket (14).
- 10 Remove four hexagon cap screws (15), four lockwashers (16), and portable fire extinguisher bracket (14).

NOTE

Step 11 is written for removal of four tool box webbing straps.

- 11 If damaged, unbuckle and remove four webbing straps (17), securing three mechanic's tool boxes and welder's tool chest, from strap loops.



NOTE

Steps 12 thru 14 are written for removal of mounting hardware securing the M16A1/A2 rifles.

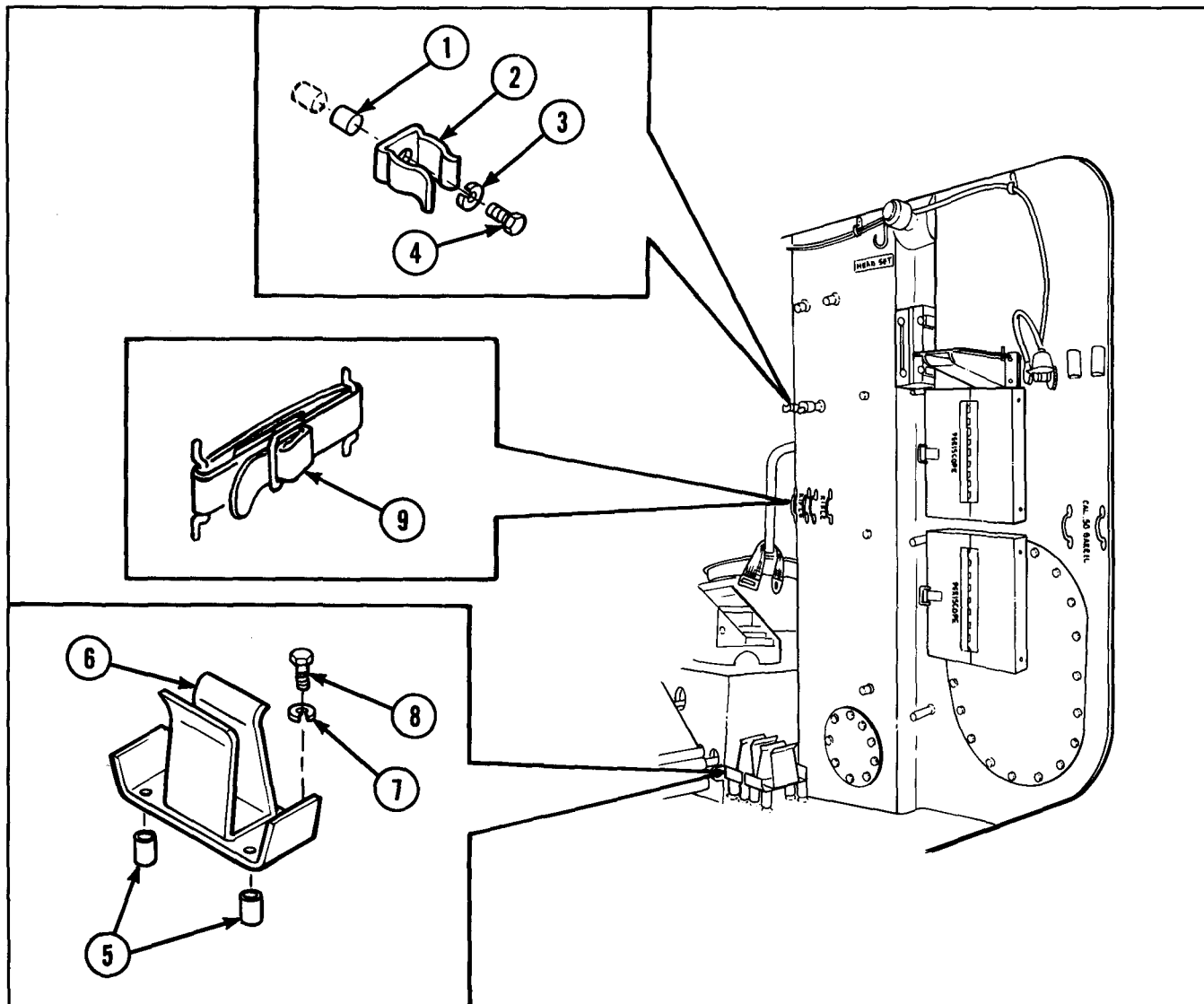
- 12 Remove eight hexagon cap screws (18), eight lockwashers (19), eight pipe extenders (20), and two rifle supports (21).
- 13 If damaged, unbuckle two webbing straps (22) and remove two M16A1/A2 rifles. Remove webbing straps from strap loops.
- 14 Remove two hexagon cap screws (23), two lockwashers (24), two spring tension clips (25), and two pipe extenders (26).

INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 Binocular stowage bracket assembly is a repairable assembly. Refer to page 2-350.
- 3 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

2-94. MAINTENANCE OF CAB INTERIOR BOXES, BRACKETS, STRAPS, AND RELATED PARTS (CONT).

INSTALLATION



NOTE

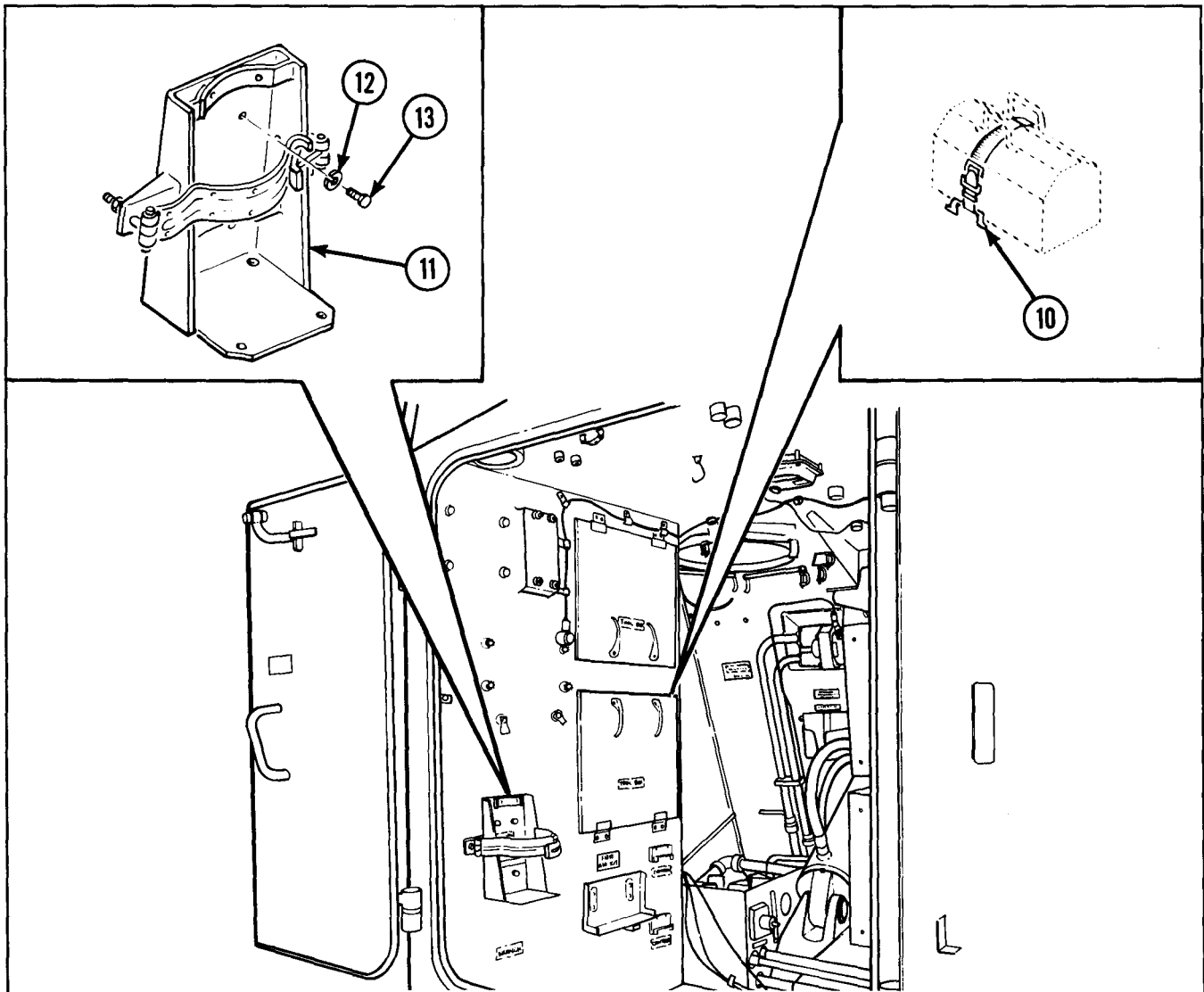
Steps 1 thru 4 are written for installation of mounting hardware securing the M16A1/A2 rifles.

- 1 Install two pipe extenders (1) and two spring tension clips (2) and secure with two new lockwashers (3) and two hexagon capscrews (4).

- 2 Install eight pipe extenders (5) and two rifle supports (6) and secure with eight new lockwashers (7) and eight hexagon cap screws (8).

- 3 Install two M16A1/A2 rifles.

- 4 If removed, install two new webbing straps (9) in strap loops.



NOTE

Steps 5 and 6 are written for installation of four tool box webbing straps.

5 Install three mechanic's tool boxes and welder's tool chest.

6 If removed, install four new webbing straps (10) in strap loops, securing three mechanic's tool boxes and welder's tool chest.

NOTE

Steps 7 and 8 are written for installation of portable fire extinguisher bracket.

7 Install portable fire extinguisher bracket (11) and secure with four new lockwashers (12) and four hexagon capscrews (13).

8 Install portable fire extinguisher in portable fire extinguisher bracket (11).

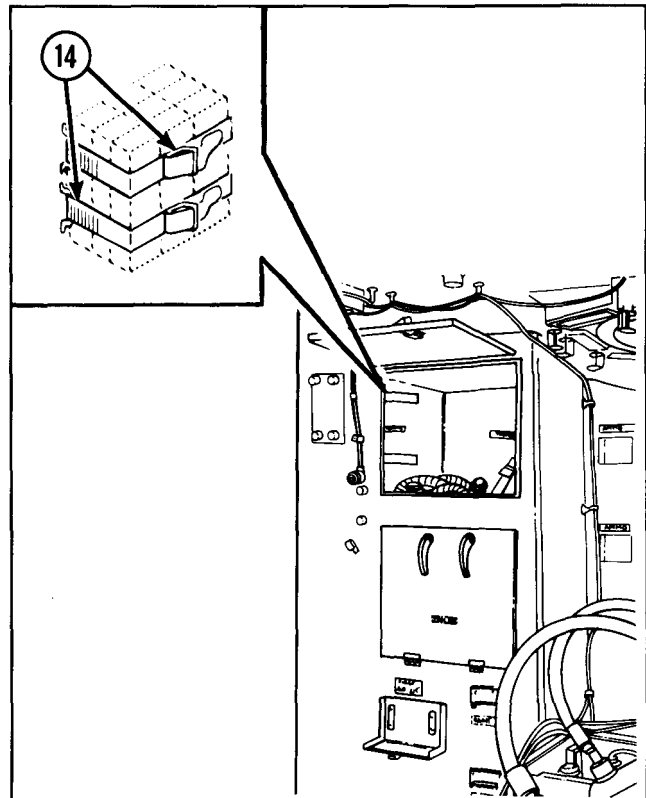
2-94. MAINTENANCE OF CAB INTERIOR BOXES, BRACKETS, STRAPS, AND RELATED PARTS (CONT).

INSTALLATION (CONT)

NOTE

Step 9 is written for installation of field rations webbing straps.

- 9 If removed, install two new field rations webbing straps (14) in strap loops. Replace rations and secure with two field rations webbing straps.

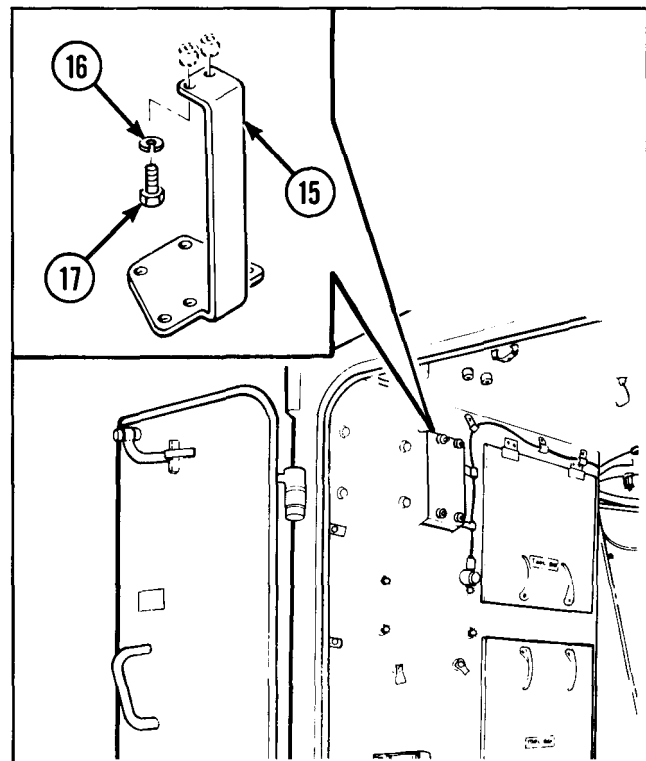


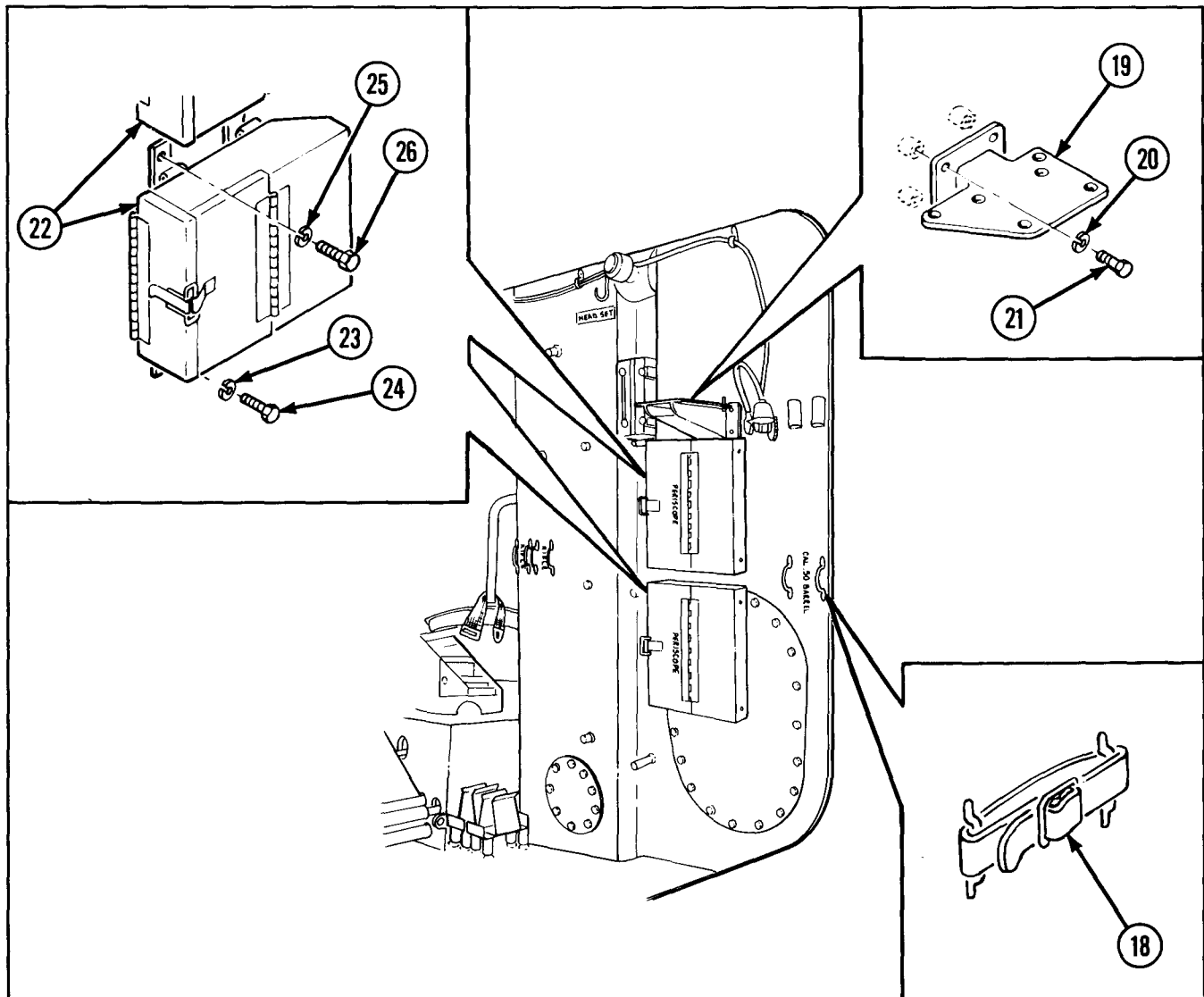
NOTE

Steps 10 and 11 are written for installation of radio support brackets.

- 10 Install radio support bracket (15) and secure with two new lockwashers (16) and two hexagon capscrews (17).

- 11 Install radio on radio support bracket (15).





NOTE

Steps 12 and 13 are written for installation of .50 caliber barrel webbing straps.

12 Install .50 caliber spare barrel.

13 If removed, install two new webbing straps (18) in strap loops, securing .50 caliber spare barrel.

NOTE

Steps 14 and 15 are written for installation of hull radio bracket.

14 Install hull radio bracket (19) and secure with four new lockwashers (20) and four hexagon cap screws (21).

15 Install hull radio on hull radio bracket (19).

NOTE

Steps 16 and 17 are written for installation of periscope accessories boxes.

16 Install two periscope stowage accessories boxes (22) and secure with four new lockwashers (23), four hexagon cap screws (24), two new lockwashers (25), and two hexagon cap screws (26).

17 Install two periscopes in two periscope stowage accessories boxes (22).

2-95. MAINTENANCE OF CAB INTERIOR BOXES, BRACKETS, STRAPS, RACKS, AND RELATED PARTS.

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

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive (appx B)
 Shop equipment, automotive maintenance and repair: organizational maintenance, common no. 2, less power (appx B)
 Wire brush
 Tool set, vehicle, full-tracked: organizational maintenance, supplemental no. 2, less power (appx B)
 Electrowelding holder
 Generator, gasoline
 Welder's gloves
 Welder's helmet
 Welder, machine arc

Materials/Parts

Epoxy resin adhesive (item 2, appx C)
 Lockwasher (24) (MS35333-42)
 Lockwasher (16) (MS35338-44)
 Lockwasher (2) (MS35338-46)

References

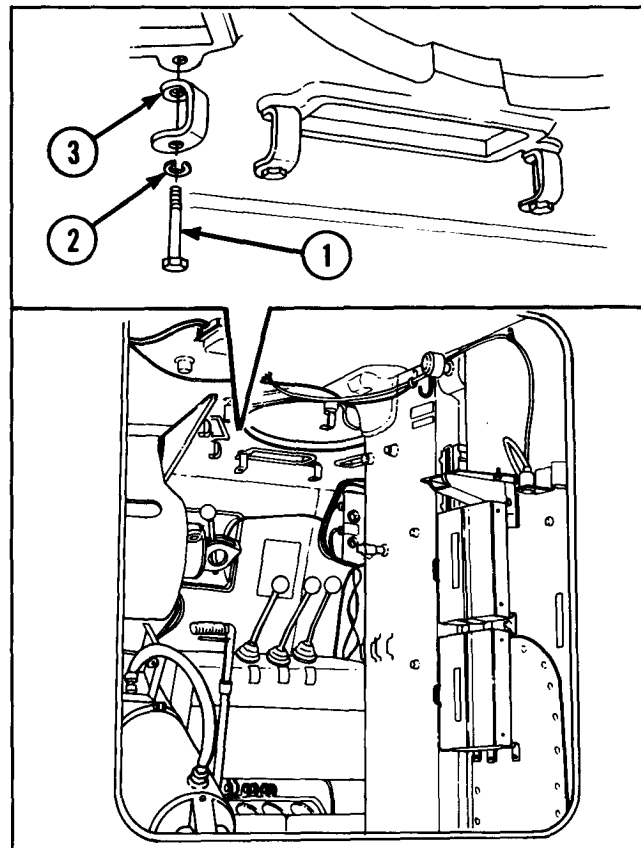
MIL-STD-1261C(MR)
 TM 9-2350-238-24P-2

REMOVAL

NOTE

Step 1 is written for removal of periscope retainers.

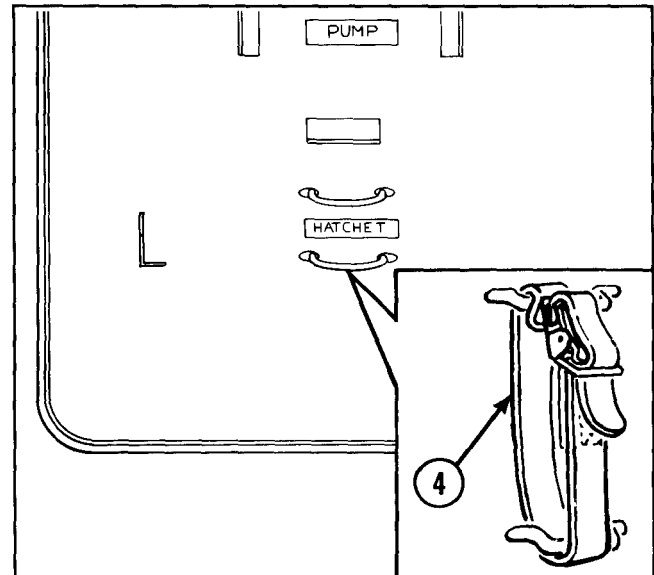
- 1 Remove 24 hexagon capscrews (1), 24 lockwashers (2), and 24 periscope retainers (3), releasing periscopes.



NOTE

Step 2 is written for removal of hatchet webbing strap.

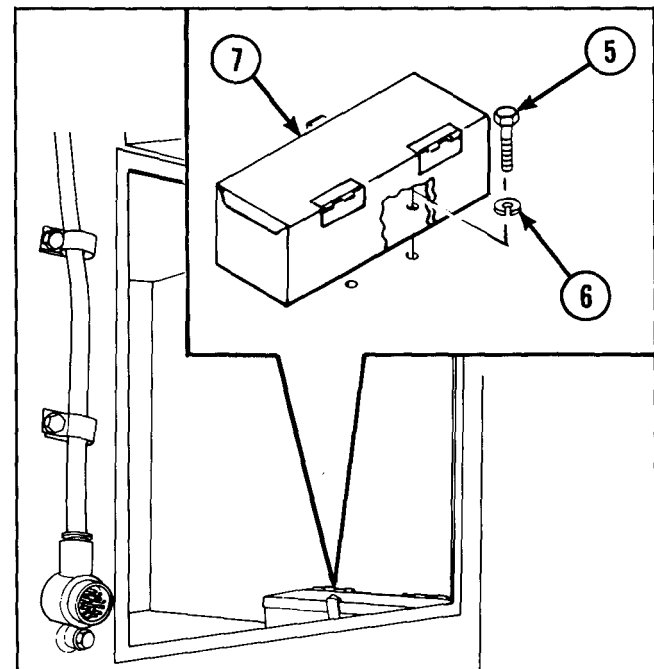
- 2 If damaged, unbuckle webbing strap (4) and remove hatchet. Remove webbing strap from strap loop.



NOTE

Step 3 is written for removal of spare lamp stowage box assembly.

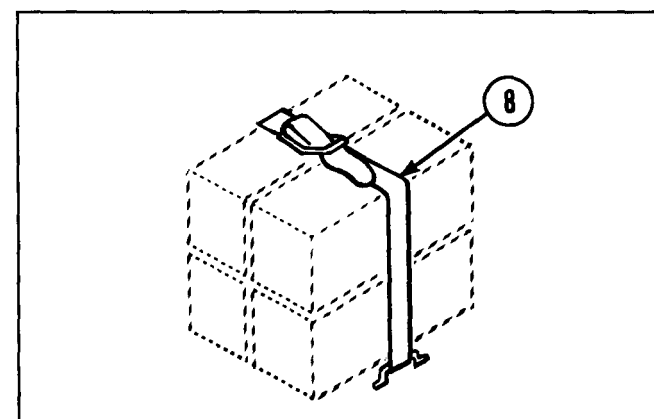
- 3 Remove two machine screws (5), two lockwashers (6), and spare lamp stowage box assembly (7).



NOTE

Step 4 is written for removal of ammunition box webbing strap.

- 4 If damaged, unbuckle webbing strap (8) and remove ammunition box. Remove webbing strap from strap loop.



2-95. MAINTENANCE OF CAB INTERIOR BOXES, BRACKETS, STRAPS, RACKS, AND RELATED PARTS (CONT).

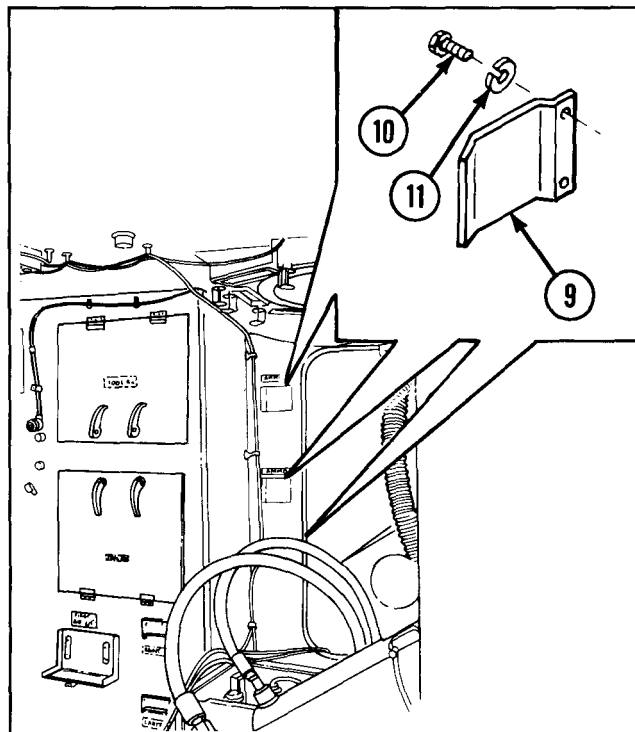
REMOVAL (CONT)

NOTE

Steps 5 and 6 are written for removal of ammunition stowage box clips.

5 Remove ammunition stowage boxes from ammunition stowage box clips (9).

6 Remove six hexagon capscrews (10), six lockwashers (11), and three ammunition stowage box clips (9).



NOTE

Step 7 is written for removal of wrench locking plate.

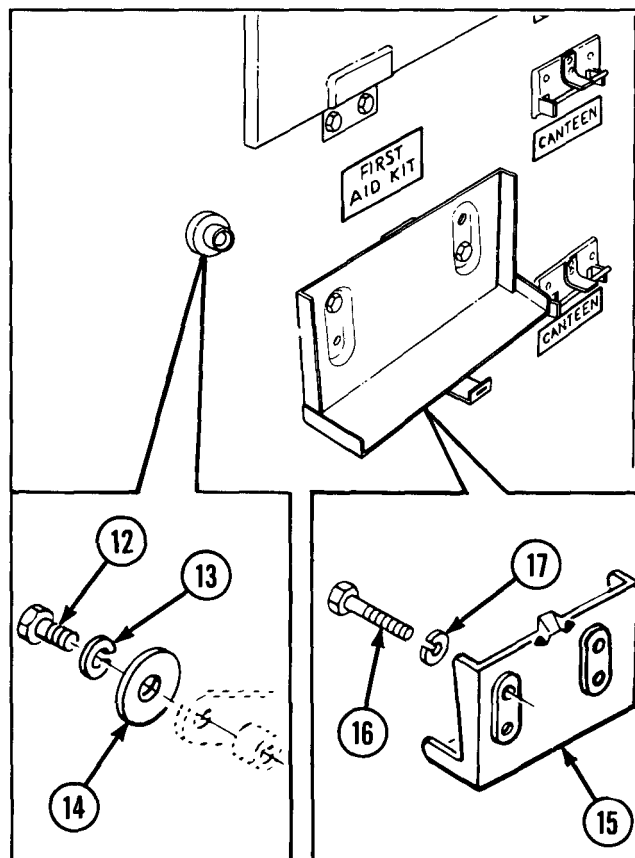
7 Remove hexagon capscrew (12), lockwasher (13), locking plate (14), and wrench.

NOTE

Steps 8 and 9 are written for removal of first aid rack.

8 Remove first aid kit from first aid rack (15).

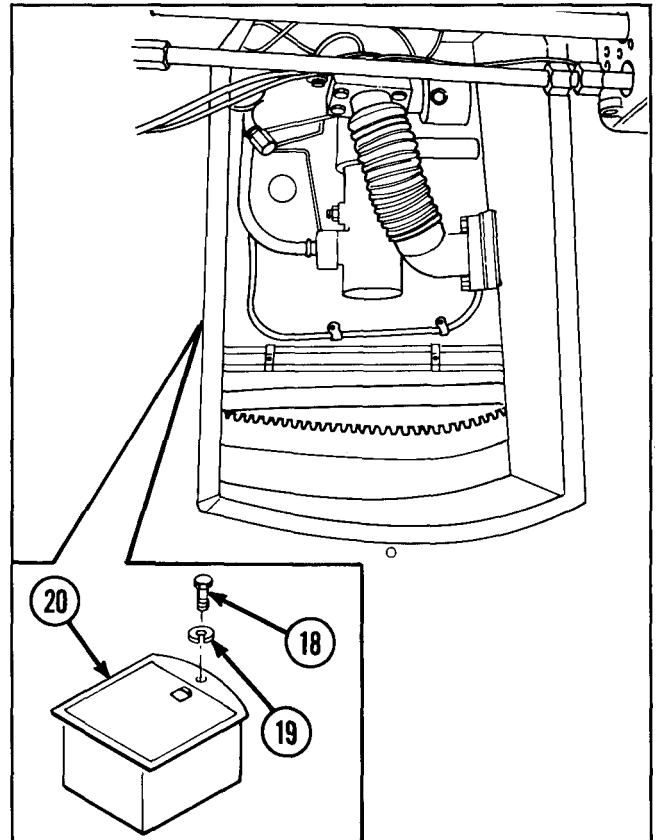
9 Remove two hexagon capscrews (16), two lockwashers (17), and first aid rack (15).



NOTE

Step 10 is written for removal of equipment stowage box.

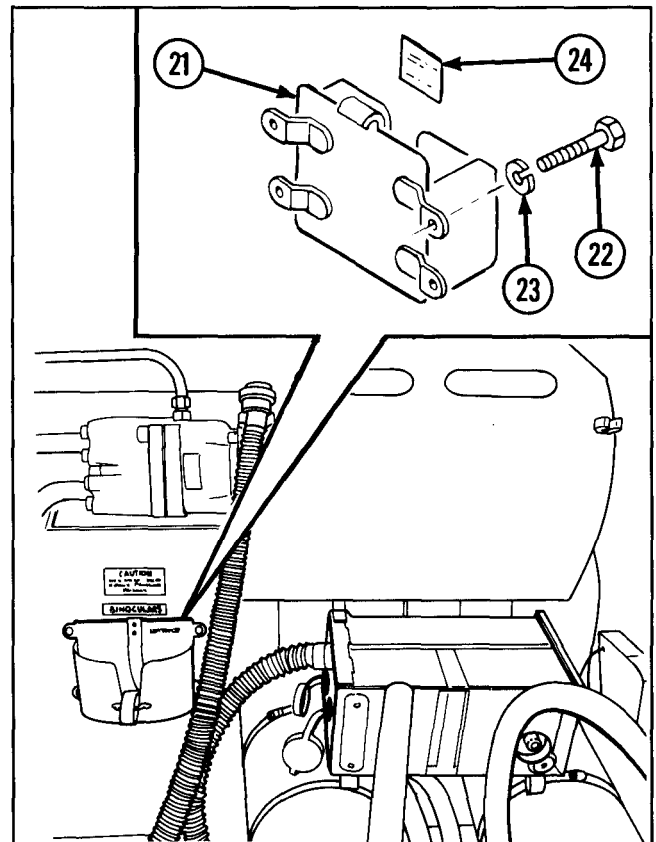
- 10 Remove hexagon capscrew (18), lock-washer (19), and equipment stowage box (20).



NOTE

Steps 1 thru 13 are written for removal of binocular stowage bracket assembly.

- 11 Remove binoculars from binocular stowage bracket assembly (21).
- 12 Remove four hexagon capscrews (22), four lockwashers (23), and binocular stowage bracket assembly (21).
- 13 If damaged, remove instruction plate (24).



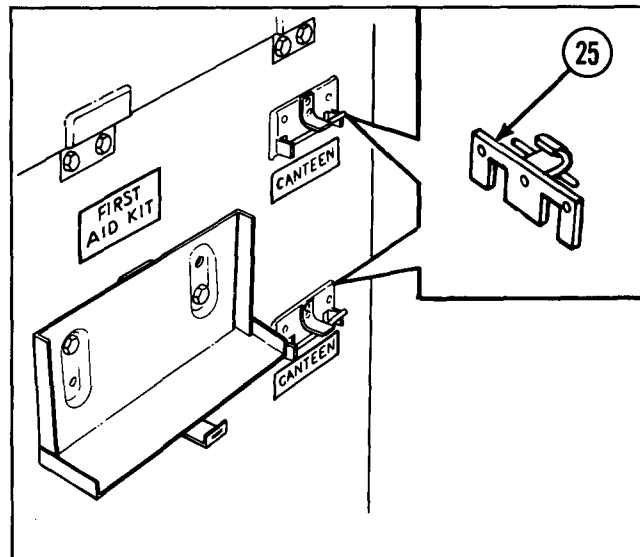
2-95. MAINTENANCE OF CAB INTERIOR BOXES, BRACKETS, STRAPS, RACKS, AND RELATED PARTS (CONT).

REMOVAL (CONT)

NOTE

Steps 14 and 15 are written for removal of canteen rack assemblies.

- 14 Remove two canteens from two canteen rack assemblies (25).
- 15 If damaged, remove two canteen rack assemblies (25).



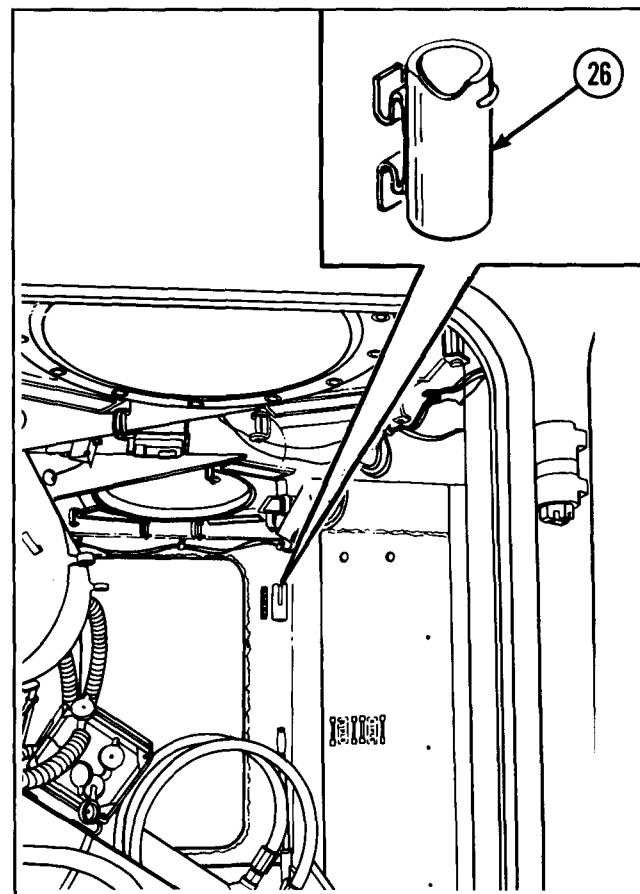
NOTE

Steps 16 and 17 are written for removal of flashlight holder.

- 16 Remove flashlight from flashlight holder (26).
- 17 If damaged, remove flashlight holder (26).

INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

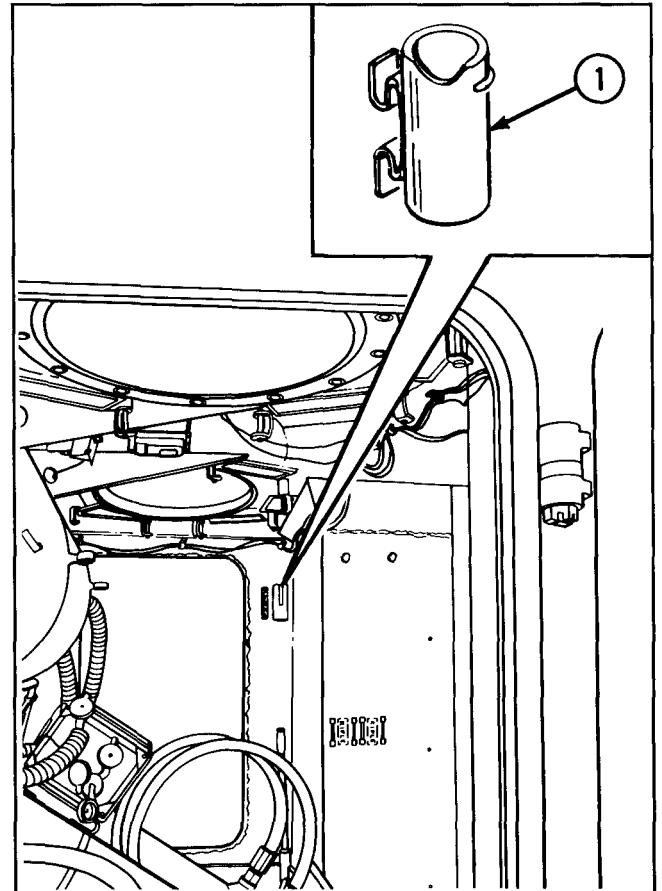


INSTALLATION

NOTE

Steps 1 and 2 are written for installation of flashlight holder.

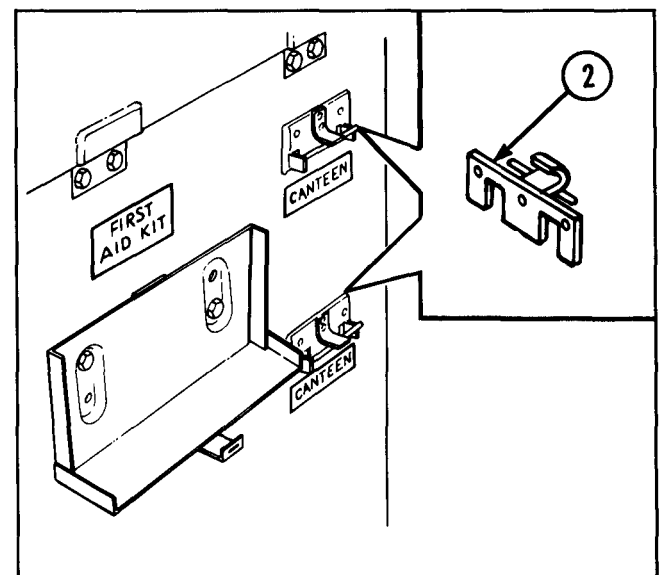
- 1 If necessary, position flashlight holder (1) in cab and weld in accordance with MIL-STD-1261C(MR).
- 2 Install flashlight in flashlight holder (1).



NOTE

Steps 3 and 4 are written for installation of canteen rack assemblies.

- 3 If necessary, position two canteen rack assemblies (2) on cab and weld in accordance with MIL-STD-1261C(MR).
- 4 Install two canteens on canteen rack assemblies (2).



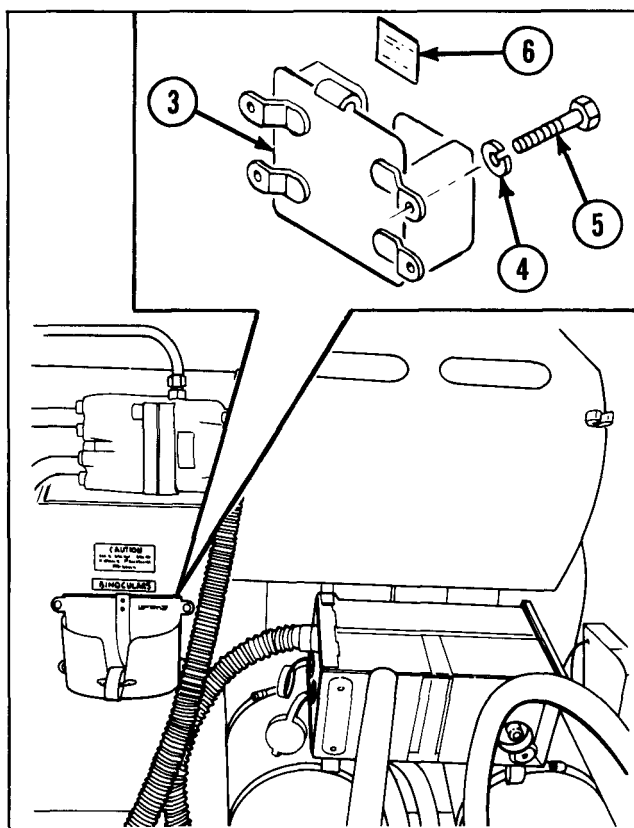
2-95. MAINTENANCE OF CAB INTERIOR BOXES, BRACKETS, STRAPS, RACKS, AND RELATED PARTS (CONT).

INSTALLATION (CONT)

NOTE

Steps 5 thru 7 are written for installation of binocular stowage bracket assembly.

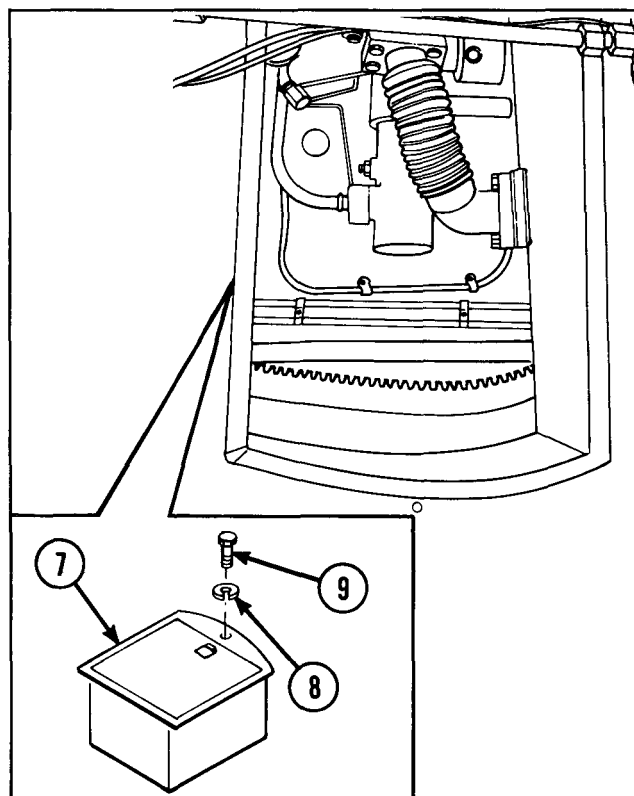
- 5 Position binocular stowage bracket assembly (3) on cab and secure with four new lockwashers (4) and four hexagon cap-screws (5).
- 6 Install binoculars in binocular stowage bracket assembly (3).
- 7 If removed, install new instruction plate (6) in accordance with MIL-STD-1261C(MR) using epoxy resin adhesive (item 2, appx C).



NOTE

Step 8 is written for installation of equipment stowage box.

- 8 Position equipment stowage box (7) in cab well and secure with new lockwasher (8) and hexagon capscrew (9).



NOTE

Steps 9 and 10 are written for installation of first aid rack.

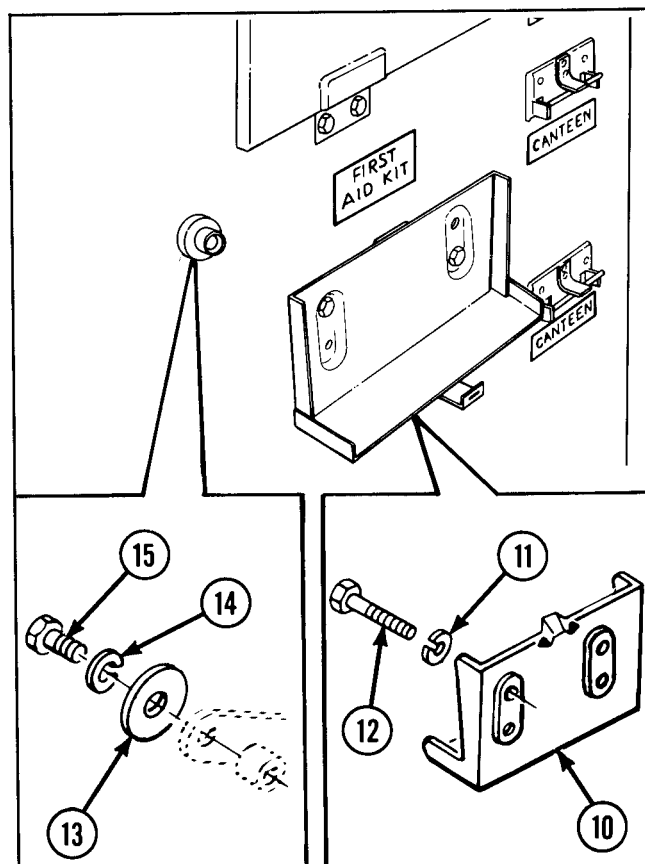
- 9** Position first aid rack (10) on vehicle and secure with two new lockwashers (11) and two hexagon capscrews (12).

- 10** Install first aid kit in first aid rack (10).

NOTE

Step 11 is written for installation of wrench locking plate.

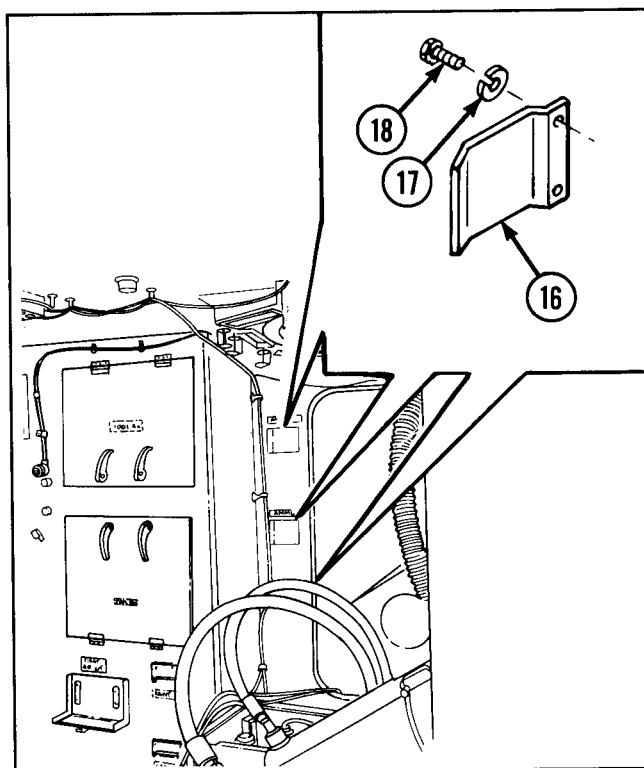
- 11** Position wrench on vehicle and secure using locking plate (13), new lockwasher (14), and hexagon capscrew (15).

**NOTE**

Steps 12 and 13 are written for installation of stowage box ammunition clips.

- 12** Position three stowage box ammunition clips (16) on vehicle and secure with six new lockwashers (17) and six hexagon capscrews (18).

- 13** Install ammunition stowage boxes on ammunition stowage box clips (16).



2-95. MAINTENANCE OF CAB INTERIOR BOXES, BRACKETS, STRAPS, RACKS, AND RELATED PARTS (CONT).

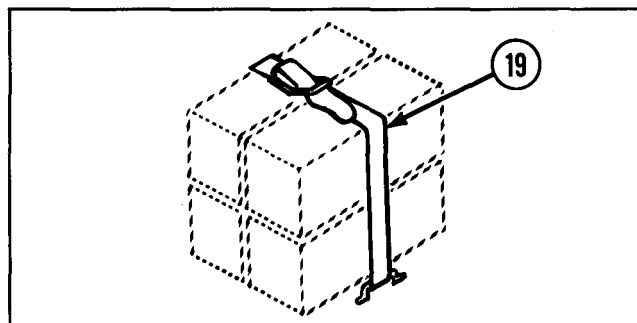
INSTALLATION (CONT)

NOTE

Steps 14 and 15 are written for installation of ammunition box webbing straps.

14 Install ammunition boxes in cab.

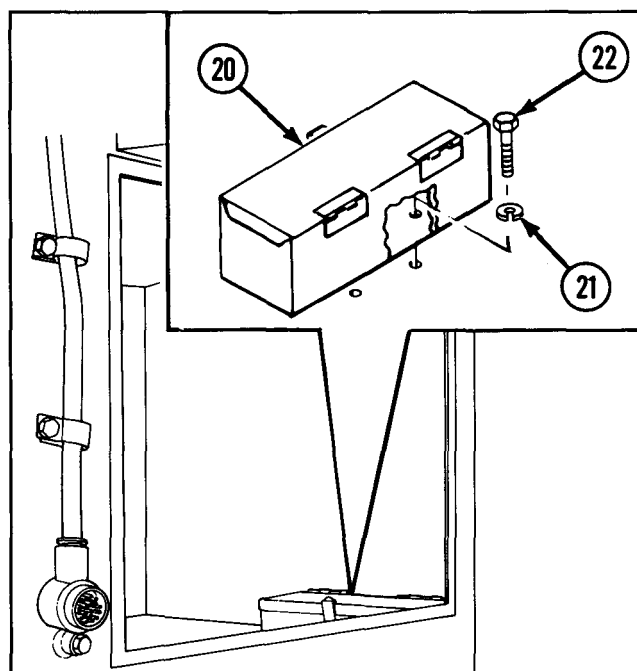
15 Install webbing straps (19) in strap loop and secure ammunition boxes.



NOTE

Step 16 is written for installation of spare lamp stowage box assembly.

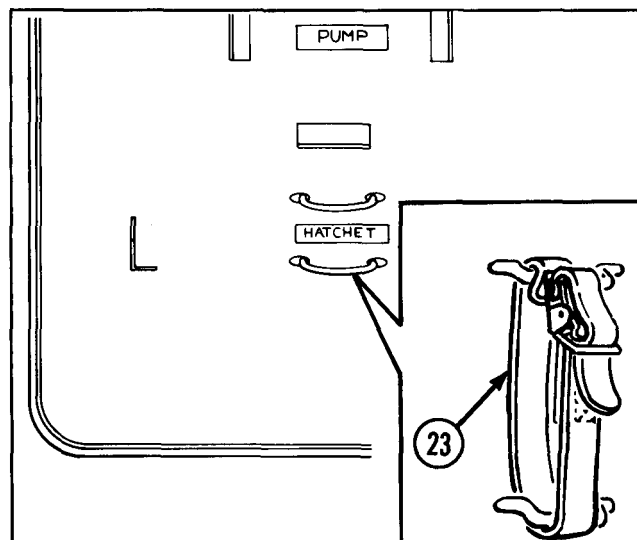
16 Position spare lamp stowage box assembly (20) on vehicle and secure with two new lockwashers (21) and two machine screws (22).

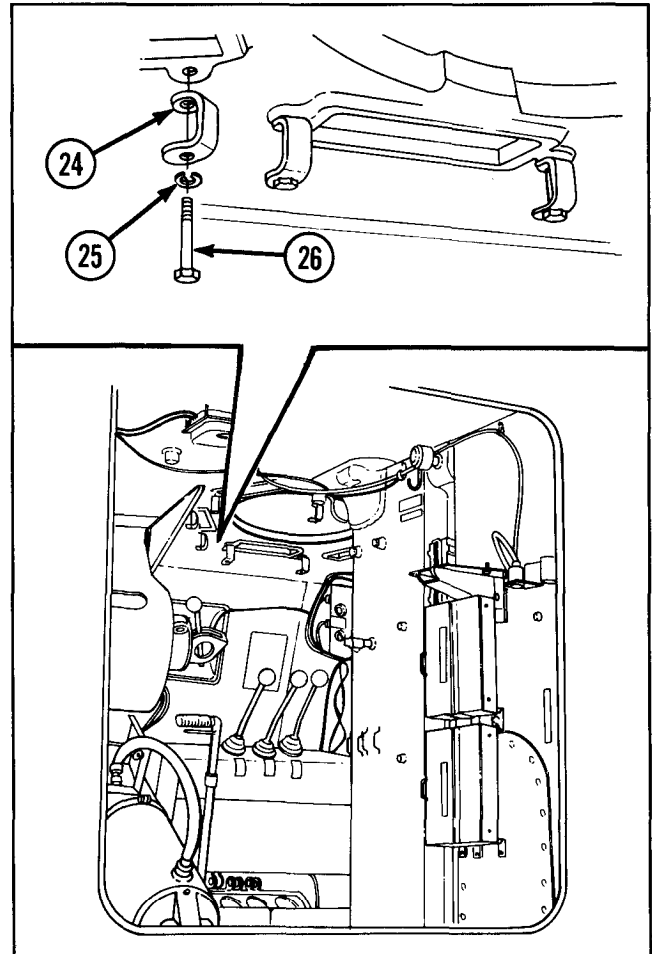


NOTE

Step 17 is written for installation of hatchet webbing strap.

17 Install hatchet and slide webbing strap (23) through strap loop to secure.



**NOTE**

Step 18 is written for installation of periscope retainers.

- 18** Position periscopes in cab and secure with 24 periscope retainers (24), 24 new lockwashers (25), and 24 hexagon capscrews (26).

2-96. MAINTENANCE OF CAB EXTERIOR STOWAGE RACKS, BOXES, AND STRAPS.

This task covers: a. <i>Removal</i> b. <i>Inspection/Repair</i> c. <i>Installation</i>		
INITIAL SETUP		
Tools and Special Tools General mechanic's tool kit, automotive (appx B)		References TM 9-2350-238-24P-2
Materials/Parts Lockwasher (22) (MS35338-46) Lockwasher (9) (MS35338-48)		

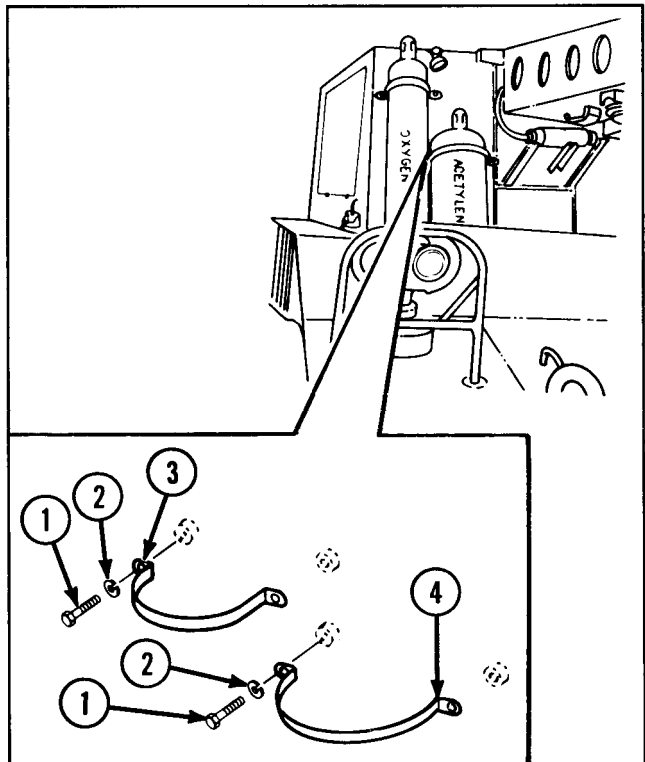
2-96. MAINTENANCE OF CAB EXTERIOR STOWAGE RACKS, BOXES, AND STRAPS (CONT).

REMOVAL

NOTE

Steps 1 and 2 are written for removal of two gas cylinder bottle retaining straps.

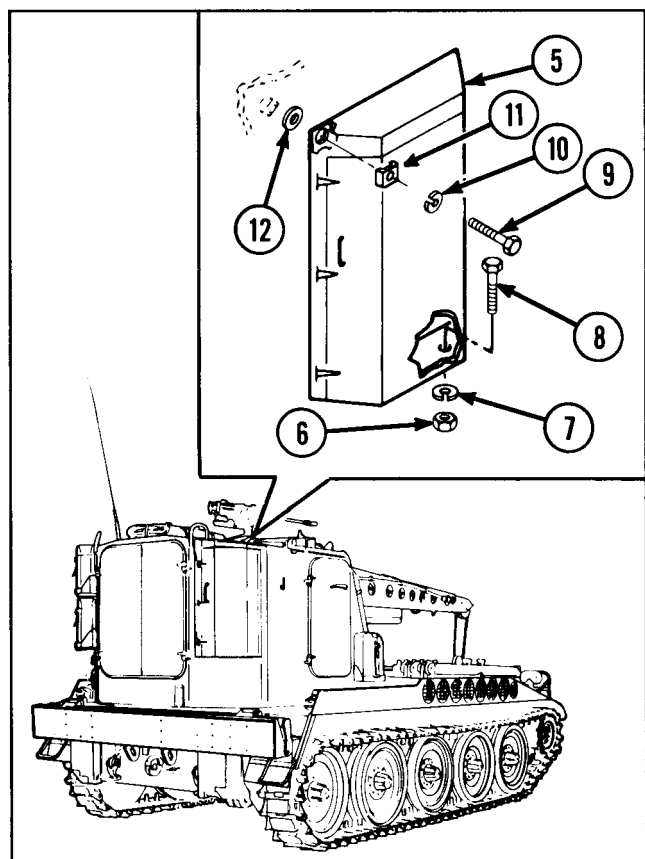
- 1 Remove four hexagon capscrews (1), four lockwashers (2), gas cylinder bottle retaining strap (3), and gas cylinder bottle retaining strap (4).
- 2 Remove oxygen and acetylene gas bottles from vehicle.



NOTE

Steps 3 thru 5 are written for removal of external cab stowage tool locker.

- 3 Open external cab stowage tool locker (5) and remove tools.
- 4 Remove two hexagon plain nuts (6), two lockwashers (7), and two hexagon capscrews (8).
- 5 Remove two hexagon capscrews (9), two lockwashers (10), two tool locker bridge retainer clamps (11), two flat washers (12), and external cab stowage tool locker (5).

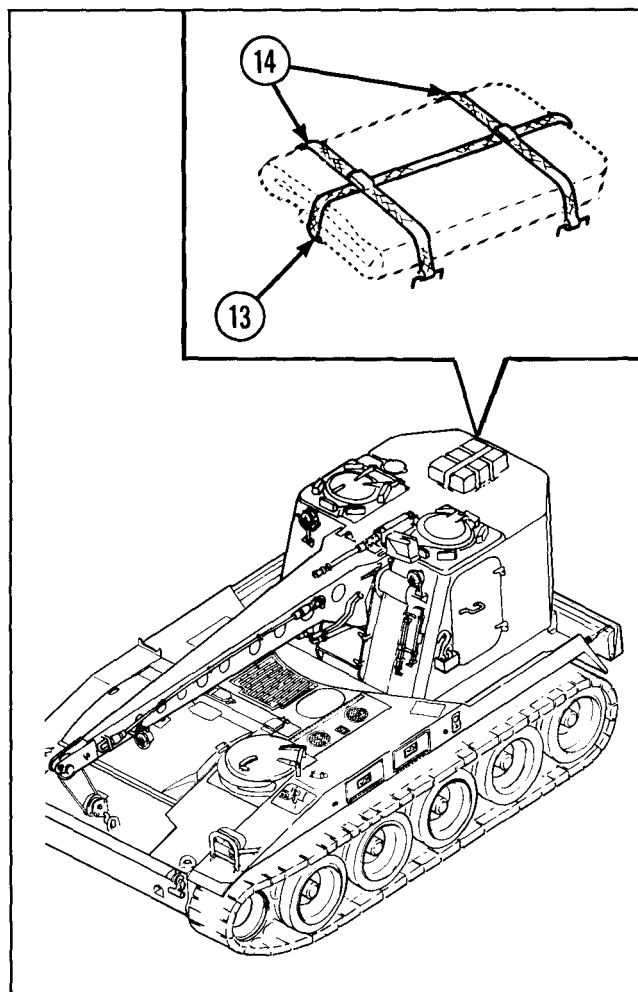


NOTE

Steps 6 and 7 are written for removal of three tarpaulin webbing straps.

- 6 If damaged, remove tarpaulin webbing strap (13) and two tarpaulin webbing straps (14) from loops.

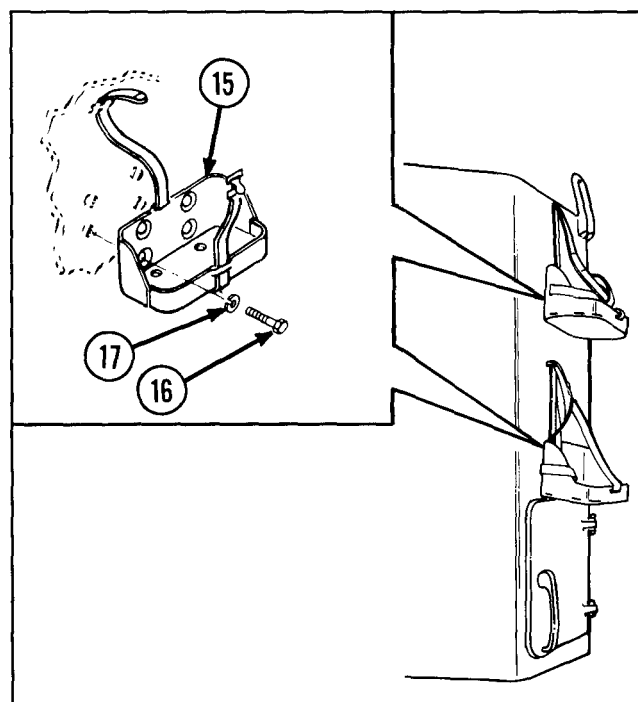
- 7 Remove tarpaulin from top of cab.

**NOTE**

Steps 8 and 9 are written for removal of two bracket assemblies.

- 8 Remove five gallon gasoline can and M13 decontamination apparatus from two bracket assemblies (15).

- 9 Remove eight hexagon capscrews (16), eight lockwashers (17), and two bracket assemblies (15).



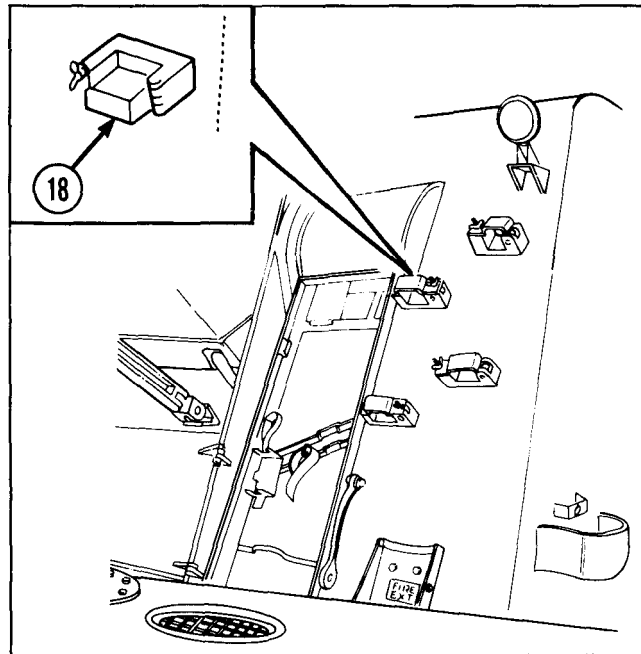
2-96. MAINTENANCE OF CAB EXTERIOR STOWAGE RACKS, BOXES, AND STRAPS (CONT).

REMOVAL (CONT)

NOTE

Steps 10 and 11 are written for removal of track repair fixture mounting clamps.

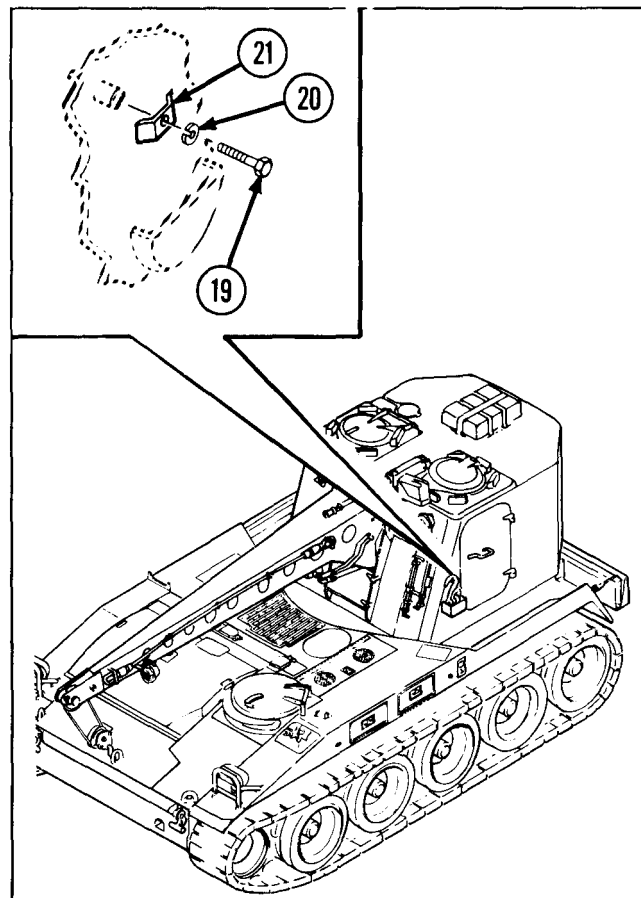
- 10 Remove two track connecting fixtures from track repair fixture mounting clamps (18).
- 11 If damaged, remove four track repair fixture mounting clamps (18).



NOTE

Steps 12 and 13 are written for removal of snatch block retainer retaining plate.

- 12 Remove hexagon capscrew (19), lock-washer (20), and snatch block retaining strap (21).
- 13 Remove snatch block from snatch block tray.



NOTE

Steps 14 and 15 are written for removal of portable fire extinguisher bracket.

- 14 Remove portable fire extinguisher from portable fire extinguisher bracket (22).
- 15 Remove four hexagon capscrews (23), four lockwashers (24), and portable fire extinguisher bracket (22).

NOTE

Steps 16 and 17 are written for removal of pioneer tool bracket assembly.

- 16 Remove tools from pioneer tool bracket assembly (25).
- 17 Remove six hexagon capscrews (26), six lockwashers (27), and pioneer tool bracket assembly (25).

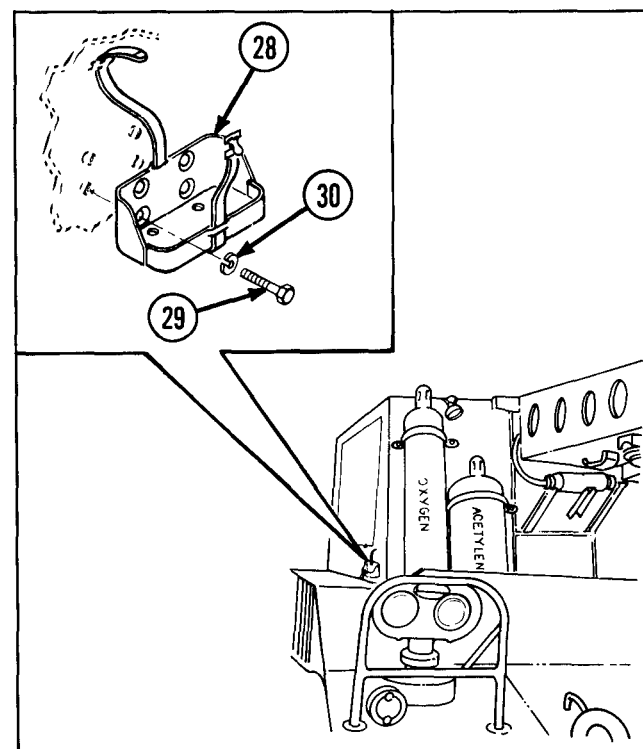
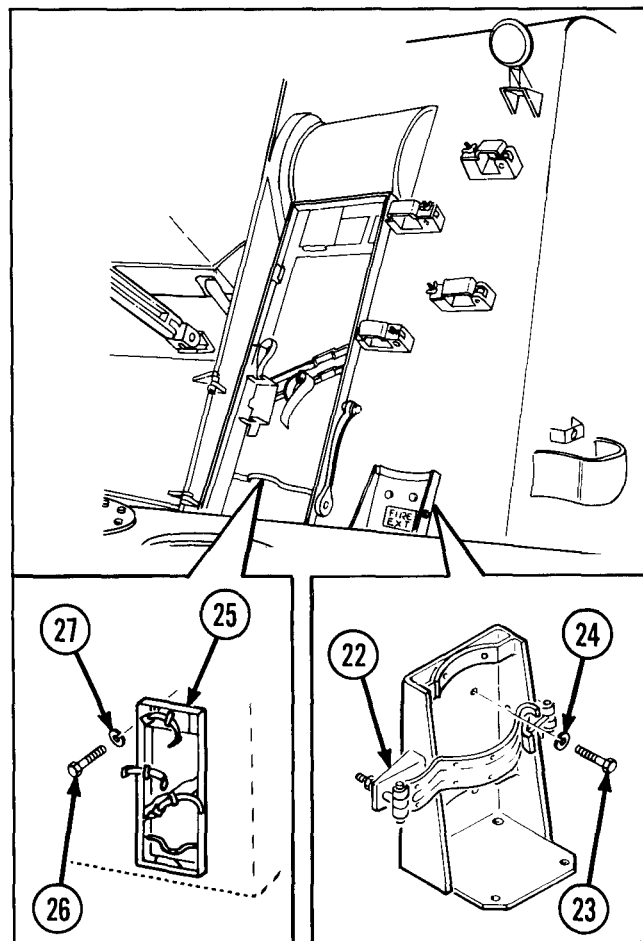
NOTE

Steps 18 and 19 are written for removal of bracket assembly.

- 18 Remove water can from bracket assembly (28).
- 19 Remove four hexagon capscrews (29), four lockwashers (30), and bracket assembly (28).

INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 Pioneer tool bracket assembly is a repairable assembly. Refer to page 2-348.
- 3 External cab stowage tool locker is a repairable assembly. Refer to page 2-349.
- 4 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).



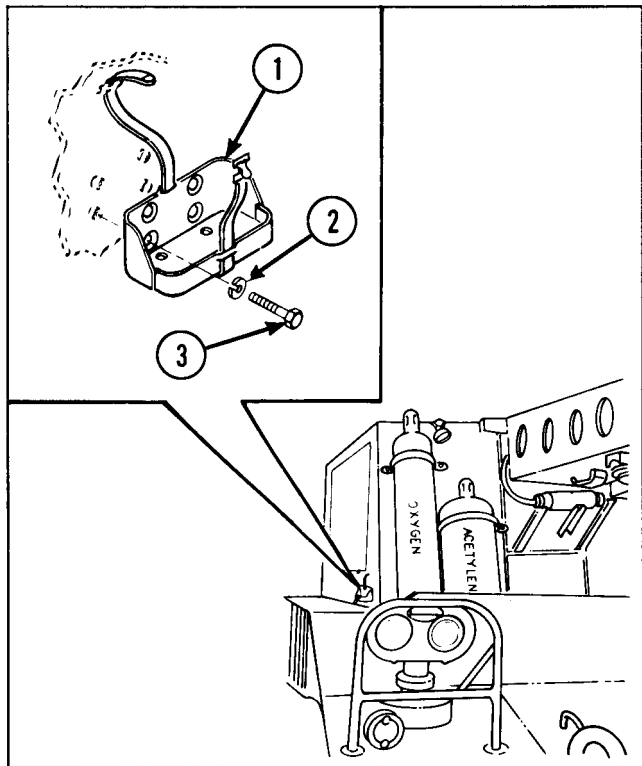
2-96. MAINTENANCE OF CAB EXTERIOR STOWAGE RACKS, BOXES, AND STRAPS (CONT).

INSTALLATION

NOTE

Steps 1 and 2 are written for installation of bracket assembly.

- 1 Install bracket assembly (1) and secure with four new lockwashers (2) and four hexagon capscrews (3).
- 2 Install water can on bracket assembly (1).



NOTE

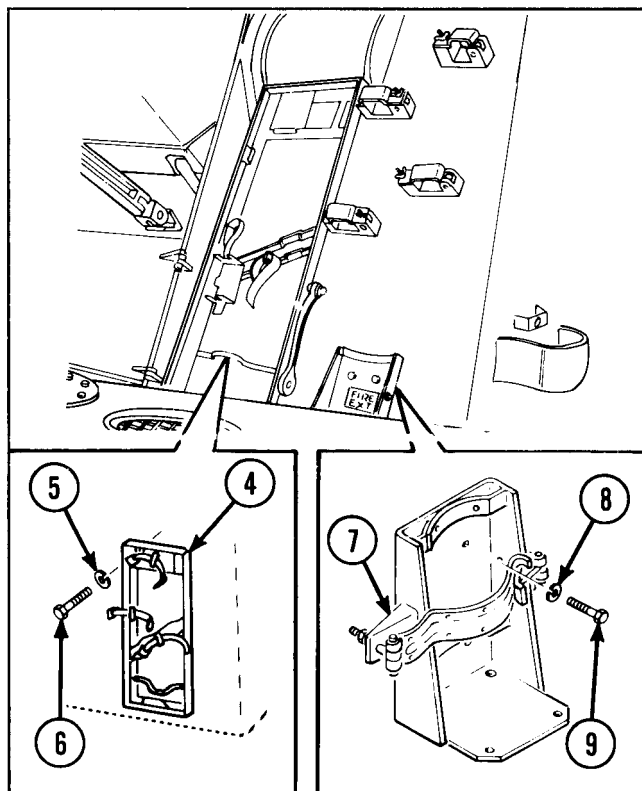
Steps 3 and 4 are written for installation of pioneer tool bracket assembly.

- 3 Install pioneer tool bracket assembly (4) and secure with six new lockwashers (5) and six hexagon capscrews (6).
- 4 Install tools on pioneer tool bracket assembly (4).

NOTE

Steps 5 and 6 are written for installation of portable fire extinguisher bracket.

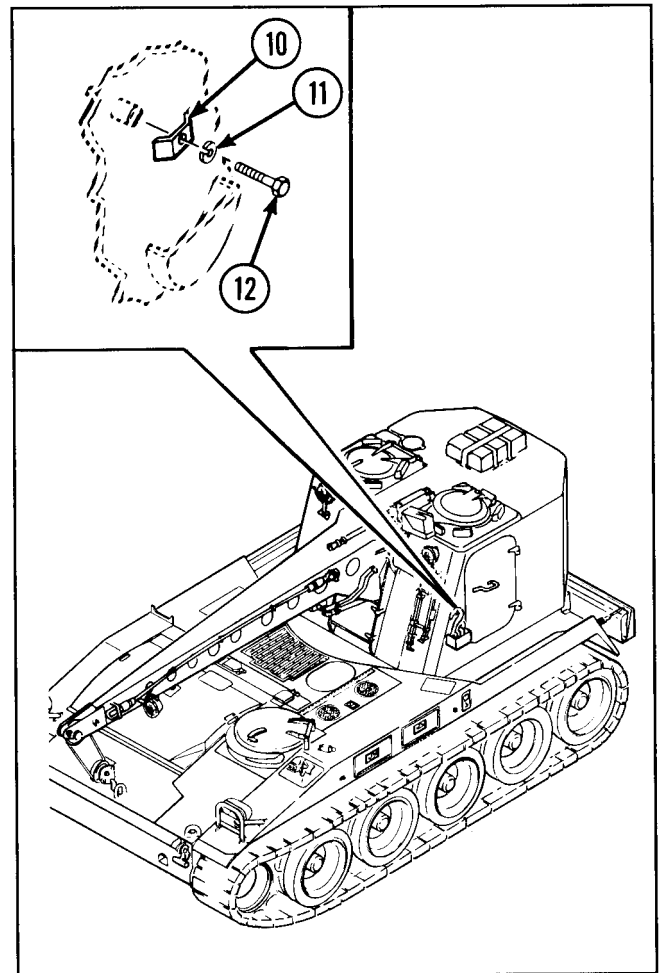
- 5 Install portable fire extinguisher bracket (7) and secure with four new lockwashers (8) and four hexagon capscrews (9).
- 6 Install portable fire extinguisher on portable fire extinguisher bracket (7).



NOTE

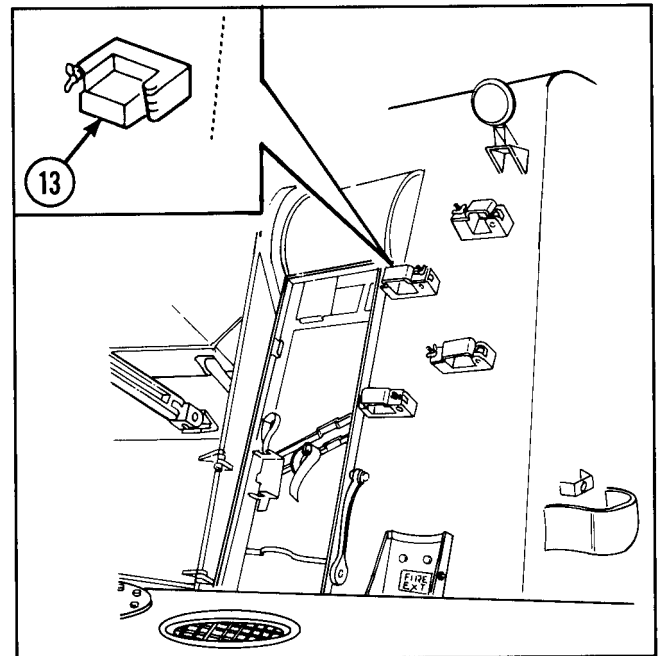
Steps 7 and 8 are written for installation of snatch block retainer retaining plate.

- 7 Install snatch block in snatch block tray on side of vehicle.
- 8 Install snatch block retaining strap (10) and secure with new lockwasher (11) and hexagon capscrew (12).

**NOTE**

Steps 9 and 10 are written for installation of track repair fixture mounting clamps.

- 9 If removed, install four track repair fixture mounting clamps (13) and fillet weld around mounting clamps with 0.125 in. (0.318 cm) minimum.
- 10 Install two track connecting fixtures and secure in track repair fixture mounting clamps (13).



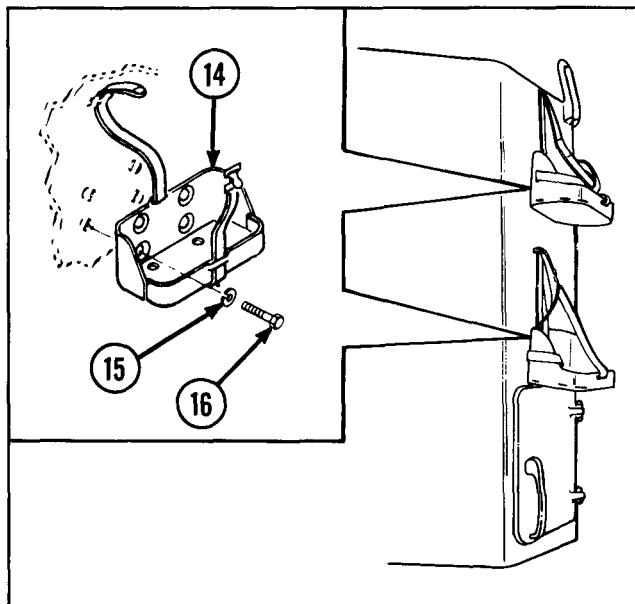
2-96. MAINTENANCE OF CAB EXTERIOR STOWAGE RACKS, BOXES, AND STRAPS (CONT).

INSTALLATION (CONT)

NOTE

Steps 11 and 12 are written for installation of two bracket assemblies.

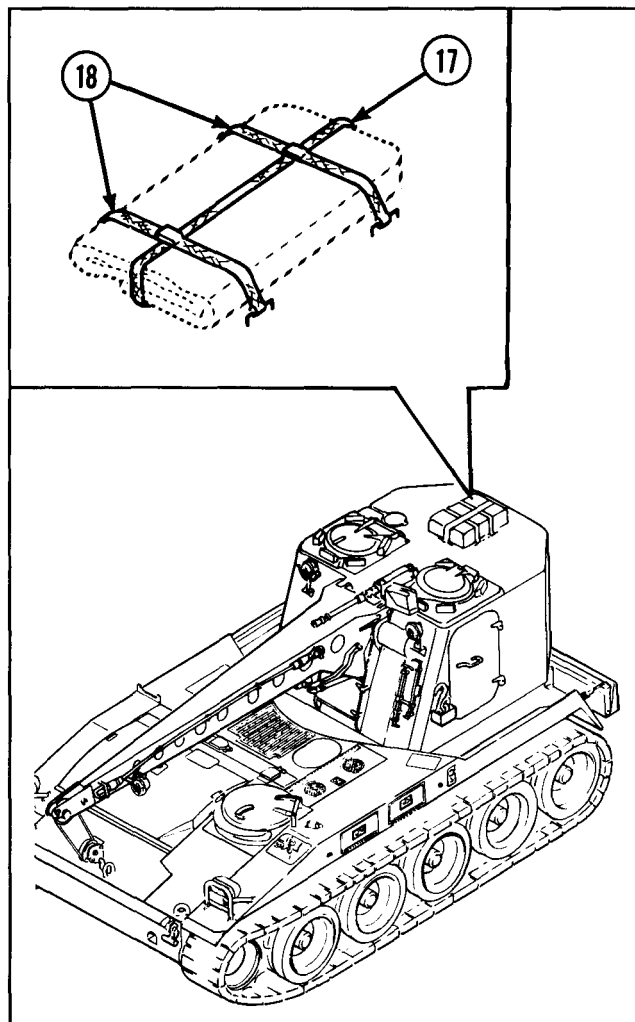
- 11 Install two bracket assemblies (14) and secure with eight new lockwashers (15) and eight hexagon capscrews (16).
- 12 Install five gallon gasoline can and M13 decontamination apparatus on two bracket assemblies (14).



NOTE

Steps 13 and 14 are written for installation of three tarpaulin webbing straps.

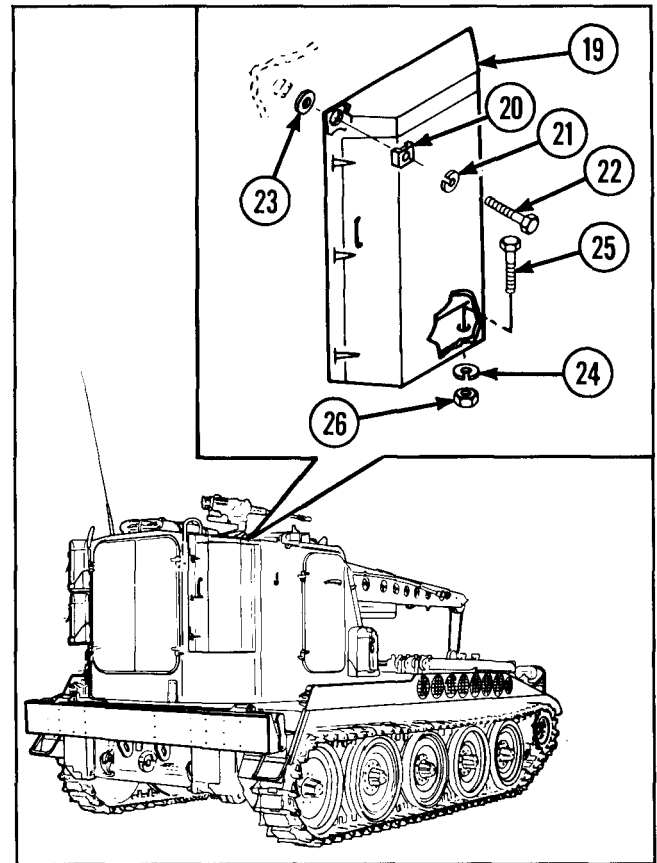
- 13 Install tarpaulin on top of cab.
- 14 If necessary, install tarpaulin webbing strap (17) and two tarpaulin webbing straps (18) in loops to secure tarpaulin.



NOTE

Steps 15 thru 17 are written for installation of external cab stowage tool locker.

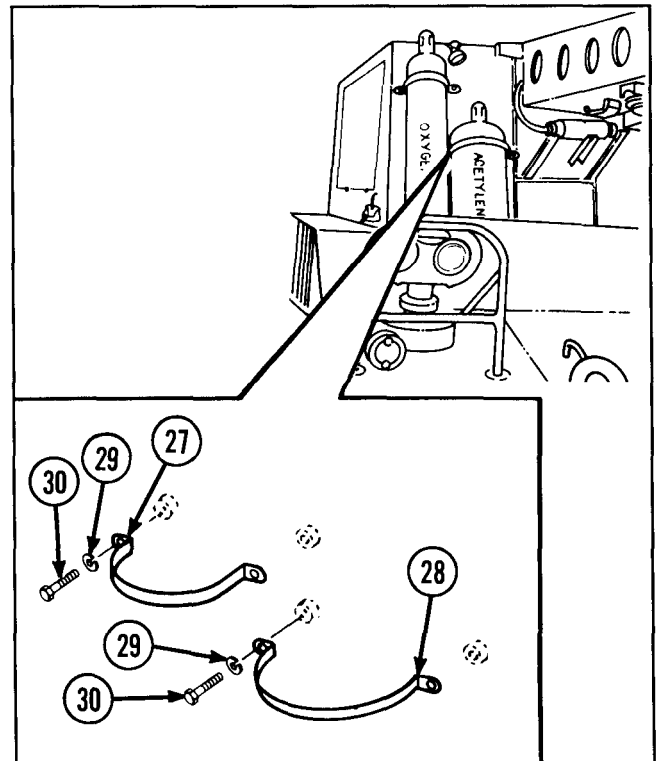
- 15 Install external cab stowage tool locker (19) and secure with two tool locker bridge retainer clamps (20), two new lockwashers (21), two hexagon cap-screws (22), and two flat washers (23).
- 16 Install two new lockwashers (24), two hexagon capscrews (25), and two hexagon plain nuts (26).
- 17 Install tools in external cab stowage tool locker (19).



NOTE

Steps 18 and 19 are written for installation of two gas cylinder bottle retaining straps.

- 18 Install oxygen and acetylene gas bottles on vehicles.
- 19 Install gas cylinder bottle retaining strap (27) and gas cylinder bottle retaining strap (28) and secure with four new lockwashers (29) and four hexagon cap-screws (30).



2-97. MAINTENANCE OF PIONEER TOOL BRACKET ASSEMBLY.

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

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive
(appx B)

Equipment Conditions

2-339 Pioneer tool bracket assembly
removed

References

TM 9-2350-238-24P-2

DISASSEMBLY

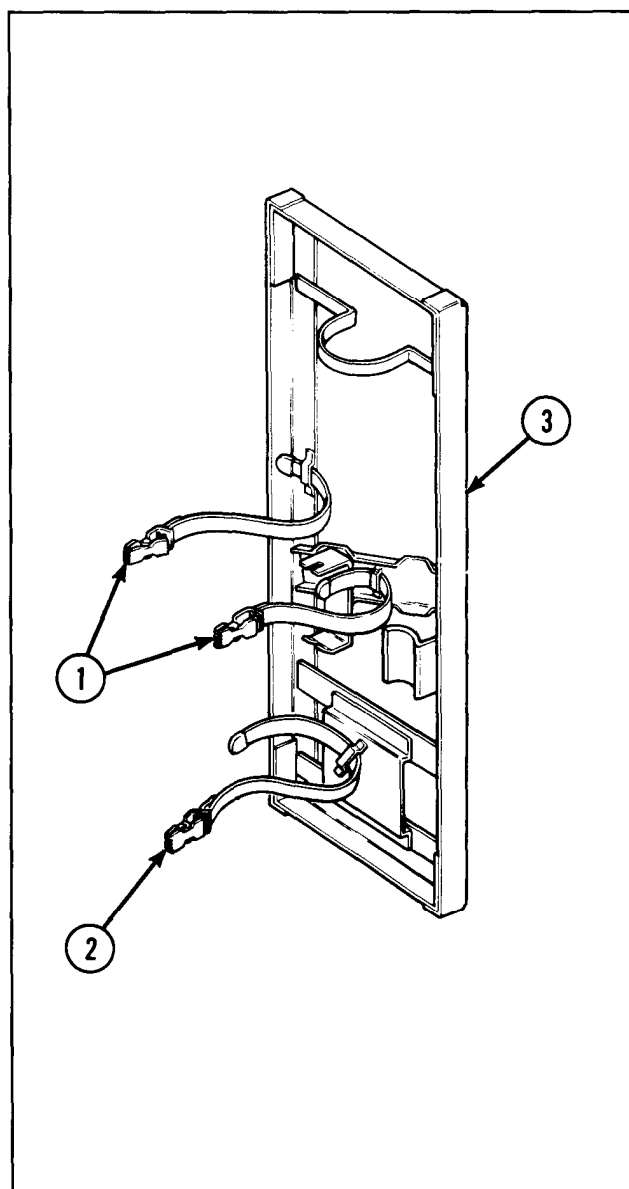
If damaged, remove two lower webbing straps (1) and upper webbing strap (2) from bracket (3).

INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 If bracket is broken, damaged, or missing, repair is by replacement of next higher assembly.
- 3 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2) which do not meet inspection criteria.

REASSEMBLY

If removed, install two new lower webbing straps (1) and upper webbing strap (2) on bracket (3).



2-98. MAINTENANCE OF EXTERNAL CAB STOWAGE TOOL LOCKER.

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

INITIAL SETUP*Tools and Special Tools*

General mechanic's tool kit, automotive
(appx B)

Equipment Conditions

2-339 External cab stowage tool locker
removed

Materials/Parts

Safety chain (figure 5, appx D)
Solid rivet (3) (MS20613-3C6)

References

TM 9-2350-238-24P-2

DISASSEMBLY

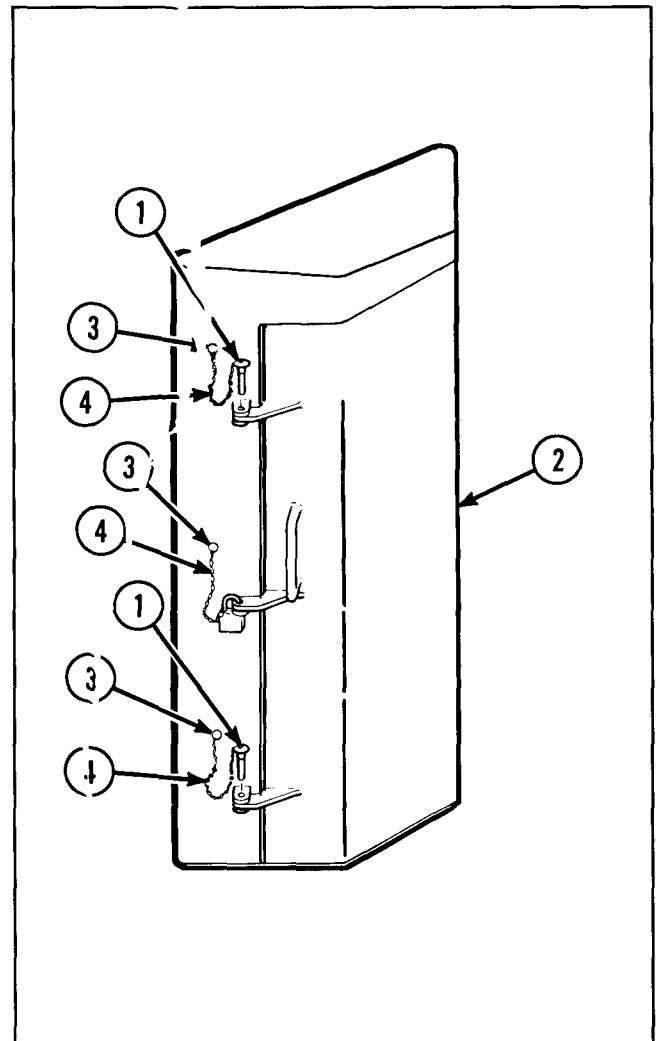
- 1 Remove two quick release pins (1) from external cab stowage tool locker (2).
- 2 If damaged, remove three solid rivets (3) and three safety chains (4) from external cab stowage tool locker (2).

INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 Safety chain is a manufactured item, refer to appendix D.
- 3 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2) which do not meet inspection criteria.

REASSEMBLY

If removed, install three safety chains (4) and two quick release pins (1) on external cab stowage tool locker (2) and secure with three new solid rivets (3).



2-99. MAINTENANCE OF BINOCULAR STOWAGE BRACKET ASSEMBLY.

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

INITIAL SETUP

Tools and Special Tools

General mechanic's tool kit, automotive
(appx B)

Materials/Parts

Solid rivet (2) (546067)

References

TM 9-2350-238-24P-2

Equipment Conditions

2-321 Binocular stowage bracket as-
sembly removed

DISASSEMBLY

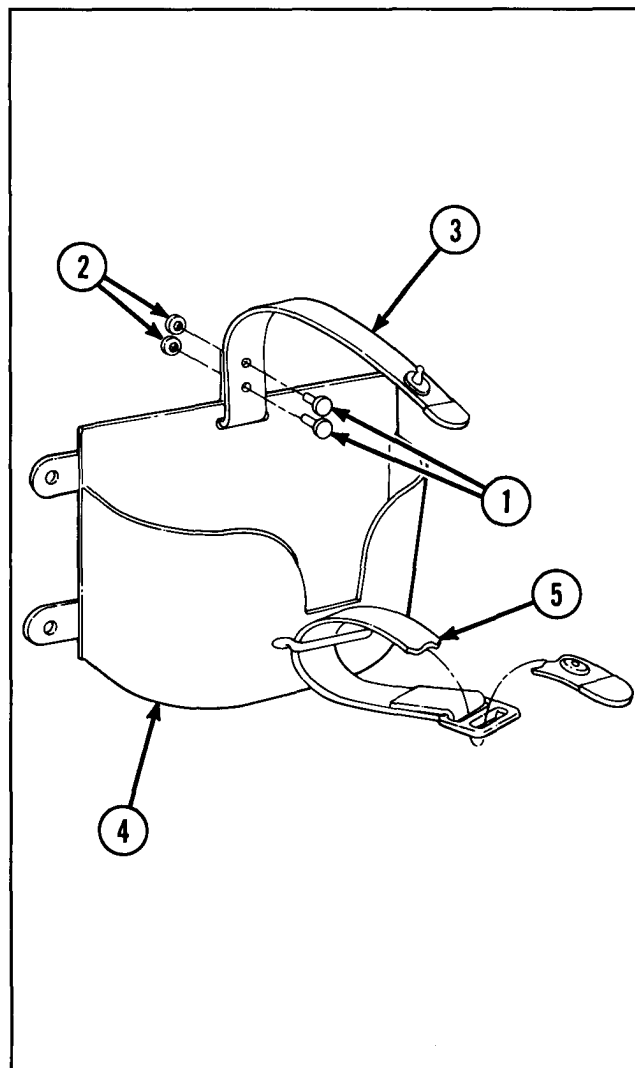
- 1 If damaged, remove two solid rivets (1), two flat washers (2), and strap assembly (3) from binocular stowage bracket assembly (4).
- 2 If damaged, remove webbing strap (5) from binocular stowage bracket assembly (4).

INSPECTION/REPAIR

- 1 Inspect for broken, damaged, or missing parts.
- 2 Repair is by replacement of authorized parts (TM 9-2350-238-24P-2).

REASSEMBLY

- 1 If removed, install new strap assembly (3) on binocular stowage bracket assembly (4) and secure with two flat washers (2) and two new solid rivets (1).
- 2 If removed, install new webbing strap (5) in loop of binocular stowage bracket assembly (4).



Section VIII. PREPARATION FOR STORAGE OR SHIPMENT

2-102. DEFINITION OF ADMINISTRATIVE STORAGE. The placement of equipment in administrative storage can be for short periods of time when: (1) An organization lacks operating funds, personnel, other resources, or normal usage of its organic materiel, and (2) materiel which exceeds the capability of the owning organization to operate or maintain must be retained by that organization for contingency or other cogent reasons.

Installation or organization commanders may authorize the administrative storage of their materiel within guidance furnished by MACOM commanders and AR 750-1. Recovery vehicles should be ready for use within the time factors as determined by the directing authority.

During the storage period appropriate maintenance records will be kept.

a. Scope. The requirements specified herein are necessary to maintain the M578 Recovery Vehicle in administrative storage in such a way as to achieve the maximum readiness condition.

b. General.

(1) Except as indicated in the Maintenance Services and Inspection and Corrections of Shortcomings and Deficiencies paragraphs, equipment that is placed in administrative storage should be capable of being readied to perform its mission within a 24-hour period or as otherwise prescribed by the approving authority. Before equipment is placed in administrative storage, current maintenance services, shortcomings, and deficiencies should be corrected, and all modification work orders (MWOS) should be applied.

(2) Report equipment in administrative storage in Materiel Readiness and Unit Readiness reports as prescribed for all reportable equipment. See AR 220-1.

(3) Perform inspections, maintenance services, and lubrications IAW TM 9-2350-238

series manuals, lubrication order (LO), or applicable technical manuals. In case of conflict in lubrication instructions, the LO will apply.

(4) Records and reports to be maintained for equipment in administrative storage are those prescribed by DA PAM 738-750, for equipment in use.

(5) Ten percent variance is acceptable on time running hours, or mileage used to determine maintenance actions required.

c. Security. Instructions contained herein do not modify security procedures and requirements for classified or pilferable items. See AR 190-13, DA PAM 738-750, and 750-35.

d. Storage Site.

(1) Select the best available site for administrative storage. Separate stored equipment from equipment in use. Conspicuously mark the area "Administrative Storage".

(2) Covered space is preferred. When sufficient covered space for all Recovery Vehicles to be stored is not available, select an open site.

(3) Open sites should be improved hardstand, if available. Unimproved sites should be firm, well-drained, and kept free of excessive vegetation.

e. Storage Plan.

(1) Store equipment so as to provide maximum protection from the elements and to provide access for inspection, maintenance, and exercise. Anticipate removal or deployment problems and take suitable precautions.

(2) Take into account environmental conditions, such as extreme heat or cold; high humidity; blowing sand, dust, or loose debris; soft ground; mud; heavy snows; earthquakes; or combinations thereof and take adequate precautions.

2-102. DEFINITION OF ADMINISTRATIVE STORAGE (CONT).

e. *Storage Plan. (cont)*

(3) Establish a fire plan and provide for adequate firefighting equipment and personnel.

f. *Maintenance Services and Inspection.* Prior to storage, perform the next scheduled major preventive maintenance service (monthly, quarterly, or semiannually).

g. *Auxiliary Equipment and Basic Issue Items.* Process auxiliary and basic issue items simultaneously with the Recovery Vehicle to which they are assigned. If possible, store auxiliary and basic issue items with the Recovery Vehicle. If stored apart from the Recovery Vehicle, mark auxiliary and basic issue items with tags indicating the Recovery Vehicle, its registration or serial number and location, and store in protective type closures. In addition, place a tag or list indicating the location of the removed items in a conspicuous place on the Recovery Vehicle.

h. *Corrections of Shortcomings and Deficiencies.* Correct all shortcomings and deficiencies prior to storage, or obtain a deferment from the approving authority.

i. *Lubrication.* Lubricate equipment IAW the applicable LO or technical manual. Retract hydraulic systems linkage and coat exposed portion of shafts with grease.

j. *General Cleaning, Painting, and Preservation.*

CAUTION

Do not direct water or steam under pressure against air cleaners, air duct outlets, exhaust outlets, unsealed electrical systems, fire control instruments, upholstery, or any exterior opening which will damage a component.

(1) Clean the equipment of dirt, grease, and other contaminants IAW this manual.

(2) Removal of rust and damaged paint by scraping, wire brushing, sanding, or buffing is not authorized on armament components.

(3) After cleaning and drying, immediately coat unpainted metal surfaces with an oil or grease as appropriate.

CAUTION

Place a piece of barrier material between desiccant bags and metal surfaces.

NOTE

Air circulation under draped covers reduces deterioration from moisture and heat.

(4) Sunlight, heat, moisture (humidity), and dirt tend to accelerate deterioration. Install all covers (including vehicle protection closures) authorized for the equipment. Close and secure all openings except those required for venting and draining. Seal openings to prevent the entry of rain, snow, or dust. Insert desiccant when complete seal is required. Place equipment and provide blocking or framing to allow for ventilation and water drainage. Support cover away from Recovery Vehicle surfaces which may rust, rot, or mildew.

2-103. CARE OF EQUIPMENT IN ADMINISTRATIVE STORAGE.

a. *Maintenance Services.* After equipment has been placed in administrative storage, suspend all regularly scheduled preventive maintenance services and inspect and exercise as specified herein. Do not reduce Prescribed Load List. See DA PAM 738-750 and DA PAM 750-35.

b. Inspection. Inspection will usually be visual and must consist of at least a walk-around examination of all equipment to observe any deficiencies that may have occurred. Inspect equipment in open storage weekly and equipment in covered storage monthly. Immediately after any severe storm or environmental change inspect all equipment. The following are examples of things to look for during visual inspection:

(1) Leaks: coolant, fuel, oil, or hydraulic fluid.

(2) Condition of preservatives, seals, and wraps. Seals may develop leaks during storage, during exercise, or shortly thereafter. If leaking continues, refer to maintenance procedures in this manual or notify direct support maintenance.

(3) Corrosion or other deterioration.

(4) Missing or damaged parts.

(5) Water in compartments.

(6) Any other readily recognizable shortcomings or deficiencies.

c. Rotation. To assure utilization of all assigned materiel, rotate items IAW any rotational plan that will keep equipment in an operational condition and reduce maintenance effort.

d. Removal from Administrative Storage. Remove preservative materials. Perform the next scheduled preventive maintenance service and prepare equipment for service as outlined in TM 9-2350-238-10.

e. Servicing. Resume the maintenance service schedule in effect at the commencement of storage as per DD Form 314. See DA PAM 738-750.

APPENDIX A

REFERENCES

A-1. SCOPE. This appendix lists all forms, field manuals, technical bulletins, technical manuals, and miscellaneous publications referenced in this manual.

A-2. FORMS.

DA Form 2028	Recommended Changes to Publications and Blank Forms
DA Form 2028-2	Recommended Changes to Equipment Technical Publications
DA Form 2404	Equipment Inspection and Maintenance Worksheet
DA Form 2407	Maintenance Request
DD Form 6	Packaging Improvement Report
DD Form 314	Preventive Maintenance Schedule and Record
DD Form 1397	Processing and Reprocessing Record for Shipment, Storage, and Issue of Vehicles and Spare Engines
SF Form 368	Product Quality Deficiency Report

A-3. FIELD MANUALS.

FM 3-5	NBC Decontamination
FM 3-87	Nuclear, Biological, and Chemical (NBC) Reconnaissance and Decontamination Operations
FM 3-100	NBC Operations
FM 21-11	First Aid for Soldiers

A-4. TECHNICAL BULLETINS.

TB SIG 222	Solder and Soldering

A-5. TECHNICAL MANUALS.

TM 9-214	Inspection, Care, and Maintenance of Antiriction Bearings

A-5. TECHNICAL MANUALS (CONT).

TM 9-237	Operator's Manual for Welding Theory and Application
TM9-2350-238-10	Operator's Manual for Recovery Vehicle, Full Tracked: Light, Armored, M578
TM 9-2350-238-24P-2	Unit, Direct Support, and General Support Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) for Recovery Vehicle, Full-Tracked, Light, Armored, M578
TM9-2350-274-BD	Operational, Organizational, Direct Support and General Support Maintenance, Battlefield Damage Assessment and Repair: for M109/M110/M578 Vehicles
TM10-277	Chemical, Toxicological, and Missile Fuel Handlers Protective Clothing Subscription Form
TM 11-291	Radio Sets AN/VRC-13, AN/VRC-14, and AN/VRC-15
TM 11-2643	Intercommunication Sets AN/UIC-1 and AN/UIC-1X
TM11-5820-401-10-1	Operator's Manual for Radio Sets AN/VRC-12, AN/VRC-43, AN/VRC-44, AN/VRC-45, AN/VRC-46, AN/VRC-47, AN/VRC-48, and AN/VRC-49
TM11-5820-401-10-2.	Operator's Manual for Radio Sets AN/VRC-12, AN/VRC-43, AN/VRC-44, AN/VRC-45, AN/VRC-46, AN/VRC-47, AN/VRC-48, and AN/VRC-49
TM 11-5820-401-20-1	Organizational Maintenance for Radio Sets AN/VRC-12, AN/VRC-43, AN/VRC-44, AN/VRC-45, AN/VRC-46, AN/VRC-47, AN/VRC-48, AN/VRC-49
TM 11-5820-401-20-2	Organizational Maintenance Manual for Radio Sets AN/VRC-12, AN/VRC-43, AN/VRC-44, AN/VRC-45, AN/VRC-46, AN/VRC-47, AN/VRC-48, AN/VRC-49
TM 11-5830-340-12	Operator's and Organizational Maintenance Manual for intercommunications Set AN/VIC-1(V)

TM 43-0139	Painting Instructions for Field Use
TM 750-244-5-1	Destruction of Conventional Ammunition and Improved Conventional Munitions to Prevent Enemy Use
TM 750-244-6	Procedures for Destruction of Tank- Automotive Equipment to Prevent Enemy Use

A-6. MISCELLANEOUS PUBLICATIONS.

AR 190-13	The Army Physical Security Program
AR 220-1	Unit Status Reporting
AR 750-1	Army Materiel Maintenance Policies
CTA 8-100	Army Medical Department Expen- dable/Durable Items
CTA 50-970	Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items)
DA PAM 738-750	The Army Maintenance Management Systems (TAMMS)
DA PAM 750-35	Functional User's Guide for Motor Pool Operations
MIL-STD-1261C (MA)	Arc Welding Procedures for Constructional Steels.

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. GENERAL.

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. The Maintenance Allocation Chart (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.

c. Section III lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from Section II.

d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

B-2. MAINTENANCE FUNCTIONS. Maintenance functions will be limited to and defined as follows: (except for ammunition MAC¹)

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, i.e., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

d. *Adjust.* To maintain or regulate, within prescribed limits, by bringing into proper or exact 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.

¹Exception is authorized for ammunition MAC to permit the redesignation/redefinition of maintenance function headings to more adequately identify ammunition maintenance functions. The heading designations and definitions will be included in the appropriate technical manual for each category of ammunition.

B-2. MAINTENANCE FUNCTIONS (CONT).

f. *Calibrate.* To determine and cause corrections to be made or to be adjusted on instruments or test, measuring, and diagnostic equipments 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 service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into a 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 is shown as the third position code of the SMR code.

i. *Repair.* The application of maintenance services², including fault location/troubleshooting³, removal/installation, and disassembly/assembly⁴ procedures, and maintenance actions⁵ 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., 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 material maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipment/components.

B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II.

a. *Column 1, Group Number.* Column 1 lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly. End item group number shall be "00".

b. *Column 2, Component/Assembly.* Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

²Services—inspect, test, service, adjust, align, calibrate, and/or replace.

³Fault location/troubleshooting—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).

⁴Disassembly/assembly—encompasses the step-by-step taking apart (or breakdown) of a spare/functional group coded item to the level of its least component identified as maintenance significant (i.e., assigned an SMR code) for the level of maintenance under consideration.

⁵Actions—welding, grinding, riveting, straightening, facing, remachining, and/or resurfacing.

c. Column 3, Maintenance Function. Column 3 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. Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s), the level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform the maintenance functions 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 will 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), troubleshooting/fault location time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance levels are as follows:

C	Operator or Crew
O	Unit Maintenance
F	Direct Support Maintenance
H	General Support Maintenance
L	Specialized Repair Activity (SRA) ⁶
D	Depot Maintenance

e. Column 5, Tools and Equipment. Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, TMDE, and support equipment required to perform the designated function.

f. Column 6, Remarks. This column shall, when applicable, contain a letter code, in alphabetic order, which shall be keyed to the remarks contained in Section IV.

B-4. EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS, SECTION III.

a. Column 1, Reference Code. The tool and test equipment reference code correlates with a code used in the MAC, Section II, column 5.

b. Column 2, Maintenance Level. The lowest level of maintenance authorized to use the tool or test equipment.

c. Column 3, Nomenclature. Name or identification of the tool or test equipment.

d. Column 4, National Stock Number. The National stock number of the tool or test equipment.

e. Column 5, Tool Number. The manufacturer's part number.

⁶This maintenance level is not included in Section II, column 4 of the Maintenance Allocation Chart. To identify functions to this level of maintenance, enter a work time figure in the "H" column of Section II, column 4, and use an associated reference code in the Remarks column 6. Key the code to Section IV, Remarks, and explain the SRA complete repair application there. The explanatory remark(s) shall reference the specific Repair Parts and Special Tools List (RPSTL) TM which contains additional SRA criteria and the authorized spare/repair parts.

B-5. EXPLANATION OF COLUMNS IN REMARKS, SECTION IV.

a. *Column 1, Reference Code.* The code recorded in Section II, column 6.

b. *Column 2, Remarks.* This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section II.

**Section II. MAINTENANCE ALLOCATION CHART (MAC)
FOR
M578 RECOVERY VEHICLE**

NOMENCLATURE OF END ITEMS

M578 Recovery Vehicle Crane (Cab) Components

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQPT	(6) REMARKS
			UNIT		DS	GS	DEPOT		
			C	O	F	H	D		
00	M578 Armored Light Full-Track Recovery Vehicle	Repair Overhaul Service					**		
01	Cab Assembly	Inspect Service Adjust Replace Repair	1.0 2.5	2.0	4.0 4.0			21,25	
0101	Left Side Cab Swinging Metal Door	Replace Repair		0.2 0.2				25	
0102	Right Side Cab Vehicle Hatch Door	Replace Repair		0.2 0.2				25	
0103	Left Rear Cab Swinging Metal Door	Replace Repair		0.2 0.2				25	
0104	Commander's Cupola Assembly	Inspect Service Replace Repair	0.2 0.2	1.0 1.5				21,25	

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQPT	(6) REMARKS
			UNIT		DS	GS	DEPOT		
			C	O	F	H	D		
0105	Left Cab Stowage Vehicle Hatch Door (Lower)	Replace Repair		0.2 0.5				21,25	
0106	Left Cab Stowage Vehicle Hatch Door (Upper)	Replace Repair		0.2 0.5				21,25	
0107	Vehicular Seat	Replace Repair		0.2 0.5				21,25	
010701	Manual Control Lever	Replace Repair		0.1 0.2				21,25	
0108	Forward Left-Hand Non-skid Metallic Tread	Replace Repair		0.3 0.5				25	
02	Boom and Winch	Inspect Service Replace Repair Test	0.3 0.5	1.0 4.0 4.0	2.0			5,12,19, 20,21, 24,25	
0201	Single Tackle Block	Service Replace Repair	0.1	0.5 0.75				4,12,21, 25	
0202	Winch Level Wind	Service Replace Repair	0.1	1.0	1.0			19,25	
020201	Connecting Link Slide	Replace Repair			1.0 1.0			19,25	
0203	Boom Winch Cover	Replace Repair		0.5 0.1				25	
0204	Hydraulic Motor	Replace Repair			0.5 1.0			19,25	
0205	Vehicle Drum Winch	Inspect Service Replace Repair	0.5 0.5		2.0 0.5			19,25	

Section II. MAINTENANCE ALLOCATION CHART (MAC)
FOR
M578 RECOVERY VEHICLE (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQPT	(6) REMARKS
			UNIT		DS	GS	DEPOT		
			C	O	F	H	D		
020501	Manual Control Lever	Replace Repair		0.2 0.5				25	
020502	Planetary (Boom) Winch	Service Replace Repair	0.5		2.0 3.0			16,19,25	
02050201	Winch Control Cylinder	Replace Repair			0.2 0.5			25,26	
02050202	Stage One Boom Winch Gear Cluster	Replace Repair			0.2 0.5			18,19,25	
02050203	Stage Two Boom Winch Carrier Assembly	Replace Repair			0.2 0.5			18,19,25	
02050204	Stage Three Boom Winch Carrier Assembly	Replace Repair			0.2 0.5			19,25	
0206	Boom Winch Control Cylinder Assembly	Replace Repair			1.0 2.0			19,22, 25,28,30	
0207	Manual Control Lever	Replace Repair		0.2 0.5				25	
0208	Vehicle Tow Drum Winch	Inspect Service Replace Repair	0.5 0.5		2.0 3.0			17,19,25	
020801	Winch Control Cylinder	Replace Repair			0.2 0.5			25,26	
020802	Stage One Carrier Assembly Mechanical Housing	Replace Repair			0.2 0.5			19,25	
020803	Stage Two Carrier Assembly Gear Cluster	Replace Repair			0.2 0.5			18,19,25	

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQPT	(6) REMARKS
			UNIT		DS	GS	DEPOT		
			C	O	F	H	D		
020804	Stage Three Winch Carrier Assembly	Replace Repair			0.2 0.5			18,19,25	
020805	Stage Four Carrier Assembly Spur Gearshaft	Replace Repair			0.2 0.5			19,25	
03	Hydraulic Installation	Service Repair		0.3 0.2	1.0			21,25	
0301	Three Spool Directional Linear Valve	Replace Repair			0.5 1.0			25	
0302	Manifold Assembly Counterbalance	Replace Repair			0.3 1.5			25	
030201	Pressure Relief Valve	Adjust Replace Repair			0.2 0.3 0.3			6,23,25	
030202	Check Valve	Adjust Replace Repair			0.2 0.3 0.3			25	
030203	Check Valve	Adjust Replace Repair			0.2 0.7 2.0			25	
030204	Pressure Relief Valve	Ajdst Replace Repair			0.2 0.7 2.0			6,23,25	
030205	Pressure Relief Valve	Adjust Replace Repair			0.2 0.7 2.0			6,23,25	
0303	Hydraulic Flow Divider Manifold	Replace Repair			0.7 2.0			25	
030301	Hydraulic Flow Divider Plug Valve	Replace Repair			0.2 0.5			25	
030302	Relief Valve	Adjust Replace Repair			0.2 0.3 0.3			6,23,25	

Section II. MAINTENANCE ALLOCATION CHART (MAC)
FOR
M578 RECOVERY VEHICLE (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQPT	(6) REMARKS
			UNIT		DS	GS	DEPOT		
			C	O	F	H	D		
030303	Check Valve	Replace Repair			0.3 0.3			25	
030304	Pressure Relief Valve	Adjust Replace Repair			0.2 0.3 0.3			6,23,25	
030305	Solenoid Valve	Adjust Replace Repair			0.2 0.7 2.0			6,23,25	
0304	Hydraulic Reservoir Filter and Strainer Assembly	Replace Repair		0.7 2.0				25	
0305	Turret Traverse Control Directional Linear Valve	Replace Repair			0.5 0.5			19,25	
030501	Spool Assembly	Replace Repair			0.1 0.1			19,25	
04	Traversing Installation	Inspect Service Replace Repair	0.5 0.75		2.0 4.0			19,20, 22,25	
0401	Cab Traversing Unit	Replace Repair			1.0 2.0			1,5,8,10, 11,13, 15,19, 25,29	
040101	Traversing Hydraulic Motor	Replace Repair			1.0 1.5			19,25	
040102	Primary Planetary Speed Gear Assembly	Service Replace Repair	0.5		0.5 0.5			19,25	

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQPT	(6) REMARKS
			UNIT		DS	GS	DEPOT		
			C	O	F	H	D		
0402	Traversing Final Drive	Service Replace Repair	0.2		1.0 0.5			4,7,9,25, 29	
05	Electrical Installation	Inspect Replace Repair	1.0	2.0	3.0			25	
0501	Dome Light	Inspect Replace Repair	0.5	0.5 0.5				25	
0502	Warning Light	Inspect Replace Repair	0.5	0.5 0.5				25	
0503	Operator Vehicular Flasher Control Panel	Replace Repair		0.5 0.5				25	
050301	Flasher Indicator Light	Replace Repair		0.2 0.3				25	
06	Cab Filter Installation and Circuit Breaker	Inspect Service Replace Repair	1.0	0.5 1.5	3.0			25	
0601	Hose Assembly	Inspect Replace Repair		0.5 0.5 0.5				25	
0602	Hose Assembly	Inspect Replace Repair		0.5 0.5 0.5				25	
0603	Hose Assembly	Inspect Replace Repair		0.5 0.5 0.5				25	
0604	Gas Particulate Filter Unit	Inspect Replace Repair		0.5 0.75 1.0				25	

Section II. MAINTENANCE ALLOCATION CHART (MAC)
FOR
M578 RECOVERY VEHICLE (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQPT	(6) REMARKS
			UNIT		DS	GS	DEPOT		
			C	O	F	H	D		
060401	M2A2 Air Purifier Assembly	Inspect Replace Repair		0.5	0.75 1.0			25	
06040101	Housing Precleaner Assembly	Inspect Replace Repair		0.75 1.0 1.0				25	
0605	Circuit Breaker and Switch Assembly	Inspect Replace Repair		0.1 0.2 0.2				25	
07	Equipment Stowage Installation	Replace Repair		0.5	0.5			25	
0701	Pioneer Tool Bracket Assembly	Replace Repair		0.1 0.1				25	
0702	Tool Locker	Replace Repair		0.5 0.5				25	
0703	Tackle Stowage Tray	Replace Repair		0.5 0.5				25	
0704	Boom Tray Stowage Handle	Replace Repair		0.3 0.3				25	
0705	Binocular Stowage Bracket Assembly	Replace Repair		0.1 0.3				25	
08	Turret Bearing Installation	Replace Repair			2.0 0.5			19,25	
0801	Plain Bearing Unit	Inspect Service Replace Repair	0.3	0.3 0.1	4.0 0.5 4.0			3,14, 19,25	
080101	Outer Race Assembly	Repair			0.3			2,19,25, 27	

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQPT	(6) REMARKS
			UNIT		DS	GS	DEPOT		
			C	O	F	H	D		
09	Machine Gun Mount Assembly	Inspect Service Replace Repair	0.3 0.3 0.3	0.3 1.0					A
9500	Special Tools								
9999	Bulk								

* *INDICATES TIME FOR MAINTENANCE FUNCTION IS ALLOTTED IN DMWR

**Section III . TOOL AND TEST EQUIPMENT REQUIREMENTS
FOR
M578 RECOVERY VEHICLE CRANE (CAB) COMPONENTS**

Ref Code	Maintenance Level	Nomenclature	National Stock Number	Tool Number
1	F	Adapter	4910-00-842-3063	11631430
2	F	Adapter, Retainer	5120-00-472-2731	11643222
3	F	Bolt, Eye Lifting	5306-00-522-2910	5222910
4	O	Handle, Remover and Replacer	5120-00-316-9182	7950864
5	O	Handle, Remover and Replacer	5120-00-708-3883	7083883
6	F	Pliers Set, Retaining Ring	5120-00-789-0492	PR36
7	F	Remover and Replacer, Bearing	5120-00-722-4063	10902750
8	F	Remover and Replacer, Bearing and Clutch	5120-00-733-8932	10904175
9	F	Replacer	5120-00-733-8915	10904173
10	F	Replacer, Bearing	5120-00-602-4855	8350230

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS
FOR
M578 RECOVERY VEHICLE CRANE (CAB) COMPONENTS (CONT)

Ref Code	Maintenance Level	Nomenclature	National Stock Number	Tool Number
11	F	Replacer, Bearing	5120-00-733-8962	10904194
12	O	Replacer, Bearing Cup	5120-00-722-4071	10902752
13	F	Replacer, Oil Seal	5120-00-733-8951	10904181
14	F	Scale, Spring		AAA-S-133
15	F	Screw, Jacking	4910-00-722-3915	10904195
16	F	Screw, Jacking	5305-00-017-9843	MS35295-64
17	F	Screw, Jacking	5305-00-719-5270	MS90726-123
18	F	Sets, Kits, Outfits, and Tools: Welding Shop, Trailer Mounted	3431-01-090-1231	SC 3431-95-A04
19	F	Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Basic, Less Power	4910-00-754-0705	SC 4910-95-A31
20	F	Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Supplemental No. 1, Less Power	4910-00-754-0706	SC 4910-95-A62
21	O	Shop Equipment, Automotive Maintenance and Repair: Organizational Maintenance, Common No. 1, Less Power	4910-00-754-0654	SC 4910-95-CL-A74
22	F	Sling	4933-00-389-0349	RE1-91-16018
23	F	Tester, Oil Pressure	4910-00-572-8612	8356176
24	F	Thermometer	6685-00-526-8122	1797
25	O	Tool Kit, General Mechanic's, Automotive	5180-00-177-7033	SC 5180-90-CL-N26

Ref Code	Maintenance Level	Nomenclature	National Stock Number	Tool Number
26	F	Wrench, Lockout Cylinder Locknut	5120-00-733-8982	10904219
27	F	Wrench, Socket	5120-00-610-5331	6105331
28	F	Wrench, Spanner	5120-00-062-9477	10909066
29	F	Wrench, Spanner	5120-00-277-9075	GGG-W-665
30	F	Wrench, Strap	5120-00-262-8491	GGG-W-651

Section IV. REMARKS

Reference Code	Remarks
A	Refer to TM 9

APPENDIX C

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

C-1. SCOPE. This appendix lists expendable/durable supplies and materials you will need to operate and maintain the M578 Recovery Vehicle. This listing is for informational purposes only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (Except Medical, Class V, Repair Parts, and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

C-2. EXPLANATION OF COLUMNS.

a. Column (1) – Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., sealing compound (item 17, appx C)).

b. Column (2) – Level. This column identifies the lowest level of maintenance that requires the listed item.

O–Unit Maintenance

c. Column (3) – National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

d. Column (4) – Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the Contractor and Government Entity Code (CAGEC) in parentheses followed by the part number.

e. Column (5) – Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in., pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	O	5350-00-598-5537	ABRASIVE PAPER, FLINT (58536) A-A-1202	HD
2	O	8040-00-262-9025 8040-00-262-9026	ADHESIVE: epoxy resin (81348) MMM-A-1617 4 oz tube 1/2 pt can	OZ PT
3	O	8040-01-036-3771	ADHESIVE: plastic epoxy plastic (03481) A-1177B 4 oz kit	OZ
4	O	8030-00-753-4953	ANTISEIZE COMPOUND (81349) MIL-A-13881 1 lb can	LB
5	O	9150-01-053-6688 9150-01-054-6453	CLEANER, LUBRICANT, PRESERVATIVE: CLP (81349) MIL-L-63460 1 gal. container 1 pt container	GL PT
6	O	5350-00-221-0872	CLOTH, ABRASIVE: crocus ferric oxide and quartz, clothback (58536) A-A-1206 50 sheet pack	PK
7	O	5350-00-584-4654	CLOTH, FINE EMORY (58536) A-A-1049	EA
8	O	8305-00-152-3587	CLOTH, LINT-FREE (81349) MIL-C-40129 45 in. (114.30 cm) wide	SH
9	O	6850-00-281-3061	DRY CLEANING SOLVENT: liquid, white, 140 degree flashpoint (SD-2) (64959) KS7860-40Z 4 oz can	OZ

**Section II. EXPENDABLE/DURABLE SUPPLIES
AND MATERIALS LIST (CONT)**

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
10	O	6850-00-281-1985	DRY CLEANING SOLVENT: liquid, white, 140 degree flashpoint (SD-2) (02978) PS661 1 gal. can	GL
11	O	8010-00-079-3752	ENAMEL: black, class A (70785) PSP6	PT
12	O		GREASE, AUTOMOTIVE AND ARTILLERY: (GAA) (81349) MIL-G-10924	
		9150-01-197-7693	14 oz carton	OZ
		9150-01-197-7690	1.75 lb can	LB
		9150-01-197-7689	6.5 lb can	LB
13	O	5350-00-193-7227	LAPPING GRINDING COMPOUND (58536) A-A-1203	TB
13.1	C		OIL, LUBRICATING: chain and wire rope, Type II (CW-11) (81348) VV-L-751	LB
		9150-00-234-5199	5 lb can	
13.2	C	9150-00-056-9523	OIL, LUBRICATING: chain and wire rope, exposed gear and cables (GO-75) (81349) MIL-L-2105	LB
14	O		LUBRICATING OIL: general purpose (81349) MIL-L-3150	
		9150-00-231-2361	1 qt can	QT
		9150-00-231-2356	5 gal. can	GL
14.1	C		OIL, LUBRICATING, INTERNAL COMBUSTION ENGINE: (OE/HDO) (81349) MIL-L-2104B	
		9150-00-189-6727	1 qt can OE/HDO 10	QT
		9150-00-186-6668	1 gal. can OE/HDO 10	GL
		9150-01-152-4117	1 qt can 15W40 1 qt	QT
		9150-01-152-4118	1 gal. can 15W40 5 gallon	GL

**Section II. EXPENDABLE/DURABLE SUPPLIES
AND MATERIALS LIST (CONT)**

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
14.2	C	9150-00-242-7602 9150-00-242-7603	OIL, LUBRICATING, INTERNAL COMBUSTION ENGINE: (OEA) (15445) CONOCO 600 fluid 1 qt can 5 gal. can	QT GL
15	O	5610-00-141-7838	PAINT: non-slip, type II, color: OD (58536) MIL-W-5044	GL
15.1	O	6640-00-285-4694	PAPER, LENS: cleaning paper, Type 1, Class 3, packet (81348) NNN-P-40	SH
16	O	7920-00-205-1711	RAG, WIPING: cleaned, 50 lb bale (58536) A-A-531	LB
17	O	8030-00-081-2331 8030-00-900-4412	SEALING COMPOUND: type C or CV, blue (80244) MIL-S-22473 10 cc bottle 250 c bottle	BT BT
18	O	8030-01-069-3046	SEALING COMPOUND: type II, grade M (81349) MIL-S-46163 50 cc bottle	BT
19	O	6850-01-304-6632	SILICONE COMPOUND (81349) MIL-S-8660 8 oz can	OZ
20	O	5970-00-419-4290	TAPE, INSULATION (81349) M24391-01 1 roll	RL

APPENDIX D
ILLUSTRATED LIST OF MANUFACTURED ITEMS

D-1. INTRODUCTION. This appendix includes complete instructions for making items authorized to be manufactured or fabricated at unit maintenance.

a. A part number index in alphanumeric order is provided for cross-referencing the part number of the item to be manufactured to the figure which covers fabrication criteria.

b. All bulk materials needed for manufacture of an item are listed by part number or specification number in a tabular list on the illustration.

D-2. MANUFACTURED ITEMS PART NUMBER INDEX.

Part Number	Figure Number
MIL-B-43436/1-1	1
MS28762-12-0300	2
MS28762-12-0470	3
M13486/1-5	4
RRC271TYPEIICL6 B	5
11643052 -1	6

D-3. MANUFACTURED ITEMS ILLUSTRATIONS.

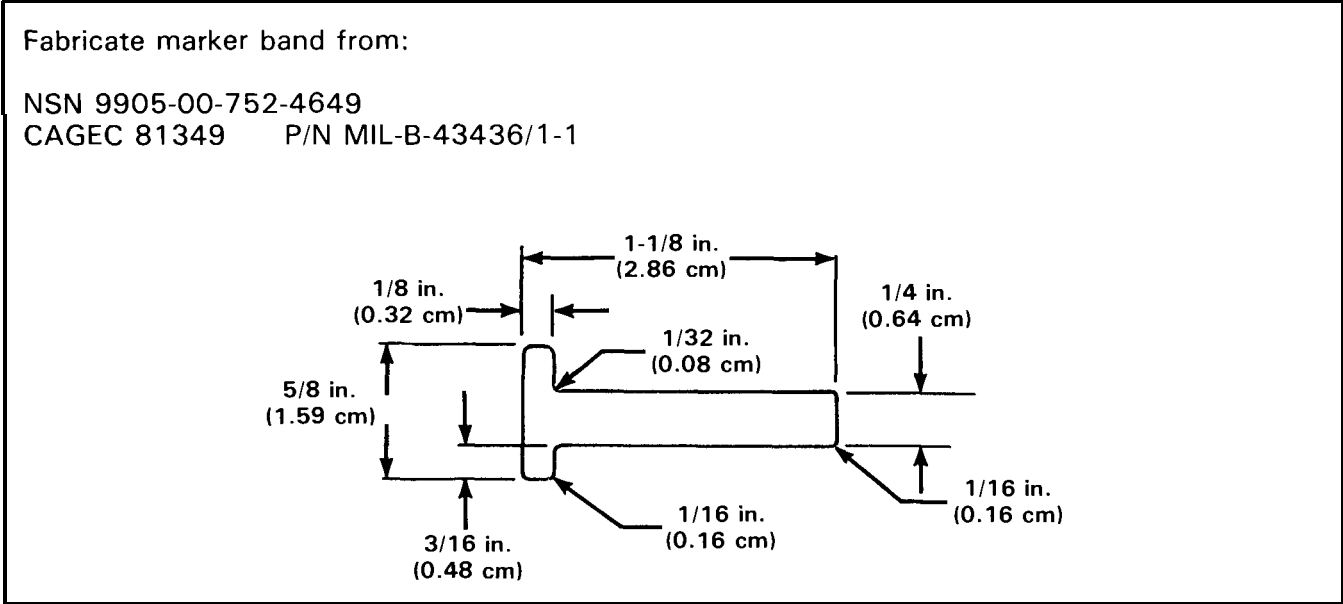


Figure 1. Marker Band (MIL-B-43436/1-1)

D-3. MANUFACTURED ITEMS ILLUSTRATIONS (CONT).

Fabricate nonmetallic hose assembly from:

NSN 4720-00-554-8088

CAGEC 96906

P/N M8788-2

and straight adapter

NSN 4720-00-541-6605

CAGEC 96906

P/N MS28761-12

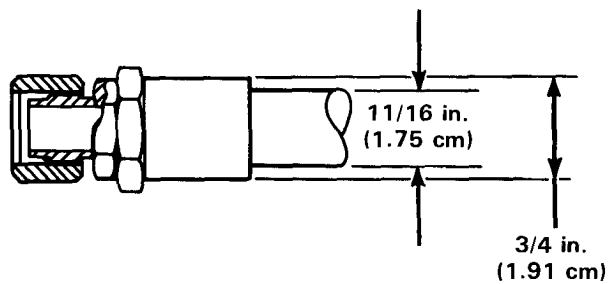


Figure 2. Nonmetallic Hose Assembly (MS28762-12-0300)

Fabricate nonmetallic hose assembly from:

NSN 4720-00-554-8088

CAGEC 96906

P/N M8788-2

and straight adapter

NSN 4720-00-541-6605

CAGEC 96906

P/N MS28761-12

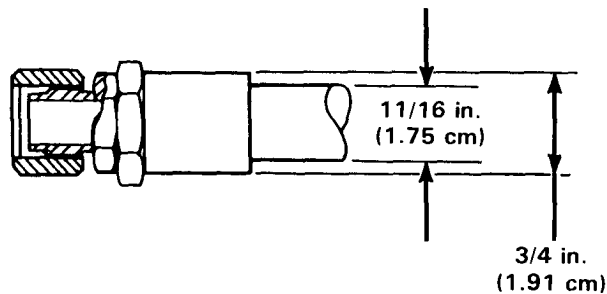


Figure 3. Nonmetallic Hose Assembly (MS28762-12-0470)

Fabricate electrical wire from:

NSN 6145-00-152-6499
CAGEC 81349

P/N M13486

NOTE

Use conductor size 14.

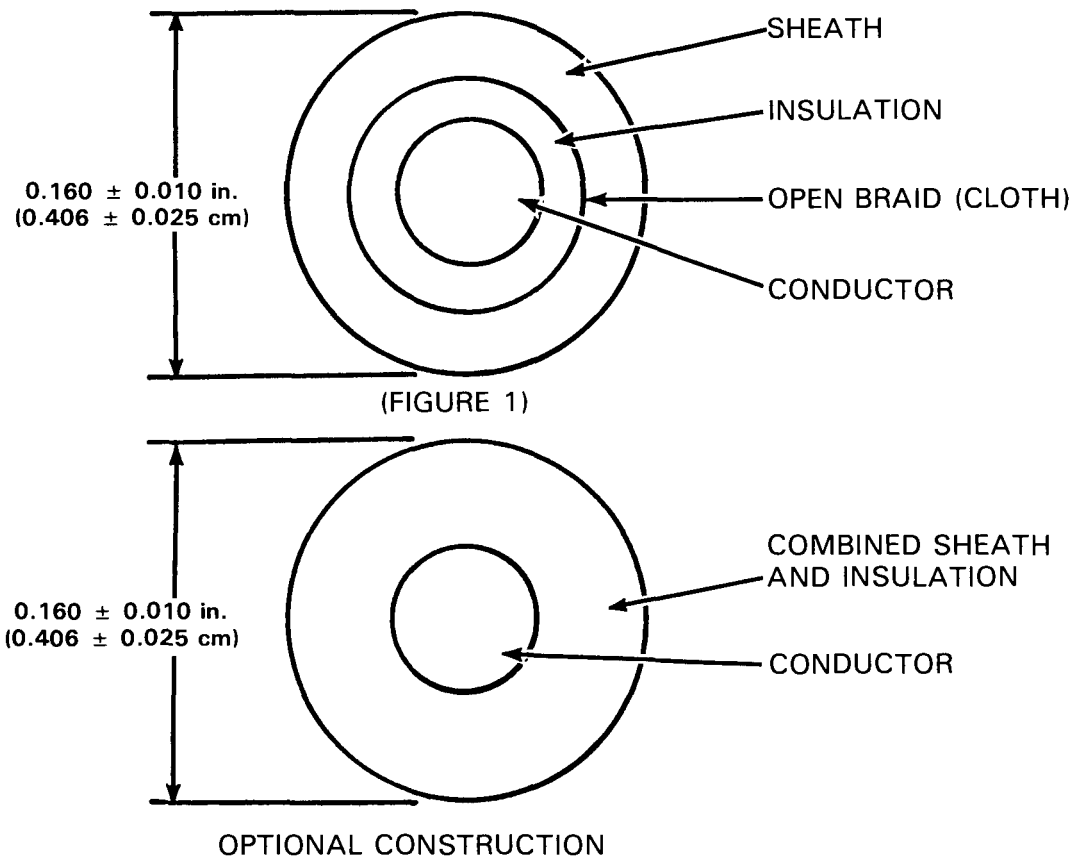


Figure 4. Electrical Wire (M13486/1-5)

Fabricate safety chain from:

NSN 4010-00-171-4427
CAGEC 81348

P/N RR-C-271

NSN 4010-00-554-8661
CAGEC 84248

P/N 42016550



Figure 5. Safety Chain (RRC271TYPEIICL6B)

D-3. MANUFACTURED ITEMS ILLUSTRATIONS (CONT).

Fabricate hose from:

NSN 4720-00-937-1114

CAGEC 96906

P/N MS521301A201R

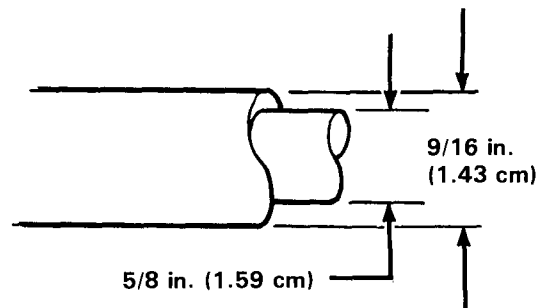


Figure 6. Hose (11643052-1)

APPENDIX E

TORQUE VALUES

E-1. GENERAL.

a. Follow torque values given throughout this manual. When no torque value is given, follow the guide to prevent damaging parts.

b. The guide is based on using clean, dry threads.

TORQUE VALUE GUIDE

SCREW DIAMETER	TORQUE NO DASHES (SAE GRADE 2)	TORQUE 3 DASHES (SAE GRADE 5)	TORQUE 6 DASHES (SAE GRADE 8)	SOCKET SIZE
1/4-20 UNC	3-5 ft-lb (4-7 N-m)	6-8 ft-lb (8-11 N-m)	10-12 ft-lb (14-16 N-m)	7/16
1/4-28 UNF	4-6 ft-lb (5-8 N-m)	8-10 ft-lb (11-14 N-m)	9-14 ft-lb (12-19 N-m)	7/16
5/16-18 UNC	7-11 ft-lb (9-15 N-m)	13-17 ft-lb (18-23 N-m)	19-24 ft-lb (26-33 N-m)	1/2
5/16-24 UNF	7-11 ft-lb (9-15 N-m)	14-19 ft-lb (19-26 N-m)	23-28 ft-lb (31-38 N-m)	1/2
3/8-16 UNC	14-18 ft-lb (19-24 N-m)	26-31 ft-lb (35-42 N-m)	39-44 ft-lb (53-60 N-m)	9/16
3/8-24 UNF	15-19 ft-lb (20-26 N-m)	30-35 ft-lb (41-47 N-m)	46-51 ft-lb (62-69 N-m)	9/16
7/16-14 UNC	23-28 ft-lb (31-38 N-m)	44-49 ft-lb (60-66 N-m)	65-70 ft-lb (88-95 N-m)	5/8
7/16-20 UNF	23-28 ft-lb (31-38 N-m)	44-54 ft-lb (60-73 N-m)	69-79 ft-lb (94-107 N-m)	5/8
1/2-13 UNC	32-37 ft-lb (43-50 N-m)	65-75 ft-lb (88-102 N-m)	95-105 ft-lb (129-142 N-m)	3/4
1/2-20 UNF	34-41 ft-lb (46-56 N-m)	73-83 ft-lb (99-113 N-m)	113-123 ft-lb (153-167 N-m)	3/4
9/16-12 UNC	46-56 ft-lb (62-76 N-m)	100-110 ft-lb (136-149 N-m)	145-155 ft-lb (197-210 N-m)	13/16
9/16-18 UNF	47-57 ft-lb (64-77 N-m)	107-117 ft-lb (145-159 N-m)	165-175 ft-lb (224-237 N-m)	13/16
5/8-11 UNC	62-72 ft-lb (84-98 N-m)	140-150 ft-lb (190-203 N-m)	200-210 ft-lb (271-285 N-m)	15/16
5/8-18 UNF	67-77 ft-lb (91-104 N-m)	153-163 ft-lb (207-221 N-m)	235-245 ft-lb (319-332 N-m)	15/16
3/4-10 UNC	106-116 ft-lb (144-157 N-m)	260-270 ft-lb (353-366 N-m)	365-375 ft-lb (495-508 N-m)	1-1/4
3/4-16 UNF	115-125 ft-lb (156-169 N-m)	268-278 ft-lb (363-377 N-m)	417-427 ft-lb (565-579 N-m)	1-1/4

TORQUE VALUE GUIDE (CONT)

SCREW DIAMETER	TORQUE NO DASHES (SAE GRADE 2)	TORQUE 3 DASHES (SAE GRADE 5)	TORQUE 6 DASHES (SAE GRADE 8)	SOCKET SIZE
7/8—9 UNC	165—175 ft-lb (224—237 N-m)	385—395 ft-lb (522—536 N-m)	595—605 ft-lb (807—820 N-m)	1-5/16
7/8—14 UNF	178—188 ft-lb (241—255 N-m)	424—434 ft-lb (575—588 N-m)	663—673 ft-lb (899—912 N-m)	1-5/16
1—8 UNC	251—261 ft-lb (340—354 N-m)	580—590 ft-lb (786—800 N-m)	900—910 ft-lb (1220—1234 N-m)	1-1/2
1—14 UNF	255—265 ft-lb (346—359 N-m)	585—634 ft-lb (793—860 N-m)	943—993 ft-lb (1279—1346 N-m)	1-1/2
1-1/4—7 UNC	451—461 ft-lb (611—625 N-m)	1070—1120 ft-lb (1451—1518 N-m)	1767—1817 ft-lb (2396—2463 N-m)	1-7/8
1-1/4—12 UNF	488—498 ft-lb (662—675 N-m)	1211—1261 ft-lb (1642—1710 N-m)	1963—2013 ft-lb (2661—2729 N-m)	1-7/8
1-1/2—6 UNC	727—737 ft-lb (986—999 N-m)	1899—1949 ft-lb (2575—2642 N-m)	3111—3161 ft-lb (4218—4286 N-m)	2-1/4
1-1/2—12 UNF	816—826 ft-lb (1106—1120 N-m)	2144—2194 ft-lb (2907—2975 N-m)	3506—3556 ft-lb (4753—4821 N-m)	2-1/4

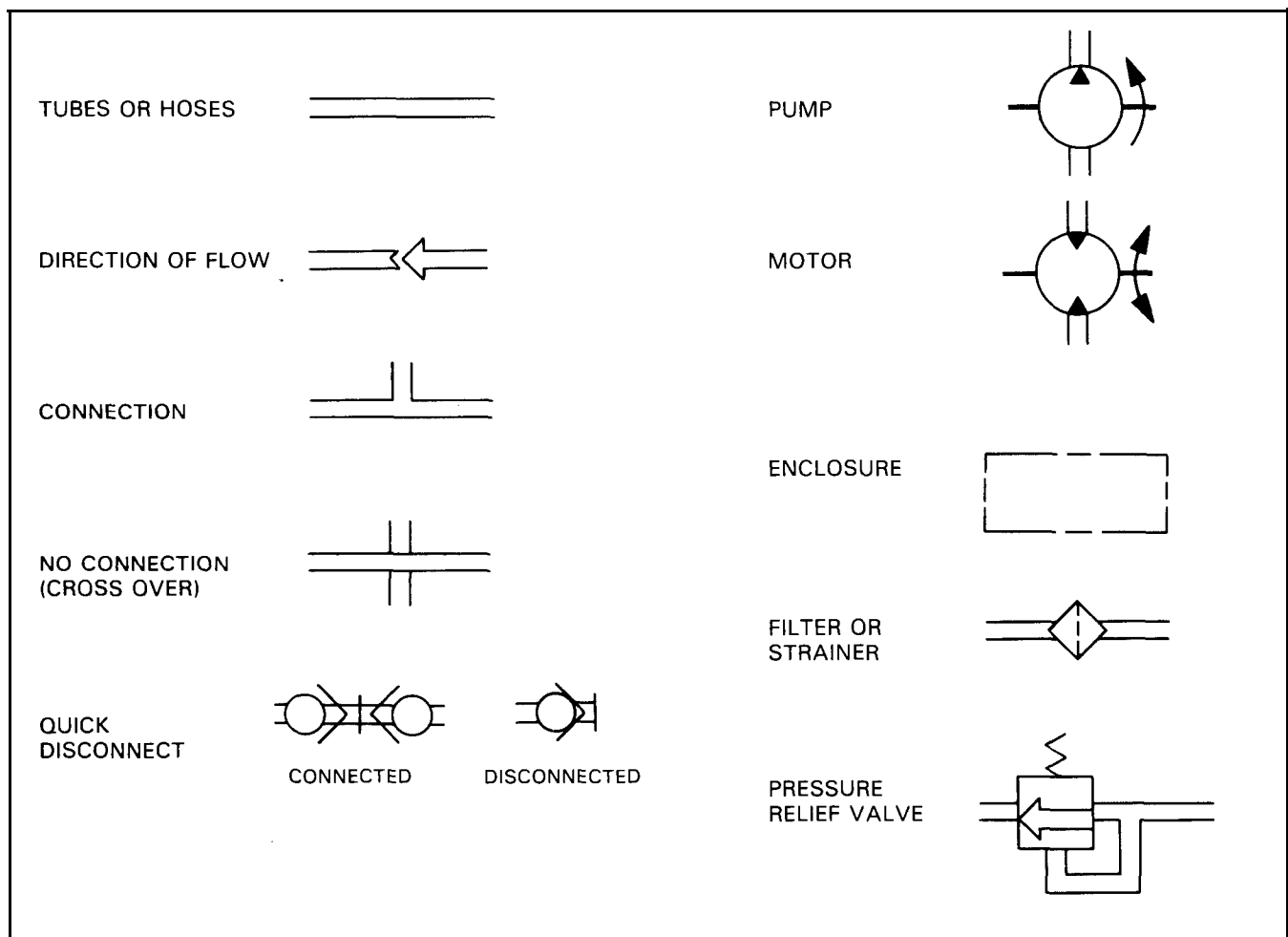
APPENDIX F

HYDRAULIC SYSTEM DESCRIPTION AND SCHEMATIC DIAGRAMS

F-1. GENERAL. This appendix contains functional descriptions and schematic diagrams of the hydraulic system. The hydraulic system is divided into eight basic subsystems: hydraulic power, boom winch, traversing, boom cylinder, tow winch, impact wrench, spade, and suspension lockout.

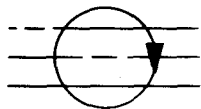
The M578 Recovery Vehicle has an open-center type hydraulic system. This means that the hydraulic fluid continuously circulates through the main hydraulic supply lines. When no hydraulic subsystem is being used, the hydraulic fluid pressure in the main supply lines is near zero. When a subsystem is used, hydraulic fluid from the main supply lines is diverted through the subsystem. Hydraulic fluid pressure builds up within the subsystem to a level high enough for the subsystem to function. Preset pressure relief or pressure reduction valves protect the subsystem from too much pressure.

F-2. HYDRAULIC SYMBOLS.

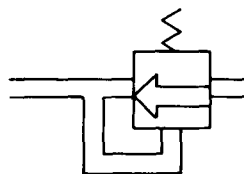


F-2. HYDRAULIC SYMBOLS (CONT).

SLIP RING



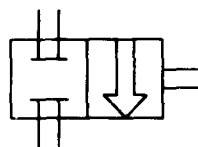
PRESSURE REDUCING VALVE



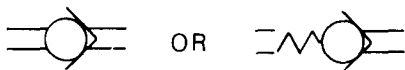
FLOW CONTROL VALVE



MANUALLY OPERATED SHUTOFF VALVE



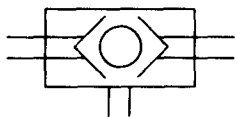
CHECK VALVE



RESERVOIR



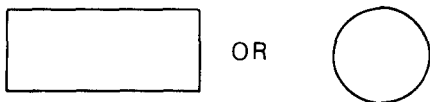
SHUTTLE VALVE



SOLENOID VALVE



COMPONENT



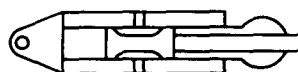
POWER TAKEOFF (MECHANICAL)



HYDRAULIC CYLINDER



LOCKOUT CYLINDER

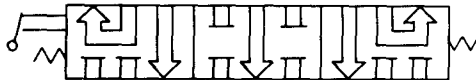


SCHEMATIC DIAGRAM INTERCONNECTIONS

HYDRAULIC PRESSURE SWITCH



DIRECTIONAL CONTROL VALVE (MANUALLY OPERATED SPRING RETURN TO CENTER)



BAR CODE



Supply pressure



Intake or return



Pilot or reduced pressure



Inactive blank

FROM HYDRAULIC POWER SUBSYSTEM

(A)

TO BOOM WINCH SUBSYSTEM

FROM HYDRAULIC POWER SUBSYSTEM

(B)

TO TRAVERSING SUBSYSTEM

FROM TRAVERSING SUBSYSTEM

(C)

TO HYDRAULIC POWER SUBSYSTEM

FROM HYDRAULIC POWER SUBSYSTEM

(D)

TO BOOM CYLINDER SUBSYSTEM

FROM HYDRAULIC POWER SUBSYSTEM

(E)

TO IMPACT WRENCH SUBSYSTEM

FROM HYDRAULIC POWER SUBSYSTEM

(F)

TO BOOM WINCH, TRAVERSING, AND TOW WINCH SUBSYSTEMS

FROM HYDRAULIC POWER SUBSYSTEM

(G)

TO TRAVERSING SUBSYSTEM

FROM SPADE SUBSYSTEM

(H)

TO HYDRAULIC POWER SUBSYSTEM

FROM HYDRAULIC POWER SUBSYSTEM

(I)

TO IMPACT WRENCH SUBSYSTEM

FROM BOOM WINCH, TRAVERSING, BOOM CYLINDER, TOW WINCH, AND SUSPENSION LOCK-OUT SUBSYSTEMS

(J)

TO HYDRAULIC POWER SUBSYSTEM

FROM BOOM CYLINDER SUBSYSTEM

(K)

TO TOW WINCH SUBSYSTEM

FROM BOOM WINCH SUBSYSTEM

(L)

TO TOW WINCH SUBSYSTEM

FROM IMPACT WRENCH SUBSYSTEM

(M)

TO SPADE SUBSYSTEM

FROM SPADE SUBSYSTEM

(N)

TO SUSPENSION LOCK-OUT SUBSYSTEM

F-3. HYDRAULIC POWER SUBSYSTEM.

Functional Description.

a. Hydraulic reservoir (19) is filled with hydraulic fluid.

b. When engine (13) is running and magnetic clutch (15) is energized, hydraulic fluid from hydraulic reservoir (19) is drawn through filter (21) and slip ring (1) by hydraulic pumps (16, 17, and 18).

c. The hydraulic pump (16) supplies hydraulic fluid at 40 gallons per minute (152 liters per minute) through the flow divider manifold for distribution to the boom winch subsystem.

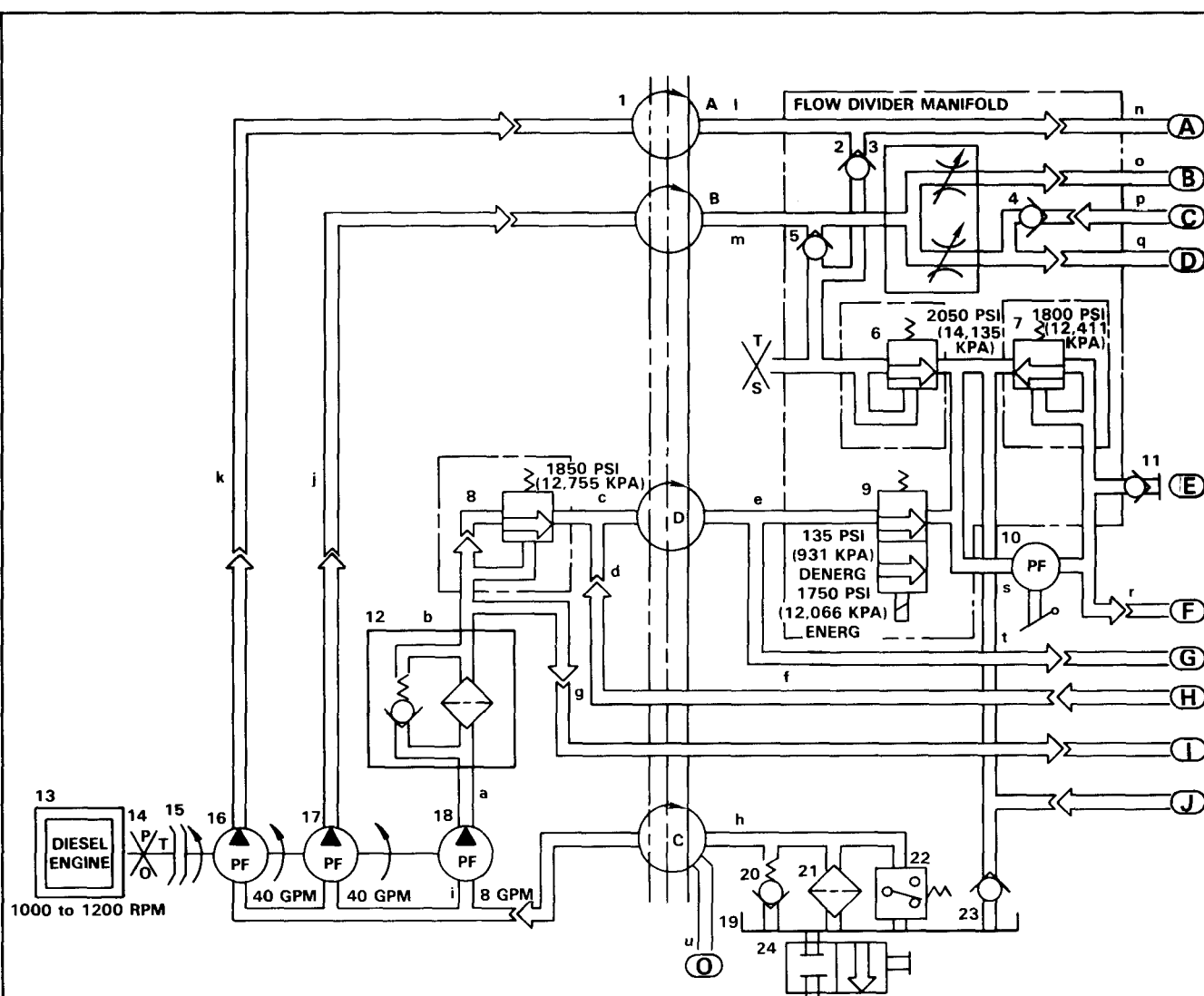
d. The hydraulic pump (17) supplies hydraulic fluid at 40 gallons per minute (152 liters per minute) to the flow divider valve (3), which distributes the fluid flow between the traversing subsystem and the boom cylinder subsystem. When the traversing subsystem is not being used, unused fluid is directed back to the flow divider manifold for use by the boom cylinder subsystem as needed.

e. The relief valve (7) has two pressure settings. Only the high pressure setting can be externally adjusted by the pressure adjustment setscrew. The valve is normally in the low pressure setting position, shifting to the high pressure setting when the solenoid is energized by the closing of one of the tow winch level wind switches.

f. The hydraulic pump (18) pumps hydraulic fluid at 8 gallons per minute (30 liters per minute) through the filter (12) and relief valves (8 and 9). The relief valve (8) allows the hydraulic pressure to build up to 1850 psi (12,756 kPa) for operation of the impact wrench, spade, and suspension lockout cylinders. The relief valve (9) is a solenoid operated dual setting type relief valve. Normally, the relief valve is deenergized. When deenergized, the relief

valve (9) keeps the pressure in the supply lines to the level wind solenoid valves at 135 psi (931 kPa). During level wind traversing, the relief valve (9) is energized by the tow winch cable sensing switches. When energized, the relief valve (9) increases pressure to 1750 psi (12,066 kPa) to drive the cab traversing hydraulic motor.

g. The handpump (10) provides hydraulic fluid pressure for emergency manual release of the boom winch, tow winch, and traversing motor brakes and for emergency manual raising of the spade.



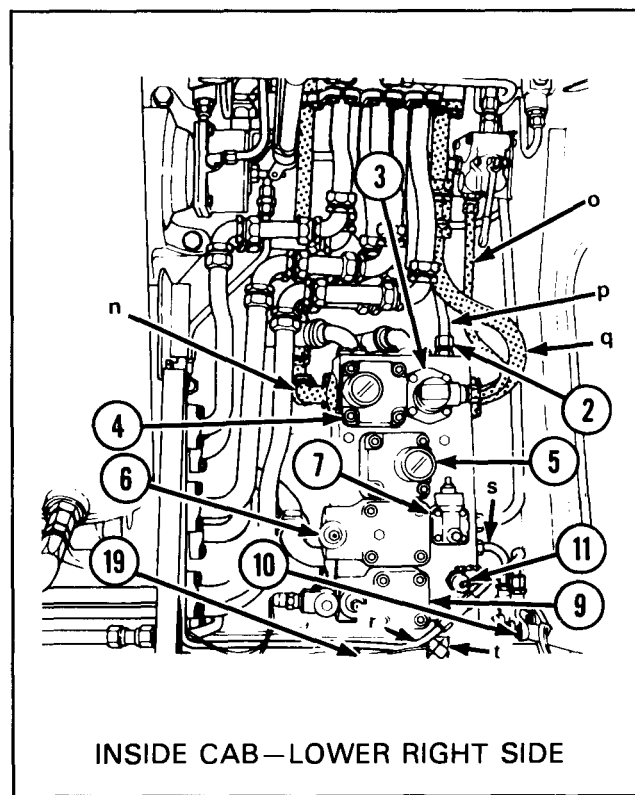
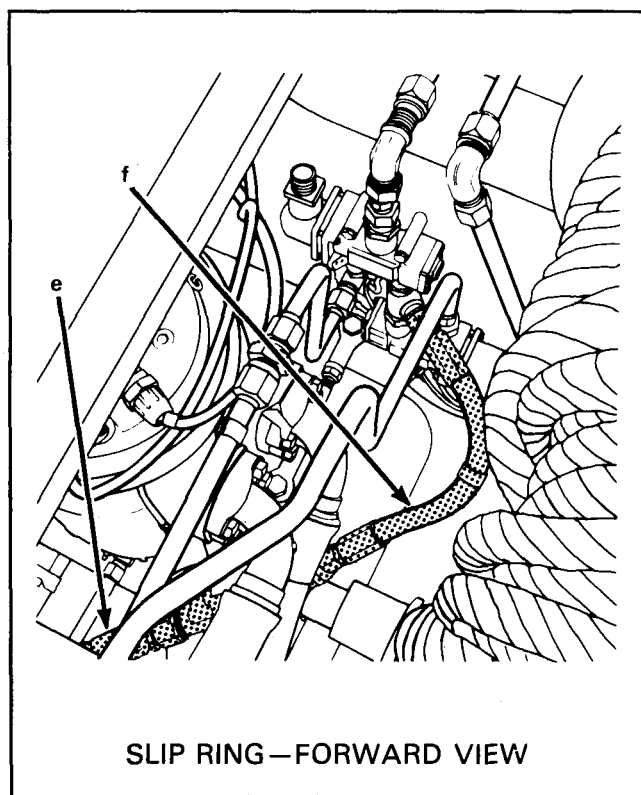
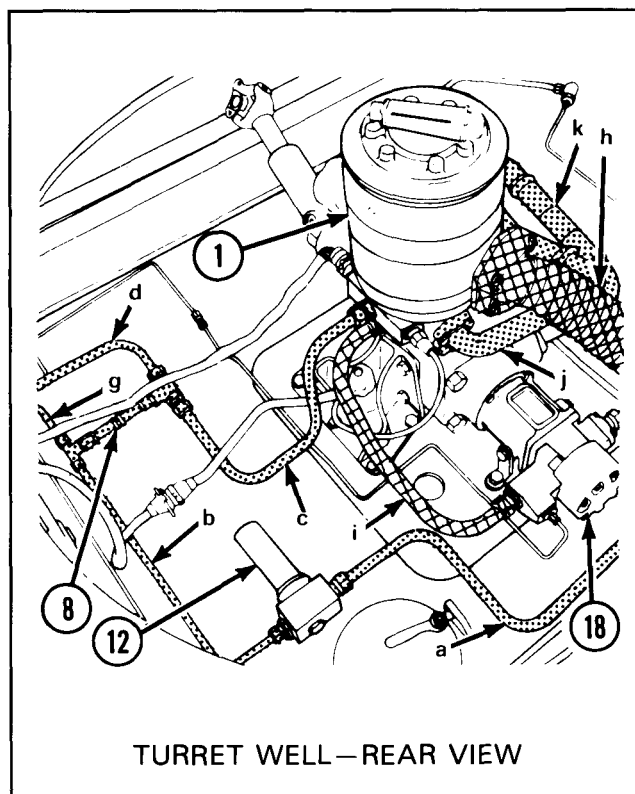
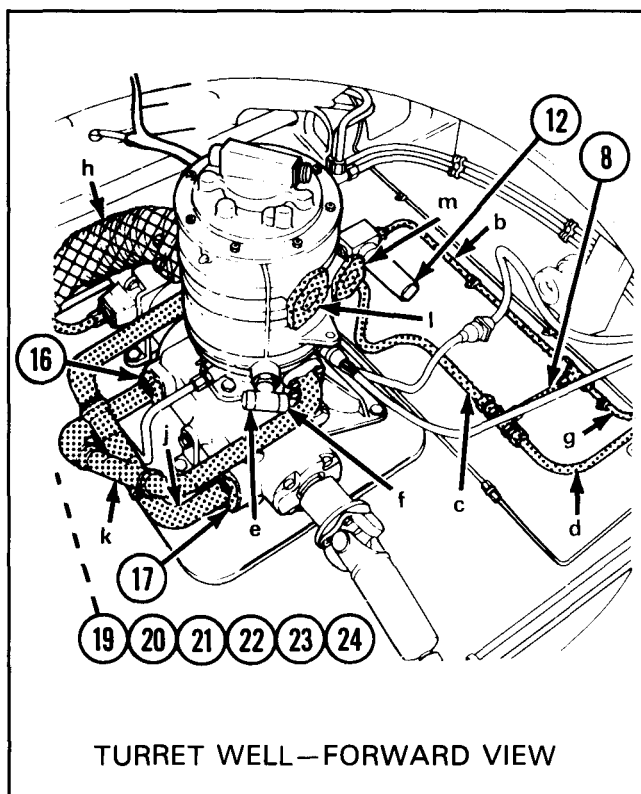
LEGEND

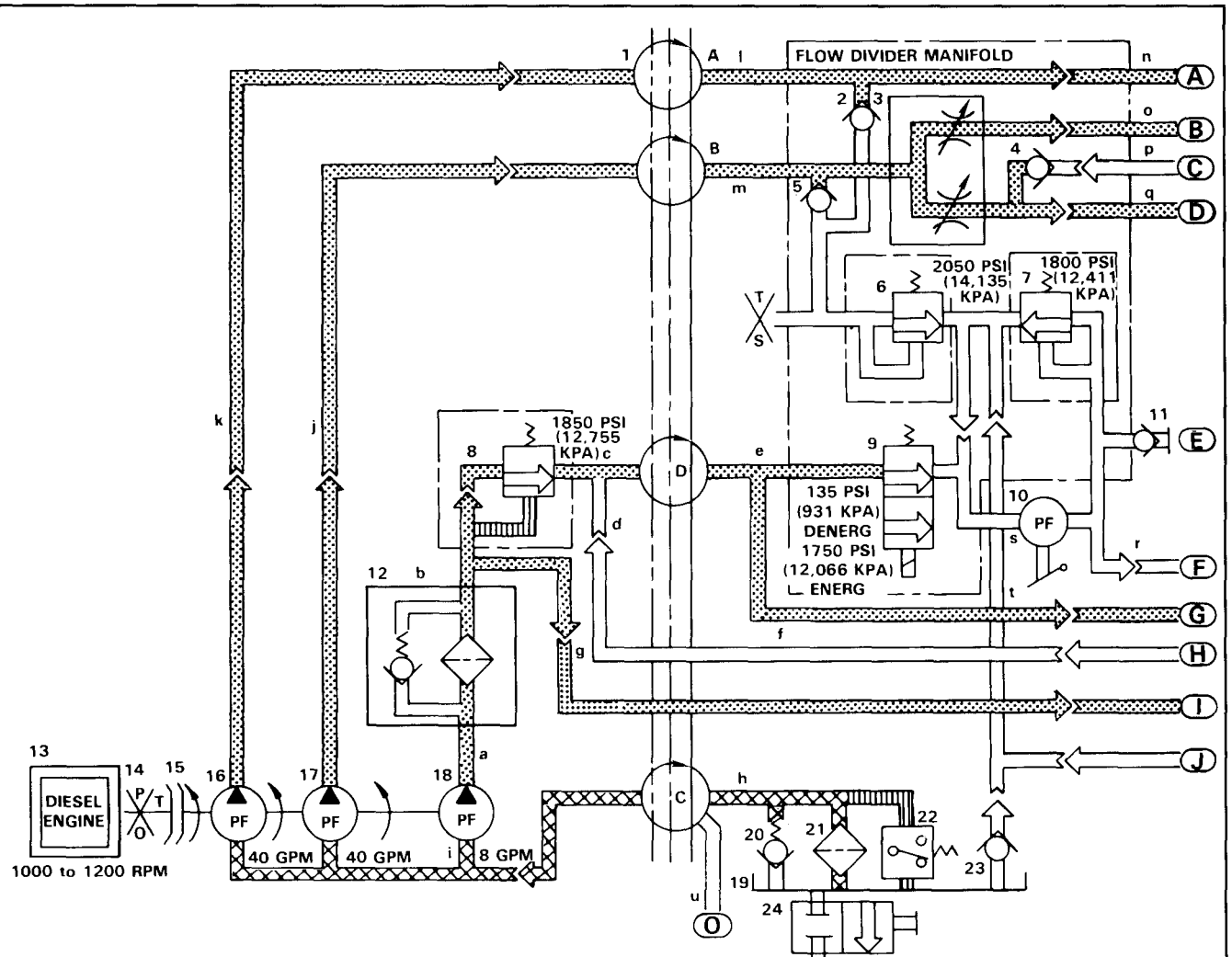
1 Slip ring	13 Diesel engine
2 Check valve	14 Power takeoff
3 Flow divider	15 Magnetic clutch
4 Check valve	16 Pump
5 Check valve	17 Pump
6 Relief valve	18 Pump
7 Relief valve	19 Reservoir
8 Relief valve	20 Filter bypass valve
9 Solenoid dual relief valve	21 Filter
10 Hand pump	22 Differential pressure switch
11 Quick-disconnect coupling	23 Check valve
12 Filter	24 Drain valve

BAR CODE

	Supply pressure
	Intake or return
	Pilot or reduced pressure
	Inactive blank

F-3. HYDRAULIC POWER SUBSYSTEM (CONT).





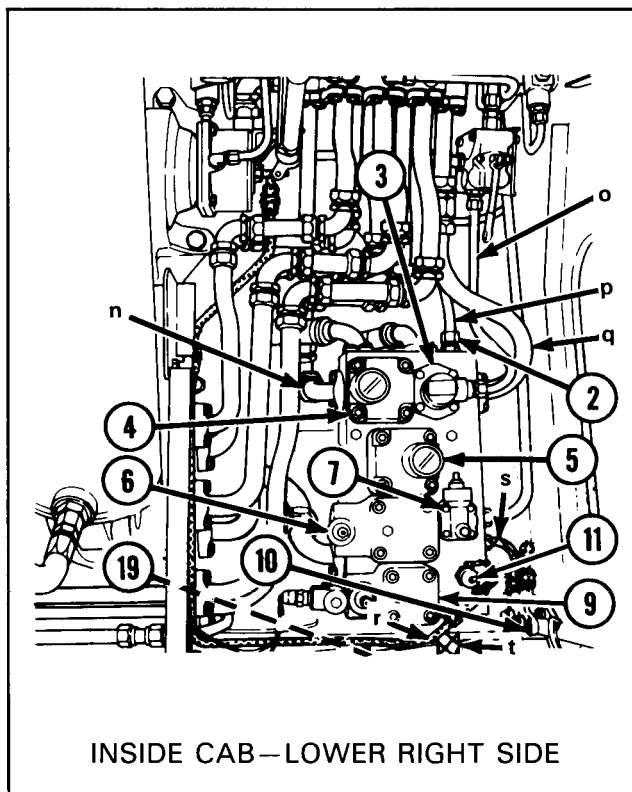
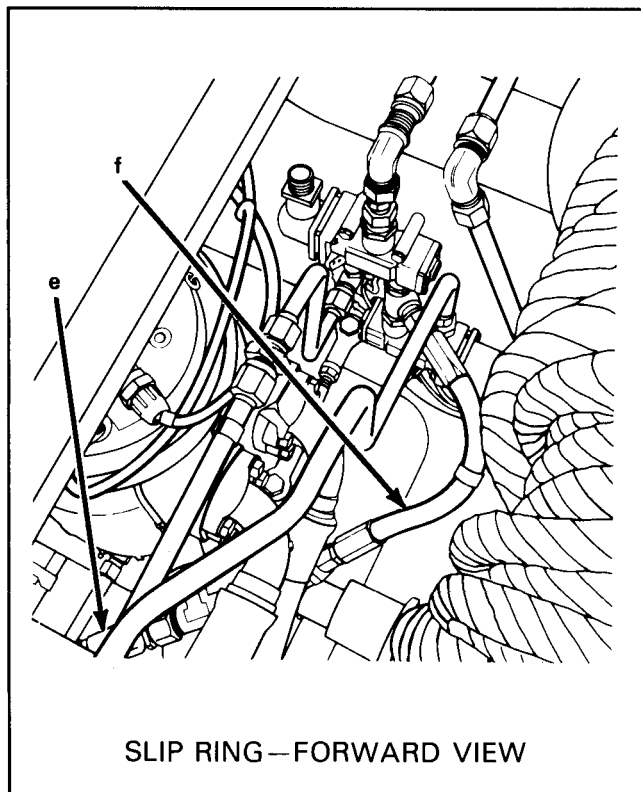
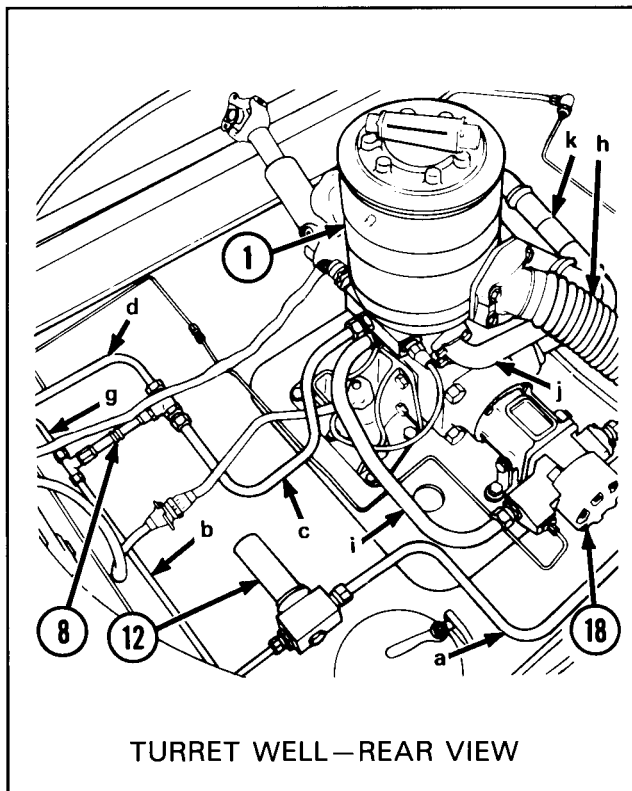
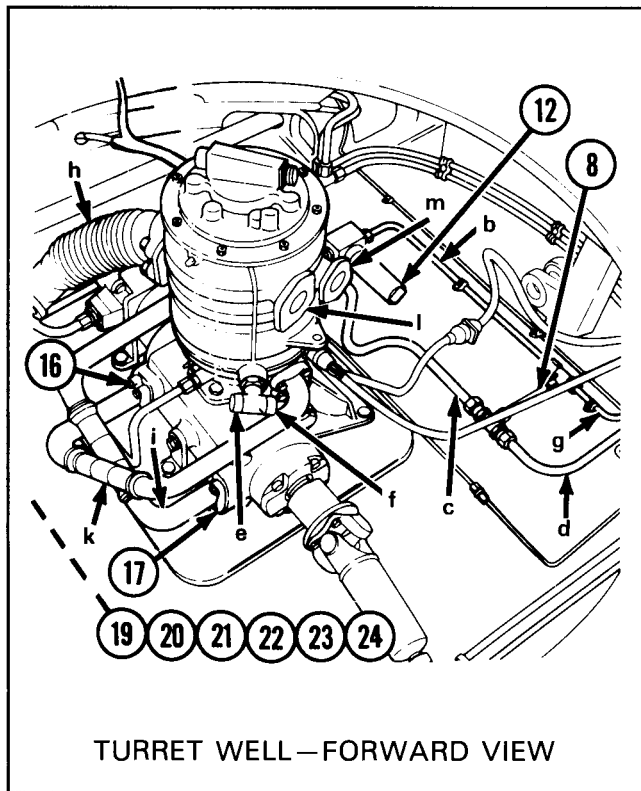
LEGEND

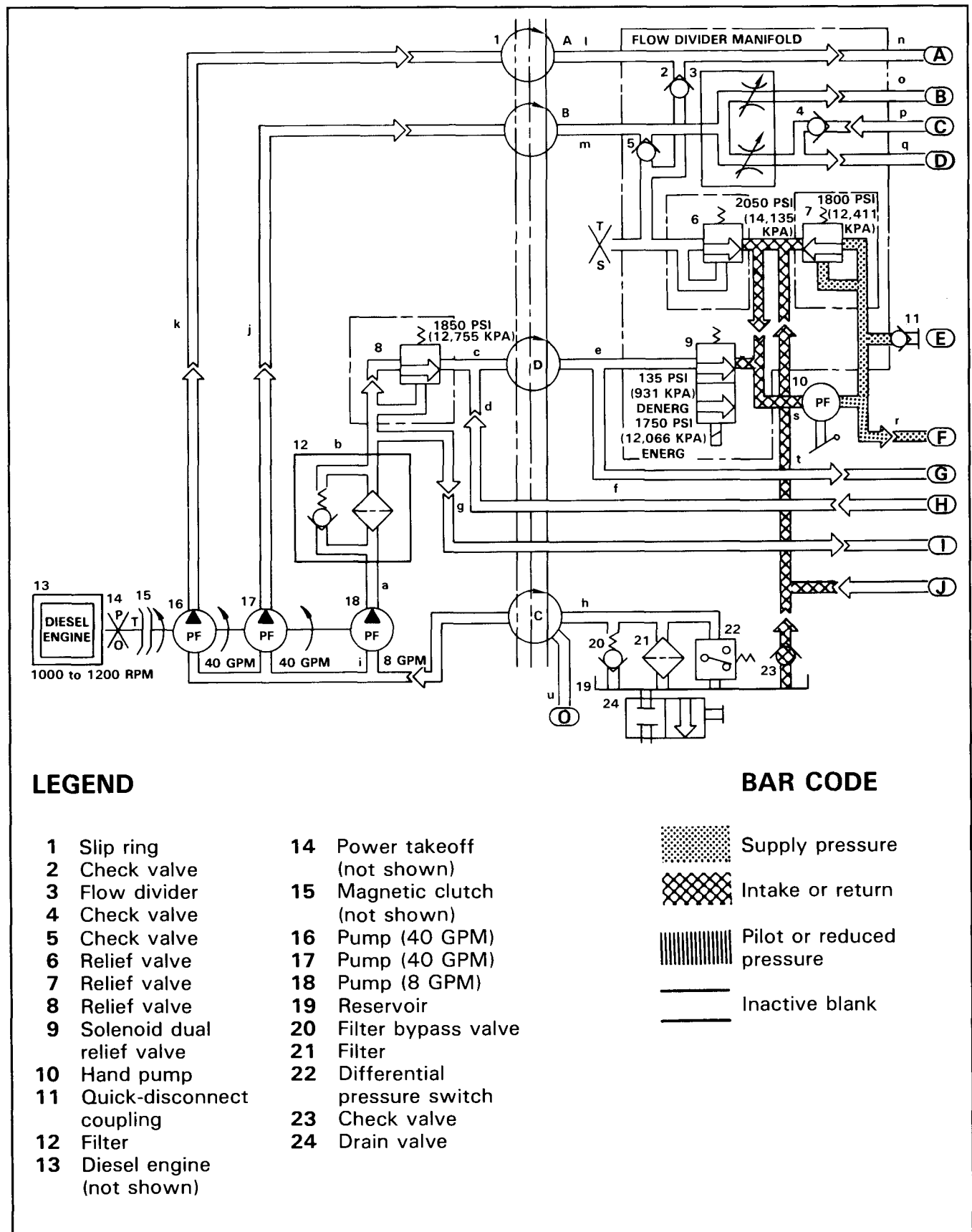
1 Slip ring	14 Power takeoff (not shown)
2 Check valve	15 Magnetic clutch (not shown)
3 Flow divider	16 Pump (40 GPM)
4 Check valve	17 Pump (40 GPM)
5 Check valve	18 Pump (8 GPM)
6 Relief valve	19 Reservoir
7 Relief valve	20 Filter bypass valve
8 Relief valve	21 Filter
9 Solenoid dual relief valve	22 Differential pressure switch
10 Hand pump	23 Check valve
11 Quick-disconnect coupling	24 Drain valve
12 Filter	
13 Diesel engine (not shown)	

BAR CODE

	Supply pressure
	Intake or return
	Pilot or reduced pressure
	Inactive blank

F-4. HYDRAULIC POWER SUBSYSTEM - HAND PUMP OPERATING.





F-5. BOOM WINCH HYDRAULIC SUBSYSTEM.

Functional Description.

a. The hydraulic fluid power for the operation of the boom winch is supplied by the hydraulic power subsystem.

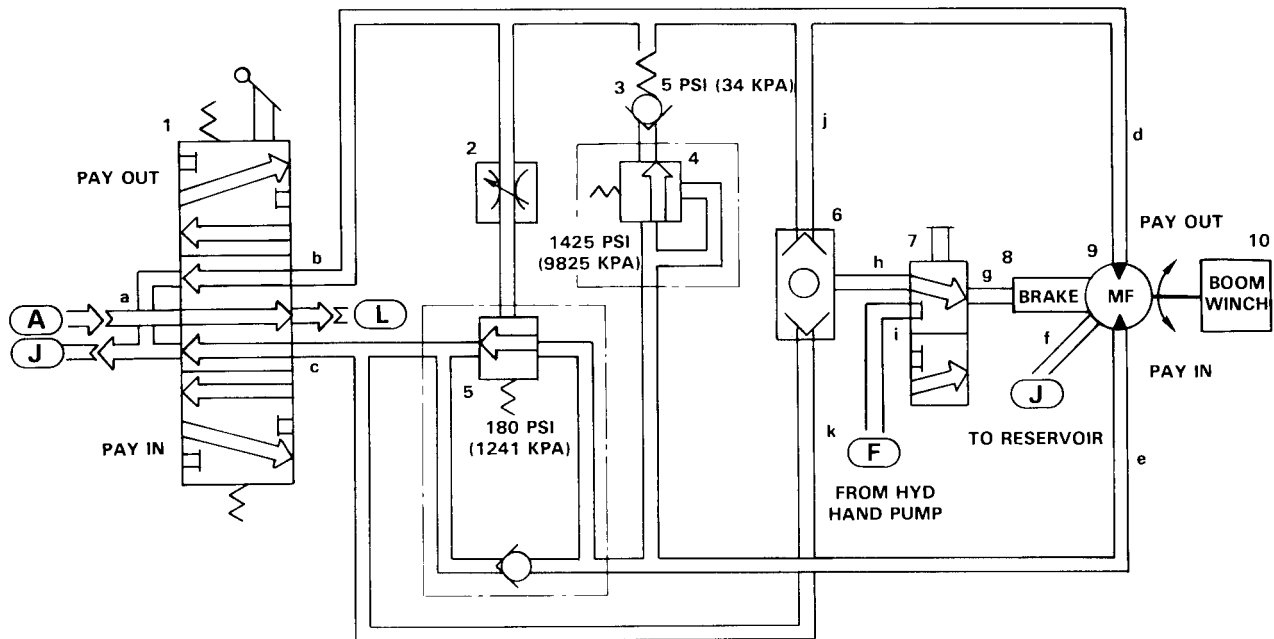
b. The boom winch hydraulic subsystem controls the power for boom winch operation when lifting or lowering a load.

c. Move the handle of the directional control valve (1) in the PAY IN position to direct hydraulic fluid to release brake (7) and operate the hydraulic motor (9) to retrieve the boom winch wire rope. Return fluid from the hydraulic motor (9) flows through the pressure relief valve (5) and the directional control valve (1), then to the reservoir. The relief valve (4) limits hydraulic pressure when paying in to 1425 psi (9825 kPa) to protect the winch components from overload.

d. Moving the handle of the directional control valve (1) in the PAY OUT position has the same effect as in PAY IN except that the hydraulic fluid is routed in the opposite direction through the hydraulic motor (9). The relief valve (5) controls the rate of flow in the return line and prevents free fall of the load.

e. When the handle of the directional control valve (1) is in the neutral position, hydraulic fluid flows through the open center port to the tow winch directional control valve.

f. When the engine is not operating or during hydraulic power failure, the boom winch brake can be manually released by setting the brake release valve (7) to HAND PUMP PRESSURE and operating the hand pump to lower a load.



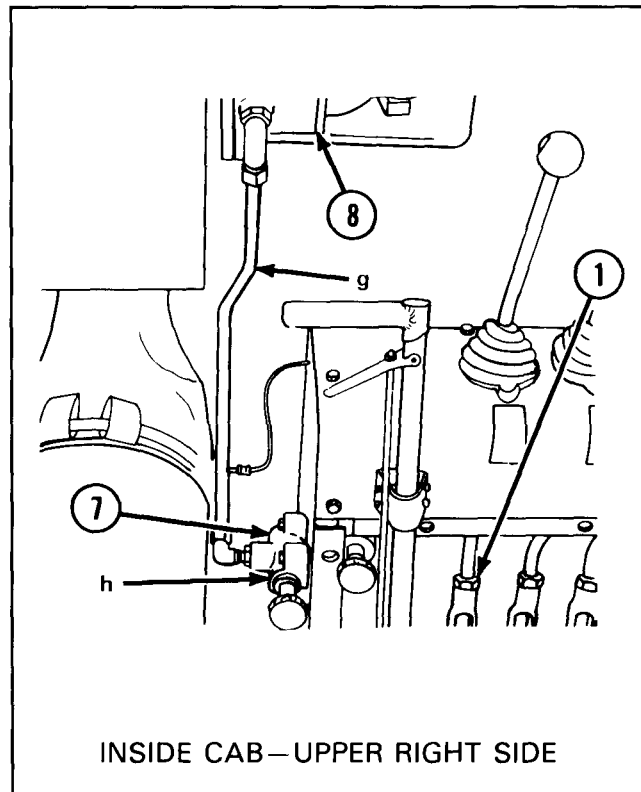
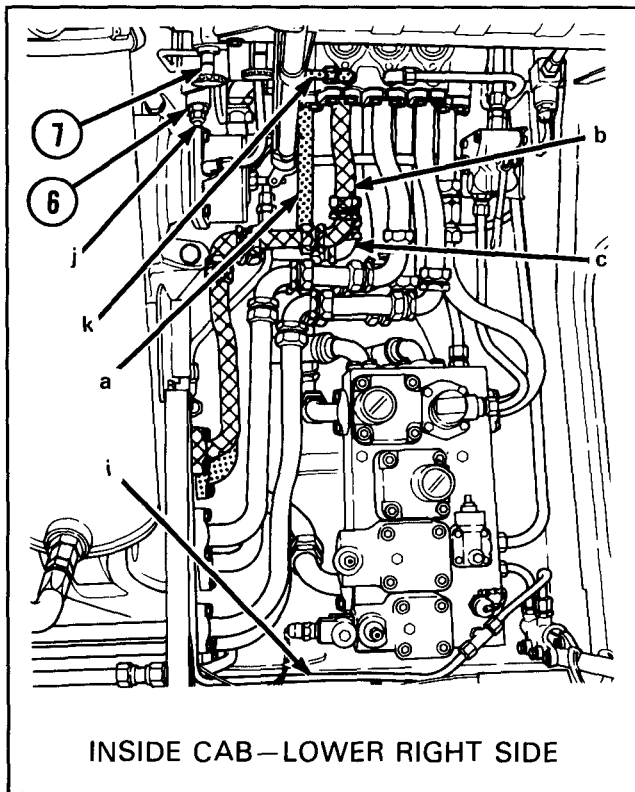
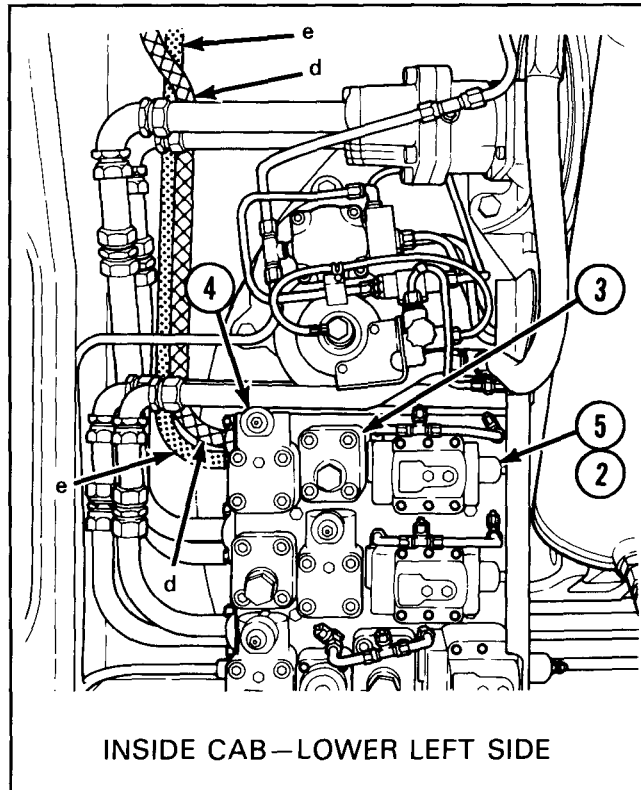
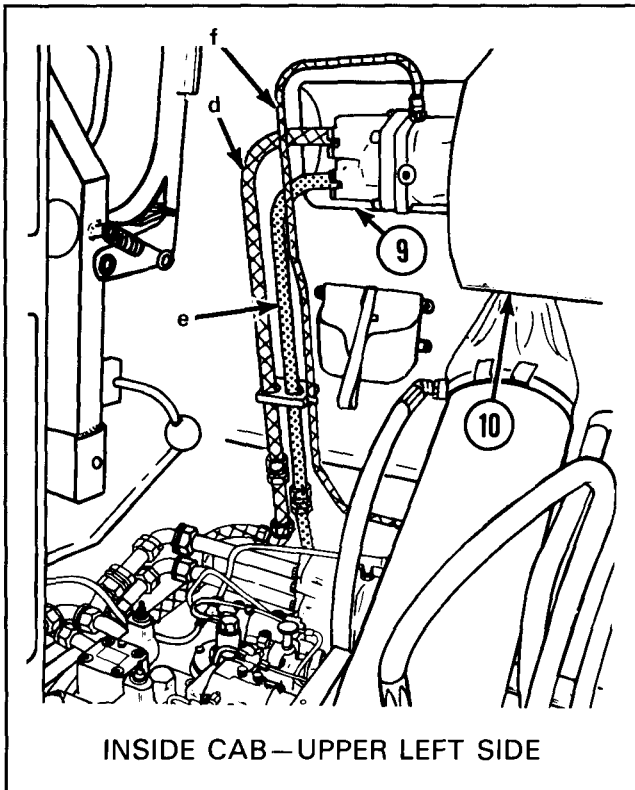
LEGEND

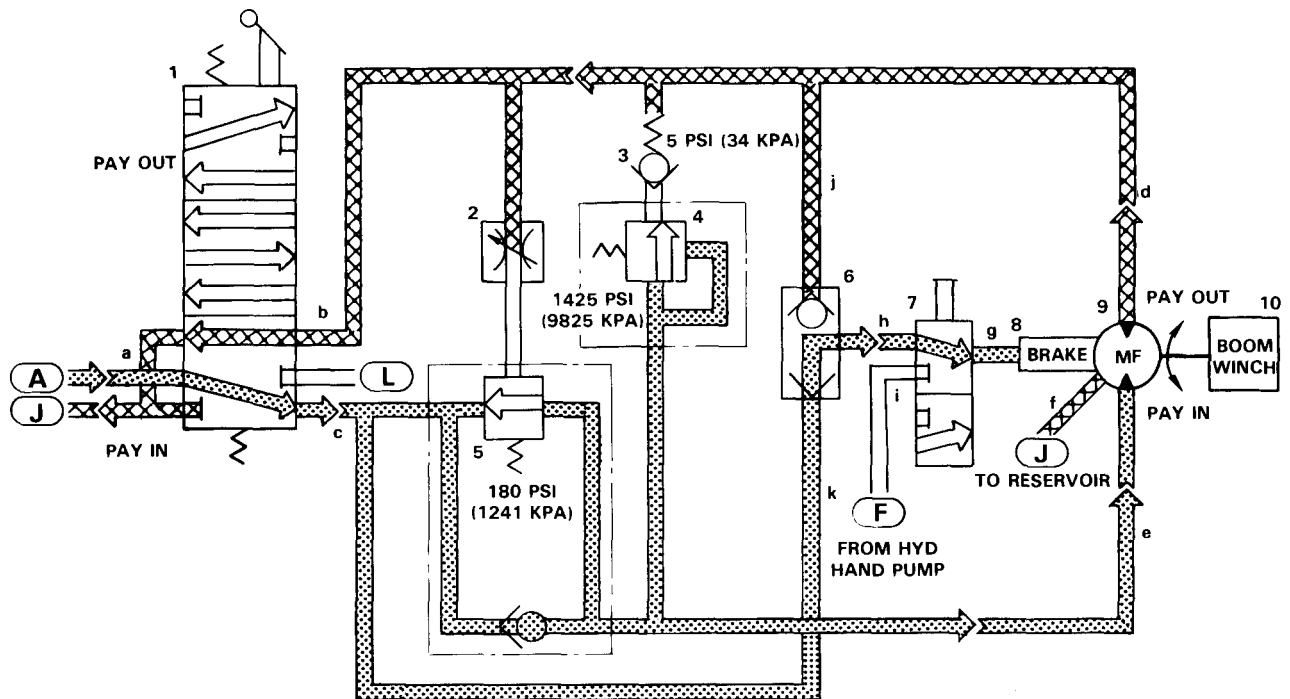
- 1 Directional control valve
- 2 Flow control valve, P/O valve (5)
- 3 Check valve
- 4 Relief valve
- 5 Relief valve
- 6 Shuttle valve
- 7 Brake release valve
- 8 Brake
- 9 Hydraulic motor
- 10 Winch

BAR CODE

-  Supply pressure
-  Intake or return
-  Pilot or reduced pressure
-  Inactive blank

F-6. BOOM WINCH HYDRAULIC SUBSYSTEM - PAY IN.





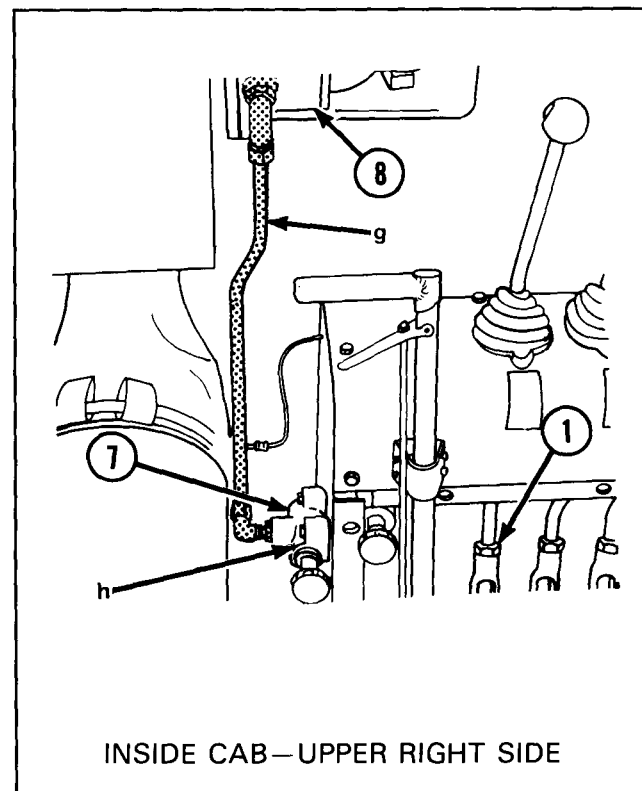
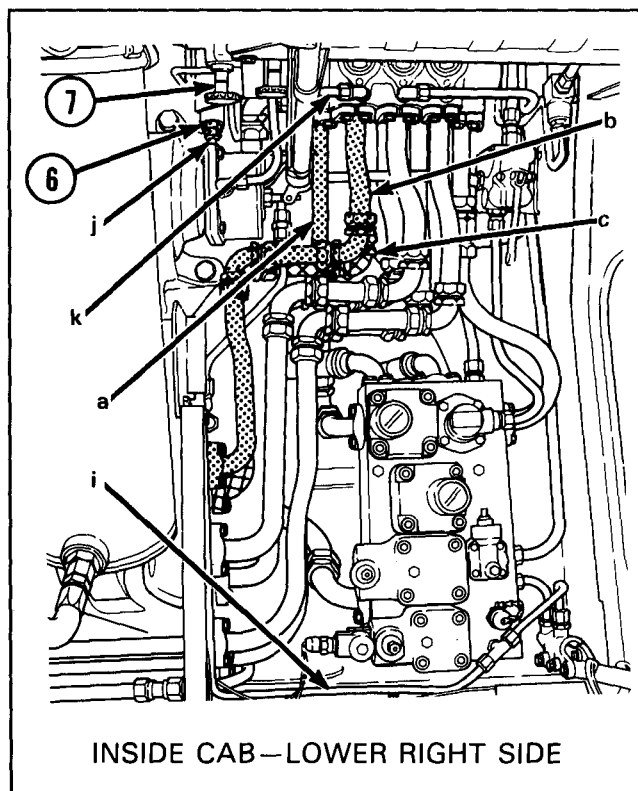
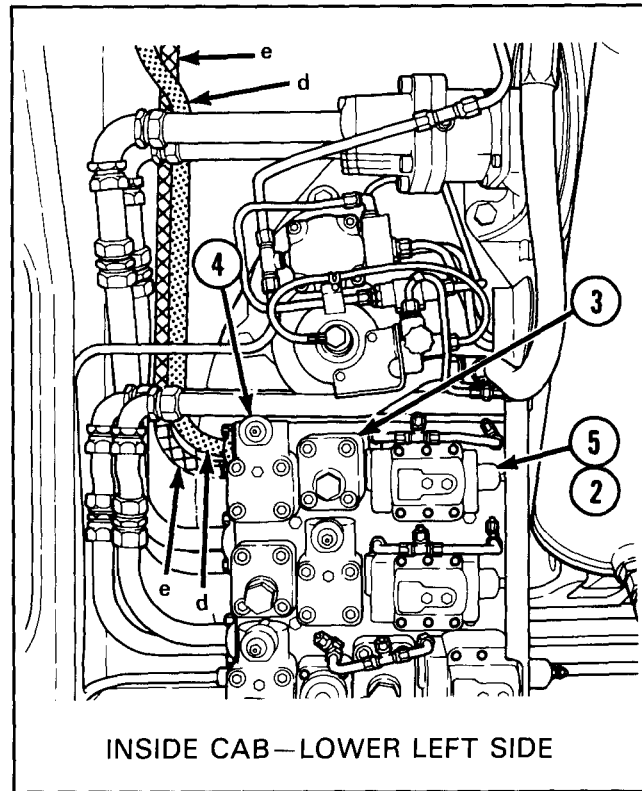
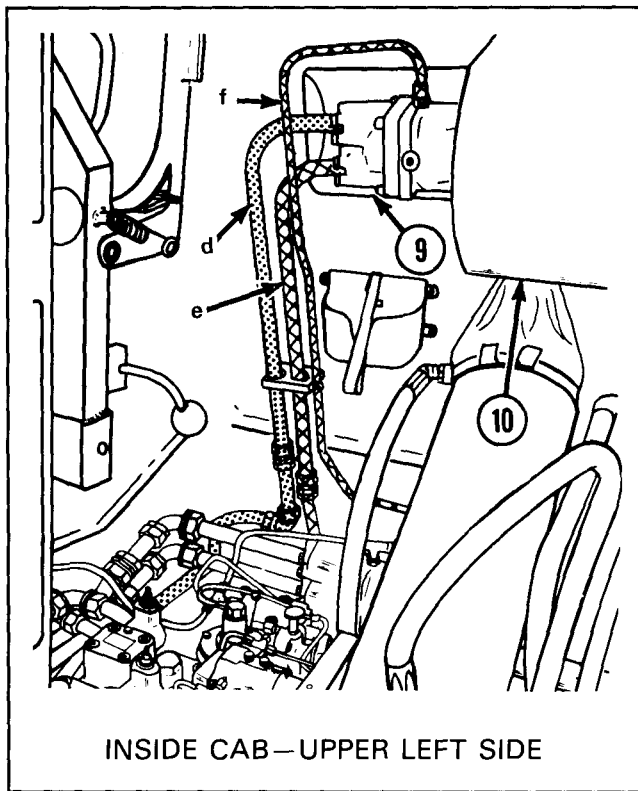
LEGEND

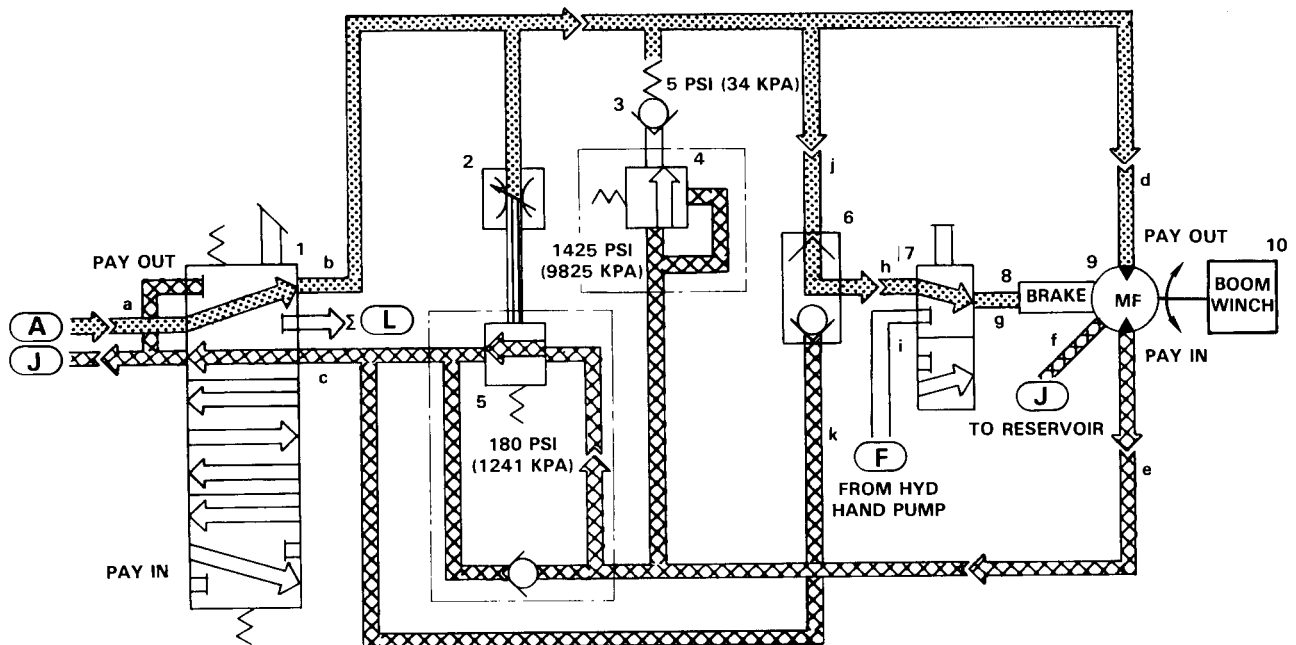
- 1 Directional control valve
- 2 Flow control valve
- 3 Check valve
- 4 Relief valve
- 5 Relief valve
- 6 Shuttle valve
- 7 Brake release valve
- 8 Brake
- 9 Hydraulic motor
- 10 Winch

BAR CODE

-  Supply pressure
-  Intake or return
-  Pilot or reduced pressure
-  Inactive blank

F-7. BOOM WINCH HYDRAULIC SUBSYSTEM - PAY OUT.





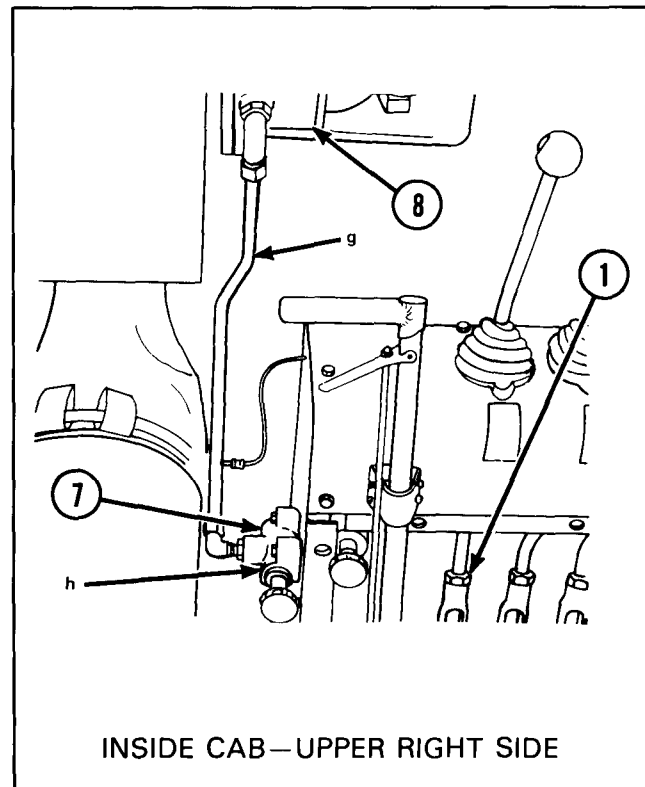
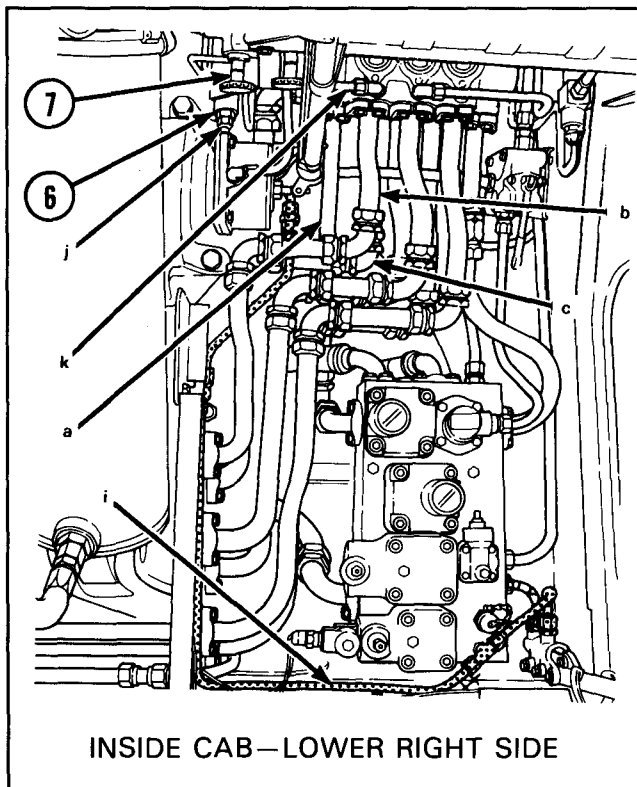
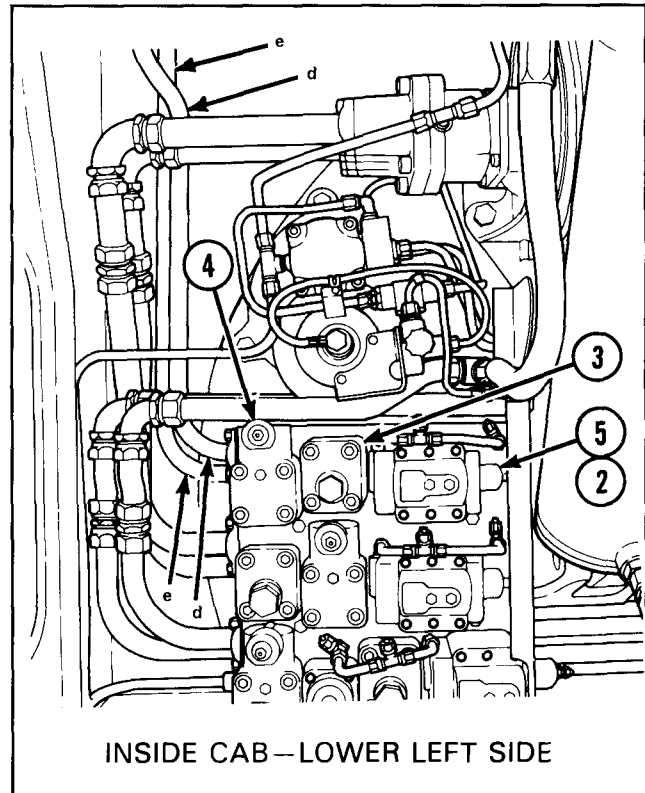
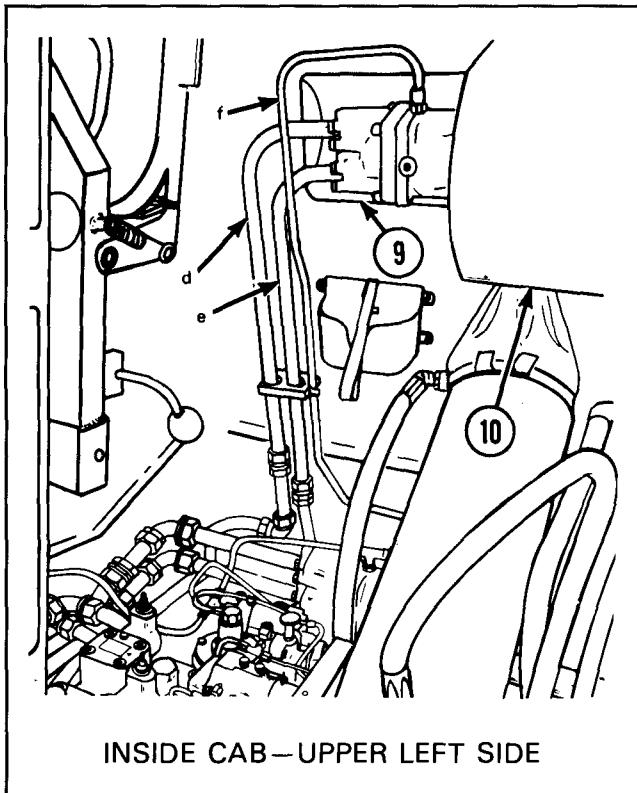
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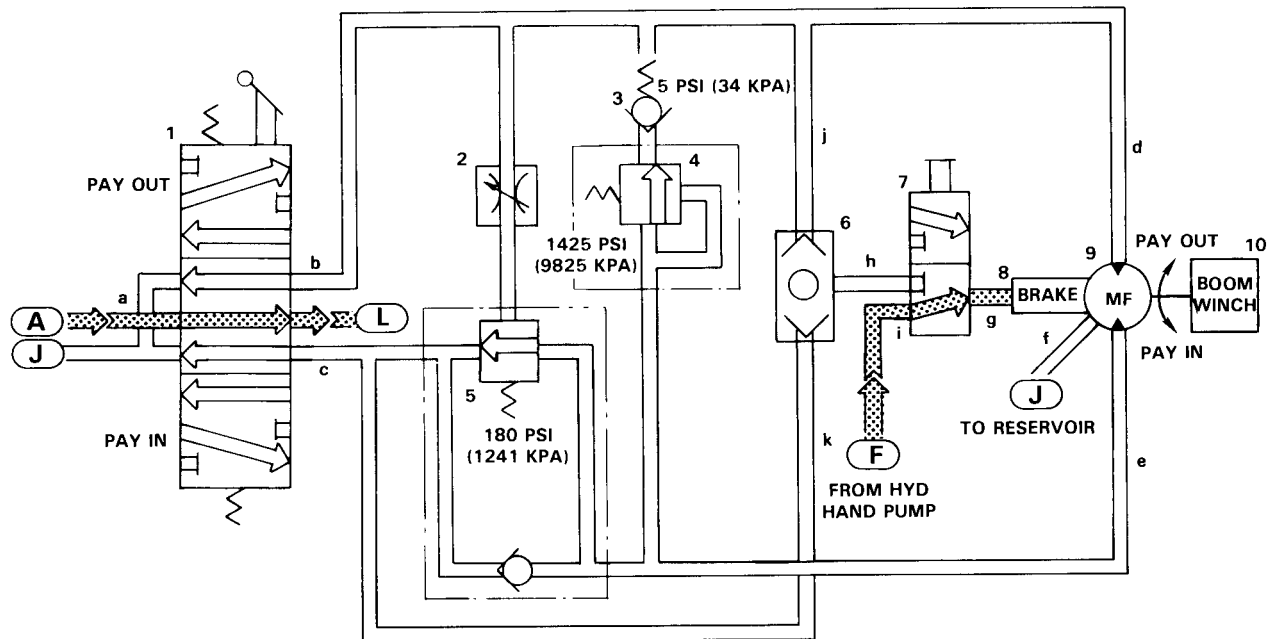
- 1 Directional control valve
- 2 Flow control valve
- 3 Check valve
- 4 Relief valve
- 5 Relief valve
- 6 Shuttle valve
- 7 Brake release valve
- 8 Brake
- 9 Hydraulic motor
- 10 Winch

BAR CODE

-  Supply pressure
-  Intake or return
-  Pilot or reduced pressure
-  Inactive blank

F-8. BOOM WINCH HYDRAULIC SUBSYSTEM - MANUAL RELEASE.

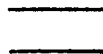




LEGEND

- 1 Directional control valve
- 2 Flow control valve
- 3 Check valve
- 4 Relief valve
- 5 Relief valve
- 6 Shuttle valve
- 7 Brake release valve
- 8 Brake
- 9 Hydraulic motor
- 10 Winch

BAR CODE

-  Supply pressure
-  Intake or return
-  Pilot or reduced pressure
-  Inactive blank

F-9. TRAVERSING HYDRAULIC SUBSYSTEM.

Functional Description.

a. The hydraulic fluid power for the operation of the traversing subsystem is supplied by the hydraulic power subsystem.

b. The traversing hydraulic subsystem controls the power for rotational movement of the cab.

c. Depressing the forward portion of the foot pedal of the directional control valve (2), directs hydraulic fluid at 2050 psi (14,135 kPa) through the solenoid valve (4) to the brake release valve (6), releasing the brake (7), and to the hydraulic motor (9), which traverses the cab to the left. The return flow from the hydraulic motor (9) passes through the solenoid valve (3) and the directional control valve (2) and back to the reservoir.

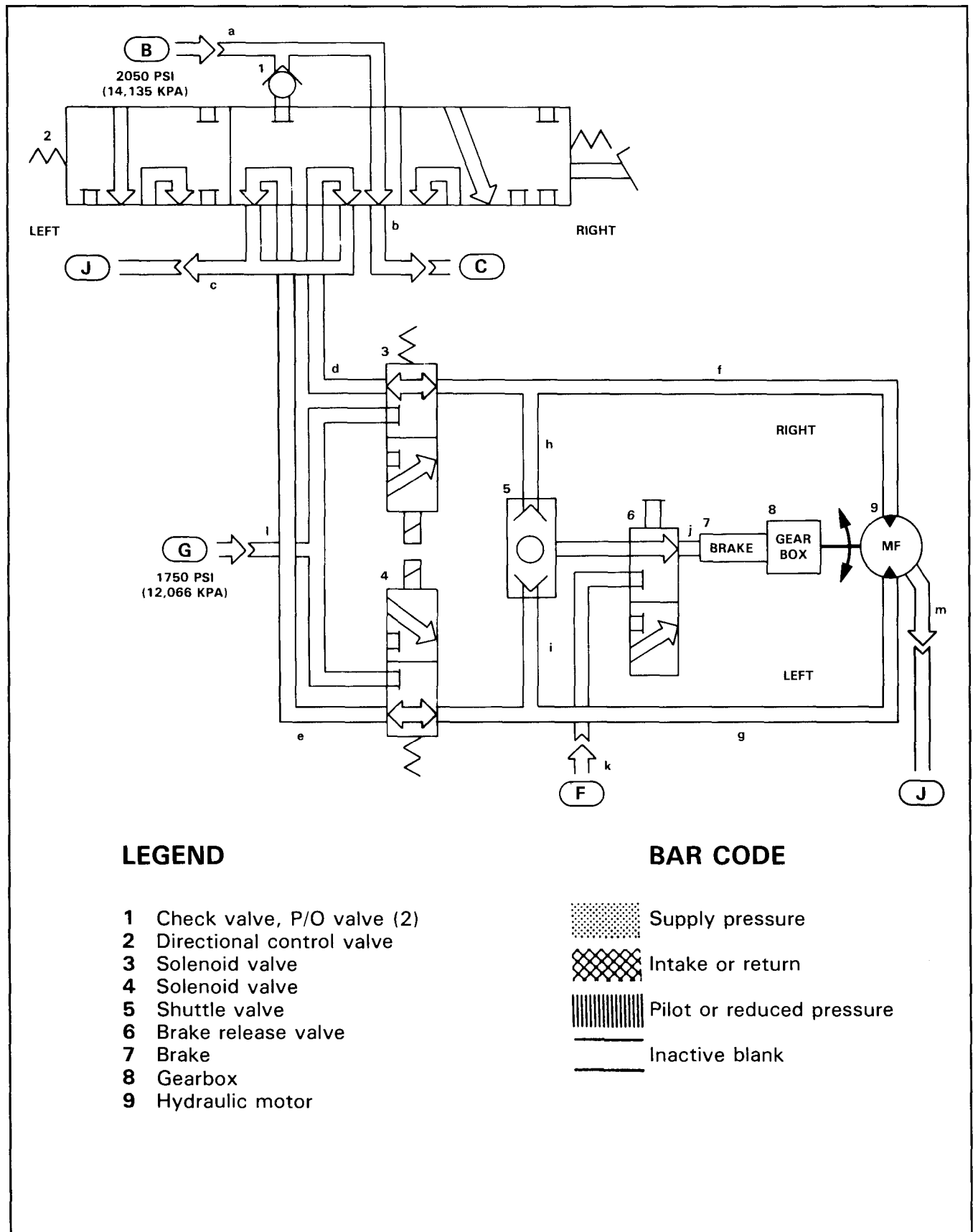
d. Depressing the rear portion of the foot pedal of the directional control valve (2) has the same effect as when traversing left, described above, except that the hydraulic fluid is routed in the opposite

direction through the hydraulic motor (9), which traverses the cab to the right.

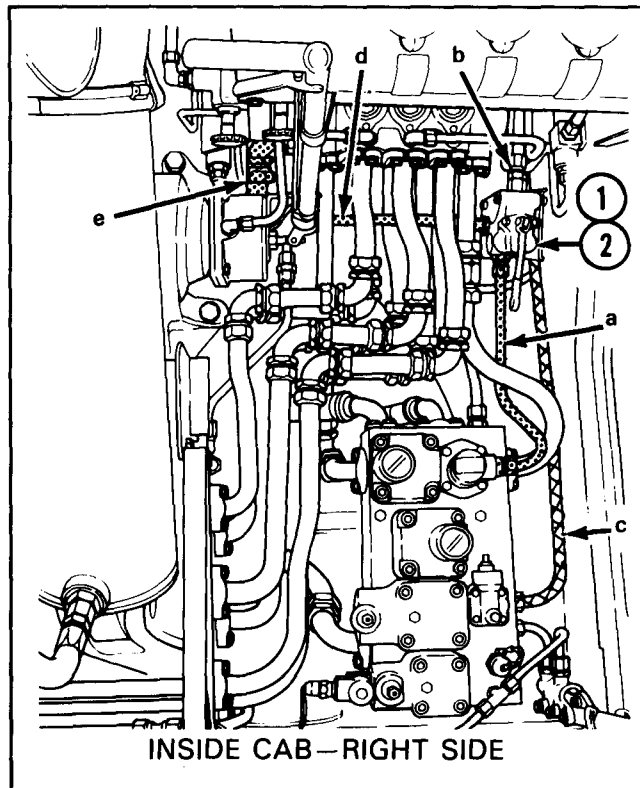
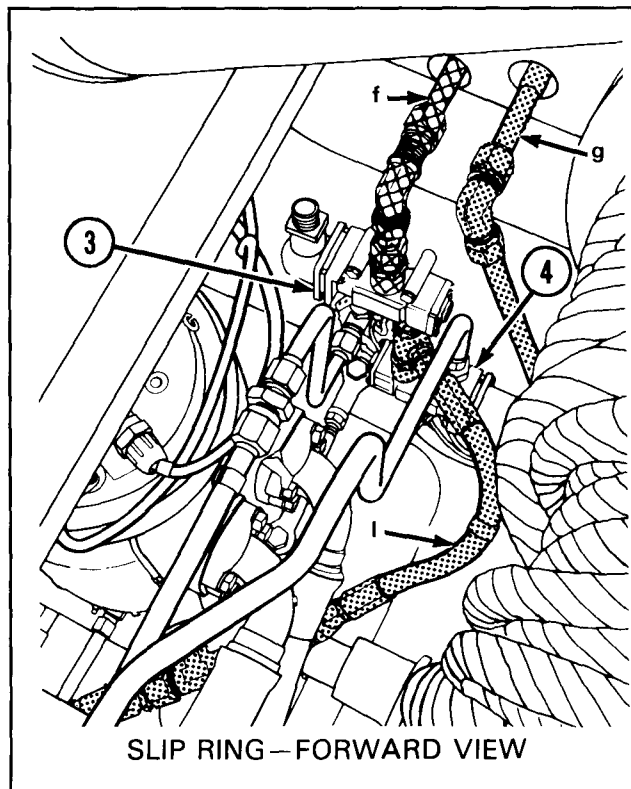
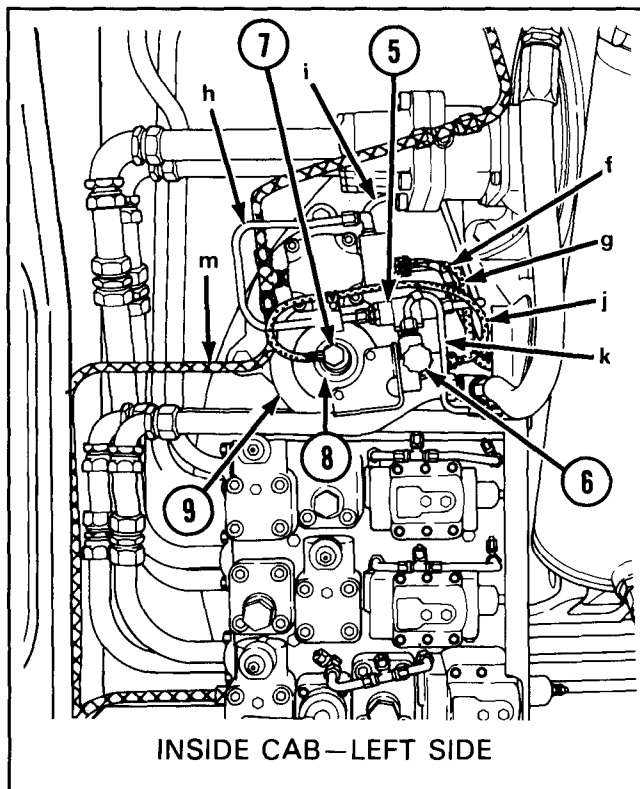
e. When directional control valve (2) is in neutral position, hydraulic fluid flows through the open center port to the flow divider manifold in the hydraulic power subsystem.

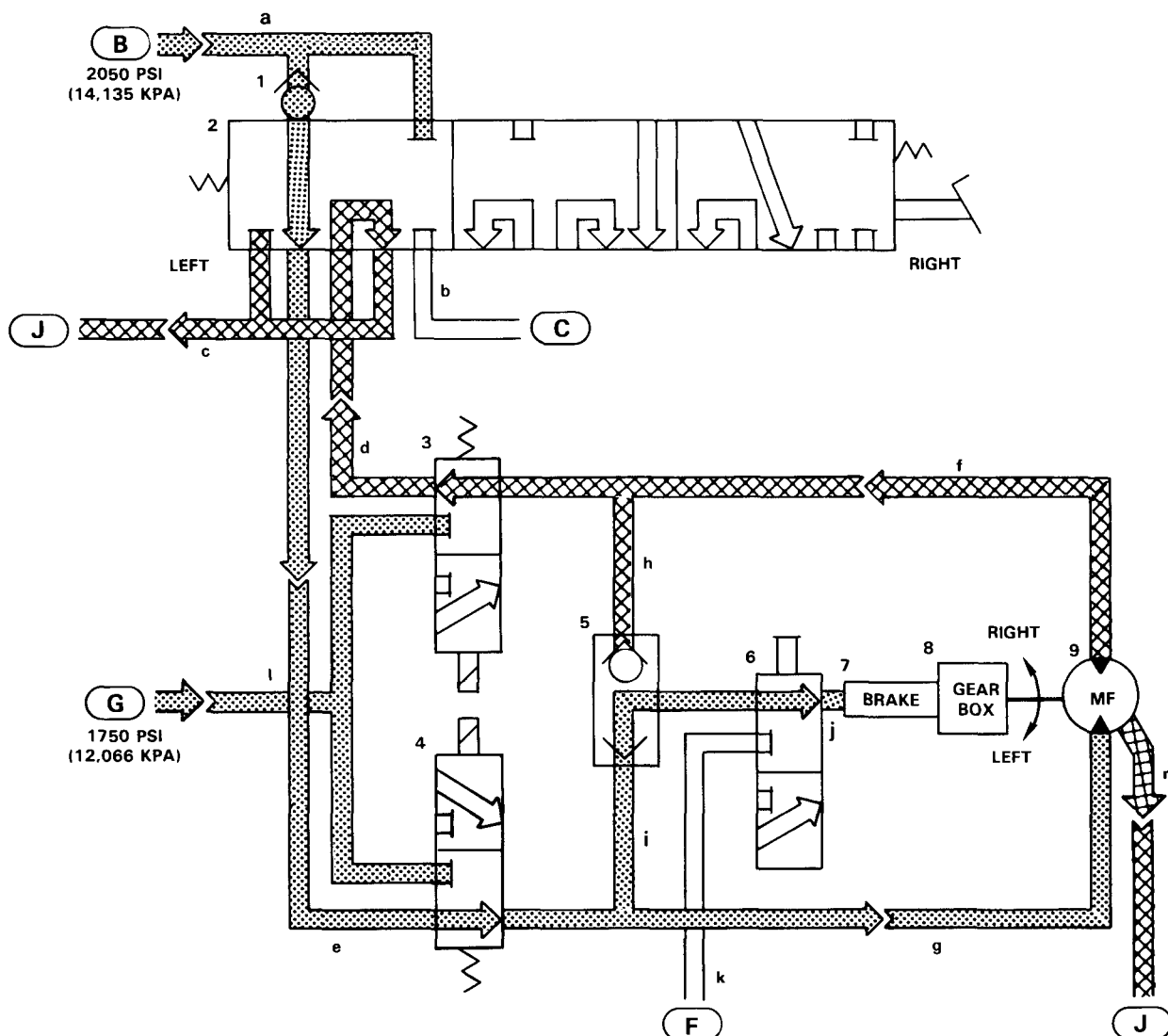
f. When the engine is not operating or during hydraulic power failure, the traversing brake (7) can be manually released by setting the brake release valve (6) to HAND PUMP PRESSURE and operating the hand pump, so that the cab can be rotated.

g. During tow winch operation, cab traversing is controlled automatically by an electrical sensing system. The sensing system energizes either the solenoid valve (3) for right traversing, or the solenoid valve (4) for left traversing. Hydraulic pressure at 1750 psi (12,066 kPa) is supplied by the 8 gpm pump in the hydraulic power subsystem.



F-10. TRAVERSING HYDRAULIC SUBSYSTEM - TRAVERSING LEFT.





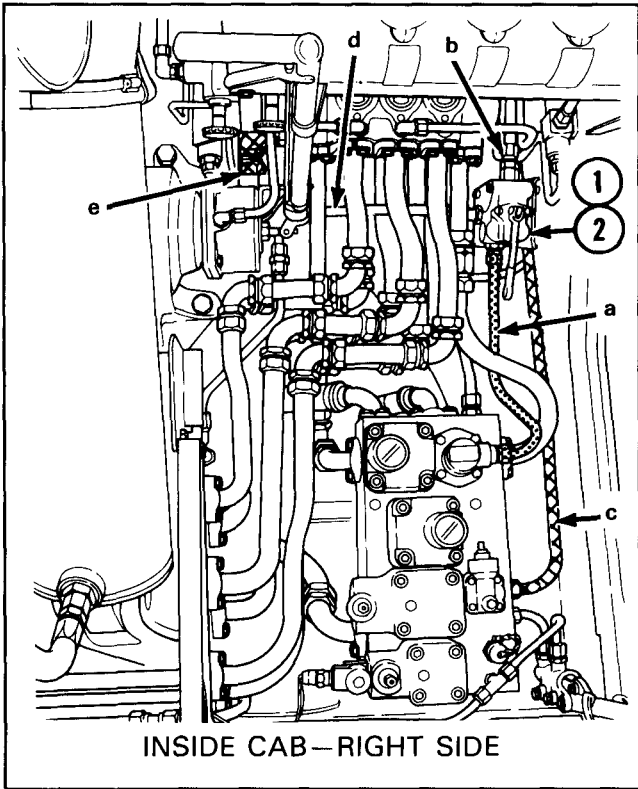
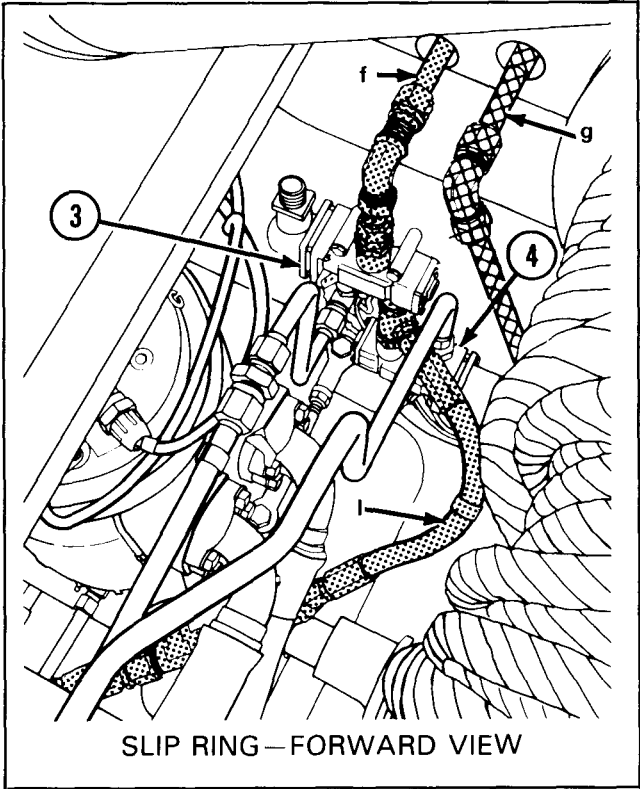
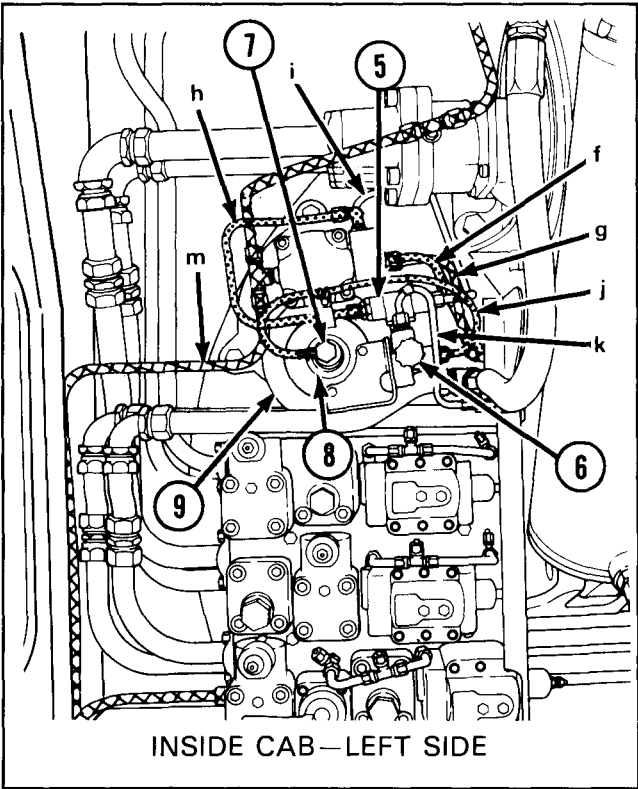
LEGEND

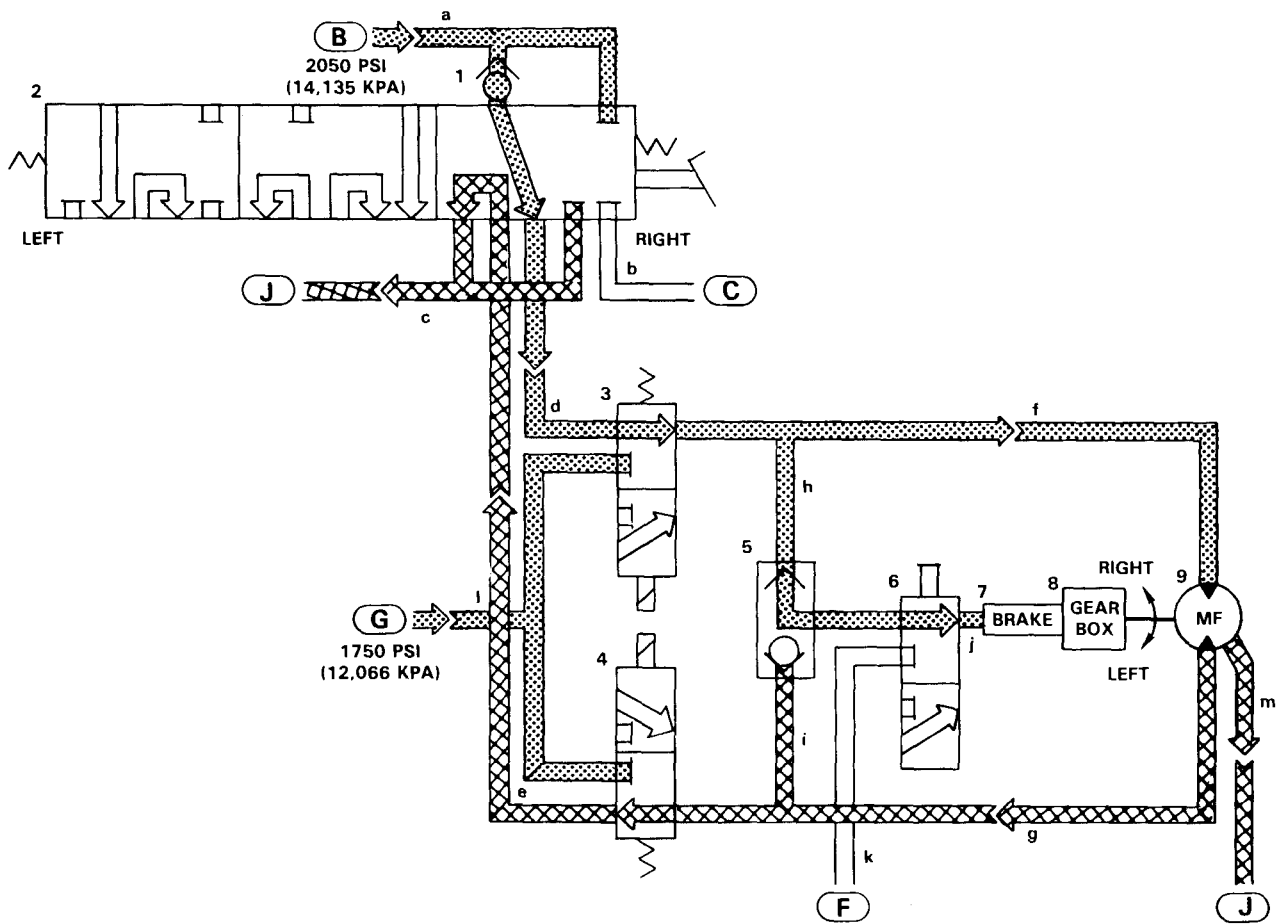
- 1 Check valve, P/O valve (2)
- 2 Directional control valve
- 3 Solenoid valve
- 4 Solenoid valve
- 5 Shuttle valve
- 6 Brake release valve
- 7 Brake
- 8 Gearbox
- 9 Hydraulic motor

BAR CODE

-  Supply pressure
-  Intake or return
-  Pilot or reduced pressure
-  Inactive blank

F-11. TRAVERSING HYDRAULIC SUBSYSTEM - TRAVERSING RIGHT.

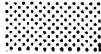
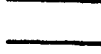




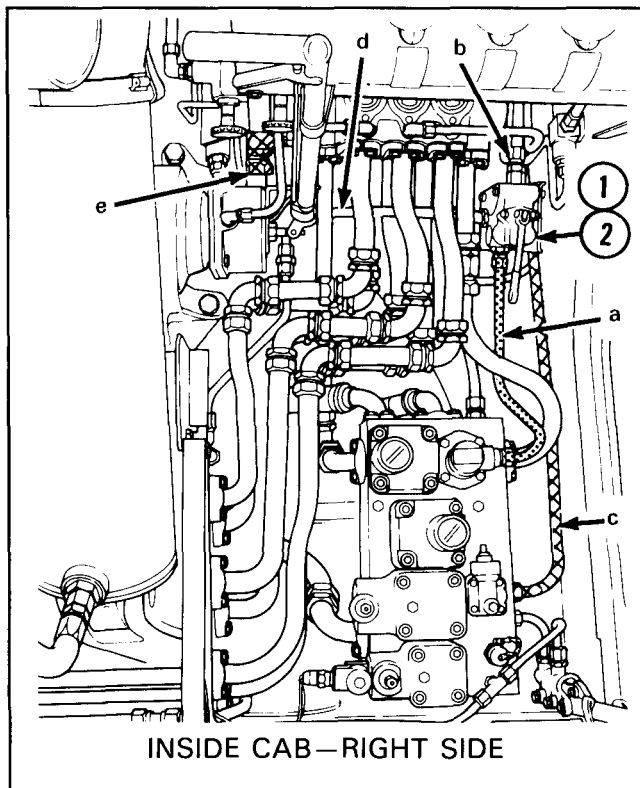
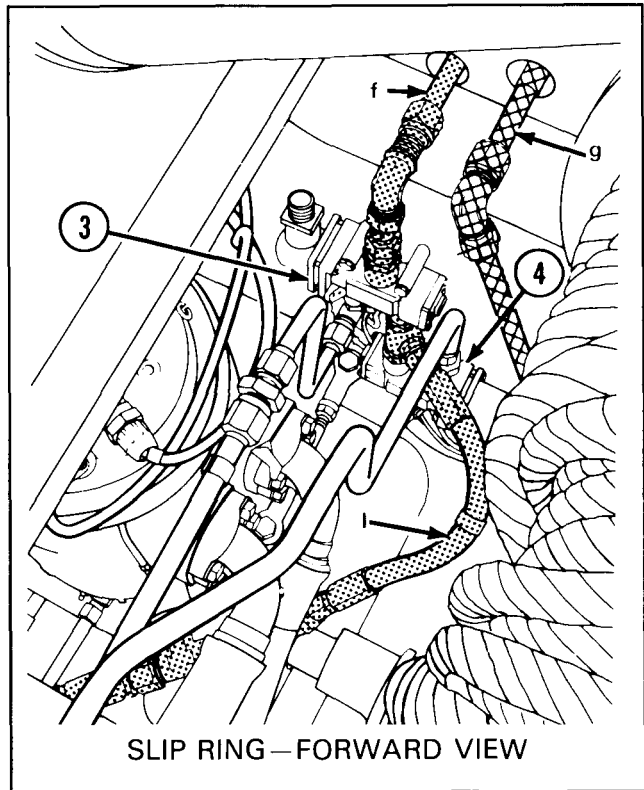
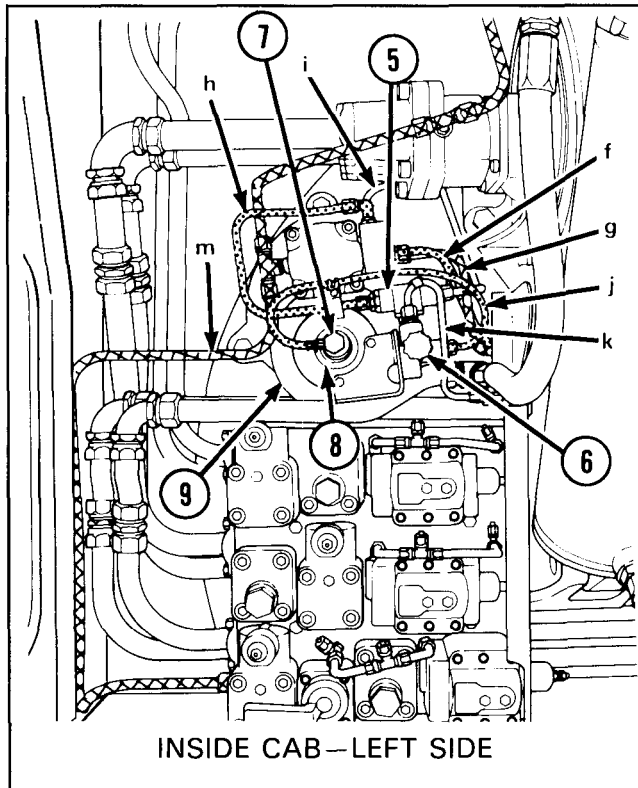
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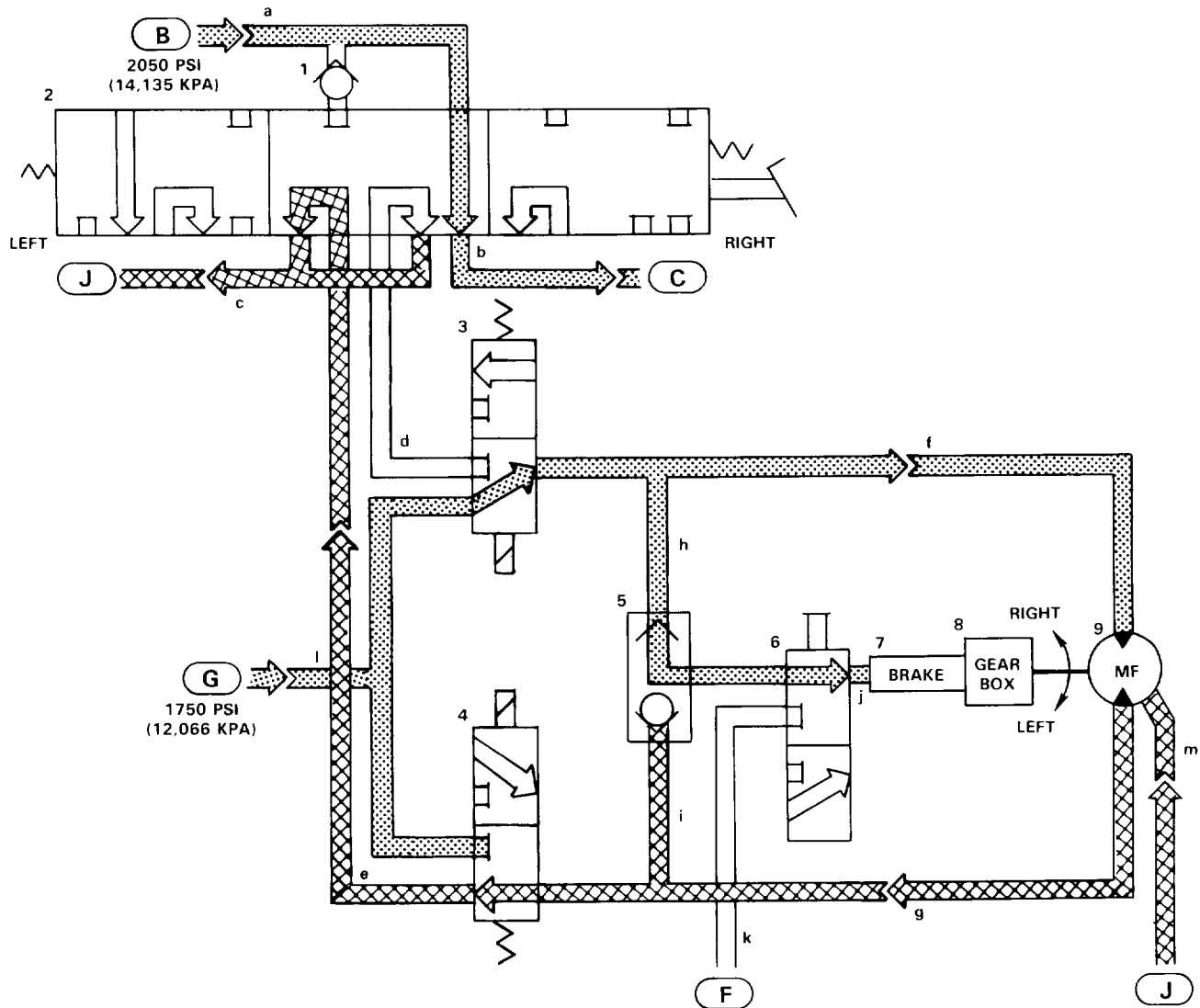
- 1 Check valve, P/O valve (2)
- 2 Directional control valve
- 3 Solenoid valve
- 4 Solenoid valve
- 5 Shuttle valve
- 6 Brake release valve
- 7 Brake
- 8 Gearbox
- 9 Hydraulic motor

BAR CODE

-  Supply pressure
-  Intake or return
-  Pilot or reduced pressure
-  Inactive blank

F-12. TRAVERSING HYDRAULIC SUBSYSTEM - LEVEL WIND TRAVERSING RIGHT.





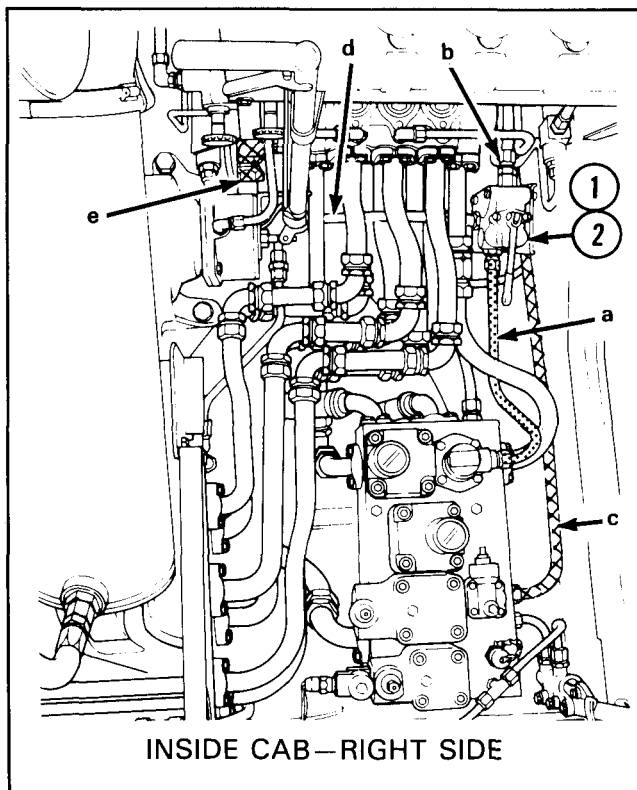
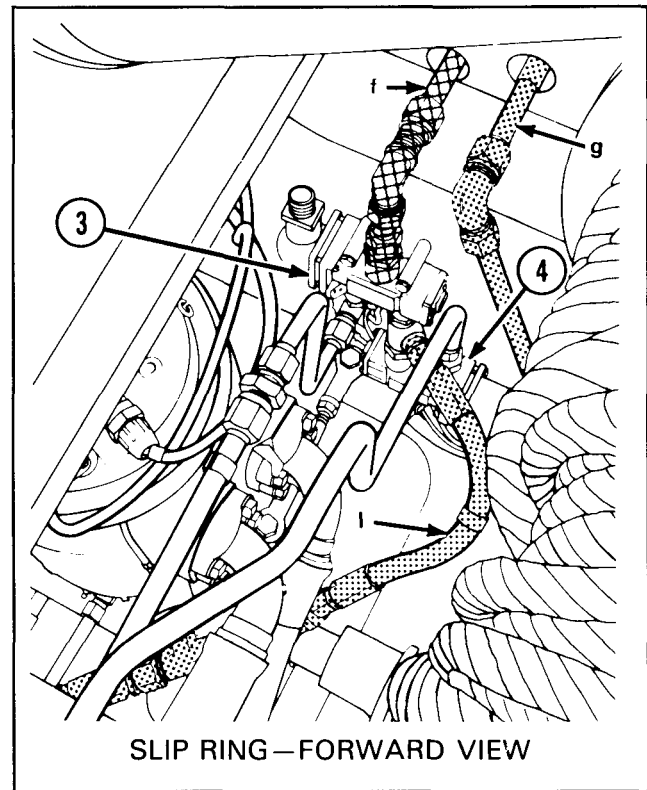
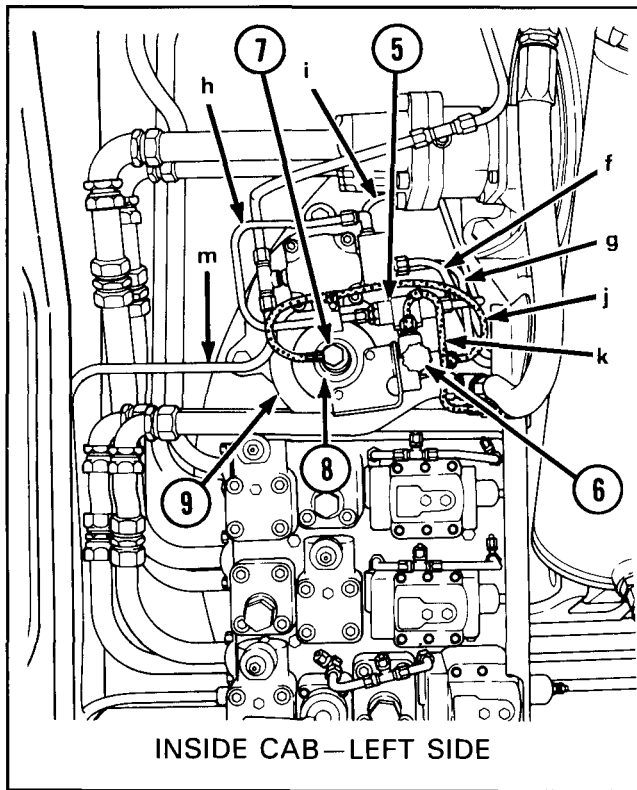
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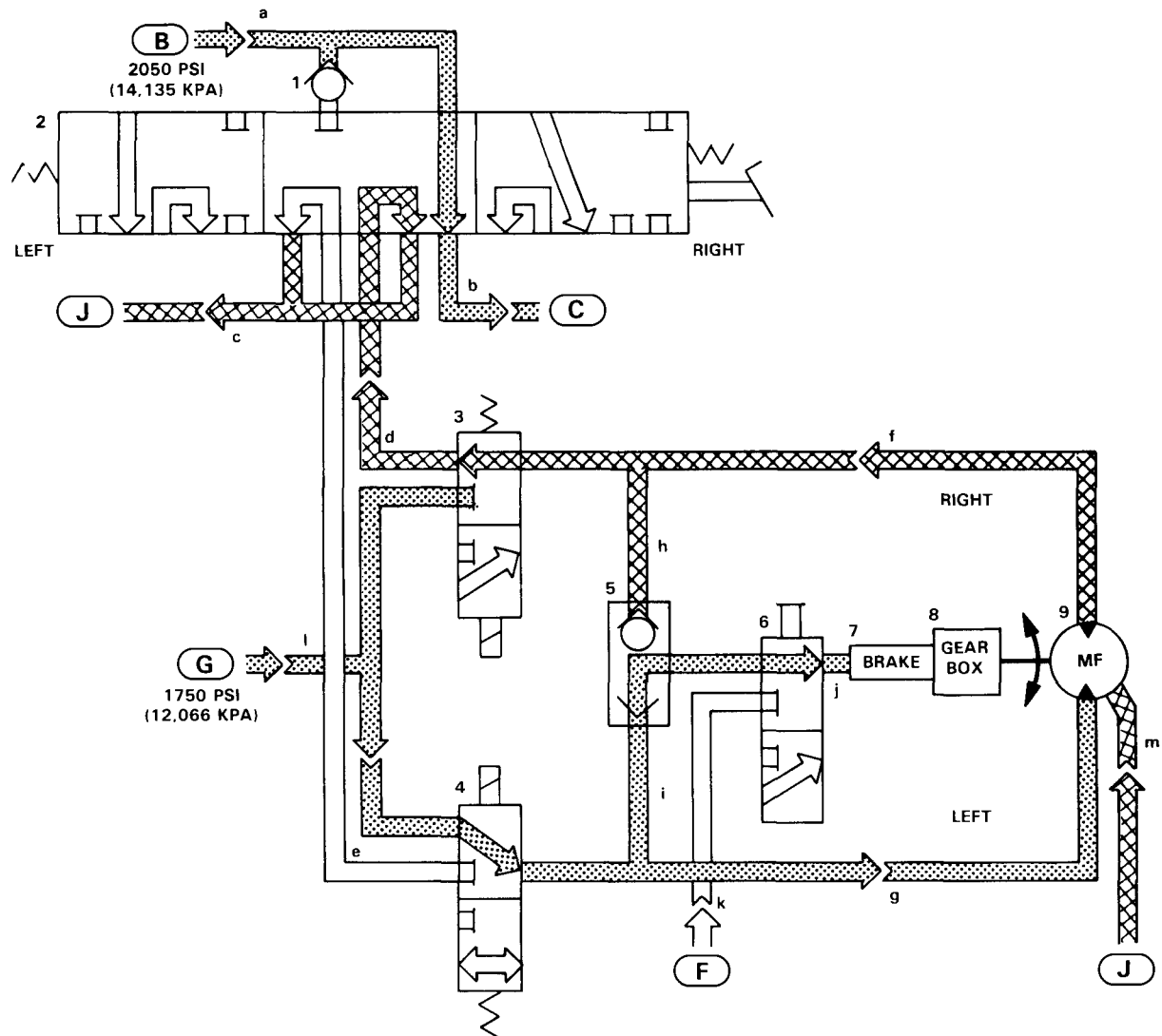
- 1 Check valve, P/O valve (2)
- 2 Directional control valve
- 3 Solenoid valve
- 4 Solenoid valve
- 5 Shuttle valve
- 6 Brake release valve
- 7 Brake
- 8 Gearbox
- 9 Hydraulic motor

BAR CODE

-  Supply pressure
 Intake or return
 Pilot or reduced pressure
 Inactive blank

F-13. TRAVERSING HYDRAULIC SUBSYSTEM - LEVEL WIND TRAVERSING LEFT.





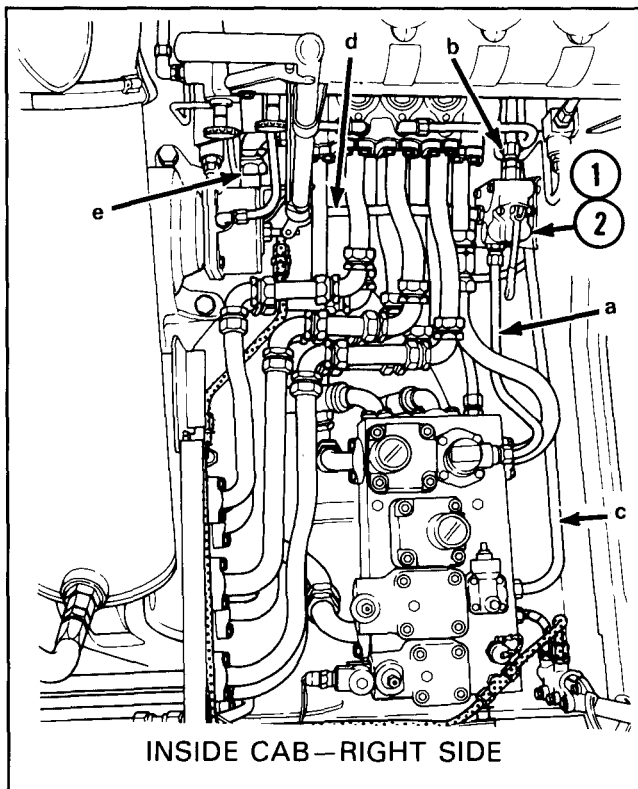
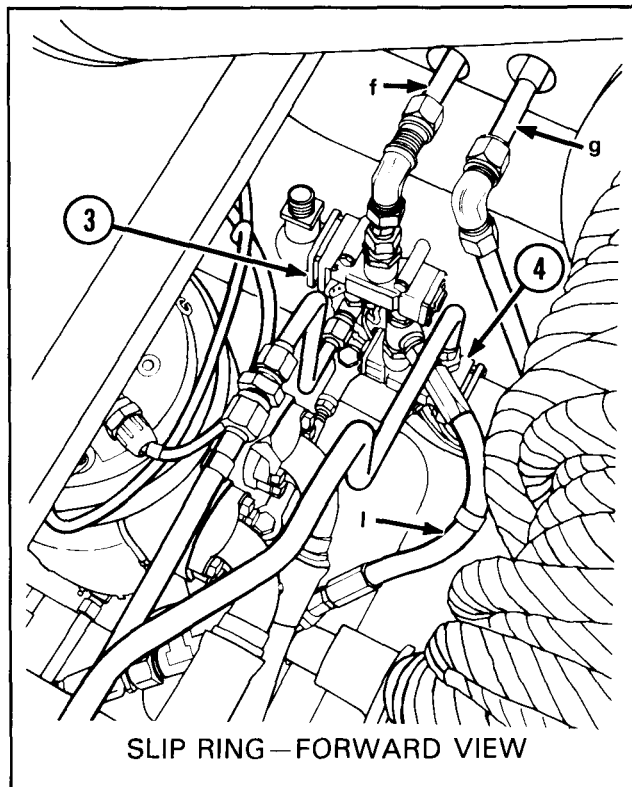
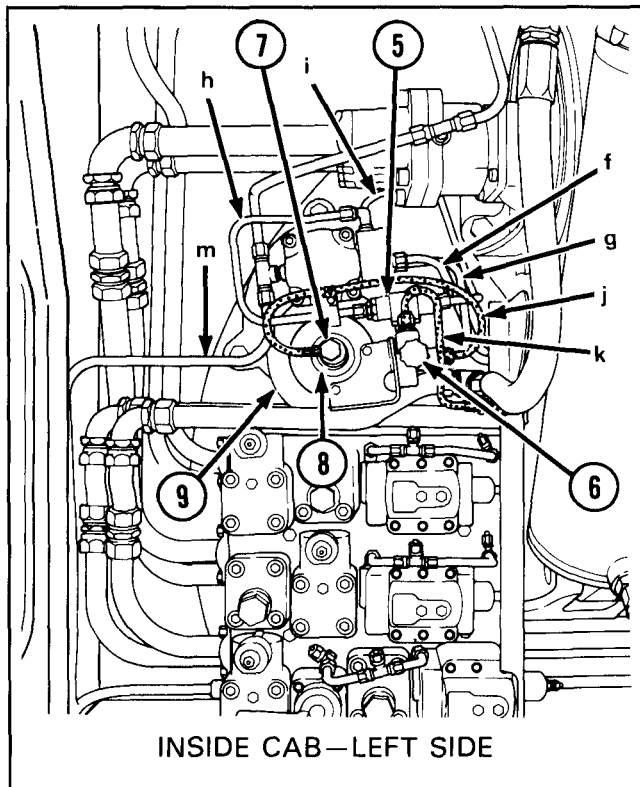
LEGEND

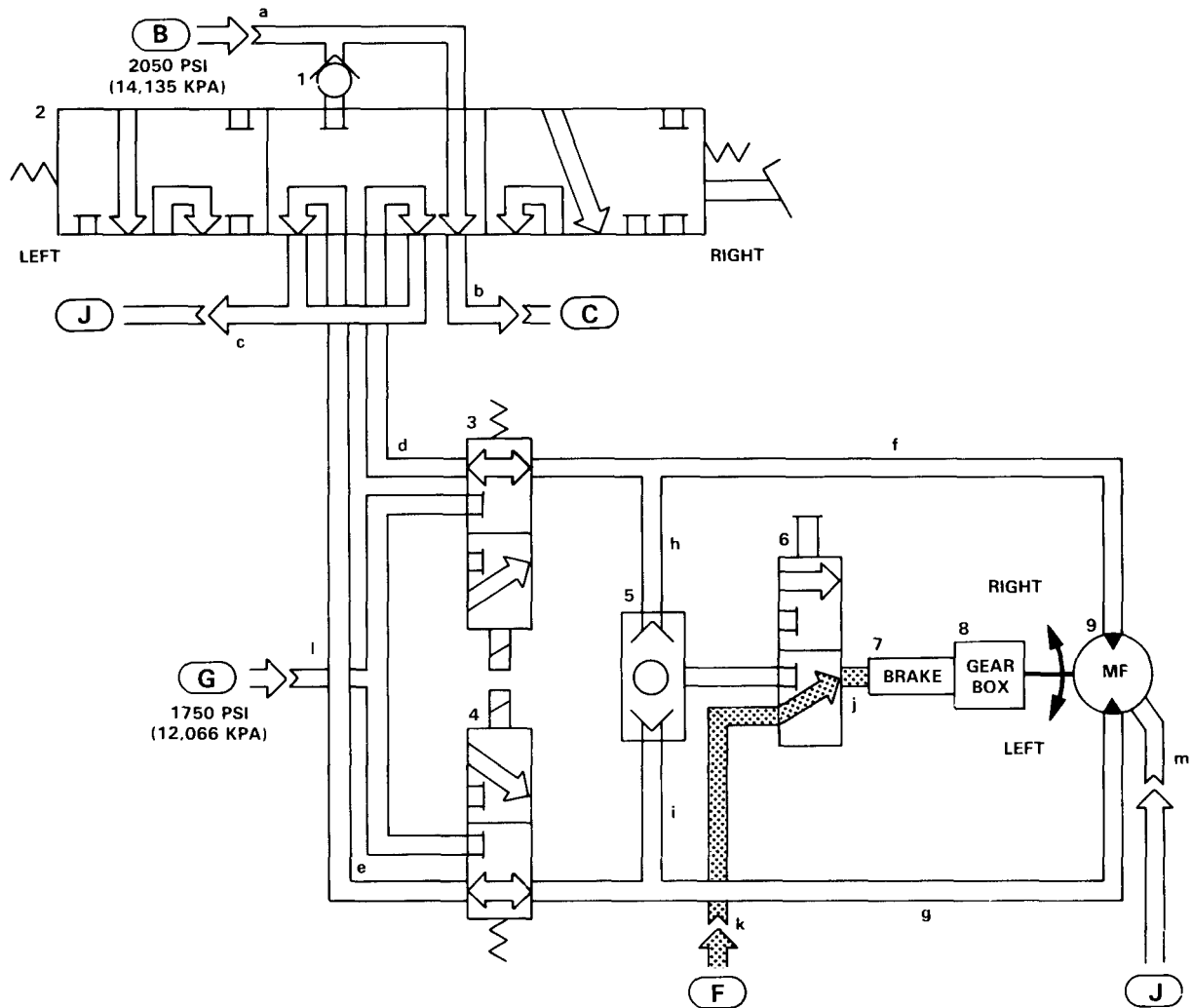
- 1 Check valve, P/O valve (2)
- 2 Directional control valve
- 3 Solenoid valve
- 4 Solenoid valve
- 5 Shuttle valve
- 6 Brake release valve
- 7 Brake
- 8 Gearbox
- 9 Hydraulic motor

BAR CODE

-  Supply pressure
-  Intake or return
-  Pilot or reduced pressure
-  Inactive blank

F-14. TRAVERSING HYDRAULIC SUBSYSTEM - MANUAL RELEASE.





LEGEND

- 1 Check valve, P/O valve (2)
- 2 Directional control valve
- 3 Solenoid valve
- 4 Solenoid valve
- 5 Shuttle valve
- 6 Brake release valve
- 7 Brake
- 8 Gearbox
- 9 Hydraulic motor

BAR CODE

-  Supply pressure
 Intake or return
 Pilot or reduced pressure
 Inactive blank

F-15. BOOM CYLINDER HYDRAULIC SUBSYSTEM.

Functional Description.

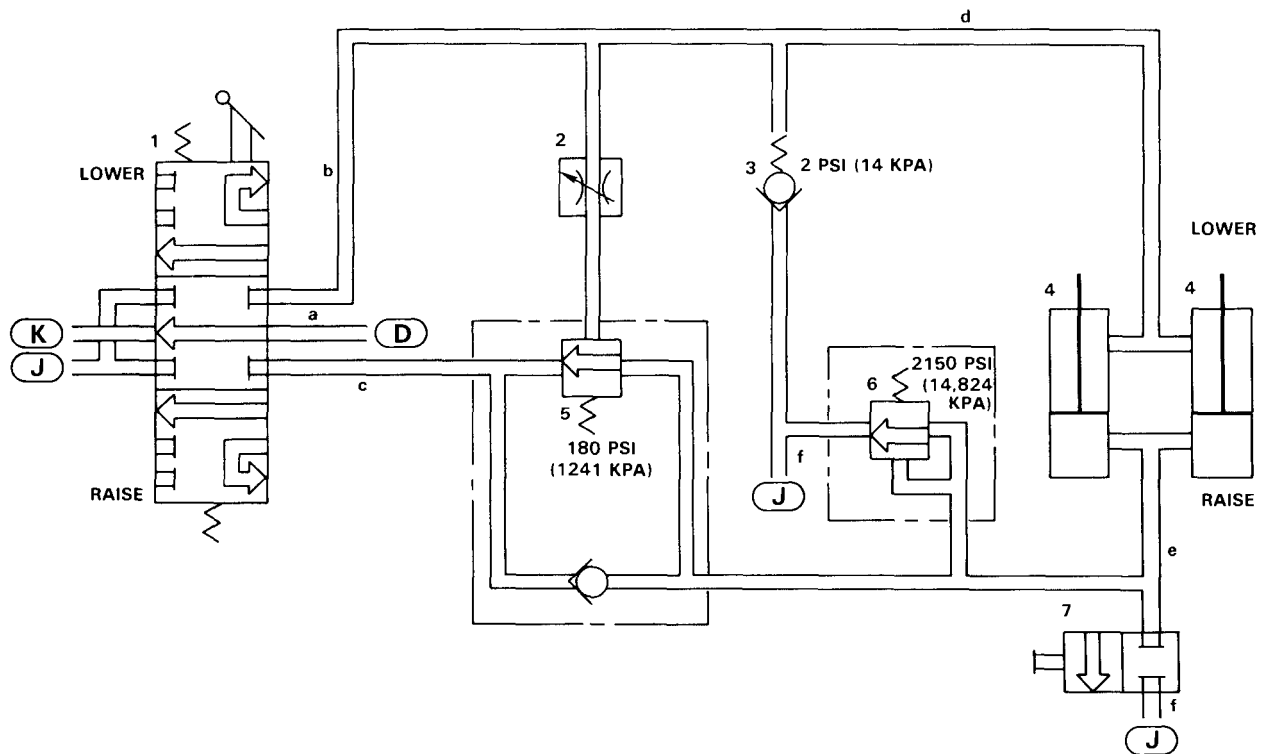
a. The hydraulic fluid power for the operation of the boom cylinders is supplied by the hydraulic power subsystem.

b. The boom cylinder hydraulic subsystem controls the power to raise and lower the boom.

c. Moving the handle of the directional control valve (1) in the RAISE position directs hydraulic fluid through the bypass check valve of the relief valve (5) to the extend ports of the boom cylinders (4), which raises the boom. The relief valve (6) releases excess hydraulic fluid pressure over 2150 psi (14,824 kPa) to return to the reservoir.

d. Moving the handle of the directional control valve (1) in the LOWER position directs hydraulic fluid to the retract ports of the boom cylinders (4), which lowers the boom. The relief valve (6) protects the subsystem from overpressure. Hydraulic pressure passing through the flow control valve (2) causes the relief valve (5) to open and allow return flow to the reservoir.

e. When the handle of the directional control valve (1) is in the neutral position, hydraulic fluid is blocked, hydraulically locking the boom cylinders in a fixed position. The emergency release valve (7) can be opened to lower the boom.



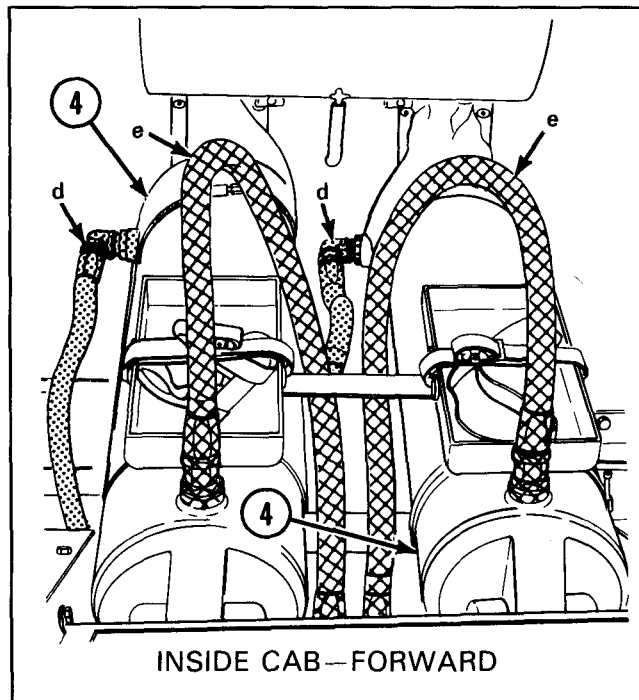
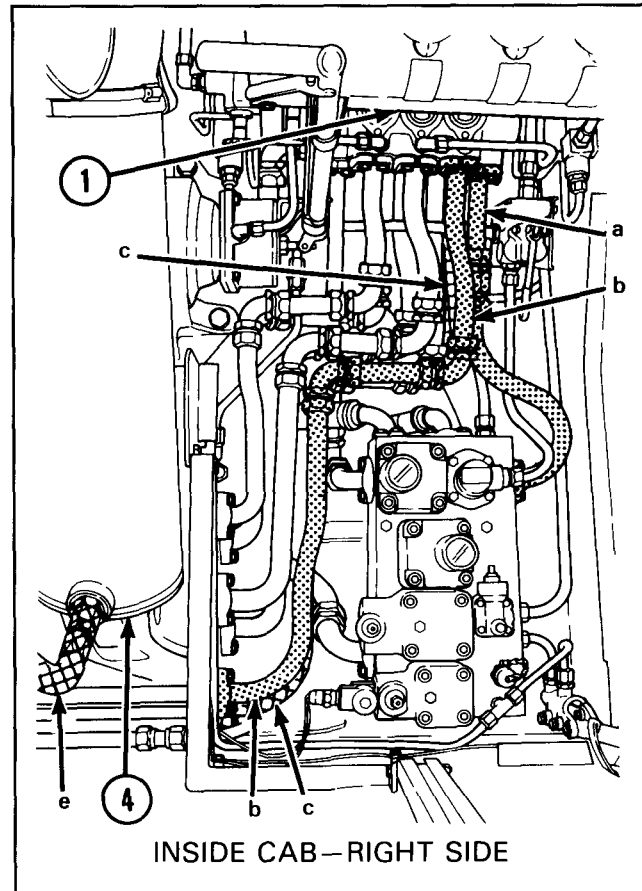
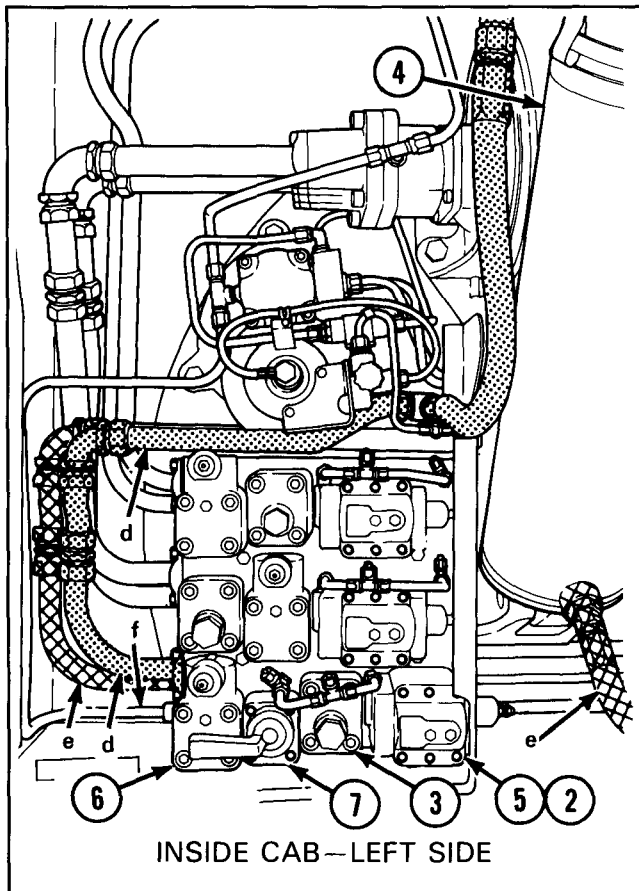
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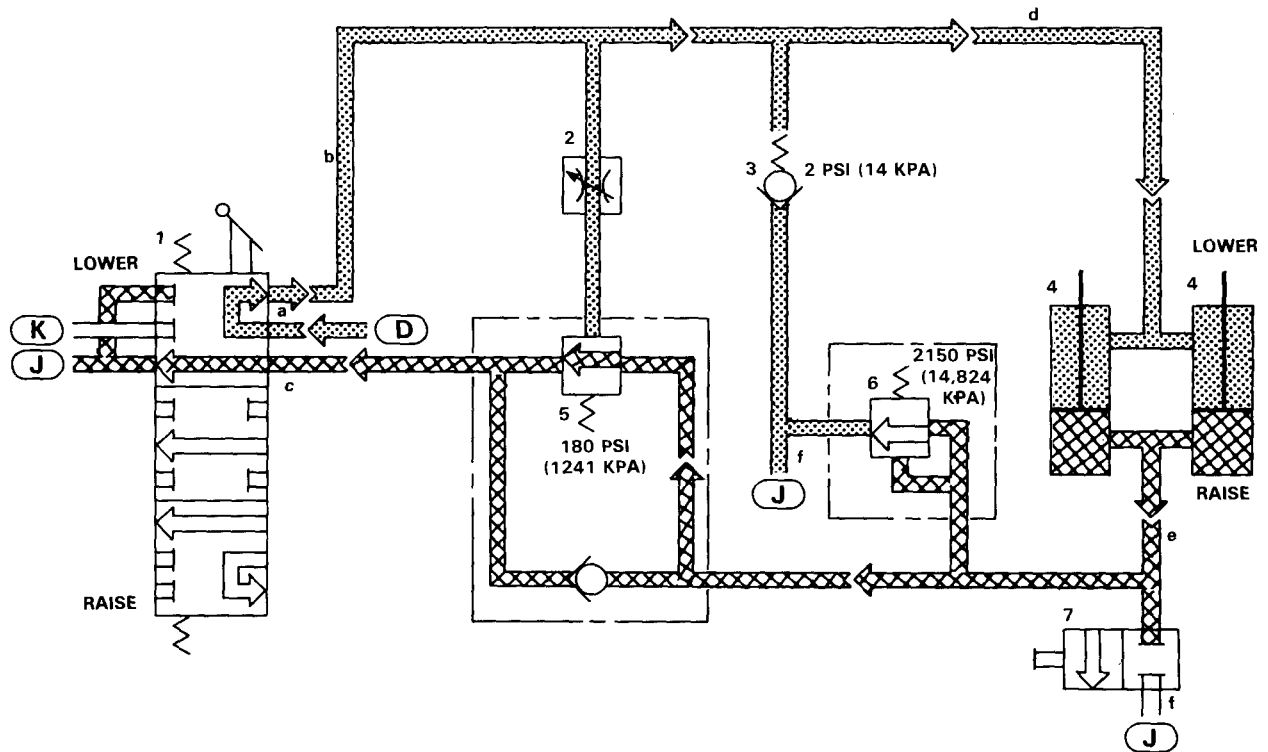
- 1 Directional control valve
- 2 Flow control valve, P/O valve (5)
- 3 Check valve
- 4 Hydraulic cylinder
- 5 Relief valve
- 6 Relief valve
- 7 Emergency release valve

BAR CODE

-  Supply pressure
-  Intake or return
-  Pilot or reduced pressure
-  Inactive blank

F-16. BOOM CYLINDER HYDRAULIC SUBSYSTEM - LOWERING BOOM.





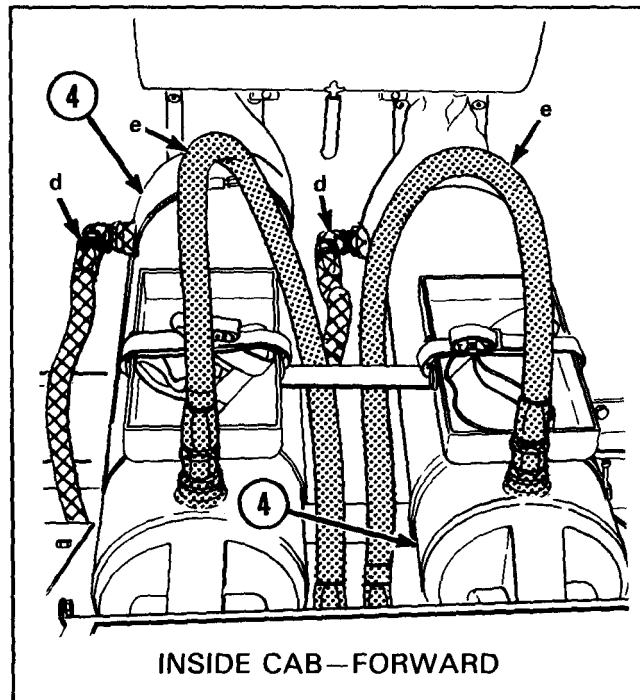
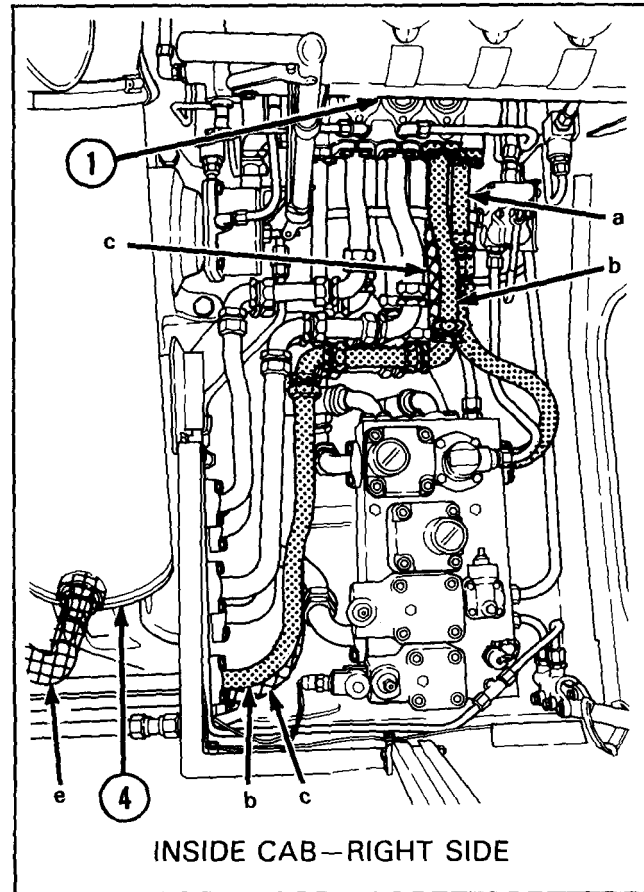
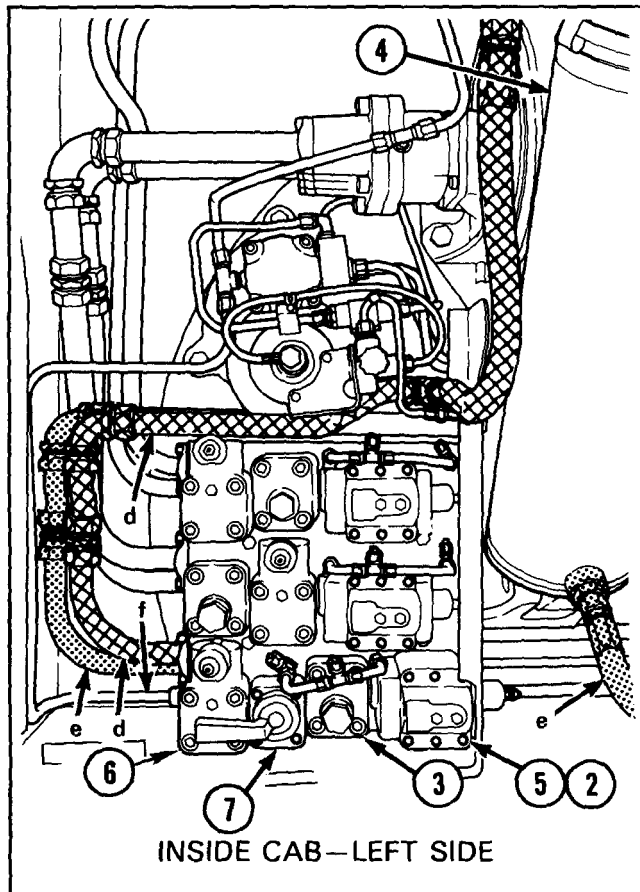
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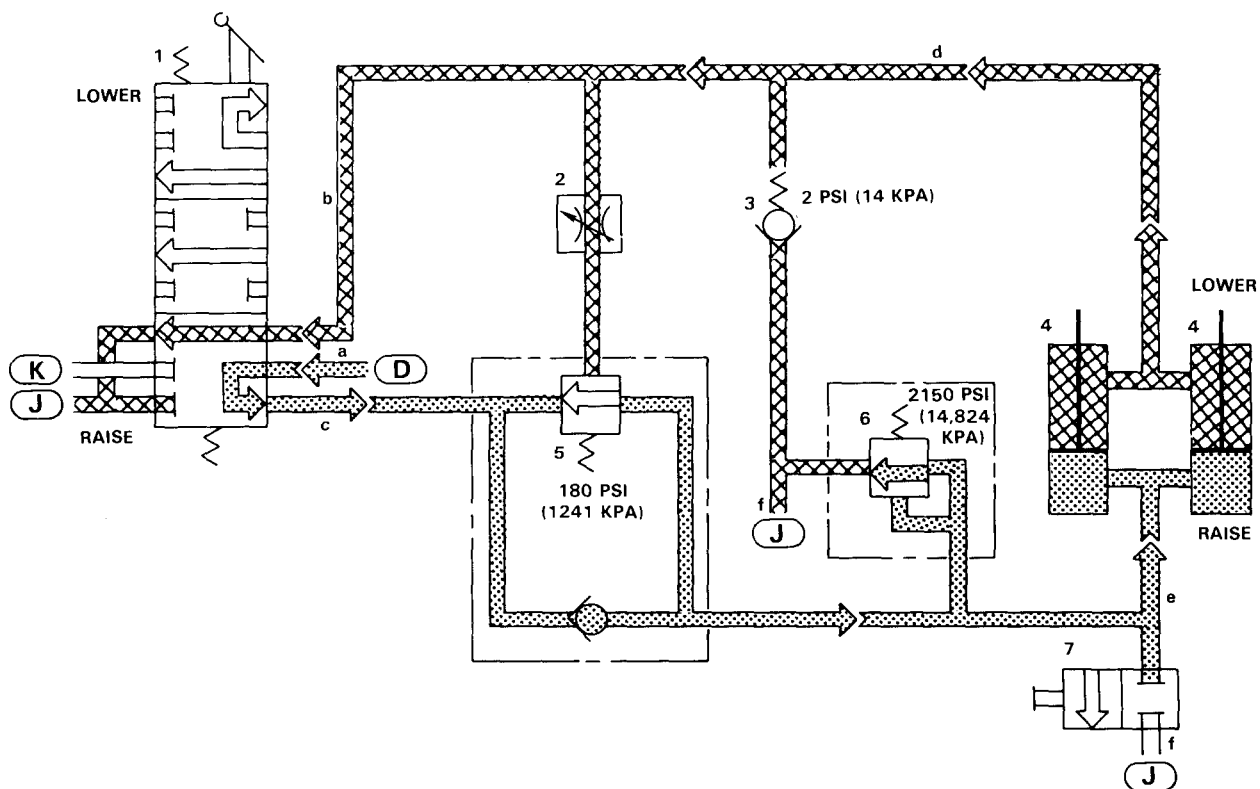
- 1 Directional control valve
- 2 Flow control valve, P/O valve (5)
- 3 Check valve
- 4 Hydraulic cylinder
- 5 Relief valve
- 6 Relief valve
- 7 Emergency release valve

BAR CODE

-  Supply pressure
-  Intake or return
-  Pilot or reduced pressure
-  Inactive blank

F-17. BOOM CYLINDER HYDRAULIC SUBSYSTEM - RAISING BOOM.





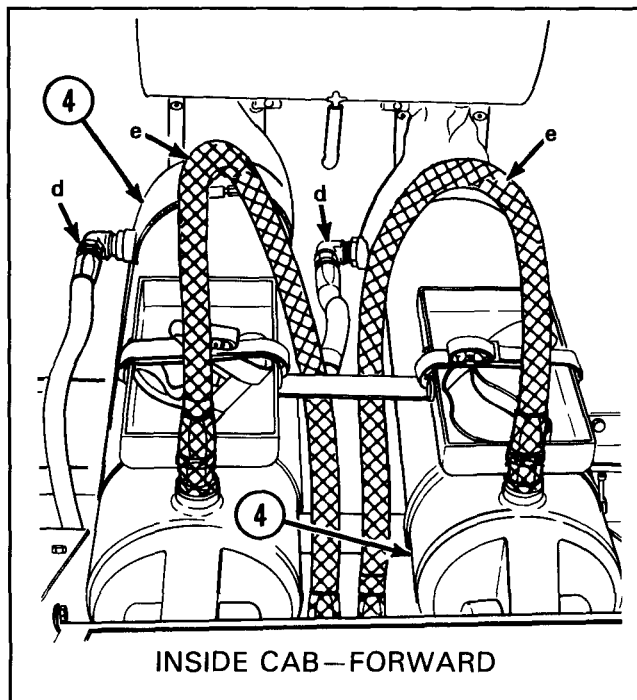
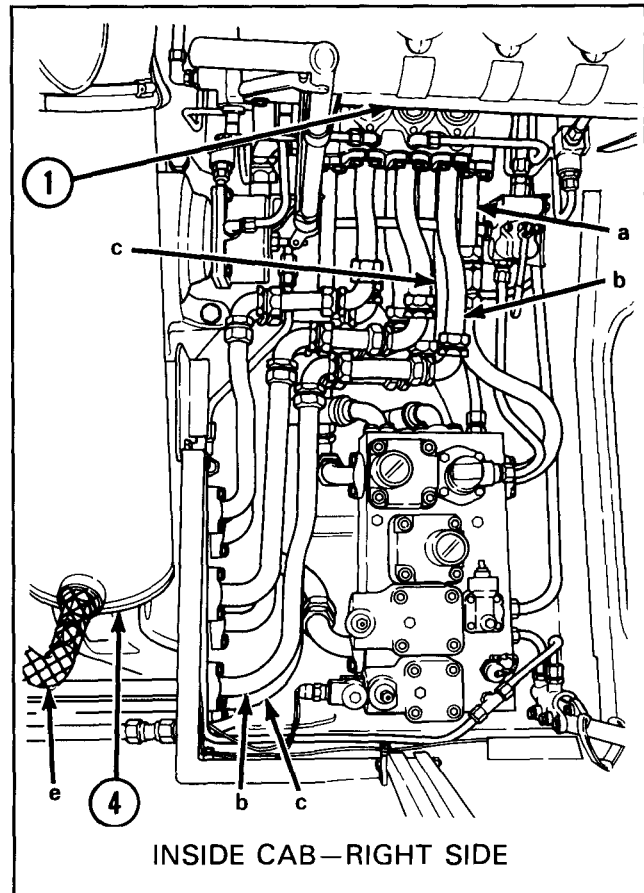
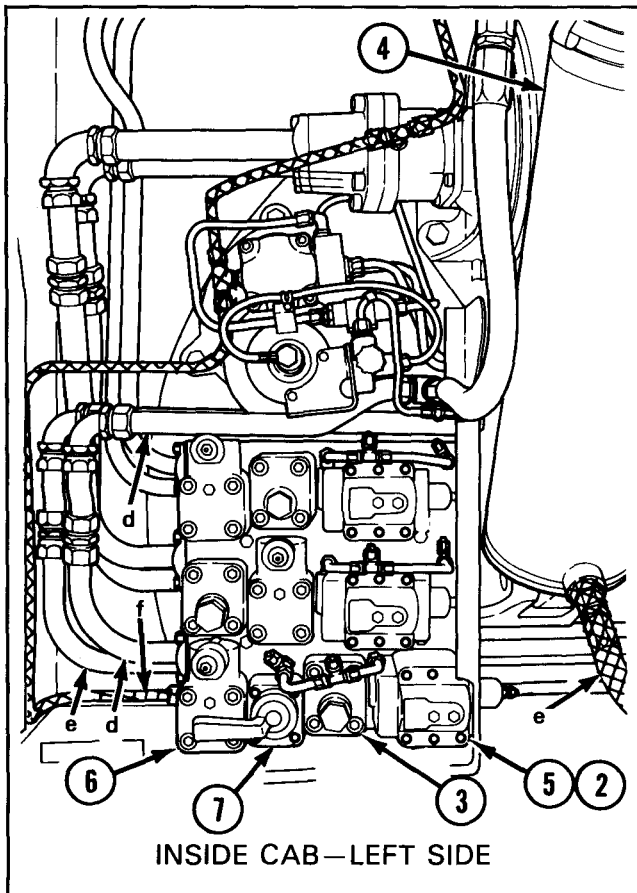
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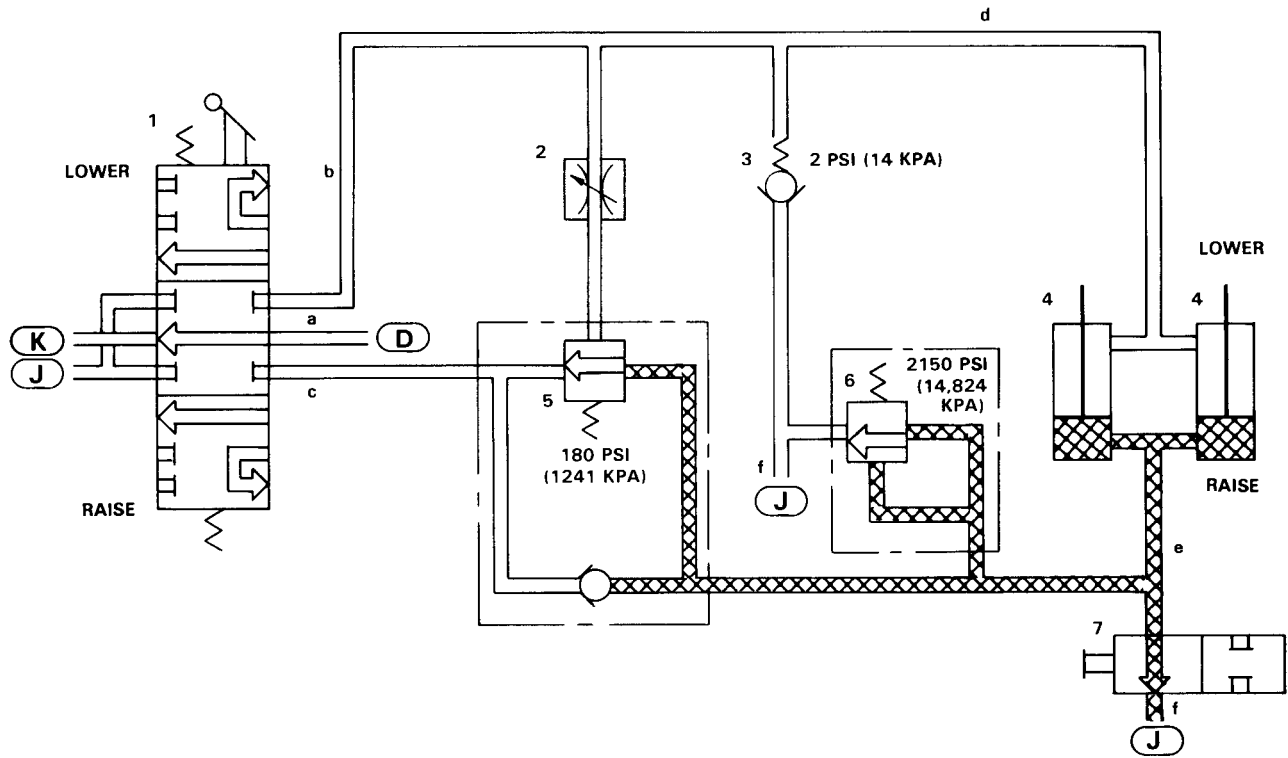
- 1 Directional control valve
- 2 Flow control valve, P/O valve (5)
- 3 Check valve
- 4 Hydraulic cylinder
- 5 Relief valve
- 6 Relief valve
- 7 Emergency release valve

BAR CODE

	Supply pressure
	Intake or return
	Pilot or reduced pressure
	Inactive blank

F-18. BOOM CYLINDER HYDRAULIC SUBSYSTEM - MANUAL LOWERING.





LEGEND

- 1 Directional control valve
- 2 Flow control valve, P/O valve (5)
- 3 Check valve
- 4 Hydraulic cylinder
- 5 Relief valve
- 6 Relief valve
- 7 Emergency release valve

BAR CODE

-  Supply pressure
-  Intake or return
-  Pilot or reduced pressure
-  Inactive blank

F-19. TOW WINCH HYDRAULIC SUBSYSTEM.

Functional Description.

a. The hydraulic fluid power for the operation of the tow winch is supplied by the hydraulic power subsystem.

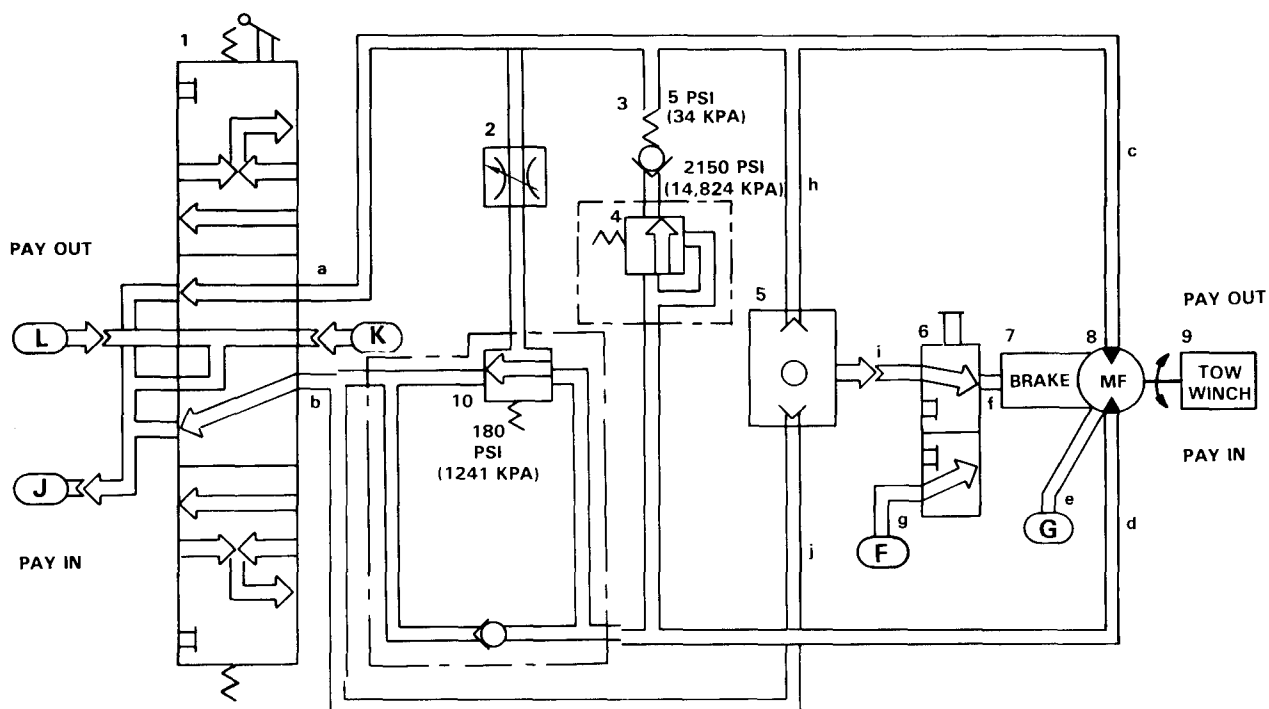
b. The tow winch hydraulic subsystem controls the power for tow winch operation when pulling or releasing a load.

c. Moving the handle of the directional control valve (1) in the PAY IN position directs hydraulic fluid to release brake (7) and operate the hydraulic motor (8) to retrieve the tow winch wire rope. Return fluid from the hydraulic motor (8) flows through the pressure relief valve (10) and the directional control valve (1), then to the reservoir. The relief valve (4) limits hydraulic pressure when paying in to 2150 psi (14,824 kPa) to protect winch components from overload.

d. Moving the handle of the directional control valve (1) in PAY OUT position has the same effect as in PAY IN except that the hydraulic fluid is routed in the opposite direction through the hydraulic motor (8). The relief valve (10) controls the rate of flow in the return line.

e. When the handle of the directional control valve (1) is in the neutral position, hydraulic fluid from both 40 gpm hydraulic pumps flows through the open center port to the reservoir.

f. If the boom winch is used at the same time that the tow winch is being used, the tow winch operation will be slowed down in proportion to boom winch use.



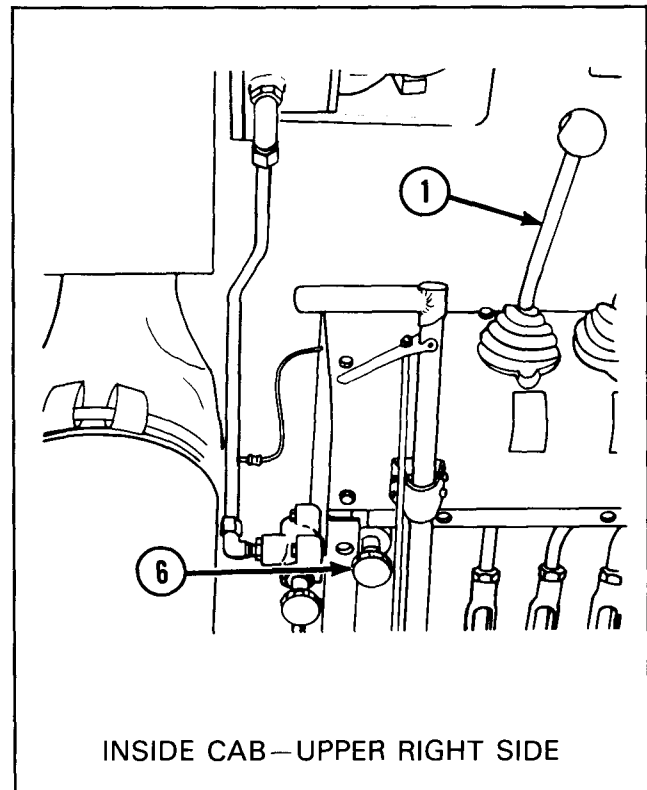
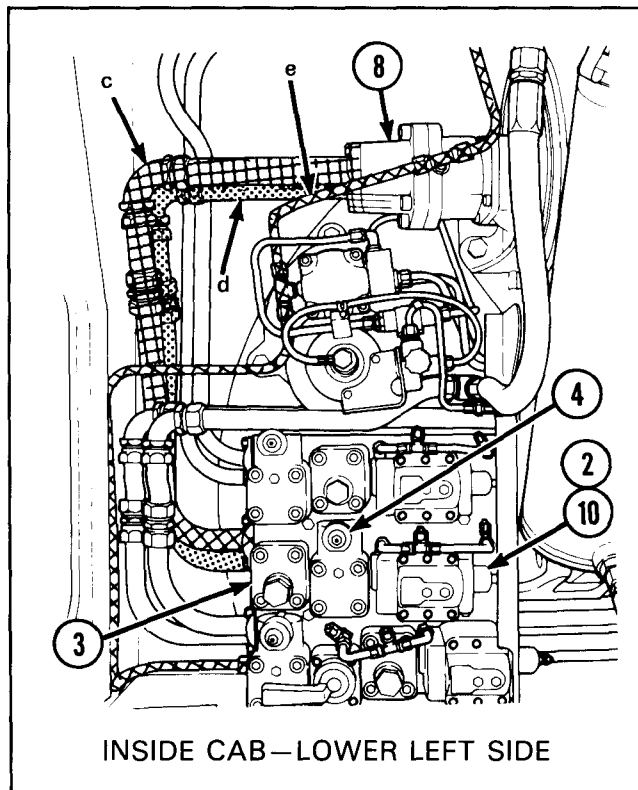
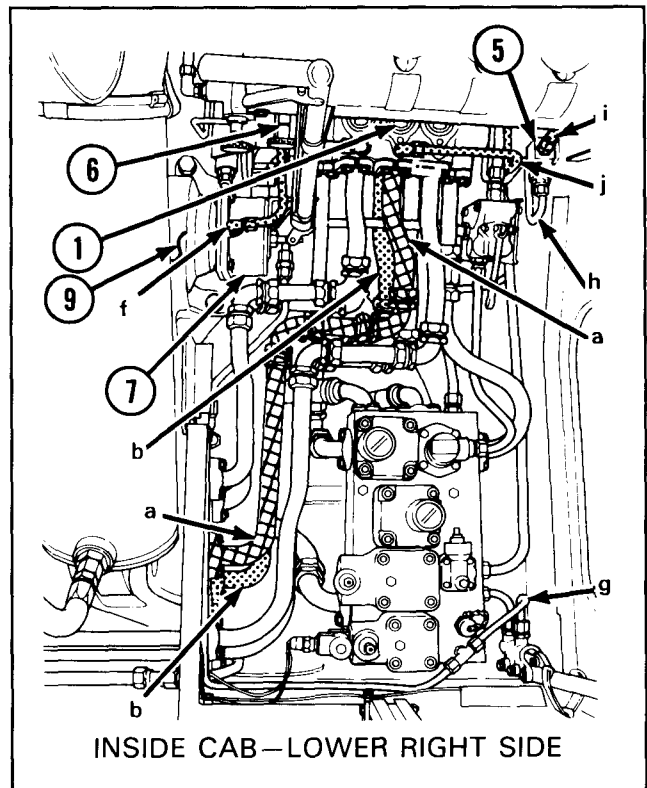
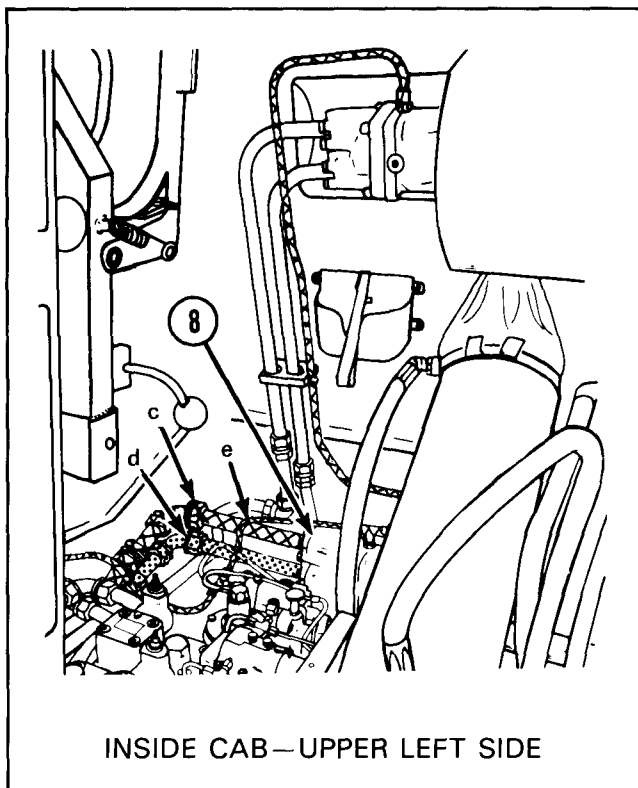
LEGEND

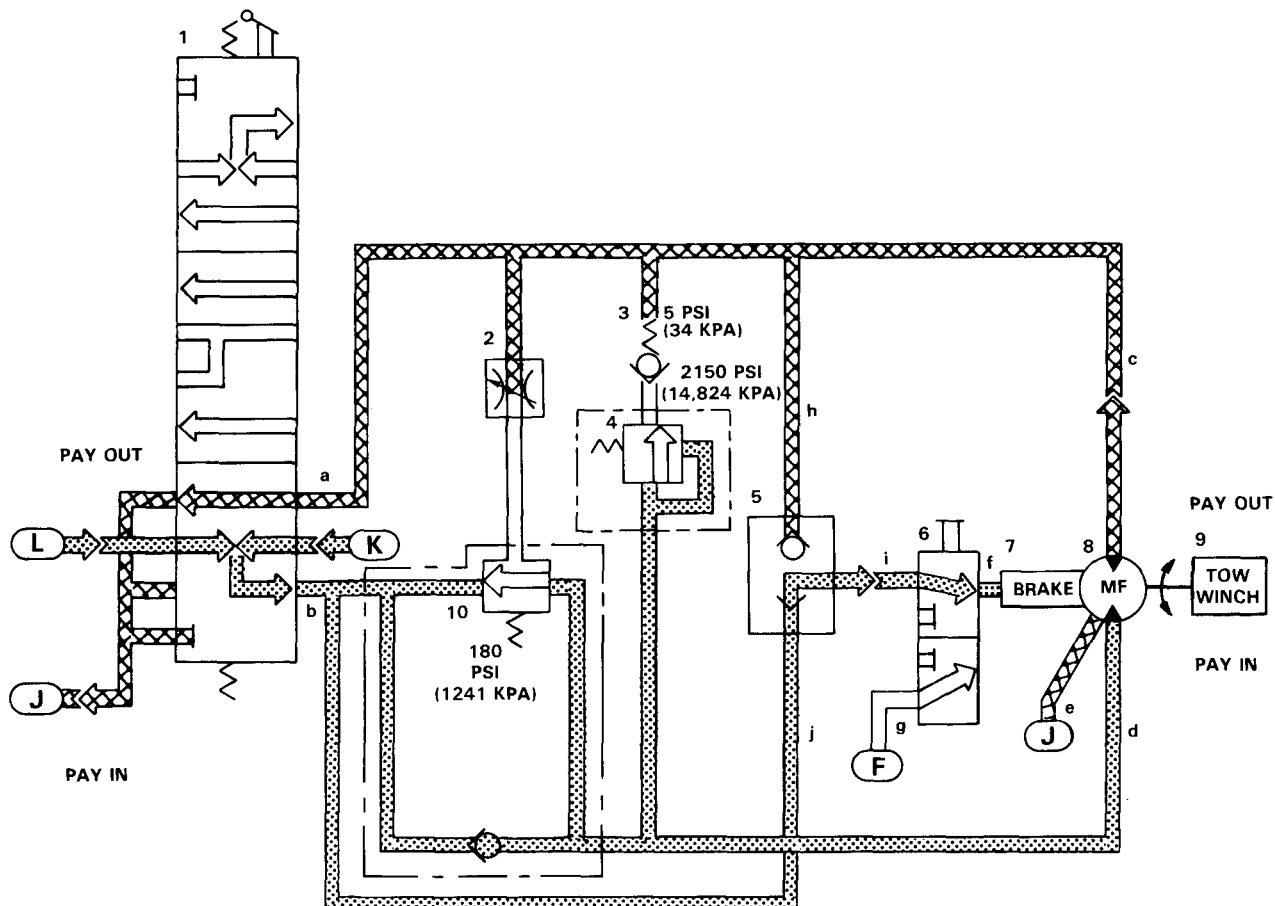
- 1 Directional control valve
- 2 Flow control valve, P/O valve (10)
- 3 Check valve
- 4 Relief valve
- 5 Shuttle valve
- 6 Brake release valve
- 7 Brake
- 8 Hydraulic motor
- 9 Winch
- 10 Relief valve

BAR CODE

	Supply pressure
	Intake or return
	Pilot or reduced pressure
	Inactive blank

F-20. TOW WINCH HYDRAULIC SUBSYSTEM - PAYING IN.





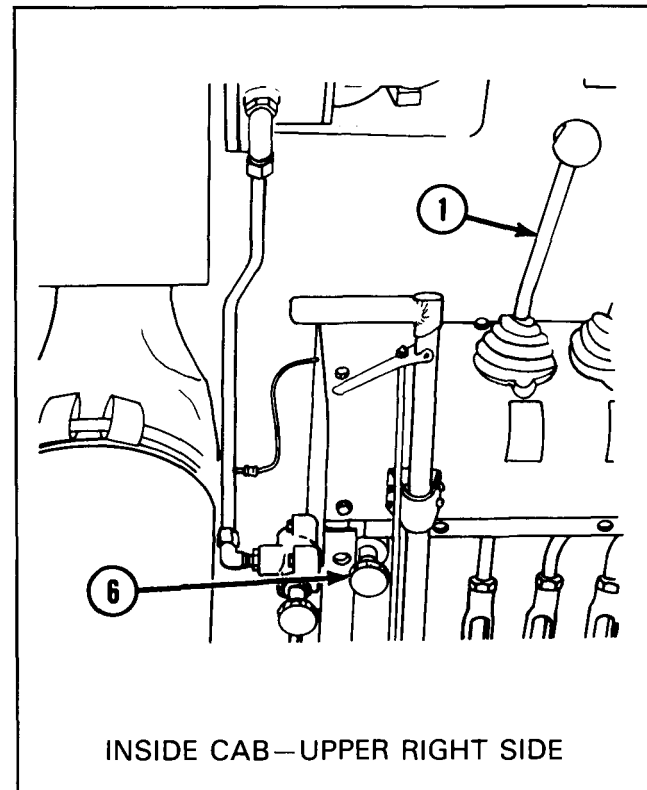
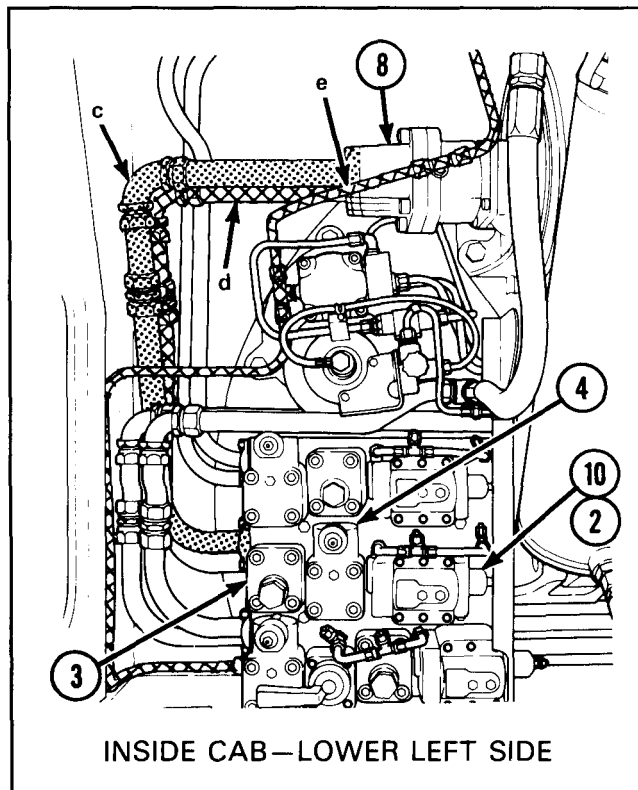
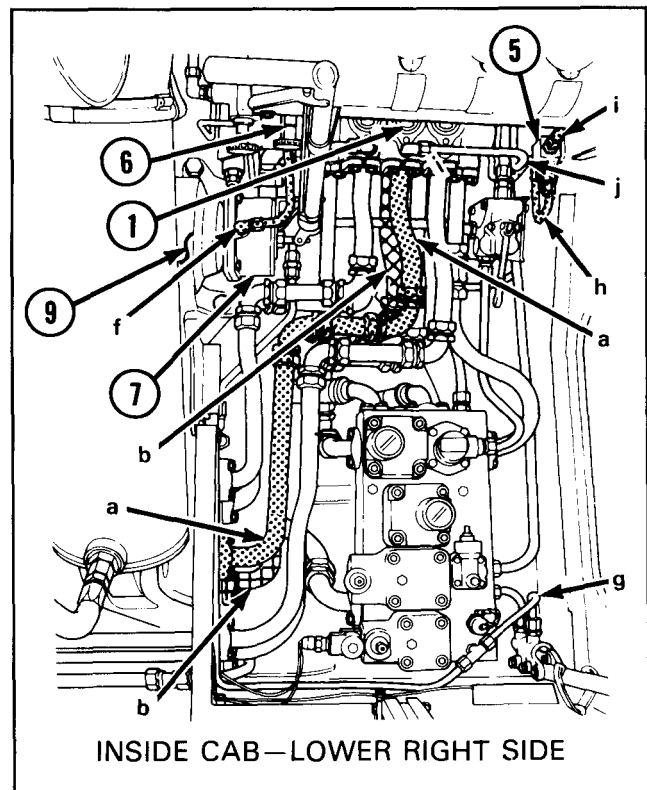
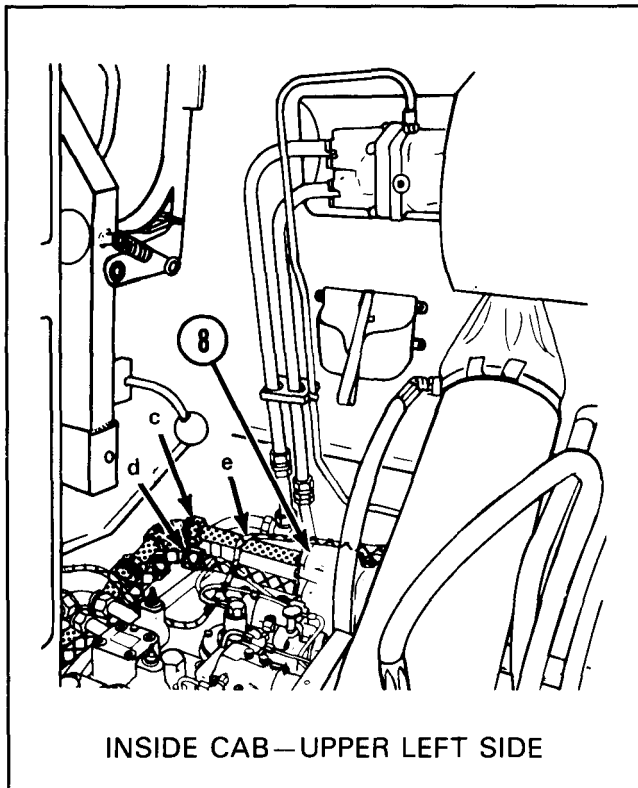
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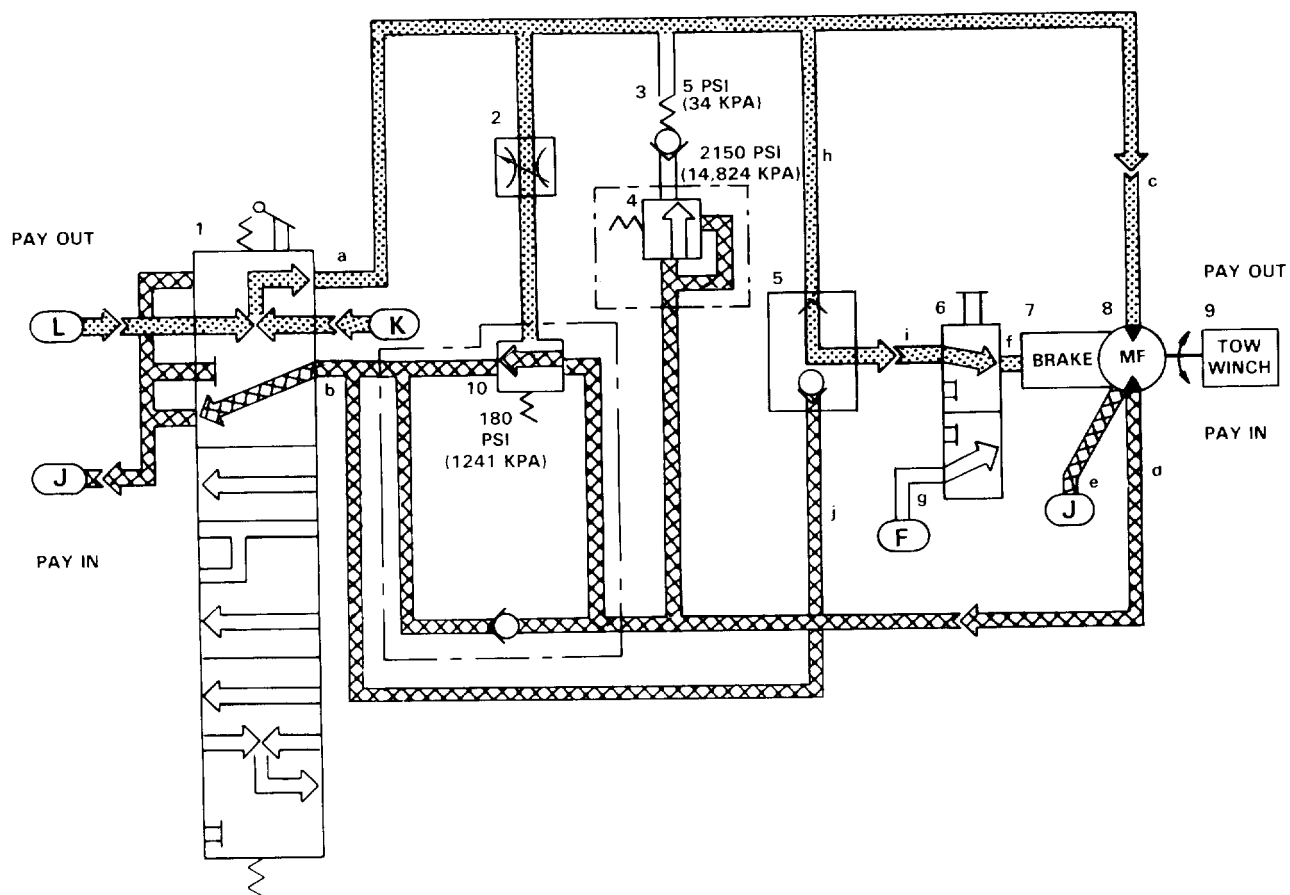
- 1 Directional control valve
- 2 Flow control valve, P/O valve (10)
- 3 Check valve
- 4 Relief valve
- 5 Shuttle valve
- 6 Brake release valve
- 7 Brake
- 8 Hydraulic motor
- 9 Winch
- 10 Relief valve

BAR CODE

-  Supply pressure
-  Intake or return
-  Pilot or reduced pressure
-  Inactive blank

F-21. TOW WINCH HYDRAULIC SUBSYSTEM - PAYING OUT.





LEGEND

- 1 Directional control valve
- 2 Flow control valve, P/O valve (10)
- 3 Check valve
- 4 Relief valve
- 5 Shuttle valve
- 6 Brake release valve
- 7 Brake
- 8 Hydraulic motor
- 9 Winch
- 10 Relief valve

BAR CODE

-  Supply pressure
-  Intake or return
-  Pilot or reduced pressure
-  Inactive blank

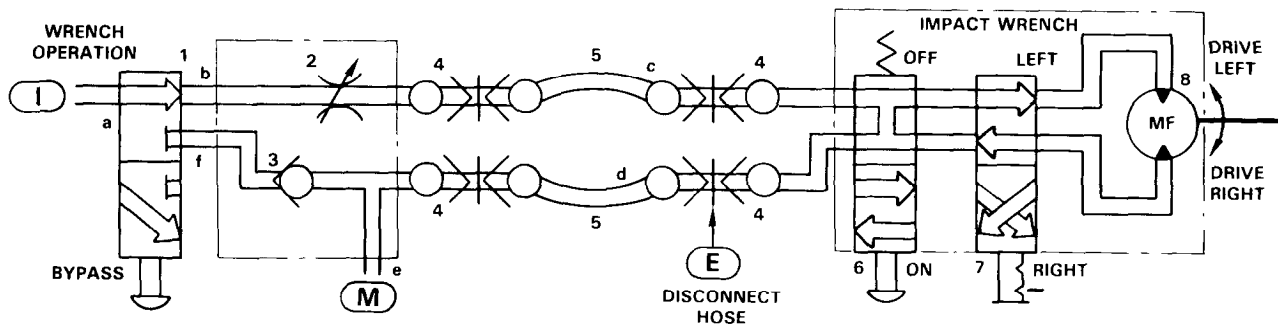
F-22. IMPACT WRENCH HYDRAULIC SUBSYSTEM.

Functional Description.

a. Hydraulic fluid power for the operation of the impact wrench is supplied by the 8 gpm pump of the hydraulic power subsystem.

b. The impact wrench hydraulic subsystem is a continuous flow system, which allows return fluid from the impact wrench to continue on to the spade hydraulic subsystem. During impact wrench operation, the impact wrench is connected to the flow control manifold by means of flexible hoses and quick-disconnect couplings.

c. Pulling out the two-way valve (1) allows hydraulic fluid to flow through the flow control valve (2), through quick-disconnects (4) and the extension hose (5), and on to the impact wrench. Then by pressing the control trigger of the selector valve (6), hydraulic fluid passes through the directional control valve (7) to the hydraulic motor (8). The hydraulic motor (8) rotates in either a clockwise or counterclockwise direction, depending upon the setting of the directional control valve (7). The speed of the hydraulic motor (8) is controlled by adjusting the flow control valve (2).

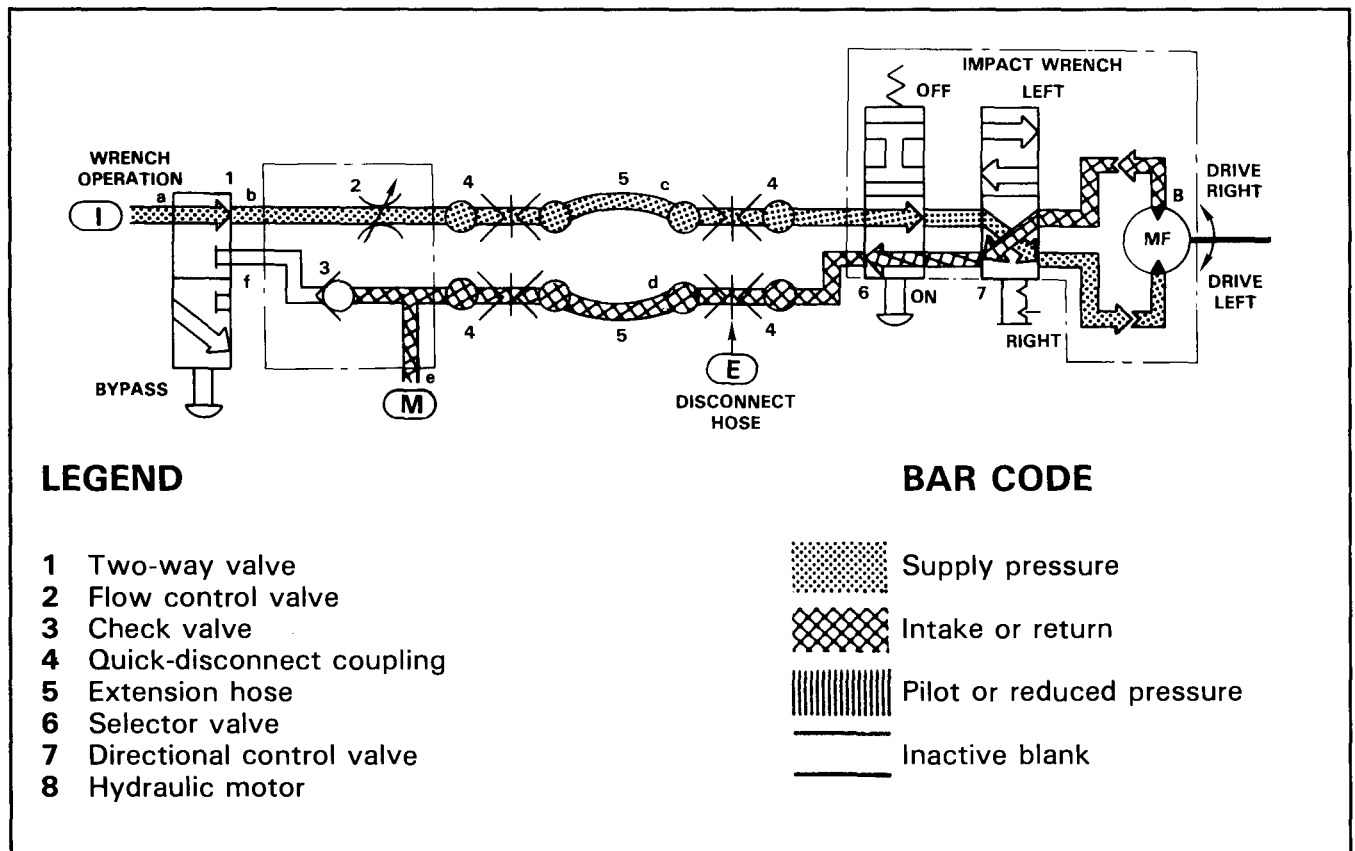
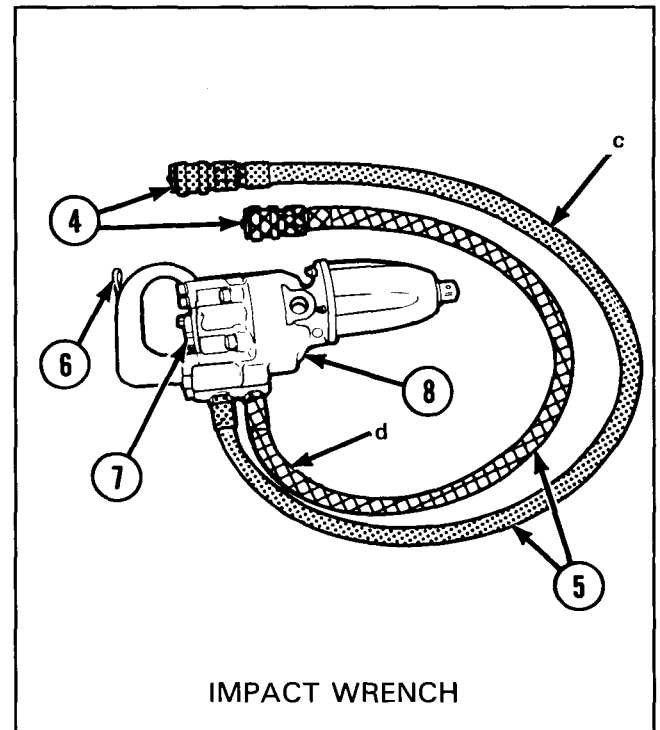
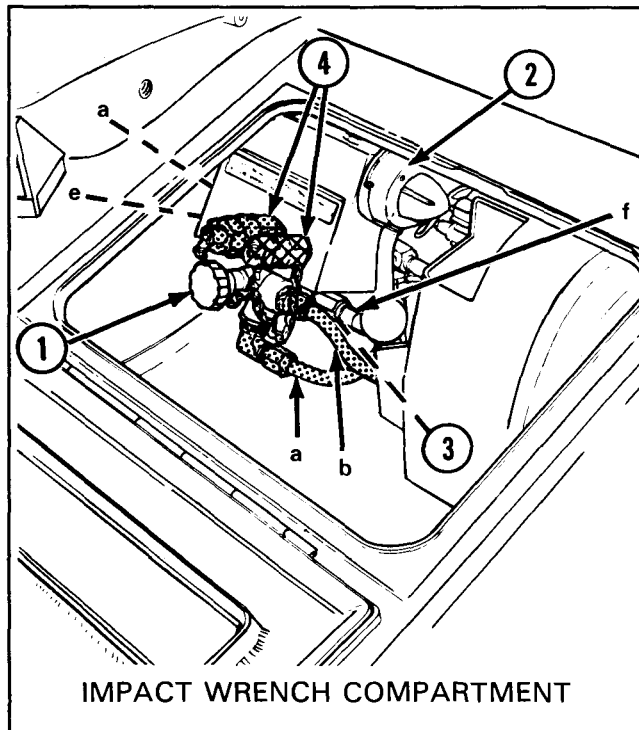
**LEGEND**

- 1 Two-way valve
- 2 Flow control valve
- 3 Check valve
- 4 Quick-disconnect coupling
- 5 Extension hose
- 6 Selector valve
- 7 Directional control valve
- 8 Hydraulic motor

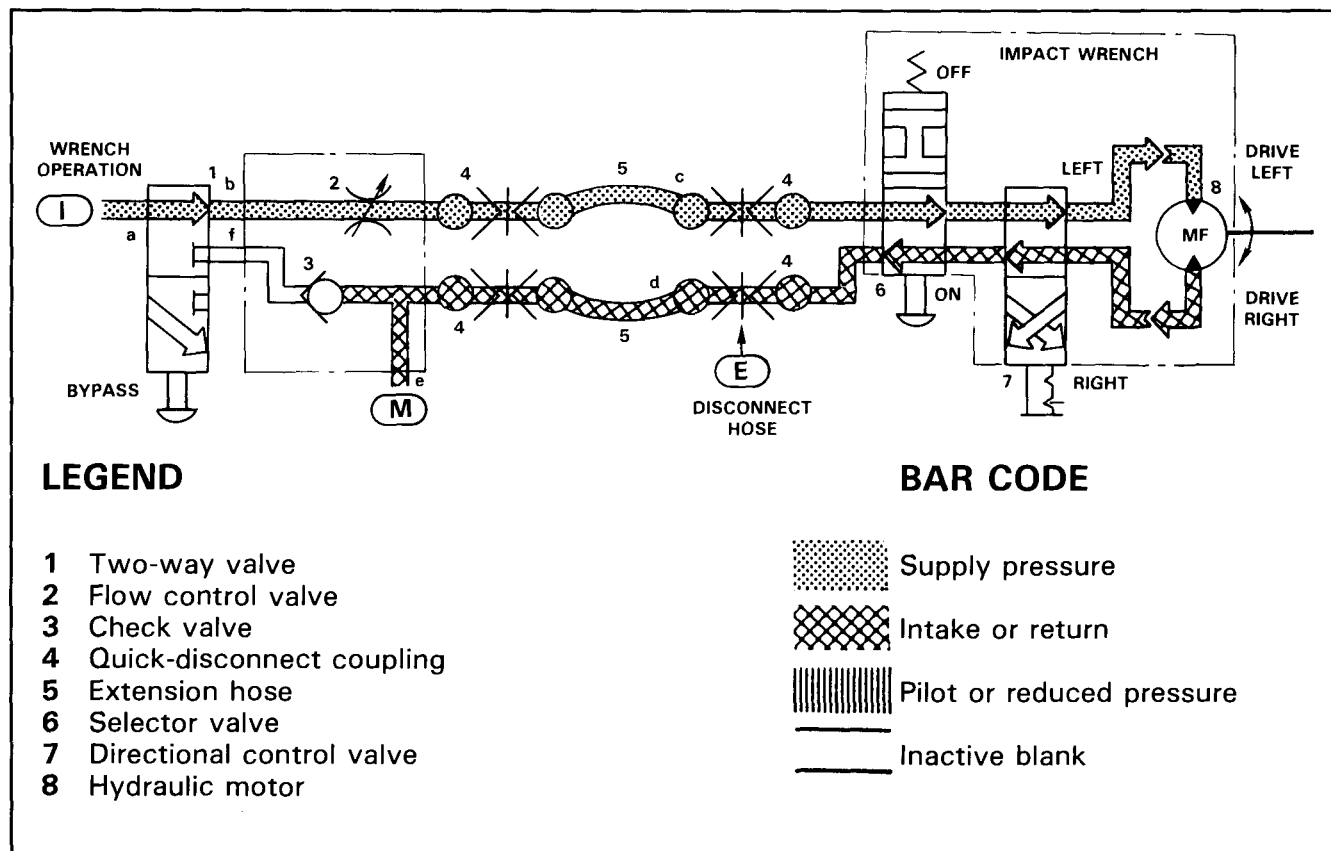
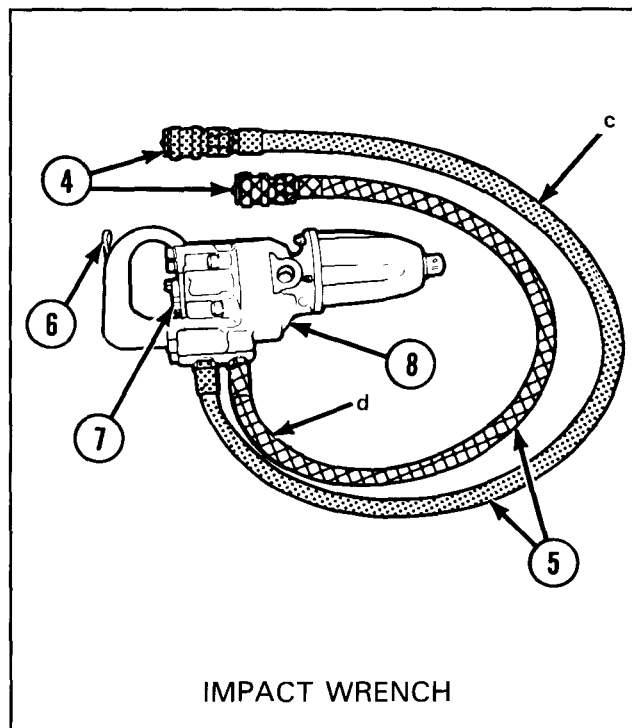
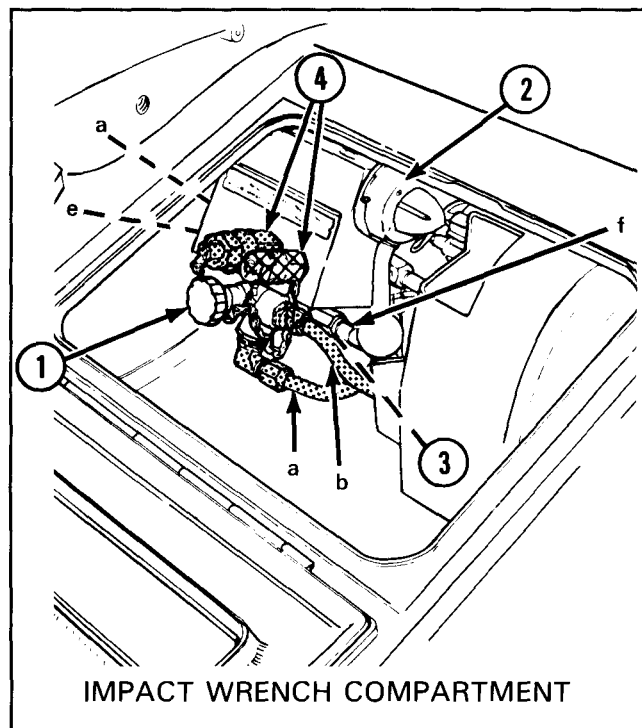
BAR CODE

-  Supply pressure
-  Intake or return
-  Pilot or reduced pressure
-  Inactive blank

F-23. IMPACT WRENCH HYDRAULIC SUBSYSTEM - DRIVING RIGHT.



F-24. IMPACT WRENCH HYDRAULIC SUBSYSTEM - DRIVING LEFT



F-25. SPADE HYDRAULIC SUBSYSTEM.

Functional Description.

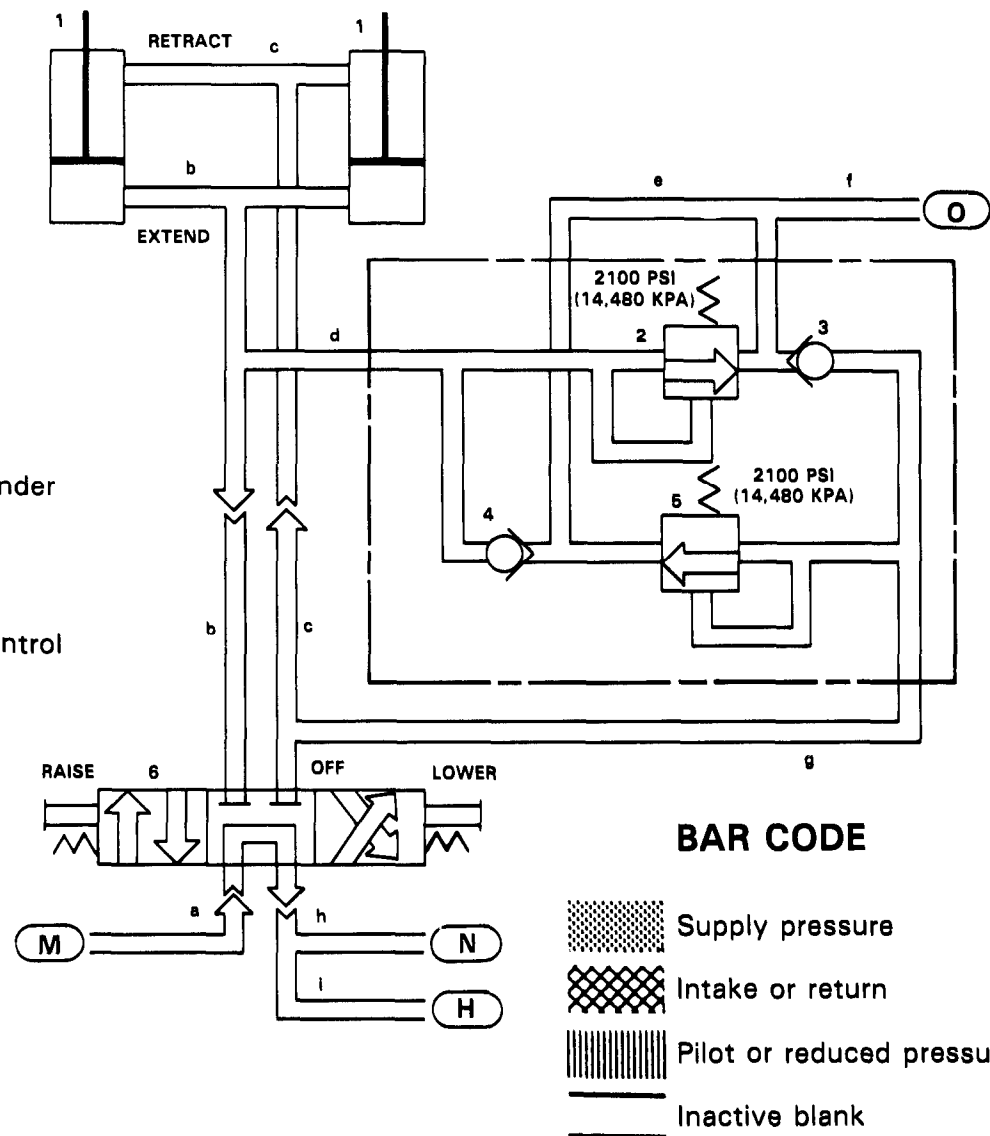
a. The hydraulic fluid power for the operation of the spade (spade cylinders) is supplied by the 8 gpm pump of the hydraulic power subsystem. The spade hydraulic subsystem controls the power for raising or lowering the spade.

b. Moving the handle of the directional control valve (6) in the LOWER position directs hydraulic fluid to retract hydraulic cylinders (1). The relief valves (2 and 5)

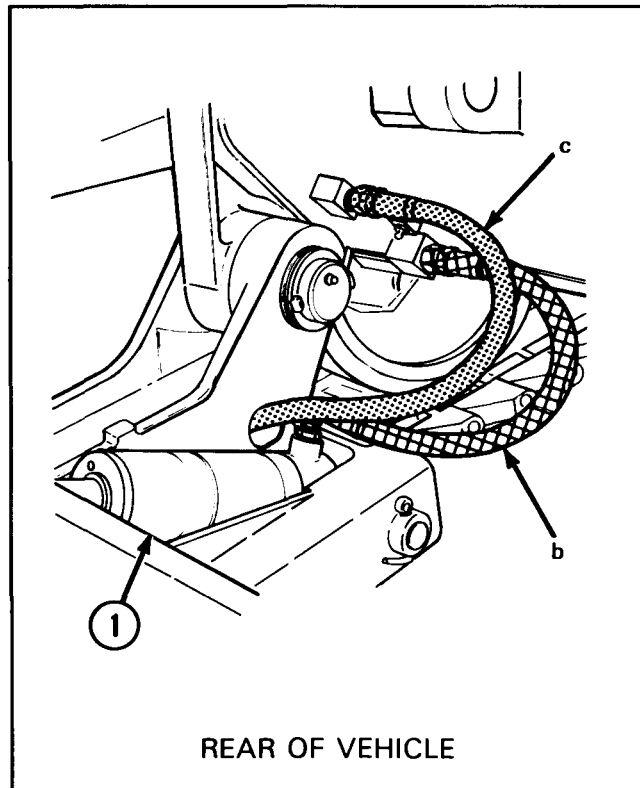
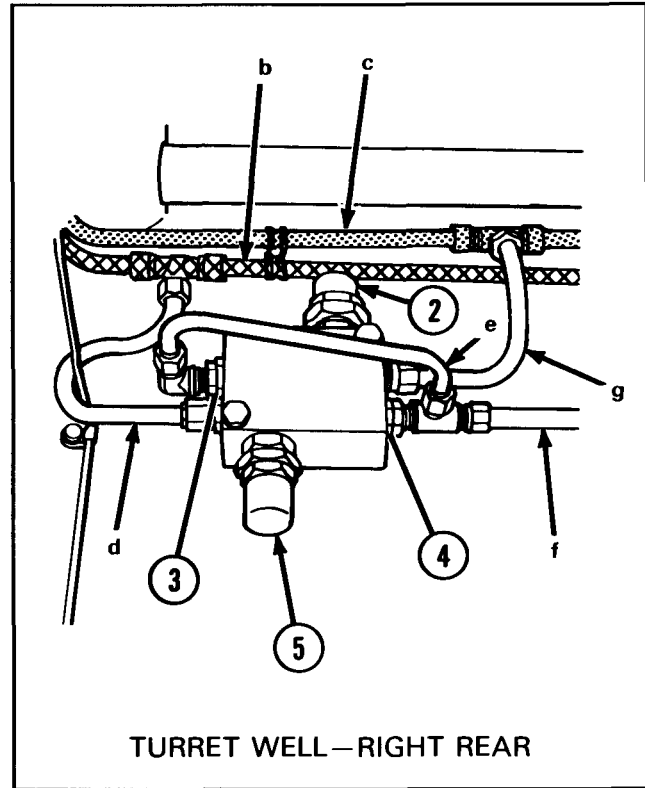
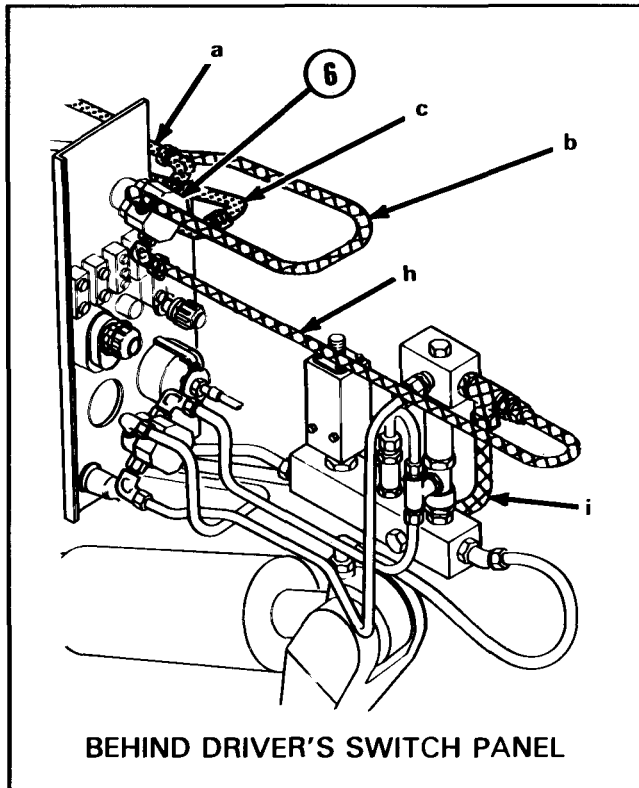
protect the subsystem when external forces on the spade create excessive pressure. Pressure over 2100 psi (14,480 kPa) is relieved to the other side of the hydraulic cylinders (1). Moving the handle of the directional control valve (6) in the RAISE position has the same effect as in the LOWER position except that the hydraulic fluid is routed to extend the hydraulic cylinder (1), raising the spade.

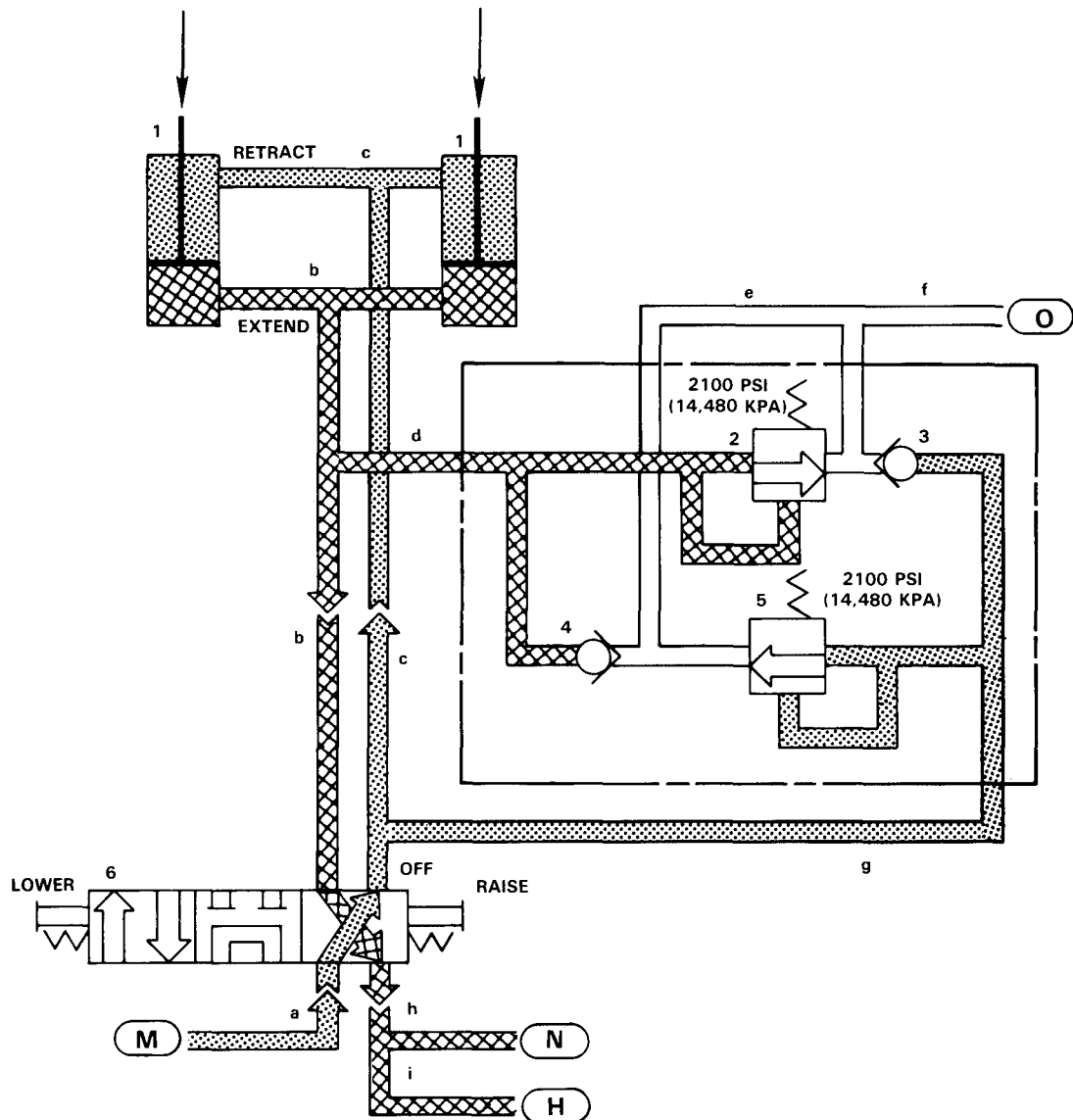
LEGEND

- 1 Hydraulic cylinder
- 2 Relief valve
- 3 Check valve
- 4 Check valve
- 5 Relief valve
- 6 Directional control valve



F-26. SPADE HYDRAULIC SUBSYSTEM - RETRACTING SPADE CYLINDERS.

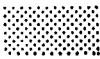




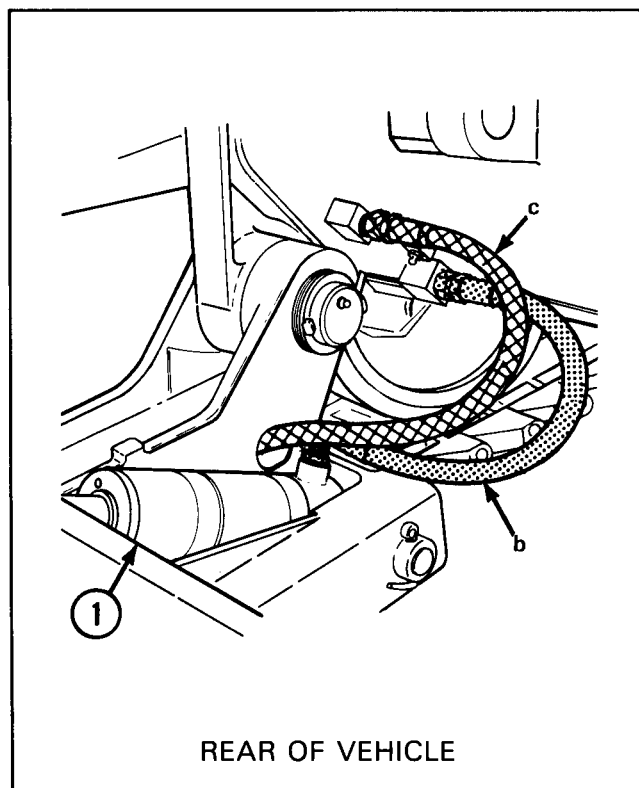
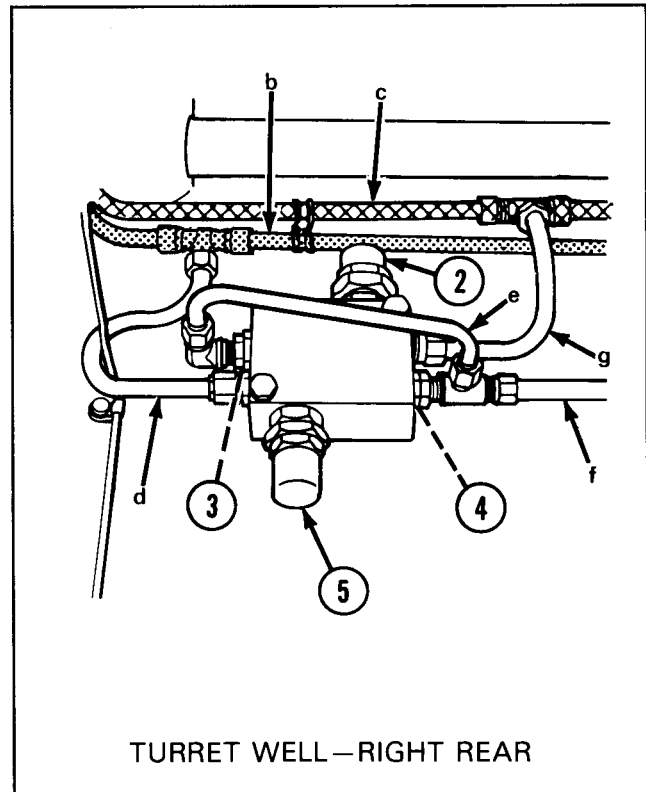
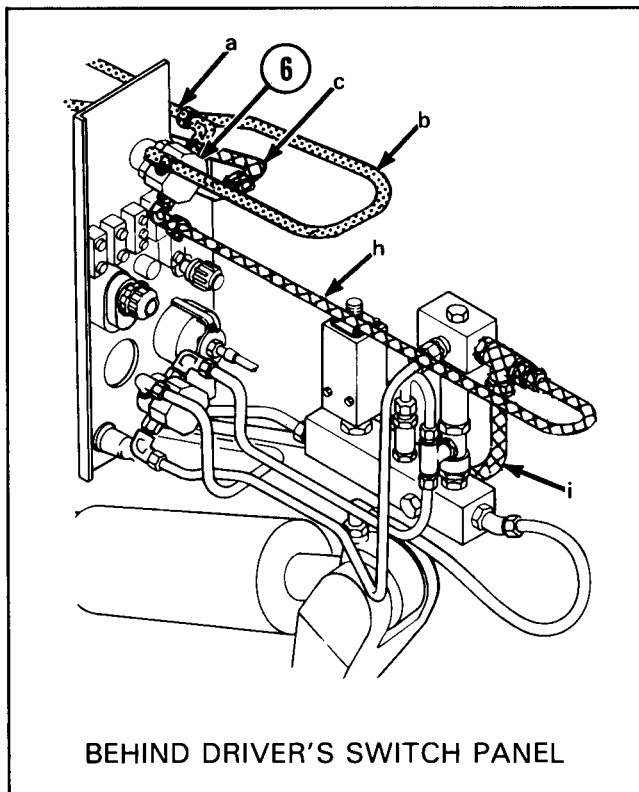
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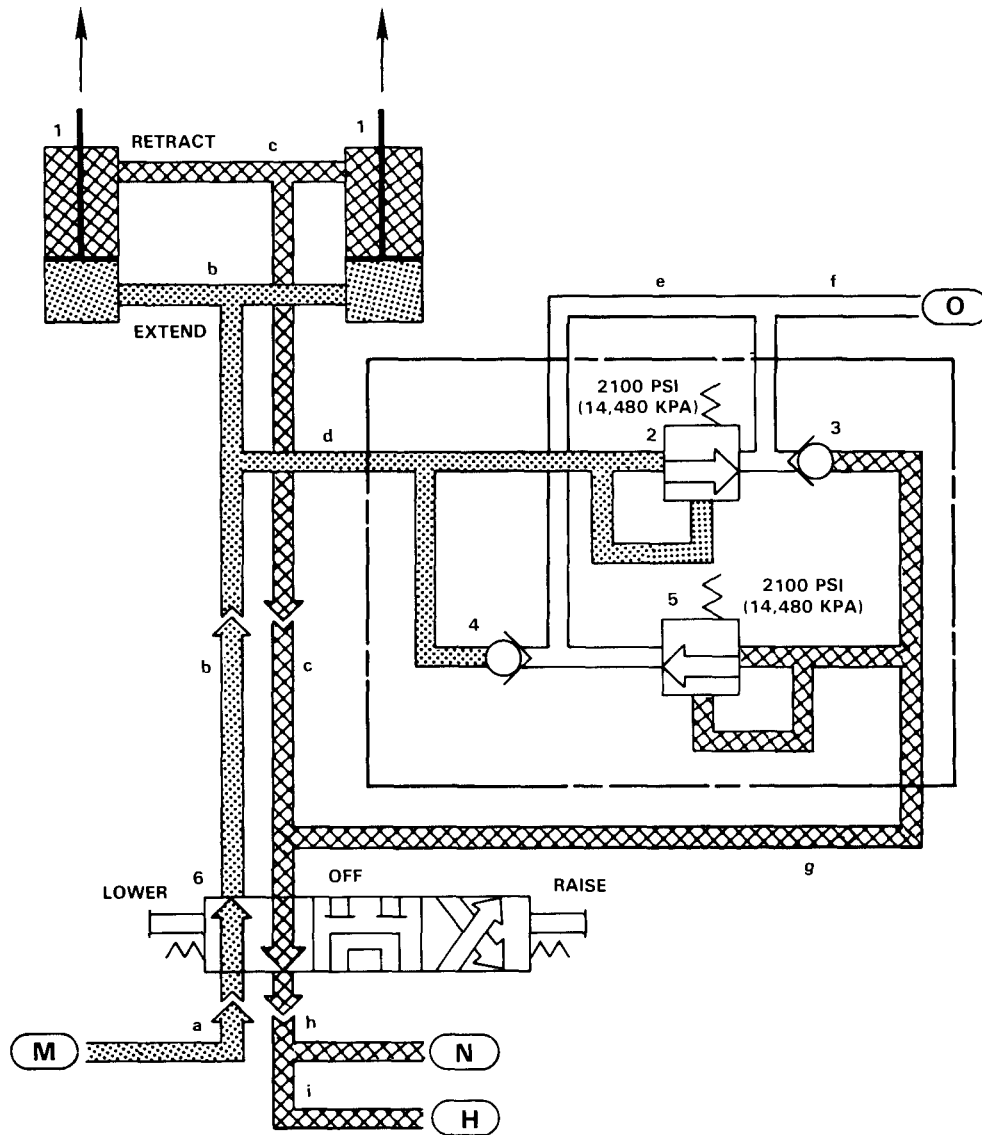
- 1 Hydraulic cylinder
- 2 Relief valve
- 3 Check valve
- 4 Check valve
- 5 Relief valve
- 6 Directional control valve

BAR CODE

-  Supply pressure
-  Intake or return
-  Pilot or reduced pressure
-  Inactive blank

F-27. SPADE HYDRAULIC SUBSYSTEM - EXTENDING SPADE CYLINDERS.





LEGEND

- 1 Hydraulic cylinder
- 2 Relief valve
- 3 Check valve
- 4 Check valve
- 5 Relief valve
- 6 Directional control valve

BAR CODE

-  Supply pressure
-  Intake or return
-  Pilot or reduced pressure
-  Inactive blank

F-28. SUSPENSION LOCKOUT HYDRAULIC SUBSYSTEM.

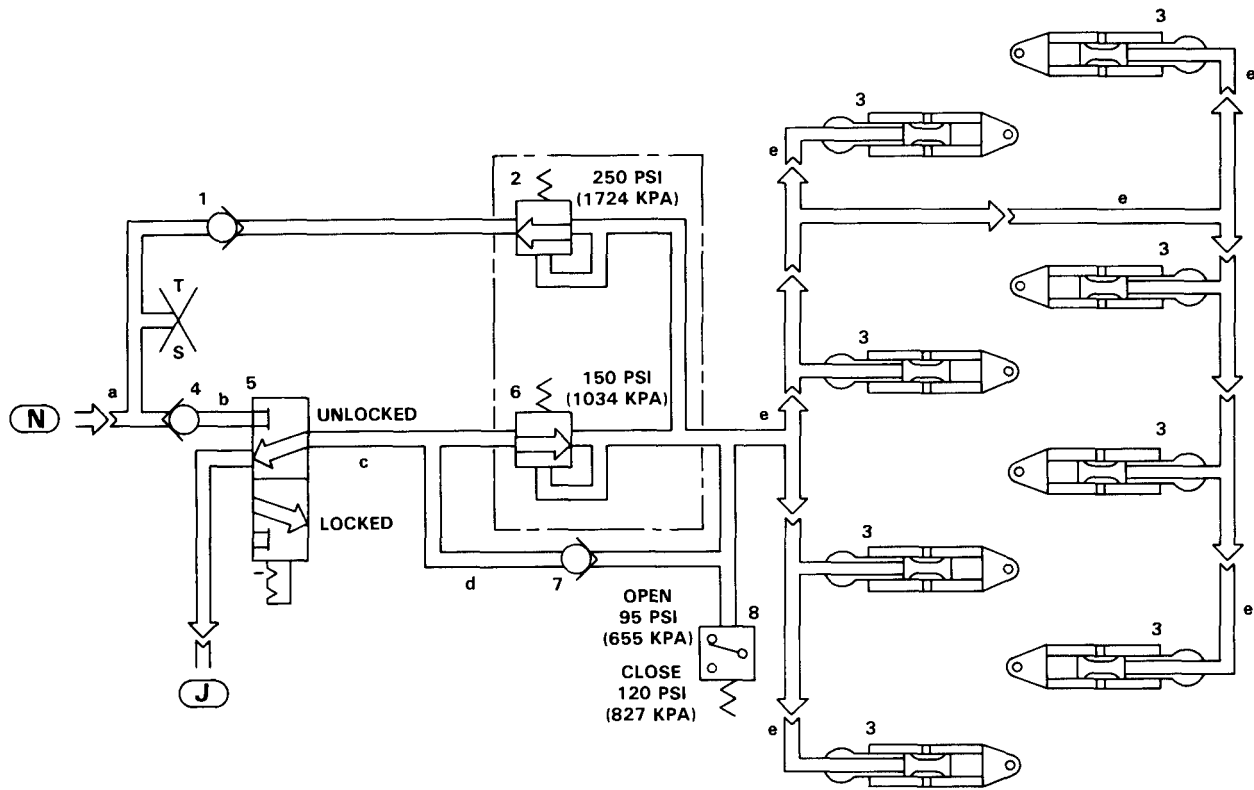
Functional Description.

a. The suspension lockout hydraulic subsystem forms a hydrostatic lock within each lockout cylinder (3). This stops up and down movement of the road wheels and provides a solid hoisting platform.

b. Lockout cylinders (3) are locked by setting the selector control valve (5) to LOCKED. Hydraulic fluid at 1600 to 2400 psi (11,032 to 16,548 kPa) flows through the valve (5) to the valve (6). The valve (6) reduces the fluid pressure to 150 psi (1034 kPa). As the fluid pressure builds up in the lockout cylinders (3), the lockout pistons are forced into the lockout position. This prevents hydraulic fluid from passing from

one side of the cylinder piston to the other. The pressure switch (8) is closed when pressure in the lockout cylinder is over 120 psi (827 kPa), lighting the SUSPENSION LOCKED indicator lights. When the hydraulic pressure drops below 95 psi (655 kPa), the pressure switch (8) opens, putting out the SUSPENSION LOCKED indicator lights.

c. The subsystem is protected from overpressure by the relief valve (2), which bypasses fluid over 240 psi (1655 kPa) back to the reservoir. The cylinders (3) are unlocked by setting the valve (5) to UNLOCKED. This allows the hydraulic fluid to flow back to the reservoir.



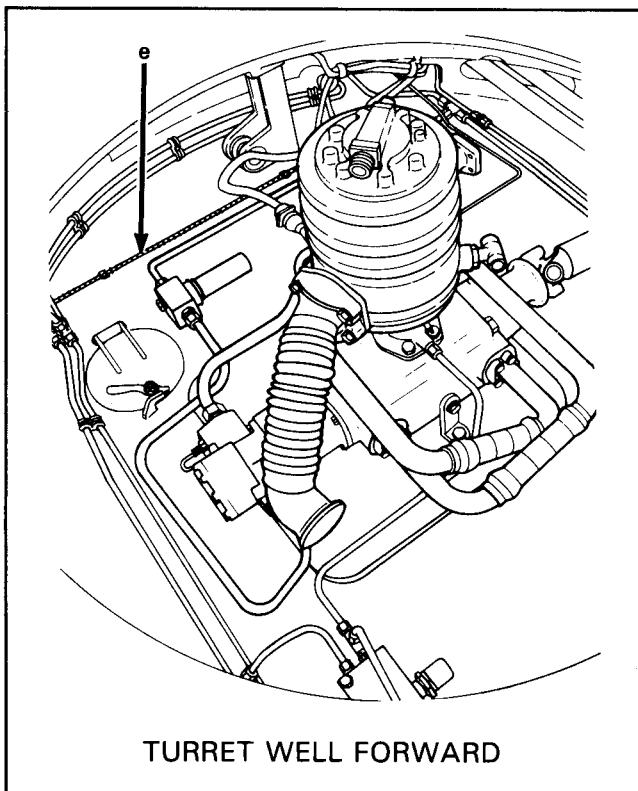
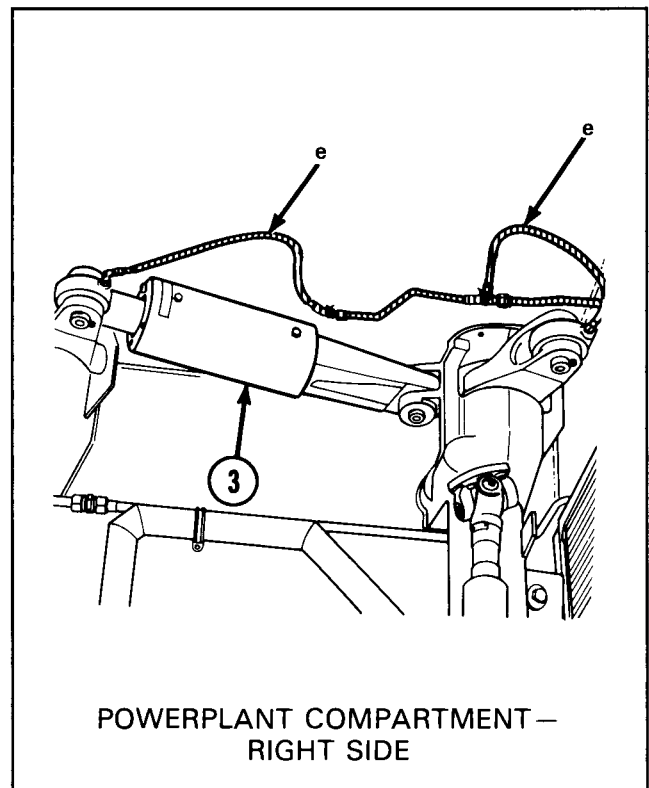
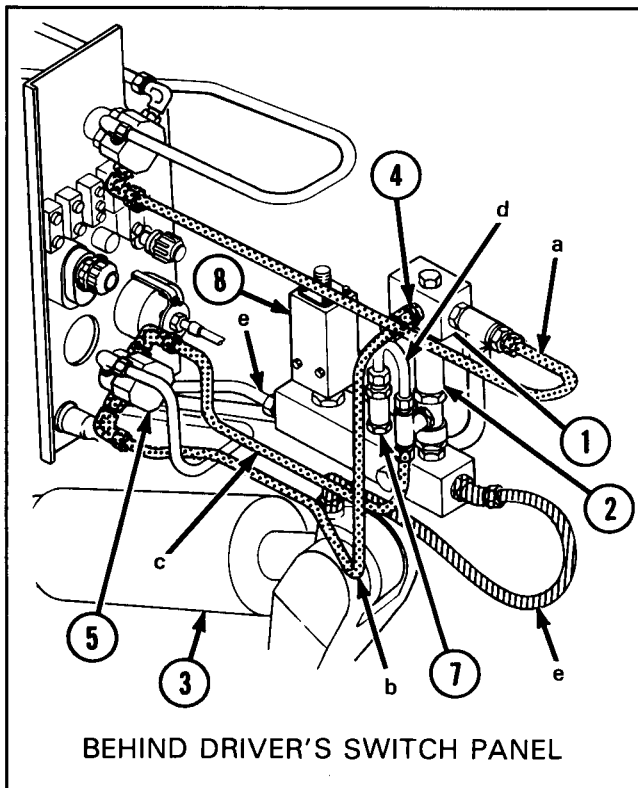
LEGEND

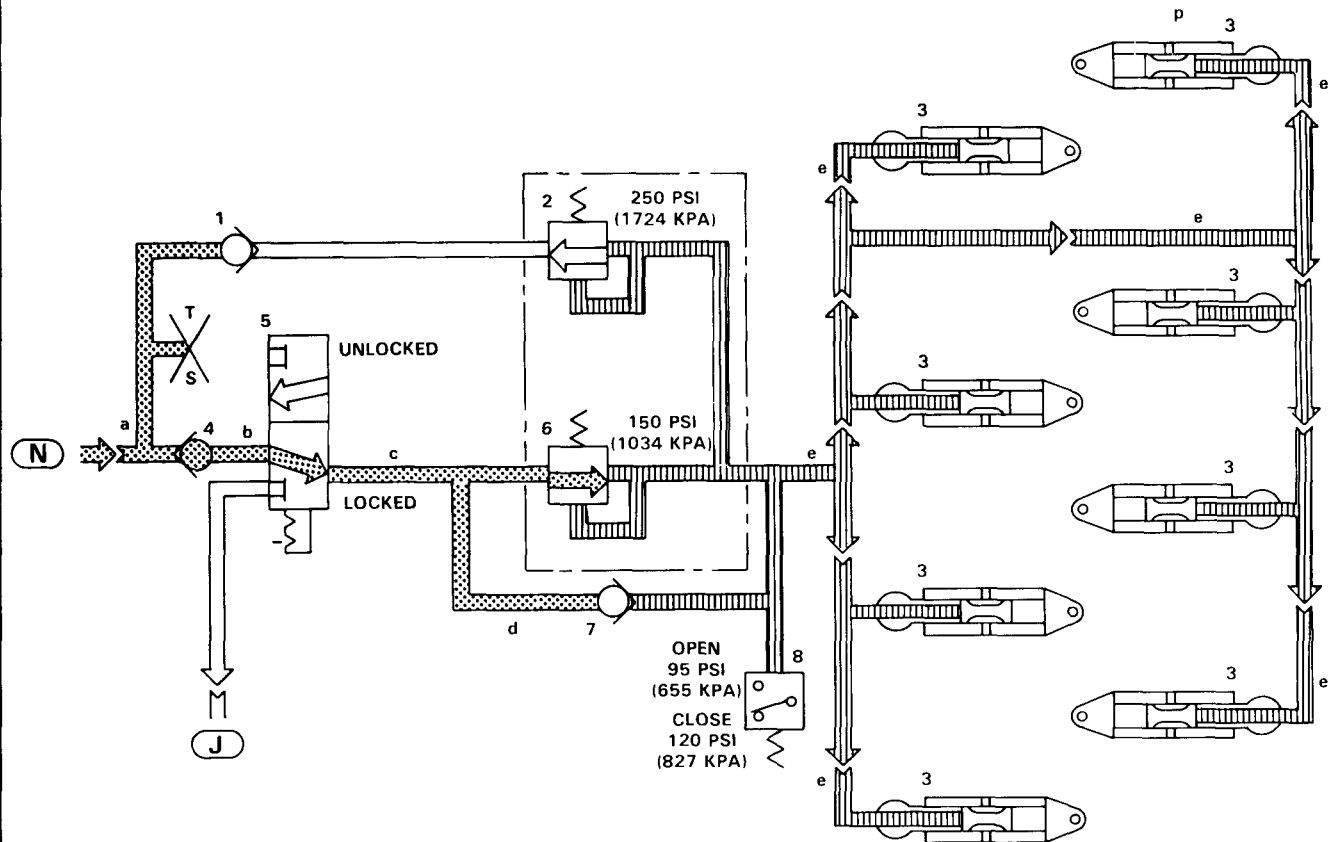
- 1 Check valve
- 2 Relief valve
- 3 Lockout cylinder
- 4 Check valve
- 5 Selector valve
- 6 Reducing valve, P/O valve (2)
- 7 Check valve
- 8 Pressure switch

BAR CODE

-  Supply pressure
-  Intake or return
-  Pilot or reduced pressure
-  Inactive blank

F-29. SUSPENSION LOCKOUT HYDRAULIC SUBSYSTEM - CYLINDERS LOCKED.

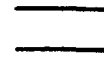




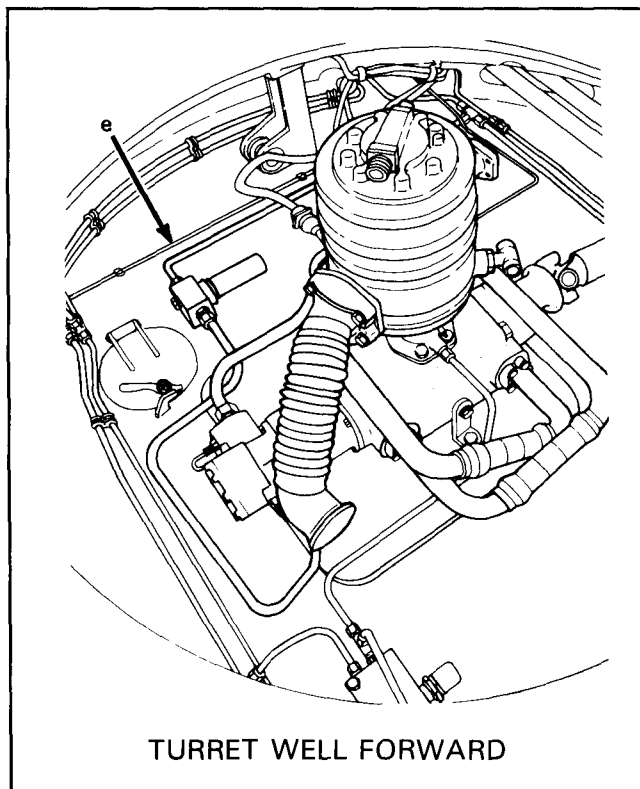
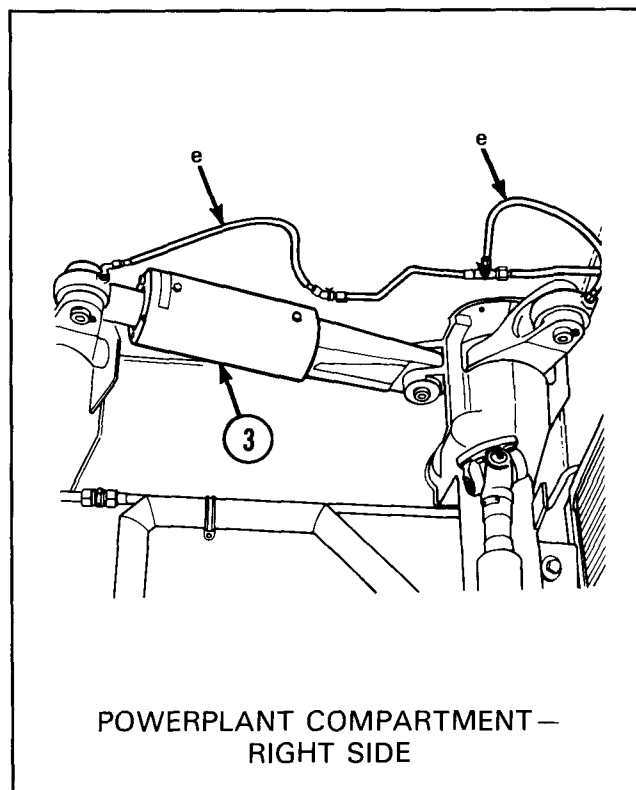
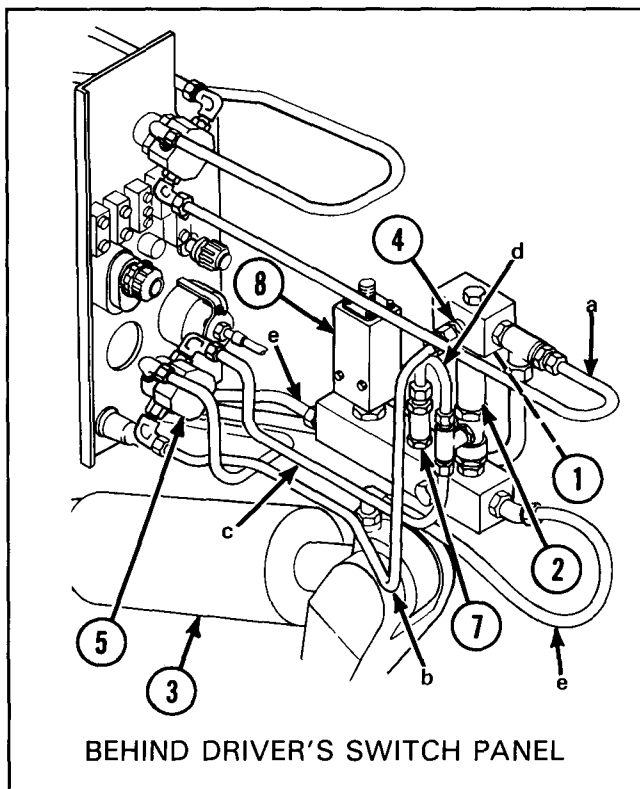
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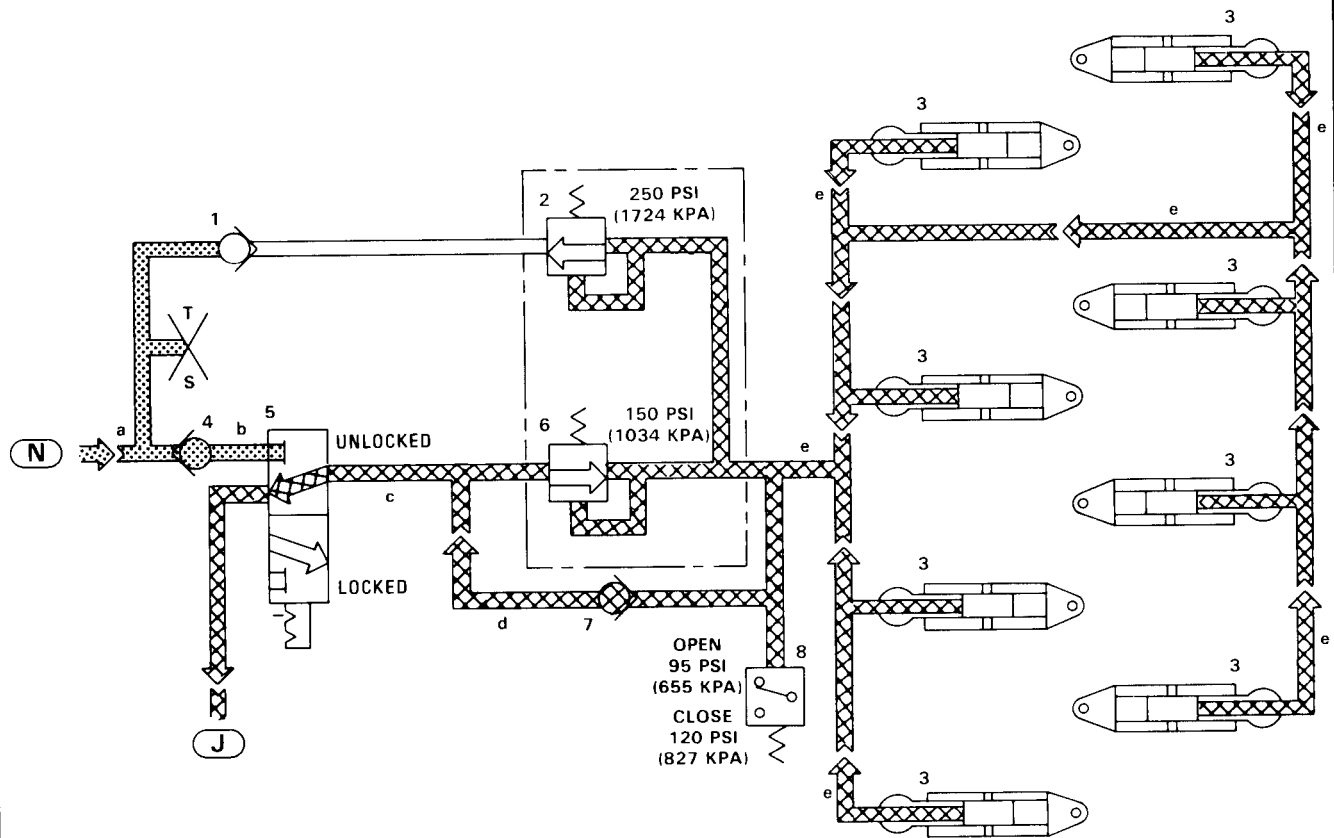
- 1 Check valve
- 2 Relief valve
- 3 Lockout cylinder
- 4 Check valve
- 5 Selector valve
- 6 Reducing valve
- 7 Check valve
- 8 Pressure switch

BAR CODE

-  Supply pressure
-  Intake or return
-  Pilot or reduced pressure
-  Inactive blank

F-30. SUSPENSION LOCKOUT HYDRAULIC SUBSYSTEM - CYLINDERS UNLOCKED.





LEGEND

- 1 Check valve
- 2 Relief valve
- 3 Lockout cylinder
- 4 Check valve
- 5 Selector valve
- 6 Reducing valve
- 7 Check valve
- 8 Pressure switch

BAR CODE

-  Supply pressure
-  Intake or return
-  Pilot or reduced pressure
-  Inactive blank

APPENDIX G

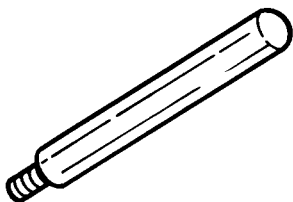
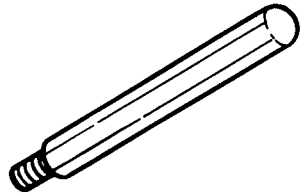
SPECIAL TOOLS AND EQUIPMENT

G-1. GENERAL. Repair parts, special tools, and support equipment are issued for maintaining the vehicle. Tools and equipment should not be used for purposes other than those prescribed. When not in use, they should be properly stowed.

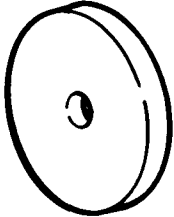
G-2. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT. Special tools and equipment necessary to perform the maintenance described in this manual are listed for your information. Special tools and support equipment are listed in TM 9-2350-238-24P-2 which is the authority for requisitioning replacements.

G-3. REPAIR PARTS. Repair parts are issued to the replacement of parts that have become worn, broken, or otherwise unserviceable. Repair parts are listed in TM 9-2350-238-24P-2 which is the authority for requisitioning replacements.

SPECIAL TOOLS AND EQUIPMENT

ITEM	NUMBER	USE
 HANDLE, REMOVER AND REPLACER	5120-00-708-3883 (7083883)	Used with replacers (5120-00-722-4071) and (5120-00-733-8451).
 HANDLE, REPLACER OIL SEAL	5120-00-316-9182 (7950864)	Used with replacer (5120-00-733-8915) and remover (5120-00-722-4063).

SPECIAL TOOLS AND EQUIPMENT (CONT)

ITEM	NUMBER	USE
 REPLACER, BEARING CUP	5120-00-722-4071 (10902752)	To replace boom pulley bearing cup. Use with handle (5120-00-708-3883).

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B			
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Boom and Winch and Boom Winch Cover, Maintenance of	2-166	Cab Exterior Stowage Racks, Boxes, and Straps, Maintenance of	2-339
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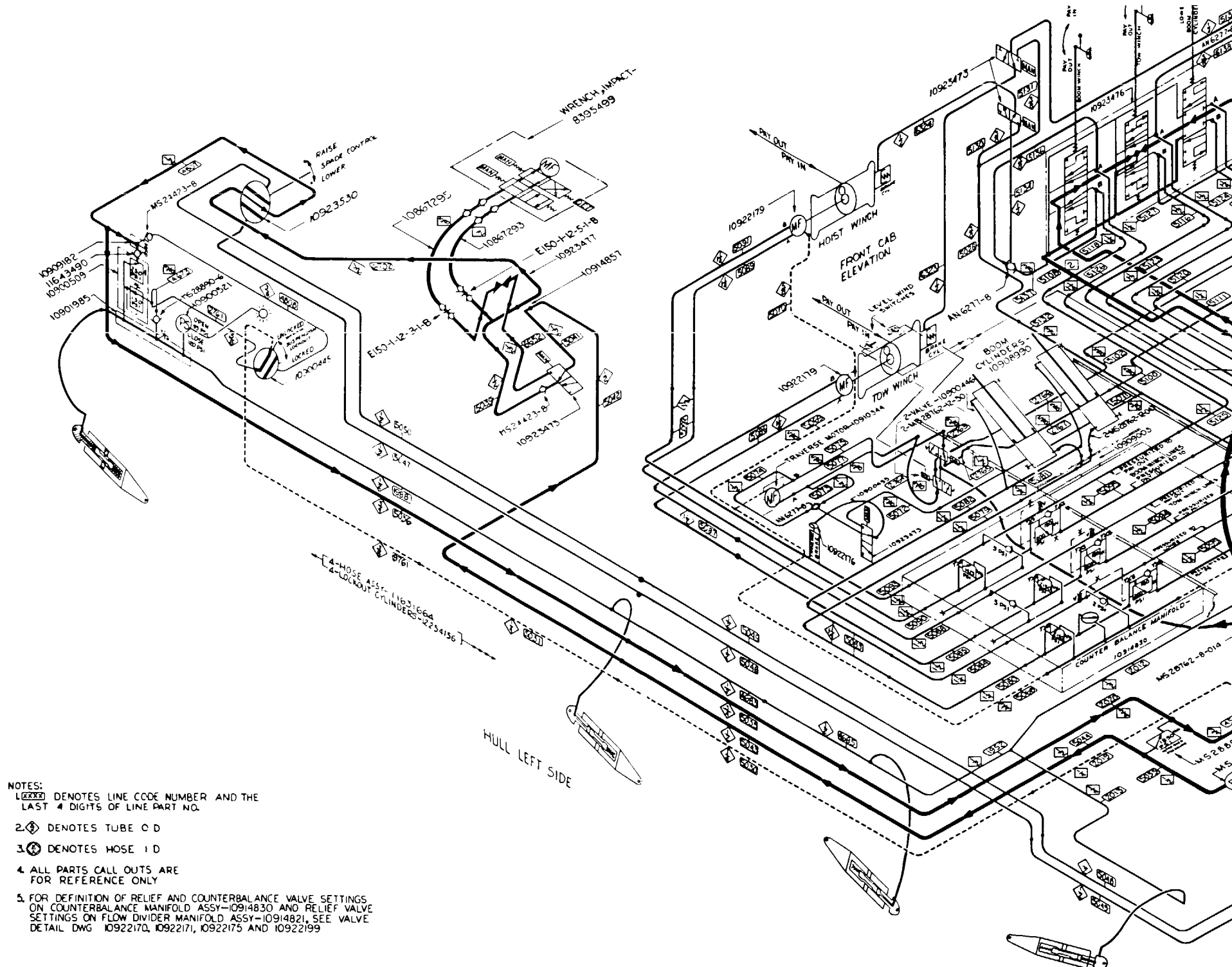
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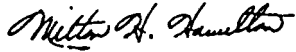


- NOTES:
1. **XXXX** DENOTES LINE CODE NUMBER AND THE LAST 4 DIGITS OF LINE PART NO.
 2. **④** DENOTES TUBE O D
 3. **⑤** DENOTES HOSE I D
 4. ALL PARTS CALL OUTS ARE FOR REFERENCE ONLY
 5. FOR DEFINITION OF RELIEF AND COUNTERBALANCE VALVE SETTINGS ON COUNTERBALANCE MANIFOLD ASSY-10914830 AND RELIEF VALVE SETTINGS ON FLOW DIVIDER MANIFOLD ASSY-10914821, SEE VALVE DETAIL DWG 10922170, 10922171, 10922175 AND 10922199

By Order of the Secretary of the Army:

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

Official:



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

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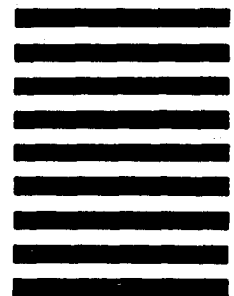
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METRIC CHART

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

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

WEIGHTS

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

LIQUID MEASURE

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

SQUARE MEASURE

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

CUBIC MEASURE

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

TEMPERATURE

$5/9 (^{\circ}\text{F} - 32) = ^{\circ}\text{C}$
 212° Fahrenheit is equivalent to 100° Celsius
 90° Fahrenheit is equivalent to 32.2° Celsius
 32° Fahrenheit is equivalent to 0° Celsius
 $9/5 \text{ C}^{\circ} + 32 = \text{F}^{\circ}$

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621



