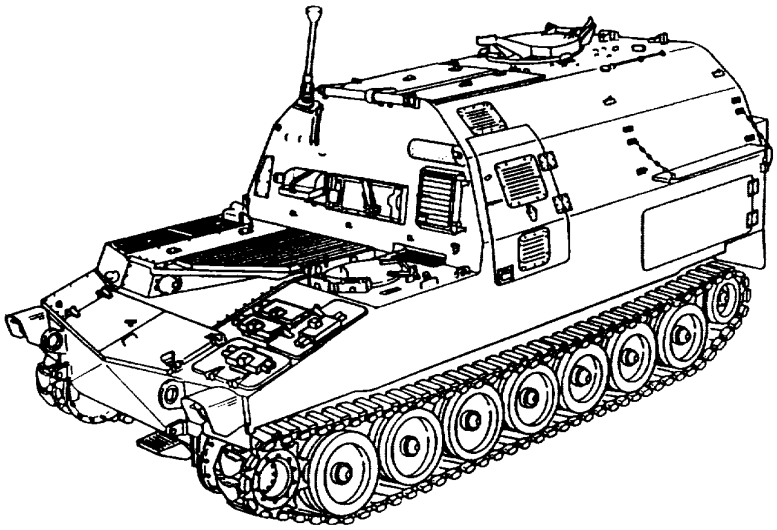
TECHNICAL MANUAL



UNIT MAINTENANCE MANUAL FOR

CARRIER, AMMUNITION, TRACKED M992A1 (NSN 2350-01-352-3021)

Approved for public release; distribution is unlimited.

HEADQUARTERS, DEPARTMENT OF THE ARMY
OCTOBER 1993

CHANGE
No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C. *6 June 1997*

UNIT MAINTENANCE MANUAL
FOR
CARRIER, AMMUNITION, TRACKED
M992A1
(NSN 2350-01-352-3201)
EIC: AE6

TM 9-2350-287-20-1, dated 22 October 1993, is changed as follows:
1. Remove old pages and insert new pages as indicated below.
2. New, changed, or deleted material is indicated by a vertical bar in the margin of the page or by a deletion notice.
3. Added pages or changed page numbers are indicated by a vertical bar by the page number.

Remove Pages	*Insert Pages*
i through iv	i through iv
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None	7-260.1 (blank) through 7-260.4 (blank)
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Front Cover	Front Cover

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Chief of Staff

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JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
03577

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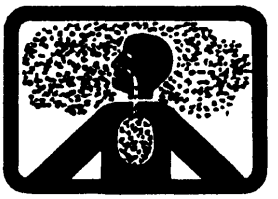
WARNING

CARBON MONOXIDE HAZARD



CARBON MONOXIDE (EXHAUST GAS) CAN KILL YOU

- Carbon monoxide is a colorless, odorless, DEADLY POISONOUS gas and when breathed deprives body of oxygen and causes SUFFOCATION. Breathing air with carbon monoxide produces headache, dizziness, loss of muscular control, a sleepy feeling, and coma. Permanent BRAIN DAMAGE or DEATH can result from serious exposure.

- The following precautions MUST be followed to ensure personnel are safe whenever personnel heater, main engine, or auxiliary engine is operated for any purpose.

  - DO NOT operate personnel heater or engine of vehicle in enclosed area without adequate ventilation.

  - DO NOT idle engine for long periods without ventilator blower operating. If tactical situation permits, open hatches.

  - DO NOT drive any vehicle with inspection plates, cover plates, or engine compartment doors removed unless necessary for maintenance purposes.

  - NEVER sleep in a vehicle when the heater is operating or the engine is idling.

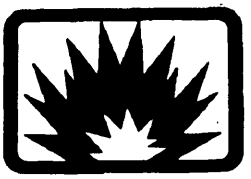
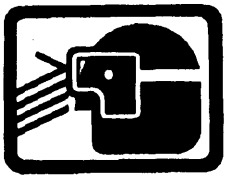
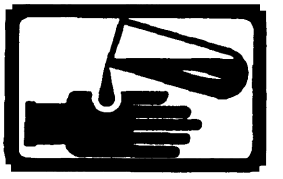
  - BE ALERT at all times during vehicle operation for exhaust odors and exposure symptoms. If either are present, IMMEDIATELY EVACUATE AND VENTILATE the area. Treatment for affected treatment shall be: expose to fresh air; keep warm; DO NOT PERMIT PHYSICAL EXERCISE; if necessary, give artificial respiration as described in FM 21-11 and get medical attention.

  - BE AWARE: neither the gas particulate filter unit nor field protection mask for nuclear-biological-chemical protection will protect you from carbon monoxide poisoning.

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING
IS GOOD VENTILATION

WARNING

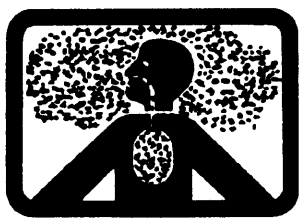
BATTERY HAZARDS

- Lead-acid batteries can explode. Do not smoke, have open flames, or make sparks around a battery, especially if the caps are off. if a battery is gassing, it can explode and cause injury to personnel.
- Ventilate when charging or using battery in an enclosed space.
- Wear safety goggles and acid-proof gloves when battery cover must be removed or when adding electrolyte.
- Avoid contact between battery electrolyte and skin, eyes, or clothing. If electrolyte spills, take immediate action to stop burning effects:
  - External. Immediately flush with cold running water to remove all acid.
  - Eyes. Flush with cold water for at least 15 minutes. Seek immediate medical attention.
  - Internal. Drink large amounts of water or milk. Follow with milk of magnesia, beaten egg, or vegetable oil. Seek immediate medical attention.
  - Clothing or Vehicle. Wash at once with cold water. Neutralize with baking soda or household ammonia solution.
- Wear safety glasses or goggles when checking batteries. Always check electrolyte level with engine stopped. Do not smoke or use exposed flame when checking battery; explosive gases are present and severe injury to personnel can result
- Remove or disconnect batteries or turn off master battery disconnect switch prior to performing maintenance in immediate battery area or working on electrical system. Such disconnections prevent electrical shock to personnel or equipment
- Battery acid (electrolyte) is extremely harmful. Always wear safety goggles and rubber gloves, and do not smoke when performing maintenance on batteries. Injury will result if acid contacts skin or eyes. Wear rubber apron to prevent damage to clothing.
- Remove all jewelry, such as rings, identification tags, bracelets, etc. if jewelry contacts battery terminal, a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

WARNING

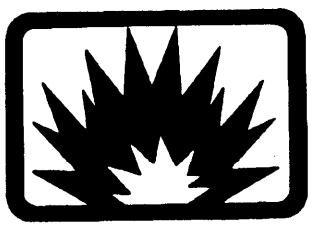
CHEMICAL AGENT RESISTANT COATING (CARC) HAZARD



Unusable chemical agent resistant coating (CARC) mixtures are considered hazardous waste and will require disposal in accordance with Federal, state, DOD, DA, and local installation hazardous waste regulations. Consult the installation environmental office for proper disposal guidance. Mixed CARC is extremely flammable. Use only in well-ventilated areas. Keep away from open flames, sparks, and other ignition sources.

WARNING

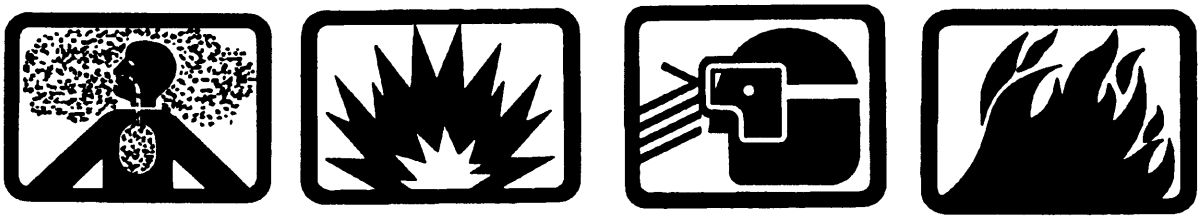
FUEL HANDLING HAZARDS



- Fuel is very flammable and can explode easily. To avoid serious injury or death:
  - Keep fuel away from open flame or any spark (ignition source).
  - Keep at least a B-C fire extinguisher within easy reach when working with fuel or on a fuel system.
  - Do not work on fuel system when engine is hot; fuel can be ignited by a hot engine.
  - Clean fuel tank to purge any flammable liquid or vapors before welding, grinding, or using any heat-producing device near the fuel tank.
  - Post signs that read "NO SMOKING WITHIN 50 FEET" when working with open fuel, fuel lines, or fuel tanks.

WARNING

SOLVENT P-D-680 HAZARDS



- Drycleaning solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in well-ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flash point for type I drycleaning solvent is 100°F (38°C) and for type II it is 138°F (50°C). Failure to do so may result in injury or death to personnel.

- If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.

WARNING

NUCLEAR, BIOLOGICAL, OR CHEMICAL (NBC) EXPOSURE AND VEHICLE AIR FILTERS HAZARDS

- NBC-contaminated air filters must be handled and disposed of only by authorized and trained personnel. The unit commander or senior officer in charge of maintenance personnel must ensure that prescribed protective clothing (FM 3-4) is used and that prescribed safety measures and decontamination procedures (FM 3-5) are followed. The local unit SOP is responsible for final disposal of contaminated air filters. Failure to comply may cause severe injury to personnel.

- The NBC protection filters use a type of carbon that contains Chromium VI. This is a known carcinogen if inhaled or swallowed. Damaged or unusable filters are classified as hazardous waste.

  - Do not throw away damaged or unusable filters as trash.

  - Turn in damaged or unusable filters to your Hazardous Waste Management Office or Defense Reutilization and Marketing Office (DRMO).

NUCLEAR, BIOLOGICAL, OR CHEMICAL (NBC) EXPOSURE AND VEHICLE AIR FILTERS HAZARDS (continued)

- Filters are completely safe to handle and use if they are not damaged in such away that carbon leaks from them. If carbon does leak, use protection such as a dust respirator to cover nose and mouth and put carbon in a container such as self-sealing plastic bag; turn into Hazardous Waste Management Office or DRMO.

- Disposal of hazardous waste is restricted by law. Violation is subject to criminal penalties.

WARNING

AUTOMATIC FIRE EXTINGUISHING SYSTEM (AFES) HAZARDS

Any automatic fire extinguishing system (AFES) component in need of maintenance or repair is prone to accidental discharge. Accidental discharge can lead to frostbite or other injury. Small parts or tools become dangerous projectiles when propelled by Halon at 750 psi (5171 kPa).

WARNING

HEAVY PARTS HAZARDS

- Many parts of the M992A1, such as doors, conveyor sections, and seats, are heavy and require more than one person to lift safely. Have one or two assistants help lift heavy components. Failure to do this can result is severe injury to personnel.

- Personnel must stand clear during lifting operations. A swinging or shifting load can cause injury or death.

WARNING

HOT PARTS HAZARD

Do not work on exhaust system, cooling system, powerpack, suspension, or hydraulic system until components are cool to the touch. The powerpack and the cooling and hydraulic systems contain fluids that can cause severe burns.

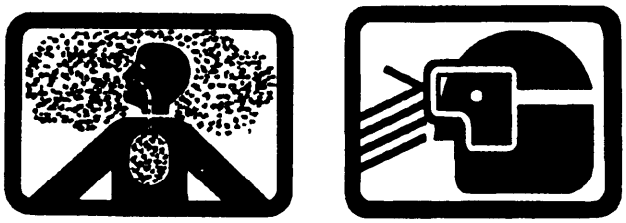
WARNING

HYDRAULIC PRESSURE HAZARD

High-pressure hydraulics (oil under 1500 psi [10,342 kPa] pressure) operate this equipment. Refer to vehicle operator and maintenance manuals for hydraulic oil pressure. Never disconnect any hydraulic line or fitting without first dropping pressure to zero. A high-pressure oil stream can pierce body and cause severe injury to personnel.

WARNING

ADHESIVE HAZARD



Adhesive causes immediate bonding on contact with eyes, skin, or clothing and also gives off harmful vapors. Wear protective goggles and use In well-ventilated area. If adhesive gets in eyes, try to keep eyes open; flush eyes with water for 15 minutes and get immediate medical attention.

TECHNICAL MANUAL

NO. 9-2350-287-20-1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 22 OCTOBER 1993

UNIT MAINTENANCE MANUAL
FOR
CARRIER, AMMUNITION, TRACKED
M992A1
(NSN 2350-01-352-3201)
EIC:AE6

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 Tank-automotive and Armaments Command, ATTN: AMSTA-IM-OPIT, Warren, MI 48397-5000. A reply will be furnished to you.

You may also provide DA Form 2028-2 information to TACOM via datafax or e-mail:
- TACOM's fax number is DSN 786-6323 or Commercial (810) 574-6323
- TACOM's e-mail address is tacom-tech-pubs@cc.tacom.army.mil

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HOW TO USE THIS MANUAL

SCOPE.

This technical manual contains Unit maintenance procedures for the M992A1 Carrier, Ammunition, Tracked. Chapter 1 contains general information; Chapter 2 contains information on general maintenance procedures and describes and illustrates troubleshooting procedures; and Chapters 3 through 22 describe and illustrate maintenance procedures for various systems and components. Ten appendixes and a subject index are also included in this manual.

INDEXING.

Four indexing procedures are used to help you locate information quickly:

- Cover index. Lists chapter titles and important parts of the manual, with corresponding page numbers. Each chapter or part listed is boxed in, with a black outeredge that is in line with the first page of that chapter or part.
- Table of contents. The table of contents follows the Safety Summary. The table of contents lists all chapters numerically, with corresponding page numbers.
- Chapter indexes. Each chapter starts with a numerical listing of all paragraphs in that chapter.
- Alphabetical index. The alphabetically arranged subject index starts on page Index 1.

MAINTENANCE TEXT AND ILLUSTRATIONS (CHAPTERS 3 THROUGH 22).

Each chapter begins with a numerical listing of all paragraphs. The first paragraph in each chapter is titled "General" and describes the system(s) to be covered. General repair and inspection procedures may also be given.

Each paragraph contains the following information, as appropriate:

- The common or specials tools and test equipment required to perform the procedures are listed under the heading "Tools/Test Equipment." Common and special tools are listed in Appendix I.
- Materials and mandatory replacement parts that will be discarded during the procedure are listed under the heading "Materials/Parts." A Materials/Parts list does not contain items that may be replaced if found defective during inspection. Also, the list does not contain the item named in the paragraph title. Materials may be found in Appendix D. Mandatory replacement parts may be found in Appendix H. Refer to TM 9-2350-287-24P for information on other parts that may have to be replaced.
- If more than one person is required to perform the procedure, the number is specified under the heading Personnel Required."
- Technical manuals, technical bulletins, field manuals, or other reference material that may be required to perform the procedure are listed under the heading "References." Note that the titles of all publications and forms referenced in the manual are listed in Appendix A.
- Procedures that must be performed on the vehicle prior to the maintenance procedure are listed under the heading "Equipment Conditions."

TEXT AND ILLUSTRATIONS.

Maintenance procedures are to be performed in the sequence given in the text and illustrations.

Illustrations are numbered clockwise, beginning at the 11 o'clock position. Because an illustration is keyed to the text, parts that are removed sequentially may not have sequential numbers. For example:

1. Remove screw (4), lockwasher (6), washer (7), and bracket (5) from transmission.

IMPORTANT.

Be sure to read the entire paragraph before beginning a maintenance procedure. Also, read the general information in Chapter 1 before beginning a procedure.

Warnings and cautions appear immediately preceding the step to which they pertain. It is important to read and thoroughly understand the warnings and/or cautions before beginning maintenance.

Notes may precede or follow the steps to which they pertain, depending on what makes the most sense. Notes highlight essential operating or maintenance procedures, conditions, or statements.

PROBLEM SOLVING.

The best way for you to fulfill your responsibility for maintaining the equipment covered in this manual is to make maximum use of your maintenance manual. The following three sample problems illustrate ways to use the manual efficiently:

1. How do I replace the roadwheel hub?

   - Look in the subject index for "roadwheel hub replacement" and turn to the appropriate page.

2. An equipment condition for replacing surge tank hoses (para 6-4) is, "Powerpack removed (para 3-2)." How do I find out what page paragraph 3-2 begins on?

   - Look in the chapter index for Chapter 3 until you find paragraph 3-2, Powerpack Replacement; then turn to the appropriate page.

3. The auxiliary power unit (APU) engine won't start. How do I find out what's wrong?

   - Turn to the Quick Guide to Troubleshooting (para 2-18). Find the name of the item that doesn't work (APU).
   - Find the problem (ENGINE CRANKS BUT FAILS TO START) in the listing for APU.
   - Turn to the paragraph in the Troubleshooting Chart (para 2-19) that is referenced-in this case, paragraph 2-19u(1).

PROBLEM SOLVING (continued).

- Follow the troubleshooting steps until you find out what is wrong.
- Follow the instructions given or turn to the paragraph referenced for repair of the damaged component.

REPAIR PARTS AND SPECIAL TOOLS.

For repair parts and special tools used on this vehicle, refer to TM 9-2350-287-24P.

SAFETY SUMMARY

This safety summary contains general safety precautions and hazardous materials warnings that must be understood and applied during maintenance to protect personnel and DOD property. Portions of this summary be repeated elsewhere for emphasis.

WARNING and CAUTION statements appear throughout this manual prior to procedures, practices, or conditions that may endanger personnel (WARNING) or cause equipment and property damage (CAUTION). A warning or caution will apply each time the related step is repeated. Before starting any task, review and understand the warnings and cautions included in the text for that task.

This manual contains procedures which may require using chemicals, solvents, paints, or other commercially available material that may pose a health or safety hazard. Refer to the “Materials/Parts” list at the beginning of a task to see which materials will be used during the task. Obtain material safety data sheets (Occupational Safety and Health Act [OSHA] Form 20 or equivalent) from the manufacturer or supplier of the material to be used. Become completely familiar with the information and manufacturer/supplier procedures, recommendations, warnings, and cautions for the safe use, handling, storage, and disposal of these materials.

Following the “General Safety Precautions” list is a list of “Hazardous Materials Warnings.” These warnings are designed to warn personnel of dangers associated with hazardous materials. For each hazardous material used, a material safety data sheet is required to be provided and available for review by personnel. Consult your local safety and health staff concerning questions on hazardous chemicals, personnel protective equipment requirements, and appropriate handling and emergency procedures.

GENERAL SAFETY PRECAUTIONS

- Always use the same fastener part number (or equivalent) when replacing fasteners. Do not risk using a fastener of less quality; do not mix metric and inch (customary) fasteners. Mismatched or incorrect fasteners can result in damage, malfunction, or injury.
- Fuel and oil are slippery and can cause falls. To avoid injury, wipe up spilled fuel or oil with rags.
- Make sure equipment will not move while repairing or inspecting it. For powered equipment, block or chock wheels or tracks and “red tag” the starter. Prevent a “quick fix” from becoming a quick injury.
- When adjustment or service requires a running engine, two personnel will be used, one at the controls and one at the service point. This helps prevent accidental movement of controls.
- When checking connections, do not let tools touch battery box. A direct short, arcing, tool heating to red hot, and battery explosion could result, causing injury or death to personnel.
- Sharp edges can cut hands. Use rags or a brush to lubricate.
- Do not use equipment for other than its intended use, unless authorized by the NICP/commodity command.

GENERAL SAFETY PRECAUTIONS (continued)

- Hearing protection is required for all personnel working in and around this vehicle while engine is running.
- Remove rings, bracelets, wristwatches, and neck chains before working on any vehicle. Jewelry can catch on equipment and cause injury, or may short across an electrical circuit cause severe burns or electrical shock
- Never crawl under equipment when performing maintenance unless equipment is securely blocked. Equipment may fall and cause serious injury or death to personnel.
- Keep clear of equipment when equipment is being raised or lowered. Equipment may fall and cause serious injury or death to personnel.
- Do not work on any item supported only by lift jacks or hoist. Always use blocks or proper stands to support the item prior to any work. Equipment may fall and cause injury or death to personnel.
- Do not allow heavy components to swing while hanging from lifting device. Equipment may strike personnel and cause injury.
- Exercise extreme caution when working near a cable or chain under tension. A snapped cable or a swinging or shifting load may result in injury or death to personnel.
- When working on a running engine, provide shielding to exposed rotating parts. Tools, clothing, or hands can get caught and cause serious injury to personnel.

HAZARDOUS MATERIALS WANINGS

- Adhesive causes immediate bonding on contact with eyes, skin, or clothing and also gives off harmful vapors. Wear protective goggles and use in a well-ventilated area. If adhesive gets in eyes, try to keep eyes open; flush with water for 15 minutes and get immediate medical attention.
- Adhesive sealant MIL-S-46163 (Loctite) can damage your eyes. Wear safety goggles/glasses when using; avoid contact with eyes. if sealant contacts eyes, flush eyes with water and get immediate medical attention.

HAZARDOUS MATERIALS WARNINGS (continued)

- Chemical agent resistant coating (CARC) paint contains isocyanyte (HDI), which is highly irritating to skin and respiratory system. High concentrations of HDI can produce symptoms of itching and reddening of skin, a burning sensation in throat and nose, and watering of the eyes. In extreme concentrations, HDI can cause cough, shortness of breath, pain during respiration, increased sputum production, and chest tightness. The following precautions must be taken whenever using CARC paint:

  - **ALWAYS** use air line respirators when using CARC paint unless air sampling shows exposure to be below standards. Use chemical cartridge respirator if air sampling is below standards.

  - **DO NOT** let skin or eyes come in contact with CARC paint. Always wear protective equipment (gloves, ventilation mask, safety goggles, etc.).

  - **DO NOT** use CARC paint without adequate ventilation.

  - **NEVER** weld or cut CARC-coated materials.

  - **DO NOT** grind or sand painted equipment without high-efficiency air purifying respirators in use.

  - **BE AWARE** of CARC paint exposure symptoms; symptoms can occur a few days after initial exposure. Seek medical help immediately if symptoms are detected.

- Drycleaning solvent (P-D-680) is TOXIC and flammable. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and do not breathe vapors. Keep away from heat or frame. Never smoke when using the solvent; the flashpoint for type I is 100°F (38°C) and for type II it is 138°F (50°C). Failure to do so may result in injury or death to personnel.

- If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. if solvent contacts skin or clothes, flush with cold water. if solvent contacts eyes, immediately flush with water and get immediate medical attention.

CHAPTER 1
INTRODUCTION

Section I. GENERAL INFORMATION

1-1. SCOPE.

a. **Type of manual:** Unit maintenance.
b. **Model number and equipment name:** M992A1 Carrier, Ammunition, Tracked.
c. **Purpose of equipment:** Provide overland transport of 155-millimeter projectiles and propelling charges from ammunition supply points to self-propelled howitzers in the field.

1-2. MAINTENANCE FORMS, RECORDS, AND REPORTS.

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by (as applicable) DA Pam 738-750, The Army Maintenance Management System; DA Pam 738-751, Functional Users Manual for the Army Maintenance for the Army Maintenance Management System-Aviation (TAMMS-A); or AR 700-138, Army Logistics Readiness and Sustainability.

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

Refer to TM 750-244-6 for procedures on destruction of military vehicles. Destruction of munitions is covered in TM 750-244-5-1 (conventional ammunition) and TM 43-0002-33 (improved conventional munitions).

1-4. PREPARATION FOR STORAGE OR SHIPMENT.

Refer to para 2-36 of this manual for procedures on preparation of the M992A1 for storage or shipment.

1-5. QUALITY ASSURANCE.

No specific quality assurance manual pertains to the M992A1.

Defective material received through the supply system should be reported on an SF Form 388, Product Quality Deficiency Report, Instructions for preparing the reports are provided in AR 702-7, Reporting of Quality Deficiency Data. Mail your completed form directly to:

Commander
U.S. Army Tank-Automotive Command
ATTN: AMSTA-QRT
Warren, MI 48397-5000

1-6. OFFICIAL NOMENCLATURE. NAMES, AND DESIGNATIONS.

Nomenclature in this manual was chosen in accordance with the terms used for provisioning as they appear in the repair parts and special tools list (RPSTL) and maintenance allocation chart (MAC) for Unit maintenance on the M992A1 .

A few tools and hull components are, however, referred to by names more common that those in the RPSTL. In many cases, the more common name is a shorter name for the same component.

Nomenclature Cross-Reference

Manual Nomenclature	Official Nomenclature
Adapter	Straight pipe adapter
Bracket	Rotating eye bracket
Front hull slope plate	Armor plate
Hook	Strap fastener loop
Hose or hose assembly	Hose assembly, nonmetallic
Lockwire	Nonelectrical wire
Master relay	Relay and housing assembly
Side hull slope plate	Door support plate
Spring	Adjustable door spring
Tube	Metallic bent tube
Wiring harness	Branched wiring harness

1-7. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRs).

If your M992A1 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 or performance. Put it on an SF Form 368 (Product Quality Deficiency Report). Mail it to the address specified in DA Pam 738-750.

1-8. WARRANTY INFORMATION.

The M992A1 is not warranted.

1-9. SAFETY, CARE, AND HANDLING.

For information on general safety precautions and regulations, review the warning summary at the front of this manual and the safety summary that follows the table of contents. Observe all warnings and cautions that appear in the maintenance procedures.

1-10. CORROSION PREVENTION AND CONTROL (CPC).

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 the problem can be corrected and improvements can be made to prevent the problem in future items.

While corrosion is typically associated with the 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.

If a corrosion problem is identified, it can be reported using an SF Form 368. Use of key words such as "corrosion," "rust," "deterioration," and "cracking" will ensure that the information is identified as a CPC problem.

The form should be submitted to the address specified in DA Pam 738-750.

Section II. EQUIPMENT DESCRIPTION AND DATA

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1-11. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

Purpose

The M992A1 is a field artillery ammunition support vehicle comparable in speed, mobility, and survivability to current field artillery weapons (M109A6 self-propelled howitzer class).

Capabilities

This full-tracked, self-propelled, diesel-powered vehicle is highly mobile and maneuverable. It is capable of long-range, high-speed operation on improved roads and is well suited to rough terrain, muddy or marshy ground, sand, snow, or ice. The M992A1 can also ford waterways where maximum depth is 42 inches.

Features

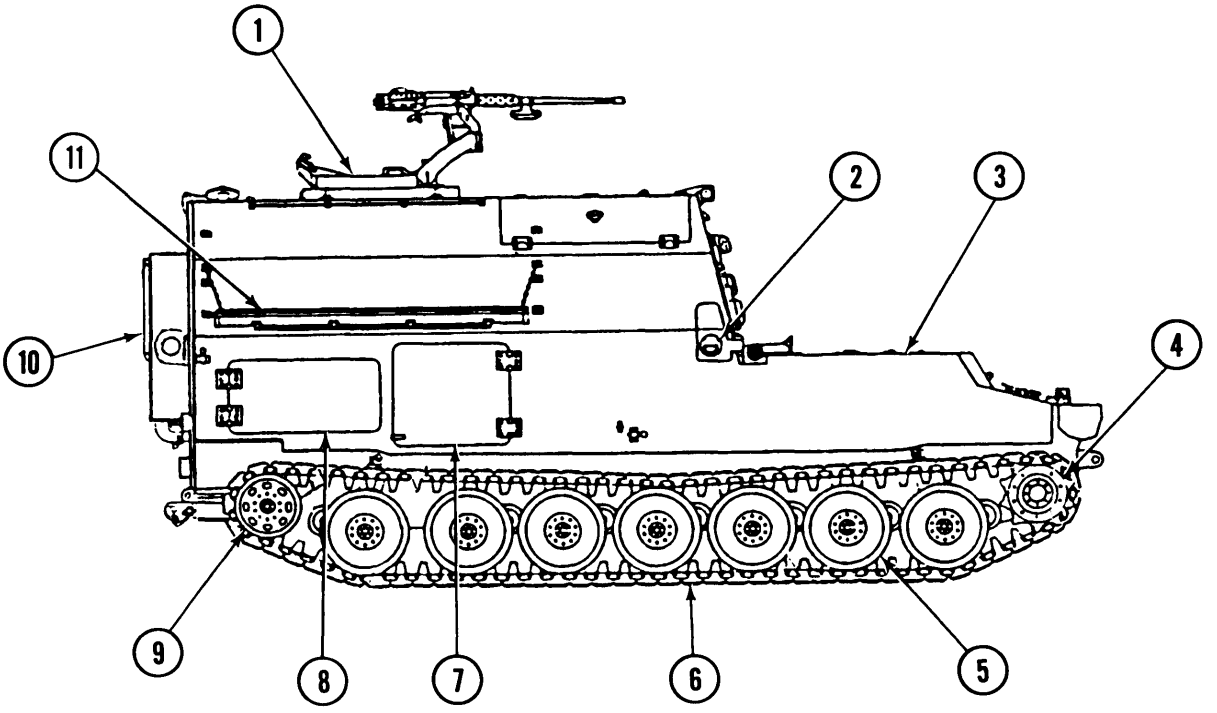
- Ammunition-handling equipment that includes a hydraulically operated conveyor assembly, two projectile rack assemblies, canister stowage compartments, and related components.
- Remote start, diesel-powered auxiliary power unit (APU) for continuous operation of electrical and hydraulic systems without use of the main engine.

[Text Deleted]

- Upper rear door that, when opened, provides overhead ballistic protection between M992A1 and supported howitzer. Two small doors in upper rear door allow operation of conveyor with upper rear door closed.
- Side doors, on both sides of vehicle, that provide access for personnel and for the loading of propellant-charge canisters and copperhead projectiles into canister compartments.
- On-board nuclear, biological, and chemical (NBC) agent detection and protection system.
- Crew seating for three, plus driver's seat and commander's seat.
- Simplified test equipment for the internal combustion engine (STE/ICE).

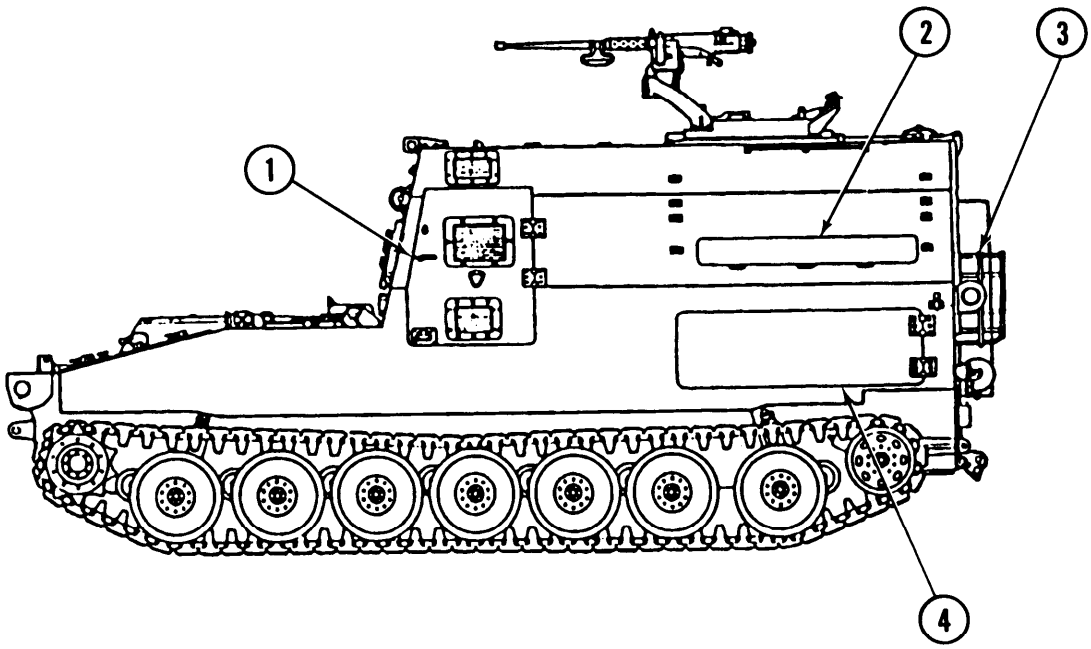
1-12. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.

1. Commanders cupola
2. Fuel fill access door
3. Hull
4. Drive sprocket (one on each side)
5. Roadwheel (seven sets of two on each side)
6. Track (one on each side)
7. Personnel side door
8. Canister side door
9. Idler wheel
10. Crew automatic fire extinguishing system (AFES) fire extinguisher box assembly
11. Duffle bag stowage rack



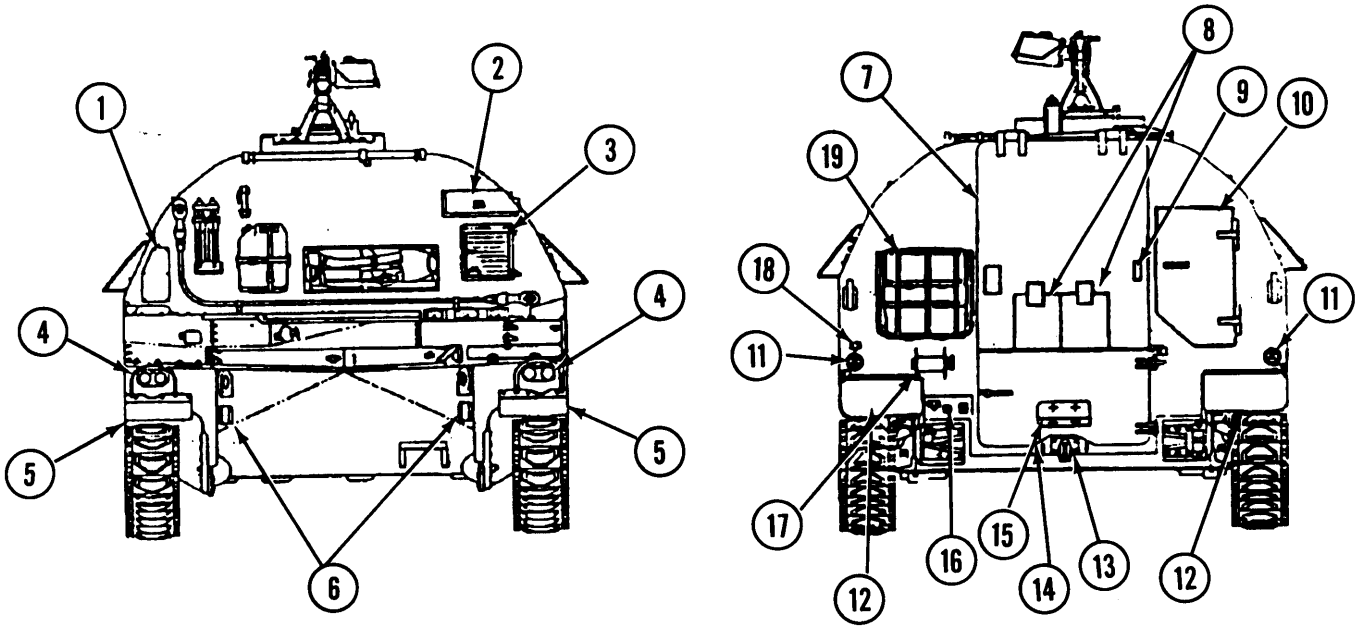
1-12. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (continued).

1. APU door
2. Duffle bag stowage rack
3. Stowage rack
4. Canister door/copperhead projectiles



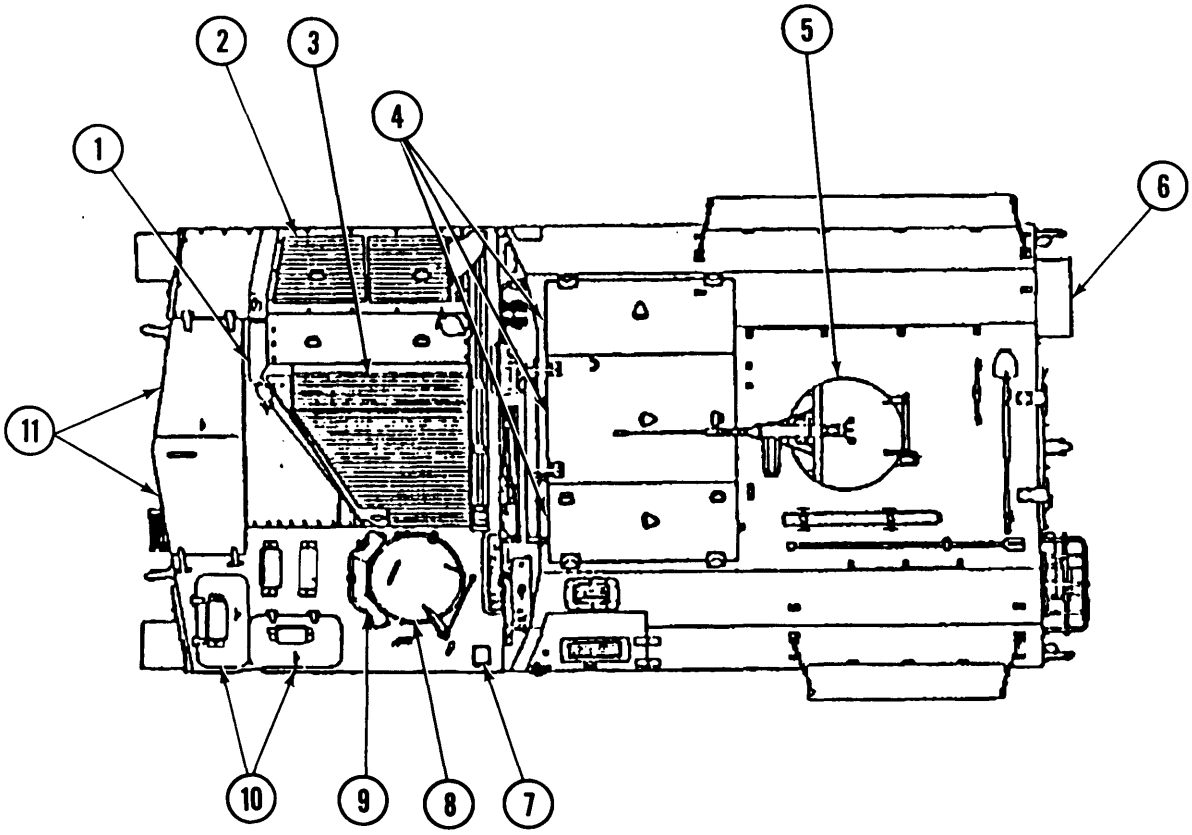
1-12. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (continued).

1. Fuel fill filter access plate
2. APU muffler
3. APU air inlet door
4. Headlights
5. Fenders
6. Towing lugs
7. Upper rear door
8. Upper rear door small doors
9. Small door latches
10. Crew AFES fire extinguisher box assembly
11. Taillights
12. Fenders
13. Tow pintle
14. Lower rear door
15. Ml 3 Decontamination Apparatus
16. NBC terminals, NATO intervehicle slave connector, and trailer receptacle
17. Telephone handreel
18. Telephone terminals
19. Stowage rack

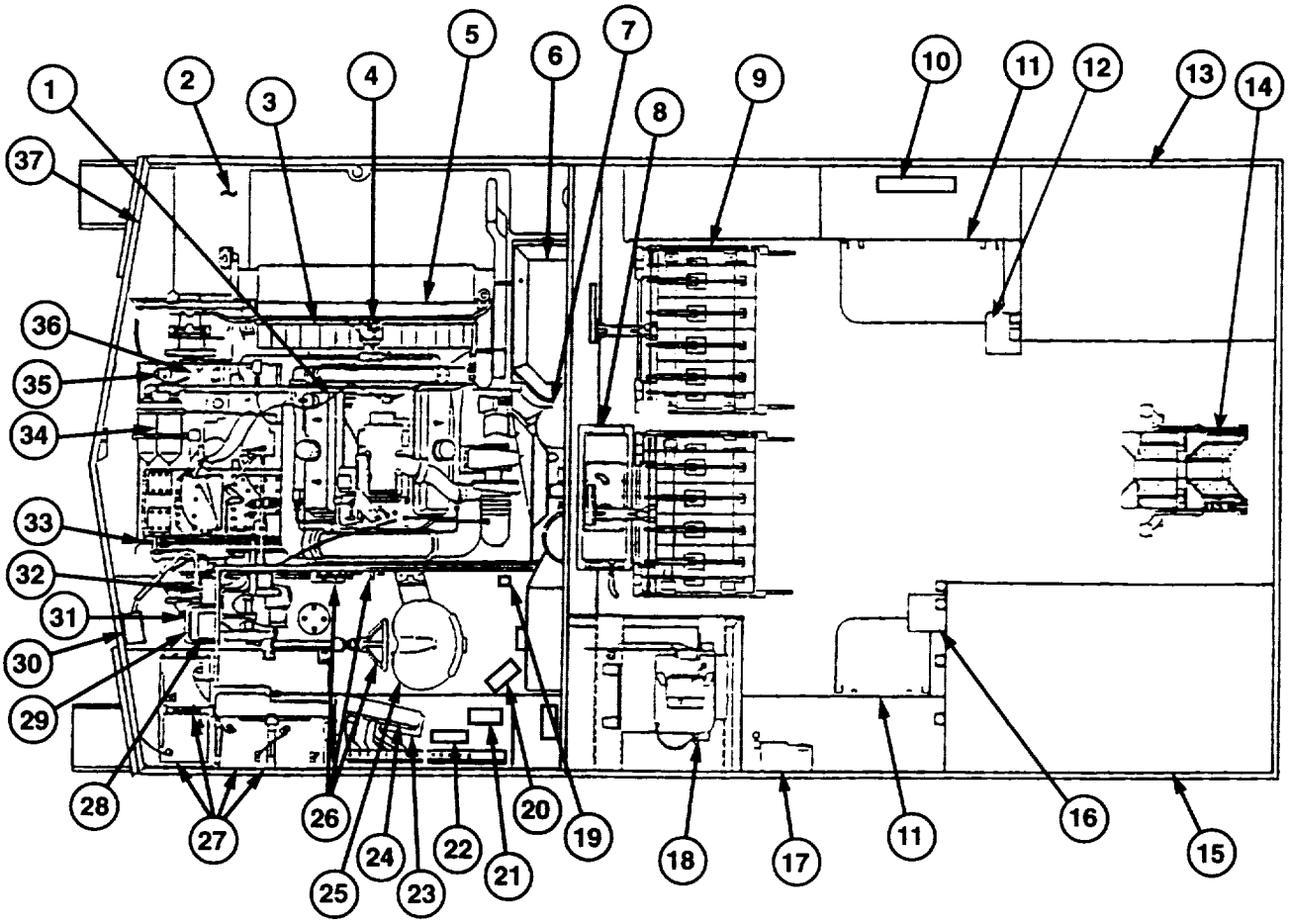


1-12. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (continued).

1. Engine deck access plates
2. Engine access cover
3. Air intake grille
4. Tcp doors
5. Commanders cupola
6. Crew AFES fire extinguisher box assembly
7. AFES manual discharge system (AFES/MDS) lanyard cable pull handle
8. Driver's hatch
9. Driver's periscope assembly
10. Battery access covers
11. Transmission access covers



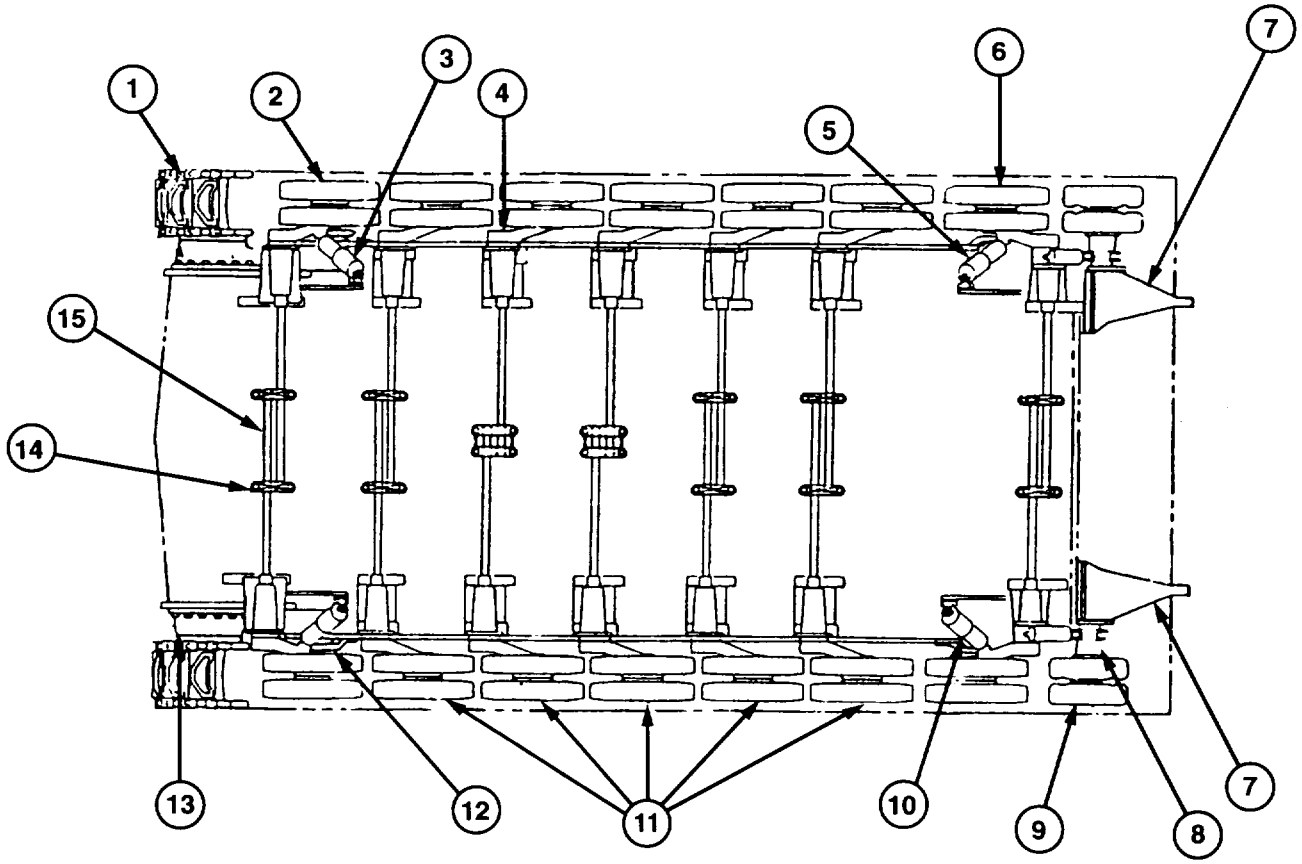
1-12. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (continued).



1. Engine
2. Fuel tanks and pumps
3. Radiator
4. Generator
5. Fan assembly
6. Air cleaner
7. Personnel heater
8. Hydraulic fluid reservoir
9. Projectile rack assemblies
10. Crew AFES test and alarm (T/A) panel
11. Crew seats
12. Precision lightweight global positioning system (GPS) receiver (PLGR)
13. Right canister compartment shelf assembly
14. Conveyor assembly
15. Left canister compartment shelf assembly
16. Mounted water ration heater (MWRH)
17. Hydraulic control panel
18. APU
19. Air cleaner restriction indicator
20. Personnel heater control box
21. AFES/MDS actuator assembly
22. Engine AFES T/A panel
23. Driver's compartment NATO slave receptacle
24. Main and portable instrument panels
25. Drivers seat
26. Drivers controls
27. Batteries
28. Voltage regulator
29. Bilge pump relay
30. Rectifier
31. Starter relay
32. Master relay
33. Secondary fuel filter
34. Engine oil filters
35. Primary fuel filter
36. Transmission
37. Coolant surge tank

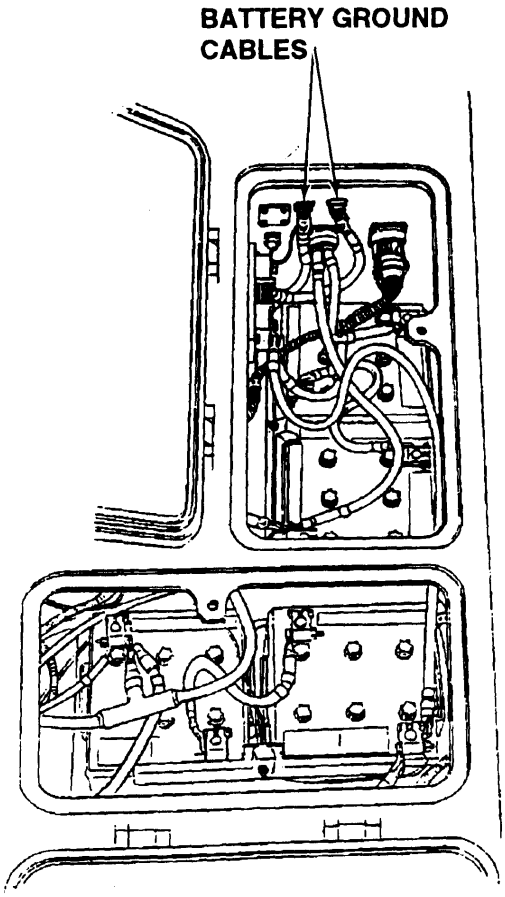
1-12. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (continued).

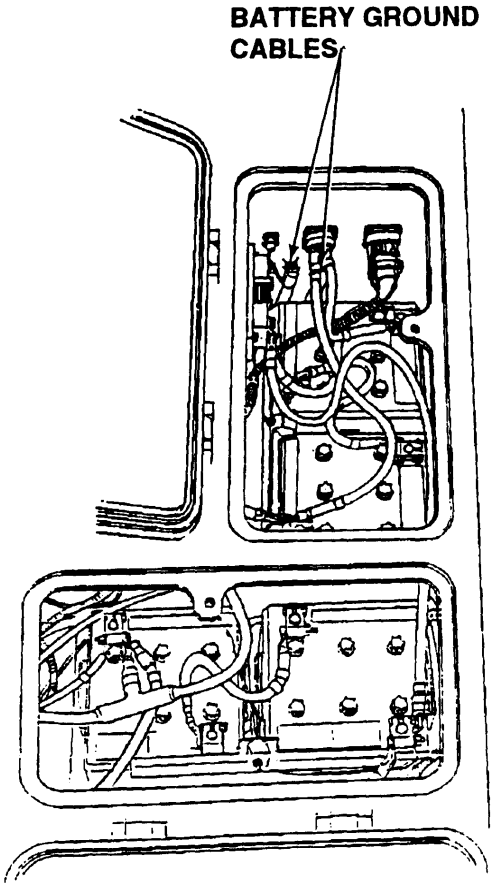
1. Drive sprockets
2. No. 1 roadwheels
3. Front shock absorbers
4. Roadwheel arms and hubs
5. Rear shock absorbers
6. No. 7 roadwheels
7. Idler wheel housings
8. Idler arms and hubs
9. Idler wheels
10. Bump stop brackets
11. Intermediate roadwheels
12. Bump stop brackets
13. Final drive housings
14. Torsion bar anchors
15. Torsion bars



1-13. DIFFERENCES BETWEEN MODELS.

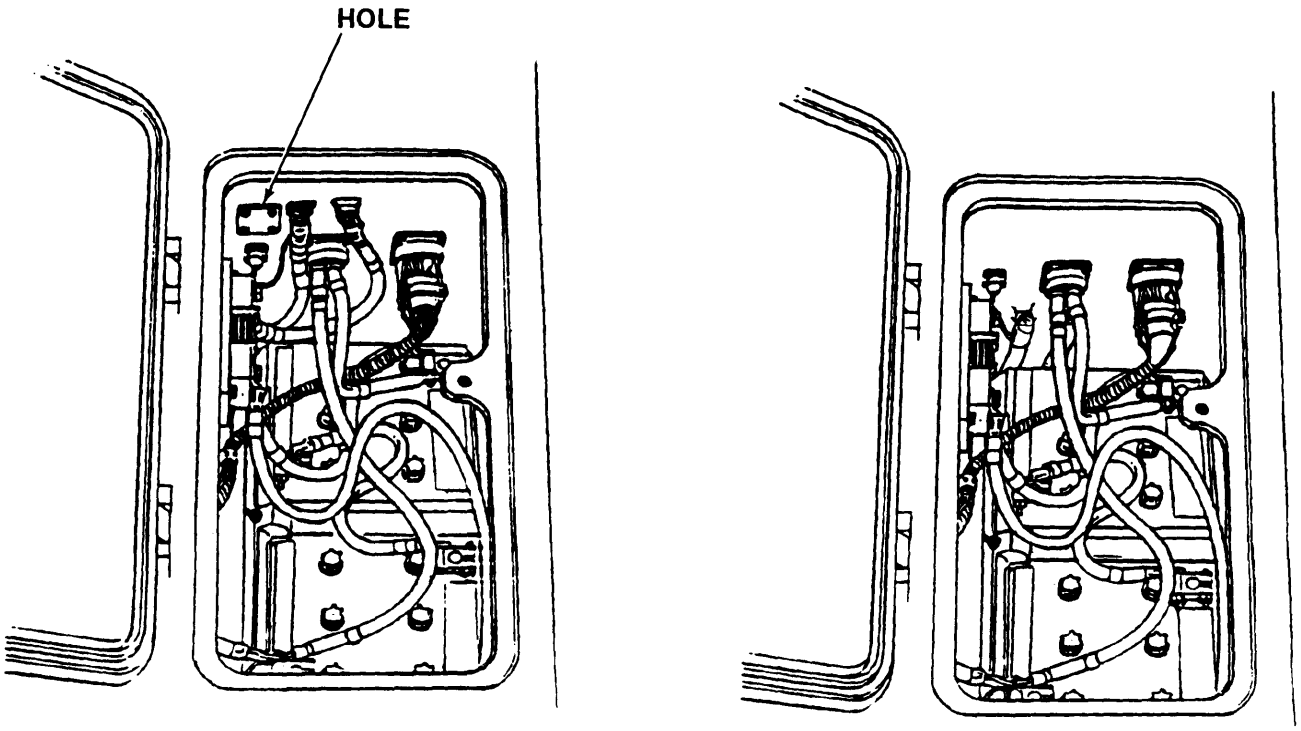
There is onty one model of the M992A1, but there are differences between vehicles. Connection of the battery ground cables to the vehicle differ in location. The two locations are illustrated below.





1-13. DIFFERENCES BETWEEN MODELS (continued).

In addition, some vehicles do not have holes cut in the battery box bulkhead. The two configurations are shown below.



Because these are production deviations, serial number effectivities are not available. Be aware of the differences and the impact on performing certain maintenance procedures.

1-14. EQUIPMENT DATA.

GENERAL

Crew 3
Other personnel ..... 2 max.
Weight (combat loaded) ..... 57,500 lb (26,105 kg)
Length (overall) ..... 260 in. (660.40 cm)
Width (overall) ..... 124 in. (314.96 cm)
Height (overall; combat loaded to top of GPS antenna assembly) ..... 143 in. (363.22 cm)
Ground clearance ..... 15 in. (38.10 cm)
Armament ..... 50-cal. M2, HB flex machine gun; 5.56 mm, M16A2 rifle

PERFORMANCE

High speed (max.) ..... 35 mph (56 kph)
Reverse speed (max.) ..... 7 mph (11 kph)
Maximum grade ..... 60 percent
Maximum trench (width) ..... 72 in. (183 cm)
Maximum vertical wall ..... 21 in. (53 cm)
Turning radius (min.) ..... 1 vehicle length
Fording depth ..... 42 in. (107 cm)
Cruising range ..... 220 mi (354 cm)

ENGINE

Type/model ..... Detroit Diesel 8V71T, liquid-cooled, two-cycle
Manufacturer ..... Detroit Diesel Corporation
Cylinders 8
Brake horsepower (max.) ..... 405 at 2300 rpm
Brake horsepower (continuous) ..... 345 at 2300 rpm
Engine horsepower (full load) ..... 440 at 2300 rpm
Displacement ..... 567.4 cu in (34 cc)
Bore ..... 4.25 in. (10.8 cm)
Stroke ..... 5 in.(12.7 cm)
Compression ratio 17:1
Torque (max. gross) ..... 980 ft-lb (1329 N•m) at 1700 rpm
Torque (max. net) ..... 895 ft-lb (1214 N•m) at 1600 rpm
Ignition ..... Compression

NOTE

Under emergency conditions and in military operations involving jet transportation, JP-5 aircraft turbine engine fuel may be used instead of diesel fuel specified by FED SPEC VV-F-800D.

Fuel (FED SPEC VV-F-800D) 7iesel
Regular grade (DF-2)(NATO F-54) ..... +20° to 115°F (-7° to 46°C)
W inter grade (DF-1) ..... -20° to +20°F (-29° to -7°C)
Arctic grade (DF-A) ..... -65° to -25°F (-54° to -32°C)
Fuel capacity ..... 135 gal. (511 L)
Fuel acceptance (safe max.) ..... 50 gpm (189 lpm)

1-14. EQUIPMENT DATA (continued).

Lubrication oil system capacity (refill) ..... 27 qt (approx.) (25 L)
Cooling system capacity (refill) ..... 14.5 gal. (55 L)
Cooling system capacity (dry) ..... 20.20 gal. (77 L)

TRANSMISSION

Model XTG-411-4
Manufacturer ..... Detroit Diesel Corporation, Allison Division
Usable ranges:
- First (low range) 5.69:1
- Second (low intermediate) 3.17:1
- Third (low intermediate) 1.58:1
- Fourth (high range) 0.79:1
- Low reverse (R 1) 5.60:1
- High reverse (R2) 3.79:1
- Steer 1.475:1

Oil capacity (refill) ..... 56 qt (53 L)
Steer control (first and second) ..... Clutch brake

ELECTRICAL SYSTEM

Voltage (nominal) ..... 24 V dc
Batteries ..... 4, 12 V dc each, series parallel
Generator type ..... 180 amps
Manufacturer ..... Prestolite Electric Inc.
Model A001-5520AC
Amperage 180
RPM ..... 8000 (m ax.)
Voltage ..... 28 V dc

COMMUNICATIONS

Intercommunications set ..... AN/VIC 1
Outlets 3
External jack 1
External extension (model) C-998/U

SUSPENSION

Type ..... Independent torsion bar
Roadwheel ..... 7 pairs per side
Size ..... 24 in. (61 cm)
Loadings:
- 1,2, and 7 positions ..... 4000 lb (approx.) (1816 kg)
- Intermediate positions ..... 2600 lb (approx.) (1180 kg)

Track:
- Type ..... T-154 double pin
- Adjustment at idler w heel ..... Track adjuster
- Shoes per track 80

1-14. EQUIPMENT DATA (continued).

AUTOMATIC FIRE EXTINGUISHING SYSTEM (AFES)

Manufacturer ..... HTL Systems
Extinguishing agent ..... Halon 1301
Systems:
- Quantity 3
- Type ..... Engine AFES, crew AFES, AFES manual discharge

Bottles (fixed):
- Number ..... Engine AFES-2, crew AFES-6
- Capacity (each) ..... Engine-AFES-two 10 lb (4.5 kg), Halon 1301 Crew AFES-six 7 lb (3 kg), Halon 1301
- Pressure ..... 750 psig (5171 kPa) at 70°F (210C), nitrogen

Detection systems:
- Engine AFES ..... Engine compartment thermal wire
- Crew AFES ..... 4 optical fire sensing assemblies
- AFES manual discharge ..... Switch on T/A panels and 2 pull handles

Portable extinguishers:

[Text Deleted]

- Number 2
- Extinguishing agent ..... CO_2
- Discharge system ..... Manual

HYDRAULIC SYSTEM

Reservoir capacity ..... 13 gal. (49 L)
System pressure ..... 1550 psi (10, 687 kPa)
Oil MIL-H-6083
Filter ..... 10-micron element
Pump:
- Manufacturer ..... Rexroth Corp.
- Model ..... P2-3AH2-1 L
- Flow rate ..... 6.9 gpm (26.1 lpm) at 2000 rpm
- Type ..... Gear

[Text Deleted]

CONVEYOR

Hydraulic motor:

Manufacturer	H.P.I. Nicols
Model	110-3-450

1-14. EQUIPMENT DATA (continued).

CONVEYOR (continued)

Type	Gear
Chain length	19 ft (5.8 m)

AUXILIARY POWER UNIT

Height	25.75 in. (65.4 cm)
Weight	310 lb (140.7 kg) (approx.)
Length	23.875 in. (60.64 cm)
Width	18.375 in. (46.67 cm)
Number of cylinders	2
Displacement	70 cu in (4.2 cc)
Horsepower at 2000 rpm	11.5 HP
Governor setting	2000rpm +/- 100
Bore	3.50 in. (8.89 cm) diameter
Stroke	3.625 in. (9.208 cm)
Compression ratio	19:1
Oil capacity	3.5 qt (3.31 L)
Fuel (FED SPEC VV-F-800D)	Diesel
Cooling air at2000 rpm	650 cu ft/min (18 cu m/min)
Combustion air at 2000 rpm	34.0 cu ft/min (1 cu m/min)
Electrical system:	
Generator/starter	300 am p
Battery voltage	24 V dc
Glow plug	2
Manifold heater, series connected	2

1-15. EQUIPMENT CONFIGURATION.

There is only one configuration of the M992A1.

Section III. PRINCIPLES OF OPERATION

1-16. EQUIPMENT OPERATION.

The M992A1 requires the integrated performance of several systems to successfully complete its mission. The electrical supply and track and suspension systems are powered by the powerpack. The auxiliary power unit provides power to the hydraulic system.

POWERPACK

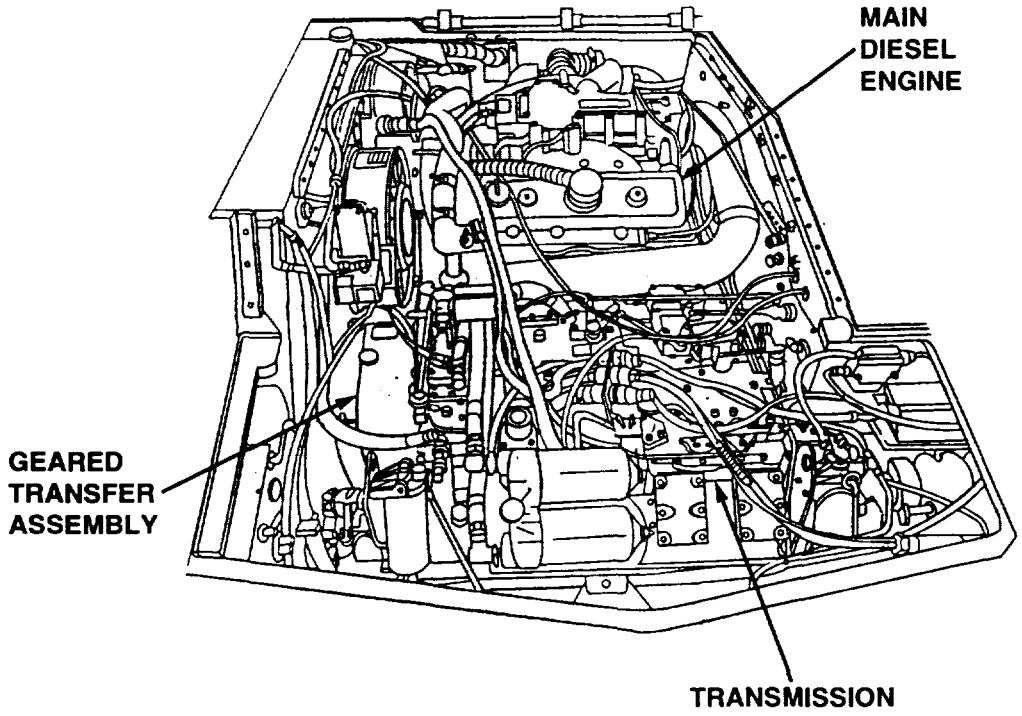
The powerpack includes the main diesel engine and the unitized transmission and transfer assembly.

The geared transfer assembly transfers engine power to the transmission. The transmission transfers power through the left and right final drives to the drive sprockets.

The powerpack is removed and installed as a single unit. It must be removed from the vehicle before the engine and transmission unit can be separated.

The engine is a Detroit Diesel turbocharged eight-cylinder, V-type, two-cycle diesel.

The Allison model XTG411-4 cross-drive transmission combines transmission, steering, and braking. The driver's compartment steering wheel is connected through linkages to hydraulic controls in the transmission. Braking is controlled by the service brake pedal through linkages to disks in the transmission.



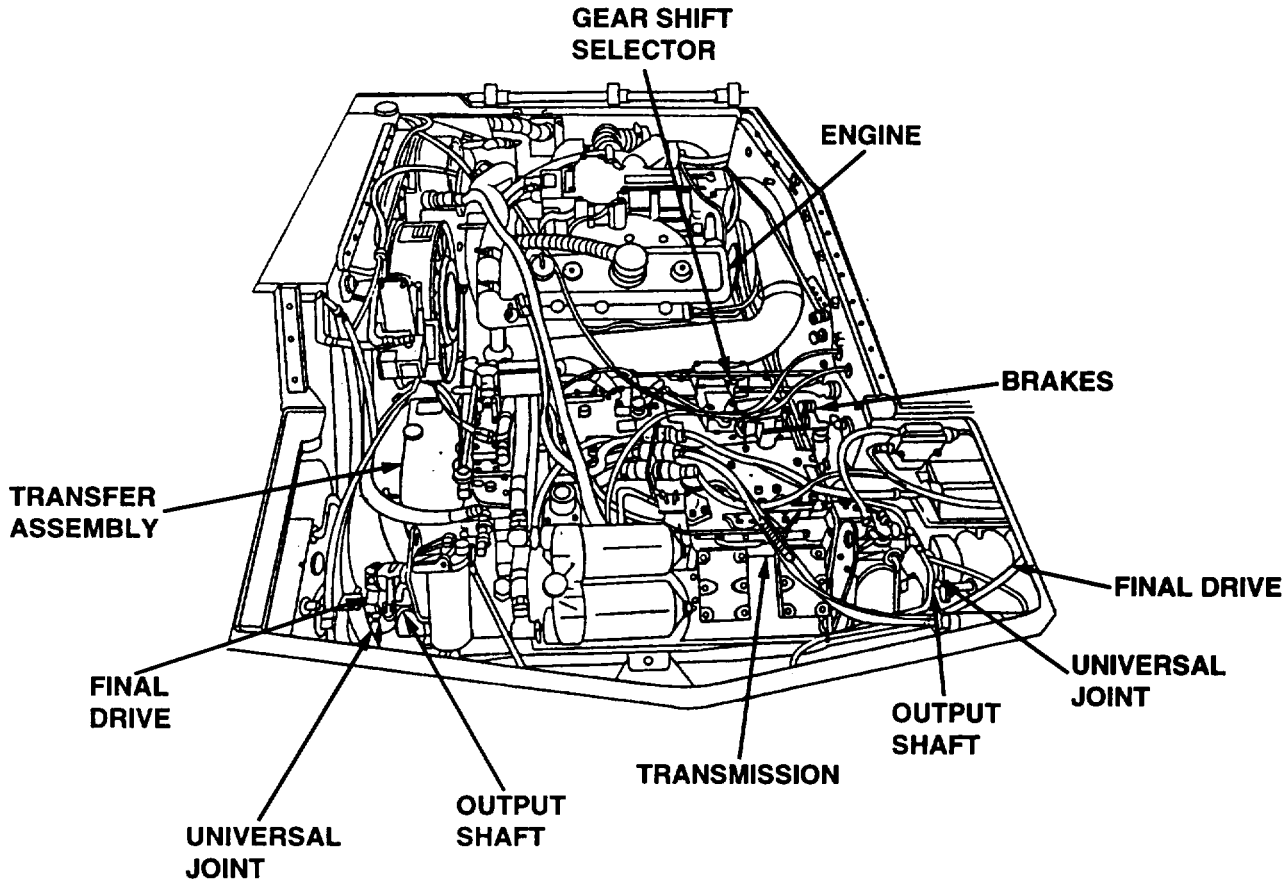
1-16. EQUIPMENT OPERATION (continued).

TRANSMISSION AND DRIVE CONTROL ASSEMBLIES

The transmission is mechanically and hydraulically operated. It receives power from the engine through a transfer assembly. The transmission has four forward, two reverse, and one neutral setting. Power is delivered to the left and right final drives through output shafts linked to the transmission by universal joints.

Transmission mechanically linked drive control assemblies include the following:

- Brakes, which provide internal mechanical braking for right and left transmission drive assemblies. Used to stop or slow vehicle by depressing brake pedal in driver's compartment.
- Gear shift selector, which selects speed for the transmission.



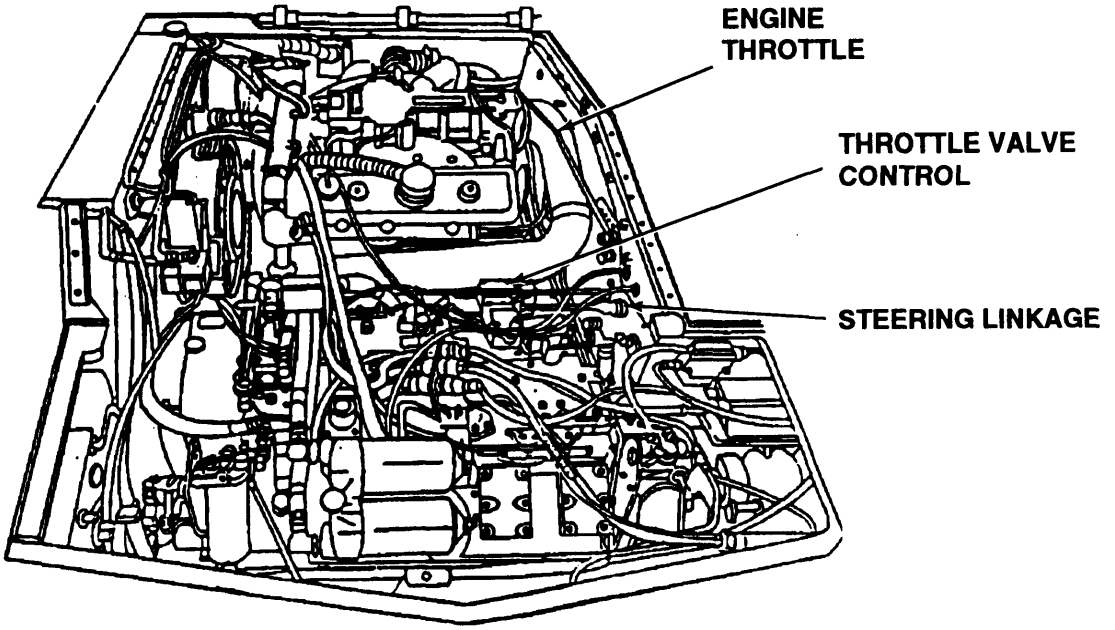
1-16. EQUIPMENT OPERATION (continued).

NOTE

The throttle valve control does not govern the speed of the vehicle. Speed and rpm are determined by engine rpm and the shift control position.

- Throttle valve control, which interconnects with the engine throttle and gear shift selector. With engine operating and shift control in neutral position, the transmission throttle valve is 'locked out." When gear shift selector is in a forward or reverse gear, the transmission throttle valve is "locked in," allowing transfer of power from the transfer assembly into the transmission.

- Steering linkage, which is connected to the steering wheel in driver's compartment. Turning the steering wheel applies brakes to track on inside of turn. For example, during a left turn the brake is applied to the left drive output. During a right turn the brake is applied to the right drive output.



1-16. EQUIPMENT OPERATION (continued).

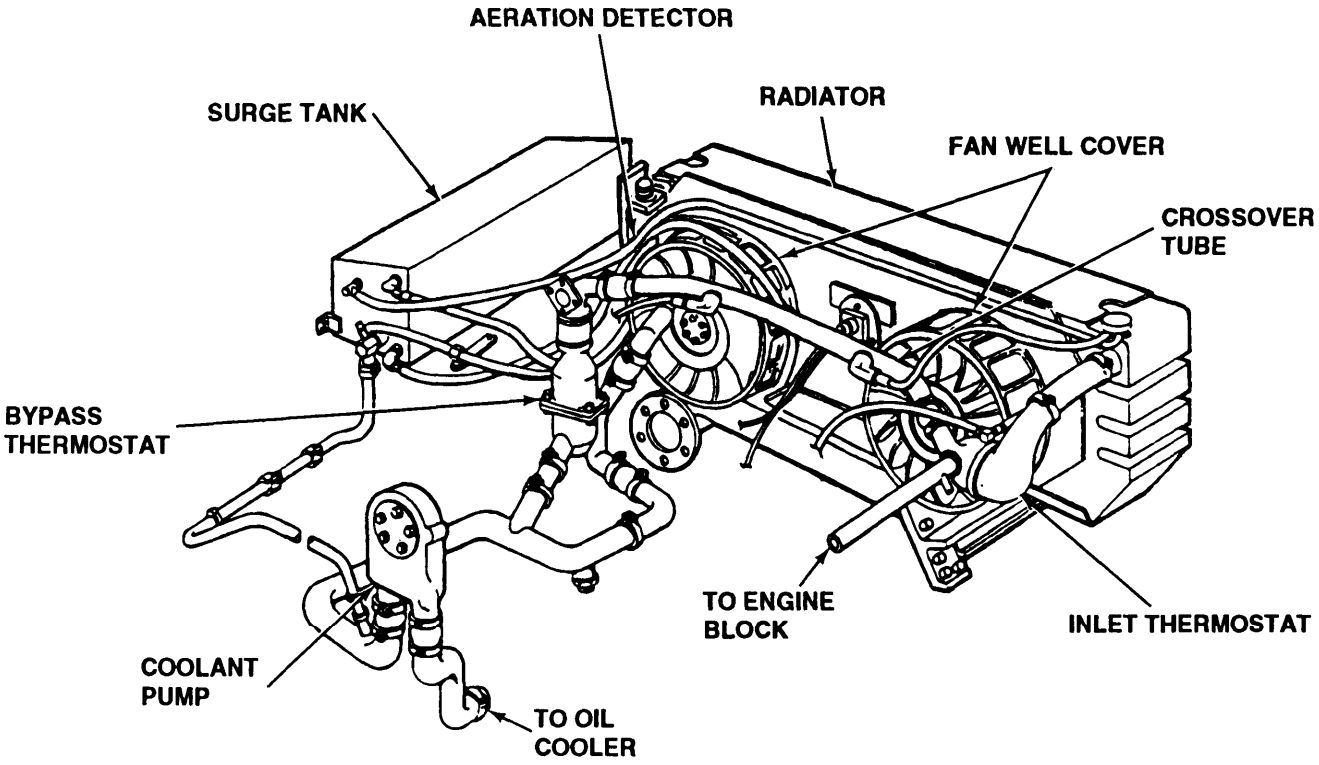
ENGINE COOLING SYSTEM

Cooling air is drawn through the fan well cover and is forced through the radiator by two cooling fans. Airflows around the engine and is exhausted through grilles on the vehicle deck.

Engine coolant flows from the coolant pump into a two-section oil cooler that cools the engine and transmission oil. From the oil cooler cores, coolant flows into engine water jackets for engine block cooling. At normal operating temperatures, the bypass thermostat is closed and the inlet thermostat is open, allowing coolant to circulate through the radiator. Below normal operating temperatures, the inlet thermostat closes and the bypass thermostat opens, allowing coolant to flow through the crossover tube and bypass the radiator.

The surge tank stores excess coolant, allowing coolant to flow back into the system as required to maintain the system at full level. Air trapped in the system is bled off through the pressure relief valve, which is connected to the surge tank.

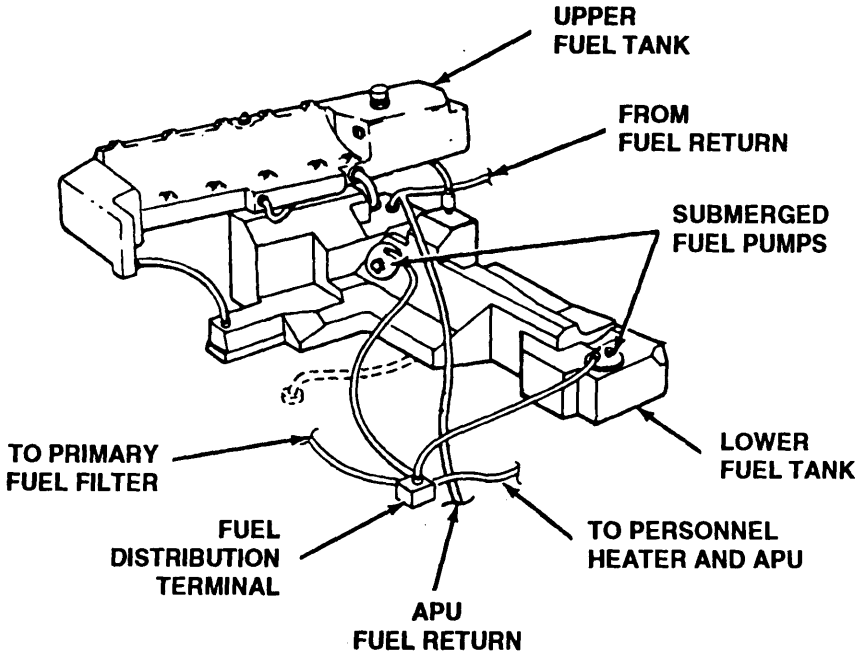
The aeration detector senses low coolant level and activates a warning indicator light on the driver's instrument panel.



1-16. EQUIPMENT OPERATIONS (continued).

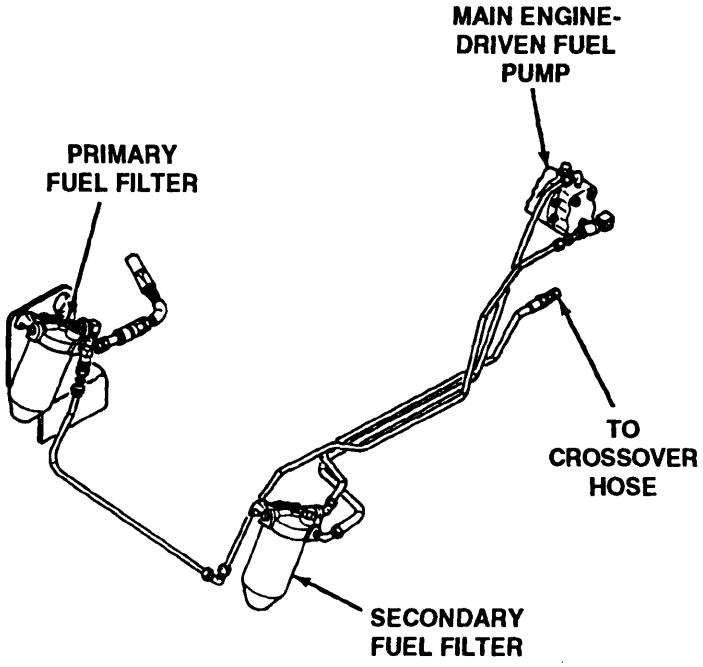
FUEL SYSTEM

The upper and lower fuel tanks have a combined capacity of 135 gallons. Fuel is pumped from the tanks by two submerged electrically driven fuel pumps to a fuel distribution terminal, where it is routed to the personnel heater, APU fuel pump and filters, or primary fuel fitter or is returned to the tanks.



The primary fuel filter receives fuel from the fuel tanks. The main engine-driven fuel pump pulls fuel from the primary fuel filter and channels it to the secondary fuel filter.

Fuel is delivered from the secondary fuel filter to the engine. The fuel-return crossover hose carries fuel from the right to the left cylinder head. Unused fuel from the engine is routed through the fuel-return hose to the fuel tanks.



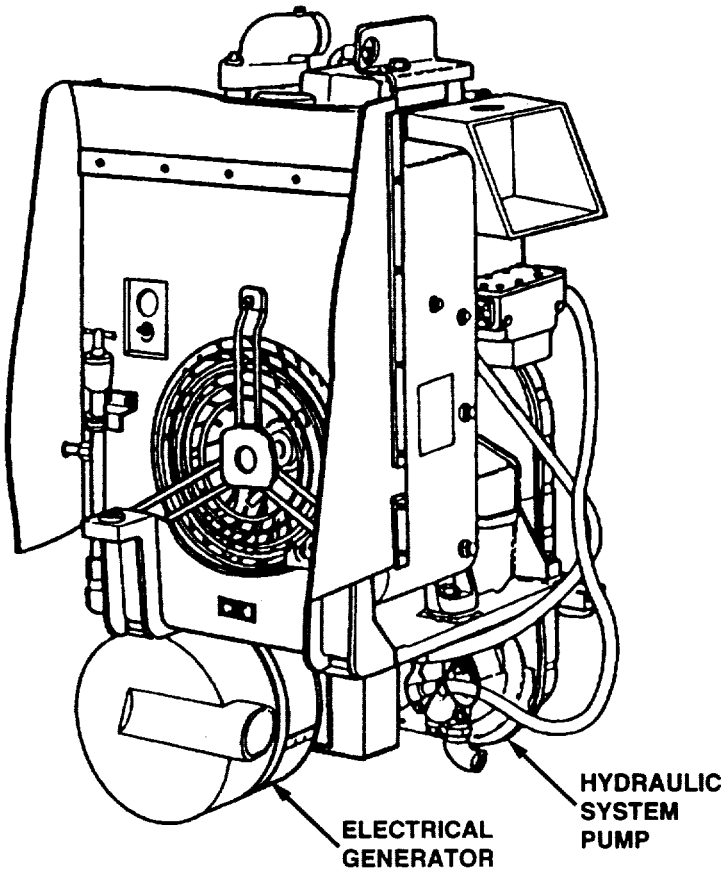
1-16. EQUIPMENT OPERATION (continued).

APU

The APU is an 11.5-horsepower, overhead valve, two-cylinder, four-cycle, air-cooled diesel engine used to drive an electrical generator and the hydraulic system pump.

The chain-driven generator is used to recharge the batteries and provide electrical power for the operation of M992A1 components and a supported howitzer.

The hydraulic system pump powers hydraulic system components. Failure of the APU would result in system failure.



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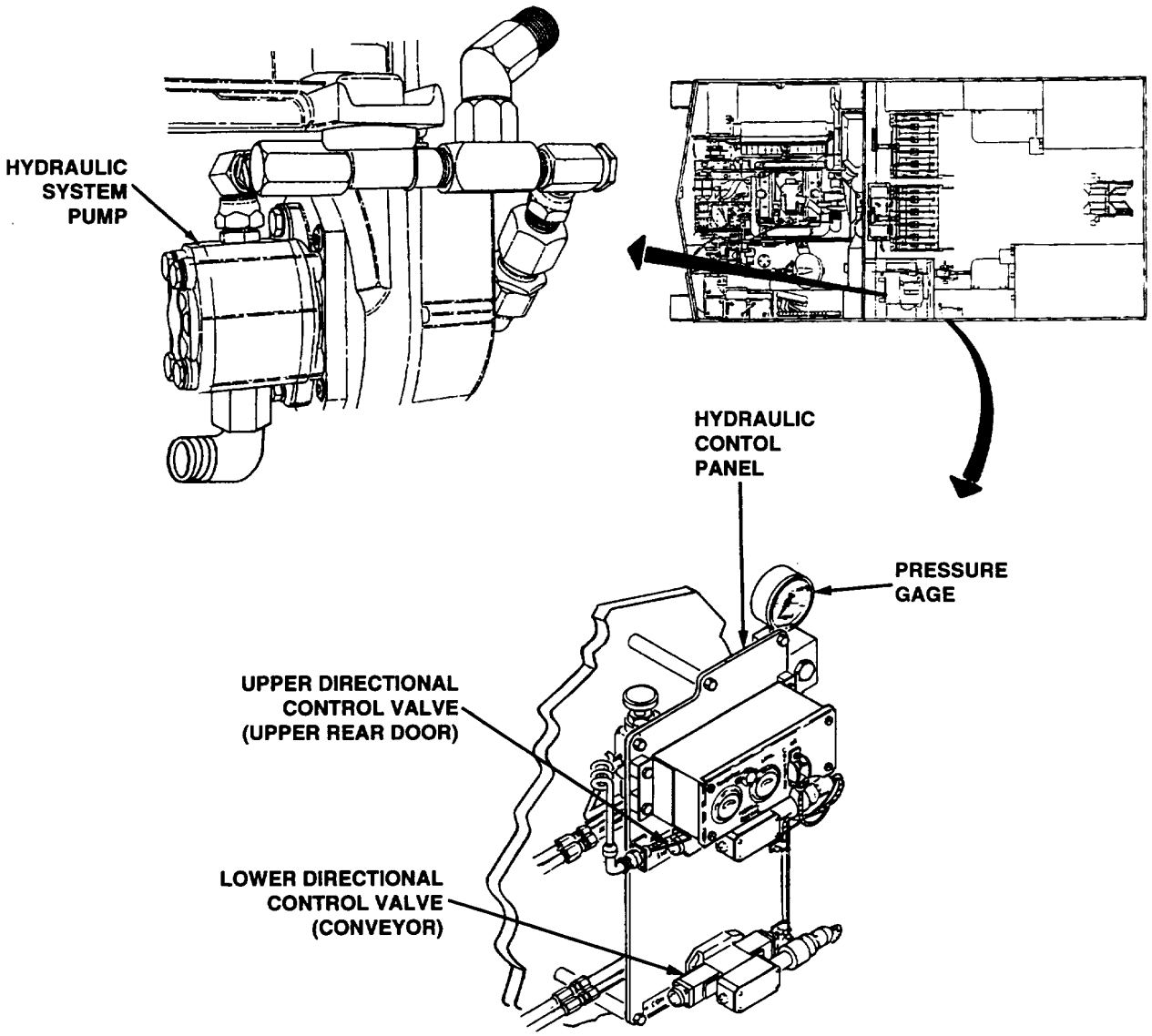
1-16. EQUIPMENT OPERATION (continued).

HYDRAULIC SYSTEM OPERATION

The hydraulic system operates the upper rear door and conveyor assembly. The APU drives the hydraulic system pump, which is capable of delivering 4.5 gallons per minute of flow at a system pressure of 1550 psi. Hydraulic fluid is pumped from the 13-gallon-capacity hydraulic reservoir to the hydraulic control panel. The hydraulic control panel contains two electromechanically activated directional control valves. The upper directional control valve controls the upper rear door actuator, extending or retracting the actuator to open or close the upper rear door. The lower directional control valve controls the conveyor motor for forward or reverse travel of the conveyor chain. The hydraulic control panel also incorporates a pressure gage that indicates system pressure. The conveyor control switch actuates the conveyor solenoid at the conveyor control valve.



The rear door switches are located at the upper and lower left areas of the rear door opening.

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1-16. EQUIPMENT OPERATION (continued).

CONVEYOR SYSTEM

The conveyor assembly is hydraulically powered and can be operated in either forward or reverse. Two stationary dead-end sections, one at each end, are used as staging areas for ammunition transfer. The powered parts of the conveyor assembly are the drive-end section, center section, and takeup-end section. A three-position switch, located on the hydraulic control panel, actuates the conveyor directional control valve that operates the conveyor hydraulic motor. A drive sprocket coupled to the motor shaft moves the conveyor chain.

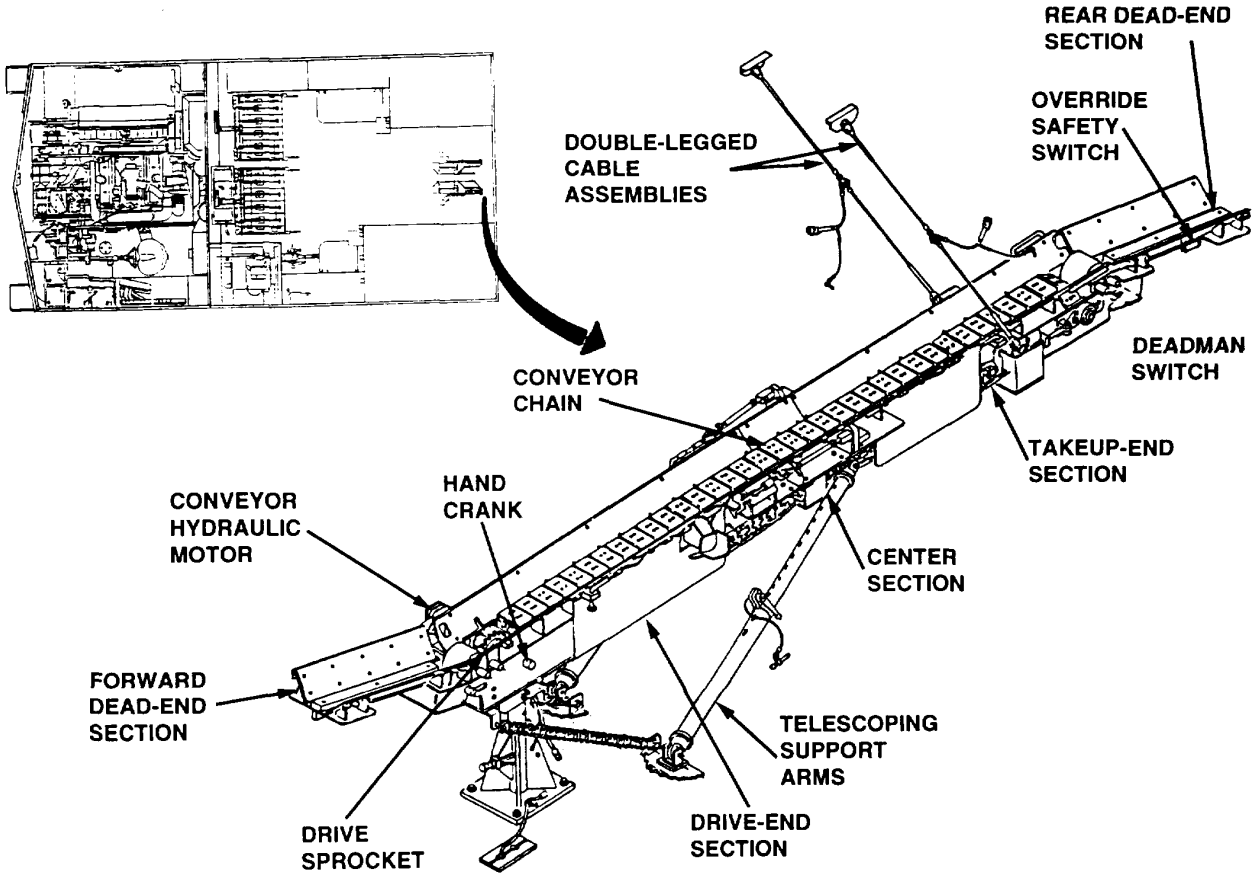
An override safety switch at the rear dead-end section provides an outside shutoff capability. A deadman switch is installed in the rear dead-end section to shut off the conveyor when a projectile is present, to prevent a pile-up of projectiles and charges when the conveyor assembly is in operation.

The conveyor chain runs taut across the top of the conveyor assembly, loose across the bottom. A chain adjustment device allows chain tension to be adjusted by moving the idler sprocket forward or backward.

Telescoping support arms adjust to lock the conveyor in several operating positions. Two double-legged cable assemblies support the conveyor assembly during deployment. They are stowed when the conveyor assembly is in operation.

A hand crank for manual operation is provided in case of a hydraulic system malfunction.

The conveyor assembly can be folded and stowed inside the vehicle when not in use.



1-16. EQUIPMENT OPERATION (continued).

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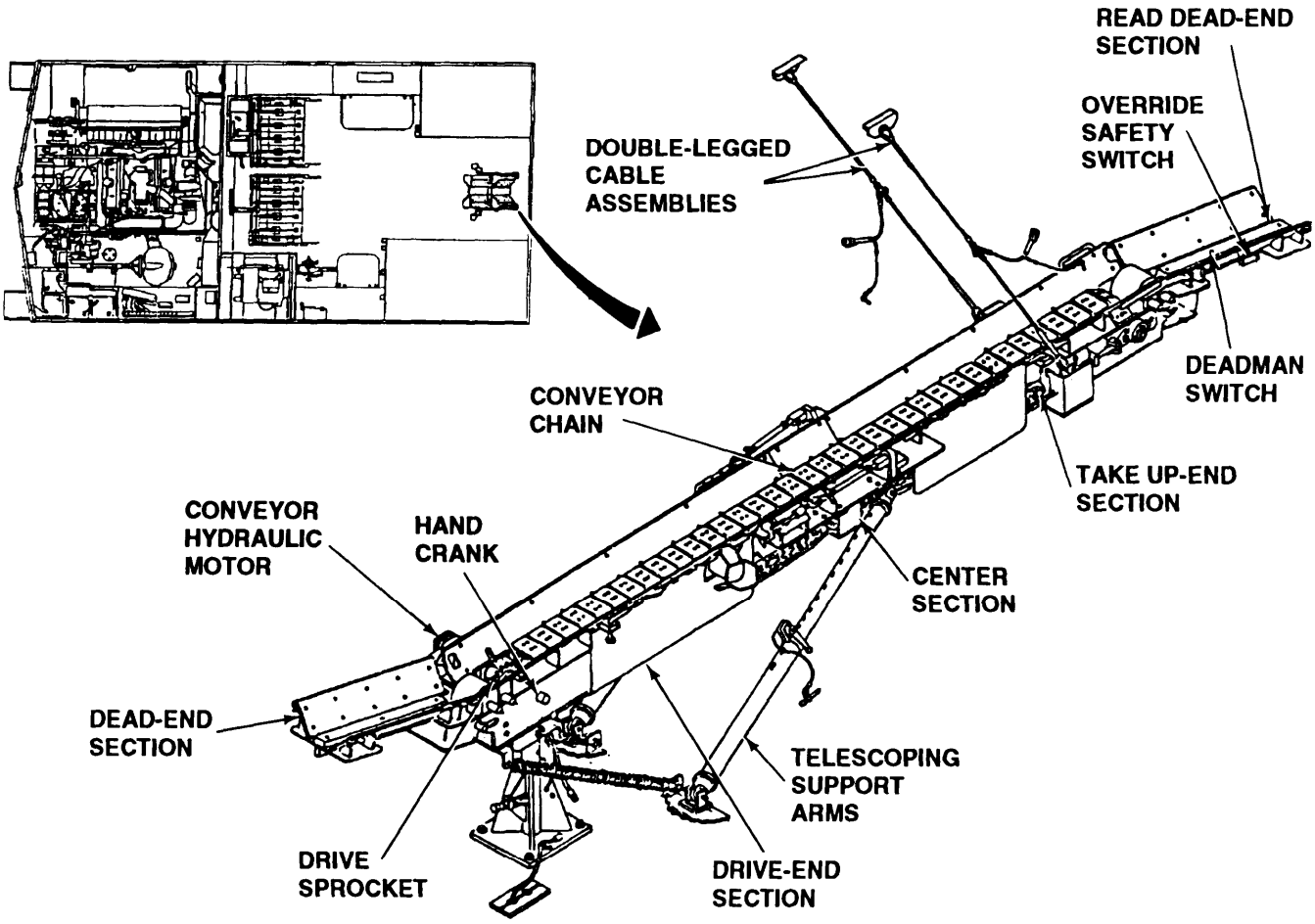


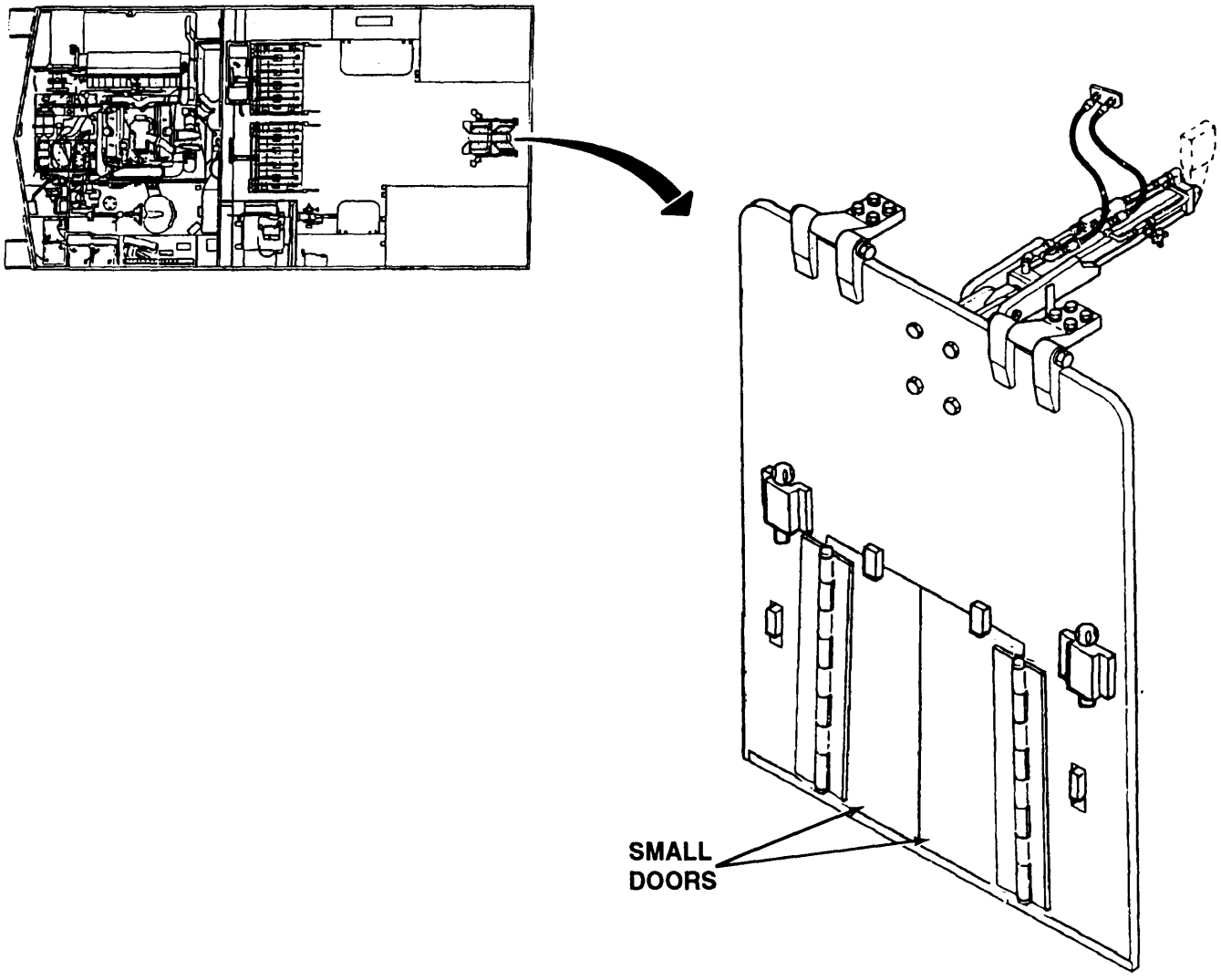
1-16. EQUIPMENT OPERATION (continued).

UPPER REAR DOOR

The upper rear door is hydraulically actuated by the ballistic shield directional control valve on the hydraulic control panel. When raised, the upper rear door provides ballistic protection between the M992A1 and a supported howitzer. The door also helps deploy and position the conveyor assembly. From the closed position, it can be raised to any position by a hydraulic actuator up to 120 degrees. The upper rear door directional control valve can be actuated by two three-position switches mounted inside the rear door opening on the left side. For inside and outside access, one is mounted high and the other is mounted low.

In the event of hydraulic system failure, the door is prevented from closing by a pilot check valve that stops hydraulic fluid backflow within the door hydraulic system, In addition, a mechanical lock engages the vehicle hull in the 45- and 90-degree (from closed) positions.

In the upper rear door, there are two small doors that allow the conveyor to be operated while the upper rear door is closed. This feature is for use with the M109A6 howitzer.

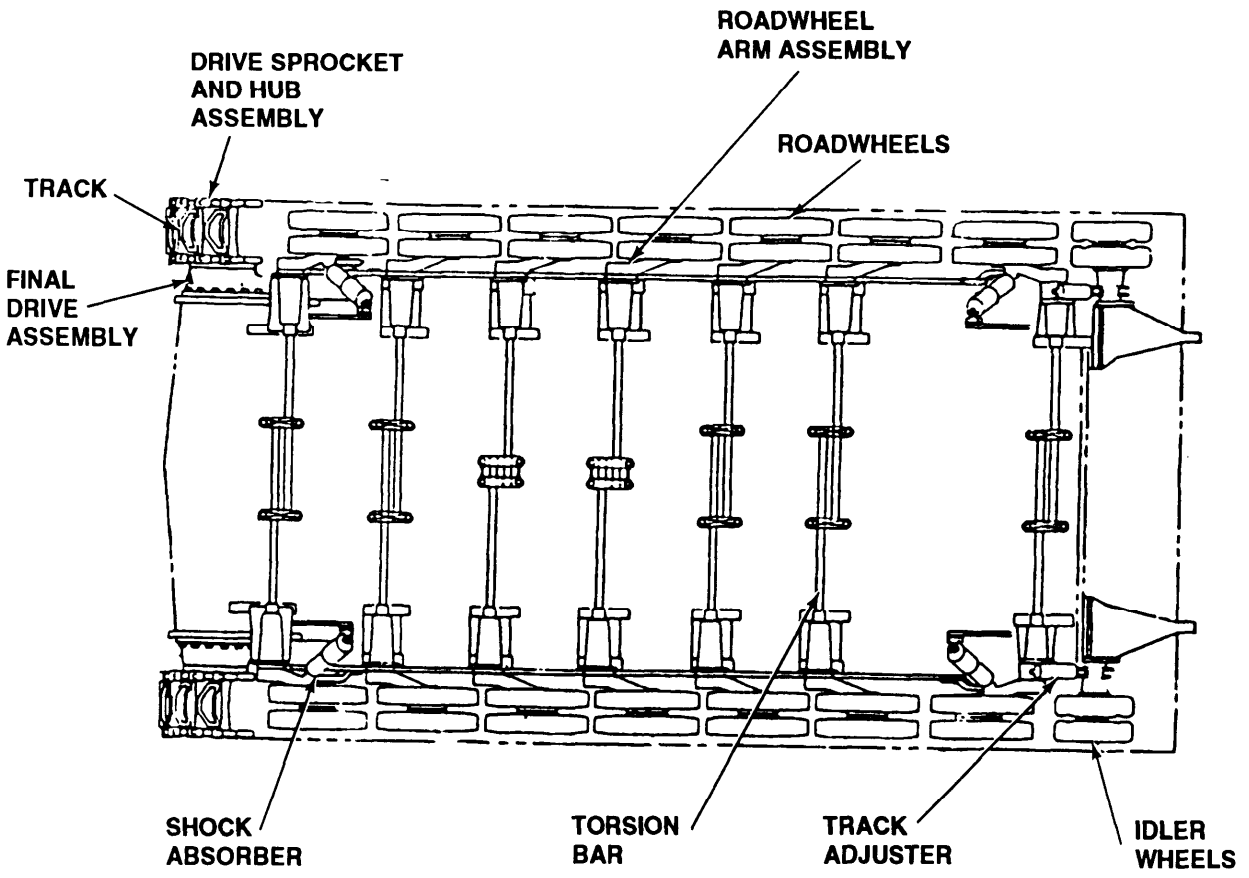


1-16. EQUIPMENT OPERATION (continued).

SUSPENSION SYSTEM

Two final drive assemblies transfer power from the powerpack to the track through two drive sprocket and hub assemblies. Seven pairs of roadwheels on each side of the vehicle help center the tracks on the drive sprocket and hub assemblies. Track tension is maintained by two idler wheels, which are connected to grease actuated track adjusters.

Each pair of roadwheels is supported by a roadwheel arm assembly. Each roadwheel arm assembly is connected to a torsion bar, which is anchored to the hull, to help maintain contact between the roadwheels and track. Four shock absorbers, connected to the two pairs of front and rear roadwheels, help smooth the ride of the vehicle.



1-16. EQUIPMENT OPERATION (continued).

NBC VENTILATED FACE PIECE SYSTEM

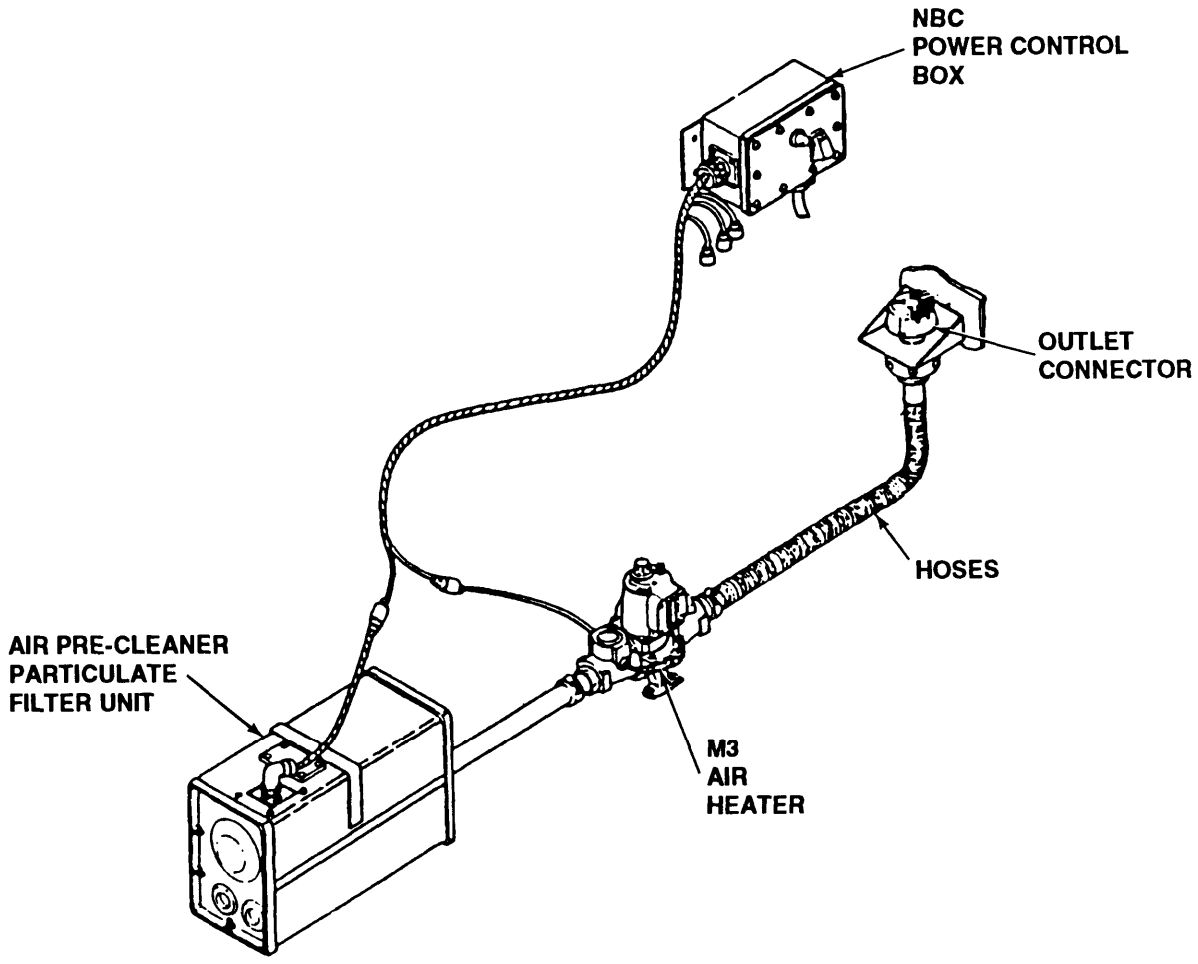
The ventilated face piece system (VFPS) provides clean, filtered air for the crew and personnel under NBC situations.

The system includes one air precleaned/particulate filter unit with four filtered air outlets, four M3 air heater, four outlet connectors, and one NBC power control box.

The air precleaned/particulate filter is located in the lower left rear of the crew compartment Three air heaters are mounted forward from the precleaned. One air heater is located in the driver's compartment The NBC control box is located on the left side of the crew compartment ceiling and is controlled by the user.

When not in use, hoses are connected to outlet connectors that function as one-way valves allowing system air to escape and preventing backflow. When in use, the hoses are disconnected from outlet connectors and are connected to canister packs on face masks used with the system.

Each filtered air outled has an M3 air heater connected in-line to allow air temperature to be individually controlled by the user.



1-16. EQUIPMENT OPERATION (continued).

DRIVER'S INSTRUMENT PANELS

The driver's portable and main instrument panels are located to the left and in front of the driver's seat. The portable instrument panel can be separated from the main instrument panel and be placed on the hull outside the vehicle, for hatch-open operations.

The portable instrument panel (7) contains the following indicators and gages:

Coolant indicator (1), which indicates low coolant level;

Transmission oil temperature gage (2);

Engine coolant temperature gage (3);

MASTER warning light (4), which indicates critical powerpack operating conditions for Iow transmission oil pressure, high transmission oil temperature, high engine coolant temperature, and low engine oil temperature;

Transmission oil pressure gage (5);

Engine oil pressure gage (6);

Battery-generator gage (8);

Fuel level gage (9); and

MASTER switch (10), which actuates the electrical system.

The main instrument panel (12) contains the following indicators and gages:

Parking brake engaged indicator (11);

Light switch unit (13);

High-beam indicator (14);

Bilge pump switch (15);

Fuel level gage transmitter switch (16);

Glow plug switch (17);

Fuel prime switch (18);

Starter switch (19);

Glow plug indicator lamp (20);

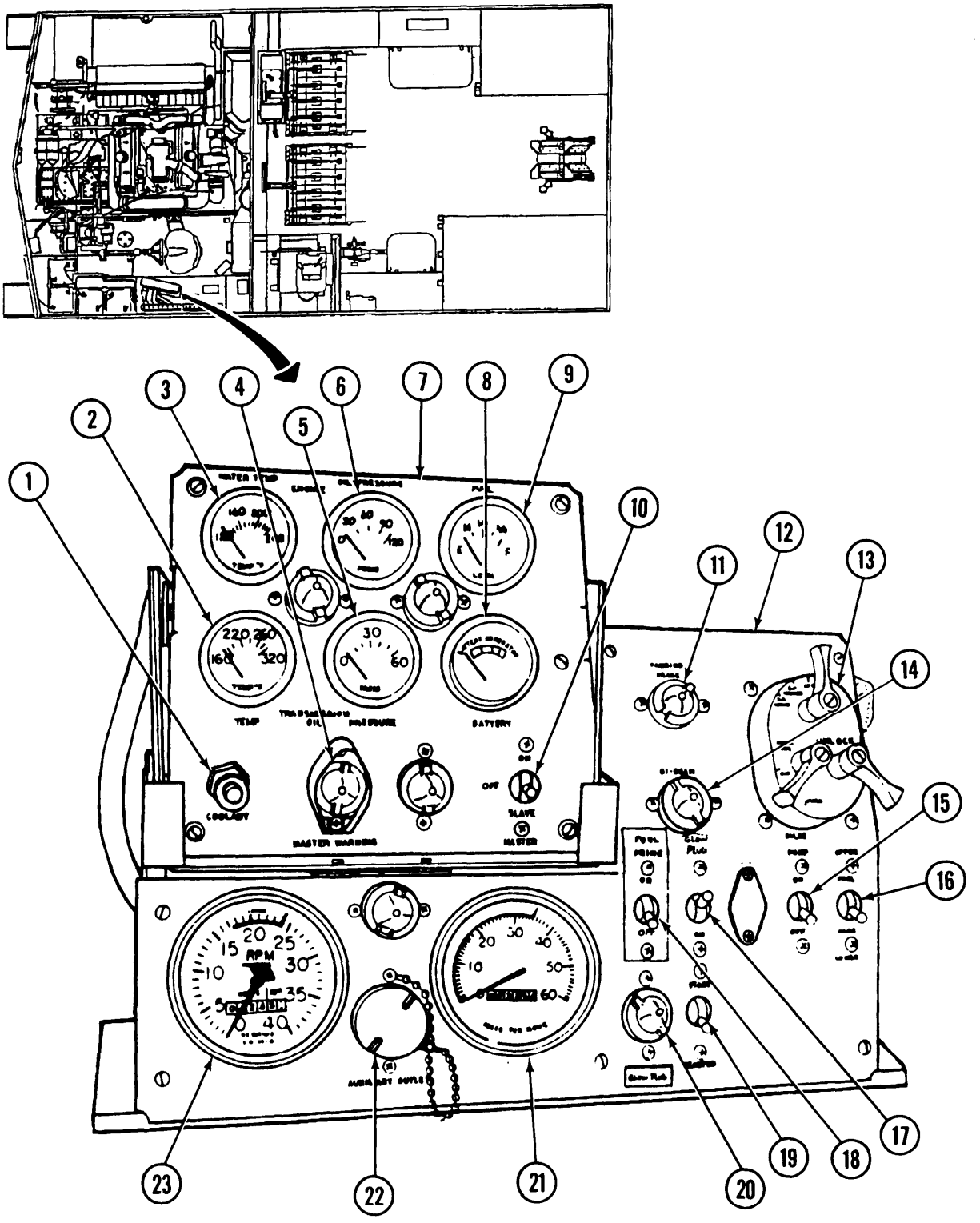
Speedometer/odometer (21);

Auxiliary outlet (22); and

Tachometer/hour meter (23).

1-16. EQUIPMENT OPERATION (continued).

DRIVER'S INSTRUMENT PANELS (continued)



CHAPTER 2
GENERAL MAINTENANCE PROCEDURES

2-1. GENERAL.

This chapter describes common tools and equipment; repair parts; special tools, TMDE, and support equipment; general inspection and repair procedures; AFES checkout; servicing and connecting batteries; radiator fan protective screens removal and installation; interconnections; preliminary servicing and adjustment of equipment; reporting unsatisfactory conditions; preoperational servicing and adjustment; service interval; reporting repairs; general PMCS procedures; specific PMCS procedures; preventive maintenance checks and services table; electrical troubleshooting; quick guide to troubleshooting; troubleshooting procedures; general STE/ICE test methods; quick guide to STE/ICE troubleshooting; STE/ICE troubleshooting procedures; work safety; cleaning instructions; inspection instructions; repair instructions; tagging hoses, lines, and tubes; lubrication instructions; torque values; decal replacement; definition of administrative storage; preparation for administrative storage; care of equipment in administrative storage; exercise schedule; removal from administrative storage; and preparation of equipment for shipment.

2-2. COMMON TOOLS AND EQUIPMENT.

Common tools and equipment are issued to Unit maintenance personnel for maintaining the M992A1. Common tools and equipment should not be used for purposes other than those prescribed and should be properly stored when not in use. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE), CTA 50-970, or CTA 8-100 as applicable to your unit.

2-3. REPAIR PARTS.

Repair parts are listed and illustrated in the Repair Parts and Special Tools List (RPSTL), TM 9-2350-287-24P, which covers Unit, Direct Support, and General Support maintenance for the M992A1.

Gaskets, packings, preformed packings, seals, lockwashers, self-locking nuts, cotter pins, and spring pins must be replaced. Bushings must be replaced only if removed.

Springs must be replaced if broken, kinked, or cracked or if they do not conform to standards specified in the repair procedures.

2-4. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT.

Special tools, TMDE, and support equipment necessary to perform the maintenance described in this manual are listed in Appendix B for information only. The authority for requisitioning replacements for special tools, TM DE, and support equipment is TM 9-2350-287-24P.

2-5. GENERAL INSPECTION AND REPAIR PROCEDURES.

During disassembly and assembly, the mechanic will perform a visual inspection of transmission-related components.

During inspection, look for the following conditions and take the appropriate indicated action:

- Check for stripped or damaged thread on retaining bolts, nuts, or studs. Repair threads or replace bolts, nuts, or studs as necessary.

- Check for broken screws or bolts.
  Drill and remove any portion of a broken screw or bolt remaining in the transmission, transfer, or drive control assembly with a stud remover. Replace the broken screw or bolt.

- Check for bent, distorted, or damaged control rods and tubes.
  Straighten, repair, or replace rods and tubes as appropriate.

- Check for rod ends that fit too loosely on retaining pins.
  Readjust rod ends as specified in the appropriate procedure. Replace rod ends if bearing wear is excessive.

- Check for improper alinement of control systems.
  Adjust appropriate control linkages.

- Check for cracked, distorted, or damaged bellcrank and support assemblies.
  Replace a required.

2-6. AFES CHECKOUT.

This Task Covers:

a. Engine AFES Check
b. Crew AFES Check
c. AFES Manual Discharge System Check

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- Sealing compound (Item 63, Appendix D)

Equipment Conditions:
- Projectile rack assemblies moved to rear of vehicle (refer to TM 9-2350-287-10).
- MASTER switch set to ON (refer to TM 9-2350-287-10).

2-6. AFES CHECKOUT (continued).

a. ENGINE AFES CHECK

WARNING

- **Use caution when working near fire extinguisher nozzles. When nozzles discharge, frostbite may occur to personnel, and small objects may become projectiles causing SERIOUS INJURY or damage. Do not strike extinguisher with tools.**
- **AFES is designed to provide 2 to 4 hours of fire protection AFTER vehicle shutdown. Turning MASTER switch to OFF does not deactivate AFES. Working on AFES when active may cause serious injury to personnel.**

1. Turn Maintenance switch on engine test and alarm (T/A) panel to AFES Maintenance position (para 21-2). Make sure all lamps on T/A panel, including POWER ON lamp, are not illuminated.
2. Check to see that seven wiring harness connectors are secure (para 7-78). If not, apply sealing compound and tighten connectors.
3. Check to see that fire-sensing wire in engine compartment is secure and that connections are tight.
4. Make sure locking pin is installed in valve actuator guard of engine extinguisher cylinder bottle no. 1 (para 21 -2).
5. Turn Maintenance switch on engine T/A panel to LAMP TEST. Verify that all four lamps and light-emitting diodes (LEDs) light. Time permitting, perform engine AFES test (refer to TM 9-2350-287-10).
6. Set SYSTEM TEST/LAMP TEST switch on engine T/A panel to LAMP TEST. Verify that all four lamps and LEDs light. Time permitting, perform engine AFES test (refer to TM 9-2350-287-10).

b. CREW AFES CHECK

WARNING

- **Use caution when working near fire extinguisher nozzles. When nozzles discharge, frostbite may occur to personnel, and small objects may become projectiles causing SERIOUS INJURY or damage. Do not strike extinguisher with tools.**
- **AFES is designed to provide 2 to 4 hours of fire protection AFTER vehicle shutdown. Turning MASTER switch to OFF does not deactivate AFES. Working on AFES when active may cause serious injury to personnel.**

1. Turn MAINTenance switch on crew T/A panel to vertical position (para 21-3). Make sure all lamps on T/A panel, including POWER ON lamp, are not illuminated.
2. Check to see that connectors on three wiring harnesses are secure. Make sure keyways are alined, shells are fully seated, and locking rings are fully rotated. If not secure, make sure optical fire sensing assemblies (OFSAs) connectors snap in place. Loosen all other connectors, apply sealing compound, and tighten loosened connectors.

2-6. AFES CHECKOUT (continued).

3. Remove locking pin from crew compartment extinguishers No. 3 and No. 4 valve actuator guards connected by mechanical cable to actuator assembly (para 21 -3). Make sure the other four extinguishers' locking pins are installed.

4. Remove antirecoil plug from six crew compartment extinguishers (para 21-3). Place nozzles on extinguishers (para 21-3).

5. Turn Maintenance switch on crew T/A panel to horizontal position (para 21 -3). Make sure green POWER ON lamp lights and green PASS TEST lamp lights and then goes out, indicating that system is operational.

6. Momentarily hold SYSTEM TEST/LAMP TEST toggle switch on crew T/A panel to LAMP/TEST. Verify that all four Iamp and all LEDs light. Time permitting, perform crew AFES system test (refer to TM 9-2350-287-10).

c. AFES MANUAL DISCHARGE SYSTEM CHECK

1. Make sure safety wire on external manual cable pull handle near driver's hatch is secure and intact (para 21-16).

2. Make sure safety wire on internal manual cable handle is secure and intact (para 21 -16).

3. Remove locking pin from engine extinguisher No. 2 valve actuator guard (para 21 -2). Do not remove locking pin from engine extinguisher No. 1 valve actuator guard.

FOLLOW-ON MAINTENANCE:

- Move projectile rack assemblies to front of vehicle (refer to TM 9-2350-287-10).

2-7. SERVICING AND CONNECTING BATTERIES.

This Task Covers:

a. Servicing

b. Connecting

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- Distilled water (Item 26, Appendix D)
- Rags (Item 56, Appendix D)

References:
TM 9-6140-200-14

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Battery access doors opened (refer to TM 9-2350-287-10).

a. SERVICING

WARNING

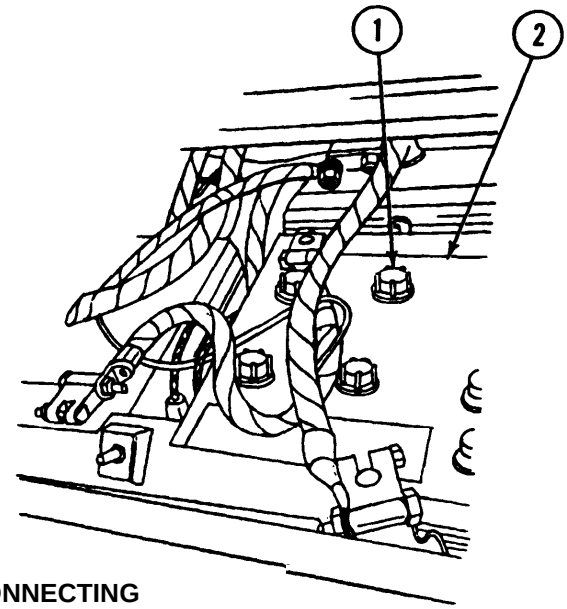
Lead-acid battery gases can explode. Do not smoke, have open flames, or make sparks around a battery, especially if caps are off. If a battery is gassing, it can explode and cause injury to personnel.

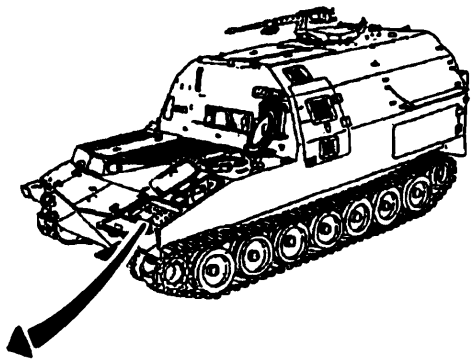
Battery acid (electrolyte) is extremely harmful. Always wear safety goggles and rubber gloves, and do not smoke when performing maintenance on batteries. Injury will result if acid contacts skin or eyes. Wear rubber apron to prevent clothing being damaged.

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

1. Using rags, wipe any dust, dirt, or debris from tops of four batteries (2).
2. Remove six filler caps (1) from each of four batteries (2).
3. Service batteries according to TM 9-6140-200-14. Add distilled water if necessary.

2-7. SERVICING AND CONNECTING BATTERIES (continued).



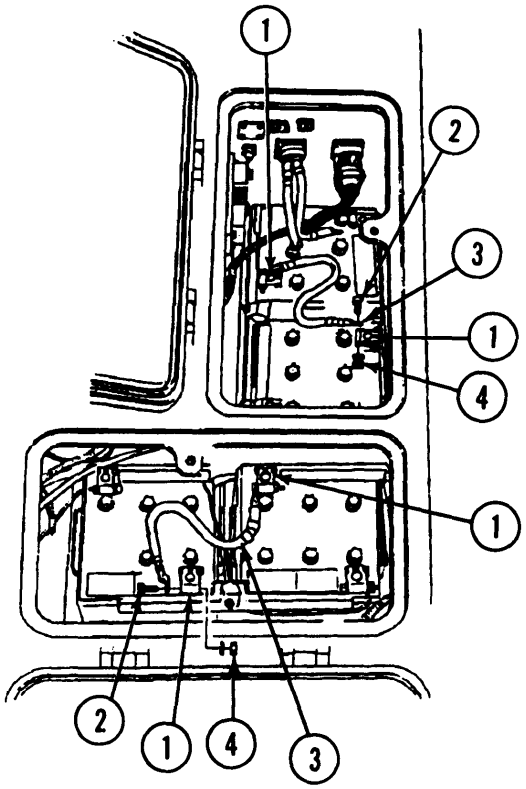


b. CONNECTING

CAUTION

Make sure batteries are installed with positive and negative terminals oriented as shown. If necessary, remove batteries (para 7-41), and Install with terminals as shown. Failure to do this can result in damage to batteries or electrical components.

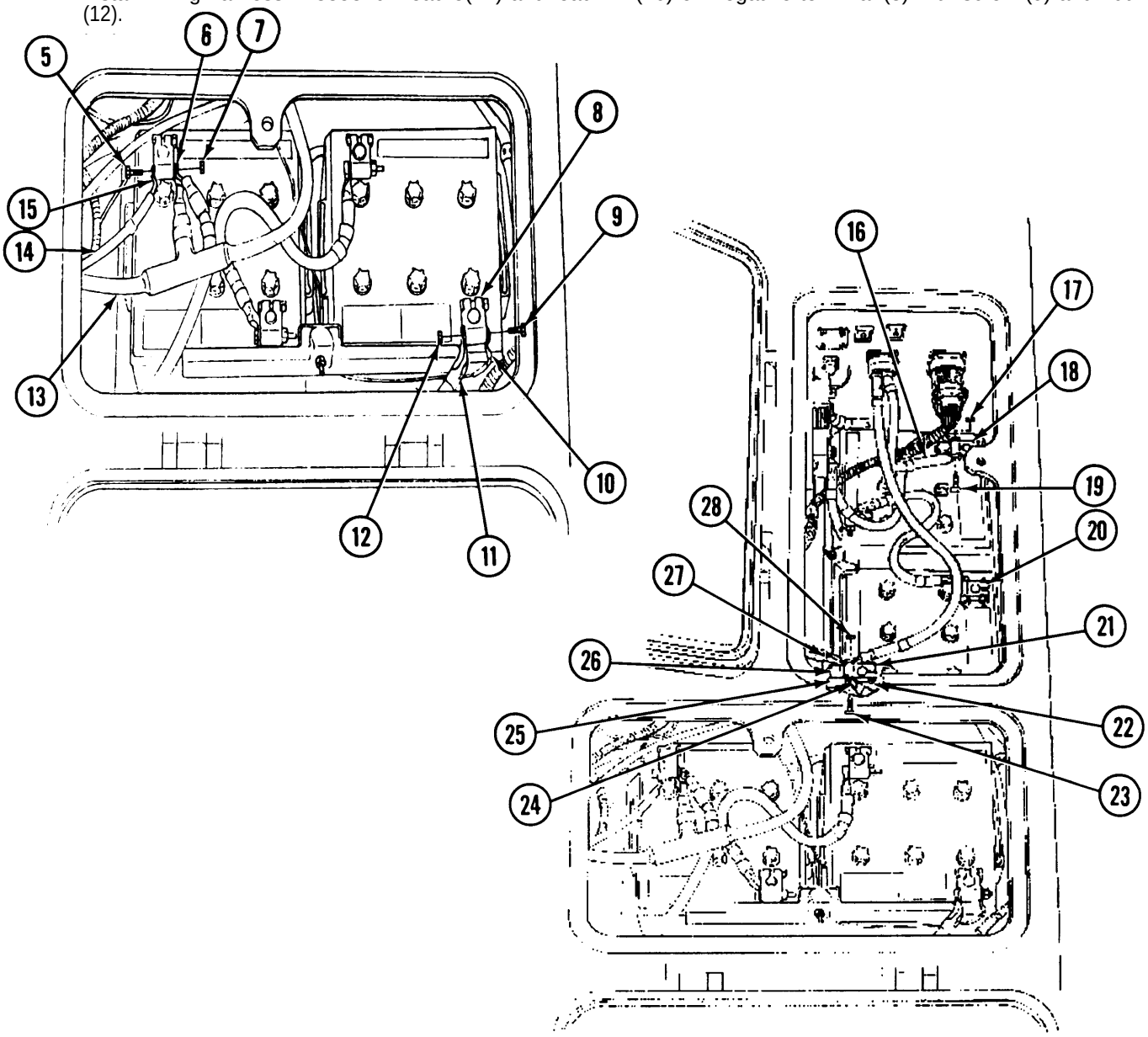
1. Install two interconnecting cables (3) to four battery terminals (1) with four screws (2) and nuts (4).



2-7. SERVICING AND CONNECTING BATTERIES (continued).

2. Install wiring harness 12268418-1 lead 81 (13), wiring harness 12353401 lead 6 (6), and wiring harness 12376404 lead 2A (14) to positive battery terminal (15) with screw (5) and nut (7).

3. Install wiring harness 123353401 lead 5(11) and lead AZ (10) on negative terminal (8) with screw (9) and nut (12).

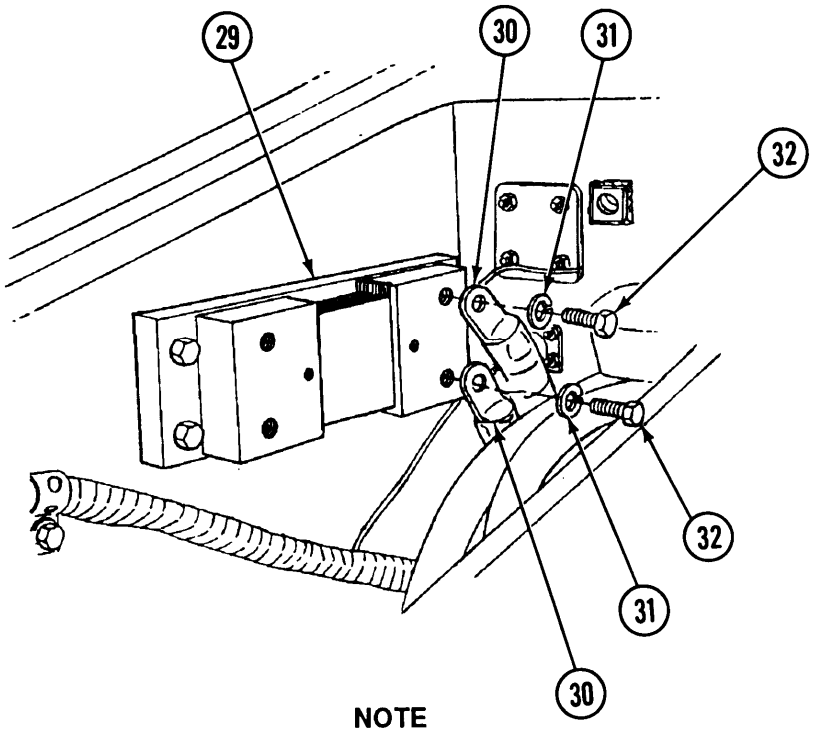


4. Install wiring harness 12376406 lead 2B (24), wiring harness 12268418-1 lead 81 (22), wiring harness 12330317 lead 6 (27), wiring harness 12353402 lead 49 (20), lead 10R (25), and lead 10V (26) to positive terminal (21) with screw (23) and nut (28).

5. Install wiring harness 12353402 lead 50 (16) on negative terminal(18) with screw(19) and nut (17).

6. Connect two 10897992 leads (30) to STE/ICE shunt (29) with two screws (32) and Iockwashers (31).

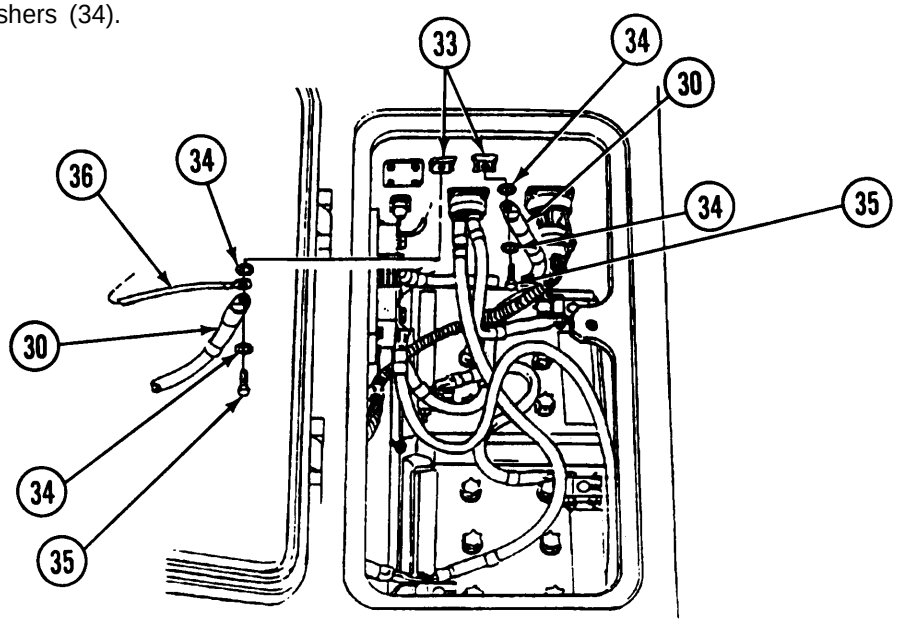
2-7. SERVICING AND CONNECTING BATTERIES (continued).



NOTE

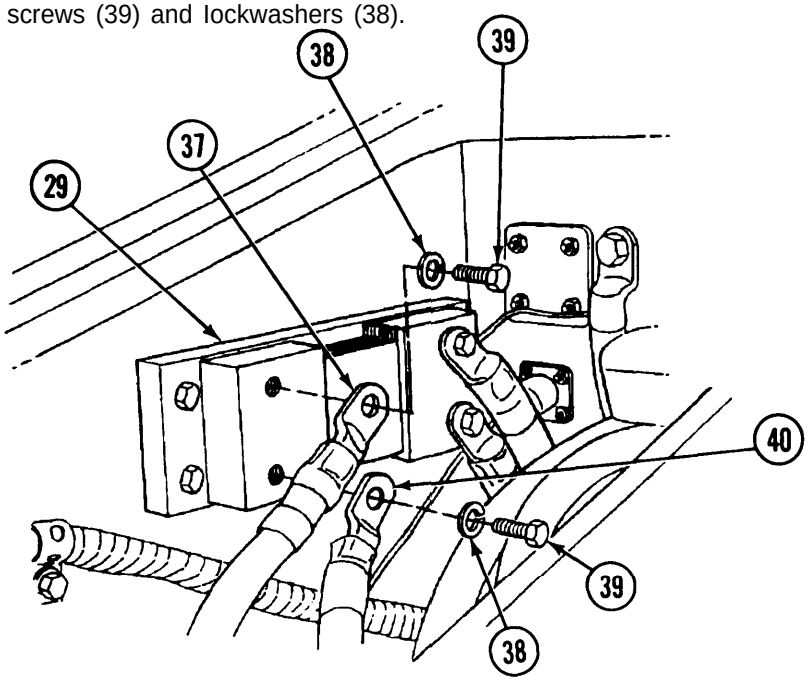
There are two configurations for the mounting of ground leads. See para 1-13 for more information.

7. Connect two 10897992 leads (30) and lead GND (36) to two vehicle grounds (33) with two screws (35) and four lockwashers (34).



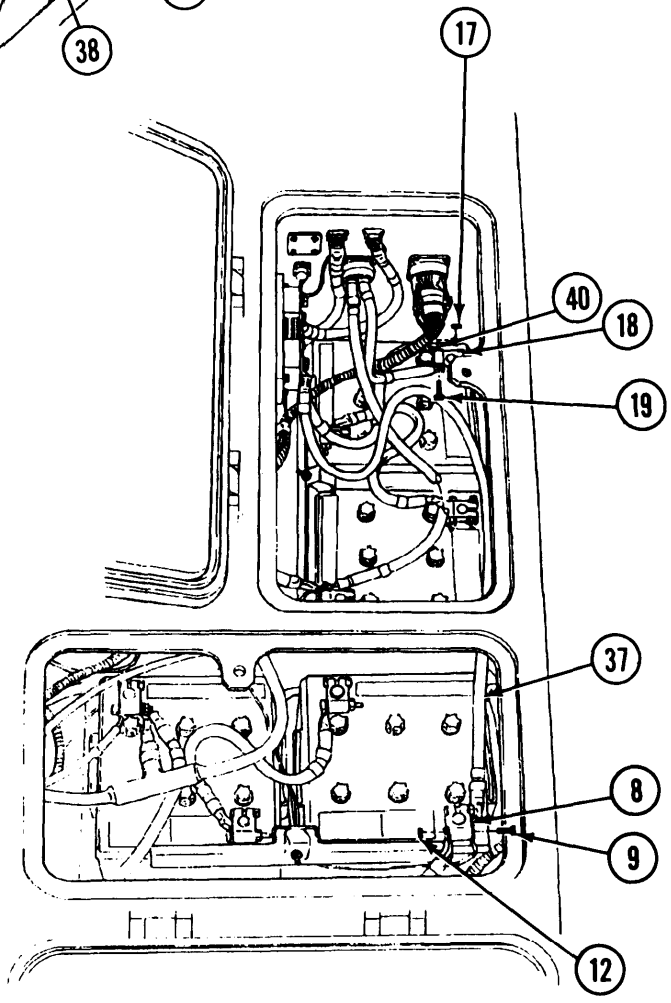
2-7. SERVICING AND CONNECTING BATTERIES (continued).

8. Connect wiring harness 12330348 lead 7(37) and wiring harness lead 10897992 lead 7(40) to STE/ICE shunt (29) with two screws (39) and lockwashers (38).



9. Install wiring harness 12330348 lead 7 (37) to positive terminal (8) with screw (9) and nut (12).

10. Install wiring harness 10897992 lead 7 (40) to negative terminal (18) with screw (19) and nut (17).



FOLLOW-ON MAINTENANCE:

- Close battery access doors (refer to TM 9-2350-287-10).

2-8. RADIATOR FAN PROTECTIVE SCREEN REPLACEMENT.

This Task Covers:

a. Installation

b. Removal

Initia Setup:

Tools/Test Equipment:
- Protective screen assembly (Item 45, Appendix 1)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Air intake grille opened and secured (refer to TM 9-2350-287-10).

a. INSTALLATION

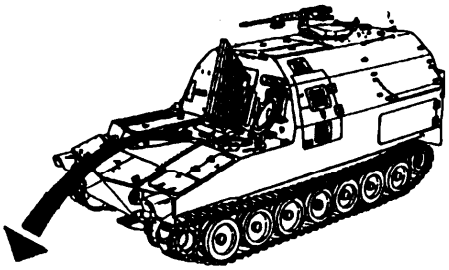
WARNING

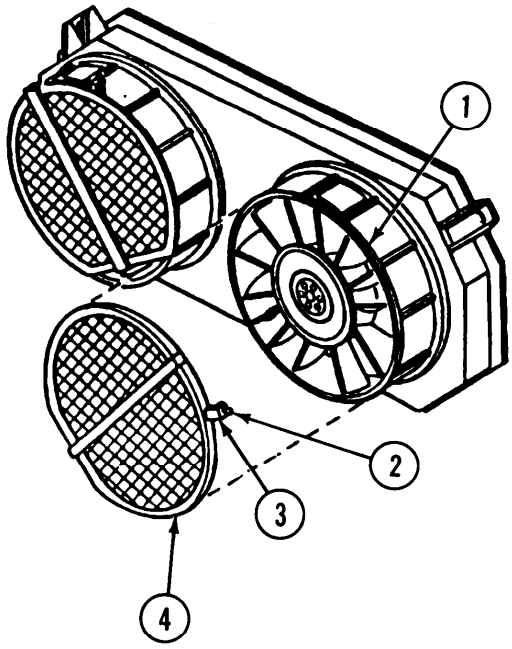
A **protective fan screen must be installed before doing maintenance in the engine compartment when engine is running or when running engine in the ground-hop mode. Contact with rotating fan can cause injury.**

NOTE

Flat side of protective screen should aline with two lower mounting bolts of fan housing.

Install protective screen assembly (4) on fan housing (1), and tighten thumbscrew (2) and nut (3).





b. REMOVAL

Loosen nut (3) and thumbscrew (2), and remove protective screen assembly (4) from fan housing (1).

FOLLOW-ON MAINTENANCE:
- Close air intake grille (refer to TM 9-2350-287-10).

2-9. INTERCONNECTIONS.

Interconnection wiring data for equipment that is not permanently installed in the M992A1 is discussed in detail in Chapter 7.

2-10. PRELIMINARY SERVICING AND ADJUSTMENT OF EQUIPMENT.

Equipment faults disclosed during preliminary inspection and servicing or during break-in period will be corrected by Unit, Direct or General Support maintenance.

2-11. REPORTING UNSATISFACTORY CONDITIONS.

Serious equipment faults that appear to involve unsatisfactory design or material will be reported on SF 368, Quality Deficiency Report (Category 11), as prescribed in DA Pam 738-750.

2-12. PREOPERATIONAL SERVICING AND ADJUSTMENT.

1. Conduct general overall inspection of the vehicle (refer to TM 9-2350-287-1 O).
2. Check all electrical wires/connectors for damage.
3. Check all hydraulic lines/connectors for leaks or damage.
4. Check all welds for cracks or breaks.
5. Check all bolts for proper fitting.
6. Check all seals for leaks.

NOTE

Preservative engine oil PE1 is identical to engine oil HDO 15W40 except it contains a preservative. PE1 will be used in the same manner as regularly used engine oil HDO 15W40. PE1 will be used in the transmission until the first scheduled 2000-mile or semiannual oil change. Refer to Appendix G for lubrication instructions.

7. Check all fluid levels (refer to TM 9-2350-287-10).

NOTE

Due to internal processing, engine may start hard, smoke, and run rough. Conditions should improve after approximately 5 minutes running time. Conduct troubleshooting procedures if engine fails to develop full power after 5 minutes.

8. Start vehicle engine (refer to TM 9-2350-287-10). Run engine until preservative oil is out of combustion chambers and engine is operating smoothly. Check for fuel and oil leaks immediately.

2-13. SERVICE INTERVALS.

PMCS is to be performed at intervals determined by whichever comes first:

- Semiannual-1500 miles or 150 hours; or
- Annual-3000 miles or 300 hours.

PMCS items and intervals are to be scheduled on DD Form314 in accordance with DA Pam 738-750.

After operation in water, mud, or loose sand, the vehicle should be cleaned as soon as possible. Lubricate without waiting for the next scheduled service.

Lubrication instructions are in Appendix G.

2-14. REPORTING REPAIRS.

Equipment faults discovered during PMCS that require repair and appear to involve unsatisfactory design or material should be reported on SF 368, Quality Deficiency Report (Category II), as prescribed in DA Pam 738-750.

2-15. GENERAL PMCS PROCEDURES.

Preventive maintenance is the step-by-step care, inspection, and service of equipment to maintain it in good condition and to find problems before extensive repairs or replacements are needed. Refer to DA Pam 738-750 for instructions on the use of forms for preventive maintenance services.

Routine Applications

TM 9-2350-287-10 contains procedures and instructions that the Unit mechanic must use to perform his duties.

Vehicle Cleanliness

CAUTION

Do not direct a stream of water or steam against the opening between the hull and doors or hatches or against exhaust grilles, mufflers, AFES components, or other electrical components. Failure to heed this caution may result in damage to equipment.

NOTE

The vehicle should be clean, dry, and not caked with mud when brought to a scheduled PMCS. The vehicle should not be washed just before a scheduled PMCS; some defects, such as loose parts and oil leaks, may not be noticed immediately after washing.

Services

Unit-level services are defined by, and limited to, the following general procedures, Higher-level maintenance services must be approved by the supporting maintenance unit.

2-15. GENERAL PMCS PROCEDURES (continued).

ADJUST. Make all needed adjustments using instructions in this manual and/or technical bulletins.

CLEAN. Wash the vehicle to remove old lubricant, dirt, and other foreign matter. Special cleaning instructions are given as needed.

INSPECT. Determine the serviceability of an item by comparing physical, mechanical, and/or electrical characteristics with established standards through examination.

SERVICE. Smite includes checking fluid fill operations, such as checking radiator coolant level, checking battery electrolyte level, draining and refilling units with lubricating or hydraulic oil, and changing or cleaning oil, fuel, and air filters.

TIGHTEN. Tighten all nuts, bolts, screws, and plugs to torque values given in the maintenance procedures. Use accurate torque wrenches. If a torque value is not given, refer to the Torque Value Guide Tables in Appendix C. Do not overtighten fasteners. Be sure to install new lockwashers, self-locking nuts, lockwire, and cotter pins where needed.

SPECIAL LUBRICATION. Special lubrication applies either to lubrication operations that do not appear in Appendix G or to items that do appear, but should be lubricated as part of an annual service.

REPAIR. Restore an item to serviceable condition. This includes, but is not limited to, inspection, cleaning, preserving, adjusting, replacing, welding, riveting, and strengthening. Refer to Appendix B for authorized Unit maintenance repair, replacement, and adjustment procedures.

2-16. SPECIFIC PMCS PROCEDURES.

DA Form 2404, Equipment Inspection and Maintenance Worksheet, is used by the mechanic to record the periodic maintenance services performed and faults corrected. The item number on the DA Form 2404 must corresponding to the item number of the PMCS check.

Specified items to be checked semiannually and annually are found in Table 2-1. Before you begin to check specific items, remember to check common things in all areas.

NOTE

Perform repair or replacement as authorized. Report faulty equipment that is beyond Unit maintenance as prescribed in DA Pam 738-750.

Electrical Wires and Connectors. Electrical wiring should be checked for cracks due to aging and for exposed wires that cause electrical shorts. Repair with electrical tape or replace. Check connectors and tighten if loose. Complete hull wiring diagrams are contained in Appendix F. Diagrams of wiring harnesses can be found in Chapter 7. Notify Direct Support maintenance if wiring harnesses are damaged extensively enough to require replacement.

Welds. Many items are attached to the hull, door, and other components with welds. Check for damaged welds by looking for chipped paint or oxidation. Notify Direct Support maintenance if welds are cracked.

Seals. Check for leaks around seals. Check gasket material. Check door and hatch seals. Check for deterioration, cracks, or tears.

2-16. SPECIFIC PMCS PROCEDURES (continued).

Nuts, Bolts, and Screws. Check for loose nuts, bolts, and screws. Loose fasteners can be difficult to spot without actually applying a wrench. You often can tell by loose or chipped paint around the nut, bolt head, or screw head and if bare metal or oxidation is present.

Hoses and Fluid Lines. Check all hoses and fluid lines for signs of wear, leaks, loose clamps, and loose fittings. A stain around a fitting is a sign of a leak. Tighten, repair, or replace hoses and fittings.

The following definitions concern classes of fluid leakage. Each crewmember must be familiar with these definitions in order to determine whether the vehicle is mission capable.

CAUTION

Equipment operation with minor leakage (Class I or II) is allowable. Consideration must be given to the fluid capacity in the system being inspected. When in doubt, notify your supervisor. When operating with Class I or Class II leaks, continue to check all fluid levels as required in your PMCS. Class Ill leaks should be reported to the Unit maintenance supervisor.

Class I. Seepage of fluid, 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 fall from item being inspected.

Class Ill. Leakage of fluid great enough to form drops that fall from the item being inspected.

Thread Inserts. Check for loose, damaged, or cross-threaded thread inserts. Use a thread chaser on thread inserts to repair minor faults. If thread inserts are unserviceable, notify Direct Support maintenance.

Explanation of Table Entries

Item No. Numbers in this column are for reference. When completing DA Form 2404, include the item number for the check/service indicating a fault. item numbers appear in the order that you must do checks and services for the intervals listed.

Interval. This column tells you when you must do the procedure listed in the Procedure column. Semiannual (S) procedures must be done every six months–1500 miles or 150 hours of engine operation, whichever comes first. Annual (A) procedures must be done every 12 months-3000 miles or 300 hours of engine operation, whichever comes first. Special intervals will also be specified (e.g., Every 100 hours lube) when the component requires service more frequently than semiannually or annually.

Item To Be Inspected. This column describes the item to be checked or serviced.

Procedure. This column gives you the procedure you must do to check or service the item listed in the Item to Be Inspected column to know if the equipment is ready or available for its intended mission or for operation. You must do the procedure at the time stated in the Interval column.

Not Fully Mission Capable If. Information in this column tells you what faults will keep the equipment from being capable of performing its mission. If PMCS reveals faults listed in this column, do not operate the equipment. Follow standard operating procedures for maintaining the equipment or reporting equipment failures.

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) FOR M992A1
S=SEMIANNUAL A=ANNUAL

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURE	NOT FULLY MISSION CAPABLE IF
			NOTE • Make sure operator has performed all PMCS listed in TM 9-2350-287-10.	
			• Before road test, check instruments, gages, and warning lights for normal indications, as outlined in TM 9-2350-287-10.	Engine, transmission, water temperature, or pressure gages do not operate.
1	S	ROAD TEST BEFORE SERVICE	Have operator perform a road test, for at least 5 miles (8 km), within a designated route.	
			NOTE When conditions prevent a road test perform engine testing (para 2-22) STE-ICE-R test 10, 13, 14, 24, 67, and 71-75.	
		STARTER	While starting engine, listen for unusual noises and difficult cranking at starter.	Any unusual noise or difficult cranking exists.
		ENGINE	Listen for unusual noises, hesitation, and varying idle speed.	Any unusual noises, hesitation, or varying idle speed exists.
		STEERING	a. Check steering for left and right turns (refer to TM 9-2350-287-10).	
			b. Make sure vehicle responds to each direction. Make sure linkage is not binding (para 12-2).	b. Any binding or no response in either direction.
		BRAKES	a. Check vehicle braking (refer to TM 9-2350-287-10).	
			b. If vehicle does not stop when brakes are fully depressed, check brake adjustment (para 8-7,10-2, 10-3, and 10-4).	b. Brakes do not stop vehicle.
2	S	FUEL SYSTEM	a. Change primary fuel filter element (para 4-25), secondary fuel filter element (para 4-26), and personnel heater fuel filter element (para 16-8).	a. Clogged fuel filter or cracked or broken fitting and fuel lines. Any bent fuel line that would be restricted or would stop fuel flow.

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) FOR M992A1
S=SEMIANNUAL A=ANNUAL

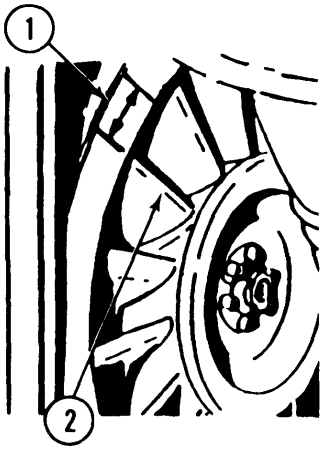
ITEM N0.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURE	NOT FULLY MISSION CAPABLE IF
		FUEL SYSTEM (continued)	b. Check all connections for evidence of leaks.	b. Any leaks.
		FUEL FILLER	Remove and inspect fuel fill access plate, fill cap, and strainer (para 4-21). Replace strainer if badly clogged or torn.	Any missing screws or the rubber seal is cracked, torn, or missing. Clogged or torn strainer.
3	S	ENGINE FAN DRIVE SYSTEM	Perform backlash test as follows: a. Disconnect both battery ground cables (para 7-41). b. Open air intake grille (refer to TM 9-2350-287-10). c. Mark any accessible blade (2).  d. While holding the opposite fan impeller, rotate marked blade (2) as far left as possible. Mark fan housing (1) directly above marked blade (2). e. While holding the opposite fan impeller, rotate marked blade (2) as far right as possible. Mark fan housing (1) directly above marked blade (2). f. Measure the distance between # marks on fan housing (1). If distances over one inch (2.5 cm), backlash is excessive; notify Direct Support maintenance.	f. Backlash is over one inch (2.5 cm).

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) FOR M992A1
S=SEMIANNUAL A=ANNUAL

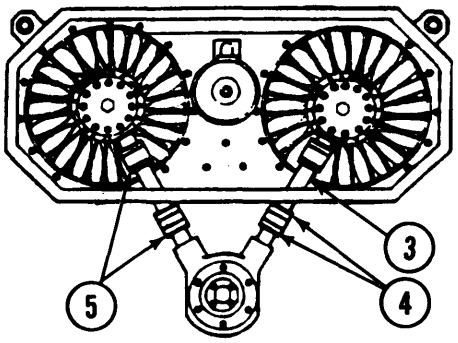
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURE	NOT FULLY MISSION CAPABLE IF
		ENGINE FAN DRIVE SYSTEM (continued)		
			g. Inspect fan for cracked or loose rubber boots (5) and loose retaining rings (4) on boot covering drive shaft universal joints (3).	g. Rubber boot is cracked or boot retaining ring on covers for drive shaft universal joints is loose.
			WARNING	
4	S	AIR CLEANER FILTER	**If nuclear, biological, or chemical (NBC) exposure is suspected, all air filter media will be handled by personnel wearing full NBC protective equipment.**	
			NOTE Left and right projectile rack assemblies must be moved to the rear of the vehicle to gain access for checks 4 and 6.	
			a. Move left and right projectile rack assemblies to rear of vehicle (refer to TM 9-2350-287-10).	
			b. Check for worn or missing seals (6) and hoses (7).	b. Any seals or hoses are cracked, worn or missing.

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) FOR M992A1
S=SEMIANNUAL A=ANNUAL

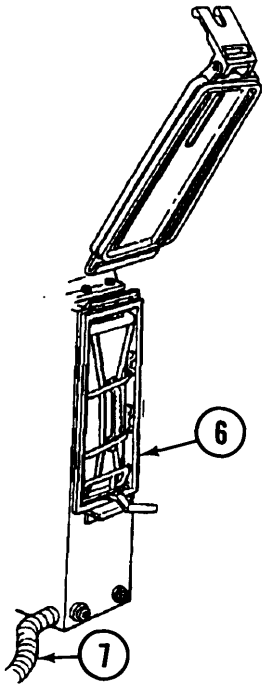
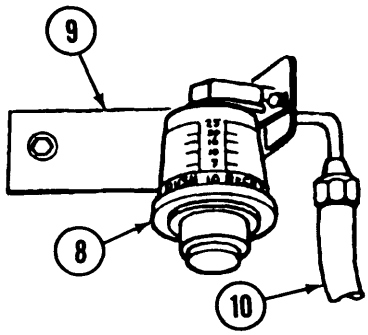
ITEM No.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURE	NOT FULLY MISSION CAPABLE IF
		AIR CLEANER FILTER (continued)		
			c. Check blower motors for proper operation (refer to TM 9-2350-287-10). Troubleshoot as necessary (para 2-19e).	c. Blower motors do not operate.
			d. Clean, repair, or replace blower motors, seals, hoses, and fitter elements as required (para 4-9, 4-10, 4-13, and 4-14).	d. Air filter elements is clogged or wet. Air cleaner doors do not close properly.
5	S	AIR CLEANER INDICATOR	a. Check indicator casing (8) for damage. b. Check that bracket is (9) secure. c. Check hose (10) for leaks. 	

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) FOR M992A1
S=SEMIANNUAL A=ANNUAL

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURE	NOT FULLY MISSION CAPABLE IF
			WARNING	
6	S	HYDRAULIC FLUID FILTER	**To avoid serious injury or burns, make sure all systems have** been **shut down and hydraulic pressure has dropped to zero psi on pressure gage. Make sure fluid is cool before removing fitter.** a. Replace filter and gasket (Appendix G). b. Move left and right projectile rack assemblies to front of vehicle (refer to TM 9-2350-287-10).	
7	S	BATTERY	**WARNING** **To avoid eye injury, eye protection is required when working around batteries. Lead-acid battery gas can explode. Don't smoke, have open flames, or make sparks if caps are off.** **NOTE** Remove all jewelry, such as rings, dog tags, bracelet. If jewelry contacts battery terminal, a direct short will result in instant heating of tools, damage to equipment, and injury to personnel. a. Remove batteries from vehicle (para 7-41). b. Check and record specific gravity of each cell in all four batteries (refer to TM 9-6140-200-14). c. Check electrolyte level. If low, add distilled water (refer to TM 9-6140-200-14). Check battery cables for frays, splits, and security. Clean tops of batteries and coat terminals lightly with grease. d. Clean battery compartment. e. Install batteries (para 7-41).	b. Specific gravity is not within set standards. c. One or more batteries unserviceable; missing, frayed, or broken cables.

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) FOR M992A1
S=SEMIANNUAL A=ANNUAL

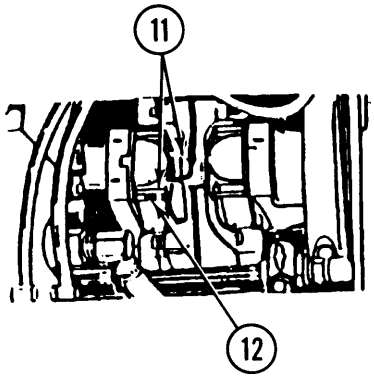
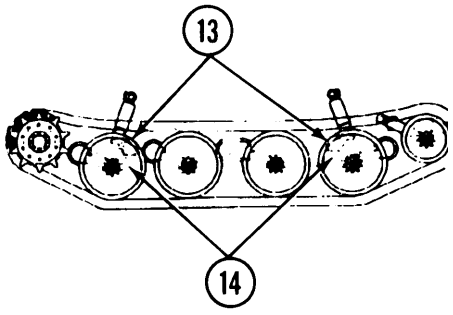
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURE	NOT FULLY MISSION CAPABLE IF
8	S	FINAL DRIVE UNIVERSAL JOINTS	a. Check for missing or broken lockwires (11) on mounting bolts (1 2). b. If missing or broken, tighten mounting bolts (12) to 90 ft-lb, then install lockwires.  	a. Any loose, missing, or broken lockwire or mounting bolts.
			WARNING **APU engine is hot after operation. Use caution when reaching into APU compartment.**	
9	s	APU CHAINCASE DRAIN	a. Open side APU access door (refer to TM 9-2350-287-10). b. Drain and refill APU chaincase (Appendix G).	
10	A	BUMP STOP BRACKETS	a. Check for loose mounting bolts (13) on bump stops (14) with wrench. b. If loose, tighten mounting bolts (13) between 300 and 350 ft-lb (405 and 475 N•m).  	

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) FOR M992A1
S=SEMIANNUAL A = A N N U A L

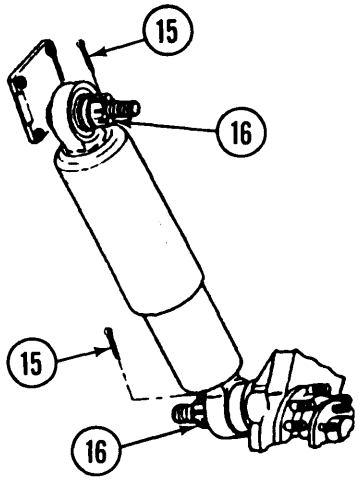
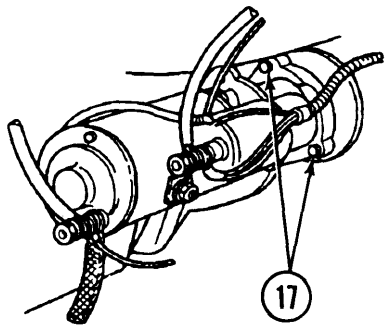
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURE	NOT FULLY MISSION CAPABLE IF
11	A	SHOCK ABSORBERS	a. Check all shock absorber mounting nuts (16) for looseness and missing cotter pins (15). b. If loose nuts (16) or missing cotter pins (15) are found, tighten nuts (16) between 100 and 140 ft-lb (136 and 190 N•m). c. Install new cotter pins (15) as required. 	a. Any missing, broken, or loose shock absorber mounting nuts. Any class III leaks.
12	A	STARTER	**NOTE** The powerpack must be removed from the vehicle to perform checks 12 through 23. a. Remove powerpack (para 3-2). b. Check and make sure all starter bolts (17) and mounting hardware are properly secured (para 7-5). 	

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) FOR M992A1
S= SEMIANNUAL A= ANNUAL

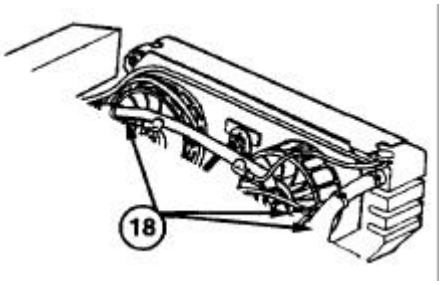
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURE	NOT FULLY MISSION CAPABLE IF
13			**[Text Deleted]**	
14	A	FLEXIBLE COUPLING INSERT	a. Turn coupling insert by rotating alternator fan; coupling insert should not move more than 1/8 inch (para 3-12). If coupling insert moves more than 1/8 inch, remove and inspect coupling insert (para 3-12).	a. Coupling insert moves more than 1/8 inch.
			b. Check coupling insert for cracks, missing/loose mounting bolts, or broken housing (para 3-12).	b. Coupling insert is cracked or has missing/loose mounting bolts, or housing is broken.
			c. Remove radiator shroud (para 6-8).	
15	A	COOLING SYSTEM RADIATOR HOSES AND PUMPS	**WARNING** **Do not remove radiator cap from radiator if engine is warm. Steam and hot gases can cause injury or severe burns to personnel.**	
			a. Check for cracked, weak, or broken hoses (18).	a. Any hoses are cracked, worn, or broken.
			b. Check cooling system for leakage.	b. Any coolant leaks.
			c. Remove radiator shroud (para 6-8).	
				

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) FOR M992A1
S= SEMIANNUAL A= ANNUAL

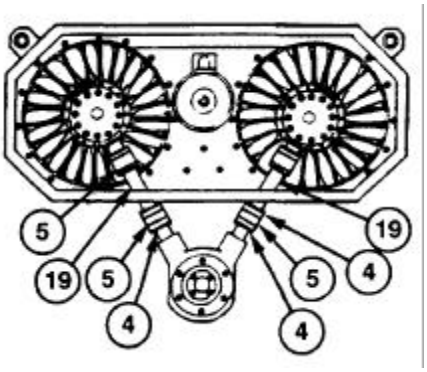
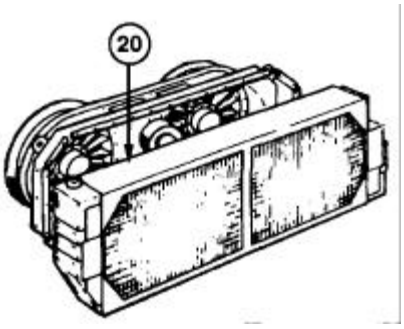
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURE	NOT FULLY MISSION CAPABLE IF
15	A	COOLING SYSTEM RADIATOR HOSES AND PUMPS (continued)	 d. Check drive shafts (19) for excessive wear, torn or loose rubber boots (5), or loose or missing retaining rings (4) (para 6-5).	d. Drive shaft boots are torn or loose, or retaining rings are missing.
			NOTE	
16	A	COOLING SYSTEM RADIATOR	Clean radiator with oil cooler cleaner and cleaning agent that removes deposits of sand, oil, clay, and other debris from radiator cooling fins. The cleaning agent can be a solution of detergent and water or nontoxic, nonflammable solvent and water. a. Connect oil cooler cleaner (Item 40, Appendix I) to air supply, and insert liquid supply hose into container for cleaning solution. b. Insert oil cooler cleaner through radiator fan shroud opening, and wet front and back of radiator (20) with cleaning solution. Allow solution to soak on radiator (20) for approximately 10 minutes. 	a. Radiator fins are clogged. Engine overheats.

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) FOR M992A1
S= SEMIANNUAL A= ANNUAL

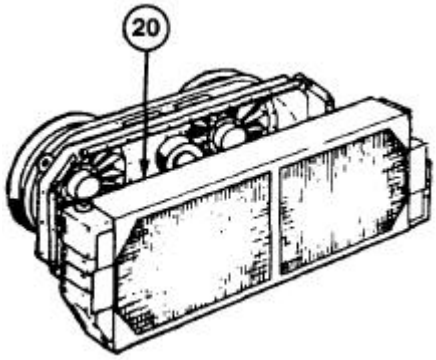
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURE	NOT FULLY MISSION CAPABLE IF
		COOLING SYSTEM RADIATOR (continued)	 c. Remove heavy deposits from face of radiator (20) with medium stiff brush that will not damage radiator. d. Blast radiator (20) with air and cleaning solution mixture, holding head of cleaning tool approximately 1/2 inch (12.7 mm) from face of radiator (20). Alternate from back to front with cleaning tool until cleaning solution flows smoothly through radiator (20). e. Drain cleaning solution from container, rinse, and refill with clean water. Flush engine parts and radiator (20) completely. Remove liquid supply hose from container. Use compressed air to complete the operation. f. Remove tape from engine exhaust outlet. g. Install radiator shroud (para 6-8).	

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) FOR M992A1
S= SEMIANNUAL A= ANNUAL

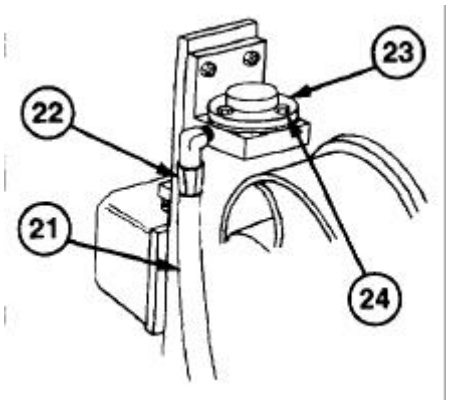
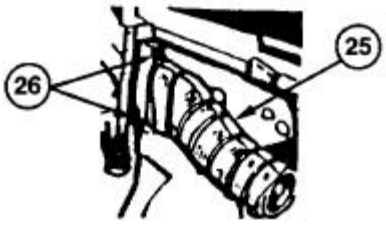
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURE	NOT FULLY MISSION CAPABLE IF
17	A	COOLING SYSTEM PRESSURE RELIEF VALVE	a. Remove and clean cooling system pressure relief valve as follows: (1) Unscrew nut (22) and remove hose (21) from lower end of relief valve (23).  (3) Wipe off accumulation of rust from relief valve (23). Depress spring to make sure relief valve (23) is not broken. (4) 'Position relief valve (23) in place and install four screws (24). (5) Install hose (21) on lower end of relief valve (23) and tighten nut (22).	a. Any missing screws or broken or missing valve parts, or any coolant leaks.
18	A	COOLANT	Test radiator coolant for proper protection (refer to TB 750-651). a. Check coolant system for leakage. b. Check coolant level (refer to TM 9-2350-287-10).	a. Coolant does not pass alkalinity test in TB 750-651. Not protected to -200F.
19	A	EXHAUST DUCTS	Check all components. Replace any damaged components. Check all clamps (25) and mount bolts (26).  	Any damaged component, loose clamps, or exhaust leaks.

TABLE **2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) FOR M992A1**
S=SEMIANNUAL A=ANNUAL

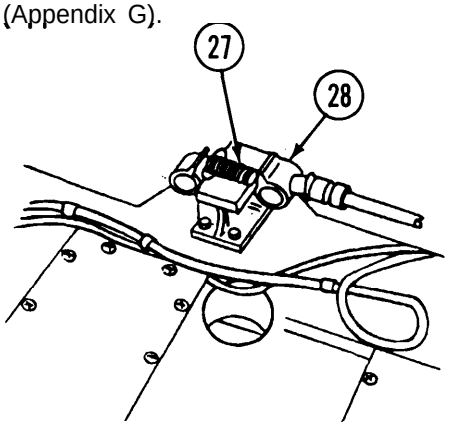
ITEM No.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURE	NOT FULLY MISSION CAPABLE IF
20	A	ENGINE MOUNTBASE	Inspect mount screw (27), engine mount base (28), and rear jaw for excessive wear damage. Lubricate engine rear jaw mount screw (27) on engine mount base (28) with GMD (Appendix G). 	Rear mount base screw or jaw broken.
21	A	FUEL TANK AND HEAT SHIELD	a. Inspect upper and lower fuel tank heat shields for damage, and loose or missing seals and fasteners (para 4-24). b. Inspect upper and lower fuel tanks for damage and leaks. co Operate fuel pumps and listen for pump operation and check for leaks (para 2-19d (3), step J).	a. Upper or lower heat shield missing. Any cracked/missing seal or fastener. b. Any fuel leak. c. Any fuel leak. Any pump not operating.
22	A	TRANSMISSION GEARCASE	**NOTE** Drain only if directed by Army Oil Analysis Program (AOAP). This would be done while powerpack is removed. a. Drain transmission gearcase (only after operation) (Appendix G). Clean and install drain plug. b. Refill transmission with OE/HDO to within OPERATING RANGE (Appendix G). Remove cover and fitter element, and inspect (Appendix G).	a. Oil is milky or any Class Ill leaks or AOAP requested oil change.

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) FOR M992A1
S=SEMIANNUAL A=ANNUAL

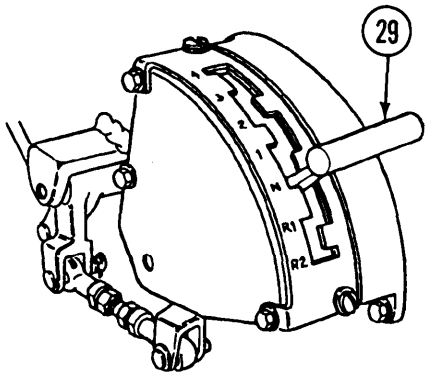
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURE	NOT FULLY MISSION CAPABLE IF
23	A	ENGINE CRANK-CASE	**NOTE** Drain only if directed by AOAP. This would be done while powerpack is removed. a. Drain engine crankcase (only after operation) (Appendix G). b. Refill engine crankcase. Drain oil filter, remove elements, and clean shell parts. Dry, inspect, and install with new elements (para 3-8).	a. AOAP requested oil change.
24	A	ENGINE	a. Groundhop powerpack (para 3-3) and check for leaks and proper operation. b. Perform STE/ICE-R PMCS testing (para 2-22). c. Perform STWCE-R tests 10,13, 14 24,24,67, and 71-75. d. Install powerpack (para 3-2).	
25	A	TRANSMISSION SHIFT CONTROL LEVER	a. Move transmission shift control lever (29) to all positions. Shift control lever should not bind. If binding occurs, adjust shift control linkage (para 8-2). 	a. Transmission shift control lever out of adjustment, excessively loose, or binding.
26	A	DECALS, INSTRUCTIONS PLATES, STENCIL MARKINGS, AND PAINT	Replace any decals and instruction plates, or restencil markings that are not legible. Clean and paint bare or worn spots.	

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) FOR M992A1
S=SEMIANNUAL A=ANNUAL

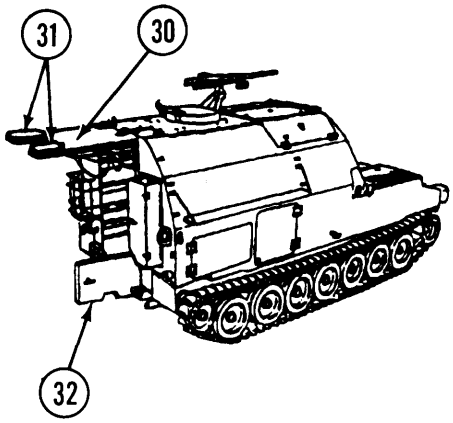
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURE	NOT FULLY MISSION CAPABLE IF
27	A	REAR DOOR	a. inspect upper rear door (30), upper rear small doors (31), and lower rear door (32) for loose, damaged, or deteriorated door seals (para 15-31 and 15-32). **WARNING** Make sure upper door is locked in 45-or 90-degree position before standing under it.  b. Check operation of upper rear door Inspect hydraulic lines and fittings for for leaks, damage, and deterioration. Be sure door will hold and stay in opened position (refer to TM 9-2350-287-10). c. Check latch operation of lower rear door. Check that door opens freely and locks in opened position (para 15-33,15-34, and 15-35). d. Check latch operation of upper rear small doors. Check that doors open freely and lock in opened positions (para 15-35). e. Check for cracked hinges, broken latches, and missing or loose bolts (para 15-31 through 15-35). f. Repair or replace components as necessary.	a. Upper rear door does not lock in the 45-or 90-degree position. Upper rear door will not open. c. Any door latch missing or inoperative.

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) FOR M992A1
S=SEMIANNUAL A=ANNUAL

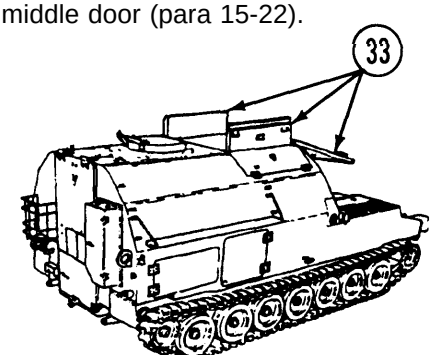
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURE	NOT FULLY MISSION CAPABLE IF
28	A	TOP DOORS	a. Check operation and fit of all three top doors (33) (refer to TM 9-2350-287-10). b. Inspect doors for loose, damaged, or deteriorated door seals (para 15-17 15-18, 15-19, and 15-22). c. Check inside latch operation of top middle door (para 15-22).  d. Inspect hinge operation. Check for cracked hinges, latches, and attaching bolts (para 15-22). e. Check spring assist of torsion bars by opening and closing top middle door (para 15-22). f. Repair or replace defective components as necessary.	
29	A	COMMANDER'S CUPOLA	a. Rotate cupola to ensure ease of rotation (refer to TM 9-2350-287-10). b. Operate cupola hatch latches and make sure hatch locks in both open and closed positions (refer to TM 9-2350-287-10). c. Check seals for tears and deterioration (para 15-46). d. Repair or replace defective components as necessary.	b. Commander's cupola will not lock in open and closed positions.

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) FOR M992A1
S=SEMIANNUAL A=ANNUAL

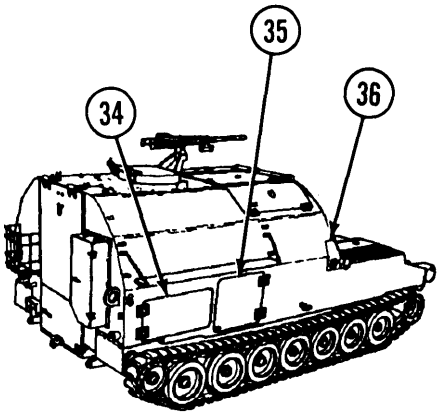
ITEM No.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURE	NOT FULLY MISSION CAPABLE IF
30	A	RIGHT AND LEFT SIDE DOORS, PERSONNEL SIDE DOOR, AND FUEL FILL DOOR	a. Inspect left and right canister doors (34) and personnel side door (35) for loose, damaged, or deteriorated door seals (para 15-30).  b. Check that doors latch securely and operate freely. Check for free operation of hinges (para 15-25 through 15-29). c. Check fit of fuel fill door (36). Check for proper door and latch operation (para 15-42). d. Repair or replace defective components as necessary.	
31	A	APU COMPARTMENT FRONT ANC SIDE DOORS	a. Check that doors latch securely and operate freely (refer to TM 9-2350-287-10). b. Check hinges for free operation (para 15-38). c. Repair or replace defective components as necessary.	
32	A	FENDERS AND REAR SPLASH GUARDS	a. Inspect for dents, cracks, breaks, or other damage (para 15-51 and 15-52). b. Repair or replace components as necessary.	

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) FOR M992A1
S=SEMIANNUAL A=ANNUAL

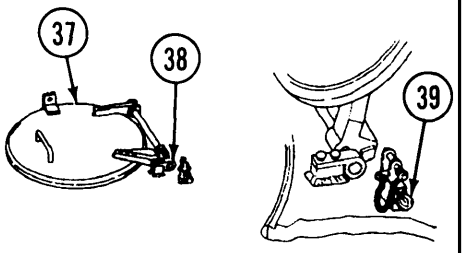
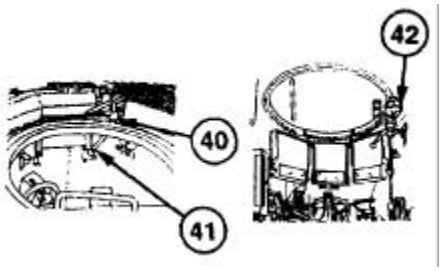
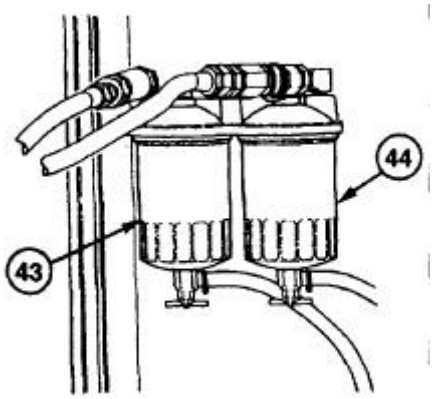
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURE	NOT FULLY MISSION CAPABLE IF
33	A	COMMANDER'S, DRIVER'S AND CREW SEATS	a. Inspect seats for torn cushions and backrests (para 15-62 through 15-65).	
			b. Check adjusting mechanisms for smooth operation (refer to TM 9-2350-287-10).	b. Driver's seat will not adjust.
			c. Check seatbelts and buckles for proper operation (refer to TM 9-2350-287-10).	
			d. Check frames for breaks and other damage (para 15-62 through 15-65).	
			e. Repair or replace defective components.	
A		DRIVER'S HATCH	a. Inspect driver's hatch cover (37). Check locking chuck and handle for damage.	a. Locking chuck missing or driver's hatch will not lock in open position.
			b. Check for broken torsion bar (38).	
			c. Check seals for tears or deterioration (para 15-54 and 15-58).	
			d. Inspect hold-open lock (39) for proper operation. Check hatch cover and lock engagement (refer to TM 9-2350-287-10). 	
			e. Operate hatch from outside and inside of vehicle. Check locking handles (40 and 41) (refer to TM 9-2350-287-10).	
			f. Check operation of security latch (42) (refer to TM 9-2350-287-10).	
			g. Repair or replace components as necessary.	

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) FOR M992A1
S= SEMIANNUAL A= ANNUAL

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURE	NOT FULLY MISSION CAPABLE IF
				
35	EVERY 100 HOURS	APU FUEL FILTERS	a. Replace primary fuel filter (43) every 600 hours (para 18-11). b. Replace secondary fuel filter (44) every 3000 hours (para 18-11). 	a. Fuel filter is clogged or there are Class III leaks.
36	EVERY 100 HOURS	APU ENGINE CRANKCASE DRAIN	a. Drain and refill APU engine crankcase (Appendix G).	a. There are Class II leaks.
37	EVERY 100 HOURS	APU ENGINE OIL FILTER	a. Replace APU engine oil filter (Appendix G).	

2-17. ELECTRICAL TROUBLESHOOTING.

a. Electrical troubleshooting in this section provides schematic diagrams and pictorial views to give clear insight to the location of harnesses and components involved.

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

WARNING

Throughout troubleshooting of the electrical system or electrical components, be certain MASTER switch is OFF between every step unless otherwise directed. Remove all jewelry and metal objects when working on the electrical system to prevent injury due to electrical shock.

c. The multimeter is used throughout electrical troubleshooting. Ensure when using the multimeter that it is used with a probe kit.

d. When doing a shorts test, make sure all connectors and/or leads are disconnected from their components. Probe the pins (or sockets) with a multimeter. This is done by placing the red lead on pin (or socket) A (or 1) and then placing the black lead on the next pin (or socket) in alphabetical (or numerical) order. Probe every pin (or socket) on the connector or lead with the black lead of the multimeter.

e. When this probing has been completed, place the red lead on the second pin (or connector) and do the probing with the black lead in order again. Do this until every pin has been probed with the red lead of the multimeter. Then place the black lead of the multimeter on the connector and place the red lead on each pin (or socket) on the connector.

f. If continuity is present between any two points, a short exists. Shorts must be repaired to continue any operation.

g. If instructed in a procedure to skip a pin (or socket) during a shorts test, that is because that pin (or socket) is not used or is shielded. Those pins (or sockets) will be covered in separate troubleshooting.

h. When a repair or replacement of a lead or harness has been done, do the shorts test again to make sure the problem has been corrected.

2-18. QUICK GUIDE TO TROUBLESHOOTING.

ITEM	SYMPTOM	PARAGRAPH
ENGINE	ENGINE CRANKS SLOWLY, BATTERY INDICATOR IN LOW YELLOW OR RED.	para 2-19.a(1)
	ENGINE DOES NOT ACCELERATE PROPERLY, DOES NOT DEVELOP FULL POWER, or does not maintain steady RPM.	para 2-19.a(2)
	ENGINE HAS LOW OR NO OIL PRESSURE.	para 2-19.a(3)
	ENGINE OVERHEATS.	para 2-19.a(4)
	ENGINE CRANKS, BUT WILL NOT START.	para 2-19.a(5)
ENGINE, FUEL SYSTEM	ENGINE CRANKS, BUT WILL NOT START.	para 2-19.b(1)
	ENGINE DOES NOT ACCELERATE PROPERLY, DOES NOT DEVELOP FULL POWER, or does not maintain steady RPM.	para 2-19.b(2)
ENGINE, COOLANT SYSTEM	ENGINE OVERHEATS.	para 2-19.c(1)
ENGINE, ELECTRICAL SYSTEM	ENGINE DOES NOT CRANK. All other electrical systems operate.	para 2-19.d(1)
	ENGINE CRANKS, SLOWLY, BATTERY INDICATOR IN LOW YELLOW OR RED.	para 2-19.d(2)
	ENGINE CRANKS, BUT WILL NOT START.	para 2-19.d(3)
	ONE OR MORE GLOW PLUGS FAIL TO OPERATE.	para 2-19.d(4)
	ENGINE CRANKS, BUT WILL NOT START IN COLD WEATHER, OR GLOW PLUG SYSTEM FAILS TO OPERATE. All other electrical systems operate.	para 2-19.d(5)
AIR CLEANER BLOWER MOTORS	AIR CLEANER BLOWER MOTORS DO NOT OPERATE WITH VEHICLE IN GEAR.	para 2-19.e(1)
GENERATOR	GENERATOR FAILS TO CHARGE BATTERIES. GAGE INDICATES NOT CHARGING, UNSTEADY OR INACCURATE READING.	para 2-19.f(1)
GAGES	ENGINE OIL PRESSURE GAGE FAILS TO OPERATE WITH ENGINE RUNNING. All other gages operate property.	para 2-19.g(1)

2-18. QUICK GUIDE TO TROUBLESHOOTING (continued).

ITEM	SYMPTOM	PARAGRAPH
GAGES	ENGINE WATER TEMPERATURE GAGE FAILS TO OPERATE PROPERLY, NEEDLE DOES NOT MOVE, IS UNSTEADY, OR INACCURATE. All other gages operate properly.	para 2-19.g(2)
	TRANSMISSION OIL PRESSURE GAGE FAILS TO OPERATE. All other gages operate properly.	para 2-19.g(3)
	TRANSMISSION OIL TEMPERATURE GAGE FAILS TO INDICATE OIL TEMPERATURE. All other gages operate properly.	para 2-19.g(4)
	FUEL GAGE FAILS TO INDICATE LEVEL READING WITH BOTH FUEL TANKS FULL. All other gages operate properly.	para 2-19.g(5)
	FUEL GAGE FAILS TO INDICATE LEVEL OF UPPER FUEL TANK. Indicates level of lower fuel tank properly.	para 2-19.g(6)
	FUEL GAGE FAILS TO INDICATE LEVEL OF LOWER FUEL TANK. Indicates level of upper fuel tank properly.	para 2-19.g(7)
	BATTERY/GENERATOR GAGE FAILS TO OPERATE PROPERLY - NO OR UNSTEADY READING. Other gages operate properly.	para 2-19.g(8)
	TACHOMETER FAILS TO OPERATE WHEN ENGINE IS RUNNING.	para 2-19.g(9)
	SPEEDOMETER FAILS TO OPERATE.	para 2-19.g(10)
LIGHTS	PORTABLE INSTRUMENT PANEL MASTER WARNING LIGHT FAILS TO OPERATE. Other MASTER WARNING light operates.	para 2-19.h(1)
	STEERING SHAFT MASTER WARNING LIGHT FAILS TO OPERATE. Other MASTER WARNING light operates.	para 2-19.h(2)
	MASTER WARNING LIGHT FAILS TO OPERATE WHEN ENGINE OVERHEATS. All other lights operate.	para 2-19.h(3)
	ENGINE LOW LEVEL COOLANT LIGHT FAILS TO OPERATE WHEN PRESSED-TO-TEST. All other lights operate.	para 2-19.h(4)

2-18. QUICK GUIDE TO TROUBLESHOOTING (continued).

ITEM	SYMPTOM	PARAGRAPH
LIGHTS	GLOW PLUG WAIT LIGHT FAILS TO OPERATE, ENGINE STARTS IN COLD WEATHER (BELOW 50°F). All other lights operate.	para 2-19.h(5)
	MASTER SWITCH INDICATOR LIGHT FAILS TO OPERATE WITH MASTER SWITCH ON. All other electrical systems operate.	para 2-19.h(6)
	HIGH BEAM INDICATOR LIGHT FAILS TO OPERATE. All other lights operate.	para 2-19.h(7)
	PARKING BRAKE INDICATOR LIGHT FAILS TO OPERATE. Parking brake is set.	para 2-19.h(8)
	PERSONNEL HEATER INDICATOR LED FAILS TO OPERATE WHEN PRESSED-TO-TEST OR WITH HEATER OPERATING.	para 2-19.h (9)
	ONE OR BOTH HEADLIGHTS FAIL TO OPERATE. All other lights operate.	para 2-19.h(10)
	ONE OR BOTH BLACKOUT (BO) DRIVE LIGHTS FAIL TO OPERATE. All other lights operate.	para 2-19.h(11)
	FRONT BLACKOUT (BO) MARKER LED'S FAIL TO OPERATE. All other lights operate.	para 2-19.h(12)
	TAILLIGHTS FAILS TO OPERATE. All other lights operate.	para 2-19.h(13)
	STOPLIGHT FAILS TO OPERATE. All other lights operate.	para 2-19.h(14)
	ONE OR BOTH REAR BLACKOUT (BO) MARKER LED'S FAIL TO OPERATE. All other lights operate.	para 2-19.h(15)
	BLACKOUT (BO) STOP LED FAILS TO OPERATE. All other lights operate.	para 2-19.h(16)
	PORTABLE INSTRUMENT PANEL LIGHTS FAIL TO OPERATE. All other lights operate.	para 2-19.h(17)
	ACCESSORY CONTROL BOX PANEL LIGHTS FAIL TO OPERATE. All other lights operate.	para 2-19.h(18)
	DOME LIGHT FAILS TO OPERATE.	para 2-19.h(19)

2-18. QUICK GUIDE TO TROUBLESHOOTING (continued).

ITEM	SYMPTOM	PARAGRAPH
NATO SLAVE RECEPTACLES	NO POWER TO VEHICLE FROM NATO SLAVE RECEPTACLE. Disabled vehicle had power when operating.	para 2-19.i(1)
	NO POWER AT INTERNAL OR EXTERNAL POWER RECEPTACLE.	para 2-19.i(2)
AUXILIARY OUTLET	AUXILIARY OUTLET FAILS TO OPERATE. All other eletrical systems operate.	para 2-19.j(1)
TRANSMISSION DRIVING CONTROLS	TRANSMISSION OVERHEATS, TRANSMISSION OIL TEMPERATURE GAGE READS OVER 285°F (140°C). MASTER WARNING LIGHT IS LIT.	para 2-19.k(1)
	VEHICLE DOES NOT MOVE. TRANSMISSION DOES NOT OPERATE IN ANY SHIFT POSITION.	para 2-19.k(2)
	VEHICLE DOES NOT STEER IN EITHER DIRECTION IN ANY RANGE.	para 2-19.k(3)
TRACKS AND SUSPENSION	VEHICLE BRAKES POORLY. Vehicle does not stop correctly when brake is applied.	para 2-19.l(1)
	VEHICLE PULLS TO ONE SIDE WITH STEERING WHEEL IN CENTER POSITION.	para 2-19.l(2)
	VEHICLE THROWS TRACK.	para 2-19.l(3)
BILGE PUMP	BILGE PUMP DOES NOT OPERATE. All other electrical systems operate.	para 2-19.m(1)
PERSONNEL HEATER	PERSONNEL HEATER FAILS TO OPERATE. All other electrical systems operate.	para 2-19.n(1)
	HEATER MOTOR RUNS BUT FAILS TO OPERATE. Sufficient fuel in fuel tank.	para 2-19.n(2)
	PERSONNEL HEATER CONTINUES RUNNING WITH HEAT SELECTOR SWITCH TURNED OFF. All other electrical systems operate.	para 2-19.n(3)
PERSONNEL VENTILATION BLOWER	PERSONNEL VENTILATION BLOWER DOES NOT OPERATE. All other electrical components operate.	para 2-19.o(1)
	PERSONNEL VENTILATION BLOWER DOES NOT OPERATE IN INTAKE MODE.	para 2-19.o(2)

2-18. QUICK GUIDE TO TROUBLESHOOTING (continued).

ITEM	SYMPTOM	PARAGRAPH
PERSONNEL VENTILATION BLOWER	PERSONNEL VENTILATION BLOWER DOES NOT OPERATE IN EXHAUST MODE.	para 2-19.o(3)
	PERSONNEL VENTILATION BLOWER OPERATES, BUT DOES NOT COME ON AUTOMATICALLY IN EXHAUST MODE DURING AFES TEST.	para 2-19.o(4)
	CONVEYOR CHAIN WILL NOT OPERATE IN EITHER DIRECTION. All other hydraulic systems operate.	para 2-19.p(1)
PRIMARY ROTARY PUMP	INSUFFICIENT OR NO HYDRAULIC PRESSURE.	para 2-19.q(1)
	[Text Deleted]	
UPPER REAR DOOR	UPPER REAR DOOR DOES NOT GO UP OR DOWN. All other hydraulic systems operate.	para 2-19.s(1)
	UPPER REAR DOOR DRIFTS CLOSED.	para 2-19.s(2)
	ACTUATOR OPERATION IS SLOW OR ERRATIC All other hydraulic systems operate.	para 2-19.s(3)
HYDRAULIC SYSTEMS, ELECTRICAL	UPPER REAR DOOR DOES NOT GO UP OR DOWN.	para 2-19.t(1)
	CONVEYOR CHAIN WILL NOT OPERATE IN EITHER DIRECTION.	para 2-19.t(2)
AUXILIARY POWER UNIT	ENGINE CRANKS BUT FAILS TO START.	para 2-19.u(1)
	ENGINE FAILS TO CRANK. All other electrical systems operate.	para 2-19.u(2)
	ENGINE HARD TO START.	para 2-19.u(3)
	ENGINE STARTS, BUT FAILS TO KEEP RUNNING OR MISFIRES.	para 2-19.u(4)
	ENGINE OVERHEATS.	para 2-19.u(5)
	GENERATOR CHARGING SYSTEM INDICATOR READS IN LOW YELLOW OR RED WITH MAIN ENGINE CHARGING.	para 2-19.u(6)

2-18. QUICK GUIDE TO TROUBLESHOOTING (continued).

ITEM	SYMPTOM	PARAGRAPH
AFES, ENGINE	(1) POWER ON LAMP DOES NOT LIGHT WHEN MASTER SWITCH IS ON. All other electrical systems operate.	para 2-19.v(1)
	FIRE WIRE (F/W) LED REMAINS ON, NO FIRE PRESENT.	para 2-19.v(2)
	FAULT LAMP REMAINS ON. AUTO LED IS LIT.	para 2-19.v(3)
	FAULT LAMP REMAINS ON. MANUAL LED IS LIT.	para 2-19.v(4)
	BOTH ENGINE BOTTLES DISCHARGE WHEN MANUAL SWITCH ON ENGINE AFES T/A PANEL IS ACTIVIATED.	para 2-19.v(5)
	BOTTLES NOT DISCHARGING WHEN PULLING MANUAL CABLES.	para 2-19.v(6)
	AFES MEGOMETER TROUBLESHOOTING PROCEDURES.	para 2-19.v(7)
	AFES, CREWPOWER ON LAMP DOES NOT LIGHT WHEN MASTER SWITCH IS ON. All other electrical systems operate.	para 2-19.w(1)
	FAULT LAMP REMAINS LIT. FIRE DET. LED'S LIT.	para 2-19.w(2)
	FIRE EXT. LED'S ARE LIT. FAULT LAMP REMAINS ON.	para 2-19.w(3)
	CREW BOTTLES DISCHARGING WITHOUT BEING ACTIVATED.	para 2-19.w(4)
	CREW BOTTLES NOT FULLY DISCHARGING/NOT EXTINGUISHING FIRES.	para 2-19.w(5)
	BOTTLES NOT DISCHARGING WHEN PULLING MANUAL CABLES.	para 2-19.w(6)
	AFES MEGOMETER TROUBLESHOOTING PROCEDURES.	para 2-19.w(7)

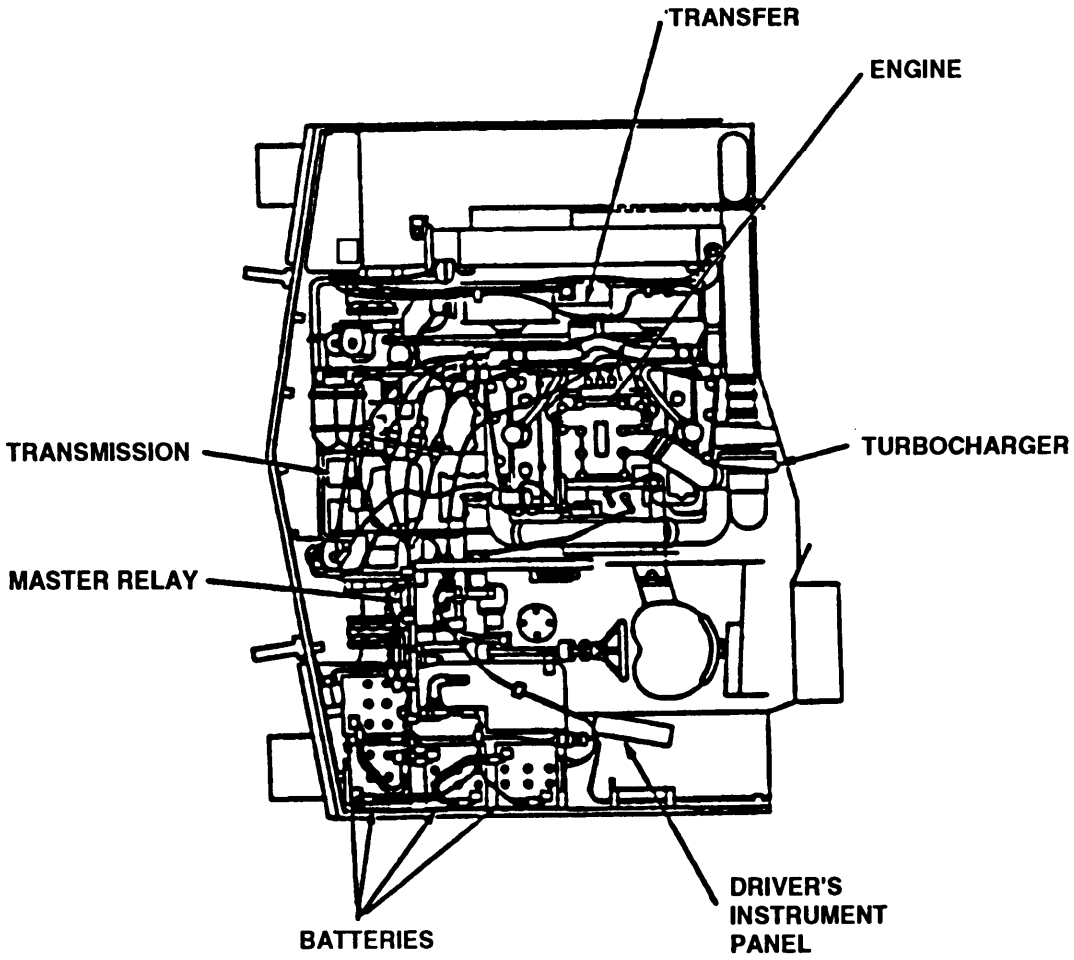
2-18. QUICK GUIDE TO TROUBLESHOOTING (continued).

ITEM	SYMPTOM	PARAGRAPH
NBC SYSTEM	NO FAN OPERATION FROM M2A2 AIR PURIFIER UNIT.	para 2-19.x(1)
	ONE OR MORE M3 UNITS (AIR ELECTRIC HEATERS) FAIL TO OPERATE. No flow from M2A2 air purifier unit.	para 2-19.x(2)

2-19. TROUBLESHOOTING CHART.

a. ENGINE.

The engine is an internal-combustion, liquid-cooled, diesel engine with an exhaust-driven turbocharger. The engine is the main component of the vehicle drain train and has many components and associated wiring harnesses. The relationship of the engine and these components is shown in the pictorial diagram below. The engine is started by turning the MASTER switch ON. This supplies 24 vdc from the batteries to the MASTER relay. When the START button is pushed, the voltage is routed to the starter which cranks and starts the engine. Once started, the engine can develop up to 440 horsepower at 2300 rpm and deliver this power to the transfer assembly. The transfer assembly will then send this power to the transmission.



2-19. TROUBLESHOOTING CHART (continued).

a. ENGINE (continued).	(1) ENGINE CRANKS SLOWLY, BATTERY INDICATOR LOW YELLOW OR RED.

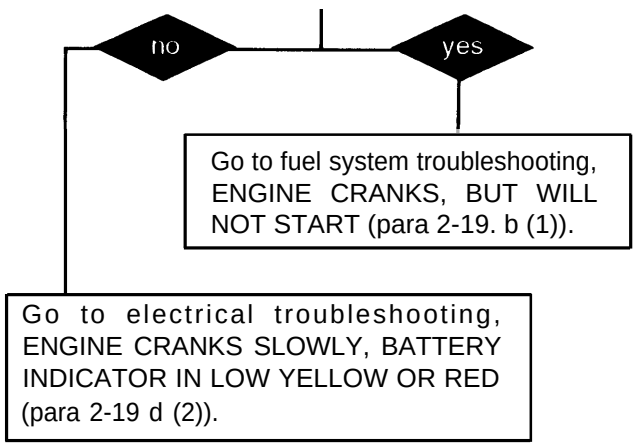
Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix 1)
- STE/ICE Test equipment (Item 65, Appendix 1)

Equipment Conditions:
- Engine and transmission access doors open (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

A. Perform STE/ICE troubleshooting, ENGINE RPM-TEST 10 (para 2-22. b(9)).

Does test pass?



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

a. ENGINE (continued).	(2) ENGINE DOES NOT ACCELERATE PROPERLY, DOES NOT DEVELOP FULL POWER, or does not maintain steady RPM.

Initial Setup:

Tool/Test Equipment:
- General Mechanic's tool kit (Item 24, Appendix 1)
- STE/ICE test equipment (Item 65, Appendix 1)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

A. Perform STE/ICE troubleshooting, ENGINE POWER PERCENTAGE-TEST 13 (para 2-22. b (11)).

Does engine pass test?

no → Notify Direct Support maintenance.

yes →

B. Perform STE/ICE troubleshooting COMPRESSION UNBALANCE-TEST 14 (para 2-22. b (10)).

Does engine past test?

no → Notify Direct Support maintenance.

yes →

Go to fuel system troubleshooting ENGINE DOES NOT ACCELERATE PROPERLY, DOES NOT DEVELOP FULL POWER, or engine does not maintain steady RPM (para 2-19. b (2)).

END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

a. ENGINE (continued).	(3) ENGINE HAS LOW OR NO OIL PRESSURE.

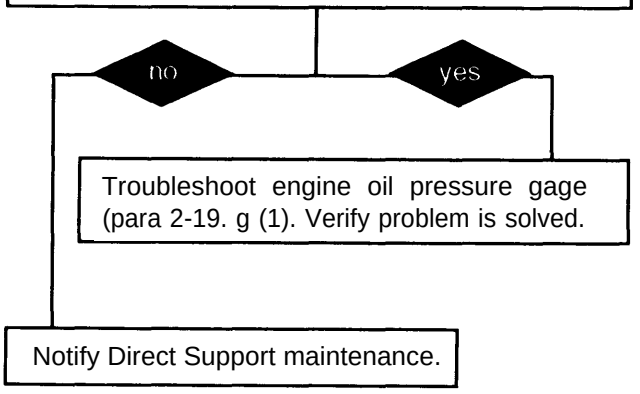
Initial Setup:

Tools/Test Equipment:
- General Mechanic's tool kit (Item 24, Appendix 1)
- STE/ICE test equipment (Item 85, Appendix 1)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

A. Perform STE/ICE troubleshooting, VEHICLE OIL PRESSURE TEST 50 (para 2-22. b (17)).

Does test pass?



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

a. ENGINE (continued). (4) ENGINE OVERHEATS

Initial Setup:

- None

A. Check reading on coolant temperature gage.

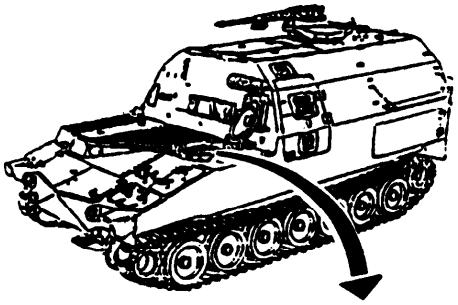
Does coolant temperature gage read above 212 degrees F°?

no

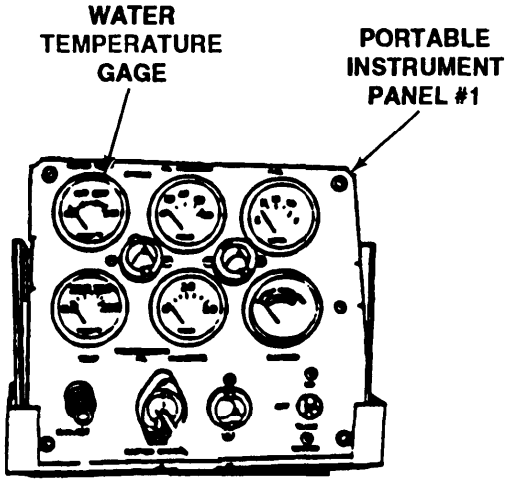
Troubleshoot water temperature gage (para 2-19. g (2)). Verify problem is solved .

yes

Continue troubleshooting at coolant system troubleshooting ENGINE OVERHEATS (para 2-19. c (1)).



END OF TASK



2-19. TROUBLESHOOTING CHART (continued).

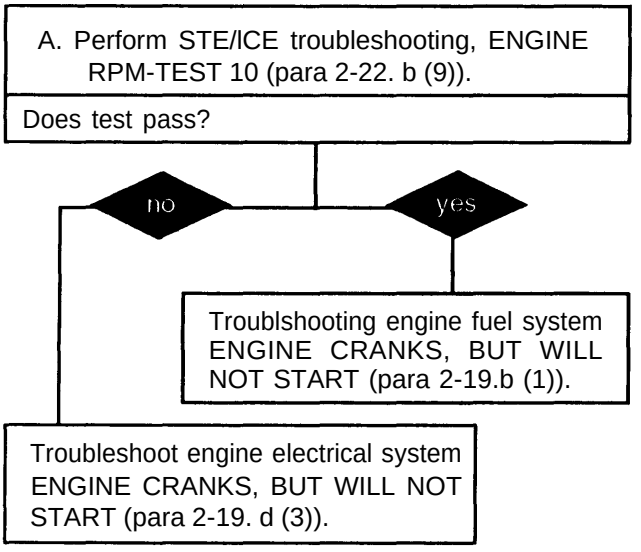
a. ENGINE (continued).

(5) ENGINE CRANKS, BUT WILL NOT START.

Initial Setup:

Tools/Test Equipment:
- General Mechanic's tool kit (item 24, Appendix I)
- STE/ICE test equipment (Item 85, Appendix 1)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

b. ENGINE - FUEL SYSTEM. (1) ENGINE CRANKS, BUT WILL NOT START.

Initial Setup:

Tools/Test Equipment
- General Mechanics tool kit (Item 24, Appendix 1)
- STE/ICE test equipment (Item 65, Appendix H)

A. 1. Drain primary and secondary fuel fitters (refer to TM 9-2350-287-10).

2. Check elements for debris or clogging material.

Are elements clean?

no

Clean or replace elements (para 4-25 or 4-26). Verify problem is solved.

yes

B. Perform STE/ICE troubleshooting, FUEL SUPPLY PRESSURE -TEST 24 (para 2-22. b (13)).

Does test pass?

no

yes

Problem is solved.

C. Perform STE/ICE troubleshooting, FUEL PRESSURE DROP -TEST 26 (para 2-22. b (22)).

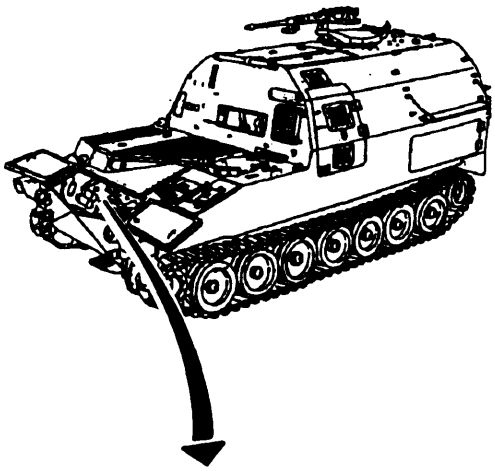
Does test pass?

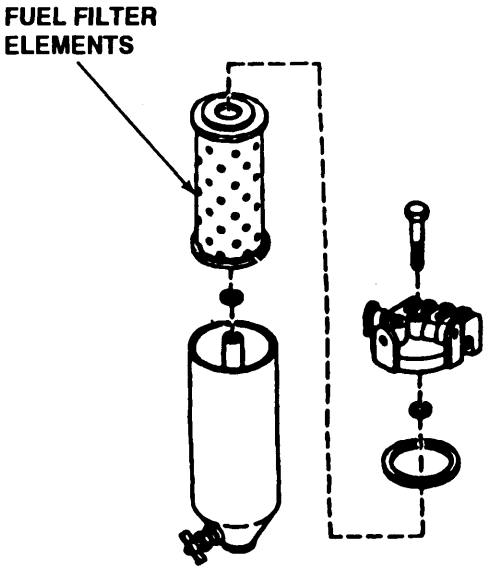
no

Replace engine driven fuel pump (para 4-7). Verify problem is solved.

yes

Go to engine electrical troubleshooting for ENGINE CRANKS, BUT WILL NOT START (para 2-19. d (3)).





END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

b. ENGINE - FUEL SYSTEM.	(2) ENGINE DOES NOT ACCELERATE PROPERLY, DOES DEVELOP FULL POWER, or does not maintain steady RPM.

Initial Setup:

Tools/Test Equipment
- General Mechanic's tool kit (Item 24, Appendix I)
- STE/ICE test equipment (Item 64, Appendix 1)

A. Perform STE/ICE troubleshooting, FUEL SUPPLY PRESSURE -TEST 24 (para 2-22. b (13)).

Does test pass?

no → Replace engine driven fuel pump (para 4-7). Verify problem is solved.

yes →

B. Perform STE/ICE troubleshooting, FUEL FILTER PRESSURE DROP - TEST 26 (para 2-22. b (22)).

Does test pass?

yes → Problem is solved.

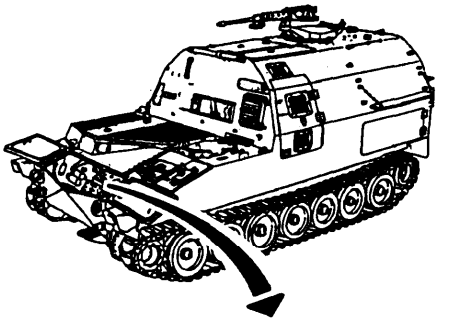
no →

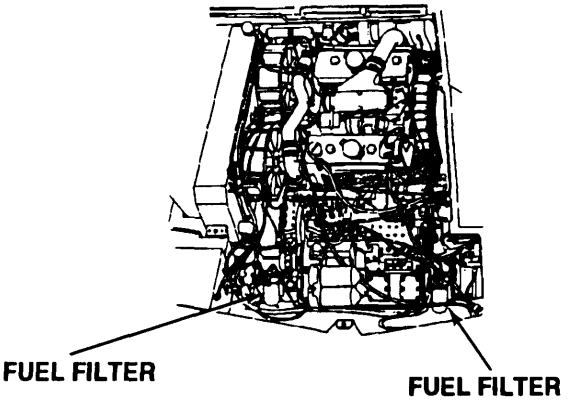
C. Check both fuel filter elements to see if they are dirty or clogged.

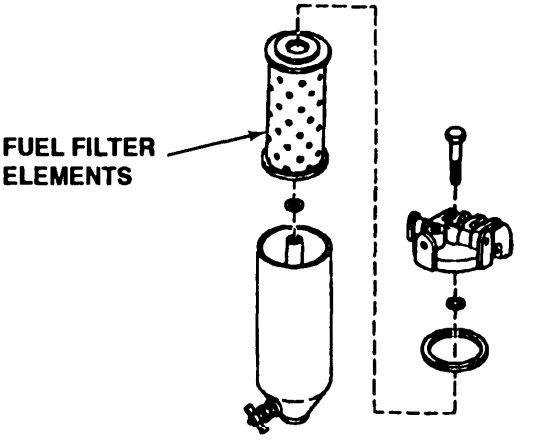
Are fuel fitter elements dirty or clogged?

yes → Replace fitter elements (para 4-25 and 4-26). Verify problem is solved.

no → If engine still idles rough or accelerates poorly, notify Direct Support Maintenance.







END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

c. ENGINE - COOLANT SYSTEM.	(1) ENGINE OVERHEATS.

Initial Setup:

Tools/Test Equipment:
- General Mechanic's tool kit (Item 24, Appendix I)

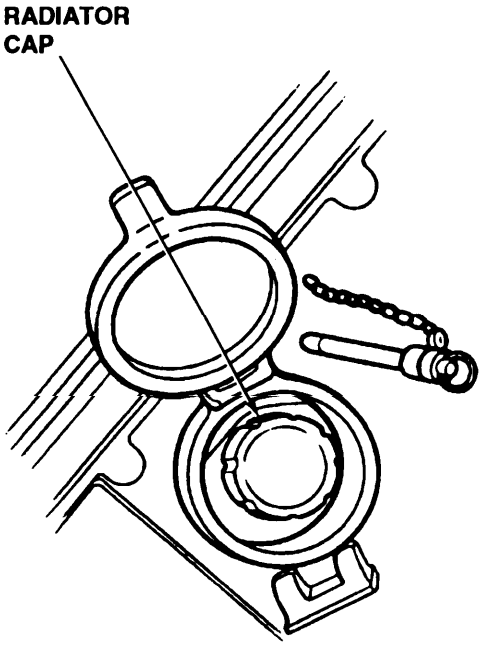
Equipment Conditions:
- Air intake grill opened (refer to TM 9-2350-287-10).
- Protective fan screen installed (para 2-8).

WARNING

When engine is hot, remove radiator cap slowly to relieve pressure. Failure to follow this procedure may result in severe injury.

To avoid burns, ensure engine and coolant have cooled before removing components. Failure to comply may result in severe injury.

A protective fan screen must be installed prior to doing maintenance in the engine compartment when the engine is running or engine is in ground hop mode. Contact with rotating fan can cause injury.



A. 1. Remove radiator cap and start engine (refer to TM 9-2350-287-10).

2. After engine has idled for 3-5 minutes, look inside radiator to see if coolant is circulating.

Does coolant fluid start to circulate?

no → Notify Direct Support maintenance.

yes

B. Check for bulging, collapsed, or leaking coolant hoses or tubes.

Are there restrictions or collapsed hoses and tubes?

Continued to next page

12-19. TROUBLESHOOTING CHART (continued).

c. ENGINE - COOLANT SYSTEM (continued). (1) ENGINE OVERHEATS (continued).

CONTINUED FROM B

no / yes

Replace hoses and tubes (para 6-4). Verify problem is solved.

C. Check outlet hose coming from the inlet thermostat to see if it is collapsed due to vacuum caused by coolant pump operating, but no coolant flow from the thermostat.

Is outlet hose collapsed?

no / yes

Replace inlet thermostat (para 6-11). Verify problem is solved.

D. Check the outlet hose from the bypass thermostat to see if it is collapsed.

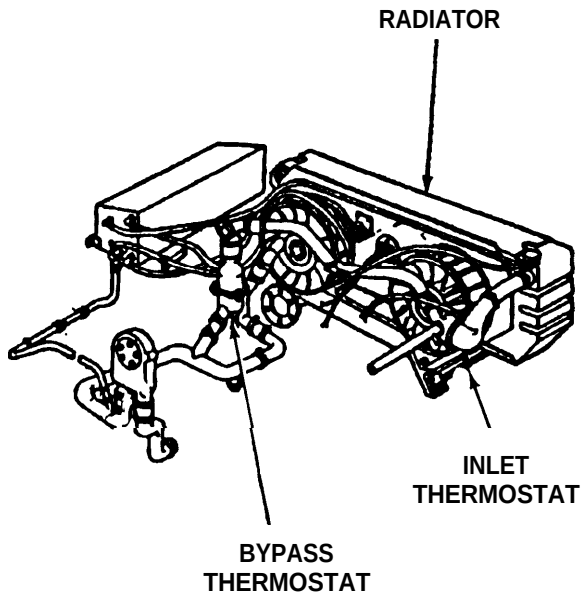
Is outlet hose collapsed?

no / yes

Replace bypass thermostat (para 6-12). Verify problem is solved.

Notify Direct Support maintenance.

END OF TASK



2-19. TROUBLESHOOTING CHART (continued).

d. ENGINE, ELECTRICAL SYSTEM.	(1) ENGINE DOES NOT CRANK. All other electrical systems operate.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)
- STE/ ICE test equipment (Item 65, Appendix 1)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Transmission in "Neutral" (refer to TM 9-2350-287-10).

Personnel Required: Two

NOTE

- Instead of using multimeter forvoltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multimeter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.
- Shift lever must be placed in neutral when attempting' engine start, otherwise engine will not crank.

A. Perform STE/ICE troubleshooting, CHARGING CIRCUIT (at battery) - TEST 67 (para 2-22. b (8)).

Does test pass?

no — yes

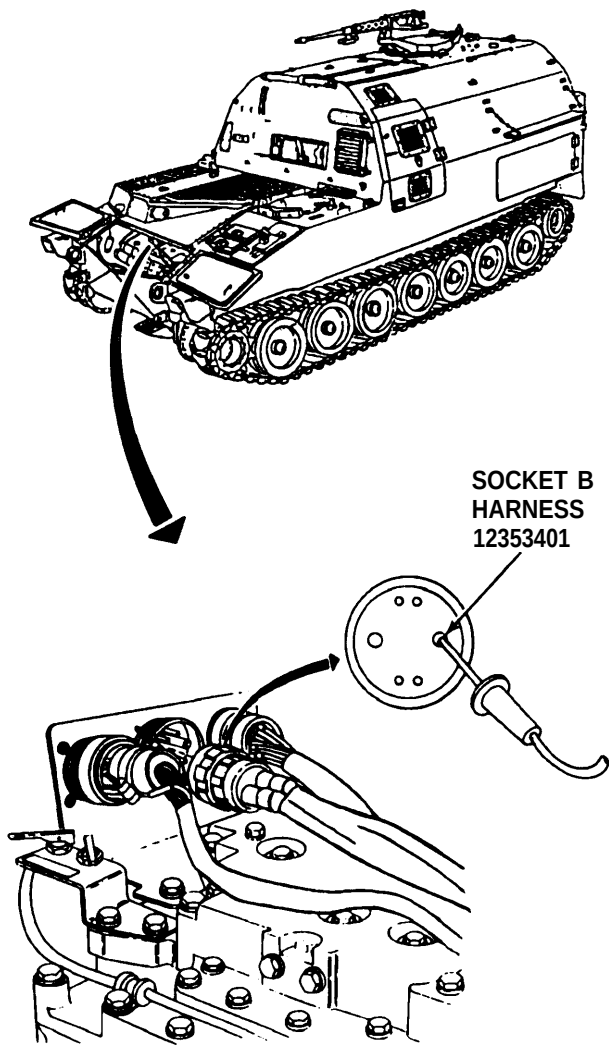
Recharge or replace batteries (para 7-41). Verify problem is solved.

NOTE

If battery charge is low, perform STE/ ICE troubleshooting, TESTS 82 and 83 to be sure that alternator is operating property.

B. 1. Disconnect harness 12353401 from engine disconnect bracket.

2. Place red lead of multimeter in socket B and ground black lead.



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12-19. TROUBLESHOOTING CHART (continued).

d. ENGINE, ELECTRICAL SYSTEM (continued).	(1) ENGINE DOES NOT CRANK. All other electrical systems operate (continued).

CONTINUED FROM B

B. 3. Turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Check for 24 ± 3 vdc.

5. Turn MASTER switch OFF (refer toTM 9-2350-287-10).

Is voltage indicated?

no — yes

Repair wire 6 or replace harness 12353401 from battery positive terminal to engine disconnect bracket (para 7-51). Verify problem is solved.

C. 1. Reconnect wire harnessl 2353401 to engine disconnect bracket.

2. Disconnect harness 12268418-1 from engine disconnect bracket.

3. Place red lead of multimeterin socket Pand ground black lead,

4. Turn MASTER switch ON and hold starter switch ON (refer to TM 9-2350-287-1 O).

5. Check for 24 ± 3 vdc.

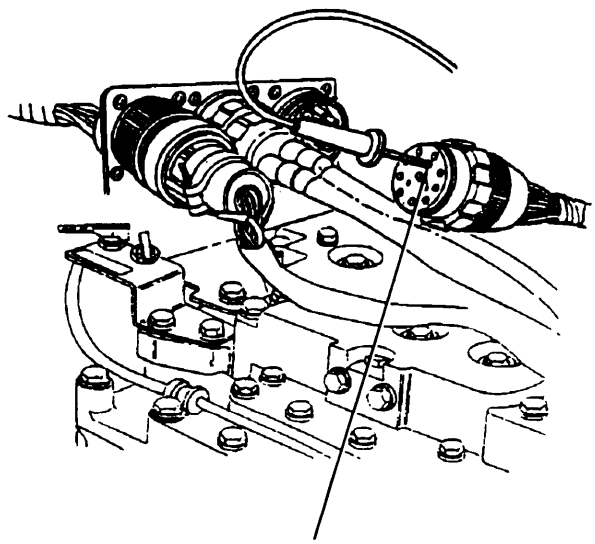
6. Release starter switch and turn MASTER switch OFF (refer to TM 9-2350-287-1 O).

Is voltage indicated?

no — yes

GO TO STEP N

D. 1. Disconnect harness 12268418-1 from starter protection relay.



SOCKET P
HARNESS
12268418-1

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

d. ENGINE, ELECTRICAL SYSTEM (continued).	(1) ENGINE DOES NOT CRANK. All other electrical systems operate (continued).

CONTINUED FROM D

D. 2. Place one lead of multimeter in socket Pof harness 12268418-1 engine disconnect connector and place the other lead of multimeter and in socket E of harness 12268418-1 starter protection relay connector.

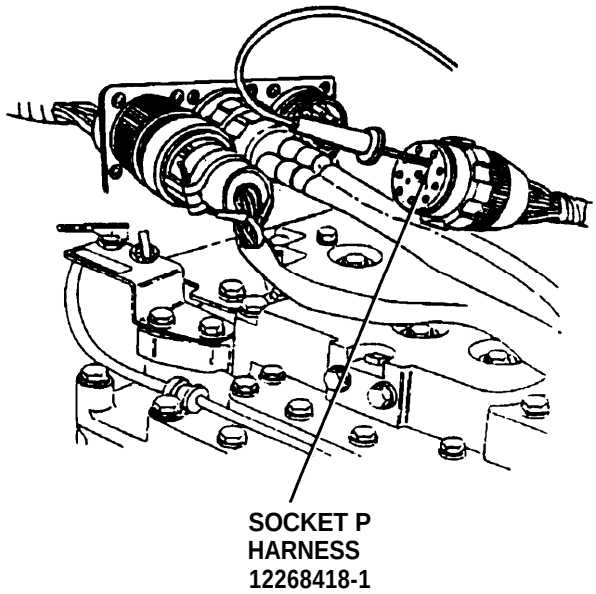
3. Check harness 12268418-1 wire 14B for continuity.

4. Is continuity indicated?

Is continuity indicated?

no — Repair wire 14B or replace harness 12268418-1 (para 7-44) Veril problem is solved.

yes



E. 1. Reconnect harness 12268418-1 to engine disconnect bracket.

2. Place red lead of multimeter in socket B of harness 12268418-1 starter protection relay connector and ground black lead.

3. Turn MASTER switch ON (refer to TM 9-2350-287-1 O).

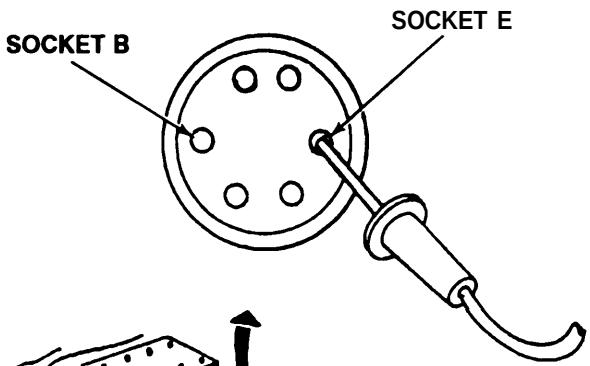
4. Check for 24 ± 3 vdc.

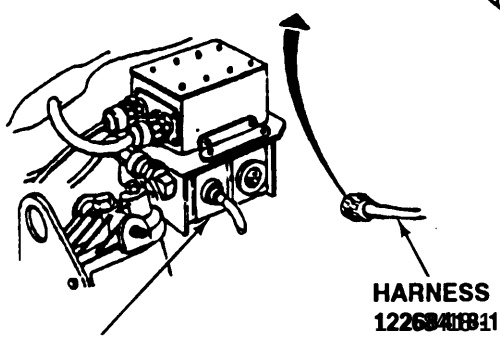
5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no — **CONTINUED AT STEP G**

yes





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2-19. TROUBLESHOOTING CHART (continued).

d. ENGINE, ELECTRICAL SYSTEM (continued).	(1) ENGINE DOES NOT CRANK. All other electrical systems operate (continued).

CONTINUED FROM E

F. 1. Place red lead of multimeter in socket A of harness 12266418-1 starter protection relay and ground black lead.

2. Turn MASTER switch ON and hold starter switch ON (refer to TM 9-2350-287-10)

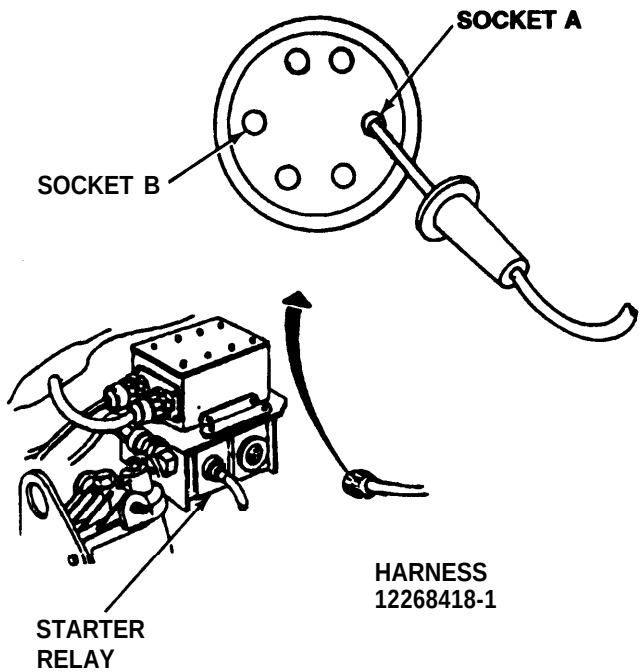
3. Check for 24 ± 3 vdc.

4. Release starter switch and turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no → Replace starter protection relay (para 7-3). Verify problem is solved.

yes



G. 1. Disconnect wire harness 12260287 from drivers bulkhead and disconnect harness 12268418-1 from voltage regulator.

2. Place red lead of multimeter in socket T of harness 12268418-1 driver's bulkhead connector and place the other lead on socket A of harness 12268418-1 starter protection relay connector.

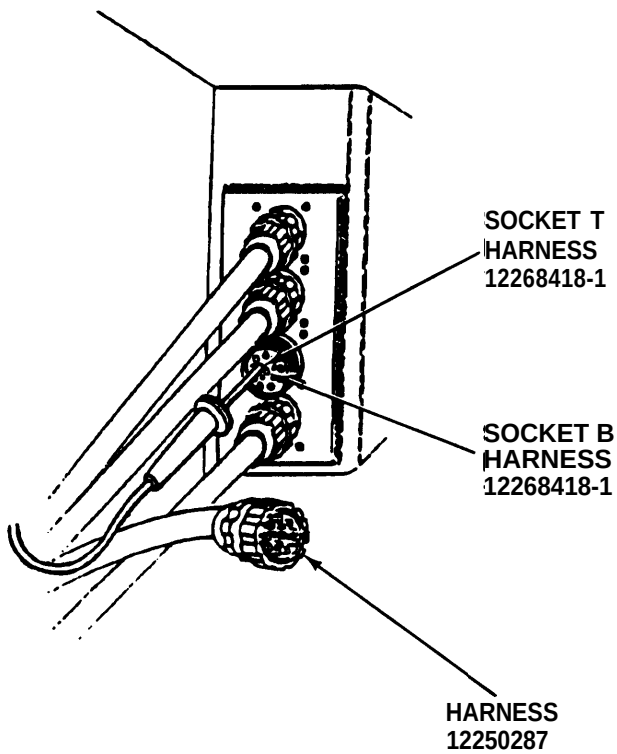
3. Check for continuity.

4. Place red lead of multimeter in socket B of harness 12268418-1 driver's bulkhead connector and place the other lead in socket B of harness 12268418-1 voltage regulator connector.

5. Check for continuity.

6. Place black lead of multimeter on socket B of harness 12266418-1 starter protection relay connector and leave red lead as in step 3.

7. Check for continuity.



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2-19. TROUBLESHOOTING CHART (continued).

d. ENGINE, ELECTRICAL SYSTEM (continued).	(1) ENGINE DOES NOT CRANK. All other electrical systems operate (continued).

CONTINUED FROM G

Is continuity indicated in all three circuits?

no → Repair wire 14 and/or 400-459B or replace wire harness 12268418-1 (para 7-44). Verify problem is solved.

yes →

H. 1. Reconnect harness 12268418-1 to starter protection relay and to the voltage regulator.

2. Disconnect wire 14 (coming from the driver's bulkhead) from the neutral safety switch.

3. Place one lead of the multimeter in wire 14 of harness 12260287 and place the other lead to pin T of harness 12260287 driver's bulkhead connector.

4. Check for continuity.

Is continuity indicated?

no → Repair wire 14 or replace harness 12260287 (para 7-56.) Verify problem is solved.

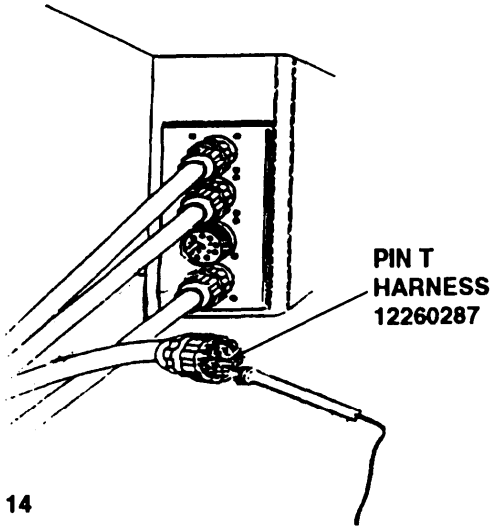
yes →

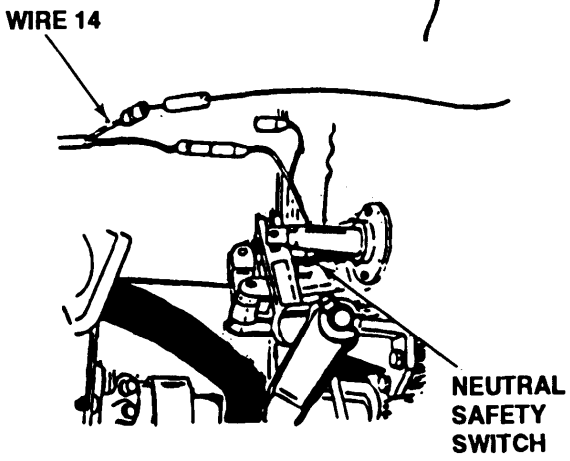
1. 1. Reconnect harnesses 12260287 to the bulkhead.

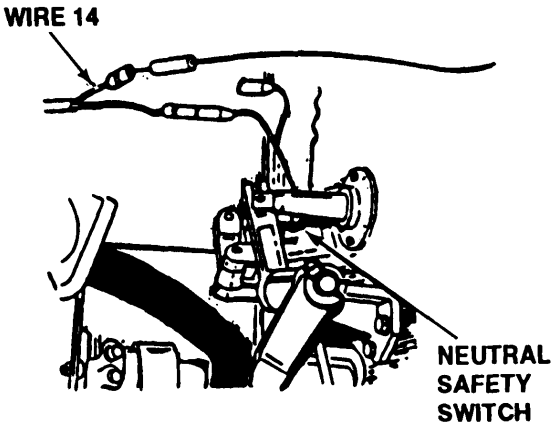
2. Disconnect other wire 14 from the neutral safety switch.

3. Place red lead of multimeter in wire 14 (coming from the starter switch) of harness 12260287 and ground black lead.

4. Turn MASTER switch ON and hold starter switch ON (refer to TM 9-2350-287-1 0).







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12-19. TROUBLESHOOTING CHART (continued).

d. ENGINE, ELECTRICAL SYSTEM (continued).	(1) ENGINE DOES NOT CRANK. All other electrical systems operate (continued).

CONTINUED FROM I

1. 5. Check for 24 ± 3 vdc.

6. Release starter switch and turn MASTER switch OFF (refer to TM 9-2350-287-1 0).

Is voltage indicated?

no — yes

Replace neutral safety switch (para 8-3). Verify problem is solved.

J. 1. Reconnect both 14 wires of harness 12260287 to neutral safety switch.

2. Remove six screws and driver's instrument panel cover from driver's instrument panel.

3. Disconnect wire 14 from starter switch output.

4. Place red lead of multimeter in starter switch output and ground black lead.

5. Turn MASTER switch ON and hold starter switch ON (refer to TM 9-2350-287-10).

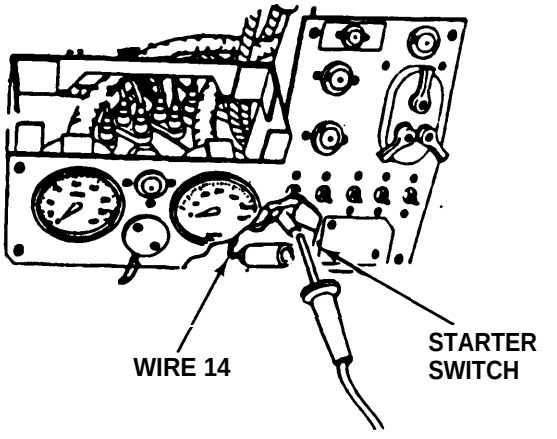
6. Check for 24 ± 3 vdc.

7. Release starter switch and turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no — yes

Repair wire 14 or replace harness 12260287 (para 7-56). Verify problem is solved.



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2-19. TROUBLESHOOTING CHART (continued).

d. ENGINE, ELECTRICAL SYSTEM (continued).	(1) ENGINE DOES NOT CRANK. All other electrical systems operate (continued).

CONTINUED FROM J

no

K. 1. Disconnect wire 10 from the starter switch input.

2. Place red lead of multimeter to wire 10 of harness 12268104 and ground black lead.

3. Turn MASTER SWITCH ON (refer to TM 9-2350-287-1O).

4. Check for 24 ± 3 vdc.

5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no — yes

Replace starter switch (para 7-9). Verify problem is solved.

L. 1. Reconnect wire 14 of harness 12260287 and wire 10 of harness 21268104 to starter switch.

2. Disconnect wire 10 of harness 12268104 from the output of circuit breaker no. 7 on panel no. 1

3. Place red lead of multimeter in circuit breaker no. 7 output and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-1O).

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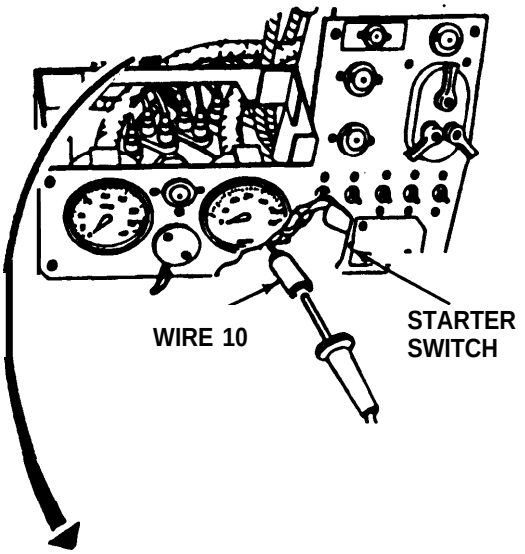
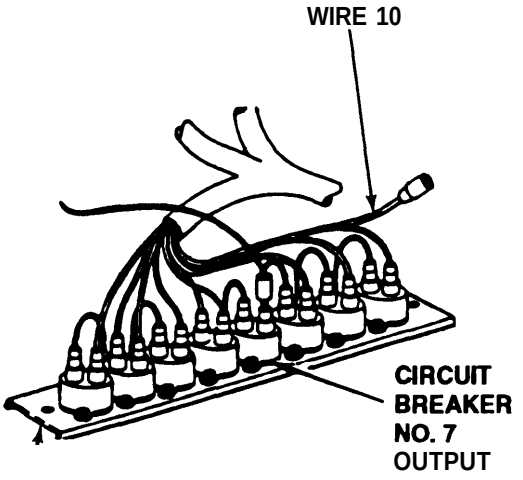




CIRCUM BREAKER PANEL NO. 1

12-19. TROUBLESHOOTING CHART (continued).

d. ENGINE, ELECTRICAL SYSTEM (continued).	(1) ENGINE DOES NOT CRANK. All other electrical systems operate (continued).

CONTINUED FROM L

Is voltage indicated?

no

yes

Replace wire 10 of harness 12268104 (para 7-61). Verify problem is solved.

M. 1. Reconnect wire 10 to circuit breaker no. 7

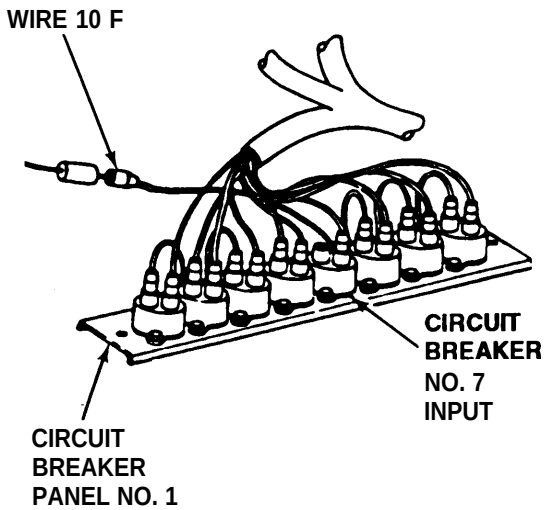
2. Disconnect wire 10F of harness 12376405 from circuit breaker no. 7 input.

3. Place multimeter red lead in wire 10F and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-1O).



Is voltage indicated?

no

yes

Replace circuit breaker no. 7 (para 7-11). Verify problem is solved.

Repair wire 10F or replace wire harness 12376405 (para 7-57). Verify problem is solved.

CONTINUED FROM STEP C

N. 1. Remove powerpack (para 3-2).

2. Disconnect wire 14B from starter.

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

d. ENGINE, ELECTRICAL SYSTEM (continued).	(1) ENGINE DOES NOT CRANK. All other electrical systems operate (continued).

CONTINUED FROM N

N. 3. Connect one lead on pin P of harness 12268308 engine disconnect bracket connector and connect other lead on wire 14B engine starter terminal connector and check for continuity.

Is continuity indicated?

no → repair wire 14B or replace harness 1226830b (para 7-50). Verify problem is solved.

yes

0. **WARNING**

Wires 5A and 6A of harness 12353072 carry live voltage from the batteries. Handle these wires with caution to avoid injury to personnel or damage to vehicle.

1. Disconnect harness 12353072 from engine disconnect bracket.

2. Disconnect wires 6A and 5A from engine starter.

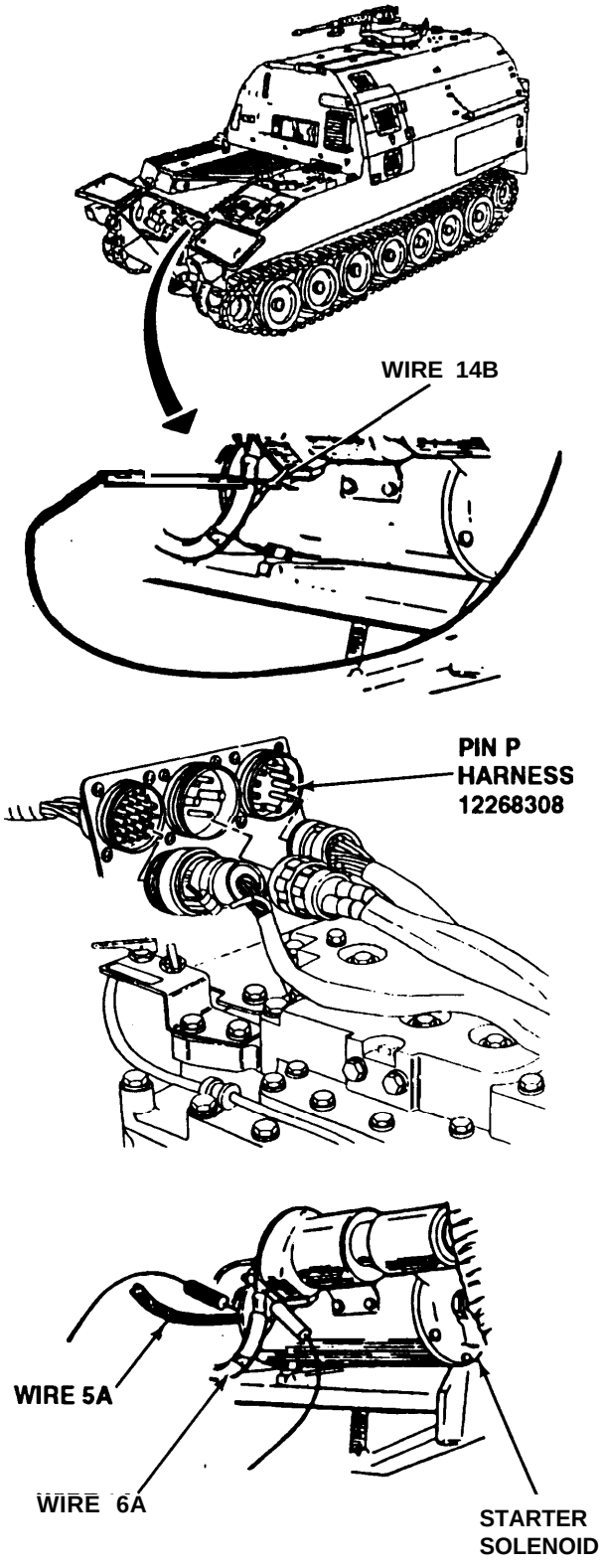
3. Check continuity of wires 6A and 5A.

Is continuity indicated in both wires?

no → Repair 5A and/or 6A or replace defective wire harness 12353072 (para 7-52). Verify problem is solved.

yes → Replace starter motor (para 7-5). Verify problem is solved.

END OF TASK



2-19. TROUBLESHOOTING CHART (continued).

d. ENGINE, ELECTRICAL SYSTEM (continued).	(2) ENGINE CRANKS SLOWLY, BATTERY INDICATOR IN LOW YELLOW OR RED.

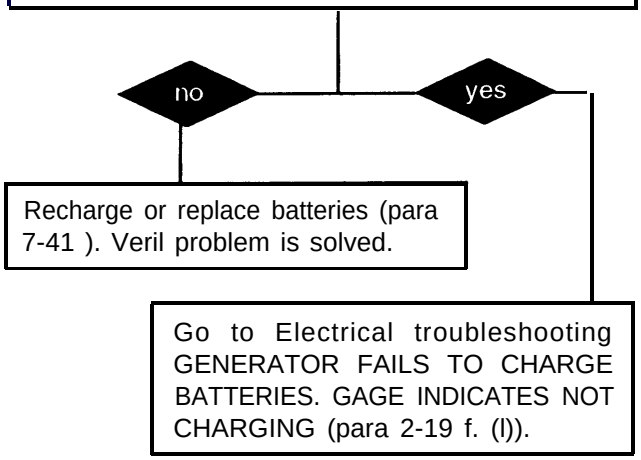
Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- STE/ICE test equipment (Item 65, Appendix I)

Equipment Conditions:
- Equipment and transmission access doors open (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

A. Perform STE/ICE troubleshooting, CHARGING CIRCUIT (at battery) - TEST 67 (para 2-22 b. (8)).

Does test pass?



END OF TASK

12-19. TROUBLESHOOTING CHART (continued).

d. ENGINE - ELECTRICAL SYSTEM (continued).	(3) ENGINE CRANKS, BUT WILL NOT START.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Materiais/Parts:
- Lockwashers (Item 164, Appendix H)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Portable instrument panel stowed in outside position (refer to TM 9-2350-287-10).

NOTE

- Instead of using multimeter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multimeter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. 1. Remove 12 screws, lockwashers, and access panel in driver compartment. Discard lockwashers.

2. Disconnect wire 76 from left in-tank fuel pump.

3. Place multimeter red lead in wire 76 and black lead to ground.

4. Turn MASTER switch and hold FUEL PRIME switch ON (refer to TM 9-2350-287-10), check wire 76 for voltage (24 ± 3 vdc).

5. Turn MASTER switch and FUEL PRIME switch OFF (refer to TM 9-2350-287-10).

Is voltage present?

no

yes

Repair or replace left in-tank fuel pump (para 4-4). Verify problem is solved.

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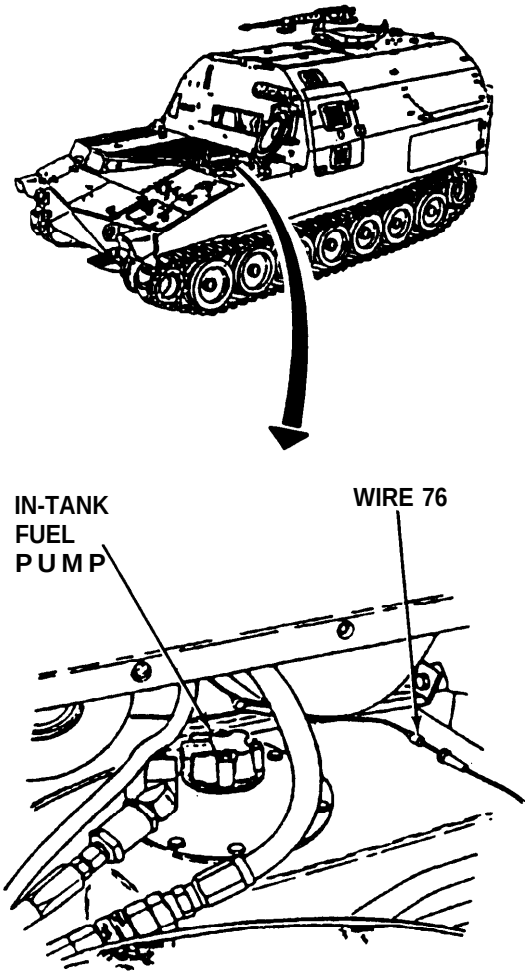


2-19. TROUBLESHOOTING CHART (continued).

d. ENGINE - ELECTRICAL SYSTEM (continued).	(3) ENGINE CRANKS, BUT WILL NOT START (continued).

CONTINUED FROM A

NOTE

If voltage was indicated but right in-tank fuel pump was not operating, then remove powerpack (para 3-2) and repeat procedure A for right in-tank fuel pump. If voltage is indicated, replace right in-tank fuel pump.

B. 1. Reconnect wire 76 to left in-tank fuel pump.

2. Disconnect harness l2330252 from harness 10921380 at bulkhead disconnect.

3. Place multimeter red lead in socket N and ground black lead,

4. Turn MASTER switch ON (refer to TM 9-2350-287-1 O) and check socket N for voltage (24 ± 3 vdc).

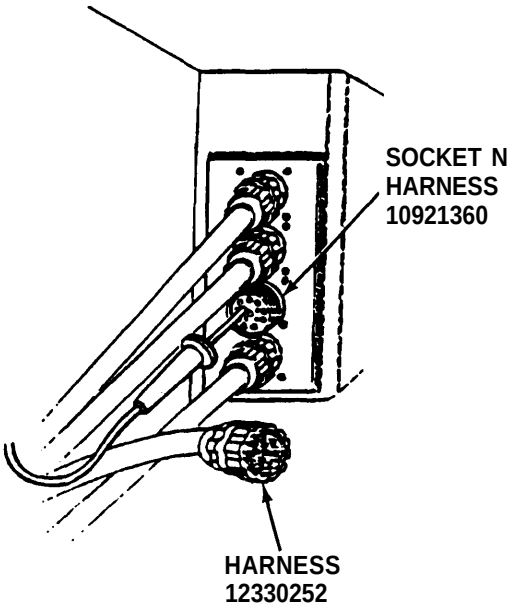
5. Turn MASTER switch OFF (refer to TM 9-2350-287-1O).

Is voltage present?

no

Repair or replace harness 10921380 (para 7-43). Veril problem is solved.

yes

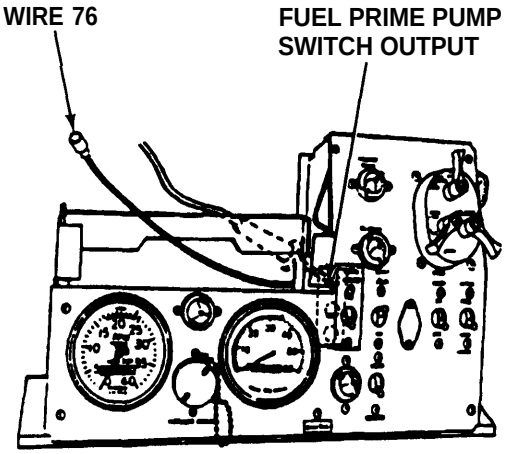


C. 1. Reconnect harness 12330252 to harness 10921380 at bulkhead disconnect.

2. Disconnect wire 76 of harness 12330252 at fuel prime pump switch output.

3. Place multimeter red lead on fuel prime pump switch output and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-1O).



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2-19. TROUBLESHOOTING CHART (continued).

d. ENGINE - ELECTRICAL SYSTEM (continued).

(3) ENGINE CRANKS, BUT WILL NOT START (continued).

CONTINUED FROM C

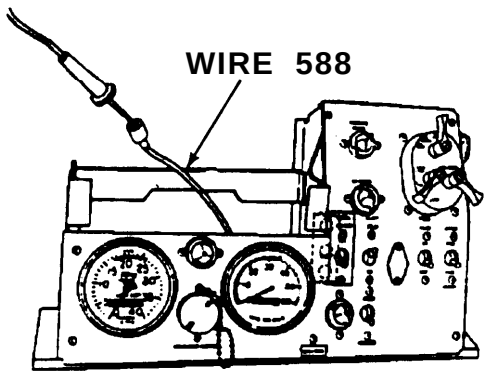
C. 5. Hold fuel prime pump switch in the ON position and check for voltage (24 ± 3 vdc),

6. Turn MASTER switch OFF (refer to TM 9-2350-287-1O).

Is voltage present?

no → **GO TO STEP G**

yes



D. 1. Reconnect wire 76 of harness 12330252 to fuel prime pump switch.

2. Disconnect wire 588 of harness 12268104 at fuel prime pump switch.

3. Place multimeter red lead in wire 588 and ground black lead.

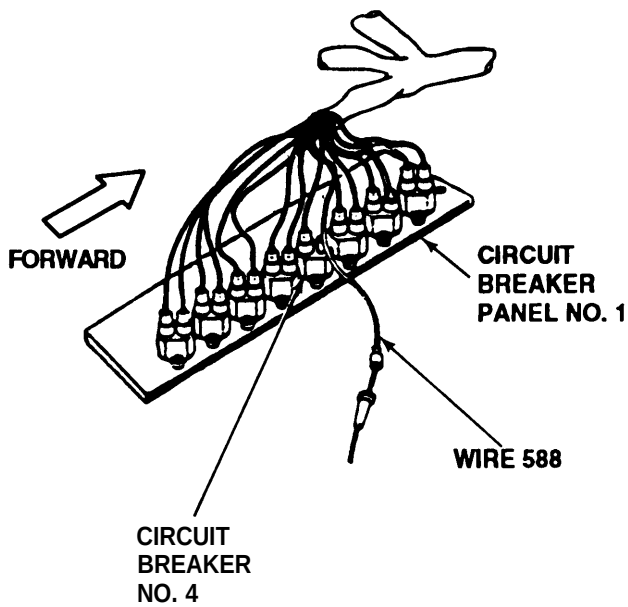
4. Turn MASTER switch ON (refer to TM 9-2350-287-1O) and check wire 588 for voltage 24 ± 3 VdC.

5. Turn MASTER switch OFF (refer to TM 9-2350-287-1O).

Is voltage present?

no

yes → Replace FUEL PRIME PUMP switch (para 7-9). Verify problem is solved.



E. 1. Reconnect wire 588 of harness 12268104 to fuel prime pump switch.

2. Disconnect wire 588 from fuel prime pump circuit breaker no. 4 output of panel no. 1.

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

d. ENGINE - ELECTRICAL SYSTEM (continued).	(3) ENGINE CRANKS, BUT WILL NOT START (continued).

CONTINUED FROM E

E. 3. Place red lead of multimeter in circuit breaker output and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-1O) and check circuit breaker output for voltage (24 ± 3 vdc).

5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage present?

no → Repair wire 588 or replace wire harness 12268104 (para 7-61). Verify problem is solved.

yes →

F. 1. Reconnect wire 588 to circuit breaker no. 4 output.

2. Disconnect wire 10D from circuit breaker no. 4 input.

3. Place multimeter red lead in wire 10D and ground black lead.

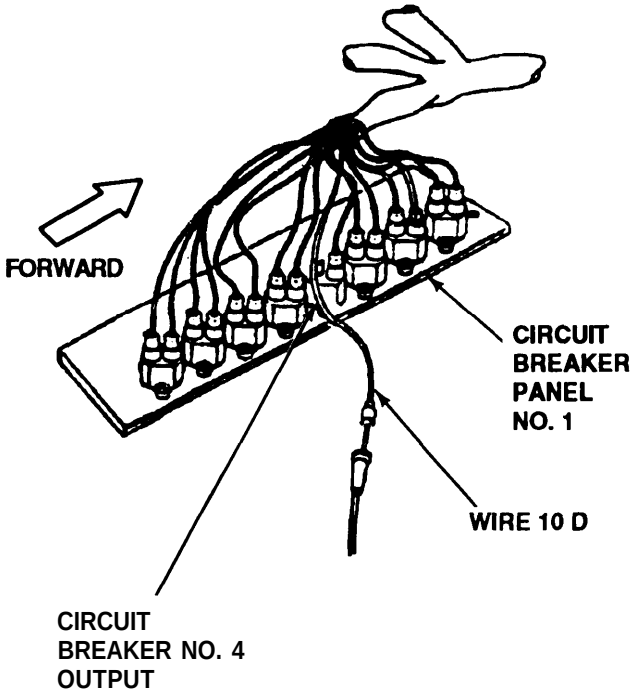
4. Turn MASTER switch ON (refer to TM 9-235&287-10) and check for 24 ± vdc.

5. Turn MASTER switch OFF (refer to TM 9-2350-287-1O).

Is voltage present?

no → Replace circuit breaker no. 4 (para 7-11). Verify problem is solved.

yes → Replace wire 10D or replace harness 12376405 (para 7-57). Verify problem is solved.



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12-19. TROUBLESHOOTING CHART (continued).

d. ENGINE - ELECTRICAL SYSTEM (continued).	(3) ENGINE CRANKS, BUT WILL NOT START (continued).

CONTINUED FROM STEP C

G. 1. Reconnect wire 76 to FUEL PRIME PUMP switch.

2. Disconnect lead assembly 12353646 connector from in-tank fuel pumps and generator system relay.

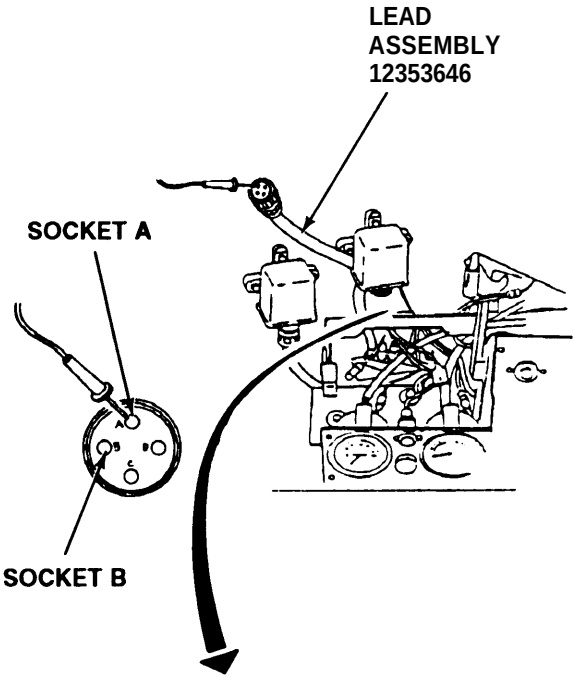
3. Place multimeter red lead in socket A of connector and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-1 O) and check socket A for voltage (24 ± 3 VdC.)

5. Repeat voltage check for socket B (24 ± vdc) .

6. Turn MASTER switch OFF (refer to TM 9-2350-287-1 O).

Is voltage present in both sockets?



no

yes

GO TO STEP J

H. 1. Reconnect connect or to in-tank fuel pumps and generator system relay.

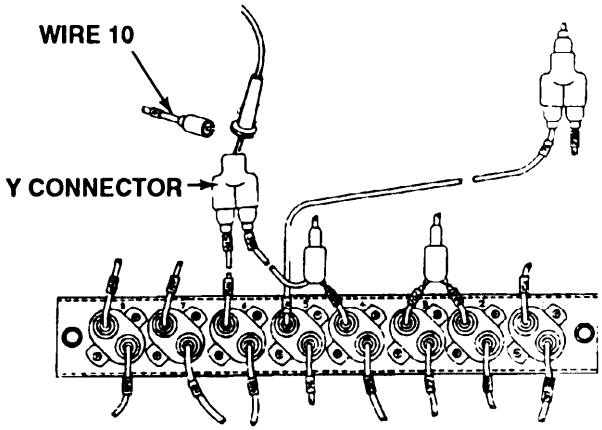
2. Disconnect wire 10 from Y connector.

3. Place multimeter red lead in Y connector and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10) and check Y connector for voltage (24 ± 3 vdc).

5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage present?



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2-19. TROUBLESHOOTING CHART (continued).

d. ENGINE - ELECTRICAL SYSTEM (continued).

(3) ENGINE CRANKS, BUT WILL NOT START (continued).

CONTINUED FROM H

no / yes

Repair wire 10 or replace harness 12353646 (para 7-62). Verify problem is solved.

1. 1. Reconnect wire 10 of wire assembly 12353646 to Y connector.

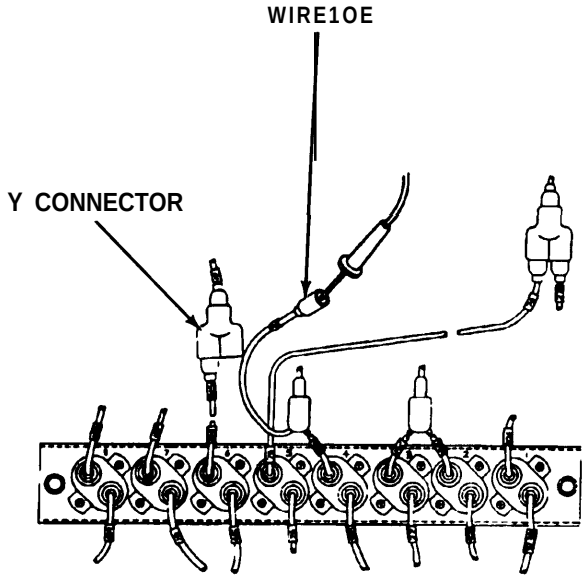
2. Disconnect wire 10E of harness 12376405 from Y connector.

3. Place muitimeter red lead in wire 10E and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10) and check for voltage (24 ± 3 vdc).

5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage present?



no / yes

Repair or replace Y connector (para 7-47). Verify problem is solved.

CONTINUED TO STEP M

CONTINUED FROM STEP G

J. 1. Reconnect lead assembly 12353646 to in-tank fuel pumps and generator system relay.

2. Disconnect wire 76 of harness 12268308 from air cleaner and generator system relay oil pressure actuated switch.

Continued to next page

2-19. TROUBLESHOOTING CHART (continued).

d. ENGINE - ELECTRICAL SYSTEM (continued).	(3) ENGINE CRANKS, BUT WILL NOT START (continued).

CONTINUED FROM J

J. 3. Connect grounded jumper wire to wire 76.

4. Have assistant open engine access panel in driver's compartment.

5. Have assistant turn MASTER switch and FUEL PRIME PUMP SWITCH ON (refer to TM 9-2350-287-10).

6. Listen for in-tank fuel pump operation.

NOTE

If it cannot be determined if both in-tank fuel pumps are operating, turn MASTER switch OFF (refer to TM 9-2350-287-10) and disconnect wire 76 from left in-tank fuel pump and repeat above procedures.

7. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Do both in-tank fuel pumps operate?

no

yes

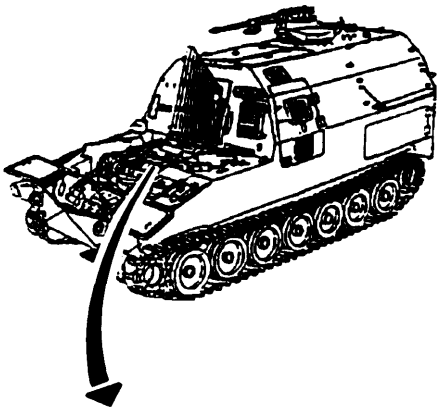
Replace air cleaner and generator system relay oil pressure actuated switch (para 7-38). Verify problem is solved.

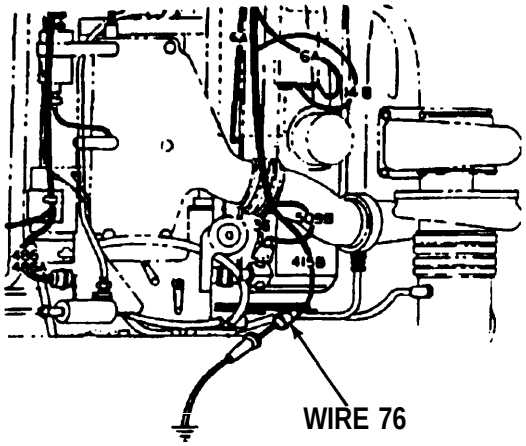
K. 1. Disconnect harness 12268418-1 from engine disconnect bracket.

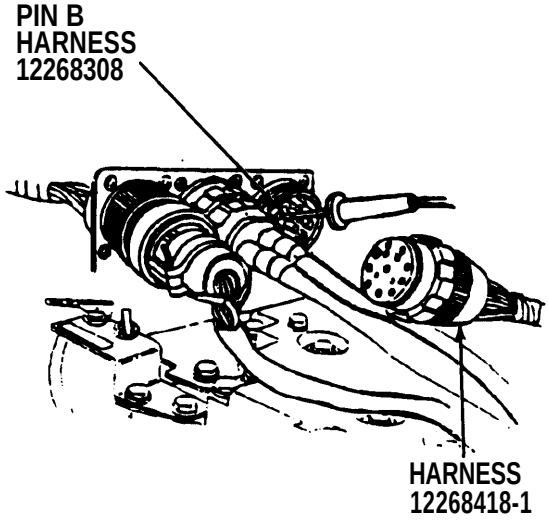
2. Place one multimeter lead in socket B (wire 76) of harness 12268308 connector and place other lead in wire 76 connector,

3. Check wire 76 for continuity.

Is continuity present?







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2-19. TROUBLESHOOTING CHART (continued).

d. ENGINE - ELECTRICAL SYSTEM (continued).

(3) ENGINE CRANKS, BUT WILL NOT START (continued).

CONTINUED FROM K

no / yes

Repair or replace wire harness 12268308 (para 7-50). Verify problem .is solved.

L. 1. Disconnect lead assembly 12353646 to in-tank fuel pumps and generator system relay in driver's compartment.

2. Disconnect harness 12260287 from driver's bulkhead.

3. Place multimeter red lead in socket D (wire 415B) of intake fuel pumps and system relay lead assembly 12353646 connector.

4. Place multimeter black lead on pin D of harness 12260287 bulkhead connector.

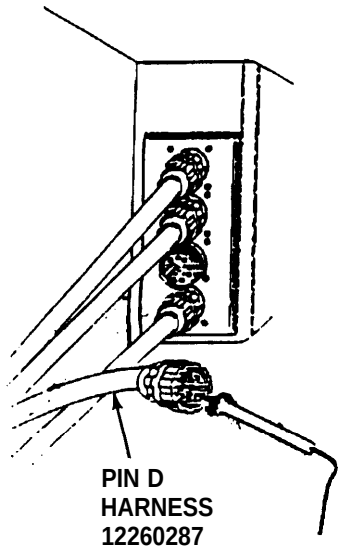
5. Perform continuity check on wire 415B.

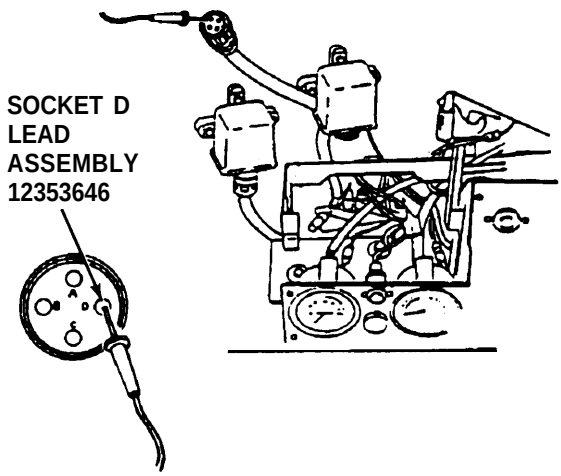
Is continuity present?

no / yes

Replace wire 415B or repair harness 12260287 (para 7-56). Verify problem is solved.

Replace intank fuel pumps and system relay lelad assembly 12353646 (para 7-62). Verify problem is solved.



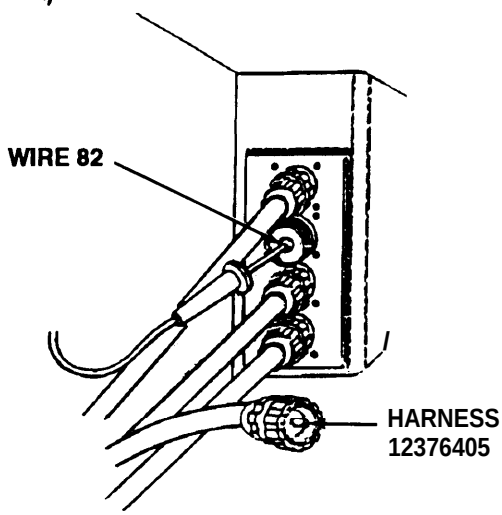


CONTINUED FROM STEP 1

M. 1. Reconnect wire 10E to Y connector.

2. Disconnect wire harness 12376405 (wire 10) from driver's bulkhead.

3. Place red lead of multimeter in wire 82 (harness 12353403) socket and ground black lead.



Continued to next page

2-19. TROUBLESHOOTING CHART (continued).

d. ENGINE - ELECTRICAL SYSTEM (continued).	(3) ENGINE CRANKS, BUT WILL NOT START (continued).

CONTINUED FROM M

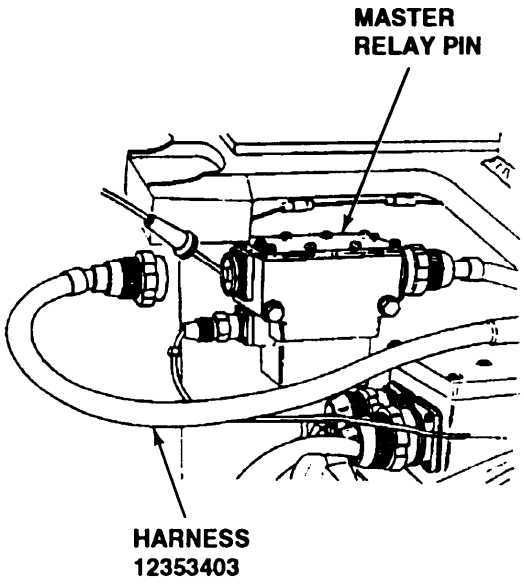
M. 4. Turn MASTER switch ON (refer to TM 9-2350-287-10) and check for 24 ± 3 vdc.

5. Turn MASTER switch OFF (refer to TM 9-2350-287-1 O).

Is voltage indicated?

no → Repair wire 10 or replace wire harness 12376405 (para 7-57) Verify problem is solved.

yes



N. 1. Reconnect wire harness 12376405 to driver's bulkhead.

2. Disconnect wire harness 12353403 (wire 82) from master relay.

3. Place red lead of multimeter on master relay pin and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

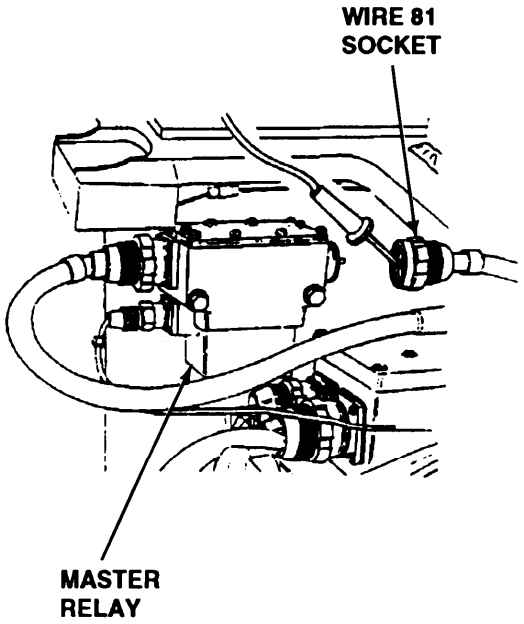
5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no → Repair wire 82 or replace wire harness 12353403 (para 7-49). Verify problem is solved.

yes



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12-19. TROUBLESHOOTING CHART (continued).

d. ENGINE - ELECTRICAL SYSTEM (continued).	(3) ENGINE CRANKS, BUT WILL NOT START **(continued).**

CONTINUED FROM O

O. 1. Reconnect wire harness 12353403 to master relay.

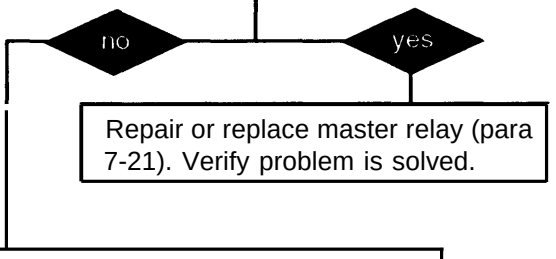
2. Disconnect wire 81 from master relay.

3. Place red lead of multimeter in wire 81 socket and ground black lead.

4. Check for 24 ± 3 vdc.

5. Is voltage indicated?

Is voltage indicated?



Repair or replace master relay (para 7-21). Verify problem is solved.

Replace wire 81 or repair harness 12288418-1 (para 7-44). If batteries are not fully charged recharge them. Verify problem is solved.

END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

d. ENGINE, ELECTRICAL SYSTEM (continued).	(4) ONE OR MORE GLOW PLUGS FAIL TO OPERATE.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Personnel Required: Two

Equipment Conditions:
- MASTER switch set to OFF (refer to (TM 9-2350-287-10).
- Open engine intake grille (refer to (TM 9-2350-287-10).

NOTE

- Instead of using multimeter for voltage check, STE/iCE troubleshooting, INDIVIDUAL BATTERY TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. 1. Disconnect wire harness 12268389 from suspect glow plugs.

2. Place positive end of circuit tester to positive batterty terminal.

3. Touch probe end of 24V circuit tester to suspect glow plug.

Does circuit tester light up when 24V circuit tester is applied?

no

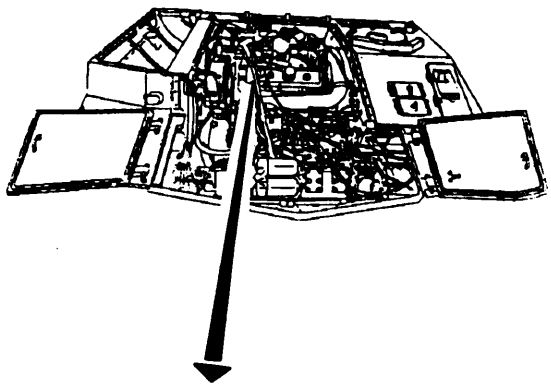
Replace glow plugs (para 4-27). Verify problem is solved

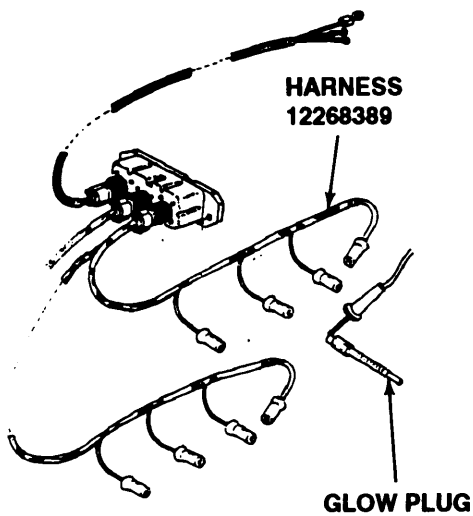
yes

NOTE

Glow plug system will only operate when temperature is 50°or less. It can be tricked into operating by placing an ice bag on the controller.

Continued on next page





2-19. TROUBLESHOOTING CHART (continued).

d. ENGINE, ELECTRICAL SYSTEM (continued).	(4) ONE OR MORE GLOW PLUGS FAIL TO OPERATE (continued).

CONTINUED FROM B

B. 1. Reconnect glow plug wires to glow plugs.

2. Disconnect harness 12268389 connector from glow plug controller.

3. Connect multimeter red lead to pin A and ground black lead.

NOTE

You may have to manually override the glow plug system to continue troubleshooting.

4. Turn MASTER switch and hoid GLOW PLUG switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Repeat above steps for pins B to H.

7. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

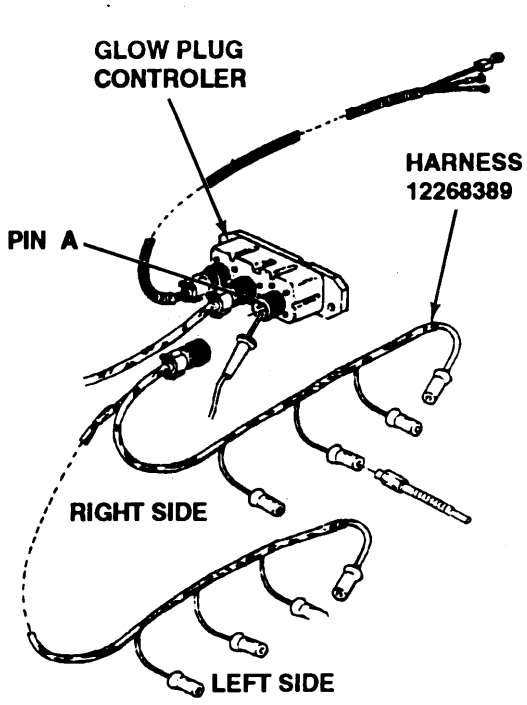
Is voltage indicated at all 8 pins?

no

Go to troubleshooting ENGINE CRANKS, BUT WILL NOT START IN COLD WEATHER, OR GLOW PLUG SYSTEM FAILS TO OPERATE. All other electrical systems operate. (para 2-19.d (5)).

yes

Replace harness 12268389 (para 4-27). Verify problem is solved.



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

d. ENGINE, ELECTRICAL SYSTEM (continued).	(5) ENGINE CRANKS, BUT WILL NOT START IN COLD WEATHER OR GLOW PLUG SYSTEM FAILS TO OPERATE. All other electrical systems operate.

Initial Setup:

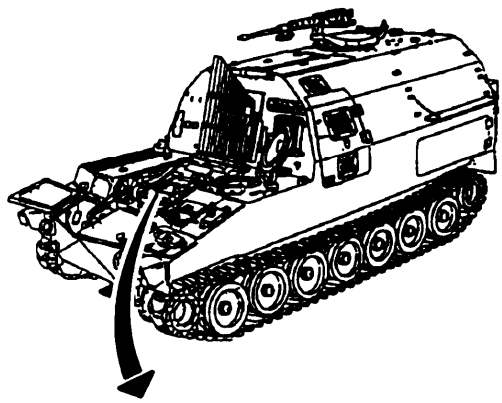
Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- ŽGeneral mechanic's tool kit (Item 24, Appendix 1)

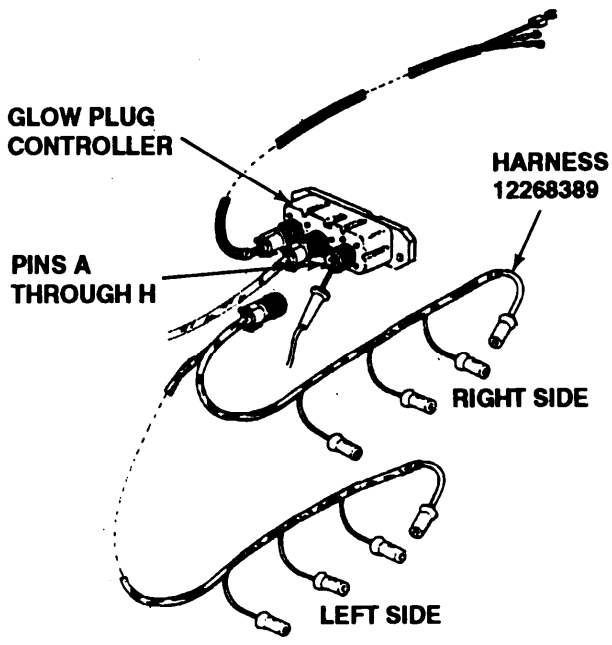
Personnel Required: Two

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Open engine intake grille (refer to TM 9-2350-287-10).

NOTE

- Instead of using mutlimeter for voltage check, STE/ICE troubleshooting, INDIVIDAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.
- Glow plug controller is programmed not to operate at ambient temperatures of below 50°F and higher. The controller can be tricked into thinking the ambient temperature is 50°F if an ice bag is placed on the controller.





A. 1. Disconnect harness 12268389 connector from glow plug controller.

2. Place multimeter red lead on pin A of glow plug controller and ground black lead.

3. Have assistant turn MASTER switch ON and hold GLOW PLUG switch ON (refer to TM 9-2350-287-1 O).

4. Check for 24 ± 3 vdc.

5. Repeat above steps for pins B through H.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-1 O).

Is voltage indicated at all 8 pins?

Continued on next page

12-19. TROUBLESHOOTING CHART (continued).

d. ENGINE, ELECTRICAL SYSTEM (continued).	(5) ENGINE CRANKS, BUT WILL NOT START IN COLD WEATHER OR GLOW PLUG SYSTEM FAILS TO OPERATE. All other electrical systems operate (continued).

CONTINUED FROM A

no / yes

Go to troubleshooting ONE OR MORE GLOW PLUGS FAIL TO OPERATE (para 2-19.d (4)).

B. 1. Reconnect harness 12268389 to glow plug controller.

2. Remove harness 12268308 connector from glow plug controller.

3. Place multimeter red lead in socket B (wire 486A) and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-1O).

5. Hold GLOW PLUG switch ON (refer to TM 9-2350-287-1O).

6. Check for 24 ± 3 vdc.

7. Turn MASTER switch OFF (refer to TM 9-2350-287-1 O).

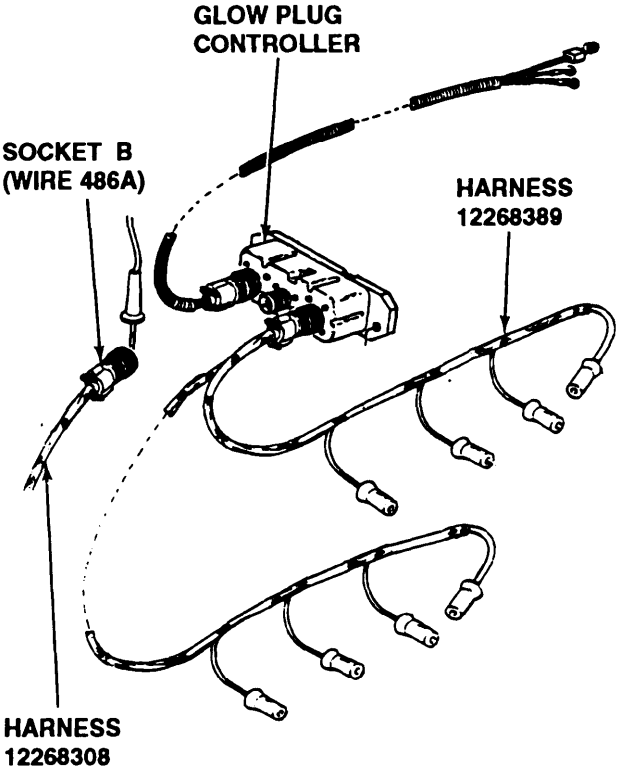
Is voltage indicated?

no / yes

Check fuses in glow plug controller to see if they are blown. If fuses are blown, replace fuse (para 4-27). If not, replace glow plug controller (para 4-27)..

C. 1. Reconnect harness 12268308 to glow plug controller.

2. Remove six screws and cover from driver's instrument panel.



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12-19. TROUBLESHOOTING CHART (continued).

d. ENGINE, ELECTRICAL SYSTEM (continued).	(5) ENGINE CRANKS, BUT WILL NOT START IN COLD WEATHER OR GLOW PLUG SYSTEM FAILS TO OPERATE. All other electrical systems operate (continued).

CONTINUED FROM C

C. 3. Disconnect wire 486A of harness 12260287 from glow plug switch at back of driver's instrument panel.

4. Place multimeter red lead on output of glow plug switch and ground black lead.

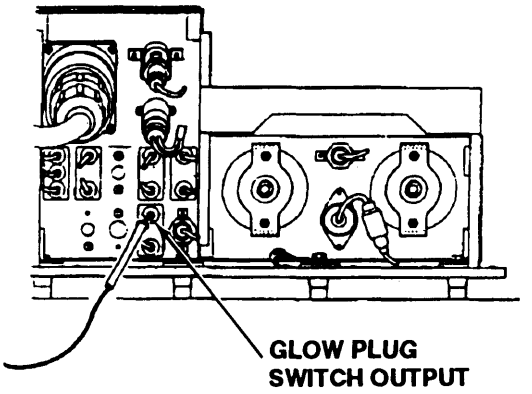
5. Turn MASTER switch ON.

6. Hold GLOW PLUG switch ON (refer to TM 9-2350-287-10).

7. Check GLOW PLUG switch output for 24 ± 3 vdc.

8. Turn MASTER switch and GLOW PLUG switch OFF (refer to TM 9-2350-287-10).

Is continuity indicated?



no

yes

CONTINUED AT STEP G

D. 1. Reconnect wire 486A of harness 12260287 to glow plug switch.

2. Disconnect wire10 of harness 12268104 at glow plug switch input.

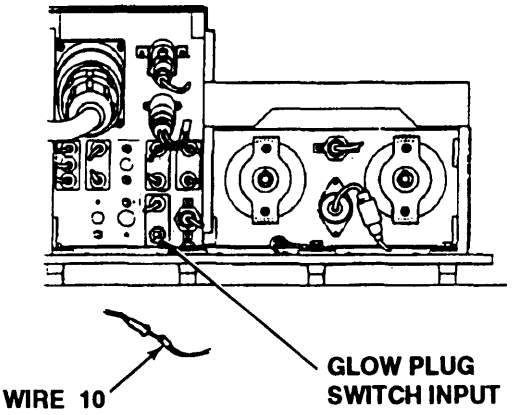
3. Place red lead of multimeter in wire 10 and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?



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2-19. TROUBLESHOOTING CHART (continued).

d. ENGINE, ELECTRICAL SYSTEM (continued).	(5) ENGINE CRANKS, BUT WILL NOT START IN COLD WEATHER OR GLOW PLUG SYSTEM FAILS TO OPERATE. All other electrical systems operate (continued).

CONTINUED FROM D

no

yes

Replace glow plug switch (refer to para 7-9). Verify problem is solved.

E. 1. Reconnect wire 10 of harness 12268104 to giow plug switch.

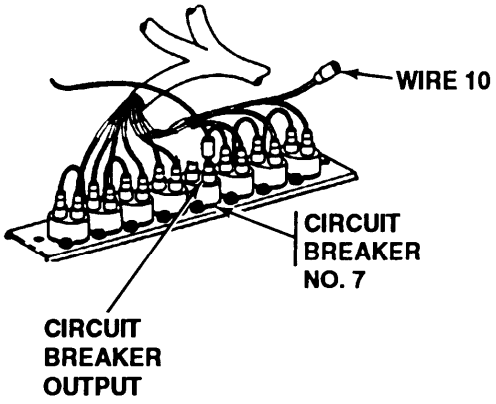
2. Disconnect wire 10 of harness 12268104 from output of circuit breaker no. 7 of panel no. 1.

3. Place multimeter red lead in circuit breaker output and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-1O).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).



Is voltage indicated?

no

yes

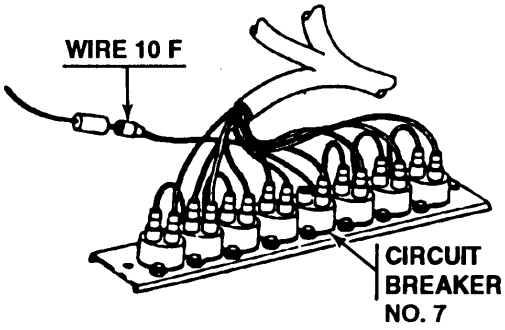
Replace harness 12268104 (para 7-61). Verify problem is solved.

F. 1. Reconnect wire 10 of harness 12268104 to circuit breaker output.

2. Disconnect wire 10F of harness 12376405 from circuit breaker no. 7 of panel no. 1 input.

3. Place red lead of multimeter in wire 10F socket and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).



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2-19. TROUBLESHOOTING CHART (continued).

d. ENGINE, ELECTRICAL SYSTEM (continued).	(5) ENGINE CRANKS, BUT WILL NOT START IN COLD WEATHER OR GLOW PLUG SYSTEM FAILS TO OPERATE. All other electrical systems operate (continued).

CONTiNUED FROM F

F. 5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-1 O).

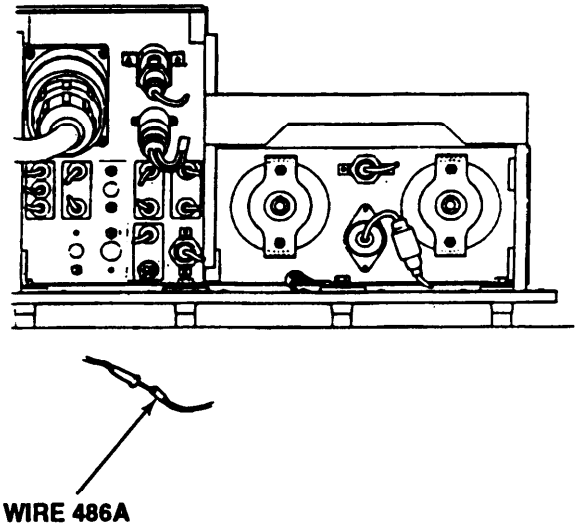
Is continuity indicated?

no

yes

Replace circuit breaker no. 7 of panel no. 1 (para 7-11). Verify problem is solved.

Repair 10F or replace harness 12376405 (para 7-57). Verify problem is solved.



CONTINUED FROM STEP C

G. 1. Disconnect harness 12260287 at driver's bulkhead disconnect.

2. Place multimeter red lead on pin F of harness 12260287 bulkhead connector and place other lead on wire 486A of harness 12260287 GLOW PLUG switch connector.

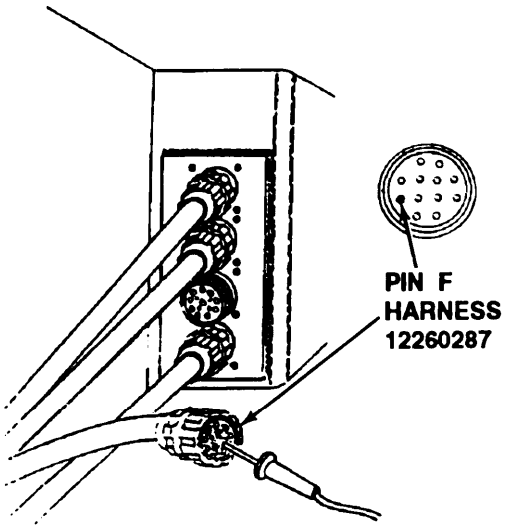
3. Check for continuity.

Is continuity indicated?

no

yes

Repair wire 486A or replace harness 12260287 (para 7-56). Verify problem is solved.



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2-19. TROUBLESHOOTING CHART (continued).

d. ENGINE, ELECTRICAL SYSTEM (continued).	(5) ENGINE CRANKS, BUT WILL NOT START IN COLD WEATHER OR GLOW PLUG SYSTEM FAILS TO OPERATE. All other electrical systems operate (continued).

CONTINUED FROM H

H. 1. Disconnect harness 12268418-1 connector at engine disconnect bracket.

2. Place one multimeter lead in socket F of driver's bulkhead connector of harness 12268418-1 and connect other lead in socket C of engine disconnect bracket connector of harness 12268418-1.

3. Check for continuity.

Is continuity indicated?

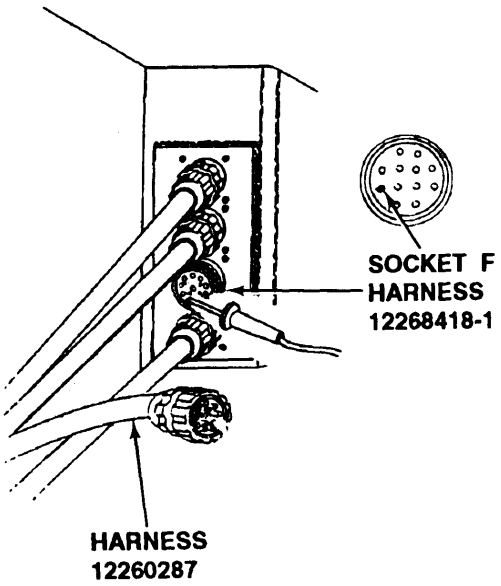
no

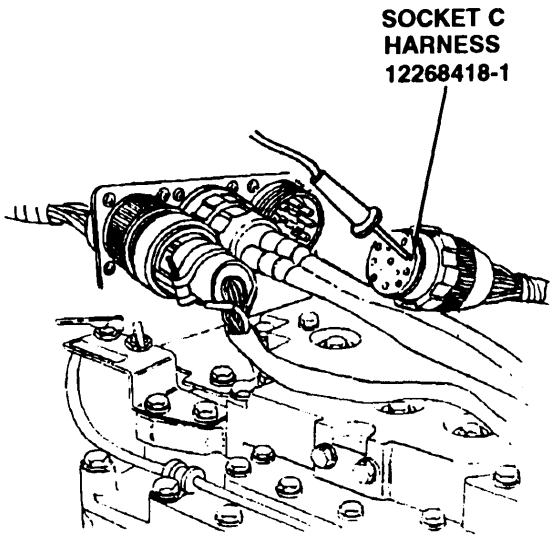
Repair wire 486A or replace harness 12268418-1 (para 7-44). Verify problem is solved.

yes

Repair wire 486A or replace harness 12268308 (para 7-50). Verify problem is solved.

END OF TASK

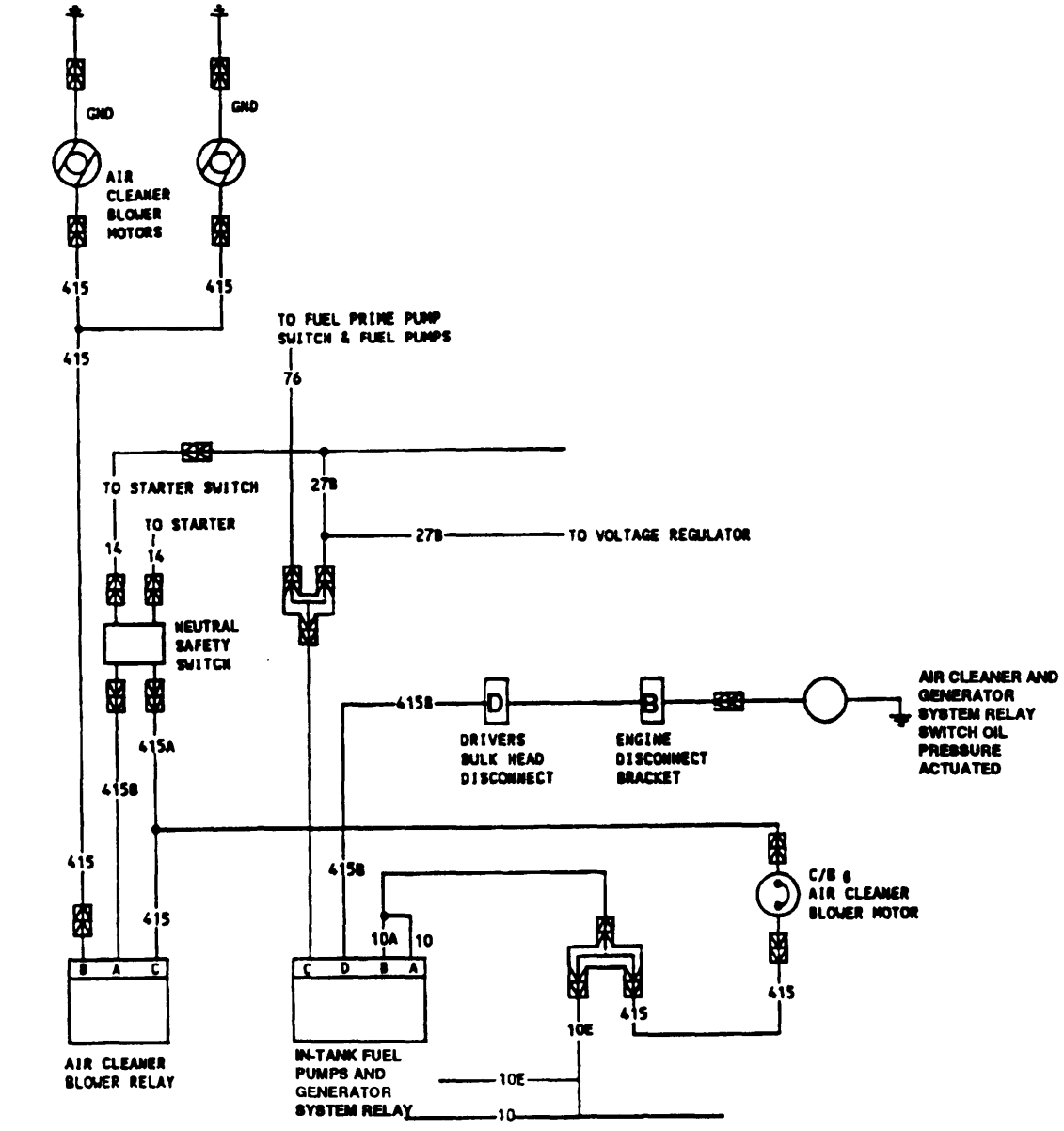




2-19. TROUBLESHOOTING CHART (continued).

e. AIR CLEANER FAN ASSEMBLY.

The air cleaner fan assembly system consists of two blower motors, the air cleaner blower motor relay, air and generator system relay switch, neutral safety switch, and circuit breakers 6, and 7, and associated wIring. When MASTER switch is turned ON, 24VDC is supplied through the master relay to circuit breakers 6 and 7.24 VDC from wire 20 of wire harness 12376405 Is routed through the generator system and fuel pumps relay, the air cleaner and generator system relay switch (oil pressure actuated), which provides aground for that circuit, and through the neutral safety switch to the air cleaner blower motor relay. 24 VDC from circuit breaker 6 is supplied to the air cleaner blower motors through the air cleaner blower motor relay. The relationship of these components is shown in the wiring diagram below.



2-19. TROUBLESHOOTING CHART (continued).

e. AIR CLEANER FAN ASSEMBLY (continued).	(1) AIR CLEANER BLOWER MOTORS DO NOT OPERATE WITH VEHICLE IN GEAR.

Initial Setup:

Tool/test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)

Personnel Required: Two

Equipment Conditions:
- Right projectile rack moved back (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Place vehicle in drive gear (refer to TM 9-2350-287-10).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multimeter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. 1. Disconnect wire 415 of harness 12351544 from each air cleaner blower motor.

2. Disconnect ground of both air cleaner blower motors from each socket connector.

3. Place on lead of multimeter on wire 415 pin connector of air cleaner blower motor and other multimeter lead on ground pin.

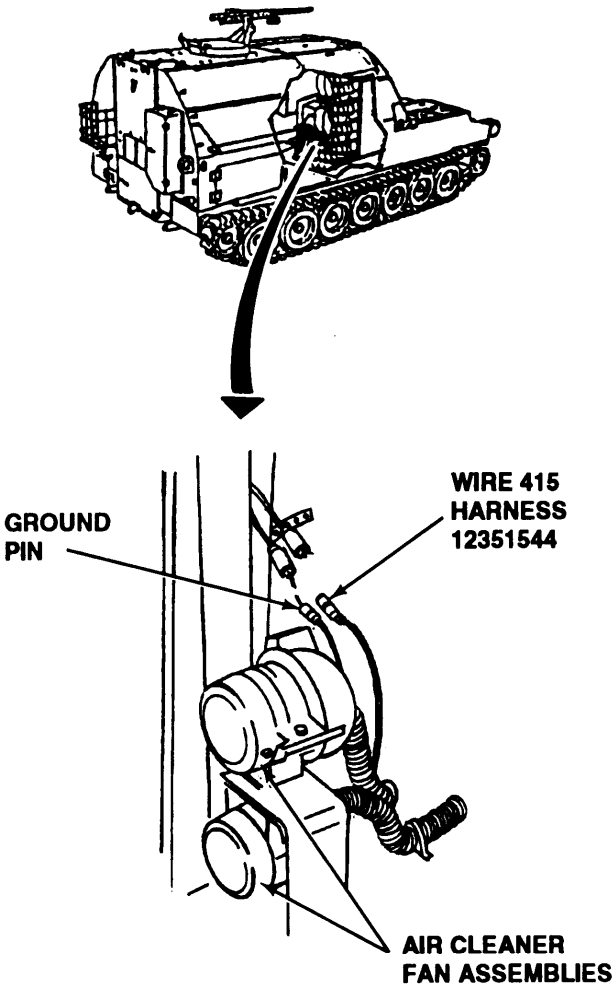
4. Check air cleaner blower motor for continuity.

5. Repeat step3 and 4 for the other air cleaner blower motor.

Is continuity indicated in both air cleaner blower motors?

no — Replace defective air cleaner fan assembly (para 4-13). If only one air cleaner blower motor is inoperative, continue troubleshooting at step B after replacement. Verify problem is solved.

yes — Continued on next page



2-19. TROUBLESHOOTING CHART (continued).

e. AIR CLEANER FAN ASSEMBLY (continued).

(I) AIR CLEANER BLOWER MOTORS DO NOT OPERATE WITH VEHICLE IN GEAR (continued).

CONTINUED FROM STEP A

B. 1. Reconnect ground wire pin connectors of air cleaner blower motors to ground wire socket connectors.

2. Disconnect wire 415 of harness 12351544 connector from wire 415 of harness 12353259.

3. Place one lead of multimeter at wire 415 air cleaner blower motor connector sockets of harness 12351544 and have other crew member place other lead of multimeter in socket connector of harness 12351544 near air cleaner blower motor relay.

4. Check continuity of wire 415 of harness 12351544.

5. Repeat procedure for other wire 415 air cleaner blower motor connector.

Is continuity indicated?

no

Repair wire 415 or replace harness 12351544 (wire 415) (para 7-64). Verify problem is solved.

yes

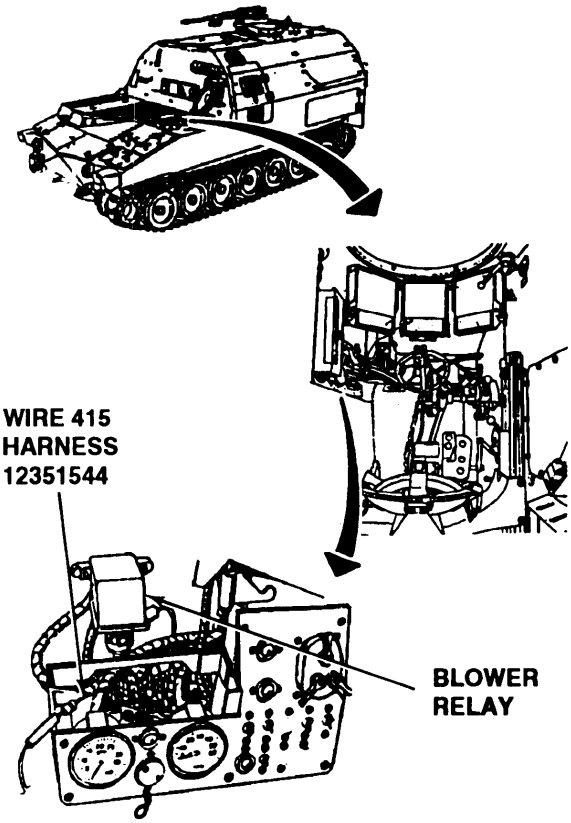
C. 1. Reconnect wires 415 to the air cleaner blower motors and at harness 12353259 connector.

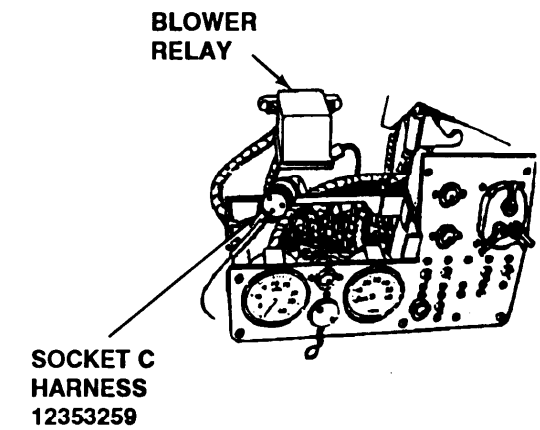
2. Disconnect wire harness 12353259 from air cleaner blower motor relay and disconnect wire 415A from neutral safety switch connector.

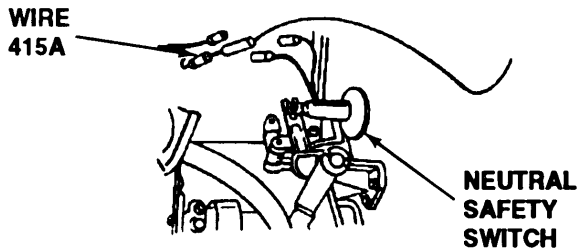
3. Place red lead of multimeter in connector C of harness 12353259 and ground black probe.

4. Check for 24 ± 3 vdc.

5. Place red lead of multimeter in wire 415A socket connector, ground black lead.







Continued on next Page

2-19. TROUBLESHOOTING CHART (continued).

e. AIR CLEANER FAN ASSEMBLY (continued).	(I) AIR CLEANER BLOWER MOTORS DO NOT OPERATE WITH VEHICLE IN GEAR (continued).

CONTINUED FROM C

C. 5. Turn MASTER switch ON (refer to TM 9-2350-287-10).

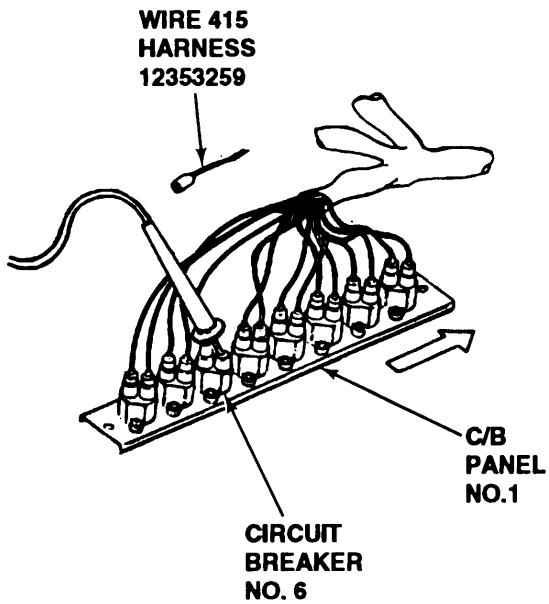
6. Check for 24 ± 3 vdc.

7. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated in both circuits?

no → D.

yes → GO TO STEP H



D. 1. Reconnect wire 415A to neutral safety switch connector and wire harness 12353259 to air cleaner blower motor relay.

2. Disconnect wire 415 of harness 12353259 from output of circuit breaker no. 6 of C/B panel no. 1.

3. Place red lead of multimeter in circuit breaker no. 6 output and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

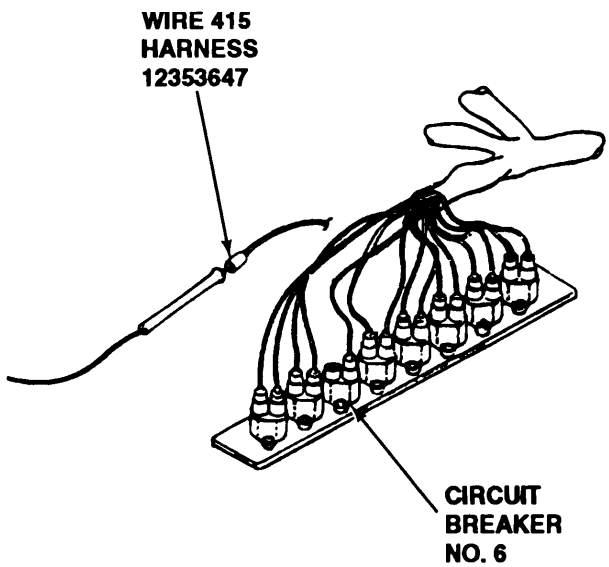
5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no → E.

yes → Repair wire 415 or replace harness 12353259 (para 7-63). Verify problem is solved.



E. 1. Reconnect wire 415 of harness 12353259 to output of circuit breaker no. 6.

2. Disconnect wire 415 of harness 12353647 from circuit breaker no. 6 input.

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

e. AIR CLEANER FAN ASSEMBLY (continued).	(1) AIR CLEANER BLOWER MOTORS DO NOT OPERATE WITH VEHICLE IN GEAR (continued).

CONTINUED FROM E

E. 3. Place red lead of muitimeter in wire 415 of lead assembly 12353647.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no

yes

Replace circuit breaker no. 6 (para 7-11). Verify problem is solved.

F. 1. Disconnect wire 415 of lead assembly 12353647 from Y connector.

2. Place one lead of multimeter in wire 415 circuit breaker connector and place other lead of multimeter in wire 415 socket connector and check wire 415 for continuity.

Is continuity indicated?

no

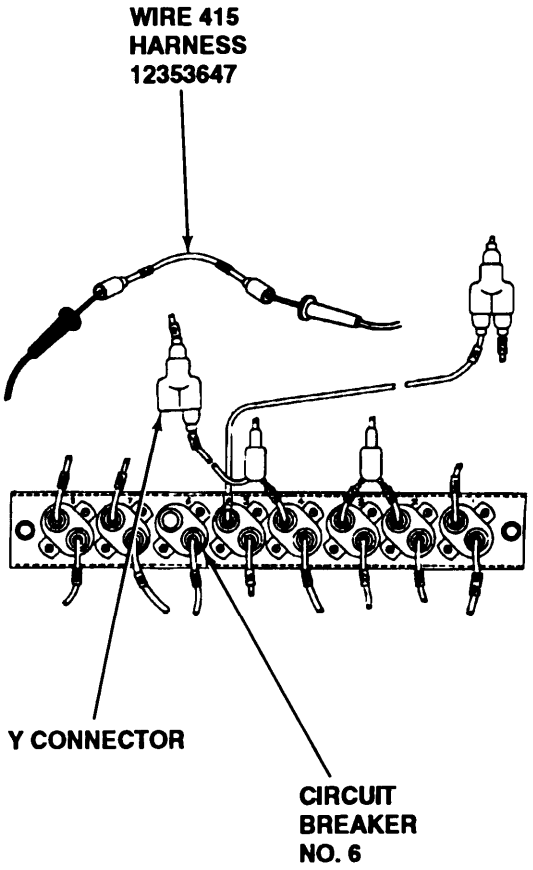
yes

Replace lead assembly 12353647 (para 7-62). Verify problem is solved.

G. 1. Reconnect lead 12353647 (wire 415) to Y connector and circuit breaker no. 6.

2. Disconnect wire 10E of harness 12376405 from Y connector.

3. Place multimeter red lead in wire 10E socket and ground black lead.



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2-19. TROUBLESHOOTING CHART (continued).

e. AIR CLEANER FAN ASSEMBLY (continued).	(1) AIR CLEANER BLOWER MOTORS DO NOT OPERATE WITH VEHICLE IN GEAR (continued).

CONTINUED FROM G

G. 4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

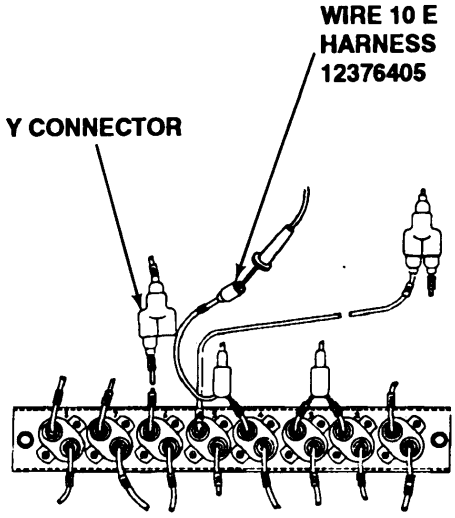
5. Check for 24 ± 3 wk.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no → Replace Y connector (para 2-62). Verify problem is solved.

yes → Repair wire 10E or replace harness 12376405 (para 7-57). Verify problem is solved.



CONTINUED FROM STEP C

H. 1. Disconnect wire 415B from the neutral safety switch.

2. Reconnect wire 12353259 to air cleaner blower motor relay.

3. Insert a jumper wire from wire 415A to wire 415B.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

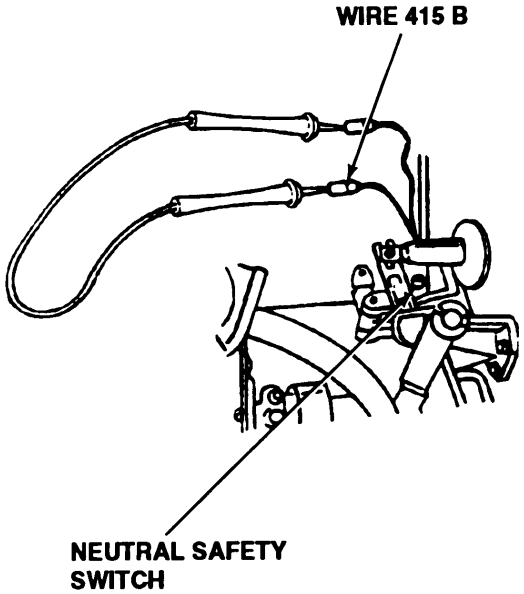
5. Observe both air cleaner blower motors for operation.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Do air cleaner blower motors operate with MASTER switch on?

no → Replace neutral safety switch (para 8-3). Verify problem is solved.

yes → Continued on next page



2-19. TROUBLESHOOTING CHART (continued).

e. AIR CLEANER FAN ASSEMBLY (continued).

(1) AIR CLEANER BLOWER MOTORS DO NOT OPERATE WITH VEHICLE IN GEAR (continued).

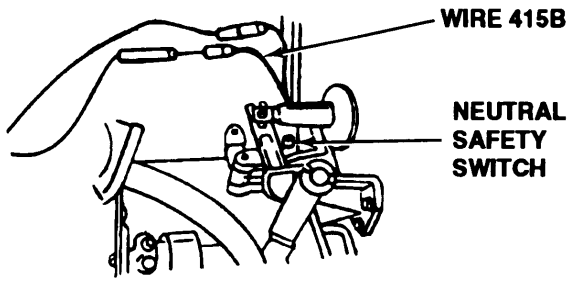
CONTINUED FROM H

1. Disconnect wire 12353259 from air cleaner blower motor relay.

2. Remove jumper wire and place one lead of multimeter at wire 415B neutral safety switch connector and place the other multi meter lead in connector of harness 12353259 air cleaner blower motor relay connector.

3. Check wire 415B for continuity.

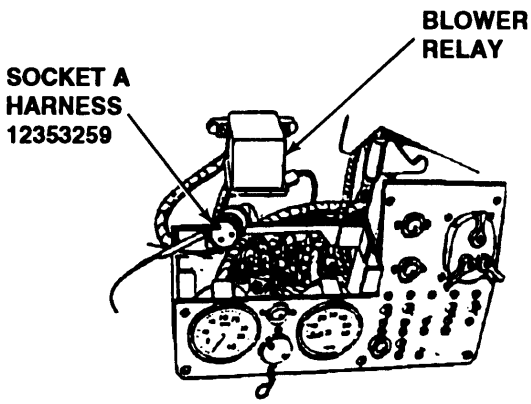
Is continuity indicated?



no

Repair wire 415B or replace wire Harness 12353259 (para 7-63). Verify problem is solved.

yes



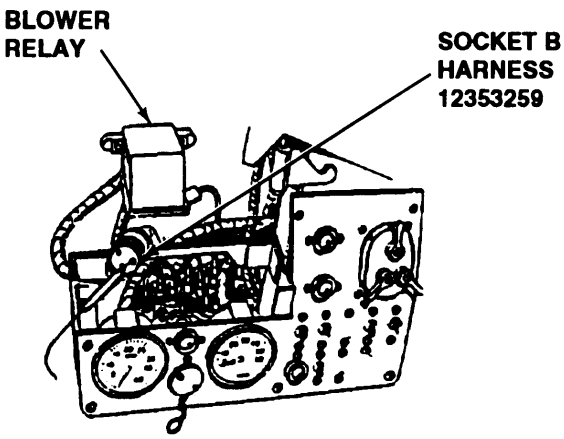
J. 1. Reconnect wires 415A and 415B to neutral safety switch.

2. Disconnect wire 415 of harness 12353259 from wire 415 of harness 12351544.

3. Place one lead of multimeter in connector B of harness 12353259 and place the other lead of multimeterin wire 41 5 pin connector of harness 12353259.

4. Check wire 415 for continuity.

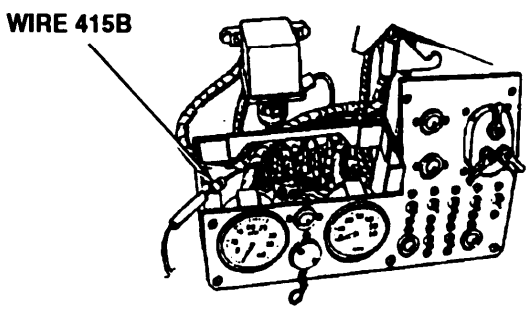
Is continuity indicated?



no

Repair wire 415 or replace wire harness 12353259 (para 7-63). Verify problem is solved.

yes



Repair or replace air cleaner blower motor relay (para 7-12). Verify problem is solved.

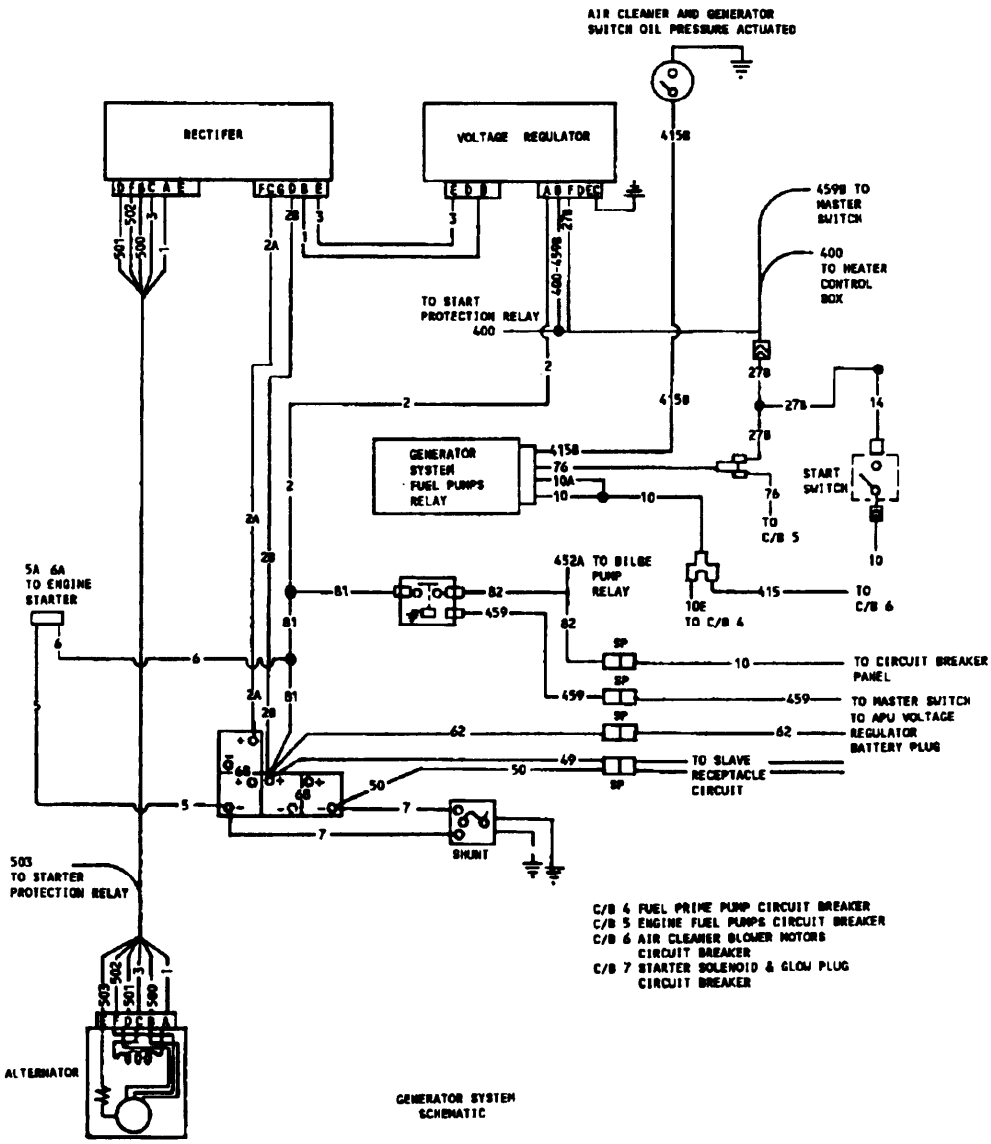
END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

f. GENERATOR.

The generator circuit consists of the alternator, voltage regulator, rectifier, master relay, vehicle batteries, air cleaner/generator system relay switch, starter switch, generator system and fuel pumps relay, and circuit breakers 4,5,6, and 7. The relationship of these components is shown in the diagram below.

When the MASTER switch is turned ON, 24 vdc is supplied from the batteries through the master relay, through circuit 82/10 to the circuit breaker panels. Voltage is supplied to the voltage regulator C/B no. 7 (starter solenoid and glow plug circuit breaker). When engine is cranked and oil pressure reaches 4-8 psi, the oil pressure actuated air cleaner and generator switch closes, causing the fuel pump/generator relay to close. This closes a circuit in the voltage regulator and the alternator begins operating and supplying voltage to charge the batteries and operate all electrical components of the vehicle.



GENERATOR SYSTEM SCHEMATIC

12-19. TROUBLESHOOTING CHART (continued).

f. GENERATOR (continued).	(1) GENERATOR FAILS TO CHARGE BATTERIES. GAGE INDICATES NOT CHARGING, UNSTEADY, OR INACCURATE READING.

Initial Setup:

Tools/Test Equipment:
Ž Digital multimeter (DMM) (Item 13, Appendix 1)
ŽGeneral mechanic's tool kit (Item 24, Appendix 1)

Personnel Required: Two

Equipment Conditions:
ŽBattery access doors open (refer to TM 9-2350-287-10).
ŽTransmission access doors open (refer to TM 9-2350-287-10).
• Engine intake grille open (refer to TM 9-2350-287-10).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

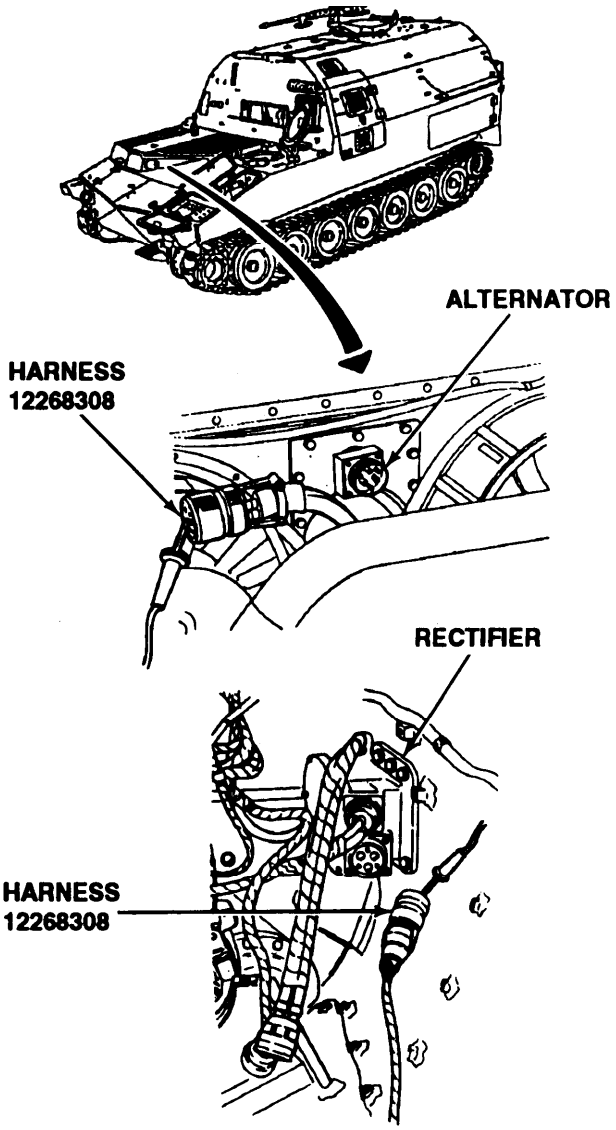
ŽAs an alternative to doing the following procedures, perform STE/ICE troubleshooting, ALTERNATOR OUTPUT VOLTAGE (DC) - TEST 82, GENERATOR FIELD VOLTAGE - TEST 83, and GENERATOR NEGATIVE CABLE DROP - TEST 84.

A. 1. Disconnect harness 12268308 from alternator and rectifier.

2. Check continuity of harness 12268308 at the following locations:

ALTERNATOR CONNECTOR	To	RECTIFIER CONNECTOR
SOCKET A		PIN A
SOCKET B		PIN B
SOCKET C		PIN C
SOCKET D		PIN D
SOCKET F		PIN E

Is continuity indicated in all circuits?



Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

f. GENERATOR (continued).	(1) GENERATOR FAILS TO CHARGE BATTERIES. GAGE INDICATES NOT CHARGING, UNSTEADY, OR INACCURATE READING (continued).

CONTINUED FROM A

no / yes

Repair faulty wires or replace harness 12268308 (para 7-50). Verify problem IS solved.

B. 1. Reconnect wire harness 12268308 to alternator.

2. Remove wires 1 and 3 from harness 12268308 rectifier connector.

3. Connect wire harness 12268308 to rectifier.

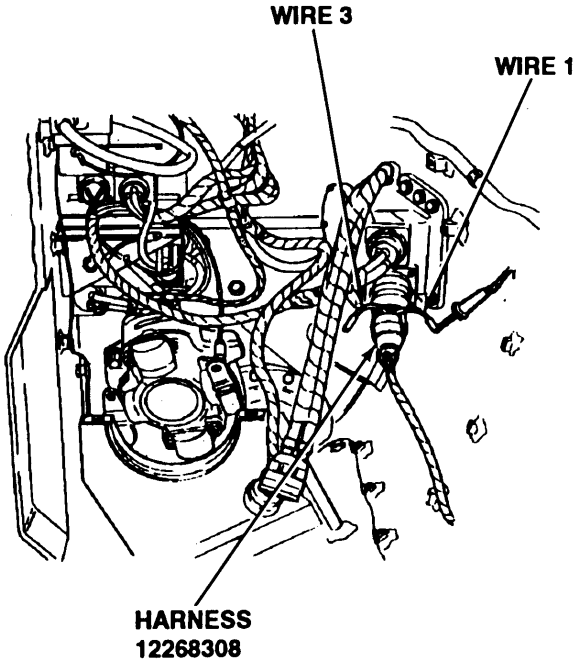
4 Turn MASTER switch ON and start engine (refer to TM 9-2350-287-1 O).

5. Set multimeter to AC and place multimeter red lead on pin of wire 1, ground black lead, and check for 28* 3.

6. Repeat step 4 for wire 3 pin.

7. Turn engine and MASTER switch OFF (refer to TM 9-2350-287-1 O).

s voltage indicated?



no / yes

Replace generator (alternator) (para 7-2). Verify problem is solved.

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

f. GENERATOR (continued).	(1) GENERATOR FAILS TO CHARGE BATTERIES. GAGE INDICATES NOT CHARGING, UNSTEADY, OR INACCURATE READING (continued).

CONTINUED FROM B

C. 1. Disconnect cable assembly 12376406 from rectifier.

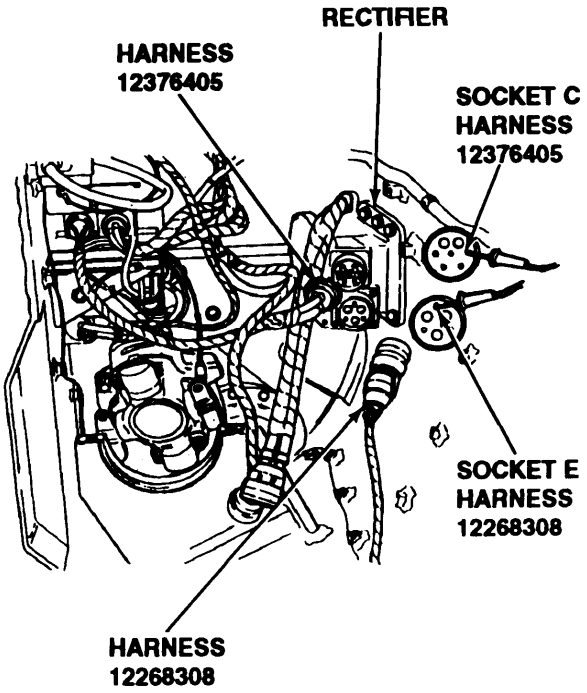
2. Disconnect cable assembly 12268308 from rectifier.

3. Install wire 1 into pin "A" and wire 3 into pin "C" of harness 12268308.

4. Check continuity of rectifier by placing multimeter leads at the following positions.

RECTIFIER 12268308 CONNECTOR	To	RECTIFIER 12376406 CONNECTOR
Socket C		Socket E
Socket A		Socket B

Is continuity indicated at both circuits?



no → Replace rectifier (para 7-4). Verify problem is solved.

yes →

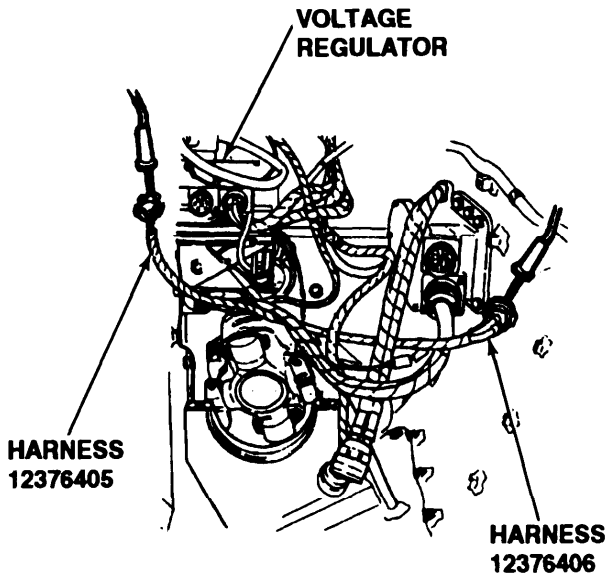
D. 1. Reconnect harness 12268308 to alternator and rectifier.

2. Disconnect cable assembly 12376406 from voltage regulator.

3. Place one lead of multimeter on pin B of cable assembly 12376406 rectifier connector and place other lead of multimeter on pin B of cable assembly 12376406 voltage regulator connector and check for continuity.

4. Place one lead of multimeter on pin E of cable assembly 12376406 rectifier connector and place other lead of multimeter on pin E of cable assembly 12376406 voltage regulator connector and check for continuity.

Is continuity indicated at both circuits?



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2-19. TROUBLESHOOTING CHART (continued).

f. GENERATOR (continued).	(1) GENERATOR FAILS TO CHARGE BATTERIES. GAGE INDICATES NOT CHARGING, UNSTEADY, OR INACCURATE READING (continued).

CONTINUED FROM D

no / yes

Repair faulty wires or replace cable assembly 12376406 (para 7-54). Verify problem is solved.

E. 1. Reconnect cable assembly 12376406 to voltage regulator and rectifier.

2. Disconnect harness 12268418-1 from voltage regulator and from batteries.

3. Place one lead of multimeter on socket A of harness 12268418-1 voltage regulator connector and place other lead of multimeter on wire 81 battery connector.

4. Repeat procedure for other wire 81 battery connector.

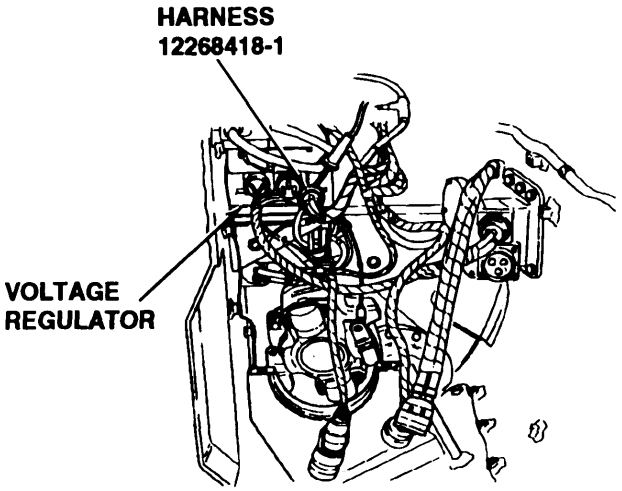
Is continuity indicated at both circuits?

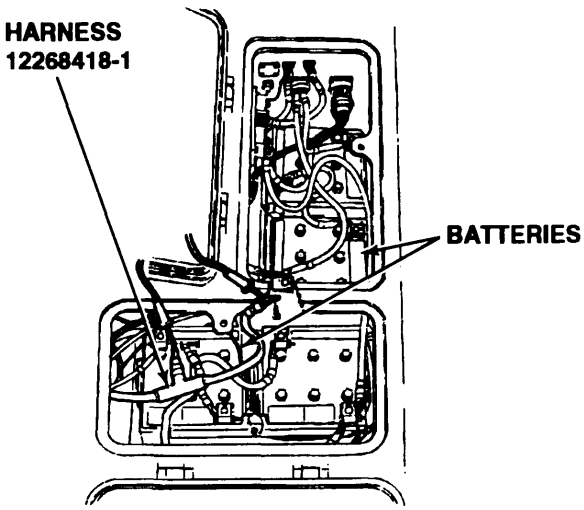
no / yes

Repair wire 81 or replace harness 12268418-1 (para 7-44). Verify problem is solved.

Replace voltage regulator (para 7-3). Verify problem is solved.

END OF TASK





12-19. TROUBLESHOOTING CHART (continued).

g. GAGES.

The gages are located on the portable instrument panel and include the engine oil pressure gage, engine water temperature gage, transmission oil pressure gage, transmission oil temperature gage, fuel gage, and the battery/generator gage. Also included in the gage system is the tachometer and the speedometer which are located on the driver's instrument panel.

The engine oil pressure circuity consists of the pressure gage, circuit breaker, pressure transmitter and associated wiring. The engine oil pressure gage should indicate engine oil pressure anytime the MASTER switch is turned ON and the engine is running. The relationship of the engine oil pressure gage and related components is shown on the diagram on the following page.

The engine water temperature gage circuit consists of the temperature gage, circuit breaker, the temperature transmitter and associated wiring. The engine water temperature gage should indicate engine coolant temperature any time the MASTER switch is turned ON. The relationship of the engine water temperature gage and related components is shown in the diagram on the following page.

The transmission oil pressure gage circuit consists of the pressure gage, circuit breaker, pressure transmitter, and associated wiring. The transmission oil pressure gage should indicate transmission oil pressure any time the MASTER switch is turned ON and the engine is running. The relationship of the transmission oil pressure gage and related components is shown on the diagram on the following page.

The transmission oil temperature gage circuit consists of the temperature gage, circuit breaker, temperature transmitter and associated wiring. The transmission oil temperature gage should indicated transmission oil temperature any time the MASTER switch is turned ON. The relationship of the transmission oil temperature gage and associated circuits is shown in the diagram on the following page.

The fuel gage circuit consists of the fuel gage, circuit breaker, fuel gage switch, upper and lower fuel tank transmitters, and associated wiring. The fuel gage should indicated the level of fuel in the upper tank when the fuel gage switch is set to UPPER and the MASTER switch is ON. The fuel gage should indicated the level of fuel in the lower tank by setting the fuel gage switch to LOWER and turning the MASTER switch ON. The relationship of the fuel gage and related components is shown in the diagram on the following page.

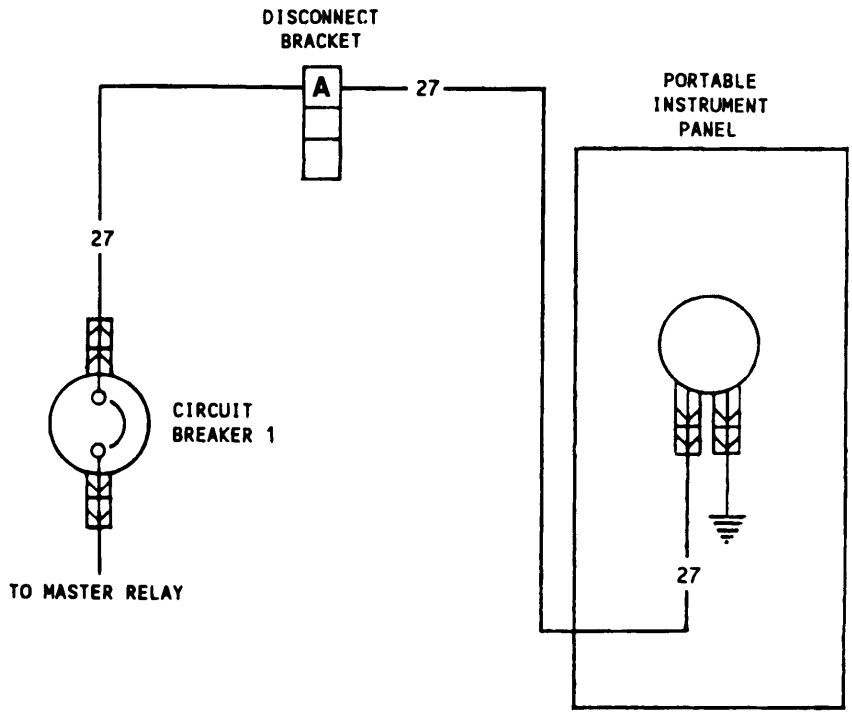
The battery/generator gage circuit consists of the gage, circuit breaker, and associated wiring. The battery/generator gage should indicate the vehicle voltage any time the MASTER switch is turned ON. The relationship of the battery/generator and related components is shown on electrical schematic on page FO-1 through FO-10.

The tachometer consists of the tachometer, flexible drive shaft, pulse tachometer, and drive output shaft. The tachometer should indicate engine revolutions per minute any time the MASTER switch is turned ON, and the engine is running. The relationship of the tachometer and related components is shown on the pictorial diagram on the troubleshooting chart.

The speedometer consists of the speedometer, flexible drive shaft, pulse speedometer drive shaft, and speedometer drive. The speedometer should indicate vehicle speed in miles per hour anytime the MASTER switch is turned ON with the engine running and the transmission in forward gear. The relationship of the speedometer and related components is shown on the pictorial diagram on the troubleshooting chart.

12-19. TROUBLESHOOTING CHART (continued).

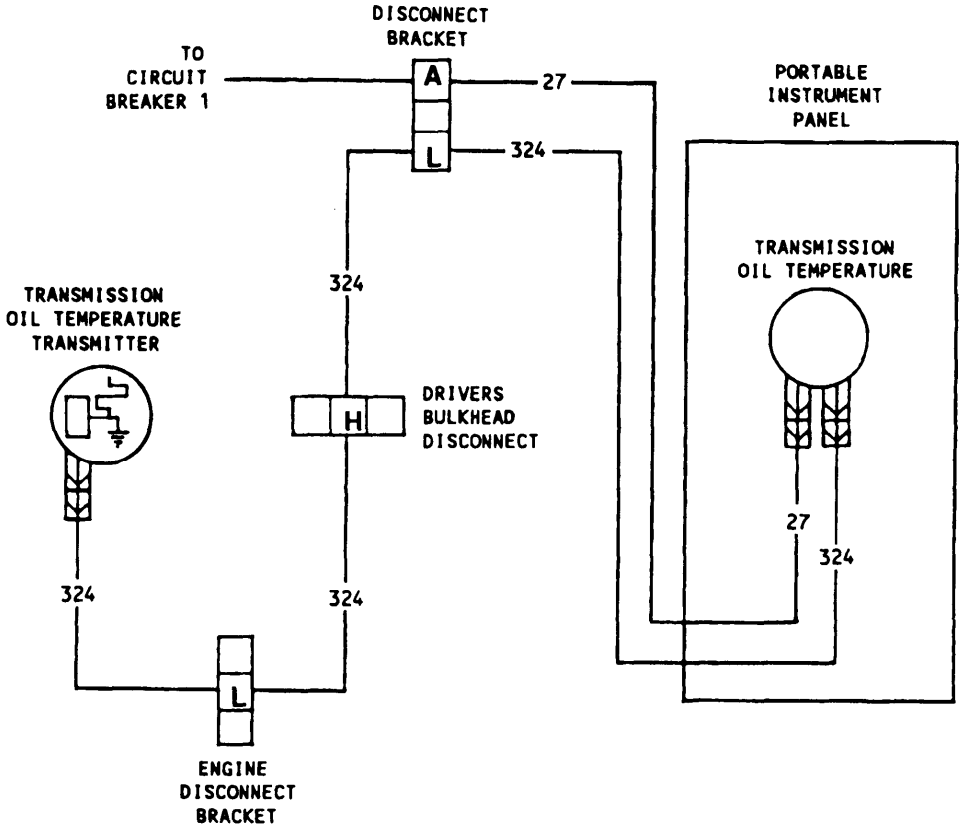
g. GAGES (continued).



BATTERY/GENERATOR GAGE CIRCUIT

2-19. TROUBLESHOOTING CHART (continued).

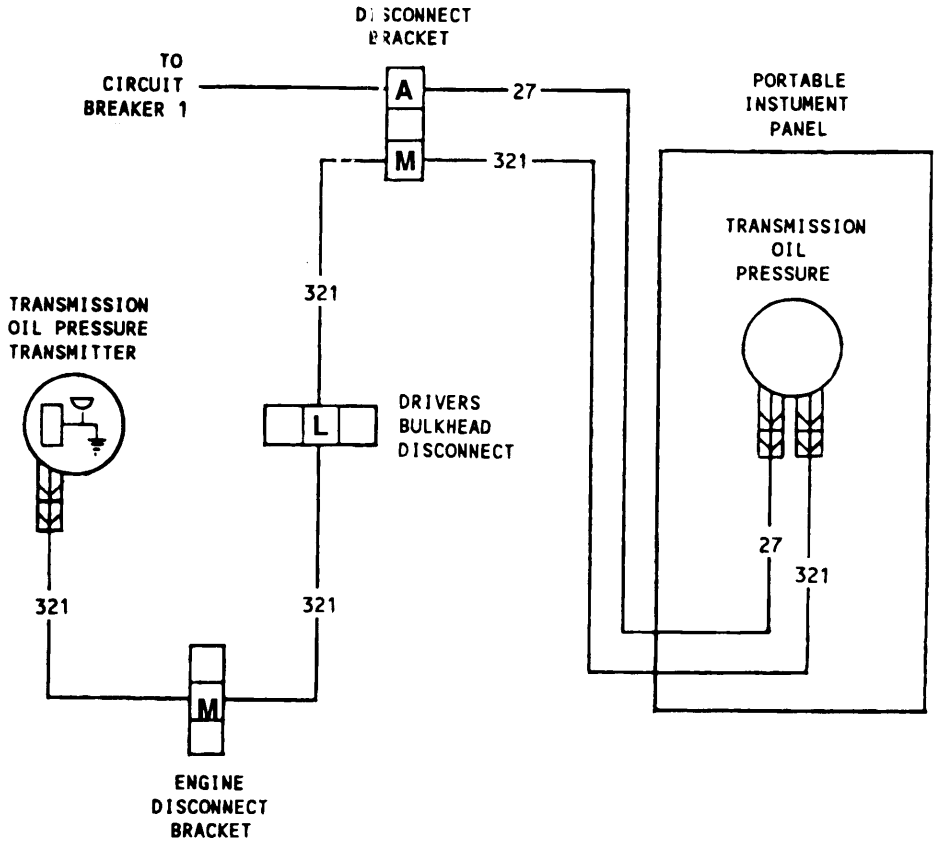
g. GAGES (continued).



TRANSMISSION OIL TEMPERATURE GAGE CIRCUIT

12-19. TROUBLESHOOTING CHART (continued).

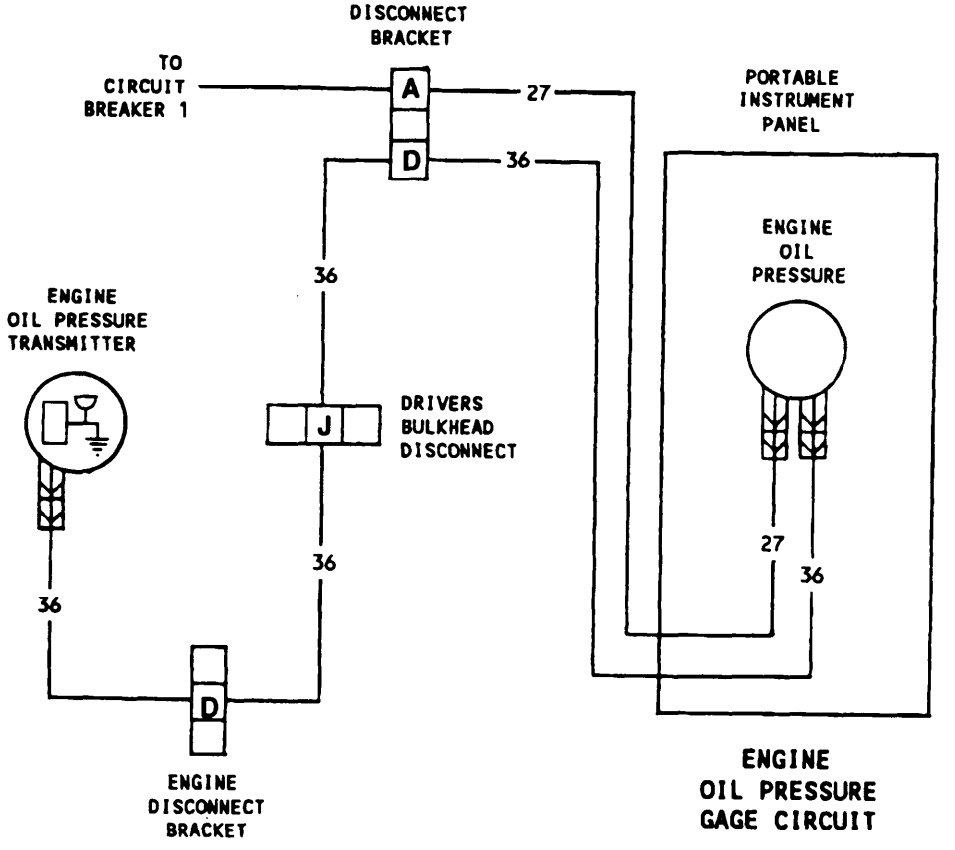
g. GAGES (continued).



TRANSMISSION OIL PRESSURE GAGE CIRCUIT

2-19. TROUBLESHOOTING CHART (continued).

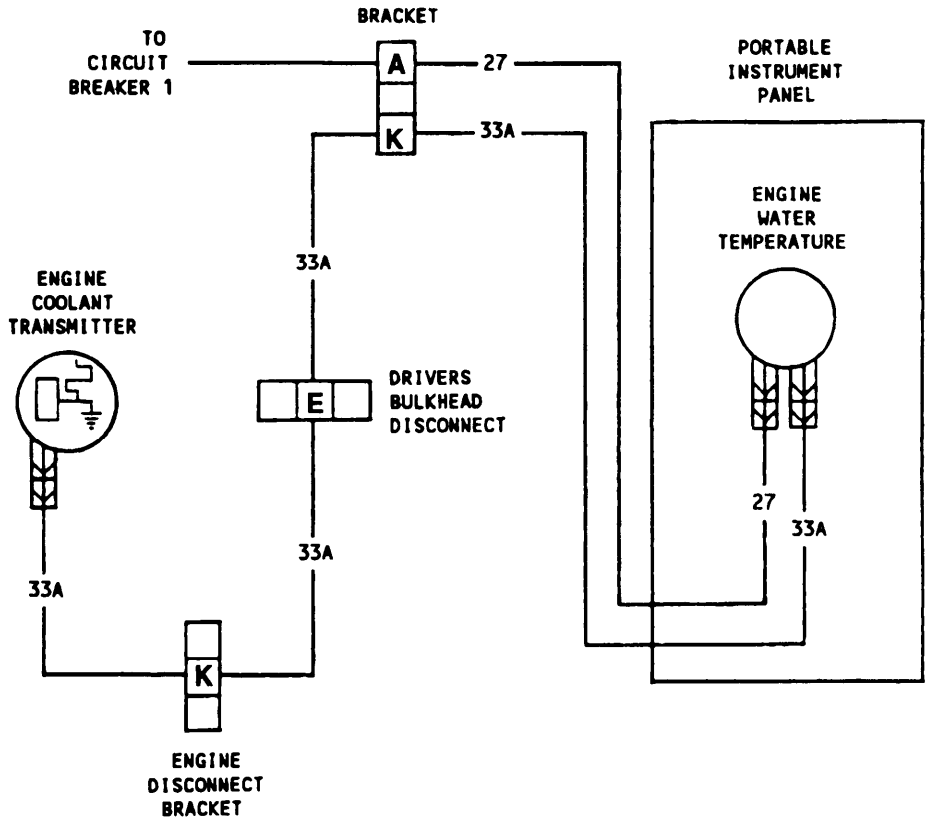
g. GAGES (continued).



ENGINE OIL PRESSURE GAGE CIRCUIT

2-19. TROUBLESHOOTING CHART (continued).

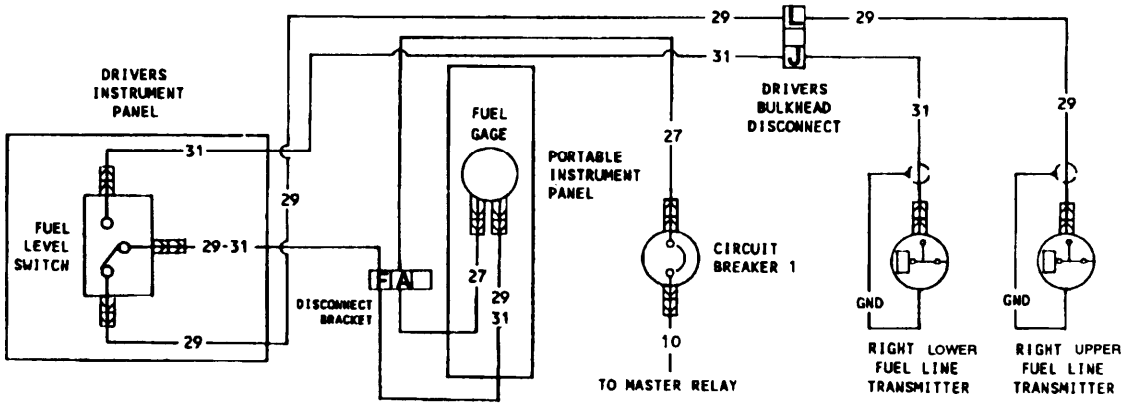
g. GAGES (continued).



ENGINE WATER TEMPERATURE GAGE CIRCUIT

2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).



FUEL GAGE CIRCUIT

12-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).	(1) ENGINE OIL PRESSURE GAGE FAILS TO OPERATE WITH ENGINE RUNNING. All other gages operate properly.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- LockWasher (12) (Item 164, Append H)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Remove cover from driver's portable instrument panel (para 7-6).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 may be performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performd.

A. 1. Disconnect wire 27 from engine oil pressure gage.

2. Place multimeter red lead in wire 27, and ground black lead.

3. Turn MASTER switch ON (refer to TM 9-2350-287-1O).

4. Check for 24 ± 3 vdc.

5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

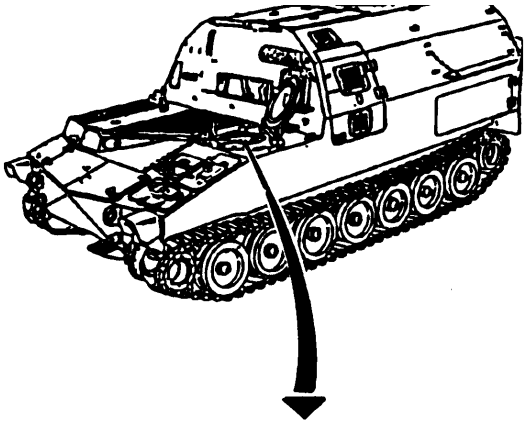
no

Repair wire 27 or replace harness 12260298 (para 7-7). Verify problem is solved.

yes

B. 1. Reconnect wire 27 to gage.

2. Disconnect wire 36 from engine oil pressure gage.



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2-19. TROUBLESHOOTING CHART (continued).

g GAGES (continued).	(l) ENGINE OIL PRESSURE GAGE FAILS TO OPERATE WITH ENGINE RUNNING. All other gages operate properly (continued).

CONTINUED FROM B

B. 3. Insert a grounded jumper wire into gage.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Observe gage on instrument panel.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Does gage indicate maximum pressure?

no

Replace engine oil pressure gage (para 7-6). Veril problem is solved.

yes

C. 1. Reconnect wire 36 to engine oil pressure gage.

2. Open engine intake grille (refer to TM 9-2350-287-10).

3. Remove 12 screws and Iockwashers, and the engine compartment access cover from the driver's compartment wall (para 15-16). Discard Iockwashers.

4. Remove wire 36 from engine oil pressure transmitter.

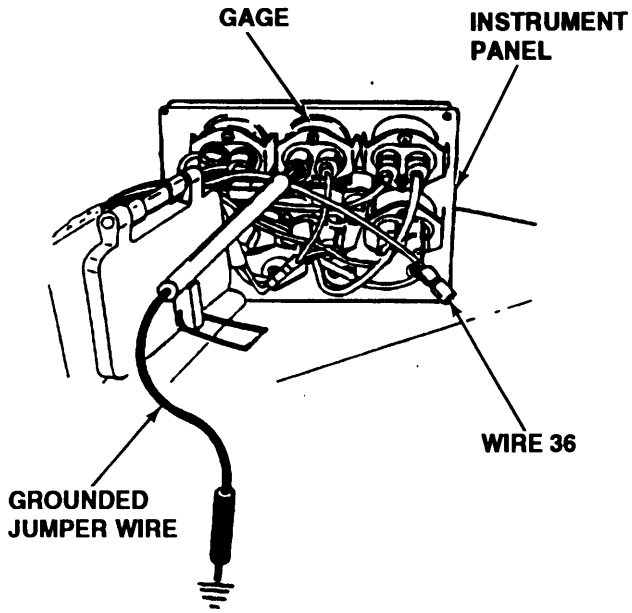
5. Insert a grounded jumper wire into wire onto wire 36.

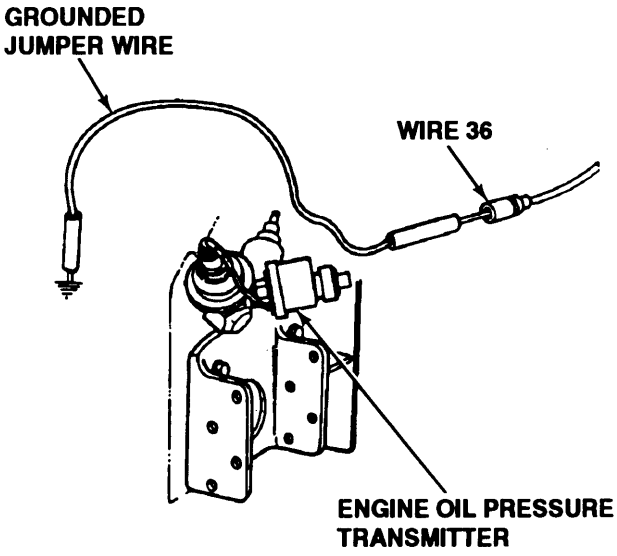
6. Turn MASTER switch ON (refer to TM 9-2350-287-10).

7. Observe gage on instrument panel.

8. Turn MASTER switch OFF (refer toTM 9-2350-287-10).

Does gage indicate maximum pressure?





Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).

(1) ENGINE OIL PRESSURE GAGE FAILS TO OPERATE WITH ENGINE RUNNING. All other gages operate properly (continued).

CONTINUED FROM C

no / yes

Replace engine oil pressure transmitter (para 7-38). Verify problem is solved.

D. 1. Reconnect wire 36 to engine oil pressure transmitter.

2. Disconnect harness 12268418-1 connector at engine disconnect bracket.

3. Insert red multimeter probe into socket D of harness connector 12268418-1 at engine disconnect bracket, and black probe to ground.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-1 O).

Is voltage indicated?

no / yes

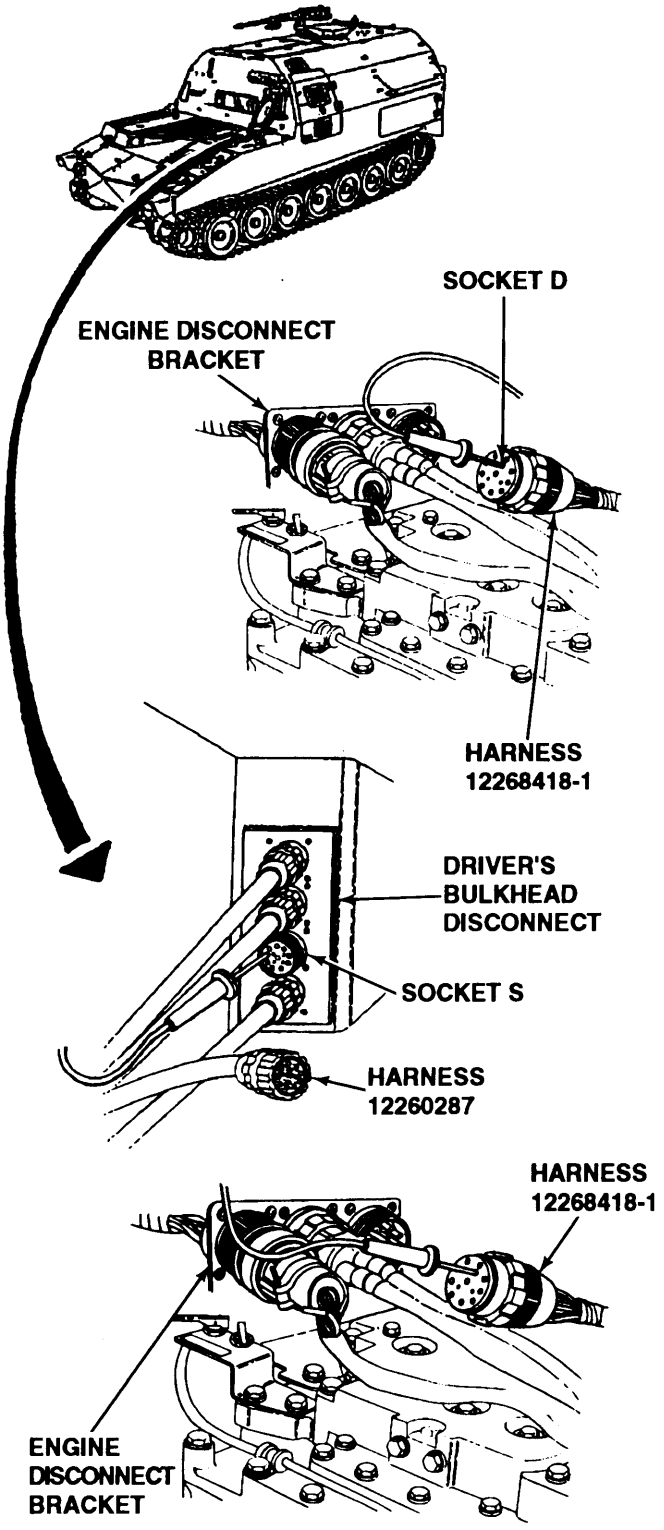
Repair wire 36 or replace harness 12268308 (para 7-50). Verify problems solved.

E. 1. Disconnect harness 12260287 connector from driver's bulkhead disconnect.

2. Place 1 multimeter lead in harness 12268418-1, pin D at engine disconnect bracket and other lead on harness 12268468-1, socket S at driver bulkhead disconnect.

3. Check for continuity.

Is continuity present?



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2-19. TROUBLESHOOTING CHART (continued).

g GAGES (continued).	(1) ENGINE OIL PRESSURE GAGE FAILS TO OPERATE WITH ENGINE RUNNING. All other gages operate properly (continued).

CONTINUED FROM E

no / yes

Repair lead 36 or replace harness 12268418-1 (para 7-44) Verify problem is solved.

F. 1. Disconnect harness 12260298 at disconnect bracket.

2. Place one multimeter lead in harness 12260287 socket J at driver's bulkhead disconnect and other lead on harness 12260287 pin D at disconnect bracket.

3. Check for continuity

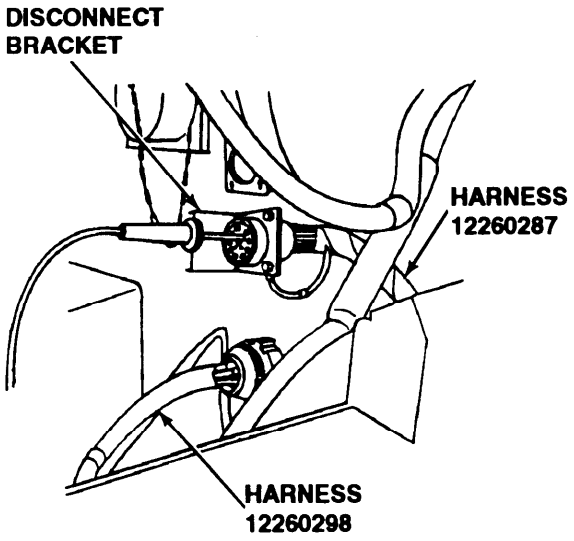
Is continuity present?

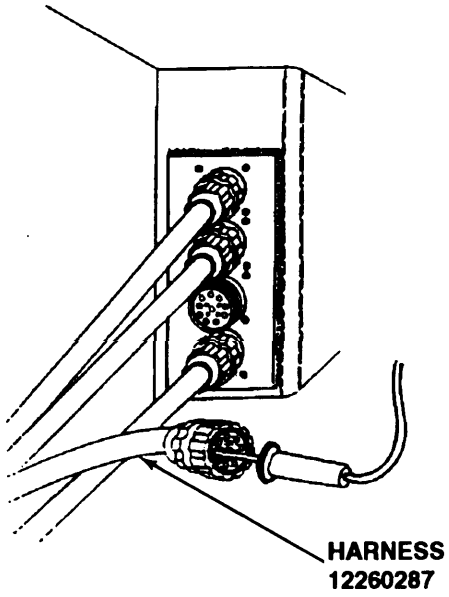
no / yes

Repair lead 36 or replace harness 12260287 (para 7-56). Verify problem is solved.

Repair lead 36 or replace harness 12260298 (para 7-7). Verify problem is solved.

END OF TASK





2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).	(2) ENGINE COOLANT TEMPERATURE GAGE FAILS TO OPERATE PROPERLY, NEEDLE DOES NOT MOVE, IS STEADY, OR INACCURATE. All other gages operate properly.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- Wire (Item 77, Appendix D)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Remove cover from driver's portable instrument panel (para 7-6).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. 1. Disconnect wire 27 from coolant temperature gage.

2. Place multimeter red lead in wire 27 connector, and ground black lead.

3. Turn MASTER switch ON (refer to TM 9-2350-287-1 O).

4. Check for 24 ± 3 vdc.

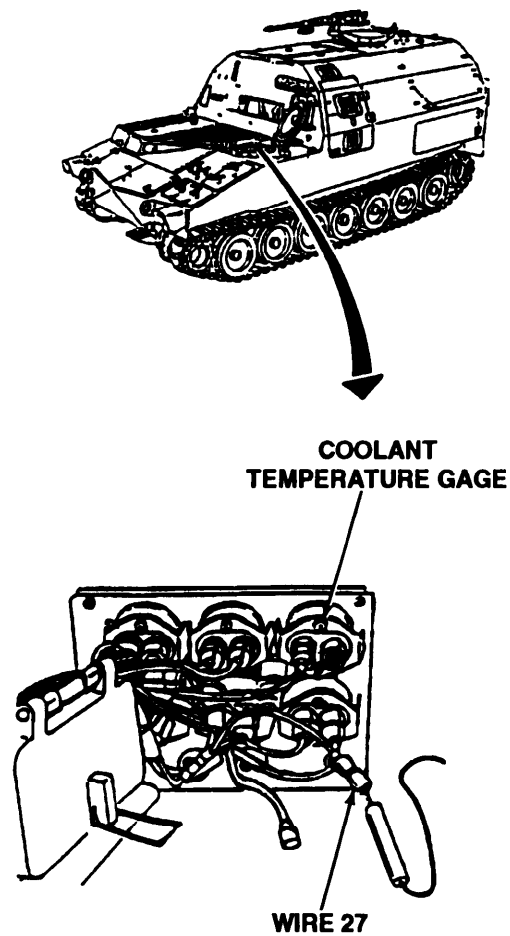
5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no

Repair wire 27 or replace harness 12260298 (para 7-7). Verify problem is solved.

yes



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2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).	(2) ENGINE COOLANT TEMPERATURE GAGE FAILS TO OPERATE PROPERLY, NEEDLE DOES NOT MOVE, IS STEADY, OR INACCURATE. All other gages operate properly (continued).

CONTINUED FROM A

B. 1. Reconnect wire 27 to gage.

2. Disconnect wire 33A from temperature gage.

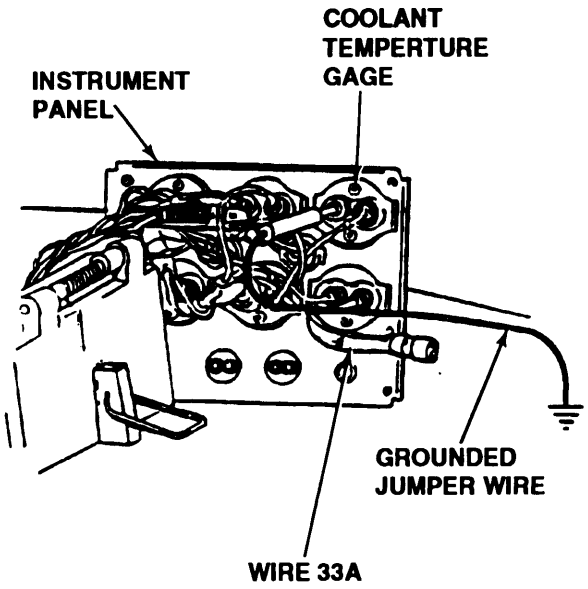
3. Insert a grounded jumper wire into gage.

4. Turn MASTER switch ON (refer to TM 9-2350-287-1 O).

5. Observe engine coolant temperature gage on instrument panel.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-1 O).

Does gage indicate maximum temperature?



no

Replace engine coolant temperature gage (para 7-6). Verify problem is solved.

yes

C. 1. Reconnect lead 33A to engine coolant temperature gage.

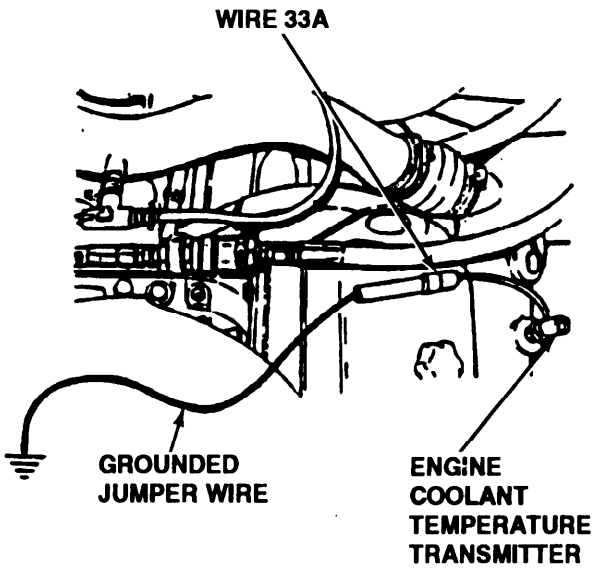
2. Open engine intake grille (refer to TM 9-2350-287-10).

3. Remove engine compartment access cover (para 15-16).

4. Remove wire 33A from engine water temperature transmitter.

5. Insert a grounded jumper wire into wire 33A.

6. Turn MASTER switch ON (refer to TM 9-2350-287-1O).



Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).

(2) ENGINE COOLANT TEMPERATURE GAGE FAILS TO OPERATE PROPERLY, NEEDLE DOES NOT MOVE, IS STEADY, OR INACCURATE. All other gages operate properly (continued).

CONTINUED FROM C

C. 7. Observe coolant temperature gage on instrument panel.

8. Turn MASTER switch OFF (refer to TM 9-2350-287-1 O).

Does gage indicate maximum temperature?

no — yes

Replace engine coolant temperature transmitter (para 7-36). Verify problem is solved.

D. 1. Reconnect wire 33A to engine coolant temperature transmitter.

2. Disconnect harness 12268418-1 connector at engine disconnect bracket.

3. Insert red multimeter probe into socket K of harness connector 12268418-1 at engine disconnect bracket and black probe to ground.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

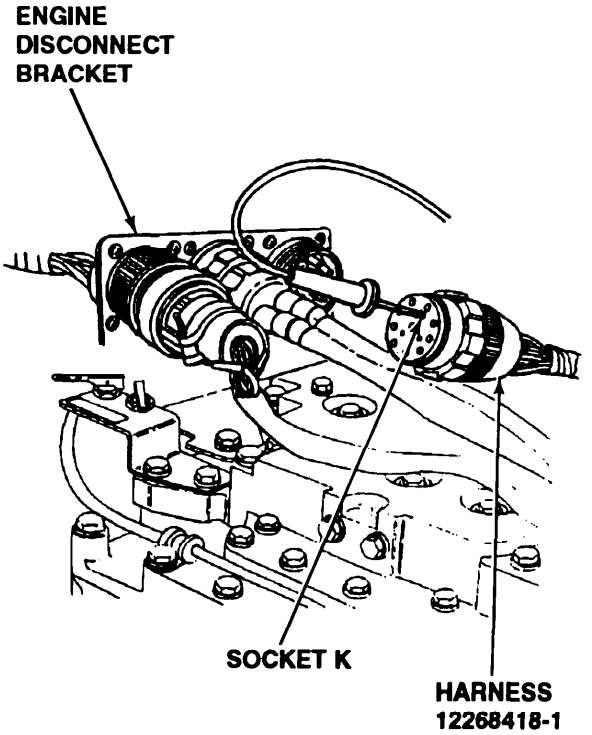
6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no — yes

Repair wire 33A or replace harness 12268308 (para 7-50). Verify problem is solved.

E. 1. Disconnect harness 12260287 connector from driver's bulkhead disconnect.



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2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).	(2) ENGINE COOLANT TEMPERATURE GAGE FAILS TO OPERATE PROPERLY, NEEDLE DOES NOT MOVE, IS STEADY, OR INACCURATE. All other gages operate properly (continued).

CONTINUED FROM E

E. 2. Place one multimeter lead in harness 12268418-1, pin K at engine. disconnect bracket and other lead on harness 12268418-1, socket Eat driver bulkhead disconnect.

3. Check for continuity

Is continuity present?

no — Repair lead 33A or replace harness 12268418-1 (para 7-44). Verify problem is solved.

yes

F. 1. Reconnect harness 12268418-1 at engine disconnect bracket.

2. Disconnect harness 12260298 at disconnect bracket.

3. Place one multimeter lead in harness 12260287 pin E at driver's bulkhead disconnect and other lead on harness 12260287 socket K at disconnect bracket.

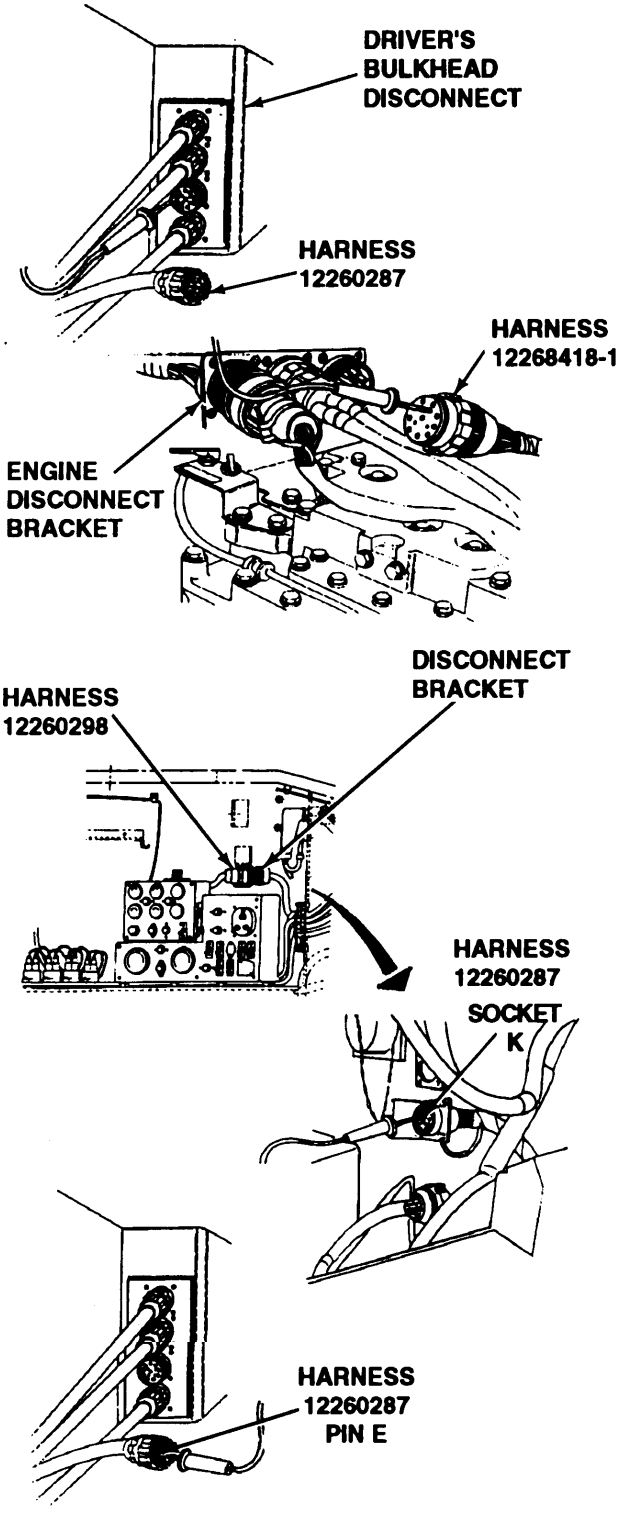
4. Check for continuity?

Is continuity present?

no — Repair lead 33D or replace harness 12260287 (para 7-56). Verify problem is solved.

yes — Repair lead 33A or replace harness 12260298 (para 7-7). Verify problem is solved.

END OF TASK



2-19. TROUBLESHOOTING CHART (continued).

g GAGES (continued).

(3) TRANSMISSION OIL PRESSURE GAGE FAILS TO OPERATE. All other gages operate properly..

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- Wire (Item 77, Appendix D)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Remove cover from driver's portable instrument panel (para 7-6).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/iCE troubleshooting, TEST 91 may be performed.

A. 1. Disconnect wire 27 from transmission oil pressure gage.

2. Place multimeter red lead in wire 27 and ground black lead.

3. Turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Check for 24 ± 3 vdc.

5. Turn MASTER switch OFF (refer to TM 9-2350-287-1O).

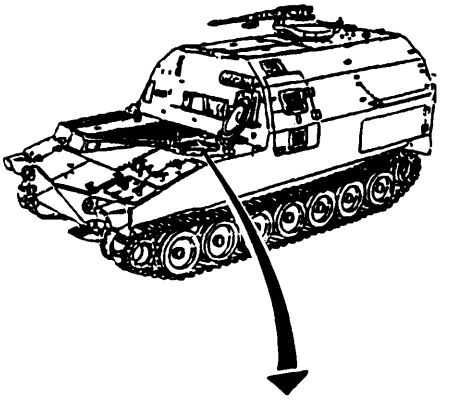
Is voltage indicated?

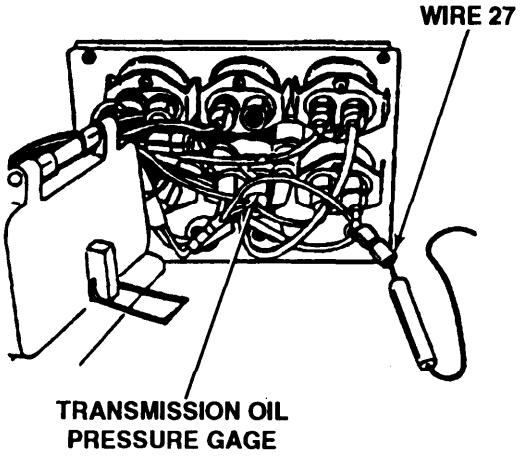
no

Repairwire 27 or replace harness 12260298 (para 7-7). Verify problem is solved.

yes

Continued on next page





2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).	(3) TRANSMISSION OIL PRESSURE GAGE FAILS TO OPERATE. All other gages operate properly (continued).

CONTINUED FROM A

B. 1. Reconnect wire 27 to gage.

2. Disconnect wire 321 from transmission oil pressure gage.

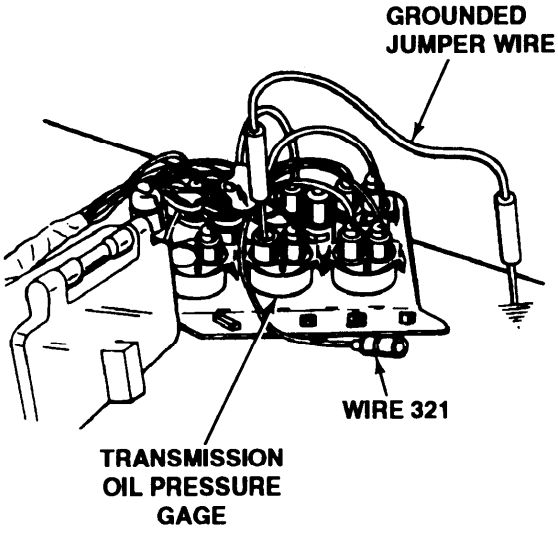
3. Insert grounded jumper wire into gage.

4. Turn MASTER switch ON (refer to TM 9-2350-287-1 O).

5. Observe transmission oil pressure gage.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Does gage indicate maximum pressure?



no

Replace transmission oil pressure gage (para 7-6). Verify problem is solved.

yes

C. 1. Reconnect wire 321 to transmission oil pressure gage.

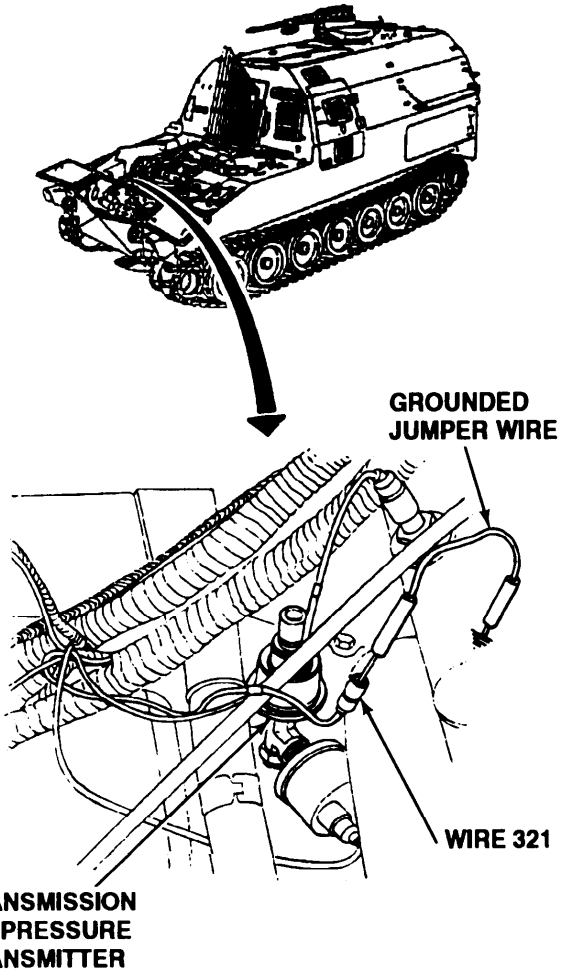
2. Open engine intake grille (refer to TM 9-2350-287-10).

3. Remove engine compartment access cover (para 15-16).

4. Remove wire 321 from transmission oil pressure transmitter.

5. Insert a grounded jumper wire into wire 321.

6. Turn MASTER switch ON (refer to TM 9-2350-287-10).



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2-19. TROUBLESHOOTING CHART (continued).

g GAGES (continued).	(3) TRANSMISSION OIL PRESSURE GAGE FAILS TO OPERATE. All other gages operate properly (continued).

CONTINUED FROM C

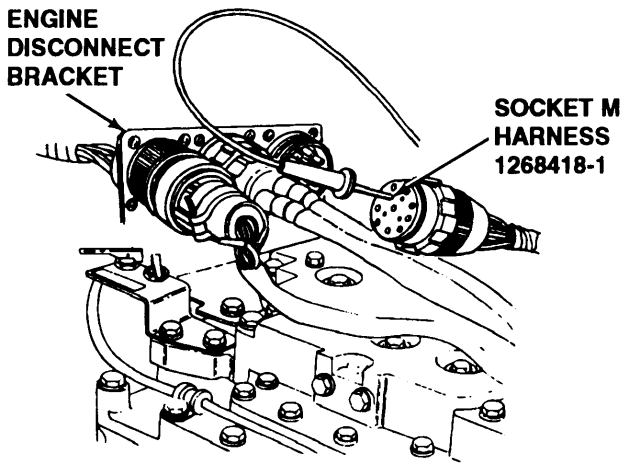
C. 7. Observe transmission oil pressure gage on instrument panel.

8. Turn MASTER switch OFF (refer to TM 9-2350-287-1 O).

Does gage indicate maximum pressure?

no — yes

Replace transmission oil pressure transmitter (para 7-40). Verify problem is solved.



D. 1. Reconnect wire 321 to transmission oil pressure transmitter.

2. Disconnect harness 12268418-1 connector at engine disconnect bracket.

3. Insert red multimeter probe into socket M of harness connector 12268418-1 at engine disconnect bracket and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-1O).

Is voltage indicated?

no — yes

Repair wire 321 or replace harness 12268308 (para 7-50). Verify problem is solved.

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).	(3) TRANSMISSION OIL PRESSURE GAGE FAILS TO OPERATE. All other gages operate properly (continued).

CONTINUED FROM E

E. 1. Disconnect harness 12260287 connector from driver's bulkhead disconnect.

2. Place one multimeter lead in harness 12268418-1 socket pin M at engine disconnect bracket and other lead on harness 12268418-1 socket L at driver's bulkhead disconnect.

3. Check for continuity.

Is continuity present?

no — Repair lead 321 or replace harness 12268418-1 (para 7-44). Verify problem is solved.

yes

F. 1. Reconnect harness 12268418-1 at engine disconnect bracket.

2. Disconnect harness 12260298 at driver's compartment disconnect bracket.

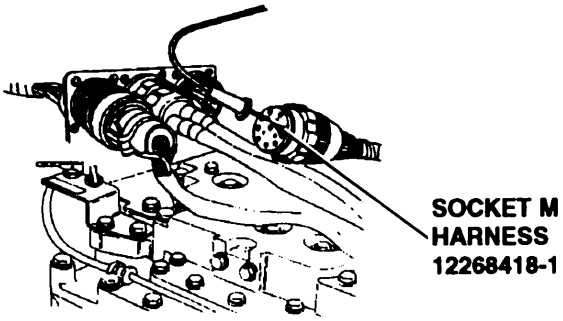
3. Place one multimeter lead in harness 12260287 pin L at driver's bulkhead disconnect and other lead on harness 12260287 socket M at disconnect bracket.

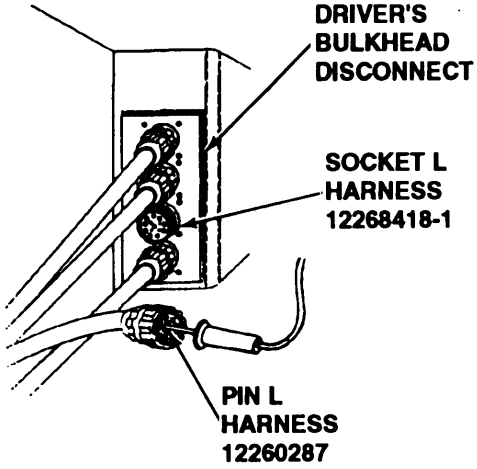
4. Check for continuity.

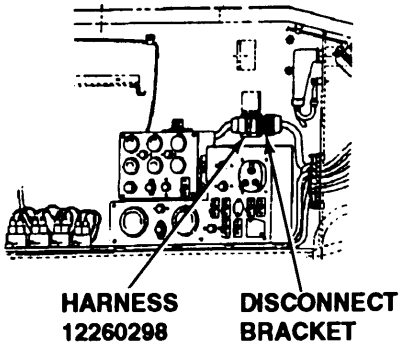
Is continuity present?

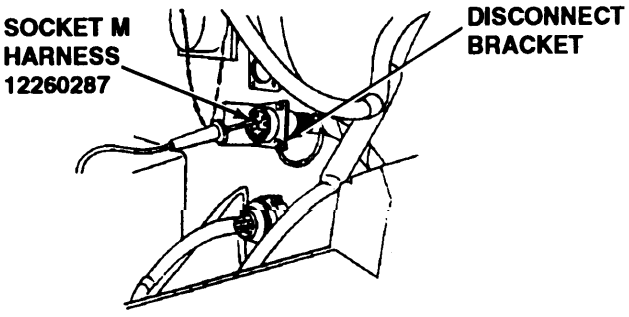
no — Repair lead 321 or replace harness 12260287 (para 7-56). Verify problem is solved.

yes — Repair lead 321 or replace harness 12260298 (para 7- 7). verify problem is solved.









END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).	(4) TRANSMISSION OIL TEMPERATURE GAGE FAILS TO INDICATE OIL TEMPERATURE. All other gages operate properly.

Initial Setup:

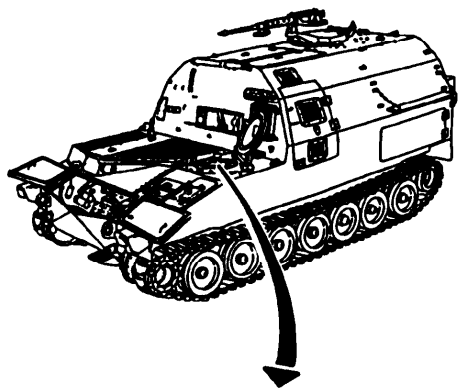
Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix I
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Wire (Item 77, Appendix D)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Remove cover from drivers portable instrument panel (para 7-6).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.



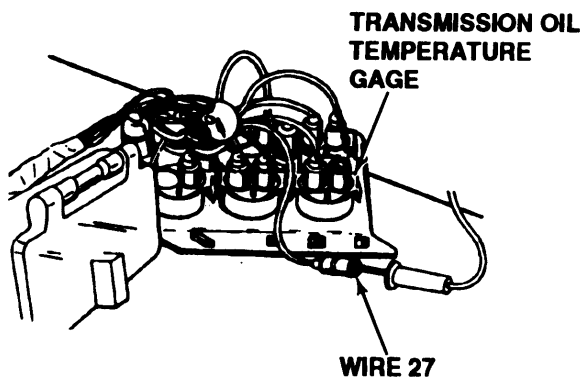
A. 1. Disconnect wire 27 from transmission oil temperature gage.

2. Connect multimeter red lead in wire 27 and ground black lead.

3. Turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Check for *24 ± 3 vdc.*

5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).



Is voltage indicated?

no

Repair wire 27 or replace harness 12260298 (para 7-7). Verify problem is solved.

yes

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).	(4) TRANSMISSION OIL TEMPERATURE GAGE FAILS TO INDICATE OIL TEMPERATURE. All other gages operate property (continued).

CONTINUED FROM A

B. 1. Reconnect wire 27 to transmission oil temperature gage.

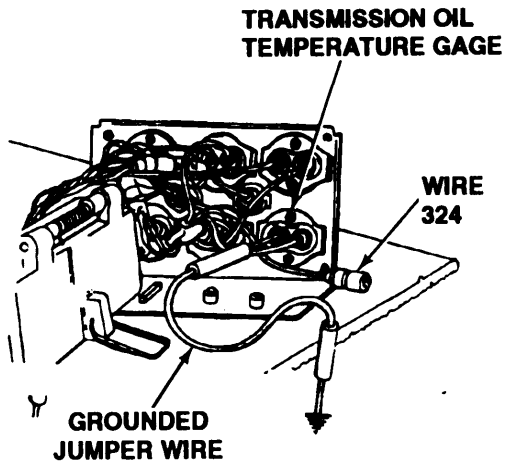
2. Disconnect wire 324 from transmission oil temperature gage.

3. Insert a grounded jumper wire into the transmission oil temperature gage.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Observe transmission oil temperature gage.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).



Does gage indicate maximum temperature?

no

Replace transmission oil temperature gage (para 7-6). Verify problem is solved.

yes

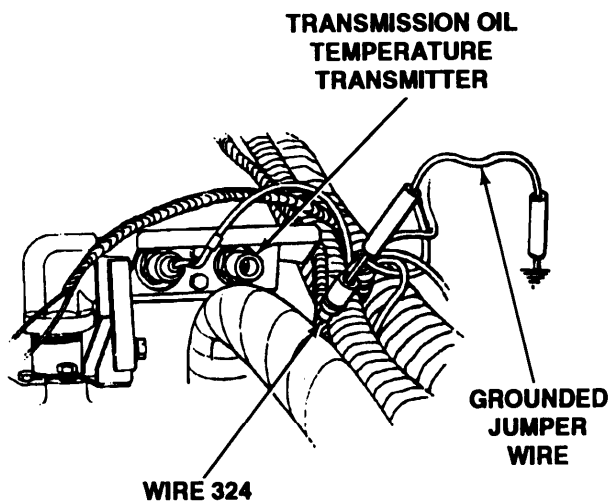
C. 1. Reconnect lead 324 to transmission oil temperature gage.

2. Open engine intake grille (refer to TM 9-2350-287-1 O).

3. Remove engine compartment access cover (para 15-16).

4. Remove wire 324 from engine transmission oil temperature transmitter.

5. Insert a grounded jumper wire into wire 324.



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2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).	(4) TRANSMISSION OIL TEMPERATURE GAGE FAILS TO INDICATE OIL TEMPERATURE. All other gages operate properly (continued).

CONTINUED FROM C

C. 5. Turn MASTER switch ON (refer to TM 9-2350-287-1 O).

6. Observe transmission oil temperature gage on instrument panel.

7. Turn MASTER switch OFF (refer to TM 9-2350-287-1O).

Does gage indicate maximum temperature?

no → Replace transmission oil temperature transmitter (para 7-39) Verify problem is solved.

yes →

D. 1. Reconnect wire 324 to transmission oil temperature transmitter.

2. Disconnect harness 12268418-1 connector at engine disconnect bracket.

3. Insert red multimeter probe into socket L of harness connector 12268418-1 at engine disconnect bracket and ground black probe.

4. Turn MASTER switch ON (refer to TM 9-2350-287-1 O).

5. Check for 24 ± 3 vdc.

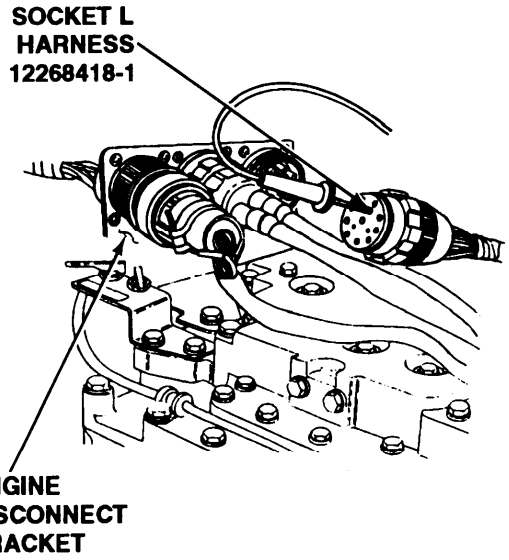
6. Turn MASTER switch OFF (refer to TM 9-2350-287-1 O).

Is voltage indicated?

no →

yes → Repair wire 324 or replace harness 12268308 (para 7-50). Verify problem is solved.

Continued on next page



2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).	(4) TRANSMISSION OIL TEMPERATURE GAGE FAILS TO INDICATE OIL TEMPERATURE. All other gages operate properly (continued).

CONTINUED FROM D

E. 1. Disconnect harness 12260287 connector from driver's bulkhead disconnect.

2. Place one multimeter lead in harness 12268418-1, socket L at engine disconnect bracket and other lead on harness 12268468-1, socket Hat driver bulkhead disconnect.

3. Check for continuity.

Is continuity present?

no — Repair lead 324 or replace harness 12268418-1 (para 7-44). Verify problem is solved.

yes

F. 1. Reconnect harness 12268418-1 at engine disconnect bracket.

2. Disconnect harness 12260298 at disconnect bracket.

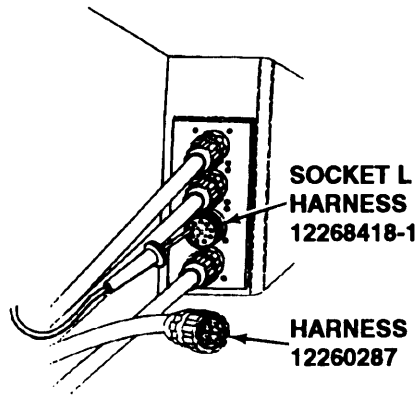
3. Place one multimeter lead in harness 12260287 pin Hat driver's bulkhead disconnect and other lead on harness 12260287 socket L at disconnect bracket.

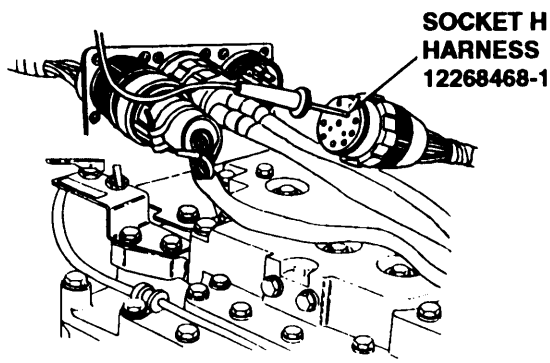
4. Check for continuity.

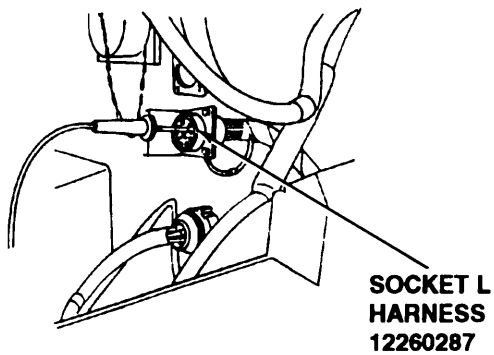
Is continuity present?

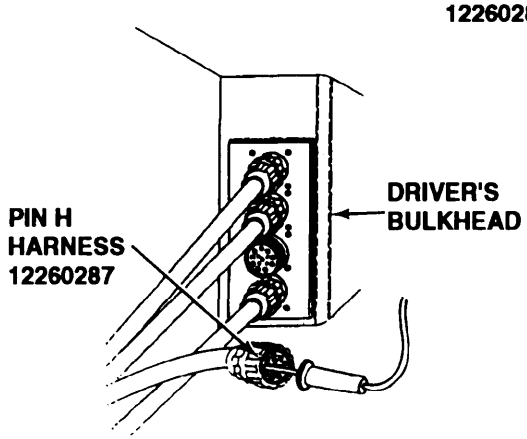
no — Repair lead 324 or replace harness 12260287 (para 7-56). Verify problem is solved.

yes — Repair lead 324 or replace harness 12260287 (para 7-7). Verify problem is solved.









END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued)	(5) FUEL GAGE FAILS TO INDICATE A LEVEL READING WITH BOTH FUEL TANKS FULL. All other gages operate property

Initial Setup:

Tools/Test Equipment:
- Digital (DMM) muitimeter (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- Wire (Item 77, Appendix D)
- LockWasher (3) (Item 175, Appendix H)
- Self-locking nut (2) (Item 317, Appendix H)

Equipment Conditions:
- Fuel tanks full (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Engine compartment heat shield removed (refer to TM 9-2350-287-10).
- Driver's portable instrument panel stowed in outside position (refer to TM 9-2350-287-10).
- Air intake grille open (refer to TM 9-2350-287-10).

Personnel Required: Two

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. 1. Remove four screws and driver's portable instrument panel cover plate.

2. Disconnect harness 12260298 lead 28 from fuel gage connector.

3. Place red lead of multimeter in lead 28 connector socket and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-1O).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-1O).

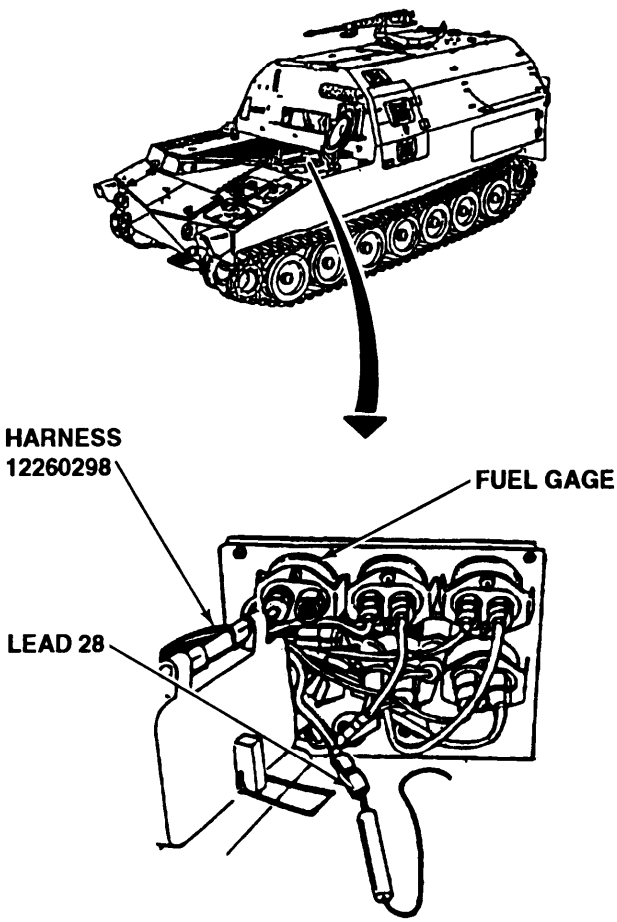
Is voltage indicated?

no

Repair lead 28 or replace harness 12260298 (para 7-7). Verify problem is solved.

yes

Continued on next page



2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).	(5) FUEL GAGE FAILS TO INDICATE A LEVEL READING WITH BOTH FUEL TANKS FULL. All other gages operate property (continued).

CONTINUED FROM A

B. 1. Connect harness 12260298 lead 28 to fuel gage.

2. Disconnect harness 12260298 lead 29-31 from fuel gage connector.

3. Connect jumper wire to fuel gage connector pin. (Do not attach jumper wire to ground.)

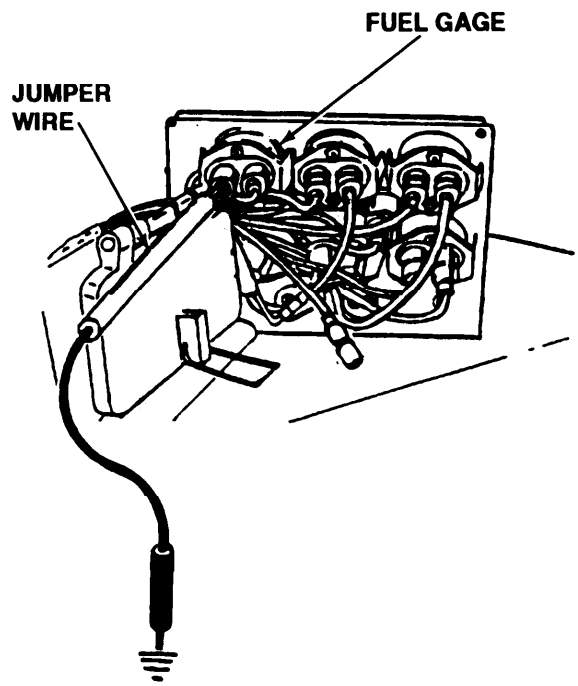
4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Observe fuel gage.

6. Ground jumper wire.

7. Observe fuel gage.

8. Turn MASTER switch OFF (refer to TM 9-2350-287-10).



Does fuel gage indicate FULL when not grounded and EMPTY?

no

Replace fuel gage (para 7-6). Verify problem is solved.

yes

C. 1. Reconnect wire 29-31 to fuel gage.

2. Install driver's portable instrument panel cover plate with four screws.

3. Remove exhaust deflectors (para 15-9).

4. Remove exhaust deck (para 15-8).

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued)	(5) FUEL GAGE FAILS TO INDICATE A LEVEL READING WITH BOTH FUEL TANKS FULL. All other gages operate properly (continued).

CONTINUED FROM C

C. 5. Remove three screws and lockwashers and upper fuel level transmitter cover. Discard lockwashers.

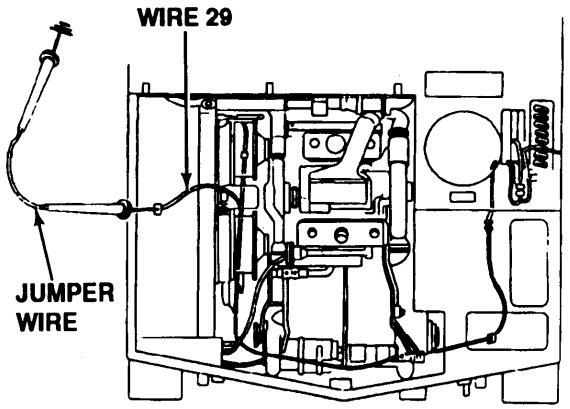
6. Disconnect wire 29 of harness 10921380 from upper fuel tank transmitter.

7. Ground wire 29 with a jumper wire.

8. Turn MASTER switch ON and hold FUEL LEVEL switch to UPPER position (refer to TM 9-2350-287-10).

9. Observe fuel gage at driver's portable instrument panel.

10. Turn MASTER switch OFF (refer to TM 9-2350-287-10).



Does fuel gage indicate empty?

no

yes

Replace upper fuel tank transmitter (para 4-22). Verify problem is solved.

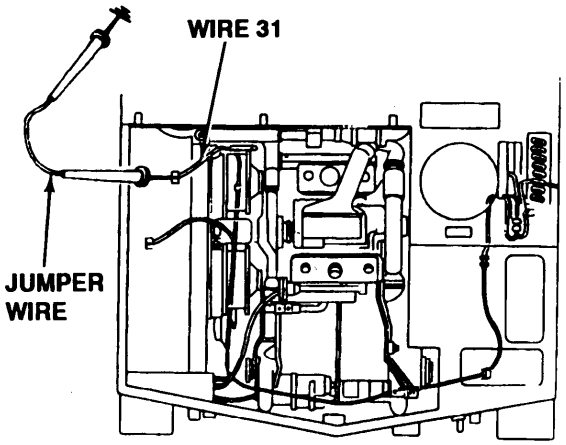
D. 1. Remove two self-locking nuts, five nuts, five washers, screw, lower fuel tank transmitter access cover, and seal. Discard self-locking nuts.

2. Disconnect wire 31 from lower fuel tank transmitter.

3. Ground wire 31 with a jumper wire.

4. Turn MASTER switch ON and place FUEL LEVEL switch to LOWER position (refer to TM 9-2350-287-1 O).

5. Observe fuel level gage at driver's portable instrument panel.



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2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).	(5) FUEL GAGE FAILS TO INDICATE A LEVEL READING WITH BOTH FUEL TANKS FULL. All other gages operate properly (continued).

CONTINUED FROM D

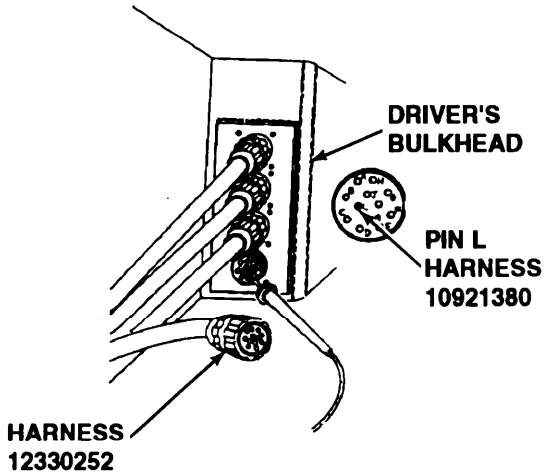
D. 6. Turn MASTER switch OFF (refer to TM 9-2350-287-1O).

Does fuel gage indicate empty?

no

yes

Replace lower fuel tank transmitter (para 4-23). Verify problem is solved.



E. 1. Disconnect harness 12330252 from driver's bulkhead connector.

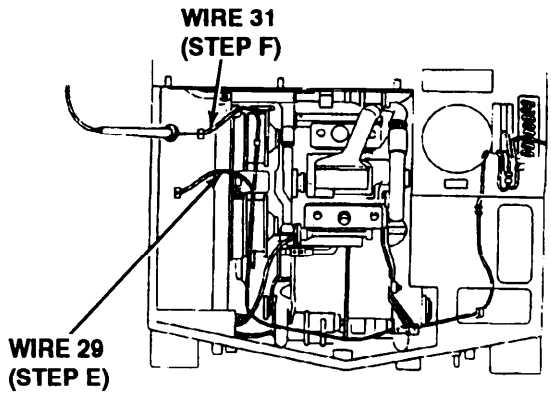
2. Place one lead of muttimeter in lead 29 and place the other on pin L of bulkhead connector of harness 10921380 and check for continuity.

Is continuity present?

no

yes

Repair lead 29 or replace wire harness 10921380 (para 7-43). Verify problem is solved.

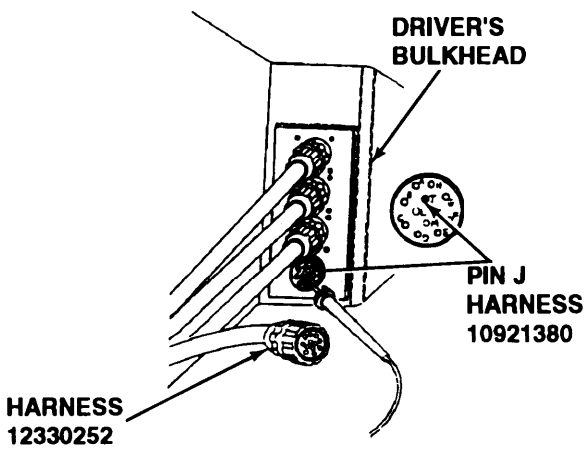


F. 1. Reconnect harness 10921380 lead 29 to upper fuel tank transmitter.

2. Install upper fuel level transmitter cover with three screws and new lockwashers.

3. Place multimeter lead in wire 31 and place other multimeter lead on pin J of driver's bulkhead connector of harness 10921380 and check for continuity.

Is continuity present?



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12-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued)	(5) FUEL GAGE FAILS TO INDICATE A LEVEL READING WITH BOTH FUEL TANKS FULL All other gages operate properly (continued).

CONTINUED FROM F

no / yes

Repair wire 31 or replace harness 10921380 (para 7-43). Verify problem is solved.

G. 1. Reconnect lead 31 to lower fuel level transmitter.

2. Install lower fuel tank level transmitter access cover and seal with five nuts, five washers, screw and, two new self-locking nuts.

3. Remove six screws and driver's portable instrument panel cover.

4. Disconnect lead 29 from fuel level switch.

5. Place one multimeter lead in socket L of harness 12330252 driver's bulkhead connector and place the other lead in wire 29 of harness 12330252 at fuel level switch and check for continuity.

Is continuity present?

no / yes

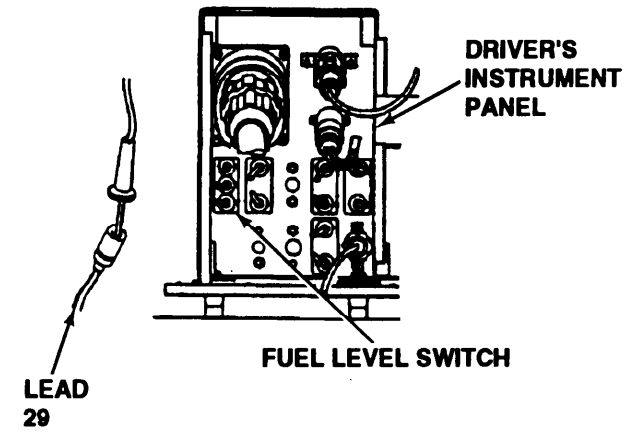
Notify Direct Support maintenance.

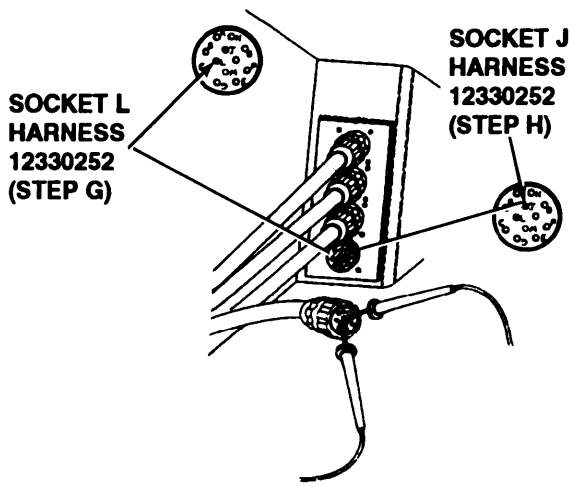
H. 1. Reconnect lead 29 to fuel level switch.

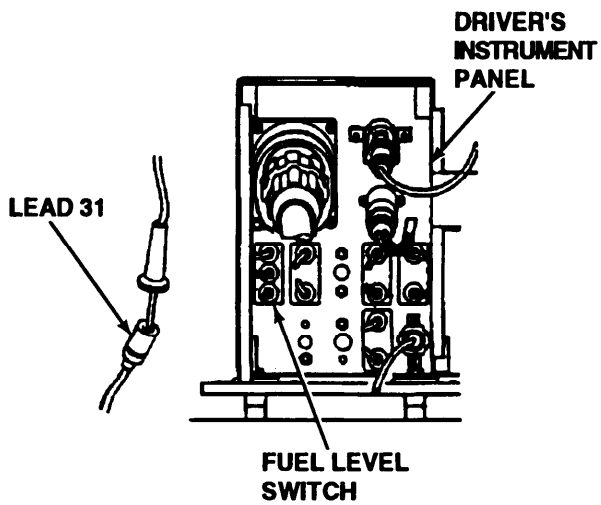
2. Disconnect lead 31 from fuel level switch.

3. Place one lead of multimeter in socket J of harness 12330252 driver's bulkhead connector and other lead of multimeter in wire 31 of harness 12330252 at fuel level switch and check for continuity.

Is continuity present?







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2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).	(5) FUEL GAGE FAILS TO INDICATE A LEVEL READING WITH BOTH FUEL TANKS FULL. All other gages operate properly (continued).

CONTINUED FROM H

no

yes

Notify Direct Support maintenance.

I. 1. Reconnect harness 12330252 to driver's bulkhead.

2. Reconnect wire 31 to fuel level switch.

3. Disconnect wire 29-31 of harness 12260287 from fuel level switch.

4. Disconnect wire harness 12260298 from harness 12260287.

5. Place one lead of multimeter in wire 29-31 fuel level switch connector and place other lead in socket F of harness 12260287 bracket mount connector, and check for continuity.

Is continuity present?

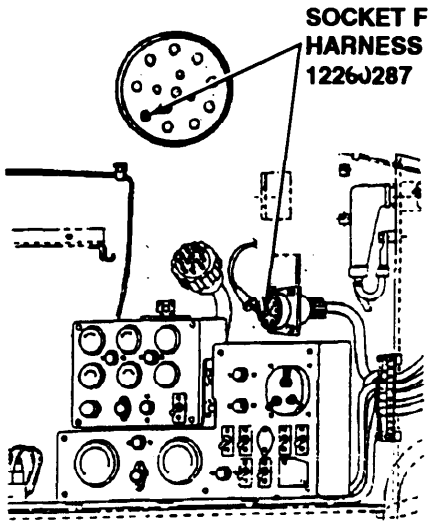
no

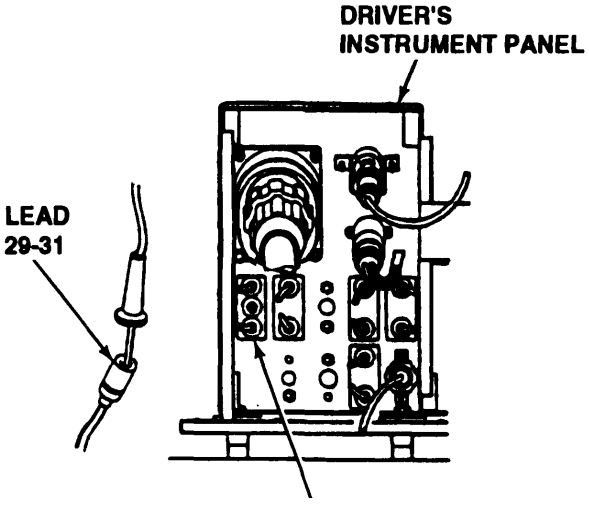
yes

Replace fuel level switch of driver's instrument panel (para 7-6). Verify problem is solved.

Repair wire 29-31 or replace wire harness 12260287 (para 7-56). Verify problem is solved.

END OF TASK





2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).	(6) FUEL GAGE FAILS TO INDICATE LEVEL OF UPPER FUEL TANK. Indicates level of lower fuel tank properly.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- Wire (Item 77, Appendix D)
- Lockwasher (3) (Item 175, Appendix H)

Equipment Conditions:
- Fuel tanks f ull (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Driver's portable instrument panel stowed in outside position (refer to TM 9-2350-287-10).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. 1. Remove driver's instrument panel cover (para 7-9).

2. Disconnect harness 12330252 lead 29 from FUEL LEVEL switch.

3. Place FUEL LEVEL switch in UPPER position.

4. Turn MASTER switch ON (refer to TM 9-2350-287-1O).

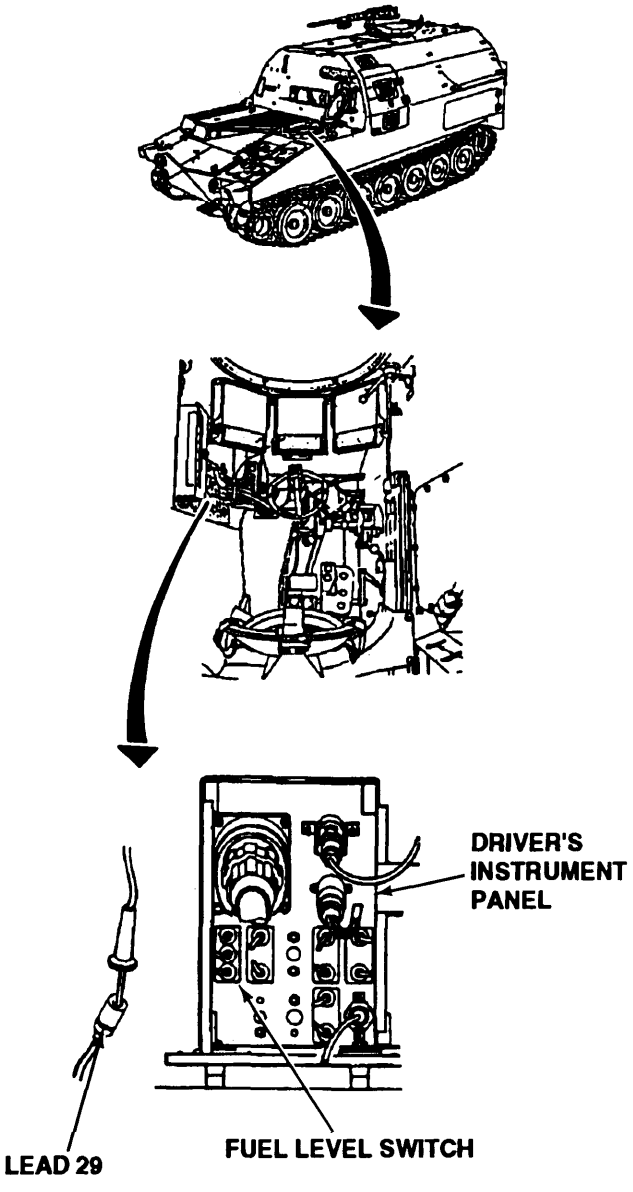
5. Observe fuel gage.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-1O).

Does fuel gage indicate FULL?

no → Replace FUEL LEVEL switch (para 7-9). Verify problem is solved.

yes → Continued on next page



2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).	(6) FUEL GAGE FAILS TO INDICATE LEVEL OF UPPER FUEL TANK. Indicates level of lower fuel tank properly (continued).

CONTINUED FROM A

B. 1. Connect harness 12330252 lead 29 to fuel level switch.

2. Install driver's instrument panel cover (para 7-9).

3. Remove exhaust deflectors (para 15-9).

4. Remove exhaust deck (para 15-8).

5. Open engine grille (refer to TM 9-2350-287-10).

6. Remove three screws and lockwashers and upper fuel tank fuel level transmitter cover. Discard lockwashers.

7. Disconnect wire 29 from upper fuel tank transmitter.

8. Install a jumper wire into lead 29. Do not ground jumper wire at this time.

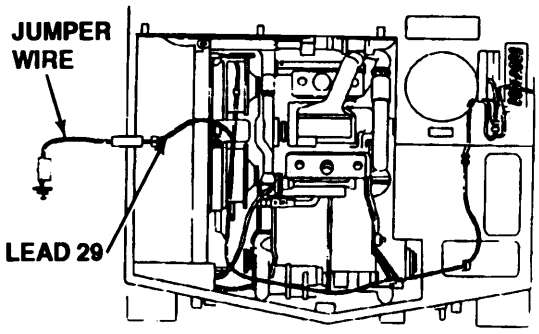
9. Turn MASTER switch ON (refer to TM 9-2350-287-1O).

10. Observe fuel gage at driver's portable instrument panel.

11. Ground jumper wire.

12. Observe fuel gage.

13. Turn MASTER switch OFF (refer toTM 9-2350-287-1O).



Does fuel gage show FULL when not grounded? Does fuel gage show EMPTY when grounded?

no

yes

Replace upper fuel level transmitter (para 4-22). Verify problem is solved.

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).	(6) FUEL GAGE FAILS TO INDICATE LEVEL OF UPPER FUEL TANK. Indicates level of lower fuel tank properly (continued).

CONTINUED FROM C

C. 1. Disconnect wire harness 12330252 from driver's bulkhead disconnect.

2. Place one lead of multimeter in lead 29 at upper fuel tank transmitter socket and place the other lead at pin L of driver's bulkhead connector of harness 10921380 and check for continuity.

Is continuity present?

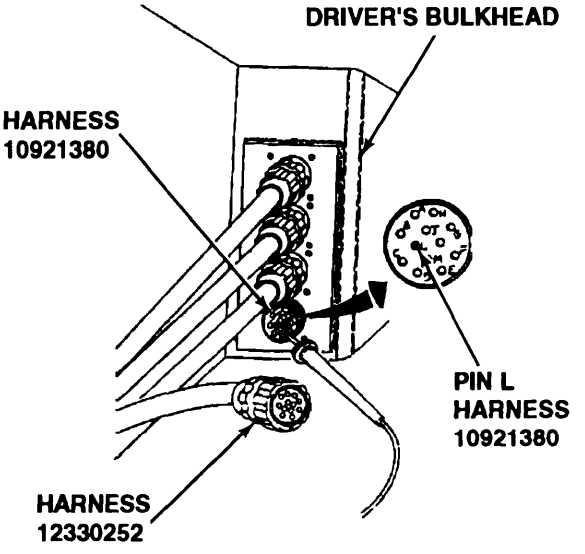
no

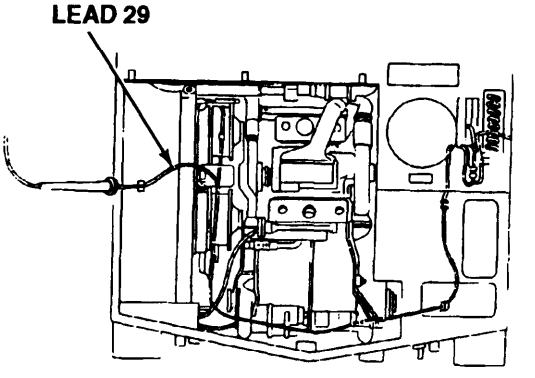
Repair wire 29 or replace wire harness 10921380 (para 7-43). Verify problem is solved.

yes

Notify Direct Support maintenance.

END OF TASK





2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).	(7) FUEL GAGE FAILS TO INDICATE LEVEL OF LOWER FUEL TANK. Indicates level of upper fuel tank properly.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- Wire (Item 77, Appendix D)
- Self-locking nut (2) (Item 317, Appendix H)

Equipment Conditions:
- Fuel tanks full (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Drivet's portable instrument panel stowed in outside position (refer to TM 9-2350-287-10).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. 1. Remove six screws, lockwashers, and cover from driver's instrument panel.

2. Disconnect harness 12330252 lead 31 from FUEL LEVEL switch.

3. Place FUEL LEVEL switch in LOWER position.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

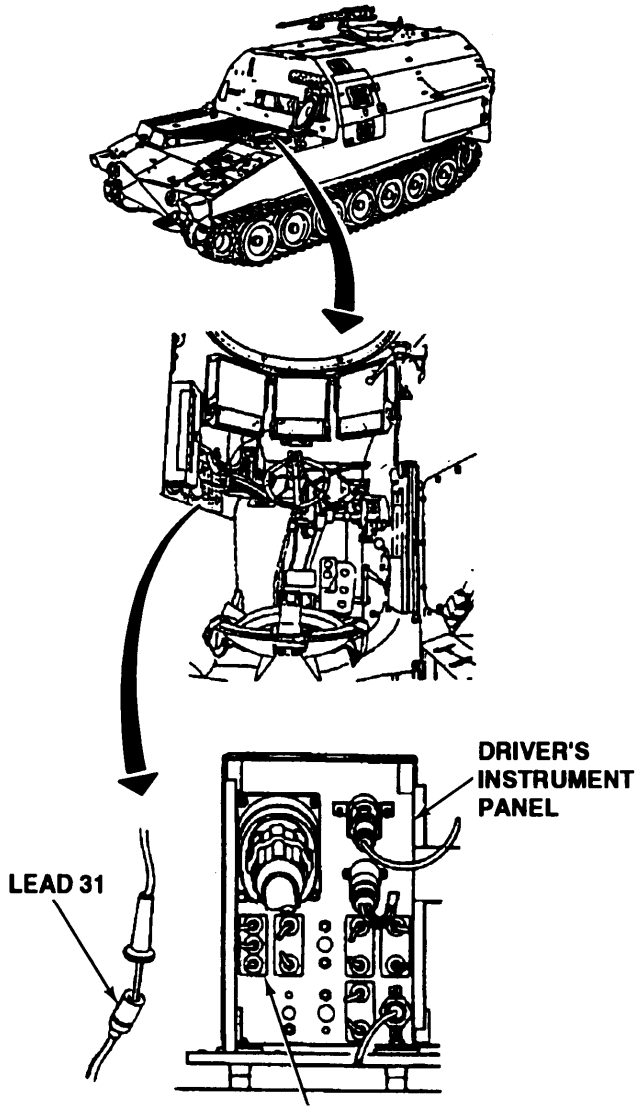
5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Does fuel gage indicate FULL?

no

Replace FUEL LEVEL switch (para 7-9). Verify problem is solved.

yes



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2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).	(7) FUEL GAGE FAILS TO INDICATE LEVEL OF LOWER FUEL TANK. Indicates level of upper fuel tank properly (continued).

CONTINUED FROM A

B. 1. Connect harness 12330252 lead 31 ,to fuel level switch.

2. Install cover to driver's instrument panel with six screws.

3. Remove armor plate cover from overcooling system and exhaust system (refer to TM 9-2350-287-10).

4. Remove engine grill.

5. Remove two self-locking nuts from bar. Discard self-locking nuts.

6. Remove screw, washer, and stiffener from bar.

7. Remove nut and washer from bar.

8. Remove two nuts and washers from access cover.

9. Remove bar, access cover and seal from heat shield.

10. Loosen nut and position tube out of the way.

11. Disconnect electrical connector from transmitter.

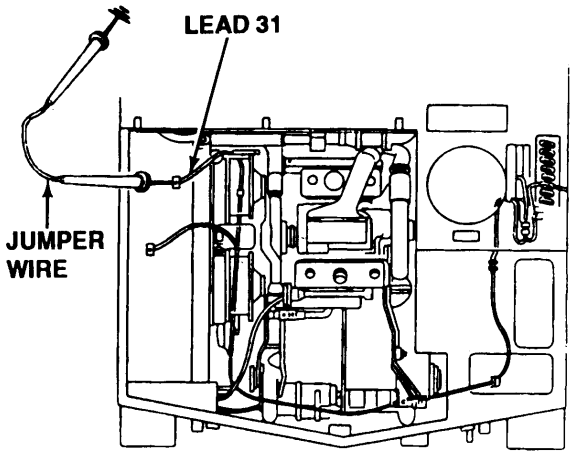
12. Remove five screws and washers and ground lead from transmitter.

13. Disconnect wire 31 from lower fuel tank transmitter.

14. Install a jumper wire into lead 31. Do not ground the jumper wire at this time.

15. Turn MASTER switch ON (refer to TM 9-2350-287-10).

16. Observe fuel gage at driver's portable instrument panel.



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2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).

(7) FUEL GAGE FAILS TO INDICATE LEVEL OF LOWER FUEL TANK. Indicates level of upper fuel tank properly (continued).

CONTINUED FROM B

B. 17. Ground jumper wire.

18. Observe fuel gage.

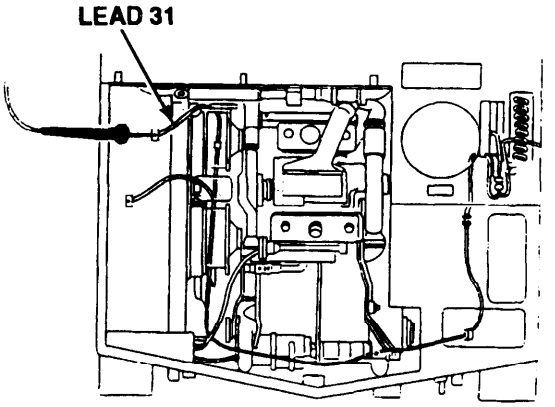
19. Turn MASTER switch OFF (refer to TM 9-2350-287-1O).

Does fuel gage show both FULL when not grounded and EMPTY reading when grounded?

no

yes

Replace lower fuel tank transmitter (para 4-23). Verify problem is solved.



C. 1. Disconnect wire harness 12330252 from driver's bulkhead disconnect.

2. Place one lead of multimeter in harness 10921380 lead 31 at lower fuel tank transmitter socket and place the other lead at pin J of harness 10921380 bulkhead connector.

3. Check for continuity.

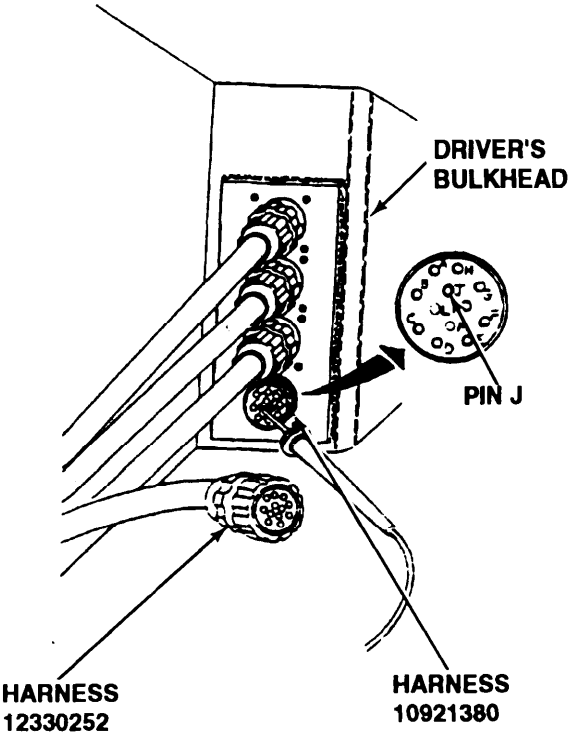
Is continuity present?

no

yes

Repair wire 31 or replace wire harness 10921380 (para 7-43). Verify problem is solved.

Notify Direct Support maintenance.



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).	(8) BATTERY/GENERATOR GAGE FAILS TO OPERATE PROPERLY - NO OR UNSTEADY READING. Other gages operate properly.

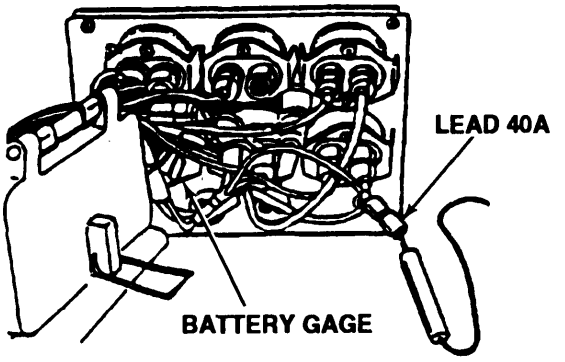
Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's too kit (Item *24,* Appendix 1)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Remove driver's portable instrument panel (para *7-6).*

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.



A. 1. Disconnect lead 40A from battery gage.

2. Connect red lead of multimeter in lead 40A and ground black lead.

3. Turn MASTER switch ON and start engine (refer to TM 9-2350-287-10).

4. Check for 24 ± 3 vdc.

5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no

Repair lead 40A or replace harness 12260298 (para 7-7).

yes

Replace battery/generator gage (para 7-6).

END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).	(9) TACHOMETER FAILS TO OPERATE WHEN ENGINE IS RUNNING.

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix 1)

Personnel Required: Two

Equipment Conditions:
- Left and right transmission access doors (refer to TM 9-2350-287-10).
- Engine shut OFF (refer to TM 9-2350-287-10).
- Portable instrument panel removed refer to (para 7-6).
- Air intake grille open (refer to TM 9-2350-287-10).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. 1. Place driver's portable instrument panel in outside location (refer to TM 9-2350-287-10).

2. Remove six screws and cover from driver's instrument panel.

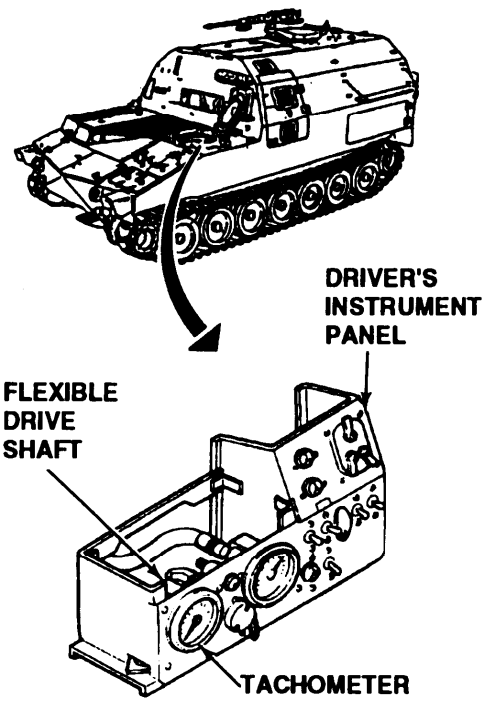
3. Pull fuel shutoff out and hold it so that engine will not start (refer to TM 9-2350-287-10).

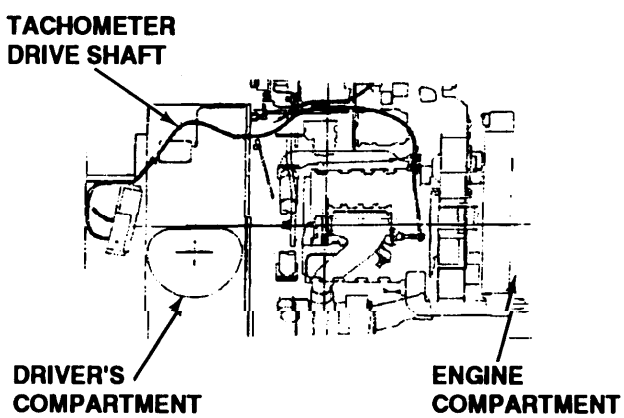
4. Turn MASTER switch ON (refer to TM 9-2350-287-1O).

5. Crank engine (refer to TM 9-2350-287-10).

6. Observe tachometer flexible drive shaft for rotation.

Does tachometer flexible drive shaft rotate?





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2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).	(9) TACHOMETER FAILS TO OPERATE WHEN ENGINE IS RUNNING (continued).

CONTINUED FROM A

no / yes

Replace tachometer (para 7-9). Verify problem is solved.

WARNING

B.

A protective fan screen must be installed prior to doing maintenance in the engine compartment, when the engine is running or engine is in ground hop mode. Contact with a rotating fan can cause injury.

1. Reconnect tachometer drive shaft to tachometer.

2. Install protective fan screens (para 2-8).

3. Disconnect tachometer drive shaft from tachometer drive on engine.

4. Have assistant hold fuel shutoff out and crank engine (refer to TM 9-2350-287-10).

5. Observe tachometer drive for rotation.

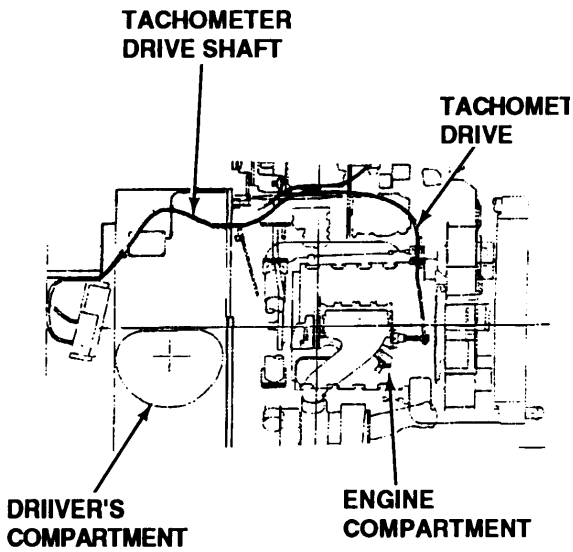
Does tachometer drive rotate?

no / yes

GO TO STEP E

C. 1. Connect tachometer drive shaft to tachometer drive on engine.

2. Disconnect tachometer drive shaft from bulkhead coupling.



Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).

(9) TACHOMETER FAILS TO OPERATE WHEN ENGINE IS RUNNING (continued).

CONTINUED FROM C

C. 3. Have assistant hold fuel shutoff out. Crank engine (refer to TM 9-2350-287-10).

4. Observe tachometer flexible drive shaft for rotation.

Does tachometer flexible drive shaft rotate?

no

Replace tachometer drive shaft from tachometer drive to bulkhead coupling (para 20-2).

yes

D. 1. Connect tachometer drive shaft to bulkhead coupling.

2. Disconnect tachometer drive shaft from pulse tachometer.

3. Have assistant hold fuel shutoff out. Crank engine (refer to TM 9-2350-287-1 O).

4. Observe pulse tachometer for rotation.

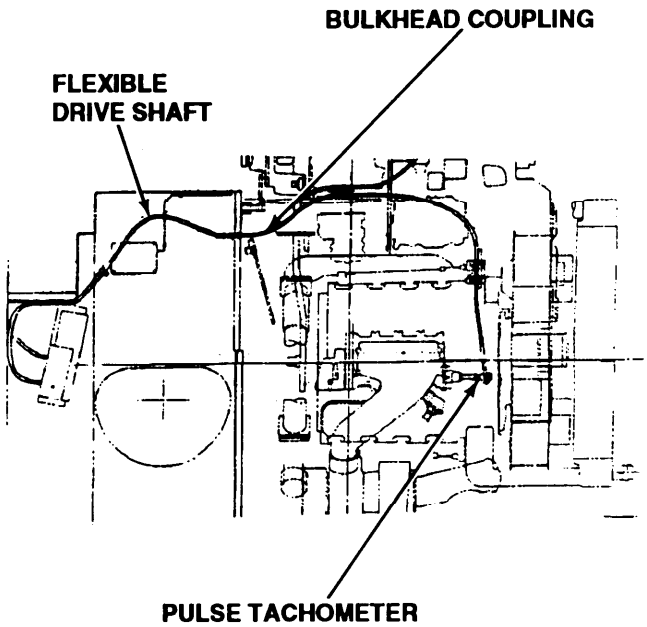
Does pulse tachometer rotate?

no

Replace pulse tachometer (para 20-2). Verify problem is solved.

yes

Replace tachometer drive shaft from pulse tachometer to tachometer (para 20-2). Verify problem is solved.



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

g GAGES (continued).

(10) SPEEDOMETER FAILS TO OPERATE.

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item *24,* Appendix 1)
- Socket wrench socket adapter (Item 63, Appendix 1)

Personnel Required: Two

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Remove portable instrument panel (para 7-6).
- Open transmission access doors (refer to TM 9-2350-287-10).

A. 1. Disconnect speedometer drive shaft from speedometer.

2. Rotate shaft on speedometer by hand.

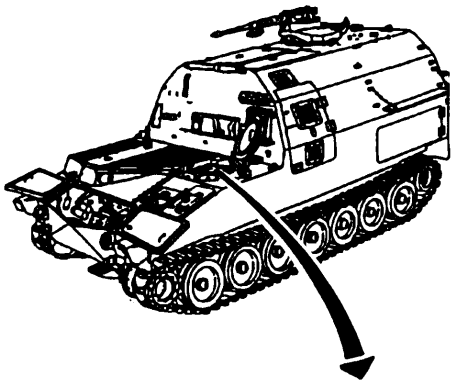
3. Observe speedometer needle for movement.

Does speedometer needle move?

no

yes

Replace speedometer (para 7-9). Verify problem is solved.



B. 1. Disconnect flexible drive shaft from speedometer angle drive adapter.

2. With the aid of an assistant, rotate drive shaft by hand at one end.

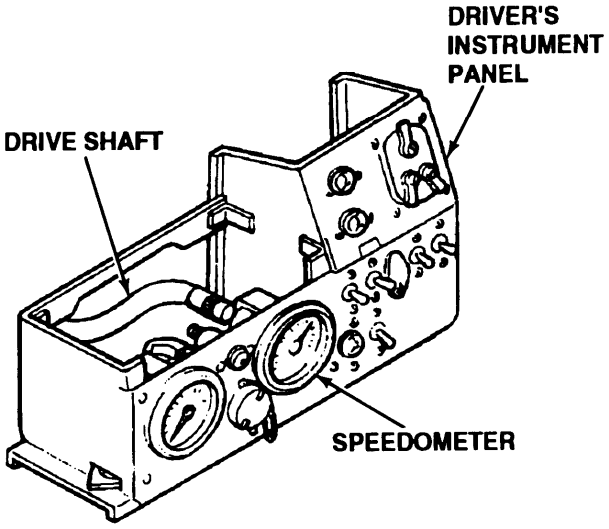
3. Observe other end for rotation.

Does shaft rotate?

no

yes

GO TO STEP E



Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

g. GAGES (continued).

(10) SPEEDOMETER FAILS TO OPERATE (continued).

CONTINUED FROM B

C. 1. Reconnect speedometer drive shaft to speedometer.

2. Remove speedometer angle drive adapter.

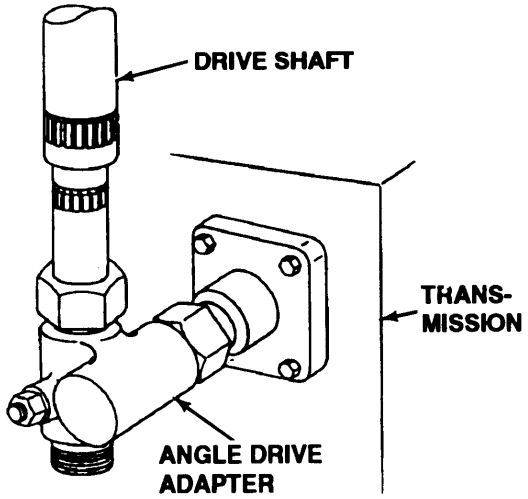
3. Rotate drive shaft on speedometer angle drive adapter by hand.

4. Observe other end for rotation.

Does drive shaft rotate?

no / yes

Replace speedometer angle drive adapter (para 20-2). Verify problem solved.



D. 1. Reconnect speedometer angle drive adapter to flexible drive shaft.

2. Remove two screws, washers, and right transmission trunnion support cap.

3. Remove four screws, lockwashers, and speedometer straight drive adapter from transmission.

4. Rotate straight drive adapter drive shaft by hand.

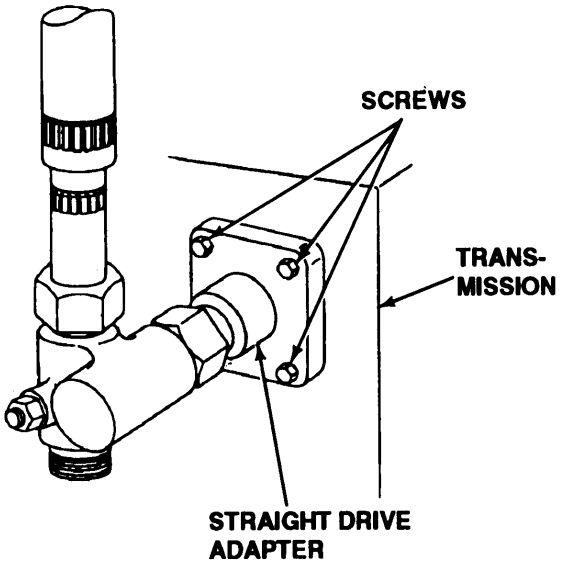
5. Observe other end for rotation.

Does drive shaft rotate?

no / yes

Replace speedometer straight drive adapter (para 20-2). Verify problem solved.

Notify Direct Support maintenance.



Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

g GAGES (continued).	(10) SPEEDOMETER FAILS TO OPERATE (continued).

CONTINUED FROM D

CONTINUED FROM STEP B

E. 1. Disconnect speedometer drive shaft from bulkhead coupling.

2. Rotate one end of speedometer drive shaft by hand.

3. Observe other end for rotation.

Does speedometer drive shaft rotate?

no — yes

Replace speedometer drive shaft (para 20-2). Verify problem is solved.

F. 1. Reconnect speedometer drive shaft to speedometer and bulkhead coupling.

2. Disconnect flexible drive shaft from bulkhead coupling.

3. Rotate one end of flexible drive shaft by hand.

4. Observe other end for rotation.

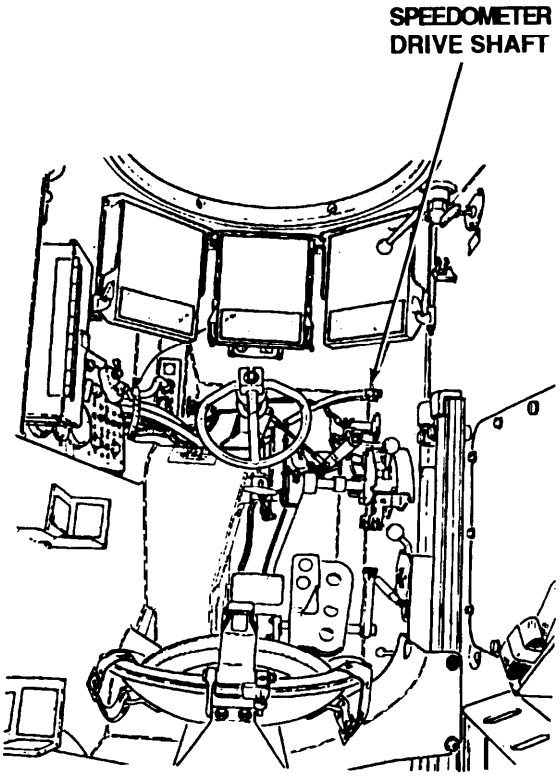
Does flexible drive shaft rotate?

no — yes

Replace flexible drive shaft (para 20-2). Verify problem is solved.

Replace bulkhead coupling (para 20-2). Verify problem is solved.

END OF TASK



2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS.

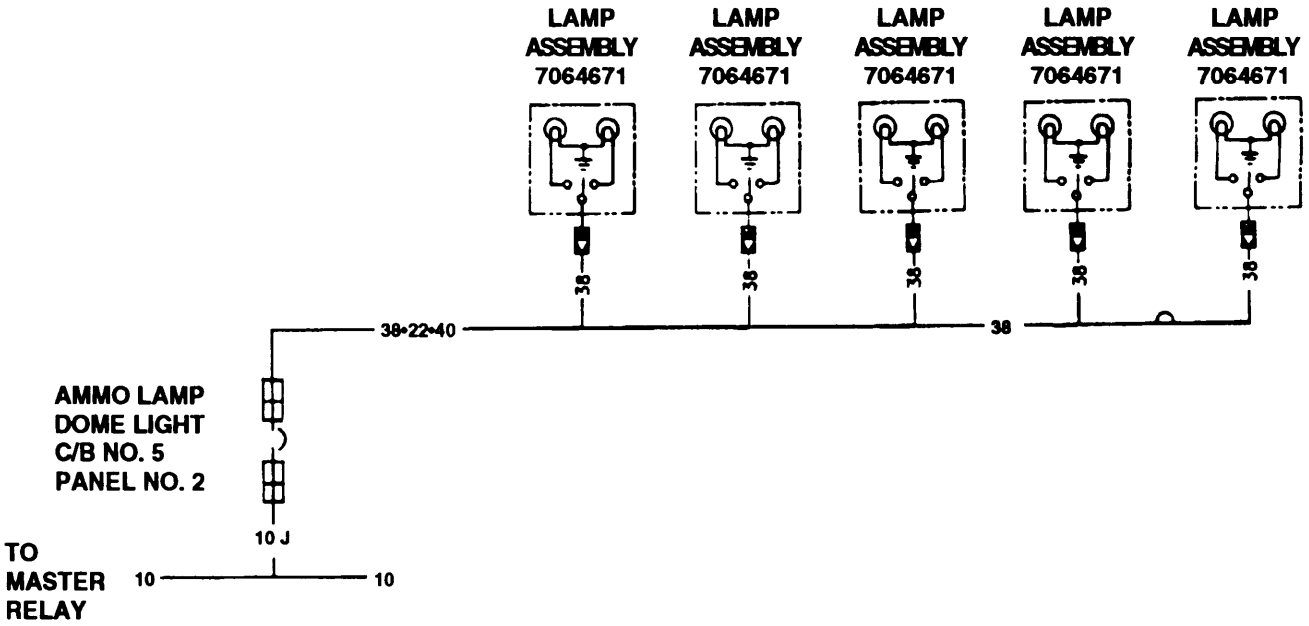
The vehicle lighting system consists of the left and right headlight assemblies, left and right taillight assemblies, stoplight switch, dimmer switch, domelights, driver's night viewer and light switch assembly.

The driver's instrument panel lights consist of the HIGH BEAM indicator light, GLOW PLUG WAIT light, PARKING BRAKE indicator light, and one panel light for illumination of the tachometer and speedometer.

The portable instrument panel lights consist of the MASTER indicator light, MASTER WARNING light, LOW COOLANT light, and two panel lights for illumination of the portable instrument panel.

Lights associated with the accessory control box consist of the HEATER indicator light, EXHAUST indicator light, and two panel lights for illumination of the accessory control box panel. Miscellaneous lighting consists of one MASTER indicator light located on the steering shaft and another located on the enclosure assembly in the crew compartment. The M3 electrical air heater is equipped with an ON/OFF indicator light.

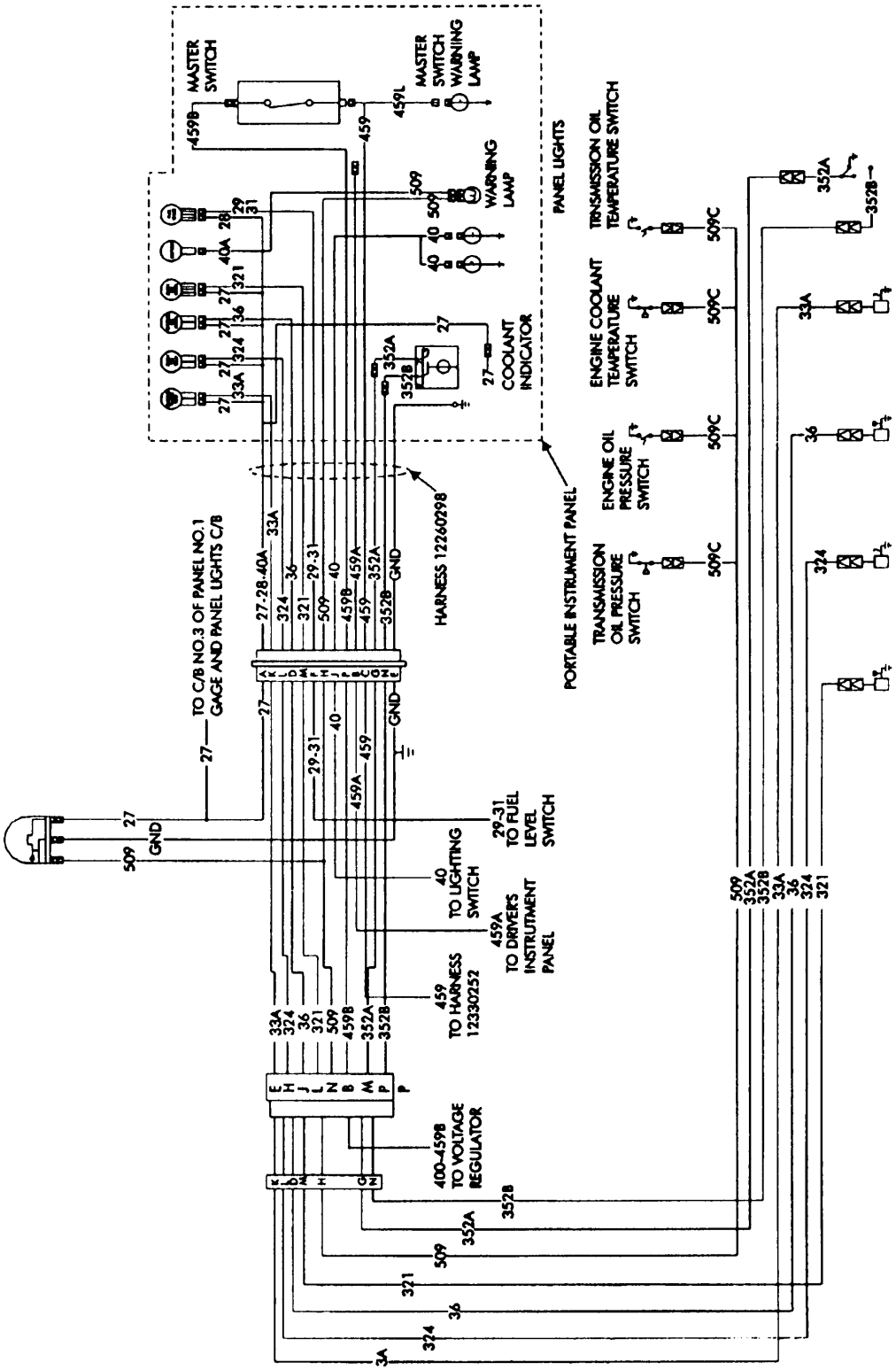
The relationship of the vehicle lighting system and related individual components is shown on the wiring diagrams (para 6-88).
When the MASTER switch is turned ON, 24 vdc is supplied through the MASTER relay to the circuit breaker panel. Circuit breakers 1,2,4 and 6 distribute the power to the various lamps, LEDs and controlling switches.



AMMO COMPARTMENT DOME LIGHT CIRCUIT

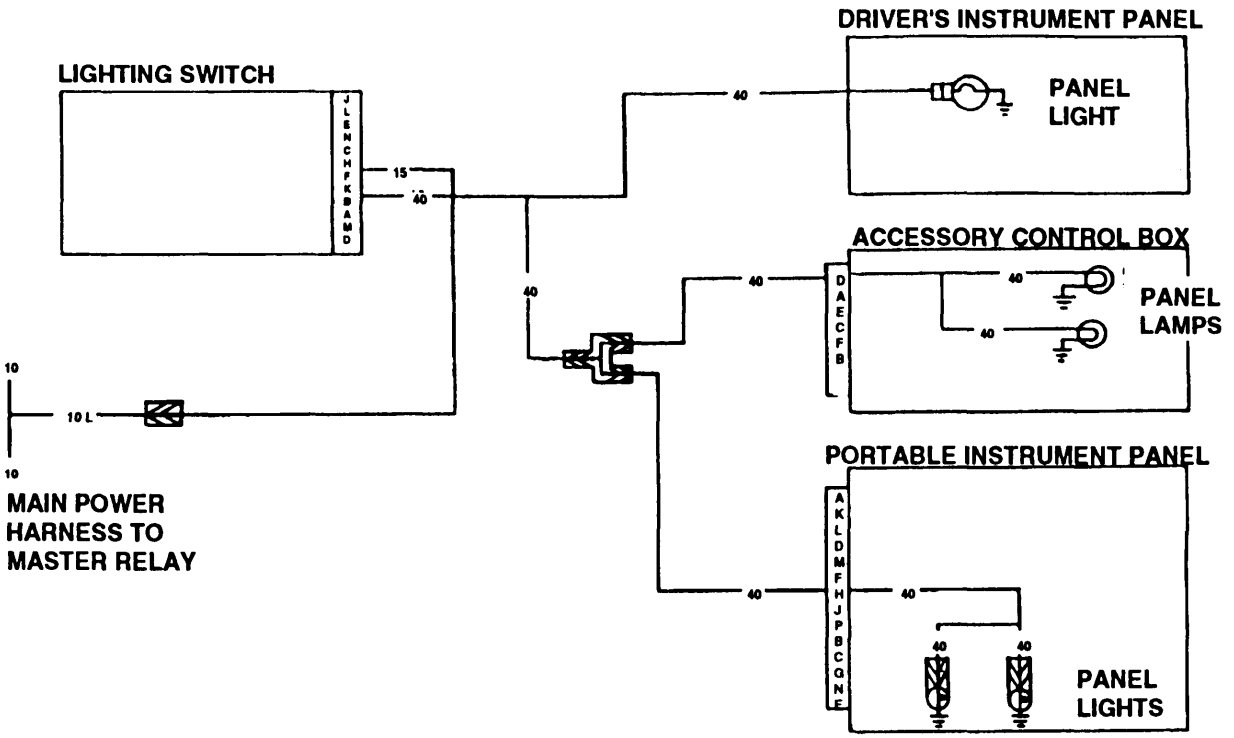
2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).



2-19. TROUBLESHOOTING CHART (continued).

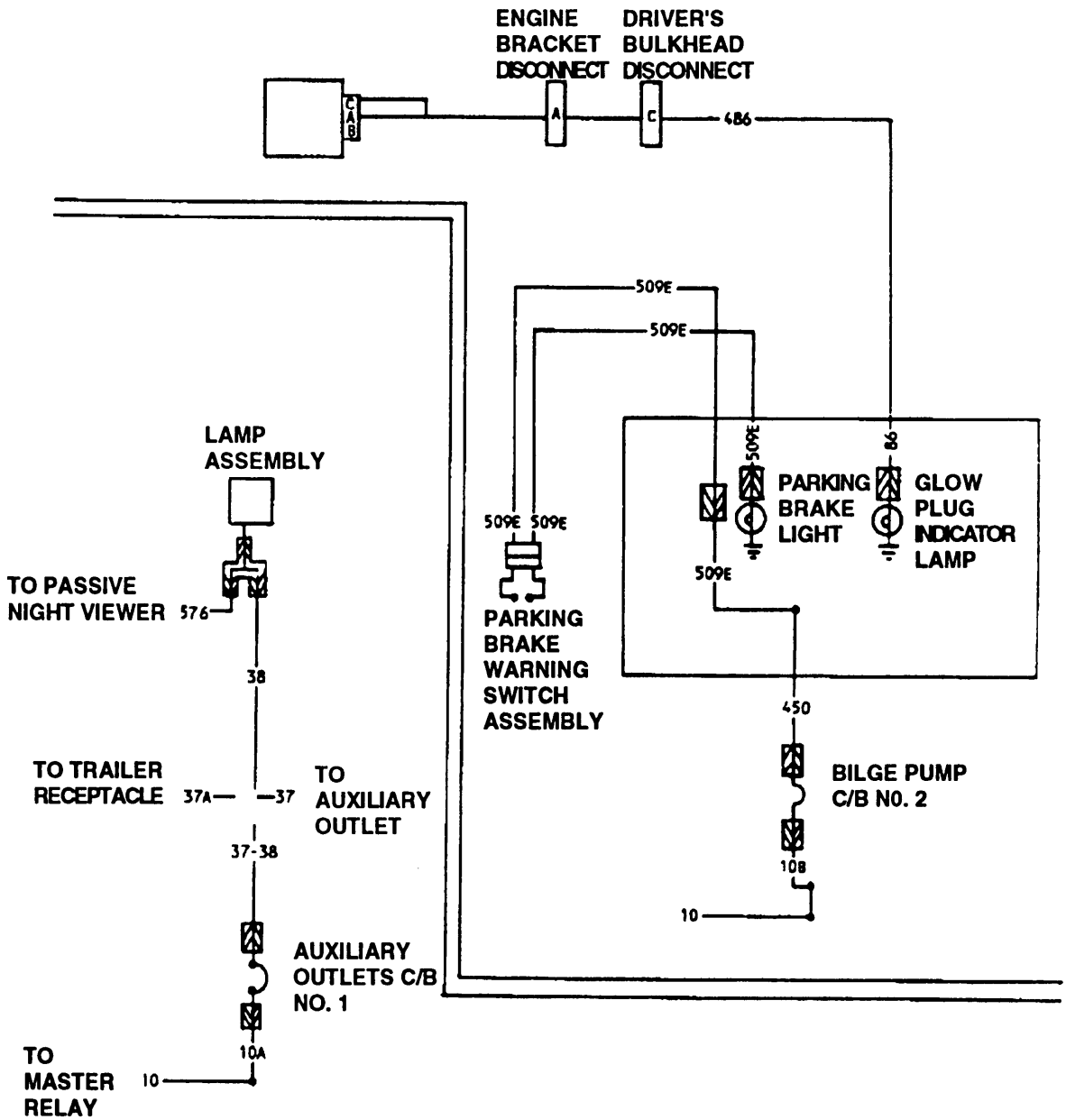
h. LIGHTS (continued).



PANEL LIGHTS CIRCUITS

2-19. TROUBLESHOOTING CHART (continued).

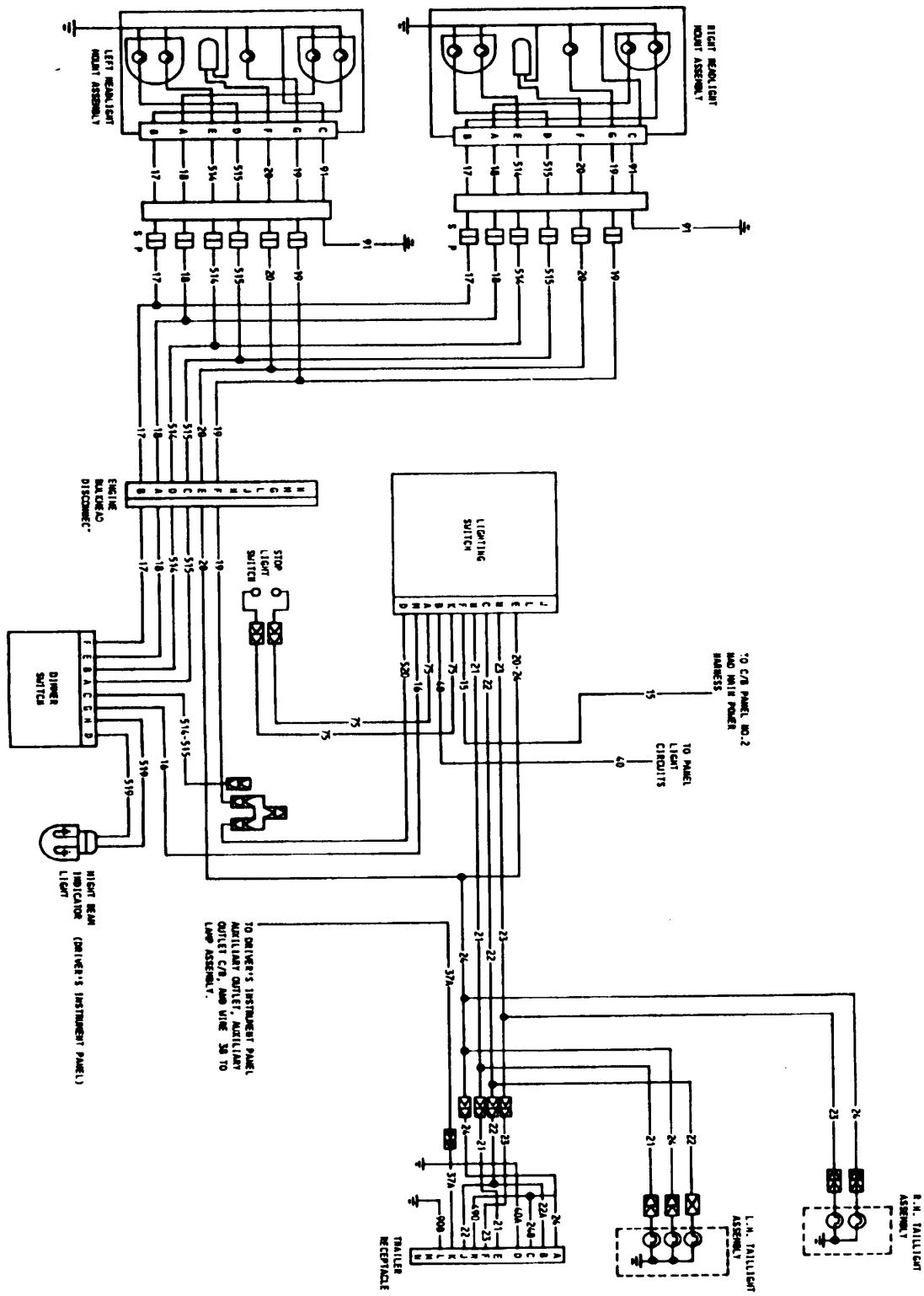
h. LIGHTS (continued).



DRIVER'S INSTRUMENT PANEL LIGHTS & DRIVER COMPARTMENT

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).



FRONT HEADLIGHT AND REAR TAILLIGHT ELECTRICAL SCHEMATIC

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(l) PORTABLE INSTRUMENT PANEL MASTER WARNING LIGHT FAILS TO OPERATE. Other MASTER WARNING light operates properly.

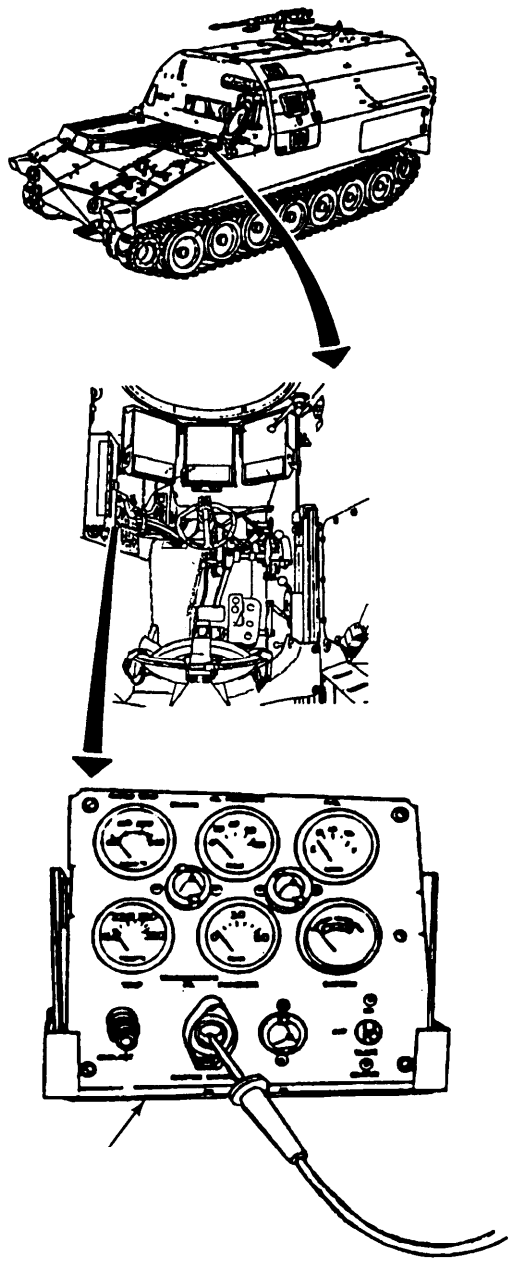
Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.



A. 1. Remove lens and light bulb from MASTER WARNING light socket.

2. Place red lead of multimeter in light socket and ground black lead.

3. Turn MASTER switch ON (refer to TM 9-2350-287-1 O).

4. Check for 24 ± 3 vdc.

5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no

yes

Replace light bulb (para 7-6). Verify problem is solved.

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(l) PORTABLE INSTRUMENT PANEL MASTER WARNING LIGHT FAILS TO OPERATE. Other MASTER WARNING light operates property (continued).

CONTINUED FROM B

B. **NOTE**

Make a note of how two pins are alined.

1. Install light bulb.

2. Disconnect wire 509 from warning light.

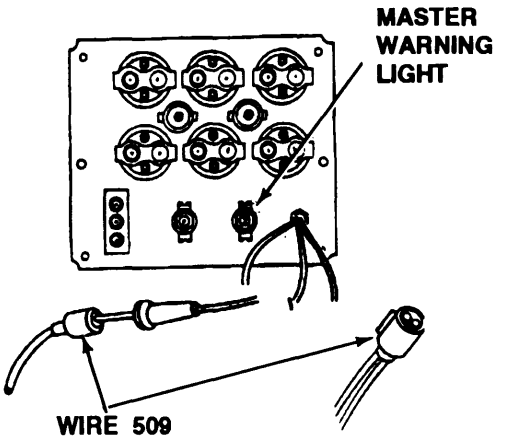
3. Place red probe of multimeter on wire 509 (coming from wire 27-28-40A splice) and ground black lead.

4.Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch off (refer to TM 9-2350-287-10).

Is voltage indicated?



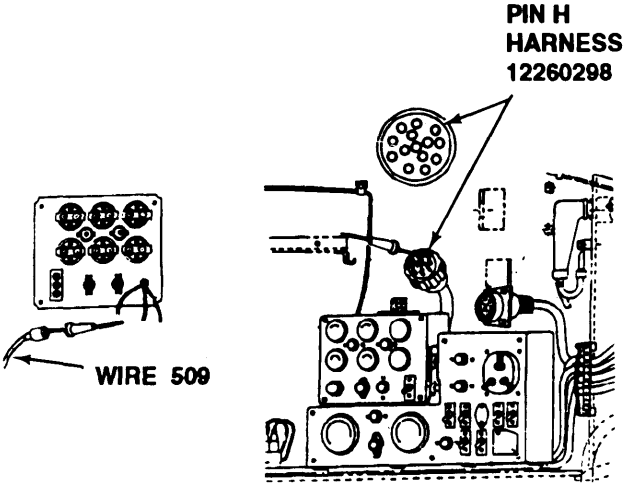
no → **GO TO STEP D**

yes →

c. 1. Disconnect wire harness 12260298 connector from harness 12260207.

2. Place one lead of multirneter on pin H of harness 12260298 and place other lead on socket of wire 509 coming from pin H.

Is continuity indicated?



no → Repair wire 509 or replace harness 12260298 (para 7-7). Verify problem is solved.

yes →

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(1) PORTABLE INSTRUMENT PANEL MASTER WARNING LIGHT FAILS TO OPERATE. Other MASTER WARNING light operates properly (continued).

CONTINUED FROM C

Repair wire 509 or replace harness 12260287 (para 7-56). Reconnect harnesses and reassemble instrument panel. Verify problem is solved.

D. 1. Place one lead of multimeter on pin A of harness 12260298 and connect other lead to wire 509 (coming from splice) MASTER WARNING light connector.

2. Cheek for continuity.

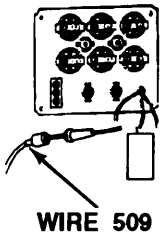
Is continuity indicated?

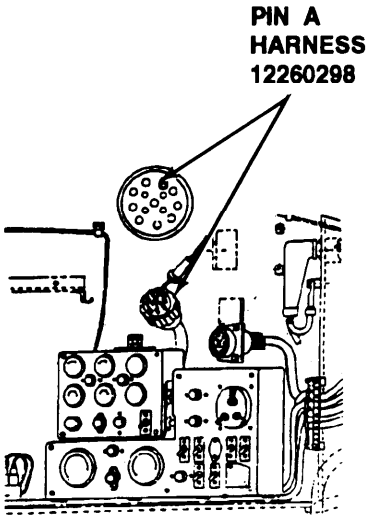
no

yes

Repair wire 509 or replace harness 12260287 (para 7-56). Reassemble portable instrument panel and reconnect all harnesses. Verify problem is solved.

Repair wire 509 or replace wire harness 12260298 (para 7-7). Verify problem is solved.





END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(2) STEERING SHAFT MASTER WARNING LIGHT FAILS TO OPERATE. Other MASTER WARNING light operates.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOTAGE TEST-TEST 89 may be performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. 1. Remove light bulb from MASTER WARNING light socket.

2. Place red lead of multimeter in light socket and ground black lead.

3. Turn MASTER switch ON (refer to TM 9-2350-287-1O).

4. Check for 24 ± 3 vdc.

5. Turn MASTER switch OFF (refer to TM 9-2350-287-1O).

is voltage indicated?

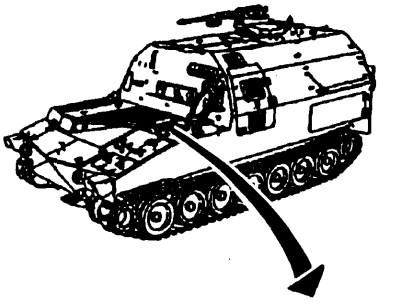
no

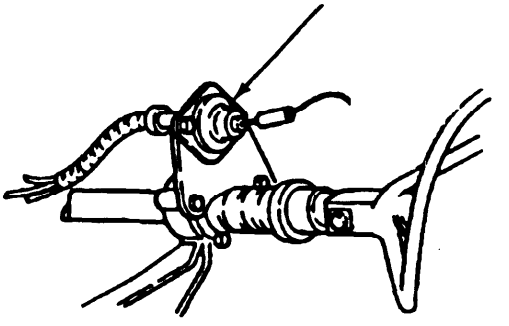
yes

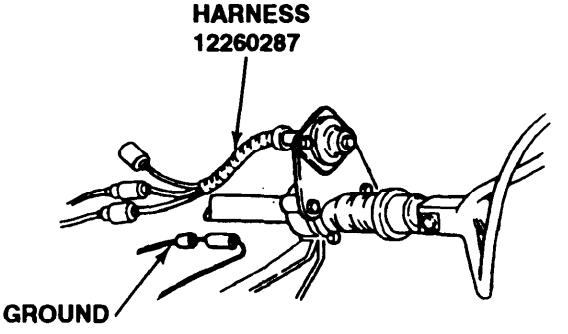
Replace light bulb (para 7-35). Verify problem is solved.

B. 1. Install light bulb in socket.

2. Disconnect ground wire of harness 12260287 from MASTER WARNING light assembly ground wire.







Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(2) STEERING SHAFT MASTER WARNING LIGHT FAILS TO OPERATE. Other MASTER WARNING light operates (continued).

CONTINUED FROM B

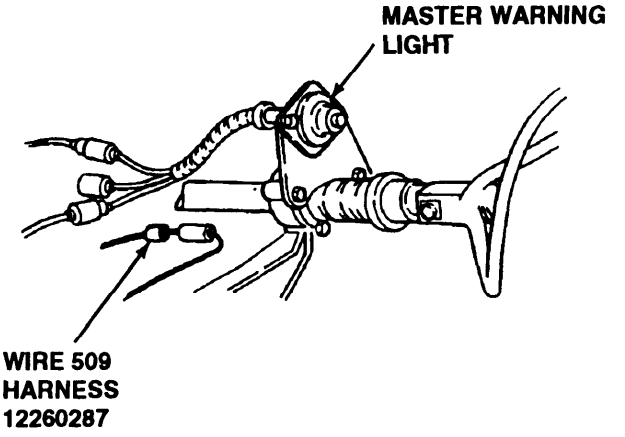
B. 3. Place red lead of multimeter in ground wire pin.

4. Ground black lead and check for continuity.

Is continuity indicated?

no → Repair ground wire or replace harness 12260287 (para 7-56) Verify problem is solved

yes →



C. 1. Reconnect ground wire to MASTER WARNING light socket.

2. Disconnect wire harness 12260287 at driver's bulkhead.

3. Disconnect wire 509 of harness 12260287 from MASTER WARNING light.

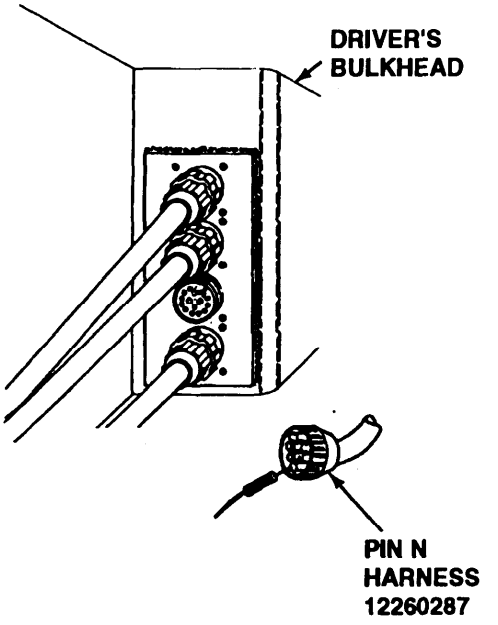
4. Place one lead of multimeter on pin N of harness 12260287 driver's bulkhead connector and connect other lead on wire 509 MASTER WARNING light connector.

5. Check for continuity.

Is continuity indicated?

no → Repair wire 509 or replace harness 12260287 (para 7-56). Verify problem is solved.

yes → Repair wire 27 or replace harness 12260287 (para 7-56). Verify problem solved.



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(3) MASTER WARNING LIGHT FAILS TO OPERATE WHEN ENGINE OVERHEATS. All other lights operate.

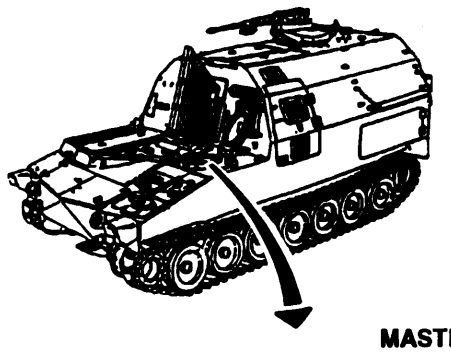
Initial Setup:

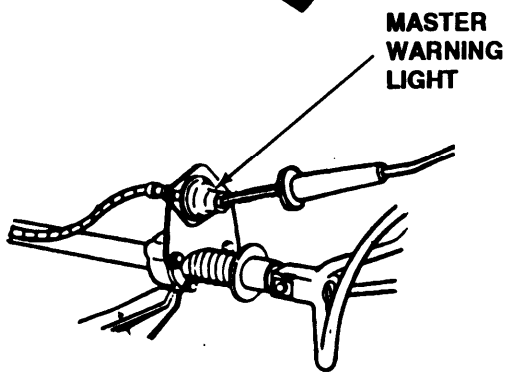
Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, (Appendix 1)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.





A. 1. Remove lens and light bulb from driver's portable instrument panel MASTER warning light indicator, and remove light bulb from steering shaft MASTER warning light assembly.

2. Turn MASTER switch ON (refer to TM 9-2350-287-1O).

3. Place red lead of multimeter in driver's portable instrument panel MASTER warning light indicator socket and ground black lead.

4. Check for 24 ± 3.

5. Perform steps 3 and 4 on steering shaft warning light assembly.

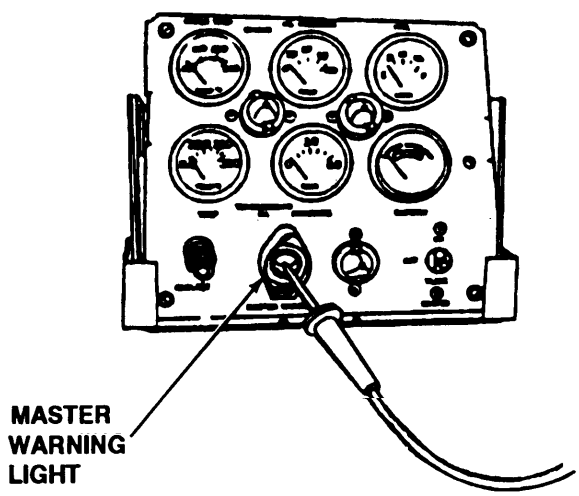
6. Turn MASTER switch OFF (refer to TM 9-2350-287-10.

Is voltage indicated?

no

Replace lamp from socket that indicated voltage (para 7-6 or 7-35). Verify problem is solved.

yes



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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(3) MASTER WARNING LIGHT FAILS TO OPERATE WHEN ENGINE OVERHEATS. All other lights operate (continued).

CONTINUED FROM B

B. 1. Install light bulb in steering shaft MASTER warning light assembly, and light bulb and lens in driver's portable instrument panel MASTER warning light indicator.

2. Disconnect wire harness 12260287 from portable instrument panel harness and from driver's bulkhead.

3. Place one lead of multimeter on socket H of harness 12260287 at portable instrument panel connector and place the other lead at pin N of harness 12260287 at driver's bulkhead connector.

4. Check for continuity.

Is continuity indicated?

no

Repair 509 or replace wire harness 12260287 (para 7-56) Verify problem is solved.

yes

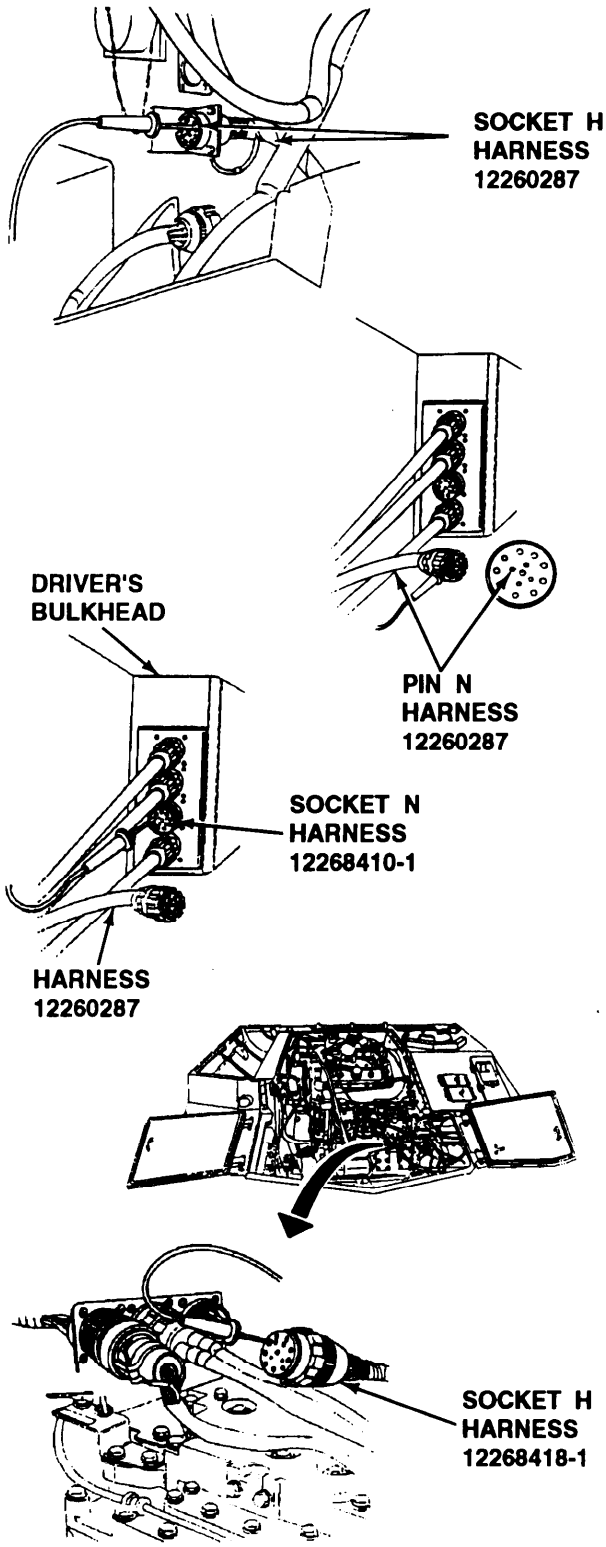
C. 1. Reconnect harness 12260287 at portable instrument panel,

2. Disconnect harness 12268418-1 from engine disconnect bracket.

3. Place one lead of multimeter on socket N of harness 12268418-1 at engine bulkhead connector, and place the other lead of mutimeter on socket H of harness 12268418-1 at engine disconnect bracket connector.

4. Check harness 12268418-1 for continuity.

Is continuity indicated?



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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(3) MASTER WARNING LIGHT FAILS TO OPERATE WHEN ENGINE OVERHEATS. All other lights operate (continued).

CONTINUED FROM C

no — Repair wire 509 or replace wire harness 12268418-1 (para 7-44). verify problem is solved.

yes

D. 1. Reconnect wire harness 12260287 at driver's bulkhead.

2. Disconnect wire 509A from engine coolant temperature switch.

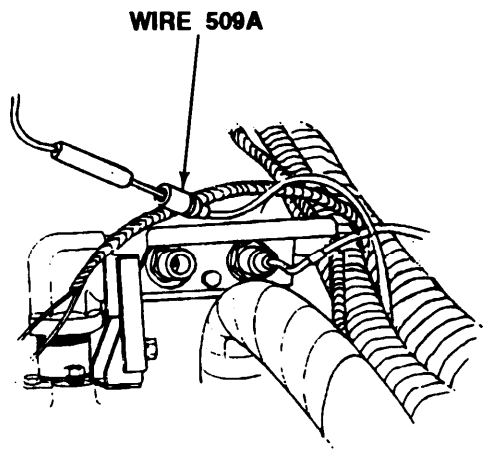
3. Place one lead of multimeter on pin H of wire harness 12268308 and other lead in wire 509A.

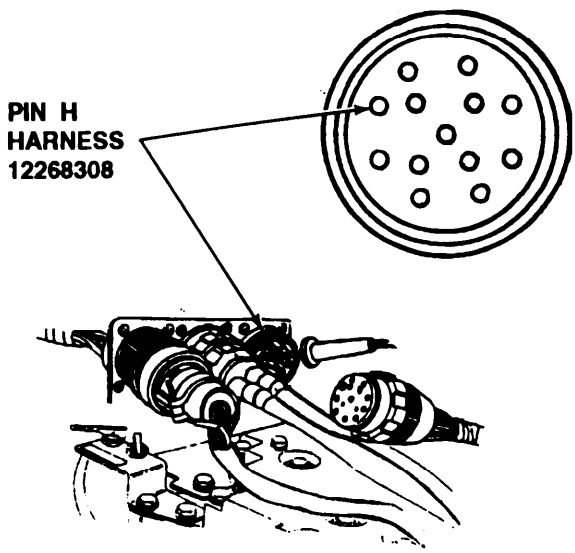
4. Check for continuity.

Is continuity indicated?

no — Repair wire 509 or replace wire harness 12268308 (para 7-50) Verify problem is solved.

yes — Replace engine coolant high temperature switch (para 7-37). Verify problem is solved.





END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(4) ENGINE LOW LEVEL COOLANT LIGHT FAILS TO OPERATE WHEN PRESSED-TO-TEST. All other lights operate.

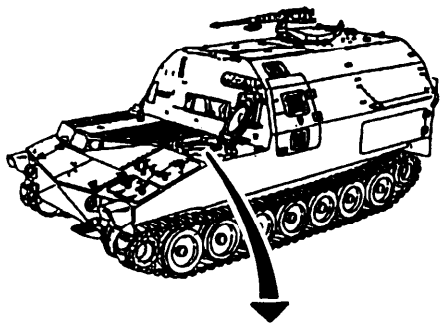
Initial Setup:

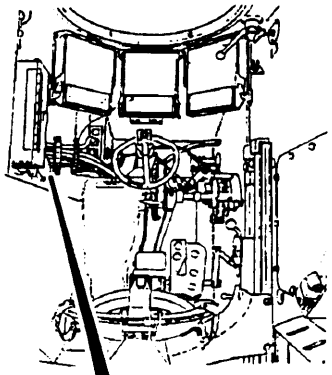
Tool/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-1O).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST- TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.





A. 1. Remove light bulb from press-to-test indicator on driver's portable instrument panel.

2. Place multimeter red lead in light socket and ground black lead.

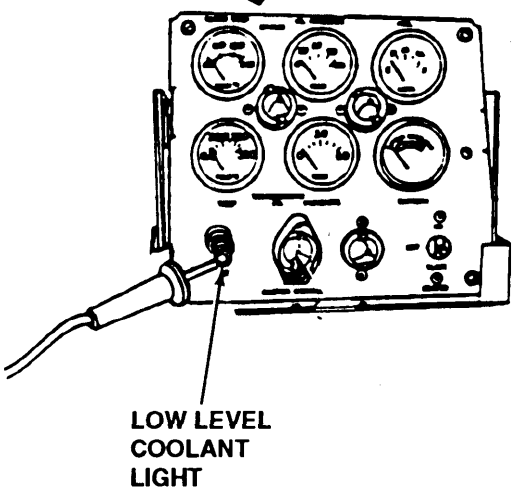
Do not be misled by the term "low voltage." Voltage as low as 50 volts may cause death. For artificial respiration, refer to FM 21-11.

3. Turn MASTER switch ON (refer to TM 9-2350-287-10) and press the press-to-test indicator in.

4. Check for 24 ± 3 vdc.

5. Turn MASTER switch OFF (refer to TM 9-2350-287-10) and release press-to-test indicator.

Is voltage indicated?



no

yes

Replace light bulb (para 7-6). Verify problem is solved.

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(4) ENGINE LOW LEVEL COOLANT LIGHT FAILS TO OPERATE WHEN PRESSED-TO-TEST. All other lights operate (continued).

CONTINUED FROM A

B. 1. Install light bulb to press-to-test indicator on driver's portable instrument panel.

2. Remove four screws and cover panel from portable instrument panel.

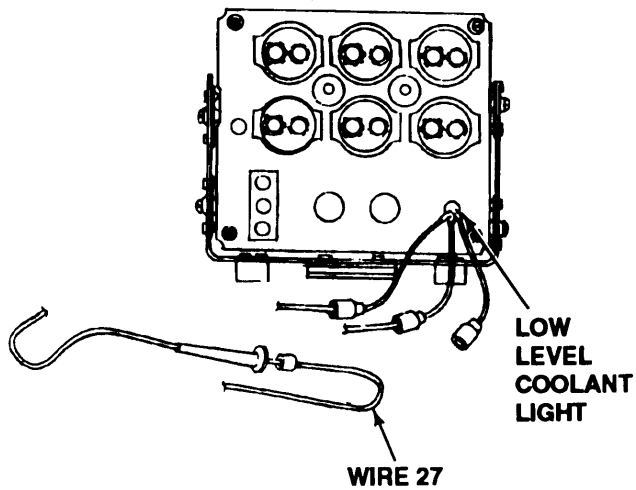
3. Disconnect wire 27 of harness 12260298 from wire 27 of coolant low level light.

4. Place red lead of multimeter in wire 27 of harness 12260298 and ground black lead.

5. Turn MASTER switch ON (refer to TM 9-2350-287-10).

6. Check for 24 ± 3 vdc.

7. Turn MASTER switch OFF (refer to TM 9-2350-287-10).



Is voltage indicated?

no

Replace wire 27 or replace harness 12260298 (para 7-7). Verify problem is solved.

yes

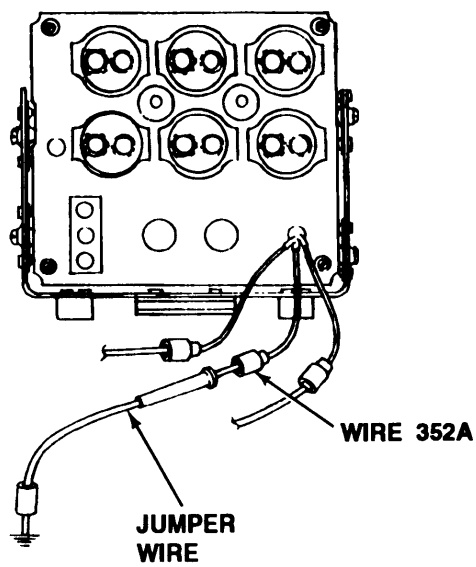
C. 1. Reconnect wire 27 of harness 12260298 to coolant low level coolant light.

2. Disconnect wire 352A of harness 12260298 from wire 352A of coolant low level light.

3. Insert a grounded jumper wire into wire 352A of coolant low level light.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Press press-to-test button.



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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).

(4) ENGINE LOW LEVEL COOLANT LIGHT FAILS TO OPERATE WHEN PRESSED-TO-TEST. All other lights operate (continued).

CONTINUED FROM C

C. 6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

does light illuminate?

no — yes

Replace low level coolant light press-to-test indicator lamp (para 7-6). Verify problem is solved.

D. 1. Disconnect harness 12260298 from harness 12260287.

2. Place one lead of multimeter in wire 352A on pin G of harness 12260298 connector and place other lead of multimeter on harness 12260298 wire 352A coolant low level light connector.

3. Check for continuity.

Is continuity indicated?

no — yes

Repair wire 352A or replace harness 12260298 (para 7-7). Verify problem is solved.

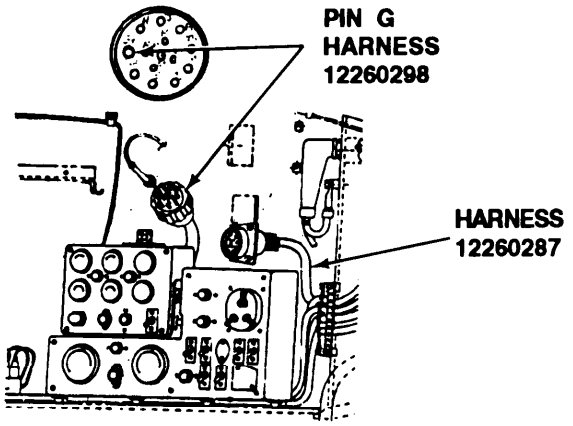
E. 1. Reconnect wire harness 12260298 to connector 12260287. Connect 352A to coolant low level light and reassemble portable instrument panel.

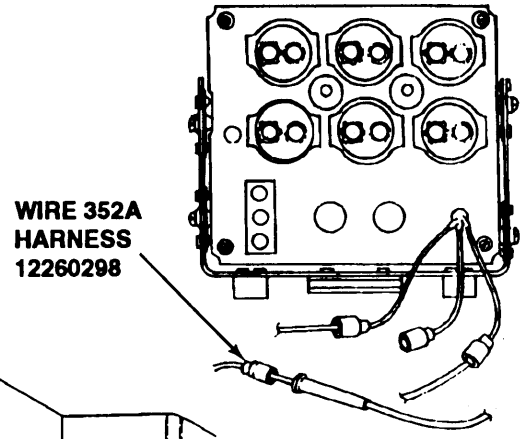
2. Disconnect wire harness 12260287 from driver's bulkhead.

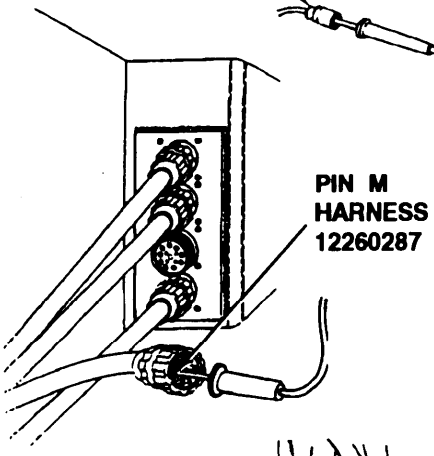
3. Connect one lead of multimeter on pin M of harness 12260287 bulkhead connector and place other lead on socket G of harness 12260287 portable instrument panel harness connector.

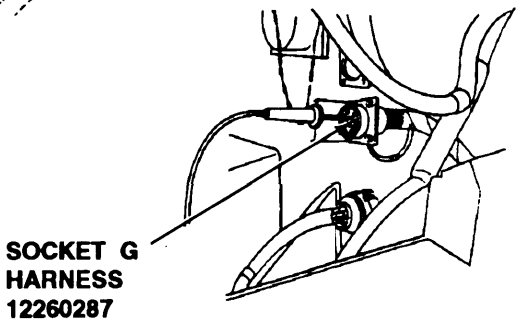
4. Check for continuity.

Is continuity indicated?









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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).

(4) ENGINE LOW LEVEL COOLANT LIGHT FAILS TO OPERATE WHEN PRESSED-TO-TEST. All other lights operate (continued).

CONTINUED FROM E

no / yes

Repair wire 352A or replace harness 12260287. (para 7-56). Verify problem is solved.

F. Reconnect harness 12260298 to harness 12260287.

2. Disconnect harness 12268418-1 from engine disconnect bracket.

3. Place one lead of multimeter in socket M of harness 12268418-1 driver's bulkhead connector and connect other lead in socket G of harness 12268418-1 engine disconnect bracket connector and check for continuity.

Is continuity indicated?

no / yes

Repair wire 352A or replace harness 12268418-1 (para 7-44). Verify problem is solved.

G. 1. Reconnect harnesses 12268418-1 and 12260287 to engine and driver's bulkheads.

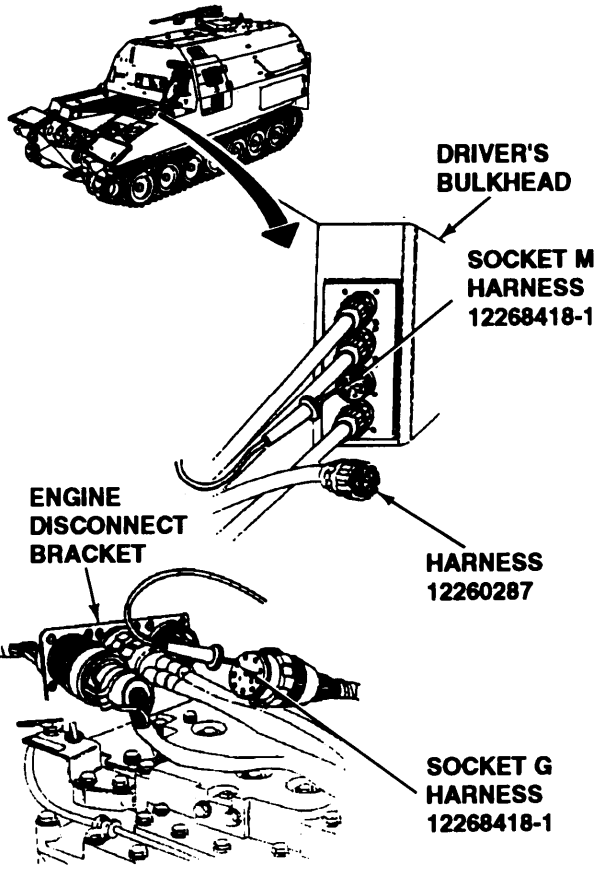
2. Disconnect wire 352A of harness 12268308 from low level coolant switch.

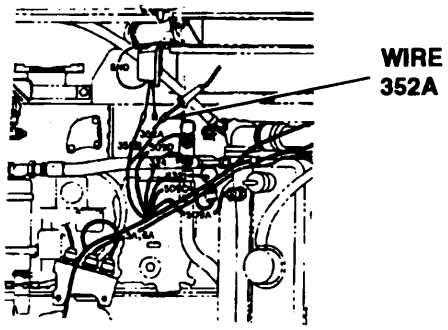
3. Place one lead of multimeter on harness 12268308 wire 352A low level coolant switch connector and place other lead of multimeter in pin G of harness 12268308 engine disconnect bracket connector.

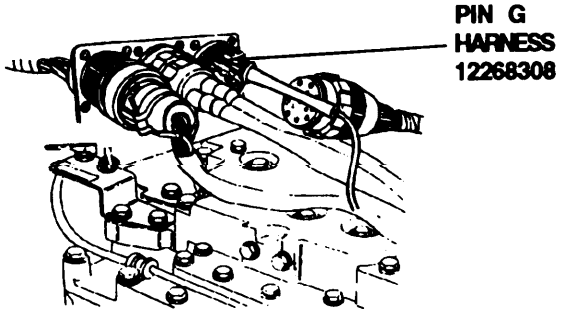
4. Check for continuity.

Is continuity indicated?

Continued on next page



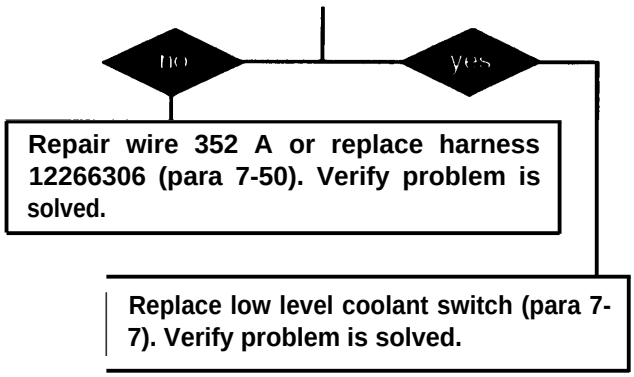




2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(4) ENGINE LOW LEVEL COOLANT LIGHT FAILS TO OPERATE WHEN PRESSED-TO-TEST. All other lights operate (continued).

CONTINUED FROM G



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(5) GLOW PLUG WAIT LIGHT FAILS TO OPERATE, ENGINE STARTS IN COLD WEATHER (BELOW 50° F). All other lights operate.

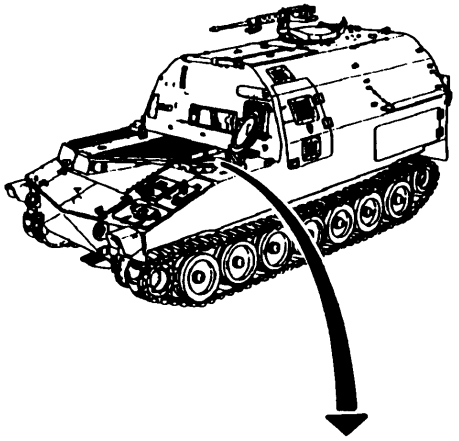
Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix I)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-1 0).
- Portable instrument panel stowed in outside position (refer to TM 9-2350-287-1 O).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.
- Glow plug controller does not work at temperatures above 50 °F.



A. 1. Remove glow plug lens and light bulb from glow plug indicator.

2. Place multimeter red lead in indicator and ground black lead.

3. Turn MASTER switch ON and hold GLOW PLUG switch ON (refer to TM 9-2350-287-10).

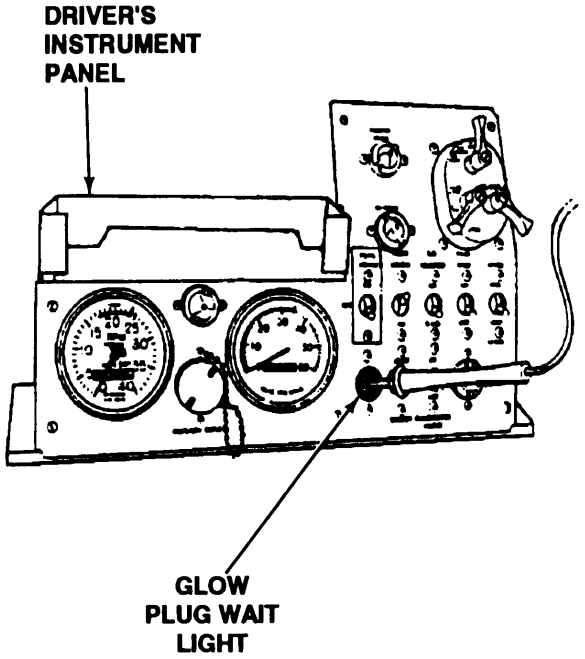
4. Check for 24 ± 3 vdc.

5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no → Replace glow plug indicatorlamp (para 7-9). Verify problem.

yes



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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(5) GLOW PLUG WAIT LIGHT FAILS TO OPERATE, ENGINE STARTS IN COLD WEATHER (BELOW 50° F). All other lights operate (continued).

CONTINUED FROM A

B. 1. Install light bulb and lens in glow plug indicator.

2. Loosen six screws and cover from driver's instrument panel.

3. Disconnect wire 486 from indicator lamp on back of the driver's instrument panel.

4. Connect multimeter red lead in wire 486 and ground black lead.

5. Turn MASTER switch ON and hold GLOW PLUG switch ON (refer to TM 9-2350-287-10).

6. Check for 24 ± 3 vdc.

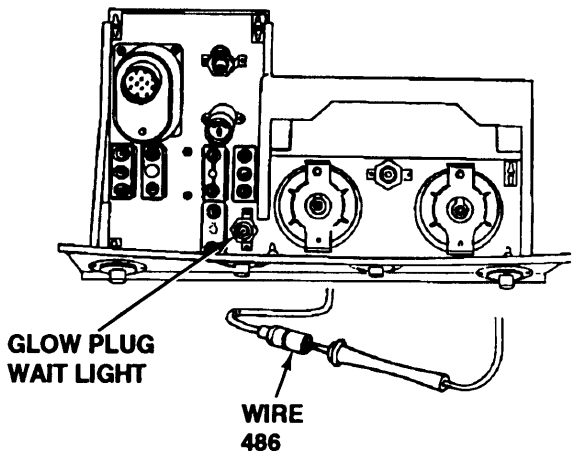
7. Turn MASTER switch GLOW PLUG switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no

yes

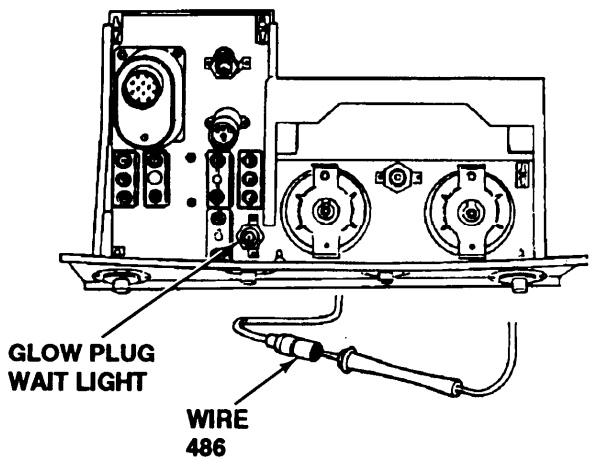
Replace glow plug wait light socket (para 7-9). Verify problem is solved.



C. 1. Disconnect wire harness 12260287 from bulkhead disconnect.

2. Place one multimeter lead in pin C of harness 12260287 bulkhead connector and place other lead on wire 486 of harness 12260287 and check for continuity.

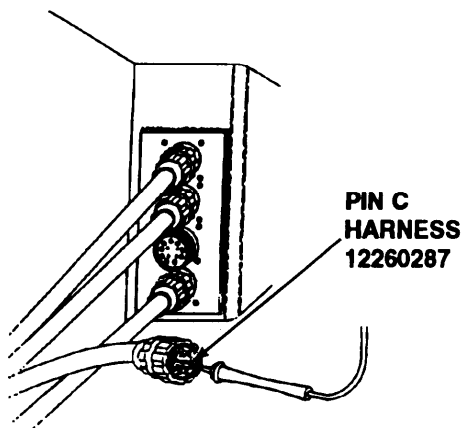
Is continuity indicated?



no

yes

Repair wire 486 or replace harness 12260287 (para 7-56). Verify problem is solved.



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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).

(5) GLOW PLUG WAIT LIGHT FAILS TO OPERATE, ENGINE STARTS IN COLD WEATHER (BELOW 50° F). All other lights operate (continued).

CONTiNUED FROM C

D. 1. Reconnect wire486 of harness 12260287 to glow plug wait light and reassembledriver's instrument panel.

2. Disconnect harness 12268418-1 at engine disconnect bracket and harness 12260287 at driver's bulkhead.

3. Place one lead of multimeter in socket C of harness 12268418-1 bulkhead connector and place other lead in socket A of harness 12268418-1 engine disconnect bracket connector and check for continuity.

Is continuity indicated?

no — yes

Repair wire 486 or replace harness 12268418-1 (para 7-44). Verify problem is solved.

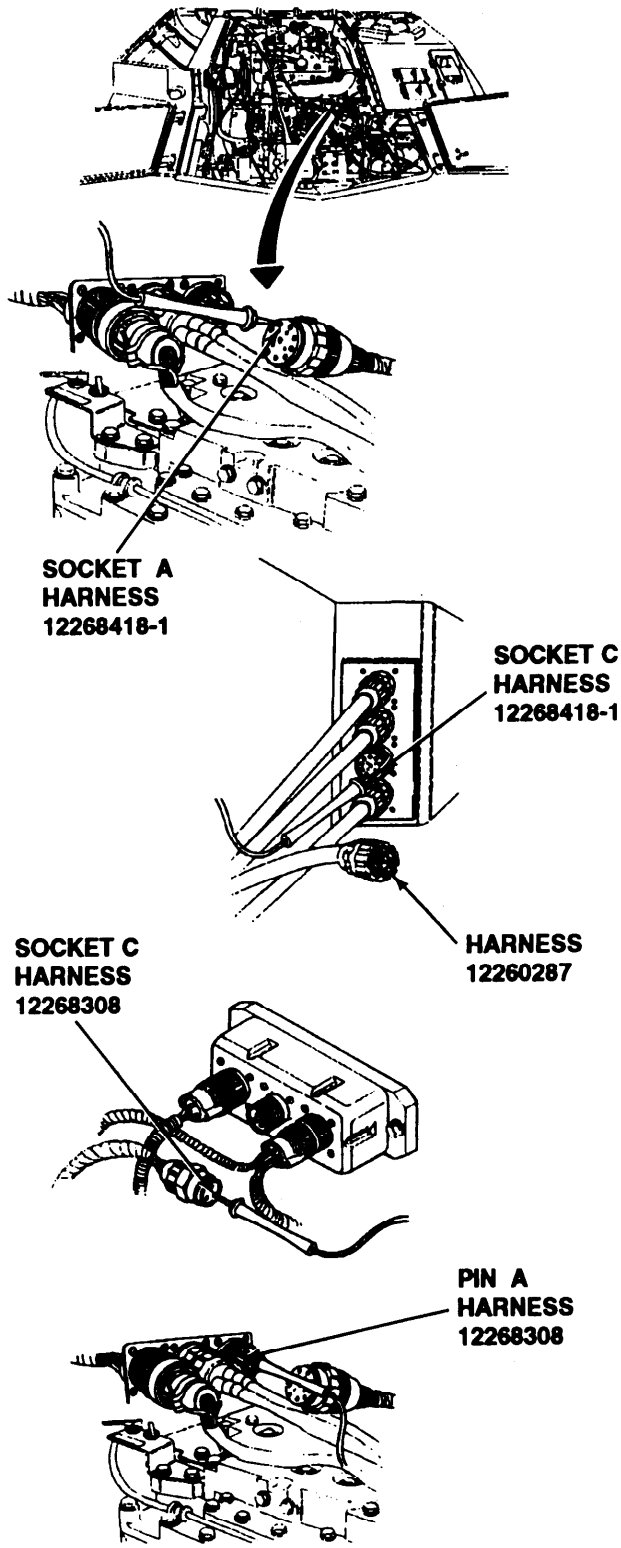
E. 1. Reconnect harnesses 12260287 to driver's bulkhead connector.

2. Disconnect wire harness 12268308 from glow plug controller.

3. Place one lead of multimeter on pin A of harness 12268418-1 engine disconnect bracket connector and place other lead on socket A of harness 12268308 glow plug controller connector and check for continu-

4. Repeat step 3 except place one muitimeter lead on pin C of harness 12268308 glow plug controller connector and check for continuity.

Is continuity indicated in both circuits?



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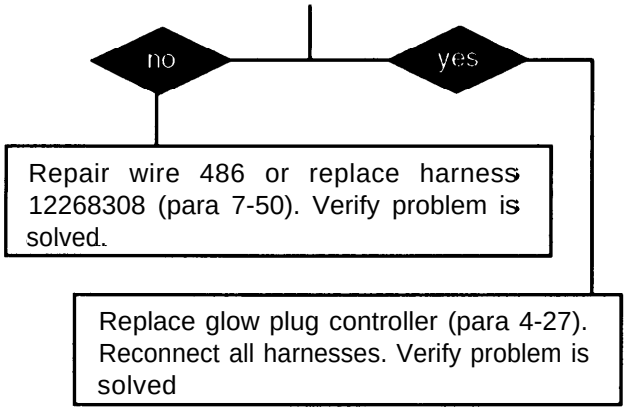
12-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(5) GLOW PLUG WAIT LIGHT FAILS TO OPERATE, ENGINE STARTS IN COLD WEATHER (BELOW 50° F). All other lights operate (continued).

CONTINUED FROM E



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).

(6) MASTER SWITCH INDICATOR LIGHT FAILS TO OPERATE WITH MASTER SWITCH ON. All other electrical systems operate.

Initial Setup:

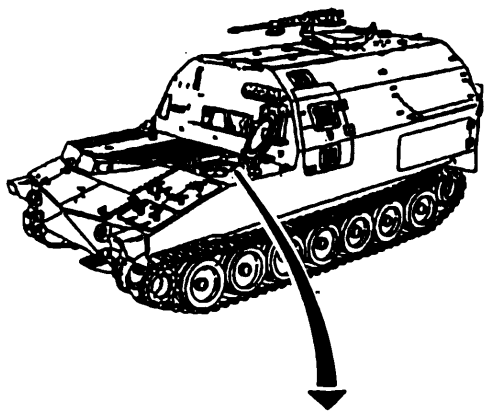
Tools/Test Equipment:
Digital multimeter (DMM) (Item 13, Appendix I)
General mechanic's tool kit (Item 24, Appendix I)

Equipment Conditions:
MASTER switch set to OFF (refer to TM 9-2350-287-10).

NOTE

Instead of using multimeter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.

Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.



A. 1. Remove lens and light bulb from MASTER switch indicator lamp socket.

2. Place red lead of multimeter in indicator light socket and ground black lead.

3. Turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Check for 24 ± 3 vdc.

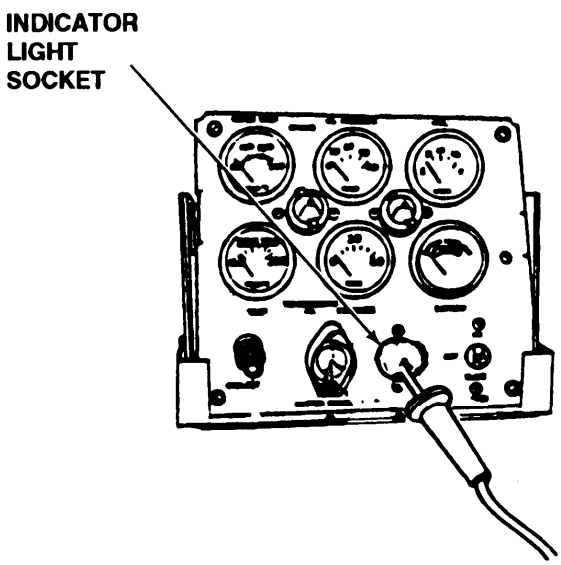
5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no

yes

Replace indicator lamp (para 7-6). Verify problem is solved.



B. 1. Install light bulb and lens in MASTER switch indicator lamp socket.

2. Remove four screws and cover from driver's portable instrument panel.

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(6) MASTER SWITCH INDICATOR LIGHT FAILS TO OPERATE WITH MASTER SWITCH ON. All other electrical systems operate (continued).

CONTINUED FROM B

B. 3. Remove wire 459L from MASTER switch indicator light assembly.

4. Place red lead of multimeter in wire 459L and ground black lead.

5. Turn MASTER switch ON (refer to TM 9-2350-287-10).

6. Check for 24 ± 3 vdc.

7. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

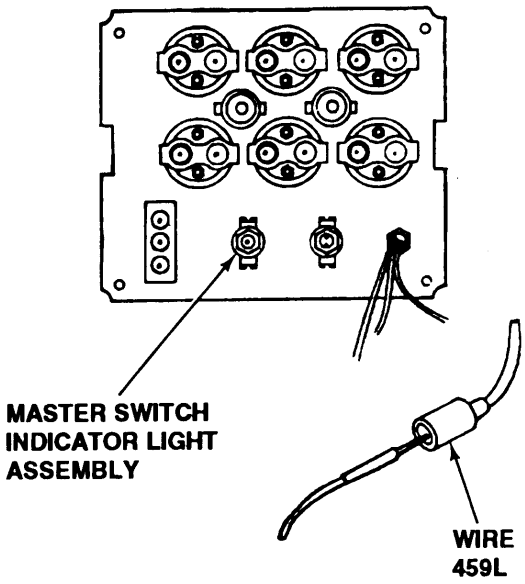
Is voltage indicated?

no

yes

Replace indicator lamp assembly (para 7-6). Verify problem is solved.

Repair wire 459L or replace harness 122680298 (para 7-7). Verify problem is solved.



END OF TASK

12-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(7) HIGH BEAM INDICATOR LIGHT FAILS TO OPERATE. All other lights operate.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10),
- Portable instrument panel stowed in outside position (refer to TM 9-2350-287-1 0).
- For this entire task ensure the light switch is set to service drive (SER DRIVE); headlights are on high beam (refer to TM 9-2350-287-1 0).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. 1. Remove lens and light bulb from high beam indicator socket.

2. Place red lead of multimeter in indicator light socket and ground black lead.

3. Turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Check for 24 ± vdc.

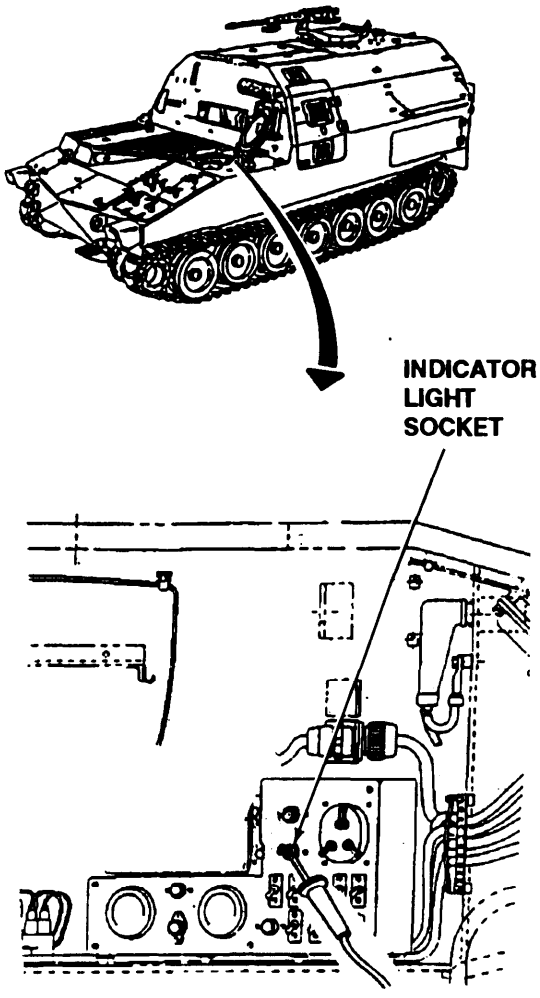
5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no

yes

Replace indicator light bulb (para 7-9). Verify problem is solved.



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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(7) HIGH BEAM INDICATOR LIGHT FAILS TO OPERATE. All other lights operate (continued).

CONTINUED FROM A

B. 1. Install light bulb and lens in high beam indicator.

2. Remove six screws, lockwashers, and cover from driver's instrument panel.

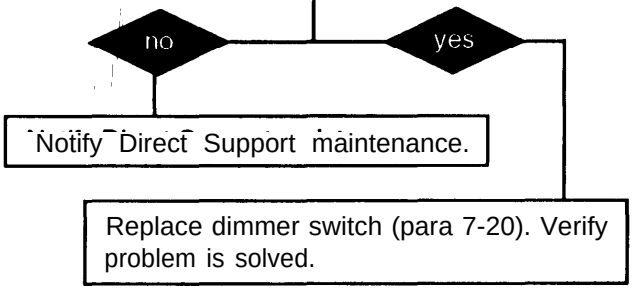
3. Disconnect harness 12330252 wires 519 from high beam indicator light.

4. Disconnect harness 12330252 from dimmer switch.

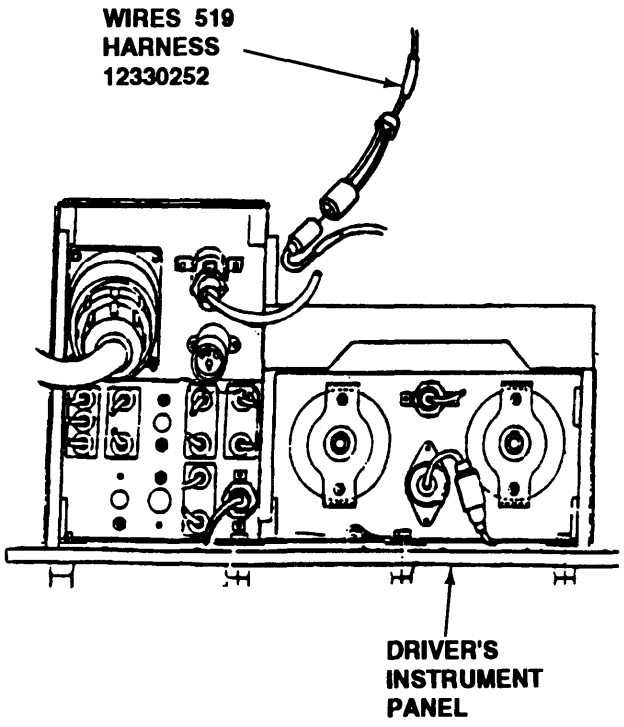
5. Place one lead of multimeter in socket H of harness 12330252 dimmer switch connector and place other lead to corresponding wire 519 of harness 12330252 HIGH BEAM indicator light and check for continuity.

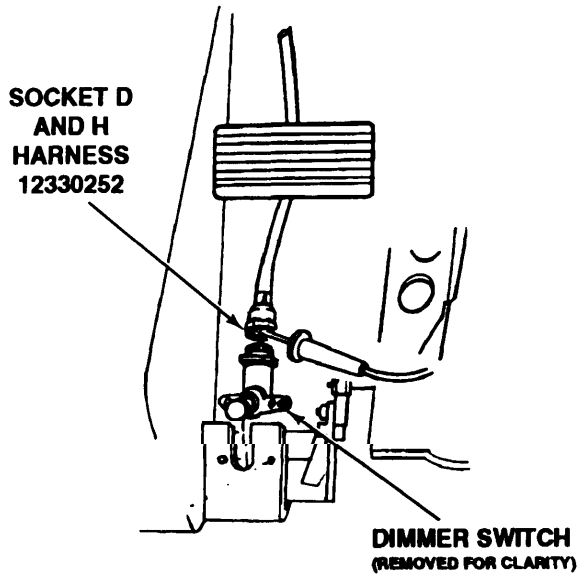
6. Place one lead of multimeter to socket D of harness 12330252 dimmer switch connector and place other lead to corresponding wire 519 of harness 12330252 HIGH BEAM indicator light and check for continuity.

Is continuity indicated at both circuits?



END OF TASK





2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(8) PARKING BRAKE INDICATOR LIGHT FAILS TO OPERATE. Parking brake is set.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)

Personnel Required: Two

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Driver's portable instrument panel cover removed (para 7-6).
- Parking brake engaged (refer to TM 9-2350-287-10).
- Portable instrument panel stowed in outside position (refer to TM 9-2350-287-10).

NOTE

- Instead of using multimeter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. 1. Remove lens and light bulb from parking brake indicator light socket.

2. Place red lead of multimeter on indicator light socket center contact and ground black lead.

3. Turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Check for 24 ± 3 vdc.

5. Turn off MASTER switch (refer to TM 9-2350-287-10).

Is voltage indicated?

no

yes

Replace parking brake indicator light bulb (para 7-9). Verify problem is solved.

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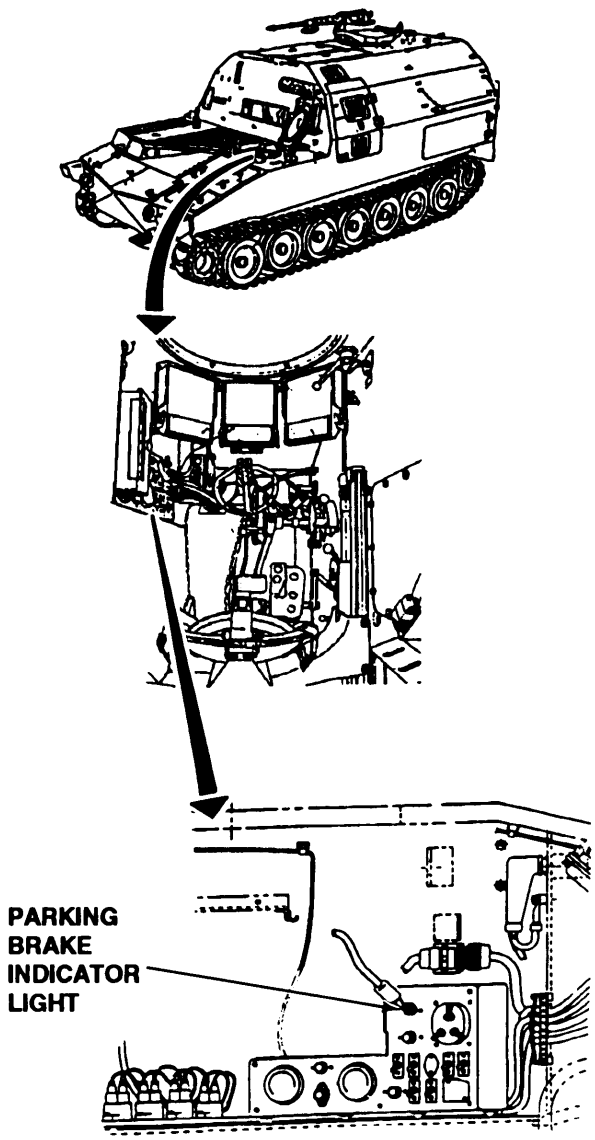


2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(8) PARKING BRAKE INDICATOR LIGHT FAILS TO OPERATE. Parking brake is set (continued).

CONTINUED FROM A

B. 1. Disconnect wire 509E from parking brake light.

2. Place red lead of multimeter on wire 509E connector pin and ground black lead.

3. Turn MASTER switch ON (refer to TM 9-2350-287-10).

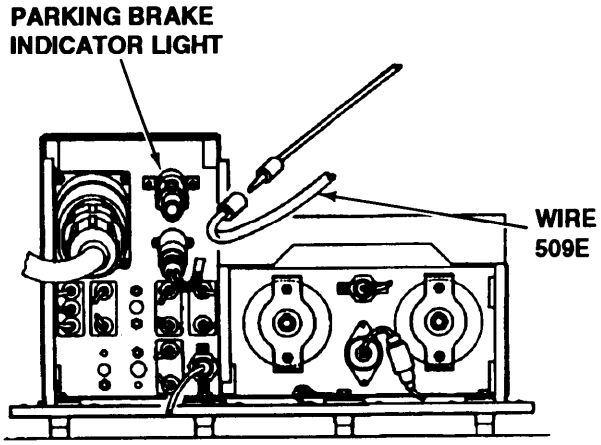
4. Check for 24 ± 3 vdc.

5. Turn off MASTER switch (refer to TM 9-2350-287-10).

Is voltage indicated?

no — yes

Replace parking brake light assembly (para 7-9). Verify problem is solved.



C. 1. Reconnect wire 509E to parking brake light.

2. Disconnect wire harness 12260287 wires 509E from parking brake warning switch.

3. Place red lead of multimeter on wire 509E (connector wire 509E from circuit breaker panel) and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-1O).

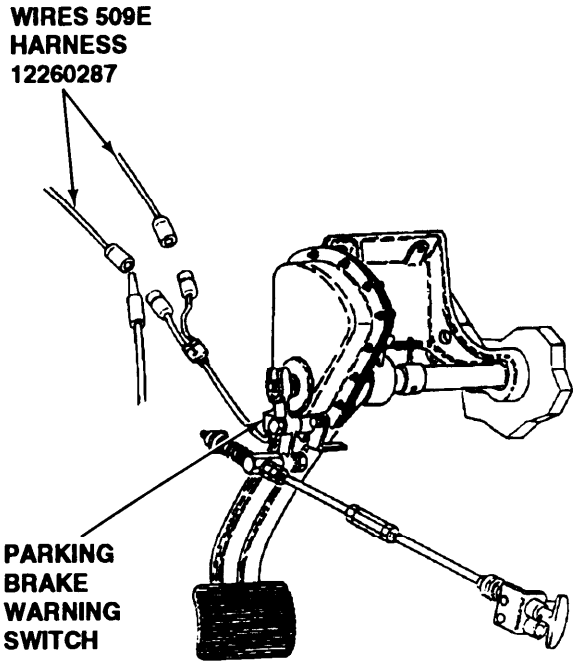
5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no — yes

Replace parking brake warning switch assembly (para 7-20). Verify problem is solved.



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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).

(8) PARKING BRAKE INDICATOR LIGHT FAILS TO OPERATE. Parking brake is set (continued).

CONTINUED FROM C

D. 1. Reconnect wires 509E to parking brake warning switch assembly.

2. Disconnect harness 12268104 wire 509E from harness 12260287 wire 509E behind driver's instrument panel.

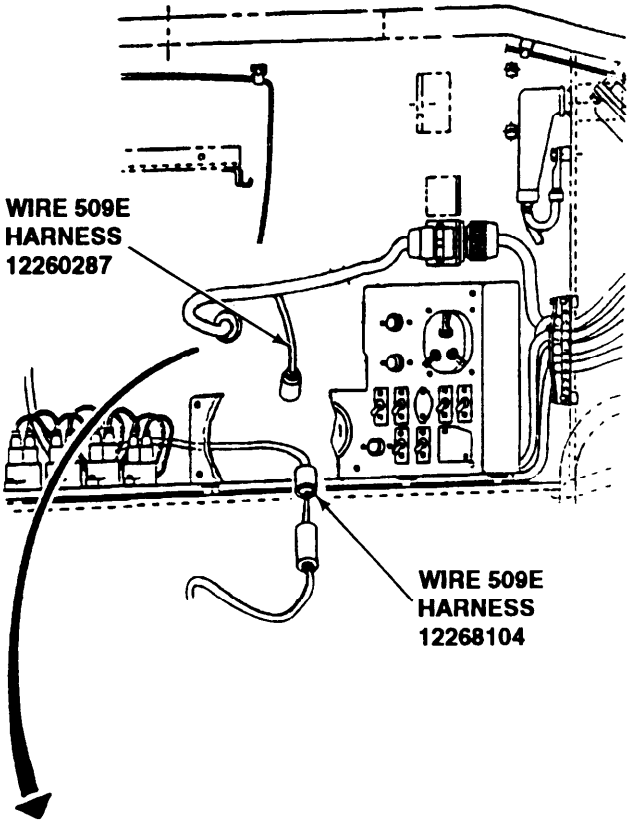
3. Place red lead of multimeter on harness 12268104 wire 509E connector socket and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10)

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10)

Is voltage indicated?



No

Yes

Repair wire 509E or replace harness 12260287 (para 7-56). Verify problem is solved.

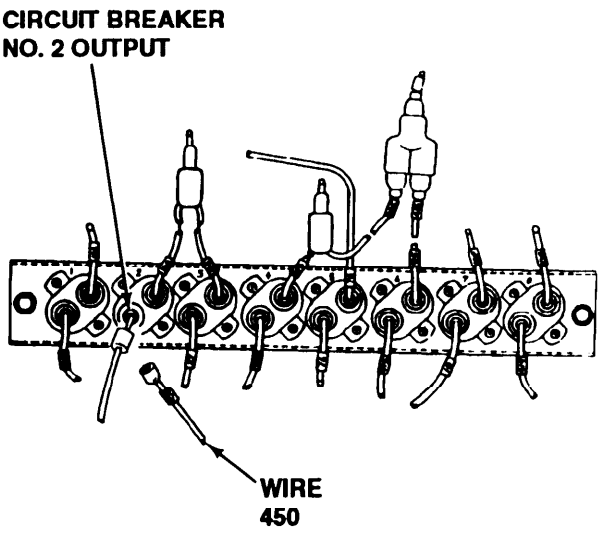
E. 1. Connect wire harness 12268104 wire509E to wire harness 12260287 wire 509E.

2. Disconnect wire 450 of harness 12268104 from output circuit breaker no. 2 of panel no. 1.

3. Place red lead of multimeter in output of circuit breaker no. 2 and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± vdc.



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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).

(8) PARKING BRAKE INDICATOR LIGHT FAILS TO OPERATE. Parking brake is set (continued).

CONTINUED FROM E

E. 6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no → Repair or replace harness 12268104 (para 7-61). Verify problem is solved.

yes →

F. 1. Connect wire 450 of harness 12268104 to circuit breaker no. 2 output.

2. Disconnect wire 10B from circuit breaker no. 2 input.

3. Place red lead of multimeter in wire 10B and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

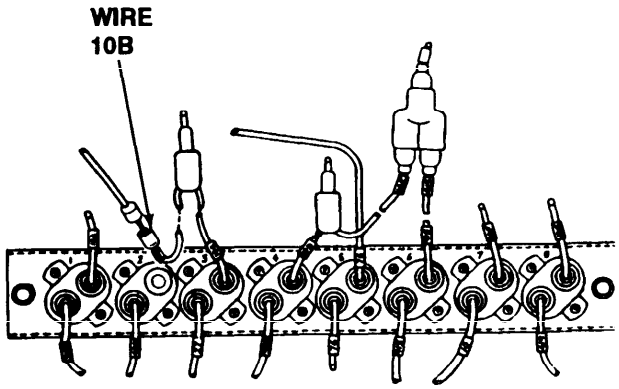
5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-1O).

Is voltage indicated?

no → Repair wire 10B or replace harness 12376405 (para 7-57). Verify problem is solved.

yes → Replace circuit breaker no. 2 of panel no. 1 (para 7-11). Verify problem is solved.



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(9) PERSONNEL HEATER INDICATOR LED FAILS TO OPERATE WHEN PRESSED-TO-TEST OR WITH HEATER OPERATING .

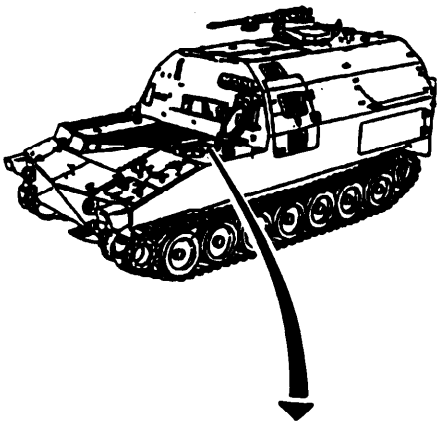
Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.



A. 1. Remove personnel heater indicator light from socket.

2. Place red lead of multimeter in indicator light socket and ground black lead.

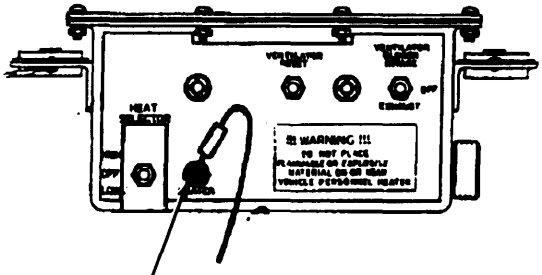
3. Turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Press in personnel heater indicator.

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-1O).

Is voltage indicated?



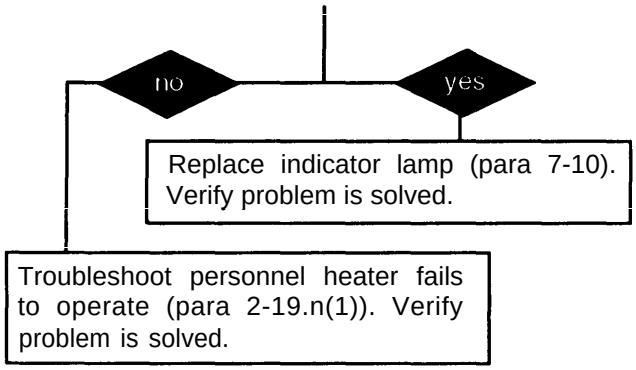
PERSONNEL HEATER INDICATOR LIGHT

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(9) PERSONNEL HEATER INDICATOR LED FAILS TO OPERATE WHEN PRESSED-TO-TEST OR WITH HEATER OPERATING (continued).

CONTINUED FROM A



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued)..	(10) ONE OR BOTH HEADLIGHTS FAIL TO OPERATE. All other lights operate.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)

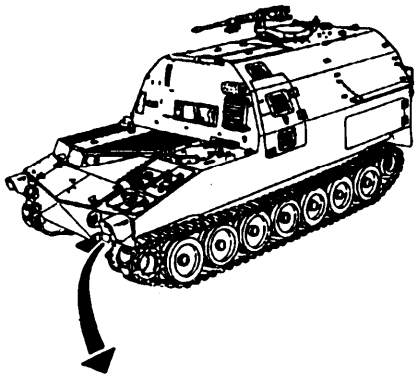
Materials/Parts:
- LockWasher (4) (Item 119, Appendix H)

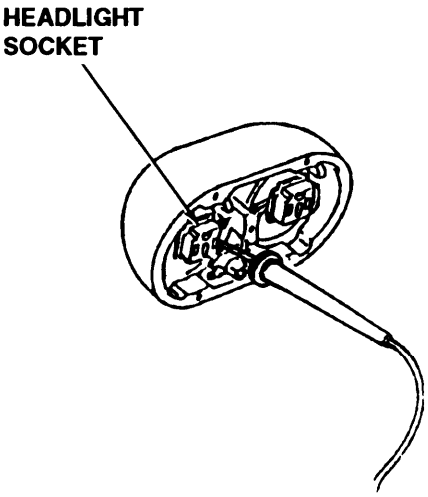
Personnel Required: Two

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Lighting switch in SER DRIVE position and dimmer switch set to low beam (refer to TM 9-2350-287-10).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLATGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.
- Troubleshooting procedures for both headlight assemblies are identical. If both headlights fail to work, troubleshoot both according to steps A through C.





A. 1. Remove four screws, lockwashers, cover, and headlight bulb from headlight assembly. Discard lockwashers.

2. Place red lead of multimeter in light bulb socket and ground black lead.

3. Turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Turn MASTER switch OFF (refer toTM 9-2350-287-10).

Is voltage indicated?

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(10) ONE OR BOTH HEADLIGHTS FAIL TO OPERATE. All other lights operate (continued).

CONTINUED FROM A

no / yes

Replace headlight bulb (para 7-32). **Verify problem is solved.**

B. 1. Loosen clamp, and remove headlight assembly from headlight mount assembly.

2. Place red lead of multimeter in socket A of headlight mount assembly harness and ground black lead.

3. Have assistant turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Check for 24 ± 3 vdc.

6. Have assistant set dimmer switch to high beam (refer to TM 9-2350-287-10).

7. Place red lead of multimeter in socket B of headlight mount assembly harness and ground black lead.

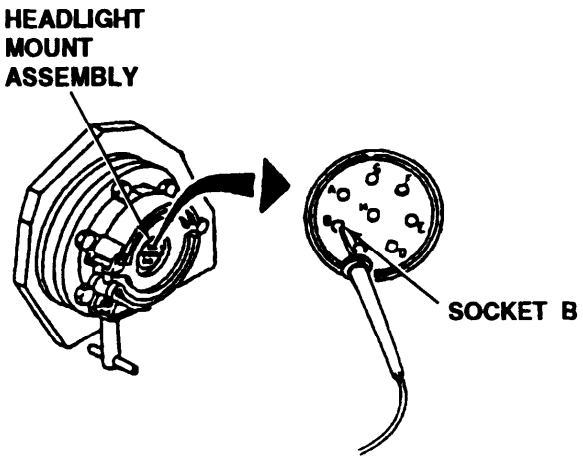
8. Check for 24 ± 3 vdc.

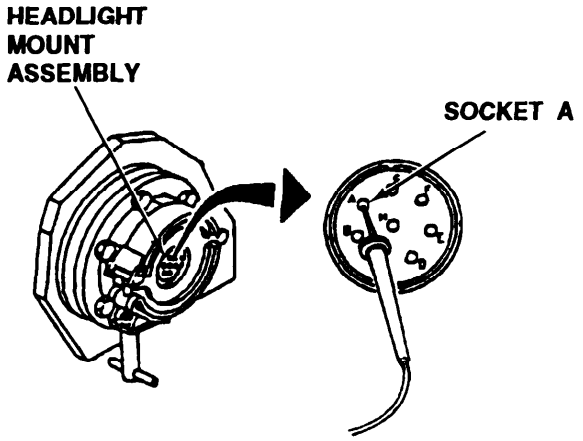
9. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated at both sockets?

no / yes

Repair or replace headlight assemblies (para 7-31). Verify problem is solved.





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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).

(10) ONE OR BOTH HEADLIGHTS FAIL TO OPERATE. All other lights operate (continued).

CONTINUED FROM B

C. 1. Disconnect wires 17 and 18 of harness 10921380 from headlight mount assembly harness.

2. Place one lead of multimeter in socket A at headlight mount and place other lead on wire 18 pin connector of headlight mount assembly harness and check for continuity.

3. Place one lead of multimeter in socket B at headlight mount and place other lead on wire 17 pin connector of headlight mount assembly harness and check for continuity.

Is continuity indicated at both circuits?

no

Replace headlight mount assembly (para 7-31). Verify problem is solved.

yes

D. 1. Install headlight assembly in headlight mount assembly.

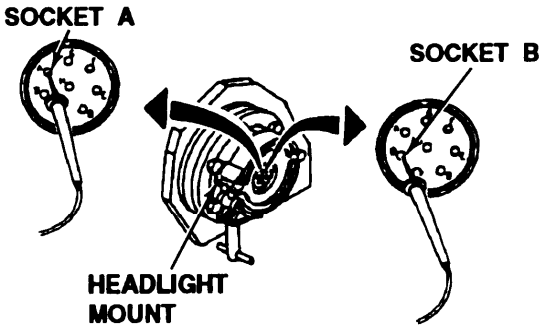
2. Install headlight bulb and cover on headlight assembly with four screws and new lockwashers.

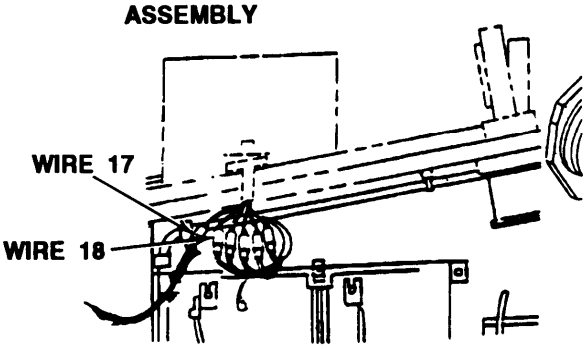
3. Disconnect harness 12330252 from driver's bulkhead.

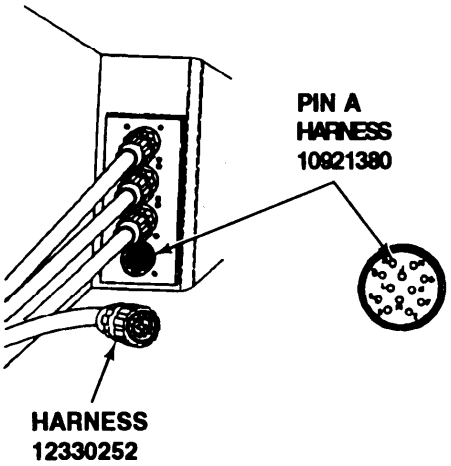
4. Place one lead of mutlimeter in harness 10921380 wire 18 connector to headlight mount assembly and connect other lead on pin A of harness 10921380 bulkhead connector and check for continuity.

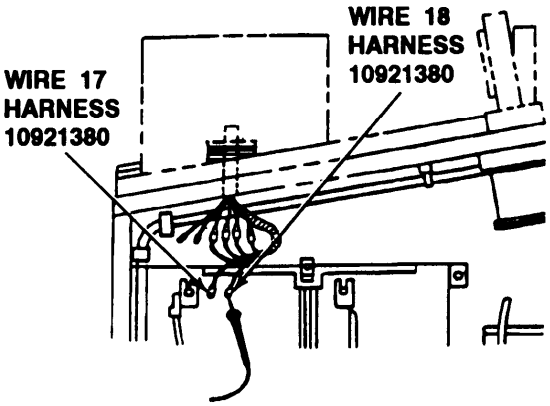
5. Place one lead of multimeter in harness 10921380 wire 17 connector to headlight mount assembly and place other lead on pin B of harness 10921380 bulkhead connector and check for continuity.

Is continuity indicated at both circuits?









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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(10) ONE OR BOTH HEADLIGHTS FAIL TO OPERATE. All other lights operate (continued).

CONTINUED FROM D

no / yes

Repair wires 17 and/or 18 or replace harness 10921380 (para 7-43). Verify problem is solved.

E. 1. Reconnect wires 17 and 18 of harness 10921380 to headlight mount assembly harness.

2. Disconnect harness 12330252 from dimmer switch.

3. Place one lead of multimeter on socket A of harness 12330252 driver's bulkhead connector and place other lead of multimeter on socket E of harness 12330252 dimmer switch connector and check for continuity.

4. Place one lead of multimeter in socket B of harness 12330252 driver's bulkhead connector and place other lead of multimeter on socket F of harness 12330252 dimmer switch connector and check for continuity.

Is continuity indicated?

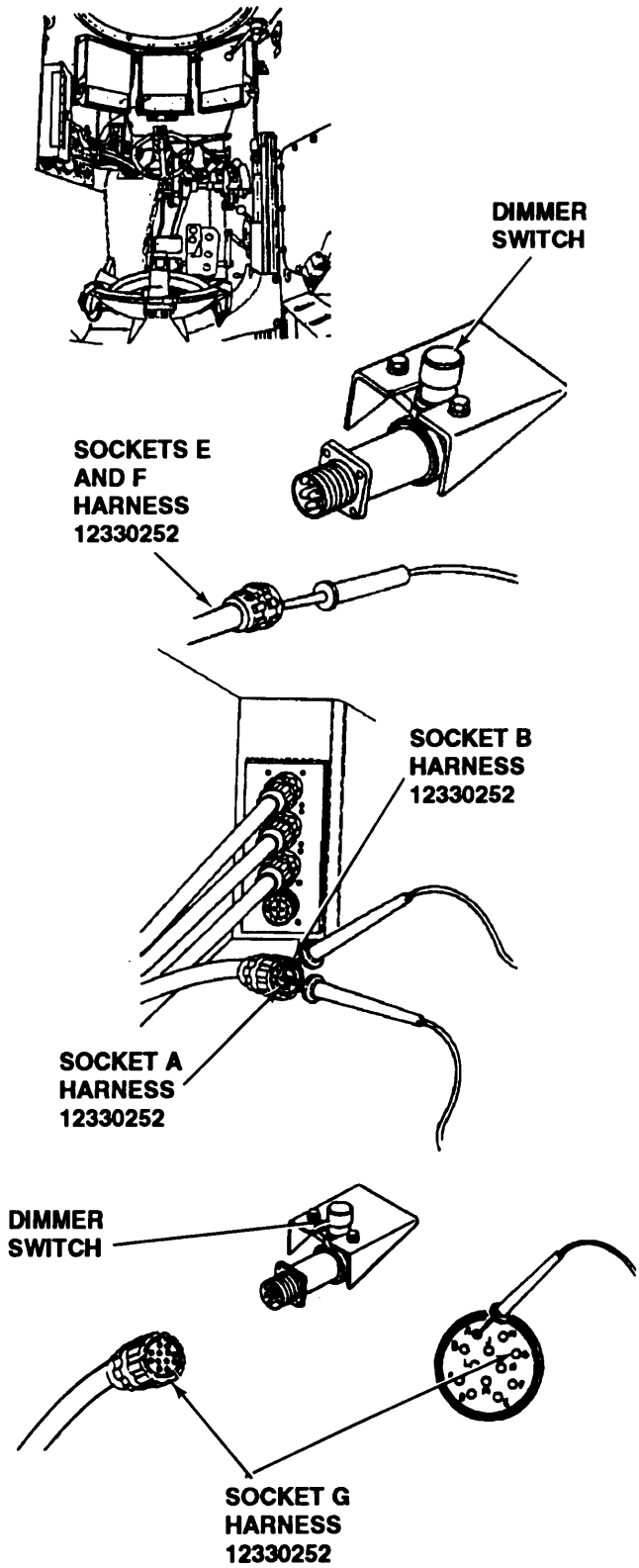
no / yes

Notify Direct Support maintenance.

F. 1. Reconnect harness 12330252 to harness 10921380.

2. Place red lead of multimeter in socket G of harness 12330252 and ground black lead.

3. Turn MASTER switch ON (refer to TM 9-2350-287-10).



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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(10) ONE OR BOTH HEADLIGHTS FAIL TO OPERATE. All other lights operate (continued).

CONTINUED FROM F

F. 4. Check for 24 ± 3 vdc

5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no / yes

Replace dimmer switch (para 7-20). Verify problem is solved.

G. 1. Remove six screws and cover from driver's instrument panel.

2. Disconnect harness 12330252 connector from lighting switch.

3. Place one lead of muitimeter in socket G of harness 12330252 dimmer switch connector and place other lead socket M of harness 12330252 lighting switch connector and check for continuity.

Is continuity indicated?

no / yes

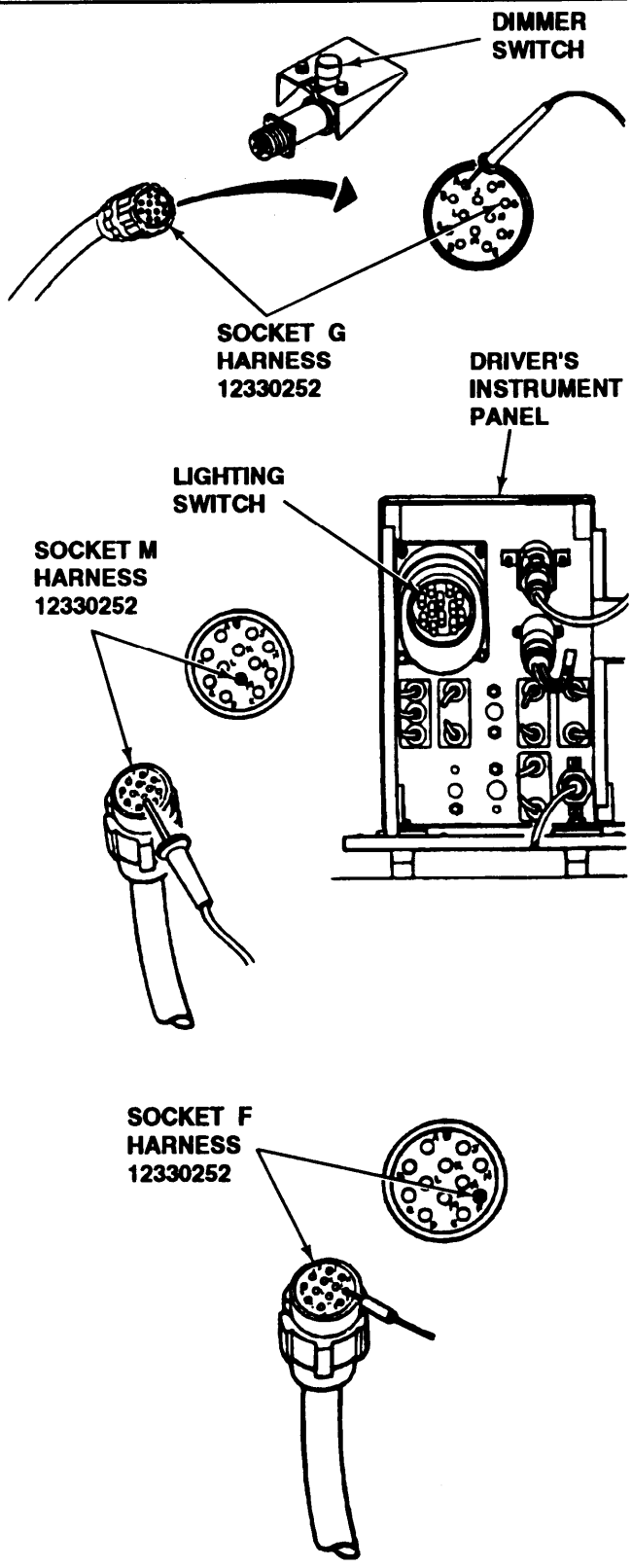
Notify Direct Support maintenance.

H. 1. Connect harness 12330252 connector to dimmer switch.

2. Place red lead of multimeter in socket F of harness 12330252 lighting switch connector and ground black lead.

3. Turn MASTER switch ON (refer to TM 9-2350-287-1O).

4. Check for 24 ± 3 vdc.



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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(1O) ONE OR BOTH HEADLIGHTS FAIL TO OPERATE. All other lights operate (continued).

CONTINUED FROM H

H. 5. Turn MASTER switch OFF (refer to TM 9-2350-287-1O).

Is voltage indicated?

no

yes

Replace lighting switch of driver's instrument panel (para 7-9). Verify problem is solved.

I. 1. Connect harness 12330252 to lighting switch.

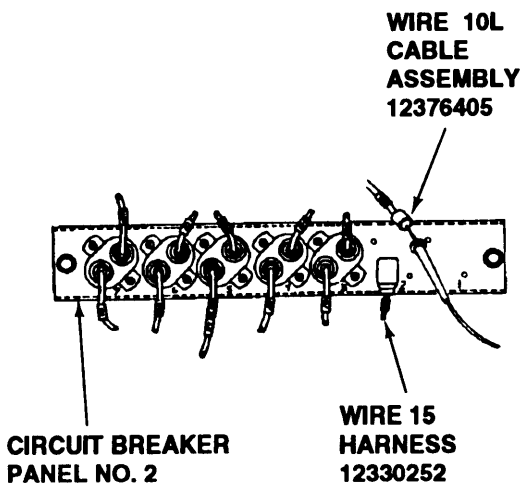
2. Disconnect wire 15 of harness 12330252 from wire 10L of cable assembly 12376405.

3. Place red lead of multimeter in wire 10L of cable assembly 12376405 and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-1O).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).



no

yes

Notify Direct Support maintenance.

Repair wire 10L or replace cable assembly 12376405 (para 7-57). Verify problem solved.

END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(11) ONE OR BOTH BLACKOUT (BO) DRIVE LIGHTS FAIL TO OPERATE. All other lights operate.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Lockwasher (4) (Item 119, Appendix H)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Lighting switch in BO DRIVE position and dimmer switch set on low beam (refer to TM 9-2350-287-10).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.
- This procedure can be used for both BO drive lights.

A. 1. Remove four screws and lockwashers and cover from headlight assembly. Discard lockwashers.

2. Remove light bulb from socket on headlight assembly.

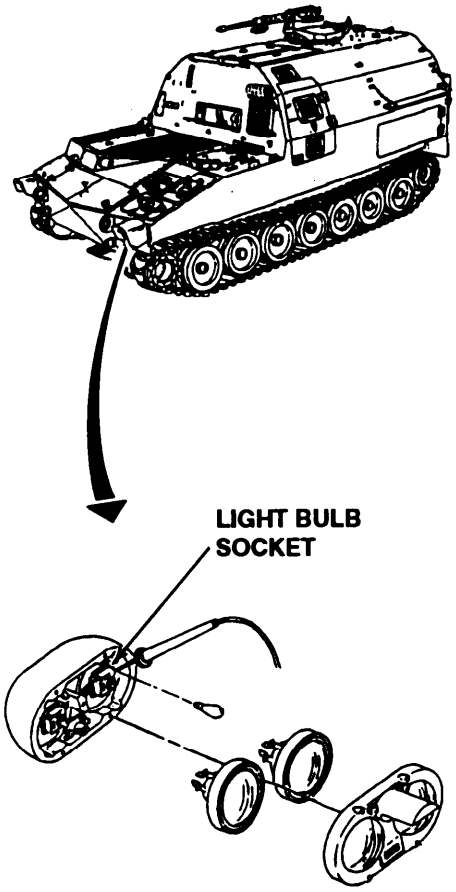
3. Place red lead of multimeter in light bulb socket and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?



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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued)..	(11) ONE OR BOTH BLACKOUT (60) DRIVE LIGHTS FAIL TO OPERATE. All other lights operate. (continued).

CONTINUED FROM A

no / yes

Replace blackout drive bulb (para 7-32). Verify problem is solved.

B. 1. Loosen clamp, and remove headlight assembly from headlight mount assembly.

2. Place red lead of multimeter in socket D of headlight mount assembly harness and ground black lead.

3. Have assistant set dimmer switch to low beam and turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Check for 24 ± 3 vdc.

5. Have assistant set dimmer switch to high beam.

6. Place red lead of multimeter on socket E and ground black lead.

7. Check for 24 ± 3 vdc.

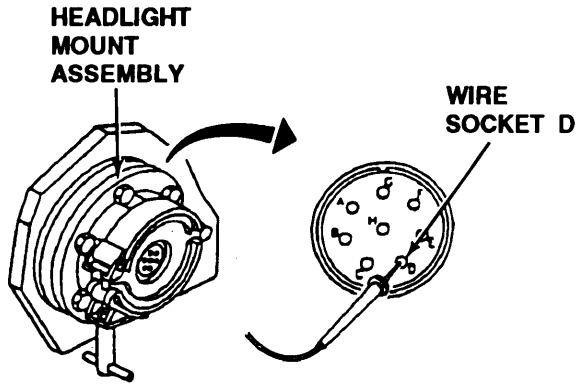
8. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

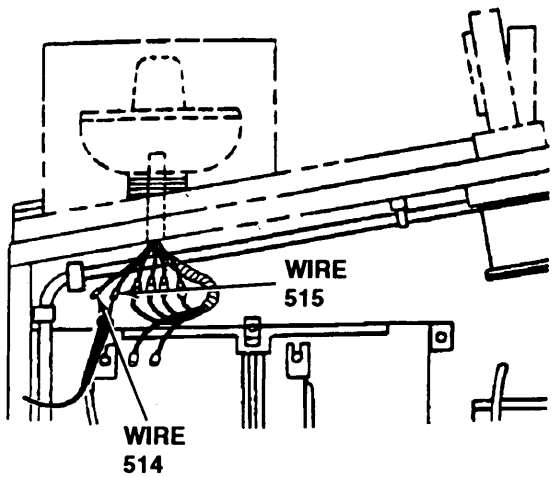
Is voltage indicted at both locations?

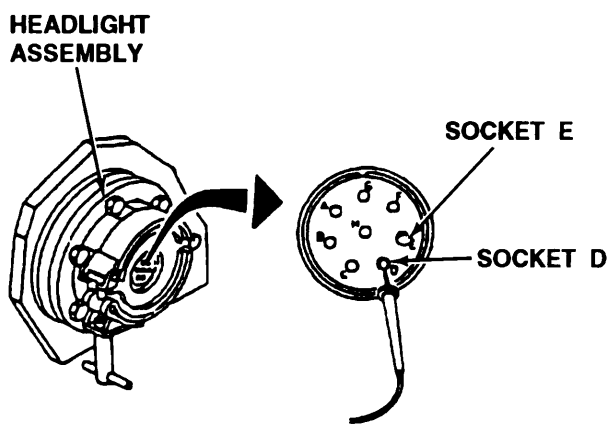
no / yes

Repair or replace headlight assembly (para 7-31). Verify problem is solved.

C. 1. Disconnect wires 514 and 515 of harness 10921380 from headlight mount assembly harness.







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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(11) ONE OR BOTH BLACKOUT (BO) DRIVE LIGHTS FAIL TO OPERATE. All other lights operate. (continued).

CONTINUED FROM C

C. 2. Place one lead of multimeter on socket D at headlight mount and place other lead on wire 515 pin connector of headlight mount assembly harness.

3. Check for continuity.

4. Place one lead of multimeter on socket E at headlight mount and place other lead on wire 514 pin connector of headlight mount assembly harness.

5. Check for continuity.

Is continuity indicated?

no — Replace headlight mount assembly (para 7-31). Verify problem is solved.

yes

D. 1. Install headlight assembly in headlingt mount assembty and tightem clamp.

2. Install lightbulb and cover on headlight assembly with four screws and new lockwashers.

3. Disconnect harness 12330252 from drivers bulkhead.

4. Place one lead of multimeter in harness 10921380 wire 515 connector to headlight mount assembly and place other lead on pin C of harness 10921380 bulkhead connector.

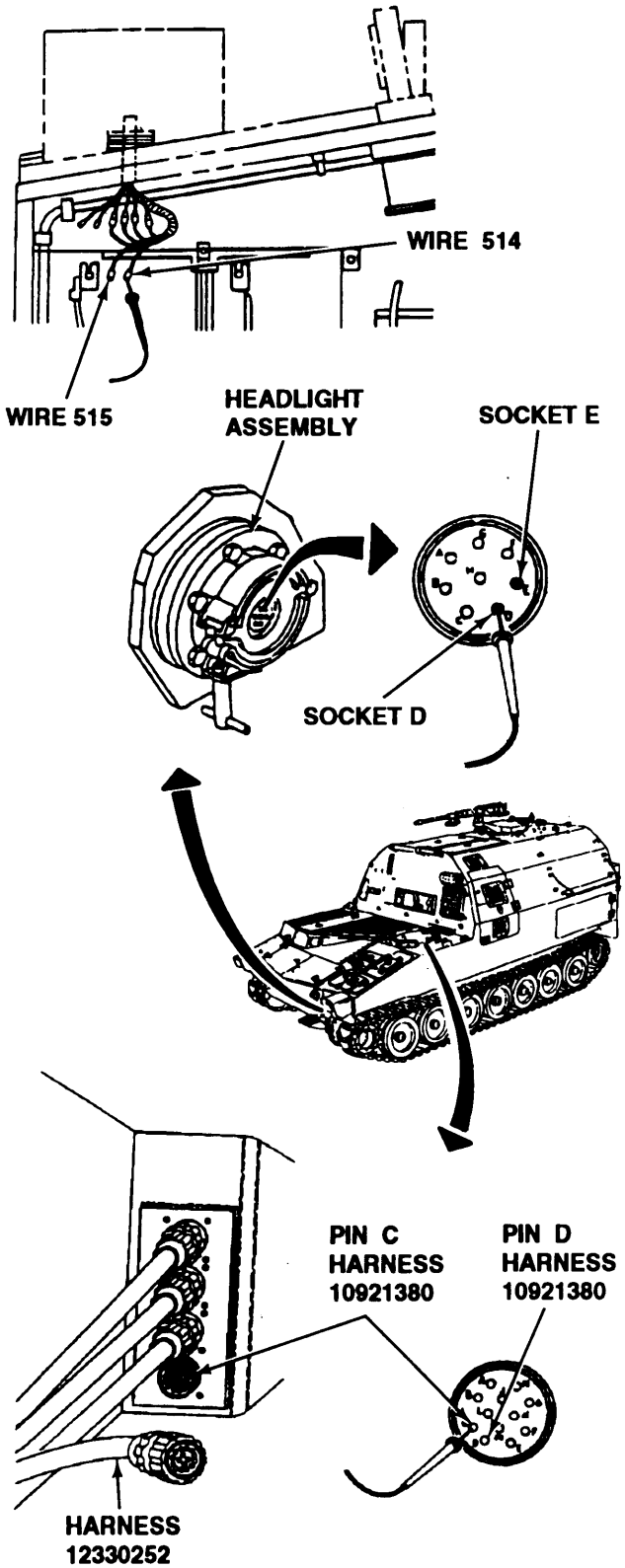
5. Check for continuity.

6. Place one lead of multimeter in harness 10921380 wire 514 connector to headlight mount assembly and place other lead on pin D of harness 10921380 bulkhead connector and

7. Check for continuity.

Is continuity indicated at both circuits?

Continued on next page



2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(11) ONE OR BOTH BLACKOUT (BO) DRIVE LIGHTS FAIL TO OPERATE. All other lights operate. (continued).

CONTINUED FROM E

no / yes

Repair wires 514 and/or 515 or replace harness 10921380 (para 7-43). Verify problem is solved.

E. 1. Reconnect wires 514 and 515 of harness 10921380 to headlight mount assembly harness.

2. Disconnect harness 12330252 from dimmer switch.

3. Place one lead of multimeter on socket C of harness 12330252 driver's bulkhead connector and place other lead of multimeter on pin A of harness 12330252 dimmer switch connector and check for continuity.

4. Place one lead of multimeter on socket D of harness 12330252 driver's bulkhead connector and place other lead of multimeter on pin B of harness 12330252 dimmer switch connector and check for continuity.

Is continuity indicated?

no / yes

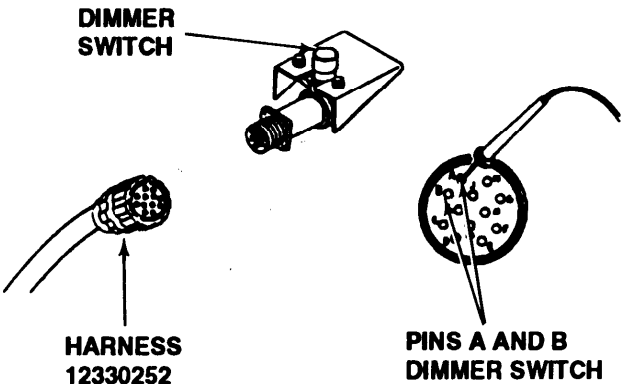
Notify Direct Support maintenance.

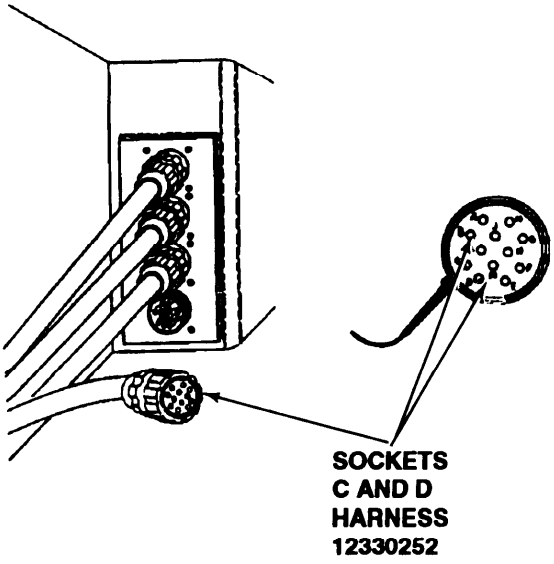
F. 1. Reconnect harness 12330252 to harness 10921380.

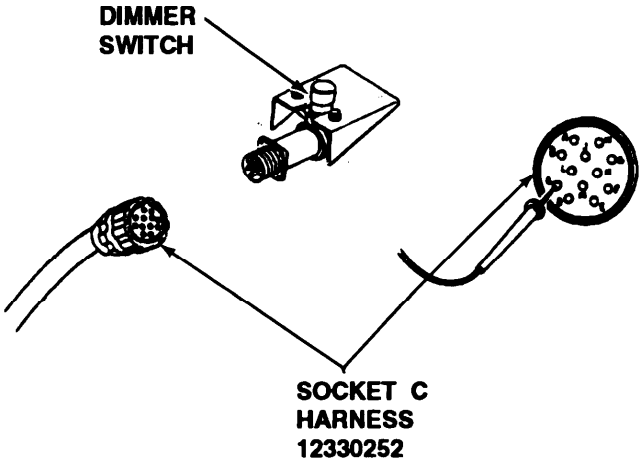
2. Place red lead of multimeter in socket C of harness 12330252 and ground black lead.

3. Turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Check for 24 ± 3 vdc?







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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(11) ONE OR BOTH BLACKOUT (BO) DRIVE LIGHTS FAIL TO OPERATE. All other lights operate. (continued).

CONTINUED FROM F

F. 4. Turn MASTER switch and lighting switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no → Replace dimmer swtich (para 7-20). Verify problem is solved.

yes →

G. 1. Remove six screws and cover from driver's instrument panel.

2. Disconnect harness 12330252 connector from lighting switch.

3. Place one lead of multimeter in socket C of harness 12330252 dimmer switch connector and place other lead socket D of harness 123330252 lighting switch connector and check for continuity.

Is continuity indicated?

no → Notify Direct Support maintenance.

yes →

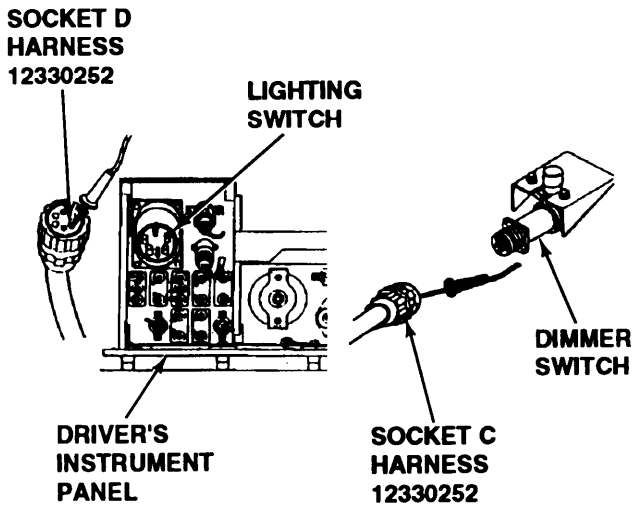
H. 1. Reconnect harness 12330252 connector to dimmer switch.

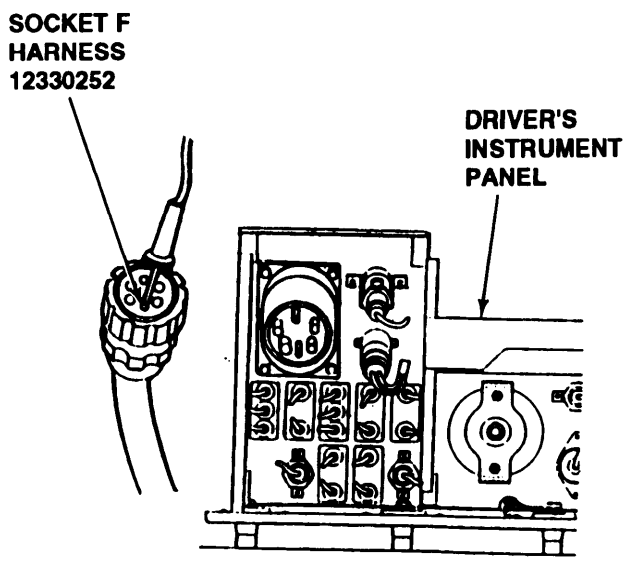
2. Place multimeter red lead in socket F of harness 12330252 lighting switch and ground black lead.

3. Turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Check for 24 ± 3 vdc.

5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).





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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(11) ONE OR BOTH BLACKOUT (BO) DRIVE LIGHTS FAIL TO OPERATE. All other lights operate. (continued).

CONTINUED FROM H

Is voltage indicated?

no → Replace lighting switch of driver's instrument panel (para 7-9). Verify problem is solved.

yes

I. 1. Reconnect harness 12330252 to lighting switch.

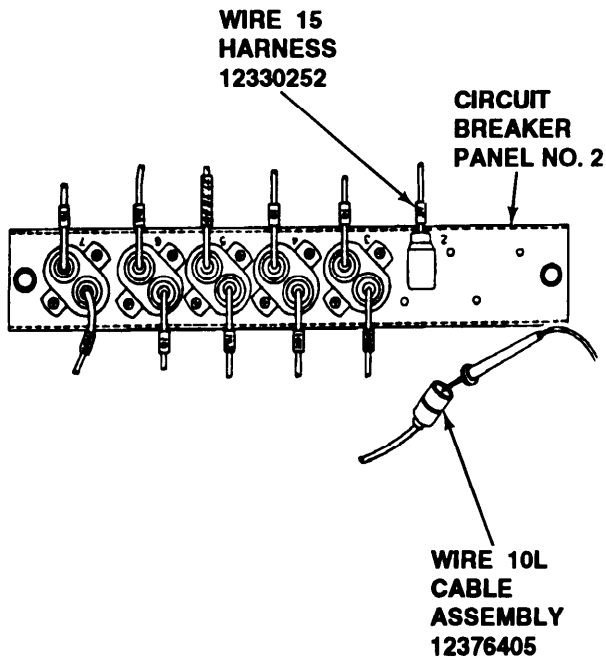
2. Disconnect wire 15 of harness 12330252 from wire 10L of cable assembly 12376405 at no. 2 position of circuit breaker panel no. 2.

3. Place multimeter red lead in wire 10L and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-1 0),



Is voltage indicated?

no → Repair wire 10L or replace cable assembly 12376405 (para 7-57).

yes → Notify Direct Support maintenance.

END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(12) FRONT BLACKOUT (BO) MARKER LED'S FAIL TO OPERATE. All other lights operate.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Lighting switch in BO MARKER position (refer to TM 9-2350-287-10).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.
- This procedure maybe used for right and left marker light.

A. 1. Remove four screws and cover from headlight assembly. Remove BO LED from bottom socket of headlight assembtl.

2. Place red lead of multimeter in LED socket and ground black lead.

3. Have assistant turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Check for 24 ± 3 vdc.

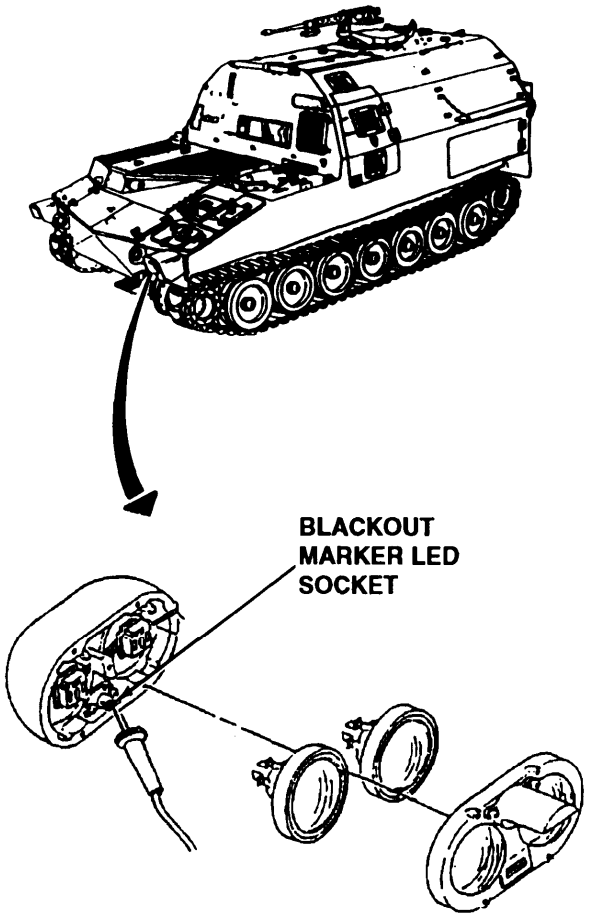
5. Have assistant turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no

yes

Replace LED (para 7-31). Verify problem is solved.



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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(12) FRONT BLACKOUT (BO) MARKER LED'S FAIL TO OPERATE. All other lights operate (continued).

CONTINUED FROM A

B. 1. Loosen clamp and remove headlight assembly from headlight mount of vehicle.

2. Place red lead of multimete ron wire socket F of headlight mount and ground black lead.

3. Have assistant turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Check for 24 ± 3 vdc.

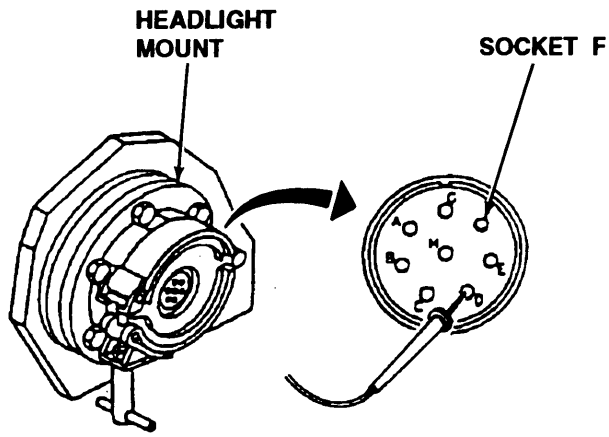
5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no

yes

Repair or replace headlight assembly (para 7-31). Verify problem is solved.



C. 1. Disconnect wire 20 of harness 10921380 from headlight mount assembly harness.

2. Place one lead of multimeter on socket F at headlight mount and place other lead on wire 20 pin connector of headlight mount assembly harness.

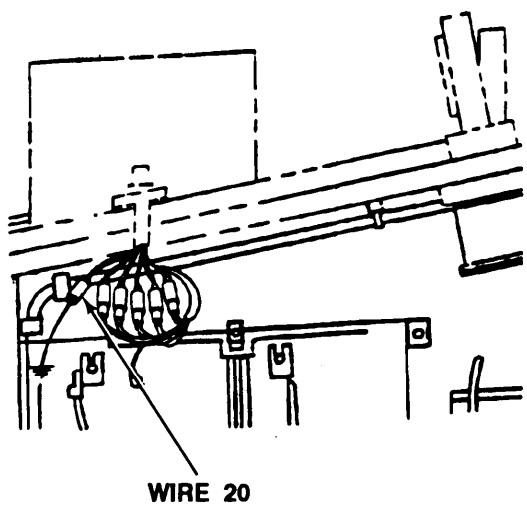
3. Check for continuity.

Is continuity indicated?

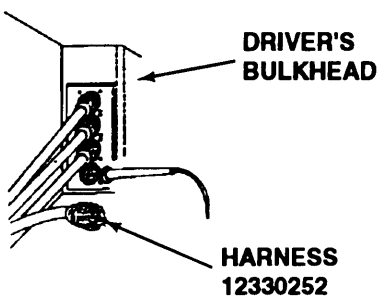
no

yes

Replace headlight mount assembly (para 7-31). Verify problem is solved.



D. 1. Disconnect harness 12330252 from driver's bulkhead.



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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(12) FRONT BLACKOUT (BO) MARKER LED'S FAIL TO OPERATE. All other lights operate (continued).

CONTINUED FROM D

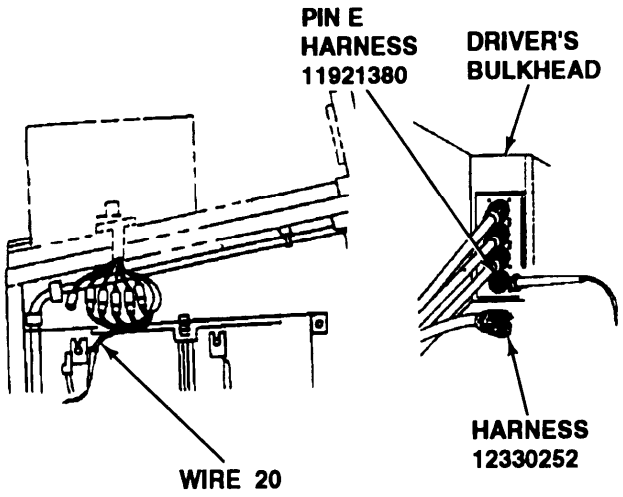
D. 2. Place one lead of multimeter in harness 10921380 wire 20 connector to headlight mount assembly and place other lead on pin E of harness 10921380 bulkhead connector.

3. Check for continuity.

Is continuity indicated at both circuits?

no — Repair wire 20 or replace harness 10921380 (para 7-43). Verify problem is solved.

yes



E. 1. Reconnect wire 20 of harness 10921380 to headlight mount assembly harness.

2. Remove six screws, Iockwashers and cover from driver's instrument panel.

3. Disconnect harness 12330252 connector from lighting switch.

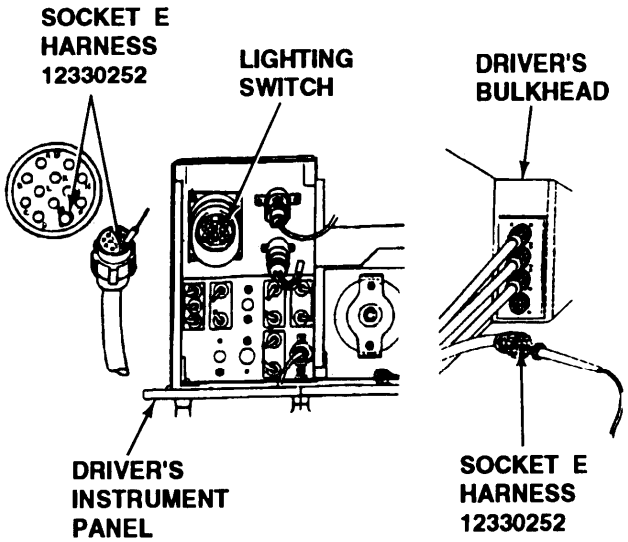
4. Place one lead of multimeter in socket E of harness 12330252 bulkhead connector and place other lead socket E of harness 12330252 light switch connector.

5. Check for continuity.

Is continuity indicated?'

no — Notify Direct Support maintenance.

yes — Replace lighting switch (para 7-9). Verify' problem is solved.



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(13) TAILLIGHTS FAIL TO OPERATE. All other lights operate.

Initial Setup::

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)

Personnel Required: Two

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Lighting switch set to SER DRIVE position (refer toTM 9-2350-287-10).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. 1. Loosen six screws, and remove cover from taillight assembly.

2. Remove taillight bulb from taillight assembly.

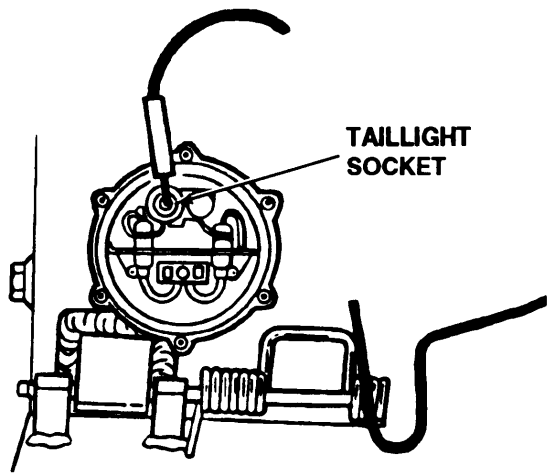
3. Place red lead of muttimeter on light socket center contact and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is votlage indicated?



no

yes

Replace taillight bulb (7-33 or 7-34). Verify problem is solved.

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(13) TAILLIGHTS FAIL TO OPERATE. All other lights operate (continued).

CONTINUED FROM A

B. 1. Install bulb and cover on taillight assembly, and tighten six screws.

2. Remove eight screws, lockwashers, and brace from left side crew compartment.

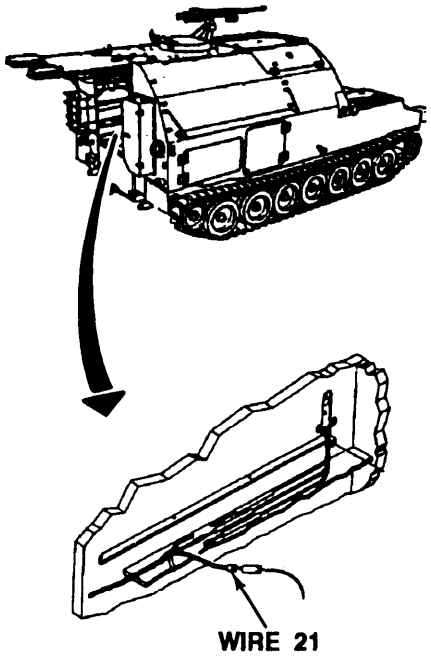
3. Remove screws, spacers, and wiring harness cover from rear wall of crew compartment.

4. Disconnect wire 21 of harness 12330252 from taillight assembly harness.

5 Have assistant turn MASTER switch ON (refer to TM 9-2350-287-10).

6. Check for 24 ± 3 wk.

7. Have assistant turn MASTER switch OFF (refer to TM 9-2350-287-10).



Is voltage indicated?

no

Repair or replace left taillight assembly (para 7-33). Verify problem is solved.

yes

C. 1. Remove six screws and cover from driver's instrument panel.

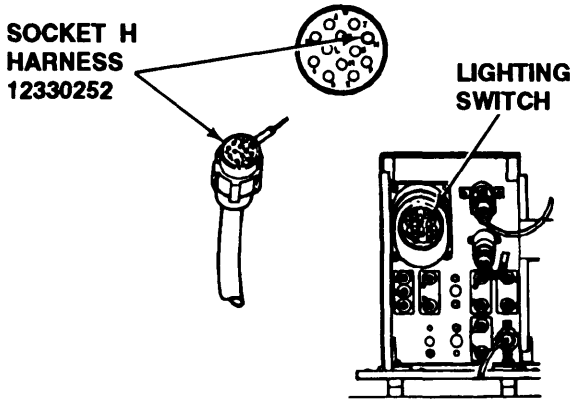
2. Disconnect harness 12330252 from lighting switch.

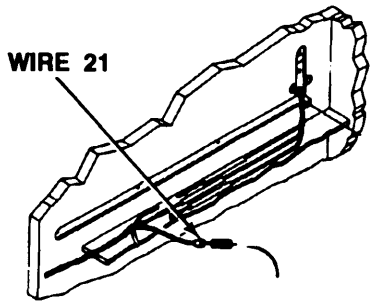
NOTE

To complete this step you will need to fabricate a multimeter extension using at least 12 feet of wire and make sure the end of the wire is able to be used as a probe into a socket.

3. Have assistant place one lead of muitimeter to socket H of harness 12330252 lighting switch connector and place other lead on socket of wire 21 of harness 12330252 connector at rear of crew compartment.

4. Check for continuity.





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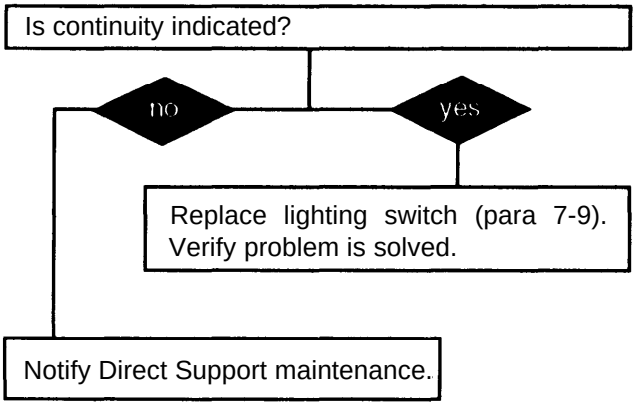
2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(13) TAILLIGHTS FAIL TO OPERATE. All other lights operate (continued).

CONTINUED FROM B



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(14) STOPLIGHT FAILS TO OPERATE. All other lights to operate.

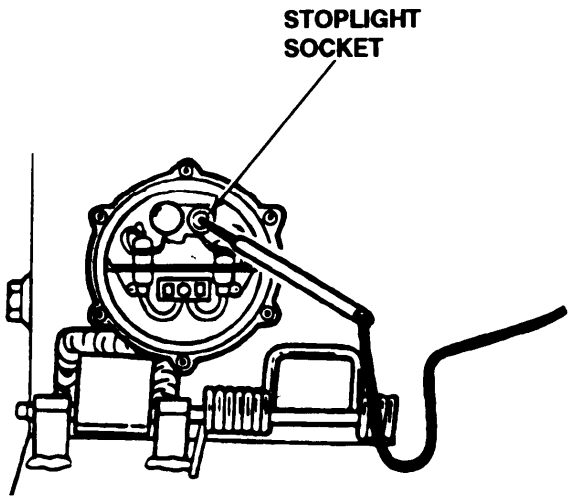
Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Lighting switch in STOPLIGHT position and brake pedal applied.

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.



A. 1. Loosen six screws, and remove cover from taillight assembly, and remove stoplight bulb from taillight assembly.

2. Place multimeter red lead in center contact of stoplight and ground black lead.

3 Have assistant turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Have assistant turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no

yes

Replace stoplight bulb (para 7-33 or 7-34). Verify problem is solved.

B. 1. Install bulb and cover on taillight assembly, and tighten six screws.

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(14) STOPLIGHT FAILS TO OPERATE. All other lights to operate (continued).

CONTINUED FROM B

B. 2. Remove eight screws, lockwashers, and brace from left side of crew compartment.

3. Remove screws, spacers, and wiring harness cover from rear of crew compartment.

4. Disconnect wire 22 of harness 12330252 from taillight assembly harness.

5. Place red lead of multimeter on socket of wire 22 of harness 12330252 and ground black lead.

6. Have assistant turn MASTER switch ON (refer to TM 9-22350-287-10).

7. Check for 24 ± 3 vdc.

8. Have assistant turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no

yes

Repair or replace left taillight assembly (para 7-33). Verify problem is solved.

C. 1. Loosen six screws, lockwashers, and cover from driver's instrument panel.

2. Disconnect harness 12330252 from lighting switch.

NOTE

To complete this step you will need to fabricate a muttimeter extension using at least 12 feet of wire and make sure the end of the wire is able to be used as a probe into a socket.

3. Have assistant place one lead of multimeter to socket C of harness 12330252 light switch connector and place other lead on socket of wire 22 of harness 12330252 connector at rear of crew compartment.

4. Check for continuity.

Is continuity indicated?

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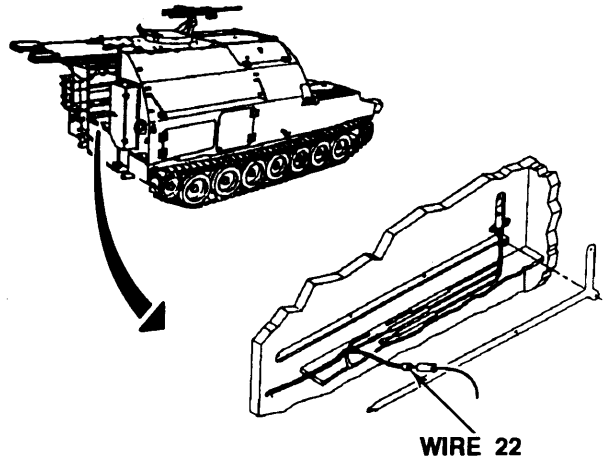
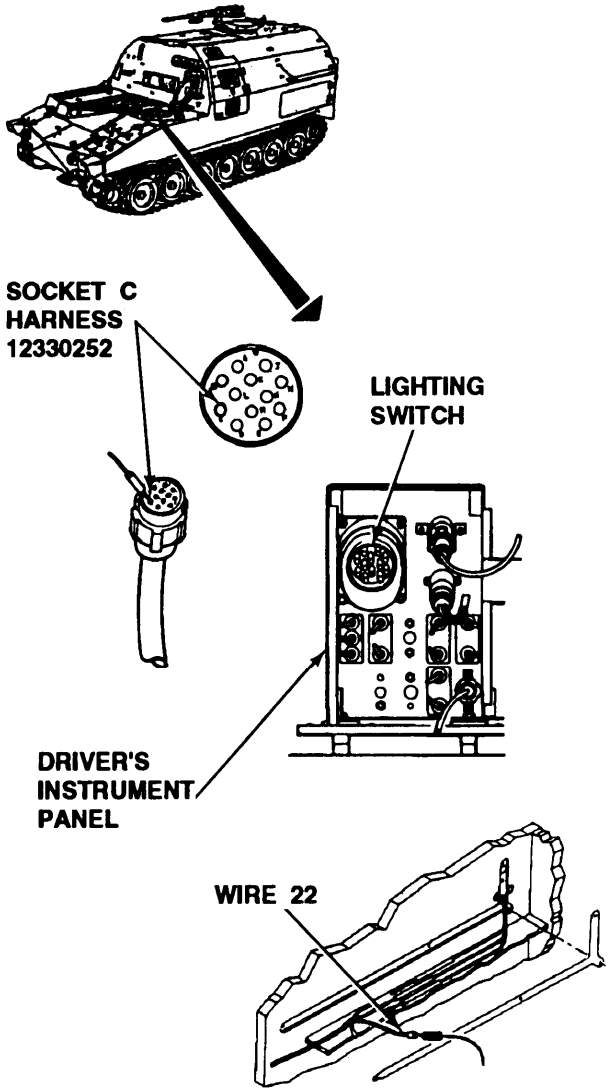




2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).

(14) STOPLIGHT FAILS TO OPERATE. All other lights to operate (continued).

CONTINUED FROM C

no / yes

Notify Direct Support maintenance.

D. 1. Reconnect wire 22 of harness 12330252 to taillight harness. Install wiring harness cover, spacers, and screws on crew compartment wall, and install brace with eight screws and lockwashers.

2. Disconnect both wires 75 from stoplight switch.

3. Place one lead of multimeter in socket A of harness 12330252 lighting switch connector and place other lead in corresponding wire 75 of harness 12330252 at stoplight switch

4. Check for continuity.

5. Place one lead of multimeter in socket K of harness 12330252 lighting switch connector and place other lead in corresponding wire 75 of harness 12330252 at stoplight switch.

6. Check for continuity.

Is continuity indicated at both circuits?

no / yes

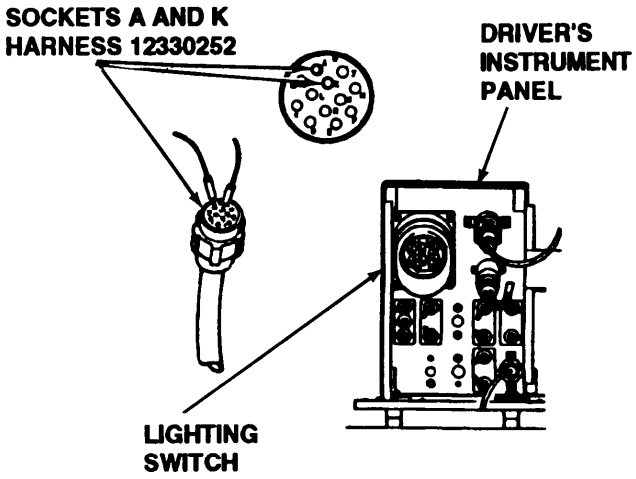
Notify Direct Support maintenance.

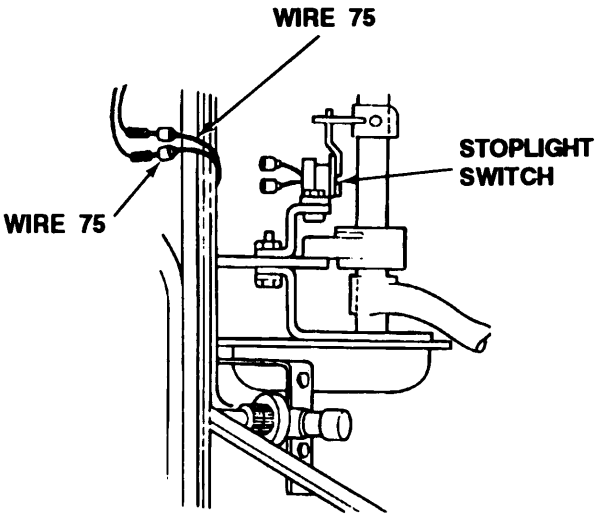
E. 1. Place one lead of multimeter in one stoplight switch harness wire and place other lead in other stoplight switch harness wire.

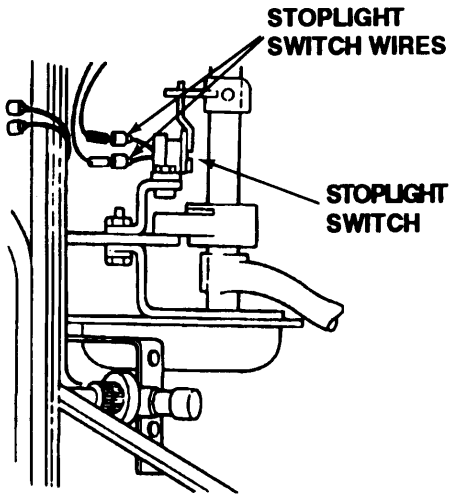
2. Apply brakes.

3. Check stoplight switch for continuity.

Is continuity indicated?







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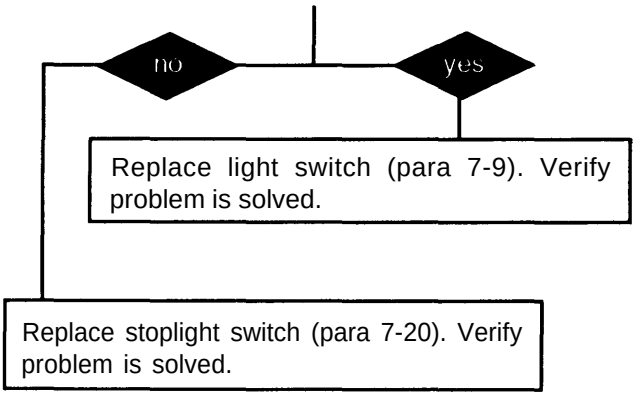
2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(14) STOPLIGHT FAILS TO OPERATE. All other lights to operate (continued).

CONTINUED FROM E



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(15) ONE OR BOTH REAR BUCKOUT (BO) MARKER LEDs FAIL TO OPERATE. All other lights operate.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Personnel Required: Two

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Lighting switch set to BO MARKER.

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.
- Left and right BO taillights are checked in the same manner.

A. 1. Loosen six screws and remove cover from taillight.

2 Remove LED from taillight assembly.

3. Place multimeter red lead in BO marker LED socket and ground black lead.

4. Have an assistant turn MASTER switch ON (refer to TM 9-2350-287-10).

5 Check socket for 24 ± 3 vdc.

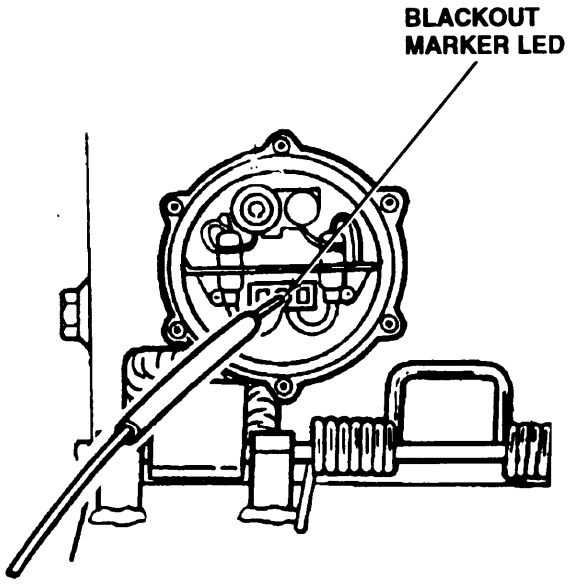
6. Have an assistant tum OFF MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no

yes

Replace BO marker LED (para 7-33 or 7-34). Verify problem is solved.



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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(15) ONE OR BOTH REAR BLACKOUT (BO) MARKER LEDs FAIL TO OPERATE. All other lights operate (continued).

CONTINUED FROM A

B. 1. Install LED and cover on taillight assembly, and tighten six screws.

2. If left taillight assembly is the problem, remove eight screws, lockwashers, and bracket from left side canister compartment shelves.

3. Remove screws, spacers and taillight harness cover from rear wall of crew compartment.

4. Disconnect wire 24 of harness 12330252 from taillight assembly harness.

5. Place red lead of multimeter on socket of wire 24 of harness 12330252 and ground black lead.

6. Have assistant turn MASTER switch ON (refer to TM 9-2350-287-1 0).

7. Check for 24 ± 3 vdc.

8. Have assistant turn MASTER switch OFF (refer to TM 9-2350-287-1 0).

Is voltage indicated?

no

yes

Repair or replace taillight assembly (para 7-33 or 7-34). Verify problem is solved.

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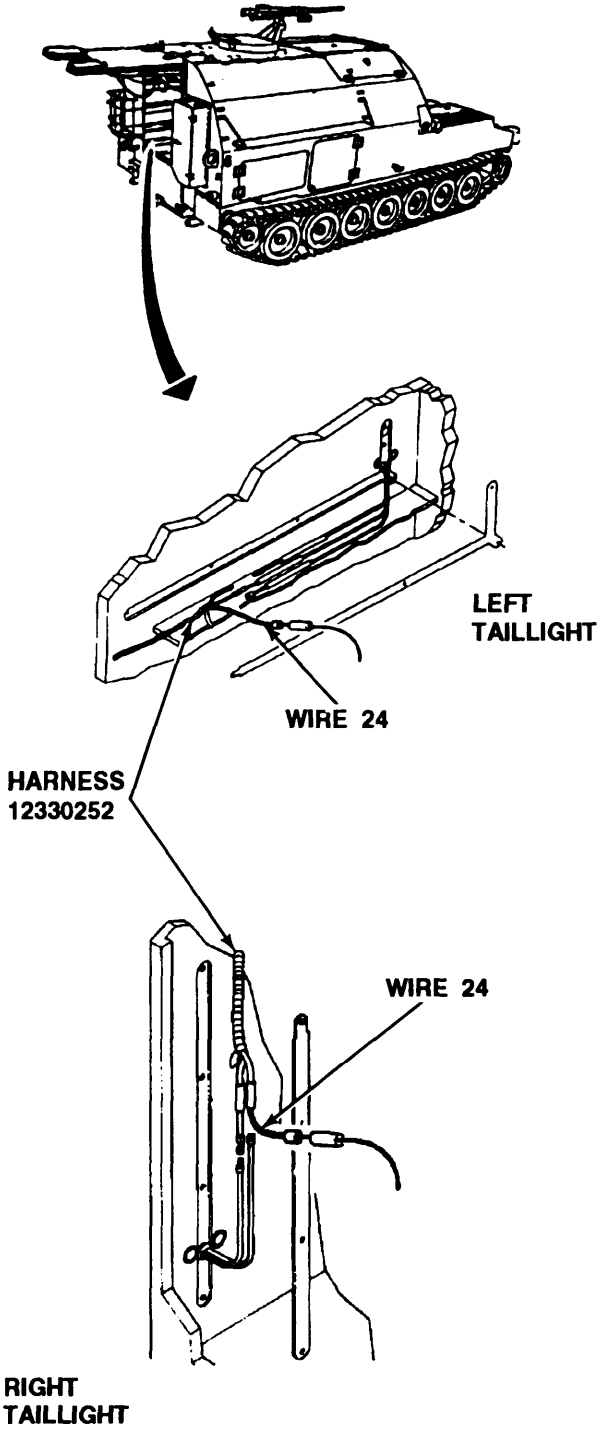


2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(15) ONE OR BOTH REAR BLACKOUT (BO) MARKER LEDs FAIL TO OPERATE. All other lights operate (continued).

CONTINUED FROM B

C. 1. Remove six screws and cover from driver's instrument panel.

2. Disconnect harness 12330252 from lighting switch.

NOTE

To complete this step you will need to fabricate a multimeterextension using at least 12 feet of wire and make sure the end of the wire is able to be used as a probe into a socket.

3. Have assistant place one lead of muttimeter to socket E of harness 12330252 lighting switch connector and place other lead on socket of wire 24 of harness 12330252 connector at rear of crew compartment.

4. Check for continuity.

Is continuity indicated?

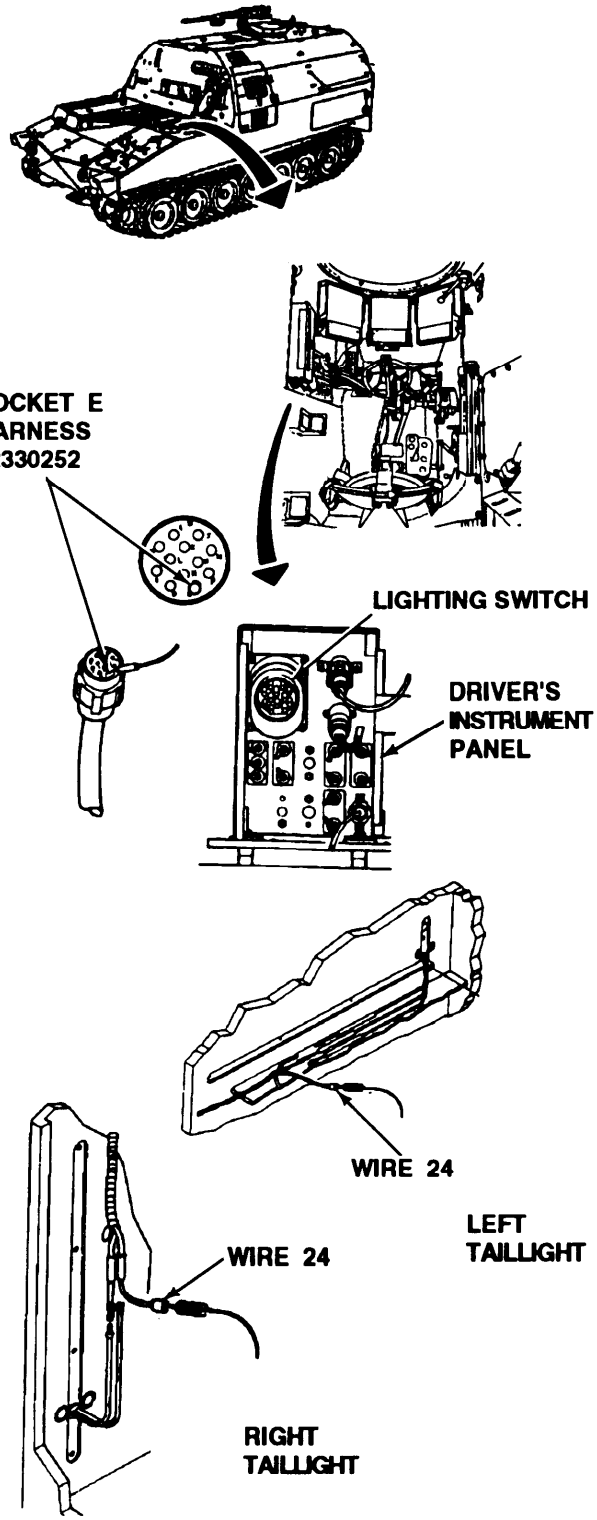
no

Replace light switch (para 7-9). Verify problem is solved.

yes

Notify Direct Support maintenance..

END OF TASK



2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(16) BLACKOUT (BO) STOP LED FAILS TO OPERATE. All other lights operate.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (Item 13, Appendix I)
- General mehanic's tool kit (Item 24, Appendix I)

Materials/Parts:
Wire (12 foot) (Item 77, Appendix D)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Lighting switch set to BO DRIVE position and brake pedal locked.

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. 1. Loosen six screws, and remove cover from right taillight assembly.

2. Remove BO stoplight LED from bottom socket of taillight assembly.

3. Place multimeter red lead in LED socket and ground black lead.

4. Have assistant turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check socket for 24 ± 3 vdc.

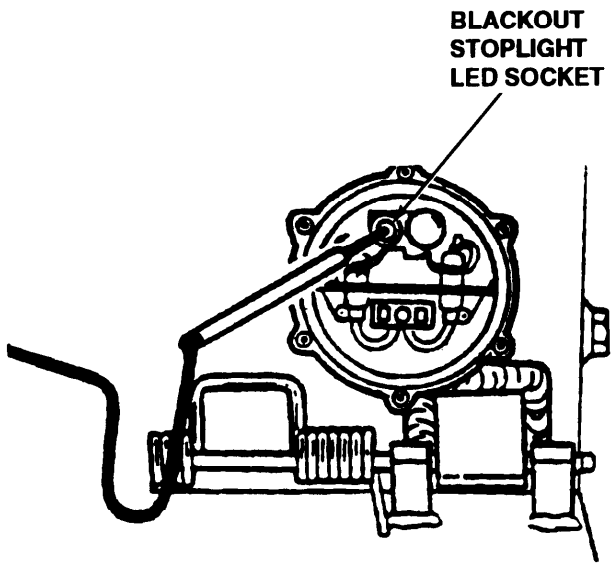
6. Turn MASTER switch off (refer to TM 9-2350-287-10).

Is voltage indicated?

no

yes

Replace blackout stoplight LED (para 7-34). Verify problem is solved.



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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(16) BLACKOUT (BO) STOP LED FAILS TO OPERATE. All other lights operate (continued).

CONTINUED FROM A

B. 1. Install BO stop light LED and cover on right taillight assembly.

2. Remove four screws, spacers, and taillight harness cover from rear wall of crew compartment.

3. Disconnect wire 23 of harness 12330252 from taillight assembty harness.

4. Place red lead of multimeter on socket of wire 23 of harness 12330252 and ground black lead.

5. Have assistant turn MASTER switch ON (refer to TM 9-2350-287-10).

6. Check for 24 ± 3 vdc.

7. Have assistant turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated at both locations?

no

yes

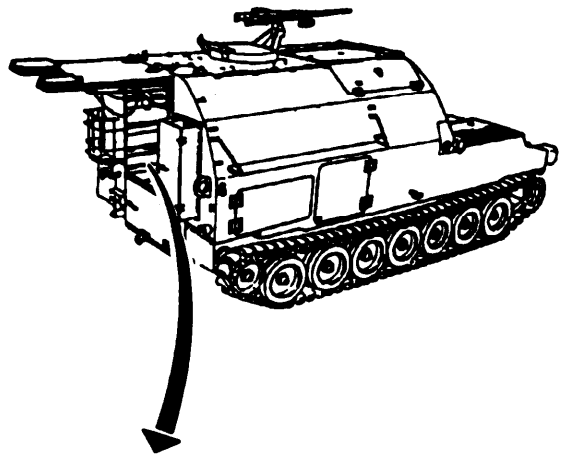
Repairer replace taillight assembly (para 7-34). Verify problem is solved.

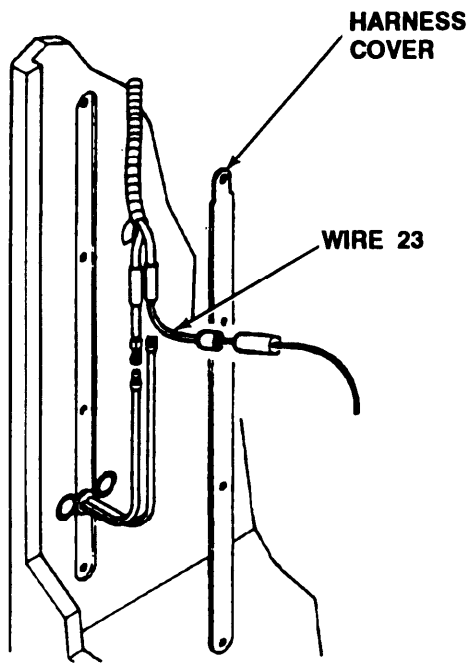
NOTE

To complete this step you will need to fabricate a multimeterextension using at least 12 feet of wire and make sure the end of the wire is able to be used as a probe into a socket.

C. 1. Remove sixscrews and cover from driver's instrument panel.

2. Disconnect harness 12330252 from lighting switch.





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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(16) BLACKOUT (BO) STOP LED FAILS TO OPERATE. All other lights operate (continued).

CONTINUED FROM C

C. 3. Place one lead (long lead) of multimeter in socket N of harness 12330252 lighting switch connector and place other lead on socket of wire 23 of harness 12330252 connector at rear of crew compartment.

4. Check for continuity.

Is continuity indicated at both circuits?

no → Notify Direct Support maintenance.

yes →

D. 1. Reconnect wire 24 of harness 12330252 to taillight harness and reinstall four screws, spacers, and taillight harness cover on rear crew compartment wall.

2. Disconnect both wires 75 from stoplight switch.

3. Place one lead of multimeter in socket A of harness 12330252 lighting switch connector and place other lead in each wire 75 (one at a time) of harness 12330252 at stoplight switch.

4. Check for continuity.

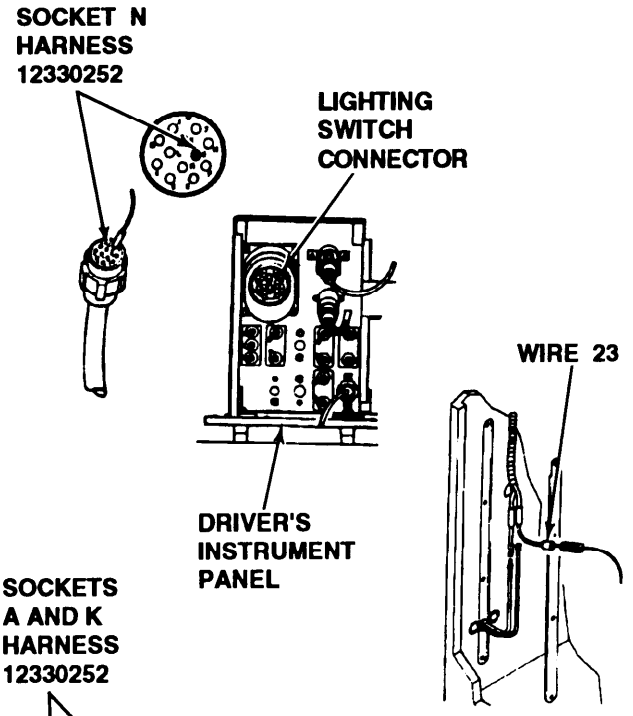
Is continuity indicated in only one circuit?

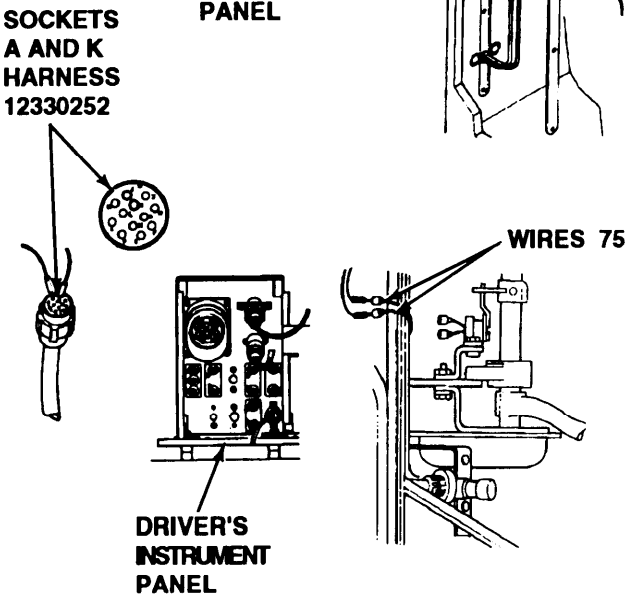
no → **Notify Direct Support maintenance.**

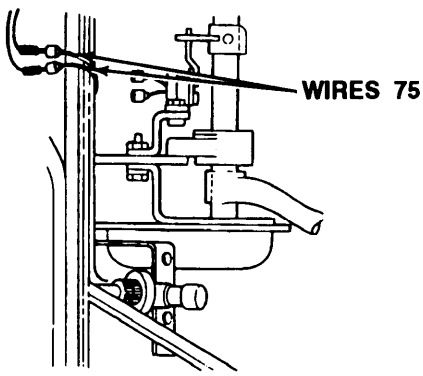
yes →

E. 1. Place one lead of multimeter in socket K of harness 12330252 lighting switch connector and place other lead in each wire 75 (one at a time) of harness 12330252 at stoplight switch.

2. Check for continuity.







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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(16) BLACKOUT (BO) STOP LED FAILS TO OPERATE. All other lights operate (continued).

CONTINUED FROM E

Is continuity indicated in only one circuit?

no → Notify Direct Support maintenance.

yes →

F. 1. Place one lead of multimeter in one stoplight harness wire 75 and place other lead in other stoplight harness wire 75.

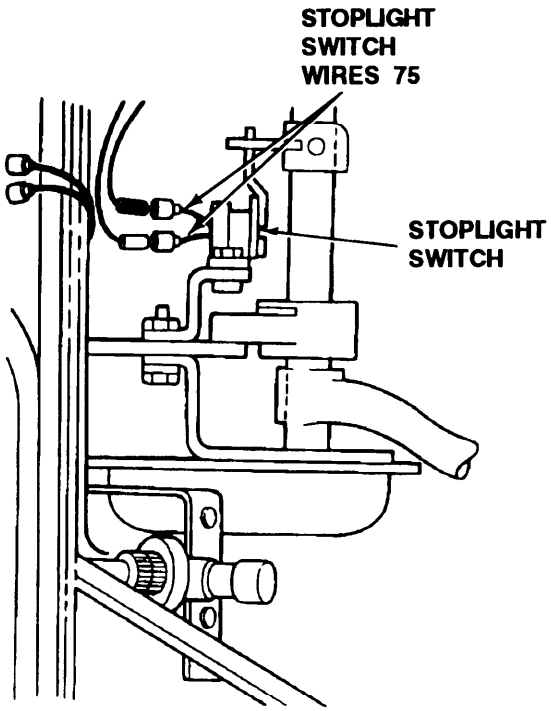
2. Apply brakes.

3. Check stoplight switch for continuity.

Is continuity indicated?

no → Replace stoplight switch (para 7-20). Verify problem is solved.

yes → Relace lighting switch (para 7-9). Verify problem is solved.



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(17) PORTABLE INSTRUMENT PANEL LIGHTS FAIL TO OPERATE. All other lights operate.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Panel lighting switch set to bright (refer to TM 9-2350-287-10).

NOTE

- Instead of using multimeter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. 1. Remove defective panel light from driver's instrument panel (para 7-7).

2. Place multirneter red lead in center contact of light bulb socket and ground black lead.

3. Turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Check for 24 ± 3 vdc.

5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no

yes

Replace light bulb (para 7-6). Verify problem is solved.

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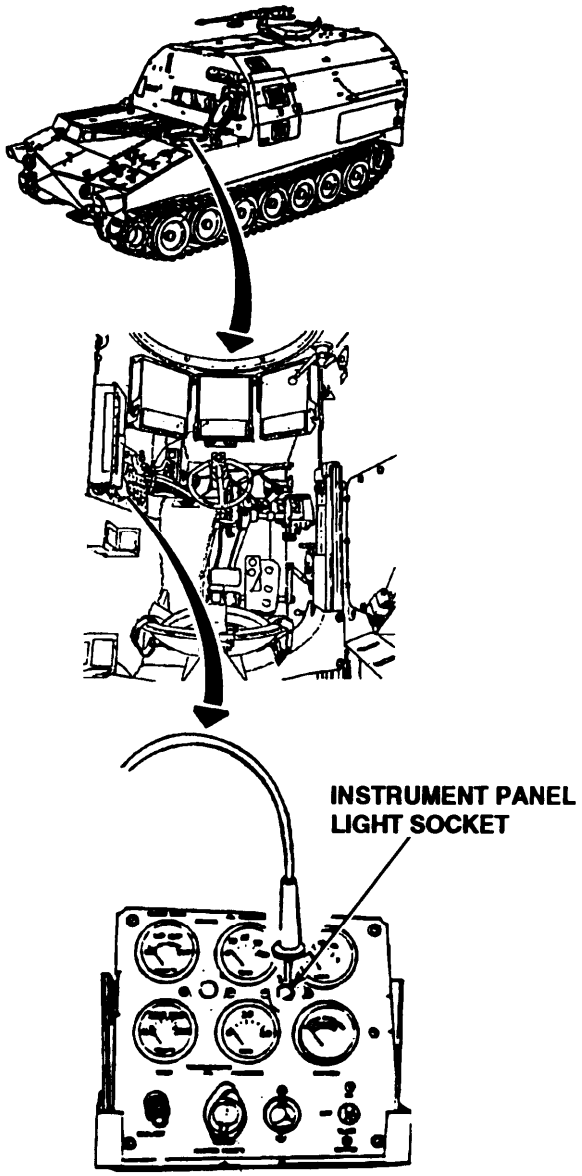


2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(17) PORTABLE INSTRUMENT PANEL LIGHTS FAIL TO OPERATE. All other lights operate (continued).

CONTINUED FROM A

B. 1. Remove front panel of driver's portable instrument panel.

2. Disconnect lead 40 at light socket.

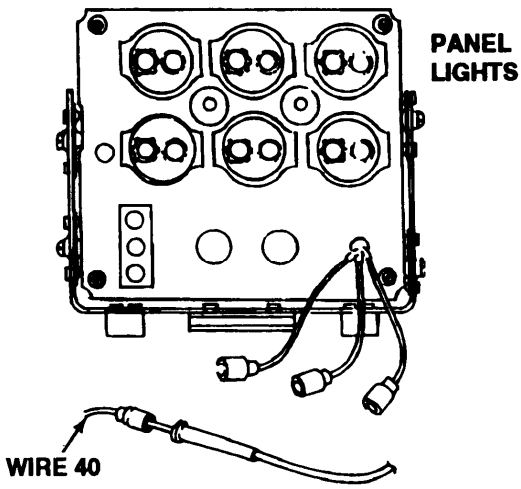
3. Place red lead of multimeter in lead 40 and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?



no → Replace instrument panel light socket (para 7-6). Verify problem is solved.

yes

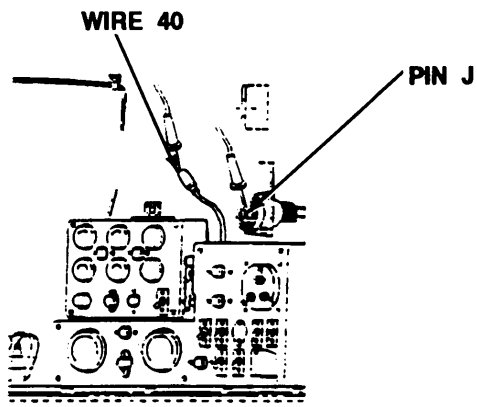
C. 1. Disconnect harness 12260298 connector from harness 12260287.

2. Place one lead of multimeter on pin J of connector and place other lead of multimeter in wire 40 lamp connector.

3. Check for continuity.

4. Repeat steps 2 and 3 for other wire 40 lamp connector.

Is continuity indicated in both circuits?

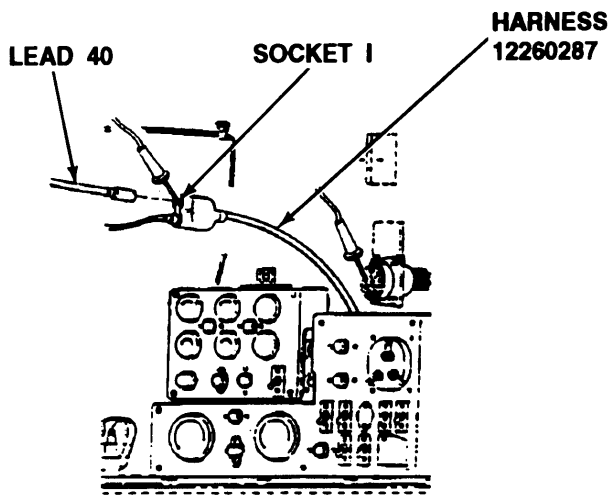


no → Repair or replace harness 12260298 (para 7-7). Verify problem is solved.

yes

D. 1. Install front panel of driver's portable instrument panel.

2. Disconnect harness 12260298 lead 40 from Y connector.



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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(17) PORTABLE INSTRUMENT PANEL LIGHTS FAIL TO OPERATE. All other lights operate (continued).

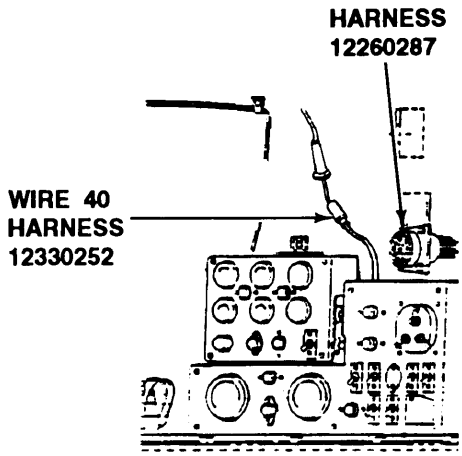
CONTINUED FROM D

3. Place one lead of multimeter in harness 12260287 lead 40 and place other lead in socket J of harness 12260287 portable instrument panel harness connector and check for continuity.

Is continuity indicated?

no — yes

Repair wire 40 or replace wire harness 12260287 (para 7-56). Verify problem is solved.



E. 1. Reconnect wire harness 12260298 to harness 12260287.

2. Reconnect harness 12260287 wire 40 to "Y" connector.

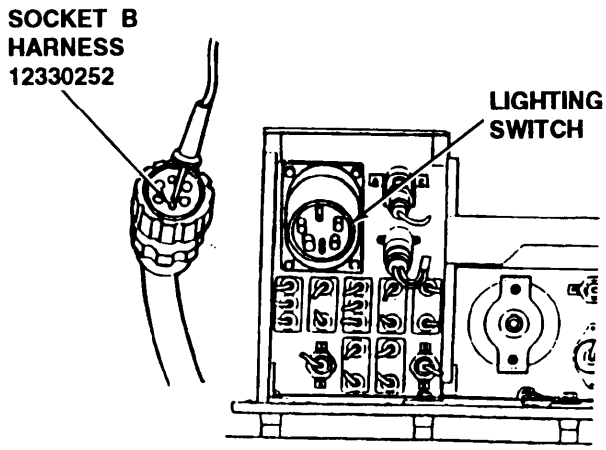
3. Disconnect harness 12330252 wire 40 at "Y" connector.

4. Remove six screws and cover from driver's instrument panel.

5. Disconnect wire harness 12330252 from lighting switch.

6. Place one lead of multimeter at harness 12330252 wire 40 and place other lead on socket B of harness 12330252 lighting switch connector.

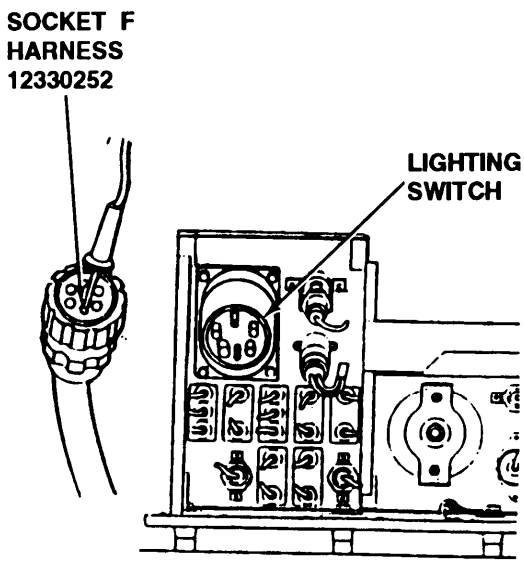
7. Check for continuity.



Is continuity indicated?

no — yes

Notify Direct Support maintenance.



F. 1. Reconnect harness 12330252 wire 40 to "Y" connector.

2. Place multimeter red lead in socket F of harness 12330252 lighting switch connector and ground black lead.

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(17) PORTABLE INSTRUMENT PANEL LIGHTS FAIL TO OPERATE. All other lights operate (continued).

CONTINUED FROM F

F. 3. Turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Check for 24 ± 3 vdc.

5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no → Replace lighting switch (para 7-9). Verify problem is solved.

yes

G. 1. Reconnect harness 12330252 to lighting switch.

2. Disconnect wire 15 of harness 12330252 from wire 10L of harness 12376405 at no. 2 position of circuit breaker panel no. 2.

3. Place multimeter red lead in wire 10L and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

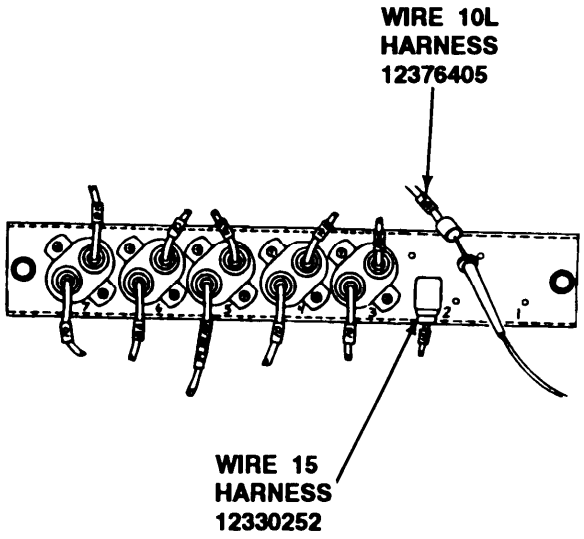
5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no → Notify Direct Support maintenance.

yes → Repair wire 10L or replace harness 12376405 (para 7-57). Verify problem is solved.



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(18) ACCESSORY CONTROL BOX PANEL LIGHTS FAIL TO OPERATE. All other lights operate.

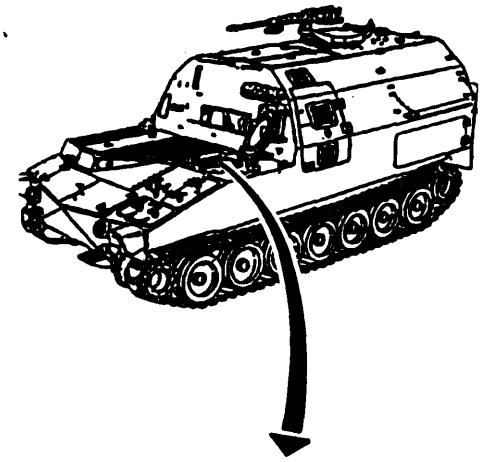
Initial Setup:

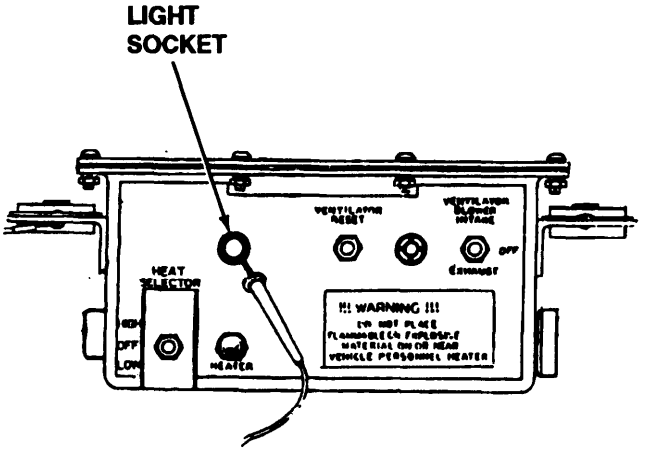
Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix I
- General mechanics tool kit (Item 24, Appendix I)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Lighting switch selector set to PANEL LIGHTS (refer to TM 9-2350-287-10).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multimeter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.





A. 1. Remove panel light from acessory control box.

2. Place multimeter red lead in center contact of light bulb socket and ground black lead.

3. Turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Check for 24 ± 3 vdc.

5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

NO

Replace light bulb (para 7-10). Verify problem.

YES

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(18) ACCESSORY CONTROL BOX PANEL LIGHTS FAIL TO OPERATE. All other lights operate (continued).

CONTINUED FROM A

B. 1. Disconnect harness 12351544 from accessory control box.

2. Place multimeter red lead in pin D of harness 12351544 and ground black lead.

3. Turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Check for 24 ± 3 vdc.

5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no → Repair or replace accessory control box (para 7-10).

yes

C. 1. Disconnect harness 12351544 lead 40 from "Y" connector.

2. Place one lead of multimeter in harness 12351544 lead 40 and place other lead on socket D of harness 12351544 accessory control box connector.

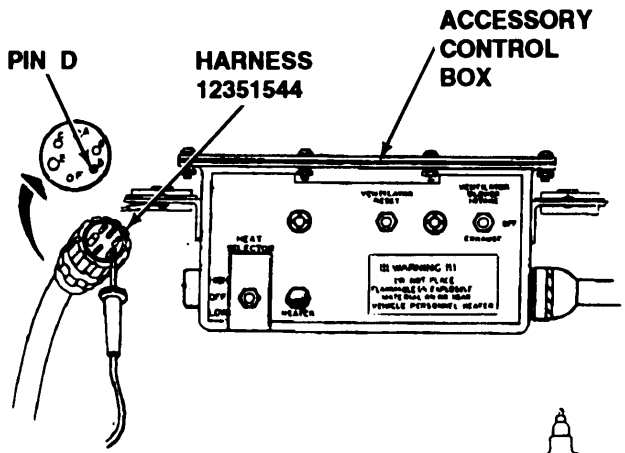
3. Check for continuity.

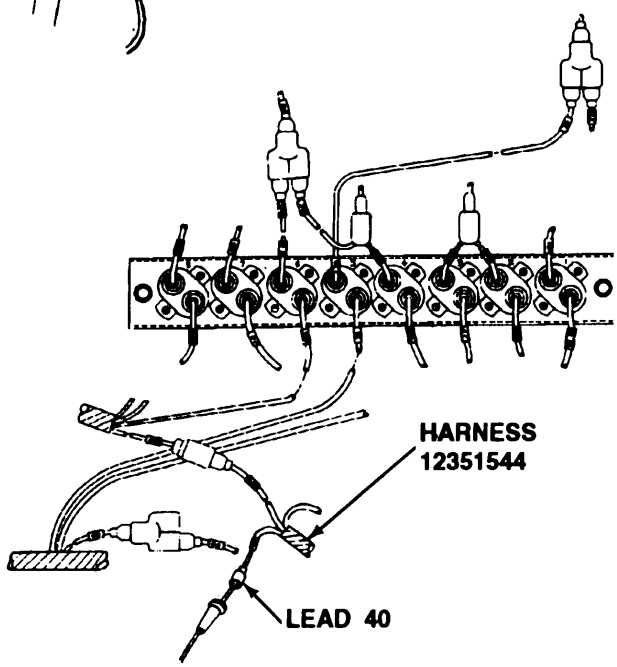
Is continuity indicated?

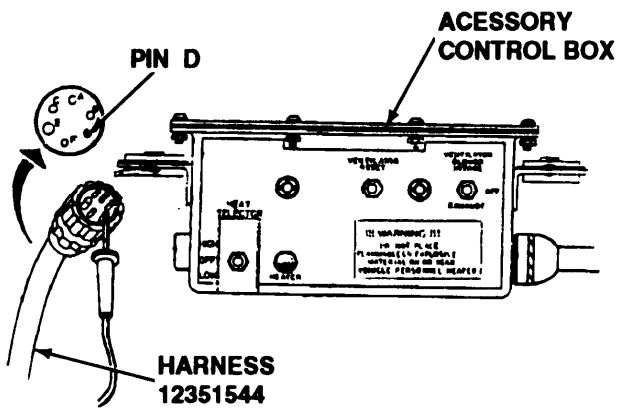
no → Repair wire 40 or replace wire harness 12351544 (para 7-64). Verify problem is solved.

yes

D. 1. Connect wire harness 12351544 to accessory control box.







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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(18) ACCESSORY CONTROL BOX PANEL LIGHTS FAIL TO OPERATE. All other lights operate (continued).

CONTINUED FROM D

D. 2. Connect harness 12351544 wire 40 to 'Y" connector.

3. Disconnect harness 12330252 wire 40 at Y connector.

4. Remove six screws, split washers and cover from driver's instrument panel.

5. Disconnect wire harness 12330252 from lighting switch.

6. Place one lead of multimeter at harness 12330252 wire 40 and place other lead on pin B of harness 12330252 lighting switch connector.

7. Check for continuity.

Is continuity indicated?

no

Notify Direct Support maintenance.

yes

E. 1. Connect harness 12330252 wire 40 to Y connector.

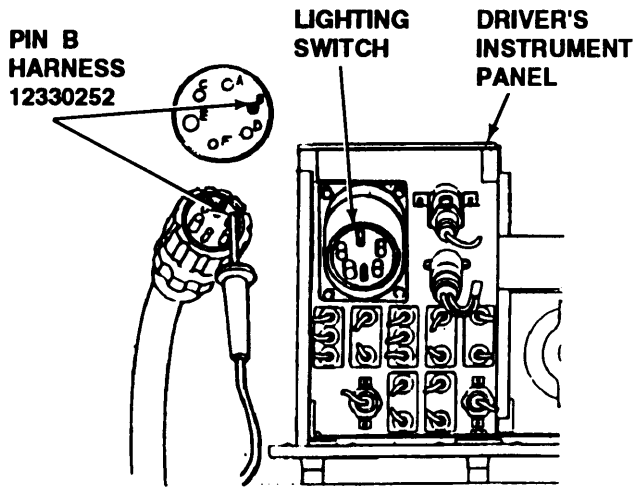
2. Place multimeter red lead in pin F of harness 12330252 lighting switch connector and ground black lead.

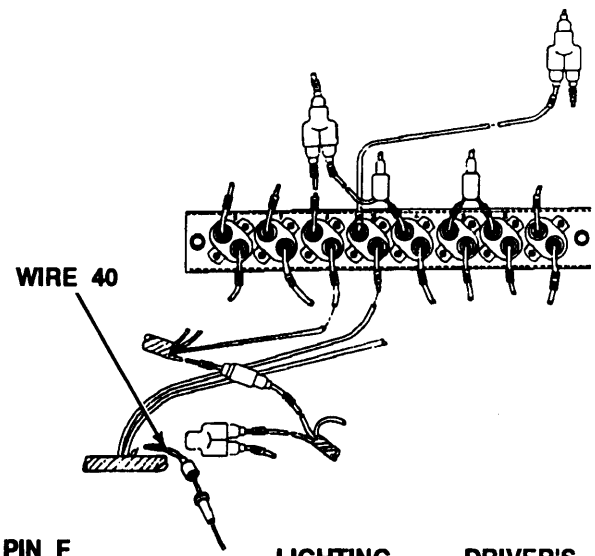
3. Turn MASTER switch ON (refer to TM 9-2350-287-10).

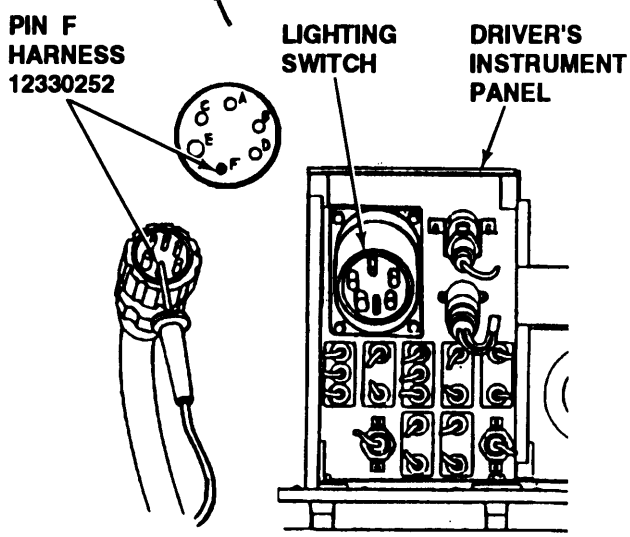
4. Check for 24 $\pm$ 3 vdc.

5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?







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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(16) ACCESSORY CONTROL BOX PANEL LIGHTS FAIL TO OPERATE. All other lights operate (continued).

CONTINUED FROM F

no / yes

Replace lighting switch (para 7-9). Verify problem is solved.

F. 1. Connect harness 12330252 to lighting switch.

2. Disconnect wire 15 of harness 12330252 from wire 10L of harness 12376405 at no. 2 position of circuit breaker panel no. 2.

3. Place multimeter red lead in wire 10L and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

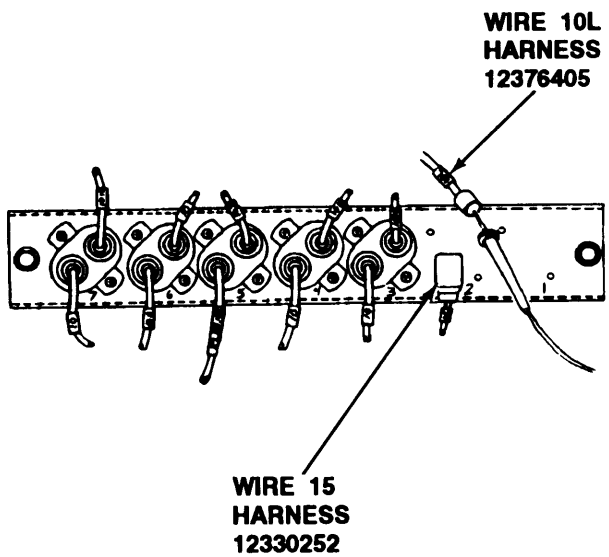
6. Turn MASTER switch OFF (refer to TM 9-2350-287-1 0).

Is voltage indicated?

no / yes

Notify Direct Support maintenance.

Repair wire 10L or replace wire harness 12376405 (para 7-57).



END OF TASK

12-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(19) DOME LIGHT FAILS TO OPERATE.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (hem 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be perforrned.

A. 1. Disconnect wire 38 from defective dome light.

2. Place red lead of multimeter in wire 38 and ground black lead.

3. Turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Check for 24 ± 3 vdc.

5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

6. Repeat steps 2 through 5 for remaining defective dome lights.

Is voltage indicated?

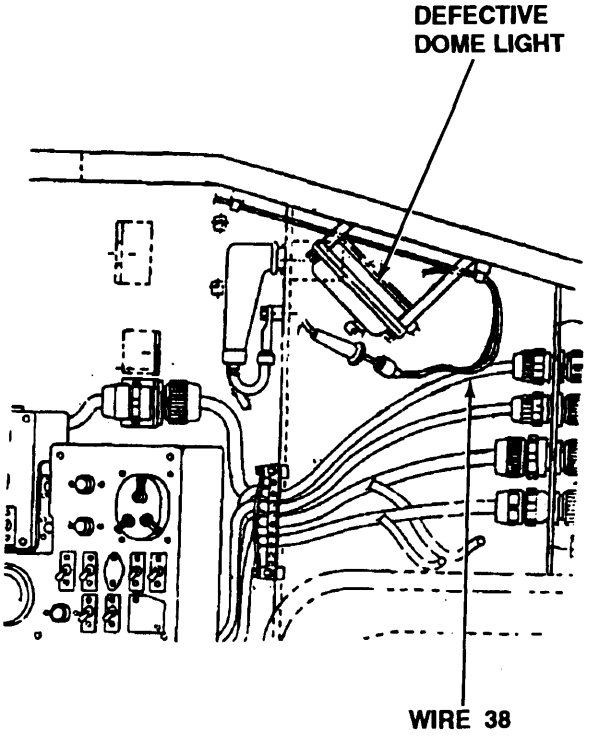
no

Repair or replace dome light assembly (para 7-30). Verify problem is solved.

yes

B. 1. Reconnect wire 38 to dome light assembly.

2. Move portable instrument panel to outside location (refer to TM 9-2350-287-10).



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2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).	(19) DOME LIGHT FAILS TO OPERATE (continued).

CONTINUED FROM B

B. 3. Disconnect wire 38-27-40 from circuit breaker no. 5 of panel no. 2 output.

4. Place red lead of multimeter in circuit breaker output and ground black lead.

5. Turn MASTER switch ON (refer to TM 9-2350-287-10).

6. Check for 24 ± 3 vdc.

7. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no — yes

Notify Direct Support maintenance. Verify problem is solved.

C. 1. Reconnect wire 38-27-40 to circuit breaker output.

2. Disconnect wire 10K from circuit breaker no. 5 of panel no. 2 input.

3. Place red lead of multimeter in wire 10K and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

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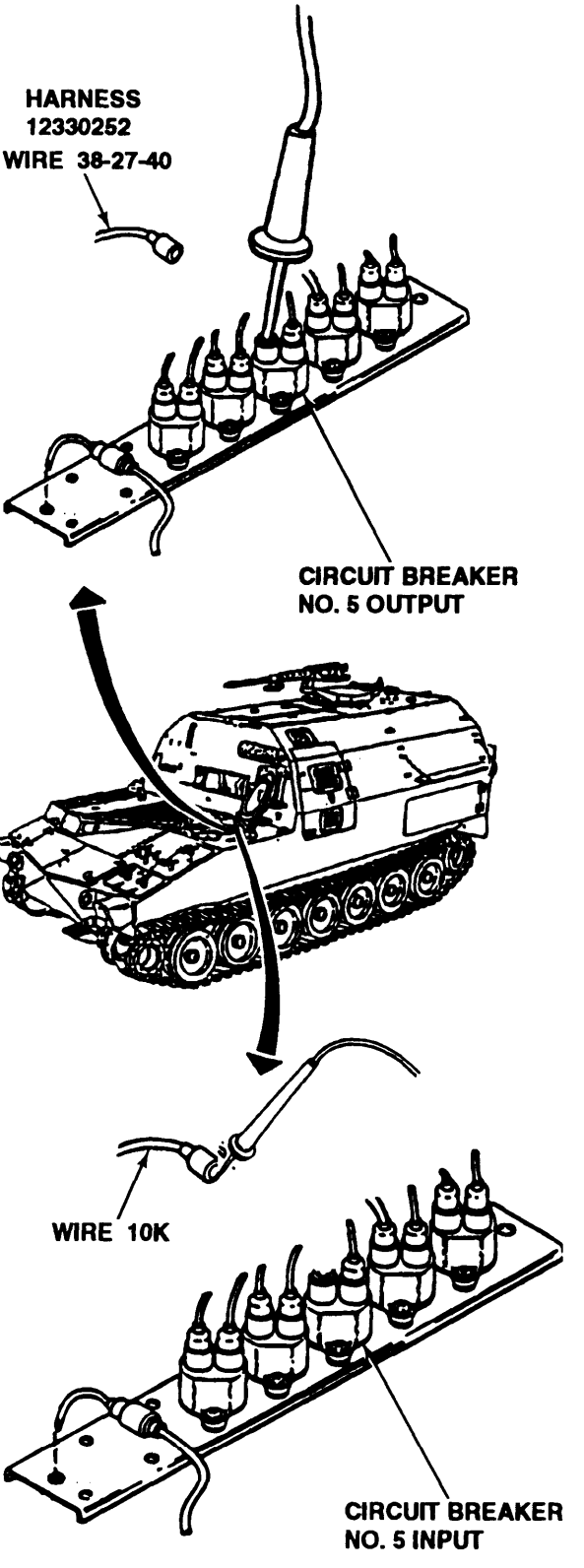
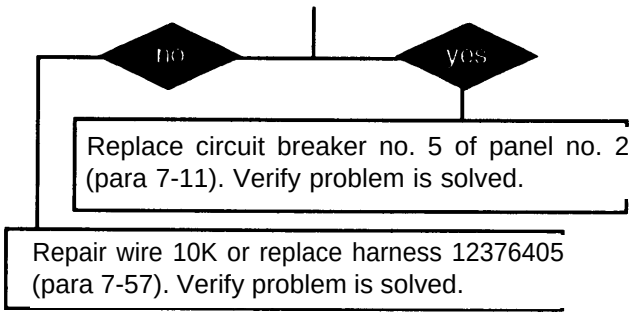


2-19. TROUBLESHOOTING CHART (continued).

h. LIGHTS (continued).

(19) DOME LIGHT FAILS TO OPERATE (continued).

CONTINUED FROM C



END OF TASK

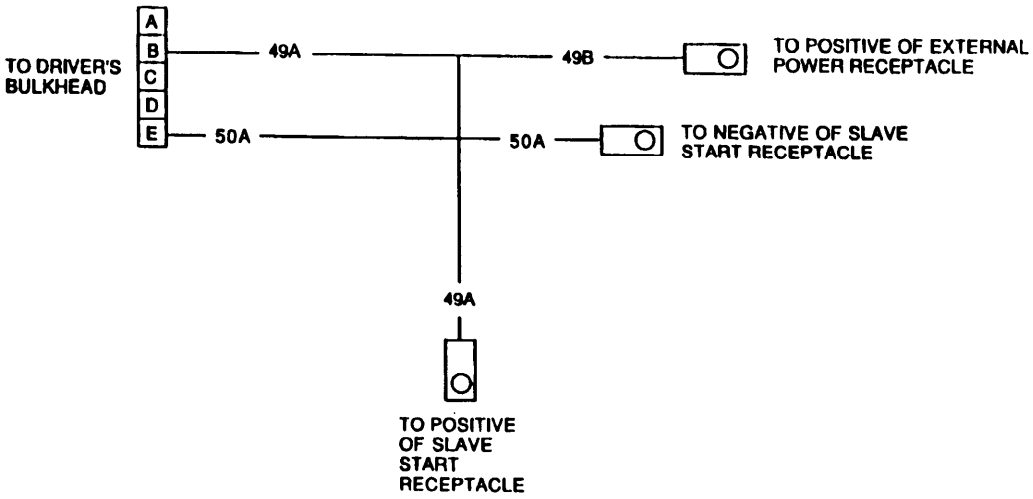
2-19. TROUBLESHOOTING CHART (continued).

i. NATO SLAVE RECEPTACLES.

The NATO slave receptacle is located in the driver's compartment. When a slave cable is connected between the NATO slave receptacles on two vehicles, one vehicle can power the other vehicle's electrical system. The disabled vehicle may be powered by turning the MASTER switch to ON in the slave vehicle and setting the MASTER switch to SLAVE in the disabled vehicle. 24 VDC is supplied to the disabled vehicle's master relay, energizing it, which supplies voltage to the batteries and starting system.

External power receptacle is located at the right rear of the vehicle. This receptacle is used to provide power from one vehicle to another vehicle by connecting a slave cable between the external power receptacles of both vehicles, while turning the MASTER switch to ON in the slaving vehicle.

The diagram below shows the connection between the NATO slave and external power receptacles.



2-19. TROUBLESHOOTING CHART (continued).

i.	NATO SLAVE RECEPTACLES	(1) NO POWER TO VEHICLE FROM NATO SLAVE RECEPTACLE. Disabled vehicle had power when operating.

Initial Setup:

Tools/Test Equipment:
Digital multimeter (DMM) (Item 13, Appendix I)
General mechanic's tool kit (Item 24, Appendix 1)

Equipment Conditions:
. MASTER switch set to OFF (refer to TM 9-2350-287-1 0).

- Disconnect slave cable from disabled vehicle's slave start receptacle (refer to TM 9-2350-287-10).
- Disconnect batteries (para 7-41) and leave disconnected for all steps.

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

Â. 1. Disconnect wires 49A and 50A of wire harness 12376573 at slave start receptacle.

2. Disconnect harness 12376573 from driver's bulkhead.

3. Check continuity of harness 12376573 at the following locations:

a. Pin B of bulkhead connector to wire 49A slave receptacle connector.

b. Pin E of bulkhead connector to wire 50A slave receptacle connector.

Is continuity indicated?

no

Repair wires 49A and/or 50A or replace harness 12376573 (para 7-59). Verify problem is solved.

yes

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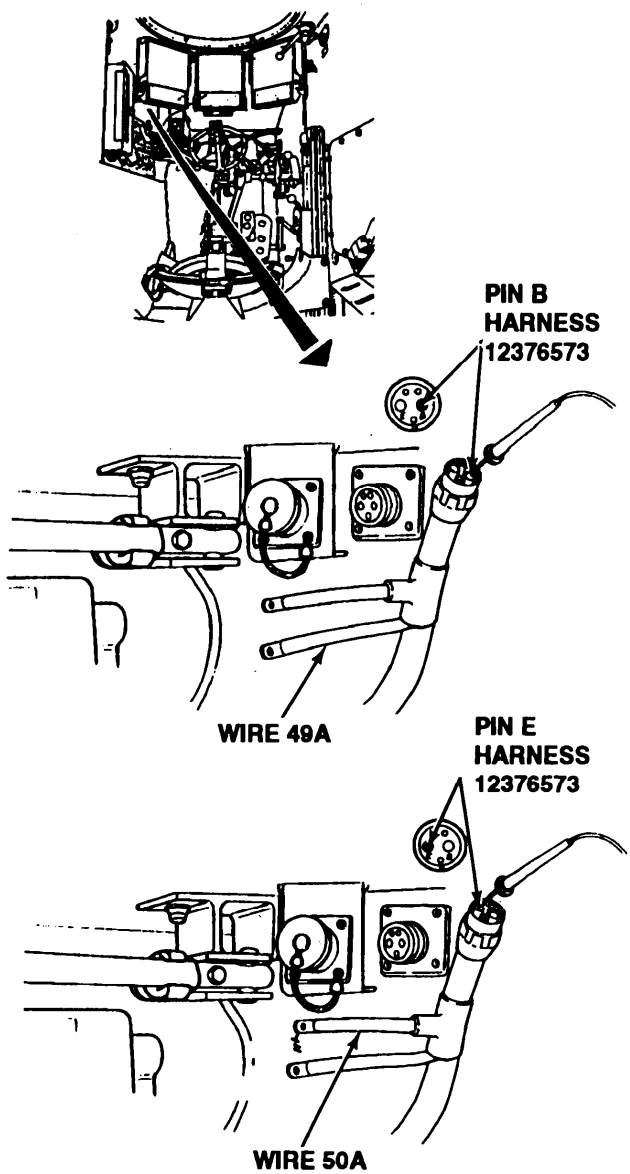


2-19. TROUBLESHOOTING CHART (continued).

i. NATO SLAVE RECEPTACLES	(1) NO POWER TO VEHICLE FROM NATO SLAVE RECEPTACLE. Disabled vehicle had power when operating (continued).

CONTINUED FROM A

6. 1. Reconnect wires 49A and 50A of harness 12376573 to slave receptacle and to driver's bulkhead connector.

2. Check continuity of harness 12353402 in the following places.

a. Socket B of bulkhead connector to wire 49 battery connector.

b. Socket E of bulkhead connector to wire 50 battery connector.

Is continuity indicated in both circuits?

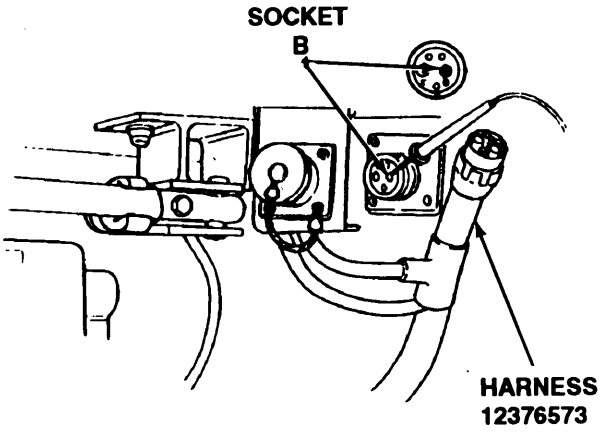
no

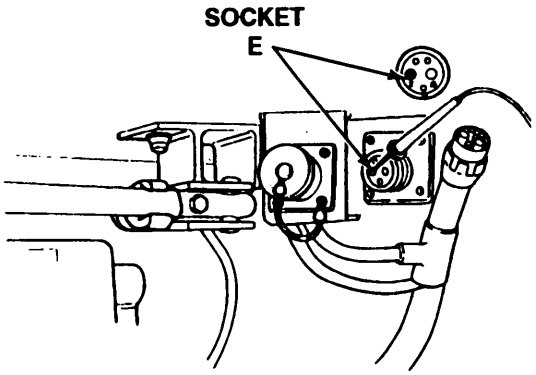
Repair wires 59 and/or500 or replace harness 12376573 (para 7-59).

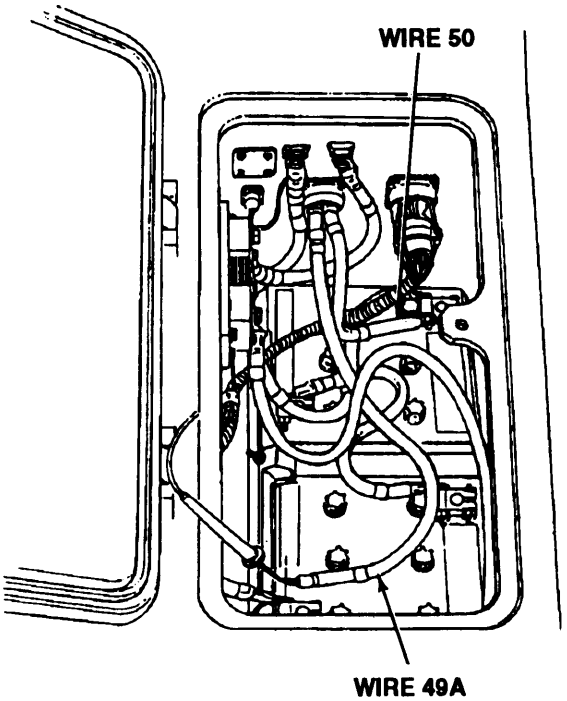
yes

Fault is with the slave cable or slaving vehicle.

END OF TASK







2-19. TROUBLESHOOTING CHART (continued).

i. NATO SLAVE RECEPTACLES (continued).	(2) NO POWER AT INTERNAL OR EXTERNAL POWER RECEPTACLE .

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-1 0).

Personnel Required: Two

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. 1. Place multimeter red lead on external power receptacle contact and ground black lead.

2. Check for 24 ± 3 vdc.

Is voltage indicated?

no — yes

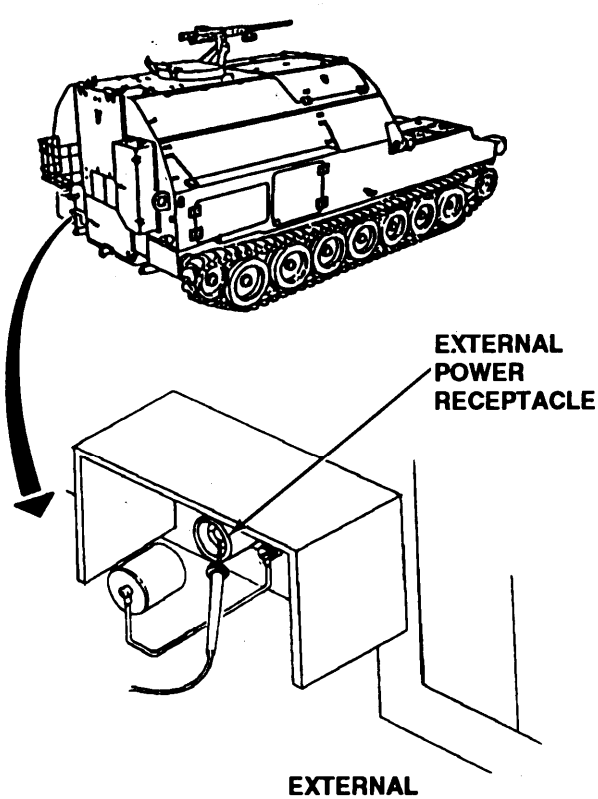
Verify problem is solved.

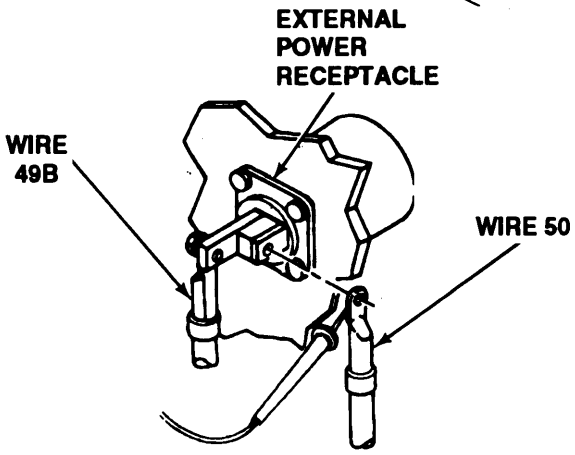
B. 1. Disconnect batteries (para 7-41).

2. Disconnect wire 49B and wire 50 of wire harness 12376573 from external power receptacle.

3. Place red lead of multimeter to wire 50 terminal and ground black lead and check for continuity.

Is continuity indicated?





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2-19. TROUBLESHOOTING CHART (continued).

i. NATO SLAVE RECEPTACLES (continued).

(2) NO POWER AT INTERNAL OR EXTERNAL POWER RECEPTACLE (continued).

CONTINUED FROM B

no / yes

Repair wire 50 or replace lead 1233276 (para 7-59). Verify problem is solved.

C. 1. Connect wire 50 of lead 1233276 to external power receptical.

2. Disconnect harness 12376573 at driver's bulkhead.

3. Disconnect lead 49B at external power receptical.

4. Place one lead of multimeter at wire 49B of harness 12376573 external power receptacle connector and place other lead of multimeter at pin B.

5. Check for continuity.

Is continuity indicated?

no / yes

Repair wire 49B or replace harness `1276573 (para 7-59)). Verify problem is solved.

D. 1. Place one multimeter lead in socket B of harness 12353402 and the other lead on wire 49 battery connecto.

2. Check for continuity.

3. Place one multimeter lead in socket E of harness 12353402 and the other lead on wire 50 battery connector.

4. Check for continuity.

Is continuity indicated in both places?

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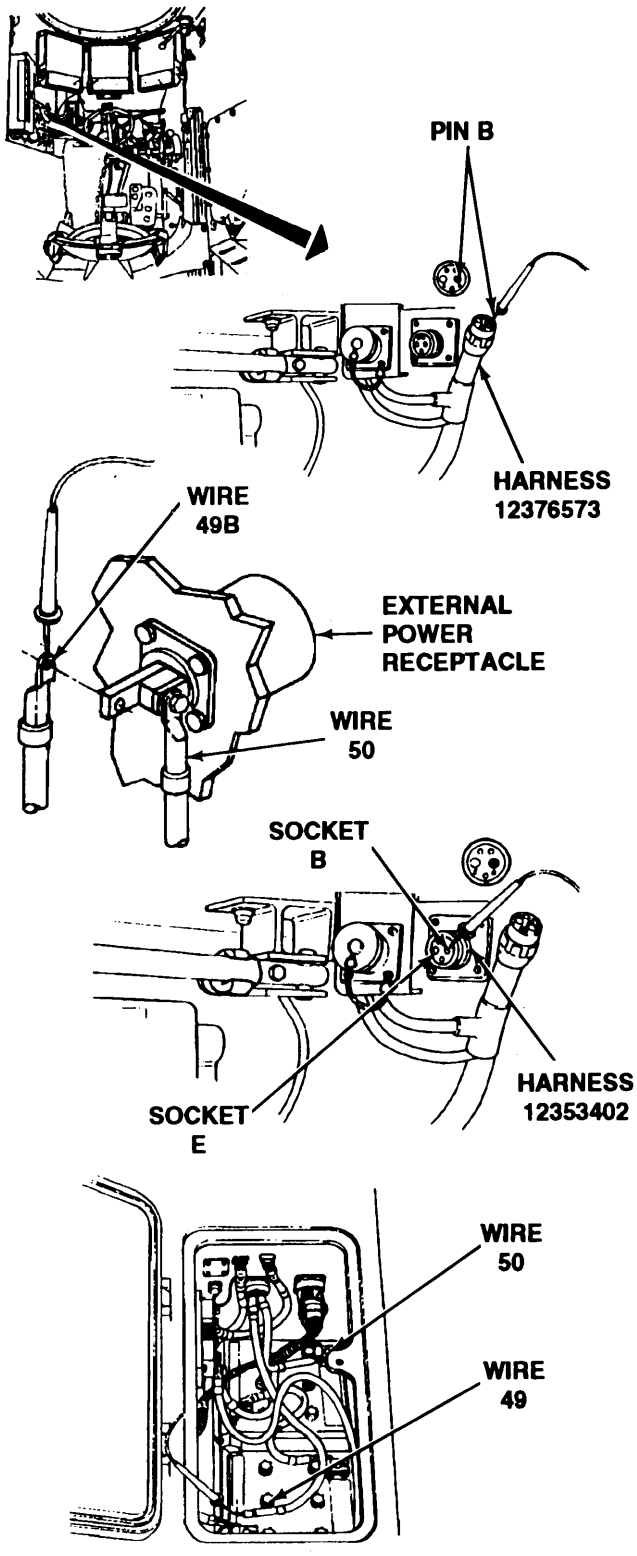
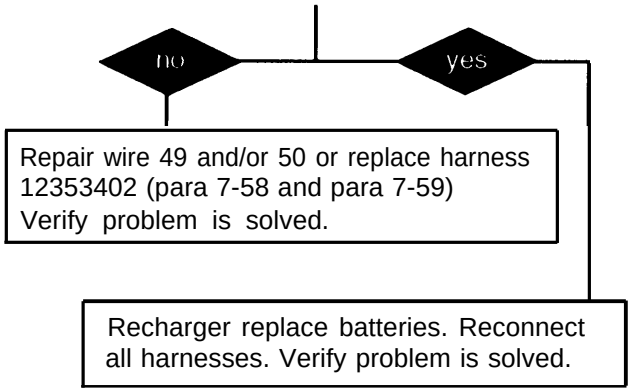


2-19. TROUBLESHOOTING CHART (continued).

i. NATO SLAVE RECEPTACLES (continued).	(2) NO POWER AT INTERNAL OR EXTERNAL POWER RECEPTACLE (continued).

CONTINUED FROM D

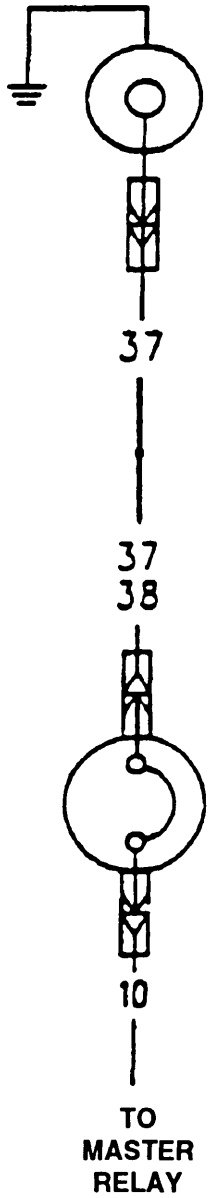


END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

¡ AUXILIARY OUTLET.

The auxiliary outlet is located on the driver's instrument panel. The auxiliary outlet circuit consists of the outlet circuit breaker number 1 and related electrical wiring. The diagram below shows the relationship of these components. The primary use of the auxiliary outlet is for the vehicle's night viewer. When the night viewer is installed, the power cord is plugged. By turning the MASTER switch ON, 24 vdc from the batteries is applied through the master relay to circuit breaker no. 1, which supplies the voltage to the auxiliay outlet.



12-19. TROUBLESHOOTING CHART (continued).

i	AUXILIARY OUTLET (continued).	(1) AUXILIARY OUTLET FAILS TO OPERATE. All other electrical systems operate.

Initial Setup:

Tool/Test Equipment:
- Digital Multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. 1. Connect red multimeter lead on auxiliary outlet center contact and ground black lead to outlet housing.

2. Turn MASTER switch ON (refer to TM 9-2350-287-10).

3. Check for 24 ± 3 vdc.

4. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no

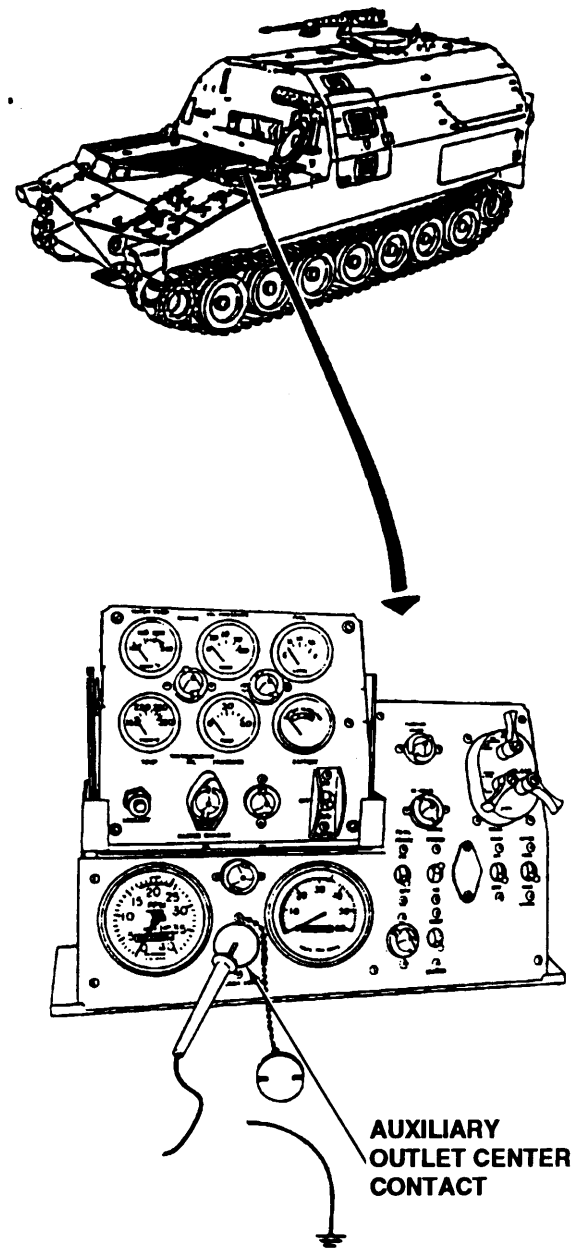
yes

Fault is with the item being connected to auxiliary outlet. Verify problem is solved.

B. 1. Stow portable instrument panel in outside mounting bracket.

2. Disconnect lead 37 from auxiliary outlet connector.

3. Place multimeter red lead in 37 connector socket of harness 12330252 and ground black lead.



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2-19. TROUBLESHOOTING CHART (continued).

j.	AUXILIARY OUTLET (continued).	(1) AUXILIARY OUTLET FAILS TO OPERATE. All other electrical systems operate (continued).

CONTINUED FROM B

B. 4. Turn MASTER switch ON (refer to TM 9-2350-287-1 0).

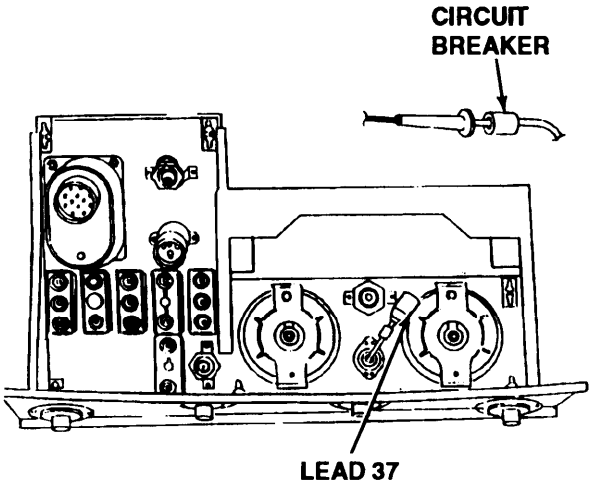
5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-1 O).

Is voltage indicated?

no → Replace auxiliary outlet (para 7-9). Verify problem is solved.

yes



NOTE

For the following steps (C&D), the driver's instrument panel needs to be removed (refer to TM 9-2350-287-10).

C. 1. Reconnect lead 37 of harness 12330252 to auxiliary outlet.

2. Disconnect harness 12330252 lead 37/38 from circuit breaker no. 1, panel no. 1.

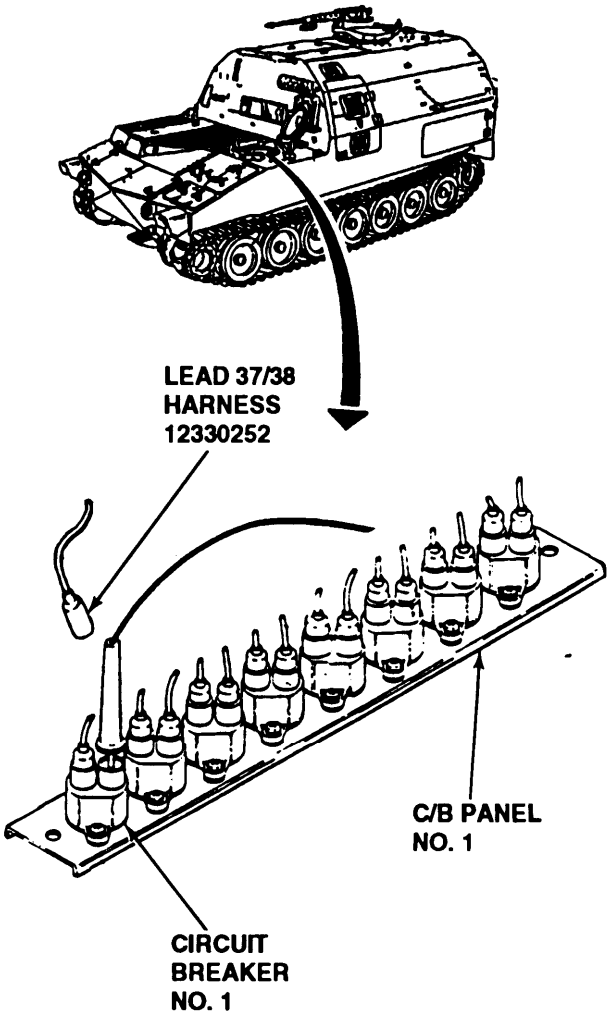
3. Place multimeter red lead on circuit breaker no. 1 connector pin and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?



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2-19. TROUBLESHOOTING CHART (continued).

i	AUXILIARY OUTLET (continued).	(1) AUXILIARY OUTLET FAILS TO OPERATE. All other electrical systems operate (continued).

CONTINUED FROM C

no / yes

Notify Direct Support maintenance.

D. 1. Reconnect wire 37-38 to circuit breaker no. 1.

2. Disconnect wire 10A of harness 12376405 from circuit breaker no. 1 input.

3. Place red lead of multimeter in wire 10A and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

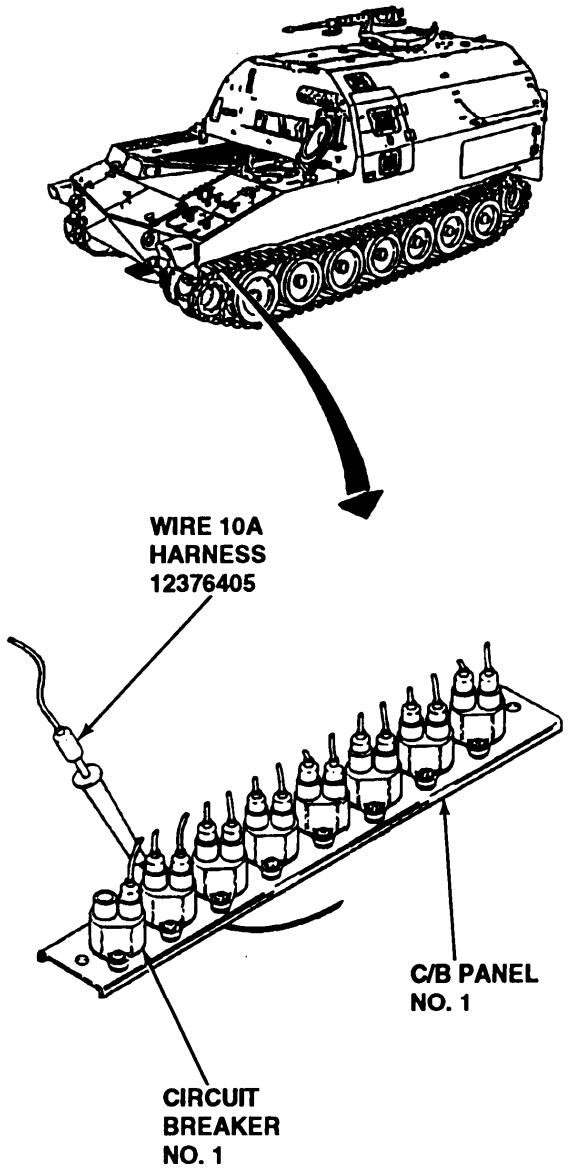
7. Check for 24 ± 3 vdc.

Is voltage indicated?

no / yes

Replace circuit breaker no. 1 (para 7-11). Verify problem is solved.

Repair wire 10A or replace harness 12376405 (para 7-57). Verify problem is solved.



END OF TASK

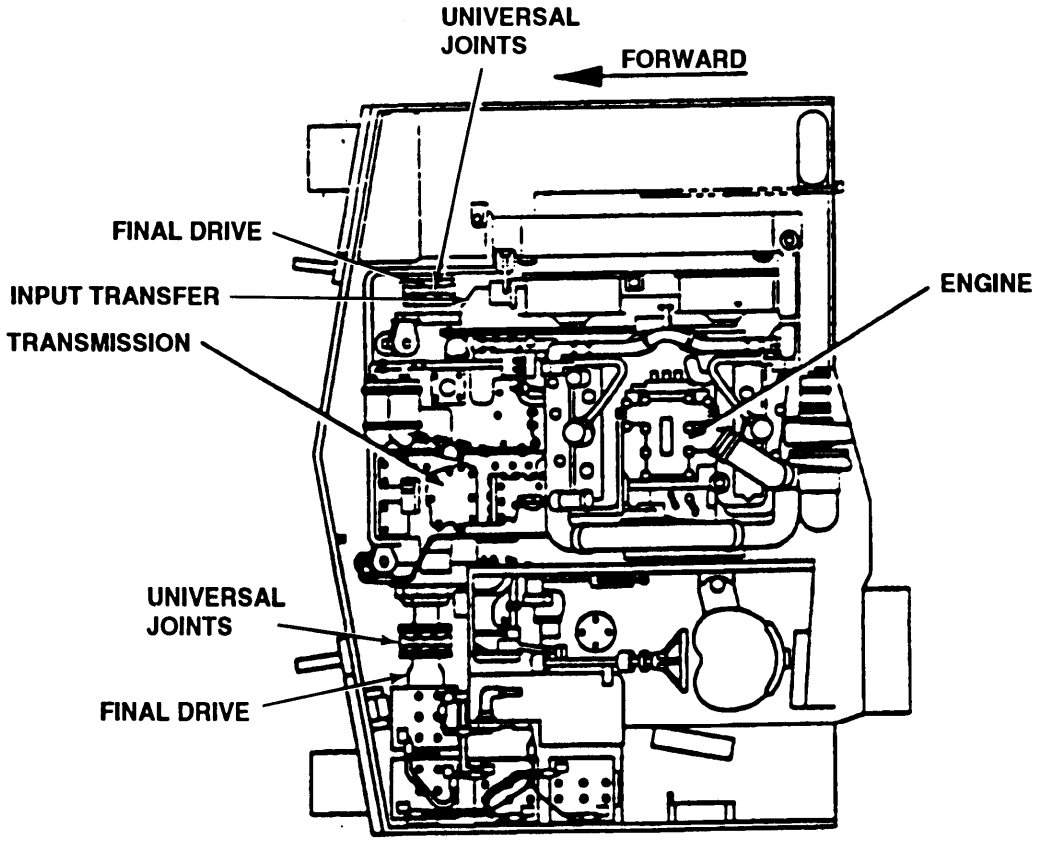
2-19. TROUBLESHOOTING CHART (continued).

k. TRANSMISSION AND DRIVING CONTROLS.

The transmission is mechanically and hydraulically operated and is oil cooled. Power to operate the transmission is delivered by the engine through the transfer assembly. The relationship of these components is shown in the diagram below.

The transmission has 7 gears -4 forward, 1 neutral and 2 reverse. Once power is provided to the transmission, it delivers this power to the left and right drive sprockets through an output shaft, universal joints and the final drive assemblies. The final drive assemblies reduce the transmission power and provides this reduced power to the sprockets and hubs.

The transmission also serves as the steering and braking mechanism for the vehicle.



2-19. TROUBLESHOOTING CHART (continued).

k. TRANSMISSION AND DRIVING CONTROLS (continued).	(1) TRANSMISSION OVERHEATS, TRANSMISSION OIL TEMPERATURE GAGE READS OVER 285°F (140°C). MASTER WARNING LIGHT IS LIT.

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item *24,* Appendix 1)

Materials/Parts:
- Lockwasher (3) (Item 183, Appendix H)

Personnel Required: Two

Equipment Conditions:
- Transmission access doors open (refer to TM 9-2350-287-10).

WARNING

- **Transmission contains hot oil under high pressure. Stop engine before removing or installing transmission components. Failure to follow these precautions can cause injury to personnel or damage to equipment.**

A. Inspect transmission oil cooler lines for leaks or restrictions.

Are transmission oil cooler lines free of leaks and restrictions?

no

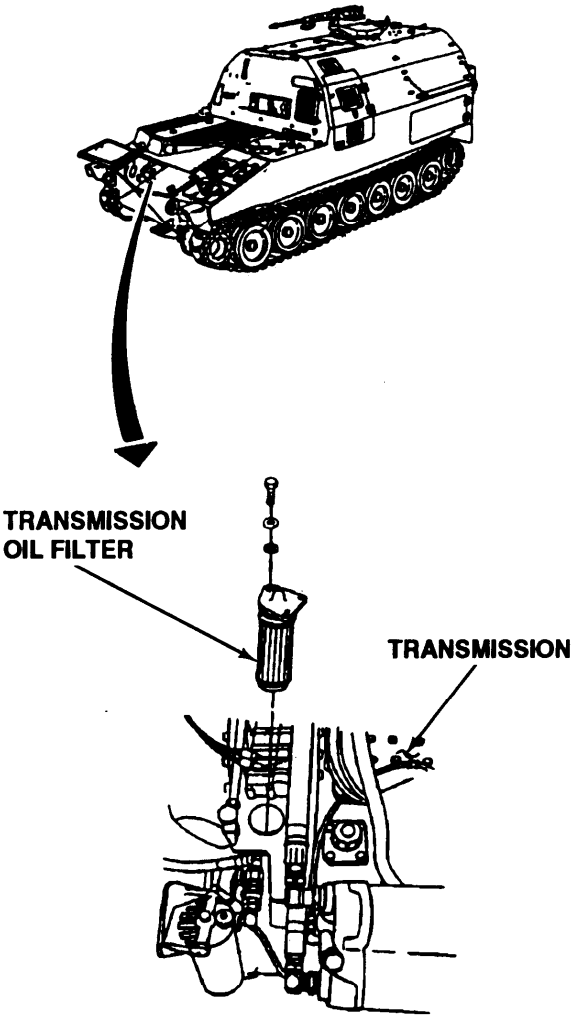
Tighten leaking transmission oil cooler lines. Repair or replace restricted lines (para 8-5). Verify problem is solved.

yes

B. 1. Remove three screws, washers, and lockwashers, transmission oil filter cover, and transmission oil filter. Discard lockwashers.

2. Check for clogged, dirty, or improperly installed oil filter.

Is transmission oil filter clean and installed properly?



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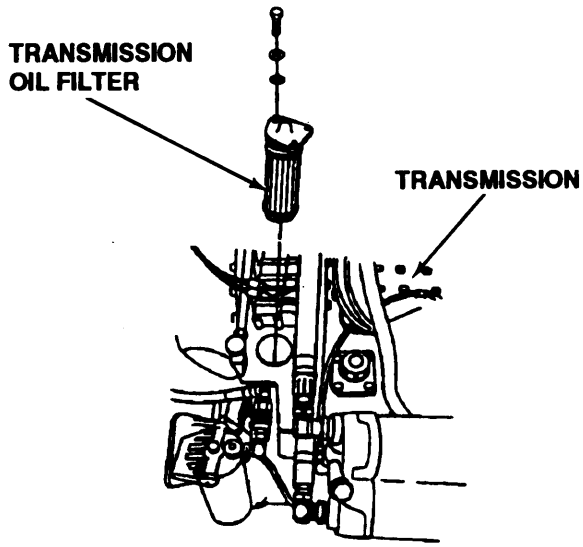
2-19. TROUBLESHOOTING CHART (continued).

k. TRANSMISSION AND DRIVING CONTROLS (continued).	(1) TRANSMISSION OVERHEATS, TRANSMISSION OIL TEMPERATURE GAGE READS OVER 285°F (140°C). MASTER WARNING LIGHT IS LIT (continued).

CONTINUED FROM STEP B

no yes

Replace transmission oil filter (Appendix G). Verify problem is solved.



C. 1. Install transmission oil fitter and oil filter cover with three screws, washers, and new lockwashers.

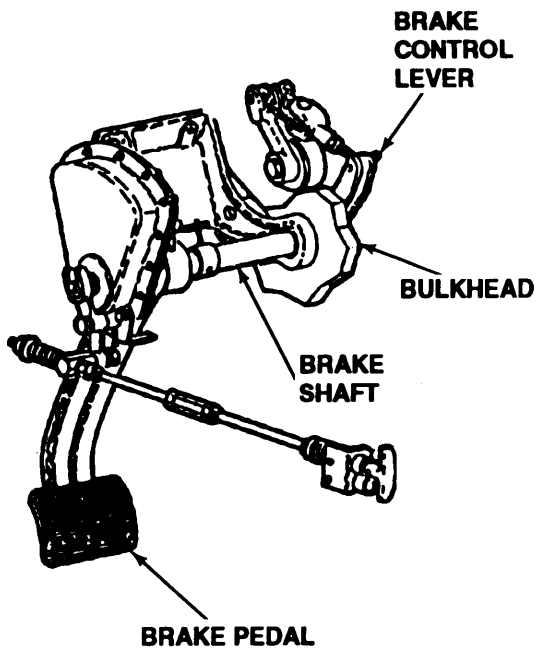
2. Check brake linkage and internal brake adjustment for proper alignment (para 2-19.I (1)).

Are brakes adjusted properly?

no yes

Adjsust brakes (paras 10-2 and 10-3) Verify probelm is solved

Notify Direct Support maintenance.



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

k. TRANSMISSION AND DRIVING CONTROLS (continued).	(2) VEHICLE DOES NOT MOVE. TRANSMISSION DOES NOT OPERATE IN ANY SHIFT POSITION.

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix 1)

Personnel Required: Two

Equipment Conditions:
Transmission access open (refer to TM 9-2350-287-10).
Air intake grille opened and secured (refer to TM 9-2350-287-10).

WARNING

Vehicle has no brakes when final drives are disconnected. Failure to securely block vehicle can cause injury to personnel or damage to equipment.

A. 1. Remove three screws, washers, and lockwashers, transmission oil filter cover, and transmission oil filter.

2. Check for clogged or damaged fitter.

Is oil fitter clogged or damaged?

no — yes

Clean clogged filters or replace damaged filters (Appendix G.)

B. Check transmission oil for debris (e.g., metal shavings) or contamination.

Is transmission oil free of debris and contamination?

no — yes

Notify Direct Support maintenance.

C. 1. Install transmission oil filter and cover with three screws, washers, and new lockwashers.

2. Check shift control linkage for disconnection or improper adjustment.

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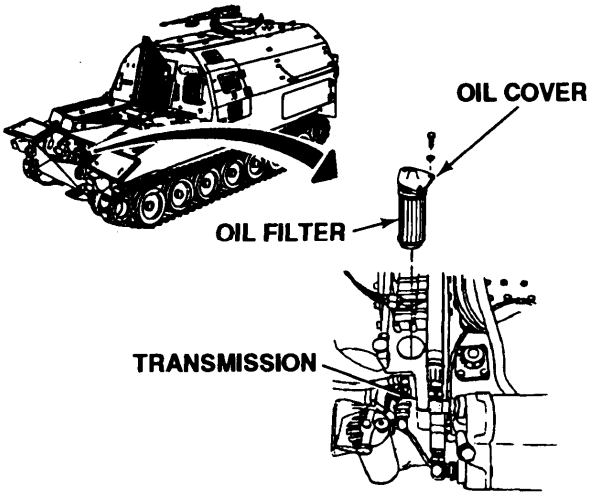
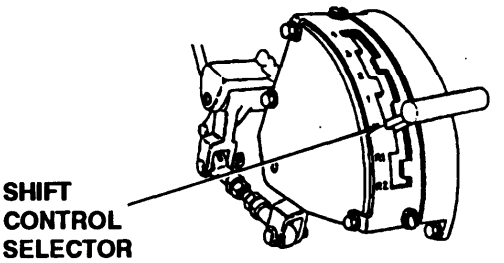
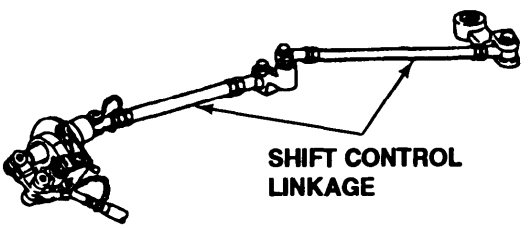






2-19. TROUBLESHOOTING CHART (continued).

k. TRANSMISSION AND DRIVING CONTROLS (continued).	(2) VEHICLE DOES NOT MOVE. TRANSMISSION DOES NOT OPERATE IN ANY SHIFT POSITION (continued).

CONTINUED FROM STEP C

C. 3. With the aid of an assistant, move the shift selector through all positions, checking that the shift selector setting in the driver's compartment is the same as shift control lever index on transmission at all positions.

Is shift control linkage connected and adjusted properly?

no

Connect and/or adjust shift control linkage (para 8-2). Verify problem is solved.

yes

D. With the aid of an assistant, check bra linkage for proper adjustment by checking shaft index marks for alinement with level index marks.

Is brake linkage properly adjusted?

no

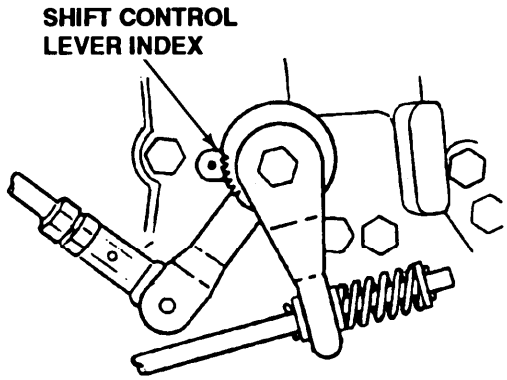
Adjust brake linkage (para 10-2 and 10-3). Verify problem is solved.

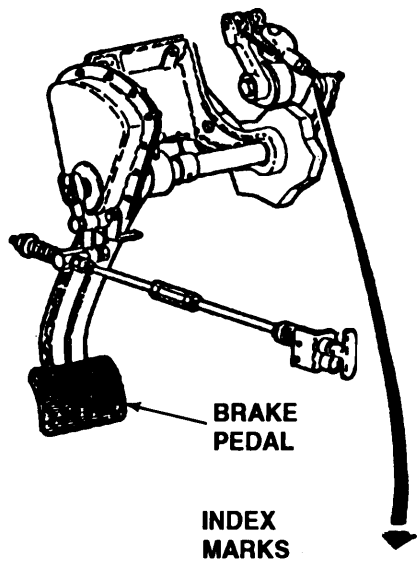
yes

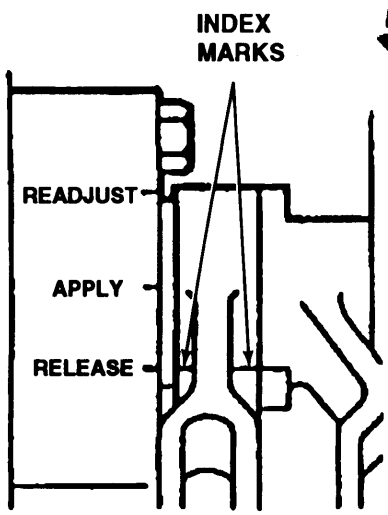
E. 1. With the aid of an assistant, check transmission internal brake adjustment by fully applying brakes and observing index marks on brake levers.

2. Brakes are properly adjusted if the index marks rotate to APPLY mark on retainer, but not to READJUST mark.

Is brake linkage and transmission internal brake adjusted property?







BRAKE LEVER INDEX

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

k. TRANSMISSION AND DRIVING CONTROLS (continued).	(2) VEHICLE DOES NOT MOVE. TRANSMISSION DOES NOT OPERATE IN ANY SHIFT POSITION (continued).

CONTINUED FROM STEP E

no / yes

Adjust brake linkage and/or transmission internal brake (para 10-2,10-3, and 8-7). Verify problem is solved.

F. Inspect final drive universal joints for any broken or damaged parts, missing or loose bolts.

Are universal joints connected and in good condition?

no / yes

Repair final drive universal joints (para 9-3). Verify problem is solved.

G. Inspect final drive and universal joint connections for any broken or damaged parts (e.g., flange, packing) or missing or loose bolts.

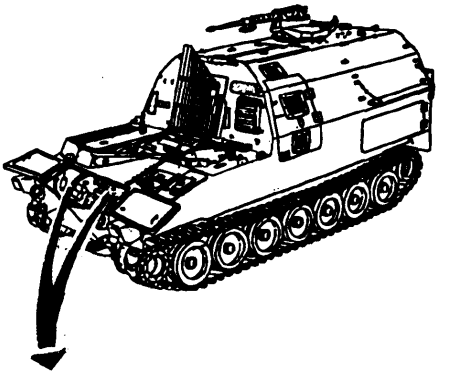
Are final drives in good condition?

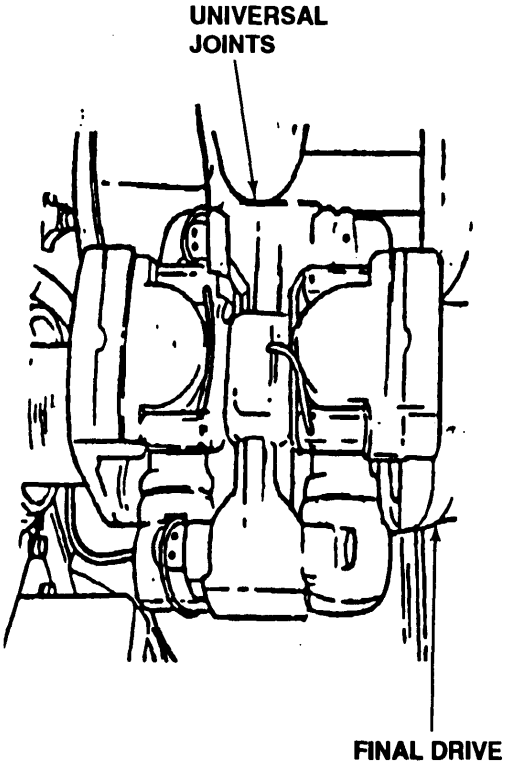
no / yes

Replace defective final drives (para 9-4). Verify problem is solved.

Notify Direct Support maintenance.

END OF TASK





12-19. TROUBLESHOOTING CHART **(continued).**

k. TRANSMISSION AND DRIVING CONTROLS (continued).	(3) VEHICLE DOES NOT STEER IN EITHER DIRECTION IN ANY RANGE.

Initial Setup:

Tools/Test Equipment
- General mechanic's tool kit (Item 24, Appendix I)

Equipment Conditions:
- Transmission left and right access door opened (refer to TM 9-2350-287-10).
- Air intake grille open (refer to TM 9-2350-287-10).

A. 1. Check for disconnected or loose steering control linkage and components.

Are all steering control linkage and components secure?

no → Repairer replace linkage or any connecting pins and bolts that may be missing or broken (para 12-2). Verify problem is solved.

yes

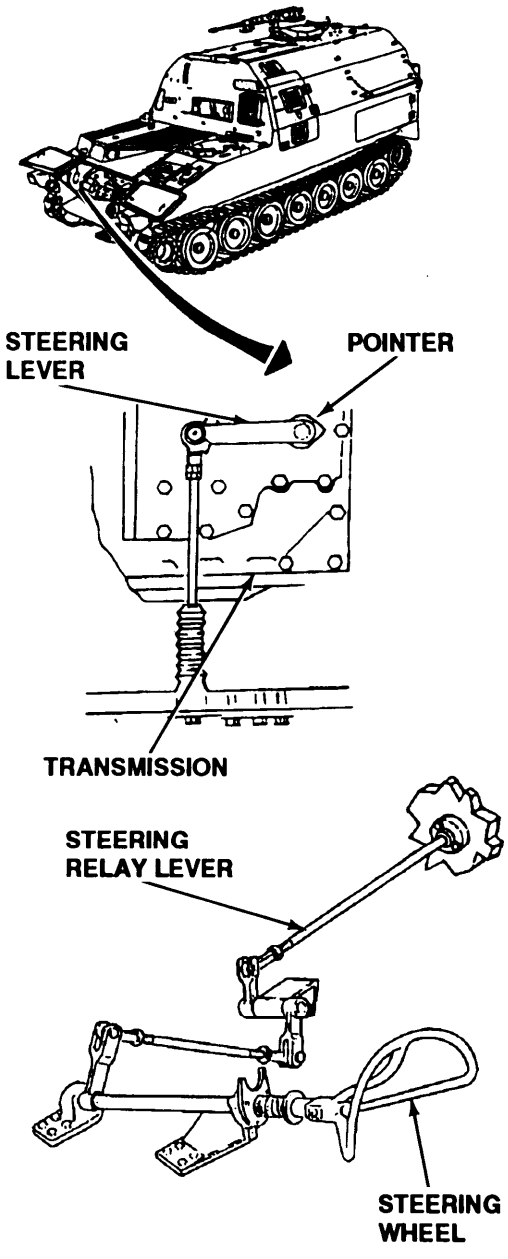
B. 1. Check for improperly adjusted steering wheel in neutral position (center spoke vertical), check to see that steering control lever is also in the neutral position with pointer aligned with center position marker, and lever parallel with center line of vehicle.

Is steering control linkage properly adjusted?

no → Adjust steering properly (para 12-2). Verify problem is solved.

yes → Notify Direct Support maintenance to repair the steering linkage in the transmission.

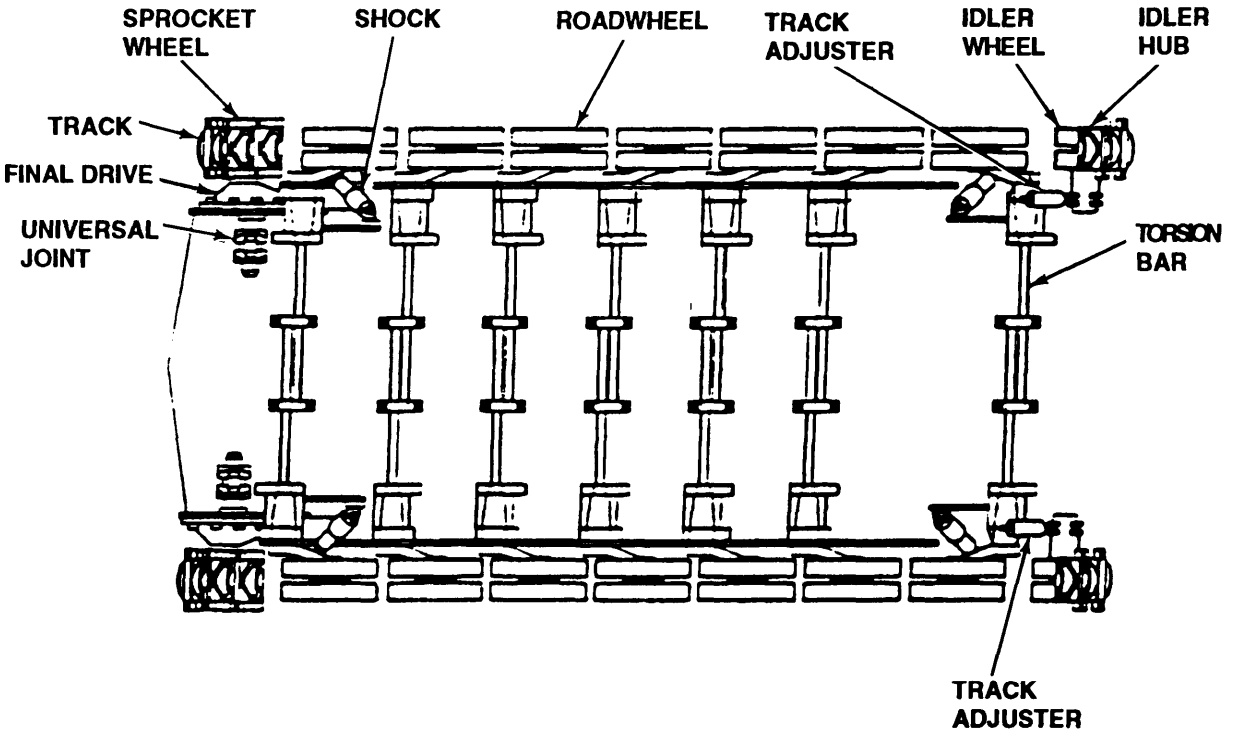
END OF TASK



2-19 TROUBLESHOOTING CHART-CONTINUED

1. **TRACK AND SUSPENSION.**

The vehicle track and suspension system consists of the tracks, final drives, sprockets, universal joints, roadwheels, roadwheel arms, idler wheels, idler hubs, shock absorbers and torsion bars. The relationship of these components is shown in the diagram below. When the track receives power from the transmission through the universal joints, final drives, and sprockets, the tracks begin to revolve around the roadwheels, over the idler wheels and back to the sprockets, This propels the vehicle either forward or backward, depending on the selected transmission gear.



2-19. TROUBLESHOOTING CHART (continued).

1. TRACK AND SUSPENSION (continued).	(1) VEHICLE BRAKES POORLY. Vehicle does not stop correctly when brake is applied.

Initial Setup:

Tools/Test Equipment:
General mechanic's tool kit (Item 24, Appendix 1)

Personnel Required: Two

Equipment Conditions:
Left and right transmission access doors opened (refer to TM 9-2350-287-10).

A. Inspect brake linkage for proper adjustment by checking shaft index marks for alignment with lever index marks.

Is brake linkage adjusted properly?

no — Adjust brake linkage (para 10-3). Verify problem is solved.

yes

B. 1. Push down on brake pedal and inspect linkage for any free play in the pedal or linkage in the driver's compartment.

2. With the aid of an assistant, check to see if the brake shaft leading out of the bulkhead is turning when the brake pedal is pushed in.

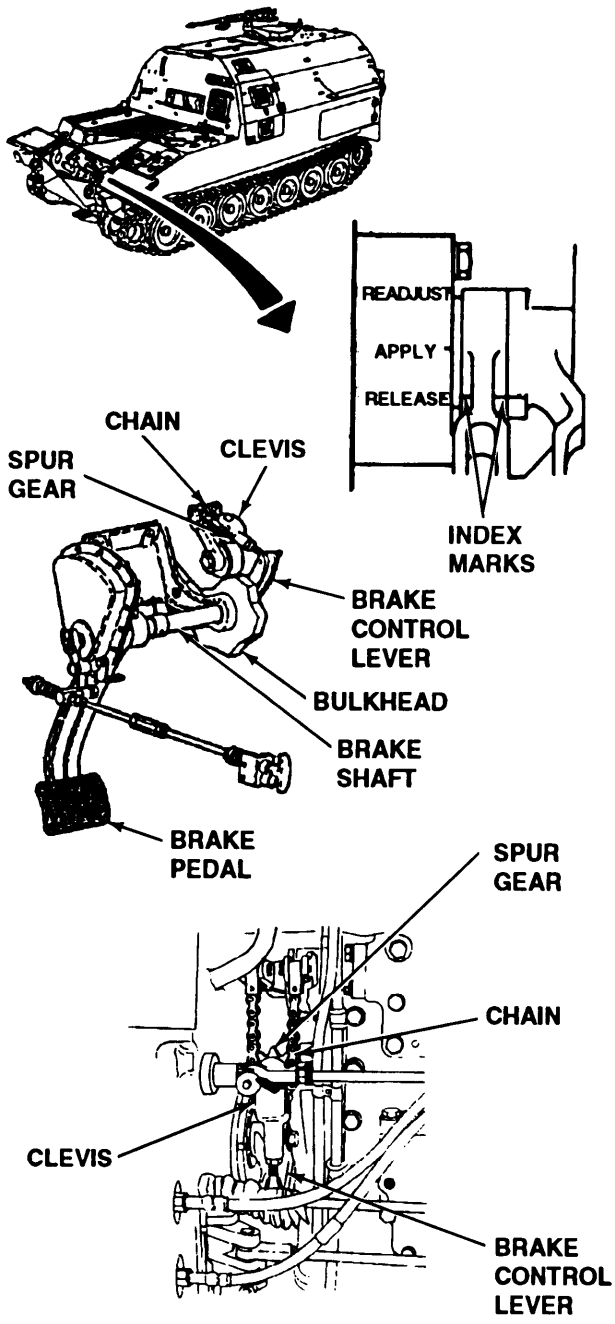
Are all driver's compartment linkages and components secure, and does the brake shaft turn when brake pedal is pushed in?

no — Repair or replace brake pedal and linkage or any connecting pins and botts that may be missing or broken (para 10-4). Verify problem is solved.

yes

C. 1. Inspect brake control lever in the engine compartment and make sure it is secure at the bulkhead and the clevis assembly.

2. Inspect and ensure that the clevis, chain, and spur gear assemblies are secure.



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2-19. TROUBLESHOOTING CHART (continued).

1. TRACK AND SUSPENSION (continued).	(1) VEHICLE BRAKES POORLY. Vehicle does not stop correctly when brake is applied (continued).

CONTINUED FROM STEP C

Are all engine compartment brake linkage components secure?

no

Repair or replace brake control lever or any connecting pins and bolts that may be missing or broken (para 10-4). Verify problem is solved.

yes

D. 1. With the aid of an assistant, check transmission internal brake adjustment by fully applying brakes and observing the index marks on brake levers.

2. If index marks rotate to APPLY mark on retainer but not to READJUST mark, brakes are properly adjusted,

Is transmission internal brake adjusted properly?

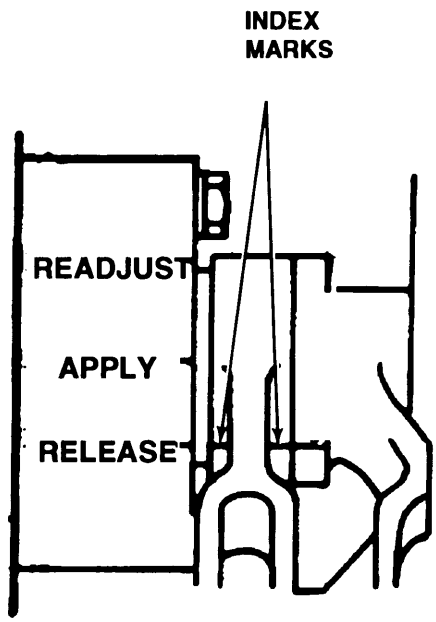
no

Adjust transmission internal brake (para 8-7). Verify problem is solved.

yes

Notify Direct Support maintenance.

END OF TASK



12-19 TROUBLESHOOTING CHART (continued).

I. TRACK AND SUSPENSION (continued).	(2) VEHICLE PULLS TO ONE SIDE WITH STEERING WHEEL IN CENTER POSITION.

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item *24,* Appendix 1)

Equipment Conditions:
- Air intake grille opened and secured (refer to TM 9-2350-287-10).
- Left and right transmission access doors opened (refer to TM 9-2350-287-10).

NOTE

Crown on road may cause vehicle to pull away from center of road. Road test vehicle on flat surface.

A. Check for disconnected or loose steering control linkage and components.

Are all steering control linkage and components secure?

no → Repair or replace linkage or any connecting pins and bolts that maybe missing or broken (para 12-2). Verify problem is solved.

yes →

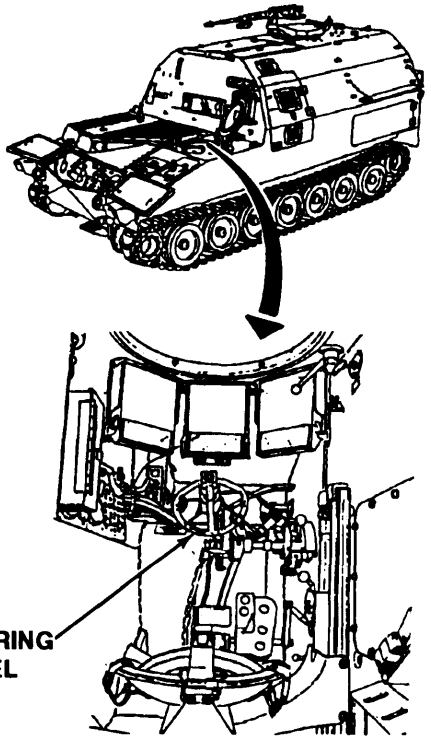
B. Check for improperly adjusted steering control linkage by placing steering wheel in neutral position (center spoke vertical), check to see that steering control lever is also in the neutral position with pointer aligned with center position marker, and lever parallel with centerline of vehicle.

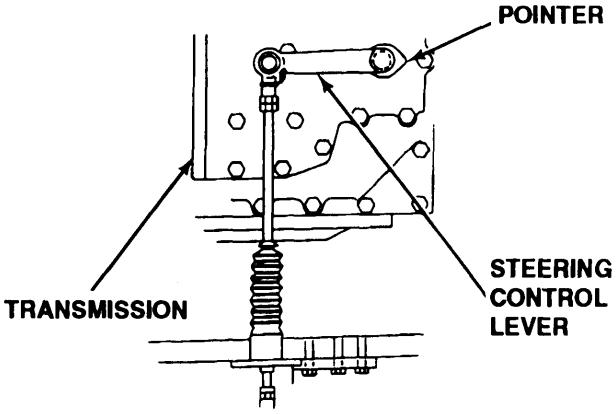
Is steering control linkage properly adjusted?

no → Adjust steering control linkage (para 12-2). Verify problem is solved.

yes →

Continued on next page





2-19 TROUBLESHOOTING CHART (continued).

l. TRACK AND SUSPENSION (continued).	(2) VEHICLE PULLS TO ONE SIDE WITH STEERING WHEEL IN CENTER POSITION (continued).

CONTINUED FROM STEP B

C. Check suspension system for broken, damaged, and or binding suspension components.

Are all suspension components in good condition?

no

Repair or replace any broken, damaged, and/or binding suspension components as required (paras 11-2 through 11 -14). Verify problem is solved.

yes

D. Inspect for even wear of all drive sprockets.

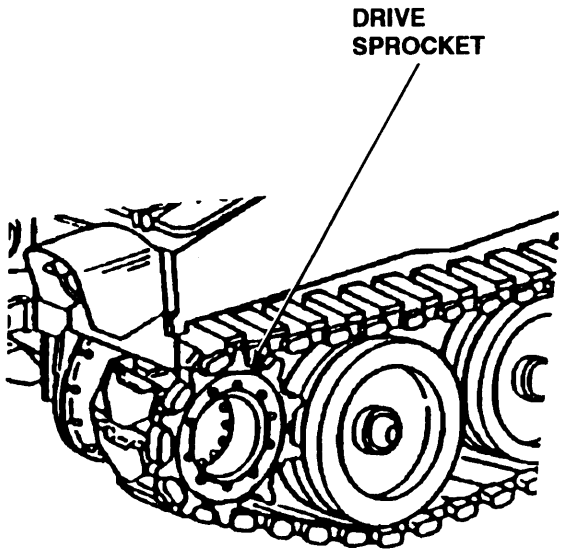
Are all drive sprockets worn evenly?

no

Repair or replace drive sprockets as required (para 11-11). Verify problem is solved.

yes

Perform brake system troubleshooting (para 2-19. I (1)).



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

l. TRACK AND SUSPENSION (continued).	(3) VEHICLE THROWS TRACK.

Initial Setup:

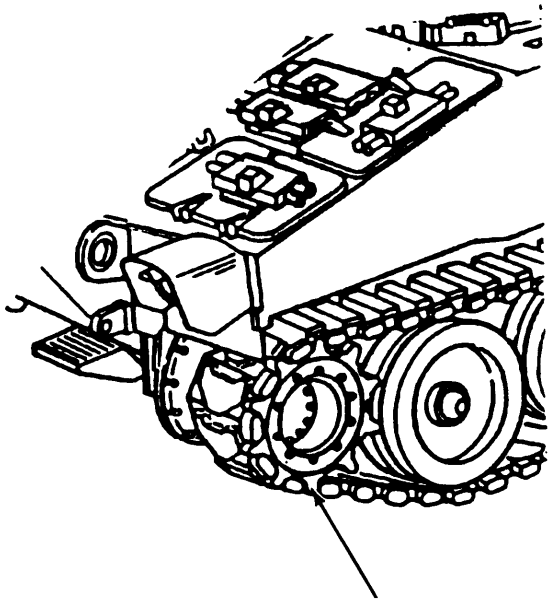
Tools/Test Equipment:
General mechanic's tool kit (Item *24,* Appendix 1)

A. Check drive sprockets for excessive or uneven wear.

Are drive sprockets in good condition and worn evenly?

- no → Reverse or replace drive spockets as required (para 11-11). Verify problem is solved.
- yes → Notify Direct Support maintenance.

END OF TASK



DRIVE SPROCKETS

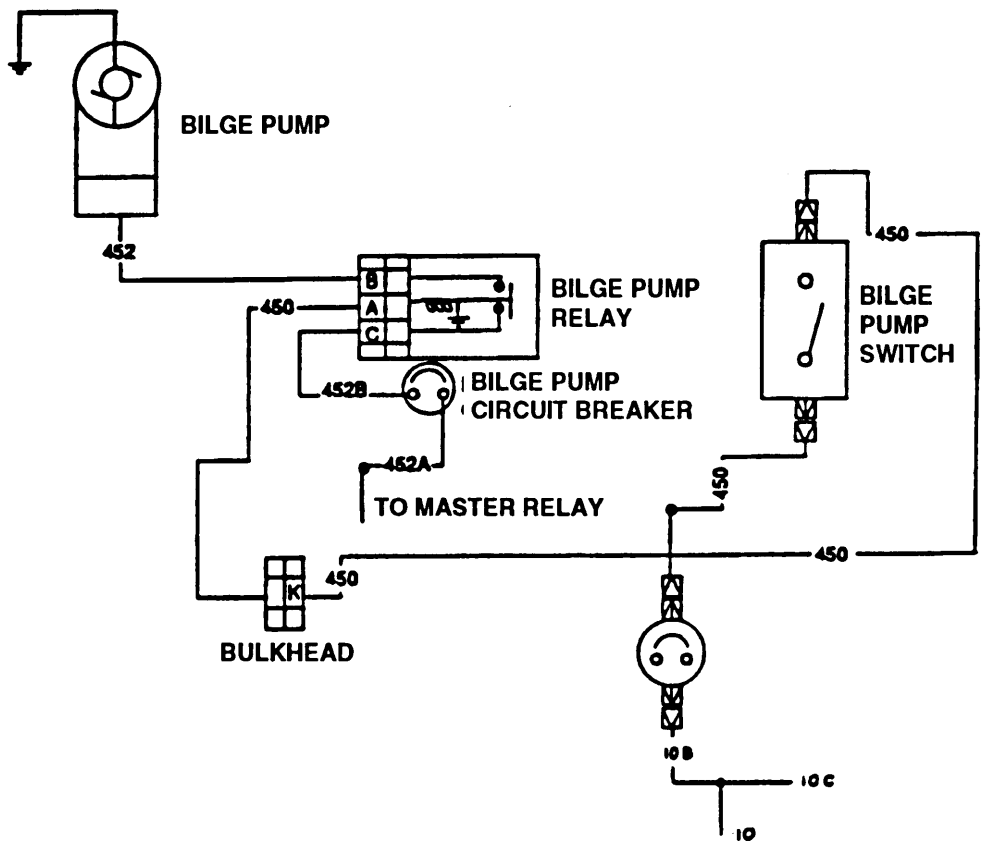
12-19. TROUBLESHOOTING CHART (continued).

m. BILGE PUMP.

The bilge pump is used to evacuate water from the engine compartment, usually after fording. The bilge pump should not be operated for more than one minute in a dry compartment or 15 minutes in a flooded compartment, unless the engine is running.

The bilge pump system consists of the bilge pump, bilge pump relay, bilge pump circuit breaker, circuit breaker 2, and associated wiring.

To operate the bilge pump, the MASTER switch must be turned ON. By turning on the MASTER switch, 24 vdc is supplied from the batteries through the MASTER relay, to circuit breaker 2. From circuit breaker 2, the voltage is routed to the bilge pump switch. When the bilge pump switch is turned on, power is supplies through the bilge pump circuit breaker to the bilge pump relay. The bilge pump relay sends the power to the bilge pump and the bilge pump is energized.



ELECTRICAL DIAGRAM

12-19. TROUBLESHOOTING CHART (continued).

m. BILGE PUMP (continued).	(1) BILGE PUMP DOES NOT OPERATE. All other electrical systems operate.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- Wire (Item 77, Appendix D)

Personnel Required: Two

Equipment Conditions:
- Transmission access doors open (refer to TM 9-2350-287-10).
- Engine intake grille open (refer to TM 9-2350-287-10).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. 1. Disconnect wire 452 from bilge pump.

2. Place red lead of multimeter in wire 452 and black lead to ground.

3. Have assistant turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Turn BILGE PUMP switch ON.

5. Check for 24 ± 3 vdc.

6. Turn BILGE PUMP and MASTER switch OFF (refer to TM 9-2350-287-10).

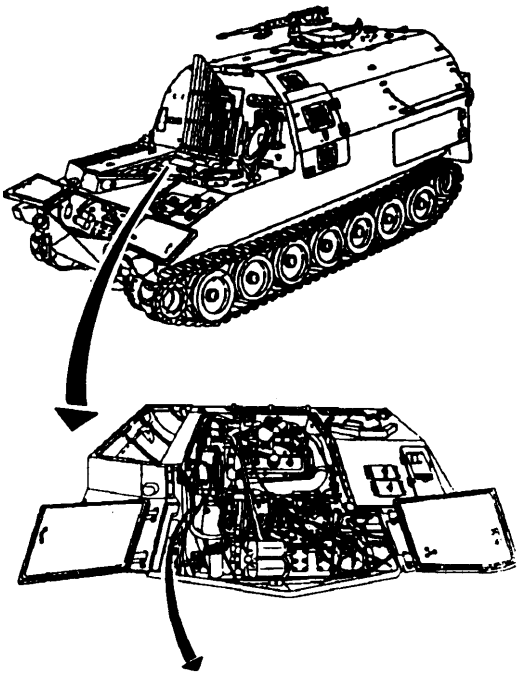
Is voltage indicated?

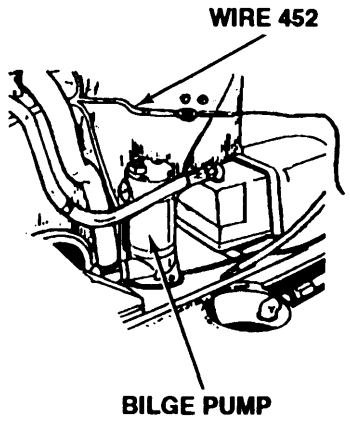
no

yes

Replace bilge pump (para 16-3). Verify problem is solved.

Continued on next page





2-19. TROUBLESHOOTING CHART **(continued).**

m. BILGE PUMP (continued).	(1) BILGE PUMP DOES NOT OPERATE. All other electrical systems operate (continued).

CONTINUED FROM A

B. 1. Reconnect wire 452 to bilge pump.

2. Disconnect harness 10921380 from bilge pump relay.

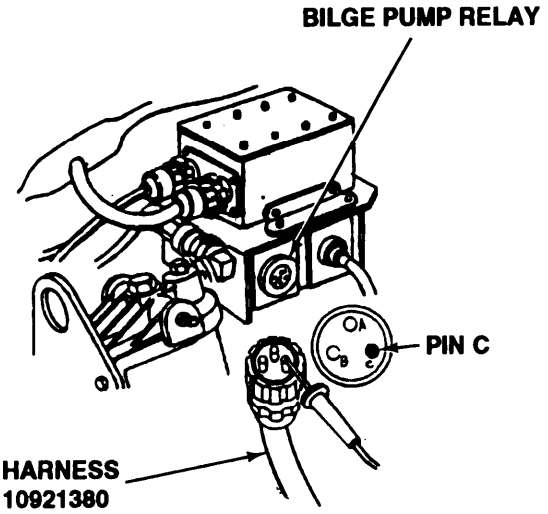
3. Place red lead of multimeter in pin C and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?



no → **GO TO STEP 1**

yes →

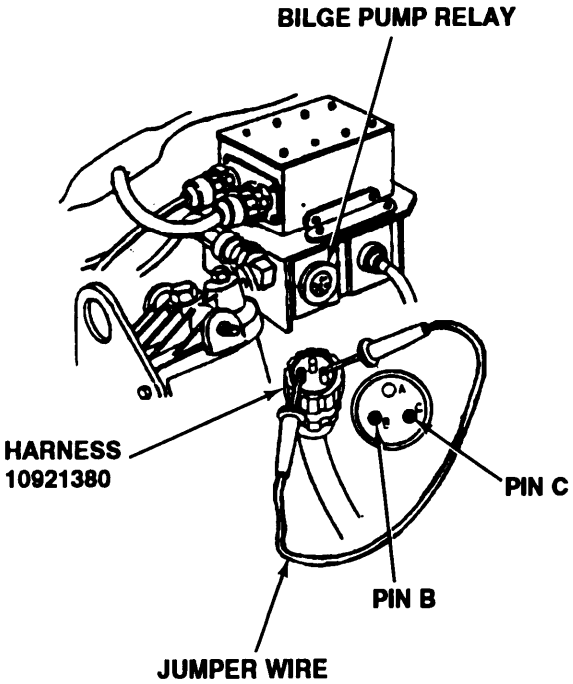
C. 1. Use a jumper wire to connect harness 10921380 pin C to pin B wire 452.

2. Turn MASTER switch ON (refer to TM 9-2350-287-10).

3. Check bilge pump for operation.

4. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Does bilge pump operate?



no → Repair wire452 or replace wire harness 10921380 (para 7-43). Verify problem is solved.

yes →

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

m. BILGE PUMP (continued).	(1) BILGE PUMP DOES NOT OPERATE. All other electrical systems operate (continued).

CONTINUED FROM C

D. 1. Place red lead of multimeter in pin A wire 450 and ground black lead.

2. Turn MASTER switch and BILGE PUMP switch ON (refer to TM 9-2350-287-10).

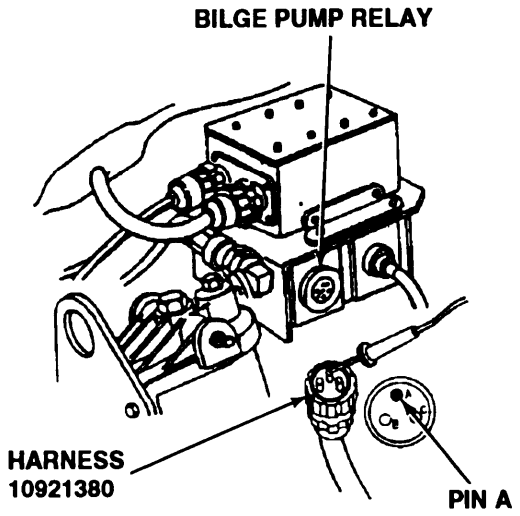
3. Check for 24 ± 3 vdc.

4. Turn MASTER switch and BILGE PUMP switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no → Replace bilge pump relay (para 7-3). Verify problem is solved.

yes



E. 1. Reconnect wire harness 10921380 to bilge pump relay.

2. Remove six screws from driver's instrument panel control plate. Remove control plate for access to bilge pump switch.

3. Disconnect wire 450 of harness 12260287 at BILGE PUMP switch output.

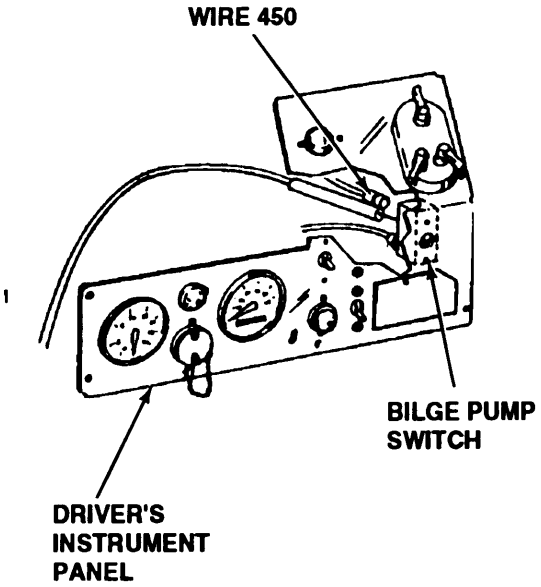
4. Place red lead of multimeter in BILGE PUMP switch output and ground black lead.

5. Turn MASTER switch and BILGE PUMP switch ON (refer to TM 9-2350-287-10).

6. Check for 24 ± 3 vdc.

7. Turn MASTER switch and BILGE PUMP switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?



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2-19. TROUBLESHOOTING CHART (continued).

m. BILGE PUMP (continued).	(1) BILGE PUMP DOES NOT OPERATE. All other electrical systems operate (continued).

CONTINUED FROM E

no / yes

GO TO STEP K

F. 1. Reconnect wire 450 to bilge pump switch output.

2. Disconnect wire 450 from BILGE PUMP switch input.

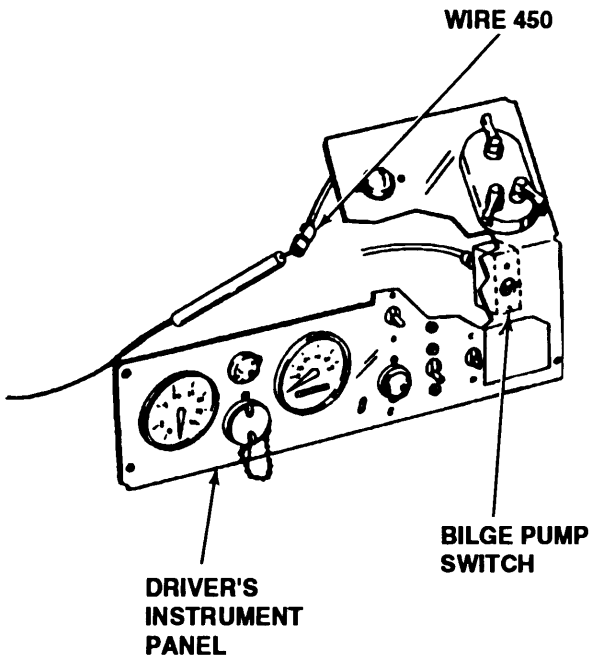
3. Place red lead of multimeter in wire 450 and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?



no / yes

Replace BILGE PUMP switch on driver's instrument panel (para 7-9). Verify problem is solved.

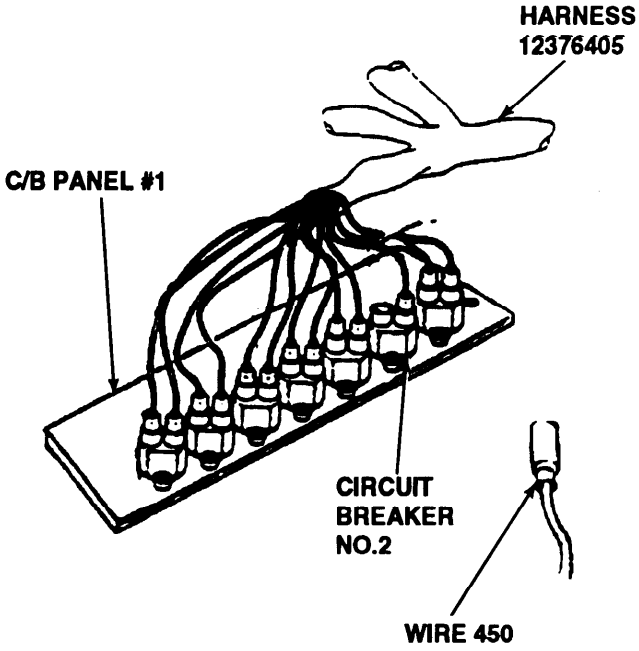
G. 1. Reconnect wire 450 to bilge pump switch.

2. Disconnect wire 450 of wire harness 12268104 from circuit breaker no. 2 output.

3. Place red lead of multimeter in circuit breaker no. 2 output and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.



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2-19. TROUBLESHOOTING CHART (continued).

m. BILGE PUMP (continued).	(1) BILGE PUMP DOES NOT OPERATE. All other electrical systems operate (continued).

CONTINUED FROM G

G. 6. Turn MASTER switch OFF (refer toTM 9-2350-287-10).

Is voltage indicated?

no → Repair wire 450 or replace harness 12268104 (para 7-61). Verify problem is solved.

yes →

H. 1. Reconnect wire 450 to circuit breaker output.

2. Disconnect wire 10B of wire harness 12376405 from circuit breaker no. 2 input.

3. Place red lead of multimeter in wire 10B and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

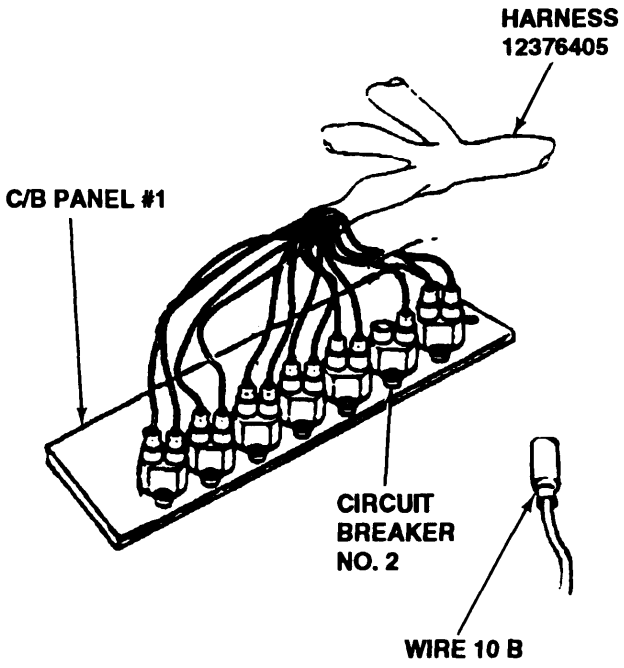
5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no → Replace circuit breaker no. 2 (para 7-11). Verify problem is solved.

yes → Repair wire 10B or replace harness 12876405 (para 7-57). Verify problem is solved.



CONTINUED FROM STEP B

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

m. BILGE PUMP (continued).	(1) BILGE PUMP DOES NOT OPERATE. All other electrical systems operate (continued).

CONTINUED FROM H

1. 1. Reconnect wire 452B to bilge pump relay.

2. Disconnect wire 452B from bilge pump circuit breaker output.

3. Place red lead of multimeter in circuit breaker output and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no → yes

Repair wire 452B or replace harness 12353403 (para 7-49).

J. 1. Reconnect wire 452B to bilge pump circuit breaker input.

2. Disconnect wire 452A from bilge pump circuit breaker input.

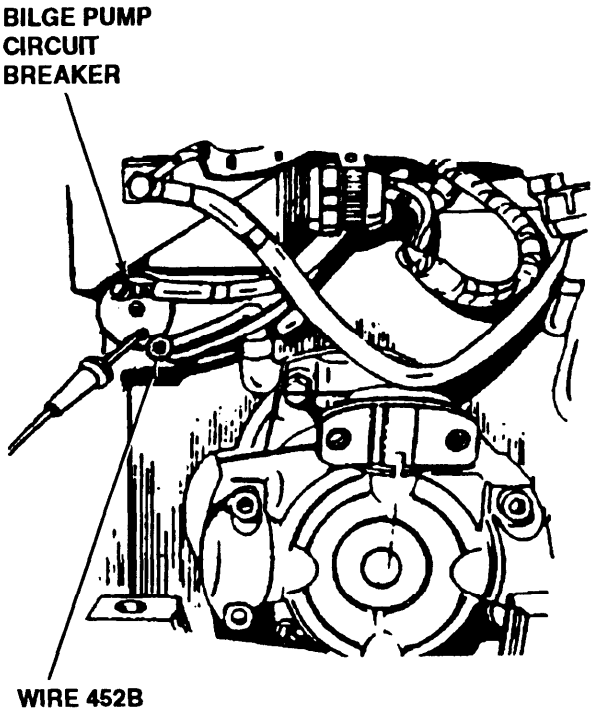
3. Place red lead of multimeter on wire 452A and ground lead.

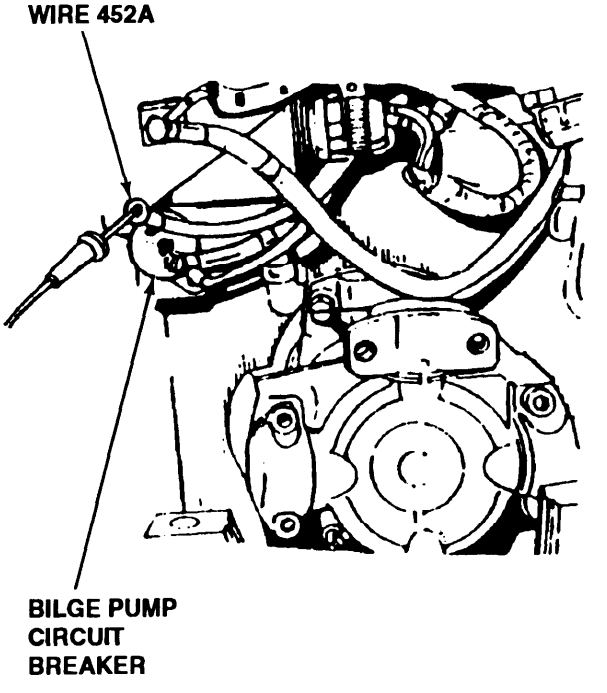
4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?





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2-19. TROUBLESHOOTING CHART (continued).

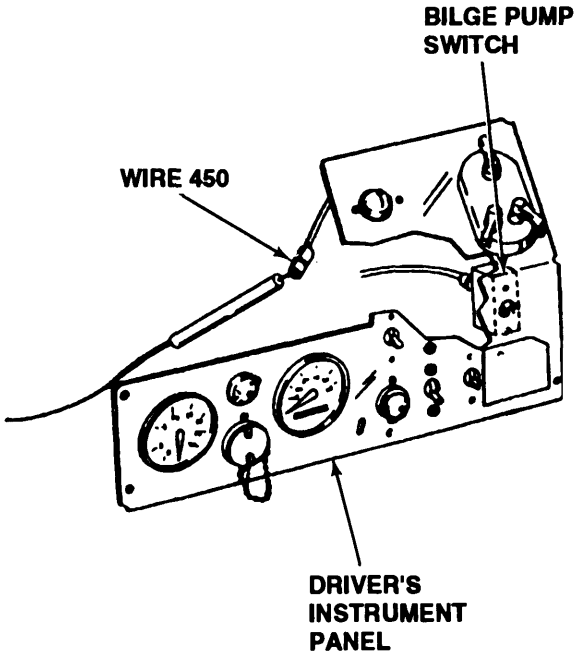
m. BILGE PUMP (continued).	(1) BILGE PUMP DOES NOT OPERATE. All other electrical systems operate (continued).

CONTINUED FROM J

no / yes

Replace bilge pump circuit breaker (para 7-11). Verify problem is solved.

Repair wire 452A or replace harness 12353403 (para 7-49), Verify problem is solved.



CONTINUED FROM STEP E

K. 1. Disconnect wire harness 12330252 at driver's bulkhead.

2. Place red lead of multimeter in socket M and black lead to wire 450 at BILGE PUMP switch output.

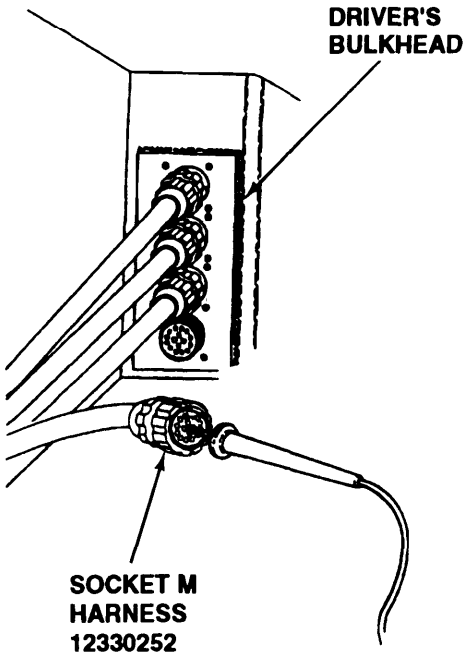
3. Check wire 450 of harness 12330252 for continity.

Is continuity indicated?

no / yes

Notify Direct Support maintenance.

Repair wire 450 or replace wiring harness 10921380 (para 7-43). Verify problem is solved.

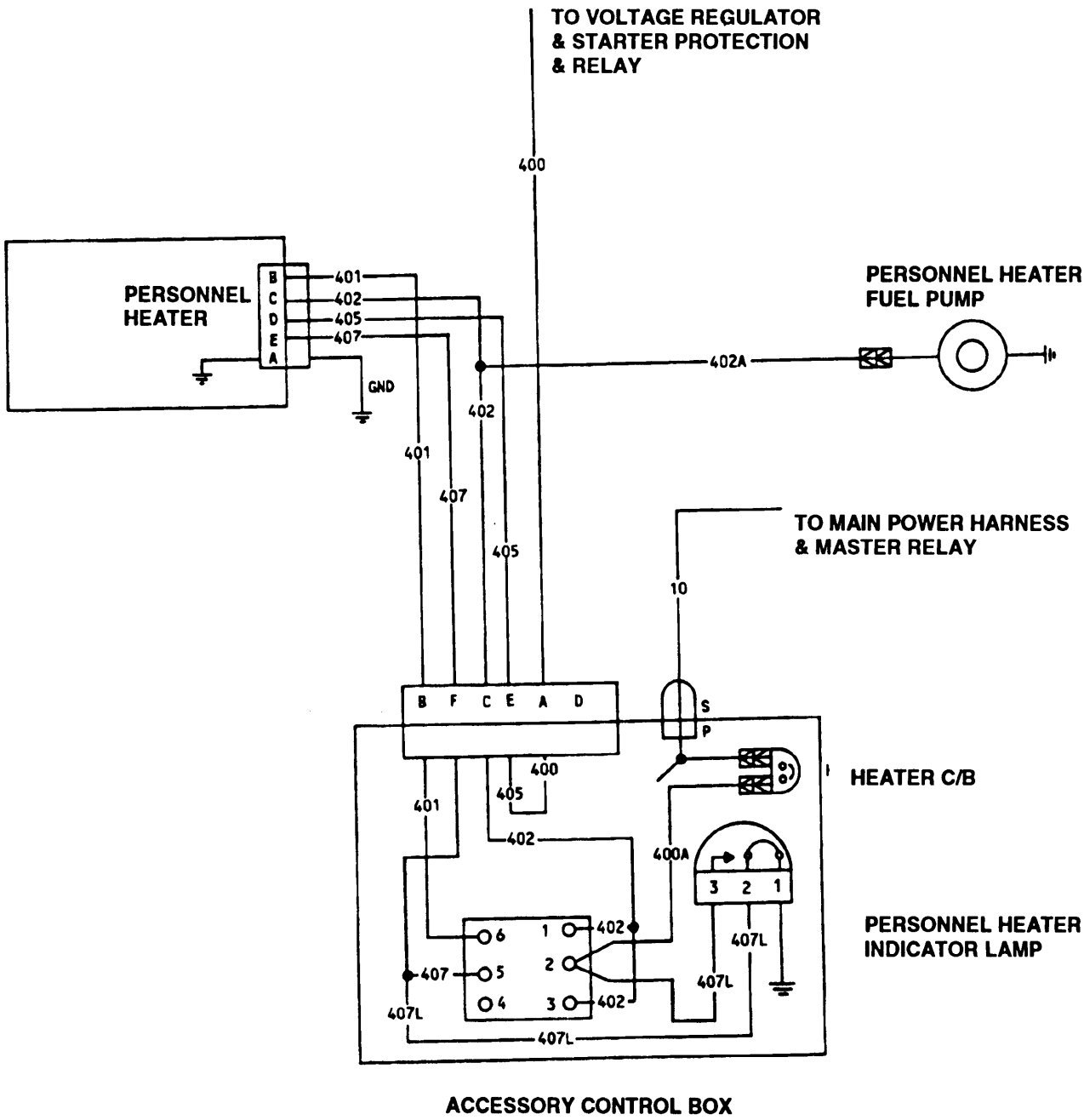


END OF TASK

2-19 TROUBLESHOOTING CHART-CONTINUED

n. PERSONNEL HEATER.

The personnel heater system consists of the personnel heater, accessory control box, and heater fuel pump. The diagram below shows the relationship of these components. When the vehicle MASTER switch is turned ON, 24Vdc is supplied to the accessory control panel. When the HEAT SELECTOR SWITCH is turned to LOW, voltage is applied to the heater fuel pump and personnel heater. After approximately 3 minutes, the heater indicator light will illuminate to indicate the heater is operating properly.



2-19. TROUBLESHOOTING CHART (continued)

n. PERSONNEL HEATER (continued).	(1) PERSONNEL HEATER FAILS TO OPERATE. All other electrical systems operate.

Initial/Setup:

Tools/Test Equipment:
- Digital multimeter (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Personnel Required: Two

Equipment Conditions:
- Projectile racks moved to rear of vehicle (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multimeter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. **WARNING**

Harness 12351544 (lead 400) at accessory control box has battery voltage. if batteries are connected, use care when removing connector to avoid electrical shocks and burns.

1. Disconnect wiring harness 12351544 at personnel heater.

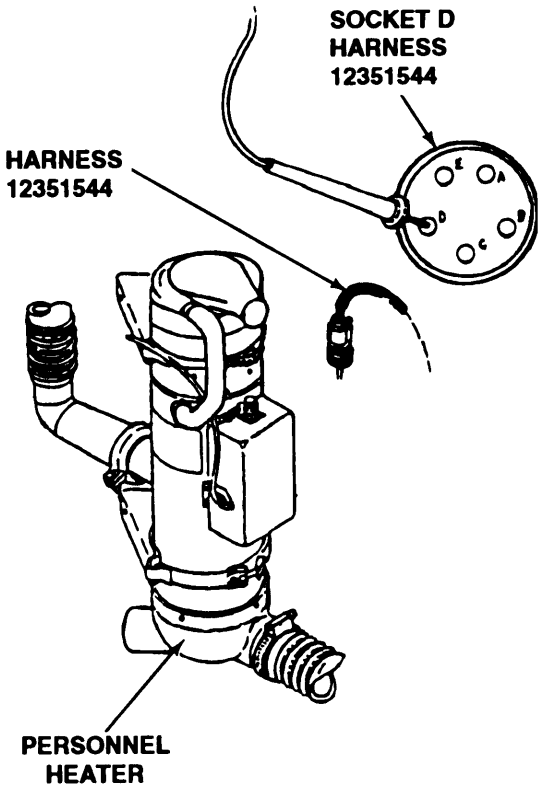
2. Place red multimeter lead in socket D and black lead to ground.

3. Turn MASTER switch ON (refer toTM 9-2350-287-10).

4. Check for 24 ± 3 vdc.

5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage present?



no → **GO TO STEP E**

yes → **Continued on next page**

2-19. TROUBLESHOOTING CHART (continued)

n. PERSONNEL HEATER (continued).	(1) PERSONNEL HEATER FAILS TO OPERATE. All other electrical systems operate (continued).

CONTINUED FROM STEP A

B. 1. Place red multimeter lead in socket C and black to ground.

2. Turn MASTER switch ON (refer to TM 9-2350-287-10) and heater selector switch to HIGH or LOW.

3. Check for 24 ± 3 vdc.

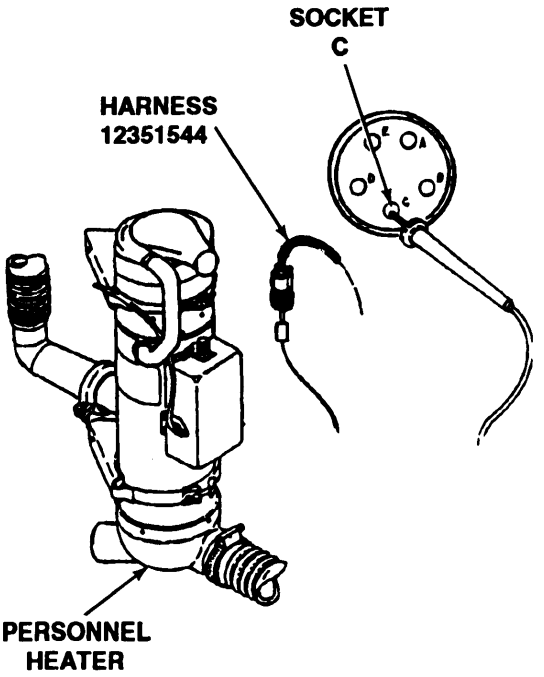
4. Turn MASTER switch and heater selector switch OFF (refer to TM 9-2350-287-10).

Is voltage present?

no

yes

Replace personnel heater (para 16-7). Verify problem is solved.



C. 1. Reconnect harness 12351544 to personnel heater.

2. Disconnect wiring harness 12351544 at accessory control box.

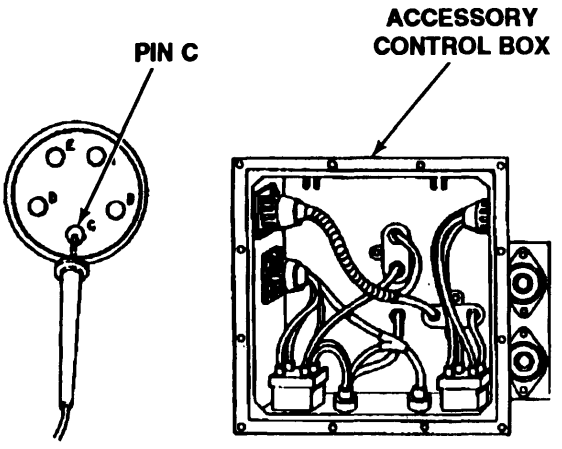
3. Place red multimeter lead on pin C of accessory control box and black lead to ground.

4. Turn MASTER switch ON and heater selector switch to HIGH or LOW (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch and heater selector switch OFF (refer to TM 9-2350-287-10).

Is voltaqe present?



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12-19. TROUBLESHOOTING CHART (continued)

n.	PERSONNEL HEATER (continued).	(1) PERSONNEL HEATER FAILS TO OPERATE. All other electrical systems operate (continued).

CONTINUED FROM STEP C

no / yes

Repair wire 402 or replace wiring harness 12351544 (para 7-64). Verify problem is solved.

D. 1. Reconnect harness 12351544 to accessory control box.

2. Disconnect wire 10 harness 12376405 at accessory control box.

3. Place red lead of multimeter in wire 10 and black lead to ground.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn Master switch OFF (refer to TM 9-2350-287-10).

Is voltage present?

no / yes

Replace accessory control box (para 7-10). Verify problem solved.

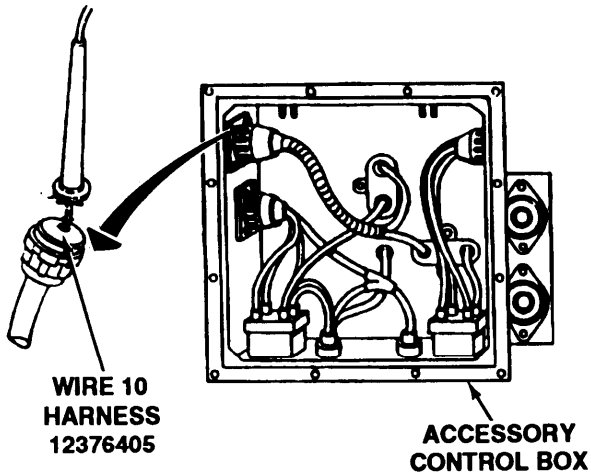
Repair lead 10 or replace 12376405 (para 7-57). Verify problem is solved.

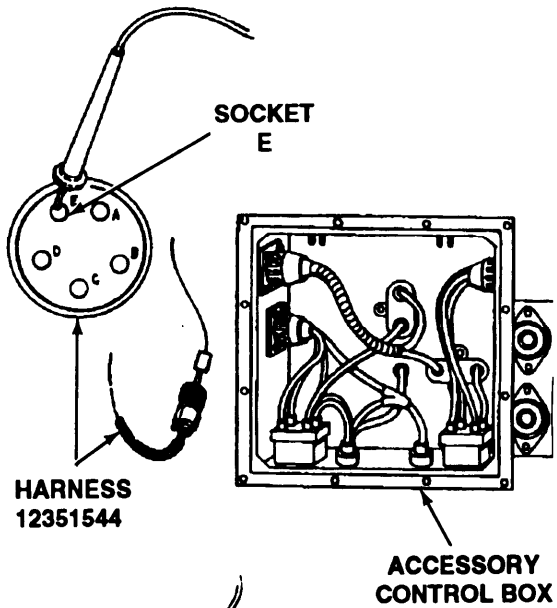
CONTINUED FROM STEP A

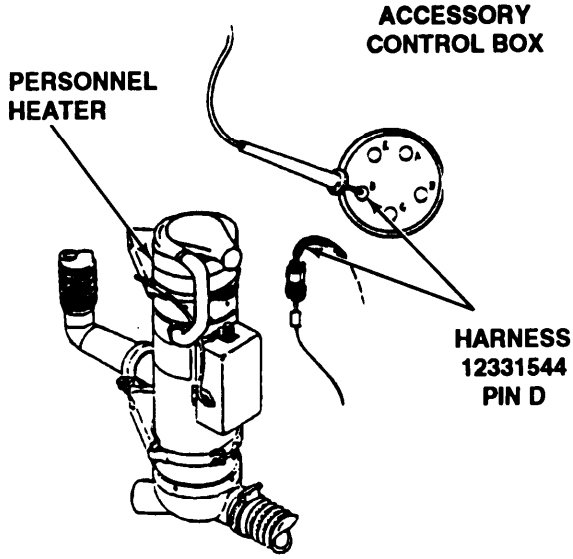
E. 1. Disconnect wiring harness 12351544 from accessory control box.

2. Check for continuity between pin D of harness 12351544 personnel heater and pin Eat accessory control box.

Continued on next page







2-19. TROUBLESHOOTING CHART (continued)

n. PERSONNEL HEATER (continued).	(1) PERSONNEL HEATER FAILS TO OPERATE. All other electrical systems operate (continued).

CONTINUED FROM STEP E

Is continuity present?

no → Repair wires 405 or replace wiring harness 12351544 (para 7-64). Verify problem is solved.

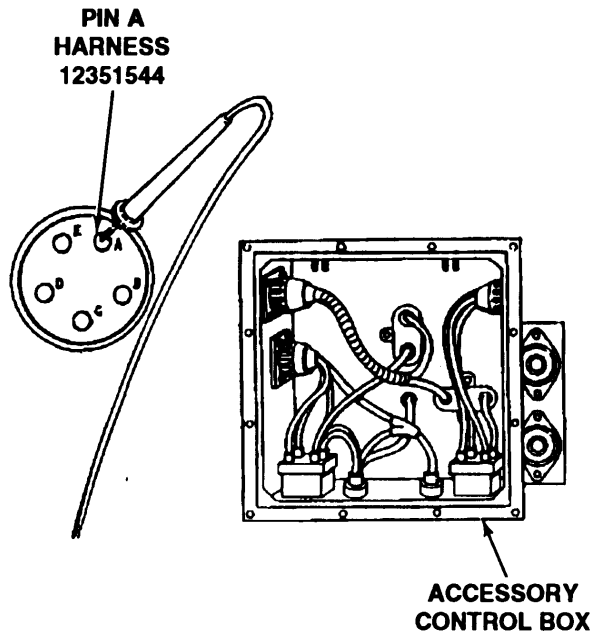
yes

F. 1. Reconnect wiring harness 12351544 to personnel heater.

2. Place red multimeter lead in pin A of wiring harness 12351544 accessorycontrol box connector and black to ground.

3. Check for 24 ± 3 vdc.

Is voltage present?



no → Replace accessory control box (para 7-10). Verify problem is solved.

yes

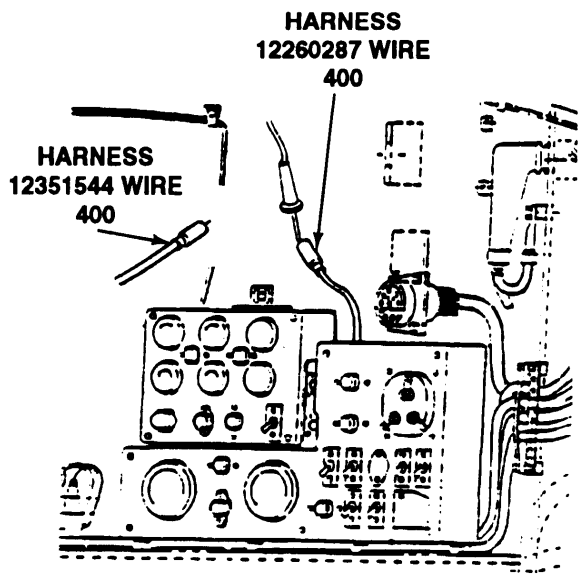
G. 1. Reconnect harness 12351544 to accessoy control box.

2. Disconnect harness 12351544 wire 400 from wire harness 12260287 wire 400 connector.

3. Place red lead of multimeter in harness 12260287 wire 400 socket and black to ground.

4. Check for 24 ± 3 vdc.

Is voltage present?



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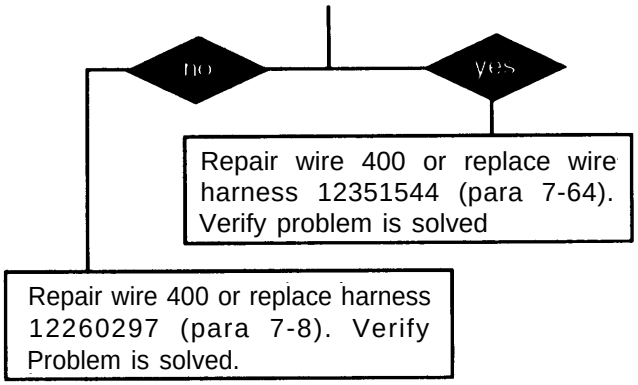
2-19. TROUBLESHOOTING CHART (continued)

n. PERSONNEL HEATER (continued).	(1) PERSONNEL HEATER FAILS TO OPERATE. All other electrical system operate (continued).

CONTINUED FROM STEP G



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

n. PERSONNEL HEATER (continued).	(2) HEATER MOTOR RUNS BUT FAILS TO OPERATE. Sufficient fuel in fuel tank.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (Item 13, Appendix I)
  Drain pan (Item 14, Appendix I)
  General mechanic's tool kit (Item 24, Appendix 1)

Equipment Conditions:
MASTER switch set to OFF (refer to TM 9-2350-287-1 0).
- AFES deactivated (para 21-2 and 21-3).
  Fire extinguishers bottles removed (para 21-4 and 21-5).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. 1. Disconnect harness 12351544 wire 402A from heater fuel pump connector.

2. Place multimeter red lead in harness 12351544 wire 402A socket and ground black lead.

3. Make sure HEAT selector switch is on HIGH or LOW (refer to TM 9-2350-287-10).

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

Is voltage indicated?

no

Repair wire 402 or replace harness 12351544 (para 7-64).

yes

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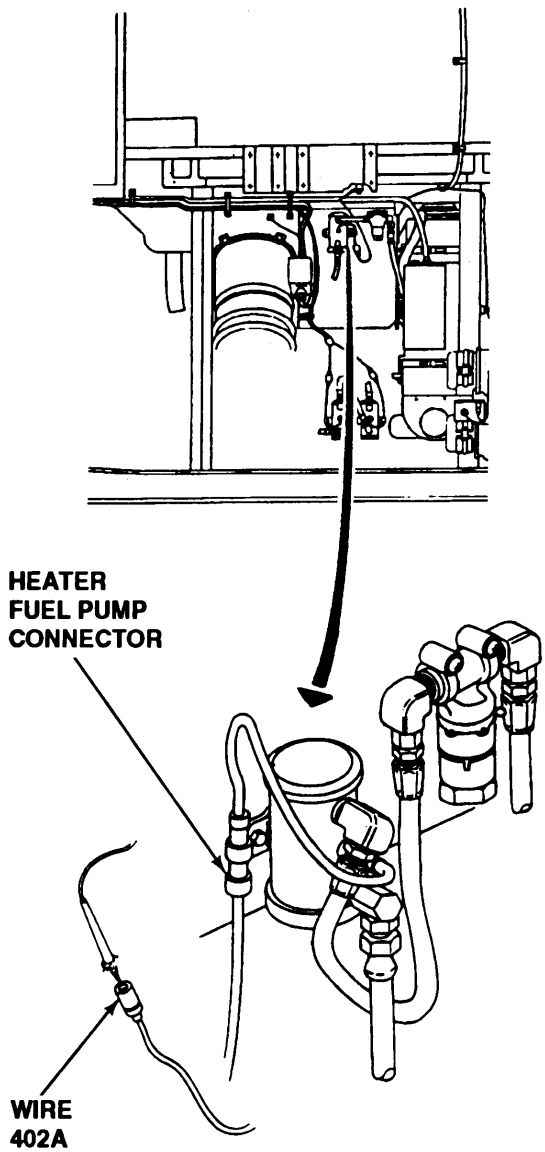


2-19. TROUBLESHOOTING CHART (continued).

n. PERSONNEL HEATER (continued).	(2) HEATER MOTOR RUNS BUT FAILS TO OPERATE. Sufficient fuel in fuel tank (continued).

CONTINUED FROM A

WARNING

Ensure no open flame is near area. Never smoke when working on the fuel system. An explosion may occur causing severe injury or death.

B. 1. Reconnect harness 12351544 wire 402A to heater fuel pump connector.

2. Disconnect fuel line from heater fuel pump at fuel fitter.

3. Place fuel line in drain pan to hold draining fuel.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Set HEAT selector switch to HIGH or LOW.

6. Check for fuel flow.

7. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Was fuel pumped into the container?

no

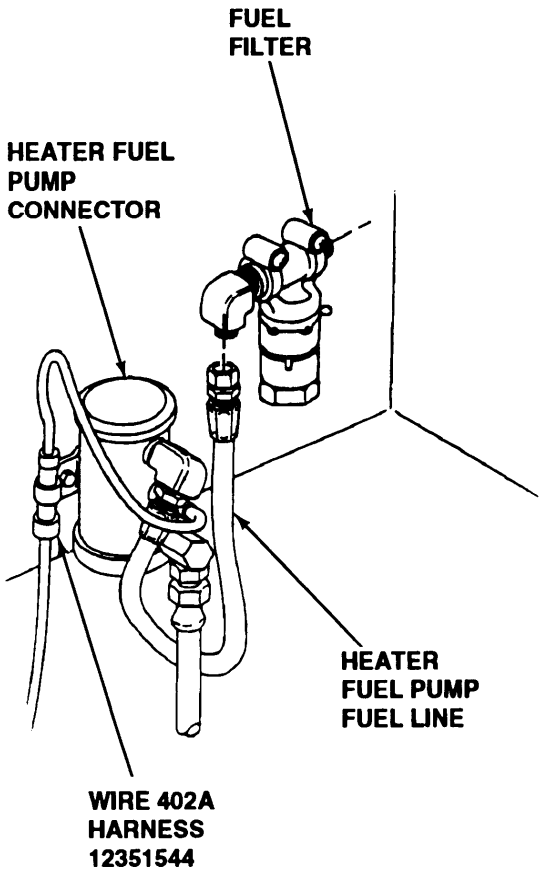
Replace heater fuel pump (para 4-6).

yes

C. 1. Reconnect fuel line from fuel pump to fuel filter.

2. Disconnect fuel line at personnel heater.

3. Place line in suitable container for holding fuel.



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2-19. TROUBLESHOOTING CHART (continued).

n. PERSONNEL HEATER (continued).

(2) HEATER MOTOR RUNS BUT FAILS TO OPERATE. Sufficient fuel in fuel tank (continued).

CONTINUED FROM C

C. 4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for fuel flow.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

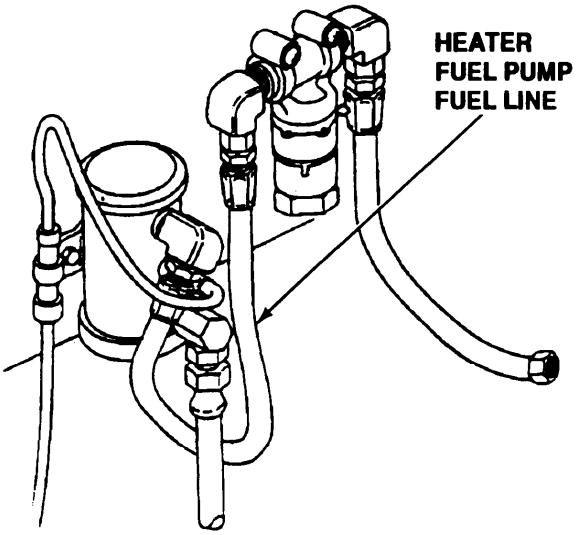
Was fuel pumped into the container?

no

yes

Continue troubleshooting personnel heater according to procedures in para 2-19.n (1).

Replace personnel heater fuel fitter (para 16-8).



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

n. PERSONNEL HEATER (continued).	(3) PERSONNEL HEATER CONTINUES RUNNING WITH HEAT SELECTOR SWITCH TURNED OFF. All other electrical systems operate.

Initial Setup:

Tools/Test Equipment:
- Digital Multimeter(DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix I)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Crew AFES system deactivated (para 21-3).
- Engine AFES system deactivated (para 21-2).
- Engine AFES fire bottles removed (para 21-4).

WARNING

if heater is blowing hot air, do not disconnect any electrical leads from the heater. An explosion may occur causing injury or death.

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.
- If heater continues to blow hot air after HEAT SELECTOR switch is turned OFF and after cool down period has elapsed (one to two minutes) go to heater fuel pump and disconnect harness 12351544.
- When heater blows cool air, turn MASTER switch OFF (refer to TM 9-2350-287-10).

Continued on next page

2-19. TROUBLESHOOTING CHART **(continued).**

n. PERSONNEL HEATER (continued).

(3) PERSONNEL HEATER CONTINUES RUNNING WITH HEAT SELECTOR SWITCH TURNED OFF. All other electrical systems operate.

A. 1. Disconnect harness 12351544 from personnel heater.

2. Place red lead of multimeter in socket C and ground black lead.

3. Have assistant turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Check for 24 ± 3 vdc.

5. Turn MASTER switch OFF (refer to TM 9-2350-287-1 0).

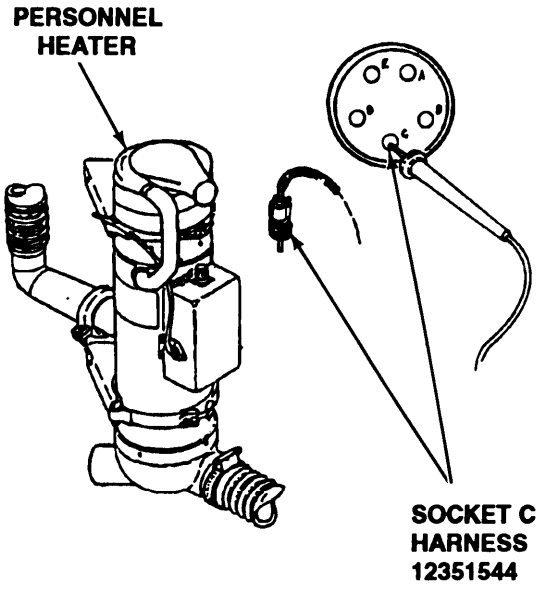
Is voltage indicated?

no

yes

Replace accessory control box (para 7-10). Verify problem is solved.

Repair or replace personnel heater (para 16-7). Verify problem is solved.



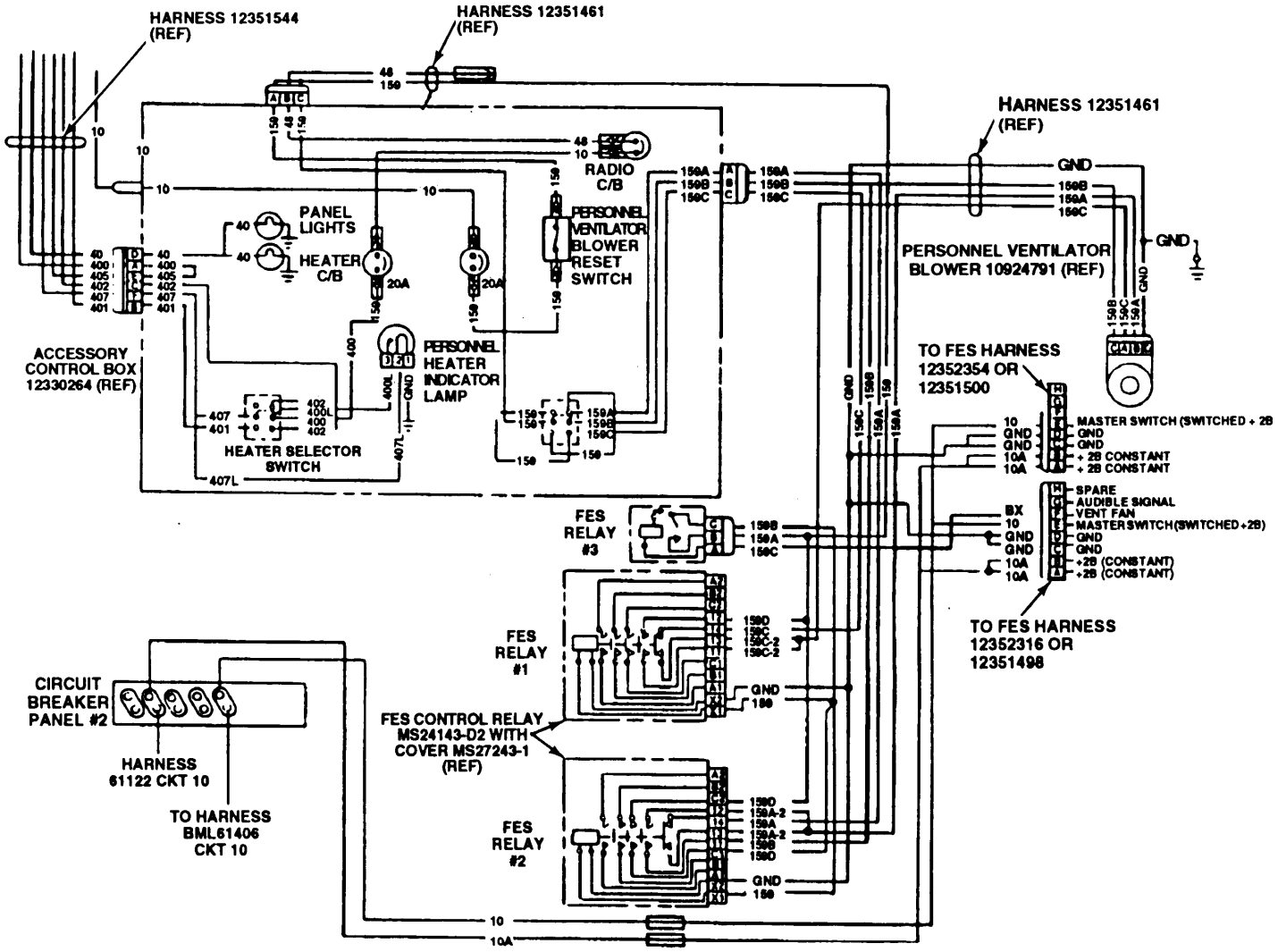
END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

0. PERSONNEL VENTILATION BLOWER.

The personnel ventilation blower and lead filter fan consists of the personnel ventilation fan, lead filter fan, lead filter fan, and accessory control box. The relationship of the personnel ventilation blower and related components is shown in the diagram below.

When the MASTER switch is turned ON, 24 vdc is supplied from the batteries through the MASTER relay to the accessory control box. When the personnel ventilation blower switch is set to EXHAUST, voltage is applied to energize the personnel ventilation blower in either a forward or reverse direction. When the MASTER switch is turned ON, 24 vdc is supplied from the batteries through the MASTER relay to the accessory control box. The lead filter fan operates when the ventilation blower switch is set to INTAKE.



2-19. TROUBLESHOOTING CHART (continued).

0. PERSONNEL VENTILATION BLOWER (continued).	(1) PERSONNEL VENTILATION BLOWER DOES NOT OPERATE. All other electrical components operate.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix I)
  STE/ICE test kit (Item 63, Appendix I)

Materials/Parts:
- Lockwashers (4) (Item 196, Appendix H)

Equipment Conditions:
- Crew AFES anti-recoil plugs installed (para 21-4 and 21-5).
- Engine AFES T/A panel maintenance switch to vertical position (refer to TM 9-2350-287-1 0).
- Crew AFES T/A panel maintenance switch to vertical position (refer to TM 9-2350-287-1 0).
- Safety pins installed in all AFES bottle actuators (para 21-4 and 21-5).
- Left projectile rack moved to rear of vehicle (refer to TM 9-2350-287-10).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.
- STE/ICE test no. 89, Voltage checks, and no. 91, continuity and resistance checks, may be used as an alternate troubleshooting method.

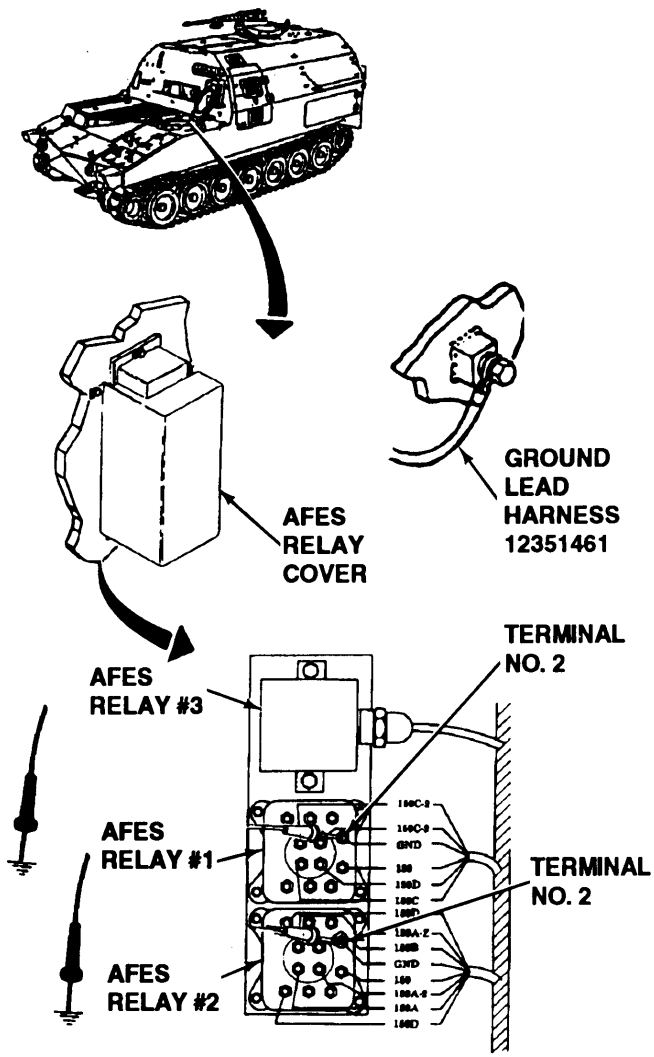
WARNING

Ventilation system and Automatic Fire Extinguisher System (AFES) electrical systems are interconnected.

A. 1. Remove AFES relay covers by removing 4 screws, 4 washers, 4 lockwashers and cover.

2. Check harness 12351461 ground at bulkhead. Tighten screw to ensure good ground.

3. Using a multimeter, test grounds at the following points.



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2-19. TROUBLESHOOTING CHART (continued).

o. PERSONNEL VENTILATION BLOWER (continued).	(I) PERSONNEL VENTILATION BLOWER DOES NOT OPERATE. All other electrical components operate (continued).

CONTINUED FROM A

A. a. AFES relay #2, terminal 2 and chassis.

b. AFES relay #1, terminal 2 and chassis.

c. Harness 12351461, pin D, at connection to AFES harness 12352354.

d. Harness 12351461, pin D, at connection to AFES harness 12352316.

Do all ground points check out good?

no — yes

Repair or replace harness 12351461 (para 7-79). Verify problem is solved.

B. 1. Disconnect wire harness 12351461 from ventilation blower motor.

2. Place red lead of multimeter in socket A of plug and ground black lead.

3. Turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Press PERSONNEL VENTILATOR BLOWER toggle switch to EXHAUST position.

5. Check for 24 ± 3 vdc.

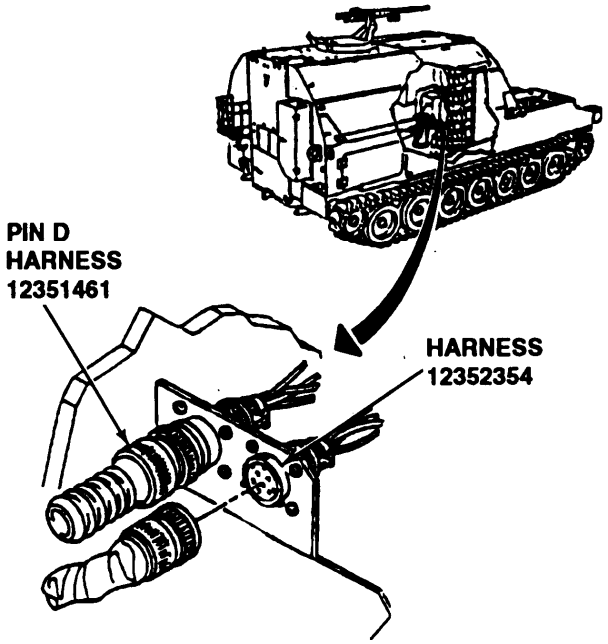
6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

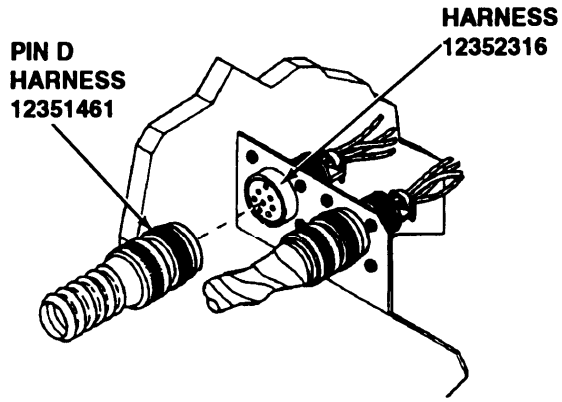
Is voltage present in the exhaust circuits?

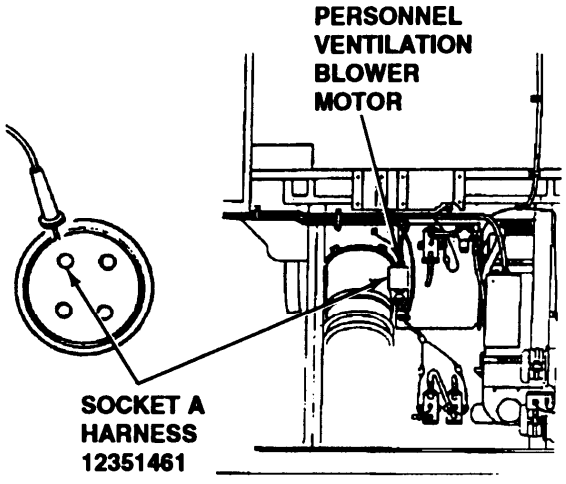
no — yes

Replace personnel ventilator blower (para 7-81). Verify problem solved.

Continued on next page







2-19. TROUBLESHOOTING CHART (continued).

o. PERSONNEL VENTILATION BLOWER (continued).	(1) PERSONNEL VENTILATION BLOWER DOES NOT OPERATE. All other electrical components operate (continued).

CONTINUED FROM B

C. 1. Place red lead of multimeter in plug socket B and ground black lead.

2. Turn MASTER switch ON (refer to TM 9-2350-287-1 O).

3. Press PERSONNEL VENTILATOR BLOWER toggle switch to INTAKE position.

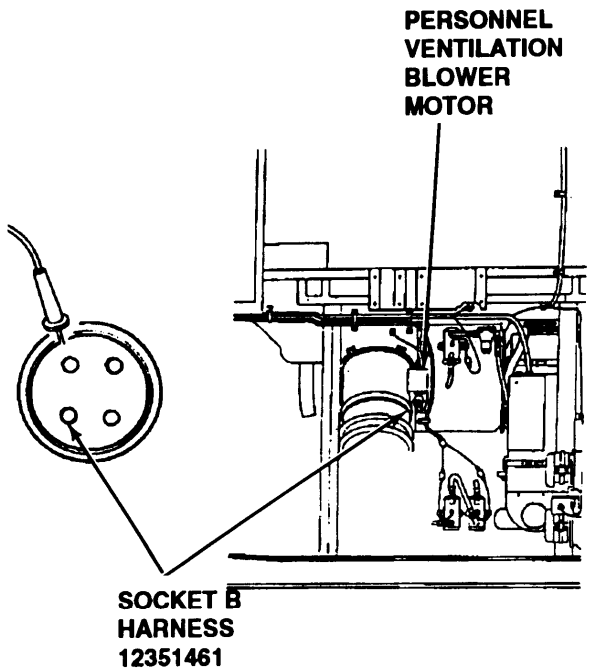
4. Check for 24 ± 3 vdc.

IS voltage present in the intake circuit?

no

yes

Replace personnel ventilator blower (para 7-81). Verify problem solved.



D. 1. Reconnect wiring harness 12351461 plug to ventilation blower motor.

2. Disconnect wiring harness 12351461 plug (circuits 159A, 159B, 159C) from accessory control box.

3. Place red lead of multimeter in accessory control box connector socket C and ground black lead.

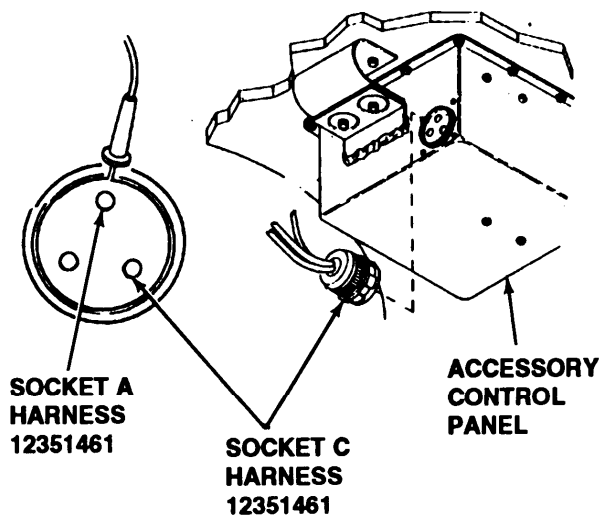
4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Place PERSONNEL VENTILATOR BLOWER switch in EXHAUST position.

6. Check for 24 ± 3 vdc.

7. Place red lead of multimeter in socket A and ground black lead.

8. Place PERSONNEL VENTILATOR BLOWER switch in the INTAKE position.



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2-19. TROUBLESHOOTING CHART (continued).

0. PERSONNEL VENTILATION BLOWER (continued).	(1) PERSONNEL VENTILATION BLOWER DOES NOT OPERATE. All other electrical components operate (continued).

CONTINUED FROM D

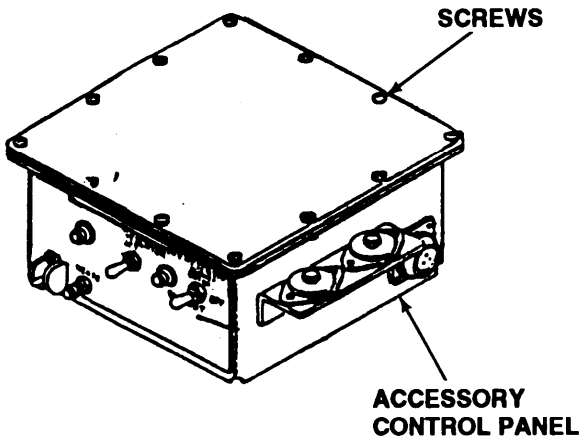
D. 9. Check for 24 ± 3 vdc.

10. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage present on both circuits?

no — yes

Repair wire 159C or replace harness 12351461 (para 7-79). Verify problem is solved.



E. 1. Remove accessory control box (para 7-10).

2. Remove 12 nuts, 12 Iockwashers, 12 flat washers, 12 screws, cover and gasket from control box.

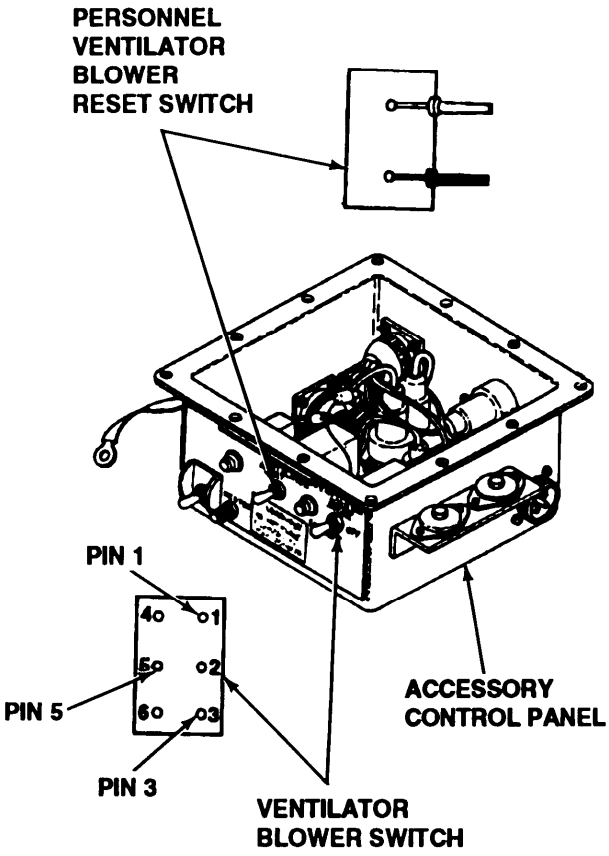
3. Check ventilator blower switch for continuity of the INTAKE circuit between pin 5 and pin 1 with the switch in the up (INTAKE) position.

4. Check ventilator blower switch for continuity of the EXHAUST circuit between pin 5 and pin 3 with the switch in the down (EXHAUST) position.

Is there continuity in both INTAKE and EXHAUST circuits?

no — yes

Replace ventilator blower switch (para 7-9). Verify problem is solved.



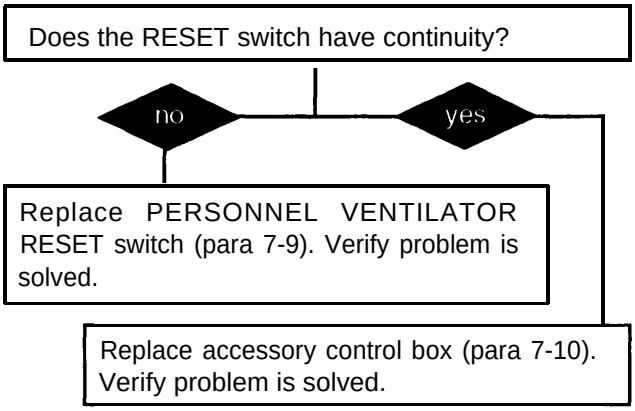
F. Check PERSONNEL VENTILATOR BLOWER RESET switch for continuity by placing red lead of multimeter on first pin of switch and black lead of muttimeter on remaining pin of switch, toggle RESET switch.

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

o. PERSONNEL VENTILATION BLOWER (continued).	(1) PERSONNEL VENTILATION BLOWER DOES NOT OPERATE. All other electrical components operate (continued).

CONTINUED FROM I



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

o. PERSONNEL VENTILATION BLOWER (continued).	(2) PERSONNEL VENTILATION BLOWER DOES NOT OPERATE IN INTAKE MODE.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)
- STE/ICE test kit (Item 65, Appendix 1)

Materials/Parts:
- LockWashers (6) (Item 196, Appendix H)

Equipment Conditions:
- Crew AFES anti-recoil plugs installed (para 21-4 and 21 **-5).**
- AFES bottle safety pins installed (para 21-4 and 21-5).
- Engine AFES T/A panel maintenance switch to vertical position (refer to TM 9-2350-287-10).
- Crew AFES T/A panel maintenance switch to vertical position (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

NOTE

- **Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.**
- **Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.**

A. 1. Disconnect wiring harness 12351461 from ventilator blower motor.

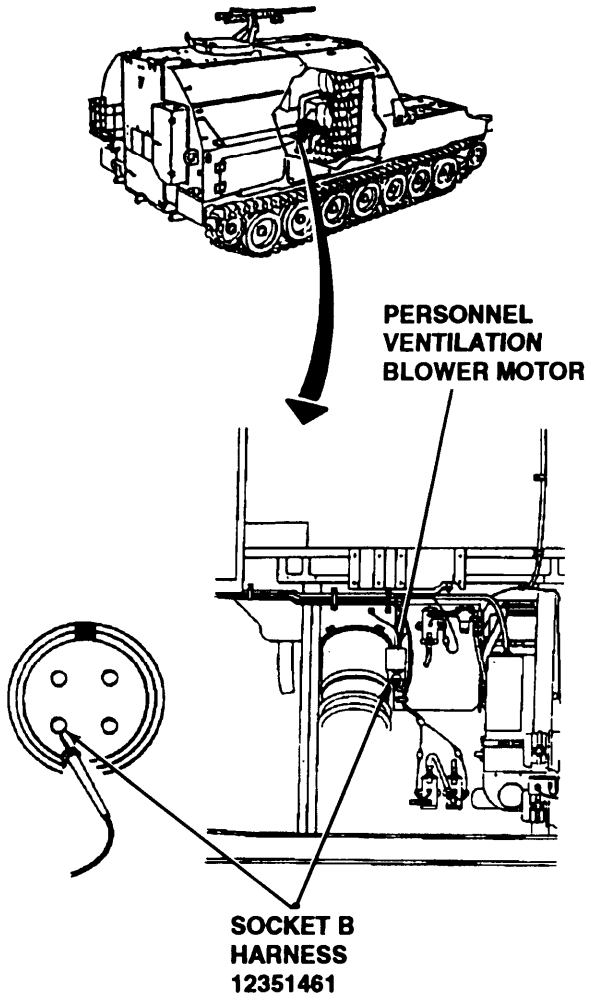
2. Place red lead of muitimeter in socket B of plug and black lead of multimeter to ground.

3. Turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Press PERSONNEL VENTILATOR BLOWER switch to the INTAKE position.

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).



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2-19. TROUBLESHOOTING CHART (continued).

0. PERSONNEL VENTILATION BLOWER (continued).	(2) PERSONNEL VENTILATION BLOWER DOES NOT OPERATE IN INTAKE MODE (continued).

CONTINUED FROM A

Is voltage indicated?

no — yes → **GO TO STEP F**

B. **WARNING**

When AFES relay cover is removed, use caution while working around exposed electrical terminals to avoid electrical shock Do not short out terminals with tools or bare hands.

1. Remove AFES control relay cover by removing 4 screws, 4 washers, 4 lockwashers and cover. Discard lockwashers.

2. On AFES relay #2 (bottom), place red probe of multimeter on pin 12 and black lead of multimeter to pin 2 (ground).

3. Ensure PERSONNEL VENTILATOR BLOWER switch is in the INTAKE position.

4. Turn MASTER switch ON (refer to TM 9-2350-287-1 O).

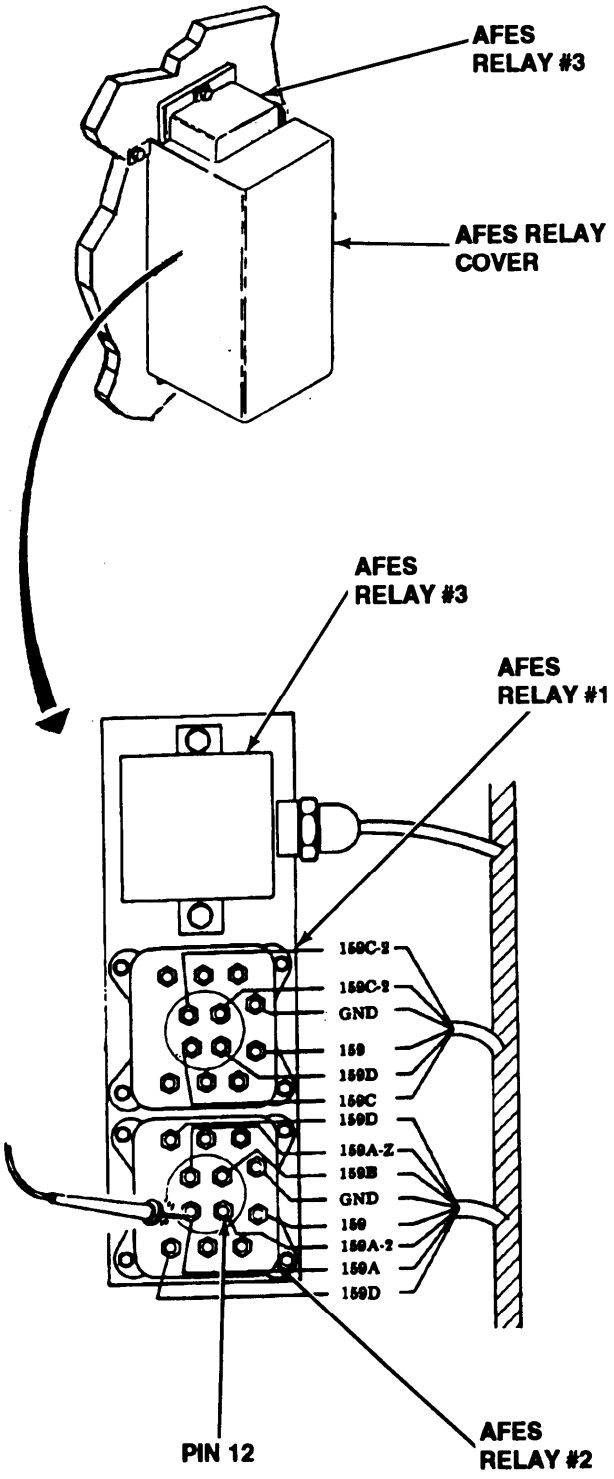
5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-1O).

Is voltage indicated?

no — yes → Repair wire 159A or replace harness 12351461 (para 7-79). Verify problem is solved.

Continued on next page



2-19. TROUBLESHOOTING CHART (continued).

o. PERSONNEL VENTILATION BLOWER (continued).	(2) PERSONNEL VENTILATION BLOWER DOES NOT OPERATE IN INTAKE MODE (continued).

CONTINUED FROM B

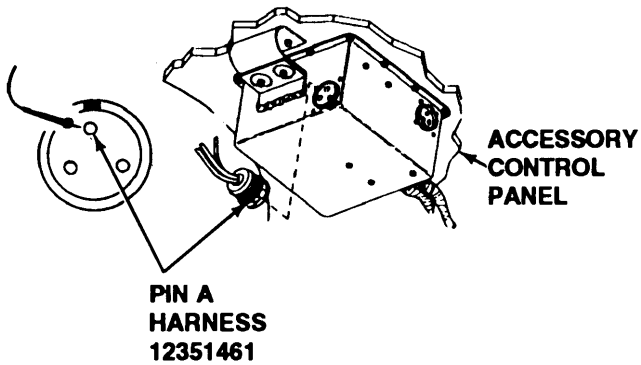
C. 1. Install wiring harness 12351461 on personnel ventilator blower motor.

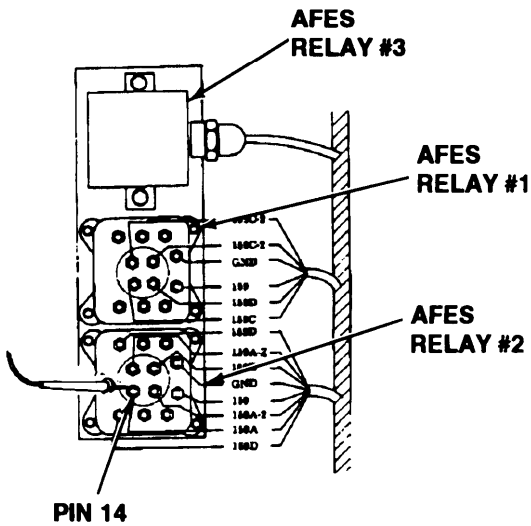
2. Disconnect harness 12351461 from accessory control box (circuits 159A, 1596, 159C).

3. Place red probe of multimeter on pin A of harness 12351461 and black lead of mutti-meter to pin 14 of AFES relay #2 (bottom).

4. Check for continuity.

Is continuity indicated in the INTAKE circuit?





no

Repair wire 159A or replace harness 12351461 (para 7-79) Verify problem IS solved.

yes

Replace AFES control relay #1 (bottom) (para 21-1 1). Verifyproblem is solved.

CONTINUED FROM STEP A

D. 1. Place red lead of multimeter on socket C and black lead of multi meter to ground.

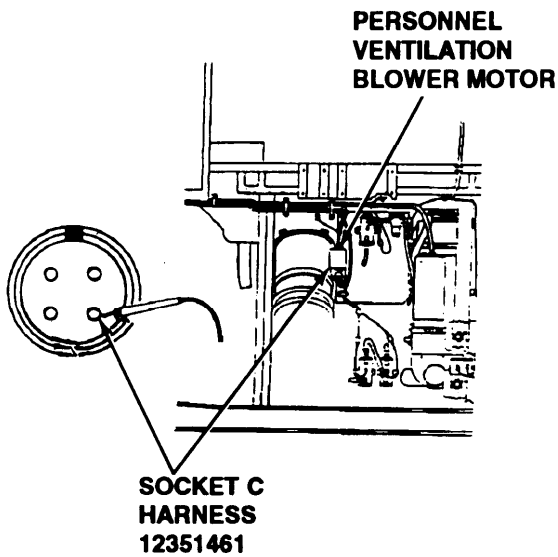
2. Turn MASTER switch ON (refer to TM 9-2350-287-1O).

3. Ensure PERSONNEL VENTILATOR BLOWER switch is in INTAKE position.

4. Check for 24 ± 3 vdc.

5. Turn MASTER switch to OFF (refer to TM 9-2350-287-10).

Is voltage present?



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2-19. TROUBLESHOOTING CHART (continued).

o. PERSONNEL VENTILATION BLOWER (continued).	(2) PERSONNEL VENTILATION BLOWER DOES NOT OPERATE IN INTAKE MODE (continued).

CONTINUED FROM D

no / yes

Replace personnel ventilator blower (para 7-81). Verify problem is solved.

E. 1. Install wiring harness 12351461 on PERSONNEL VENTILATOR BOWLER motor.

2. Remove wiring harness 12351461 connector from accessory control box (circuits 159A, 1596, 159C).

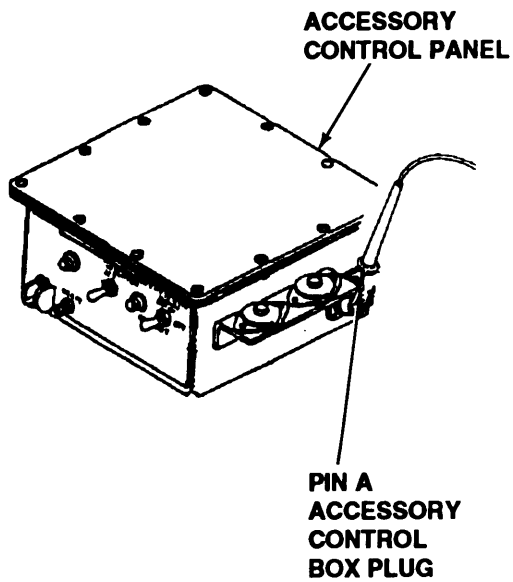
3. Place red lead of multimeter to pin A on accessory control box plug, and black lead of multimeter to ground.

4. Turn MASTER switch ON (refer to TM 9-2350-287-1O).

5. Position PERSONNEL VENTILATOR BLOWER switch to INTAKE position.

6. Check for 24 ± 3 vdc.

7. Turn MASTER switch OFF (refer to TM 9-2350-287-10).



Is voltage present?

no / yes

Replace personnel ventilator blower (para 7-81). Verify problem is solved.

Replace PERSONNEL VENTILATOR BLOWER switch (para 7-9). Verify problem is solved.

END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

0. PERSONNEL VENTILATION BLOWER (continued).	(3) PERSONNEL VENTILATION BLOWER DOES NOT OPERATE IN EXHAUST MODE.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)
- STE/ICE test kit (Item 65, Appendix 1)

Materials/Parts:
- LockWasher (6) (Item 196, Appendix H)

Equipment Conditions:
- Crew AFES anti-recoil plugs installed (para 21-4 and 21-5).
- AFES bottle safety pins installed (para 21-4 and 21-5).
- Engine AFES T/A panel maintenance switch to vertical position (refer to TM 9-2350-287-10).
- Crew AFES T/A panel maintenance switch to vertical Position (refer to TM 9-2350-287-10).
- AFES relay cover removed (para 21-11).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

NOTE

- **Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 may be performed.**
- **Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.**

A. 1. Disconnect wiring harness 12351461 from ventilator blower motor.

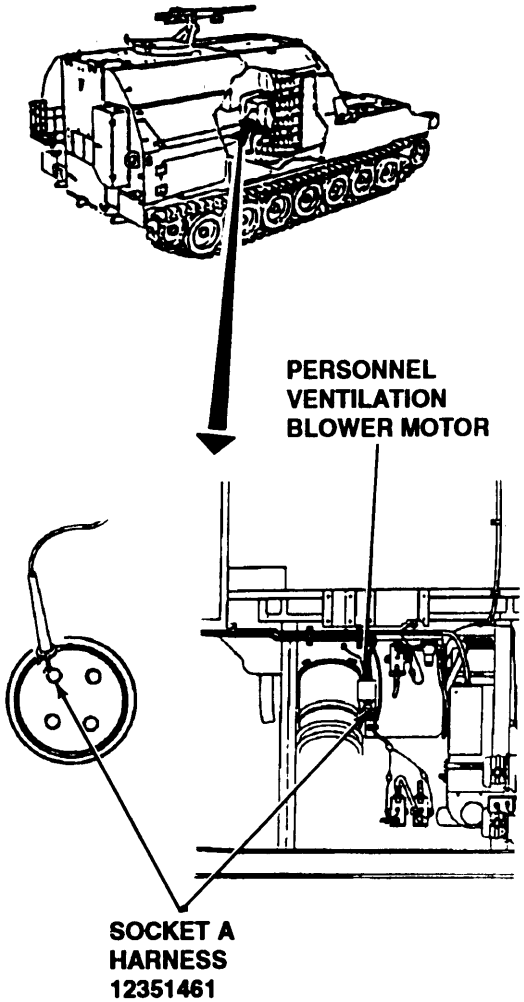
2. Place red lead of multimeter in socket A of plug and black lead of multimeter to ground.

3. Turn MASTER switch On (refer to TM 9-2350-287-10).

4. Press PERSONNEL VENTILATOR BLOWER switch to the EXHAUST position.

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).



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2-19. TROUBLESHOOTING CHART (continued).

o. PERSONNEL VENTILATION BLOWER (continued).	(3) PERSONNEL VENTILATION BLOWER DOES NOT OPERATE IN EXHAUST MODE (continued).

CONTINUED FROM A

Is voltage indicated?

no → yes → **GO TO STEP F**

B. **WARNING**

When AFES relay cover is removed, use caution while working around exposed electrical terminals to avoid electrical shock. Do not short out terminals with tools or bare hands.

1. Remove AFES control relay cover by removing 4 screws, 4 washers, 4 lockwashers and cover.

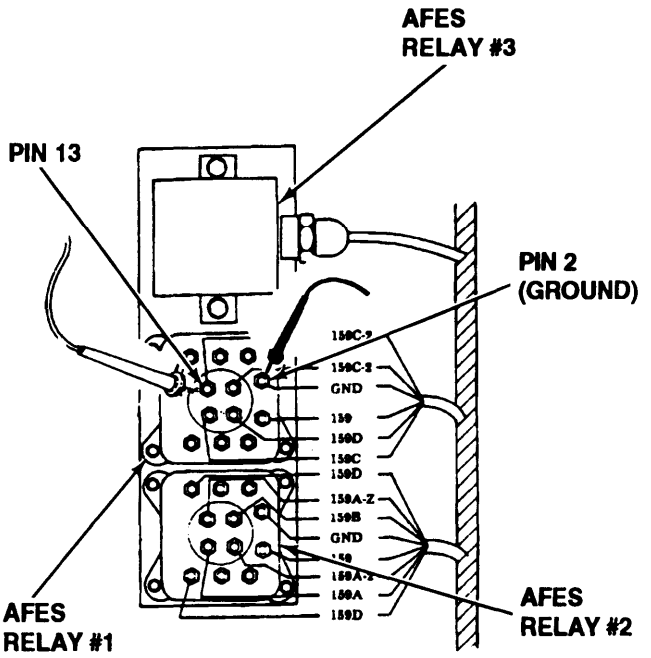
2. On AFES relay #1 (middle) place red probe of multimeter on pin 13 and black lead of multimeter to pin 2 (ground).

3. Ensure PERSONNEL VENTILATOR BLOWER switch is in the EXHAUST position.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).



Is voltage indicated?

no → yes → **Repair wire 159C-2 or replace harness 12351461 (para 7-79). Verify problem is solved.**

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

o. PERSONNEL VENTILATION BLOWER (continued).

(3) PERSONNEL VENTILATION BLOWER DOES NOT OPERATE IN EXHAUST MODE (continued). (continued).

CONTINUED FROM B

C. 1. Install wiring harness 12351461 on PERSONNEL VENTILATOR BLOWER.

2. Check for continuity of EXHAUST circuit by removing harness 12351461 from accessory control box (circuits 159A, 159B, 159C).

3. Place red probe of multimeter on pin C of harness 12351461 and black lead of multimeter to pin 14 of AFES relay #1 (middle) and check for continuity.

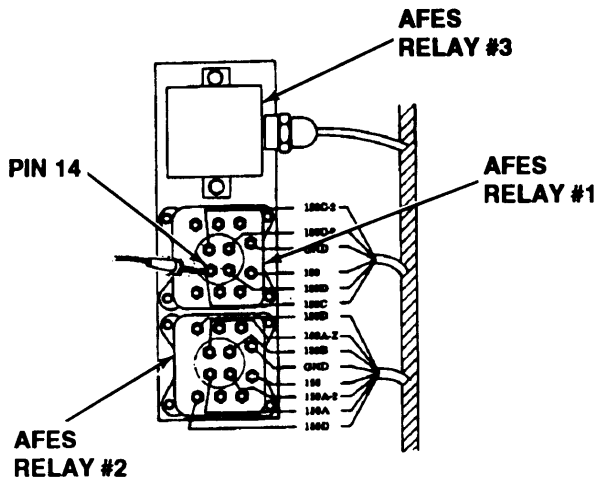
Is voltage continuity indicated in the EXHAUST circuit?

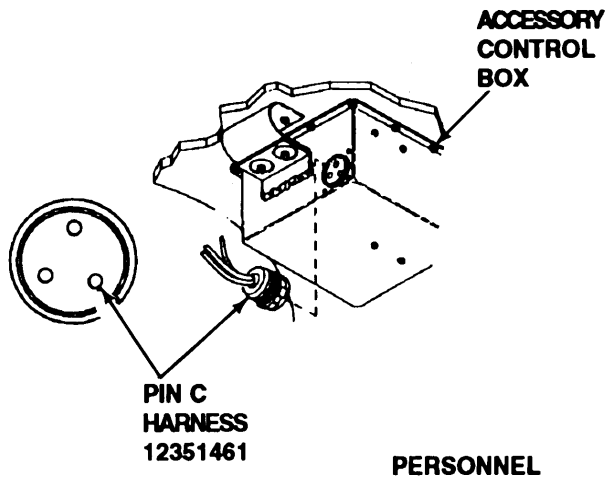
no

Repair wire 159C or replace harness 12351461 (para 7-79) Verify problem is solved.

yes

Replace AFES control relay #2 (middle) (para 21-1 1). Verify problem is solved.





CONTINUED FROM STEP A

D. 1. Place red lead of multimeter on socket C harness 12351461 and black lead of multimeter to ground.

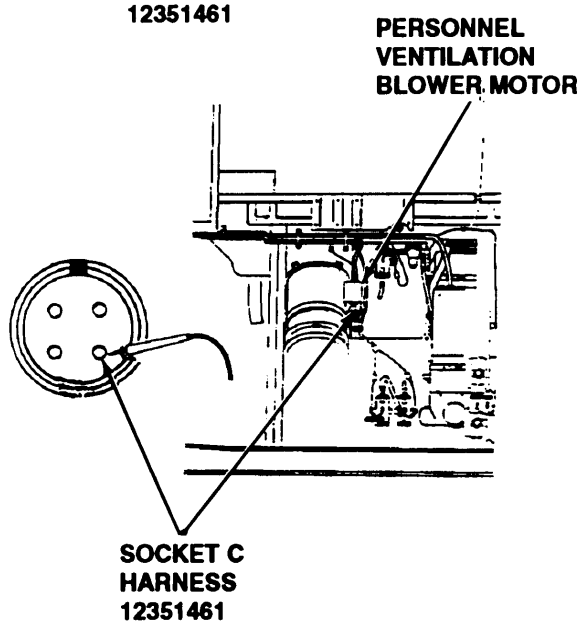
2. Turn MASTER switch ON (refer to TM 9-2350-287-10).

3. Ensure PERSONNEL VENTILATOR BLOWER switch is in EXHAUST position.

4. Check for 24 ± 3 vdc.

5. Turn MASTER switch to OFF (refer to TM 9-2350-287-10).

Is voltage present?



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2-19. TROUBLESHOOTING CHART (continued).

o. PERSONNEL VENTILATION BLOWER (continued).	(3) PERSONNEL VENTILATION BLOWER DOES NOT OPERATE IN EXHAUST MODE (continued).

CONTINUED FROM D

no / yes

Replace personnel ventilator blower (para 7-81). Verify problem is solved.

E. 1. Install wiring harness 12351461 on PERSONNEL VENTILATOR BOWLER motor.

2. Remove wiring harness 12351461 connector from accessory control box (circuits 159A, 159B, 159C).

3. Place red lead of multimeter to pin B on accessory control box plug, and black lead of multimeter to ground.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Position PERSONNEL VENTILATOR BLOWER switch to EXHAUST position.

6. Check for 24 ± 3 vdc.

7. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

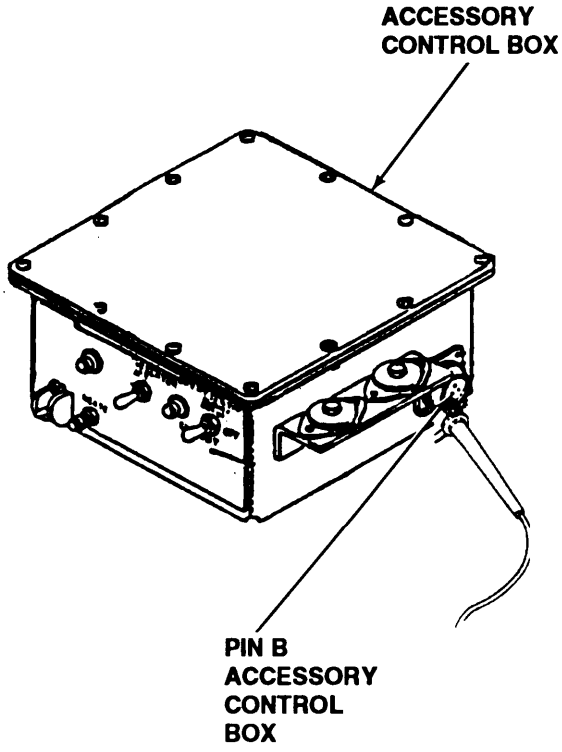
Is voltage present?

no / yes

Replace personnel ventilator blower (para 7-81). Verify problem is solved.

Replace PERSONNEL VENTILATOR BLOWER switch (para 7-9). Verify problem is solved.

END OF TASK



2-19. TROUBLESHOOTING CHART (continued).

o. PERSONNEL VENTILATION BLOWER (continued).	(4) PERSONNEL VENTILATION BLOWER OPERATES, BUT DOES NOT COME ON AUTOMATICALLY IN EXHAUST MODE DURING AFES TEST.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- LockWashers (4) (Item 196, Appendix H)

Equipment Conditions:
- Crew AFES anti-recoil plugs installed (para 21-4 and 21-5).
- Engine AFES anti-recoil plugs installed (para 21-4).
- Engine AFES bottle safety pins installed (para 21-4).
- Crew AFES bottle safety pins installed (para 21-5)
- Engine AFES T/A panel maintenance switch turned to vertical position (refer to TM 9-2350-287-10).
- Crew AFES T/A panel maintenance switch turned to vertical position (refer to TM 9-2350-287-10).
- Left projectile rack assembly moved to rear of vehicle (refer toTM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

WARNING

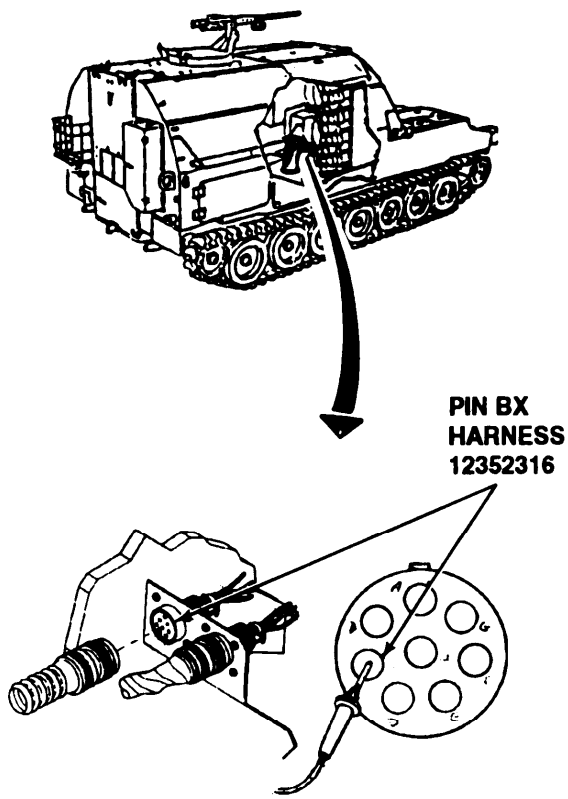
Ventilation and Automatic Fire Extinguishing System (AFES) electrical systems are interconnected.

NOTE

- **Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.**
- **Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.**
- **Ensure all electrical connectors are securely fastened. A loose connector could cause incorrect fault indicat ions.**

A. 1. Disconnect PERSONNEL VENTILATOR BLOWER wiring harness 12351461 from AFES wiring harness 12352316 bracket-mounted connector.

2. Connect red lead of multimeter to pin BX of wiring harness 12352316 and black lead of multimeter to ground.



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2-19. TROUBLESHOOTING CHART (continued).

o. **PERSONNEL VENTILATION BLOWER (continued).**	(4) **PERSONNEL VENTILATION BLOWER OPERATES, BUT DOES NOT COME ON AUTOMATICALLY IN EXHAUST MODE DURING AFES TEST (continued).**

CONTINUED FROM A

A. 3. Turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Perform AFES crew fire detection test (refer to TM 9-2350-287-10).

5. Watch multimeter after actuating MANUAL DISCHARGE switch. A pulse voltage for a minimum duration of 0.5 seconds should be read.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage present?

no

Proceed to AFES system troubleshooting, fault (para 2-19. v (1) and 2-19. v (2)).

yes

B. **WARNING**

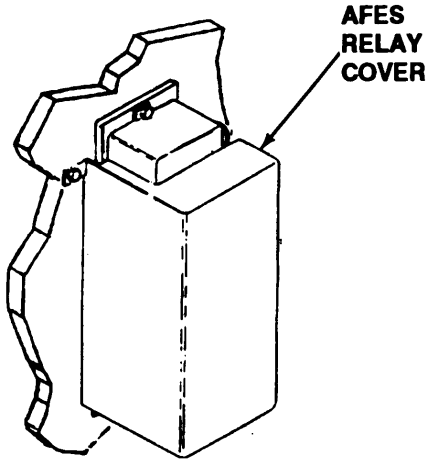
Make sure you do not touch leads of multimeter to any terminals other than those specified in the following procedures.

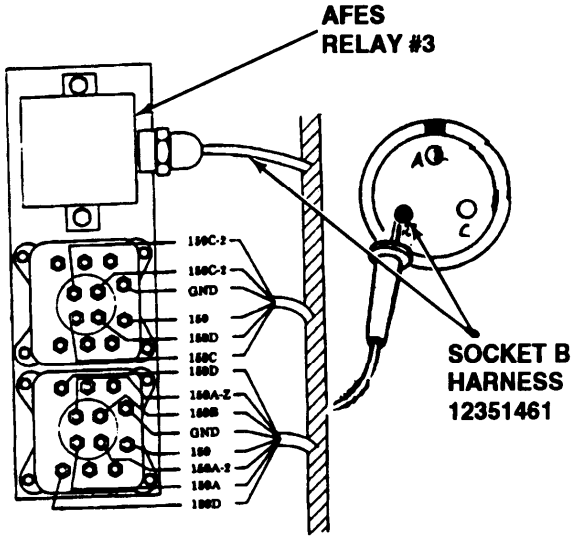
1. Remove AFES control relay cover by removing four screws, four washers, four lockwashers and cover. Discard lockwashers.

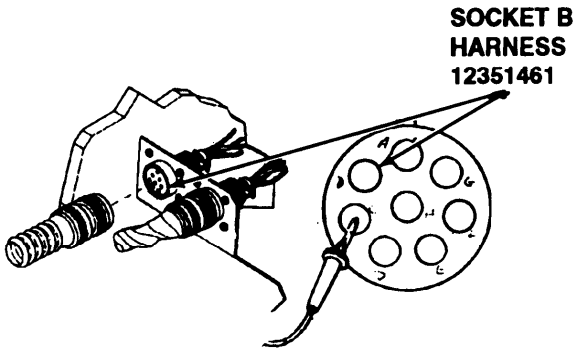
2. Remove wiring harness 12351461 from #3 (top) AFES control relay.

3. Place red lead of multimeter into socket B of wiring harness 12351461 at #3 (top) relay. Place black lead of multimeter into socket B of harness 12351461 at AFES wiring harness.

4. Check for continuity.







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2-19. TROUBLESHOOTING CHART (continued).

o. PERSONNEL VENTILATION BLOWER (continued).	(4) PERSONNEL VENTILATION BLOWER OPERATES, BUT DOES NOT COME ON AUTOMATICALLY IN EXHAUST MODE DURING AFES TEST (continued).

CONTINUED FROM B

Is continuity indicated?

no → Replace wiring harness 12351461 (para 7-79). Verify problem is solved.

yes →

C. 1. Connect wiring harness 12351461 to AFES wiring harness 12352316 bracket-mounted connector.

2. Place red lead of multimeter to pin 1 of AFES control relay #1 (middle) and black lead of multimeter to ground.

3. Turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Perform AFES crew fire detection test (refer to TM 9-2350-287-10).

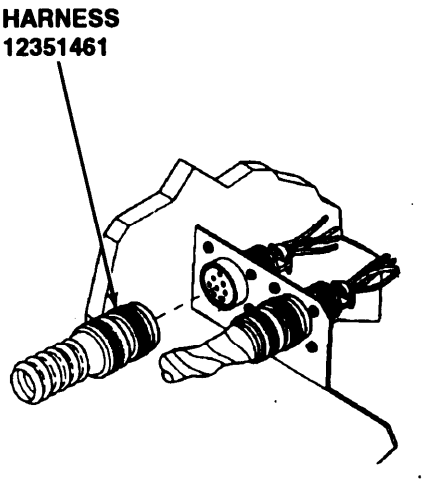
5. Check multimeter after actuating MANUAL DISCHARGE switch for 24 ± 3 vdc.

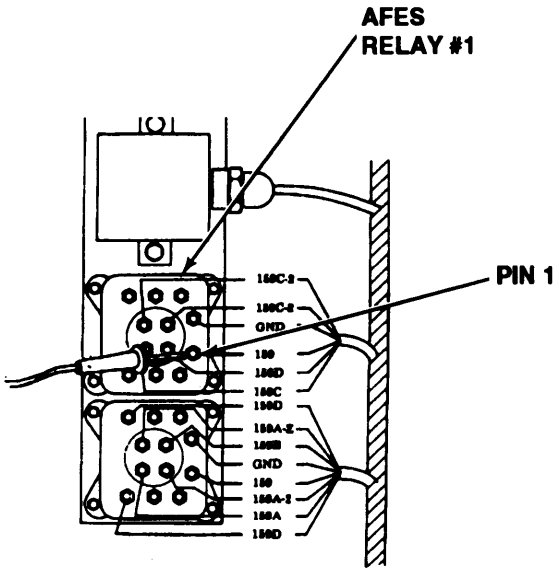
6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage present?

no → Repair wire 159 or replace harness 12351461 (para 7-79). Verify problem is solved.

yes → Replace AFES control relay #3 (top) (para 21-11). Verify problem is solved.



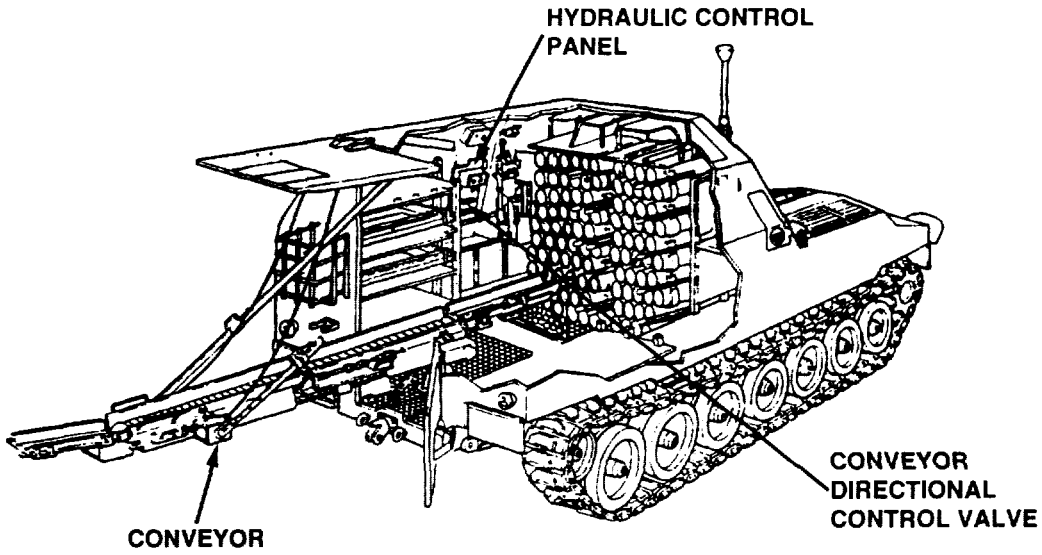


END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

p. CONVEYOR.

The conveyor is hydraulically powered by the hydraulic pump at the APU. The conveyor is used for loading and unloading ammunition onto and from the vehicle. The direction of the motion of the conveyor chain is controlled by the conveyor directional control switch on the hydraulic control panel. The direction of the conveyor chain can also be controlled manually by using push buttons on either side of the conveyor directional control valve on the conveyor directional control solenoid below the hydraulic control panel.



2-19. TROUBLESHOOTING CHART (continued).

p. CONVEYOR (continued).

(1) CONVEYOR CHAIN WILL NOT OPERATE IN EITHER DIRECTION. All other hydraulic systems operate.

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

A. Inspect conveyor hydraulic motor for damage or leakage.

Is conveyor hydraulic motor damaged or leaking?

no / yes

Replace conveyor hydraulic motor (para 17-19). Verify problem is solved.

B. Inspect hydraulic lines, fittings, and components from conveyor directional control valve to conveyor motor for damage or signs of leakage.

Are any lines, fittings, or components leaking or damaged?

no / yes

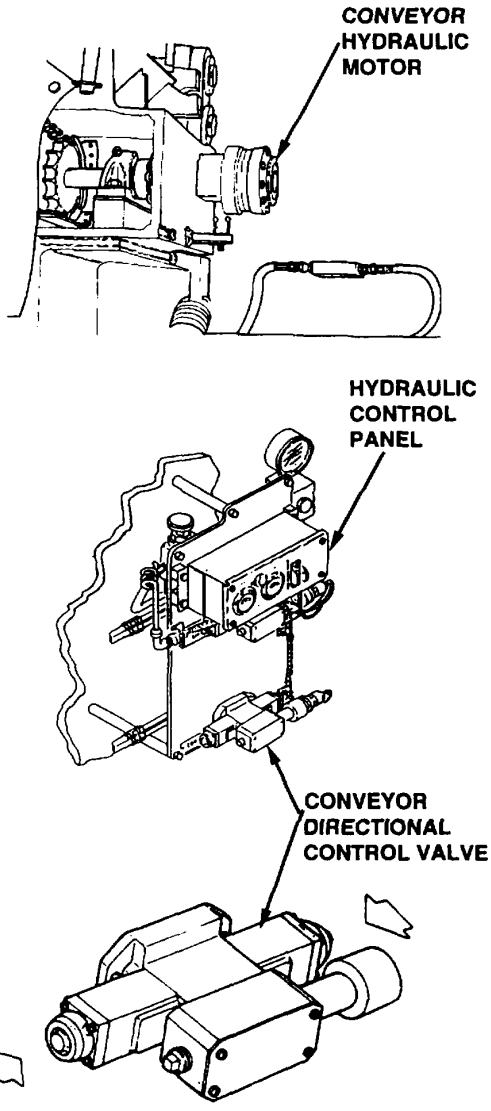
Replace leaking or damaged lines, fittings, or components (para 17-27 or 32). Verify problem is solved.

C. 1. Turn MASTER switch ON (refer to TM 9-2350-287-10).

2. Activate hydraulic system (refer to TM 9-2350-287-10).

3. Operate conveyor directional control valve using override buttons located on both ends.

4. Observe operation of directional control valve.



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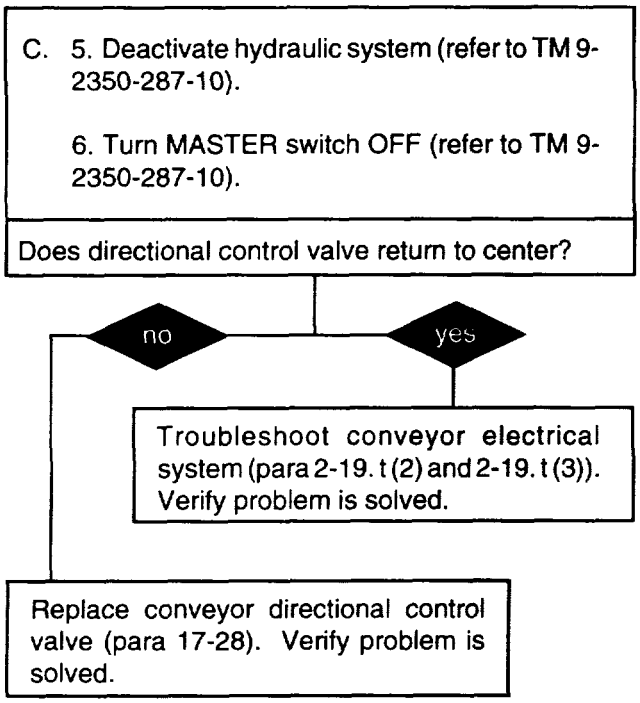
2-19. TROUBLESHOOTING CHART (continued).

p. CONVEYOR (continued).	(1) CONVEYOR CHAIN WILL NOT OPERATE IN EITHER DIRECTION. All other hydraulic systems operate (continued).

CONTINUED FROM C

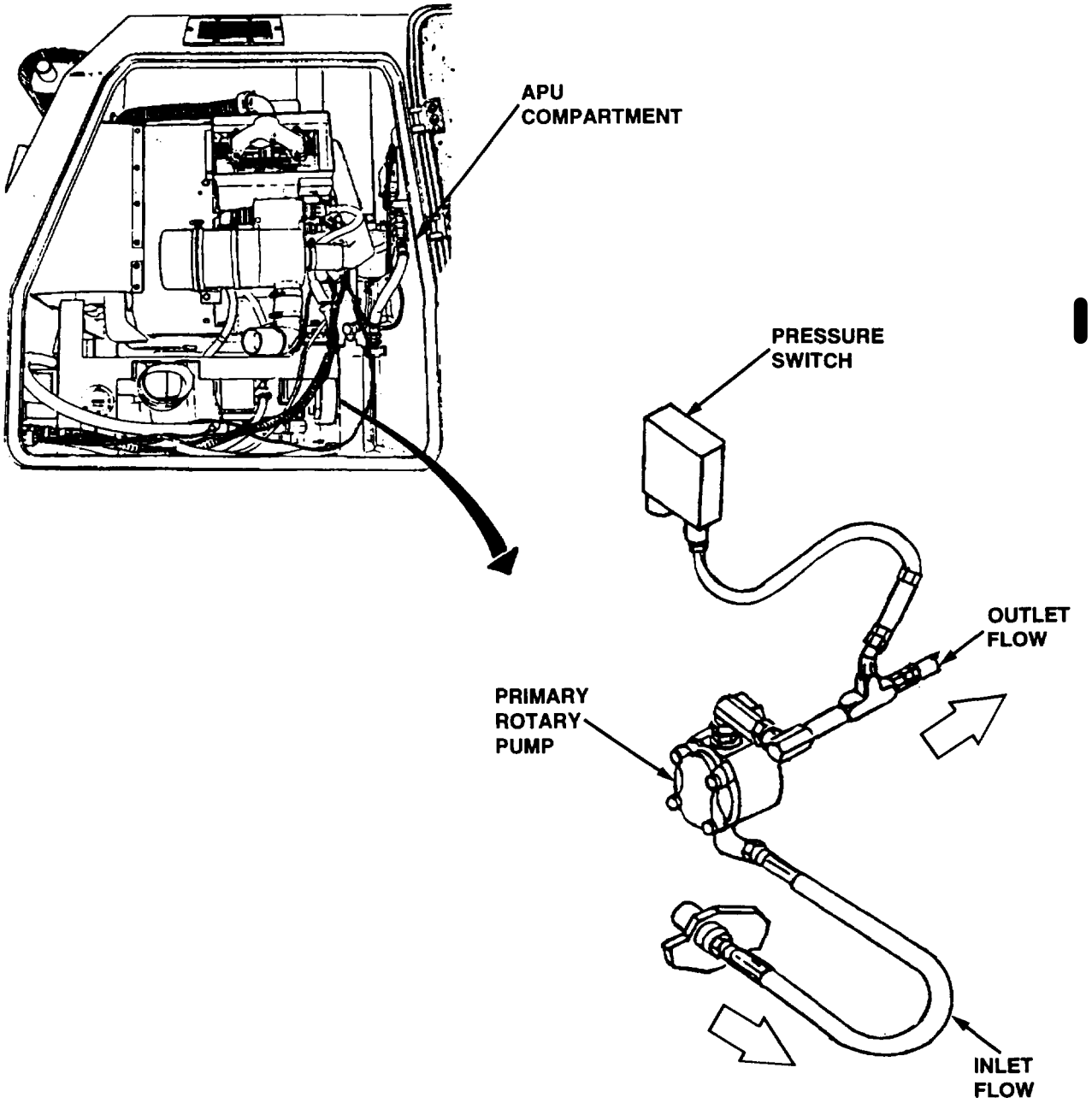


END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

q. PRIMARY ROTARY PUMP.

The primary rotary pump is located in the APU compartment underneath the APU on the lower right-hand side as you face the outside of the vehicle. The primary rotary pump is activated by the APU when the check valve located near the inflating-deflating pump is in the IN position. The primary rotary pump is powered by a direct drive from the APU and provides hydraulic pressure to the hydraulic actuator and to the hydraulic motor.



2-19. TROUBLESHOOTING CHART (continued).

q. PRIMARY ROTARY PUMP (continued). (1) INSUFFICIENT OR NO HYDRAULIC PRESSURE

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

A. Inspect primary rotary pump for damage or signs of leakage.

Is primary rotary pump leaking or damaged?

no / yes

Replace primary rotary pump (refer to TM 9-2350-287-20-2). Verify problem is solved.

B. Inspect all hoses, fittings, and components between primary rotary pump and hydraulic control panel for damage or signs of leakage.

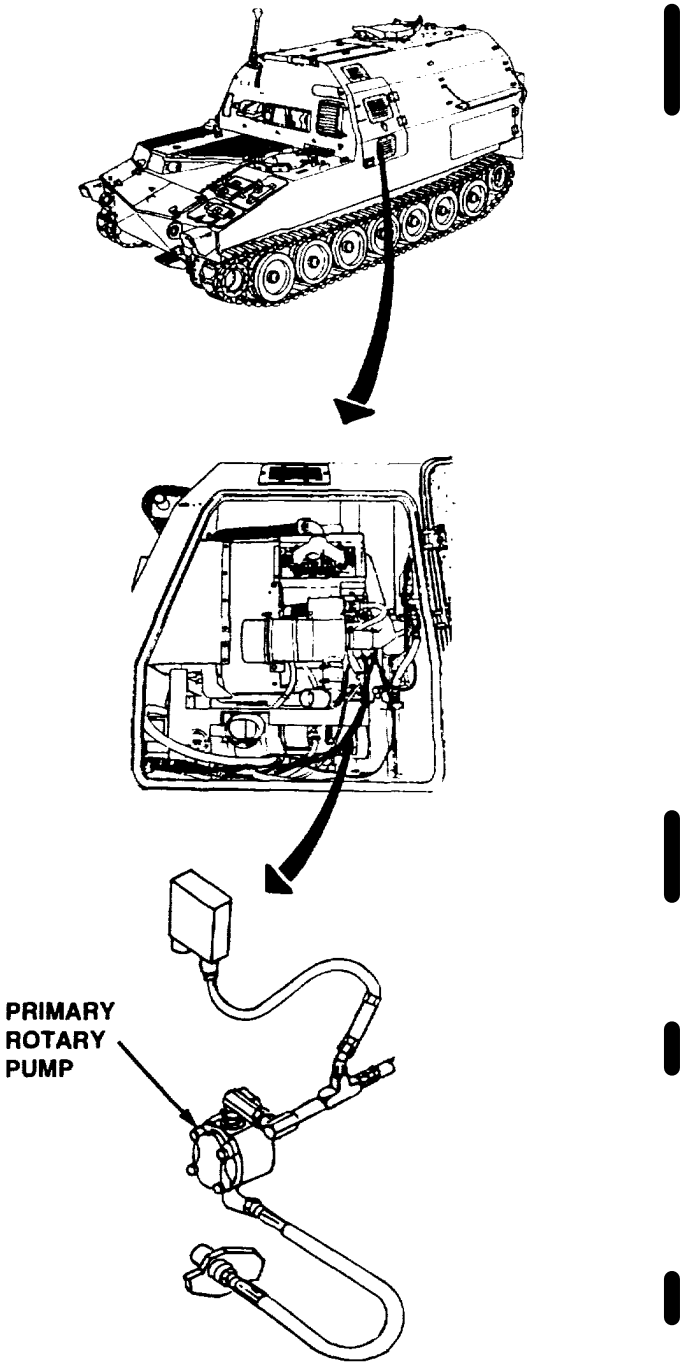
Are any hoses, fittings, or components leaking or damaged?

no / yes

Replace leaking or damaged hoses, fittings, or components (refer to TM 9-2350-287-20-2). Verify problem is solved.

Replace check valve between primary rotary pump and hydraulic control panel (refer to TM 9-2350-287-20-2). Verify problem is solved.

END OF TASK



2-19. TROUBLESHOOTING CHART (continued).

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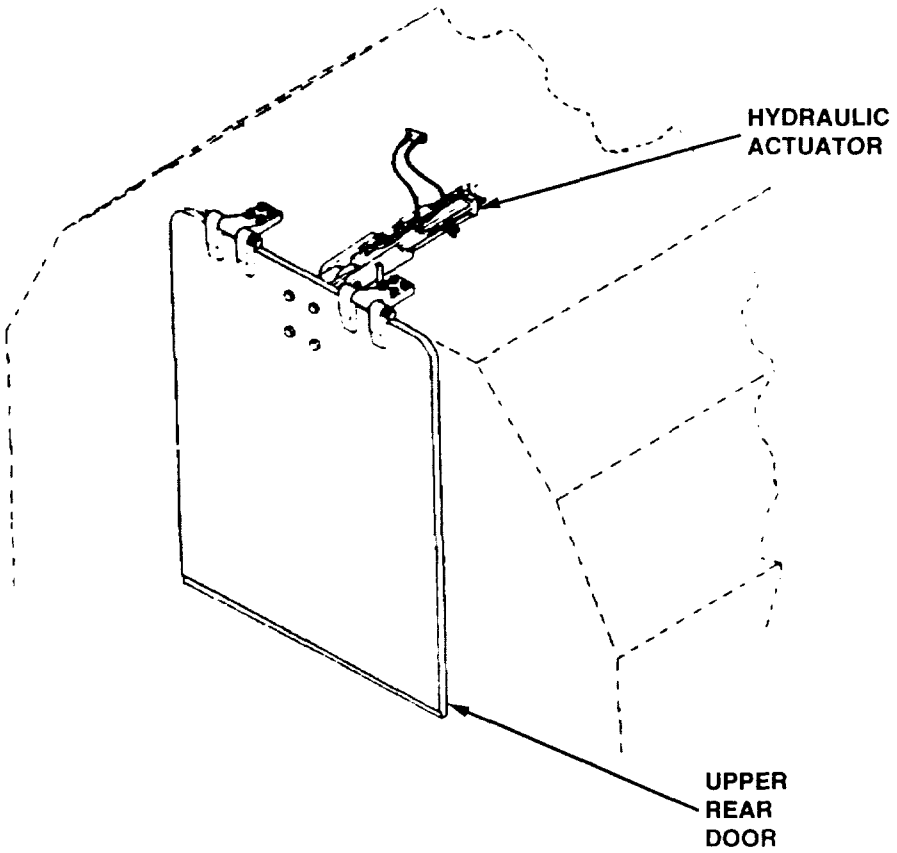
2-19. TROUBLESHOOTING CHART (continued).

s. UPPER REAR DOOR.

The upper rear door is powered hydraulically by the hydraulic actuator. The hydraulic actuator is powered by the primary rotary pump. The upper rear door is raised and lowered electrically by one of two switches located at the rear of the vehicle at the top of the upper rear door and at the bottom near the APU control box. The upper rear door can also be operated manually by the push buttons on either side of the directional control valve located underneath the hydraulic control panel.



2-19. TROUBLESHOOTING CHART (continued).

s. UPPER REAR DOOR (continued).

(1) UPPER REAR DOOR DOES NOT GO UP OR DOWN. All other hydraulic systems operate.

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

A. 1. Open lower rear door (refer to TM 9-2350-287-10).

2. Inspect upper rear door and hinges for damage or binding.

Is ballistic shield damaged or are hinges binding?

no / yes

Repair or replace damaged hinges or upper rear door (para 15-31). Verify problem is solved.

B. Inspect hydraulic actuator for damage or signs of fluid leakage.

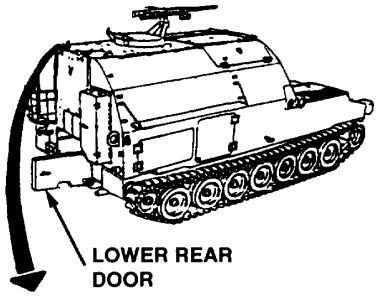
Are any leaks or damage found on actuator?

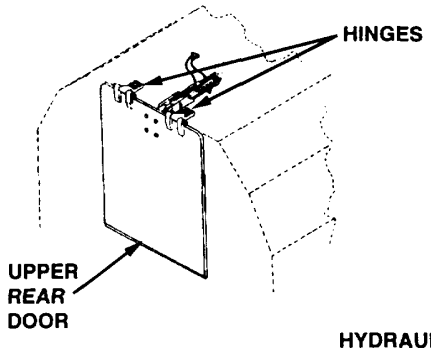
no / yes

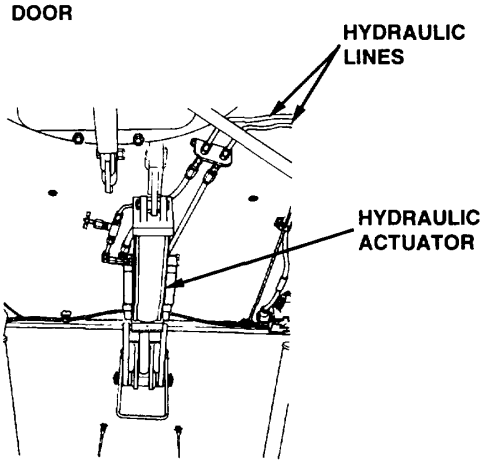
Replace damaged hydraulic actuator (para 17-29). Verify problem is solved.

C. Inspect all hydraulic hoses, lines, fittings, and components from directional control valve to hydraulic actuator for damage or signs of leakage.

Are any of the hoses, lines, fittings, and components damaged or leaking?







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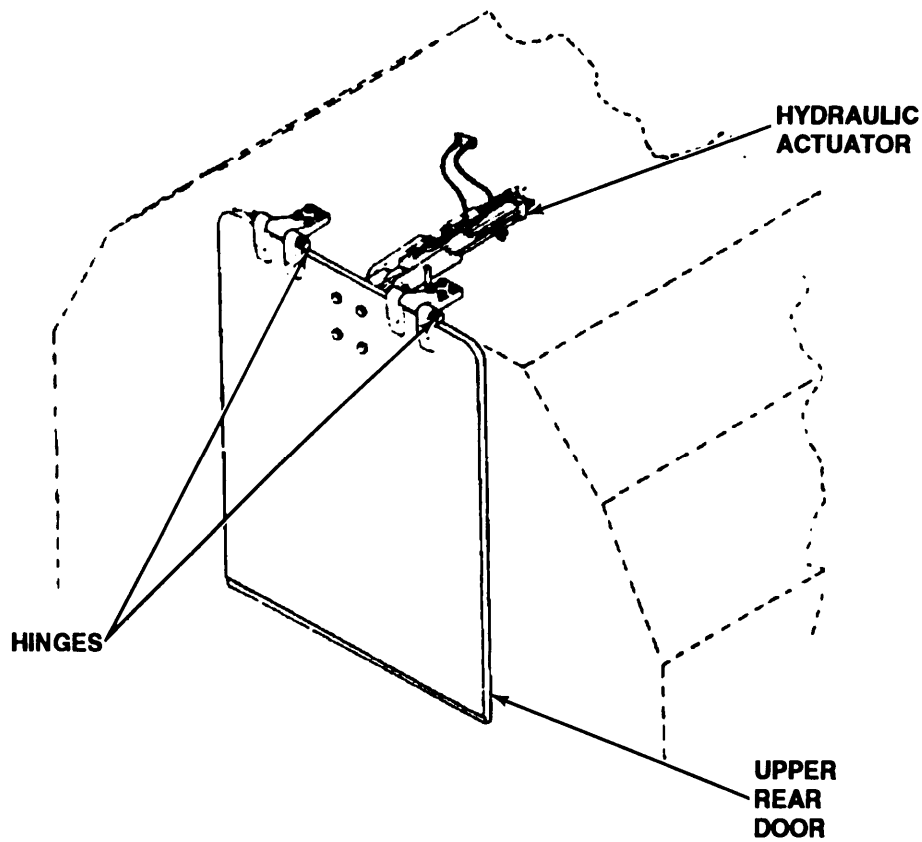
2-19. TROUBLESHOOTING CHART (continued).

s. UPPER REAR DOOR.

The upper rear door is powered hydraulically by the hydraulic actuator. The hydraulic actuator is powered by either the primary hydraulic pump or one of the backup hydraulic pumps. It is raised and lowered electrically by one of two switches located at the rear of the vehicle at the top of the upper rear door and at the bottom near the APU control box. The upper rear door can also be operated manually by the push buttons on either side of the directional control valve located underneath the hydraulic control panel.



2-19. TROUBLESHOOTING CHART (continued).

s. UPPER REAR DOOR (continued).	(1) UPPER REAR DOOR DOES NOT GO UP OR DOWN. All other hydraulic systems operate.

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix 1)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

A. 1. Open lower rear door (refer to TM 9-2350-287-10).

2. Inspect upper rear door and hinges for damage or binding.

Is ballistic shield damaged or are hinges binding?

no / yes

Repair or replace damaged hinges or upper rear door (para 15-31). Verify problem is solved.

B. Inspect hydraulic actuator for damage or signs of fluid leakage.

Are any leaks or damage found on actuator?

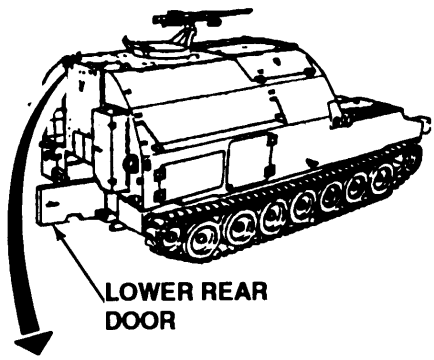
no / yes

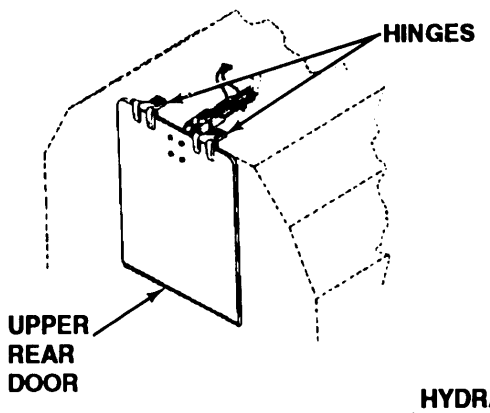
Replace damaged hydraulic actuator (para 17-29). Verify problem is solved.

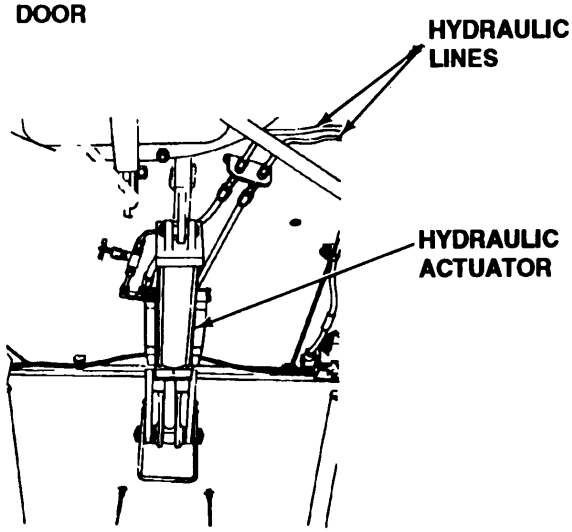
C. Inspect all hydraulic hoses, lines, fittings, and components from directional control valve to hydraulic actuator for damage or signs of leakage.

Are any of the hoses, lines, fittings, and components damaged or leaking?

Continued on next page







2-19. TROUBLESHOOTING CHART (continued).

s. UPPER REAR DOOR (continued).	(1) UPPER REAR DOOR DOES NOT GO UP OR DOWN. All other hydraulic systems operate (continued).

CONTINUED FROM C

no

yes

Replace damaged or leaking hoses, lines, fittings, or components (para17-30). Verify problem is solved.

D. 1. Activate hydraulic system (refer to TM 9-2350-287-10).

2. Manually operate ballistic shield directional control valve with override buttons located at both ends of the valve.

3. Observe operation of directional control valve.

4. Deactivate hydraulic system (refer to TM 9-2350-287-10).

Does directional control valve return to center?

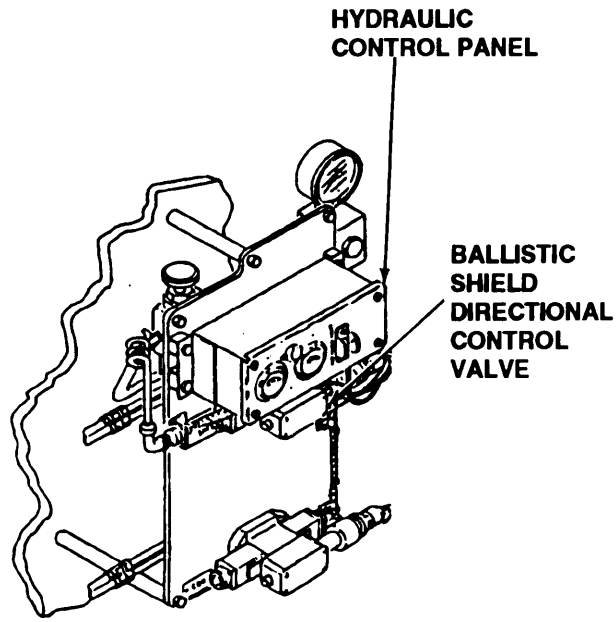
no

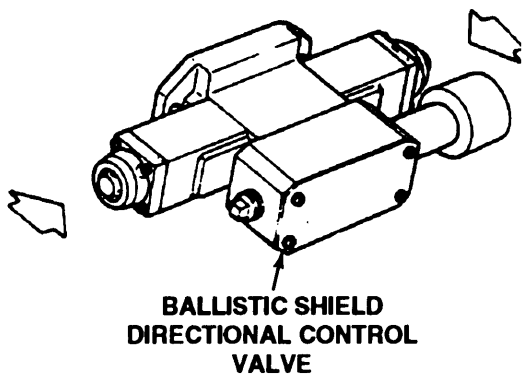
yes

Replace ballistic shield directional control (para 17-28). Verify problem is solved.

Troubleshoot hydraulic electrical system (para 2-19.t (1)).

END OF TASK





2-19. TROUBLESHOOTING CHART (continued).

s. UPPER REAR DOOR (continued).	(2) UPPER REAR DOOR DRIFTS CLOSED.

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix 1)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

WARNiNG

Ensure spilled hydrauiic fluid is cleaned up to prevent fire hazard.

A. 1. Turn MASTER switch ON and activate hydraulic system (refer to TM 9-2350-287-10).

2. Open upper rear door (refer to TM 9-2350-287-10).

3. Close flow control valve.

Does door remain open?

no — Replace upper rear door hydraulic actuator (para 17-29). Verify problem is solved.

yes

B. Open flow control valve (refer to TM 9-2350 287-10).

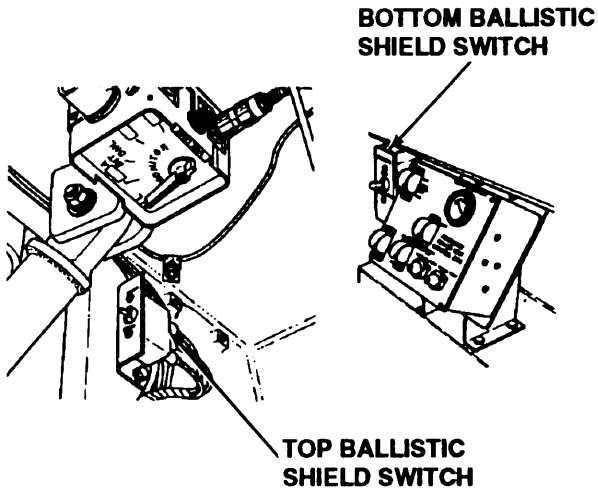
Does door remain open?

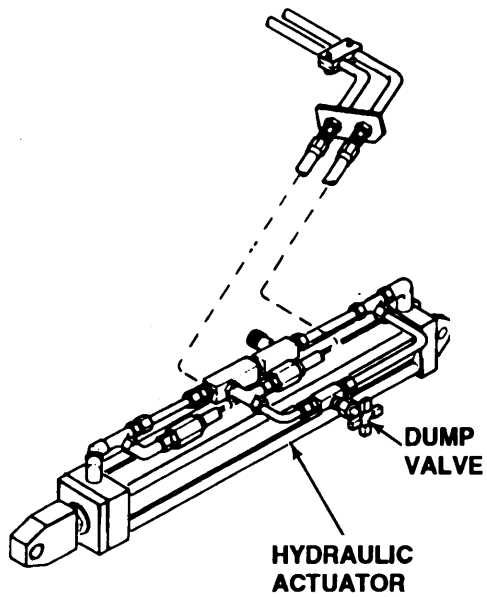
no

yes — Problem is solved.

C. Close dump valve (refer to TM 9-2350-287-10).

Does door remain open?



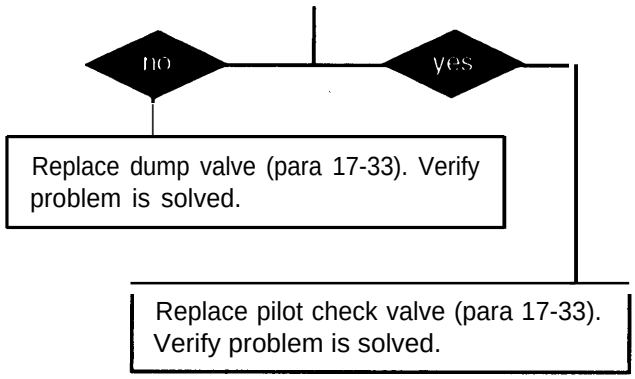


Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

s. UPPER REAR DOOR (continued).	(2) UPPER REAR DOOR DRIFTS CLOSED (continued).

CONTINUED FROM C



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

s. UPPER REAR DOOR (continued).	(3) ACTUATOR OPERATION IS SLOW OR ERRATIC. All other hydraulic systems operate.

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix 1)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

WARNiNG

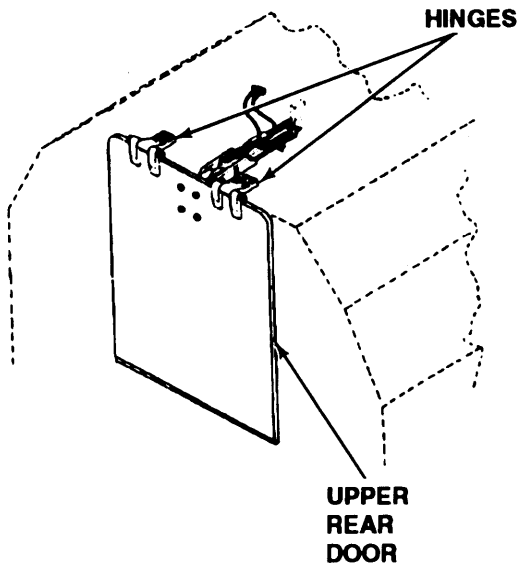
Ensure spilled hydraulic fluid is cleansd up to prevent fire hazard.

A. Inspect door and door hinges for damage or binding.

Are door and hinges damaged or binding?

no / yes

Replace upper rear door or (para 15-31). Verify problem is solved.

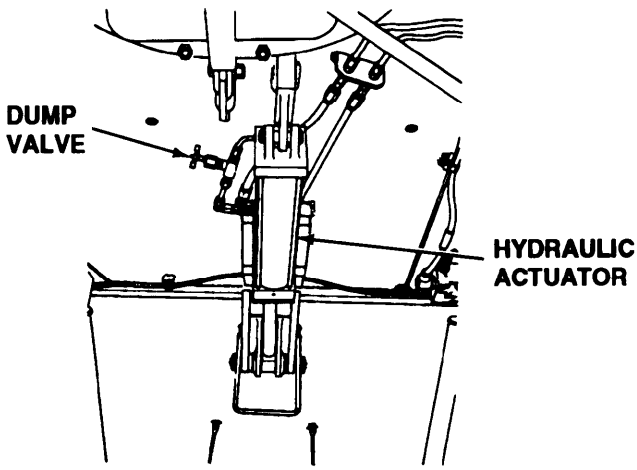


B. Inspect door hydraulic actuator for damage or signs of fluid leakage.

Is upper rear door actuator damaged or leaking?

no / yes

Repair or replace hydraulic actuator (para 17-29). Verify problem is solved.



C. 1. Close dump valve (refer to TM 9-2350-287-10).

2. Turn MASTER switch ON and activate hydraulic system (refer to TM 9-2350-287-10).

3. Open upper rear door (refer to TM 9-2350-287-10).

Is actuator operation still erratic or slow?

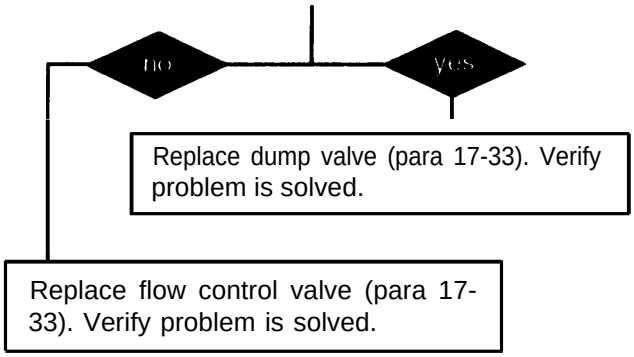
Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

s. UPPER REAR DOOR (continued).

(3) ACTUATOR OPERATION IS SLOW OR ERRATIC. All other hydraulic systems operate (continued).

CONTINUED FROM C

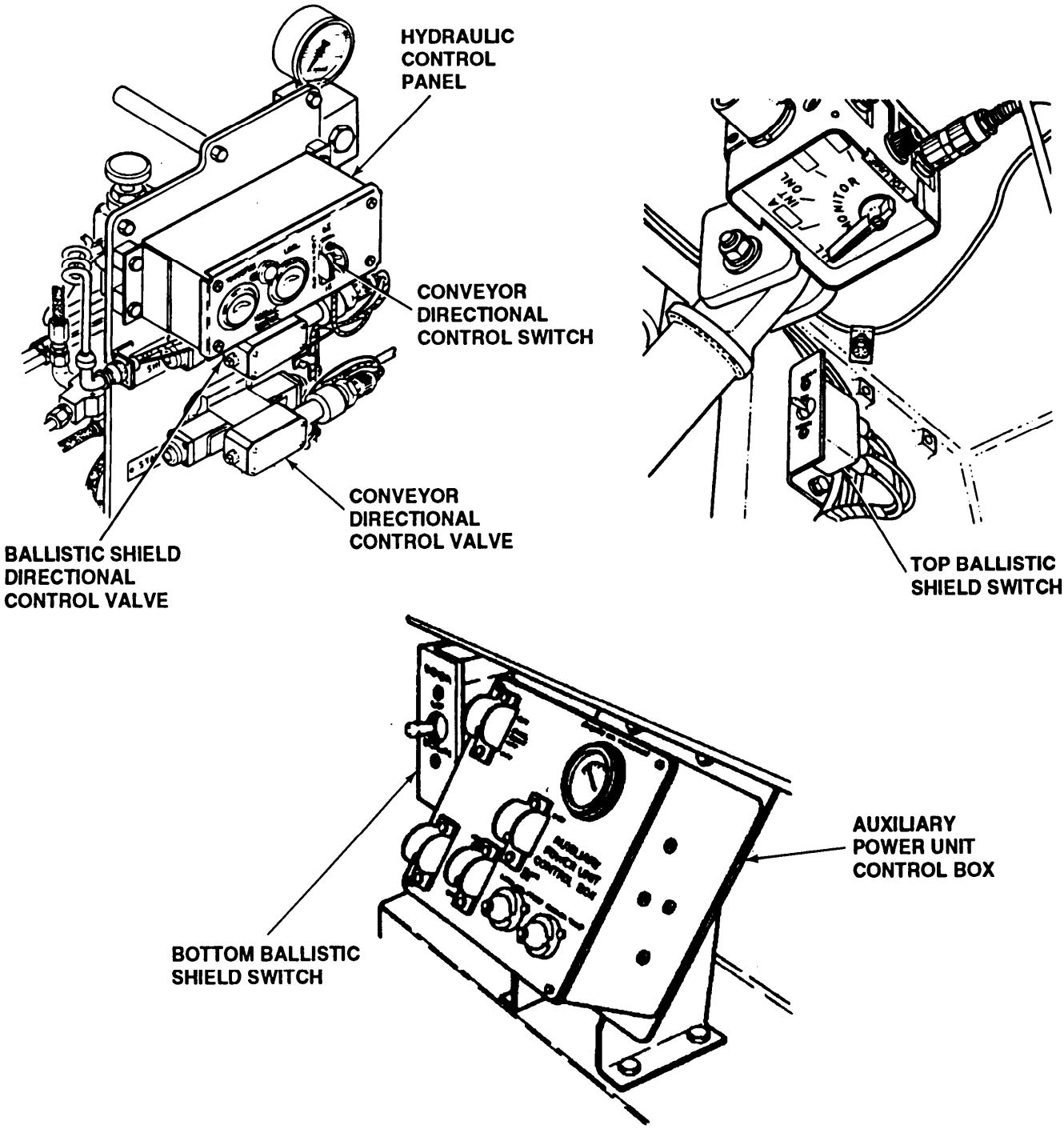


END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

t. HYDRAULIC ELECTRICAL SYSTEMS.

The hydraulic electrical systems consist of the conveyor direction control switch on the hydraulic control panel, the conveyor hydraulic motor, the convey or directional control valve, the ballistic shield directional control valve, top and bottom ballistic shield switches located at the rear of the vehicle, and circuit breaker no. 4 of circuit breaker panel no. 2. The primary function of the hydraulic electrical systems is to raise and lower the ballistic shield and to operate the conveyor in both directions for loading and unloading of ammunition.



2-19. TROUBLESHOOTING CHART **(continued).**

t.	HYDRAULIC SYSTEMS, ELECTRICAL (continued).	(1) UPPER REAR DOOR DOES NOT GO UP OR DOWN .

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

NOTE

- **instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 may be performed.**
- **Instead of using multi meter for continuity check, STE/iCE troubleshooting, TEST 91 may be performed.**

A. 1. Turn MASTER switch ON (refer to TM 9-2350-287-10).

2. Activate hydraulic system (refer to TM 9-2350-287-10).

3. Attempt to open and close upper rear door using top upper rear door switch and bottom upper rear door switch.

4. Observe upper rear door for proper operation.

5. Deactivate hydraulic system (refer to TM 9-2350-287-10).

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Does either switch fall to open or close door?

no → Problem is solved.

yes

NOTE

The following procedures will work for either the top upper rear door switch or the bottom upper rear door switch.

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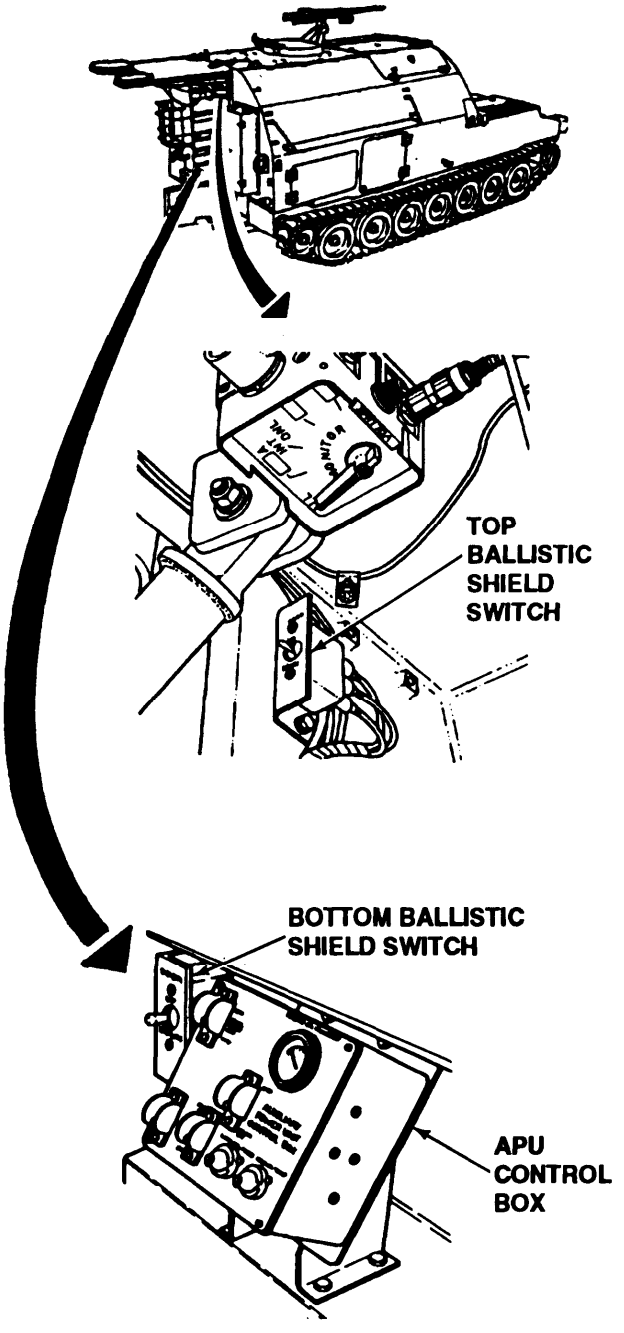


2-19. TROUBLESHOOTING CHART (continued).

t. HYDRAULIC SYSTEMS, ELECTRICAL (continued).	(1) UPPER REAR DOOR DOES NOT GO UP OR DOWN (continued).

CONTINUED FROM A

yes

B. 1. Disconnect wire 10 of wire harness 12330252 from upper rear door switch.

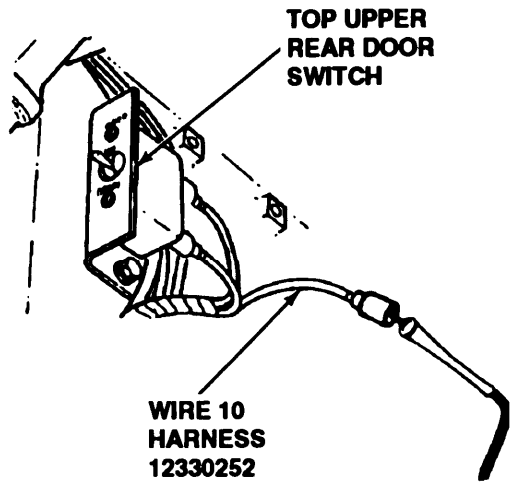
2. Place red lead of multimeter to wire 10 socket and ground black lead.

3. Turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Check for 24 ± 3 vdc.

5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Was voltage indicated?



no — yes

CONTINUED AT STEP E

C. 1. Reconnect wire 10 to upper rear door switch.

2. Disconnect wire 10 from output of circuit breaker no. 4 of circuit breaker panel no. 2.

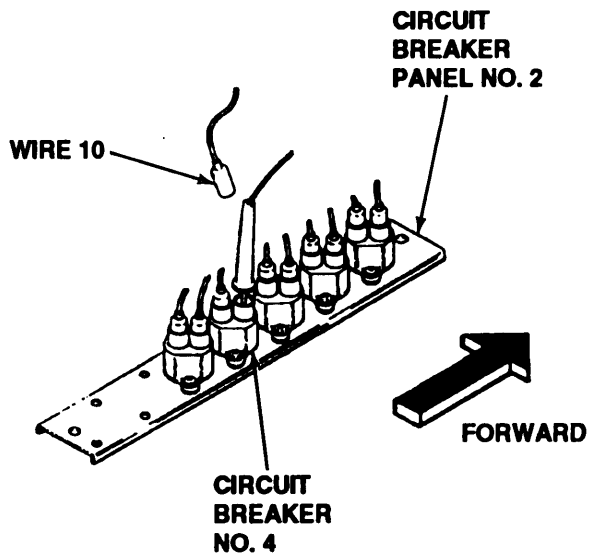
3. Place red lead of multimeter in circuit breaker no. 4 and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Was voltage indicated?



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2-19. TROUBLESHOOTING CHART (continued).

t. HYDRAULIC SYSTEMS, ELECTRICAL (continued).	(1) UPPER REAR DOOR DOES NOT GO UP OR DOWN (continued).

CONTINUED FROM C

no / yes

Notify Direct Support maintenance.

D. 1. Reconnect wire 10 of harness 12330252 to circuit breaker no. 4

2. Disconnect wire 10K from circuit breaker no. 4 of panel no. 2.

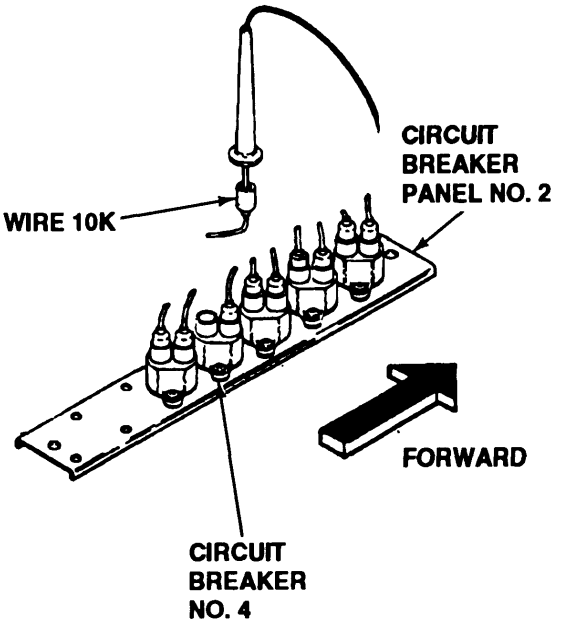
3. Place multimeter red lead in wire 10K and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 VdC.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

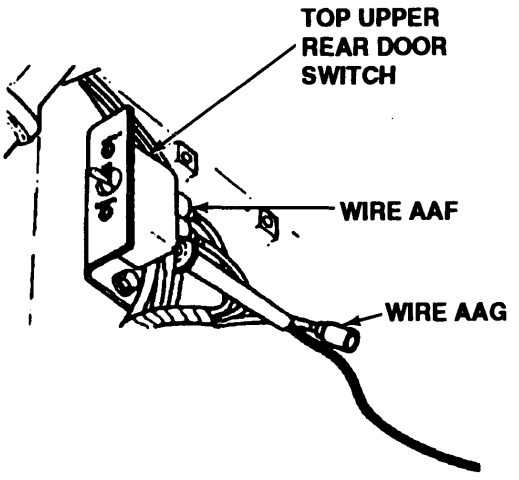
Was voltage indicated?



no / yes

Replace circuit breaker no. 4 of circuit breaker panel no. 2 (para 7-11). Verify problem is solved.

Repair wire 10K or replace harness 12376405 (para 7-57). Verify problem is solved.



CONTINUED FROM STEP B

E. 1. Reconnect wire 10 to upper rear door switch.

2. Disconnect wires AAF and AAG from upper rear door switch.

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

t.	HYDRAULIC SYSTEMS, ELECTRICAL (continued).	(1) UPPER REAR DOOR DOES NOT GO UP OR DOWN (continued).

CONTINUED FROM E

E. 3. Place red lead of multimeter in top switch connector and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Place upper rear door switch in UP position.

6. Check for 24 ± 3 vdc.

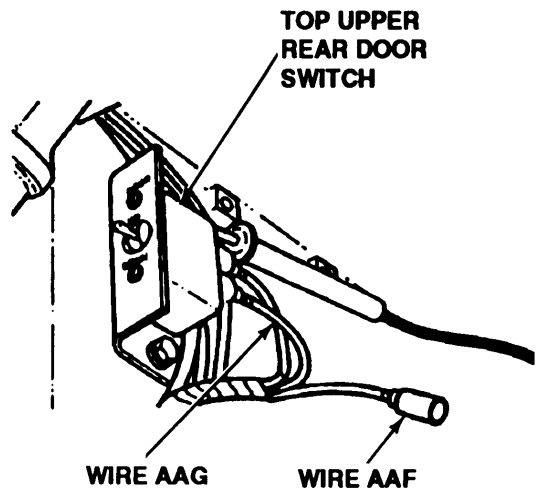
7. Place red lead of multimeter in bottom switch connector and ground black lead.

8. Hold upper rear door switch in DOWN position.

9. Check for 24 ± 3 vdc.

10. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated at both circuits?



no

yes

Replace upper rear door switch (para 7-23). Verify problem is solved.

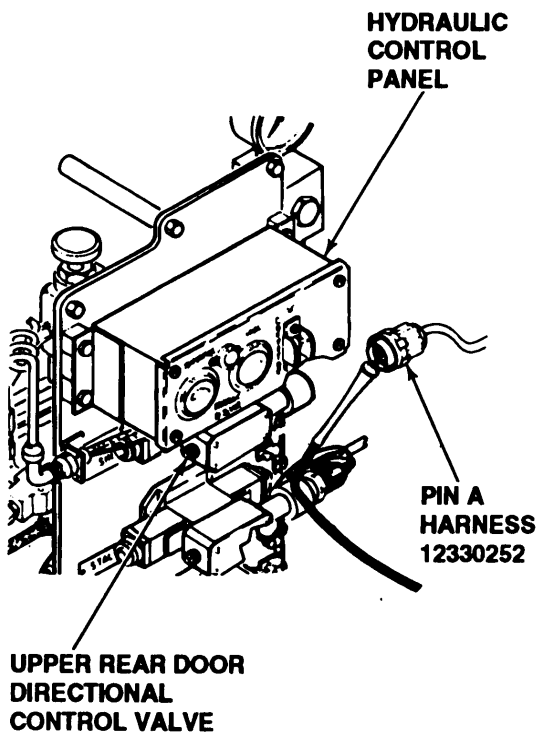
F. 1. Reconnect wires AAF and AAG to upper rear door switch.

2. Disconnect wire harness 12330252 connector from upper rear door directional control valve on hydraulic control panel.

3. Place red lead of multimeter on pin A and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Hold upper rear door switch to the UP position.



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2-19. TROUBLESHOOTING CHART (continued).

t.	HYDRAULIC SYSTEMS, ELECTRICAL (continued).	(1) UPPER REAR DOOR DOES NOT GO UP OR DOWN (continued).

CONTINUED FROM F

F. 6. Check for 24 ± 3 vdc.

7. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

1

no → Notify Direct Support maintenance.

yes →

G. 1. Place red lead of multimeter on pin B and ground black lead.

2. Hold upper rear door switch to DOWN position.

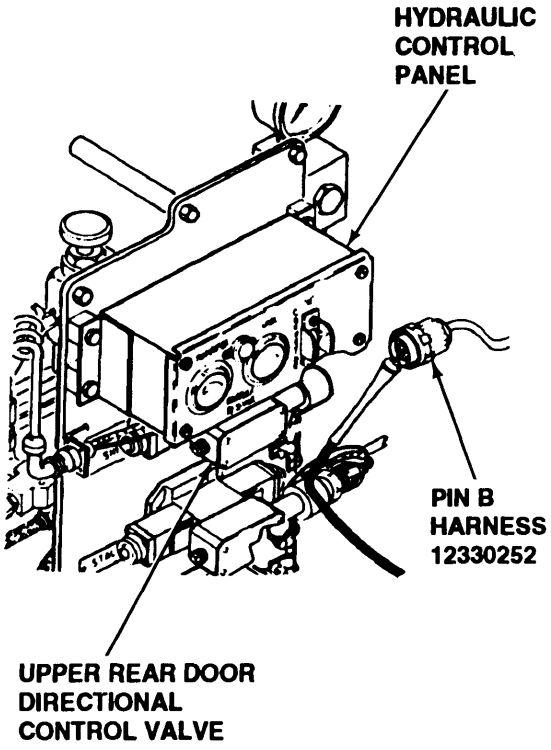
3. Check for 24 ± 3 vdc.

4. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no → Notify Direct Support maintenance.

yes → Replace upper rear door directional control valve (para 17-28). Verify problem is solved.



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

t. HYDRAULIC SYSTEMS, ELECTRICAL (continued).	(2) CONVEYOR CHAIN WILL NOT OPERATE IN EITHER DIRECTION .

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Conveyor deployed (refer to TM 9-2350-287-10).

NOTE

- **Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.**
- **Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.**

A. 1. Disconnect ground leads from conveyor override switch.

2. Place red lead of multimeter on one ground connector of switch and place black lead on the other.

3. Turn conveyor override switch ON (refer to TM 9-2350-287-10).

4. Check for continuity.

Is continuity indicated?

no → Replace conveyor override switch (para 7-24). Verify problem is solved.

yes →

B. 1. Reconnect ground leads to conveyor override switch.

2. Disconnect conveyor harness 12376544 ground leads from conveyor deadman switch.

3. Place one lead of multimeter in ground socket of harness 12376544 and place other lead at ground terminal on the conveyor support stand.

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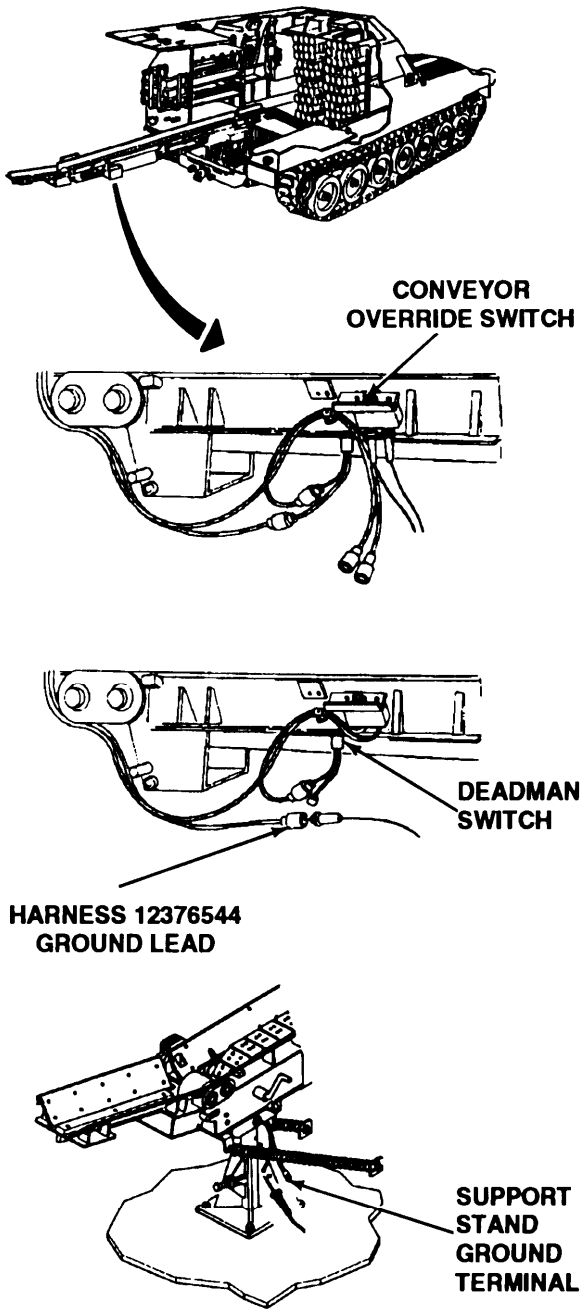


2-19. TROUBLESHOOTING CHART (continued).

t. HYDRAULIC SYSTEMS, ELECTRICAL (continued).	(2) CONVEYOR CHAIN WILL NOT OPERATE IN EITHER DIRECTION (continued).

CONTINUED FROM B

B. 4. Check for continuity.

Is continuity indicated at either connection of switch side of harness?

no

Repair ground lead or replace harness 12376544 (para 7-70). Verify problem is solved.

yes

C. 1. Reconnect ground lead, harness 12376544 to deadman switch.

2. Turn MASTER switch ON (refer to TM 9-2350-287-10).

3. Activate hydraulic system (refer to TM 9-2350-287-10).

4. Operate directional control valve by activating directional control switch (refer to TM 9-2350-287-10).

5. Observe directional control valve.

6. Deactivate hydraulic system (refer to TM 9-2350-287-10).

7.Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Does switch activate directional control valve?

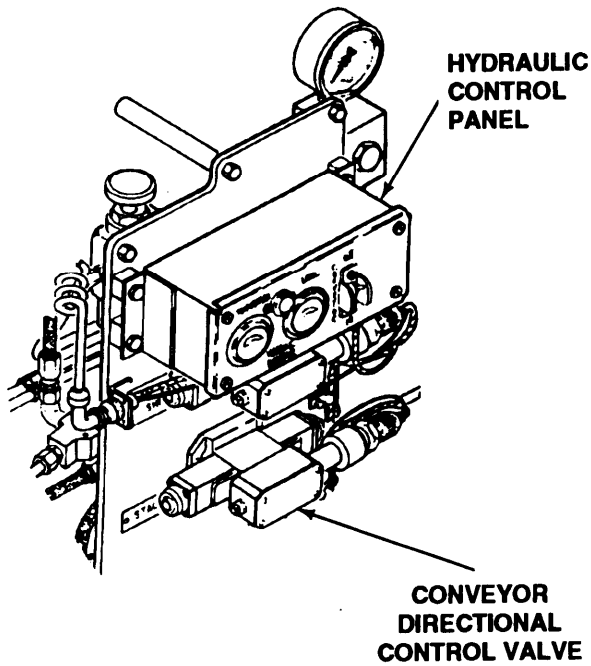
no

Go to hydraulics troubleshooting (para 2-19.s(1)).

yes

D. 1. Disconnect wire harness 12330252 from hydraulic control panel.

2. Place red lead of multimeter in socket B and ground black lead.



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2-19. TROUBLESHOOTING CHART (continued).

t.	HYDRAULIC SYSTEMS, ELECTRICAL (continued).	(2) CONVEYOR CHAIN WILL NOT OPERATE IN EITHER DIRECTION (continued).

CONTINUED FROM D

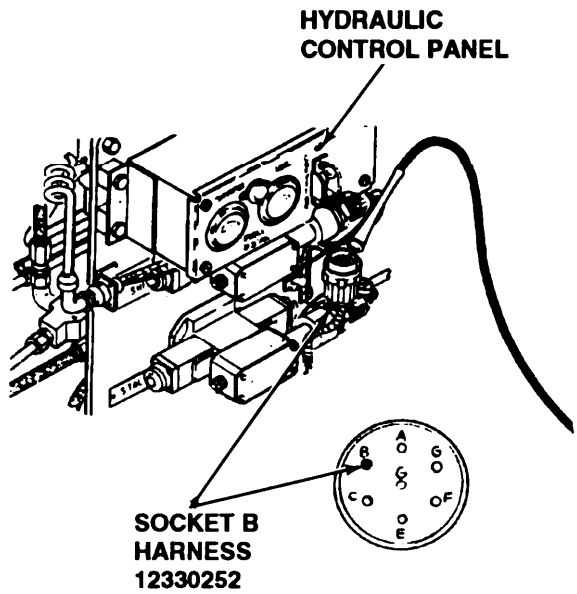
D. 3. Turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Check for 24 ± 3 vdc.

5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no → yes → **CONTINUED AT STEP G**



E. 1. Reconnect wire 12330252 to hydraulic control panel.

2. Disconnect wire harness 12330252 lead 10 from output of circuit breaker no. 4 of circuit breaker panel no. 2.

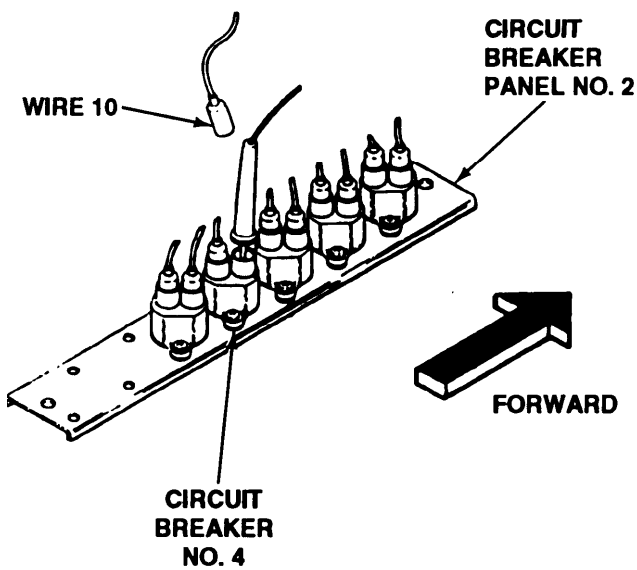
3. Place red lead of multimeter in circuit breaker output and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?



no → yes → Notify Direct Support maintenance.

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

t. HYDRAULIC SYSTEMS, ELECTRICAL (continued).	(2) CONVEYOR CHAIN WILL NOT OPERATE IN EITHER DIRECTION (continued).

CONTINUED FROM E

F. 1. Reconnect harness 12330252 to hydraulic control panel.

2. Disconnect wire 10K of harness 12376405 from circuit breaker no. 4 of panel no. 2.

3. Place red lead of multimeter in wire 10K and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

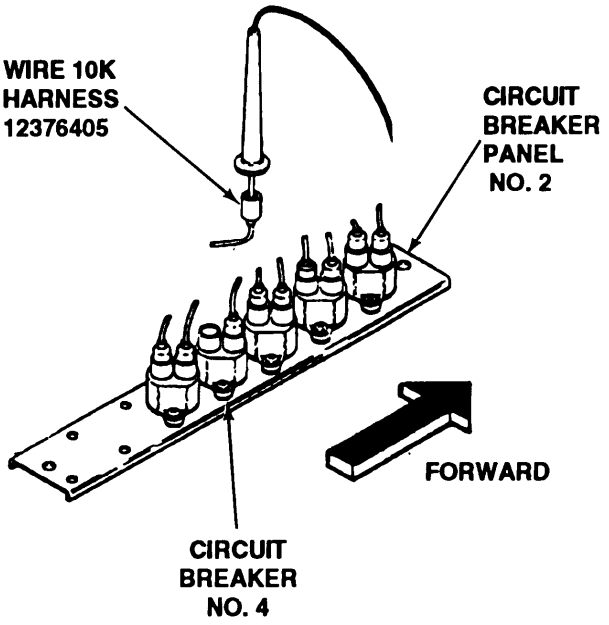
Is voltage indicated?

no

Repair wire 10K or replace harness 12376405 (para 7-57). Verify problem is solved.

yes

Replace circuit breaker no. 4 of circuit breaker panel no. 2 (para 7-11). Verify problem is solved.

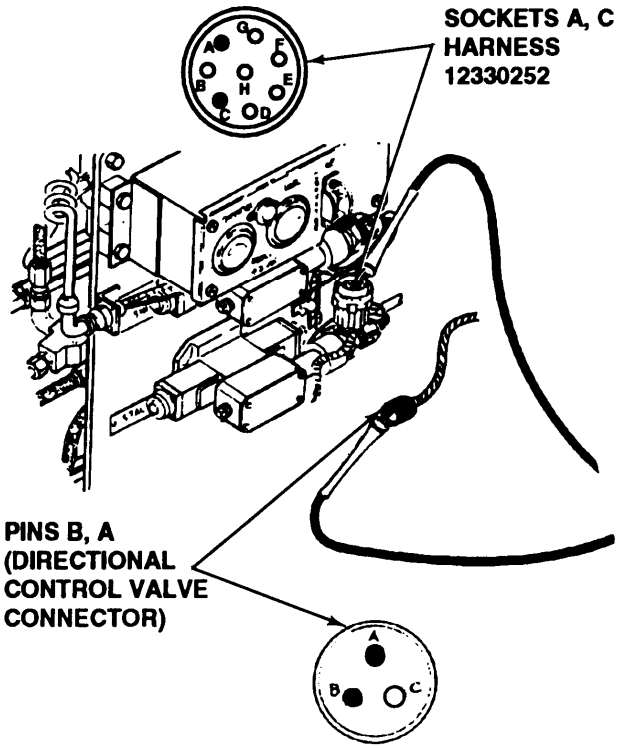


CONTiNUED FROM STEP D

G. 1. Disconnect harness 12330252 from conveyor directional control valve.

2. Place one lead of multimeter in socket A of harness 12330252 hydraulic control panel connector and place other lead of multimeter in pin B of harness 12330252 conveyor directional control valve connector.

3. Check for continuity.



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2-19. TROUBLESHOOTING CHART (continued).

t.	HYDRAULIC SYSTEMS, ELECTRICAL (continued).	(2) CONVEYOR CHAIN WILL NOT OPERATE IN EITHER DIRECTION (continued).

CONTINUED FROM G

G. 4. Place one lead of multimeter in socket C of harness 12330252 hydraulic control panel connector and place other lead of multimeter in pin A of harness 12330252 conveyor directional control vatve connector.

5. Check for continuity.

Is continuity indicated in both places?

no → Notify Direct Support maintenance.

yes →

H. 1. Reconnect harness 12330252 to hydraulic control panel.

1. Place one lead of multimeter in socket C of conveyor directional control valve and the other lead in socket A.

2. Check for continuity.

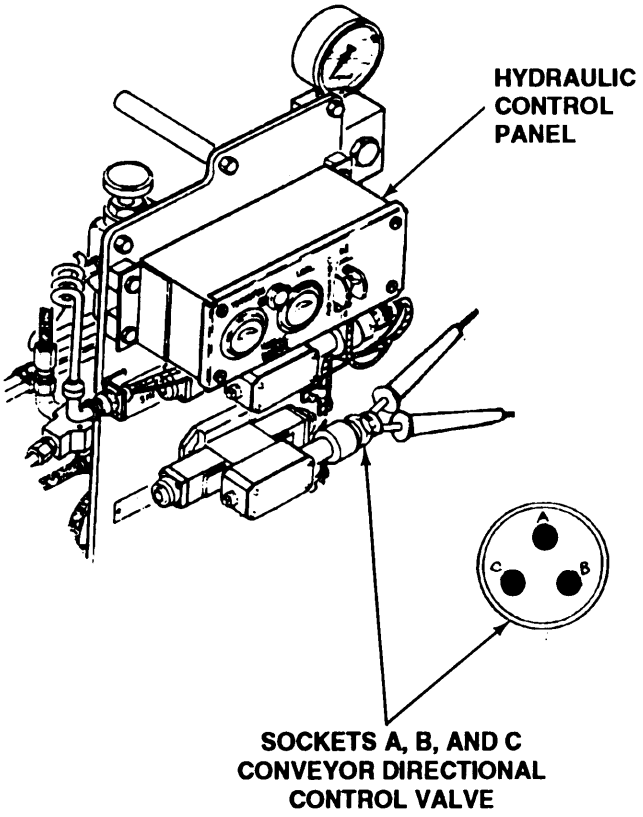
3. Place one lead of multimeter in socket C of conveyor directional control valve and the other lead in socket B.

4. Check for continuity.

Is continuity indicated in both places?

no → Replace conveyor directional control valve (para 7-28). Verify problem is solved.

yes → Replace conveyor control switch (para 7-17). Verify problem is solved.

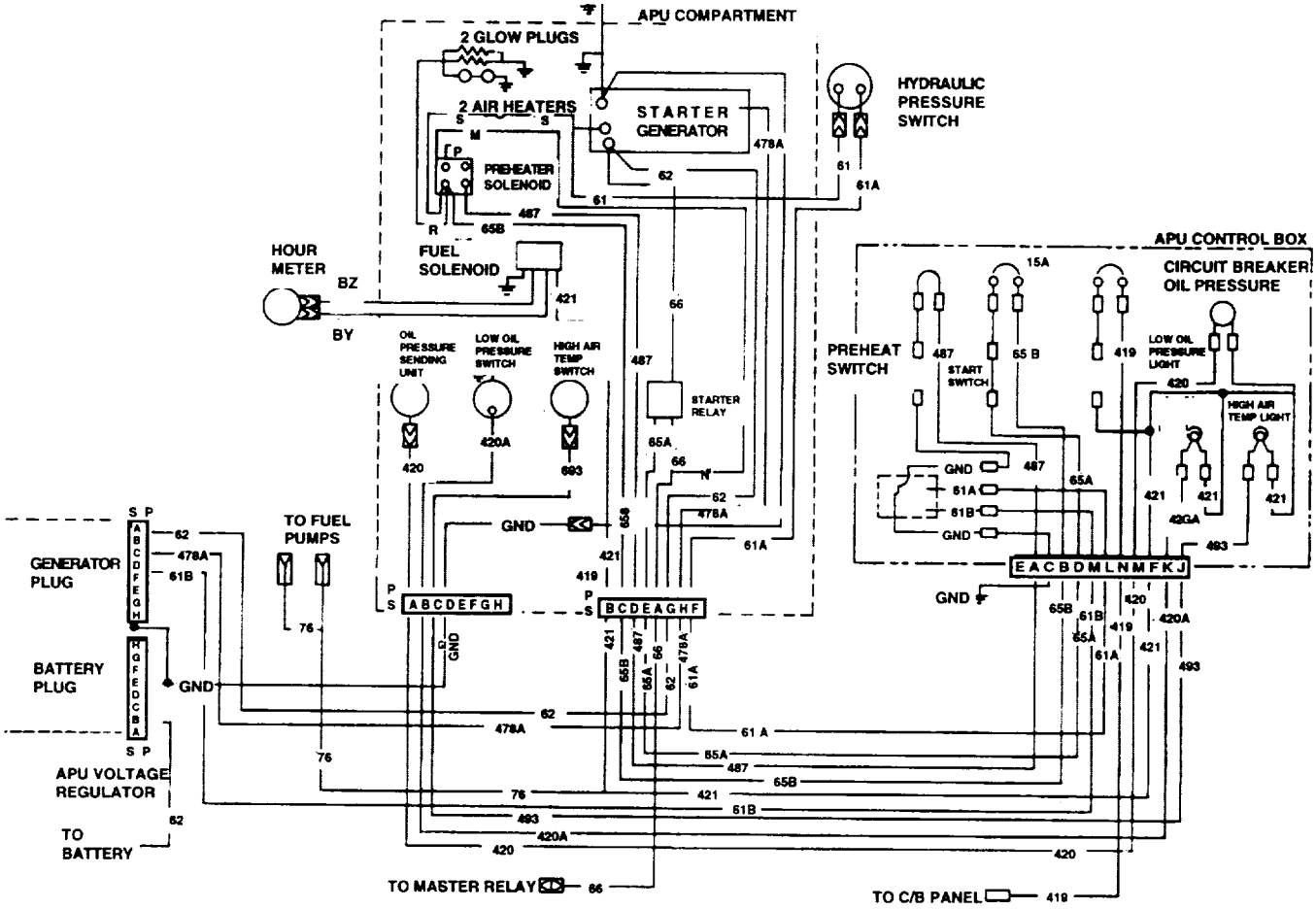


END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (APU).

The APU of the M992A1 is an 11.5 horsepower, 2 cylinder, 4 cycle diesel engine. It is used to power the hydraulic pump and the APU starter/generator. The ignition, fuel shut-off switch, preheat switch, and APU engine indicators are on the APU control box, located in the cargo compartment of the vehicle. The APU generator can provide enough electrical power to run the vehicle's electrical systems, as well as the electrical system of a disabled vehicle via the NATO slave cable/receptacle. The primary electrical components of the APU system are the APU control box, APU starter/generator, APU starter relay, APU fuel solenoid, APU preheat solenoid, APU fuel pumps, APU voltage regulator, and wire harnesses 12329640, 12329650, 12329660, and 12330248.



2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued). (1) ENGINE CRANKS BUT FAILS TO START.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix I)
- Drain pan (Item 14, Appendix I)
- General mechanic's took kit (Item 24, Appendix I)

Material Parts:
- Lockwasher (4) (Item 196, Appendix H) TM 9-2350-287-10).

Personnel Required: Two

Equipment Conditions:
- APU side door opened (refer to TM 9-2350-287-10).
- APU compartment access plate removed (para 15-39).
- MASTER switch set to OFF (refer to

NOTE

- **Instead of using multimeter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 may be performed.**
- **Instead of using multimeter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.**

A. 1. Place a drain pan under fuel filter and open drain cocks.

2. With aid of an assistant turn MASTER switch ON (refer to TM 9-2350-287-10).

3. Turn APU FUEL SHUT-OFF switch ON (refer to TM 9-2350-287-10).

4. Observe drain cocks for fuel flow.

5. Turn MASTER switch and APU FUEL SHUT-OFF switch OFF (refer to TM 9-2350-10).

6. Close drain cocks.

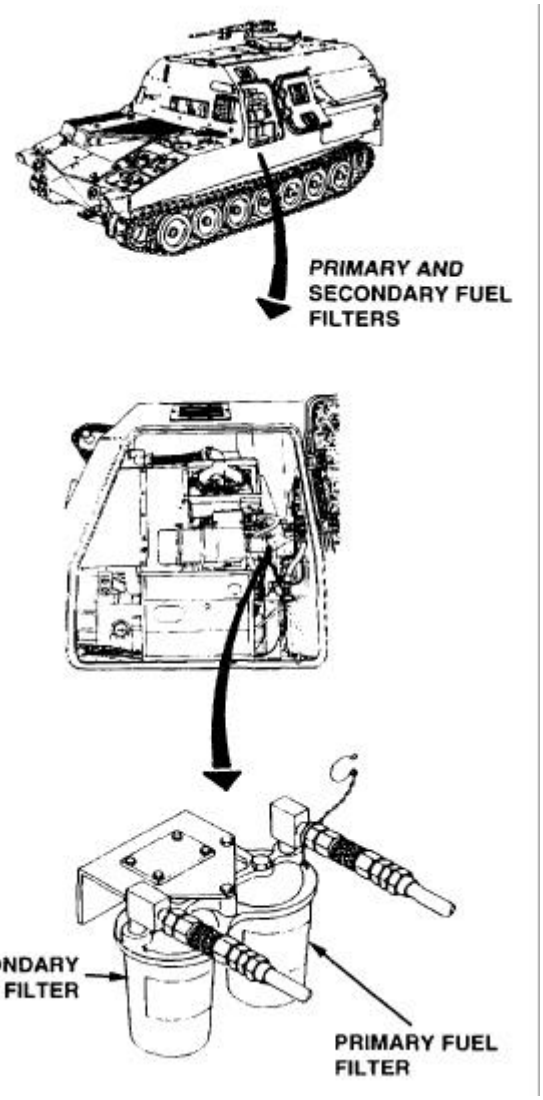
Is there fuel flow?

no — yes

yes → **CONTINUED AT STEP C**

B. Inspect APU compartment fuel lines and fittings for leakage or damage.

Are APU compartment fuel lines or fittings leaking or damaged?



Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued).

(1) ENGINE CRANKS BUT FAILS TO START (continued).

CONTINUED FROM B

no / yes

Repair or replace any leaking or damaged fuel lines (para 4-5) Verify problem is solved.

CONTINUED TO STEP C

C. 1. Disconnect fuel return line.

2. Place a suitable container under engine-mounted disconnect fitting.

3. With the aid of an assistant turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Turn APU FUEL SHUT-OFF switch ON (refer to TM 9-2350-287-10).

5. Using a screw driver, push open disconnect valve and observe fuel flow.

6. Turn MASTER switch and FUEL SHUT-OFF switch OFF (refer to TM 9-2350-287-10).

Is there any fuel flow?

no / yes

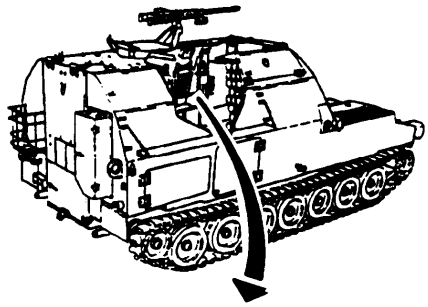
CONTINUED AT STEP G

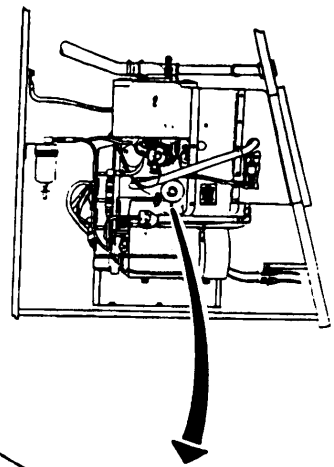
D. 1. Reconnect fuel return I line.

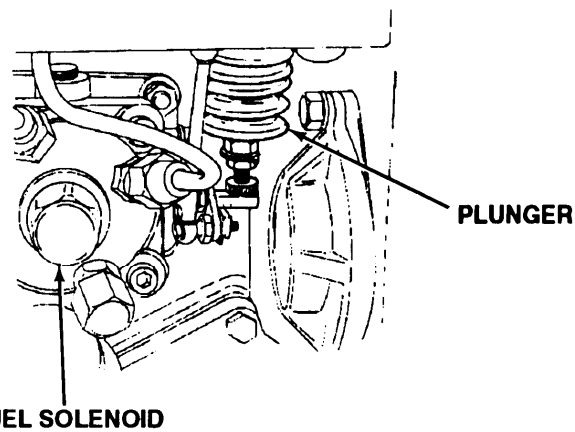
2. Turn MASTER switch ON (TM 9-2350-287-10).

3. Turn APU FUEL SHUT-OFF switch ON and OFF while observing fuel solenoid plunger (refer to TM 9-2350-287-10).

Continued on next page







2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued).

(1) ENGINE CRANKS BUT FAILS TO START (continued).

CONTINUED FROM D

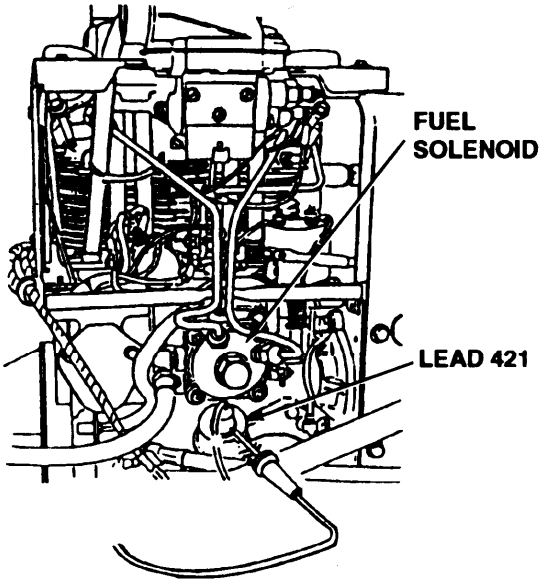
D. **NOTE**

Plunger should pull up when switch is turned ON, and should move down when switch is turned OFF.

Does fuel solenoid plunger function property?

no — yes

Notify Direct Support maintenance.



E. 1. Place red probe of multimeter on lead 421 terminal at fuel solenoid and ground black probe.

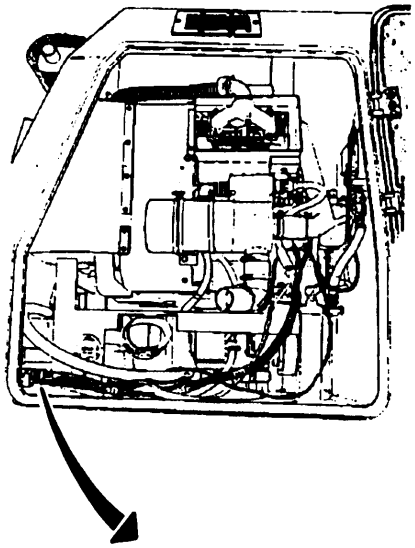
2. With the aid of an assistant turn MASTER switch ON (refer to TM 9-2350-287-10).

3. Turn APU FUEL SHUT-OFF switch ON (refer to TM 9-2350-287-10).

4. Check for 24 ± 3 vdc.

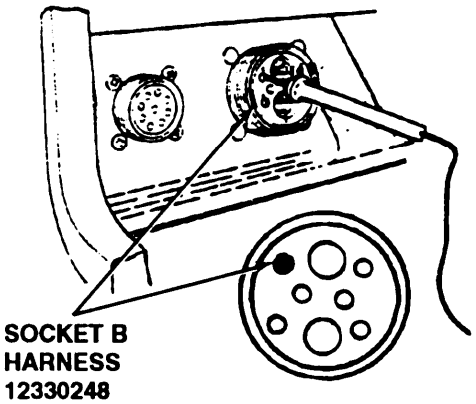
5. Turn MASTER switch and FUEL SHUT-OFF switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?



no — yes

Notify Direct Support maintenance.



F. 1. Disconnect harness 12329640 connector (larger connector) at APU wall mount.

2. Place red probe of multimeter on wall-mounted connector socket B and ground black probe.

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued).	(1) ENGINE CRANKS BUT FAILS TO START (continued).

CONTINUED FROM F

F. 3. With the aid of an assistant turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Turn FUEL SHUT-OFF switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

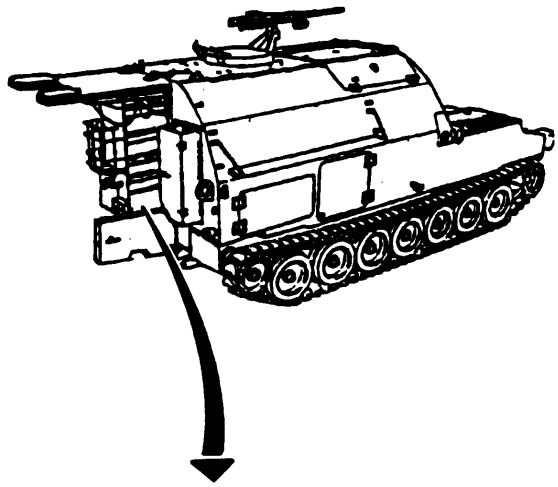
6. Turn MASTER switch and FUEL SHUT-OFF switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no

yes

Repair lead 421 or replace harness 12329640 (para 18-21). Verify problem is solved.



CONTINUED FROM STEP C

G. 1. Reconnect harness 12329640 connector to APU wall.

2. Remove APU control box (para 7-22).

3. Disconnect wire harness 12330248 plug from APU control box.

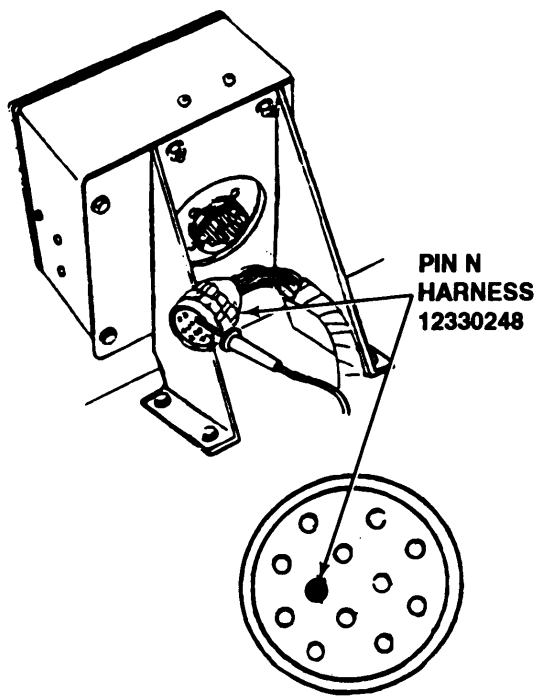
4. Place red probe of multirneter in pin N of plug and ground black probe.

5. With the aid of an assistant turn MASTER switch ON (refer to TM 9-2350-287-10).

6. Check for 24 ± 3 vdc.

7. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?



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2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued).	(1) ENGINE CRANKS BUT FAILS TO START (continued).

CONTINUED FROM G

no — yes

CONTINUED AT STEP K

H. 1. Reconnect wire harness 12330248 plug to APU control box.

2. Install APU control box (para 7-22).

3. Disconnect lead 419 shell connectors where harnesses 12330248 and 12330252 connect.

4. Place red probe of multimeter in lead 419 shell connector of wire harness 12330252 and ground black lead.

5. With the aid of an assistant turn MASTER switch ON (refer to TM 9-2350-287-10).

6. Check for 24 ± 3 vdc.

7. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

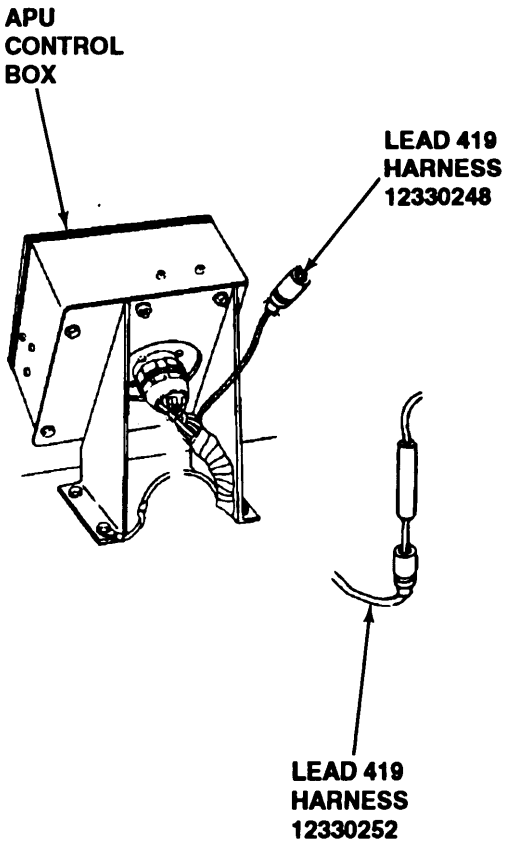
Is voltage indicated?

no — yes

Repair lead 419 or replace harness 12330248 (para 7-71) Verify problem is solved.

1. 1. Reconnect lead 419 of wire harness 12330252 to lead 419 of wire harness 12330248.

2. Disconnect lead 419 from circuit breaker No. 8 output of circuit breaker panel no. 1



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2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued).	(1) ENGINE CRANKS BUT FAILS TO START (continued).

CONTINUED FROM I

1. 3. Place red lead of multimeter in circuit breaker output and ground black probe.

4. With the aid of an assistant turn MASTER switch ON (refer to TM 9-2350-287-10).

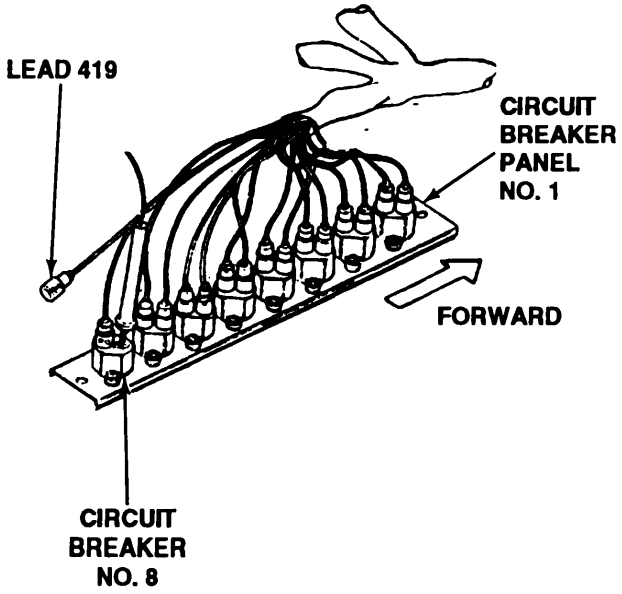
5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no → Notify Direct Support maintenance.

yes



J. 1. Reconnect lead 419 to circuit breaker no. 8. output on circuit breaker panel no. 1.

2. Disconnect lead 10G from circuit breaker No. 8. input of circuit breaker panel no. 1.

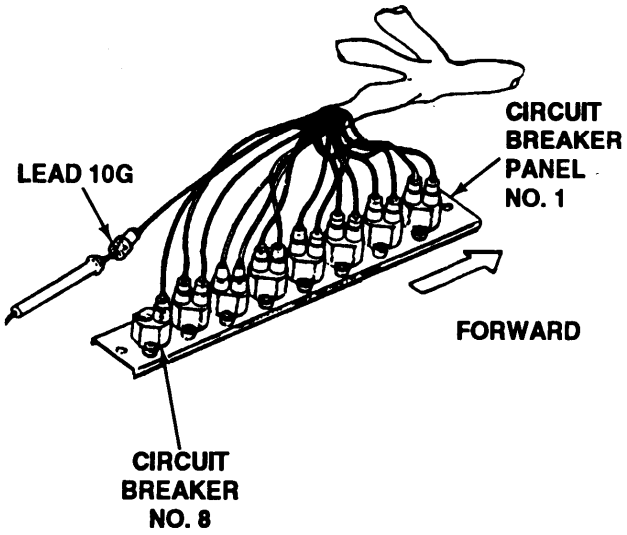
3. Place red probe of multimeter on wire 10G connector and ground black probe.

4. With the aid of an assistant turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?



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2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued).	(1) ENGINE CRANKS BUT FAILS TO START (continued).

CONTINUED FROM J

no / yes

Replace circuit breaker (para 7-11). Verify problem is solved.

Notify Direct Support maintenance.

CONTINUED FROM STEP G

K. 1. Connect lead 10G to Circuit Breaker No. 8. input of Circuit Breaker panel no. 1.

2. Check APU control box FUEL SHUT-OFF switch circuit for continuity.

3. Place multimeter red probe on pin N and black probe on pin F.

4. Turn FUEL SHUT-OFF switch ON (refer to TM 9-2350-287-10).

5. Check for continuity.

6. Turn FUEL SHUT-OFF switch OFF (refer to TM 9-2350-287-10).

Is continuity indicated?

no / yes

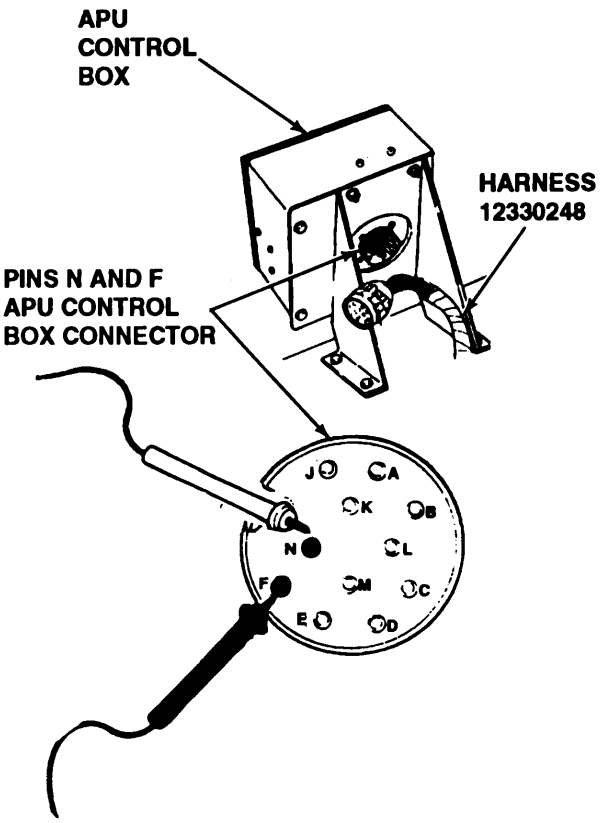
CONTINUED TO STEP M

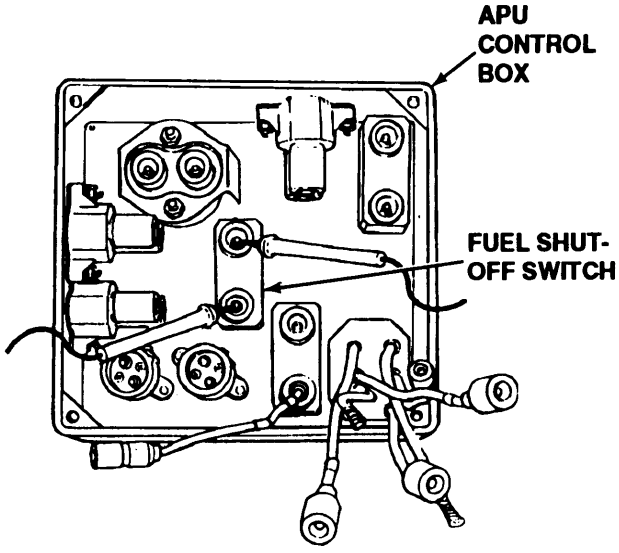
L. 1. Remove NBC air purifier (para 22-2).

2. Remove four screws and lockwashers, access panel, and bracket. Discard lockwashers.

3. Disconnect harness 12330248.

4. Disconnect two leads from FUEL SHUT-OFF switch.





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2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued).	(1) ENGINE CRANKS BUT FAILS TO START (continued).

CONTINUED FROM L

L. 5. Place multimeter lead on each connector of FUEL SHUT-OFF switch.

6. Place FUEL SHUT-OFF switch in ON position (refer to TM 9-2350-287-10).

7. Check for continuity.

Is continuity indicated?

no

Replace FUEL SHUT-OFF switch (para 7-22). Verifyproblem is solved.

yes

M. 1. Reconnect two leads to FUEL SHUT-OFF switch.

2. Reconnect harness 12330248 to APU control box panel.

3. Install bracket and access panel on APU control box with four new Iockwashers and screws.

4. Install NBC air purifier (para 22-2).

5. Place red probe of multimeter on socket B of wall-mounted connector and ground black probe.

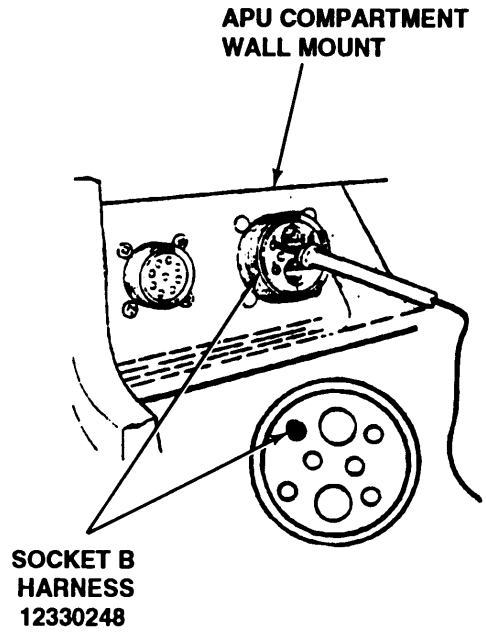
6. With the aid of an assistants turn MASTER switch ON (refer to TM 9-2350-287-10).

7. Turn FUEL SHUT-OFF switch ON (refer to TM 9-2350-287-10).

8. Check for 24 ± 3 vdc.

9. Turn MASTER switch and fuel SHUT-OFF switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?



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2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued).	(1) ENGINE CRANKS BUT FAILS TO START (continued).

CONTINUED FROM M

Is voltage indicated in both power leads?

no

Repair lead 421 or replace harness 12330248 (para 7-71). Verify problem is solved.

yes

N. 1. Move left projectile racks to rear of vehicle. (refer to TM 9-2350-287-10).

2. Disconnect power leads (circuit 76) from APU fuel pumps.

3. Place red lead of multimeter into socket of power lead of first pump.

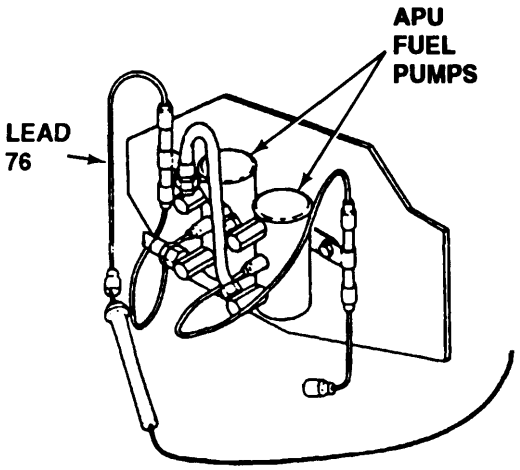
4. With the aid of an assistant turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Turn FUEL SHUT-OFF switch ON (refer to TM 9-2350-287-10).

6. Check for 24 ± 3 vdc.

7. Repeat procedures 4 through 7 for second power lead.

8. Turn Master switch OFF (refer to TM 9-2350-287-10).



no

Repair lead 76 or replace harness 12330248 (para 7-71). Verify problem is solved.

yes

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued).	(1) ENGINE CRANKS BUT FAILS TO START (continued).

CONTINUED FROM N

O. 1. Place a suitable container under the fuel pumps.

2. Disconnect fuel line from the inlet port of the second fuel pump.

3. With the aid of an assistant turn MASTER switch and FUEL SHUT-OFF switch ON (refer to TM 9-2350-287-10).

4. Observe fuel hose for fuel flow.

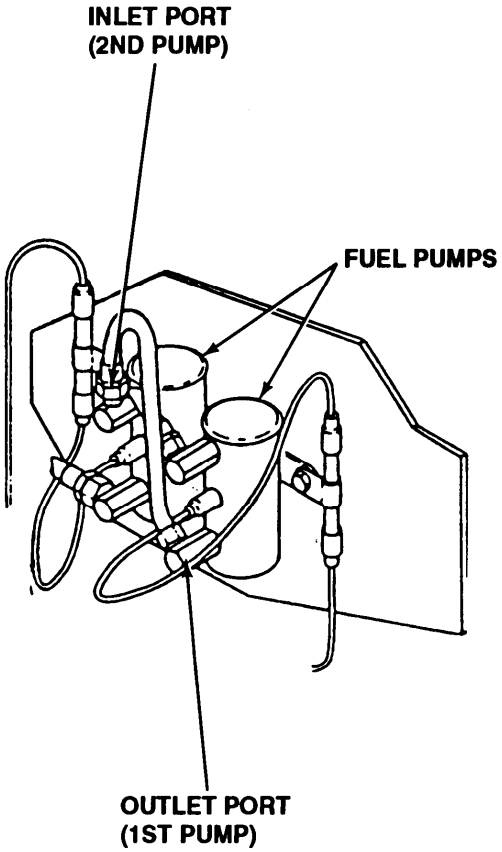
5. Turn MASTER switch and FUEL SHUT-OFF switch OFF (refer to TM 9-2350-287-10).

Does fuel flow out of the fuel pump?

no

yes

Replace second fuel pump (para 4-5). Verify problem is solved.



P. 1. Connect fuel line to the inlet port of the second fuel pump.

2. Disconnect fuel line from outlet port of the first fuel pump.

3. With the aid of an assistant turn MASTER switch and FUEL SHUT-OFF switch ON (refer to TM 9-2350-287-10).

4. Observe fuel hose for fuel flow.

5. Turn MASTER switch and FUEL SHUT-OFF switch OFF (refer to TM 9-2350-287-10).

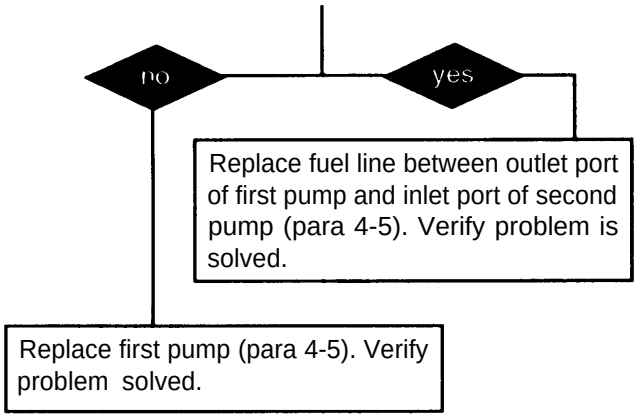
Does fuel flow out of the fuel pump?

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued).	(1) ENGINE CRANKS BUT FAILS TO START (continued).

CONTINUED FROM P



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued).	(2) ENGINE FAILS TO CRANK. All other electrical syetems operate.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Personnel Required: Two

Equipment Conditions:
- APU plenum removed (para 18-17).
- APU compartment access plate removed (para 15-39).
- Projectile racks moved to rear of vehicle (refer to TM 9-2350-287-10).
- APU cylinders shroud removed (para 18-14).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. 1. Disconnect lead 66 from APU starter/generator positive terminal B.

2. Place red probe of multimeter on lead 68 and black probe to ground.

3. With the aid of an assistant, turn MASTER switch ON and hold APU START AND PREHEAT switch ON (refer to TM 9-2350-287-10).

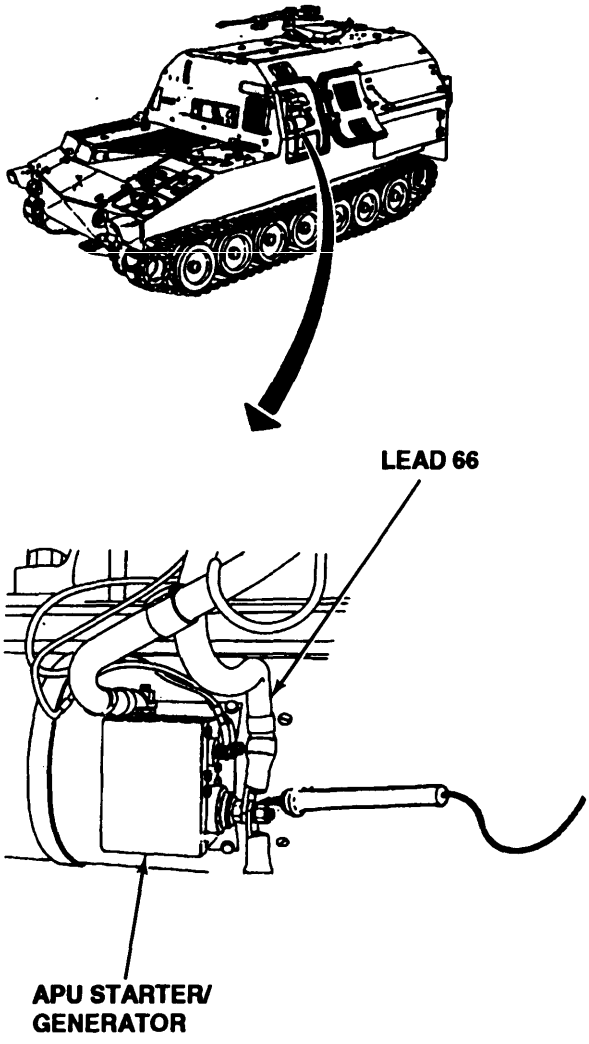
4. Check for voltage 24 ± 3 vdc.

5. Release APU START AND PREHEAT switch and turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no → **CONTINUED TO STEP C**

yes → **Continued on next page**



2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued).

(2) ENGINE FAILS TO CRANK. All other electrical systems operate (continued).

CONTINUED FROM A

yes

B. Using multimeter, check continuity between terminal E of generator and chassis ground.

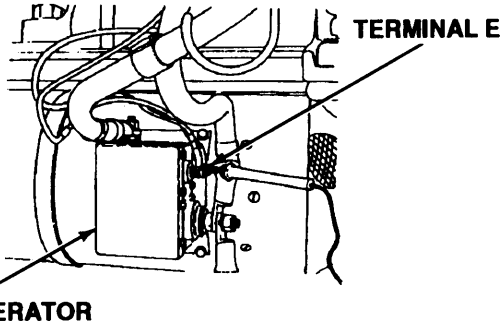
Is continuity 0 OHMS?

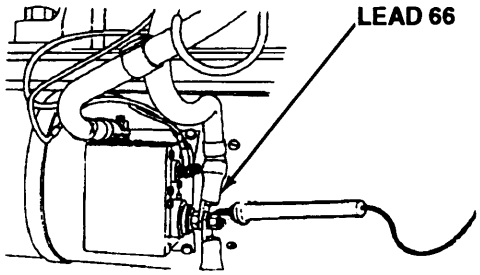
no

Repair ground lead or replace harness 12329650 (para 18-22). Verify problem is solved.

yes

Replace generator (para 18-16). Verify problem is solved.





CONTINUED FROM STEP A

C. 1. Disconnect lead 66 from output side of APU starter relay.

2. Using multimeter, check continuity of lead 66 between starter relay and generator.

Is continuity indicated?

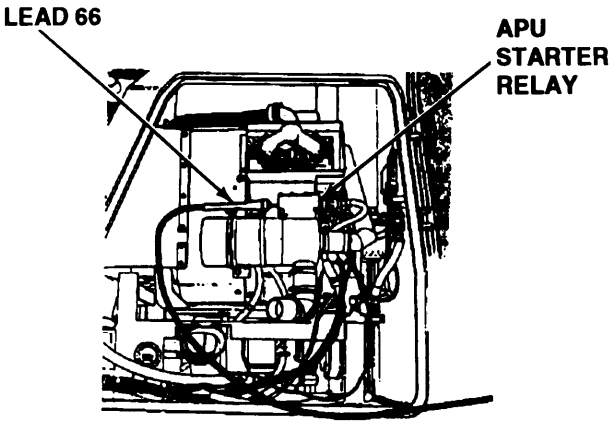
no

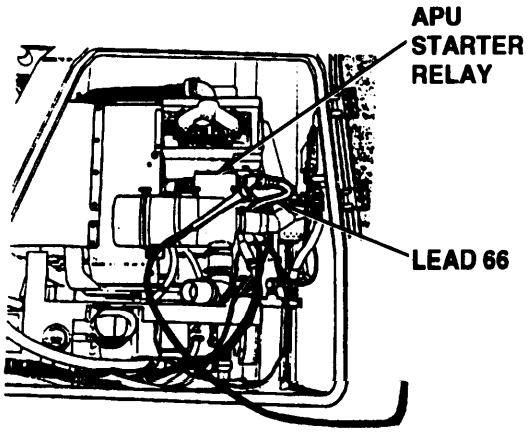
Replace cable assembly 11672191 (para 18-23). Verify problem is solved.

yes

D. 1. Connect lead 66 to generator and output side of APU starter relay.

2. Disconnect lead 66 from input side of APU starter relay.





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2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued).	(2) ENGINE FAILS TO CRANK. All other electrical systems operate (continued).

CONTINUED FROM D

D. 3. Disconnect harness 12329640 from APU compartment wall.

4. Using multimeter check continuity between lead 66 and pin A of harness connector 12329640.

Is continuity indicated?

no

Repair lead 66 or replace harness 12329640 (para 18-21). Verify problem is solved.

yes

E. 1. Disconnect lead 66 from connector 10.

2. Using multimeter check continuity from socket A and pin on wire 66.

Is continuity indicated?

no

Repair lead 66 or replace harness 12330248 (para 7-71). Verify problem is solved.

yes

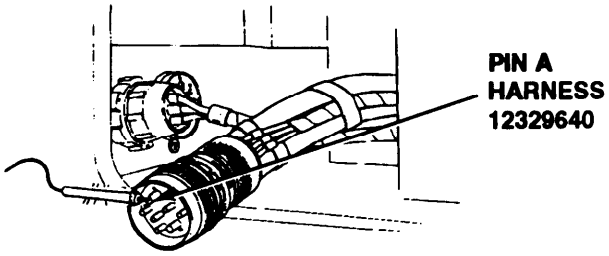
F. 1. Connect lead 66 to connector 10.

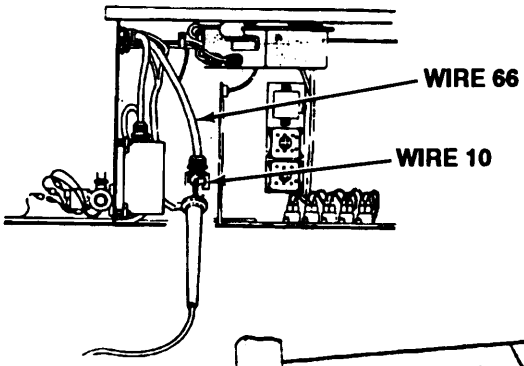
2. Connect lead 66 to input of APU starter relay.

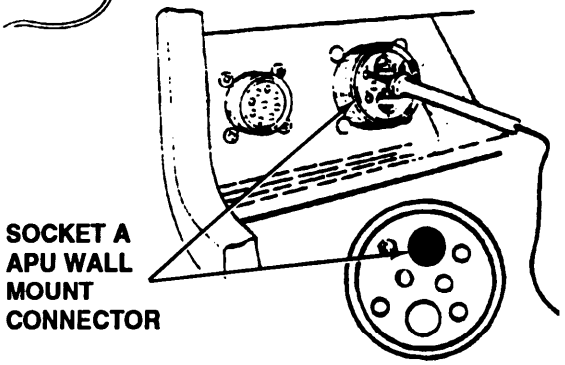
3. Connect harness 12329640 to APU compartment wall connector.

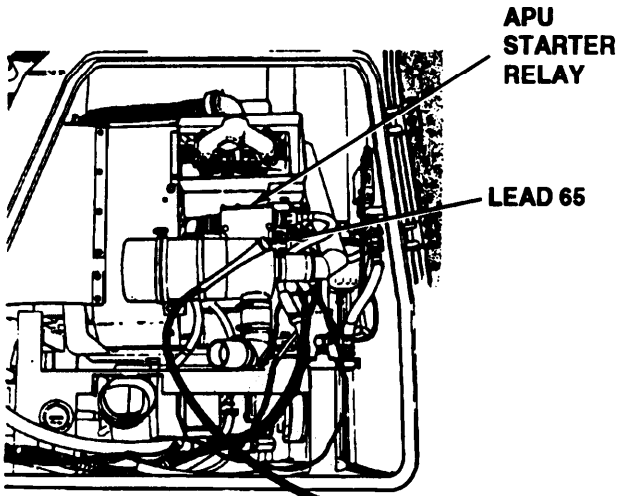
4. Disconnect lead 6512329640 from input side of APU starter relay.

5. Place red probe of multimeter in socket of lead 65 and ground black probe.









Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued).

(2) ENGINE FAILS TO CRANK. All other electrical systems operate (continued).

CONTINUED FROM F

F. 6. With the aid of an assistant turn MASTER switch ON and hold APU PREHEAT AND START switch (refer to TM 9-2350-287-10).

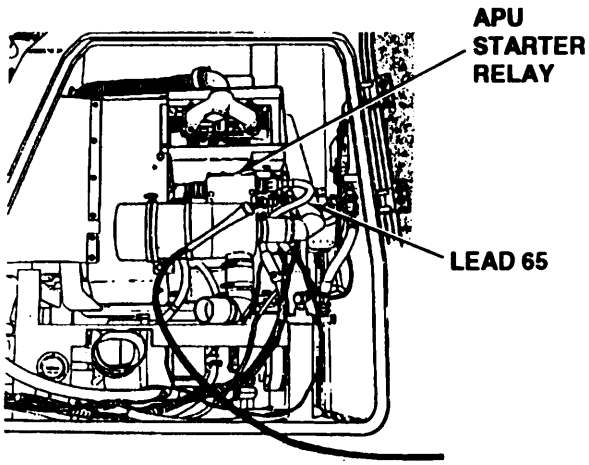
7. Check for 24 ± 3 vdc.

8. Release APU PREHEAT AND START switch and turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no → yes

Replace starter relay (para 18-18). Verify problem is solved.

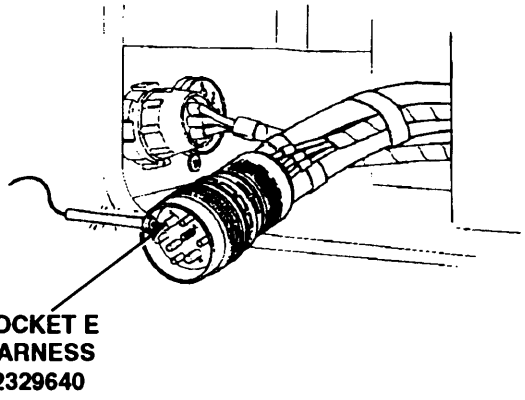


G. 1. Disconnect harness 12329640 from APU compartment wall connector.

2. Place multimeter red probe in lead 65 and black probe on pin E of harness 12329640 connector.

3. Check for continuity.

Is continuity indicated?



no → yes

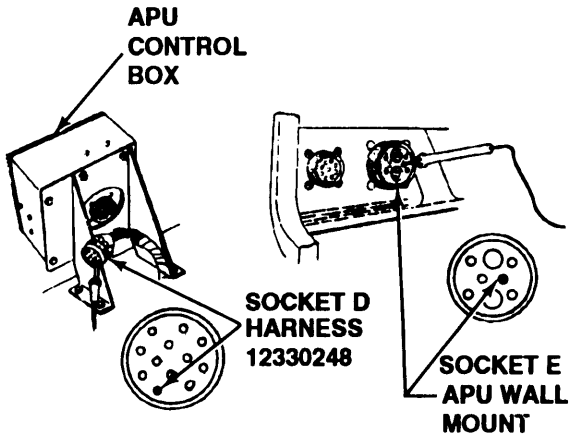
Repair wire 65 or replace harness 12329640 (para 18-21). Verify problem is solved.

H. 1. Connect lead 65 to onput side of APU starter relay.

2. Disconnect harness 12330248 from APU control box.

3. Place multimeter red probe in socket E of harness 12330248 APU wall mount connector and black probe in socket D of harness 12330248 APU control box connector.

4. Check for continuity.



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2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued).

(2) ENGINE FAILS TO CRANK. All other electrical systems operate (continued).

CONTINUED FROM H

Is continuity indicated?

no — Repair wire 65 or replace harness 12330248 (para 7-71). Verify problem is solved.

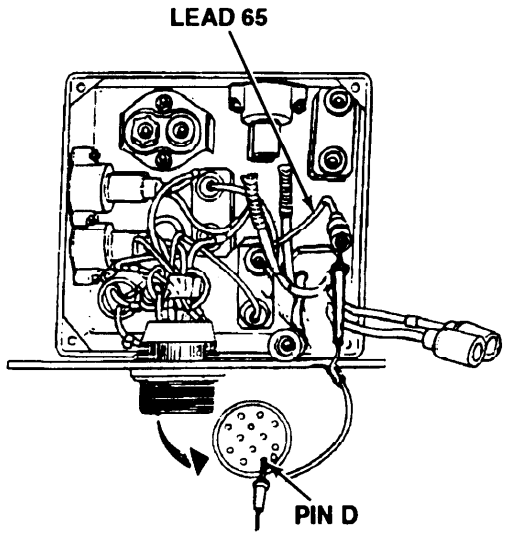
yes

l. 1. Remove and disassemble APU control box (para 7-22).

2. Place multimeter red probe on pin D and black probe in lead 65 connector.

3. Check for continuity.

Is continuity indicated?



no — Repair wire 65A or replace harness 12330248 (para 7-71). Verify problem is solved.

yes

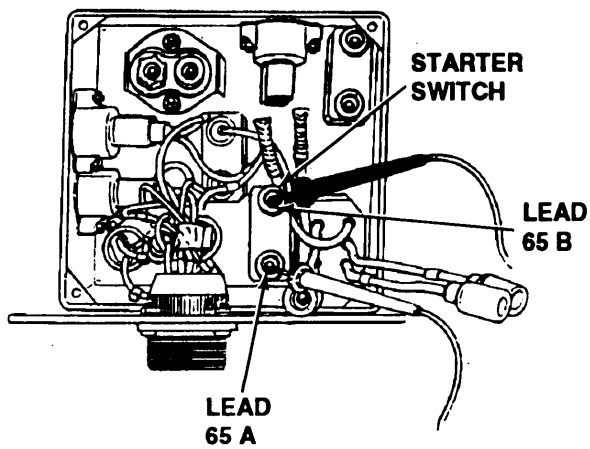
J. 1. Check APU control box APU START switch for continuity.

2. Place multimeter probes on each connector of APU START switch.

3. Hold APU START switch in ON position (refer to TM 9-2350-287-10).

4. Check for continuity.

Is continuity indicated?



no — Replace APU START switch (para 7-22). Verify problem is solved.

yes

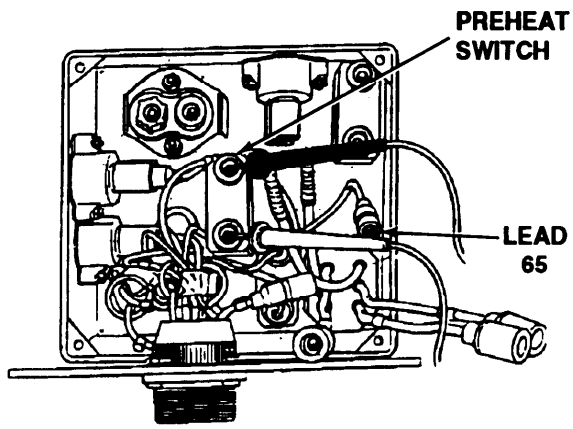
K. 1. Check PREHEAT switch for continuity.

2. Place multimeter probes on each connector of PREHEAT switch.

3. Place PREHEAT switch in ON position (refer to TM 9-2350-287-10).

4. Check for continuity.

Is continuity indicated?



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2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued).	(2) ENGINE FAILS TO CRANK. All other electrical systems operate (continued).

CONTINUED FROM K

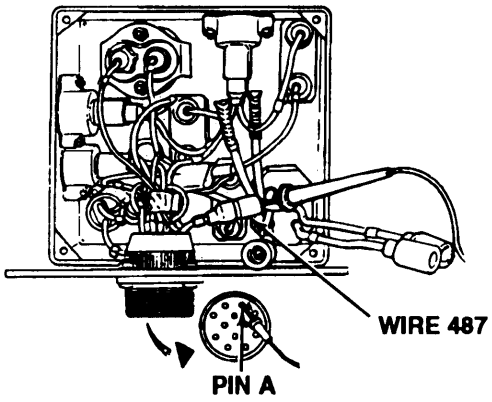
no / yes

Replace PREHEAT switch (para 7-22). Verify problem is solved.

L. 1. Place multimeter red probe in wire 487 connector and black probe on pin A.

2. Check for continuity.

Is continuity indicated?



no / yes

Repair wire 487 or replace harness 12330248 (para 7-71). Verify problem is solved.

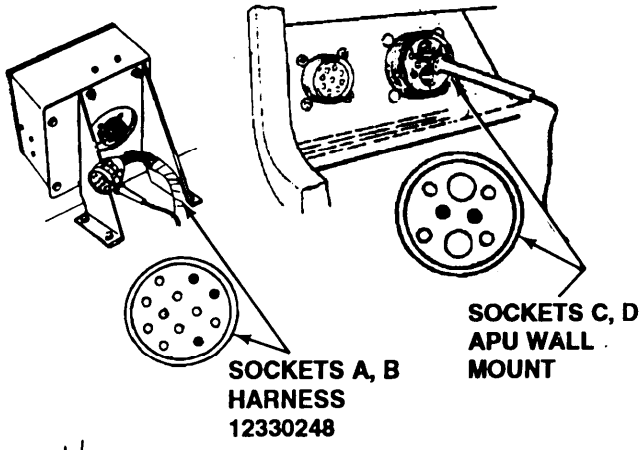
M. 1. Place multimeter red probe in socket A of harness 12330248 and black probe in socket D.

2. Check for continuity.

3. Place multimeter red probe in socket B of harness 12330248 and black probe in socket c.

4. Check for continuity.

Is continuity indicated for both checks?



no / yes

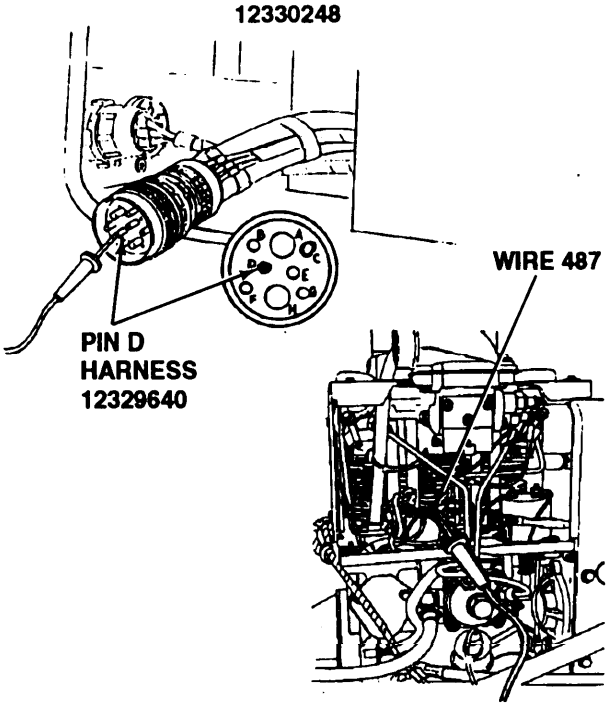
Repair wire 487 or wire 65B or replace harness 12330248 (para 7-71). Verify problem is solved.

N. 1. Assemble and install APU control box (para 7-22).

2. Place multimter red probe in wire harness 12330248 connector 487 and black probe on pin D.

3. Check for continuity.

Is continuity indicated?



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2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued).	(2) ENGINE FAILS TO CRANK. All other electrical systems operate (continued).

CONTINUED FROM N

no / yes

Repair wire 487 or replace harness 12329640 (para 18-21). Verify problem is solved.

O. 1. Remove wire 65B from preheat solenoid

2 Place multimeter red probe in wire 65B connector and black probe on pin C of harness 12329640.

3. Check for continuity.

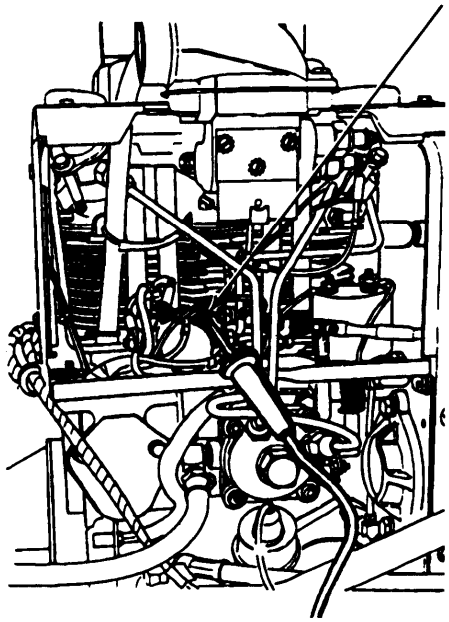
Is continuity indicated?

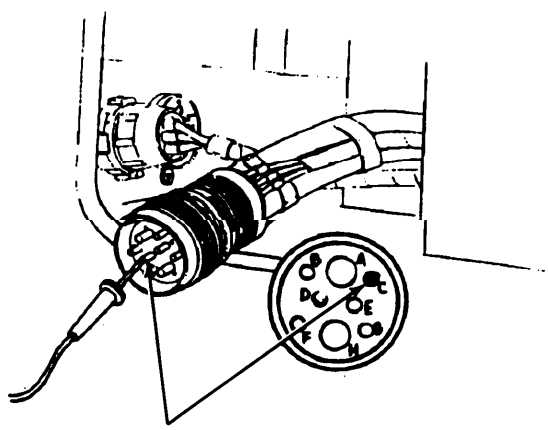
no / yes

Repair wire 65B or replace harness 12329640 (para 18-21). Verify problem is solved.

Notify Direct Support maintenance.

END OF TASK





2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued). (3) ENGINE HARD TO START.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix I)
- Drain pan (Item 14, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)

Personnel Required: Two

Equipment Conditions:
- Move projectile racks to rear of vehicle (refer to TM 9-2350-287-10).
- Remove APU compartment access plate (para 15-39).
- Remove cylinder shroud panel (para 18-14).

A. 1. Place a drain pan under fuel fitters and open drain cocks.

2. With the aid of an assistant turn MASTER switch and APU FUEL SHUT-OFF switch ON (refer to TM 9-2350-287-10).

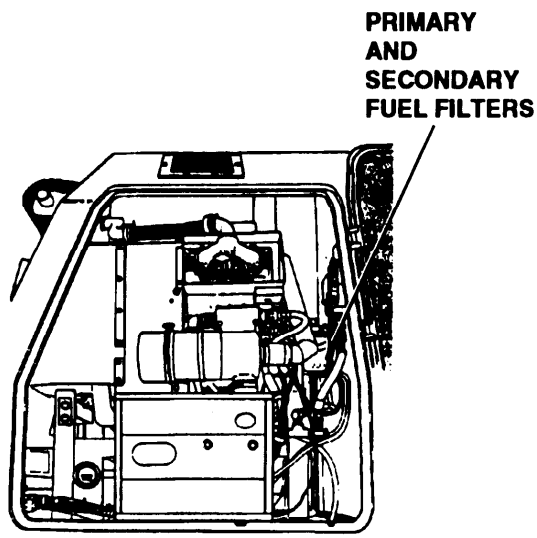
3. Turn MASTER switch and FUEL SHUT-OFF switch OFF (refer to TM 9-2350-287-10).

Is there fuel flow?

no

Troubleshoot engine electrical (para 2-19 d.(3)).

yes



B. 1. Disconnect lead R from glow plugs.

2. Place one multimeter probe on glow plug terminal and other probe on ground.

3. Check for continuity.

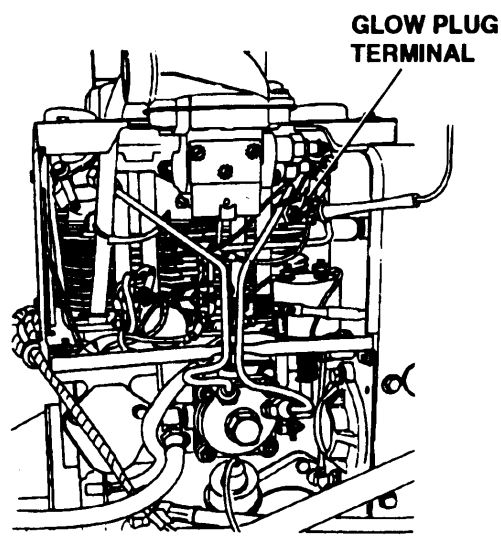
4. Repeat steps 2 and 3 for each glow plug.

Does meter indicate 4.75 ± 1.5 OHMS for each glow plug?

no

Notify Direct Support maintenance.

yes



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2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued). (3) ENGINE HARD TO START (continued).

CONTINUED FROM B

C. 1. Disconnect lead R from preheat solenoid.

2. Place one multimeter probe on lead R at preheat solenoid and other probe on lead R at glow plugs.

3. Check for continuity.

Is continuity indicated?

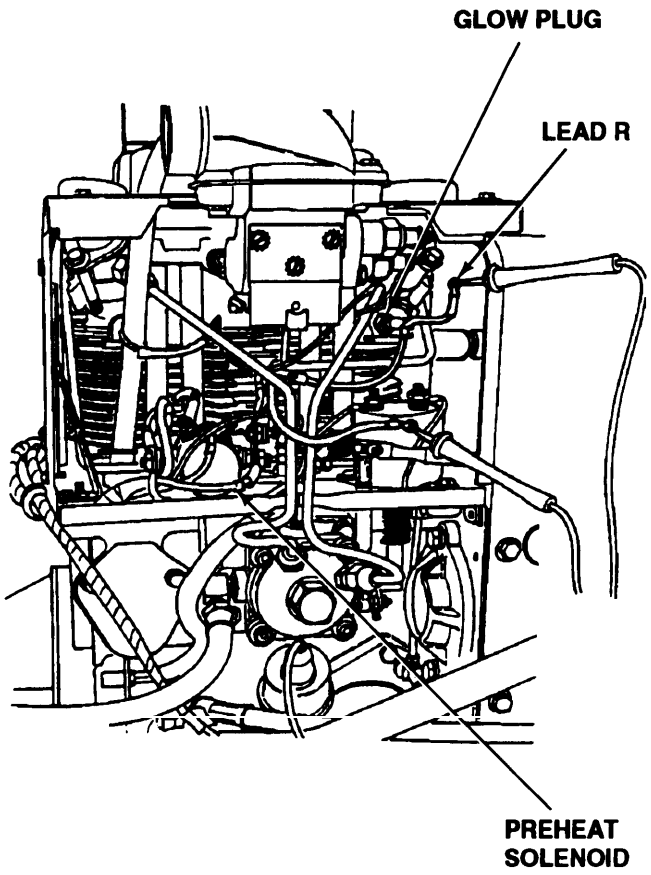
no

Repair lead R or replace harness 11671380-2 (para 18-27). Verify problem is solved.

yes

Notify Direct Support maintenance.

END OF TASK



2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued).

(4) ENGINE STARTS, BUT FAILS TO KEEP RUNNING OR MISFIRES.

Initial Setup:

Tools/Test Equipment:
- Drain pan (Item 14, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Personnel Required: Two

Equipment Conditions:
- Left projectile rack assembly moved to rear of vehicle (refer to TM 9-2350-287-10).
- APU compartment access plate removed (para 15-39).
- Cylinder shroud panel removed (para 18-14).

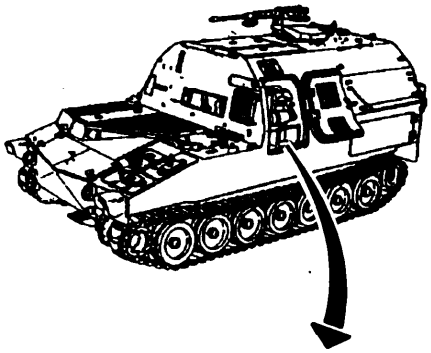
A. Check APU fuel lines for damage or leaks.

Are fuel lines damaged or leaking?

no

yes

Repair or replace unserviceable fuel lines (para 4-5). Verify problem is solved.

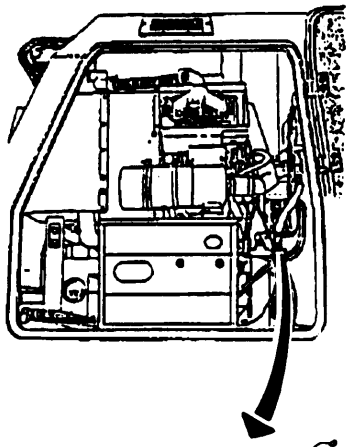


B. 1. Place drain pan under fuel fitter drain hoses and open filter drain cocks.

2. With the aid of an assistant, turn MASTER switch and APU FUEL SHUT-OFF switch ON (refer to TM 9-2350-287-10).

3. Observe fuel flow from drain cocks and check for contaminants in fuel.

4. Turn MASTER switch and APU FUEL SHUT-OFF switch OFF (refer to TM 9-2350-287-10).

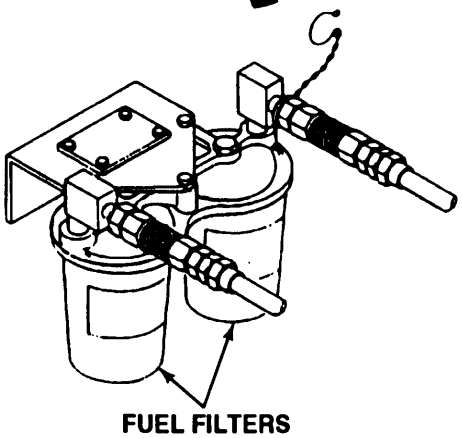


Is fuel flow steady without contaminants?

no

yes

Check and replace fuel filter elements (para 18-11). Verify problem is solved.



FUEL FILTERS

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued).

(4) ENGINE STARTS, BUT FAILS TO KEEP RUNNING OR MISFIRES (continued).

CONTINUED FROM B

C. 1. Close APU fuel fitter drain cocks.

2. Disconnect fuel return line at APU injection pump quick disconnect.

3. Place a drain pan under the APU injection pump.

4. Hold open quick disconnect valve on injection pump.

5. With the aid of an assistant turn MASTER switch and APU FUEL SHUT-OFF switch ON (refer to TM 9-2350-287-10).

6. Observe injection pump for fuel flow.

7. Turn MASTER switch and APU FUEL SHUT-OFF switch OFF (refer to TM 9-2350-287-10).

Is fuel flow steady?

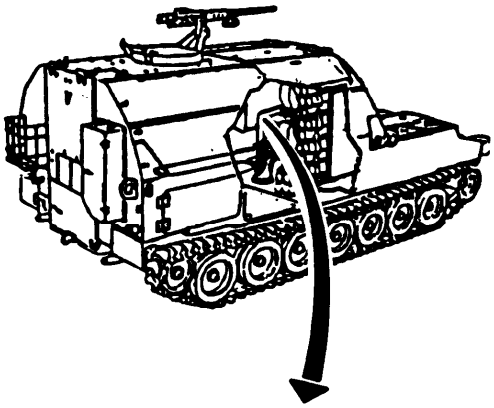
no

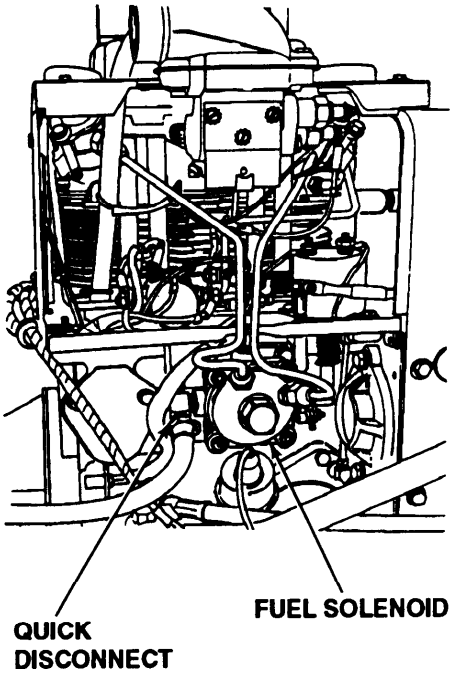
Notify Direct Support maintenance.

yes

Notify Direct Support maintenance

END OF TASK





2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued).	(5) ENGINE OVERHEATS.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Personnel Required: Two

Equipment Conditions:
- APU side door opened (refer to TM 9-2350-287-10).

A. 1. Start the APU (refer to TM 9-2350-287-10).

2. While APU is running, make sure APU fan is rotating.

Is fan operating?

no → **Notify Direct Support maintenance.**

yes →

B. 1. Shut down the APU (refer to TM 9-2350-287-10).

2. If HIGH AIR Temperature light is on after APU engine has cooled, disconnect lead 493 from high air temperature switch on APU engine.

Does HIGH AIR TEMPerature light go out?

no → **Notify Direct Support maintenance.**

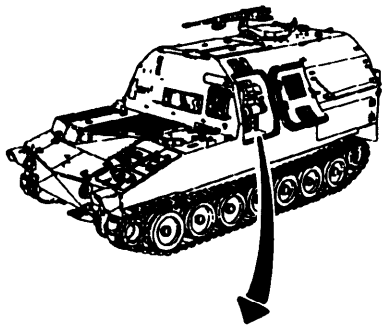
yes →

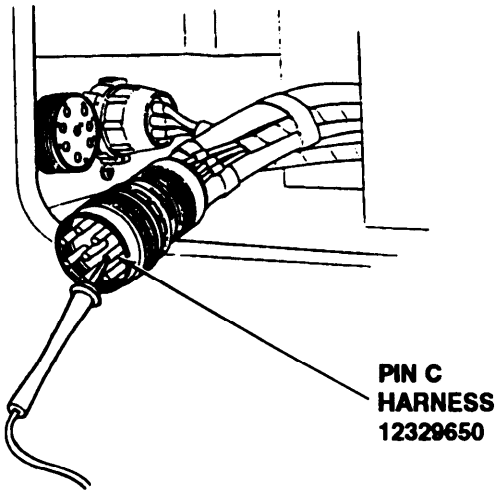
C. Disconnect harness 12329650 connector at APU compartment wall.

2. Using multimeter, check for continuity between lead 493 and pin C of connector.

3. Check for continuity

Is continuity indicated?





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2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued). (5) ENGINE OVERHEATS (continued).

CONTINUED FROM C

no yes

Repair lead 493 or replace harness 12329650 (para 18-22). Verify problem is solved.

D. 1. Connect lead 493 to HIGH AIR Temperature switch.

2. Remove APU control box (para 7-22).

3. Disconnect harness 12330248 connector from APU control box.

4 Using a multimeter check continuity between socket C harness 1233180 at APU wall and pin J at control box connector.

5. Check for continuity.

Is continuity indicated?

no yes

Repair wire 493 or replace harness 12330248. (para 7-71). Verify problem is solved.

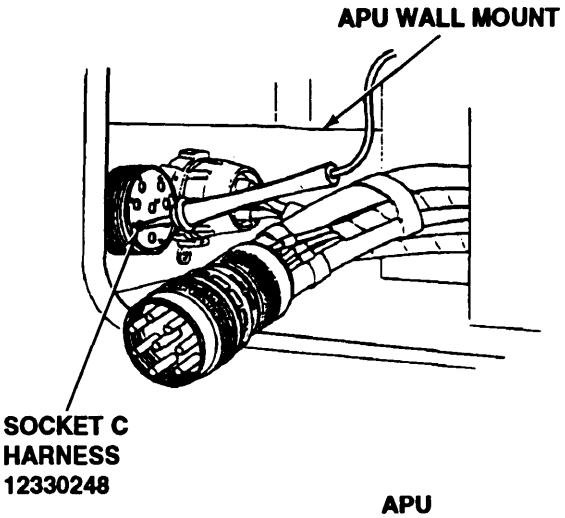
E. 1. Connect harness 12329650 to APU compartment wall.

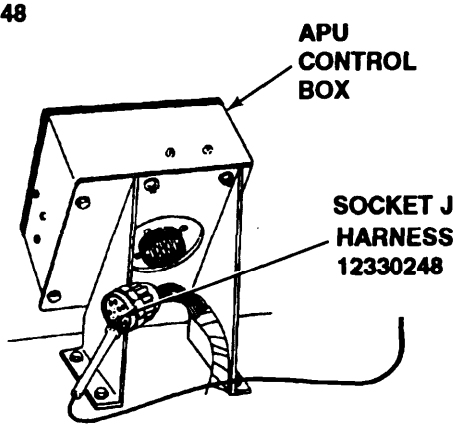
2. Disassemble APU control box (para 7-22).

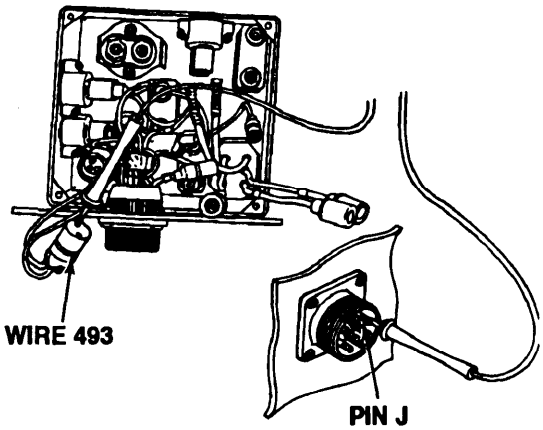
3. Place multimeter red probe in socket J of APU control box connector and black probe in wire 493 connector.

4. Check for continuity.

Is continuity indicated?







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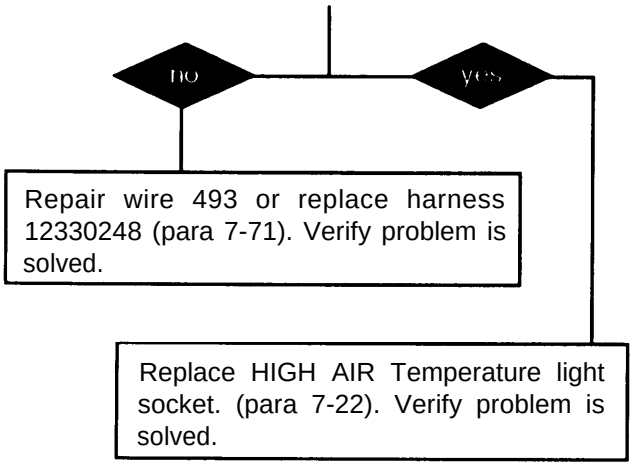
2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued).

(5) ENGINE OVERHEATS (continued).

CONTINUED FROM E



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued).	(6) GENERATOR CHARGING SYSTEM INDICATOR READS IN LOW YELLOW OR RED WITH MAIN ENGINE CHARGING.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)

Personnel Required: Two

Equipment Conditions:
- APU plenum removed (para 18-17).

NOTE

- **Instead of using multimeter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 may be performed.**
- **Instead of using multimeter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.**
- **Activate reset switch on APU voltage regulator prior to performing troubleshooting, and test generator charging system. If condition persists, perform troubleshooting procedure.**
- **Check for APU hydraulic pressure between 100 and 300 psi. If pressure is not between 100 and 300 psi, adjust hydraulic flow regulator. If condition persists, perform troubleshooting procedure.**

A. 1. Disconnect harness 12329640 from APU compartment wall.

2. Disconnect lead 478A and lead 62 from APU starter/generator.

3. Check for continuity between lead 478A and pin H and between lead 62 and pin G.
[Text Deleted]

Is continuity indicated in both circuits?

no

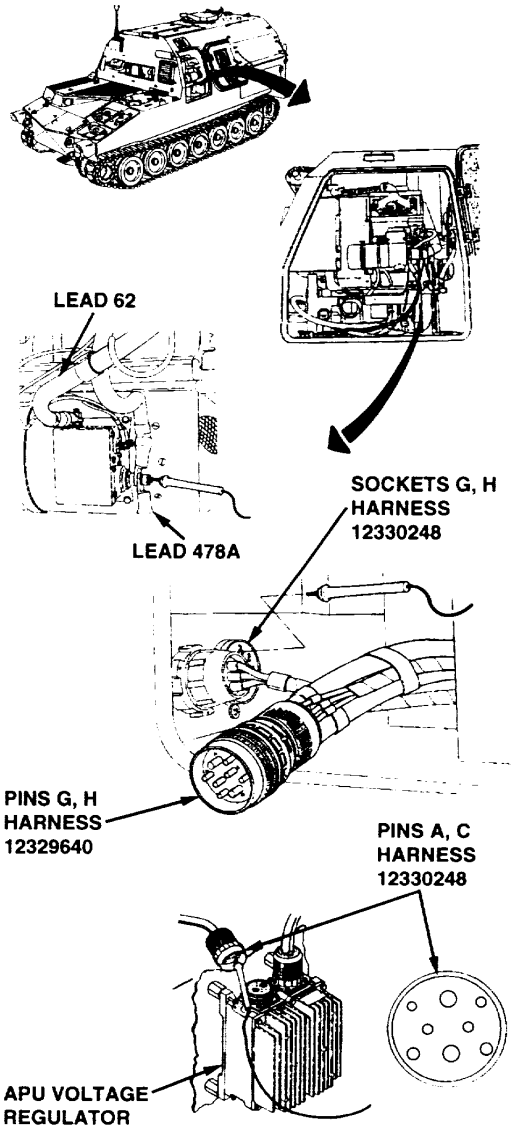
Repair lead 62 and/or lead 478A or replace harness 12329640 (para 18-21). Verify problem is solved.

yes

B. 1. Connect leads 478A and 62 to APU starter/generator.

2. Disconnect harness 12330248 connector from APU voltage regulator.

3. Place multimeter red probe in socket G of harness 12330248 and black probe on pin A of harness 12330248 APU voltage regulator connector.



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2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued).

(6) GENERATOR CHARGING SYSTEM INDICATOR READS IN LOW YELLOW OR RED WITH MAIN ENGINE CHARGING (continued).

CONTINUED FROM B

B. 4. Check for continuity.

5. Place multimeter red probe in socket H of harness 12330248 and black probe on pin C of APU voltage regulator connector.

Is continuity indicated in both circuits?

no

Repair lead 62 and/or lead 478A or replace harness 12330248 (para 7-71). Verify problem is solved.

yes

C. 1. Connect harness12329640 to APU compartment wall connector.

2. Remove APU control box (para 7-22).

3. Disconnect harness12330248 connector from APU control box.

4. Check for continuity between pin F at regulator connector and socket H at control box connector.

[Text Deleted]

Is continuity indicated?

no

Repair lead 61B or replace harness 12330248 (para 7-71). Verify problem is solved.

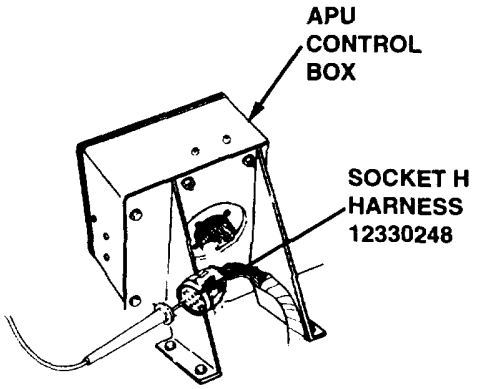
yes

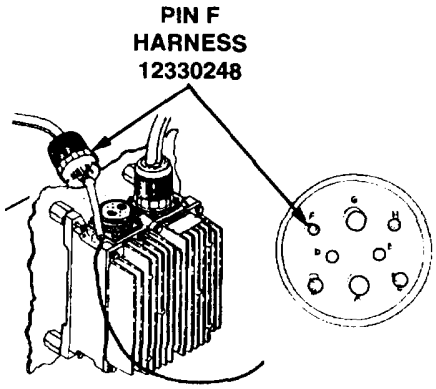
D. 1. Disassemble APU control box (para 7-22).

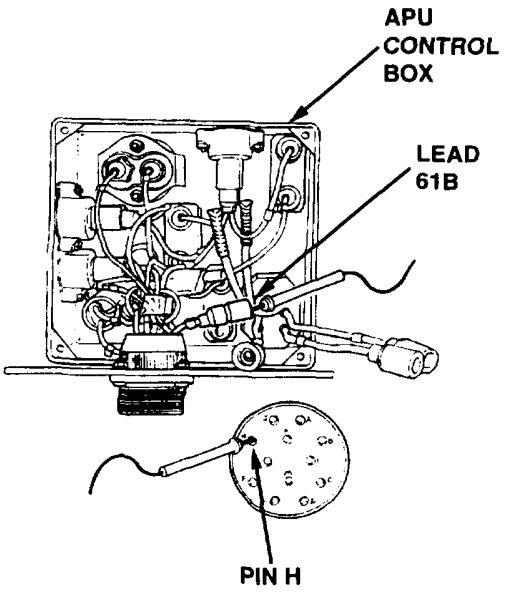
2. Place multimeter red probe in connector 61B and black probe on pin H.

3. Check for continuity.

Is continuity indicated?







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2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued).	(6) GENERATOR CHARGING SYSTEM INDICATOR READS IN LOW YELLOW OR RED WITH MAIN ENGINE CHARGING (continued).

CONTINUED FROM D

no / yes

Repair wire 61B or replace APU controller box (para 7-22). Verify problem is solved.

E. 1. Assemble and install APU control box (para 7-22).

2. Connect harness 12330248 to APU voltage regulator.

3. Operate APU with APU Generator switch ON (refer to TM 9-2350-287-10).

4. Place red probe of multimeter on terminal 62 at battery compartment and black probe to ground.

5. Check for 24 to 28 vdc.

6. Turn APU OFF (refer to TM 9-2350-287-10).

Is voltage between 24 and 28 vdc?

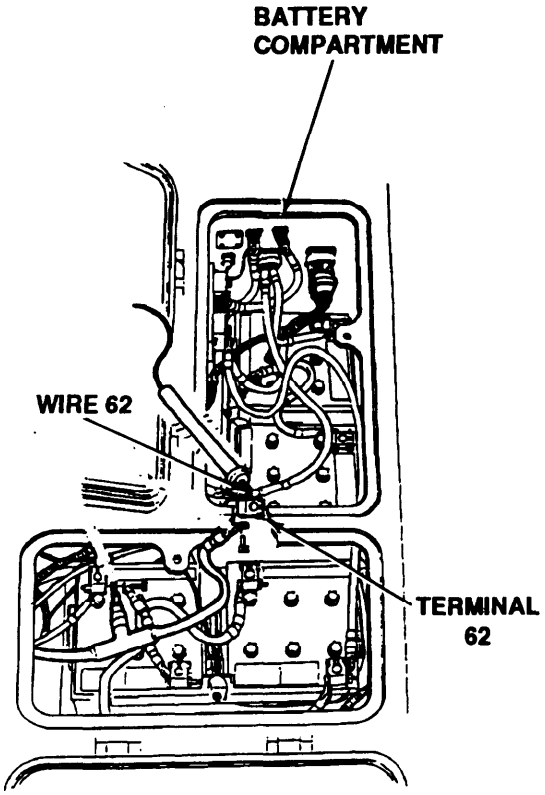
no / yes

Replace APU voltage regulator (para 7-15). Verify problem is solved.

F. 1. Operate APU with APU GENerator switch ON (refer to TM 9-2350-287-10).

2. Place red probe of multimeter on terminal B of APU starter/generator and black probe to ground.

3. Check for 24 to 28 vdc.



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2-19. TROUBLESHOOTING CHART (continued).

u. AUXILIARY POWER UNIT (continued).

(6) GENERATOR CHARGING SYSTEM INDICATOR READS IN LOW YELLOW OR RED WITH MAIN ENGINE CHARGING (continued).

CONTINUED FROM F

F. 5. Turn APU OFF (refer to TM 9-2350-287-10).

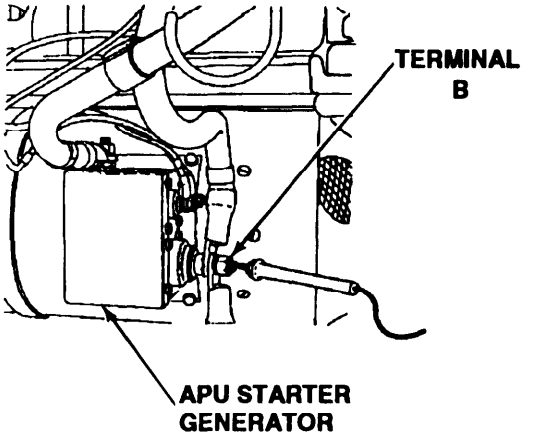
Is voltage between 24 to 28 vdc?

no

Replace APU starter/generator (para 18-16). Verify problem is solved.

yes

Troubleshoot battery gage (para 2-19. g. (8)).

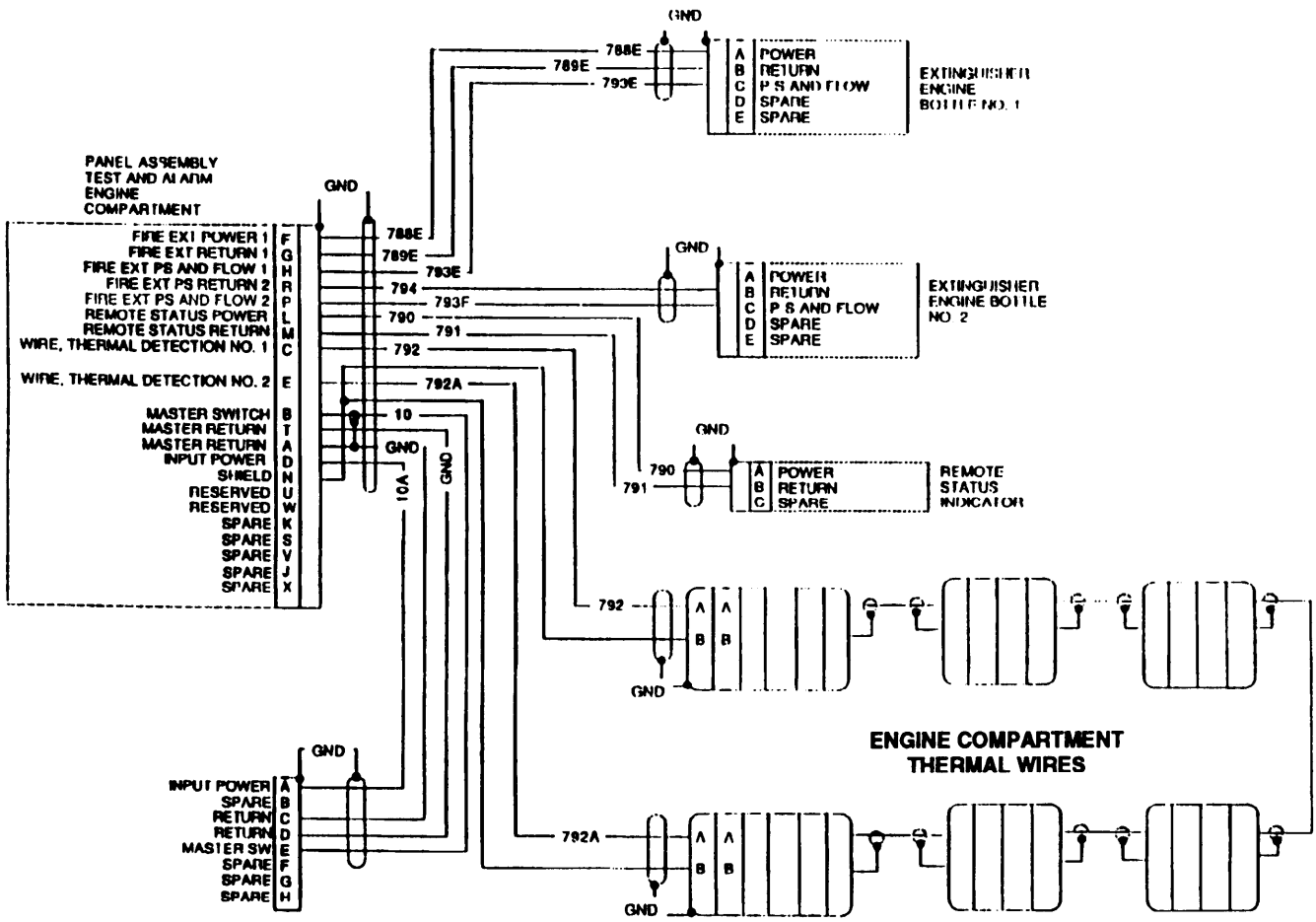


END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

v. AFES, ENGINE.

The Automatic Fire Extinguisher System (AFES) is an automatic electrical system that when actuated, provides fire extinguishing capability for the engine compartment. It consists of a TEST/ALARM panel, sensors, and associated electrical wiring harnesses. Automatic electrical operation will sense fires and discharge halon fire extinguishers to put out any fires. This system will not activate unless the engine TEST/ALARM panel maintenance switch is in the horizontal power-on position. A manual discharge backup to the electrical system enables the operator to manually discharge engine compartment fire extinguishers when the automatic system fails to function or does not completely extinguish the fire.



2-19. TROUBLESHOOTING CHART (continued).

v. AFES, ENGINE (continued).	(1) POWER ON LAMP DOES NOT LIGHT WHEN MASTER SWITCH IS ON. All other electrical system operate.

Initial Setup:

Tools/Test Equipment:
- Digital mltimeter (DMM) (Item 13, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Engine AFES Test/Alarm panel MAINT switch in maintenance position (para 21 -2).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multimeter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A.

WARNING

Turn Engine T/A panel MAINT switch to vertical position and MASTER switch OFF before disconnecting any electrical wiring harnesses. Failure to comply may result in discharge of fire extinguisher cylinders, electrical shock and injury to personnel.

1. Disconnect wiring harness 12352354 connector P1 from Engine T/A panel.

2. Place red lead of multimeter in socket D and ground black lead of multimeter.

3. Check for 24 ± 3 vdc.

Is voltage indicated?

NO — YES

GO TO STEP F

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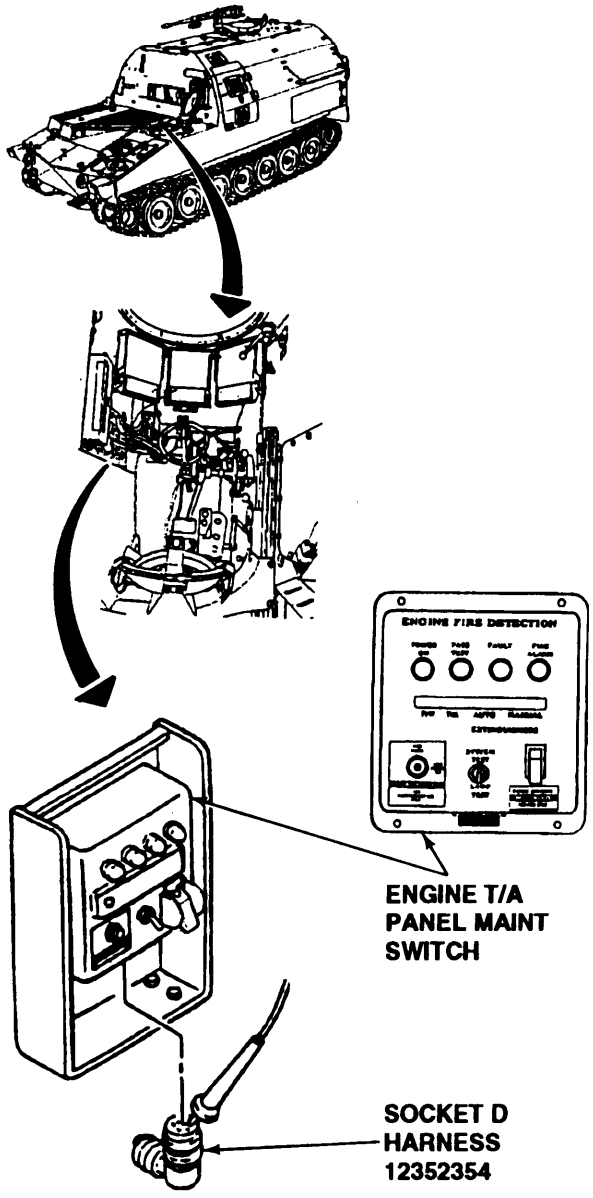


2-19. TROUBLESHOOTING CHART (continued).

v. AFES, ENGINE (continued).	(1) POWER ON LAMP DOES NOT LIGHT WHEN MASTER SWITCH IS ON. All other electrical systems operate (continued).

B. 1. Connect wiring harness 12352354 connector P1 to Engine T/A panel.

2. Disconnect wiring harness 12352354 connector P7 from bracket-mounted socket of harness 12351461.

3. Place red lead of multimeter in socket A of harness 12351461 and ground black lead of muttimeter.

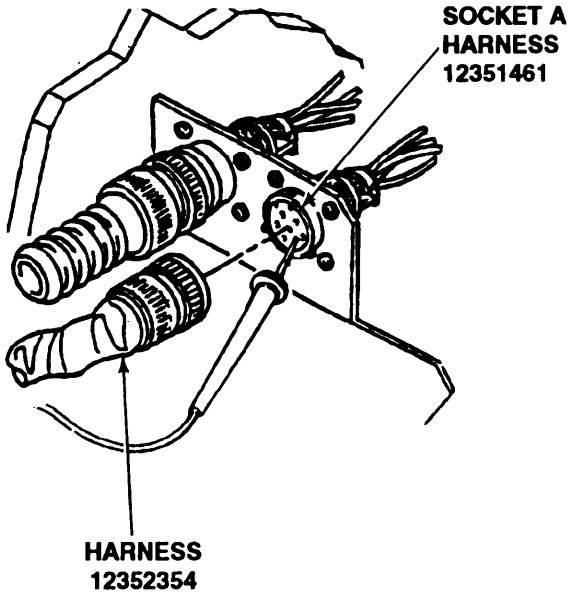
4. Check for 24 ± 3 vdc.

Is voltage indicated?

no

yes

Repair wire 10A or replace wiring harness (para 7-78). Verify problem is solved.



C.

WARNING

Circuit 10A, if functioning properly, is a live circuit carrying a constant 24 volts. Failure to comply with this precaution when working with this circuit may result in personal injury or damage to equipment.

1. Connect wiring harness 12352354 P7 to bracket-mounted socket of wire harness 12351461.

NOTE

Circuit breaker panel 2 is located on the sponson directly behind the engine T/A panel.

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

v. AFES, ENGINE (continued).	(1) POWER ON LAMP DOES NOT LIGHT WHEN MASTER SWITCH IS ON. All other electrical systems operate (continued).

CONTINUED FROM C

C. 2. Disconnect wiring harness 12351461, wire 10A from circuit breaker No. 6 on circuit breaker panel No. 2.

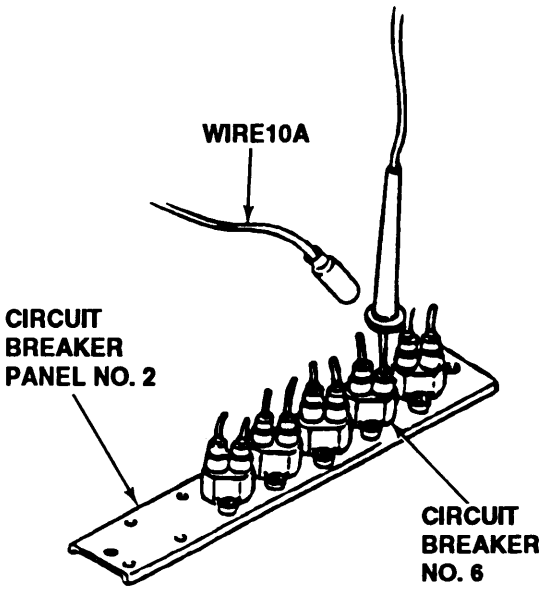
3. Place red lead of multimeter in circuit breaker socket and ground black lead of multimeter.

4. Check for 24 ± 3 vdc.

Is voltage indicated?

no — Repair wire 10A or replace wiring harness 12351461 (para 7-79). Verify problem is solved.

yes



D. Connect wiring harness 12351461, wire 10A to circuit breaker No. 6 on circuit breaker panel No. 2.

2. Disconnect wiring harness 12351754 wire 10 from circuit breaker No. 6 on circuit breaker panel No. 2.

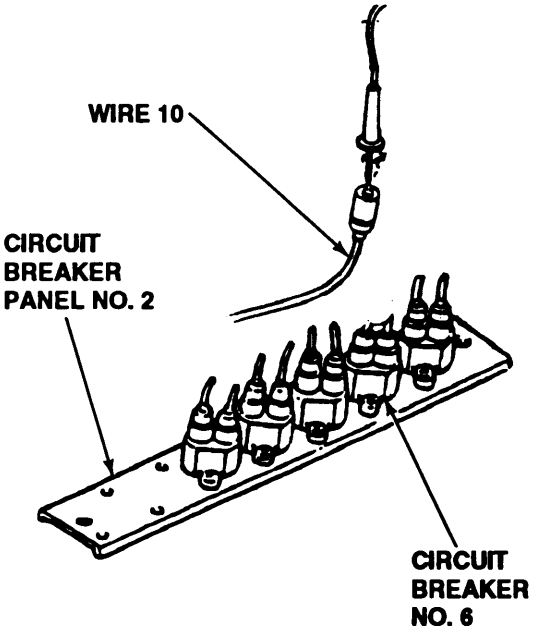
3. Place red lead of multimeter in wire 10 connector and ground black lead of multimeter.

4. Check for 24 ± 3 vdc.

Is voltage indicated?

no — Replace circuit breaker No. 6 (para 7-11). Verify problem is solved.

yes



E. 1. Connect wiring harness 12351754 wire 10 connector to circuit breaker No. 6 on circuit breaker panel No. 2.

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2-19. TROUBLESHOOTING CHART (continued).

v. AFES, ENGINE (continued).	(1) POWER ON LAMP DOES NOT LIGHT WHEN MASTER SWITCH IS ON. All other electrical systems operate (continued).

CONTINUED FORM E

E. 2. Disconnect wiring harness 12260287 from bulkhead connector.

3. Place red lead of multimeter in bulkhead connector socket S of wiring harness 12268418-1 and ground black lead of multimeter.

4. Check for 24 ± 3 vdc.

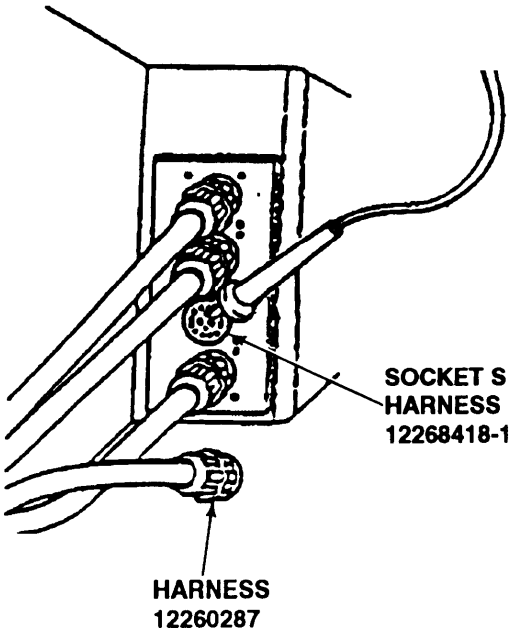
Is voltage indicated?

no

Repair wire 415 or replace wiring harness 12268418-1 (para 7-44). Verify problem is solved.

yes

Repair wire 415 or replace wiring harness 12260287 (para 7-56). Verify problem is solved.



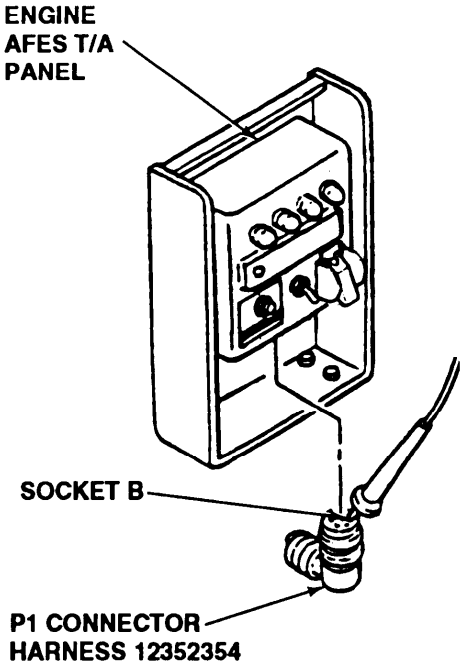
CONTINUED FROM A

F. 1. Place red lead of multimeter in socket B of wiring harness 12352354 connector P1 and ground black lead of multimeter.

2. Turn MASTER switch ON (refer to TM 9-2350-287-10).

3. Check for 24 ± 3 vdc.

4. Turn MASTER switch OFF (refer to TM 9-2350-287-10).



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2-19. TROUBLESHOOTING CHART (continued).

v. AFES, ENGINE (continued).	(1) POWER ON LAMP DOES NOT LIGHT WHEN MASTER SWITCH IS ON. All other electrical systems operate (continued).

CONTINUED FROM F

Is voltage indicated?

no → Replace engine AFES T/A panel (para 21-13). Verify problem is solved.

yes

G. 1. Connect wiring harness 12352354 connector P1 to engine T/A panel.

2. Disconnect wiring harness 12352354 connector P7 from bracket-mounted connector of wiring harness 12351461.

3. Place red lead of multimeter in socket E of wiring harness 12351461 and ground black lead of multimeter.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Check for 24 ± 3 vdc.

5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

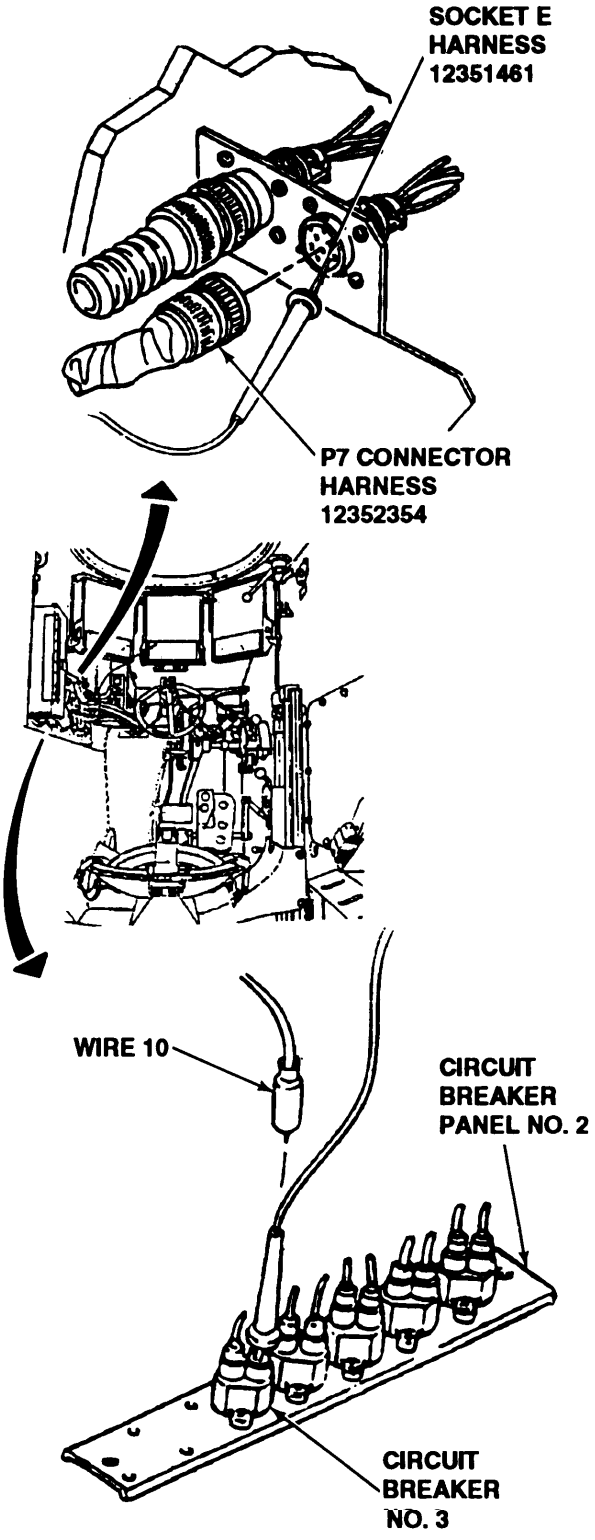
Is voltage indicated?

no → Repair wire 10 or replace wiring harness 12352354 (para 7-78). Verify problem is solved.

yes

H. 1. Connect wiring harness 12352354 connector P7 to bracket-mounted connector of wiring harness 12351461.

2. Disconnect wiring harness 12351461, wire 10, from circuit breaker No. 3 on circuit breaker panel No. 2.



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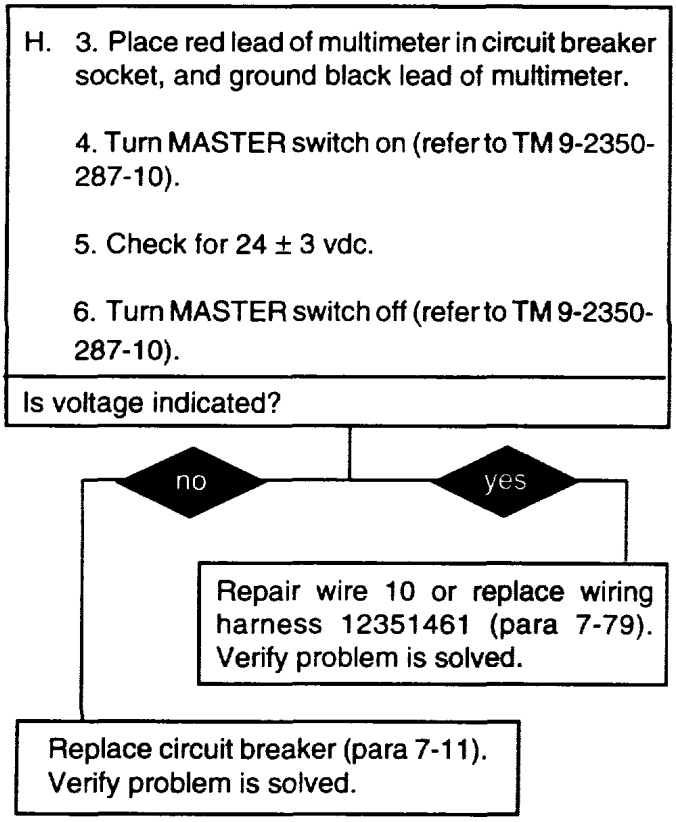
2-19 TROUBLESHOOTING CHART (continued).

v. AFES, ENGINE (continued).	(1) POWER ON LAMP DOES NOT LIGHT WHEN MASTER SWITCH IS ON. All other electrical systems operate (continued).

CONTINUED FROM H



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

v. AFES, ENGINE (continued).	(2) FIRE WIRE (F/W) LED REMAINS ON, NO FIRE PRESENT

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (Item 13, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Cleaning compound (Item 14, Appendix D)

Equipment Conditions:
- Transmission doors open (refer to TM 9-2350-287-10).
- Forward battery box open (refer to TM 9-2350-287-10).
- Air intake grille opened and secure (refer to TM 9-2350-287-10).
- Engine AFES test and alarm panel MAINT switch in maintenance position (para 21-2).

A. **CAUTION**

Digital multimeter (DMM) must not be operated any longer than necessary to obtain a reading. Misleading improvements in resistance readings could result.

NOTE

- **Use a DMM for the following tests. Do not use a standard volt/ohm meter (VOM). The VOM's method of operation will not give accurate readings.**
- **Sixty-inch elements are installed at the underside of engine deck, above engine.**

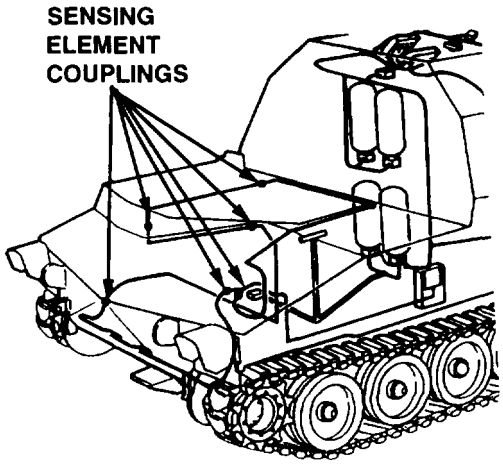
1. Disconnect all fire sensing element couplings (para 21-10).

2. Check all connections for dirt and grease. Clean with cleaning compound.

3. Using a multimeter, measure resistance between center and outer sheath of each of five sensing elements and six couplings separately.

4. Resistance of each item must be greater than 1 megohm.

Are any components defective?



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2-19 TROUBLESHOOTING CHART (continued).

v. AFES, ENGINE (continued).

(2)FIRE WIRE (F/W) LED REMAINS ON, NO FIRE PRESENT (continued).

CONTINUED FROM STEP A

yes / no

Replace defective components (paras 21-4 and 21-10). Verify problem is solved.

B. 1. Connect all couplings except the two couplings that connect to the elbows in the battery compartment.

2. Place red multimeter probe in the center of one fire wire and the black probe in the center of the other.

3. Check resistance.

Is resistance between 95 and 180.5 ohms?

yes / no

Replace engine AFES T/A panel (para 21-13). Verify problem is solved.

C. **NOTE**

Use a DMM with range greater than 1 megohm.

1. Place black probe on center wire and red probe on outer sheath of thermal sensing elements loop.

2. Check for resistance.

Is resistance 1 megohm or greater?

yes / no

Replace engine AFES T/A panel (para 21-13). Verify problem is solved.

D. **NOTE**

Sixty-inch elements are installed at the underside of engine deck, above engine.

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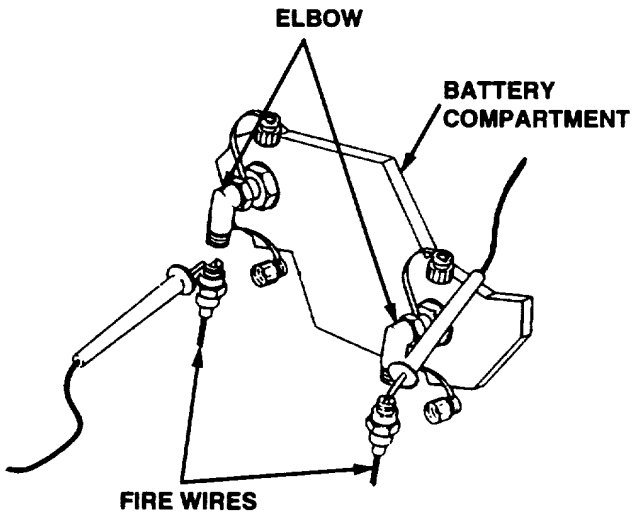
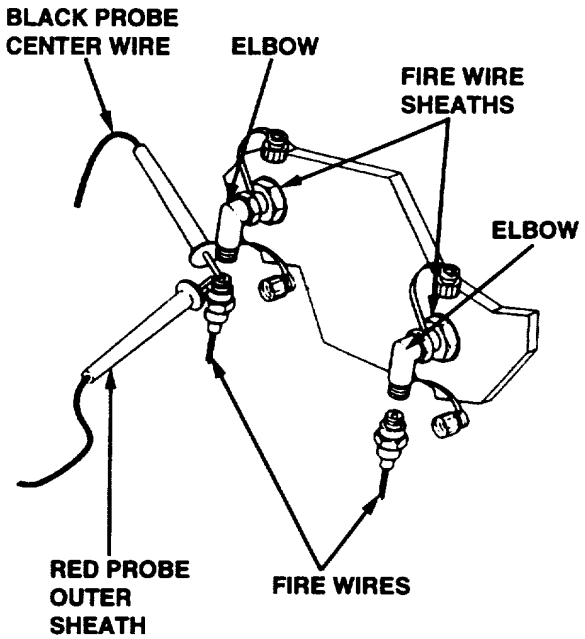




2-19. TROUBLESHOOTING CHART (continued).

v. AFES, ENGINE (continued).

(2) FIRE WIRE (F/W) LED REMAINS ON, NO FIRE PRESENT (continued).

CONTINUED FROM STEP D

D. 1. Disconnect all five sensing elements (paras 21-9 and 21-10).

2. Place red probe of digital multimeter (DMM) on center wire of sensing element, and place black probe on opposite end of center wire.

3. Record resistance.

4. Repeat steps 2 and 3 for all five sensing elements and six coupings.

Sensing Element Length	MIN ohms	MAX ohms
150"	25.0	37.5
60"	10.0	30.5
Coupling	0.0	1.0

Are components within specifications?

yes

no

Replace defective components (para 21-9 and/or 21-10). Verify problem is solved.

E. 1. Connect all elements and ensure connections are secure.

2. Trace route of sensing elements. Ensure there are no kinks or bends in sensing elements.

3. Ensure rear sensing element is clear of personnel heater exhaust by 3/4 of an inch minimum.

Are sensing elements properly routed?

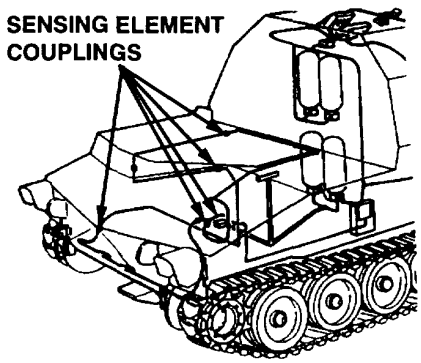
yes

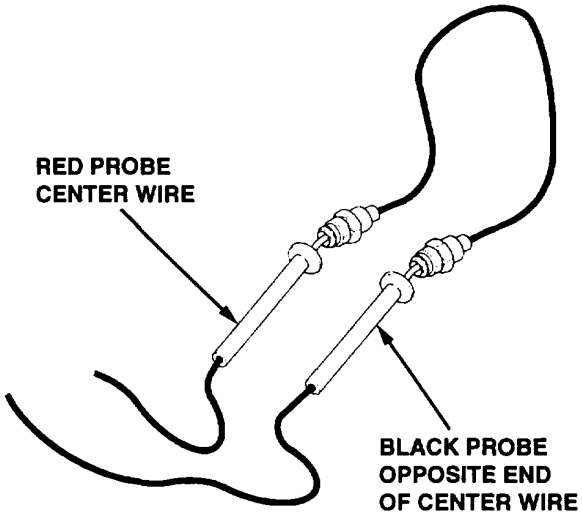
no

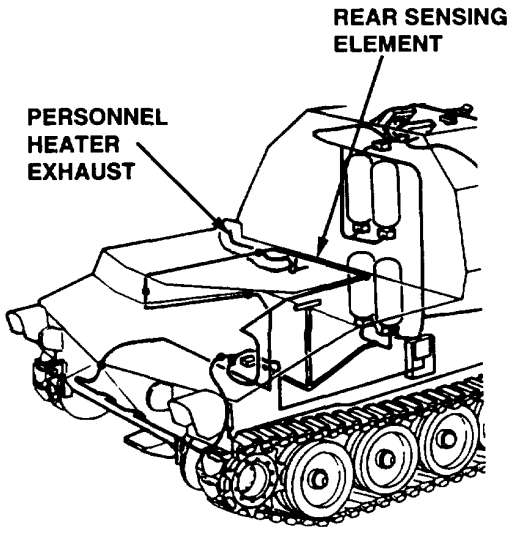
Correct proper routing (para 21-10). Verify problem is solved.

Repeat steps C and D. Verify problem is solved.

END OF TASK







2-19. TROUBLESHOOTING CHART (continued).

v. AFES, ENGINE (continued) (3) FAULT LAMP REMAINS ON. AUTO LED IS LIT.

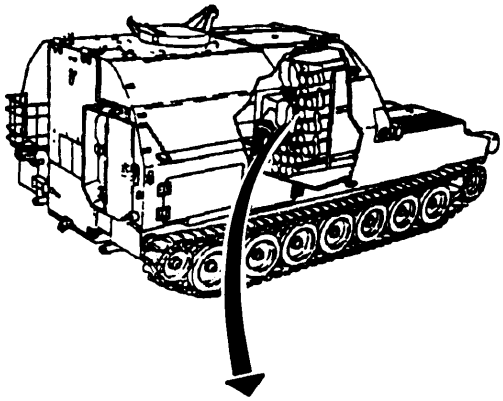
Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)

Equipment Conditions:
- Left projectile rack moved to rear of vehicle (refer to TM 9-2350-287-10).
- Engine AFES Test/Alarm panel MAINT switch in maintenance position (para 21 -2).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.



A. 1. Check for protruding flow indicator of valve actuator of engine fire extinguisher no. 1.

2. Check pressure gage of engine fire extinguisher no. 1 and make sure black needle is on green temperature wedge.

Is pressure gage in the correct position and flow indicator is not protruding from valve?

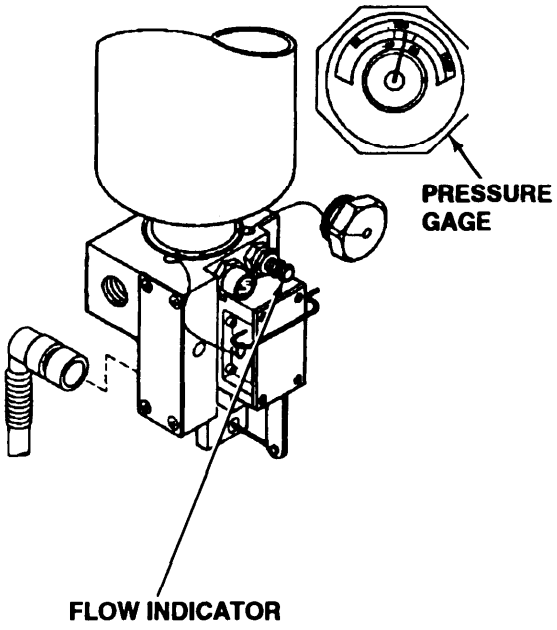
no

If flow indicator is protruding, reset flow indicator of valve actuator by pushing into valve body. If pressure is low, replace engine extinguisher no. 1. Verify problem is solved.

yes

B. **WARNING**

Make sure that engine T/A panel Maintenance switch is in the vertical position. Failure to comply may result in cylinder discharge.



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2-19. TROUBLESHOOTING CHART (continued).

v. AFES, ENGINE (continued)

(3) FAULT LAMP REMAINS ON, AUTO LED IS LIT (continued).

CONTINUED FROM B

B. 1. Disconnect harness 12352354 connector P1 from engine AFES T/A panel, and disconnect connector P2 from valve actuator of engine fire extinguisher cylinder bottle no. 1.

2. Check continuity as follows:

T/A Panel Connector P1	Extinguisher Connector P2
Pin F (788E)	Pin A (GND)
Pin G (789E)	Pin B (10)
Pin H (798E)	Pin C (792)

Is there continuity in all circuits?

no

Repair or replace wire harness 12352354 (para 7-78). Verify problem is solved.

yes

C. 1. Connect harness 12352354 to engine T/A panel.

2. Place red probe of multimeter on pin A and black probe on pin B of engine fire extinquister no. 1 connector.

3. Check for continuity.

4. Place red probe of multimeter on pin B and black probe on pin C of engine extinguisher no. 1 connector.

5. Check for continuity.

Is continuity indicated?

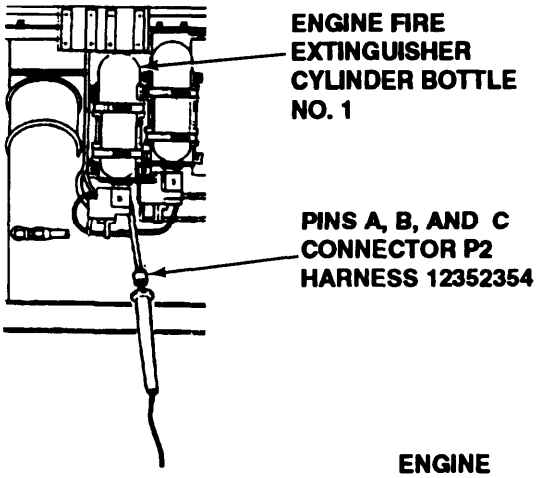
no

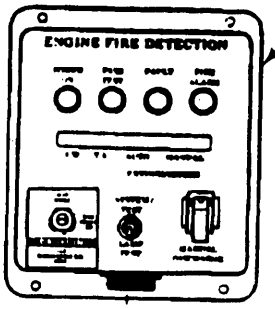
Replace engine fire extinguisher cylinder bottle no. 1 (para 21-4). Verify problem is solved.

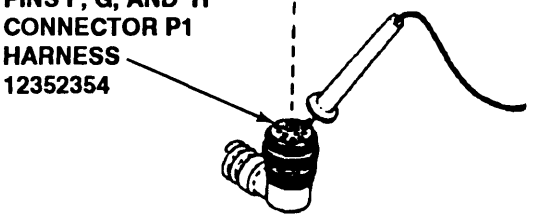
yes

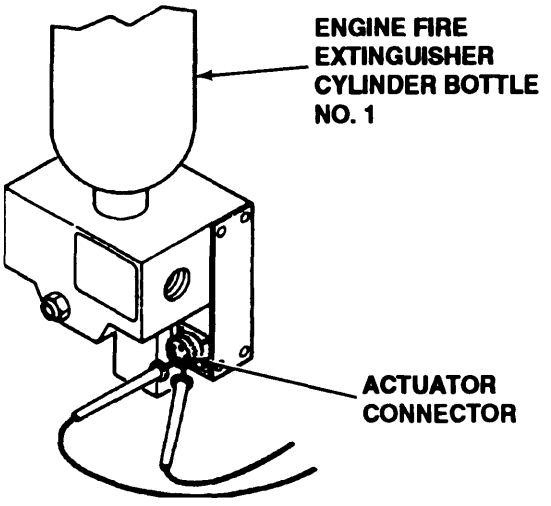
Replace engine AFES T/A panel (para 21-13). Verify problem is solved.

END OF TASK









2-19. TROUBLESHOOTING CHART (continued).

v. AFES, ENGINE (continued).	(4) FAULT LAMP REMAINS ON, MANUAL LED IS LIT.

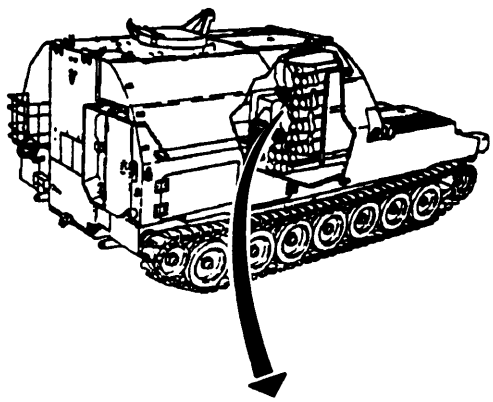
Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)

Equipment Conditions:
- Left and right projectile rack moved to rear of vehicle (refer to TM 9-2350-287-10).
- Engine AFES Test/Alarm panel MAINT switch in maintenance position (para 21 -2).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 may be performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.



A. 1. Check for protruding flow indicator of valve actuator of engine fire extinguisher cylinder bottle no. 2.

2. Loosen clamps and remove ventilation duct hose (para 16-2).

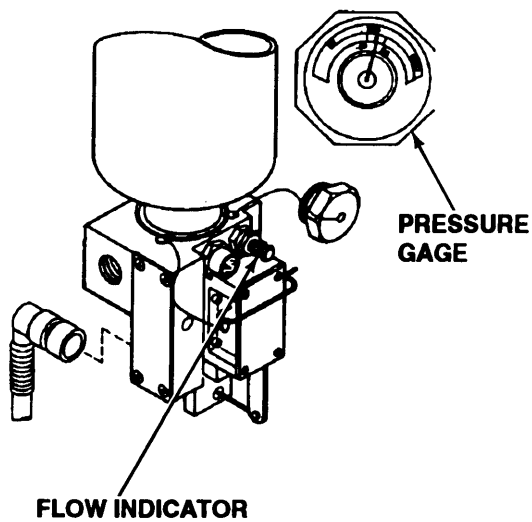
3. Check pressure gage of engine fire extinguisher cylinder bottle no. 2 to make sure black needle of the gage is in green temperature wedge.

Is pressure gage in the correct position and flow indicator not protruding from valve?

no

If flow indicator is protruding, reset flow indicator by pushing it into the valve body. If pressure is low, replace engine extinguisher cylinder bottle no. 2 (para 21-4). Verify problem is solved,

yes



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2-19. TROUBLESHOOTING CHART (continued).

v. AFES, ENGINE (continued). (4) FAULT LAMP REMAINS ON, MANUAL LED IS LIT (continued).

CONTINUED FROM A

B. 1. Disconnect harness 12352354 connector P1 from engine AFES T/A panel and plug P3 from valve actuator of engine fire extinguisher cylinder bottle no. 2.

2. Check continuity as follows:

T/A Panel Connector P1	Extinguisher Connector P3
Pin R (794)	Pin B (794)
Pin P (793F)	Pin C (793F)

Is there continuity in all circuits?

no → Repair or replace harness 12352354 (para 7-78). Verify problem is solved.

yes →

C. 1. Reconnect harness 12352354 to engine AFES T/A panel.

2. Place multimeter red probe on pin B and the other lead on pin C of engine fire extinguisher cylinder bottle no. 2 actuator socket.

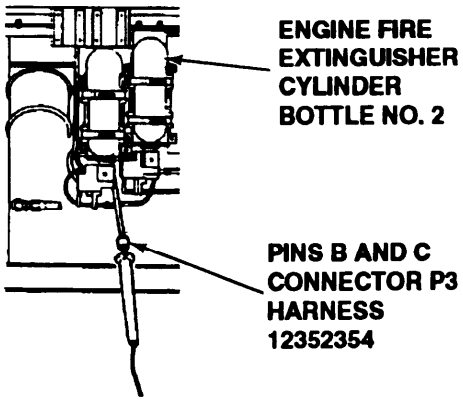
3. Check for continuity.

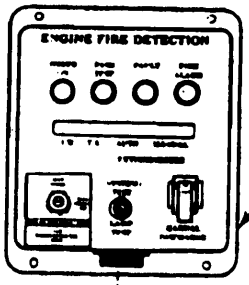
Is continuity indicated?

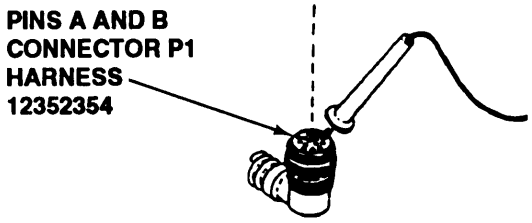
no → Replace engine AFES T/A panel (para 21-13). Verify problem is solved.

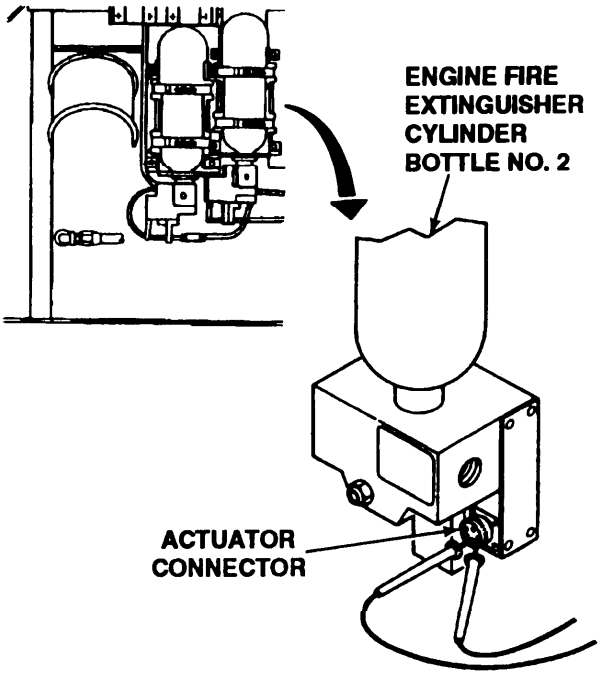
yes → Replace engine fire extinguisher cylinder bottle no. 2 (para 21-4). Verify problem is solved.

END OF TASK









2-19. TROUBLESHOOTING CHART (continued).

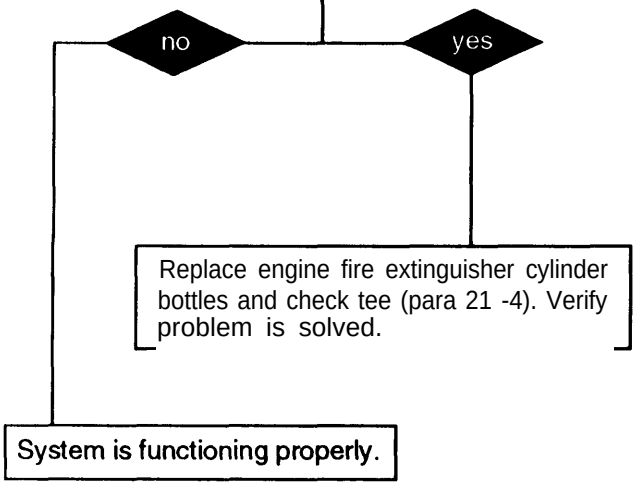
v. AFES, ENGINE (continued).	(5) BOTH ENGINE BOTTLES DISCHARGE WHEN MANUAL SWITCH ON ENGINE AFES T/A PANEL IS ACTIVATED.

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix 1)

Equipment Conditions:
- Left and right projectile rack assemblies moved to rear of vehicle (refer to TM 9-2350-287-10).
- Engine AFES Test/Alarm panel MAINT switch in maintenance position (para 21 -2).

A. Do both engine bottles discharge when manual discharge switch or pull cable at engine T/A panel is activated?



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

v. AFES, ENGINE (continued). (6) BOTTLES NOT DISCHARGING WHEN PULLING MANUAL CABLES.

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Equipment Conditions:
- Left and right projectile rack assemblies moved to rear of vehicle (refer to TM 9-2350-287-10).
- Engine AFES Test/Alarm panel MAINT switch in maintenance position (para 21-2).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. Ensure locking pin on engine fire extinguisher no. 2 is in the stowed position.

Is pin in stowed position?

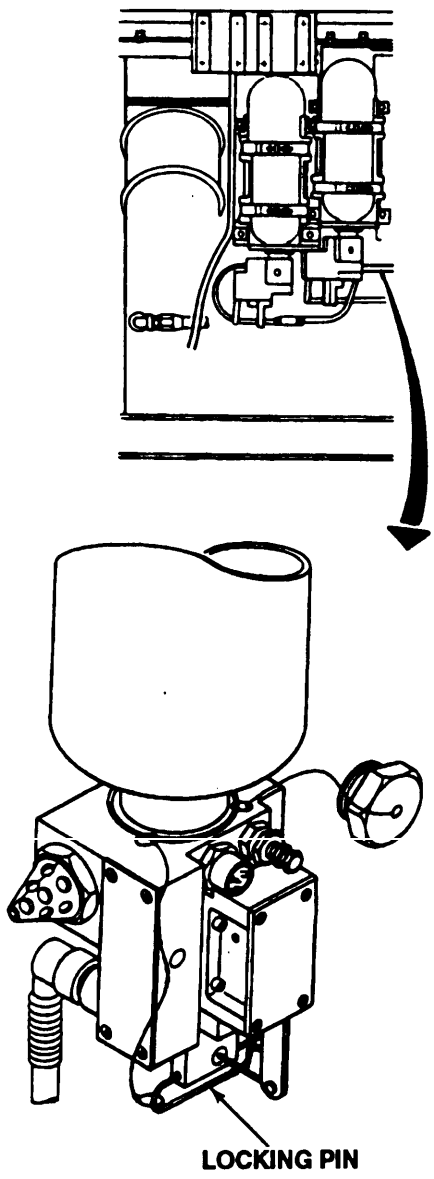
no

Correctly install locking pin in stowed position.

yes

Check adjustments of cables (para 21-16).

END OF TASK



2-19. TROUBLESHOOTING CHART (continued).

v. AFES, ENGINE (continued).

The FAASV Automatic Fire Extinguishing System (AFES) Troubleshooting Aid is a test box and set of seven connecting cables, developed by HTL, to assist the FAASV user in troubleshooting the FAASV AFES. Using the troubleshooting aid allows testing of both the crew and engine subsystems individually without the fear of accidental discharge of fire extinguishers. This is accomplished by disconnecting the FAASV's installed fire extinguishers from the AFES and substituting "dummy" simulation fire extinguishers contained within the test box. Use of the troubleshooting aid speeds faultfinding and helps achieve a more accurate fault diagnosis by allowing maintenance personnel to take measurements at the test box. The troubleshooting aid allows the user to isolate an AFES problem without moving the projectile racks, saving considerable time and effort. The troubleshooting aid should be used in conjunction with TM 9-2350-287-20-1 and TM 9-2350-287-20-2 as the technical manual is used for reference in the following troubleshooting procedure.

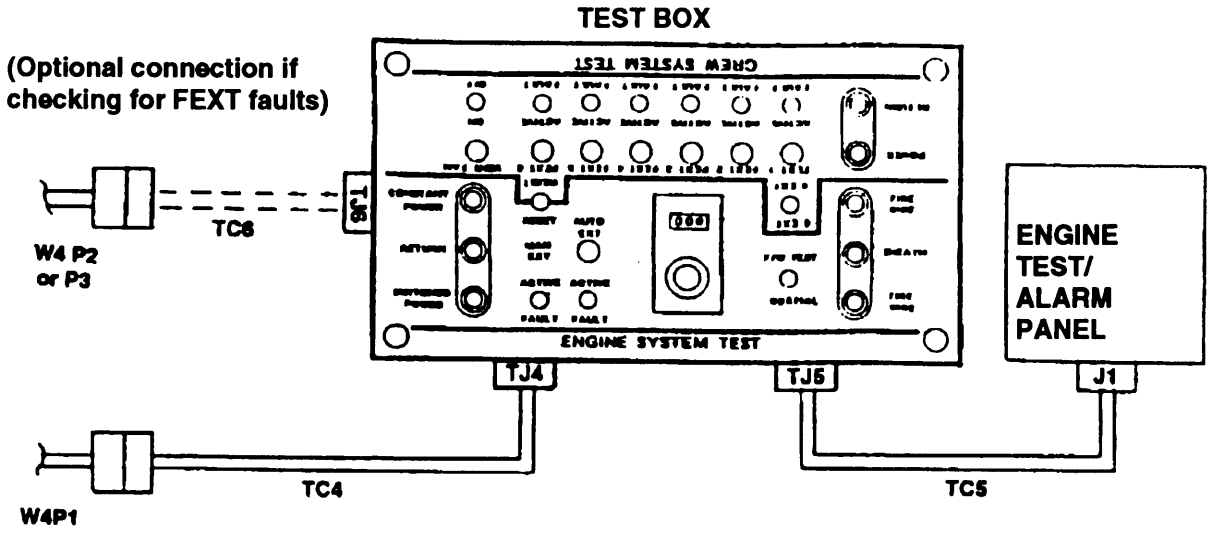


FIGURE 2
ENGINE COMPARTMENT TEST SETUP

2-19. TROUBLESHOOTING CHART (continued).

v. AFES, ENGINE (continued).	(7) AFES MEGOMETER TROUBLESHOOTING PROCEDURES

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- Megometer kit (Item 37, Appendix 1)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Engine AFES Test/Alarm panel MAINT switch in maintenance position (para 21-2).
- AFES fire extinguisher bottle harnesses disconnected (para 7-78).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. 1. Make sure the green POWER ON lamp is off, indicating the power has been removed from the AFES.

2. Connect the test box to engine AFES T/A panel and wire harness 12352354 connector using test cables TC4 and TC5.
3. Set the test box switches as follows:

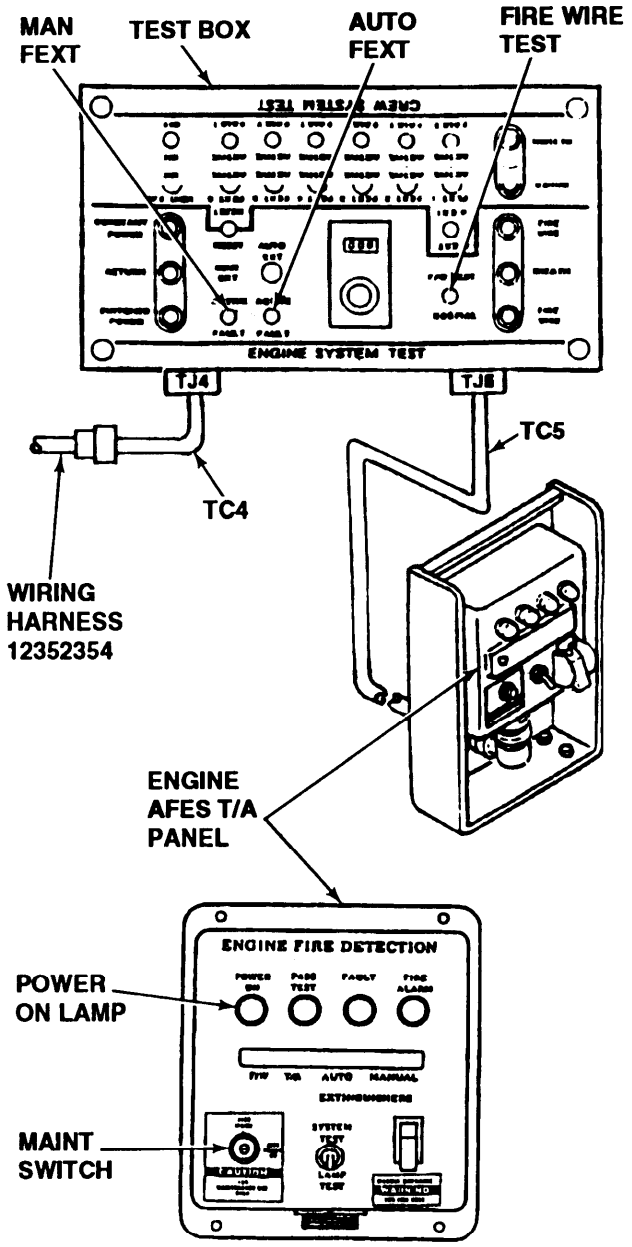
a. FIREWIRE TEST to NORMAL
b. AUTO FEXT to ACTIVE
c. MAN FEXT to ACTIVE

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Turn the engine AFES T/A panel Maintenance switch to the horizontal position and check to see that the green POWER ON lamp is on, indicating that the AFES is powered and fully operational.

6. observe the test box leds.

Are any of the red LED's on the test box illuminated?



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2-19. TROUBLESHOOTING CHART (continued).

v. AFES, ENGINE (continued).

(7) AFES MEGOMETER TROUBLESHOOTING PROCEDURES (continued).

CONTINUED FROM A

no

yes

Press the RESET switch on the test box and go to step B.

B. Use a multimeter and check for voltage at the ENGINE SYSTEM POWER on the test box in the CONSTANT and SWITCHED power jacks.

Does multimeter indicate between 22 and 28 vdc for both checks?

no

yes

Refer to para 2-19.a(2) - (5) per applicable fault LED. Verify problem is solved.

C. 1. Run a system test by pressing the engine AFES T/A panel toggle switch to SYSTEM TEST and releasing.

2. If yellow FAULT lamp illuminates, observe the red LEDs for fault isolation.

Does FAULT lamp illuminate?

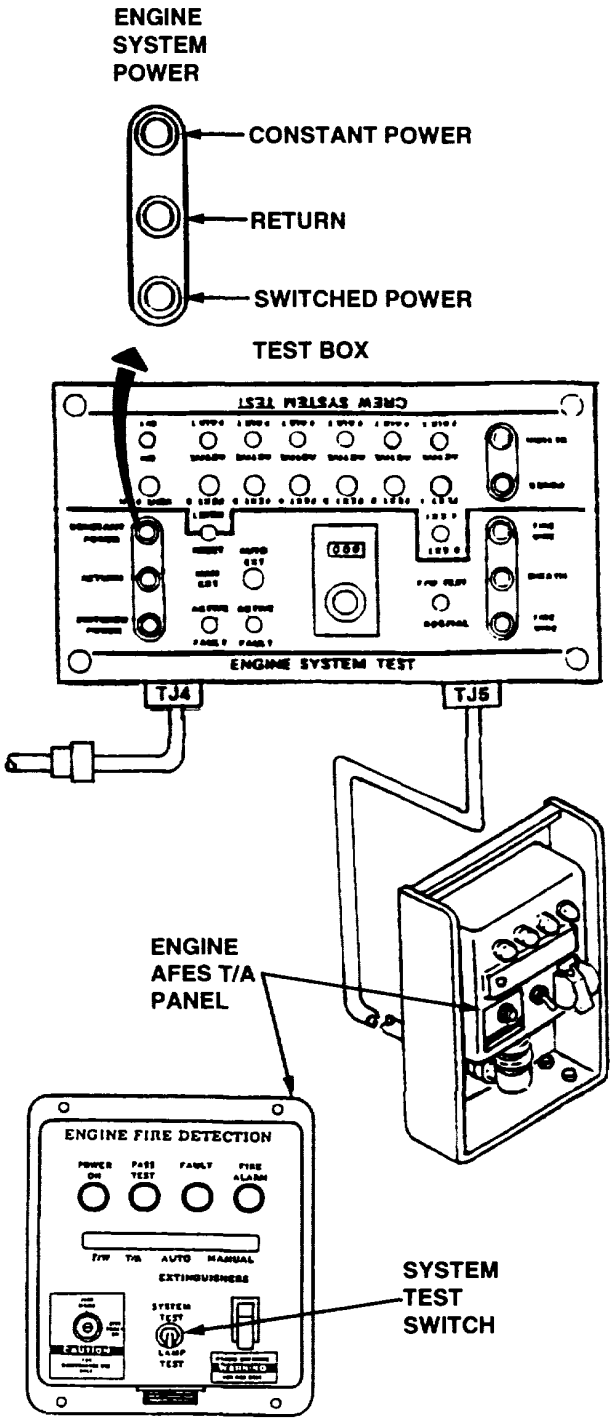
no

yes

CONTINUED AT STEP G

D. **NOTE**

The fire wire test switch substitutes an adjustable potentiometer dial for the fire wire loop.



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2-19. TROUBLESHOOTING CHART (continued).

v. AFES, ENGINE (continued).

(7) AFES MEGOMETER TROUBLESHOOTING PROCEDURES (continued).

CONTINUED FROM D

D. 2. Set the knob of the potentiometer to its maximum setting, fully clockwise.

3. The potentiometer dial should read 10.0, representing 10 Kohms.

4. Rerun system test.

5. Observe the fire wire LED indicator on the ENGINE T/A panel.

Does fire wire LED remain illuminated on engine AFES T/A panel?

no

yes

Replace faulty engine AFES T/A panel (para 21-13). Verify problem is solved.

E. 1. Test the fire wire loop with a multimeter at the FIREWIRE TEST jacks as follows:

2. Disconnect test cable TC5 from test box.

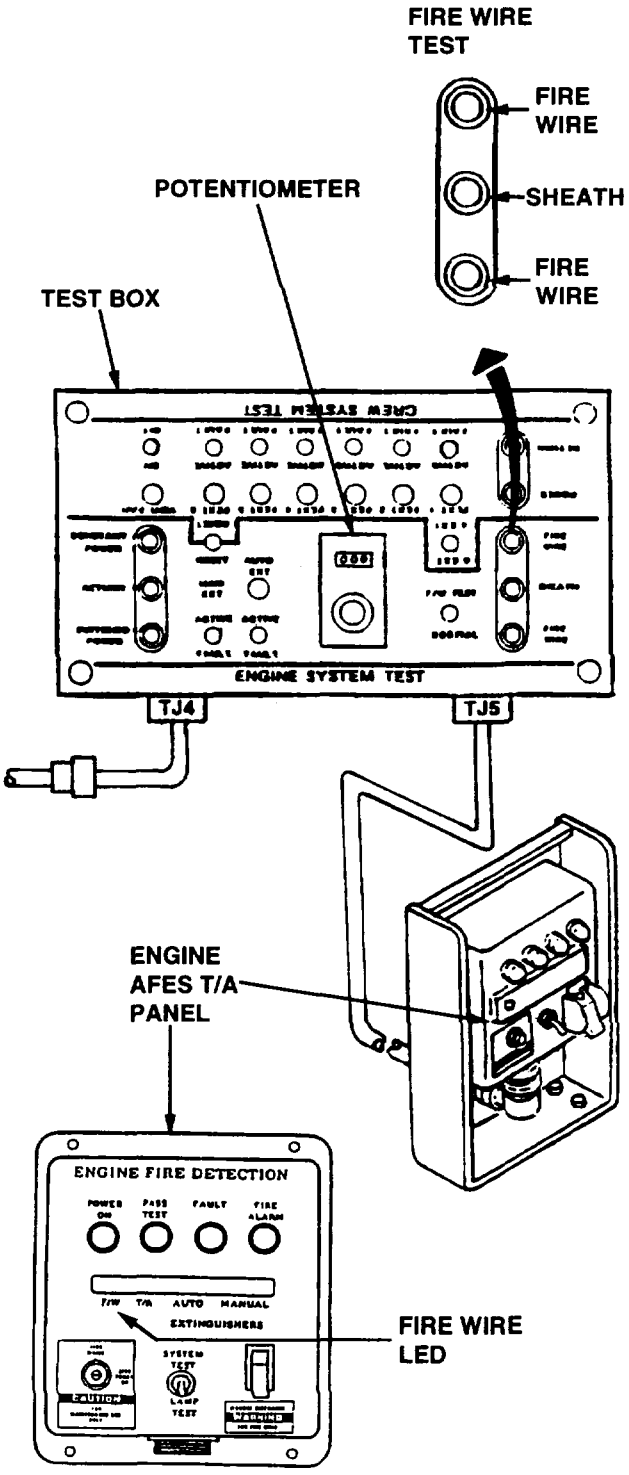
3. Check the center wire continuity/resistance by placing the multimeter probes in the red and green FIREWIRE TEST jacks.

4. The resistance must be between 95 and 180 ohms.

5. Check insulation resistance between the center wire and the outer sheath by placing the multimeter probes in either the black and red or the black and green FIREWIRE TEST jacks.

6. The resistance must be greater than 1 megohm.

Do the resistance tests of the fire wire indicate resistance within the ranges indicated above?



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2-19. TROUBLESHOOTING CHART (continued).

v. AFES, ENGINE (continued).

(7) AFES MEGOMETER TROUBLESHOOTING PROCEDURES (continued).

CONTINUED FROM E

no

yes

Troubleshoot engine AFES system (para 2-19 v. (3), Fault lamp remains on. Auto led is lit.). Verify problem is solved.

F. 1. Check operation of engine AFES T/A panel overheat and fire detection circuits as follows:

a. Reduce potentiometer setting to 5.0 k.

NOTE

The red FIRE lamps on the engine AFES T/A panel and the RSI panel in the crew compartment should begin to blink on and off.

b. Observe red FIRE lamps on the engine AFES T/A panel and RSI panel.

c. Reduce potentiometer setting to 1.0 k.

d. Observe red fire lamps on the engine AFES T/A panel and on the RSI panel.

Do the FIRE lamps stay on without blinking and do the AUTO FEXT LED's on the engine AFES T/A panel illuminate?

no

yes

Repair or replace wire harness 12352354 (para 7-78). Re-adjust the potentiometer knob to 10K (fully on) and press the RESET button on the test box. Verify problem is solved.

Replace engine AFES T/A panel (para 21 -13). Readjust the potentiometer knob to 10K (fully on) and press the RESET button on the test box. Verify problem is solved.

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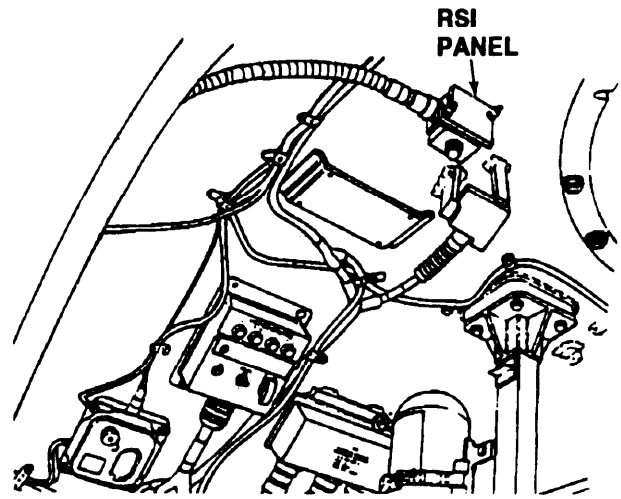

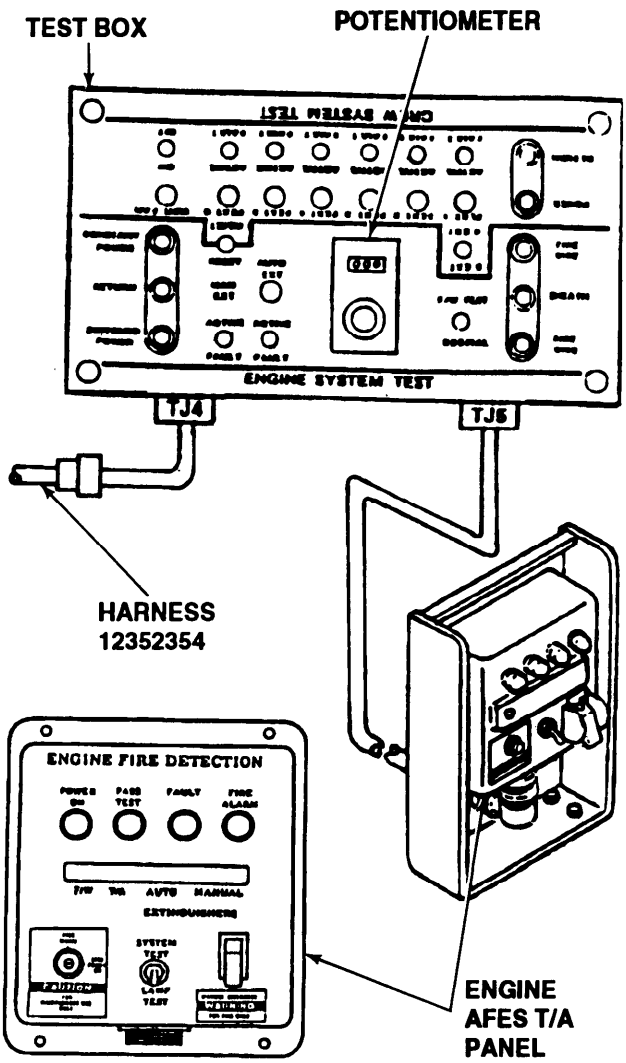

2-19. TROUBLESHOOTING CHART (continued).

v. AFES, ENGINE (continued).

(7) AFES MEGOMETER TROUBLESHOOTING PROCEDURES (continued).

CONTINUED FROM F

G. 1. Test each engine system fire extinguisher fault recognition circuit by placing test box toggle switch in FAULT position.

NOTE

The corresponding fault LED on the engine AFES T/A panel should illuminate immediately upon insertion of the fault and should go off as soon as the toggle switch is returned to the ACTIVE position.

2. Observe the engine AFES T/A panel fault LED's.

Does the engine AFES T/A panel respond as indicated above?

no — Replace engine AFES T/A panel (para 21 -13). Verify problem is solved.

yes

H. 1. Test the fire extinguisher activation circuitry by momentarily activating the engine T/A panel MANUAL DISCHARGE switch located under the red switch guard.

2. Observe the engine AFES T/A panel and test box auto FEXT LED's.

Do the AUTO FEXT LED's illuminate on the engine AFES T/A panel and the test box?

no — Replace engine AFEST/A panel (para 21-13). Verify problem is solved.

yes

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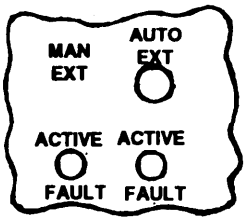
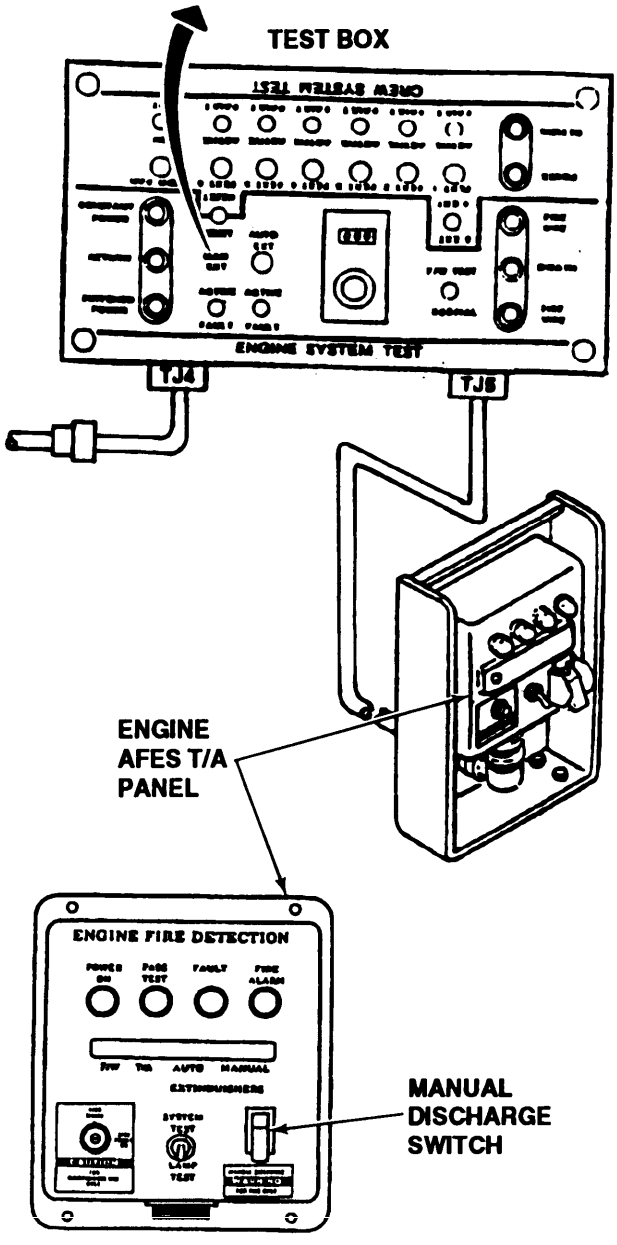




2-19. TROUBLESHOOTING CHART (continued).

v. AFES, ENGINE (continued).

(7) AFES MEGOMETER TROUBLESHOOTING PROCEDURES (continued).

1. 1. Turn the engine AFES T/A panel Maintenance switch to the maintenance position and check the green POWER ON lamp to make sure the AFES is not powered.

2. Disconnect the engine AFES T/A panel from the test box and return the AFES to its normal configuration.

3. Turn the engine AFES T/A panel Maintenance switch to the horizontal position and check the green POWER ON lamp to verify the AFES is powered.

4. Observe the engine AFES T/A panel FEXT LED's for fault indication.

Are FEXT LED'S illuminated.

no → **Problem is solved.**

yes

J. 1. Locate the fire extinguisher cylinder bottle indicated as faulty by the engine AFES T/A panel LED and disconnect it from wire harness 12352354.

2. Using extension cable TC6, connect fire extinguisher wire harness 12352354 connector P2 or P3 (from fire extinguisher) to connector TJ6 of the test box (this simulates a good fire extinguisher cylinder bottle).

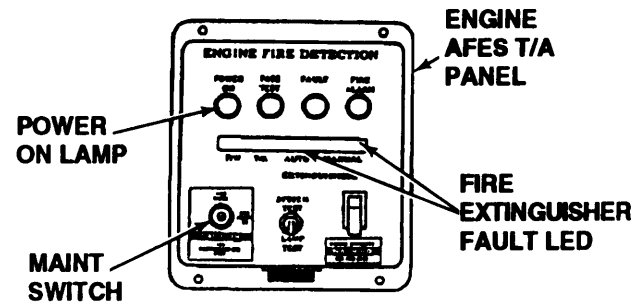
3. Observe the engine AFES T/A panel fault LED.

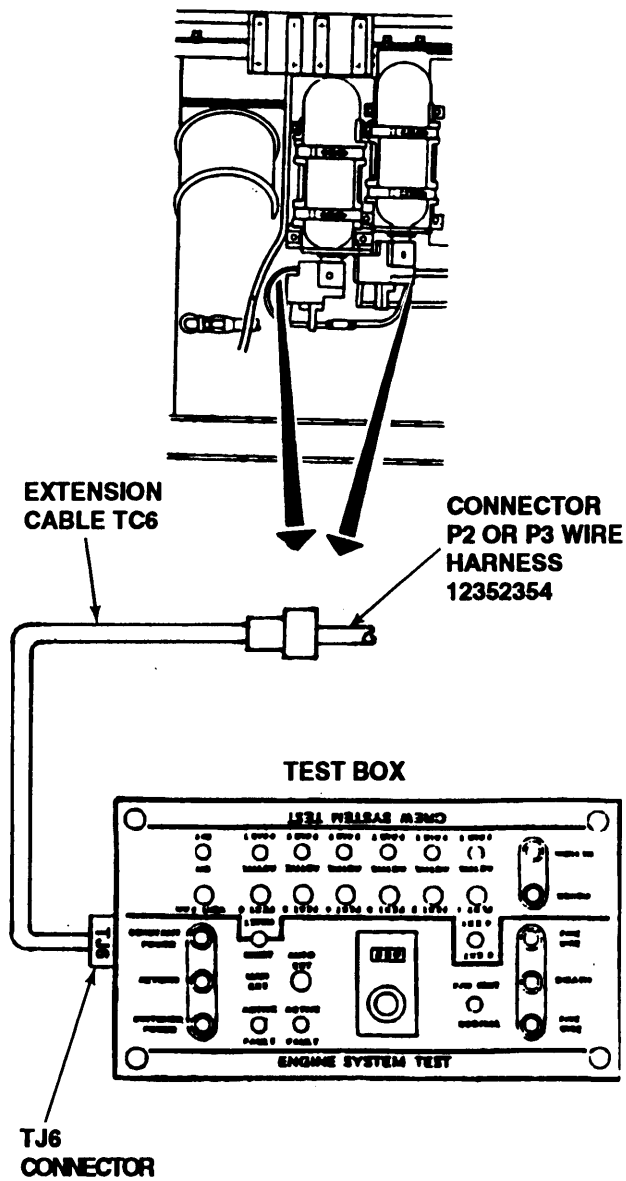
Does fault LED go out?

no → Repair leads 788E, 789E, or 793E in P2 connector, or leads 793F or 794 in P3 connector, or replace wire harness 12352354 (para 7-78). Verify problem is solved.

yes → Replace fire extinguisher cylinder bottle (para 21-4). Verify problem is solved.

END OF TASK

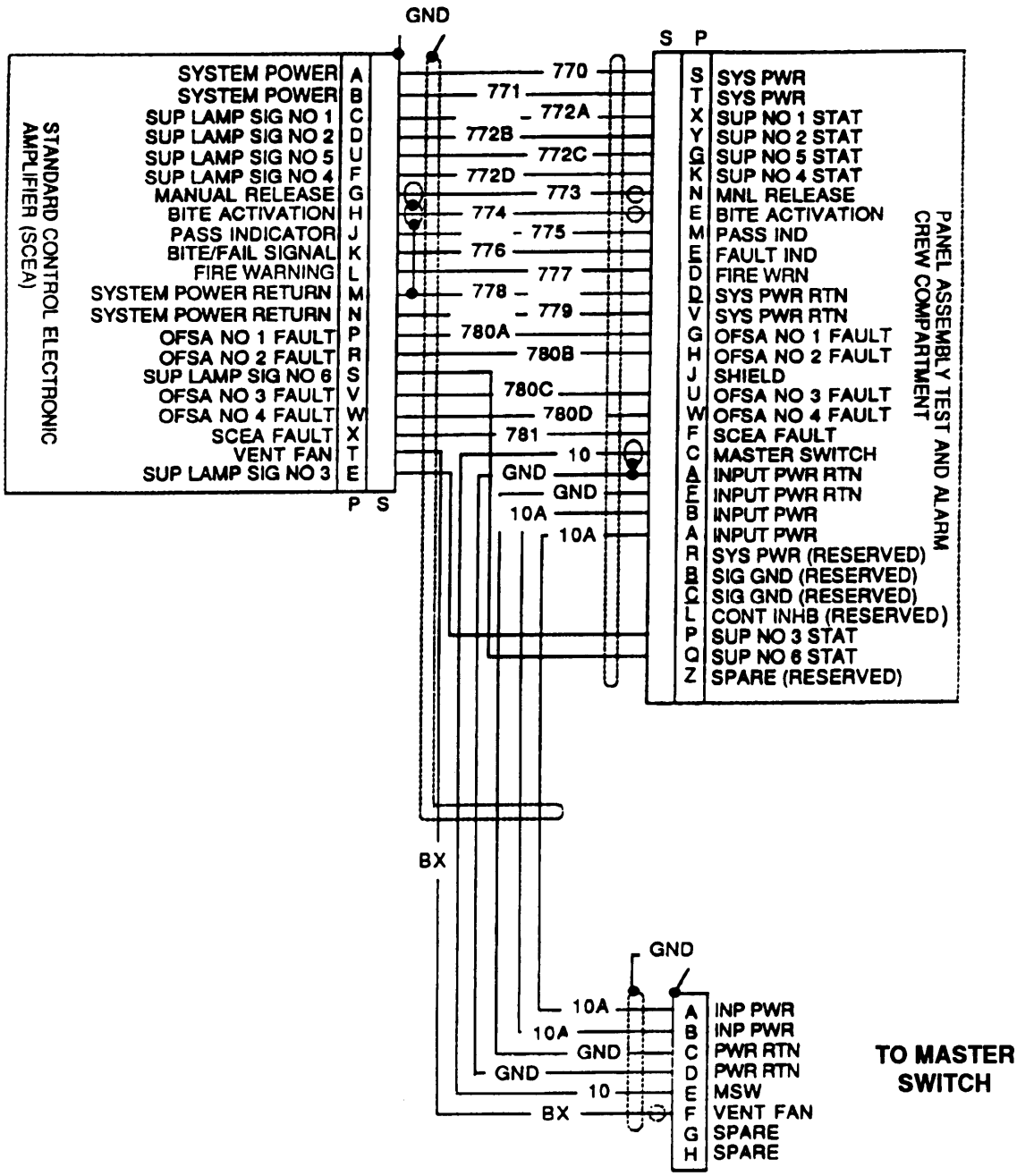




2-19. TROUBLESHOOTING CHART (continued).

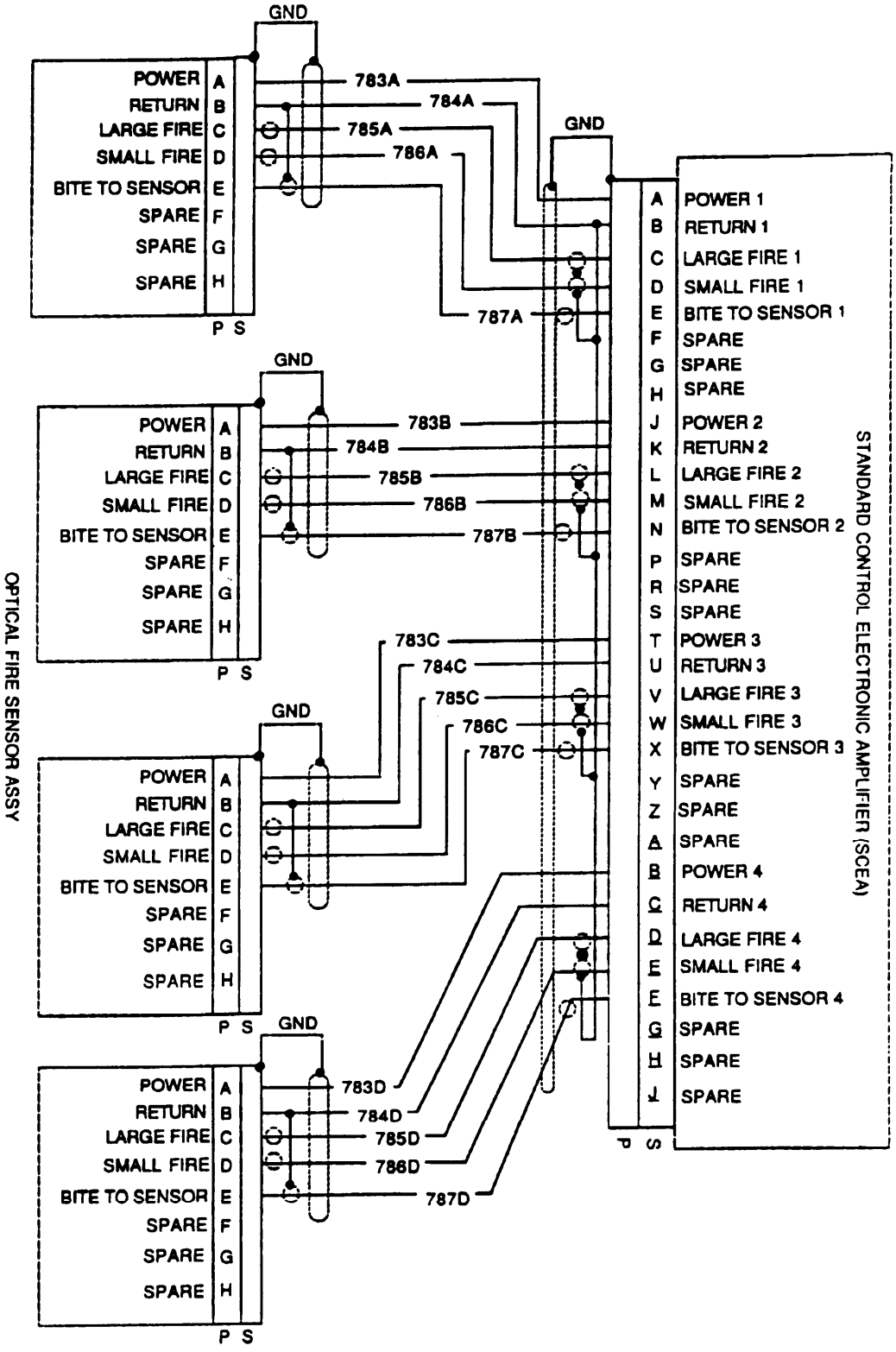
w. AFES, CREW.

The Automatic Fire ExnguisherSystem (AFES) is an automatic electrical system that when actuated, provides fire extinguishing capability for the crew compartment. It consists of a TEST/ALARM panel, sensors, halon fire extinguishers, and associated electrical wiring harnesses. Automatic electrical operation will sense fires and discharge halon fire extinguishers to put out any fires. This system will not activate unless the crew TEST/ ALARM panel maintenance switch is in the horizontal power-on position. A manual discharge backup to the electrical system enables the operator to manually discharge engine compartment fire extinguishers when the automatic system fails to function or does not completely extinguish the fire.



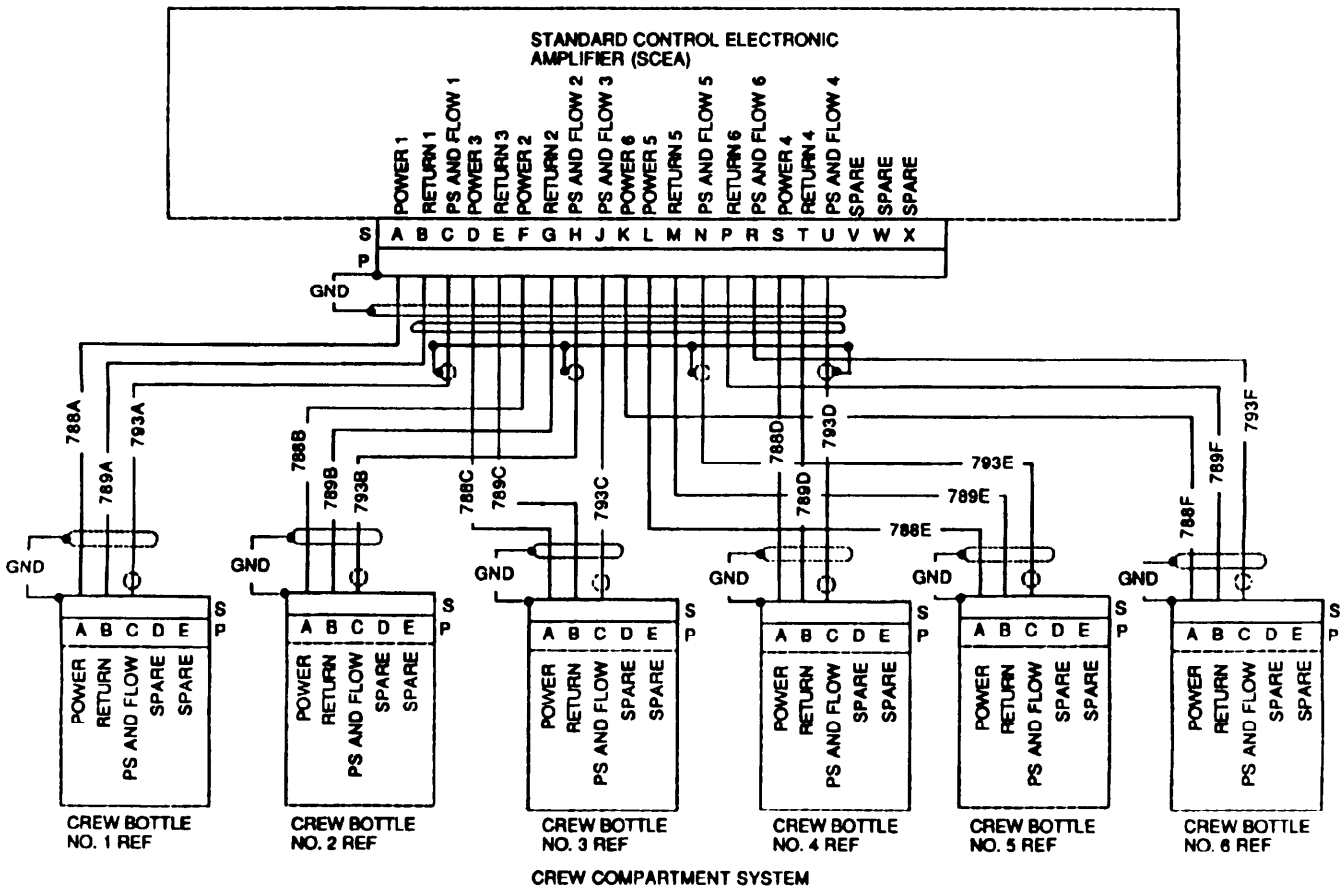
2-19. TROUBLESHOOTING CHART (continued).

w. AFES, CREW (continued).



2-19. TROUBLESHOOTING CHART (continued).

w. AFES, CREW (continued).



2-19. TROUBLESHOOTING CHART (continued).

w. AFES, CREW (continued).	(1) POWER ON LAMP DOES NOT LIGHT WHEN MASTER SWITCH IS TURNED ON. All other electrical systems operate.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix
- General mechanic's tool kit (Item 24, Appendix I)

Personnel Required: Two

Equipment Conditions:
- Crew AFES T/A panel MAINT switch in maintenance position (para 21 -3).

NOTE

- Instead of using multimeter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. **WARNING**

Turn crew AFES T/A panel Maintenance switch to vertical position before disconnecting any electrical wiring harnesses. Failure to comply may result in discharge of extinguisher cylinders and injury to personnel.

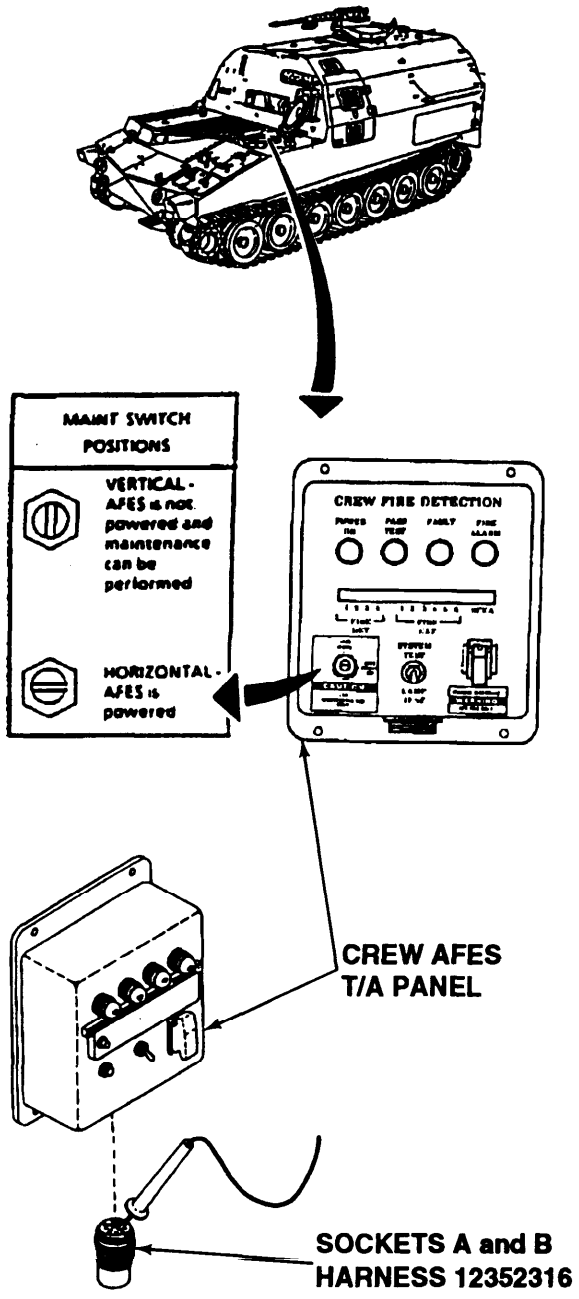
1. Place red lead of multimeter in pin socket B of harness 12352316 and ground black lead of multimeter.
2. Check for *24* ± 3 vdc.
3. Repeat procedure for socket A.

Is voltage indicated in both sockets?

no — yes

yes → **CONTINUED TO STEP C**

B. 1. Reconnect wire harness 12352316 to crew AFES T/A panel.



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2-19. TROUBLESHOOTING CHART (continued).

w. AFES, CREW (continued).	(1) POWER ON LAMP DOES NOT LIGHT WHEN MASTER SWITCH IS TURNED ON. All other electrical systems operate (continued).

CONTINUED FROM STEP B

B. 2. Disconnect wire harness 12352316 from bracket-mounted socket 12351461 in driver's compartment.

3. Place red lead of multimeter in pin socket A of bracket-mounted socket 12351461 and ground black lead of multimeter.

4. Check for 24 ± 3 vdc.

5. Place red lead of multimeter in pin socket B of bracket-mounted socket 12351461 and ground black lead of multimeter.

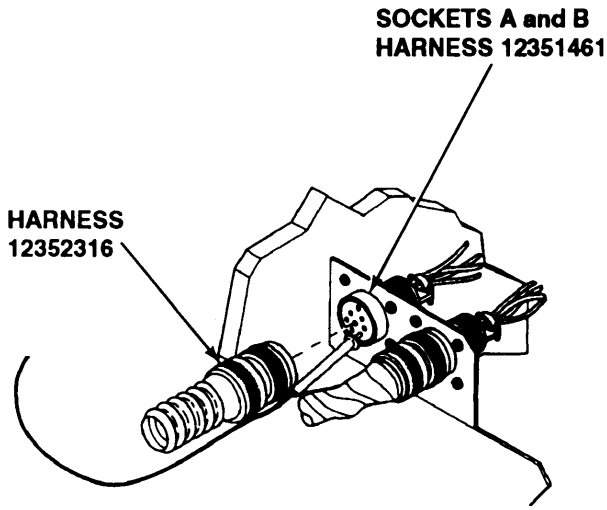
6. Check for 24 ± 3 vdc.

Is voltage indicated in both circuits?

no

yes

Replace wire harness 12352316 (para 7-77). Verify problem is solved.



C.

WARNING

Circuit 10A, if functioning properly, is a live circuit carrying a constant 24 volts. Exercise proper precautions when working with this circuit. Failure to comply will result in injury to personnel or equipment damage.

1. Reconnect wire harness 12352316 to bracket-mounted socket 12351461.

NOTE

Circuit breaker panel no. 2 is located directly behind engine AFES T/A panel.

Continued on next page

2-19. TROUBLESHOOTING CHART (continued).

w. AFES, CREW (continued).	(1) POWER ON LAMP DOES NOT LIGHT WHEN MASTER SWITCH IS TURNED ON. All other electrical systems operate (continued).

CONTINUED FROM STEP C

C. 2. Disconnect wire harness 12351461 circuit 10A from number 6 circuit breaker panel no. 2.

3. Place red lead of multimeter in circuit breaker socket and black lead to ground.

4. Check for 24 ± 3 vdc.

Is voltage indicated?

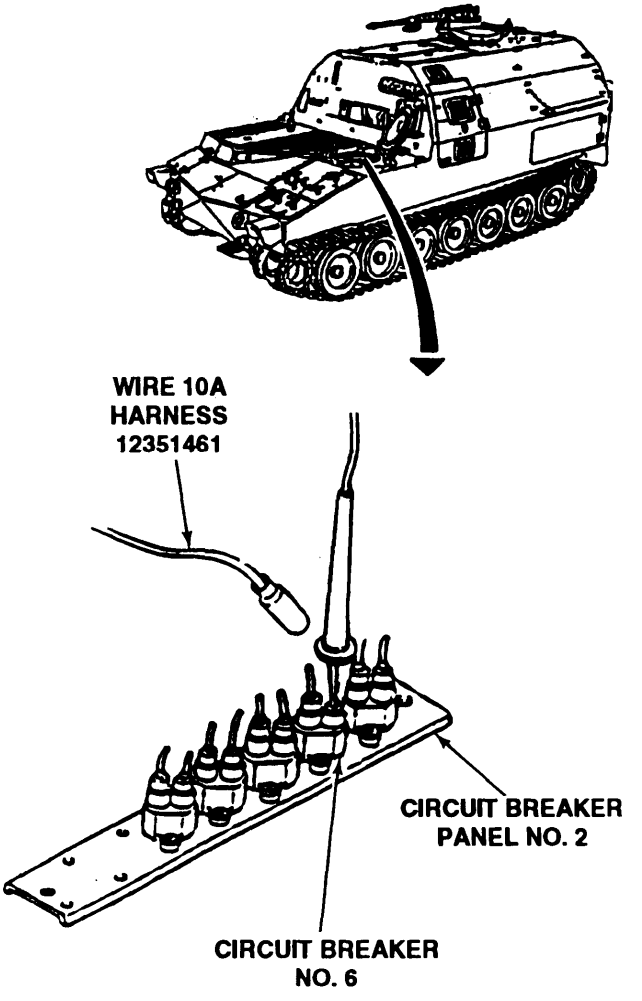
no

yes

Repair wire 10A or replace wire harness 12351461 (para 7-77). Verify problem is solved.

Replace circuit breaker no. 6 (para 7-11). Verify problem is solved.

END OF TASK



2-19. TROUBLESHOOTING CHART (continued)

w. AFES, CREW (continued).	(2) FAULT LAMP REMAINS LIT. FIRE DET. LED'S LIT.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)

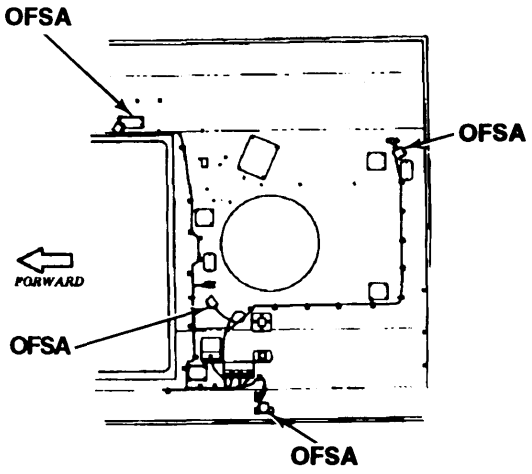
Materials/Parts:
- Cleaning compound (Item 19, Appendix D)
- Lens paper (Item 51, Appendix D)
- Sealing compound (Item 58, Appendix D)

Personnel Required: Two

Equipment Conditions:
- Crew AFES Test/Alarm panel MAINT switch in maintenance position (para 21 -3).

NOTE

- Instead of using multimeter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.



A. 1. Inspect all four wire harness connectors to OFSAs for loose connectors.

2. Inspect connectors for moisture or contamination.

Are all connections clean, dry, and secure?

no

yes

Clean connectors with cleaning compound, and apply sealing compound to connectors and reinstall. Verify problem is solved.

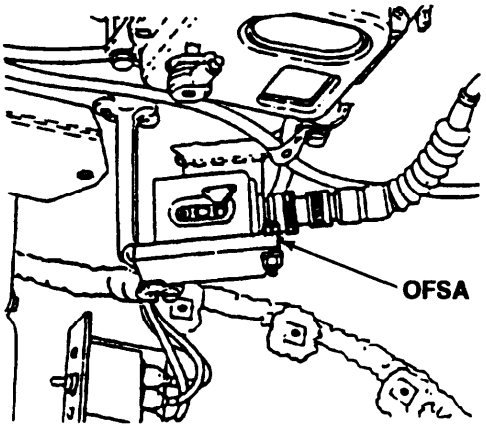
B. Inspect all four OFSAs for corrosion, dirt, or cracked lenses.

Are lenses dirty or cracked?

no

yes

Clean lens with lens paper or, if broken, replace OFSA (para 21-14). Verify problem is solved.



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2-19. TROUBLESHOOTING CHART (continued).

w. AFES, CREW (continued).	(2) FAULT LAMP REMAINS LIT. FIRE DET. LED'S LIT (continued).

C. **WARNING**

Turn crew AFES T/A panel Maintenance switch to vertical position before disconnecting any electrical wiring harnesses. Failure to comply may result in discharge of extinguisher cylinders and injury to personnel.

1. Disconnect harness 12352353 connectors from OFSAS.

2. Place red lead of multimeter in socket A (wire 783A, 783B, 783C, or 783D) of the four connectors and ground black lead.

3. With the aid of an assistant, turn MASTER switch ON (refer to TM 9-2350-287-10), and turn crew AFES T/A panel Maintenance switch to horizontal position.

4. Check for 24 ± 3 vdc.

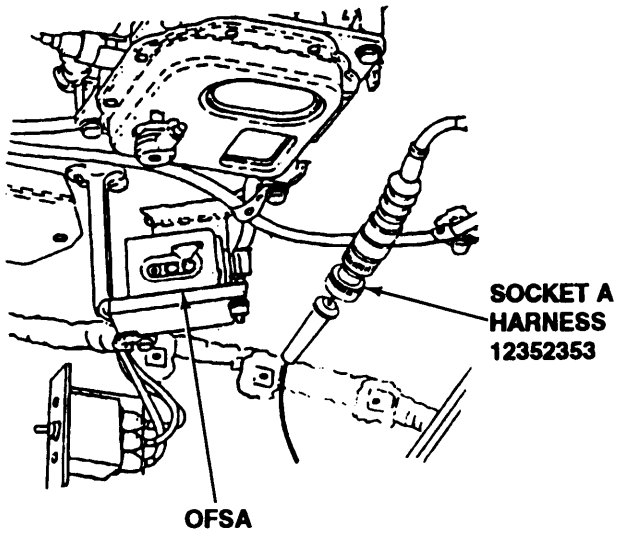
5. Turn MASTER switch OFF (refer to TM 9-2350-287-10), and turn crew AFES T/A panel Maintenance switch to vertical position.

Is voltage indicated at the OFSAs?

no

yes

Replace defectiveOFSAs (para 21-14).



D. 1. Disconnect harness 12352353 connector from the standard control electronic amplifier (SCEA).

2. Check for continuity between:

Continued to next page

2-19. TROUBLESHOOTING CHART (continued)

w. AFES, CREW (continued).	(2) FAULT LAMP REMAINS LIT. FIRE DET. LED'S LIT (continued).

CONTINUED FROM D

D. a. Socket A of OFSA connector WIP2 and pin A of SCEA connector (wire 783A).

b. Socket A of OFSA connector WIP3 and pin J of SCEA connector (wire 783B).

c. Socket A of OFSA connector WIP4 and pin T of SCEA connector (wire 783C).

d. Socket A of OFSA connector W1P5 and pin B of SCEA connector (wire 783D).

Is there continuity on all four wires?

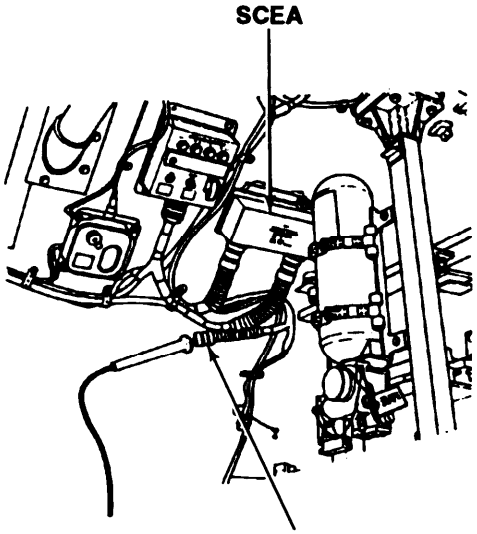
NO

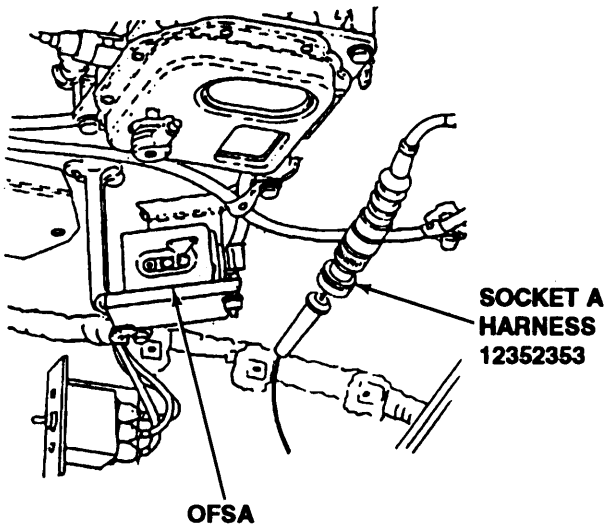
Replace wire harness 12352353 (para 7-77). Verify problem is solved.

YES

Replace standard control electronic amplifier (SCEA) (para 21-15). Verify problem is solved.

END OF TASK





2-19. TROUBLESHOOTING CHART (continued).

w. CREW AFES (continued).	(3) FIRE EXT. LED'S ARE LIT. FAULT LAMP REMAINS ON.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- Cleaning compound (Item 19, Appendix D)
- Sealing compound (Item 58, Appendix D)

Equipment Conditions:
- Left and right projectile rack assemblies moved to rear of vehicle (refer to TM 9-2350-287-10). (for crew extinguishers 1 and 2 only).
- Crew AFES test./alarm panel MAINT switch in maintenance position (para 21-3).

NOTE

- Instead of using multimete for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. 1. Inspect all six electrical connectors for moisture, contamination, or loose fit.

Are all connections clean, dry, and secure?

no

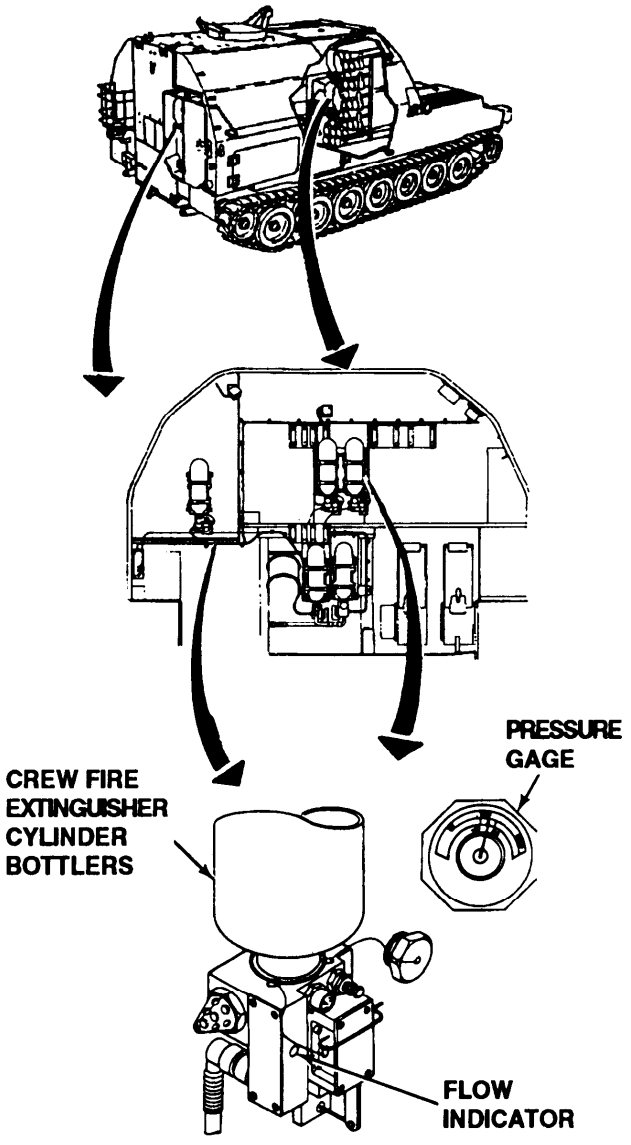
yes

Clean connectors with cleaning compound and apply sealing compound to connectors and reinstall. Very promblen is solved.

B. 1. Check for protruding flow indicator of valve actuators of crew fire extinguisher cylinder bottles 1 thru 6 as indicated by LEDs on crew T/A panel.

2. Check pressure gage of crew fire extinguishers. Black needle of pressure gage should be inside green temperature wedge.

Is pressure gage needle in the correct position, and flow indicators are not protruding from their valves?



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2-19. TROUBLESHOOTING CHART (continued).

w. CREW AFES (continued).	(3) FIRE EXT. LED'S ARE LIT. FAULT LAMP REMAINS ON (continued).

CONTINUED FROM B

no

yes

If flow indicator is protruding from valve, reset flow indicator by pushing it into the valve body. If pressure is low, replace crew fire extinguishercylinder bottle (para 21-5). Verify problem is solved.

c. **WARNING**

Make sure crew AFES T/A panel Maintenance switch is turned to vertical position before trouble-shooting AFES system. Failure to comply will result in injury to personnel or damage to vehicle.

1. Disconnect wire harness 12352315 from SCEA connector J2, and also disconnect wire harness 12352315 from actuator of defective fire extinguisher(s).

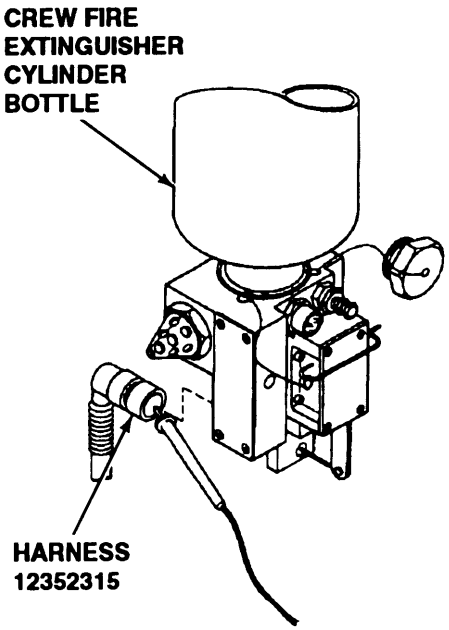
2. Check wire harness 12352315 circuits for continuity in the following order for applicable fire extinguisher bottle:

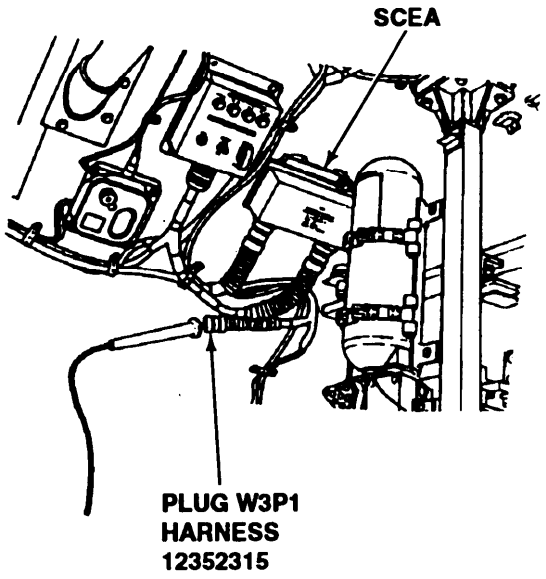
FIRE EXTINGUISHER NO. 2

W3P3	W3P1
A	F
B	G
C	H

FIRE EXTINGUISHER NO. 4

W3P5	W3P1
A	S
B	T
C	U





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2-19. TROUBLESHOOTING CHART (continued).

w. CREW AFES (continued).	(3) FIRE EXT. LED'S ARE LIT. FAULT LAMP REMAINS ON (continued).

CONTINUED FROM C

FIRE EXTINGUISHER NO. 3

W3P4	W3P1
A	D
B	E
C	J

FIRE EXTINGUISHER NO. 1

W3P2	W3P1
A	A
B	B
C	C

FIRE EXTINGUISHER NO. 5

W3P6	W3P1
A	L
B	M
C	N

FIRE EXTINGUISHER NO. 6

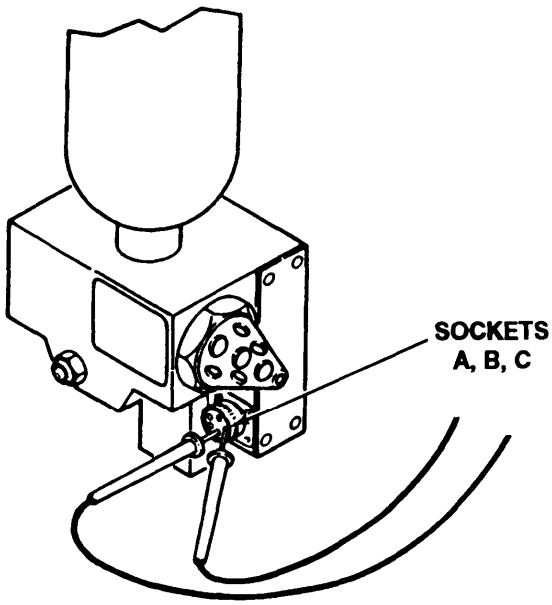
W3P7	W3P1
A	K
B	P
C	R

Is there continuity in all circuits?

no

Replace wire harness 12352315 (para 7-77). Verify problem is solved.

yes



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2-19. TROUBLESHOOTING CHART (continued).

w. CREW AFES (continued).	(3) FIRE EXT. LED'S ARE LIT. FAULT LAMP REMAINS ON (continued).

D. 1. Place multimeter red probe in socket A and other probe in socket B of crew fire extinguisher actuator.
2. Check for continuity.
3. Place multimeter red probe in socket B and other probe in socket C of crew fire extinguisher actuator.
4. Check for continuity.

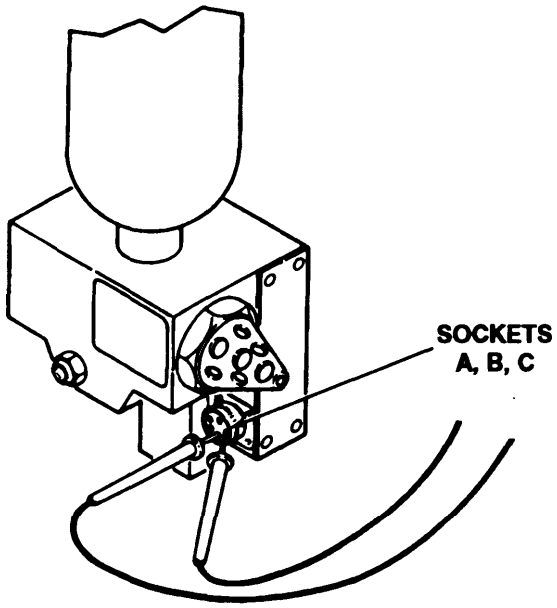
Is there continuity in all circuits?

no

Replace crew fire extinguisher cylinder bottle (para 21-5). Verify problem is solved.

yes

Replace SCEA (para 21-15). Verify problem is solved.



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

w. AFES, CREW (continued).

(4) CREW BOTTLES DISCHARGING WITHOUT BEING ACTIVATED.

Initial Setup:

Tools/Test Equipment:
- General Mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Cleaning compound (Item 19, At)pendix D)
- Sealing compound (Item 58, Appendix D)

Equipment Conditions:
- Left projectile rack assembly moved to rear of vehicle (refer to TM 9-2350-287-10).
- Crew AFES test/alarm panel MAINT switch in maintenance position (para 21-3).

NOTE

- Instead of using multimeter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. Inspect all electrical connectors on AFES crew system. Check for moisture, contamination, or loose fit.

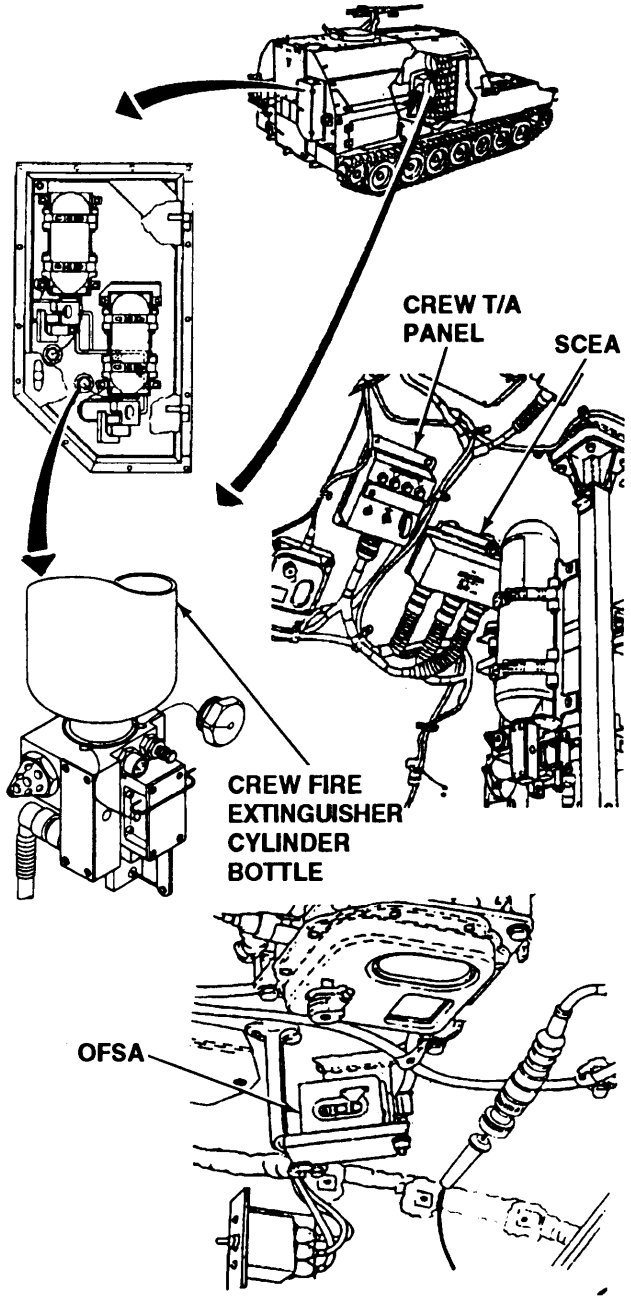
Are all connections clean, dry, and secure?

no

Clean connections with cleaning compound, and apply sealing compound to connector sand reinstall. Verify problem is solved.

yes

Troubleshoot crew AFES system according to the procedures in para 2-19 w. (3). Verify problem is solved.



END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

w. AFES, CREW (continued).	(5) CREW BOTTLES NOT FULLY DISCHARGING/ NOT EXTINGUISHING FIRES.

Initial Setup:

Tools/Test Equipment:
- Automotive wrench (Item 4, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix I)

Equipment Conditions:
. Left projectile rack assembly moved to rear of vehicle (refer to TM 9-2350-287-10).
. Crew AFES Test/Alarm panel MAINT switch in maintenance position (para 21-3).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST- TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. Check pressure gage of crew fire extinguisher. The black needle of the pressure gage should be inside the green wedge.

Is pressure gage in the correct position?

no

Replace crew fire extinguisher cylinder bottle (para 21-5). Verify problem is solved.

yes

B. Check dispersal nozzles for proper installation. Red notch on dispersal nozzle should line up with red notch on bottle assembly.

Are nozzles lined up?

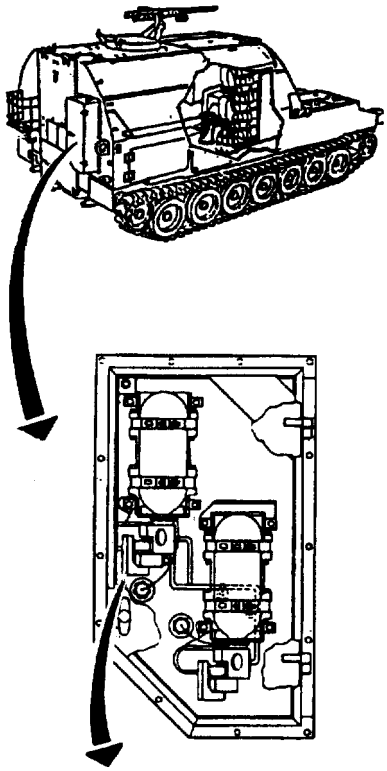
no

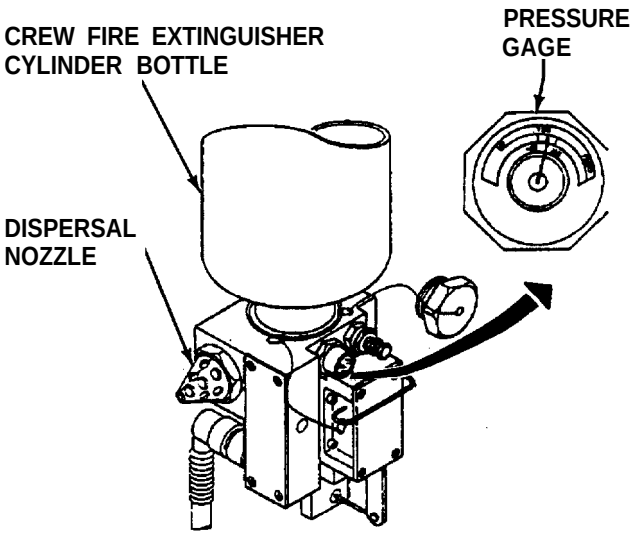
Install dispersal nozzle in bottle assembly. Back up nozzle not more than 1 full turn to line up red notches. Verify problem is solved.

yes

Recheck steps A and B to ensure correctness. Verify problem is solved.

END OF TASK





2-19. TROUBLESHOOTING CHART (continued).

w. AFES, CREW (continued).	(6) BOTTLES NOT DISCHARGING WHEN PULLING MANUAL CABLES.

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix 1)

Equipment Conditions:
- Left projectile rack assembly moved to rear of vehicle (refer to TM 9-2350-287-10).

A. Ensure locking pins on crew fire extinguisher cylinder bottles 3 and 4 and engine fire extinguishercylinder bottle 2 are in stowed position.

Are pins in correct position?

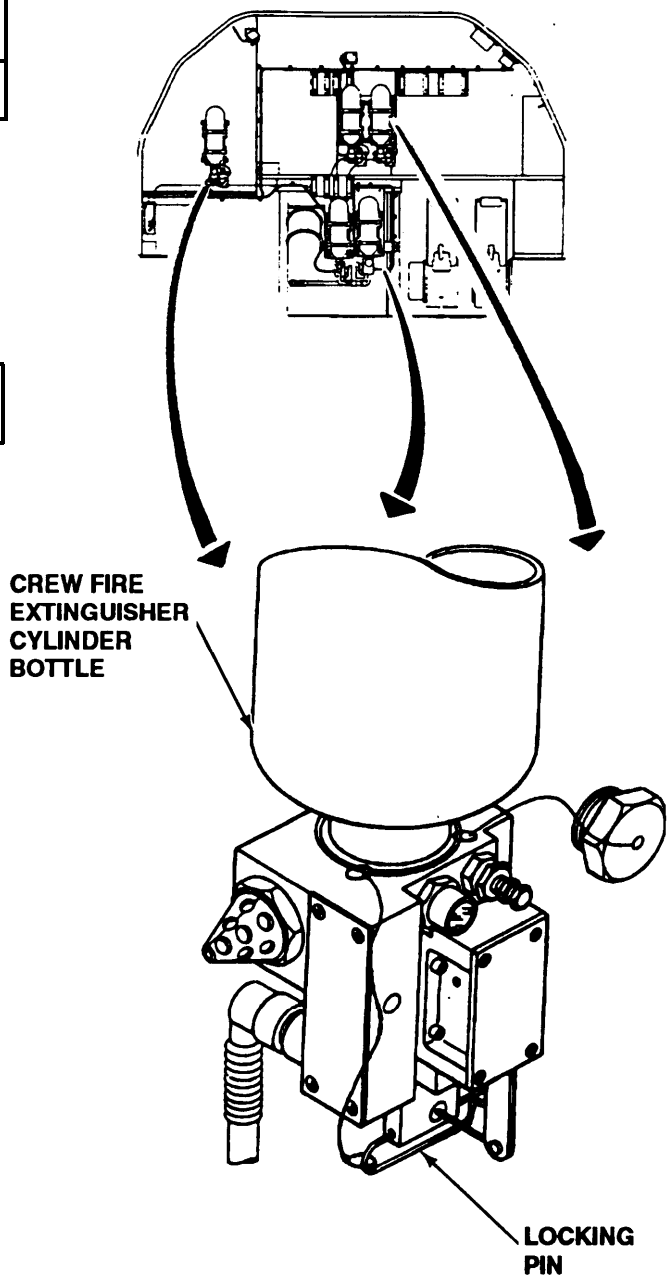
no

Correctly install locking pins in stowed position. Verify problem is solved.

yes

Check adjustments of cables (para 21-16). Verify problem is solved.

END OF TASK

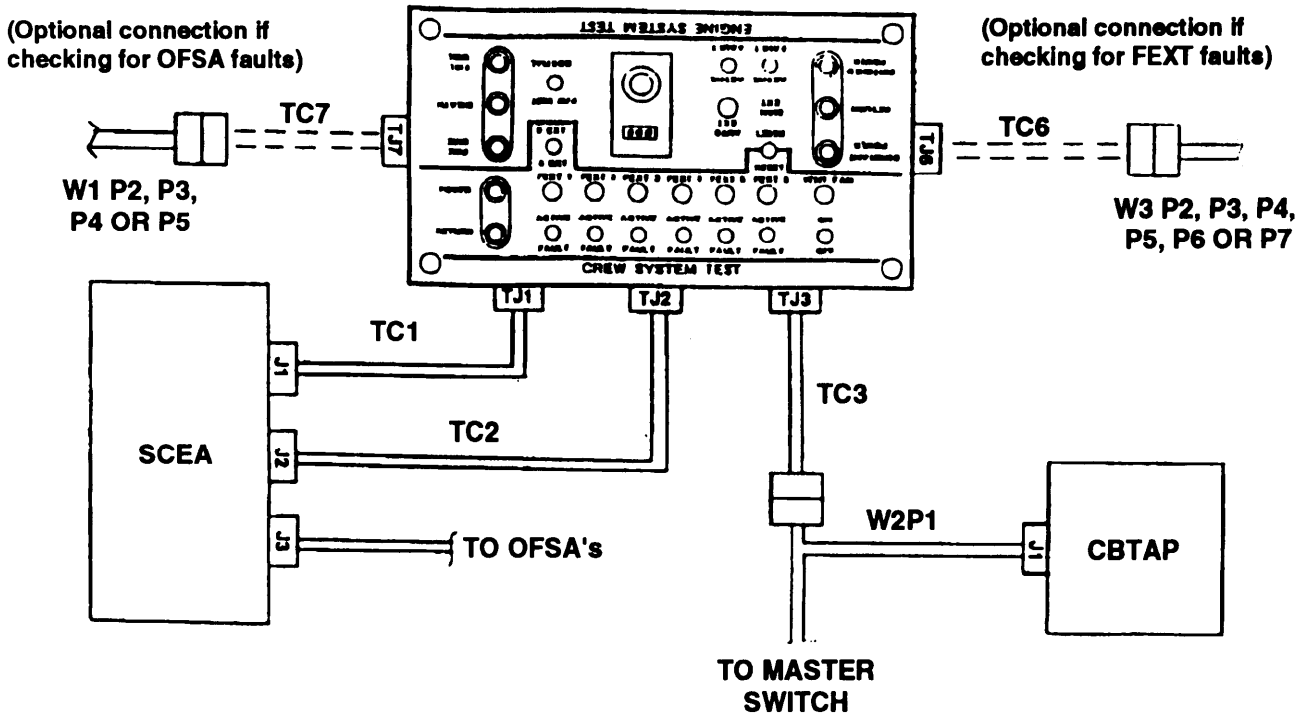


2-19. TROUBLESHOOTING CHART (continued).

w. AFES, CREW (continued).

The FAASV Automatic Fire Extinguishing System (AFES) Troubleshooting Aid is a test box and set of seven connecting cables, developed by HTL, to assist the FAASV user in troubleshooting the FAASV AFES. Using the troubleshooting aid allows testing of both the crew and engine subsystems individually without the fear of accidental discharge of fire extinguishers. This is accomplished by disconnecting the FAASV's installed fire extinguishers from the AFES and substituting 'dummy" simulation fire extinguishers contained within the test box. Use of the troubleshooting aid speeds faultfinding and helps achieve a more accurate fault diagnosis by allowing maintenance personnel to take measurements at the test box. The troubleshooting aid allows the user to isolate an AFES problem without moving the projectile racks, saving considerable time and effort. The troubleshooting aid should be used in conjunction with TM 9-2350-287-20-1 and TM 9-2350-287-20-2 as the technical manual is used for reference in the following troubleshooting procedure.

CREW COMPARTMENT TEST SETUP



2-19. TROUBLESHOOTING CHART (continued).

w. AFES, CREW (continued).	(7) AFES MEGOMETER TROUBLESHOOTING PROCEDURES.

Initial Setup:

Tools/test Equipment:
- Megometer (Item 37, Appendix 1)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Crew AFES Test/Alarm panel MAINT switch in maintenance position (para 21-3).
- Crew AFES fire extinguisher bottle harnesses disconnected (para 7-77).

NOTE

- Instead of using multimeter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. 1. Make sure the green POWER ON lamp on the crew T/A panel is off, indicating that power has been removed from the AFES system.

NOTE

The W3P1 connector is disconnected during these tests.

2. Connect the test box to the SCEA and W2 wiring harness using test cables TC1, TC2, and TC3 as shown in figure 1.

3. Set the test box switches as follows:

a. All fire extinguishers (FEXT 1-6) to ACTIVE.

b. VENT FAN to ON.

c. CREW switch to 4 EXT or 6 EXT, depend ing on whether the vehicle has a four extinguisher system or a six-extinguish system.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

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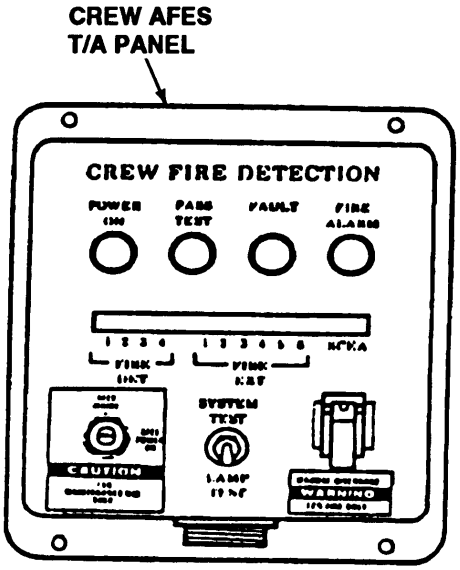
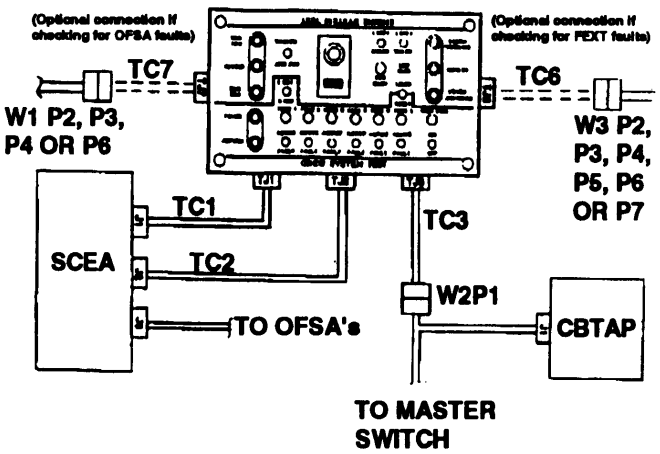


CREW COMPARTMENT TEST SETUP



2-19. TROUBLESHOOTING CHART (continued).

w. AFES, CREW (continued).

(7) AFES MEGOMETER TROUBLESHOOTING PROCEDURES (continued).

CONTINUED FROM A

A. 5. Turn CREW AFEST/A panel Maintenance switch to the horizontal position and check to see that the green POWER ON lamp is ON, indicating that the AFES is powered and fully operational.

6. If any red LED's on the test box are illuminated, press the RESET switch on the test box.

7. Use a multimeter and check for voltage at the CREW SYSTEM POWER on the test box in the CONSTANT and SWITCHED power jacks.

Does voltage read between 22 and 28 vdc?

no

Refer to troubleshooting procedures in para 2-19w. (2) - (3) per applicable fault LED for detailed AFES troubleshooting steps.

yes

B. 1. Run system test by pressing CREW AFES T/A panel toggle switch to SYSTEM TEST and releasing it.

2. Observe fault lamp on crew T/A panel.

Does yellow FAULT lamp illuminate?

no

CONTINUED AT STEP D

yes

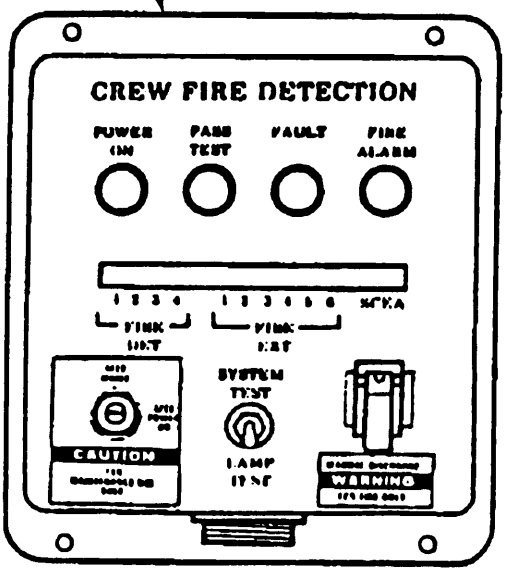
C. 1. Observe red LEDs for fault information.

2. Locate the OFSA indicated as faulty by the CREW AFES T/A panel LED and disconnect the harness 12352353 W1 from it.

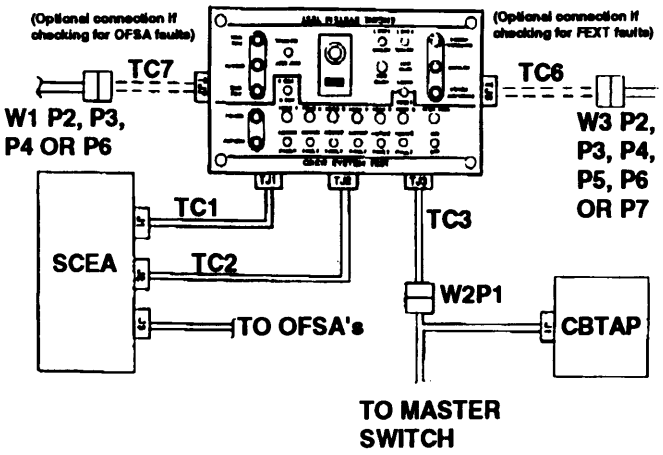
3. Connect the harness 12352353 W1 OFSA connector to connector TJ7 on the test box using test cable TJ7.

Continued on next page

CREW AFES T/A PANEL



CREW COMPARTMENT TEST SETUP



2-19. TROUBLESHOOTING CHART (continued).

w. AFES, CREW (continued).

(7) AFES MEGOMETER TROUBLESHOOTING PROCEDURES (continued).

CONTINUED FROM C

c. **NOTE**

This connection simulates good OFSA for the possible faulty one.

4. Press and release SYSTEM TEST.

5. Observe the results on the CREW AFES T/A panel.

Does fault lamp remain on?

no — yes

Replace harness 12352353 W1 (para 7-77). Verify promblen is solved.

D. 1. Test the performance of each OFSA by holding a cigarette lighter up to the "eyes' of the OFSA and lighting the flame.

2. Observe the results on the CREW AFES T/A panel.

Does the system discharge the simulated fire extinguishers?

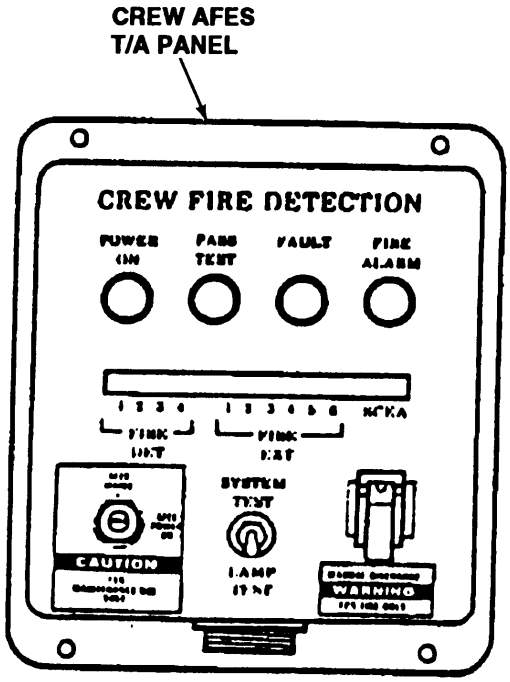
no — yes

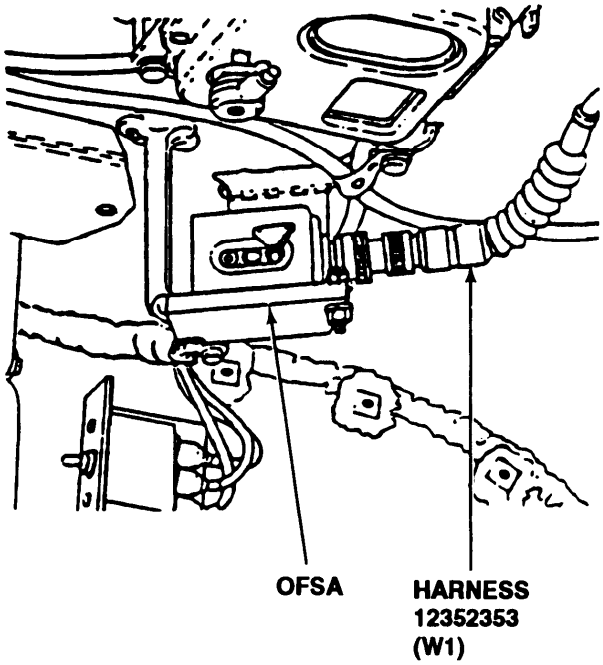
Replace defective OFSA (para 21-14). Press RESET switch on test box to reset OFSAs Verify problem is solved.

E. 1. Test each fire extinguisher fault recognition circuit by placing the applicable test box toggle switch in the FAULT position.

2. Observe the corresponding fault LED on the CREW AFES T/A panel. It should illuminate immediately.

3. Turn switch fault switch on test panel back to ACTIVE position.





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2-19. TROUBLESHOOTING CHART (continued).

w. AFES, CREW (continued).

(7) AFES MEGOMETER TROUBLESHOOTING PROCEDURES (continued).

CONTINUED FROM E

E. 4. Observe the fault LED on the CREW AFES T/A panel if it should go out.

Do crew AFES T/A panel lights operate as indicated above?

no

Perform troubleshooting of SCEAorCREW AFES T/A panel (para 2-19.w(2)).

yes

F. 1. Test fire extinguisher activation circuitry by momentarily activating CREW AFES T/A panel MANUAL DISCHARGE switch located under red switch guard.

2. Corresponding LEDs on CREW AFES T/A panel and on test box should illuminate to indicate the fire extinguishers which were activated, and personnel ventilation fan should automatically turn on in exhaust mode 8 to 10 seconds after fire extinguisher activation.

Does personnel ventilation fan turn on?

no

CONTINUED AT STEP H

yes

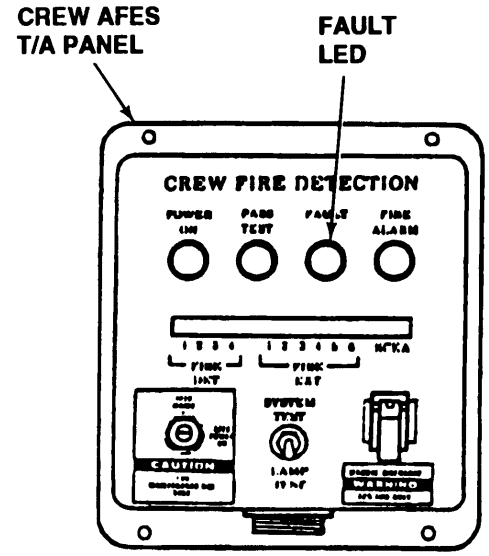
G. 1. Set VENT FAN toggle switch on the test box to OFF.

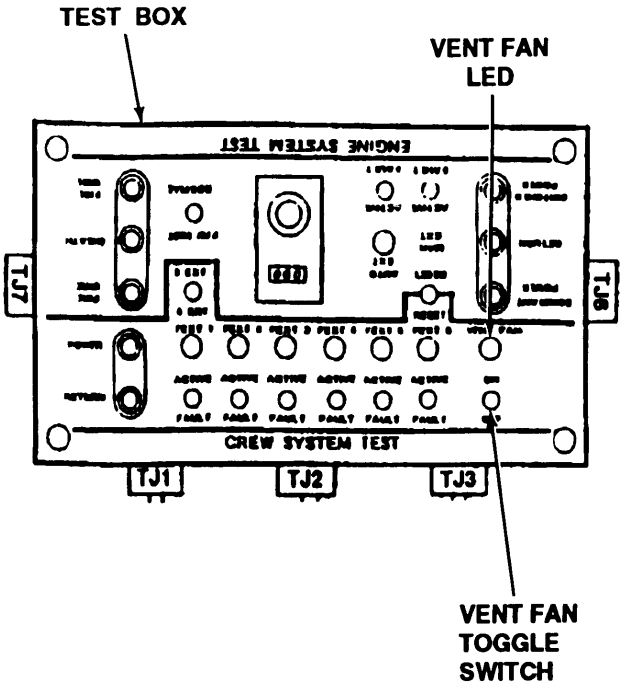
2. Reset fire extinguisher simulators on test box by pressing RESET switch on the test box.

3. Repeat Step F.

4. Observe VENT FAN LED on the test box.

Does VENT FAN LED on test box illuminate for 5 seconds after the 8-10 second fire extinguisher?





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2-19. TROUBLESHOOTING CHART (continued).

w. AFES, CREW (continued).

(7) AFES MEGOMETER TROUBLESHOOTING PROCEDURES (continued).

CONTINUED FROM G

no / yes

Troubleshoot personnel ventilation blower system (para 2-19o.(1). Return VENT FANswitch to ON. Verify problem is solved.

Replace SCEA (para 21-15). Return VENT FAN switch to ON. Verify problem is solved.

CONTINUED FROM STEP F

H. 1. Turn the CREW AFES T/A panel Maintenance switch to the vertical position and check the green POWER ON lamp to make sure the AFES is not powered.

2. Disconnect SCEA from the test box and return the AFES to its normal configuration.

3. Turn the CREW AFES T/A panel maintenance switch to the horizontal position and check the green POWER ON lamp to verify the AFES is powered.

4. Check the CREWAFES T/A panel for FIRE EXT fault LED's.

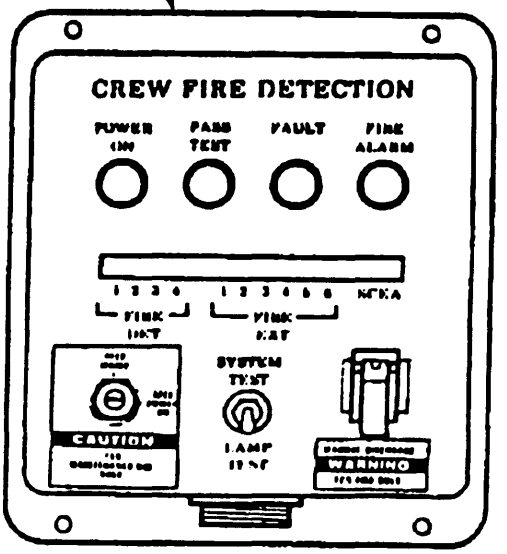
Is faulty fire extinguisher indicated on CREW AFES T/A panel?

no / yes

Problem is solved.

I. 1. Locate the fire extinguisher indicated as faulty by the CREW AFES T/A panel LED and disconnect it from the harness 12352315 W3.

CREW AFES T/APANEL



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2-19. TROUBLESHOOTING CHART (continued).

w. AFES, CREW (continued).	(7) AFES MEGOMETER TROUBLESHOOTING PROCEDURES (continued).

CONTINUED FROM I

1. 2. Using extension cable TC6, connect the fire extinguisher connector to the W3 wiring harness to connector TJ6 of the test box, which simulates a good fire extinguisher.

   3. Observe the status of the CREW AFES T/A panel fault LED.

Does the fault LED go out?

no

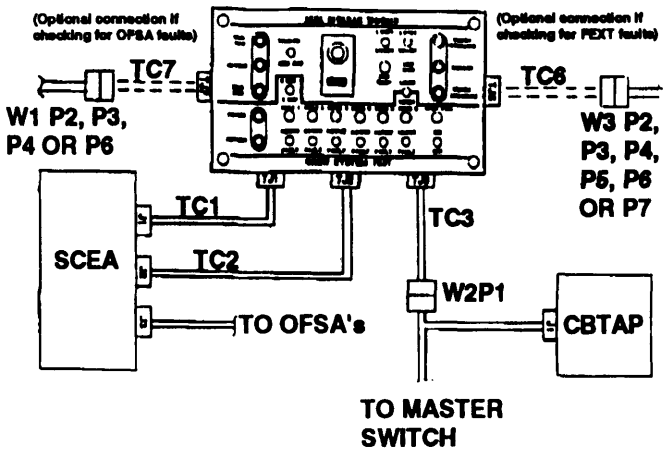
Replace harness 12352315 W3 (para 7-77). Verify problem is solved.

yes

Replace faulty crew fire extinguisher cylinder bottle (para 21-5). Verify problem is solved.

END OF TASK

CREW COMPARTMENT TEST SETUP

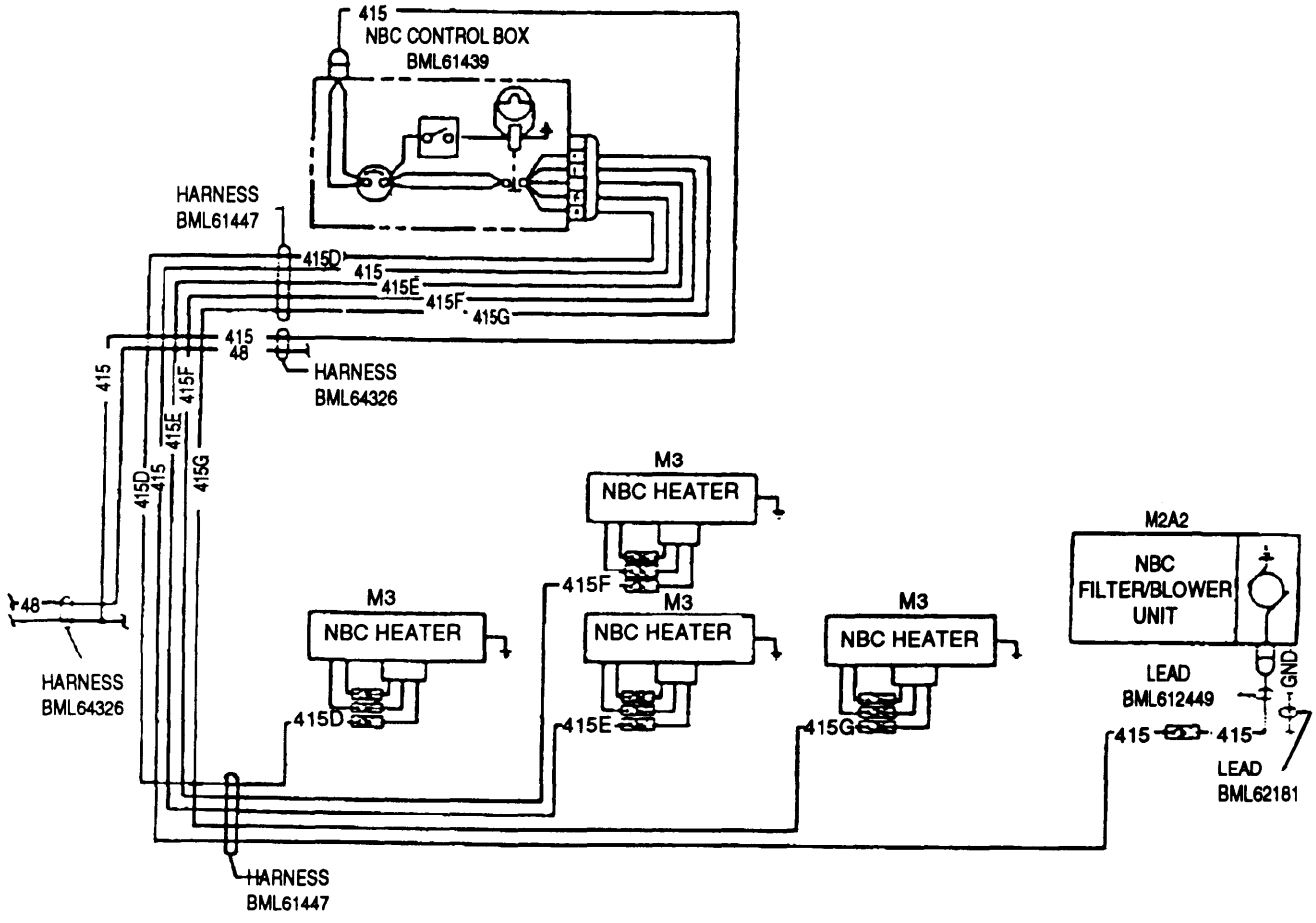


2-19. TROUBLESHOOTING CHART (continued).

x. NBC SYSTEM.

The NBC system consists of four M3 electric air heaters, M2A2 air purifier, NBC control box, related electrical wiring, and the individual crew VFPS and hoses. The relationship of these components is shown in the diagram below.

To operate the NBC system the MASTER switch and the NBC POWER switch must be turned on. 24vdc is supplied from the batteries, through the MASTER relay to the NBC control box. The NBC control box then applies the voltage to each M3 electric air heater. The M3 electric air heaters are individually controlled with a rheostat type switch.



ELECTRICAL SCHEMATIC

2-19. TROUBLESHOOTING CHART (continued).

x. NBC SYSTEM (continued).	(1) NO FAN OPERATION FROM M2A2 AIR PURIFIER.

Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

NOTE

- Instead of using multi meter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multimeter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.

A. 1. Disconnect wire 415C harness 12330298 from M2A2 air purifier.

2. Place multimeter red lead in wire 415C and ground black lead.

3. Turn MASTER switch ON (refer to TM 9-2350-287-10).

4. Check for 24 ± 3 vdc.

5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

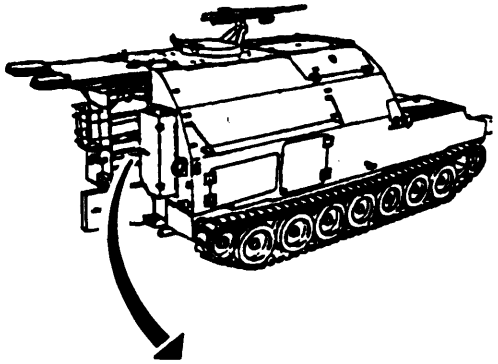
no

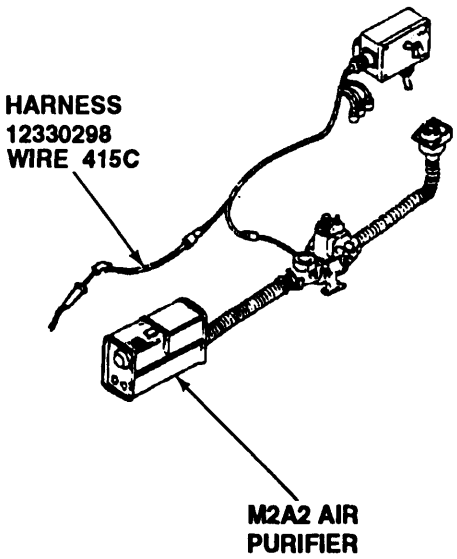
yes

Replace M2A2 unit (para 22-2). Verify problem is solved.

B. 1. Reconnect wire 415C harness 12330298 to M2A2 air purifier.

2. Disconnect harness 12330298 from NBC wiring harness 12330296.





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2-19. TROUBLESHOOTING CHART (continued).

x. NBC SYSTEM (continued).	(1) NO FAN OPERATION FROM M2A2 AIR PURIFIER UNIT (continued).

CONTINUED FROM B

B. 3. Place multimeter red lead on terminal of wire 415C of NBC wire harness 12330296 and ground black lead.

4. Turn MASTER switch and NBC POWER switch ON (refer to TM 9-2350-287-10).

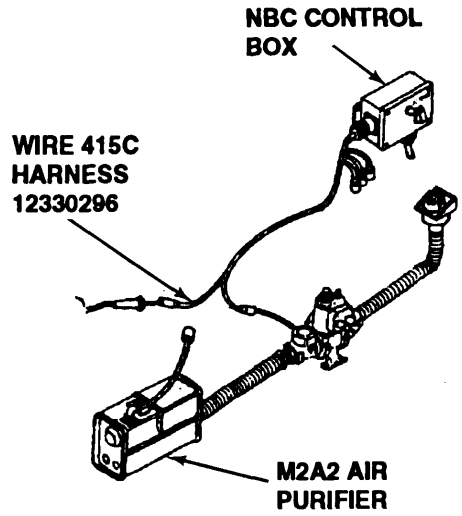
5. Check for 24 ± 3 vdc.

6. Turn MASTER switch and NBC power switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no → Repair wire 415C or replace harness 12330296 (para 7-69) Verify problem is solved.

yes



C. 1. Reconnect harness 12330298 to NBC wiring harness 2330296.

2. Disconnect NBC wire harness 12330296 from NBC control box J2 connector.

3. Place multimeter red lead in socket B of NBC control box output and ground black probe.

4. Turn MASTER switch and NBC POWER switch ON (refer to TM 9-2350-287-10).

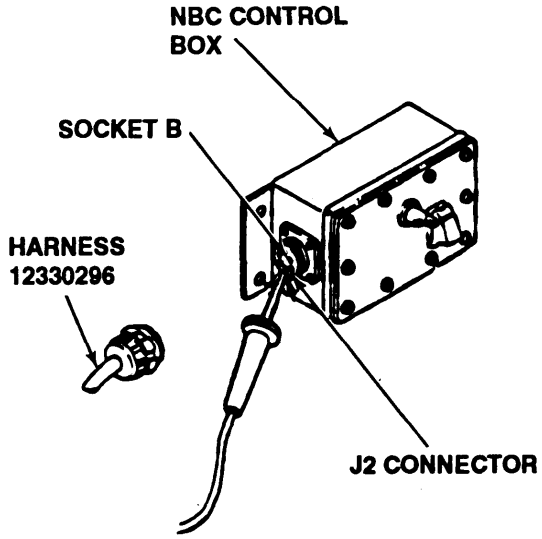
5. Check for 24 ± 3 vdc.

6. Turn MASTER switch and NBC POWER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no → Repair wire 415C or replace NBC WIRING harness 12330296 (para 7-69). Verify problem is solved.

yes



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2-19. TROUBLESHOOTING CHART (continued).

x. NBC SYSTEM (continued).	(1) NO FAN OPERATION FROM M2A2 AIR PURIFIER (continued).

CONTINUED FROM C

D. 1. Reconnect NBC wiring harness 12330296 to NBC control box J2 connector.

2. Disconnect wire harness 12376405, wire 415 from NBC control box J1 connector.

3. Place multimeter red lead in wire 415 socket and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

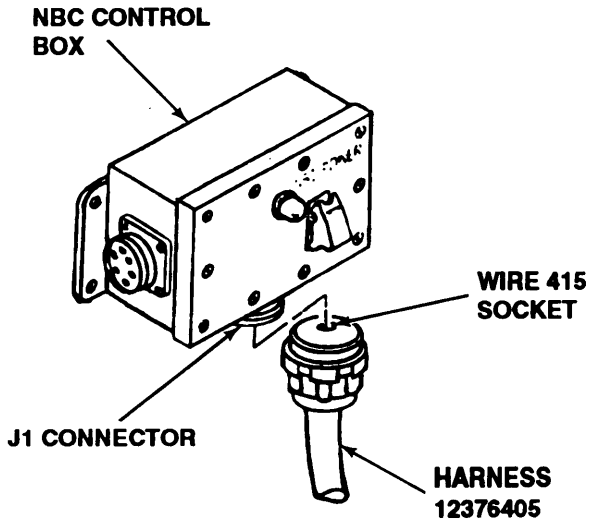
5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no → **CONTINUED AT STEP E**

yes



E. 1. Reconnect wire harness 12376405, wire 415 to NBC control box connector J1.

2. Disconnect wire harness 12376405, wire 10 from driver's bulkhead.

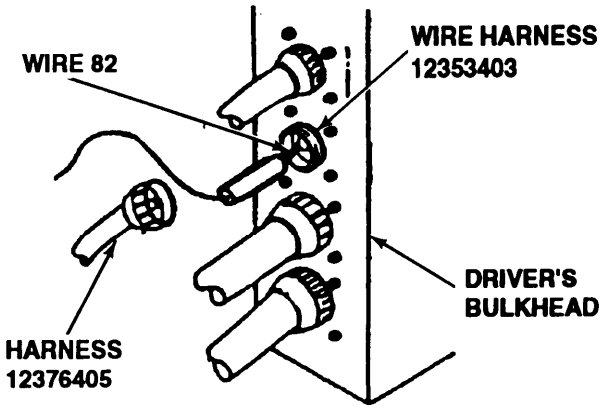
3. Place red lead of multimeter in wire 82 socket wire harness 12353403 and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?



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2-19. TROUBLESHOOTING CHART (continued).

x. NBC SYSTEM (continued).	(1) NO FAN OPERATION FROM M2A2 AIR PURIFIER UNIT (continued).

CONTINUED FROM E

no / yes

Repair wire 10 or replace wire harness 12376405 (para 7-57). Verify problem is solved.

F. 1. Reconnect wire harness 12376405 to driver's bulkhead.

2. Disconnect wire harness 12353403 from master relay.

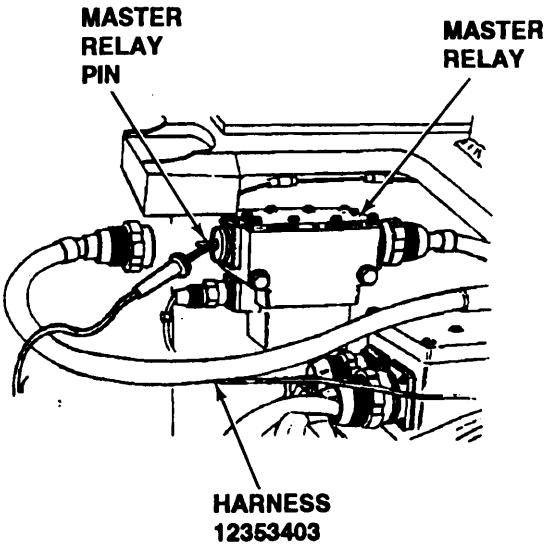
3. Place red lead of multimeter on master relay pin and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?



no / yes

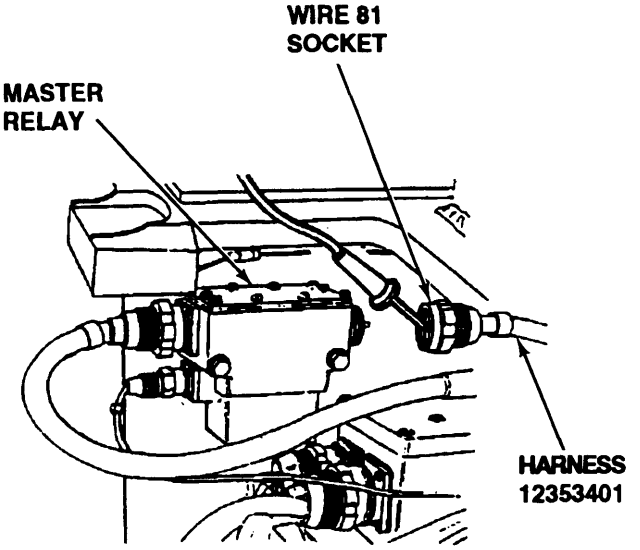
Repair wire 82 or replace wire harness 12353403 (para 7-49). Verify problem is solved.

G. 1. Reconnect wire harness 12353403 to master relay.

WARNING

Wire 81 is a live wire with 24 vdc. Take appropriate precautions (refer to TM 9-2350-287-10).

2. Disconnect wire harness 12353401 from master relay.



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2-19. TROUBLESHOOTING CHART (continued).

x. NBC SYSTEM (continued).	(1) NO FAN OPERATION FROM M2A2 AIR PURIFIER (continued).

CONTINUED FROM G

G. 3. Place red lead of multimeter in wire 81 socket and ground black lead.

4. Turn MASTER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage indicated?

no

yes

Repair or replace master relay box (para 7-21). Verify problem is solved.

Check batteries for charge. If batteries are fully charged, replace wire 81 (para 7-51). If batteries are not fully charged, recharge them. Verify problem is solved.

END OF TASK

2-19. TROUBLESHOOTING CHART (continued).

x. NBC SYSTEM (continued).	(2) ONE OR MORE M3 UNITS (ELECTRIC AIR HEATERS) FAIL TO OPERATE. No flow from M2A2 air purifier unit.

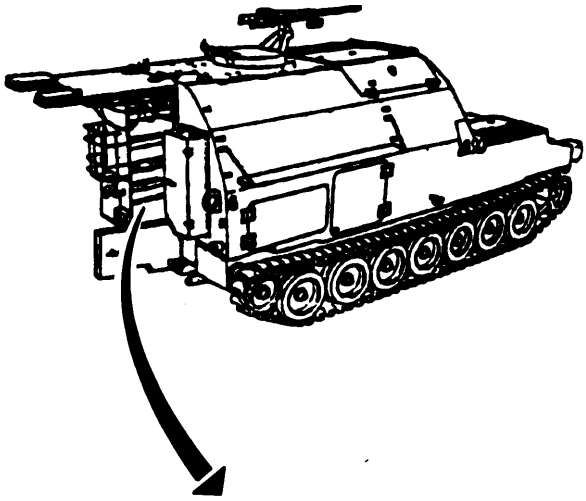
Initial Setup:

Tools/Test Equipment:
- Digital multimeter (DMM) (Item 13, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)

Equipment Conditions:
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

NOTE

- Instead of using multimeter for voltage check, STE/ICE troubleshooting, INDIVIDUAL BATTERY VOLTAGE TEST-TEST 89 maybe performed.
- Instead of using multi meter for continuity check, STE/ICE troubleshooting, TEST 91 may be performed.
- M3 electric air heaters can require up to 15 minutes of warm-up before producing heat.



A. Check hose(s) between M2A2 unit and inoperative M3 unit(s).

Are hoses in good condition?

no → Repair and replace hoses (para 22-5). Verify problem is solved.

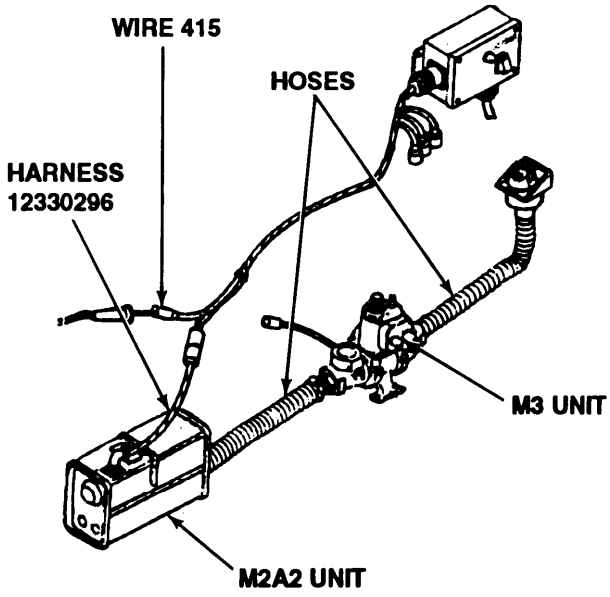
yes →

B. 1. Disconnect harness 12330296 at input connection from defective M3 unit(s).

2. Place red lead of multimeter in wire 415 and ground black probe.

3. Turn MASTER switch and NBC POWER switch ON (refer to TM 9-2350-287-10).

4. Check for 24 ± 3 vdc.



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2-19. TROUBLESHOOTING CHART (continued).

x. NBC SYSTEM (continued).	(2) ONE OR MORE M3 UNITS (ELECTRIC AIR HEATERS) FAIL TO OPERATE. No flow from M2A2 air purifier unit (continued).

CONTINUED FROM B

B. 5. Turn MASTER switch OFF (refer to TM 9-2350-287-10).

Is voltage present?

no — Yes

Replace M3 electric air heater(s) (para 22-3). Verify problem is solved.

C.

NOTE

Trace the electrical lead from the defective M3 unit back to the harness connector pin on the NBC control box (J2 connector). Leads are numbered (415D to 415G) for easy identification.

1. Reconnect wire harness 12330296 to input connection of M3 unit(s).

2. Disconnect harness from NBC control box J2 connector.

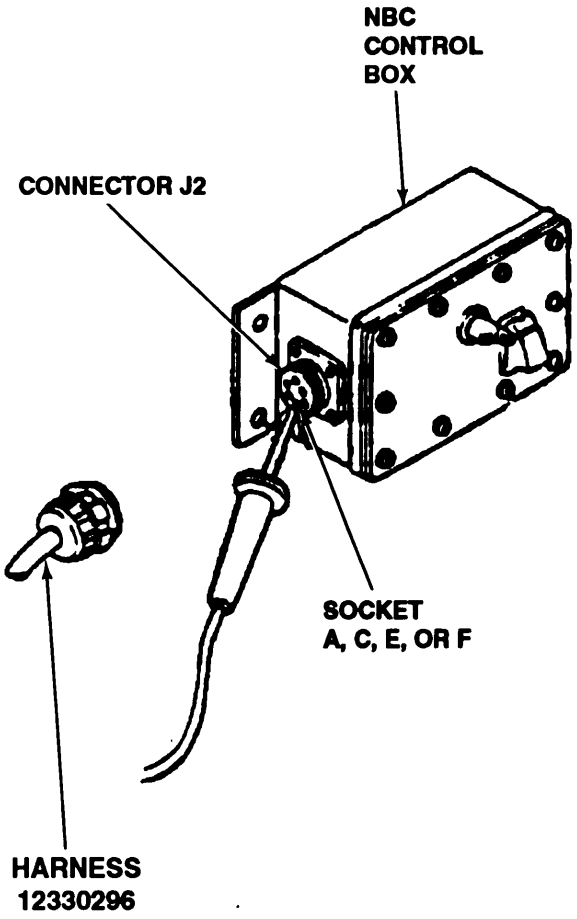
3. Place red lead of multimeter in sockets A,C,E or F (depending on which M3 unit is defective) of control box power box outlet and ground black probe.

4. Turn MASTER switch and NBC POWER switch ON (refer to TM 9-2350-287-10).

5. Check for 24 ± 3 vdc.

6. Turn MASTER switch and NBC power switch OFF (refer to TM 9-2350-287-10).

Is voltage present?



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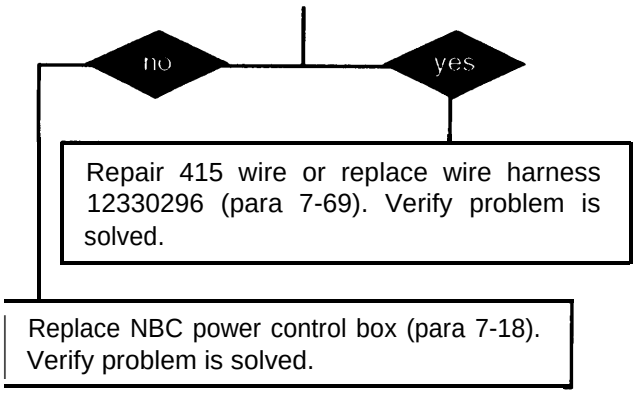
2-19. TROUBLESHOOTING CHART (continued).

x. NBC SYSTEM (continued).	(2) ONE OR MORE M3 UNITS (ELECTRIC AIR HEATERS) FAIL TO OPERATE. No flow from M2A2 air purifier unit (continued).

CONTINUED FROM C



END OF TASK

2-20. GENERAL STE/ICE TEST METHODS.

NOTE

This test set is now designated as STE/ICE-R (reprogrammable). The “R” indicates its circuit boards can now be reprogrammed at depot. There are no other changes to this test set. For testing purposes, STE/ICE and STE/ICE-R are the same.

The Simplified Test Equipment for Internal Combustion Engines (STE/ICE) connects to the M992A1 Diagnostic Cable Assembly (DCA) located in the driver’s compartment. The DCA reduces the mechanic’s need to install test transducers and leads to perform engine and engine component diagnostic checks. STE/ICE provides measurements on voltage resistance, pressure, temperature and speed to analyze the conditions of an engine system. STE/ICE also provides a thorough preventive maintenance check on the M992A1 engine as part of service upon receipt and as an annual check in PMCS.

a. Engine Testing.

The STE/ICE equipment is used for two different test methods. The PMCS tests check the general condition of the M992A1 engine. Using STE/ICE for troubleshooting will isolate a malfunction down to the defective part or assembly.

b. PMCS Test Method.

The PMCS Test consists of a pre-test inspection and STE/ICE testing.

1. Pre-test Inspections. Before using STE/ICE do the following inspections:

   (a) Fan Belts - Check for proper tension., Replace if cracked or frayed.

   (b) Ignition Cables - Make sure they are in good condition and securely connected.

   (c) Oil Levei - Check oil. If low, fill to proper level.

   (d) Fuel Level - Make sure there is enough fuel for testing.

   (e) Radiator - Check water Ievel. If low, fill to proper level.

   (f) Battery- If the case is cracked or terminal post is damaged, replace battery. Clean off any corrosion. Make sure connections to ground and starter are clean and in good condition. Check electrolyte level. If low, fill to proper level with distilled water.

2. STE/ICE Testing. STE/ICE testing has two different sequences of tests; PMCS and Troubleshooting. A PMCS tree is a logical sequence of tests performed to determine the general condition of the engine. PMCS trees are arranged so testing starts with PMCS-(1) and goes through each PMCS tree until the test is terminated by a pass or failure. If testing is terminated by the last PMCS tree, then the vehicle has no identifiable problem. If any test is terminated by a failure, you will be sent to a Troubleshooting tree for more testing and troubleshooting to determine the cause of the failure.

Rules to follow when using the PMCS test method:

NOTE

The DCA PMCS trees are the primary troubleshooting trees. The TK PMCS trees are to be used only when the DCA connector and/or wiring is faulty.

2-20. GENERAL STE/ICE TEST METHODS (continued).

(a) Select the proper PMCS (DCA or TK) tree.

(b) Always start with PMCS tree #1. Do not start in the middle of any tree.

(c) Complete each step in a tree. Do not skip any procedure or instructions.

(d) If a PMCS tree fails a test, go to the specified troubleshooting tree or higher level of maintenance.

(e) After correcting a failed test with a troubleshooting tree, return to PMCS test #1 and restart testing to make sure there are no other problems with the vehicle.

(f) Each PMCS tree test depends on the passing of a previous test. Do not skip any test under any circumstance.

3. Vehicle Test Card (VTC). When familiar with the STE/ICE procedures, the vehicle test card can be used as a quick reference. The front of the test card has all of the information the user will need to do common measurements on the vehicle. The card has logical order (from top to bottom) of steps from powering up the VTM to completing a series of tests.

The top of the card tells you how to power up STE/ICE for the vehicle. Next, a table lists many measurements that can be useful when troubleshooting the vehicle. This table has the VTM test number, required offset test limits, engine operating condition, required special connections, expected pass/fail limits and units of measurement. The order of the measurements in this table allow for the first measurements to be taken with the engine off. This makes sure the starting system of the vehicle is in working order. Order of the other measurements are:

(a) Engine running, but not warm,

(b) Engine running and warm.

(c) Engine not running, but warm.

(d) Miscellaneous.

Hookups for the measurements used to troubleshoot the vehicle are on the back of the VTC. Measurement that require special hookups are also done on the back of the VTC.
To begin the PMCS test method, do the pre-test inspections and go to PMCS tree #1.

c. STE/ICE Troubleshooting Method.

1. STE/ICE engine troubleshooting uses only troubleshooting trees. When an engine malfunction is recognized, using the “Quick Guide to STE/ICE Troubleshooting” index will send you to a specific troubleshooting tree to isolate the cause of the malfunction.

To start the STE/ICE troubleshooting method, do the following:

NOTE

The DCA PMCS trees are the primary troubleshooting trees. The TK PMCS trees are to be used only when the DCA connector and/or wiring is faulty.

2-20. GENERAL STE/ICE TEST METHODS (continued).

(a) Select the proper troubleshooting (DCA or TK) tree.

(b) Do PMCS tree #1 to make sure STE/ICE is in working order.

(c) Do troubleshooting tree listed in “Quick Guide to STE/ICE Troubleshooting” for malfunction.

Follow the following rules when doing STE/ICE troubleshooting:

(a) Do not enter a troubleshooting tree in the middle. Always start at the beginning.

(b) Follow all instructions and procedures of a PMCS tree.

(c) After correcting a problem with a troubleshooting tree, do any testing necessary to make sure the problem no longer exists.

2-21. QUICK GUIDE TO STE/ICE TROUBLESHOOTING.

ITEM	SYMPTOM	PARAGRAPH
STE/ICE PMCS	VTM CONNECTIONS AND CHECKOUT FOR DCA	para 2-22.a(1)
	VTM CONNECTIONS AND CHECKOUT FOR TK	para 2-22.a(2)
	CURRENT FIRST PEAK TEST - DCA	para 2-22.a(3)
	CURRENT FIRST PEAK TEST - TK	para 2-22.a(4)
	ENGINE START AND LUBRICATION CHECK - DCA	para 2-22.a(5)
	ENGINE START AND LUBRICATION CHECK - TK	para 2-22.a(6)
	CHARGING VOLTAGE TEST - DCA	para 2-22.a(7)
	CHARGING VOLTAGE TEST - TK	para 2-22.a(8)
	COOLANT CHECK/ENGINE OIL PRESSURE GAGE TEST - DCA	para 2-22.a(9)
	COOLANT CHECK/ENGINE OIL PRESSURE GAGE TEST - TK	para 2-22.a(10)
	GOVERNOR CHECK/POWER TEST - DCA	para 2-22.a(11)
	GOVERNOR CHECK/POWER TEST - TK	para 2-22.a(12)
	IDLE SPEED CHECK - DCA	para 2-22.a(13)
	IDLE SPEED CHECK - TK	para 2-22.a(14)
	COMPRESSION UNBALANCE TEST - DCA	para 2-22.a(15)
STE/ICE TROUBLE-SHOOTING	GENERATOR NEGATIVE CABLE DROP-TEST 84	para 2-22.b(1)
	STARTER CIRCUIT RESISTANCE-TEST 74	para 2-22.b(2)
	BATTERY INTERNAL RESISTANCE-(DCA) - TEST 73	para 2-22.b(3)
	BATTERYRESISTANCE CHANGE-TEST 75	para 2-22.b(4)
	STARTER NEGATIVE CABLE DROP-TEST 69	para 2-22.b(5)

2-21. QUICK GUIDE TO STE/ICE TROUBLESHOOTING.

ITEM	SYMPTOM	PARAGRAPH
	GENERATOR FIELD VOLTAGE - TEST 83	para 2-22.b(6)
	FUEL PRESSURE RETURN - TEST 49	para 2-22.b(7)
	CHARGING CIRCUIT (at battery) - TEST 67	para 2-22.b(8)
	ENGINE RPM - TEST 10	para 2-22.b(9)
	COMPRESSION UNBALANCE - TEST 14	para 2-22.b(10)
	ENGINE POWER PERCENTAGE - TEST 13	para 2-22.b(11)
	GENERATOR OUTPUT VOLTAGE - TEST 82	para 2-22.b(12)
	FUEL SUPPLY PRESSURE (DCA and TK) - TEST 24	para 2-22.b(13)
	CRANKING CURRENT - TEST 71	para 2-22.b(14)
	CURRENT FIRST PEAK - TEST 72	para 2-22.b(15)
	STARTER SOLENOID VOLTAGE - TEST 70	para 2-22.b(16)
	VEHICLE OIL PRESSURE - TEST 50	para 2-22.b(17)
	AIR FILTER PRESSURE DIFFERENTIAL - TEST 28	para 2-22.b(18)
	STARTER POSITIVE TERMINAL VOLTAGE - TEST 68	para 2-22.b(19)
	INDIVIDUAL BATTERY VOLTAGE TEST - TEST 89	para 2-22.b(20)
	AIR BOX PRESSURE - TEST 32	para 2-22.b(21)
	FUEL PRESSURE DROP - TEST 26	para 2-22.b(22)

2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE).

a. STE/ICE PMCS - (continued). (1) VTM CONNECTIONS AND CHECKOUT FOR DCA.

WARNING

To prevent personal injury, do not connect or disconnect VTM while engine is running.

CAUTION

Connect connector P1 of DCA cable W1 to J1 on the VTM before connecting to the diagnostic connector.

Connect battery to VTM:

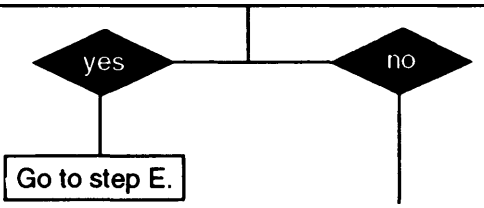
1. Pull VTM power switch to the OFF position.
2. Connect DCA cable WI connector P1 to VTM connector J1.
3. Connect DCA cable W1 connector P2 to harness W100 connector P4 DCA receptacle.
4. Make sure all connections are correct and tightened.

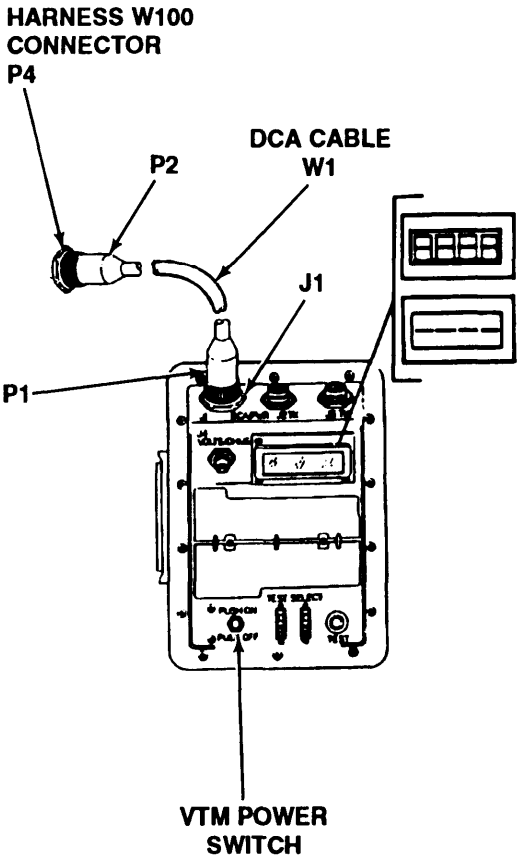
NOTE

Place the VTM so only its rubber feet touch the vehicle ordo all testing with the MASTER switch ON. This will prevent sparking during testing. Sparking will interrupt testing, but will not damage the VTM.

A. 1. Push power switch on VTM to ON position.
2. Make sure VTM display shows “8.8.8.8” for two seconds and then changes to”- ---.”

Does VTM display show “8.8.8.8” and then change to . . . . . ?





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2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

a. STE/ICE PMCS - (continued).	(1) VTM CONNECTIONS AND CHECKOUT FOR DCA (continued).

Continued from step A

B. Make sure VTM display lights up.

Does VTM display light up?

yes / no

If only part of display shows, module may beburned out. Go to TM 9-4910-571-12&P for replacement.

C. 1. Pull VTM power switch to OFF position.
2. Check and clean battery connections and all interconnecting cables.
3. Push VTM power switch to ON.

Does VTM display show ".8.8.8.8" and then change to "- - - -?"

yes / no

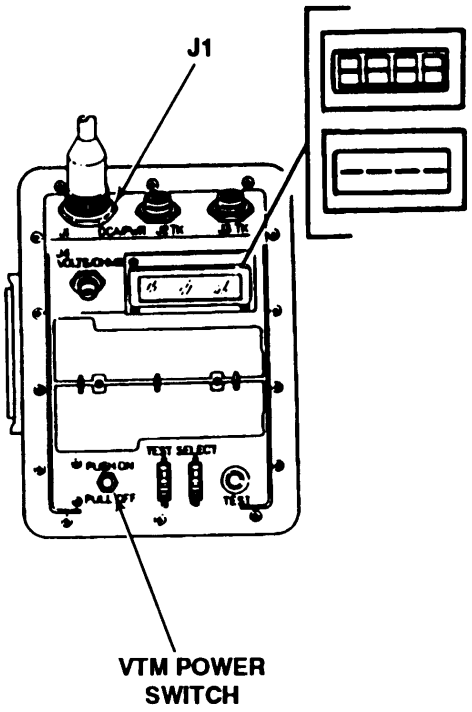
Go to step F.

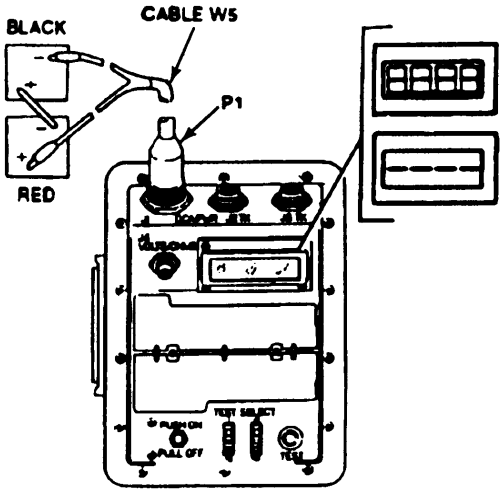
D. 1. Pull VTM power switch to OFF position.
2. Disconnect DCA cable W1 from harness W100 DCA receptacle and from STE/ICE VTM connector J1.
3. Connect DCA cable W5 to VTM connector Jl.
4. Connect DCA cable W5 to known good battery.
5. Push VTM power switch to ON position.

Does VTM display show ".8.8.8.8" and then change to "- - -?"

yes / no

Go to TM 9-4910-571-12&P to fault isolate cable W5.





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2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

a. STE/ICE PMCS - (continued). (1) VTM CONNECTIONS AND CHECKOUT FOR DCA (continued).

Continued from step D

E. 1. Check battery electrolyte level (refer to TM 9-2350-287-10).
2. Clean battery terminals (refer to TM 9-2350-287-10).
3. Check battery specific gravity (refer to TM 9-2350-287-10).
4. If required, charge batteries.
5. Return to step A.

If the problem reoccurs, check for broken or loose connections in the DCA wiring from the battery or in cable W1.

Continued from step C

F. 1. Dial 66 into TEST SELECT to run confidence test.
2. Press and release TEST button.

Does VTM show and hold “0066”?

yes → Go to step H.

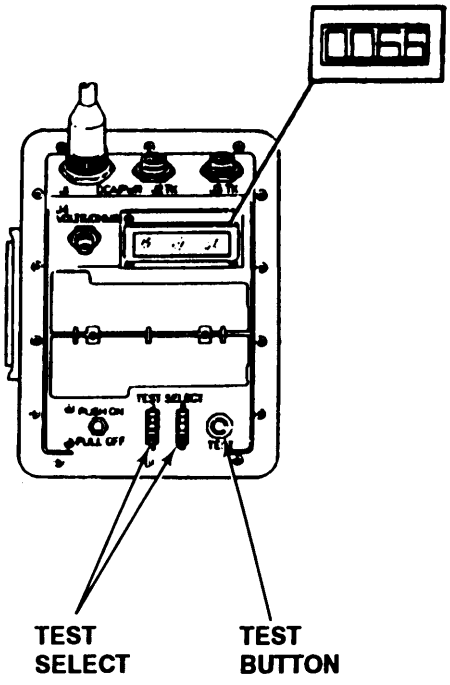
no →

G. 1. Pull VTM power switch to OFF position.
2. Do step A one time.
3. Do step D again, one time.

Does VTM show and hold “0066”?

yes → Go to step H.

no → Replace faulty STE/ICE (refer to TM 9-4910-571-12&P).



2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

a. STE/ICE PMCS - (continued). (1) VTM CONNECTIONS AND CHECKOUT FOR DCA (continued).

Continued from step E and F

G. 1. Dial 99 into TEST SELECT.
2. Press and release TEST button.

Does VTM show “0099” and “.8.8.8.8”?

NOTE

All numbers of the display should be illuminated. If some parts of the display are not, go to TM 9-4910-571-12&P to replace module,

yes → Go to step G.

no

H. 1. Make sure several series of numbers are showing on display. This means the VTM is going through confidence test.
2. Look for VTM to show and hold the word ‘PASS”.

Does VTM show and hold the word ‘PASS”?

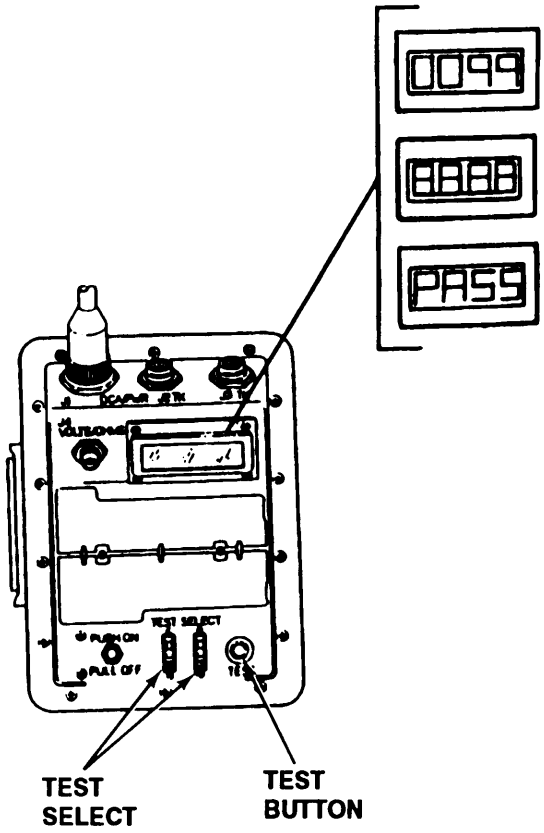
yes

no → Go to TM 9-4910-571-12&P for confidence test fault isolation.

NOTE

VTM can fail confidence test because of a bad transducer. If failure happens when connected with cable W1, disconnect all cables from VTM and connect only W. Clip W5 to vehicle batteries. If VTM passes test, a transducer is bad in the DCA. Continue testing with TK PMCS troubleshooting trees starting with para 2-22.a(2). If VTM still fails, VTM has failed internally.

Continued to step I



2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

a. STE/ICE PMCS - (continued).	(1) VTM CONNECTIONS AND CHECKOUT FOR DCA (continued).

Continued from step H

1. 1. Dial 60 into TEST SELECT.
   2. Press and release TEST button. Message "UEH" should be shown.
   3. When "UEH" message is shown, dial in the identification number 11.
   4. Press and release TEST button.

Does VTM display identification number 11 ?

NOTE

If error message "E010" is shown, wrong VID has been entered.

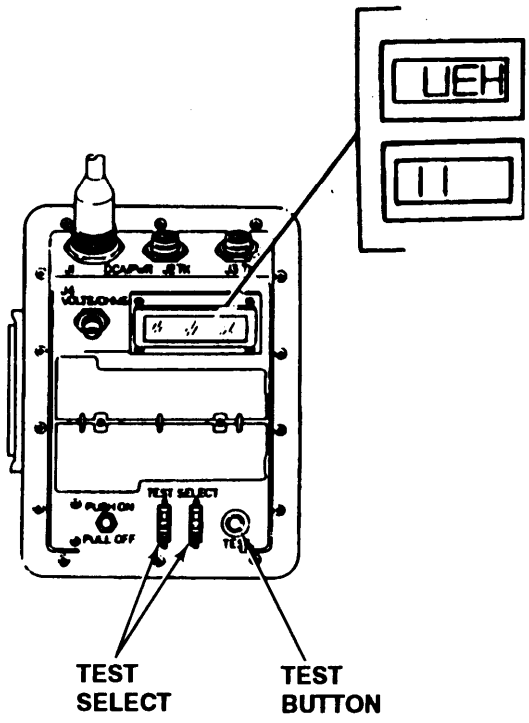
yes → Go to para 2-22.a(3).

no →

J. Does VTM show an error message?

yes → Replace faulty STE/ICE (refer to TM 9-4910-571-12&P). Verify problem is solved.

no → Do error message fault isolation (refer to TM 9-4910-571-12&P).



END OF TASK

2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

a. STE/ICE PMCS - (continued). (2) VTM CONNECTIONS AND CHECKOUT FOR TK.

WARNING

To prevent personal injury, do not connect or disconnect VTM white engine is running.

CAUTION

Connect connector P1 of DCA cable W5 to J1 on the VTM before connecting clip leads to the battery.

Connect battery to VTM:
1. Pull VTM power switch to the OFF position.
2. Connect cable W5 connector P1 to VTM connector J1.
3. Connect red clip lead to positive terminal of battery and connect black lead to negative terminal.

NOTE

Place the VTM so only its rubber feet touch the vehicle or do all testing with the MASTER switch ON. This will prevent sparking during testing. Sparking will interrupt testing, but will not damage the VTM.

A. 1. Push power switch on VTM to ON position.
2. Make sure VTM display shows “8.8.8.8” for two seconds and then changes to’- -- -“.

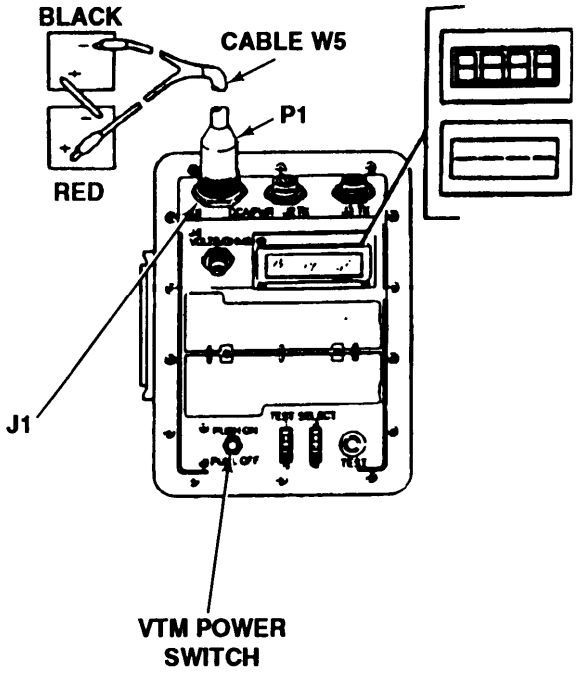
Does VTM display show “8.8.8.8” and then change to “- -- -“?

yes — Go to step D.

no

B. Make sure VTM display lights up.

Does display light up?



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2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

a. STE/ICE PMCS - (continued). (2) VTM CONNECTIONS AND CHECKOUT FOR TK (continued).

Continued from Step B

yes / no

If only part of display shows, module may be burned out. Go to TM 9-4910-571-12&P for replacement.

C. 1. Pull VTM power switch to OFF position.
2. Check and clean battery connections and all interconnecting cables.
3. Push VTM power switch to ON position.

Does VTM display show ".8.8.8.8" and then change to '- -- -"?

yes / no

Go to step E.

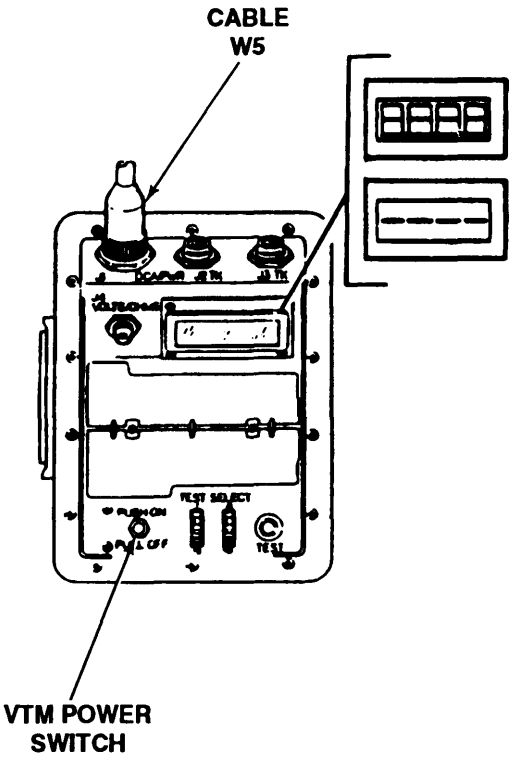
D. 1. Pull VTM power switch to OFF position.
2. Disconnect DCA cable W5 from battery and connect to a known good battery.
3. Push VTM power switch to ON position.

Does VTM display show ".8.8.8.8" and then change to "- -- -"?

yes / no

Go to TM 9-4910-571-12&P to fault isolate cable W5. If W5 cable IS good, replace STE/ICE. Verify promblen is solved.

1. Check battery electrolyte level (refer to TM 9-2350-287-10).
2. Clean battery terminals (refer to TM 9-2350-287-10).
3. Check battery specific gravity (refer toTM 9-2350-287-10).
4. If required, charge batteries.
5. Return to step A.



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2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

a. STE/ICE PMCS - (continued).

(2) VTM CONNECTIONS AND CHECKOUT FOR TK (continued).

Continued from previous page

E. 1. Dial 66 into TEST SELECT to run confidence test.
2. Press and release TEST button.

Does VTM show and hold “0086”?

yes → Go to step G.

no

F. 1. Pull VTM power switch to OFF position.
2. Do step A one time.
3. Do step D again, one time.

I Does VTM show and hold “0086”?

yes → Replace faulty STE/ICE (refer to TM 9-4910-571-12&P).

no

G. 1. Dial 99 into TEST SELECT.
2. Press and release TEST button.

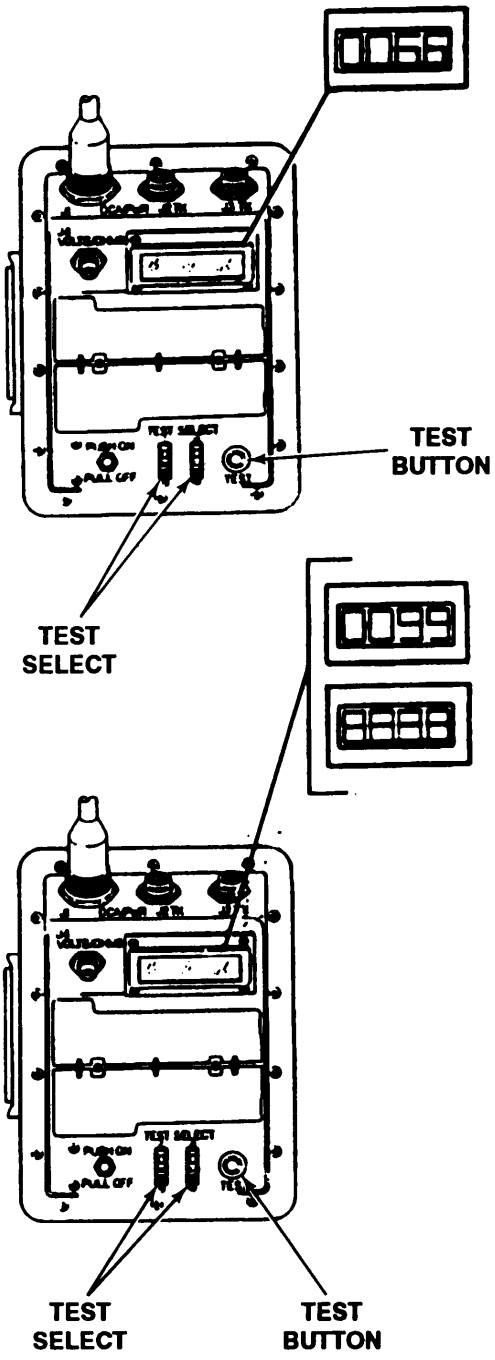
Does VTM show “0099” and “.8.8.8.8”?

NOTE

All numbers of the display should be illuminated. If some parts of the display are not, go to TM 9-4910-571-12&P and replace module.

yes

no → Go to step E.



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2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

a. STE/ICE PMCS - (continued).	(2) VTM CONNECTIONS AND CHECKOUT FOR TK (continued).

Continued from step G

H. 1. Make sure several series of numbers are showing on display. This means the VTM is going through confidence test.
2. Look for VTM to show and hold the word "PASS".

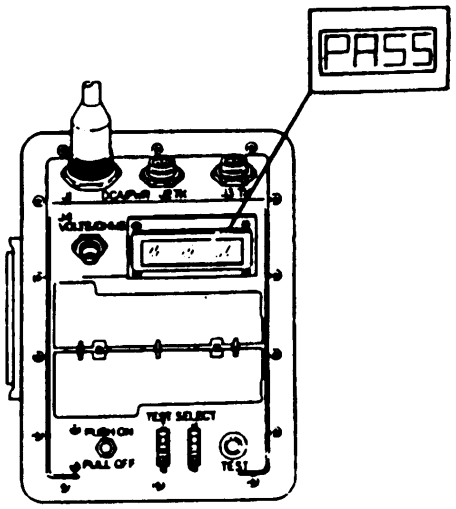
Does VTM show and hold the word "PASS"?

yes / no

NOTE

VTM can fail confidence test because of a bad transducer. If failure happens when connected with cable W5, disconnect all cables from J2, J3 and J4, then try again. If it passes, a transducer is bad. If it fails, the VTM has failed internally.

G0 to TM 9-4910-571-12&P for confidence test fault isolation.



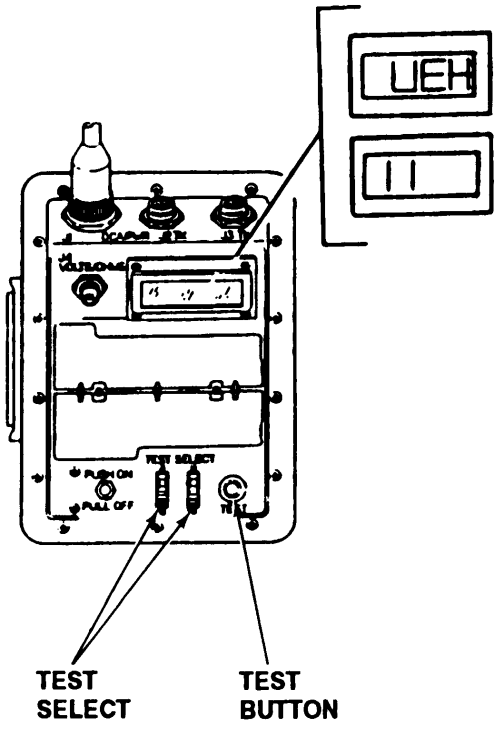
1. 1. Dial 60 into TEST SELECT.
2. Press and release TEST button. Message "UEH" should be shown.
3. When "UEH" message is shown, dial in the identification number11.
4. Press and release TEST button.

Does VTM display identification number 11 ?

yes / no

Go to step K.

J. Does VTM show an error message?



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2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

a. STE/ICE PMCS - (continued). (2) VTM CONNECTIONS AND CHECKOUT FOR TK (continued).

Continued from step J

yes

no

Replace faulty STE/ICE (refer to TM 9-4910-571-12&P).

Do error message fault isolation (refer to TM 9-4910-571-12&P).

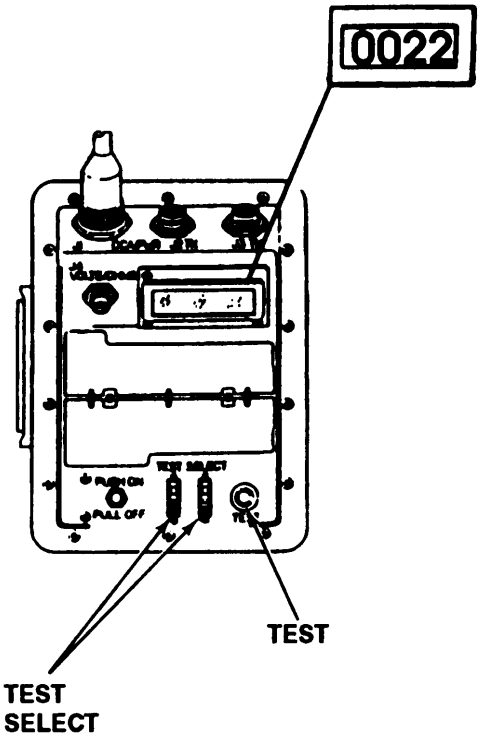
K. 1. Dial 67 into TEST SELECT, press and release TEST button.
2. Observe VTM display.

Is voltage above +22 vdc?

yes

no

Check VTM connections, clean battery connections, check specific gravity and charge batteries if necessary.
Troubleshoot W5 in accordance with TM 9-4910-571-12&P. After repairs, repeat para 2-22.a(2).



WARNING

- Protective fan screens must be installed prior to doing maintenance in the engine compartment when the engine is running or engine is in ground hop mode. Contact with rotating fan can cause serious personal injury.
- To prevent injury to personnel, turn engine OFF before installing pulse tachometer.

CAUTION

Clean all mounting surfaces before you install the transducer to keep foreign substances from damaging the engine or the transmission.

2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

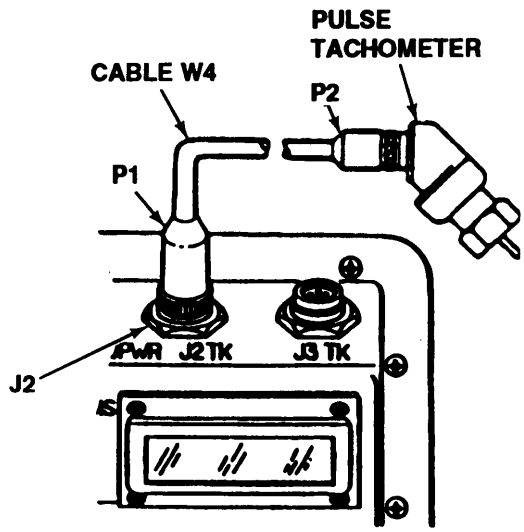
a. STE/ICE PMCS - (continued).	(2) VTM CONNECTIONS AND CHECKOUT FOR TK (continued).

Continued from previous page

NOTE

If rpm or power tests vary more than +5%, tach drive adapter and pulse tachometer should be removed from the tach cable. You might have to rotate the tach speed adapter to connect the pulse tachometer.

L. 1. Install fan protective screens (para 2-8).
2. Disconnect tachometer cable from engine (para 20-2).
3. Install pulse tachometer on engine.
4. Connect cable W4 connector P1 to VTM connector J2.
5. Connect cable W4 connector P2 to the connector on the pulse tachometer. Make sure cable W4 is clear of belts and fans.



Go to Para 2-22.a(4)

END OF TASK

2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

a. STE/ICE PMCS - (continued).

(3) CURRENT FIRST PEAK TEST - DCA.

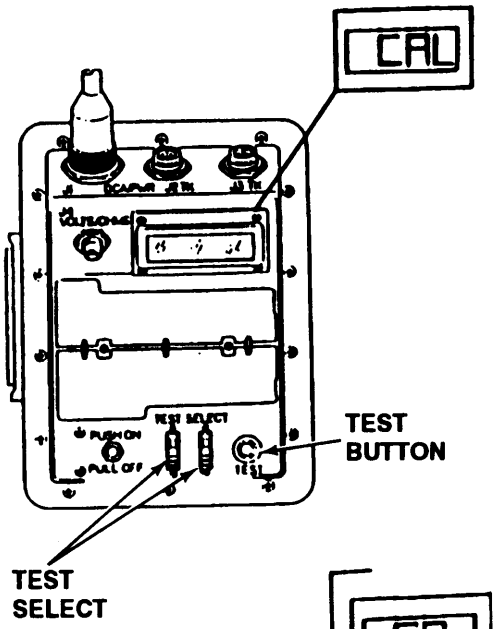
A. 1. Turn MASTER switch to OFF (refer to TM 9-2350-287-10).
2. Dial 72 into TEST SELECT.
3. Press and hold TEST button until the message 'CAL" appears on the display, then release.
4. Wait for offset value to appear.

Is offset value in the limits of -225 to +225?

yes

no

Go to TM 9-4910-571-12&P for offset fault isolation



B. 1. Press and release TEST button.
2. Wait for message "GO" to appear on display.

NOTE

If ".9.9.9.9" appears, go toTM 9-4910-571 - 12&P for offset fault isolation.

3. When "GO" appears on display, pull and hold engine fuel shutoff handle and depress the starter switch until "OFF or "EO13 is on display.

NOTE

If VTM loses power and comes on again showing"- -- -" or display after cranking, go to para 2-22.b(4).

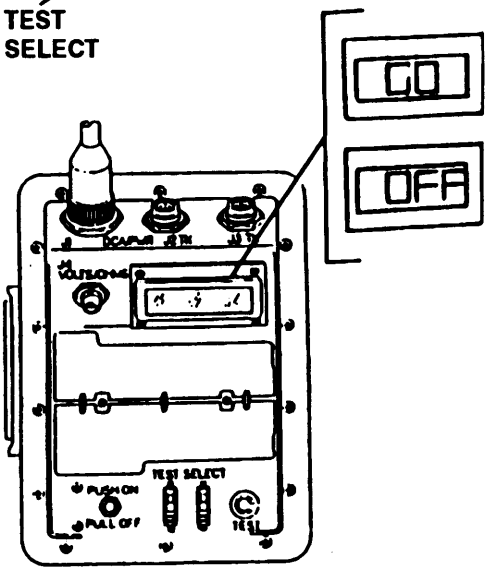
Is current within 875 to 1680 amps?

yes

no

Got to para 2-22.a(5).

Go to para 2-22.b(2).



END OF TASK

2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

a. STE/ICE PMCS - (continued).

(4) CURRENT FIRST PEAK TEST - TK.

A. 1. Turn MASTER switch to OFF (refer to TM 9-2350-287-10).
2. Connect cable W4 connector P1 to VTM connector J3 and connect cable W4 connector P2 to connector on current probe.
3. Clamp the current probe around lead 81A from battery to MASTER relay. Point arrow on the probe to the starter.
4. Make sure the probe is closed.
5. Dial 72 into TEST SELECT.
6. Press and hold TEST until the message "CAL" appears on the display, then release.
7. Wait for offset value to appear.

Is offset value in the limits of -225 to +225?

yes / no

Go to TM 9-4910-571-12&P for offset fault isolation.

B. 1. Press and release TEST button.
2. Wait for message "GO" to appear on display.

NOTE

If ".9.9.9.9" appears, go to TM 9-4910-571-12&P for offset fault isolation.

3. When "GO" appears on display, pull and hold engine fuel shutoff handle and depress the starter switch until "OFF" or "E013 is on display.

NOTE

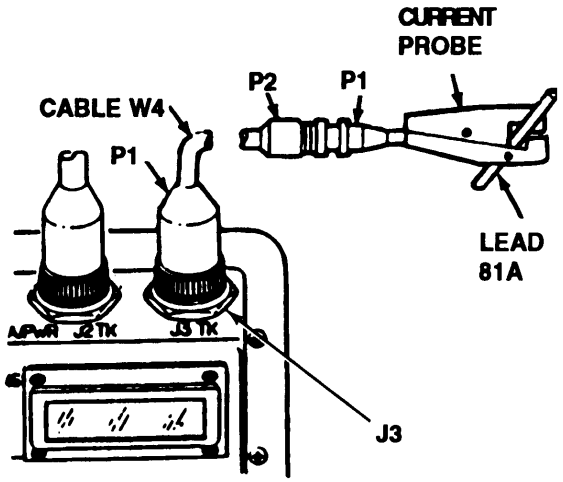
If VTM loses power and comes on again showing'- -- -" or display after cranking, go to para 2-22.b(20).

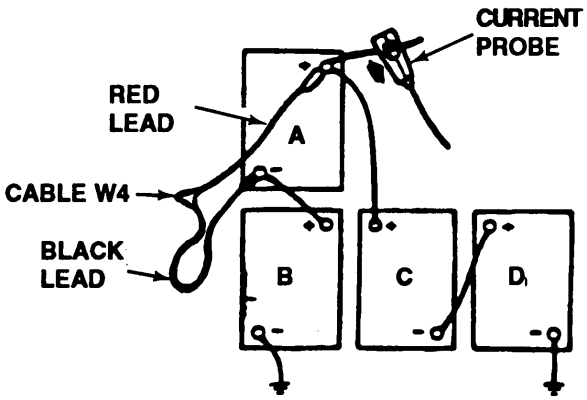
Is current within 875 to 1680 amps?

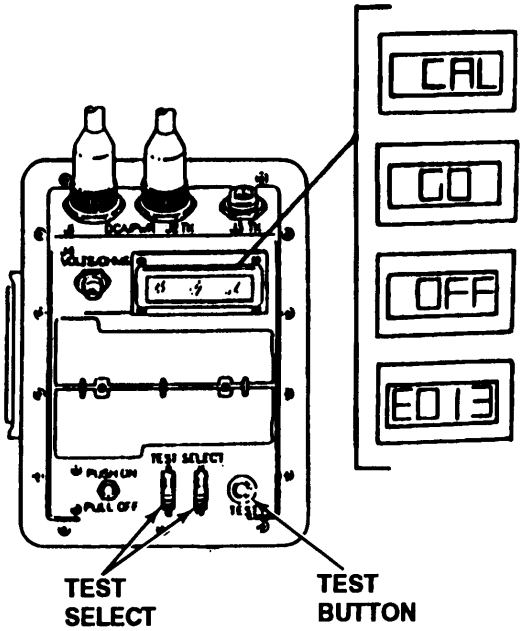
yes / no

Go to para 2-22.a(6). | Go to para 2-22.b(20).

END OF TASK







2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

a. STE/ICE PMCS - (continued). (5) ENGINE START AND LUBRICATION CHECK - DC/L

WARNING

Do not remove radiator cap when the engine is hot. Failure to follow this may result in serious Injury or burns to personnel.

CAUTION

To prevent equipment damage, check oil level and turn all hydraulic switches to OFF before starting engine.

NOTE

Check coolant level and battery electrolyte level. Add coolant and distilled water as necessary.

A. Start engine (refer to TM 9-2350-287-10).

Does engine start?

yes → Go to step C

no

B. Did engine crank?

yes → Go to para 2-22.b(9)

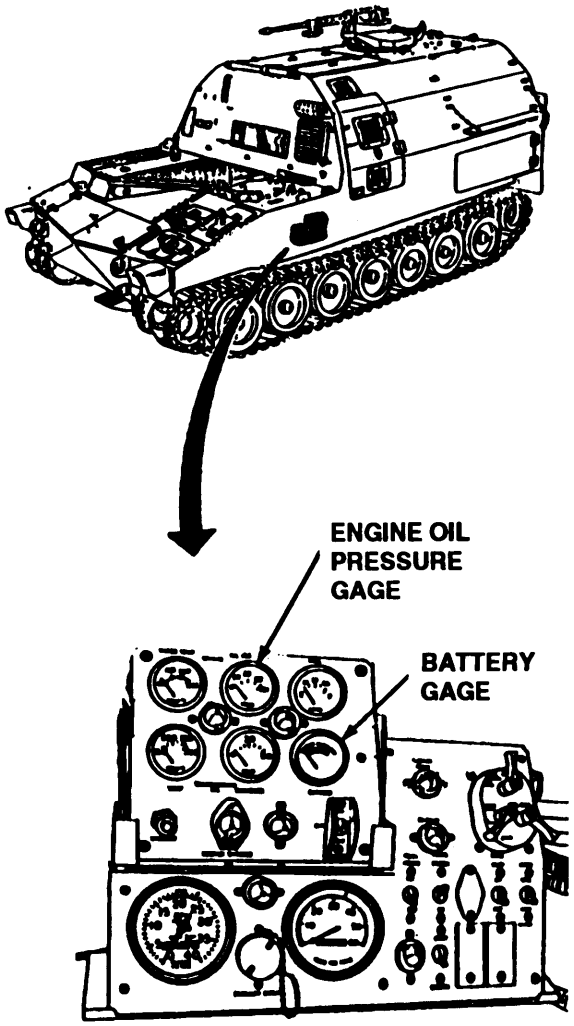
no → Go to para 2-22.b(3) and 2-22.b(9).

C. Check engine oil pressure gage to make sure pressure is at least 10 psi.

Is engine oil pressure at least 10 psi?

yes → **Continued on next page**

no → Go to para 2-22.b(17).



2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

a. STE/ICE PMCS - (continued).

(5) ENGINE START AND LUBRICATION CHECK - DCA (continued).

Continued from step C

D. Check battery gage for proper voltage (refer to TM 9-2350-287-10).

Does battery gage read normal?

yes

no

Go to para 2-22.a(7).

E. Check the rest of the vehicle gages for normal readings (refer to TM 9-2350-287-10).

Do gages have normal readings?

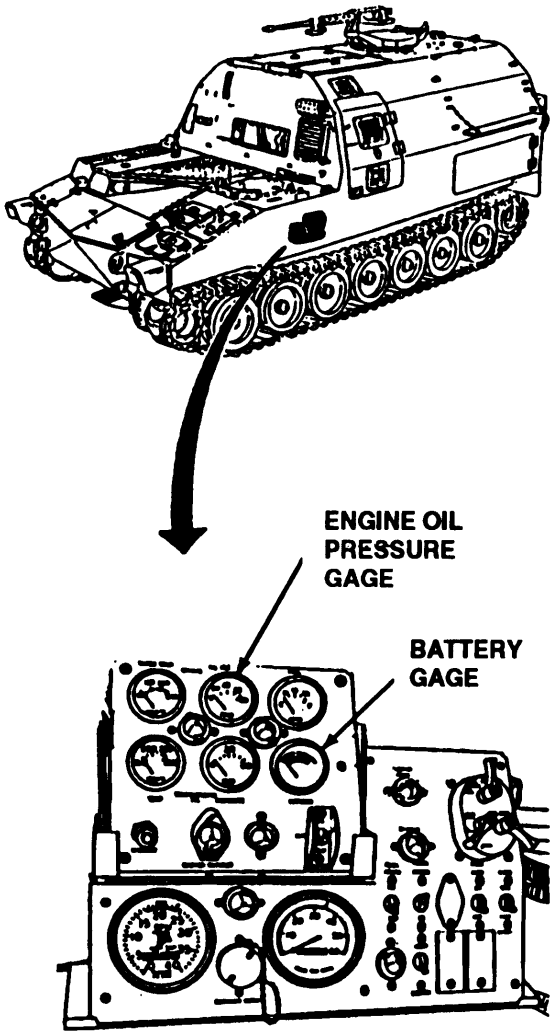
yes

no

Go to para 2-22.a(7).

Go to "QUICK GUIDE TO TROUBLESHOOTING" to find fault symptom and correct fault. Then return to para 2-22.a(3) to make sure no problems exist.

END OF TASK



2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

a. STE/ICE PMCS - (continued). (6) ENGINE START AND LUBRICATION CHECK - TK.

WARNING

Do not remove radiator cap when the engine is hot. Failure to follow this may result in serious injury or burns to personnel.

CAUTION

To prevent equipment damage, check oil level and turn all hydraulic switches to OFF before starting engine.

NOTE

Check coolant level and battery electrolyte level. Add coolant and distilled water as necessary.

A. Start engine (refer to TM 9-2350-287-10).

Does engine start?

yes → Go to step C.

no

B. Did engine crank?

yes → Go to para 2-19.g(3).

no → Go to para 2-19.g(1).

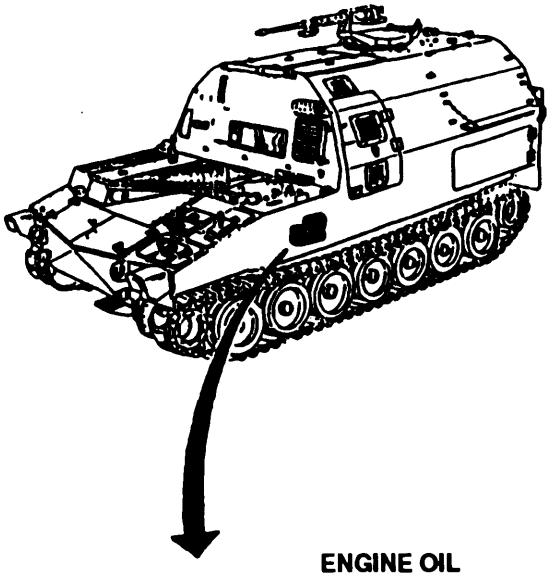
Continued from step A

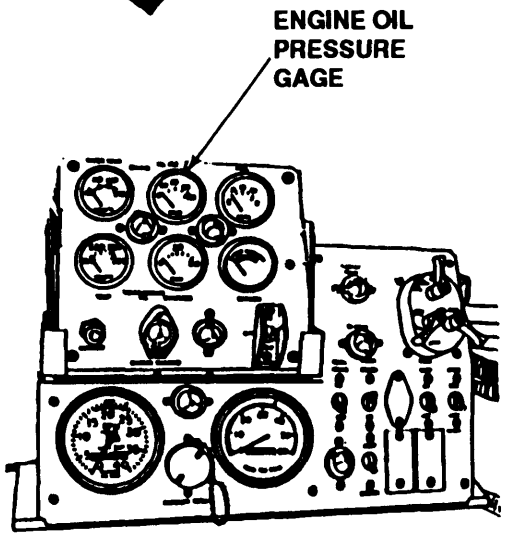
C. Check engine oil pressure gage to make sure pressure is at least 10 psi.

Is engine oil pressure at least 10 psi?

yes → Continued to next page

no → Go to para 2-22.b(17).





2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

a. STE/ICE PMCS - (continued).

(6) ENGINE START AND LUBRICATION CHECK - TK. (continued).

Continued from step C

D. Check battery gage for proper voltage (refer to TM 9-2350-287-10).

Does battery gage read normal?

yes

no

Go to para 2-22.a(8).

E. Check the rest of the vehicle gages for normal readings (refer to TM 9-2350-287-10).

Do gages have normal readings?

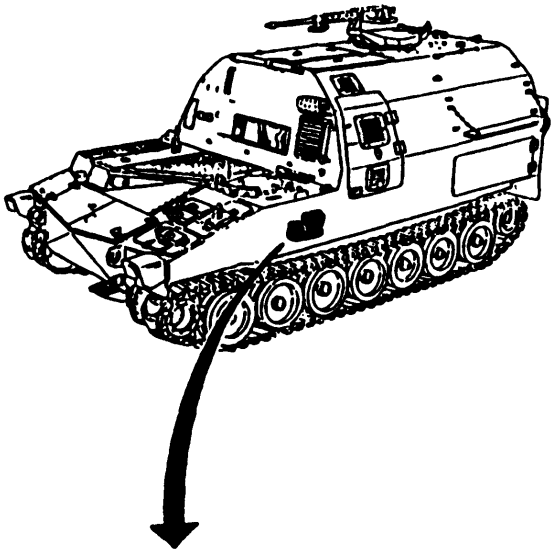
yes

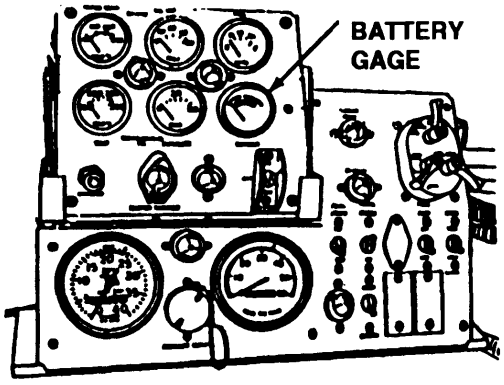
no

Go to para 2-22.a(8).

Go to "QUICK GUIDE TO TROUBLESHOOTING" to find fault symptom and correct fault. Then return to para 2-22.a(4) to make sure no problems exist.

END OF TASK





2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

a. STE/ICE PMCS - (continued).

(7) CHARGING VOLTAGE TEST - DCA.

A. 1. Dial 01 into TEST SELECT and press and release TEST button.
2. When VTM shows 'CON" on display, dial 67 into TEST SELECT and press and release TEST button.

NOTE

VTM will show battery voltage and RPM alternately. If VTM does not show RPM, a connection may be loose. Check connection between STE/ICE and pulse tachometer in driver's compartment. If RPM is still not displayed, replace tachometer.

3. Start engine (refer to TM 9-2350-287-10).
4. Adjust engine speed to 1000-1200 RPM.
5. Turn ON headlights and accessories to load charging system (refer to TM 9-2350-287-10).
6. Watch the display to make sure battery voltage is between 26.5 and 28.5 vdc.

Is voltage between 26.5 and 28.5 vdc?

yes

no

Go to para 2-22.b(12).

B. Check battery gage for normal reading (refer to TM 9-2350-287-10).

Does battery gage indicate normal reading?

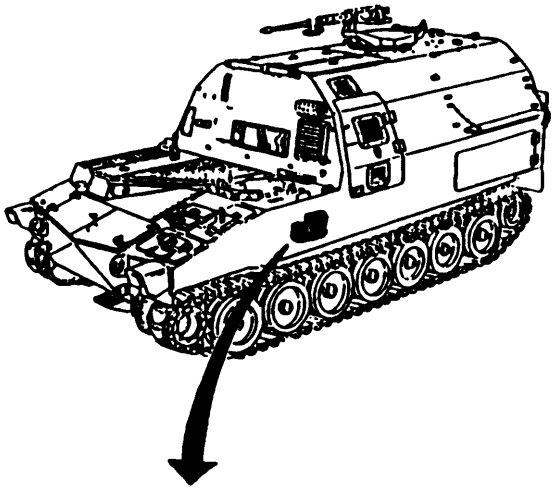
yes

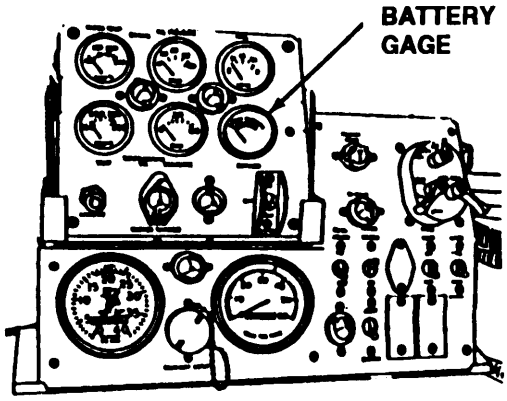
no

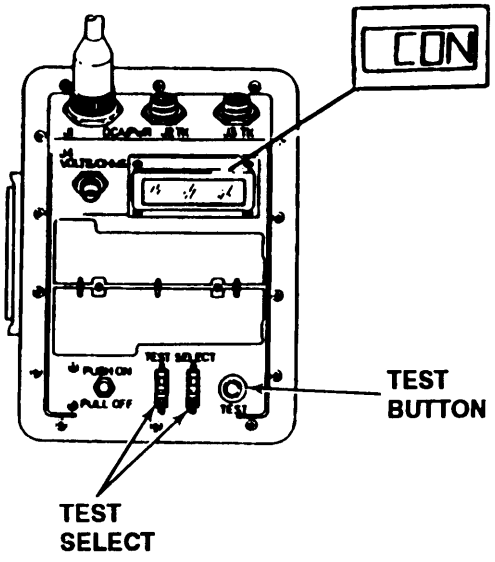
Go to para 2-22.a(9).

Go to para 2-22.b(20).

END OF TASK







2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

a. STE/ICE PMCS - (continued).

(8) CHARGING VOLTAGE TEST - TK.

A. 1. Dial 01 into TEST SELECT and press and release TEST button.
2. When VTM shows "CON" on display, dial 67 into TEST SELECT and press and release TEST button.

NOTE

VTM will show battery voltage and RPM alternately. If VTM does not show RPM, a connection may be loose. Check connection between STE/ICE and pulse tachometer in driver's compartment. If RPM is still not displayed, replace pulse tachometer.

3. Start engine (refer to TM 9-2350-287-10).
4. Adjust engine speed to 1000-1200 RPM.
5. Turn ON headlights and accessories to load charging system (refer to TM 9-2350-287-10).
6. Watch the display to make sure battery voltage is between 27.5 and 28.5 vdc.

Is voltage between 27.5 and 28.5 vdc?

yes

no

Go to step C.

B. Check battery gage for normal reading (refer to TM 9-2350-287-10).

Does battery gage indicate normal reading?

yes

no

Go to para 2-22.a(10).

C. Check battery gage reading for low voltage (refer to TM 9-2350-287-10).

Is battery gage voltage reading low?

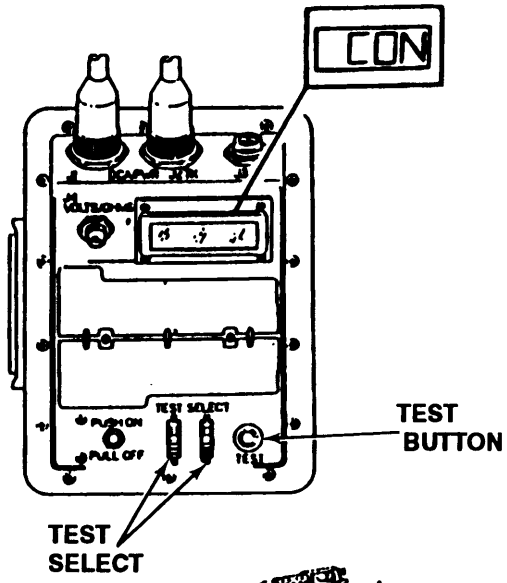
yes

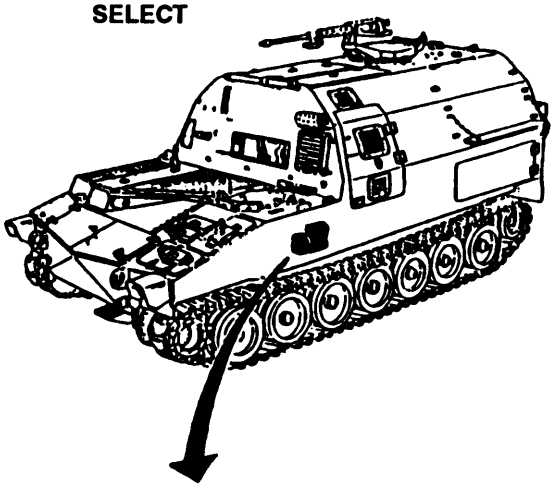
no

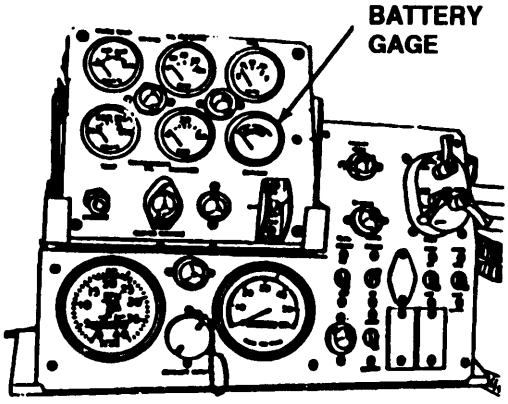
Go to QUICK GUIDE for additional troubleshooting.

If too high, notify Direct Support Maintenance. After repairs, repeat STE/ICE PMCS trees. Verify problem is solved.

END OF TASK







2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

a. STE/ICE PMCS - (continued).

(9) **COOLANT CHECK/ENGINE OIL PRESSURE GAGE TEST - DCA.**

A. 1. Check vehicle for oil, fuel and coolant leaks. Repair as necessary.
2. Start engine (refer to TM 9-2350-287-10).
3. Warm up the engine and check ENGINE WATER Temperature gage.

Does ENGINE WATER TEMPerature gage read between 170°F and 185°F (76°C and 85°C)?

yes

no

If temperature is above 185°F (85°C), go to QUICK GUIDE FOR TROUBLESHOOTING and troubleshoot for engine and cooling system high temperature. If temperature is below 170°F (76°C), go to para 2-22.b(21).

B. 1. Dial 10 into TEST SELECT.
2. Press and release TEST button.
3. Increase engine speed to 2100 RPM on VTM display.
4. Check engine oil pressure gage.

Is oil pressure between 50 and 70 psi?

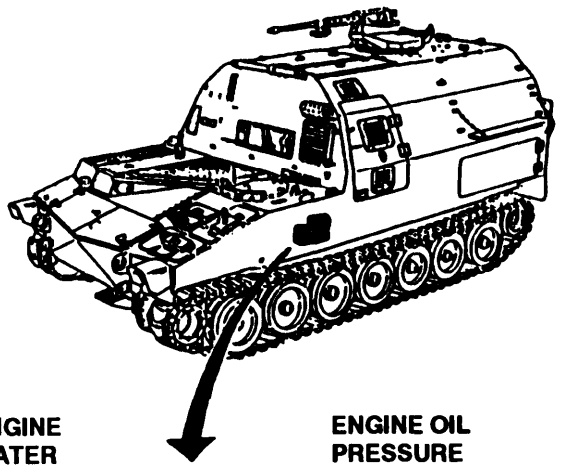
yes

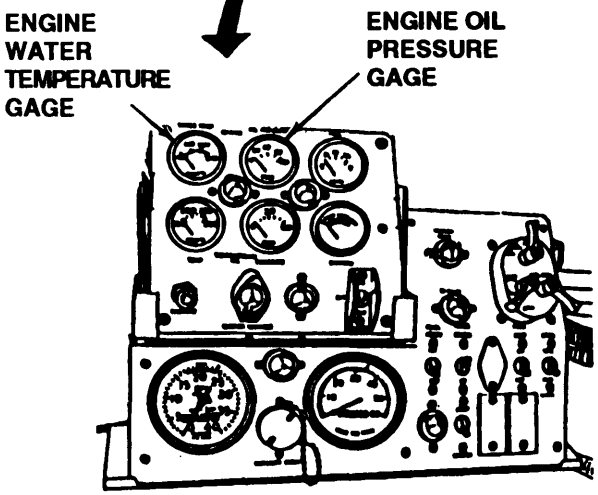
no

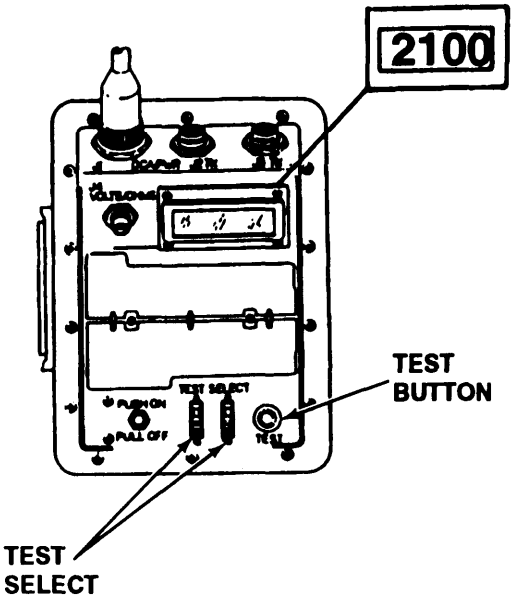
Go to para 2-22.a(11).

Go to para 2-22.b(17).

END OF TASK







2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

a. STE/ICE PMCS - (continued).

(10) COOLANT CHECK/ENGINE OIL PRESSURE GAGE TEST - TK.

NOTE

If VTM does not display engine RPM, isolate fault is pulse tachometer (refer to TM 9-4910-571-12&P).

A. 1. Check vehicle for oil, fuel and coolant leaks. Repair as necessary.
2. Start engine (refer to TM 9-2350-287-10).
3. Warm up the engine and check ENGINE WATER Temperature gage.

Does ENGINE WATER Temperature gage read between 170°F and 185°F (76°C and 85°C)?

yes / no

If temperature is above 185°F (85°C), go to QUICK GUIDE FOR TROUBLESHOOTING and troubleshoot for engine and cooling system high temperature. If temperature is below 1700F (76°C), go to para 2-22.b(21).

B. 1. Dial 10 into TEST SELECT.
2. Press and release TEST button.
3. Increase engine speed to 2100 RPM on VTM display.
4. Check engine oil pressure gage.

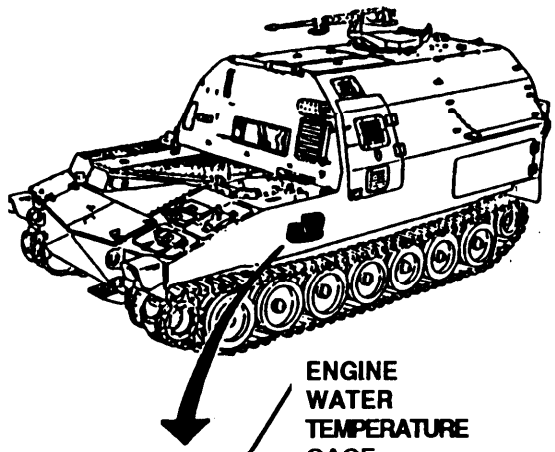
Is oil pressure between 50 and 70 psi?

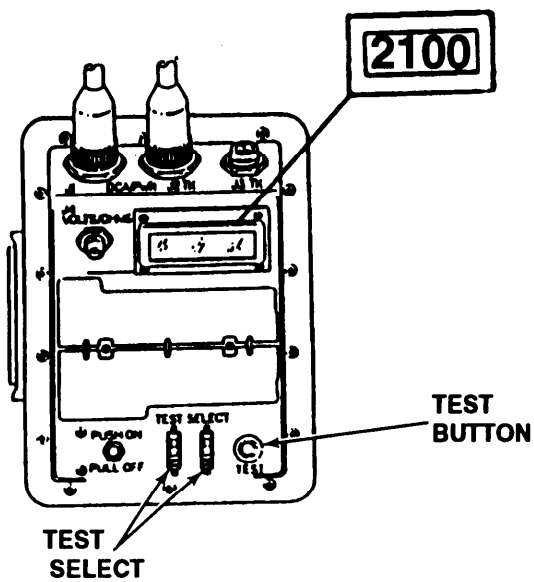
yes / no

Go to para 2-22.a(12)

Go to para 2-22.b(17).

END OF TASK





2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

a. STE/ICE PMCS - (continued). (11) GOVERNOR CHECK/POWER TEST - DCA.

CAUTION

To avoid possible damage to the engine, check governor operation before doing Power Test.

NOTE

Before doing Power Test, engine must beat normal operating temperature.

A. 1. While watching VTM, increase engine speed to maximum governor speed of 2350 to 2500 RPM.
2. Press accelerator to full throttle.

Does engine RPM stay between 2350 and 2500 RPM?

yes — no

If RPM is higher, notify Direct Support Maintenance. TexIf RPM is lower, go to para 2-22.b(13).

CAUTION

To prevent engine damage, do not perform Power Test if engine temperature is above the normal operating temperature.

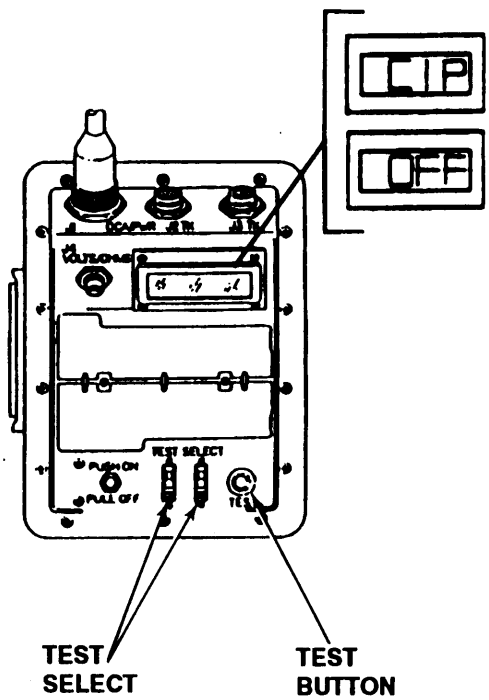
B. 1. Dial 13 into TEST SELECT.
2. Press and release TEST button.
3. When prompting message “CIP” appears on the display, press down and hold accelerator until the VTM shows “OFF. Then release accelerator.
4. A number will appear on the VTM. This number is equal to the percentage of power. Compare this number with the following table:

%POWER: MINIMUM TEST LIMIT		
0-2000 FT	2000-4000 FT	ABOVE 4000 FT
7570	68%	60%

Is power limit in the above table?

yes — no

Go to para 2-22.a(13). **Go to para 2-22.b(13).**



END OF TASK

2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

a. STE/ICE PMCS - (continued). (12) GOVERNOR CHECK/POWER TEST - TK.

CAUTION

To avoid possible damage to the engine, check governor operation before doing Power Test.

NOTE

Before doing Power Test, engine must beat normal operating temperature.

A. 1. While watching VTM, increase engine speed to maximum governor speed of 2350 to 2500 RPM.
2. Press accelerator to full throttle.

Does engine RPM stay between 2350 and 2500 RPM?

yes

no

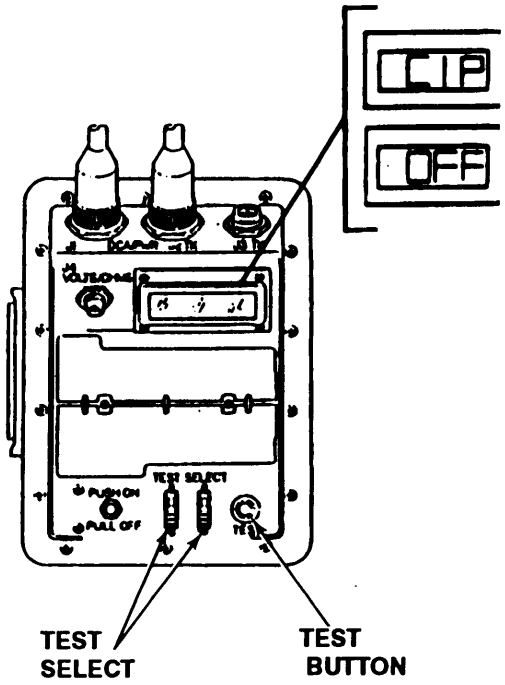
If RPM is higher, notify Direct Support Maintenance. If RPM is lower, remove air cleaner filters (para 4-14) and repeat step A. If RPM is still lower than 2350, go to para 2-22.b(13).

CAUTION

To prevent engine damage, do not perform Power Test if engine temperature is above the normal operating temperature.

NOTE

Engine speed must be below 1000 RPM.



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2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

a. STE/ICE PMCS - (continued).	(12) GOVERNOR CHECK/POWER TEST - TK. (continued).

Continued from step A

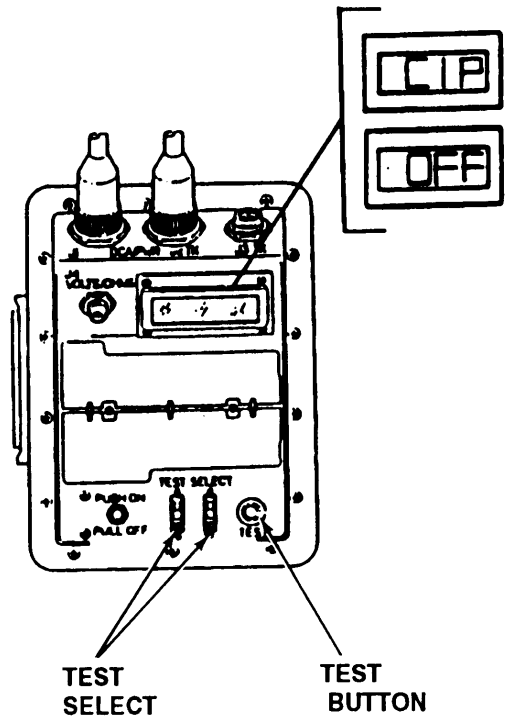
B. 1. Dial 13 into TEST SELECT.
2. Press and release TEST button.
3. When prompting message “CIP” appears on the display, press down and hold accelerator until the VTM shows “OFF”. Then release accelerator.
4. A number will appear on the VTM. This number is equal to the percentage of power. Compare this number with the following table:

%POWER: MINIMUM TEST LIMIT		
0-2000 FT	2000-4000 FT	ABOVE 4000 FT
7 5 %	68%	60%

Is power limit in the above table?

yes → Go to para 2-22.a(14).

no → Remove air cleaner filters (para 4-14) and repeat Power Test. If test fails, install air cleaner filters and go to para 2-22.b(13).



END OF TASK

2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

a. STE/ICE PMCS - (continued).

(13) IDLE SPEED CHECK - DCA.

A. 1. Dial 10 into TEST SELECT.
2. Press and release TEST button.
3. Adjust engine idle speed between 550 and 600 RPM.
4. Watch the VTM display for 10 seconds to make sure idle speed stays between 550 and 600 RPM.

Does idle speed stay between 550 and 600 RPM?

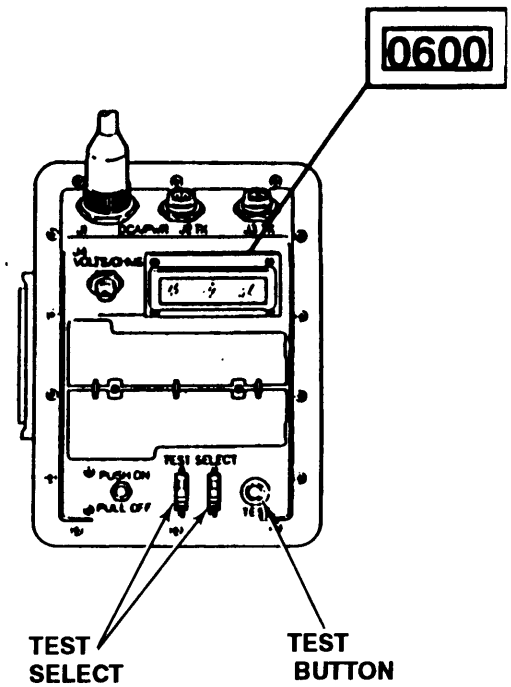
yes → Go to para 2-22.a(15).

no → B. Check throttle linkage (para 4-28).

Is linkage correct?

yes → Notify Direct Support Maintenance.

no → Correct linkage (para 4-28) and repeat Idle Speed Check - DCA.



END OF TASK

2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

a. STE/ICE PMCS - (continued).

(14) IDLE SPEED CHECK - TK.

A. 1. Dial 10 into TEST SELECT.
2. Press and release TEST button.
3. Adjust engine idle speed between 550 and 600 RPM.
4. Watch the VTM display for 10 seconds to make sure idle speed stays between 550 and 600 RPM.

Does idle speed stay between 550 and 600 RPM?

yes

End of STE/ICE PMCS (TK) trees.

no

B. Check throttle linkage (para 4-28).

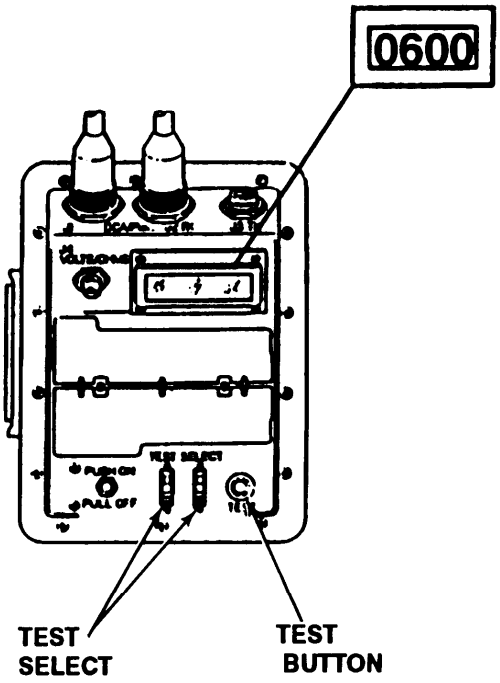
Is linkage correct?

yes

Notify Direct Support Maintenance..

no

Correct linkage (para 4-28). Repeat Idle Speed Check - TK.



END OF TASK

2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

a. STE/ICE PMCS - (continued). (15) COMPRESSION UNBALANCE TEST - DCA.

NOTE

- Before doing Compression Unbalance Test, engine must beat normal operating temperature.
- To prevent discharging of batteries, do not perform more than two (2) compression unbalance test in a row.

A. 1. Shutoff fuel supply (refer to TM 9-2350-287-10).
2. Crank engine with no fuel for 5 seconds to clear fuel from cylinders.
3. Dial 14 into TEST SELECT.
4. Press and release TEST button.

Does prompting message “GO” show on display?

yes / no

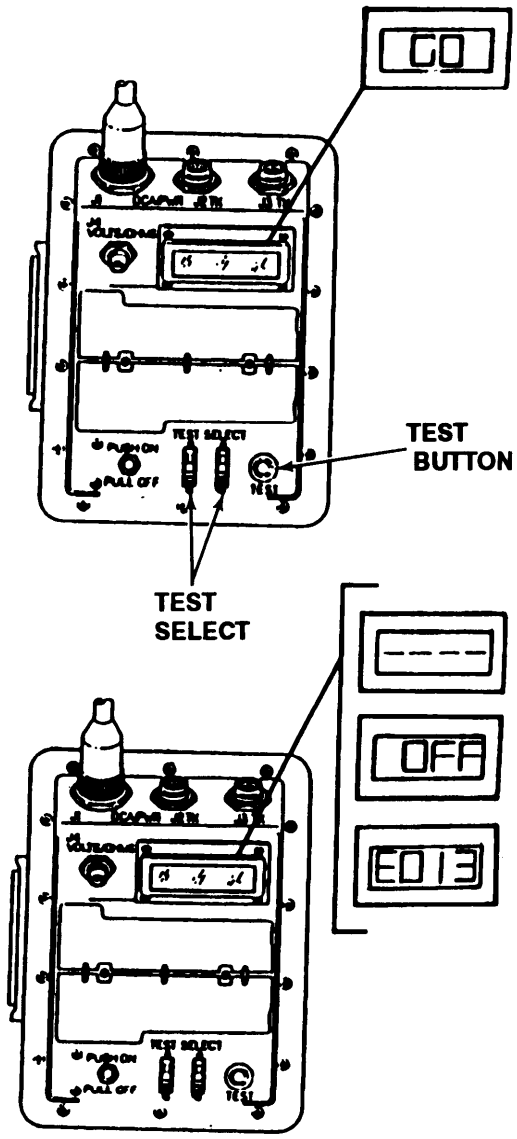
Make sure VTM is operating properly (refer to TM 9-4910-571-12&P).

B. 1. Pull and hold fuel shutoff handle (refer to TM 9-2350-287-10).
2. Crank engine and watch VTM to make sure it shows “- -- -“ on display.
3. Stop cranking engine when VTM display shows “OFF or E013“.
4. Wait for VTM to display number.

Is a number on VTM display?

yes / no

If the number is between 0 and 10, STE/ICE PMCS is completed. If the number is higher than 10, notify Direct Support Maintenance.



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2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

a. STE/ICE PMCS - (continued).

(15) COMPRESSION UNBALANCE TEST - DC (continued).

Continued from step B

C. Does the VTM display “GO” or “FAIL”?

yes

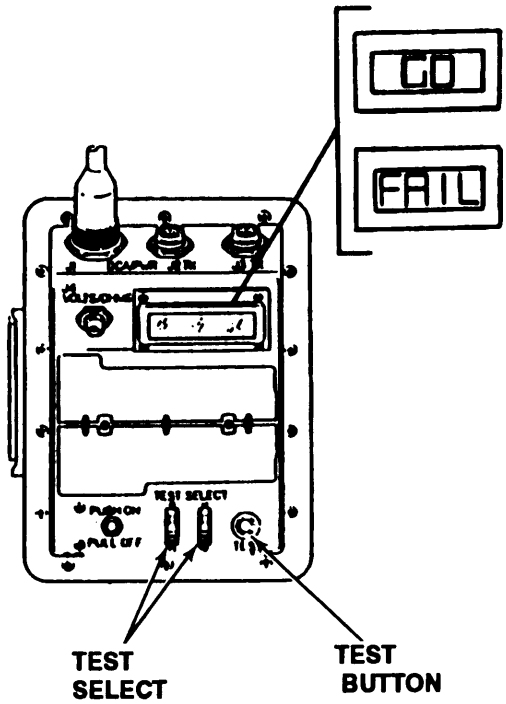
no

If “GO”, perform step B again.
IF “FAIL”, go to step D.

Notify Direct Support Maintenance.

D. 1. Turn on fuel supply (refer to TM 9-2350-287-10).
2. Start engine (refer to TM 9-2350-287-1 0).
3. Allow engine to warm up and charge batteries.
4. Shut down engine (refer to TM 9-2350-287-10) and repeat step B.

END OF TASK



2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE).

b. STE/ICE TROUBLESHOOTING. **(1) GENERATOR NEGATIVE CABLE DROP - TEST 84.**

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- STE/ICE test set (Item 65, Appendix I)

A. 1. Connect DCA cable W1 connector P1 to VTM connector J1.
2. Connect DCA cable W1 to harness 12329996 connector DCA receptacle in driver's compartment.
3. Push power switch on VTM to ON position.
4. Do confidence test 66/99 (para 2-22.a(1)).
5. Dial 60 into TEST SELECT.
6. Press and release TEST button. Message "VEH" should be displayed on the VTM.
7. Enter the vehicle ID number 11.
8. Enter 01 into TEST SELECT to view RPM and voltage alternately on the VTM during testing.
9. Press and release TEST button and "CON" should be displayed on the VTM.
10. Enter 84 into TEST SELECT.
11. Press and release TEST button.
12. Start engine (refer to TM 9-2350-287-10) and increase engine speed between 1000 and 1200 RPM.
13. Record test results and check limits on VTM.

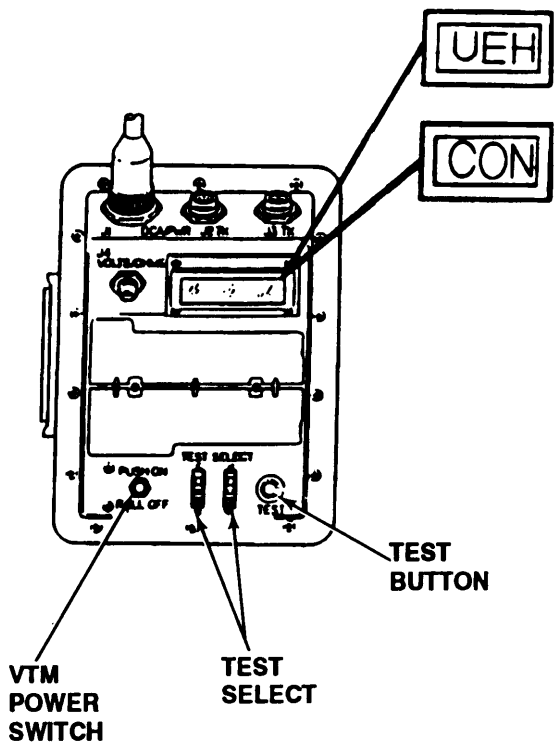
Are results more than 0.2 vdc?

yes

Do test 91 on cable. If cable is bad, repair or replace wiring harness 12329994 (para 7-75). Verify problem is solved.

no

Fault does not exist as indicated. Recheck fault symptom.



END OF TASK

2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) **(continued).**

b. STE/ICE TROUBLESHOOTING - (continued). (2) STARTER CIRCUIT RESISTANCE - TEST 74.

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- STE/ICE test set (Item 65, Appendix I)

A. 1. Connect DCA cable W1 connector P1 to VTM connector J1.
2. Connect DCA cable W1 to harness 12329996 connector at DCA receptale in driver's compartment.
3. Push power switch on VTM to ON position.
4. Do confidence test 66/99 (para 2-22.a(1)).
5. Dial 60 into TEST SELECT.
6. Press and release TEST button. Message "VEH" should be displayed on the VTM.
7. Enter the vehicle ID number 11.
8. Enter 74 into TEST SELECT, then press TEST until "CAL" appears.
9. Release TEST button and wait for reading. Reading should be between -225 to +225.
10. Press and release TEST button.
11. When "GO" shows on the VTM display, crank engine while holding fuel shutoff control handle (refer to TM 9-2350-287-10).
12. When VTM shows "OFF", stop cranking engine.
13. Record test results and check limits on VTM.

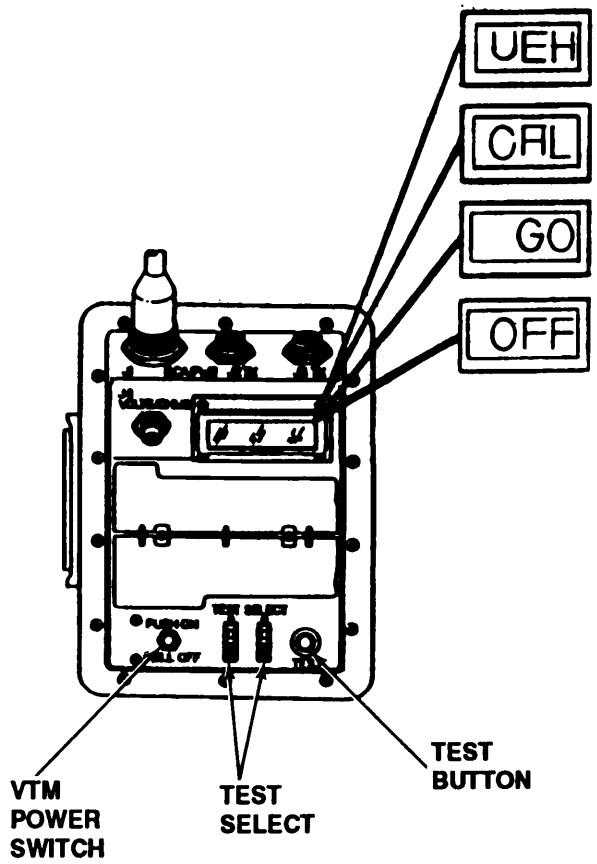
Are results between 3 and 25 milliohms?

yes

Fault does not exist as indicated. Recheck fault symptom.

no

Do test 67 (para 2-22.b(8), test 68 (para 2-22.b(19), test 69 (para 2-22.b(5), and test 70 (para 2-22.b(16). If tests are good, replace starter motor (para 7-5). Verify problem is solved.



END OF TASK

2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

b. STE/ICE TROUBLESHOOTING - (continued). (3) BATTERY INTERNAL RESISTANCE (DCA) - TEST 73.

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- STE/ICE test set (Item 65, Appendix I)

A. 1. Connect DCA cable W1 connector P1 to VTM connector J1.
2. Connect DCA cable W1 to harness 12329996 connector at DCA receptacle in driver's compartment.
3. Push power switch on VTM to ON position.
4. Do confidence test 66/99 (para 2-22.a(1)).
5. Dial 60 into TEST SELECT.
6. Press and release TEST button. Message "VEH" should be displayed on the VTM.
7. Enter the vehicle ID number 11.
8. Enter 73 into TEST SELECT, then press and hold TEST button until "CAL" appears.
9. Release TEST button and wait for reading. Reading should be between -225 to +225.
10. Press and release TEST button.
11. When "GO" shows on the VTM display, crank engine while holding fuel shutoff control handle out (refer to TM 9-2350-287-10).
12. When VTM shows "OFF, stop cranking engine.
13. Record test results and check limits on VTM.

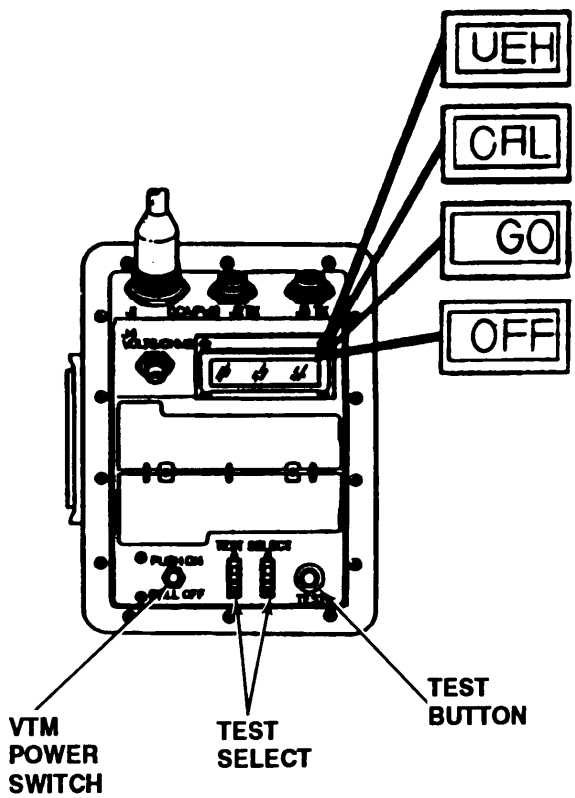
Are results less than 13 milliohms?

yes

Fault does not exist as indicated. Recheck fault symptom.

no

Check battery terminals, connections, and battery electrolyte level (refer to TM 9-2350-287-10). Repeat Battery Internal Resistance Test. If test fails second time, Perform Individual Battery Voltage Checks using STE/ICE Test 89 (para 2-22.b(20).



END OF TASK

2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

b. STE/ICE TROUBLESHOOTING - (continued). (4) BATTERY RESISTANCE CHANGE - TEST 75.

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- STWICE test set (Item 65, Appendix I)

A. 1. Connect DCA cable W1 connector P1 to VTM connector J1.
2. Connect DCA cable W1 to harness 12329996 connector at DCA receptacle in driver's compartment.
3. Push power switch on VTM to ON position.
4. Do confidence test 66/99 (para 2-22.a(1)).
5. Dial 60 into TEST SELECT.
6. Press and release TEST button. Message "VEH" should be displayed on the VTM.
7. Enter the vehicle ID number 11.
8. Enter 75 into TEST SELECT, then press and hold TEST button until "CAL" appears.
9. Release TEST button and wait for results.
10. Press and release TEST button.
11. When 'GO" shows on the VTM display, crank engine while holding fuel shutoff control handle out (refer to TM 9-2350-287-10).
12. When VTM shows "OFF", stop cranking engine.
13. Record test results and check limits on VTM.

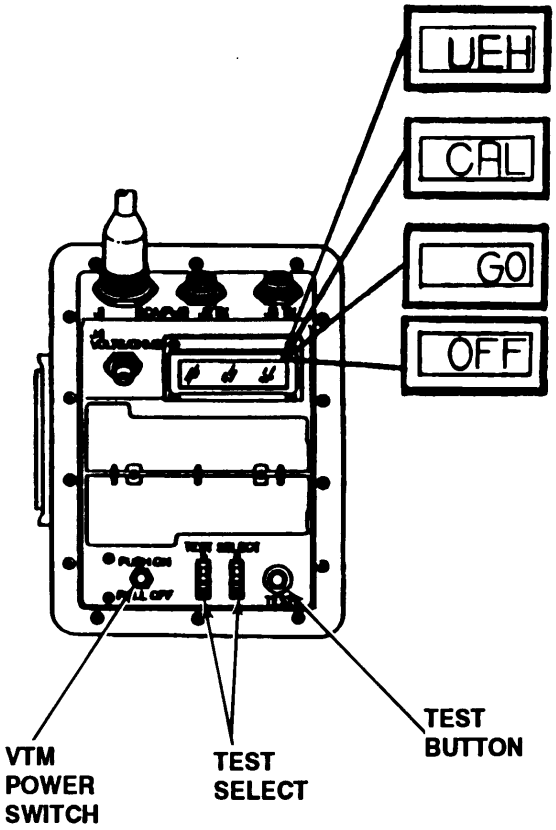
Are results less than 50 milliohms?

yes

Go to Battery Internal Resistance (DCA) - Test 73 (para 2-22.b(3)).

no

Check battery terminals, connections, and battery electrolyte level (refer to TM 9-2350-28710). Repeat Battery Resistance Change Test. If test fails second time, perform Individual Battery Voltage Checks using STE/ICE Test 89 (para 2-22.b(20)).



END OF TASK

2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

b. STE/ICE TROUBLESHOOTING - (continued). **(5) STARTER NEGATIVE CABLE DROP - TEST** 69.

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- STE/ICE test set (Item 65, Appendix I)

A. 1. Connect DCA cable W1 connector P1 to VTM connector J1.
2. Connect DCA cable W1 to harness 12329996 connector at DCA receptacle in driver's compartment.
3. Push power switch on VTM to ON position.
4. Do confidence test 66/99 (para 2-22.a(1)).
5. Dial 60 into TEST SELECT.
6. Press and release TEST button. Message "VEH" should be displayed on the VTM.
7. Enter the vehicle ID number 11.
8. Enter 69 into TEST SELECT.
9. Press and release TEST button.
10. Crank engine while holding fuel shutoff control handle out (refer to TM 9-2350-287-10).
11. Record test results and check limits on VTM.

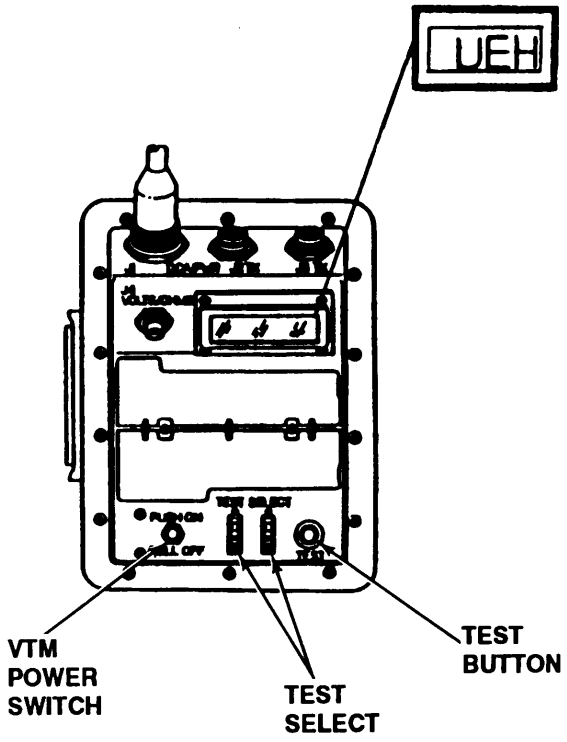
Are results higher than 12 vdc?

yes

Do test 91 on cable. If cable is bad, repair or replace wiring harness 12329994 (para 7-75). Verify problem is solved.

no

Fault does not exist as indicated. Recheck fault symptom.



END OF TASK

2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

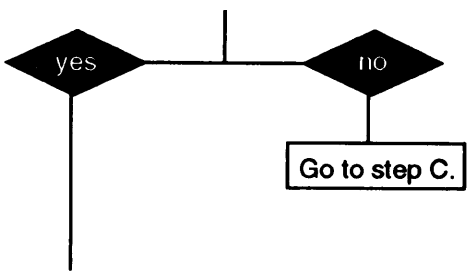
b. STE/ICE TROUBLESHOOTING - (continued). (6) GENERATOR FIELD VOLTAGE - TEST 83.

Tools/Test Equipment:
- Electrical connector repair tool kit (Item 16, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)
- STE/ICE test set (item 65, Appendix I)

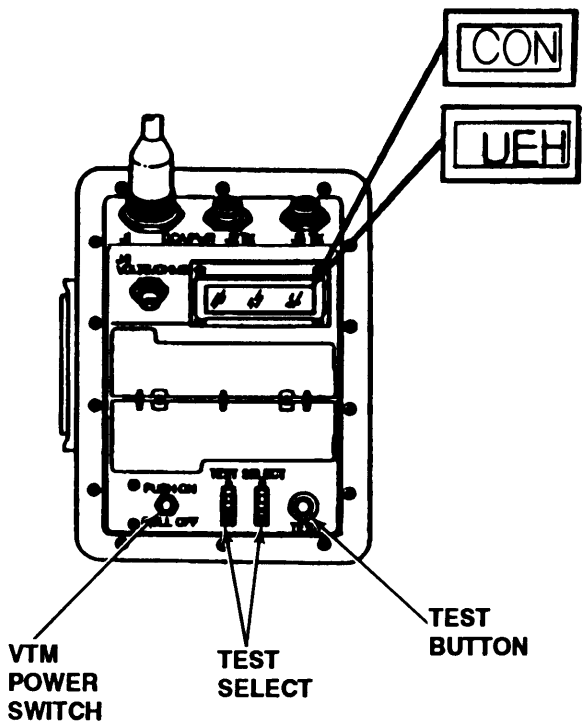
Equipment Conditions:
- Air intake grille opened (refer to TM 9-2350-287-10).
- Battery compartment access doors opened (refer to TM 9-2350-287-10).

A. 1. Connect DCA cable W1 connector P1 to VTM connector J1.
2. Connect DCA cable W1 to harness 12329996 connector at DCA receptacle in driver's compartment.
3. Push power switch on VTM to ON position.
4. Do confidence test 66/99 (para 2-22.a(1)).
5. Dial 60 into TEST SELECT.
6. Press and release TEST button. Message "VEH" should be displayed on the VTM.
7. Enter the vehicle ID number 11.
8. Start engine (refer to TM 9-2350-287-10).
9. Turn on headlights and accessories to load charging system (refer to TM 9-2350-287-10).
10. Increase engine speed between 1000 and 1200 RPM.
11. Enter 83 into TEST SELECT.
12. Press and release TEST button.
13. Record test results (Limits maximum 22 vdc).

Are results higher than 22 vdc?



Continued to step B



2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

b. STE/ICE TROUBLESHOOTING - (continued). (6) GENERATOR FIELD VOLTAGE - TEST 83. (continued)

Continued from step A

B. 1. Shut down engine (refer to TM 9-2350-287-10).
2. Turn MASTER switch to OFF (refer to TM 9-2350-287-10).
3. Disconnect harness 12329994 lead AV from harness 12376408 lead AV.
4. Install 3-way connector between harness 12329994 lead AV and harness 12376408 lead AV.
5. Place red lead in open socket of 3-way connector and black lead to ground.
6. Turn MASTER switch to ON (refer to TM 9-2350-287-10).
7. Enter 89 into TEST SELECT and press TEST.
8. Start engine (refer to TM 9-2350-287-10) and read voltage on VTM.

Is battery voltage present?

yes — Go to para 2-19.i(1)

no — Do test 0184 (para 2-22.b(1)). If results are good, replace voltage regulator (para 7-3).

Continued from step A

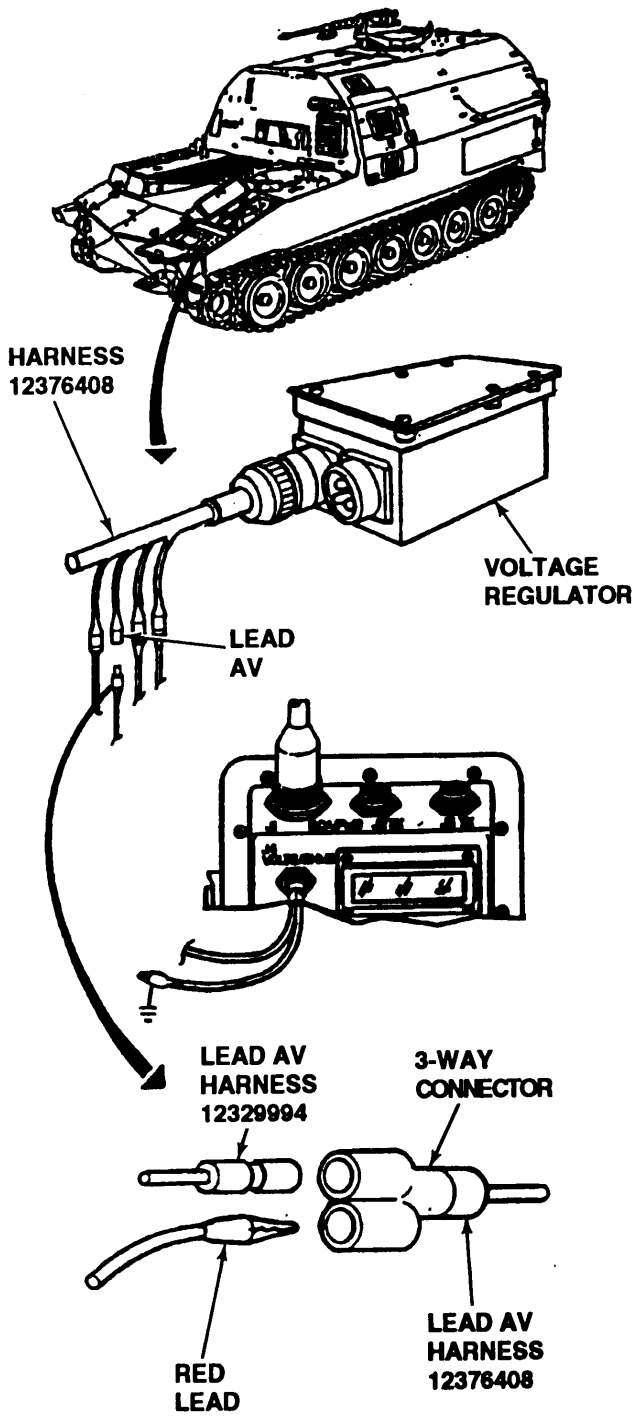
C. Do individual test 75 (para 2-22.b(4)), test 73 (para 2-22.b(3)), and test 89 (para 2-22.b(20)).

Are batteries good?

yes — Make sure battery cables are clean and serviceable (refer to TM 9-2350-287-10). Go to 2-19.i(1)).

no — Replace faulty batteties (para 7-41).

END OF TASK



2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

b. STE/ICE TROUBLESHOOTING - (continued). (7) FUEL PRESSURE RETURN - TEST 49.

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix 1)
- STE/ICE test set (Item 65, Appendix I)

Equipment Conditions:
- Air intake grille opened (refer to TM 9-2350-287-10).
- Transmission and doors opened (refer to TM 9-2350-287-10).

WARNING

Contact with rotating fan can cause serious personal injury. Protective fan screens must be installed prior to doing maintenance in the engine compartment with the engine is running or in ground hop mode.

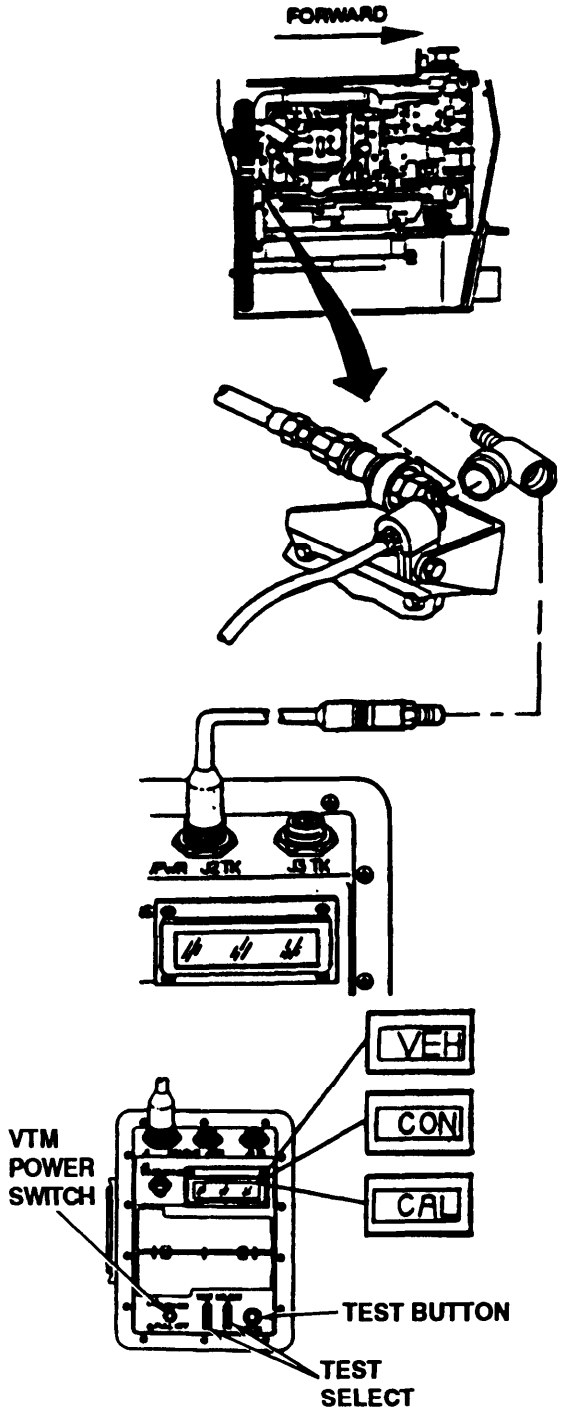
A. 1. Install protective fan screens.
2. Connect DCA cable W1 connector P1 to VTM connector J1.
3. Connect DCA cable W1 to harness 12329996 connector (DCA receptacle) in driver's compartment.
4. Install red striped transducerTK22 and adapter TK24 at the engine fuel return line quick disconnect.
5. Connect DCA cable W4 connector P1 to VTM connector J3.
6. Connect DCA cable W4 connector P2 to transducer TK22.
7. Push power switch on VTM to ON position.
8. Do confidence test 66/99 (para 2-22.a(1)).
9. Dial 60 into TEST SELECT.
10. Press and release TEST button. Message "VEH" should be displayed on the VTM.
11. Enter the vehicle ID number 11.
12. Enter 01 into TEST SELECT. Press TEST when "CON" shows on VTM to see RPM and test limits alternately.
13. Enter 49 into TEST SELECT, then press TEST until "CAL" appears.
14. Press and release TEST.
15. Start engine (refer to TM 9-2350-287-10) and record the test results (in psi).

is reading less than 2 psi?

yes — Notify Direct Support Maintenance..

no — Fault does not exist as indicated. Recheck fault symptom.

END OF TASK



2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

b. STE/ICE TROUBLESHOOTING - (continued). (8) CHARGING CIRCUIT (at battery) - TEST 67.

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- STE/ICE test set (Item 65, Appendix I)

A. 1. Connect DCA cable W1 connector P1 to VTM connector J1.
2. Connect DCA cable W1 to harness 12329996 connector at DCA receptacle in driver's compartment.
3. Push power switch on VTM to ON position.
4. Do confidence test 66/99 (para 2-22.a(1)).
5. Dial 60 into TEST SELECT.
6. Press and release TEST button. Message "VEH" should be displayed on the VTM.
7. Enter the vehicle ID number 11.
8. Enter 67intoTEST SELECT, then press TEST button to check static voltage.

Is static voltage at least 22 volts?

yes

no

Do individual battery test 75 (para 2-22.b(4), test 73 (para 2-22.b(3), and test 89 (para 2-22. b(20).

B. 1. Enter 02 into TEST SELECT and press TEST button.
2. When VTM shows "CON", enter 67 into TEST SELECT and press TEST button.
3. Crank engine (refer to TM 9-2350-287-10) while holding fuel shutoff handle out.
4. Record results of cranking test.

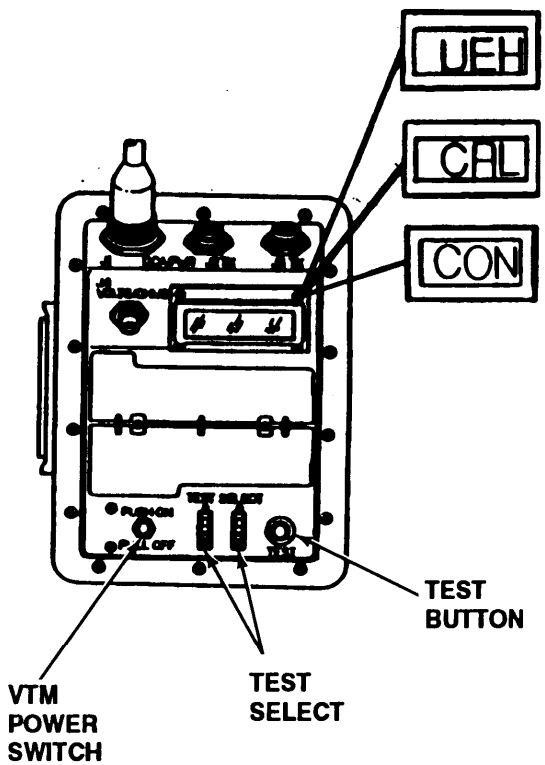
Is cranking test voltage at least 18 volts?

yes

no

Do individual battery test 75 (para 2-22.b(4) and test 73 (para 2-22.b(3). If necessary, do test 89 (para 2-22.b(20).

Continued to step C



2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

b. STE/ICE TROUBLESHOOTING - (continued).	(8) CHARGING CIRCUIT (at battery) - TEST 67 (continued).

Continued from step B

C 1. Enter 01 into TEST SELECT and press TEST button.
2. When "CON" shows on VTM, enter 67 into TEST SELECT and press TEST button.
3. Start engine (refer to TM 9-235-287-10).
4. Record reading at idle (550 rpm) and at governor (2300 rpm).
5. Shut down engine (refer to TM 9-2350-287-10).

Is charging voltage between 26.5 and 28.5 vdc?

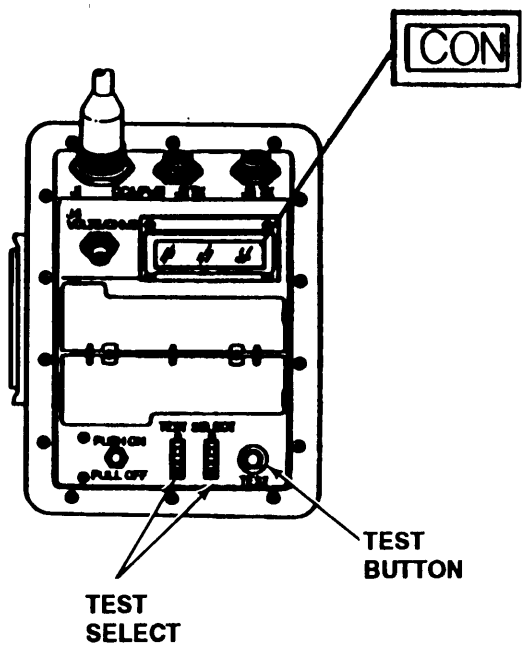
yes

Fault does not exist as indicated. Recheck fault symptom.

no

Go to para 2-22.b(12).

END OF TASK



2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

b. STE/ICE TROUBLESHOOTING - (continued). (9) ENGINE RPM - TEST 10.

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- STE/ICE test set (Item 65, Appendix I)

A. 1. Connect DCA cable W1 connector P1 to VTM connector J1.
2. Connect DCA cable W1 to harness 12329996 connector at DCA receptacle in driver's compartment.
2. Push power switch on VTM to ON position.
4. Do confidence test 66/99 (para 2-22.a(1)).
5. Dial 60 into TEST SELECT.
6. Press and release TEST button. Message "VEH" should be displayed on the VTM.
7. Enter the vehicle ID number 11.
8. Enter 10 into TEST SELECT, then press and release TEST button.
9. Crank engine (refer to TM 9-2350-287-10) while holding fuel shutoff handle out.

Is cranking RPM at least 100 RPM?

yes / no

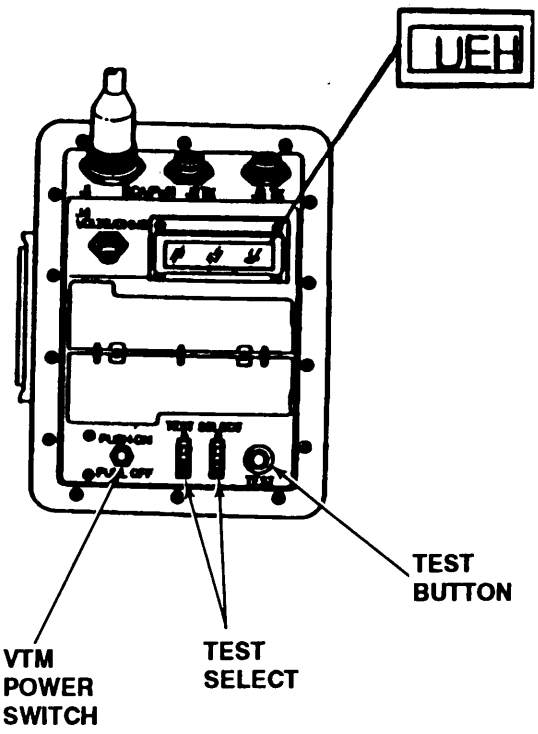
Notify Direct Support Maintenance.

B. 1. Release fuel shutoff handle and start engine (refer to TM 9-2350-287-10).
2. Let the engine warm up for about 1 minute and then read RPM.

Is idle RPM between 550 and 600 RPM?

yes / no

Notify Direct Support Maintenance.

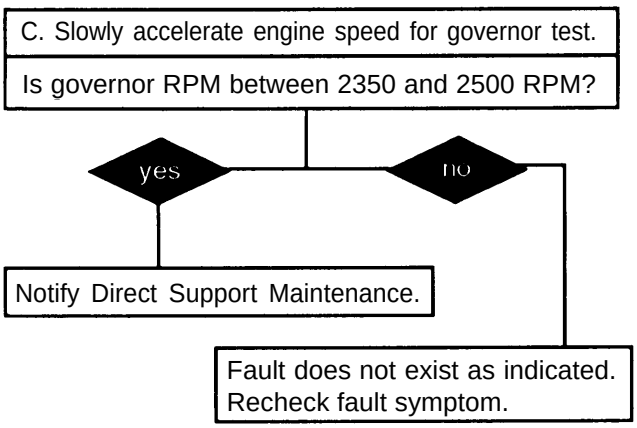


Continued to step C

2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

b. STE/ICE TROUBLESHOOTING - (continued). (9) ENGINE RPM - TEST 10 (continued).

Continued from step B



END OF TASK

2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

b. STE/ICE TROUBLESHOOTING - (continued). (10) COMPRESSION UNBALANCE - TEST 14.

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- STE/ICE test set (Item 65, Appendix I)

A. 1. Connect DCA cable W1 connector P1 to VTM connector J1.
2. Connect DCA cable WI to harness 12329996 connector at DCA receptacle in driver's compartment.
3. Push power switch on VTM to ON position.
4. Do confidence test 66/99 (para 2-22.a(1)).
5. Dial 60 into TEST SELECT.
6. Press and release TEST button. Message 'VEH" should be displayed on the VTM.
7. Enter the vehicle ID number 11.
8. Enter 14 into TEST SELECT, then press and release TEST button.
9. When "GO" shows on VTM, crank engine (refer to TM 9-2350-287-10) while holding fuel shutoff handle out.
10. When "OFF' shows on VTM, stop cranking engine.
11. Read results on VTM.

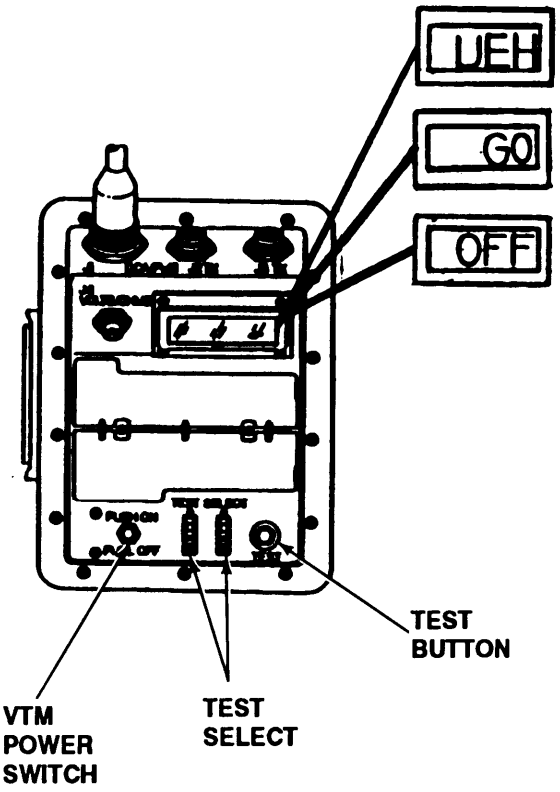
Is reading 10% or less?

yes

no

Notify Direct Support Maintenance.

Fault does not exist as indicated. Recheck fault symptom.



END OF TASK

2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

b. STE/ICE TROUBLESHOOTING - (continued). (11) ENGINE POWER PERCENTAGE - TEST 13.

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- STE/ICE test set (Item 65, Appendix I)

A. 1. Connect DCA cable W1 connector P1 to VTM connector J1.
2. Connect DCA cable W1 to hamess 12329996 connector at DCA receptacle in driver's compartment.
3. Push power switch on VTM to ON position.
4. Do confidence test 66/99 (para 2-22.a(1)).
5. Dial 60 into TEST SELECT.
6. Press and release TEST button. Message "VEH" should be displayed on the VTM.
7. Enter the vehicle ID number 11.
8. Start engine (refer to TM 9-2350-287-10).
9. Enter 13 into TEST SELECT, then press and release TEST button.
10. When "CIP" shows on VTM, quickly accelerate engine (refer to TM 9-2350-287-10) until "OFF appears on VTM.
11. Repeat this test again, then record results.

Is engine limit at least 60%

yes / no

Fault does not exist as indicated.
Recheck fault symptom.

B. 1. Do the following tests using control function 01:
- 24 - Fuel supply pressure (para 2-22.b(13)).
- 26 - Fuel pressure drop (para 2-22.b(22)).
- 49 - Fuel pressure return (para 2-22.b(9)).
- 32 - Air box pressure (para 2-22.b(21)).
- 28 - Air filter pressure differential (para 2-22.b(18)).
- 14-Compression unbalance (para 2-22.b(10)).

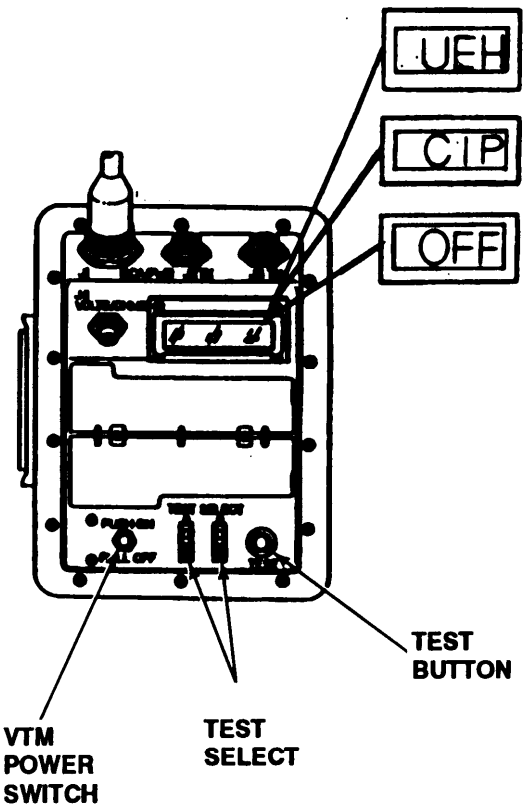
2. Do fuel flow test (para 2-19.b(2)).

Does fault still exist?

yes / no

Recheck fault symmptom.

Notify Direct Support Maintenance.



END OF TASK

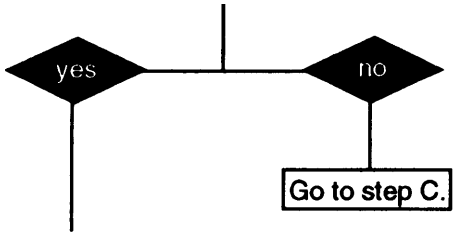
2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

b. STE/ICE TROUBLESHOOTING - (continued). (12) GENERATOR OUTPUT VOLTAGE - TEST 82.

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- STE/ICE test set (Item 65, Appendix I)

A. 1. Connect DCA cable W1 connector P1 to VTM connector J1.
2. Connect DCA cable W1 to harness 12329996 connector at DCA receptacle in driver's compartment.
3. Push power switch on VTM to ON position.
4. Do confidence test 66/99 (para 2-22.a(1)).
5. Dial 60 into TEST SELECT.
6. Press and release TEST button. Message "VEH" should be displayed on the VTM.
7. Enter the vehicle ID number 11.
8. Start engine (refer to TM 9-2350-287-10).
9. Increase engine speed between 1000 and 1200 RPM.
10. Turn on headlights and electrical accessories (refer to TM 9-2350-287-10).
11. Enter 01 into TEST SELECT, then press and release TEST button.
12. When "CON" shows on VTM, enter 82 into TEST SELECT, then press and release TEST button.
13. Record test results.

Is reading on VTM greater than 26.5 vdc?



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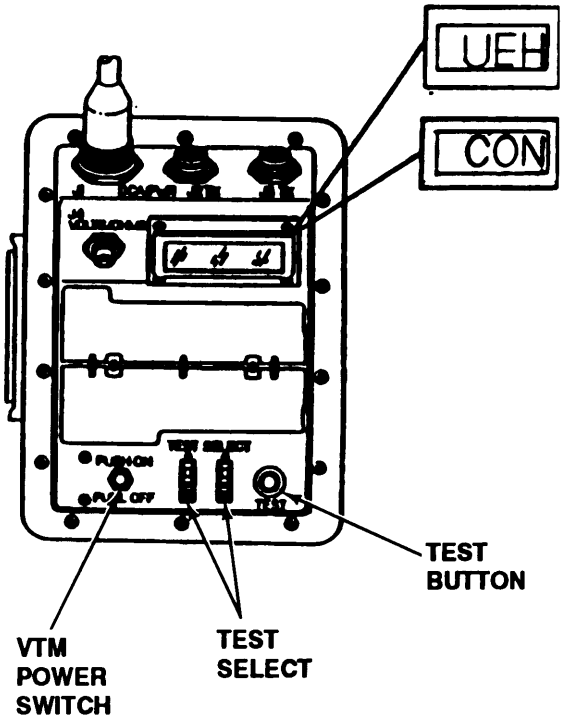


2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

b. STE/ICE TROUBLESHOOTING - (continued). (12) GENERATOR OUTPUT VOLTAGE - TEST 82 (continued).

Continued from step A

B. 1. Enter 01 into TEST SELECT and press TEST button.
2. When 'CON" shows on VTM, enter 83 into TEST SELECT, then press and release TEST button.
3. Enter 01 into TEST SELECT, then press and release TEST button.
4. When "CON" shows on VTM, enter 84 into TEST SELECT, then press and release TEST button.

Do these tests pass?

yes → Go to para 2-19.i(1).

no → Replace indicated faulty components. Verify problem is solved.

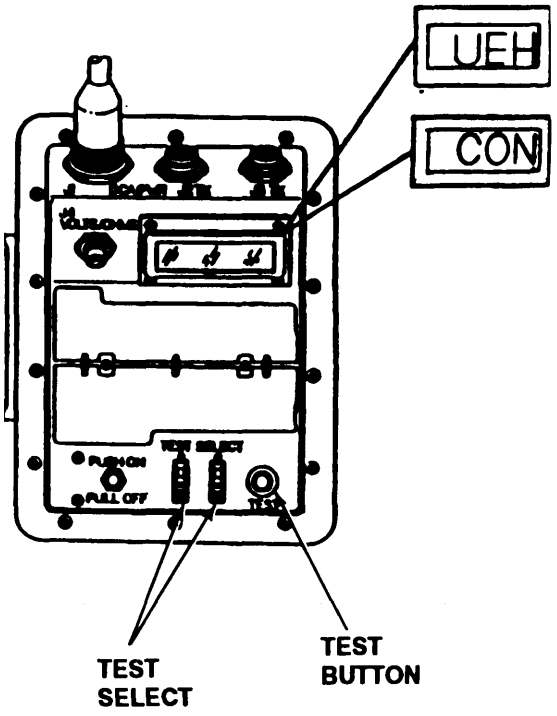
Continued from step A

C. If the reading on VTM was greater than 28.5vdc, do individual battery test 75 (para 2-22.b(4), test 73 (para 2-22.b(3), and test 89 (para 2-22.b(20).

Are batteries good?

yes → Go to para 2-19.i (1)

no → Replace batteries (para 7-41). Verify problem is solved.



END OF TASK

2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

b. STE/ICE TROUBLESHOOTING - CONTINUED	(13) FUEL SUPPLY PRESSURE - (DCA AND TK) TEST 24.

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- STE/ICE test set (Item 65, Appendix I)

Equipment Conditions:
- Air intake grille opened (refer to TM 9-2350-287-10).
- Transmission access doors opened (refer to TM 9-2350-287-10).

A. 1. Connect DCA cable W1 connector PI to VTM connector J1.
2. Connect DCA cable W1 to harness 12329996 connector at DCA receptacle in driver's compartment.
3. Push power switch on VTM to ON position.
4. Do confidence test 66/99 (para 2-22a(1)).
5. Dial 60 into TEST SELECT.
6. Press and release TEST button. Message "VEH" should be displayed on the VTM.
7. Enter the vehicle ID number 11.
8. Enter 01 into TEST SELECT, then press and release TEST button.
9. When "CON" shows on VTM, enter 24 into TEST SELECT, then press TEST button until "CAL" appears.
10. Press and release TEST button.
11. Crank engine (refer to TM 9-2350-287-10) for 10 seconds while holding fuel shutoff control handle out.
12. Record test results.
13. Release fuel shutoff control handle and start engine (refer to TM 9-2350-287-10). Record test results.

Is reading on VTM between 4.0 and 7.0 psi?

yes

Fault does not exist as indicated. Recheck fault symptom.

no

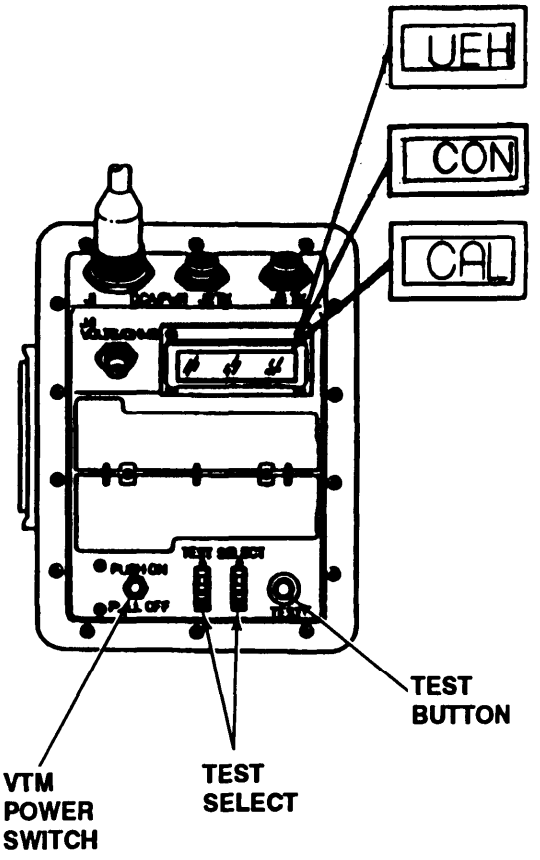
B. Check results recorded during 10-second engine crank.

Was VTM reading at least 4 psi?

yes

no

Continued on next page



2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

b. STE/ICE TROUBLESHOOTING - (continued).

(13) FUEL SUPPLY PRESSURE - (DCA AND TK) TEST 24 (continued).

Continued from step B

Do test 26 (para 2-22.b(22)) and if no pressure is indicated, do test 49 (para 2-22.b(7)). If engine will not start and pressure is 0 psi, check engine driven fuel pump shaft (para 4-7).

C. 1. Turn MASTER switch to OFF (refer to TM 9-2350-287-10).
2. Remove harness 12353646 from in-tank fuel pumps and generator system relay.
3. Place a jumper wire from socket A to socket C.
4. Install red-striped transducer TK22 and adapter TK24 at the inlet side of the primary fuel filter.
5. Connect DCA cable W4 connector P1 to connector J3 on VTM.
6. Connect DCA cable W4 connector P2 to transducer TK22.
7. Turn MASTER switch to ON (refer to TM 9-2350287-1 0).
8. Enter 49 into TEST SELECT, then press and release TEST button.

Does VTM reading show 4 psi?

yes — no

Go to para 2-19.h(5).

D. 1. Turn MASTER switch to OFF (refer to TM 9-2350-287-10).
2. Remove the jumper wire and reconnect harness 12353646 to in-tank fuel pumps and generator system relay.
3. Turn MASTER switch to ON and start engine (refer to TM 9-2350-287-10).
4. Enter 49 into TEST SELECT and press TEST button.
5. Hold engine speed at 1200 RPM.

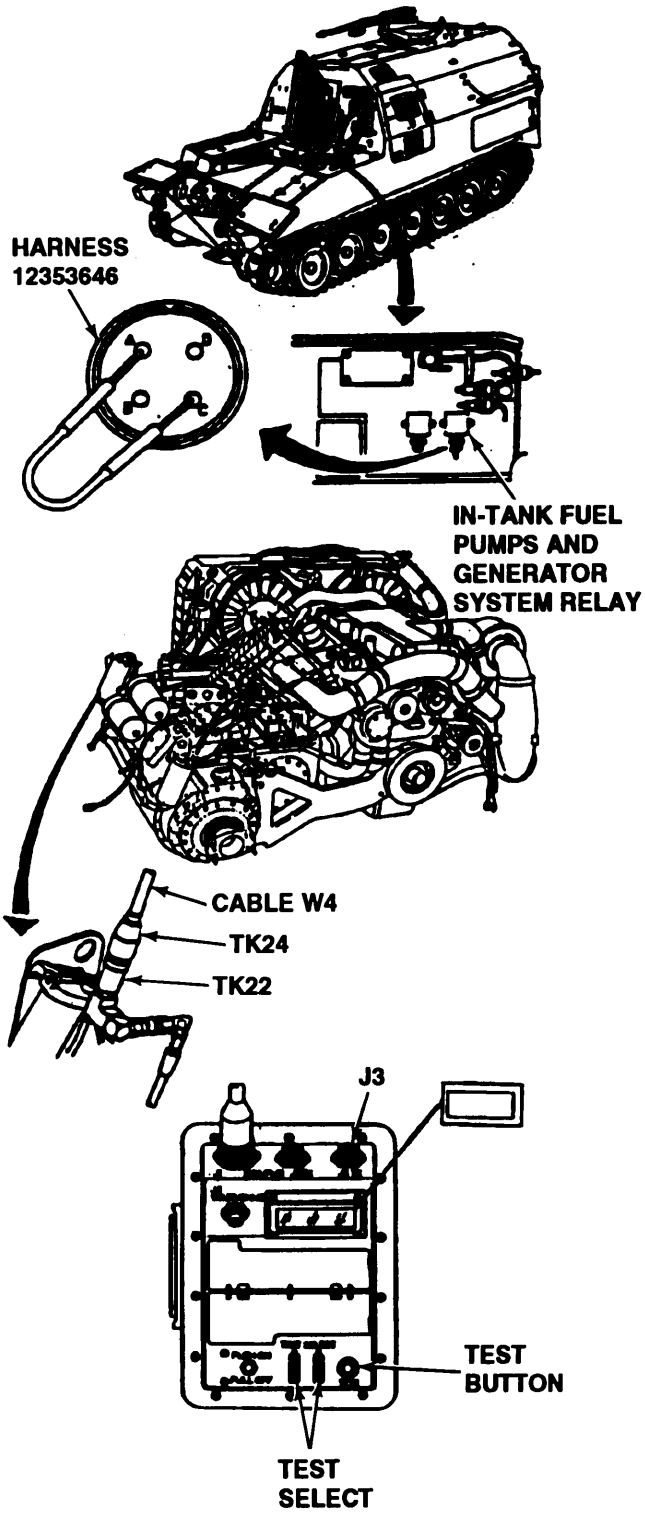
Is a pressure of 1.2 psi held?

yes — no

Fault does not exist as indicated. Recheck fault symptom.

Do test 26 (para 2-22.b(22)). If test passes, replace engine driven fuel pump (para 4-7).

END OF TASK



2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

b. STE/ICE TROUBLESHOOTING - (continued). (14) CRANKING CURRENT - TEST 71.

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- STE/ICE test set (Item 65, Appendix I)

A. 1. Pull power switch on VTM to OFF position.
2. Connect DCA cable W1 connector PI to VTM connector J1.
3. Connect DCA cable W1 to harness 12329996 connector at DCA receptacle in driver's compartment.
4. Push power switch on VTM to ON position.
5. Do confidence test 66/99 (para 2-22.a(1)).
6. Dial 60 into TEST SELECT.
7. Press and release TEST button. Message "VEH" should be displayed on the VTM.
8. Enter the vehicle ID number 11.
9. Enter 71 into TEST SELECT, then press and hold TEST button until "CAL" appears.
10. Press and release TEST button.
11. Crank engine (refer to TM 9-2350-287-10) while holding fuel shutoff control handle out.
12. Record test results.

Is reading on VTM between -350 and -500 amps?

yes

Fault does not exist as indicated. Recheck fault symptom.

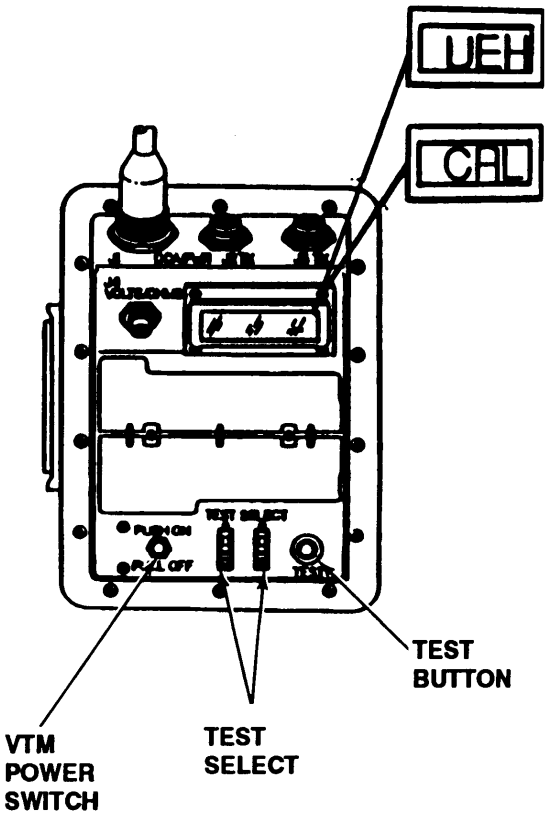
no

B. 1. Do the following tests using function control 01:
- 72- Current first peak (para 2-22.b(15)).
- 73 - Battery internal resistance (para 2-22.b(3)).
- 74 - Starter circuit resistance (para 2-22.b(2)).
- 75 - Battery resistance change (para 2-22.b(4).

2. If tests are good, do the following tests:
- 68 - Starter positive terminal voltage (para 2-22.b(19)).
- 69 - Starter negative cable drop (para 2-22.b(5)).
- 70 - Starter solenoid voltage (para 2-22.b(16)).

3. If fault still exists, do individual battery voltage test 89 (para 2-22.b(20)).

END OF TASK



2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

b. STE/ICE TROUBLESHOOTING - (continued). (15) CURRENT FIRST PEAK - TEST 72.

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- STE/ICE test set (Item 65, Appendix I)

A. 1. Connect DCA cable W1 connector P1 to VTM connector J1.
2. Connect DCA cable W1 to hamess 12329996 connector at DCA receptacle in driver's compartment.
3. Push power switch on VTM to ON position.
4. Do confidence test 66/99 (para 2-22.a(1)).
5. Dial 60 into TEST SELECT.
6. Press and release TEST button. Message "VEH" should be displayed on the VTM.
7. Enter the vehicle ID number 11.
8. Enter 72 into TEST SELECT, then press and release TEST button.
9. When "GO" appears on VTM, crank engine (refer to TM 9-2350-287-10) while holding fuel shutoff control handle until "OFF or''.9.9.9.9"on VTM display.
10. Record test results.

Is reading on VTM between 875 and 1800 amps?

yes

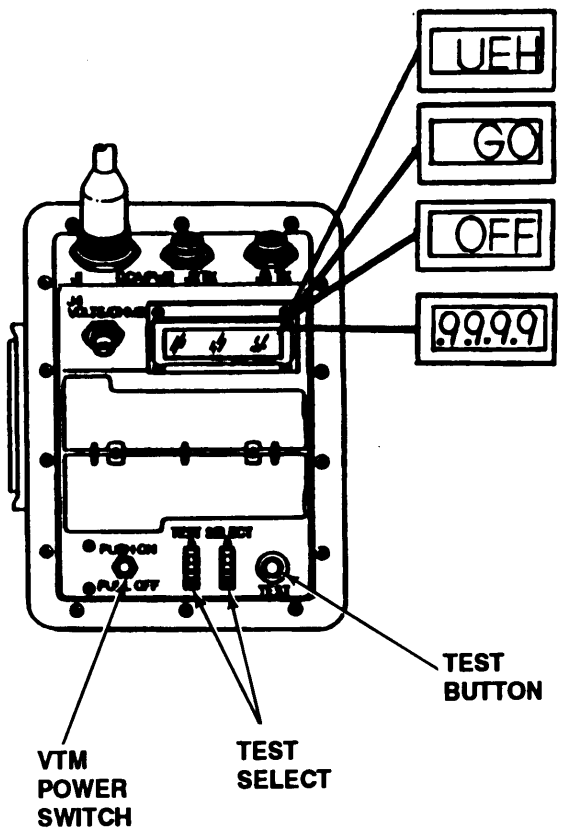
Fault does not exist as indicated. Recheck fault symptom.

no

B. 1. Do the following tests using function control 01:
- 71 - Cranking current (para 2-22.b(14)).
- 73 - Battery internal resistance (para 2-22.b(3)).
- 74 - Starter circuit resistance (para 2-22.b(2)).
- 75- Battery resistance change (para 2-22.b(4)).

2. If tests are good, do the following tests:
- 68- Starter positive terminal voltage (para 2-22.b(19)).
- 69 - Starter negative cable drop (para 2-22.b(5)).
- 70 - Starter solenoid voltage (para 2-22.b(16)).

3. If fault still exists, do individual battery voltage test 89 (para 2-22.b(20)).



END OF TASK

2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

b. STE/ICE TROUBLESHOOTING - (continued). (16) STARTER SOLENOID VOLTAGE - TEST 70.

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- STE/ICE test set (Item 65, Appendix I)

A. 1. Connect DCA cable W1 connector PI to VTM connector J1.
2. Connect DCA cable W1 to harness 12329996 connector at DCA receptacle in driver's compartment.
3. Push power switch on VTM to ON position.
4. Do confidence test 66/99 (para 2-22.a(1)).
5. Dial 60 into TEST SELECT.
6. Press and release TEST button. Message "VEH" should be displayed on the VTM.
7. Enter the vehicle ID number 11.
8. Enter 70 into TEST SELECT, then press and release TEST button.
9. Crank engine (refer to TM 9-2350-287-10) while holding fuel shutoff control handle out.
10. Record test results.

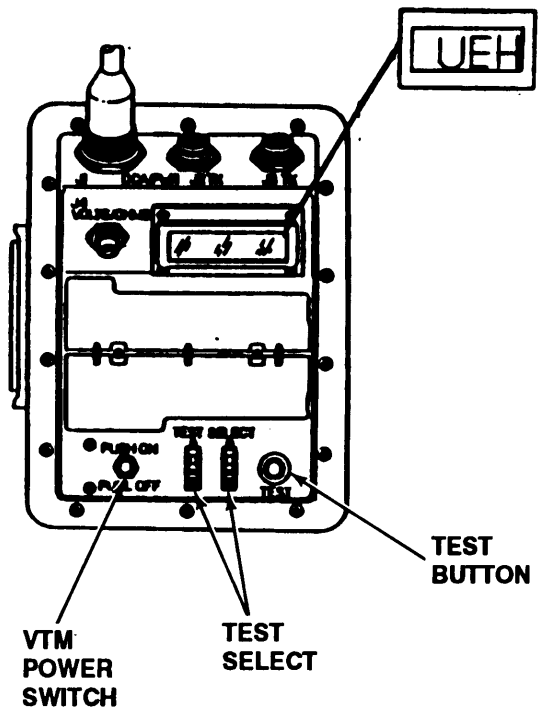
Is reading on VTM at least 18 vdc?

yes

Fault does not exist as indicated. Recheck fault symptom.

no

Do test 67 (para 2-22.b(8)) and test 69 (para 2-22.b(5)) using function control 02. If tests are good, notify Direct Support Maintenance.



END OF TASK

2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

b. STE/ICE TROUBLESHOOTING - (continued). (17) VEHICLE OIL PRESSURE - TEST50.

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- STE/ICE test set (Item 65, Appendix I)

Equipment Conditions:
- Air intake grille opened (refer to TM 9-2350-287-10).
- Transmission doors opened (refer to TM 9-2350-287-10).

A. 1. Connect DCA cable WI connector P1 to VTM connector J1.
2. Connect DCA cable W1 to harness 12329996 connector at DCA receptacle in driver's compartment.
3. Push power switch on VTM to ON position.
4. Do confidence test 66/99 (para 2-22.a(1)).
5. Dial 60 into TEST SELECT.
6. Press and release TEST button. Message "VEH" should be displayed on the VTM.
7. Enter the vehicle ID number 11.
8. Remove 90° elbow from sampling port of fitter housing.
9. Install blue-striped transducer TK17 and elbow TK26 in sampling port of oil filter manifold.
10. Connect DCA cable W4 connector P2 to blue-striped transducer TK17.
11. Connect connector P1 of harness W4 to VTM.
12. Enter 01 into TEST SELECT, then press and release TEST button.
13. When "CON" appears on the VTM, enter 50 into TEST SELECT, then press and hold TEST button until "CAL" is displayed on VTM.
14. Release TEST button and wait for reading. Reading should be between -150+ 150.
15. Press and release TEST button.
16. Start engine (refer to TM 9-2350-287-10) and let run until normal operating temperature is reached (1800).
17. Accelerate engine speed to 1000 RPM and record test results.

Is reading on VTM between 30 and 50 psi?

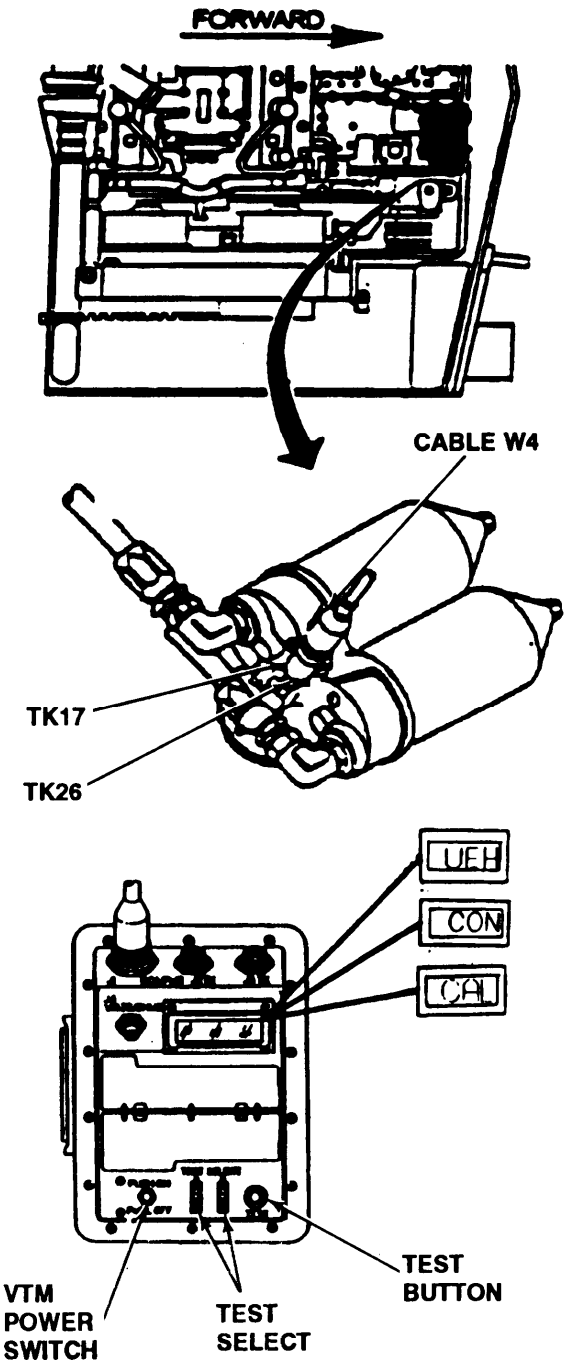
yes

Fault does not exist as indicated. Recheck fault symptom.

no

Check oil level (refer to TM 9-2350-287-10) and notify Direct Support Maintenance.

END OF TASK

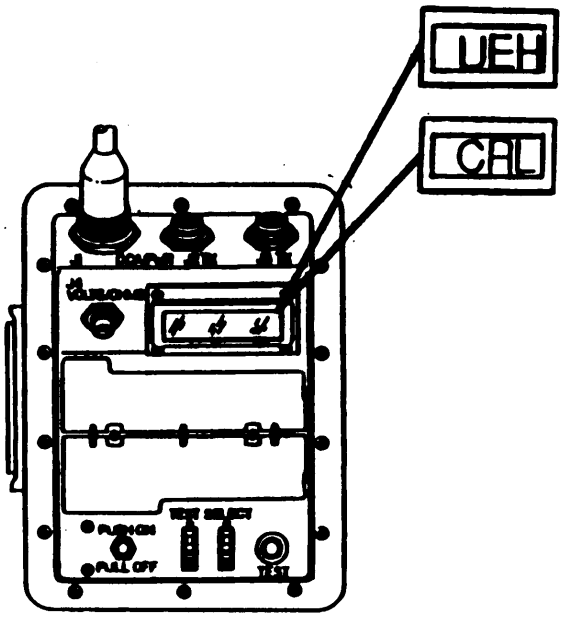


2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

b. STE/ICE TROUBLESHOOTING - (continued). (18) AIR FILTER PRESSURE DIFFERENTIAL - TEST 28.

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- STE/ICE test set (Item 65, Appendix I)

A. 1. Connect DCA cable WI connector P1 to VTM connector J1.
2. Connect DCA cable W1 to harness 12329996 connector at DCA receptacle in driver's compartment.
3. Push power switch on VTM to ON position.
4. Do confidence test 66/99 (para 2-22.a(1)).
5. Dial 60 into TEST SELECT.
6. Press and release TEST button. Message "VEH" should be displayed on the VTM.
7. Enter vehicle ID number 11.
8. Enter 28 into TEST SELECT, then press and hold TEST button until "CAL" is displayed on VTM.
9. Press and release TEST button.
10. Turn MASTER switch ON and start engine (refer to TM 9-2350-287-10).
11. Record test results.



Is reading on VTM greater than -20 H20?

yes

Fault does not exist as indicated. Recheck fault symptom.

no

Check air cleaner indicator and air cleaner assemblies (refer to TM 9-2350-287-10). Replace air cleaner fitters as necessary (para 4-14). Verify problem is solved.

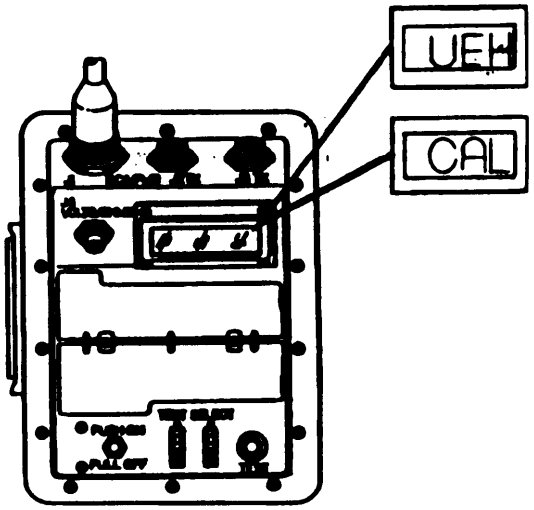
END OF TASK

2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

b. STE/ICE TROUBLESHOOTING - (continued). (19) STARTER POSITIVE TERMINAL VOLTAGE - TEST 68.

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- STE/ICE test set (Item 65, Appendix I)

A. 1. Connect DCA cable WI connector P1 to VTM connector J1.
2. Connect DCA cable W1 to harness 12329996 connector at DCA receptacle in driver's compartment.
3. Push power switch on VTM to ON position.
4. Do confidence test 86/99 (para 2-22.a(1)).
5. Dial 60 into TEST SELECT.
6. Press and release TEST button. Message "V/EH" should be displayed on the VTM.
7. Enter vehicle ID number 11.
8. Enter 68 into TEST SELECT, then press and hold TEST button until "CAL" is displayed on VTM.
9. Press and release TEST button.
10. Crank engine (refer toTM 9-2350-287-10) while holding fuel shutoff control handle out.
11. Record test results.



Is reading on VTM at least 18 vdc?

yes

Fault does not exist as indicated. Recheck fault symptom.

no

Do test 67 (para 2-22b(8)) with control function 02. If test passes, replace wiring harness 12329996 (para 7-74). Verify problem is solved.

END OF TASK

2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

b. STE/ICE TROUBLESHOOTING - (continued). (20) INDIVIDUAL BATTERY VOLTAGE - TEST 89.

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- STE/ICE test set (Item 65, Appendix I)

Equipment Conditions:
- Battery access doors opened (refer to TM 9-2350-287-10).

A. 1. Connect DCA cable W1 connector P1 to VTM connector J1.
2. Connect DCA cable W1 to harness 12329996 connector at DCA receptacle in driver's compartment.
3. Push power switch on VTM to ON position.
4. Do confidence test 66/99 (para 2-22.a(1)).
5. Connect STE/ICE cable W2 connector P1 to VTM connector J4.
6. Attach red clip of cable W2 to black clip of cable W2.
7. Enter 89 into TEST SELECT.
8. Press and hold TEST button until "CAL" is displayed on VTM.
9. Press TEST button and wait for offset value to appear on VTM.
10. If offset value is between -6.8 and +6.8, connect red clip of cable W2 to positive terminal of battery "A" and black clip of cable W2 to negative terminal of battery "A".
11. Crank engine (refer to TM 9-2350-287-10) while holding fuel shutoff control handle out.
12. Record value displayed while cranking engine.
13. Repeat test for batteries B, C, and Done at a time by connecting red clip of cable W2 to positive terminal and black clip of cable W2 to negative terminal.

Is each battery value at least 9.5 vdc?

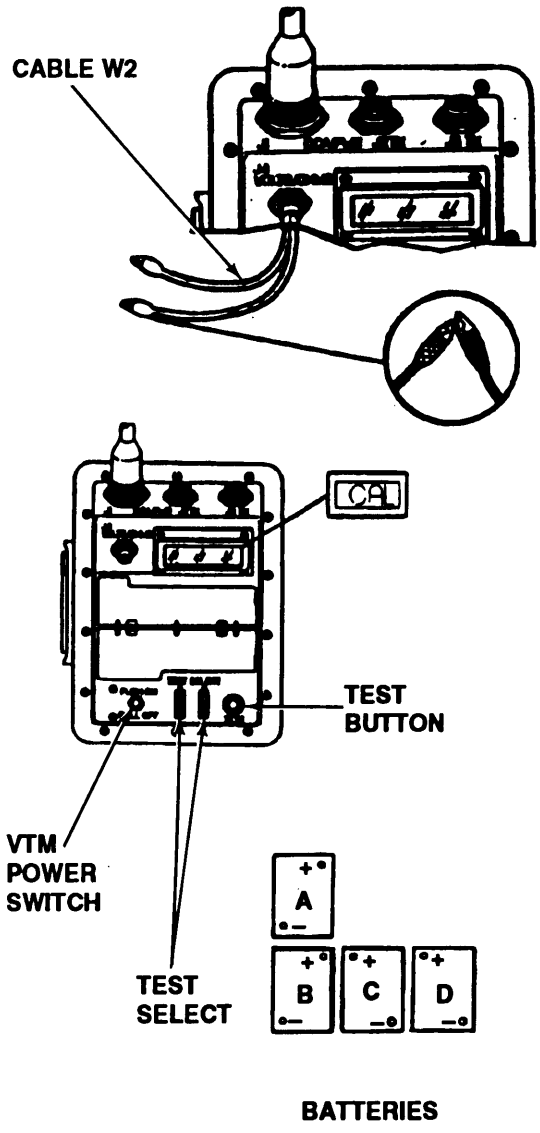
yes

Fault does not exist as indicated. Recheck fault symptom.

no

Check battery electrolyte level (refer to TM 9-2350-287-10). Perform specify gravity checks (Unit PMCS). Replace batteries as required (para 7-41).

END OF TASK



2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

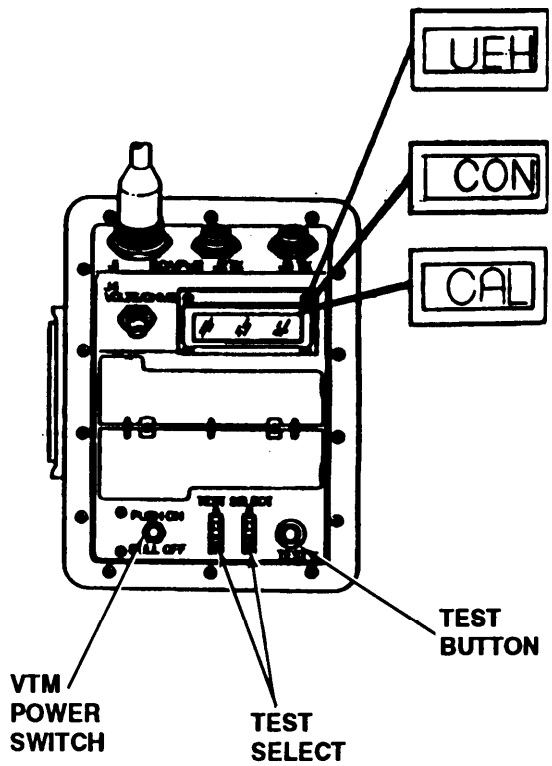
b. STE/ICE TROUBLESHOOTING - (continued). (21) AIR BOX PRESSURE - TEST 32.

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- STE/ICE test set (Item 65, Appendix I)

Equipment Conditions:
- Final drive U-Joints disconnected (para 8-20).

A. 1. Connect DCA cable W1 connector P1 to VTM connector J1.
2. Connect DCA cable W1 to harness 12329996 connector at DCA receptacle in driver's compartment.
3. Push power switch on VTM to ON position.
4. Do confidence test 66/99 (para 2-22.a(1)).
5. Dial 60 into TEST SELECT.
6. Press and release TEST button. Message "VEH" should be displayed on the VTM.
7. Enter vehicle ID number 11.
8. Enter 01 into TEST SELECT, then press and release TEST button.
9. When VTM shows "CON", enter 32 into TEST SELECT, then press and hold TEST button until "CAL" is displayed on VTM.
10. Press and release TEST button.
11. Start engine (refer to TM 9-2350-287-10), apply brakes, place transmission in 4th gear, and increase engine speed to full throttle.
12. When VTM shows peak reading, record test results and slow engine speed to 1000 RPM.
13. Place transmission in NEUTRAL and let engine run for 3 to 5 minutes.

Were the following results displayed?
1550-1800 RPM /21 -28 in. Hg.



yes

Fault does not exist as indicated. Recheck fault symptom.

no

Do test 13 (para 2-22b(11)) and test 14 (para 2-22b(10)). If tests fail, check blower, blower seals, air box seals, and turbocharger. If faulty, notify Direct Support Maintenance.

END OF TASK

2-22. SIMPLIFIED TEST EQUIPMENT FOR INTERNAL COMBUSTION ENGINES (STE/ICE) (continued).

b. STE/ICE TROUBLESHOOTING - (continued)	(22) FUEL PRESSURE DROP - TEST 26.

Tools/Test Equipment:	Equipment Conditions:
• General mechanic's tool kit (Item 24, Appendix I) • STE/ICE test set (Item 65, Appendix I)	• Air intake grille opened (refer to TM 9-2350-287-10).

A. 1. Connect DCA cable W1 connector P1 to VTM connector J1.
2. Connect DCA cable W1 to harness 12329996 connector at DCA receptacle in driver's compartment.
3. Push power switch on VTM to ON position.
4. Do confidence test 66/99 (para 2-22.a(1)).
5. Dial 60 into TEST SELECT.
6. Press and release TEST button. Message "VEH" should be displayed on the VTM.
7. Enter vehicle ID number 11.
8. Enter 26 into TEST SELECT.
9. Start engine (refer to TM 9-2350-287-10) and increase engine speed between 2400 and 2500 RPM.
10. Press and release TEST button.
11. Record test results.

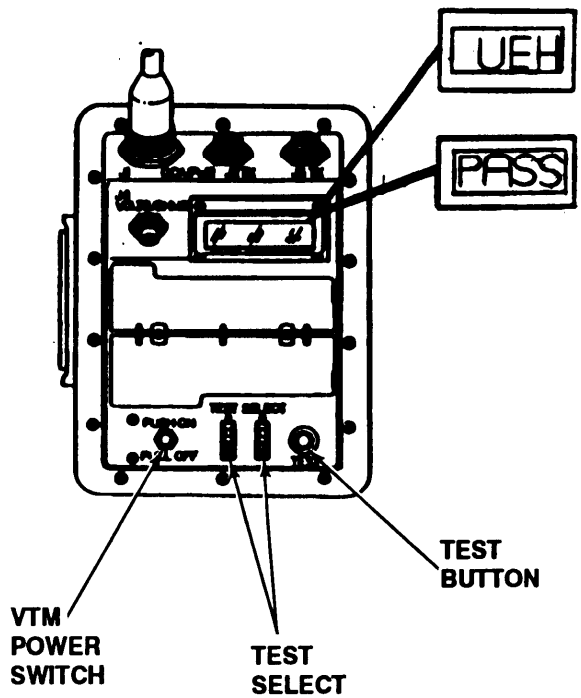
Does VTM show "PASS"?

yes

Fault does not exist as indicated. Recheck fault symptom.

no

Replace primary and secondary fuel filters (para 4-25 and 4-26). Repeat this test to make sure problem has been corrected.



END OF TASK

2-23. WORK SAFETY.

Safety must be the primary concern of all maintenance personnel.

Be sure to read and understand all the warnings in the Warning Summary. Always observe the warnings and cautions that appear in maintenance procedures before the applicable steps. You must observe the warnings and cautions to prevent serious injury to yourself or damage to your equipment.

2-24. CLEANING INSTRUCTIONS.

1. Use wire brush on metal parts to remove rust and corrosion.

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT use near open flame or excessive heat.

2. Clean all metal pads except bearings with drycleaning solvent. Metal or fiber brushes maybe used to apply dry cleaning solvent and to remove softened or dissolved material. Hand scraping with metal scrapers may be used to remove soft coatings or deposits.

3. Clean bearings in accordance with TM 9-214, Inspection and Care of Bearings.

4. Soak very oily or greasy metal parts in a tank containing dry cleaning solvent. The soaking time varies with the amount and type of material to be removed.

CAUTION

Do not steam-clean electrical components. Moisture and condensation in electrical wiring and components can cause short circuits and other damage.

5. Clean rubber hoses with warm soap and water, and wipe dry with clean rags. Clean electrical wiring harness insulation with a damp rag and wipe dry.

6. Remove corrosion or rust by sandblasting or with crocus cloth. Use the method that will not damage the surface being cleaned. Crocus cloth should be used to remove corrosion and rust from polished surfaces only. Make sure that critical dimensions are not altered when using crocus cloth.

7. Apply white enamel to interior of hull (refer toTM 43-0139).

8. Apply appropriate shade of CARC paint to exterior of vehicle (refer toTM 43-0139).

9. Apply deck-covering compound to areas where personnel walk, such as front decks and crew compartment interiors (refer to TM 43-0139).

2-25. INSPECTION INSTRUCTIONS.

1. Always clean parts before inspecting for serviceability. Dirt and grease can hide damage that may make an item unusable,

2. Inspect bearings in accordance with TM 9-214, Inspection and Care of Bearings.

3. Inspect all mounting hardware for serviceability. Replace any damaged screws, nuts, or washers. Always replace lockwashers, self-locking nuts, cotter pins, and spring pins, if removed.

4. Inspect threaded holes for damage or knurled threads, Repair damaged threads with a thread restorer file by chasing or by using a tap and die.

5. Always measure a component when tolerances are given, to make sure the component is still serviceable. Tolerances will be given in the maintenance procedures when applicable.

2-26. REPAIR INSTRUCTIONS.

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

CAUTION

Never scribe marks on bearing surfaces. Damage to the bearing will result.

2. Mark gears on mating teeth with scribe marks or with dye, indelible ink, or paint, to be certain of correct positioning at assembly. Avoid using chalk or crayon because they smudge and are easily wiped off.

3. During assembly, subassemblies should be assembled first, combined into major components where possible, and then installed to forma single component.

4. Records to provide repair and replacement data and statistics should be prepared carefully and be maintained according to DA Pam 738-750.

5. When assembling components, replace damaged keys with new ones.

6. Gaskets, nonmetallic packings, preformed packings, seals, and bearings must be replaced if they are removed. Springs must be replaced if broken, kinked, stretched, or cracked.

7. Remove burrs from metal items with a stone or file. Remove burrs on closely fitting mating surfaces by lapping the surfaces with abrasive-grade compound.

2-27. TAGGING HOSES, LINES, AND TUBES.

Always tag hoses, lines, and tubes when they are being disconnected so they can be identified easily and connected correctly. Use the circuit number for the hose, line, or tube, if given, or an easily recognized term (e.g.,''fuel filter in.. .“) that identifies the type of fluid in the hose, what it connects to, and whether it is a supply or return line.

2-28. LUBRICATION INSTRUCTIONS.

Apply a light coat of lubricating oil to metal parts after they are cleaned, but before they are assembled, to prevent corrosion. Lubricate components and systems in accordance with the instructions in Appendix G.

2-29. TORQUE VALUES.

Torque values given in the procedures apply to unlubricated threads. Follow the torque values given in the maintenance procedures. If no torque value is given, follow the Torque Value Guide in Appendix C.

2-30. DECAL REPLACEMENT.

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothing, and DO NOT use near open flame or excessive heat.

NOTE

For proper installation of decal, note its location before removing.

1. Use drycleaning solvent to loosen damaged decal, and remove decal from surface. Discard decal.

2. Clean any decal residue from surface with dry cleaning solvent. Wipe surface with clean rag.

NOTE

Surface must be clean and dry before installing new decal.

3. Remove protective backing from new decal and position on surface.

4. Using a dry rag, press decal into position. Start in the center of decal and press outward to remove any air bubbles.

2-31. DEFINITION OF ADMINISTRATIVE STORAGE.

Equipment placement in administrative storage can be for short periods when:

a. Units lack operating funds, personnel, other resources, or normal usage of its organic materiel.

b. Materiel exceeding the owning unit's capability for operation and maintenance must be retained by that unit for contingency or other reasons.

Installation or unit commanders may authorize the administrative storage of their materiel through guidance furnished in AR 750-1. M992A1s should be ready to use within time factors determined by the directing authority.

2-32. PREPARATION FOR ADMINISTRATIVE STORAGE.

Except as indicated elsewhere in this paragraph, equipment placed in administrative storage should be capable of mission readiness 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.

Report equipment in administrative storage in Materiel Readiness and Unit Readiness reports as prescribed for all reportable equipment. Refer to AR 200-1.

Perform inspections, maintenance services, and lubrication in accordance with TM 9-2350-287-10 and this manual.

Records and reports to be maintained for equipment in administrative storage are those prescribed by DA Pam 738-750, for equipment in use.

Ten percent variance is acceptable on running time hours, or milage used to determine maintenance actions involved.

Security

Instructions in this paragraph do not modify security procedures and requirements for classified or pilferable items. Refer to AR 190-13 and AR 190-51.

Storage Site

Select the best available site for administrative storage. Separate stored equipment from equipment in use. Conspicuously mark the area "Administrative Storage."

Covered storage space is preferred. When insufficient covered space is available for all M992A1s to be stored, select an open site.

Open sites should be improved hardstand, if available. Unimproved sites should be firm, well-drained, and kept free of excessive vegetation.

Storage Plan

Store equipment to provide maximum protection from the elements and to provide access for inspection, maintenance, and exercising. Anticipate removal or deployment problems and take suitable precautions.

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.

2-32. PREPARATION FOR ADMINISTRATIVE STORAGE (continued).

Establish a fire plan and provide adequate firefighting equipment and personnel.

Maintenance Services and Inspections

Prior to storage, perform the next scheduled major preventive maintenance services (semi-annually or annually).

Basic Issue Items

Process basic issue items simultaneously with the M992A1 to which they are assigned. if possible, store basic issue items with the M992A1. if stored apart from the M992A1, basic issue items with tags designating the vehicle, its registration or serial number, and location, and store in protective closures. In addition, place a tag or list indicating the location of the removed items in a conspicuous place in the M992A1.

Corrections of Shortcomings and Deficiencies

Correct all shortcomings and deficiencies prior to storage, or obtain a deferment from the approving authority.

Lubrication

Lubricate equipment in accordance with the applicable lubrication instructions in TM 9-2350-287-10 and Appendix G. Retract hydraulic system linkages and coat exposed portions of shafts with grease.

General Cleaning, Painting, and Preservation

Clean the equipment of dirt, grease, and other contaminants in accordance with this manual.

CAUTION

Do not direct high-pressure water or steam against air cleaners, air duct outlets, exhaust outlets, unsealed electrical systems, automatic fire extinguishing system (AFES) equipment, or any exterior component. Moisture will cause electrical malfunctions. Condensation in ducts can cause corrosion.

After cleaning and drying, immediately coat all unpainted metal surfaces with oil or grease as appropriate.

NOTE

- Air circulation under draped covers reduces deterioration from moisture and heat.
- Place a piece of cloth or other material between desiccant bags and metal surfaces.

Sunlight, heat, 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 M992A1 surfaces which may rust, rot, or mildew.

2-33. CARE OF EQUIPMENT IN ADMINISTRATIVE STORAGE.

Maintenance services

After equipment has been placed in administrative storage, suspend ail regularly scheduled preventive maintenance checks and services, and inspect and exercise as specified in this chapter.

Inspection

A vehicle to be prepared for administrative storage must be given a limited technical inspection and processed as prescribed on DD Form 1397. The result of the inspection and classification will be entered on DA Form 2404.

If a vehicle is not shipped or issued upon expiration of the administrative storage period, process as applicable in accordance with the appropriate vehicle specification.

If a vehicle to be shipped will reach its destination within the administrative storage period, it need not be reprocessed when removed from storage, unless necessary because of anticipated in-transit weather conditions.

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 that 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:

a. Leaks (coolant, fuel, or hydraulic fluid)

b. Condition of preservation, seals, and wraps. Seals may develop leaks during storage, during exercise, or shortly thereafter. If leaking continues, refer to the repair procedure in this manual or notify Support Maintenance,

c. Corrosion or other deterioration.

d. Damaged or missing parts.

e. Water in compartments.

f. Any other readily recognizable shortcomings or deficiencies.

2-34. EXERCISE SCHEDULE.

To assure utilization of all assigned materiel, rotate items in accordance with any rotational plan that will keep equipment in operational condition and reduce maintenance effort.

2-35. REMOVAL FROM ADMINISTRATIVE STORAGE.

Remove preservative materials. Perform the next scheduled maintenance service and prepare equipment for service in accordance with instructions on DD Form 1397 and instructions in TM 9-2350-287-10.

Resume the maintenance service schedule in effect after the commencement of storage as in accordance with DD Form 314. Refer to DA Pam 738-750.

2-36. PREPARATION OF EQUIPMENT FOR SHIPMENT.

When shipping the M992A1, the officer in charge of preparing the shipment will be responsible for furnishing the materiel in serviceable condition, properly cleaned, processed, packaged, and packed. Transport the M992A1 in accordance with TM 55-2350-287-14.

Removal of Preservatives Prior to Shipment

Personnel removing vehicle from storage for shipment must not remove preservatives other than to make sure the materiel is complete and serviceable. If preservatives have been removed, they must be restored to the prescribed level of preservation prior to shipment.

Army Shipping Documents

Prepare all Army shipping documents in accordance with AR 55-355.

Loading

CAUTION

Height and width of vehicle, when prepared for rail transportation, must not exceed limitations prescribed for particular railway lines. Whenever possible, local transportation officers must be consulted about limitations of particular railroad lines to be used for movement in order to avoid delays, dangerous conditions, or damage to equipment.

When vehicle is shipped by rail, every precaution must be taken to see that it is properly loaded, blocked, and securely fastened to flatcar floor.

Inspect flatcar prior to loading. Make sure it is suitable condition to carry loads safely.

Prepare flatcar for loading by removing debris, previous blocking, nails, and other obstructions. Inspect flatcar for loose or broken floor planks. If found unsatisfactory, reject flatcar for use.

If suitable hoisting equipment, permanent loading ramps, and handling equipment are not available for loading or unloading materiel, improvised runways, ramps, and spanning platforms can be constructed.

Loading must be governed by the capacity and length of flatcars available at the time of shipment, as well as requirements of bills of lading and shipping instructions.

Position vehicle as far from brake wheel end of flatcar as space permits. Provide minimum clearance of 4 in. below and 6 in. above, behind, and to each side of flatcar brake wheel.

Blocking

All blocking instruction specified herein are minimum and are in accordance with the Association of American Railroads Pamphlet, Section No. 6 (Rules Governing the Loading of Department of Defense Materiel on Open-Top Cars). Additional blocking may be added at discretion of officer in charge.

Blocks

Construct four chock blocks; two to fit angle between tracks and car deck at front of vehicle, and two to fit angle between track and car deck at rear of vehicle. Using 1 -5/8 in.-thick lumber, make chock blocks 12 in. wide and a minimum of 18 in. high. Nail pieces together with 20-penny nails. Place one chock block against front of each track, and against rear of each track. Toenail chock blocks to car floor with 40-penny nails.

2-36. PREPARATION OF EQUIPMENT FOR SHIPMENT (continued).

End Cleats

Place one end cleat (2x4x12in., eight required) against end of each chock block and secure to car deck with 30-penny nails. Place upper cleat on top of lower cleat and secure to lower cleat with 30-penny nails.

Track Inside Cleats

Place track inside cleats (6 x 6 in., 14 ft. long, two required) along inside of left and right tracks. Nail to car floor with 30-penny nails, one about every 12 in.

Side Cleats

Locate one cleat (2x 3 x 10 in., eight required) against inside and outside of each chock block. Secure each to car deck with 20-penny nails.

Track blocks

Cut blocks (24 required) to conform with shape of roadwheels. Install blocks between inside and outside roadwheels on tracks. Place wedges under each block to ensure snug fit against roadwheel, if necessary. Nail 2 in. x 4 in. cleat (as long as required) across tops of track blocks to prevent track blocks from sliding out of position.

Hold-down Rods

Thread both ends of hold-down rod (1 1/4 in. diameter, as long as required). insert one end of hold-down rod through lifting eye on front of vehicle. Bend rod and insert other end through stake pocket on opposite side of flatcar. Repeat operation with second rod and lifting eye on front of vehicle, and with two rods on rear of vehicle.

Transportation

When transiting the M992A1 by any means other than railroad flatcar, transport in accordance with TM 55-2350-287-14.

CHAPTER 3
POWERPACK MAINTENANCE

3-1. GENERAL.

This chapter describes and illustrates procedures for removal and installation of the powerpack and transmission trunnion caps. The powerpack consists of the engine, transfercase, transmission assembly, and related components.

Procedures for operating the powerpack after it has been removed from the vehicle are also described and illustrated.

The powerpack will be given periodic checks to find possible fire hazards. Inspect powerpack cooling accessories, air shrouds, wiring harnesses, and hull compartment for foreign matter during each maintenance service.

Whenever a powerpack is removed for maintenance, or because of a malfunction, general cleaning and inspection of wiring harnesses, hoses, tubes, and the engine compartment should be standard practice (paras 2-24 and 2-25).

Operating the powerpack out of the vehicle lets maintenance personnel inspect the control and drive components of the powerpack by hand-operating the control linkages on the transmission. Components can be checked for proper functioning and performance with the powerpack outside the vehicle without harm to the powerpack.

3-2. POWERPACK REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- Five-ton hoist (Item 23, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)
- Socket wrench socket adapter (Item 63, Appendix I)
- Torque wrench, 0-175 ft-lb (Item 69, Appendix I)

Materials/Parts:
- Grease (Item 33, Appendix D)
- Cotter pin (3) (Item 17, Appendix H)
- Lockwasher (2) (Item 131, Appendix H)
- Lockwasher (2) (Item 163, Appendix H)
- Lockwasher (3) (Item 177, Appendix H)
- Self-locking nut (9) (Item 317, Appendix H)

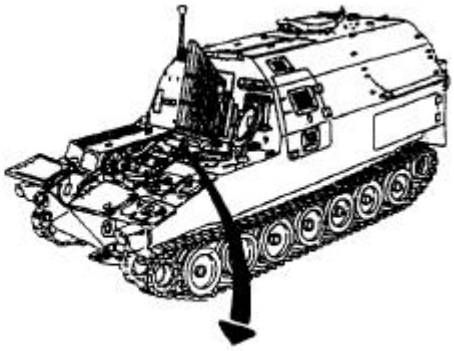
Personnel Required: Three

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Tracks blocked (refer to TM 9-2350-287-10).
- Parking brake released (refer to TM 9-2350-287-10).
- Throttle in idle position (refer to TM 9-2350-287-10).
- Transmission selector set in R-2 position (refer to TM 9-2350-287-10).
- Universal joints disconnected (refer to TM 9-2350-287-10).
- Water can bracket removed (para 15-67).
- Exhaust duct removed (para 5-2).
- Engine compartment access cover removed (para 15-16).
- Front hull slope plate removed (para 15-11).
- Battery ground cables disconnected from battery (para 7-41).
- Steering control linkage removed (para 12-2).

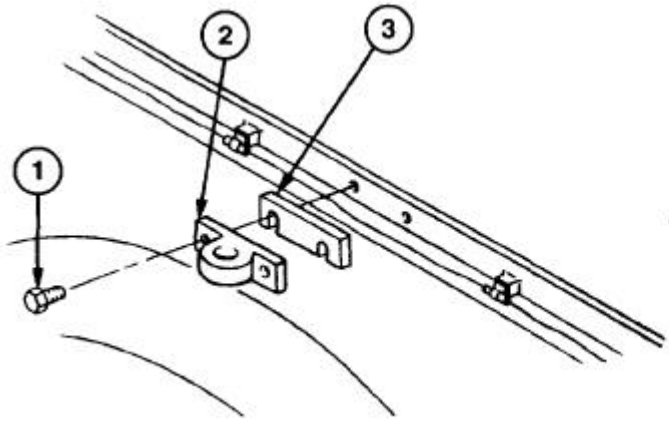
a. REMOVAL

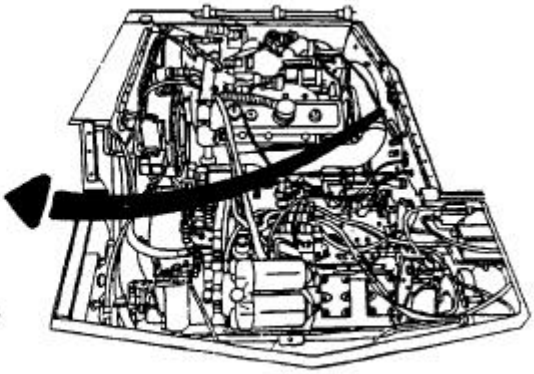
WARNING

Tracks must be blocked securely so the vehicle will not roll. When powerpack is removed, vehicle is without brakes. Failure to securely block the tracks can result in severe injury to personnel.



1. Remove two screws (1), air intake grille handle bracket (2), and shim (3) from hull.

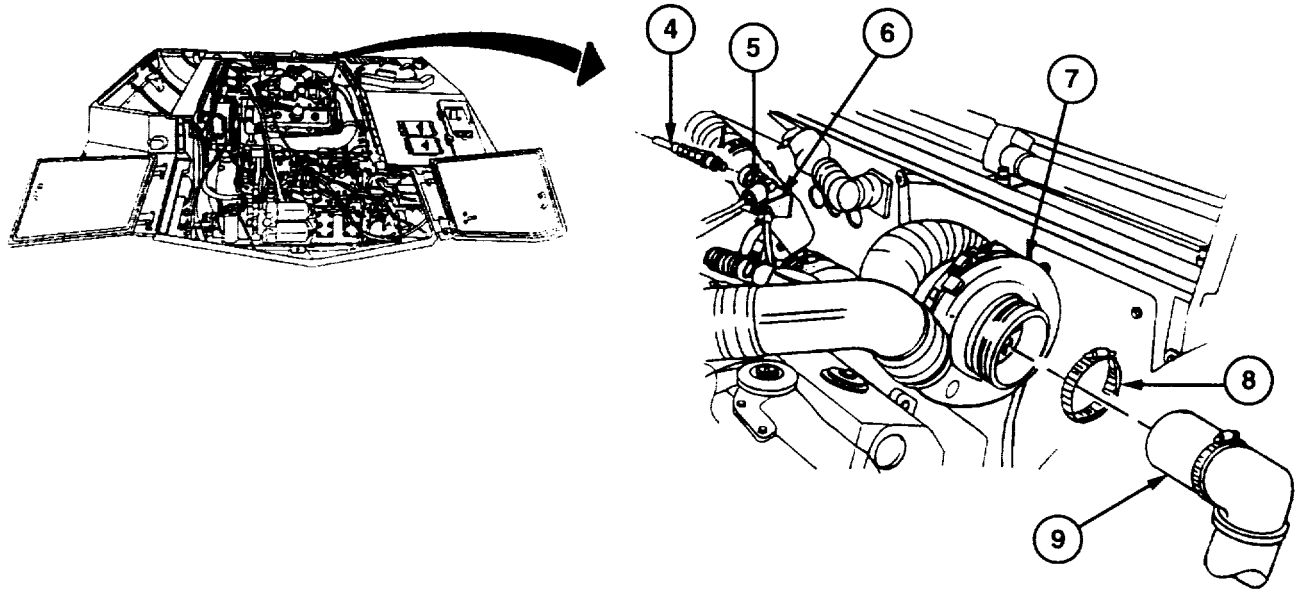




3-2. POWERPACK REPLACEMENT (continued).

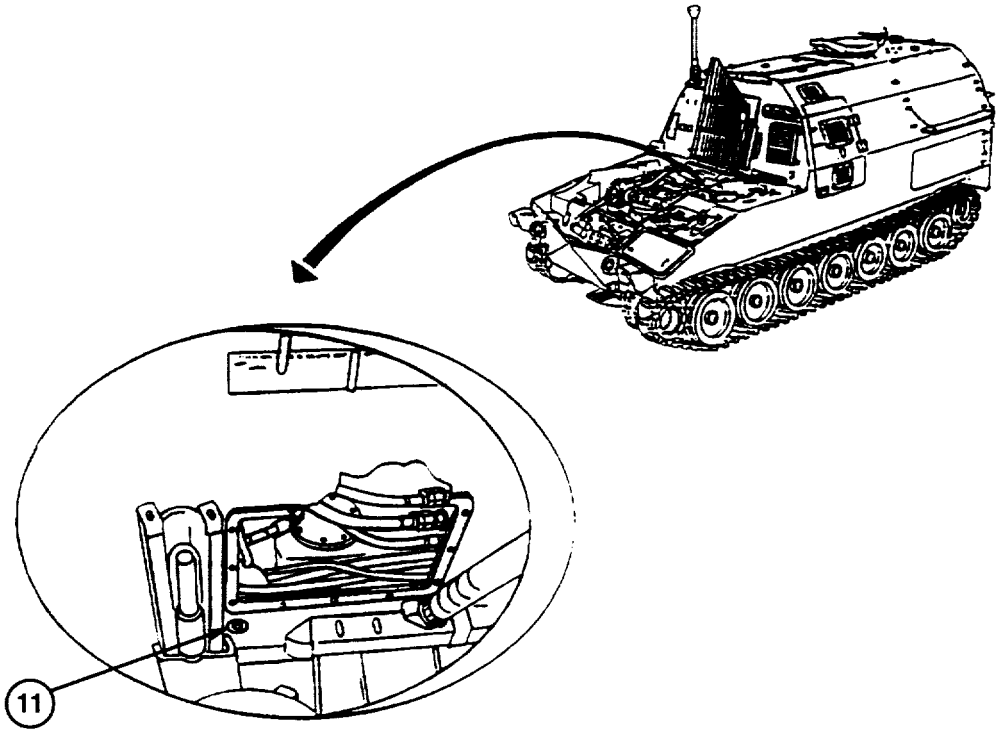
2. Disconnect lower fuel tank return-from-engine hose (4) from engine bracket (6) at quick disconnect (5).

3. Loosen hose clamp (8), and disconnect turbocharger inlet duct (9) from turbocharger (7).



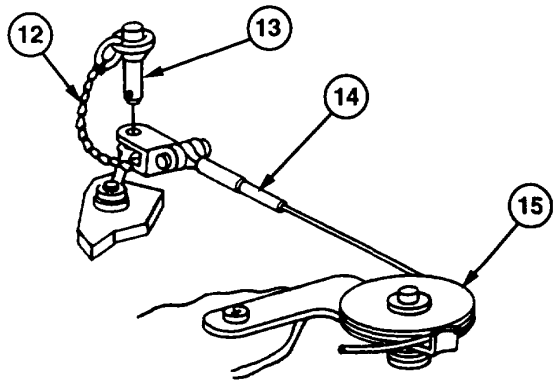
[Step Deleted]

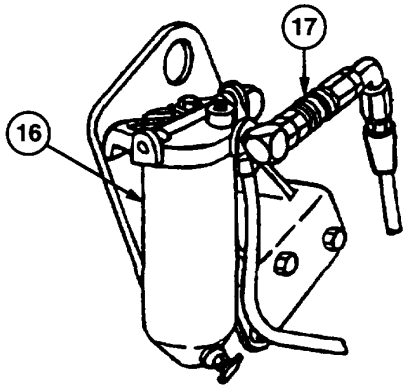
5. From inside driver's compartment, turn engine mount release shaft (11) counterclockwise to unlock powerpack.



3-2. POWERPACK REPLACEMENT (continued).

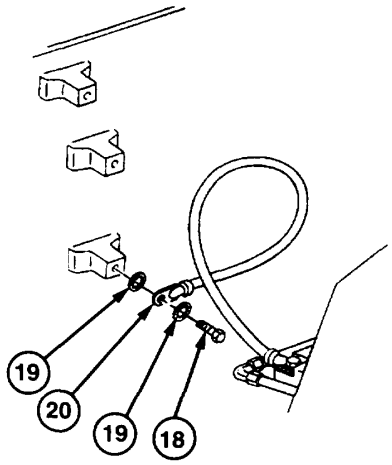
6. Remove quick-release pin (13) and fuel shutoff cable (14) from fuel shutoff control (12). Lift up on pulley (15), and remove fuel shutoff cable (14) from pulley (15). Lay fuel shutoff cable (14) out of the way.

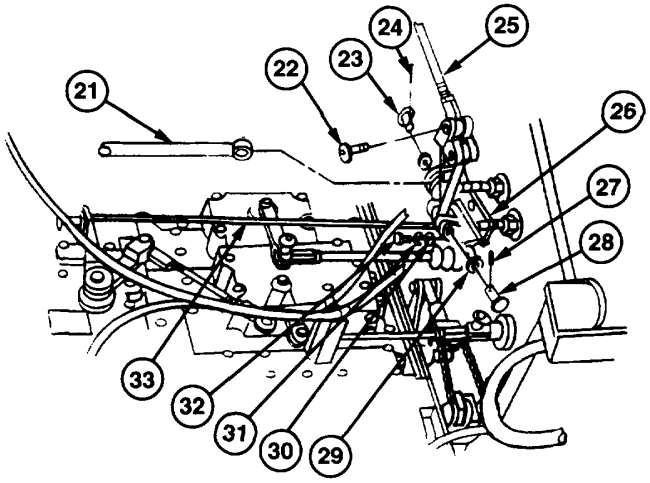




7. Disconnect fuel-line quick disconnect (17) from primary fuel filter (16).

8. Remove screw (18), two lockwashers (19), and ground lead (20) from hull. Discard lockwashers.





CAUTION

After disconnecting, make sure steering and shift control rods are in driver's compartment wall to prevent damage when removing and installing powerpack.

9. Remove quick-release pin (22) and throttle governor control connecting linkage (25) from throttle linkage bracket (26).

10. Remove cotter pin (24), straight pin (23), and throttle valve control rod (21) from throttle linkage bracket (26). Discard cotter pin.

11. Remove cotter pin (27), washer (29), straight pin (28), and accelerator linkage (33) from throttle linkage bracket (26). Discard cotter pin.

12. Remove three screws (32), lockwashers (31), and washers (30) and throttle linkage bracket (26) from hull. Discard lockwashers.

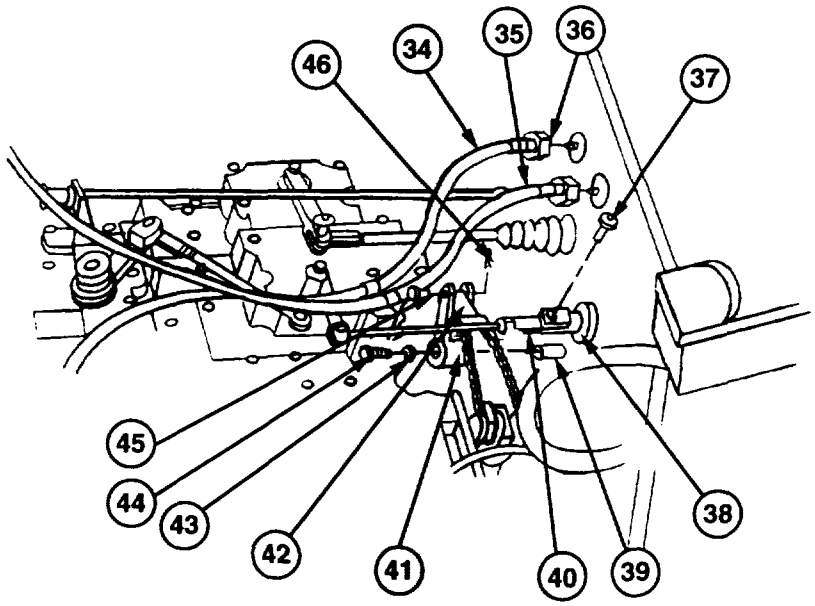
3-2. POWERPACK REPLACEMENT (continued).

13. Loosen two nuts (36) and disconnect tachometer cable (34) and speedometer cable (35) from hull.

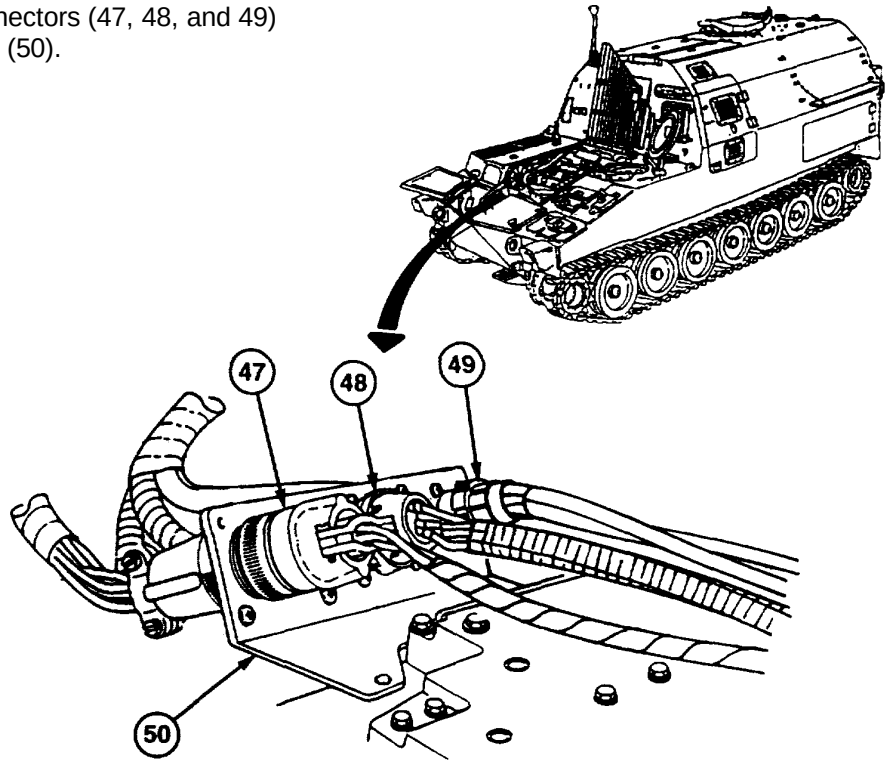
14. Remove quick-release pin (37) and shift control rod (40) from shift control linkage (38).

15. Remove cotter pin (46), pin (45), and brake control rod end plain bearing (42) from remote control lever (41). Discard cotter pin.

16. Remove screw (44), washer (43), and remote control lever (41) from shaft (39).



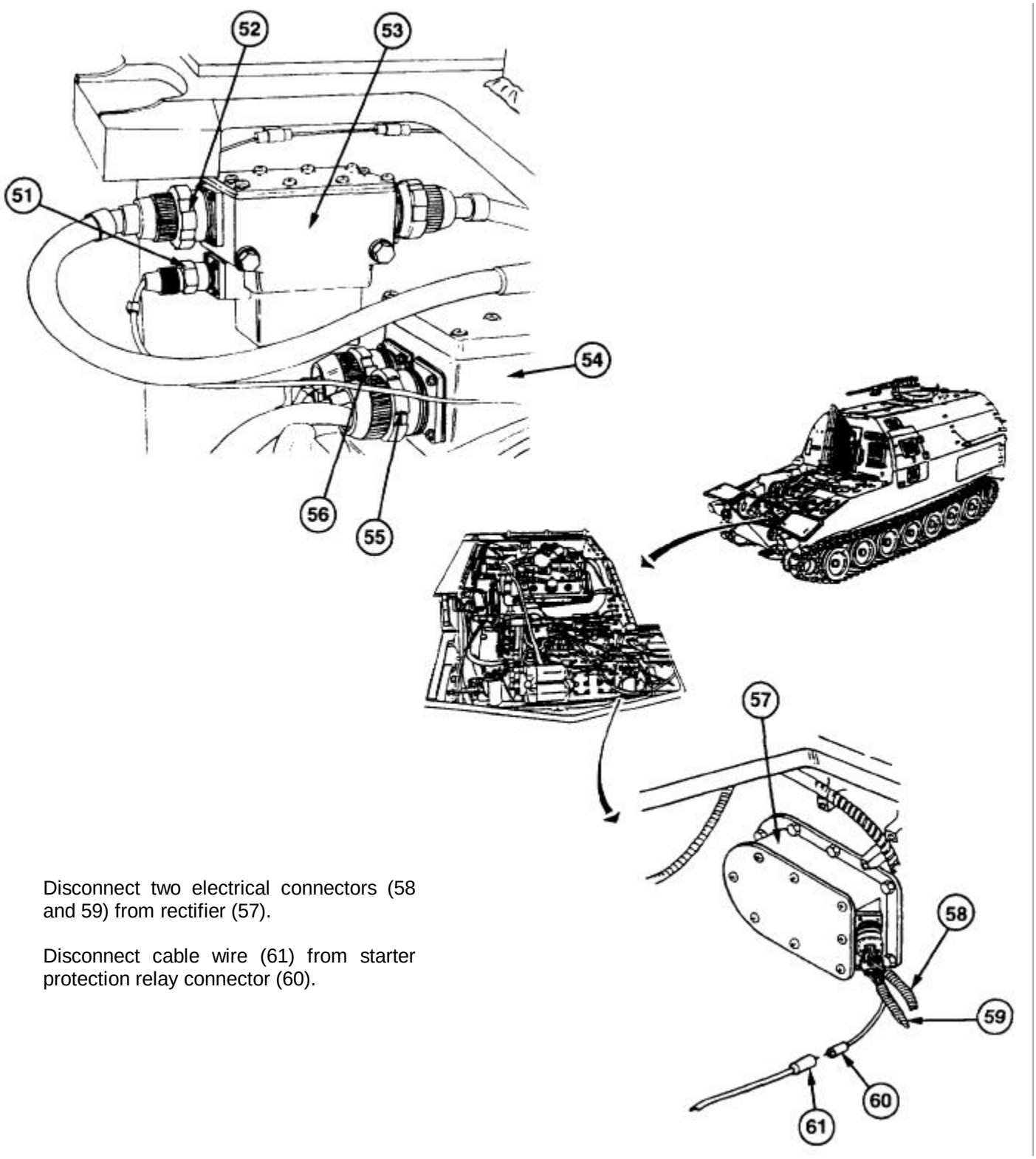
17. Disconnect three electrical connectors (47, 48, and 49) from engine disconnect bracket (50).



3-2. POWERPACK REPLACEMENT (continued).

18. Disconnect two electrical connectors (51 and 52) from master relay (53).

19. Disconnect two electrical connectors (55 and 56) from voltage regulator (54).

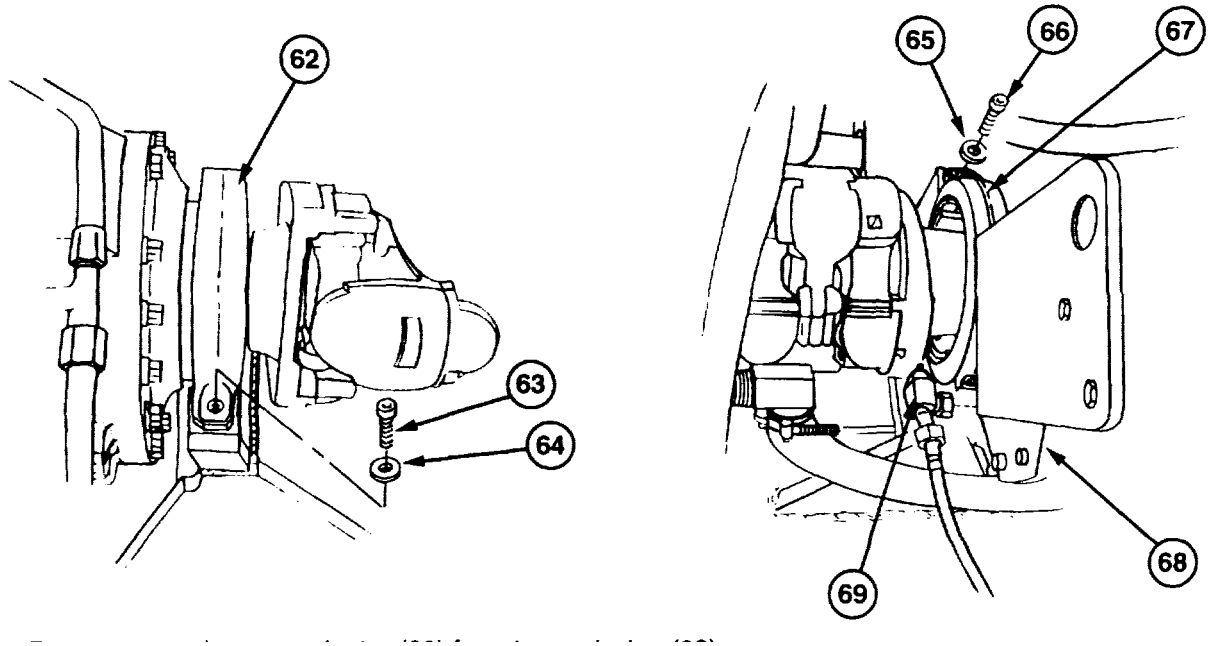


20. Disconnect two electrical connectors (58 and 59) from rectifier (57).

21. Disconnect cable wire (61) from starter protection relay connector (60).

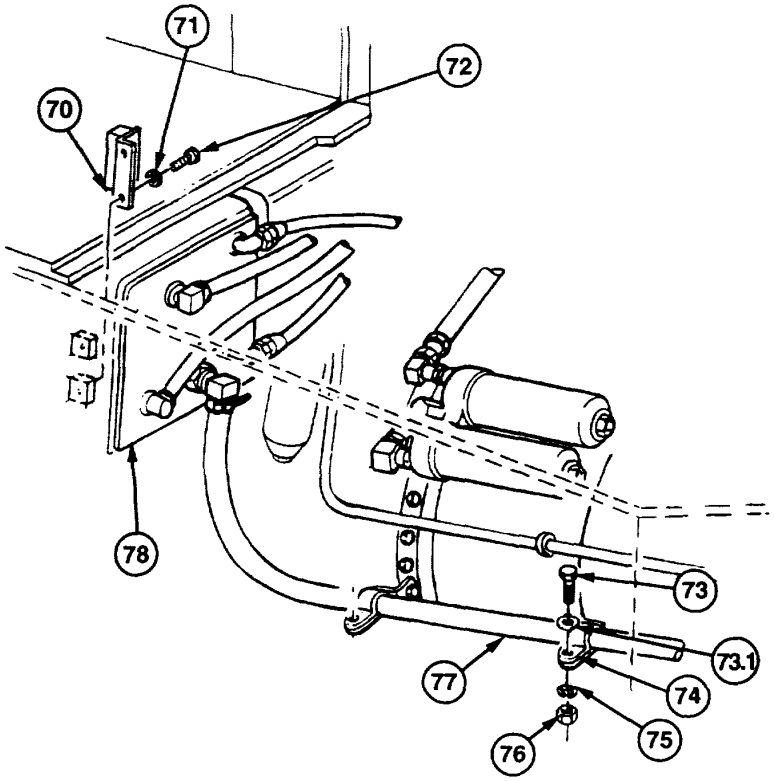
3-2. POWERPACK REPLACEMENT (continued).

22. Remove two screws (63) and washers (64). and transmission cover (62) from left side of powerpack.



23. Remove speedometer adapter (69) from transmission (68).

24. Remove two screws (66) and washers (65) and transmission cover (67) from right side of powerpack.



25. Remove two screws (72) and washers (71) and surgetank retainer (70) from hull.

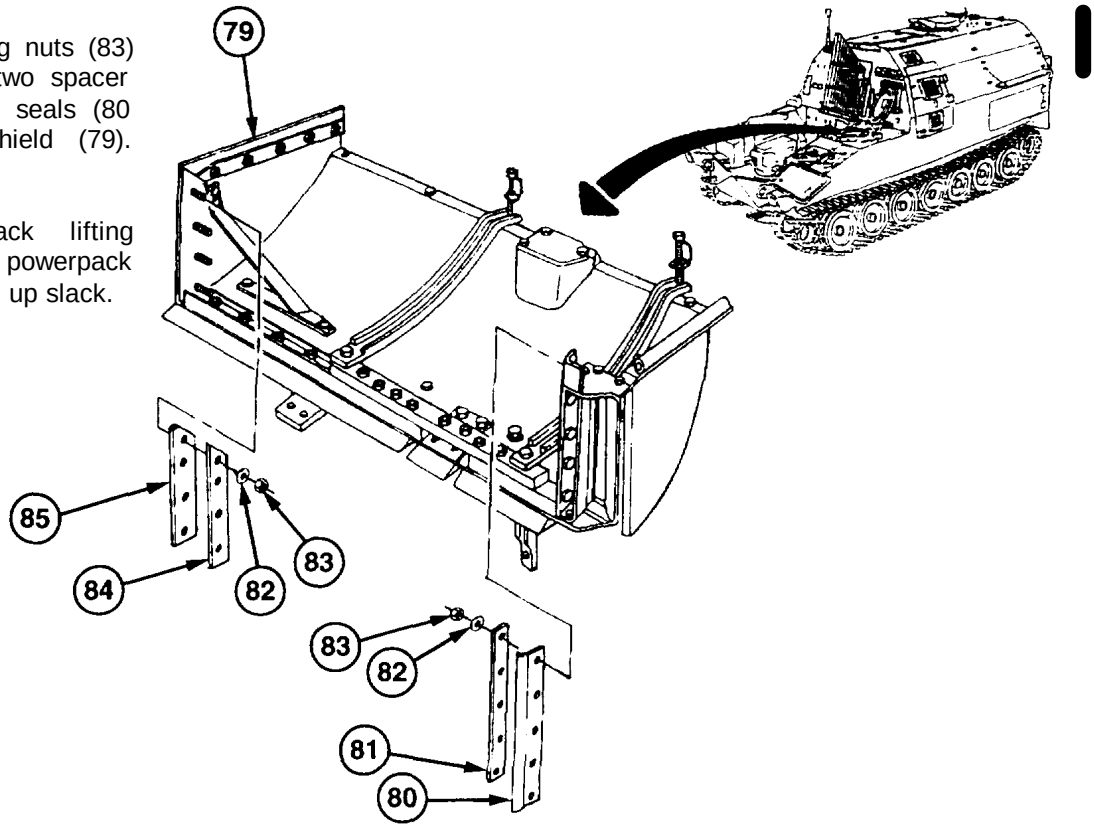
26. Remove screw (73), washer (73.1) lockwasher (75), nut (76), and hose (77) from each of two clamps (74) on transmission. Discard lockwashers.

27. Remove surge tank (78) from hull and place on powerpack.

3-2. POWERPACK REPLACEMENT (continued).

28. Remove nine self-locking nuts (83) and washers (82) and two spacer plates (81 and 84) and seals (80 and 85) from heat shield (79). Discard self-locking nuts.

29. Attach powerpack lifting sling to hoist and four powerpack lifting eyes (86), and take up slack.

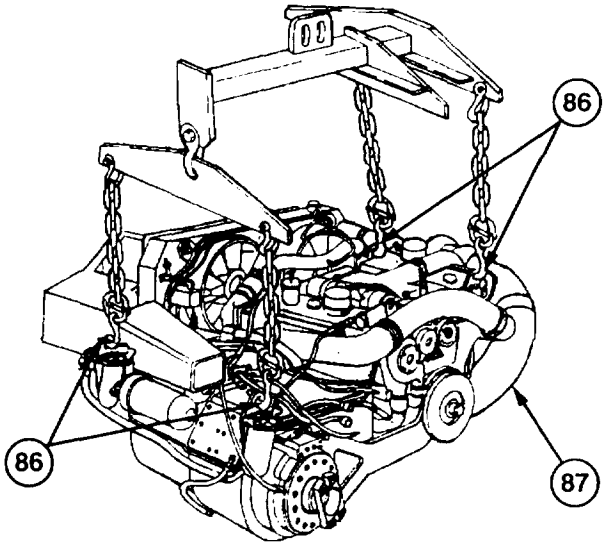


WARNING

- **Personnel must stand clear during lifting operations. A swinging or shifting load can cause severe injury to personnel.**
- **Do not stand near powerpack while it is being removed from or installed in vehicle. Failure to heed this warning can result in severe injury or death to personnel.**

CAUTION

Lift powerpack carefully. Make sure all wiring harnesses and mechanical linkages are secured out of the way. Failure to heed this warning can result in damage to equipment.



30. Raise powerpack (87) several inches and shift it toward the front of vehicle for clearance. While lifting powerpack (87) out of vehicle, watch all sides of powerpack (87) to make sure it clears all components in hull during removal.

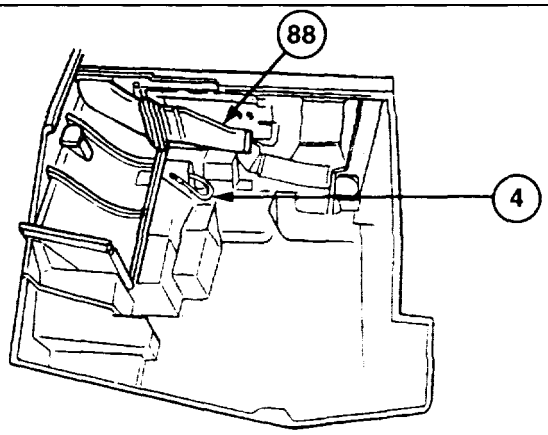
31. Place powerpack (87) on wooden blocks.

32. Remove lifting sling from four powerpack lifting eyes (86) and hoist.

3-2. POWERPACK REPLACEMENT (continued).

b. INSTALLATION

1. Position engine exhaust pipe (88) and lower fuel tank return-from-engine hose (4) against hull.



2. Attach powerpack lifting sling to four powerpack lifting eyes (86) and hoist, and take up slack.

WARNING

- **Personnel must stand clear during lifting operations. A swinging or shifting load can cause severe injury to personnel.**
- **Do not walk under powerpack while it is being installed in vehicle. Failure to follow this warning may result in severe injury or death.**

CAUTION

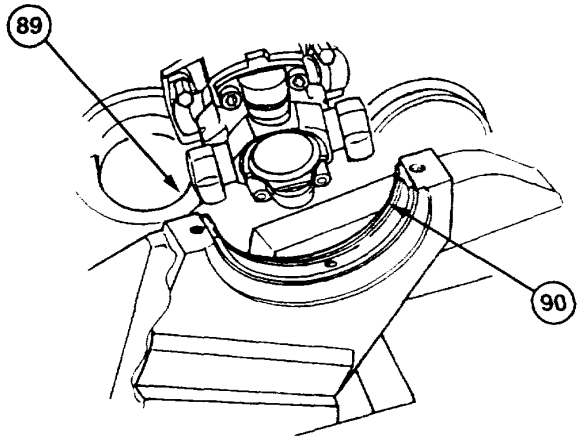
- **When installing powerpack, be careful of hoses, fittings, and linkages on driver's compartment wall. Failure to heed this warning may result in damage to equipment.**
- **Watch all sides of powerpack while it is being installed. Have one person observe from driver's compartment through engine compartment access cover to make sure air intake duct is not forced into fuel tank, damaging intake duct and fuel tank.**

NOTE

Make sure two transmission lower trunnion mount inserts are installed in trunnion mounts.

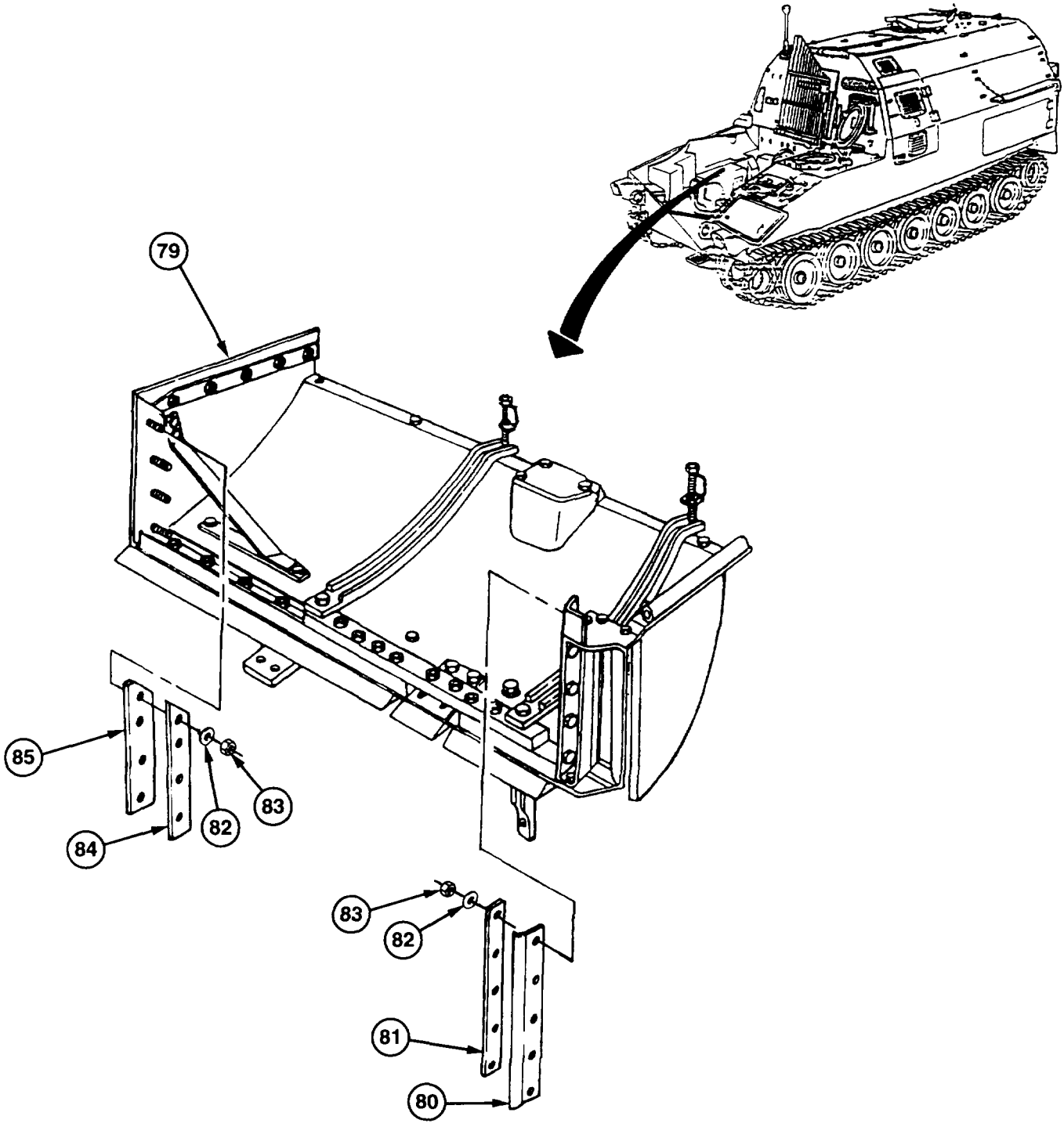
3. Install powerpack (87) in vehicle, making sure lower trunnion mount insert alignment ring (90) in right transmission trunnion mount (89) seats properly in powerpack (87).

4. Remove powerpack lifting sling from four powerpack lifting eyes (86) and hoist.



3-2. POWERPACK REPLACEMENT (continued).

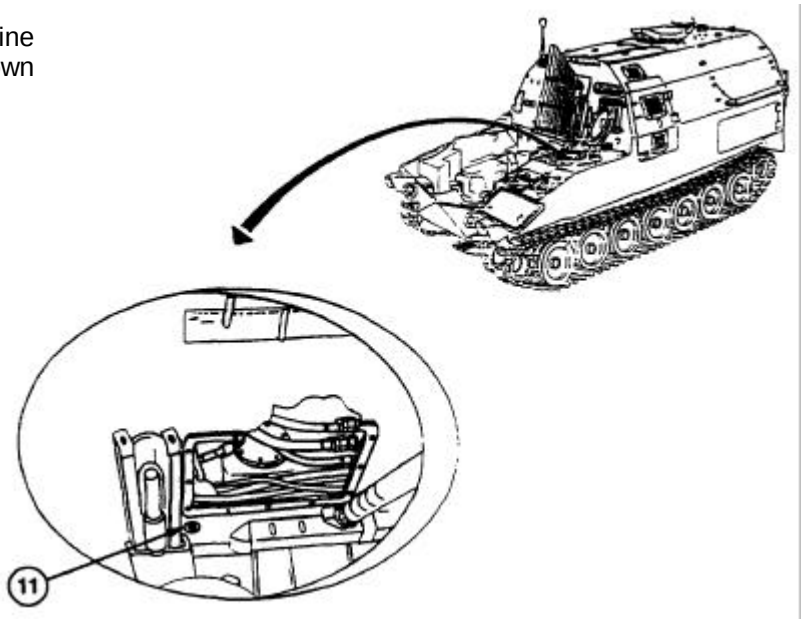
4.1. Install two seals (80 and 85) on heat shield (79) using two spacer plates (81 and 84) and nine washers (82) and new self-locking nuts (83).



3-2. POWERPACK REPLACEMENT (continued).

5. From inside driver's compartment, turn engine mount release shaft (11) clockwise to lock down powerpack.

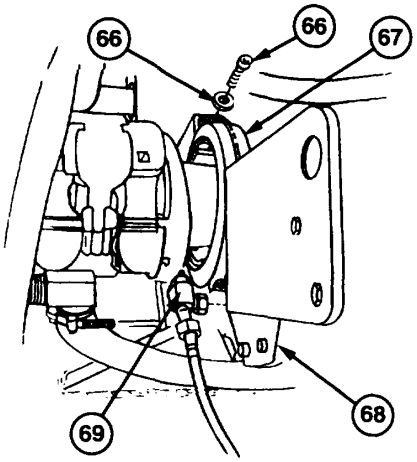
[Step Deleted]

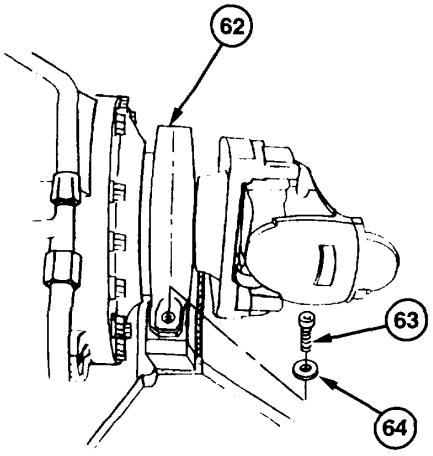


7. Check upper trunnion mount inserts in transmission covers (62 and 67) for cracks, pitting, or excessive wear. Replace if damaged.

8. Install transmission cover (67) on right side of powerpack with two washers (65) and screws (66). Torque screws between 80 and 90 ft-lb (108 and 122 N?m).

9. Install speedometer adapter (69) on transmission (68).





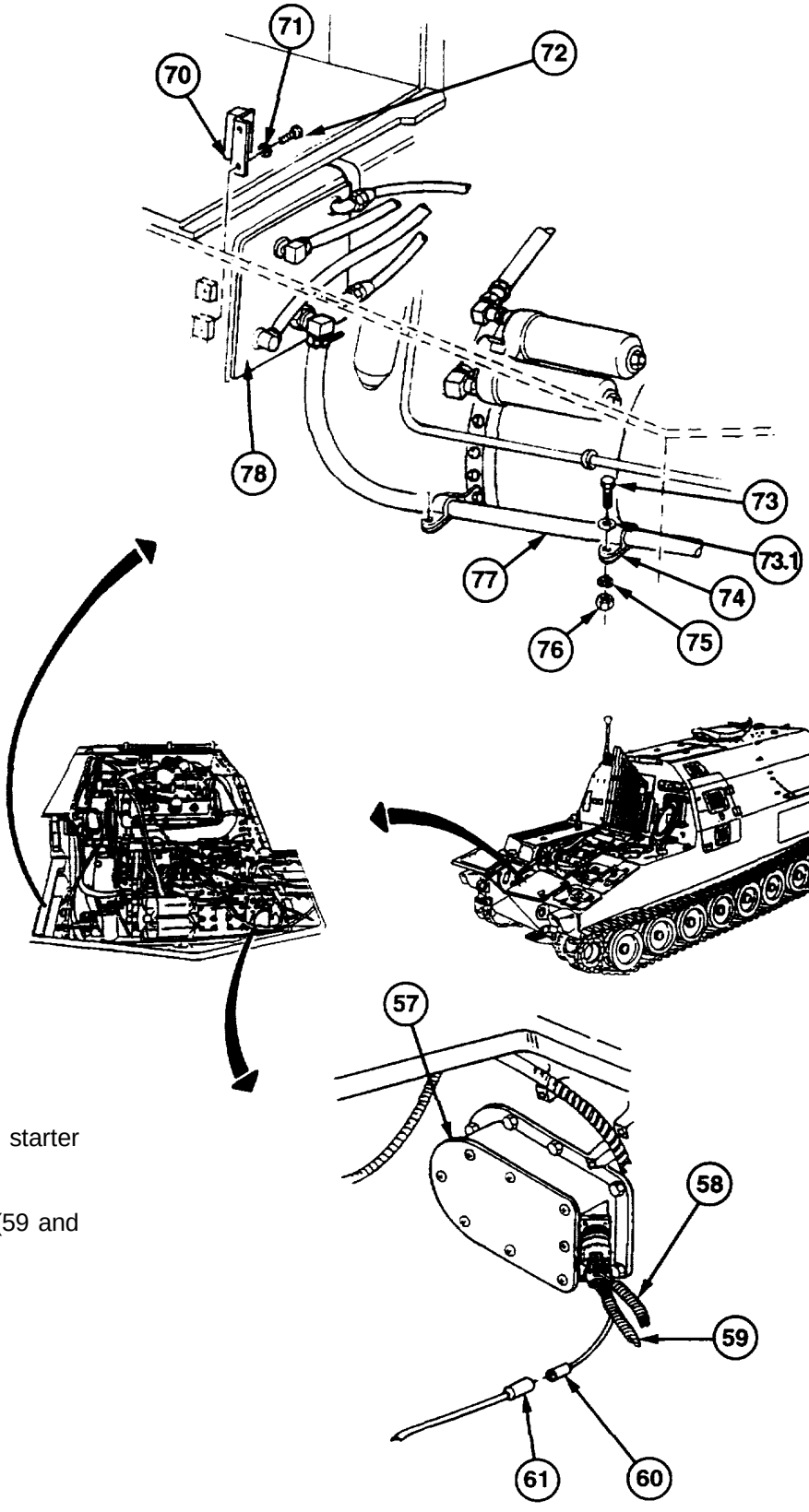
10. Install transmission cover (62) on left side of powerpack with two washers (64) and screws (63). Torque screws between 80 and 90 ft-lb (108 and 122 Nom).

3-2. POWERPACK REPLACEMENT (continued).

11. Remove surge tank (78) from powerpack and install on hull.

12. Install surge tank retainer (70) on hull with two washers (71) and screws (72).

13. Install hose (77) in each of two clamps (74) on transmission with two screws (73), washers (73.1), new lockwashers (75), and nuts (76).



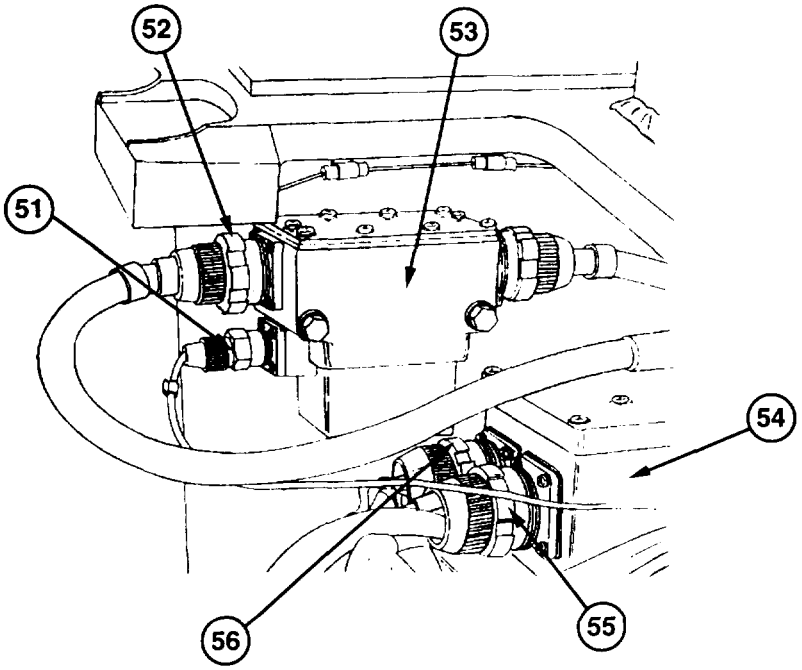
14. Connect cable wire (61) to starter protection relay connector (60).

15. Connect two electrical connectors (59 and 58) to rectifier (57).

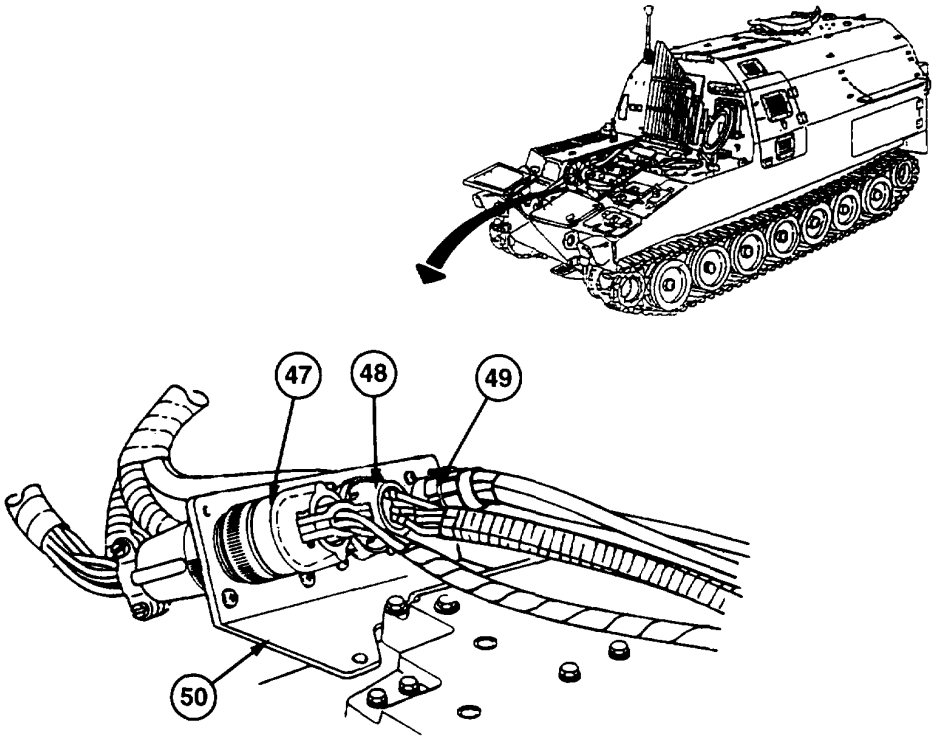
3-2. POWERPACK REPLACEMENT (continued).

16. Connect two electrical connectors (56 and 55) to voltage regulator (54).

17. Connect two electrical connectors (52 and 51) to master relay (53).



18. Connect three electrical connectors (49, 48, and 47) to engine disconnect bracket (50).



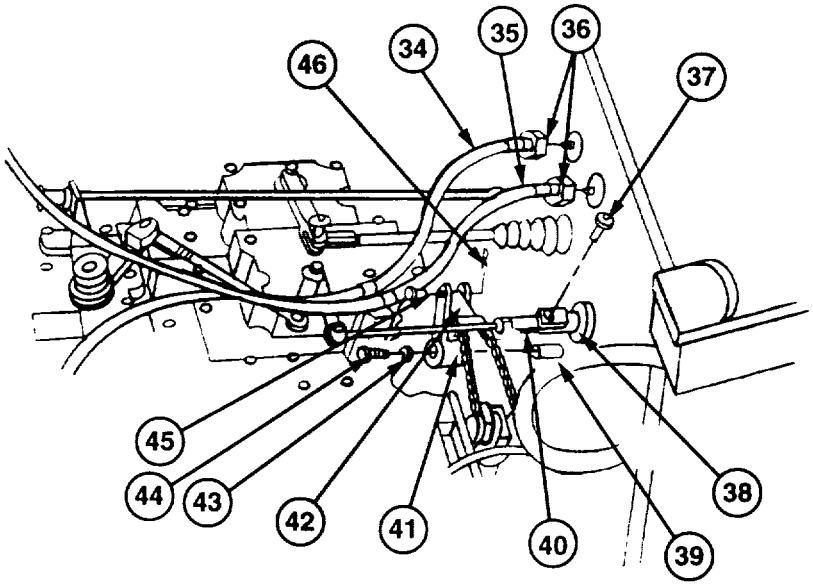
3-2. POWERPACK REPLACEMENT (continued).

19. Install remote control lever (41) on shaft (39) with washer (43) and screw (44).

20. Install brake control rod end plain bearing (42) on remote control lever (41) with pin (45) and new cotter pin (46).

21. Install shift control rod (40) on shift control linkage (38) with quick-release pin (37).

22. Connect tachometer cable (34) and speedometer cable (35) on hull with two nuts (36).

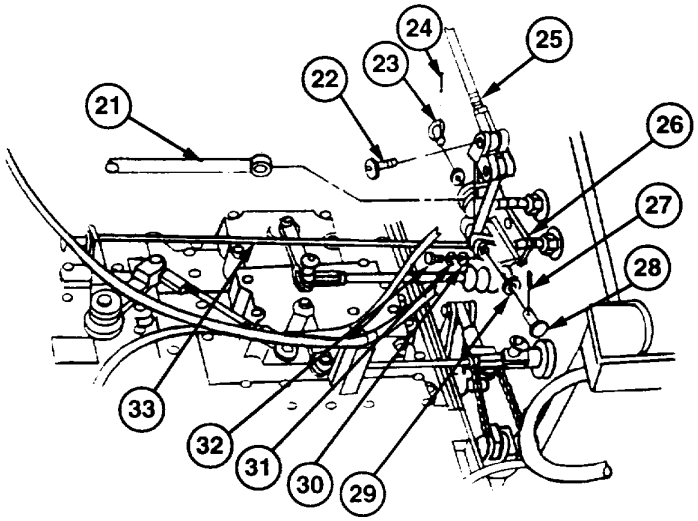


23. Install throttle linkage bracket (26) on hull with three washers (30), new lockwashers (31), and screws (32).

24. Install accelerator linkage (33) on throttle linkage bracket (26) with straight pin (28), washer (29), and new cotter pin (27).

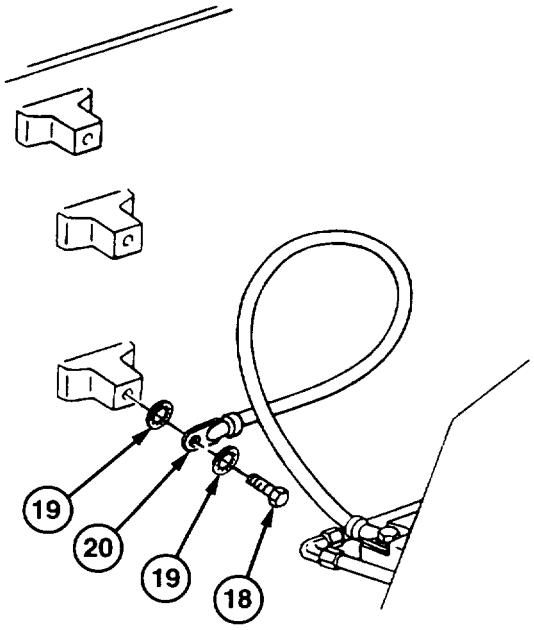
25. Install throttle valve control rod (21) on throttle linkage bracket (26) with straight pin (23) and new cotter pin (24).

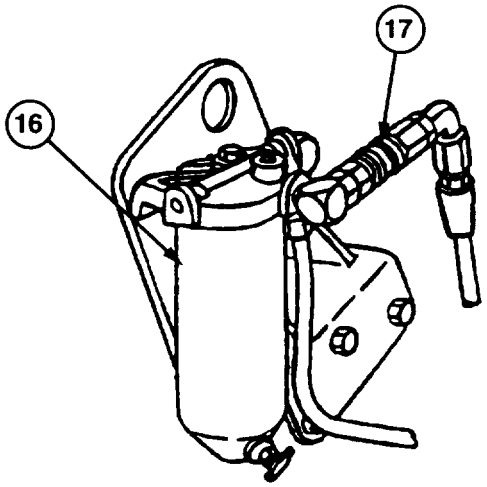
26. Install throttle governor control connecting linkage (25) on throttle linkage bracket (26) with quick-release pin (22).



3-2. POWERPACK REPLACEMENT (continued).

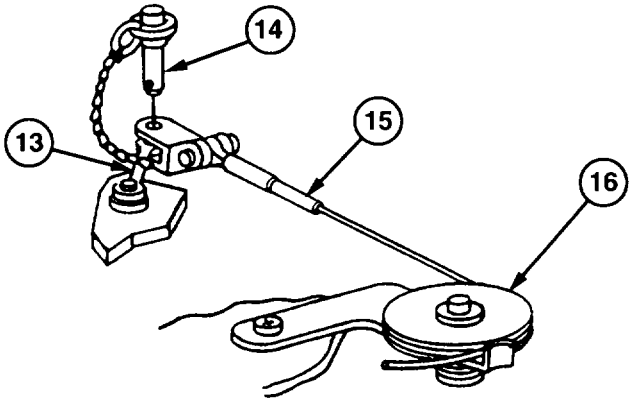
27. Install ground lead (20) on hull with two new lockwashers (19) and screw (18).

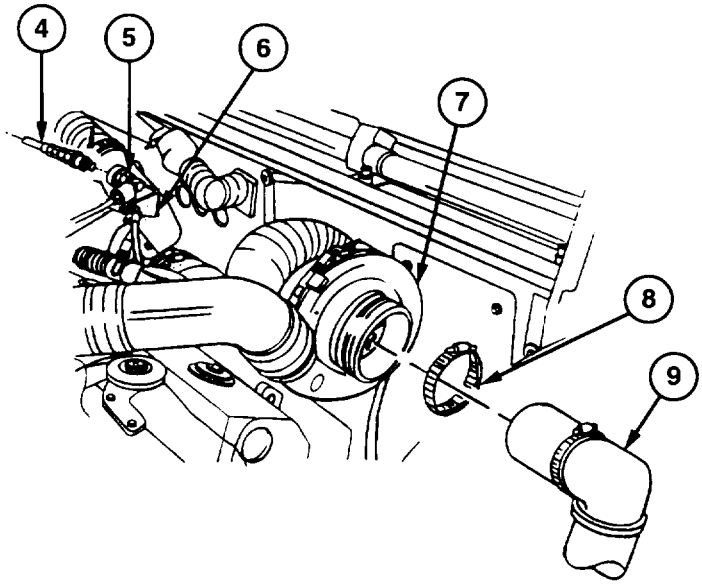




28. Connect fuel-line quick disconnect (17) to primary fuel filter (16).

29. Install fuel shutoff cable (14) on pulley (15), and connect fuel shutoff cable (14) to fuel shutoff control (12) with quick-release pin (13).



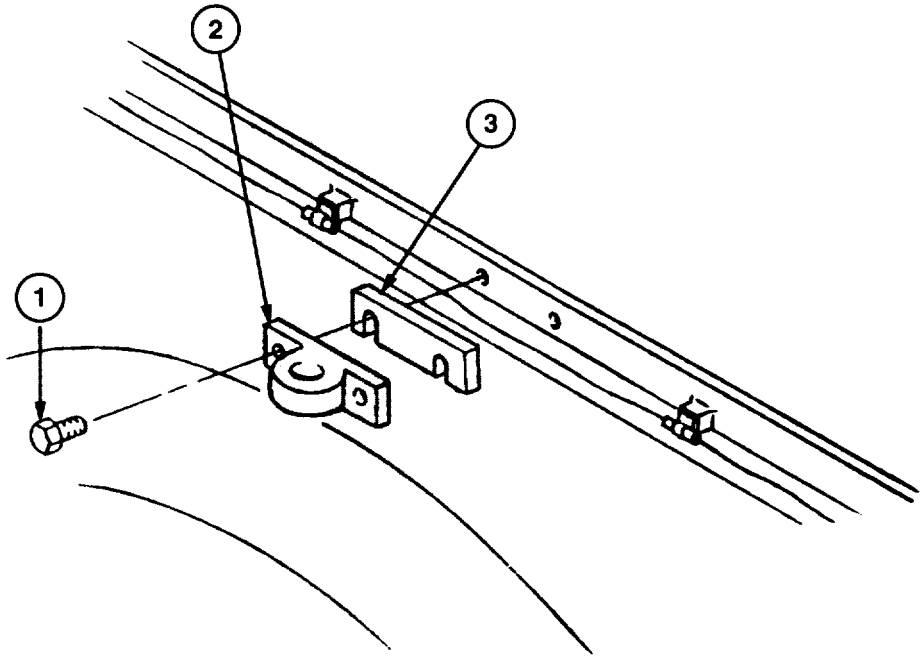


30. Connect turbocharger inlet duct (9) to turbocharger (7) and secure with hose clamp (8).

31. Connect lower fuel tank return-from-engine hose (4) to engine bracket (6) at quick disconnect (5).

3-2. POWERPACK REPLACEMENT (continued).

32. Install air intake grille handle bracket (2) and shim (3) on hull with two screws (1).



FOLLOW-ON MAINTENANCE:

- Connect universal joints (refer to TM-9-2350-287-10).
- Set transmission selector to neutral (refer to TM 9-2350-287-10).
- Set parking brake (refer to TM 9-2350-287-10).
- Unblock tracks (refer to TM 9-2350-287-10).
- Install steering control linkage (para 12-2).
- Install front hull slope plate (para 15-11).
- Install water can bracket (para 15-67).
- Install exhaust duct (para 5-2).
- Connect battery ground cables (para 7-41).
- Install engine compartment access cover (para 15-16).

3-3 GROUND HOP PROCEDURES

This Task Covers:

a. Installation
b. Operating Procedures
c. Removal Procedures

Initial Setup:

Tools/Test Equipment:
- Electrical power cable assembly 12268427 (Item 17, Appendix I)
- Electrical power cable assembly 12268162 (Item 18, Appendix I)
- Electrical power cable assembly 12268426 (Item 19, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)
- Ground cable assembly (Item 25, Appendix I)
- Hose assembly (2) (Item 29, Appendix I)
- Protective screen assembly (2) (Item 45, Appendix I)
- Quick-disconnect coupling (Item 46, Appendix I)
- Safety screen (Item 50, Appendix I)
- STE/ICE test equipment (Item 65, Appendix I)

Materials/Parts:
- Exhaust pipe 12260213-1 (removed from vehicle)
- Lockwasher (2) (retained from powerpack)

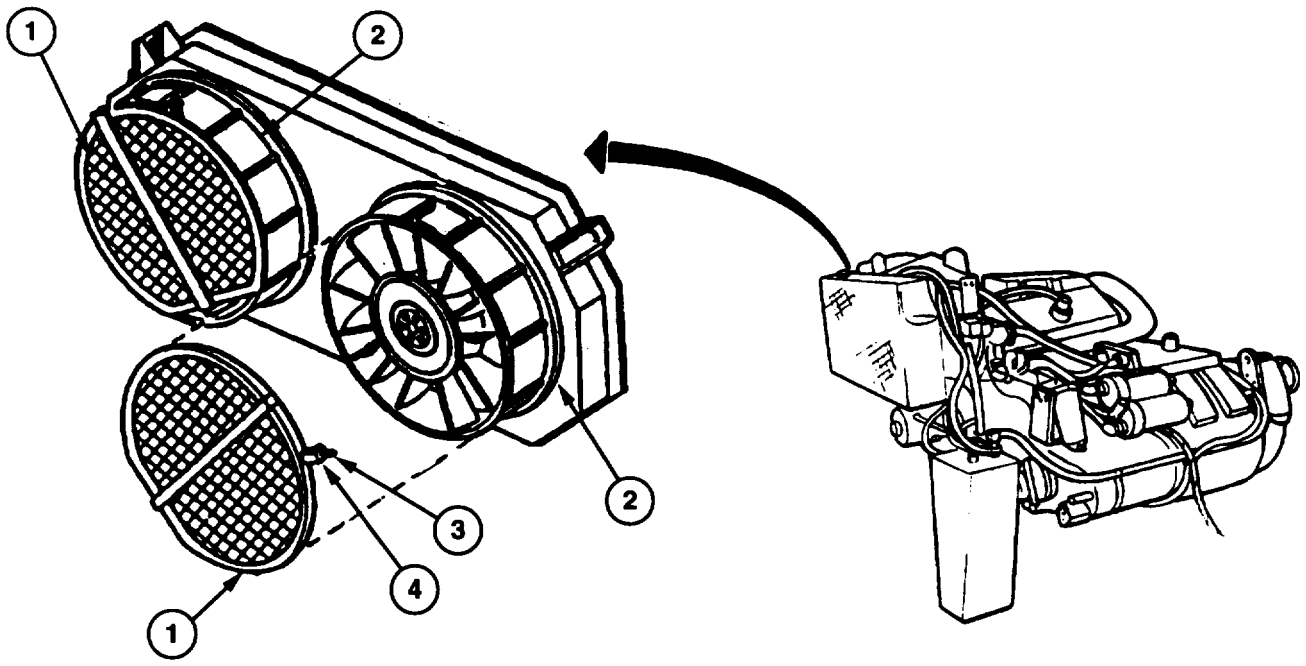
Equipment Conditions:
- Powerpack removed (para 3-2).

Personnel Required: Two

References:
TM 9-4910-571-12&P

a. INSTALLATION PROCEDURES

1. Install protective fan screen (1) on each of two radiator fans (2) with two thumbscrews (3) and nuts (4).

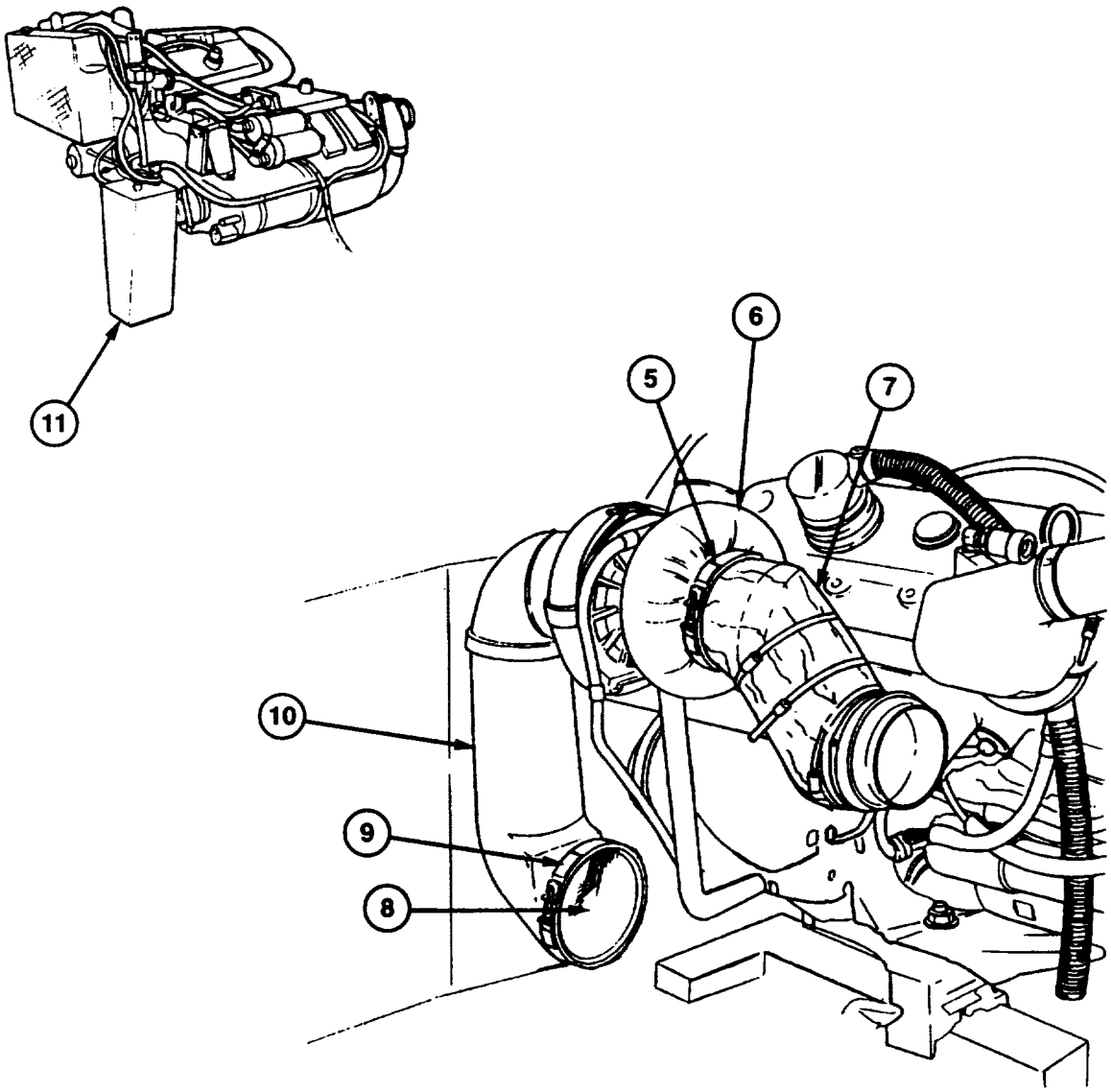


3-3. GROUND HOP PROCEDURES (continued).

2. Install safety screen (8) on turbocharger inlet (10) with fine screen side facing out, and install exhaust clamp (9) on turbocharger inlet (10).

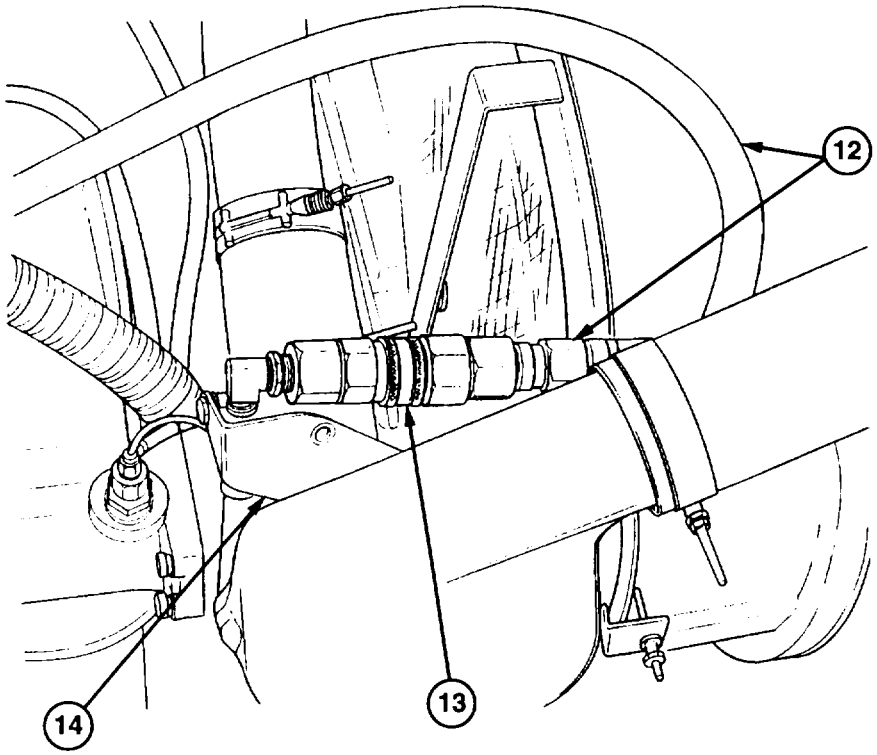
3. Install exhaust pipe (7) on exhaust outlet (6) with clamp (5).

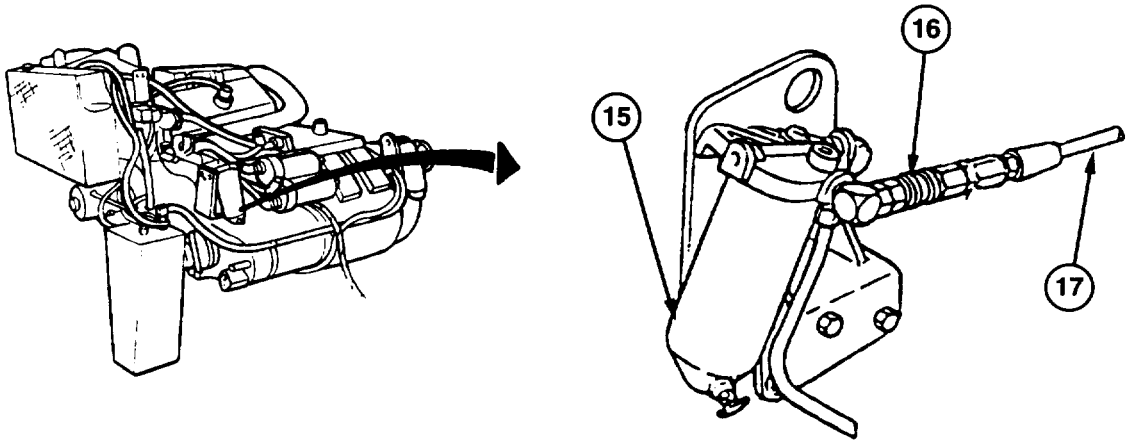
4. Position surge tank (11) to one side, being careful not to bend hoses.



3-3. GROUND HOP PROCEDURES (continued).

5. Connect hose assembly (12) to quick disconnect (13) on engine fuel return bracket (14).





6. Connect hose assembly (17) to quick disconnect (16) on primary fuel filter (15).

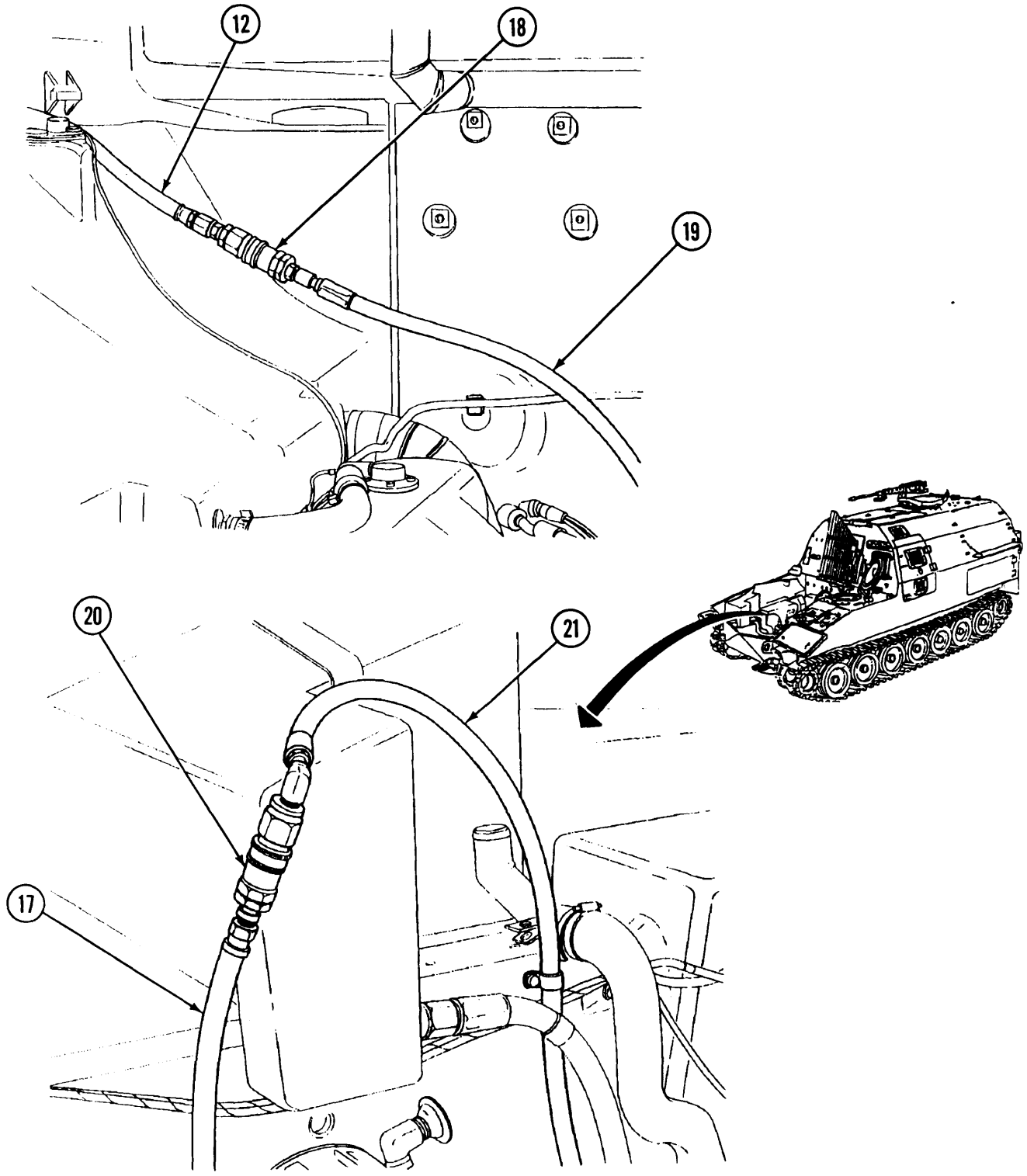
NOTE

If a vehicle is being used that already has a powerpack installed, the support vehicle's fuel return hose will have to be disconnected from the engine bracket and the fuel supply hose from the primary fuel filter.

3-3. GROUND HOP PROCEDURES (continued).

7. Connect hose assembly (12) to fuel return hose (19) at quick disconnect (18).

8. Connect hose assembly (17) to fuel supply hose (21) at quick-disconnect (20).



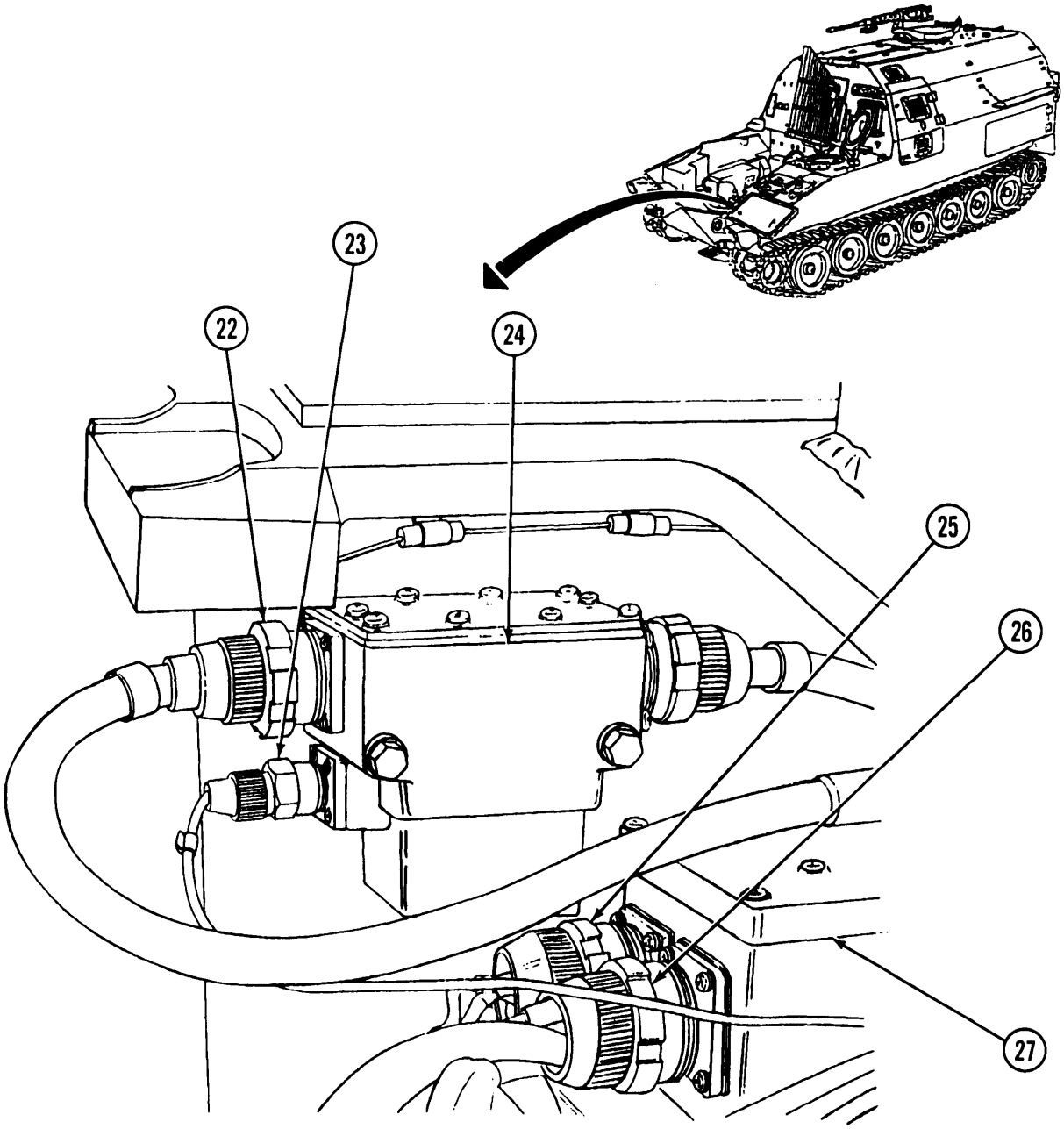
3-3. GROUND HOP PROCEDURES (continued).

NOTE

Perform steps 9 through 11 only if the vehcle being used to operate the is the one from which the powerpack was removed.

9. Connect two electrical connectors (22 and 23) to master relay (24).

10. Connect two electrical connectors (25 and 26) to voltage regulate (27).



3-3. GROUND HOP PROCEDURES (continued).

11. Connect wiring harness 12376406 connector (28) to rectifier (29).

NOTE

If a vehicle is being used that already has a powerpack installed, four wiring harnesses will have to be disconnected from the engine disconnect bracket, starter protection electrical lead, and top terminal of the rectifier of the support vehicle before connecting power cable assemblies in steps 12 through 16.

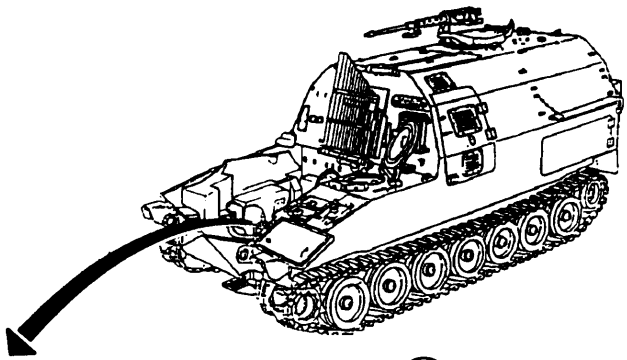
12. Connect power cable assembly 12268426 (30) to rectifier (29).

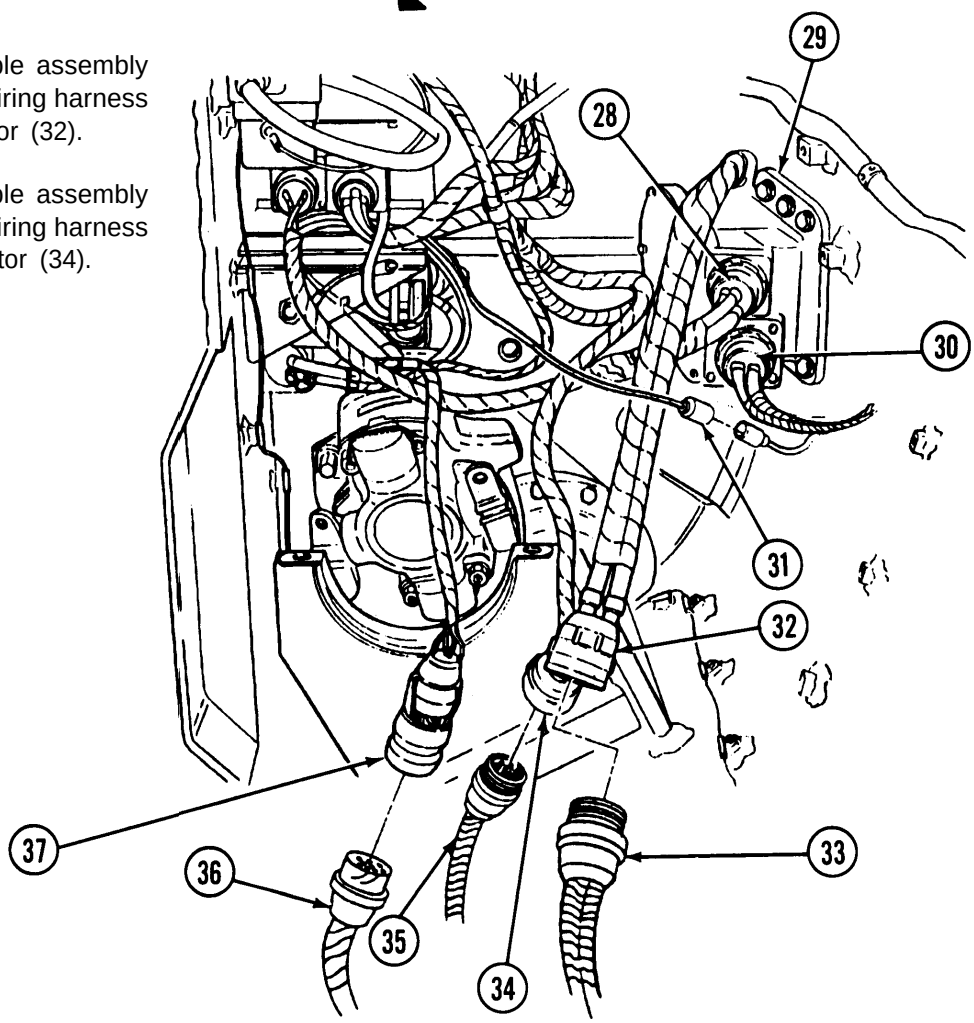
13. Connect starter protection relay electrical lead 503 (31) to cable assembly (30).

14. Connect power cable assembly (36) to wiring harness 12329994 connector (37).

15. Connect power cable assembly 12268427 (33) to wiring harness 122353401 connector (32).

16. Connect power cable assembly 12268162 (35) to wiring harness 12268418-1 connector (34).

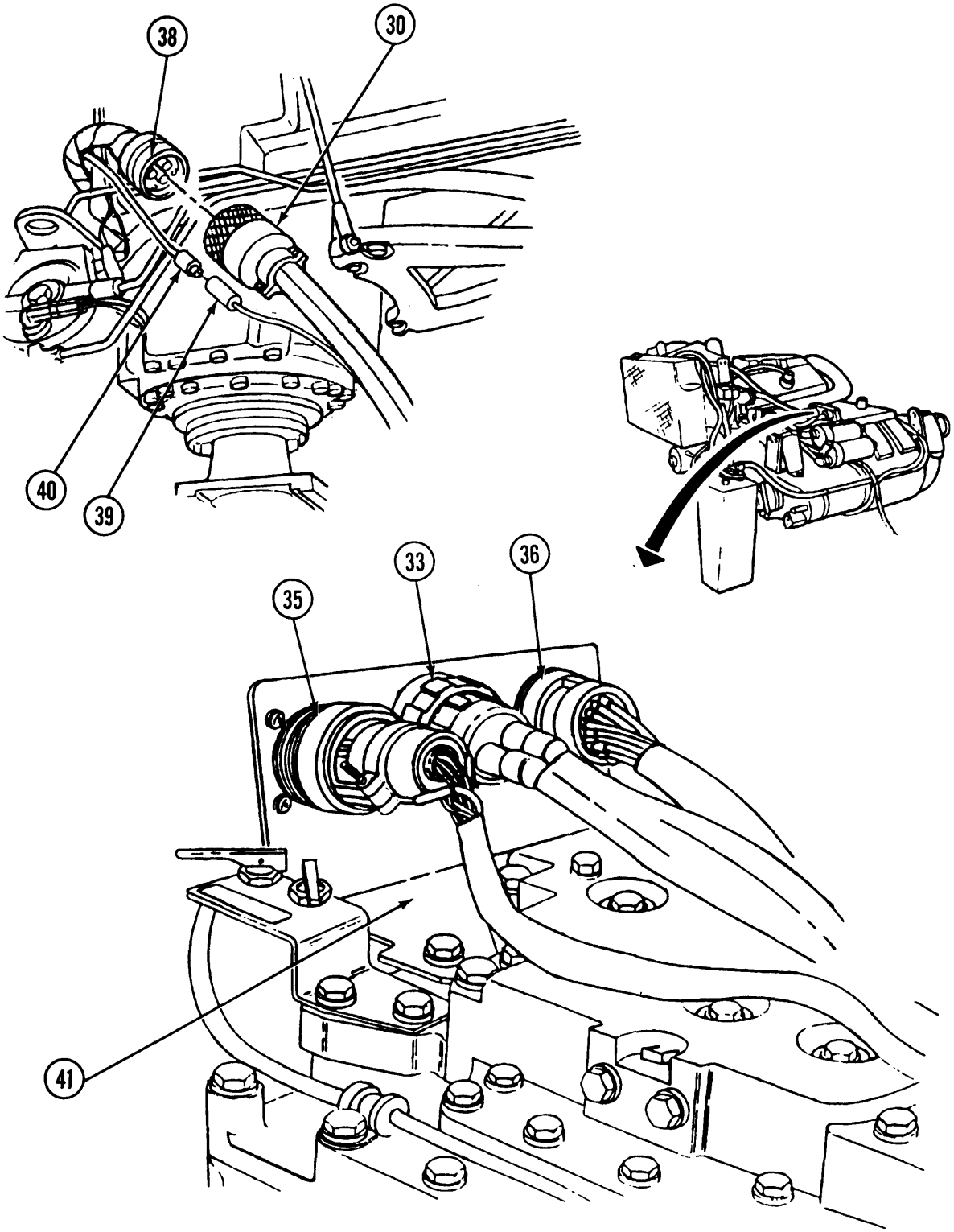




3-3. GROUND HOP PROCEDURES (continued).

17. Connect power cable assembly 12268426 (30) to wiring harness 12268308 connector (38).

18. Connect starter protection electrical lead 503 (39) to electrical lead 503 (40).



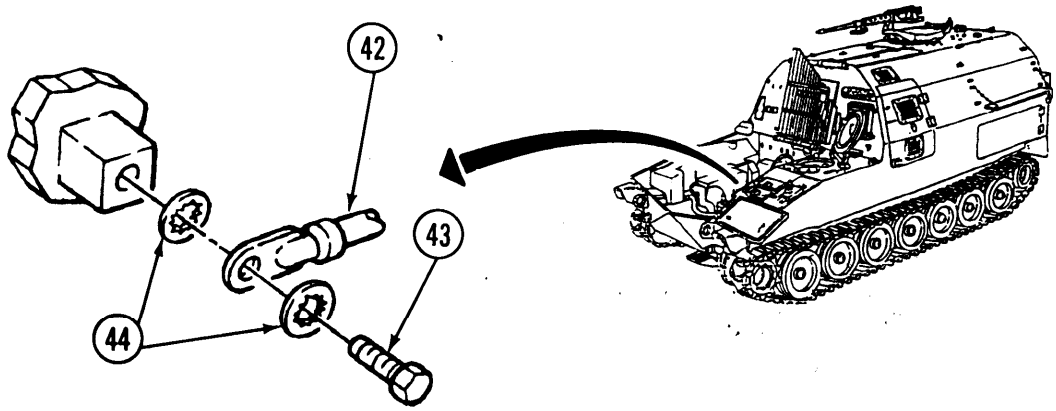
3-3. GROUND HOP PROCEDURES (continued).

19. Connect power cable assembly (36) to right terminal of engine disconnect bracket (41).

20. Connect power cable assembly 12268427 (33) to center terminal of engine disconnect bracket (41).

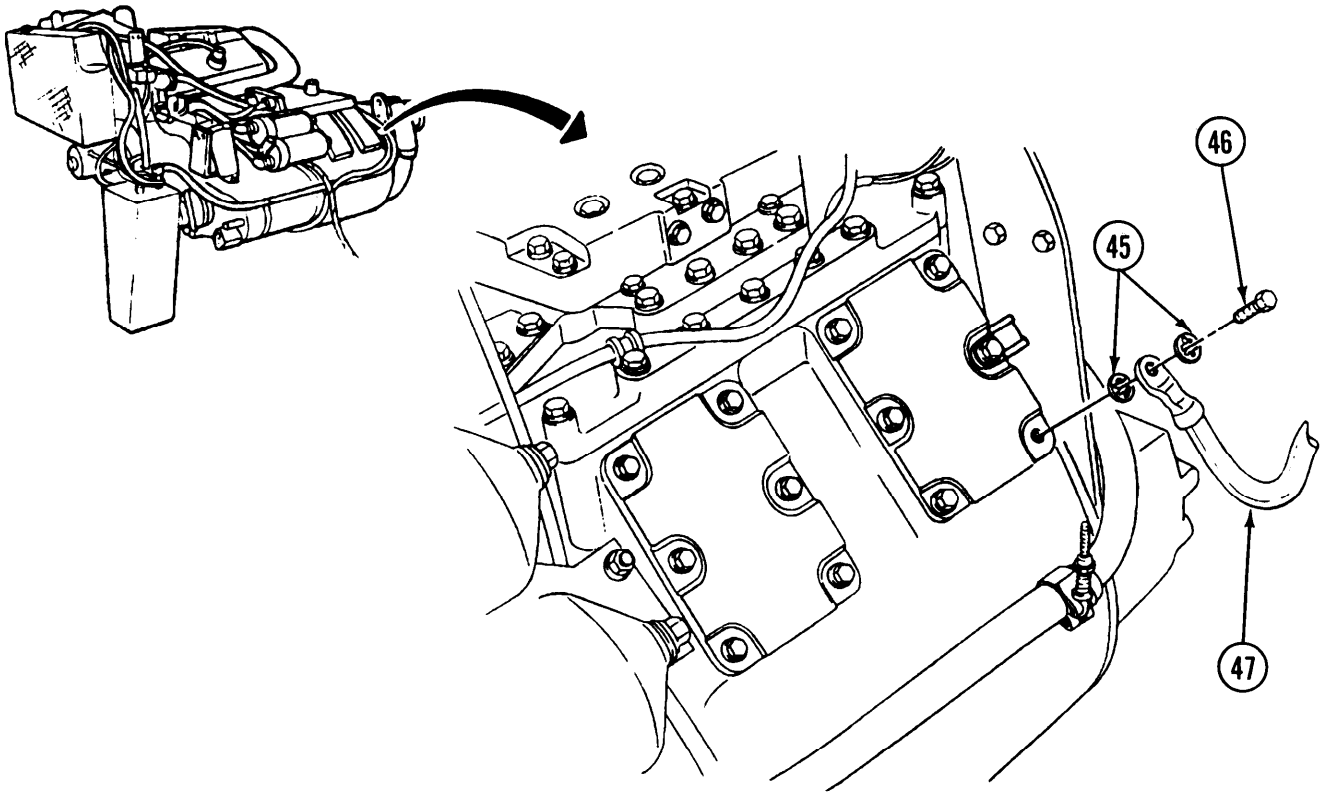
21. Connect power cable assembly 12268162 (35) to left terminal of engine disconnect bracket (41).

22. Connect ground cable assembly (42) to vehicle hull with screw (43) and two lockwashers (44).



23. Remove screw (46), two lockwashers (45) and ground cable (47) from transmission.

24. Connect other end of ground cable assembly (42) to transmission with screw (46) and two lockwashers (45).



3-3. GROUND HOP PROCEDURES (continued).

NOTE

Perform step 25 only if the vehicle being used to operate the powerpack is the one from which the powerpack was removed.

25. Connect battery ground cables (para 7-41).

b. OPERATING PROCEDURES

WARNING

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

Do not operate powerpack outside vehicle without adequate ventilation. Buildup of exhaust gases can cause carbon monoxide poisoning.

Keep tools, power cables, hose assemblies, clothing, and body parts clear of moving parts on the powerpack. Failure to folliow this warning can result in severe injury or death to personnel.

Do not touch coolant hoses, exhaust manifolds, or turbocharger. These components are very hot during and immediately after engine operation. Failure to follow this warning can result in severe injury to personnel.

Wear hearing protection while operating powerpack outside vehicle. High noise levels can cause permanent hearing damage.

Do not touch power cable assembly connectors while powerpack is operating, or while MASTER switch is set to ON. Failure to follow this warning can result in electrical shock to personnel.

CAUTION

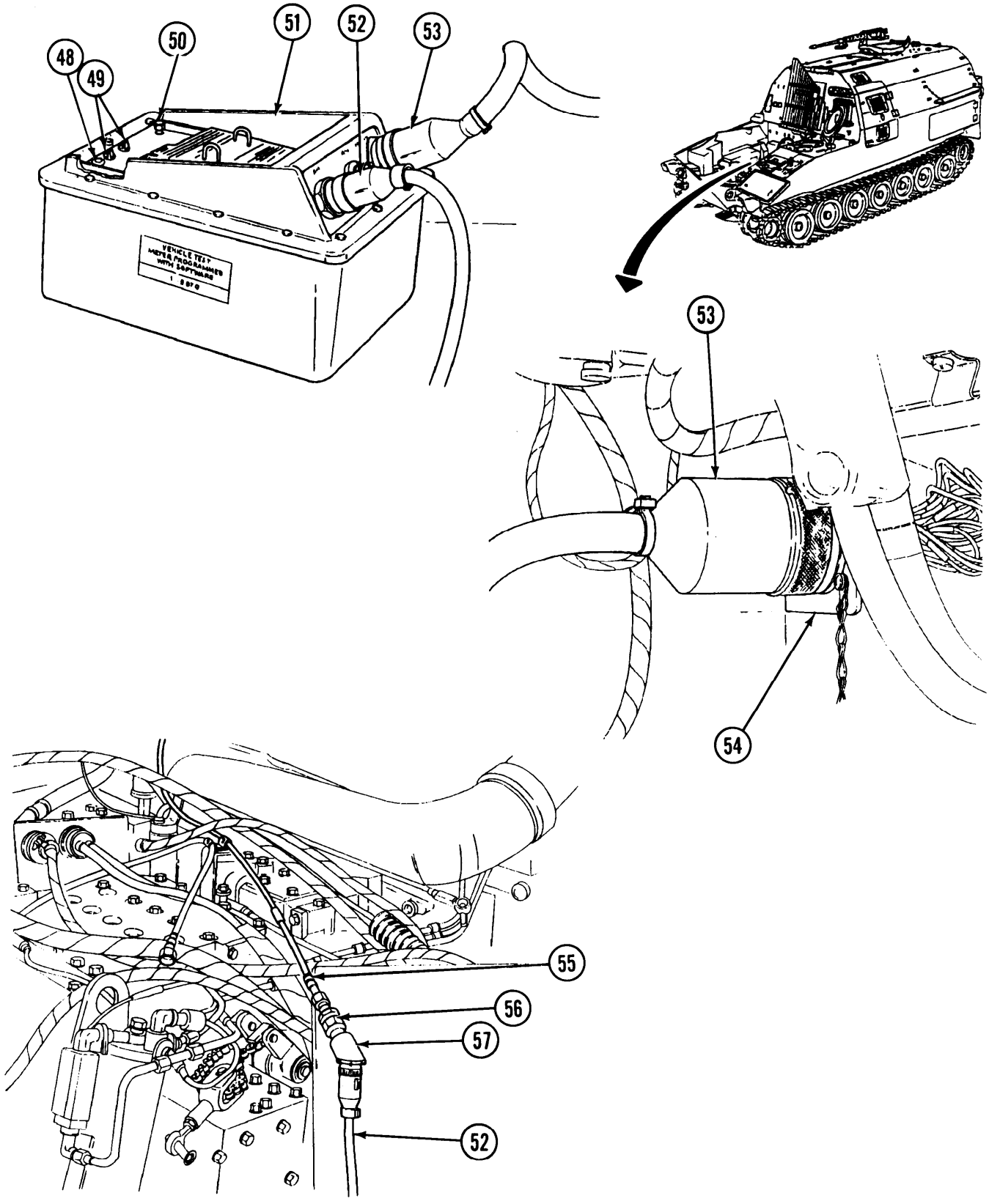
Do not allow powerpack to exceed 2350 rpm. Damage to engine can result.

Make sure engine coolant and lubricant levels are replenished before operating powerpack outside vehicle. Failure to do this can result in damage to powerpack.

When operating the powerpack while mounted on blocks, be carefui to keep powerpack from vibrating off blocks. Damage to powerpack may result.

1. Connect STE/lCE DCA cable (53) to vehicle test meter (VTM) (51) and to STE/lCE resistor box (54).
2. Connect tachometer drive adapter (56) to pulse tachometer (57) and tachometer cable (55).
3. Connect W-4 cable (52) to pulse tachometer (57) and vehicle test meter VTM (51).
4. Push VTM power switch (50) ON.
5. Perform STE/ICE confidence test (refer to TM 9-4910-571-12&P).

3-3. GROUND HOP PROCEDURES (continued).



3-3. GROUND HOP PROCEDURES (continued).

WARNING

Make sure transmission is neutral or injury to personnel could occur.

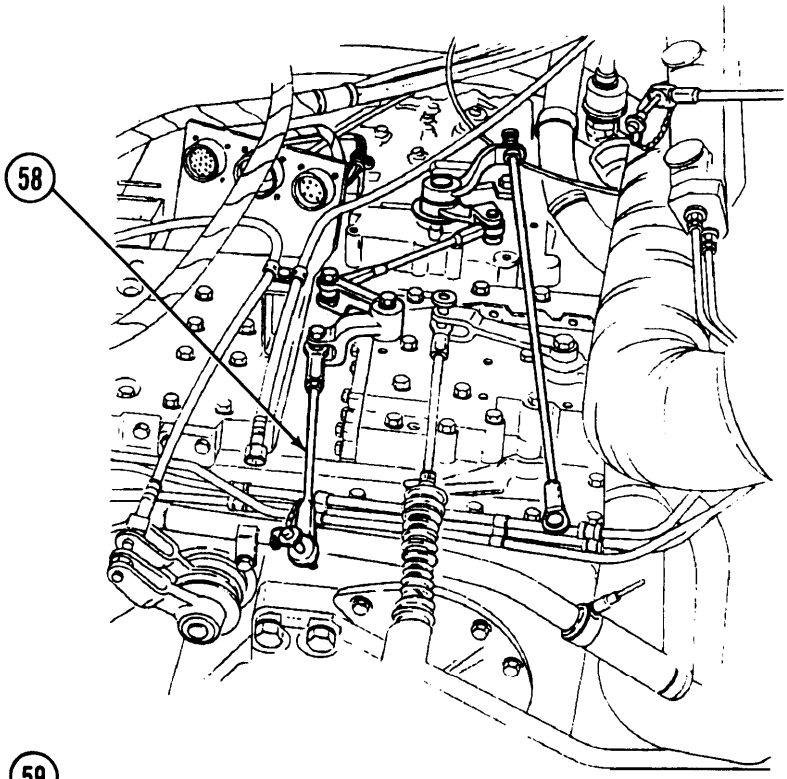
6. From inside driver's compartment, place transmission in neutral.

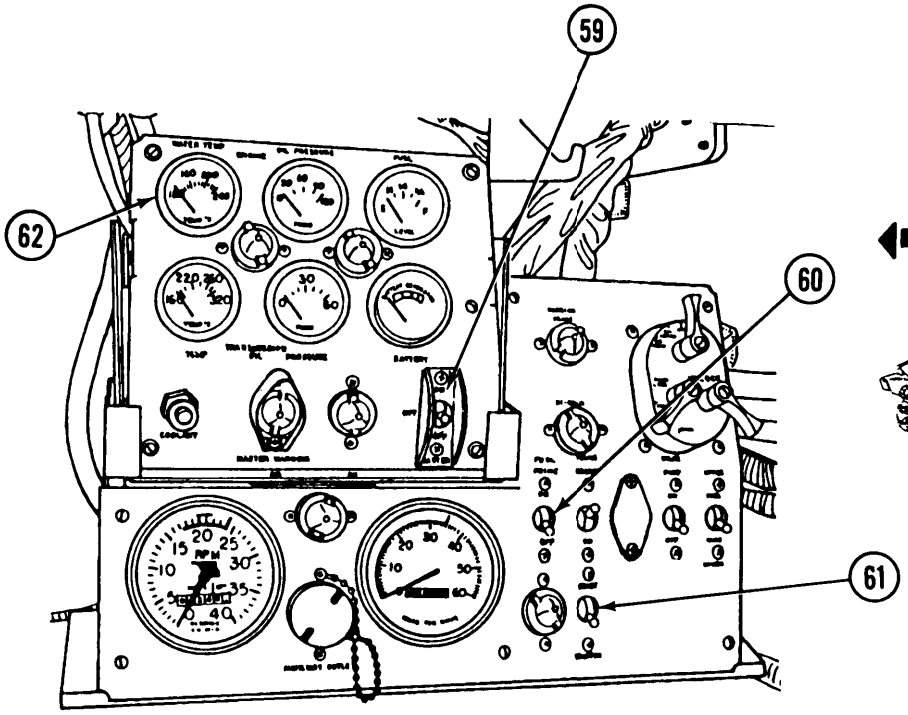
7. Pull transmission shift linkage (58) forward all the way. Push transmission shift linkage (58) back two clicks to shift into neutral.

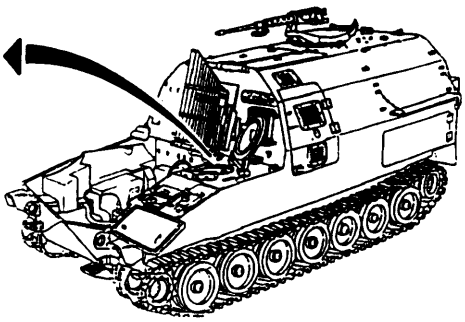
8. Turn MASTER switch (59) in vehicle to ON.

9. Hold FUEL PRIME switch (60) to ON for 1 minute, then release.

10. Push and hold engine STARTER switch (61) to START until powerpack starts.





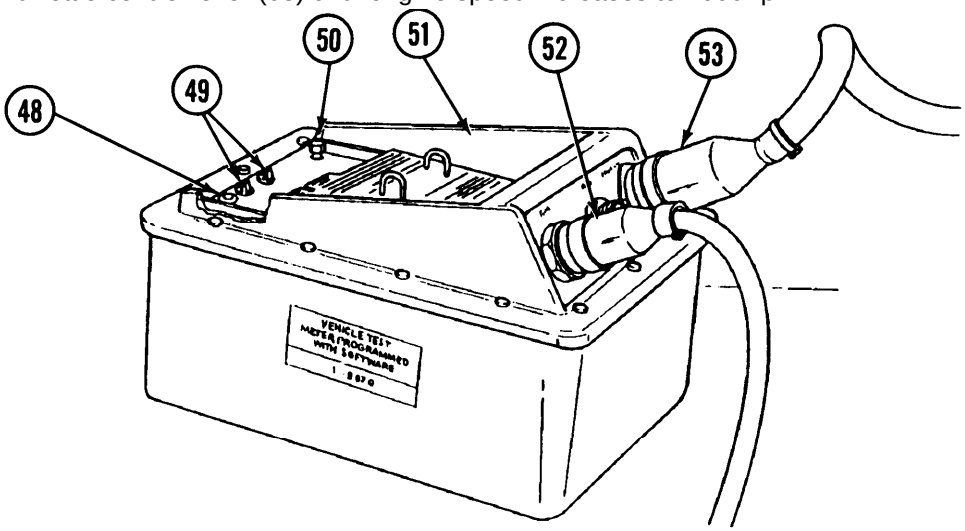


3-3. GROUND HOP PROCEDURES (continued).

11. Dial 10 into TEST SELECT (49) on VTM (51), and press and release TEST button (48). VTM should now display engine rpm. Idle speed should be between 550 and 600 rpm.

12. Idle powerpack between 550 and 600 rpm for about two minutes.

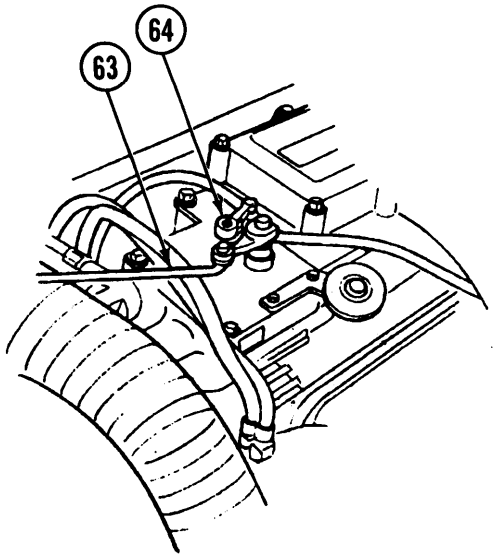
13. Push throttle control lever (63) until engine speed increases to 1000 rpm.



14. Continue to operate powerpack at 1000 rpm until ENGINE WATER Temperature gage (62) registers at least 185 F°.

CAUTION

Failure to idle engine before shutting engine down can result in damage to turbocharger.



15. After power pack has reached normal operating temperature, release throttle control lever (63), and allow engine to idle at 550 to 600 rpm.

WARNING

Keep hands and clothing clear of moving parts when operating shutoff lever. Failure to follow this warning can result in severe injury or death to personnel.

16. To shutoff powerpack, pull and hold shutoff lever (64) until powerpack stops, then release lever (64).

17. Turn MASTER switch (59) in vehicle to OFF.

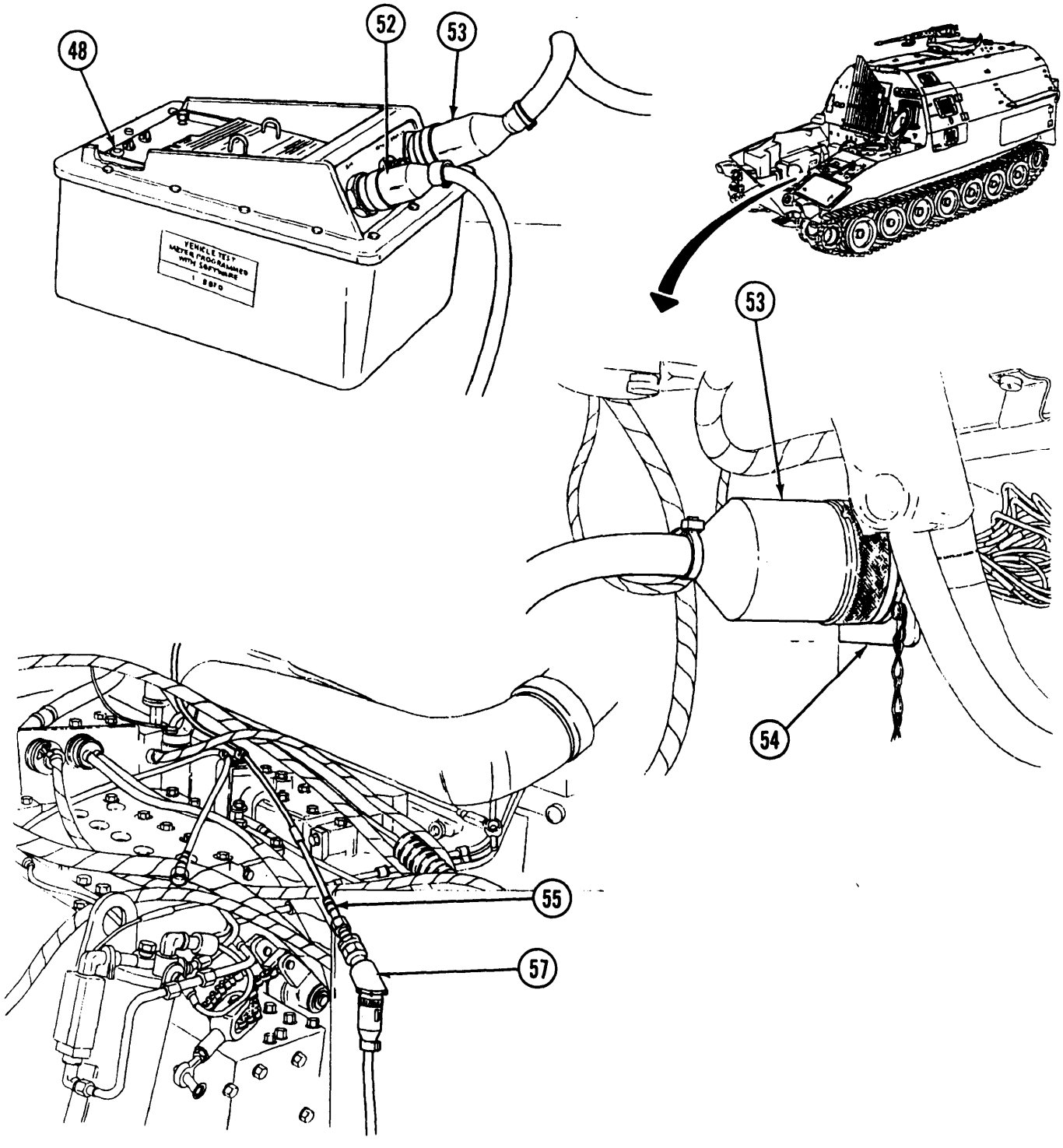
18. Pull VTM power switch (48) to OFF.

3-3. GROUND HOP PROCEDURES (continued).

19. Disconnect STE/ICE DCA cable (53) from STE/ICE resistor box (54) and VTM (51).

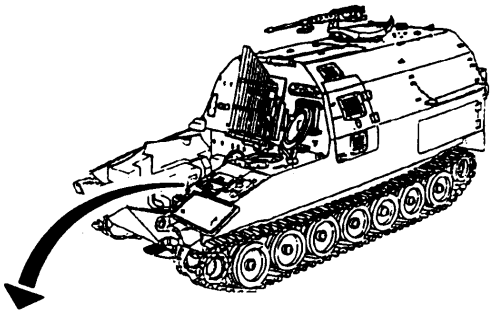
20. Remove W-4 cable (52) from pulse tachometer (57) and VTM (51).

21. Remove tachometer drive adapter (56) from pulse tachometer (57) and tachometer cable (55).



3-3. GROUND HOP PROCEDURES (continued).

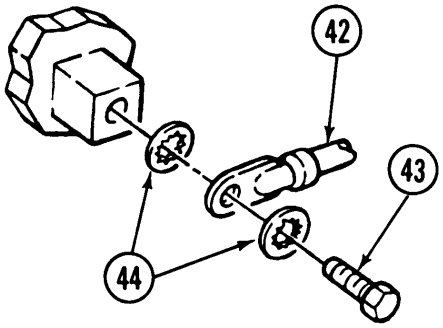
c. REMOVAL PROCEDURES



WARNING

Make sure MASTER switch is set to OFF before disconnecting electrical connectors of power cable assemblies. Failure to follow this warning can result in injury to personnel.

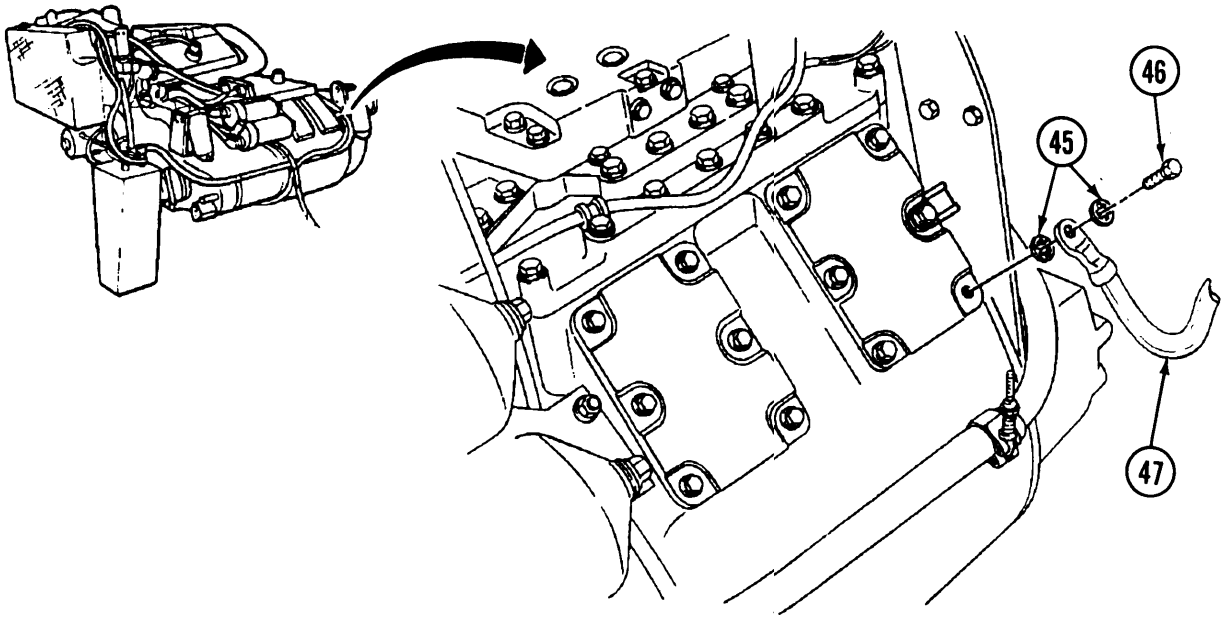
Allow powerpack to cool off before beginning to remove special equipment. Hot components can cause severe bums.



NOTE

Perform step 1 only if the vehicle being used to support the powerpack is one from which the powerpack was removed.

1. Disconnect battery ground cables (para 7-41).
2. Remove screw (43) and two lockwashers (44) and ground cable assembly (42) from vehicle.
3. Remove screw (46), two lockwashers (45) and ground cable (42) from transmission.
4. Install ground cable (47), two lockwashers (45) and screw (46) on transmission.

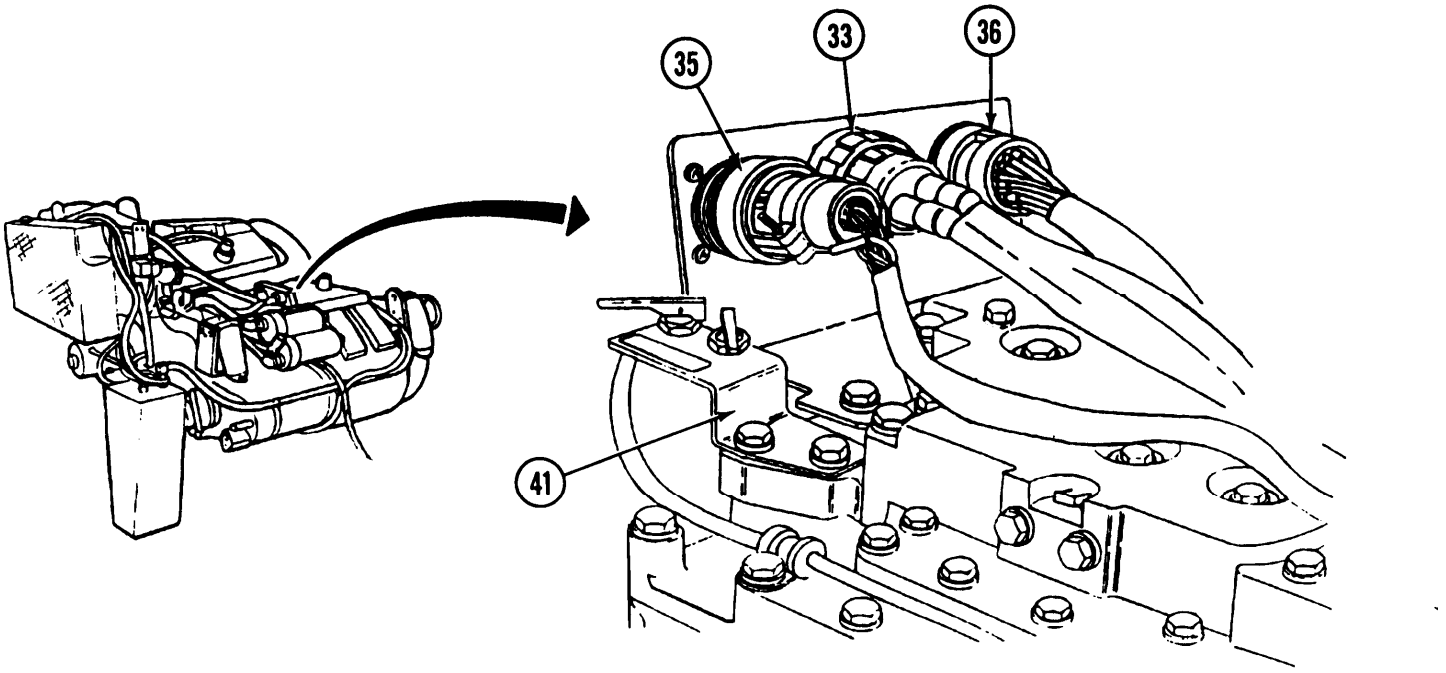


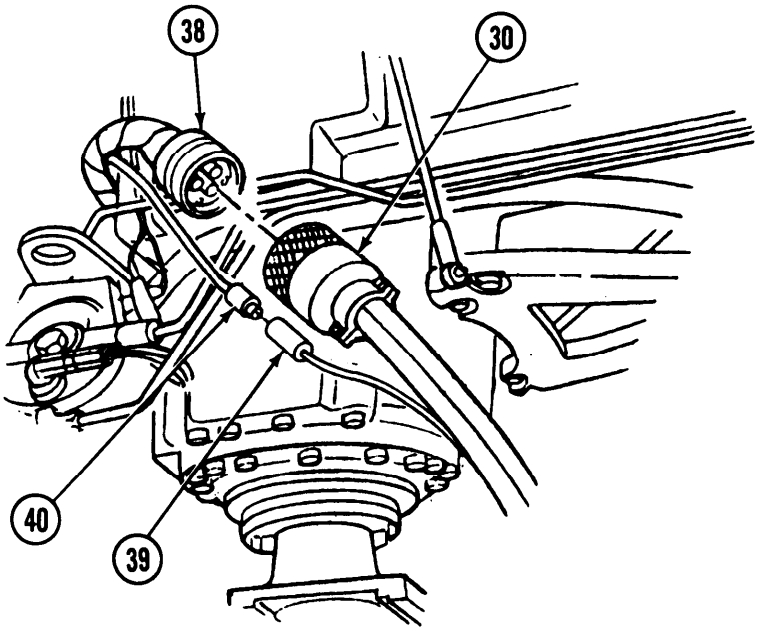
3-3. GROUND HOP PROCEDURES (continued).

5. Disconnect power cable assembly 12268162 (35) from right terminal of engine disconnect bracket (41).

6. Disconnect power cable assembty 12268427 (33) from center terminal of engine disconnect bracket (41).

7. Disconnect power cable assembly (36) from right terminal of engine disconnect fuel return bracket (41).





3-3. GROUND HOP PROCEDURES (continued).

NOTE

If a vehicle is being used that already has a powerpack installed, wiring harnesses will have to be connected to the engine disconnect bracket, starter protection relay electrical lead, and top terminal of the rectifier after disconnecting power cable assemblies in steps 6 through 12.

8. Disconnect starter protection electrical lead 503 (39) from electrical lead 403 (40).

9. Disconnect power cable assembly 12268426 (30) from wiring harness 12268308 connector (38).

10. Disconnect power cable assembly 12268162 (32) from wiring harness 12268414-1 connector (34).

11. Disconnect power cable assembly 12268427 (33) from wiring harness 12353401 connector (32).

12. Disconnect power cable assembly (36) from wiring harness 12329994 connector (37).

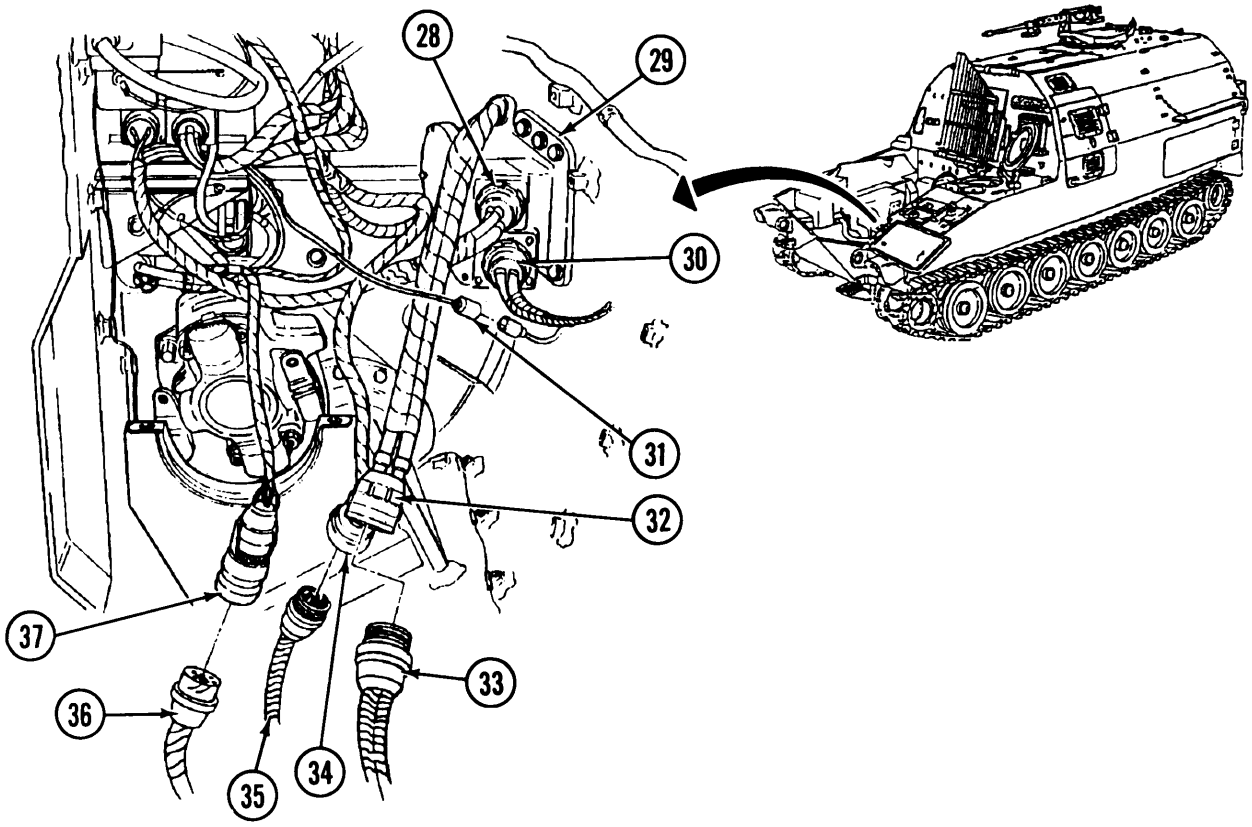
13. Disconnect starter protection relay electrical lead 503 (31) from power cable assembly 12268426 (30).

14. Disconnect cable assembly (30) from rectifier (29).

NOTE

Perform steps 15 through 17 only if the vehicle being used to operate the powerpack is the one from which the powerpack was removed.

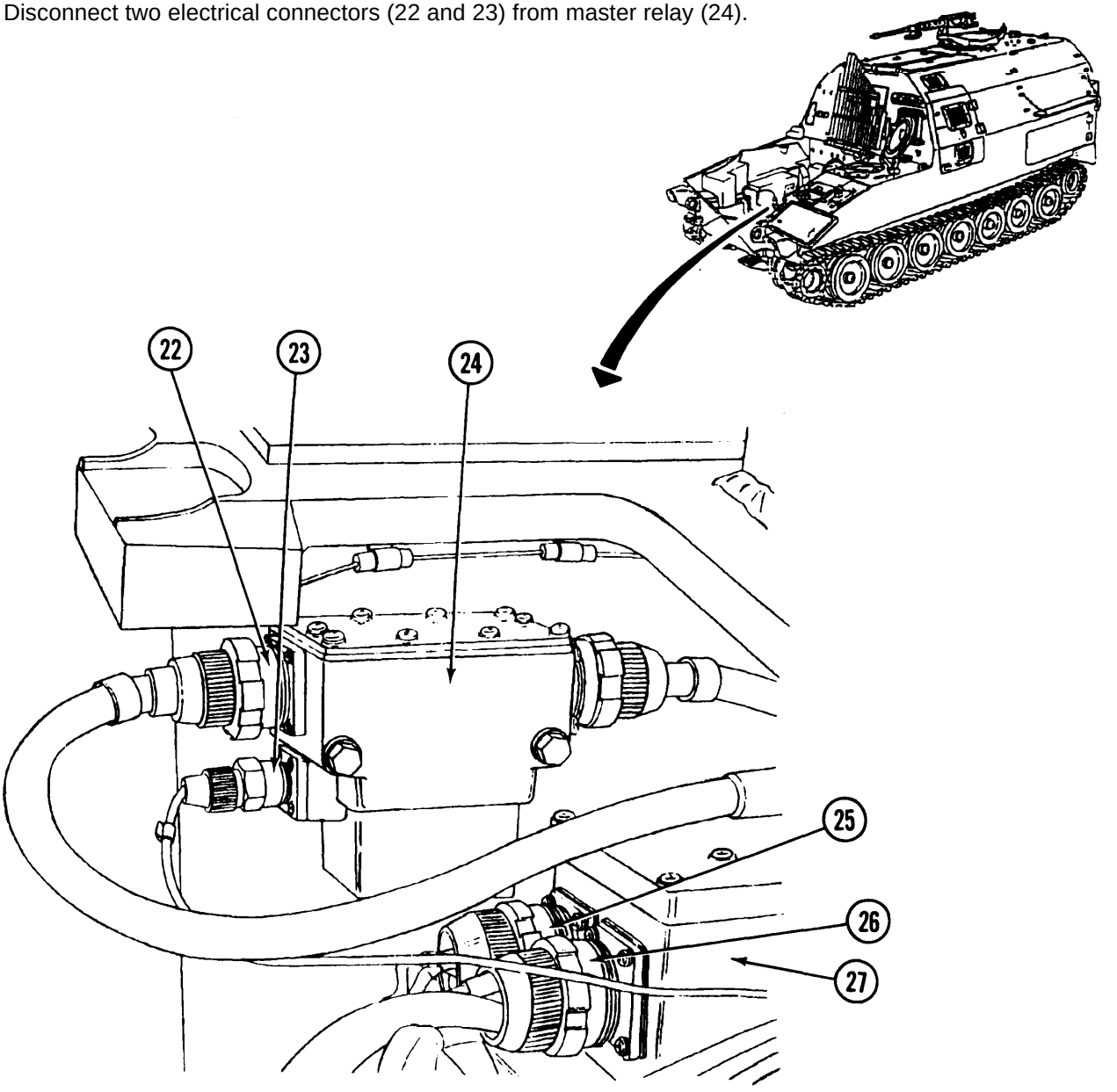
15. Disconnect wiring harness 12376406 connector (28) from rectifier (29).



3-3. GROUND HOP PROCEDURES (continued).

16. Disconnect two electrical connectors (25 and 26) from voltage regulator (27).

17. Disconnect two electrical connectors (22 and 23) from master relay (24).

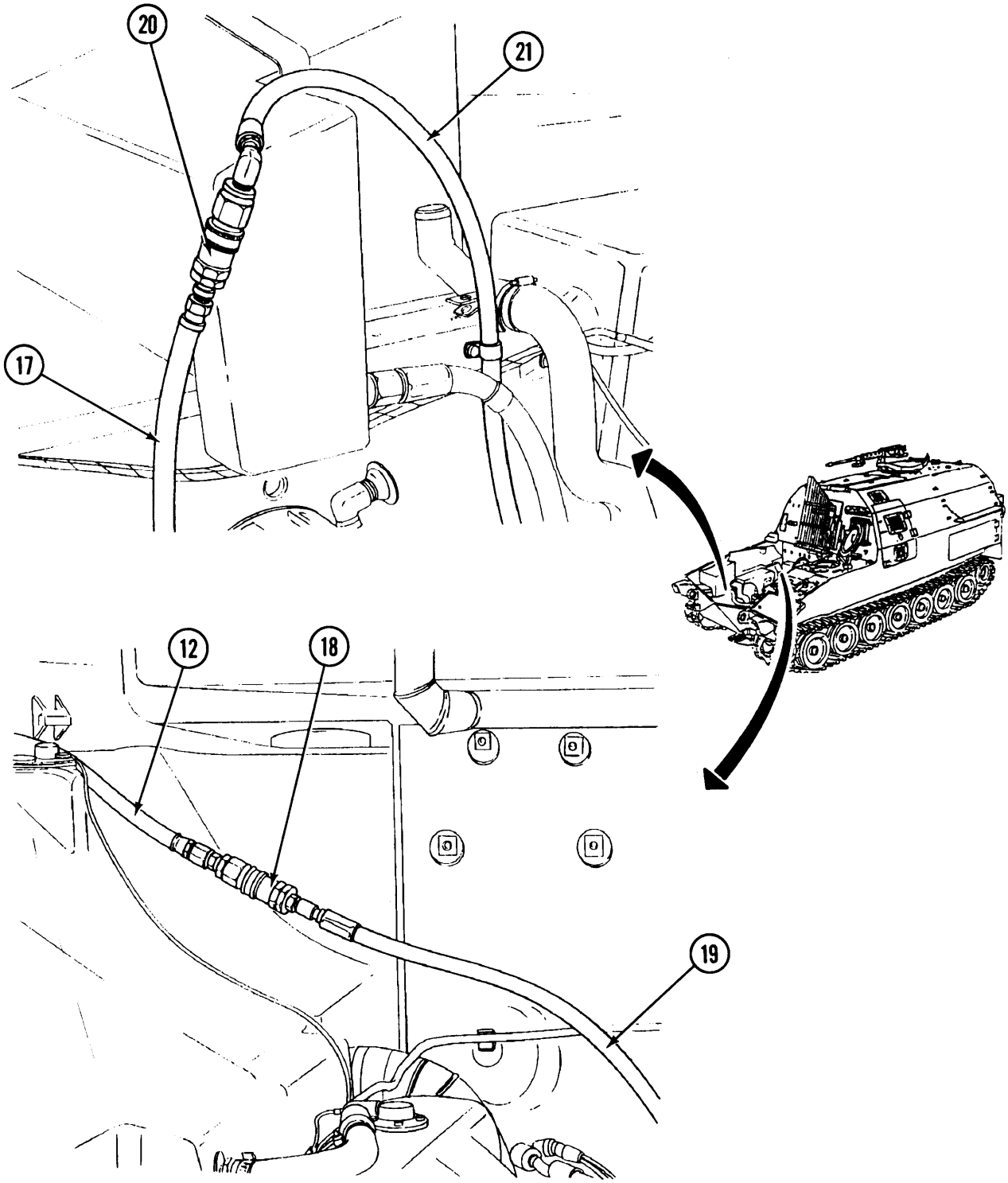


NOTE

If a vehicle is being used that already has a powerpack installed, the support vehicle's fuel return nose will have to be connected to the engine bracket and the fuel supply hose will have to be connected to the primary fuel filter.

3-3. GROUND HOP PROCEDURES (continued).

18. Disconnect hose assembly (17) from fuel supply hose (21) at quick-disconnect (20).

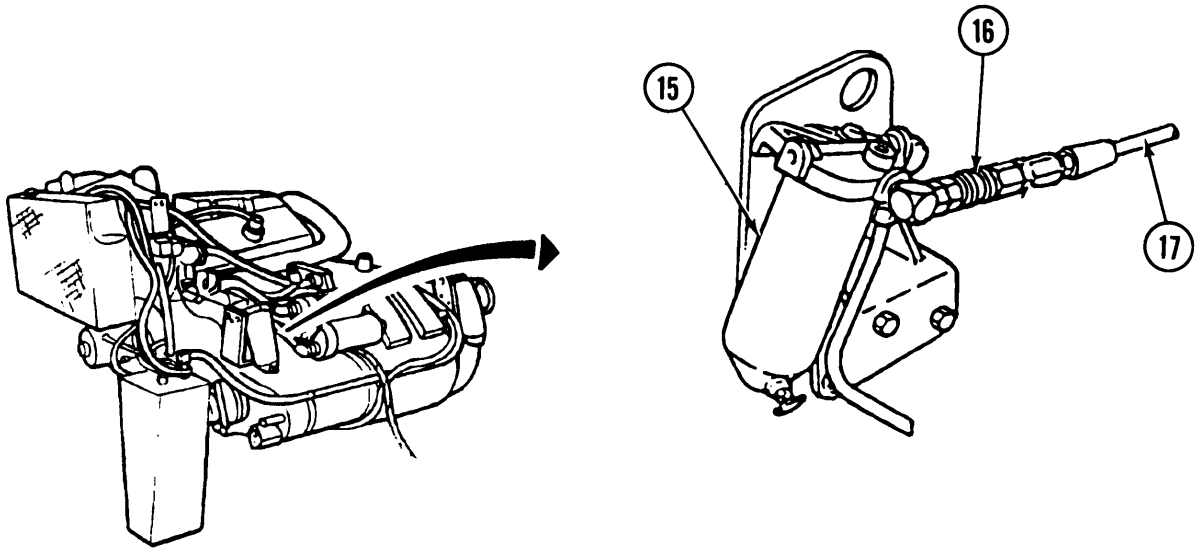


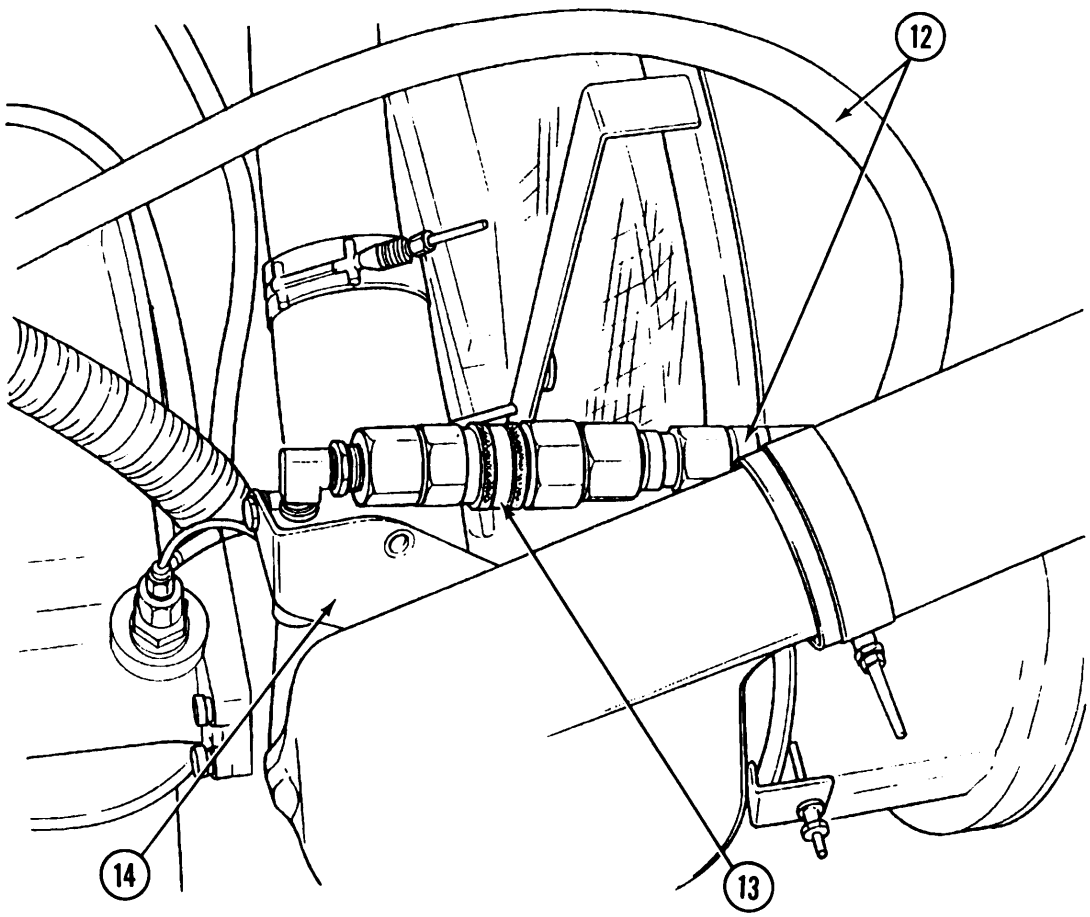
19. Disconnect hose assembly (12) from fuel return hose (19) at quick-disconnect (18).

3-3. GROUND HOP PROCEDURES (continued).

20. Disconnect hose assembly (17) from quickdisconnect (16) on primary fuel filter (15).

21. Disconnect hose assembly (12) to quickdisconnect (13) on engine bracket (14).





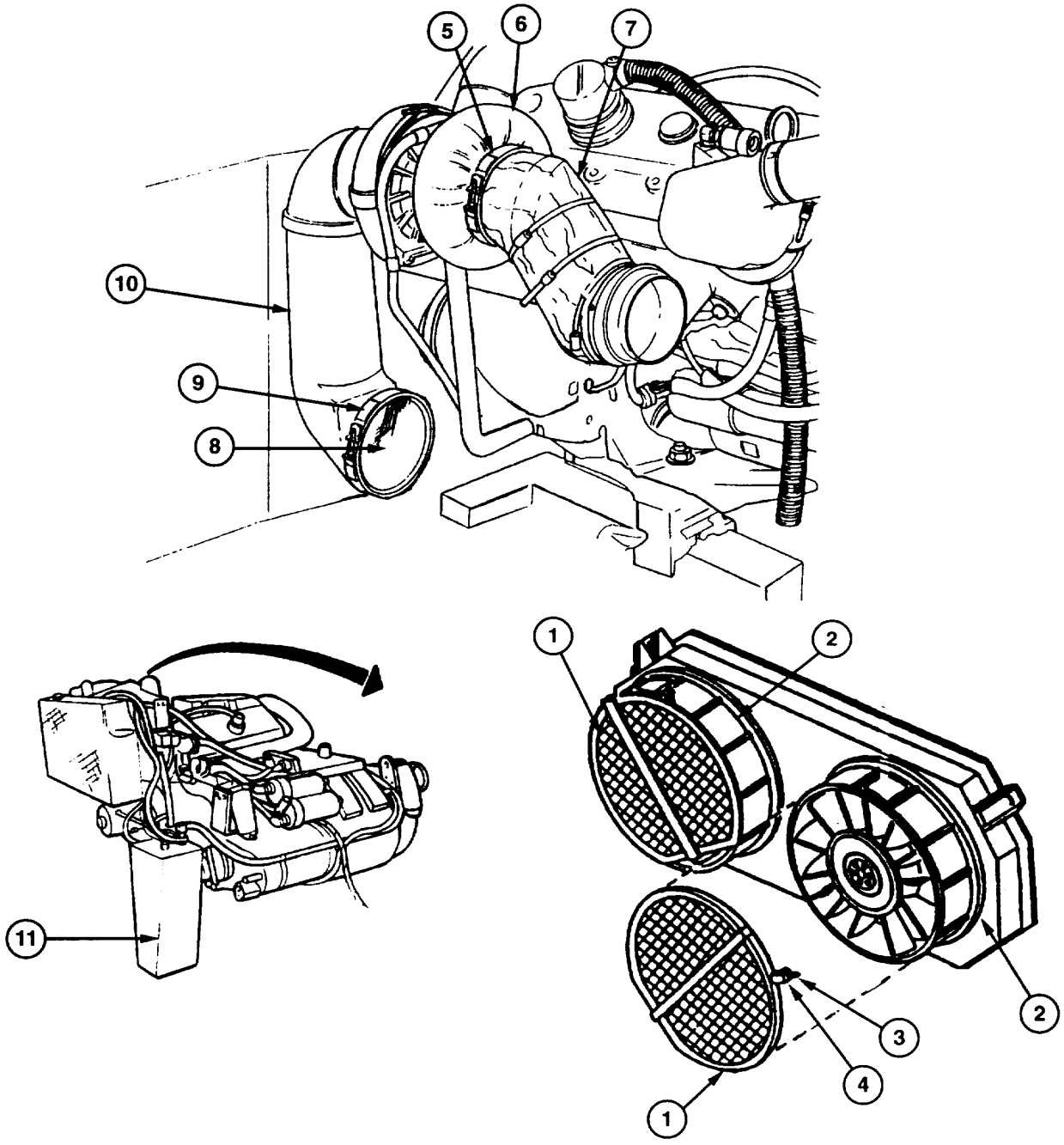
3-3. GROUND HOP PROCEDURES (continued).

22. Position surge tank (11) on powerpack.

23. Remove clamp (5) and exhaust pipe (7) from exhaust outlet (6).

24. Remove clamp (9) and safety screen (8) from turbocharger inlet (10).

25. Loosen two thumbscrews (3) and nuts (4), and remove protective fan screen (1) from each of two radiator fans (2).



FOLLOW-ON MAINTENANCE:

- Install powerpack (para 3-2).

3-4. SHOCK MOUNT AND BRACKET REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- Torque wrench (0-175 ft-lb) (Item 69, Appendix I)

Materials/Parts:
- Lockwasher (3) (Item 177, Appendix H)
- Lockwasher (2) (Item 180, Appendix H)
- Self-locking nut (Item 326, Appendix H)
- Self-locking screw (8) (Item 335, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Powerpack removed (para 3-2).

[Equipment Condition Deleted]

a. REMOVAL

WARNING

Engine must be properly supported before removing shock mount. Failure to provide proper support can result in injury to personnel or equipment damage.

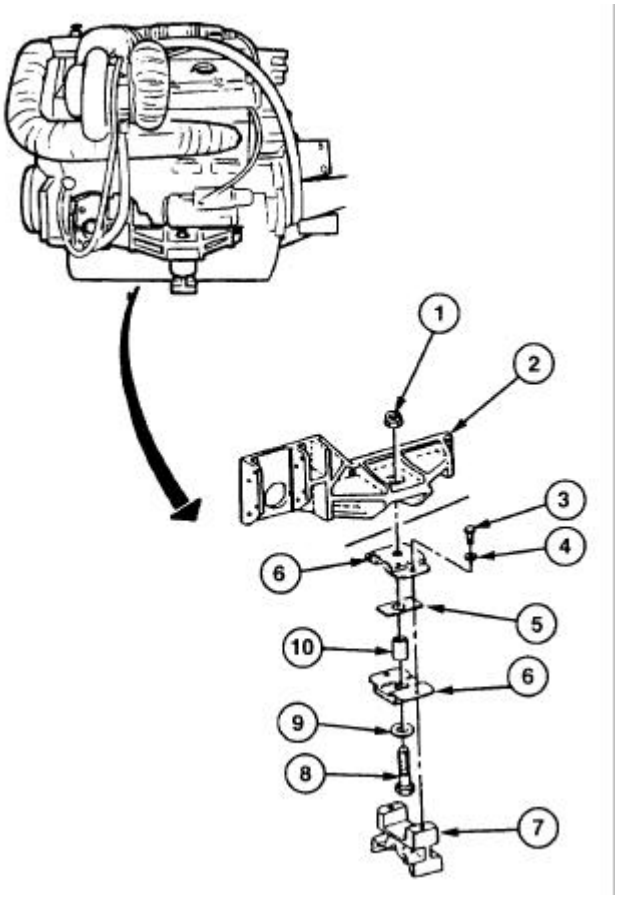
1. Remove self-locking nut (1) and shock mount (7), with two engine shock mount plates (6) attached, from bracket (2). Discard self-locking nut.

2. Remove two screws (3) and lockwashers (4) fromshock mount (7). Discard lockwashers.

3. Separate two engine shock mount plates (6), spacer plate (5), spacer sleeve (10), washer (9), and screw (8) from shock mount (7).

4. Remove three screws (12) and lockwashers (13) from bracket (2). Discard lockwashers.

5. Remove eight self-locking screws (11) and bracket (2) from engine. Discard self-locking screws.



3-4. SHOCK MOUNT AND BRACKET REPLACEMENT (continued).

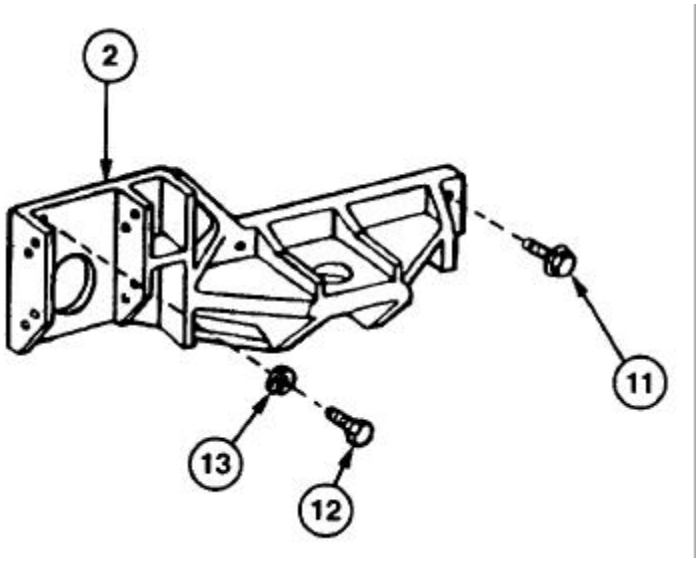
b. INSTALLATION

1. Install bracket (2) and eight new self-locking screws (11) on engine. Torque screws (11) between 60 and 65 ft-lb (81 and 88 N•m).

2. Install three screws (12) and new lockwashers (13) on bracket (2). Torque screws (12) to 35 ft-lb (46 N•m).

3. Install two engine shock mount plates (6), spacer plate (5), spacer sleeve (10), washer (9), and screw (8) on shock mount (7) with two screws (3) and new lockwashers (4).

4 Install shock mount (7), with two engine shock mount plates (6) attached, on bracket (2) with new self-locking nut (1).



FOLLOW-ON MAINTENANCE:
[Follow-On Task Deleted]
- Install powerpack (para 3-2).

3-5. OIL FILTER BRACKET REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Lockwasher (8) (Item 177, Appendix H)
- Self-locking nut (2) (Item 313, Appendix H)
-

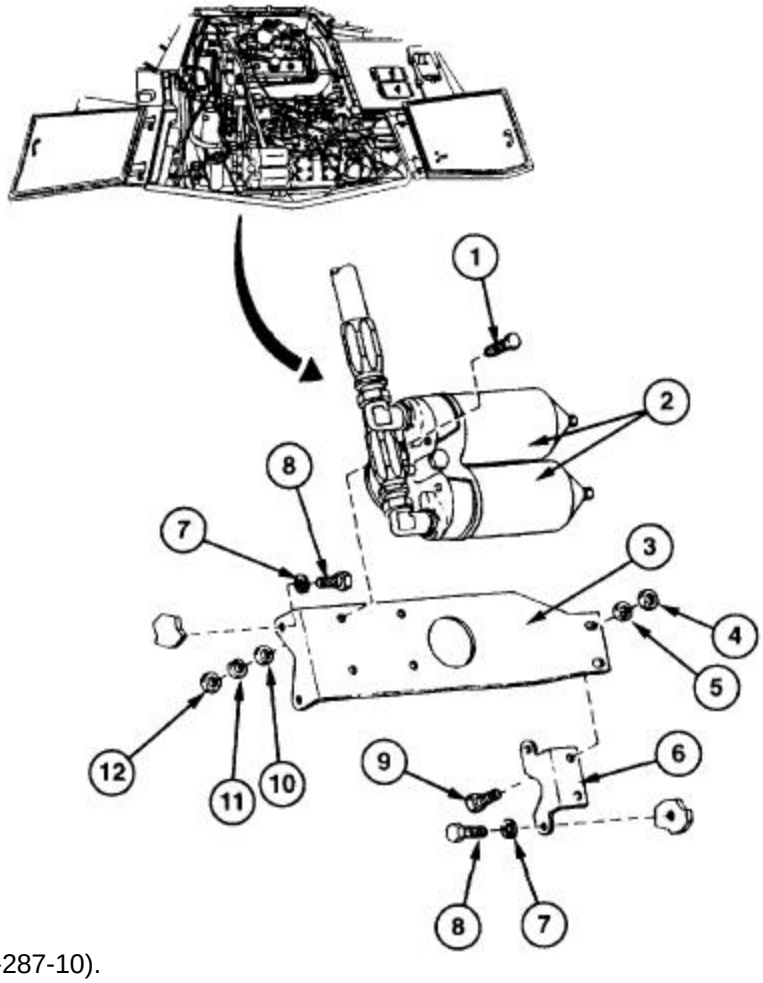
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Transmission access doors opened (refer to TM 9-2350-287-10).

a. REMOVAL

1. Remove four screws (1), washers (10), lockwashers (11), and nuts (12) and oil filter assembly (2) from mounting bracket (3). Discard lockwashers.

2. Remove four screws (8) and lockwashers (7) and mounting bracket (3) from transmission. Discard lockwashers.

3 Remove two screws (9), washers (5), and self-locking nuts (4) from bracket (6), and separate mounting bracket (3) from bracket (6). Discard self-locking nuts.



b. INSTALLATION

1. Install mounting bracket (3) on bracket (6) with two screws (9), washers (5), and new self-locking nuts (4).

2. Install mounting bracket (3) on transmission with four screws (8) and new lockwashers (7).

3. Install oil filter assembly (2) on mounting bracket (3) with four screws (1), washers (10), new lockwashers (11), and nuts (12).

FOLLOW-ON MAINTENANCE:
- Close transmission access doors (refer to TM 9-2350-287-10).

3-6. OIL COOLER HOSES REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

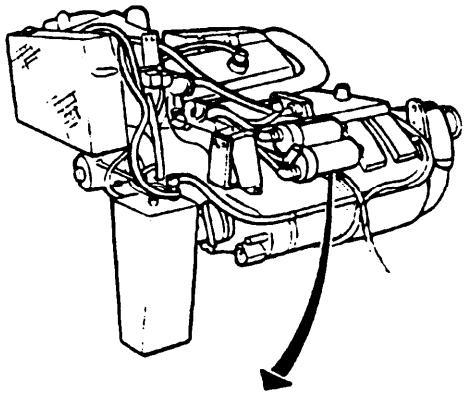
Initial Setup:

Tools/Test Equipment:
- Drain pan (Item 14, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)

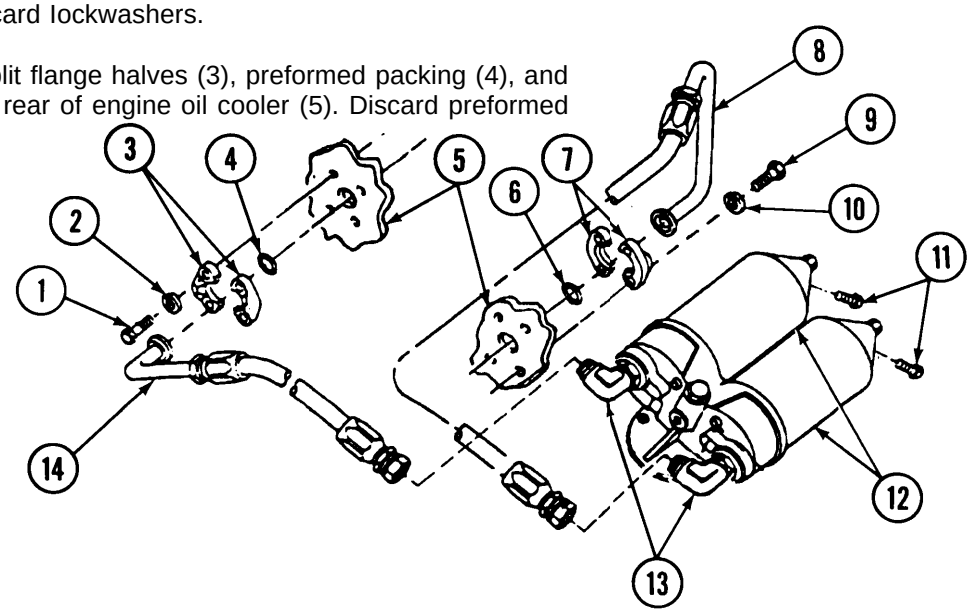
Materials/Parts:
- Lockwasher (8) (Item 179, Appendix H)
- Preformed packing (2) (Item 219, Appendix H)

Equipment Conditions:
- Powerpack removed (para 3-2).
- Remove engine coolant manifold connector housing (para 6-11).
- Remove bypass thermostat and housing assembly (para 6-12).
- Remove engine coolant tube assembly (para 6-10).
- Remove transmission oil cooler hose assembly (para 8-5).

a. REMOVAL



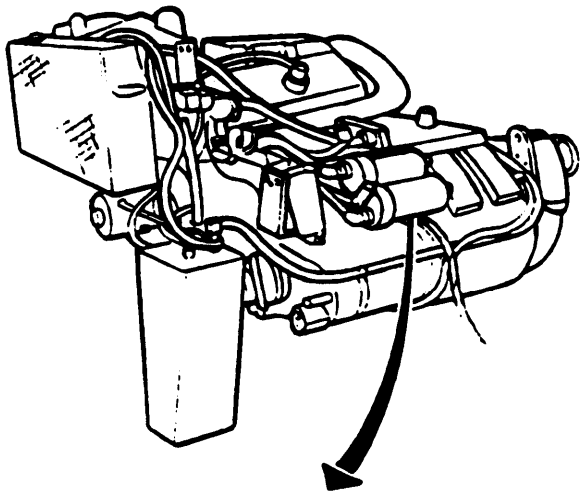
1. Place suitable container under two drain plugs (11).
2. Remove two drain plugs (11) and allow oil to drain into drain pan.
3. Disconnect two hoses (8 and 14) from elbows (13) on two oil filter covers (12).
4. Remove four screws (9) and lockwashers (10) from two split flange halves (7). Discard lockwashers.
5. Remove two split flange halves (7), preformed packing (6), and hose (8) from front of engine oil cooler (5). Discard preformed packing.
6. Remove four screws (1) and lockwashers (2) from two split flange halves (3). Discard lockwashers.
7. Remove two split flange halves (3), preformed packing (4), and hose (14) from rear of engine oil cooler (5). Discard preformed packing.

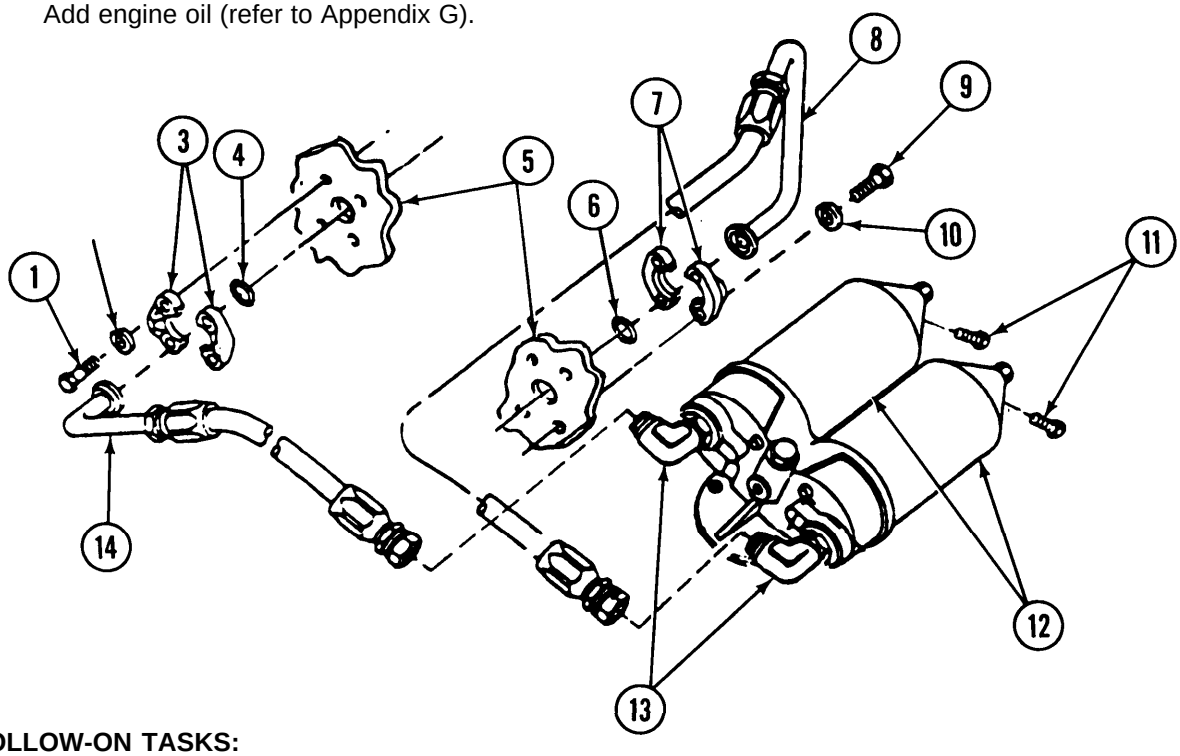


3-6 OIL COOLER HOSES REPLACEMENT (continued).

b. INSTALLATION

1. Install two split flange halves(3), newpreformed packing (4), and hose (14) on rear of engine oil cooler (5).
2. Install four screws (1) and new lockwashers (2) on two split flange halves (3).
3. Install two split flange halves (7), new preformed packing (6), and hose (8) on front of engine oil cooler (5).
4. Install four screws (9) and new Iockwashers (10) on two split flange halves (7).
5. Install two hoses (8 and 14) on elbows (13) on two oil filter covers (12).
6. Install two drain plugs (11) on two oil fitler covers (12).
7. Add engine oil (refer to Appendix G).





FOLLOW-ON TASKS:

- Install transmission oil cooler hose assembly (para 8-5).
- Install engine coolant tube assembly (para 6-10).
- Install bypass thermostat and housing assembly (para 6-12).
- Install engine coolant manifold connector housing (para 6-11).
- Install powerpack (para 3-2).

3-7. OIL SAMPLER SYSTEM REPLACEMENT.

This Task Covers:

a. Removal

a. Installation

Initial Setup:

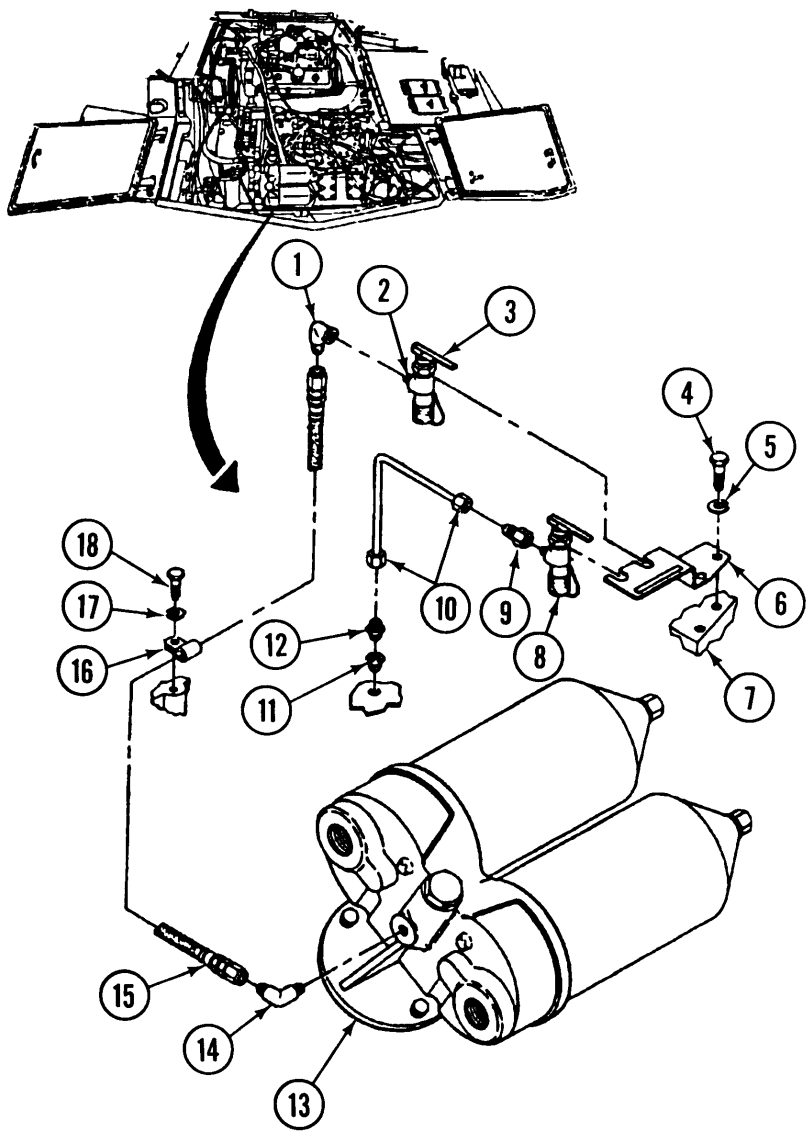
Tools/Test Equipment:
•General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
• Teflon antiseize tape (Item 70, Appendix D)
• Lockwasher (Item 163, Appendix H)
• Lockwasher (2) (Item 183, Appendix H)

Equipment Conditions:
• Vehicle parked on level ground (refer to TM 9-2350-287-10).
• Transmission access doors opened (refer to TM 9-2350-287-10).

a. REMOVAL

1. Loosen two swivel nuts (10) on tube (19), and remove tube (19) from transmission adapter (12) and adapter (9).
2. Remove adapter (12) and bushing (11) from transmission (7).
3. Disconnect hose (15) from two elbows (1 and 14).
4. Remove elbow (14) from oil filter adapter (13).
5. Remove screw (18), lockwasher (17), and clamp (16) from transmission (7), and remove hose (15) from vehicle. Discard lockwasher.
6. Remove two screws (4) and lockwashers (5) and mounting bracket (6) from transmission (7). Discard lockwashers.
7. Remove adapter (9) from drain cock (8).
8. Remove elbow (1) from drain cock (3).
9. Loosen two nuts (2) on two drain cocks (3 and 8), and pull two drain cocks (3 and 8) from mounting bracket (6).



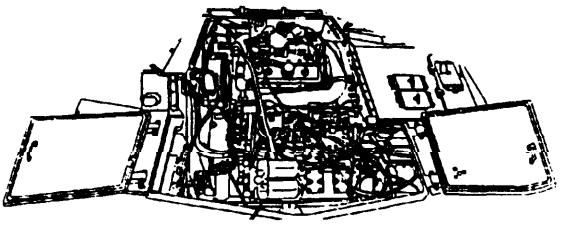
3-7. OIL SAMPLER SYSTEM REPLACEMENT (continued).

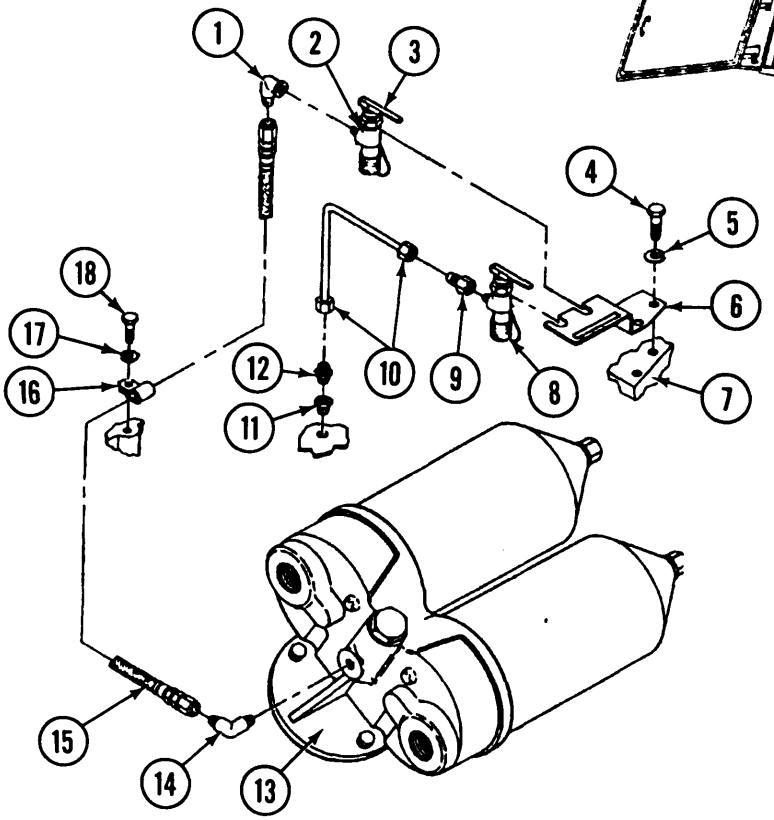
b. INSTALLATION

NOTE

Apply Teflon antiseize tape to all male pipe threads prior to installation.

1. Install two drain cocks (3 and 8) on mounting bracket (6). Tighten two nuts (2).
2. Install elbow (1) on drain cock (3).
3. Install adapter (9) on drain cock (8).
4. Install mounting bracket (6) on transmission (7) with two screws (4) and new lockwashers (5).
5. Install elbow (14) on oil filter adapter (1 3).
6. Connect hose (15) to two elbows (1 and 14).
7. Secure hose (15) to transmission (7) with clamp (16), screw (18), and new lockwasher (17).
8. Install bushing (11) and adapter (12) in transmission (7).
9. Install tube (19) at adapter (9) and adapter (1 2). Tighten two swivel nuts (10).





FOLLOW-ON MAINTENANCE:

• Close transmission access doors (refer to TM 9-2350-287-10).

3-8. OIL FILTER AND OIL FILTER ADAPTER REPAIR.

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- Toque wrench, 0-175 ft-lb (Item 69, Appendix I)
- Drain pan (Item 14, Appendix I)

Materials/Parts:
Ž Gasket (2) (Item 86, Appendix H)
- Gasket (2) (Item 91, Appendix H)
- Lockwasher (4) (Item 177, Appendix H)
- Preformed packing (2) (Item 238, Appendix H)

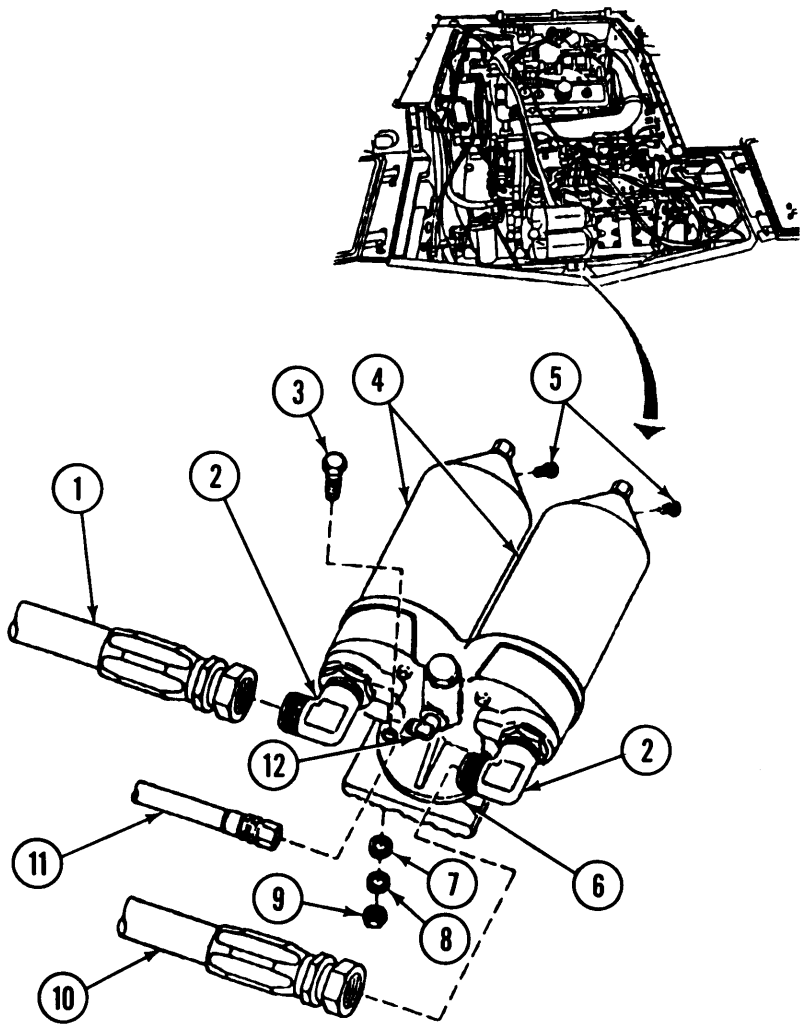
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Left and right transmission access doors opened (refer to TM 9-2350-287-10).

a. REMOVAL

1. Place drain pan under two oil filter drain plugs (5).
2. Remove two drain plugs (5) and allow oil to drain.
3. Disconnect two hoses (1 and 10) from two elbows (2).
4. Disconnect hose (11) from elbow (12).
5. Remove four screws (3), nuts (9), lockwashers (8), and washers (7) and two oil filter covers (4) from bracket (6). Discard lockwashers.

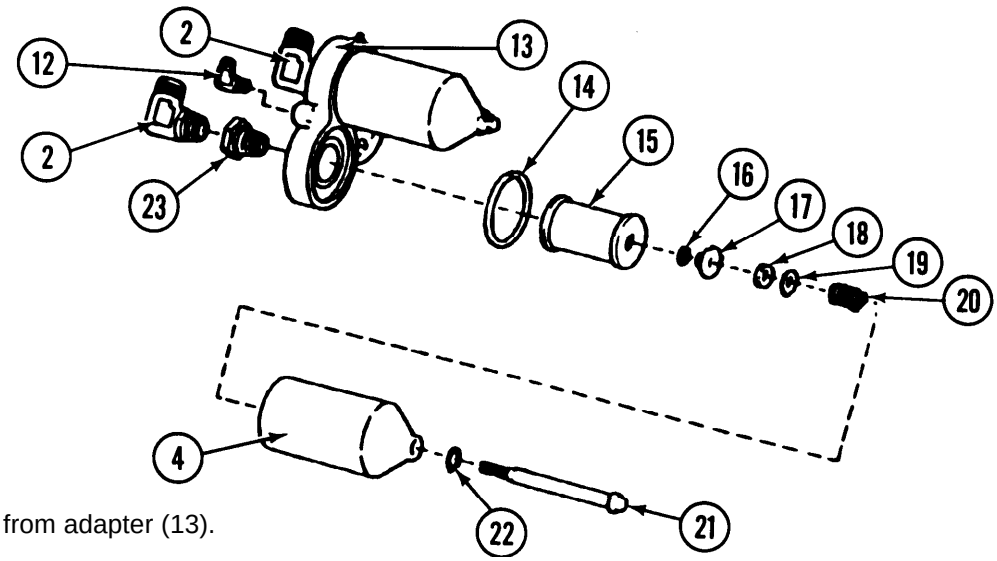
b. DISASSEMBLY

1. Loosen two center studs (21).
2. Remove two oil filter covers (4) and gaskets (14) from adapter (13). Discard gaskets.



3-8. OIL FILTER AND OIL FILTER ADAPTER REPAIR (continued).

3. Remove two center studs (21), gaskets (22), filter elements (15), retaining rings (16), retainers (17), preformed packings (18), washers (19), and springs (20) from two oil fitter covers (4). Discard gaskets and preformed packings.



4. Remove elbow (12) from adapter (13).

5. Remove two elbows (2) and bushings (23) from adapter (13).

c. ASSEMBLY

1. Install two bushings (23) and elbows (2) on adapter (13).

2. Install elbow (12) on adapter (13).

3. Install two springs (20), washers (19), new preformed packings (18), retainers (17), retaining rings (16), filter elements (15), new gaskets (22), and center studs (21) in two oil fitter covers (4).

4. Install two oil filter covers (4) and new gaskets (14) on adapter (13). Torque two center studs (21) between 40 and 50 ft-lb (54 and 68 N•m).

d. INSTALLATION

1. Install two oil filter covers (4) on bracket (6) with four screws (3), washers (7), new lockwasher (8), and nuts (9).

2. Connect hose (11) to elbow (12).

3. Connect two hoses (1 and 10) to two elbows (2).

4. Install two drain plugs (5) in two oil filter covers (4).

5. Add engine oil (refer to Appendix G).

FOLLOW-ON MAINTENANCE:
• Close transmission access doors (refer to TM 9-2350-287-10).

3-9. LIQUID (LUBE OIL) LEVEL GAGE ROD AND TUBE ASSEMBLY REPLACEMENT

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Cap and plug set (Item 13, Appendix D)
- Lockwasher (Item 163, Appendix H).

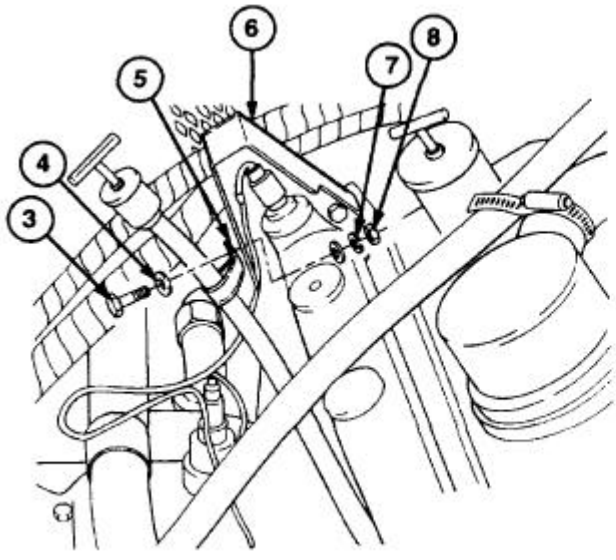
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Powerpack removed (para 3-2).

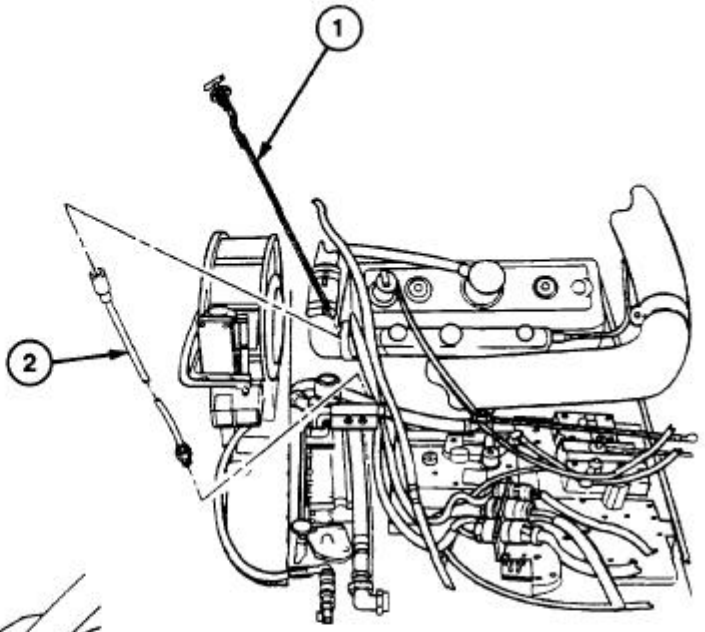
[Equipment Condition Deleted]

a. REMOVAL

1. Remove liquid level gage rod (1) from metal tube assembly (2).

2. Remove screw (3), nut (8), lockwasher (7), washer (4), and loop clamp (5) from sensor cover (6). Discard lockwasher.



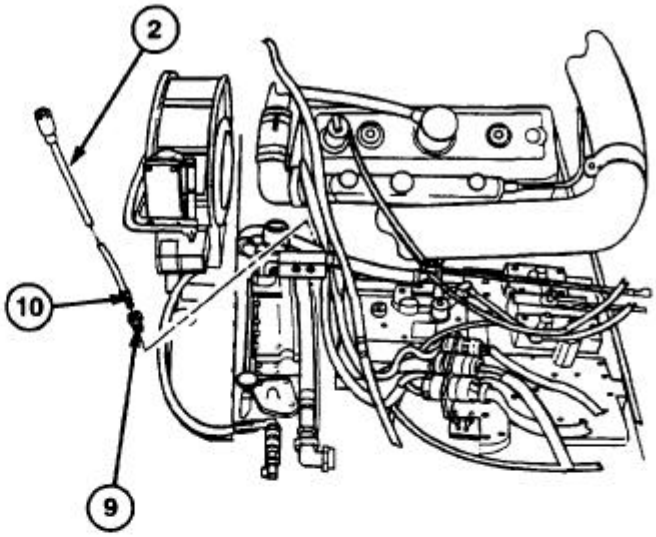


3-9. LIQUID (LUBE OIL) LEVEL GAGE ROD AND TUBE ASSEMBLY REPLACEMENT (continued).

CAUTION

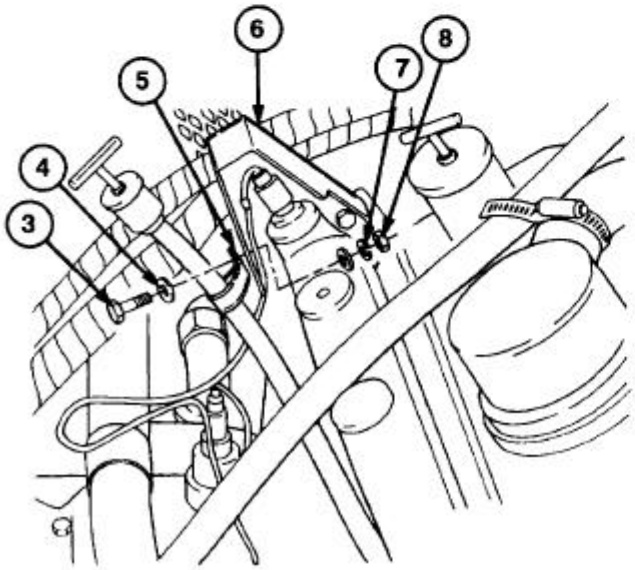
To prevent contaminants from entering engine oil, cap all ports immediately after removing components.

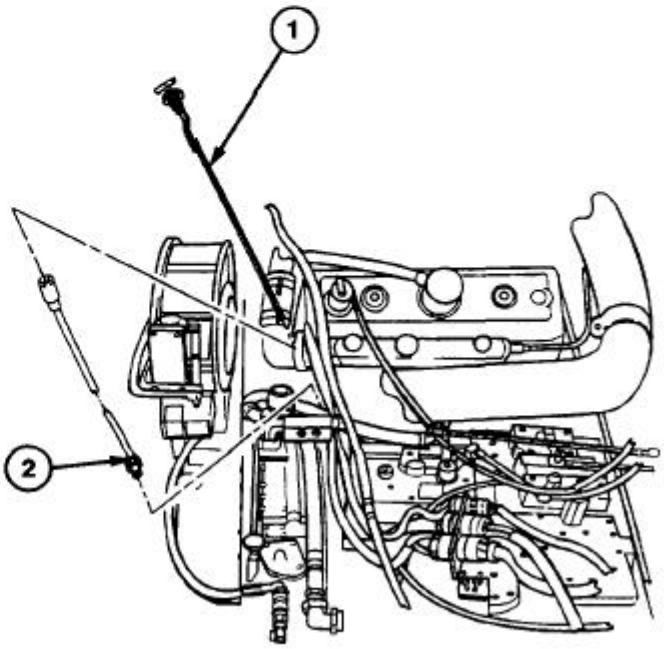
3. Unscrew nut (10) and remove metal tube assembly (2) from straight adapter (9).
4. Remove straight adapter (9) from engine.



b. INSTALLATION

1. Install straight adapter (9) in engine.
2. Install metal tube assembly (2) in straight adapter (9) and tighten nut (10).
3. Secure metal tube assembly (2) to sensor cover (6) with loop clamp (5), new lockwasher (7), washer (4), screw (3), and nut (8).
4. Install liquid level gage rod (1) in metal tube assembly (2).





FOLLOW-ON MAINTENANCE:
[Follow-on Task Deleted]
- Install powerpack (para 3-2).

3-10. CRANKCASE AND GEAR TRAIN BREATHER TUBES REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Tiedown strap (2) (Item 375, Appendix H)

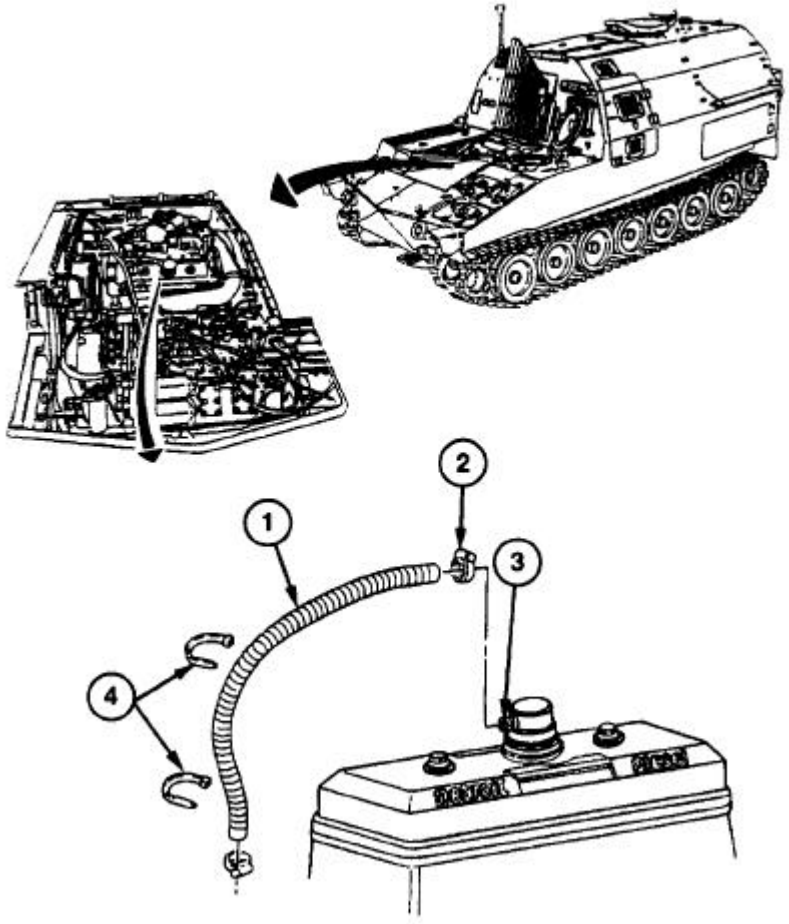
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Air intake grille opened (refer to TM 9-2350-287-10).

a. REMOVAL

NOTE

Removal of crankcase and gear train breather tubes is the same.

1. Loosen clamp (2).
2. Pull breathertube (1) out of breather retainer (3).
3. Remove two tiedown straps (4) and breather tube (1) from vehicle. Discard tiedown straps.



b. INSTALLATION

1. Install breather tube (1) in breather retainer (3).
2. Install breather tube (1) and two new tiedown straps (4) on vehicle.
3. Tighten clamp (2).

FOLLOW-ON MAINTENANCE:
- Close air intake grille (refer to TM 9-2350-287-10).

3-11. CROSSOVER EXHAUST PIPE REPLACEMENT

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Equipment Conditions:
- Vehicle parked on level ground refer to TM 9-2350-287-10).
- Air intake grille opened and secured (refer to TM 9-2350-287-10).

a. REMOVAL

1. Remove quick-release pin (7) and accelerator linkage (1) from lever (6). Move accelerator linkage (1) clear of crossover exhaust pipe (5).

2. Remove quick-release pin (9) and fuel shutoff cable (2) from lever (8). Move fuel shutoff cable (2) clear of exhaust pipe (5).

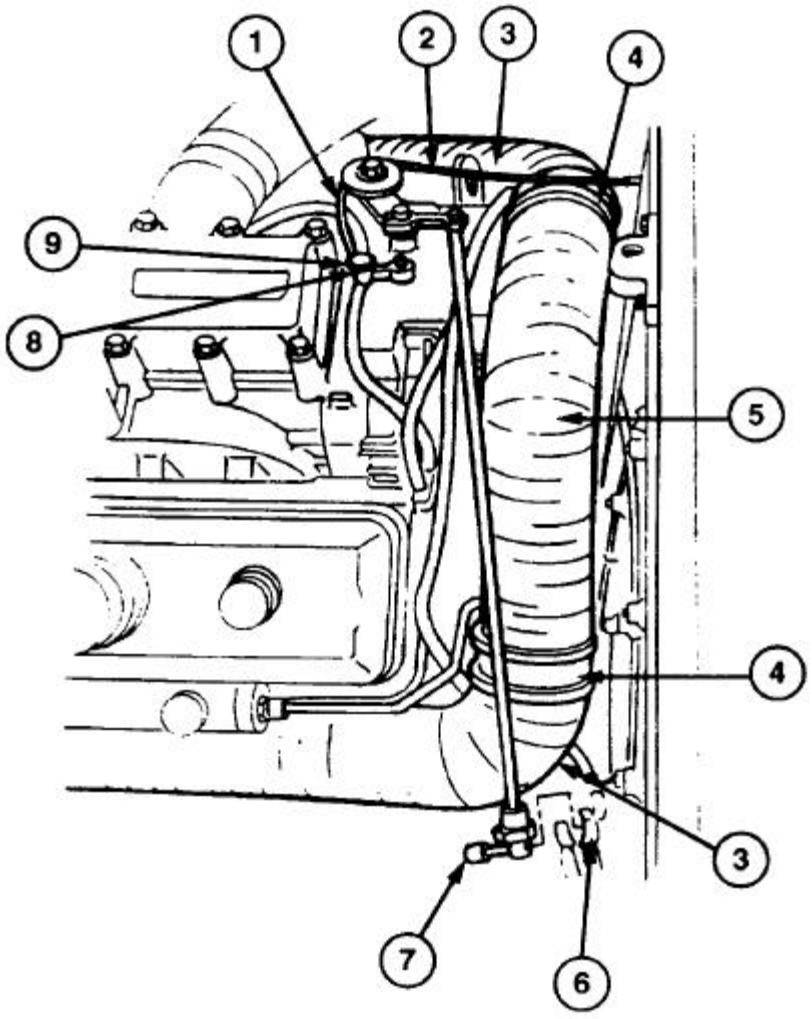
3 Remove two clamps (4) and exhaust pipe (5) from two exhaust manifolds (3).

b. INSTALLATION

1. Install exhaust pipe (5) and two clamps (4) on two exhaust manifolds (3).

2. Install fuel shutoff cable (2) on lever (8) with quick-release pin (9).

3. Connect accelerator linkage (1) to lever (6) with quick-release pin (7).



FOLLOW-ON MAINTENANCE:
- Close air intake grille (refer to TM 9-2350-287-10).

3-12. ACCESSSORY DRIVE ADDAPTER REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Gasket (Item 87, Appendix H)
- Lockwasher (Item 164, Appendix H)

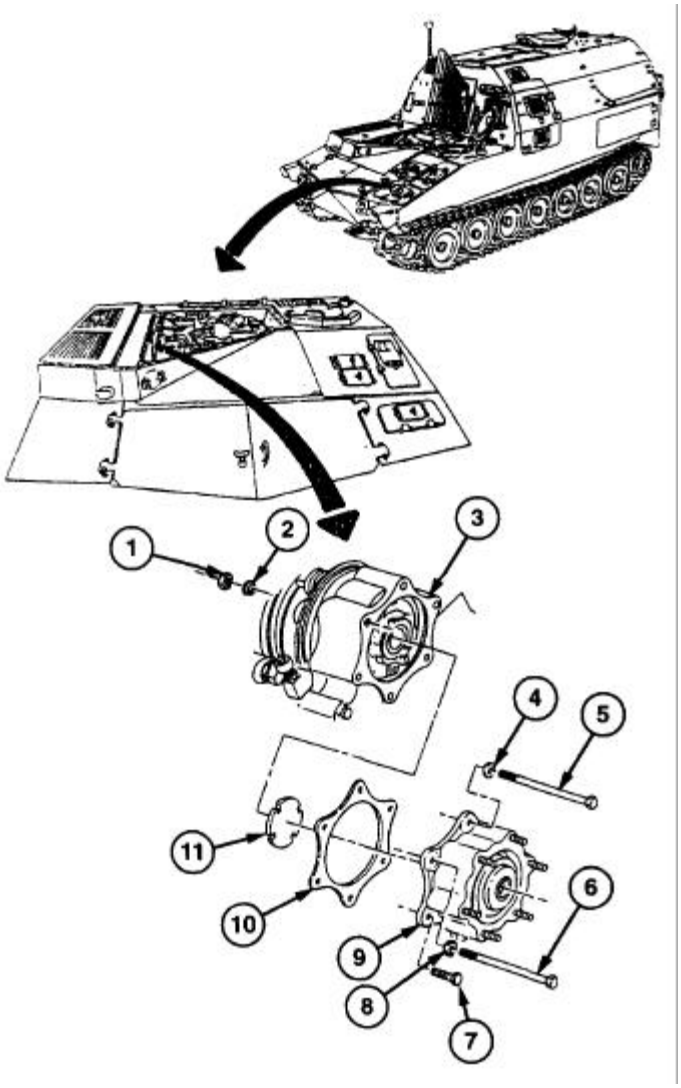
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Alternator removed (para 7-2).

a. REMOVAL

NOTE

Note location of accessory drive adapter mounting hardware for installation.

1. Remove three bolts (5) and lockwashers (4), two bolts (7), bolt (6), washer (8), lockwasher (2), and nut (1) from accessory drive adapter (9). Discard lockwashers.
2. Remove accessory drive adapter (9) from engine (3).
3. Remove flexible coupling insert (11) from accessory drive adapter (9), and inspect flexible coupling insert (11) for unusual wear and cracks. Replace if defective.
4. Remove housing gasket (10) from accessory drive adapter (9). Discard housing gasket.



b. INSTALLATION

1. Install new housing gasket (10) on accessory drive adapter (9).
2. Install flexible coupling insert (11) in accessory drive adapter (9).
3. Install accessory drive adapter (9) on engine (3) using nut (1), new lockwasher (2), washer (8), bolt (6), two bolts (7), and three new lockwashers (4) and bolts (5).

FOLLOW-ON MAINTENANCE:
- Install alternator (para 7-2).

CHAPTER 4
FUEL SYSTEM MAINTENANCE

4-1. GENERAL.

This section contains instructions on how to remove, disassemble, clean, inspect, assemble, test, and install the fuel system. The fuel system consists of the following:

- Electric fuel pumps
- Engine-driven fuel pump
- Fuel check valves
- Fuel filter assemblies
- Fuel tank level transmitters
- Hoses, tubes, and fittings

4-2. FUEL SYSTEM DRAINING.

This Task Covers:

Draining

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- 55-gallon container
- Gasket (Item 65, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Vehicle positioned over maintenance pit (refer to TM 9-2350-287-10).

DRAINING

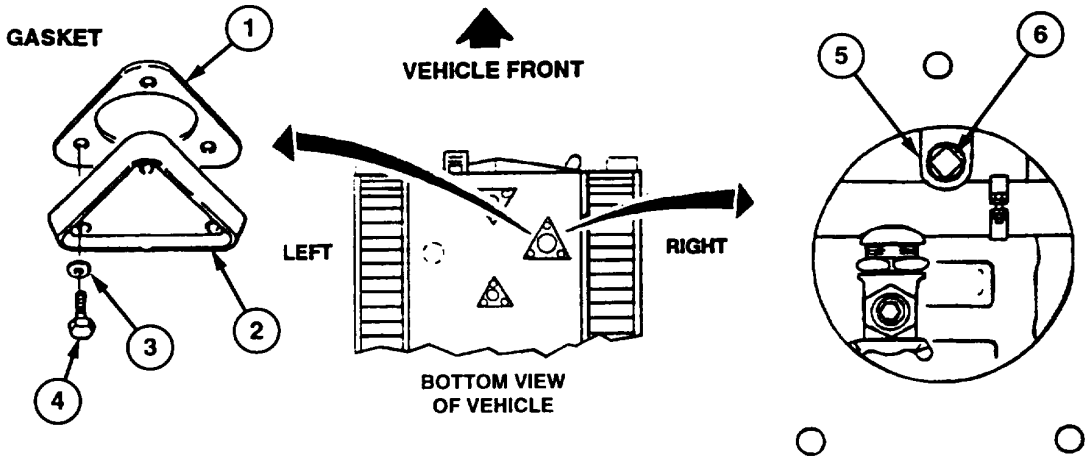
WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open flame. When working where fuel is present, post signs that read "No Smoking Within 50 Feet of Vehicle."

NOTE

Fuel tank capacity is 135 gallons. Removing drain plug at bottom of vehicle allows draining of the fuel system in less than 30 minutes.

1. Remove three screws (4) and washers (3), access cover (2), and gasket (1) from hull. Discard gasket.
2. Remove fuel plug (6) from elbow (5) and drain fuel into suitable containers.



3. Install fuel plug (6) in elbow (5).
4. Install new gasket (1) and access cover (2) on hull with three washers (3) and screws (4).

FOLLOW-ON MAINTENANCE:
- Move vehicle from maintenance pit and refuel (refer to TM 9-2350-287-10).

4-3 RIGHT ELECTRIC FUEL PUMP AND CHECK VALVE REPAIR.

This Task Covers:

a. Removal
b Disassembly
c. Inspection
d. Assembly
e. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Teflon pipe sealant (Item 63, Appendix D)
- Gasket (Item 66, Appendix H)
- Gasket (Item 84.1, Appendix H)
- Gasket (Item 84.2, Appendix H)
- Lockwasher (4) (Item 134, Appendix H)
- Lockwasher (3) (Item 161, Appendix H)
- Lockwasher (Item 189.1, Appendix H)
- Preformed packing (Item 227.1, Appendix H)
- Sleeve (Item 342.1, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Fuel system drained (para 4-2).
- Powerpack removed (para 3-2).

a. REMOVAL

1. Disconnect electrical connector (6) from fuel pump assembly (4).

2. Disconnect fuel hose (2) and remove check valve (1) from fuel pump assembly (4).

3. Remove 10 screws (5), fuel pump assembly (4), and gasket (3) from fuel tank (7). Discard gasket.

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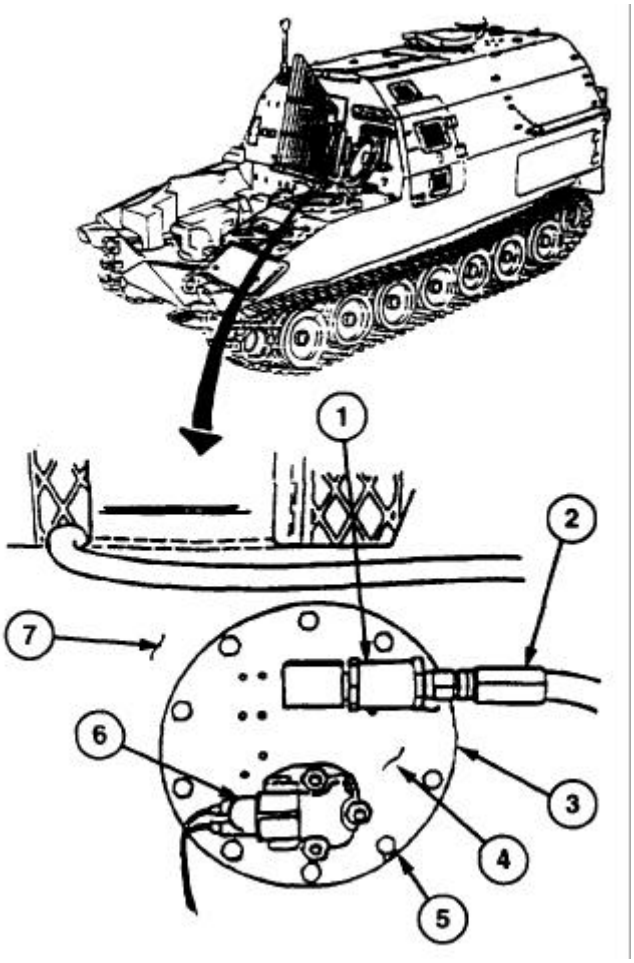
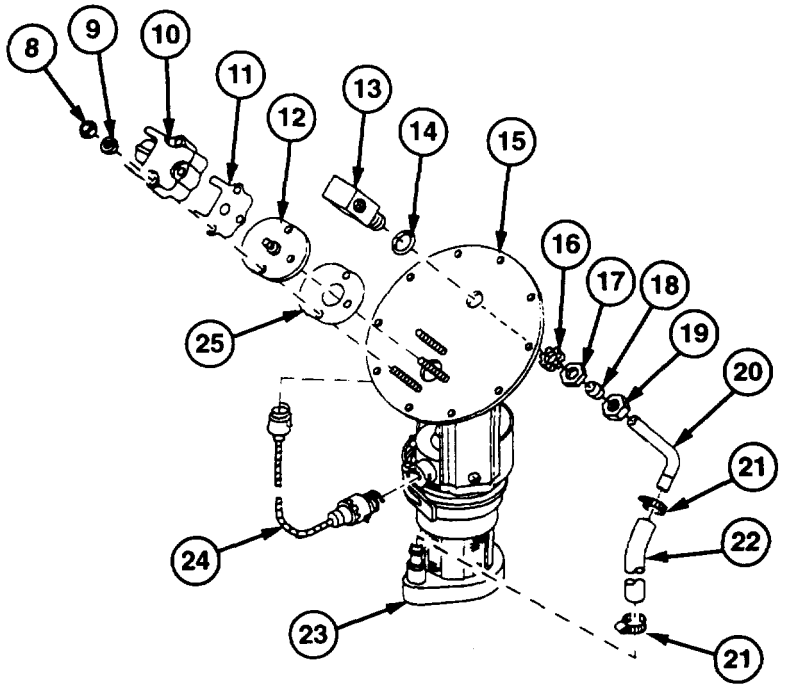


4-3. RIGHT ELECTRIC FUEL PUMP AND CHECK VALVE REPAIR (continued).

b. DISASSEMBLY

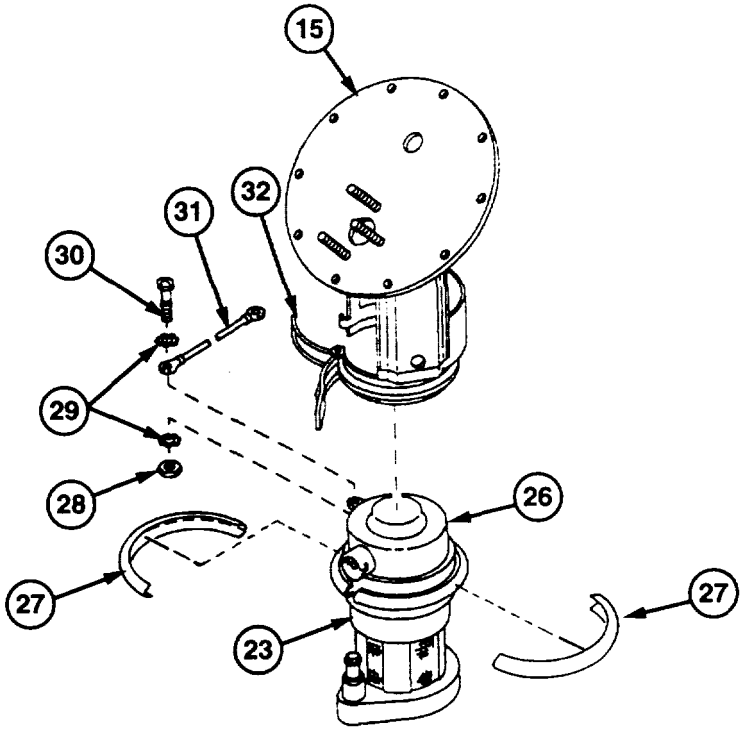
1. Disconnect shielded electrical cable (24) from right electric fuel pump (23) and plate (12).
2. Remove three nuts (8) and lockwashers (9), connector assembly (10), gasket (11), plate (12), and gasket (25) from access cover (15). Discard lockwashers and gaskets.
3. Remove nut (19), sleeve (18), and pipe (20) from elbow (13). Discard sleeve.
4. Remove nut (17), lockwasher (16), preformed packing (14), and elbow (13) from access cover (15). Discard preformed packing and lockwasher.
5. Remove clamp (21) and hose (22) from fuel pump (23).
6. Remove clamp (21) from hose (22) and pipe (20). Separate hose (22) from pipe (20).



4-3. RIGHT ELECTRIC FUEL PUMP AND CHECK VALVE REPAIR (continued).

7 Open latch (32) and separate fuel pump (23), two retainers (27), and rubber mount (26) from access cover (15).

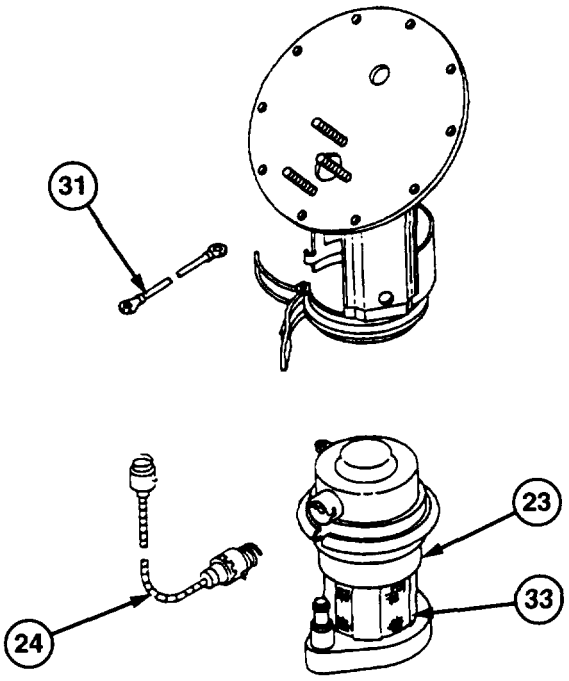
8. Remove two screws (30) and nuts (28), four lockwashers (29), and ground lead (31) from access cover (15) and fuel pump (23). Discard lockwashers.



4-3. RIGHT ELECTRIC FUEL PUMP AND CHECK VALVE REPAIR (continued).

c. INSPECTION

1. Inspect fuel pump (23) housing. Replace if damaged or defective.
2. Inspect fuel pump inlet screens (33). Clean if clogged.
3. Inspect electrical cable (24). Replace if frayed or damaged.
4. Test electrical cable (24) for continuity. Replace if shorted or defective.
5. Test ground lead (31) for continuity. Replace if defective.



4-3. RIGHT ELECTRIC FUEL PUMP AND CHECK VALVE REPAIR (continued).

6. Inspect connector assembly (10). Replace if damaged or deteriorated.

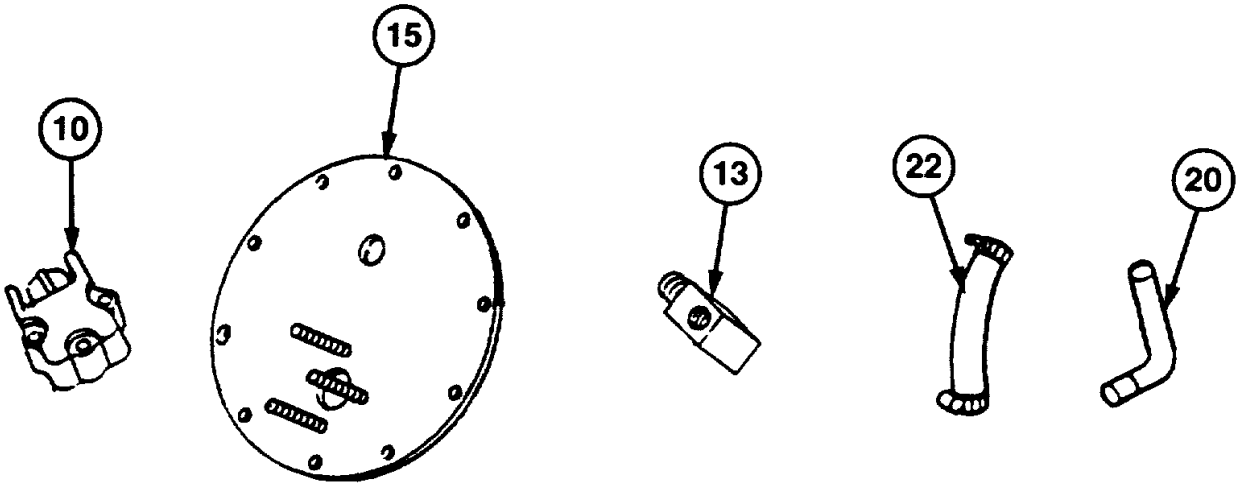
7. Test connector assembly (10) for continuity. Replace if shorted or defective.

8. Inspect access cover (15). Replace if damaged or defective.

9. Inspect elbow (13). Replace if damaged or defective.

10. Inspect hose (22) and pipe (20). Replace if cracked or deteriorated.

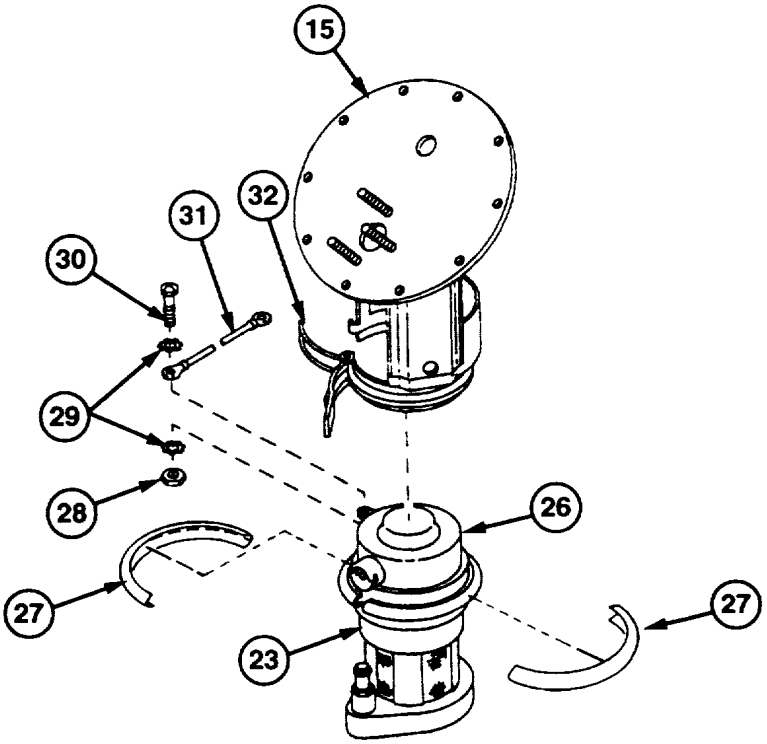
11. Inspect all other components for damage. Replace if damaged.



d. ASSEMBLY

1. Install ground lead (31) on access cover and fuel pump (23) with two screws (30), new lockwashers (29), and two nuts (28).

2. Install fuel pump (23), two retainers (27), rubber mount (26) in access cover (15), close latch (32).



4-3. RIGHT ELECTRIC FUEL PUMP AND CHECK VALVE REPAIR (continued).

3. Install hose (22) on pipe (20) with clamp (21).

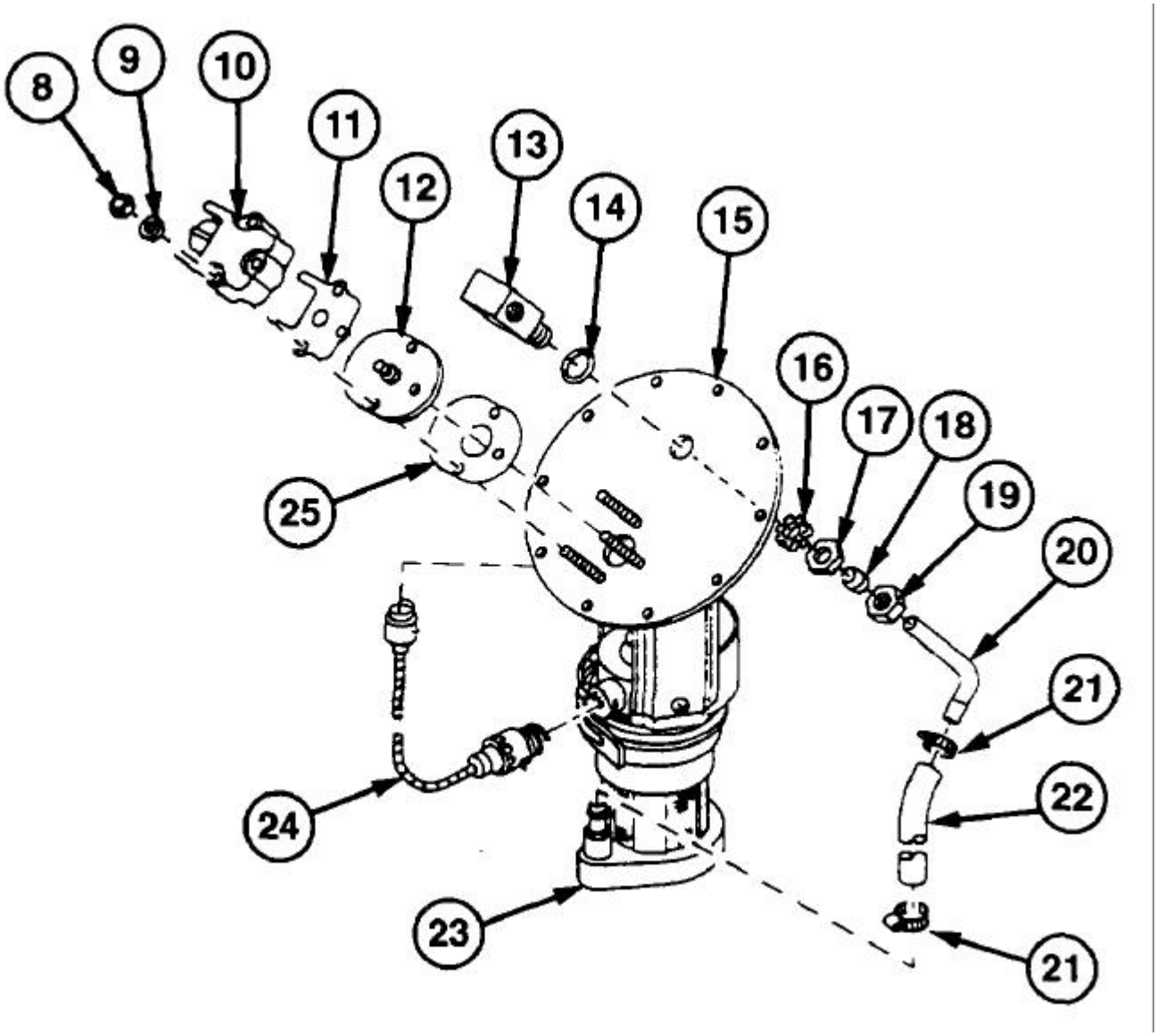
4. Install hose (22) on fuel pump (23) with clamp (21).

5. Install elbow (13) and new preformed packing (14) on access cover (15) with new lockwasher (16) and nut (17).

6. Install new sleeve (18) and pipe (20) on elbow (13) with nut (19).

7. Install new gasket (25), plate (12), new gasket (11), and connector assembly (10) on access cover (15) with three new lockwashers (9) and nuts (8).

8 Connect electrical cable (24) to connector assembly (10) and fuel pump (23).



4-3. RIGHT ELECTRIC FUEL PUMP AND CHECK VALVE REPAIR (continued).

e. INSTALLATION

1. Apply Teflon pipe sealant to new gasket (3).

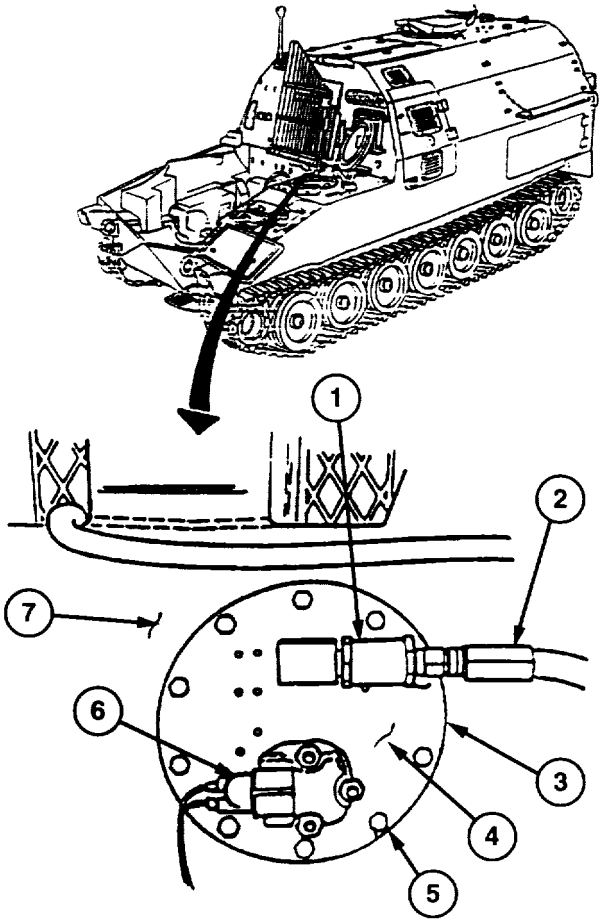
NOTE

When installed on fuel tank 10955510, if the fuel pump touches the bottom surface of fuel tank and the top plate does not seal on flange, loosen the screws on both sides and make the fuel pump and hanger assembly shorter by the amount of gap (measured without gasket) between flange and top plate plus 1/8 inch maximum. Retighten both screws and install pump and hanger assembly (and gasket).

2. Install gasket (3) and fuel pump assembly (4) on fuel tank (7) with 10 screws (5).

3. Install check valve (1) on fuel pump assembly (4) and connect fuel hose (2).

4. Connect electrical connector (6) to fuel pump assembly (4).



FOLLOW-ON MAINTENANCE:

- Install powerpack (para 3-2).
- Refill fuel tanks (refer to TM 9-2350-287-10).

4-4 LEFT ELECTRIC FUEL PUMP AND CHECK VALVE REPAIR.

This Task Covers:

a. Removal
b. Disassembly
c. Inspection
d. Assembly
e. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I).

Materials/Parts:
- Teflon pipe sealant (Item 63, Appendix D)
- Gasket (Item 66, Appendix H)
- Gasket (Item 84.1, Appendix H)
- Gasket (Item 84.2, Appendix H)
- Lockwasher (4) (Item 134, Appendix H)
- Lockwasher (3) (Item 161, Appendix H)
- Lockwasher (Item 189.1, Appendix H)
- Preformed packing (Item 227.1, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Fuel system drained (para 4-2).
- Engine compartment access cover removed (para 15-16).

a. REMOVAL

1. Disconnect electrical connector (3) from fuel pump assembly (5).
2. Remove fuel hose (8), check valve (1), and elbow (2) from fuel pump assembly (5).
3. Remove 10 screws (6), fuel pump assembly (5), and gasket (7) from fuel tank (4). Discard gasket.

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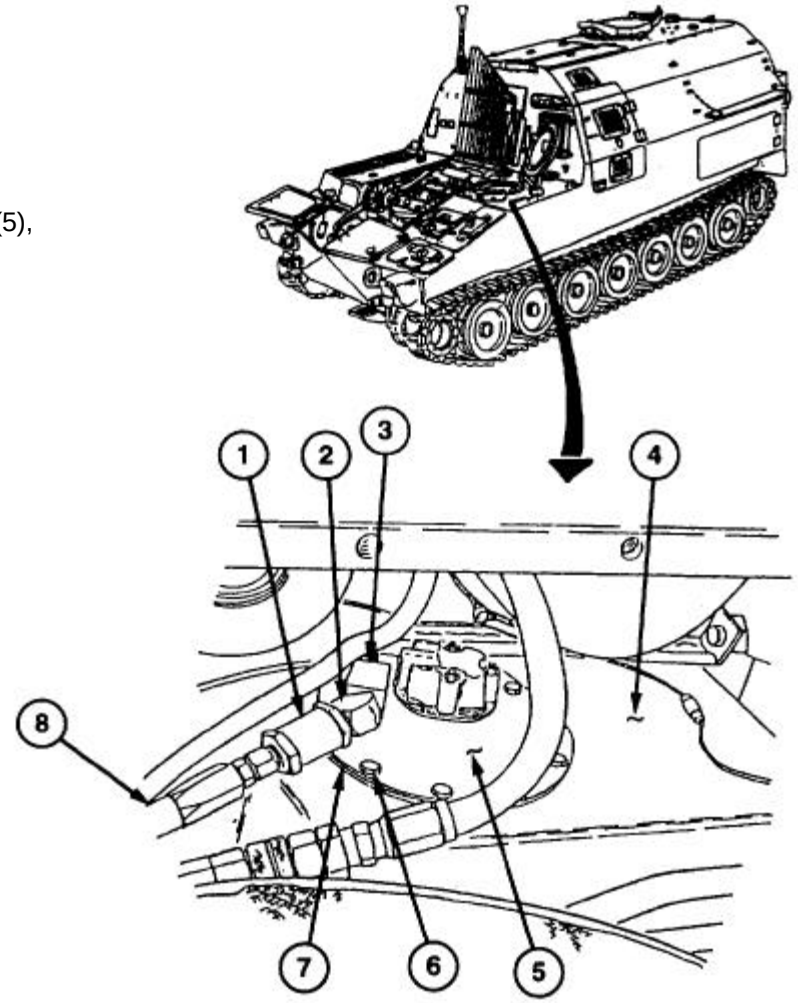
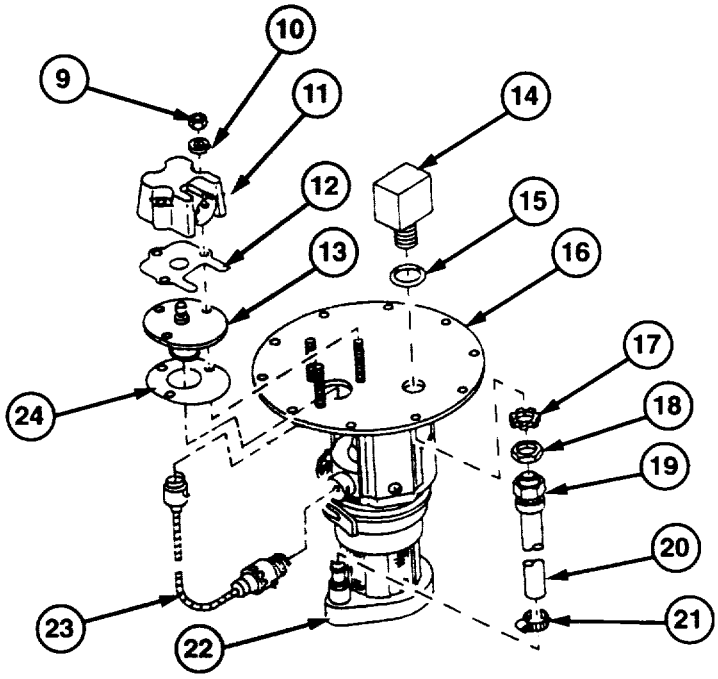


4-4. LEFT ELECTRIC FUEL PUMP AND CHECK VALVE REPAIR (continued).

b. DISASSEMBLY

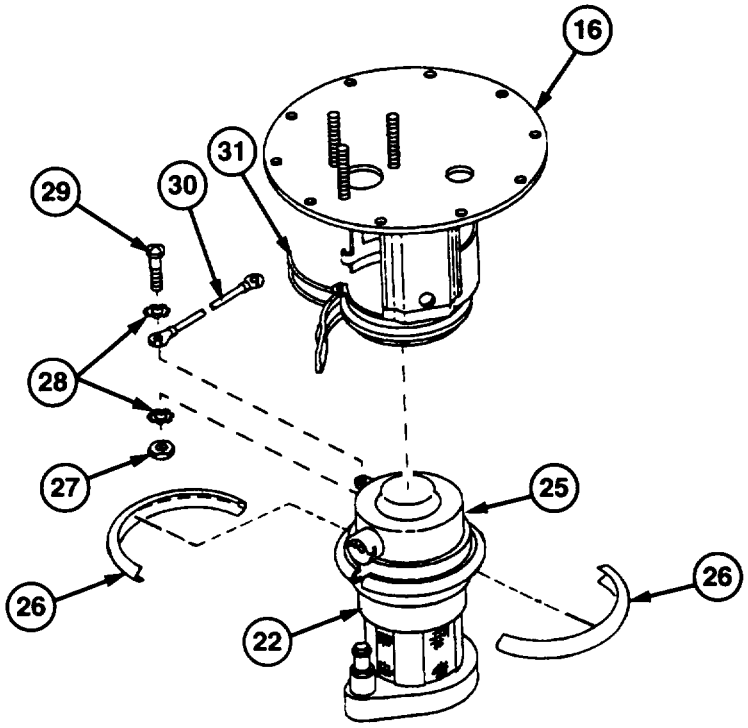
1. Disconnect shielded electrical cable (23) from left electric fuel pump (22) and plate (13).
2. Remove three nuts (9) and lockwashers (10), connector assembly (11), gasket (12), plate (13), and gasket (24) from access cover (16). Discard lockwashers and gaskets.
3. Remove nut (19) and hose (20) from elbow (14).
4. Remove nut (18), lockwasher (17), preformed packing (15), and elbow (14) from access cover (16). Discard preformed packing and lockwasher.
5. Remove clamp (21) and hose (20) from fuel pump (22).



4-4. LEFT ELECTRIC FUEL PUMP AND CHECK VALVE REPAIR (continued).

6. Open latch (31) and separate fuel pump (22), two retainers (26), and rubber mount (25) from access cover (16).

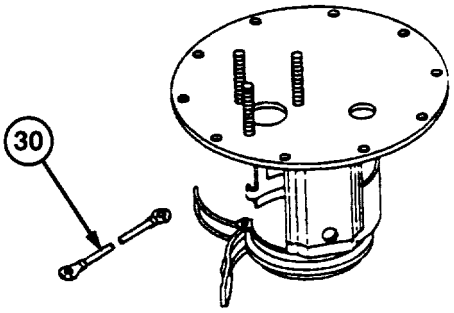
7. Remove two screws (29) and nuts (27), four lockwashers (28), and ground lead (30) from access cover (16) and fuel pump (22). Discard lockwashers.

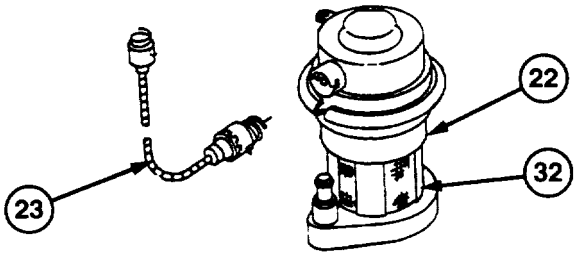


4-4. LEFT ELECTRIC FUEL PUMP AND CHECK VALVE REPAIR (continued).

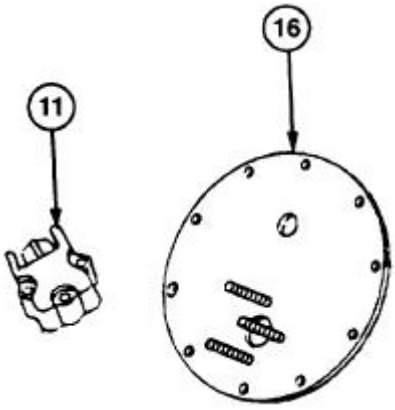
c. INSPECTION

1. Inspect fuel pump (22) housing. Replace if damaged or defective.
2. Inspect fuel pump inlet screens (32). Clean if clogged.
3. Inspect electrical cable (23). Replace if frayed or damaged.
4. Test electrical cable (23) for continuity. Replace if shorted or defective.
5. Test ground lead (30) for continuity. Replace if defective.





6. Inspect connector assembly (11). Replace if damaged or deteriorated.
7. Test connector assembly (11) for continuity. Replace if shorted or defective.
8. Inspect access cover (16). Replace if damaged or defective.

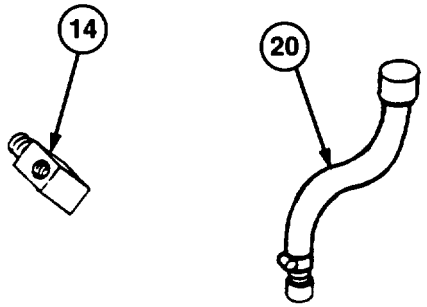


4-4. LEFT ELECTRIC FUEL PUMP AND CHECK VALVE REPAIR (continued).

9. Inspect elbow (14). Replace if damaged or defective.

10. Inspect hose (20). Replace if cracked or deteriorated.

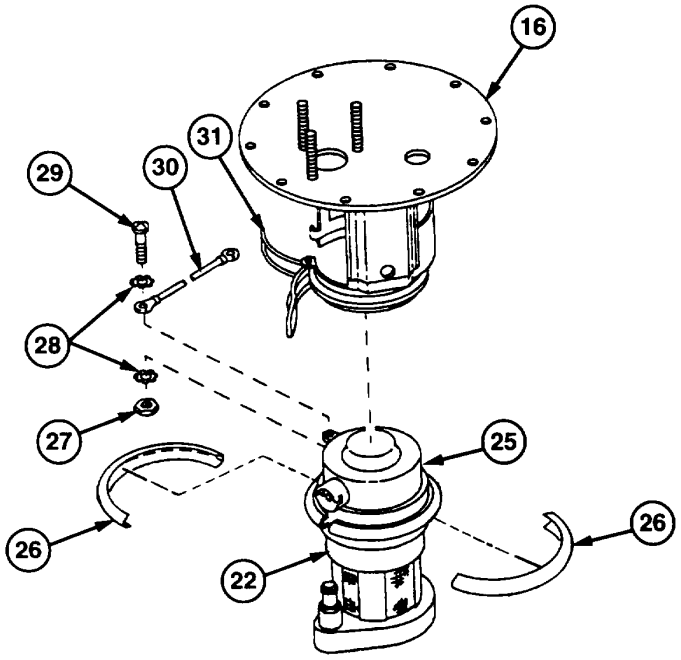
11. Inspect all other components for damage. Replace if damaged.



d. ASSEMBLY

1. Install ground lead (30) on access cover (16) and fuel pump (22) with two screws (29), four new lockwashers (28), and two nuts (27).

2 Install fuel pump (22), two retainers (26), and rubber mount (25) in access cover (16), and close latch (31).



4-4. LEFT ELECTRIC FUEL PUMP AND CHECK VALVE REPAIR (continued).

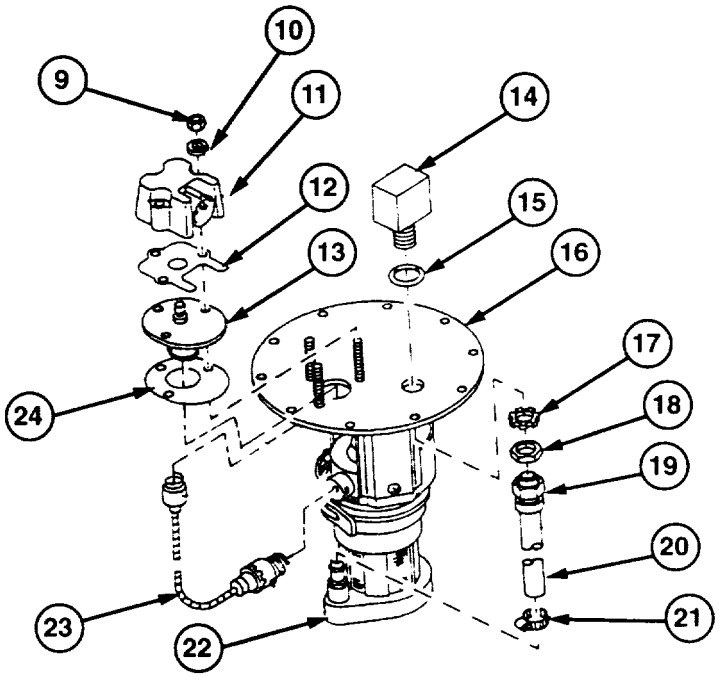
3. Install hose (20) on fuel pump (22) with clamp (21).

4. Install elbow (14) and new preformed packing (15) on access cover (16) with new lockwasher (17) and nut (18).

5. Install hose (20) on elbow (14) with nut (19).

6. Install new gasket (24), plate (13), new gasket (12), and connector assembly (11) on access cover (16) with three new lockwashers (10) and nuts (9).

7. Connect electrical cable (23) to connector assembly (11) and fuel pump (22).



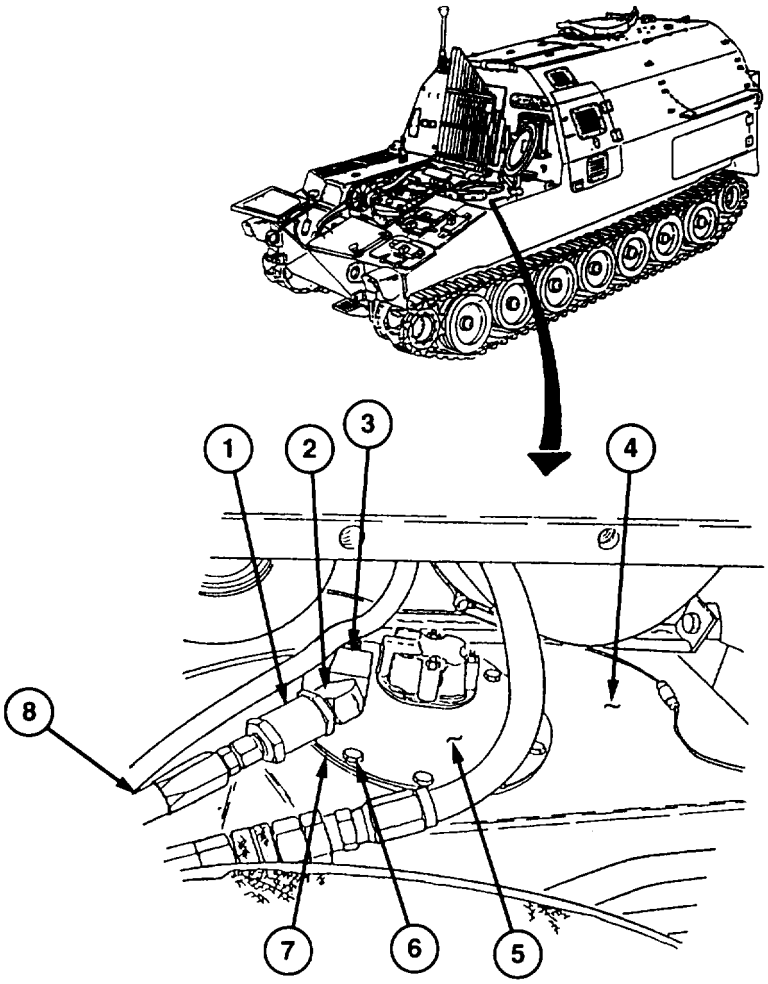
4-4. LEFT ELECTRIC FUEL PUMP AND CHECK VALVE REPAIR (continued).

e. INSTALLATION

1. Apply Teflon pipe sealant to new gasket (7) before installation, and install gasket (7) and fuel pump assembly (5) on fuel tank (4) with 10 screws (6).

2. Install elbow (2), check valve (1), and fuel hose (8) on fuel pump assembly (5).

3. Connect electrical connector (3) to fuel pump assembly (5).



FOLLOW-ON MAINTENANCE:
- Install engine compartment access cover (para 15-16).
- Refill fuel tanks (refer to TM 9-2350-287-10).

4-5. APU CARGO COMPARTMENT FUEL HOSES, PUMPS, AND FITTINGS REPLACEMENT.

This *Task Covers:*

a. Removal

b. Installation

Initial Setup:

Tool/Test Equipment:
- Drain pan (Item 14, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Cap and plug set (Item 13, Appendix D)
- Teflon pipe sealant (Item 63, Appendix D)

Ž Lockwasher (6) (Item 175, Appendix H)

Personnel Required: Two

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Powerpack removed (lower engine compartment fuel line only) (para 3-2).
- Left projectile rack assembly moved to rear of vehicle (refer to TM 9-2350-287-10).
- Heating and ventilating duct removed (para 16-2).
- APU plenum removed (para 18-17).
- Engine compartment access cover removed (para 15-16).

a. REMOVAL

WARNING

Diesel fuel is flammable. Do not perform this procedure near fire, flame, or sparks. injury or death to psrsonnel can result.

CAUTION

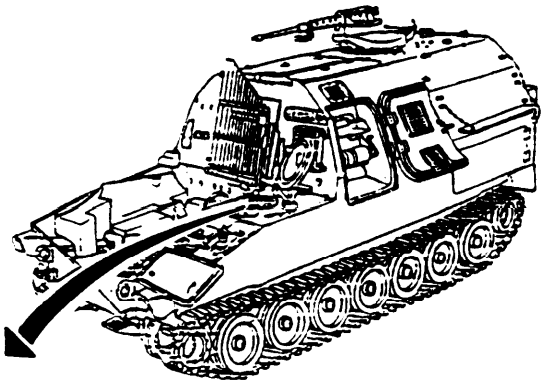
To prevent contamination to fuel system, all hoses and fittings must be capped immediately after disconnection.

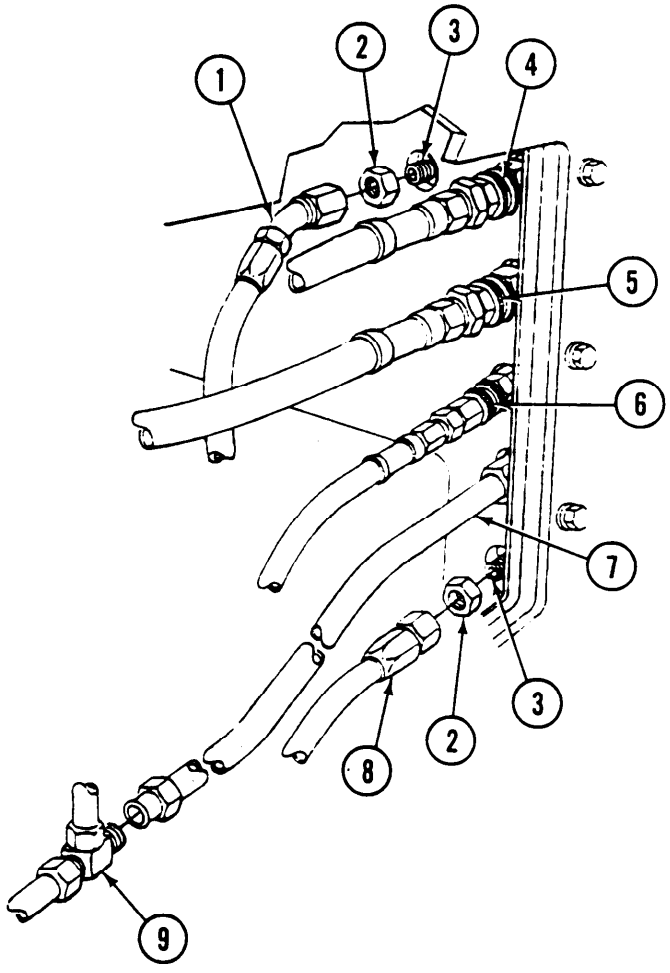
NOTE

- **Drain fuel from disconnected fuel lines into drain pan.**
- **Perform steps 1 through 4 for lower engine compartment fuel line and fittings only.**

4-5. APUCARGO COMPARTMENT FUEL HOSES, PUMPS, AND FITTINGS REPLACEMENT (continued).

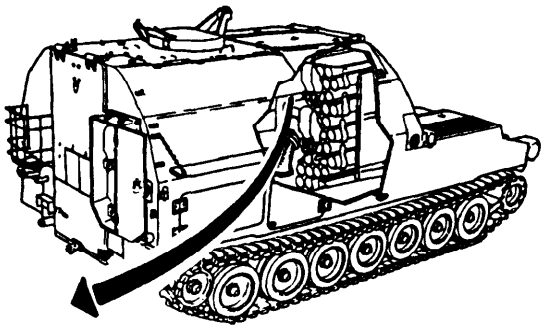
1. In driver's compartment, disconnect three hydraulic quickdisconnects (4, 5, and 6) from engine compartment wall.
2. Disconnect AFES tube (7) from engine compartment wall and tee (9).
3. Disconnect hose assembly (8) from adapter (3).
4. Disconnect hose assembly (1) from adapter (3).
5. Remove two nuts (2) from adapters (3).

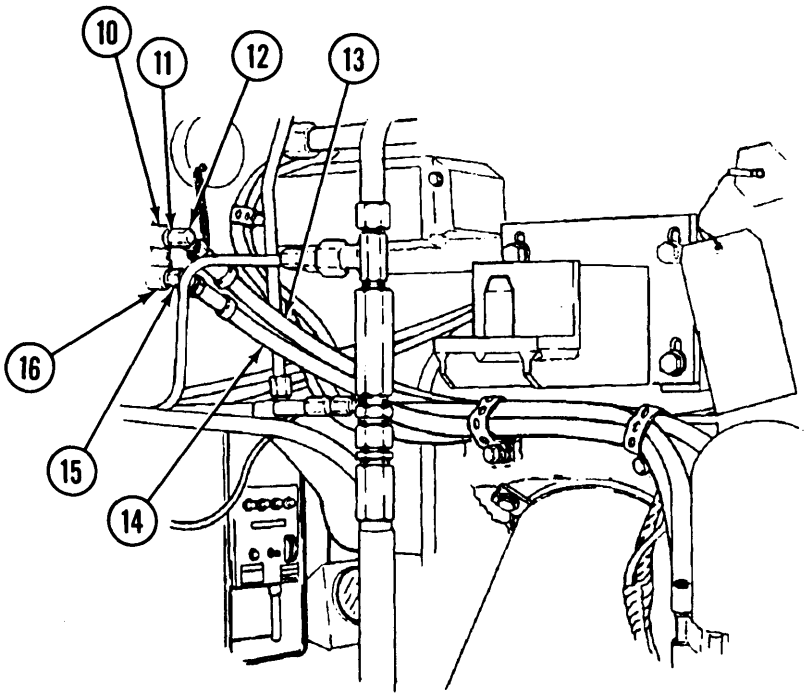




6. In crew compartment, disconnect hose assembly (13) from elbow (1 2).
7.. Remove elbow (12) and loop of APU heater vent cap chain (11) from adapter (10) in APU compartment wall.

4-5. APU CARGO COMPARTMENT FUEL HOSES, PUMPS, AND FITTINGS REPLACEMENT (continued).



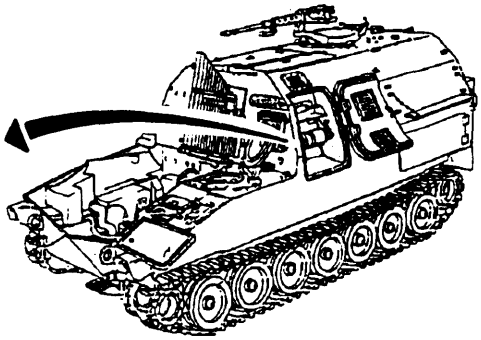


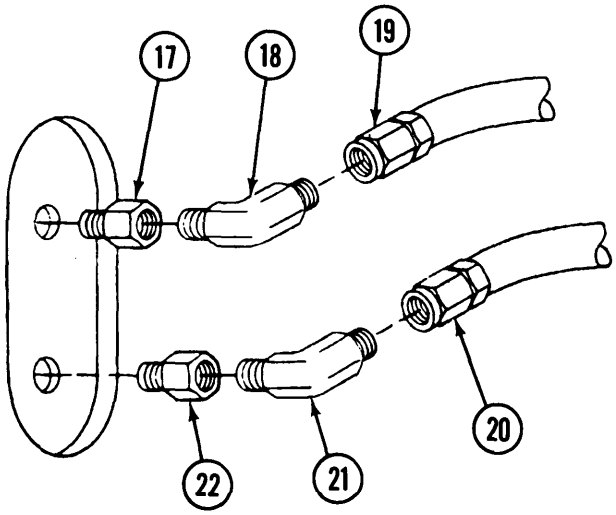
8. Disconnect hose assembly (14) from elbow (15).

9. Remove elbow (15) from adapter (16).

10. In APU compartment, remove two hoses (19 and 20) and elbows (18 and 21) from adapters (17 and 22).

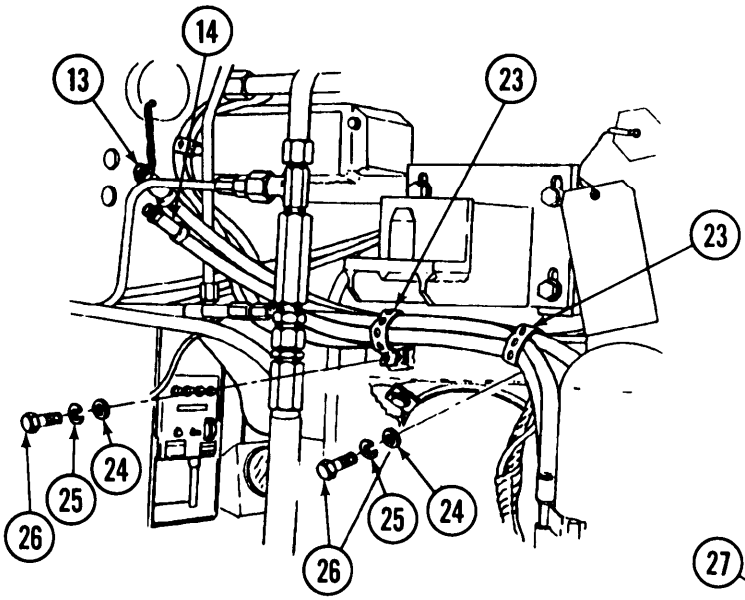
11. Remove two adapters (17 and 22) from bulkhead.





4-5. APUCARGO COMPARTMENT FUEL HOSES, PUMPS, AND FITTINGS REPLACEMENT (continued).

12. Remove two screws (26), lockwashers (25), washers (24), and straps (23) securing hose assemblies (13 and 14) to crew compartment wall. Discard lockwashers.



13. Disconnect hose assembly (33) from tee (27).

14. Disconnect hose assembly (32) from tee (27) at quick disconnect (31).

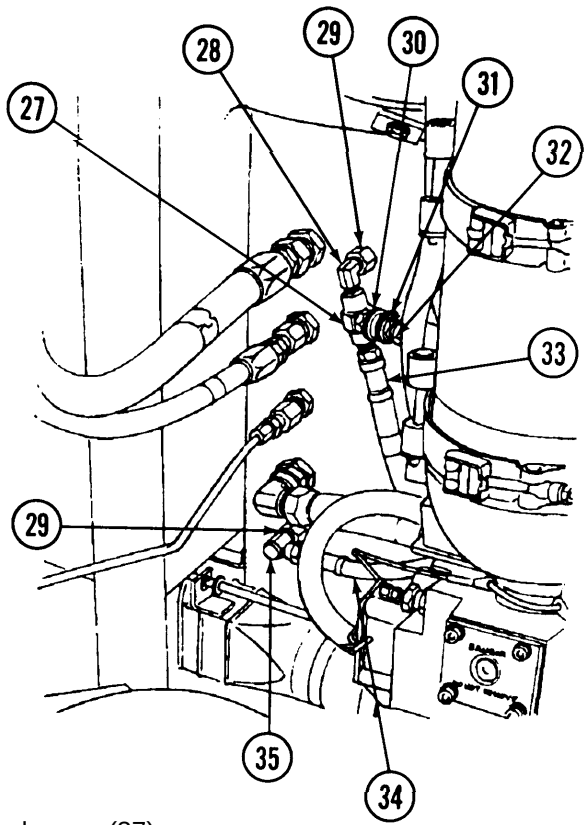
15. Remove tee (27), quick-disconnect coupling half (30), elbow (28), and adapter (29) from bulkhead.

16. Remove quick-disconnect coupling half (30), tee (27), and adapter (29) from elbow (28).

17. Disconnect hose assembly (34) from elbow (35).

18. Remove elbow (35) and adapter (29) from bulkhead.

19. Remove elbow (35) from adapter (29).



20. Disconnect hose assembly (33) from elbow (43) on fuel pump (37).

21. Disconnect hose assembly (40) from elbow (30) on fuel pump (37).

22. Disconnect hose assembly (8) from elbow (41) on fuel pump (39).

23. Disconnect hose assembly (40) from elbow (42) on fuel pump (39).

4-5. APU CARGO COMPARTMENT FUEL HOSES, PUMPS, AND FITTINGS REPLACEMENT (continued).

24. Disconnect two electrical connectors (36) from two fuel pumps (37 and 39).

25. Remove four screws (44), lockwashers (45), and two fuel pumps (37 and 39) from bulkhead. Discard lockwashers.

26. Remove two elbows (38 and 43) from fuel pump (37), and two elbows (41 and 42) from fuel pump (39).

b. INSTALLATION

NOTE

Apply Teflon pipe sealant to male threads of all fittings at installation.

1. Install two elbows (38 and 43) in fuel pump (37), and two elbows (41 and 42) in fuel pump (39).

2. Install two fuel pumps (37 and 39) on bulkhead with four new lockwashers (45) and screws (44).

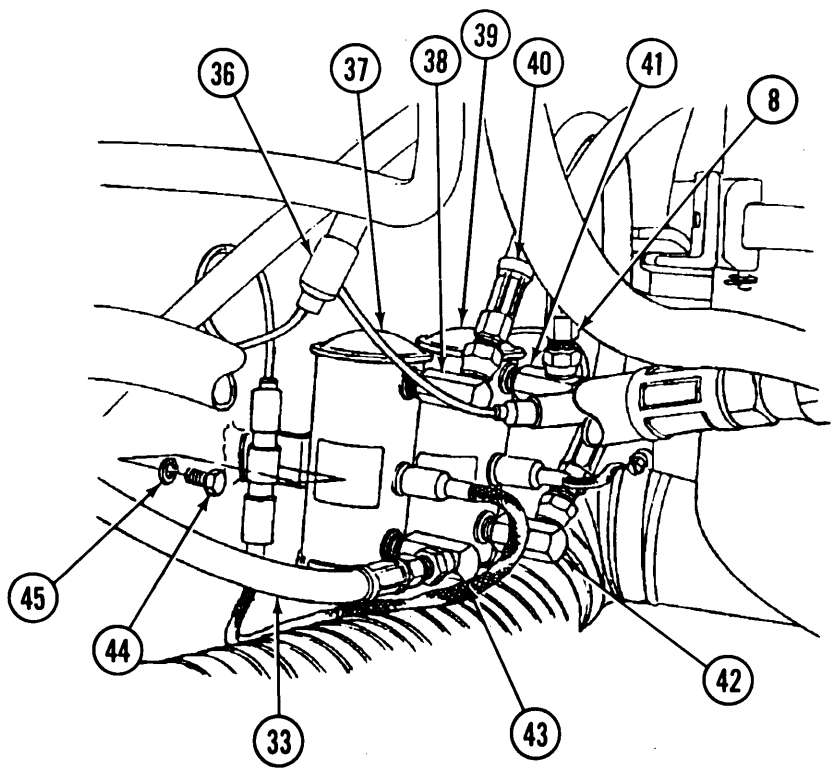
3. Connect two electrical connectors (36) to two fuel pumps (37 and 39).

4. Connect hose assembly (40) to elbow (42) on fuel pump (39).

5. Connect hose assembly (8) to elbow (41) on fuel pump (39).

6. Connect hose assembly (40) to elbow (38) on fuel pump (37).

7. Connect hose assembly (33) to elbow (43) on fuel pump (37).



4-5. APU CARGO COMPARTMENT FUEL HOSES, PUMPS, AND FITTINGS REPLACEMENT (continued).

8. Install adapter (29) on elbow (35).

9. Install adapter (29) and elbow (35) on bulkhead.

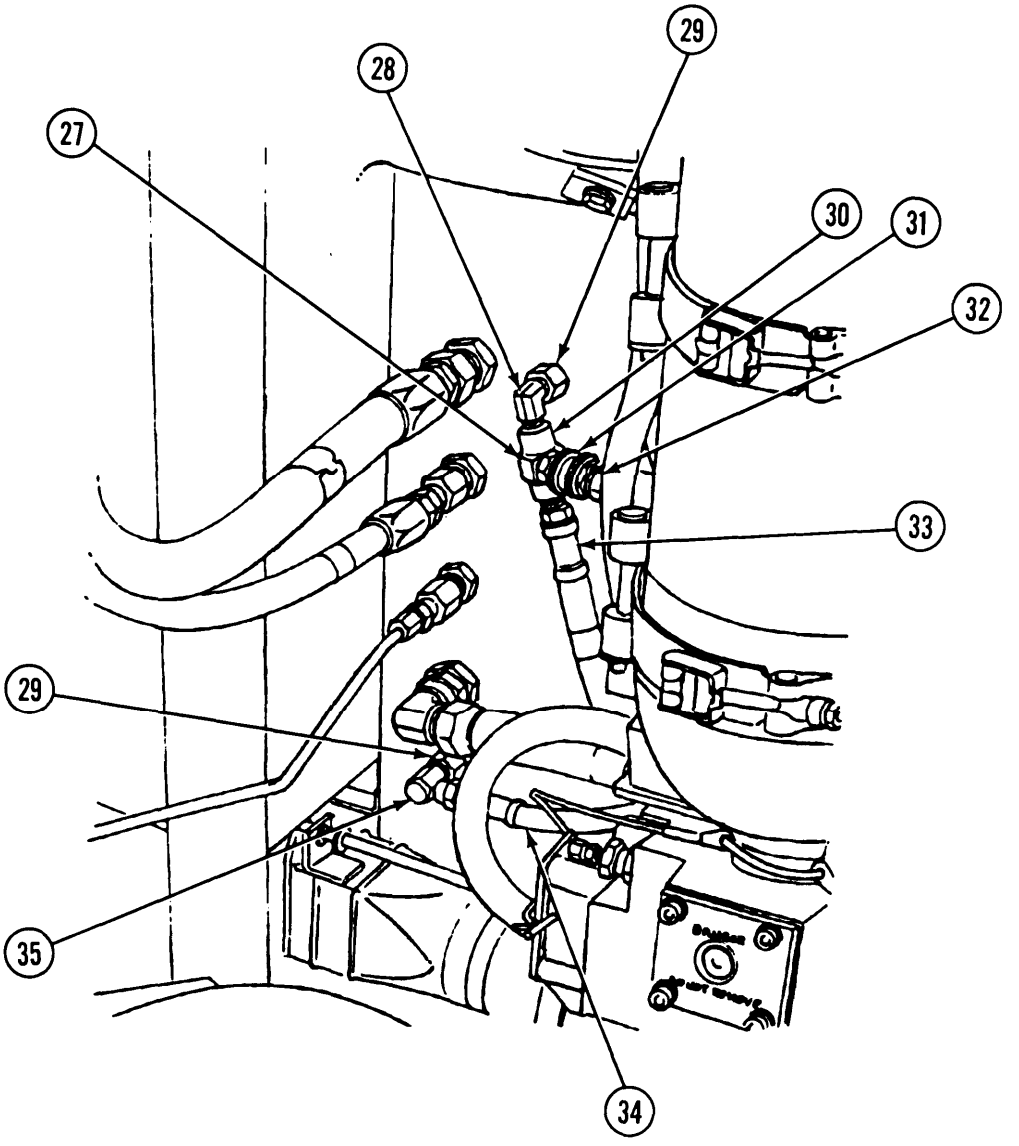
10. Connect hose assembly (34) to elbow (35).

11. Install adapter (29), tee (27), and quick-disconnect coupling half (30) on elbow (28).

12. Install adapter (29), with elbow (28), tee (27), and quick-disconnect coupling half (30) attached, on bulkhead.

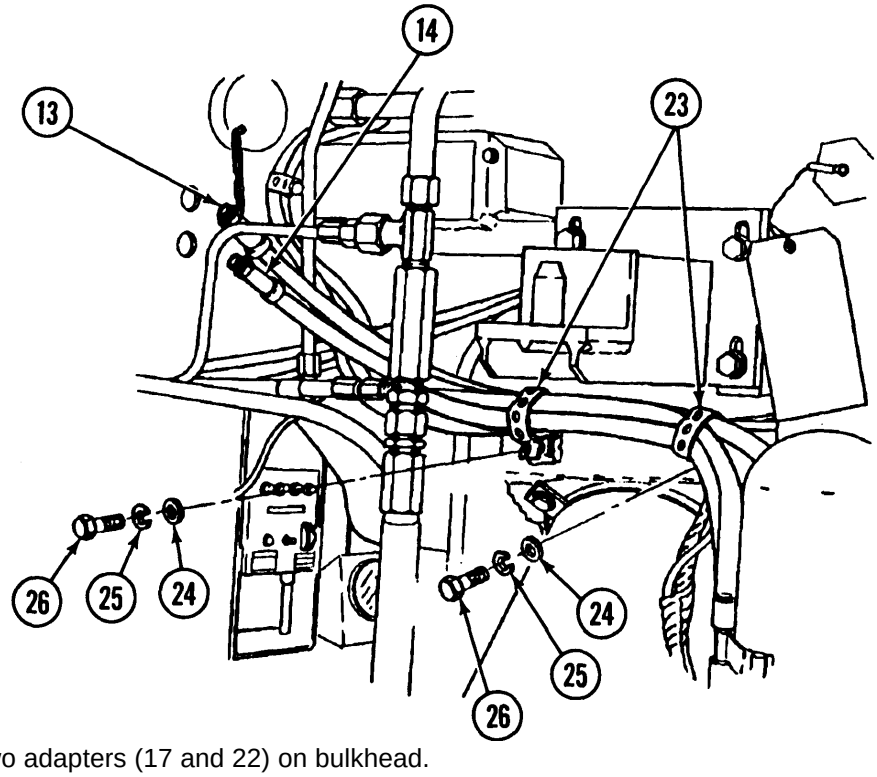
13. Connect hose assembly (32) to tee (27) at quickdisconnect

14. Connect hose assembly (33) to tee (27).



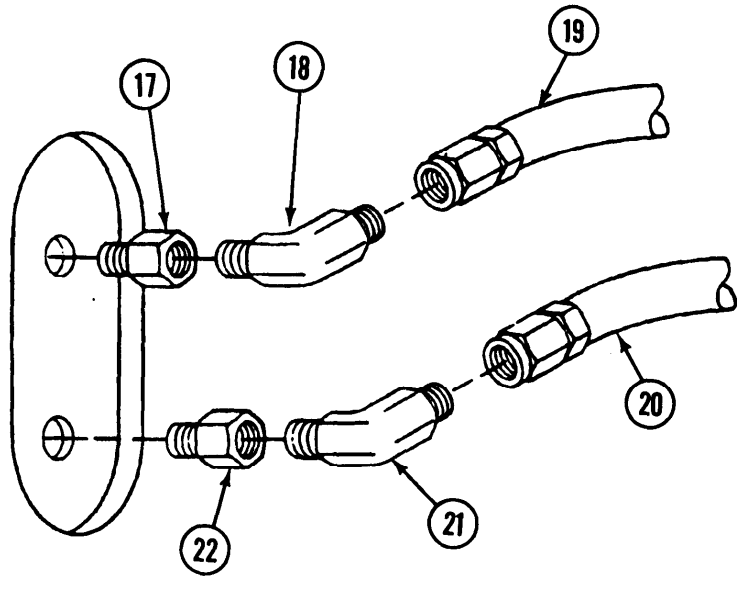
4-5. APU CARGO COMPARTMENT FUEL HOSES, PUMPS, AND FITTINGS REPLACEMENT (continued).

15. Secure hose assemblies (13 and 14) to crew compartment wall with two straps (23), washers (24), new lockwashers (25), and screws (26).



16. Install two adapters (17 and 22) on bulkhead.

17. In APU compartment, install two elbows (18 and 21) and hoses (19 and 20) on adapters (17 and 22).



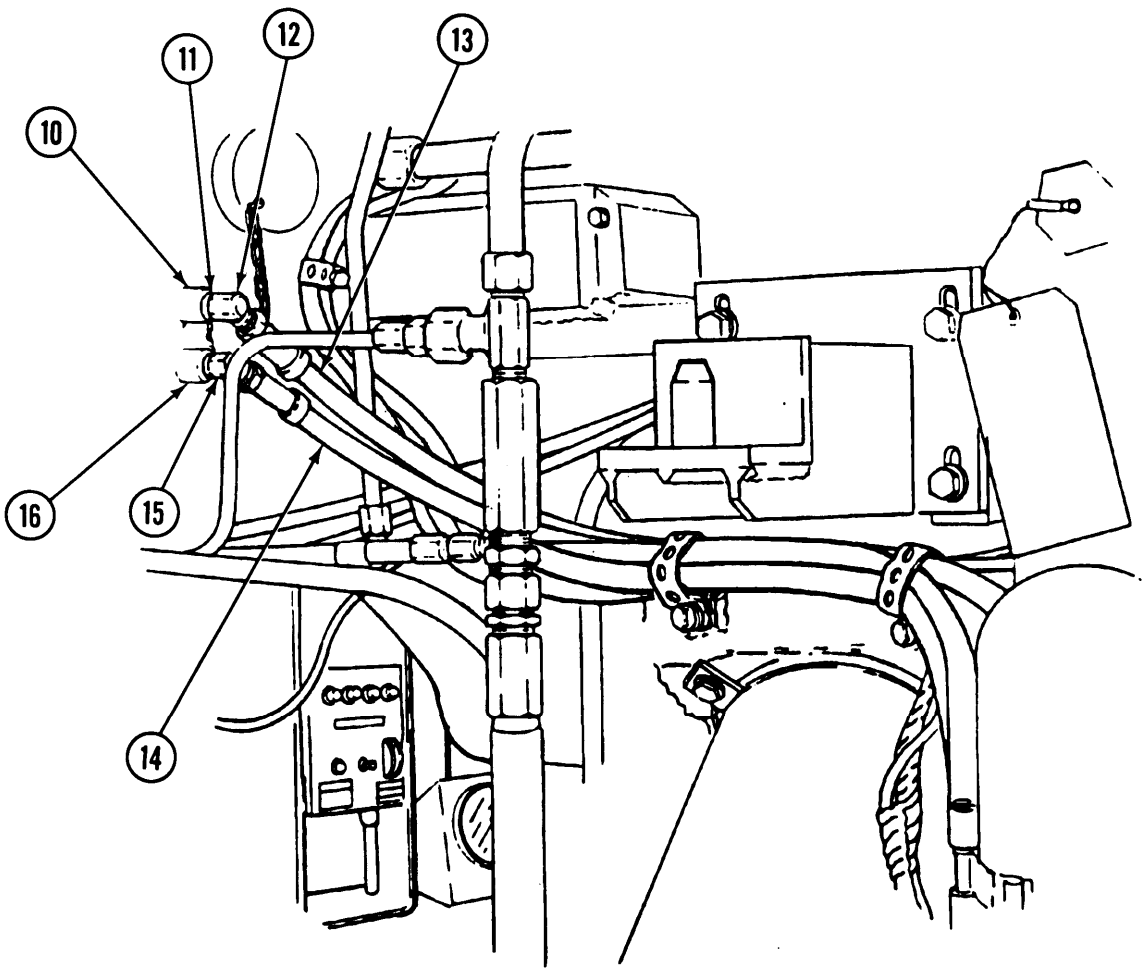
4-5. APU CARGO COMPARTMENT FUEL HOSES, PUMPS, AND FITTINGS REPLACEMENT (continued).

18. Install elbow (15) on adapter (16).

19. Connect hose assembly (14) to elbow (15).

20. Install loop of APU heater vent cap chain (11) and elbow (12) on adapter (10)

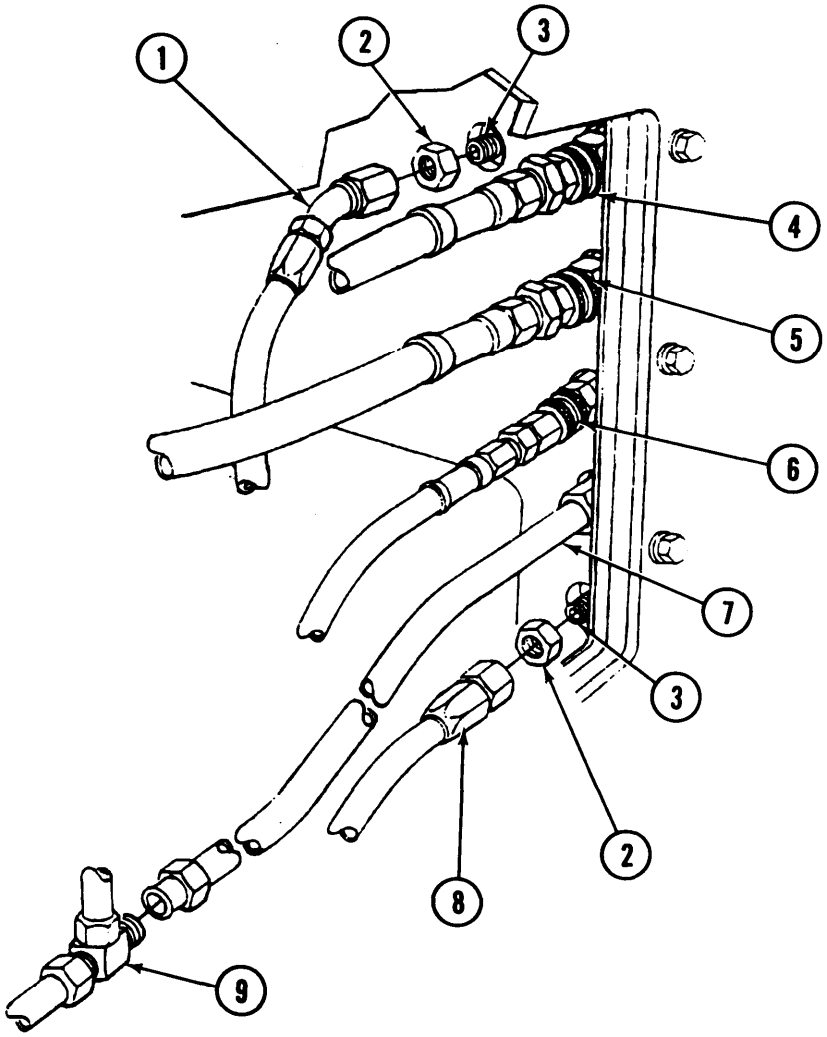
21. Connect hose assembly (13) to elbow (1 2).



22. While assistant holds two adapters (3) in place, install two nuts (2) on adapters (3).

23. Connect hose assembly (1) to adapter (3).

4-5. APU CARGO COMPARTMENT FUEL HOSES, PUMPS, AND FITTINGS REPLACEMENT (continued).



NOTE

Perform steps 24 through 26 only if lower engine compartment fuel line was removed.

24. Connect hose assembly (8) to adapter (3).

25. Connect AFES tube (7) to engine compartment wall **and** tee (9).

26. Connect three hydraulic quick disconnects (4, 5, and 6) to engine compartment wall.

4-6. PERSONNEL HEATER FUEL PUMP REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- Drain pan (Item 14, Appendix I)
- General mechanic's tool kit(Item *24,* Appendix I)

Materials/Parts:
- Drycleaning solvent (Item *28,* Appendix D)
- Rag (Item *56,* Appendix D)
- Teflon pipe sealant (Item 63, Appendix D)
- Lockwasher *(2)* (Item 175, Appendix H)

Equipment Conditions:
- Left and right projectile rack assemblies moved to rear of vehicle (refer to TM 9-2350-287-1O).
- Numbers 1 and 2 engine AFES cylinder bottles removed (para *21 -4).*
- Numbers 1 and 2 engine AFES cylinder bottle bracket straps, brackets, and mounts removed (para 21 -8).

a. REMOVAL

WARNING

- **Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open flame. When working where fuel is present, post signs that read "No Smoking Within 50 Feet of Vehicle."**
- **In the event of fire in the engine or crew compartment, be prepared to use the portable fire extinguisher and/or manually operate the automatic fire extinguisher system (AFES).**

1. Position drain pan under fuel inlet quick-disconnect hose (2), Disconnect fuel inlet quick-disconnect hose (2) from tee (l).
2. Disconnect electrical connector (10) from fuel pump connector (11).
3. Remove fuel inlet quick-disconnect hose (2) from fuel pump adapter (9).
4. Disconnect fuel filter hose (8) from fuel pump adapter (7).
5. Remove two screws (6) and Iockwashers (5), clamp (4), and fuel pump (12) from forward bulkhead (3). Discard Iockwashers.
6. Remove adapter (7 and 9) from fuel pump (1 2).

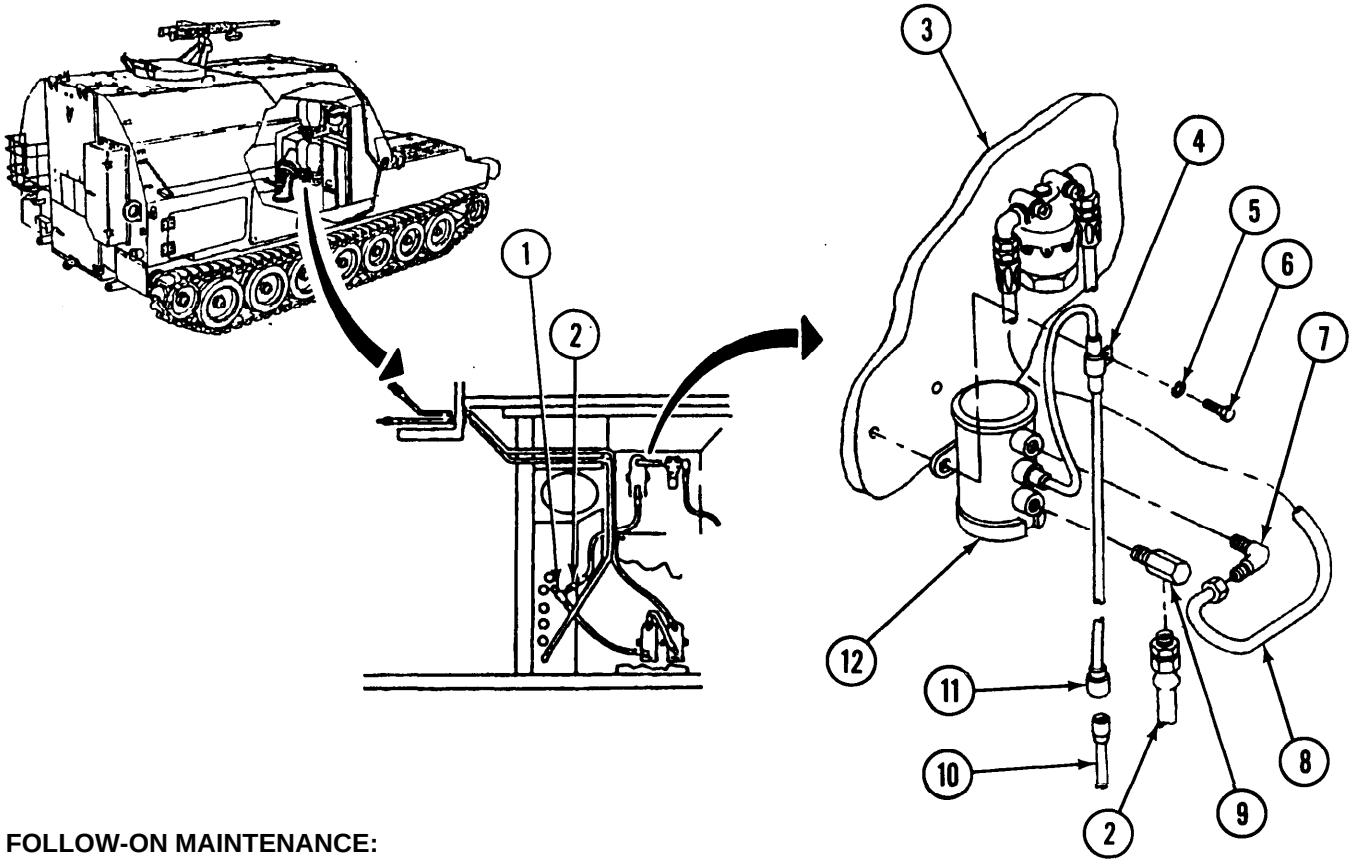
4-6. PERSONNEL HEATER FUEL PUMP REPLACEMENT (continued).

b. INSTALLATION

WARNING

Adhesives and sealing compounds can burn easily and can give off harmful vapor. To avoid injury, keep adhesives and sealing compounds away from open fire and use in a well-ventilated area.

1. Apply thin coat of Teflon pipe sealant to threads of adapters (7 and 9).
2. Install adapters (7 and 9) in fuel pump (12).
3. Position fuel pump (12) and clamp (4) on forward bulkhead (3) and secure with two screws (6) and new lockwashers (5).
4. Install fuel inlet quick-disconnect hose (2) to adapter (9) and fuel filter hose (8) to adapter (7),
5. Connect electrical connector (10) to fuel pump connector (11).
6. Install fuel inlet quick-disconnect hose (2) to tee (1).



FOLLOW-ON MAINTENANCE:

- Perform operational check of heating and ventilating system (refer to TM 9-2350-287-10).
- Install numbers 1 and 2 engine AFES cylinder bottle bracket straps, brackets, and mounts (para 21-8).
- Install numbers 1 and 2 engine AFES cylinder bottles (para 21-4).
- Install left and right projectile rack assemblies (refer to TM 9-2350-287-10).

4-7. ENGINE-DRIVEN FUEL PUMP REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Teflon pipe sealant (Item 63, Appendix D)
- Gasket (Item 89, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Air intake grille opened and secured (refer to TM 9-2350-287-10).
- Cross-over exhaust pipe removed (para 3-11).

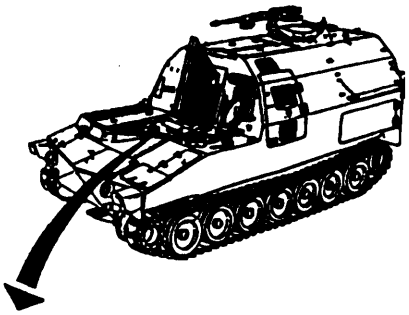
a. REMOVAL

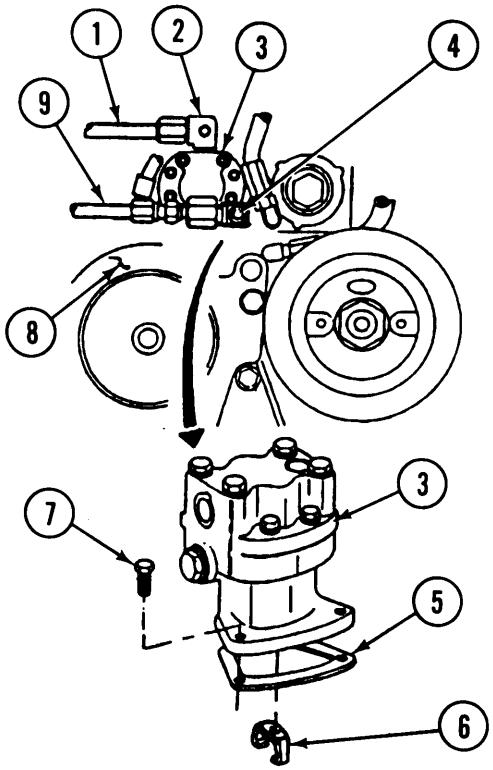
1. Disconnect tube (1) from elbow (2).
2. Disconnect tube (9) from elbow (4).
3. Remove two elbows (2 and 4) from fuel pump (3).

NOTE

When removing fuel pump, use care so fork inside does not fall out.

4. Remove three screws (7), fuel pump (3), gasket (5), and fork (6) from engine (8). Discard gasket.





b. INSTALLATION

1. Install fuel pump (3), new gasket (5), and fork (6) on engine (8) with three screws (7).
2. Apply sealing compound to threads of two elbows (2 and 4) and install elbows (2 and 4) on fuel pump (3).
3. Connect tube (9) to elbow (4).
4. Connect tube (1) to elbow (2).

FOLLOW-ON MAINTENANCE:
- Install cross-over exhaust pipe (para 3-11).
- Close air intake grille (refer to TM 9-2350-287-10).

4-8. ENGINE-DRIVEN FUEL PUMP RELIEF VALVE REPLACEMENT.

This Task Covers:

a. Removal
b. Cleaning and Inspection
c. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Drycleaning solvent (Item 28, Appendix D)
- Gasket (Item 384, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Engine-driven fuel pump removed (para 4-7).

a. REMOVAL

Remove plug (7), gasket (6), pin (5), spring (4), and valve (3) from engine-driven fuel pump (1). Discard gasket.

b. CLEANING AND INSPECTION

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated ares. Avoid contact with skin, eyes, and clothes, and DO NOT use near open flame or excessive heat.

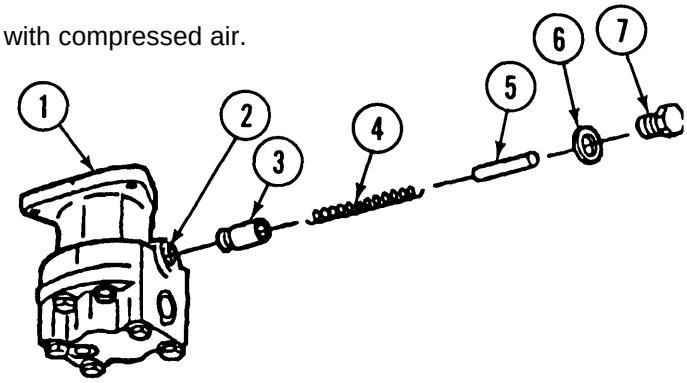
1. Clean all parts with drycleaning solvent.

2. Inspect parts for wear, deformities, or breaks. Replace defective parts.

WARNING

Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with chip guarding and personal protective equipment (goggles/shield, gloves, etc.).

3. Blow out engine-driven fuel pump cavity port (2) with compressed air.



c. INSTALLATION

Install valve (3), spring (4), pin (5), new gasket (6), and plug (7) in engine-driven fuel pump (1).

FOLLOW-ON MAINTENANCE:
- Install engine-driven fuel pump (para 4-7).

4-9. AIR CLEANER DUCTS AND HOSES REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Gasket (Item 58, Appendix H)
- Lockwasher (2) (Item 175, Appendix H)
- Lockwasher (6) (Item 177, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Right projectile rack assembly moved to rear of vehicle (refer to TM 9-2350-287-10).

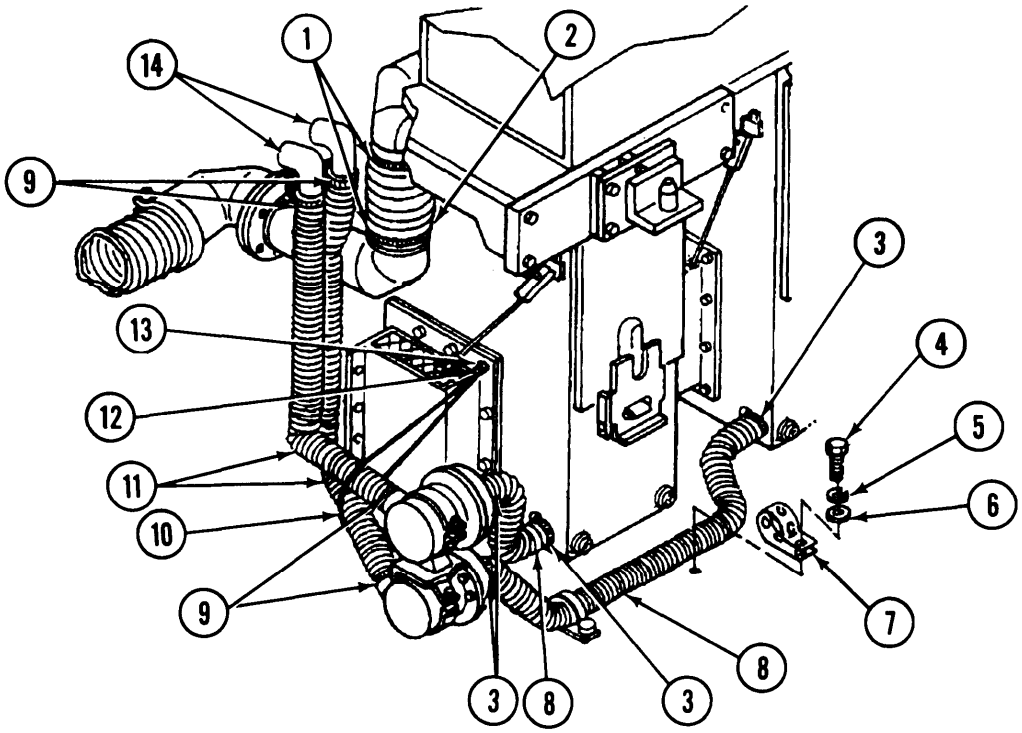
NOTE

Powerpack must be removed if removing elbow duct.

- Powerpack removed (para 3-2).

a. REMOVAL

1. Loosen two hose clamps (1) on hose (2) connecting air cleaner duct to elbow duct.
2. Remove hose (2) connecting air cleaner duct to elbow duct.
3. Remove two screws (4), lockwashers (5), washers (6), and mounting clamps (7) from bulkhead. Discard lockwashers.
4. Loosen four hose clamps (3) on two hoses (8) connecting air cleaner to duct exhaust.



4-9. AIR CLEANER DUCTS AND HOSES REPLACEMENT (continued).

5. Remove two hoses (8) connecting air cleaner to duct exhaust.

6. Loosen four hose clamps (9) on two hoses (11) connecting duct exhaust to elbow (14).

7. Remove nut (12), washer (13), and strap (10) from air cleaner.

8. Remove two hoses (11) connecting duct exhaust to elbow (14).

NOTE

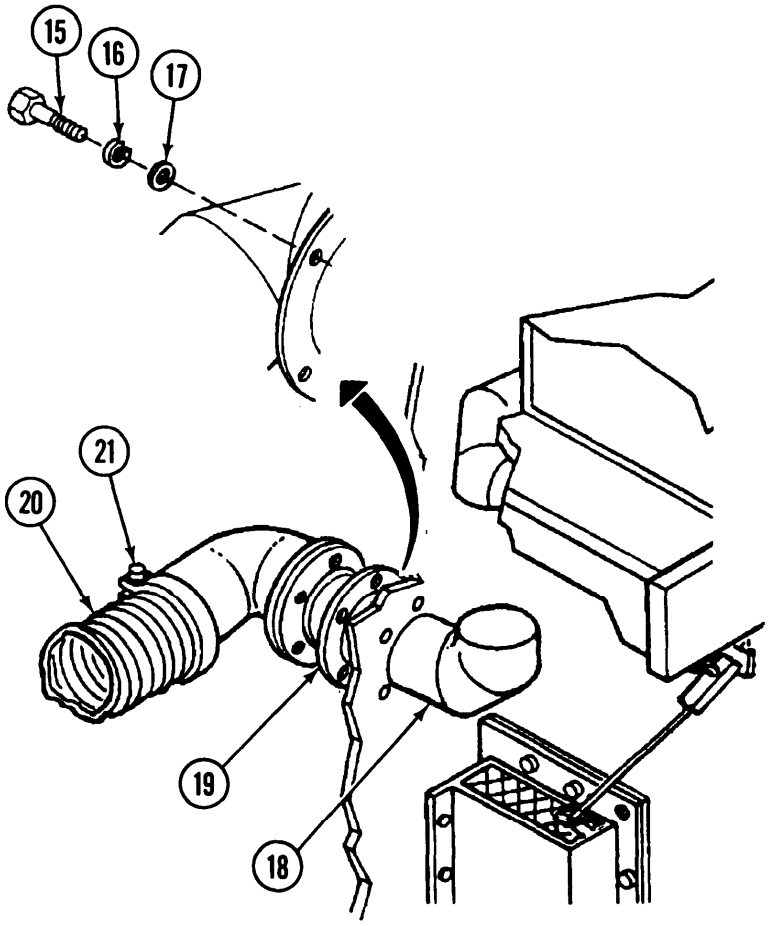
Left air cleaner must be removed to remove elbow duct.

9. Remove left air cleaner (para 4-20).

10. Remove hose clamp (21) and turbocharger air intake duct hose (20) from elbow duct (18).

11. Remove six screws (15), lockwashers (16), and washers (17) from elbow duct (18) and bulkhead. Discard lockwashers.

12. Remove elbow duct (18) through bulkhead and powerpack compartment. Remove and discard gasket (19).



b. INSTALLATION

1. Install new gasket (19) on elbow duct (18).

2. Position elbow duct (18) through bulkhead from powerpack compartment.

3. Secure elbow duct (18) to bulkhead with six screws (15), new lockwashers (16), and washers (17).

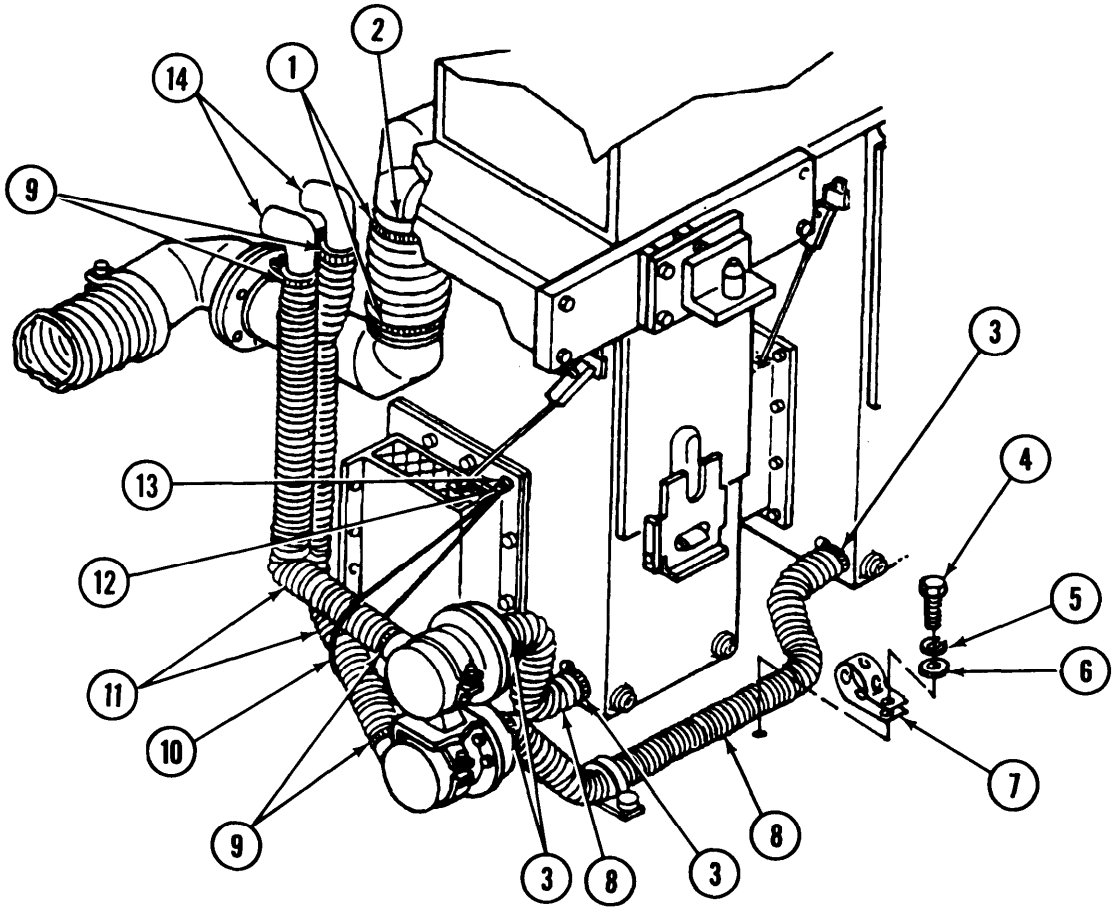
4. Install turbocharger air intake duct hose (20) on elbow duct (18) with hose clamp (21).

4-9. DUCTS AND HOSES REPLACEMENT (continued).

5. Install left air cleaner (para 4-10).

6. Install two hoses (11) connecting duct exhaust to elbow (14), and tighten four hose clamps (9).

7. Install strap (10) with washer (13) and nut (12) on air cleaner.



8. Install two hoses (8) connecting air cleaner to duct exhaust, and tighten four hose clamps (3).

9. Install two mounting clamps (7) on bulkhead with two screws (4), new Iockwashers (5) and washers (6),

10. Install hose (2) connecting air cleaner duct to elbow duct, and tighten two hose clamps (1).

FOLLOW-ON MAINTENANCE:

- Move right projectile rack assembly to front of vehicle (refer to TM 9-2350-287-10).
- Install powerpack (para 3-2).

4-10. AIR CLEANER REPAIR.

This Task Covers:

a. Removal
b. Disassembly
c. Cleaning and Inspection
d. Assembly
e. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- Crowbar (Item 12, Appendix I)

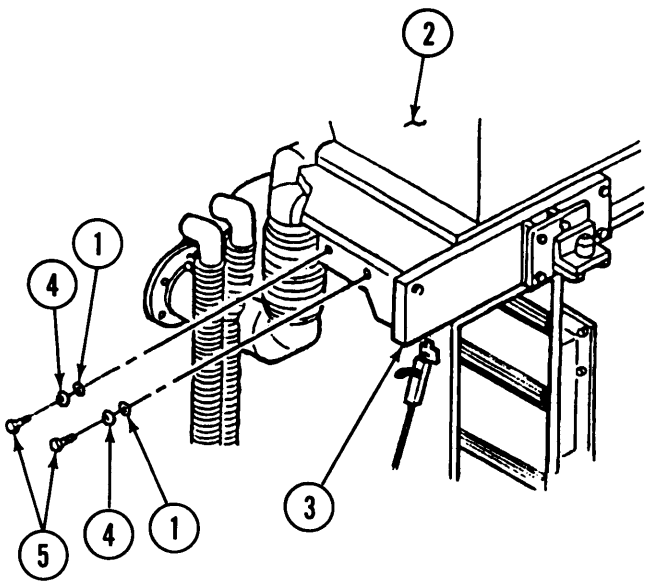
Materials/Parts:
- Drycleaning solvent (Item 28, Appendix D)
- Rag (Item 56, Appendix D)
- Rubber adhesive (Item 4, Appendix D)
- Gasket (2) (Item 55, Appendix H)
- Gasket (2) (Item 56, Appendix H)
- Gasket (2) (Item 68, Appendix H)
- Gasket (2) (Item 69, Appendix H)
- Lockwasher (20) (Item 163, Appendix H)
- Lockwasher (4) (Item 164, Appendix H)
- Lockwasher (8) (Item 177, Appendix H)
- Seal (2) (Item 268, Appendix H)
- Self-locking nut (28) (Item 315, Appendix H)

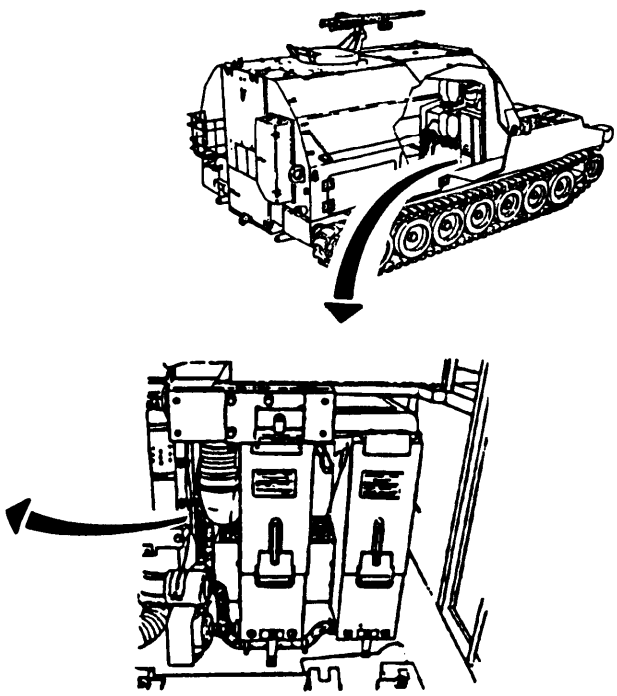
Personnel Required: Two

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Right projectile rack assembly moved to rear of vehicle (refer to TM 9-2350-287-10).
- Air cleaner filters removed (para 4-14).

a. REMOVAL

1. Remove four screws (5), lockwashers (4), and washers (1) from bracket (3). Discard lockwashers.
2. Remove bracket (3) from air cleaner duct (2).

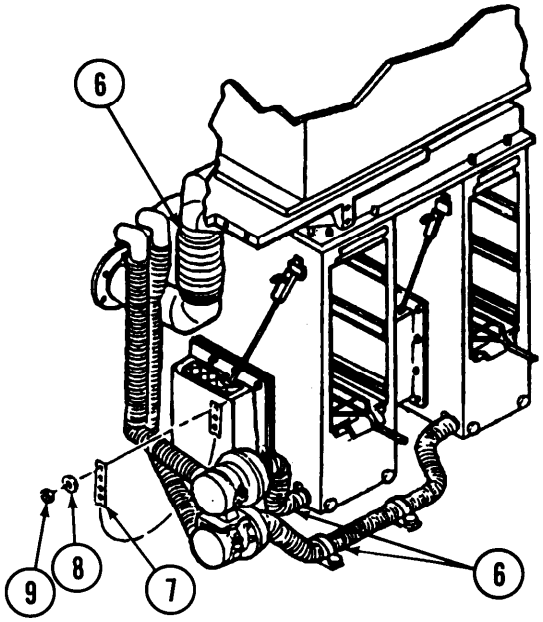


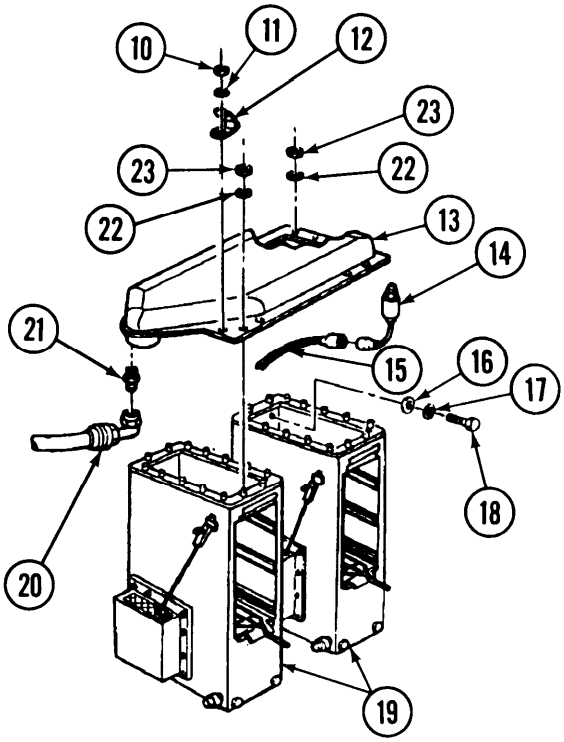


4-10. AIR CLEANER REPAIR (continued).

3. Remove nut (9), washer (8), and strap (7) from box assembly on side of air duct.

4. Remove three air inlet ducts and hoses (6) (para 4-9).





5. Disconnect STE/ICE wiring harness (15) from pressure transducer (14).

6. Remove five self-locking nuts (10) and washers (11), clamp (12), and STE/lCE wiring harness (15) from front of air cleaner duct (13). Discard self-locking nuts.

7. Remove 23 self-locking nuts (23) and washers (22) from studs on inside lip of air cleaner duct (1 3). Discard self-locking nuts.

8. Disconnect pressure indicator hose (20) from adapter (21) under left side of air cleaner duct (1 3).

WARNING

Air cleaners must be supported by a crowbar when removing screws, to prevent possible injury to personnel or damage to air cleaner.

NOTE

- There are two air cleaners. An assistant is required when removing air cleaners.
- Left air cleaner must be removed first. Both air cleaners must be removed before removing air cleaner duct.
- Both air cleaners are removed in the same manner unless noted otherwise. Removal of right air cleaner is shown.

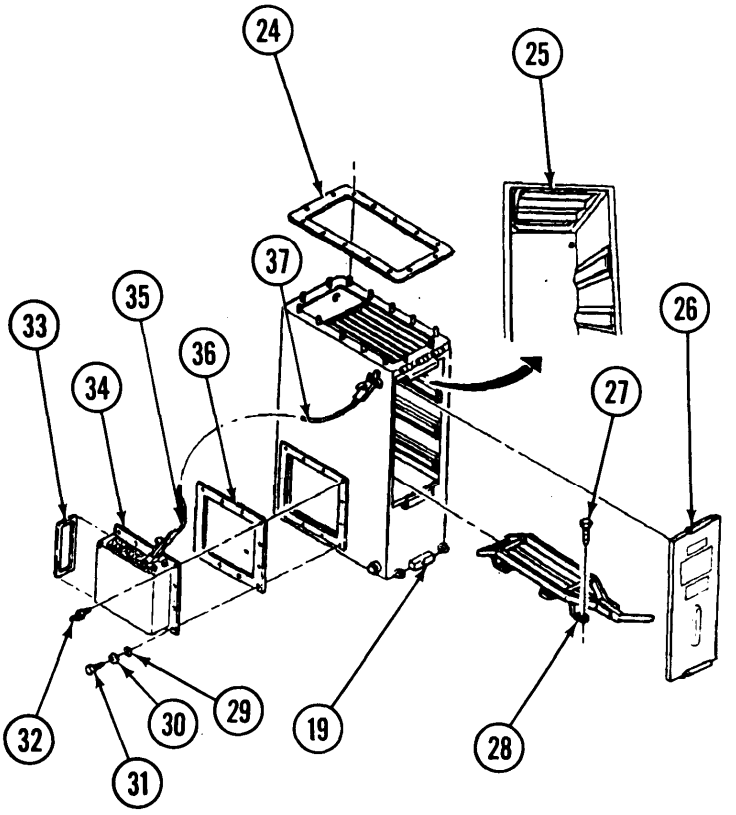
9. Support air cleaner (19) with crowbar.

4-10. AIR CLEANER REPAIR (continued).

10. Remove four screws (18), lockwashers (17), and washers (16) from air cleaner (19). Discard lockwashers.

11. Remove air cleaner (19) and support.

12. Remove air cleaner duct (13) from vehicle.



b. DISASSEMBLY

NOTE

Disassembly is the same for both air cleaners unless otherwise noted. Disassembly of right air cleaner is shown.

1. Remove gasket (24) from air cleaner (19). Discard gasket.

2. Disconnect baffle cable connector (35) from air cleaner clamp (37) on air cleaner (19).

NOTE

Shouldered stud is found on left air cleaner. Right air cleaner has ten screws.

3. Remove 10 screws (31), lockwashers (30), and washers (29), shouldered stud (32), box assembly (34), and gasket (36) from air cleaner (19). Discard lockwashers and gasket.

4. Remove eight screws (27) and latch assembly (28) from air cleaner (19).

5. Remove seal (33) from vent at bulkhead, Discard seal.

6. Remove access door gasket (26) and gasket (25) from inside upper portion of air cleaner (19). Discard gaskets.

c. CLEANING AND INSPECTION

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT use near open flame or excessive heat.

1. Clean all parts with drycleaning solvent and rag.

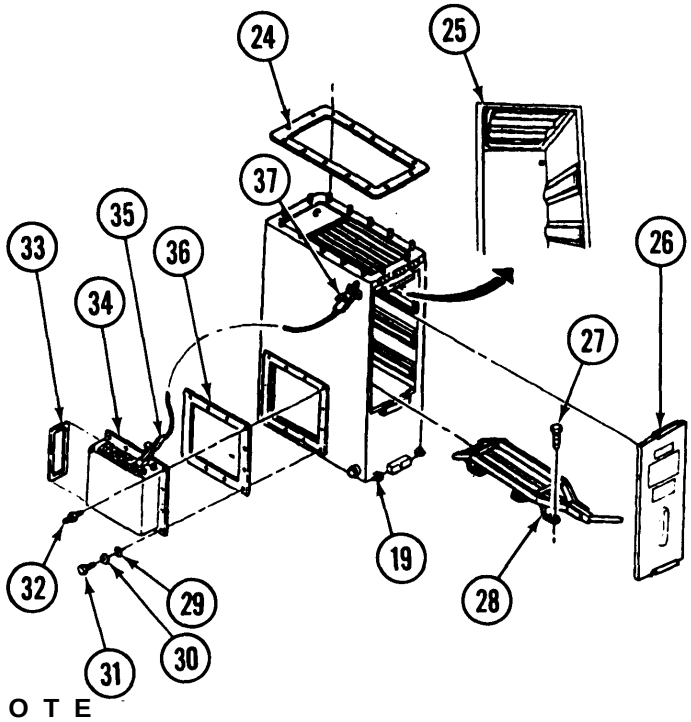
2. Inspect all parts for damage. Replace any damaged parts.

4-10. AIR CLEANER REPAIR (continued).

d. ASSEMBLY

NOTE

There are two air cleaner box assemblies. Assembly is the same for both unless otherwise noted. Assembly of right air cleaner box assembly is shown.



1. Install new access door gasket (26) and new gasket (25) on inside upper portion of air cleaner (19).
2. Apply rubber adhesive to bulkhead surface and new seal (33), and install seal (33) at vent on bulkhead.
3. Install latch assembly (28) on air cleaner (19) with eight screws (27).

N O T E

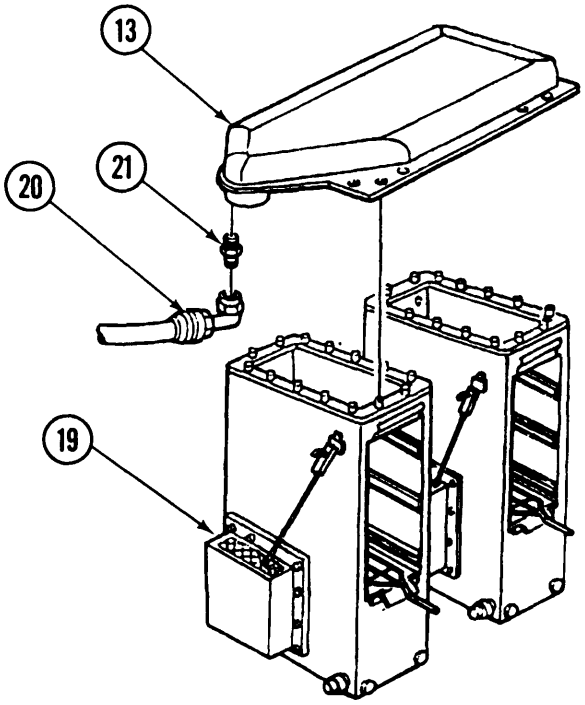
Shouldered stud is found on left air cleaner box. Right air cleaner box has 10 screws.

4. Install new gasket (36) and box assembly (34) on air cleaner (19) with shouldered stud (32) and 10 screws (31), new lockwashers (30), and washers (29).
5. Connect baffle cable connector (35) to air cleaner clamp (37) on air cleaner (19).
6. Install new gasket (24) on air cleaner (19).

e. INSTALLATION

NOTE

- An assistant is required when installing air cleaners.
- Right air cleaner must be installed first.
- Both air cleaners are installed in the same manner. Installation of right air cleaner is shown.



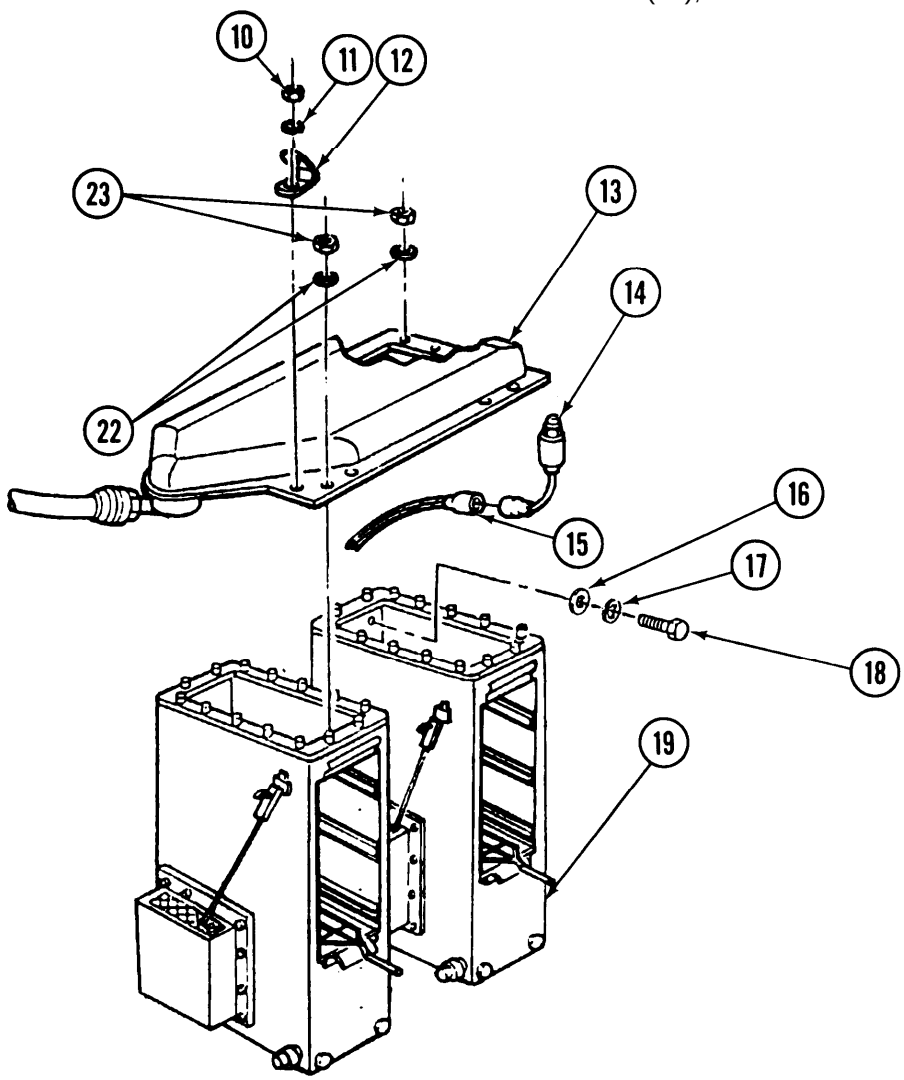
1. Install air cleaner (19) and air cleaner duct (13) in vehicle.
2. Connect pressure indicator hose (20) to adapter (21) under left side of air cleaner duct (13).

4-10. AIR CLEANER REPAIR (continued).

WARNING

Air cleaner must be supported when installing screws, to prevent possible injury to personnel or damage to air cleaner.

3. Lift air cleaner (19) with crowbar and secure to bulkhead with four screws (18), new lockwashers (17), and washers (16).



4. From inside lip of air cleaner duct (13), install 23 new self-locking nuts (23) and washers (22) on studs on inside lip of air cleaner duct (13). Tighten 23 self-locking nuts (23).

5. Install five new self-locking nuts (10), five washers (11), clamp (12), and STE/ICE wiring harness (15) on front of air cleaner duct (13).

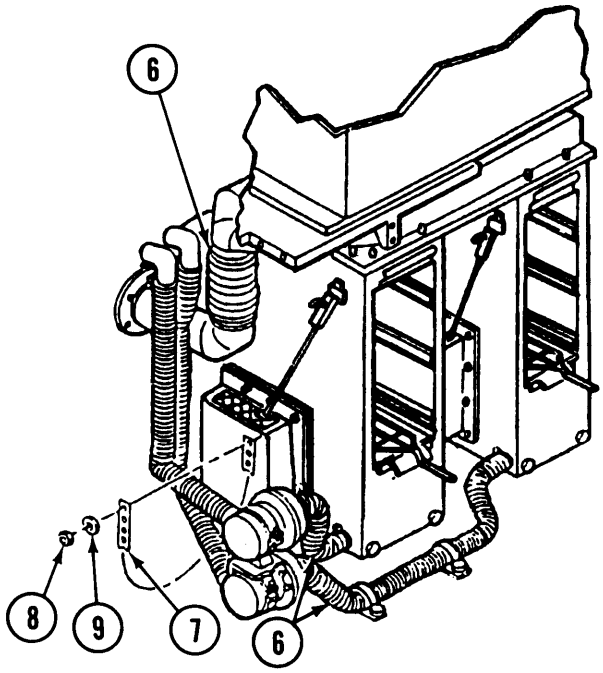
6. Install pressure transducer (14) on air cleaner duct (13).

7. Connect STE/ICE wiring harness (15) to pressure transducer (14) under air cleaner duct (13).

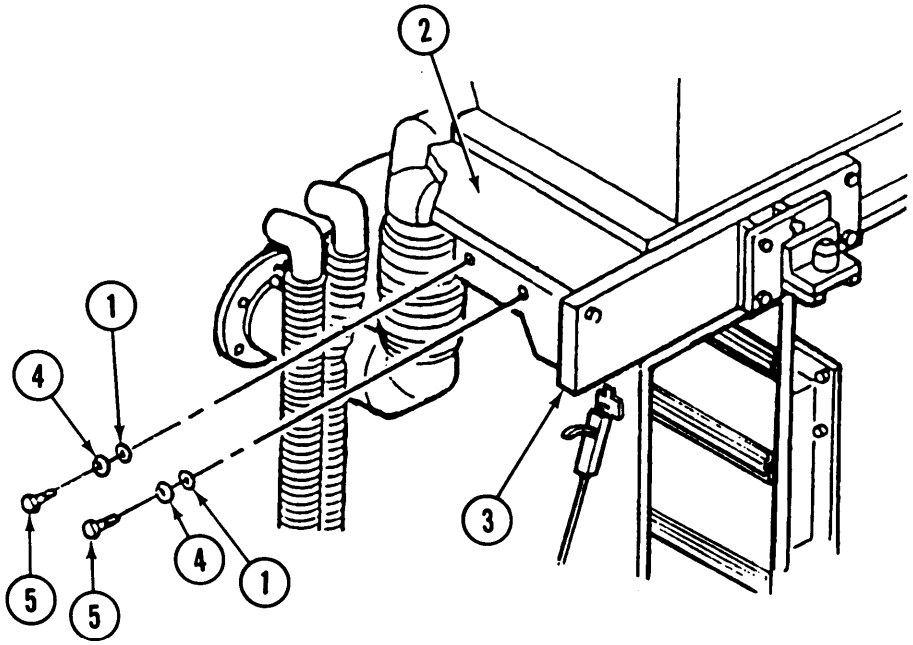
4-10. AIR CLEANER REPAIR (continued).

8. Install three air cleaner ducts and hoses (6) (para 4-9).

9. Install strap (7) with washer (9) and nut (8) on box assembly.



10. Install bracket (3) on air cleaner duct (2) with four screws (5), new lockwashers (4), and washers (1).



FOLLOW-ON MAINTENANCE:
- Install air cleaner filters (para 4-14).
- Move right projectile rack assembly to front of vehicle (refer to TM 9-2350-287-10).

4-11. AIR CLEANER BOX ASSEMBLY REPAIR.

This Task Covers:

a. Disassembly
b. Cleaning and Inspection
c. Assembly

Initial Setup:

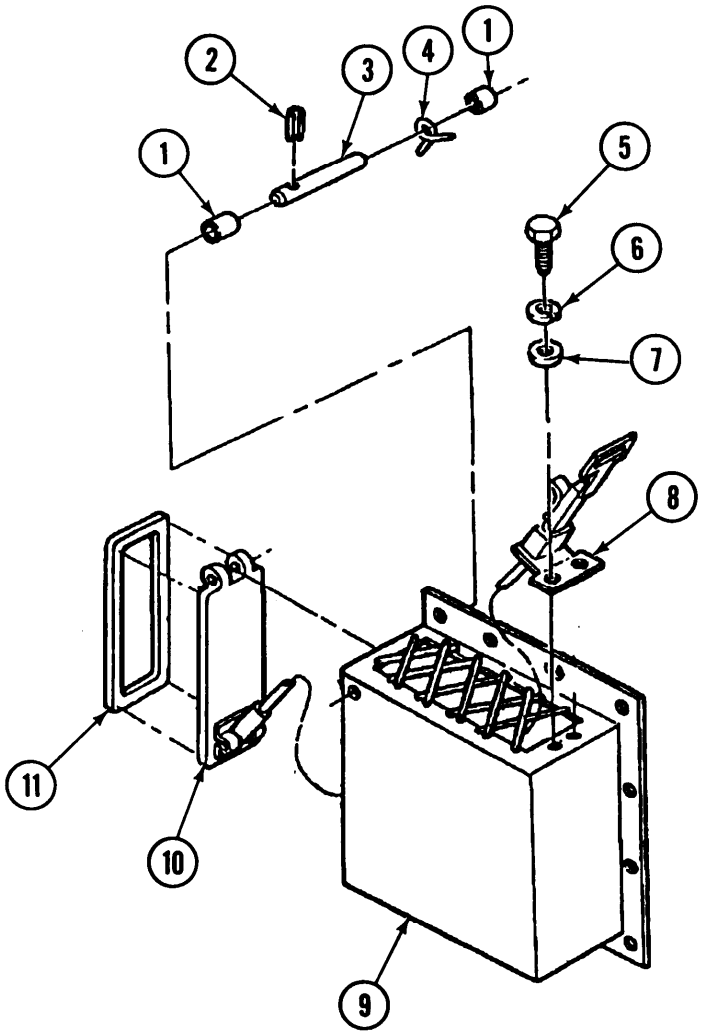
Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Cement adhesive (Item 3, Appendix D)
- Drycleaning solvent (Item 28, Appendix D)
- Rag (Item 56, Appendix D)
- Lockwasher (2) (Item 163, Appendix H)
- Seal (Item 265, Appendix H)
- Spring pin (Item 359, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Right projectile rack assembly moved to rear of vehicle (refer to TM 9-2350-287-10).
- Air cleaner box assembly removed (para 4-11).

a. DISASSEMBLY

1. Remove spring pin (2) from hinge pin (3). Discard spring pin.
2. Remove hinge pin (3), two spacers (1), and spring (4) from air cleaner box (9).
3. Remove two screws (5), lockwashers (6), and washers (7) from baffle cable connector (8) and air cleaner box (9). Discard lockwashers.
4. Thread baffle cable connector (8) through grate on air cleaner box (9).
5. Remove baffle (10) from air cleaner box (9).
6. Remove seal (11) from baffle (10). Discard seal.



4-11. AIR CLEANER BOX ASSEMBLY REPAIR (continued).

b. CLEANING AND INSPECTION

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT use near open flame or excessive heat.

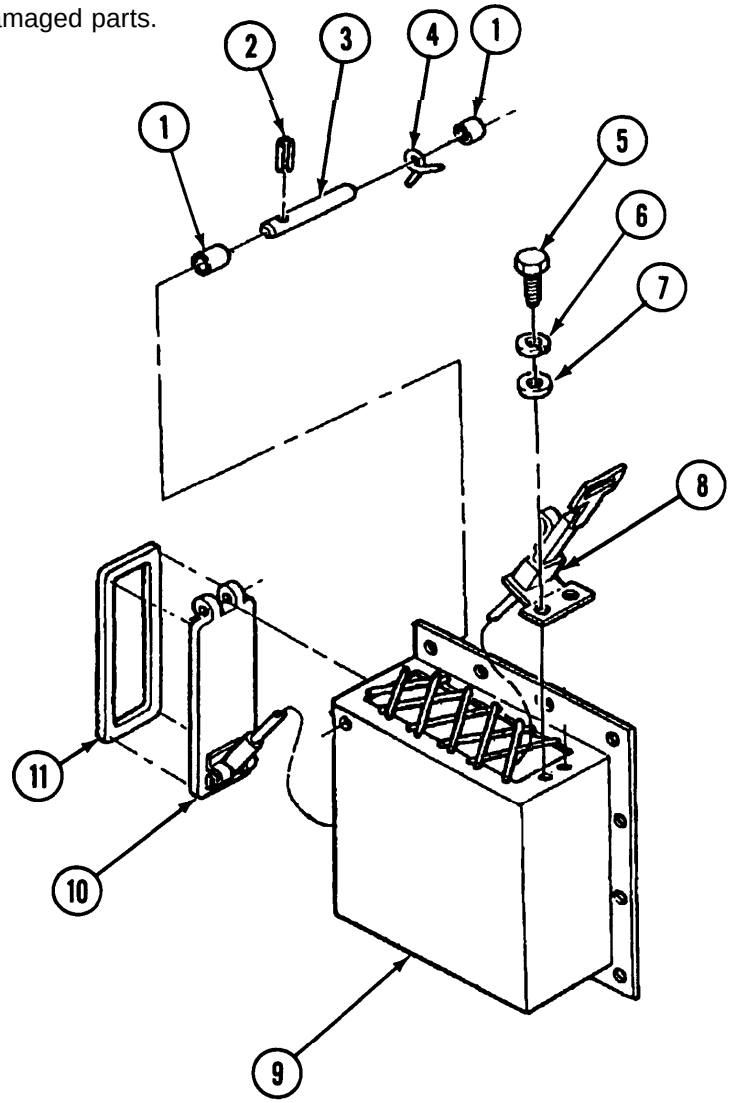
1. Clean all parts with drycleaning solvent.
2. Clean residue from baffle with drycleaning solvent.
3. Inspect all parts for damage. Replace any damaged parts.

c. ASSEMBLY

WARNING

Adhesive can burn easily and can give off harmful vapor. To prevent injury, keep adhesives away from open fire and use them in a well-ventilated area.

1. Use cement adhesive to install new seal (11) on baffle (10).
2. Thread baffle cable connector (8) through grate on air cleaner box (9).
3. Install baffle (10) and baffle cable connector (8) on air cleaner box (9) with two screws (5), new lockwashers (6), and washers (7).
4. Install hinge pin (3), spring (4), and two spacers (1) in air cleaner box (9) and baffle (10).
5. Install new spring pin (2) in hinge pin (3).



FOLLOW-ON MAINTENANCE:
- Install air cleaner box assembly (para 4-11).
- Move right projectile rack assembly to front of vehicle (refer to TM 9-2350-287-10).

4-12. AIR CLEANER RESTRICTION INDICATOR REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
• General mechanic's tool kit (Item 24, Appendix I)

Equipment Conditions:
• Vehicle parked on level ground (refer to TM 9-2350-287-10).

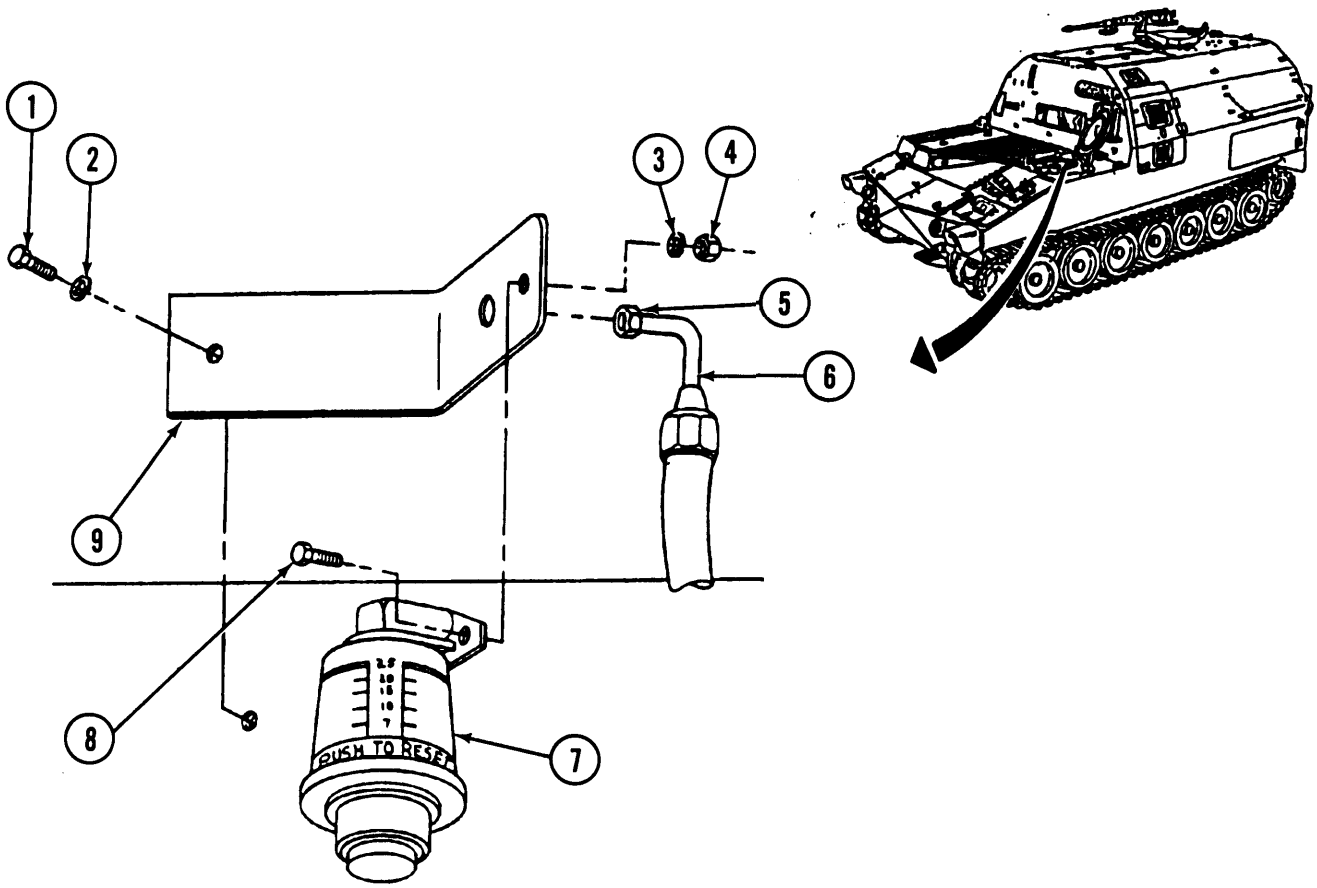
Materials/Parts:
• Lockwasher (4) (Item 196, Appendix H)

a. REMOVAL

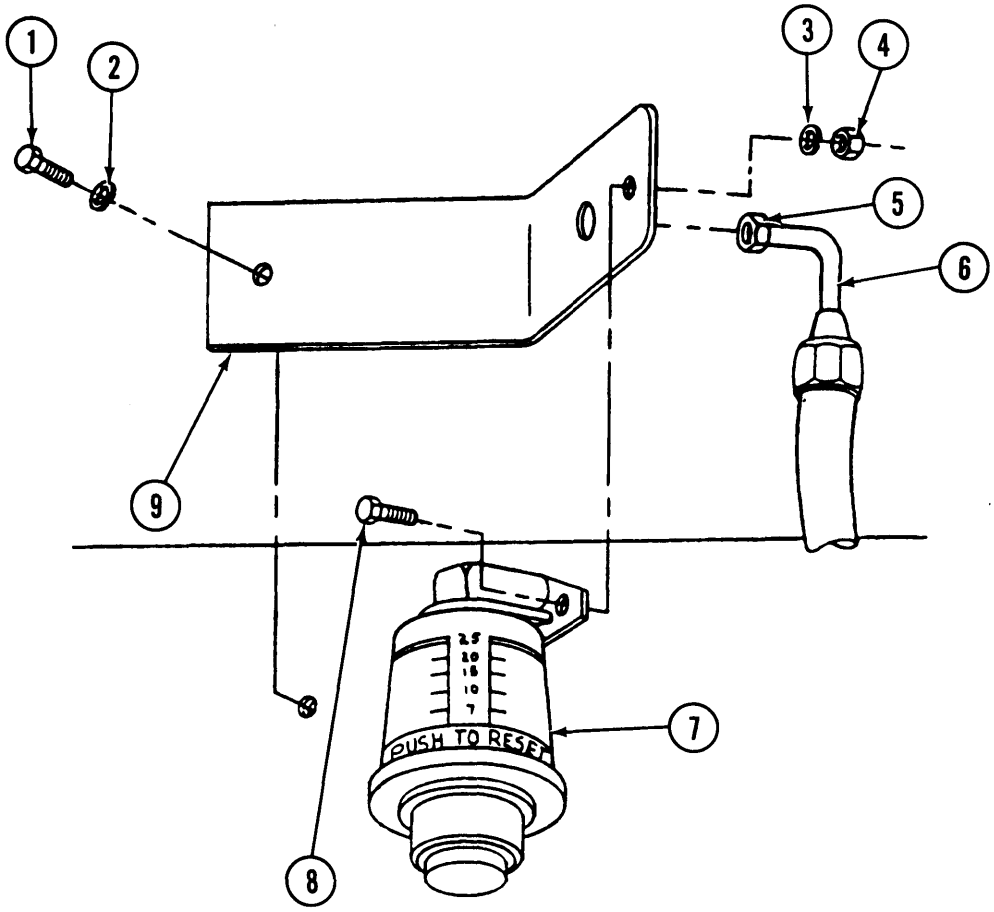
1. Loosen nut (5) and remove hose assembly (6) from air cleaner pressure indicator (7).

2. Remove two nuts (4), screws (8), and lockwashers (3) and pressure indicator (7) from bracket (9). Discard lockwashers.

3. Remove two screws (1) and lockwashers (2) and bracket (9) from bulkhead. Discard lockwashers.



4-12. AIR CLEANER RESTRICTION INDICATOR REPLACEMENT (continued).



b. INSTALLATION

1. Install bracket (9) on bulkhead with two screws (1) and new lockwashers (2).
2. Install pressure indicator (7) on bracket (9) with two screws (8), new lockwashers (3), and nuts (4).
3. Install hose assembly (6) on pressure indicator (7) and tighten nut (5).

FOLLOW-ON MAINTENANCE:
- None

4-13. AIR CLEANER FAN ASSEMBLY REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Gasket (Item 106, Appendix H)
- Lockwasher (2) (Item 177, Appendix H)
- Self-locking nut (Item 319, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Right projectile rack assembly moved to rear of vehicle (refer to TM 9-2350-287-10).

a. REMOVAL

NOTE

There are two air cleaner fans. Use this procedure to replace either one. Top air cleaner fan is shown.

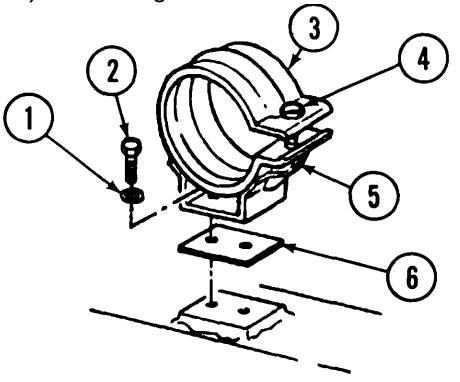
1. Disconnect electrical lead No. 415 (13) from air cleaner fan (12).

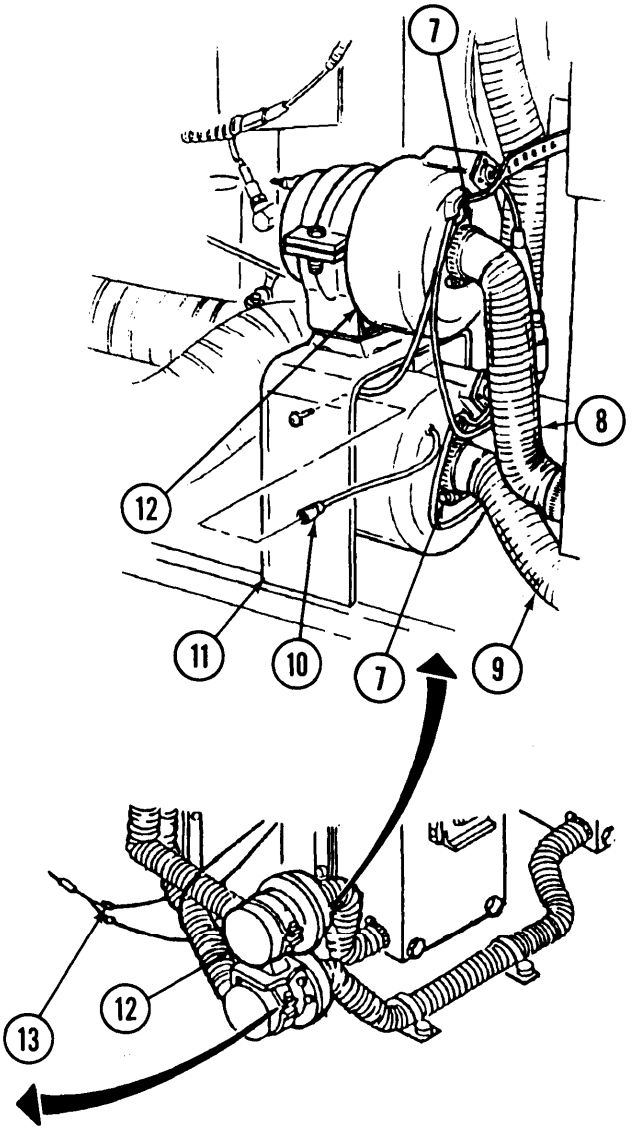
2. Disconnect ground wire (10) from inside lower air cleaner fan bracket (11).

3. Loosen screws in two clamps (7) and remove two hoses (8 and 9) from air cleaner fan (12).

4. Hold self-locking nut (5) and turn screw (4) to loosen clamp (3) and remove air cleaner fan (12) from air cleaner. Remove and discard self-locking nut.

5. Remove two screws (2) and lockwashers (1), gasket (6), and clamp (3) from lower air cleaner fan bracket (11). Discard gasket and lockwashers.

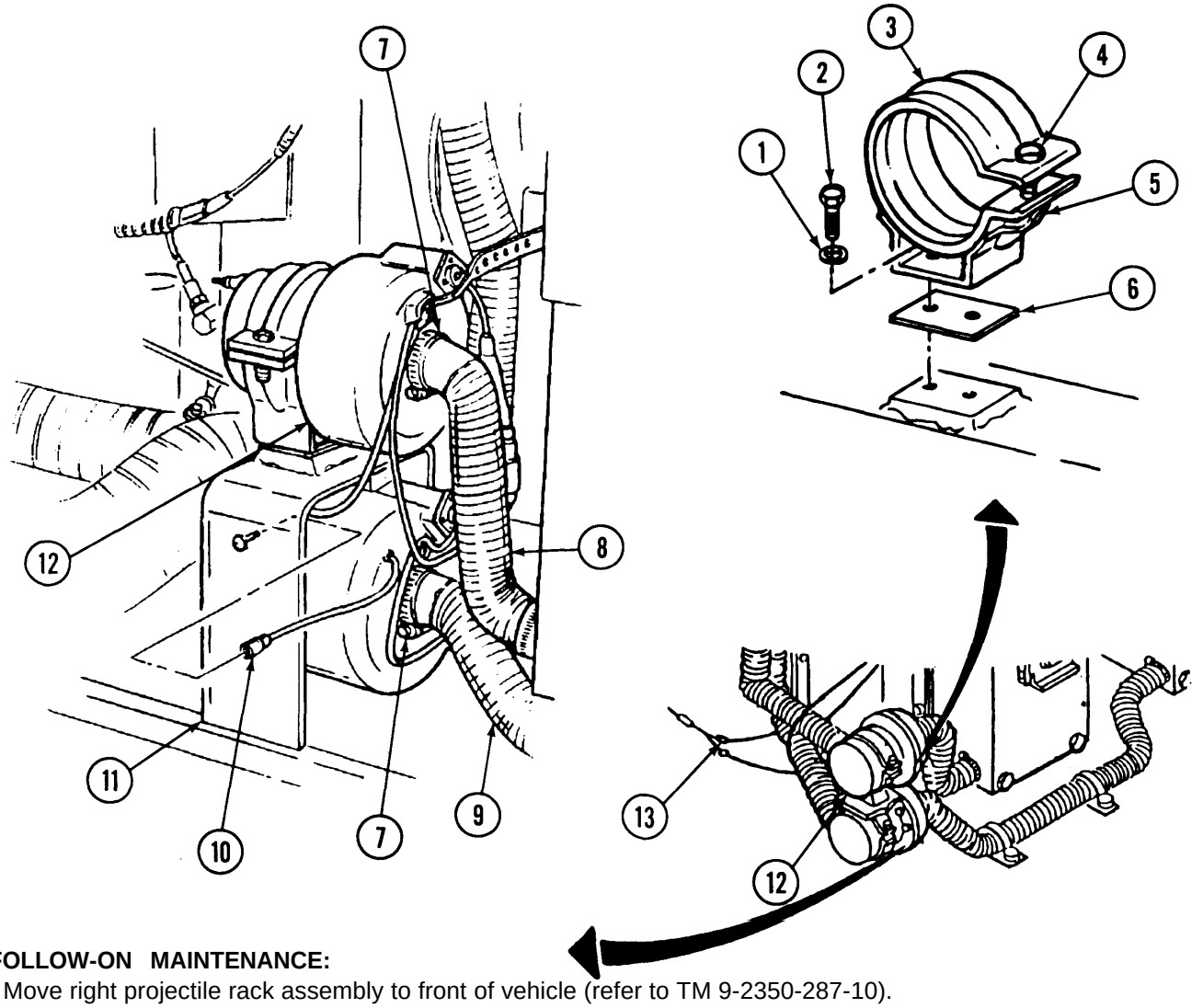




4-13. AIR CLEANER FAN ASSEMBLY REPLACEMENT (continued).

b. INSTALLATION

1. Install new gasket (6) and clamp (3) on lower air cleaner fan bracket (11) with two screws (2) and new lockwashers (1).
2. Install air cleaner fan (12) in clamp (3) and secure by tightening screw (4) and new self-locking nut (5).
3. Connect two hoses (8 and 9) to air cleaner fan (12).
4. Tighten screws in two clamps (7).
5. Connect electrical lead No. 415 (13) to air cleaner fan (12).
6. Connect ground wire (10) to lower air cleaner fan bracket (11).



FOLLOW-ON MAINTENANCE:

• Move right projectile rack assembly to front of vehicle (refer to TM 9-2350-287-10).

4-14. AIR CLEANER FILTER REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Cement adhesive (Item 3, Appendix D)
- Drycleaning solvent (Item 28, Appendix D)
- Rag (Item 56, Appendix D)
- Gasket (Item 68, Appendix H)
- Gasket (Item 69, Appendix H)

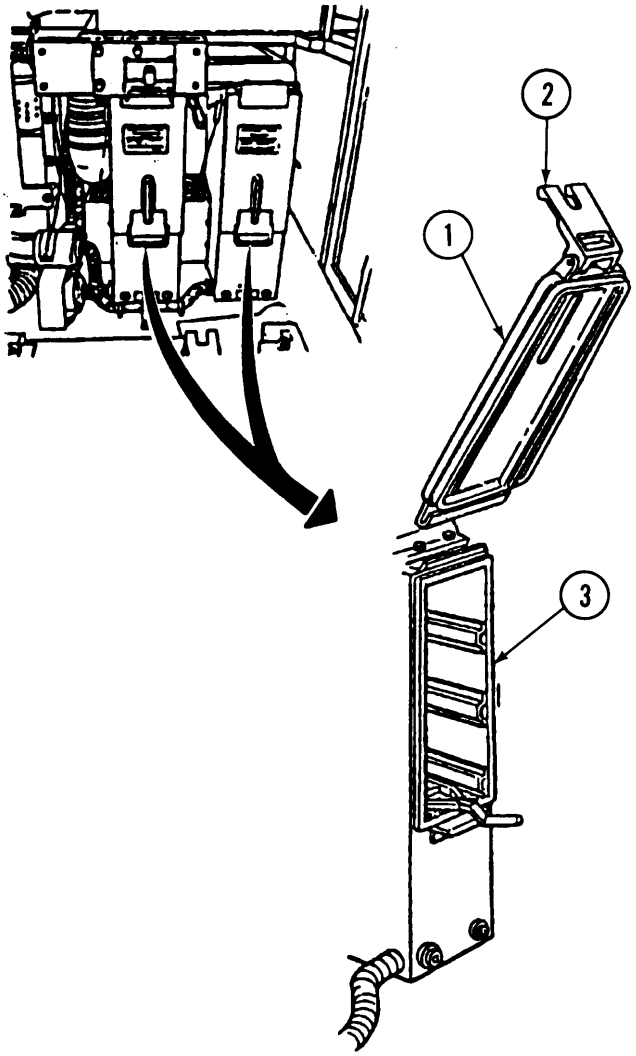
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Right projectile rack assembly moved to rear of vehicle (refer to TM 9-2350-287-10).

WARNING

If nuclear, biological, or chemical (NBC) exposure Is suspected, all air filter media will be handled by personnel wearing full NBC protective equipment.

NOTE

This procedure covers replacement of both left and right air cleaner filters. Do step 1 for right air cleaner and step 2 for left air cleaner.



a. REMOVAL

1. Remove right access door (1) from air cleaner (3) by pulling down locking latch (2) and lifting upon door (1).

CAUTION

Do not raise left access door too high when removing. Lifting left access door too high may cause binding and damage to door.

2. Remove left access door (1) from air cleaner (3) by pulling down locking latch (2), lifting up slightly, and sliding door (1) to the right.

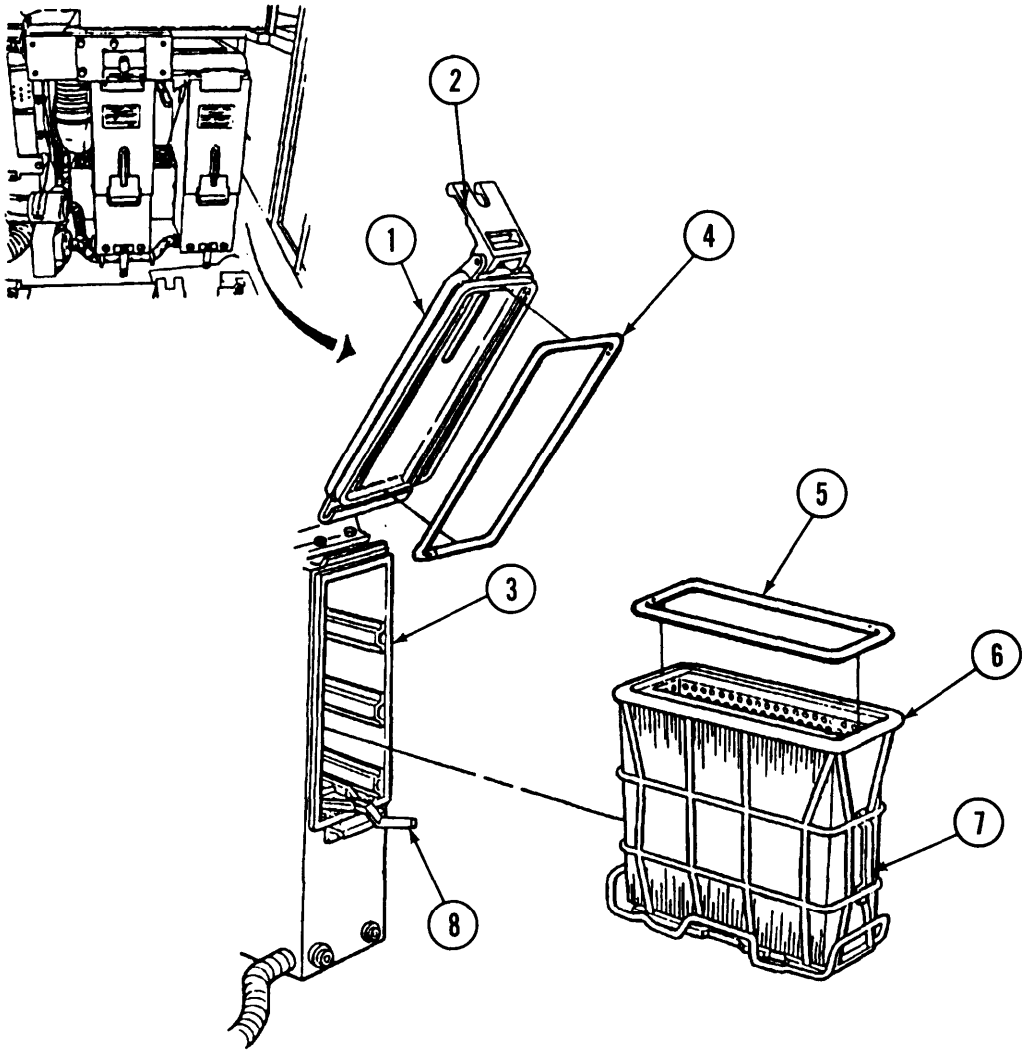
4-14. AIR CLEANER FILTER REPLACEMENT (continued).

3. Pull locking handle (8) down and release air cleaner filter pack (6). Pull out on handle (7) and remove filter pack (6) from air cleaner (3).

4. Remove gasket (5) from air cleaner (3). Discard gasket.

5. Remove gasket (4) from access door (1). Discard gasket.

6. Clean and inspect filter pack (6) (refer to TM 9-2350-287-10). If damaged, replace filter pack.



b. INSTALLATION

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat.

4-14. AIR CLEANER FILTER REPLACEMENT (continued).

1. Clean access door (1) and opening of air cleaner (3) with drycleaning solvent and rag.

WARNING

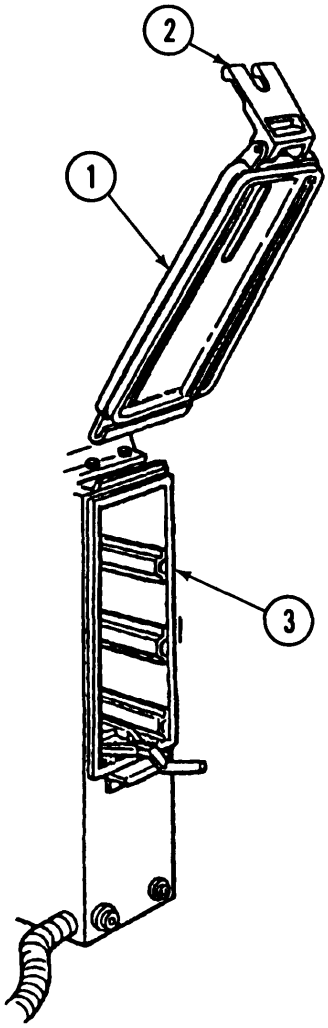
Adhesives can burn easily and can give off harmful vapors. To avoid injury, keep adhesives away from open fire and use them in a well-ventilated area.

2. Use cement adhesive to install new gasket (5) on air cleaner (3).

3. Use cement adhesive to install new gasket (4) on access door (1).

4. Install filter pack (6) in air cleaner (3). Aline with gasket (5) to ensure proper seal. Raise locking handle (8) and secure filter pack (6).

5. Install left and right access doors (1) and secure by pulling locking latch (2) on each door (1) down and then up.



FOLLOW-ON MAINTENANCE:

• Move right projectile rack assembly to front of vehicle (refer to TM 9-2350-287-10),

4-15. TURBOCHARGER OIL HOSES REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Lockwasher (Item 163, Appendix H)
- Lockwasher (Item 177, Appendix H)

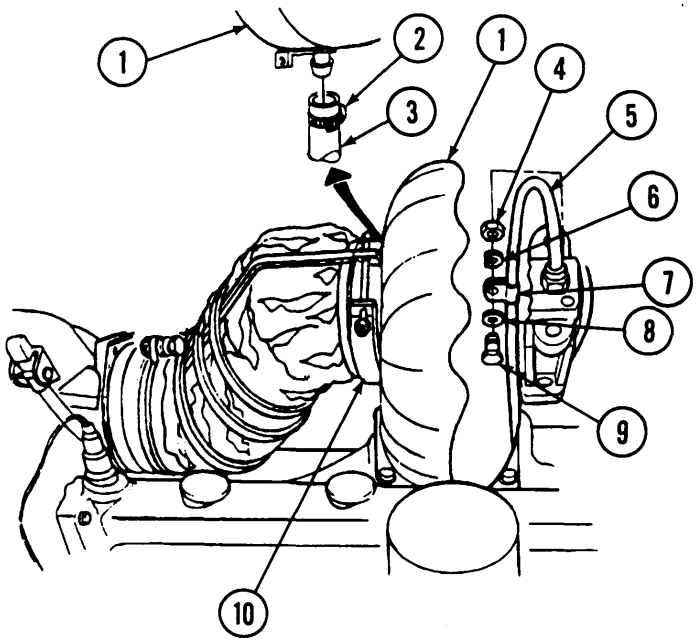
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Air intake grille opened and secured (refer to TM 9-2350-287-10).
- Engine compartment access cover removed (para 15-16).

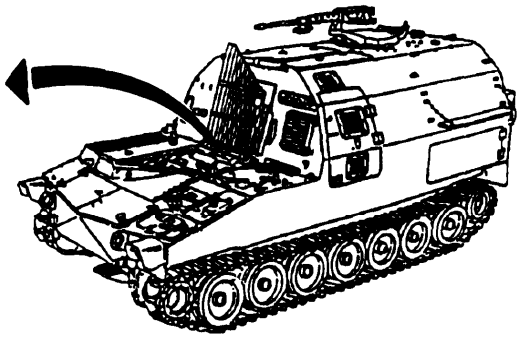
a. REMOVAL

1. Loosen clamp (2), and remove turbocharger oil hose (3) and clamp (2) from bottom of turbocharger (1).

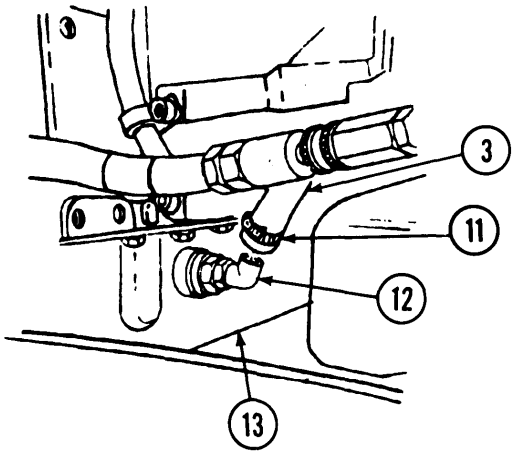
2. Disconnect turbocharger oil hose (5) from turbocharger (1).

3. Remove screw (9), washer (8), lockwasher (6), nut (4), clamp (7), and hose (5) from bracket (10). Discard lockwasher.





4. Loosen clamp (11) and remove hose (3) from fitting (12) on oil pan (13).



4-15. TURBOCHARGER OIL HOSES REPLACEMENT.

5. Disconnect hose (5) from elbow (14).

6. Remove screw (18), Lockwasher (17), and clamp (16) securing hose (5) from bracket (15). Discard Lockwasher.

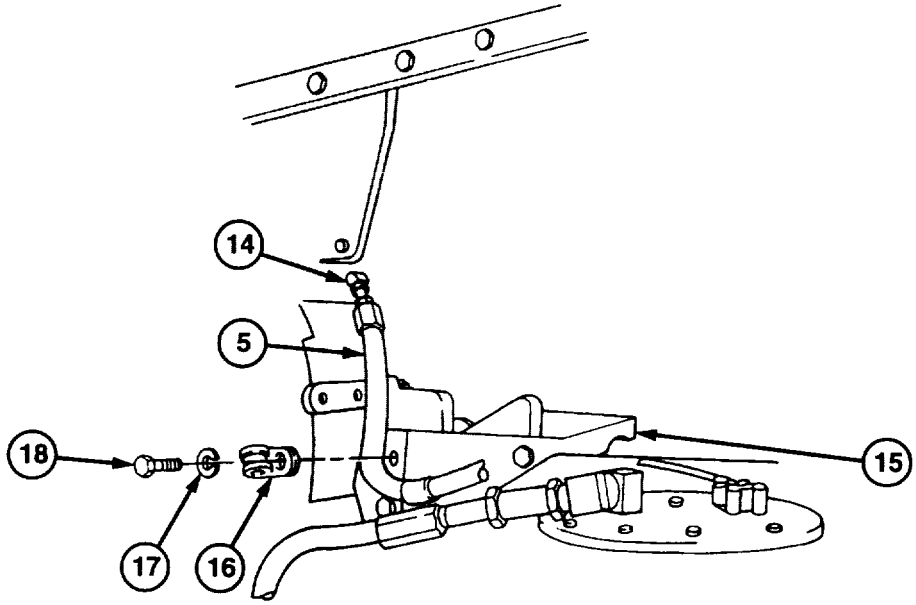
b. INSTALLATION

1. Connect hose (5) to elbow (14).

NOTE

Do not tighten screws on clamps until both ends of hose have been connected.

2. Secure hose (5) and clamp (16) to bracket (15) with new Lockwasher (17) and screw (18).



3. Install hose (3) on fitting (12) on oil pan (13) with clamp (11).

4. Secure hose (5) and clamp (7) to bracket (10) with nut (4), new lockwasher (6), washer (8), and screw (9).

5. Connect hose (5) to turbocharger (1).

6. Tighten two screws (18 and 9).

7. Connect hose (3) to turbocharger (1) with clamp (2).

FOLLOW-ON MAINTENANCE:
- Refill engine oil (Appendix G).
- Install engine compartment access cover (par 15-16).
- Close air intake grille (refer to TM 9-2350-287-10).

4-16. POWERPACK FUEL LINES REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- Drain pan (Item 14, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Cap and plug set (Item 13, Appendix D)
- Teflon pipe sealant (Item 63, Appendix D)
- Lockwasher (Item 159, Appendix H)
- Lockwasher (2) (Item 162, Appendix H)
- Lockwasher (6) (Item 183, Appendix H)
- Lockwasher (3) (Item 196, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Transmission access doors opened (refer to TM 9-2350-287-10).
- Crossover exhaust pipe removed (para 3-11).

a. REMOVAL

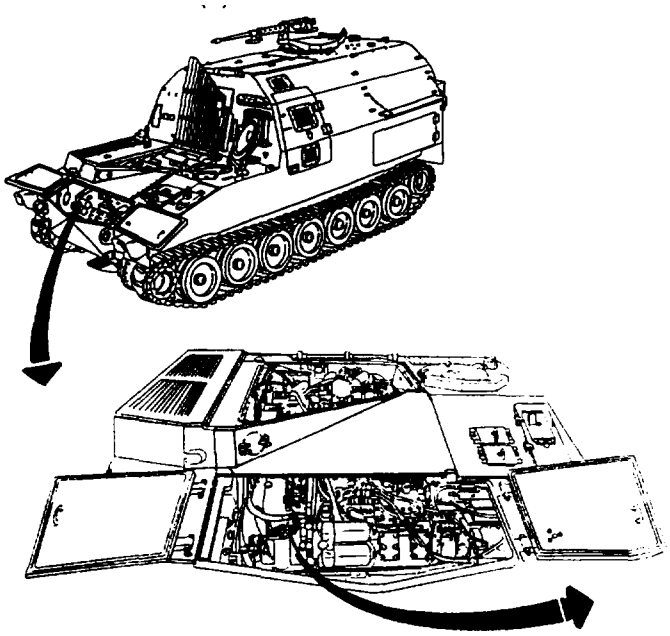
WARNING

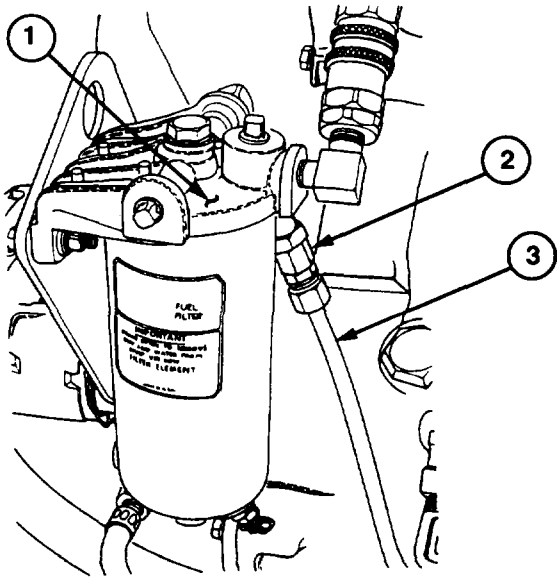
Diesel fuel is flammable. Do not perform this procedure near fire, flame, or sparks. Injury or death to personnel could result.

CAUTION

To prevent contamination of the fuel system, all lines and fittings must be capped immediately after disconnection.

1. Place drain pan under tube assembly (3), and disconnect tube assembly (3) from check valve (2) on primary fuel filter (1).

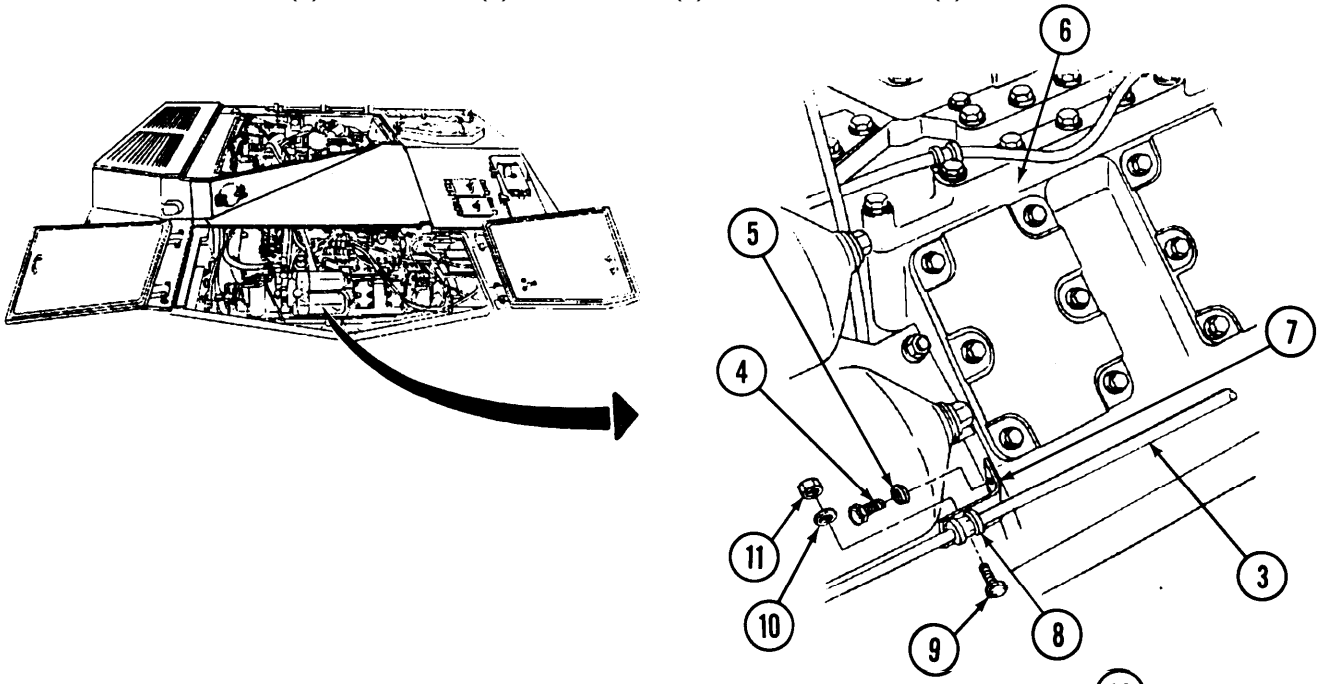




4-16. POWERPACK FUEL LINES REPLACEMENT (continued).

2. Remove screw (9), lockwasher (10), nut (11), and clamp (8) securing tube assembly (3) to bracket (7). Discard lockwasher.

3. Remove screw (4), lockwasher (5), and bracket (7) from transmission (6). Discard lockwasher.



4. Remove screw (19), lockwasher (20), two washers (21), and ground strap (22) from transmission (6). Discard lockwasher.

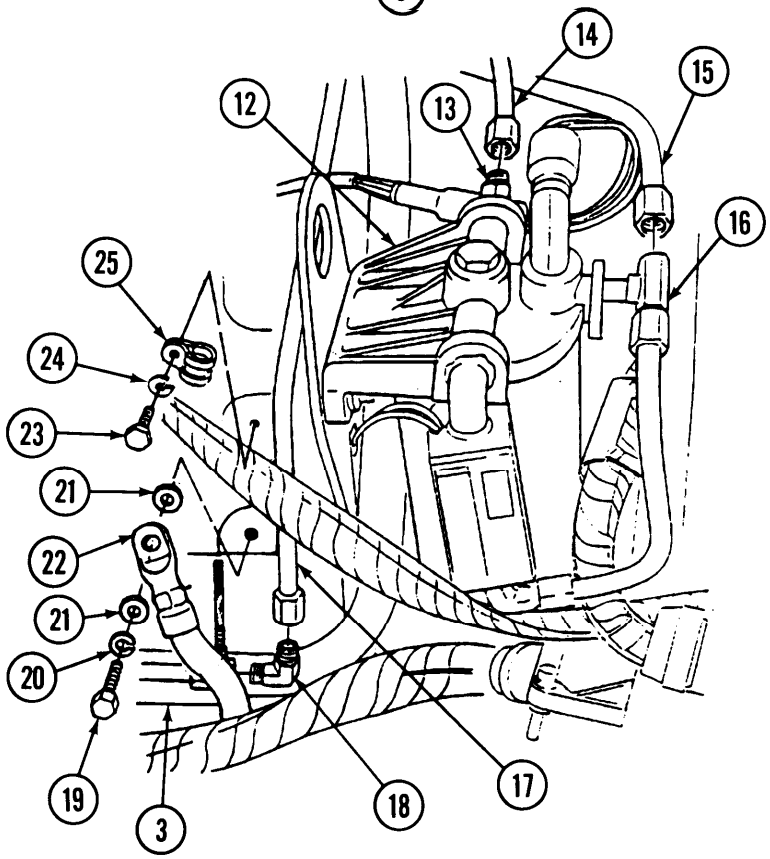
5. Disconnect tube assembly (3) from elbow (18), and remove tube assembly (3) from vehicle.

6. Remove elbow (18) from tube assembly (17).

7. Remove screw (23), lockwasher (24), and clamp (25) securing tube assembly (17) to transmission (6). Discard lockwashers.

8. Disconnect tube assembly (14) from elbow (13) on secondary fuel filter (12).

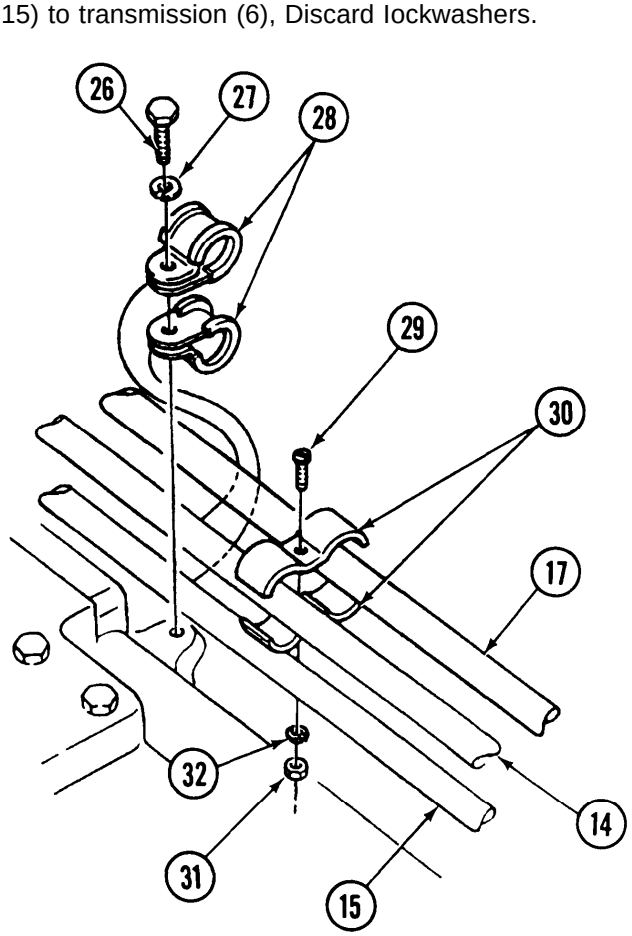
9. Disconnect tube assembly (15) from tee (16) on secondary fuel filter (12).

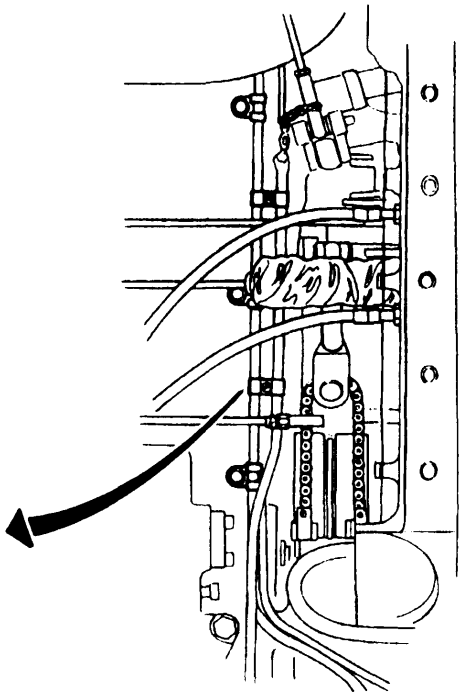


4-16. POWERPACK FUEL LINES REPLACEMENT (continued).

10. Remove two screws (29), lockwashers (32), nuts (31), and strap assemblies (30) securing tube assembly (17) to tube assembly (14). Discard lockwashers.

11. Remove three screws (26) and lockwashers (27) and six clamps (28) securing two tube assemblies (14 and 15) to transmission (6), Discard lockwashers.



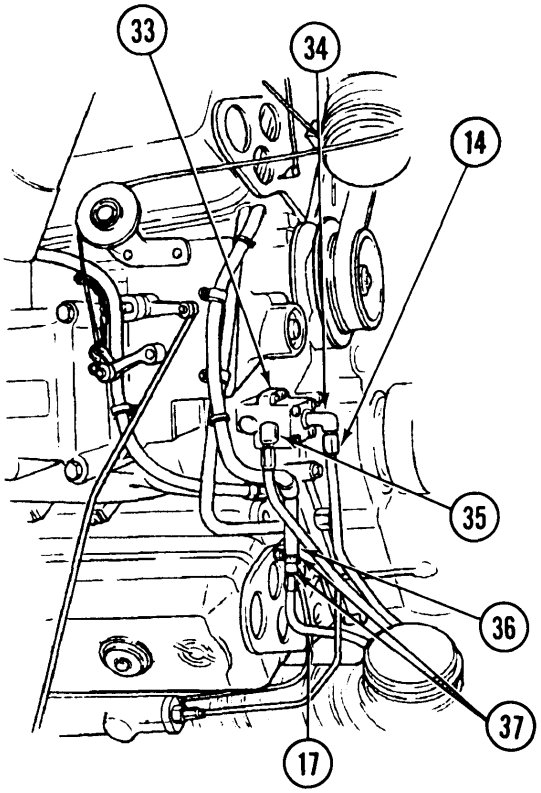


12. Disconnect tube assembly (17) and two adapters (37) from engine fuel line (36), and remove tube assembly (17) from vehicle.

13. Disconnect tube assembly (14) from elbow (34) on engine-driven fuel pump (33), and remove tube assembly (14) from vehicle.

14. Disconnect tube assembly (15) from elbow (35) on fuel pump (33), and remove tube assembly (15) from vehicle.

15. Remove two elbows (34 and 35) from fuel pump (33).



4-16. POWERPACK FUEL LINES REPLACEMENT (continued).

16. Remove three screws (39), washers (40), and clamps (41) securing two hoses (42 and 51) to engine.

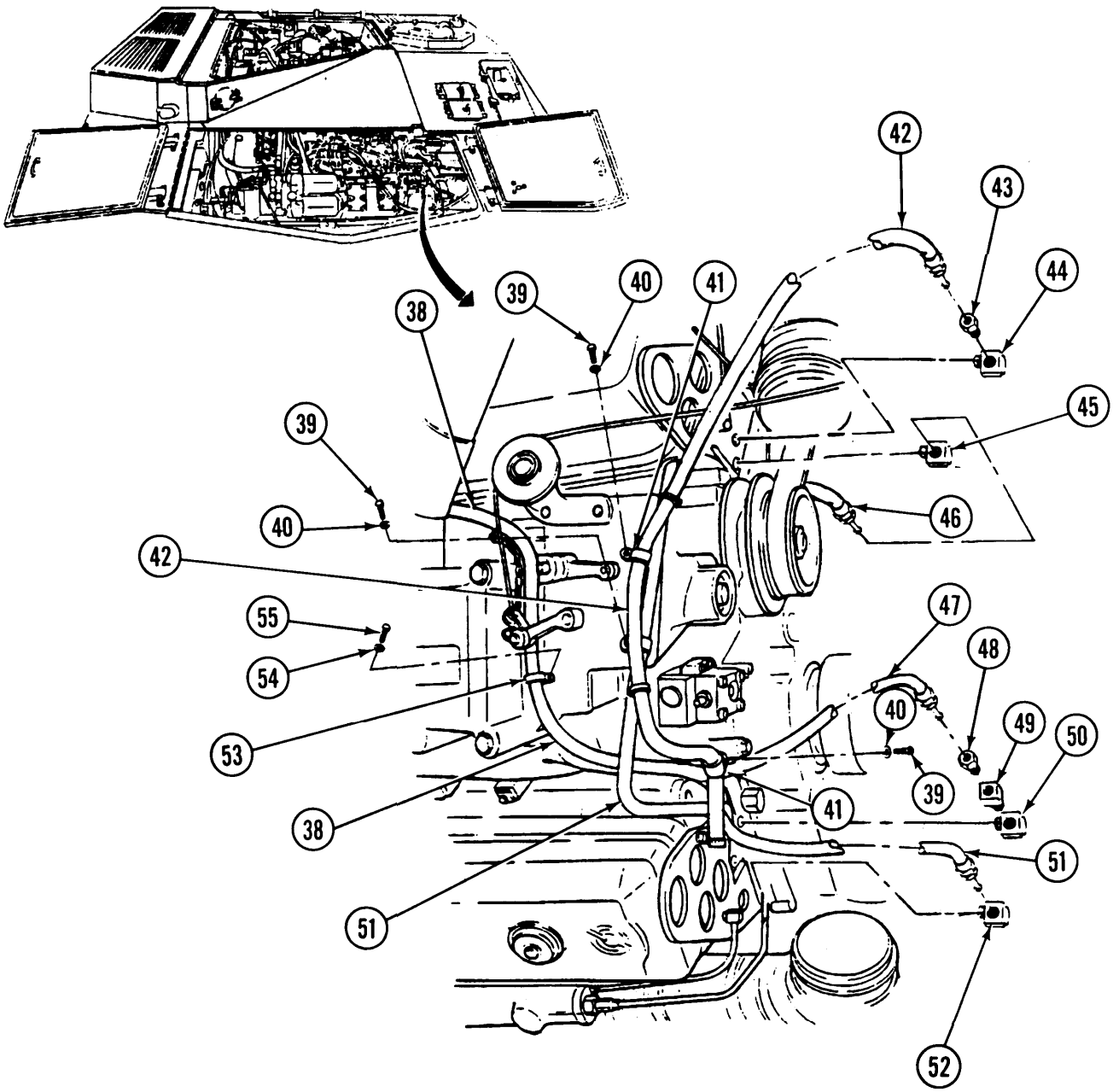
17. Disconnect two hoses (47 and 51) from two elbows (50 and 52).

18. Remove elbow (52), connector (49), adapter (48), and elbow (50) from engine.

19. Disconnect two hoses (42 and 46) from two elbows (44 and 45).

20. Remove two elbows (44 and 45) and pipe bushing (43) from engine.

21. Remove three screws (55), washers (54), and clamps (53) securing hose (38) to engine.



4-16. POWERPACK FUEL LINES REPLACEMENT (continued).

22. Disconnect hose assembly (56) from quick disconnect (57).

23. Remove two nuts (61), Iockwashers (62), washers (60), screws (65), clamps (59), and hose assembly (66) from bracket (67). Discard Iockwashers.

24. Remove quick disconnect (57), quick-disconnect coupling half (58), bushing (63), and elbow (64) from hose assembly (66).

b. INSTALLATION

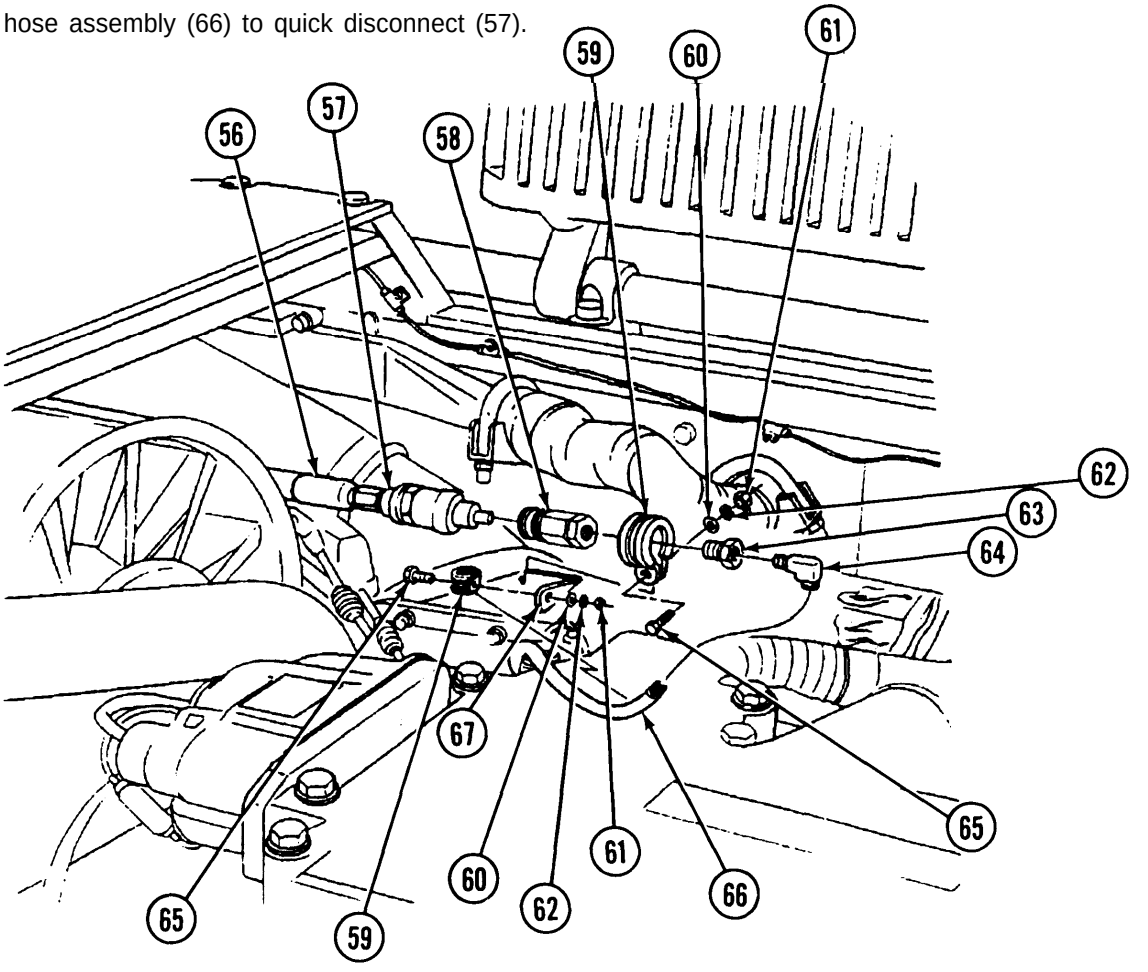
NOTE

Teflon pipe sealant must be applied to male threads of all fittings at installation.

1. Install elbow (64), bushing (63), quick disconnect (57), and quick-disconnect coupling half (58) on hose assembly (66).

2. Secure hose assembly (66) and two clamps (59) to bracket (67) with two screws (65), washers (60), new Iockwashers (62), and nuts (61).

3. Connect hose assembly (66) to quick disconnect (57).



4-16. POWERPACK FUEL LINES REPLACEMENT (continued).

4. Secure hose (38) to engine with three clamps (53), washers (54), and screws (55).

5. Install elbow (50), adapter (48), and connector (49) in engine.

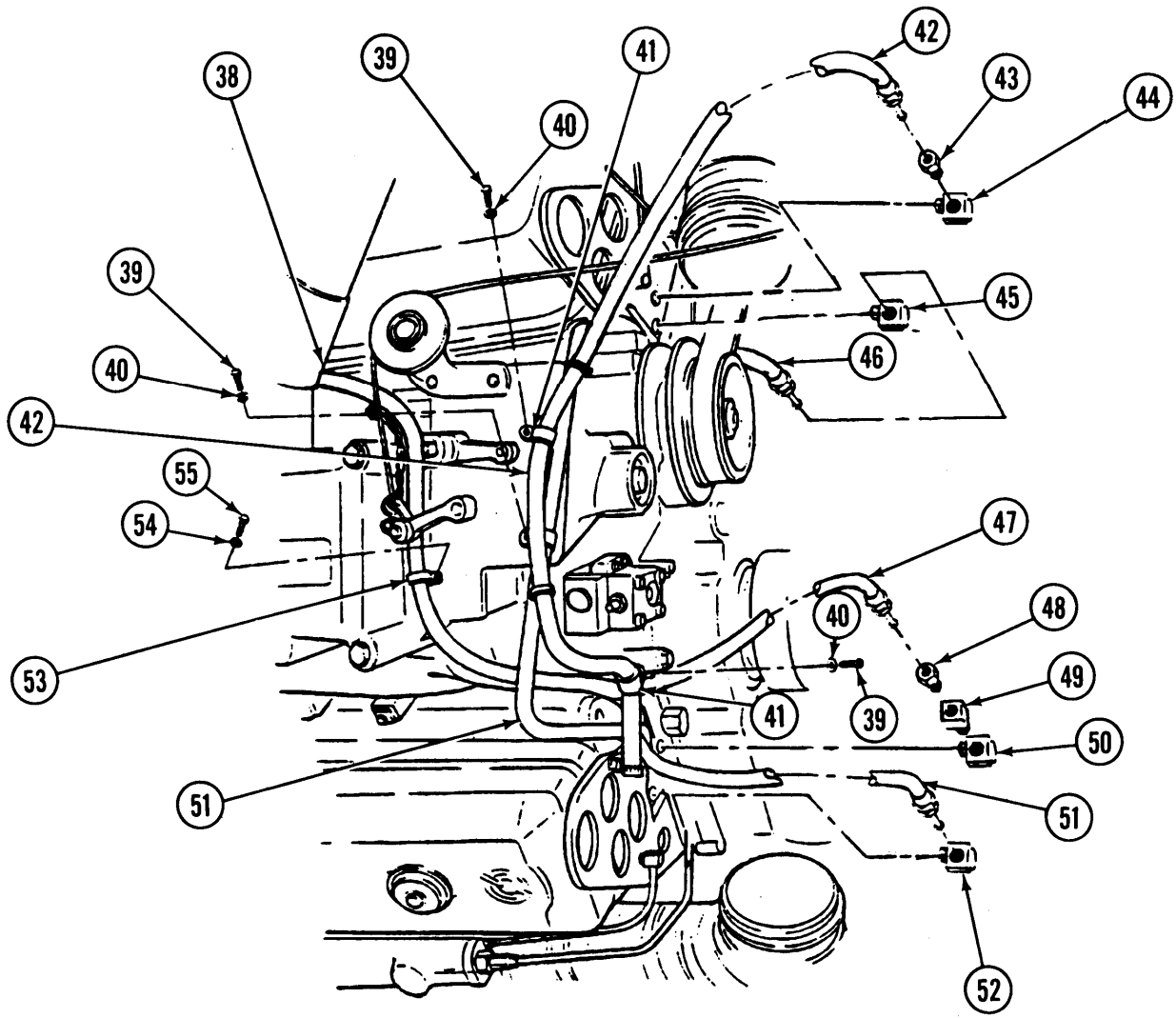
6. Install elbow (52) in engine.

7. Connect hoses (47 and 51) to elbows (50 and 52).

8. Install bushing (43) and two elbows (44 and 45) in engine.

9. Connect two hoses (42 and 46) to two elbows (44 and 45).

10. Secure two hoses (42 and 51) to engine with three clamps (41), washers (40), and screws (39).



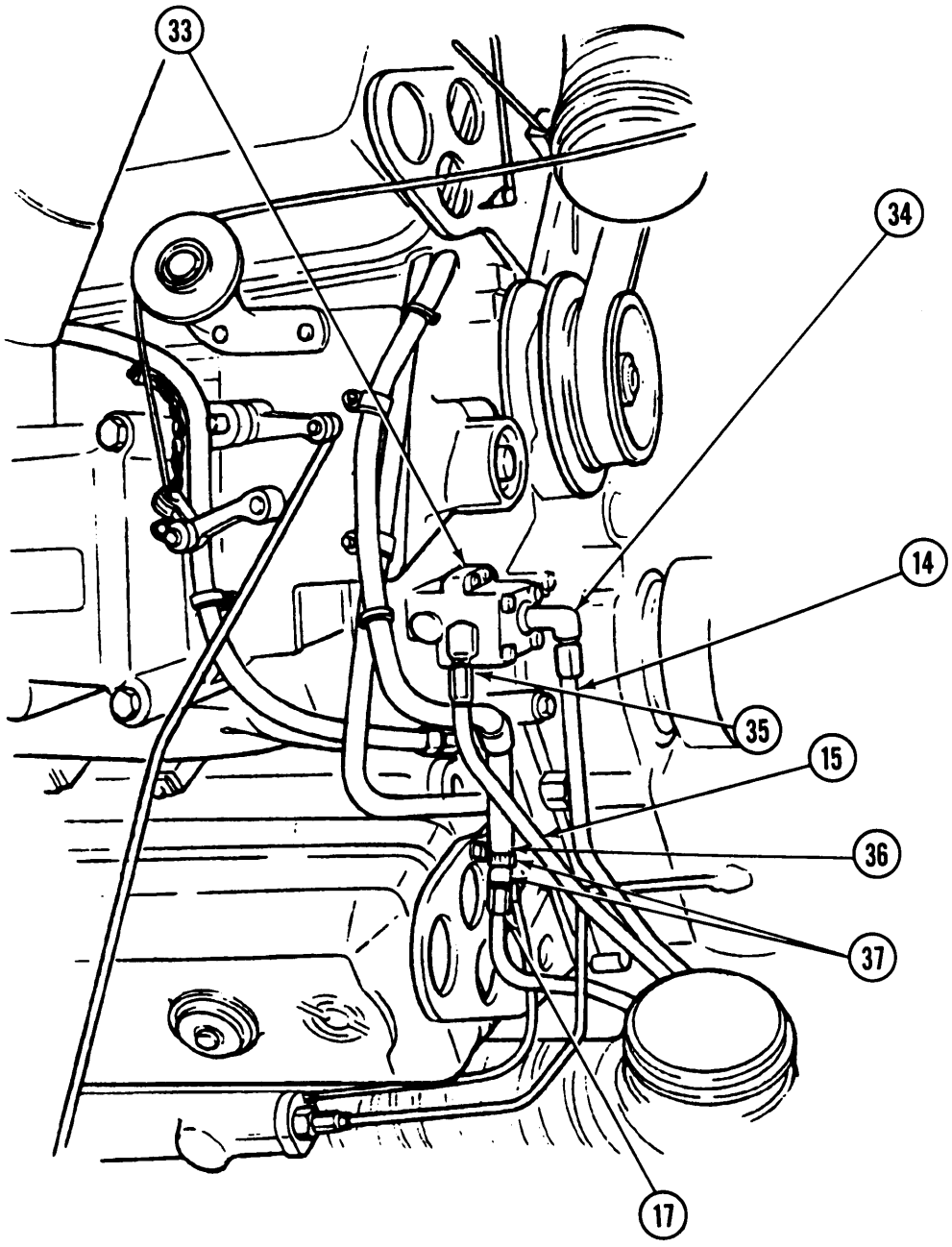
4-16. POWERPACK FUEL LINES REPLACEMENT (continued)=

11. Install two elbows (34 and 35) in fuel pump (33).

12. Connect tube assembly (15) to elbow (35) on fuel pump (33).

13. Connect tube assembly (14) to elbow (34) on fuel pump (33).

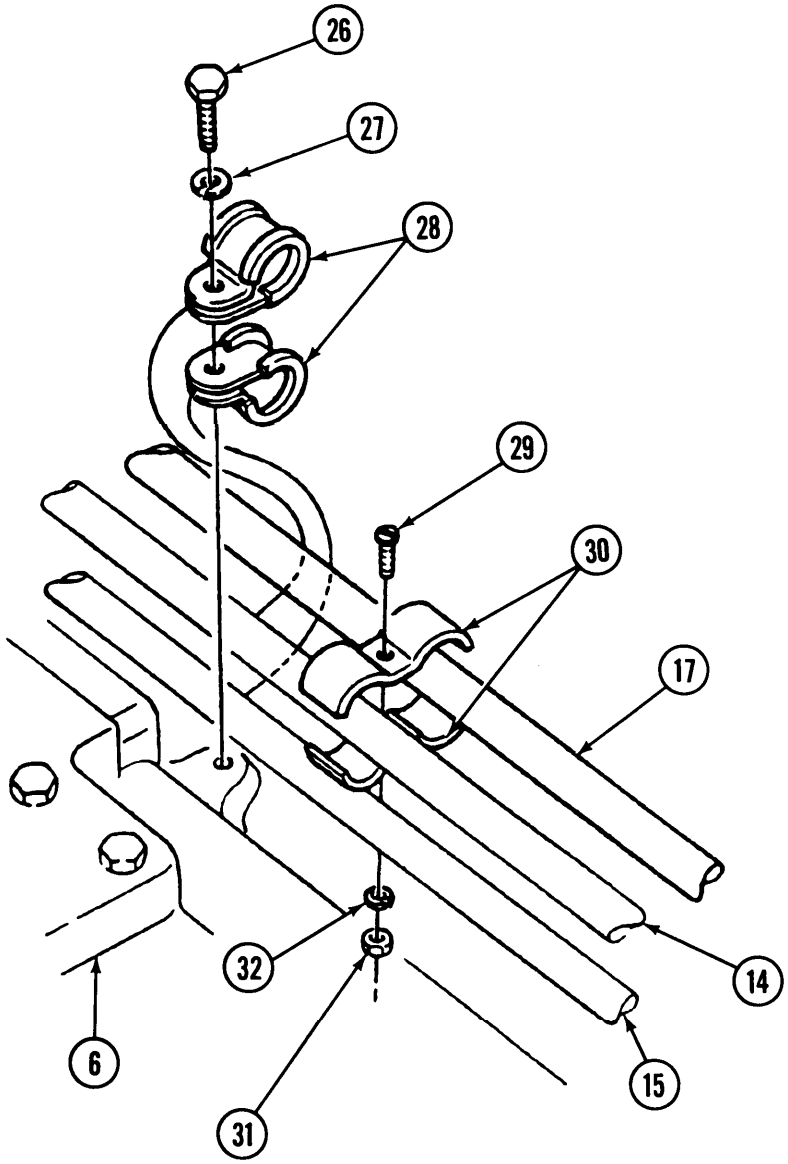
14. Connect tube assembly (17) and two adapters (37) on engine fuel line (36).



4-16. POWERPACK FUEL LINES REPLACEMENT (continued).

15. Secure two tube assemblies (14 and 15) to transmission (6) with six clamps (28), three new lockwashers (27), and three screws (26).

16. Secure tube assembly (17) to tube assembly (14) with two strap assemblies (30), screws (29), new lockwashers (32), and nuts (31).

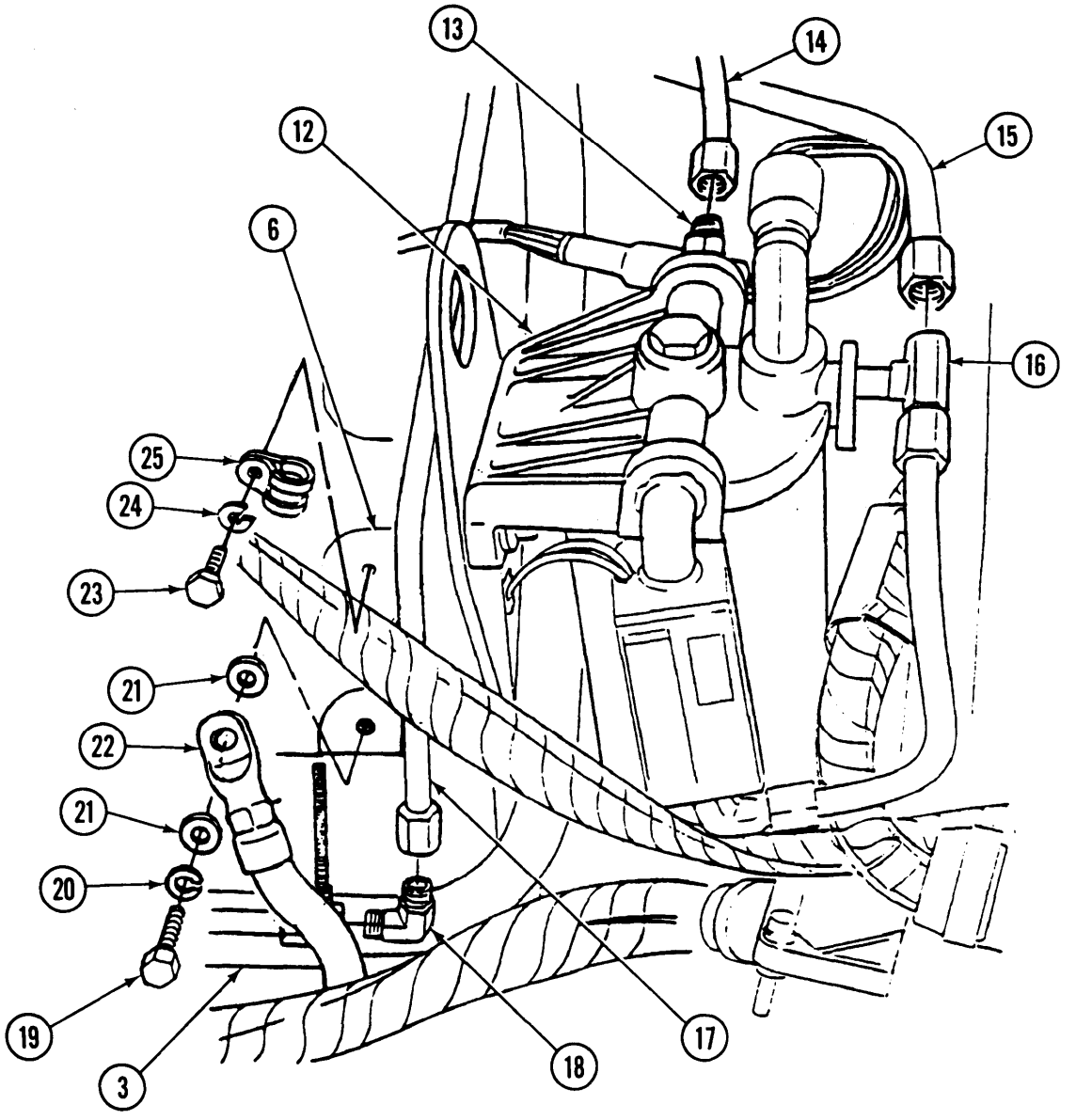


4-16. POWERPACK FUEL LINES REPLACEMENT (continued).

17. Connect tube assembly (15) to tee (16) on secondary fuel filter (12).

18. Connect tube assembly (14) to elbow (13) on secondary fuel filter (12).

19. Secure tube assembly (17) to transmission (6) with clamp (25), new lockwasher (24), and screw (23).



20. Install elbow (18) on tube assembly (17).

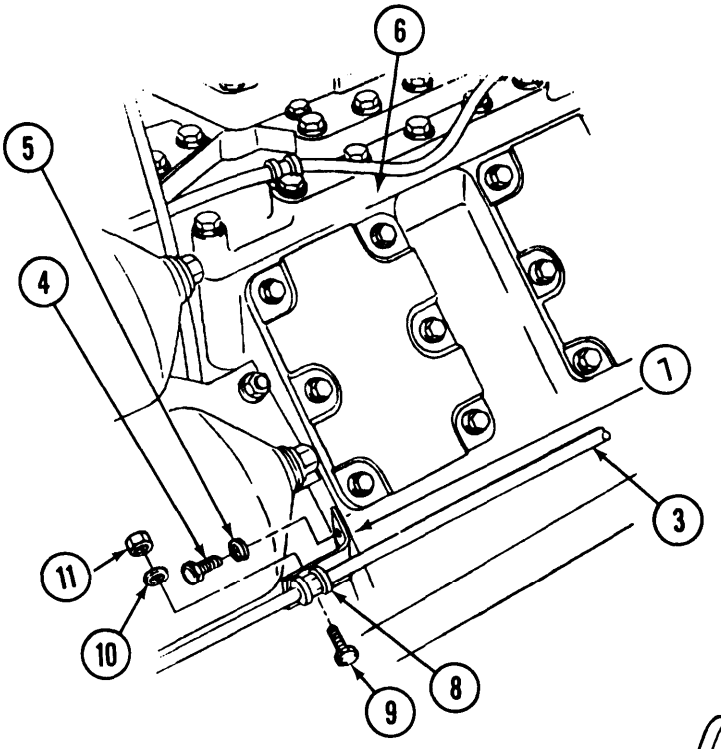
21. Connect tube assembly (3) to elbow (18).

22. Connect ground strap (22) to transmission (6) with two washers (21), new lockwasher (20), and screw (19).

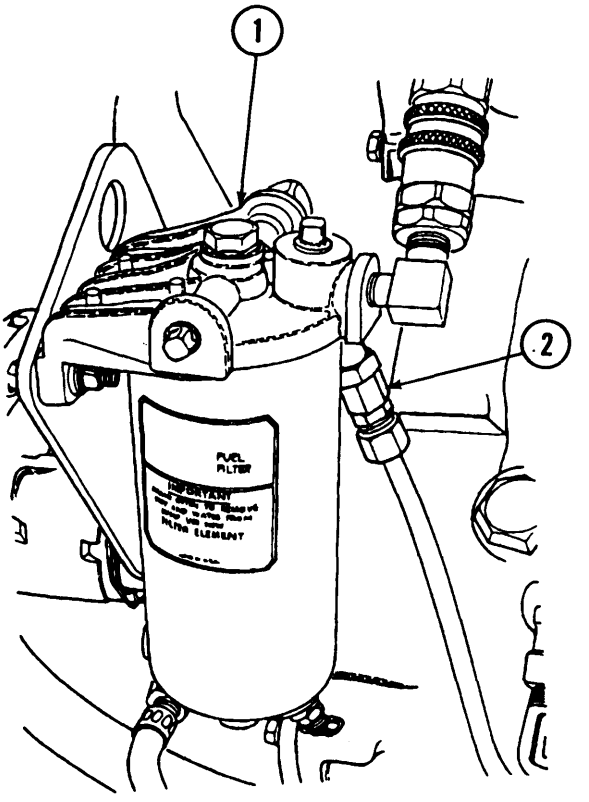
4-16. POWERPACK FUEL LINES REPLACEMENT (continued).

23. Install bracket (7) on transmission (6) with new lockwasher (5) and screw (4).

24. Secure tube assembly (3) to bracket (7) with clamp (8), screw (9), new lockwasher (10), and nut (11).



25. Connect tube assembly (3) to check valve (2) on primary fuel filter (1).



FOLLOW-ON MAINTENANCE:

- Install crossover exhaust pipe (para 3-11).
- Close transmission access doors (refer to TM 9-2350-287-10).

4-17. FUEL HOSES, LINES, AND FITTINGS REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Cap and plug set (Item 13, Appendix D)
- Teflon pipe sealant (Item 63, Appendix D)
- Lockwasher (12) (Item 175, Appendix H)
- Lockwasher (Item 196, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Fuel system drained (refer to TM 9-2350-287-10).
- Powerpack removed (para 3-2).

a. REMOVAL

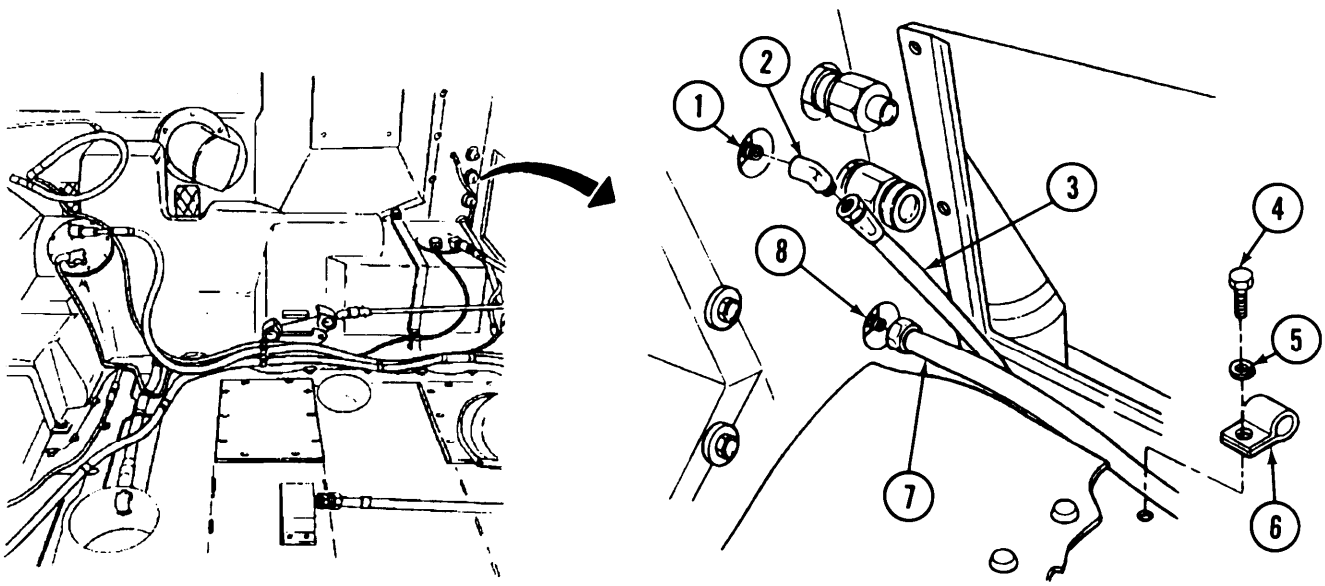
CAUTION

To prevent contamination of the fuel system, lines and fittings must be capped immediately after disconnection.

1. Disconnect APU fuel supply line (3) and elbow (2) from adapter (1) at bulkhead. Remove elbow (2) from fuel supply line (3).

2. Disconnect APU fuel return line (7) from adapter (8) at bulkhead.

3. Remove screw (4), lockwasher (5), and clamp (6) securing APU fuel return line (7) to hull. Discard lockwasher.



4-17. FUEL HOSES, LINES, AND FITTINGS REPLACEMENT (continued).

4. Disconnect APU fuel supply line (3) from elbow (11) on fuel distribution fitting (15), and remove supply line (3) from vehicle.

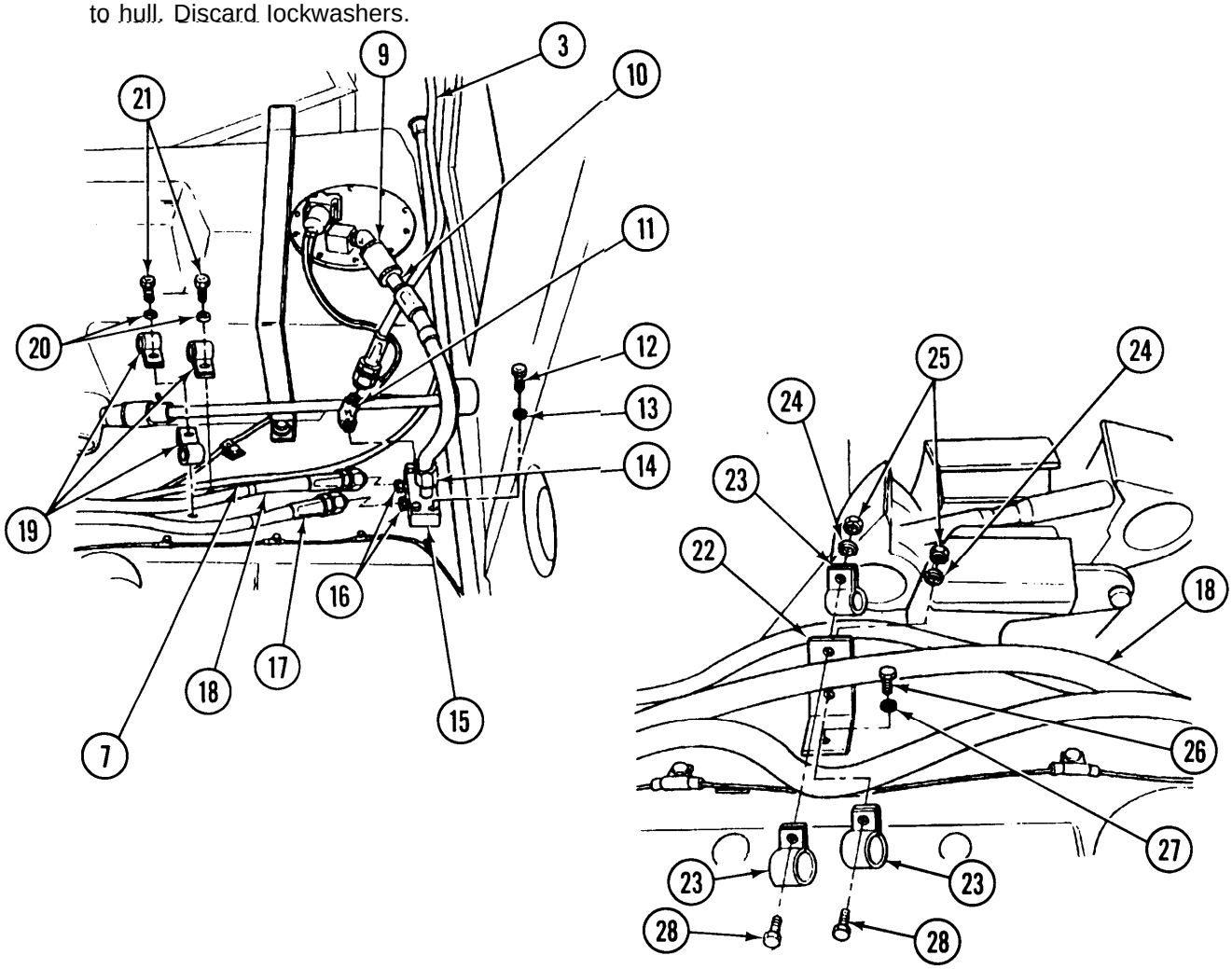
5. Disconnect supply hose assembly (10) from check valve (9) and adapter (14) on fuel distribution fitting (15), and remove supply hose assembly (10) from vehicle.

6. Disconnect supply hose (17) and return hose (18) from two adapters (16) on fuel distribution fitting (15).

7, Remove four screws (12), lockwashers (13), and fuel distribution fitting (15) from hull. Discard lockwashers.

8. Remove two adapters (16), adapter (14), and elbow (11) from fuel distribution fitting (15).

9. Remove two screws (21) and lockwashers (20) and three clamps (19) securing three hoses (7, 17, and 18) to hull. Discard lockwashers.



10. Remove two nuts (25), lockwashers (24), and screws (28) and three clamps (23) securing two hoses (17 and 18) to bracket (22).

11. Remove screw (26), lockwasher (27), and bracket (22) from vehicle. Discard lockwasher.

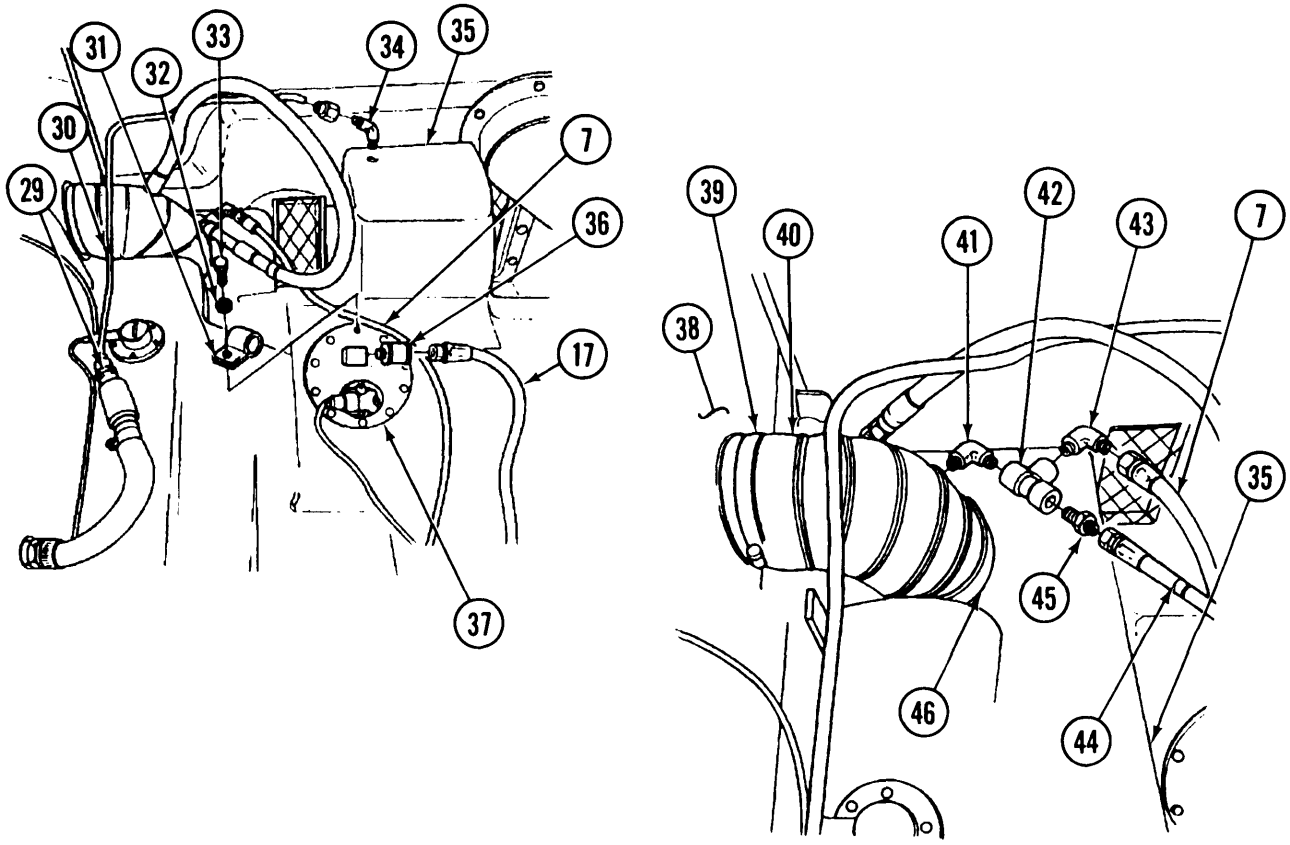
4-17. FUEL HOSES, LINES, AND FITTINGS REPLACEMENT (continued).

12. Disconnect supply hose (17) from check valve (36), and remove supply hose (17) from vehicle.

13. Remove screw (33), Iockwasher (32), and clamp (31) securing APU fuel return line (7) to fuel pump (37). Discard Iockwasher.

14. Disconnect tube assembly (30) from elbow (34) and adapter (29), and remove tube assembly (30) from vehicle.

15. Remove elbow (34) from lower fuel tank (35).



16. Loosen two clamps (39 and 46), and remove hose (40) from upper fuel tank (38) and lower fuel tank (35).

17. Disconnect APU fuel return line (7) from elbow (43), and remove fuel return hose (7) from vehicle.

18. Disconnect fuel return hose (44) from adapter (45), and remove fuel return hose (44) from vehicle.

19. Remove elbow (43) from tee (42).

20. Remove tee (42) from elbow (41).

21. Remove elbow (41) from lower fuel tank (35).

22. Remove adapter (45) from tee (42).

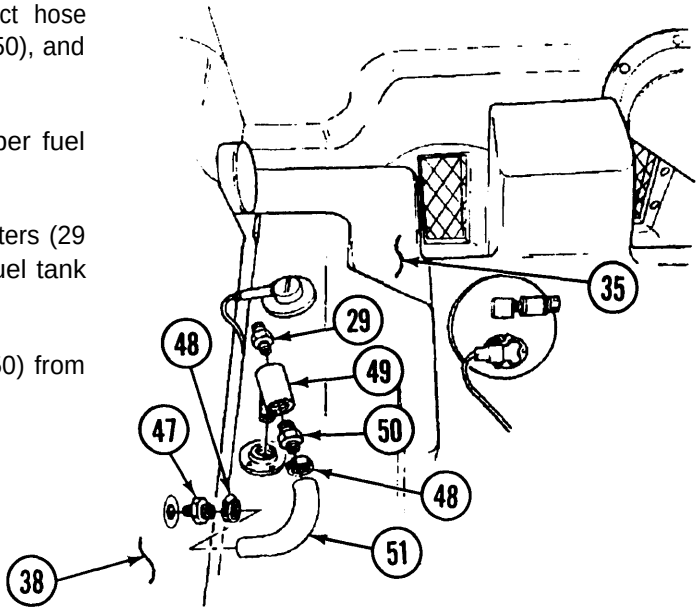
4-17. FUEL HOSES, LINES, AND FITTINGS REPLACEMENT (continued).

23. Loosen two clamps (48), disconnect hose (51) from two adapters (47 and 50), and remove hose (51) from vehicle.

24. Remove adapter (47) from upper fuel tank (38).

25. Remove tee (49), with two adapters (29 and 50) attached, from lower fuel tank (35).

26. Remove two adapters (29 and 50) from tee (49).



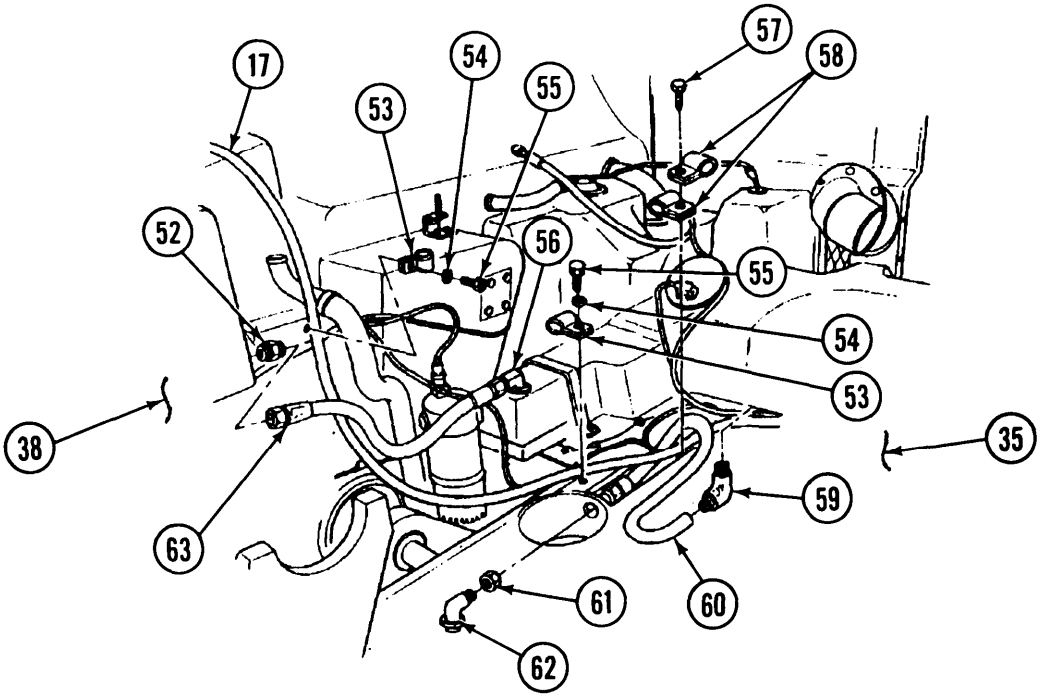
27. Remove screw (57) and two clamps (58) securing fuel supply hose (17) and drain hose (60) to hull.

28. Disconnect drain hose (60) from two elbows (59 and 62).

29. Remove elbow (59) from lower fuel tank (35).

30. Remove nut (61) and elbow (62) from hull.

31. Remove two screws (55), lockwashers (54), and clamps (53) securing fuel supply hose (17) to hull, and remove fuel supply hose (17) from vehicle. Discard lockwashers.



4-17. FUEL HOSES, LINES, AND FITTINGS REPLACEMENT (continued).

32. Disconnect hose (63) from elbow (56) and adapter (52), and remove hose (63) from vehicle.

33. Remove elbow (56) from lower fuel tank (35).

34. Remove adapter (52) from upper fuel tank (38).

b. INSTALLATION

NOTE

Apply Teflon pipe sealant to male threads of all fittings at installation.

1. Install adapter (52) in upper fuel tank (38).

2. Install elbow (56) in lower fuel tank (35).

3. Connect hose (63) to adapter (52) and elbow (56).

NOTE

Do not tighten screws on clamps until after connecting fuel return hose to fuel distribution fitting.

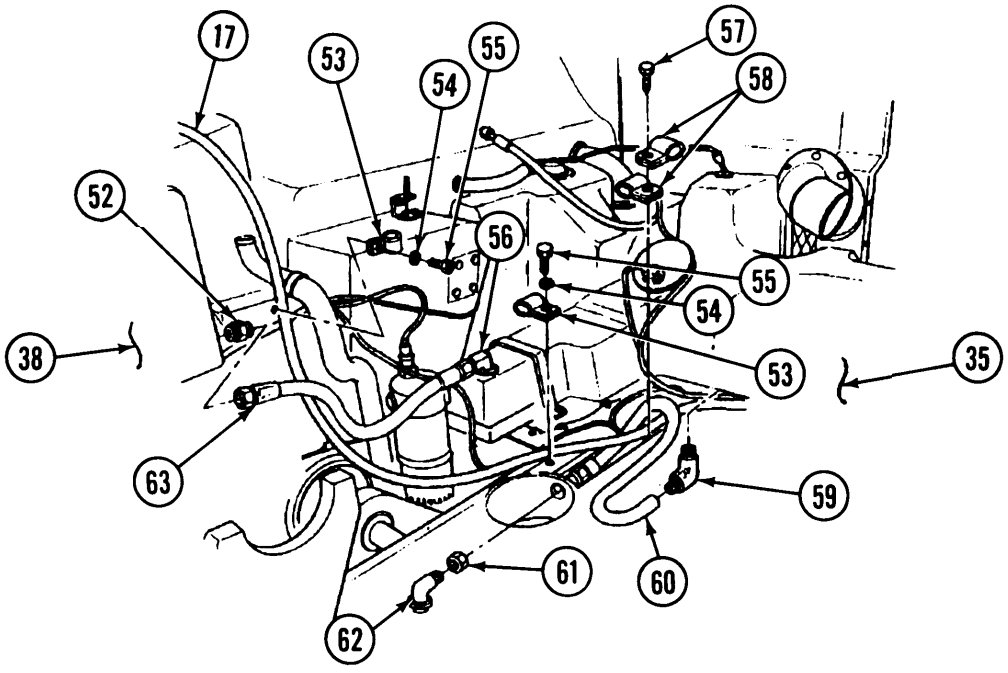
4. Install fuel supply hose (17) to hull with two clamps (53), new Iockwashers (54), and screws (55).

5. Install elbow (62) on hull with nut (61).

6. Install elbow (59) in lower fuel tank (35).

7. Connect drain hose (60) to two elbows (59 and 62).

8. Secure fuel supply hose (17), drain hose (60), and two clamps (58) to hull with screw (57).



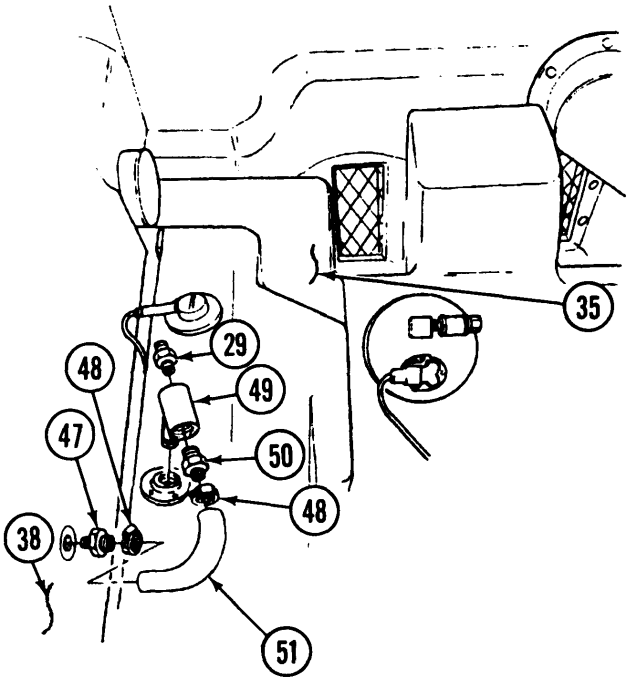
4-17. FUEL HOSES, LINES, AND FITTINGS REPLACEMENT (continued).

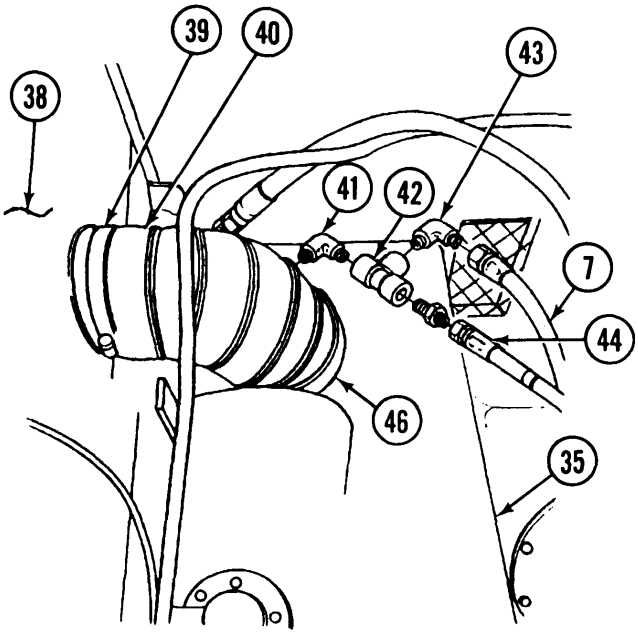
9. Install two adapters (29 and 50) in tee (49).

10. Install tee (49), with two adapters (29 and 50) attached, in lower fuel tank (35).

11. Install adapter (47) in upper fuel tank (38).

12. Install hose (51) on two adapters (47 and 50), and secure with two clamps (48).





13. Install adapter (45) in tee (42).

14. Install elbow (41) in lower fuel tank (35).

15. Install tee (42) on elbow (41).

16. Install elbow (43) on tee (42).

17. Connect fuel return hose (44) to adapter (45).

18. Connect APU fuel return line (7) to elbow (43).

19. Install hose (40) on upper fuel tank (38) and lower fuel tank (35), and tighten two clamps (39 and 46).

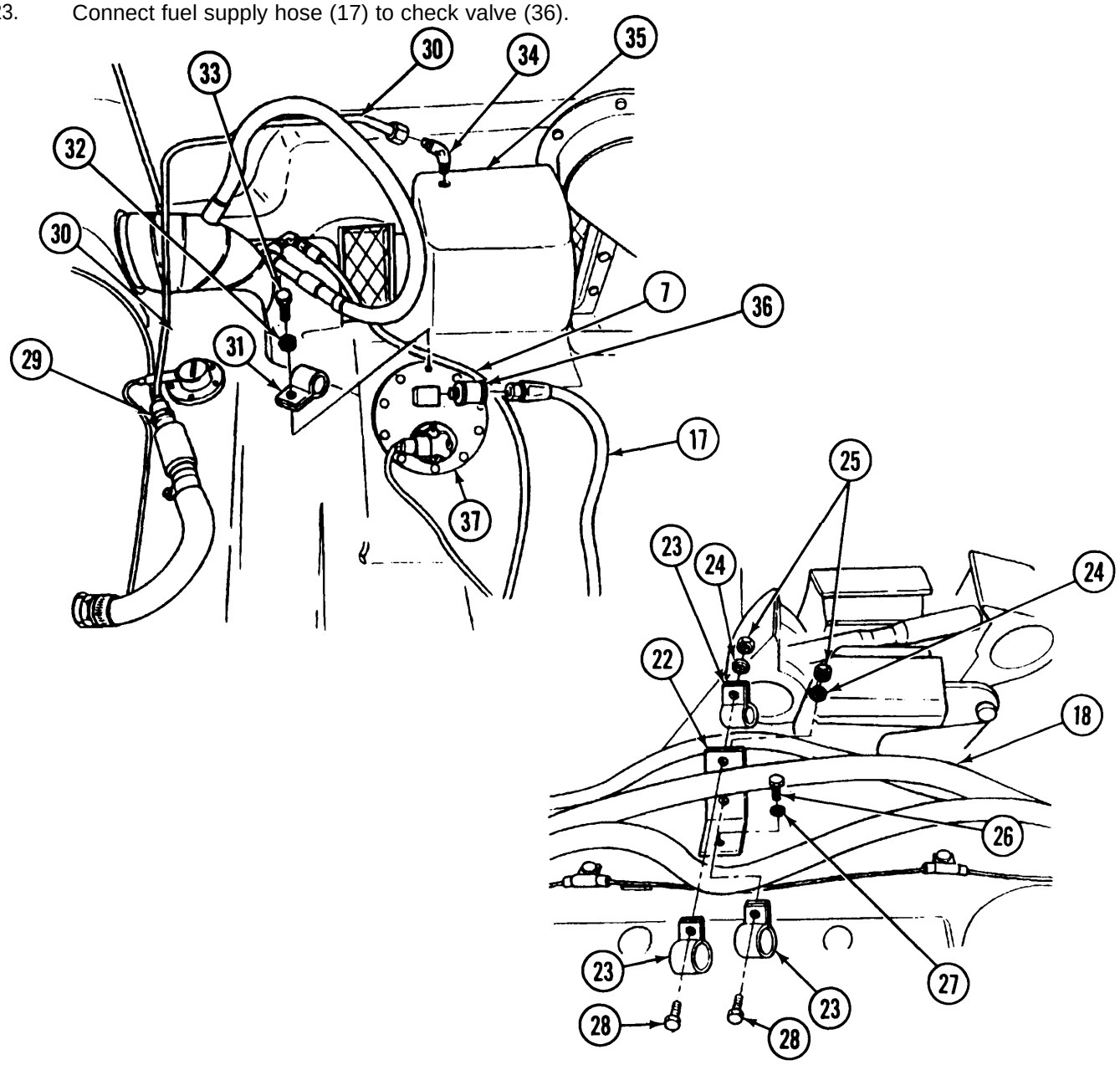
4-17. FUEL HOSES, LINES, AND FITTINGS REPLACEMENT (continued).

20. Install elbow (34) in lower fuel tank (35).

21. Connect tube assembly (30) to adapter (29) and elbow (34).

22. Secure APU fuel return line (7) and clamp (31) to fuel pump (37) with new lockwasher (32) and screw (33).

23. Connect fuel supply hose (17) to check valve (36).



24. Install bracket (22) on hull with new lockwasher (27) and screw (26).

25. Install fuel supply hose (17), fuel return hose (18), and two clamps (23) on bracket (22) with two screws (28), new lockwashers (24), and nuts (25).

4-17. FUEL HOSES, LINES, AND FITTINGS REPLACEMENT (continued).

26. Install three hoses (7, 17, and 18) and clamps (19) on hull with two new lockwashers (20) and screws (21).

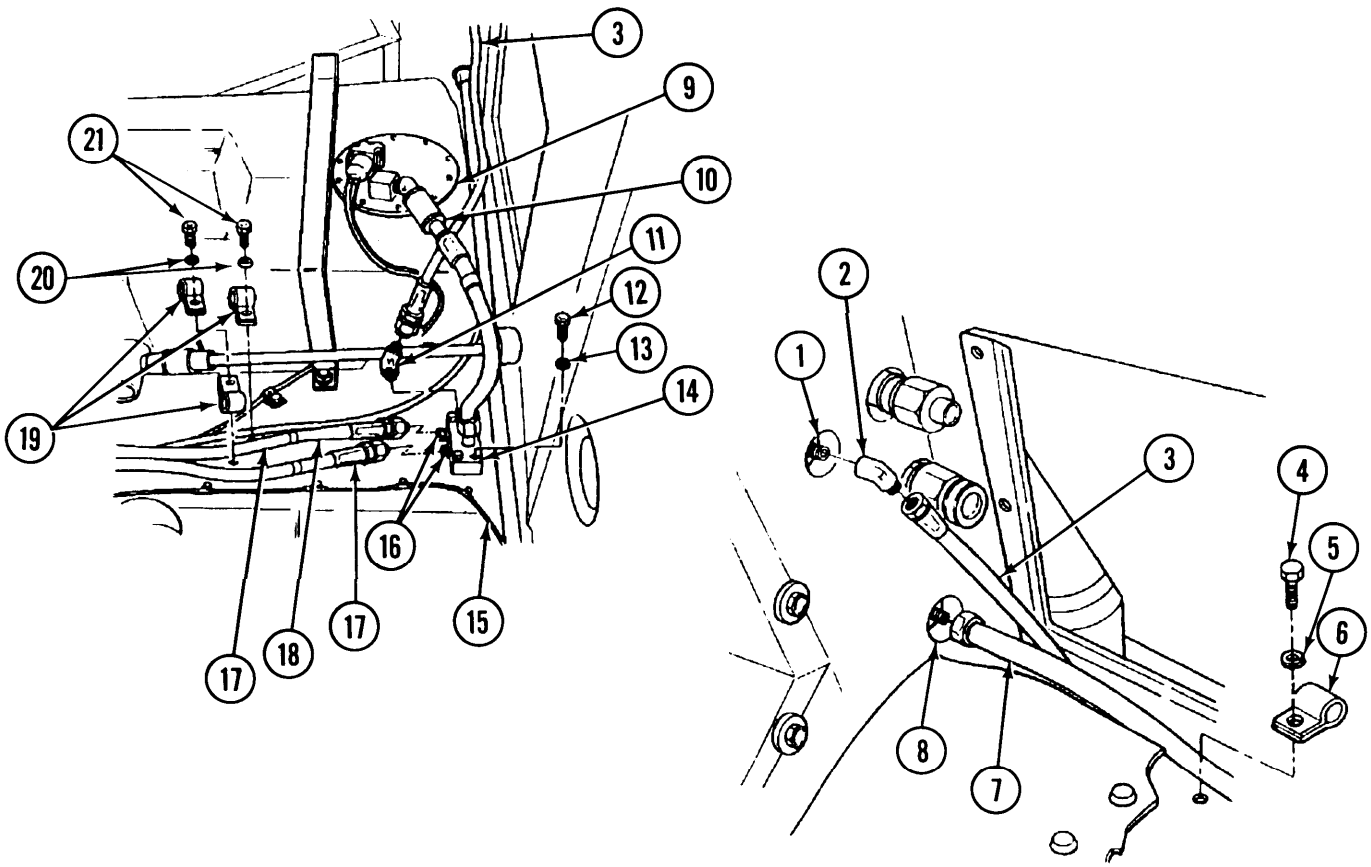
27. Install three adapters (14 and 16) and elbow (11) in fuel distribution fitting (15).

28. Install fuel distribution fitting (15) on hull with four new lockwashers (13) and screws (12).

29. Connect supply hose (17) and return hose (18) to two adapters (16) on fuel distribution fitting (15).

30. Connect fuel supply hose assembly (10) to check valve (9) and adapter (14).

31. Connect APU fuel supply line (3) to elbow (11).



32. Install APU fuel return line (7) and clamp (6) on hull with new lockwasher (5) and screw (4).

33. Connect APU fuel return line (7) to adapter (8).

34. Install elbow (2) on APU fuel supply line (3), and connect elbow (2) to adapter (1).

FOLLOW-ON MAINTENANCE:
- Install powerpack (para 3-2).
- Refill fuel system (refer to TM 9-2350-287-10).

4-18. PRIMARY FUEL FILTER ASSEMBLY LIFTING BRACKET REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Lockwasher (2) (Item 164, Appendix H)
- Lockwasher (3) (Item 165, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Right transmission access door opened (refer to TM 9-2350-287-10).

a. REMOVAL

NOTE

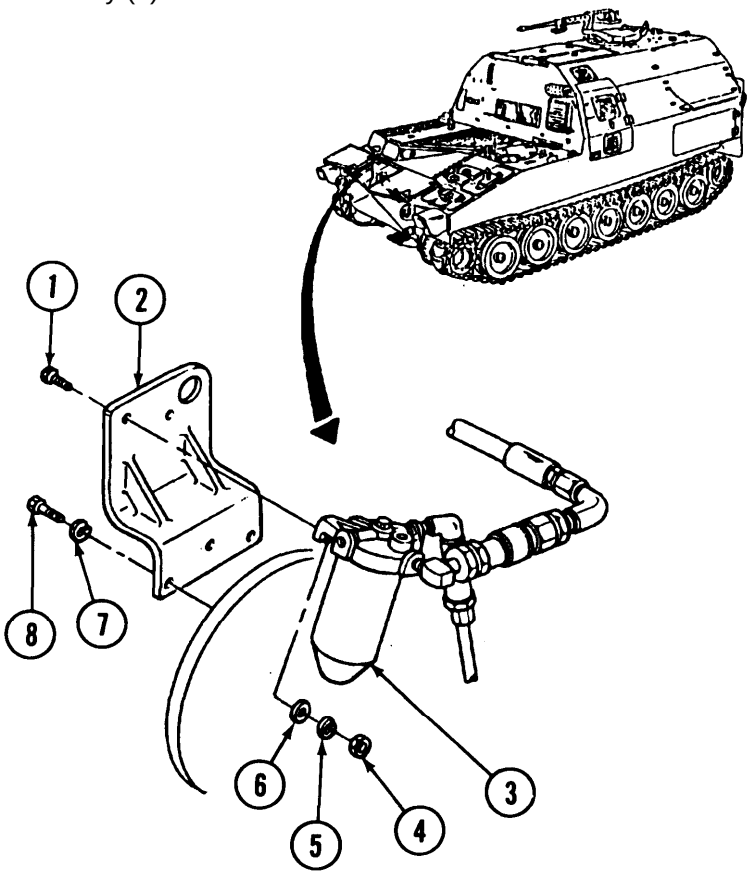
It is not necessary to disconnect fuel lines or drain fuel filter.

1. Remove two screws (1), nuts (4), lockwashers (5), and washers (6) securing primary fuel filter (3) to bracket assembly (2). Discard lockwashers.
2. Pull primary fuel filter (3) away from bracket assembly (2).

NOTE

Three screws are different lengths. When removed, mark to ensure proper installation.

3. Remove three screws (8) and lockwashers (7) and bracket assembly (2) from transmission. Discard lockwashers.



b. INSTALLATION

1. Install bracket assembly (2) on transmission with three new lockwashers (7) and three screws (8).
2. Secure primary fuel filter (3) to bracket assembly (2) with two screws (1), washers (6), new lockwashers (5), and nuts (4).

FOLLOW-ON MAINTENANCE:
- Close right transmission access door (refer to TM 9-2350-287-10).

4-19. SECONDARY FUEL FILTER ASSEMBLY LIFTING BRACKET REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Lockwasher (3) (Item 159, Appendix H)
- Lockwasher (2) (Item 164, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Left and right transmission access doors opened (refer to TM 9-2350-287-10).

a. REMOVAL

NOTE

It is not necessary to disconnect fuel lines or drain fuel filter.

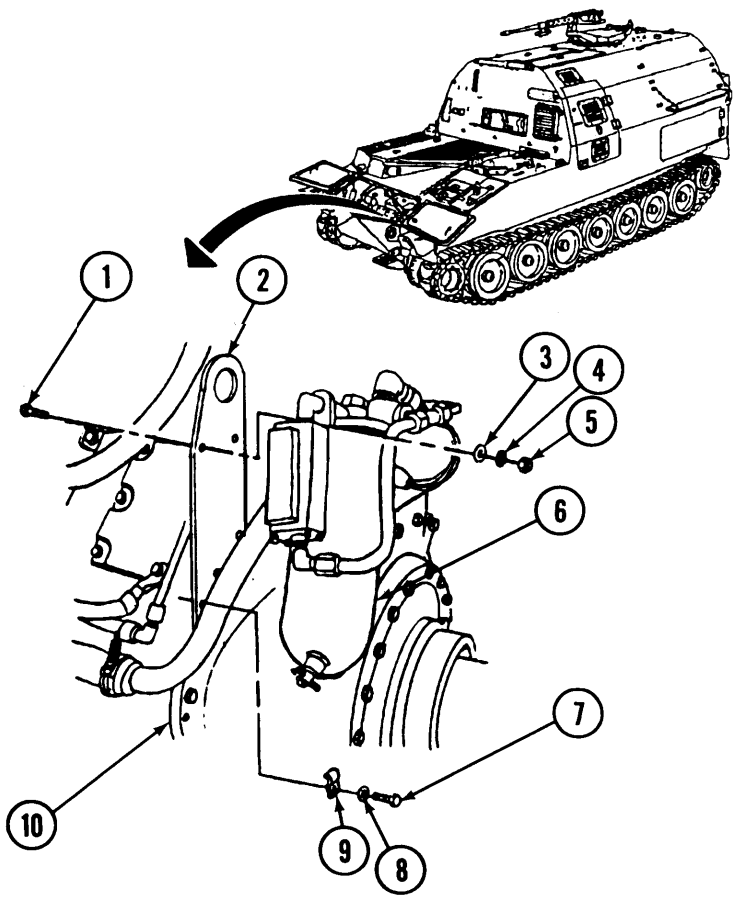
1. Remove two screws (1), nuts (5), lockwashers (4), and washers (3) securing secondary fuel filter (6) to lifting bracket (2). Discard lockwashers.

2. Remove three screws (7) and lockwashers (8), surge tank tube retaining strap (9), and lifting bracket (2) from transmission (10). Discard lockwashers.

b. INSTALLATION

1. Install lifting bracket (2) and surge tank tube retaining strap (9) on transmission (10) with three screws (7) and new lockwashers (8).

2. Secure secondary fuel filter (6) to lifting bracket (2) with two screws (1), washers (3), new lockwashers (4), and nuts (5).



FOLLOW-ON MAINTENANCE:
- Close left and right transmission access doors (refer to TM 9-2350-287-10).

4-20. FILLER NECK ASSEMBLY SEAL REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
• General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
• Silicone compound (Item 64, Appendix D)

Equipment Conditions:
• Vehicle parked on level ground (refer to TM 9-2350-287-10).

a. REMOVAL

1. Open fuel fill access door (1).
2. Remove fuel fill cap (8) and chain (9) from fuel filler neck (7).
3. Remove eight screws (2), washer (3), outer seal (4), inner seal (5), and washer (6) from around fuel filler neck (7).

b. INSTALLATION

NOTE

Seals are made eccentric so they can be adjusted. Filler neck may not be centered in filler neck hole. Adjust accordingly.

1. Apply silicone compound to outer and inner seals (4 and 5).
2. Place inner seal (5) inside outer seal (4). Turn outer and inner seals (4 and 5) to aline screw holes in seals.
3. Position washer (3) on top and washer (6) on bottom, alining threaded holes on each washer (3 and 6) with holes in seals (4 and 5).
4. Install eight screws (2) and turn three or four turns. Do not tighten screws.

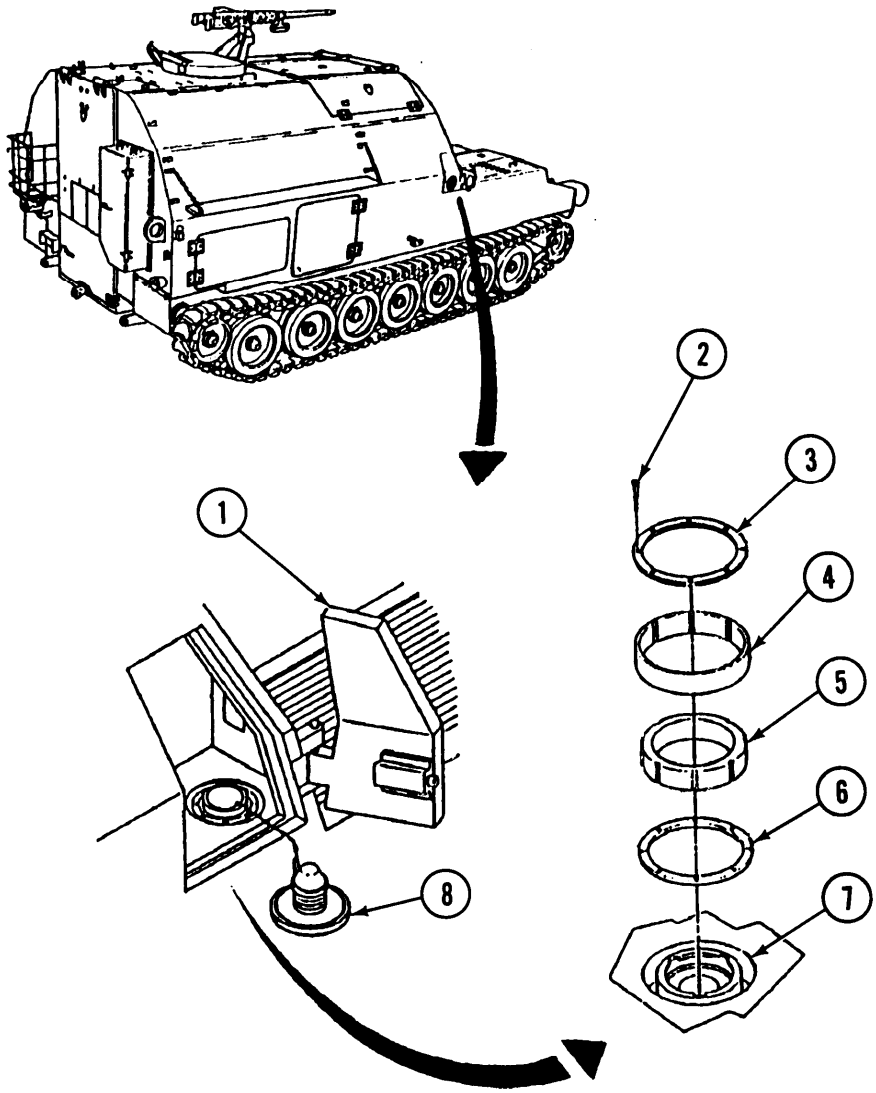
NOTE

Tightening or loosening of screws may be required during seal assembly installation.

5. Position and drive outer and inner seals (4 and 5) with attached top and bottom washers (3 and 6) into fuel filler neck (7).

4-20. FILLER NECK ASSEMBLY SEAL REPLACEMENT (continued).

6. Tighten eight screws (2) around fuel filler neck (7).
7. Connect chain (9) and fuel fill cap (8) to fuel filler neck (7).
8. Screw fuel fill cap (8) into fuel filler neck (7).
9. Close fuel fill access door (1).



FOLLOW-ON MAINTENANCE:
- None

4-21. FILLER NECK ASSEMBLY REPLACEMENT.

This Task Covens:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item *24,* Appendix 1)

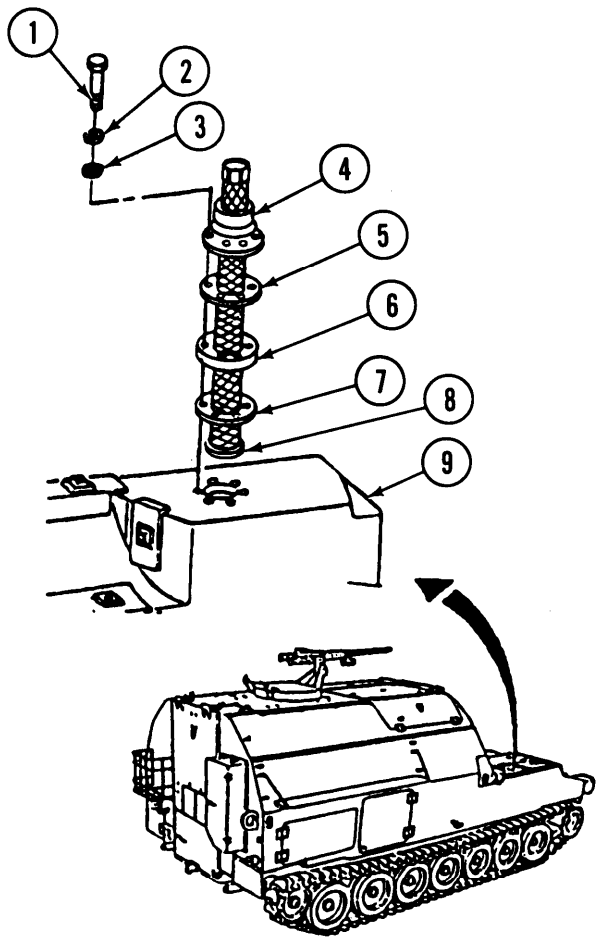
Materials/Parts:
- Silicone compound (Item 64, Appendix D)
- Gasket (2) (Item 52, Appendix H)
- Lockwasher (6) (Item 177, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Filler neck assembly seal removed (para 4-20).
- Upper fuel tank drained (para 4-2).

a. REMOVAL

1. Remove six screws (1), lockwashers (2), and washers (3) from fuel filler neck (4). Discard lockwashers.

2. Remove fuel filler neck (4), gasket (5), spacer (6), gasket (7) and strainer (8) from upper fuel tank (9). Discard gaskets.



b. INSTALLATION

NOTE

Apply silicone compound to gasket surfaces before installation.

1. Install strainer (8), new gasket (7), spacer (6), new gasket (5), and fuel filler neck (4) in upper fuel tank (9).

2. Install six screws (1), new lockwashers (2), and washers (3) on fuel filler neck (4).

FOLLOW-ON MAINTENANCE:
- Refill upper fuel tank (refer to TM 9-2350-287-10).
- Install filler neck assembly seal (para 4-20).

4-22. UPPER FUEL TANK LEVEL TRANSMITTER REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- Sealing compound (Item 58, Appendix D)
- Gasket (2) (Item 60, Appendix H)
- Lockwasher (3) (Item 175, Appendix H)

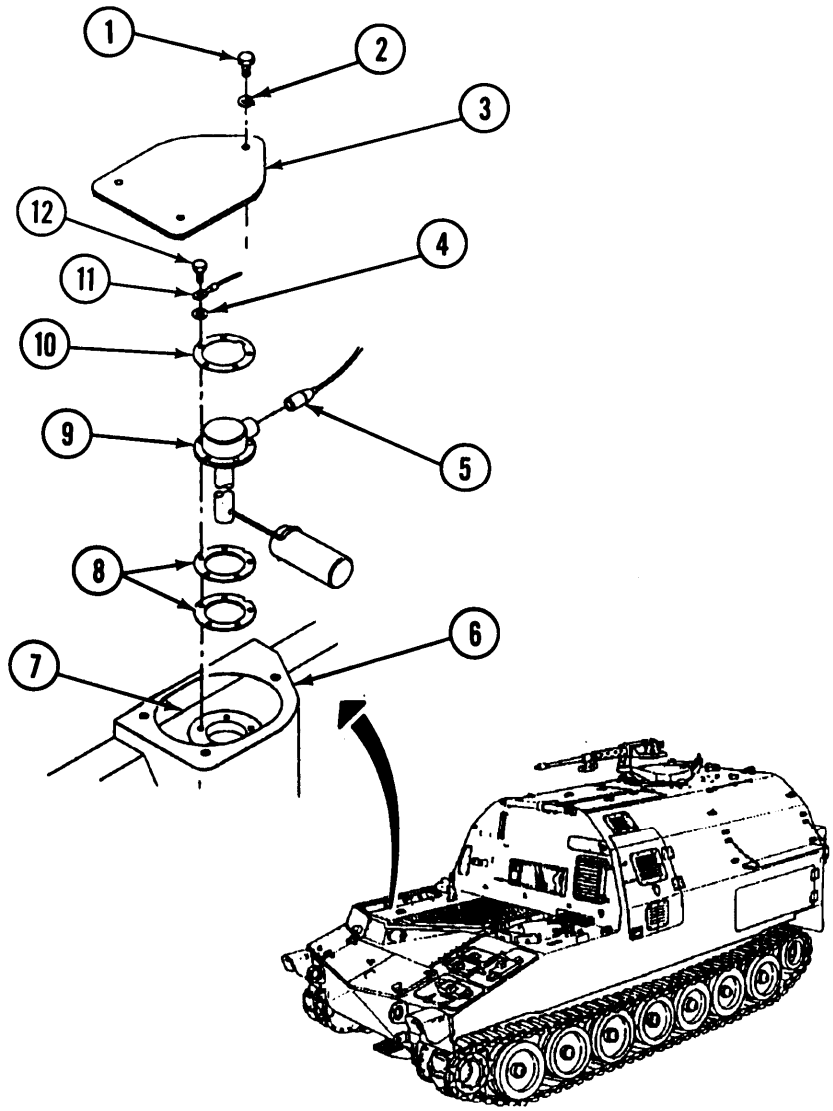
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Exhaust deck removed (para 15-8).

a. REMOVAL

NOTE

If upper fuel tank is full, drain enough fuel to make removal of transmitter possible.

1. Remove three screws (1) and lockwashers (2) and cover (3) from heat shield (6). Discard lockwashers.
2. Disconnect electrical connector (5) from fuel tank level transmitter (9).
3. Remove five screws (12), ground lead (11), five washers (4), and spacer (10) from transmitter (9).
4. Remove transmitter (9) and two gaskets (8) from fuel tank (7). Discard gaskets.



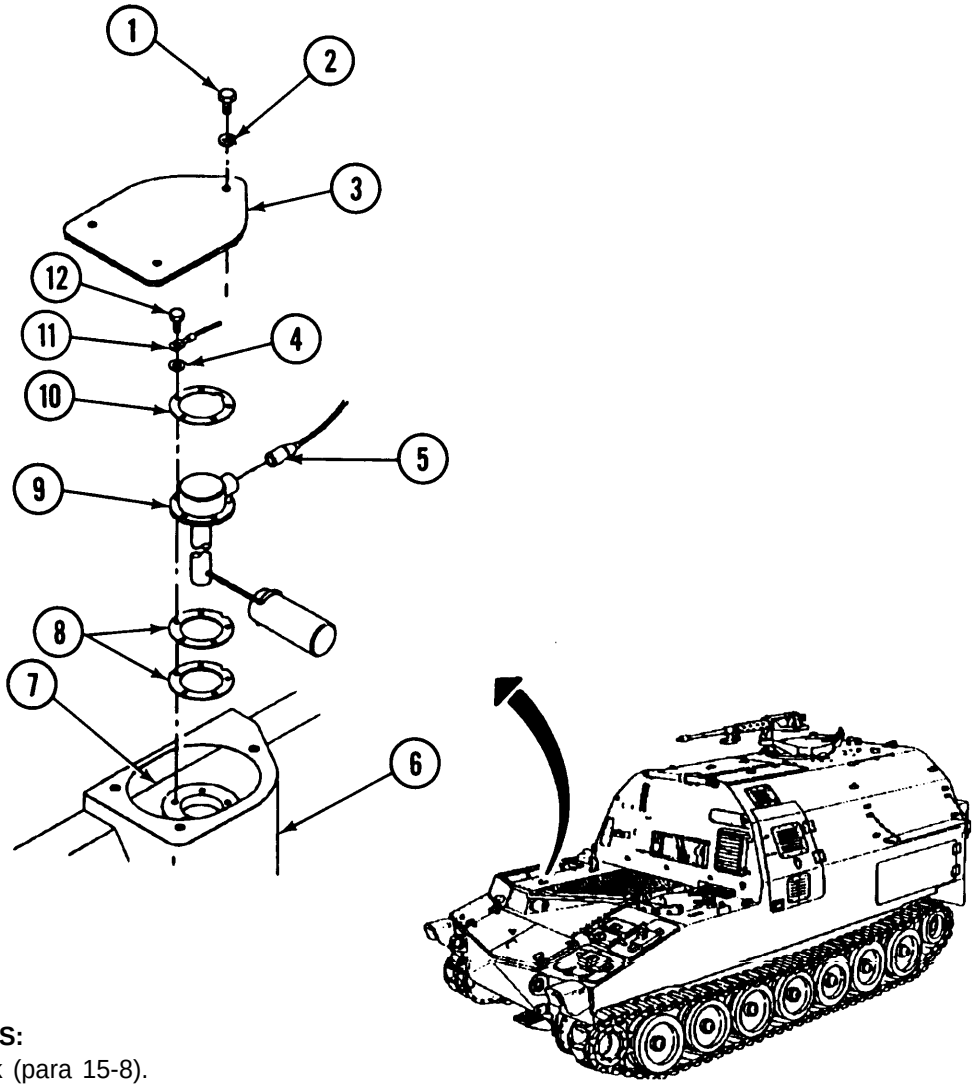
4-22. UPPER FUEL TANK LEVEL TRANSMITTER REPLACEMENT (continued).

b. INSTALLATION

NOTE

Apply sealing compound to gaskets before installation.

1. Install two new gaskets (8) and transmitter (9) in fuel tank (7).
2. Install spacer (10), five washers (4), ground lead (11), and five screws (12) on transmitter (9).
3. Connect electrical connector (5) to transmitter (9).
4. Install cover (3) on heat shield (6) with three screws (1) and new lockwashers (2).



FOLLOW-ON TASKS:
- Install exhaust deck (para 15-8).

4-23. LOWER FUEL TANK LEVEL TRANSMITTER REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

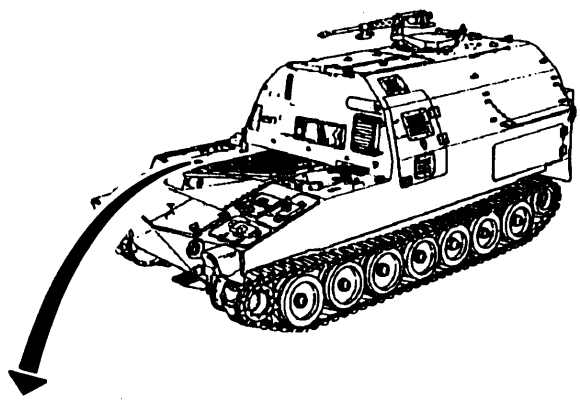
Tools/Test Equipment:
- General mechanics took kit (item 24, Appendix 1)

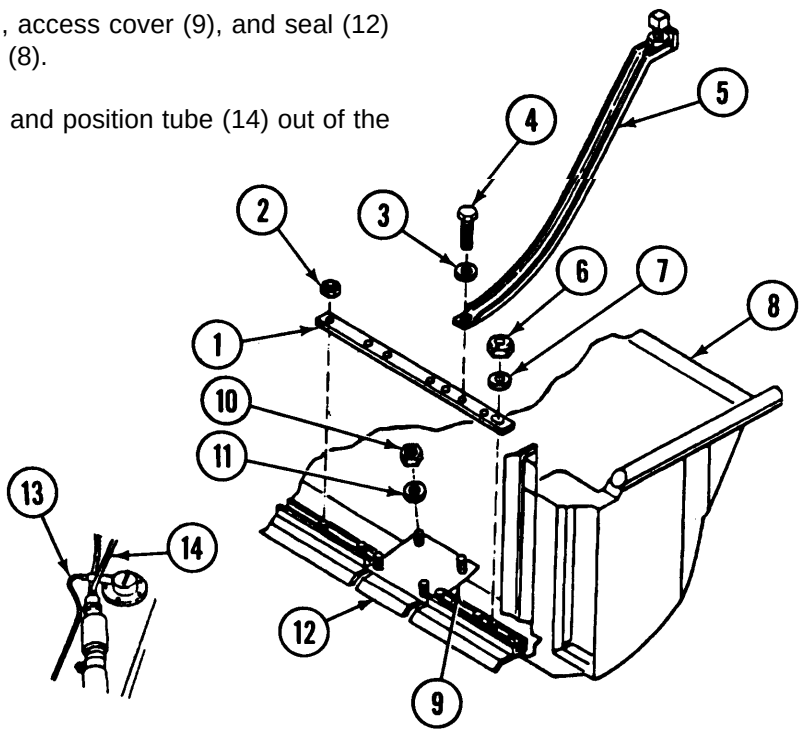
Materials/Parts:
- Sealing compound (Item 58, Appendix D)
- Gasket (Item 60, Appendix H)
- Self-locking nut (6) (Item 317, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Fuel tanks drained (para 4-2).
- Exhaust deck removed (para 15-8).

a. REMOVAL

1. Remove six self-locking nuts (2) from bar (1). Discard self-locking nuts.
2. Remove screw (4), washer (3), and stiffener (5) from bar (1).
3. Remove nut (6) and washer (7) from bar (l).
4. Remove two nuts (10) and washers (11) from access cover (9).
5. Remove bar (1), access cover (9), and seal (12) from heat shield (8).
6. Loosen nut (13) and position tube (14) out of the way.





4-23. LOWER FUEL TANK LEVEL TRANSMITTER REPLACEMENT (continued).

7. Disconnect electrical connector (15) from transmitter (21).

8. Remove five screws (16) and washers (17) and ground lead (18) from transmitter (21).

9, Remove transmitter (21) and gasket (20) from lower fuel tank (1 9). Discard gasket.

b. **INSTALLATION**

1. Apply sealing compound to new gasket (20), and install new gasket (20) and transmitter (21) in Iower fuel tank (19).

2. Install ground lead (18) on transmitter (21) with five screws (16) and washers (17).

3. Connect electrical connector (15) to transmitter (21).

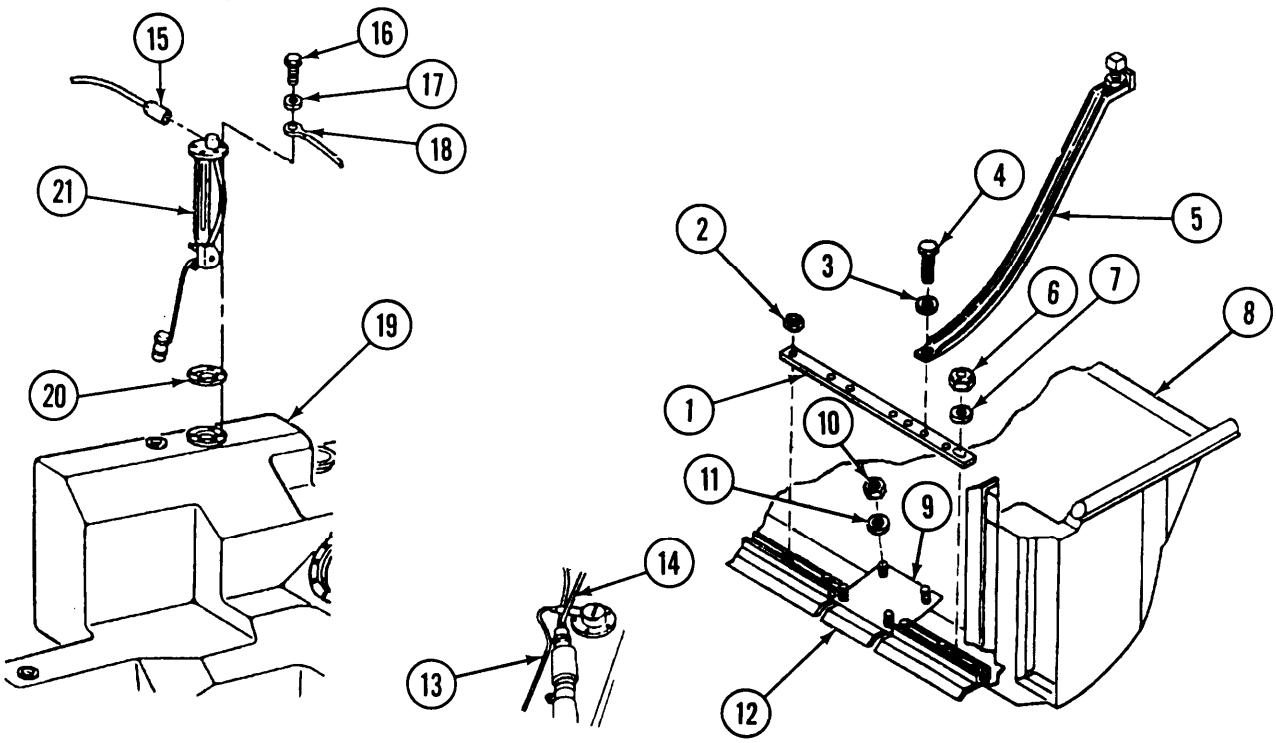
4. Position tube (14) into place and tighten nut (13).

5. Install seal (12), access cover (9), and bar (1) on heat shield (8).

6, Install two nuts (10) and washers (11) on access cover (9).

7. Install nut (6), washer (7), and six new self-locking nuts (2) on bar (1).

8. Install stiffener (5) on access cover (9) and heat shield (8) with screw (14) and washer (3).



FOLLOW-ON TASKS:
- Install exhaust deck (para 15-8).
- Refill fuel tanks (refer to TM 9-2350-287-1 0).

4-24. HEAT SHIELD REPAIR.

This Task Covers:

a. Removal
b. Disassembly
c. Cleaning and Inspection
d. Assembly
e. Installation

Initial Setup:

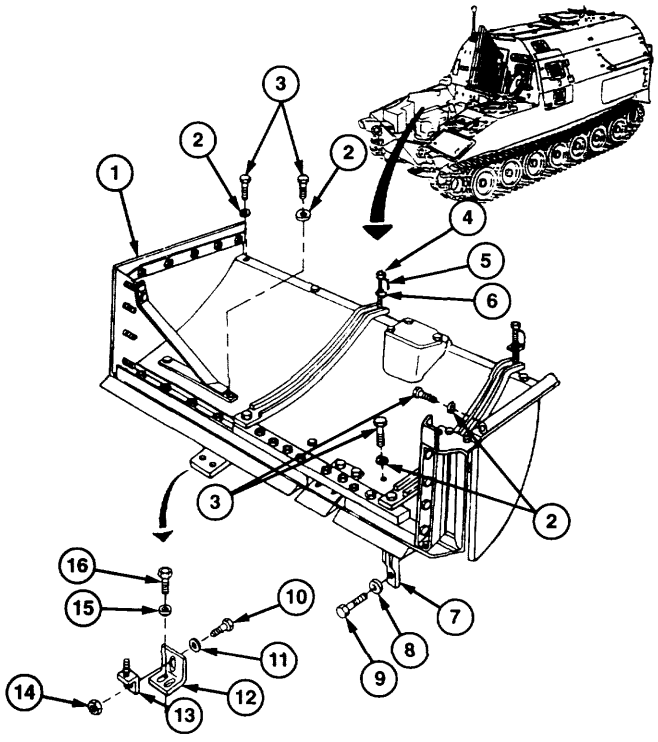
Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Adhesive, rubber (Item 5, Appendix D)
- Dry-cleaning solvent (Item 28, Appendix D)
- Sealing compound (Item 58, Appendix D)
- Lockwasher (3) (Item 175, Appendix H)
- Pad, insulation (Item 211, Appendix H)
- Self-locking nut (23) (Item 317, Appendix H
- Self-locking nut (3) (Item 320, Appendix H)
- Self-locking nut (2) (Item 324, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Powerpack, removed (para 3-2).
- Exhaust duct removed (para 5-2).

a. REMOVAL

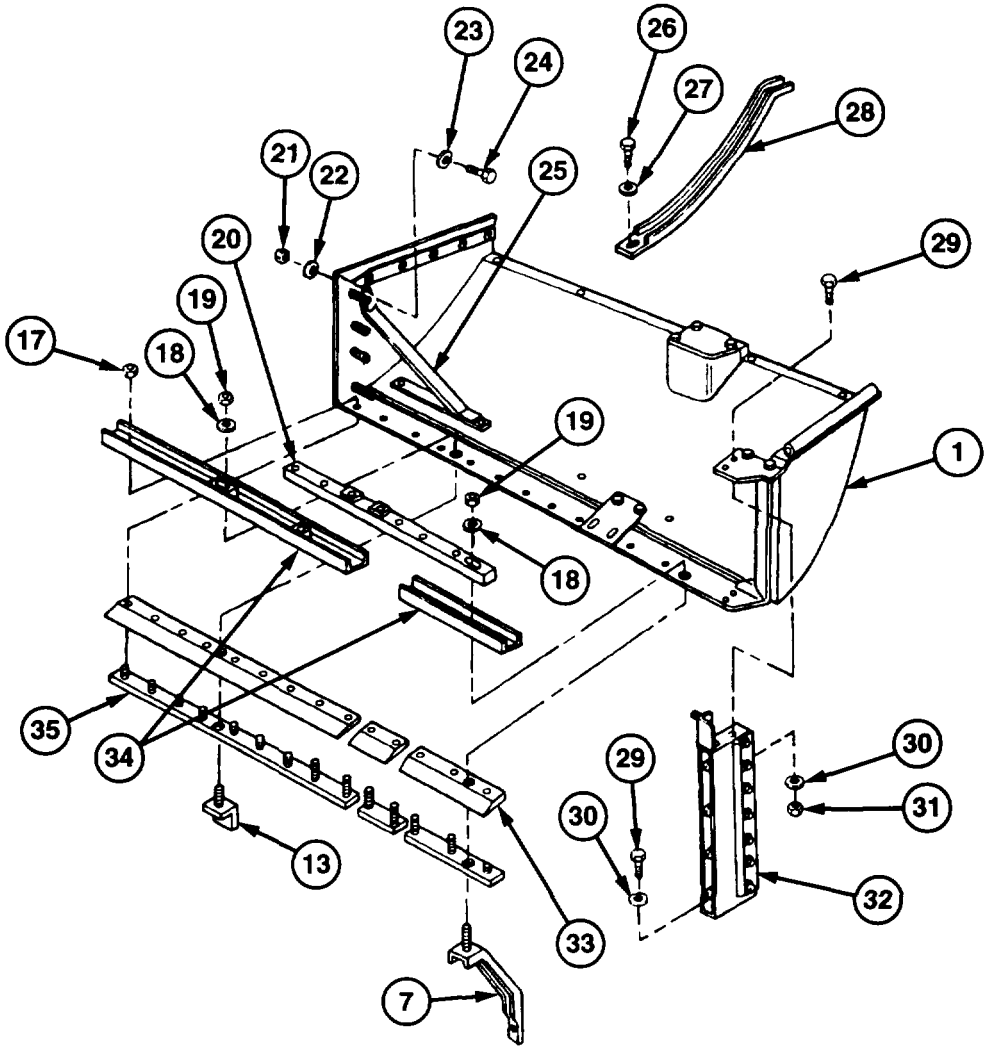
1. Remove two screws (4), nuts (6), and brackets (5) from fuel tank heat shield (1).
2. Remove 10 screws (3) and washers (2) from heat shield (1).
3. Remove two screws (16) and washers (15) and bracket (12) from vehicle.
4. Remove screw (9) and washer (8) from bracket (7).
5. Remove heat shield (1) from vehicle.
6. Remove screw (10), washer (11), and self-locking nut (14) to separate bracket (12) from section support (13). Discard self-locking nut.



4-24. HEAT SHIELD REPAIR (continued).

b. DISASSEMBLY

1. Remove two self-locking nuts (19) and washers (18), bracket (7), and section support (13) from heat shield(1). Discard self-locking nuts.
2. Remove two screws (26), washers (27), and stiffeners (28) from heat shield (1).
3. Remove two screws (24), washers (23), washers (22), and self-locking nuts (21) and shield support (25) from heat shield (1). Discard self-locking nuts.
4. Remove four screws (29), two self-locking nuts (31), four washers (30), and retainer (32) from heat shield (1). Discard self-locking nuts.
5. Remove 14 self-locking nuts (17), bar (20), and two stiffeners (34) from heat shield (1). Discard self-locking nuts.
6. Remove three seals (33) and seal retainers (35) from heat shield (1).



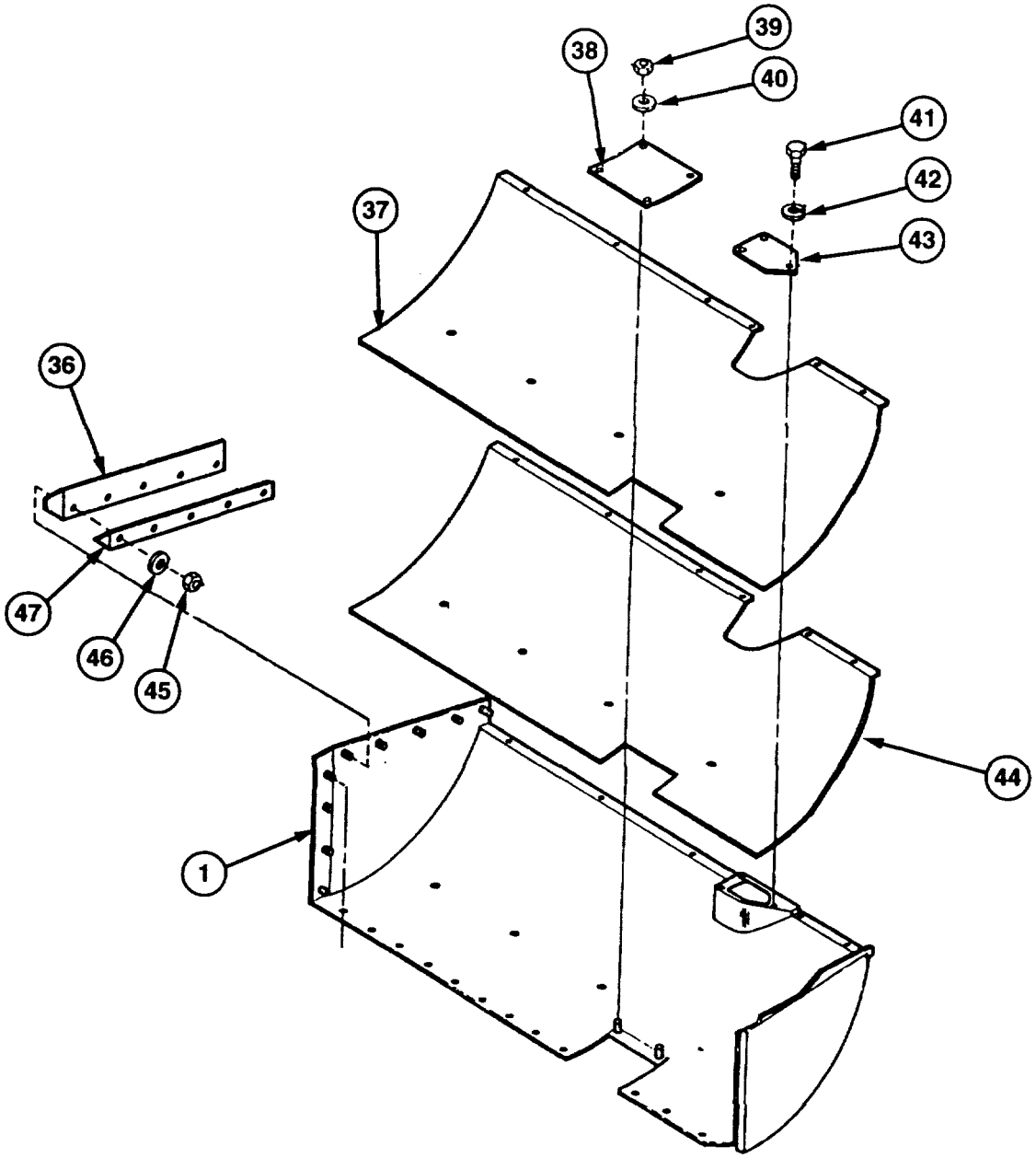
4-24. HEAT SHIELD REPAIR (continued).

7. Remove three screws (41) and lockwashers (42) and access cover (43) from heat shield (1). Discard lockwashers.

8. Remove two self-locking nuts (39) and washers (40) and access cover (38) from heat shield (1). Discard self-locking nuts.

9. Remove retainer (37) and insulation (44) from heat shield (1).

10. Remove five self-locking nuts (45) and washers (46), seal (36), and shield retain plate (47) from heat shield (1). Discard self-locking nuts.



4-24. HEAT SHIELD REPAIR (continued).

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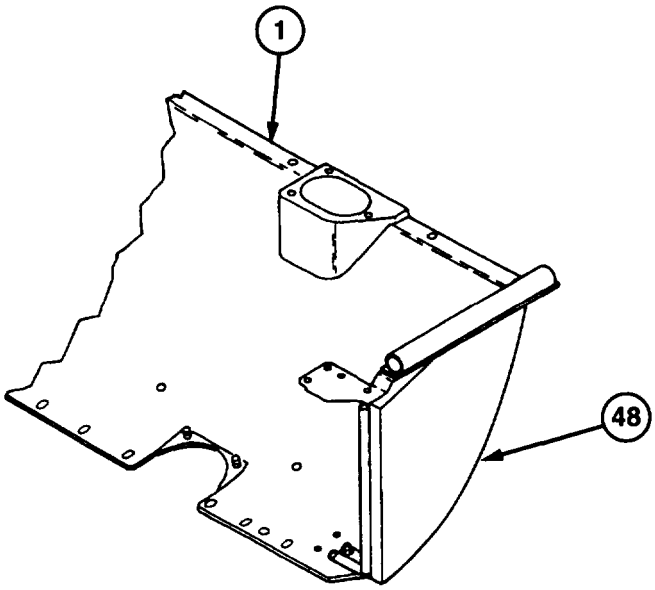


11. Remove heat shield thermal insulation (48) from heat shield (1) with putty knife. Discard thermal insulation.

c. CLEANING AND INSPECTION

WARNING

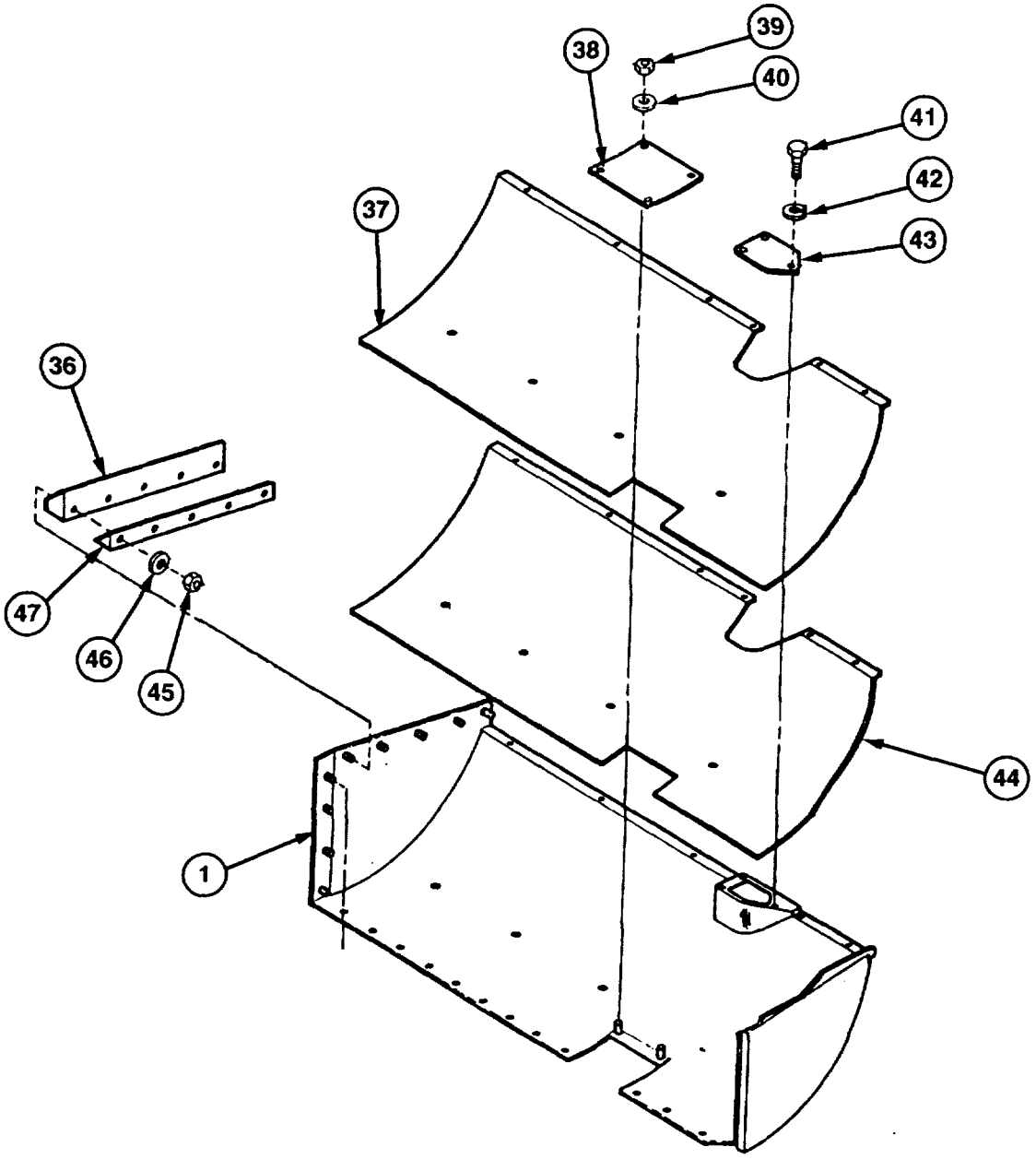
Dry-cleaning solvent P-D-680 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat.

1. Clean all metal parts with dry-cleaning solvent.
2. Clean thermal insulation mounting surface with dry-cleaning solvent to remove all residue and old thermal insulation adhesive.
3. Inspect all parts for damage. Replace any damaged parts.

d. ASSEMBLY

1. Apply rubber adhesive to new thermal insulation (48), and install thermal insulation (48) on heat shield (1).
2. Install seal (36) and shield retain plate (47) on heat shield (1) with five washers (46) and new self-locking nuts (45).

4-24. HEAT SHIELD REPAIR (continued).



3. Install insulation (44) and retainer (37) on heat shield (1).
4. Install access cover (38) on heat shield (1) with two washers (40) and new self-locking nuts (39).
5. Install access cover (43) on heat shield (1) with three new lockwashers (42) and screws (41).

4-24. HEAT SHIELD REPAIR (continued).

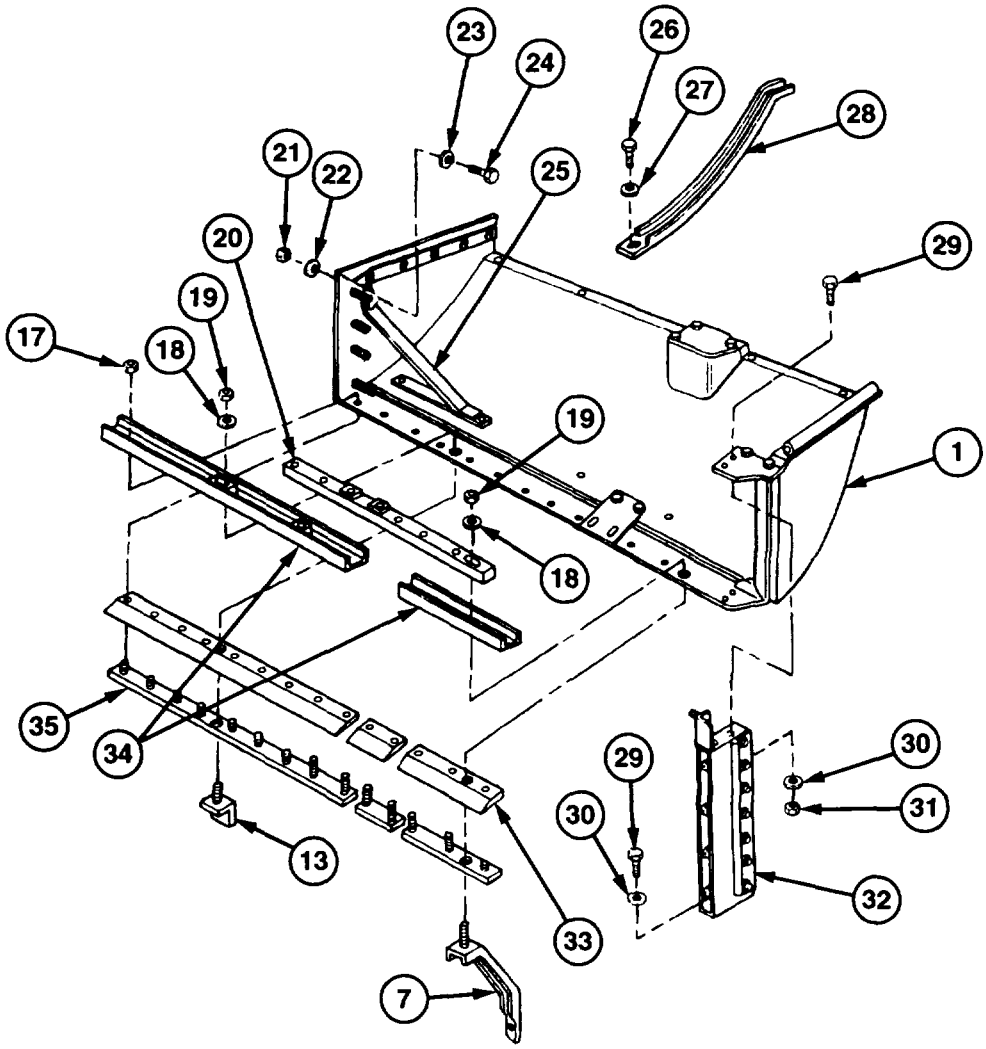
6. Install three seals (33) and seal retainers (35) on heat shield (1) with two stiffeners (34), bar (20), and 14 new self-locking nuts (17).

7. Install retainer (32) on heat shield (1) with four screws (29) and washers (30) and two new self-locking nuts (31).

8. Install shield support (25) on heat shield (1) with two screws (24), washers (23), washers (22), and new self-locking nuts (21).

9. Install two stiffeners (28) on heat shield (1) with two screws (26) and washers (27).

10. Install bracket (7) and section support (13) on heat shield (1) with two washers (18) and new self-locking nuts (19). Do not tighten self-locking nuts.



e. INSTALLATION

WARNING

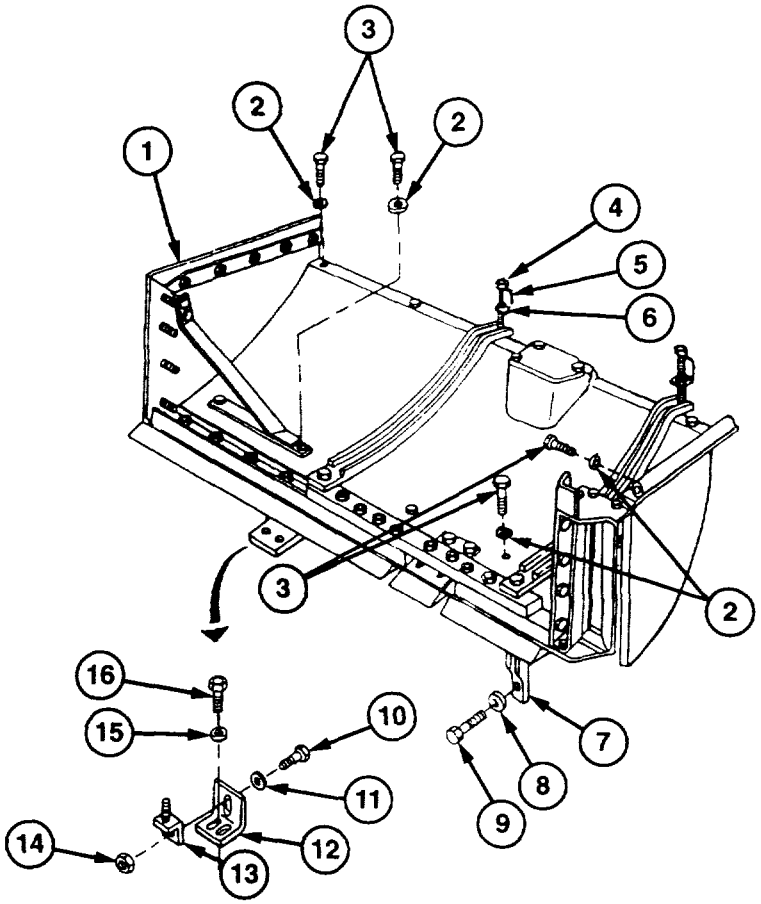
Sealing compounds can burn easily and can give off harmful vapors. To avoid injury, keep sealing compounds away from open fire and use them in a well-ventilated area.

4-24. HEAT SHIELD REPAIR (continued).

CAUTION

Threads of all screws must be coated with sealing compound when self-locking nuts are not used. Failure to do so can result in damage to equipment.

1. Secure bracket (12) to section support (13) with washer (11), screw (10), and new self-locking nut (14).
2. Install heat shield (1) in vehicle.
3. Install screw (9) and washer (8) on bracket (7)
4. Install bracket (12) in vehicle with two washers (15) and screws (16).
5. Install 10 screws (3) and washers (2) on heat shield (1).



6. Install two brackets (5) on heat shield (1) with two screws (4) and nuts (6).
7. Tighten two self-locking nuts (19) on bracket (7) and section support (13).

FOLLOW-ON MAINTENANCE:

- Install powerpack (para 3-2).
- Install exhaust duct (para 5-2).

4-25. PRIMARY FUEL FILTER ASSEMBLY REPLACEMENT.

This Task Covers:

a. Removal
b. Disassembly
c. Cleaning and Inspection
d. Assembly
e. Installation

Initial Setup:

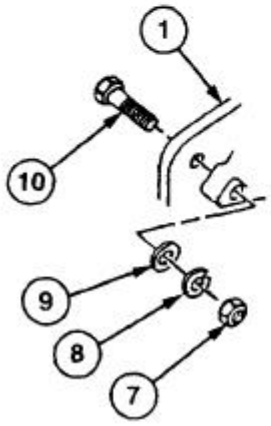
Tools/Test Equipment:
- Drain pan (Item 14, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)

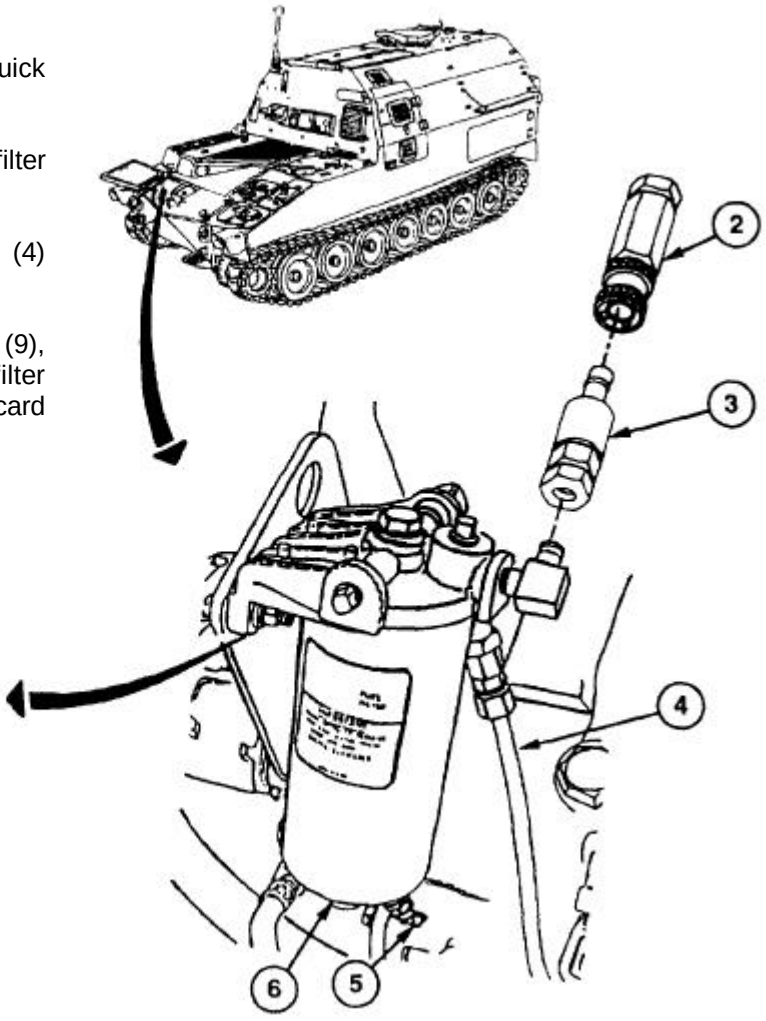
Materials/Parts:
- Dry-cleaning solvent (Item 28, Appendix D)
- Fluid filter element (Item 46, Appendix H)
- Gasket (Item 90, Appendix H)
- Lockwasher (2) (Item 164, Appendix H)
- Preformed packing (Item 226, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Right transmission access door opened (refer to TM 9-2350-287-10).

a. REMOVAL

1. Disconnect main fuel hose (2) at quick disconnect (3).
2. Open drain cock (5) and drain fuel from fuel filter assembly (6) into drain pan.
3. Disconnect engine-driven fuel pump hose (4) from fuel filter assembly (6).
4. Remove two screws (10), washers (9), lockwashers (8), and nuts (7) and fuel filter assembly (6) from bracket (1). Discard lockwashers.





4-25. PRIMARY FUEL FILTER ASSEMBLY REPLACEMENT (continued).

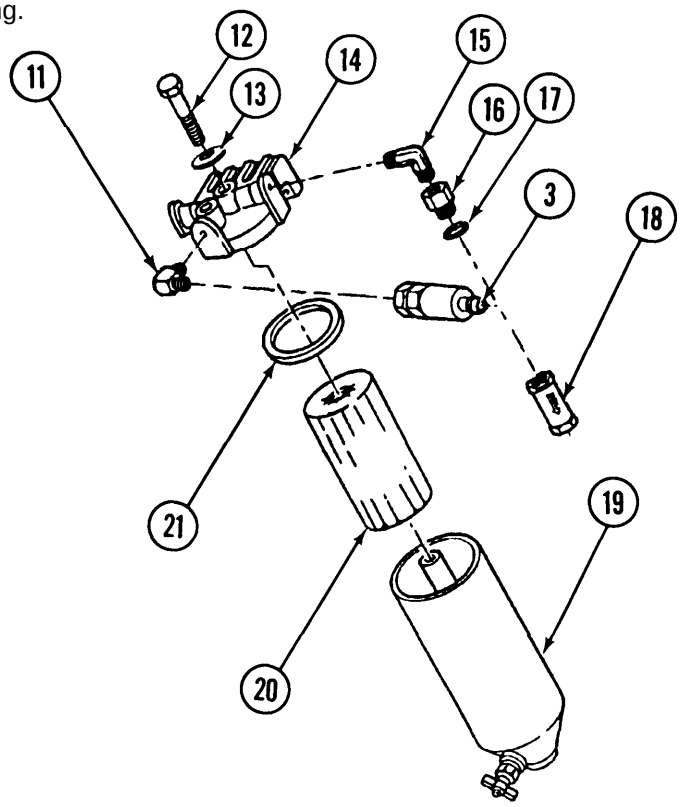
b. DISASSEMBLY

1. Remove cover screw (12) and washer (13) from filter cover (14).

2. Remove fitter shell (1 9), fuel filter element (20), and gasket (21) from filter cover (14), Discard fuel filter element and gasket.

3. Remove quick disconnect (3) and elbow (11) from filter cover (1 4).

4. Remove check valve (1 8), preformed packing (17), nipple (1 6), and elbow (15) from filter cover (14). Discard preformed packing.



c. CLEANING AND INSPECTION

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT use near open flame or excessive heat.

1. Clean all parts with drycleaning solvent.

2. Inspect all parts for damage. Replace damaged parts as necessary.

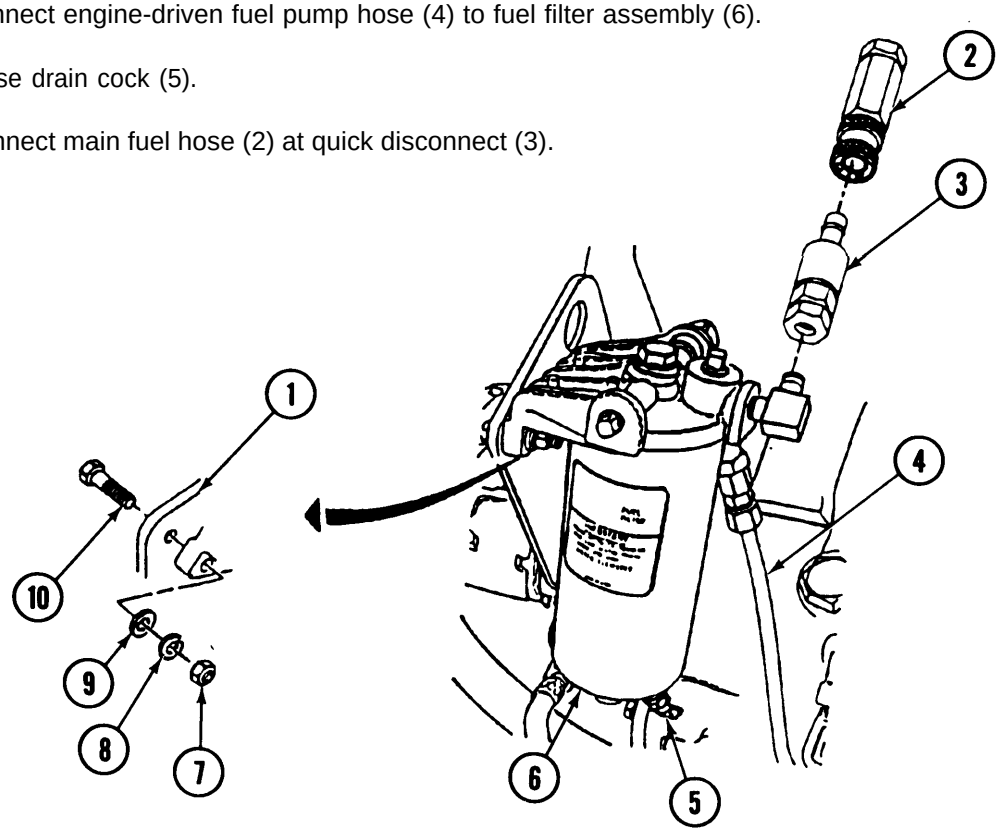
4-25. PRIMARY FUEL FILTER ASSEMBLY REPLACEMENT (continued).

d. ASSEMBLY

1. Install elbow (15), nipple (16), preformed packing (17), and check valve (18) on filter cover (14).
2. Install elbow (11) and quick disconnect (3) on filter cover (14).
3. install new fuel filter element (20) and new gasket (21) in filter shell (19).
4, Position filter shell (19) on filter cover (14) and secure with washer (13) and cover screw (12).

e. INSTALLATION

1. Install fuel filter assembly (6) on bracket (1) with two screws (10), washers (9), new lockwashers (8), and nuts (7).
2. Connect engine-driven fuel pump hose (4) to fuel filter assembly (6).
3. Close drain cock (5).
4. Connect main fuel hose (2) at quick disconnect (3).



FOLLOW-ON MAINTENANCE:
• Close right transmission access door (refer to TM 9-2350-287-10).

4-26. SECONDARY FUEL FILTER ASSEMBLY REPLACEMENT.

This Task Covers:

a. Removal
b. Disassembly
c. Cleaning and Inspection
d. Assembly
e. Installation

Initial Setup:

Tools/Test Equipment:
- Drain pan (Item 14, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- Cap and plug set (Item 13, Appendix D)
- Drycleaning solvent (Item 28, Appendix D)
- Teflon pipe sealant (Item 63, Appendix D)
- Fuel filter element (Item 46, Appendix H)
- Gasket (Item 85, Appendix H)
- Lockwasher (2) (Item 164, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-1 O).
- Left and right transmission access doors opened (refer to TM 9-2350-287-10).

a. REMOVAL

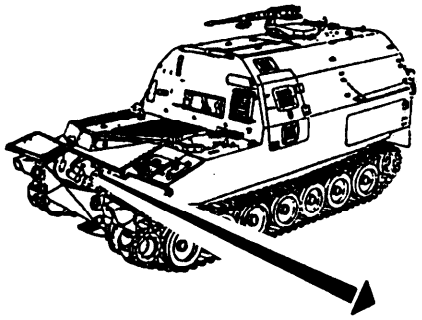
CAUTION

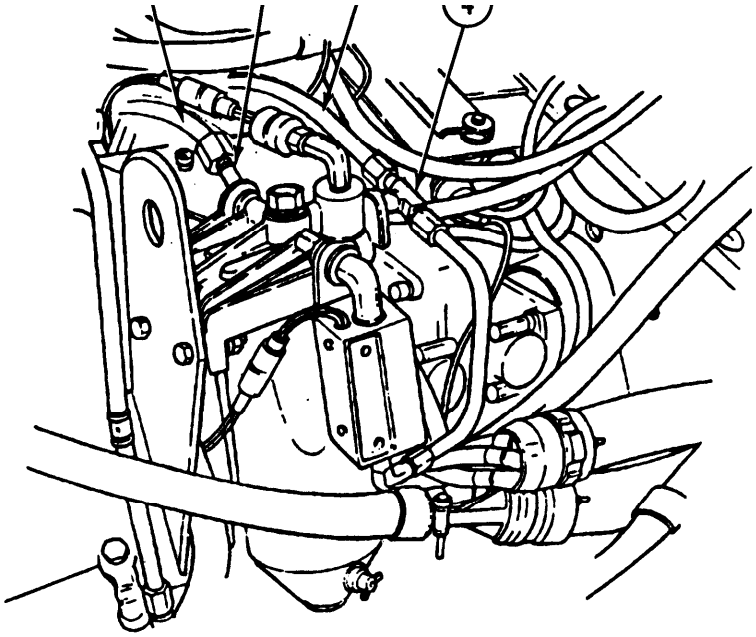
Cap all fuel component openings with protective covers. Do not use tape to seal fuel openings; tape adhesive can contaminate fuel.

1. Open drain cock (6) and drain fuel from fuel filter assembly (5) into drain pan.

2. Disconnect tube (1) from elbow (2).

3. Disconnect tube (3) from tee (4).





4-26. SECONDARY FUEL FILTER ASSEMBLY REPLACEMENT (continued).

4. Remove electrical connector (7) from transducer (8).

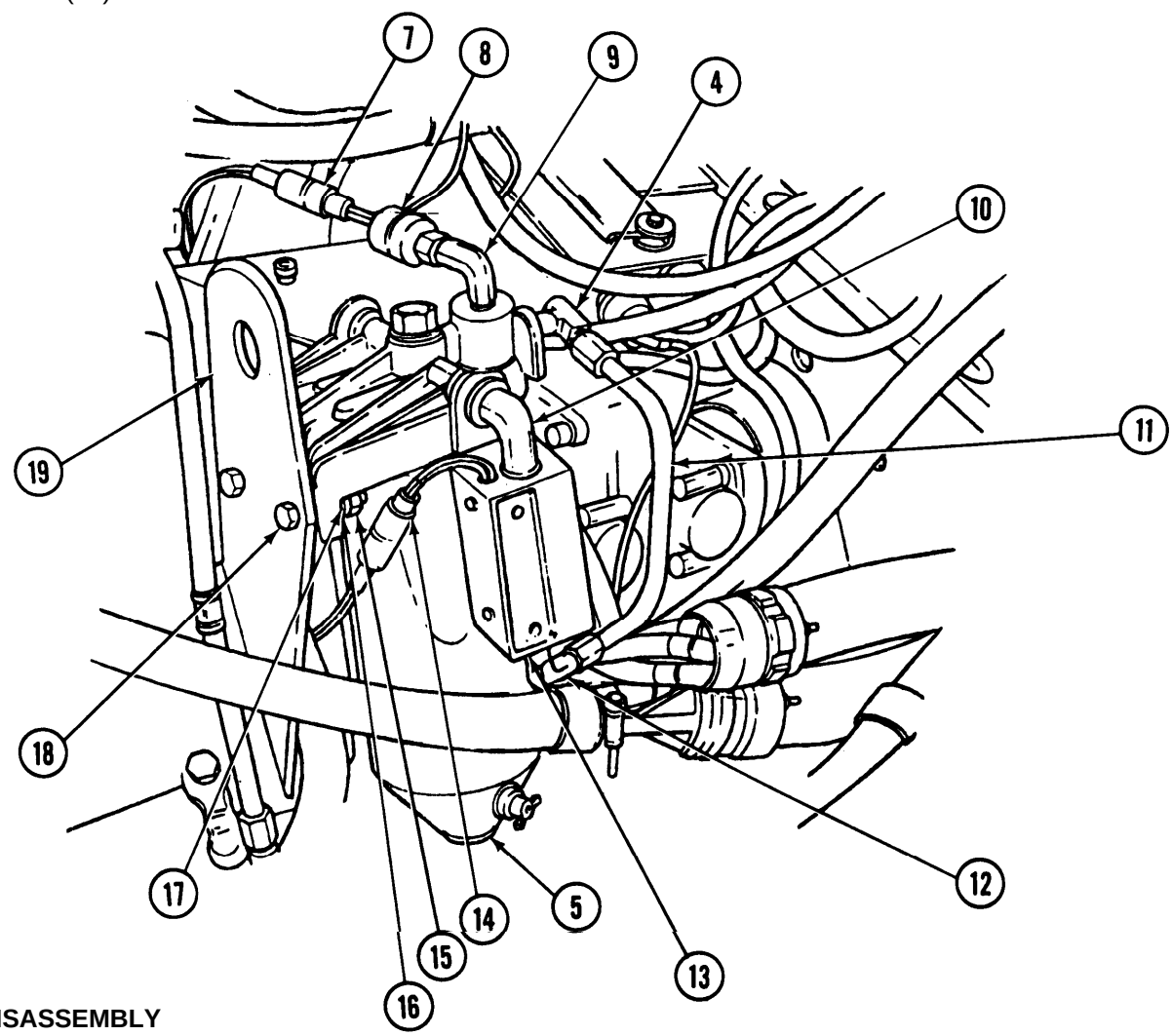
5. Remove transducer (8) from elbow (9).

6, Disconnect tube (11) from tee (4) and elbow (12).

7. Disconnect electrical connector (14) from transducer (13).

8. Remove elbow (12), transducer (13), and elbow (10) from fuel filter assembly (5).

9. Remove two screws (18), washers (17), lockwashers (16), and nuts (15) and fuel filter assembly (5) from bracket (19). Discard lockwashers.



b. DISASSEMBLY

1. Remove drain cock (6) from fitter shell (20).

2. Remove two elbows (2 and 9) and tee (4) from filter cover (24).

3. Remove cover screw (22), filter cover (24), gasket (25), filter element (21), and washer (23) from filter shell (20). Discard gasket and fitter element.

4-26. SECONDARY FUEL FILTER ASSEMBLY REPLACEMENT (continued).

c. CLEANING AND INSPECTION

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT use near open flame or excessive heat.

1. Clean all parts with drycleaning solvent.

2. Inspect all parts for damage. Replace damaged parts as necessary.

d. ASSEMBLY

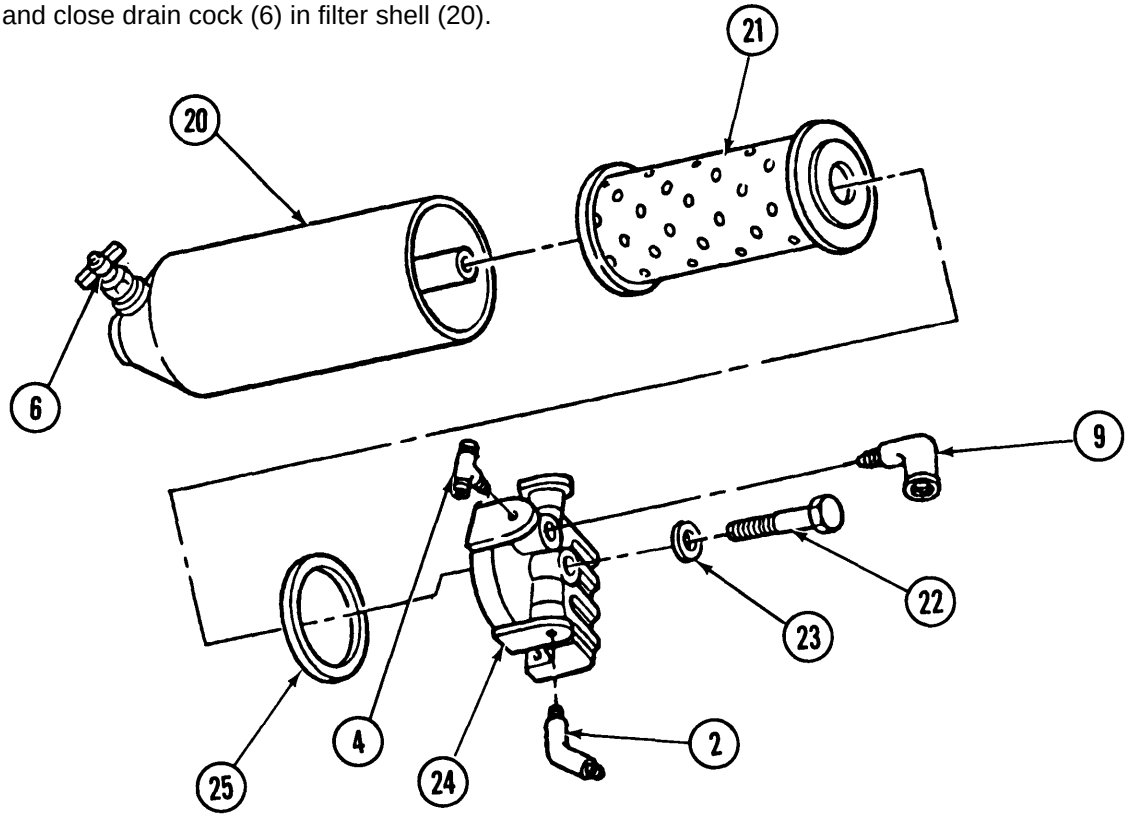
NOTE

- Apply Teflon pipe sealant to all male pipe threads before installation.
- Remove all caps and plugs blocking fuel lines and hoses.

1. Install new filter element (21), new gasket (25), washer (23), and filter cover (24) on filter shell (20) with cover screw (22).

2. Install tee (4) and two elbows (2 and 9) on filter cover (24).

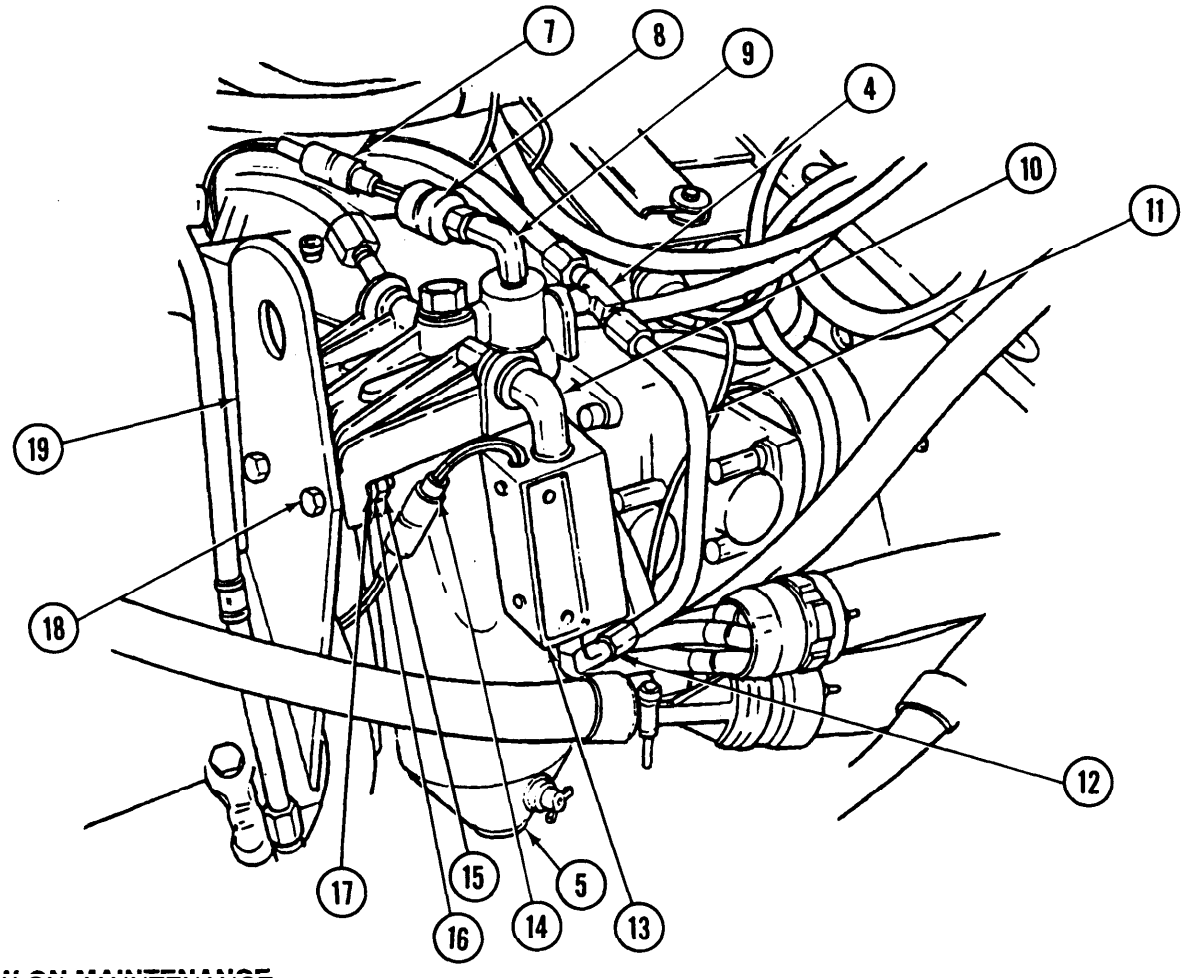
3. Install and close drain cock (6) in filter shell (20).



4-26. SECONDARY FUEL FILTER ASSEMBLY REPLACEMENT (continued).

e. INSTALLATION

1. Install fuel filter assembly (5) on bracket (19) with two screws (1 8), washers (1 7), new Iockwashers (16), and nuts (15).
2. Install elbow (10), transducer (13), and elbow (12) on fuel filter assembly (5).
3. Connect tube (11) to elbow (12) and tee (4).
4. Connect tube (3) to tee (4).
5. Connect tube (1) to elbow (2).
6. Install transducer (8) on elbow (9).
7. Connect electrical connector (7) to transducer (8).
8. Connect electrical connector (14) to transducer (1 3).



FOLLOW-ON MAINTENANCE:

• Close left and right transmission access doors (refer to TM 9-2350-287-10).

4-27. GLOW PLUG AND GLOW PLUG CONTROLLER REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

[Item Deleted]

Materials/Parts:

[Items Deleted]

- Lockwasher (2) (Item 162, Appendix H)
- Lockwasher (5) (Item 163, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-42).
- Exhaust pipe removed (for left-side glow plugs only) (para 5-2).
- Air cleaner intake duct removed (for left-side glow plugs only) (para 4-9).

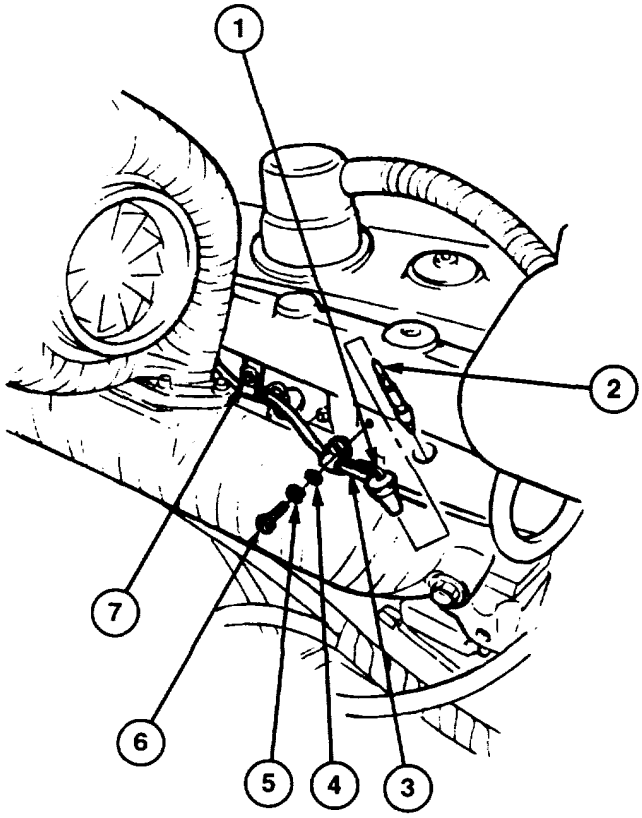
[Item Deleted]
- Front hull slope plate removed (for right-side glow plugs only) (refer to TM 9-2350-287-20-2).

a. REMOVAL

NOTE

If replacing glow plug only, perform steps 1 and 2.

1. Disconnect eight wiring harness connectors (1) from eight glow plugs (2).
2. Remove glow plug (2) from engine.
3. Remove five screws (6), lockwashers (5), washers (4), and clamps (7) securing wiring harness (3) to engine. Discard lockwashers.

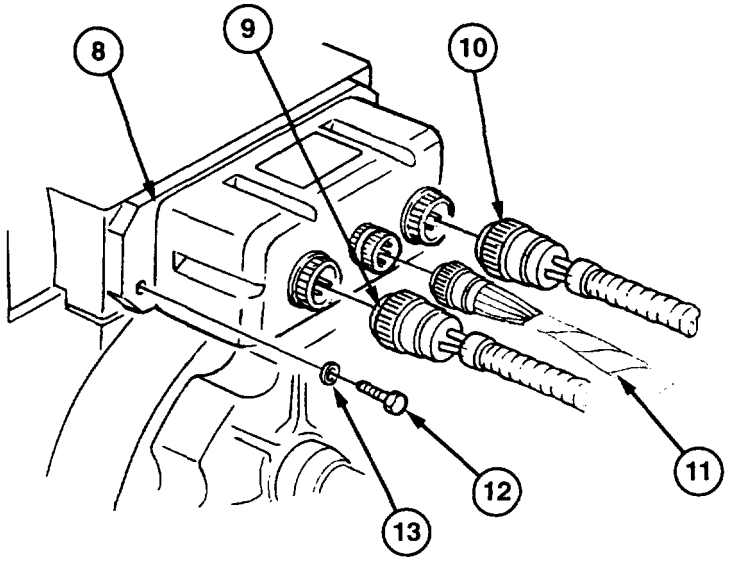


4-27. GLOW PLUG AND GLOW PLUG CONTROLLER REPLACEMENT (continued).

4. Disconnect wiring harness connector (11) from glow plug controller (8).

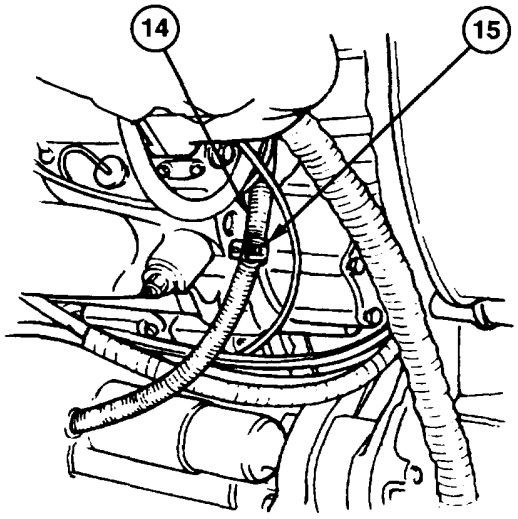
5. Disconnect two electrical connectors (9 and 10) from glow plug controller (8).

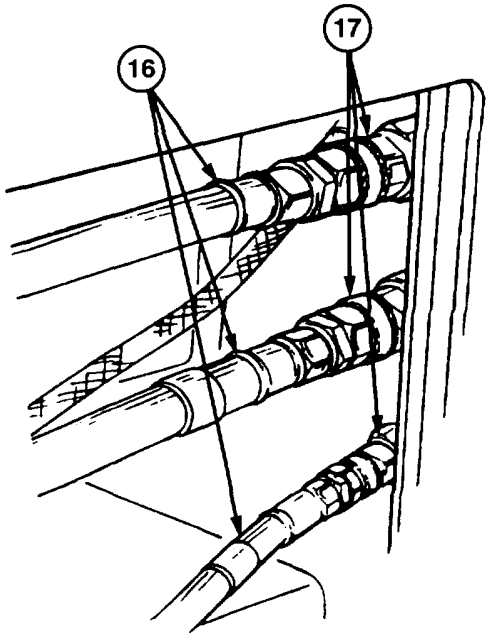
6. Remove two screws (12) and lockwashers (13) and glow plug controller (8) from engine. Discard lockwashers.



7. Squeeze and unfasten clamp (15) securing wiring harness (14) to engine.

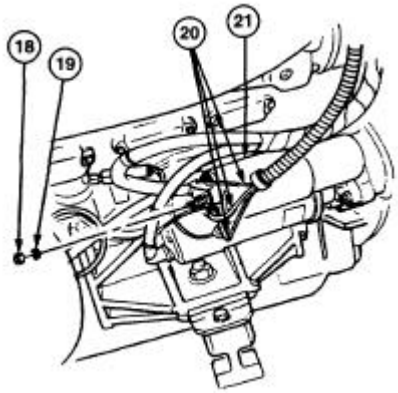
8. Disconnect three hydraulic lines (16) at quick disconnects (17).





4-27. GLOW PLUG AND GLOW PLUG CONTROLLER REPLACEMENT (continued).

9. Remove three nuts (18) and washers (19) and wiring harness (20) from starter solenoid (21).



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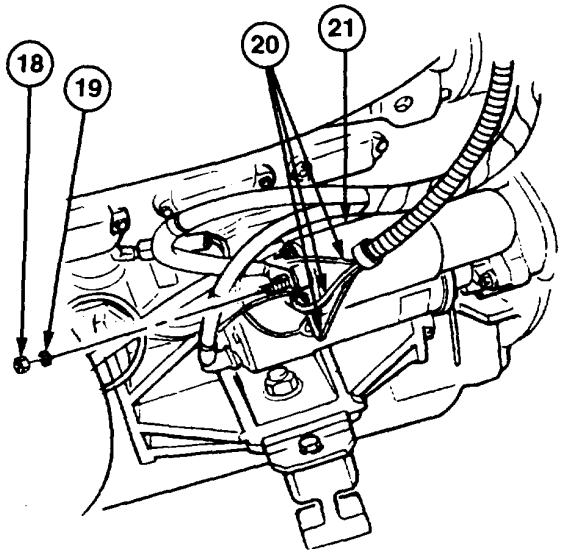
4-27. GLOW PLUG AND GLOW PLUG CONTROLLER REPLACEMENT (continued).

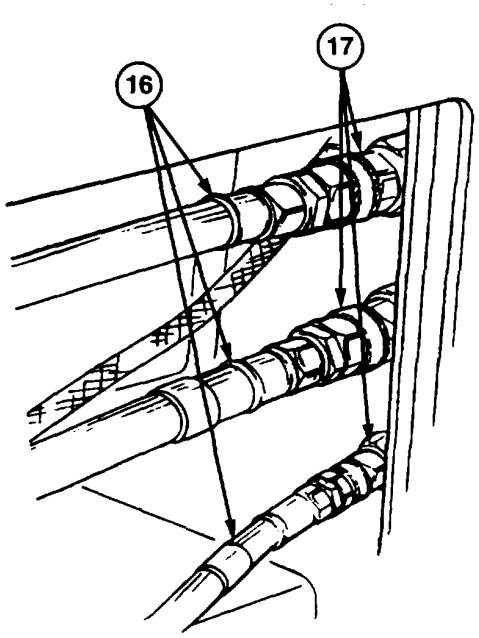
b. INSTALLATION

NOTE

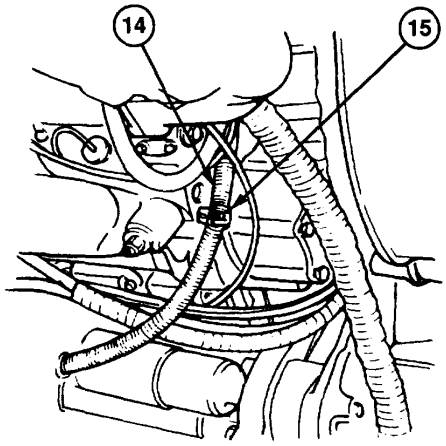
If installing glow plugs only, perform steps 8 through 10.

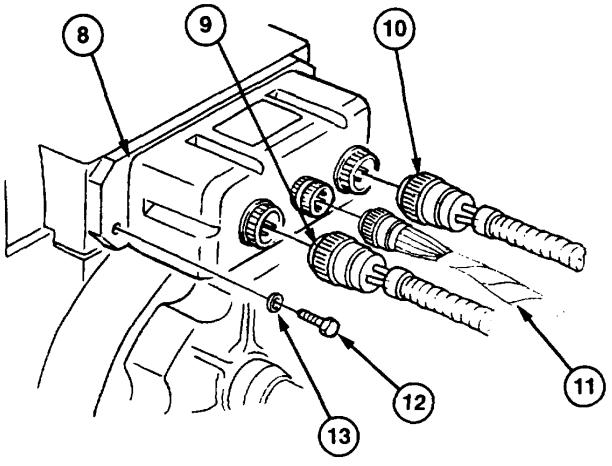
1. Connect wiring harness (20) to starter solenoid (21) with three nuts (18) and washers (19).





2. Connect three hydraulic lines (16) at quick disconnects (17).
3. Secure wiring harness (14) to engine with clamp (15).
4. Install glow plug controller (8) on engine with two screws (12) and new lockwashers (13).
5. Connect two electrical connectors (9 and 10) to glow plug controller (8).
6. Connect wiring harness connector (11) to glow plug controller (8).





4-27. GLOW PLUG AND GLOW PLUG CONTROLLER REPLACEMENT (continued).

7. Secure wiring harness (3) to engine with five clamps (7), washers (4), new lockwashers (5), and screws (6).

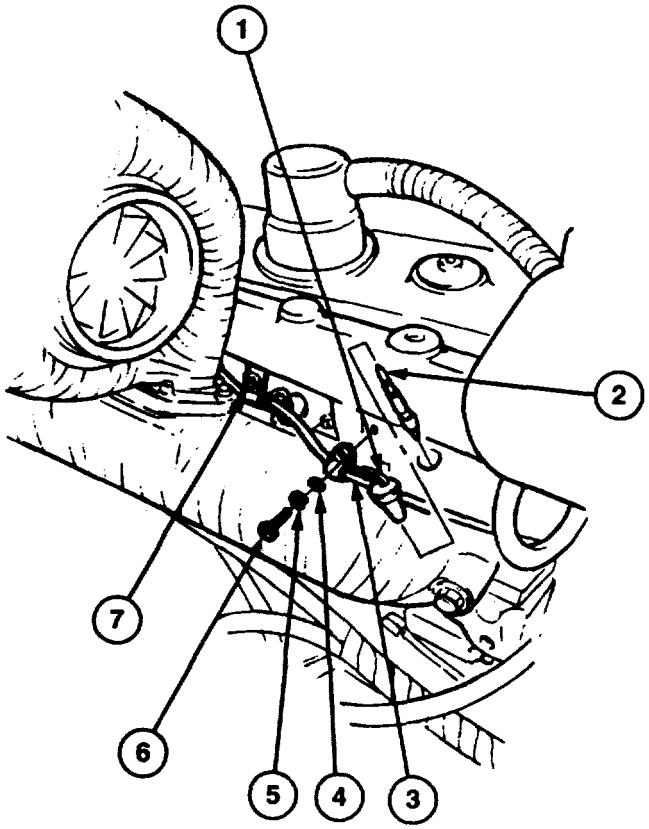
CAUTION

Install glow plug by hand. Do not use wrench. Hand-tightening glow plug will ensure that glow plug is not cross-threading in engine. Failure to comply can result in damage to equipment.

8. Install glow plug (2) in engine. Turn glow plug (2) by hand to make sure it is properly threading into engine.

9. Once glow plug (2) has been tightened by hand, use wrench to tighten glow plug (2) an additional one-half turn.

10. Connect eight wiring harness connectors (1) to eight glow plugs (2).



FOLLOW-ON MAINTENANCE:

- Install exhaust pipe (if removed) (para 5-2).
- Install air cleaner intake duct (if removed) (para 4-9).
  [Follow-On Task Deleted]
- Install front hull slope plate (if removed) (para 15-11).
- Connect battery ground cables (para 7-42).

4-28. ACCELERATOR, THROTTLE, AND ENGINE CONTROL GOVERNOR REPLACEMENT AND ADJUSTMENT.

This task covers:

a. Removal
b. Disassembly
c. Cleaning and Inspection
d. Assembly
e. Installation
f. Adjustment

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Dry-cleaning solvent (Item 28, Appendix D)
- Rag (Item 56, Appendix D)
- Cotter pin (2) (Item 17, Appendix H)
- Cotter pin (Item 19, Appendix H)
- Cotter pin (5) (Item 37, Appendix H)
- Lockpin (Item 117, Appendix H)
- Lockwasher (8) (Item 175, Appendix H)
- Lockwasher (5) (Item 177, Appendix H)
- Spring pin (Item 355, Appendix H)
- Spring pin (2) (Item 356, Appendix H)
  Spring pin (2) (Item 360, Appendix H)
- Spring pin (2) (Item 368, Appendix H)
- Wire (Item 382, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Powerpack removed (para 3-2).

a. REMOVAL

WARNING

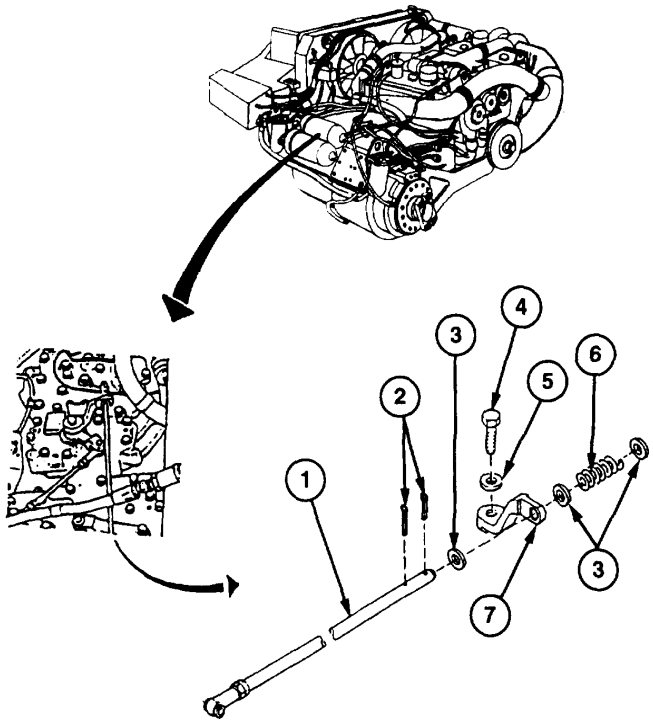
Use care when removing spring. Spring is under tension and can act as a projectile when released and could cause severe eye injury.

1. Remove two cotter pins (2), three washers (3), spring (6), and assembled rod (1) from throttle control lever (7). Discard cotter pins.

NOTE

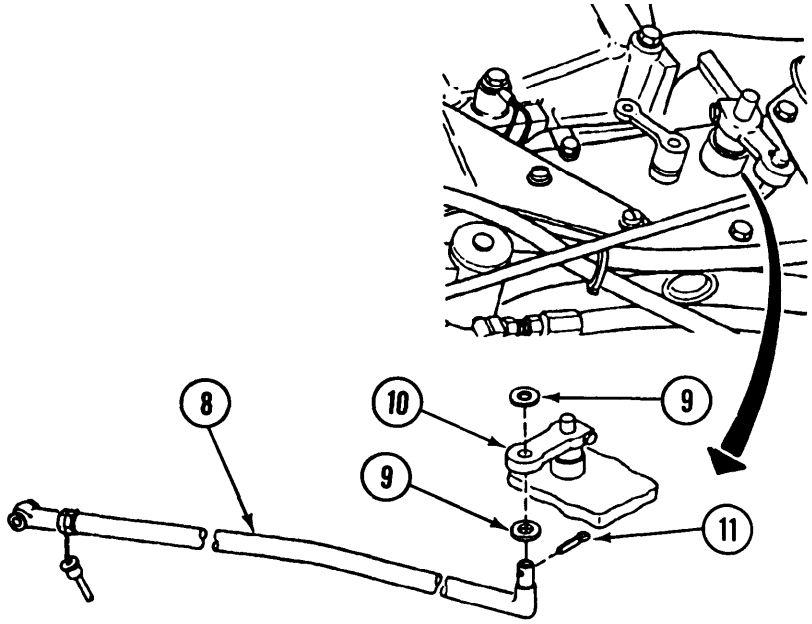
- **Remove throttle control lever from transmission shaft only if damaged or requiring replacement.**
- **If screw securing throttle control lever to transmission shaft is lost or damaged, notify Direct Support maintenance.**

2. Remove screw (4), washer (5), and throttle control lever (7) from transmission. Install screw (4) and washer (5) in transmission.

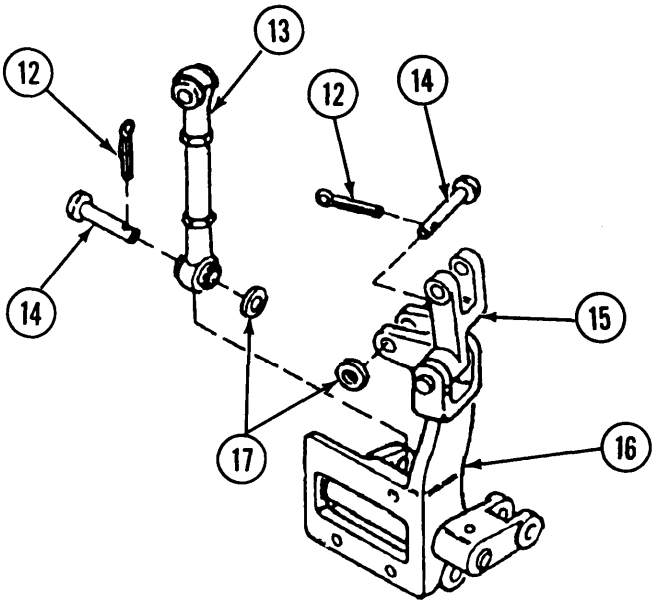


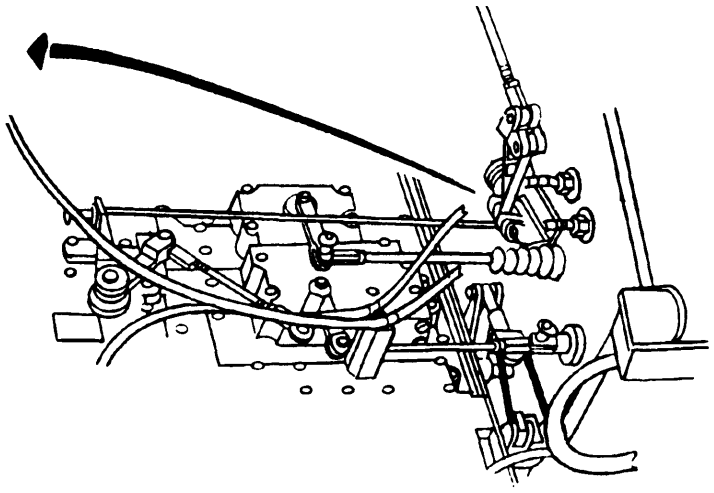
4-28. ACCELERATOR, THROTTLE, AND ENGINE CONTROL GOVERNOR REPLACEMENT AND ADJUSTMENT (continued).

3. Remove cotterpin (11), two washers (9), and connecting link (8) from engine throttle lever (1O). Discard cotter pin.



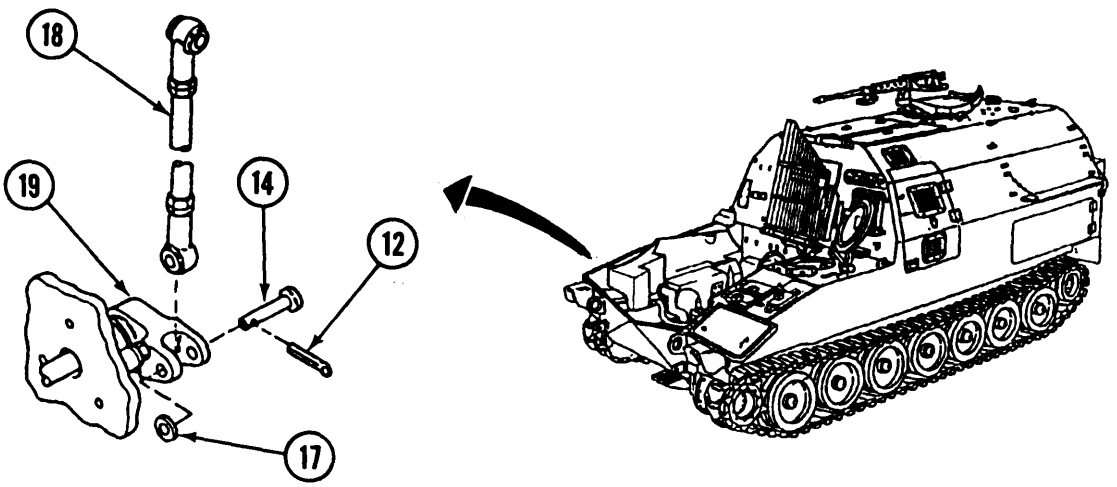
4. Remove two cotter pins (12), washers (17), and pins (14) and assembled rod (13) from two bellcranks (15 and 16). Discard cotter pins.





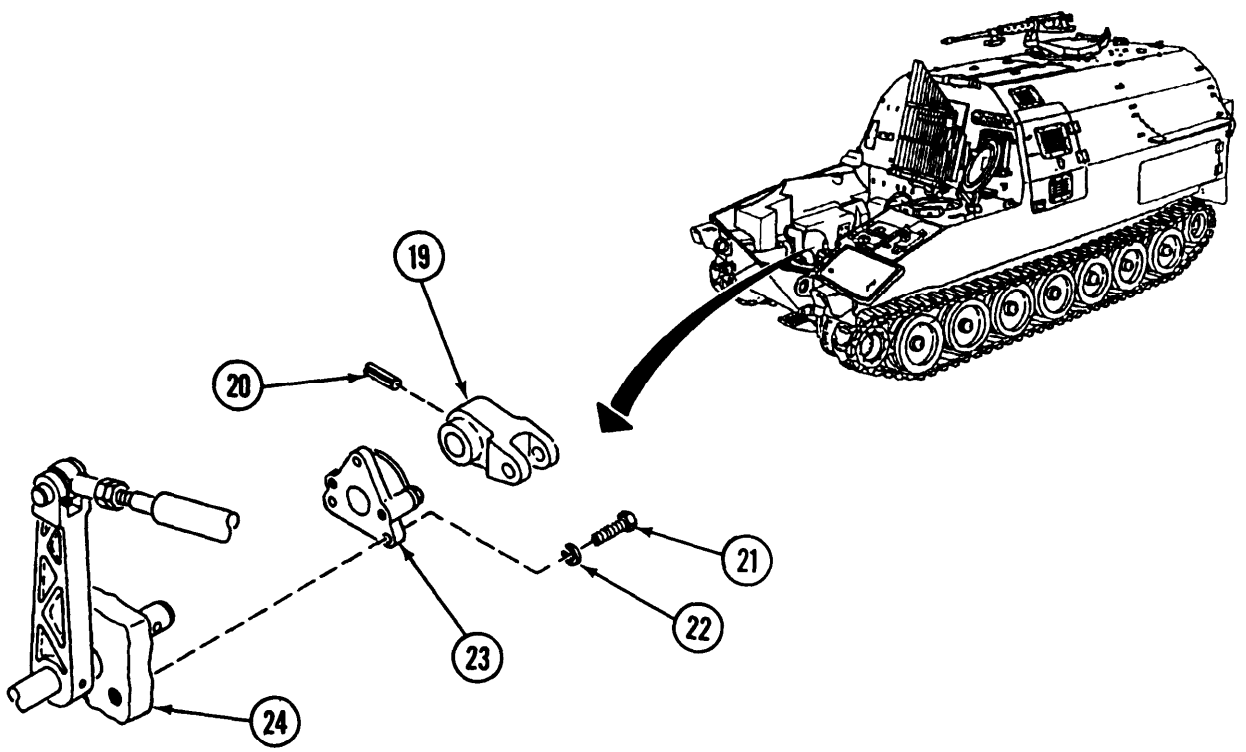
4-28. ACCELERATOR, THROTTLE, AND ENGINE CONTROL GOVERNOR REPLACEMENT AND ADJUSTMENT (continued).

5. Remove cotter pin (12), washer (17), pin (14), and assembled rod (18) from lever (19). Discard cotter pin.



6. Remove spring pin (20) and lever (19) from accelerator support (23). Discard spring pin.

7. Remove three screws (21) and lockwashers (22) and accelerator support (23). from bulkhead (24). Discard lockwashers.



4-28. ACCELERATOR, THROTTLE, AND ENGINE CONTROL GOVERNOR REPLACEMENT AND ADJUSTMENT (continued).

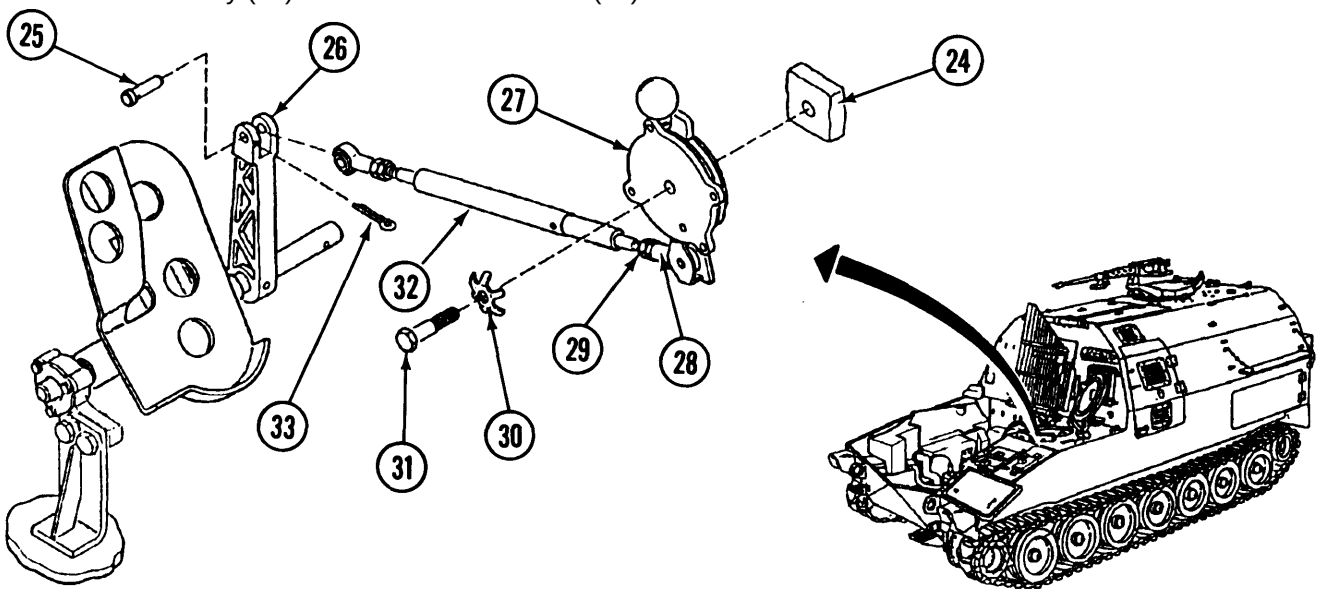
NOTE

Rod end bearing of throttle rod assembly cannot be removed from hand lever assembly.

8. Remove cotter pin (33) and pin (25) from throttle rod assembly (32) and lever (26). Discard cotter pin.

9. Remove screw (31), key washer (30), hand lever assembly (27), and throttle rod assembly (32) from bulkhead (24).

10. Remove throttle rod assembly (32) from hand lever assembly (27) by loosening nut (29) and rotating throttle rod assembly (32) off of threads of rod end (28).

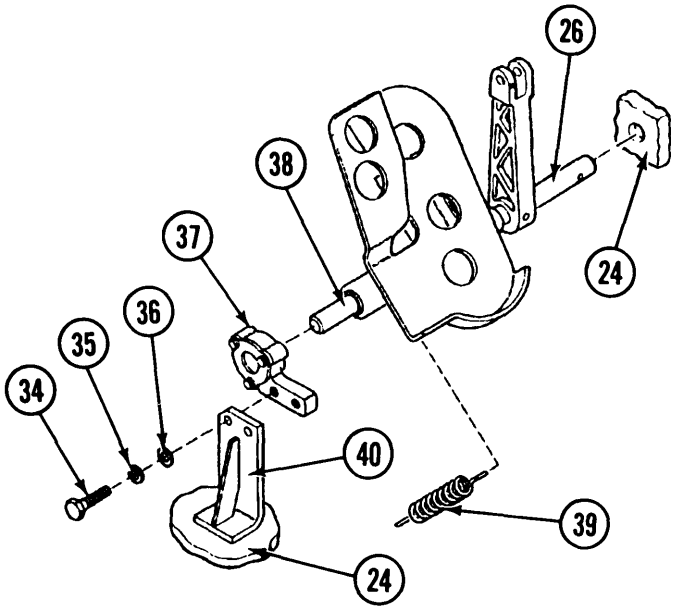


11. Remove spring (39) from accelerator pedal assembly (38) and bulkhead (24).

12. Remove two screws (34), lockwashers (35), and washers (36) and accelerator bracket (37) from mounting bracket (40). Discard lockwashers.

13. Lift accelerator pedal assembly (38) until accelerator bracket (37) clears mounting bracket (40).

14. Remove accelerator pedal assembly (38), accelerator bracket (37), and lever (26) from mounting bracket (40) and bulkhead (24) as an assembly.



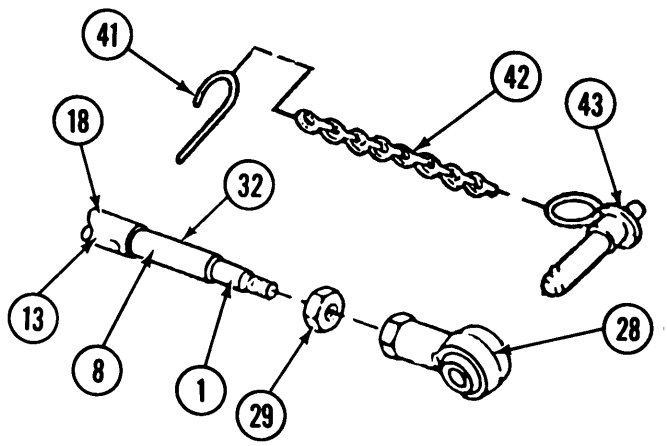
4-28. ACCELERATOR, THROTTLE, AND ENGINE CONTROL GOVERNOR REPLACEMENT AND ADJUSTMENT (continued).

b. DISASSEMBLY

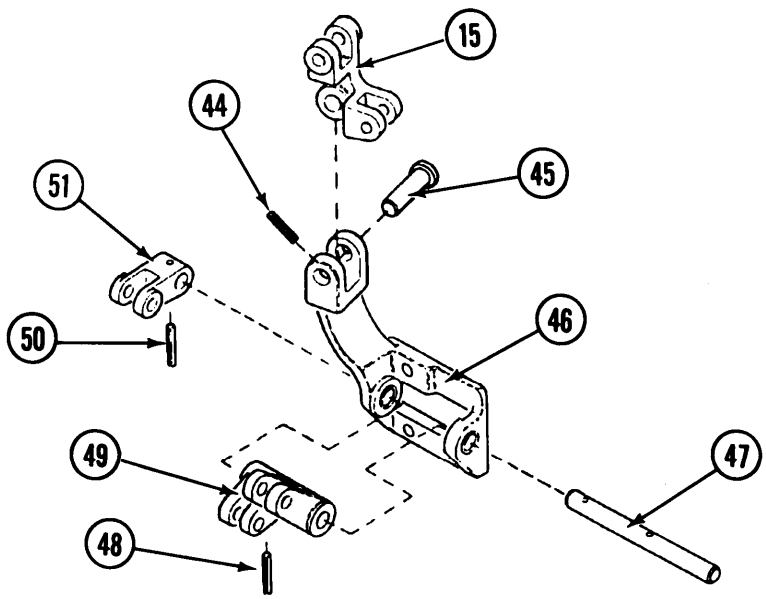
NOTE

- Step 1 covers disassembly of assembled rods (13 and 18) equipped with two rod ends each.
- Step 2 covers disassembly of assembled rod (1), connecting link (8), and throttle rod assembly (32) equipped with one rod end each.
- Step 3 covers further disassembly of connecting link (8) equipped with quick-release pin.
- Disassembly of connecting link (8) equipped with quick-release pin is shown in drawing.

1. Loosen two nuts (29) on two assembled rods (13 and 18), and remove rod ends (28) and nuts (29) from each assembly.
2. Loosen nut (29) on assembled rod (1), connecting link (8), and throttle rod assembly (32). Remove rod end (28) and nut (29) from assembled rod (1), connecting link (8), and throttle rod assembly (32).
3. Remove quick-release pin (43), chain (42), and wire (41) from rod end (28) of connecting link (8). Discard wire.



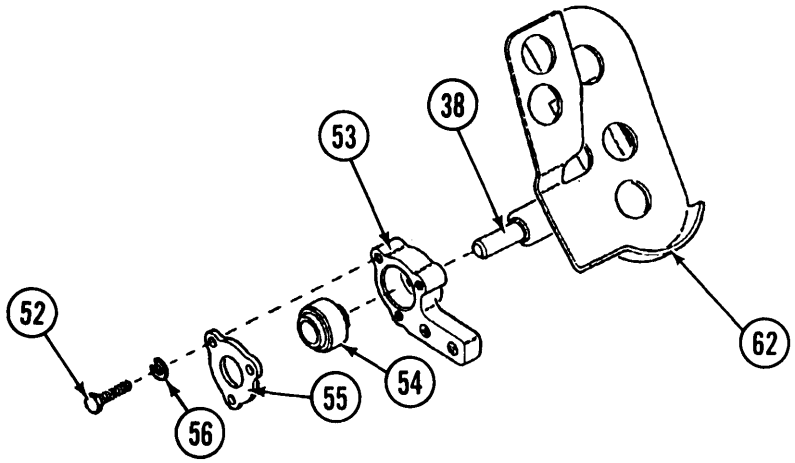
4. Remove spring pin (44) and two spring pins (48 and 50) from two pins (45 and 47). Discard spring pins.
5. Remove lever (51) and two pins (45 and 47) and bellcranks (15 and 49) from throttle bracket (46).



4-28. ACCELERATOR, THROTTLE, AND ENGINE CONTROL GOVERNOR REPLACEMENT AND ADJUSTMENT (continued).

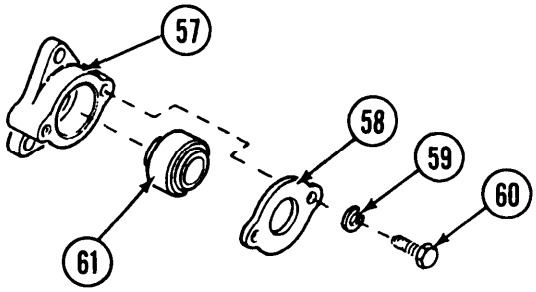
6. Remove accelerator bracket (53) from accelerator pedal assembly (38).

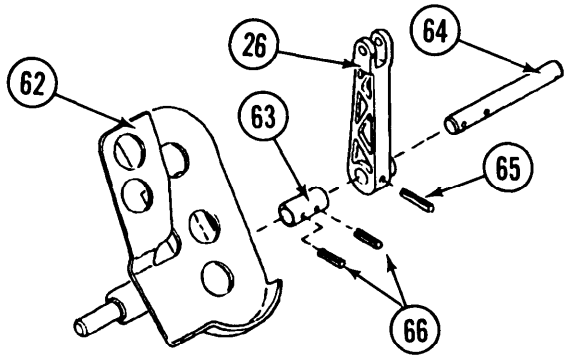
7. Remove three screws (52) and lockwashers (56), cap (55), and bearing (54) from accelerator bracket (53). Discard lockwashers.



8. Remove two screws (60) and lockwashers (59), cap (58), and bearing (61) from accelerator support (57). Discard lockwashers.

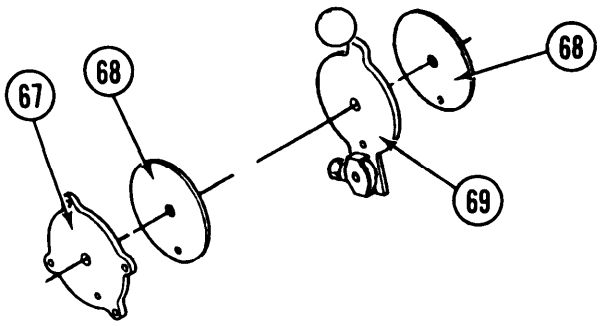
9. Remove spring pin (65) and two spring pins (66), collar (63), accelerator padel (62), and lever (26) from shaft (64). Discard spring pins.

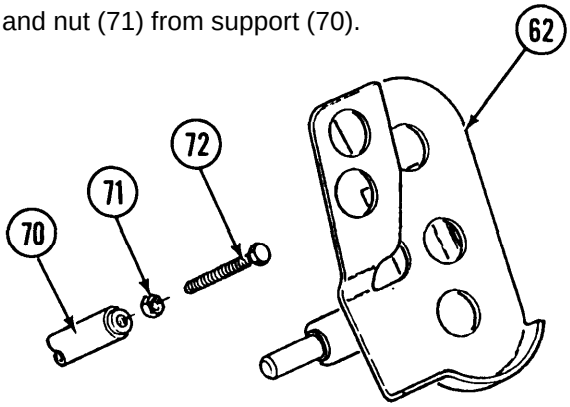




10. Separate cover (67), two disks (68), and throttle lever (69).

11. Loosen nut (71), and remove adjusting screw (72) and nut (71) from support (70).





4-28. ACCELERATOR, THROITLE, AND ENGINE CONTROL GOVERNOR REPLACEMENT AND ADJUSTMENT (continued).

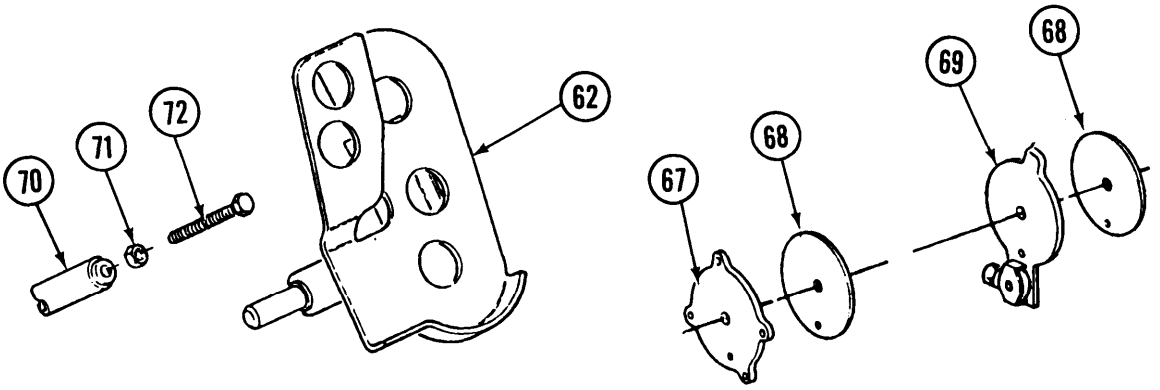
c. CLEANING AND INSPECTION

WARNING

Drycleaning solvent P-D480 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT use near open flame or excessive heat

1. Clean all metal parts except rod ends with drycleaning solvent and rag.

2. Inspect all parts for damage or excessive wear. Replace any damaged or worn parts.



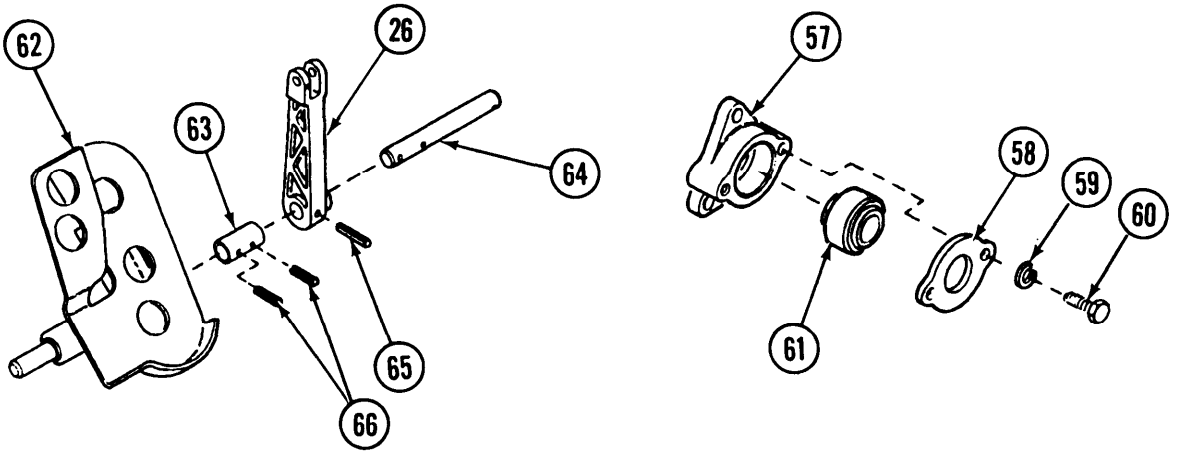
d. ASSEMBLY

1. Install nut (71) and adjusting screw (72) on support (70).

2. Assemble throttle lever (69), two disks (68), and cover (67).

3. Install lever (26), accelerator pedal (62), collar (63), new spring pin (65), and two new spring pins (66) on shaft (64).

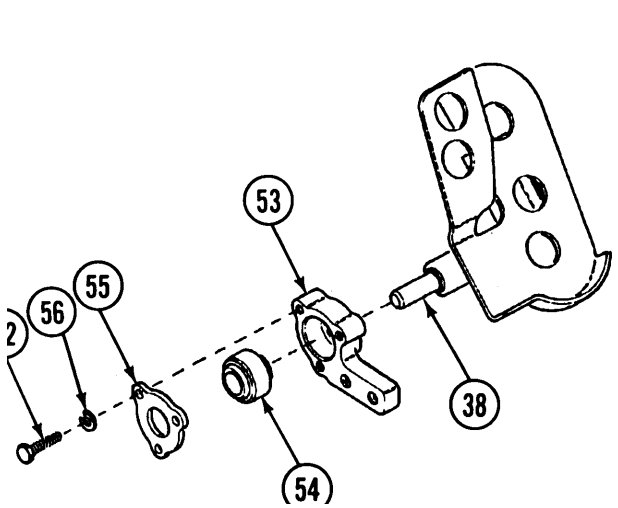
4. Install bearing (61) and cap (58) in accelerator support (57) with two screws (60) and new lockwashers (59).

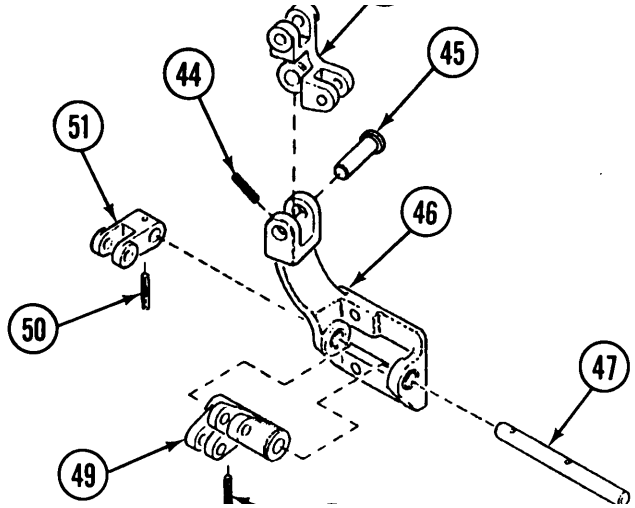


4-28. ACCELERATOR, THROTTLE, AND ENGINE CONTROL GOVERNOR REPLACEMENT AND ADJUSTMENT (continued).

5. Install bearing (54) and cap (55) in accelerator bracket (53) with three screws (52) and new lockwashers (56).

6. Install accelerator bracket (53) on accelerator pedal assembly (38).





7. Install two bellcranks(15 and 49) and pins (45 and 47) and lever (51) on throttle bracket (46).

8. Install new spring pin (44) and two new spring pins (48 and 50) on two pins (45 and 47).

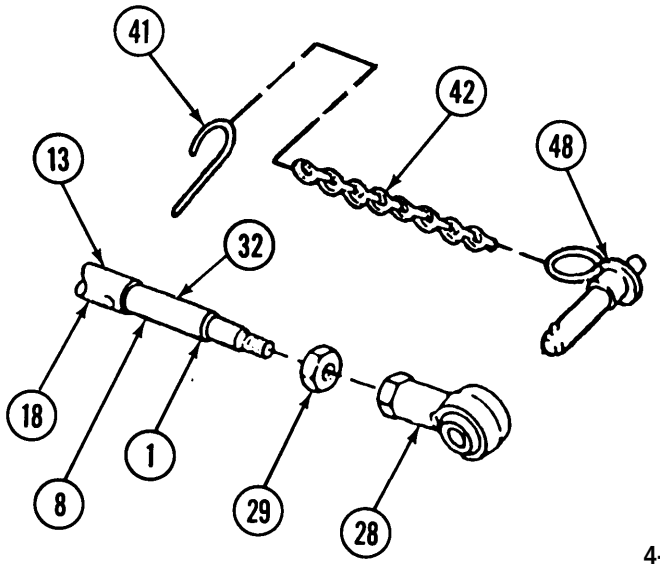
NOTE

- Step 9 covers assembly of assembled rods (13 and 18) equipped with two rod ends each.
- Step 10 covers assembly of assembled rod (1), connecting link (8), and throttle rod assembly (32) equipped with one rod end each.
- Step 11 covers further assembly of connecting link (8) equipped with quick-release pin.
- Assembly of connecting link (8) equipped with quick-release pin is shown in drawing.

9. Install two nuts (29) and rod ends (28) on each of two assembled rods (13 and 18). Do not tighten nuts until final adjustment.

10. Install nut (29) and rod end (28) unassembled rod (1), connecting link (8), and throttle rod assembly (32). Do not tighten nut until final adjustment.

11. Install quick-release pin (43), chain (42), and new wire (41) on rod end (28) of connecting link (8).



4-28. ACCELERATOR, THROTTLE, AND ENGINE CONTROL GOVERNOR REPLACEMENT AND ADJUSTMENT (continued).

e. INSTALLATION

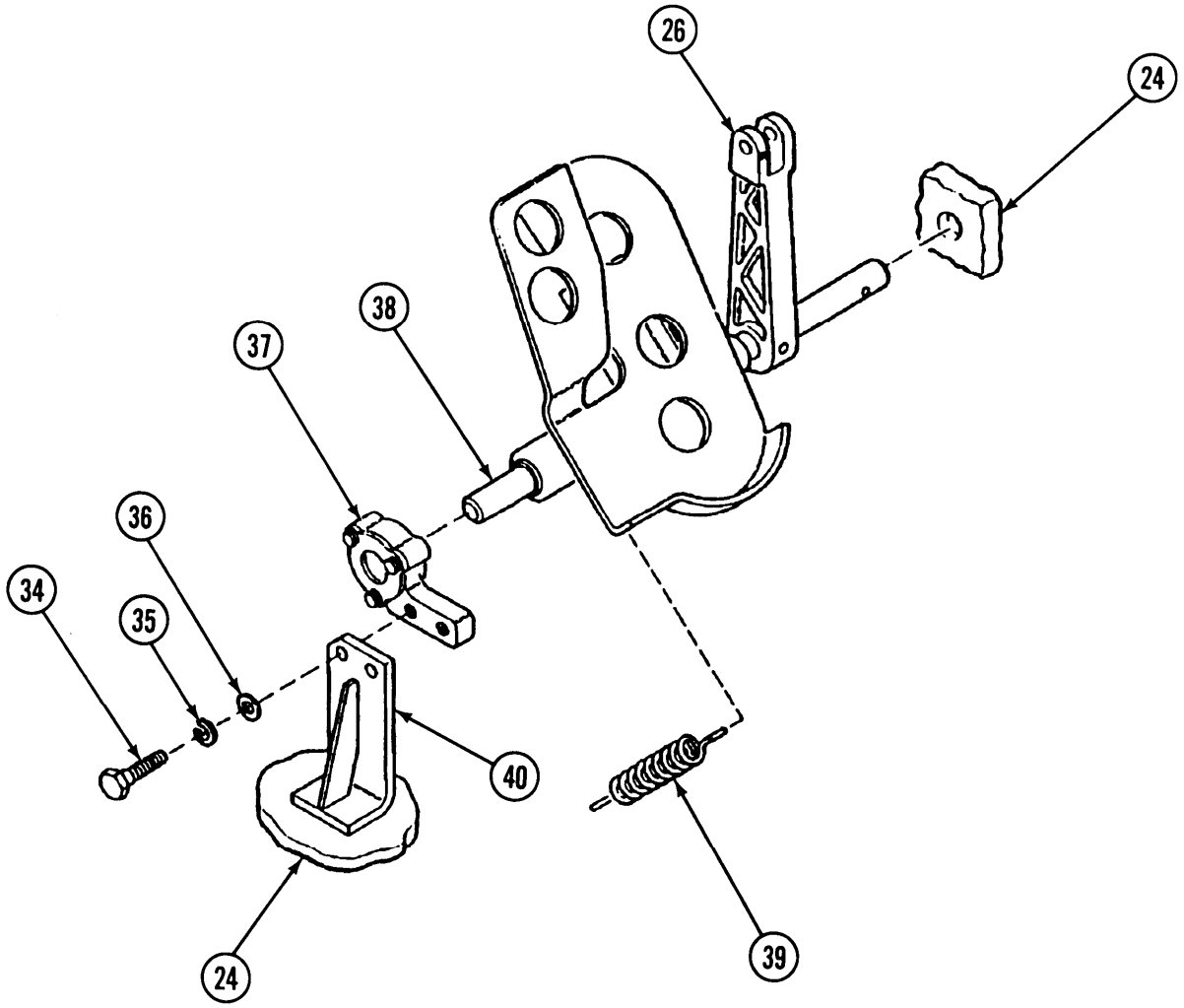
NOTE

All washers and cotter pins used in the installation of assembled rods may be installed after final adjustment is complete.

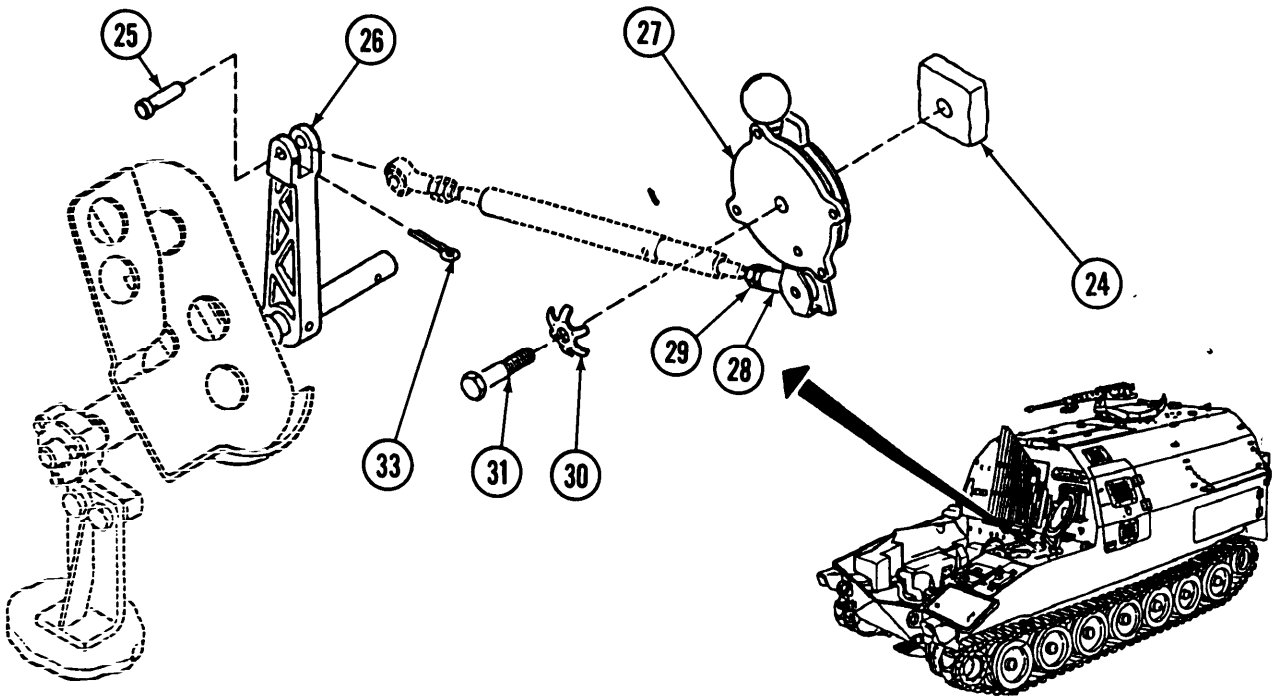
1. Position accelerator pedal assembly (38), accelerator bracket (37), and lever (26) through bulkhead (24) and on mounting bracket (40) as an assembly.

2. Install accelerator bracket (37) on mounting bracket (40) with two screws (34), new lockwashers (35), and washers (36).

3. Install spring (39) on accelerator pedal assembly (38) and bulkhead (24).



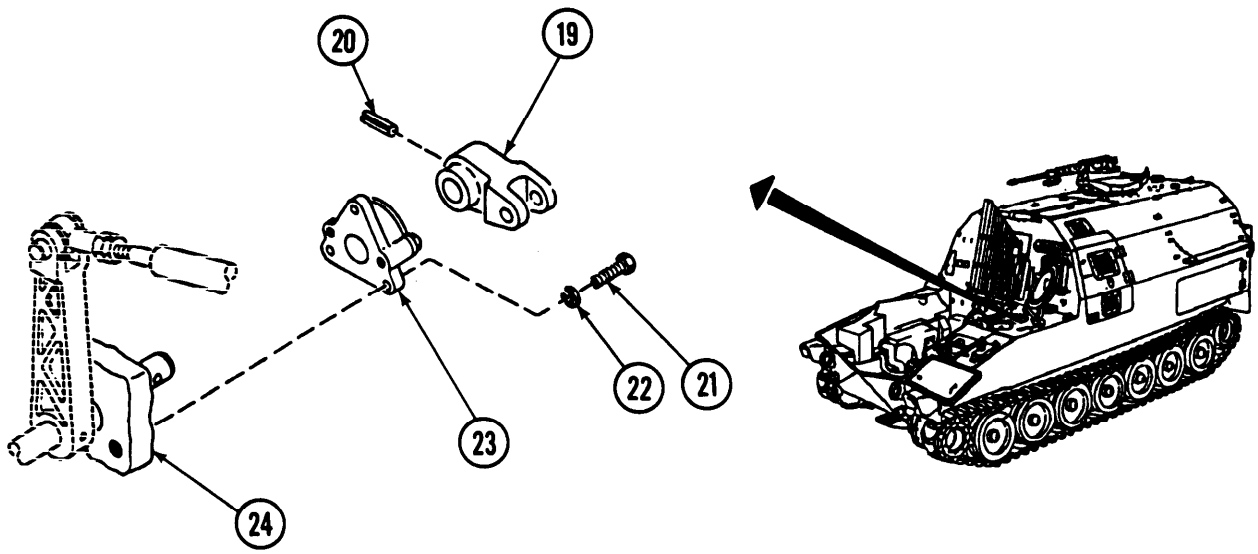
4-28. ACCELERATOR, THROTTLE, AND ENGINE CONTROL GOVERNOR REPLACEMENT AND ADJUSTMENT (continued).



4. Install throttle rod assembly (32) on hand lever assembly (27) by rotating rod assembly into threads of rod end (28). Do not tighten nut (29) until final adjustment.

5. Install hand lever assembly (27) on bulkhead (24) with key washer (30) and screw (31).

6. Install throttle rod assembly (32) on lever (26) with pin (25) and new cotter pin (33).

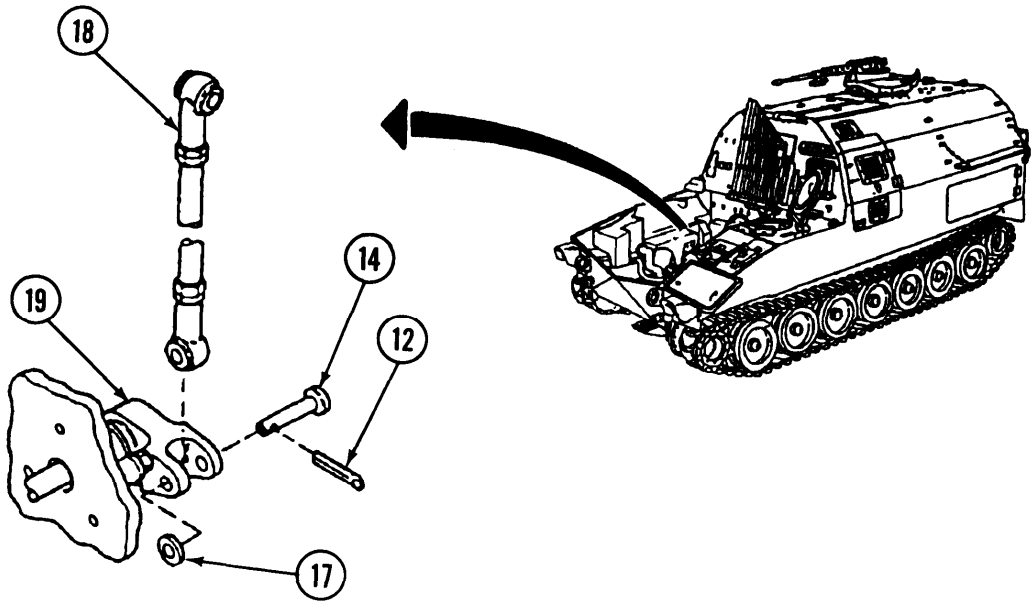


7. Install accelerator support (23) on bulkhead (24) with three screws (21) and new lockwashers (22).

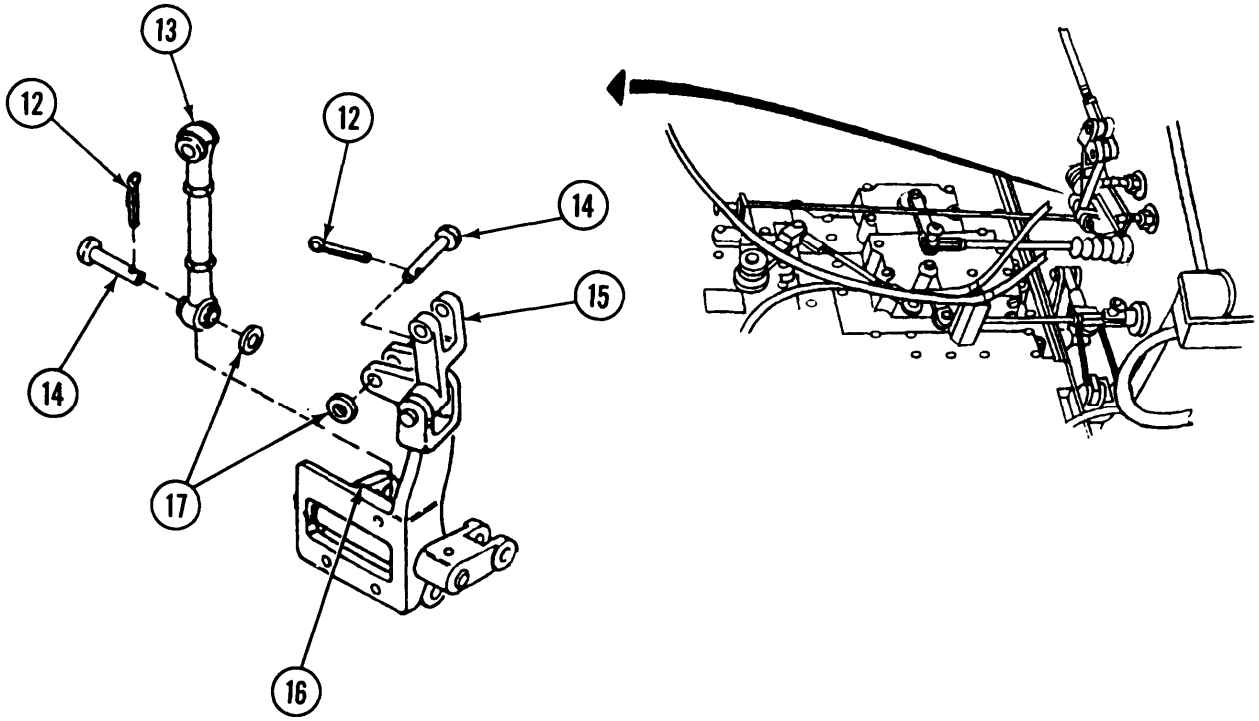
8. Install lever (19) and new spring pin (20) on accelerator support (23).

4-28. ACCELERATOR, THROTTLE, AND ENGINE CONTROL GOVERNOR REPLACEMENT AND ADJUSTMENT (continued).

9. Install assembled rod (18) on lever (19) with pin (14), washer (1 7), and new cotter pin (12).

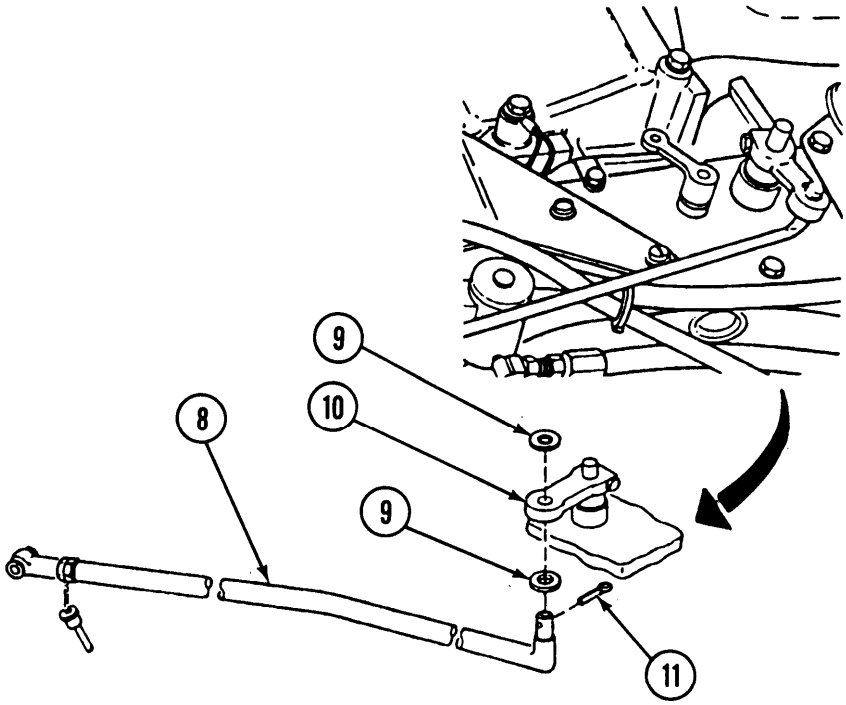


10. Install assembled rod (13) between two bellcranks (15 and 16) with two pins (14), washers (17), and new cotter pins (12).



4-28. ACCELERATOR, THROTTLE, AND ENGINE CONTROL GOVERNOR REPLACEMENT AND ADJUSTMENT (continued).

11. Install connecting link (8) on engine throttle lever (10) with two washers (9) and new cotter pin (11).

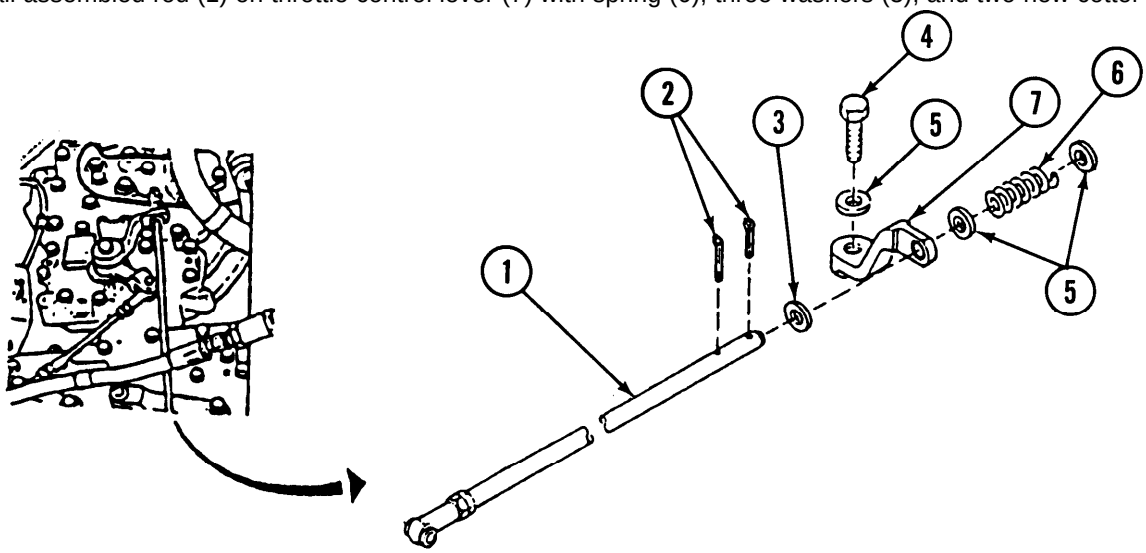


12. Install throttle control lever (7) at transmission with screw (4) and washer (5).

WARNING

Use care when installing spring. Spring is under tension and can act as a projectile when released and could cause severe eye injury.

13. Install assembled rod (1) on throttle control lever (7) with spring (6), three washers (3), and two new cotter pins (2).



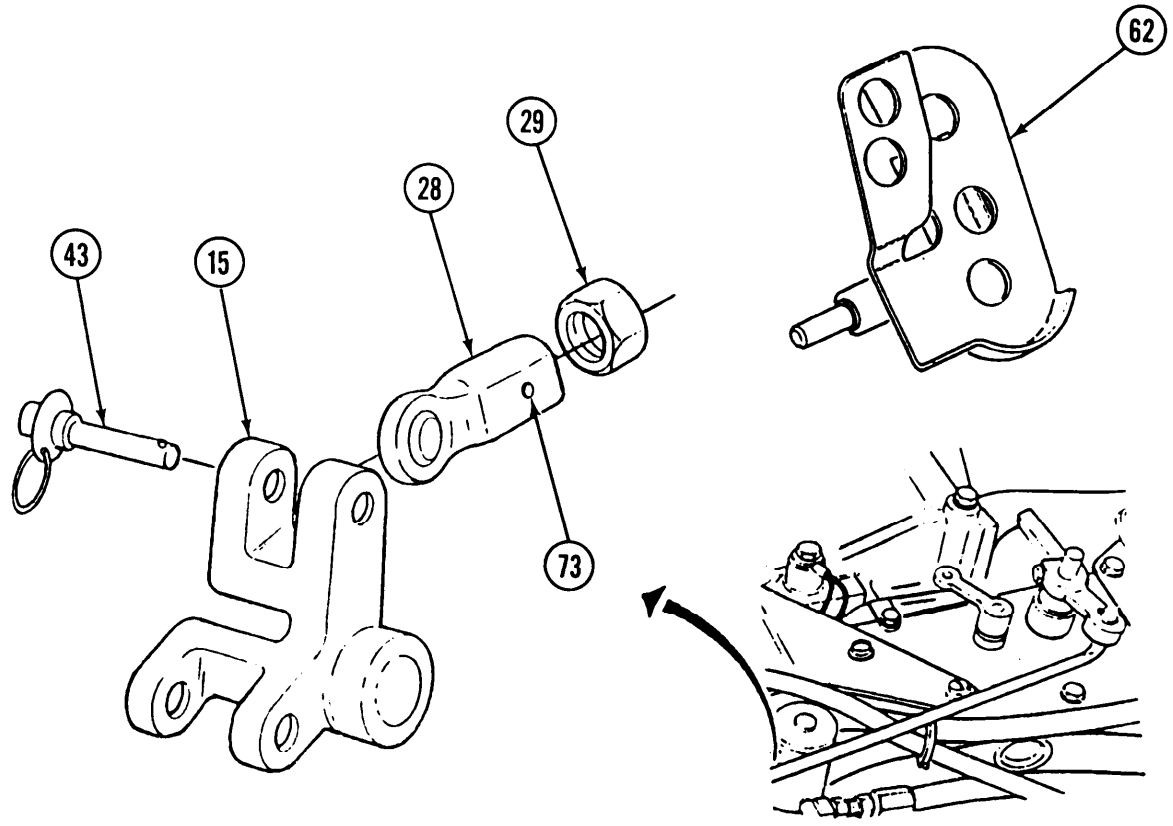
4-28. ACCELERATOR, THROTTLE, AND ENGINE CONTROL GOVERNOR REPLACEMENT AND ADJUSTMENT (continued).

f. ADJUSTMENT

NOTE

Steps 1 through 7 cover adjustment of the engine throttle governor connecting link.

1. Remove quick-release pin (43) and connecting link (8) from bellcrank (15).
2. Loosen nut (29) on connecting link (8).
3. Fully depress accelerator pedal (62).
4. Push connecting link (8) toward rear of vehicle.
5. Adjust length of connecting link (8) by turning rod end (28) until quick-release pin (43) can be installed easily into bellcrank (15) and through rod end (28).
6, Release accelerator pedal (62).
7. Tighten nut (29) against rod end (28). Check whether witness hole (73) is closed after adjustment is complete by inserting small wire into hole.



4-28. ACCELERATOR, THROTTLE, AND ENGINE CONTROL GOVERNOR REPLACEMENT AND ADJUSTMENT (continued).

NOTE

- Steps 8 through 16 cover adjustment of hand throttle control and accelerator pedal.
- A 1/4.inch dowel may be used for these tasks. Dowel fits through components and into bulkheadd pilot holes.

8. insert 1/4-inch dowel pin through positioning hole (76) on hand lever assembly (27) into bulkhead pilot hole (75).

9. Remove cotter pin (79), pin (74), and throttle rod assembly (32) from lever (26). Discard cotter pin.

10. insert 1/4-inch dowel pin through positioning hole (78) on lever (26) and into bulkhead pilot hole (77).

11. Loosen nut (29) on throttle rod assembly (32).

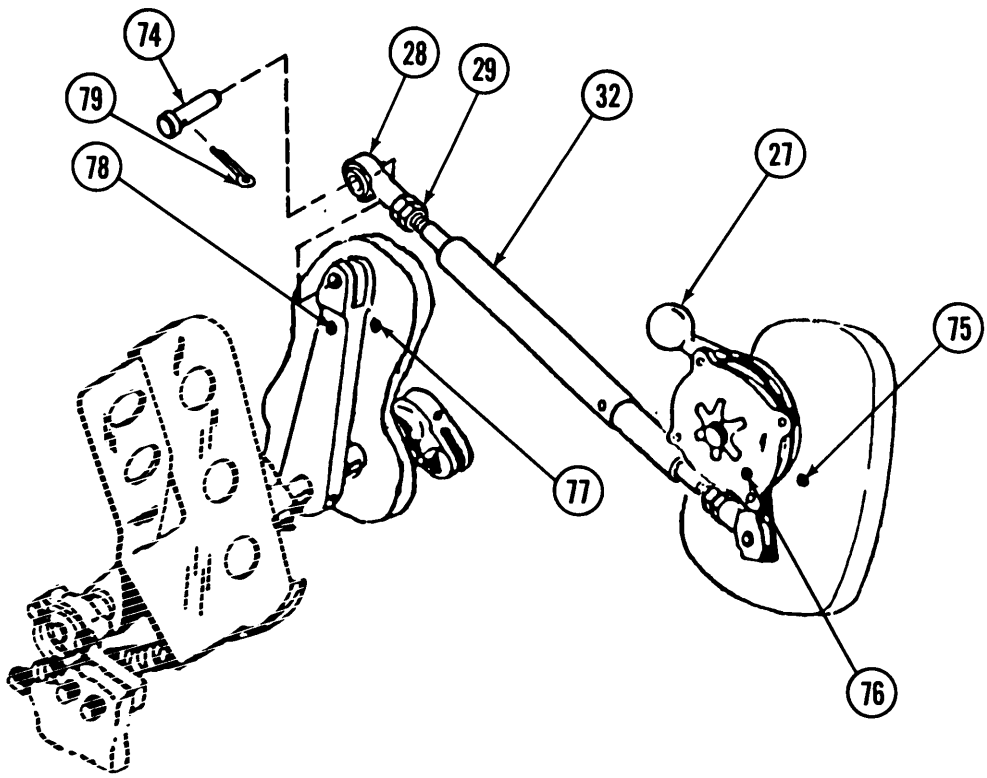
12. Adjust length of throttle rod assembly (32), turning rod end (28) until pin (74) can be installed easily into lever (26) and through rod end (28).

13. Tighten nut (29), checking witness hole of rod end (28).

14. Install new cotter pin (79) into pin (74).

15. Remove dowel pins from positioning holes (76 and 78).

16. Start engine with throttle control closed and check tachometer. Engine should beat idle speed (650 rpm).



4-28. ACCELERATOR, THROTTLE, AND ENGINE CONTROL GOVERNOR REPLACEMENT AND ADJUSTMENT (continued).

NOTE

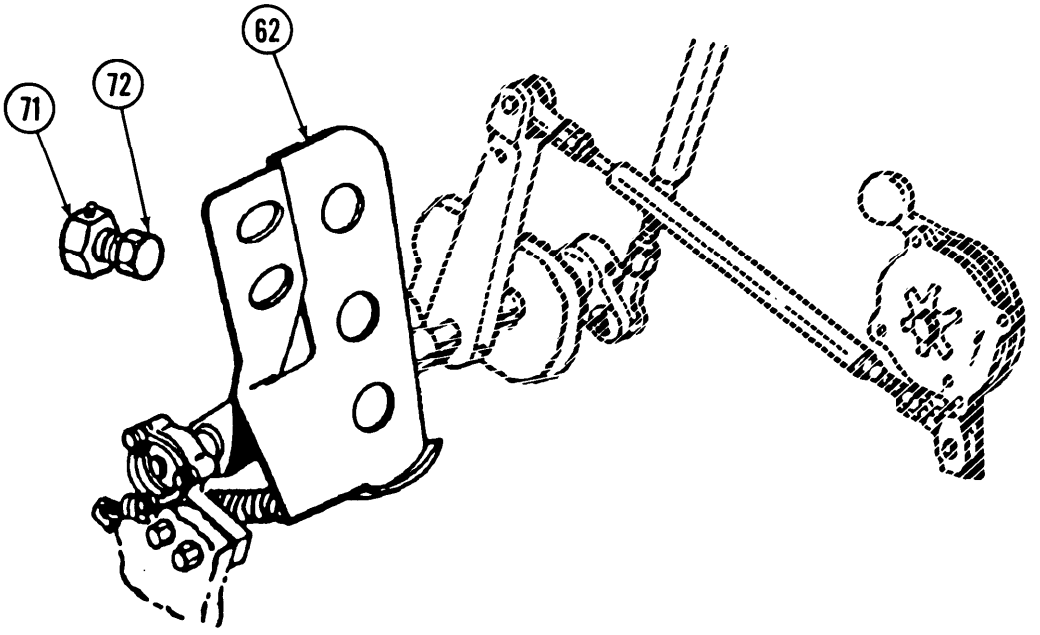
Steps 17 through 20 cover adjustment of accelerator pedal.

17. Loosen nut (71) and turn adjusting screw (72) to maximum depth.

18. Depress accelerator pedal (62) until it stops, and hold in depressed position.

19. Turn adjusting screw (72) until it lightly contacts and supports depressed accelerator pedal (62).

20. Tighten nut (71) until it prevents adjusting screw (72) from turning.



NOTE

Steps 21 through 29 cover adjustment of transmission throttle valve.

21. Remove lockpin (81), pin (80), and assembled rod (1) from bellcrank (49). Discard lockpin.

22. Hold accelerator pedal (62) in depressed position.

4-28. ACCELERATOR, THROTTLE, AND ENGINE CONTROL GOVERNOR REPLACEMENT AND ADJUSTMENT (continued).

23. Move transmission throttle control lever (7) against stop (toward bulkhead).

24. Loosen nut (29) on assembled rod (1).

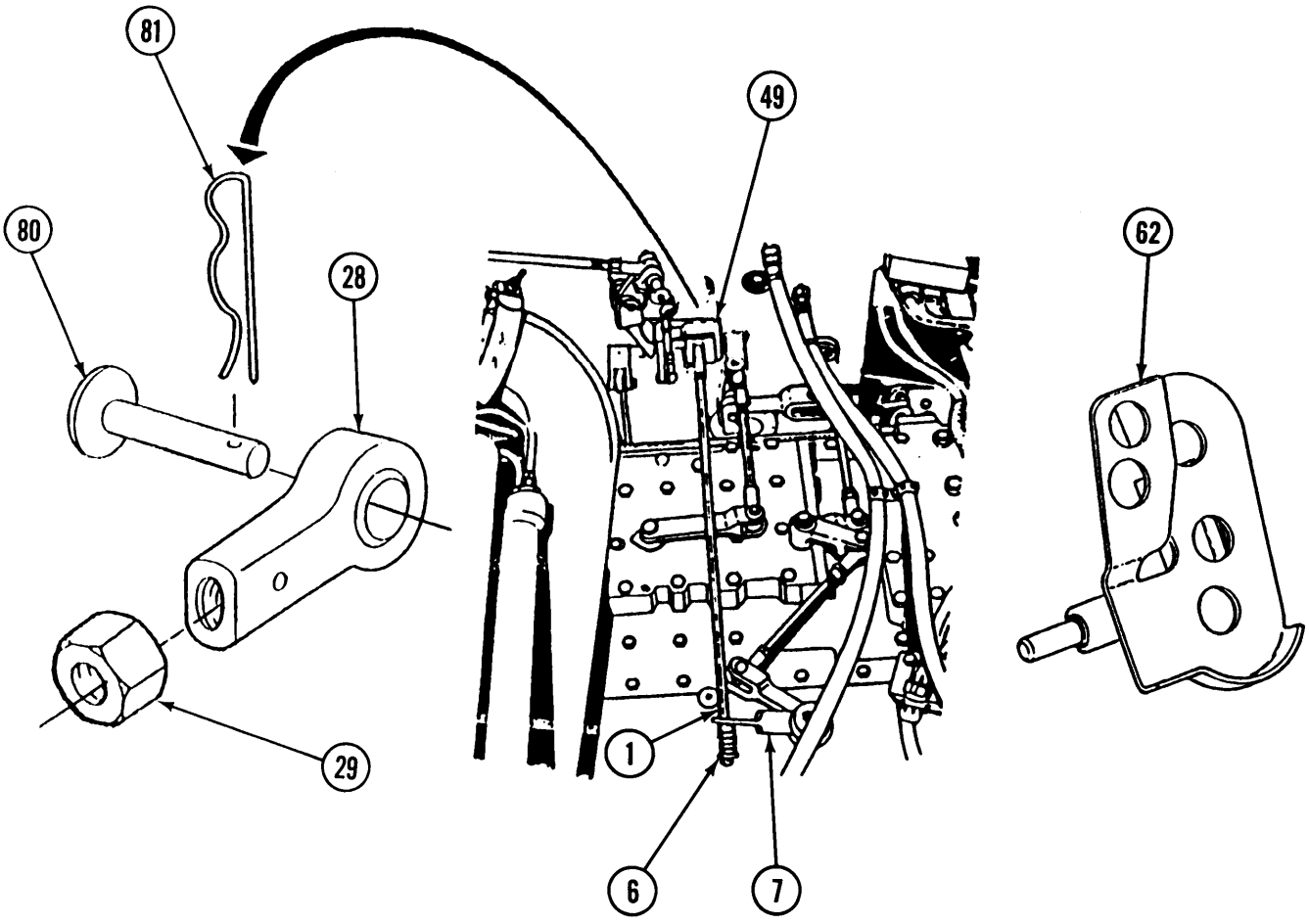
25. Adjust length of assembled rod (1), turning rod end (28) until pin (80) can be installed easily into bellcrank (49) and through rod end.

26. Release accelerator pedal (62) and remove pin (80).

27. Shorten assembled rod (1) by rotating rod end (28) two turns, compressing spring (6) slightly.

28. Tighten nut (29).

29. Install assembled rod (1), pin (80), and new lockpin (81) in bellcrank (49),



FOLLOW-ON MAINTENANCE:
• Install powerpack (para 3-2).

4-29. FUEL SHUTOFF ASSEMBLY REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- Assembled washer screw (2) (Item 1, Appendix H)
- Cotter pin (2) (Item 10, Appendix H)
- Lockwasher (3) (Item 175, Appendix H)
- Lockwasher (3) (Item 194, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Air intake grille opened and secured (refer to TM 9-2350-287-10).
- Drive& hatch cover opened and secured (refer to TM 9-2350-287-10).

a. REMOVAL

1. Remove quick-release pin (1) and clevis (23) from control arm (22).
2. Release S-hook (2) and chain (3) from cable (14).
3. Remove cotter pin (4) and clevis pin (5) from clevis (23). Discard cotter pin.
4. Remove cotter pin (11), straight pin (10), spring (9), washer (6), and pulley (7) from pulley bracket (8). Separate pulley (7) from cable (14). Discard cotter pin.
5. Remove two assembled washer screws (13) and pulley bracket (8) from engine (12). Discard Iockwashers.
6. Remove three screws (18) and Iockwashers (17) from fuel shutoff plate assembly (16). Discard Iockwashers.
7. Remove fuel shutoff plate assembly (16) and attached cable (14) from vehicle.
8. Loosen nut (21) on fuel shutoff plate assembly (16) by backing it away from handle (1 9).
9. Remove handle (19) from cable (14).
10. Remove Iockwasher (20) and nut (21) from cable (1 4). Discard Iockwasher.
11. Remove two bearing halves (15) and cable (14) from fuel shutoff plate assembly (16).

b. INSTALLATION

1. Install cable (14) and two bearing halves (15) in fuel shutoff plate assembly (16).
2. Install nut (21) and new Iockwasher (20) on cable (14).

4-29. FUEL SHUTOFF ASSEMBLY REPLACEMENT (continued).

3. Screw handle (19) onto cable (14) until threaded section of cable (14) bottoms in handle (19). Back off handle (19) to horizontal position.

4. Tighten new lockwasher (20) and nut (21) to secure handle (1 9).

5. Insert cable (14) through driver's compartment bulkhead.

6. Install fuel shutoff plate assembly (16) on driver's compartment bulkhead with three screws (18) and new lockwashers (17).

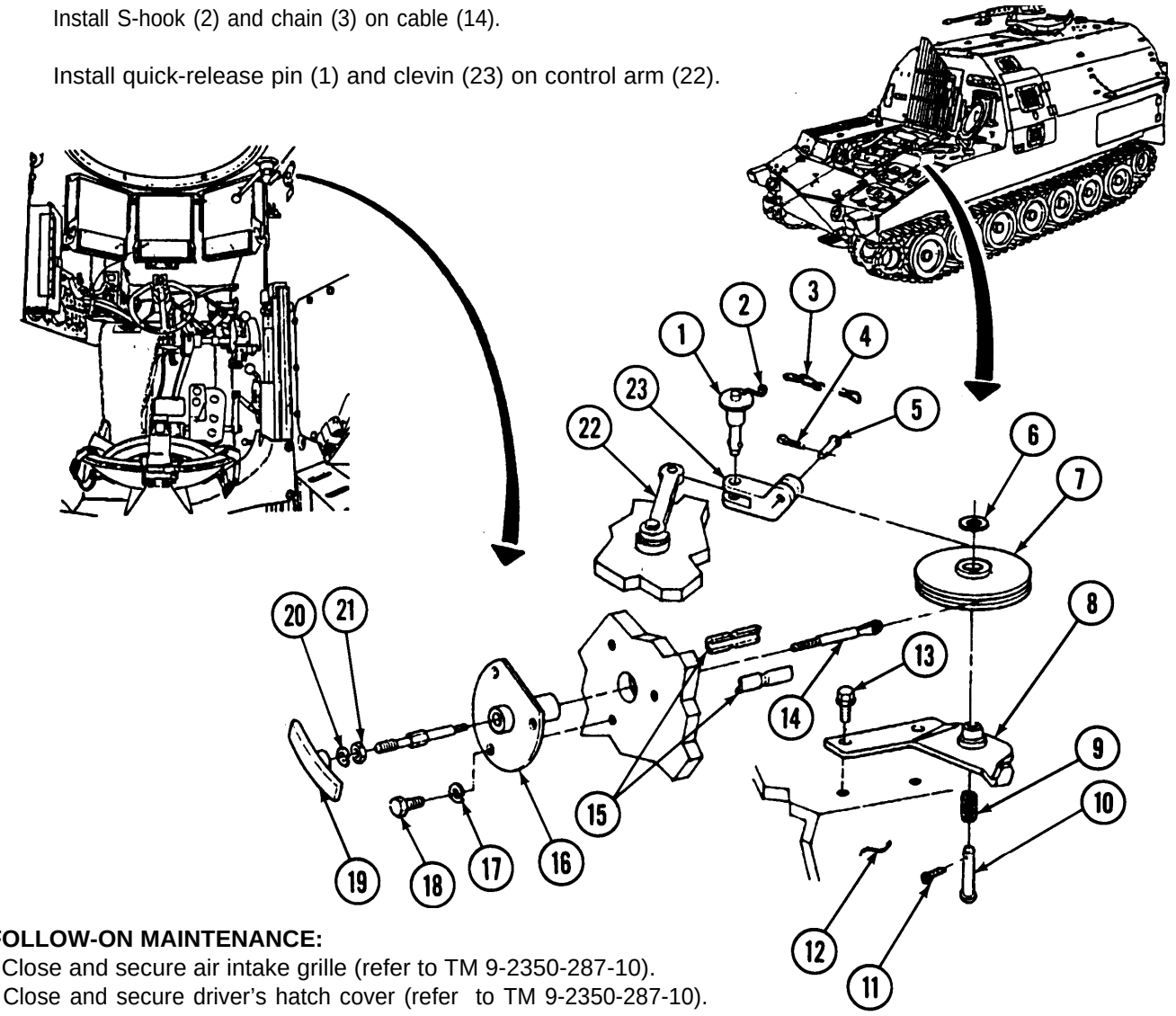
7. Install pulley bracket (8) on engine (12) with two assembled washer screws (13).

8. Run cable (14) around pulley (7) and install on pulley bracket (8) with straight pin (10), spring (9), washer (6), and new cotter pin (11).

9. Install clevis pin (5) and new cotter pin (4) in clevis (23).

10. Install S-hook (2) and chain (3) on cable (14).

11. Install quick-release pin (1) and clevin (23) on control arm (22).



FOLLOW-ON MAINTENANCE:
- Close and secure air intake grille (refer to TM 9-2350-287-10).
- Close and secure driver's hatch cover (refer to TM 9-2350-287-10).

CHAPTER 5
EXHAUST SYSTEM MAINTENANCE

5-1. GENERAL.

This chapter illustrates and describes maintenance instructions for the exhaust system.

5-2. EXHAUST DUCT AND PIPE REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- Cotter pin (2) (Item 13, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Air intake grille opened and secured (refer to TM 9-2350-287-10

NOTE

Powerpack must be removed to replace exhaust duct.

- Powerpack removed (para 3-2).

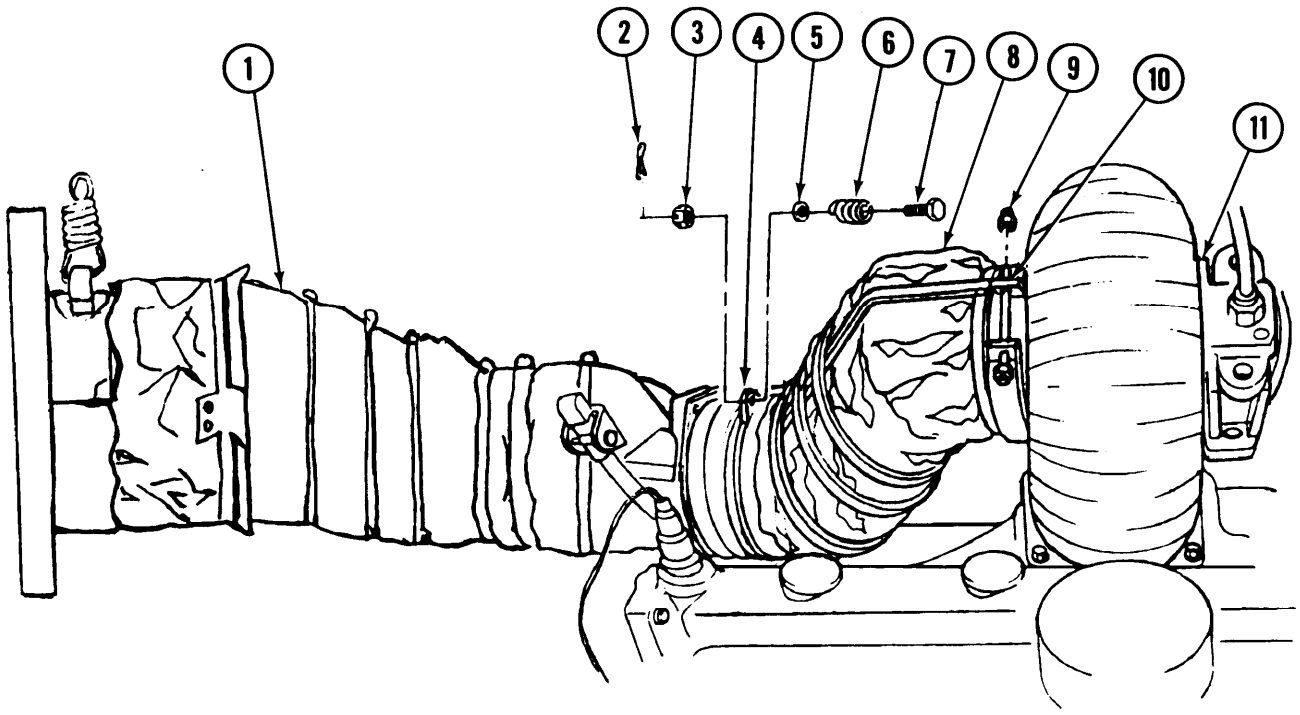
5-2. EXHAUST DUCT AND PIPE REPLACEMENT (continued).

a. REMOVAL

1. Remove two cotter pins (2), castle nuts (3), washers (5), springs (6), and screws (7) from flange (4). Discard cotter pins.

2. Remove nut (9) and clamp (10) from exhaust pipe (8) and turbocharger (11).

3. Pull exhaust pipe (8) free of exhaust duct (1) and turbocharger (11).



NOTE

Powerpack must be removed before removing exhaust duct.

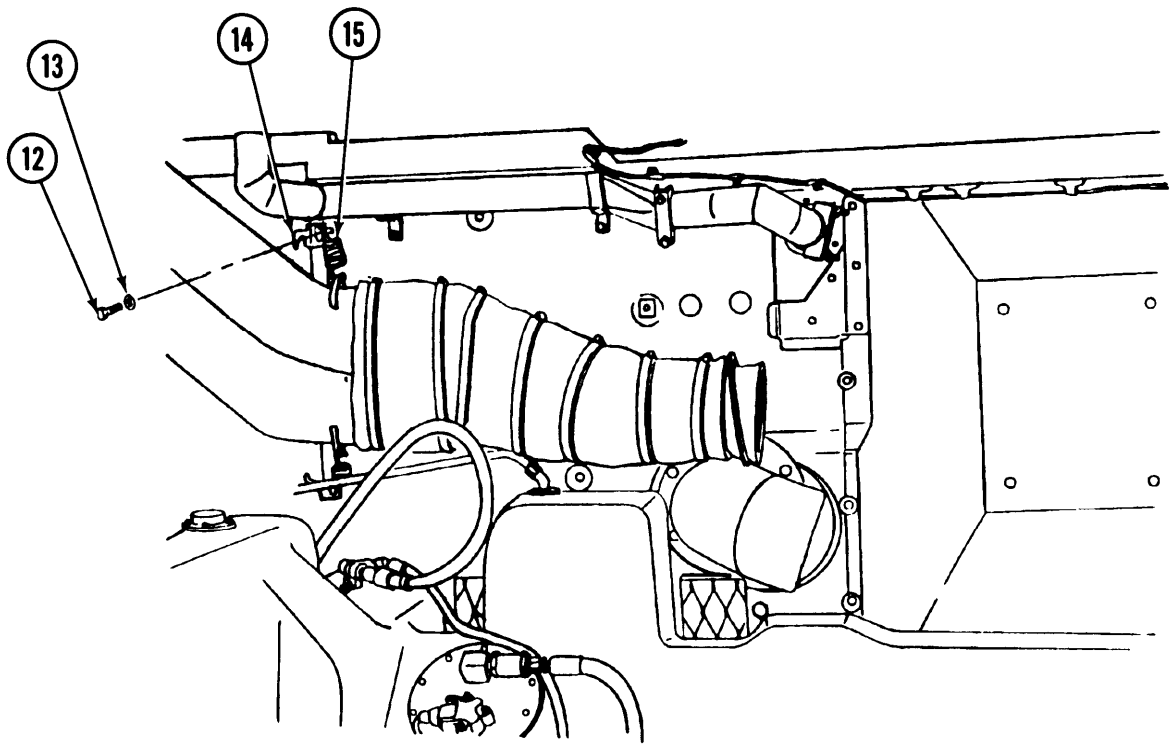
4. Disconnect two springs (15) from hanger (14), and remove exhaust duct (1) from vehicle.

5. Remove two screws (12) and washers (13) and hanger (14) from vehicle.

5-2. EXHAUST DUCT AND PIPE REPLACEMENT (continued).

b. INSTALLATION

1. Install hanger (14) in vehicle with two washers (13) and screws (1 2).
2. Install exhaust duct (1) in vehicle, and connect two springs (15) to hanger (14).
3. Position exhaust pipe (8) between exhaust duct (1) and turbocharger (11).
4. Secure exhaust pipe (8) to turbocharger (11) with clamp (10) and nut (9).
5. Secure exhaust pipe (8) to exhaust duct (1) with two screws (7), washers (5), springs (6), castle nuts (3), and new cotter pins (2).



FOLLOW-ON MAINTENANCE:
- Install powerpack (if removed) (para 3-2).
- Close air intake grille (refer to TM 9-2350-287-10).

5-3. EXHAUST DUCT AND PIPE INSULATION REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
• General mechanic's tool kit (Item 24, Appendix 1)

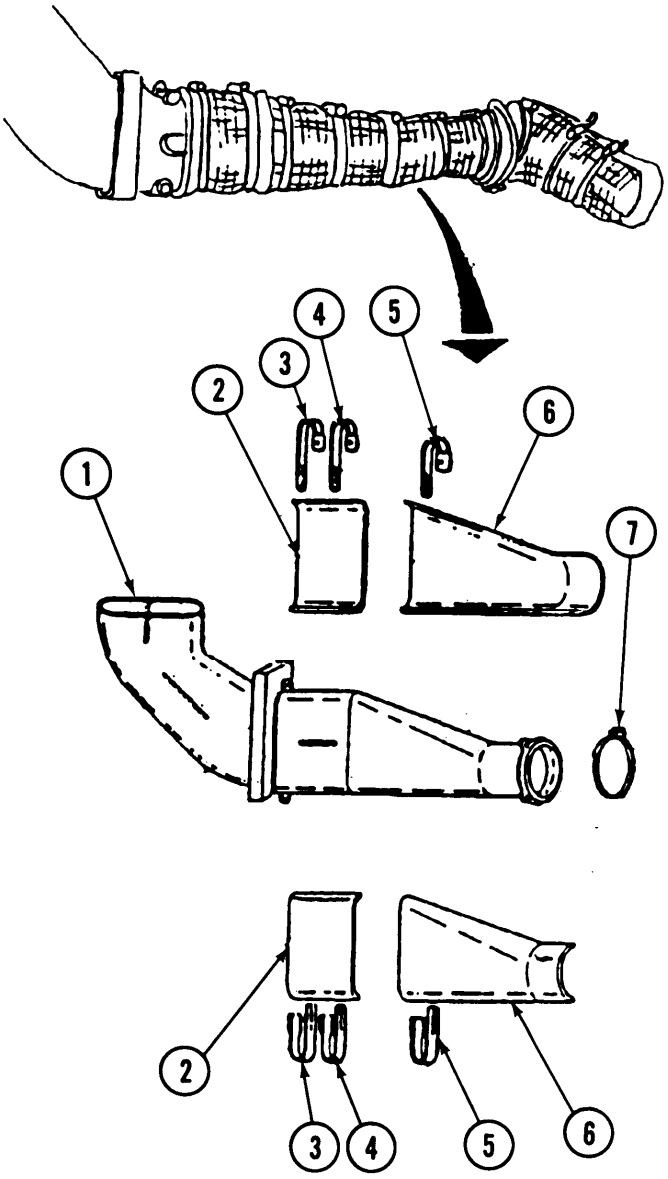
Equipment Conditions:
• Powerpack removed (para 3-2).
• Exhaust duct and pipe removed (para 5-2).

a. REMOVAL

NOTE

Three large clamps are formed by assembling two smaller clamps. It is necessary to loosen them for removal only at one location.

1. Loosen and remove two large clamps (3 and 4) from insulation (2) and exhaust duct (1).
2. Remove insulation (2) from exhaust duct (1).
3. Loosen and remove large clamp (5) and four clamps (7) from insulation (6) and exhaust duct (1).
4. Remove insulation (6) from exhaust duct (1). Discard insulation.



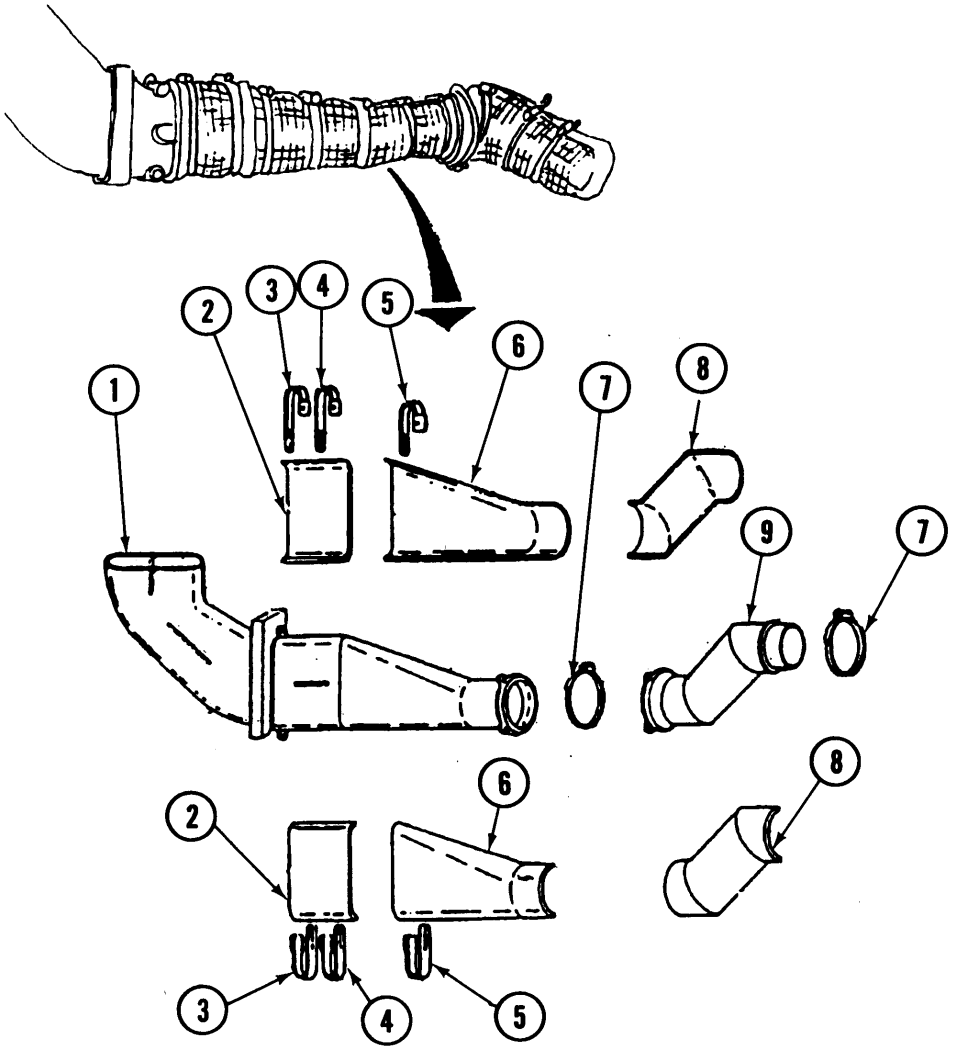
5-3. EXHAUST DUCT AND PIPE INSULATION REPLACEMENT (continued).

5. Loosen and remove three clamps (7) from insulation (8) and exhaust duct (9).

6. Remove insulation (8) from exhaust duct (9).

b. INSTALLATION

1. Install insulation (8) on exhaust duct (9) with three clamps (7).



2. Install insulation (6) on exhaust duct (1) with four clamps (7) and large clamp (5).

3. Install insulation (2) on exhaust duct (1) with two large clamps (3 and 4).

FOLLOW-ON MAINTENANCE:
- Install exhaust duct and pipe (para 5-2).
- Install powerpack (para 3-2).

CHAPTER 6
COOLING SYSTEM MAINTENANCE

6-1. GENERAL

This chapter contains procedures for the removal and installation of cooling system components. The cooling system consists of the following:

Pressure Relief Valve and Block Mount
Surge Tank
Surge Tank Hoses
Cooling Fan Universal Joints
Radiator and Mounts
Aeration Detector
Radiator Shroud
Main Engine Coolant Crossover Tube
Engine Coolant Tube
Inlet Thermostat and Housing Assembly
Bypass Thermostat and Housing Assembly

6-2. PRESSURE RELIEF VALVE AND BLOCK MOUNT REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Gasket (Item 67, Appendix H)
- Safety relief valve (Item 255, Appendix H)
- Self-locking nut (2) (Item 317, Appendix H)

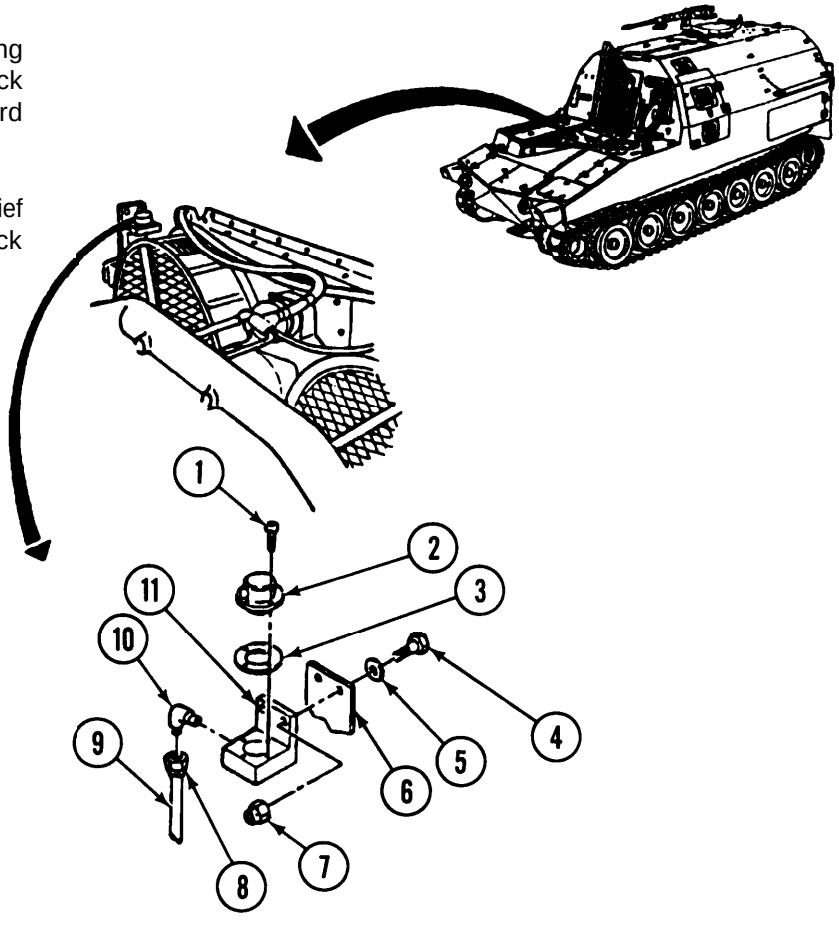
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Air intake grille opened and secured (refer to TM 9-2350-287-10).
- Radiator fan protectors installed (para 2-8).

a. REMOVAL

WARNING

A protective fan screen must be installed before doing maintenance in the engine compartment or when engine is running inside or outside vehicle. Contact with rotating fan can cause injury.

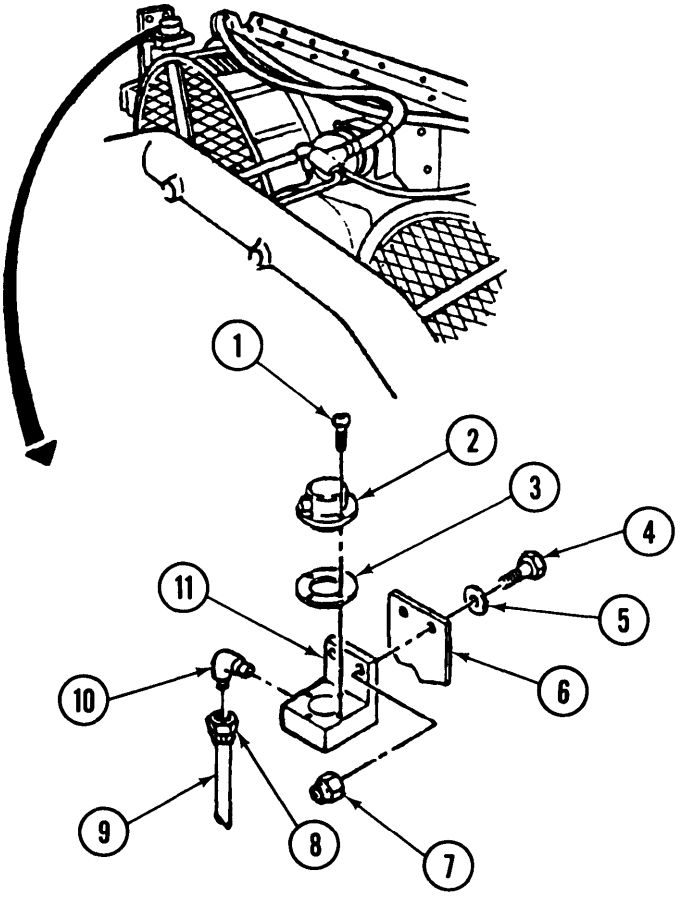
1. Loosen nut (8) on hose(9), and remove hose (9) and elbow (10) from block mount (11).
2. Remove two screws (4), setf-locking nuts (7), and washers (5) and block mount (11) from bracket (6). Discard self-locking nuts.
3. Remove four screws (1), pressure relief valve (2), and gasket (3) from block mount (11). Discard gasket.
4. Replace relief valve (2) if defective.



6-2. PRESSURE RELIEF VALVE AND BLOCK MOUNT REPLACEMENT (continued).

b. INSTALLATION

1. Install new gasket (3), relief valve (2), and four screws (1) on block mount (11).
2. Install block mount (11) and two screws (4), new self-locking nuts (7), and washers (5) on bracket (6).
3. Install hose (9) and elbow (10)onblockmount(11) and tighten nut (8).



FOLLOW-ON MAINTENANCE:

- Remove radiator fan protectors (para 2-8).
- Close air intake grille (refer to TM 9-2350-287-10).

6-3. SURGE TANK REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

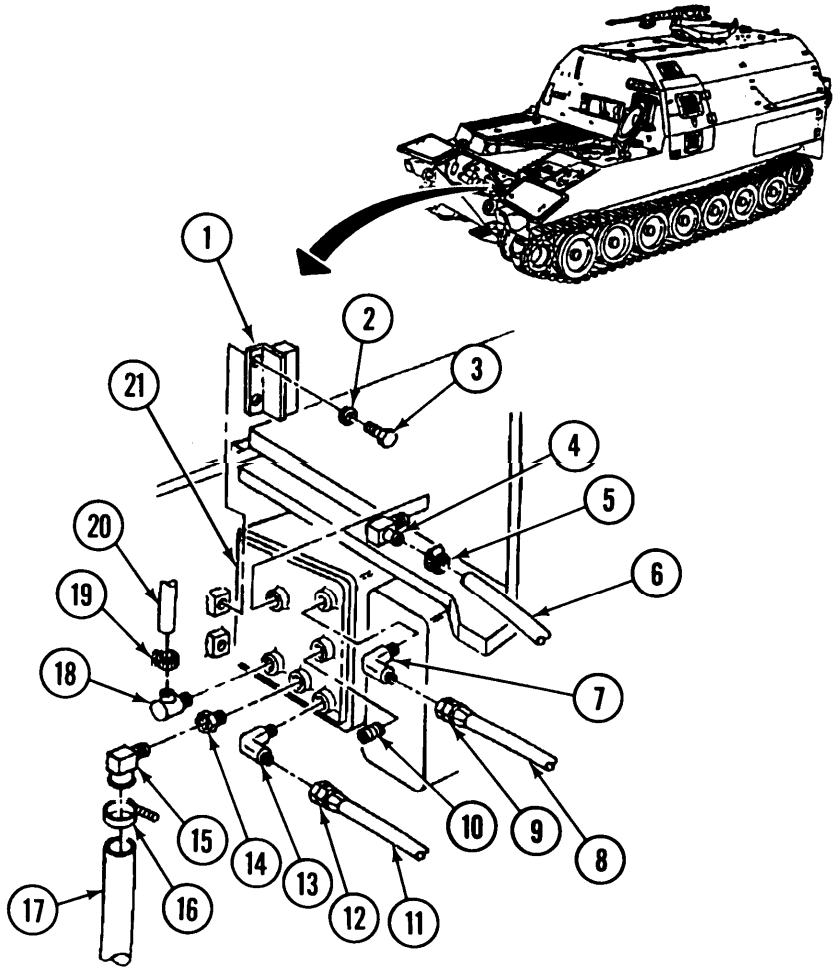
Tools/Test Equipment:
- Adjustable wrench (Item 2, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- Adhesive (Item 1, Appendix D)
- Drycleaning solvent (Item 27, Appendix D)
- Rag (Item 56, Appendix D)
- Rubber adhesive (Item 5, Appendix D)
- Sealing compound (Item 61, Appendix D)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Left and right transmission access doors opened (refer to TM 9-2350-287-10).
- Primary fuel filter assembly lifting bracket removed (para 4-18).
- Primary fuel filter assembly removed (para 4-25).
- Cooling system drained (refer to TM 9-2350-287-10).
- Oil filters and filter adapter moved out of the way (para 3-8).

a. REMOVAL

1. Remove two screws (3) and washers (2) and retainer (1) from bulkhead.
2. Loosen clamp (16) and remove hose (17) from elbow (15).
3. Loosen two clamps (5 and 19) and remove two hoses (6 and 20) from two elbows (4 and 18).
4. Loosen two nuts (9 and 12) and disconnect two hoses (8 and 11) from two elbows (7 and 13).
5. Remove four elbows (4,7, 13, and 18) from surge tank (21).
6, Remove elbow (15) and adapter (14) from surge tank (21).
7. Remove plug (10) from surge tank (21).
8. Remove surge tank (21) from vehicle.



6-3. SURGE TANK REPLACEMENT (continued).

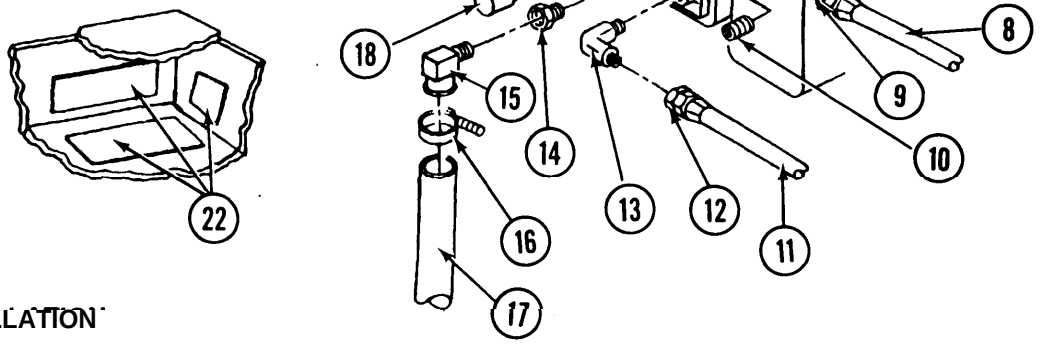
NOTE

Remove only those pads that are defective and need to be replaced.

9. Scrape pads (22) from hull.

Drycleaning solvent P-D-680 is toxic and flammabil. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT use near open flame or excessive heat.

10. Clean pad mounting surface throughly with drycleaning solvent rag.



b. INSTALLATION

WARNING

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

1. Apply adhesive to new pads (22) only, and install pads (22) on hull.

2. Install surge tank (21) in vehicle.

6-3. SURGE TANK REPLACEMENT (continued).

3. Apply sealing compound to plug (10), and install plug (10) in surge tank (21).

4. Apply sealing compound to threads of adapter (14) and elbow (15), and install adapter (14) and elbow (15) in surge tank (21).

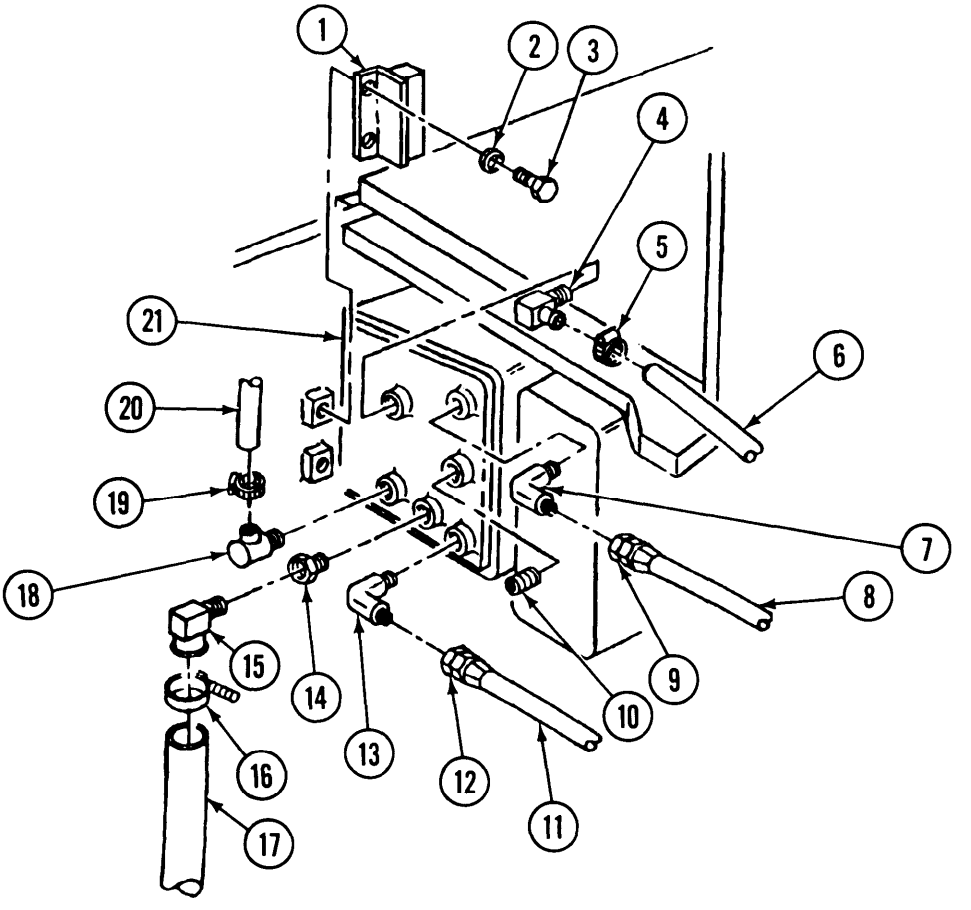
5. Apply sealing compound to threads of four elbows (4, 7, 13, and 18), and install four elbows (4, 7, 13, and 18) in surge tank (21).

6. Connect two hoses (8 and 11) to two elbows (7 and 13), and tighten two nuts (9 and 12).

7. Apply adhesive to two hoses (6 and 20), install two hoses (6 and 20) on two elbows (4 and 18), and tighten two clamps (5 and 19).

8. Apply adhesive to hose (17), install hose (17) on elbow (15), and tighten clamp (16).

9. Install retainer (1) and two screws (3) and washers (2) on bulkhead.



FOLLOW-ON MAINTENANCE:

- Reposition oil filters and filter adapter (para 3-8).
- Fill cooling system (refer to TM 9-2350-287-10).
- Install primary fuel filter assembly lifting bracket (para 4-18).
- Install primary fuel filter assembly (para 4-25).
- Close left and right transmission access doors (refer to TM 9-2350-287-10).

6-4. SURGE TANK HOSES REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

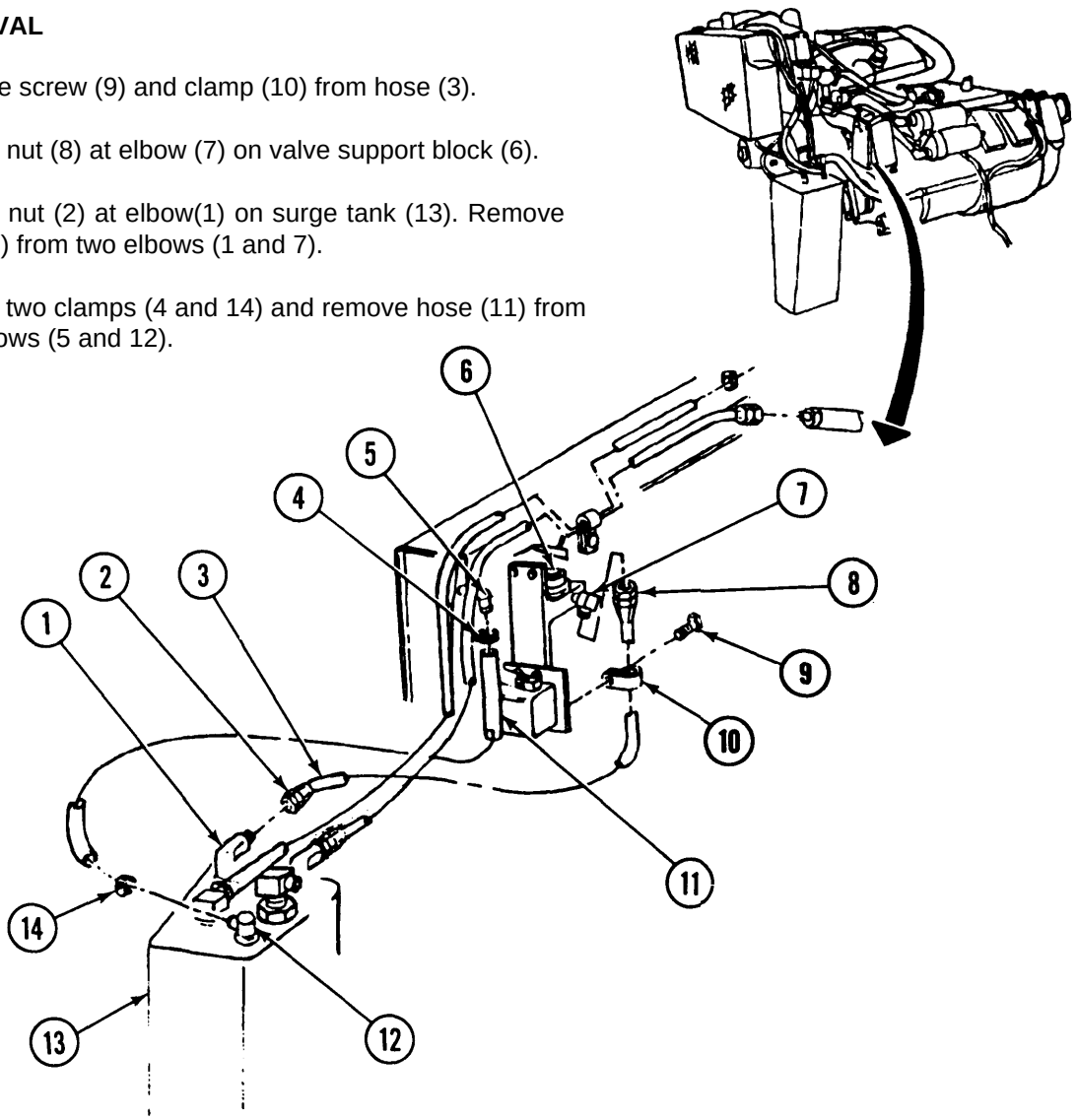
Tools/Test Equipment:
General mechanic's tool kit
(Item 24, Appendix I)

Materials/Parts:
- Adhesive (Item 1, Appendix D)
- LockWasher (2) (Item 163, Appendix H)
- LockWasher (Item 165, Appendix H)
- LockWasher (2) (Item 175, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-1 0).
- PowerPack removed (para 3-2).
- Cooling system drained (refer to TM 9-2350-287-10).

a. REMOVAL

1. Remove screw (9) and clamp (10) from hose (3).
2. Loosen nut (8) at elbow (7) on valve support block (6).
3. Loosen nut (2) at elbow(1) on surge tank (13). Remove hose (3) from two elbows (1 and 7).
4. Loosen two clamps (4 and 14) and remove hose (11) from two elbows (5 and 12).



6-4. SURGE TANK HOSES REPLACEMENT (continued).

5. Remove two screws (29), Iockwashers (31), and nuts (32) and hose (33) from two clamps (30) at transmission. Discard lockwashers.

6. Loosen two clamps (34 and 35) and remove hose (33) from elbow (28) and tube (36).

7. Remove two screws (41), lockwashers (42), and clamps (43 and 44) from tube (36). Discard lockwashers.

8. Loosen clamp (37) and remove tube (36) from hose (38).

9. Loosen clamp (39) and remove hose (38) from lower radiator crossover pipe (40),

10. Loosen nut (23) at crossover tube (24) and nut (26) at elbow (27).

11. Remove screw (21), lockwasher (20), washer (1 9), and clamp(18) from radiator fan. Discard lockwasher.

12. Remove hose (25) from elbow (27) and crossover tube (24).

13. Remove two clamps (16 and 22) and hose (17) from elbow (15) and radiator.

b. INSTALLATION

WARNING

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

1. Apply adhesive to both ends of hose (17), and install hose(17) and two clamps (16 and 22) on elbow (15) and radiator.

2. Install hose (25) on elbow (27) and crossover tube (24), tighten nut (26) at elbow (27), and tighten nut (23) at crossover tube (24).

3. Install clamp (18), screw (21), new lockwasher (20), and washer(19) on radiator fan.

4. Apply adhesive to both ends of hose (38), install hose (38) on lower radiator crossover pipe (40), and tighten clamp (39).

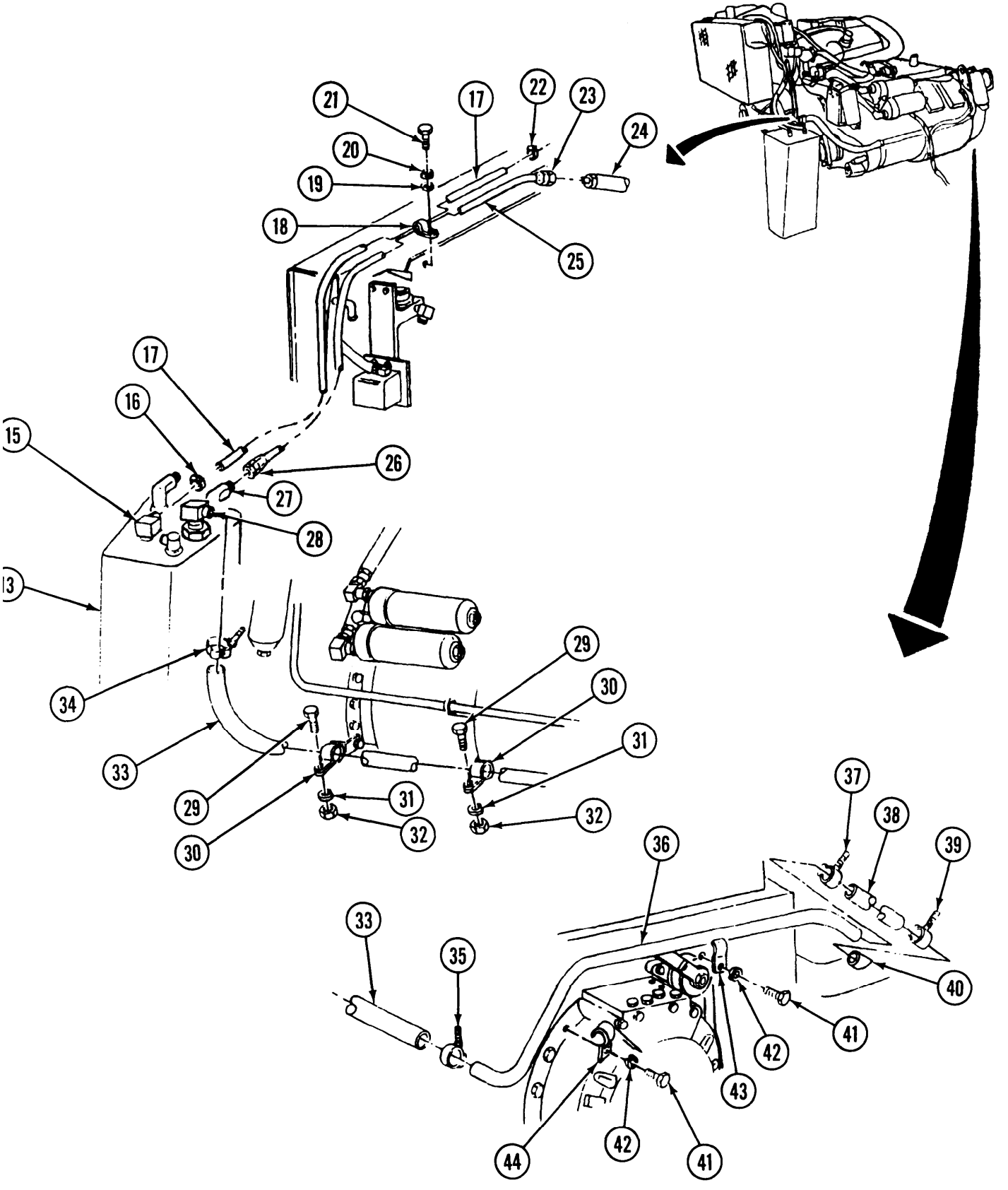
5. install tube (36) on hose (38), and tighten clamp (37).

6. Install two clamps (43 and 44), screws (41), and new lockwashers (42) on tube (36).

7. Apply adhesive to both ends of hose (33), and install hose (33) on elbow (28) and tube (36), and tighten two clamps (34 and 35).

8. Install two clamps (30), screws (29), new lockwashers (31), and nuts (32) on hose (33) at transmission.

6-4. SURGE TANK HOSES REPLACEMENT (continued).



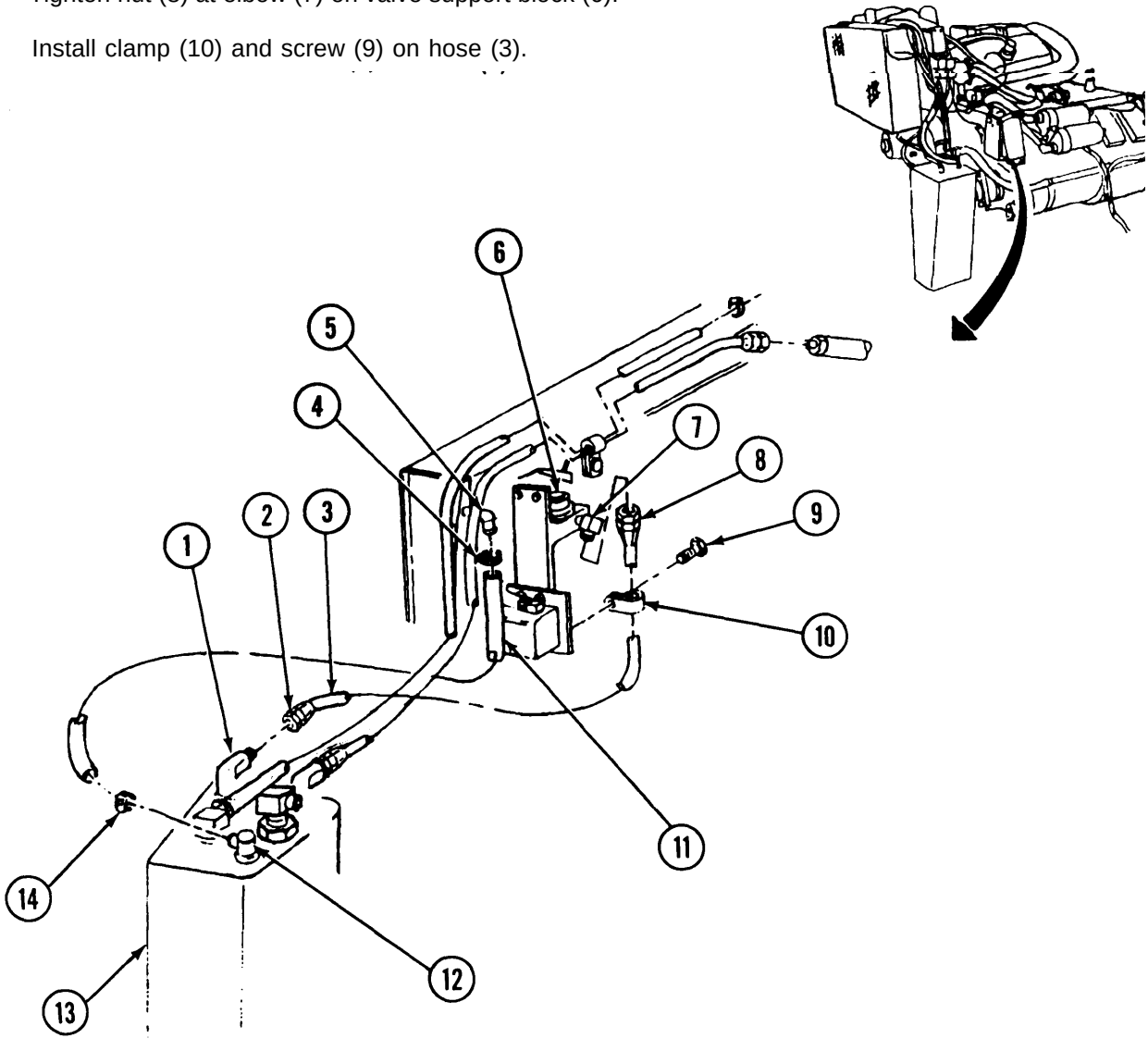
6-4. SURGE TANK HOSES REPLACEMENT (continued).

9. Apply adhesive to both ends of hose (11), and install hose (11) on two elbows (5 and 12) and radiator, and tighten two clamps (4 and 14).

10. Install hose (3) on two elbows (1 and 7). Tighten nut (2) at elbow (1) on surge tank (13).

11. Tighten nut (8) at elbow (7) on valve support block (6).

12. Install clamp (10) and screw (9) on hose (3).



FOLLOW-ON MAINTENANCE:
- Install powerpack (para 3-2),
- Refill cooling system (refer to TM 9-2350-287-10).

6-5. COOLING FAN UNIVERSAL JOINTS REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
•General mechanic's tool kit (Item 24, Appendix 1)

Equipment Conditions:
• Powerpack removed (para 3-2).

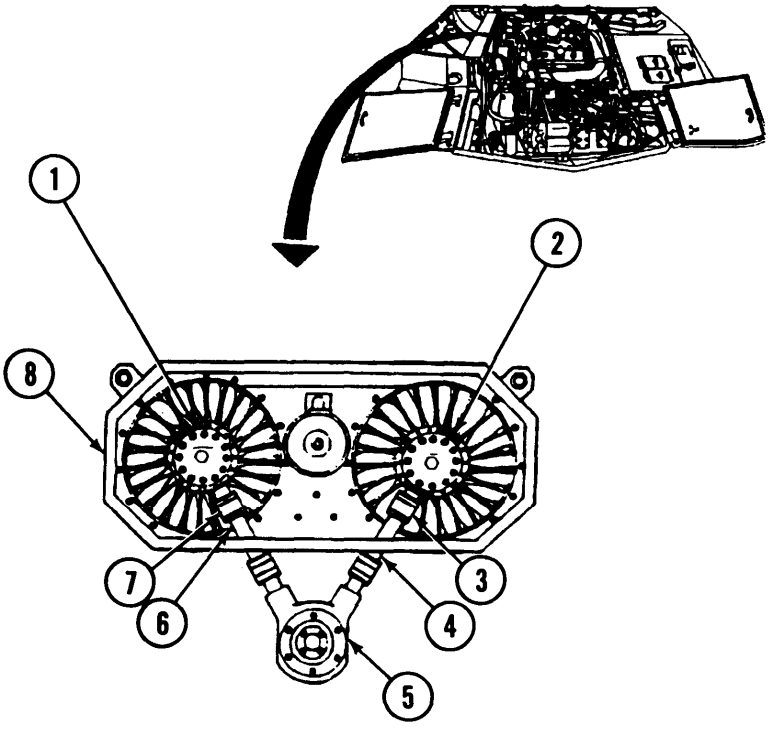
a. REMOVAL

WARNING

Universal joints are spring-loaded. To avoid injury, be careful when removing universal joints.

NOTE

- Replace entire cooling fan universal joint if any part is defective.
- Sleeve joints must be flexed to provide enough clearance to remove the two universal joints.



6-5. COOLING FAN UNIVERSAL JOINTS REPLACEMENT (continued).

1. Push sleeve joint (3 or 7) downward to remove from splined shafts on fan gearbox (1 or 2).

2. Pull cooling fan universal joint (4 or 6) away from axial drive shaft assembly (5) and up through opening in shroud (8).

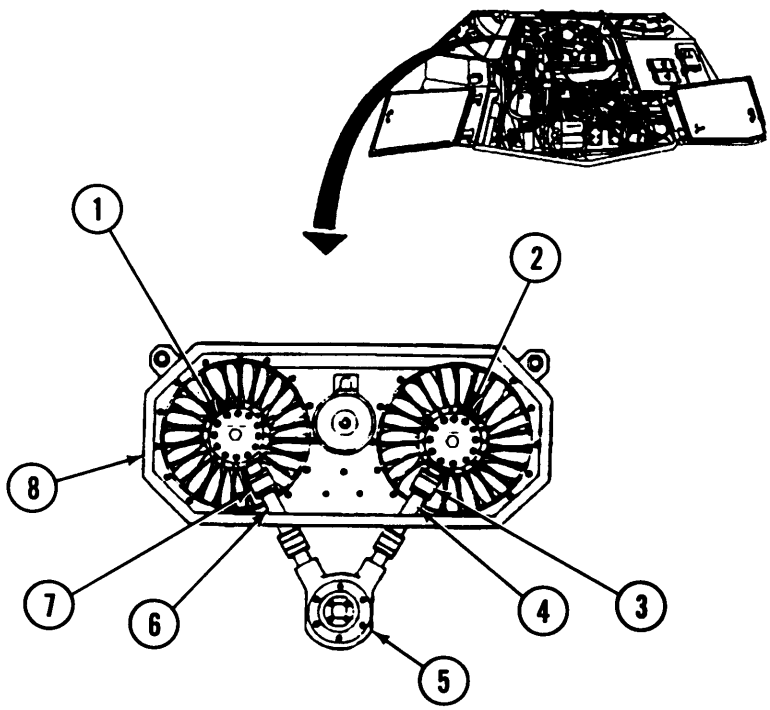
b. INSTALLATION

WARNING

Universal joints are spring-loaded. To avoid injury, be careful when installing universal joints.

1. Install universal joint (4 or 6) through opening in shroud (8), attaching end hub to splined shafts on axial drive shaft assembly (5).

2. Push sleeve joint (3 or 7) downward and install on splined shaft on fan gearbox (1 or 2).



FOLLOW-ON MAINTENANCE:
•Install powerpack (para 3-2).

6-6. RADIATOR AND MOUNTS REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tool/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materiais/Parts:
- Adhesive (Item 1, Appendix D)
- Bushing (2) (Item 6, Appendix H)
- LockWasher (20) (Item 177, Append H)
- LockWasher (2) (Item 179, Appendix H)

Personnel Required: Two

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).

NOTE

PowerPack must be removed to replace radiator mounts.

- PowerPack removed (para 3-2).
- Cooling system drained (refer to TM 9-2350-287-1 0).

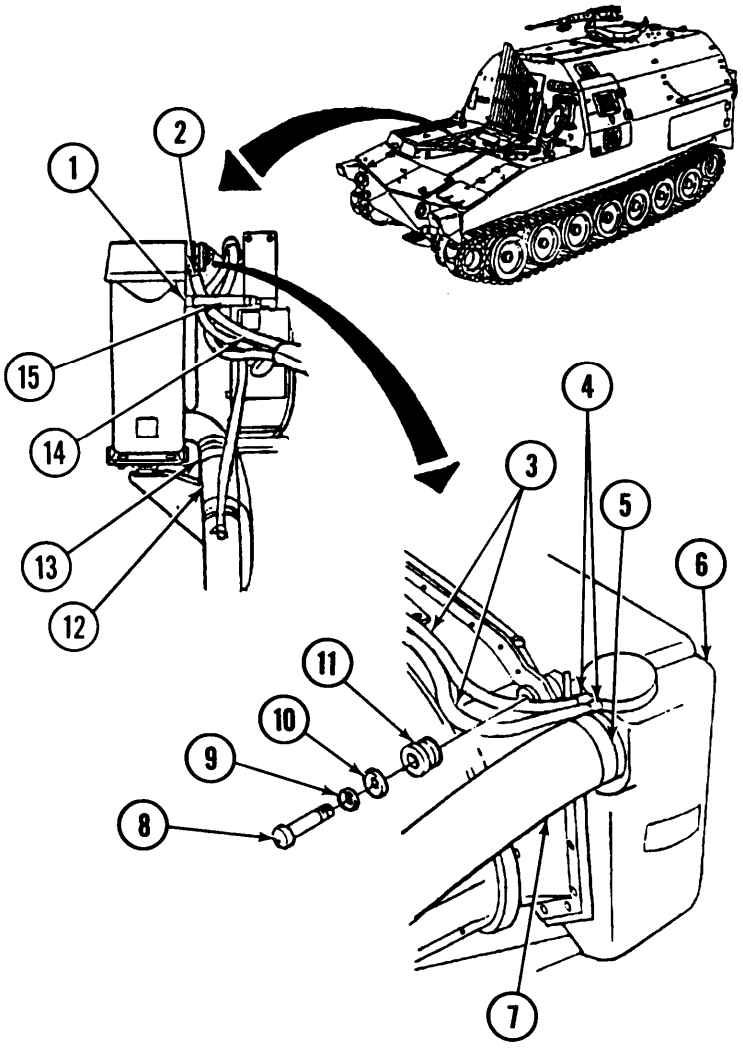
a. REMOVAL

1. Loosen clamp (1) and remove hose (15) from radiator (6).
2. Loosen clamp (2) and remove hose (14) from radiator (6).
3. Remove two screws (8), lockwashers (9), washers (1 O) and resilient mounts(11) from either side of radiator (6). Discard lockwashers.
4. Loosen outlet hose clamp (13) and remove radiator outlet hose (12) from radiator (6).
5. Loosen two vent hose clamps (4) and remove two radiator vent hoses (3) from radiator (6).
6. Loosen inlet hose clamp (5) and remove radiator inlet hose (7) from radiator (6).

WARNING

Radiator is very heavy. To prevent injury to personnel, two persons are required when removing radiator from vehicle.

7. Lift radiator (6) up and away from radiator shroud.



6-6. RADIATOR AND MOUNTS REPLACEMENT (continued).

8. Remove four screws (19), lockwashers (18), and washers(17) and two brackets(16) from bottom of radiator (6). Discard lockwashers,

9. Remove eight screws (20), lockwashers (21), and washers (22) and front mount (23) from transfer case. Discard lockwashers.

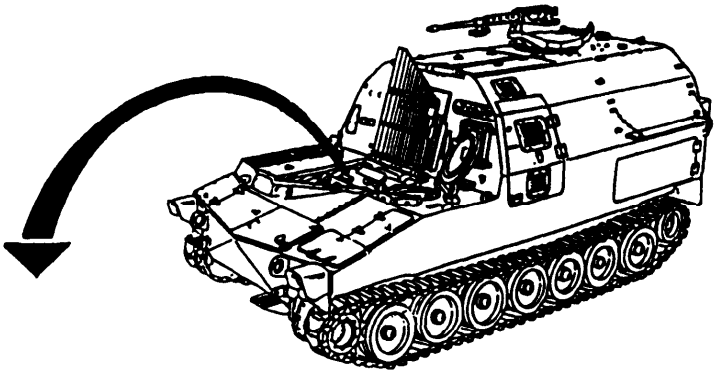
10. Remove nine screws (26), lockwashers (27), and washers (28) and rear mount (25) from transfer case. Discard lockwashers.

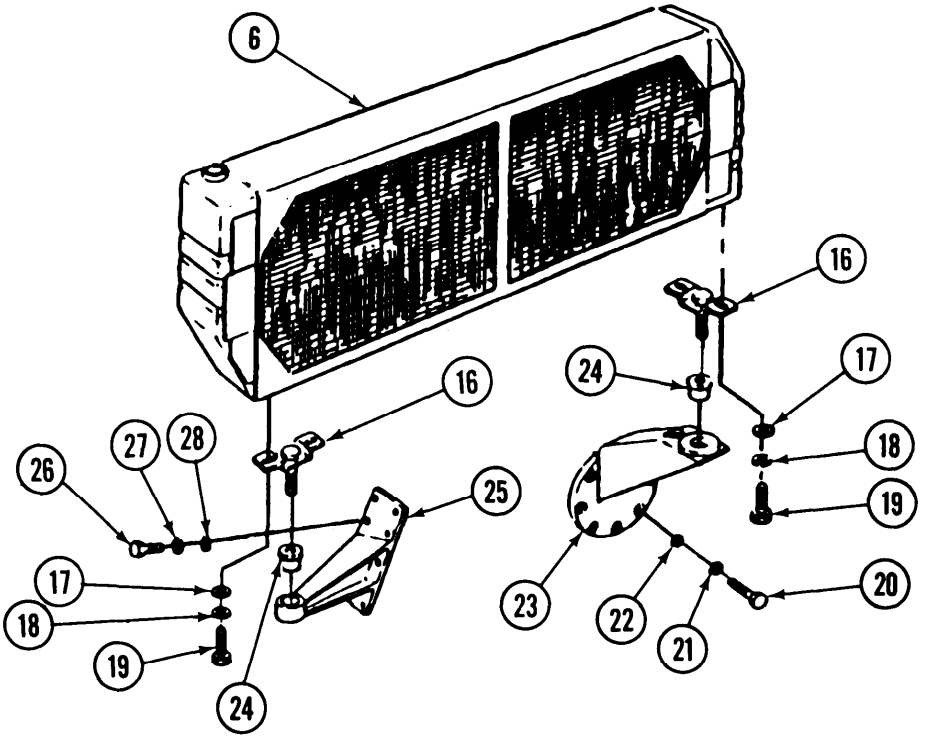
11. Remove bushing (24) from each of two mounts (23 and 25). Discard bushing.

b. INSTALLATION

1. Install new bushing (24) in each of two mounts (23 and 25).

2. Install rear mount (25) and nine screws (26), new lockwashers (27), and washers (28) on transfer case.





6-6. RADIATOR AND MOUNTS REPLACEMENT (continued).

3. Install front mount (23) and eight screws (20), new lockwashers (21), and washers (22) on transfer case.

4. Install two brackets (16) and four screws (19), new lockwashers (1 8), and washers (17) on bottom of radiator (6),

WARNING

Radiator is very heavy. To prevent injury to personnel, two persons are required when installing radiator in vehicle.

5. Position radiator (6) in place against radiator shroud.

WARNING

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

6. Apply adhesive to radiator inlet hose (7), install radiator inlet hose (7) on radiator(6), and tighten inlet hose clamp (5).

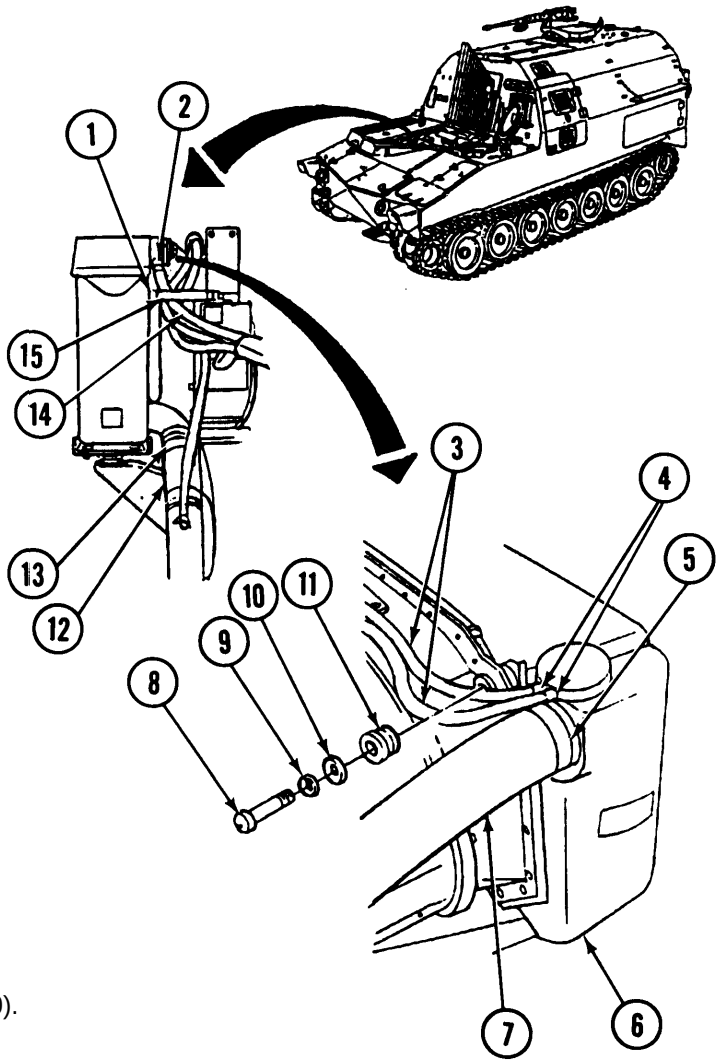
7. Apply adhesive to two radiator vent hoses (3), install radiator vent hoses (3)on radiator (6), and tighten two vent hose clamps (4).

8. Apply adhesive to radiator outlet hose (1 2), install radiator outlet hose (12) on radiator (6), and tighten outlet hose clamp (13).

9. Install two resilient mounts (11) on either side of radiator (6) with two screws (8), new lockwashers (9), and washers (10).

10. Apply adhesive to hose (14), install hose (14) on radiator (6), and tighten clamp (2).

11. Apply adhesive to hose (15), install hose (15) on radiator (6), and tighten clamp(1).



FOLLOW-ON MAINTENANCE:

- Install powerpack (para 3-2).
- Refill cooling system (refer to TM 9-2350-287-10).

6-7. AERATION DETECTOR REPLACEMENT.

This Task Covers:

a. Removal
b. Disassembly
c. Inspection
d. Assembly
e. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- Adhesive (Item 1, Appendix D)
- Sealing compound (Item 58, Appendix D)
- LockWasher (Item 164, Appendix H)
- LockWasher (2) (Item 175, Appendix H)
- LockWasher (4) (Item 196, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Air intake grille opened and secured (refer to TM 9-2350-287-10).
- Right transmission access door opened (refer to TM 9-2350-287-10).
- Pressure relief valve block mount removed (para 6-2).
- Cooling system drained (refer to TM 9-2350-287-10).

a. **REMOVAL**

1. Disconnect two electrical leads, 352A and 352B (19), from aeration detector (20).

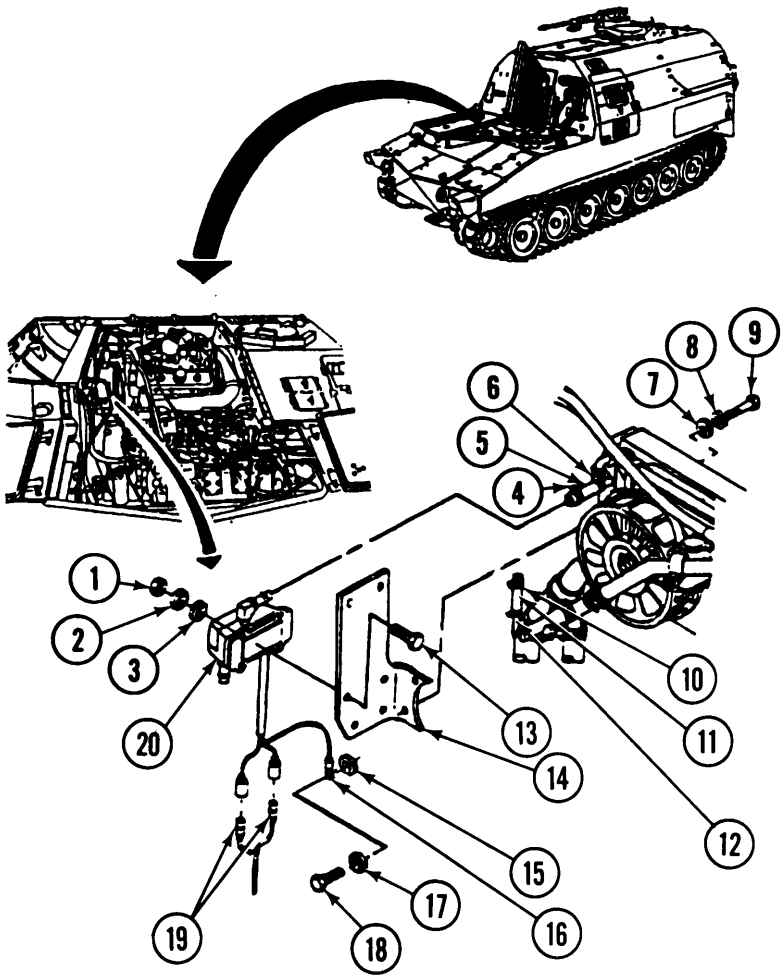
2. Remove screw (18), lockwasher (17), ground lead (16), and washer (15) from transmission. Discard lockwasher.

3, Loosen two clamps (4 and 10), and remove two hoses (5 and 11) from aeration detector (20).

4. Remove two screws (9), lockwashers (8), and washers (7) and bracket (14) from vehicle. Discard lockwashers.

5. Remove four screws (13), lockwashers (2), washers (3), and nuts (1) and aeration detector (20) from bracket (14). Discard lockwashers.

6. Loosen two clamps (6 and 12) and remove two hoses (5 and 11) from vehicle, if required.



6-7. AERATION DETECTOR REPLACMENT (continued).

b. DISASSEMBLY

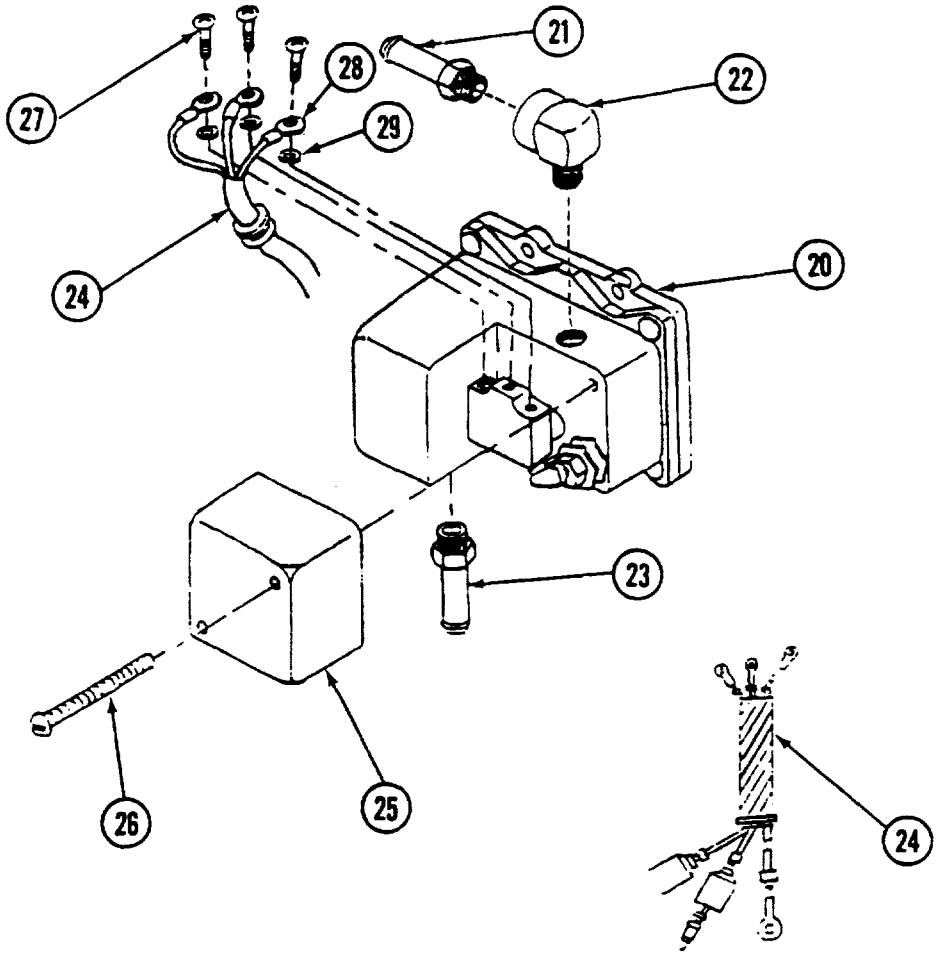
1. Remove adapter (21) and elbow (22) from aeration detector (20).
2. Remove adapter (24) from aeration detector (20).
3. Remove two screws (26) and cover (25) from aeration detector (20).
4. Remove three screws (27), wire connectors (28), and washers (29) from aeration detector (20).

c. INSPECTION

Inspect wiring harness (24) for cracks, breaks, or fraying. Replace as necessary.

d. ASSEMBLY

1. Install three wire connectors (28), screws (27), and washers (29) on aeration detector (20).
2. Install cover (25) and two screws (26) on aeration detector (20).



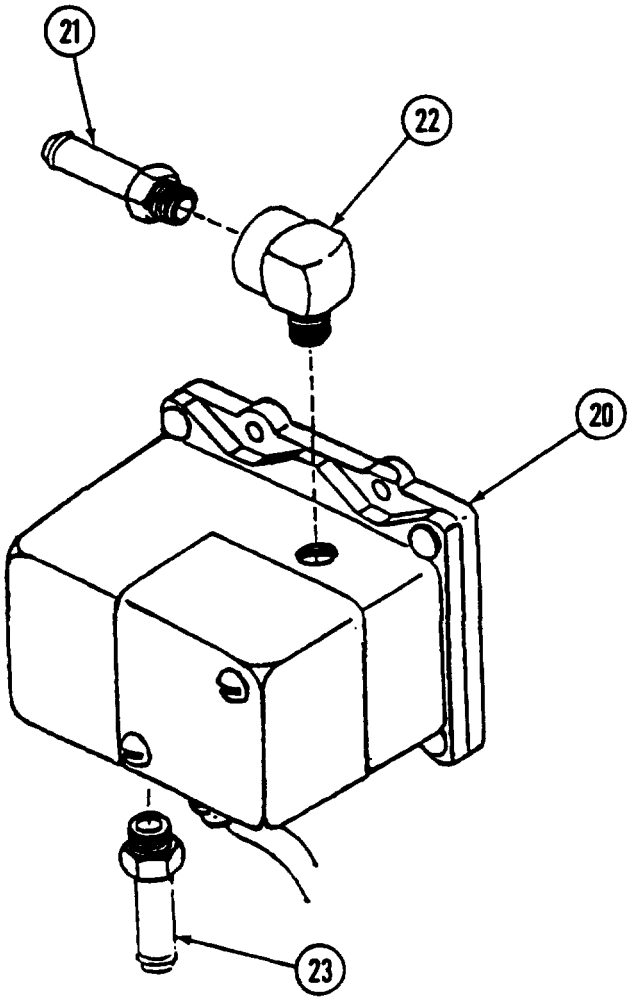
6-7. AERATION DETECTOR REPLACEMENT (continued).

WARNING

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

3. Apply sealing compound to mating surface of adapter (23), and install adapter (23) on aeration detector (20).

4. Apply sealing compound to mating surfaces of elbow (22) and adapter (21), and install elbow (22) and adapter (21) on aeration detector (20).



6-7. AERATION DETECTOR REPLACEMENT (continued).

e. INSTALLATION

WARNING

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

1, If hoses (5 and 11) were removed, apply adhesive to tube at interfaces, install two hoses (5 and 11) on vehicle, and tighten two clamps (6 and 12).

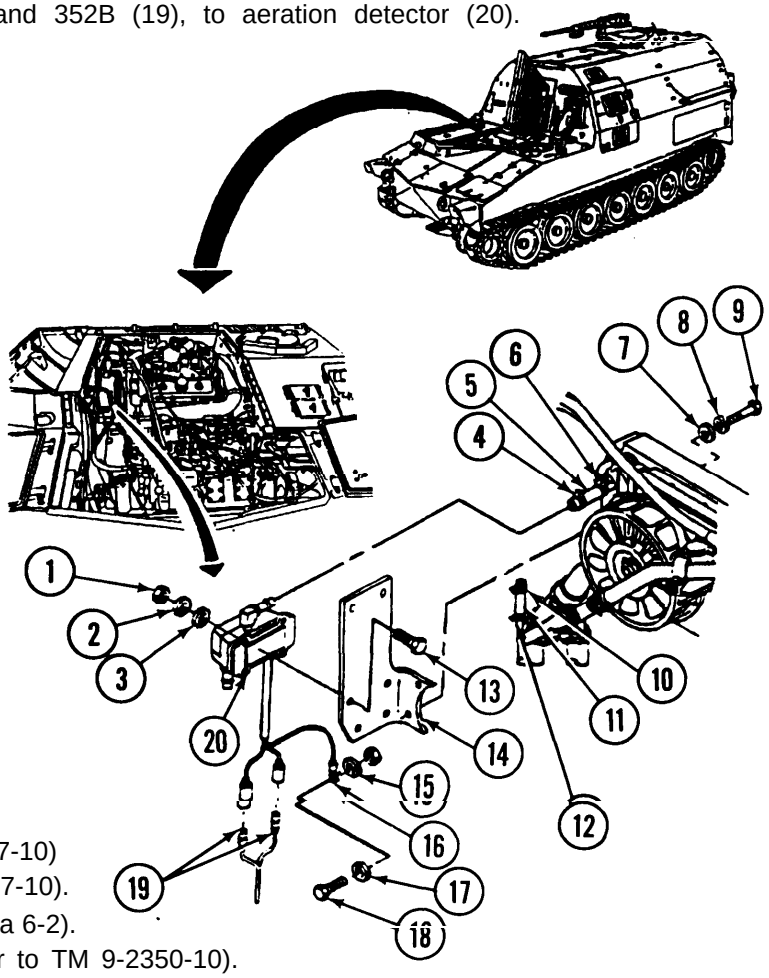
2. Install bracket (14) and two screws (9), new lockwashers (8), and washers (7) on vehicle.

3. Install aeration detector (20) and four screws (13), new lockwashers (2), washers (3), and nuts(1) on bracket (14).

4. Apply adhesive to tube at interface, install two hoses (5 and 11) on aeration detector (20), and tighten two clamps (4 and 10).

5. Install washer (15), ground lead (16), new lockwasher (1 7), and screw(18) on transmission.

6. Connect two electrical leads, 352A and 352B (19), to aeration detector (20).



FOLLOW-ON MAINTENANCE:

- Refill cooling system (refer to TM 9-2350-287-10)
- Close air intake grille (refer to TM 9-2350-287-10).
- Install pressure relief valve block mount (para 6-2).
- Close right transmission access door (refer to TM 9-2350-10).

6-8. RADIATOR SHROUD REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tool/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- LockWasher (7) (Item 163, Appendix H)
- Lockwasher (29) (Item 175, Appendix H)
- Self-locking nut (3) (Item 330, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Powerpack removed (para 3-2).
- Radiator removed from powerpack (para 6-6).

a. REMOVAL

1. Remove 11 screws (12), Iockwashers (13), and washers (14) from inside of radiator shroud (5). Discard lockwashers.
2. Remove seven screws (22) and Iockwashers (21) and retainer (20) from radiator shroud (5).
3. Remove three screws (23), washers (11), and setf-locking nuts (1 O) and plate (15) from radiator shroud (5).
4. Remove three screws (3), Iockwashers (2), and washers(1) and clamp (4) from radiator shroud (5). Move aeration detector bracket (19) out of the way.
5. Remove 15 screws (7), Iockwashers (8), and washers (9) and two clamps (6) from radiator shroud (5). Discard lockwashers.
6. Depress two fan universals (16 and 17), and remove from two fan assemblies (18).
7. Remove radiator shroud (5) from two fan assemblies (18).

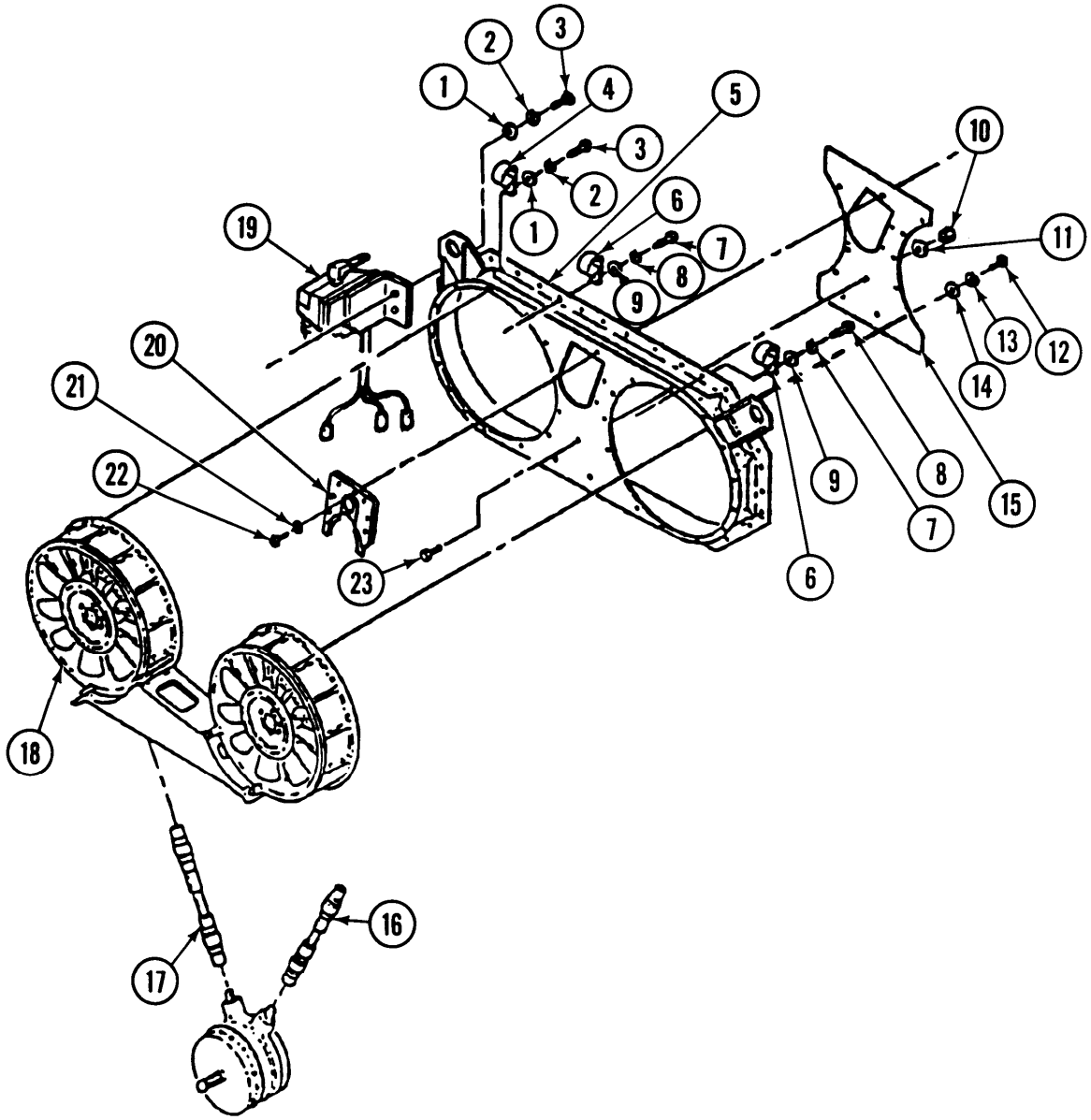
b. INSTALLATION

1. Install radiator shroud (5) on two fan assemblies (1 8).
2. Install two fan universals (16 and 17) on two fan assemblies (18).
3. Install two clamps (6) and 15 washers (9), screws (7), and new Iockwashers (8) on radiator shroud (5).
4. Position aeration detector bracket (19) in place, and install clamp(4) and three washers (1), new Iockwashers (2), and screws (3) on radiator shroud (5).
5. Install retainer (20) and seven new Iockwashers (21) and screws (22) inside radiator shroud (5),

6-8. RADIATOR SHROUD REPLACEMENT (continued).

6. Install plate (15) and three screws (23), washers (11), and self-locking nuts (10) on radiator shroud (5).

7. Install 11 screws (12), new lockwashers(13), and washers (14) inside radiator shroud (5).



FOLLOW-ON MAINTENANCE:
- Install powerpack (para 3-2).
- Install radiator on powerpack (para 6-6).

6-9. MAIN ENGINE COOLANT CROSSOVER TUBE REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materiais/Parts:
- Sealant adhesive (Item 6, Appendix D)
- Teflon antiseize tape (Item 70, Appendix D)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Cooling system drained (refer to TM 9-2350-287-10).
- Air intake grille opened and secured (refer to TM 9-2350-287-10).

a. REMOVAL

1. Loosen clamp (1) and disconnect hose (8) from elbow (7).
2. Disconnect hose (6) from elbow (2).
3. Remove two elbows (2 and 7) from main coolant crossover tube (5).
4. Loosen two clamps (4) on crossover tube (5) securing crossover tube (5) to two hoses (3), and remove crossover tube (5) from two hoses (3).

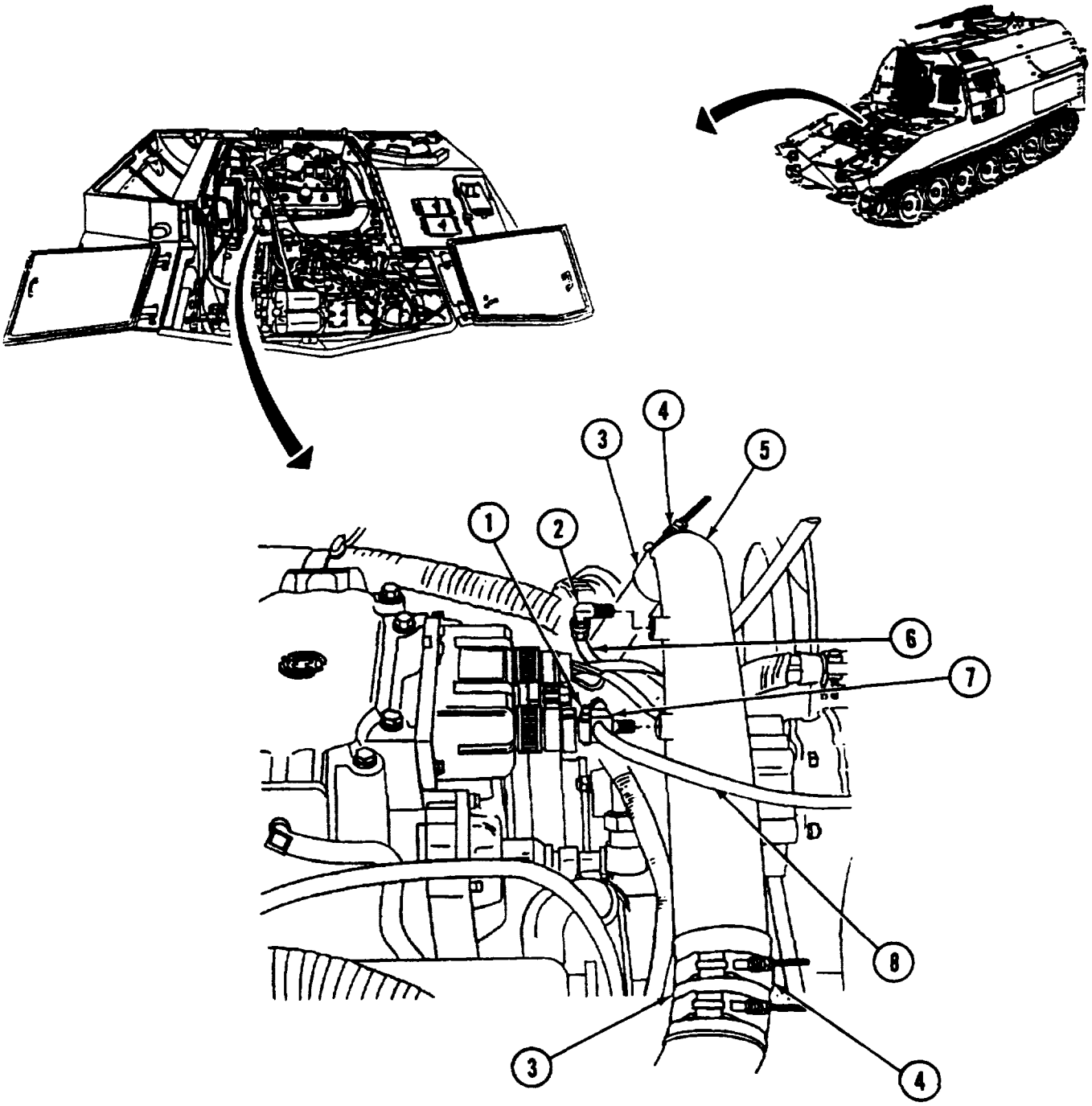
b. INSTALLATION

WARNING

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

1. Apply sealant adhesive to ends of crossover tube (5), and install crossover tube (5) on two hoses (3) with two clamps (4).
2. Apply Teflon antiseize tape to threads of two elbows (2 and 7), and install two elbows (2 and 7) in crossover tube (5).
3. Connect hose (6) to elbow (2).
4. Connect hose (8) to elbow (7) with clamp(1).

6-9. MAIN ENGINE COOLANT CROSSOVER TUBE REPLACEMENT (continued).



FOLLOW-ON MAINTENANCE:

- Fill cooling system (refer to TM 9-2350-287-10).
- Close air intake grille (refer to TM 9-2350-287-10).

6-10. ENGINE COOLANT TUBE REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Adhesive (Item 1, Appendix D)
- Lockwasher (Item 163, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10)

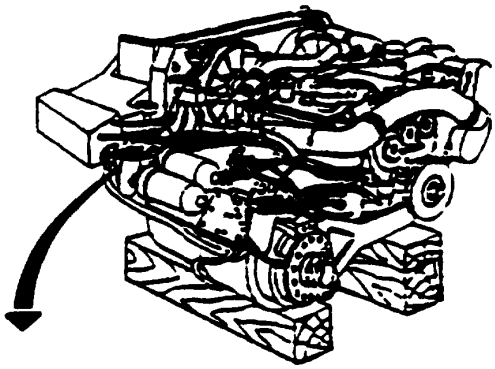
NOTE

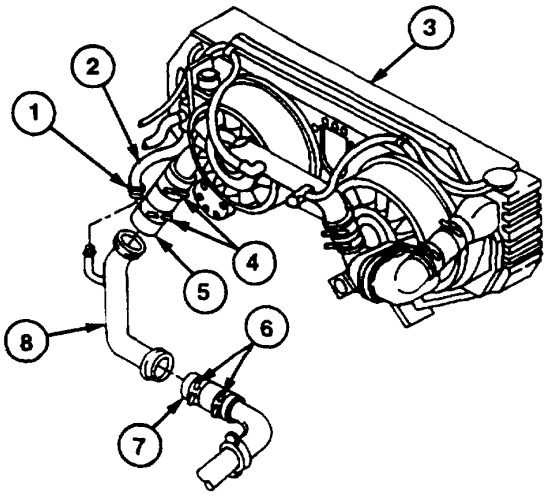
Powerpack must be supported on blocks at least 12.50 inches (31.75 cm) off the ground to remove lower coolant tube from engine.

- Powerpack removed (para 3-2).
- Cooling system drained (refer to TM 9-2350-287-10).
- Transmission oil cooler hose disconnected (para 8-5).

a. REMOVAL

1. Loosen hose clamp (1) and remove hose (2) from lower engine coolant tube (8)
2. Loosen two hose clamps (4) and hose clamps (6), and remove lower engine coolant tube (8) from lower hose (7) and radiator hose (5).
3. Remove radiator hose (5) from radiator (3).
4. Loosen hose clamp (21) at coolant pump hose (20).
5. Loosen hose clamp (23) and remove surge tank tube (9) from nipple (22).
6. Loosen two hose clamps (10) at bypass thermostat housing hose (11)
7. Loosen hose clamp (13) at lower engine coolant hose (12)
8. Remove bolt (19), washer (18), lockwasher (17), and nut (15) from loop clamp (16). Discard lockwasher
9. Remove engine coolant tube (14) from bypass thermostat housing hose (11), lower engine coolant hose (12), and coolant pump hose (20).
10. Remove loop clamp (16) from engine coolant tube (14).





6-10. ENGINE COOLANT TUBE REPLACEMENT (continued).

b. INSTALLATION

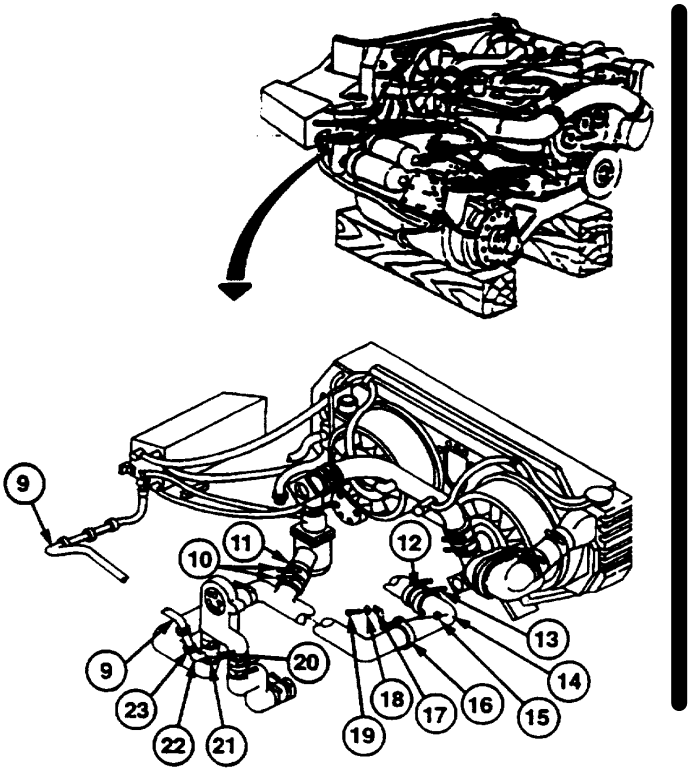
WARNING

Adhesives can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well ventilated area; if adhesive gets on clothing or skin, wash immediately with soap and water.

NOTE

- **Apply adhesive at connectors between hoses and mating tubes or castings.**
- **Hoses must cover unpainted areas of tubes and fittings or be positioned evenly between red bands on tubes and housings.**

1. Apply adhesive and install loop clamp (16) on engine coolant tube (14).
2. Apply adhesive and install engine coolant tube (14) in coolant pump hose (20), lower engine coolant hose (12), and bypass thermostat housing hose (11).
3. Apply adhesive and secure engine coolant tube (14) to engine with loop clamp (16), bolt (19), washer (18), new lockwasher (17), and nut (15).
4. Tighten hose clamp (13) at lower engine coolant hose (12)
5. Tighten two hose clamps (10) at bypass thermostat housing hose (11)
6. Apply adhesive and install surge tank tube (9) on nipple (22), and tighten hose clamp (23).
7. Tighten hose clamp (21) at coolant pump hose (20).
8. Apply adhesive and install radiator hose (5) on radiator (3).
9. Apply adhesive and install lower engine coolant tube (8) on radiator hose (5) and lower hose (7). Tighten two hose clamps (4) and hose clamps (6).
10. Apply adhesive and install hose (2) on lower engine coolant tube (8) and tighten hose clamp (1).



FOLLOW-ON MAINTENANCE:

- Connect transmission oil cooler hose (para 8-5).
- Refill cooling system (refer to TM 9-2350-287-10).
- Install powerpack (para 3-2).

6-11. INLET THERMOSTAT AND HOUSING ASSEMBLY REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- Manual control handle (Item 34, Appendix I)
- Seal installer (Item 51, Appendix I)

Materials/Parts:
- Adhesive (Item 1, Appendix D)
- Gasket (Item 62, Appendix H)
- Gasket (Item 64, Appendix H)
- Lockwasher (10) (Item 163, Appendix H)
- Seal (2) (Item 294, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10)
- Air intake grille opened and secured (refer to TM 9-2350-287-10).
- Radiator fan protectors installed (para 2-8).

a. REMOVAL

WARNING

A protective fan screen must be installed before doing maintenance in the engine compartment when engine is running or when running engine in the ground-hop mode. Contact with rotating fan can cause injury.

1. Loosen two clamps (5) and remove hose (6) from radiator (1) and inlet housing (7).
2. Remove two screws (2), lockwashers (3), and washers (4) and bracket (11) from manifold coolant connector (12).
3. Remove four screws (2) and lockwashers (3) from manifold coolant connector (12). Discard lockwashers.
4. Remove inlet housing (7) and gasket (10) from manifold coolant connector (12). Discard gasket.
5. Remove two-inlet thermostats (9) and seals (8) from inlet housing (7). Discard seals.
6. Remove three screws (17), nut (15), and four lockwashers (16) at header (14). Discard lockwashers.
7. Loosen two clamps (18) and remove hose (19) from manifold coolant connector (12) and crossover tube (20).
8. Remove manifold coolant connector (12) and gasket (13) from vehicle. Discard gasket.

b. INSTALLATION

1. Install new gasket (13) and manifold coolant connector (12) in vehicle.

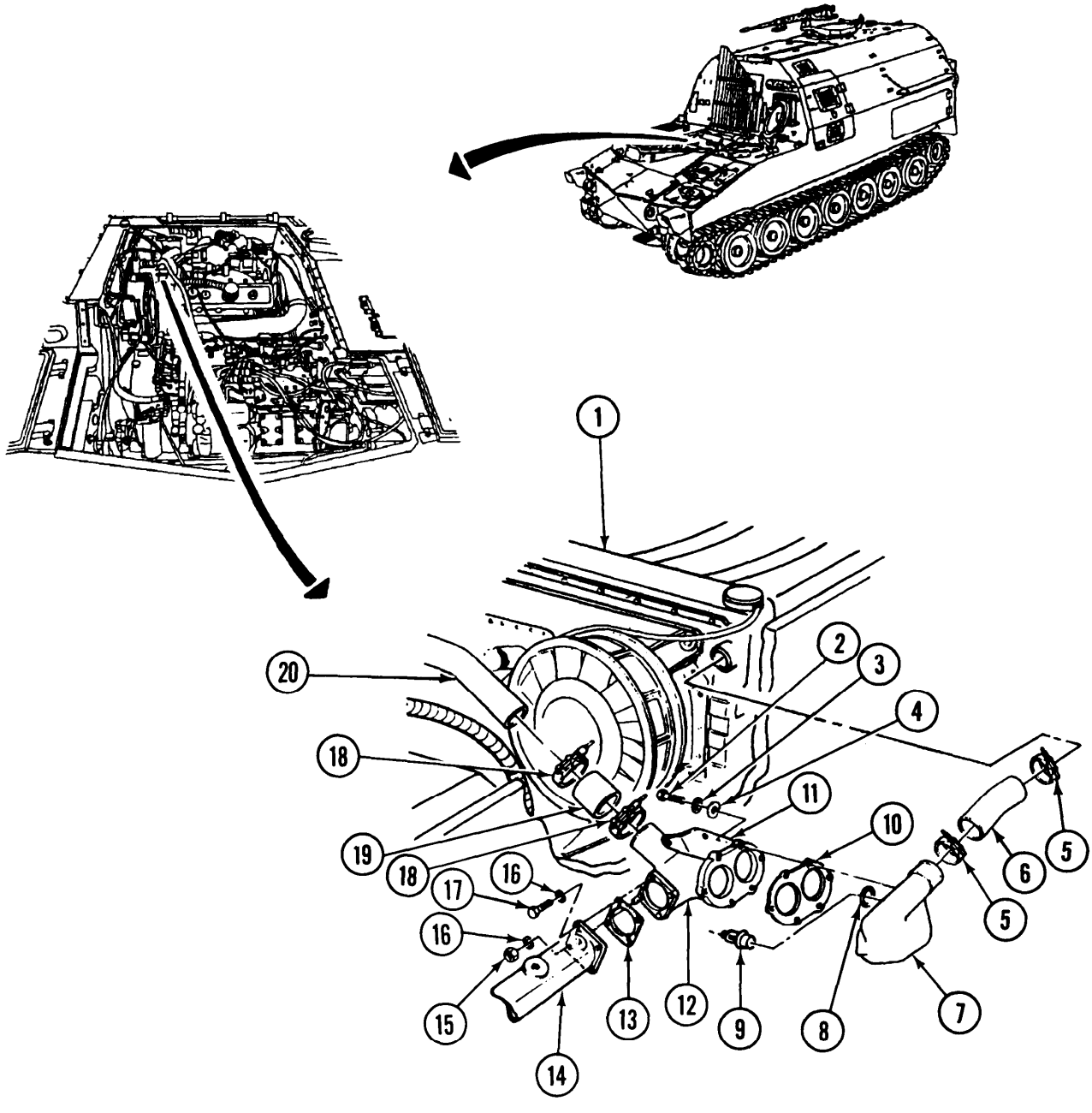
6-11. INLET THERMOSTAT AND HOUSING ASSEMBLY REPLACEMENT (continued).

WARNING

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

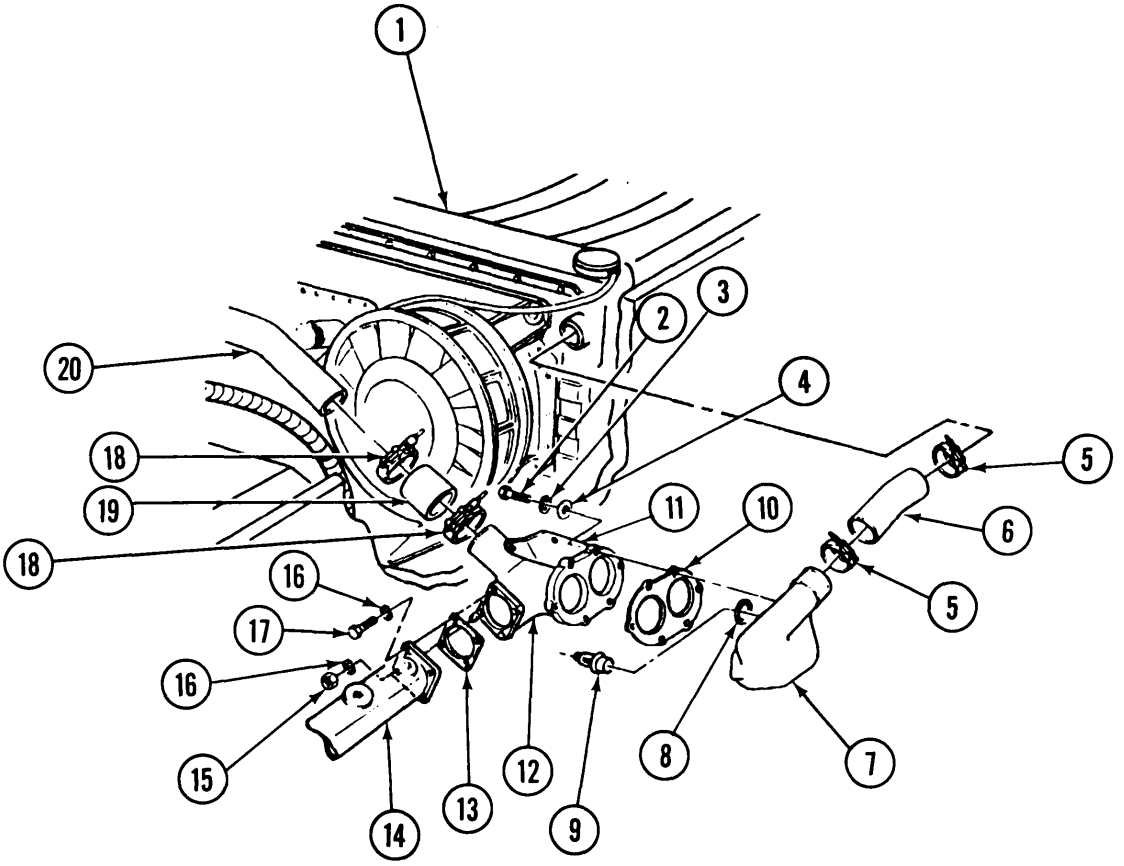
2. Apply adhesive to hose (19), install hose (19) on manifold coolant connector (12) and crossover tube (20), and tighten two clamps (18).

3. Install three screws (17), nut (15), and four new lockwashers (16) on header (14).



6-11. INLET THERMOSTAT AND HOUSING ASSEMBLY REPLACEMENT (continued).

4. Using seal installer and installer handle, install two new seals (8) in inlet housing (7) with wider lip on top,
5. Install two inlet thermostats (9) in inlet housing (7).
6. Install new gasket (10) and inlet housing (7) on manifold coolant connector (12),
7. Install six screws (2), new lockwashers (3), and washers (4) on manifold coolant connector (12).
8. Install bracket (11) and two screws (2) and new lockwashers (3) on manifold coolant connector (12),
9. Apply adhesive to hose (6), install hose (6) on radiator (1) and inlet housing (7), and tighten two clamps (5).



FOLLOW-ON MAINTENANCE:
- Remove radiator fan protectors (para 2-8).
- Close and secure air intake grille (refer to TM 9-2350-287-10).

6-12. BYPASS THERMOSTAT AND HOUSING ASSEMBLY REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- Adhesive (Item 1, Appendix D)
- Gasket (Item 62, Appendix H)
- Gasket (Item 63, Appendix H)
- LockWasher (7) (Item 163, Appendix H)
- Seal (Item 294, Appendix H)
- Thermostat (Item 372, Appendix H)

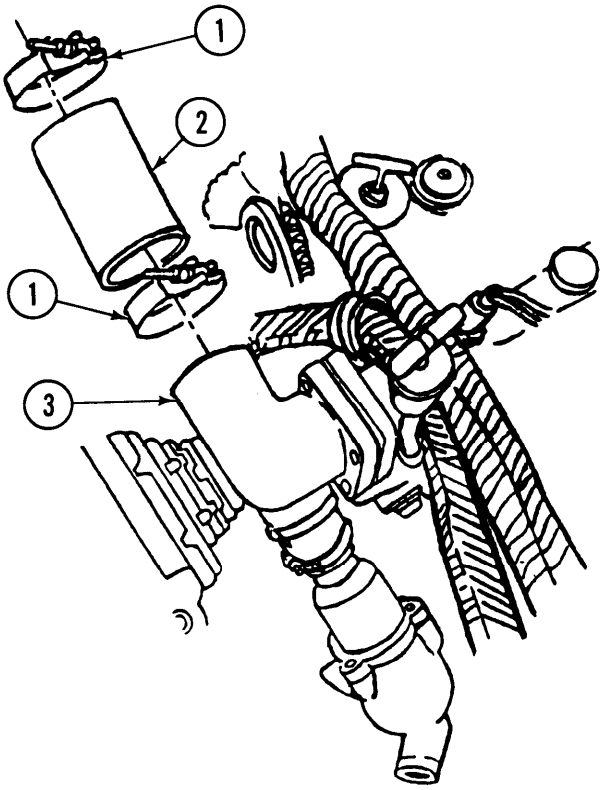
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Radiator fan protectors installed (para 2-8).
- Front hull slope plate removed (para 15-11).
- Coolant system drained (refer to TM 9-2350-287-10).

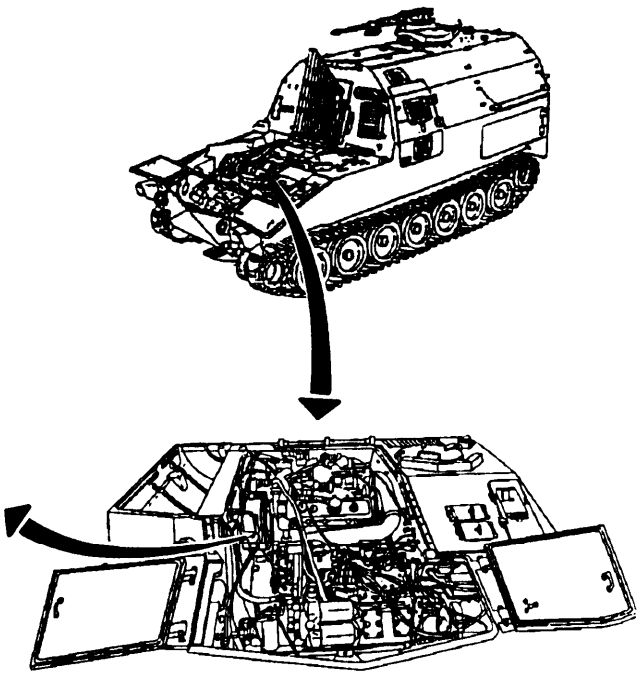
a. REMOVAL

WARNING

A protective fan screen must be installed before doing maintenance in the engine compartment when engine is running or when running engine in the ground-hop mode. Contact with rotating fan can cause injury.

1. Loosen two clamps (1) and disconnect manifold connector (3) from crossover tube connector (2).





6-12. BYPASS THERMOSTAT AND HOUSING ASSEMBLY REPLACEMENT (continued).

2. Remove screw (7), lockwasher (6), washer (5), and clamp (4) from manifold connector (3). Discard lockwasher.

3. Remove screw (10), lockwasher (11), and clamp (12) from manifold connector (3). Discard lockwasher.

4. Remove screw (27) and lockwasher (26) from manifold connector (3). Discard lockwasher.

5. Remove nut (9) and lockwasher (8) from stud on manifold connector (3). Discard lockwasher.

6. Remove engine coolant manifold (13) and gasket (14) from manifold connector (3). Discard gasket.

7. Loosen clamp (15) and remove manifold connector (3) from coolant hose (25).

8. Loosen clamp (24) and remove coolant hose (25) from upper housing (23).

9. Remove three screws (16), lockwashers (17), and washers (18) from upper housing (23). Discard lockwashers.

10. Remove upper housing (23) from lower housing (20).

11. Remove bypass thermostat (22), gasket (19), and seal (21) from lower housing (20). Discard thermostat, gasket, and seal.

b. INSTALLATION

1. Install new seal (21) in lower housing (20).

2. Install new bypass thermostat (22) and new gasket (19) on lower housing (20).

3, Install upper housing (23) on lower housing (20) with three washers (18), new lockwashers (17), and screws (16).

WARNING

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

4. Apply adhesive to both ends of coolant hose (25); install coolant hose (25) on upper housing (23), and tighten clamp (24).

5. Install manifold connector (3) on coolant hose (25), and tighten clamp (15).

6. Install engine coolant manifold (13) and new gasket (14) on manifoid connector (3).

7. Install new lockwasher (8) and nut (9) on stud on manifoid connector (3).

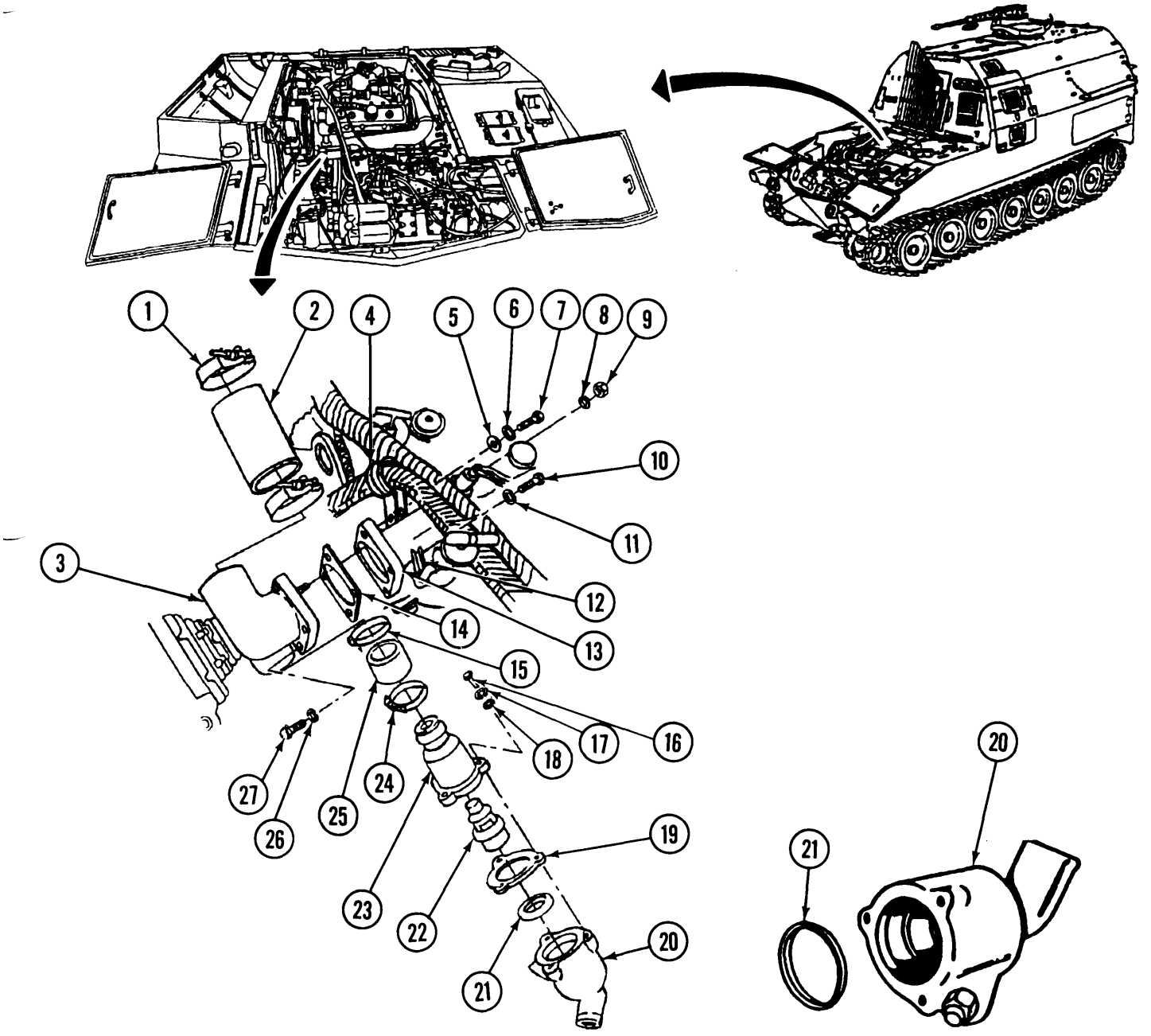
8. Install screw (27) and new lockwasher (26) on manifold connector (3).

6-12. BYPASS THERMOSTAT AND HOUSING ASSEMBLY REPLACEMENT (continued).

9. Install clamp (12), screw (10), and new lockwasher (11) on manifold connector (3).

10. Install clamp (4), screw (7), new lockwasher (6), and washer (5) on manifold connector (3).

11. Connect manifold connector (3) to crossover tube connector (2), and tighten two clamps (1).



FOLLOW-ON MAINTENANCE:

- Remove radiator fan protectors (para 2-8).
- Refill coolant system (refer to TM 9-2350-287-10).
- Install front hull slope plate (para 15-11).

CHAPTER 7
ELECTRICAL SYSTEM/CIRCUIT MAINTENANCE

7-1 . GENERAL.

This chapter illustrates and describes the removal and installation of powerpack and hull electrical systems and components. Procedures are also included for the disassembly, assembly, and checks and adjustments of components, as authorized by the maintenance allocation chart (MAC) for Unit maintenance.

Disassemble components only to the extent required to correct a malfunction or defect. Replace only those parts necessary to correct the malfunction, and install the mandatory replacement parts at that point.

7-2. GENERATOR (ALTERNATOR) REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- LockWasher (6) (Item 163, Appendix H)
- LockWasher (7) (Item 164, Appendix H)

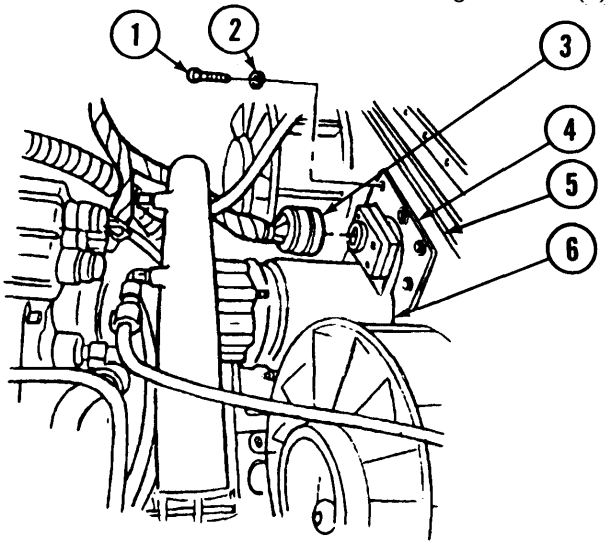
Personnel Required: Two

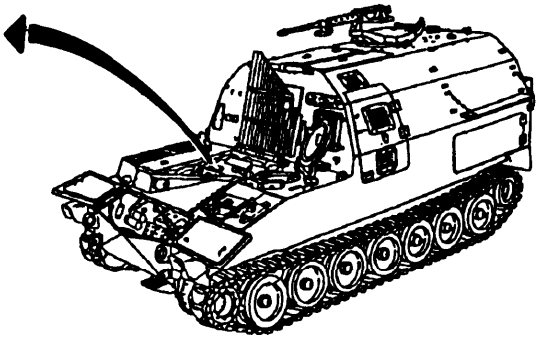
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- . MASTER switch OFF (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).
- Radiator removed from vehicle (para 6-6).

a. REMOVAL

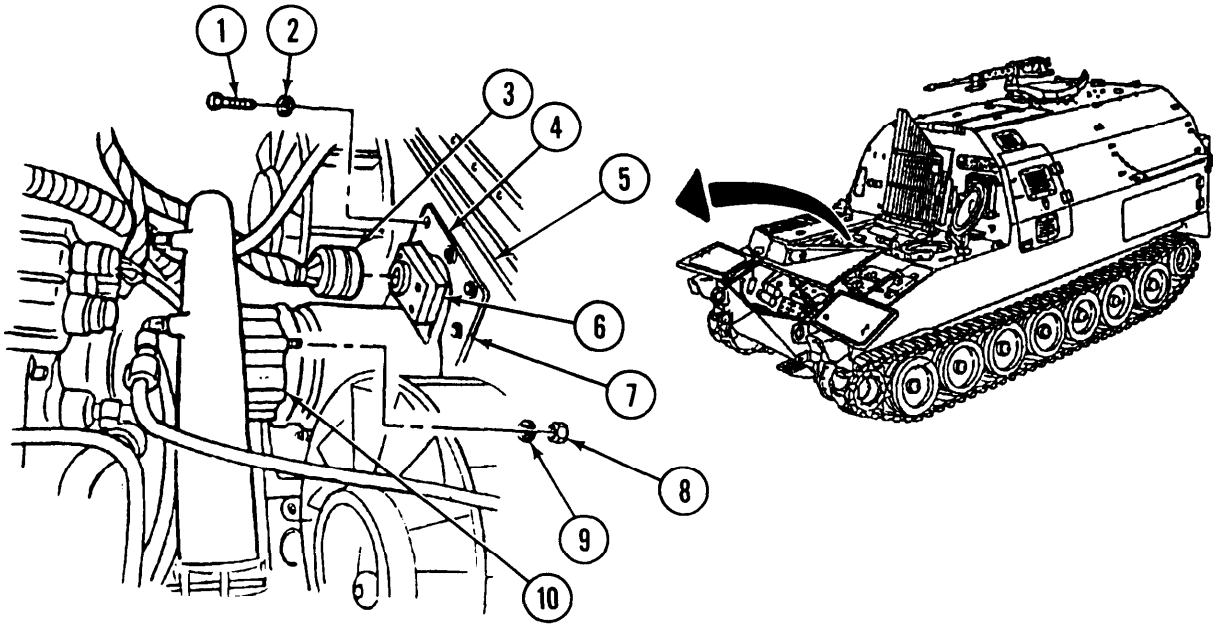
1. Remove seven screws (1) and Iockwashers (2) and plate (4) from shroud assembly (5). Discard lockwashers.

2. Disconnect alternator-to-rectifier wiring harness (3) at alternator (6).





7-2. GENERATOR (ALTERNATOR) REPLACEMENT (continued).



3. Remove six mounting nuts (8) and lockwashers (9) from alternator (6). Discard lockwashers.

WARNING

The alternator weighs 85 pounds. To prevent injury, an assistant is needed when removing alternator from vehicle.

4. Remove alternator (6) and grommet (7) from accessory drive adapter (10) through shroud assembly (5).

b. INSTALLATION

WARNING

Alternator weighs 85 pounds. Use an assistant when installing alternator in vehicle to prevent injury.

1. Aline splines of alternator (6) with splines of accessory drive adapter (10), and install alternator (6) on accessory drive adapter (10) and grommet (7) through shroud assembly (5).

2. Secure alternator (6) using six new lockwashers (9) and six mounting nuts (8).

3. Connect alternator-to-rectifier wiring harness (3) at alternator (6).

4. Install plate (4) on shroud assembly (5) with seven screws (1) and new lockwashers (2).

FOLLOW-ON MAINTENANCE:
- Install radiator in vehicle (para 6-6).
- Connect battery ground cables (para 7-41).

7-3. VOLTAGE REGULATOR, BILGE PUMP RELAY, STARTER RELAY, CIRCUIT BREAKER, AND MOUNTING BRACKETS REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materiais/Parts:
- Lockwasher (Item 129, Appendix H)
- Lockwasher (6) (Item 131, Appendix H)
- Lockwasher (4) (Item 161, Appendix H)
- Lockwasher (4) (Item 170, Appendix H)
- Lockwasher (8) (Item 175, Appendix H)
- Lockwasher (2) (Item 177, Appendix H)
- Lockwasher (2) (Item 194, Appendix H)

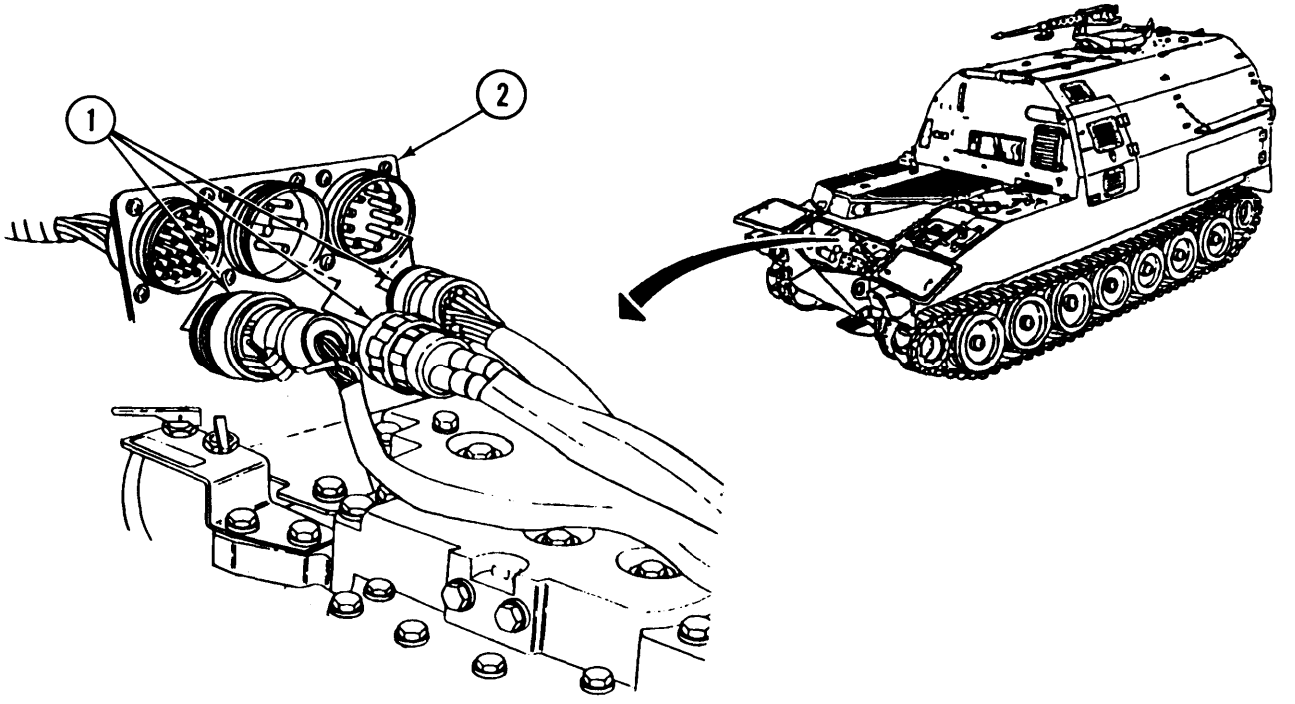
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Left transmission access door opened (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).

a. REMOVAL

NOTE

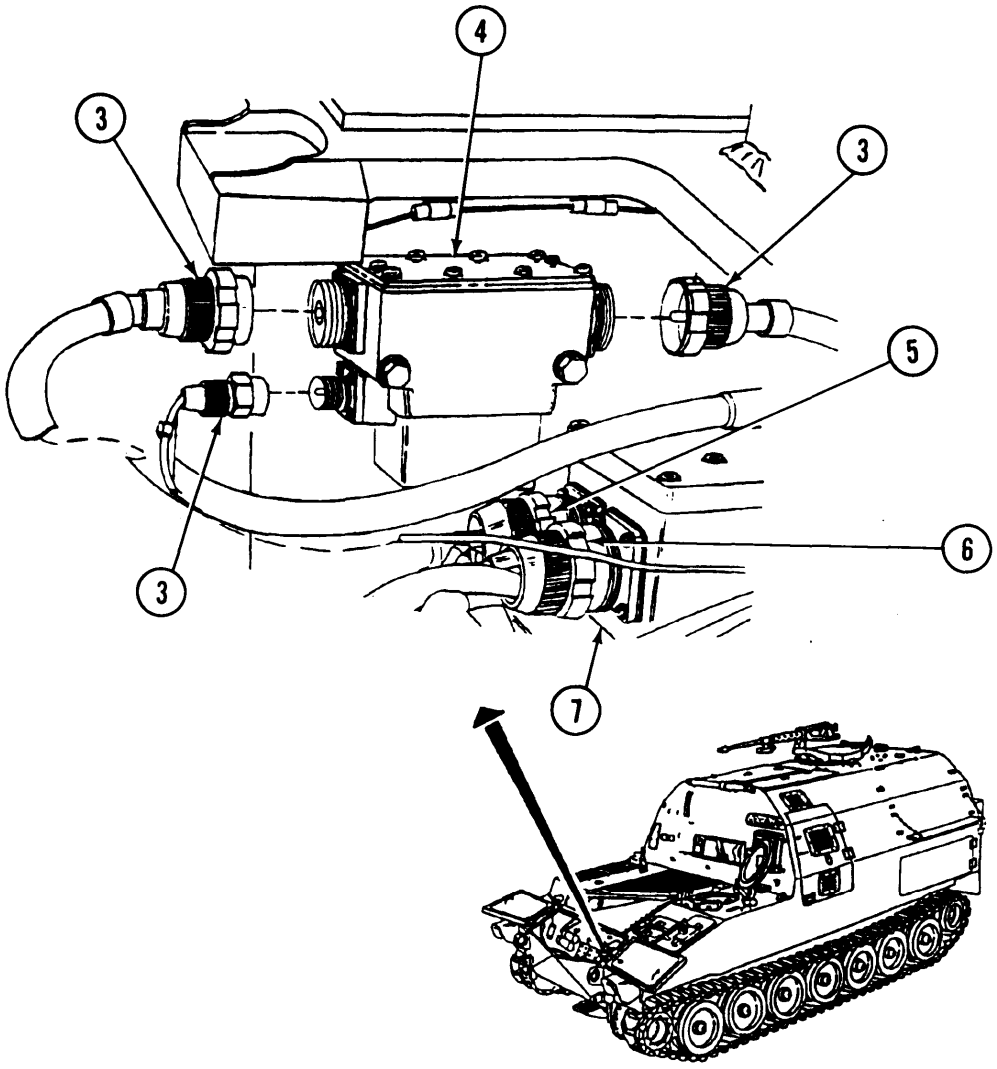
Tag electrical leads prior to removal for installation.

1. Disconnect three electrical connectors (1) from engine disconnect bracket (2).



7-3. VOLTAGE REGULATOR, BILGE PUMP RELAY, STARTER RELAY, CIRCUIT BREAKER, AND MOUNTING BRACKETS REPLACEMENT (continued).

2. Disconnect three electrical connectors (3) from master relay (4).



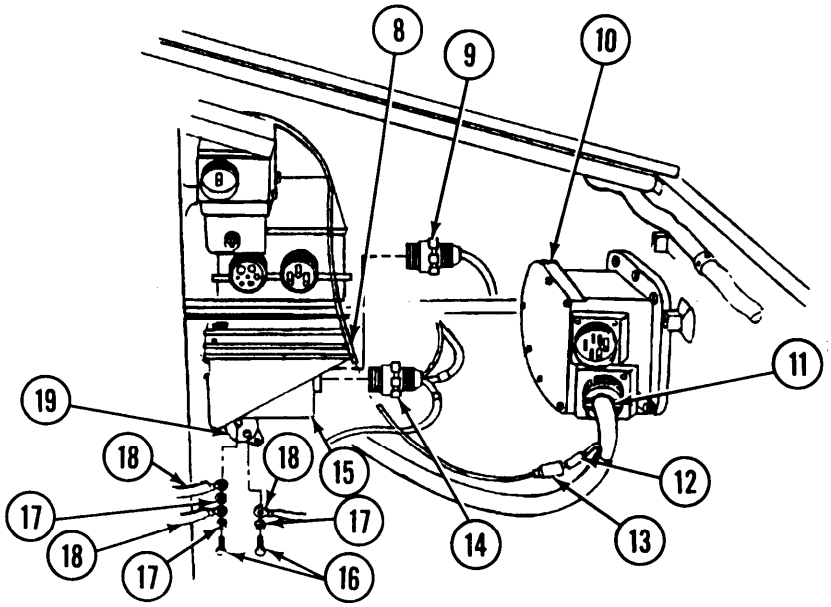
3. Disconnect electrical connector (11) from rectifier (10).

4. Disconnect starter protection relay lead 503 (12) from wiring harness 12268308 wiring harness lead (13).

5. Disconnect two electrical connectors (5 and 6) from voltage regulator (7).

6. Disconnect electrical connector (9) from starter relay (8).

7-3. VOLTAGE REGULATOR, BILGE PUMP RELAY, STARTER RELAY, CIRCUIT BREAKER, AND MOUNTING BRACKETS REPLACEMENT (continued).



7. Disconnect electrical connector (14) from bilge pump relay (15).

8. Maneuver electrical wiring clear of voltage regulator (7).

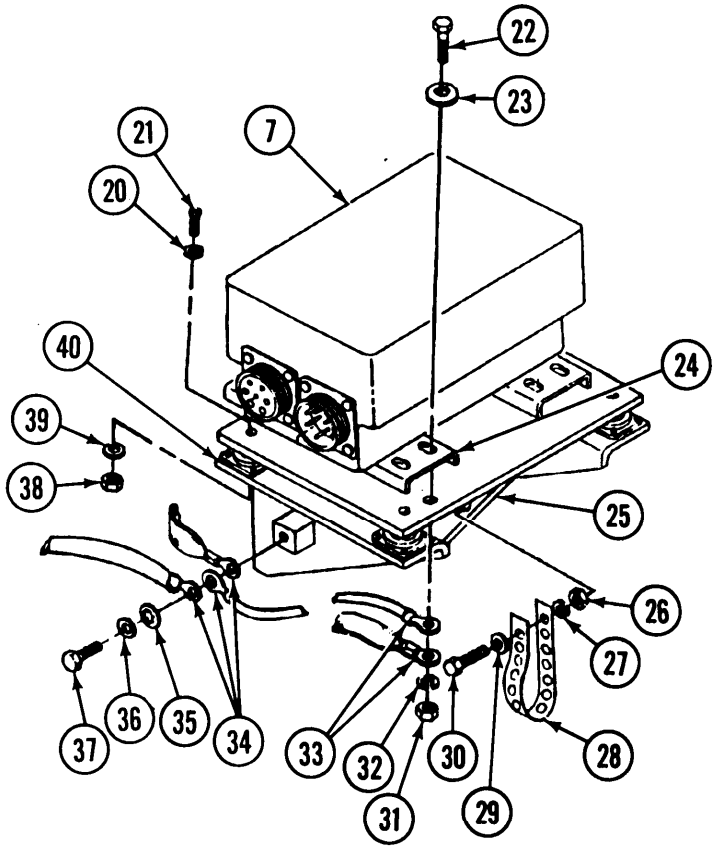
9. Remove two screws (16), three lockwashers (17), and three electrical leads (18) from circuit breaker (19). Discard lockwashers.

10. Remove nut (26), screw (30), washer (29), lockwasher (27), and strap (28) from mounting bracket (25). Discard lockwasher.

11. Remove screw (37), washer (36), lockwasher (35), and three ground leads (34) from mounting bracket (25). Discard lockwasher.

12. Remove screw (22), washer (23), lockwasher (32), nut (31), and two ground leads (33) from voltage regulator mounting bracket (24). Discard lockwasher.

13. Remove four nuts (38), screws (21), washers (20), lockwashers (39), and mounting bracket (25), voltage regulator (7), starter relay (8), bilge pump relay (15), and circuit breaker (19) as an assembly from support assembly (40). Discard lockwashers.



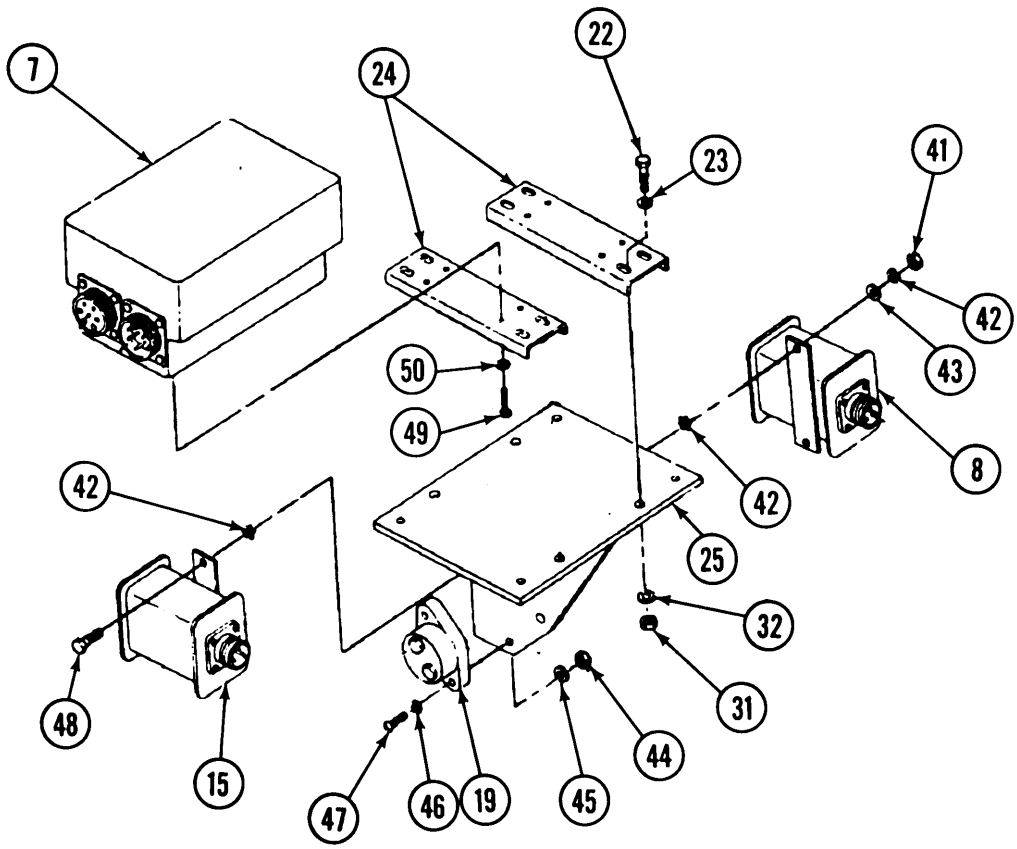
7-3. VOLTAGE REGULATOR, BILGE PUMP RELAY, STARTER RELAY, CIRCUTBREAKER, AND MOUNTING BRACKETS REPLACEMENT (continued).

14. Remove three nuts (31), screws (22), washers (23), Iockwashers (32), and voltage regulator (7) from mounting bracket (25). Discard Iockwashers.

15, Remove four screws (49), Iockwashers (50), and two mounting brackets (24) from voltage regulator (7). Discard Iockwashers.

16. Remove two nuts (44), screws (47), washers (46), Iockwashers (45), and circuit breaker (19) from mounting bracket (25). Discard Iockwashers.

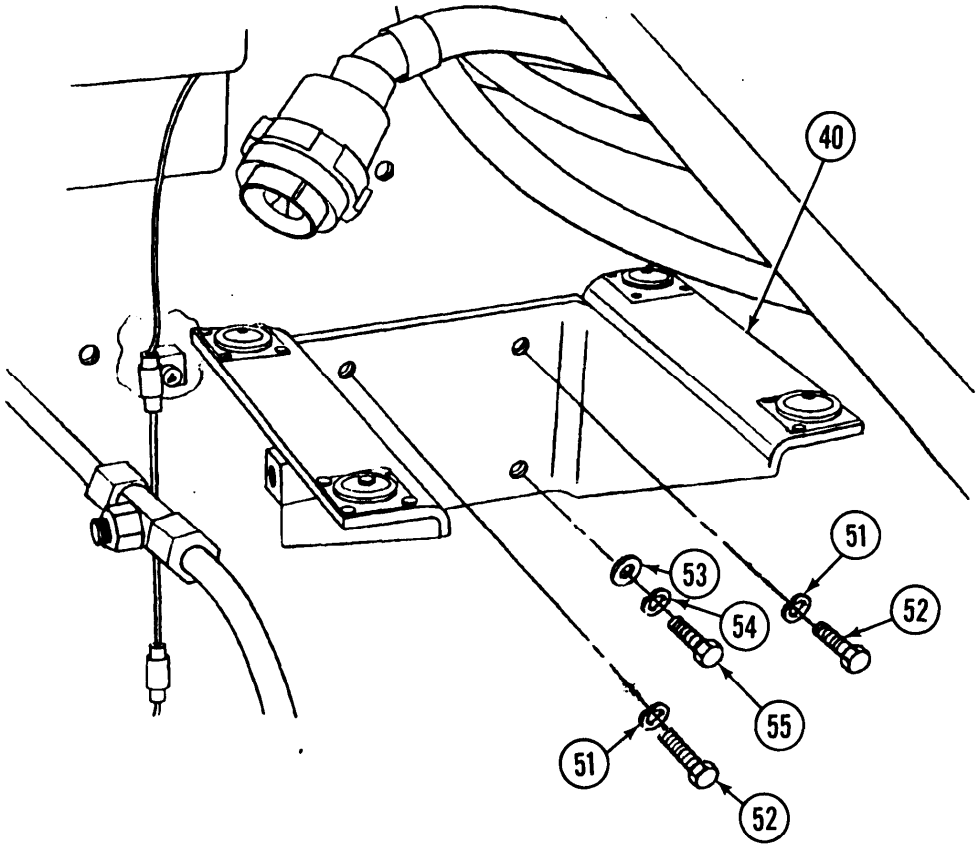
17. Remove two nuts (41), screws (48), six Iockwashers (42), two washers (43), starter relay (8), and bilge pump relay (15) from mounting bracket (25). Discard Iockwashers.



18. Remove two screws (52) and Iockwashers (51) from support assembly (40). Discard Iockwashers.

19. Remove two screws (55), Iockwashers (54), washers (53), and support assembly (40) from vehicle. Discard Iockwashers.

7-3. VOLTAGE REGULATOR, BILGE PUMP RELAY, STARTER RELAY, CIRCUIT BREAKER, AND MOUNTING BRACKETS REPLACEMENT (continued).



b. INSTALLATION

1. Install support assembly (40) in vehicle with two washers (53), new lockwashers (54), and screws (55).
2. Install two new lockwashers (51) and screws (52) in support assembly (40).
3. Install bilge pump relay (15) and starter relay (8) on mounting bracket (25) with two washers (43), six new lockwashers (42), two screws (48), and nuts (41).
4. Install circuit breaker (19) on mounting bracket (25) with two screws (47), washers (46), new lockwashers (45), and nuts (44).
5. Install two mounting brackets (24) on voltage regulator (7) with four new lockwashers (50) and screws (49).
6. Install voltage regulator (7) on mounting bracket (25) with three screws (22), washers (23), new lockwashers (32), and nuts (31).

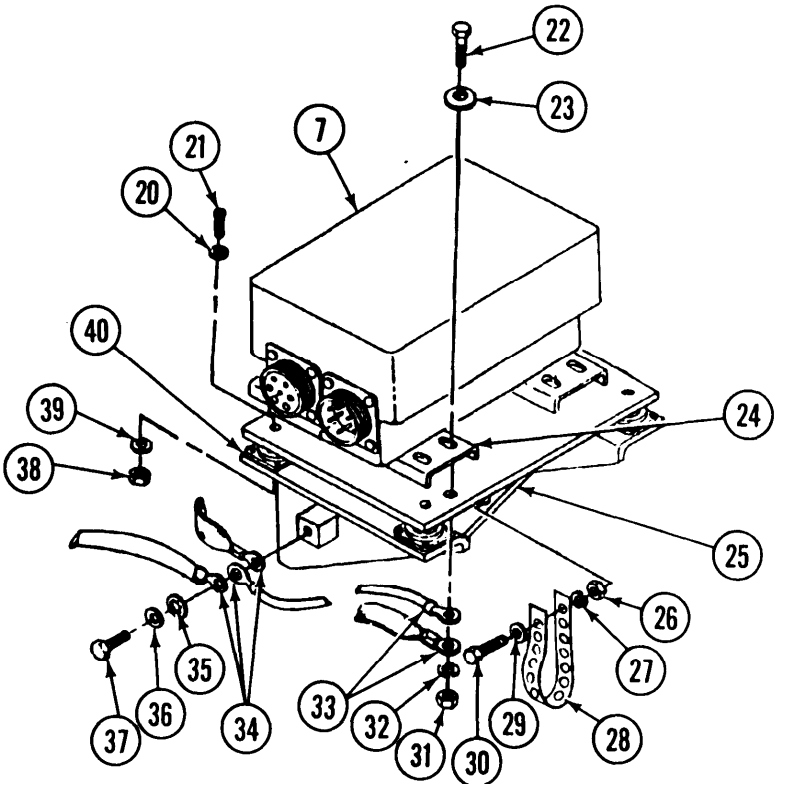
7-3. VOLTAGE REGULATOR, BILGE PUMP RELAY, STARTER RELAY, CIRCUIT BREAKER, AND MOUNTING BRACKETS REPLACEMENT (continued).

7. Install mounting bracket (25), voltage regulator (7), starter relay (8), bilge pump relay (15), and circuit breaker (19) as an assembly in vehicle with four screws (21), washers (20), new lockwashers (39), and nuts (38).

8. Install two ground leads (33) on mounting bracket (24) with screw (22), washer (23), new lockwasher (32), and nut (31).

9. Install three ground leads (34) on mounting bracket (25) with new lockwasher (35), washer (36), and screw (37).

10. Install strap (28) on mounting bracket (25) with screw (30), washer (29), new lockwasher (27), and nut (26).

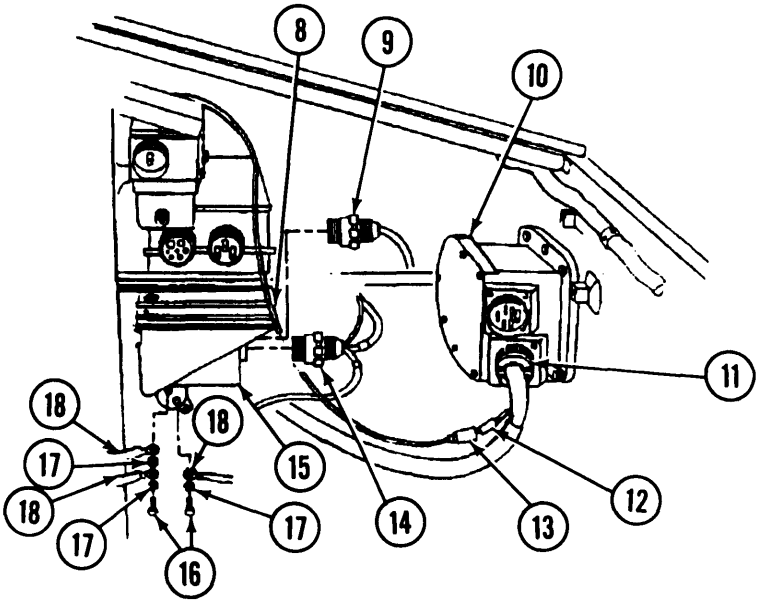


11. Install two leads (18) on circuit breaker (19) with two new lockwashers (17) and screws (16).

12. Connect electrical connector (14) to bilge pump relay (15).

13. Connect electrical connector (9) to starter relay (8).

14. Connector two electrical connectors (5 and 6) to voltage regulator (7).

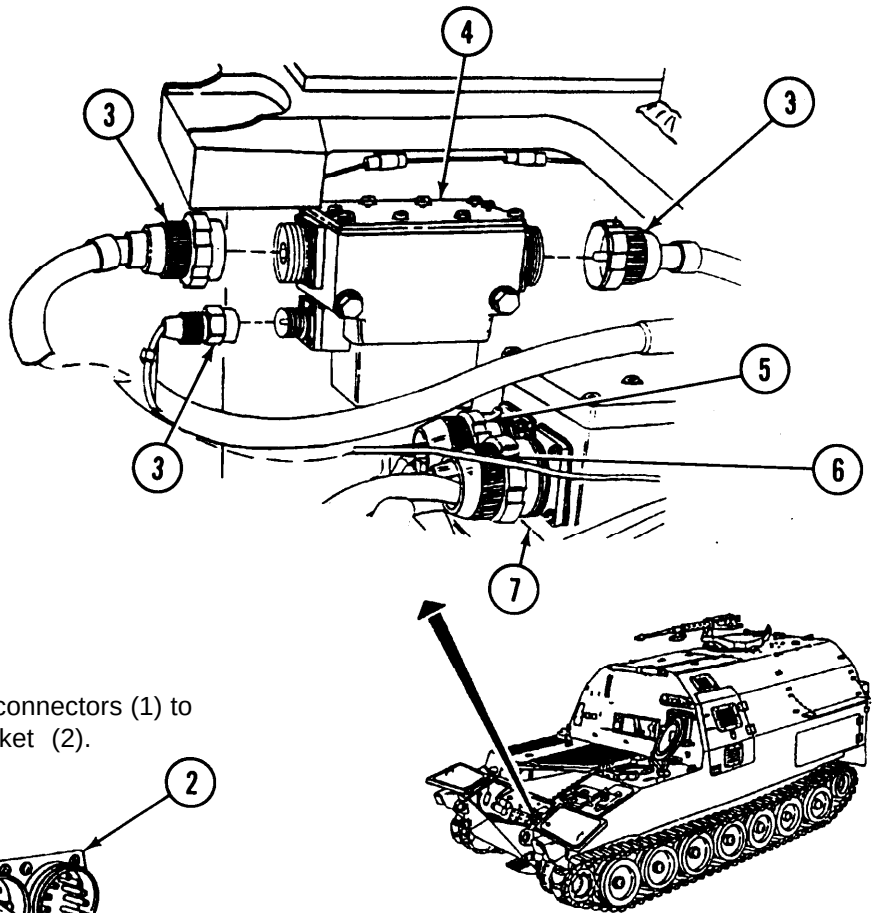


7-3. VOLTAGE REGULATOR, BILGE PUMP RELAY, STARTER RELAY, CIRCUIT BREAKER, AND MOUNTING BRACKETS REPLACEMENT (continued).

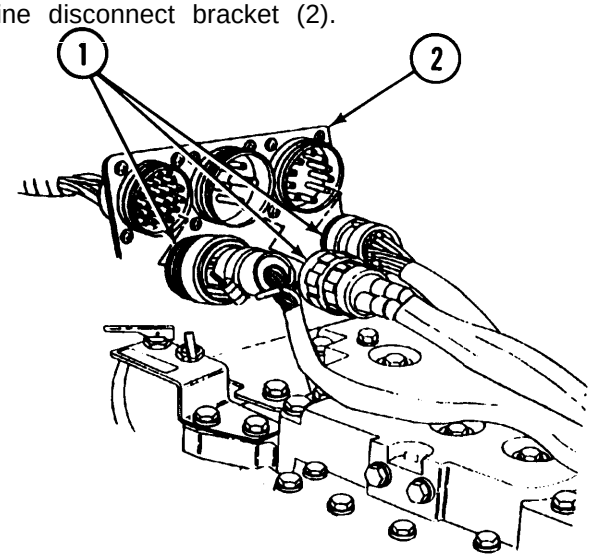
15. Connect electrical connector (11) to rectifier (10).

16. Connect starter protection relay lead 503 (12) to wiring harness 12268308 wiring harness lead (13).

17. Connect three electrical connectors (3) to master relay (4).



18. Connect three electrical connectors (1) to engine disconnect bracket (2).



FOLLOW-ON MAINTENANCE:

- Connect battery ground cables (para 7-41).
- Close left transmission access door (refer to TM 9-2350-287-10).

7-4. RECTIFIER REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Silicone compound (Item 64, Appendix D)
- LockWasher (2) (Item 142, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Left and right transmission access doors opened (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).

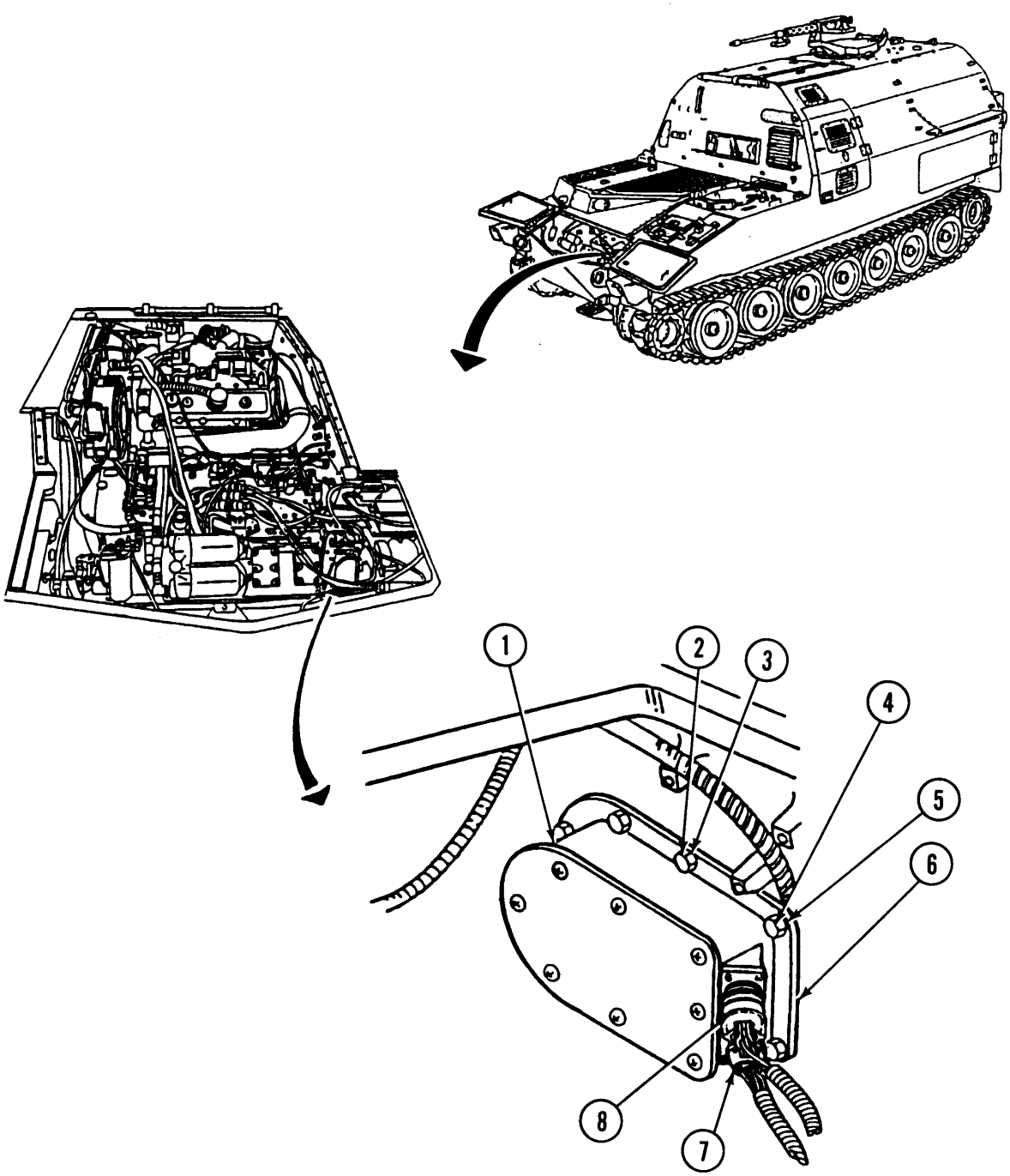
a. REMOVAL

1. Disconnect two wiring harness connectors (7 and 8) at rectifier (1).
2. Remove six screws (5) and washers (4) from rectifier (1).
3. Remove two brass screws (3) and Iockwashers (2) from rectifier (1). Discard Iockwashers.
4. Remove rectifier (1) from bulkhead.
5. Remove packing (6) from base of rectifier (1). Scrape base clean.

b. INSTALLATION

1. Remove paint from base of rectifier (1) and mating surface of hull, if required. Make certain all surfaces are clean.
2. Coat base of rectifier (1) and mating surface of hull with silicone compound.
3. Install packing (6) in base of rectifier (1).
4. Install rectifier (1) on bulkhead using two new Iockwashers (2) and brass screws (3) and six washers (4) and screws (5).
5. Connnect two wiring harness connectors (7 and 8) at rectifier (1).

7-4. RECTIFIER REPLACEMENT (continued).



FOLLOW-ON MAINTENANCE:

- Connect battery ground cables (para 7-41).
- Close left and right transmission access doors (refer to TM 9-2350-287-10).

7-5. STARTER MOTOR REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Material/Parts:
- Gasket (Item 88, Appendix H)
- Lock(washer (Item 162, Appendix H)
- Lockwasher (3) (Item 168, Appendix H)
- Lock(washer (2) (Item 190, Appendix H)
- Lockwasher (Item 193, Appendix H)

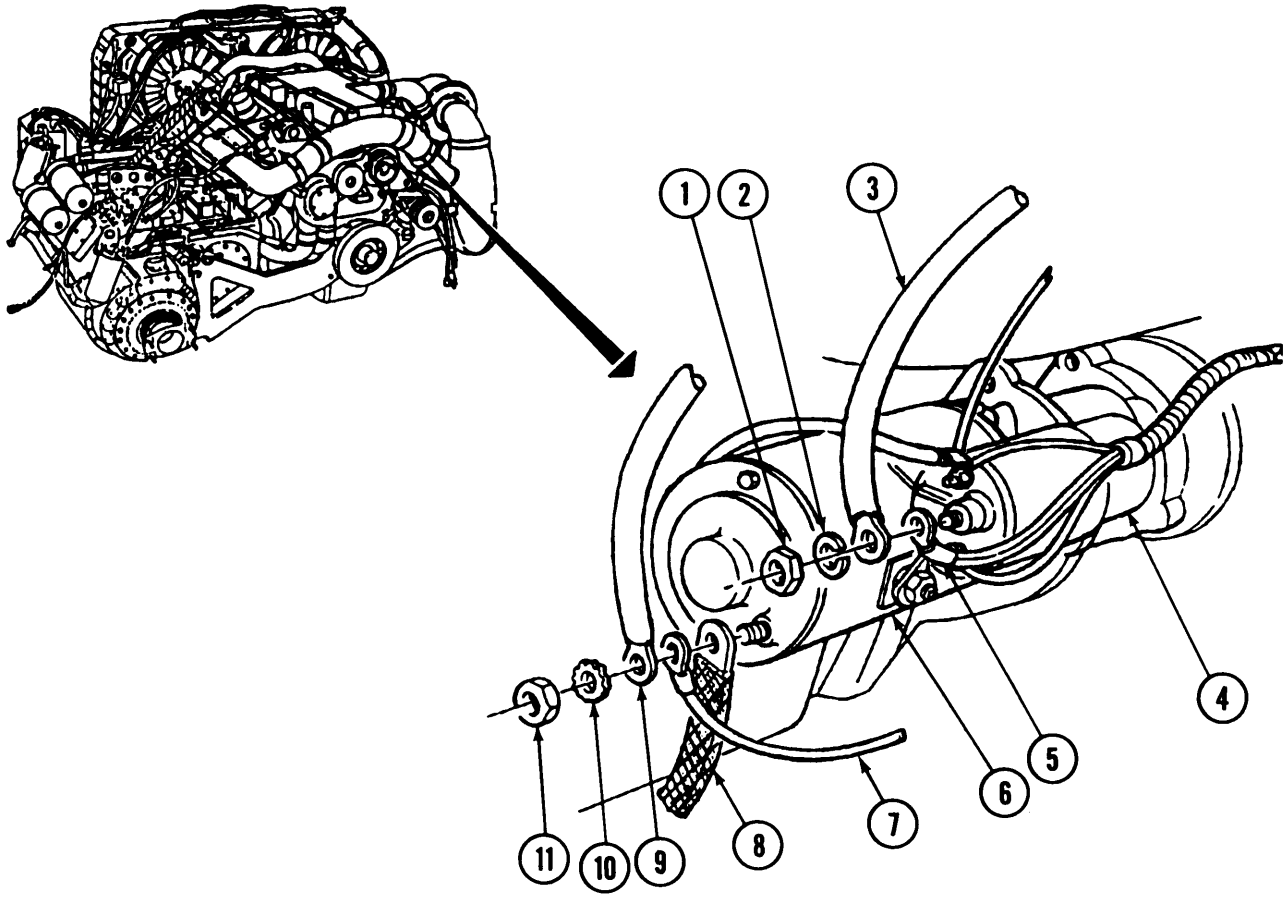
Personnel Required: Two

Equipment Conditions:
Powerpack removed (para 3-2).

a. REMOVAL

1. Remove nut (11), lockwasher (10), ground lead 5A (9), ground wire N (7), and ground strap (8) from starter motor (6). Discard lockwasher.

2. Remove nut (1), lockwasher (2), starter cable lead 6A (3), and two red wires (5) from center post of starter solenoid (4). Discard lockwasher,

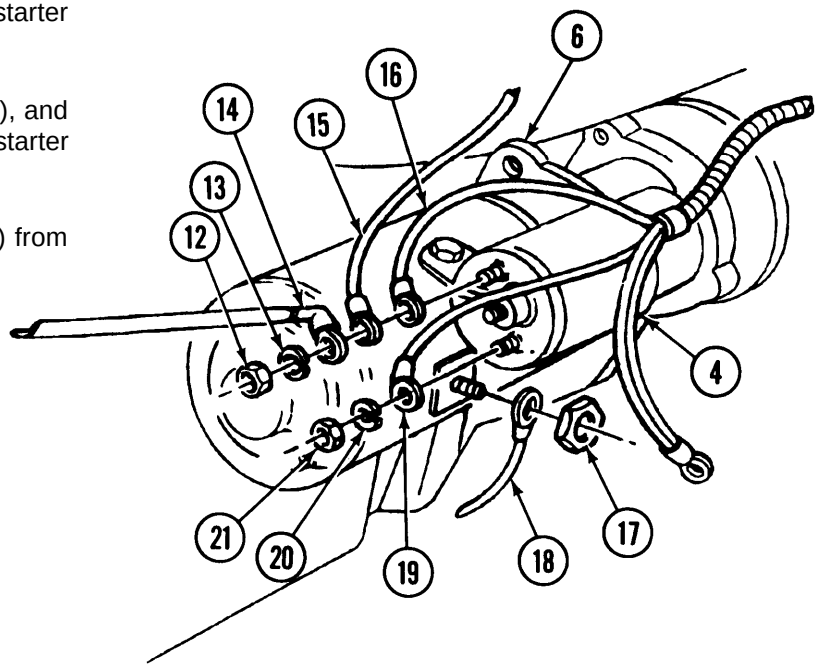


7-5. STARTER MOTOR REPLACEMENT (continued).

3. Remove nut (12), lockwasher (13), solenoid lead 14B (14), wire AX (1 5), and orange wire (16) from left post of starter solenoid (4). Discard lockwasher.

4. Remove nut (21), lockwasher (20), and black lead (19) from right post of starter solenoid (4). Discard lockwasher.

5. Remove nut (17) and lead AY(18) from starter motor (6).

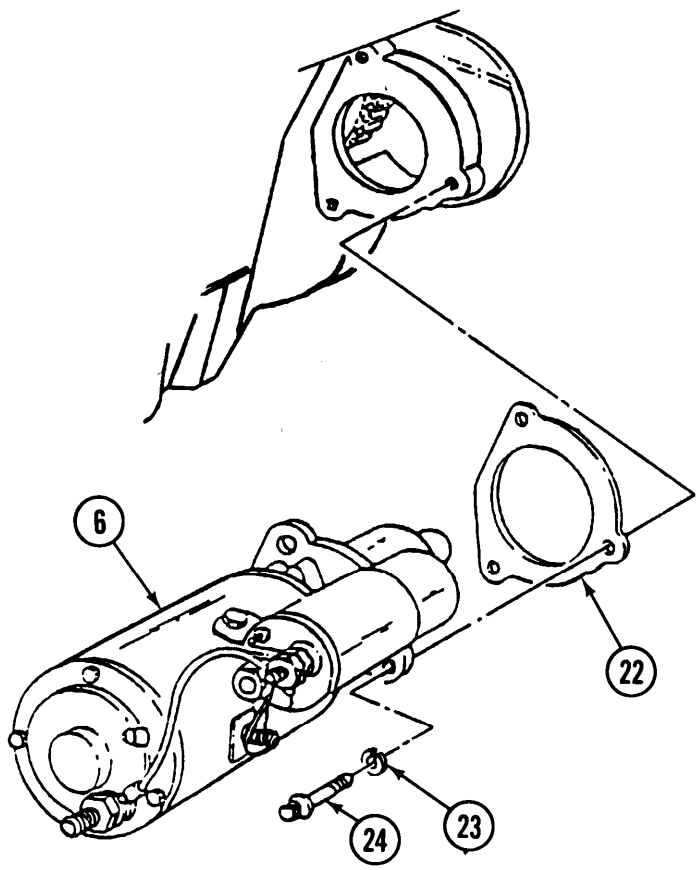


6. Remove three screws (24) and lockwashers (23) from starter motor (6). Discard lockwashers.

WARNING

Starter motor weighs 80 pounds. To avoid serious injury to personnel use an assistant when removing starter motor.

7. With the aid of an assistant, remove starter motor (6) and gasket (22) from engine. Discard gasket.



7-5. STARTER MOTOR REPLACEMENT (continued).

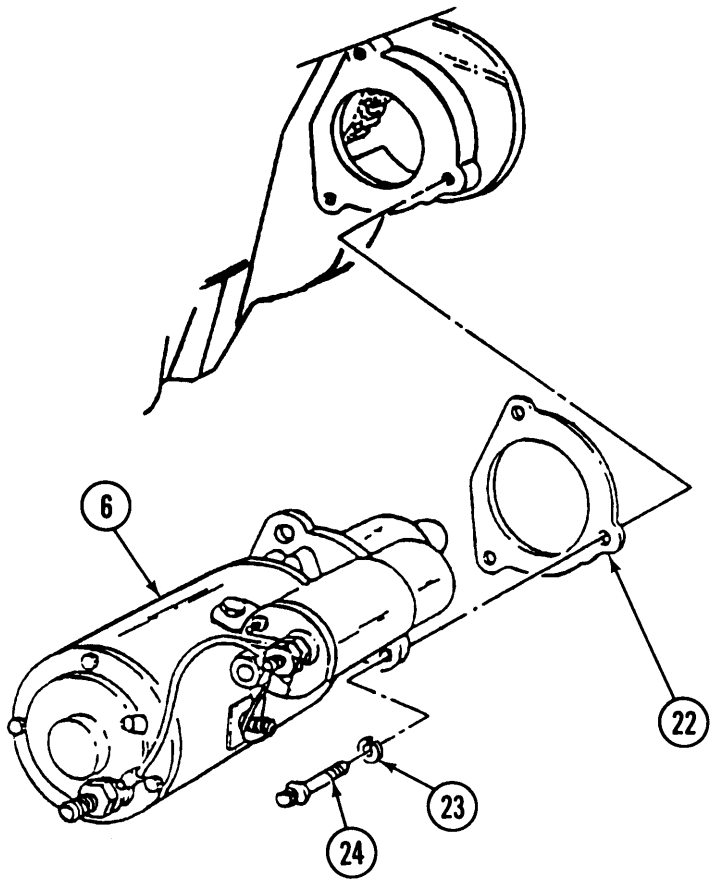
b. INSTALLATION

WARNING

Starter motor weighs 80 pounds. To avoid serious injury to personnel, use an assistant when installing starter motor.

1. With the aid of an assistant, install new gasket (22) and starter motor (6) on engine.

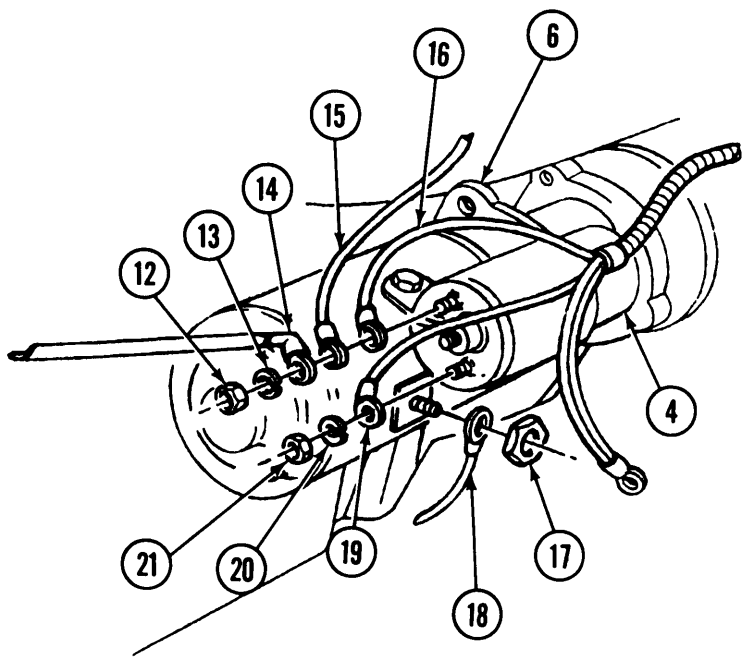
2. Secure starter motor (6) in engine with three new lockwashers (23) and screws (24).



3. Install lead AY(18) on starter motor (6) with nut (17).

4. Install black lead (19) on right post of starter solenoid (4) with new lockwasher (20) and nut (21).

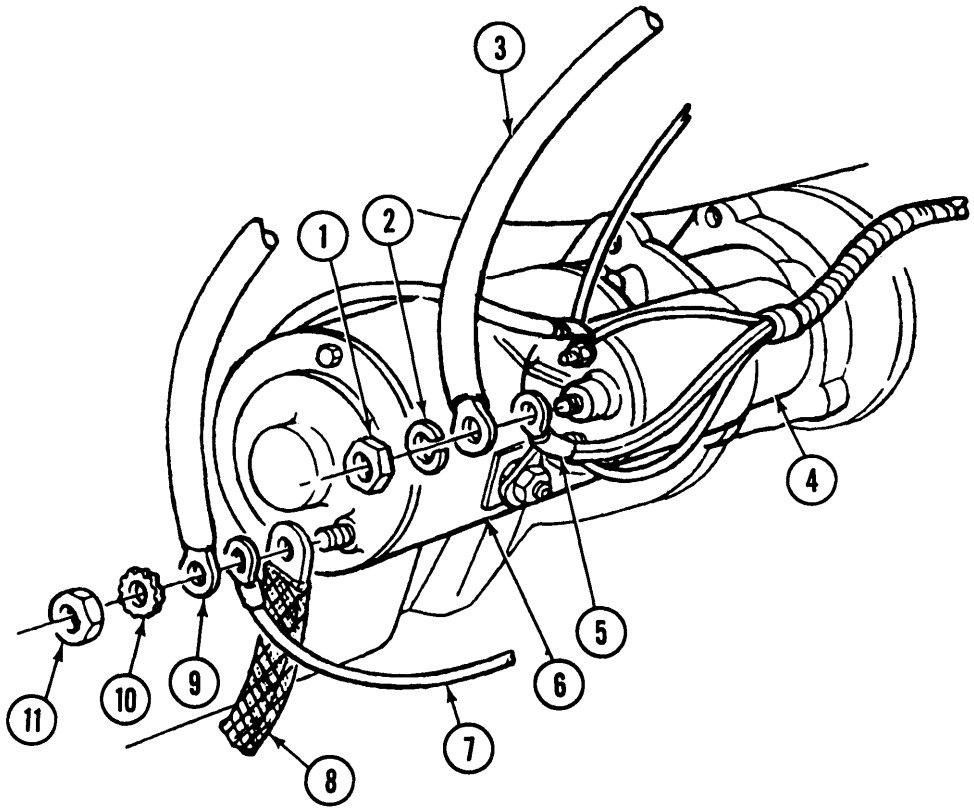
5. Install orange wire (16), wire AX (15), and solenoid lead 14B (14) on left post of starter solenoid (4) with new lockwasher (13) and nut (12).



7-5. STARTER MOTOR REPLACEMENT (continued).

6. Install starter cable 6A (3) and two red wires (5) on center terminal of starter solenoid (4) with new lockwasher (2) and nut (1).

7. Install ground strap (8), ground wire N (7), and ground lead 5A (9) on starter motor (6) with new lockwasher (10) and nut (11).



FOLLOW-ON MAINTENANCE:

- Install powerpack (para 3-2).

7-6. DRIVER'S PORTABLE INSTRUMENT PANEL REPAIR.

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

Initial Setup:

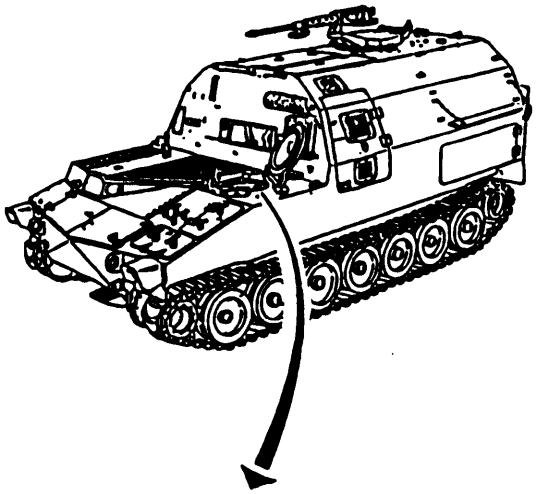
Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- LockWasher (9) (Item 156, Appendix H)
- LockWasher (12) (Item 161, Appendix H)
- LockWasher (2) (Item 173, Appendix H)
- Lockwasher (4) (Item 189, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-1 0).
- Battery ground cables disconnected (para 7-41).

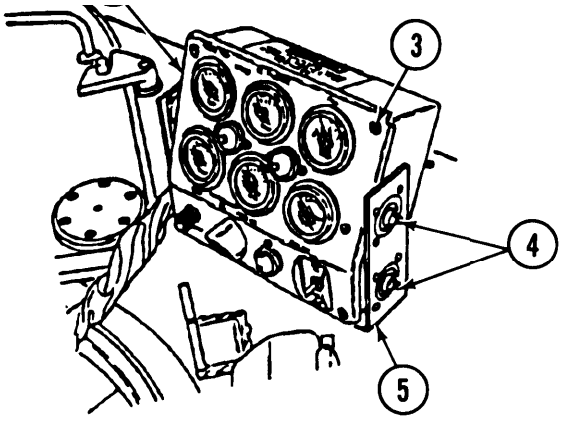
a. REMOVAL

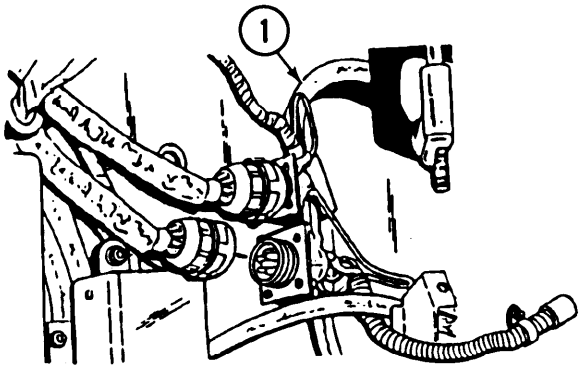
1. Disconnect driver's portable instrument panel wiring harness (1) from bulkhead.
2. Remove driver's portable instrument panel (2) from vehicle.
3. Remove four crosspoint screws(4) from bracket assembly (5) and instrument panel (2).
4. Remove instrument panel (2) from bracket assembly (5).



b. DISASSEMBLY

1. Remove four stud fasteners (3) from instrument panel (2).





7-6. DRIVER'S PORTABLE INSTRUMENT PANEL REPAIR (continued).

2. Remove panel (6) from instrument panel cover (7).

3. Slide grommet (8) from over harness assembly (9).

4. Disconnect 20 electrical connectors (12) at back of panel (6).

5. Remove screw (13), lockwasher (11), nut (10), and ground lead of harness assembly (9) from panel (6). Disard lockwasher.

6. Remove harness assembly (9) from instrument panel cover (7).

7. Remove eight screws (24) and lockwashers (25) from four lamp assemblies (14). Discard lockwashers.

8. Remove four lamp assemblies (14) from front of panel (6).

9. Remove two screws (16), washers (17), and lockwashers (18), instruction plate (20), switch guard (21), and master switch (19) from panel (6). Discard lockwashers.

10. Remove coolant light lens (22) and hexnut (23) from panel (6).

11. Remove coolant light socket (31) from panel (6).

12. Remove 12 nuts (26) and lockwashers (27) and six brackets (28) and indicators (30) from panel (6). Discard lockwashers.

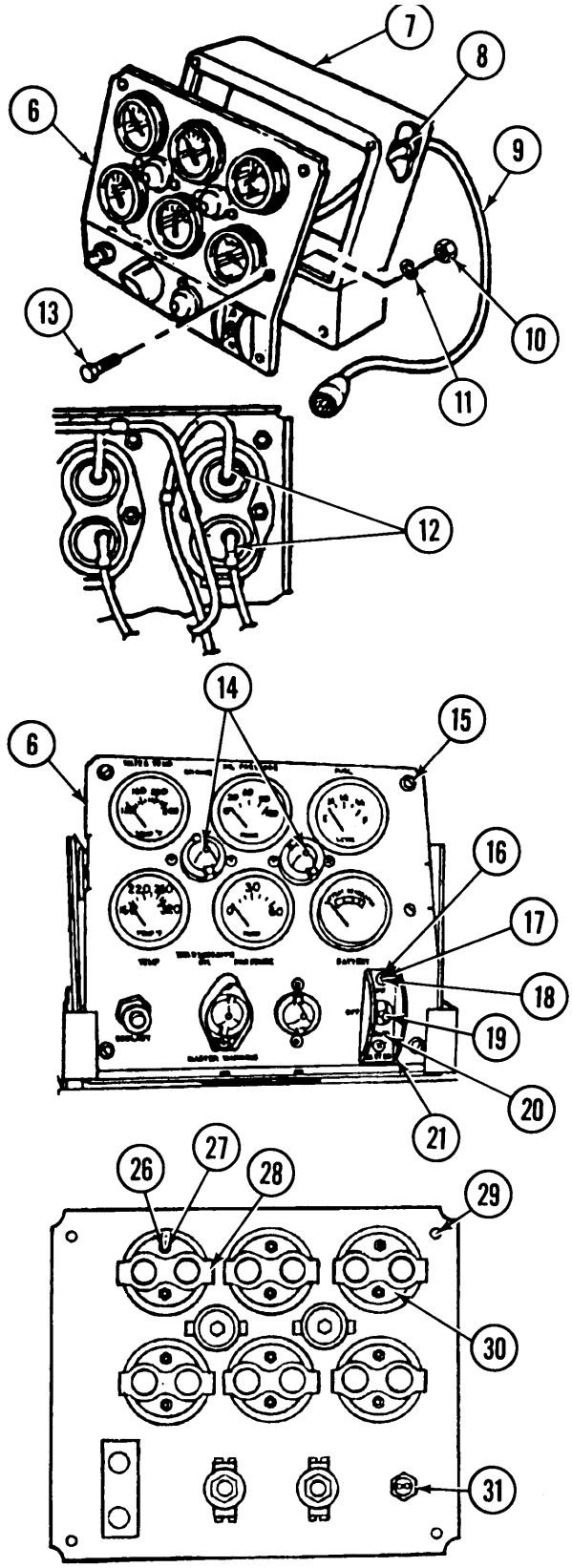
13. Remove four lockwashers (29) and studs (15) from panel (6). Discard lockwashers.

c. ASSEMBLY

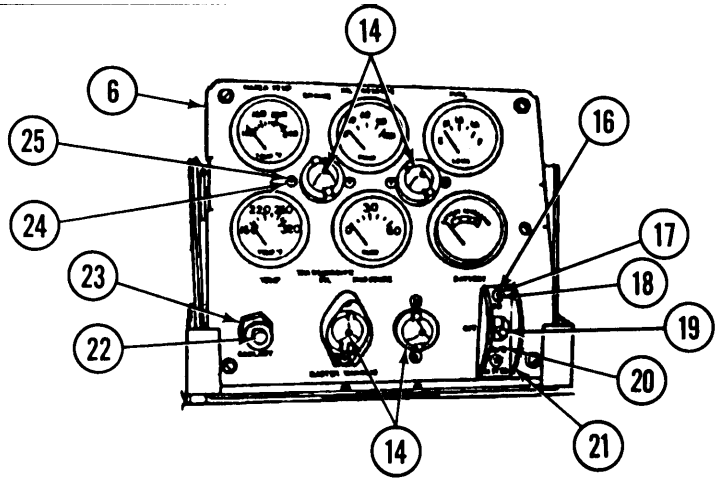
1. Install four studs (15) and new lockwashers (29) in panel (6).

2. Install six indicators (30) and brackets (28) and 12 new lockwashers (27) and nuts (26) on panel (6).

Install coolant light socket (31) on panel (6).



7-6. DRIVER'S PORTABLE INSTRUMENT PANEL REPAIR (continued).



4. Install hexnut (23) and coolant light lens (22) on panel (6).

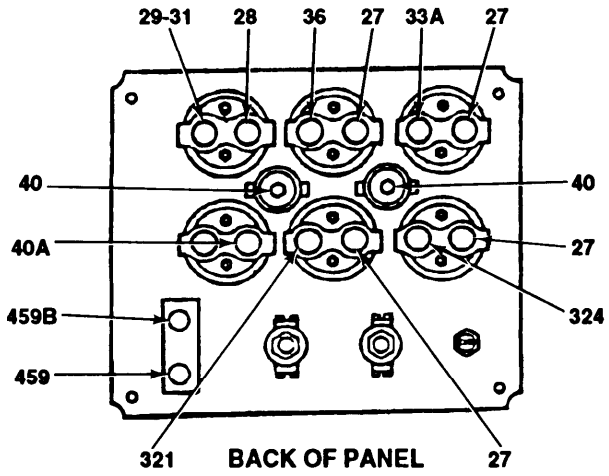
5. Install master switch (19), switch guard (21), and instruction plate (20) on panel (6) with two new lockwashers (18), washers (17), and screws (16).

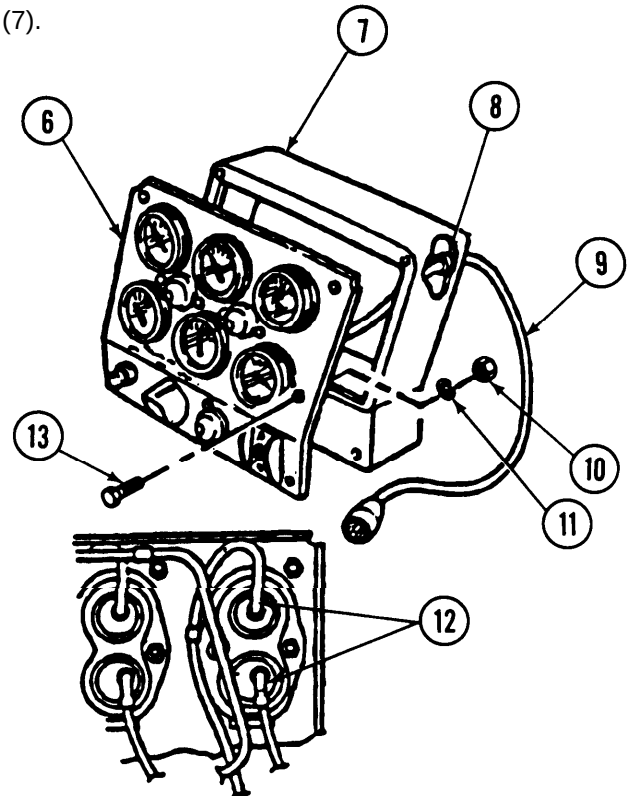
6. Install four lamp assemblies (14) on front of panel (6).

7. Secure four lamp assemblies (14) on panel (6) with eight new lockwashers (25) and screws (24).

8. Install ground lead from harness assembly (9) on panel (6) with nut (10), new lockwasher (11), and screw (13).

9. Install harness assembly (9) on instrument panel cover (7).





10. Connect 20 electrical connectors (12) to back of panel

11. Install grommet (8) over harness assembly (9).

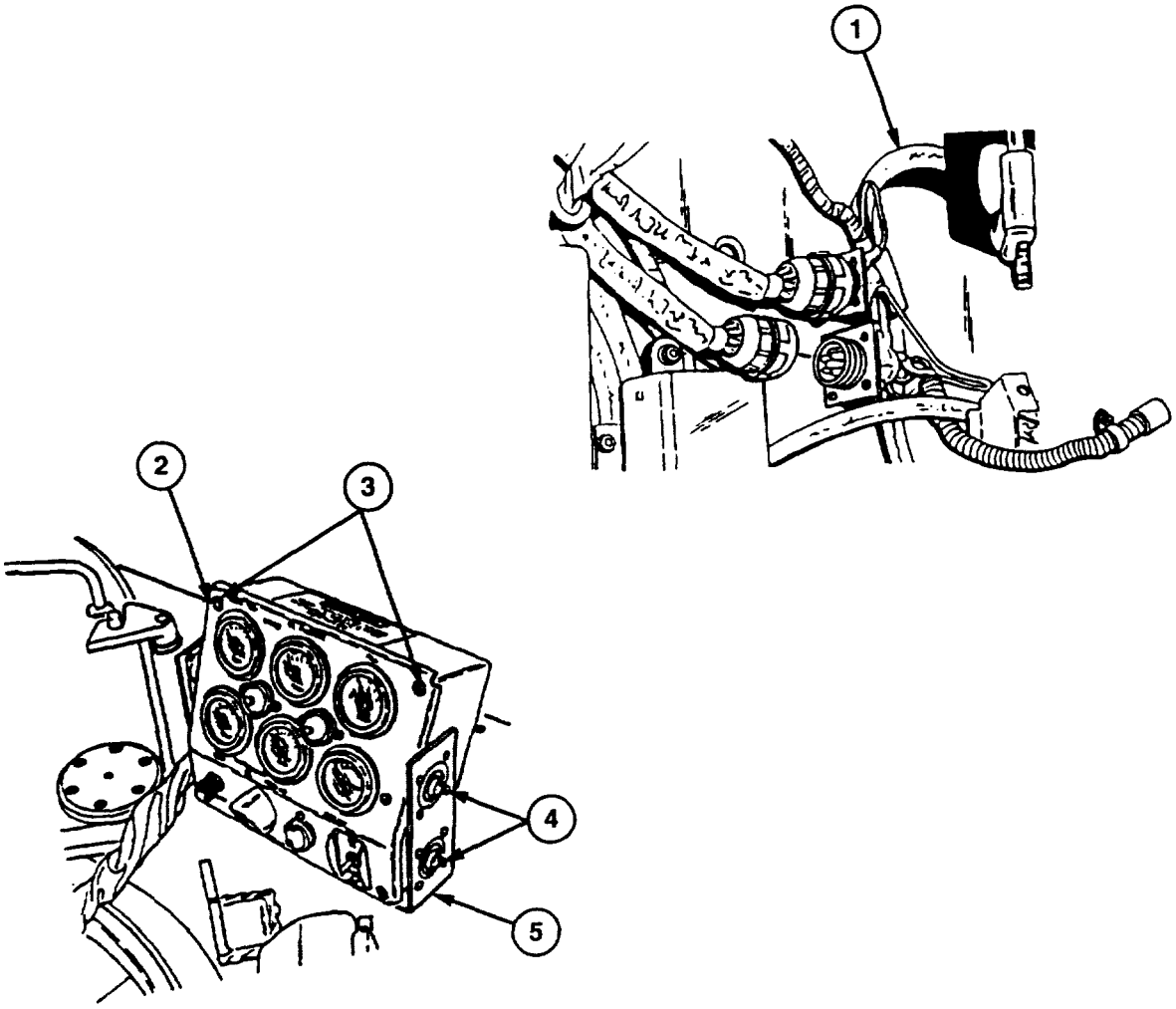
12. Install panel (6) on instrument panel cover (7).

13. Install four stud fasteners (3) on instrument panel (2).

7-6. DRIVER'S PORTABLE INSTRUMENT PANEL REPAIR (continued).

d. INSTALLATION

1. Install instrument panel (2) on bracket assembly (5).
2. Install four-crosspoint screws (4) on bracket assembly (5) and instrument panel (2).
3. Install instrument panel (2) in vehicle.
4. Connect instrument panel wiring harness (1) to bulkhead.



FOLLOW-ON MAINTENANCE:

- Connect battery ground cables (para 7-41).

[Paragraph 7-7 Deleted]

7-8. LOW COOLANT INDICATOR LIGHT ASSEMBLY AND WIRING HARNESS (12260297) REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).

a. REMOVAL

1. Turn indicator lens (7) counterclockwise, and remove indicator lens (7) and light bulb (6) from low coolant indicator (8).
2. Push in and turn four screws (2) and remove panel (3) from driver's portable instrument panel (1).
3. Remove nut (5), low coolant indicator (8), and washer (4) from panel (3).
4. Disconnect leads 27 (9), 352A (10), and 352B (11) from wiring harness 12260298 leads 27, 352A, and 352B.

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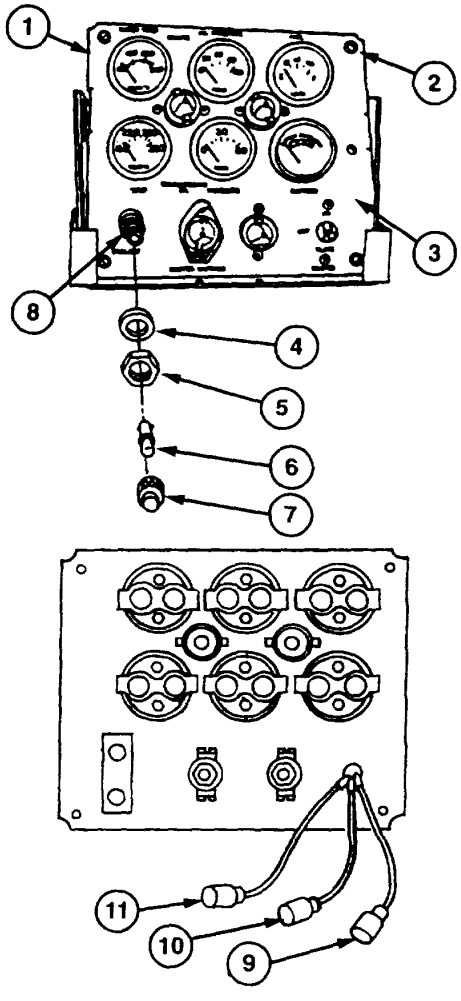


b. INSTALLATION

1. Connect lead 27 (9) on panel (3) with laser harness 12260298 lead 27; connect lead 352A (10) to wiring harness 12260298 lead 352A; and connect lead 352B (11) to wiring harness 12260298 lead 352B.
2. Install low coolant indicator (8) on panel (3) with washer (4) and nut (5).
3. Install panel (3) on driver's portable instrument panel (1) and turn four screws (2) to tighten.
4. Install light bulb (6) and lens (7) on low coolant indicator (8).

FOLLOW-ON MAINTENANCE:
- Connect battery ground cables (para 7-41).

7-9. DRIVER'S INSTRUMENT PANEL REPAIR.

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanics tool kit (Item 24, Appendix I)

Materials/Parts:
- Lockwasher (4) (Item 122, Appendix H)
- Lockwasher (4) (Item 123, Appendix H)
- Lockwasher (8) (Item 156, Appendix H)
- Lockwasher (2) (Item 172, Appendix H)
- Lockwasher (16) (Item 173, Appendix H)
- Lockwasher (4) (Item 176, Appendix H)
- Self-locking nut (3) (Item 305, Appendix H)
- Split washer (6) (Item 345, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).

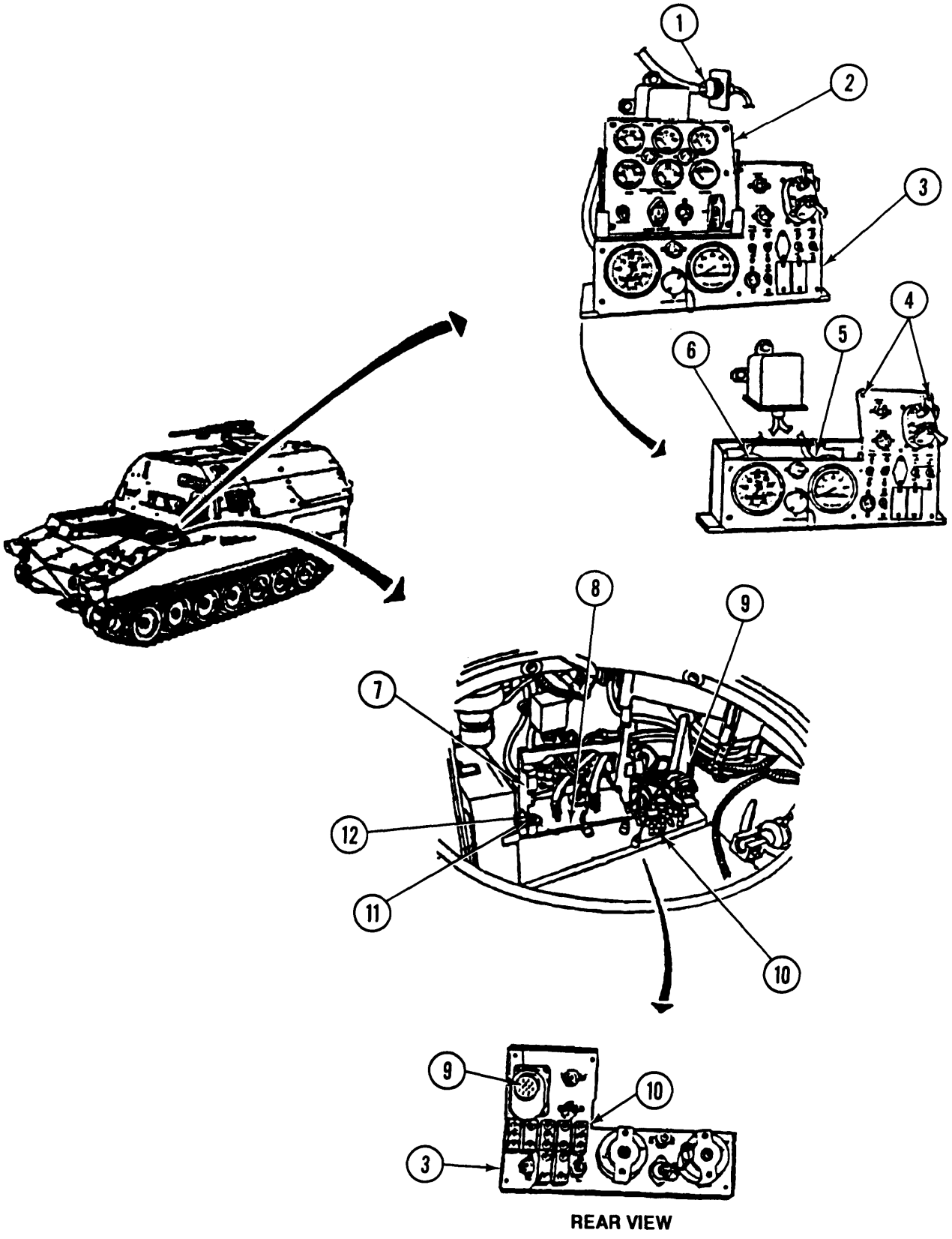
a. REMOVAL

WARNING

Be sure vehicle MASTER switch is set to OFF before you work on any part of the electrical system. You can get electrical shock or burned if power is on.

1. Disconnect electrical harness (1) at hull-mounted bracket.
2. Lift off portable instrument panel (2) from driver's instrument panel bracket and stow in outside position.
3. Disconnect flexible tachometer cable (6) and speedometer cable (5) from driver's instrument panel (3).
4. Unfasten six-stud fastener (4) from driver's instrument panel (3).
5. Disconnect 17 instrument panel connectors (10) and light switch connector (9) from driver's instrument panel (3).
6. Remove driver's instrument panel (3) from mounting support (7).
7. Remove four screws (12) and lockwashers (11) and ground strap (8) from mounting support (7). Discard lockwashers.
8. Remove mounting support (7) from vehicle.

7-9. DRIVER'S INSTRUMENT PANEL REPAIR (continued).



7-9. DRIVER'S INSTRUMENT PANEL REPAIR (continued).

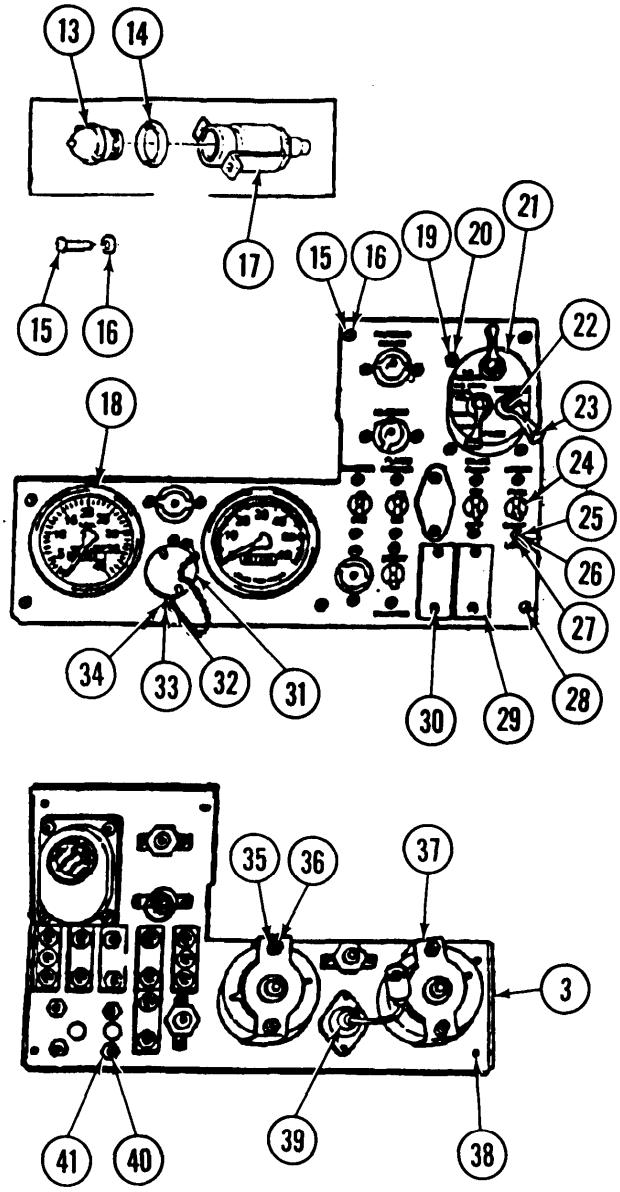
b. DISASSEMBLY

1. Remove four lenses (13) and preformed packings (14) from front of instrument panel (3).
2. Remove eight screws (15) and lockwashers (16) and four light brackets (17) from instrument panel (3). Discard lockwashers.
3. Remove 10 screws (25), lockwashers (26), and washers (27) and five switch assemblies (24) from instrument panel (3). Discard lockwashers.
4. Remove four nuts (35) and lockwashers (36) and two brackets (37) and indicators (18) from instrument panel (3). Discard Washers.
5. Remove three screws (22), handles (23), and spacers (hidden) from light switch (21).
6. Remove four screws (19) and lockwashers (20) and light switch (21) from instrument panel (3).
7. Remove cover (31), two screws (32), washers (33), and lockwashers (34), and auxiliary outlet (39) from instrument panel (3). Discard lockwashers.

NOTE

Some instrument panels are equipped with only one cover plate.

8. Remove six nuts (41), lockwashers (40), screws (30), and three cover plates (29) from instrument panel (3).
9. Remove six stud turn locks (28) and split washers (38) from instrument panel (3). Discard split washers.



c. ASSEMBLY

1. Install six new split washers (38) and stud turn locks (28) on instrument panel (3).
2. Install three cover plates (29) and six screws (30), new lockwashers (40), and nuts (41) on instrument panel (3).
3. Install auxiliary outlet (39), two new lockwashers (34), washers (33), and screws (32), and cover (31) on instrument panel (3).

7-9. DRIVER'S INSTRUMENT PANEL REPAIR (continued).

4. Install light switch (21), four new lockwashers (20), and four screws (19) on instrument panel (3).

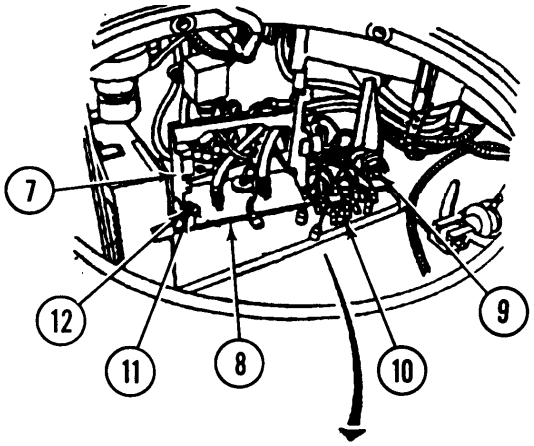
5. Install three spacers (hidden), handles (23), and screws (22) on light switch (21).

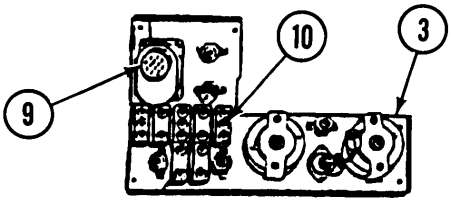
6. Install two indicators (18) and brackets (37), four new lockwashers (36), and four nuts (35) on instrument panel (3).

7. Install five switch assemblies (24) and 10 washers (27), new lockwashers (26), and screws (25) on instrument panel (3).

8. Install four light brackets (17) and eight new lockwashers (16) and screws (15) on instrument panel (3).

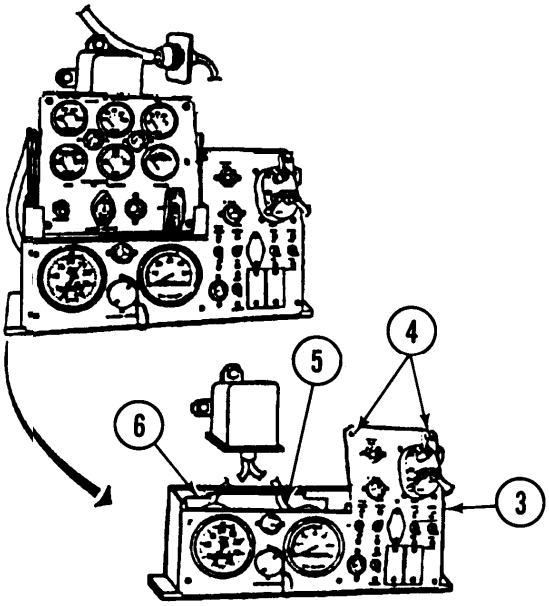
9. Install four lenses (13) and preformed packings (14) on front of instrument panel (3).





REAR VIEW

d. INSTALLATION



1. Install mounting support (7) on vehicle.

2. Install ground strap (8), four new lockwashers (11), and four screws (12) on instrument panel (3).

3. Install instrument panel (3) on mounting support (7).

4. Connect light switch connector (9) and 17 instrument panel connectors (10) to instrument panel (3).

5. Fasten six stud fasteners (4) to instrument panel (3) by turning clockwise.

6. Connect speedometer cable (5) and flexible tachometer cable (6) to instrument panel (3).

7. Install portable instrument panel (2) on instrument panel (3) bracket.

8. Connect electrical harness (1) to hull-mounted bracket.

FOLLOW-ON MAINTENANCE:

- Connect battery ground cables (para 7-41).

7-10. ACCESSORY CONTROL BOX REPAIR.

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Gasket (Item 70, Appendix H)
- Lockwasher (4) (Item 129, Appendix H)
- Lockwasher (2) (Item 135, Appendix H)
- Lockwasher (4) (Item 136, Appendix H)
- Lockwasher (12) (Item 161, Appendix H)
- LockWasher (4) (Item 172, Appendix H)
- LockWasher (18) (Item 173, Appendix H)

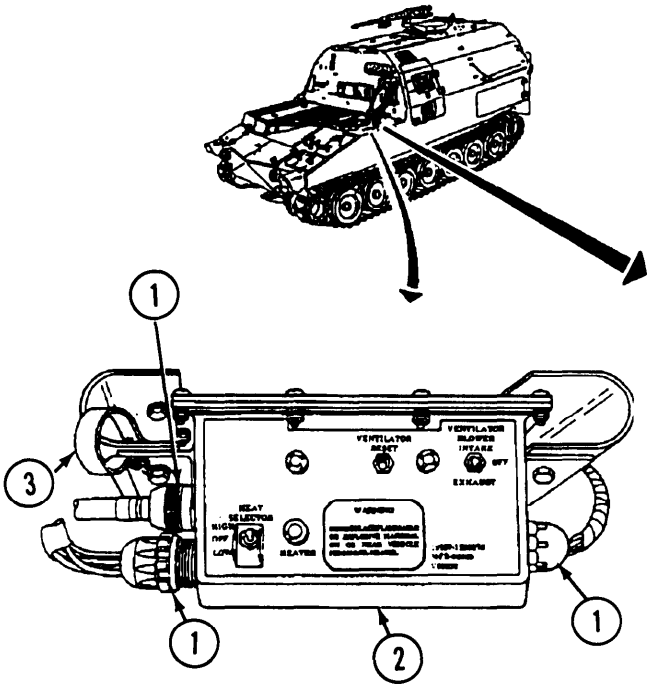
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).

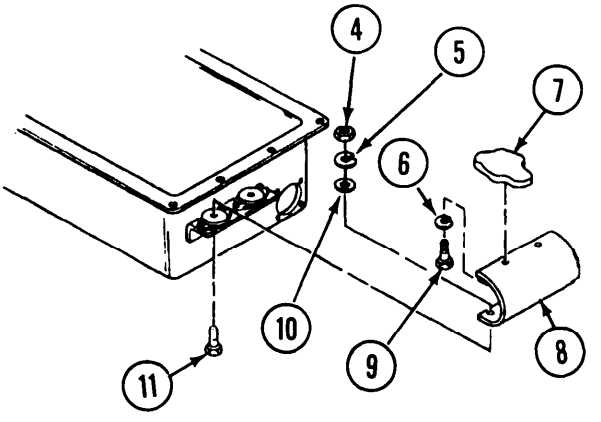
a. REMOVAL

1. Disconnect four electrical connectors (1) from accessory control box (2).

2. Remove four screws (11), washers (10), lockwashers (5), and nuts (4), electrical ground lead (3), and control box (2) from mounting bracket (8). Discard lockwashers.

3. Remove four screws (9) and lockwashers (6) and two mounting brackets (8) from hull (7). Discard lockwashers.





7-10. ACCESSORY CONTROL BOX REPAIR (continued).

b. DISASSEMBLY

1. Remove 12 screws (12), washers (15), lockwashers (16), and nuts (17) from control box (2). Discard lockwashers.

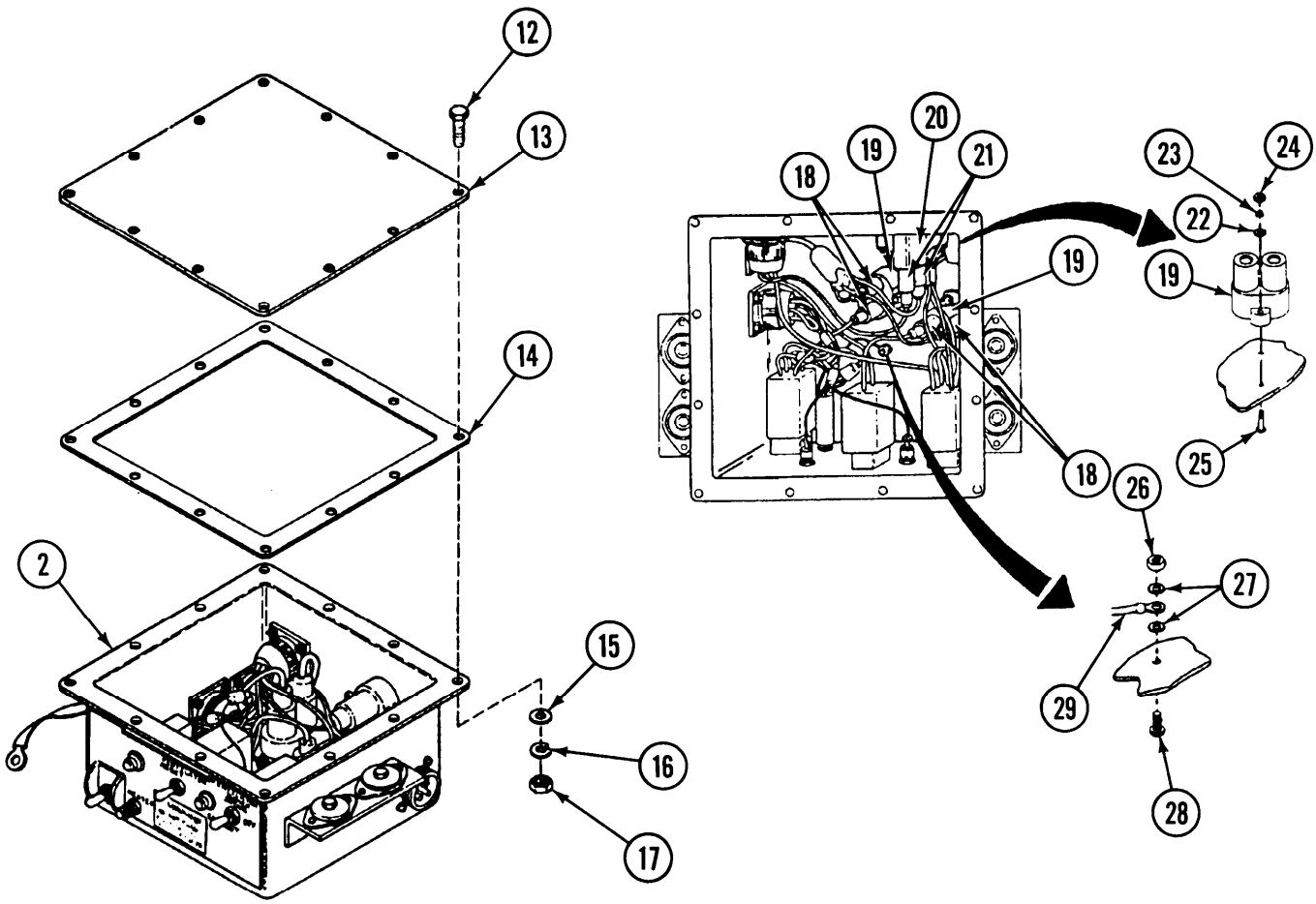
2. Remove cover (13) and gasket (14) from control box (2). Discard gasket.

3. Disconnect four electrical connectors (18) from two circuit breakers (19).

4. Disconnect two electrical connectors (21) from circuit breaker (20).

5. Remove six screws (25), washers (22), lockwashers (24), nuts (23) two circuit breakers (19), and circuit breaker (20) from control box (2). Discard lockwashers.

6. Remove screw (28), two lockwashers (27), nut (26), and electrical ground lead (29) from control box (2). Discard lockwashers.



7-10. ACCESSORY CONTROL BOX REPAIR (continued).

7. Remove three nuts (34), switch guard (33), and three toggle switches (32) from control box (2).

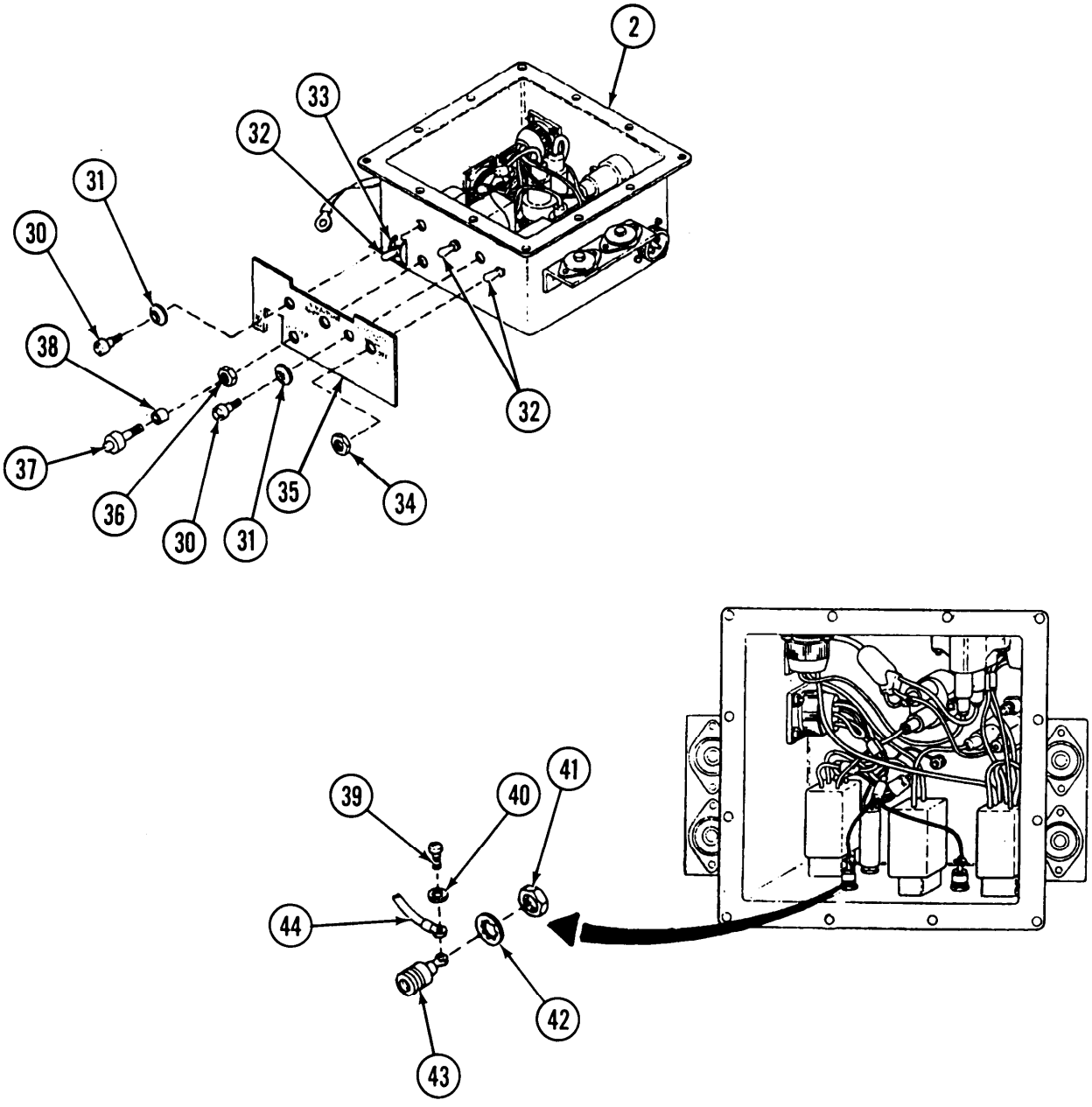
8. Disconnect two leads from ventilator/blower toggle switch (32).

9. Remove two panel light lamps (30) and moisture boots (31) from control box (2).

10. Remove indicator light cap (37), lamp (38), hexnut (36), and indicator panel (35) from control box (2).

11. Remove two screws (39), washers (40), and electrical leads (44) from two indicator light sockets (43).

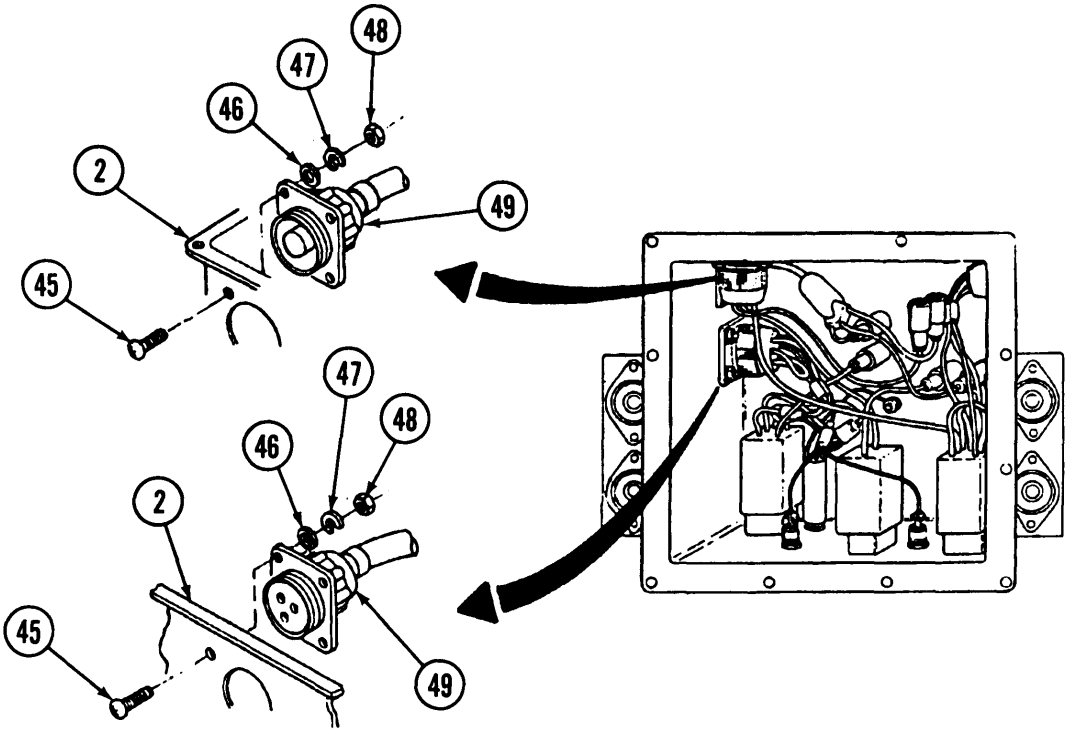
12. Remove two nuts (41), washers (42), and indicator lights sockets (43) from control box (2).



7-10. ACCESSORY CONTROL BOX REPAIR (continued).

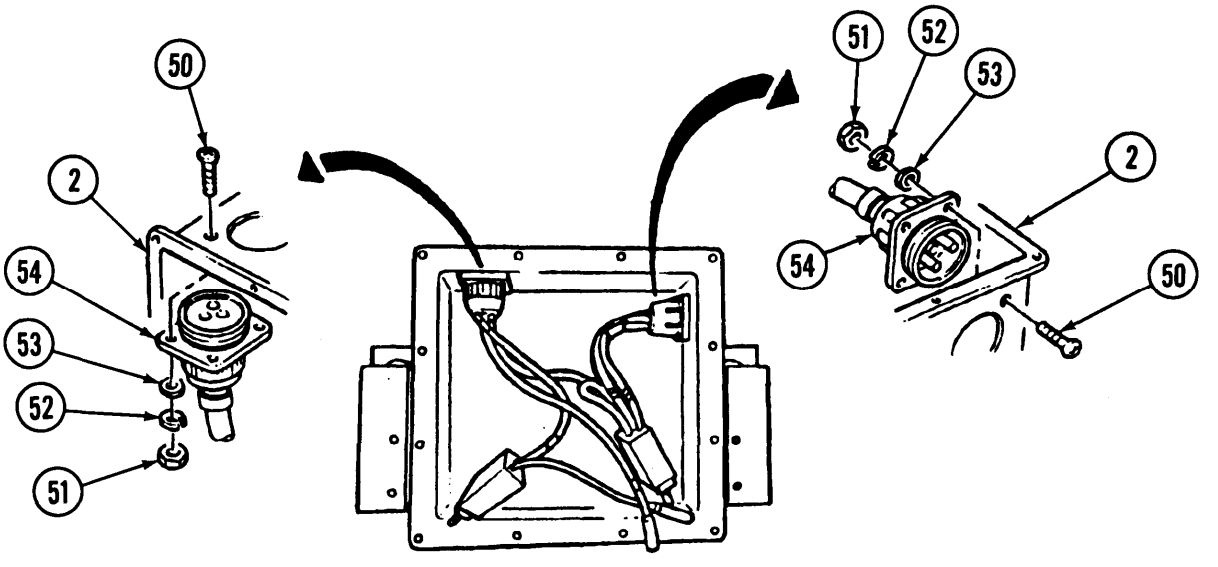
13. Remove eight screws (45), washers (46), lockwashers (47), and nuts (48) and two electrical connectors (49) from control box (2). Discard lockwashers.

14. Remove eight screws (50), washers (53), lockwashers (52), and nuts (51) and two electrical connectors (54) from control box (2). Discard lockwashers.



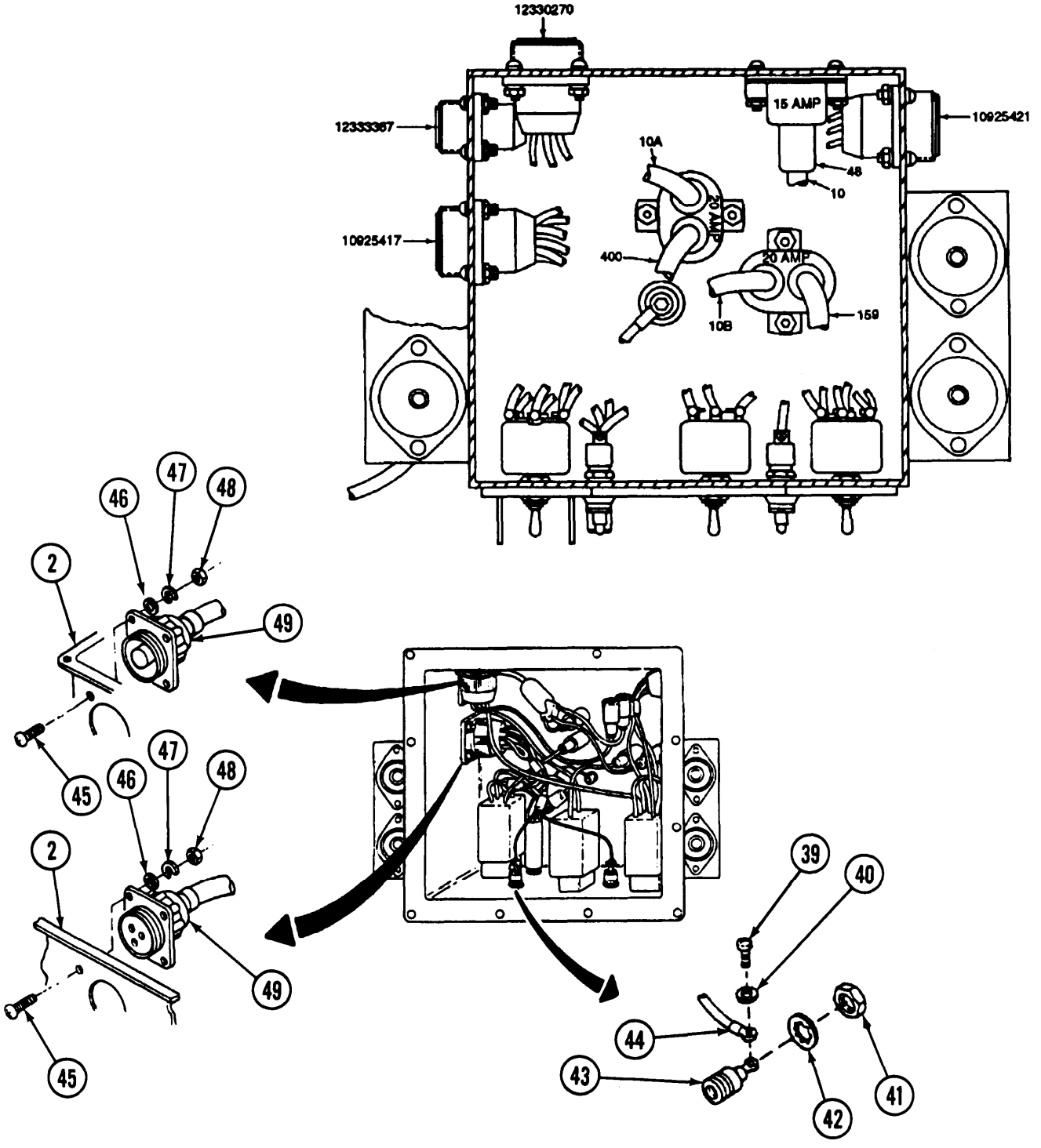
c. ASSEMBLY

1. Install two electrical connectors (54) on control box (2) with eight nuts (51), new lockwashers (52), washers (53), and screws (50).



7-10. ACCESSORY CONTROL BOX REPAIR (continued).

2. Install two electrical connectors (49) on control box (2) with eight nuts (48), new lockwashers (47), washers (46), and screws (45).



3. Install two indicator light sockets (43) on control box (2) with two washers (42) and nuts (41).

4. Install two electrical leads (44) on two indicator light sockets (43) with two washers (40) and screws (39).

7-10. ACCESSORY CONTROL BOX REPAIR (continued).

5. Install indicator panel (35), hexnut (36), lamp (38), and indicator light cap (37) on control box (2).

6. Install two moisture boots (31) and panel light lamps (30) on control box (2).

7. Install two leads to ventilator/blower toggle switch (32).

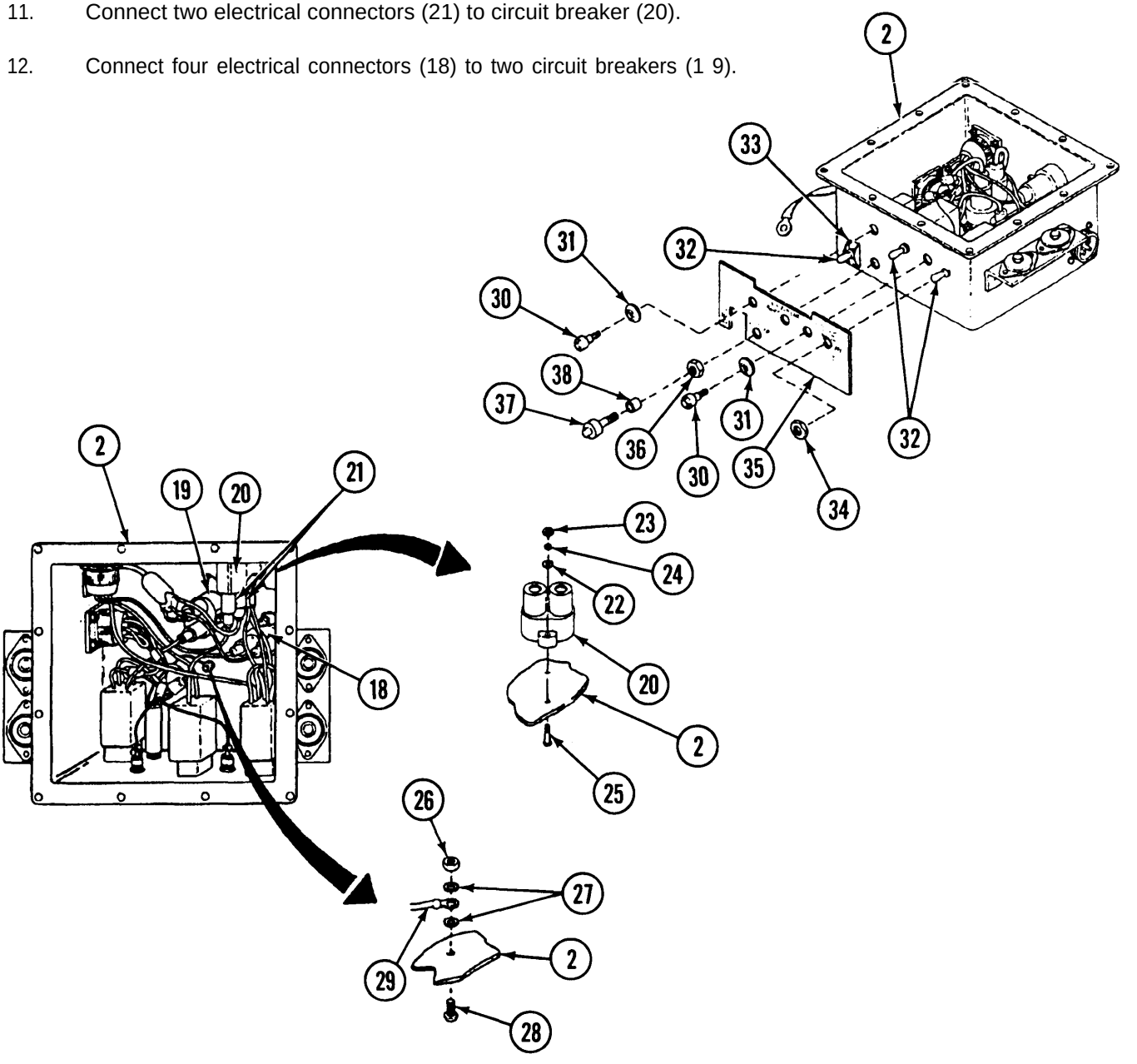
8. Install three toggle switches (32) and switch guard (33) on control box (2) with three nuts (34).

9. Install ground lead (29) on control box (2) with nut (26), two new lockwashers (27), and screw (28).

10. Install two circuit breakers (19) and circuit breaker (20) on control box (2) with six nuts (23), new lockwashers (24), washers (22), and screws (25).

11. Connect two electrical connectors (21) to circuit breaker (20).

12. Connect four electrical connectors (18) to two circuit breakers (1 9).



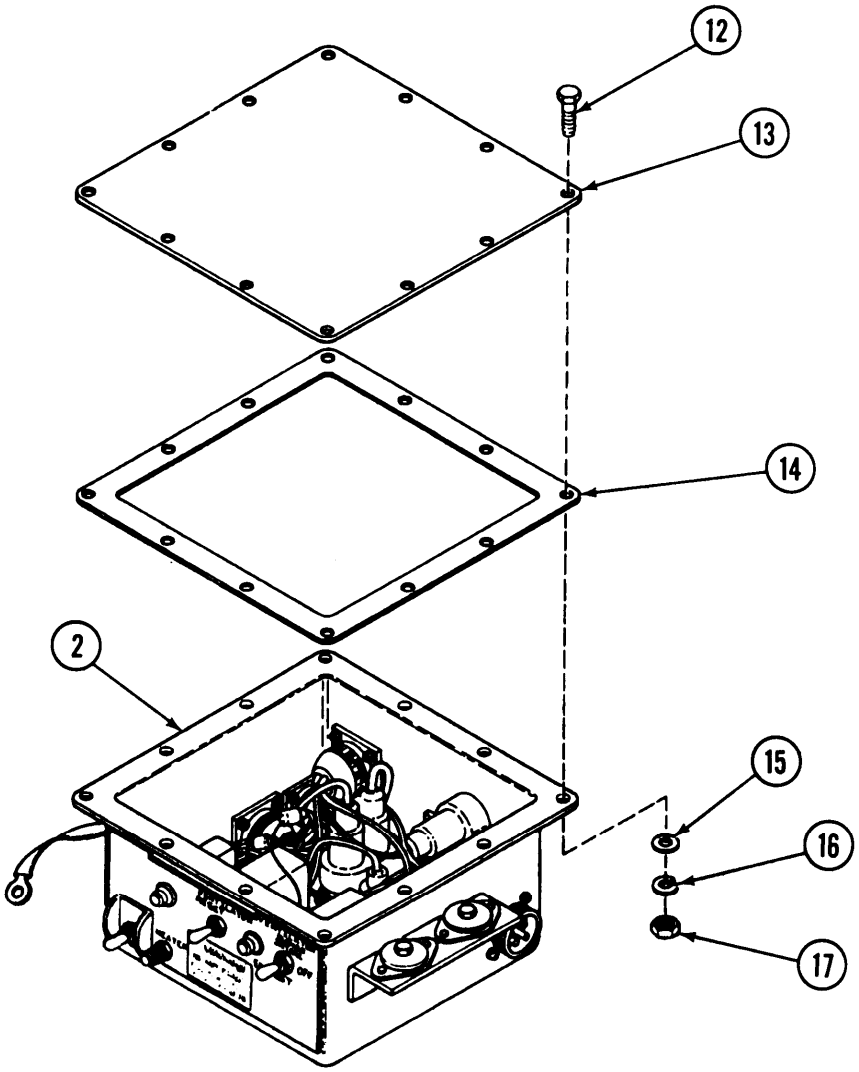
7-10. ACCESSORY CONTROL BOX REPAIR (continued).

13. Install new gasket (14) and cover (13) on control box (2) with 12 nuts (17), new lockwashers(16), washers (15), and screws (12).

d. INSTALLATION

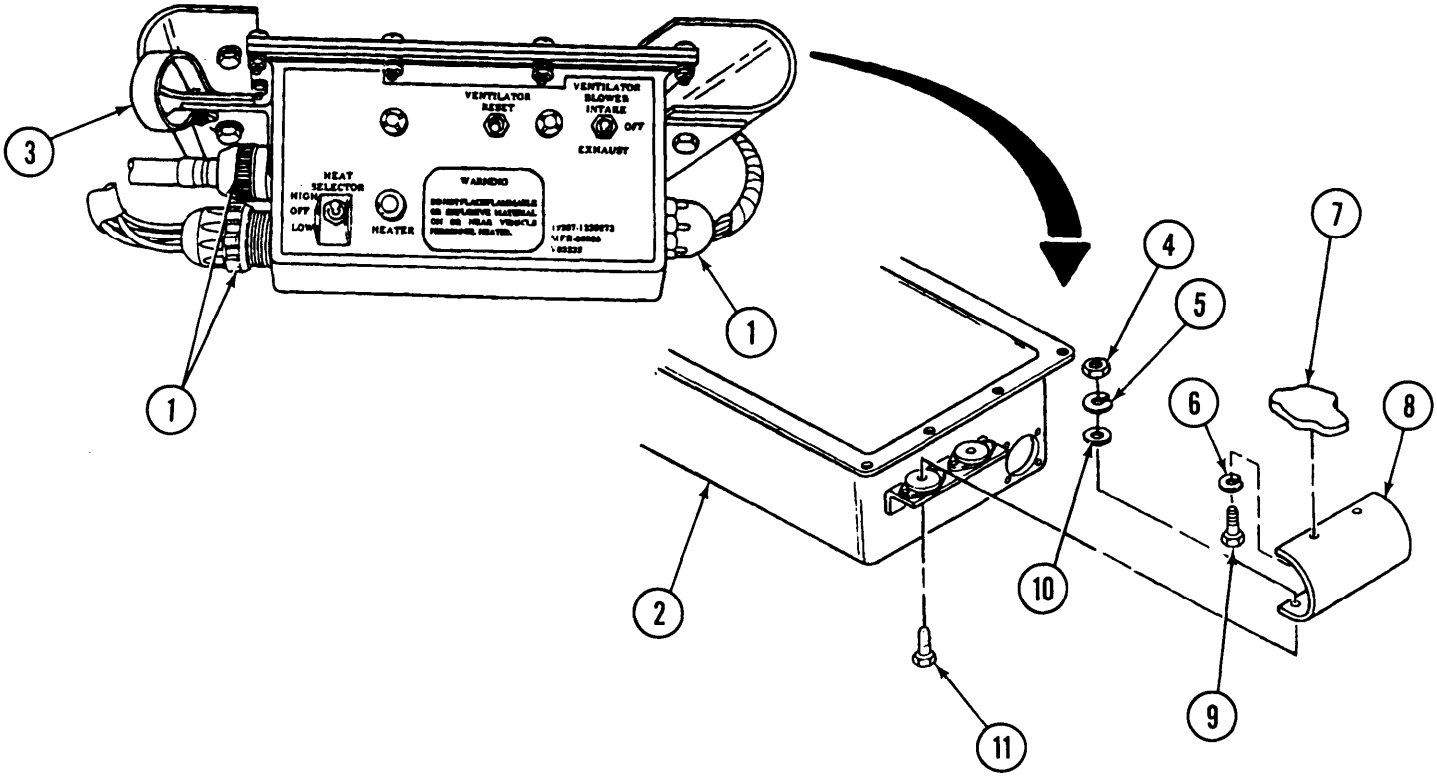
1. Install two mounting brackets (8) on hull (7) with four new lockwashers (6) and screws (9),

2. Install control box (2) and electrical ground lead (3) on two mounting brackets (8) with four nuts (4), new lockwashers (5), washers (10), and screws (11).



7-10. ACCESSORY CONTROL BOX REPAIR (continued).

3. Connect four electrical connectors (1) to accessory control box (2).



FOLLOW-ON MAINTENANCE:

- Connect battery ground cables (para 7-41).

7-11. CIRCUIT BREAKER PANELS AND CIRCUIT BREAKER REPLACEMENT.

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- Lockwasher (26) (Item 173, Appendix H)
- Lockwasher (4) (Item 196, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).
- Portable instrument panel removed (para 7-6).
- Driver's instrument panel removed (para 7-9).

a. REMOVAL

1. Disconnect eight electrical leads (4) from four circuit breakers (5) and two electrical leads (1) from circuit breaker (3) on circuit breaker mounting bracket (6).

2, Disconnect 16 electrical leads (18) from eight circuit breakers (23) on circuit breaker mounting bracket (1 9).

3. Remove two mounting brackets (6 and 19) from driver's compartment by removing four screws (15), lockwashers (14), and washers (13). Discard lockwashers.

b. DISASSEMBLY

1. Remove eight circuit breakers (23) from mounting bracket (19) by removing two nuts (22), screws (17), lockwashers (21), and washers (20) from each circuit breaker (23). Discard lockwashers.

2. Remove circuit breaker (3) from mounting bracket (6) by removing two nuts (9), screws (2), lockwashers (8), and washers (7). Discard lockwashers.

3. Remove four circuit breakers (5) from mounting bracket (6) by removing two nuts (10), screws (16), lockwashers (11), and washers (12) from each circuit breaker (5). Discard lockwashers.

c. ASSEMBLY

1. Install four circuit breakers (5) on mounting bracket (6) using two nuts (10), screws (16), new lockwashers (11), and washers (12).

2. Install circuit breaker (3) on mounting bracket (6) using two nuts (9), screws (2), new lockwashers (8), and washers (7).

7-11. CIRCUIT BREAKER PANELS AND CIRCUIT BREAKER REPLACEMENT (continued).

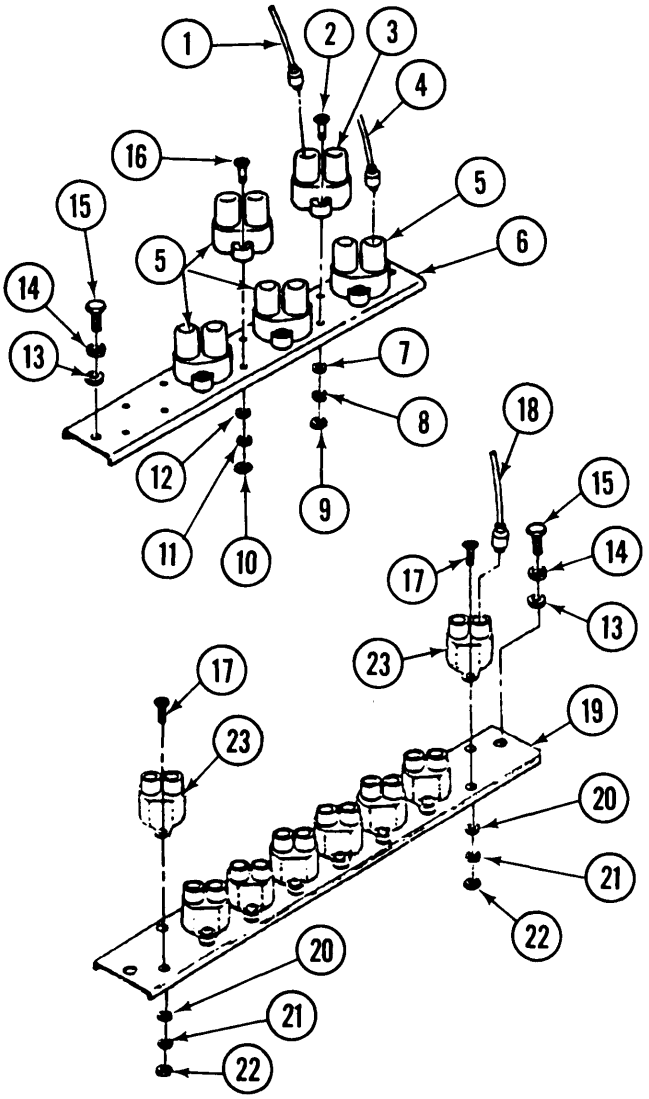
3. Install eight circuit breakers (23) on mounting bracket (19) using two nuts (22), screws (17), new lockwashers (21), and washers (20).

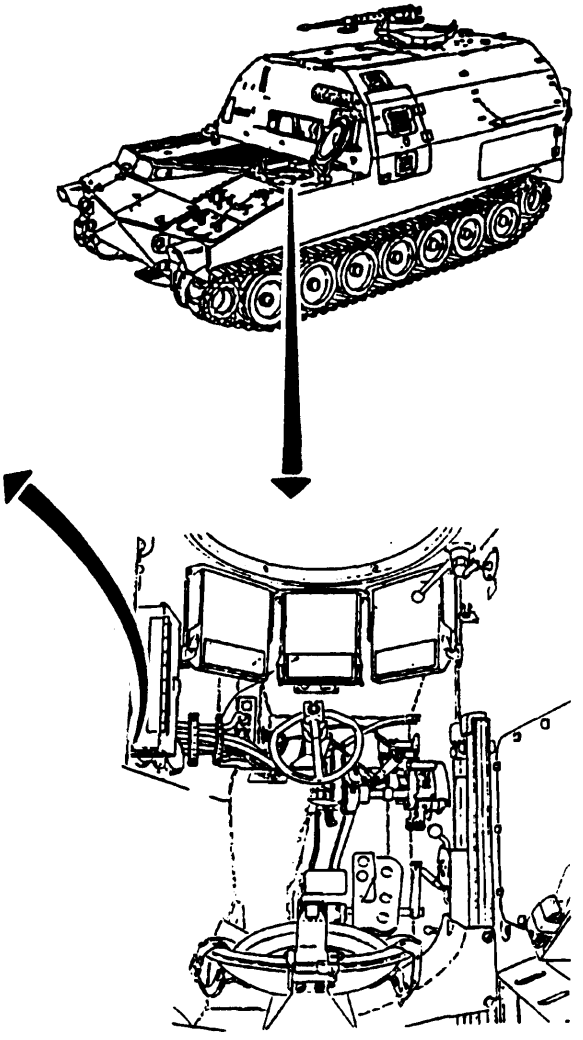
d. INSTALLATION

1. Install two mounting brackets (6 and 19) in drivers compartment with four screws (15), new lockwashers (14), and washers (13).

2. Connect 16 electrical leads (18) to eight circuit breakers (23) on mounting bracket (19).

3. Connect eight electrical leads (4) to four circuit breakers (5) and two electrical leads (1) to circuit breaker (3) on mounting bracket (6).





FOLLOW-ON TASKS:

- Install driver's instrument panel (para 7-9).
- Install portable instrument panel (para 7-6).
- Connect battery ground cables (para 7-41).

7-12 AIR CLEANER BLOWER MOTOR RELAY REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Lockwasher (2) (Item 129, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Battery ground leads disconnected (para 7-41).
- Driver's portable instrument panel removed (para 7-6).

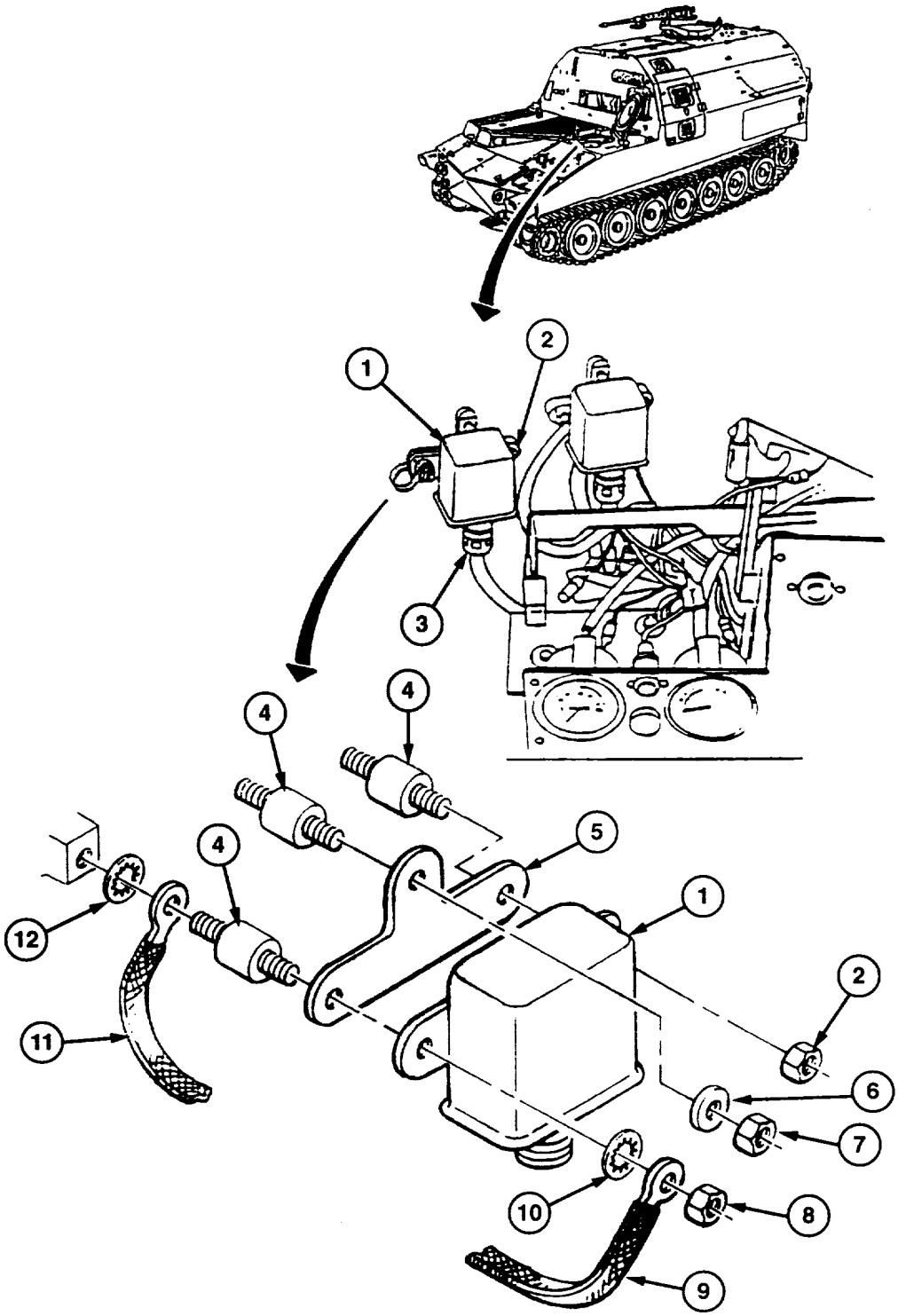
a. REMOVAL

1. Disconnect electrical connector (3) from air cleaner blower motor relay (1).
2. Remove nut (8), ground lead end (9), and lockwasher (10) from mount (4). Discard lockwasher.
3. Remove nut (2) and relay (1) from driver's compartment wall.
4. Remove nut (7), washer (6), bracket (5), three mounts (4), ground lead (11), and lockwasher (12) from driver's compartment wall. Discard lockwasher.

b. INSTALLATION

1. Install new lockwasher (12), ground lead (11), three mounts (4), and bracket (5) on driver's compartment wall with washer (6) and nut (7).
2. Install relay (1) on driver's compartment wall with nut (2).
3. Install new lockwasher (10) and ground lead end (9) on mount (4) with nut (8).
4. Connect electrical connector (3) to relay (1).

7-12. AIR CLEANER BLOWER MOTOR RELAY REPLACEMENT (continued).



FOLLOW-ON MAINTENANCE:

- Install driver's portable instrument panel (para 7-6).
- Connect battery ground cables (para 7-41).

7-13. INTAKE FUEL PUMP SYSTEM RELAY REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

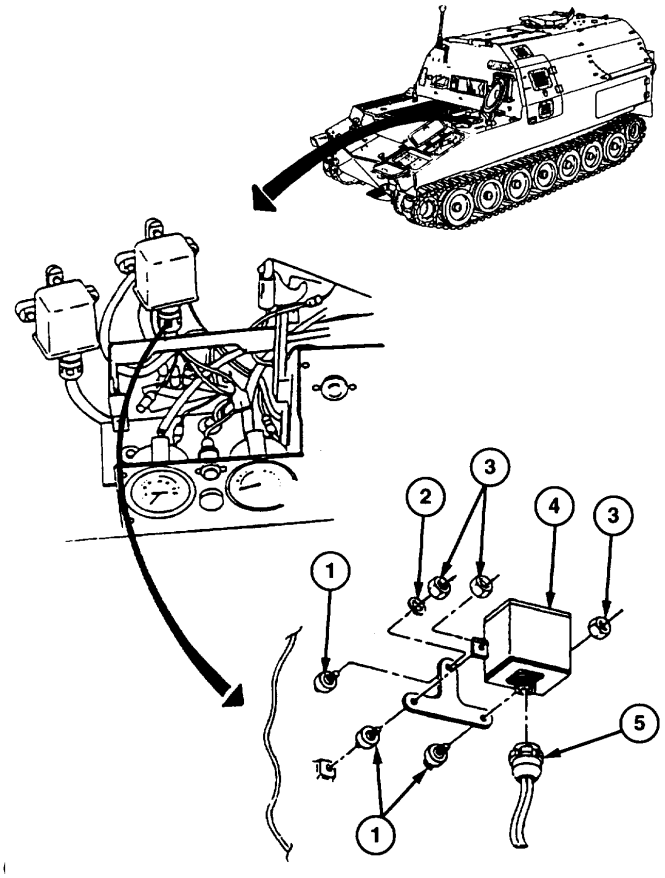
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Battery ground leads disconnected (para 7-41).
- Driver's portable instrument panel removed (para 7-6).

a. REMOVAL

1. Disconnect connector(5) from intake fuel pump system relay (4).
2. Remove three nuts, (3) washer (2), relay (4), and bracket (6) from three mounts (1).
3. Remove three mounts (1) from driver's compartment wall.

b. INSTALLATION

1. Install three mounts (1) on driver's compartment wall.
2. Install bracket (6) and relay (4) on three mounts (1) with washer (2) and three nuts (3).
3. Connect connector (5) to relay (4).



FOLLOW-ON MAINTENANCE:
- Install driver's portable instrument panel (para 7-6).
- Connect battery ground cables (para 7-41).

7-14. VENTILATION BLOWER RELAY REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Lockwasher (6) (Item 196, Appendix H)

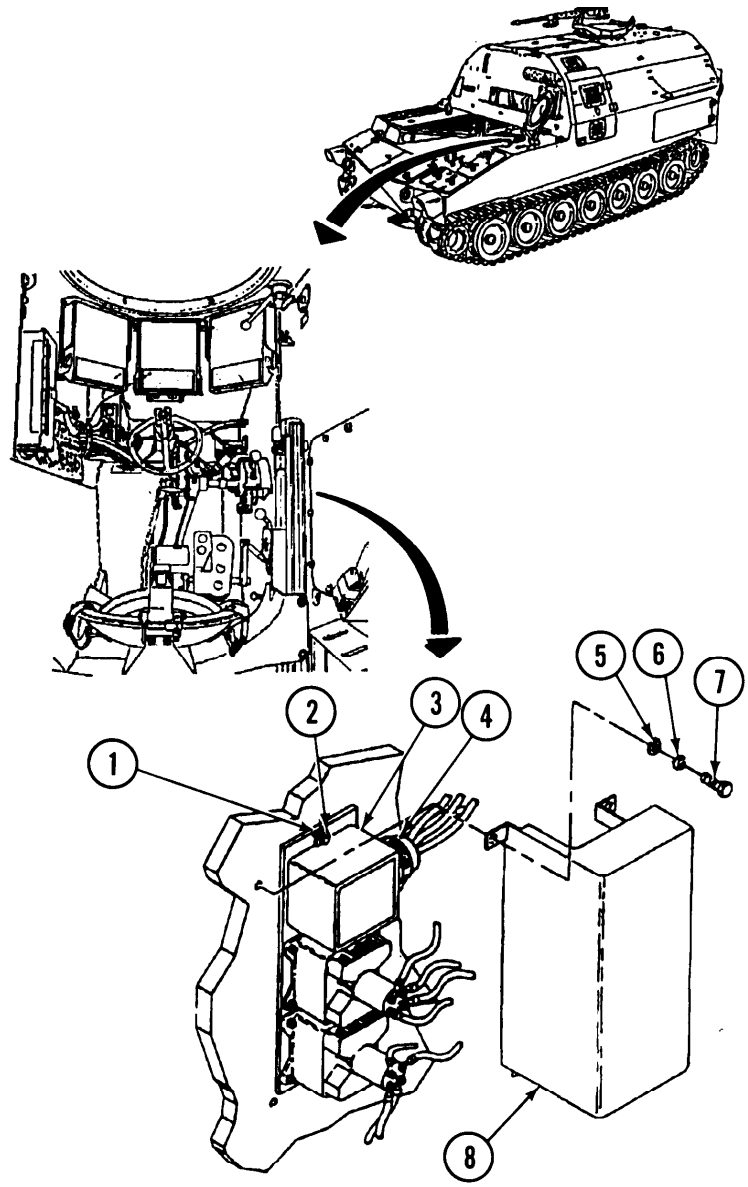
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).

a. REMOVAL

1. Remove four screws (7), lockwashers (6), and washers (5) and relay cover (8) from driver's compartment wall. Discard lockwashers.
2. Disconnect electrical harness plug (4) from relay (3).
3. Remove two screws (2) and lockwashers (1) and relay (3) from driver's compartment wall. Discard lockwashers.

b. INSTALLATION

1. Install relay (3) on driver's compartment wall with two new lockwashers (1) and screws (2).
2. Connect electrical harness plug (4) to relay (3).
3. Install relay cover (8) on driver's compartment wall with four washers (5), new lockwashers (6), and screws (7).



FOLLOW-ON MAINTENANCE:
- Connect battery ground cables (para 7-41).

7-15. APU VOLTAGE REGULATOR REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- Lockwasher (2) (Item 136, Appendix H)
- Lockwasher (4) (Item 196, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).

a. REMOVAL

1. Disconnect two electrical connectors (4) from APU voltage regulator (5).
2. Remove screw (6), lockwasher (7), and ground lead (8) from voltage regulator (5). Discard lockwasher.
3. Remove four screws (9) and voltage regulator (5) from four insulators (3).

NOTE

Remove insulators only if damaged.

4. Remove four screws (1), lockwashers (2), and insulators (3) from rear of driver's compartment wall. Discard lockwashers.

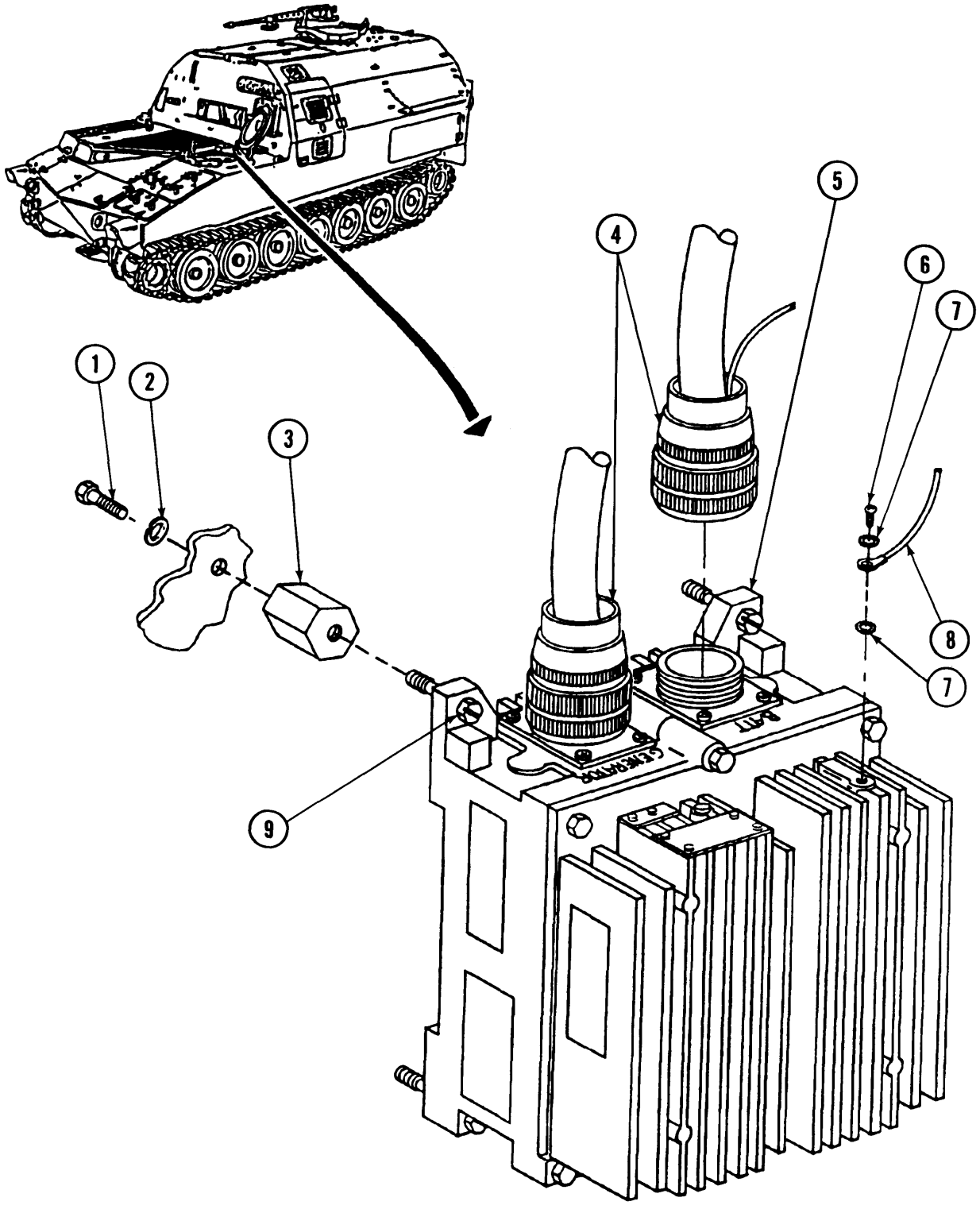
b. INSTALLATION

NOTE

Perform step 1 only if insulators were removed.

1. Install four insulators (3) on rear of driver's compartment wall with four screws (1) and new lockwashers (2).
2. Install voltage regulator (5) on four insulators (3) with four screws (9).
3. Install ground lead (8) on voltage regulator (5) with screw (6) and new lockwasher (7).
4. Connect two eletrical connectors (4) to voltage regulator (5).

7-15. APU VOLTAGE REGULATOR REPLACEMENT (continued).



FOLLOW-ON MAINTENANCE:

- Connect battery ground cables (para 7-41).

7-16. HYDRAULIC CONTROL GAGE PANEL ASSEMBLY REPAIR.

This Task Covers:

a. Disassembly

b. Assembly

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Lockwasher (4) (Item 122, Appendix H)
- Lockwasher (4) (Item 160, Appendix H)
- Lockwasher (4) (Item 161, Appendix H)
- LockwWasher (4) (Item 189, Appendix H)
- Preformed packing (Item 240, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Hydraulic control panel assembly removed (para 17-28).

a. DISASSEMBLY

WARNING

When working on vehicle's electrical system, remove dogtags, rings, and other jewelry. Disconnect batteries by removing ground cables first. Connect ground cables last when connecting batteries.

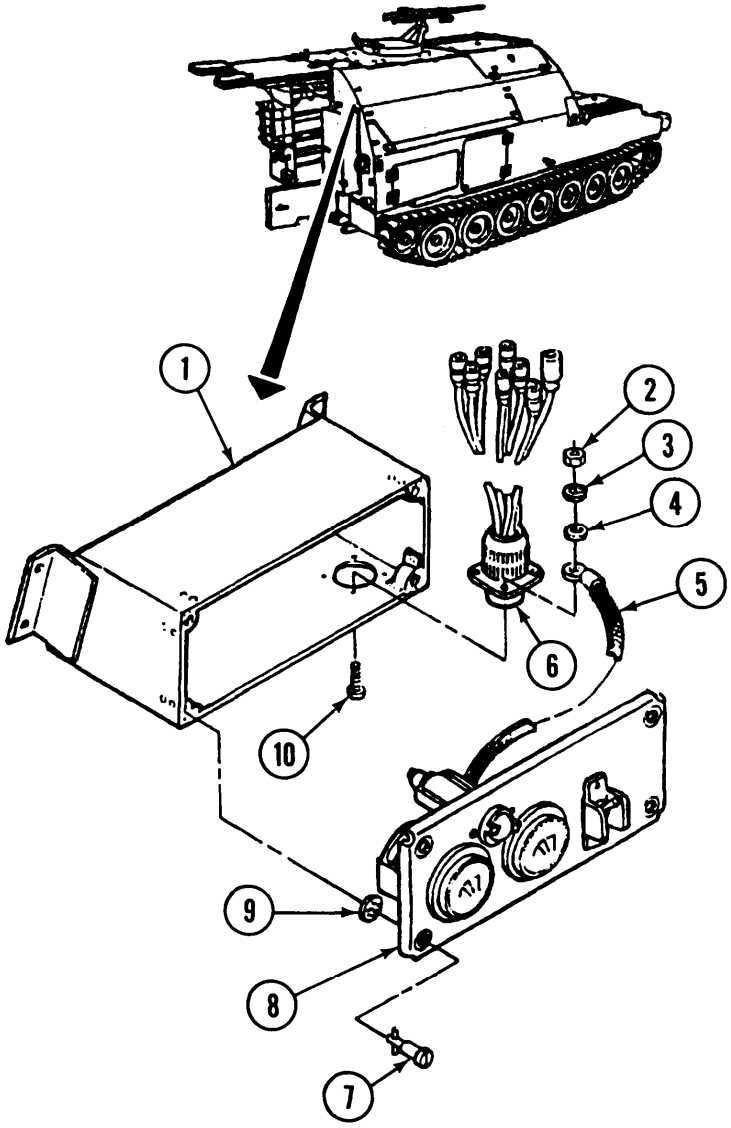
1. Turn four retaining studs (7) securing cover (8) to control box body (1), and pull cover (8) away from body (1).

2. Remove four lockwashers (9) and studs (7) from cover (8). Discard lockwashers.

NOTE

For proper assembly, note position of ground lead attached to connector and bottom hydraulic control gage clamp stud.

3. Remove four screws (10), lockwashers (3), washers (4), and nuts (2), ground lead (5), and wiring harness 12333555 (6) from body (1). Discard lockwashers.



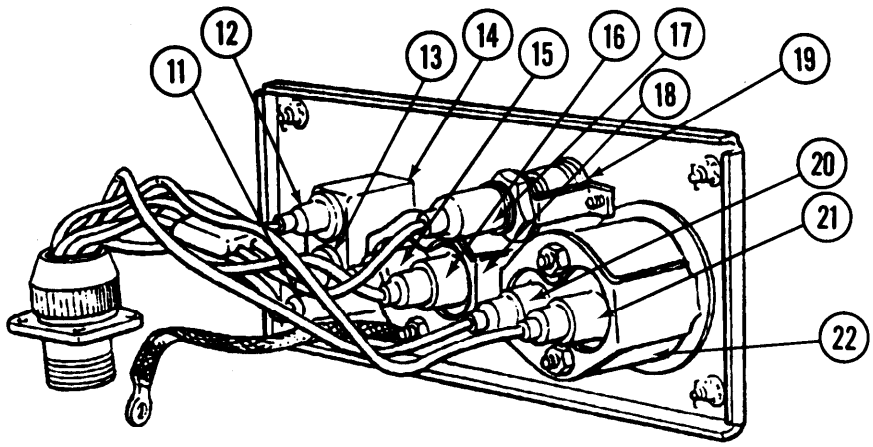
7-16. HYDRAULIC CONTROL GAGE PANEL ASSEMBLY REPAIR (continued).

4. Disconnect electrical lead MB (12), electrical lead 10 (13), and electrical lead AAA (11) from rear of toggle switch (14).

5. Disconnect electrical lead CD (15) and electrical lead 27 (16) from rear of oil level gage (18).

6. Disconnect electrical lead 40 (17) from rear of indicator light (1 9).

7. Disconnect electrical lead 664 (20) and electrical lead 27 (21) from rear of temperature gage (22).

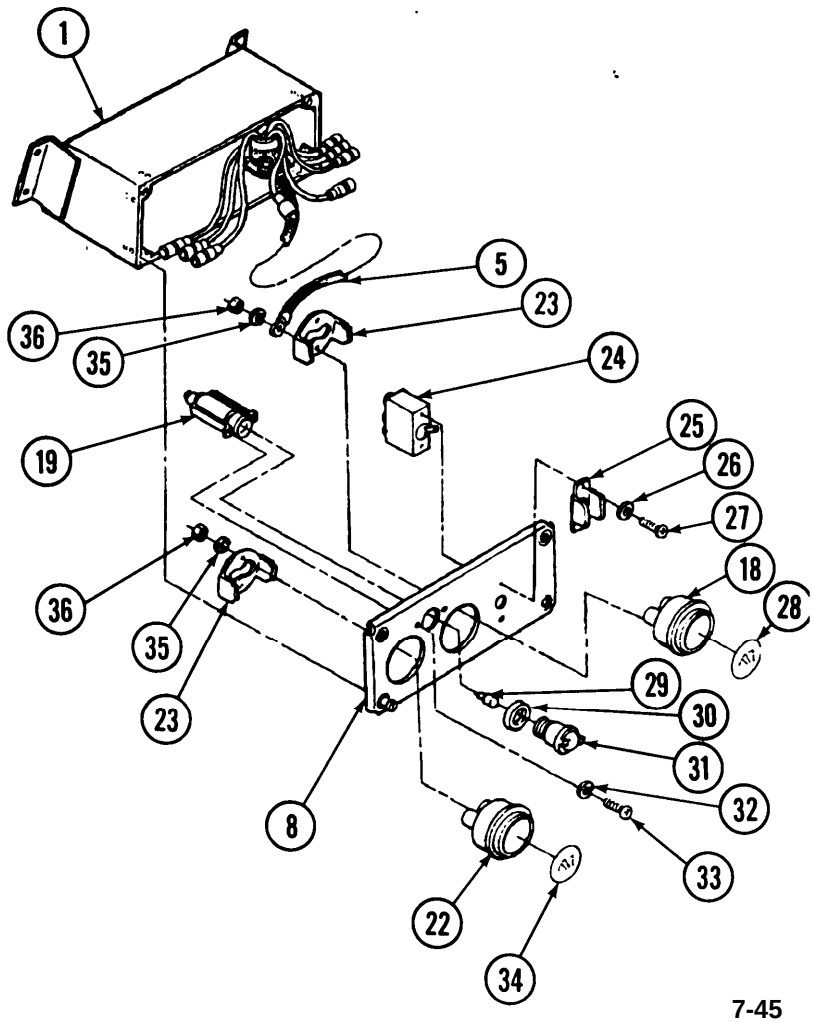


8. Remove four nuts (36) and lockwashers (35), ground lead (5), and two mounting clamps (23) securing oil level gage (18), temperature gage (22), and two lenses (28 and 34) to cover (8). Discard lockwashers.

9. Remove lens (31), preformed packing (30), and bulb (29) from indicator light (19). Discard preformed packing.

10. Remove two screws (33) and lockwashers (32) and indicator light (19) from cover (8). Discard lockwashers.

11. Remove two screws (27) and lockwashers (26), toggle switch (24), and guard (25) from cover (8). Discard lockwashers.



7-16. HYDRAULIC CONTROL GAGE PANEL ASSEMBLY REPAIR (continued).

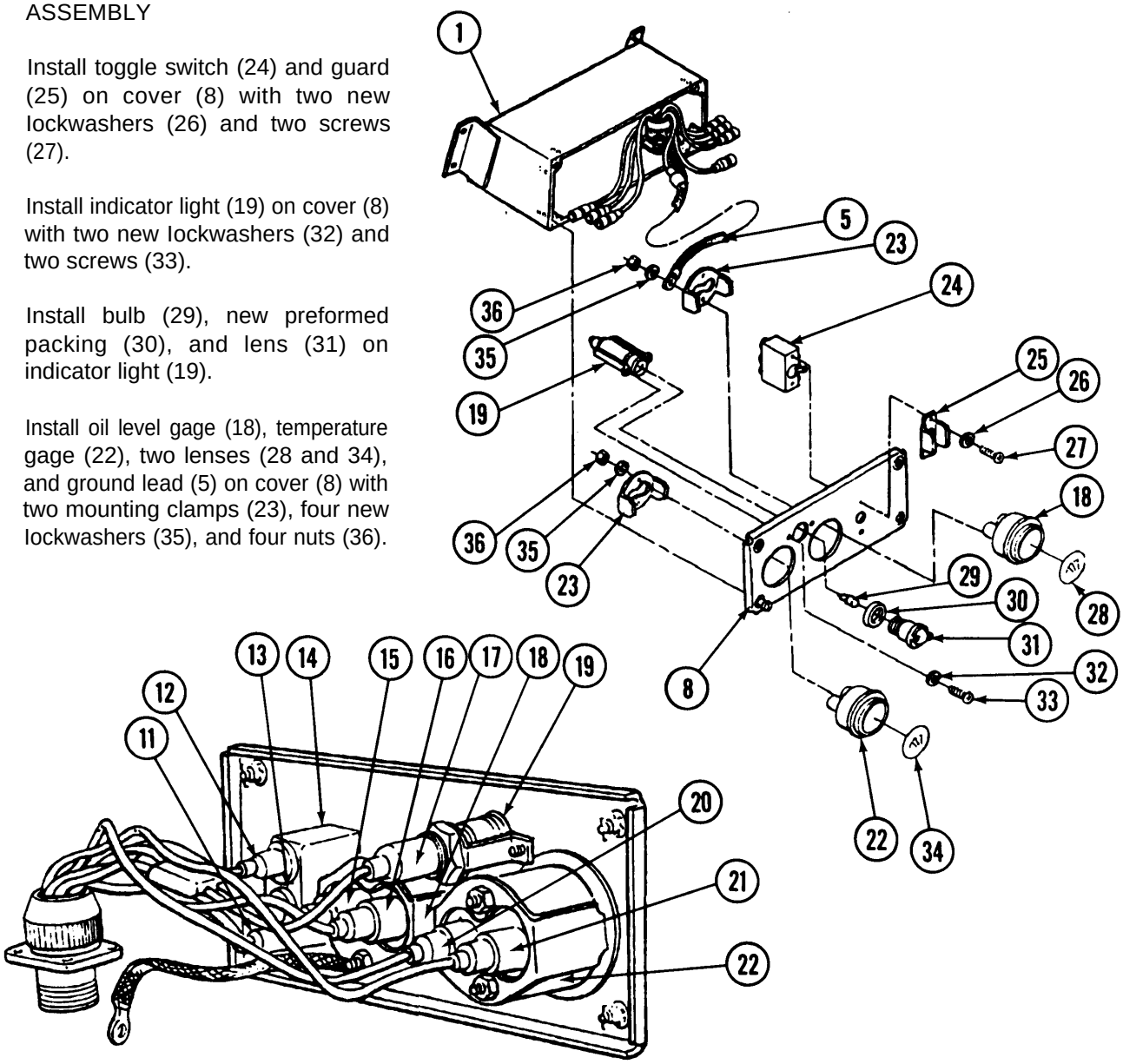
b. ASSEMBLY

1. Install toggle switch (24) and guard (25) on cover (8) with two new lockwashers (26) and two screws (27).

2. Install indicator light (19) on cover (8) with two new lockwashers (32) and two screws (33).

3. Install bulb (29), new preformed packing (30), and lens (31) on indicator light (19).

4. Install oil level gage (18), temperature gage (22), two lenses (28 and 34), and ground lead (5) on cover (8) with two mounting clamps (23), four new lockwashers (35), and four nuts (36).



5. Connect electrical lead 27 (21) and electrical lead 664 (20) to rear of temperature gage (22).

6. Connect electrical lead 40 (17) to rear of indicator light (19).

7. Connect electrical lead 27 (16) and electrical lead CD (15) to rear of oil level gage (18).

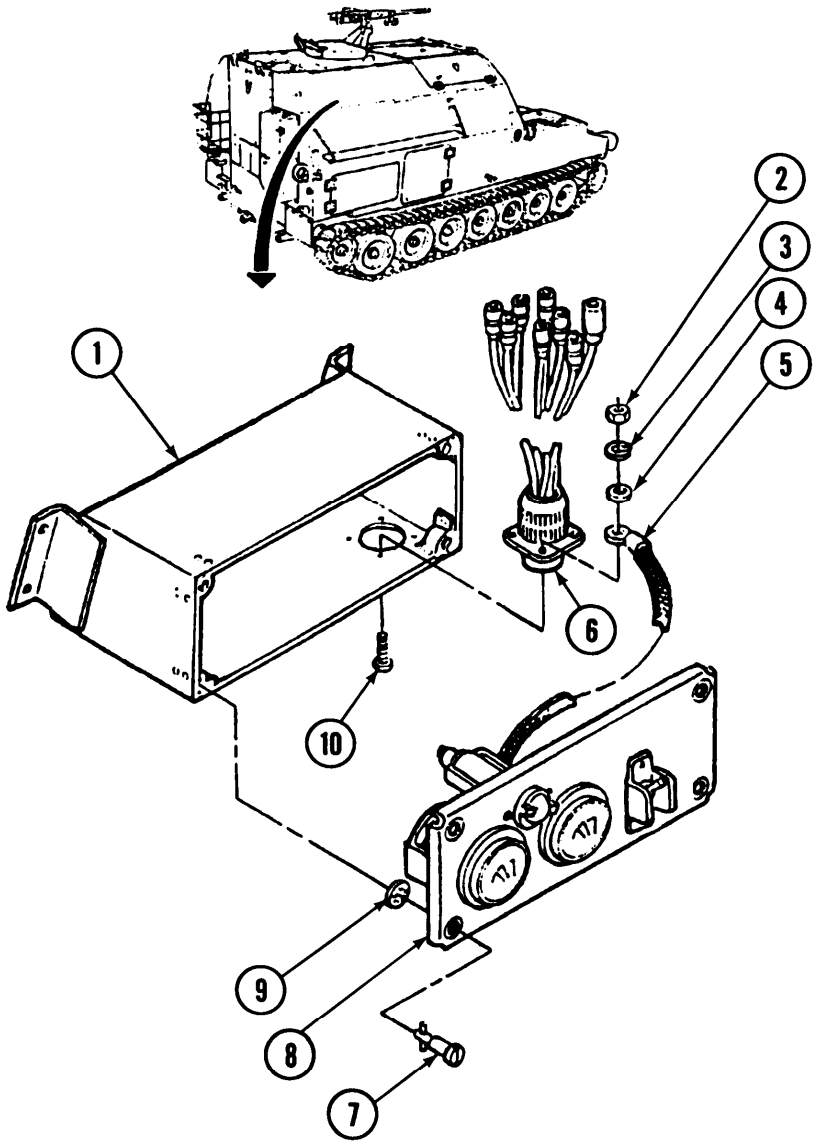
8. Connect electrical lead AAA(11), electrical lead 10(13), and electrical lead AAB (12) to rear of toggle switch (14).

7-16. HYDRAULIC CONTROL GAGE PANEL ASSEMBLY REPAIR (continued).

9. Install wiring harness 12333555 (6), with notch facing opening on body (1), with ground lead (5) and four screws (10), new Iockwashers (3), washers (4), and nuts (2).

10. Install four studs (7) on cover (8) with four new Iockwashers (9).

11. Secure cover (8) on body (1) with four studs (7).



FOLLOW-ON MAINTENANCE:

- Install hydraulic control panel assembly (para 17-28).

7-17. CONVEYOR CONTROL SWITCH REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Lockwasher (2) (Item 160, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).

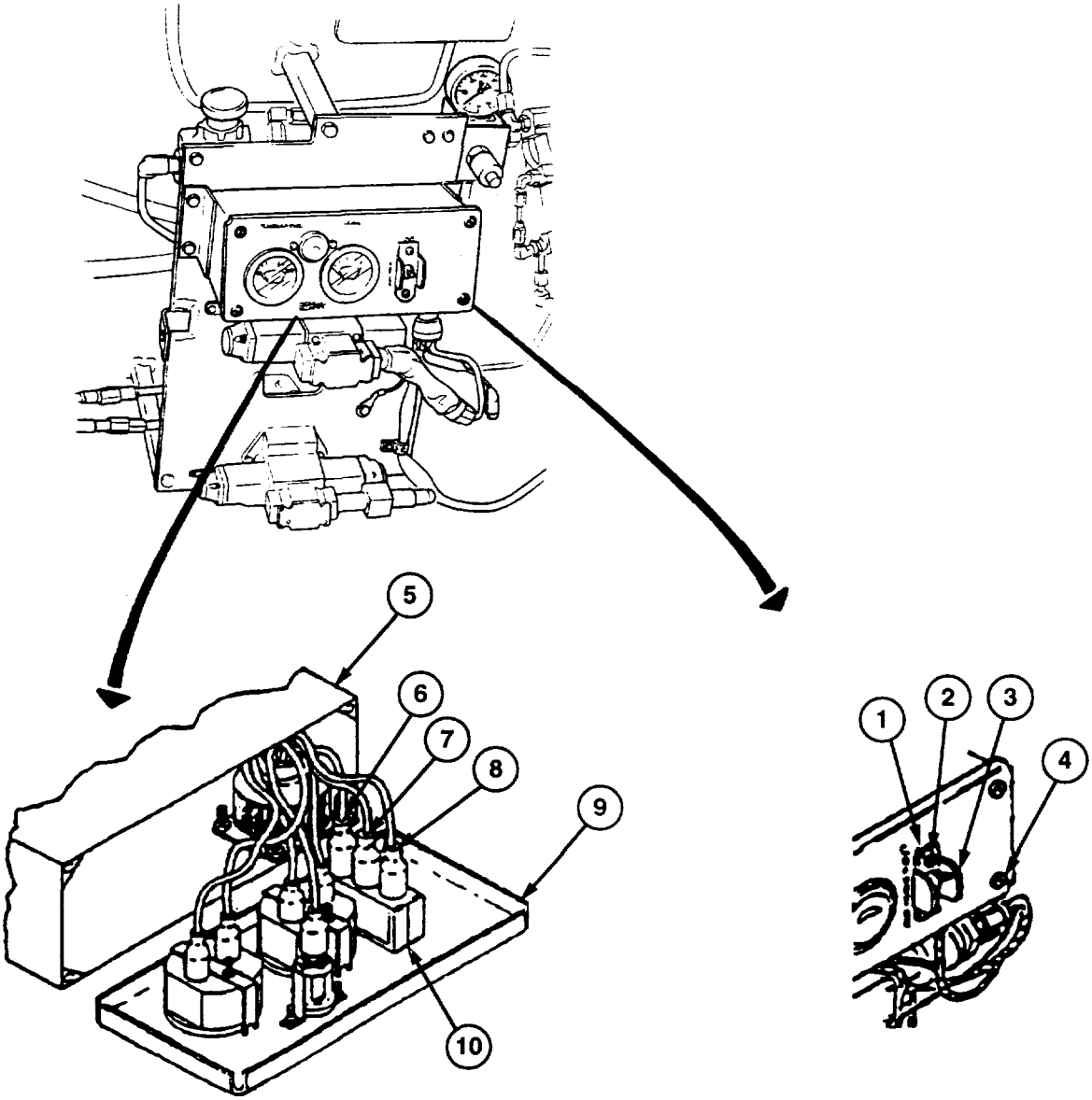
a. REMOVAL

1. Turn four retaining studs (4) on gage panel cover (9).
2. Pull gage panel cover (9) away from gage panel (5).
3. Disconnect electrical connector AAA (6), electrical connector 10 (7), and electrical connector AAB (8) from conveyor control switch (10).
4. Remove two screws (2) and lockwashers (1), switch (10), and guard (3) from gage panel cover (9). Discard lockwashers.

b. INSTALLATION

1. Install guard (3) and switch (10) on gage panel cover (9) with two new lockwashers (1) and screws (2).
2. Connect electrical connector AAB (8), electrical connector 10 (7), and electrical connector AAA (6) to conveyor control switch (10).
3. Position gage panel cover (9) on gage panel (5)$_0$
4. Secure gage panel cover (9) to gage panel (5) with four retaining studs (4).

7-17. CONVEYOR CONTROL SWITCH REPLACEMENT (continued).



FOLLOW-ON MAINTENANCE:

- Connect battery ground cables (para 7-41).

7-18. NBC POWER CONTROL BOX REPAIR.

This Task Covers:

a. Removal
b. Disassembly
c. Inspection
d. Assembly
e. Installation

Initial Setup:

Tools/Test Equipment:
- Electrical connector repair tool kit (Item 16, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)
- Solder Iron (Item 64, Appendix I)

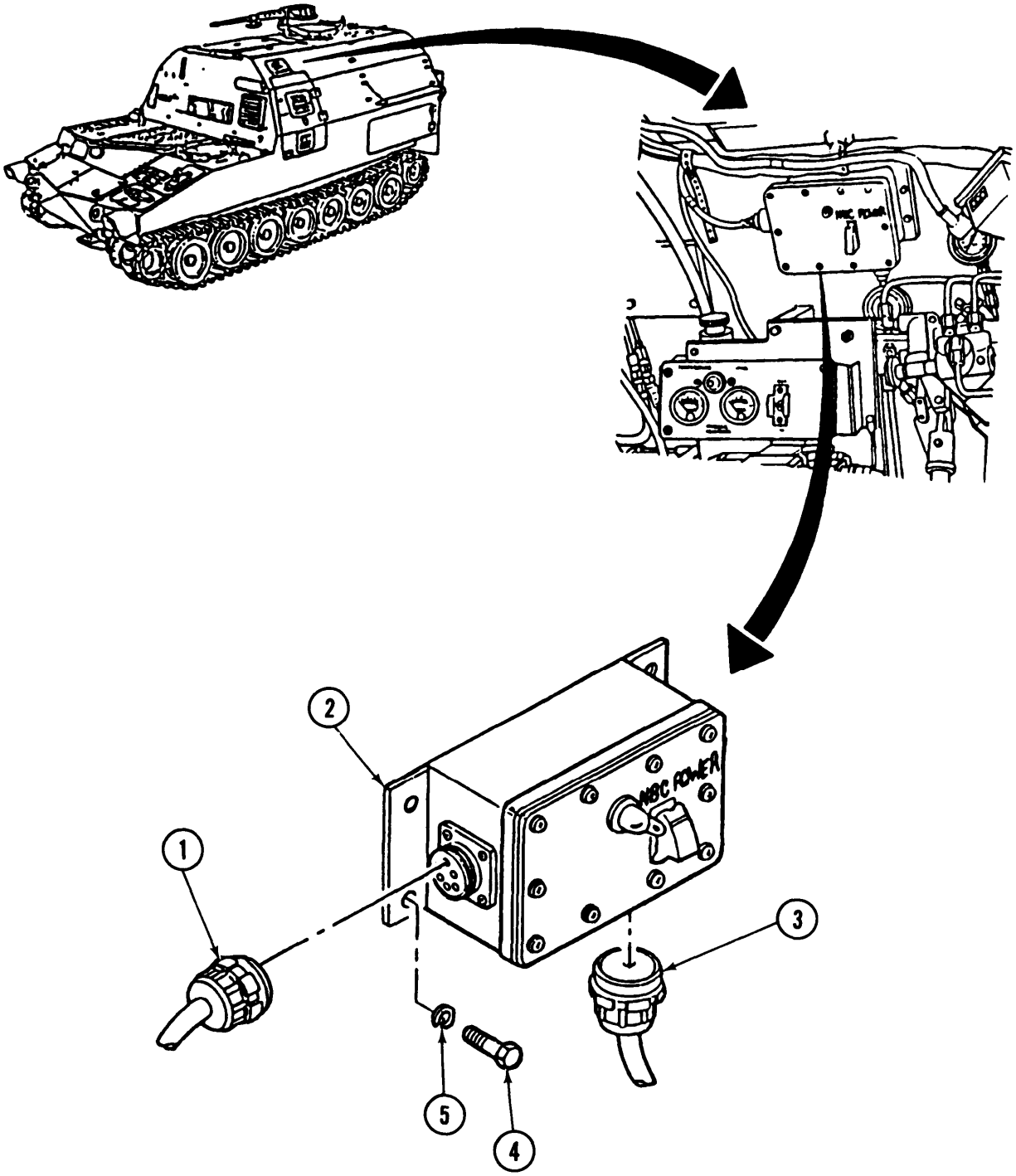
Materials/Parts:
- Enamel, insulating (Item 29, Appendix D)
- Solder (Item 66, Appendix D)
- Gasket (Item 49, Appendix H)
- Gasket (Item 50, Appendix H)
- Lockwasher (4) (Item 121, Appendix H)
- Lockwasher (4) (Item 134, Appendix H)
- Lockwasher (2) (Item 135, Appendix H)
- Lockwasher (4) (Item 136, Appendix H)
- Lockwasher (2) (Item 148, Appendix H)
- Lockwasher (4) (Item 153, Appendix H)
- Lockwasher (16) (Item 161, Appendix H)
- Lockwasher (2) (Item 184, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Upper and lower rear doors opened (refer to TM 9-2350-287-10).
- Master switch set to OFF (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).

a. REMOVAL

1. Disconnect power input harness (3) and NBC harness (1) from NBC power control box (2).
2. Remove four screws (4) and lockwashers (5) and control box (2) from vehicle. Discard lockwashers.

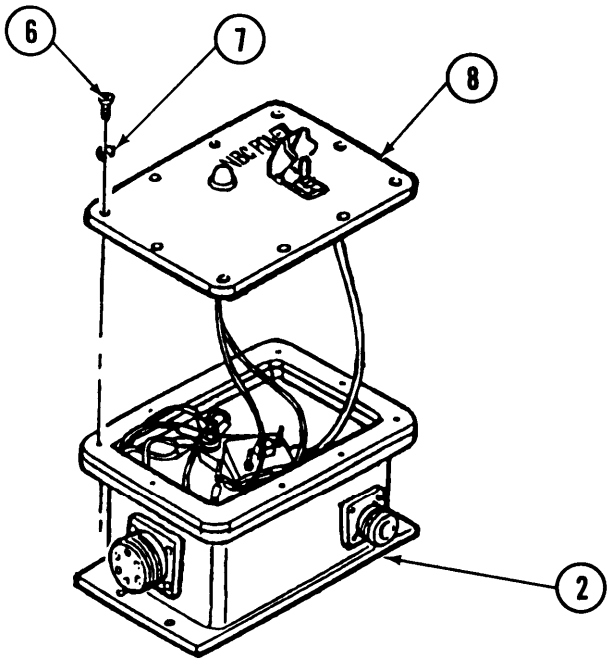
7-18. NBC POWER CONTROL BOX REPAIR (continued).



7-18. NBC POWER CONTROL BOX REPAIR (continued).

b. DISASSEMBLY

1. Remove 10 screws (6) and lockwashers (7) from cover (8) and control box (2). Discard lockwashers.



CAUTION

Use care when removing cover from control box. Damage to wires may result.

NOTE

To ensure proper assembly, make sure all wire leads are tagged before removal.

2. Lift cover (8) off control box (2) and remove two nuts (35 and 38) and lockwashers (36 and 39) from relay (33).

3. Remove two wires (23 and 34), ground wire 415-8 (37), and wire 415-5 (40) from relay (33).

4. Remove nut (9), lockwasher (10), and five wire leads, 415-C (42),415-D (43),415-E (44),415-F (45), and 415-G (46) from relay terminal (41). Discard lockwasher.

5. Remove nut (24), lockwasher (25), and two wires 415-3 (27 and 28) from relay terminal (26), Discard lockwasher.

6. Remove four screws (21) and lockwashers (22) from mounting plate (16) and control box (2).

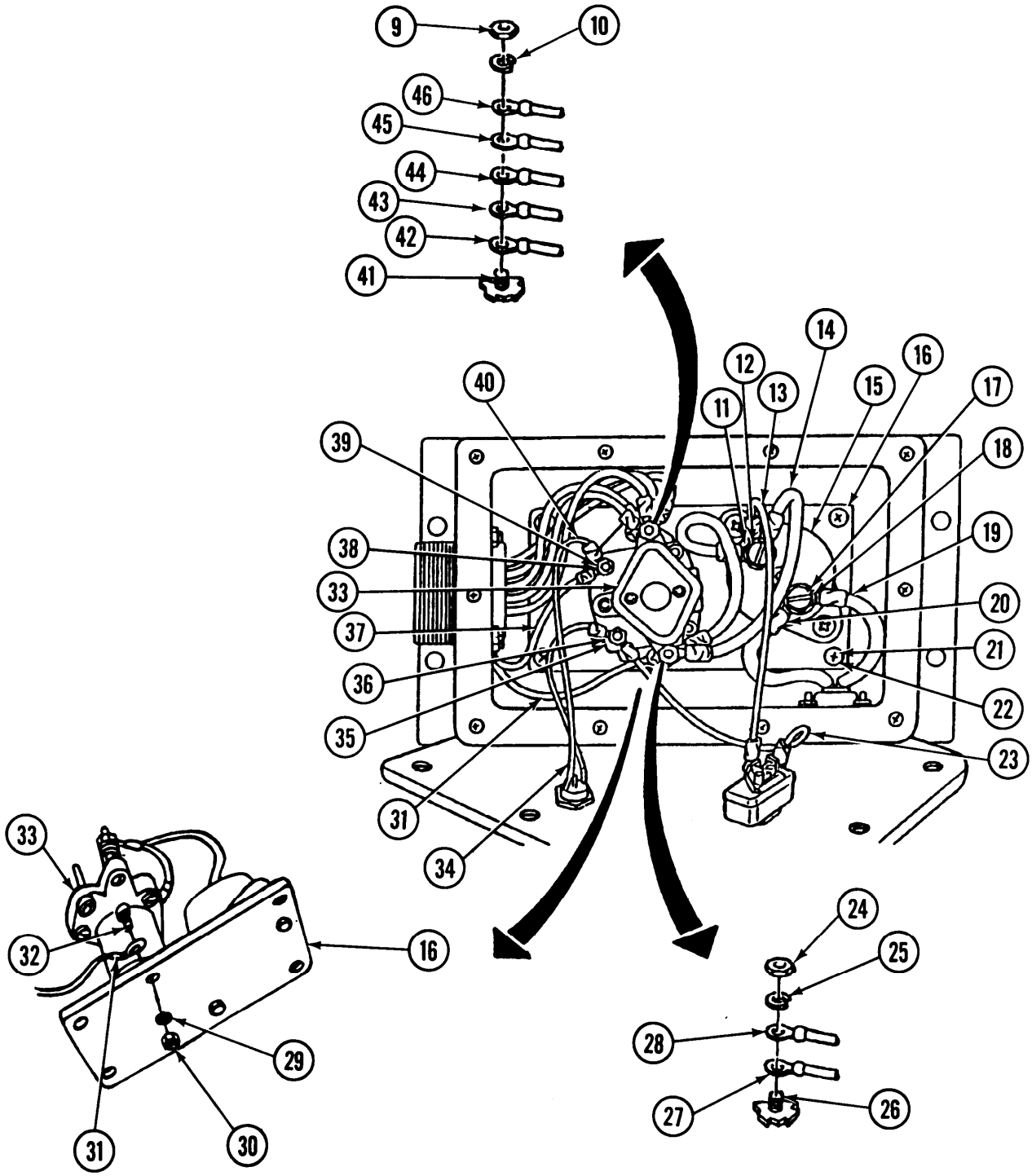
7. Lift mounting plate (16) out of control box (2) to access underside of mounting plate (16).

7-18. NBC POWER CONTROL BOX REPAIR (continued).

8. Remove two mounting screws (32) lockwashers (29), nuts (30), ground wire (31), and relay (33) from mounting plate (16). Discard lockwashers.

9. Remove screw (18), lockwasher (17), two wires 415-1 and 415-2 (19 and 20), and lockwasher (17) from circuit breaker (15). Discard lockwashers.

10. Remove screw (12), lockwasher (11), wire 415-4(13) and two wires 415-3 (27 and 28), and lockwasher (11) from circuit breaker (15). Discard lockwashers.



7-18. NBC POWER CONTROL BOX REPAIR (continued).

11. Remove two screws (54), lockwashers (53), and two leads 415-4 (13) and 415-7 (21) from switch (52).

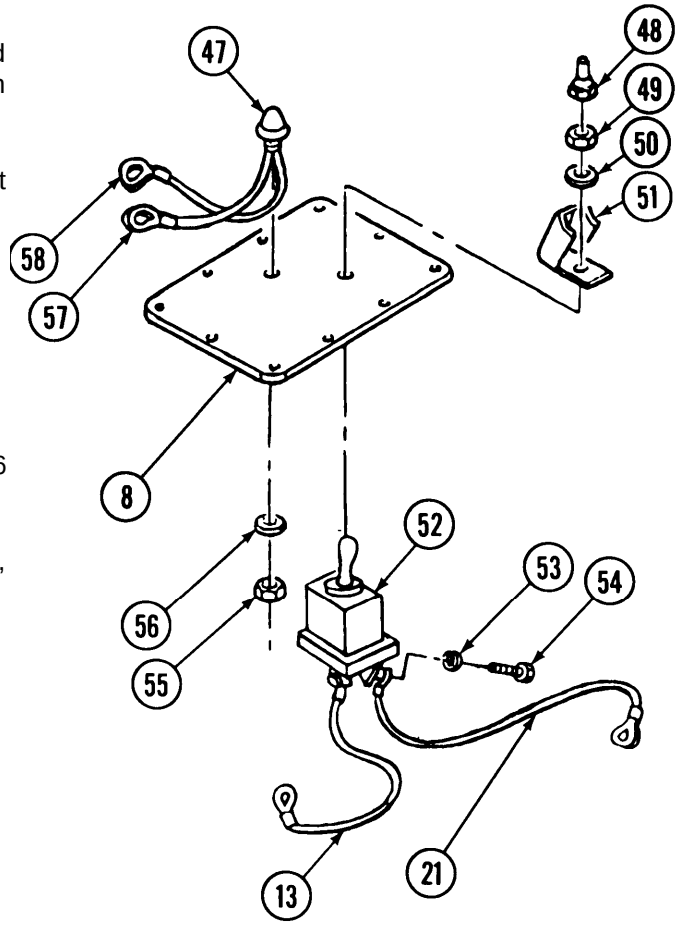
12. Remove nut (55), washer (56), and indicator light (47) from cover (8).

NOTE

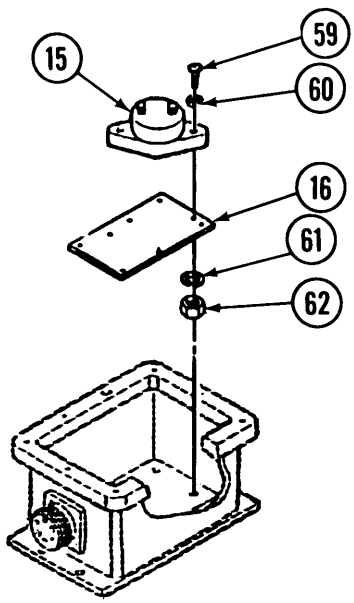
Perform step 13 only if indicator light or leads 415-5 or 415-6 are defective.

13. Unsolder and remove leads 415-5 (57) and 415-6 (58) from indicator light (47).

14. Remove dust boot (48), nut (49), washer (50), switch (52), and guard (51) from cover (8).



15. Remove two screws (59) washers (60), lockwashers (61), nuts (62) and circuit breaker (15) from mounting plate (16). Discard lockwashers.



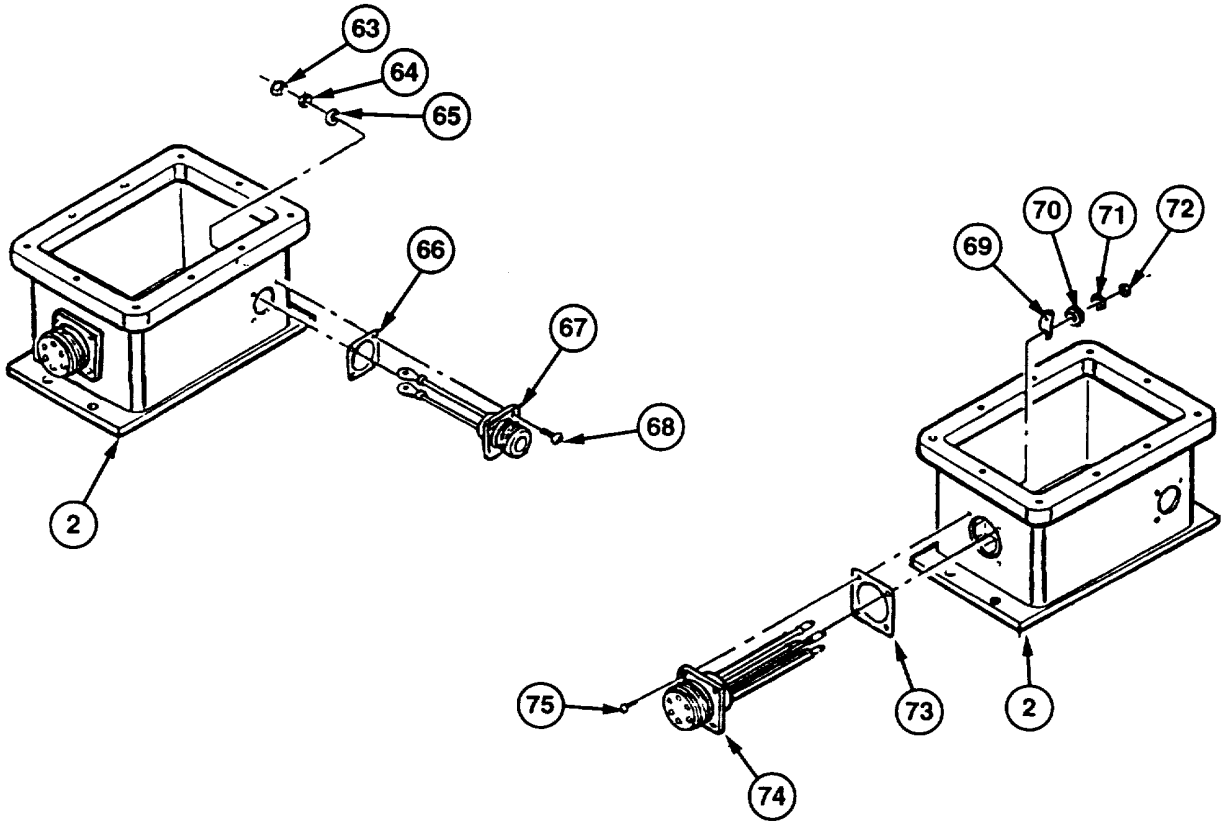
7-18. NBC POWER CONTROL BOX REPAIR (continued).

NOTE

Connectors J1 and J2 are removed with soldered wires intact.

16. Remove four screws (68), washers (65), lockwashers (64), and nuts (63), gasket (66), and connector J1 (67) from control box (2). Discard gasket and lockwashers.

17. Remove four screws (75), washers (70), lockwashers (71), and nuts (72), terminal lug (69), gasket (73), and connector J2 (74) from control box (2). Discard gasket and lockwashers.



c. INSPECTION

1. Inspect all leads for cracked insulation and broken or missing terminal lugs. Replace any damaged or defective leads.

2. Inspect connectors J1 (67) and J2 (74) for cracks, damaged threads, and missing pins, sockets, or terminal lugs. Replace any damaged components.

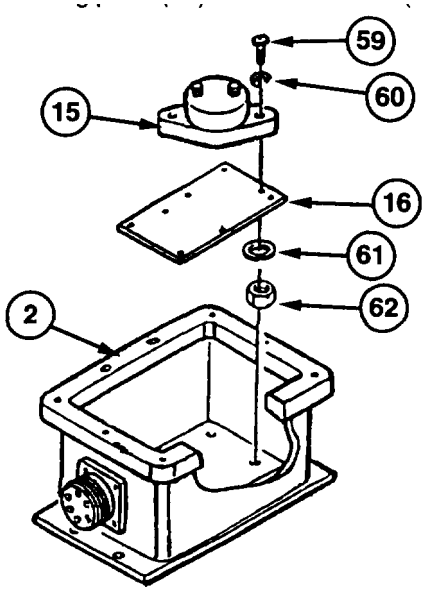
d. ASSEMBLY

1. Install connector J2 (74), new gasket (73), and terminal lug (69) on control box (2) with four screws (75), washers (70), new lockwashers (71), and nuts (72).

2. Install connector J1 (67) and new gasket (66) on control box (2) with four screws (68), washers (65), new lockwashers (64), and nuts (72).

7-18. NBC POWER CONTROL BOX REPAIR (continued).

3. Install circuit breaker (15) on mounting plate (16) with two screws (59), washers (60), new lockwashers (61), and nuts (62).



4. Install switch (52) and guard (51) on cover (8) and secure with nut (49) and washer (50).

5. Install dust boot (48) on switch (52).

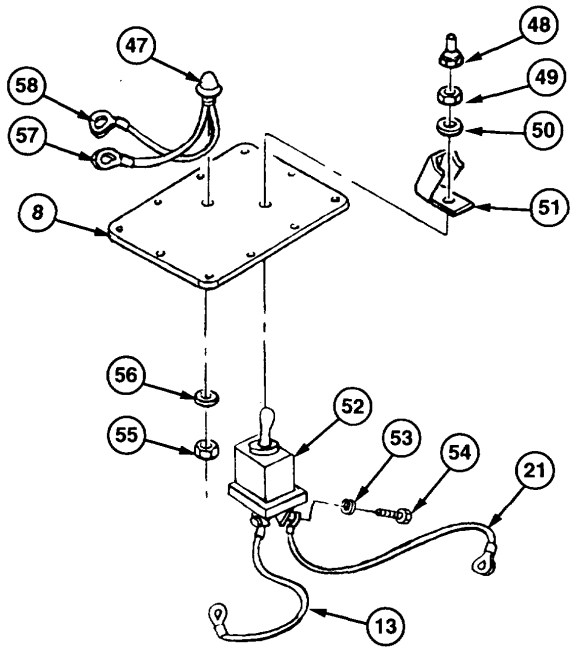
6. Install two leads, 415-4 (13) and 415-7 (21), on switch (52) and secure with two screws (54) and lockwashers (53).

NOTE

Perform step 7 only if leads 415-5 or 415-6 were removed from indicator light.

7. Solder leads 415-5 (57) and 415-6 (58) to terminal on indicator light (47).

8. Install indicator light (47) on cover (8) with nut (55) and washer (56).



7-18. NBC POWER CONTROL BOX REPAIR (continued).

9. Install 415-4 (13) and two wires 415-3 (27 and 28), new lockwasher (11) on circuit breaker (15) with screw (12) and new lockwasher (11).

10. Install wires 415-1 (19) and 415-2 (20) and new lockwasher (17) on circuit breaker (15) with screw (18) and new lockwasher (17).

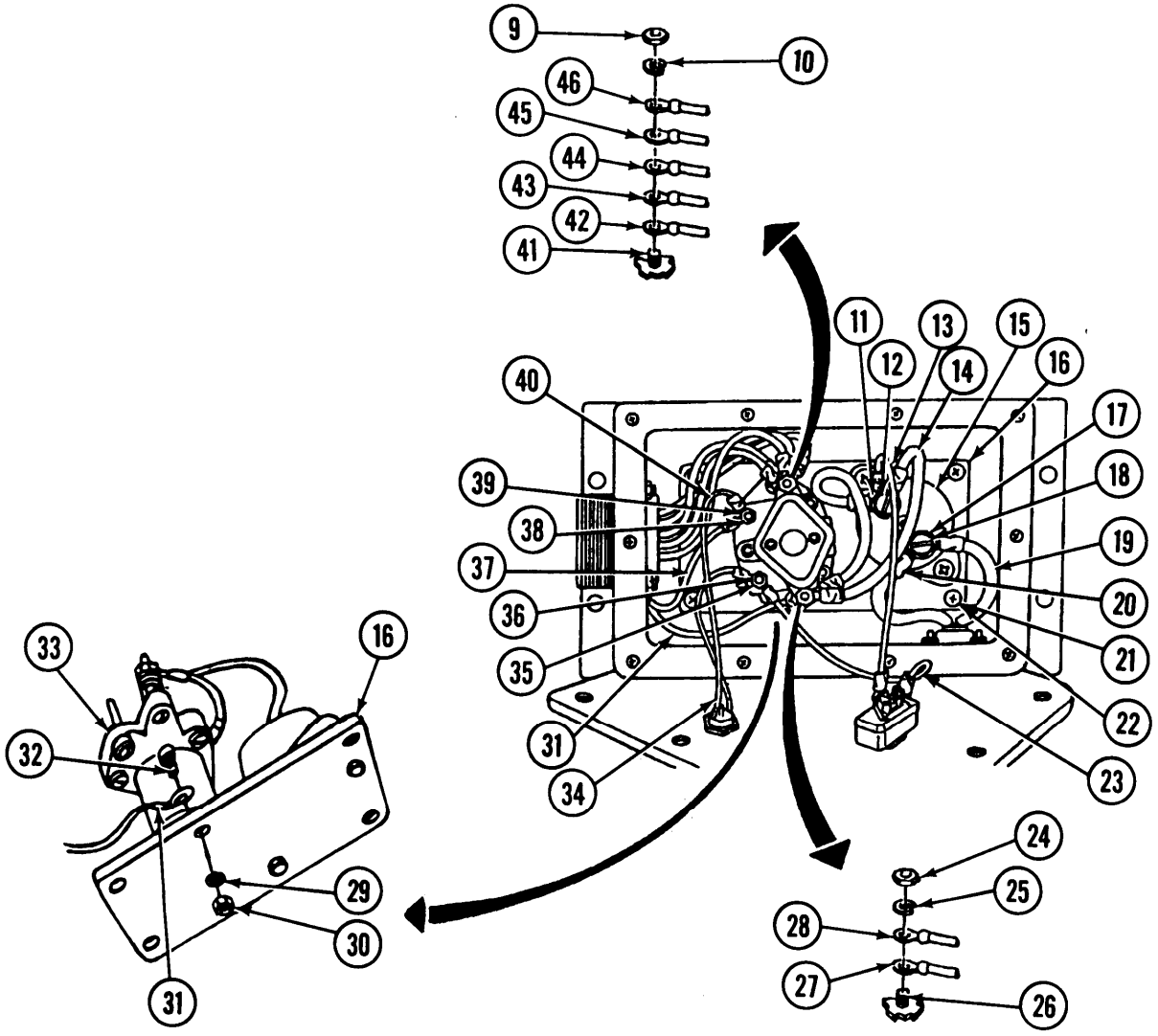
11. Install relay (33) and ground wire (31) on mounting plate (16) with two mounting screws (32) and new lockwashers (29) and nuts (30).

12. Install mounting plate (16) into control box (2) with four screws (21) and four new lockwashers (22).

13. Install two wires 415-3 (27 and 28) terminal (26) and secure with nut (24) and new lockwasher (25).

14. Install five wire leads 415-C (42), 415-D (43), 415-E (44), 415-F (45), and 415-G (46) on relay terminal (41) with nut (9) and new lockwasher (10).

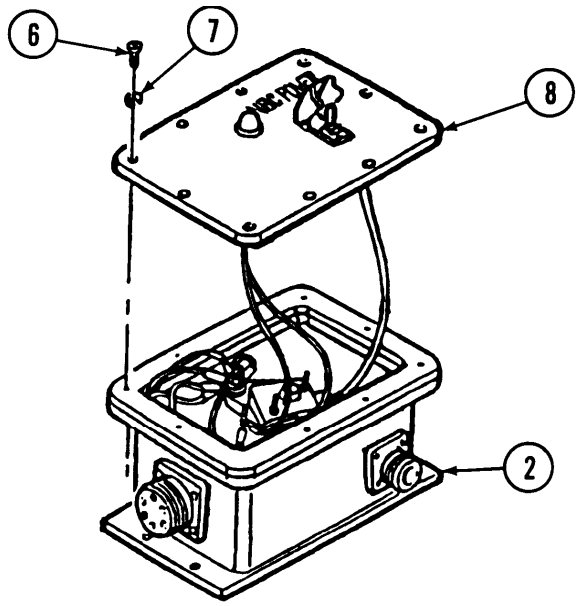
15. Install two wires 415-7 (23) and 415-6 (34), ground wire, 415-8 (37), and wire 415-5 (40) on relay (33) with two nuts (35 and 38) and two new lockwashers (36 and 39).

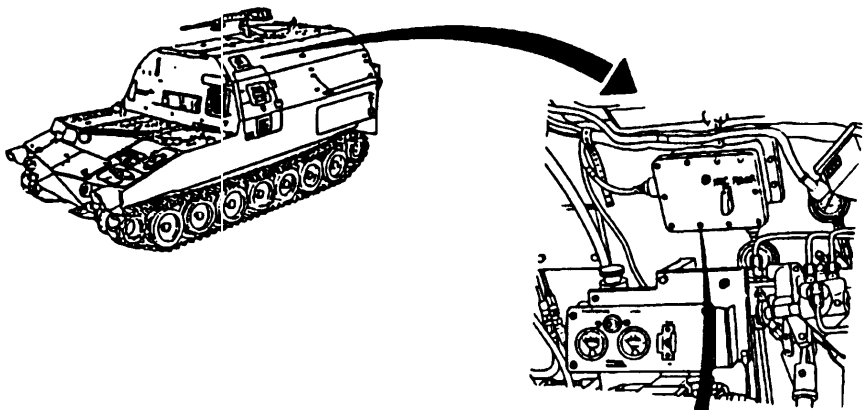


7-18. NBC POWER CONTROL BOX REPAIR (continued).

16. Apply coat of insulating enamel to all electrical connections.

17. Install cover (8) on control box (2) with 10 screws (6) and new lockwashers (7).

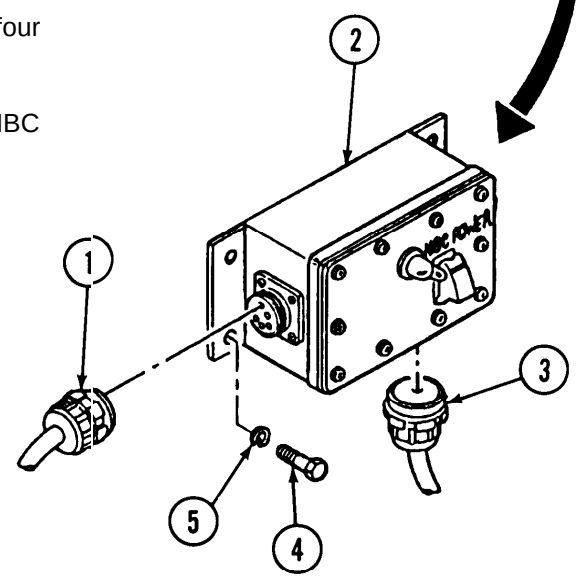




e. INSTALLATION

1. Install control box (2) in vehicle with four screws (4) and new lockwashers (5).

2. Install power input harness (3) and NBC harness (1) on control box (2).



FOLLOW-ON MAINTENANCE:
- Connect battery ground cables (para 7-41).
- Close upper and lower rear doors (refer to TM 9-2350-287-10).

7-19. STE/ICE RESISTOR BOX REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Lockwasher (4) (Item 196, Appendix H)

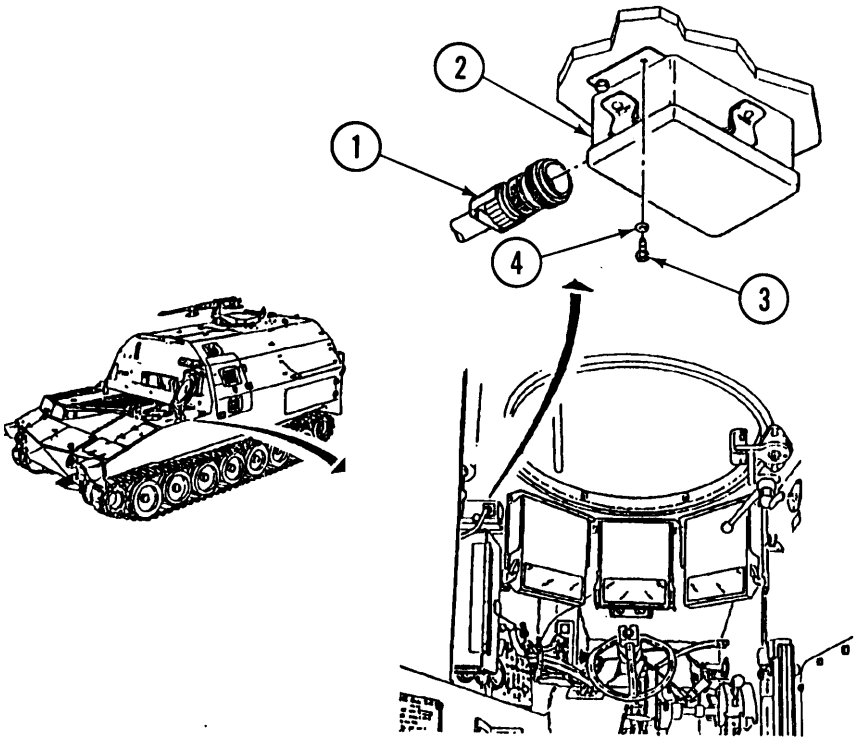
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Driver's hatch cover opened and secured (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).

a. REMOVAL

1. Disconnect STE/ICE control cable (1) from STE/ICE resistor box (2).
2. Remove four screws (3) and lockwashers (4) and STE/ICE resistor box (2) from driver's compartment bulkhead. Discard lockwashers.

b. INSTALLATION

1. Install STE/ICE resistor box (2) on driver's compartment bulkhead with four screws (3) and new lockwashers (4).
2. Connect STE/ICE controllable (1) to STE/ICE resistor box (2)



FOLLOW-ON MAINTENANCE:
- Connect battery ground cables (para 7-41).
- Close driver's hatch cover (refer to TM 9-2350-287-10).

7-20. HEADLIGHT DIMMER, STOPLIGHT AND PARKING BRAKE LIGHT SWITCHES REPLACEMENT AND ADJUSTMENT.

This Task Covers:

a. Removal
b. Parking Broke Light Switch Disassembly
c. Parking Brake Light Switch Assembly
d. Installation
e. Stoplight Control Switch Adjustment
f. Parking Brake Light Switch Adjustment

Initial Setup:

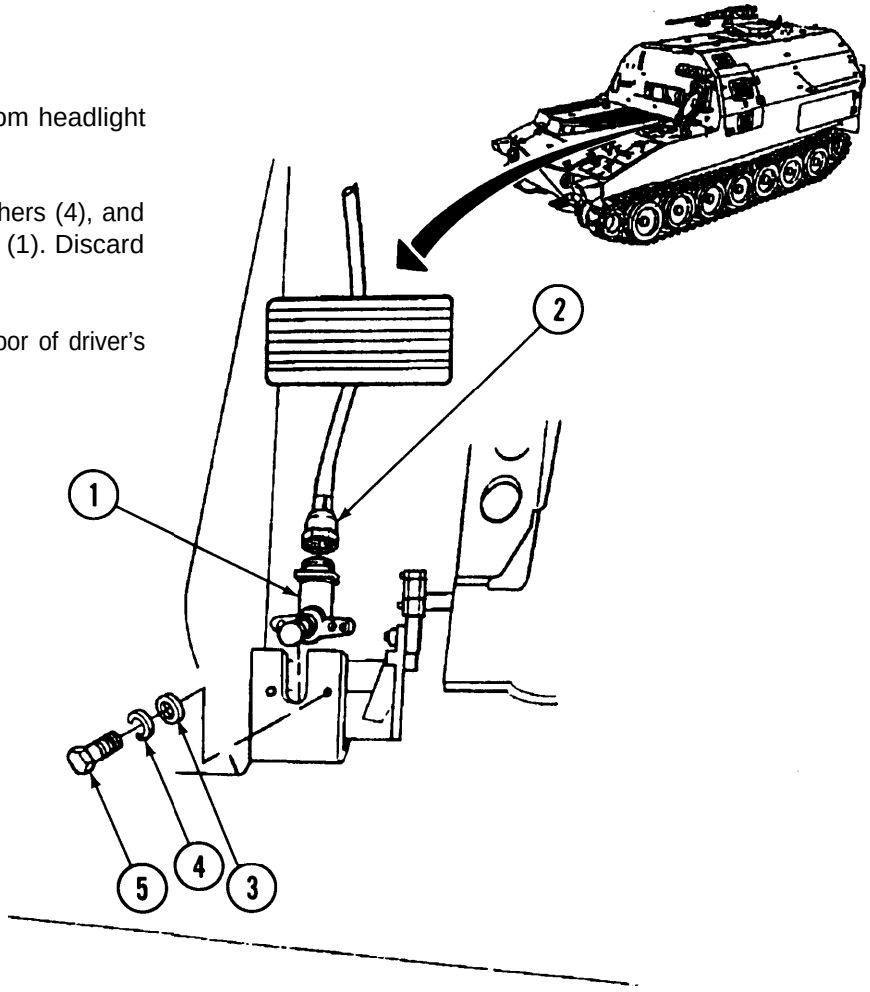
Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Lockwasher (item 140, Appendix H)
- Lockwasher (6) (Item 175, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-23050-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).
- Service and parking brake linkage removed (para 10-2).

a. REMOVAL

1. Disconnect electrical plug (2) from headlight dimmer switch (1).
2. Remove two screws (5), lockwashers (4), and washers (3) from dimmer switch (1). Discard lockwashers.
3. Remove dimmerswitch (1) from floor of driver's compartment.

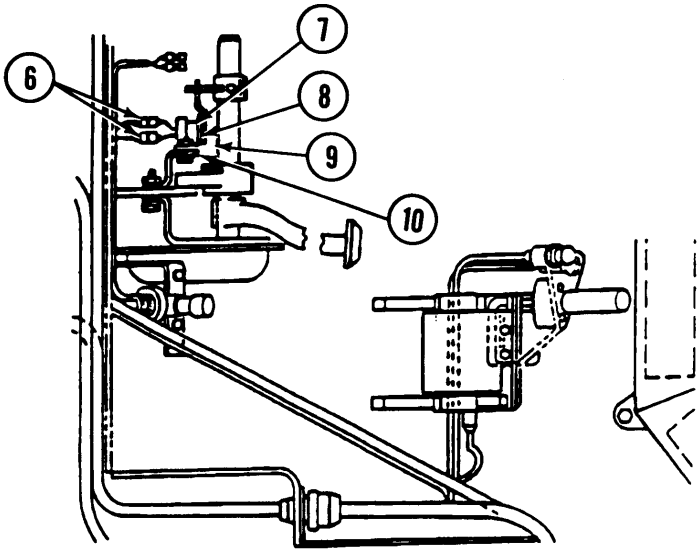


7-20. HEADLIGHT DIMMER, STOPLIGHT AND PARKING BRAKE LIGHT SWITCHES REPLACEMENT AND ADJUSTMENT (continued).

4. Disconnect two electrical connectors (6) from stoplight control switch (7).

5. Remove two screws (9) and lockwashers (8) from stoplight control switch (7).

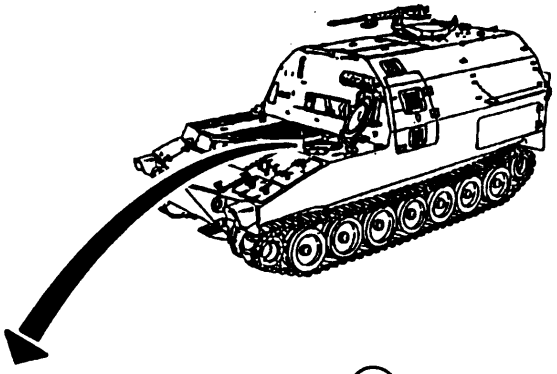
6. Remove stoplight control switch (7) from bracket (10).

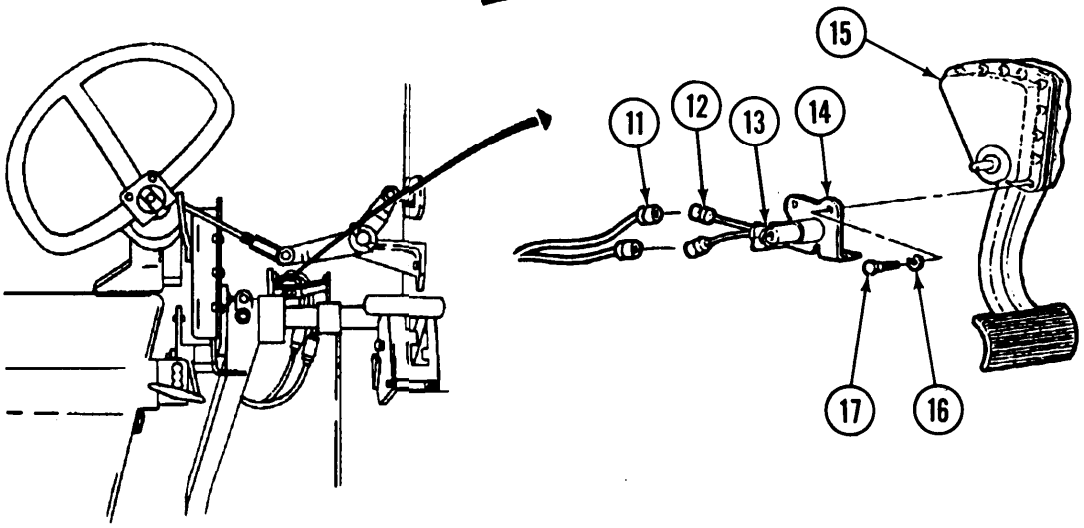


7. Disconnect two electrical connectors (11) from two electrical connectors (12) of parking brake light switch (13).

8. Remove two screws (17) and lockwashers (16) from bracket (14) and brake assembly (15). Discard lockwashers.

9. Remove bracket (14) and parking brake light switch (13) from brake assembly (15).





7-20. HEADLIGHT DIMMER, STOPLIGHT AND PARKING BRAKE LIGHT SWITCHES REPLACEMENT AND ADJUSTMENT (continued).

b. PARKING BRAKE LIGHT SWITCH DISASSEMBLY

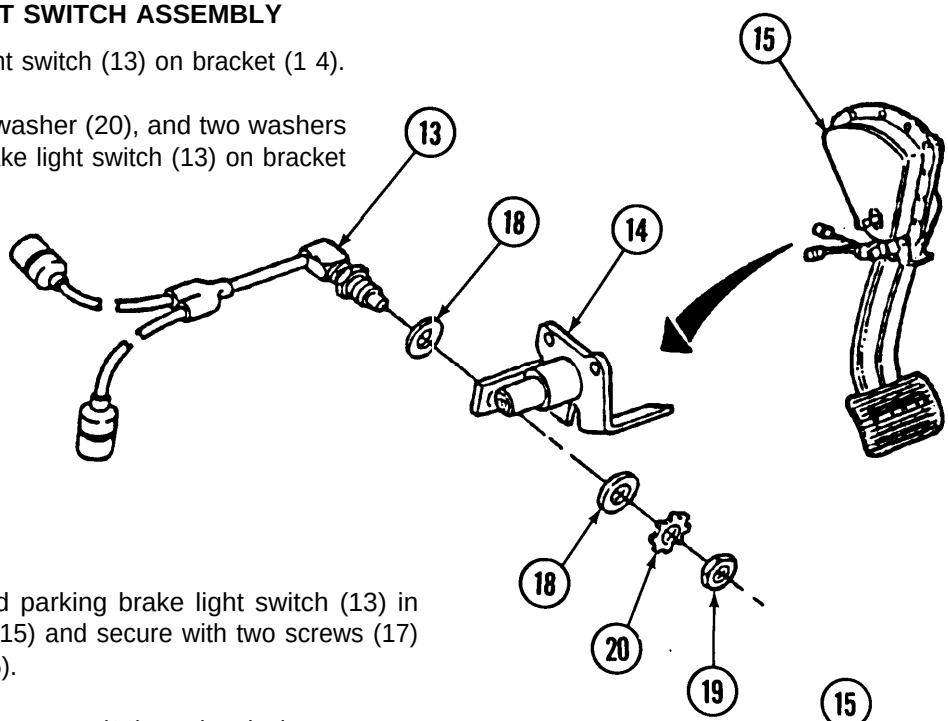
1. Unscrew nut (19), lockwasher (20), and two washers (18) from parking brake light switch (13). Discard lockwasher.

2. Separate parking brake light switch (13) and bracket (14).

c. PARKING BRAKE LIGHT SWITCH ASSEMBLY

1. Position parking brake light switch (13) on bracket (1 4).

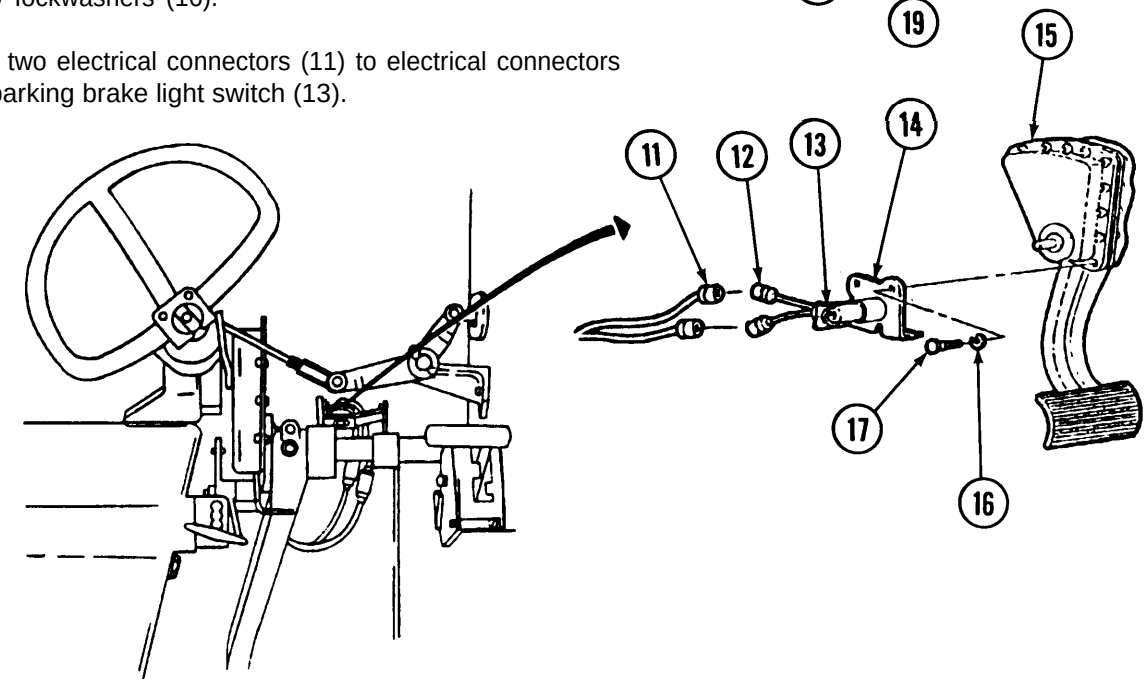
2. Install nut (19), new lockwasher (20), and two washers (18) to secure parking brake light switch (13) on bracket (14).



d. INSTALLATION

1. Position bracket (14) and parking brake light switch (13) in place in brake assembly (15) and secure with two screws (17) and new lockwasher (16).

2. Connect two electrical connectors (11) to electrical connectors (12) of parking brake light switch (13).



7-20. HEADLIGHT DIMMER, STOPLIGHT AND PARKING BRAKE LIGHT SWITCHES REPLACEMENT AND ADJUSTMENT (continued).

3. Install stoplight control switch (7) on bracket (10).

4. Install two screws (9) and lockwashers (8) on stoplight control switch (7).

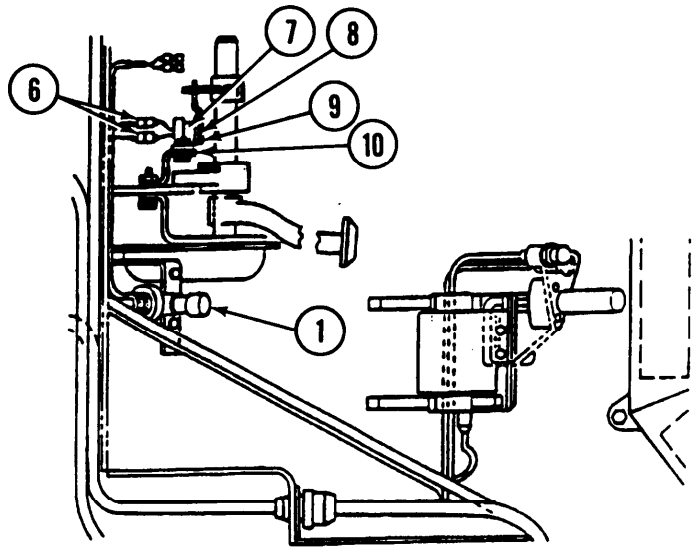
5. Connect two electrical connectors (6) to stoplight control switch (7).

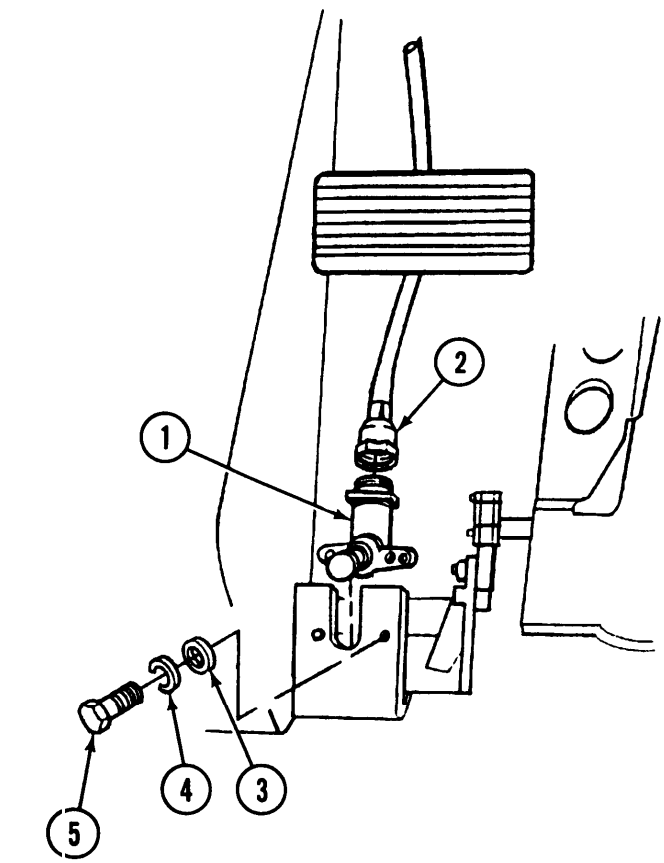
6. Install dimmer switch (1) on floor of driver's compartment.

7. Install two screws (5), new lockwashers (4), and washers (3) on dimmer switch (1).

8. Connect electrical plug (2) to dimmer switch (1).

9. Install service and parking brake linkage 10-2).





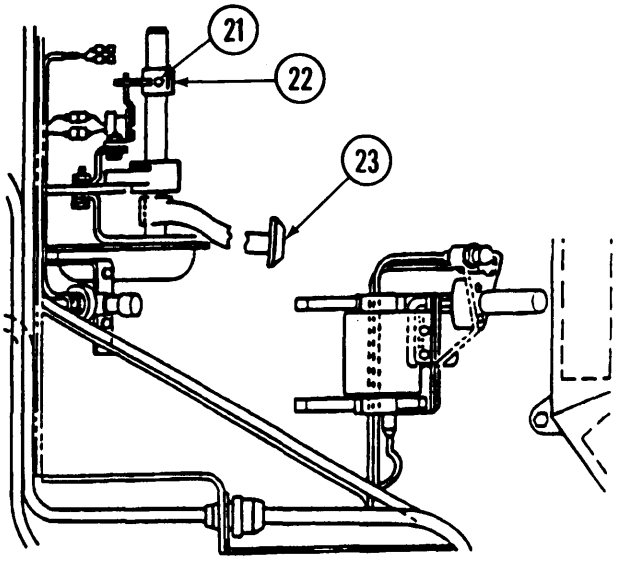
7-20. HEADLIGHT DIMMER, STOPLIGHT AND PARKING BRAKE LIGHT SWITCHES REPLACEMENT AND ADJUSTMENT (continued).

e. STOPLIGHT CONTROL SWITCH ADJUSTMENT

NOTE

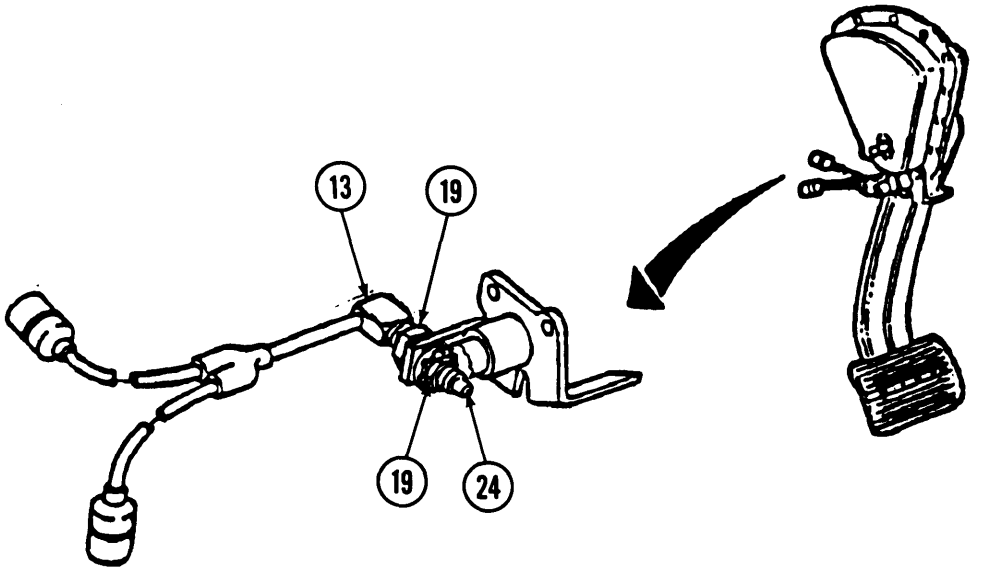
The headlight dimmer switch is not adjustable.

1. Loosen setscrew (21).
2. Slide actuator (22) right or left so stoplights are on when brake pedal (23) is depressed approximately 3/4 inch.
3. Tighten setscrew (21).



f. PARKING BRAKE LIGHT SWITCH ADJUSTMENT

1. Release parking brake (refer to TM 9-2350-287-10).
2. Loosen two nuts (19) and push parking brake light switch (13) toward parking brake linkage until button (24) is completely depressed.
3. While holding parking brake light switch (13) in place, tighten two nuts (19).



FOLLOW-ON MAINTENANCE:

- Install service and parking brake linkage (para 10-2).
- Connect battery ground cables (para 7-41).

7-21. MASTER RELAY BOX REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Lockwasher (2) (Item 130, Appendix H)

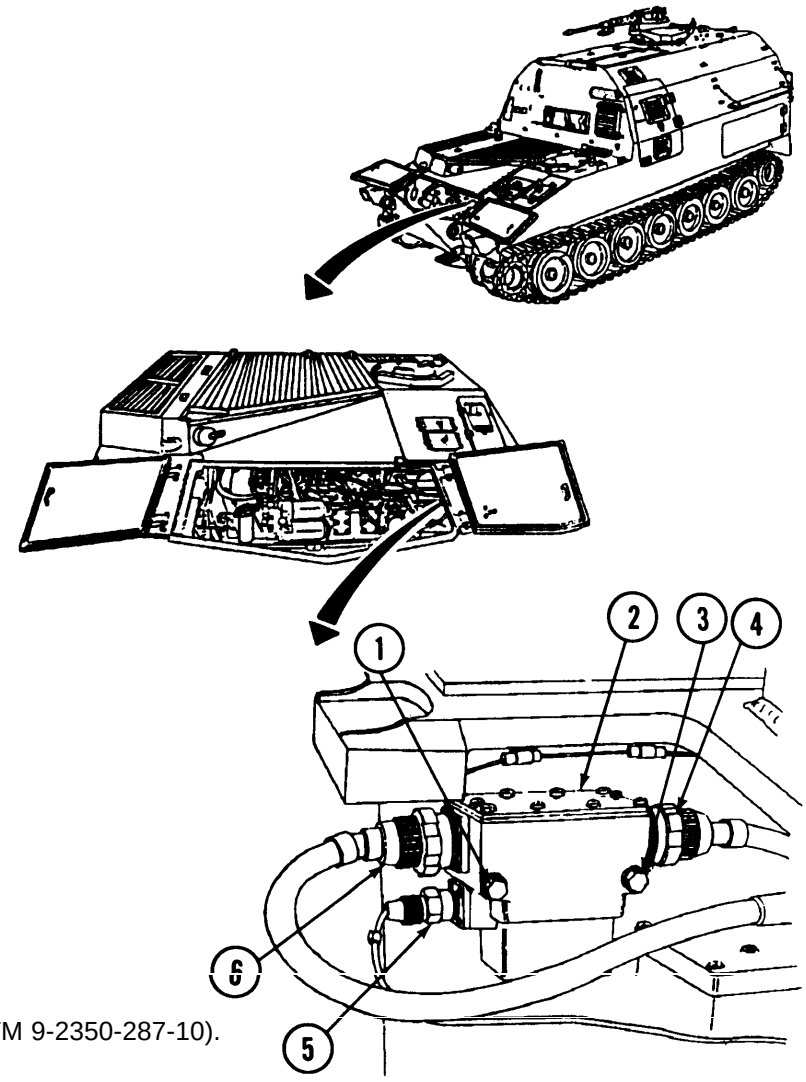
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Transmission access door opened (refer to TM 9-2350-287-10).
- Battery ground leads disconnected (para 7-41).

a. REMOVAL

1. Disconnect cable 82 (6), master switch cable 459 (5), and battery cable 81 (4) from master relay box (2).
2. Remove two screws (1) and lockwashers (3) and master relay box (2) from hull. Discard lockwashers.

b. INSTALLATION

1. Install master relay box (2) on hull with two new lockwashers (3) and two screws (1).
2. Connect cable 82 (6), master switch cable 459 (5), and battery cable 81 (4) to master relay box (2).



FOLLOW-ON MAINTENANCE:
- Connect battery ground cables (para 7-41).
- Close transmission access doors (refer to TM 9-2350-287-10).

7-22. APU CONTROL BOX REPAIR.

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

Initial/Setup

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- Lockwasher (12) (Item 196, Appendix H)
- Lockwasher (14) (Item 160, Appendix H)
- Lockwasher (2) (Item 161, Appendix H)
- Lockwasher (6) (Item 171, Appendix H)

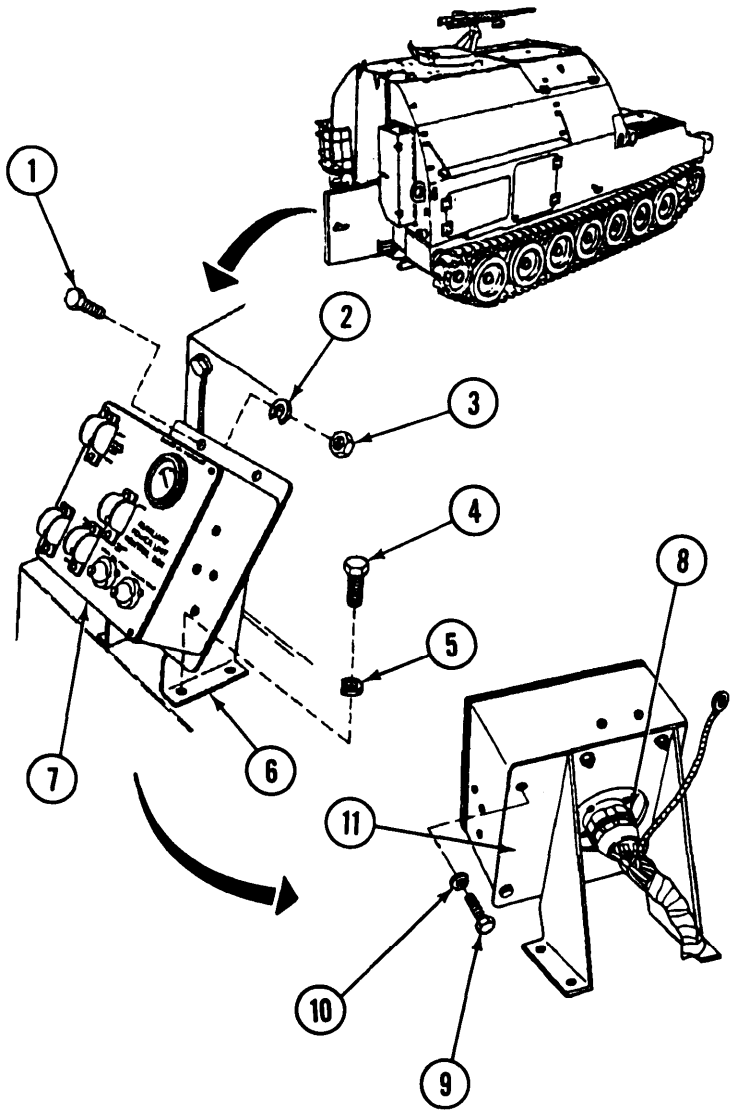
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).
- M2A2 air purifier removed (para 22-2).

a. REMOVAL

1. Remove four screws (4) and lockwashers (5) and bracket (6), with APU control box (7) attached, from vehicle. Discard lockwashers.
2. Disconnect electrical wiring harness connector (8) from APU control box (7) and remove APU control box (7) from vehicle.
3. Remove four screws (1), lockwashers (2), and nuts (3) and APU control box (7) from bracket (6). Discard lockwashers.

b. DISASSEMBLY

1. Remove four screws (9), lockwashers (10), and rear panel (11) from APU control box (7). Discard lockwashers.



7-22. APU CONTROL BOX REPAIR (continued).

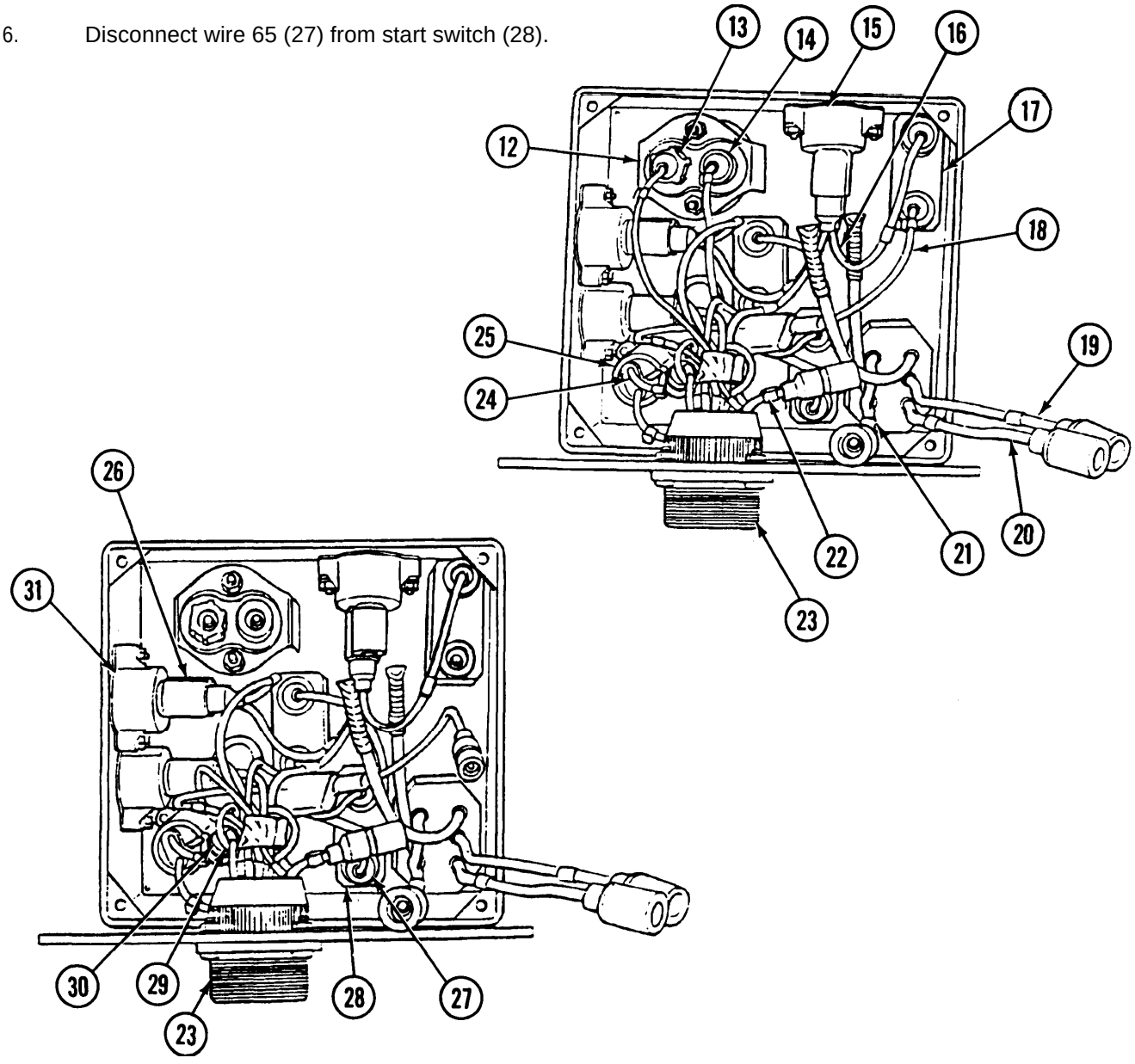
2. Disconnect ground wire (21), wire 61A (22) and wire 61 (19) from wiring harness connector (23).

3. Disconnect wire 420 (13) and wire 420 B (14) from oil pressure gage (12).

4. Disconnect wire 419 (16) from circuit breaker (15).

5. Disconnect wire 421 (18) from fuel shutoff switch (17).

6. Disconnect wire 65 (27) from start switch (28).



7. Disconnect plug (29) with wires 420 and 27 attached, from low oil pressure indicator (30).

8. Disconnect plug (24) with wires 493 and 27 attached, from high air temperature indicator (25).

9. Disconnect wire 487 (26) from circuit breaker (31).

7-22. APU CONTROL BOX REPAIR (continued).

10. Disconnect wire 65A (37) from circuit breaker (32).

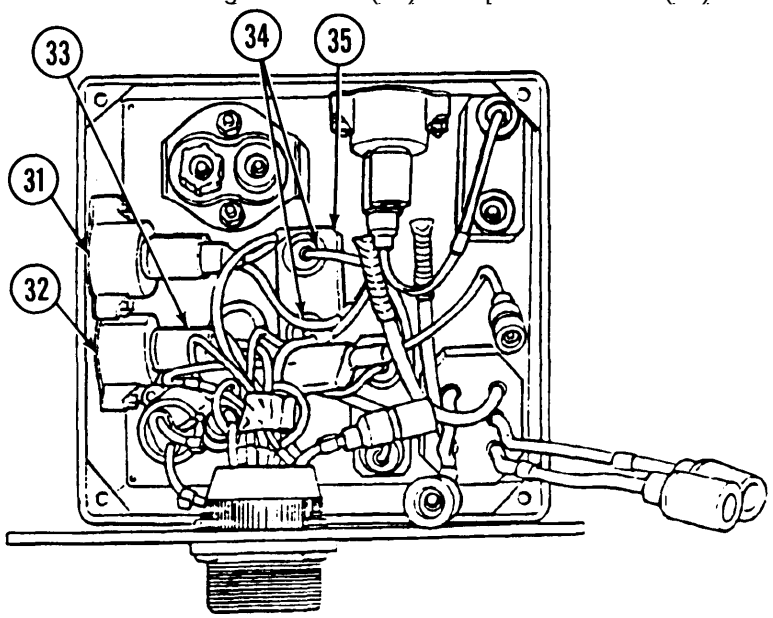
11. Remove four screws (39), washers (47), lockwashers (48), and nuts (46) and wiring harness connector (23) from rear panel (11). Discard lockwashers.

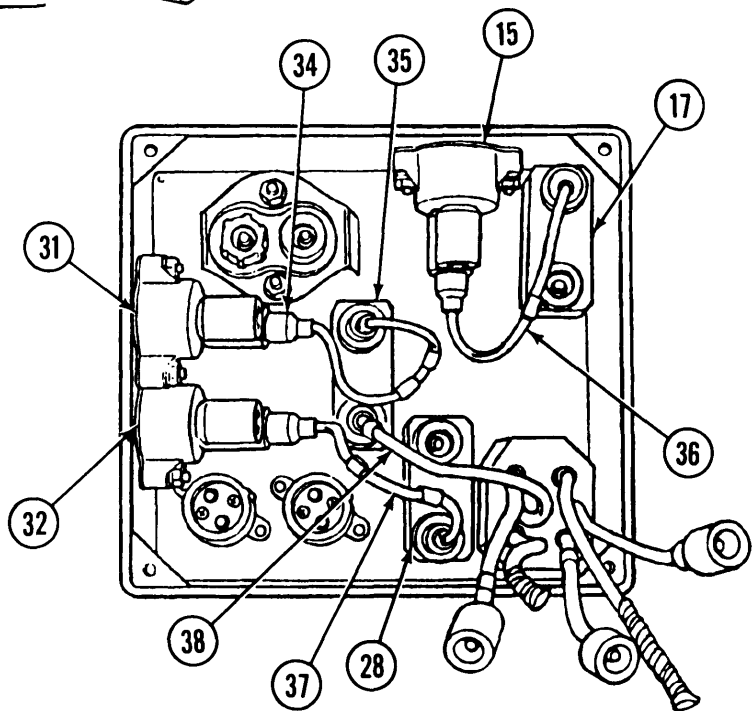
12. Disconnect wire 419 (36) from circuit breaker (15) and fuel shutoff switch (17).

13. Disconnect wire 65A (37) from start switch (28).

14. Disconnect wire 487A (34) from preheat switch (35) and circuit breaker (31).

15. Disconnect ground wire (38) from preheat switch (35).





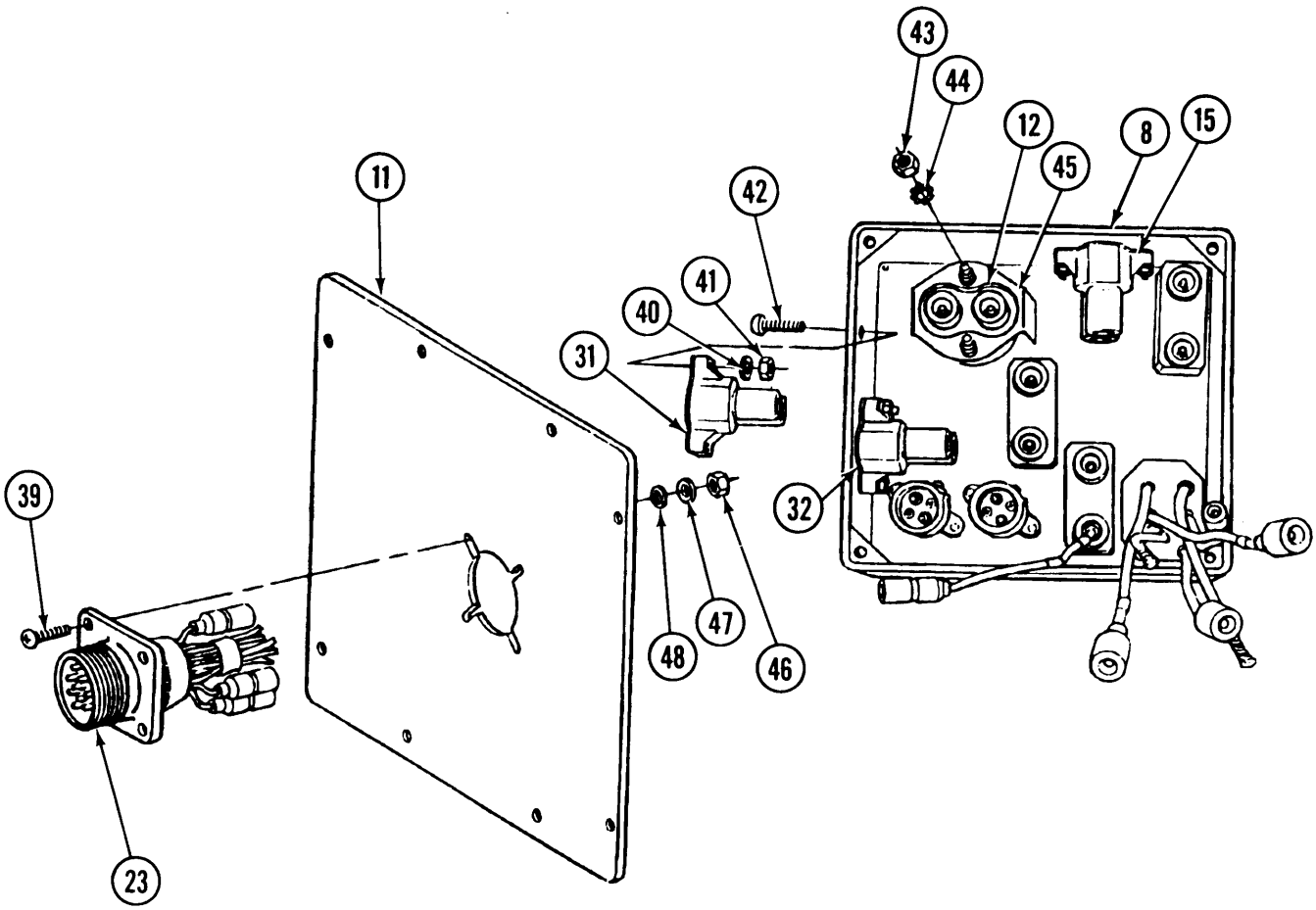
7-22. APU CONTROL BOX REPAIR (continued).

16. Remove two screws (42), lockwashers (40), and nuts (41) from each of three circuit breakers(15, 31 and 32). Discard lockwashers.

17. Remove three circuit breakers (15, 31 and 32) from control box (8).

18. Remove two nuts (43) and lockwashers (44) from rear of ENGINE OIL PRESSure gage (12). Discard lockwashers.

19. Remove gage bracket (45) and ENGINE OIL PRESSure gage (12) from control box (8).



7-22. APU CONTROL BOX REPAIR (continued).

20. Remove eight screws (52) and Iockwashers (51), and four guards (50) from FUEL SHUTOFF switch(17), APU GENerator switch (57), PREHEAT switch (35), and START switch (28). Discard Iockwashers.

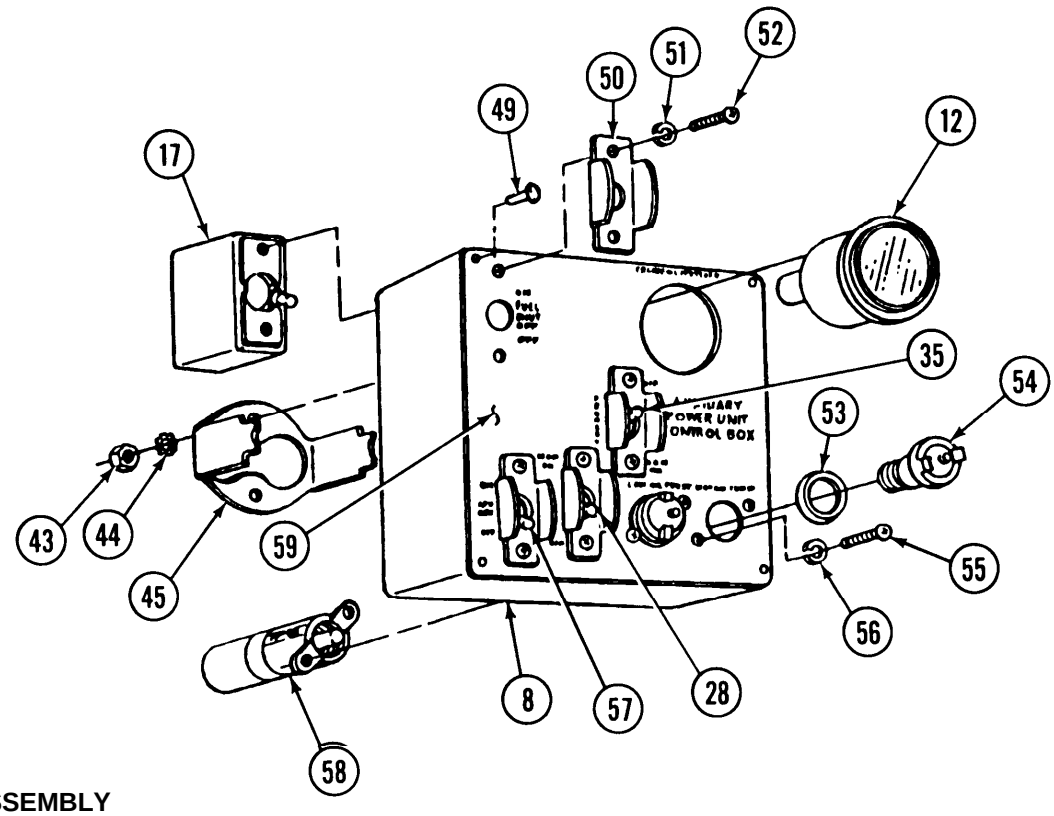
21. Remove FUEL SHUTOFF switch (17), APU Generator switch (57), PREHEAT switch (35), and START switch (28) from control box (8).

22. Remove two screws (55) and Iockwashers (56) from each of two lights (58). Discard Iockwashers.

23. Remove lens (54) and seal (53) from each of two lights (58).

24. Remove two lights (58) from control box (8).

25. Remove four rivets (49) and front panel (59) from control box (8).



c. ASSEMBLY

1. Install panel (59) on control box (8) with four rivets (49).

2. Install each of two lights (58) in control box (8) with two new Iockwashers (56) and screws (55).

3. Install seal (53) and lens (54) in each of two lights (58).

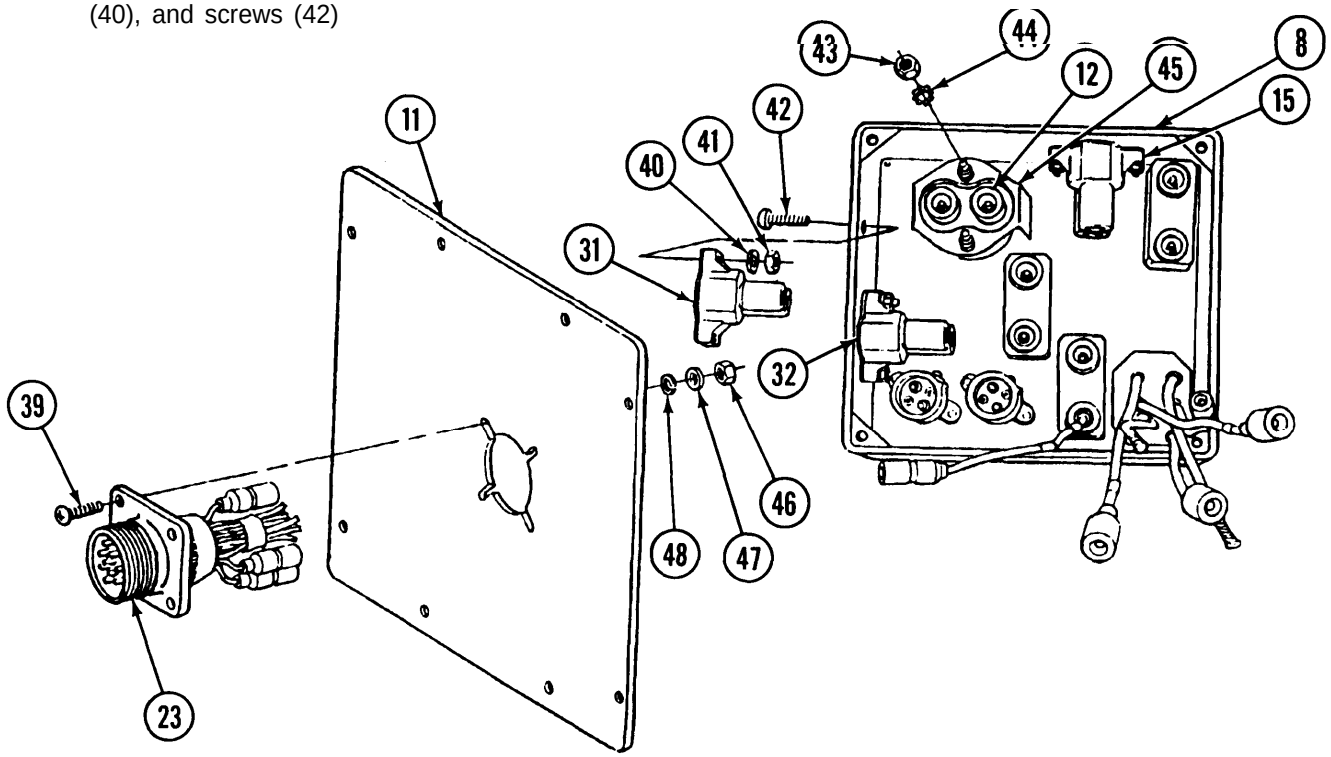
4. Install START switch (28), PREHEAT switch (35), APU Generator switch (57), and fuel SHUTOFF switch(17) on control box (8) with four guards (50) and eight new Iockwashers (51) and screws (52).

5. Install ENGINE OIL PRESSURE gage (12) on control box (8).

7-22. APU CONTROL BOX REPAIR (continued).

6. Install gage bracket (45) on gage (12) with two new lockwashers (44) and nuts (43).

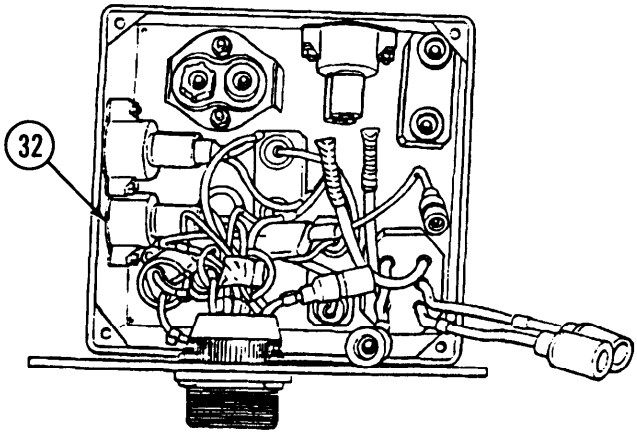
7. Install each of three circuit breakers (15, 31 and 32) on control box (8) with two nuts (41), new lockwashers (40), and screws (42)

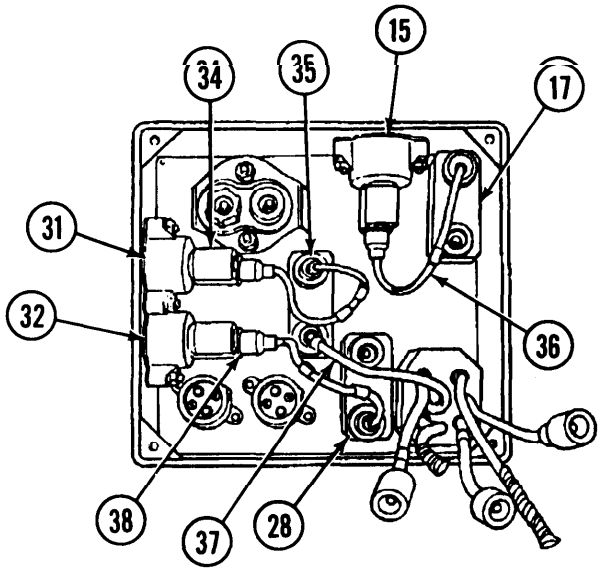


8. Connect ground wire (38) to preheat switch (35).

9. Connect wire 487A (34) to preheat switch (35) and circuit breaker (31).

10. Connect wire 65A (37) to start switch (28).





7-22. APU CONTROL BOX REPAIR (continued).

11. Connect wire 419 (36) to circuit breaker (15) and fuel shutoff switch (17),

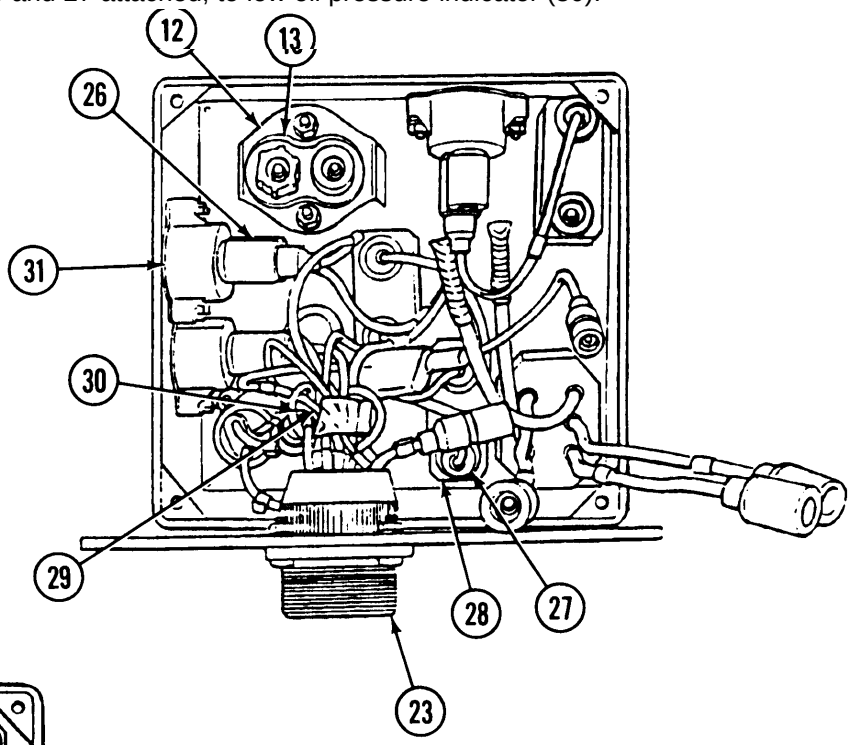
12. Install wiring harness connector (23) on rear panel(11) with four nuts (46), new lockwashers (48) washers (47), and screws (39).

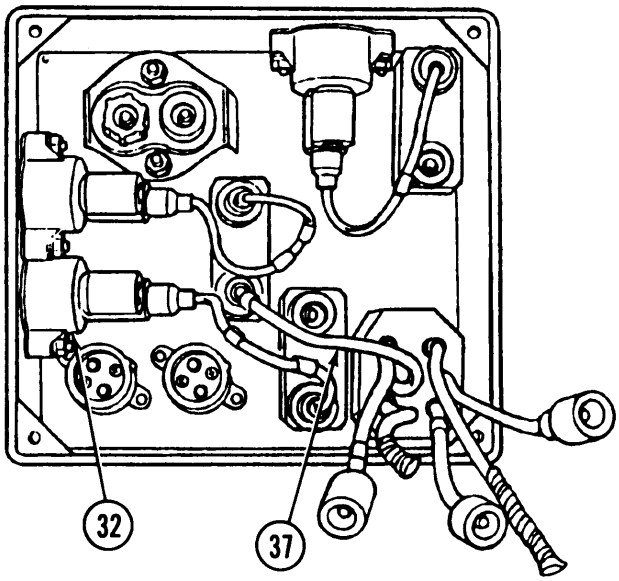
13. Connect wire 65A (37) to circuit breaker (32).

14. Connect wire 487 (26) to circuit breaker (31).

15. Connect plug (24) with wires 493 and 27 attached, to high temperature indicator (25).

16. Connect plug (29) with wires 420 and 27 attached, to low oil pressure indicator (30).





7-22. APU CONTROL BOX REPAIR (continued).

17. Connect wire 65 (27) to start switch (28).

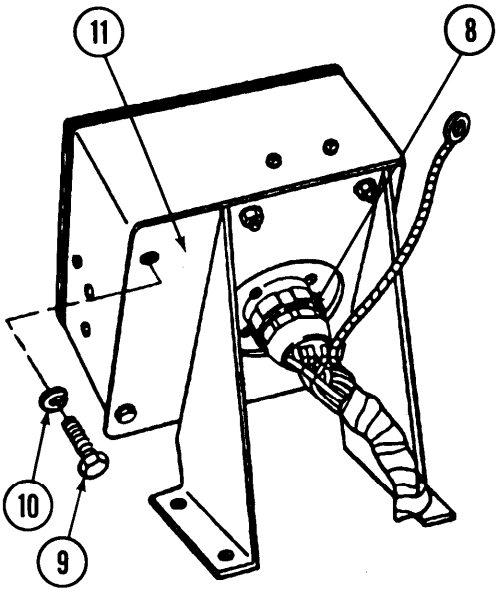
18. Connect wire 421 (18) to fuel shutoff switch (17).

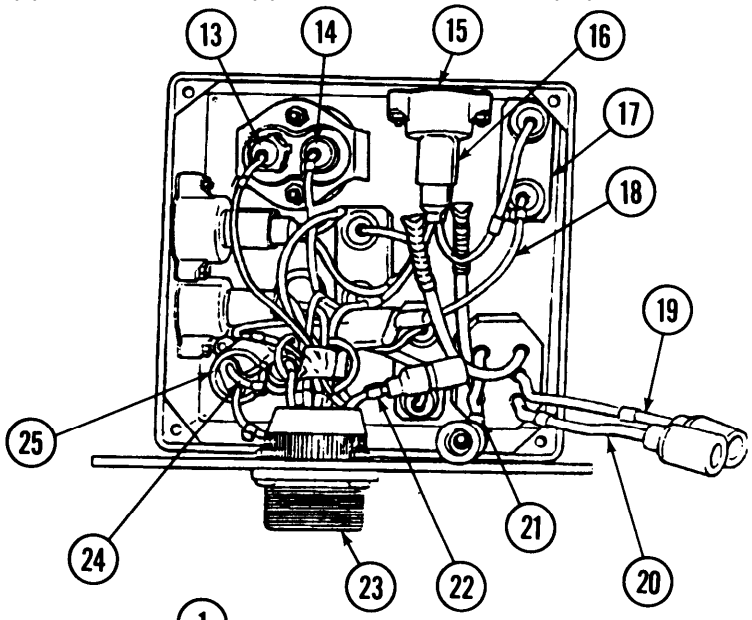
19. Connect wire 419 (16) to circuit breaker (15).

20. Connect wire 420 (13) and wire 420B (14) to oil pressure gage (12).

21. Connect ground wire (21) wire 61A (22) and wire 61 (19) to wiring harness connector (23).

22. Install rear panel (11) on APU control box (7) with four screws (9) and new lockwashers (10).



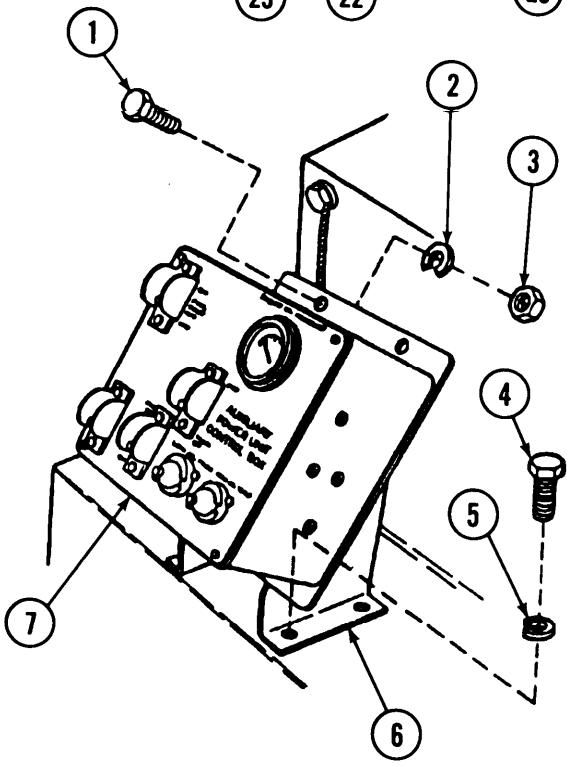


d. INSTALLATION

1. Install APU control box (7) to bracket (6) using four nuts (3), new lockwashers (2) and screws (1).

2. Connect electrical wiring harness connector (8) to APU control box (7).

3. Install bracket (6) with attached APU control box (7) on vehicle with four new lockwashers (5) and screws (4).



FOLLOW-ON MAINTENANCE:
- Install M2A2 air purifier (para 22-2).
- Connect battery ground cables (para 7-41).

7-23. UPPER REAR DOOR CONTROL SWITCHES AND BRACKET REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Lockwasher (2) (Item 160, Appendix H)
- Lockwasher (2) (Item 196, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Lower rear door opened (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).

a. REMOVAL

NOTE

If you are replacing switch bracket, perform steps 1-3. If you are replacing toggle switch only, perform steps 1 and 2 only.

1. Disconnect electrical connector AAF (3), electrical connector 10 (4), and electrical connector AAG (5) from door control toggle switch (2).

NOTE

Both upper rear door control switches are replaced the same way. Lower control switch is equipped with switch guard.

2. Remove two screws (10) and lockwashers (9), switch guard (8), and toggle switch (2) from switch bracket (1). Discard lockwashers.

3. Remove two screws (6) and lockwashers (7) and switch bracket (1) from vehicle. Discard lockwashers.

b. INSTALLATION

NOTE

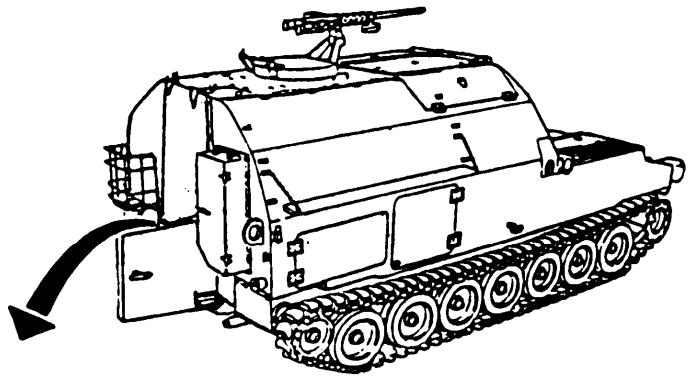
If you are replacing switch bracket, perform steps 1-3. If you are replacing toggle switch only, perform steps 2 and 3 only.

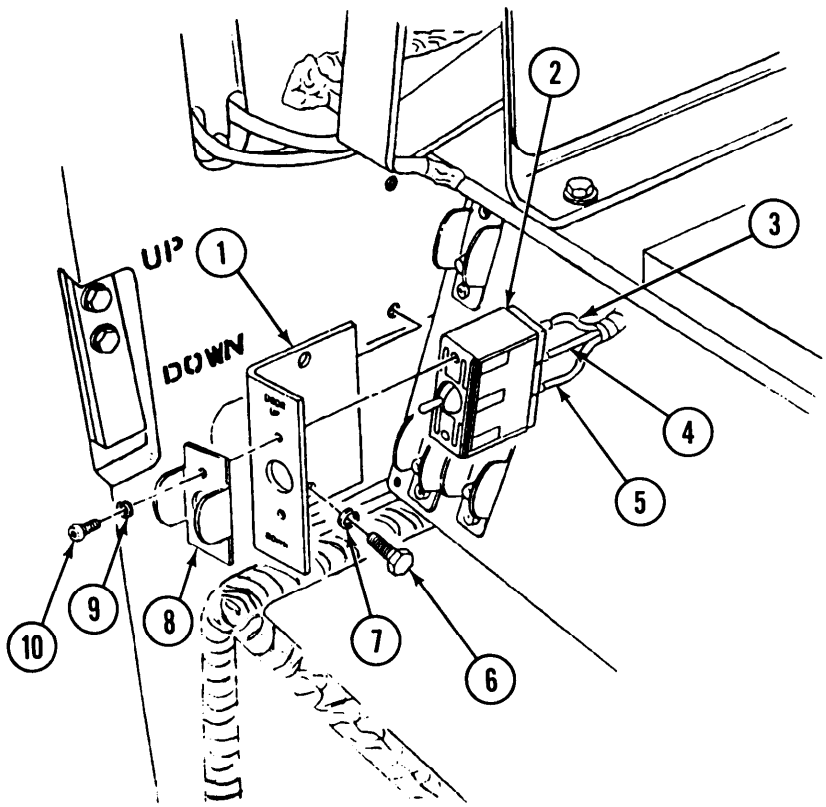
1. Install switch bracket (1) on vehicle using two new lockwashers (7) and two screws (6).

2. Install toggle switch (2) on switch bracket (1) using two new lockwashers (9) and two screws (10).

3. Connect electrical connector AAG (5), electrical connector 10 (4), and electrical connector AAF (3) to toggle switch (2).

7-23. UPPER REAR DOOR CONTROL SWITCHES AND BRACKET REPLACEMENT (continued).





FOLLOW-ON MAINTENANCE:

- Connect battery ground cables (para 7-41).
- Close lower rear door (refer to TM 9-2350-287-10).

7-24. CONVEYOR OVERRIDE SAFETY SWITCH REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

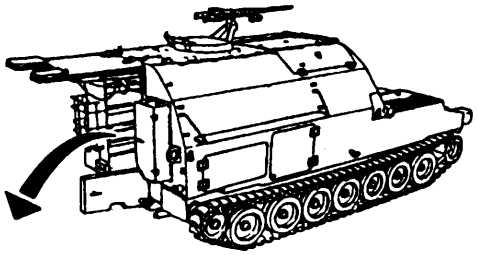
Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

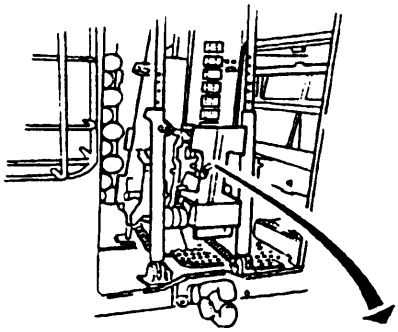
Materials/Parts:
- Lockwasher (2) (Item 160, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Upper rear door opened (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).

a. REMOVAL

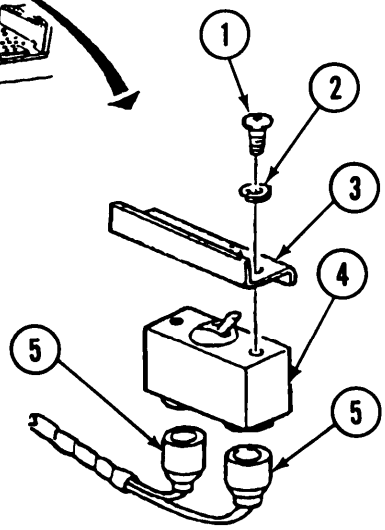
1. Disconnect two electrical leads (5) from switch (4).
2. Remove two screws (1) and lockwashers (2) and switch (4) from conveyor-mounted bracket (3). Discard lockwashers.





b. INSTALLATION

1. Install switch (4) on conveyor-mounted bracket (3) with two new lockwashers (2) and two screws (1).
2. Connect two electrical leads (5) to switch (4).



FOLLOW-ON MAINTENANCE:
- Connect battery ground cables (para 7-41).
- Close upper rear door (refer to TM 9-2350-287-10).

7-25. COMBAT OVERRIDE SWITCH ASSEMBLY REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial *Setup:*

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Lockwasher (2) (Item 151, Appendix H)
- Lockwasher (Item 160, Appendix H)
- Lockwasher (2) (Item 196, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

a. REMOVAL

1. Remove two screws (12), lockwashers (13), and washers (14), ground lead (2), combat override switch (8), and bracket (1) from crew compartment ceiling, Discard lockwashers.
2. Disconnect connector (4) from combat override switch (8).
3. Remove screw (7), lockwasher (6), washer (5), and strap (3) from ground lead (2). Discard lockwasher.
4. Disconnect ground lead (2) from combat overide switch (8).
5. Remove two screws (9), lockwashers (10), and washers (11) and combat override switch (8) from bracket (1). Discard lockwashers.

b. INSTALLATION

1. Install combat override switch (8) on bracket (1) with two washers (11), new lockwashers (10), and screws (9).
2. Connect ground lead (2) to combat override switch (8).
3. Install ground lead (2) in strap (3) and secure with screw (7), new lockwasher (6), and washer (5).
4. Connect connector (4) to combat override switch (8).
5. install combat override switch (8), bracket (1), and ground lead (2) on crew compartment ceiling with two screws (12), new lockwashers (13), and washers (14).

FOLLOW-ON MAINTENANCE:
- None

7-26. INTERCOM POWER SUPPLY BRACKET REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Lockwasher (2) (Item 136, Appendix H)
- Lockwasher (4) (Item 175, Appendix H)
- Lockwasher (4) (Item 185, Appendix H)

References:
- TM11-5830-340-12

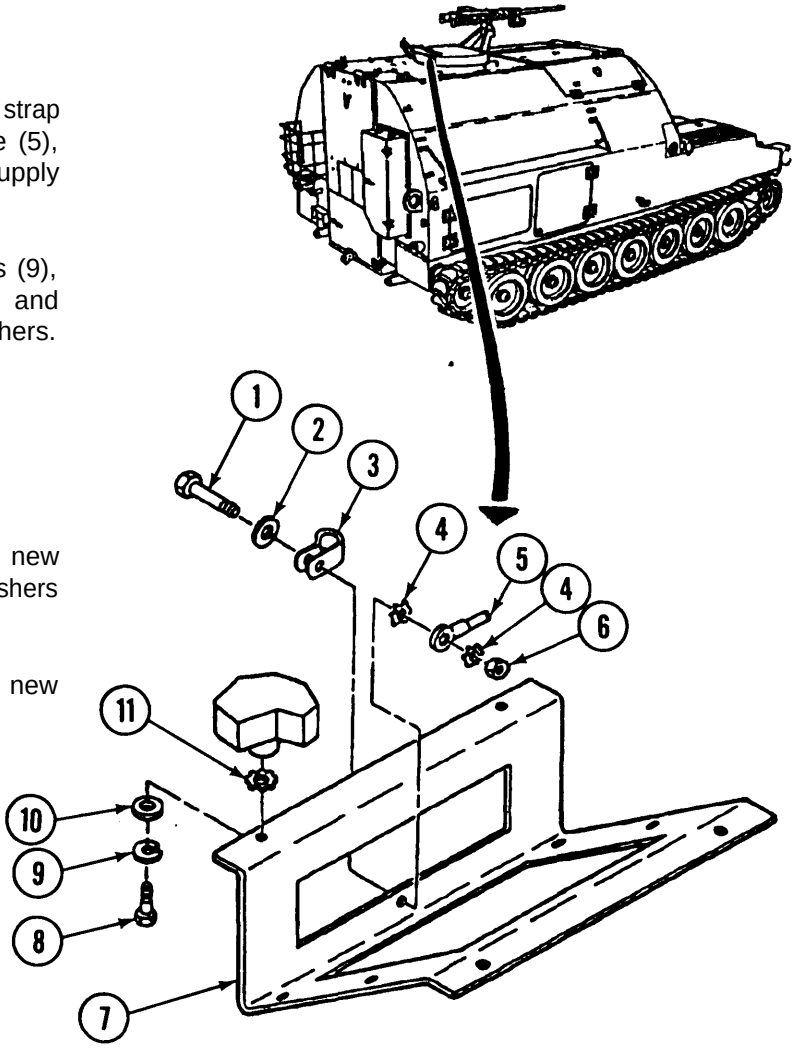
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Intercom power supply removed (refer to TM 11-5830-340-12).

a. REMOVAL

1. Remove screw (1), washer (2), tiedown strap (3), two lockwashers (4), ground wire (5), and nut (6) from intercom power supply bracket (7). Discard lockwashers.
2. Remove four screws (8), lockwashers (9), washers (10), and lockwashers (11) and bracket (7) from hull. Discard lockwashers.
3. Remove bracket (7).

b. INSTALLATION

1. Install bracket (7) on hull with four new lockwashers (11), washers (10), lockwashers (9), and screws (8).
2. Install nut (6), ground wire (5), two new lockwashers (4), tiedown strap (3), (2), and screw (1) on bracket (7).



FOLLOW-ON MAINTENANCE:
- Install intercom power supply (refer to TM 11-5830-340-12).

7-27. INTERCOM TERMINALS REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Nonmetallic washer (2) (Item 208, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Disconnect battery ground cables (para 7-41).

NOTE

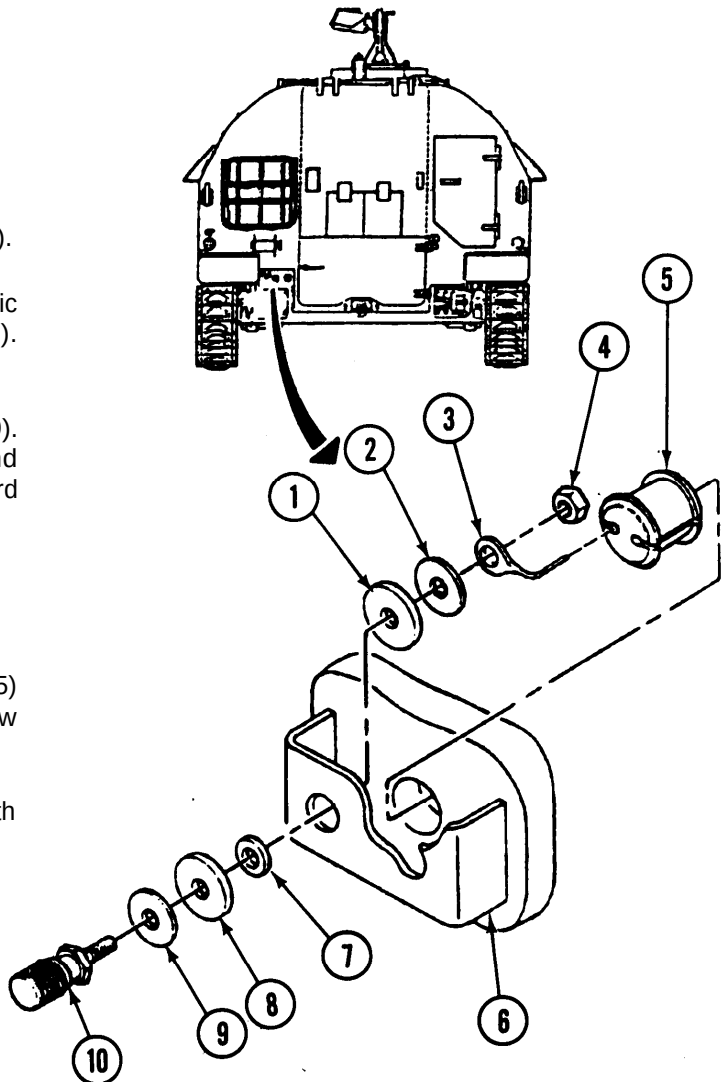
Removal and installation procedures for both intercom terminals are identical.

a. REMOVAL

1. Remove nut (4) from telephone terminal (10).
2. Remove cable (3), washer (2) , and nonmetallic washer (1) from telephone terminal (10). Discard nonmetallic washer.
3. Remove telephone termnal (10), washer (9). nonmetallic washer (8), washer (7), and grommet (5) from bracket (6) amd hull. Discard nonmetellic washer.

b. INSTALLATION

1. Install telephone terminal (10) and grommet (5) on bracket (6) and hull with washer (7), new nonmetallic washer (8), and washer (9).
2. Install cable (3) on telephone terminal (10) with new nonmetallic washer (1) and washer (2).
3. Install nut (4) on telehone terminal (10).



FOLLOW-ON MAINTENANCE:
- Connect battery ground cables (para 7-41).

7-28. REMOTE CHEMICAL DETECTOR ALARM TERMINALS REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Lockwasher (Item 118, Appendix H)
- Nonmetallic washer (2) (Item 208, Appendix H)

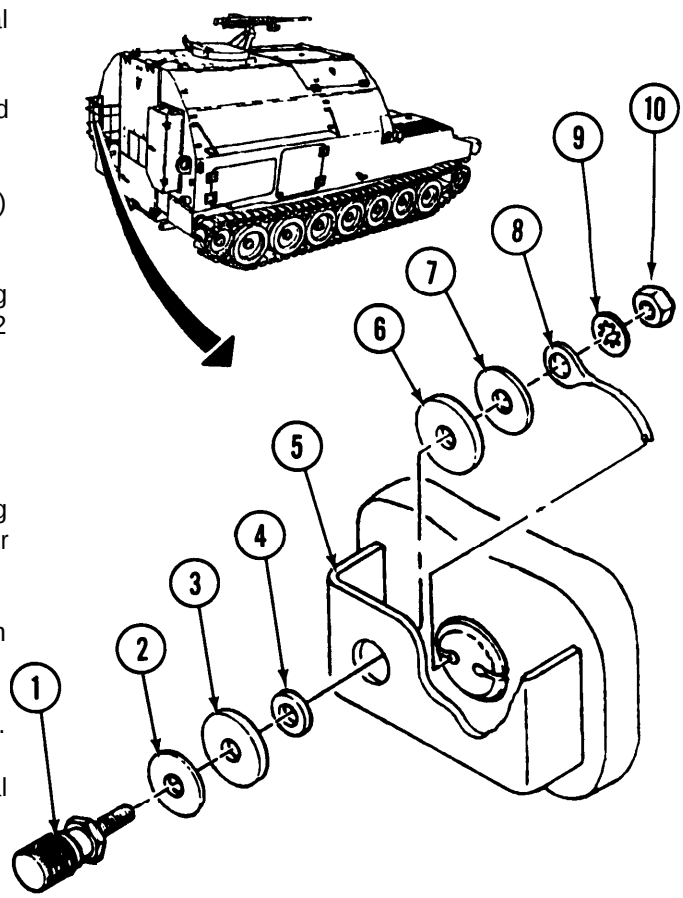
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Disconnect battery ground cables (para 7-41).

NOTE

There are two pairs of terminals. Each pair is installed on a vehicle-mounted bracket. Each terminal is removed and installed in the same way. These procedures cover only one terminal.

a. REMOVAL

1. Remove nut (10) and lockwasher (9) from terminal (1). Discard lockwasher.
2. Remove cable connector (8) from vehicle-mounted terminal bracket (5).
3. Remove washer (7) and nonmetallic washer (6) from terminal (1). Discard nonmetallic washer.
4. Pull terminal (1) out of terminal bracket (5) along with nonmetallic washer (3) and two washers (2 and 4). Discard nonmetallic washer.



b. INSTALLATION

1. Install terminal (1) on terminal bracket (5) using two washers (2 and 4) and new nonmetallic washer (3).
2. Install nonmetallic washer (6) and washer (7) on terminal (1).
3. Install cable connector (8) on terminal bracket (5).
4. Install nut (10) and new lockwasher (9) on terminal (1).

FOLLOW-ON MAINTENANCE:
- Connect battery ground cables (para 7-41).

7-29. STOPLIGHT SWITCH REPLACEMENT AND ADJUSTMENT.

This Task Covers:

a. Removal
b. Installation
c. Adjustment

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Silicone compound (Item 84, Appendix D)
- Lockwasher (2) (Item 175, Appendix H)

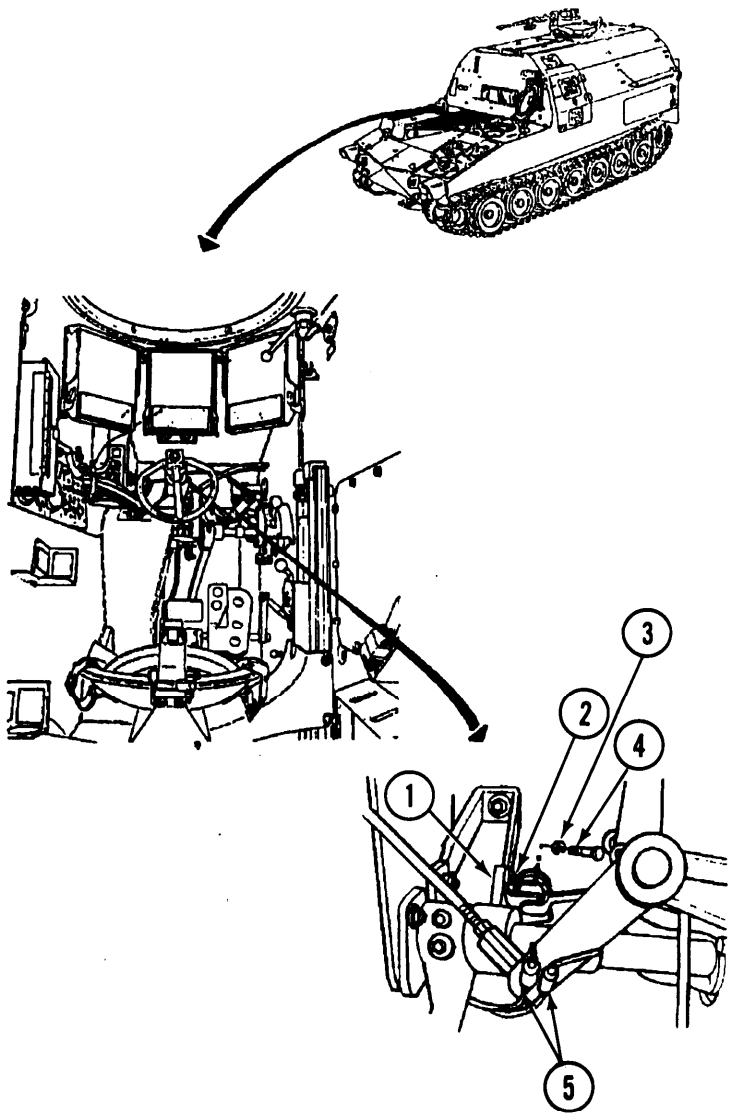
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch OFF (refer to TM 9-2350-287-10).

a. REMOVAL

1. Disconnect two electrical leads No. 75 (5) from stoplight switch (2).
2. Remove two screws (4) and lockwashers (3) and stoplight switch (2) from bracket (1). Discard lockwashers.

b. INSTALLATION

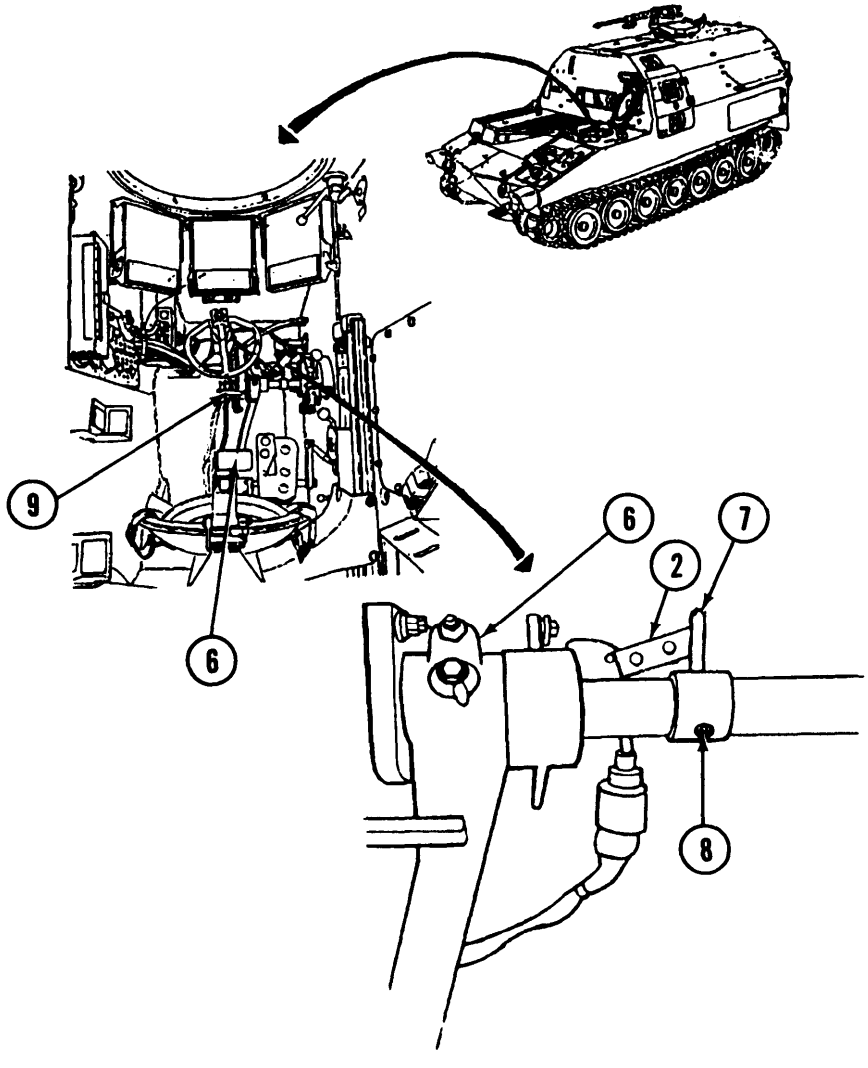
1. Install stoplight switch (2) on bracket (1) with two screws (4) and new lockwashers (3).
2. Apply silicone compound to shells of two electrical leads No. 75 (5).
3. Connect two electrical leads No. 75 (5) to stoplight switch (2).
4. Adjust stoplight switch (para 7-29c).



7-29. STOPLIGHT SWITCH REPLACEMENT AND ADJUSTMENT (continued).

c. ADJUSTMENT

1. Depress brake pedal (6) 3/4 of an inch.
2. Apply BRAKE LOCK handle (9) (refer to TM 9-2350-287-10).
3. Loosen two socket head screws (8) on stoplight actuator (7).
4. Turn stoplight actuator (7) until it contacts spring arm of stoplight switch (2).
5. Hold stoplight actuator (7) and tighten two socket head screws (8).
6. Release BRAKE LOCK handle (9) (refer to TM 9-2350-287-10).



FOLLOW-ON MAINTENANCE:
- None

7-30. DOME LIGHT REPAIR.

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

Initial Setup:

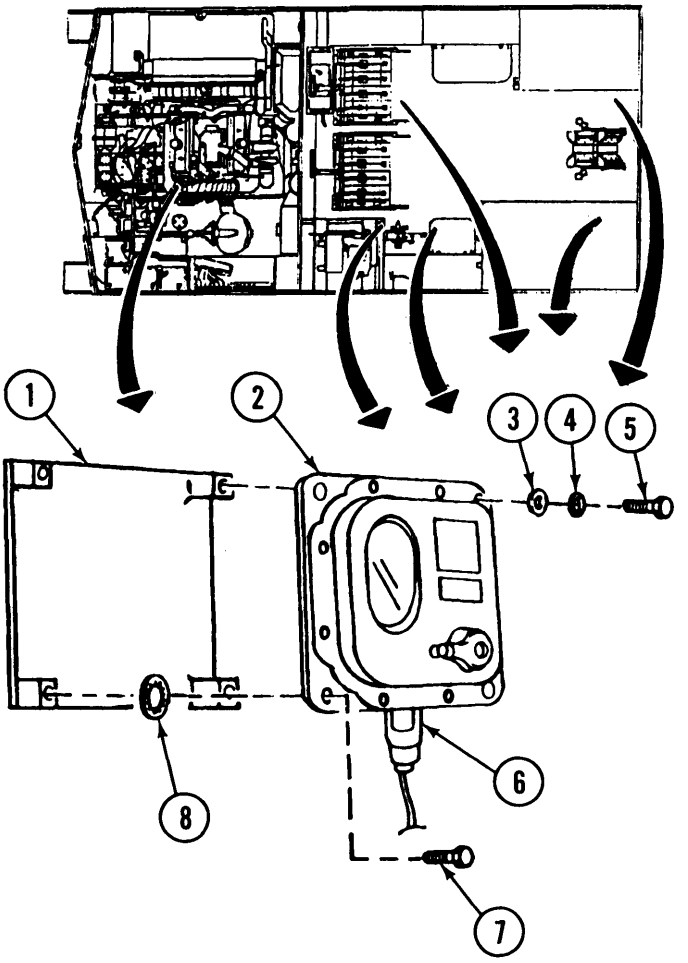
Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Gasket (Item 93, Appendix H)
- Lockwasher (Item 129, Appendix H)
- Lockwasher (Item 133, Appendix H)
- Lockwasher (3) (Item 175, Appendix H)
- Nonmetallic seal (Item 207, Appendix H)
- Preformed packing (Item 242, Appendix H)

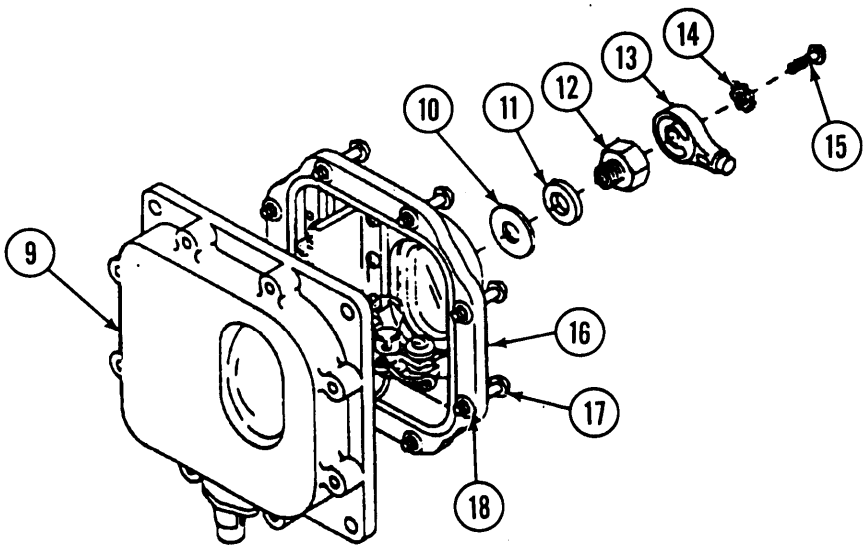
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).

a. REMOVAL

1. Disconnect electrical lead (6) from dome light (2).
2. Remove three screws (5), lockwashers (4), and washers (3) from bracket (1). Discard lockwashers.
3. Remove screw (7), lockwasher (8), and dome light (2) from bracket (1). Discard lockwasher.



7-30. DOME LIGHT REPAIR (continued).



b. DISASSEMBLY

1. Remove screw (15), lockwasher (14), switch knob (13), nut (12), washer (11), and gasket (10) from access cover (1 6). Discard lockwasher and gasket.

2. Loosen eight screws (17) with retaining rings (18).

3. Separate access cover (16) from retainer (9).

4. Disconnect electrical lead (20) at connector (21). Remove access cover (16) from retainer (9).

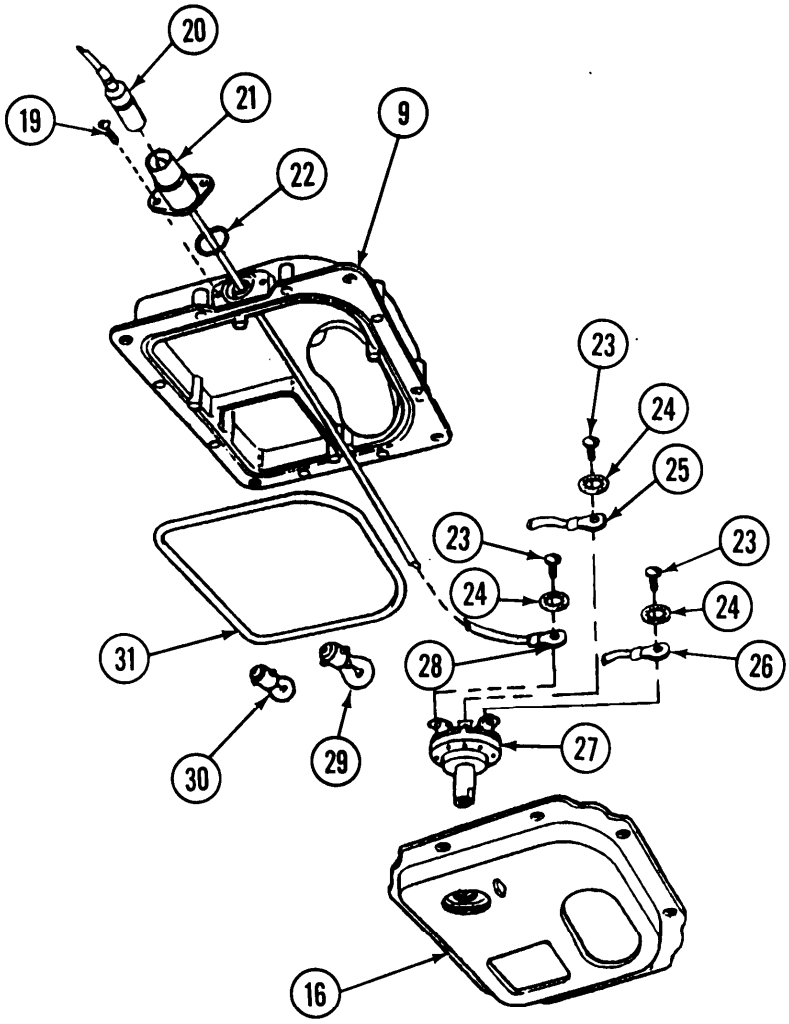
5. Remove nonmetallic seal (31) from access cover (16). Discard seal.

6. Loosen three screws (23) and lockwashers (24), and remove three electrical leads (25, 26, and 28) at switch (27). Remove switch (27) from access cover (16).

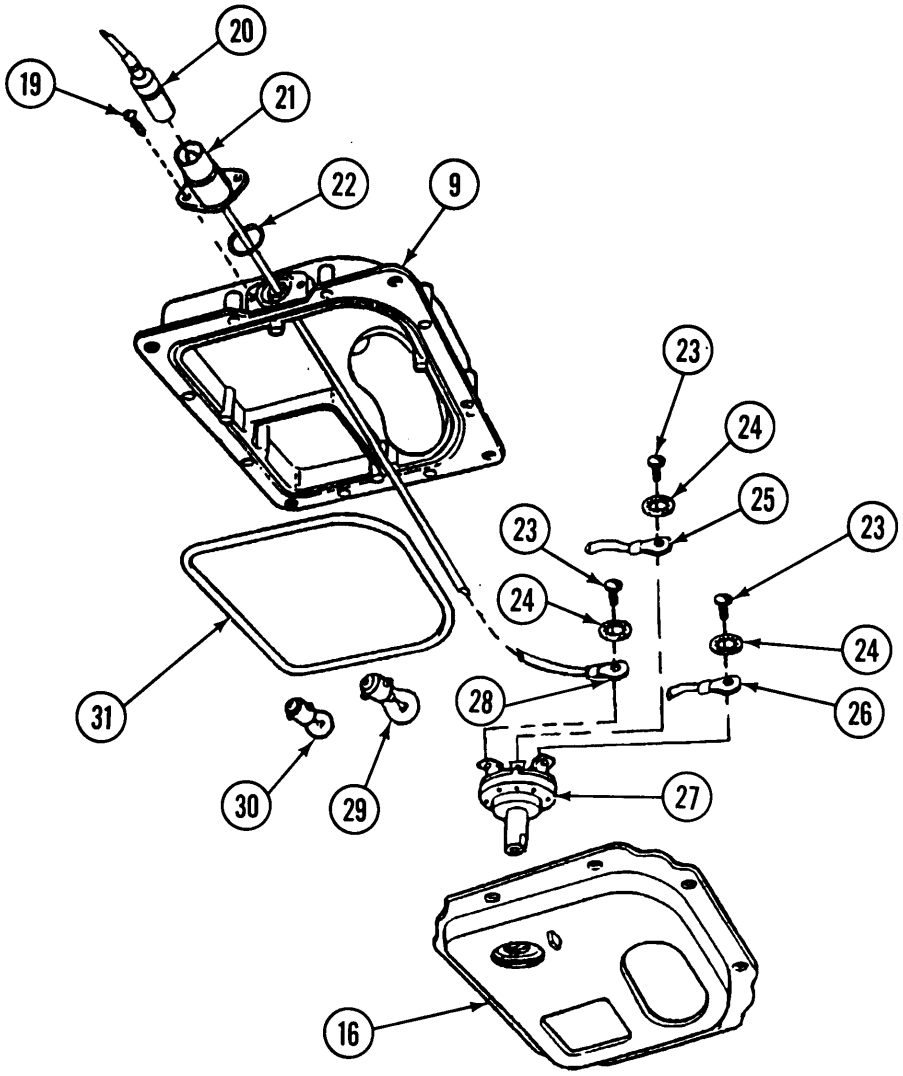
7. Remove lamp (29) from access cover (16).

8. Remove lamp (30) from access cover (16).

9. Remove two screws (19), connector (21), and preformed packing (22) from retainer (9). Discard preformed packing.



7-30. DOME LIGHT REPAIR (continued).



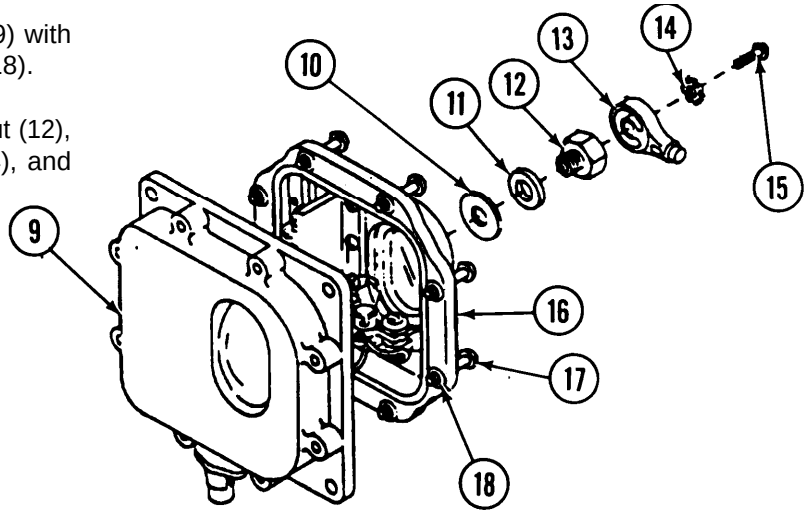
c. ASSEMBLY

1. Install connector (21) in retainer (9) with new preformed packing (22) and two screws (19).
2. Install lamp (30) in access cover (16).
3. Install lamp (29) in access cover (16).
4. Connect three electrical leads (25, 26 and 28) to switch (27) with three screws (23) and lockwashers (24).
5. Connect electrical lead (20) to connector (21) in retainer (9).
6. Install new nonmetallic seal (31) in groove of access cover (16).

7-30. DOME LIGHT REPAIR (continued).

7. Install access cover (16) on retainer (9) with eight screws (17) and retaining rings (18).

8. Install new gasket (10), washer (11), nut (12), switch knob (13), new lockwasher (14), and screw (15) on access cover (16).

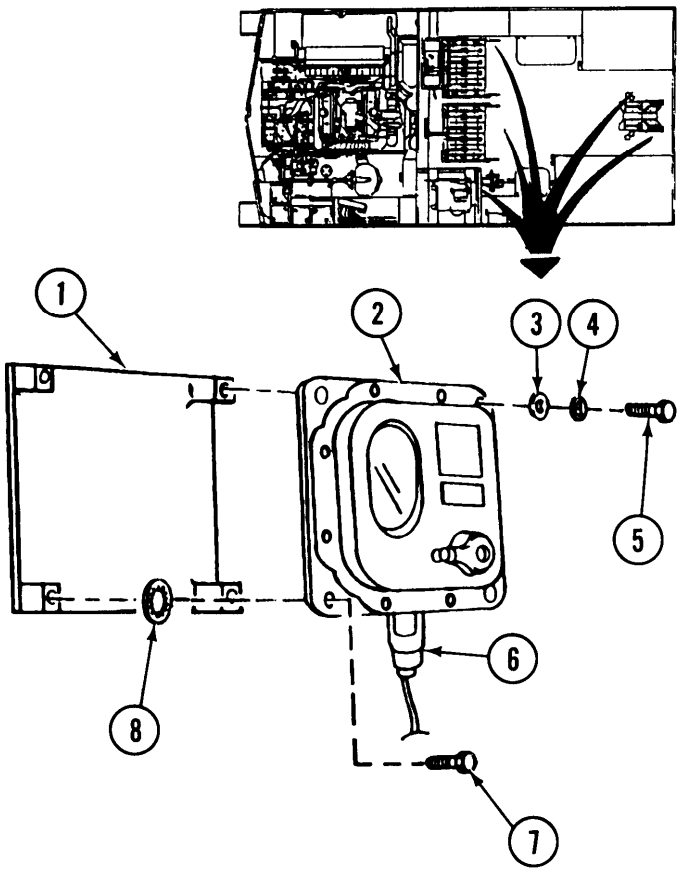


d. INSTALLATION

1. Install dome light (2) on bracket (1) with new lockwasher (8) and screw (7).

2. Install three screws (5), new lockwashers (4), and washers (3) on bracket (1).

3. Connect electrical lead (6) to dome light (2).



FOLLOW-ON MAINTENANCE:
- Connect battery cables (para 7-41).

7-31. HEADLIGHT ASSEMBLY REPAIR.

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation
e. Alinement
f. Adjustment

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- Inserter and remover (item 31, Appendix 1)

Materials/Parts:
- Cement adhesive (Item 2, Appendix D)
- Gasket (2) (Item 100, Appendix H)
- Gasket (2) (Item 101, Appendix H)
- Lockwasher (4) (Item 119, Appendix H)
- Lockwasher (6) (Item 122, Appendix H)
- Seal (Item 297, Appendix H)
- Spring pin (Item 357, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground 25 feet from wall (alinement and adjustment) (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).

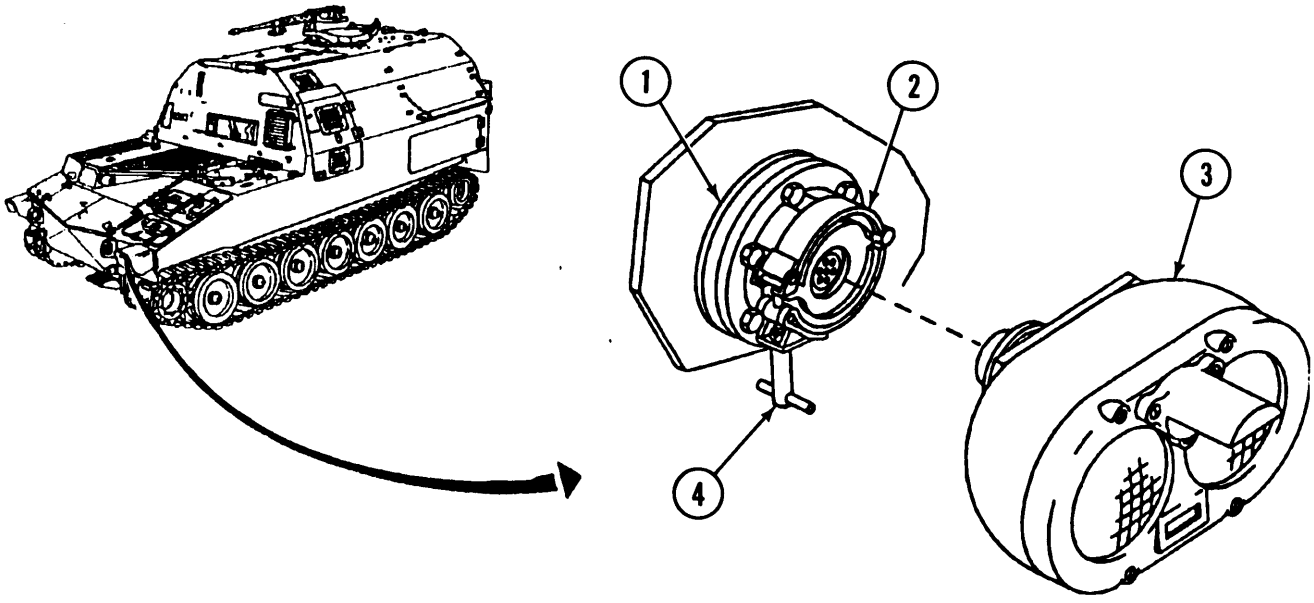
a. REMOVAL

1. Turn T-handle (4) and loosen retaining clamp (2).

CAUTION

Do not twist headlight assembly during removal or installation. Damage to connectors may result.

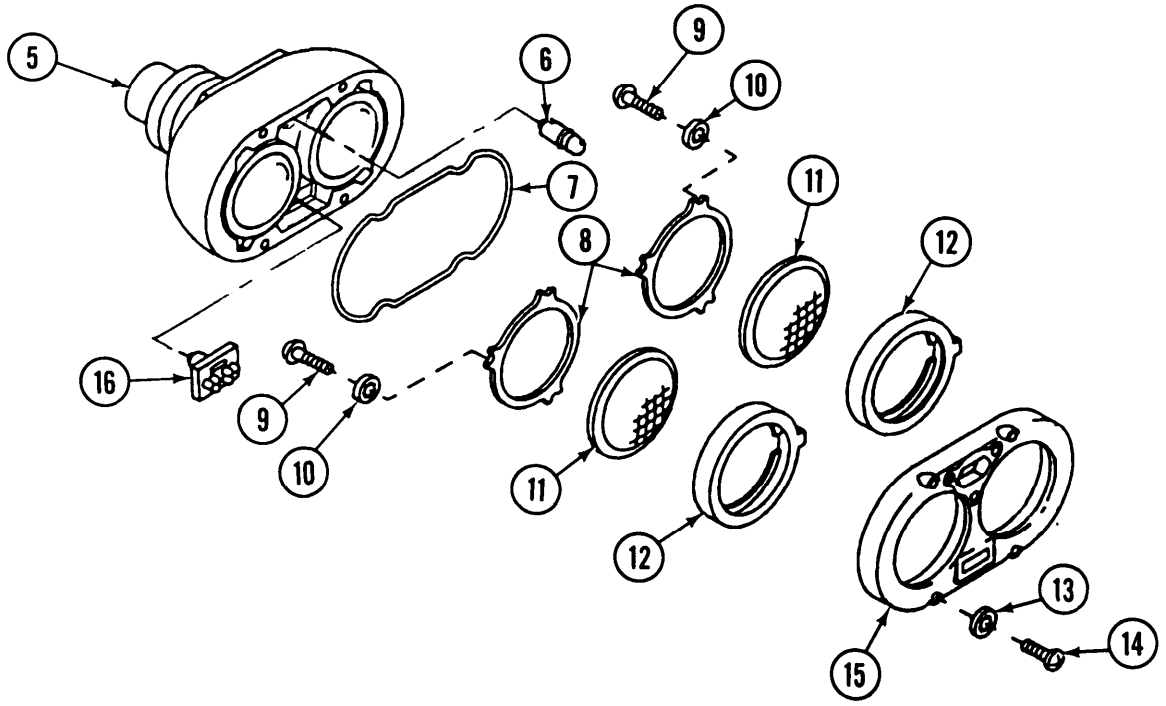
2. Remove retaining clamp (2) and headlight assembly (3) from mount (1).



7-31. HEADLIGHT ASSEMBLY REPAIR (continued).

b. DISASSEMBLY

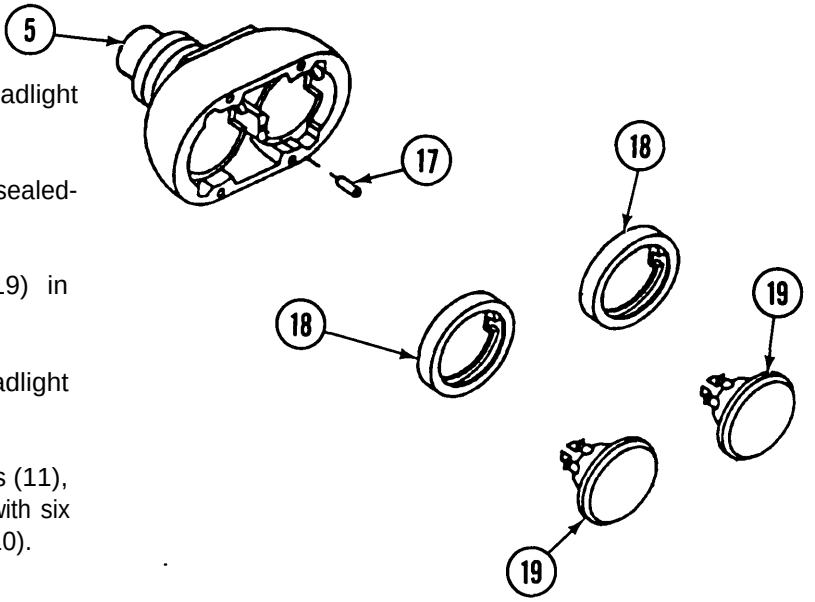
1. Loosen four screws (14) and remove cover (15) from headlight body (5).
2. Remove four screws (14) and lockwashers (13) from cover (15). Discard lockwashers.
3. Remove seal (7) from cover (15). Discard seal.
4. Remove six screws (9) and lockwashers (10) and two lens retainers (8), lenses (11), and gaskets (12) from cover (15). Discard lockwashers and gaskets.



5. Remove LED (16) and lamp (6) from headlight body (5).
6. Remove two sealed-beam units (19) from headlight body (5).
7. Remove two gaskets (18) from two sealed-beam units (19). Discard gaskets.
8. Remove spring pin (17) from headlight body (5). Discard spring pin.

7-31. HEADLIGHT ASSEMBLY REPAIR (continued).

c. ASSEMBLY

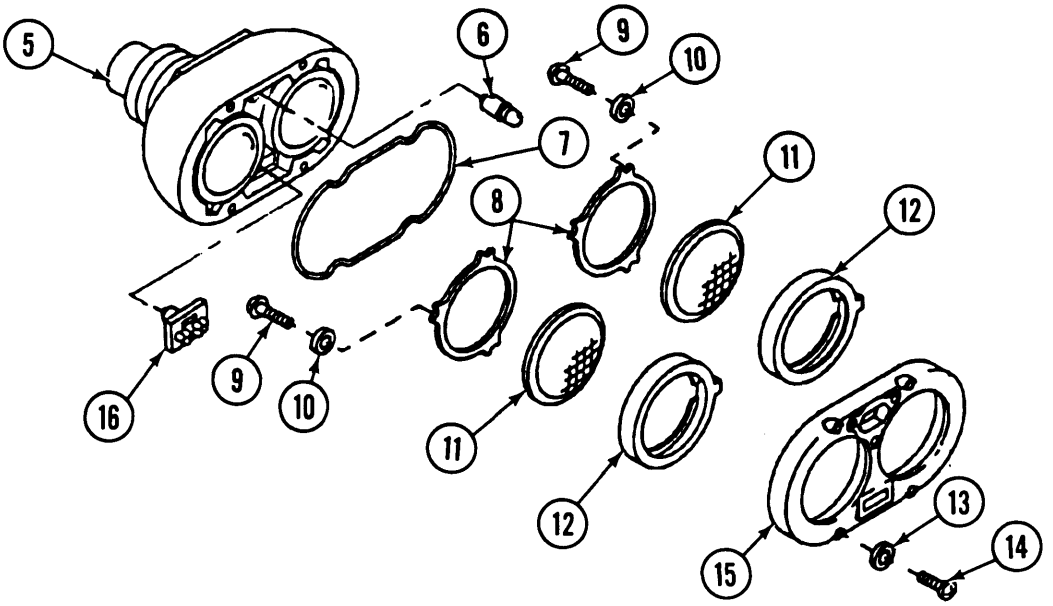


1. Install new spring pin (17) in headlight body (5).
2. Install two new gaskets(18) on two sealed-beam units (19).
3. Install two sealed-beam units (19) in headlight body (5).
4. Install lamp (6) and LED (16) in headlight body (5).
5. Install two new gaskets (12), lenses (11), and lens retainers (8) on cover (15) with six screws (9) and new lockwashers (10).

WARNING

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

6. Apply cement adhesive to new seal (7).
7. Install seal (7) in groove of cover (15).
8. Install four screws (14) and new lockwashers (13) in cover (15).
9. Install cover (15) on headlight body (5) with four screws (14).



7-31. HEADLIGHT ASSEMBLY REPAIR (continued).

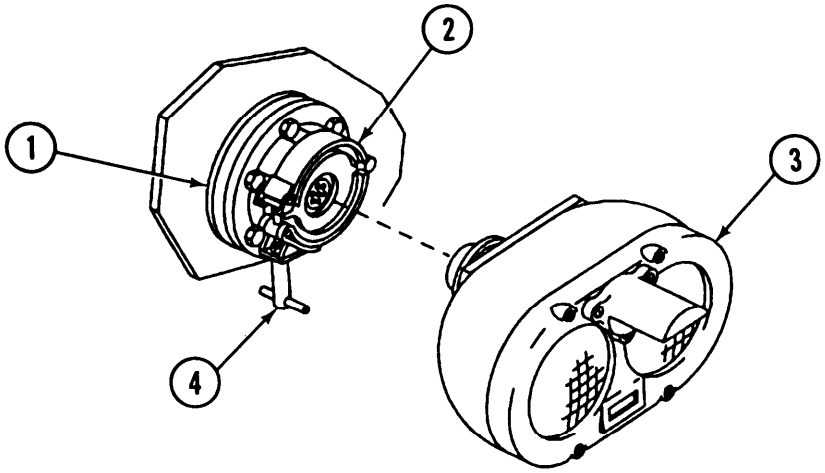
d. INSTALLATION

CAUTION

Do not twist headlight assembly during installation. Damage to connectors may result.

1. Position headlight assembly (3) in mount (1), and install retaining clamp (2) on mount (1).

2. Turn T-handle (4) and tighten retaining clamp (2).



e. ALINEMENT

NOTE

Alinement of lights should be performed in shaded or dimly lit areas.

1. Measure the distance from the center of sealed lamp unit (service side, clear) to the ground. Duplicate this measurement on the wall, drawing a horizontal centerline (20) of lamp unit.

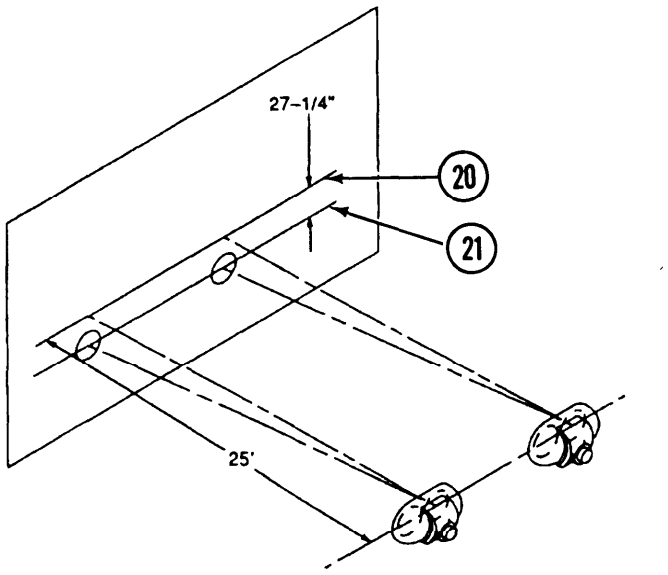
2. Draw a line (21) parallel to, and 27 1/4 inches (69.2 cm) below, centerline (20).

3. Turn lights on low beam. Centers of right and left beams should be on line (21). Adjust if necessary.

4. Connect battery ground cables (para 7-41).

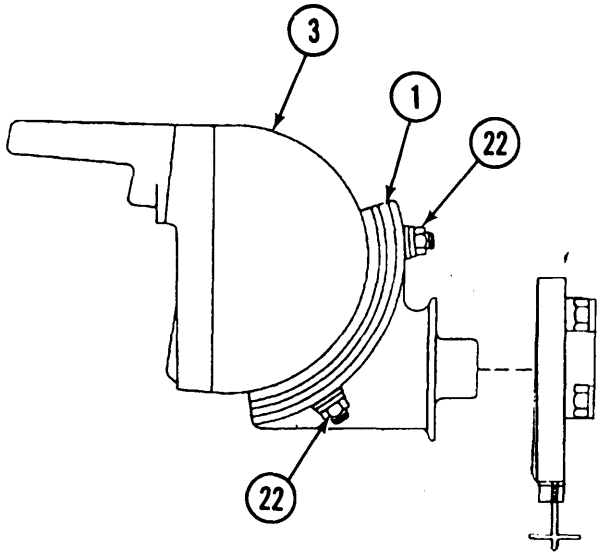
5. Turn MASTER switch ON (refer to TM 9-2350-287-10).

7-31. HEADLIGHT ASSEMBLY REPAIR (continued).



f. ADJUSTMENT

1. Remove headlight assembly (3) from mount (1).
2. Loosen four nuts (22).
3. Install headlight assembly (3) on mount (1).
4. Manually adjust headlight assembly (3) so that center of low beam is on line (21).
5. Tighten two bottom nuts (22).
6. Remove headlight assembly (3) from mount (1).
7. Tighten two top nuts (22).
8. Install headlight assembly (3) on mount (1).



FOLLOW-ON MAINTENANCE:

- Connect battery ground cables if alinement was not performed (para 7-41).

7-32. HEADLIGHT SEALED-BEAM AND INCANDESCENT LAMP REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

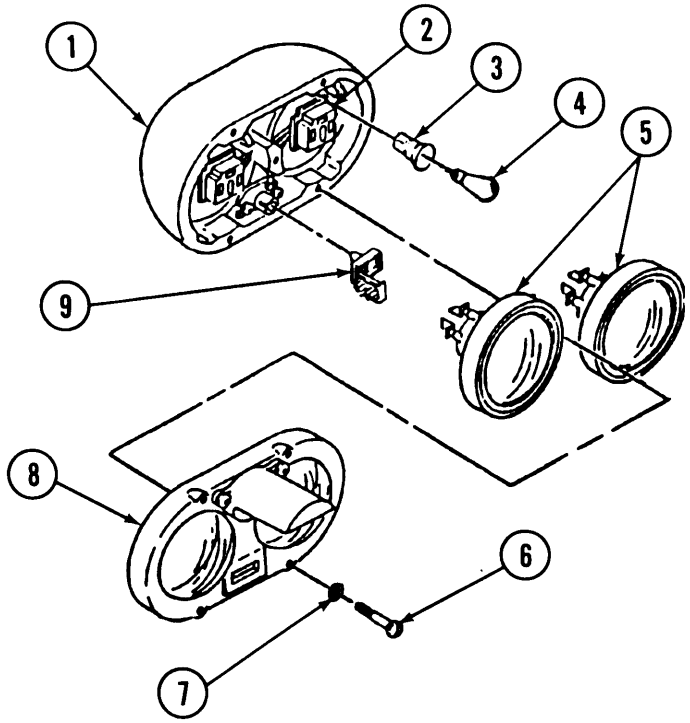
Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Gasket (2) (Item 100, Appendix H)
- Lockwasher (4) (Item 126, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

a. REMOVAL

1. Remove four screws (6) and lockwashers (7) and cover (8) from headlight body (1). Discard lockwashers.
2. Pull two sealed-beam lamps (5) out of headlight body (1).
3. Disconnect two electrical connectors (2) from two sealed-beam lamps (5).
4. Open front cover of marker assembly (9) and push in marker assembly (9) with screwdriver, turn counterclockwise, and remove from headlight body (1).
5. Pull out and remove blackout drive reflector (3) with incandescent lamp (4) from headlight body (1).
6. Push in incandescent lamp (4), turn counterclockwise, and remove from blackout drive socket (3).

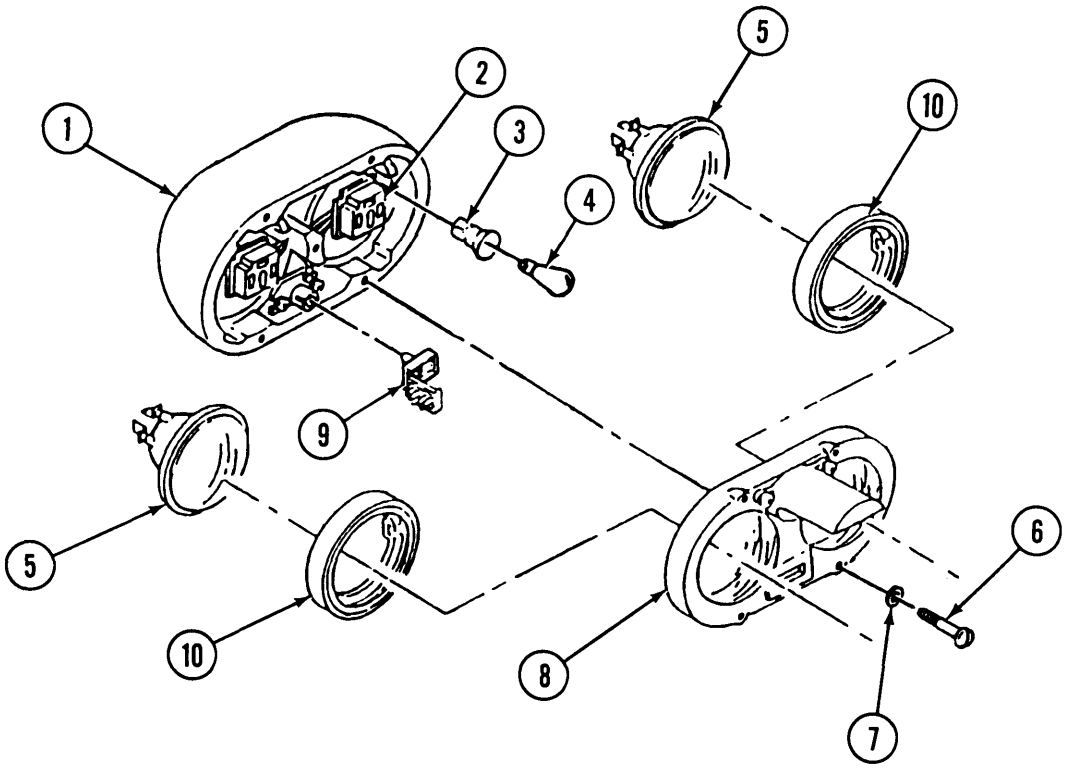


7-32. HEADLIGHT SEALED-BEAM AND INCANDESCENT LAMP REPLACEMENT (continued).

7. Remove two gaskets (10) from two sealed-beam lamps (5). Discard gaskets.

b. INSTALLATION

1. Install two gaskets (10) on two sealed-beam lamps (5).
2. Install incandescent lamp (4) in blackout drive socket (3).
3. Install blackout drive reflector (3) with incandescent lamp (4) into headlight body (1).
4. Install marker assembly (9) in headlight body (1) by pushing with screwdriver and turning clockwise. Close front cover of marker assembly (9).
5. Connect two electrical connectors (2) to two sealed-beam lamps (5).
6. Push two sealed-beam lamps (5) into headlight body (1).
7. Install cover (8) on headlight body (1) with four screws (6) and new lockwashers (7).



FOLLOW-ON MAINTENANCE:
- None

7-33. LEFT TAILLAMP ASSEMBLY REPAIR.

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix l)

Materials/Parts:
- Electrical tape (Item 67, Appendix D)
- Gasket (Item 94, Appendix H)
- Lockwasher (2) (Item 177, Appendix H)
- Lockwasher (8) (Item 196, Appendix H)

Personnel Required: Two

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).

a. REMOVAL

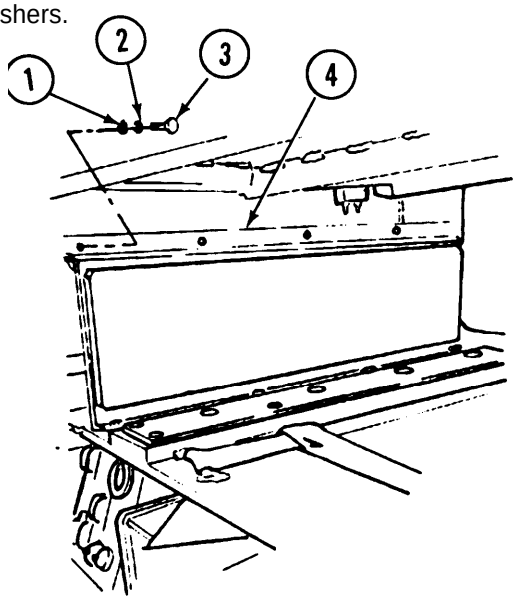
CAUTION

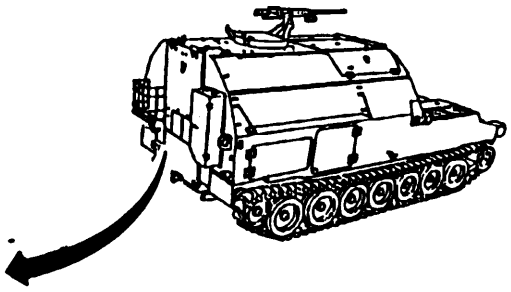
Be careful spacers do not fail while taillamp assembly is being removed. Failure to heed this caution could result in damage to taillamp assembly.

NOTE

- Taillamp assembly does not have to be removed to service lamps.
- An assistant is needed when removing taillamp assembly.

1. Remove eight screws (3), lockwashers (1), and washers (2) and guard (4) from left-side canister. Discard lockwashers.





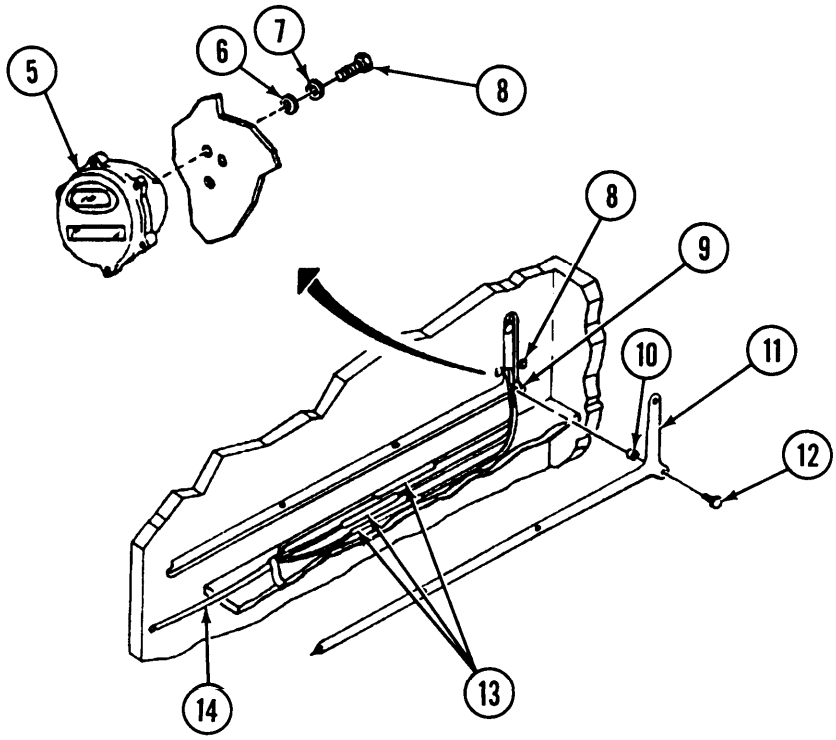
7-33. LEFT TAILLAMP ASSEMBLY REPAIR (continued).

2. Remove five screws (12) and spacers (10) and cover plate (11) from hull.

3. Disconnect three electrical leads (13) from wiring harness (14).

4. Remove two screws (8), washers (6), and lockwashers (7) from taillamp assembly (5). Discard lockwashers.

5. Remove taillamp assembly (5), grommet (9), and three electrical leads (13) from hull.



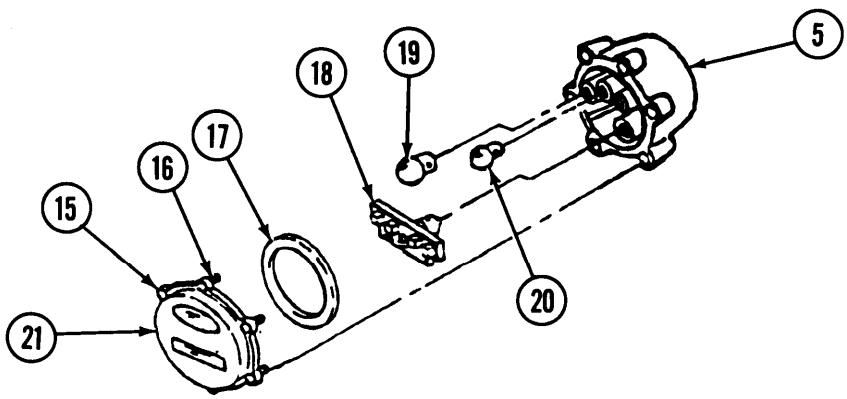
b. DISASSEMBLY

1. Loosen six screws (15) with retaining rings (16) from taillamp assembly (5).

2. Remove door (21) and gasket (17) from taillamp assembly (5). Discard gasket.

3. Push in two lamps (19 and 20) and remove from taillamp assembly (5) by turning counterclockwise.

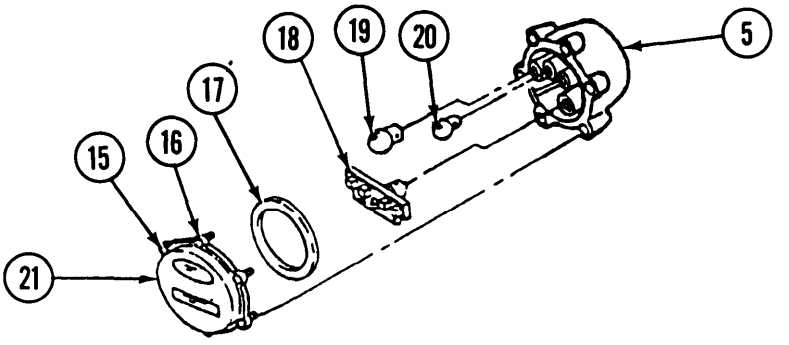
4. Push in light-emitting diode (LED) (18) with screwdriver, turn counterclockwise, and remove from taillamp assembly (5).



7-33. LEFT TAILLAMP ASSEMBLY REPAIR (continued).

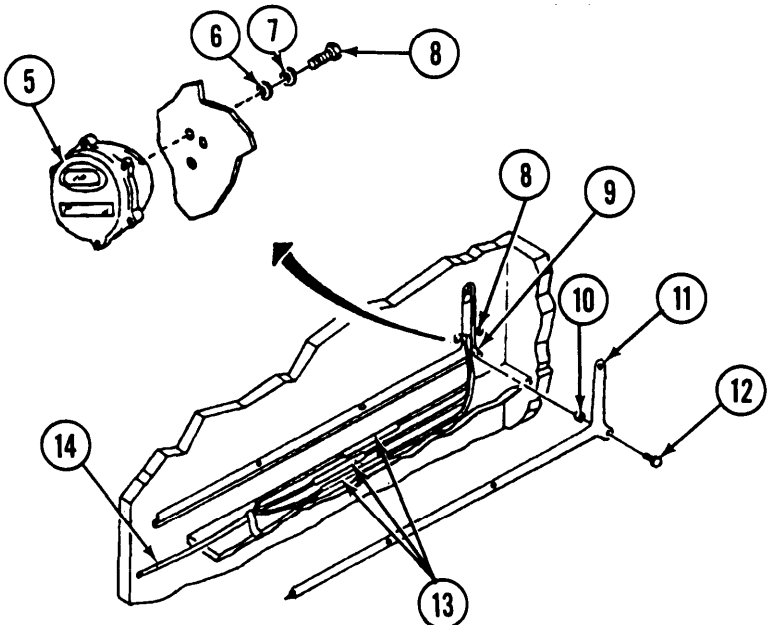
c. ASSEMBLY

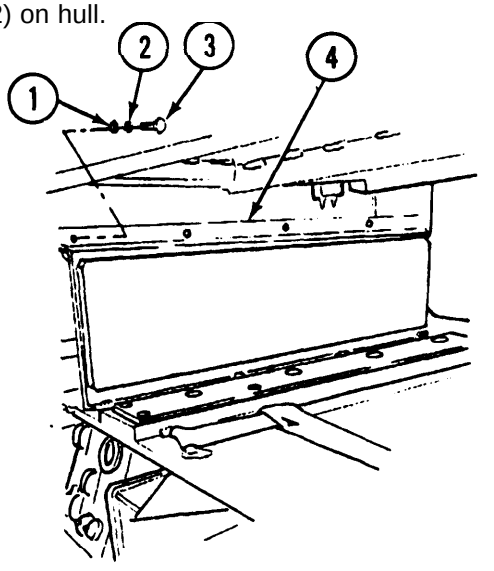
1. Install LED (18) on taillamp assembly (5) by pushing in with screwdriver and turning clockwise.
2. Install two lamps (19 and 20) on taillamp assembly (5) by pushing in and turning clockwise.
3. Install door (21) and new gasket (17) on taillamp assembly (5) with six screws (15) and retaining rings (16).



d. INSTALLATION

1. Install grommet (9) and three electrical leads (13) in hull,
2. Install taillamp assembly (5) on hull with two screws (8), new Iockwashers (7), and washers (6).
3. Connect three electrical leads (13) to wiring harness (14).
4. Install cover plate (11) amd five spaces (10) and screws (12) on hull.





5. Install guard (4) on left-side canister with eight screws (3), new Iockwashers (1), and washers (2).

FOLLOW-ON MAINTENANCE:

- Connect battery ground cables (para 7-41).

7-34. RIGHT TAILLAMP ASSEMBLY REPAIR.

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kitj (Item 24, Appendix l)

Materials/Parts:
- Electrical tape (Item 67, Appendix D)
- Gasket (Item 94, Appendix H)
- Lockwasher (2) (Item 177, Appendix H)

Personnel Required: Two

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).

a. REMOVAL

CAUTION

Be careful not to drop spacers when removing right taillamp assembly. Failure to heed this caution can result in damage to taillamp assembly.

NOTE

Taillamp assembly does not have to be removed to service light-emitting diodes (LEDs).

1. Remove four screws (8) and spacers (7) and cover plate (9) from hull.

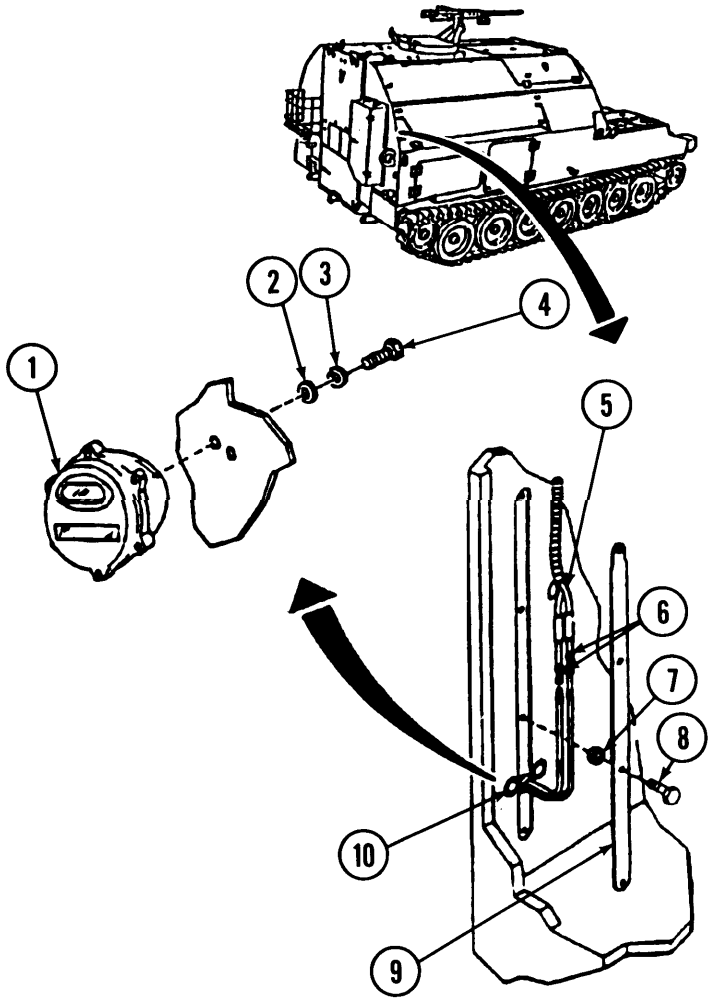
2. Disconnect two electrical leads (6) from wiring harness (5).

NOTE

An assistant is needed when removing right taillamp assembly.

3. Remove two screws (4), Iockwashers (3), and washers (2) from hull. Discard Iockwashers.

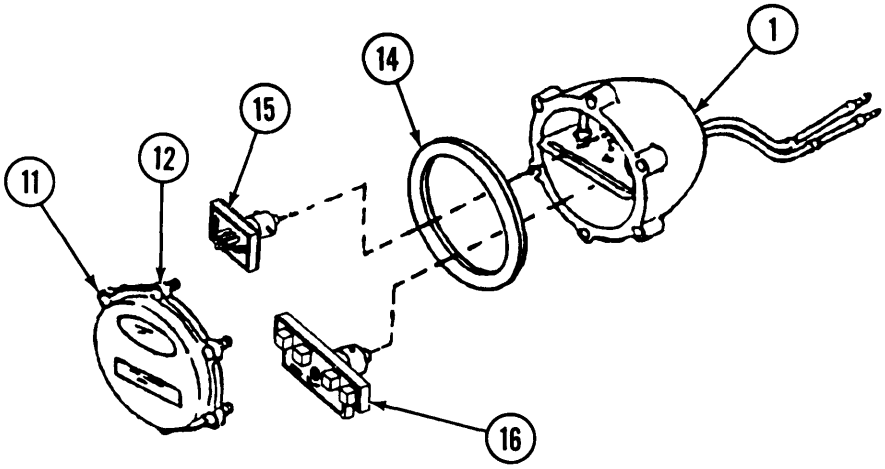
4. Remove taillamp assembly (1), grommet (10), and two electrical leads (6) from hull.



7-34. RIGHT TAILLAMP ASSEMBLY REPAIR (continued).

b. DISASSEMBLY

1. Loosen six screws (11) with six retaining rings (12) on taillamp assembly (1).
2. Remove door (13) and gasket (14) from taillamp assembly (1). Discard gasket.
3. Open front cover of LED (15) and push in LED (15) with screwdriver, turn counterclockwise and remove from taillamp assembly (1).
4. Push in LED (16) with screwdriver, turn counterclockwke, and remove from taillamp assembly (1).



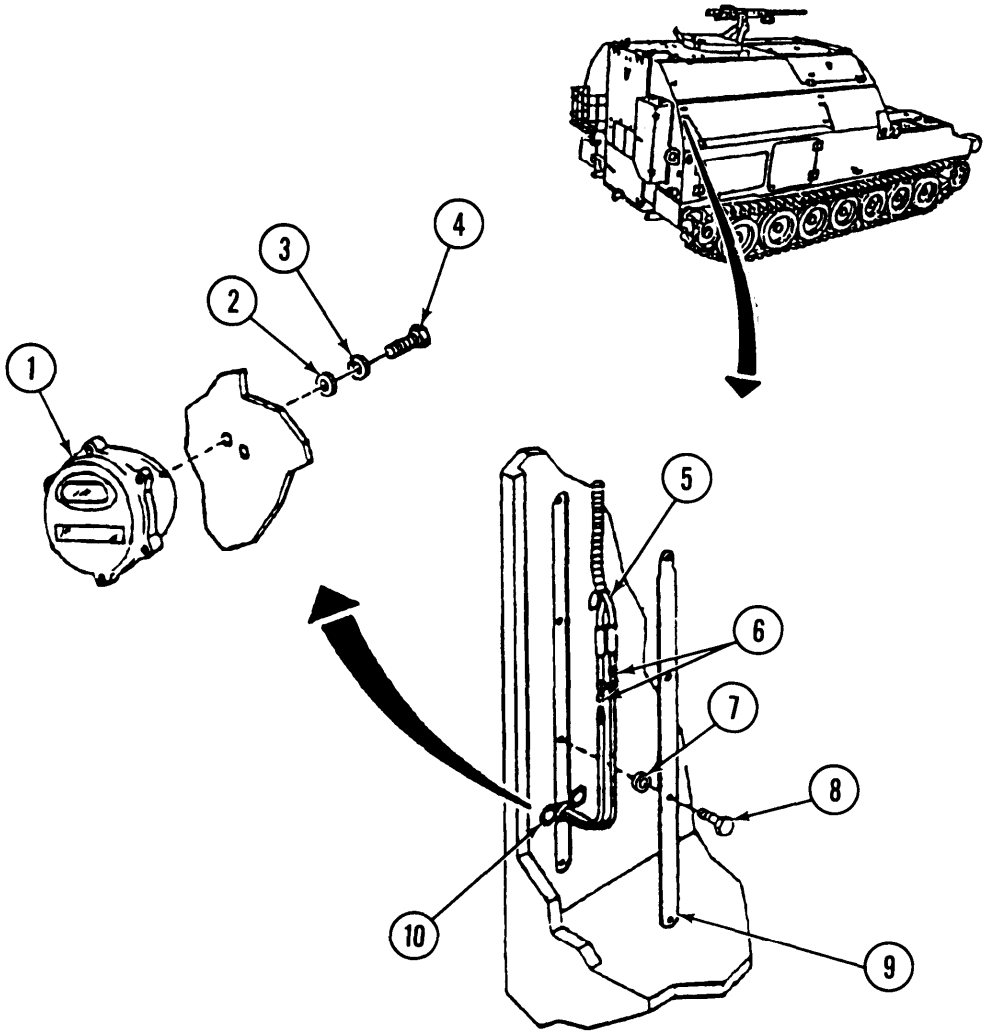
c. ASSEMBLY

1. Install LED (16) on taillamp assembly (1) by pushing in with screwdriver and turning LED (16) clockwise until seated.
2. Install LED (15) on taillamp assembly (1) by pushing in with screwdriver and turning LED (15) clockwise. Close front cover of LED (15).
3. Install door (13) and new gasket (14) on taillamp assembly (1) with six screws (11) and retaining rings (12).

d. INSTALLATION

1. Install grommet (10) and two electrical leads (6) on hull.
2. Install taillamp assembly (1) on hull with two screws (4), new Iockwashers (3), and washers (2).
3. Connect two electrical leads (6) to wiring harness (5).
4. Install four spacers (7), cover plate (9), and four screws (8) on hull.

7-34. RIGHT TAILLAMP ASSEMBLY REPAIR (continued).



FOLLOW-ON MAINTENANCE:

- Connect battery ground cables (para 7-41).

7-35. STEERING SHAFT MASTER WARNING LIGHT REPLACEMENT.

This Task Covens:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Silicone compound (Item 64, Appendix D)
- Cotter pin (Item 17, Appendix H)
- Lockwasher (3) (Item 196, Appendix H)
- Self-locking nut (2) (Item 309, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).

a. REMOVAL

NOTE

Master warning light does not have to be removed to replace lamp.

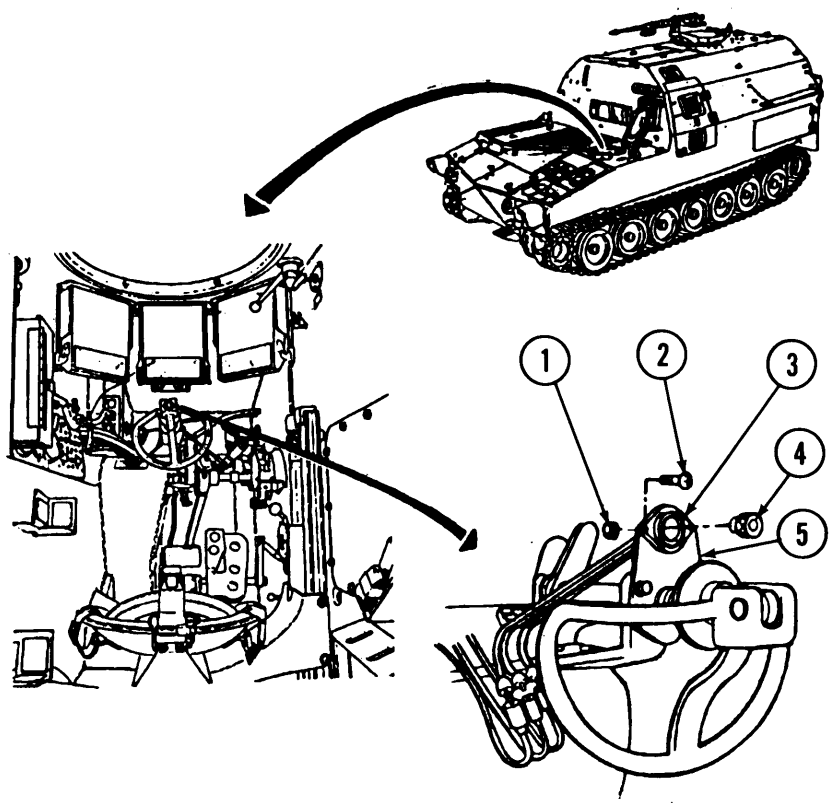
1. Turn lamp (4) counterclockwise and remove from master warning light (3).

NOTE

To ensure proper installation, tag electrical leads at removal.

2. Disconnect three electrical connectors (6) from master warning light (3).

3. Remove two self-locking nuts(1) and screws (2) and master warning light (3) from bracket (5). Discard self-locking nuts.



WARNING

Be careful when removing steering wheel. Steering wheel and collar are under spring tension and may move forward suddenly, causing injury to personnel.

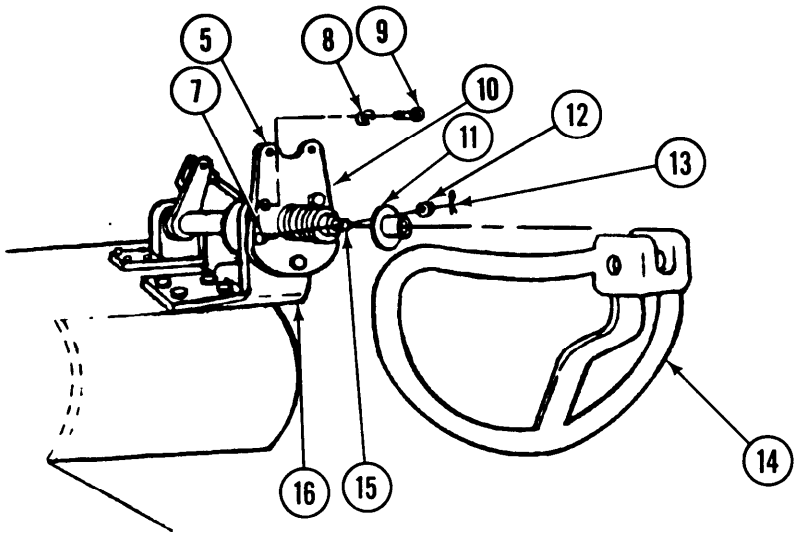
7-35. STEERING SHAFT MASTER WARNING LIGHT REPLACEMENT (continued).

NOTE

Perform steps 4 and 5 only if bracket requires replacement.

4. Remove cotter pin (13), washer (12), straight pin (7), steering wheel (14), collar (11), and spring (10) from steering shaft (15). Discard cotter pin.

5. Remove three screws (9) and lockwashers (8) and bracket (5) from steering column bracket (16). Discard lockwashers.



b. INSTALLATION

NOTE

Perform steps 1 and 2 only if steering wheel was removed.

1. Install bracket (5) on steering column bracket (16) with three screws (9) and new lockwashers (8).

WARNING

Be careful when installing steering wheel. Steering wheel and collar are under spring tension and may move forward suddenly, causing injury to personnel.

2. Install spring (10), collar (11), and steering wheel (14) on steering shaft (15) with straight pin (7), washer (12), and new cotter pin (13).

3. Install master warning light (3) on bracket (5) with two screws (2) and new self-locking nuts (1).

4. Apply silicone compound to shells of three electrical connectors (6).

5. Connect three electrical connectors (6) to master warning light (3).

6. Install lamp (4) in master warning light (3) by turning lamp (4) clockwise.

FOLLOW-ON MAINTENANCE:
- None

7-36. ENGINE COOLANT TEMPERATURE TRANSMITTER REPLACEMENT.

This task covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix l)

Materials/Parts:
- Teflon pipe sealant (Item 63, Appendix D)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Air intake grille opened and locked in position (refer to TM 9-2350-287-10).

a. REMOVAL

WARNING

Engine must be cool before removing transmitter. Removal of transmitter from hot engine will allow hot coolant to spurt from transmitter receptacle, possibly causing severe burns.

1. Disconnect lead 33A from electrical connector (1) of temperature transmitter (2).

NOTE

Cooling system coolant will drain from opening when transmitter is removed. Install replacement transmitter immediately.

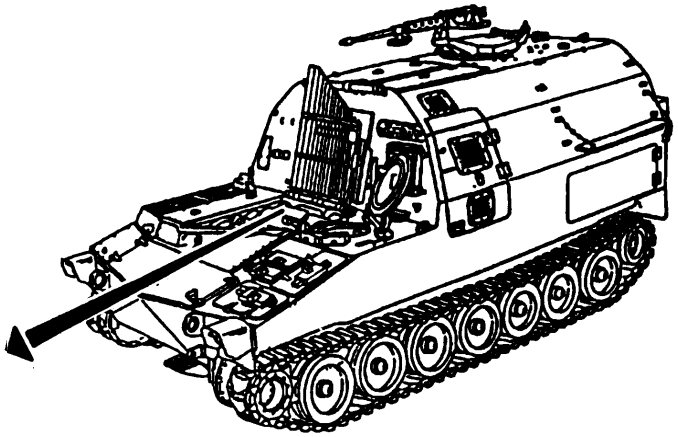
2. Unscrew and remove temperature transmitter (2) from vehicle.

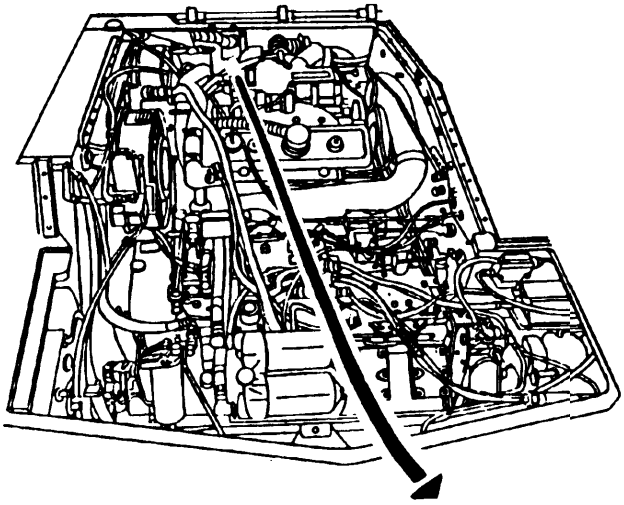
b. INSTALLATION

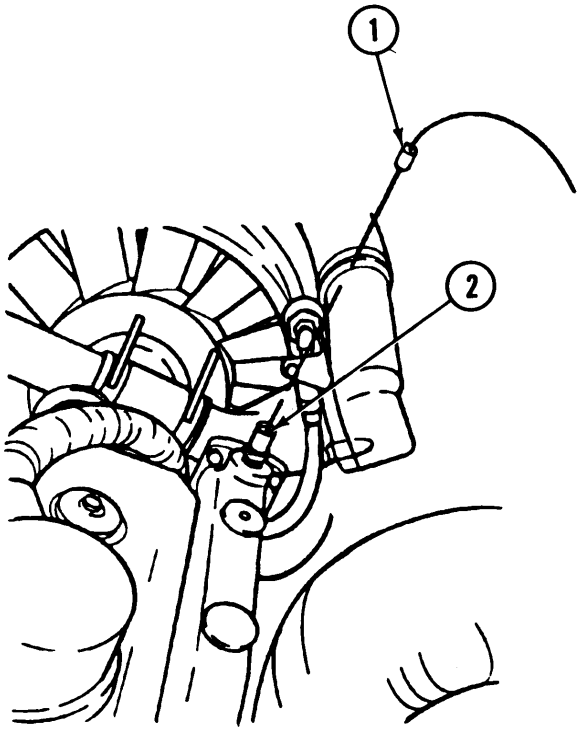
1. Apply Teflon pipe sealant to threads of temperature transmitter (2), and install temperature transmitter (2) in vehicle.

2. Connect lead 33A to electrical connector (1) of temperature transmitter (2).

7-36. ENGINE COOLANT TEMPERATURE TRANSMITTER REPLACEMENT (continued).







FOLLOW-ON MAINTENANCE:

- Close air intake grille (refer to TM 9-2350-287-10).

7-37. ENGINE COOLANT HIGH TEMPERATURE SWITCH REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Teflon pipe sealant (Item 63, Appendix D)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Air intake grille opened and locked in position (refer to TM 9-2350-287-10).

a. REMOVAL

WARNING

Engine must be cool before removing engine coolant high temperature switch. Removal of switch from hot engine will allow hot coolant to spurt from switch receptacle, possibly causing severe burns.

NOTE

Working temperature range of switch is 218° to 232°F.

1. Disconnect wire 509A from electrical connector (1) of engine coolant high temperature switch (2).

NOTE

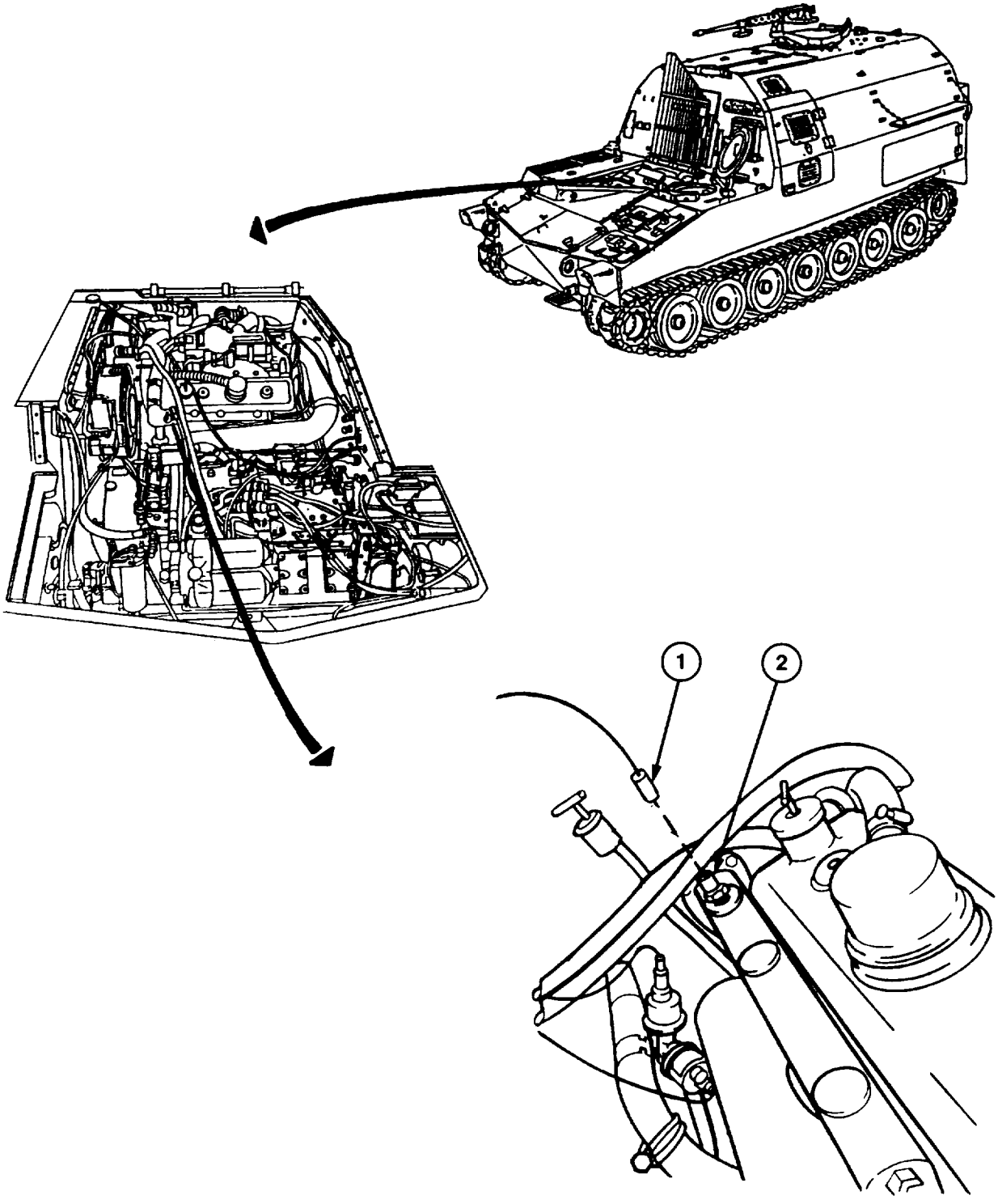
When switch is removed, coolant will drain through switch mounting opening. Replacement switch should be installed immediately to prevent loss of coolant.

2. Unscrew and remove switch (2) from vehicle.

b. INSTALLATION

1. Apply Teflon pipe sealant to threads of switch (2), and install switch (2) in vehicle.
2. Connect wire 509A to electrical connector (1) of switch (2).

7-37. ENGINE COOLANT HIGH TEMPERATURE SWITCH REPLACEMENT (continued).



FOLLOW-ON MAINTENANCE:

- Close air intake grille (refer to TM 9-2350-287-10).

7-38. ENGINE OIL PRESSURE TRANSMITTER, ENGINE OIL LOW PRESSURE SWITCH, AND AIR CLEANER BLOWER MOTOR SWITCH REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Teflon pipe sealant (Item 63, Appendix D)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Engine compartment access cover removed (para 15-16).

[Equipment Condition Deleted]

a. REMOVAL

WARNING

Hot engine may cause severe burns or injury to personnel. Make sure engine has cooled.

NOTE

Oil pressure switch energizes air cleaner blower motor relay and generator system relay.

1. Disconnect wire 76B electrical connector (2) from air cleaner blower motor switch (1).
2. Unscrew and remove air cleaner blower motor switch (1) from vehicle.
3. Disconnect wire 509B electrical connector (6) from engine oil low pressure switch (5).
4. Unscrew and remove engine oil low pressure switch (5) from vehicle.
5. Disconnect wire 36 electrical connector (4) from engine oil pressure transmitter (3).
6. Unscrew and remove engine oil pressure transmitter (3) from vehicle.

b. INSTALLATION

WARNING

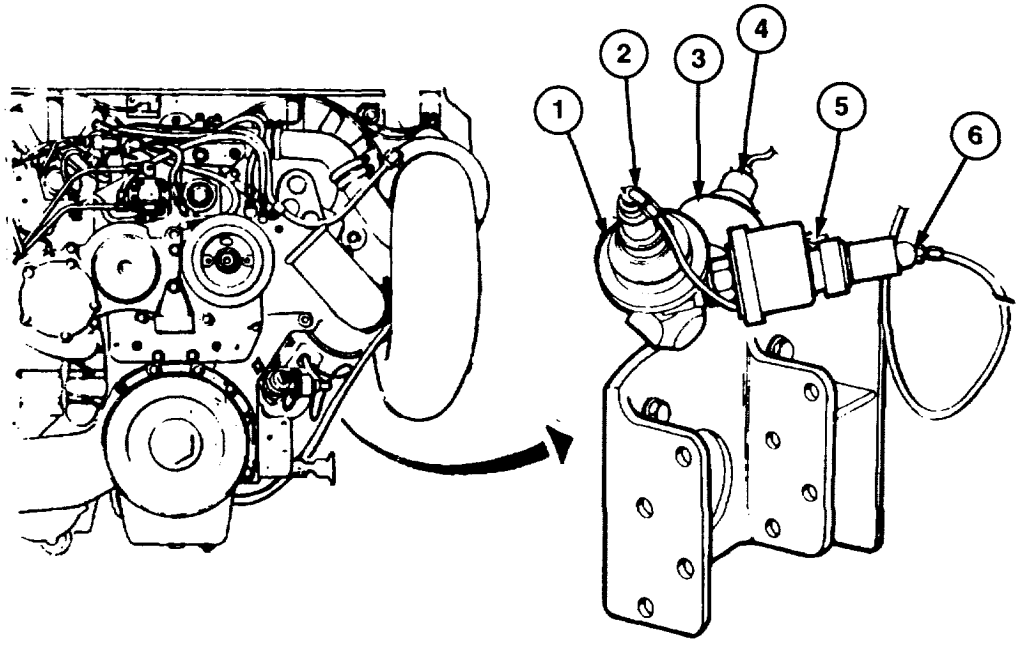
Sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If sealing compound gets on skin or clothing, wash immediately with soap and water.

7-38. ENGINE OIL PRESSURE TRANSMITTER, ENGINE OIL LOW PRESSURE SWITCH, AND AIR CLEANER BLOWER MOTOR SWITCH REPLACEMENT (continued).

NOTE

The operating pressure range for each part is as follows: Engine oil pressure transmitter, 0-120 psi; engine oil low pressure switch, 15-9 psi; and air cleaner blower motor switch, 9-13 psi.

1. Apply sealing compound to threads and install engine oil pressure transmitter (3) in vehicle.
2. Connect wire 36 electrical connector (4) to engine oil pressure transmitter (3).
3. Apply sealing compound to threads and install engine oil low pressure switch (5) in vehicle.
4. Connect wire 509B electrical connector (6) to engine oil low pressure switch (5).
5. Apply sealing compound to threads and install air cleaner blower motor switch (1) in vehicle.
6. Connect wire 76B electrical connector (2) to air cleaner blower motor switch (1).



FOLLOW-ON MAINTENANCE:

- Install engine compartment access cover (para 15-16).
  [Follow-On Task Deleted]

7-39. TRANSMISSION OIL TEMPERATURE TRANSMITTER AND OIL HIGH TEMPERATURE SWITCH REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Sealing compound (Item 59, Appendix D)
- Lockwasher (2) (Item 196, Appendix H)

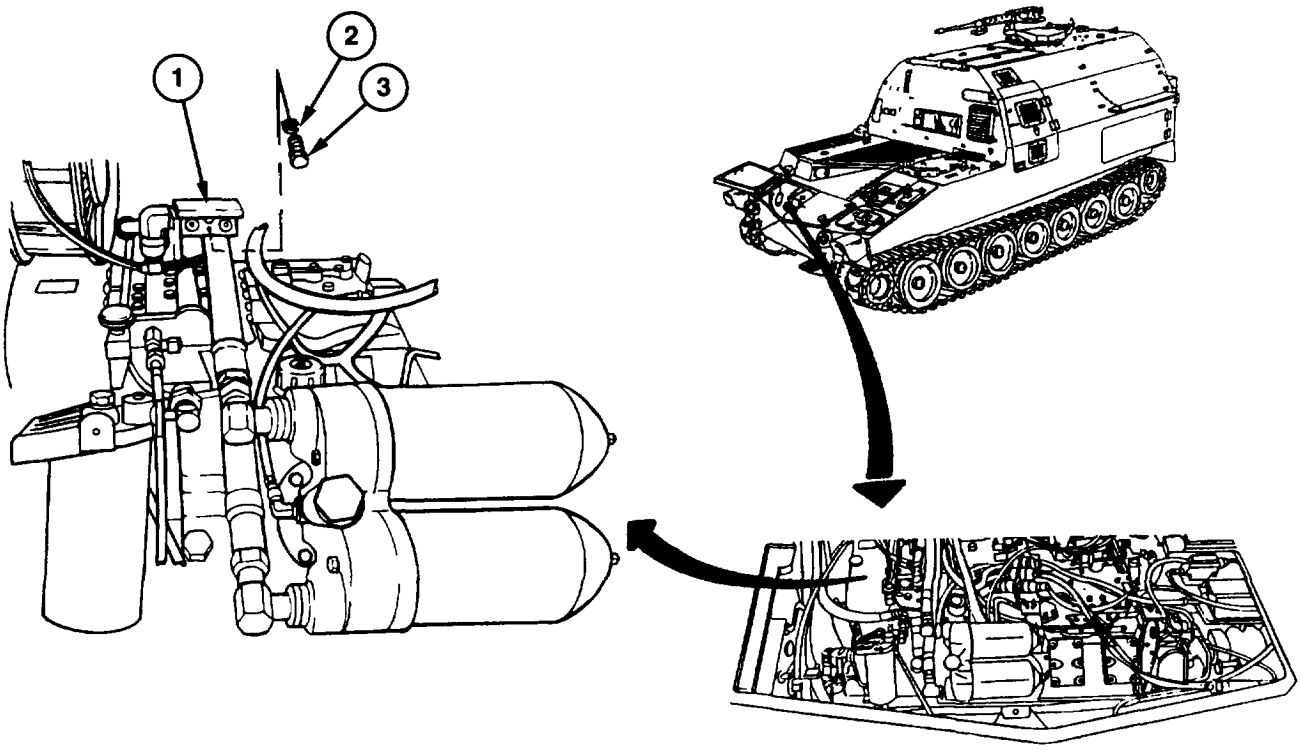
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Right transmission access door opened and secured (refer to TM 9-2350-287-10).

a. REMOVAL

WARNING

Hot engine may cause severe burns or injury to personnel. Make sure engine has cooled before removing switches.

1. Remove two screws (3) and lockwashers (2) from transmission, and slide bracket (1) forward from transmission. Discard lockwashers.



7-39. TRANSMISSION OIL TEMPERARE TRANSMITTER AND OIL HIGH TEMPERATURE SWITCH REPLACEMENT (continued).

2. Disconnect wire 324 from electrical connector (6) of transmission oil temperature transmitter (5).

3. Disconnect wire 509D from electrical connector (7) of transmission oil high temperature switch (4).

4. Remove bracket (1) from wires at two electrical connectors (6 and 7).

NOTE

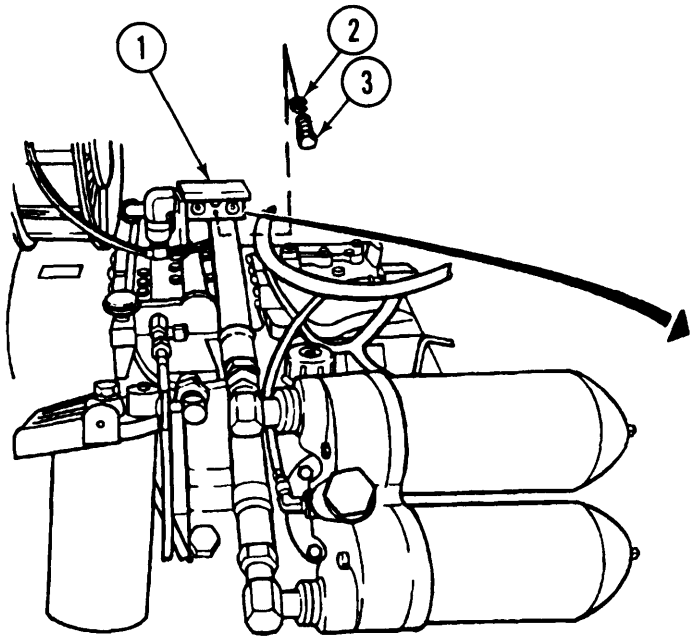
The operating temperature range of transmission oil temperature transmitter is 120°F to 280°F.

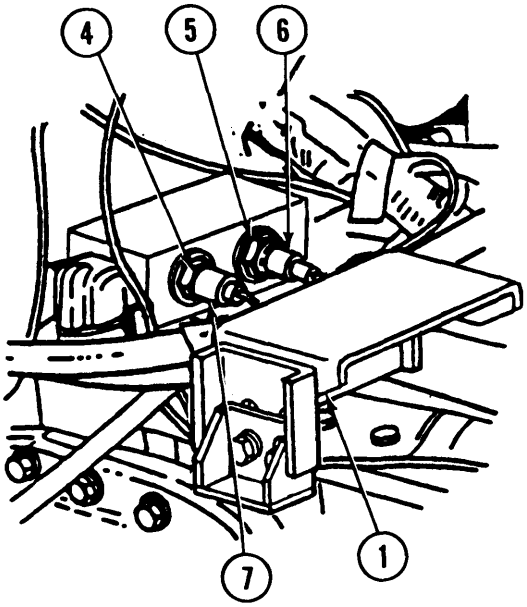
5. Unscrew and remove transmission oil temperature transmitter (5) from vehicle.

NOTE

The operating temperature range of transmission oil high temperature switch is 298°F to 312°F.

6. Unscrew and remove transmission oil high temperature switch (4) from vehicle.





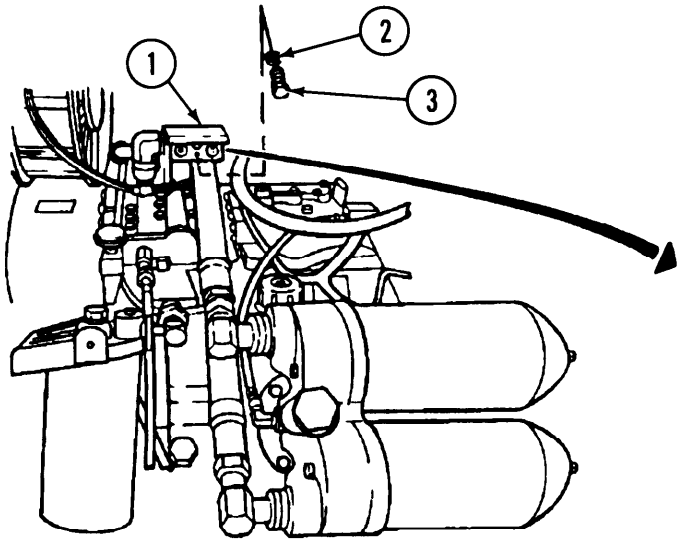
7-39. TRANSMISSION OIL TEMPERATURE TRANSMITTER AND OIL HIGH TEMPERATURE SWITCH REPLACEMENT (continued).

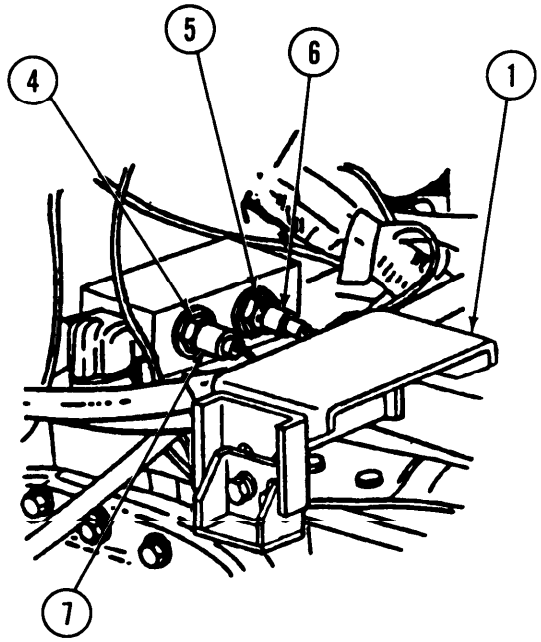
b. INSTALLATION

WARNING

Sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open firs and use in a well-ventilated area. if sealing compound gets on skin or clothing, wash immediately with soap and water.

1. Apply sealing compound to threads of transmission oil high temperature switch (4), and install transmission oil high temperature switch (4) in vehicle.
2. Apply sealing compound to threads of transmission oil temperature transmitter (5), and install transmission oil temperature transmitter (5) in vehicle.
3. Install wires on two electrical connectors (6 and 7) through bracket (1).
4. Connect wire 509D to electrical connector (7) of transmission oil high temperature switch (4).
5. Connect wire 324 to electrical connector (6) of transmission oil temperature transmitter (5).
6. Secure bracket (1) to transmission with two screws (3) and new lockwashers (2).





FOLLOW-ON MAINTENANCE:
- Close and secure right transmission access door (refer to TM 9-2350-287-10).

7-40. TRANSMISSION OIL PRESSURE TRANSMITTER AND OIL LOW PRESSURE SWITCH REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix l)

Materials/Parts:
- Teflon pipe sealant (Item 63, Appendix D)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Air intake grille opened and secured (refer to TM 9-2350-287-10).

a. REMOVAL

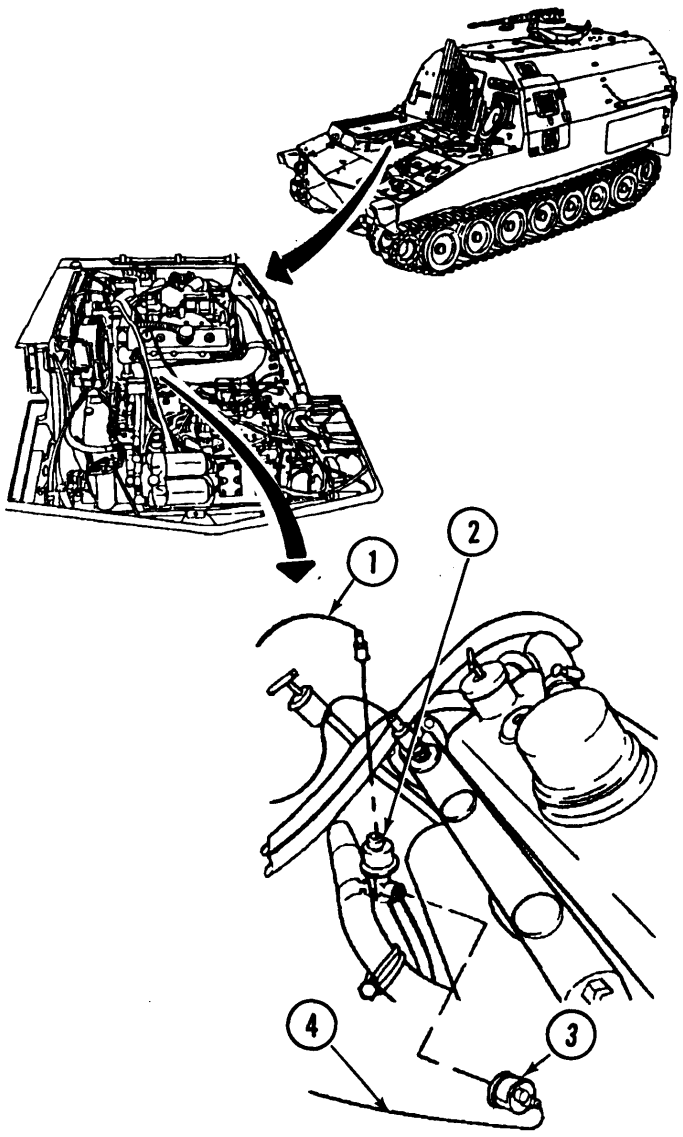
WARNING

A hot engine may cause severe burns or injury to personnel. Make sure engine has cooled before removing switch.

NOTE

- Perform steps 1 and 2 only if removing transmission oil pressure transmitter.
- Perform steps 3 and 4 only if removing transmission oil low pressure switch.

1. Disconnect wire 321 from electrical connector (1) of transmission oil pressure transmitter (2).
2. Unscrew and remove transmission oil pressure transmitter (2) from vehicle.
3. Disconnect wire 509C from electrical connector (4) of transmission low oil pressure switch (3).
4. Unscrew and remove transmission low oil pressure switch (3) from vehicle.



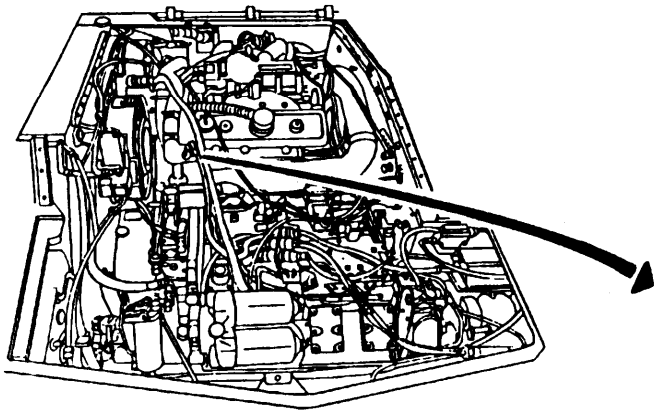
7-40. TRANSMISSION OIL PRESSURE TRANSMITTER AND OIL LOW PRESSURE SWITCH REPLACEMENT (continued).

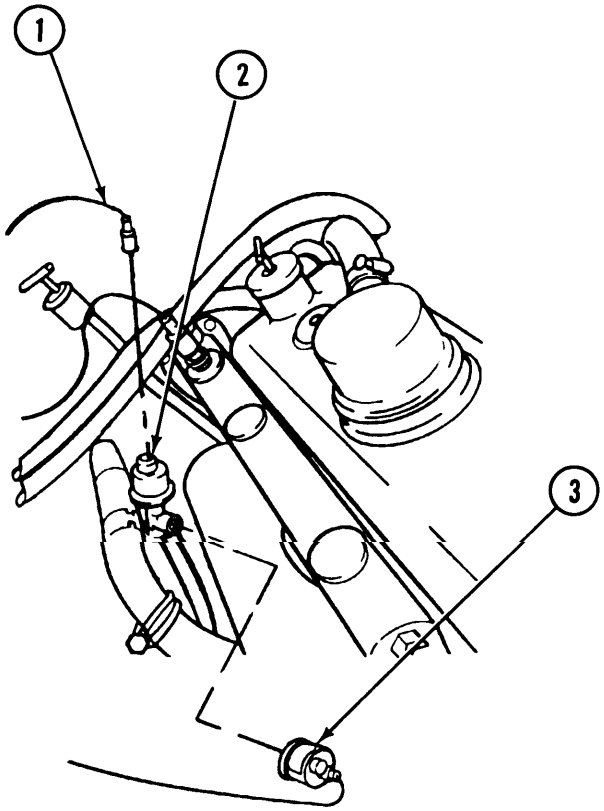
b. INSTALLATION

NOTE

- Perform steps 1 and 2 only if removing transmission oil pressure transmitter.
- Perform steps 3 and 4 only if removing transmission oil low pressure switch.

1. Apply Teflon pipe sealant to threads of transmission oil pressure transmitter (2), and install transmission oil pressure transmitter (2) in vehicle.
2. Connect wire 321 to electrical connector (1) of transmission oil pressure transmitter (2).
3. Apply sealing compound to threads of transmission low oil pressure switch (3) and install transmission low oil pressure switch (3) in vehicle.
4. Connect wire 509C to electrical connector (4) of transmission low oil pressure switch (3).





FOLLOW-ON MAINTENANCE:
- Close air intake grille (refer to TM 9-2350-287-10).

7-41. BATTERY REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment
- General mechanic's tool kit (Item 24, Appendix l)
- Battery terminal puller (Item 6, Appendix l)

Materials/Parts:
- Lockwasher (8) (Item 177, Appendix H)

References: TM 9-140-200-14

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

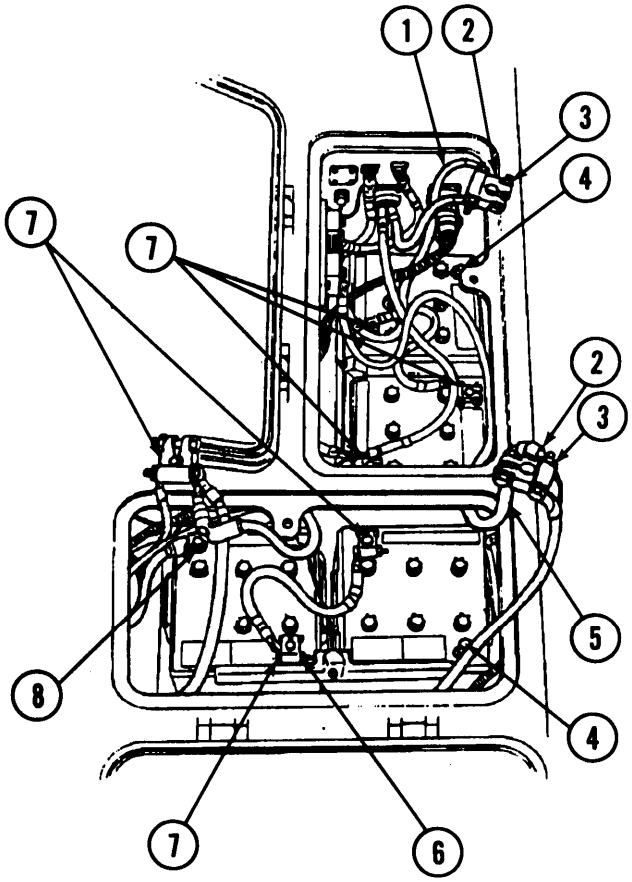
a. REMOVAL

- When removing batteries, always disconnect ground cables first. Failure to do so may result in injury or death to personnel.
- Batteries can emit gases that explode. Do not smoke, have open flame, or make sparks around batteries. Batteries emitting gases can explode, causing injury or death to personnel.

NOTE

Remove cables with terminal lugs attached.

1. Loosen two nuts (3), on two battery terminals (2).
2. Using battery terminal puller, remove ground cables (1 and 5), and two battery terminals (2) from two battery terminal posts (4).
3. Loosen six nuts (6), on six battery terminals (7).
4. Using battery terminal puller, remove six battery terminals (7) from six terminal posts (8).



7-41. BATTERY REPLACEMENT (continued).

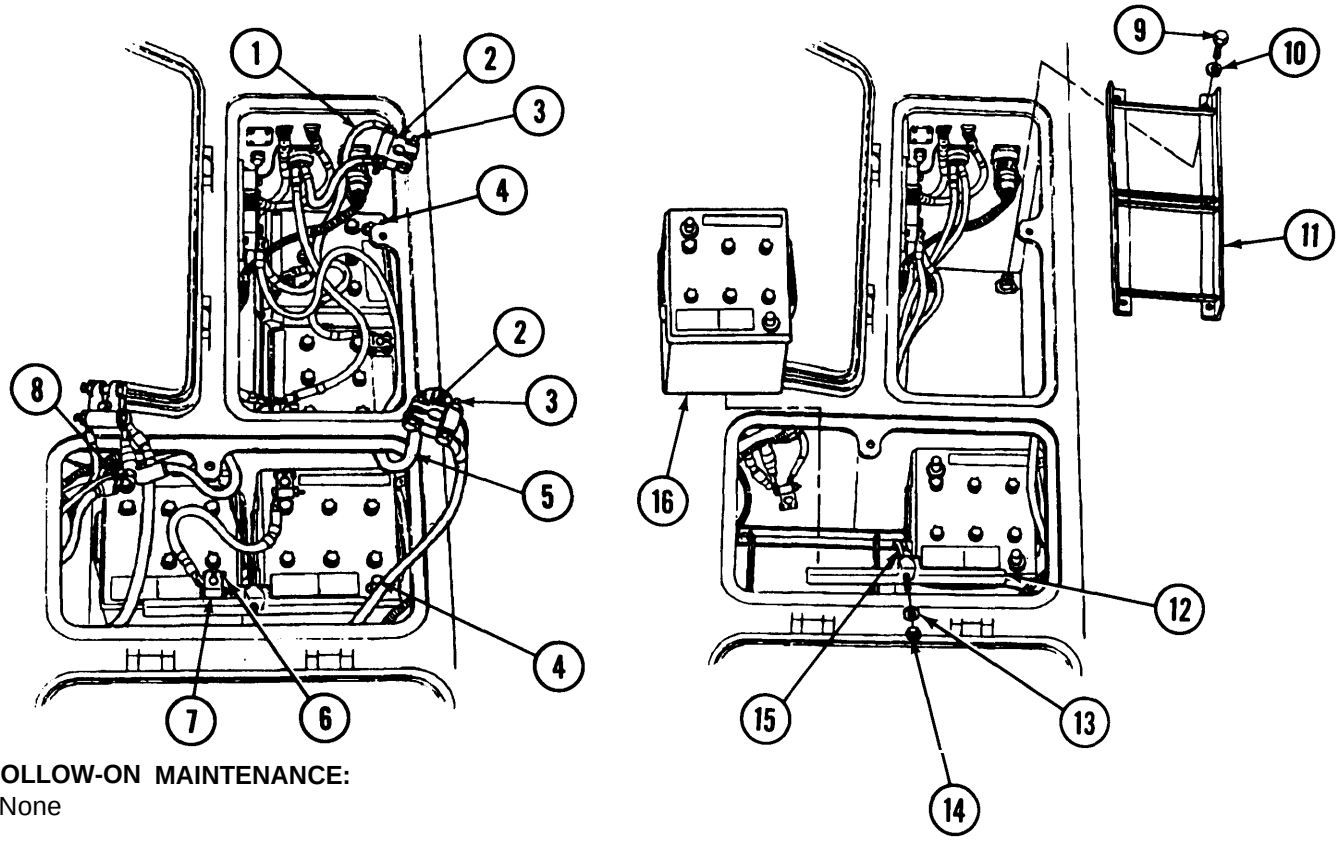
5. Remove two nuts (14), washers (13), and two hold-down brackets (12) from four batteries (16).
6. Remove two hold-down rods (15) from battery trays (11).
7. Lift four batteries (16) out of two battery trays (11).
8. Remove eight screws (9) and lockwashers (10) and two battery trays (11) from vehicle. Discard lockwashers.

NOTE

Service batteries (refer to TM 9-61 40-200-14).

b. INSTALLATION

1. Install two battery trays (11) in vehicle with eight screws (9), and new lockwashers (10).
2. Install four batteries (16) on two battery trays (11).
3. Install two hold-down rods (15) in two battery trays (11).
4. Install two nuts (14), washers (13), and two hold-down rods (15) on four batteries (16).
5. Install six battery terminals (7) on six terminal posts (8), and tighten six nuts (6).
6. Install two grounds (5 and 1) and two battery terminals (2) on two battery posts (4), and tighten nuts (3).



FOLLOW-ON MAINTENANCE:
- None

7-42. BATTERY GROUND AND INTERCONNECTING CABLES (10897992, 10897993, 12330348) REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- Battery terminal puller (Item 6, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix l)

Materials/Parts:
- Lockwasher (4) (Item 138, Appendix H)
- Lockwasher (4) (Item 149, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Battery access doors opened (refer to TM 9-2350-287-10).

a. REMOVAL

WARNING

- **Battery acid (electrolyte) is extremely harmful. Always wear safety goggles and rubber gloves, and do not smoke when performing maintenance on batteries, Injury will result if acid contacts skin or eyes. Wear rubber apron to prevent clothing being damaged.**

- **Remove all jewelry such as rings, identification tags, bracelets, etc. If jewelry contacts battery terminal, a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.**

- **Make sure MASTER switch is set to OFF before working on electrical system. Failure to follow this warning may result in electrical shock to personnel.**

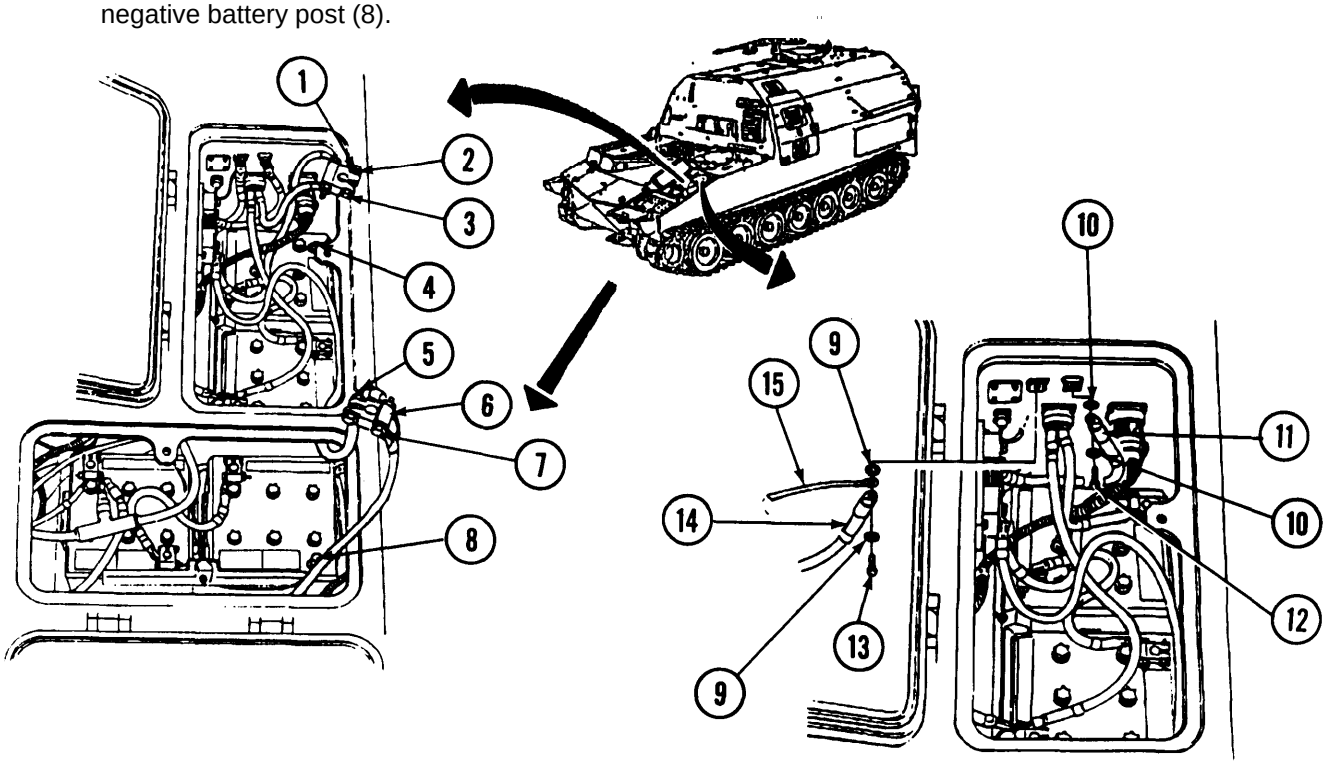
NOTE

There are two locations for mounting leads (10897992) to hull grounds.

7-42. BATTERY GROUND AND INTERCONNECTING CABLES (10897992, 10897993, 12330348) REPLACEMENT (continued).

1. Loosen nut (1) and screw (3) on terminal (2) and, using battery terminal puller, remove terminal (2) from negative battery post (4).

2. Loosen nut (5) and screw (7) on terminal (6) and, using battery terminal puller, remove terminal (6) from negative battery post (8).

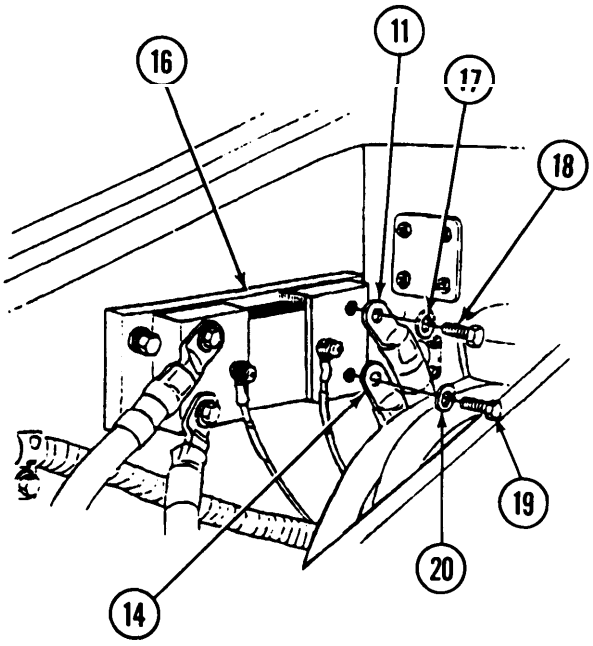


3. Remove screw (12), two lockwashers (10), and lead 10897992 (11) from hull ground. Discard lockwashers.

4. Remove screw (13), two lockwashers (9), lead GND W (15), and lead 10897992 (14) from hull ground. Discard lockwashers.

5. Remove screw (18), lockwasher (17), and lead 10897992 (11) from STE/ICE shunt (16), Discard lockwasher.

6. Remove screw (19), lockwasher (20), and lead 10897992 (14) from STE/ICE shunt (16). Discard lockwasher.



7-42. BATTERY GROUND AND INTERCONNECTING CABLES (10897992, 10897993, 12330348) REPLACEMENT (continued).

7. Remove screw (23), lockwasher (22), and lead 12330348 (21) from STE/ICE shunt (16). Discard lockwasher.

8. Remove nut (30), screw (32), circuit 5 (33), circuit AZ (31), and lead 12330348 (21) from battery terminal (6).

9. Remove screw (24), lockwasher (25), and lead 10897992(26) from STE/ICE shunt (16). Discard lockwasher.

10. Remove nut (28), screw (27), circuit 50 (29), and lead 10897992 (26) from terminal (2).

11. Remove four nuts (34) and two leads 10897993 (36) from four battery terminals (35).

b. INSTALLATION

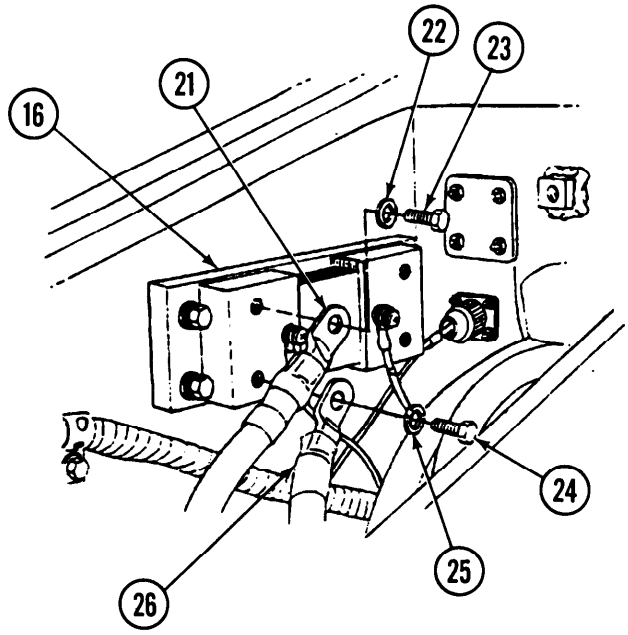
1. Install two leads 10897993 (36) to four battery terminals (35) with four nuts (34).

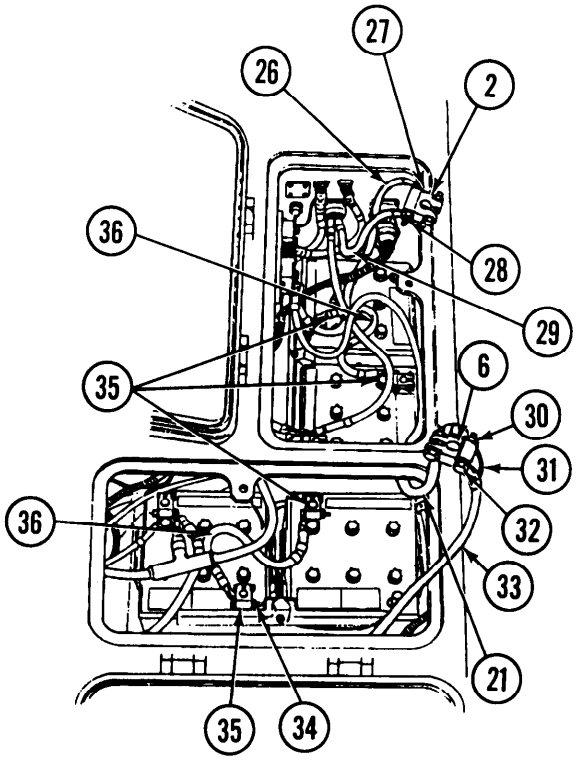
2. Install lead 10897992 (26) and circuit 50 (29) on terminal (2) with screw (27) and nut (28).

3. Install lead 12330348 (21), circuit 5 (33), and circuit AZ (31) on battery terminal (6) with nut (30) and screw (32).

4. Install lead 10897992 (26) on STE/ICE shunt (16) with new lockwasher (25) and screw (24).

5. Install lead 12330348 (21) on STE/ICE shunt (16) with new lockwasher (22) and screw (23).





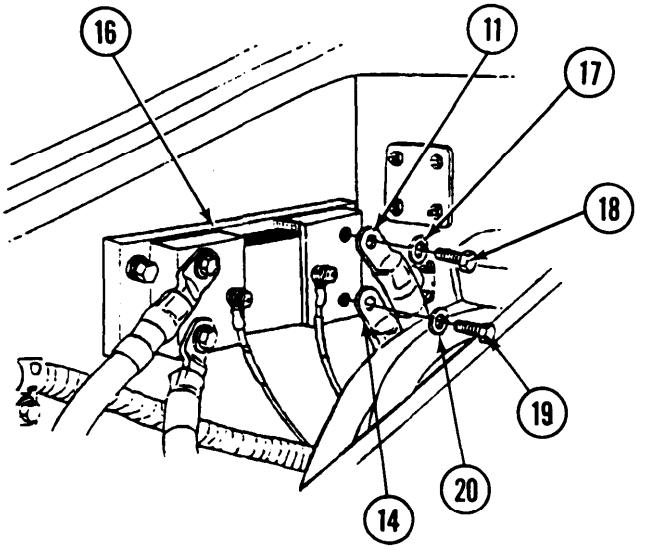
7-42. BATTERY GROUND AND INTERCONNECTING CABLES (1 0897992, 10897993, 12330348) REPLACEMENT (continued).

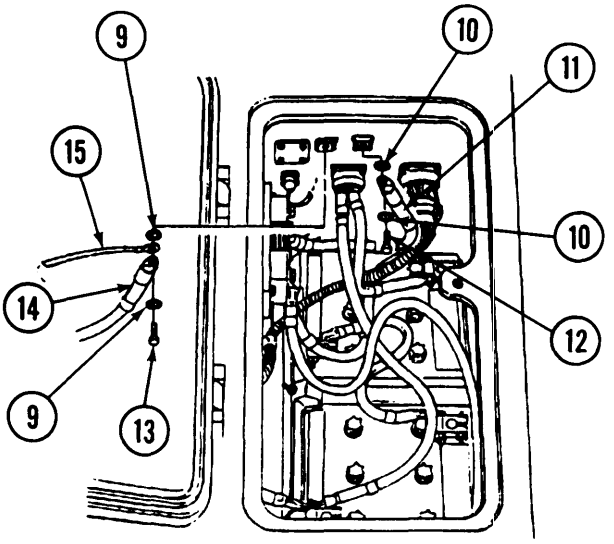
6. Install lead 10897992 (14) on STE/lCE shunt (17) with new Iockwasher (20) and screw (19).

7. Install lead 10897992 (11) on STE/lCE shunt (16) with new Iockwasher (17) and screw (18).

8. Install lead 10897992 (14) and lead GND W (15) on hull ground with two new Iockwashers (9) and screw (13).

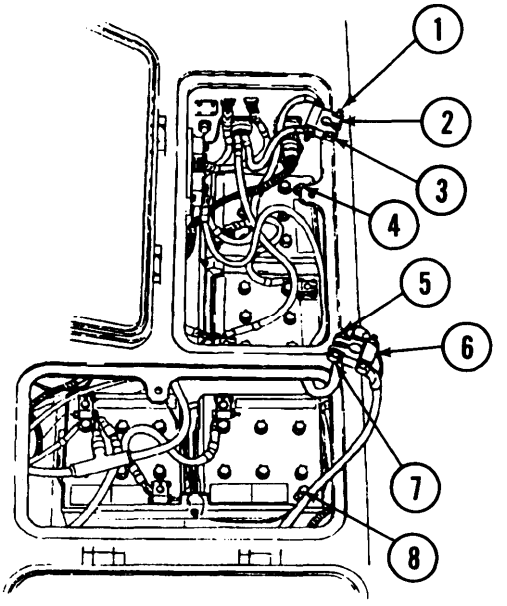
9. Install lead 10897992 (11) on hull ground with two new Iockwashers (10) and screw (12).





10. Install terminal (6) on negative battery post (8), and tighten screw (7) and nut (5).

11. Install terminal (2) on negative battery post (4), and tighten screw (3) and nut (1).



FOLLOW-ON MAINTENANCE:

- Close battery access doors (refer to TM 9-2350-287-10).

7-43. BULKHEAD TO HEADLIGHT/BILGE PUMP WIRING HARNESS (10921380) REPAIR.

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

Initial/Setup:

Tools/Test Equipment:
ŽGeneral mechanic's tool kit (Item 24, Appendix 1)

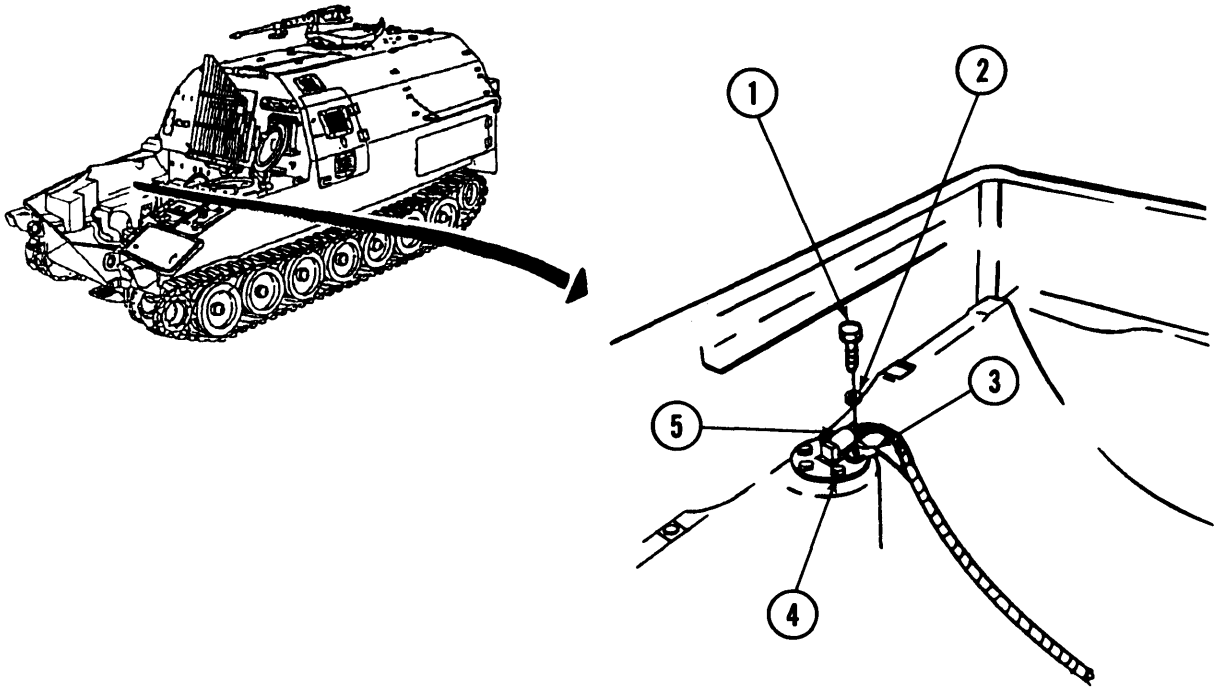
Materials/Parts:
• Electrical insulation tape (Item 67, Appendix D)
ŽLockWasher (14) (Item 175, Appendix H)

Equipment Conditions:
ŽVehicle parked on level ground (refer to TM 9-2350-287-10).
• Powerpack removed (para 3-2).

a. REMOVAL

NOTE

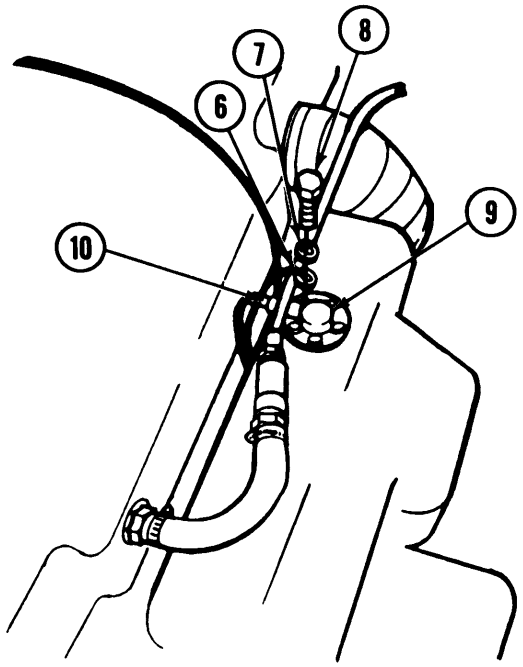
Remove and disassemble wiring harness only to extent required to repair defect.



1. Remove screw (1), washer (2), and ground lead (3) from upper fuel tank fuel level transmitter (4).

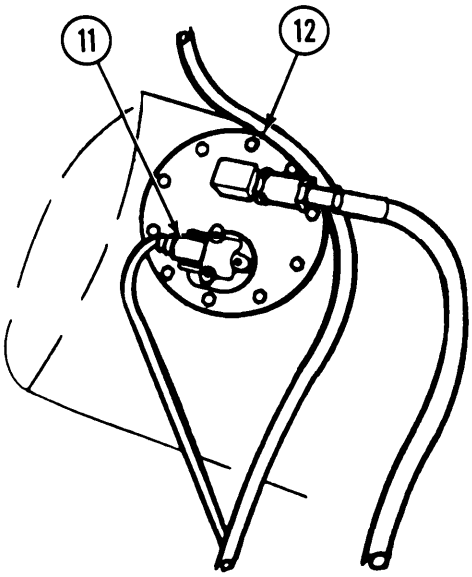
2. Remove connector No. 29 (5) from upper fuel tank fuel level transmitter (4).

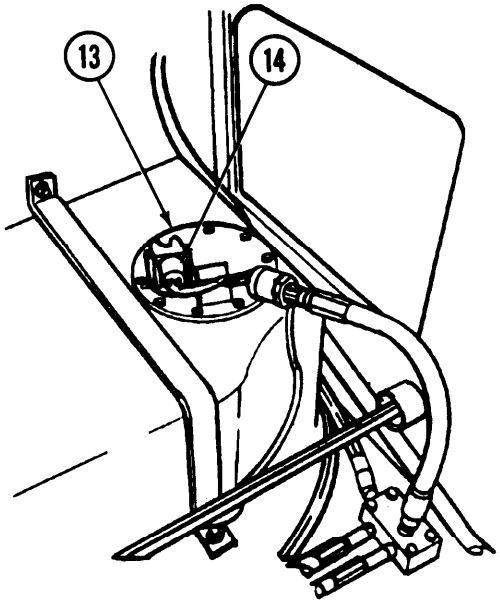
7-43. BULKHEAD TO HEADLIGHT/BILGE PUMP WIRING HARNESS (1 0921380) REPAIR (continued).



3. Remove screw (8), washer (7), and ground lead (6) from lower fuel tank fuel level transmitter (9).

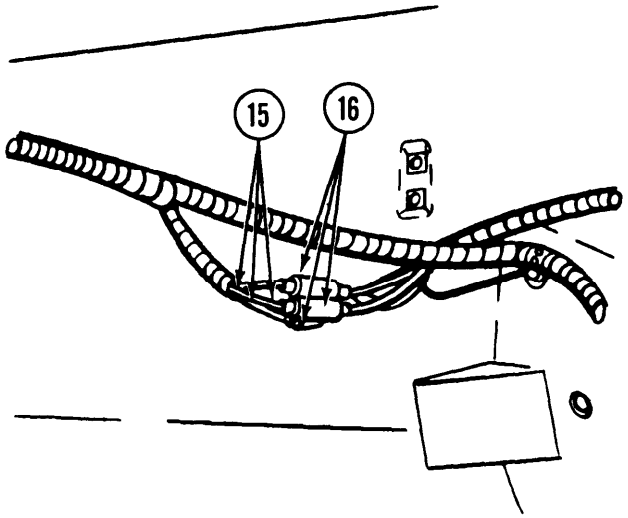
4. Remove connector No. 31 (1 0) from lower fuel tank fuel level transmitter (9).



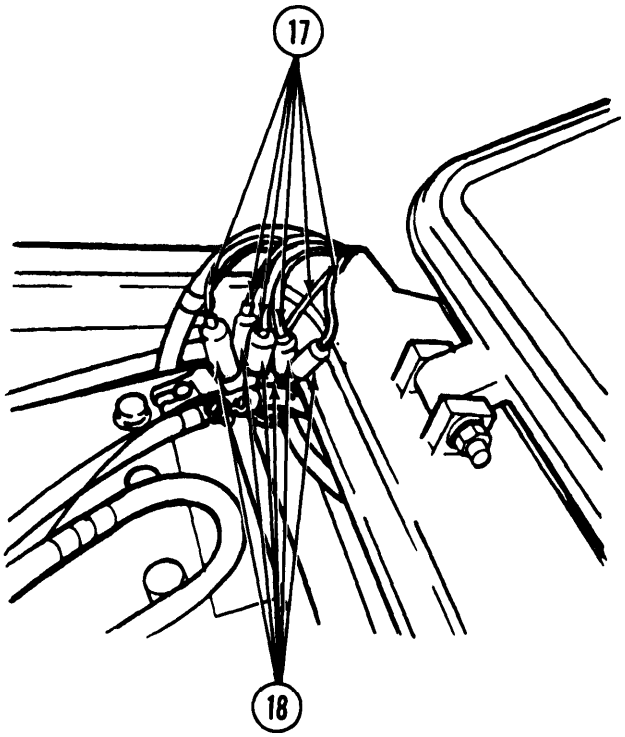


5. Remove two connectors No. 76 (11 and 14) from left and right fuel pumps (12 and 13).

7-43. BULKHEAD TO HEADLIGHTS/BILGE PUMP WIRING HARNESS (1 0921380) REPAIR (continued).

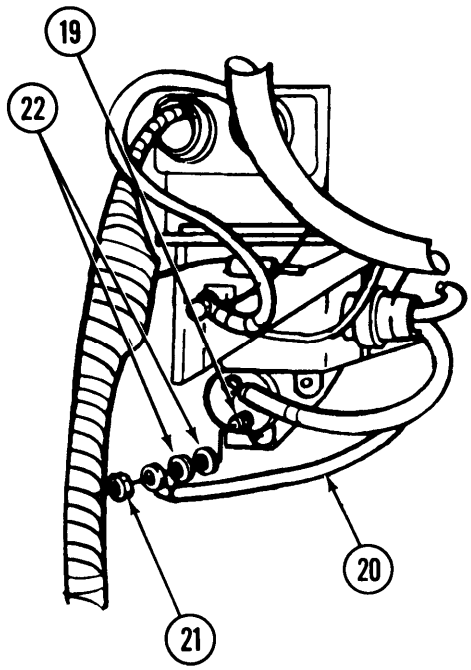


6. Disconnect connectors Nos. 17, 514, 20, 18, and 515 (16) from right headlight assembly wiring harness connectors Nos. 17, 514, 20, 18, and 515 (15).

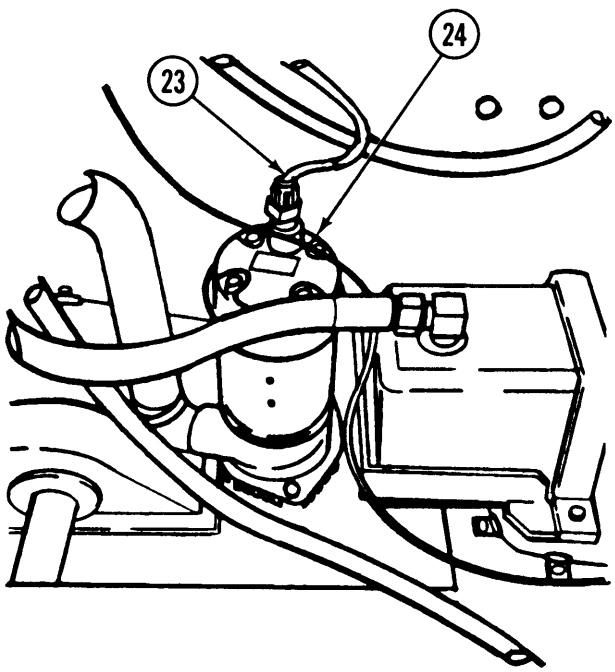


7. Disconnect connectors Nos. 17, 514, 20, 18, 19, and 515 (18) from left headlight assembly wiring harness connectors Nos. 17,514, 20, 18, 19, and 515 (17).

7-43. BULKHEAD TO HEADLIGHTS/BILGE PUMP WIRING HARNESS (1 0921380) REPAIR (continued).

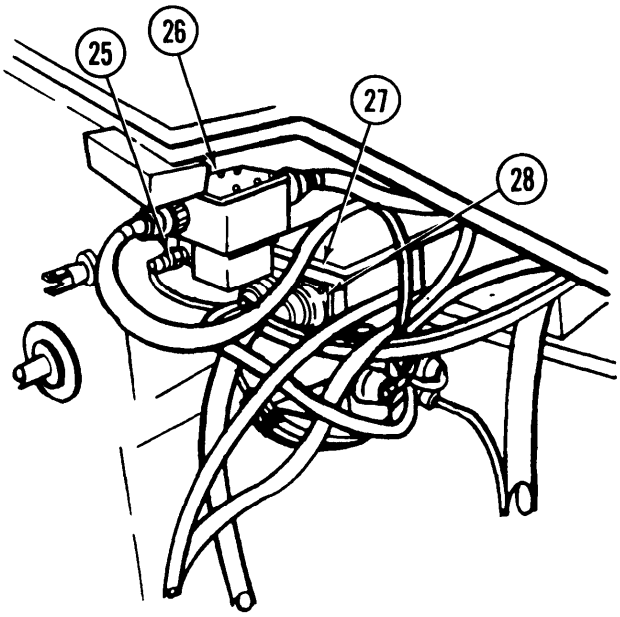


8. Remove nut (21), connector wire No. 452B (20), and two washers (22) from bilge pump circuit breaker (19).



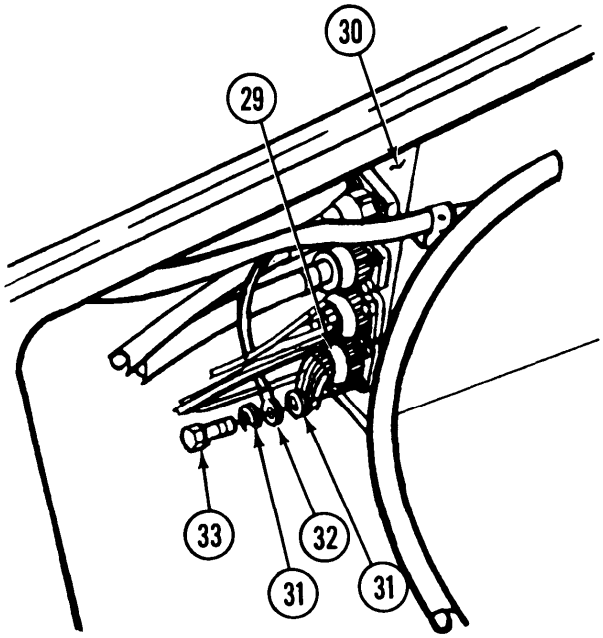
9. Remove electrical connector No. 452 (23) from bilge pump (24).

7-43. BULKHEAD TO HEADLIGHTS/BILGE PUMP WIRING HARNESS (1 0921380) REPAIR (continued).



10. Remove electrical connector No. 459 (25) fron master relay (26).

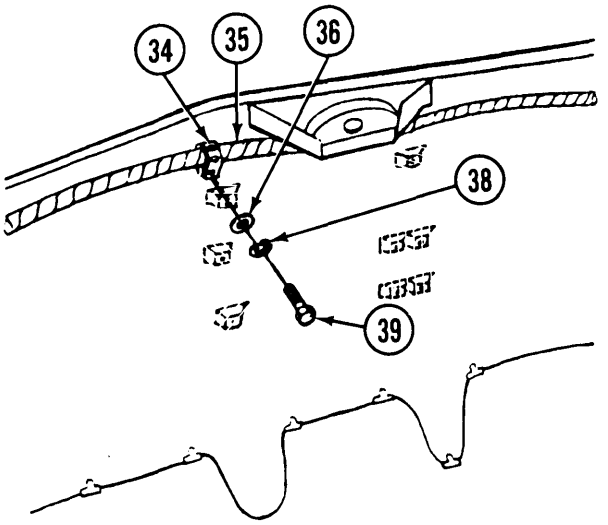
11. Remove electrical connector (28) from bildge pump relay (27).



12. Remove electrical connector (29) from driver's bulkhead (30).

13. Remove screw (33), two washers (31), and ground lead (32).

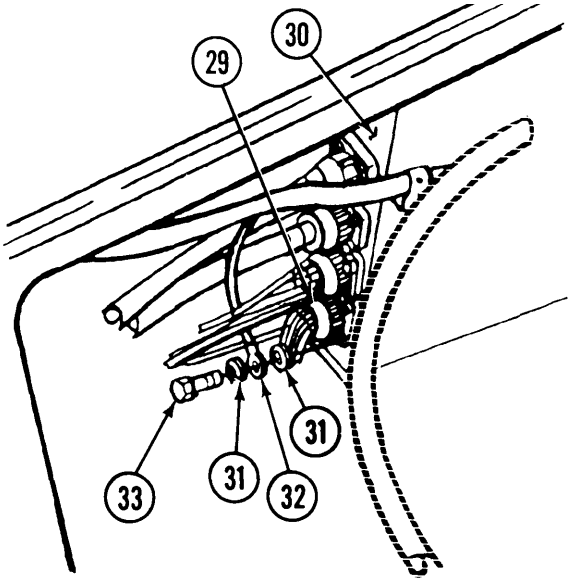
7-43. BULKHEAD TO HEADLIGHTS/BILGE PUMP WIRING HARNESS (1 0921380) REPAIR (continued).



14. Remove 14 screws (38), lockwashers (37), washers (36), and straps (34) and wiring harness (35) from vehicle. Discard lockwashers.

b. INSTALLATION

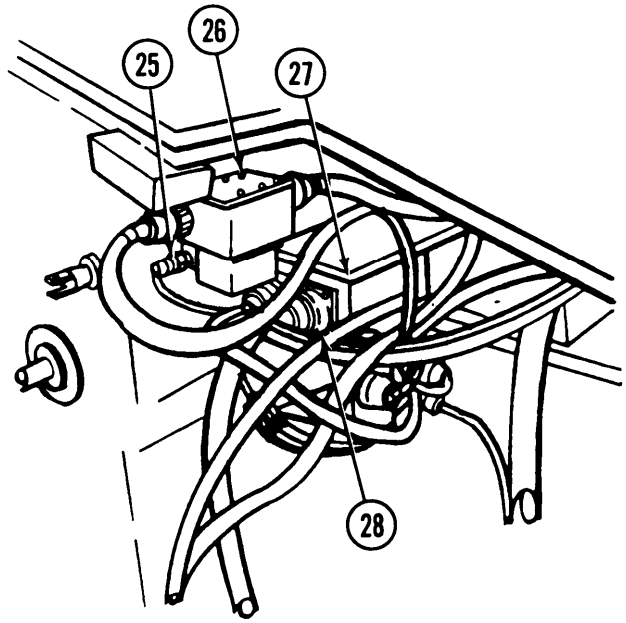
1. Install wiring harness (35) in vehicle with 14 straps (34), washers (36), new lockwashers (37), and screws (38).



2. Install ground lead (32) with screw (33) and two washers (31).

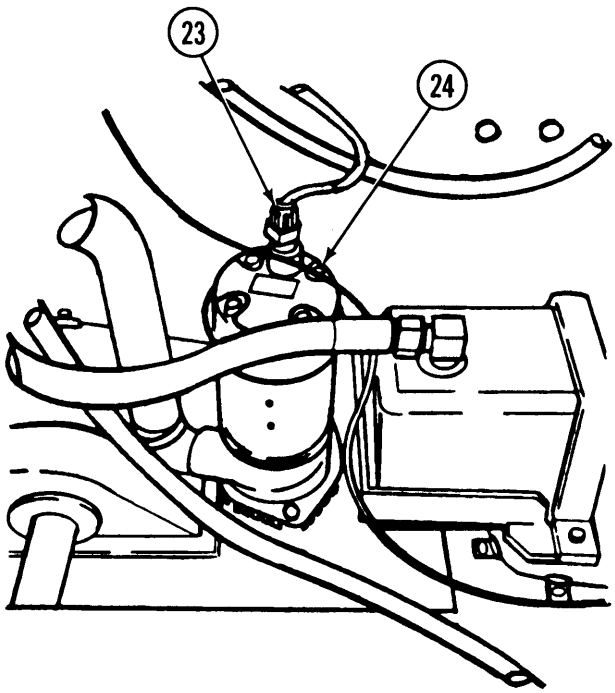
3. Install electrical connector (29) on drivets bulkhead (30).

7-43. BULKHEAD TO HEADLIGHTS/BILGE PUMP WIRING HARNESS (10921380) REPAIR (continued).



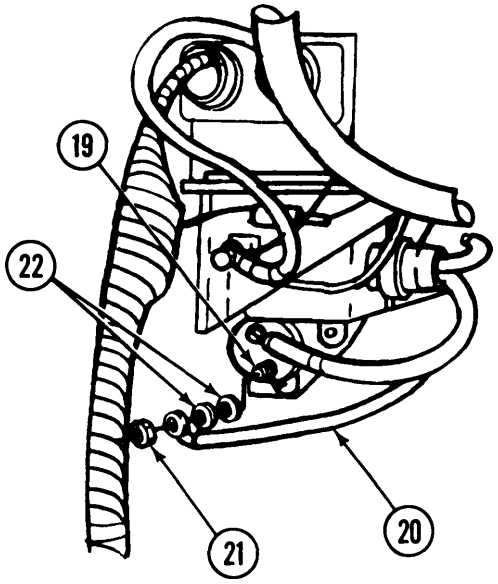
4. Install electrical connector (28) on bilge pump relay (27).

5. Install electrical connector No. 459 (25) on master relay (26).

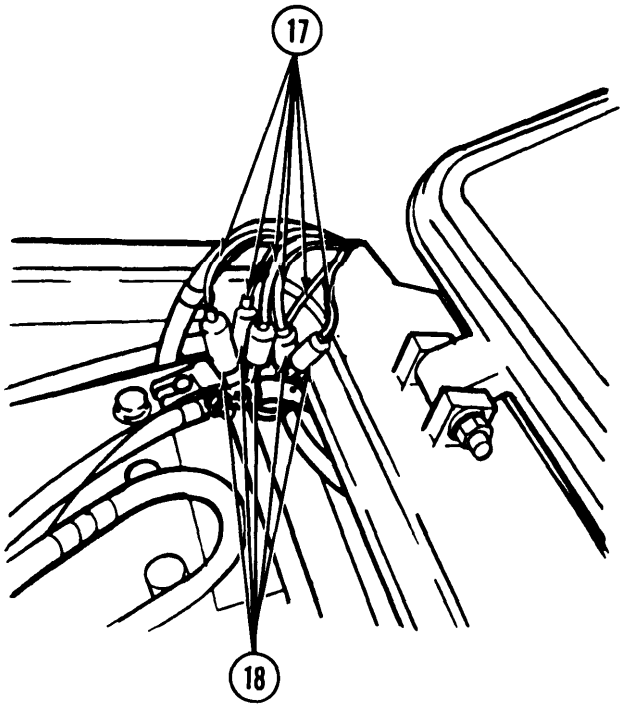


6. Install electrical connector No. 452B (23) on bilge pump (24).

7-43. BULKHEAD TO HEADLIGHTS/BILGE PUMP WIRING HARNESS (1 0921380) REPAIR (continued).

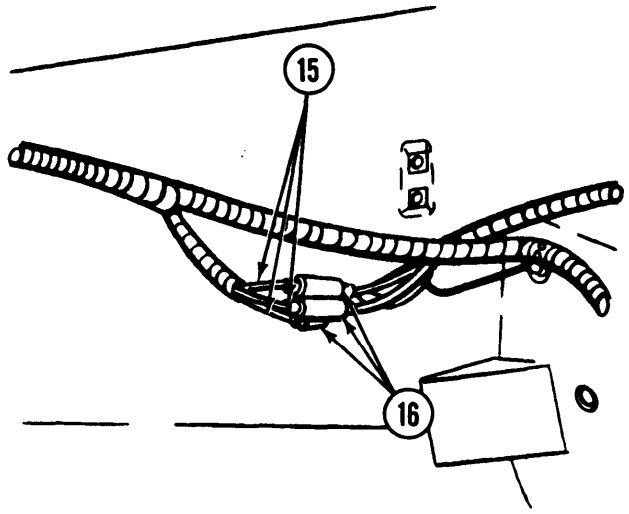


7. Install connector wire No. 452B (20) on bilge pump circuit breaker (19) with nut (21) and two washers (22).

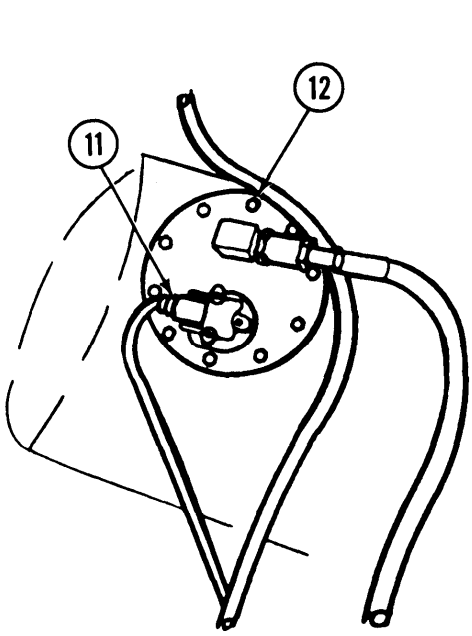


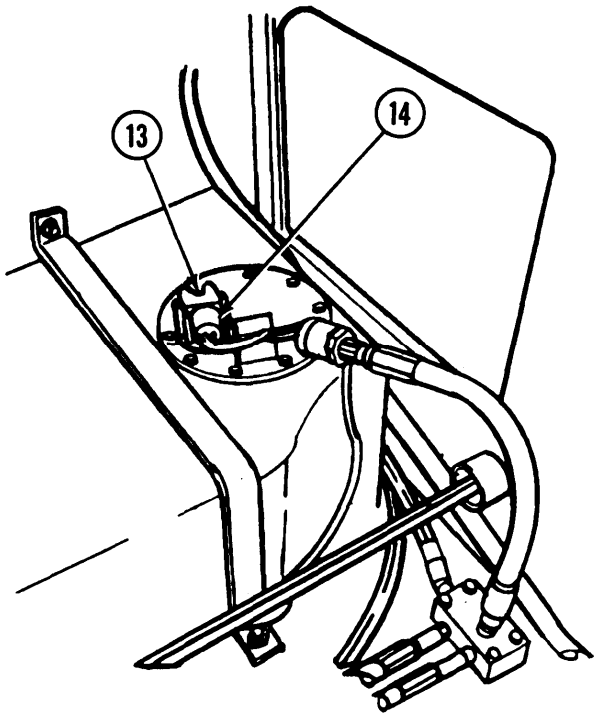
8. Connect connectors Nos. 17, 514, 20, 18, 19, and 515 (18) to left headlight assembly wiring harness connectors Nos. 17, 514, 20, 18, 19, and 515 (17).

7-43. BULKHEAD TO HEADLIGHTS/BILGE PUMP WIRING HARNESS (10921380) REPAIR (continued).



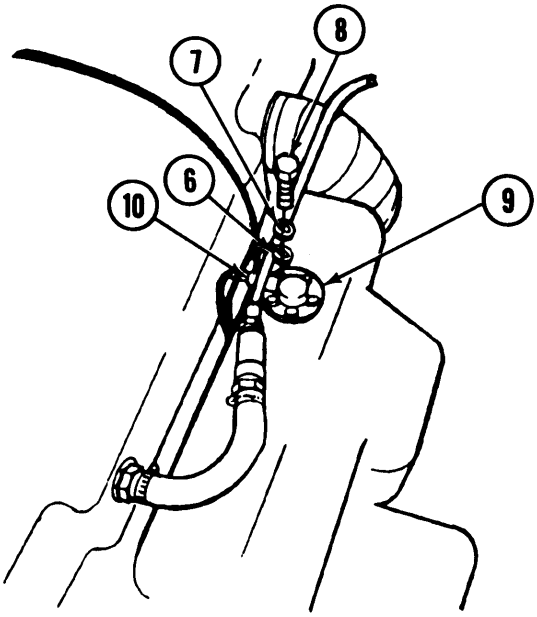
9. Connect connectors Nos. 17,514,20,18, and 515 (16) to right headlight assembly wiring harness connectors Nos. 17,514,20,18, and 515 (15).





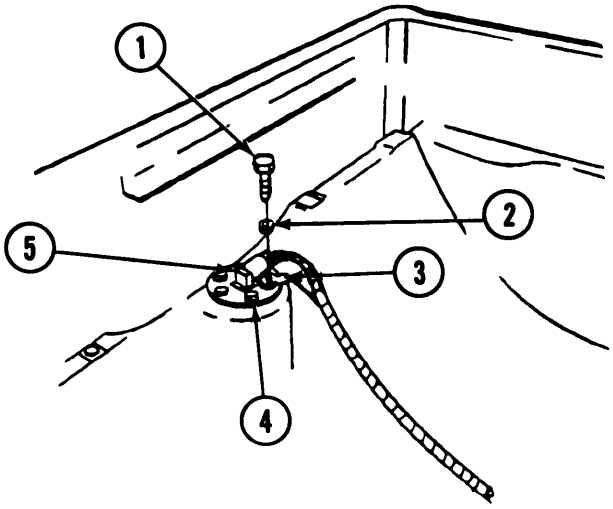
10. Install two connectors Nos. 76(1 1 and 14) on left and right fuel pumps (12 and 13).

7-43. BULKHEAD TO HEADLIGHTS/BILGE PUMP WIRING HARNESS (1 0921380) REPAIR (continued).



11. Install connector No. 31 (10) on lower fuel tank fuel level transmitter (9).

12. Install ground lead (6) on lower fuel tank fuel level transmitter (9) with screw (8) and washer (7),



13. Connect connector No, 29 (5) to upper fuel tank level transmitter (4).

14. Install ground lead (3) on upper fuel tank level transmitter (4) with screw (1) and washer (2).

FOLLOW-ON MAINTENANCE:
• Install powerpack (para 3-2).

7-44. ENGINE DISCONNECT BRACKET TO BULKHEAD WIRING HARNESS (12268418-1) REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I).

Materials/Part:
- Tape, insulation, electrical (Item 67, Appendix D)
- Lockwasher (Item 129, Appendix H)
- Lockwasher (Item 131, Appendix H)
- Lockwasher (4) (Item 172, Appendix H)
- Lockwasher (4) (Item 173, Appendix H)
- Lockwasher (3) (Item 174, Appendix H)

Personnel Required: Two

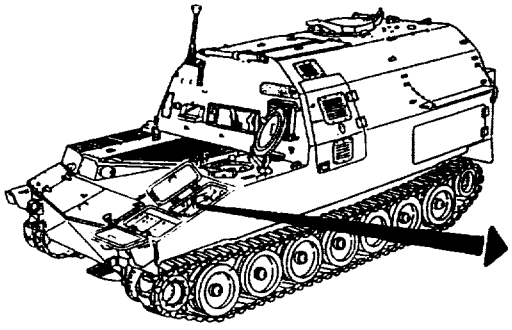
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Transmission access doors opened (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).

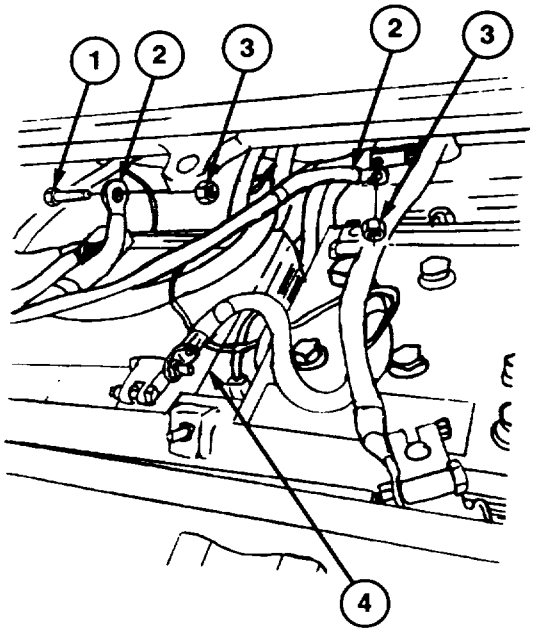
a. REMOVAL

WARNING

Wear eye protection and remove all jewelry, dogtags, and metal items before performing task. Failure to follow these instructions may result in injury or death to personnel.

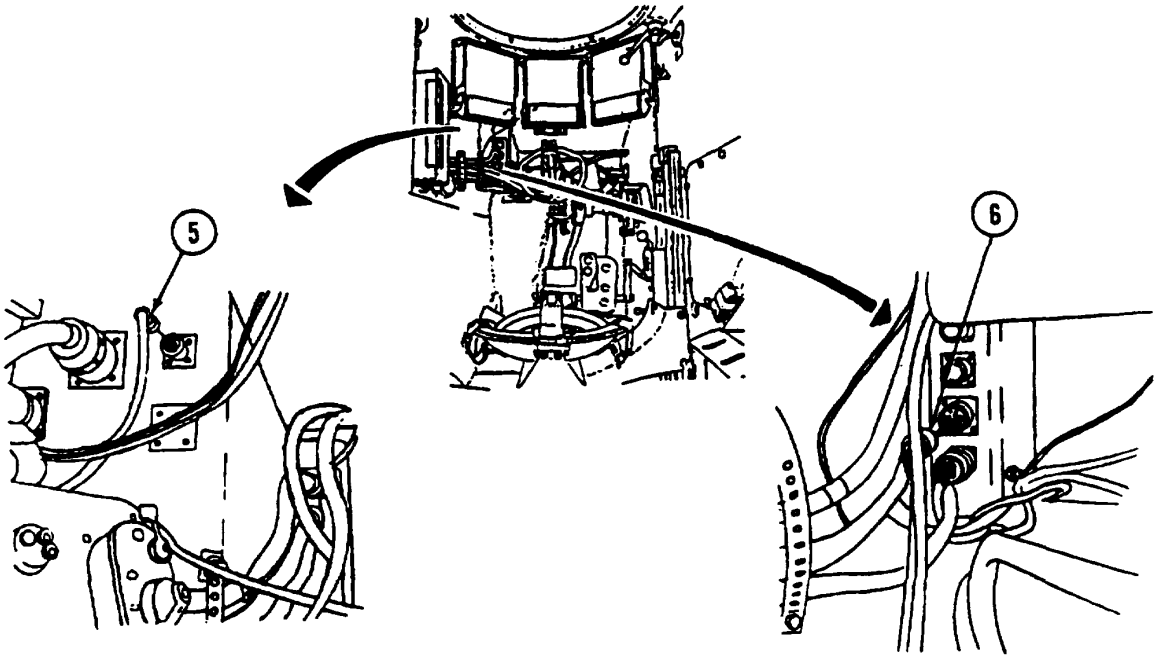
1. Remove two screws (1) and nuts (3) and disconnect two connectors (2) from two batteries (4).





7-44. ENGINE DISCONNECT BRACKET TO BULKHEAD WIRING HARNESS (12268418-1) REPLACEMENT (continued).

2. Disconnect two electrical connectors (5 and 6) from bulkhead in driver's compartment.

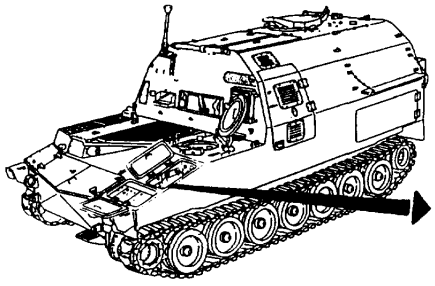


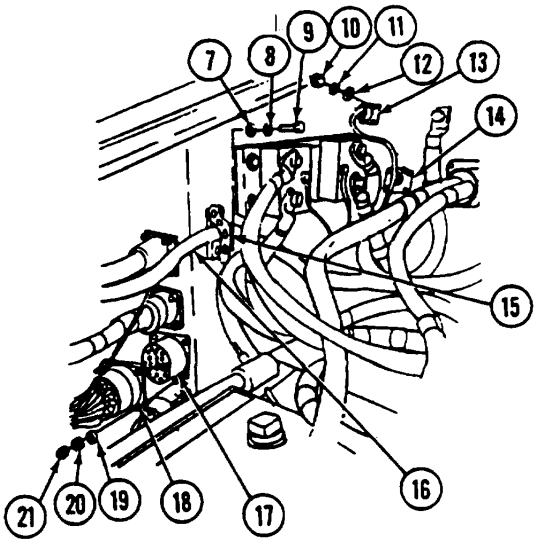
NOTE

An assistant is required for removal of two electrical connectors in battery compartment.

3. Remove four screws (14), washers (12), lockwashers (11), and nuts (10) and electrical connector (13) from bulkhead. Discard lockwashers and reinstall remaining hardware on bulkhead.

4. Remove four screws (17), washers (19), lockwashers (20), and nuts (21) and electrical connector (18) from bulkhead. Discard lockwashers and reinstall remaining hardware on bulkhead.





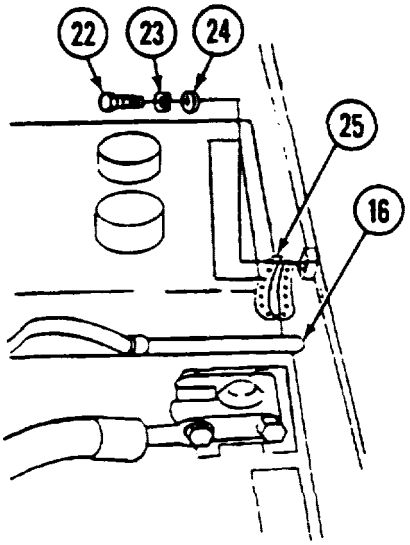
7-44. ENGINE DISCONNECT BRACKET TO BULKHEAD WIRING HARNESS (12268418-1) REPLACEMENT (continued).

NOTE

Straps may hold more than one harness lead. Remove only that lead which applies to task and loosely secure remaining leads in place.

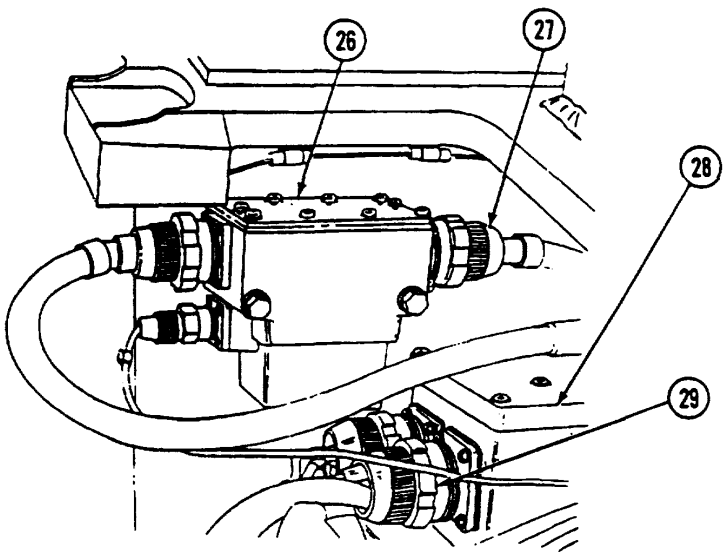
5. Remove screw (9), washer (8), lockwasher (7), strap (15), and lead No. 140 and harness (16) from bulkhead. Discard lockwasher.

6. Remove screw (22), washer (24), lockwasher (23), strap (25), and harness (16) from bulkhead. Discard lockwasher.



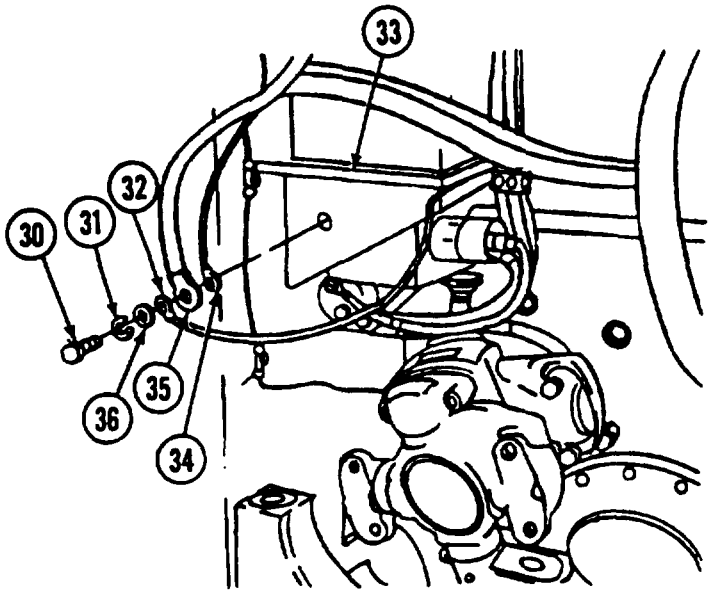
7. Disconnect electrical connector (27) from master relay (26).

8. Disconnect electrical connector (29) from voltage regulator (28).



7-44. ENGINE DISCONNECT BRACKET TO BULKHEAD WIRING HARNESS (12268418-1) REPLACEMENT (continued).

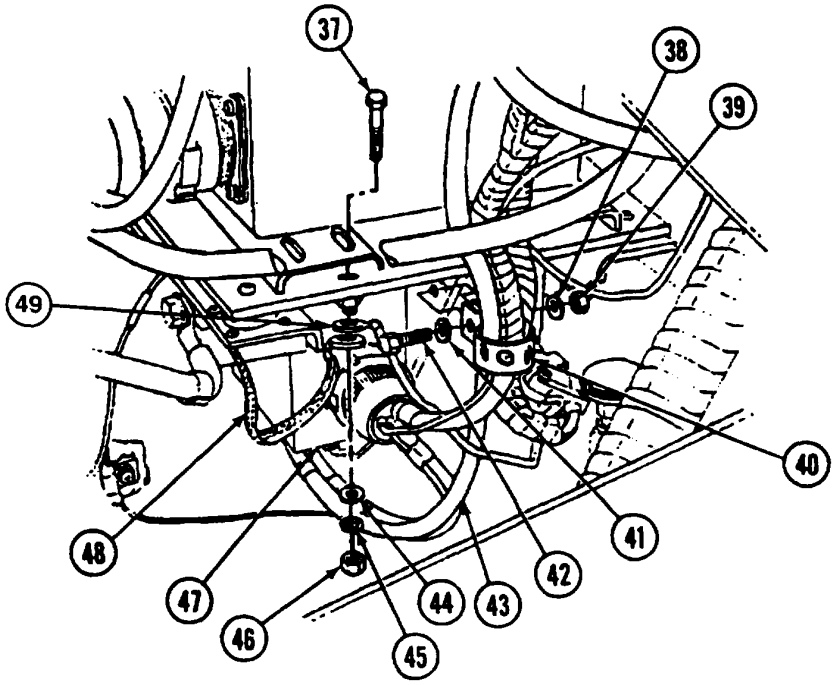
9. Remove screw (30), washer (36), lockwasher (31), ground strap (34), wire No. 8 (32), and STE/ICE ground wire (35) from voltage regulator mount (33). Discard lockwasher.



10. Disconnect electrical connector (43) from starter relay (47).

11. Remove screw (37), washer (44), lockwasher (45), nut (46), ground strap (48), and ground wire (49) from mount (33). Discard lockwasher.

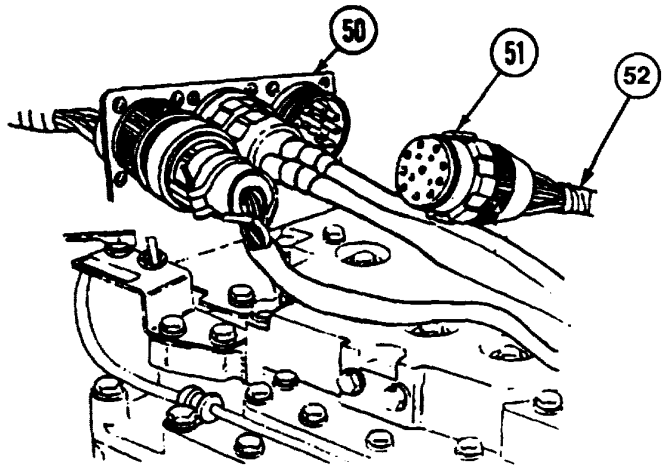
12. Remove screw (42), washer (41), lockwasher (38), nut (39), and strap (40) from mount (33). Discard lockwasher.



7-44. ENGINE DISCONNECT BRACKET TO BULKHEAD WIRING HARNESS (12268418-1) REPLACEMENT (continued).

13. Disconnect electrical connector (51) from engine disconnect bracket (50).

14. Remove engine disconnect bracket to bulkhead wiring harness 12268418-1 (52) from vehicle.



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b. INSTALLATION

1. Install wiring harness 12268418-1 (52) in vehicle.

2. Connect electrical connector (51) to engine disconnect bracket (50).

3. Install strap (40) on mount (33) with screw (42), washer (41), new lockwasher (38), and nut (39).

4. Install ground strap (48) and ground wire (49) on mount (33) with screw (37), washer (44), new lockwasher (45), and nut (46).

5. Connect electrical connector (43) to starter relay (47).

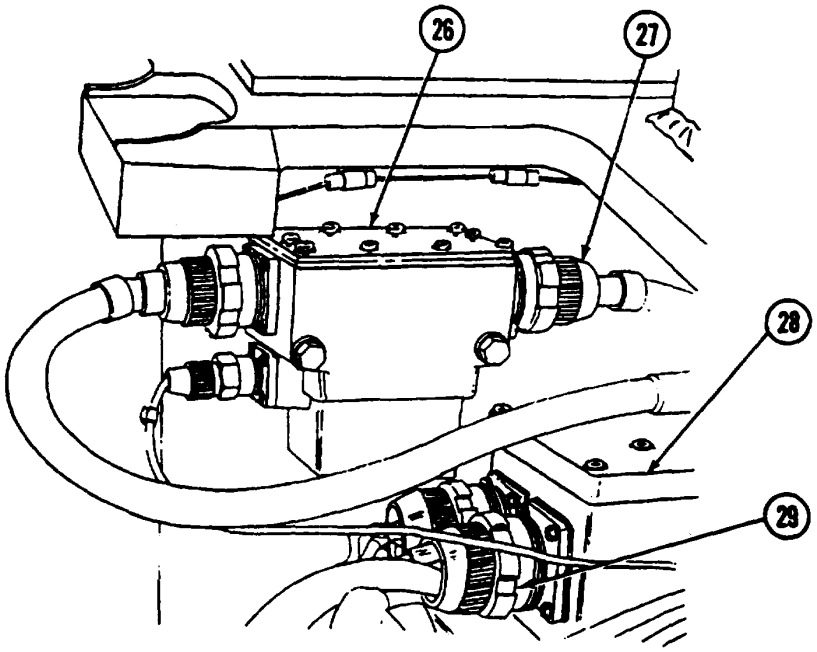
6. Install STE/ICE ground wire (35), wire No. 8 (32), and ground strap (34) on mount (33) with screw (30), new lockwasher (31), and washer (36).

7-44. ENGINE DISCONNECT BRACKET TO BULKHEAD WIRING HARNESS (12268418-1) REPLACEMENT (continued).

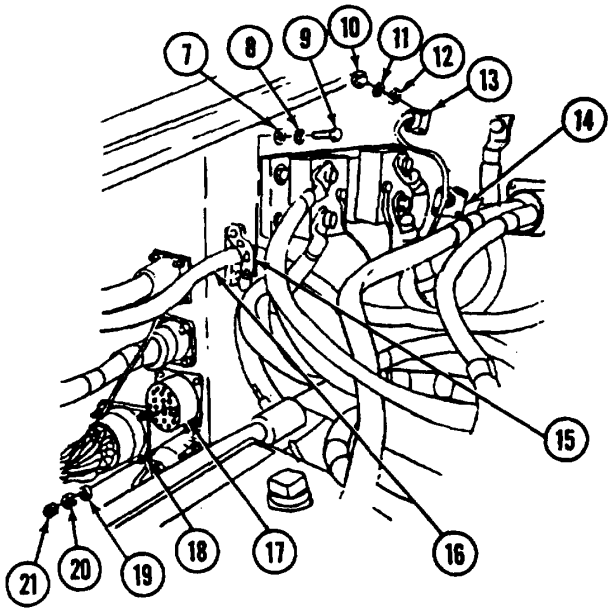
7. Connect electrical connector (29) to voltage regulator (28).

8. Connect electrical connector (27) to master relay (26).

9. Install harness (16) in strap (25) on bulkhead with screw (22), washer (24), and new lockwasher (23).



10. Install lead No. 140 and harness (16) in strap (15) on bulkhead with screw (9), washer (8), and new lockwasher (7).



7-44. ENGINE DISCONNECT BRACKET TO BULKHEAD WIRING HARNESS (12268418-1) REPLACEMENT (continued).

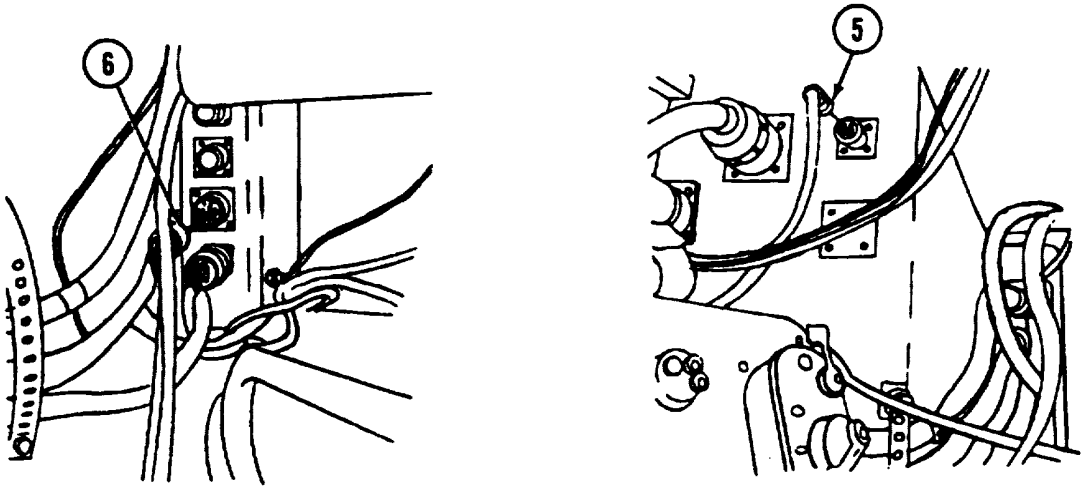
NOTE

An assistant is required for installation of two electrical connectors in battery compartment.

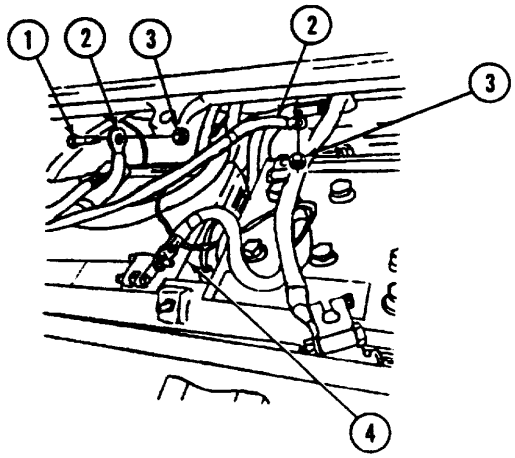
11. Remove hardware from bulkhead and install electrical connector (18) on bulkhead with four screws (17), washers (19), new lockwashers (20), and nuts (21).

12. Remove hardware from bulkhead and install electrical connector (13) on bulkhead with four screws (14), washers (12), new lockwashers (11), and nuts (10).

13. Connect two electrical connectors (5 and 6) to bulkhead in driver's compartment.



14. Connect two connectors (2) to two batteries (4) with two screws (1) and nuts (3).



FOLLOW-ON MAINTENANCE:

- Connect battery ground cables (para 7-41).
- Close transmission access doors (refer to TM 9-2350-287-10).

7-45. BULKHEAD TO COMBAT OVERRIDE SWITCH LEAD ASSEMBLY (12268419) REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

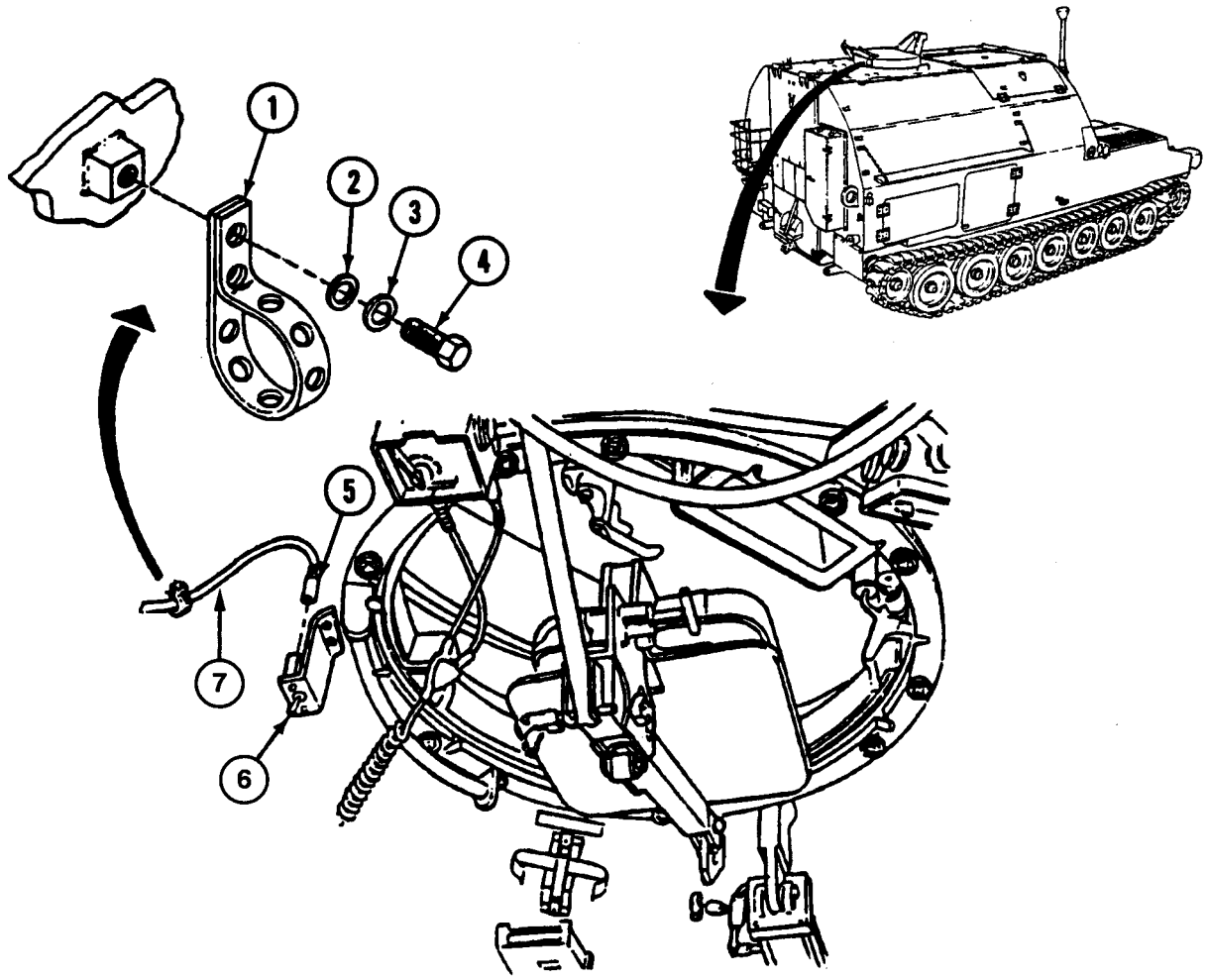
Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Lockwasher (19) (Item 175, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Wiring harness guard removed (para 7-80).
- Driver's portable instrument panel removed (para 7-6).

a. REMOVAL

1. Disconnect connector (5) of bulkhead-to-combat-override-switch lead assembly No. 14C (7) from combat override switch (6).



7-45. BULKHEAD TO COMBAT OVERRIDE SWITCH LEAD ASSEMBLY (12268419) REPLACEMENT (continued).

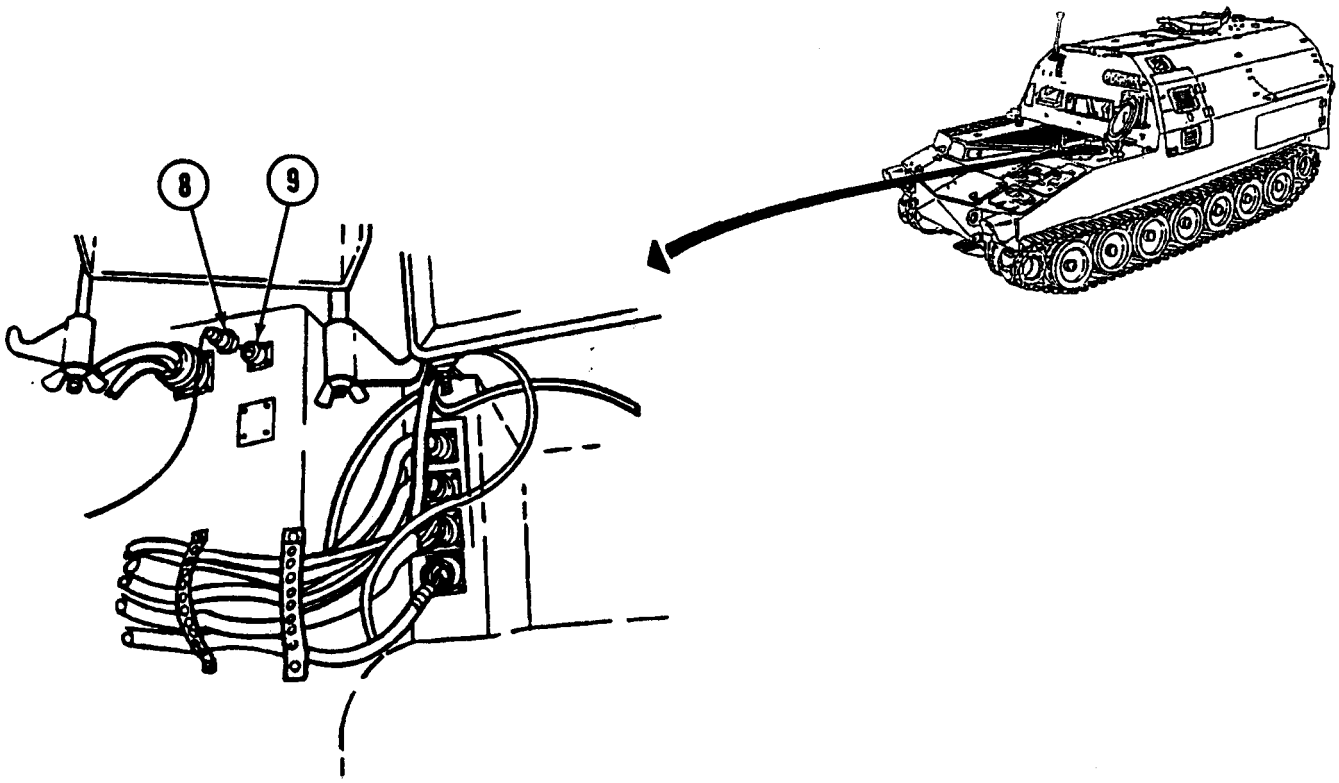
NOTE

Several wiring harnesses are secured by the same clamps.

2. Remove screw (4), lockwasher (3), and washer (2) from each of 19 clamps (1) securing lead assembly No. 14C (7) to hull. Discard lockwasher. Separate lead assembly No. 14C (7) from other wiring harnesses in clamps (1).
3. Disconnect connector (8) on lead assembly No. 14C (7) from plug (9) in driver's compartment.

b. INSTALLATION

1. Install lead assembly No. 14C (7) in 19 clamps (1).
2. Secure each of 19 clamps (1) to hull with washer (2), new lockwasher (3), and screw (4).
3. Connect connector (8) on lead assembly No. 14C (7) to plug (9) in driver's compartment.
4. Connect connector (5) of lead assembly No. 14C (7) to combat override switch (6).



FOLLOW-ON MAINTENANCE:

- Install wiring harness guard (para 7-80).
- Install driver's portable instrument panel (para 7-6).

7-46. FUEL PUMP RELAY TO CIRCUIT BREAKER LEAD ASSEMBLY (11682358-1) REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

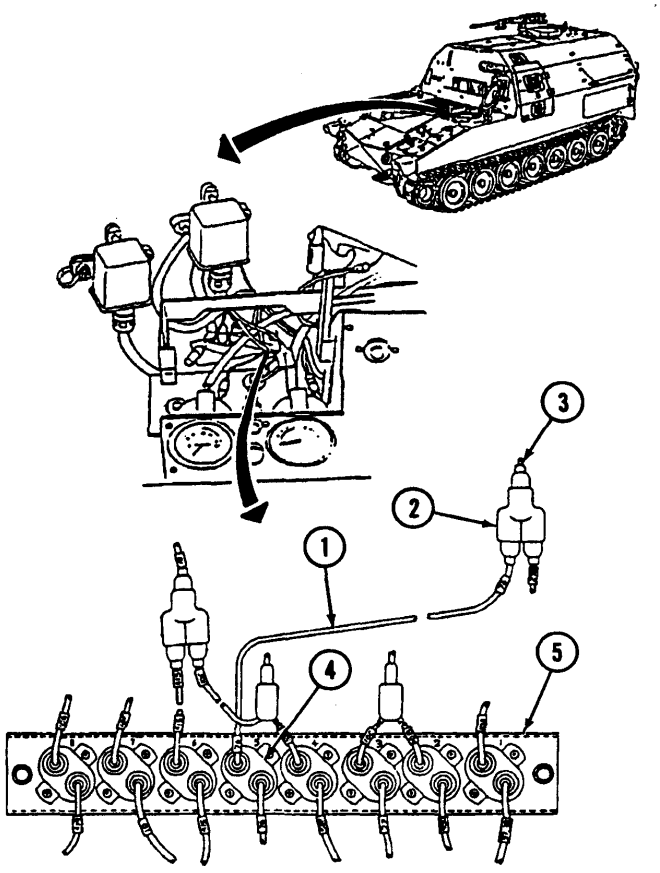
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).
- Driver's portable instrument panel removed (para 7-6).

a. REMOVAL

1. Disconnect lead No. 76 (1) from Y-connector (2) on fuel pump relay cable assembly (3).
2. Disconnect lead No. 76 (1) from circuit breaker No. 5 (4) on circuit breaker panel No. 1 (5).

b. INSTALLATION

1. Connect lead No. 76 (1) to circuit breaker No. 5 (4) on circuit breaker panel No. 1 (5).
2. Connect lead No. 76 (1) to Y-connector (2) on fuel pump relay cable assembly (3).



FOLLOW-ON MAINTENANCE:
- Install driver's portable instrument panel (para 7-6).
- Connect battery ground cables (para 7-41).

7-47. FUEL PUMP SWITCH TO CIRCUIT BREAKER LEAD ASSEMBLY (11682358-2) REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

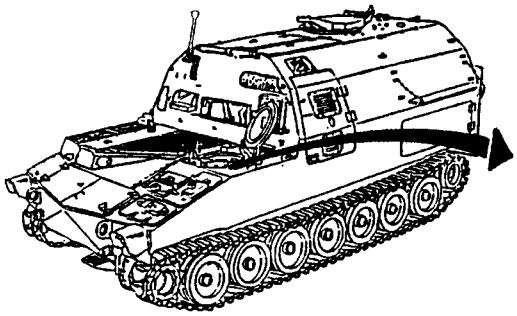
Initial Setup:

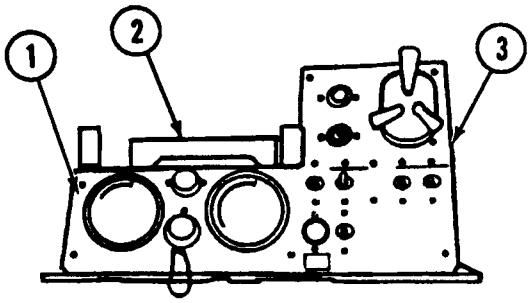
Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).
- Driver's portable instrument panel removed (para 7-6).

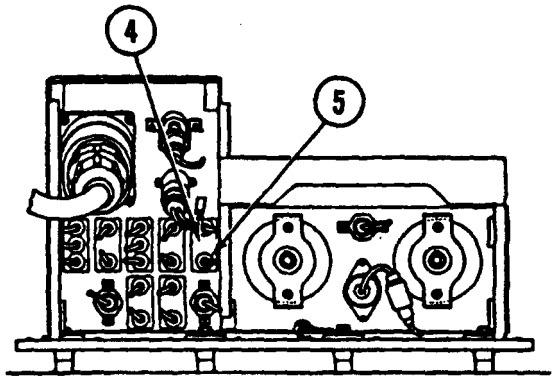
a. REMOVAL

1. Unfasten six screws (1) and pull instrument panel (3) forward from mount (2) to gain access to back of instrument panel (3).





2. Disconnect lead No. 76 (5) from bottom terminal of fuel prime switch (4).



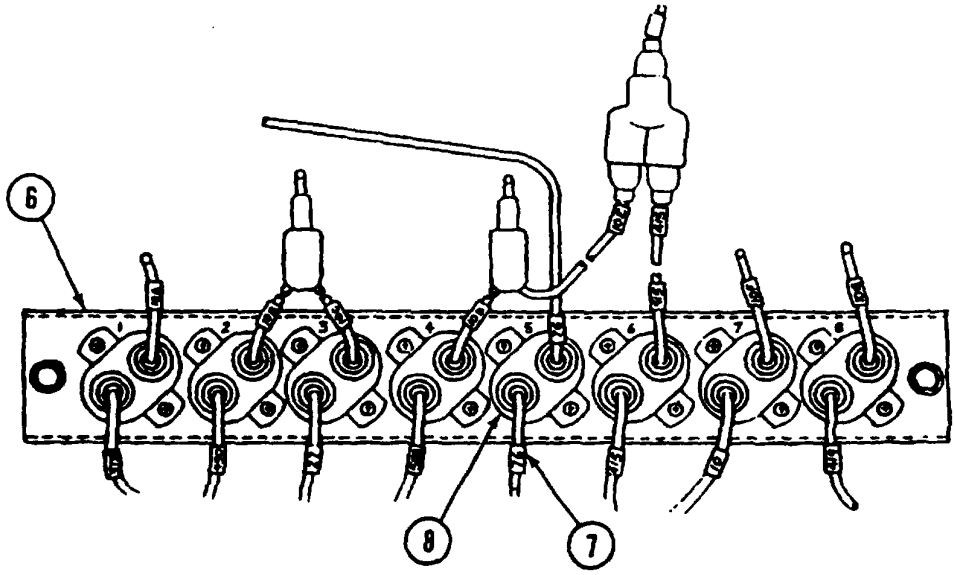
REAR VIEW

7-47. FUEL PUMP SWITCH TO CIRCUIT BREAKER LEAD ASSEMBLY (11682358-2) REPLACEMENT (continued).

3. Disconnect lead No. 76 (7) from circuit breaker No. 5 (8) on circuit breaker panel No. 1 (6) and remove from vehicle.

b. INSTALLATION

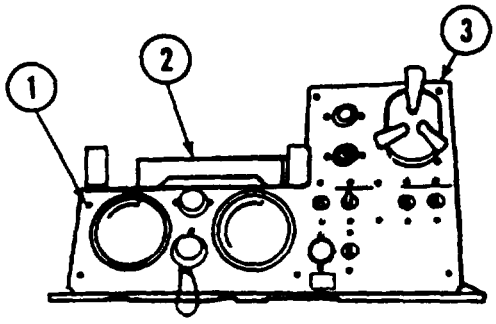
1. Connect lead No. 76 (7) to circuit breaker No. 5 (8) on circuit breaker panel No. 1 (6).

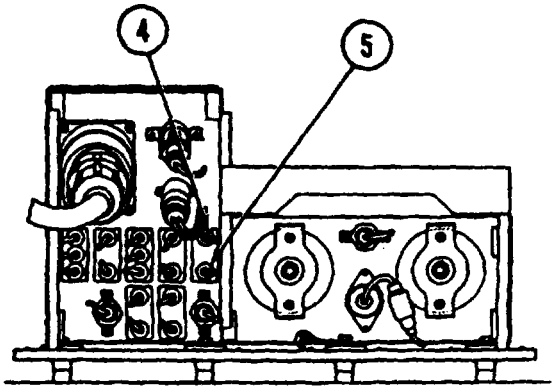


2. Connect lead No. 76 (5) to bottom terminal of fuel prime switch (4).

3. Position instrument panel (3) on mount (2).

4. Secure instrument panel (3) on mount (2) with six screws (1).





REAR VIEW

FOLLOW-ON MAINTENANCE:
- Install driver's portable instrument panel (para 7-6).
- Connect battery ground cables (para 7-41).

7-48. DIODE HARNESS ASSEMBLY (12268417) REPLACEMENT.

This Task Covers

a. Removal

b. Installation

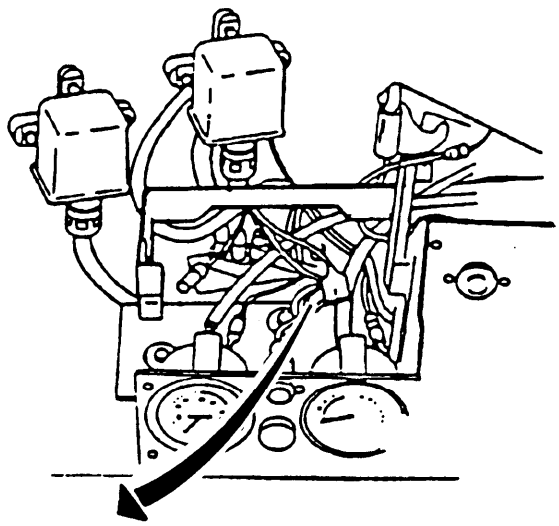
Initial Setup:

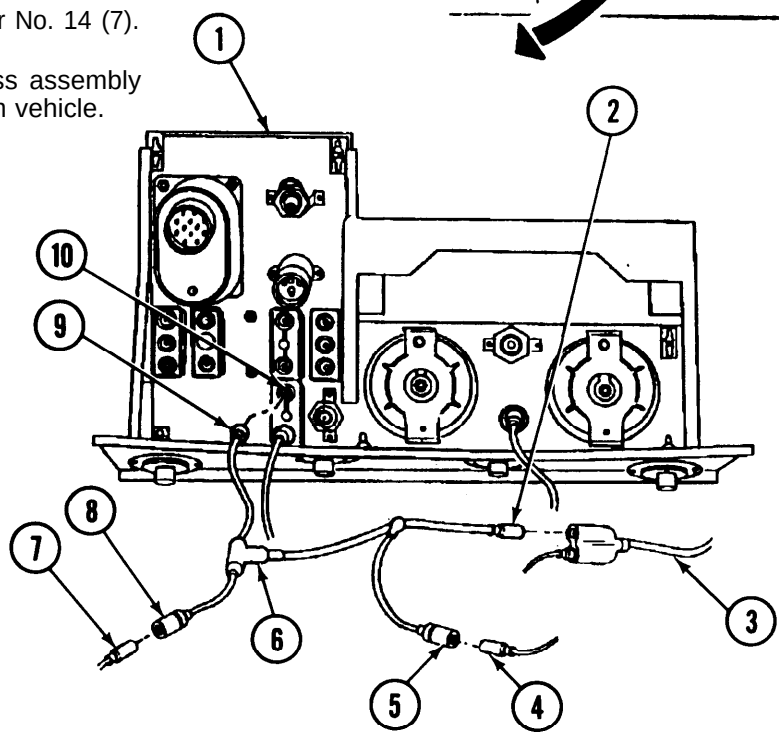
Tools/Test Equipment:
ŽGeneral mechanic's tool kit (Item 24, Appendix I)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).
- Drivet's portable instrument panel removed (para 7-6).

a. REMOVAL

1. Disconnect wire connector No. 14 (9) from starter switch (10) on back of driver's instrument panel (1).
2. Disconnect wire connector No. 27B (5) from wire connector No. 27B (4).
3. Disconnect wire connector No. 27B (2) from Y-connector (3).
4. Disconnect wire connector No. 14 (8) from wire connector No. 14 (7).
5. Remove diode harness assembly No. 12268417 (6) from vehicle.

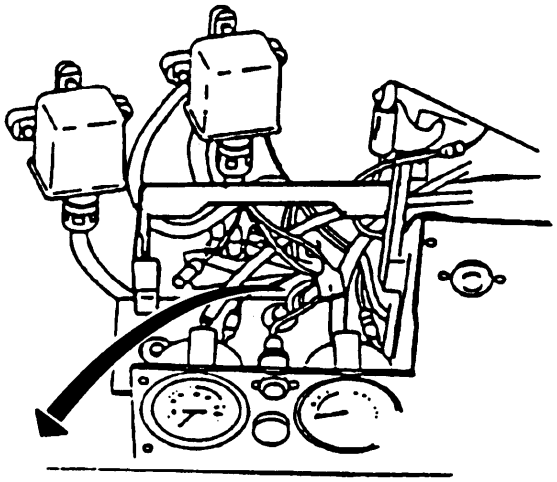


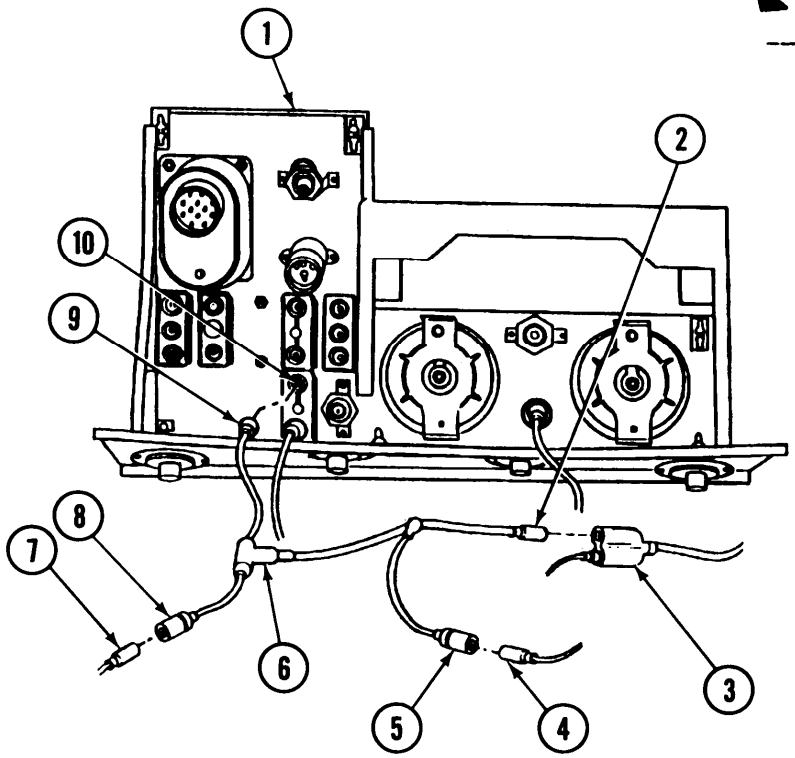


7-48. DIODE HARNESS ASSEMBLY (12268417) REPLACEMENT (continued).

b. INSTALLATION

1. Route diode harness assembly (6) in vehicle, and connect wire connector No. 14 (8) to wire connector No. 14 (7).
2. Connect wire connector No. 27B (2) to Y-connector (3).
3. Connect wire connector No. 27B (5) to wire connector No. 27B (4).
4. Connect wire connector No. 14 (9) to starter switch (10) on back of driver's instrument panel (1).





FOLLOW-ON MAINTENANCE:

- Install driver's portable instrument panel (para 7-6).
- Connect battery ground cables (para 7-41).

7-49. ENGINE BRACKET TO DRIVER'S BULKHEAD WIRING HARNESS (12353403) REPLACEMENT

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/lest Equipment
- General mechanic's tool kit (Item 24, Appendix 1)

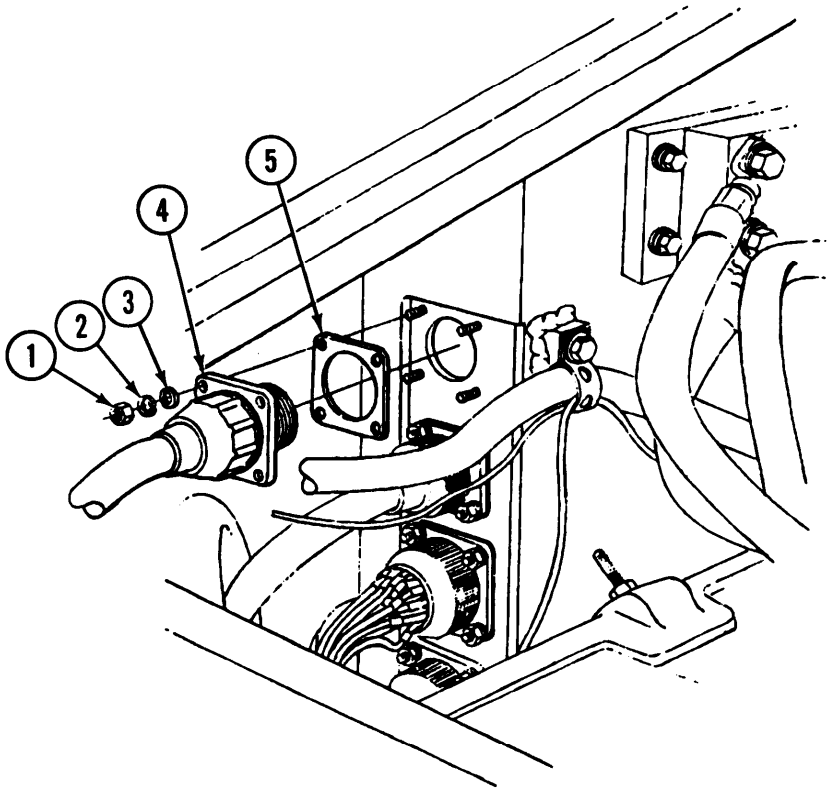
Materials/Parts:
- Gasket (Item 50, Appendix H)
- Lockwasher (Item 129, Appendix H)
- Lockwasher (4) (Item 173, Appendix H)
- Lockwasher (2) (Item 175, Appendix H)

Personnel Required: Two

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-1 0).
- Battery access doors opened (refer to (TM 9-2350-287-10).
- Left and right transmission access doors opened (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).

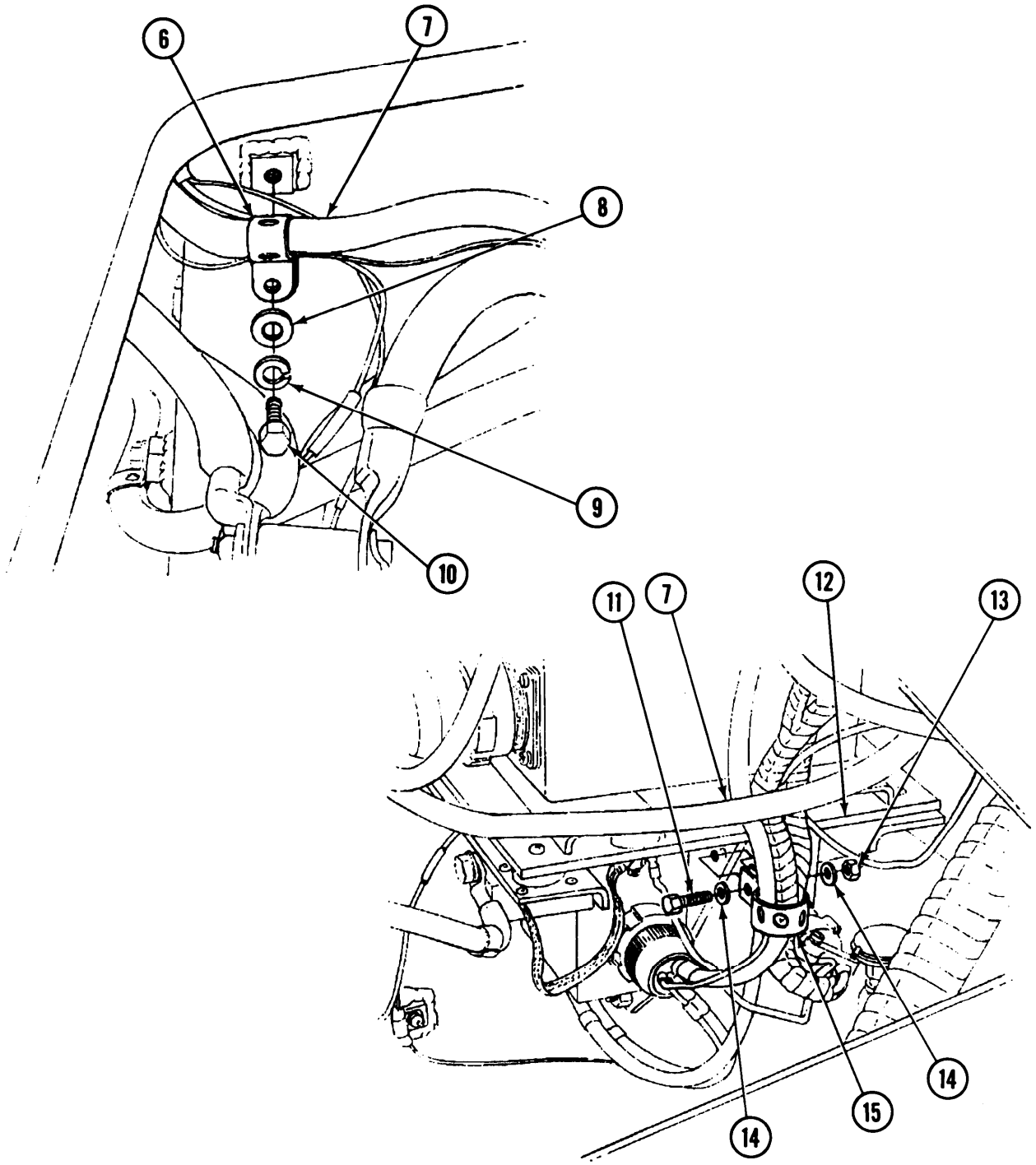
a. REMOVAL

1. While an assistant holds screw inside driver's compartment, remove four nuts (l), lockwashers (2), and washers (3), electrical connector (4), and gasket (5) from driver's compartment bulkhead. Discard lockwashers and gasket, and reinstall nuts and washers.



7-49. ENGINE BRACKET TO DRIVER'S BULKHEAD WIRING HARNESS (12353403) REPLACEMENT

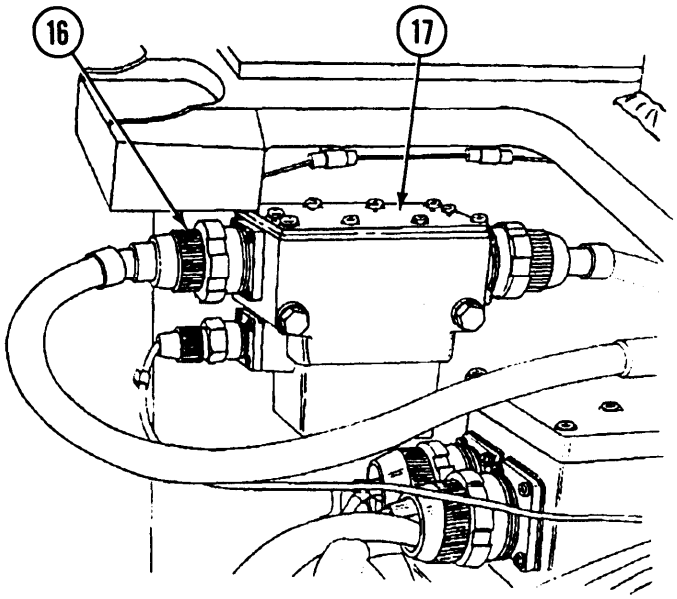
2. Remove screw (10), lockwasher (9), washer (8), and clamp (6) securing wiring harness (7) to battery compartment bulkhead. Discard lockwasher.



3. Remove screw (11), nut (1 3), two washers (1 4), and strap (15) securing wiring harness (7) to voltage regulator bracket (12).

7-49. ENGINE BRACKET TO DRIVER'S BULKHEAD WIRING HARNESS (12353403) REPLACEMENT (continued).

4. Disconnect electrical connector (16) from master relay box (17).



5. Remove screw (19), two lockwashers (20), and terminal lug (21) from bilge pump relay (18). Discard lockwashers.

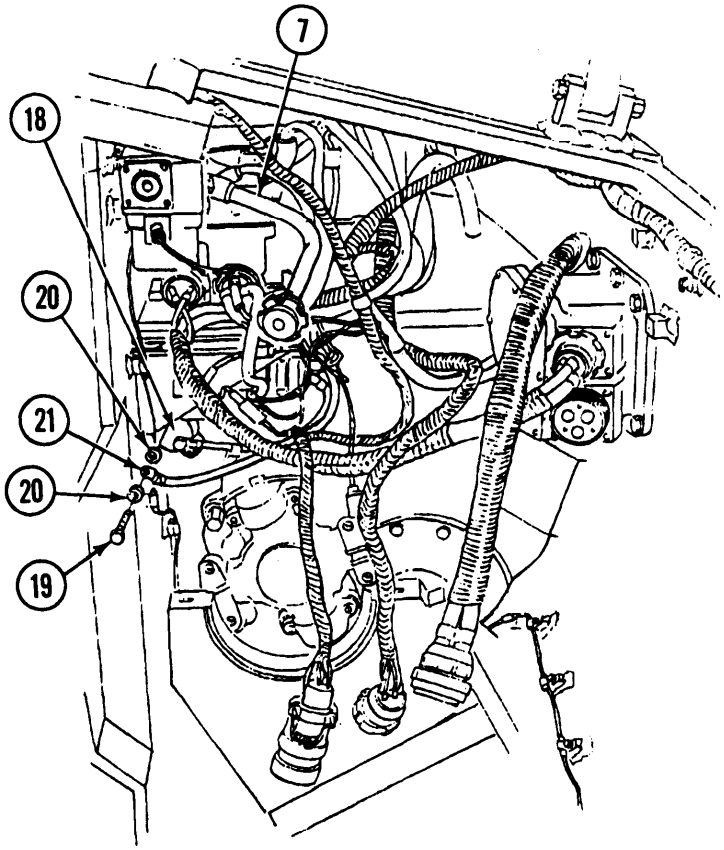
6. Remove wiring harness (7) from vehicle.

b. INSTALLATION

1. Position wiring harness (7) in engine compartment and battery compartment.

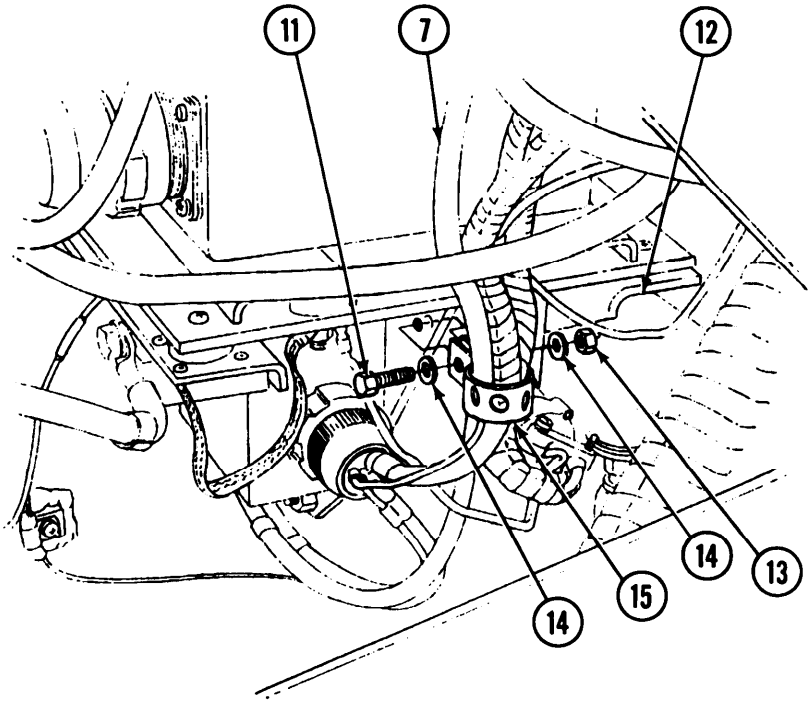
2. Install terminal lug (21) on bilge pump relay (18) with screw (19) and two new lockwashers (20).

3. Connect electrical connector (16) to master relay box (17).

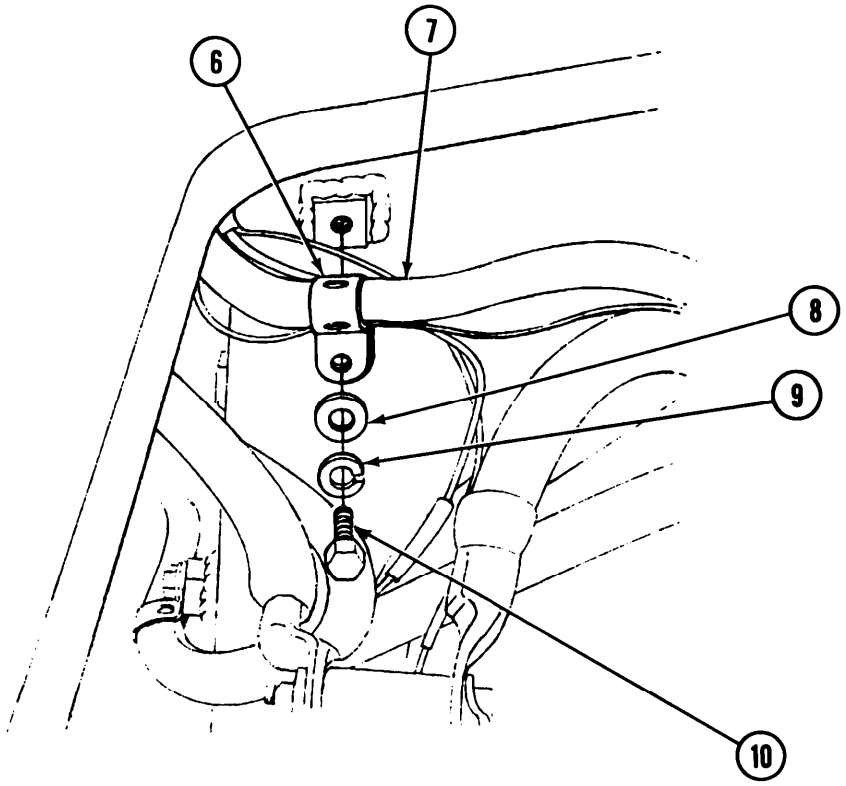


7-49. ENGINE BRACKET TO DRIVER'S BULKHEAD WIRING HARNESS (12353403) REPLACEMENT (continued).

4. Secure wiring harness (7) to voltage regulator bracket (12) with strap (15), screw (11), nut (13), and two washers (14).

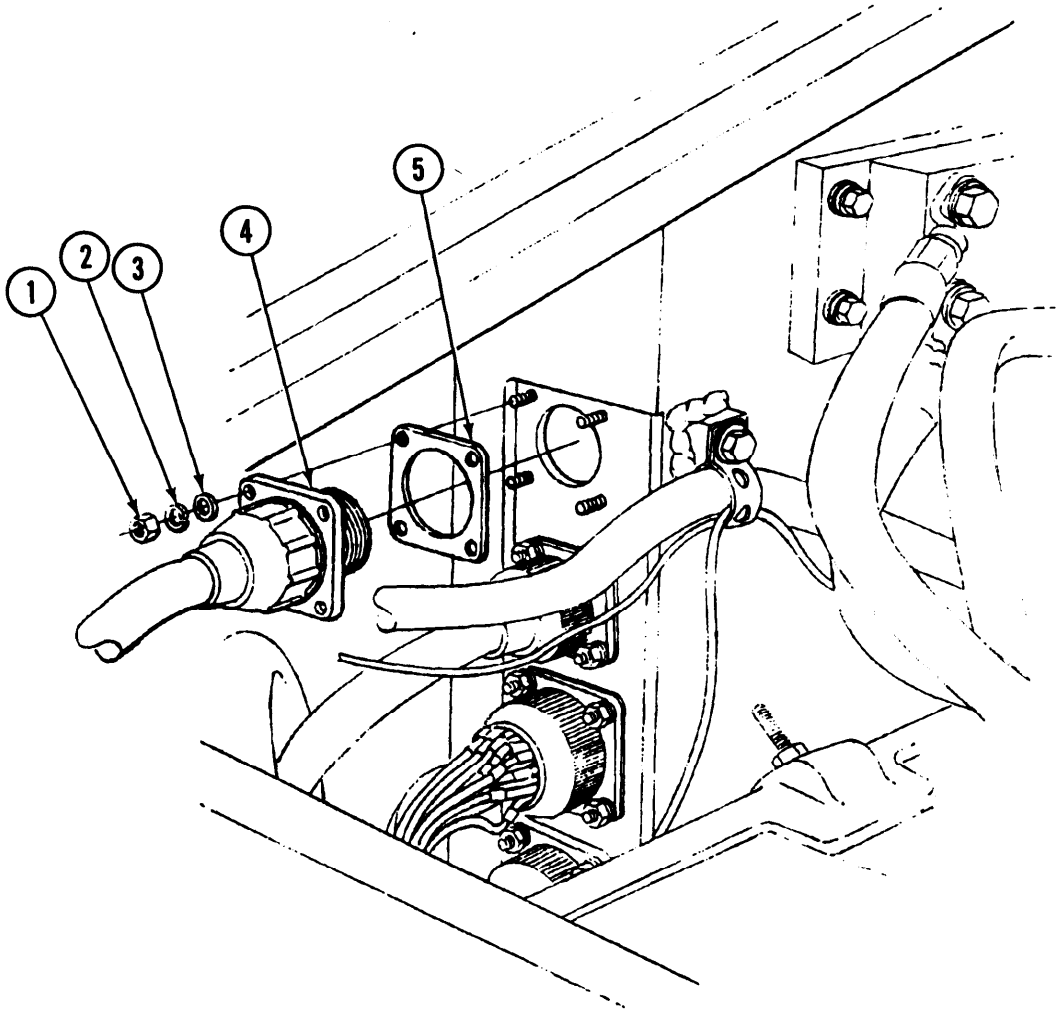


5, Secure wiring harness (7) to battery compartment bulkhead with clamp (6), screw (10), new lockwasher (9), and washer (8).



7-49. ENGINE BRACKET TO DRIVER'S BULKHEAD WIRING HARNESS (12353403) REPLACEMENT (continued).

6. While an assistant holds screw inside drivets compartment, install new gasket (5), electrical connector (4), and four nuts (1), new lockwashers (2), and washers (3) in driver's compartment bulkhead.



FOLLOW-ON MAINTENANCE:

- Connect battery ground cables (para 7-41).
- Close battery access doors (refer to TM 9-2350-287-10).
- Close left and right transmission access doors (refer to TM 9-2350-287-10).

7-50. POWERPACK WIRING HARNESS (1 2268308) REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

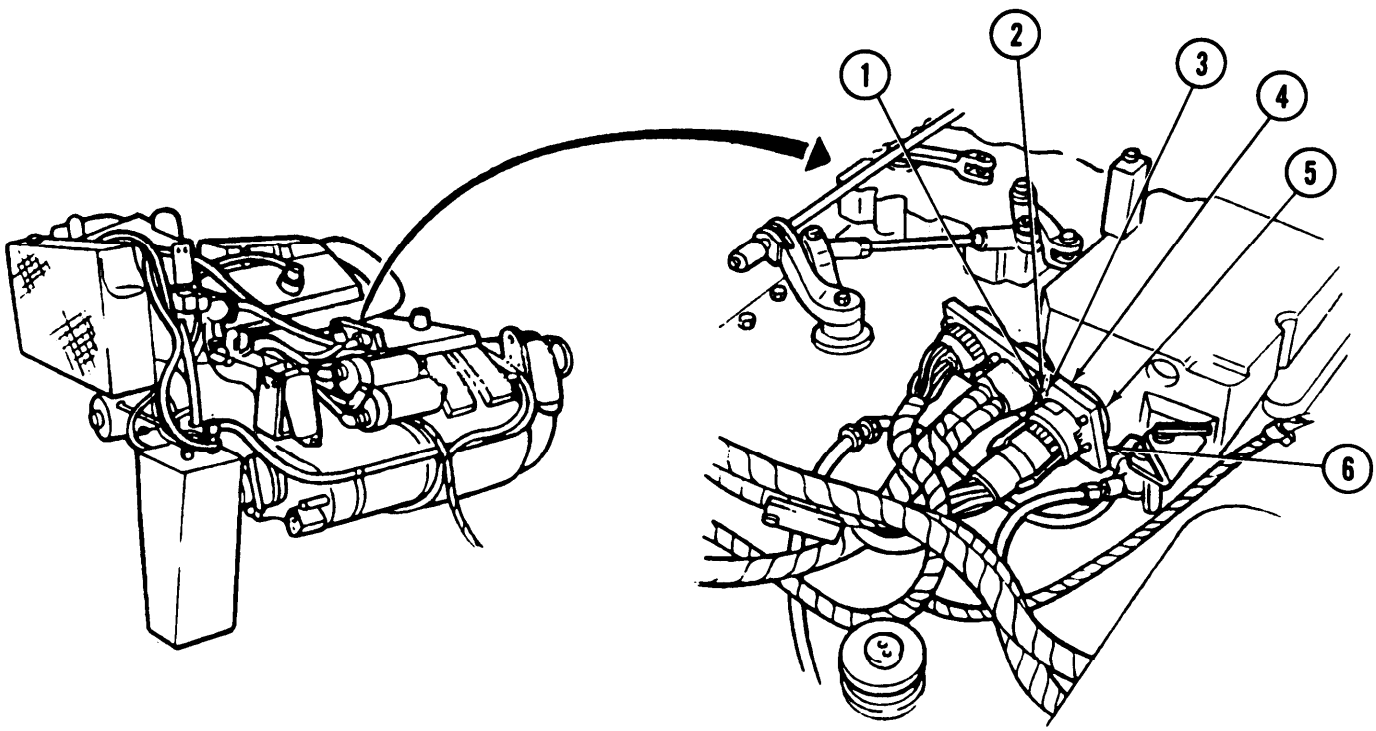
Initial Setup:

Tools/lest Equipment:
ŽGeneral mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
ŽElectrical insulation tape (Item 67, Appendix D)
• Lockwasher (Item 165, Appendix H)
ŽLockwasher (4) (Item 173, Appendix H)
• Lockwasher (Item 196, Appendix H)
ŽTiedown strap (as required) (Item 374, Appendix H)

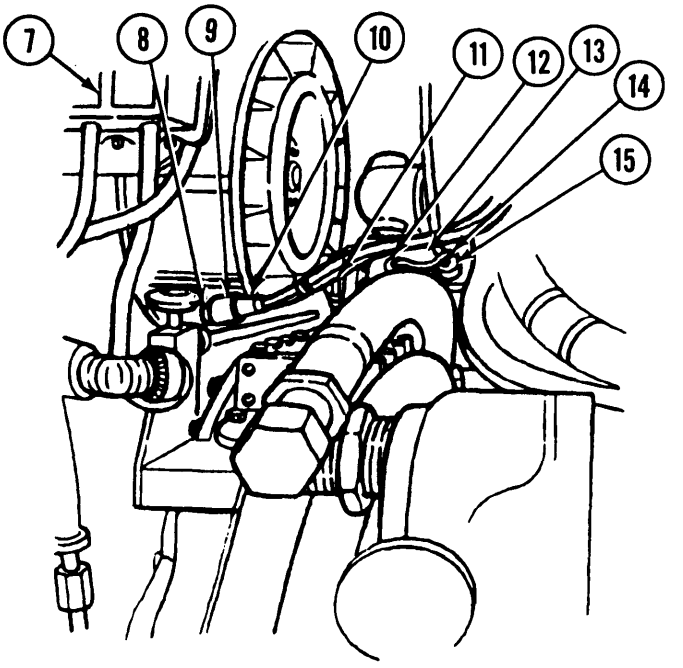
Equipment Conditions:
• Vehicle parked on level ground (refer to TM 9-2350-287-1 0).
• Powerpack removed (para 3-2).

a. REMOVAL



1. Remove four screws (4), Iockwashers (3), washers (2), and nuts (1) and electrical connector (5) from engine disconnect bracket (6). Discard Iockwashers.

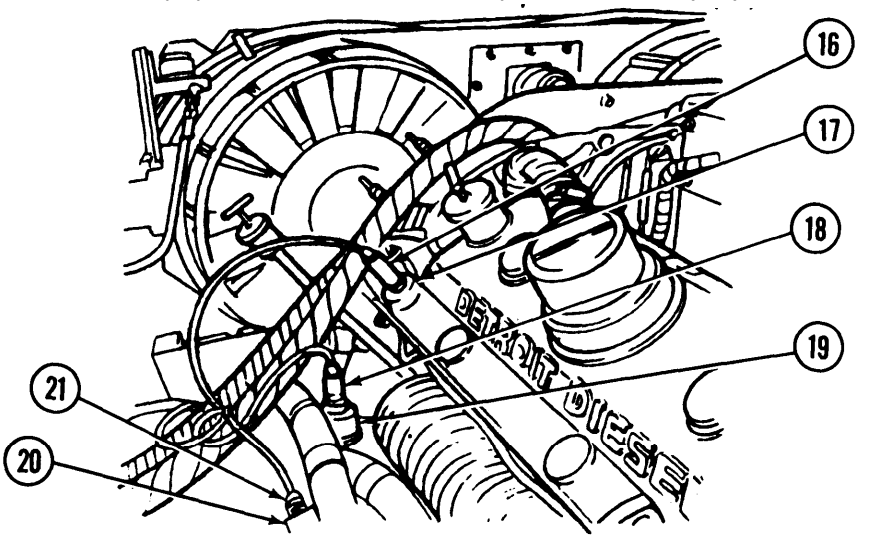
7-50. POWERPACK WIRING HARNESS (12268308) REPLACEMENT (continued).



2. Disconnect lead No, 352A (1 O) and lead No. 352B (11) from lead No. 352A (8) and lead NO. 352B (9) of aeration detector (7),

3. Disconnect lead No. 324 (12) from transmission oil temperature transmitter (13).

4. Disconnect lead No. 509D (14) from transmission oil temperature switch (15).

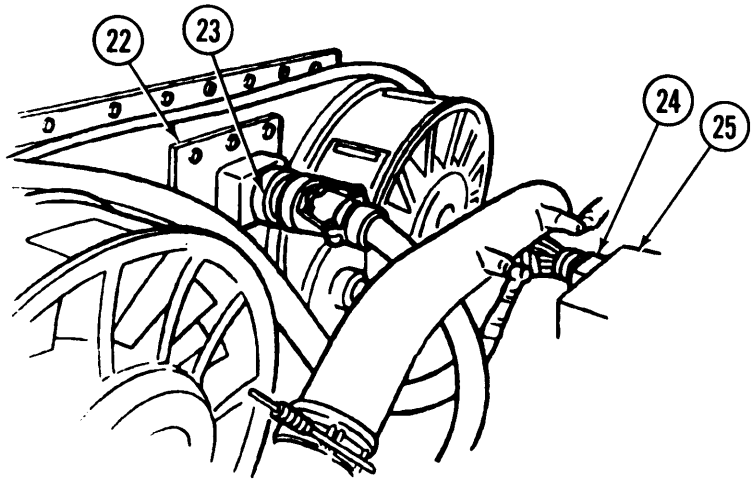


5. Disconnect lead No. 509A (16) from engine coolant temperature switch (17).

6. Disconnect lead No. 321 (18) from transmission oil pressure transmitter (19).

7. Disconnect lead 509C (20) from transmission oil pressure switch (21).

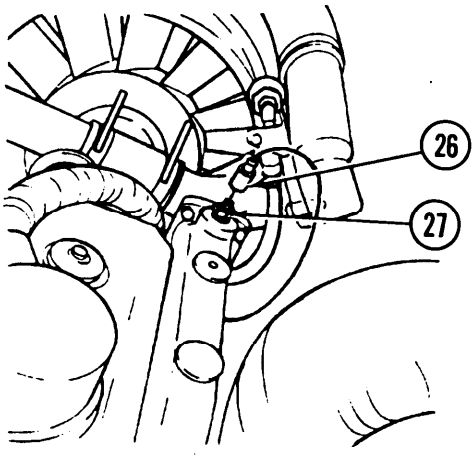
7-50. POWERPACK WIRING HARNESS (1 2268308) REPLACEMENT (continued).

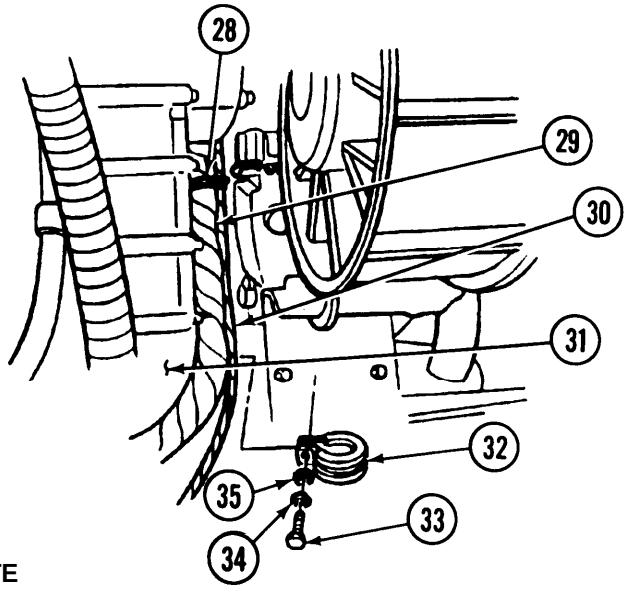


8. Disconnect connector (23) from alternator (22).

9. Disconnect connector (24) from glow plug controller (25).

10. Disconnect lead No. 33A (26) from engine coolant temperature transmitter (27).





NOTE

Quantity of tiedown straps may vary.

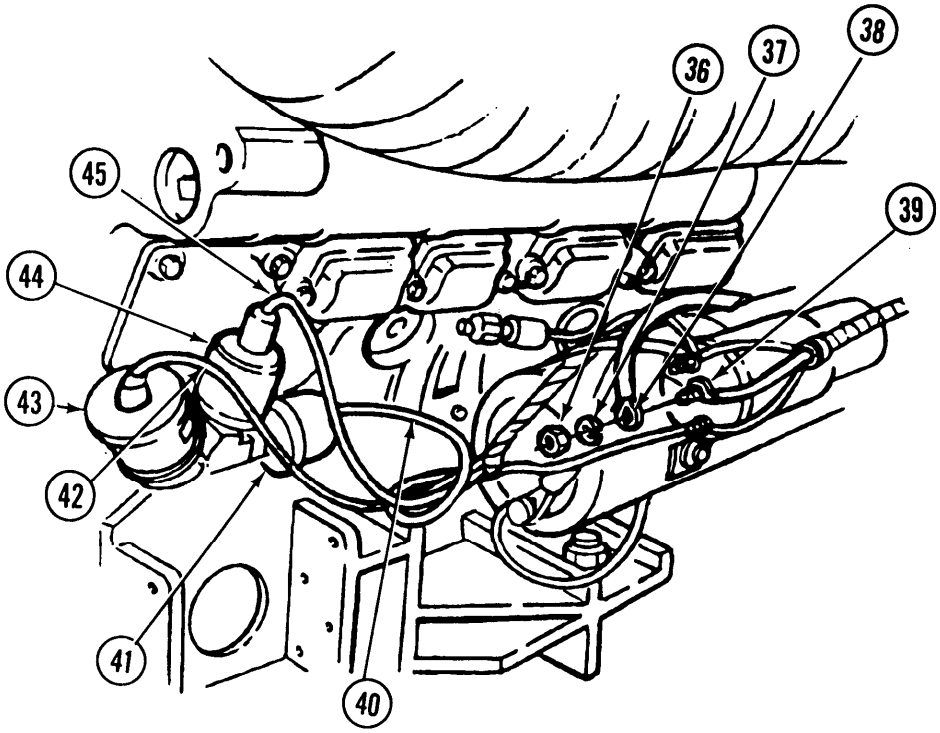
11. Remove electrical tiedown straps (28) from powerpack wiring harness (29). Discard electrical tiedown straps.

NOTE

Clamp secures more than one wiring harness. After separating the necessary harness from the clamp, loosely secure the clamp to the transfer case.

12. Remove screw (33), lockwasher (34), washer (35), and clamp (32) securing powerpack wiring harness (29) and STE/ICE wiring harness (30) to transfer case (31). Discard lockwasher.

7-50. POWERPACK WIRING HARNESS (12268308) REPLACEMENT (continued).



13. Remove nut (36), lockwasher (37), and lead No. 14B (38) from starter solenoid (39). Discard lockwasher.

14. Disconnect lead No. 36 (45) from engine oil pressure transmitter (44).

15. Disconnect lead No. 509B (42) from engine oil pressure switch (43).

16. Disconnect lead No. 76B (40) from air cleaner and generator system relay switch (41).

NOTE

Removal of electrical tape maybe required to separate powerpack wiring harness (29) from STE/ICE wiring harness 30.

17. Remove powerpack wiring harness (29) from powerpack.

b. INSTALLATION

1. Route powerpack wiring harness (29) on powerpack in approximate location of installation.

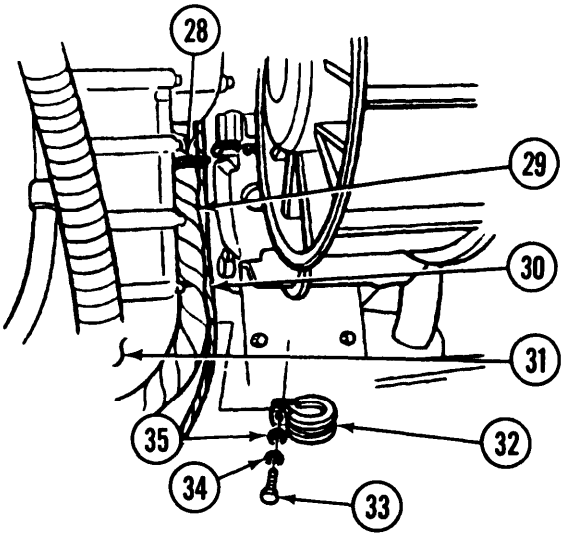
2. Connect lead No. 76B (40) to air cleaner and generator system relay switch (40).

3. Connect lead No. 509B (42) to engine oil pressure switch (42).

4. Connect lead No. 36 (45) to engine oil pressure transmitter (43).

5. Install lead No. 14B (38) to starter solenoid (39) with new lockwasher (37) and nut (36).

7-50. POWERPACK WIRING HARNESS (1 2268308) REPLACEMENT (continued).



NOTE

If removed, secure powerpack wiring harness (29) to STE/ICE wiring harness (30) with electrical tape.

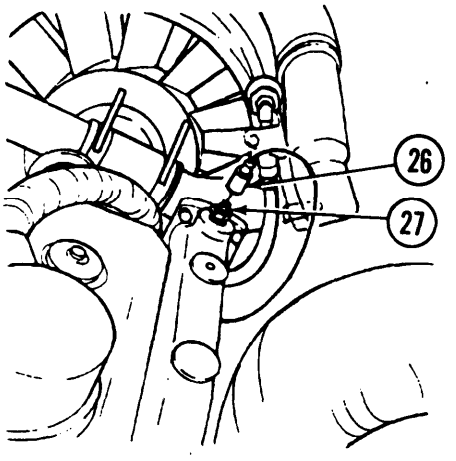
6. Secure powerpack wiring harness (29) to transfer case (31) with clamp (32), washer (35), new lockwasher (34), and screw (32).

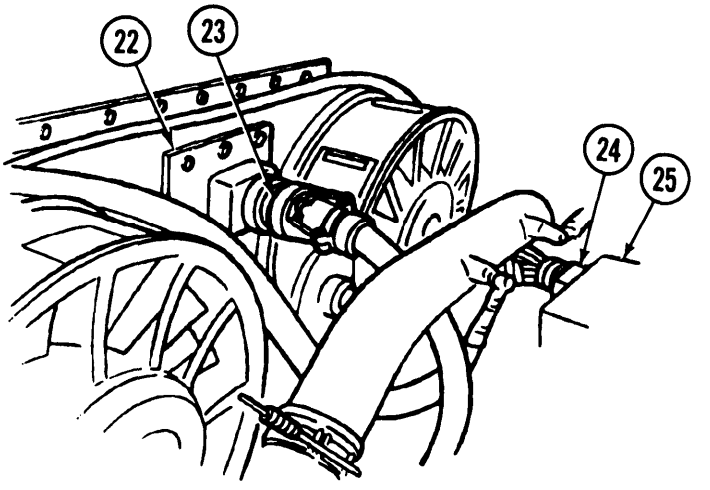
NOTE

Quantity of electrical tiedown straps required may vary.

6. Secure powerpack wiring harness (29) to wiring harness (30) with new electrical tiedown straps (28).

7. Connect lead No. 33A (26) to engine coolant temperature transmitter (27).

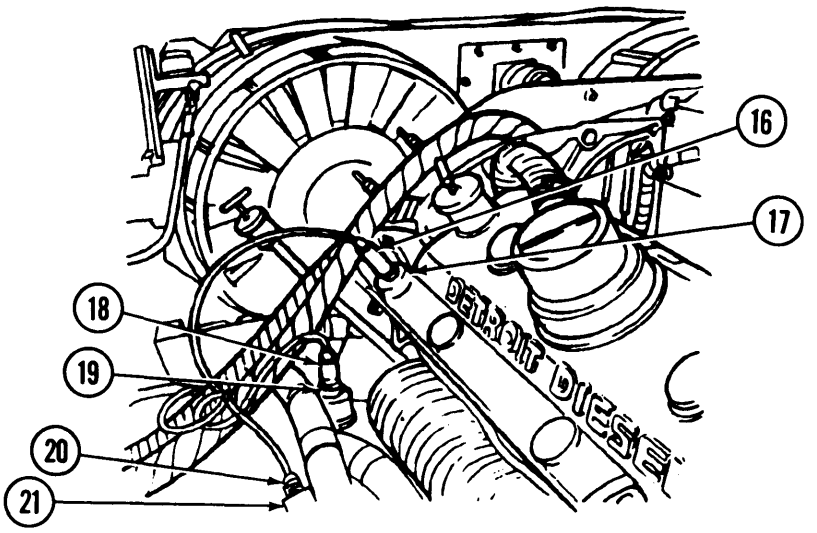




8. Connect connector (24) to glow plug controller (25),

9. Connect connector (23) to alternator (22).

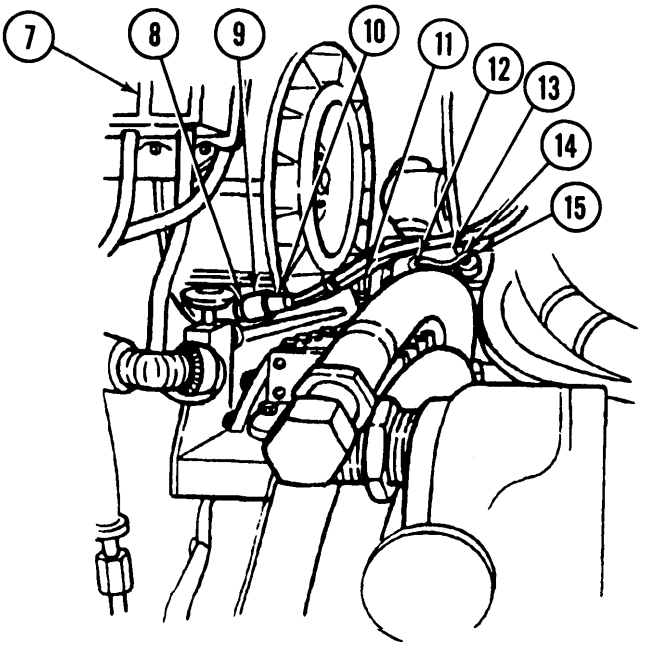
7-50. POWERPACK WIRING HARNESS (1 2268308) REPLACEMENT (continued).



10. Connect lead No. 509C (20) to transmission oil pressure switch (21).

11. Connect lead No. 321 (18) to transmission oil pressure transmitter (1 9).

12. Connect lead No. 509A (16) to engine coolant temperature switch (1 7).



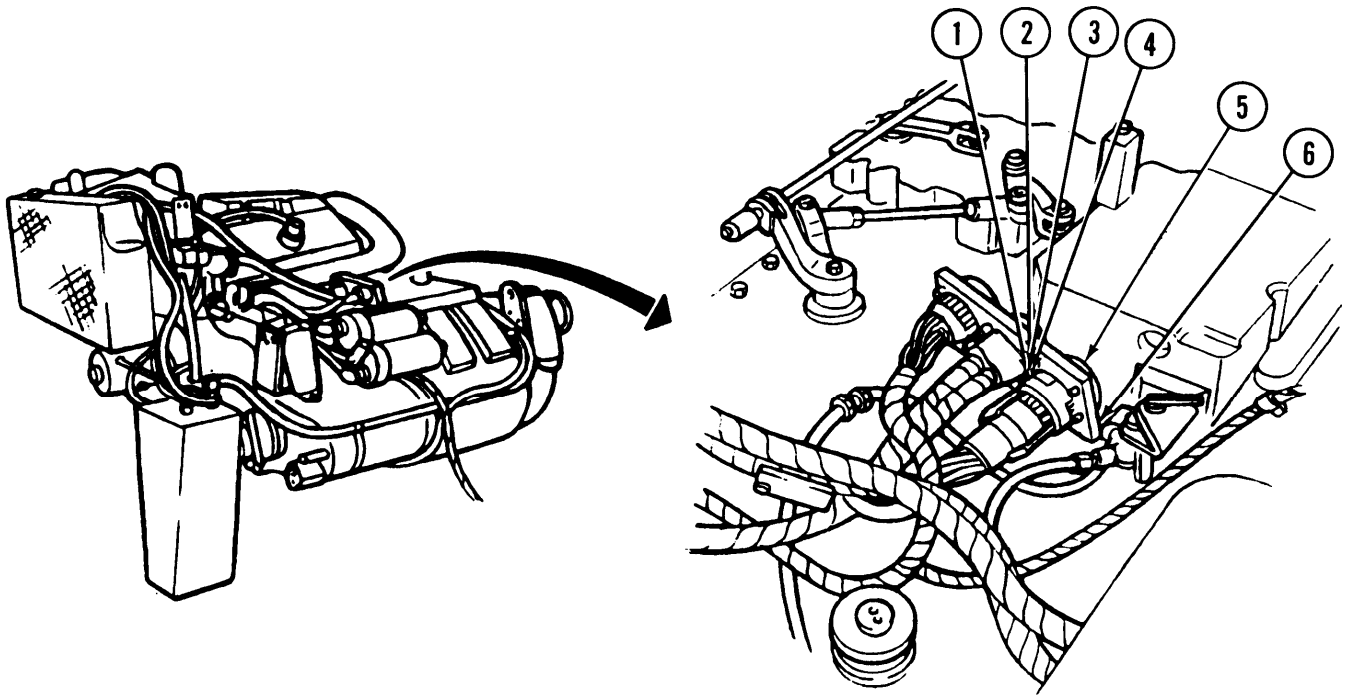
13. Connect lead No. 509D (14) to transmission oil temperature switch (15).

14. Connect lead No. 324 (12) to transmission oil temperature transmitter (1 3).

15. Connect lead No. 352A (1 O) and lead No.352B(11) to lead No. 352A (8) and lead No. 352B (9) of aeration detector (7).

7-50. POWERPACK WIRING HARNESS (1 2268308) REPLACEMENT (continued).

16. Install electrical connector (5) in engine disconnect bracket (6) with alinement spline inside connector (5) at the bottom, and secure with four screws (4), new lockwashers (3), washers (2), and nuts (1).



FOLLOW-ON MAINTENANCE:
- Install powerpack (para 3-2).

7-51. ENGINE DISCONNECT BRACKET TO BATTERIES LEAD ASSEMBLY (1 2353401) REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
ŽGeneral mechanic's tool kit (Item 24, Appendix 1)

Equipment Conditions:
• Battery ground cables disconnected (para 7-41).
• Left transmission access door opened (refer to TM 9-2350-287-10).

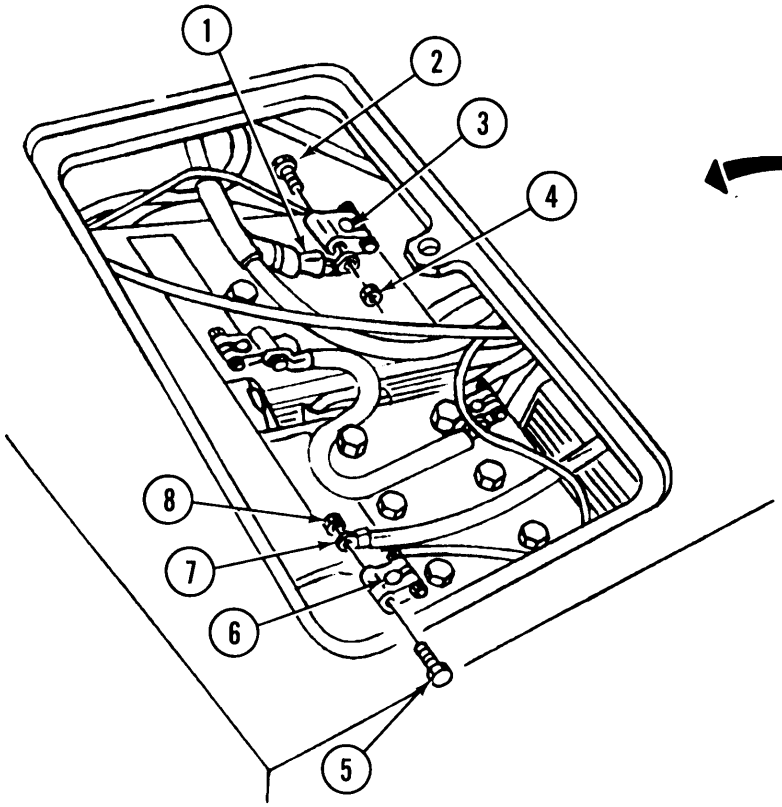
a. REMOVAL

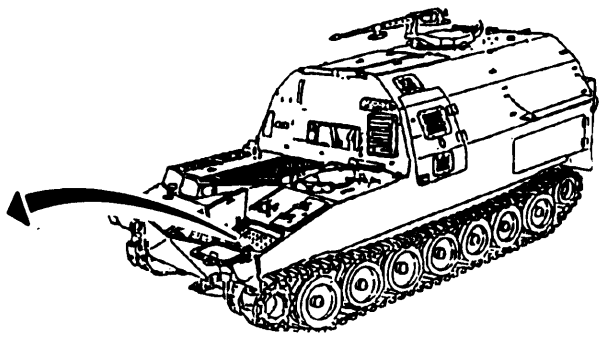
NOTE

Several leads are secured to the battery terminals. After removing the necessary lead, loosely secure the others to the terminal.

1. Remove nut (8), screw (5), and lead No. 5 (7) from negative battery terminal (6).

2. Remove nut (4), screw (2), and lead No, 6(1) from positive battery terminal (3).





7-51. ENGINE DISCONNECT BRACKET TO BATTERIES LEAD ASSEMBLY (1 2353401) REPLACEMENT (continued).

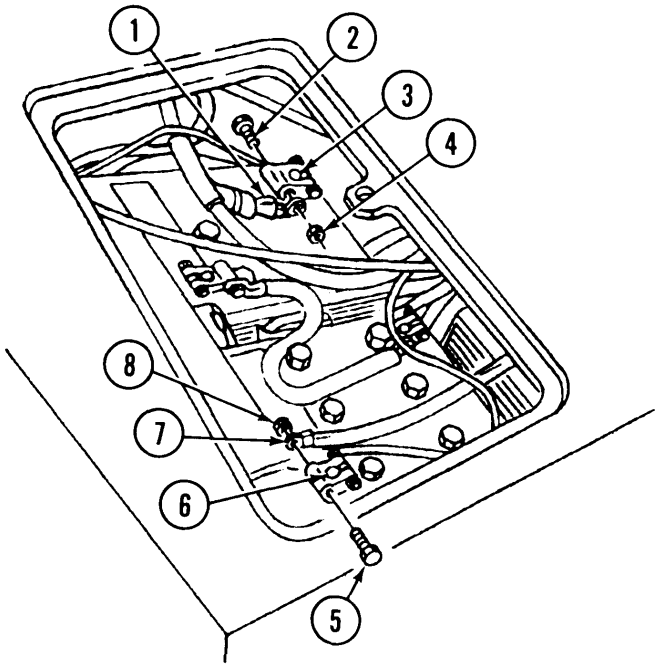
Disconnect connector (11) from center terminal (9) on engine disconnect bracket (10), and remove engine disconnect bracket to batteries wiring harness (12) from vehicle,

b. INSTALLATION

1, Position wiring harness (12) in approximate location for installation in vehicle, and connect connector (11) to center terminal (9) of engine disconnect bracket (10).

2. Connect lead No. 6 (1) to positive battery terminal (3) with screw (2) and nut (4).

3. Connect lead No. 5 (7) to negative battery terminal (6) with screw (5) and nut (8).



FOLLOW-ON MAINTENANCE:
- Close left transmission access door (refer to TM 9-2350-287-10).
- Connect battery ground cables (para 7-41).

7-52. STARTER TO ENGINE ELECTRICAL DISCONNECT CABLE ASSEMBLY (12353072) REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

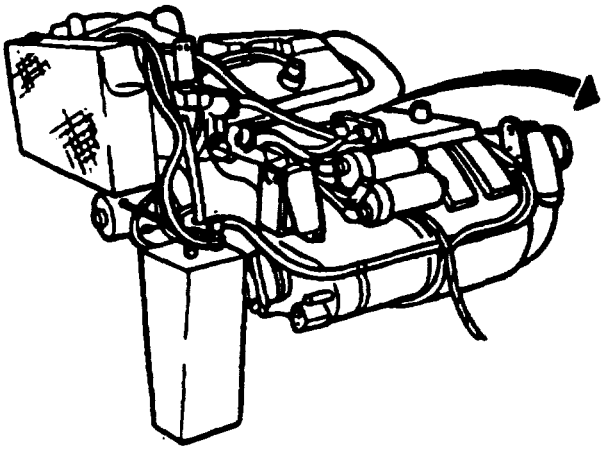
Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

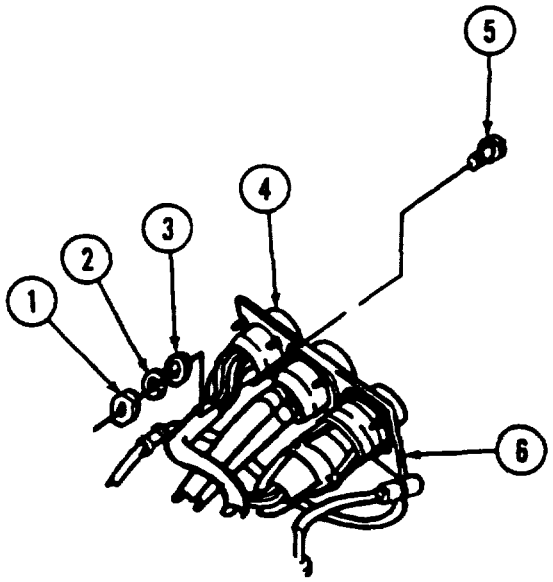
Materials/Parts:
- Tape, insulation, electrical (Item 67, Appendix D)
- Lockwasher (Item 161, Appendix H)
- Lockwasher (Item 165, Appendix H)
- Lockwasher (Item 190, Appendix H)
- Lockwasher (Item 193, Appendix H)
- Lockwasher (4) (Item 194, Appendix H)
- Tiedown strap (as required) (Item 374, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Powerpack removed (para 3-2).

a. REMOVAL

1. Remove four screws (5), nuts (1), lockwashers (2), and washers (3) and connector (4) from engine disconnect bracket (6). Discard lockwashers.





7-52. STARTER TO ENGINE ELECTRICAL DISCONNECT CABLE ASSEMBLY (12353072) REPLACEMENT (continued).

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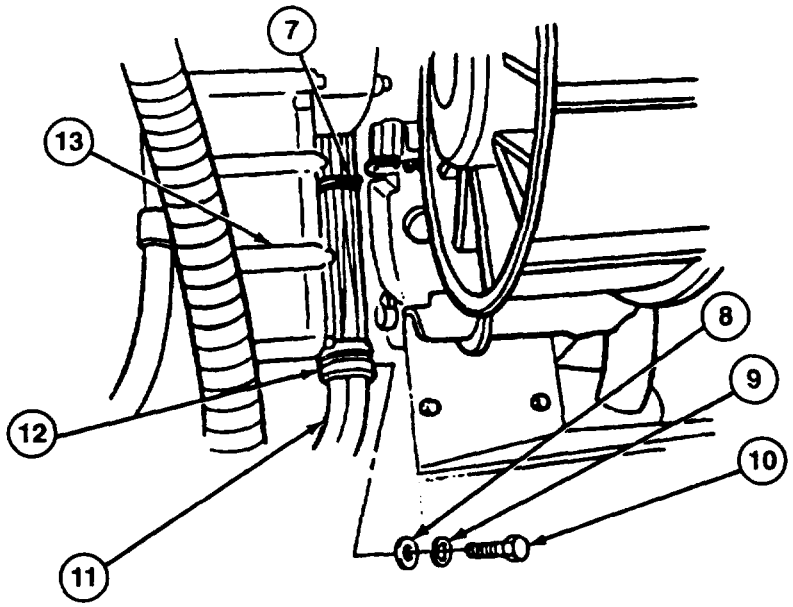
NOTE

Quantity of electrical tiedown straps may vary.

2. Remove electrical tiedown straps (7) from cable assembly (11). Discard electrical tiedown straps.

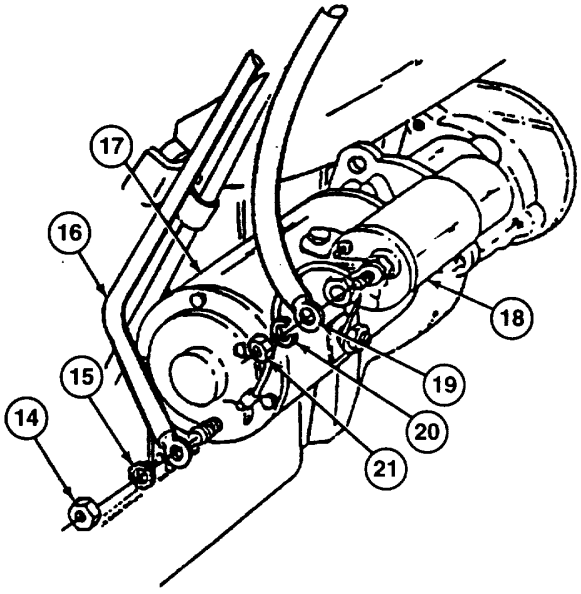


NOTE

Clamp holds more than one wiring harness. After separating the necessary cable assembly from clamp, loosely secure clamp and other harnesses to transfer case.

3. Remove screw (10), lockwasher (9), washer (8), clamp (12), and cable assembly (11) from transfer case (13). Discard lockwasher.

7-52. STARTER TO ENGINE ELECTRICAL DISCONNECT CABLE ASSEMBLY (12353072) REPLACEMENT (continued).



4. Remove nut (14), lockwasher (15), and lead 5A (16) from starter motor (17). Discard lockwasher.

5. Remove nut (21), lockwasher (20), and lead 6A (19) from starter solenoid (18). Discard lockwasher.

b. INSTALLATION

1. Route cable assembly (11) on powerpack in approximate location of installation.

2. Connect lead 6A (19) to starter solenoid (18) with new lockwasher (20) and nut (21).

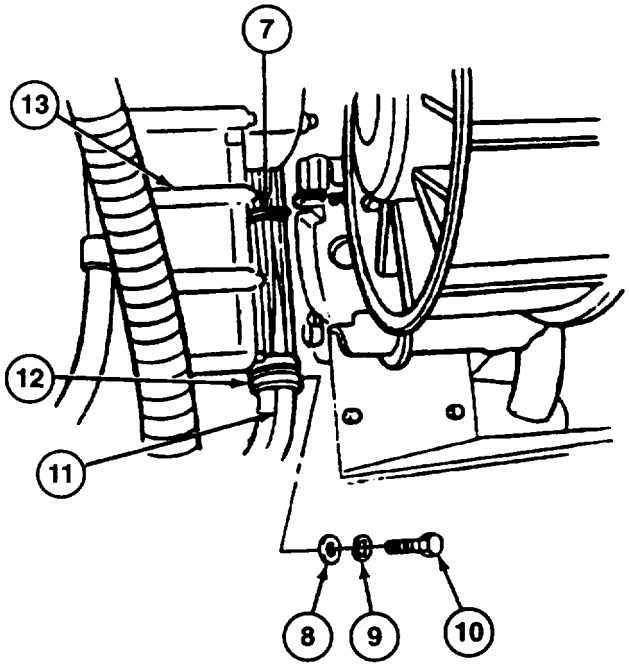
3. Connect lead 5A (16) to starter motor (17) with new lockwasher (15) and nut (14).

4. Install cable assembly (11) on transfercase (13) with clamp (12), washer (8), new lockwasher (9), and screw (10).

NOTE

Quantity of electrical tiedown straps may vary.

5. Secure cable assembly (11) with new electrical tiedown straps (7).



7-52. STARTER TO ENGINE ELECTRICAL DISCONNECT CABLE ASSEMBLY (12353072) REPLACEMENT (continued).

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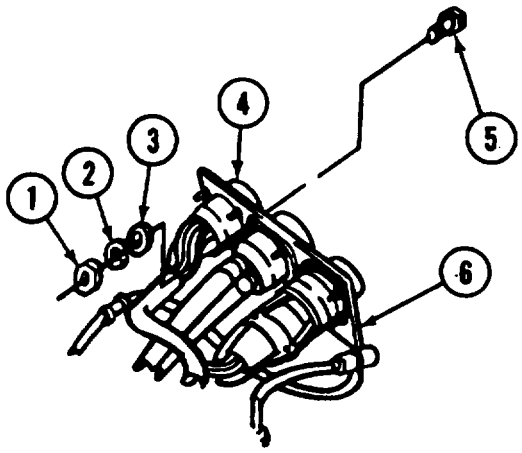
6. Install connector (4) in engine disconnect bracket (6) with spline inside connector (4) at the bottom, and secure with four screws (5), washers (3), new lockwashers (2), and nuts (1).



FOLLOW-ON MAINTENANCE:

- Install powerpack (para 3-2).

7-53. POWERPACK WIRING HARNESS MOUNTING BRACKET REPLACEMENT.

7his Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
Ž **General** mechanic's tool kit (Item 24, Appendix 1)
• Torque wrench, O-175 ft-lb (Item 69, Appendix 1)

Materials/Parts:
• Lockwasher (2) (Item 164, Appendix H)
Ž Lockwasher (12) (Item 173, Appendix H)

Equipment Conditions:
• Vehicle parked on level ground (refer to TM 9-2350-287-10).
• Transmission access doors opened (refer to TM 9-2350-287-10).
• Battery ground cables disconnected (para 7-41).

a. REMOVAL

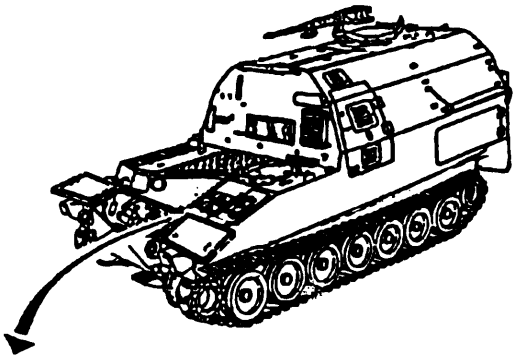
1. Disconnect three wiring harnesses (9, 10, and 12) from three electrical receptacles (5, 8, and 14) on powerpack wiring harness mounting bracket (13).

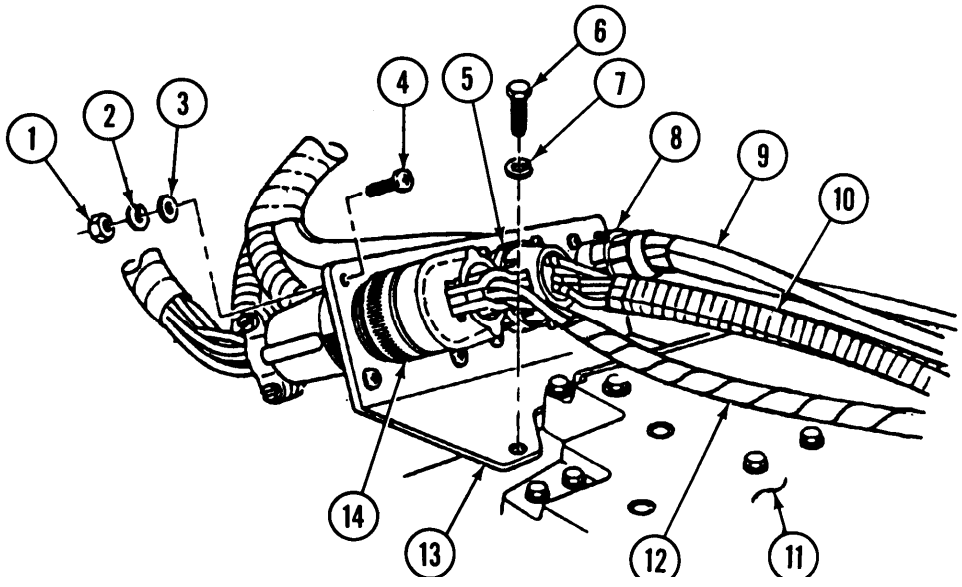
NOTE

For proper installation, mark location of each receptacle in mounting bracket.

2. Remove 12 screws (4), washers (3), lockwashers (2), and nuts (1) and three electrical receptacles (5,8, and 14) from bracket (13). Discard lockwashers.

3. Remove two screws (6) and lockwashers (7) and bracket (13) from transmission (11). Discard lockwashers.

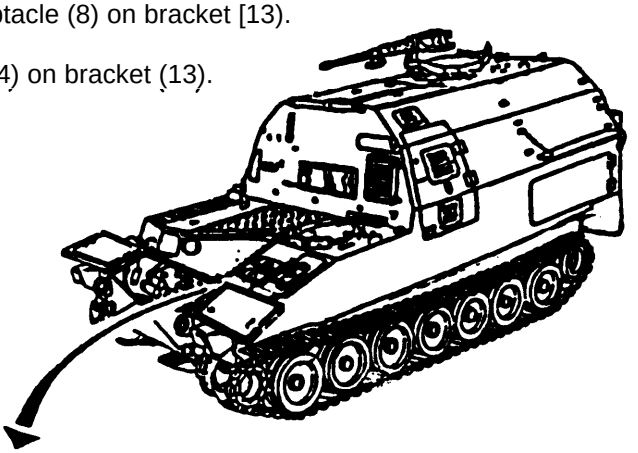


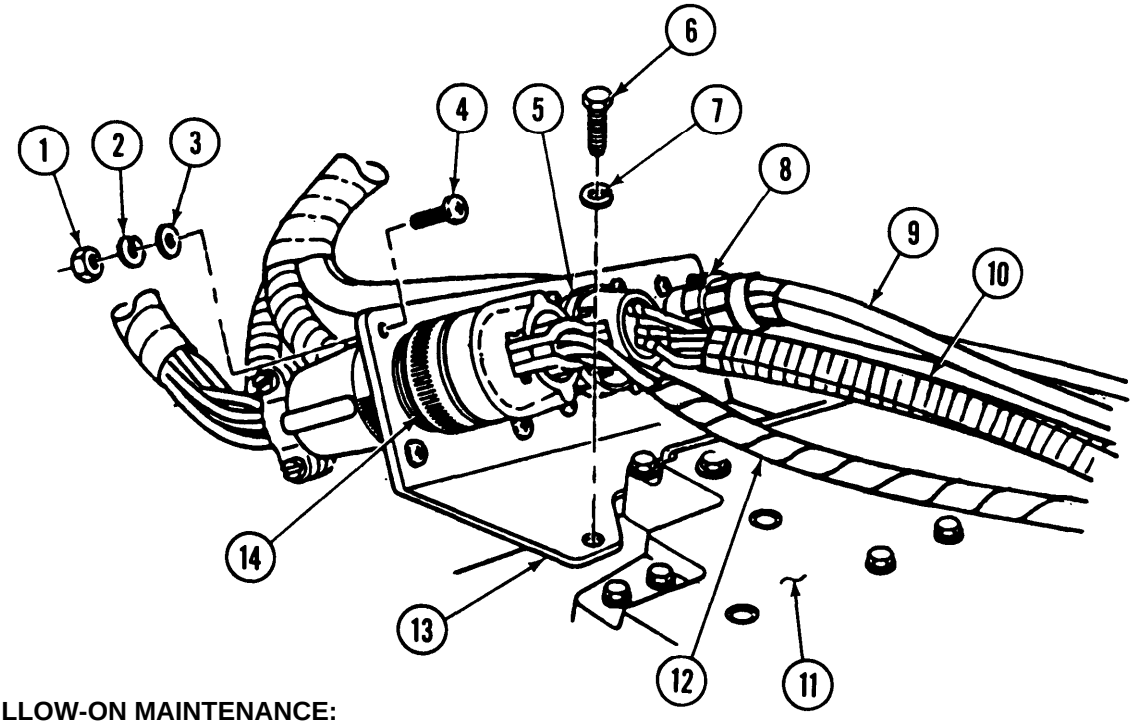


7-53. POWERPACK WIRING HARNESS MOUNTING BRACKET REPLACEMENT (continued).

b. INSTALLATION

1. Install bracket (13) on transmission (11) with two screws (6) and new lockwashers (7). Torque screws between 26 and 32 lb (36 and 44 N•m).
2. Install three electrical receptacles (5, 8, and 14) in bracket (13) with 12 screws (4), washers (3), new lockwashers (2), and nuts (l).
3. Connect wiring harness (10) to electrical receptacle (5) on bracket (13).
4. Connect wiring harness (9) to electrical receptacle (8) on bracket [13).
5. Connect wiring harness (12) to receptacle (14) on bracket (13).





FOLLOW-ON MAINTENANCE:

- l Connect battery ground cables (para 7-41).
- l Close transmission access doors (refer to TM 9-2350-287-10).

7-54. RECTIFIER TO REGULATOR WIRING HARNESS (12376406) REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

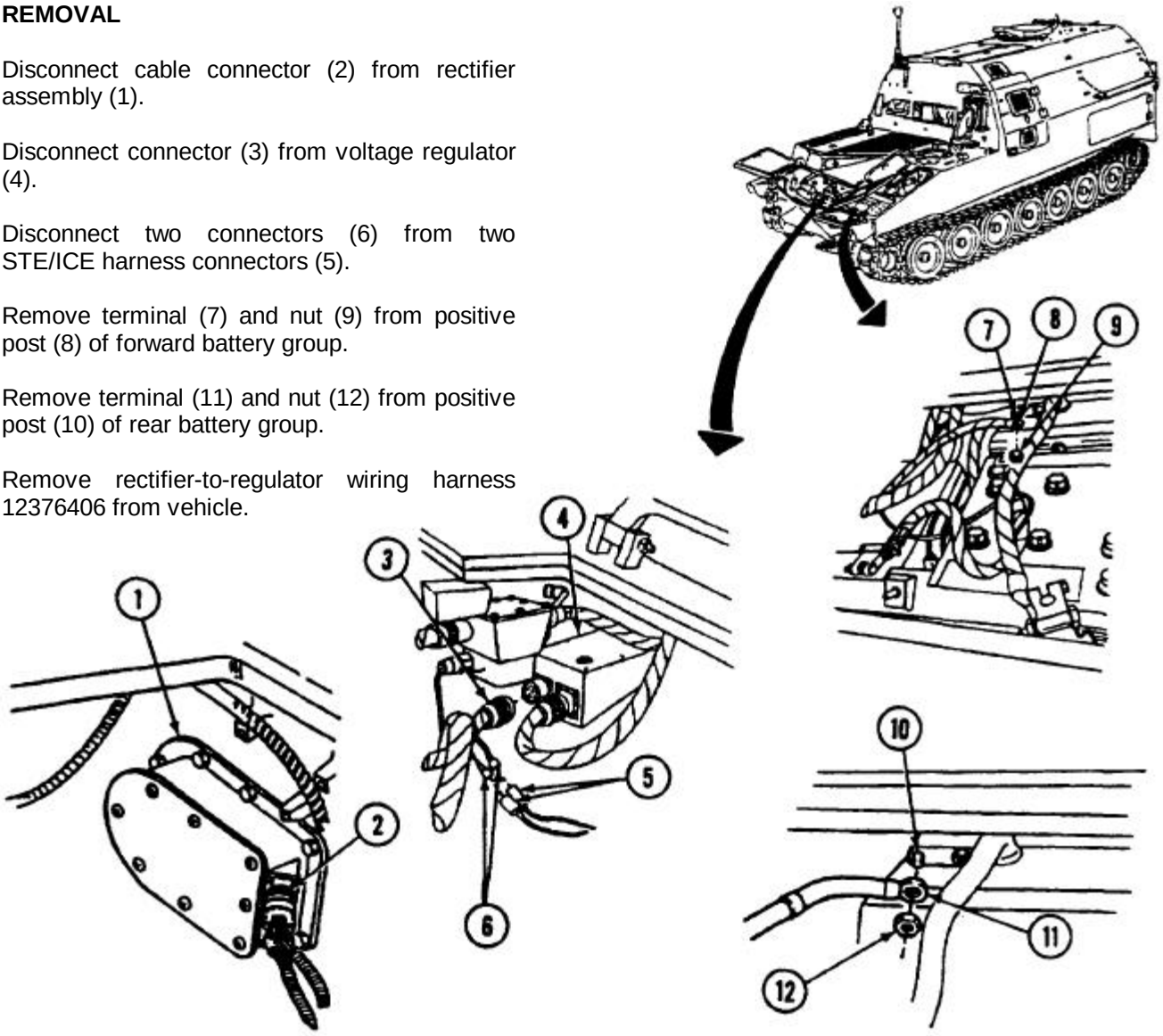
Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I).

Materials/Parts:
- Tape, insulation, electrical (Item 67, Appendix D)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).

a. REMOVAL

1. Disconnect cable connector (2) from rectifier assembly (1).
2. Disconnect connector (3) from voltage regulator (4).
3. Disconnect two connectors (6) from two STE/ICE harness connectors (5).
4. Remove terminal (7) and nut (9) from positive post (8) of forward battery group.
5. Remove terminal (11) and nut (12) from positive post (10) of rear battery group.
6. Remove rectifier-to-regulator wiring harness 12376406 from vehicle.



7-54. RECTIFIER TO REGULATOR WIRING HARNESS (12376406) REPLACEMENT (continued).

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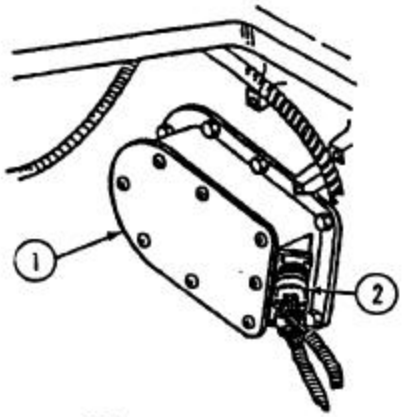
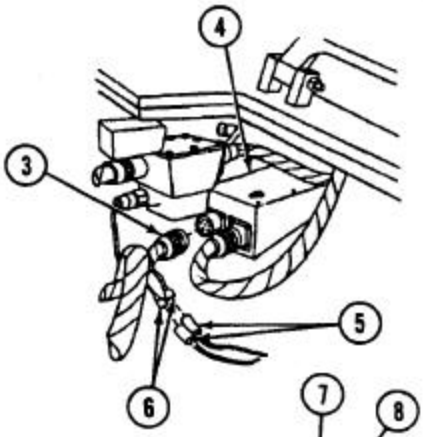
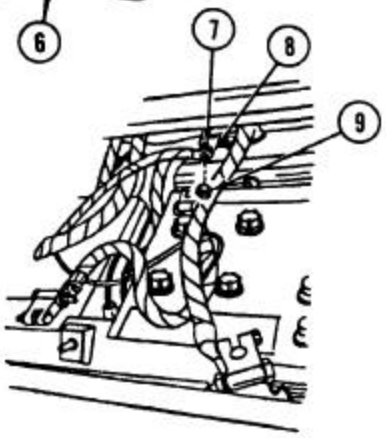
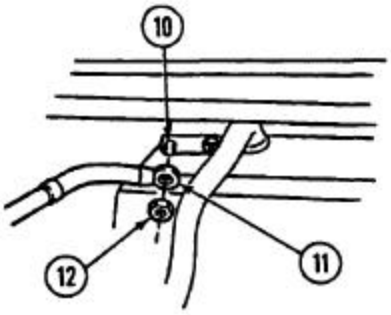






b. INSTALLATION

1. Connect terminal (11) and nut (12) to positive post (10) of rear battery group.
2. Connect terminal (7) and nut (9) to positive post (8) of forward battery group.
3. Connect two connectors (6) to two STE/ICE harness connectors (5).
4. Connect connector (3) to voltage regulator (4).
5. Connect cable connector (2) to rectifier assembly (1).



FOLLOW-ON MAINTENANCE:

- Connect battery ground cables (para 7-41).

7-55. BATTERY TO DRIVER'S BULKHEAD WIRING HARNESS (12330317) REPLACEMENT.

This Task Covers:

a. Removal

b, Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materias/Parts:
- Lockwasher (4) (Item 173, Appendix H)

Personnel Required: Two

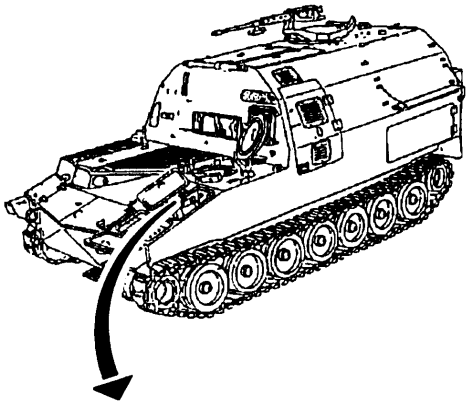
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).

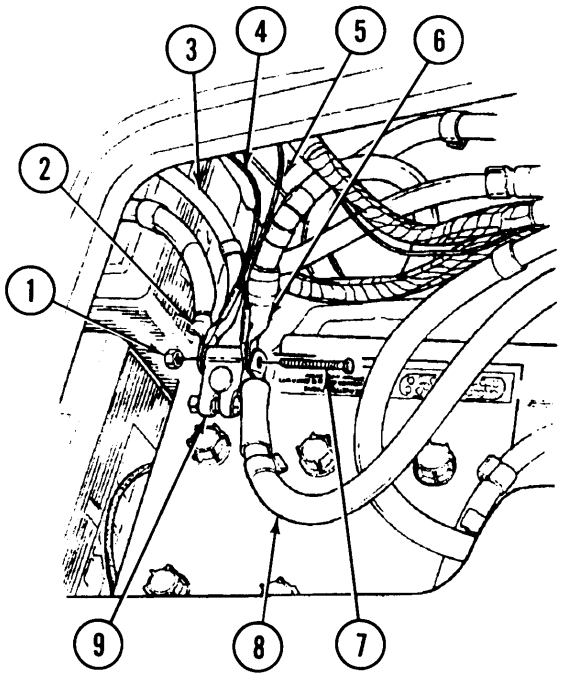
a. REMOVAL

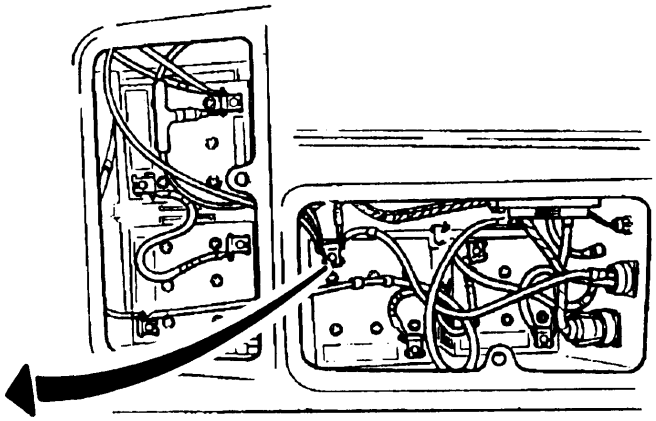
WARNING

Wear eye protection and remove all jewelry, dog tags, and metal items when performing this procedure. Failure to follow these instructions may result in injury or death to personnel.

1. Remove nut (1), screw (7), cable 2B (2), STE/ICE leadl 10-V (4), cable 81 (3), cable 62 (5), STE/ICE lead 10-R (6), and cable 49 (8) from battery terminal (9).







7-55. BATTERY TO DRIVER'S BULKHEAD WIRING HARNESS (12330317) REPLACEMENT (continued).

2. Disconnect harness 12330256 plug (10) from connector (18) at driver's side of bulkhead (17).

NOTE

An assistant is needed when removing screws from cable and STE/ICE leads.

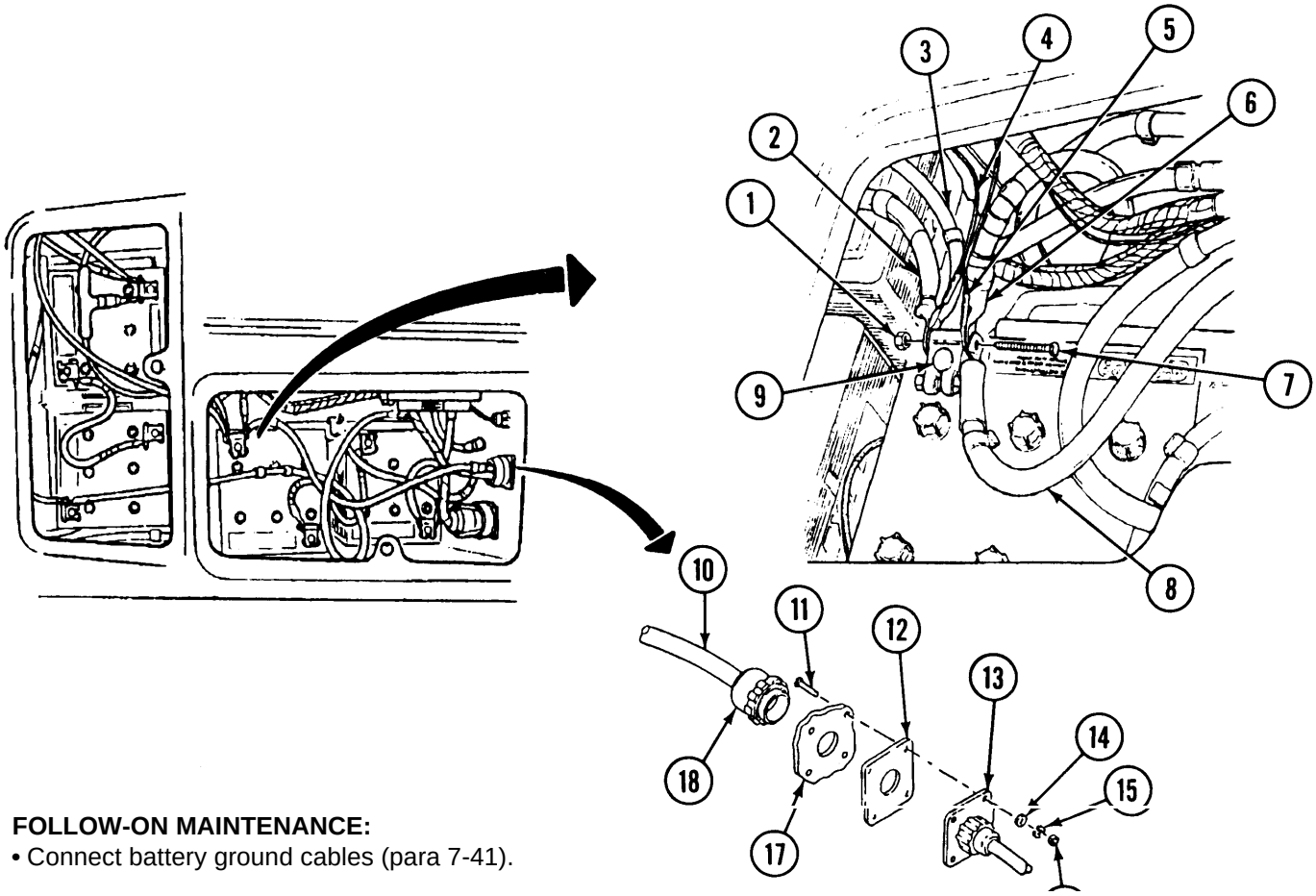
3. Remove four screws (11), washers (1 4), Iockwashers (15), and nuts (1 6), gasket (1 2), and cable receptacle (13) from driver's compartment bulkhead (17). Discard Iockwashers.

b. INSTALLATION

1. Install cable receptacle (13) in driver's compartment bulkhead (17) using gasket (12) and four nuts (1 6), new Iockwashers (15), washers (14), and screws (11).

2. Connect harness 12330256 plug (10) toconnector (18) at driver's side of bulkhead (17).

3. Install cable 49 (8), STE/lCE lead 10-R (6), cable 62 (5), cable 81 (3), STE/lCE lead 10-V (4), and cable 2B (2) on battery terminal (9) with screw (7) and nut (1).



FOLLOW-ON MAINTENANCE:
• Connect battery ground cables (para 7-41).

7-56. BULKHEAD TO DRIVER'S PORTABLE INSTRUMENT PANEL WIRING HARNESS (12260287) REPLACEMENT.

7his Task Covers:

a. Removal

b. Installation

Initial Setup:

Tool/test Equipment:
- ŽGeneral mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- ŽLockwasher (Item 122, Appendix H)
- • Lockwasher (4) (Item 173, Appendix H)
- ŽLockwasher (4) (Item 175, Appendix H)

Equipment Conditions:
- ŽVehicle parked on level ground (refer to TM 9-2350-287-10).
- • Battery ground cables disconnected (para 7-41).
- • Driver's portable insrument panel removed (para 7-6).
- ŽMASTER switch set to OFF (refer to TM 9-2350-287-10).

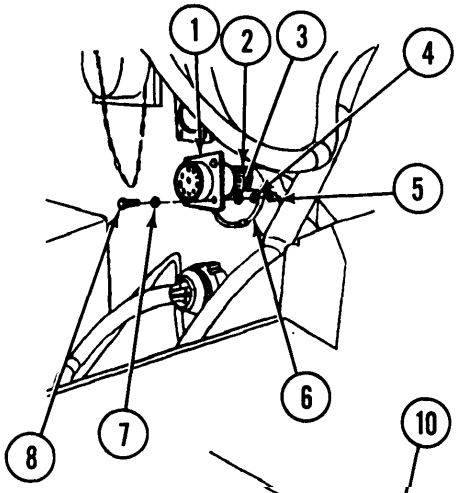
a. REMOVAL

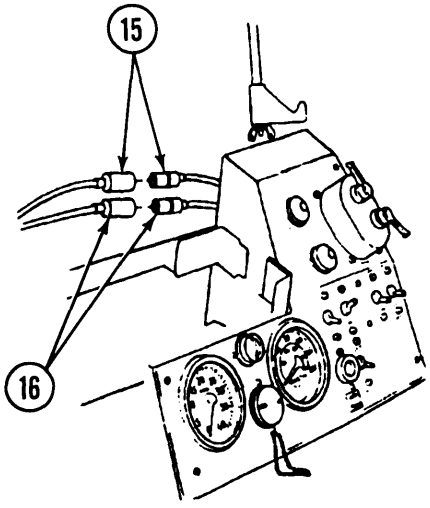
1. Remove four screws (8), washers (3), Iockwashers (4), nuts (5), ground strap (6), Iockwasher (7), and harness connector No. 12260287 (2) from bulkhead connector (1). Discard Iockwashers.

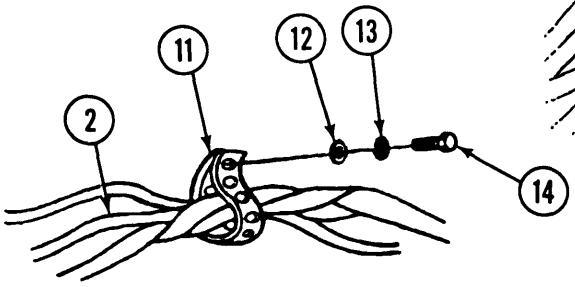
2. Disconnect connector (9) from bulkhead connector (1 O).

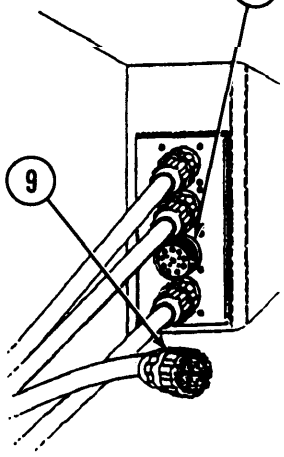
3. Remove two screws (14), Iockwashers (13), and washers (12) from two retaining straps (11). Remove wiring harness connector No. 12260287 (2) from retaining straps (11). Discard Iockwashers.

4. Disconnect wire connector No. 459A (15) and 509E (1 6).



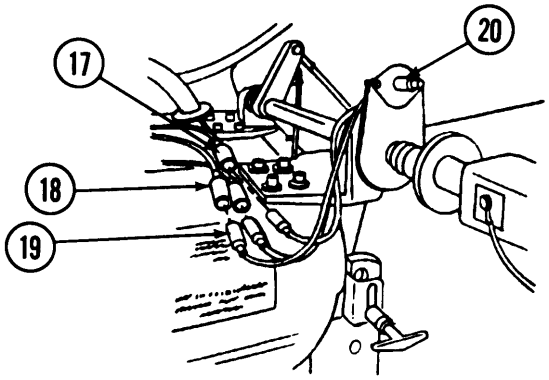




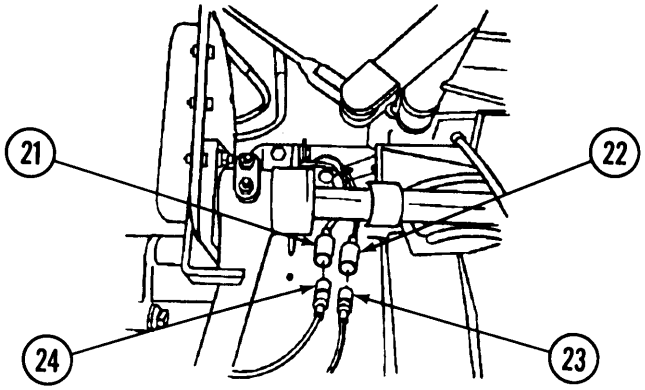


7-56. BULKHEAD TO DRIVER'S PORTABLE INSTRUMENT PANEL WIRING HARNESS (12260287) REPLACEMENT (continued).

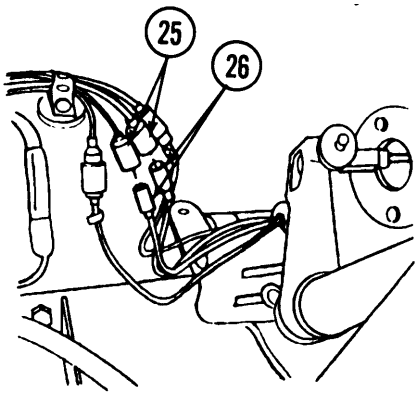
5. Disconnect were connector Nos. 27,509, and GND(17, 18, and 19) from steering column-mounted master warning light (20).



6. Disconnect two wire connector Nos. 509E (23 and 24) from parking brake warning switch connectors (21 and 22).



7. Disconnect two wire connector Nos. 14 (25) from neutral safety switch (26).



8. Remove two screws (27), lockwashers (28), and washers (29) from two retaining straps (30). Remove wiring harness connector No. 12260287 (2) from retaining straps (30). Discard lockwashers.

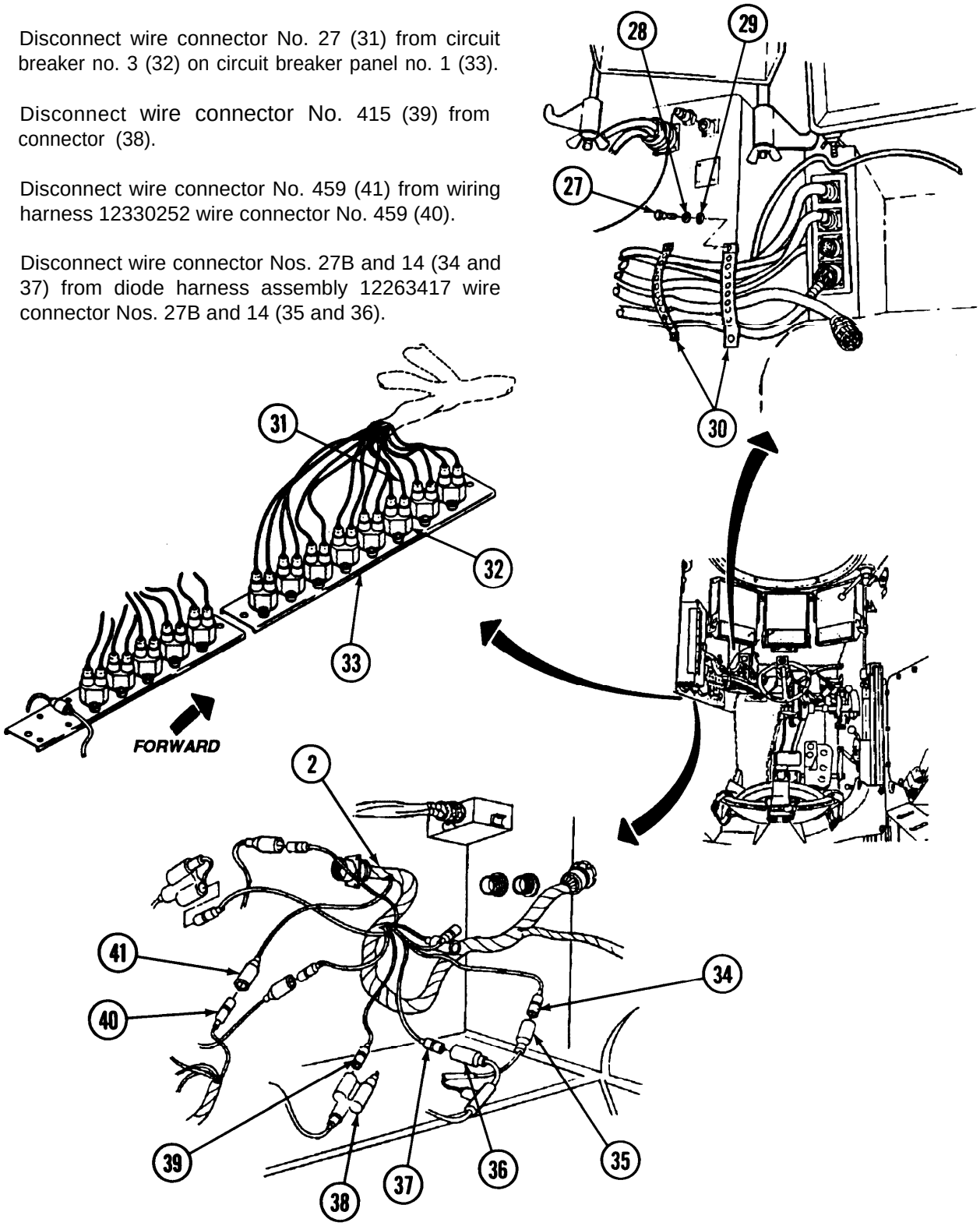
7-56. BULKHEAD TO DRIVER'S PORTABLE INSTRUMENT PANEL WIRING HARNESS (12260287) REPLACEMENT (continued).

9. Disconnect wire connector No. 27 (31) from circuit breaker no. 3 (32) on circuit breaker panel no. 1 (33).

10. Disconnect wire connector No. 415 (39) from connector (38).

11. Disconnect wire connector No. 459 (41) from wiring harness 12330252 wire connector No. 459 (40).

12. Disconnect wire connector Nos. 27B and 14 (34 and 37) from diode harness assembly 12263417 wire connector Nos. 27B and 14 (35 and 36).

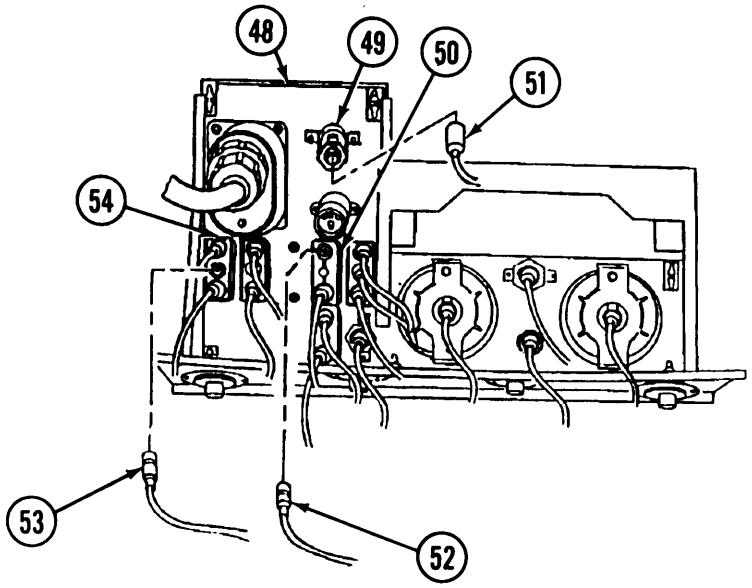


7-56. BULKHEAD TO DRIVER'S PORTABLE INSTRUMENT PANEL WIRING HARNESS (12260287) REPLACEMENT (continued).

13. Disconnect wire connector No. 486A (52) from glow plug switch (50) on driver's instrument panel (48).

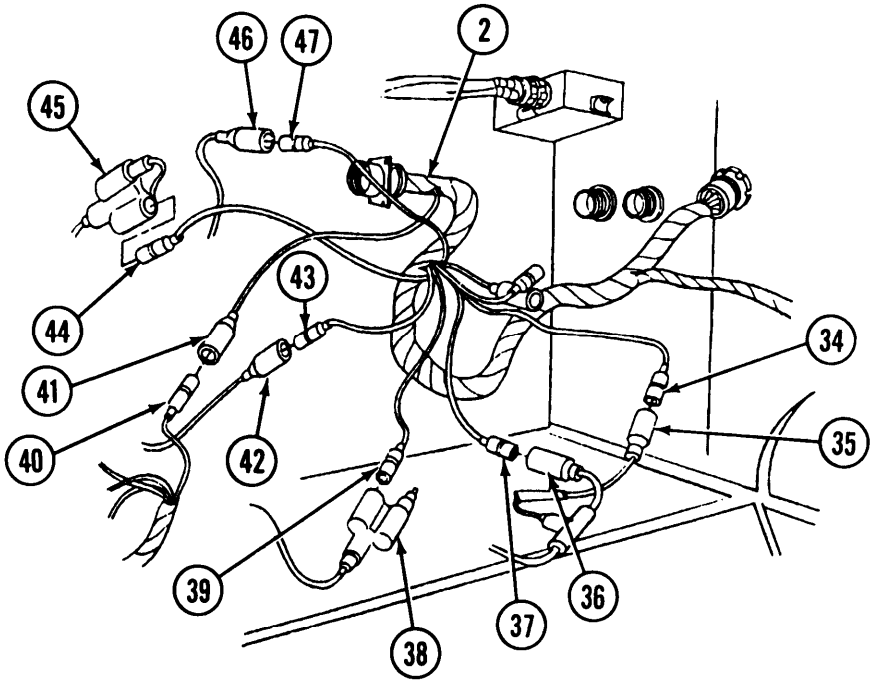
14. Disconnect wire connector No. 509E (51) from parking brake light (49) on driver's instrument panel (48).

15. Disconnect wire connector No. 29-31 (53) from fuel gage level switch (54).



16. Disconnect wire connector No. 486 (47) from lead assembly 12389711 (46).

17. Disconnect wire connector No. 40 (44) from y-connector (45) and two wire connector Nos. 400 (42 and 43) behind driver's instrument panel (48).

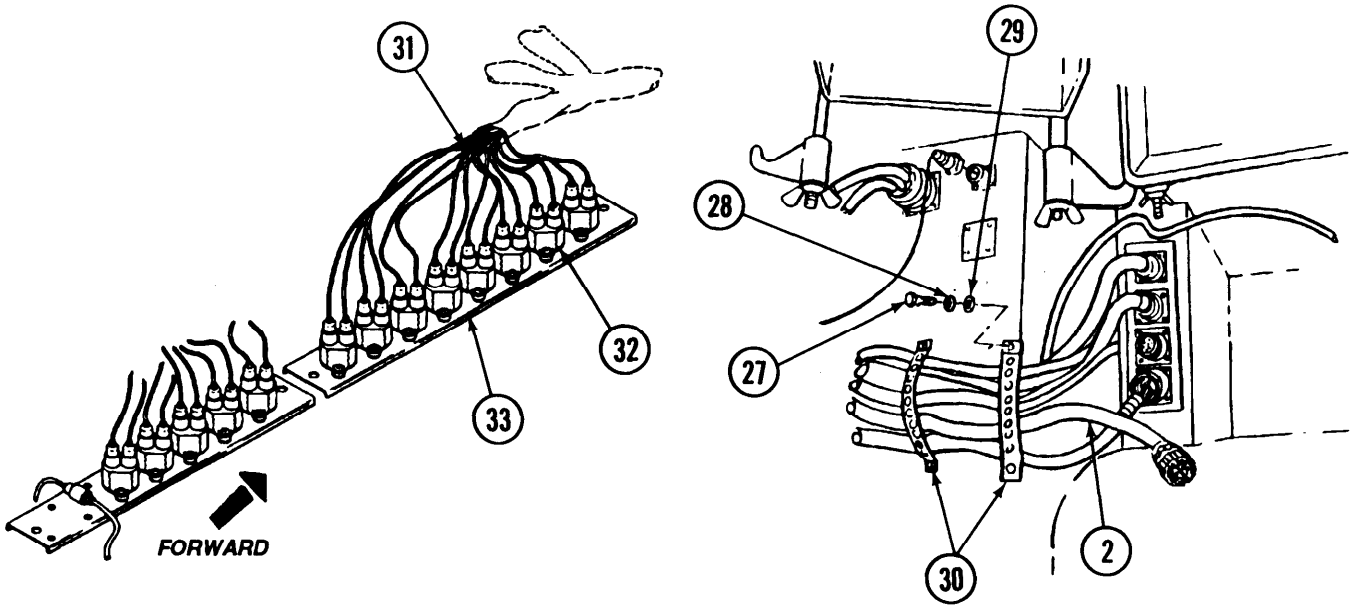


7-56. BULKHEAD TO DRIVER'S PORTABLE INSTRUMENT PANEL WIRING HARNESS (12260287) REPLACEMENT (continued).

18. Remove wiring harness 12260287 (2) from vehicle.

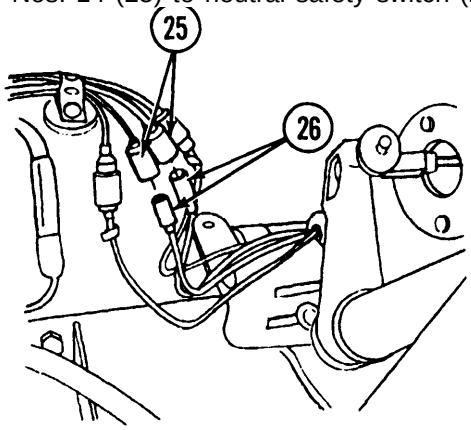
b. INSTALLATION

1. Route wiring harness 12260287 (2) in approximate location of installation.
2. Connect two wire connector Nos. 400 (42 and 43) behind driver's instrument panel (48), and wire connector (40 and 44) top y-connector (45).
3. Connect wire connector No. 486 (47) to lead assembly 12389711 (46).
4. Connect wire connector No. 29-31 (53) to fuel gage level switch (54).
5. Connect wire connector No, 509E (51) to parking brake light (49) on driver's instrument panel (48).
6. Connect wire connector No. 486A (52) to glow plug switch (50) on driver's instrument panel (48).
7. Connect wire connector Nos. 27B and 14 (34 and 37) to diode harness assembly 12263417 wire connector Nos. 27B and 14 (35 and 36).
8. Connect wire connector No. 459 (41) to wiring harness 12330252 wire connector No. 459 (40).
9. Connect wire connector No. 415 (39) to y-connector (38).
10. Connect wire connector No. 27 (31) to circuit breaker no. 3 (32) on circuit breaker panel no. 1 (33).
11. Install wiring harness in two retaining straps (30), and secure two retaining straps (30) to driver's compartment wall with two screws (27), new lockwashers (28), and washers (29).

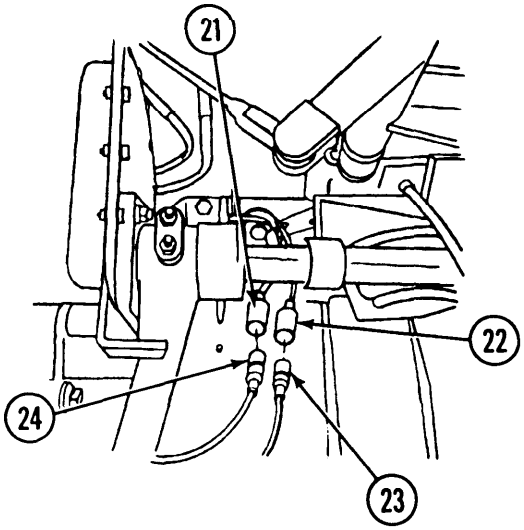


7-56. BULKHEAD TO DRIVER'S PORTABLE INSTRUMENT PANEL WIRING HARNESS (12260287) REPLACEMENT (continued).

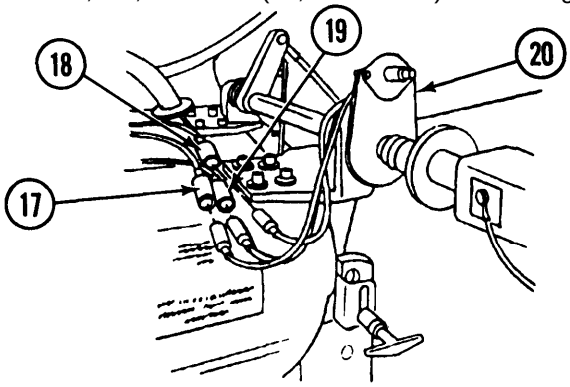
12. Connect two wire connector Nos. 14 (25) to neutral safety switch (26).



13. Connect two wire connector Nos. 509E (23 and 24) from parking brake warning switch connector and 22).

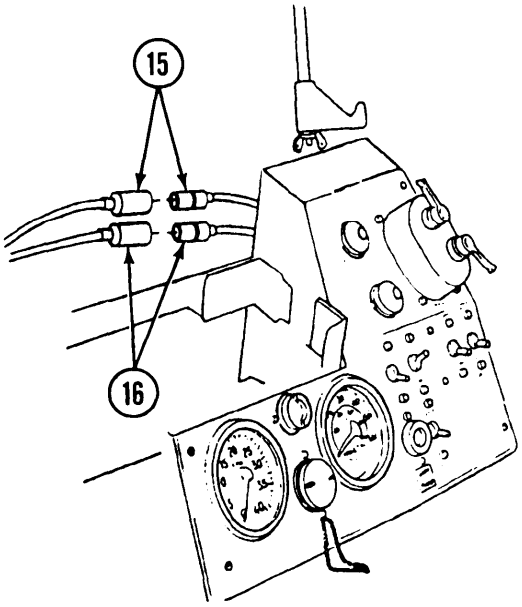


14. Connect wire connector Nos. 27,509, and GND(17, 18 and 19) to steering column-mounted master warning light (20).



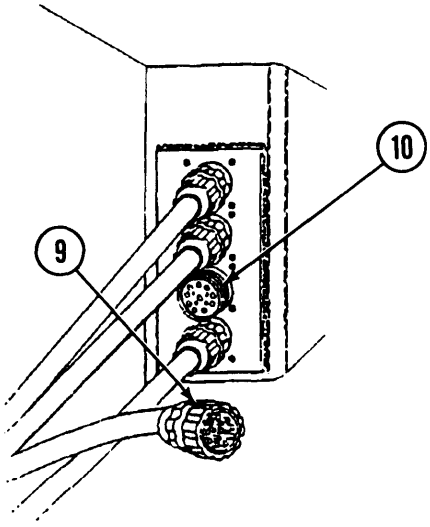
7-56. BULKHEAD TO DRIVER'S PORTABLE INSTRUMENT PANEL WIRING HARNESS (12260287) REPLACEMENT (continued).

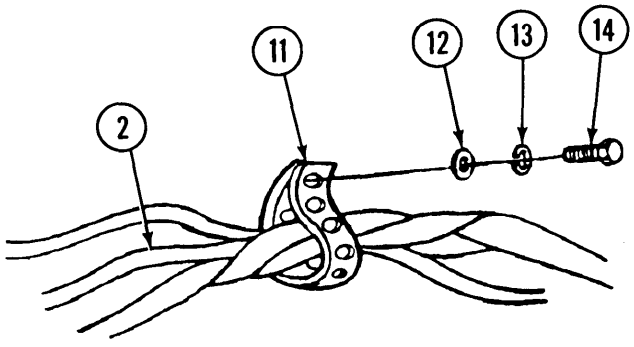
15. Connect wire connector No. 459A (15) and 509E (16).



16. Install wiring harness 12260287 in two retaining straps (11), and secure with two screws (14), new lockwashers (13), and washers (12).

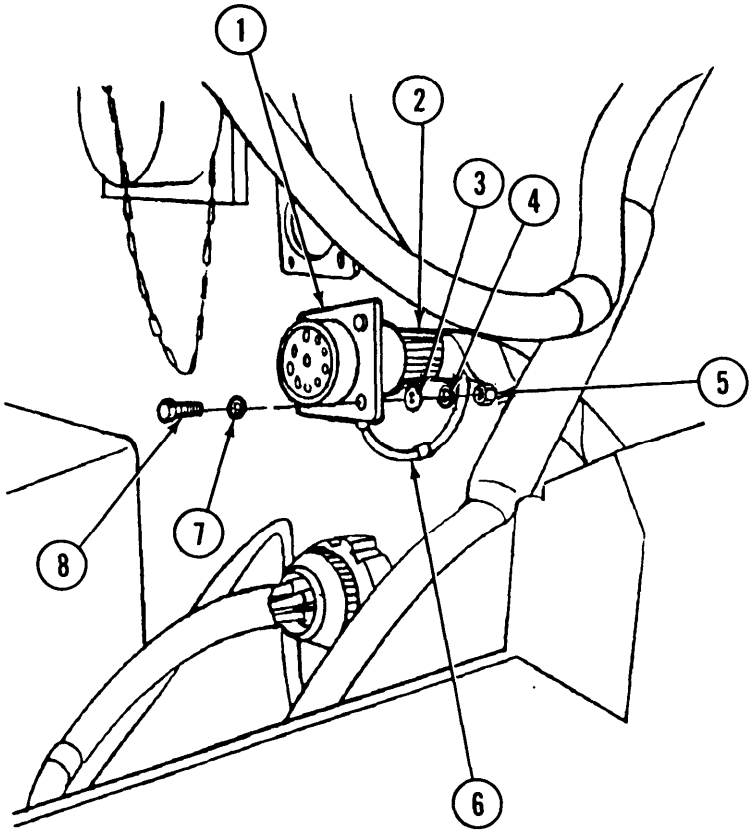
17. Connect connector (9) to bulkhead connector (10).





7-56. BULKHEAD TO DRIVER'S PORTABLE INSTRUMENT PANEL WIRING HARNESS (12260287) REPLACEMENT (continued).

18. Install wiring harness connector No. 12260287 (2) to bulkhead connector (1) and ground strap (6) with four screws (8), washers (3), new lockwashers (4), nuts (5), and lockwasher (7).



FOLLOW-ON MAINTENANCE:
Install driver's portable instrument panel (para 7-6).
Connect battery ground cables (para 7-41).

7-57. CARGO COMPARTMENT CABLE ASSEMBLY (12376405) REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Tape, insulation, electrical (Item 67, Appendix D)
- Lockwasher (2) (Item 136, Appendix H)
- Lockwasher (8) (Item 160, Appendix H)
- Lockwasher (Item 164, Appendix H)
- Lockwasher (19) (Item 175, Appendix H)
- Lockwasher (7) (Item 196, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).
- Engine AFES test and alarm (T/A) panel removed (para 21-13).
- Driver's instrument panel removed (para 7-9).
- APU control box removed (para 7-22).
- M2A2 air purifier removed (para 22-2).

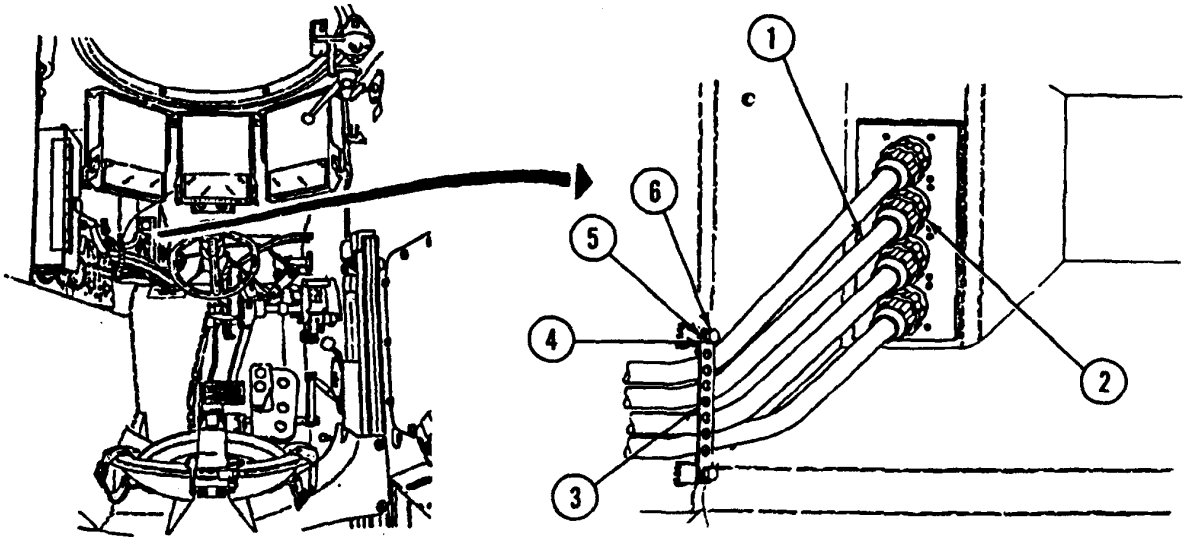
a. REMOVAL

1. Disconnect cargo compartment cable assembly 12376405 (1) from driver's bulkhead disconnect receptacle (2).

NOTE

Straps retain more than one cable assembly. Separate only the necessary cable assembly, then loosely secure the strap and the other cable assemblies.

2. Remove two screws (6), lockwashers (5), and washers (4) and cable assembly 12376405 (1) from two straps (3). Discard lockwashers.



7-57. CARGO COMPARTMENT CABLE ASSEMBLY (12376405) REPLACEMENT (continued).

3. Disconnect five electrical leads (7) from panel 1 (9) circuit breakers (8) (refer to Table 7-1).

4. Disconnect four electrical leads (14) from panel 2 (11) circuit breakers (10) (refer to Table 7-1).

5. Disconnect electrical lead 10H (13) from electrical lead 15 (12).

6 Disconnect electrical lead 10E (16) from Y connector (15).

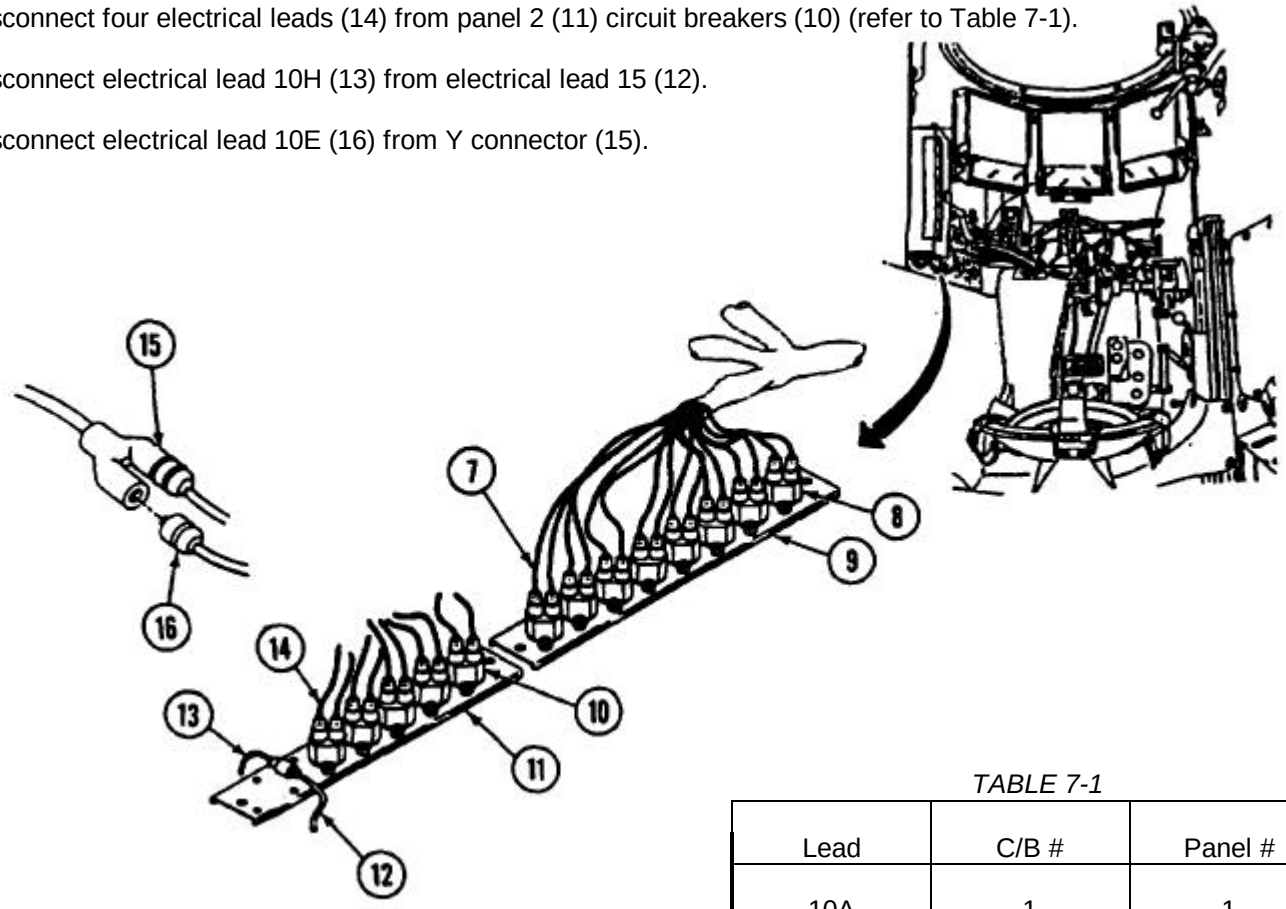


TABLE 7-1

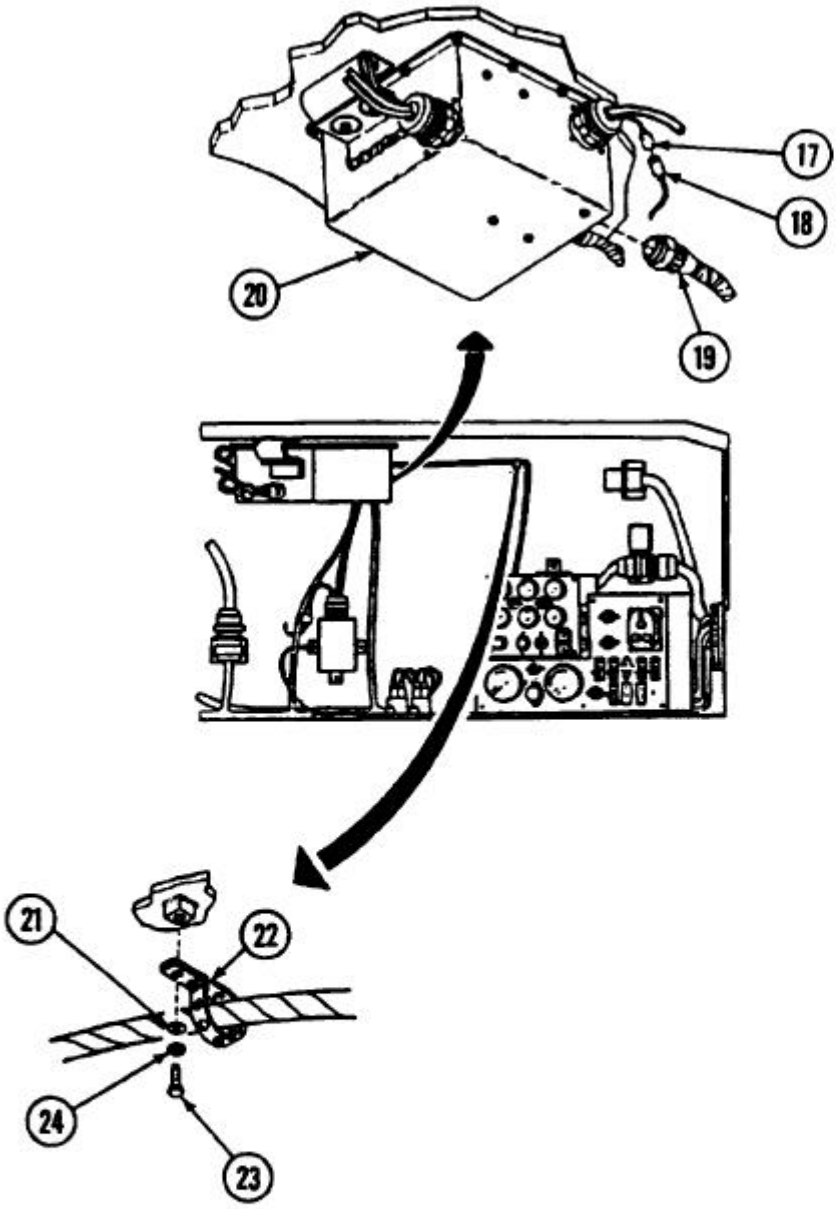
Lead	C/B #	Panel #
10A	1	1
10B	2	1
10C	3	1
10F	7	1
10G	8	1
10J	5	2
10K	4	2
10L	7	2
10M	3	2

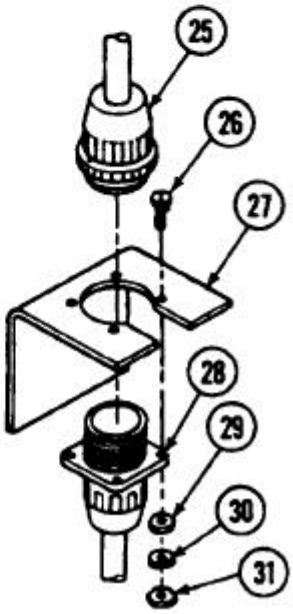
7. Disconnect electrical connector 10 (19) from accessory control box (20).

8. Disconnect harness connector 48 (18) from harness cable connector 48 (17).

9. Remove screw (23), lockwasher (24), and washer (21) from each of two harness straps (22), and remove cable assembly 12376405 (1) from harness straps (22). Discard lockwashers.

7-57. CARGO COMPARTMENT CABLE ASSEMBLY (12376405) REPLACEMENT (continued).





10. Disconnect APU power lead 66 (25) from power feed receptacle (28).

11. Remove four screws (26), washers (29), lockwashers (30), and nuts (31) and power feed receptacle (28) from wall-mounted bracket (27). Discard lockwashers.

7-57. CARGO COMPARTMENT CABLE ASSEMBLY (12376405) REPLACEMENT (continued).

NOTE

Radio power disconnect is located on left side of cargo compartment ceiling.

12. Disconnect radio power disconnect (32) from radio power disconnect receptacle (33).

13. Remove screw (40), lockwasher (41), washer (42), two lockwashers (34), harness retaining strap (43), and radio power disconnect ground lug (35) from vehicle. Discard lockwashers.

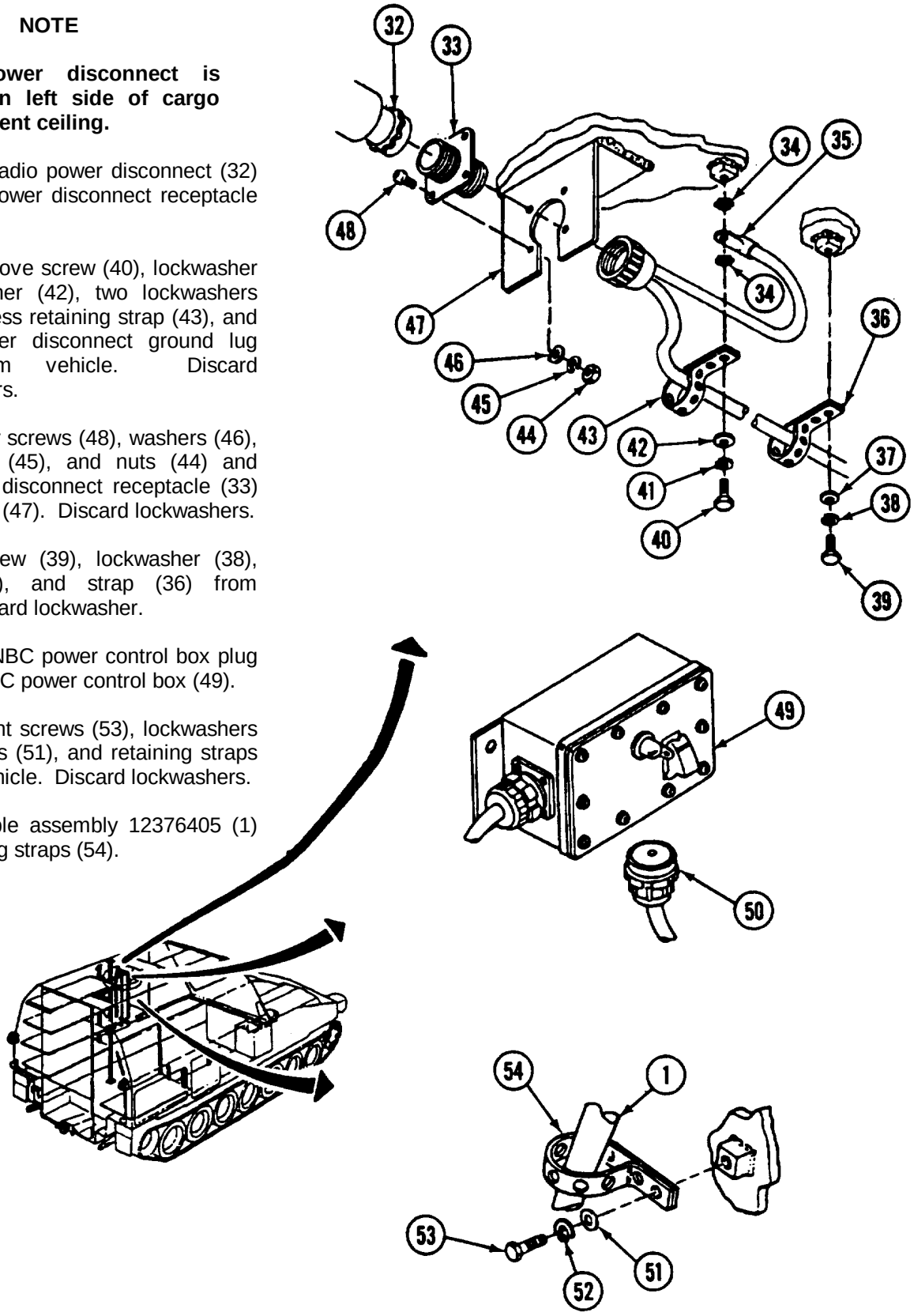
14. Remove four screws (48), washers (46), lockwashers (45), and nuts (44) and radio power disconnect receptacle (33) from bracket (47). Discard lockwashers.

15. Remove screw (39), lockwasher (38), washer (37), and strap (36) from vehicle. Discard lockwasher.

16. Disconnect NBC power control box plug (50) from NBC power control box (49).

17. Remove eight screws (53), lockwashers (52), washers (51), and retaining straps (54) from vehicle. Discard lockwashers.

18. Remove cable assembly 12376405 (1) from retaining straps (54).



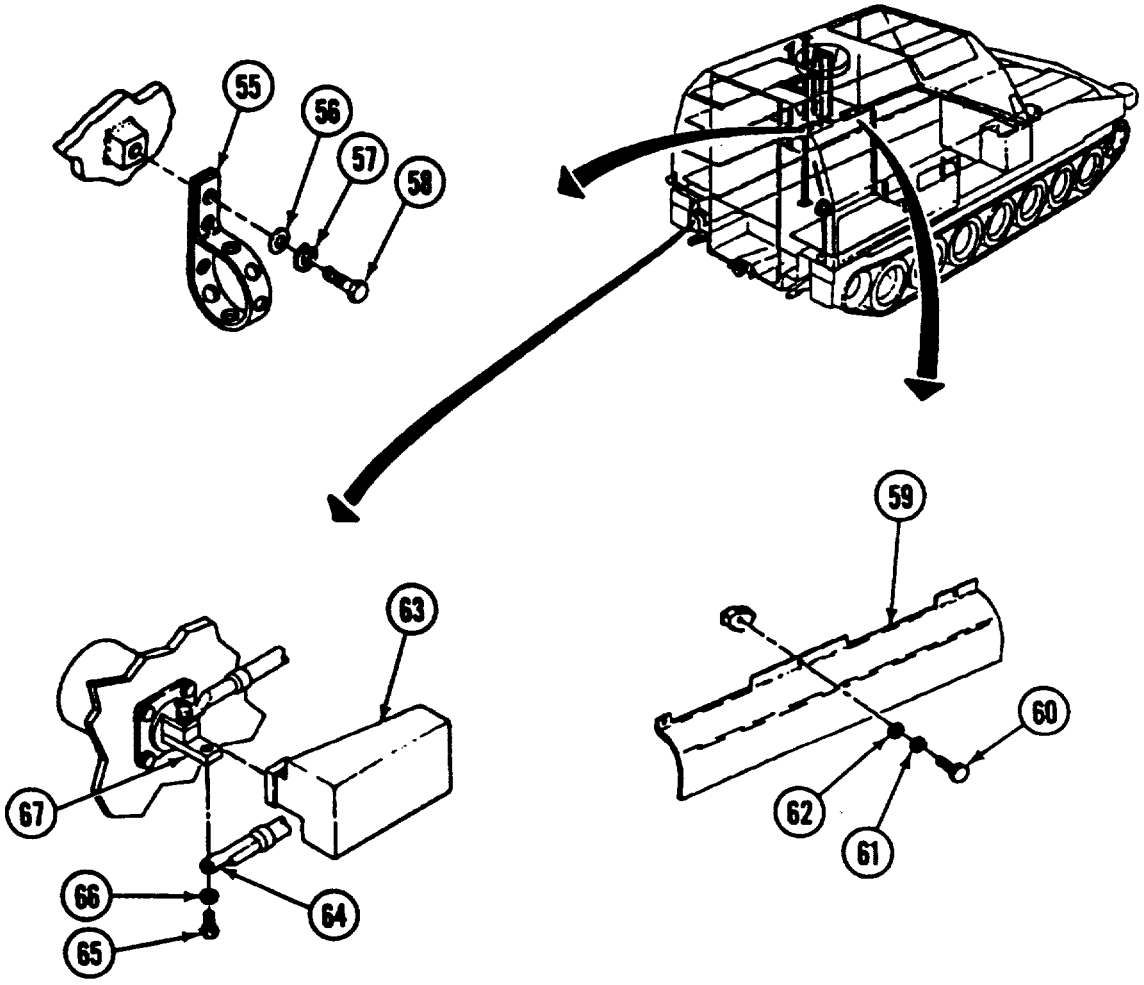
7-57. CARGO COMPARTMENT CABLE ASSEMBLY (12376405) REPLACEMENT (continued).

19. Remove seven screws (60), lockwashers (61), and washers (62) and two guards (59) from vehicle. Discard lockwashers.

20. Remove five screws (58), lockwashers (57), washers (56), and straps (55) from vehicle. Discard lockwashers.

21. Pull back boot (63) from receptacle (67). Remove screw (65), lockwasher (66), and harness lead (64) from receptacle (67). Discard lockwasher.

22. Remove cable assembly 12376405 (1) from vehicle.



b. INSTALLATION

1. Install cable assembly 12376405 (1) in vehicle in approximate location it was removed from.

2. Install harness lead (64) on receptacle (67) with screw (65) and new lockwasher (66). Push boot (63) over receptacle (67).

3. Install five straps (55) in vehicle with five screws (58), new lockwashers (57), and washers (56).

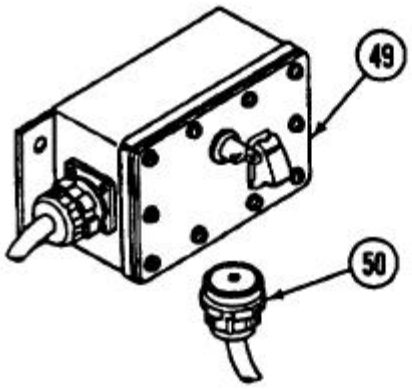
4. Install two guards (59) in vehicle with seven screws (60), new lockwashers (61), and washers (62).

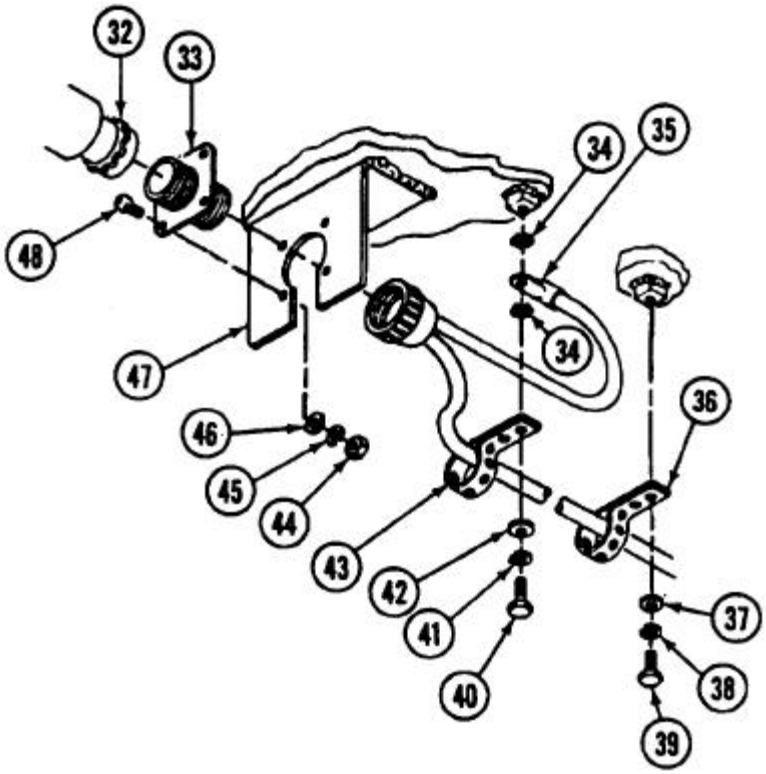
7-57. CARGO COMPARTMENT CABLE ASSEMBLY (12376405) REPLACEMENT (continued).

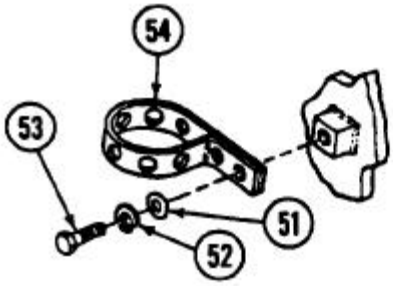
5. Install cable assembly (1) in eight retaining straps (54).

6. Secure eight retaining straps (54) in vehicle with eight screws (53), new lockwashers (52), and washers (51).

7. Connect NBC power control box plug (50) to NBC power control box (49).







8. Secure strap (36) in vehicle with screw (39), new lockwasher (38), and washer (37).

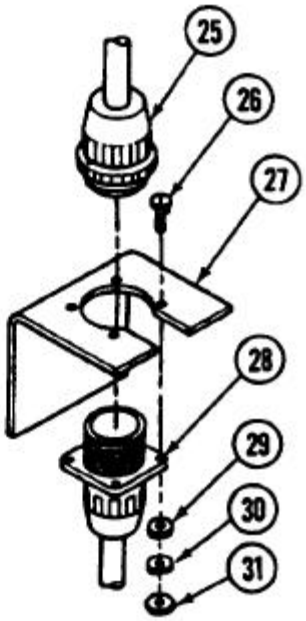
9. Install radio power disconnect receptacle (33) in bracket (47) with four screws (48), washers (46), new lockwashers (45), and nuts (44).

10. Install radio power disconnect ground lug (35) and harness retaining strap (43) in vehicle with screw (40), new lockwasher (41), washer (42), and two new lockwashers (34).

11. Connect radio power disconnect (32) to radio power disconnect receptacle (33).

12. Install power feed receptacle (28) in wall-mounted bracket (27) with four screws (26), washers (29), new lockwashers (30), and nuts (31).

13. Connect APU power lead 66 (25) to power feed receptacle (28).

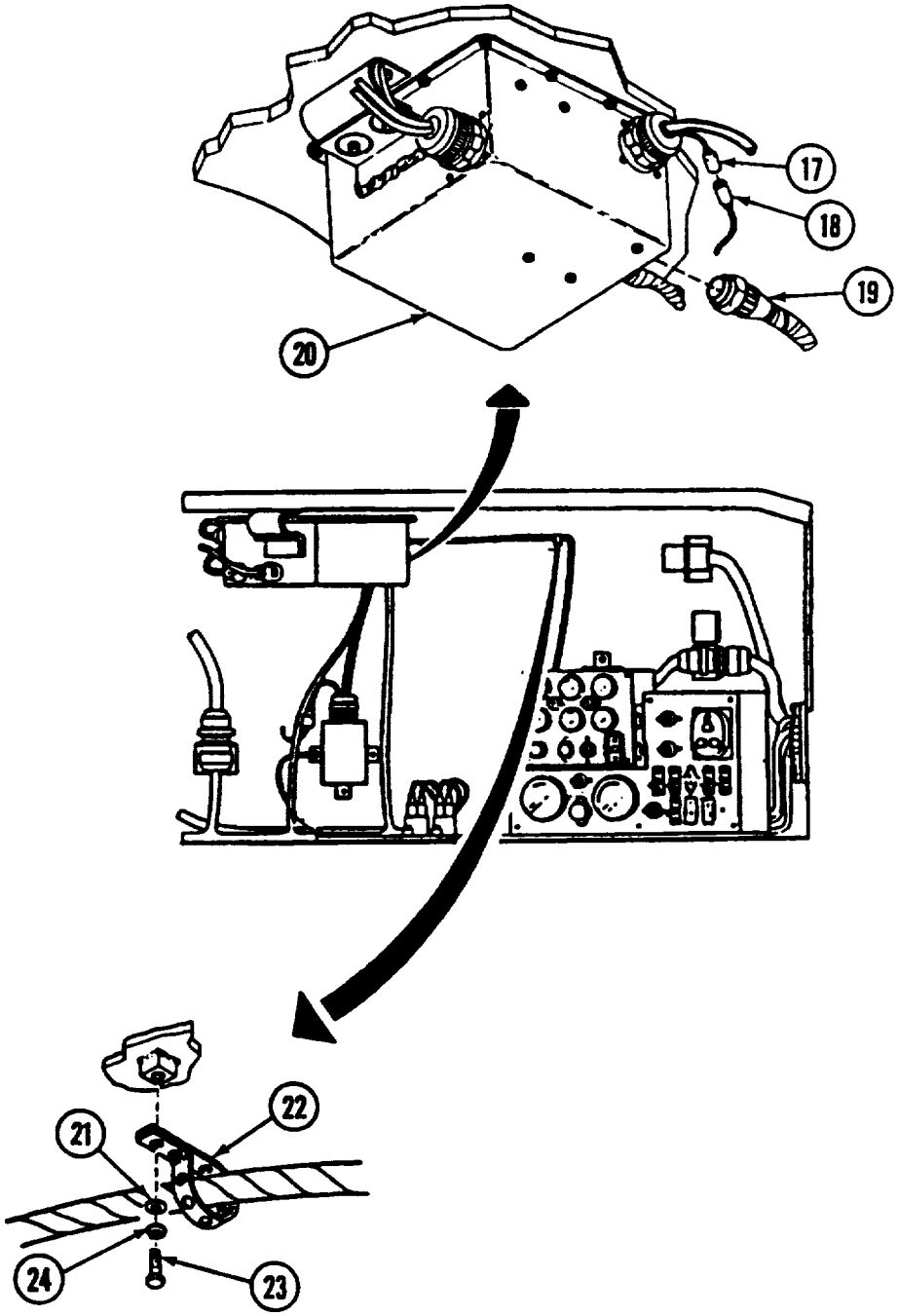


7-57. CARGO COMPARTMENT CABLE ASSEMBLY (12376405) REPLACEMENT (continued).

14. Install cable assembly 12376405 (1) in two harness straps (22) and secure with two screws (23), new lockwashers (24), and washers (21).

15. Connect harness connector 48 (18) to harness cable connector 48 (17).

16. Connect electrical connector 10 (19) to accessory control box (20).



7-57. CARGO COMPARTMENT CABLE ASSEMBLY (12376405) REPLACEMENT (continued).

17. Connect electrical lead 10 OE (16) to Y connector (15).

18. Connect electrical lead 10H (13) to electrical lead 15 (12).

19. Connect four electrical leads (14) to panel 2 (11) circuit breakers (10) (refer to Table 7-1).

20. Connect five electrical leads (7) to panel 1 (9) circuit breakers (8) (refer to Table 7-1).

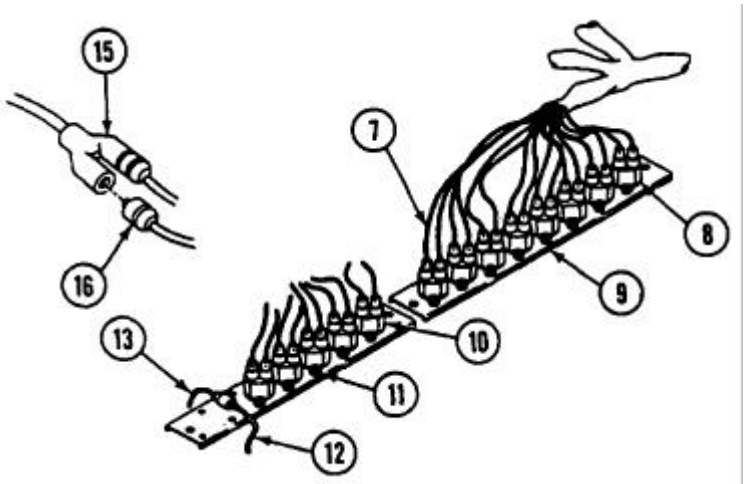
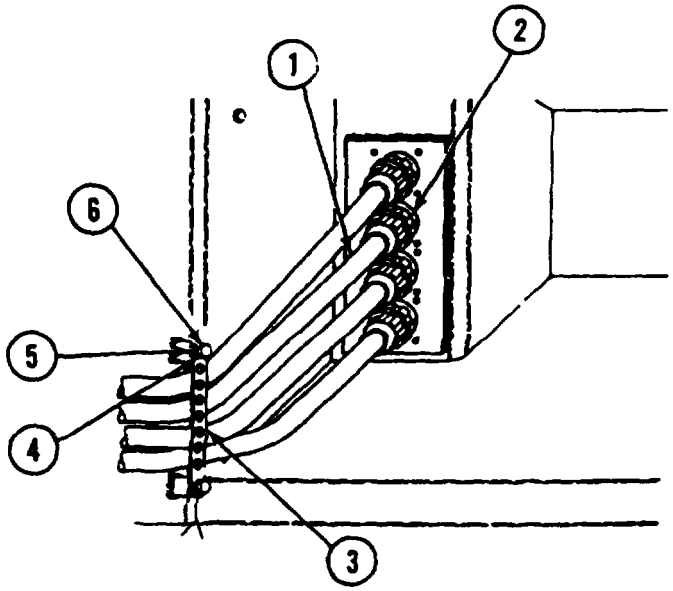


Table 7-1

Lead	C/B #	Panel #
10A	1	1
10B	2	1
i0C	3	1
10F	7	1
10G	8	1
10J	5	2
10K	4	2
10L	7	2
10M	3	2

21. Install cable assembly 12376405 (1) in two straps (3) and secure with two screws (6), new lockwashers (5), and washers (4).

22. Connect cable assembly 12376405 (1) to driver's bulkhead disconnect receptacle (2).



FOLLOW-ON TASKS:

- Install M2A2 air purifier (para 22-2).
- Install APU control box (para 7-22).
- Install driver's instrument panel (para 7-9).
- Install engine AFES test and alarm (T/A) panel (para 21-13).
- Connect battery ground cables (para 7-41).

7-58. DRIVER'S BULKHEAD TO BATTERIES AND SHUNT LEAD ASSEMBLY (12353402) REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- LockWasher (4) (Item 173, Appendix H)

Personnel Required: Two

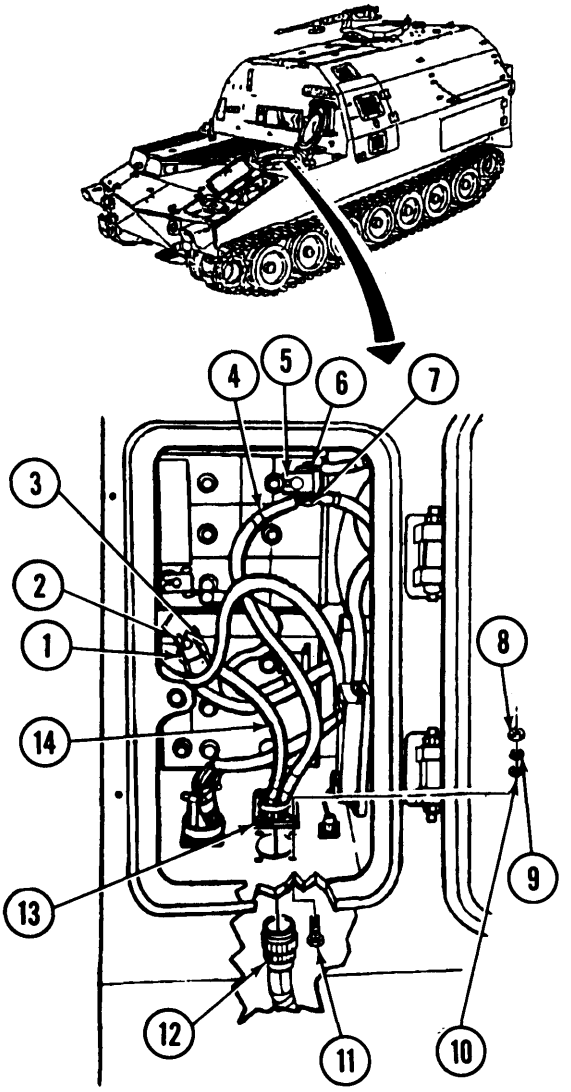
Equipment Conditions:
- Driver's hatch opened and secured (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).

a. REMOVAL

NOTE

Several leads are connected to the battery terminals. After removing the necessary lead, loosely secure the others to the terminal.

1. Remove nut (6), screw (7), and lead 49 (4) from positive battery terminal (5).
2. Remove nut (1), screw (3), and lead 50(1 4) from negative battery terminal (2).
3. Disconnect connector (12) from driver's bulkhead to batteries and shunt lead assembly (13) inside driver's compartment.
4. With the aid of an assistant, remove four nuts (10), lockwashers (9), washers (8), and screws (11) and lead assembly (13) from vehicle.



7-58. DRIVER'S BULKHEAD TO BATTERIES AND SHUNT LEAD ASSEMBLY (12353402) REPLACEMENT.

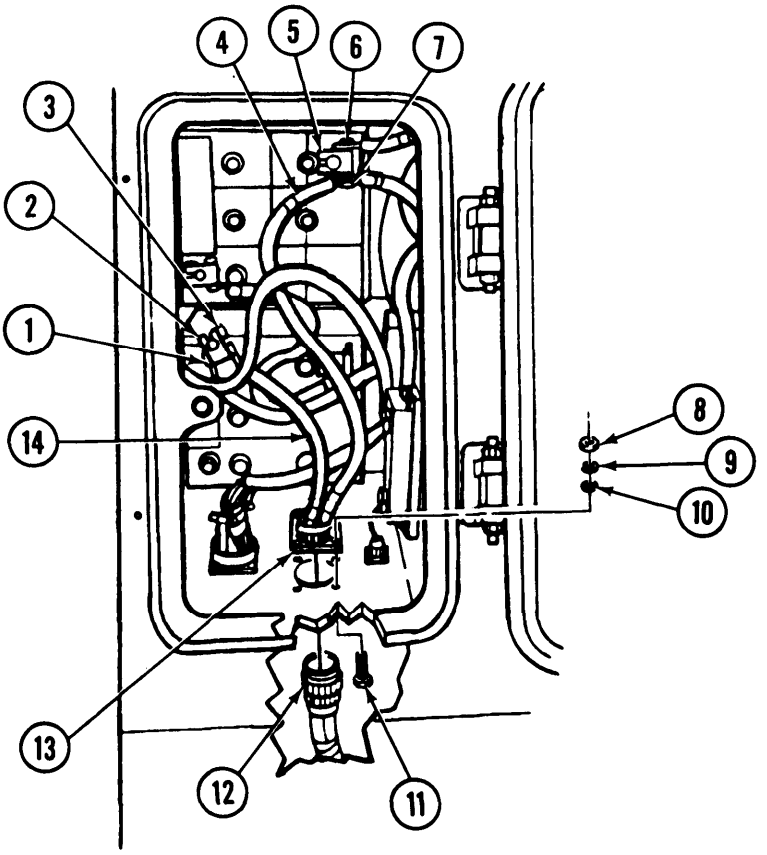
b. INSTALLATION

1. With the aid of an assistant, install lead assembly (12) in driver's bulkhead with four screws (11), washers (10), new lockwashers (9), and nuts (8).

2. Connect connector (12) to lead assembly (13).

3. Connect lead 50 (14) to negative battery terminal (2) with screw (3) and nut (1).

4. Connect lead 49 (4) to positive battery terminal (5) with screw (7) and nut (6).



FOLLOW-ON MAINTENANCE:
- Close driver's hatch (refer to TM 9-2350-287-10).
- Connect battery ground cables (para 7-41).

7-59. DRIVER'S BULKHEAD TO SLAVE RECEPTACLE WIRING HARNESS (12376573) REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

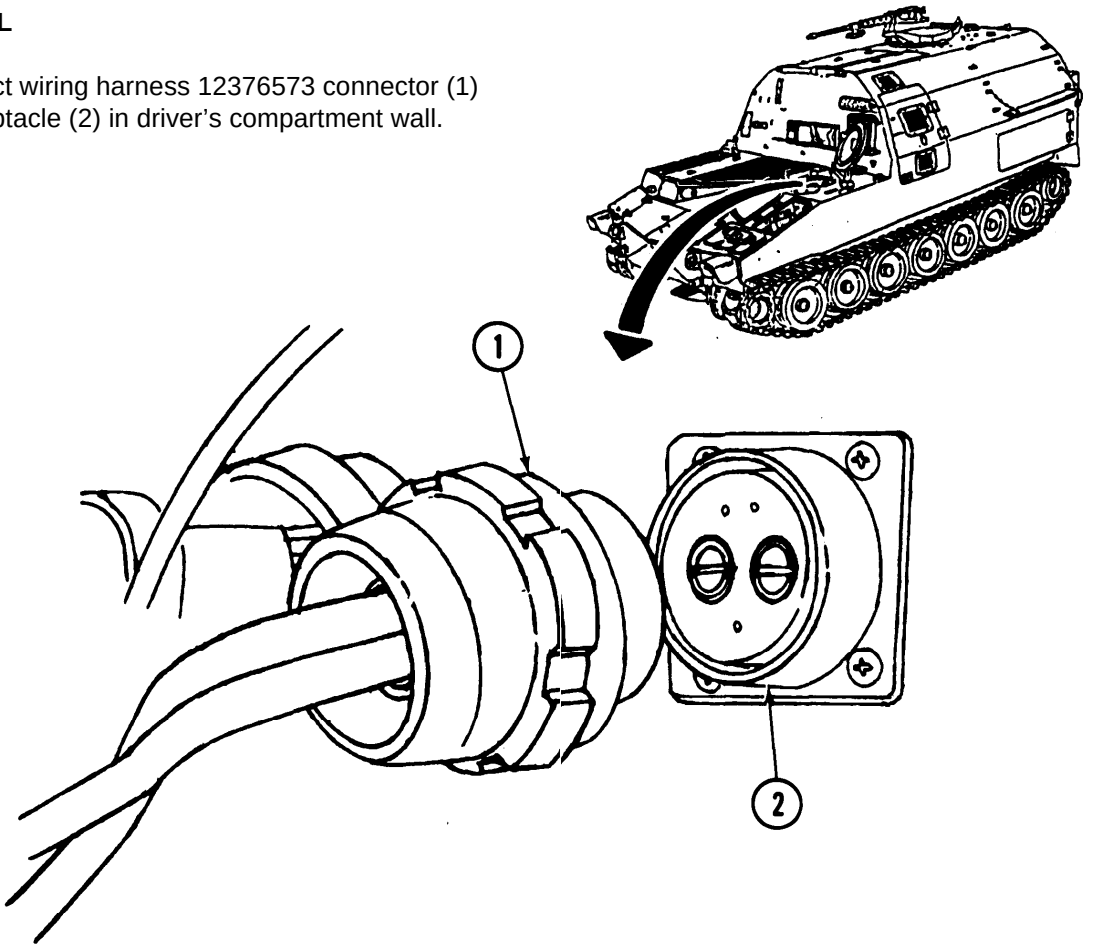
Tools/Test Equipment:
. General mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- LockWasher (Item 164, Appendix H)
- Lockwasher (4) (Item 175, Appendix H)
- LockWasher (7) (Item 196, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).
- Front NATO intervehicular slave connector removed (para 7-67).
- APU control box removed (para 7-22).
- Driver's portable instrument panel removed (para 7-6).
- Engine AFES test and alarm (T/A) panel removed (para 21-13).

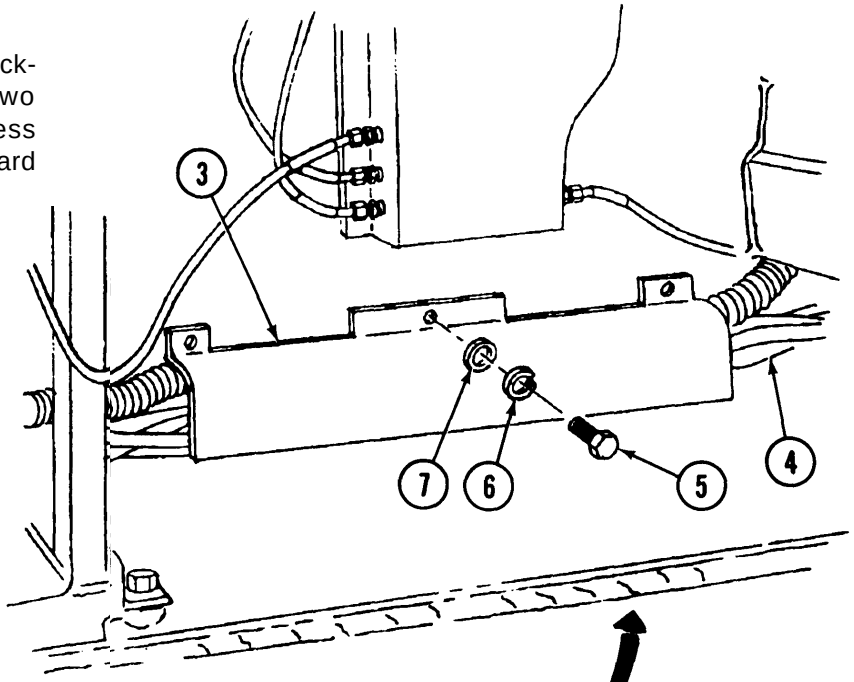
a. REMOVAL

1. Disconnect wiring harness 12376573 connector (1) from receptacle (2) in driver's compartment wall.



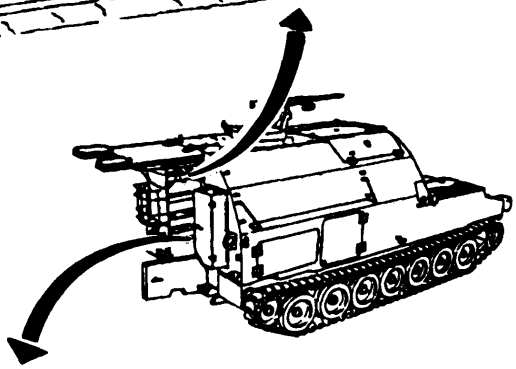
7-59. DRIVER'S BULKHEAD TO SLAVE RECEPTACLE WIRING HARNESS (12376573) REPLACEMENT (continued).

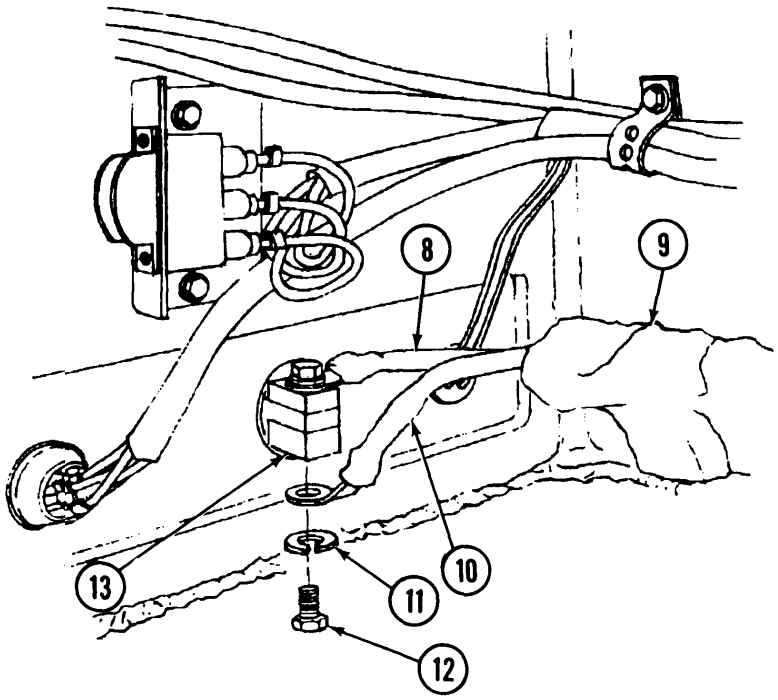
2. Remove seven screws (5), lockwashers (6), and washers (7), two covers (3), and wiring harness 12376573 (4) from hull. Discard lockwashers.



3. At rear of vehicle, push back insulation sleeving (9) on leads 49B and 50B (10 and 8) of rear NATO slave receptacle (13).

Remove screw (12), lockwasher (11), and lead 49B (10) from bottom terminal of slave receptacle (13). Discard lockwasher.





7-59. DRIVER'S BULKHEAD TO SLAVE RECEPTACLE WIRING HARNESS (12376573) REPLACEMENT (continued).

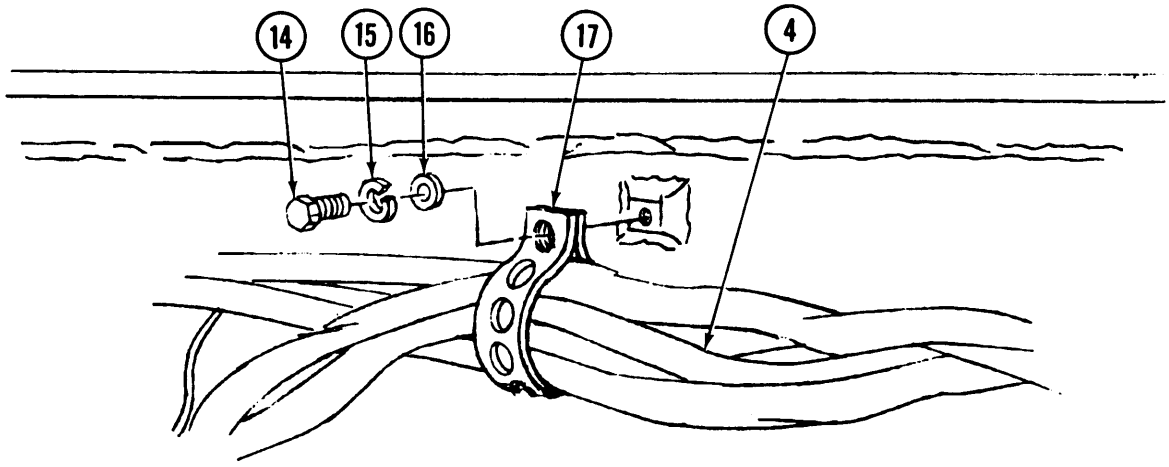
5. Remove four screws (14), lockwashers (15), washers (16), and straps (17) from hull. Discard lockwashers.

6. Remove wiring harness 12376573 (4) from four straps (17).

7. Remove wiring harness 12376573 (4) from vehicle.

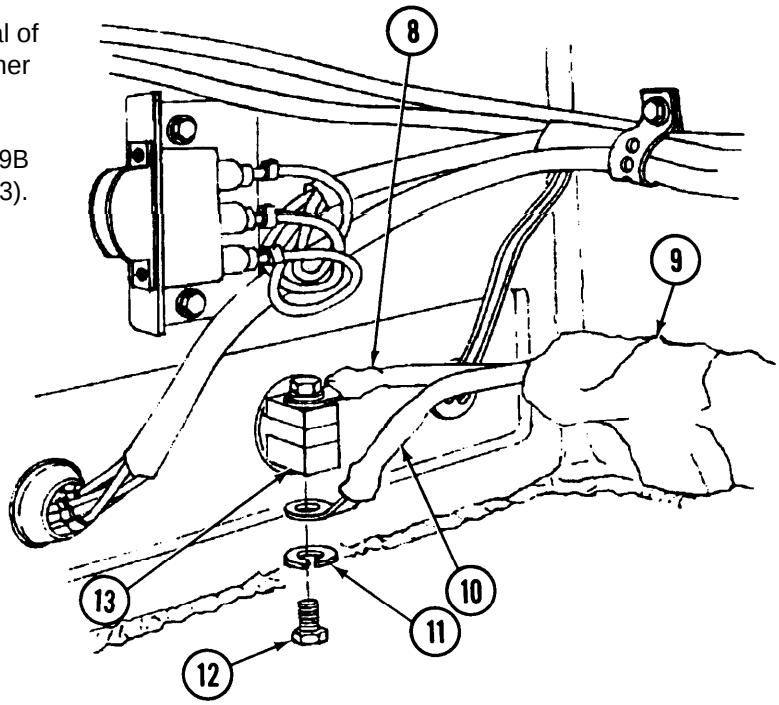
b. INSTALLATION

1. Route wiring harness 12376573 (4) in vehicle and place in four straps (17). Secure straps (17) to hull with four screws (14), new lockwashers (15), and washers (16).



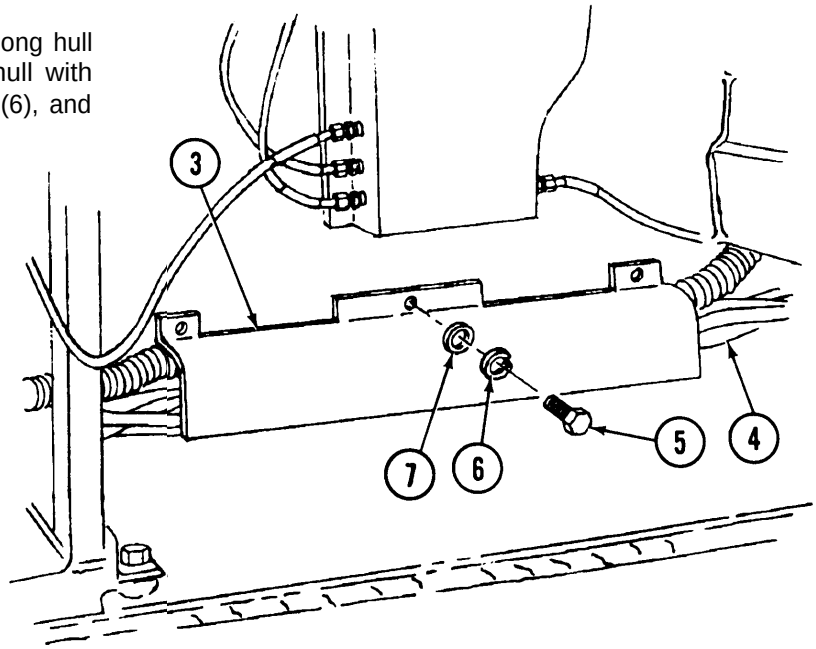
2. Connect lead 49B (10) to bottom terminal of slave receptacle (13) with new lockwasher (11) and screw (12).

3. Push insulation sleeving (9) over leads 49B and 50B (10 and 8) on slave receptacle (13).

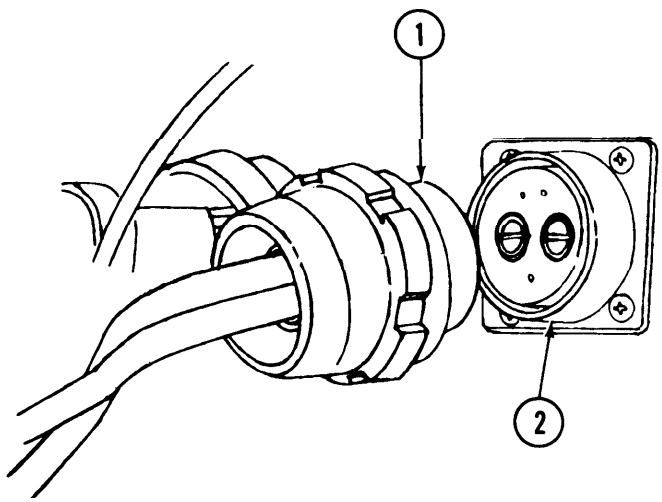


7-59. BULKHEAD TO PORTABLE INSTRUMENT PANEL WIRING HARNESS (12376573) REPLACEMENT (continued).

4. Route wiring harness 12376573 (4) along hull wall, and install two covers (3) on hull with seven washers (7), new lockwashers (6), and screws (5).



5. Connect wiring harness 12376573 connector (1) to receptacle (2) on driver's compartment.



FOLLOW-ON MAINTENANCE:

- Install engine AFES test and alarm (VA) panel (para 21-13).
- Install driver's portable instrument panel (para 7-6).
- Install front NATO intervehicular slave connector (para 7-67).
- Install APU control box (para 7-22).
- Connect battery ground cables (para 7-41).

7-60. DRIVER'S BULKHEAD TO APU VOLTAGE REGULATOR CABLE (12330256) REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Lockwasher (Item 135, Appendix H)
- LockWasher (Item 175, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).

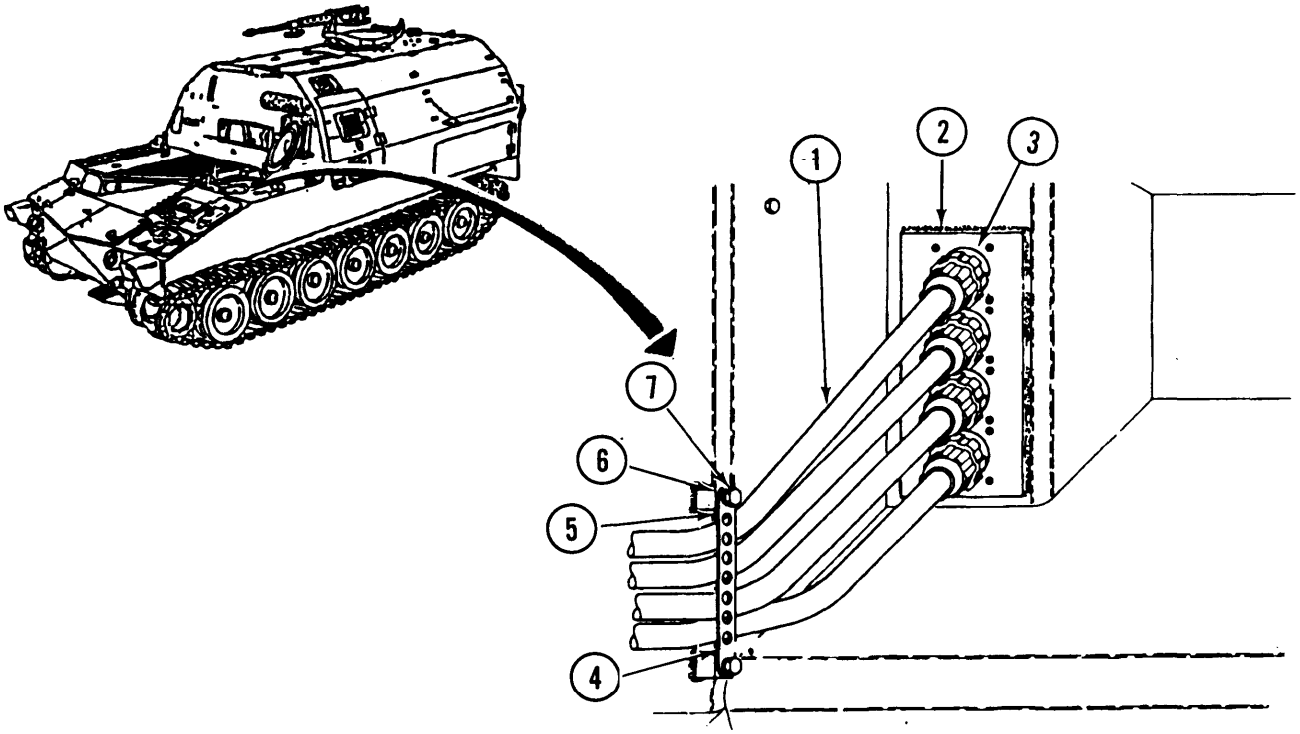
a. REMOVAL

1. Disconnect cable 62 (1) and plug (3) from driver's bulkhead receptacle (2).

NOTE

Do not remove other cables from straps.

2. Remove screw (7), lockwasher (6), washer (5), and cable (1) from two retaining straps (4). Discard lockwasher.



7-60. DRIVER'S BULKHEAD TO APU VOLTAGE REGULATOR CABLE (12330256) REPLACEMENT (continued).

3. Disconnect cable plug (11) from APU voltage regulator (12).

4. Disconnect ground lead connector (14) from harness 12330248 lead (13).

5. Remove screw (8), lockwasher (9) and cable ground lug (10) from APU voltage regulator (12). Discard lockwasher.

6. Remove harness 12330256 from vehicle.

b. **INSTALLATION**

1. Position harness 12330256 in vehicle.

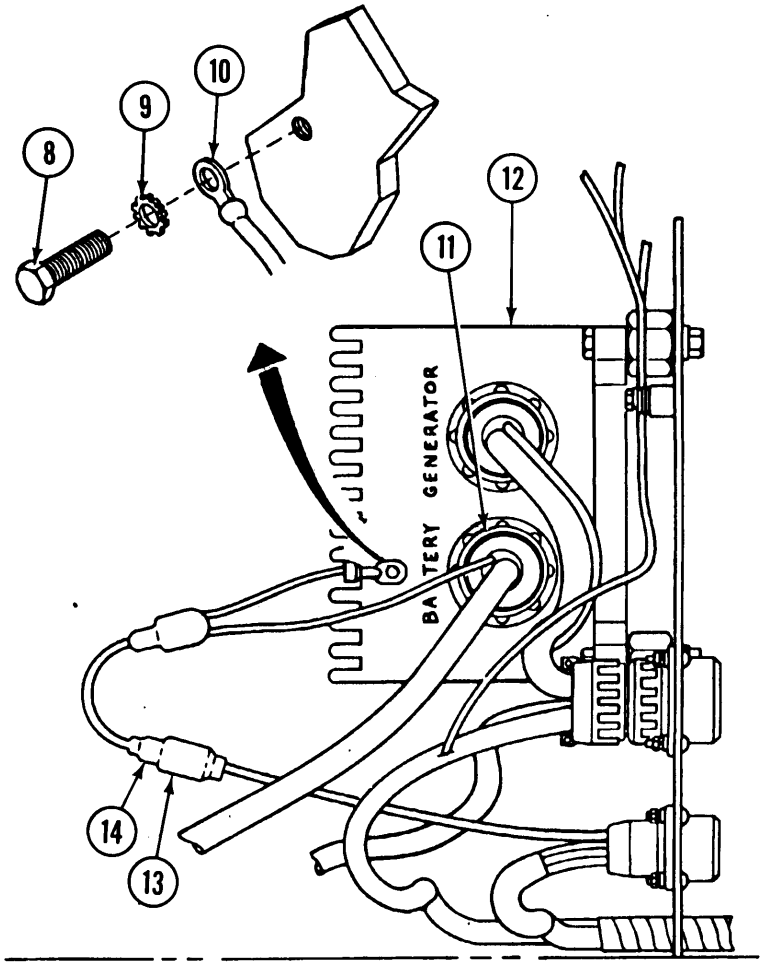
2. Install new lockwasher (9), screw (8), and cable ground lug (10) to APU voltage regulator (12).

3. Connect ground lead connector (14) to harness 12330248 lead (13).

4. Connect cable plug (11) to APU voltage regulator (12).

5. Install washer (5), new lockwasher (6), screw (7), and cable (1) to bulkhead with two retaining straps (4).

6. Connect cable 62 (1) and plug (3) to driver's bulkhead receptacle (2).



FOLLOW-ON MAINTENANCE:

- Connect battery ground cables (para 7-41).

7-61. DRIVER'S INSTRUMENT PANEL WIRING HARNESS (12268104) REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

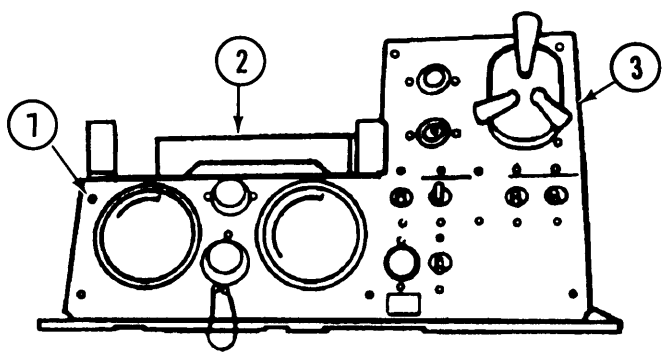
Tools/Test Equipment:
General mechanic's tool kit (Item 24, Appendix I)

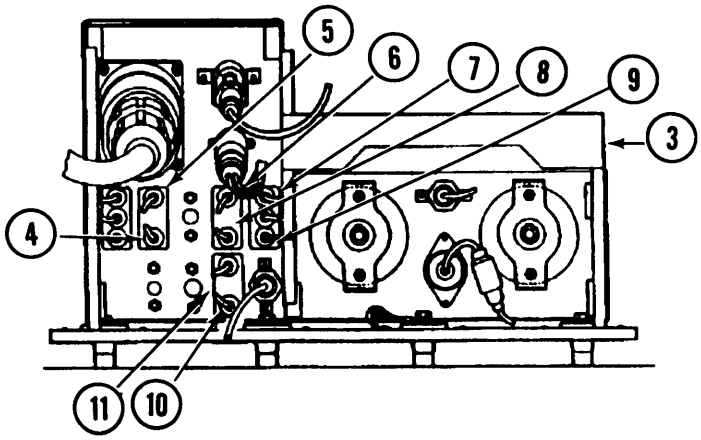
Materials/Parts:
- Electrical insulation tape (Item 67, Appendix D)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).
- Driver's portable instrument panel removed (para 7-6).

a. REMOVAL

1. Unfasten six screws (1) and pull driver's instrument panel (3) forward from mount (2) to gain access to back of panel (3).
2. Disconnect lead No. 450 (4) from bottom terminal of bilge pump switch (5).
3. Disconnect lead No. 10 (6) from bottom terminal of glow plug switch (7).
4. Disconnect lead No. 588 (8) from top terminal of fuel pump prime switch (9)
5. Disconnect lead No. 10(1 O) from bottom terminal of starter switch (11).
6. Disconnect leads No. 459A and No. 509E (21 and 17) from leads No. 459A and No. 509E (20 and 18) of wiring harness (19).
7. Disconnect lead No. 450 (23) from circuit breaker No. 2 (13) on circuit breaker panel No. 1 (12).
8. Disconnect lead No. 588 (22) from circuit breaker No. 4 (14) on circuit breaker panel No. 1 (12).
9. Disconnect lead No. 10 (16) from circuit breaker No. 7 (15) on circuit breaker panel No. 1 (12).

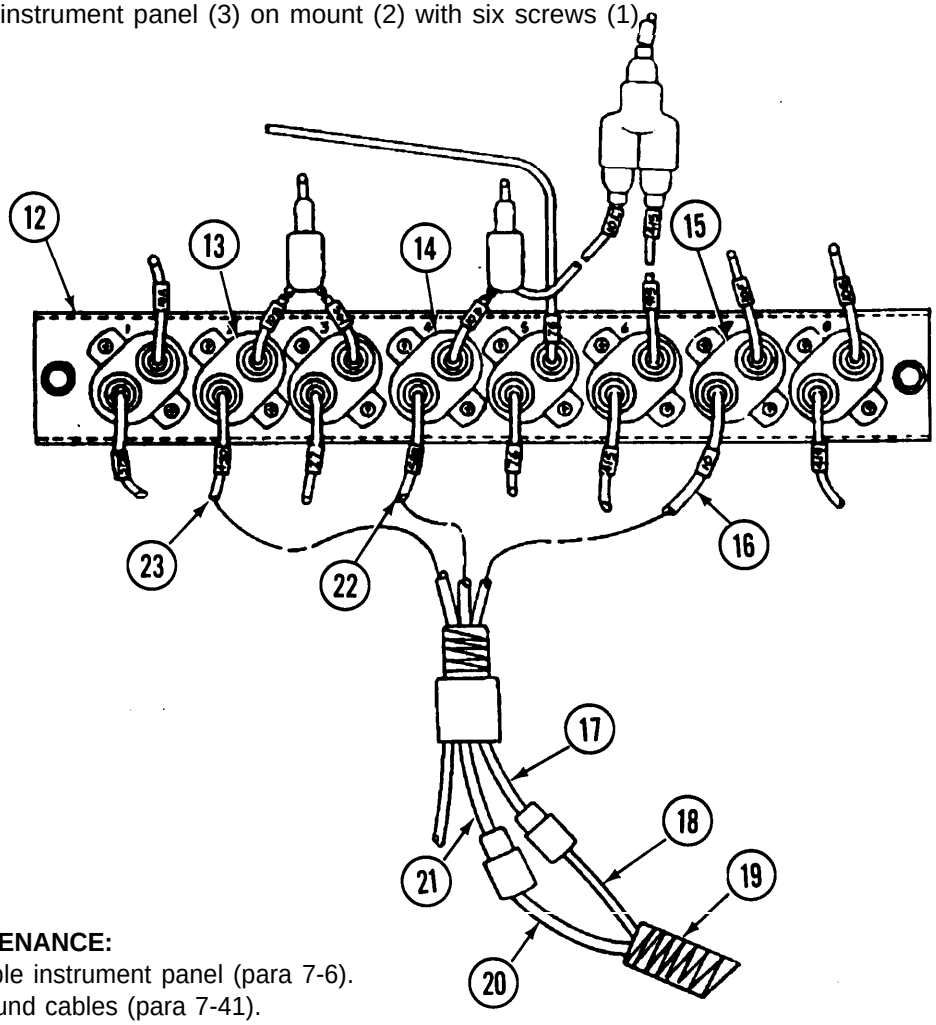




7-61. DRIVER'S INSTRUMENT PANEL WIRING HARNESS (12268104) REPLACEMENT (continued).

b. INSTALLATION

1. Connect lead No. 10 (16) to circuit breaker No. 7(15) on circuit breaker panel No. 1 (12).
2. Connect lead No. 588 (22) to circuit breaker No. 4 (14) on circuit breaker panel No. 1 (12).
3. Connect lead No. 450 (23) to circuit breaker No. 2 (13) on circuit breaker panel No. 1 (12).
4. Connect leads No. 459A and No. 509E (21 and 17) to leads No. 459A and No. 509E (20 and 18) of wiring harness (19).
5. Connect lead No. 10(10) to bottom terminal of starter switch(11).
6. Connect lead No. 588 (8) to top terminal of fuel pump prime switch (9).
7. Connect lead No. 10 (6) to bottom terminal of glow plug switch (7).
8. Connect lead No. 450 (4) to bottom terminal of bilge pump switch (5).
9. Secure driver's instrument panel (3) on mount (2) with six screws (1).



FOLLOW-ON MAINTENANCE:

- Install driver's portable instrument panel (para 7-6).
- Connect battery ground cables (para 7-41).

7-62. INTANK FUEL PUMPS AND SYSTEM RELAY LEAD ASSEMBLY (12353646), LEAD ASSEMBLY (12353647), AND Y-CONNECTOR REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item *24,* Appendix I)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).
- Driver's portable instrument panel removed (para 7-6).

a. REMOVAL

1. Disconnect connector (1) from intank fuel pumps and system relay *(2).*
2. Disconnect lead 415B (7) from wiring hamess connector415B (6).
3. Disconnect lead No. 76 (9) from y-connector (8). Disconnect lead No. 10(12) from y-connector (5).
4. Remove wire connector 415 (3) of lead assembly 12353647 from y-connector *(5).* Remove wire connector 10E *(4)* of cable assembly 12376405 from y-connector *(5),* and remove y-connector (5). Remove connector 415 (3) from circuit breaker No. 6 (10) on circuit breaker panel No. 1 (11).

b. INSTALLATION

1. Connect connector 415 (3) on circuit breaker No. 6 (10) on circuit breaker panel No. 1 (11). Connect wire connector 10E (4) of cable assembly 12376405 to y-connector (5). Connect wire connector 415 (3) of lead assembly 12353647 to y-connector (5).
2. Connect lead No. 10(12) toy-connector (5). Connect lead No. 76 (9) to y-connector (8).
3. Connect lead 415B (7) to wiring harness connector 415B (6).
4. Connect connector (1) to relay (2).

FOLLOW-ON MAINTENANCE:
- Install driver's portable instrument panel (para 7-6).
- Connect battery ground cables (para 7-41).

7-63. AIR CLEANER BLOWER MOTOR RELAY LEAD ASSEMBLY (12353259) REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Lockwasher (4) (Item 175, Appendix H).

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Center periscope removed (refer to TM 9-2350-287-10).
- Driver's instrument panel removed (para 7-9).

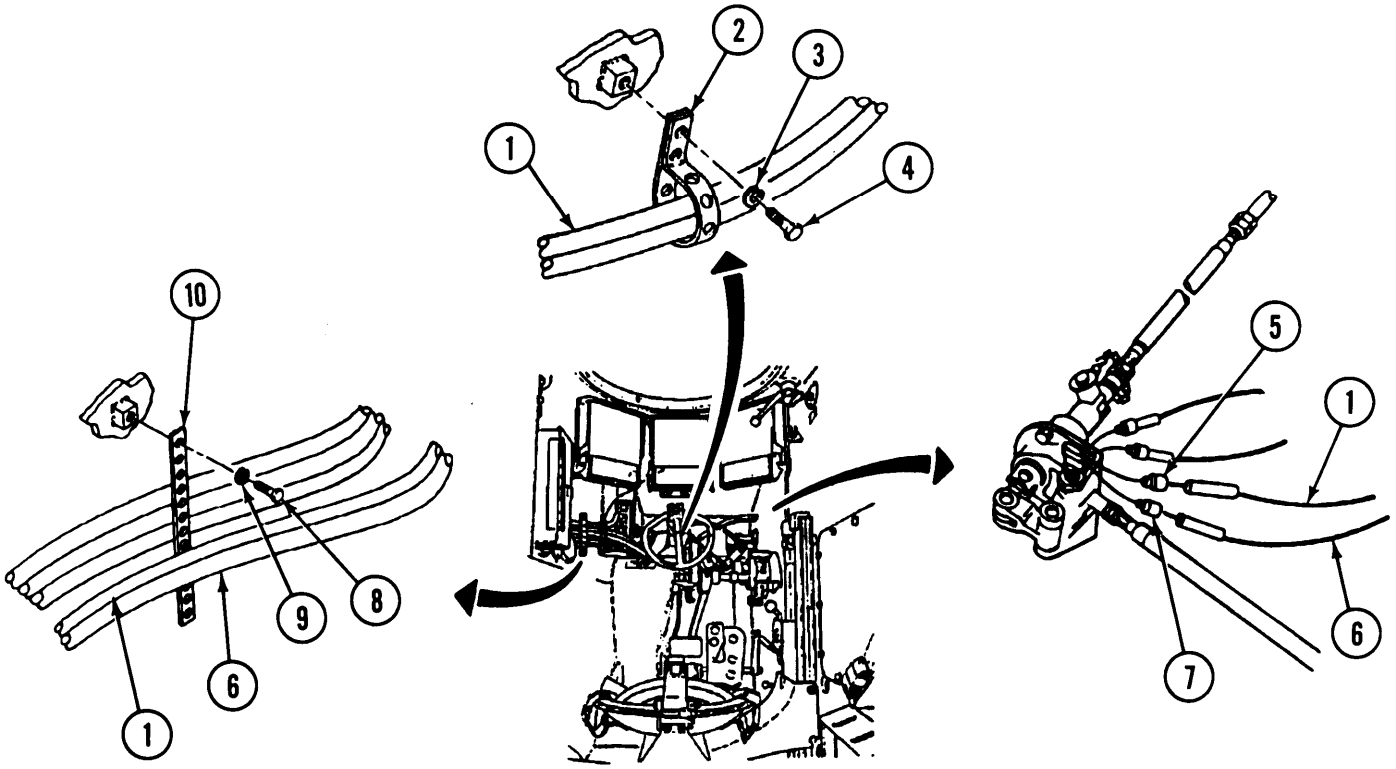
a. REMOVAL

1. Disconnect leads 415A and 415B (1 and 6) from neutral safety switch leads 415A and 415B (5 and 7).

NOTE

Each strap holds more than one lead. Separate the necessary leads from strap, then loosely secure the other leads with the strap.

2. Remove two screws (4), lockwashers (3), and straps (2) securing leads 415A and 415B (1 and 6) to driver's bulkhead. Discard lockkwashers.



7-63. AIR CLEANER BLOWER MOTOR RELAY LEAD ASSEMBLY (12353259) REPLACEMENT (continued).

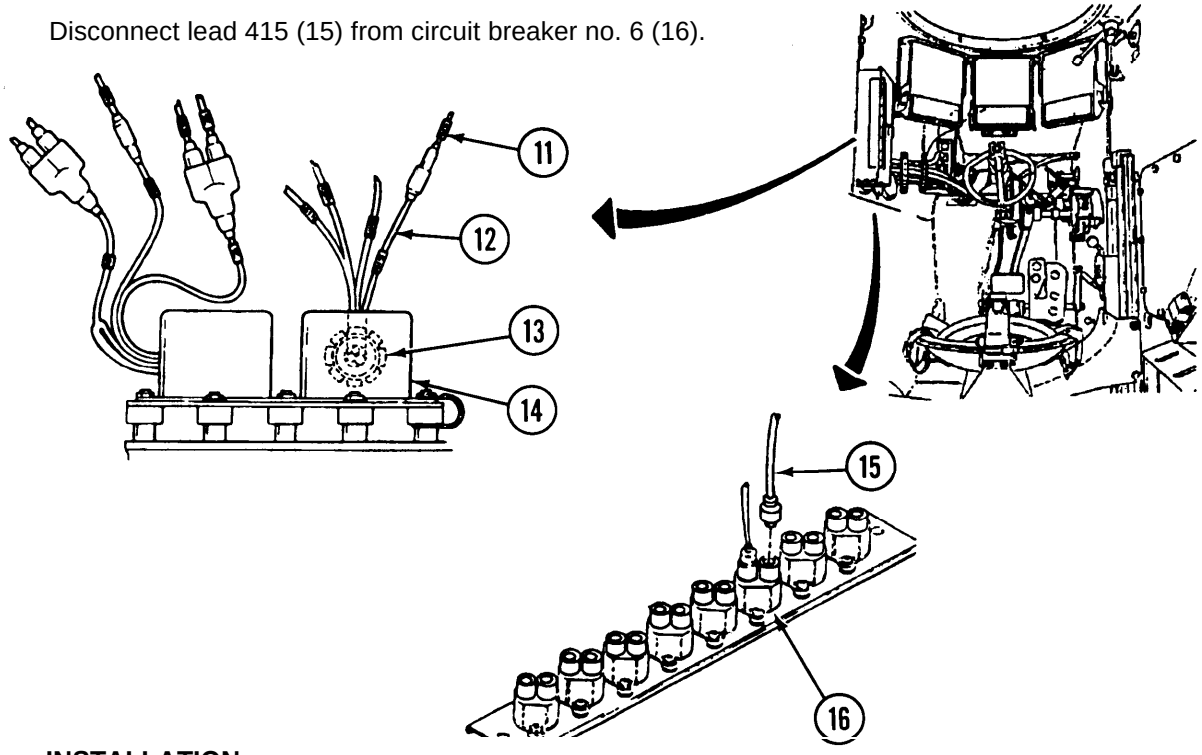
3. Remove two screws (8) and Iockwashers (9) securing bottom of two straps (10). Discard Iockwashers.

4. Remove leads 415A and 4125B (1 and 6) from two straps (10).

5. Disconnect connector (13) from air cleaner blower motor relay (14).

6. Disconnect lead 415 (12) from wiring harness lead 415(11).

7. Disconnect lead 415 (15) from circuit breaker no. 6 (16).



b. INSTALLATION

1. Connect lead 415 (15) to circuit breaker no. 6 (16).

2. Connect lead 415 (12) to wiring harness lead 415(11).

3. Connect connector (13) to relay (14).

4. Install leads 415A and 415B (1 and 6) behind two straps (10), and secure with two screws (8) and new lockwashers (9).

5. Secure leads 415A and 415B (1 and 6) to driver's bulkhead with two straps (2), new Iockwashers (3), screws (4).

6. Connect leads 415A and 415B (1 and 6) to neutral safety switch leads 415A ad 415B and (5 and 7).

FOLLOWING MAINTENANCE:

- Install center periscope (refer TM 9-2350-287-10).
- Install driver's instrument panel (para 7-9).

7-64. ACCESSORY CONTROL BOX TO AIR CLEANER BLOWER MOTORS, PERSONNEL HEATER WIRING HARNESS (12351544) REPAIR.

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

Initial Setup:

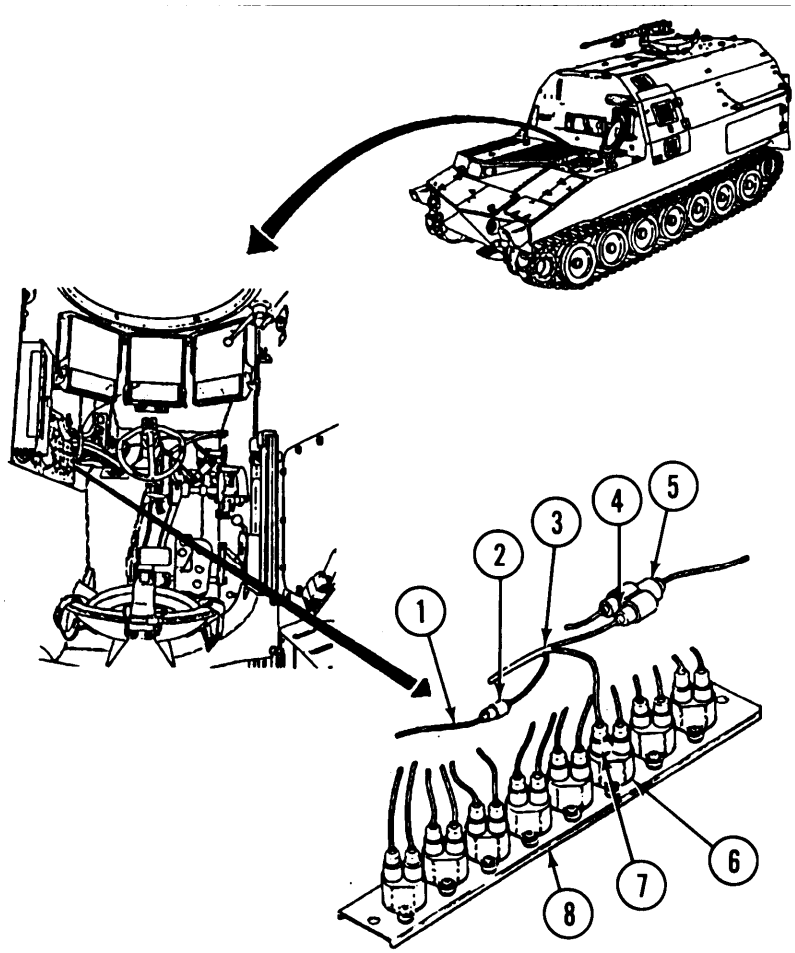
Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- Electrical insulation tape (Item 67, Appendix D)
- Lockwasher (2) (Item 129, Appendix H)
- Lockwasher (2) (Item 175, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Projectile rack assemblies moved to rear of vehicle (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).
- Portable instrument panel removed (para 7-6).
- Engine AFES cylinder bottle brackets numbers 1 and 2 removed (para 21 -8).

a. REMOVAL

1. Disconnect harness (3) lead 40 (4) from connector (5).
2. Disconnect harness connector 400 (2) from wire 400 of harness 12260287 (1).
3. Disconnect harness connector 415 (7) from circuit breaker (6) on circuit breaker panel No. 1 (8).
4. Disconnect harness plug (9) from accessory control box (10).
5. Remove harness ground lug (15) from bulkhead by removing screw (16) and two lockwashers (17). Discard lockwashers.



7-64. ACCESSORY CONTROL BOX TO AIR CLEANER BLOWER MOTORS, PERSONNEL HEATER WIRING HARNESS (12351 544) REPAIR (continued).

6. Disconnect hamess connector 402A (23) from personnel heater fuel pump (24).

7. Disconnect harness plug (19) from personnel heater (22).

8 Disconnect two hamess connectors 415 (20) from connectors on air cleaner blower motors (21).

9. Remove two screws (12), washers (13), Iockwashers (14), and straps (11) and wiring harness 12351544 (18) from vehicle. Discard Iockwashers. Replace hardware after harness removal.

b. DISASSEMBLY

NOTE

Remove electrical insulation tape only from section of wiring harness to be disassembled.

1. Remove electrical insulation tape from section of wiring harness.

2. Separate and isolate wiring harness branches.

3. Disassemble each wiring hamess branch and replace defective wires.

c. ASSEMBLY

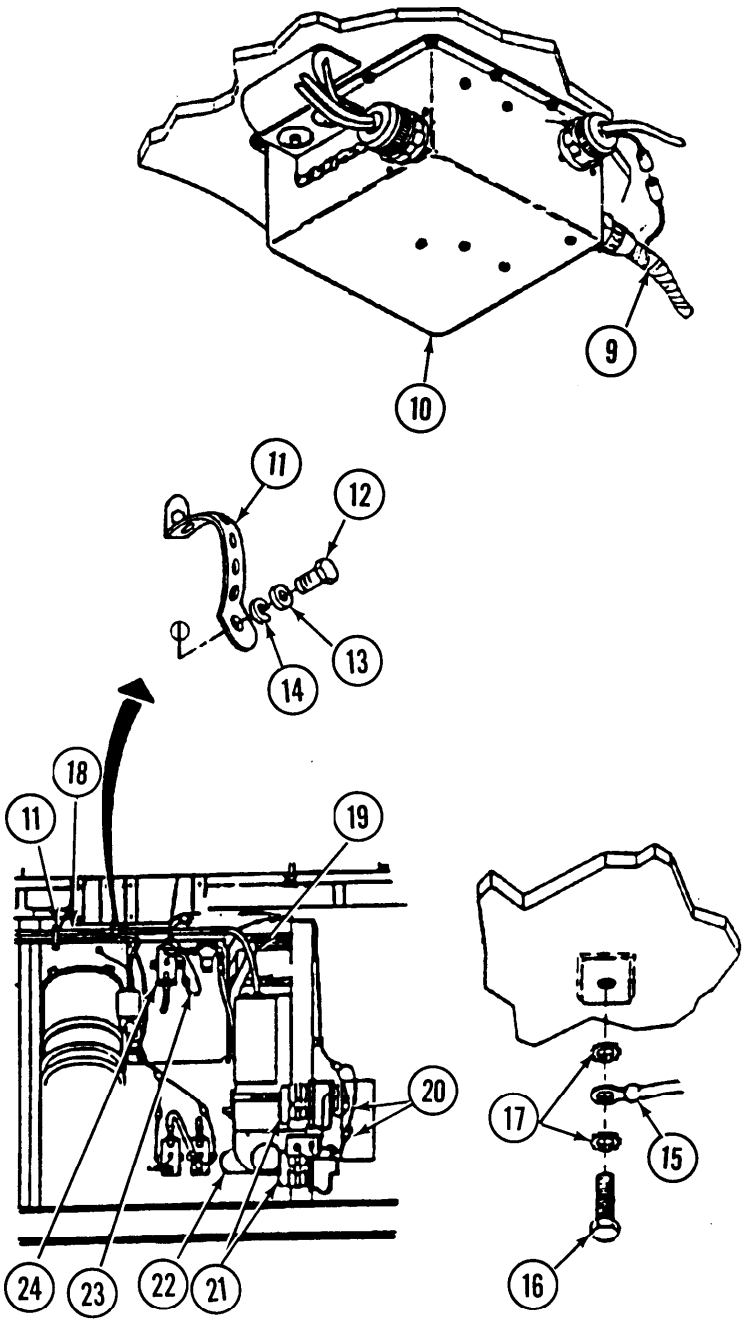
1. Reassemble each wiring harness branch.

2. Regroup wiring harness branches and secure with electrical insulation tape.

d. INSTALLATION

1. Install wiring harness 12351544 (18) in vehicle with straps (11), screws (12), new lockwashers (1 4), and washers (1 3).

2. Connect two harness connectors 415 (20) to connectors on air cleaner blower motors (21).



7-64. ACCESSORY CONTROL BOX TO AIR CLEANER BLOWER MOTORS, PERSONNEL HEATER WIRING HARNESS (12351 544) REPAIR (continued).

3. Connect harness plug (19) to personnel heater (22).

4. Connect harness connector 402A (23) to personnel heater fuel pump (24).

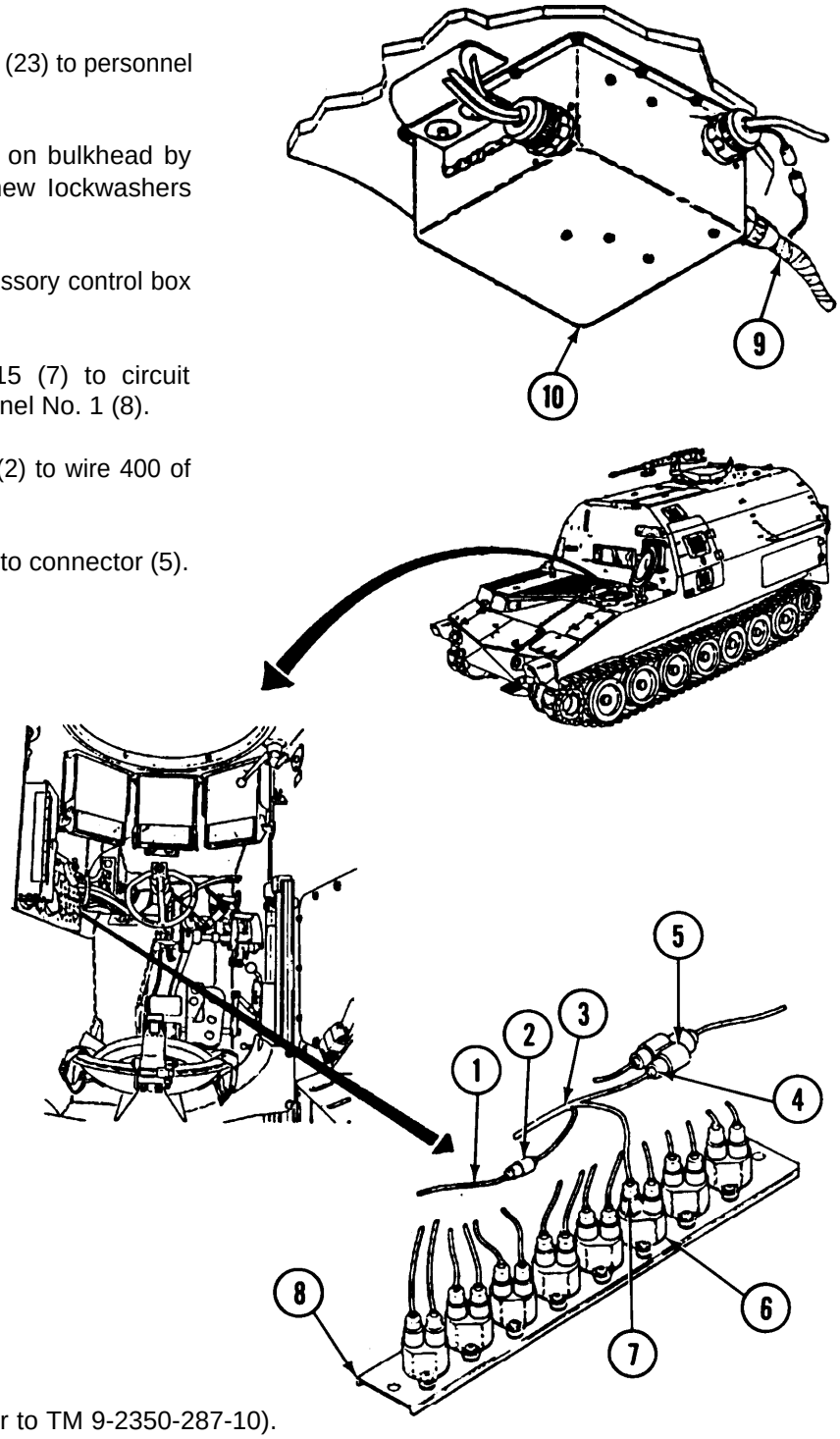
5. Install harness ground lug (15) on bulkhead by installing screw (16) and two new Iockwashers (17).

6. Connect harness plug (9) to accessory control box (10).

7. Connect harness connector 415 (7) to circuit breaker (6) on circuit breaker panel No. 1 (8).

8. Connect harness connector 400 (2) to wire 400 of harness 12260287 (1).

9. Connect harness (3) lead 40 (4) to connector (5).



FOLLOW-ON MAINTENANCE:

- Install projectile rack assemblies (refer to TM 9-2350-287-10).
- Install portable instrument panel (para 7-6).
- Connect battery ground cables (para 7-41).
- Install AFES cylinder bottle brackets numbers 1 and 2 (para 21-8).

7-65. DRIVER'S COMPARTMENT DOME LIGHT TO PASSIVE NIGHT VIEWER CABLE ASSEMBLY (12332740) REPLACEMENT.

This Task Covers

a. Removal

b. Installation

Initial Setup:

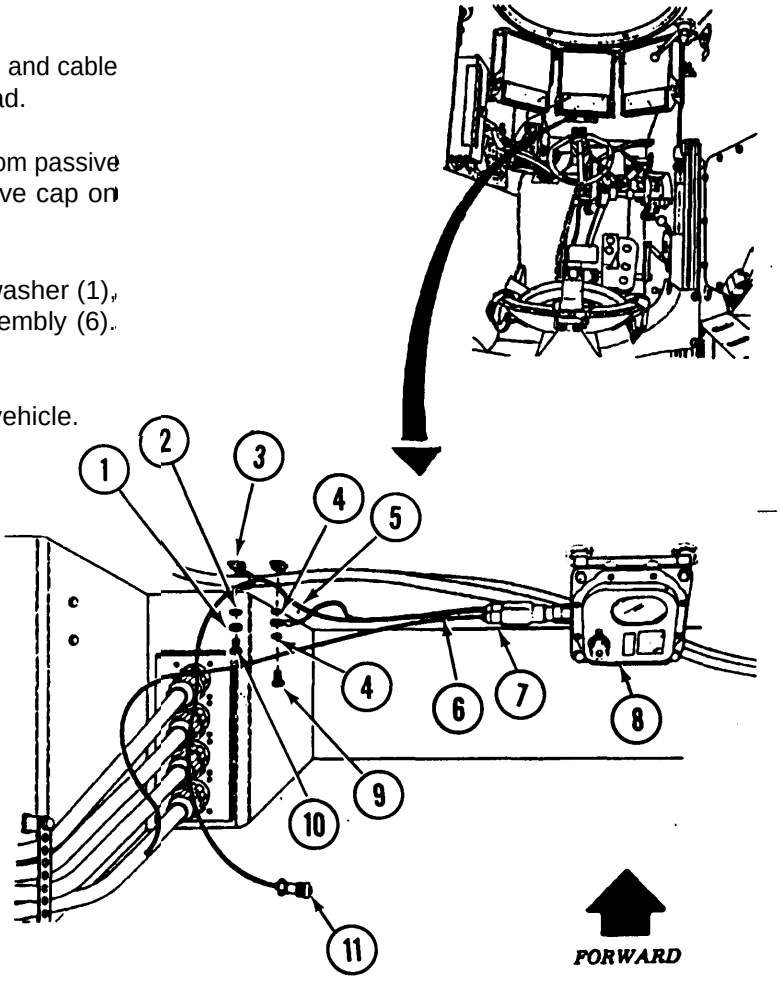
Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- LockWasher (2) (Item 129, Appendix H)
- LockWasher (Item 175, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).

a. REMOVAL

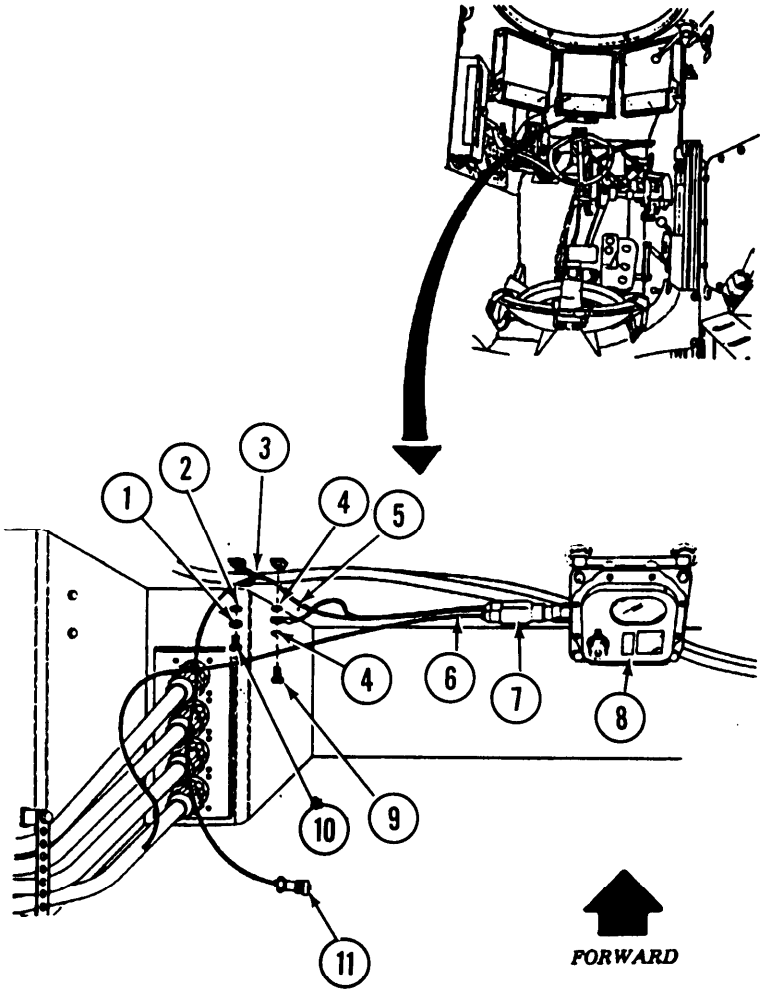
1. Disconnect connector (7) from driver's compartment dome light connector (8).
2. Remove screw (9), two lockwashers (4), and cable assembly ground wire (5) from bulkhead.
3. Disconnect cable assembly plug (11) from passive night viewer connector. Install protective cap on plug (11).
4. Remove screw (10), lockwasher (2), washer (1), and retaining strap (3) from cable assembly (6). Discard lockwasher.
5. Remove cable assemblv (6) from vehicle.



7-65. DRIVER'S COMPARTMENT DOME LIGHT TO PASSIVE NIGHT VIEWER CABLE ASSEMBLY (12332740) REPLACEMENT (continued).

b. INSTALLATION

1. Install cable assembly (6) in vehicle with retaining strap (3), screw (10), new Iockwasher (2), and washer(1).
2. Install protective cap on plug(11). Install plug(11) on passive night viewer connector.
3. Install screw (9), two new Iockwashers (4), and cable assembly ground wire (5) in bulkhead.
4. Connect connector (7) to driver's compartment dome light connector (8).



FOLLOW-ON MAINTENANCE:
•Connect battery ground cables (para 7-41).

7-66. REAR NATO INTERVEHICULAR SLAVE RECEPTACLE REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Matetials/Parts:
- Gasket (Item 74, Appendix H)
- Lockwasher (4) (Item 123, Appendix H)
- LockWasher (2) (Item 164, Appendix H)

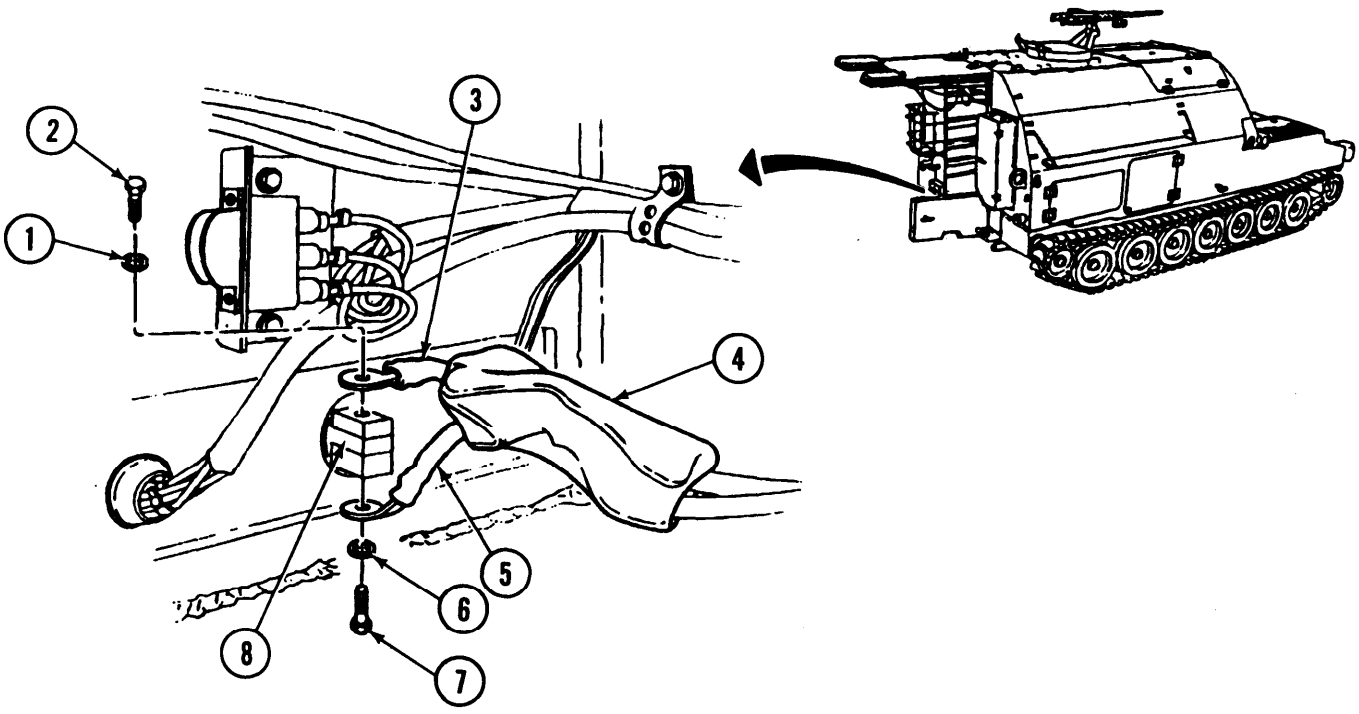
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).
- APU control box removed (para 7-22).

a. REMOVAL

1. Push dust and moisture boot (4) back on electrical leads 49 and 50(3 and 5) of rear NATO intervehicular slave receptacle (8).

2. Remove screw (2), lockwasher (1), and lead 49 (3) from positive lug of slave receptacle (8). Discard lockwasher.

3. Remove screw (7), lockwasher (6), and lead 50 (5) from negative lug of slave receptacle (8). Discard lockwasher.



7-66. REAR NATO INTERVEHICULAR SLAVE RECEPTACLE REPLACEMENT (continued).

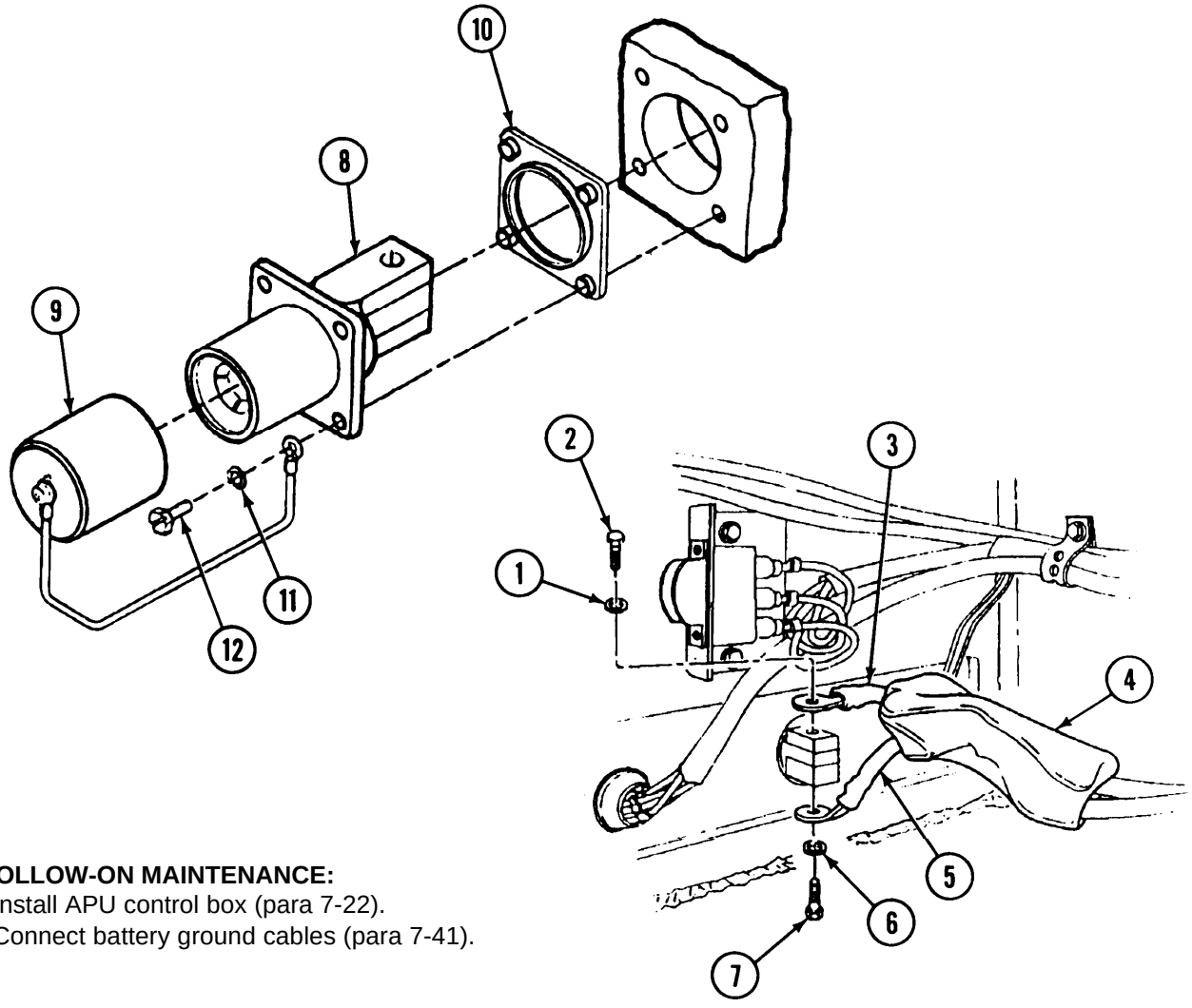
4. Remove four screws (12), lockwashers (11), cover (9), slave receptacle (8), and gasket (10) from hull. Discard lockkwashers and gasket.

b. INSTALLATION

NOTE

Install slave receptacle with negative lug at the top.

1. Install gasket (10), slave receptacle (8), and cover (9) on hull with four newlockwashers(11) and screws (12).
2. Install lead 49 (3) on positive lug of slave receptacle (8) with new lockwasher (1) and screw (2).
3. Install lead 50 (5) on negative lug of slave receptacle (8) with new lockwasher (6) and screw (7).
4. Push dust and moisture boot (4) over back of slave receptacle (8) to cover electrical leads 49 and 50 (3 and 5).



FOLLOW-ON MAINTENANCE:
- Install APU control box (para 7-22).
- Connect battery ground cables (para 7-41).

7-67. FRONT NATO INTERVEHICULAR SLAVE CONNECTOR REPLACEMENT.

This Task Covers

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

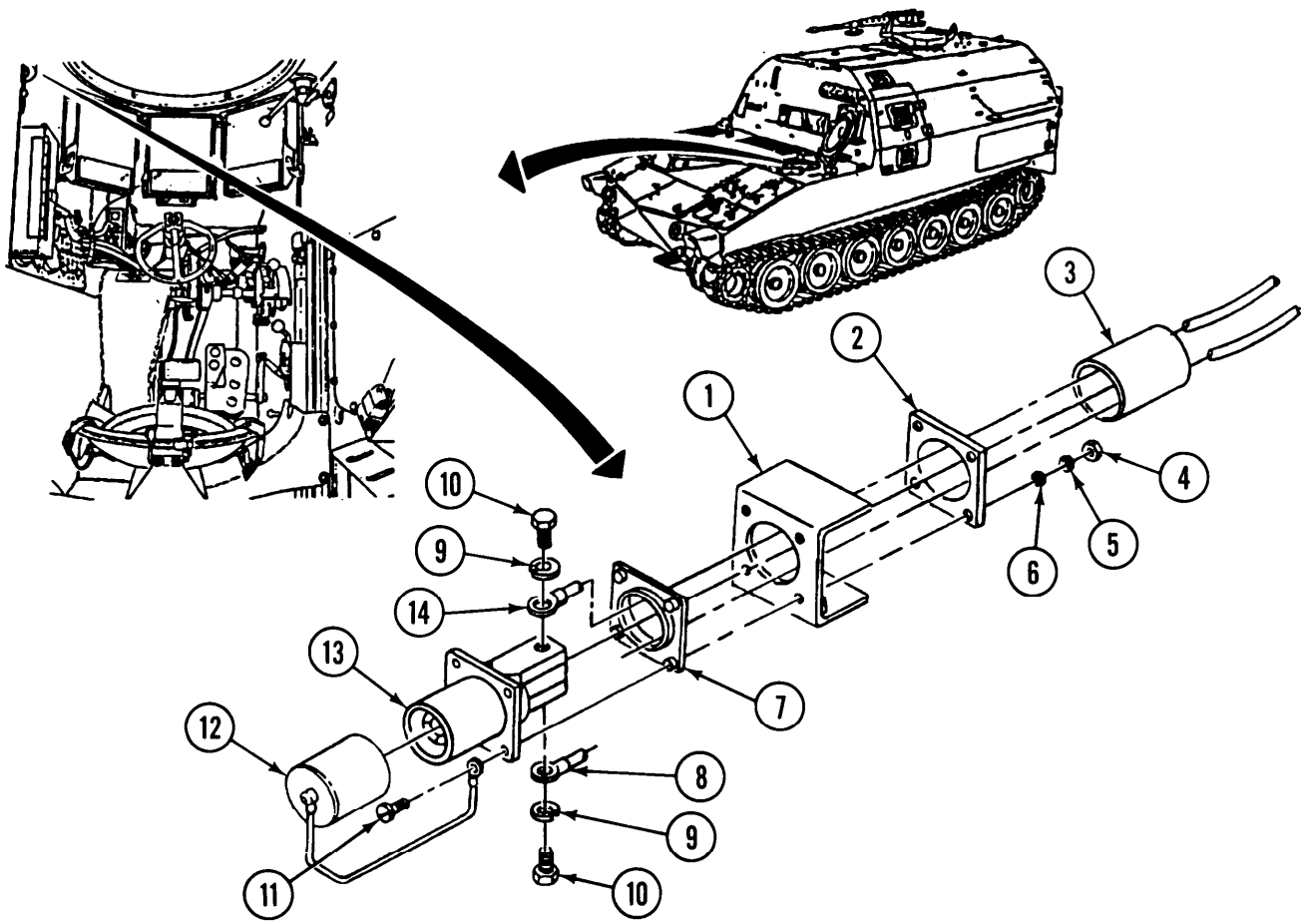
Materials/Parts:
- Insulation sleeving (Item 114, Appendix H)
- Lockwasher (4) (Item 161, Appendix H)
- Lockwasher (2) (Item 164, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).

a. REMOVAL

1. Cut off insulation sleeving (3) from connector (13) to expose two electrical leads 49A and 50A (14 and 8). Discard insulation sleeving.

2. Remove screw (10), lockwasher (9), and positive electrical lead 49A (14) from connector (13). Discard lockwasher.



7-67. FRONT NATO INTERVEHICULAR SLAVE CONNECTOR REPLACEMENT (continued).

3. Pull off cap (12) from connector (13).

4. Remove four screws (11), washers (6), Iockwashers (5), nuts (4) and cord of cap (12) from bracket (1).

5. Pull connector (13) out of bracket (1) and remove screw (10), Iockwasher (9), and negative electrical lead 50A (8) from connector (13). Discard Iockwasher.

6. Remove connector (13), gasket (7) and insulator plate (2) from bracket(1).

b. INSTALLATION

1. Install insulator plate (2), gasket (7) and connector (13) with positive (+) lug on top in bracket (1).

2. Connect negative electrical lead 50A (8) to bottom negative lug of connector (13) with new Iockwasher (9) and screw (10).

3. Install connector (13) and cord of cap (12) on bracket (1) with four new Iockwashers (5), nuts (4), washers (6) and screws (11).

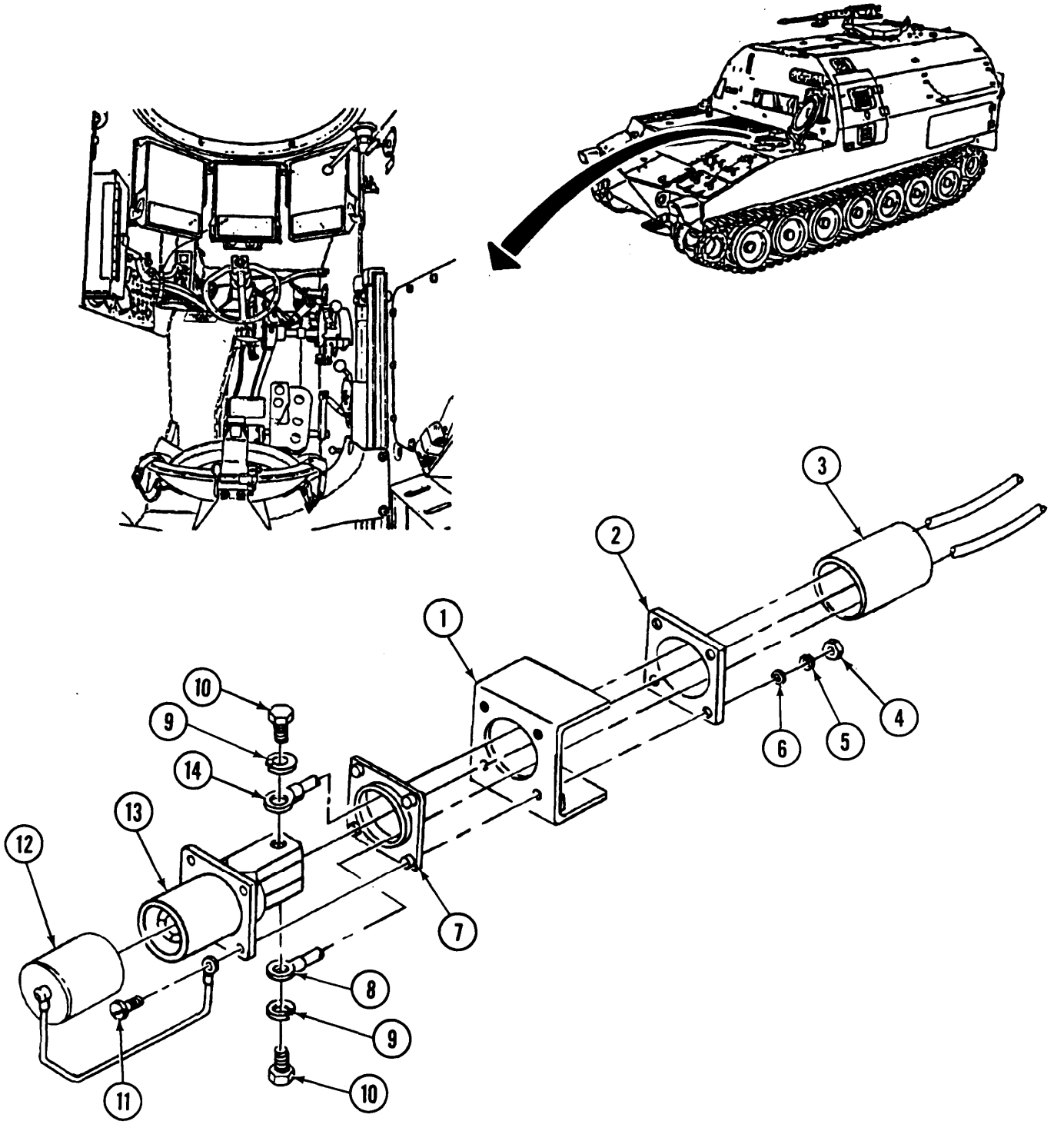
4. Install cap (12) on connector (13).

5. Install new insulation sleeving (3) over electrical leads 49A and 50A (14 and 8).

6. Connect positive electrical lead 49A(14) to top positive lug of connector (13) with new lockwasher (9) and screw (10).

7. Install insulation sleeving (3) over electrical leads 49A and 50A (14 and 8).

7-67. FRONT NATO INTERVEHICULAR SLAVE CONNECTOR REPLACEMENT (continued).



FOLLOW-ON MAINTENANCE:

- Connect battery ground cables (para 7-41).

7-68. FRONT NATO INTERVEHICULAR SLAVE CONNECTOR GROUND LEAD (12332678) REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- LockWasher (2) (Item 138, Appendix H)
- LockWasher (Item 164, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).
- APU control box removed (para 7-22).

a. REMOVAL

NOTE

Left front and left rear NATO slave connector ground cables are removed and installed in the same manner.

1. Remove screw (6) and two lockwashers (7) from bulkhead, and disconnect gound lead 12332678 (5) from bulkhead ground mount. Discard lockwashers.

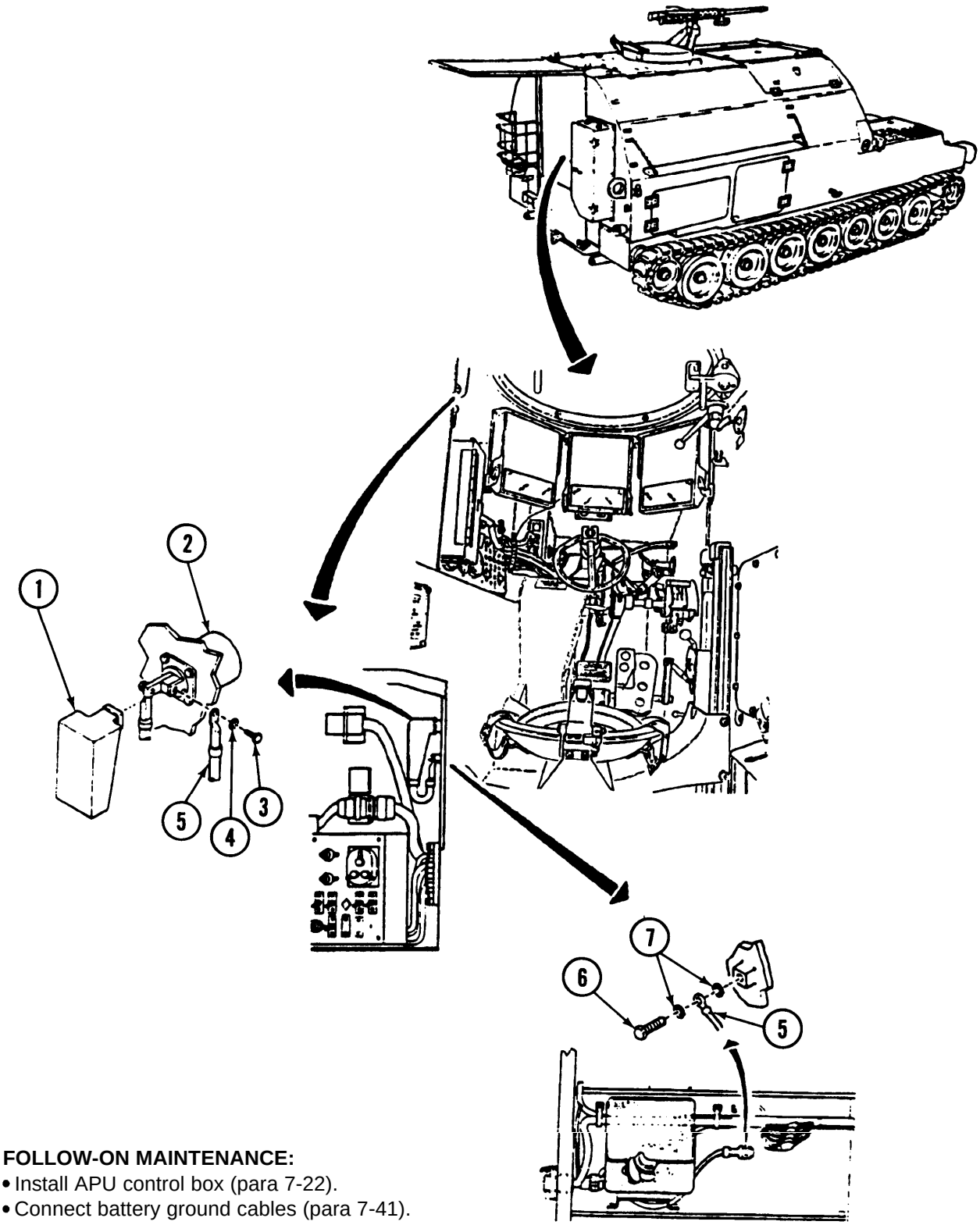
2. Pull back rubber boot (1) and remove screw (3), lockwasher (4), and ground lead 12332678 (5) from NATO slave receptacle (2). Discard lockwasher.

b. INSTALLATION

1. Install ground lead 12332678 (5) on NATO slave receptacle (2) using new lockwasher (4) and screw (3).

2. Install ground lead 12332678 (5) on bulkhead ground mount using two new lockwashers (7) and screw (6).

7-68. FRONT NATO INTERVEHICULAR SLAVE CONNECTOR GROUND LEAD (12332678) REPLACEMENT (continued).



FOLLOW-ON MAINTENANCE:

- Install APU control box (para 7-22).
- Connect battery ground cables (para 7-41).

7-69. NBC WIRING HARNESS (12330296) REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Intial Setup:

Tools/Test Equipment:
General mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- lLockWasher (11) (Item 175, Appendix H)
- lLockwasher (7) (Item 196, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).

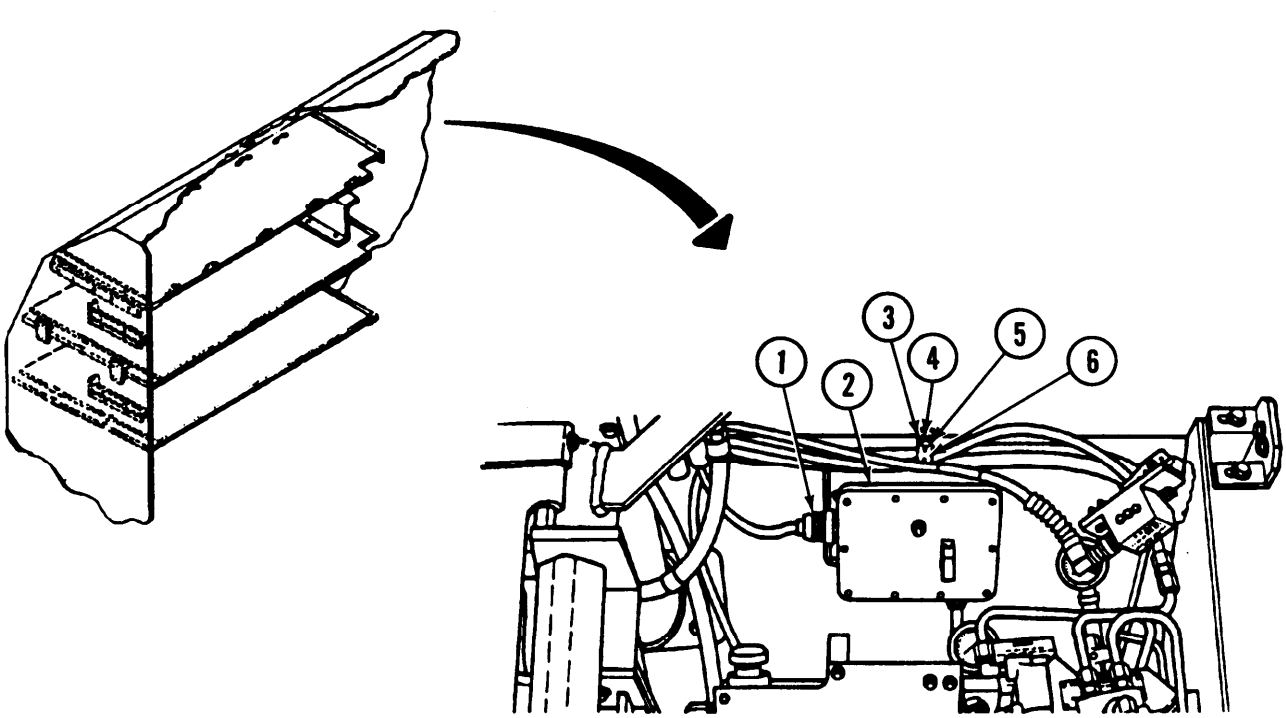
a. REMOVAL

1. Disconnect plug (1) from NBC control box (2).

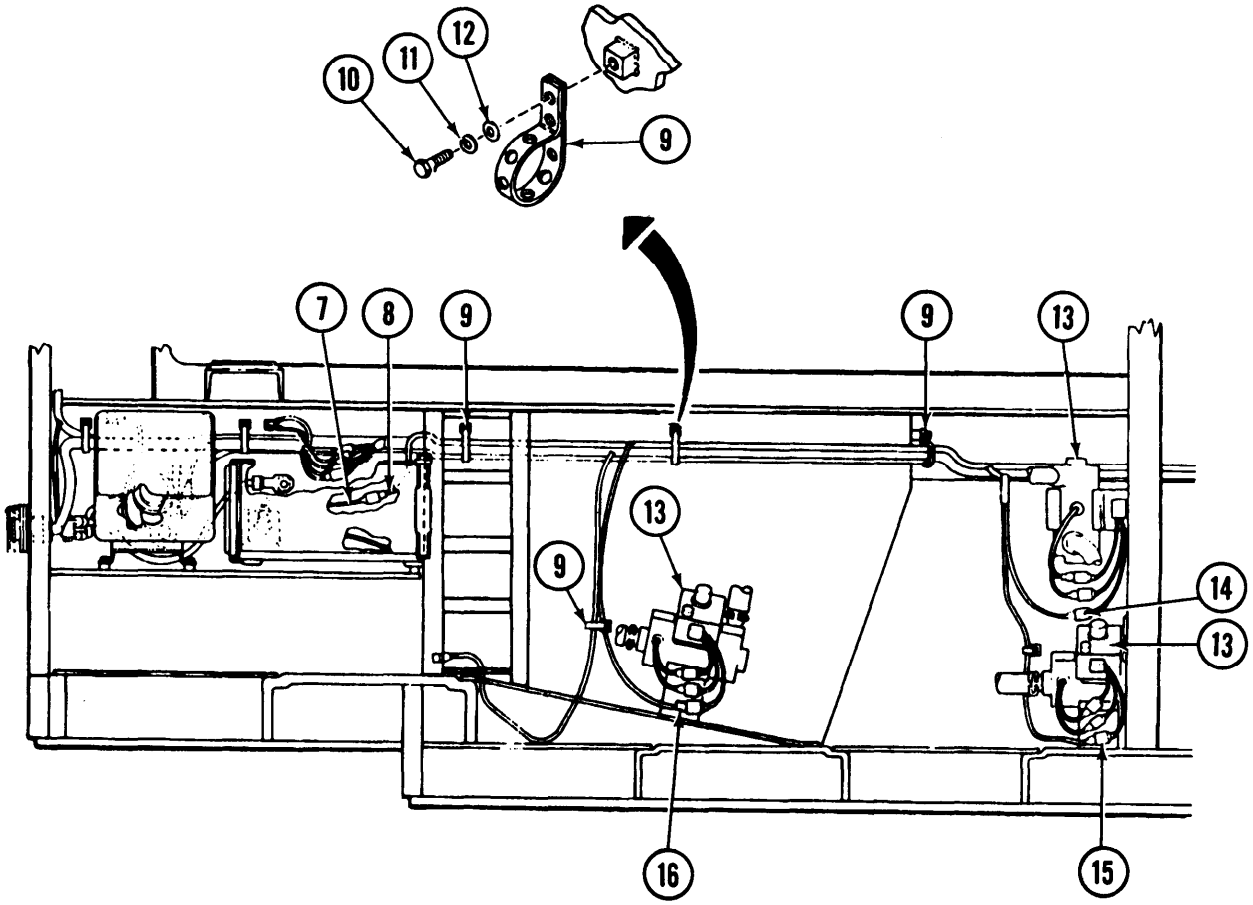
NOTE

Separate NBC wiring harness from other wiring harnesses. Do not remove other wiring harnesses from retaining straps.

2. Remove six retaining straps (6) from NBC wiring harness by removing screw(5), washer (4), and lockwasher (3) from each strap. Discard lockwashers.



7-69. NBC WIRING HARNESS (12330296) REPLACEMENT (continued).



3. Disconnect harness connectors 415G (16), 415E (14), and 415F (15) from three crew compartment NBC heaters (13).

4. Disconnect harness connector 415C (8) from NBC air purifier filter/blower wiring harness 12330298 wire 415C (7).

NOTE

Separate NBC wiring harness from other wiring harnesses. Do not remove other wiring harnesses from strap assemblies.

5. Remove five retaining straps (9) from NBC wiring harness by removing screw (10), washer (12), and lockwasher (11) from each strap. Discard lockwashers.

7-69. NBC WIRING HARNESS (12330296) REPLACEMENT (continued).

6. Disconnect connector 415D (19) from driver's compartment NBC heater (20).

7. Remove seven screws (21), washers (22), and Iockwashers (18) and two wiring harness guards (17) from bulkhead. Discard Iockwashers.

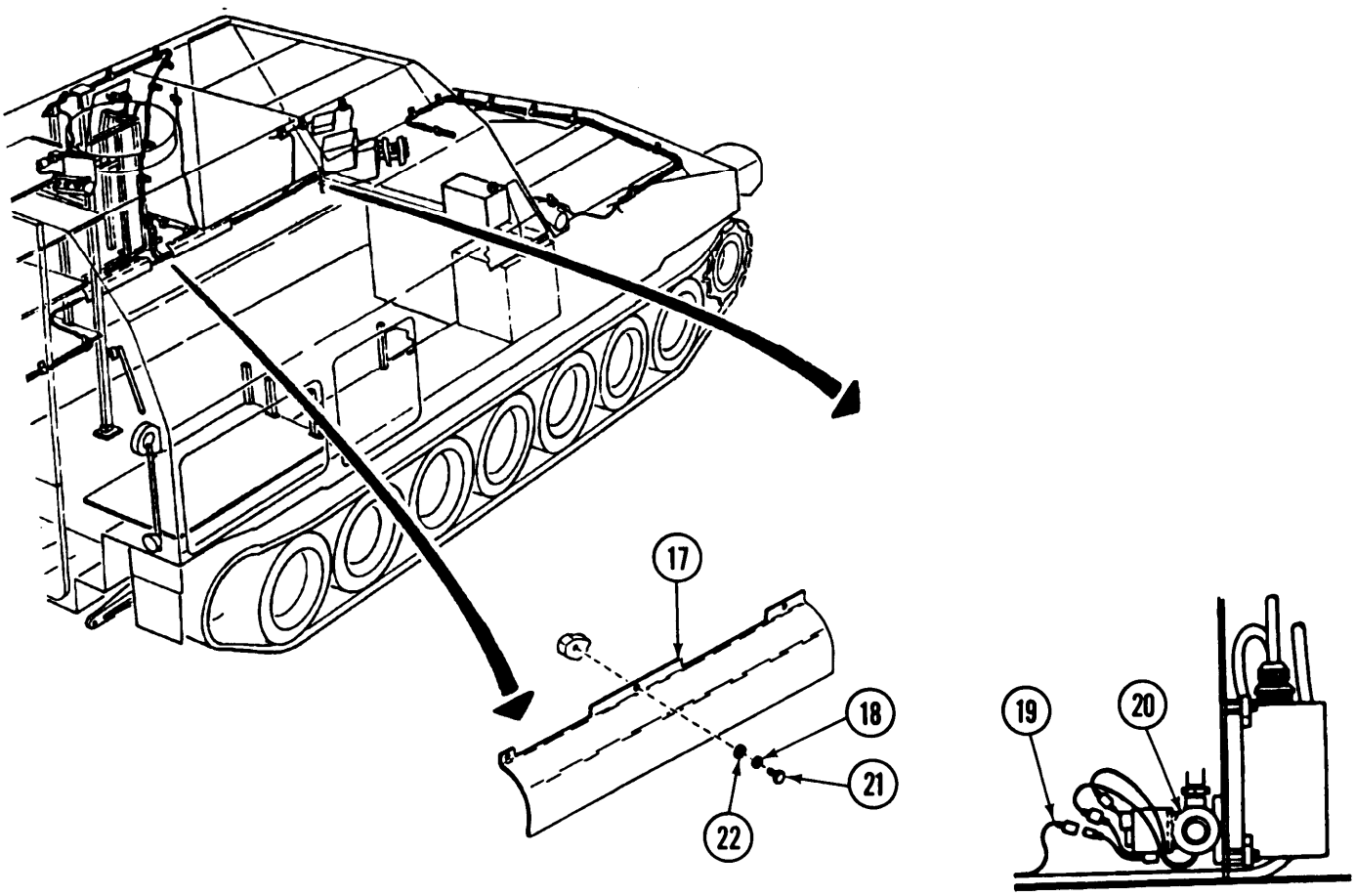
8. Remove wiring harness 12330296 from vehicle.

b. INSTALLATION

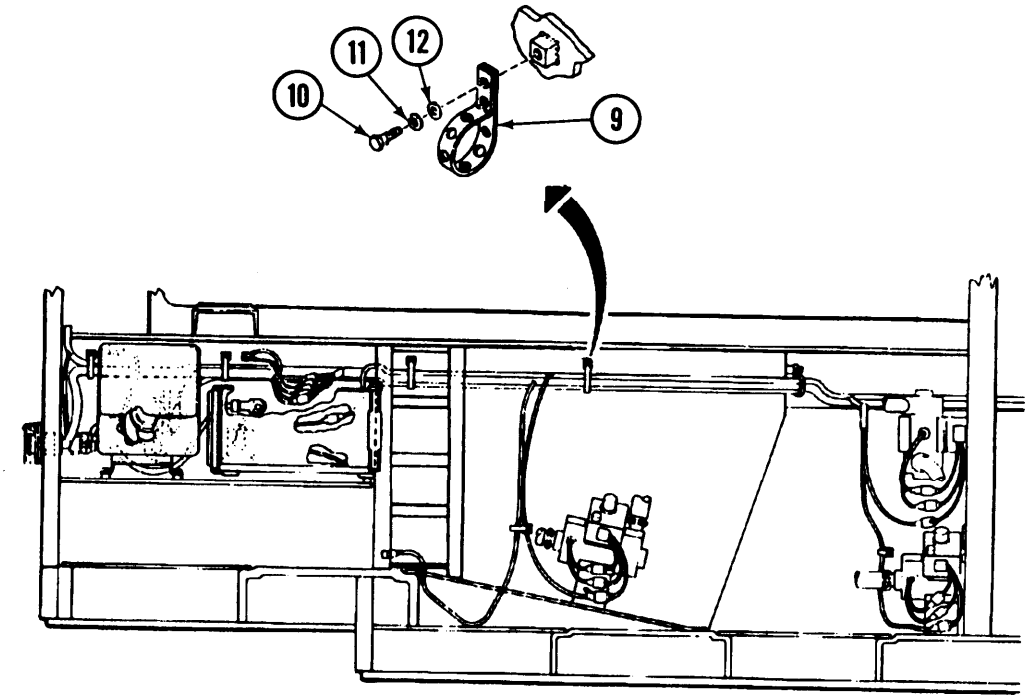
1. Install wiring harness 12330296 in vehicle.

2. Install two wiring harness guards (17) and seven washers (22), new Iockwashers (18), and screws (21) on bulkhead.

3. Connect connector 415D (19) to driver's compartment NBC heater (20).



7-69. NBC WIRING HARNESS (12330296) REPLACEMENT (continued).



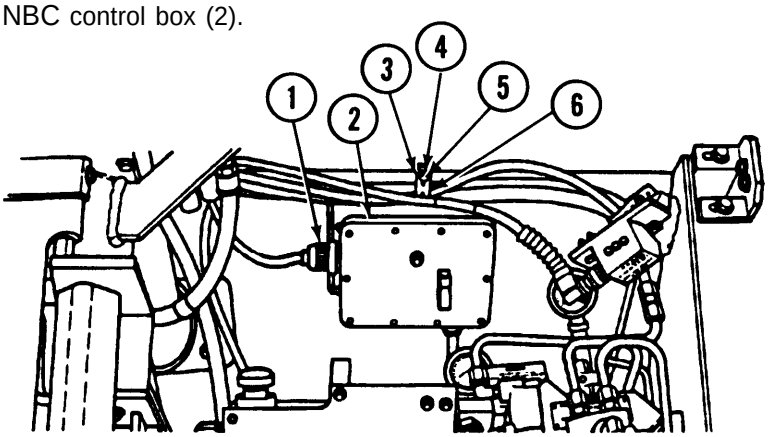
4. Install washer (1 2), new Iockwasher (11), and screw (10) to each of five retaining straps (9).

5. Connect harness connector 415C (8) to NBC air purifier filter/blower wiring harness 12330298 wire 415C (7).

6. Connect harness connectors 415G (16), 415E (14), and 415F (15) to three crew compartment NBC heaters (13).

7. Install new Iockwasher (3), washer (4), and screw (5) to each of six retaining straps (6).

8. Connect plug (1) to NBC control box (2).



FOLLOW-ON MAINTENANCE:

- Connect battery ground cables (para 7-41).

7-70. CONVEYOR CONTROL SWITCH TO CONVEYOR OVERRIDE SAFETY SWITCH CABLE ASSEMBLY (1 2376544) REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Lockwasher (2) (Item 136, Appendix H)
- Lockwasher (2) (Item 160, Appendix H)
- Lockwasher (14) (item 175, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10)
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).
- Left-side conveyor chain guards removed (para 17-17).

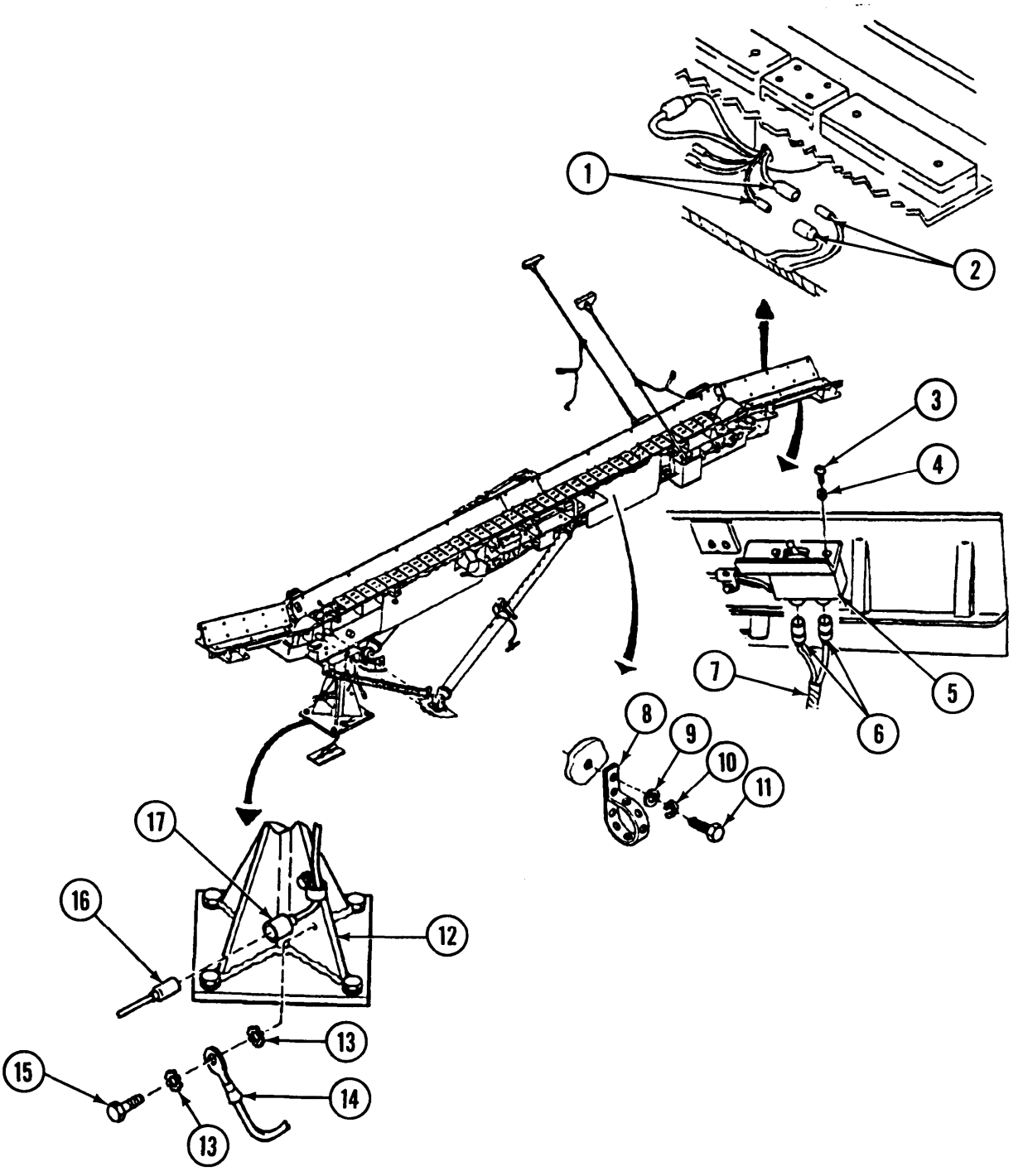
a. REMOVAL

1. Remove two screws (3), lockwashers (4), and conveyor override switch (5) from conveyor. Discard lockwashers.
2. Disconnect harness connectors (6) from conveyor override switch (5).
3. Disconnect harness connectors (2) from deadman switch leads (1).
4. Remove screw (15), two lockwashers (13), and ground lead (14) from conveyor pedestal (12). Discard lockwashers.
5. Disconnect connector (17) from 12330252 harness connector (16).
6. Remove 14 screws (11), lockwashers (10), washers (9), straps (8), and harness (7) from conveyor. Discard lockwashers.

b. INSTALLATION

1. Install harness (7) on conveyor with 14 straps (8), washers (9), new lockwashers (10), and screws (11).
2. Connect connector (17) to 12330252 harness connector (16).
3. Connect ground lead (14) to conveyor pedestal (12) with screw (15) and two newlockwashers(13).
4. Connect harness connectors (2) to deadman switch leads (1).
5. Connect harness connectors (6) to conveyor override switch (5).
6. Install conveyor override switch (5) with two screws (3) and new lockwashers (4).

7-70. CONVEYOR CONTROL SWITCH TO CONVEYOR OVERRIDE SAFETY SWITCH CABLE ASSEMBLY (12376544) REPLACEMENT (continued).



FOLLOW-ON MAINTENANCE:

- Install left-side conveyor chain guards (para 17-17).
- Connect battery ground cables (para 7-41).

7-71. APU CONTROL BOX TO APU VOLTAGE REGULATOR CABLE ASSEMBLY (12330248) REPAIR.

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Electrical insulation tape (Item 67, Appendix D)
- Lockwasher (2) (Item 136, Appendix H)
- Lockwasher (4) (Item 160, Appendix H)
- Lockwasher (4) (Item 161, Appendix H)
- Lockwasher (8) (Item 175, Appendix H)
- Lockwasher (7) (Item 196, Appendix H)

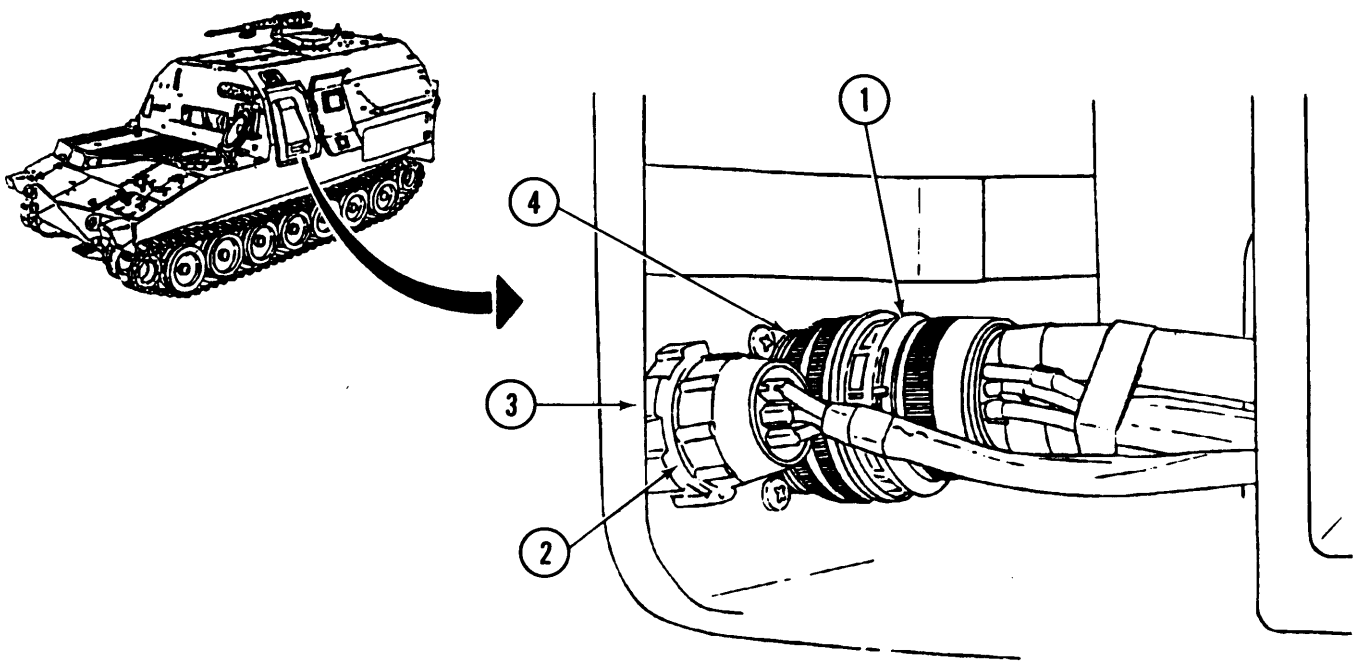
Personnel Required: Two

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- APU compartment access door opened (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).
- APU control box removed (para 7-22).
- Left projectile rack assembly moved to rear of vehicle (refer to TM 9-2350-287-10).
- Engine AFES cylinder bottle brackets nos. 1 and 2 removed (para 21-8).

a. REMOVAL

1. Disconnect harness 12329650 connector (2) from APU electrical disconnect receptacle (3).

2. Disconnect harness 12329640 connector (1) from APU electrical disconnect receptacle (4).



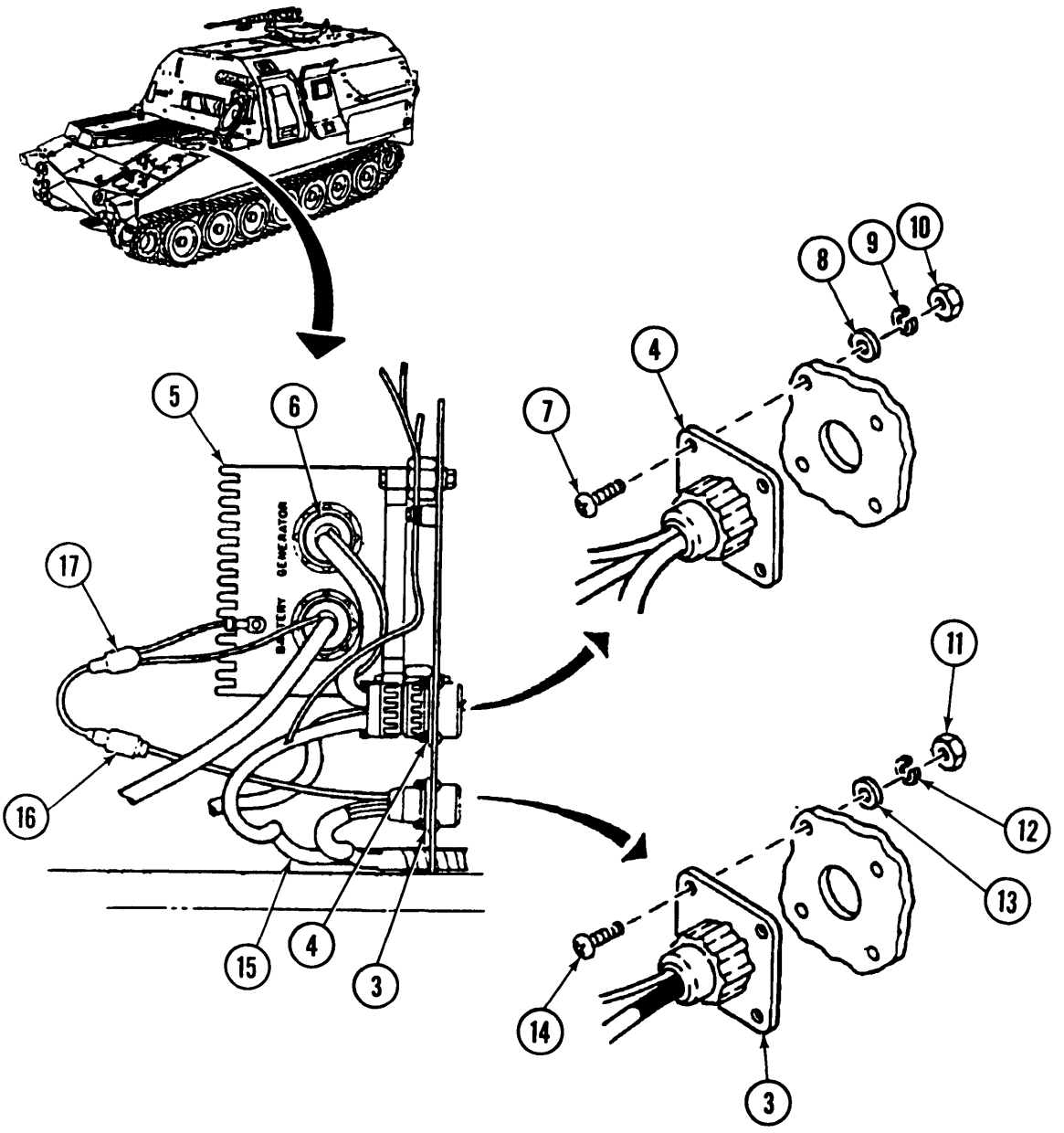
7-71. APU CONTROL BOX TO APU VOLTAGE REGULATOR CABLE ASSEMBLY (12330248) REPAIR (continued).

3. Remove four screws (14), lockwashers (12), washers (13), nuts (11), and APU electrical disconnect receptacle (3) with wiring harness (15), from APU bulkhead. Discard lockwashers.

4. Remove four screws (7), lockwashers (9), washers(8), and nuts (10) and APU electrical disconnect receptacle (4) from APU bulkhead. Discard lockwashers.

5. Disconnect cable connector (16) from wiring harness 12330256 regulator ground circuit (17).

6. Disconnect APU voltage regulator plug (6) from APU voltage regulator (5).



7-71. APU CONTROL BOX TO APU VOLTAGE REGULATOR CABLE ASSEMBLY (12330248) REPAIR (continued).

7. Disconnect APU power feed plug (22) from harness 12330257 receptacle (23).

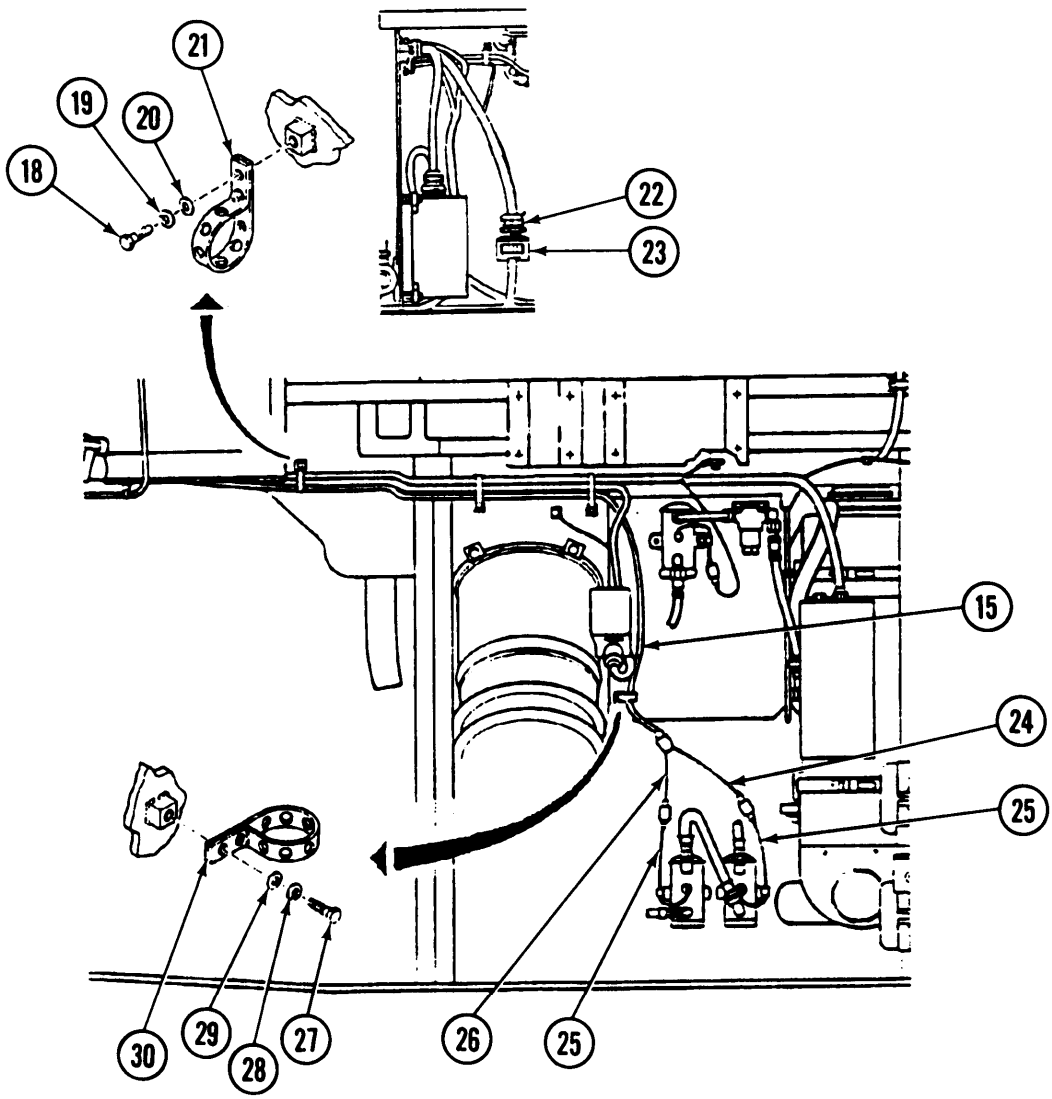
8. Disconnect APU fuel pump connectors (24 and 26) from APU fuel pump leads (25).

9. Remove screw (27), lockwasher (28), washer (29) and retaining strap (30) from vehicle. Discard lockwashers.

NOTE

Do not remove other harness from strap assemblies.

10. Remove screw (18), lockwasher (19), washer (20) and harness from each of three strap assemblies (21). Discard lockwashers.



7-71. APU CONTROL BOX TO APU VOLTAGE REGULATOR CABLE ASSEMBLY (12330248) REPAIR (continued).

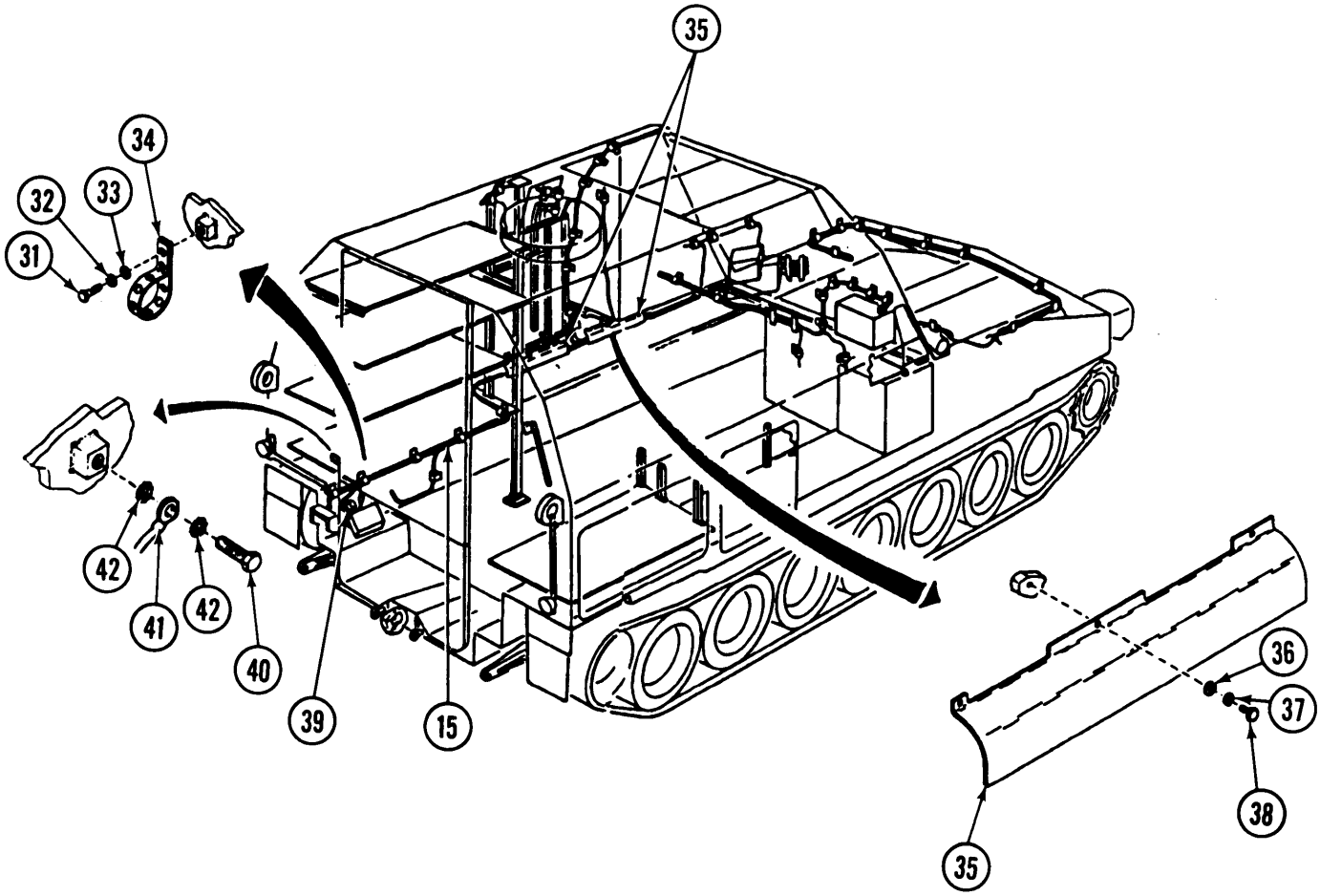
11. Remove seven screws (38), lockwashes (37), and washers (36) and two harness guards (35) from vehicle. Discard lockwashers.

12. Remove four screws (31), lockwashers (32), washers (33), and harness retaining straps (34). Remove harness (15) only. Install strap and hardware. Discard lockwashers.

13. Disconnect APU control box power lead 419 (39) from wiring harness 12330252 connector.

14. Remove screw (40), two lockwashers (42) and ground terminal (41) from vehicle.

15. Remove wiring harness (15) from vehicle.



7-71. APU CONTROL BOX TO APU VOLTAGE REGULATOR CABLE ASSEMBLY (12330248) REPAIR (continued).

b. DISASSEMBLY

NOTE

Remove electrical insulation tape from section of wiring harness to be disassembled.

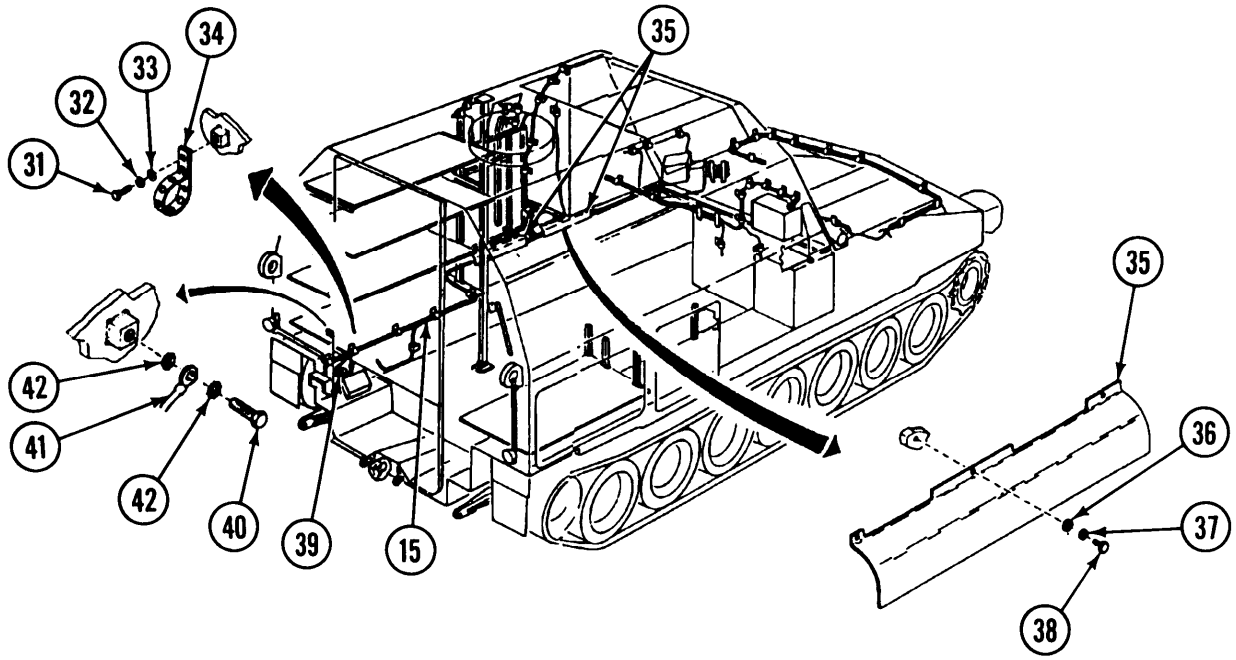
1. Remove section of electrical tape from harness.
2. Separate and isolate wiring harness branches.
3. Disassemble each wiring harness branch and replace defective wires.

c. ASSEMBLY

1. Reassemble wiring harness branches.
2. Regroup wiring branches and secure with electrical insulation tape.

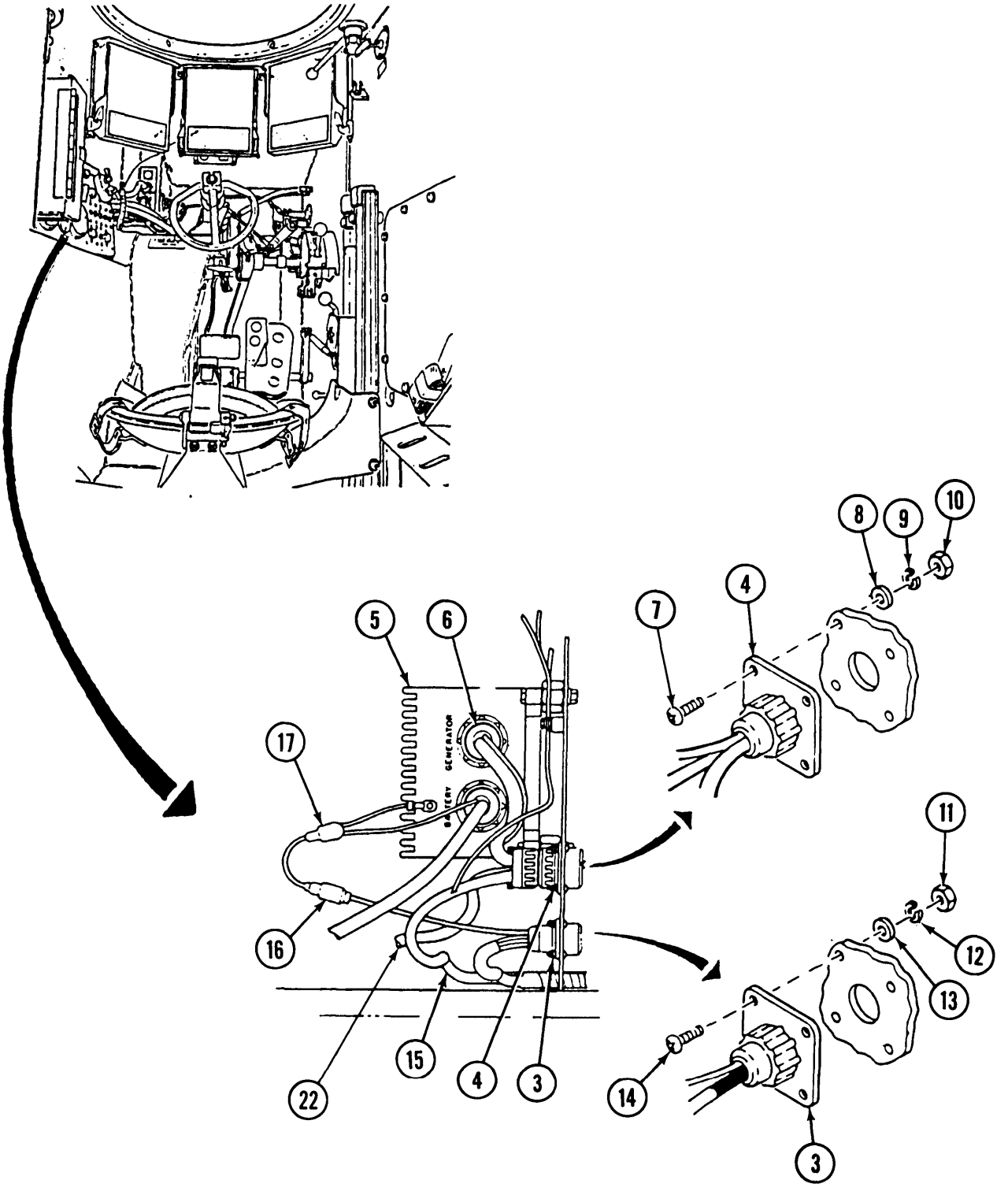
d. INSTALLATION

1. Install wiring harness (15) on vehicle.
2. Connect APU control box power feed 419 (39) to wiring harness 12330252 connector.
3. Install ground terminal (41), two new Iockwashers (42) and screw (40).
4. Install four retaining straps (34), washers (33), new Iockwashers (32), and screws (31).
5. Install two harness guards (35) and seven washers (38), new Iockwashers (37), and screws (38) on vehicle.



7-71. APU CONTROL BOX TO APU VOLTAGE REGULATOR CABLE ASSEMBLY (12330248) REPAIR (continued).

6. Feed APU voltage regulator plug (6), APU power feed plug (22), APU electrical disconnect receptacle (4), electrical disconnect (3) and APU voltage regulator ground lead (16) through bulkhead into driver's compartment.



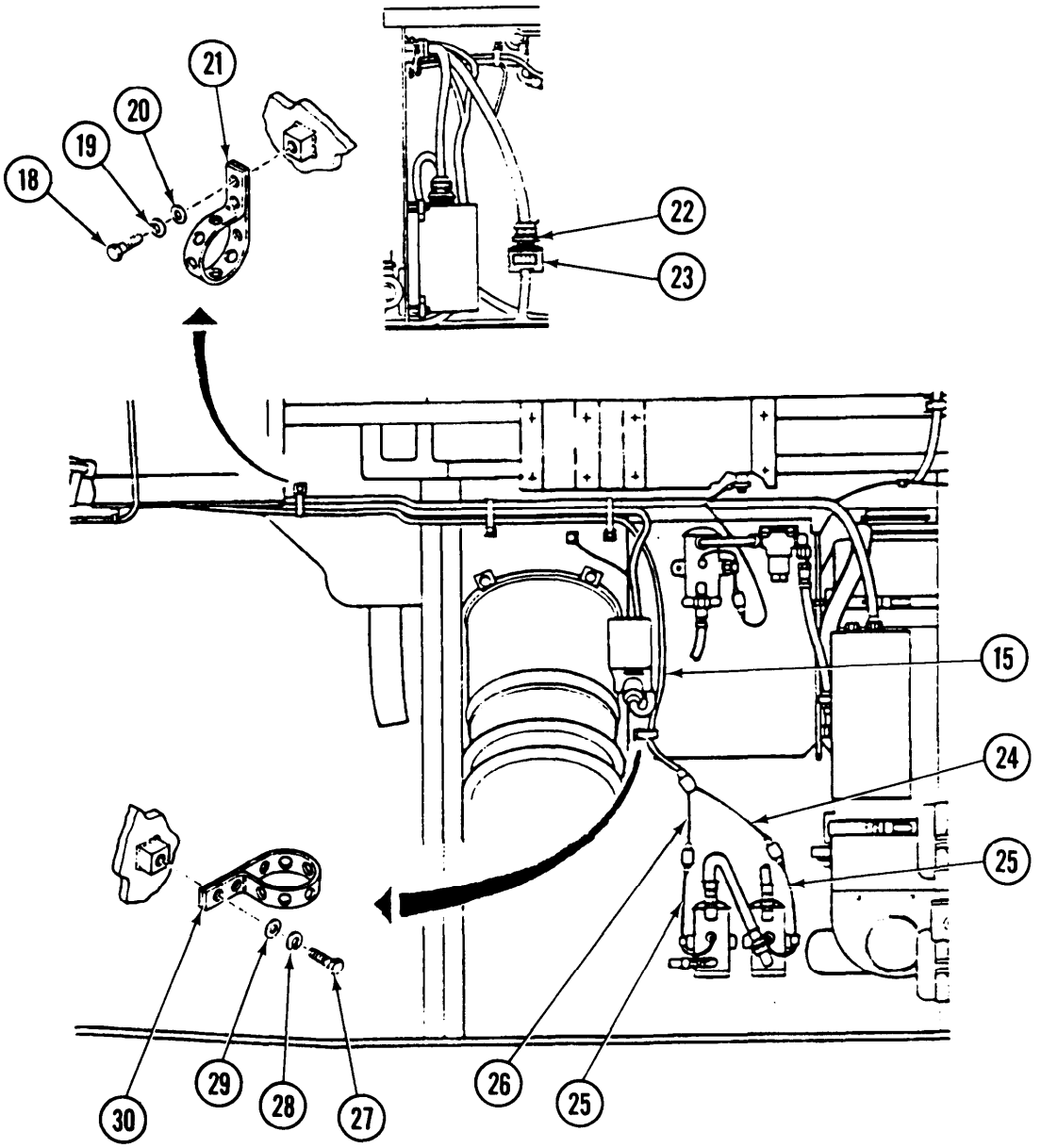
7-71. APU CONTROL BOX TO APU VOLTAGE REGULATOR CABLE ASSEMBLY (12330248) REPAIR (continued).

7. Install two washers (20), new lockwashers (19), screws (18) and retaining strap assemblies (21) on vehicle.

8. Install retaining strap (30), washer (29), new lockwasher (28) and screw (27) on vehicle.

9. Connect two APU fuel pump connectors (24 and 26) to APU fuel pump leads (25).

10. Connect APU power feed plug (22) to harness 12330257 receptacle (23).



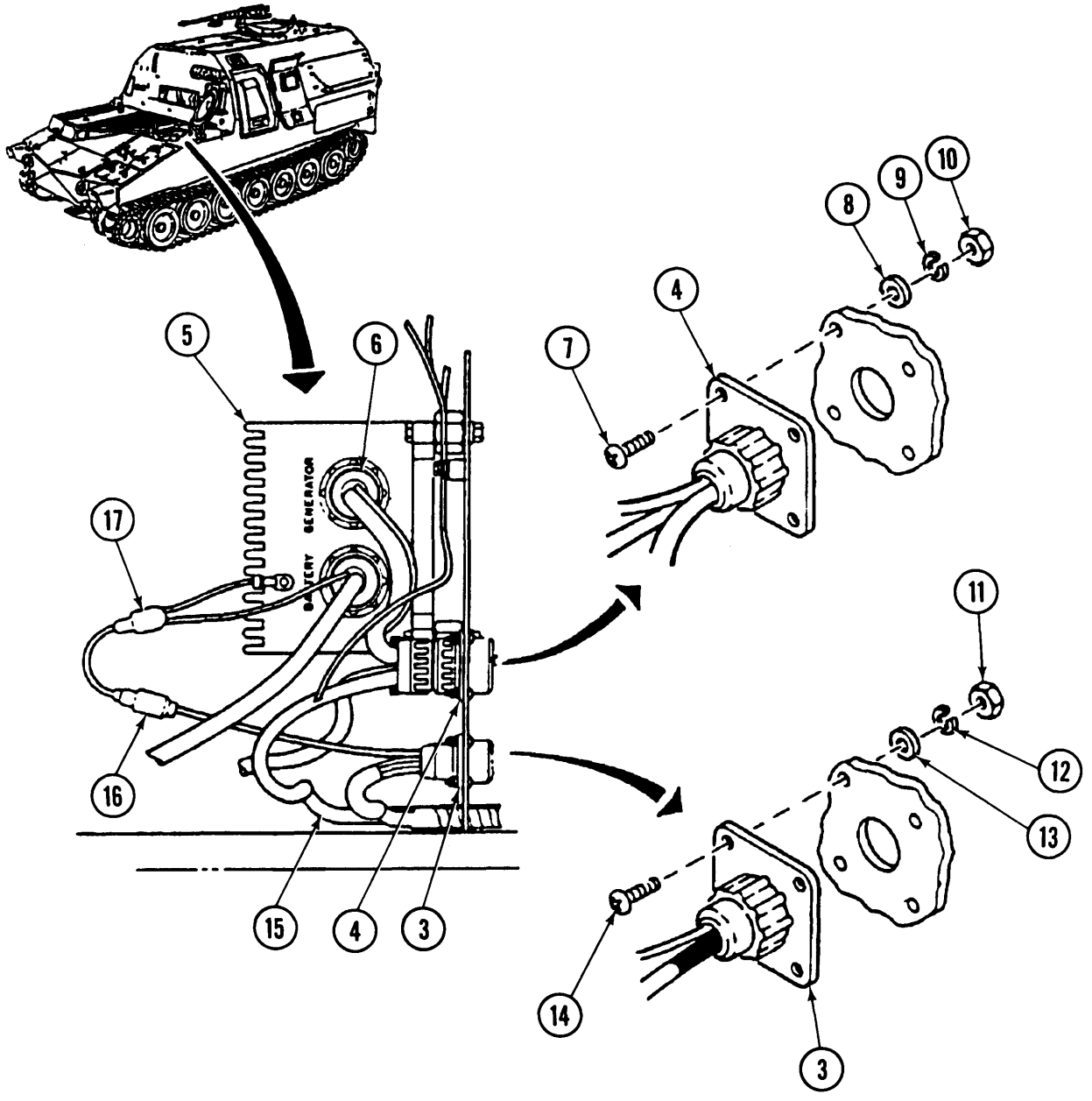
7-71. APU CONTROL BOX TO APU VOLTAGE REGULATOR CABLE ASSEMBLY (12330248) REPAIR (continued).

11. Connect APU voltage regulator generator plug (6) to APU voltage regulator (5).

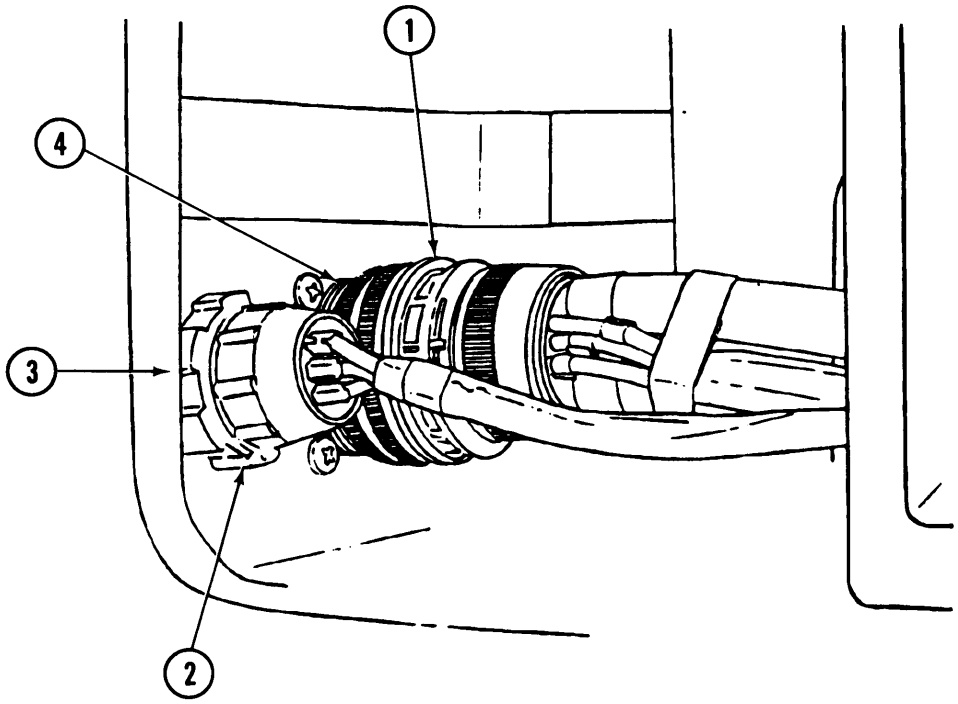
12. Install four nuts (10), washers (8), new lockwashers (9), screws (7) and receptacle (4) to APU bulkhead. Connect harness assembly 12329640 (1) to APU electrical disconnect receptacle (4).

13. Connect cable connector (16) to harness assembly 12330256 regulator ground circuit (17).

14. Install four nuts (8), washers (13), new lockwashers (12), and screws (14) and APU electrical disconnect receptacle (3) with wiring harness (15) to APU bulkhead. Connect harness 12330256 (2) to APU electrical disconnect receptacle (3).



7-71. APU CONTROL BOX TO APU VOLTAGE REGULATOR CABLE ASSEMBLY (12330248) REPAIR (continued).



FOLLOW-ON MAINTENANCE:

- Install APU control box (para 7-22).
- Connect battery ground cables (para 7-41).
- Install engine AFES cylinder bottle brackets Nos. 1 and 2 (para 21-8).
- Install left projectile rack assembly (refer to TM 9-2350-287-10).
- Close APU compartment access door (refer to TM 9-2350-287-10).

7-72. INTERVEHICULAR GROUNDING CABLE AND STOWAGE STRAPS REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Lockwasher (2) (Item 170, Appendix H)
- Lockwasher (Item 175, Appendix H)

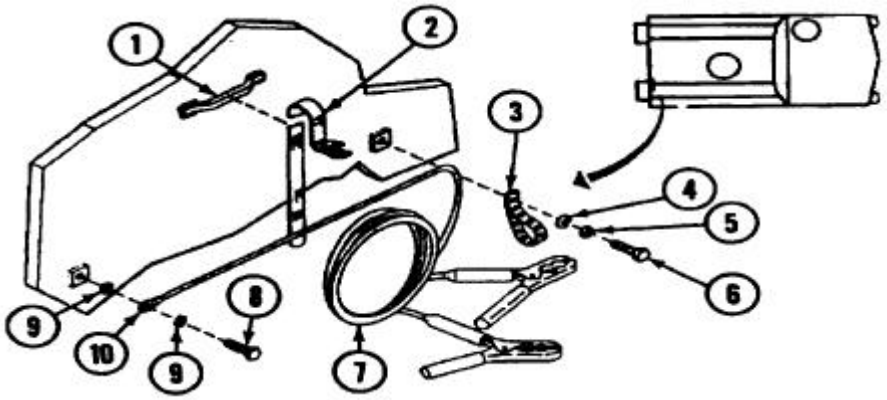
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Lower rear door opened (refer to TM 9-2350-287-10).

a. REMOVAL

1. Remove screw (8), two lockwashers (9), cable (7), and grounding lug (10) from rear of vehicle. Discard lockwashers.
2. Remove screw (6), lockwasher (5), washer (4), and tiedown strap (3) from rear of vehicle. Discard lockwasher.
3. Remove cable (7) from vehicle by releasing strap (2).
4. Remove strap (2) from vehicle-mounted bracket (1).

b. INSTALLATION

1. Install strap (2) on vehicle-mounted bracket (1).
2. Install cable (7) in vehicle by securing strap (2).
3. Install tiedown strap (3) using screw (6), new lockwasher (5), and washer (4).
4. Install cable (7) and grounding lug (10) on rear of vehicle using screw (8) and two new lockwashers (9).



FOLLOW-ON MAINTENANCE:
- Close lower rear door (refer to TM 9-2350-287-10).

7-73. TRAILER RECEPTACLE AND CABLE ASSEMBLY (12330246) REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Tape, insulation, electrical (Item 67, Appendix D)
- Gasket (Item 96, Appendix H)
- Lockwasher (2) (Item 136, Appendix H)
- Lockwasher (6) (Item 175, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).
- APU control box removed (para 7-22).

a. REMOVAL

1. Disconnect five connectors (9) from harness 12330252 connectors (8).

2. Disconnect two cable assembly ground lugs (6) from vehicle mounting studs by removing screw (7) and two lockwashers (5). Discard lockwashers.

NOTE

Do not remove other wiring harnesses from straps. Install hardware after wiring harness straps have been removed.

3. Remove two wiring harness straps (1) by removing screw (4), lockwasher (3), and washer (2) from each strap (1). Discard lockwashers.

4. Remove four screws (14) and lockwashers (13) and receptacle cover (15) from trailer receptacle (10). Discard lockwashers.

5. Pull receptacle (10), gasket (12), and cable assembly (11) from rear of vehicle.

6. Remove gasket (12) from receptacle (10). Discard gasket.

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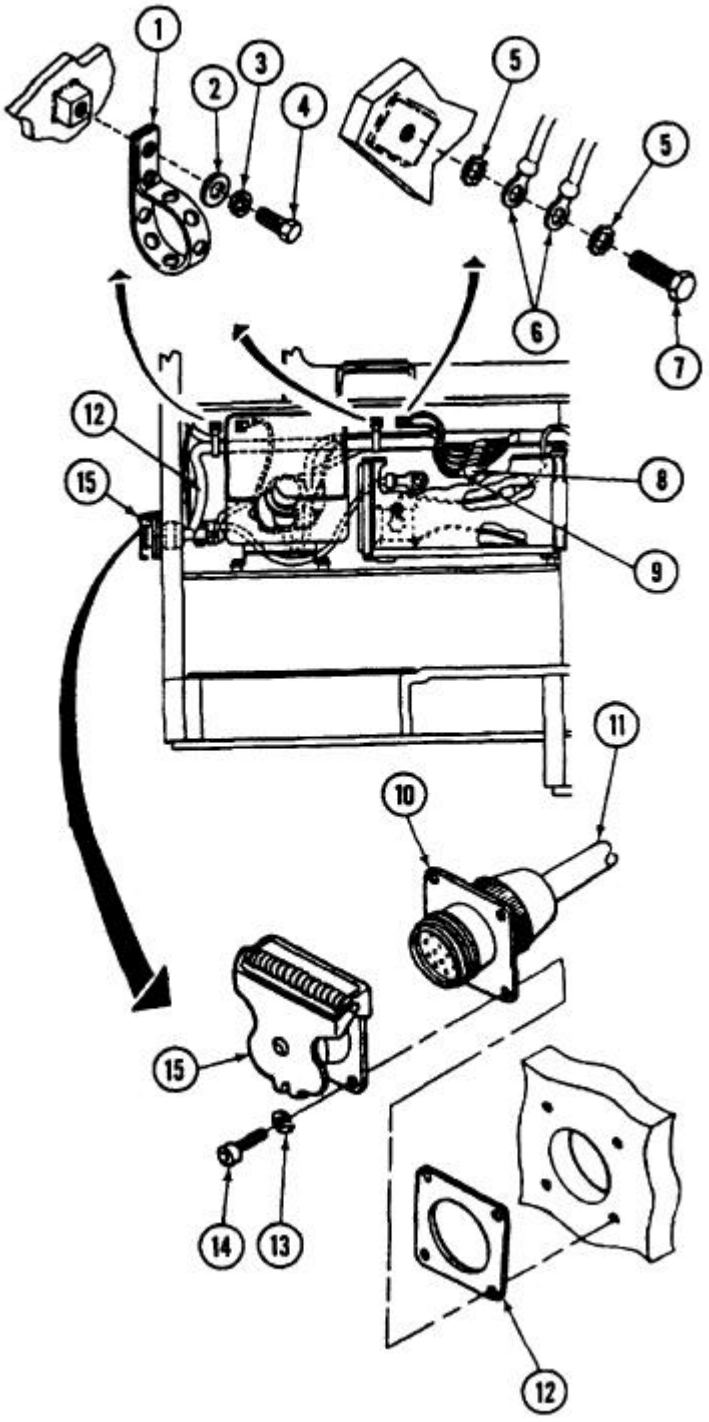
7-73. TRAILER RECEPTACLE AND CABLE ASSEMBLY (12330246) REPLACEMENT (continued).

[Text Deleted]

b. INSTALLATION

1. Install new gasket (12) on receptacle (10).
2. Install receptacle (10) with cable assembly (11) on vehicle.
3. Install receptacle cover (15) on vehicle.
4. Secure new gasket (12), receptacle (10), and receptacle cover (15) on vehicle with four screws (14) and new lockwashers (13).
5. Install two wiring harness straps (1) by installing screw (4), new lockwasher (3), and washer (2) on each strap (1).
6. Connect two cable assembly ground lugs (6) to vehicle mounting studs with screw (7) and two new lockwashers (5).
7. Connect five connectors (9) to five wiring harness 12330252 connectors (8).



FOLLOW-ON MAINTENANCE:

- Install APU control box (para 7-22).
- Connect battery ground cables (para 7-41).

7-74. DCA TO DRIVER'S BULKHEAD STE/ICE WIRING HARNESS (12329996) REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

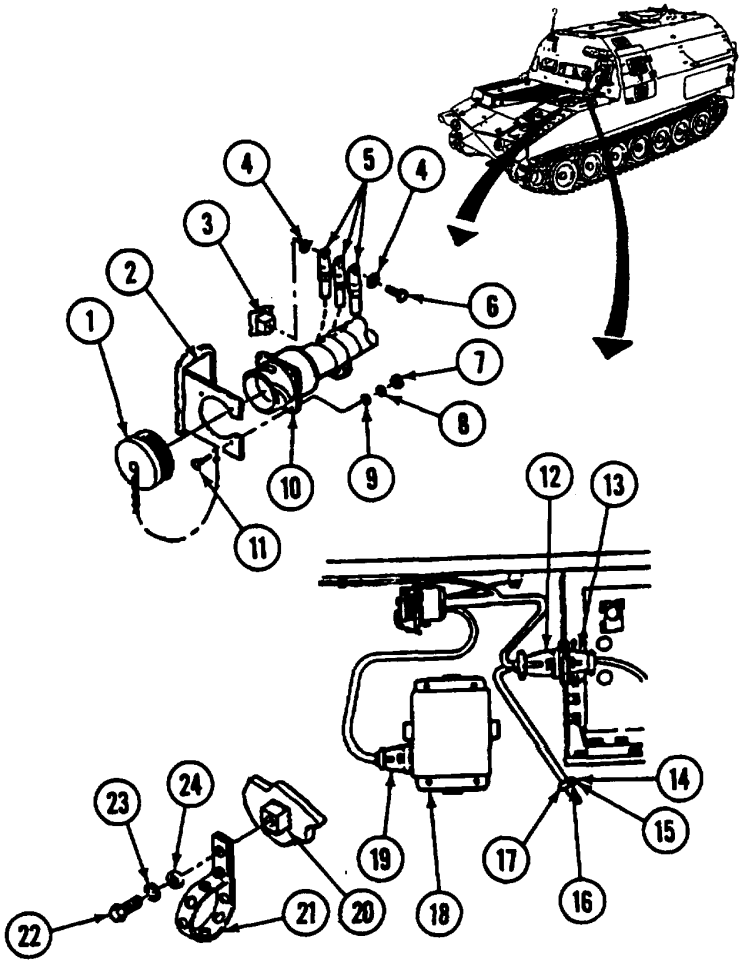
Materials/Parts:
- Lockwasher (4) (Item 136, Appendix H)
- Lockwasher (4) (Item 160, Appendix H)
- Lockwasher (12) (Item 175, Appendix H)
- Self-locking nut (Item 315, Appendix H)

Personnel Required: Two

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Driver's hatch cover opened and secured (refer to TM 9-2350-287-10).
- Right projectile rack assembly moved to rear of vehicle (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).
- Engine AFES cylinder bottle brackets Nos. 1 and 2 removed (para 21-8).

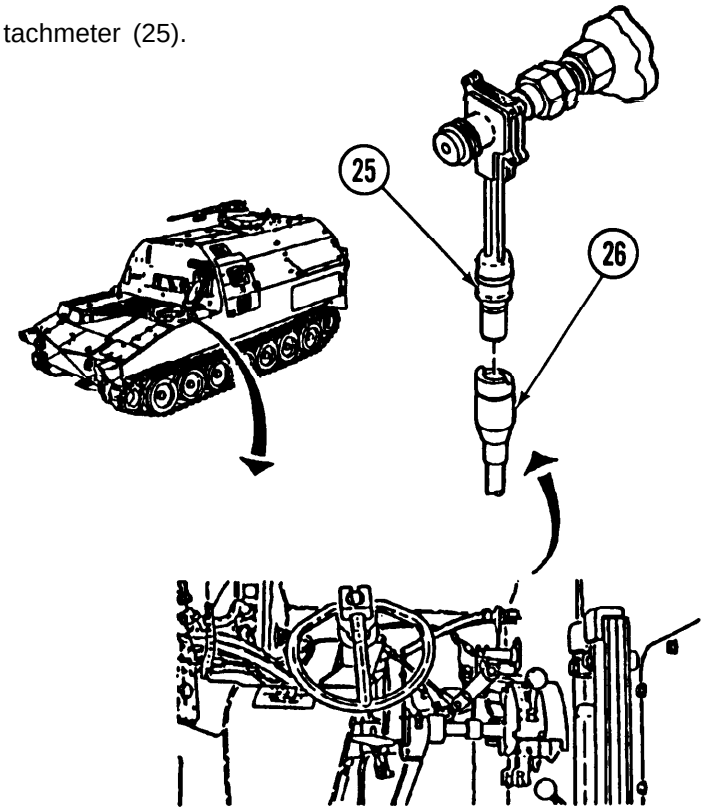
a. REMOVAL

1. Unscrew dust cap (1) from DCA receptacle (10) and let dust cap (1) hang by chain.
2. Remove four screws (11), washers (9), lockwashers (8), and nuts (7), DCA receptacle (10), and dust cap (1) from vehicle bracket (2). Discard lockwashers.
3. Remove two screws (6) and four lockwashers (4) securing two groups of three ground leads (5) to two vehicle mounts (3). Discard lockwashers.
4. Remove 10 screws (22), lockwashers (23), washers (24), and retaining straps (21) from 10 vehicle mounts (20). Discard lockwashers.
5. Disconnect plug (19) from STE/ICE resistor box (18).
6. Remove two screws (14), lockwashers (15), and washers (16) and harness support strap (17) from bulkhead. Discard lockwashers.
7. Disconnect plug (12) from driver's bulkhead receptacle (13).



7-74 DCA TO DRIVER'S BULKHEAD STE/ICE WIRING HARNESS (12329996) REPLACEMENT (continued).

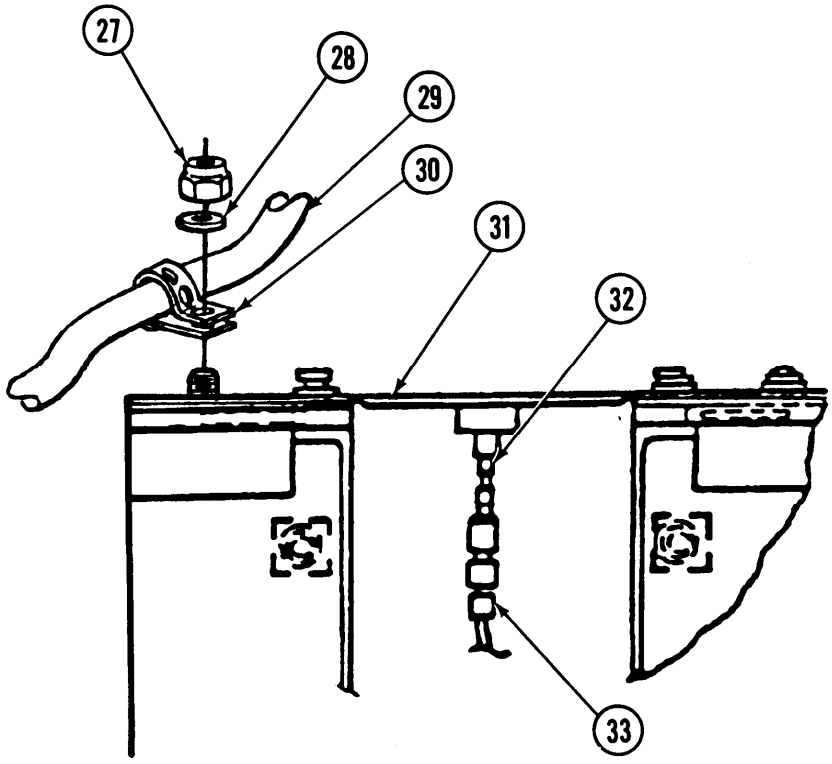
8. Disconnect plug (26) from engine pulse tachmeter (25).



9. Remove self-locking nut (27), washer (28), and clamp (30) securing STE/ICE wiring harness 12329996 (29) to air cleaner assembly (31). Discard self-locking nut.

10. Disconnect plug (33) from air cleaner pressure transducer (32).

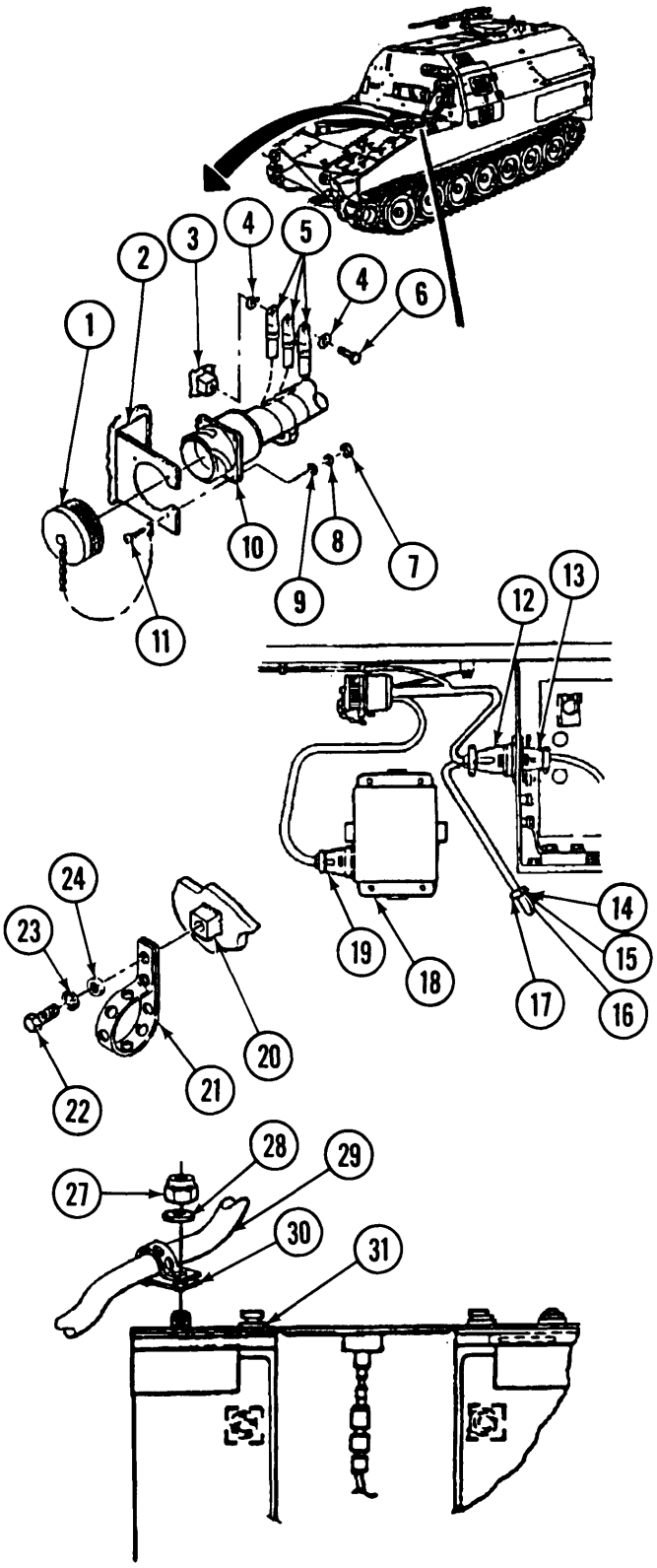
11. Remove wiring harness 12329996 (29) from vehicle. Inspect for cracks, frays, or breaks. Repair if damaged.



7-74. DCA TO DRIVER'S BULKHEAD STE/ICE WIRING HARNESS (12329996) REPLACEMENT (continued).

b. INSTALLATION

1. Connect plug (33) to air cleaner pressure transducer (32).
2. Connect plug (26) to engine pulse tachometer (25).
3. Install wiring harness 12329996 (29) on air cleaner assembly (31) with clamp (30), washer (28), and new self-locking nut (27).
4. Connect plug (12) to bulkhead receptacle (13).
5. Install harness support strap (17) on bulkhead with two screws (14), washers (16), and new lockwashers (15).
6. Connect plug (19) to STE/ICE resistor box (18).
7. Install 10 retaining straps (21) on 10 vehicle mounts (20) with 10 screws (22), washers (24), and new lockwashers (23).
8. Install two groups of three ground leads (5) on two vehicle mounts (3) with two screws (6) and four new lockwashers (4).
9. Install DCA receptacle (10) and dust cap (1) on vehicle bracket (2) with four screws (11), washers (9), new lockwashers (8), and nuts (7).
10. Install dust cap (1) on DCA receptacle (10).



FOLLOW-ON MAINTENANCE:

- Connect battery ground cables (para 7-41).
- Install engine AFES brackets Nos. 1 and 2 (para 21-8).
- Close driver's hatch cover (refer to TM 9-2350-287-10).
- Move right projectile rack assembly into position (refer to TM 9-2350-287-10).

7-75. DRIVER'S BULKHEAD TO ENGINE DISCONNECT STE/ICE WIRING HARNESS (12329994) REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Lockwasher (Item 131, Appendix H)
- Lockwasher (2) (Item 148, Appendix H)
- Lockwasher (4) (Item 172, Appendix H)
- Lockwasher (3) (Item 175, Appendix H)

Personnel Required: Two

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Driver's hatch cover opened and secured (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).

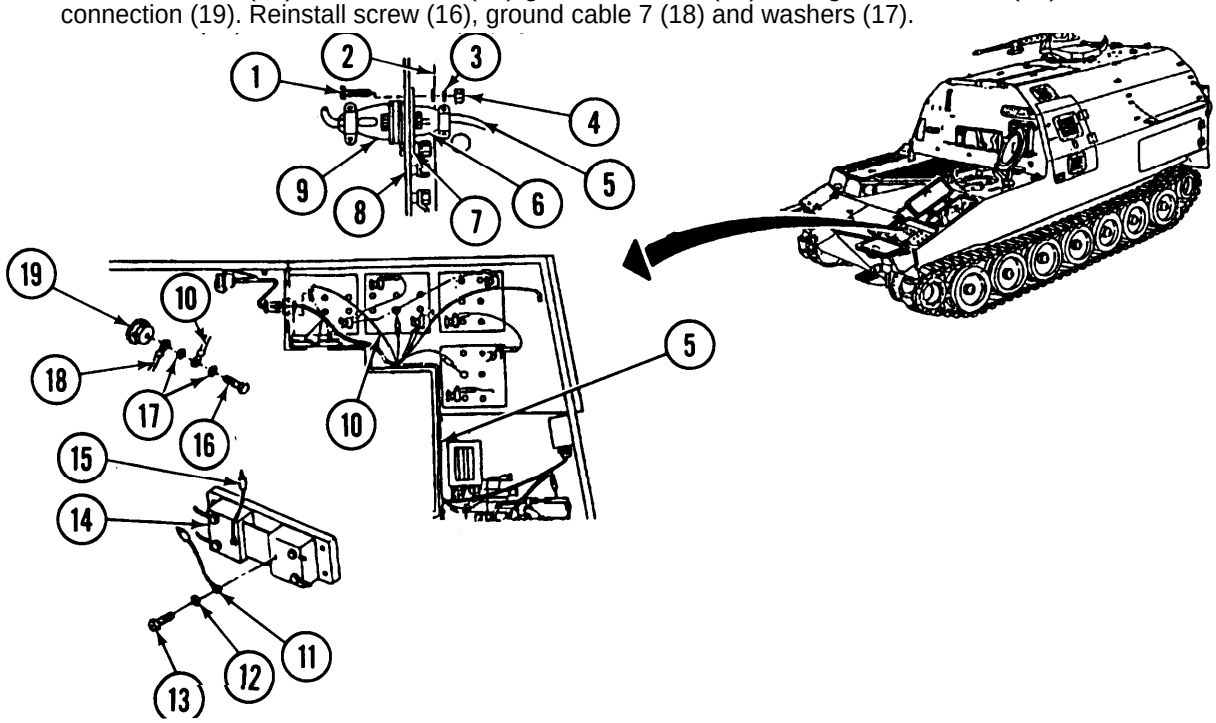
a. REMOVAL

1. Disconnect connector (9) from driver's bulkhead receptacle (6).

2. Remove four screws (1), washers (2), lockwashers (3), and nuts (4), gasket (7), STE/ICE wiring harness (5), and bulkhead receptacle (6) from engine disconnect (8). Discard lockwashers.

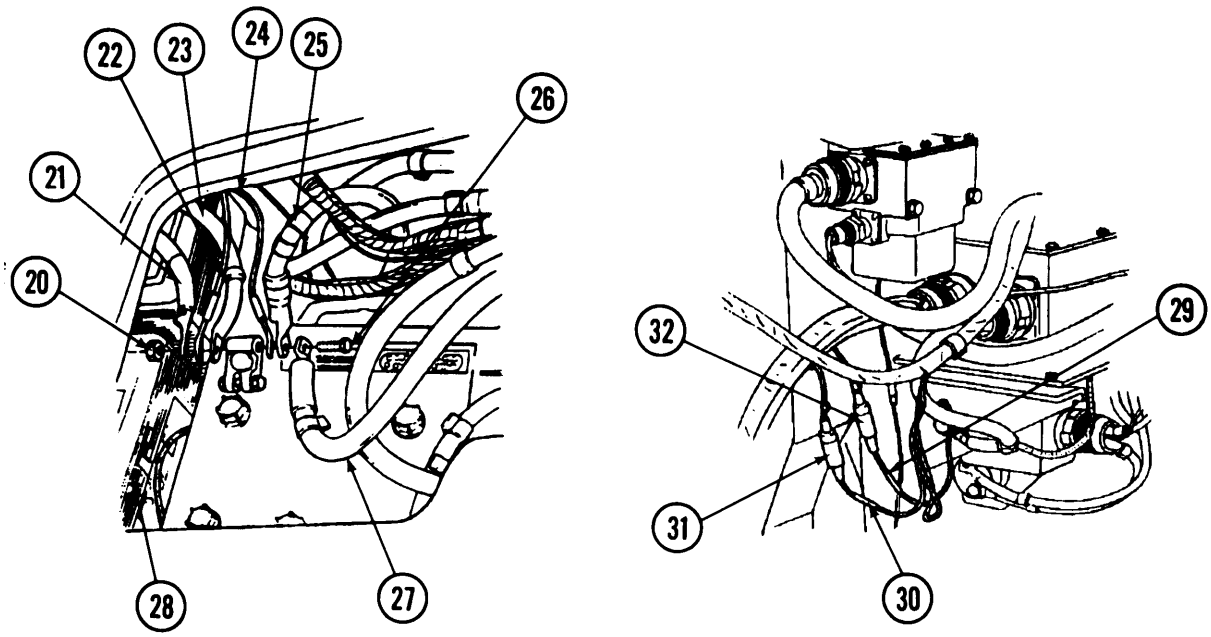
3. Remove two screws (13), lockwashers (1 2), and current shunt lead BB (11) and current shunt lead BA (15) from shunt (14). Discard lockwashers.

4. Remove screw (16), two washers (17) ground cable 7 (18), and ground lead W (10) from chassis ground connection (19). Reinstall screw (16), ground cable 7 (18) and washers (17).



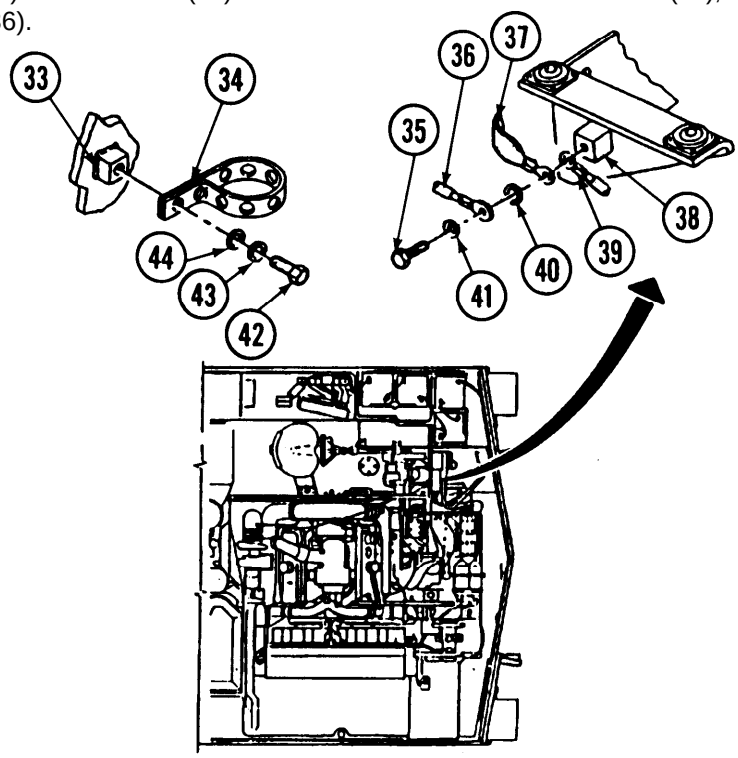
7-75. DRIVER'S BULKHEAD TO ENGINE DISCONNECT STE/ICE WIRING HARNESS (12329994) REPLACEMENT (continued).

5. Remove nut (20), screw (26), cable 2B (21), STE/ICE lead 10-V (22), cable 81 (23), cable 62 (25), STE/ICE lead 10-R (24), and cable 49 (27) from battery terminal (28).



6. Disconnect lead AW (29) from connector (32) and lead AV (30) from connector (31).

7. Remove screw (35), washer (41), alternator ground lead 3 (36), lockwasher (40), cable (37) and ground lead Z (39) from standoff (38). Discard lockwasher. Reinstall screw (35), washer (41), cable (37), and ground lead 3 (36). STE/ICE

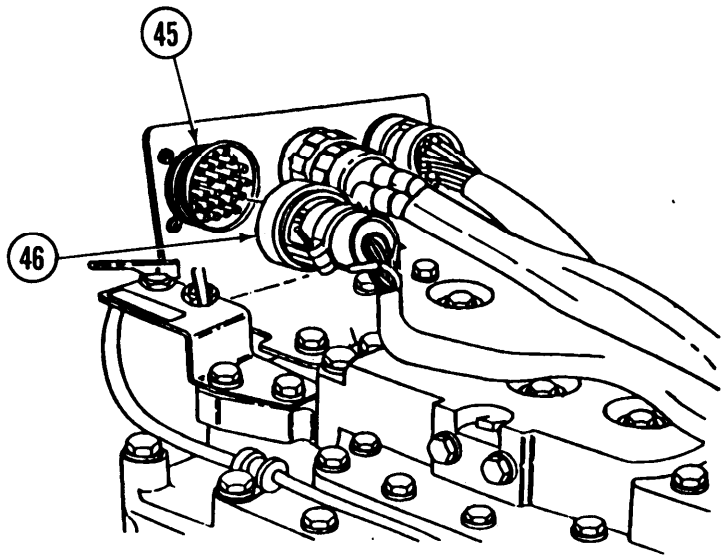


7-75. DRIVER'S BULKHEAD TO ENGINE DISCONNECT STE/ICE WIRING HARNESS (12329994) REPLACEMENT (continued).

8. Disconnect plug (46) from engine electrical disconnect receptacle (45).

9. Remove three screws (42), lockwashers (43), washers (44), and retaining straps (34) from three standoffs (33). Discard lockwashers.

10. Remove harness 12329994 from vehicle. Inspect harness for frays, cracks, and breaks. Repair harness if damaged.



b. INSTALLATION

1. Install harness 12329994 in vehicle.

2. Install three retaining straps (34) on three standoffs (33) with screws (42), new lockwashers (43), and washers (44).

3. Connect plug (46) to engine electrical connect receptacle (45).

4. Remove screw (35), washer (41), cable (37), and ground lead Z (39) from standoff (38).

5. Install cable (37) and ground lead Z (39) on standoff (38) with screw (35), washer (41), alternator ground lead (36), and new lockwasher (40).

6. Connect lead AW (29) to connector (32) and lead AV (30) to connector (31).

7. Install cable 49(27), STE/ICE lead 10-R (24), cable 62 (25), cable 81 (23), STE/ICE lead 10-V (22), and cable 2B (21) on battery terminal (28) with nut (20) and screw (26).

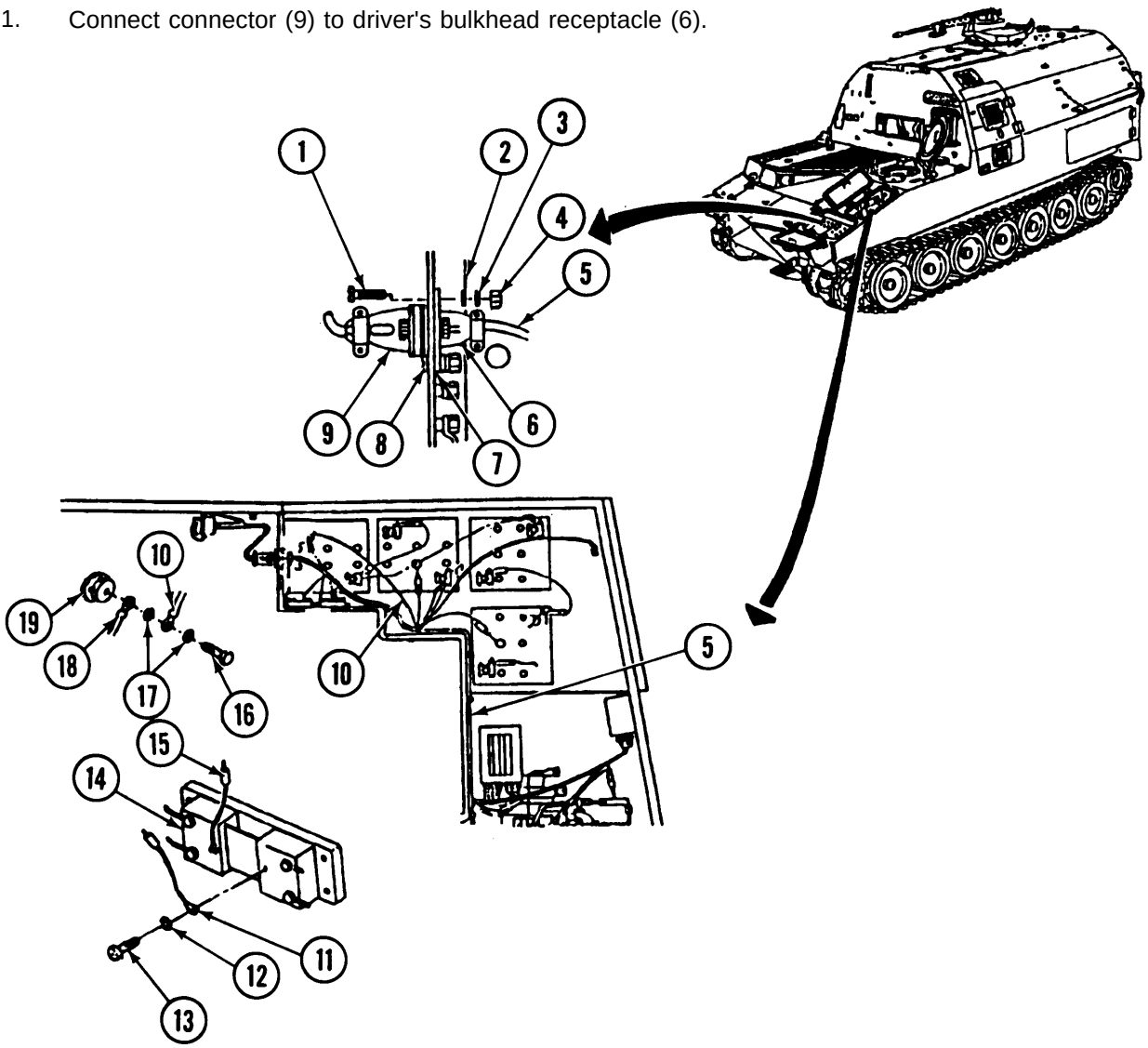
7-75. DRIVER'S BULKHEAD TO ENGINE DISCONNECT STE/ICE WIRING HARNESS (12329994) REPLACEMENT (continued).

8. Install ground lead W (10) and ground cable 7 (18) on chassis ground connection (19) with screw (16) and two washers (17).

9. Install current shunt lead BB (11) and current shunt lead BA (15) on shunt (14) with two screws (13) and new lockwashers (12).

10. Install gasket (7), bulkhead receptacle (6), and STE/ICE wiring harness (5) on bulkhead disconnect (8) with four screws (1), washers (2), new lockwashers (3), and nuts (4).

11. Connect connector (9) to driver's bulkhead receptacle (6).



FOLLOW-ON MAINTENANCE:

- Connect battery ground cables (para 7-41).
- Close driver's hatch cover (refer to TM 9-2350-287-10).

7-76. ENGINE TRANSDUCERS TO ENGINE ELECTRICAL DISCONNECT STE/ICE WIRING HARNESS (12329990) REPAIR.

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

Initial Setup:

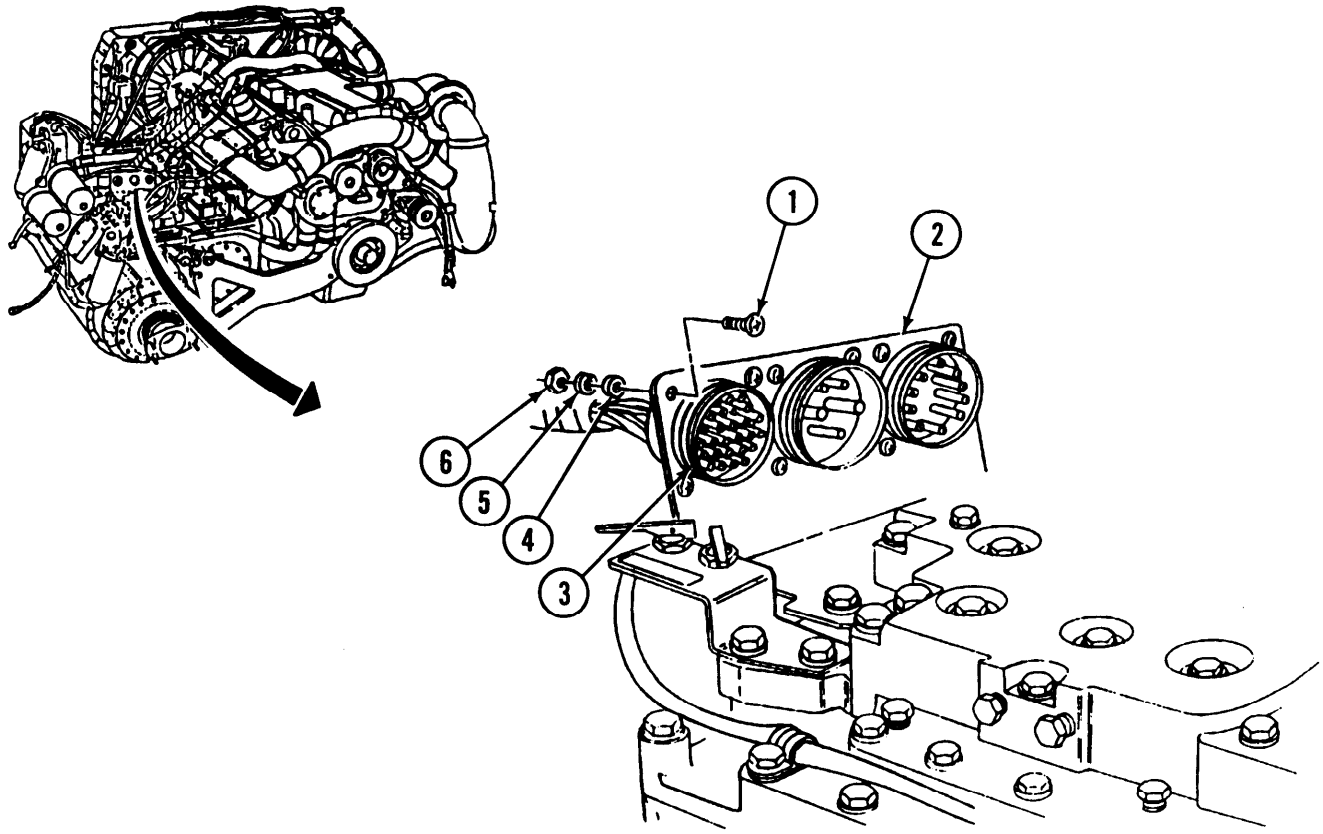
Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix l)
- Torque wrench, 0-175 ft-lb (Item 69, Appendix l)

Materials/Parts:
- Electrical insulation tape (Item 67, Appendix D)
- Lockwasher (3) (Item 162, Appendix H)
- Lockwasher (4) (Item 173, Appendix H)
- Lockwasher (2) (Item 175, Appendix H)
- Tiedown strap (as required) (Item 373, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Powerpack removed (para 3-2).

a. REMOVAL

1. Remove four screws (1), washers (4), lockwashers (5), and nuts (6) and harness receptacle (3) from vehicle bracket (2). Discard lockwashers.



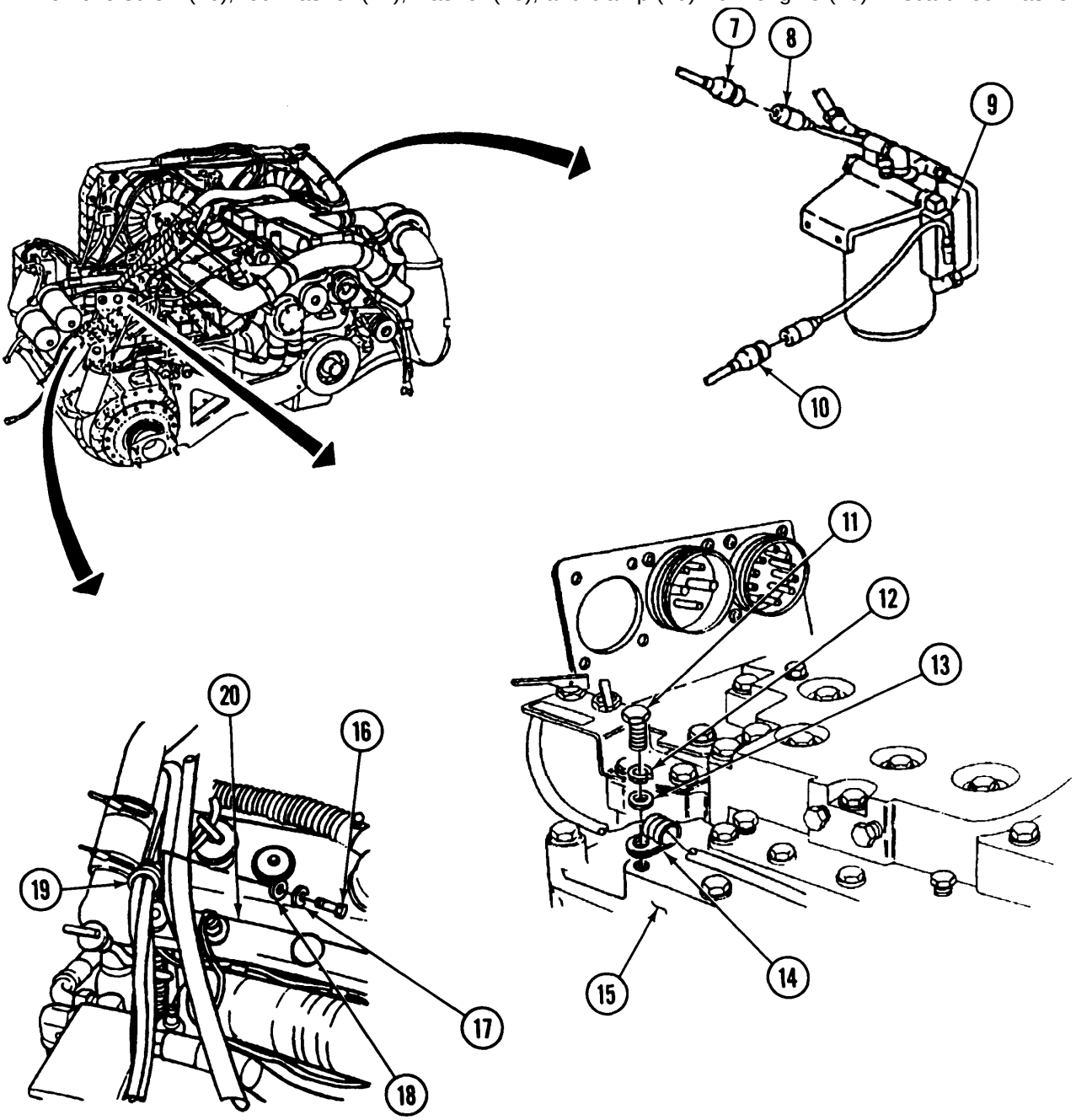
7-76. ENGINE TRANSDUCERS TO ENGINE ELECTRICAL DISCONNECT STE/ICE WIRING HARNESS (12329990) REPAIR (continued).

2. Disconnect connector (7) from fuel supply pressure transducer (8).

3. Disconnect connector (10) from fuel filter differential pressure switch (9).

4. Remove screw (11), Iockwasher (12), washer (1 3), and clamp (14) securing wiring harness to transmission (15).

5. Remove screw (16), Iockwasher (17), washer (18), and clamp (19) from engine (20). Discard Iockwasher.



7-76. ENGINE TRANSDUCERS TO ENGINE ELECTRICAL DISCONNECT STE/ICE WIRING HARNESS (12329990) REPAIR (continued).

6. Remove nut (34), lockwasher (35), and ground lead (33) from starter (36). Discard lockwasher.

7. Remove nut (31) and terminal AY (32) from starter (36).

8. Remove nut (28), lockwasher (29), and terminal AX (30) from starter (36). Discard lockwasher.

9. Disconnect STE/ICE wiring harness (27) from air box pressure transducer lead (21).

10. Remove screw (23), washer (24), lockwasher (25), and clamp (26) from engine (20). Discard lockwasher.

11. Cut tiedown straps (22) and remove STE/ICE wiring harness (27) from engine (20). Discard tiedown straps. Inspect harness for cracks, frays, and breaks.

b. DISASSEMBLY

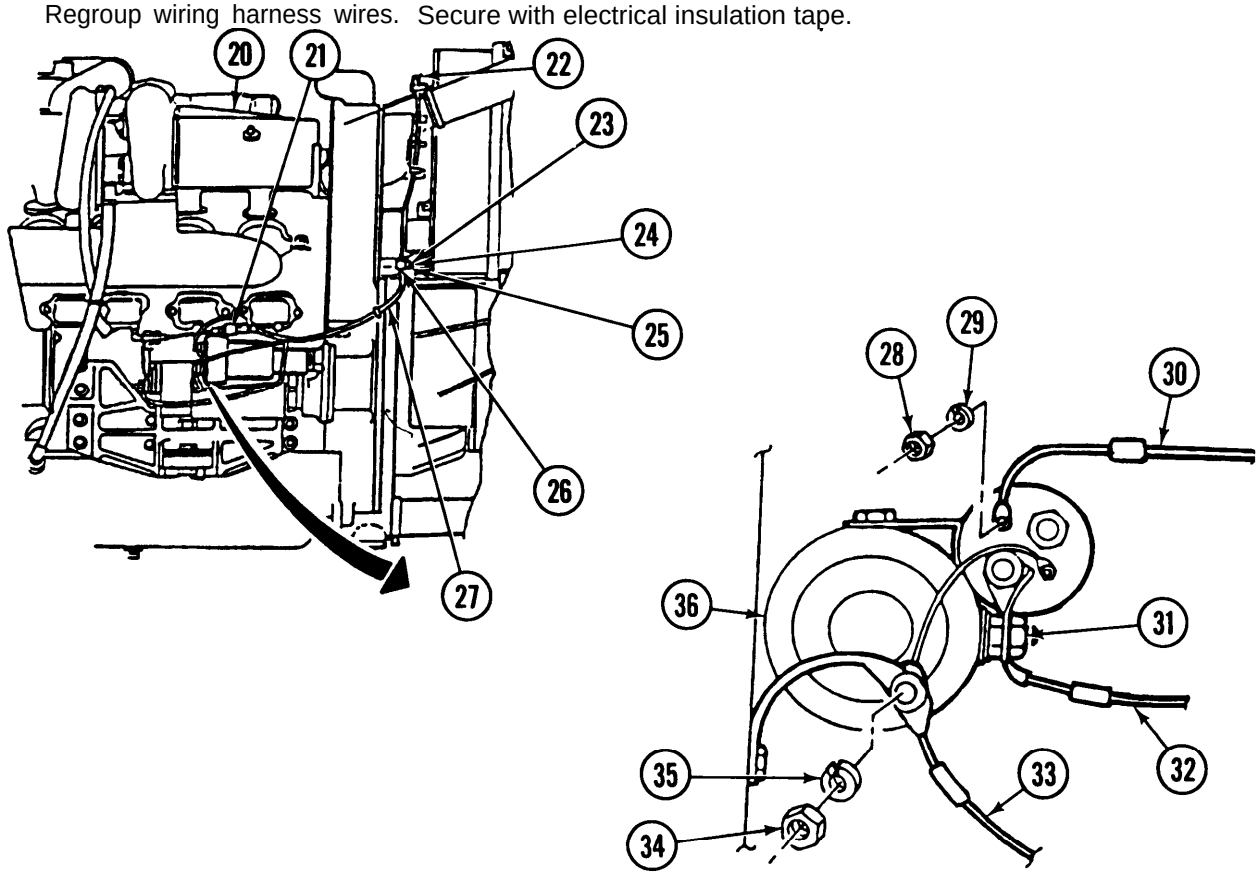
1. Remove electrical insulation tape from wiring harness.

2. Separate and isolate defective wiring harness wires.

3. Repair or replace damaged wires.

c. ASSEMBLY

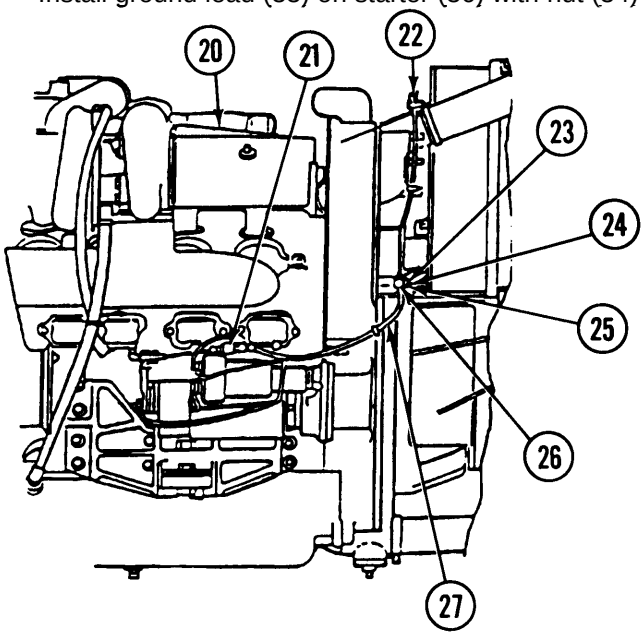
1. Regroup wiring harness wires. Secure with electrical insulation tape.

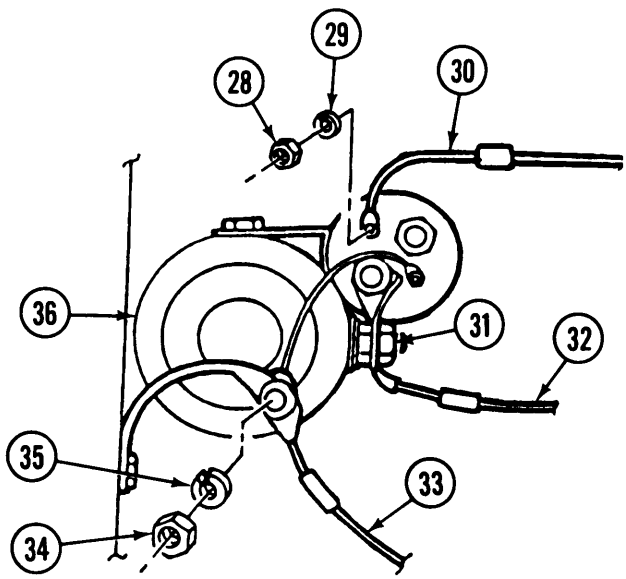


7-76. ENGINE TRANSDUCERS TO ENGINE ELECTRICAL DISCONNECT STE/ICE WIRING HARNESS (12329990) REPAIR (continued).

d. INSTALLATION

1. Install STE/ICE wiring harness (27) through tiedown straps (22) on engine (20).
2. Install clamp (26) on engine (20) with screw (23), washer (24), and new lockwasher (25).
3. Connect STE/ICE wiring harness (27) to air box pressure transducer lead (21).
4. Install terminal AX (30) on starter (36) with nut (28) and new lockwasher (29).
5. Install terminal AY (32) on starter (36) with nut (31).
6. Install ground lead (33) on starter (36) with nut (34) and new lockwasher (35).





7-76. ENGINE TRANSDUCERS TO ENGINE ELECTRICAL DISCONNECT STE/ICE WIRING HARNESS (12329990) REPAIR (continued).

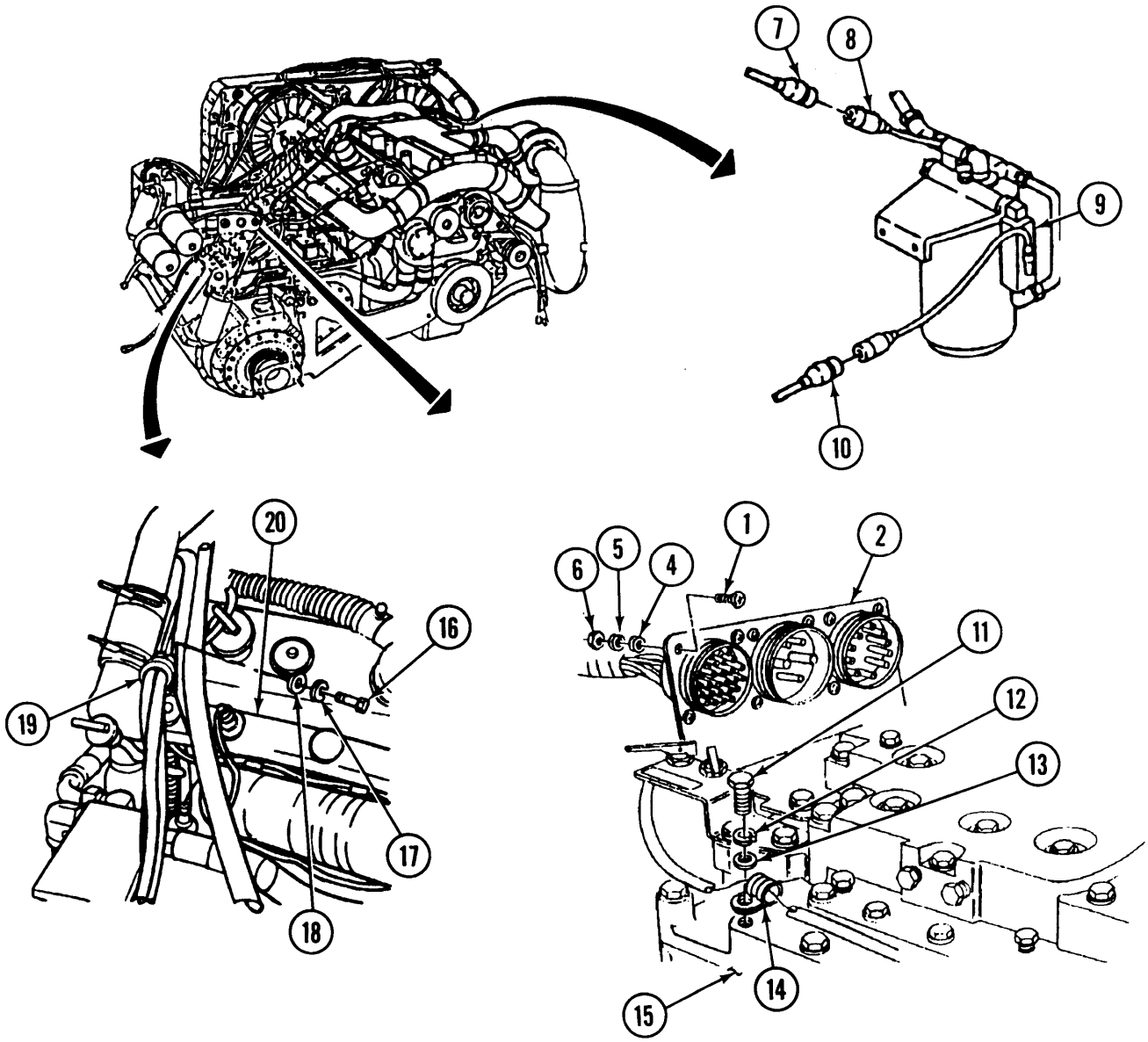
7. Connect connector (10) to fuel filter differential pressure switch (9).

8. Connect connector (7) to fuel supply pressure transducer (8).

9. Attach harness receptacle (3) to vehicle bracket (2) with four screws (1), washers (4), new lockwashers (5), and nuts (6).

10. Install wiring harness on transmission (15) with clamp (14), screw (11), new lockwasher (12), and washer (13).

11. Install clamp (19) on engine (20) with screw (16), washer (1 8), and new lockwasher (17).



FOLLOW-ON MAINTENANCE:
- Install powerpack (para 3-2).

7-77. CREW AFES ELECTRICAL WIRING HARNESSES REPLACEMENT.

This Task Covers:

a. Harness 12351754 Removal
b. Harness 12351754 Installation
c. Harness 12352315 Removal
d. Harness 12352315 Installation
e. Harness 12352316 Removal
f. Harness 12352316 Installation
g. Harness 12352353 Removal
h. Harness 12352353 Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Lockwasher (107) (Item 175, Appendix H)

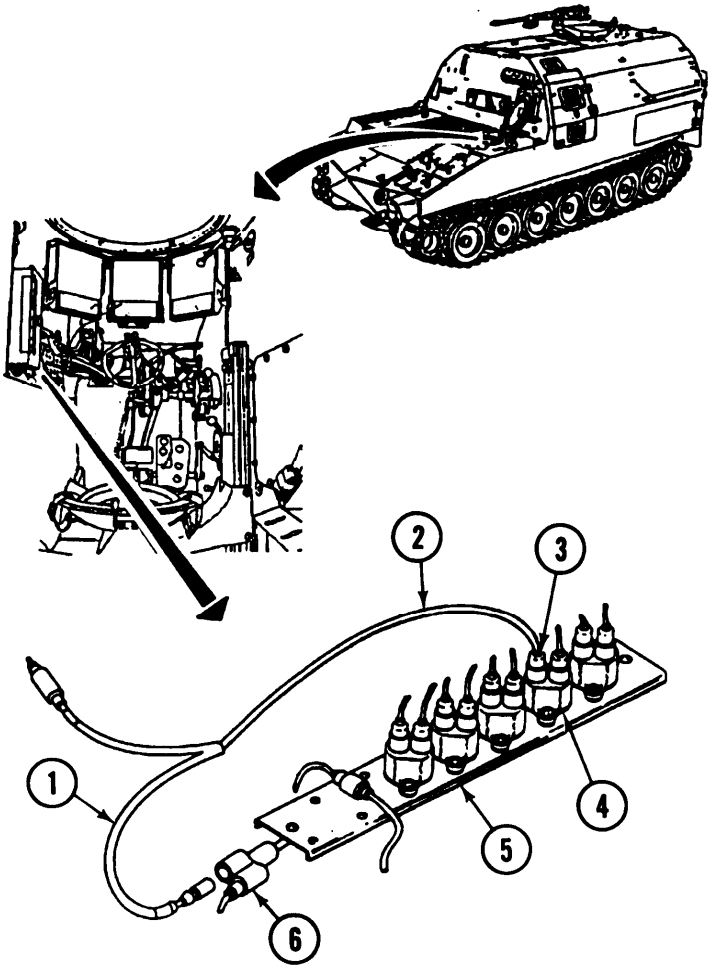
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Projectile rack assemblies removed to rear of vehicle (refer to TM 9-2350-287-10) (for harnesses 12352315 and 12352316 only).
- Stowage net removed (para 15-73).
- Crew AFES deactivated (para 21-3).

a. HARNESS 12351754 REMOVAL

1. Disconnect lead 10 (3) from circuit breaker 6 (4) on circuit breaker panel No. 2 (5).
2. Disconnect lead 415 (1) from Y-connector (6).
3. Remove harness 12351754 (2) from vehicle.

b. HARNESS 12351754 INSTALLATION

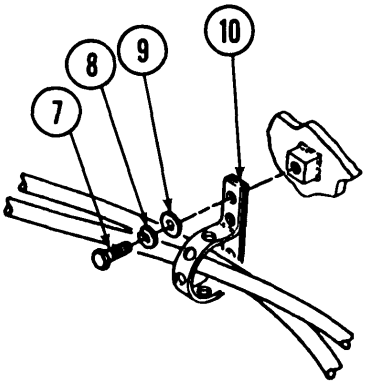
1. Position harness 12351754 (2) in vehicle.
2. Connect harness lead 415 (1) to Y-connector (6).
3. Connect harness lead 10 (3) to 6 circuit breaker 6 (4) on circuit breaker panel No. 2 (5).

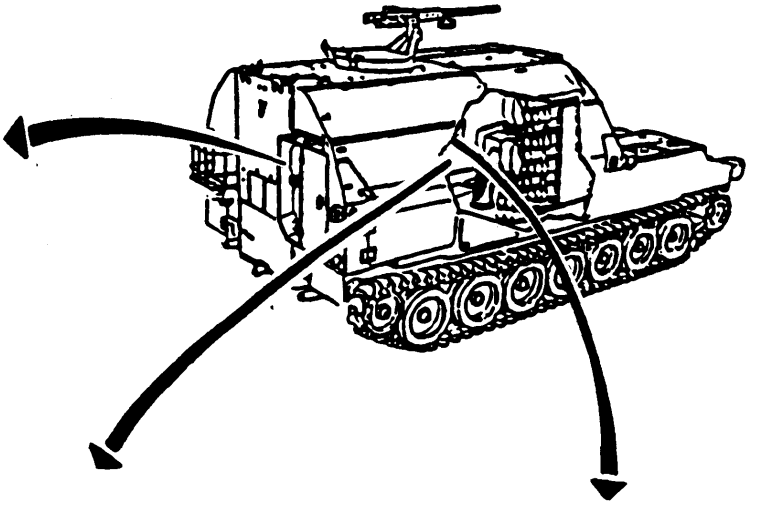


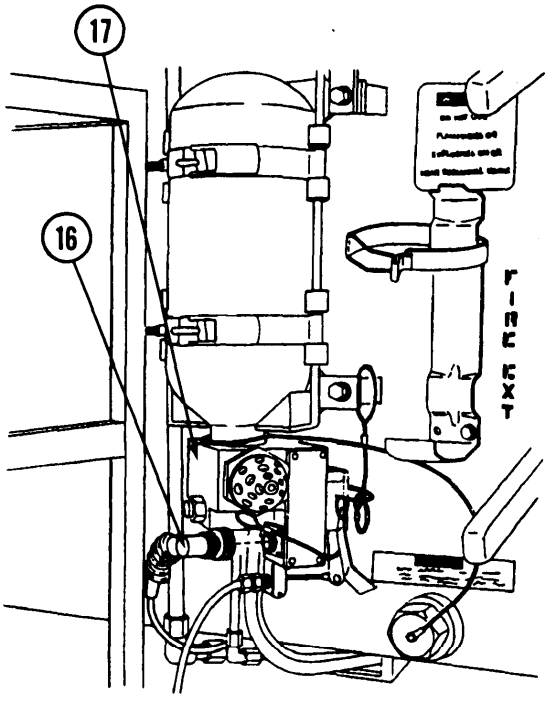
7-77. CREW AFES ELECTRICAL WIRING HARNESSES REPLACEMENT (continued).

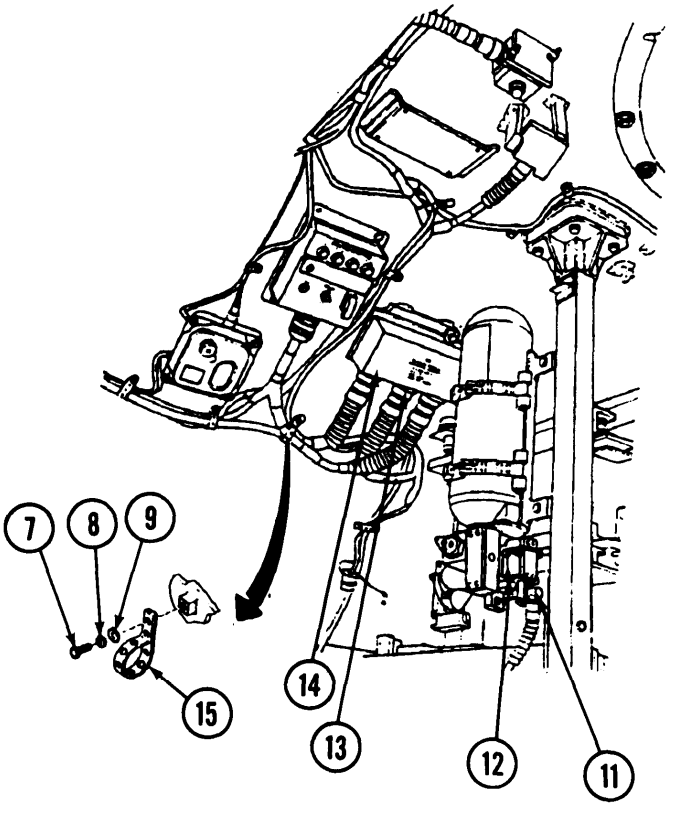
c. HARNESS 12352315 REMOVAL

1. Disconnect harness connector W3P3 (11) from crew compartment fire extinguisher No. 2 valve actuator (12).
2. Disconnect connector WSPI (13) from standard control electronic amplifier (SCEA) unit (14).
3. Disconnect harness connector W3P4 (16) from crew compartment fire extinguisher No. 3 valve actuator (17).
4. Remove 27 screws (7), washers (9), and lockwashers (8) from 14 straps (10) and 13 straps (15). Discard lockwashers.







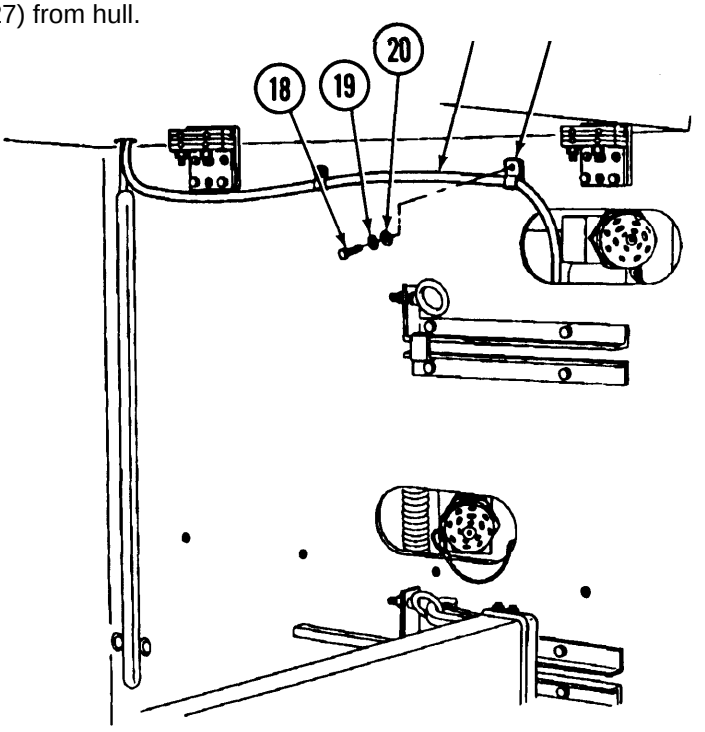


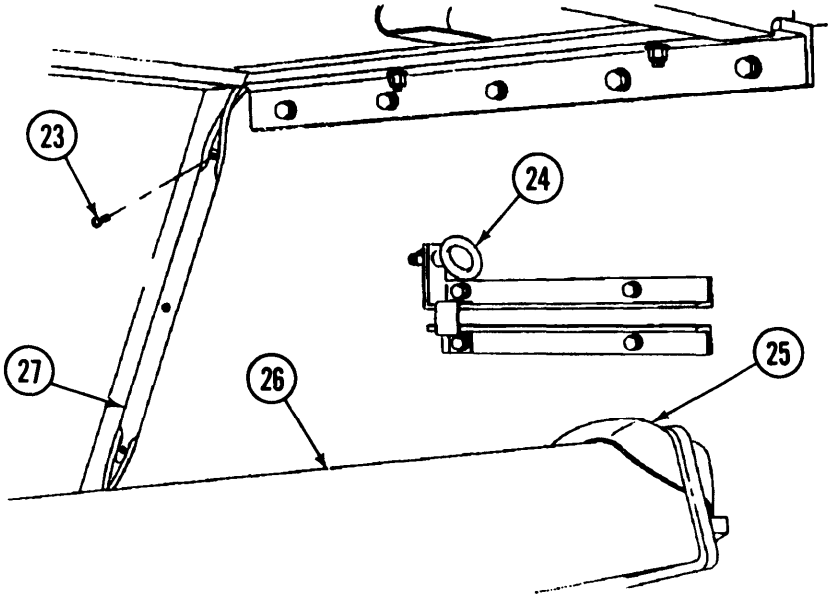
7-77. CREW AFES ELECTRICAL WIRING HARNESSES REPLACEMENT (continued).

5. Unhook restraint strap (25) from two eyehooks (24), and remove restraint bar (26) from canister compartment stowage area.

6. Remove 13 screws (18), lockwashers (19), washers (20), and straps (22) from harness (21). Discard lockwashers.

7. Remove three screws (23) and cover (27) from hull.





7-77. CREW AFES ELECTRICAL WIRING HARNESSES REPLACEMENT (continued).

8. Disconnect two connectors W3P7 and W3P6 (29 and 33) from crew compartment fire extinguisher valve actuator No. 5 and No. 6 (28 and 35).

9. Remove two screws (32), Iockwashers (31), washers (30), and straps (34) from harness and 12352315 (21) hull.

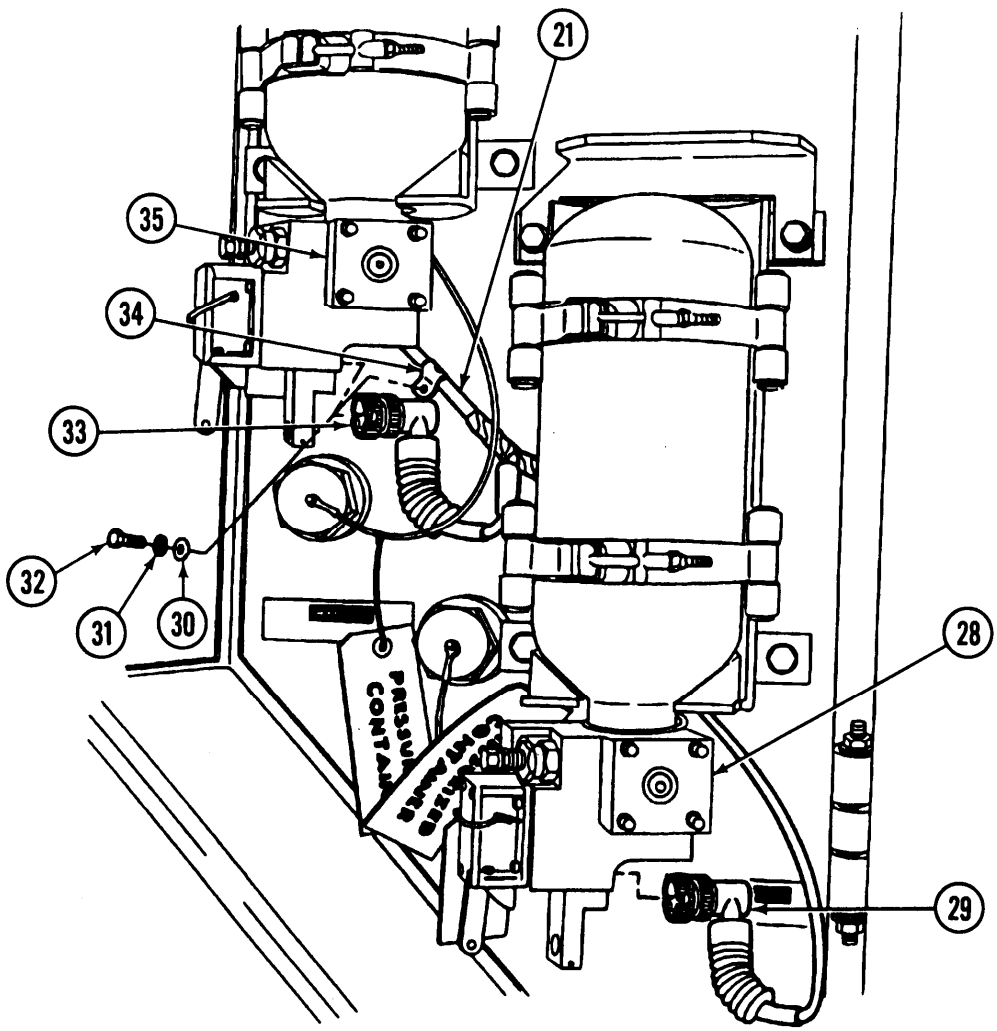
10. Remove harness 12352315 (21) from vehicle.

d. HARNESS 12352315 INSTALLATION

1. Position harness 12352315 (21) in vehicle.

2. Install two straps (34), washers (30), new Iockwashers (31), and screws (32) on harness 12352315 (21) and hull.

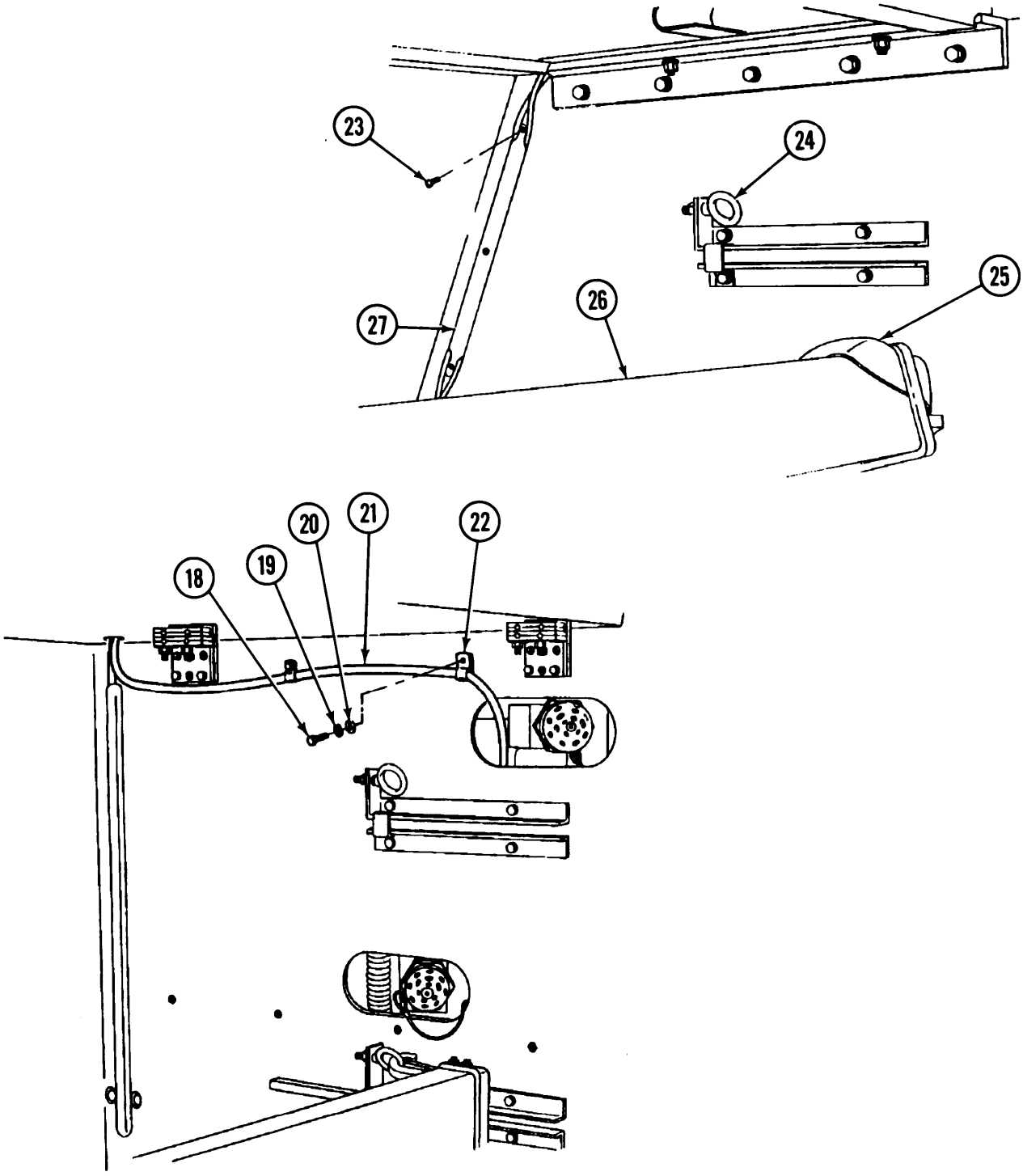
3. Connect two connectors W3P7 and W3P6 (29 and 33) to crew compartment fire extinguisher valve actuators No. 5 and No. 6 (28 and 35).



7-77. CREW AFES ELECTRICAL WIRING HARNESSES REPLACEMENT (continued).

4. Install cover (27) on hull with three screws (23).

5. Install restraint bar (26) on canister compartment stowage area, and hook restraint strap (25) to two eyehooks (24).



7-77. CREW AFES ELECTRICAL WIRING HARNESSES REPLACEMENT (continued).

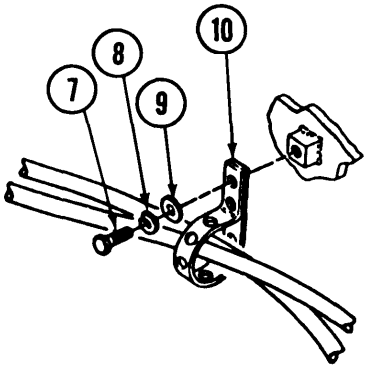
6. Install 13 straps (22) on harness (21) with 13 screws (18), new Iockwashers (19), and washers (20).

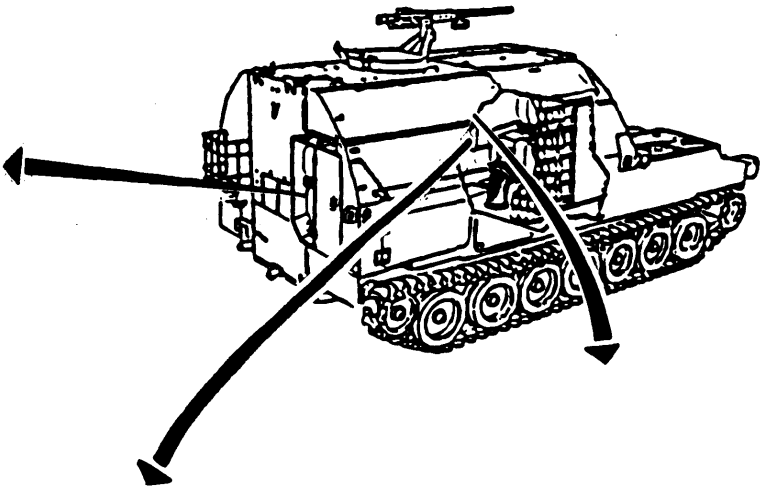
7. Install 14 straps (10), and 13 straps (15), with 27 screws (7), washers (9), and new Iockwashers (8) for each strap.

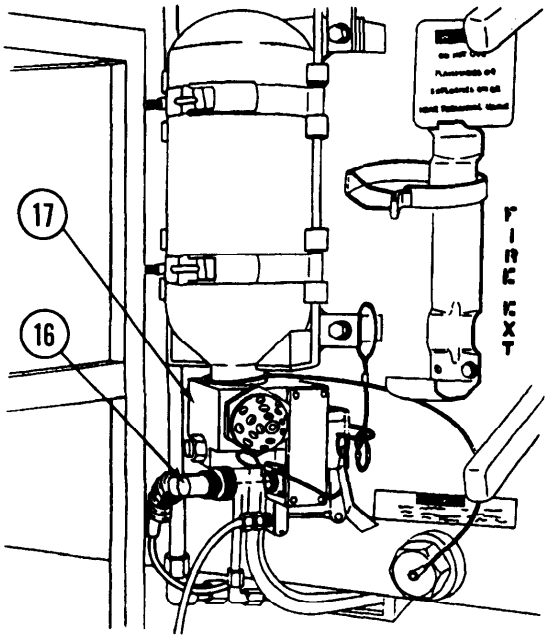
8. Connect harness W3P4 connector (16) to crew compartment fire extinguisher No. 3 valve actuator (17).

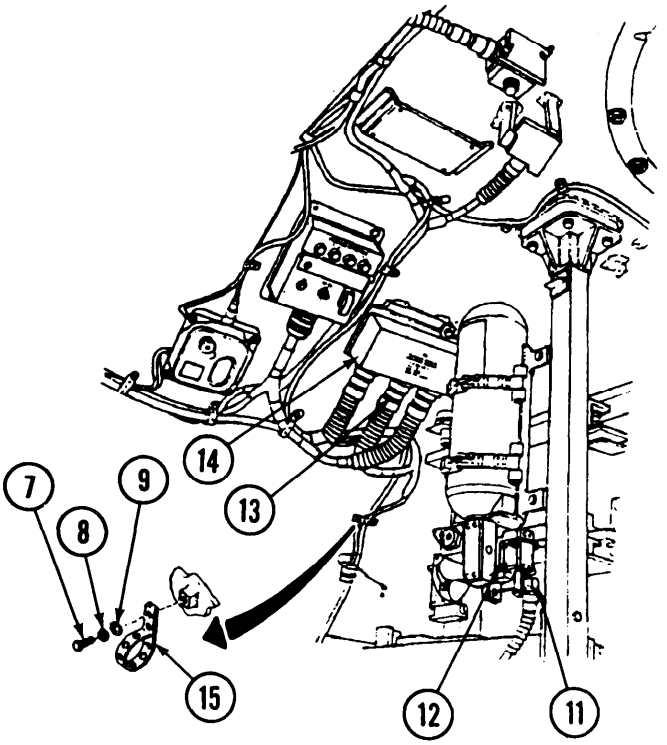
9. Connect connector W3PI (13) to SCEA unit (14).

10. Connect harness connectors W3P3 (11) to crew compartment fire extinguisher No. 2 valve actuator (12).









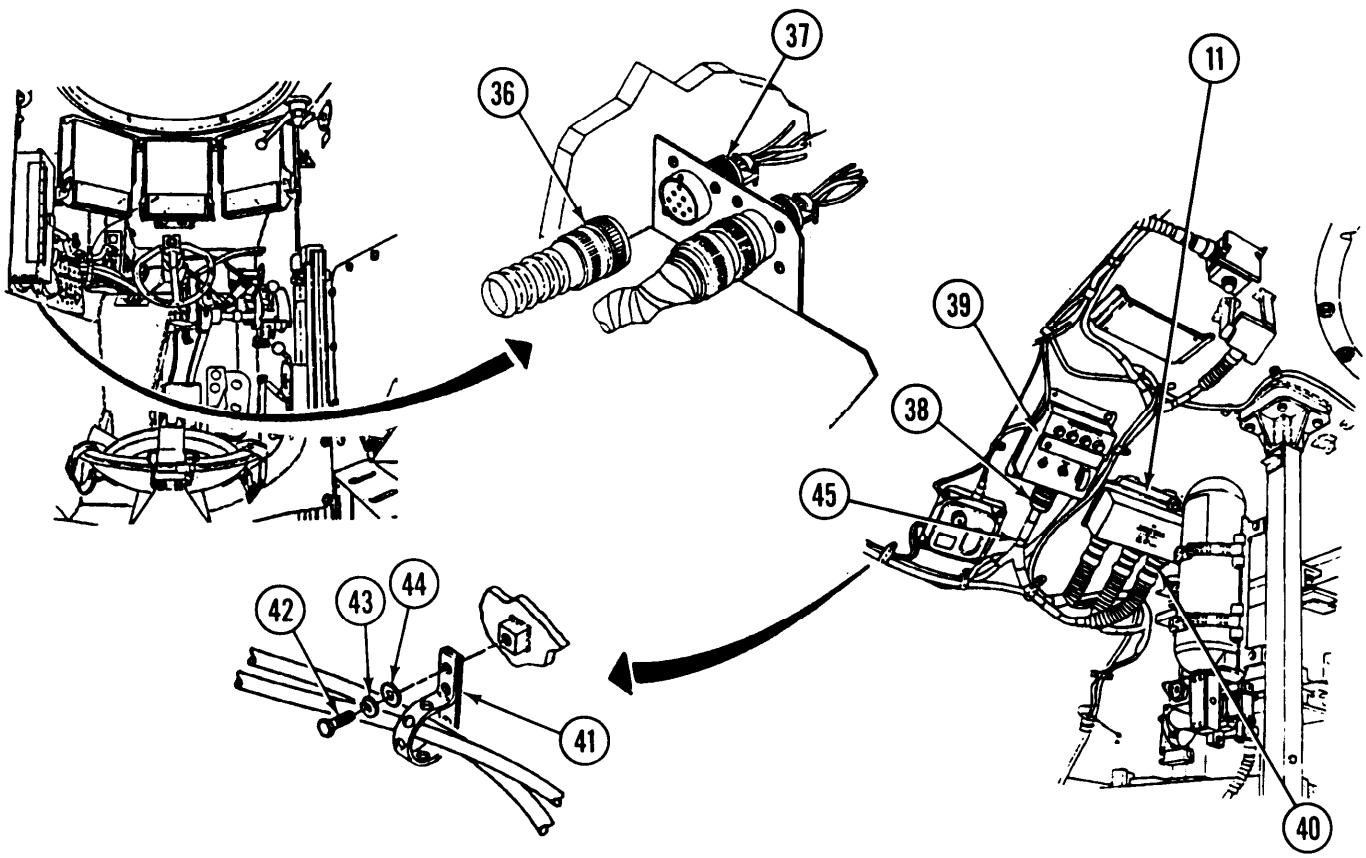
7-77. CREW AFES ELECTRICAL WIRING HARNESSES REPLACEMENT (continued).

e. HARNESS 12352316 REMOVAL

1. Disconnect harness plug W2P3 (36) from connector (37).
2. Disconnect harness plug W2PI (40) from SCEA unit (11).
3. Disconnect harness plug S2P2 (38) from crew test and alarm (T/A) panel (39).
4. Remove 25 screws (42), washers (44), and lockwashers (43), straps (41) and harness from ceiling and wall of crew compartment. Separate and remove harness 12352316 (45) from other harnesses. Discard lockwashers.
5. Remove harness 12352316 (45) from vehicle.

f. HARNESS 12352316 INSTALLATION

1. Install harness 12352316 (45) in vehicle using 25 straps (41), screws (42), washers (44), and new lockwashers (43).
2. In driver's compartment, connect harness plug W2P3 (38) to connector (37).
3. In crew compartment, connect harness plug W2P2 (38) to crew T/A panel (39).
4. Connect harness plug W2PI (40) to SCEA unit (11).



7-77. CREW AFES ELECTRICAL WIRING HARNESSES REPLACEMENT (continued).

g. HARNESS 12352353 REMOVAL

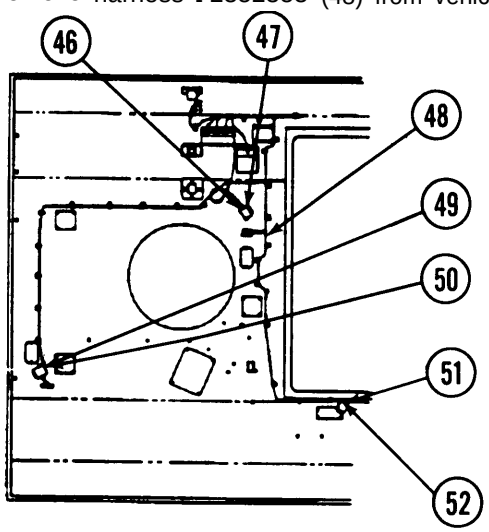
1. Disconnect four harness plugs WIP5, WIP4, WIP3, and WlP2 (50, 47,51, and 54) from four OFSA units (49, 46,52, and 53).

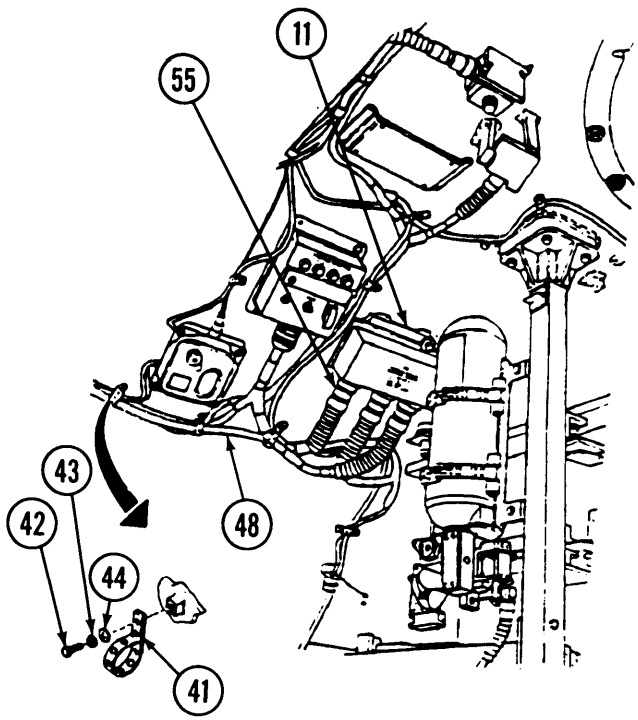
2. Disconnect harness plug WIPI (55) from SCEA unit (11).

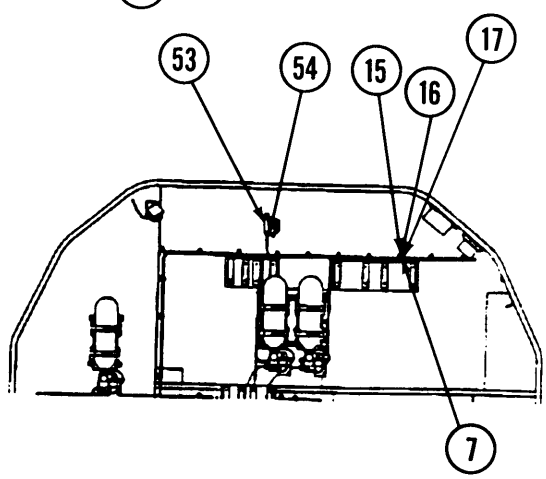
3. Remove 13 screws (42), washers (44), lockwashers (43), and straps (41) from harness 12352353 (48). Separate and remove harness from other harnesses 12352353 (48) from other harnesses. Discard lockwashers.

4. Remove 27 screws (15), lockwashers (16), washers (17), and straps (7) from harness 12352353 (48). Discard lockwashers.

5. Remove harness 12352353 (48) from vehicle.



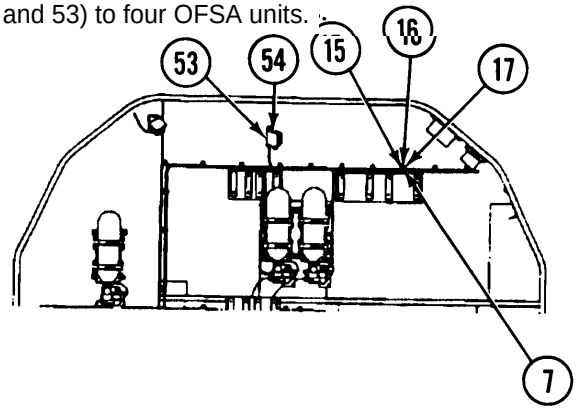


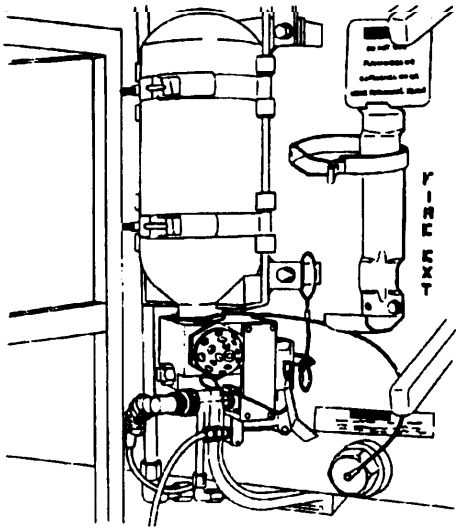


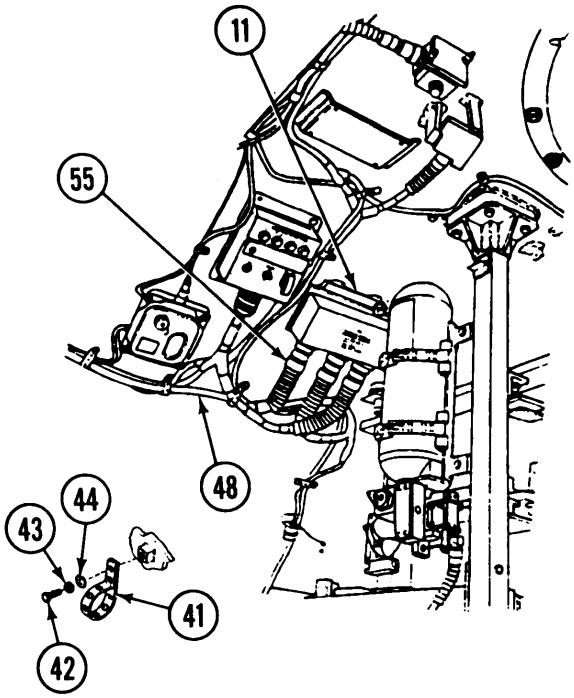
7-77. CREW AFES ELECTRICAL WIRING HARNESSES REPLACEMENT (continued).

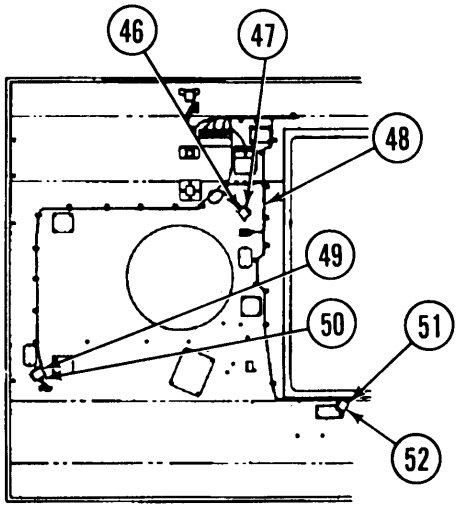
h. HARNESS 12352353 INSTALLATION

1. Position harness 12352353 (48) in vehicle.
2. Install harness 12352353 (48) in 27 straps (7) with screws (15), new lockwashers (16), and washers (17).
3. Install harness 12352353 (48) in 13 straps (41) with screws (42), washers (44), and new lockwashers (43).
4. Connect harness plug WIPI (56) to SCEA unit (11).
5. Connect four harness plugs WIP5, WIP4, WIP3, and WIP2 (50, 47,52 and 54) to four OFSA units (49, 46,52, and 53) to four OFSA units.









FOLLOW-ON MAINTENANCE:

- Install left and right projectile rack assemblies (refer to TM 9-2350-287-10) (for harnesses 12352315 and 12352316 only).
- Install stowage net (para 15-73).
- Activate crew AFES (para 21-3).

7-78. ENGINE AFES ELECTRICAL WIRING HARNESS (12352354) REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

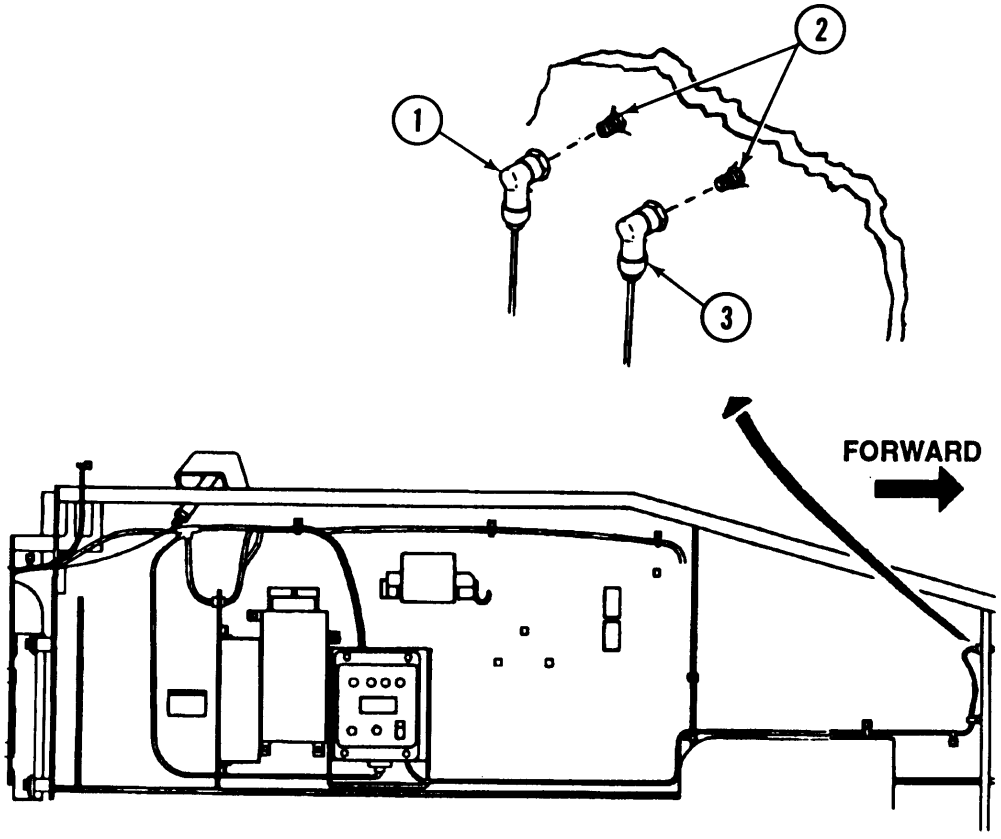
Materials/Parts:
- Lockwasher (38) (Item 175, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Left and right projectile rack assemblies moved to rear of vehicle (refer to TM 9-2350-287-10).
- Engine AFES deactivated (para 21-2).
- Engine compartment extinguisher bottle brackets removed (para 21 -8).

a. REMOVAL

1. Disconnect harness W4 plugs P6 (1) and P5 (3) from two adapters (2) in driver's compartment forward bulkhead.

2. Disconnect harness W4 plug P1 (5) from engine test and alarm (T/A) panel (4).

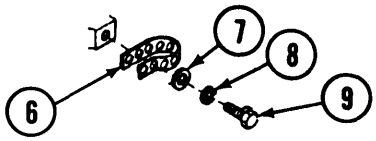


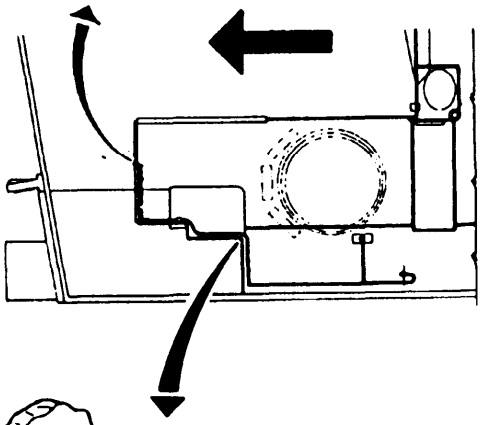
7-78. ENGINE AFES ELECTRICAL WIRING HARNESS (12352354) REPLACEMENT

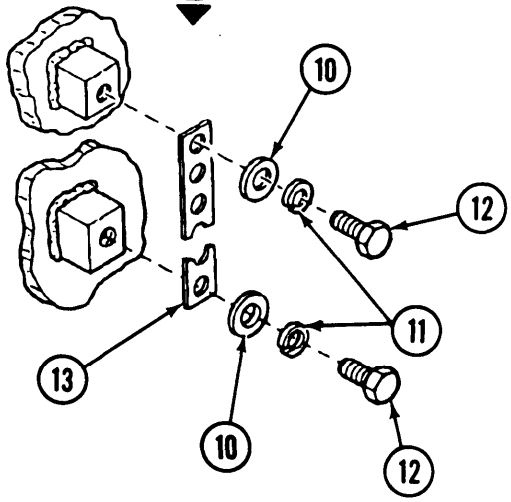
3. Remove four screws (9), lockwashers (8), washers (7), and straps (6). Discard lockwashers.

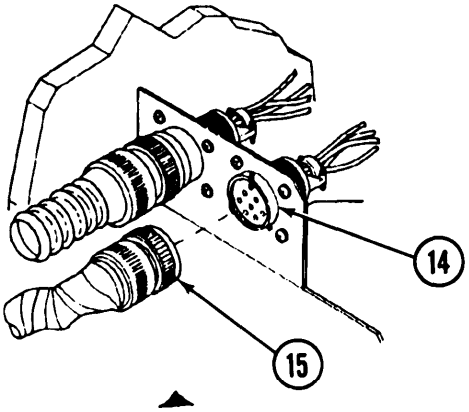
   Remove four screws (12), lockwashers (11), washers (10) two straps (13). Discard lockwashers.

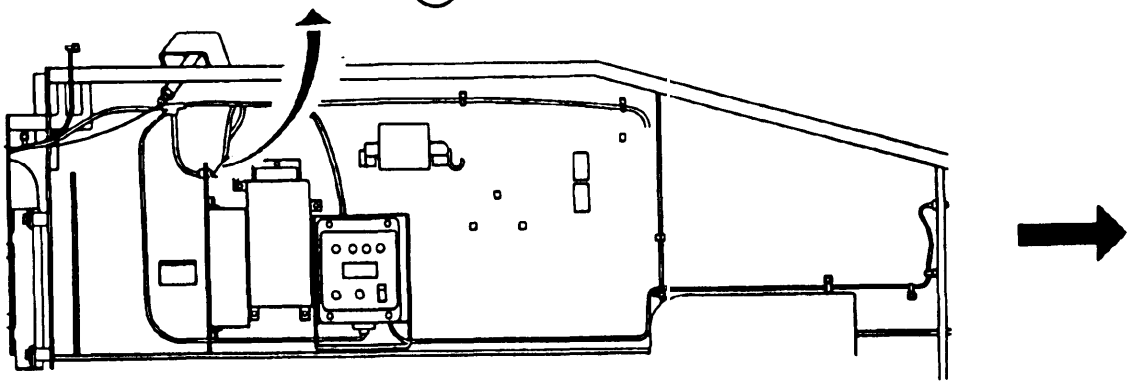
   Disconnect harness W4 plug P7 (14) from harness connector (15).







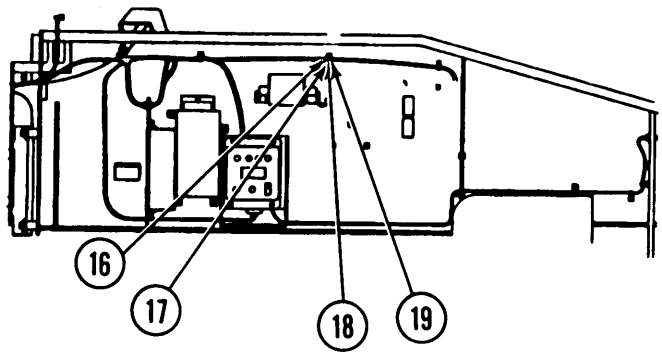




7-78. ENGINE AFES ELECTRICAL WIRING HARNESS (12352354) REPLACEMENT (continued).

6. Remove seven straps (19), strap (22), seven straps (20), 13 straps (22), and 12 straps (25) by removing screw (18), lockwasher (17), and washer (16) from each strap. Separate harness 12352354 from other harnesses and remove from vehicle. Discard lockwashers.

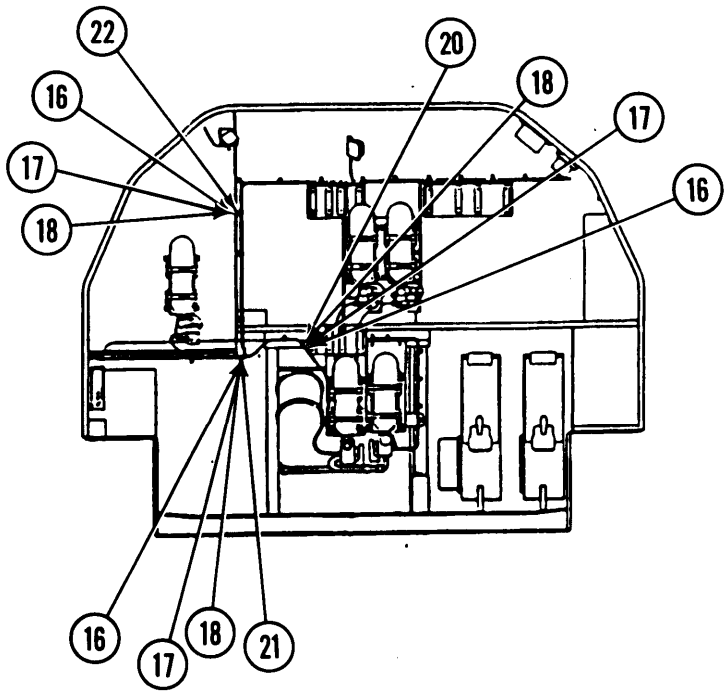
7. Disconnect harness W4 plug P4 (23) from remote status indicator (RSI) (24).

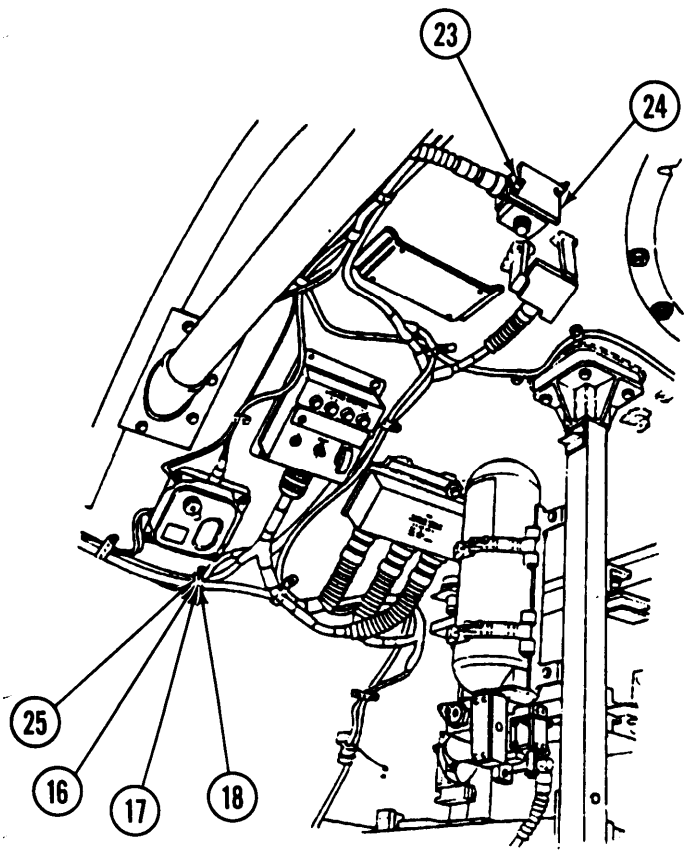


b. INSTALLATION

1. Connect harness W4 plug P4 (23) to RSI (24).

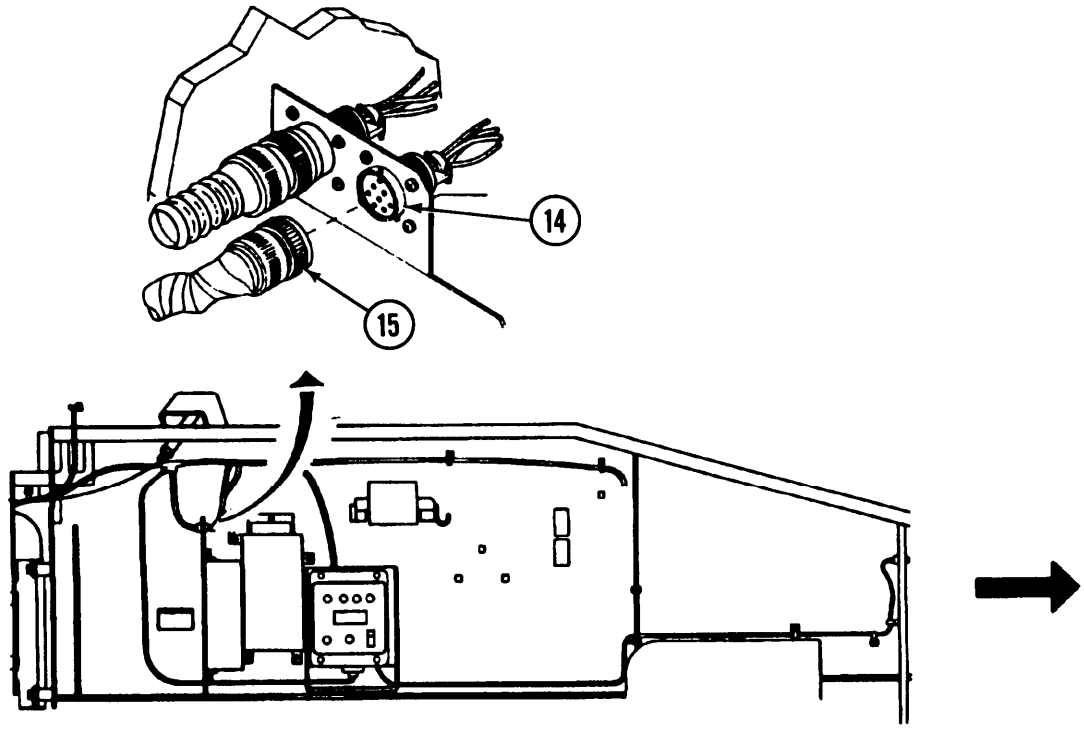
2. Install harness in vehicle with seven straps (19), strap (22), seven straps (20), 13 straps (21) and 12 straps (25) using washer (16), new lockwasher (17), and screw (18) on each strap.





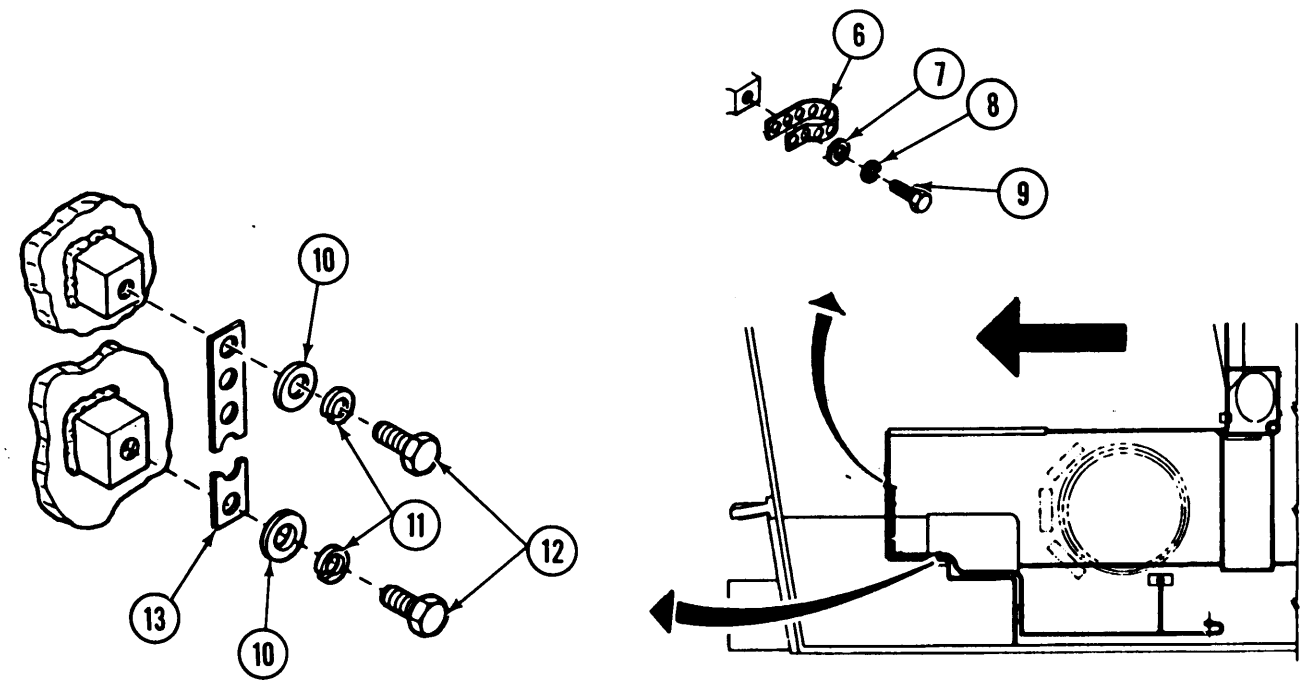
7-78. ENGINE AFES ELECTRICAL WIRING HARNESS (12352354) REPLACEMENT (continued).

3. Connect harness W4 plug P7 (14) to harness connector (15).



4. Install two straps (13), four washers (10), Iockwasher (11), and screws (12).

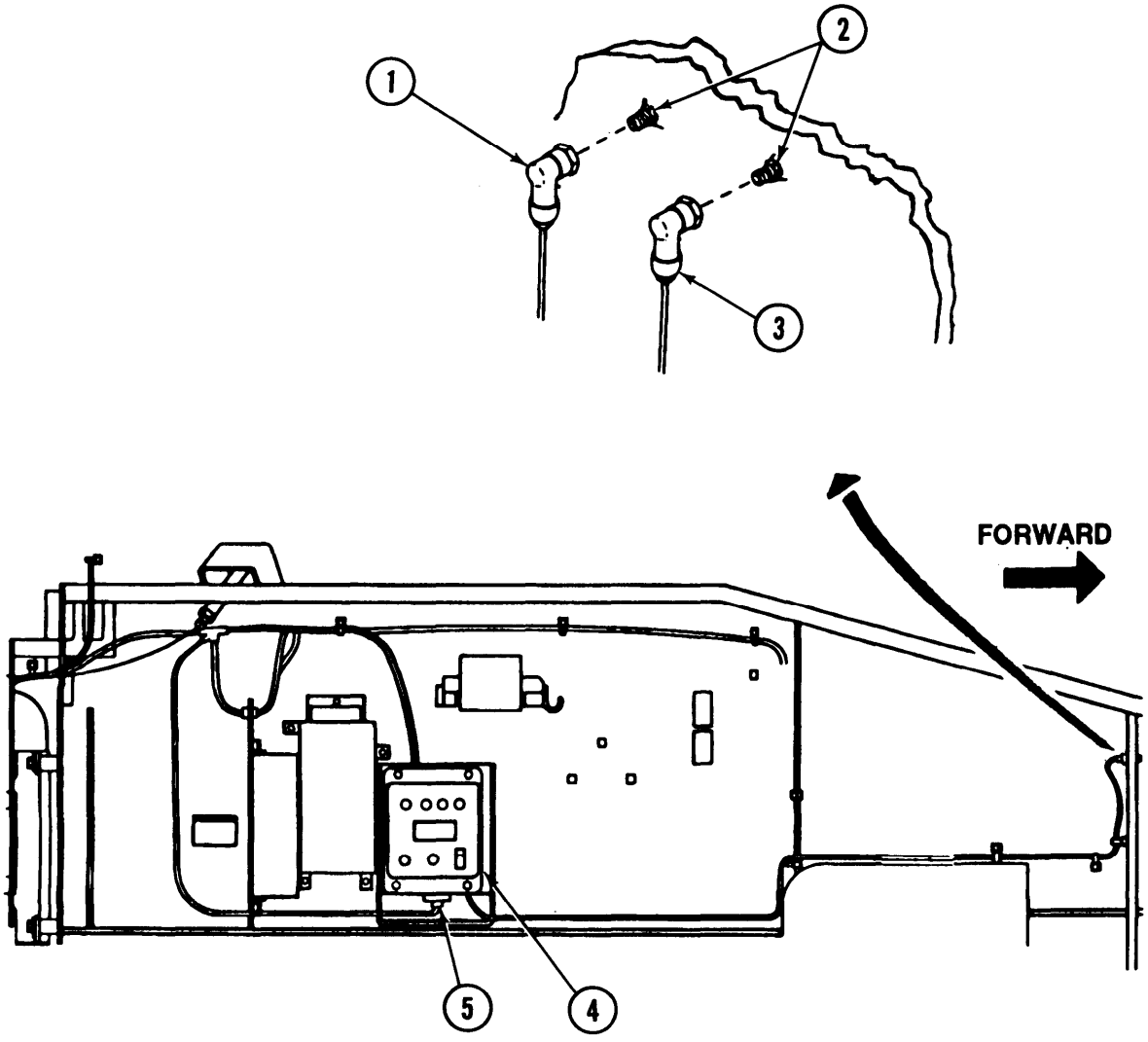
5. Install four straps (6) washers (7), new Iockwashers (8), and screws (9).



7-78. ENGINE AFESELECTRICAL WIRING HARNESS (12352354) REPLACEMENT (continued).

6. Connect harness W4 plug P1 (5) to engine T/A panel (4).

7. Connect harness W4 plugs P6 (1) and P5 (3) to two adapters (2) in driver's compartment forward bulkhead.



FOLLOW-ON MAINTENANCE:

- Install left and right projectile rack assembly (refer to TM 9-2350-287-10).
- Install engine compartment extinguisher bottle brackets (para 21-8).
- Activate engine AFES (para 21-2).

7-79. ACCESSORY CONTROL BOX TO AFES HARNESSES, AFES RELAYS, AND PERSONNEL VENTILATION BLOWER WIRING HARNESS (12351461) REPAIR.

This Task Covets:

a. Removal
b. Disassembly
c. Assembly
d. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Electrical insulation tape (item 67, Appendix D)
- Lockwasher (2) (Item 136, Appendix H)
- Lockwasher (12) (Item 148, Appendix H)
- Lockwasher (8) (Item 159, Appendix H)
- Lockwasher (6) (Item 175, Appendix H)
- Lockwasher (2) (Item 184, Appendix H)

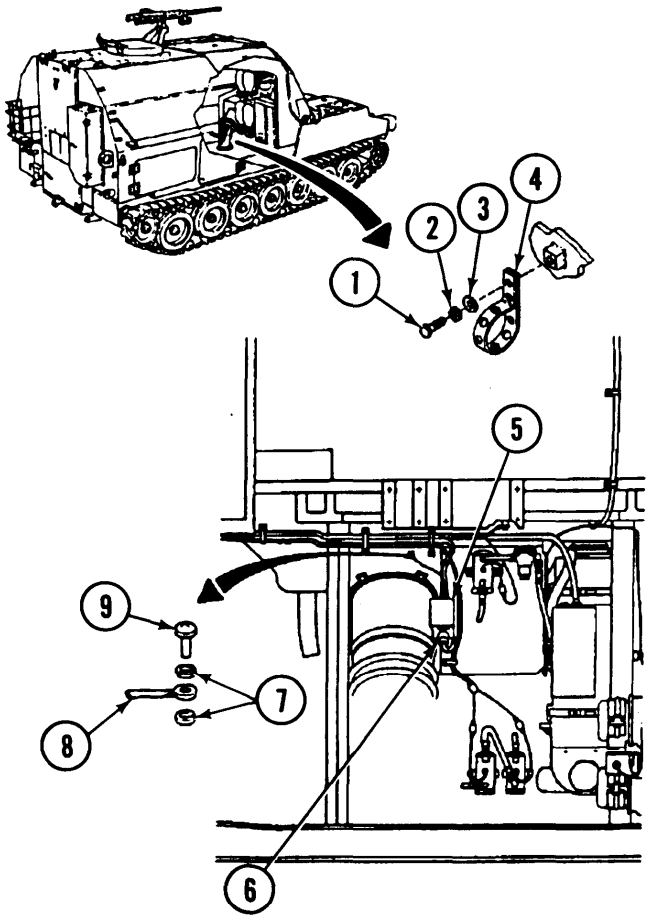
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).
- Left projectile rack assembly moved toward rear of vehicle (refer to TM 9-2350-287-10).
- Battery ground cables disconnected (para 7-41).
- Engine AFES deactivated (para 21-2).
- Crew AFES deactivated (para 21-3).
- Engine AFES relay cover removed (para 21-11).

WARNING

Any AFES in need of maintenance or repair is more prone to accidental discharge. Do not strike cylinder bottles with tools, do not drop cylinder bottles, and be careful when handling cylinder bottles in order to prevent accidental discharge. Accidental discharge could lead to frostbite or other injury. Small parts or tools become dangerous projectiles when propelled by Halon discharging at 750 psi.

a. REMOVAL

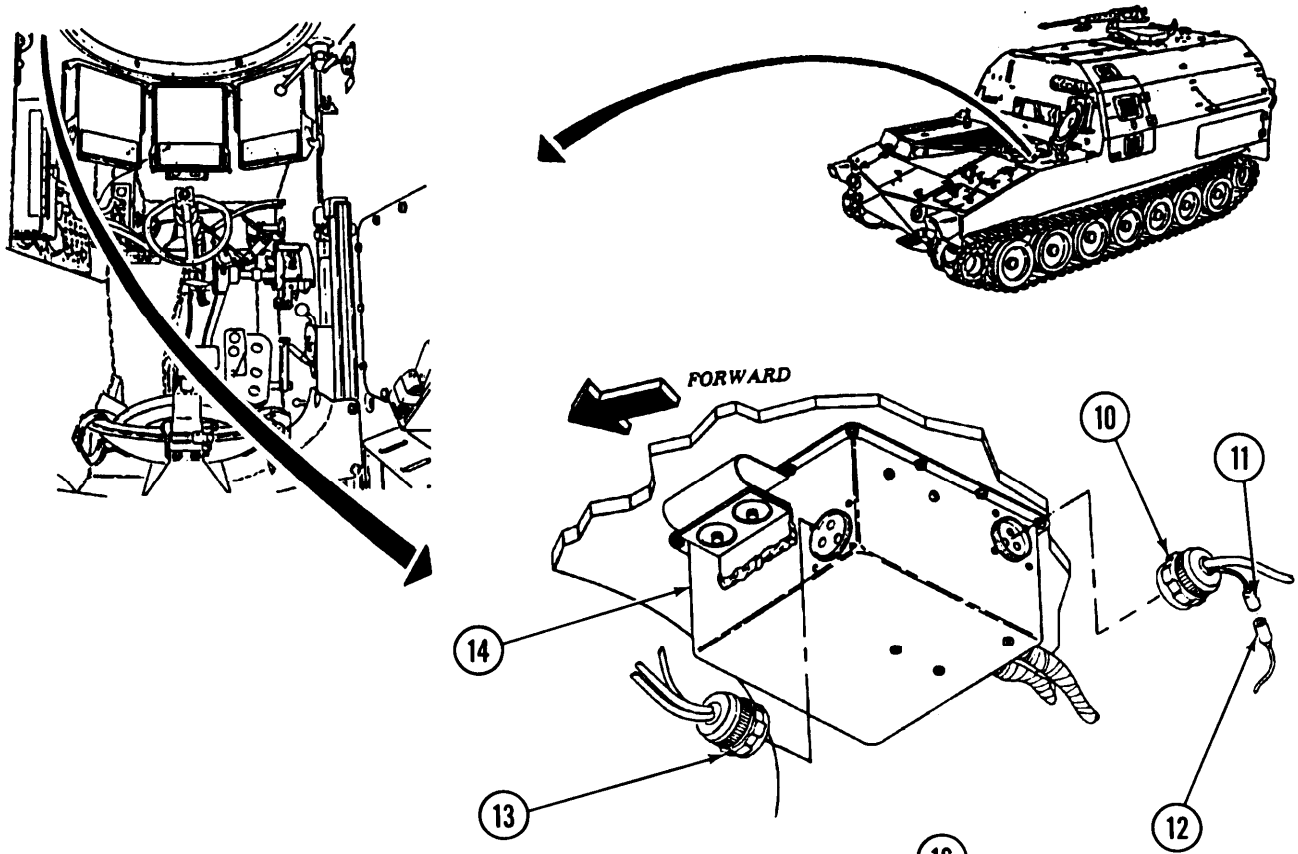
1. Disconnect harness plug (6) from personnel ventilation blower (5).
2. Remove screw (9) and two lockwashers (7) and ground wire (8) from forward bulkhead. Discard lockwashers.
3. Remove screw (1), washer (3), and lockwasher (2) from each of three strap assemblies (4). Discard lockwashers.
4. Separate ventilation blower wiring harness from other harnesses. Install three strap assemblies (4) on forward bulkhead.



7-79. ACCESSORY CONTROL BOX TO AFES HARNESSES, AFES RELAYS, AND PERSONNEL VENTILATION BLOWER WIRING HARNESS (12351461) REPAIR (continued].

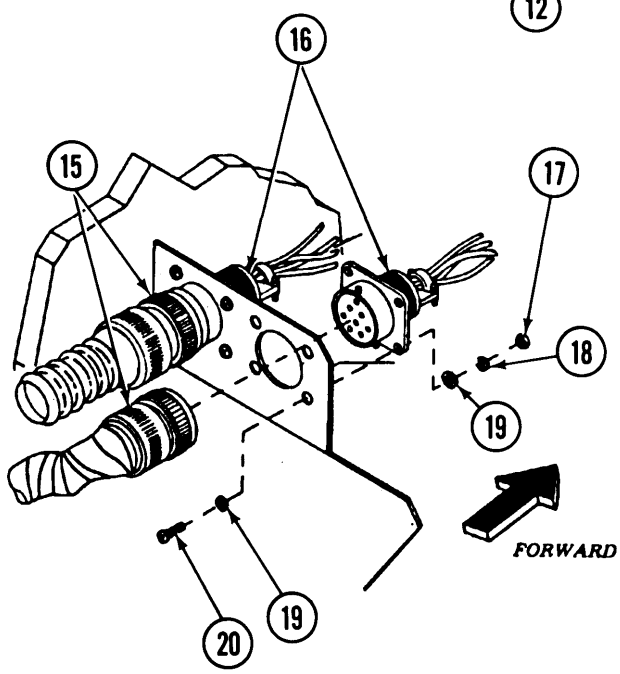
5. Disconnect two harness plugs (10 and 13) from accessory control box (14).

6. Disconnect harness connector (11) from connector on harness 12330257, CKT 48 (12).



7. Disconnect two AFES harness plugs (15) from two bracket-mounted connectors (16).

8. Remove four screws (20), eight washers (19), and four lockwashers (18), and nuts (17) from each bracket-mounted connector (16). Discard lockwashers.



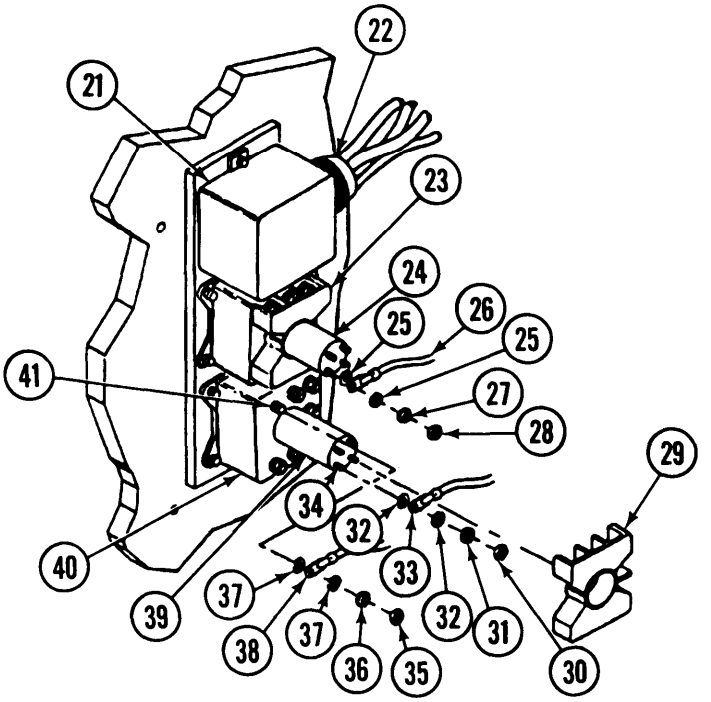
7-79. ACCESSORY CONTROL BOX TO AFES HARNESSES, AFES RELAYS, AND PERSONNEL VENTILATION BLOWER WIRING HARNESS (12351461) REPAIR (continued).

9. Disconnect harness plug (22) from AFES relay No. 3 (21).

10. Remove six nuts (28) and Iockwashers (27),12 washers (25) and six leads (26) from terminals (24) on engine AFES electrical relay (23). Discard Iockwashers.

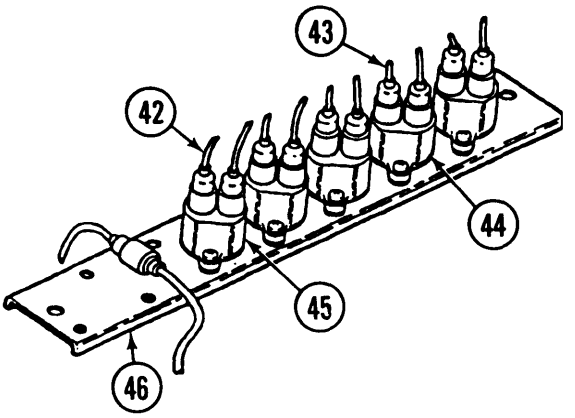
11. Remove six nuts (30), Iockwashers (31) and leads (33) and 12 washers (32) and cover (29) from terminals (34) on relay (40). Discard Iockwashers.

12. Remove two nuts (35), Iockwashers (36), and leads (38) and four washers (37) from terminals (41) on relays (39). Discard Iockwashers.



13. Disconnect harness circuit 10A (43) from circuit breaker No. 6 (44) on circuit breaker panel No. 2 (46).

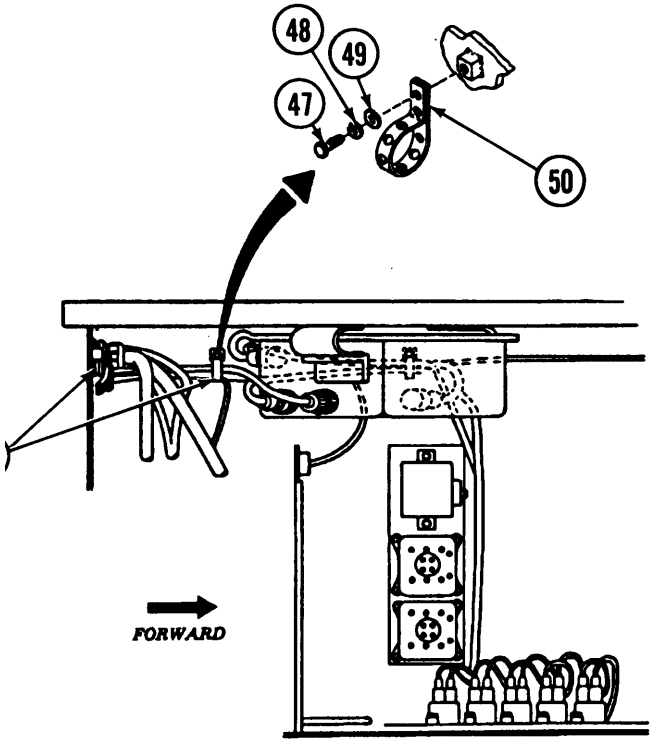
14. Disconnect harness circuit 10 (42) from circuit breaker No. 3 (45) on circuit breaker panel No. 2 (46).



7-79. ACCESSORY CONTROL BOX TO AFES HARNESSES, AFES RELAYS, AND PERSONNEL VENTILATION BLOWER WIRING HARNESS (12351461) REPAIR (continued).

15. Remove three screws (47), Iockwashers (48), washers (49), and strap assemblies (50) from AFES wiring harnesses. Discard Iockwashers.

16. Separate ventilation blower wiring harness 12351461 from other harnesses, remove from vehicle and install three strap assemblies (50) with screws (47) and washers (49).



b. DISASSEMBLY

NOTE

Remove electrical insulation tape only from section of wiring harness to be disassembled.

1. Remove section of electrical tape from harness.

2. Separate and isolate wiring harness branches.

3. Disassemble wiring harness branch and replace defective wires.

c. ASSEMBLY

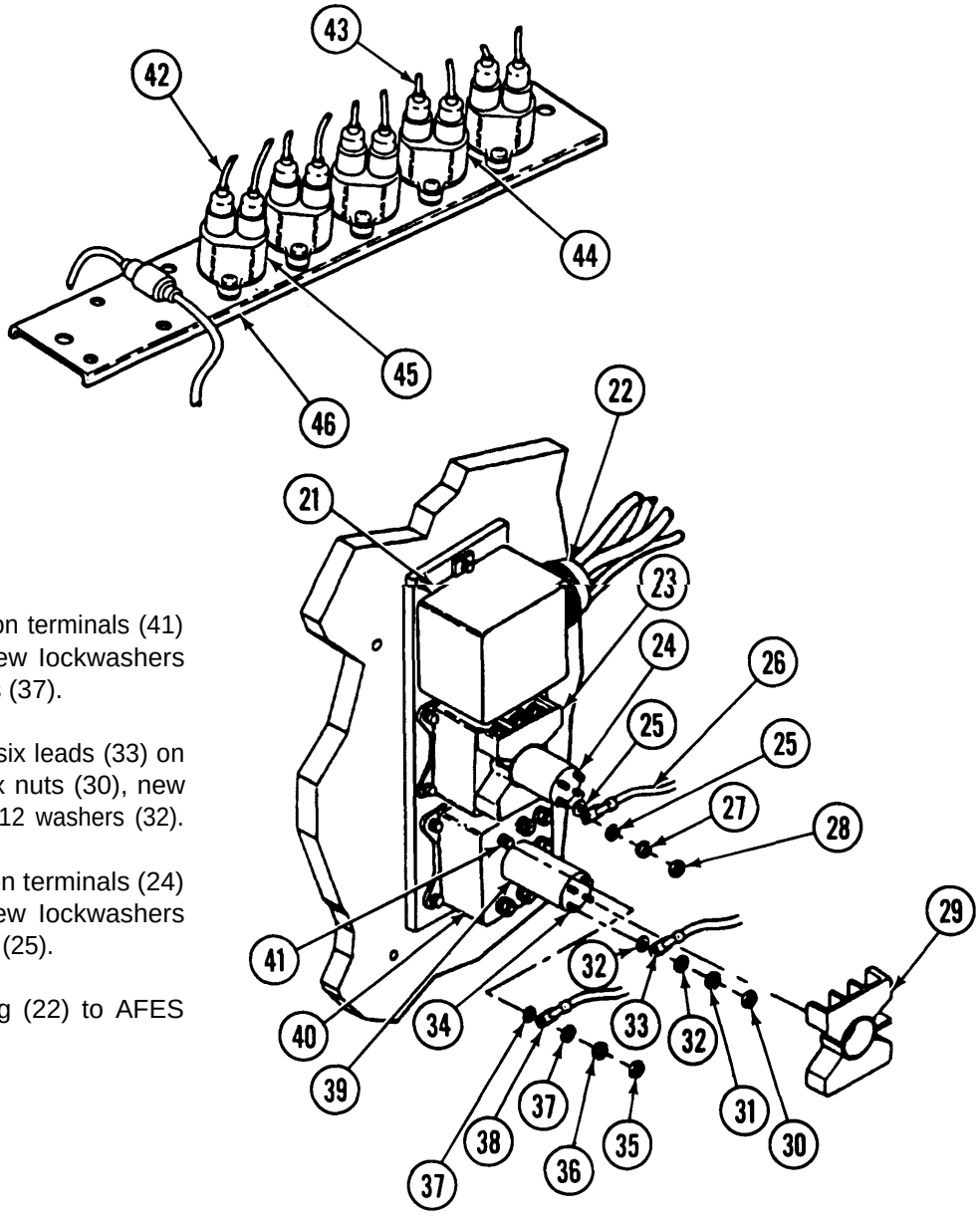
1. Assemble wiring harness branches.

2. Regroup wiring harness branches and secure with electrical insulation tape.

7-79. ACCESSORY CONTROL BOX TO AFES HARNESSES, AFES RELAYS, AND PERSONNEL VENTILATION BLOWER WIRING HARNESS (12351461) REPAIR (continued).

d. INSTALLATION

1. Position wiring harness 12351461 in vehicle.
2. Remove three screws (47), washers (49), and strap assemblies (50) from vehicle hull.
3. Install wiring harness 12351461 in three strap assemblies (50) with three screws (47), new lockwashers (48) and washers (49).
4. Connect harness circuit 10 (42) to circuit breaker No. 3 (45) on circuit breaker panel No. 2 (46).
5. Connect harness circuit 10A (43) to circuit breaker No. 6 (44) on circuit breaker panel No. 2 (46).

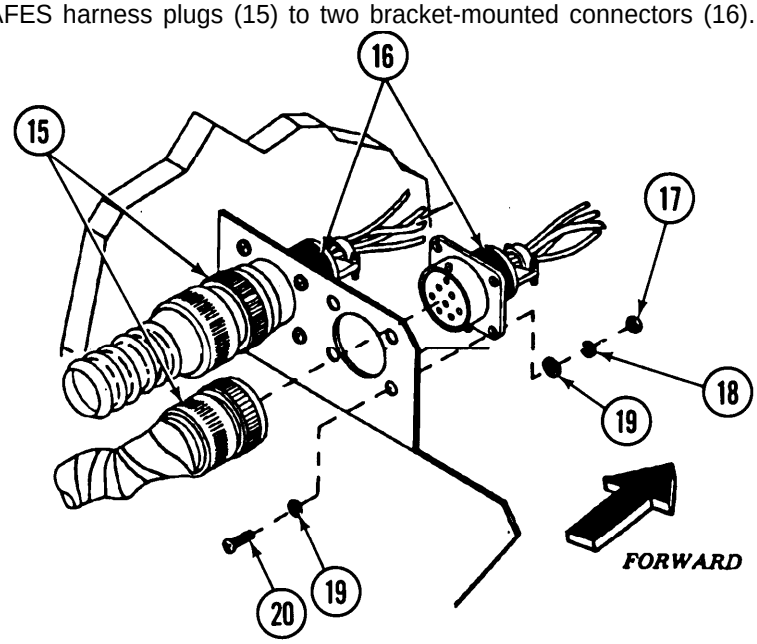


6. Install two leads (38) on terminals (41) with two nuts (35), new lockwashers (36) and four washers (37).
7. Install cover (39) and six leads (33) on terminals (34) with six nuts (30), new lockwashers (31), and 12 washers (32).
8. Install six leads (26) on terminals (24) with six nuts (34), new lockwashers (27), and 12 washers (25).
9. Connect harness plug (22) to AFES relay No. 3 (21).

7-79. ACCESSORY CONTROL BOX TO AFES HARNESSES, AFES RELAYS, AND PERSONNEL VENTILATION BLOWER WIRING HARNESS (12351461) REPAIR (continued).

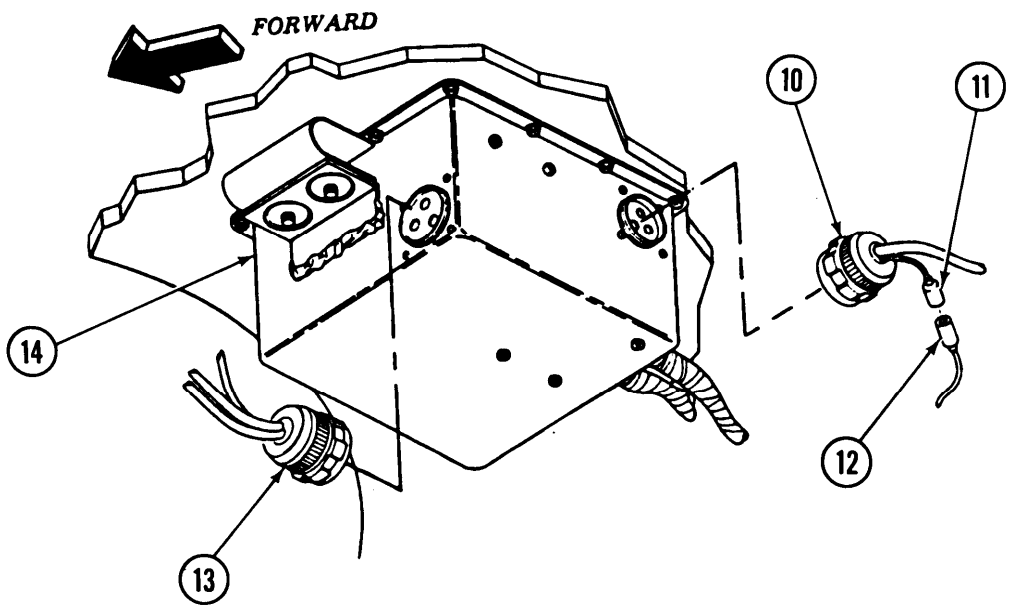
10. Install each bracket-mounted connector using four screws (20), washers (19), new lockwashers (18), and nuts (17) to each bracket-mounted connector (16).

11. Connect two AFES harness plugs (15) to two bracket-mounted connectors (16).



12. Connect harness connector (11) to connector on harness 12330257,CKT 48 (12).

13. Connect two harness plugs (10 and 13) to accessory control box (14).

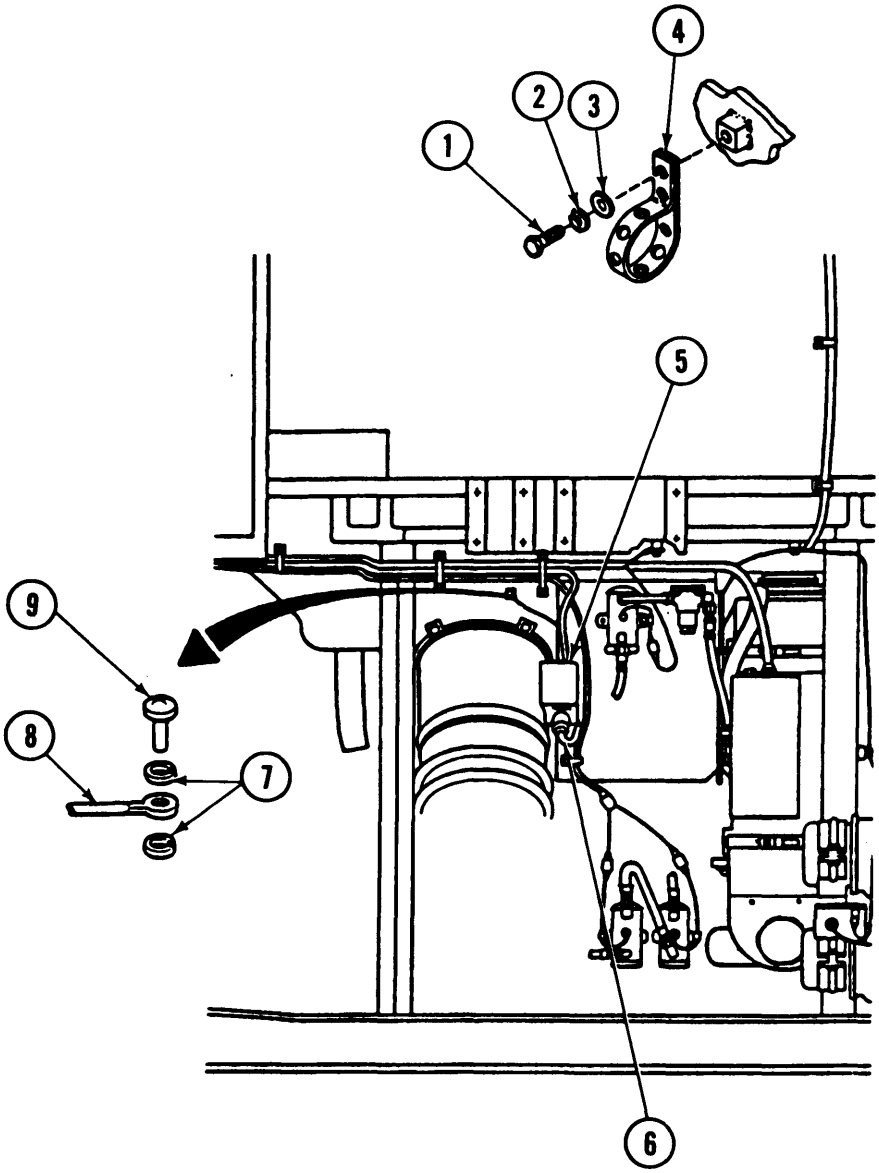


7-79. ACCESSORY CONTROL BOX TO AFES HARNESSES, AFES RELAYS, AND PERSONNEL VENTILATION BLOWER WIRING HARNESS (12351461) REPAIR (continued).

14. Install screw (1), washer (3), and new lockwasher (2) to each of three strap assemblies (4).

15. Connect ground wire (8) to forward bulkhead and secure with two new lockwashers (7) and screw (9).

16. Connect harness plug (6) to personnel ventilation blower (5).



FOLLOW-ON MAINTENANCE:

- Move left projectile rack toward front of vehicle (refer to TM 9-2350-287-10).
- Reactivate crew AFES (para 21-3).
- Reactivate engine AFES (para 21 -2).
- Connect battery ground cables (para 7-41).
- Install engine AFES relay cover (para 21-11).

7-79.1. GLOBAL POSITIONING SYSTEM (GPS) POWER CABLE (12967942) REPAIR

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

Initial Setup:

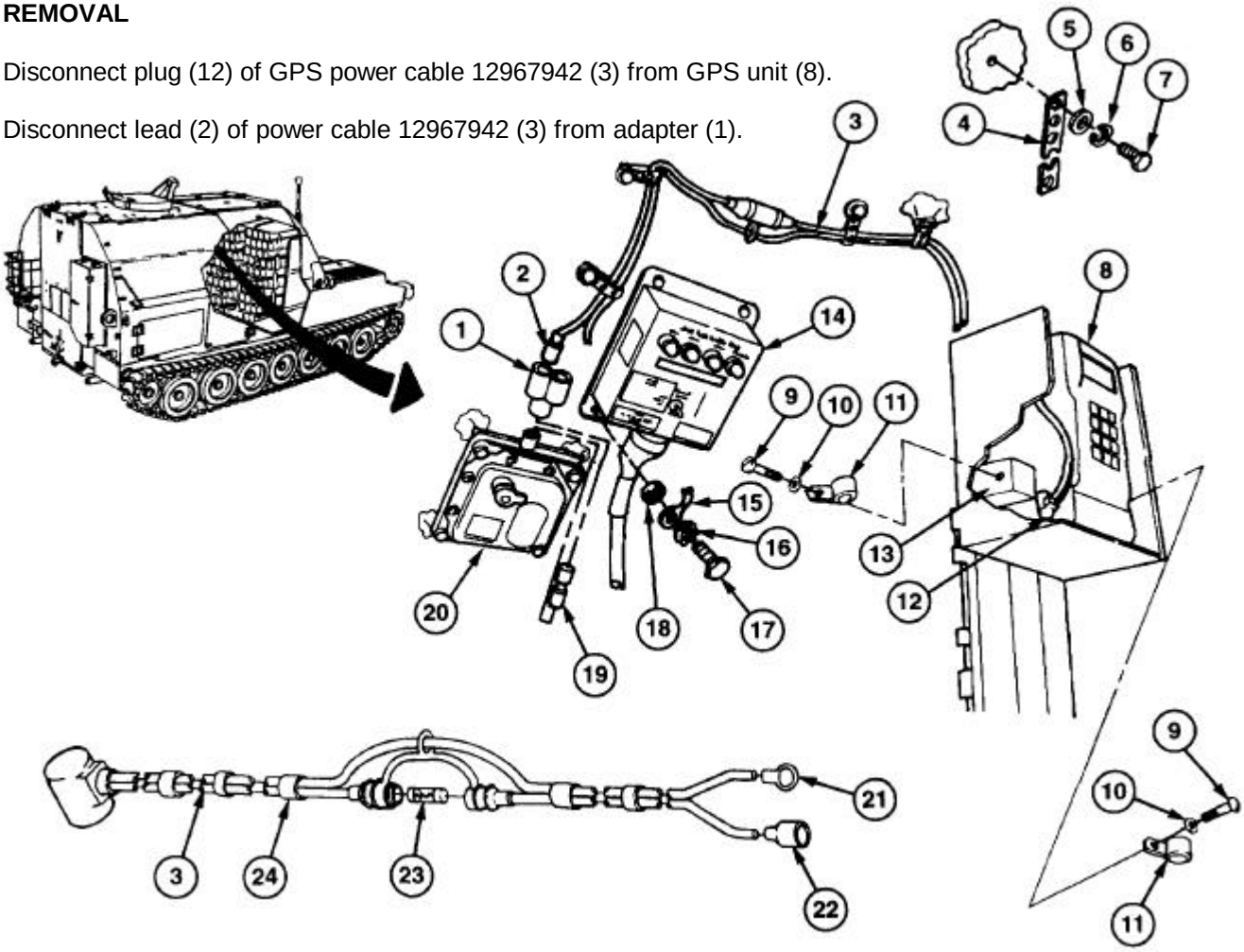
Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Silicone compound (Item 64, Appendix D)
- Tape, insulation, electrical (Item 67, Appendix D)
- Lockwasher (4) (Item 175, Appendix H)
- Lockwasher (Item 196, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

a. REMOVAL

1. Disconnect plug (12) of GPS power cable 12967942 (3) from GPS unit (8).
2. Disconnect lead (2) of power cable 12967942 (3) from adapter (1).



7-79.1. GLOBAL POSITIONING SYSTEM (GPS) POWER CABLE (12967942) REPAIR (continued).

3. Remove four screws (7), lockwashers (6), washers (5), and straps (4) from hull. Discard lockwashers.

4. Remove screw (17), lockwasher (16), ground lead (15), and washer (18) from crew compartment test and alarm (T/A) panel (14). Discard lockwasher.

5. Remove two screws (9), washers (10), and clamps (11) from GPS mounting plate (13).

6. Remove power cable 12967942 (3) from vehicle.

7. Remove adapter (1) and connector (19) from dome light (20).

b. DISASSEMBLY

NOTE

Remove electrical insulation tape only from section of wiring harness to be disassembled.

1. Remove electrical insulation tape (24) section from power cable 12967942 (3).

2. Separate and isolate wiring harness wires.

3. Replace any defective wires.

4. Replace fuse (23), if defective.

5. Replace terminal (21) or connector (22), if defective.

c. ASSEMBLY

1. Reassemble power cable 12967942 (3).

2. Regroup wiring harness wires and secure with electrical insulation tape (24).

d. INSTALLATION

1. Install connector (19) and adapter (1) on dome light (20).

2. Install power cable 12967942 (3) in vehicle.

3. Install two clamps (11), washers (10), and screws (9) on GPS mounting plate (13).

4. Install ground lead (15) on crew compartment T/A panel (14) with screw (17), washer (18), and new lockwasher (16).

5. Install four straps (4) around power cable 12967942 (3) with four screws (7), washers (5), and new lockwashers (6).

6. Connect lead (2) of power cable 12967942 (3) to adapter (1).

7. Connect plug (12) of power cable 12967942 (3) to GPS unit (8).

FOLLOW-ON MAINTENANCE:

- None

7-80. WIRING HARNESS GUARDS REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

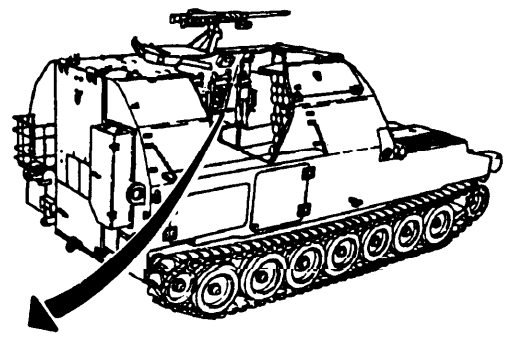
Materials/Parts:
- Lockwasher (7) (Item 196, Appendix H)

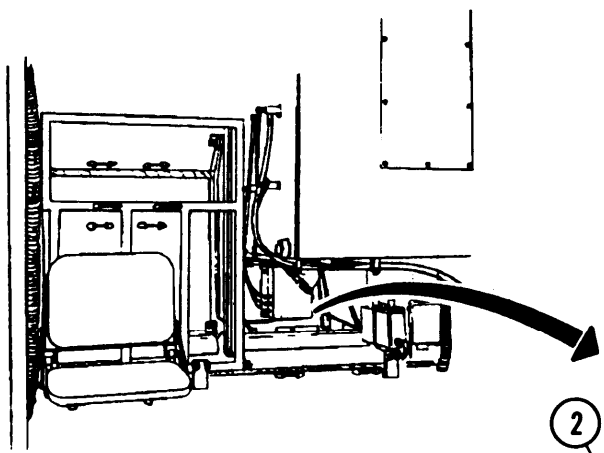
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).

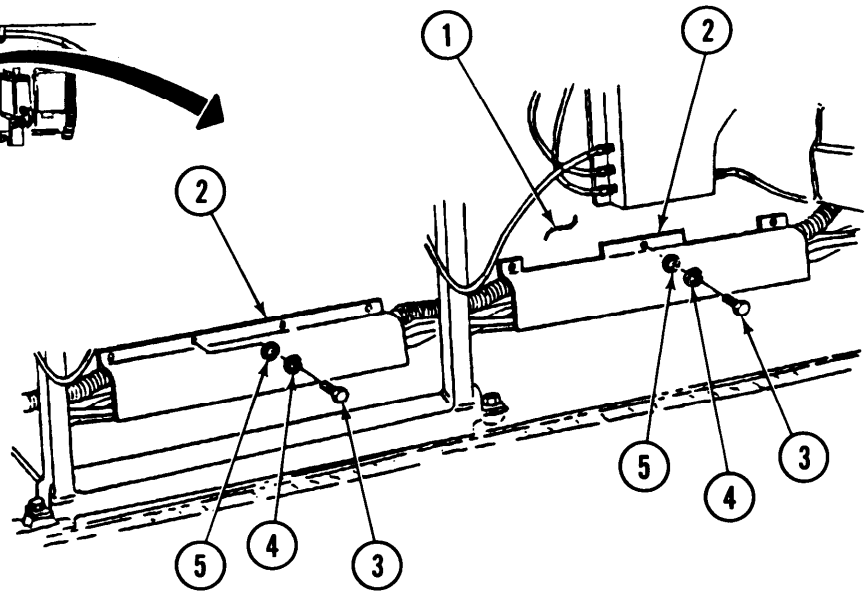
a. **REMOVAL**

1. Remove four screws (3), washers (4), and lockwashers (5) from guard (2). Discard lockwashers.

2. Remove guard (2) from side wall (1).







7-80. WIRING HARNESS GUARDS REPLACEMENT (continued).

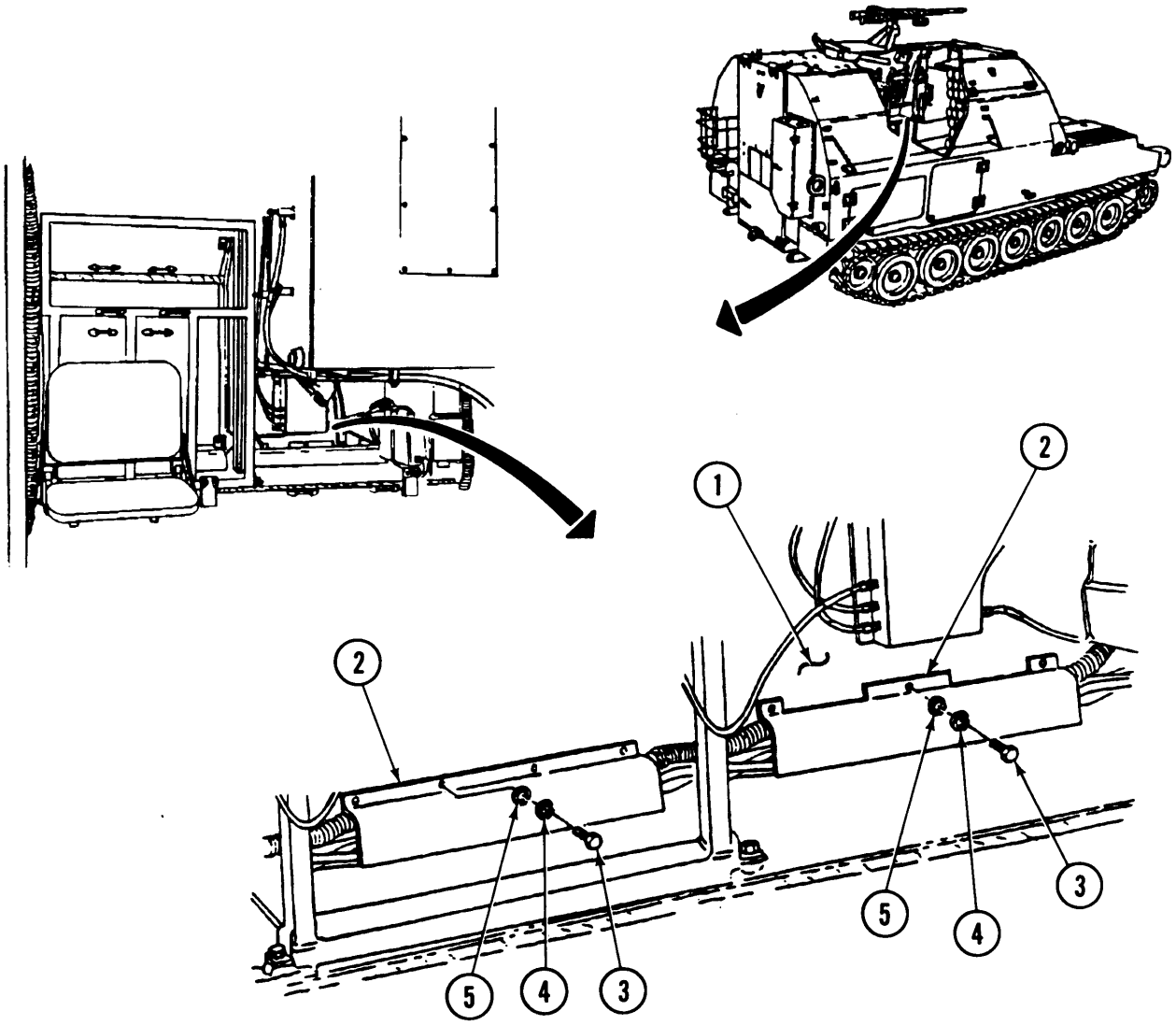
3. Remove three screws (3), washers (4), and lockwashers (5) from guard (2). Discard lockwashers.

4. Remove guard (2) from side wall (1).

b. INSTALLATION

1. Position guard (2) on side wall (1) and secure with three screws (3), washers (4), and new lockwashers (5).

2. Position guard (2) on side wall (1) and secure with four screws (3), washers (4), and new lockwashers (5).



FOLLOW-ON MAINTENANCE:
- None

7-80.1. MOUNTED WATER RATION HEATER (MWRH) POWER CABLE (12447321)

This Task Covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Silicone compound (Item 64, Appendix D)
- Tape, insulation, electrical (Item 67, Appendix D)
- Lockwasher (2) (Item 136, Appendix H)
- Lockwasher (Item 162, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- MASTER switch set to OFF (refer to TM 9-2350-287-10).

a. REMOVAL

1. Remove screw (15), lockwasher (14), two washers (3), clamp loop (13), and nut (4) from hydraulic control panel (2). Discard lockwasher.
2. Remove screw (11), two lockwashers (9), and ground lead (12) from hydraulic control panel (2). Discard lockwashers.
3. Disconnect lead (5) of MWRH power cable 12447321 (1) from connector of wiring harness 12330252-2.
4. Disconnect connector (16) of power cable 12447321 (1) from the MWRH.
5. Remove power cable 12447321 (1) from vehicle.

b. DISASSEMBLY

NOTE

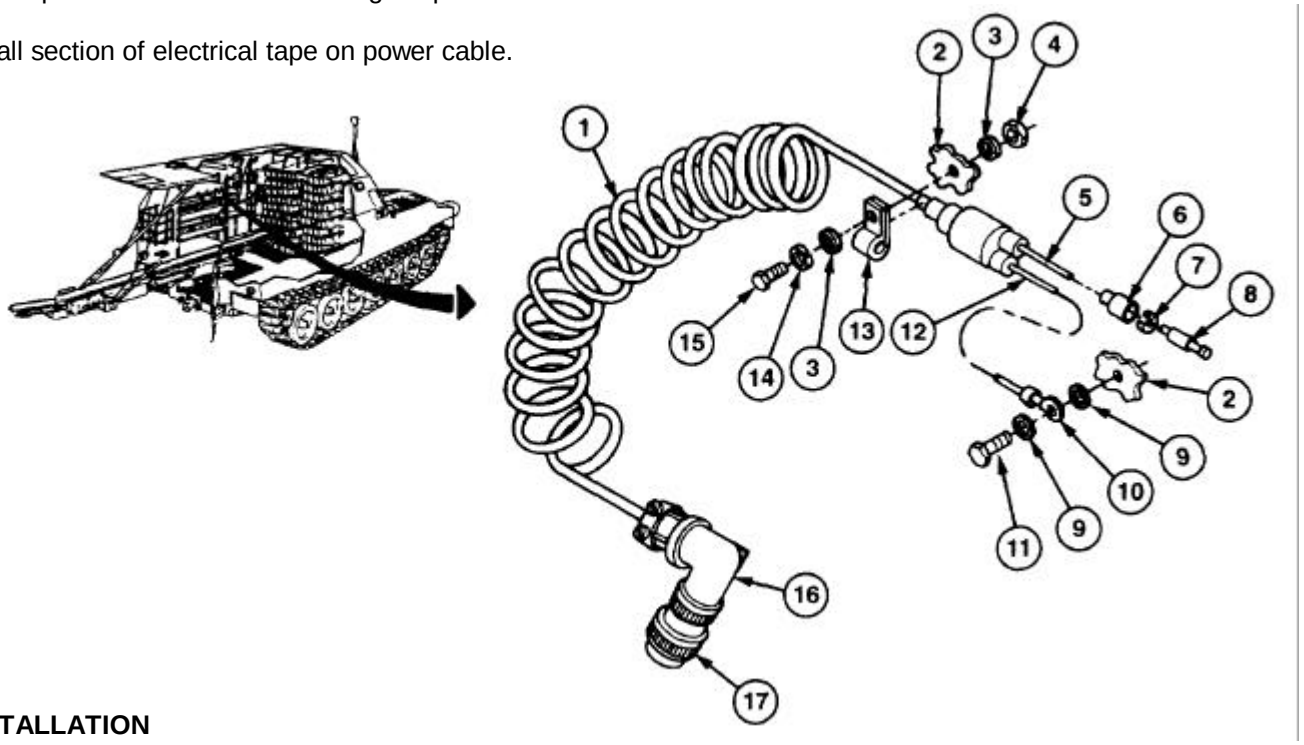
- **Disassembly of power cable is required only for damaged/defective parts.**
- **Remove electrical insulation tape only from section of power cable to be disassembled.**

1. Remove section of electrical insulation tape from power cable.
2. Separate and isolate power cable branches.
3. Disassemble each power cable branch and replace defective wires.
4. Remove terminal (10) from ground lead (12).
5. Remove contact (8), washer (7), and shell (6) from lead (5).
6. Remove cable clamp adapter (17) from connector (16).

7-80.1. MOUNTED WATER RATION HEATER (MWRH) POWER CABLE (12447321) REPAIR (continued).

c. ASSEMBLY

1. Install cable clamp adapter (17) on connector (16).
2. Install shell (6), washer (7), and contact (8) on lead (5).
3. Install terminal (10) on ground lead (12).
4. Assemble each power cable branch with new wires.
5. Return power cable branches to original position.
6. Install section of electrical tape on power cable.



d. INSTALLATION

1. Position power cable 12447321 (1) in vehicle.
2. Connect connector (16) of power cable 12447321 (1) to the MWRH.

NOTE

Lubricate rubber-to-rubber mating surfaces of electrical connectors with silicone compound.

3. Connect lead (5) of power cable 12447321 (1) to connector of wiring harness 12330252-2.
4. Secure ground lead (12) to hydraulic control panel (2) using screw (11) and two new lockwashers (9).
5. Secure power cable 12447321 (1) to hydraulic control panel (2) using clamp loop (13), screw (15), new lockwasher (14), two washers (3), and nut (4).

FOLLOW-ON MAINTENANCE:

- .None

7-81. PERSONNEL VENTILATION BLOWER REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tool/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)

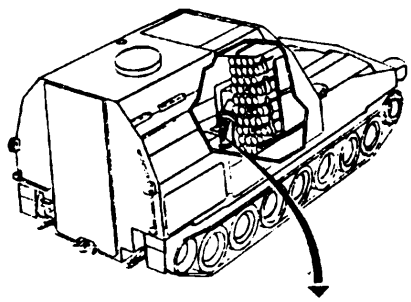
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Left projectile rack assembly moved to rear of vehicle (refer to TM 9-2350-287-10).

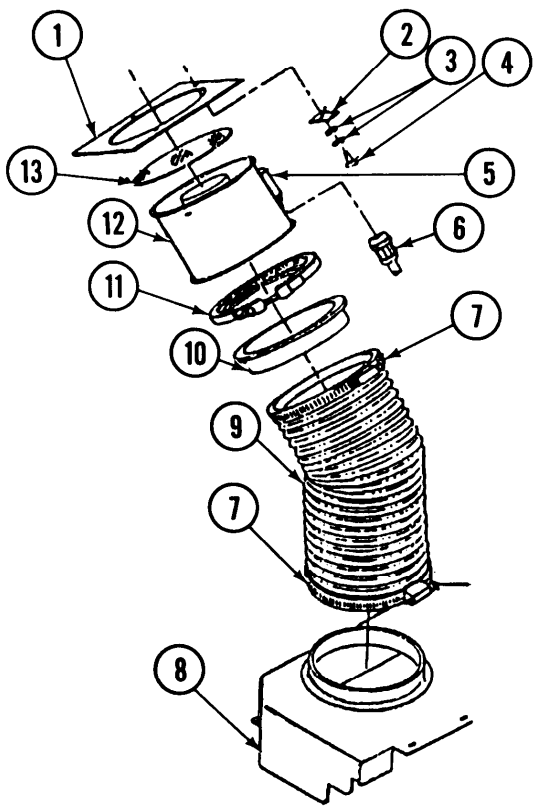
a. REMOVAL

1. Loosen two clamps (7) and remove hose (9) from connector (10) and duct (8).

2. Remove three screws (4), six washers (3), and three plates (2) ventilation blower (12) and screen (13) from forward cargo bulkhead (1) and disconnect electrical connector (6) from receptacle (5) on personnel ventilation blower (1 2).

   Remove coupling (11) and connector (10) from ventilation blower (12).





b. INSTALLATION

1. Install one screw (4) two washers (3) and one plate (2) in forward bulkhead (1).

2. Install connector (10) on ventilation blower (12) and secure with coupling (11).

3. Install screen (13) and connect electrical connector (6) to receptacle (5) on ventilation blower (1 2).

4. Position ventilation blower (12) on forward cargo bulkhead (1) and secure with two screws (4), four washers (3), two plates (2).

   Install two clamps (7) on hose (9). Position hose (9) on connector (10) and duct (8). Secure hose with clamps (7).

FOLLOW-ON MAINTENANCE:
- Install left projectile rack assembly (refer to TM 9-2350-287-10).

CHAPTER 8
TRANSMISSION MAINTENANCE

8-1. GENERAL.

This chapter illustrates and describes the replacement, repair, and adjustment procedures for transmission components. The transmission components consist of:

Shift Control Linkage
Neutral Safety Switch
Transmission Trunnion Caps
Transmission, Transfer, and Drive Control Assemblies
Oil Filter and Oil Cooler Hoses
Transmission Output Flange
Transmission Internal Brake
Transmission Filler Neck

8-2. SHIFT CONTROL LINKAGE REPAIR

This Task Covers:

a. Removal
b. Disassembly
c. Cleaning and Inspection
d. Assembly
e. Installation
f. Adjustment

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- Measuring tape (Item 35, Appendix I)
  Wire (Item 381, Appendix H)
- Spring pin (Item 356, Appendix H)
- Spring pin (3) (Item 360.1, Appendix H)
- Spring pin (Item 364, Appendix H)
- Spring pin (Item 366, Appendix H)

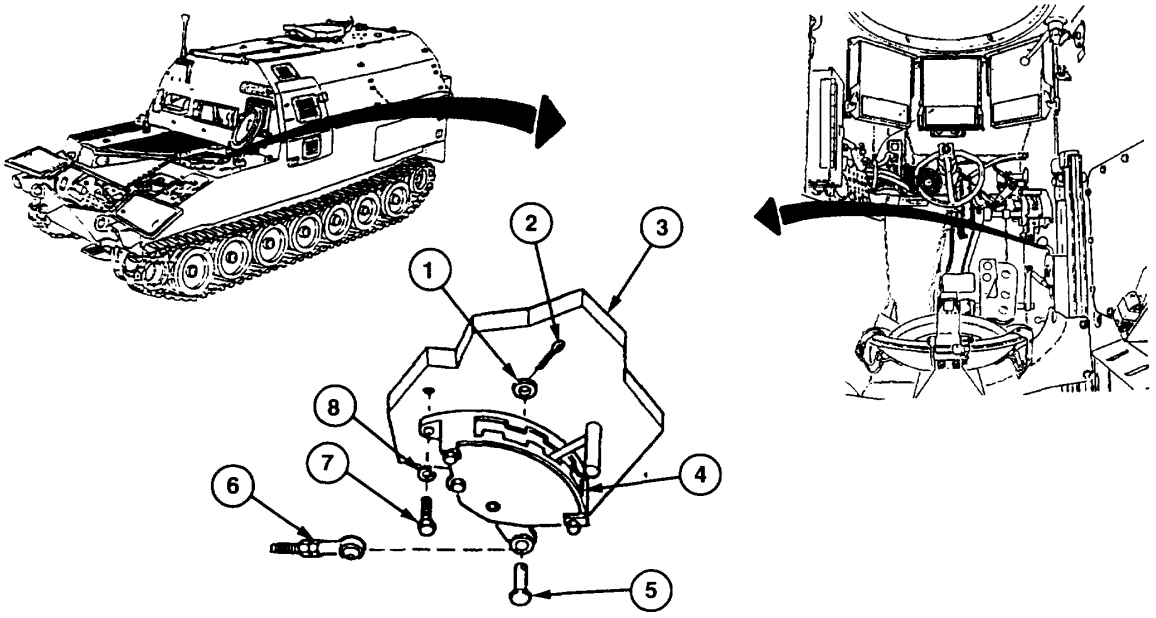
Materials/Parts:
- Drycleaning solvent (Item 27, Appendix D)
- Lubricant, solid film (Item 38, Appendix D)
- Lubricant, solid film (Item 38.1, Appendix D)
- Rag (Item 56, Appendix D)
- Cotter pin (5) (Item 14, Appendix H)
- Lockwasher (15) (Item 175, Appendix H)
- Lockwasher (3) (Item 177, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Transmission access doors opened (refer to TM 9-2350-287-10).
- Driver's hatch cover opened and secured (refer to TM 9-2350-287-10).

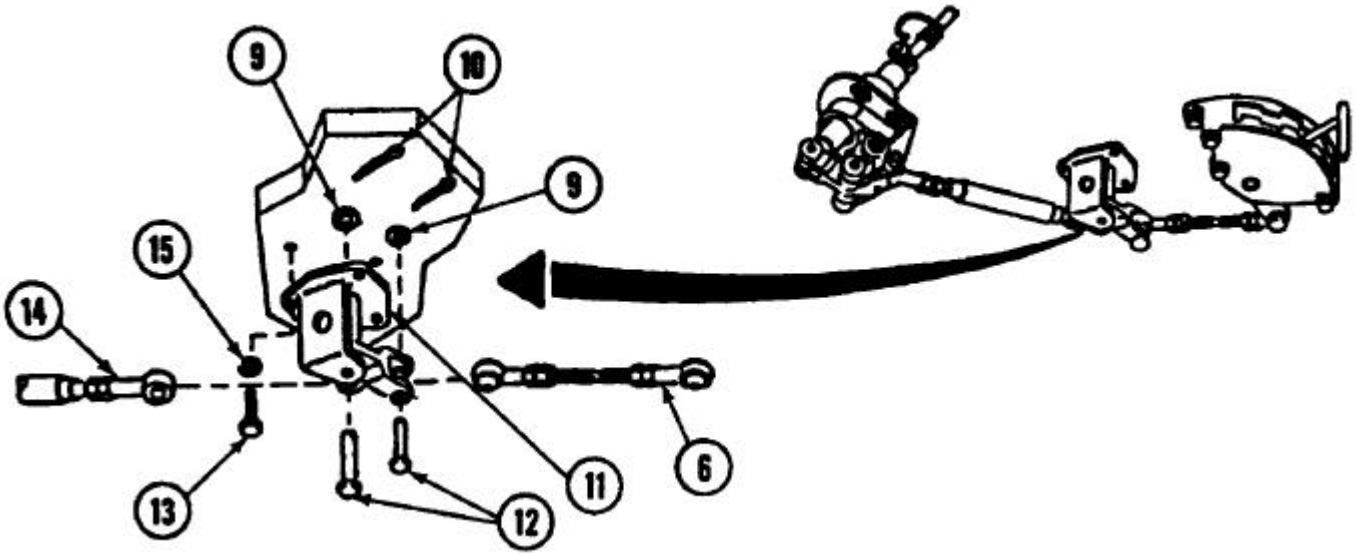
a. REMOVAL

1. Remove cotter pin (2), washer (1), pin (5), and assembled rod (6) from shift quadrant (4). Discard cotter pin.

2. Remove three screws (7) and lockwashers (8) and shift quadrant (4) from driver's bulkhead (3). Discard lockwashers.



8-2. SHIFT CONTROL LINKAGE REPAIR (continued).



3. Remove two cotter pins (10), washers (9), and pins (12) from bellcrank support (11) and two assembled rods (6 and 14). Remove assembled rod (6) and discard cotter pins.

4. Remove three screws (13) and lockwashers (15) and bellcrank support (11) from bulkhead (3). Discard lockwashers.

NOTE

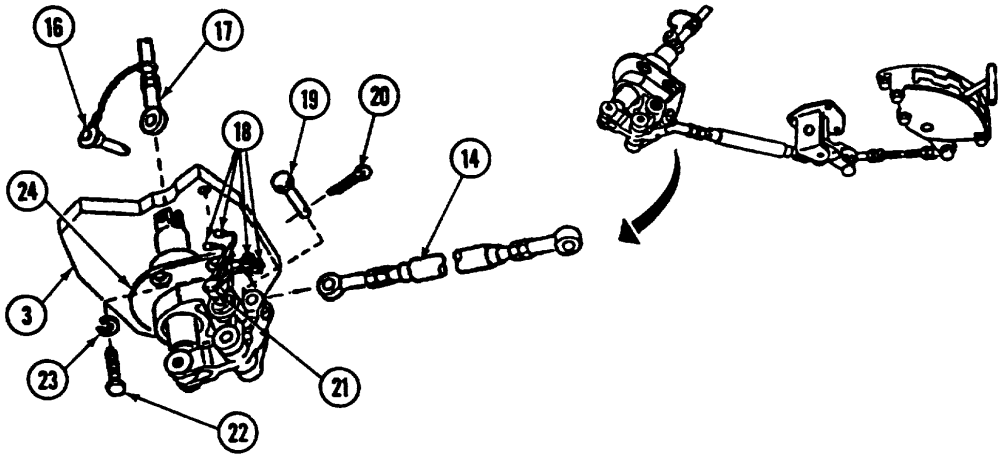
Quick-release pin is located in powerpack compartment at driver's bulkhead.

5. Remove quick-release pin (16) from control assembly (24) and assembled rod (17).

6. Disconnect four electrical leads (18) from neutral safety switch (21).

7. Remove four screws (22) and lockwashers (23) and control assembly (24) from bulkhead (3). Discard lockwashers.

8. Remove cotter pin (20), pin (19), and assembled rod (14) from control assembly (24). Discard cotter pin.

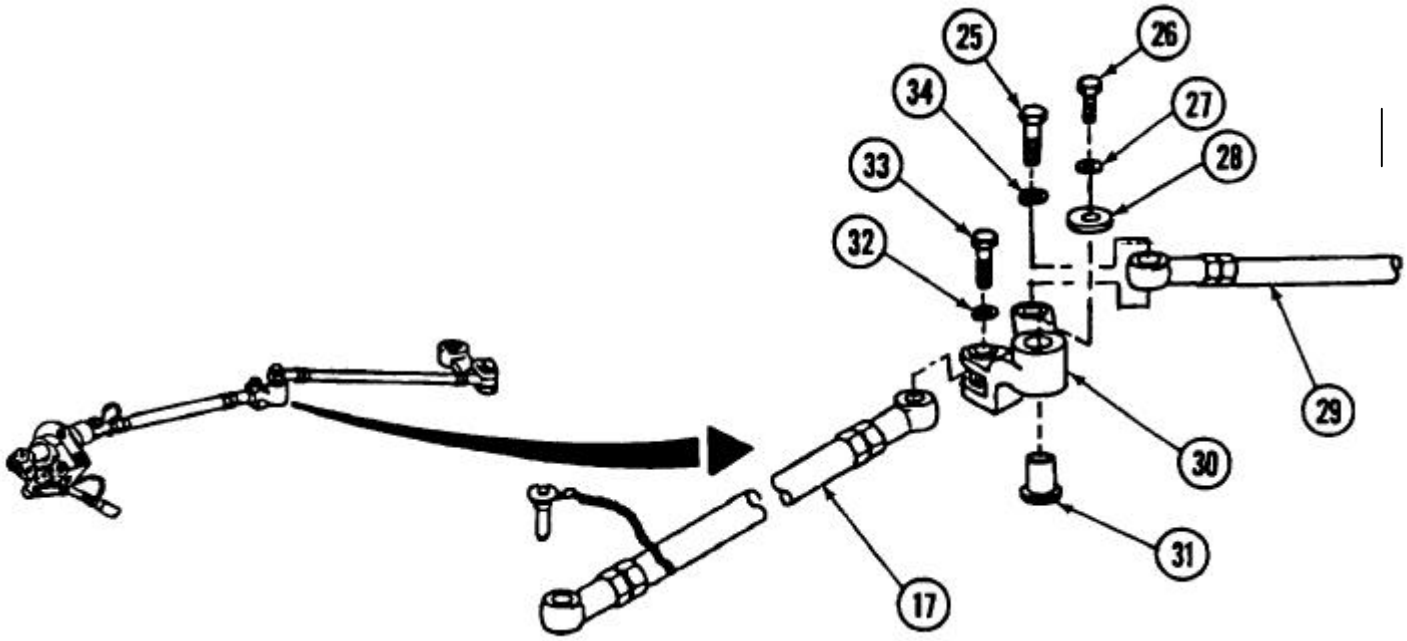


8-2. SHIFT CONTROL LINKAGE REPAIR (continued).

9. Remove screw (33), lockwasher (32), and assembled rod (17) from bellcrank (30). Discard lockwasher.

10. Remove screw (25) and lockwasher (34) from bellcrank (30) and assembled rod (29). Discard lockwasher.

11. Remove screw (26), lockwasher (27), washer (28), bellcrank (30), and spacer (31) from transmission. Discard lockwasher.

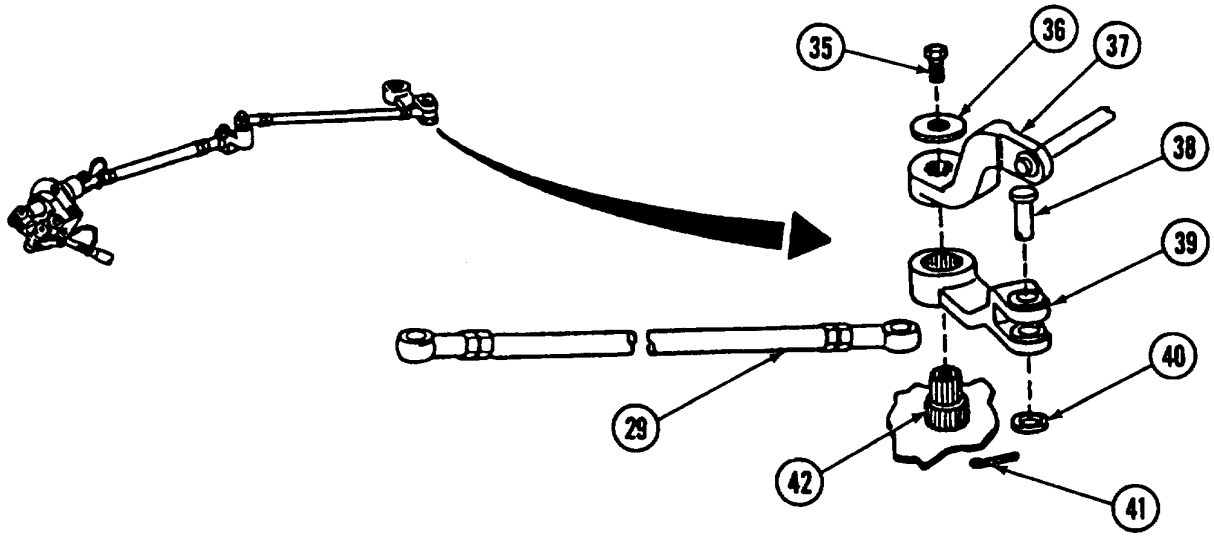


12. Remove cotter pin (41), washer (40), pin (38), and assembled rod (29) from lever (39). Discard cotter pin.

NOTE

Remove throttle control lever only if damaged or requiring replacement.

13. Remove screw (35), washer (36), throttle control lever (37), and lever (39) from transmission shaft (42).



8-2. SHIFT CONTROL LINKAGE REPAIR (continued).

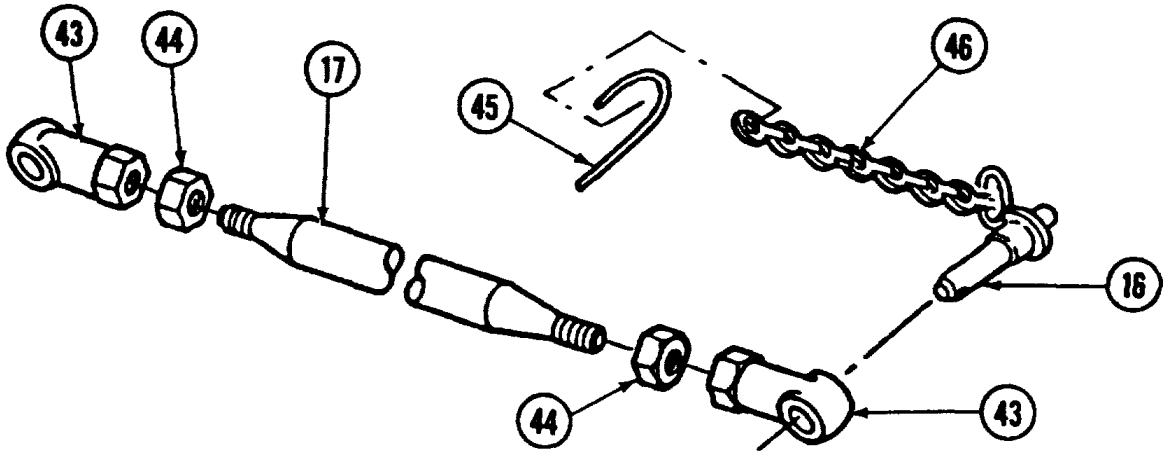
b. DISASSEMBLY

NOTE

- **Step 1 covers disassembly of all assembled rods (6,14,17, and 29). Assembled rod (17) is shown.**
- **Step 2 covers further disassembly of assembled rod (17) equipped with quick-release pin.**

1. Loosen two nuts (44) on assembled rod (17), and remove two rod end bearings (43) and nuts (44) from each assembled rod (6, 14, 17, and 29).

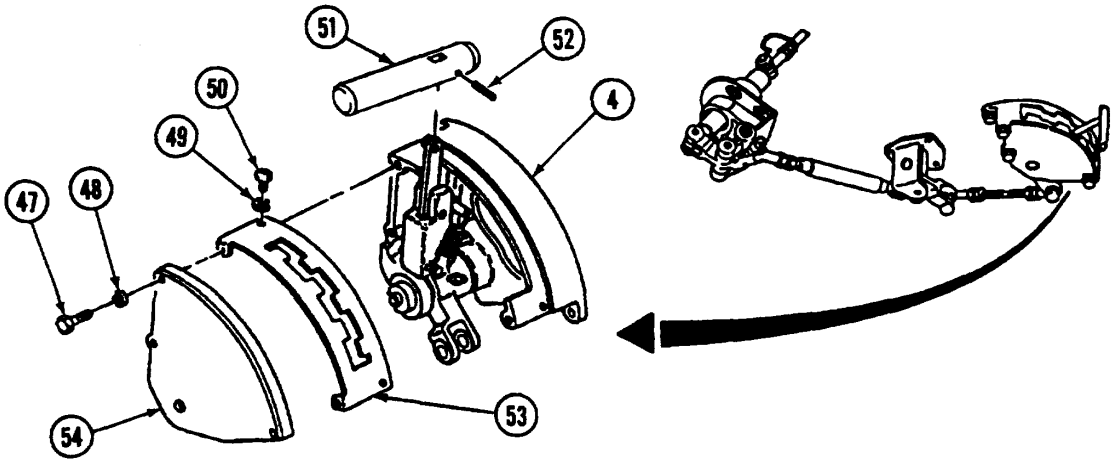
2. Remove quick-release pin (16), chain (46), and wire (45) from bearing (43) of assembled rod (17). Discard wire.



3. Remove spring pin (52) and handle (51) from shift quadrant (4). Discard spring pin.

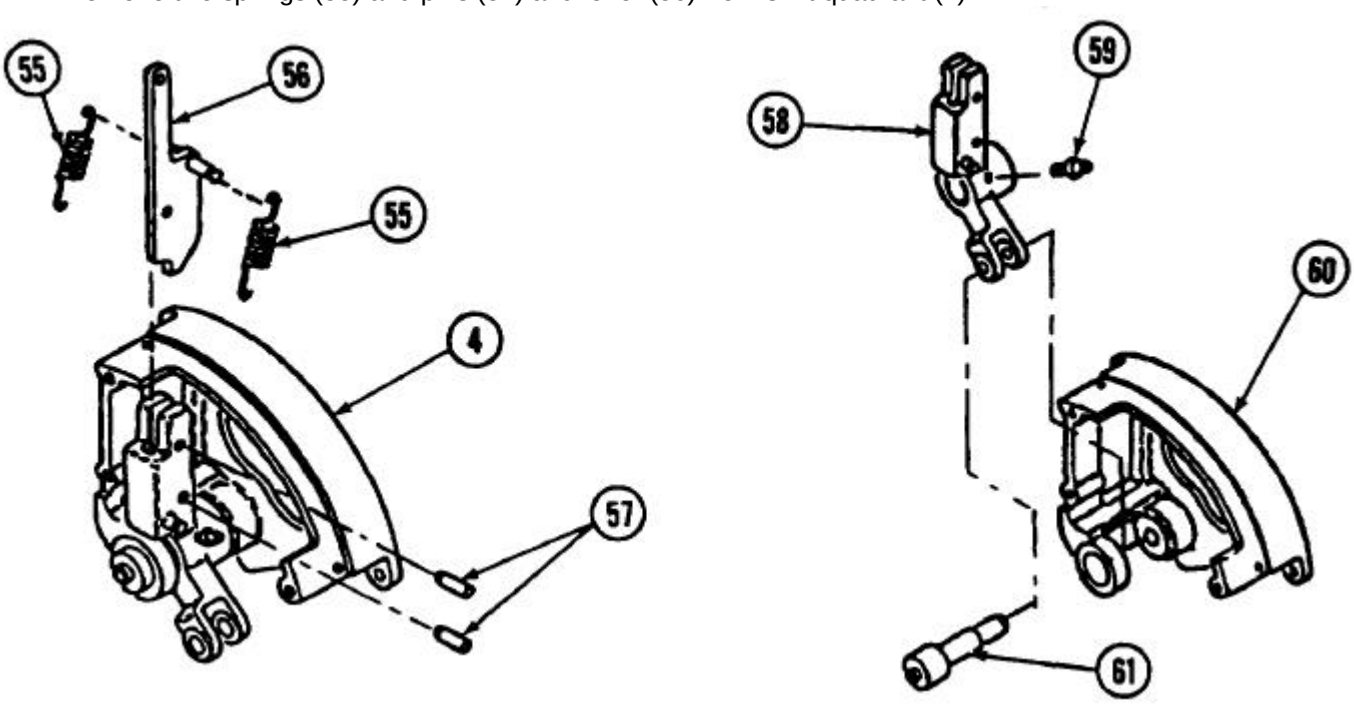
4. Remove three screws (47) and lockwashers (48) from shift quadrant (4). Discard lockwashers.

5. Remove two screws (50) and lockwashers (49), instruction plate (53), and cover (54) from shift quadrant (4). Discard lockwashers.



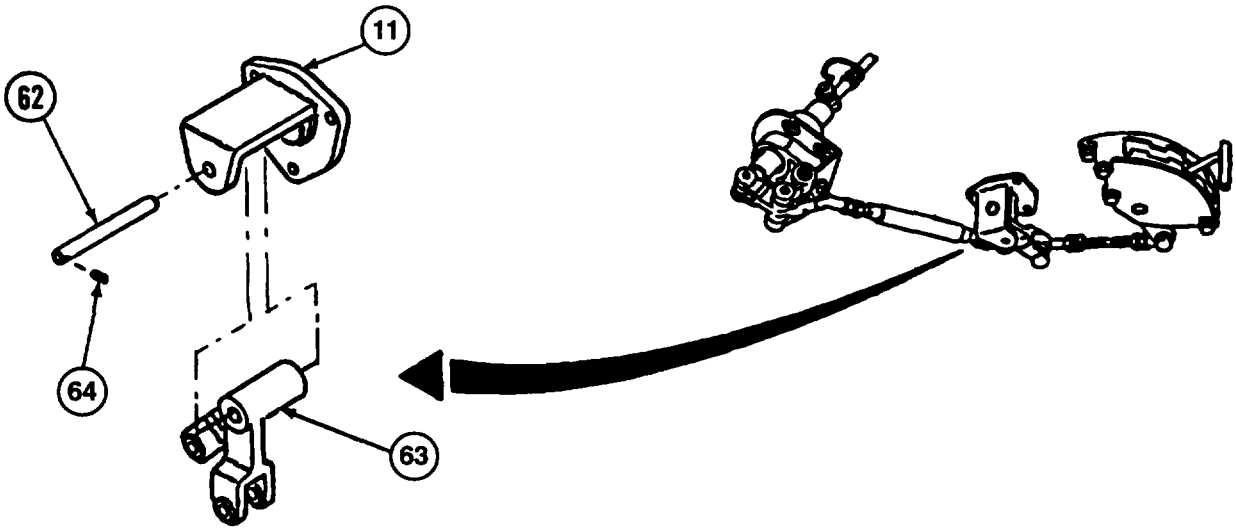
8-2. SHIFT CONTROL LINKAGE REPAIR (continued).

6. Remove two springs (55) and pins (57) and lever (56) from shift quadrant (4).



7. Remove shaft (61) and lever assembly (58) from shift quadrant bracket (60).

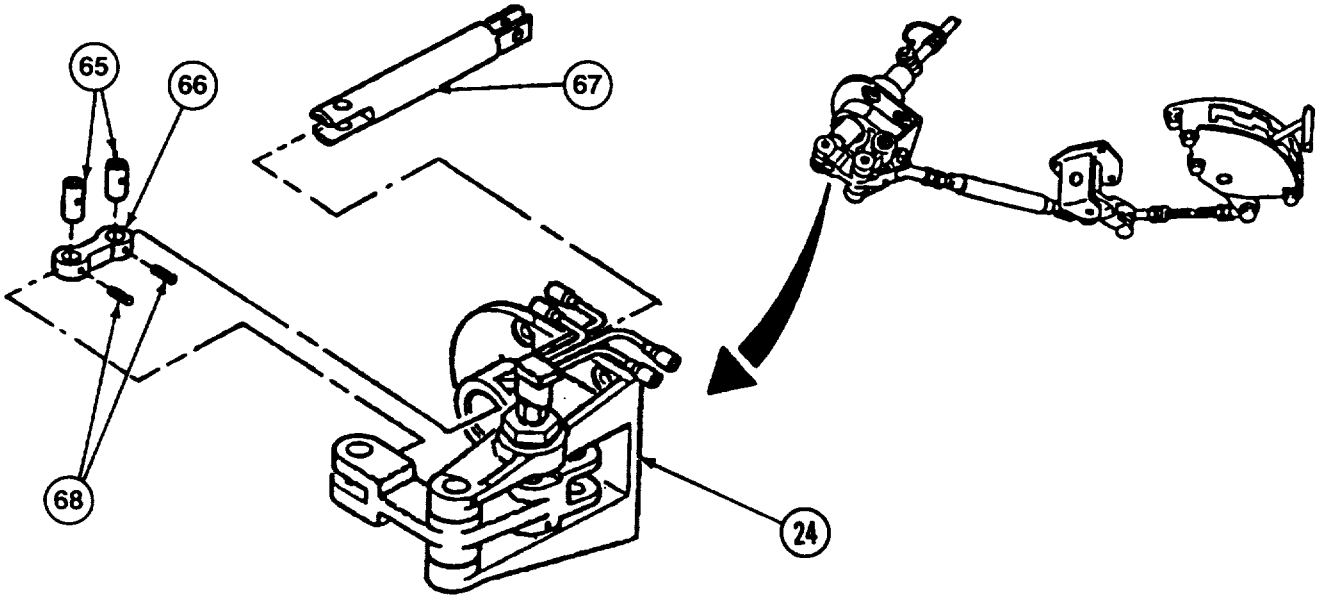
8. Remove grease fitting (59) from lever assembly (58).



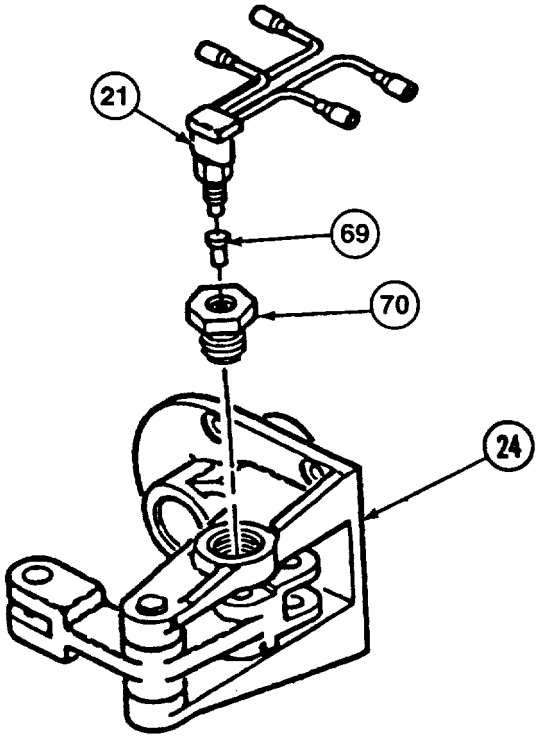
9. Remove spring pin (64), shaft (62), and bellcrank (63) from bellcrank support (11). Discard spring pin.

8-2. SHIFT CONTROL LINKAGE REPAIR (continued).

10. Remove two spring pins (68) and shafts (65), shaft (67), and link (66) from control assembly (24). Discard spring pins.



11. Remove adapter bushing (70) from control assembly (24). Remove neutral safety switch (21) and plunger(69) from adapter bushing (70).



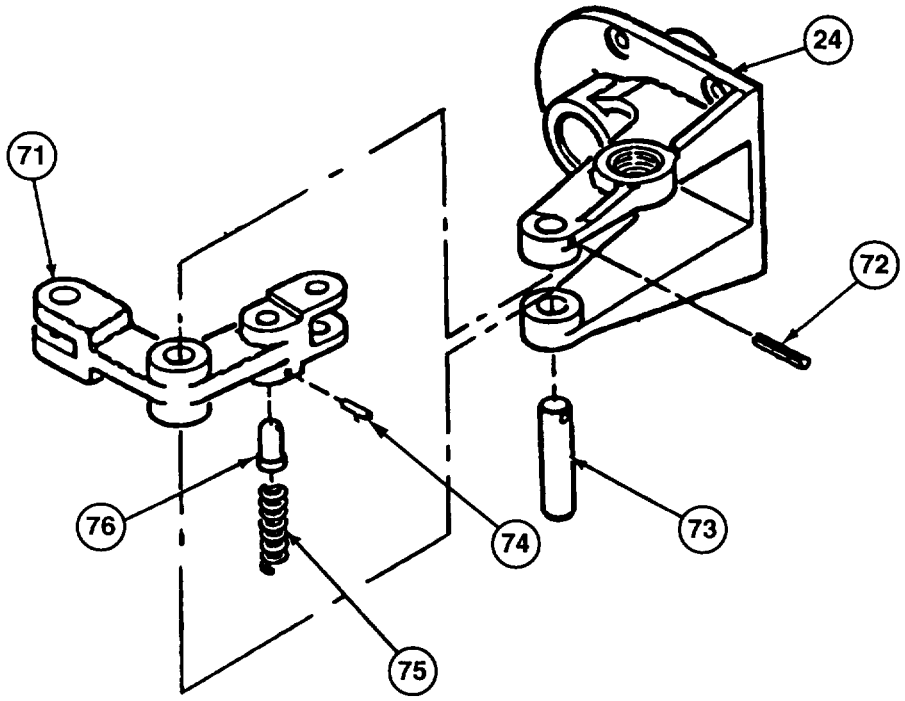
8-2. SHIFT CONTROL LINKAGE REPAIR (continued).

12. Remove spring pin (72), hollow pin (73), and bellcrank (71) from control assembly (24). Discard spring pin.

WARNING

Use care when removing spring. Spring is under tension; it can act as a projectile when released and cause severe eye injury.

13. Remove spring pin (74), spring (75), and pin (76) from bellcrank (71). Discard spring pin.



c. CLEANING AND INSPECTION

1. Clean rod end bearings.

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT use near open flame or excessive heat.

2. Clean all remaining metal parts with drycleaning solvent.

3. Inspect all parts for damage or excessive wear. Replace any damaged or worn parts.

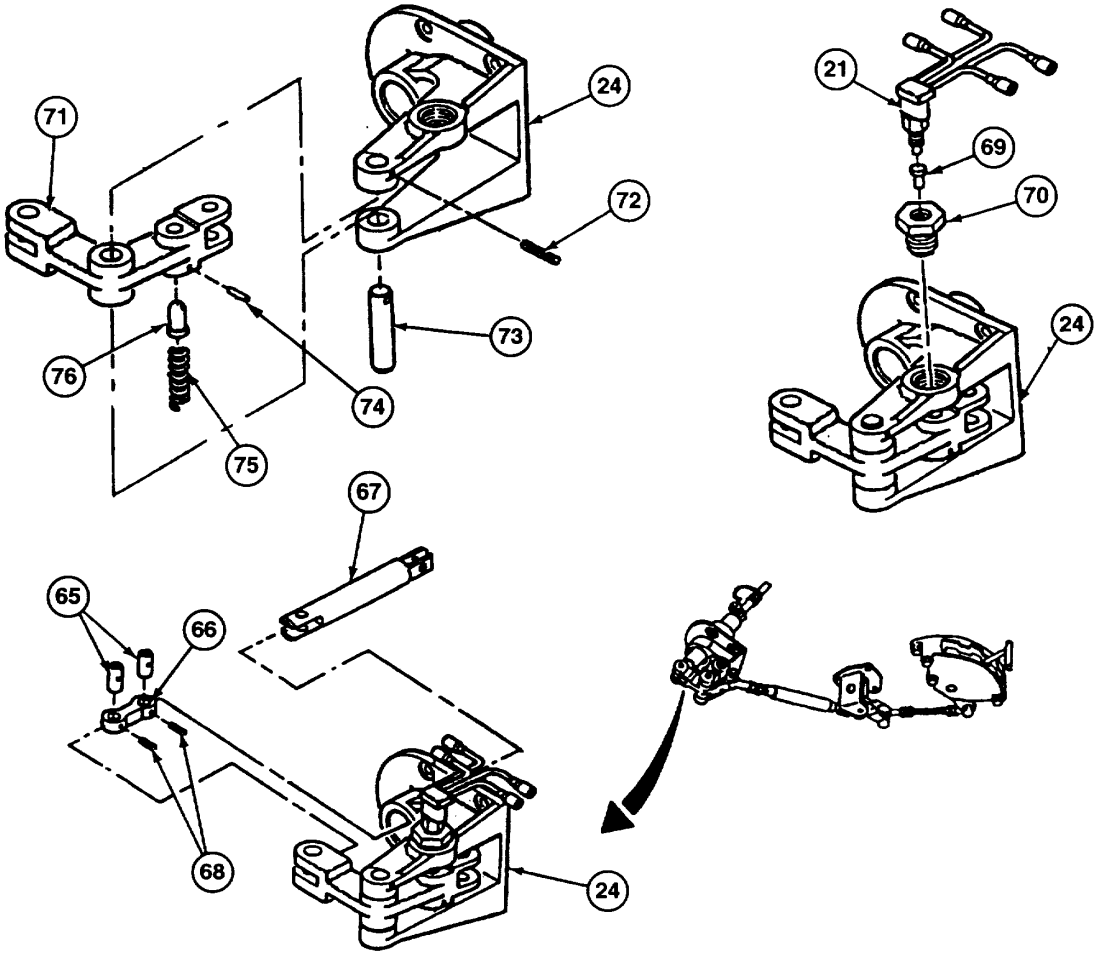
8-2. SHIFT CONTROL LINKAGE REPAIR (continued).

d. ASSEMBLY

WARNING

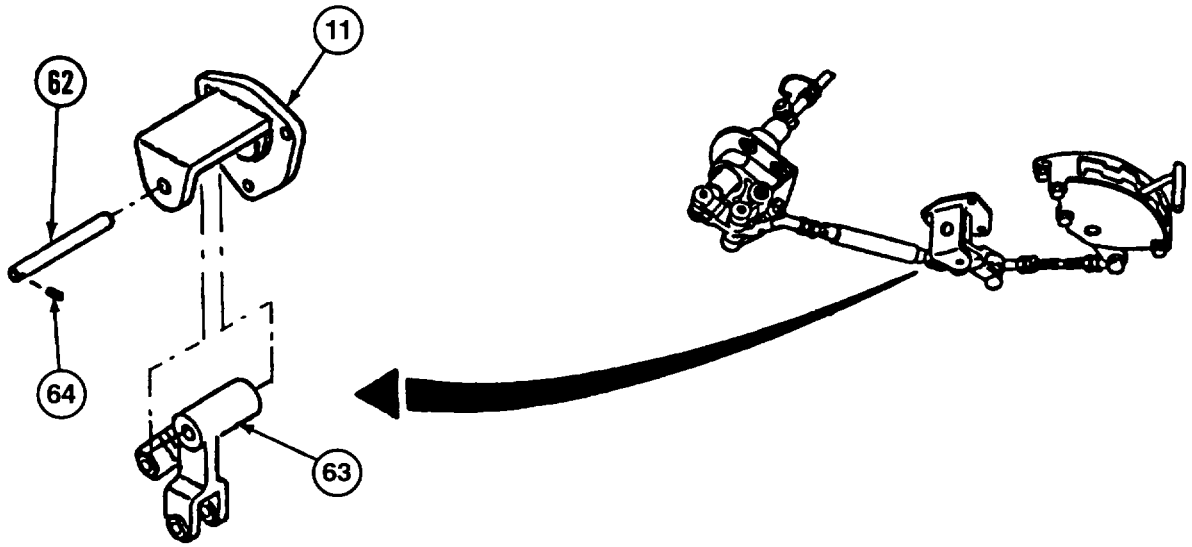
Use care when installing spring. Spring is under tension; it can act as a projectile when released and cause severe eye injury.

1. Apply lubricant (MIL-L-23396) to pin (76) and plunger (69) surfaces that will make contact with surfaces of adapter bushing (70).
2. Install pin (76), spring (75), and new spring pin (74) in bellcrank (71).
3. Install bellcrank (71) in control assembly (24) with hollow pin (73) and new spring pin (72).
4. Install plunger (69) and neutral safety switch (21) in adapter bushing (70). Install adapter bushing (70) in control assembly (24).
5. Apply lubricant (Everlube 620) to shaft (67).
6. Install shaft (67) and link (66) on control assembly (24) with two shafts (65) and new spring pins (68).



8-2. SHIFT CONTROL LINKAGE REPAIR (continued).

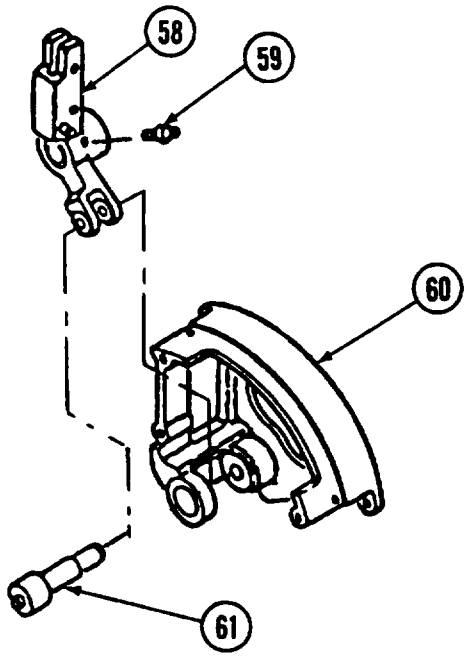
7. Install bellcrank (63) and shaft (62) in bellcrank support (11) with new spring pin (64).

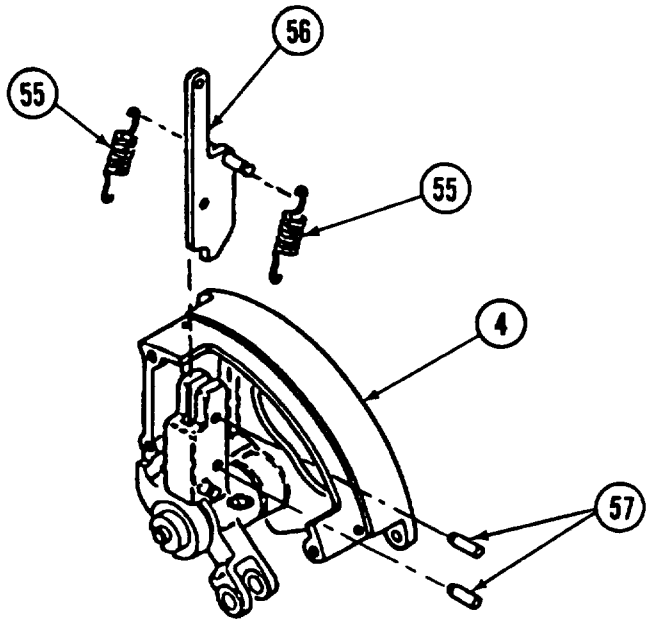


8. Install grease fitting (59) on lever assembly (58).

9. Install lever assembly (58) and shaft (61) on shift quadrant bracket (60).

10. Install lever (56) on shift quadrant (4) with two pins (57) and springs (55).



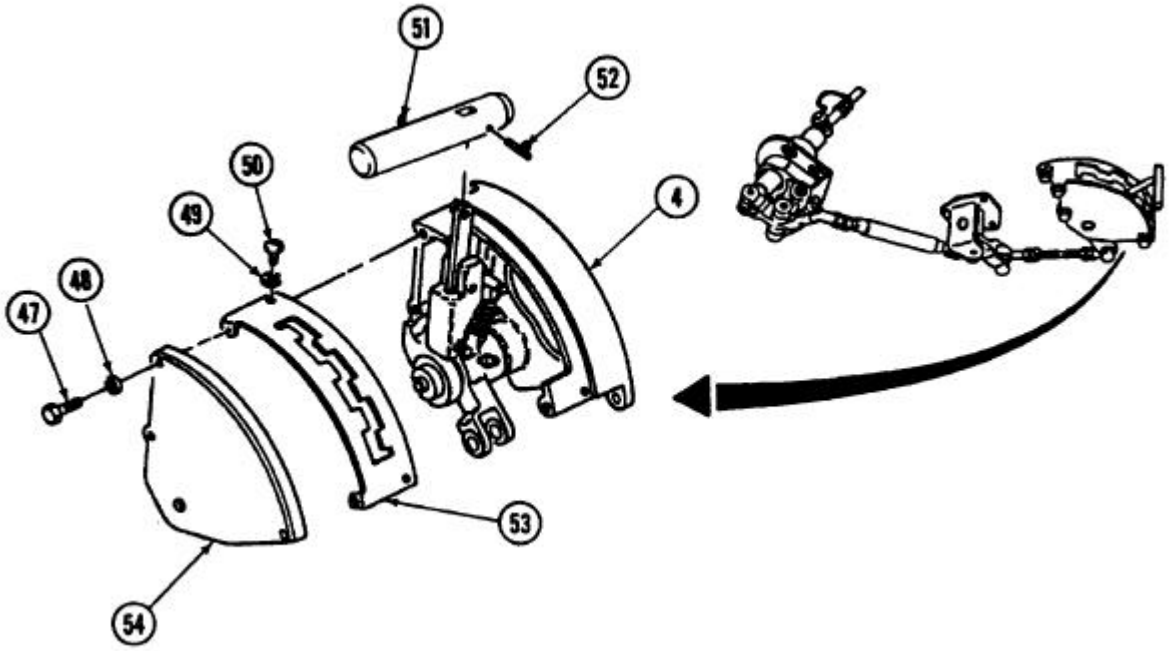


8-2. SHIFT CONTROL LINKAGE REPAIR (continued).

11. Install cover (54) and instruction plate (53) on shift quadrant (4) with two screws (50) and new lockwashers (49).

12. Install three screws (47) and new lockwashers (48) on shift quadrant (4).

13. Install handle (51) on shift quadrant (4) with new spring pin (52).

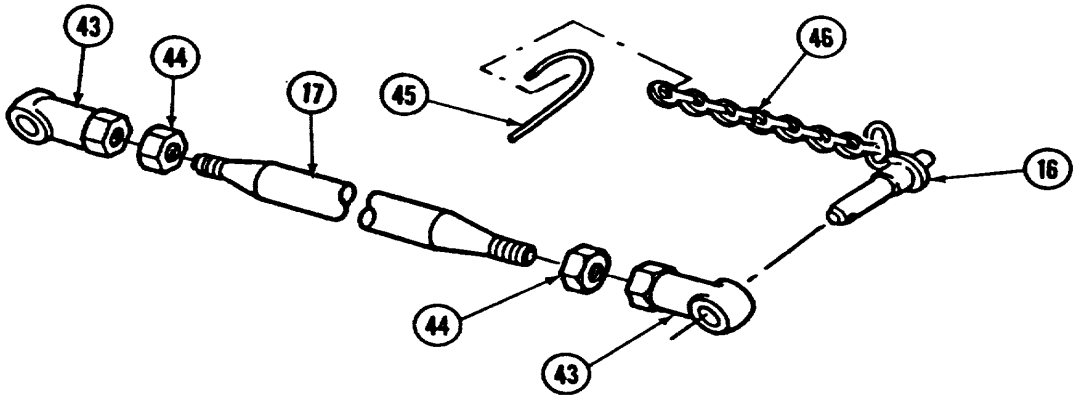


NOTE

- **Step 13 covers assembly of all assembled rods (6, 14, 17, and 29). Assembled rod (17) is shown.**
- **Step 14 covers further assembly of assembled rod (17) equipped with quick-release pin.**

14. Install two nuts (44) and bearings (43) on assembled rod (6, 14, 17, and 29). Do not tighten nuts until final adjustment.

15. Install quick-release pin (16), chain (46), and new wire (45) on bearing (43) of assembled rod (17).



8-2. SHIFT CONTROL LINKAGE REPAIR (continued).

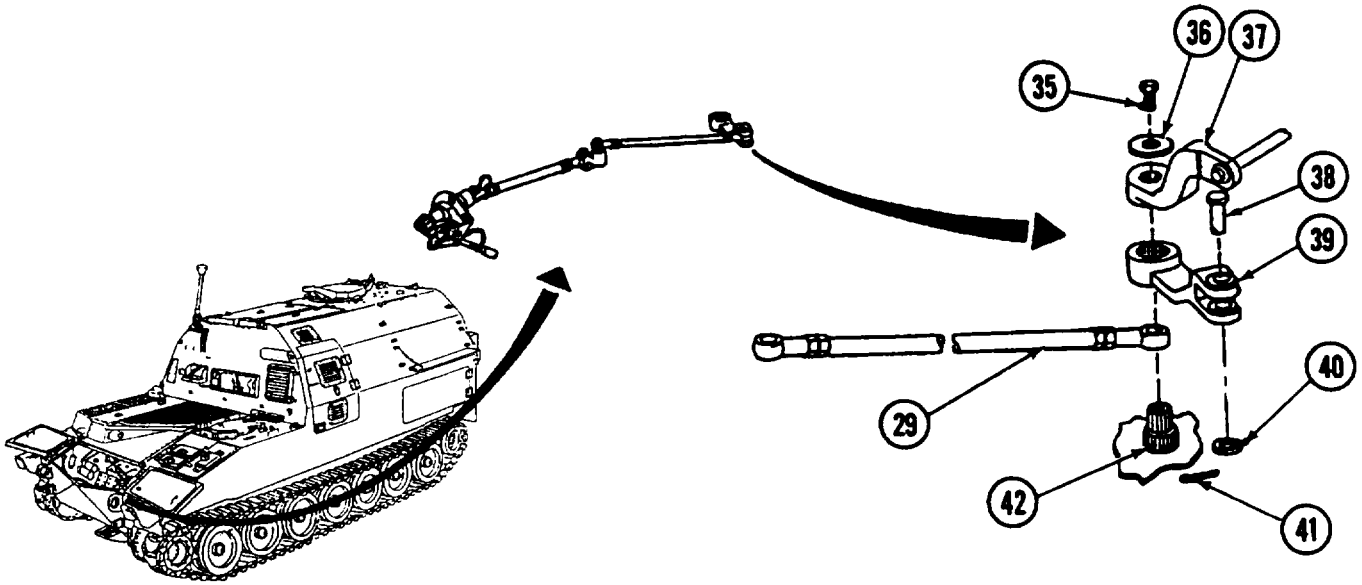
e. INSTALLATION

NOTE

All washers and cotter pins used in the installation of assembled rods may be installed after final adjustment of shift control linkage.

1. Install lever (39) and throttle control lever (37) on transmission shaft (42) with screw (35) and washer (36).

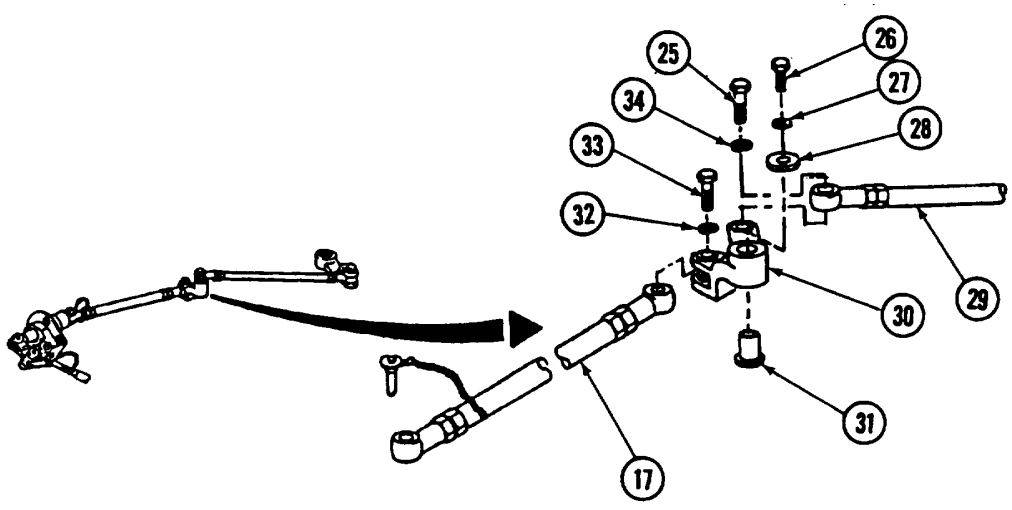
2. Install assembled rod (29) on lever (39) with pin (38), washer (40), and new cotter pin (41).



3. Install spacer (31) and bellcrank (30) on transmission with screw (26), new lockwasher (27), and washer (28).

4. Install assembled rod (29) on bellcrank (30) with screw (25) and new lockwasher (34). Torque screw between 15 and 19 ft-lb (20 and 24 N•m).

5. Install assembled rod (17) on bellcrank (30) with screw (33) and new lockwasher (32).



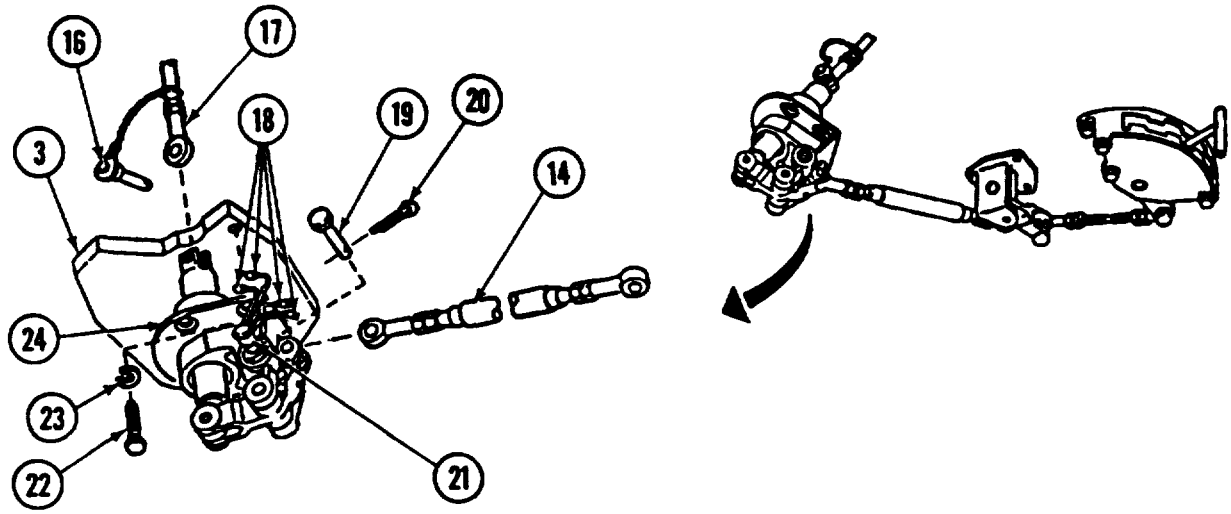
8-2. SHIFT CONTROL LINKAGE REPAIR (continued).

6. Install assembled rod (14) on control assembly (24) with pin (19) and new cotter pin (20).

7. Install control assembly (24) on bulkhead (3) with four screws (22) and new lockwashers (23).

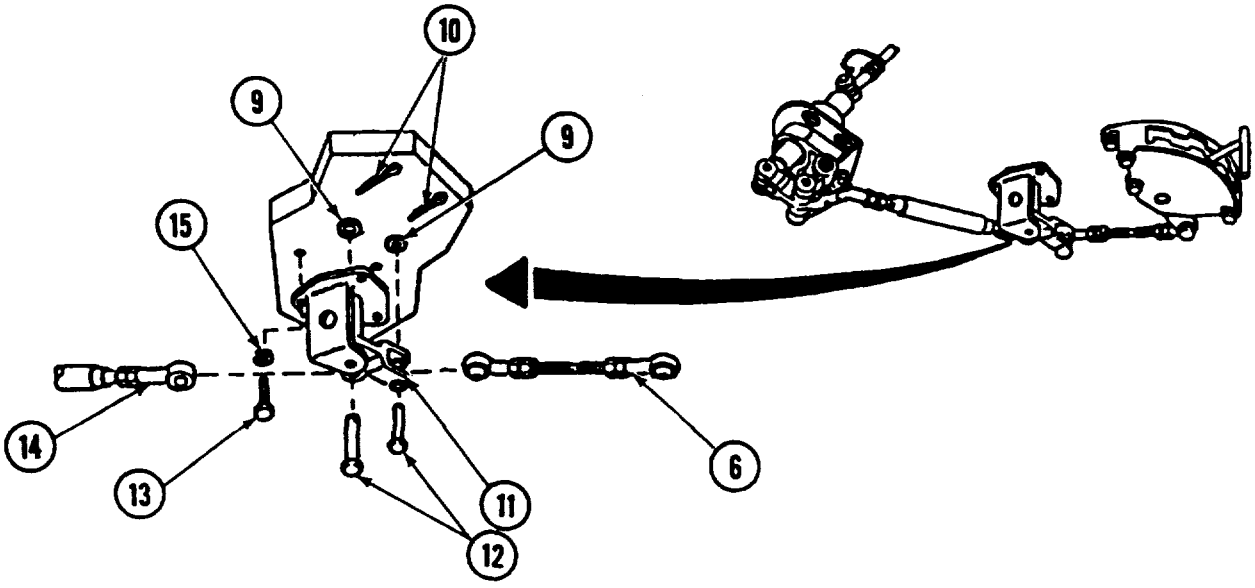
8. Connect four electrical leads (18) to neutral safety switch (21).

9. Install assembled rod (17) on control assembly (24) with quick-release pin (16).



10. Install bellcrank support (11) on bulkhead (3) with three screws (13) and new lockwashers (15).

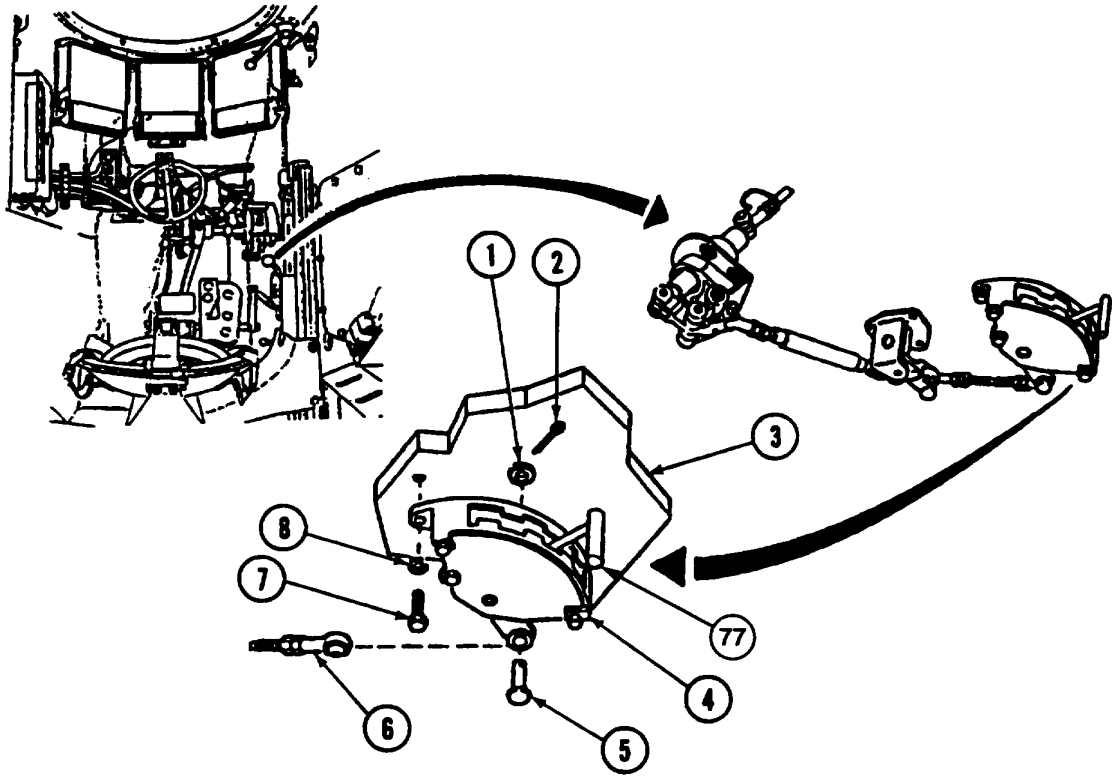
11. Install two assembled rods (6 and 14) on bellcrank support (11) with two pins (12), washers (9), and new cotter pins (10).



8-2. SHIFT CONTROL LINKAGE REPAIR (continued).

12. Install shift quadrant (4) on bulkhead (3) with three screws (7) and new lockwashers (8).

13. Install assembled rod (6) on shift quadrant (4) with pin (5), washer (1), and new cotter pin (2).



f. ADJUSTMENT

1. Place shift selector (77) in neutral (N) position. Maintain neutral position.

2. Remove cotter pin (10), washer (9), pin (12), and assembled rod (6) from bellcrank (63). Discard cotter pin.

3. Position bellcrank (63) parallel to lever assembly (58) and in vertical position.

NOTE

Bellcrank arm must remain parallel to lever assembly arm as part of adjustment.

4. Loosen two nuts (44) on assembled rod (6).

5. Adjust length of assembled rod (6), turning both bearings (43) until pin (12) can be installed easily into bellcrank (63) and through bearings (43).

6. Install washer (9) and new cotter pin (10) on pin (12).

7. Tighten two nuts (44) against two bearings (43). After adjustment is complete, check to see that witness holes (78) on bearings (43) are closed by inserting small wire into each hole.

8-2. SHIFT CONTROL LINKAGE REPAIR (continued)

8. Remove cotter pin (10), washer (9), pin (12), and assembled rod (14) from bellcrank (63). Discard cotter pin.

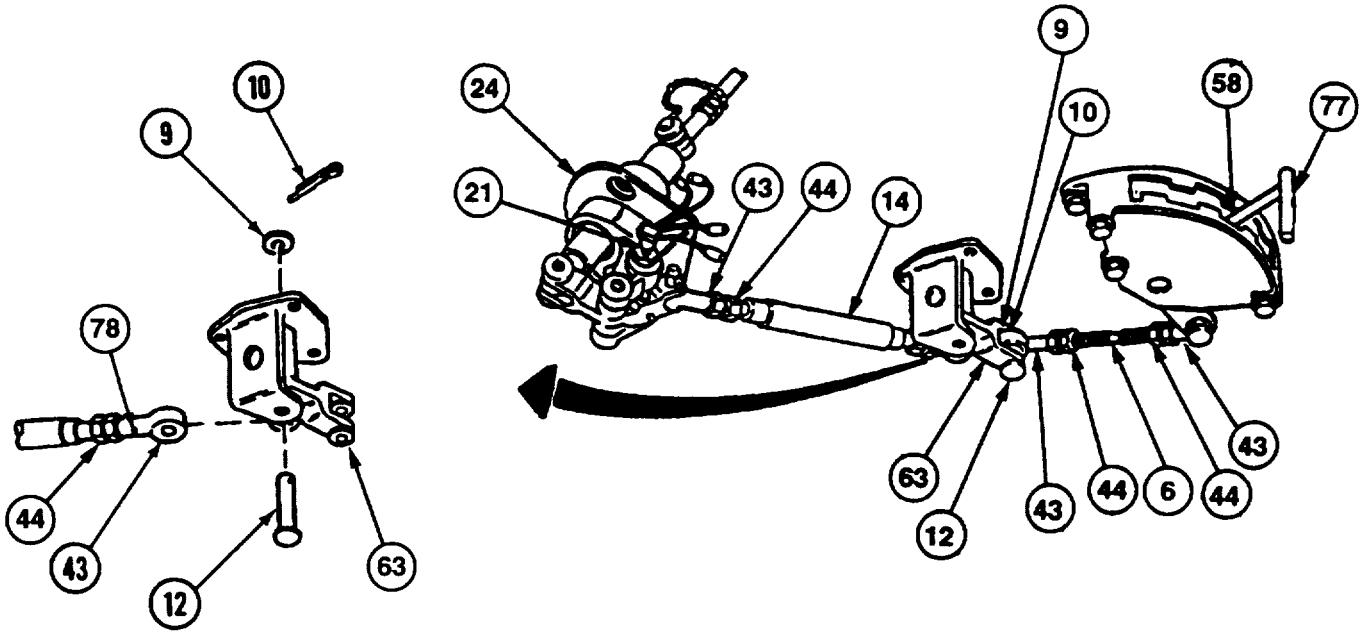
9. Check control base assembly (24) to make sure neutral safety switch (21) is in neutral (N) position. Verify by trying to crank engine after fuel shutoff handle has been pulled (para 4-29).

10. Loosen two nuts (44) on assembled rod (14).

11. Adjust length of assembled rod (14), turning both bearings (43) until pin (12) can be installed easily into bellcrank (63) and through bearings (43).

12. Install washer (9) and new cotter pin (10) on pin (12).

13. Tighten two nuts (44) against bearings (43) of assembled rod (14), checking witness holes (78) on bearings (43).



8-2. SHIFT CONTROL LINKAGE REPAIR (continued).

14. Check to see that lever (39) is in neutral (N) position at transmission shift control lever index (79).

15. Remove cotter pin (41), washer (40), pin (38), and assembled rod (29) from lever (39). Discard cotter pin.

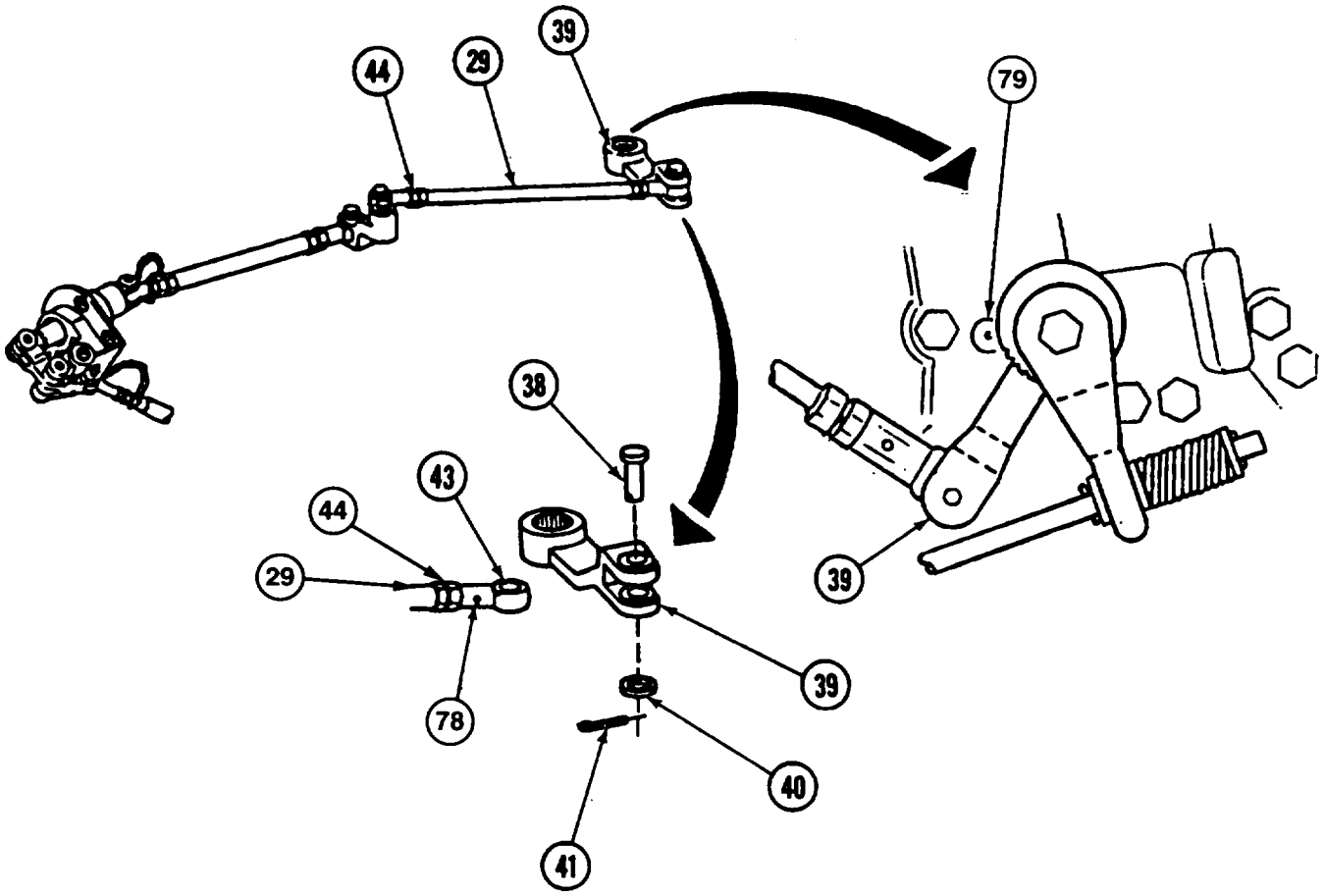
16. Loosen two nuts (44) on assembled rod (29).

17. Adjust length of assembled rod (29), turning both bearings (43) to approximately 8 1/4 inches (20.57 cm), center-to-center distance between bearings (43).

18. Install assembled rod (29) in lever (39) with pin (38), washer (40), and new cotter pin (41).

19. Tighten two nuts (44) against bearings (43) of assembled rod (29), checking witness holes (79) on bearings (43).

20. Recheck to see that lever (39) is in neutral (N) position at index (79).



8-2. SHIFT CONTROL LINKAGE REPAIR (continued).

21. Loosen two nuts (44) on assembled rod (17).

22. Disconnect quick-release pin (16) and remove assembled rod (17) from control assembly (24).

23. Recheck to see that lever (39) is in neutral (N) position at shift control lever index (79).

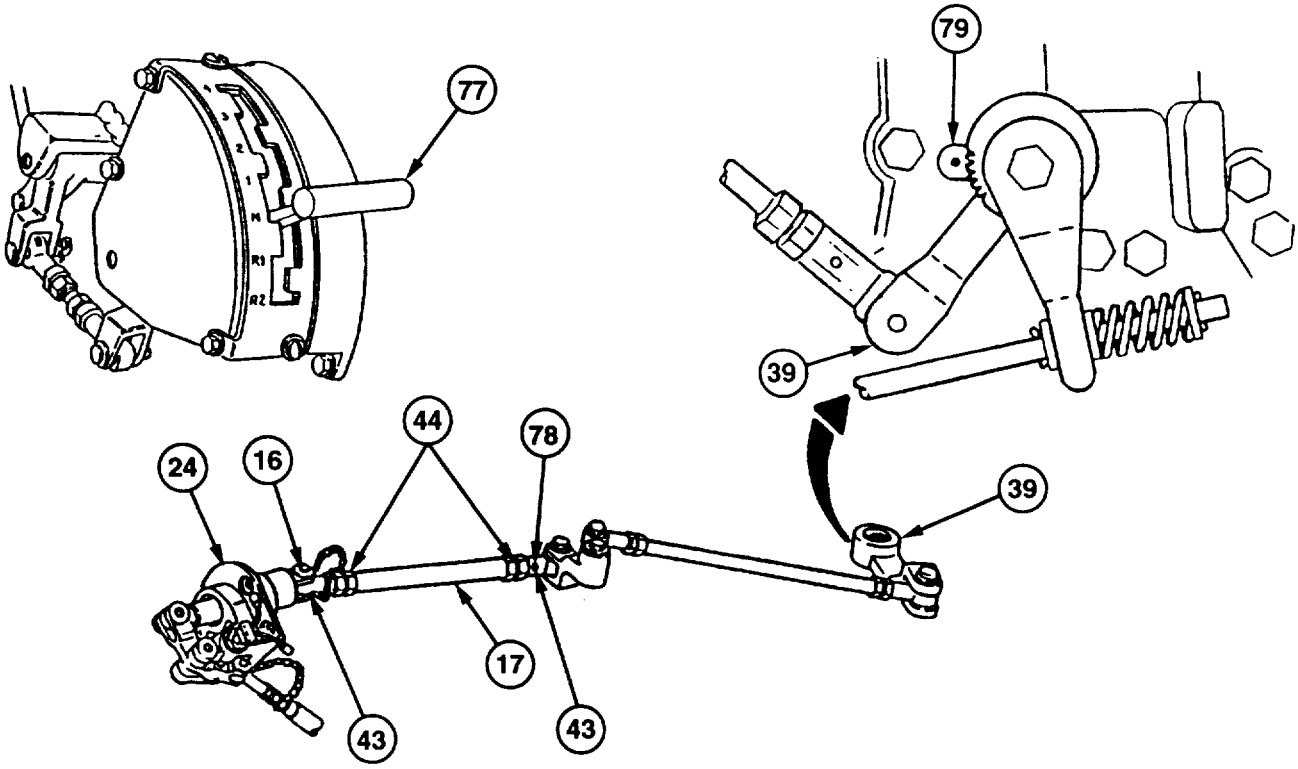
24. Adjust length of assembled rod (17), turning both bearings (43) until quick-release pin (16) can be installed easily into control assembly (24) and through bearings (43).

25. Tighten two nuts (44) against bearings (43) of assembled rod (17), checking witness holes (78) on bearings (43).

WARNING

Verification of shift positions must be performed prior to starting engine. Failure to do so may result in injury to personnel or damage to vehicle.

26. Move shift selector (77) through all positions. Check to see that shift selector setting in driver's compartment is same as shift control lever index (79) on transmission at all positions.



FOLLOW-ON MAINTENANCE:

- Close transmission access doors (refer to TM 9-2350-287-10).
- Close drivers hatch cover (refer to TM 9-2350-287-10).

8-3. NEUTRAL SAFETY SWITCH REPLACEMENT

This Task Covers:

a. Removal
b. Adjustment
c. Cleaning and Inspection
d. Installation

Initial Setup:

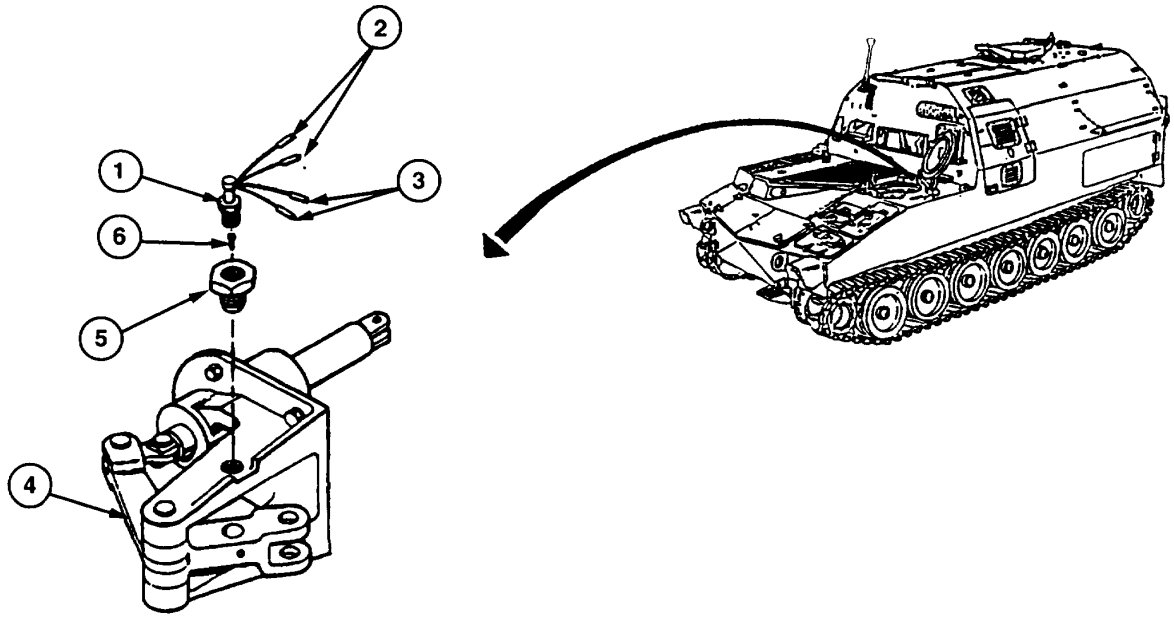
Tools/Test Equipment:
- Digital multimeter (Item 13, Appendix I)
- General mechanic's tool kit (Item 24, Appendix I)

Materials/Parts:
- Drycleaning solvent (Item 28, Appendix D)
- Lubricant, solid film (Item 38.1, Appendix D)
- Rag (Item 56, Appendix D)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Driver's hatch opened and secured (refer to TM 9-2350-287-10).
- Center periscope removed (refer to TM 9-2350-287-10).

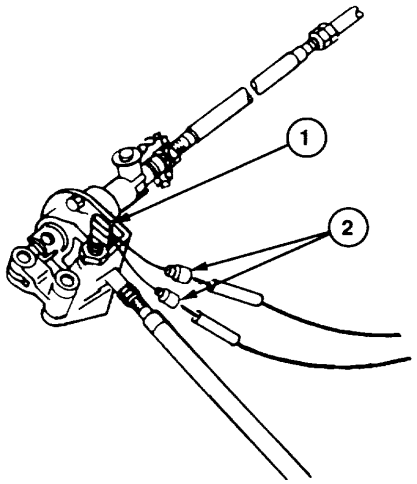
a. REMOVAL

1. Disconnect two electrical connectors 14 (2) and electrical connectors 415A and 415B (3) from neutral safety switch (1).
2. Unscrew neutral safety switch (1) from adapter bushing (5).
3. Remove plunger (6) from adapter bushing (5).
4. Unscrew and remove adapter bushing (5) from shift control linkage base assembly (4).



8-3. NEUTRAL SAFETY SWITCH REPLACEMENT (continued).

b. ADJUSTMENT



1. Disconnect two electrical connectors 14 (2) from transmission shift control lever.
2. Set transmission shift control lever at neutral (N) position.
3. Connect multimeter to two electrical connectors 14 (2) to check continuity. Turn neutral safety switch (1) until multimeter indicates 0 ohms - switch closed.
4. Set transmission shift control lever at first gear. Multimeter must indicate switch open.
5. Set transmission shift control lever at neutral. Multimeter must indicate switch closed. If not, repeat steps 3 and 4.
6. Set transmission shift control lever at each shift position. Check multimeter indication at each position. Multimeter must indicate -at positions 1, 2, 3, 4, R1, and R2, and must indicate 0 ohms at neutral. If not, adjust again.
7. Connect two electrical connectors 14 (2) to transmission shift control lever.

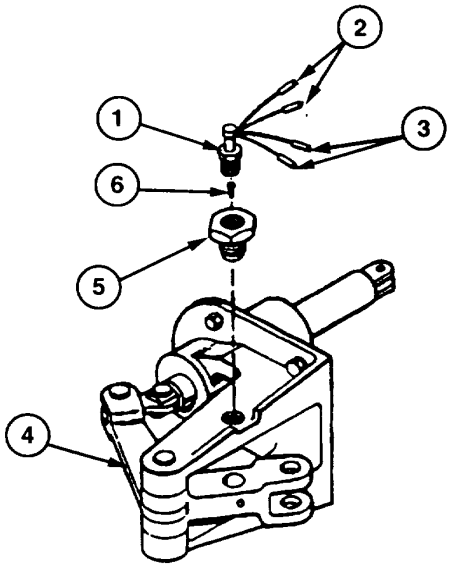
c. CLEANING AND INSPECTION

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT use near open flame or excessive heat.

1. Clean adapter bushing and plunger with drycleaning solvent and rag.
2. Inspect parts for damage or excessive wear. Replace any damaged or worn parts.

d. INSTALLATION



1. Apply lubricant to plunger (6) surfaces that come into contact with adapter bushing (5).
2. Install adapter bushing (5) in shift control linkage base assembly (4).
3. Install plunger (6) in adapter bushing (5).
4. Install neutral safety switch (1) in adapter bushing (5).
5. Connect two electrical connectors 14 (2) and electrical connectors 415A and 415B (3) to neutral safety switch (1).

FOLLOW-ON MAINTENANCE:

- Install center periscope (refer to TM 9-2350-287-10).
- Close driver's hatch (refer to TM 9-2350-287-10).

8-4. TRANSMISSION TRUNNION CAPS REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix I)
- Socket wrench socket adapter (Item 63, Appendix I)
- Torque wrench, 0-175 ft-lb (Item 69, Appendix I)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Left and right transmission access doors opened (refer to TM 9-2350-287-10).
- Primary fuel filter assembly lifting bracket removed (para 4-18).

a. REMOVAL

NOTE

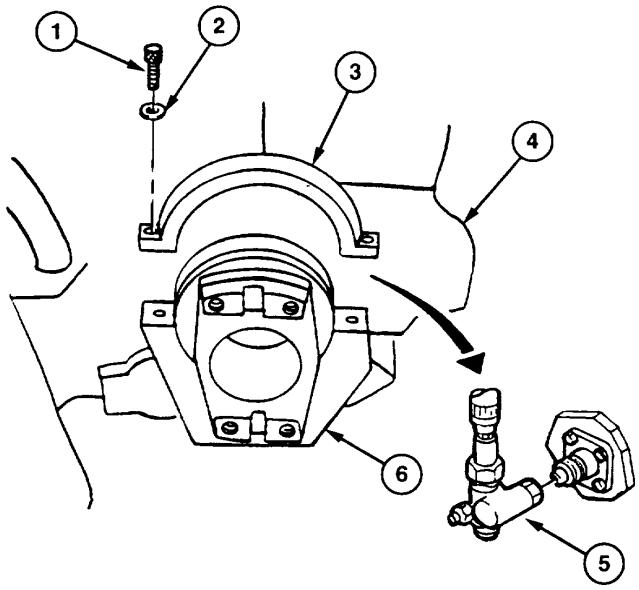
If removing right trunnion cap, begin at step 1. If removing left trunnion cap, go to step 2.

1. Remove speedometer adapter (5) from transmission (4).

2. Remove two screws (1) and washers (2) and trunnion cap (3) from each of two mounts (6) on each side of transmission (4).

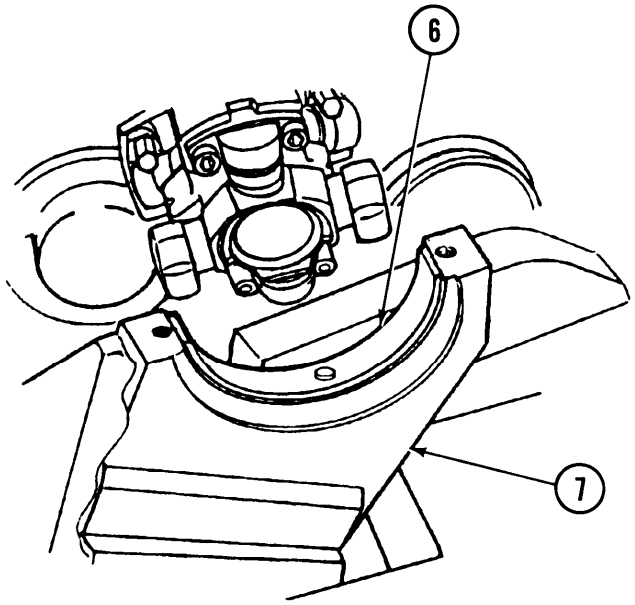
NOTE

To replace lower trunnion inserts, powerpack must be removed.



8-4. TRANSMISSION TRUNNION CAPS REPLACEMENT (continued).

3. Remove lower trunnion insert (6) from each of two mounts (7).



b. INSTALLATION

NOTE

Performstep 1 if lower trunnion inserts were removed.

1. Install lower trunnion insert (6) on each of two mounts (7).

2. Install trunnion cap (3) on each of two mounts (7) with two screws (1) and washers (2).

3. Using socket wrench socket adapter, torque two screws (1) on each of two trunnion caps (3) between 80 and 90 ft-lb (108 and 122 N•m).

NOTE

If installing one or more new trunnion caps, perform steps 4 through 8 on each new trunnion cap. If reusing trunnion caps, proceed to step 9.

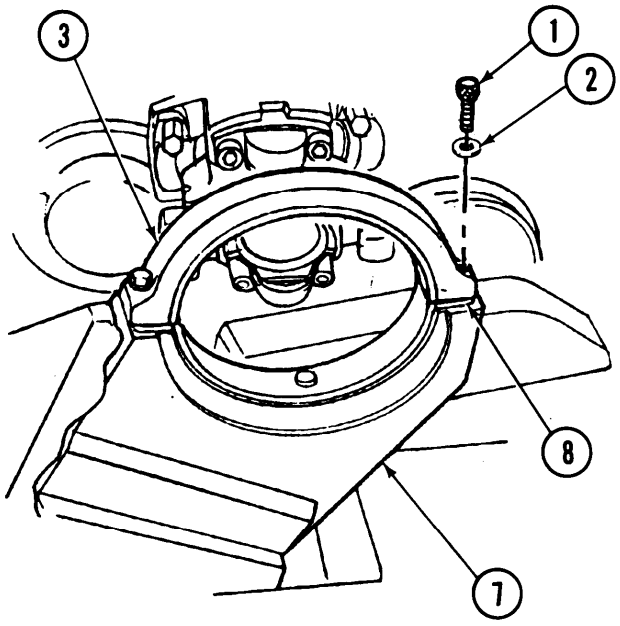
4. Using thickness gage, measure clearance between trunnion cap (3) and mount (7).

5. Compute number of shims required by subtracting 0.006 inch from clearance measurement recorded in step 4.

6. Remove two screws (1) and washers (2) and trunnion cap (3) from mount (7).

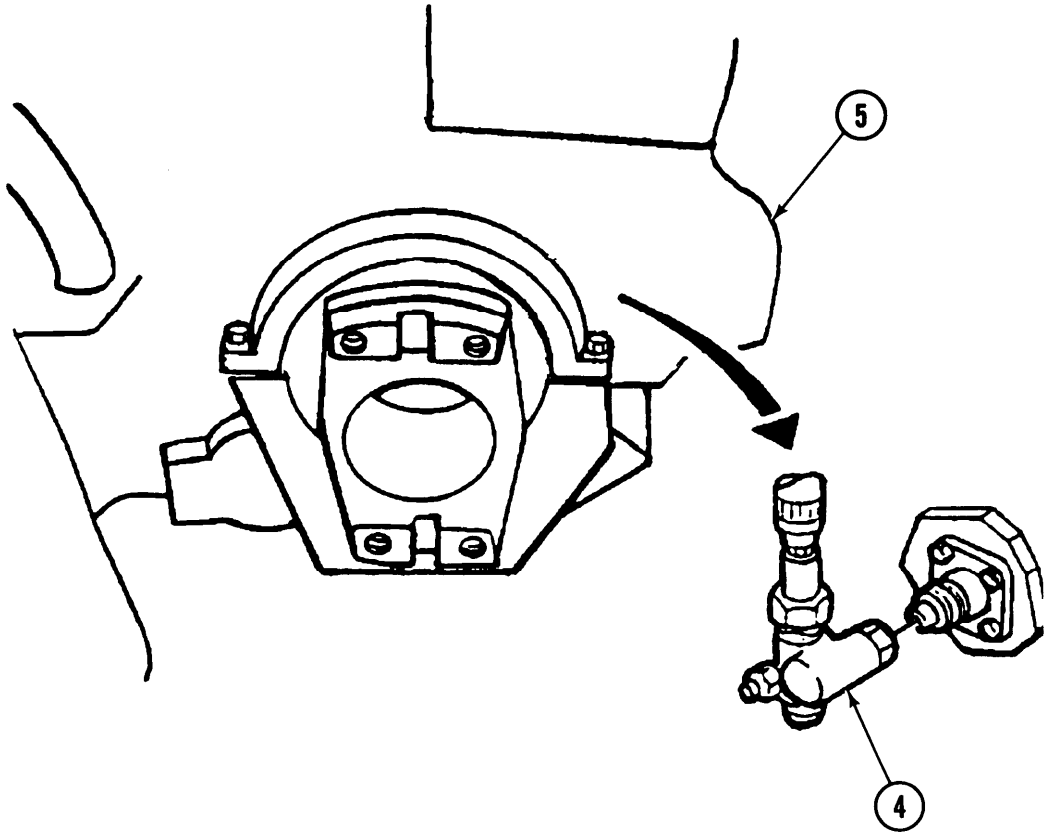
7. Install required number of shims (8) and trunnion cap (3) on mount (7) with two screws (1) and washers (2).

8. Using socket wrench socket adapter, torque two screws (1) between 80 and 90ft-lb (108 and 122 N•m).



84. TRANSMISSION TRUNNION CAPS REPLACEMENT (continued).

9. If removed, install speedometer adapter (4) on transmission (5).



FOLLOW-ON MAINTENANCE:

- Install primary fuel fitter assembly lifting bracket (para 4-18).
- Close left and right transmission access doors (refer to TM 9-2350-287-10).

8-5. TRANSMISSION, TRANSFER, AND DRIVE CONTROL ASSEMBLIES, OIL FILTER AND OIL COOLER HOSES REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- Cap and plug set (Item 13, Appendix D)
- LockWasher (8) (Item 178, Appendix H)
- Preformed packing (2) (Item 229, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Transmission oil temperature transmitter removed (para 7-39).
- Transmission oil pressure transmitter removed (para 7-40).
- PowerPack removed (para 3-2).
- Bypass thermostat housing removed (para 6-12).

a. **REMOVAL CAUTION**

To prevent contamination of oil, lines and ports must be capped immediately after disconnection.

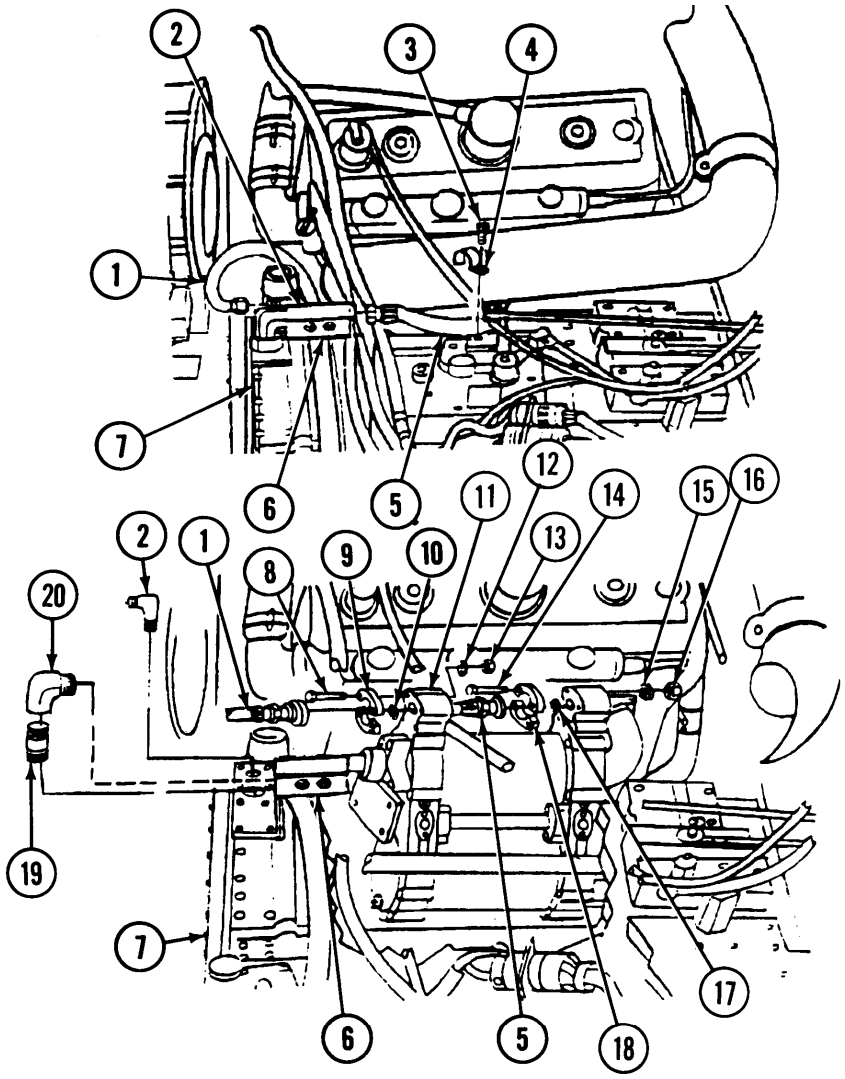
1. **Disconnect oil filter hose assembly (1) from elbow (2) on transmission (7).**

2. Remove screw (3) and clamp (4) from oil filter hose assembly (5).

3. Remove four nuts (13), lockwashers (12), and screws (8), two split flanges (9), packing (10), and oil filter hose assembly (1) from oil cooler (11). Discard packing.

4. Remove four nuts (16), lockwashers (15), and screws (14), two split flanges (18), packing (17), and oil filter hose assembly (5) from oil cooler (11). Discard packing.

5. Disconnect oil fitter hose assembly (4) from manifold (6).

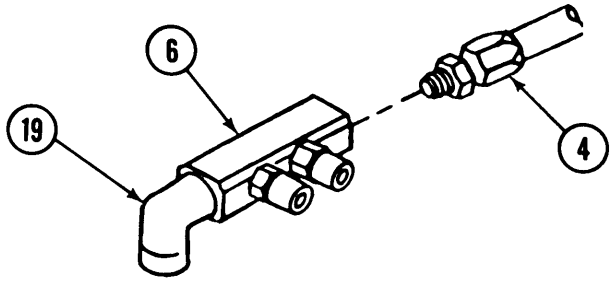


8-5. TRANSMISSION, TRANSFER, AND DRIVE CONTROL ASSEMBLiES, OIL FILTER AND OIL COOLER HOSES REPLACEMENT (continued).

6. Remove manifold (6) from elbow (20).

7. Remove elbow (20) and pipe nipple (19) from transmission (7).

8. Remove elbow (2) from transmission (7).



b. INSTALLATION

1. Install elbow (2) on transmission (7).

2. Install pipe nipple (19) and elbow (20) on transmission (7).

3. Install pipe nipple (19), elbow (20), and manifold (6) on transmission (7).

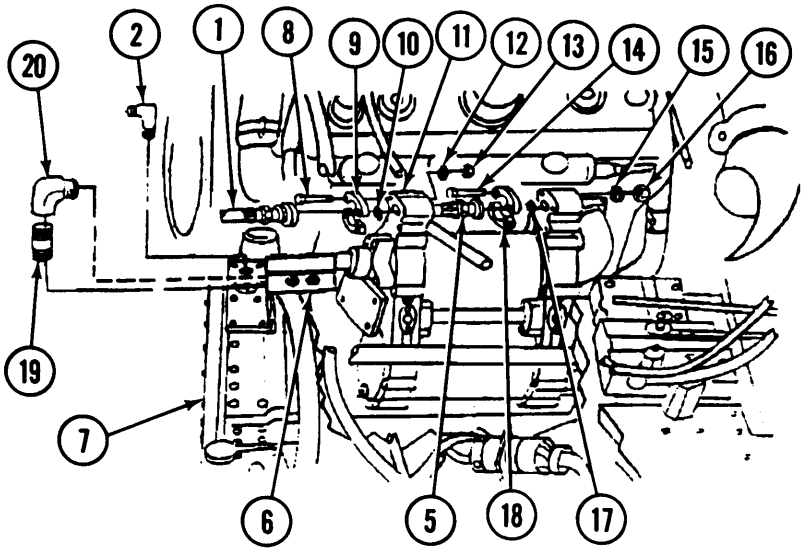
4. Connect oil filter hose assembly (5) on manifold (6).

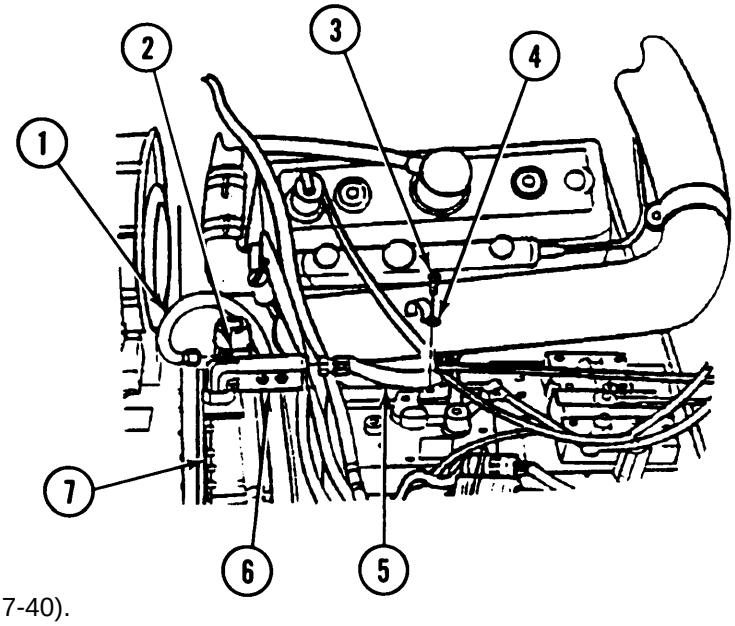
5. Install oil fitter hose assembly (5) to oil cooler (11) with new packing (17), two split flanges (18), and four screws (14), new lockwashers (15), and nuts (16).

6. Install oil cooler hose assembly (1) on oil cooler (11) with new packing (10), two split flanges (9), and four screws (8), new lockwashers (2), and nuts (13).

7. Secure oil filter hose assemby (5) to transmission (7) with clamp (4) and screw (3).

8. Connect oil filter hose assembly (1) to elbow (2).





FOLLOW-ON MAINTENANCE:

- Install bypass thermostat housing (para 6-12).
- Install powerpack (para 3-2).
- Install transmission oil pressure transmitter (para 7-40).
- Install transmission oil temperature transmitter (para 7-38).

8-6. TRANSMISSION OUTPUT FLANGE REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix 1)
- Socket wrench, 1-inch, 3/4-inch drive (Item 58, Appendix 1)
- Torque wrench, 0-600 ft-lb, 3/4-inch drive (Item 70, Appendix 1)

Materials/Parts:
- Self-locking bolt (Item 303, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Universal joint removed (para 9-3).
- Tracks blocked (refer to TM 9-2350-287-10).

a. REMOVAL

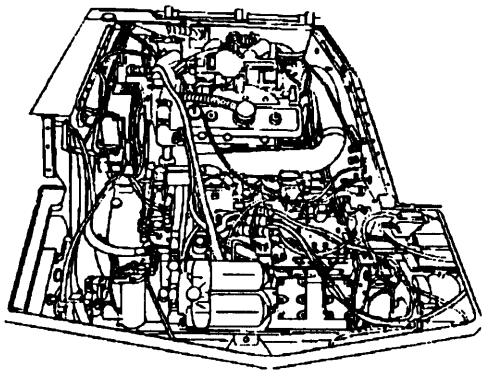
NOTE

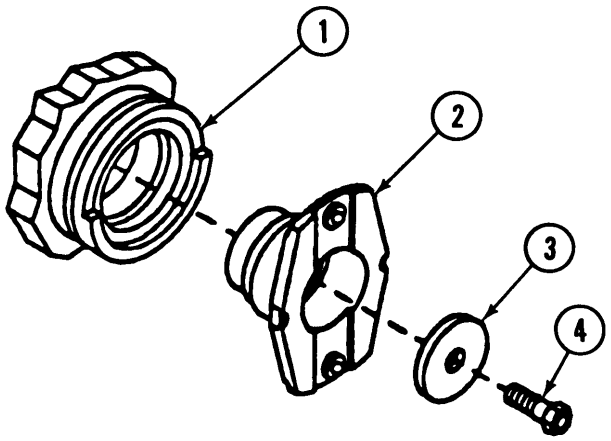
There are two transmission output flanges, which are replaced the same way.

1. Remove screw (4) and plate (3) from transmission output flange (2).
2. Remove output flange (2) from transmission (1).

b. INSTALLATION

1. Aline splines on output flange (2) and transmission (1), and install output flange (2) on transmission (1).
2. install plate (3) and screw (4) on output flange (2). Torque screw between 299 and 330 ft-lb (405 and 447 N•m).





FOLLOW-ON MAINTENANCE:
- Install universal joint (para 9-3).

8-7. TRANSMISSION INTERNAL BRAKE ADJUSTMENT.

This Task Covers:

Adjustment

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- Gasket (2) (Item 98, Appendix H)
- Lockwasher (12) (Item 183, Appendix H)

Personnel: Two

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Tracks blocked (refer to TM 9-2350-287-10).
- Transmission access door opened (refer to TM 9-2350-287-10).
- Service and parking brake linkage adjusted (para 10-2).

ADJUSTMENT

WARNING

Tracks must be blocked so vehicle will not roll when adjusting transmission internal brake. Failure to heed this warning can result in severe injury to personnel.

1. Have assistant apply brakes fully (refer to TM 9-2350-287-10). Observe index marks (5) on brake levers (4).
2. If index marks (5) rotate to APPLY mark (1) on retainer (3) but not to READJUST mark (2), brakes are properly adjusted. No further maintenance is required.
3. If index marks (5) do not rotate to APPLY mark (1), or rotate past READJUST mark (2), brakes require adjustment. Proceed to step 4.
4. Remove six screws (19) and lockwashers (20), right cover (21), and gasket (14) from right brake (18) on transmission (22). Discard lockwashers and gasket.
5. Remove file screws (9) and lockwashers (8) and clamp (7) from left cover (6) on transmission (22). Discard lockwashers.
6. Remove screw (11), lockwasher (12), two lockwashers (10), ground lead (13), left cover (6), and gasket (15) from left brake (16) on transmission (22).
7. Insert screwdriver into adjustment nut (17) on right and left brakes(18 and 16), Turning nut (17) clockwise will tighten brakes; turning nut (17) counterclockwise will loosen brakes.
8. Adjust right and left brakes (18 and 16) uniformly so that both index marks (5) aline with APPLY mark (1) on retainer (3) when brakes are applied.
9. Install new gasket (15), left cover (6), ground lead (1 3), two new lockwashers (10), new lockwasher (12), and screw (11) on left brake (16) on transmission (22).

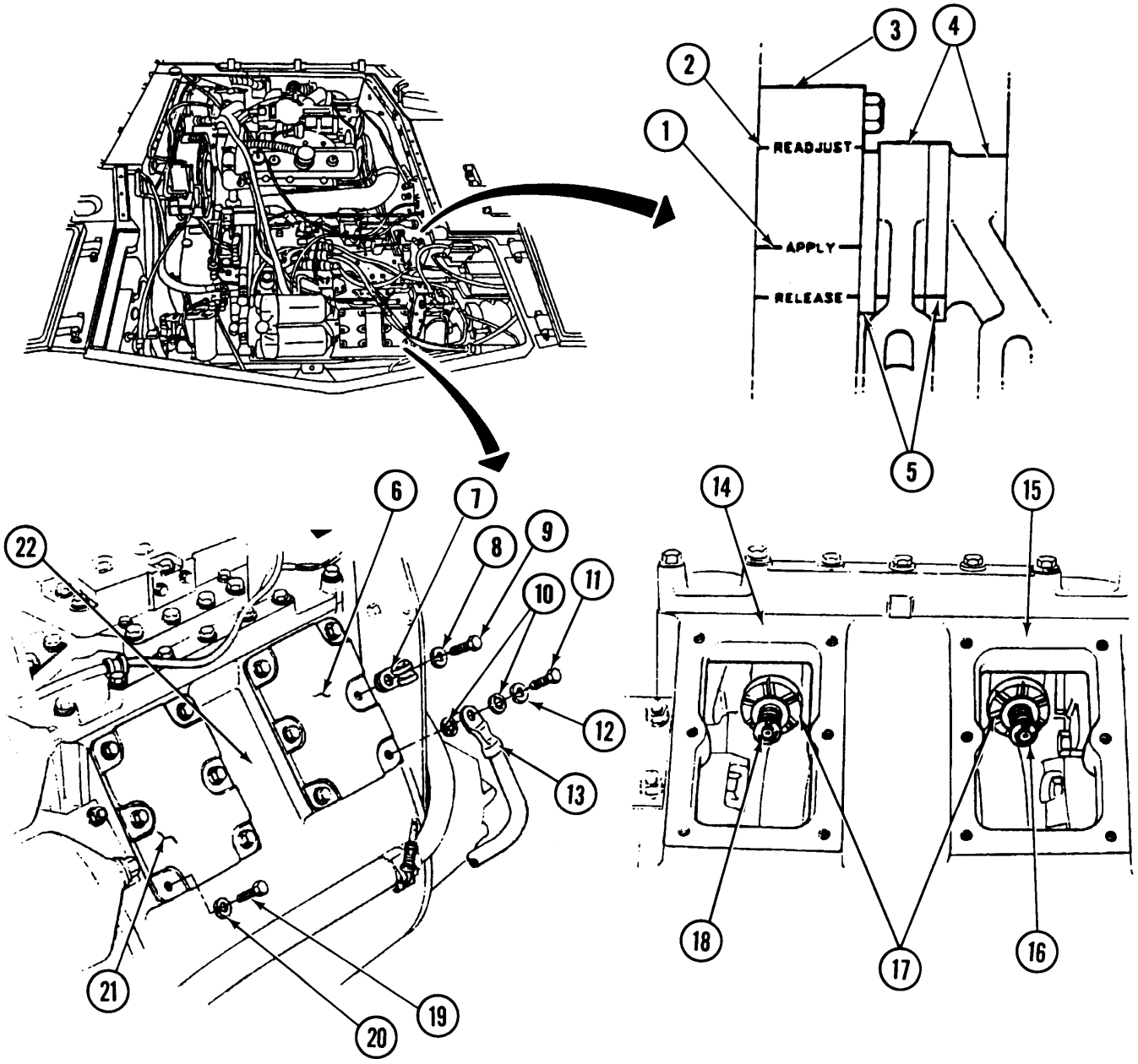
8-7. TRANSMISSION INTERNAL BRAKE ADJUSTMENT (continued).

10. Install five screws (9) and new lockwashers (8) and clamp (7) on transmission (22).

11. Install new gasket (14) and right cover (21) on transmission (22) with six screws (19) and new lockwashers (20).

12. Accelerate vehicle to 15 mph (24 kph). Release accelerator pedal and apply brakes. Vehicle should stop without pulling to one side. Adjust brakes, if required.

13. With vehicle stopped on an incline and with transmission in neutral, depress brake pedal and apply parking brakes. Brakes should lock securely and hold vehicle in place, Adjust brakes, if required.



FOLLOW-ON TASKS:

- Close transmission access doors (refer to TM 9-2350-287-10).
- Unblock tracks (refer to TM 9-2350-287-10).

8-8. TRANSMISSION FILLER NECK REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tool/Test Equipment:
- General mechanic's tool kit (item 24, Appendix 1)

Materials/Parts:
- Sealing compound (Item 58, Appendix D)
- Gasket (Item 104, Appendix H)
- Lockwasher (4) (Item 183, Appendix H)
- Seal (Item 295, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Right transmission access door opened (refer to TM 9-2350-287-10).

a. REMOVAL

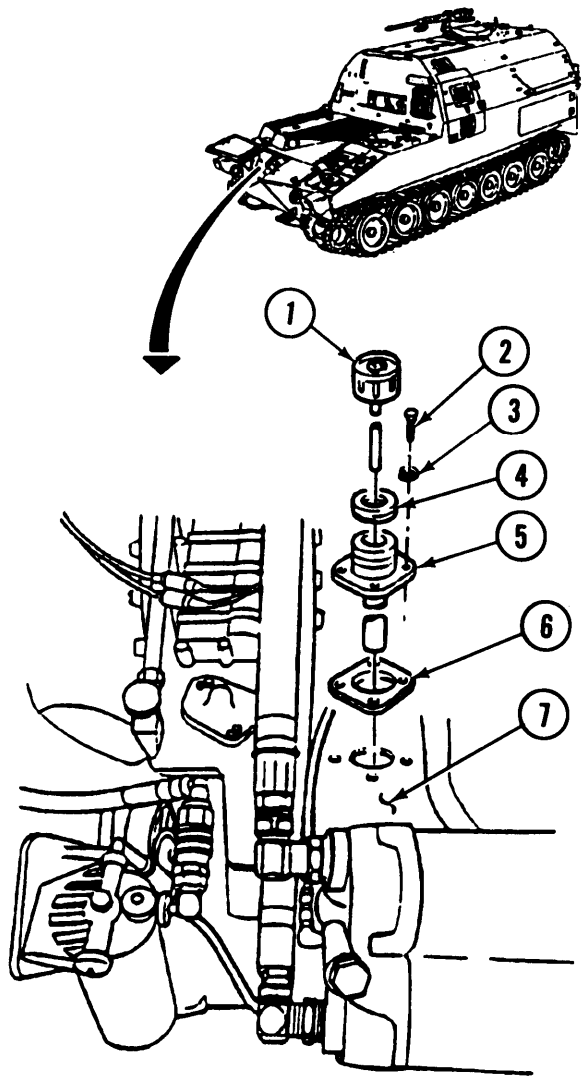
1. Remove gage rod (1) from filler neck (5).
2. Remove seal (4) from filler neck (5). Discard seal.
3. Remove four screws (2), lockwashers (3), filler neck (5), and gasket (6) from transmission (7). Discard gasket and lockwashers.

b. INSTALLATION

WARNING

Sealing compounds can bum easily, give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. if sealing compound gets on skin or clothing, wash immediately with soap and water.

1, Apply sealing compound to threads of four screws (4).
2. Install new gasket (6) and filler neck (5) on transmission (7) with four new lockashers (3) and screws (2).
3. Install seal (4) on filler neck (5).
4. Install gage rod (1) in filler neck (5).



FOLLOW-ON MAINTENANCE:
- Close right transmission access door (refer to TM 9-2350-287-10).

CHAPTER 9
TRANSFER, FINAL DRIVE, PLANETARY, AND DROP GEARBOX MAINTENANCE

9-1. GENERAL=

This chapter describes and illustrates maintenance procedures for the transfer, final drive, planetary, and drop gearbox, which includes the breather tube, fitter, and mount, universal joint, final drive assembly, and final drive skid plates.

9-2. BREATHER TUBE, FILTER, AND MOUNT REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- Automotive adjustable wrench (Item 4, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)

Materials/Parts:
- Lockwasher (2) (Item 164, Appendix H)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Right transmission door opened (refer to TM 9-2350-287-10).
- Engine intake grille opened (refer to TM 9-2350-287-10).

9-2. BREATHER TUBE, FILTER, AND MOUNT REPLACEMENT (continued).

a. REMOVAL

1. Loosen nut on hose (3) and remove hose (3) from elbow (4).
2. Remove breather filter (6) from breather mount (7).
3. Remove two screws (11), lockwashers (10), and washers (9) and ground lead (12) from transmission (8). Discard lockwashers.

NOTE

Breather tube can be replaced without removing mount.

4. Disconnect two fittings (2) on breather tube (5) at elbow (1) and mount (7).
5. Remove breather tube (5) and mount (7) from transmission (8).

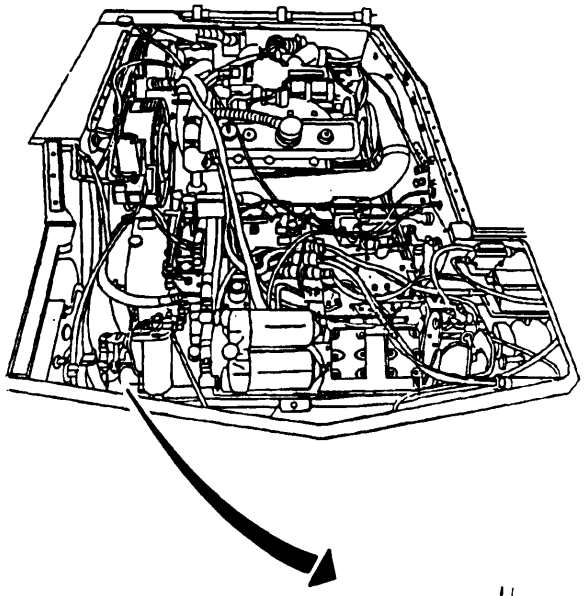
b. INSTALLATION

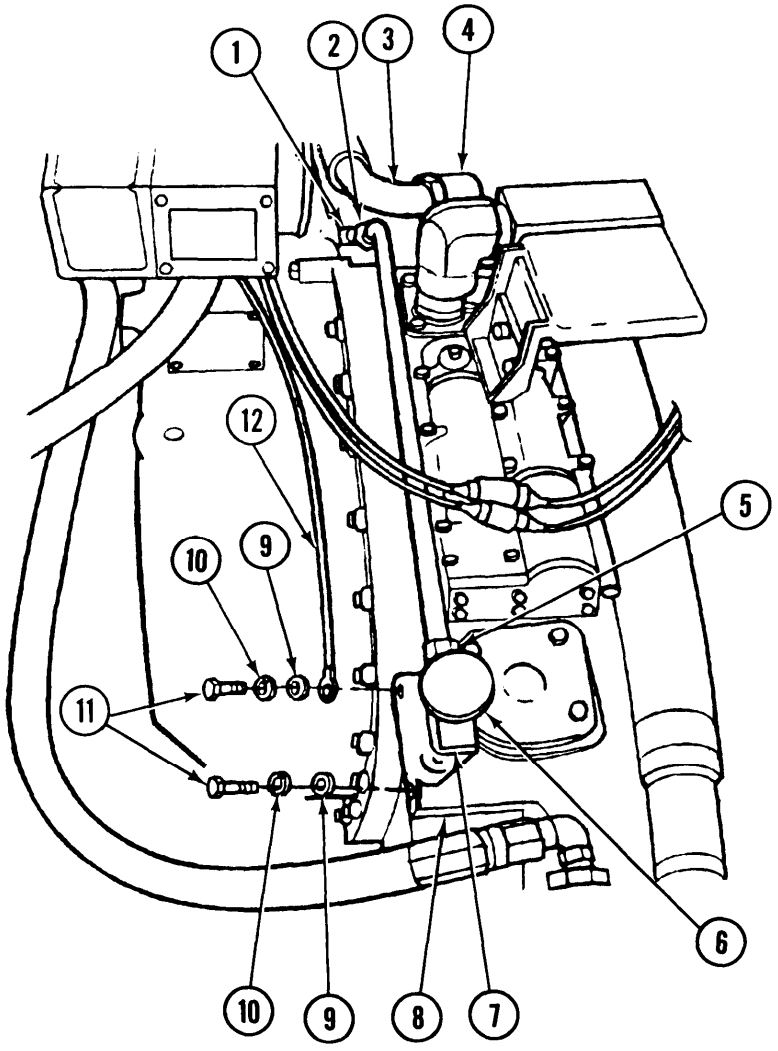
NOTE

Do not tighten screws until after tube is connected.

1. Install mount (7) and breather tube (5) on transmission (8).
2. Install ground lead (12) and two screws (11), new lockwashers (10), and washers (9) on transmission (8) and connect two fittings (2) on breather tube (5) at elbow (1) and mount (7).
3. Tighten two screws (11) on mount (7).
4. Install breather filter (6) on mount (7).
5. Install hose (3) on elbow (4) and tighten nut on hose (3).

9-2. BREATHER TUBE, FILTER, AND MOUNT REPLACEMENT (continued).





FOLLOW-ON MAINTENANCE:

- Close engine intake grille (refer to TM 9-2350-287-10).
- Close right transmission access door (refer to TM 9-2350-287-10).

9-3. UNIVERSAL JOINT REPAIR.

This Task Covers:

a. Removal
b. Disassembly
c. Cleaning and Inspection
d. Assembly
e. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix 1)
- Machinist's vise, 4-inch (Item 33, Appendix 1)
- Wire twister pliers (Item 74, Appendix 1)

Materials/Patis:
- Dry cleaning solvent (Item 27, Appendix D)
- Lockwire (2 lengths) (Item 199, Appendix H)
- Lockwire (8 lengths) (Item 203, Appendix H)

Personnel Required: Two

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Transmission access doors opened (refer to TM 9-2350-287-10).
- Track blocked (refer to TM 9-2350-287-10).

a. REMOVAL

1. Remove lockwire (3) from eight screws (4). Discard lockwire.
2. Remove four screws (4) from final drive flange (5).
3. Pry universal joint (2) and final drive flange (5) apart.

WARNING

Universal joints are heavy. An assistant is needed when removing or installing universal joint. Failure to heed this warning may result in injury to personnel.

NOTE

An assistant is needed to support universal joint during removal.

4. Remove four screws (4) and universal joint (2) from transmission output flange (1).

b. DISASSEMBLY

NOTE

To ensure proper assembly, note lockwire lacing pattern.

1. Position plate (10) into vise and secure.

9-3. UNIVERSAL JOINT REPAIR (continued).

2. Remove four lengths of lockwire (14) from eight screws (1 3). Discard lockwire.

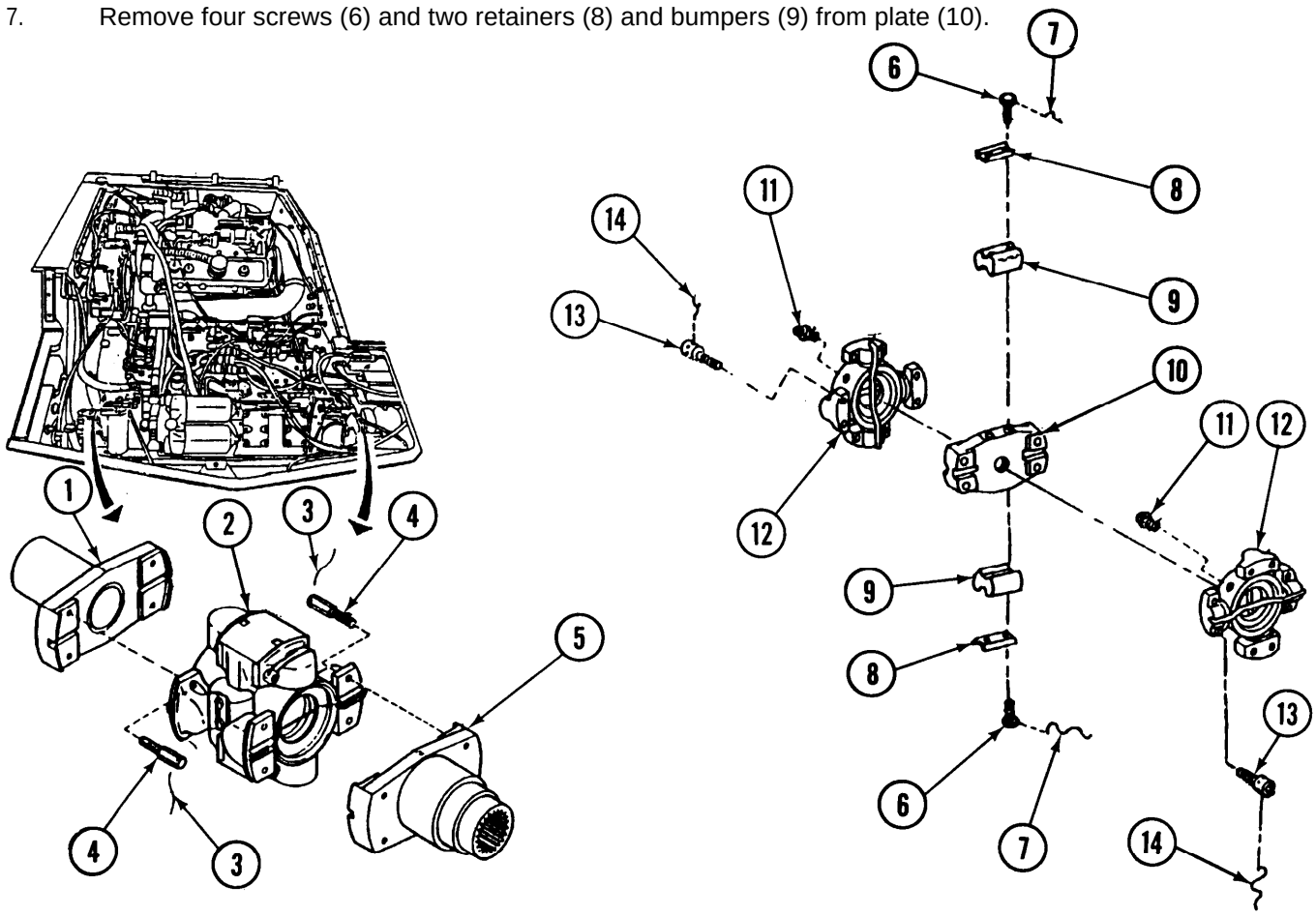
3. Remove four screws (13) from each of two spider assemblies (12).

4. Separate two spider assemblies (12) from plate (1 O).

5. Remove two lubrication fittings (11) from two spider assemblies (1 2).

6. Remove lockwire (7) from four screws (6). Discard lockwire.

7. Remove four screws (6) and two retainers (8) and bumpers (9) from plate (10).



c. CLEANING AND INSPECTION

WARNING

Drycleaning solvent P-D-680 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat.

1. Clean all metal parts with drycleaning solvent. Allow to air-dry.

9-3. UNIVERSAL JOINT REPAIR (continued).

2. Check two spider assemblies (12) for defects. Check for play between bearing caps and spider assembly. Replace spider assembly if play is excessive.

3. Inspect retainers and bumpers for deterioration, cracks, or distortion. Replace if necessary.

d. ASSEMBLY

1. Install two bumpers (9) and retainers (8) on plate (10) with four screws (6).

2. Install new Iockwire (7) on four screws (6).

3. Install two lubrication fittings (11) in two spider assemblies (1 2).

4. Install two spider assemblies (12) on plate (10) with eight screws (1 3).

5. Install new Iockwire (14) on eight screws (13).

e. INSTALLATION

WARNING

Universal joints are heavy. An assistant is needed when removing or installing universal joint. Failure to heed this warning can result in injury to personnel.

NOTE

An assistant is needed to support universal joint during installation.

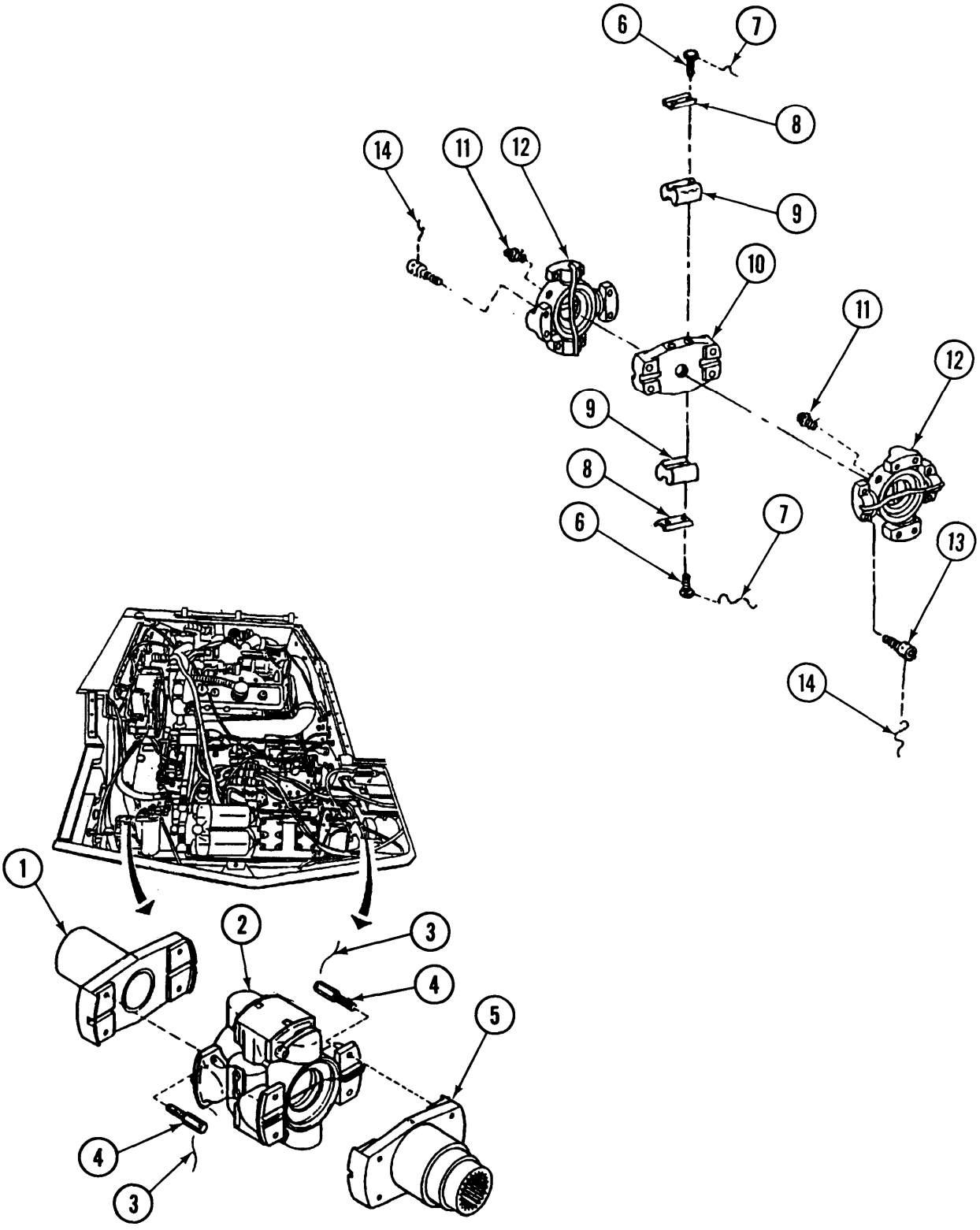
1. Aline keyways on universal joint (2) and output flange (1), and install universal joint (2) on output flange (1) with four screws (4).

2. Move final drive flange (5) toward universal joint (2).

3. Aline keyways on universal joint (2) and final drive flange (5), and install universal joint (2) on final drive flange (5) with four screws (4).

4. Install new Iockwire (3) in eight screws (4).

9-3. UNIVERSAL JOINT REPAIR (continued).



FOLLOW-ON MAINTENANCE:

- Close transmission access doors (refer to TM 9-2350-287-10).

9-4. FINAL DRIVE ASSEMBLY REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- Drain pan (Item 14, Appendix 1)
- Eye bolt (Item 21, Appendix 1)
- Final drive lifting sling (Item 22, Appendix 1)
- Five-ton hoist (Item 23, Appendix 1)
- General mechanic's tool kit (Item 24, Appendix 1)
- Guide pin (Item 27, Appendix 1)
- Socket wrench extension 1/4" drive (Item 54, Appendix 1)
- Socket wrench 3/4" drive, 1 1/16" (Item 59, Appendix 1)
- Socket wrench 3/4" drive, 1 1/8" (Item 60, Appendix 1)
- Socket wrench handle 3/4' drive (Item 61, Appendix 1)

Materials/Parts:
- Lubricating oil item 38, Appendix D)
- Lockwasher (Item 175, Appendix H)
- Lockwasher (14) (Item 182, Appendix H)
- Self-locking nut (5) (Item 311, Appendix H)

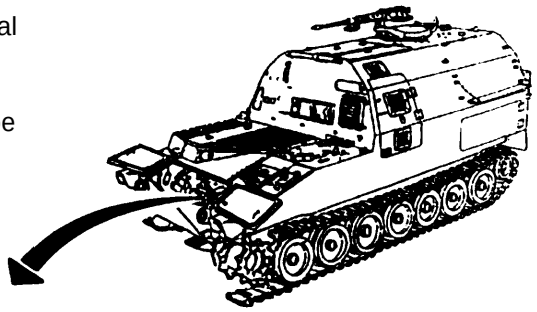
Personnel Required: Two

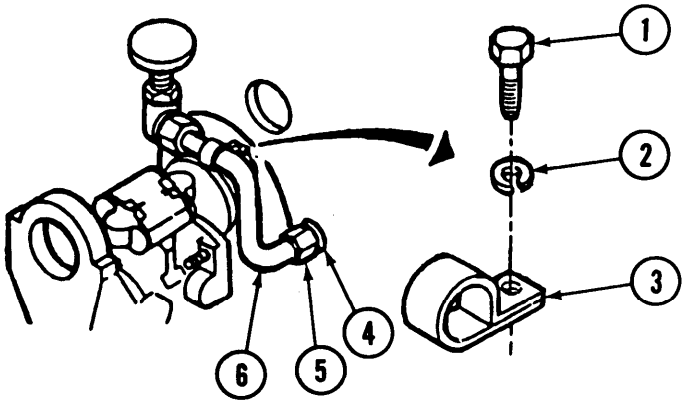
Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).
- Final drive sprocket and hub removed (para 11-11).
- Universal joint and flange removed (para 9-3).

a. REMOVAL

1. Remove screw (1), lockwasher (2), and clamp (3) from final drive assembly (4). Discard lockwasher.

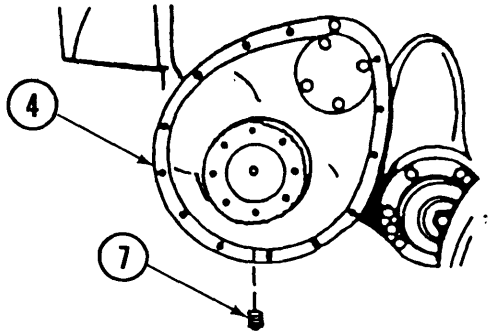
2. Unscrew vent tube hexnut connector (5) and remove vent tube (6) from final drive assembly (4).





9-4 FINAL DIRVE ASSEMBLY REPLACEMENT (continued).

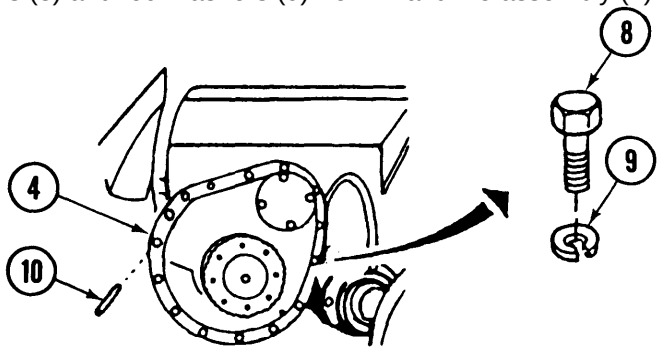
3. Remove drain plug (7) and drain oil from final drive assembly (4) into drain pan.



4. Remove two screws (8) and lockwashers (9) from final drive assembly (4). Discard lockwashers.

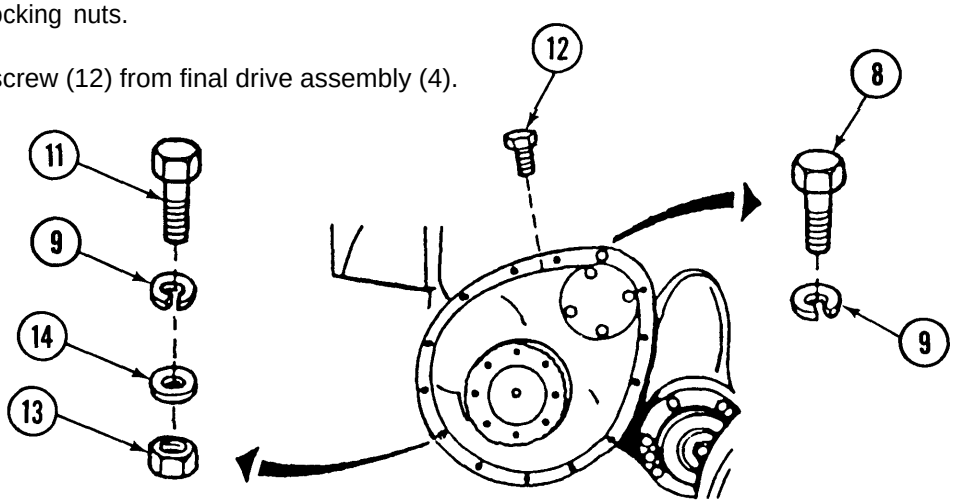
5. Install two guide pins (10) in screw holes in final drive assembly (4).

6. Remove seven screws (8) and lockwashers (9) from final drive assembly (4). Discard lockwashers.



7. Remove five screws (11), washers (14), lockwashers (9), and self-locking nuts (13). Discard lockwashers and self-locking nuts.

8. Remove screw (12) from final drive assembly (4).

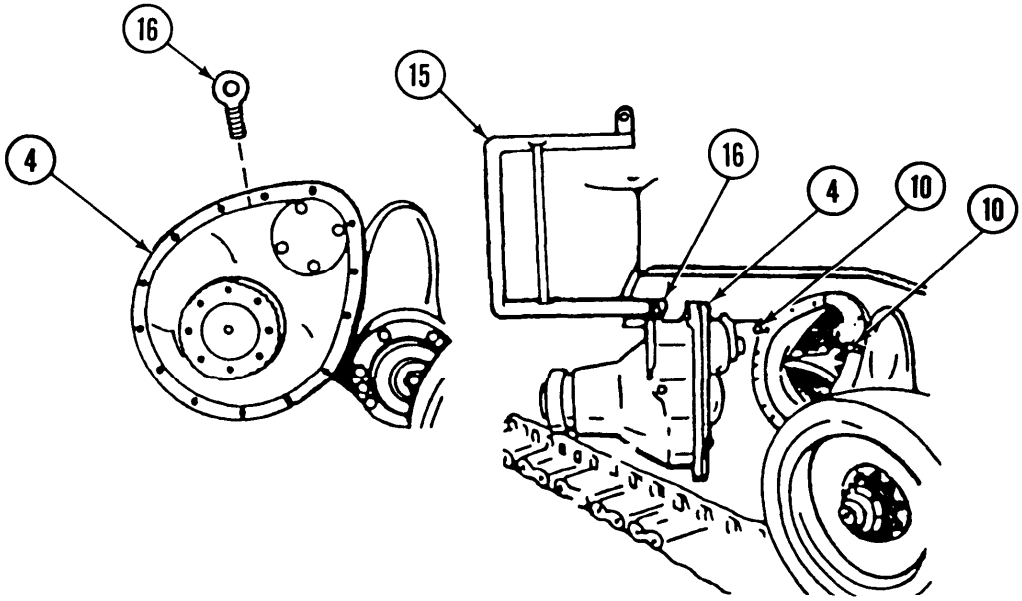


9-4. FINAL DRIVE ASSEMBLY REPLACEMENT (continued).

9. Install eyebolt (16) in top of final drive assembly (4).

10. Attach lifting sling (15) to eyebolt (16) and hoist.

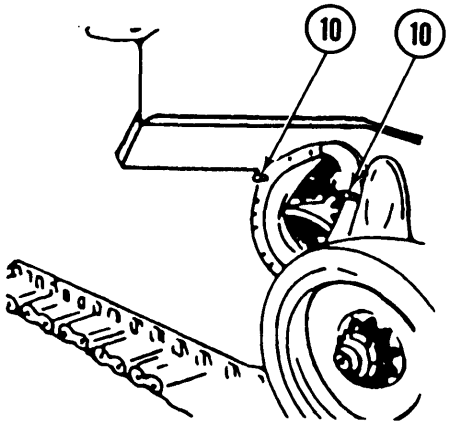
11. Remove final drive assembly (4) from vehicle hull. Place on suitable support and remove lifting sling (15).



12. Remove two guide pins (10) from vehicle hull.

b. INSTALLATION

1. Install two guide pins (10) in vehicle hull.



2. Attach lifting sling (15) to eyebolt (16) and hoist on final drive assembly (4).

9-4. FINAL DRIVE ASSEMBLY REPLACEMENT (continued).

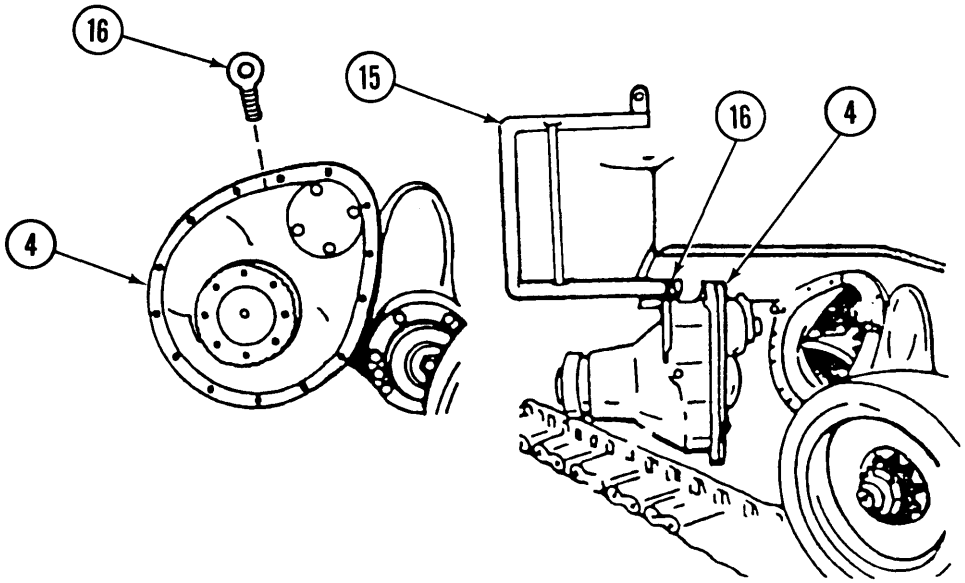
3. Position final drive assembly (4) against hull and secure with five screws (11), washers (14), new lockwashers (9), and new self-locking nuts (13).

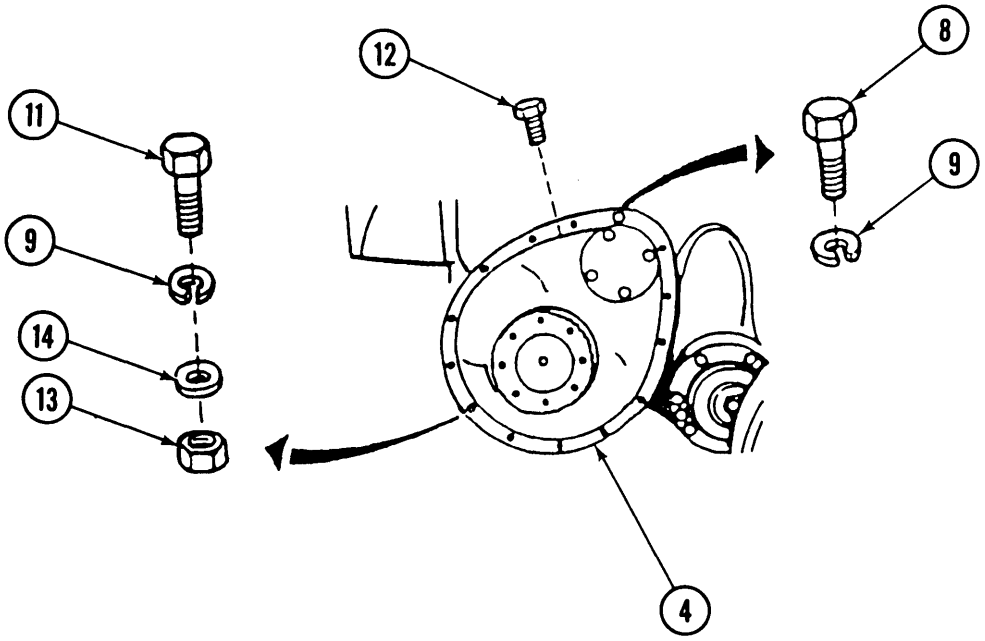
4. Install seven screws (8) and new lockwashers (9) in final drive assembly (4).

5. Torque 12 screws (8 and 11) to 290 ft-lb (393 N•m).

6. Remove hoist, lifting sling (15), eyebolt (16), and two guide pins (10) from final drive assembly (4).

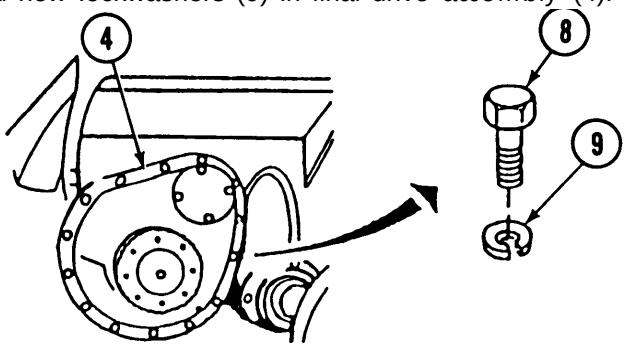
7. Install screw (12) in final drive assembly (4).





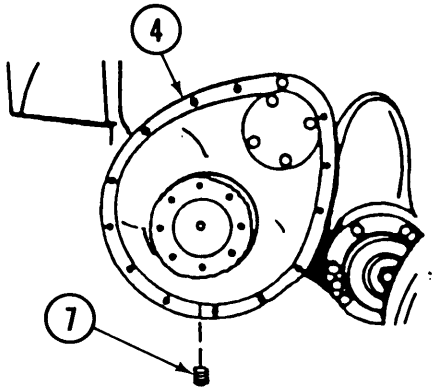
9-4. FINAL DRIVE ASSEMBLY REPLACEMENT (continued).

8. Install two screws (8) and new lockwashers (9) in final drive assembly (4). Torque screws (8) to 290 ft-lb (393 N•m).



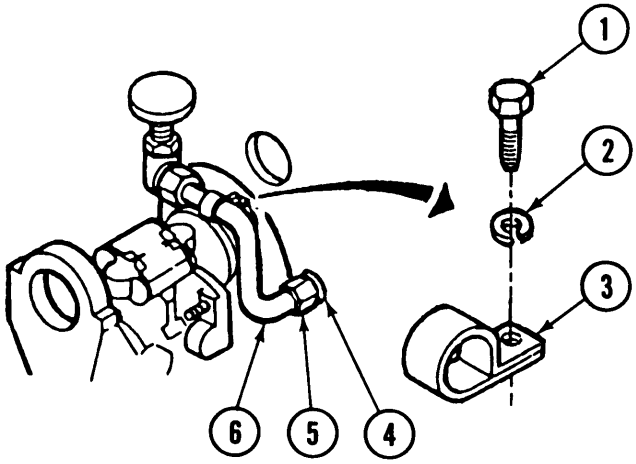
9. Install drain plug (7) in final drive assembly (4).

10. Fill final drive assembly (4) with oil (refer to Appendix G).



11. Position vent tube (6) in vehicle and tighten vent tube hexnut connector (5).

12. Secure upper end of vent tube (5) in final drive assembly (4) with clamp (3), screw (1), and new lockwasher (2).



FOLLOW ON MAINTENANCE:

- Install final drive sprocket and hub (para 11-11)
- Install universal joint and flange (para 9-3).

9-5. FINAL DRIVE SKID-PLATES REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup:

Tools/Test Equipment:
- General mechanic's tool kit (Item 24, Appendix 1)

Equipment Conditions:
- Vehicle parked on level ground (refer to TM 9-2350-287-10).

a. REMOVAL

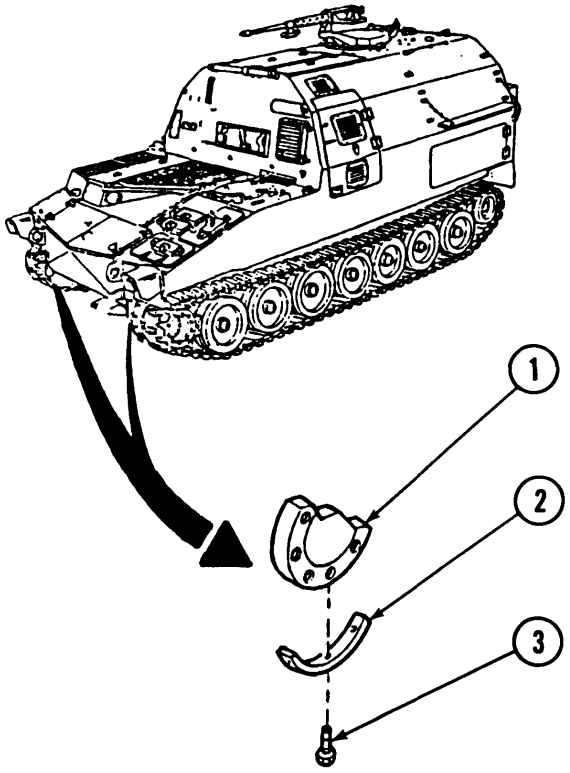
NOTE

Both final drive skid plates are replaced the same way.

Remove three screws (3) and skid plate (2) from final drive assembly (1).

b. INSTALLATION

Install skid plate (2) on final drive assembly (1) with three screws (3).



FOLLOW-ON MAINTENANCE:
- None

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Volumes 1 and 2

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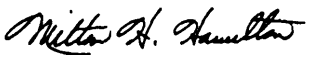
By Order of the Secretary of the Army:

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

Official:



MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
06258

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PAGE NO	PARAGRAPH	FIGURE NO	TABLE NO	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
3		2		Item 10. Change illustration. Reason: Tube end shown assembled on wrong side of lever cam.
109		51		Item 3. The NSN and P/N are not listed on the AMDF nor the MCRL. Request correct NSN and P/N be furnished.
2-8			2-1	Preventive Maintenance Checks and Services. Item 7 under "Items to be inspected" should be changed to read as follows: Firing linkage and firing mechanism pawl.
12	1-6a			Since there are both 20- and 30- round magazines for this rifle, data on both should be listed.

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THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 Lb.
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches
1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

CUBIC MEASURE

1 Cu. Centimerter = 1000 Cu. Millimeters = 0.06 Cu. Inches
1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

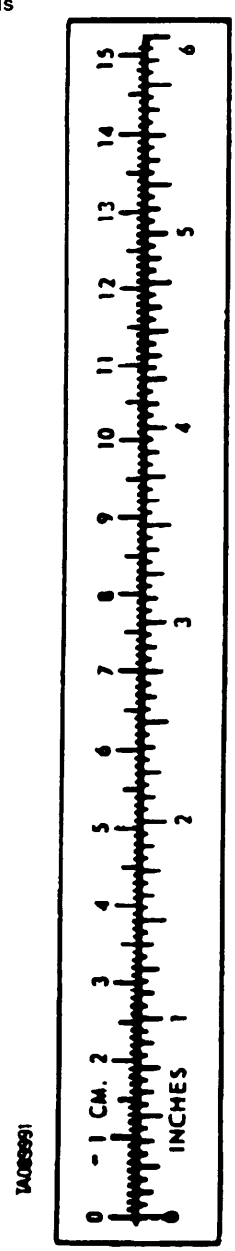
TEMPERATURE

s/s (°F — 32) = °C
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
s/s (°C + 32) = °F

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Squre 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	1.195
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621



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